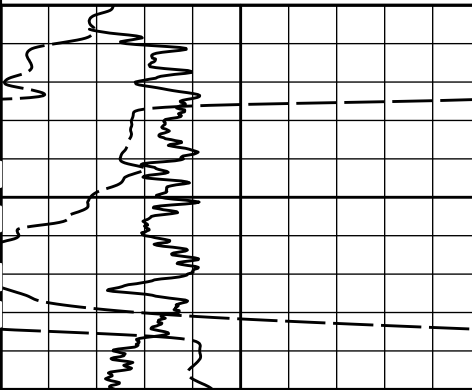
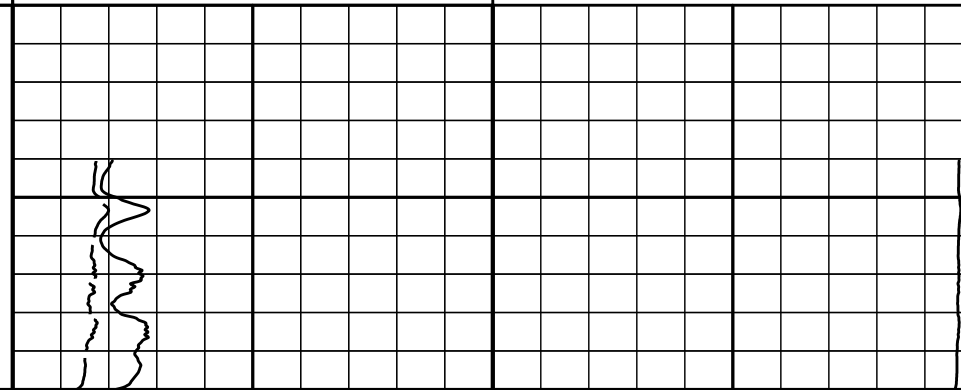


HALLIBURTON										ARRAY COMPENSATED TRUE RESISTIVITY LOG									
COMPANY					CMX, INC					COMPANY					CMX, INC				
WELL					BLACK WIDOW OWWO 1-29					WELL					BLACK WIDOW OWWO 1-29				
FIELD/BLOCK					HARDING					FIELD/BLOCK					HARDING				
COUNTY					PRATT					COUNTY					PRATT				
STATE					KANSAS					STATE					KANSAS				
Permanent Datum					GL					API No. 15-151-20320-00					Other Services:				
Log measured from					KB					Location NW NW SW 2310' FSL & 330' FWL					GTET				
Drilling measured from					KB										DSNT				
Date					19-Oct-17										SDLT				
Run No.					ONE										BSAT				
Depth - Driller					4748.0 ft										ACRT				
Depth - Logger					4738.0 ft														
Bottom - Logged Interval					4730.0 ft														
Top - Logged Interval					353.0 ft														
Casing - Driller					8.625 in @ 350.0 ft										@				
Casing - Logger					353.0 ft														
Bit Size					7.875 in										@				
Type Fluid in Hole					Water Based Mud														
Density					8.5 ppg					66.00 s/qt									
PH					9.50 pH					1.5 cpm									
Source of Sample					FLOWLINE														
Rm @ Meas. Temperature					0.55 ohmm @ 75.00 degF										@				
Rmf @ Meas. Temperature					0.63 ohmm @ 75.00 degF										@				
Rmc @ Meas. Temperature					0.47 ohmm @ 75.00 degF										@				
Source Rmf					Rmc					MEAS					MEAS				
Rm @ BHT					0.21 ohmm @ 120.0 degF										@				
Time Since Circulation					03:37 hr														
Time on Bottom					19-Oct-17 00:37														
Max. Rec. Temperature					120.00 degF @ 4736.0 ft										@				
Equipment					Location					12156883					EL RENO, OK				
Recorded By					MICHAEL RICHTER														
Witnessed By					LEAH KASTEN														

Fold here

Service Ticket No.: 904369081						API No.: 15-151-20320-00						PGM Version: WL INSITE R5.0.5 (Build 8)							
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		NONE		CENT		N/A			
Rmc @ Meas. Temp.			@			@				I-11055059									
Source Rmf	Rmc								S-11038385										
Rm @ BHT			@			@													
Rmf @ BHT			@			@													
Rmc @ BHT			@			@													
EQUIPMENT DATA																			
GAMMA				ACOUSTIC				DENSITY				NEUTRON							
Run No.		ONE		Run No.		ONE		Run No.		ONE		Run No.		ONE					
Serial No.		11021139		Serial No.		10939049		Serial No.		10865881		Serial No.		11019641					
Model No.		GTET		Model No.		BSAT		Model No.		SDLT		Model No.		DSNT					
Diameter		3.625"		No. of Cent.		2		Diameter		6.0"		Diameter		3.625"					
Detector Model No.		GTET		Spacing		0.5"		Log Type		GAM-GAM		Log Type		NEU-NEU					
Type		SCINT						Source Type		Cs-137		Source Type		Am241Be					
Length		8"		LSA [Y/N]				Serial No.		5155GW		Serial No.		DSN-436					
Distance to Source		N/A		FWDA [Y/N]				Strength		1.5 Ci		Strength		15 Ci					
LOGGING DATA																			
GENERAL				GAMMA		ACOUSTIC				DENSITY				NEUTRON					
Run	Depth		Speed	Scale		Scale		Matrix	Scale		Matrix	Scale		Matrix					
No.	From	To	ft/min	L	R	L	R		L	R		L	R						
ONE	TD	CSG	RED	0	150	30	-10	47.6 us/ft	30	-10	2.71 g/cc	30	-10	LIME					

DIRECTIONAL INFORMATION														
Maximum Deviation @									KOP @					
CLIENT REPORTED VERTICAL WELL														
Remarks: GTET-DSNT-SDLT RUN IN COMBINTION														
GTET-BSAT-ACRT RUN IN COMBINATION														
ANNULAR HOLE VOLUME CALCULATED FOR 5.5 INCH CASING														
DETAILED SECTION LOGGED UP TO 1.950 FT AS PER CLIENT REQUEST														
CHLORDES REPORTED AT 8500 PPM														
NO POST-CALS COMPLETED AS PER CLIENT REQUEST														
RIG: DUKE DRILLING RIG #4														
CREW: K. FITZPATRICK, R. BLANKENSHIP														
THANK YOU FOR CHOOSING HALLIBURTON ENERGY SERVICES -- EL RENO, OK -- 405.298.9685														
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: 19-Oct-17 07:22:17 Plot Range: 0 ft to 100 ft Data: {ActiveWell}\Well Based\DAQ Current\ Plot File: \\-LOCAL-ICMX_BLACK WIDOW\0002 GTET-BSAT-ACRTIACRTIACRT_2_main			
2 INCH MAIN LOG						
		1 : 600 ft	400 90in Conductivity 2ft Res		0	
			mmho per metre			
SP -]20[+			0 90in Resistivity 2ft Res 100			
Gamma API 150			ohm-metre			
api			0 20in Resistivity 2ft Res 100			
			ohm-metre			
						
0 Gamma API 150		1 : 600 ft	0 20in Resistivity 2ft Res 100			
api			ohm-metre			
SP -]20[+			0 90in Resistivity 2ft Res 100			
			ohm-metre			
			400 90in Conductivity 2ft Res		0	
			mmho per metre			
HALLIBURTON			Plot Time: 19-Oct-17 07:22:19 Plot Range: 0 ft to 100 ft Data: {ActiveWell}\Well Based\DAQ Current\ Plot File: \\-LOCAL-ICMX_BLACK WIDOW\0002 GTET-BSAT-ACRTIACRTIACRT_2_main			

2 INCH MAIN LOG

HALLIBURTON

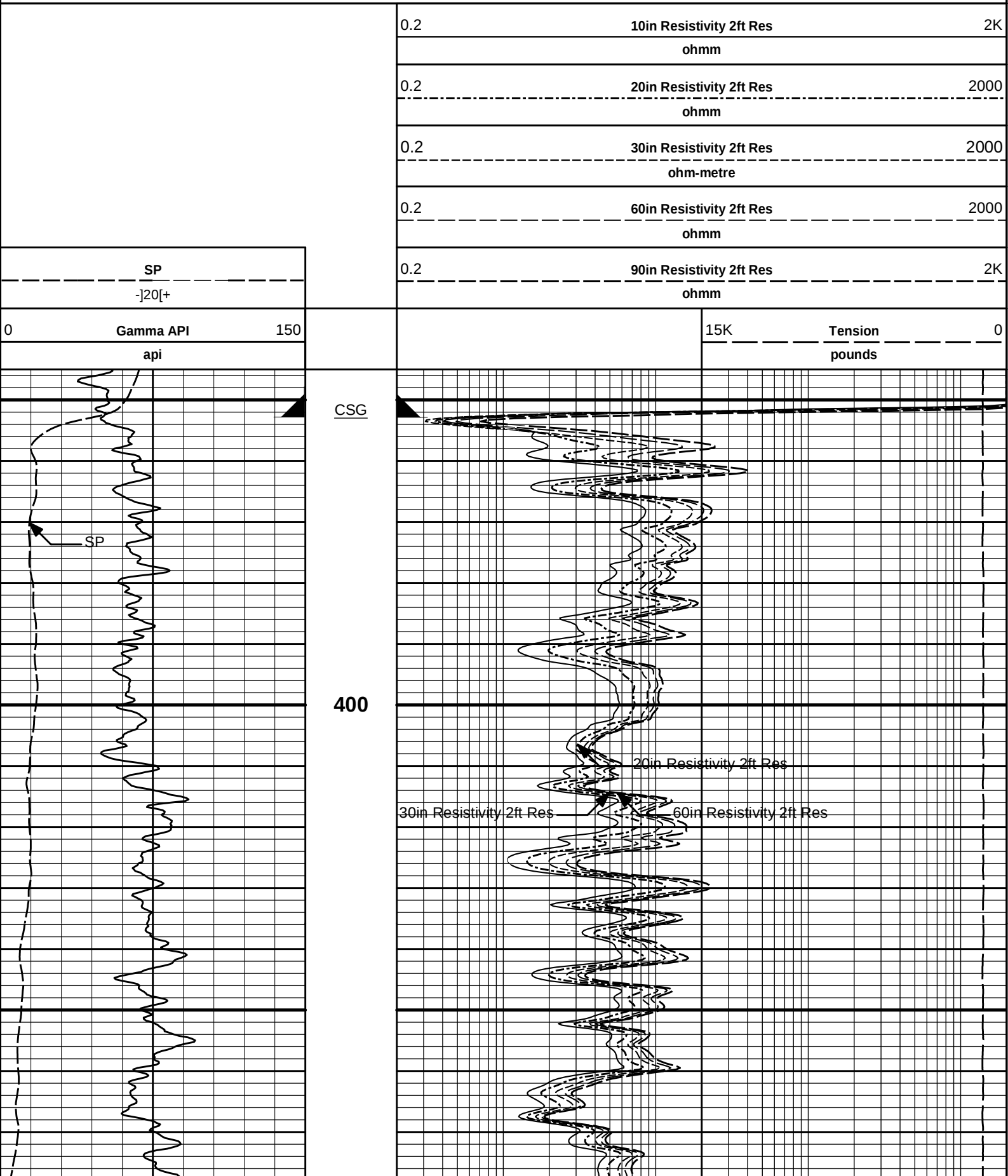
Plot Time: 19-Oct-17 07:22:19

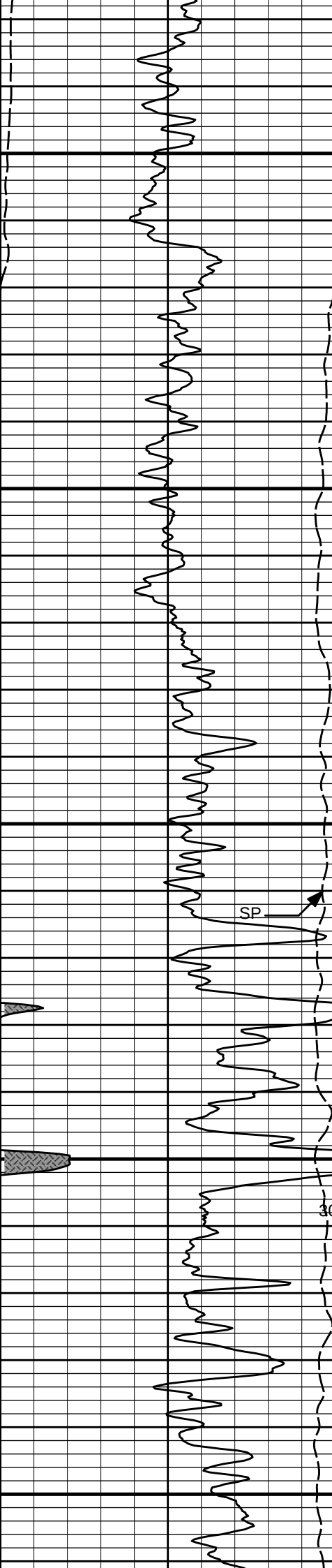
Plot Range: 345 ft to 4739.33 ft

Data: CMX_BLACK WIDOW\Well Based\RUN 2 MAIN\

Plot File: \\-LOCAL-\\CMX_BLACK WIDOW\\0002 GTET-BSAT-ACRT\\ACRT\\ACRT_5inch_main

5 INCH MAIN LOG





500

600

700

10in Resistivity 2ft Res

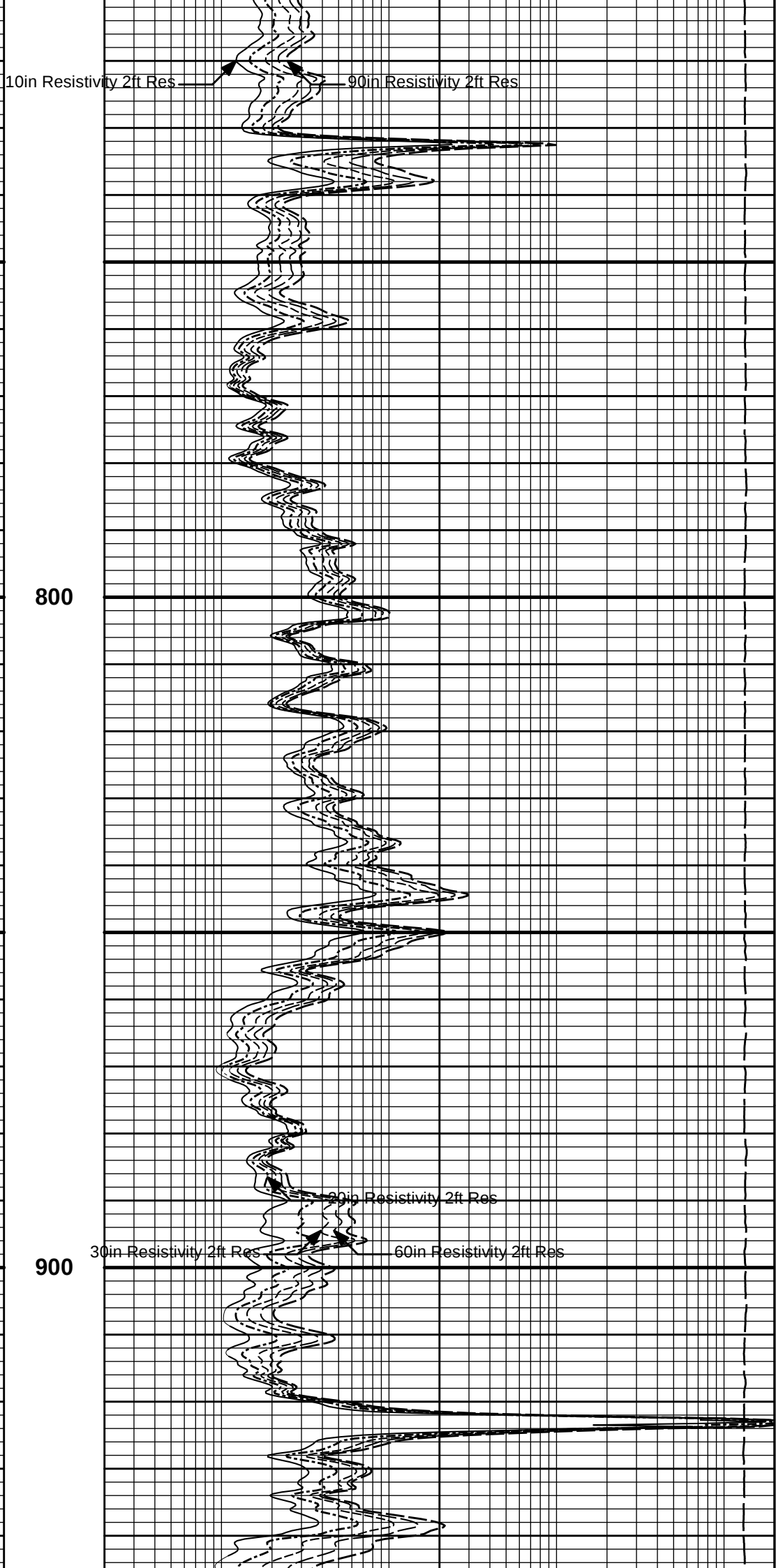
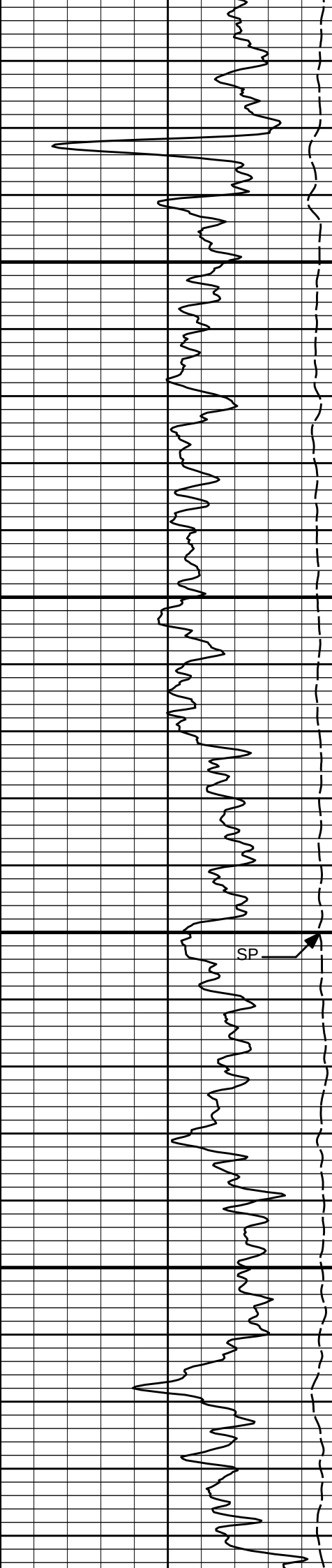
90in Resistivity 2ft Res

