

ARRAY COMPENSATED
TRUE RESISTIVITY
LOG

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

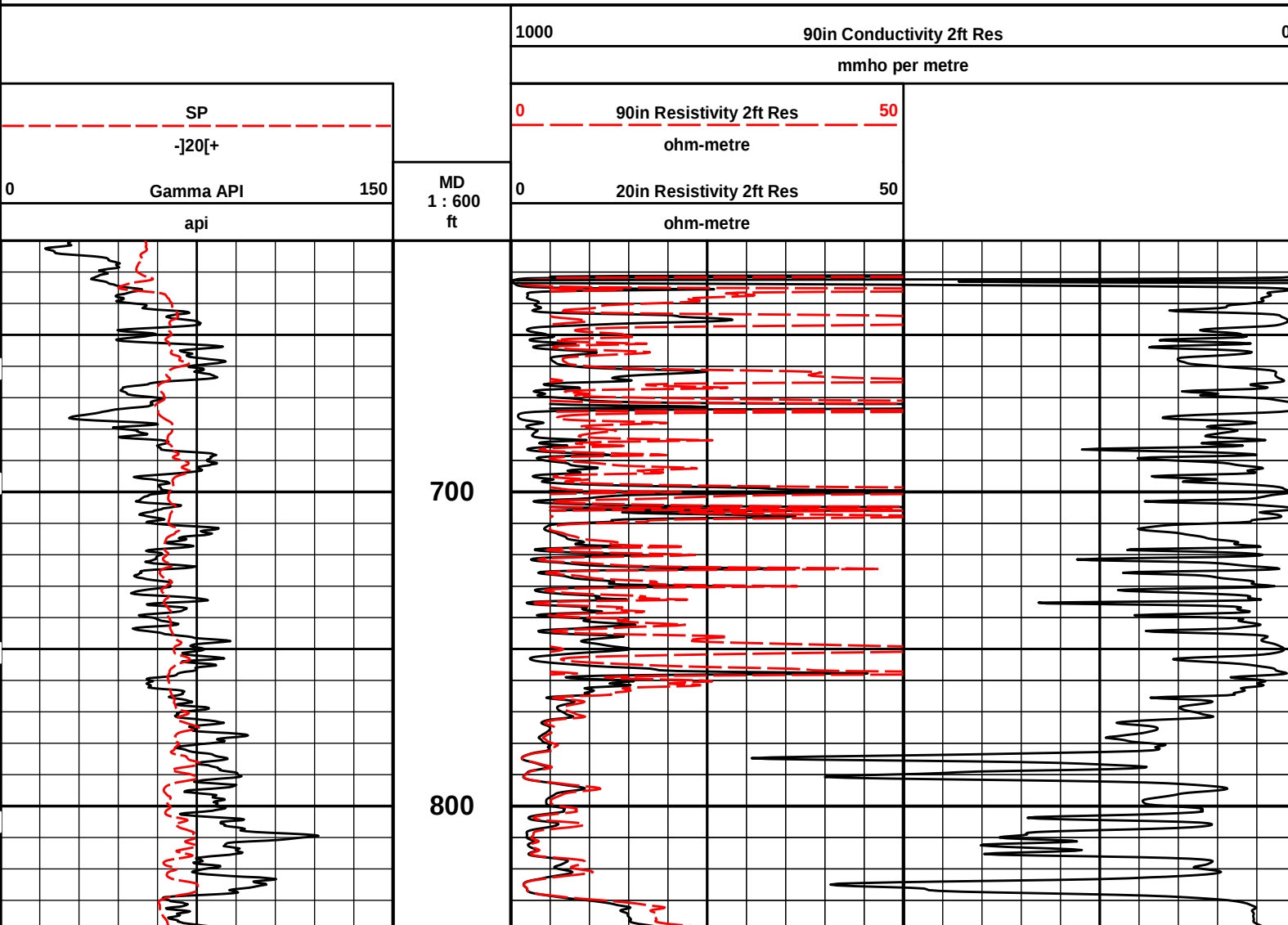
GENERAL				GAMMA		ACOUSTIC			DENSITY			NEUTRON		
Run	Depth		Speed	Scale		Scale		Matrix	Scale		Matrix	Scale		Matrix
No.	From	To	ft/min	L	R	L	R		L	R		L	R	
ONE	5375	634	REC	0	150	30	-10		47.6	30		-10	2.71	