SP

30in Resistivity 2ft Res

20in Resistivity 2ft Res

60in Resistivity 2ft Res





1000

1100

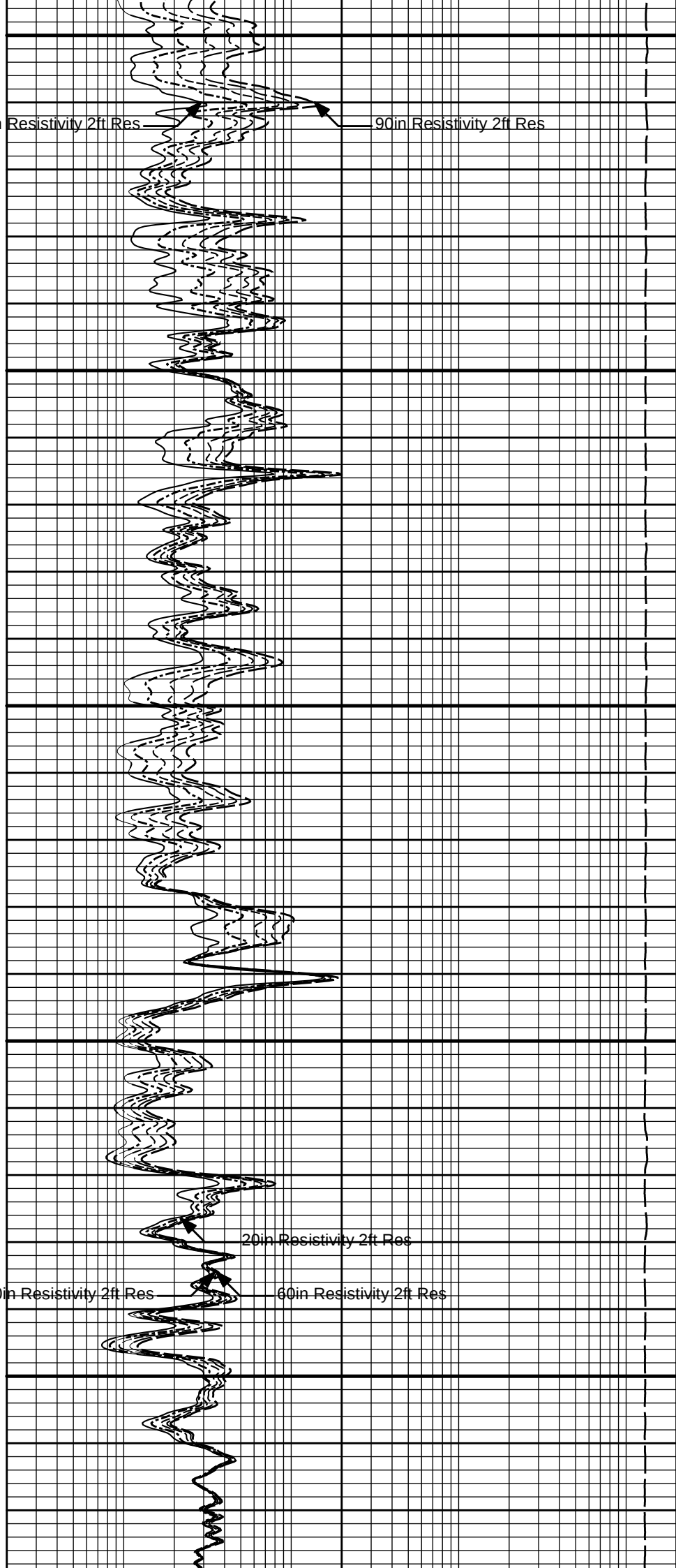
10in Resistivity 2ft Res

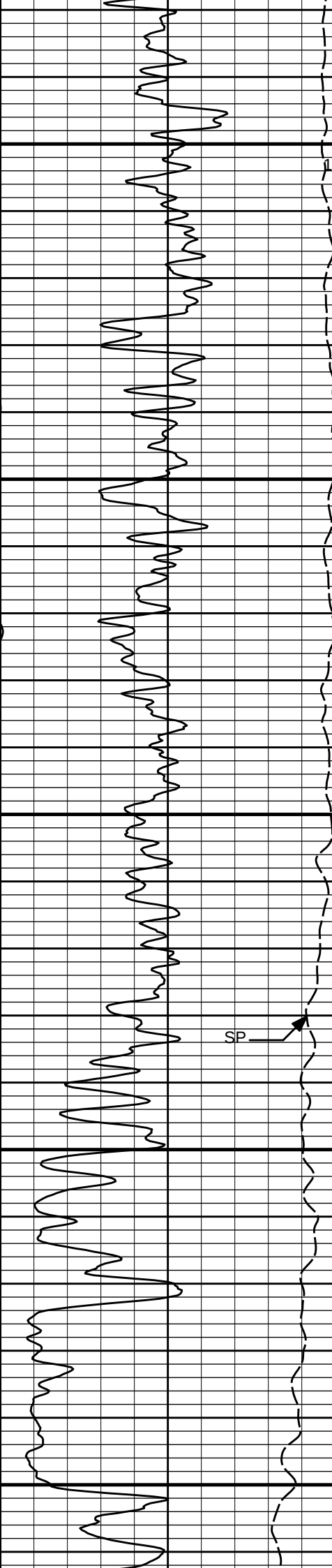
90in Resistivity 2ft Res

30in Resistivity 2ft Res

20in Resistivity 2ft Res

60in Resistivity 2ft Res





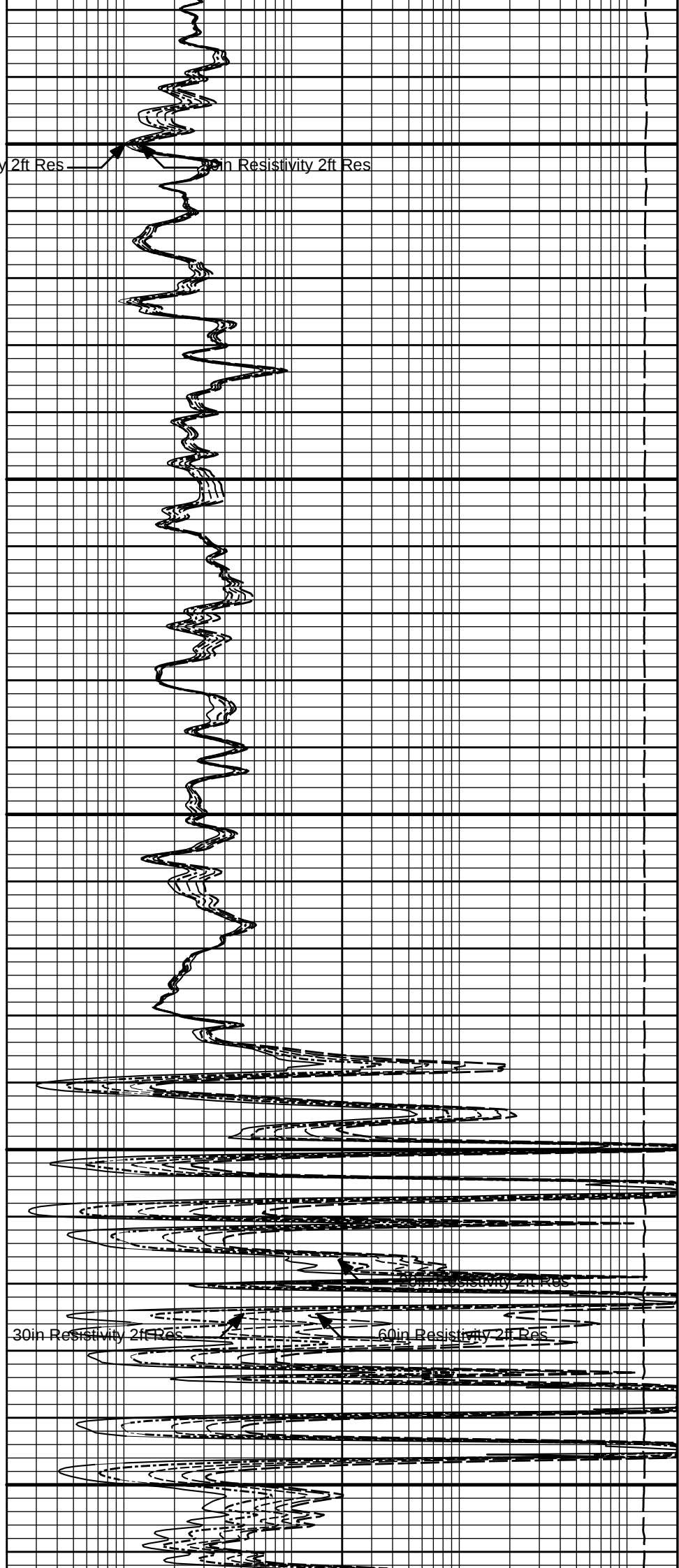
1200

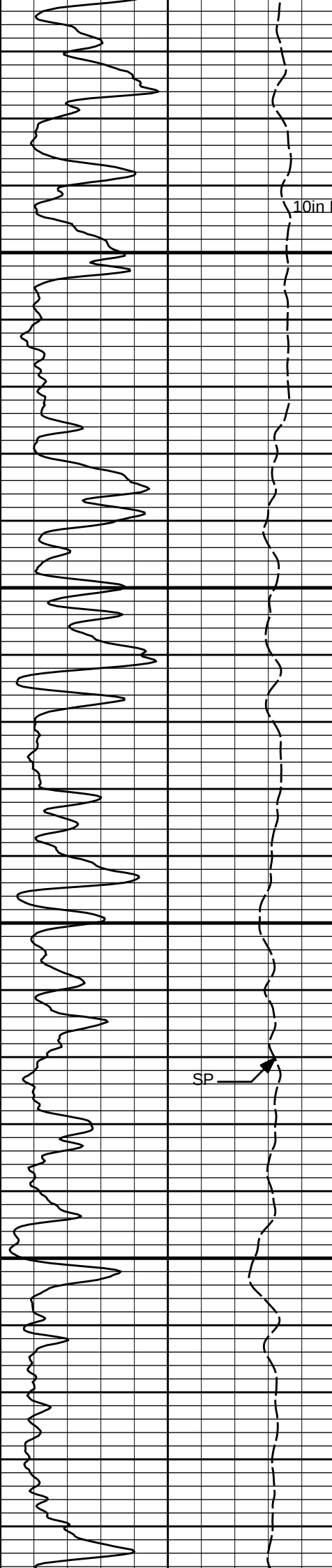
10in Resistivity 2ft Res

1300

SP

1400



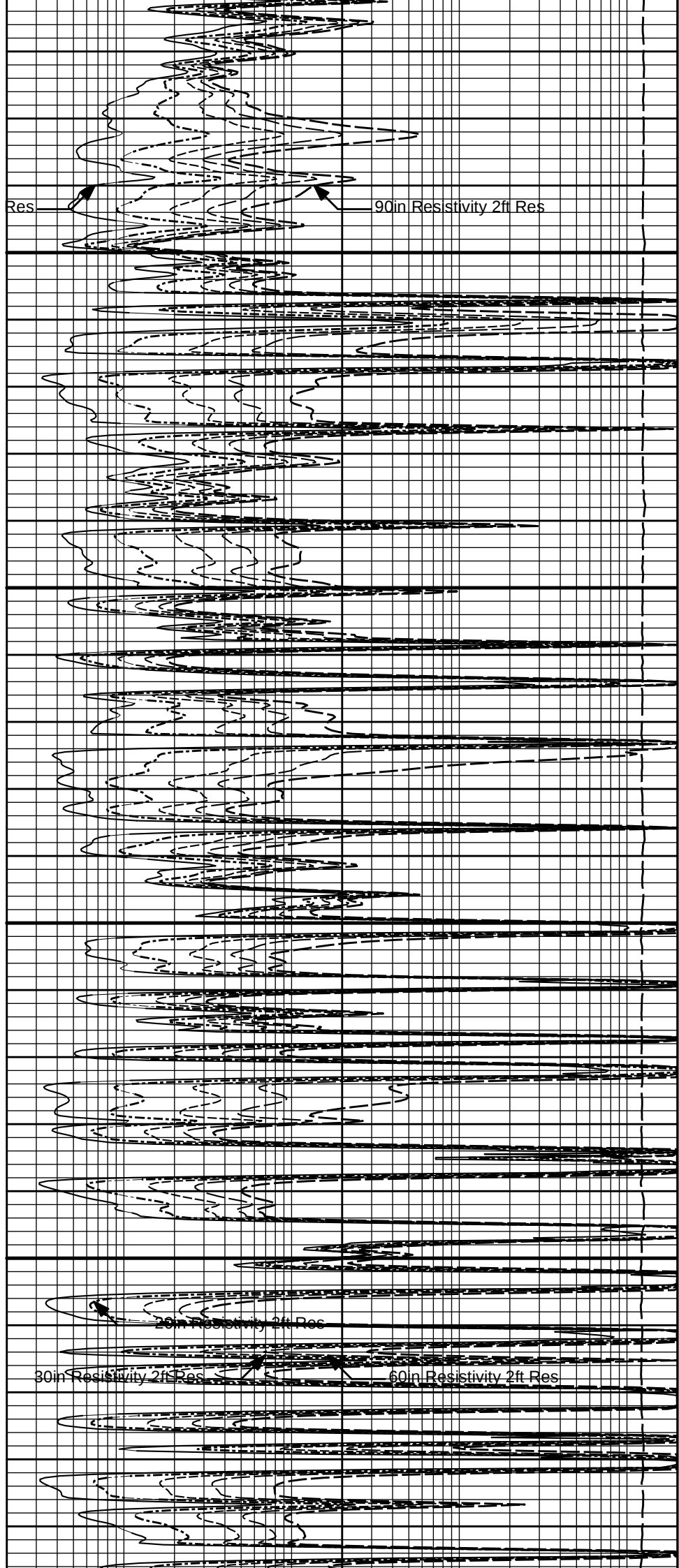


10in Resistivity 2ft Res

1500

SP

1600

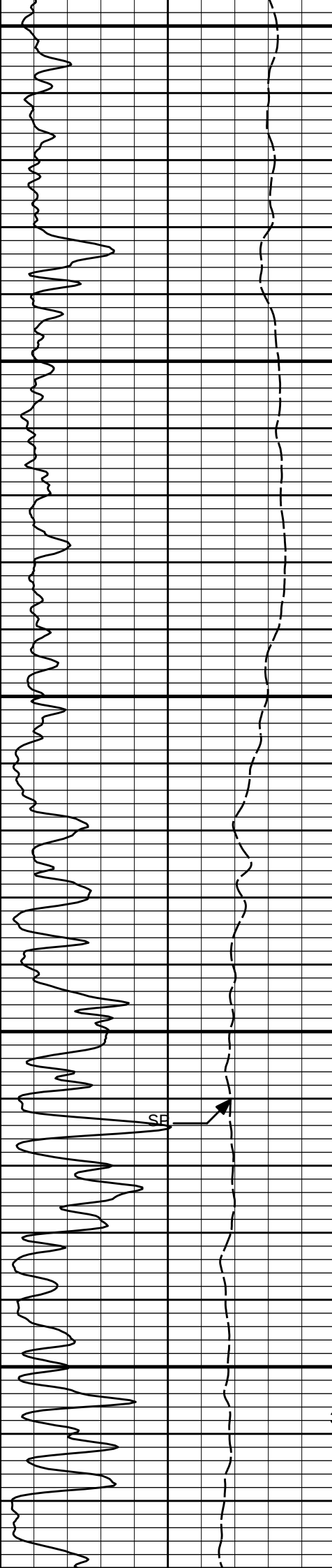


90in Resistivity 2ft Res

26in Resistivity 2ft Res

30in Resistivity 2ft Res

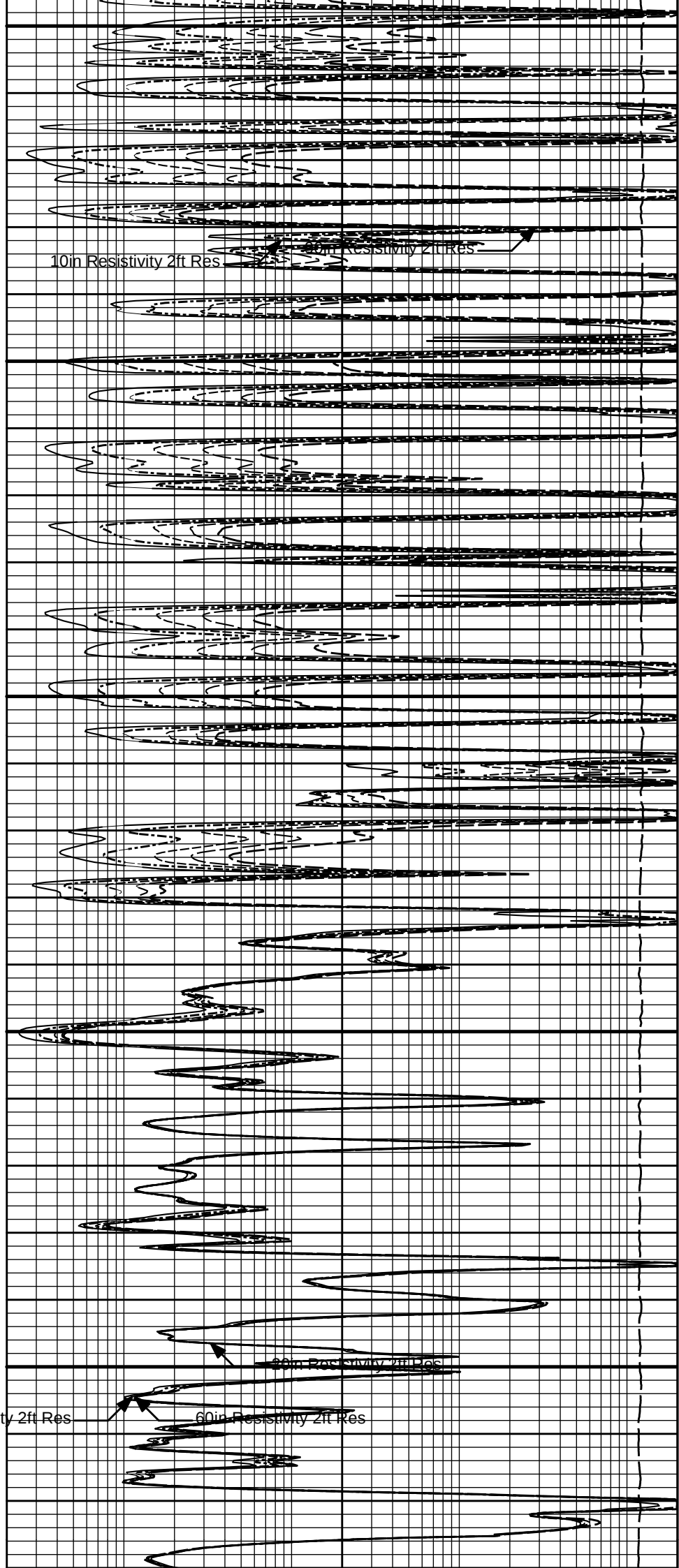
60in Resistivity 2ft Res

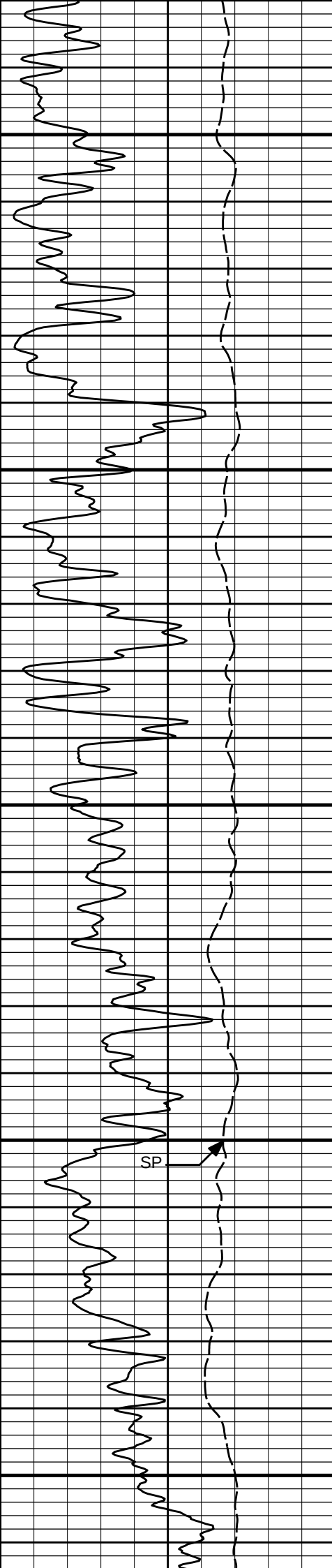


1700

1800

30in Resistivity 2ft Res



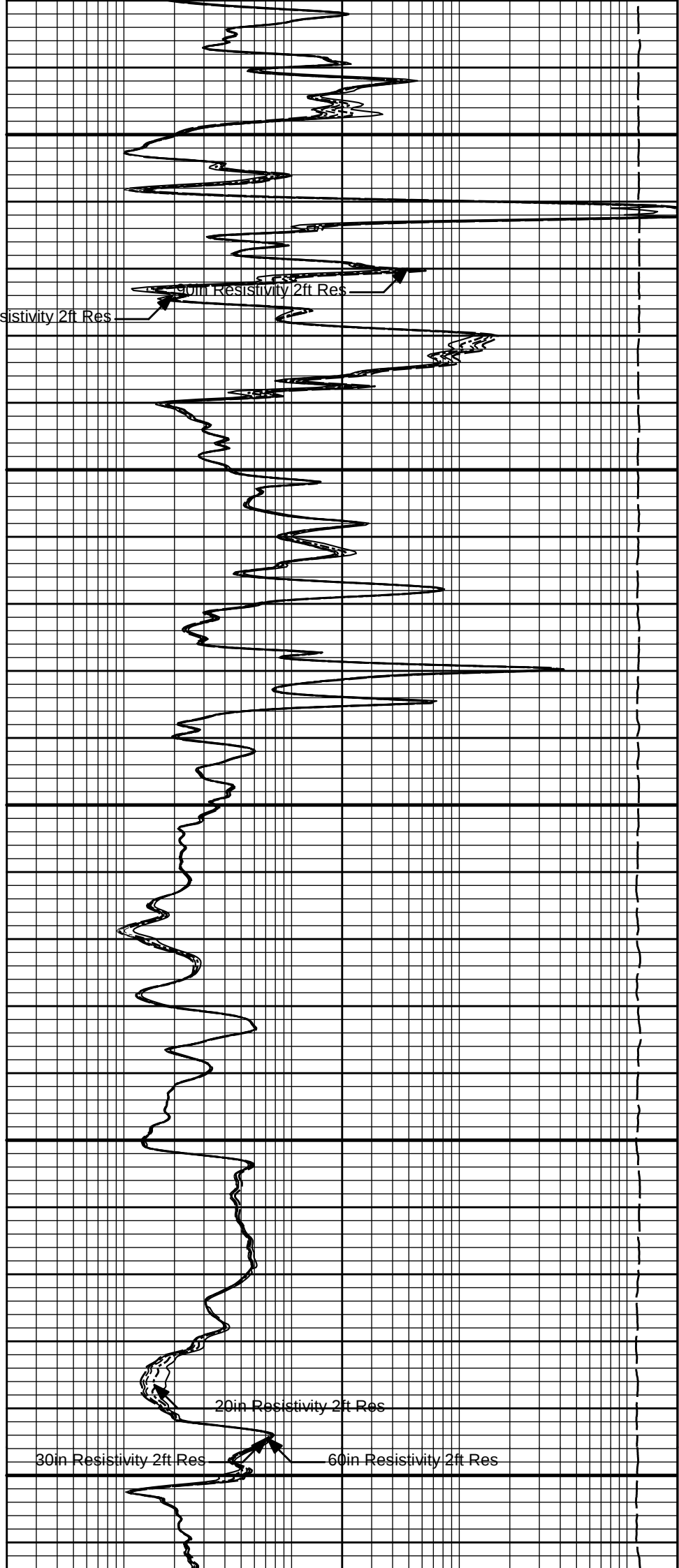


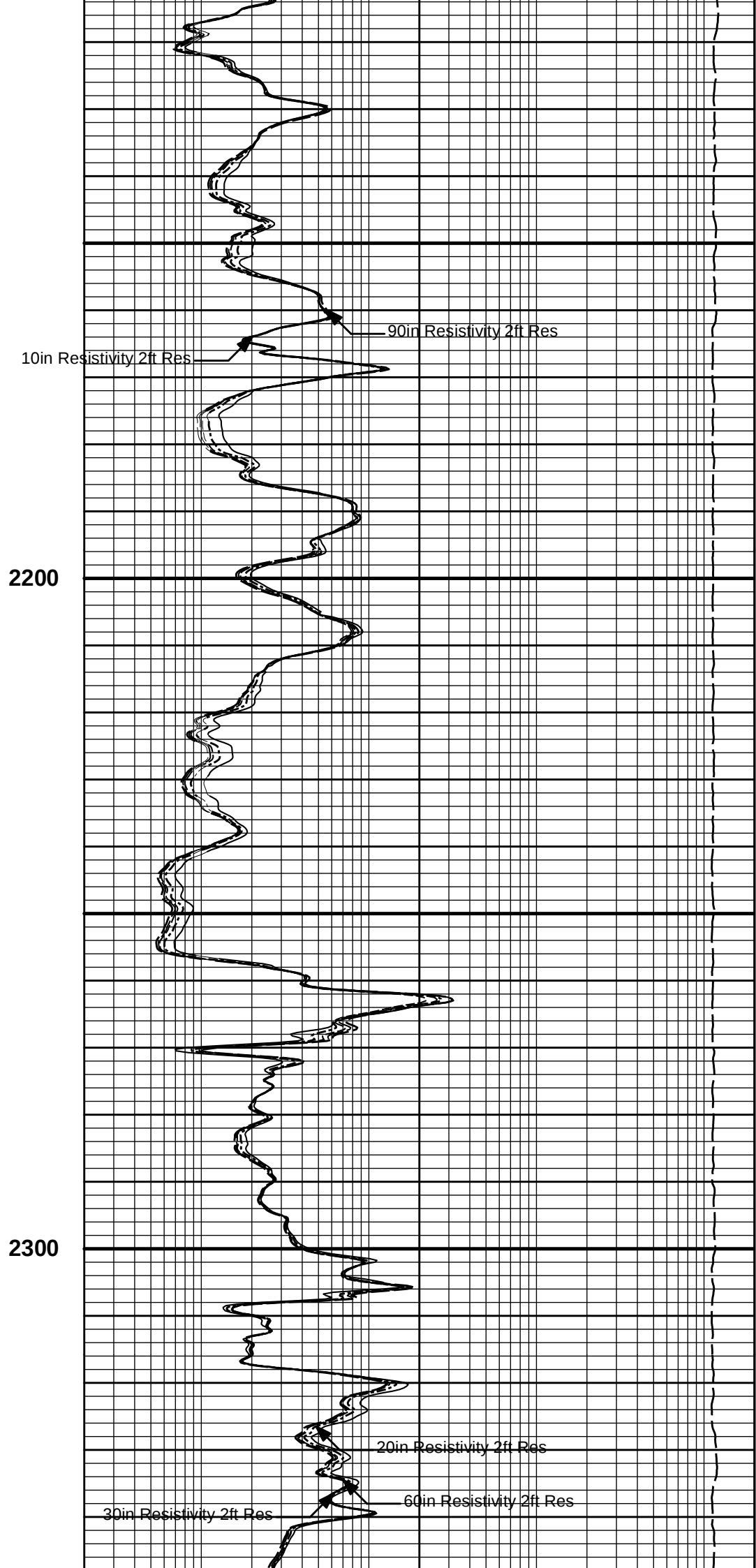
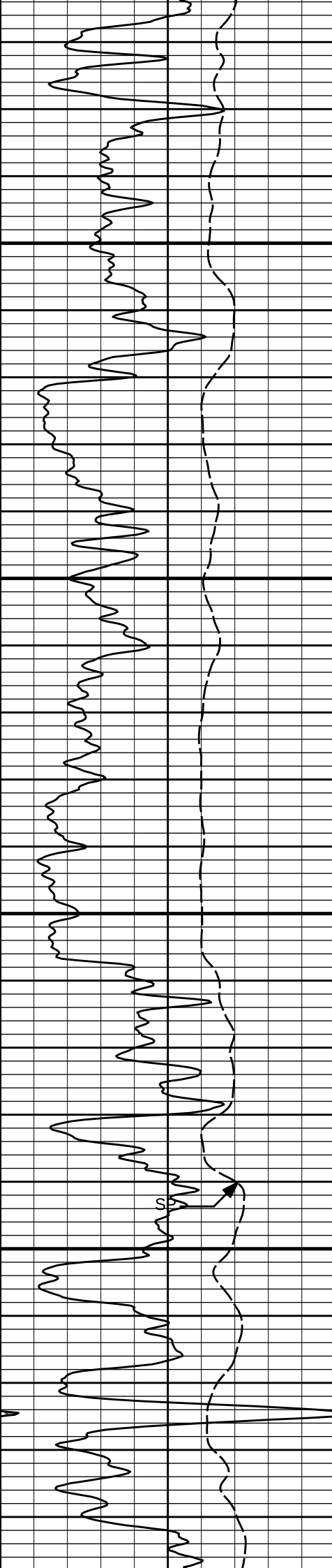
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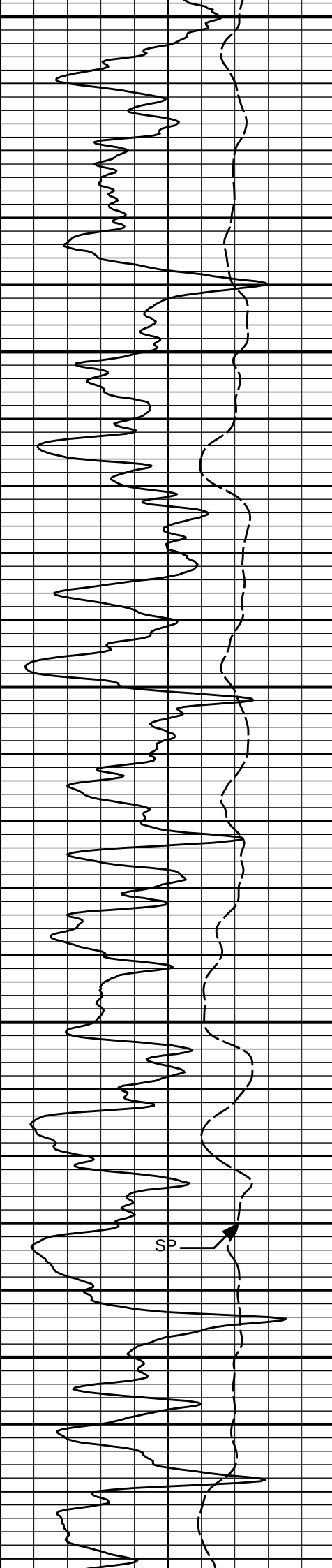
10in Resistivity 2ft Res