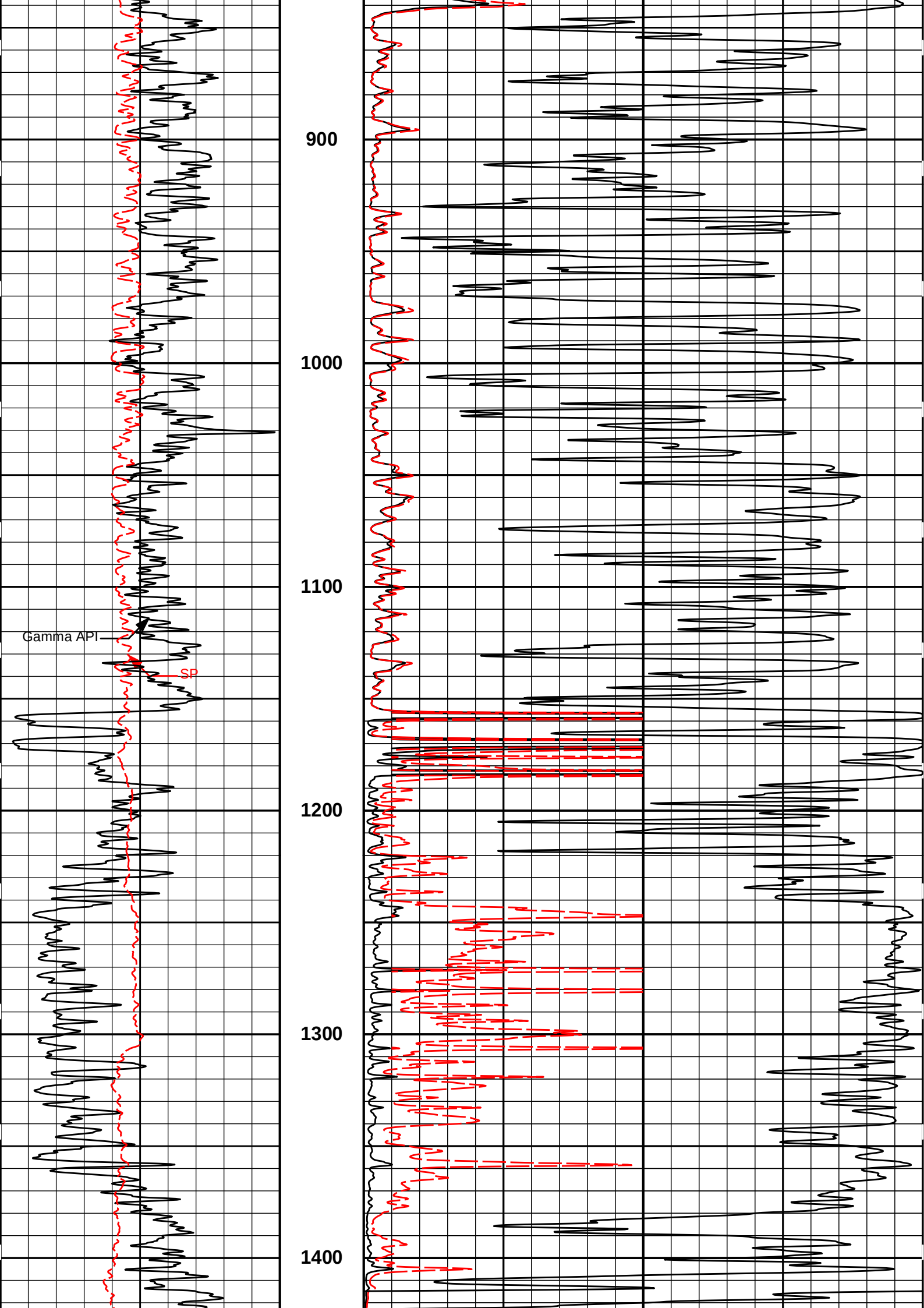
DIRECTIONAL INFORMATION																			
Maximum Deviation @										KOP @									
Remarks: ANNULAR HOLE VOLUME CALCULATED FOR 5.5-INCH CASING																			
CHLORIDES REPORTED AT 10,000 MG/L																			
LCM REPORTED AT 3 LB/BBL																			
GTET-DSNT-SDLT-BSAT-ACRT RUN IN COMBINATION																			
PRE-CALIBRATIONS NOT PERFORMED DUE TO RAINFALL AND LIGHTNING																			
TODAY'S CREW: F. VILLA & K. KING																			
THANK YOU FOR CHOOSING HALLIBURTON ENERGY SERVICES LIBERAL, KS. 620-624-8123																			
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																			