2000

2100

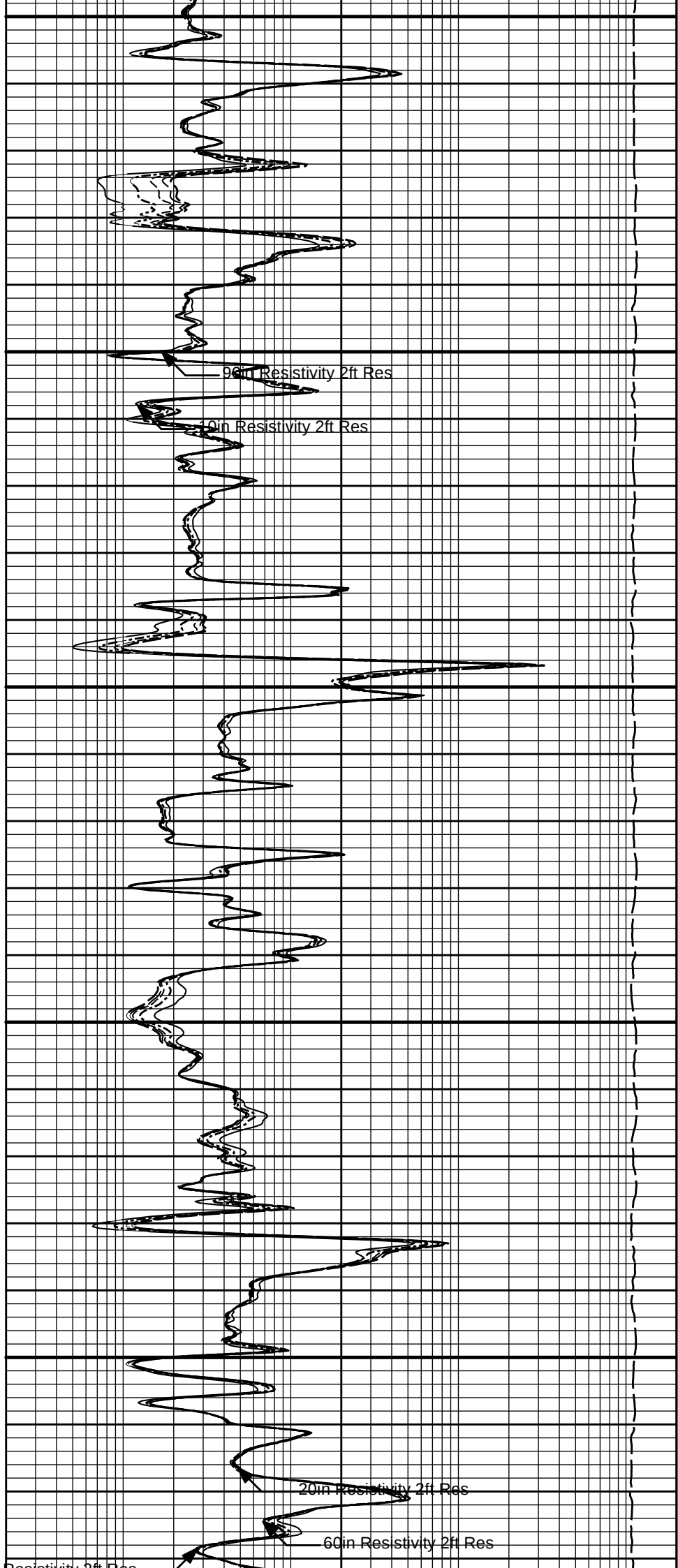


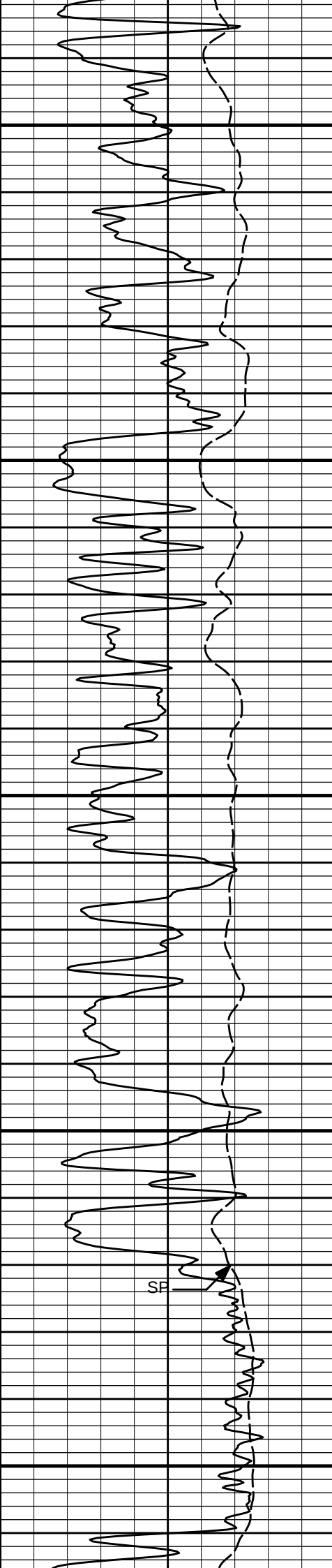




2400

2500

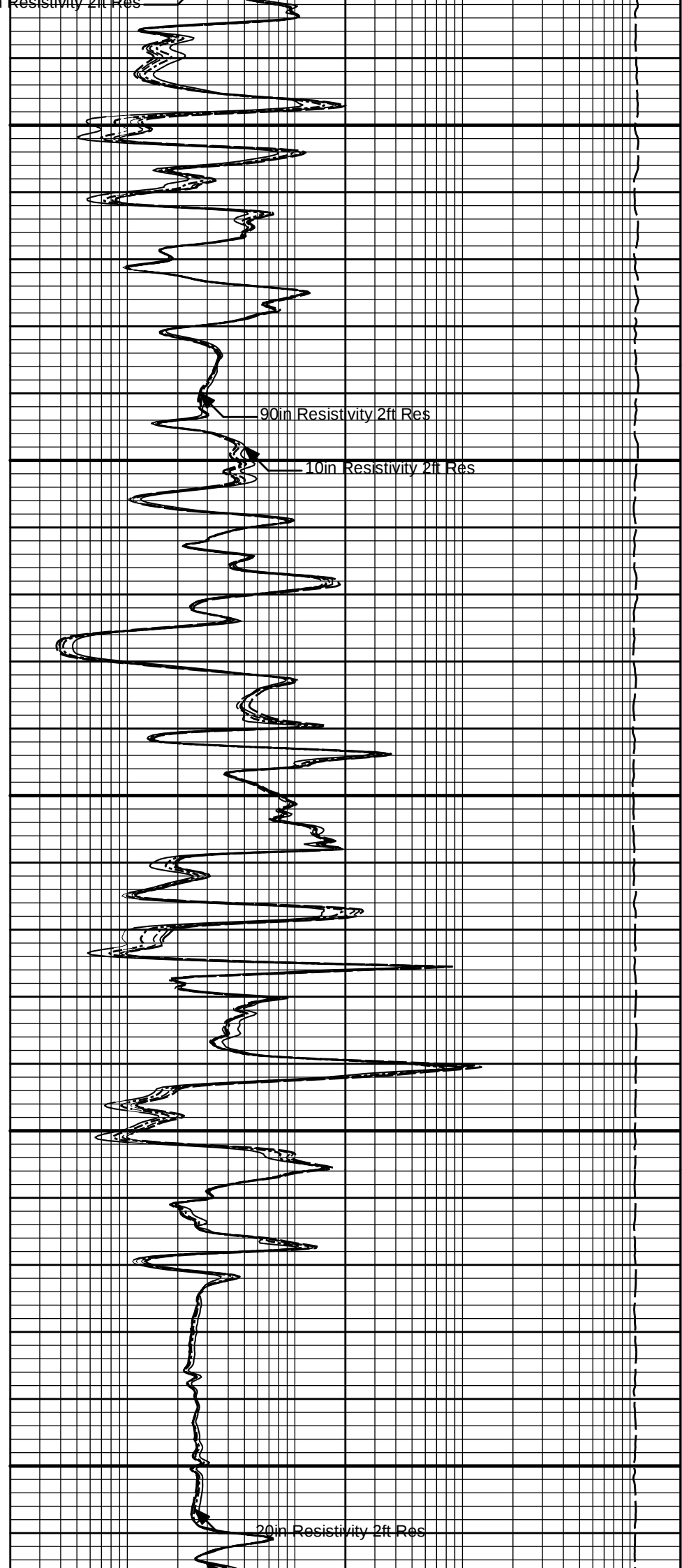




2600

2700

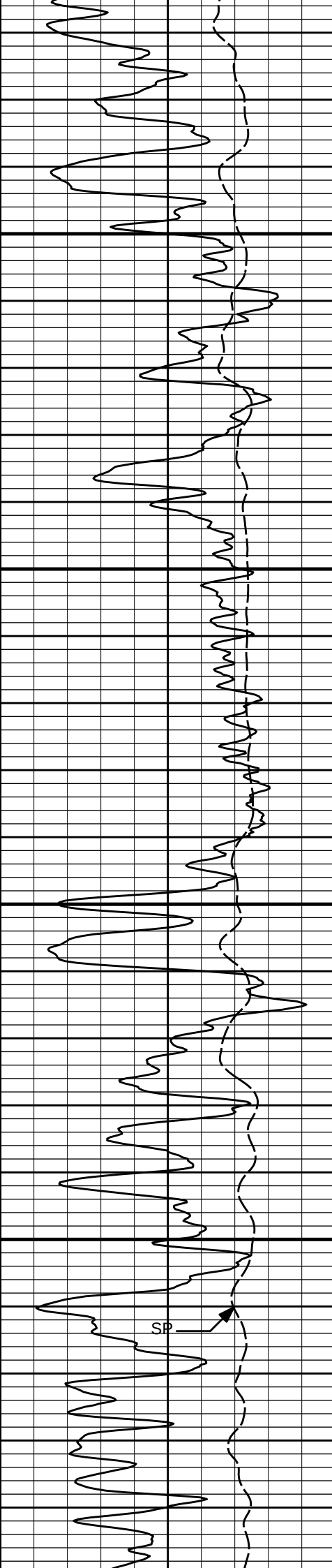
2800



90in Resistivity 2ft Res

10in Resistivity 2ft Res

20in Resistivity 2ft Res

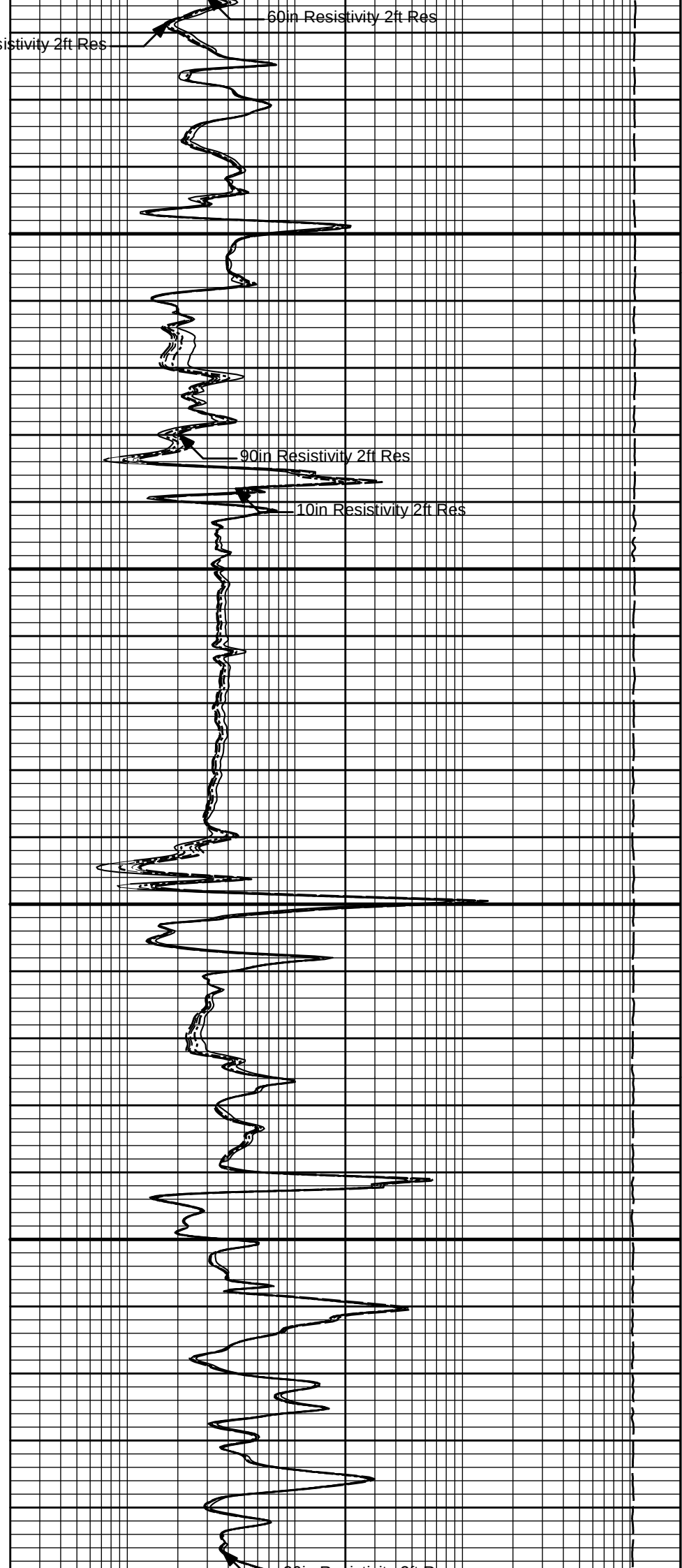


30in Resistivity 2ft Res

2900

3000

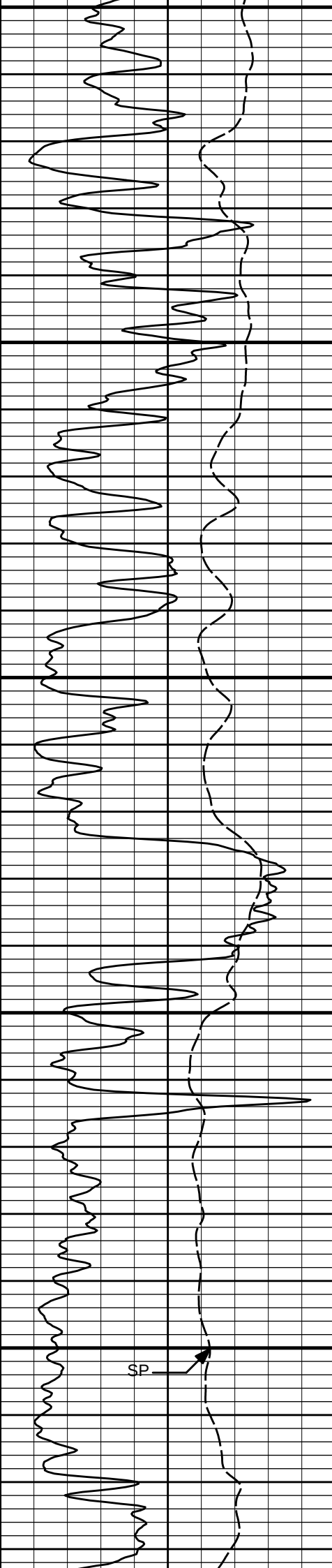
SP



60in Resistivity 2ft Res

90in Resistivity 2ft Res

10in Resistivity 2ft Res



3100

3200

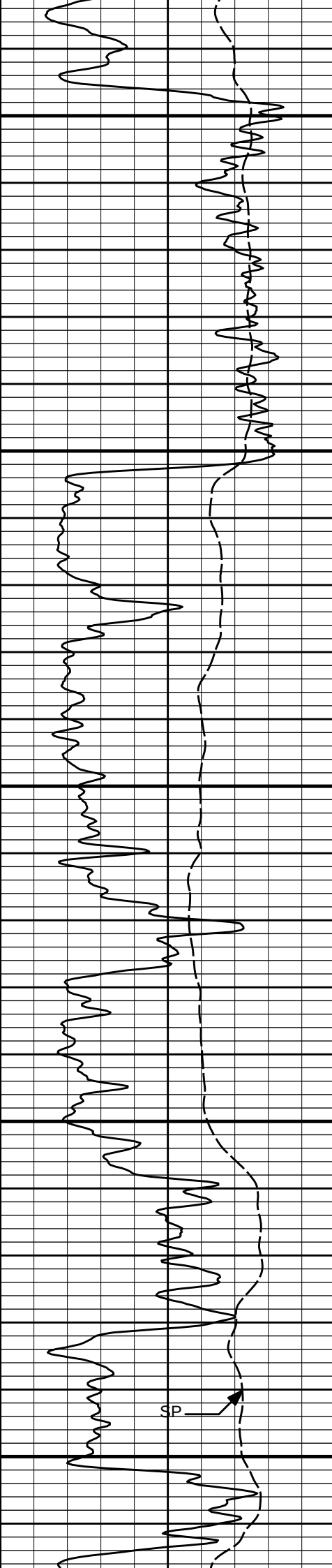
30in Resistivity 2ft Res

60in Resistivity 2ft Res

90in Resistivity 2ft Res

10in Resistivity 2ft Res

SP



3300

30in Resistivity 2ft Res

20in Resistivity 2ft Res

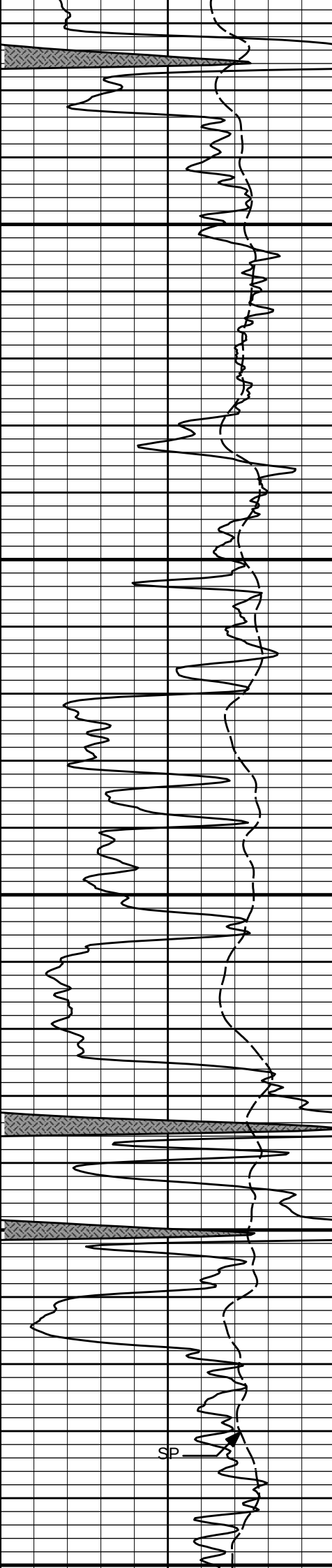
60in Resistivity 2ft Res

3400

90in Resistivity 2ft Res

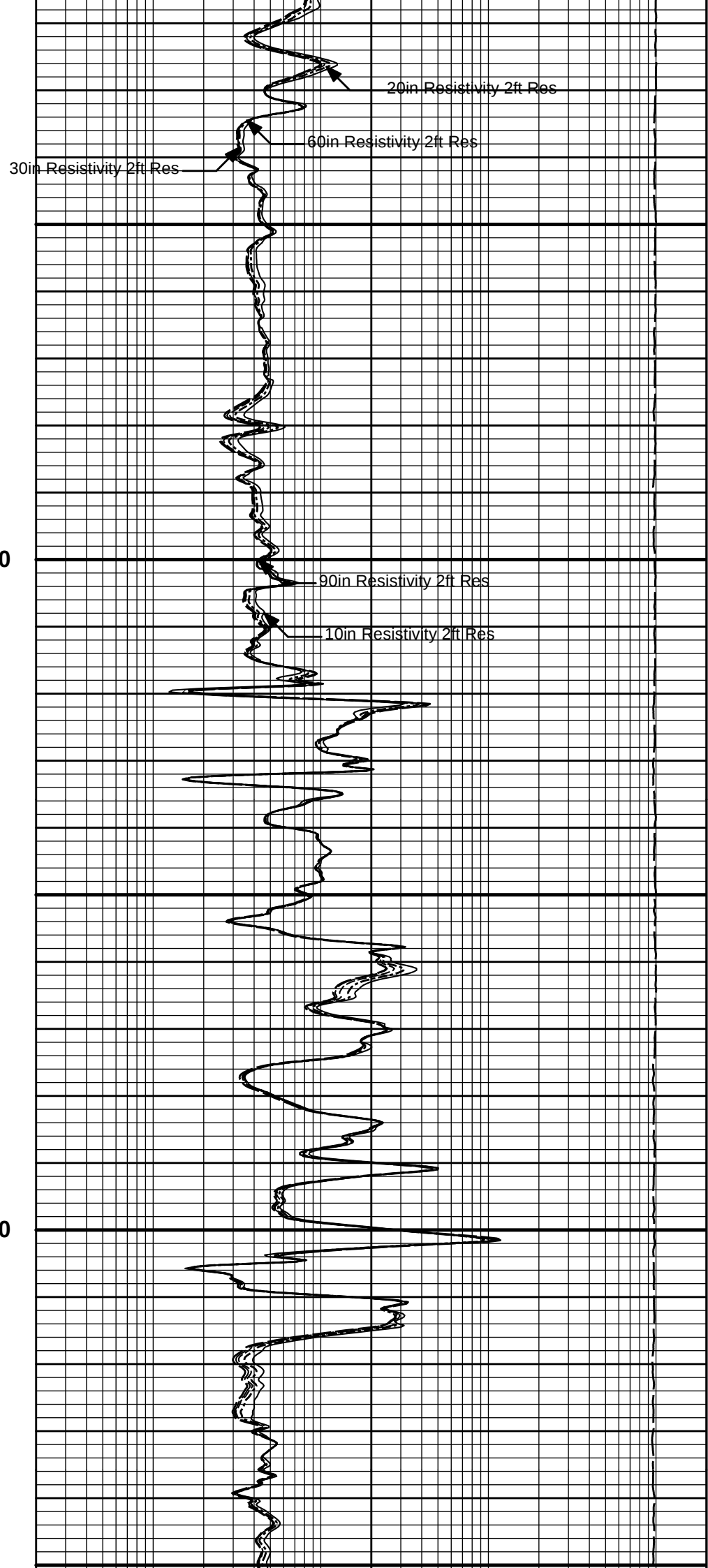
10in Resistivity 2ft Res

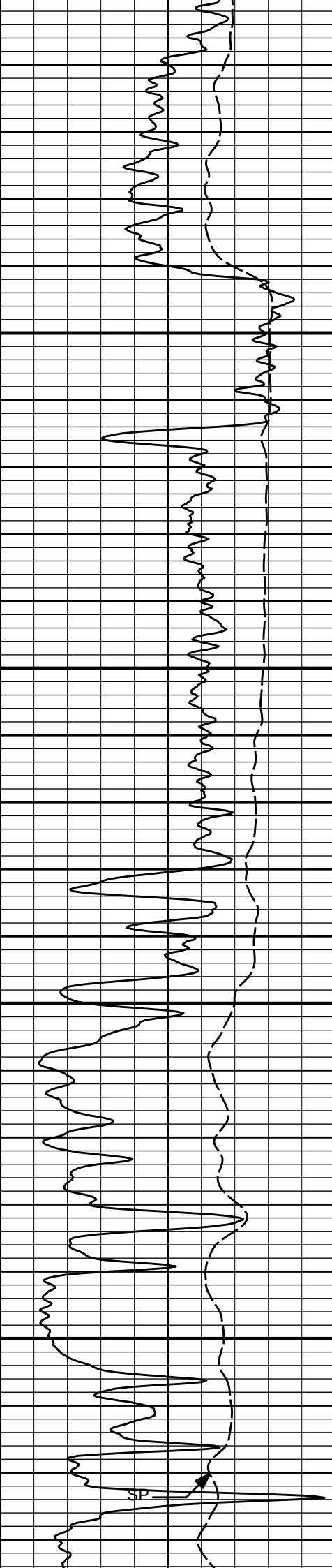
3500



3600

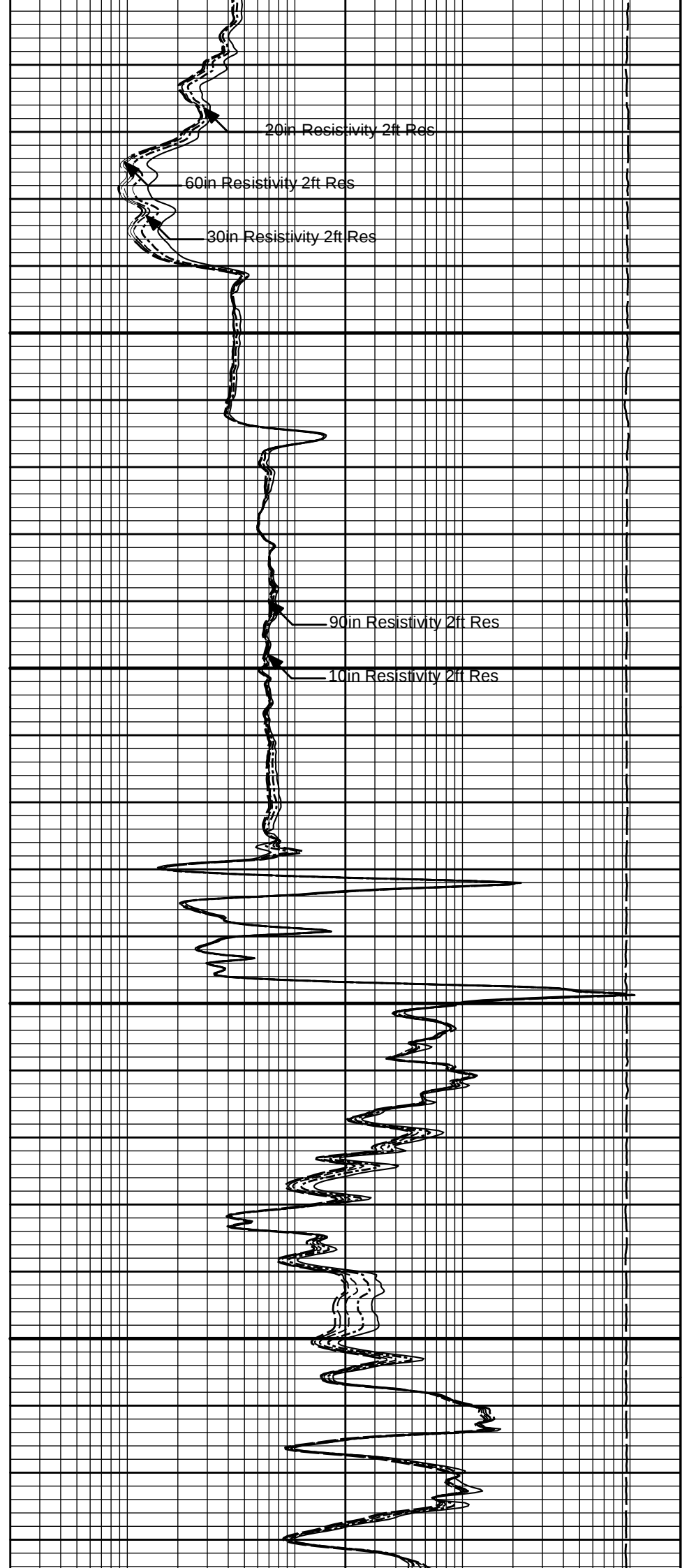
3700

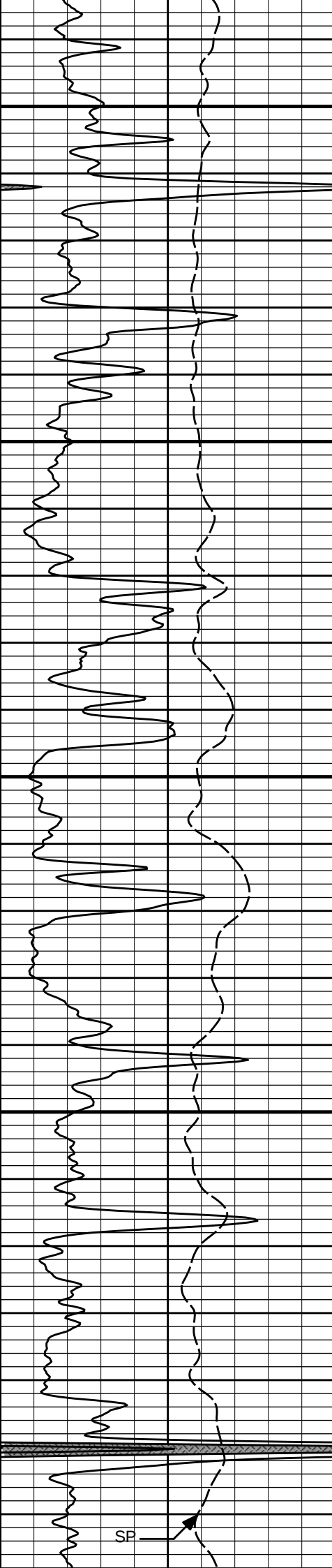




3800

3900

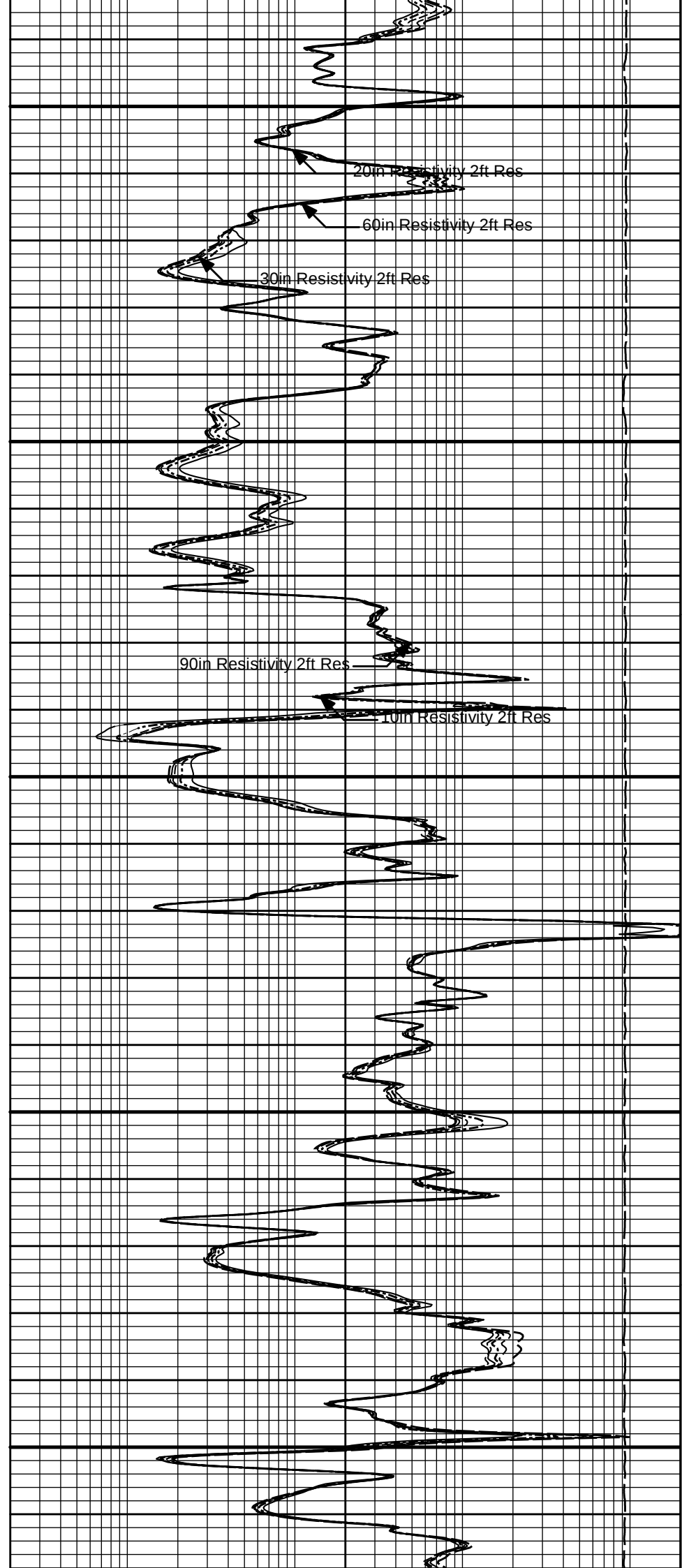


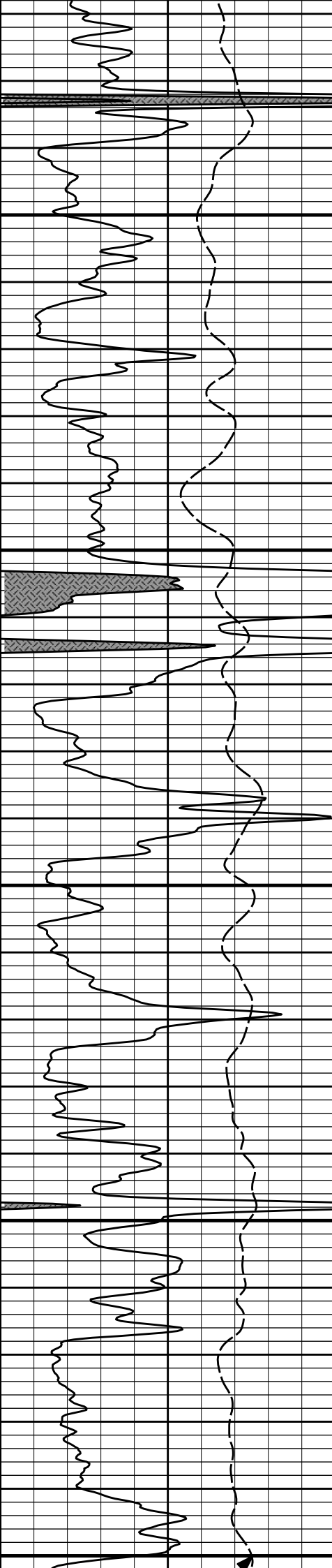


4000

4100

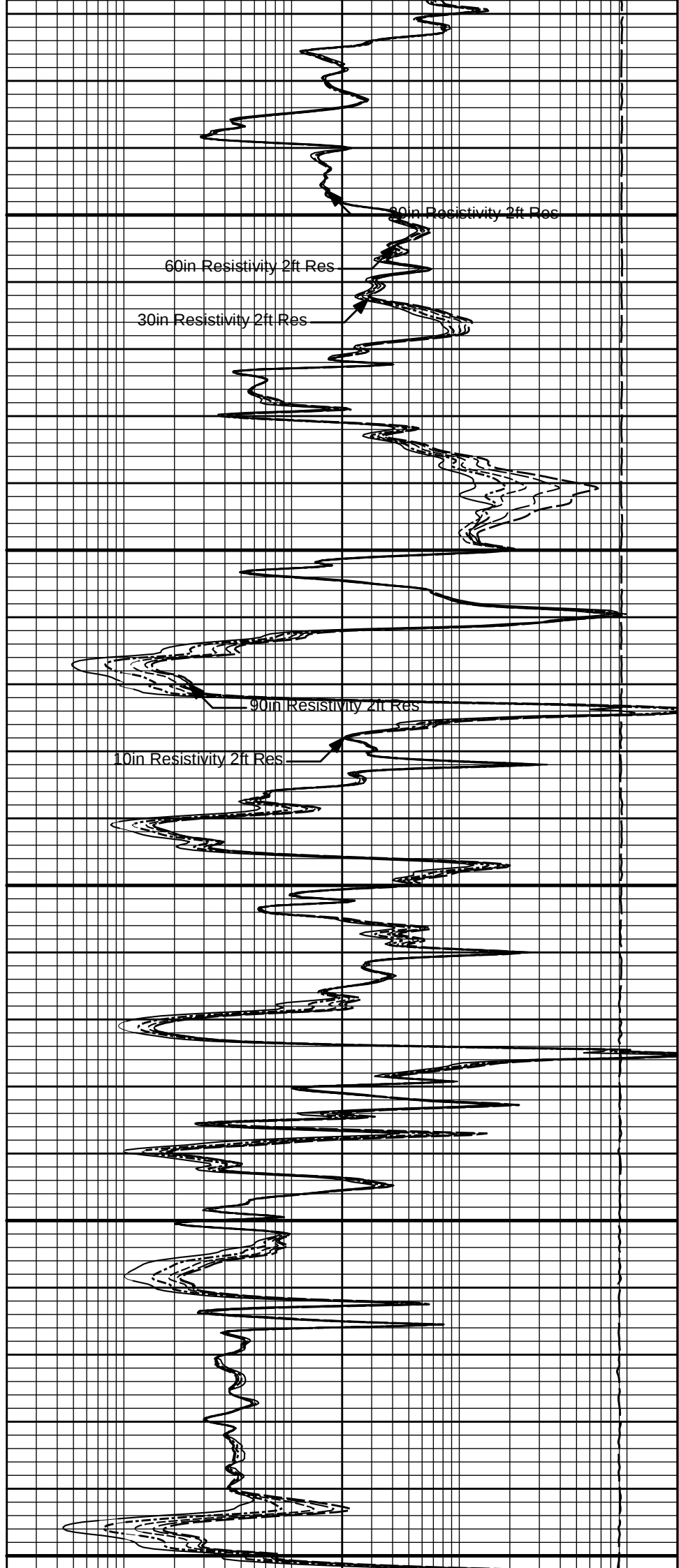
4200





4300

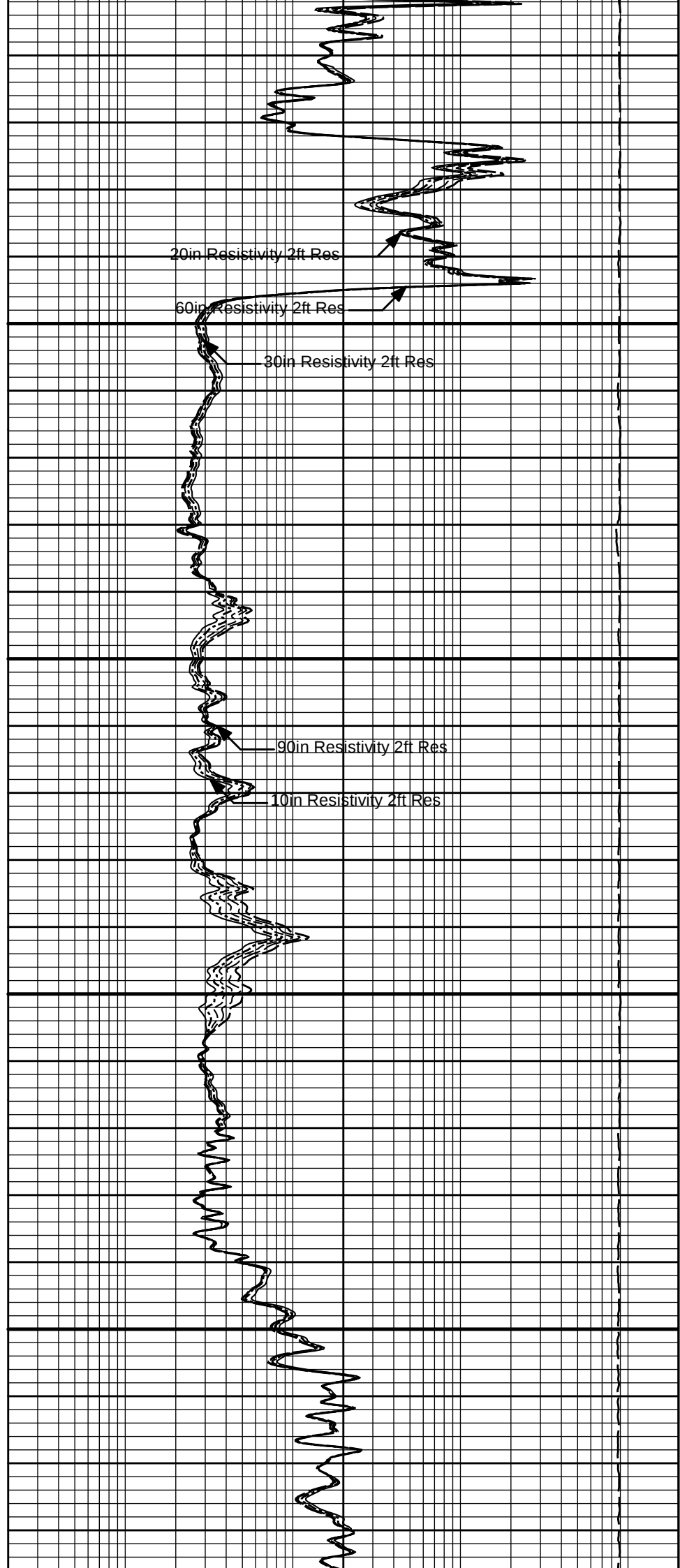
4400

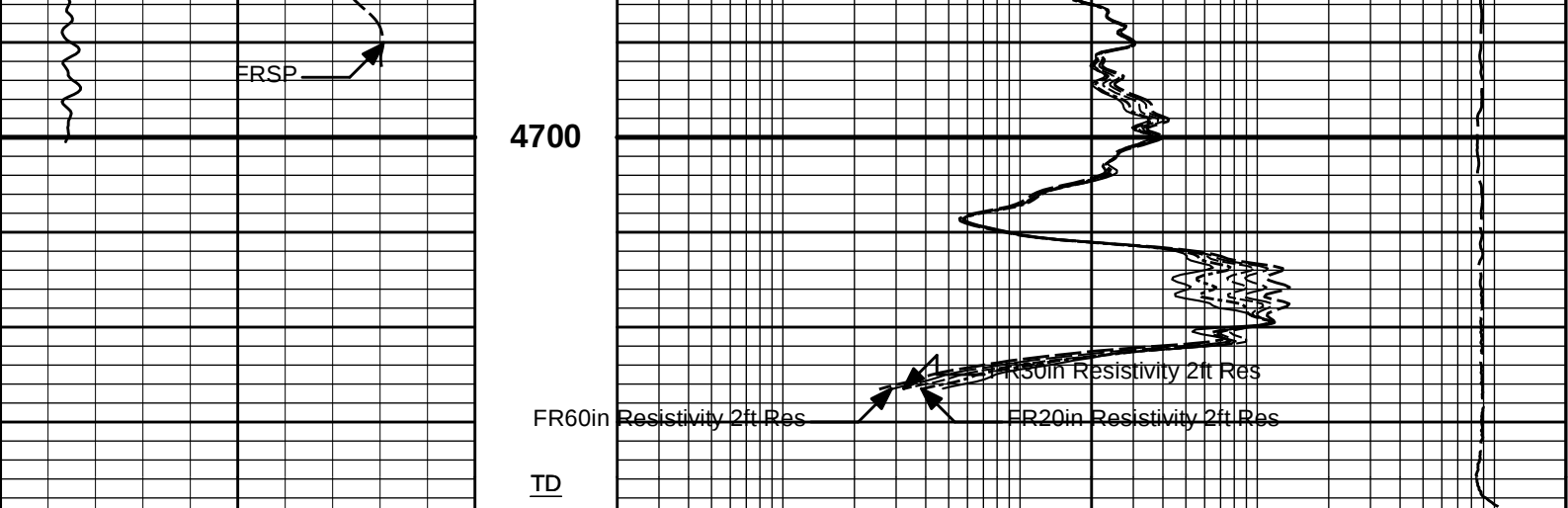




4500

4600



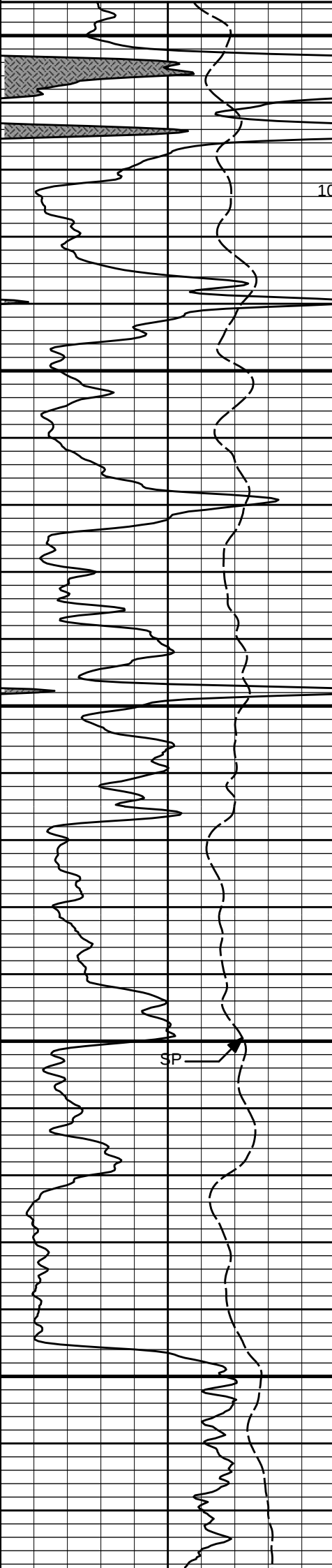


0	Gamma API	150		15K	Tension	0
	api				pounds	
	SP		0.2	90in Resistivity 2ft Res		2K
	-]20[+			ohmm		
			0.2	60in Resistivity 2ft Res		2000
				ohmm		
			0.2	30in Resistivity 2ft Res		2000
				ohm-metre		
			0.2	20in Resistivity 2ft Res		2000
				ohmm		
			0.2	10in Resistivity 2ft Res		2K
				ohmm		

HALLIBURTON	Plot Time: 19-Oct-17 07:22:25 Plot Range: 345 ft to 4739.33 ft Data: CMX_BLACK WIDOW\Well Based\RUN 2 MAIN\ Plot File: \\-LOCAL-ICMX_BLACK WIDOW\0002 GTET-BSAT-ACRTIACRTIACRT_5inch_main
5 INCH MAIN LOG	

HALLIBURTON	Plot Time: 19-Oct-17 07:22:25 Plot Range: 4295 ft to 4736.25 ft Data: CMX_BLACK WIDOW\Well Based\RUN 2 REPEAT\ Plot File: \\-LOCAL-ICMX_BLACK WIDOW\0002 GTET-BSAT-ACRTIACRTIACRT_5inch_main
5 INCH REPEAT LOG	

	0.2	10in Resistivity 2ft Res	2K
	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		
	0.2	90in Resistivity 2ft Res	2K
	ohmm		
SP			
-]20[+			
0	Gamma API	150	
api			
		15K	Tension
			pounds



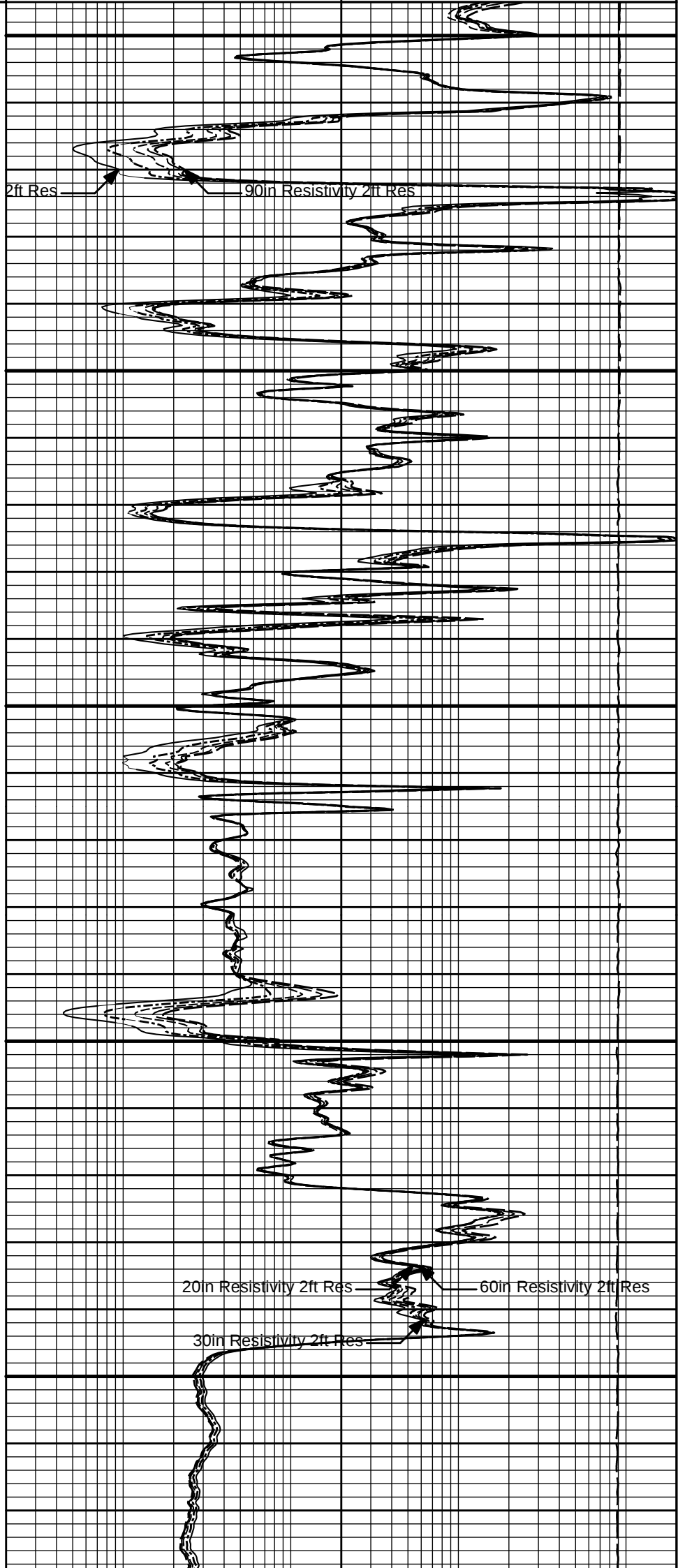
4300

10in Resistivity

2ft Res

4400

4500

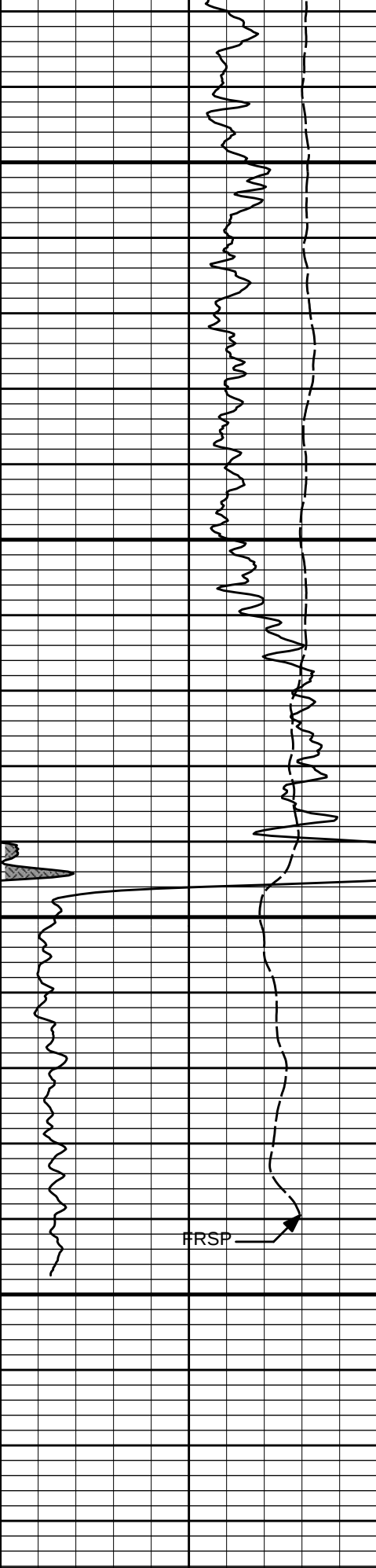


20in Resistivity 2ft Res

30in Resistivity 2ft Res

60in Resistivity 2ft Res

90in Resistivity 2ft Res

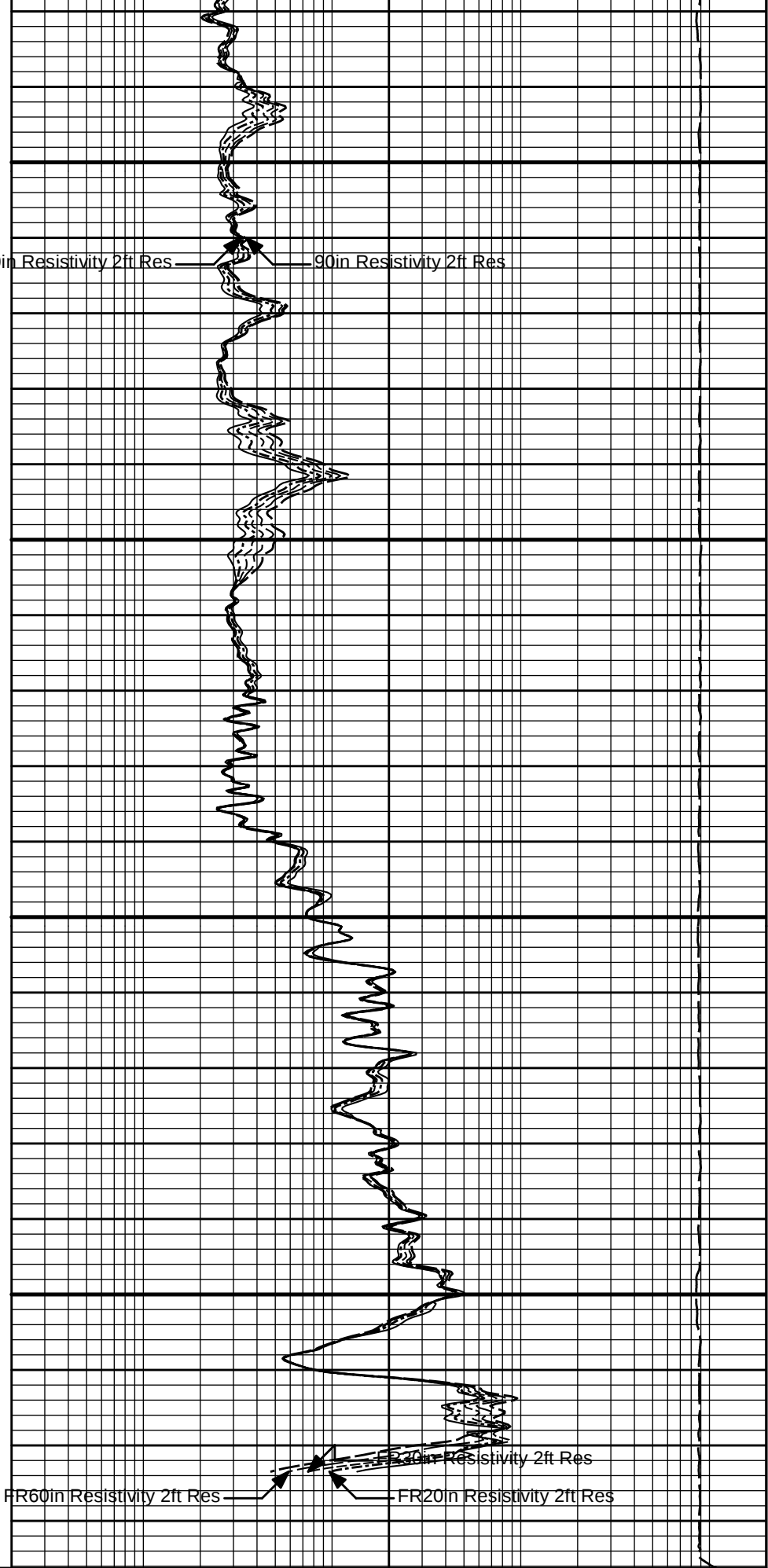


4600

4700

TD

0	Gamma API	150
	api	
	SP	
	-]20[+	



10in Resistivity 2ft Res

90in Resistivity 2ft Res

FR60in Resistivity 2ft Res

FR40in Resistivity 2ft Res

FR20in Resistivity 2ft Res

	15K	Tension	0
		pounds	
0.2	90in Resistivity 2ft Res		2K
	ohmm		
0.2	60in Resistivity 2ft Res		2000

	ohmm
	0.230in Resistivity 2ft Res2000
	ohm-metre
	0.220in Resistivity 2ft Res2000
	ohmm
	0.210in Resistivity 2ft Res2K
	ohmm

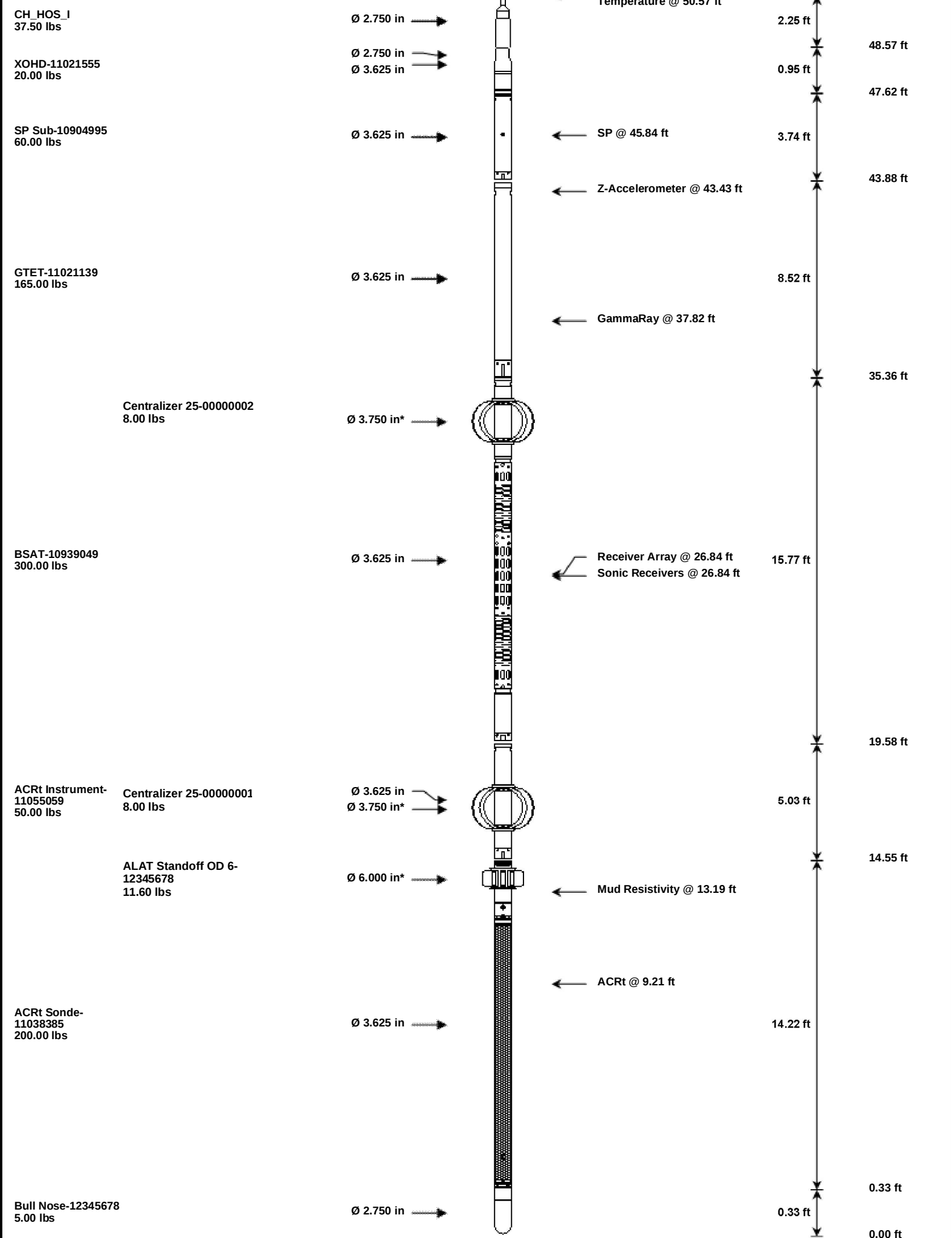
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5 INCH REPEAT LOG	

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	8.500	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	0.800	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	4745.00	ft
	SHARED	BHT	Bottom Hole Temperature	130.0	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	
	Rwa / CrossPlot	XPOK	Process Crossplot?	Yes	
	Rwa / CrossPlot	FCHO	Select Source of F	Density	
	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	Wyllie	
ACRt Sonde	RTOK	Process ACRt?	Yes	
ACRt Sonde	MNSO	Minimum Tool Standoff	1.19	in
ACRt Sonde	TCS1	Temperature Correction Source	FP Lwr & FP Up	
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: CMX_BLACK WIDOW\0002 GTET-BSAT-ACRT\IDLE			Date: 19-Oct-17 04:38:53	

HALLIBURTON				
CALIBRATION REPORT				
NATURAL GAMMA RAY TOOL SHOP CALIBRATION				
Tool Name:	GTET - 11021139		Reference Calibration Date:	23-Sep-17 12:22:06
Engineer:	WHITLOCK		Calibration Date:	06-Oct-17 11:06:34
Software Version:	WL INSITE R5.0.5 (Build 8)		Calibration Version:	1
Calibrator Source S/N: TB79				
Calibrator API Reference:222.00 api				
Equivalent Calibrator API Reference:225.9 api				
	Measurement	Measured	Calibrated	Units
	Background	25.7	25.8	api
	Background + Calibrator	250.7	251.7	api
	Calibrator	225.0	225.9	api
NATURAL GAMMA RAY TOOL FIELD CALIBRATION				
Tool Name:	GTET - 11021139		Reference Calibration Date:	06-Oct-17 11:06:34
Engineer:	WHITLOCK		Calibration Date:	06-Oct-17 11:10:24
Software Version:	WL INSITE R5.0.5 (Build 8)		Calibration Version:	1
Calibrator Source S/N: TB79				
Calibrator API Reference:222.00 api				
Equivalent Calibrator API Reference:225.9 api				
	Field Verification	Shop	Field	Units
	Background	25.8	24.9	api
	Background + Calibrator	251.7	254.1	api
	Calibrator	225.9	229.3	api
	Shop	Field	Difference	Tolerance
	225.9	229.3	3.4	+/- 0.00



Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max.Log. Speed (fpm)
CH_HOS	Hostile Cable Head with Load Cell	CH_HOS_I	37.50	2.25	48.57	300.00
XOHD	Hostile to Dits Cross Over	11021555	20.00	0.95	47.62	300.00
SP	SP Sub	10904995	60.00	3.74	43.88	300.00

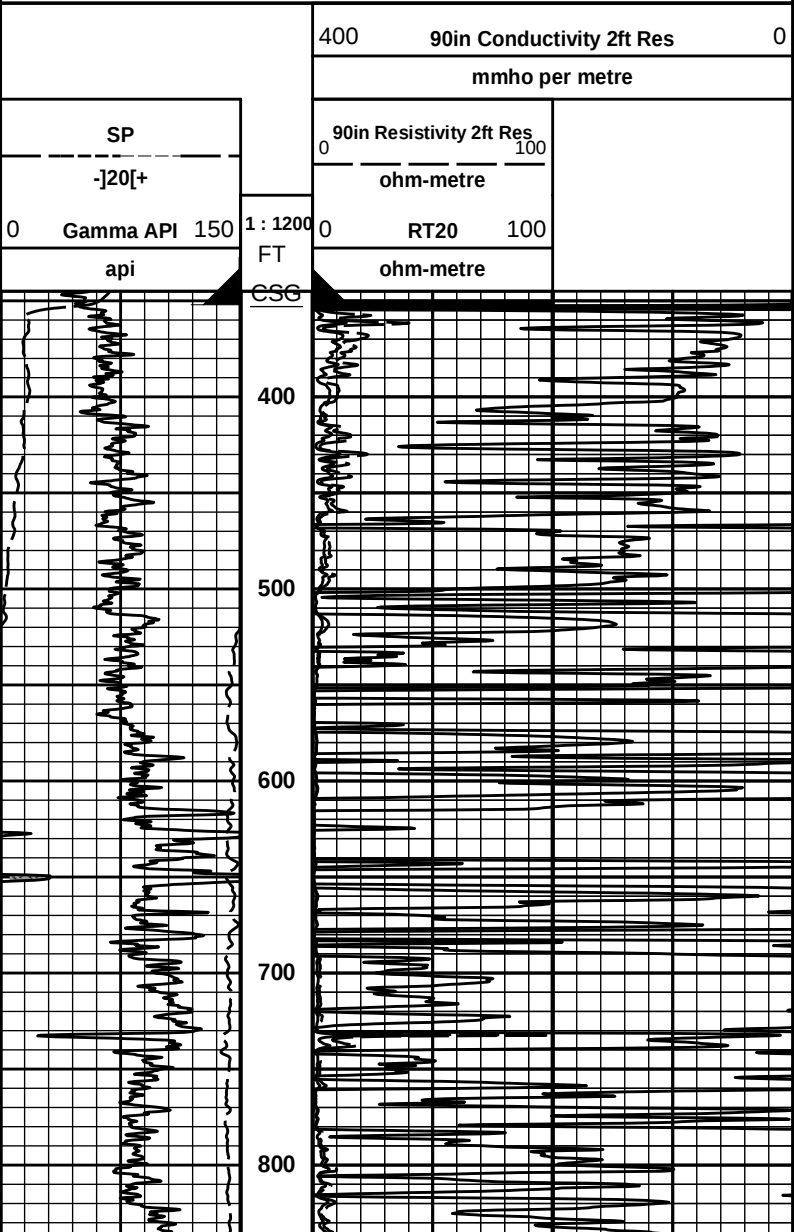
GTET	Gamma Telemetry Tool	11021139	165.00	8.52	35.36	60.00
BSAT	Borehole Sonic Array Tool	10939049	300.00	15.77	19.58	60.00
OBCEN	Centralizer - 25 in. Overbody	00000002	8.00	2.08 *	32.44	300.00
ACRt	Array Compensated True Resistivity Instrument Section	11055059	50.00	5.03	14.55	120.00
OBCEN	Centralizer - 25 in. Overbody	00000001	8.00	2.08 *	15.70	300.00
ACRt	Array Compensated True Resistivity Sonde Section	11038385	200.00	14.22	0.33	120.00
ALATS	Array Laterolog Tool OD 6 Standoff	12345678	11.60	1.00 *	13.19	60.00
BLNS	Bull Nose	12345678	5.00	0.33	0.00	300.00
Total			865.10	50.82		
* Not included in Total Length and Length Accumulation.						
Data: CMX_BLACK WIDOW\0002 GTET-BSAT-ACRT\IDLE						
Date: 19-Oct-17 03:48:35						

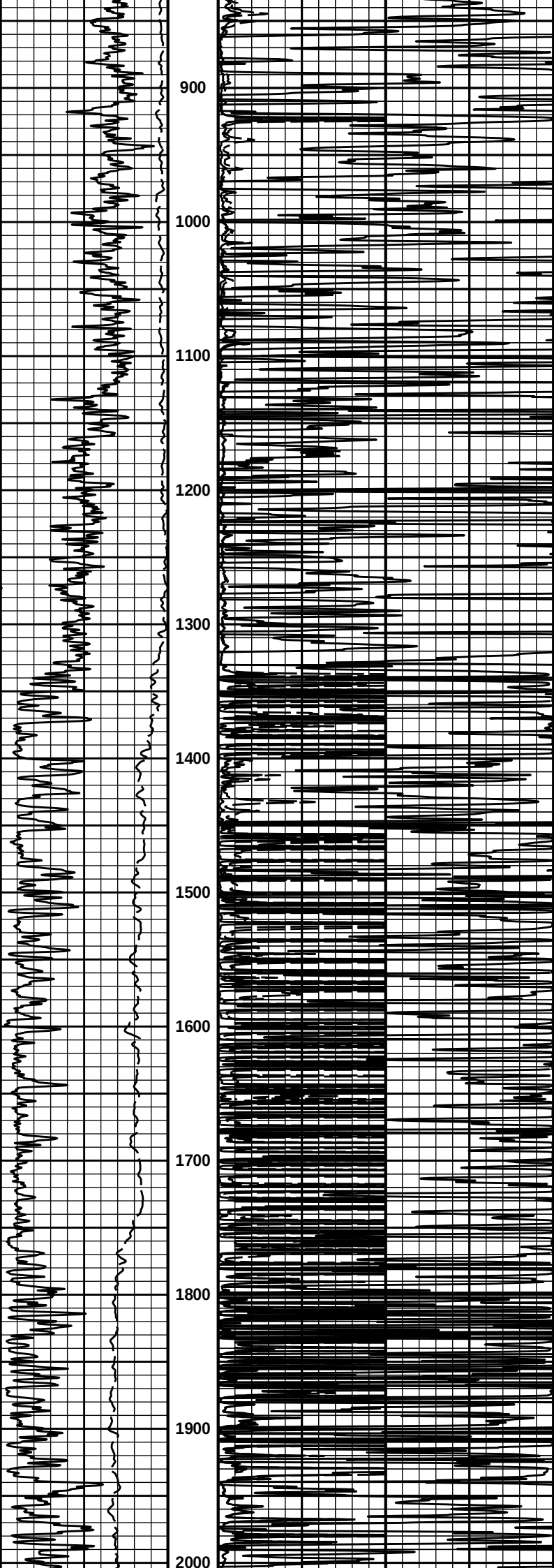
HALLIBURTON

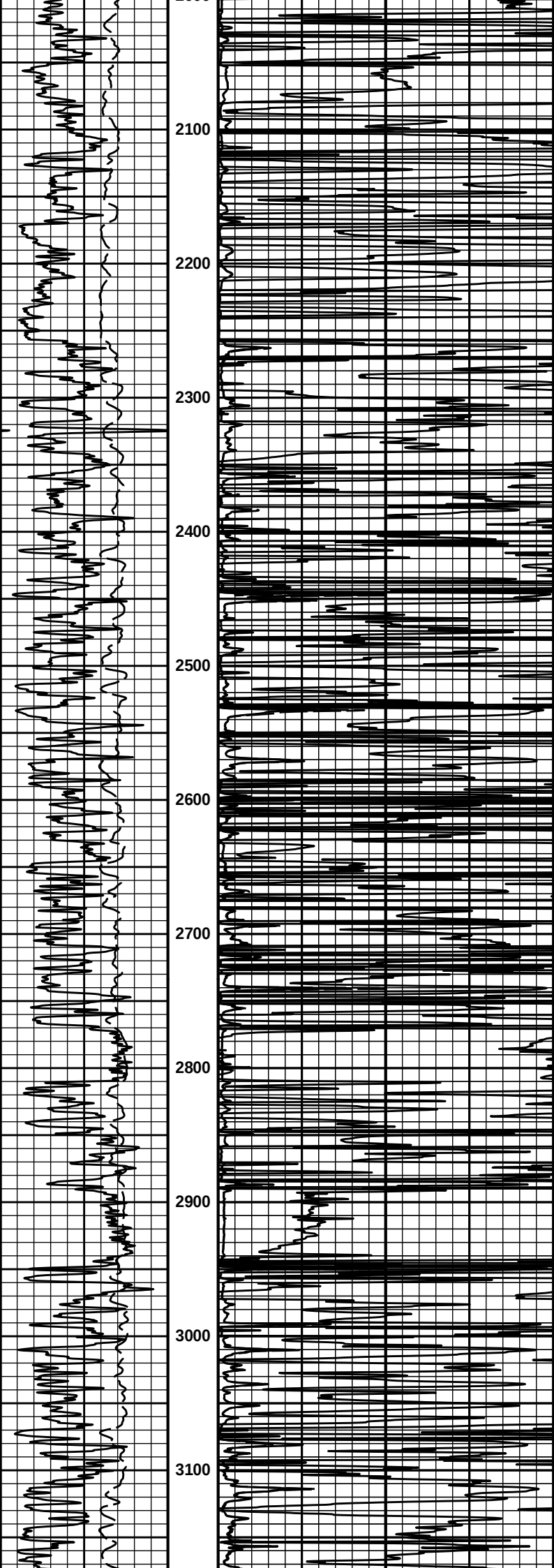
Plot Time: 19-Oct-17 07:22:29
Plot Range: 345 ft to 4726.5 ft
Data: CMX_BLACK WIDOW\Well Based\RUN 2 MAIN\
Plot File: \\LOCAL-1\CMX_BLACK WIDOW\0002 GTET-BSAT-ACRT\ACRT_1_main

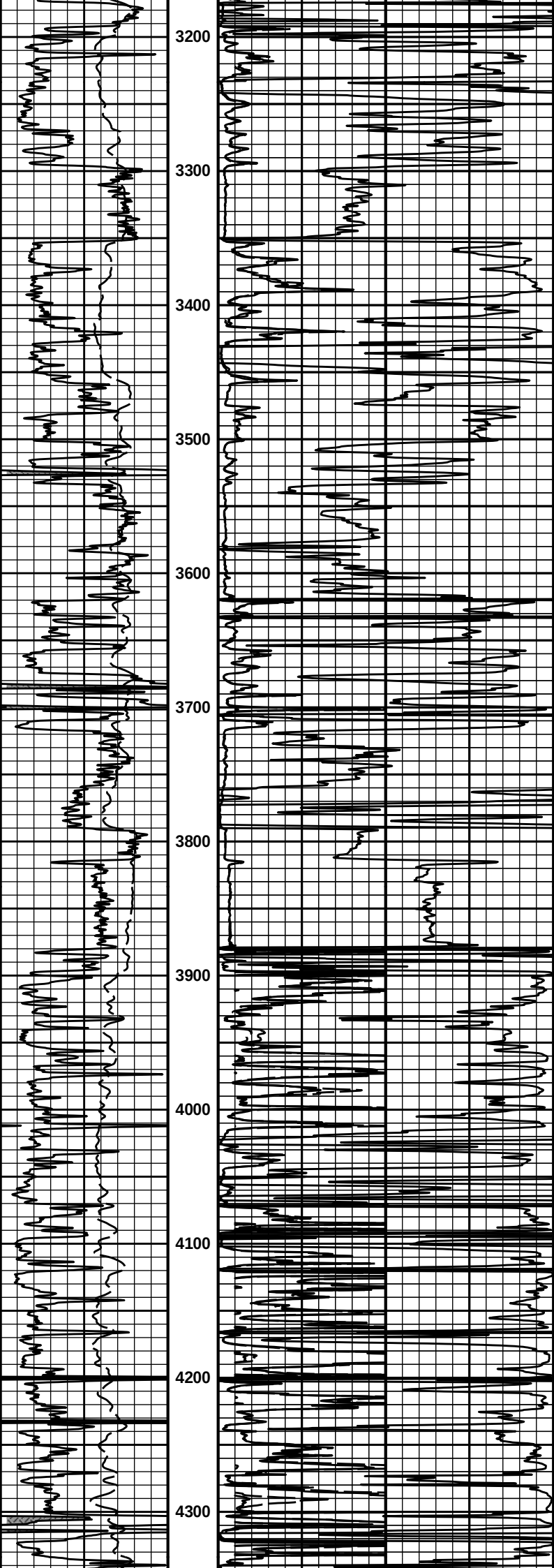
1 INCH MAIN LOG

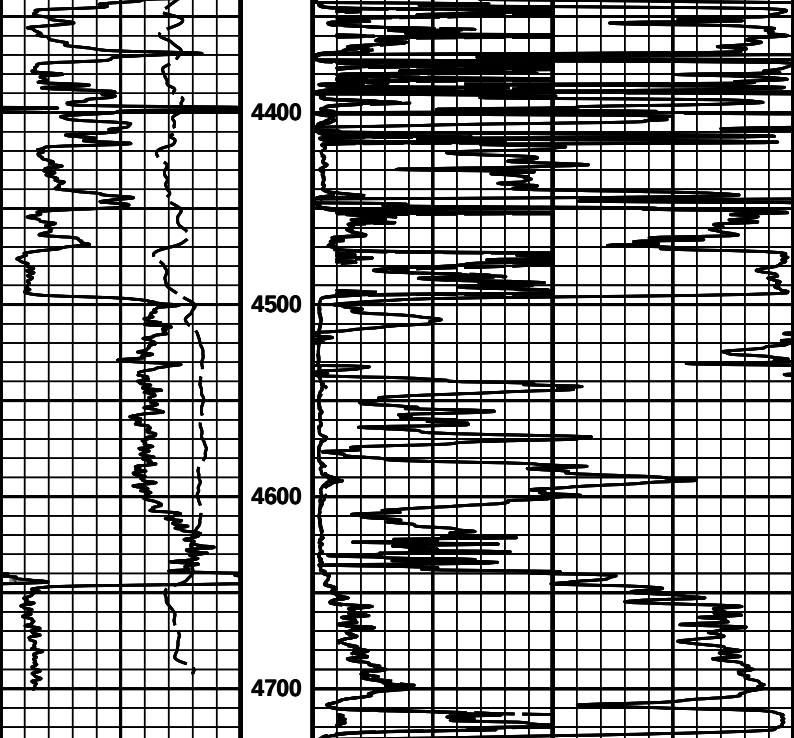
1 INCH CORRELATION LOG











0	Gamma API	150	1: 1200 FT	0	RT20	100	
	api				ohm-metre		
	SP			0	90in Resistivity 2ft Res	100	
	-]20[+				ohm-metre		
				400	90in Conductivity 2ft Res	0	
				mmho per metre			

HALLIBURTON

Plot Time: 19-Oct-17 07:22:31
Plot Range: 345 ft to 4726.5 ft
Data: CMX_BLACK WIDOWWell Based\RUN 2 MAIN\
Plot File: \\LOCAL\CMX_BLACK WIDOW0002 GTET-BSAT-ACRTIACRTIACRT_1_main

1 INCH MAIN LOG

1 INCH CORRELATION LOG

COMPANY	CMX, INC		
WELL	BLACK WIDOW OWWO 1-29		
FIELD	HARDING		
COUNTY	PRATT	STATE	KANSAS
HALLIBURTON		ARRAY COMPENSATED TRUE RESISTIVITY LOG	