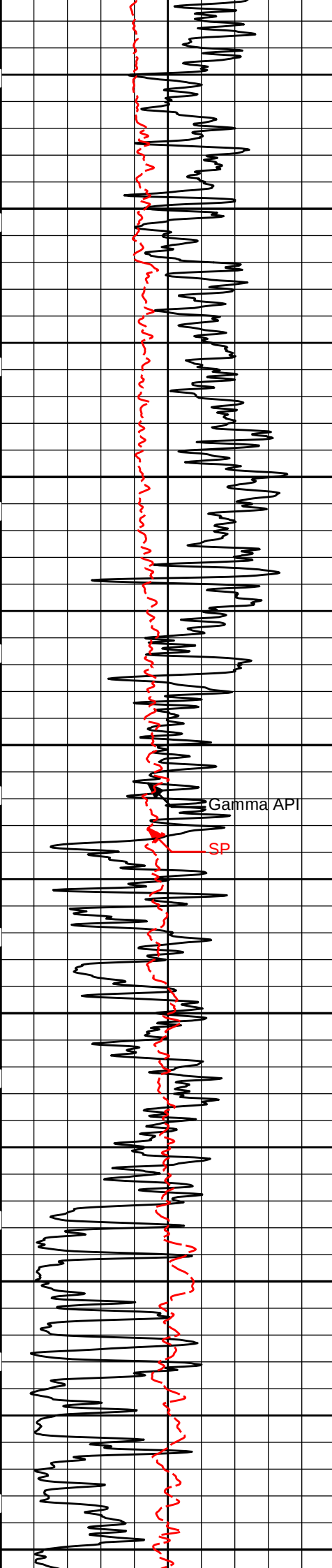
HALLIBURTON

Plot Time: 12-Apr-15 08:33:28
Plot Range: 620 ft to 5379 ft
Data: PETRA_1-8\Well Based\CASING\
Plot File: \\-LOCAL-\\PETRA_1-8\\0001 SP-GTET-DSN-SDL-FLEX-BSAT-BN\\ACRT\\ACRT_2_lib

2 INCH MAIN LOG







1500

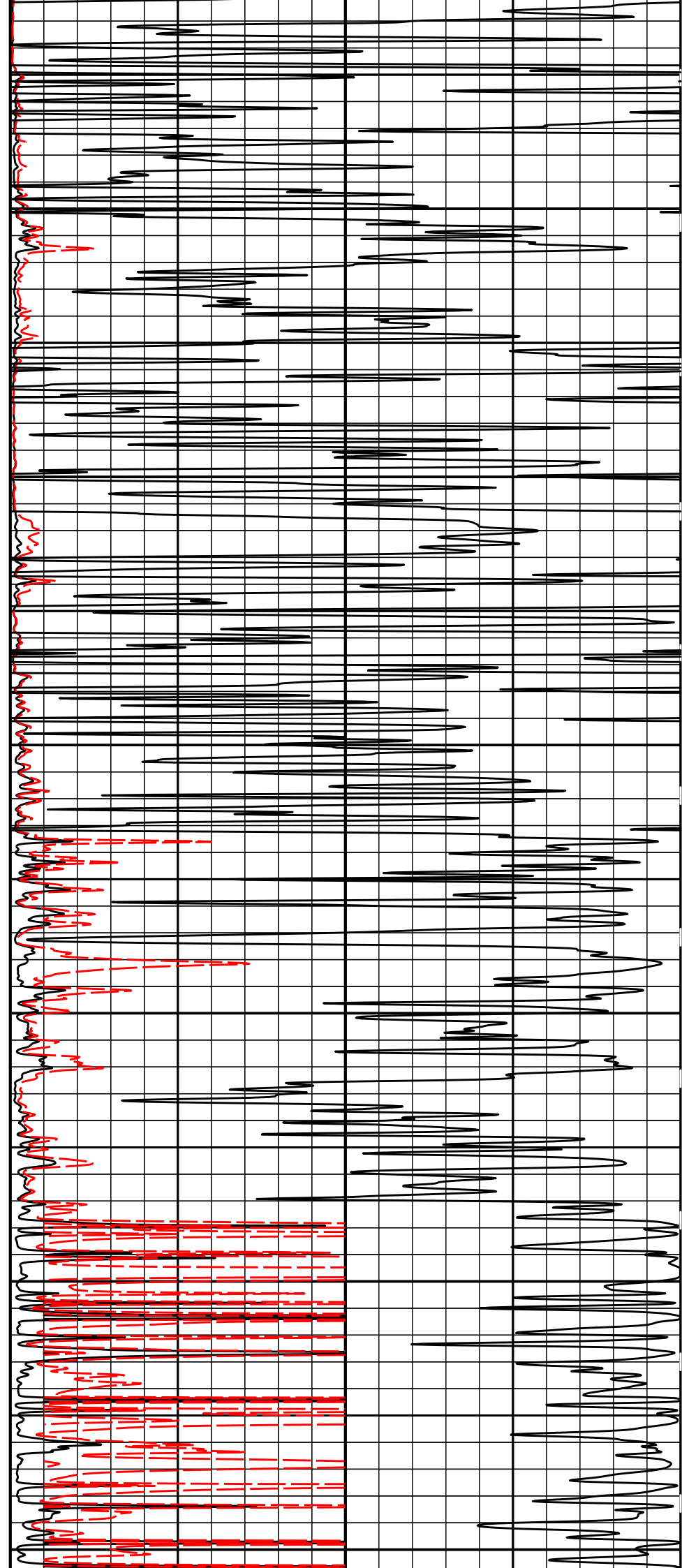
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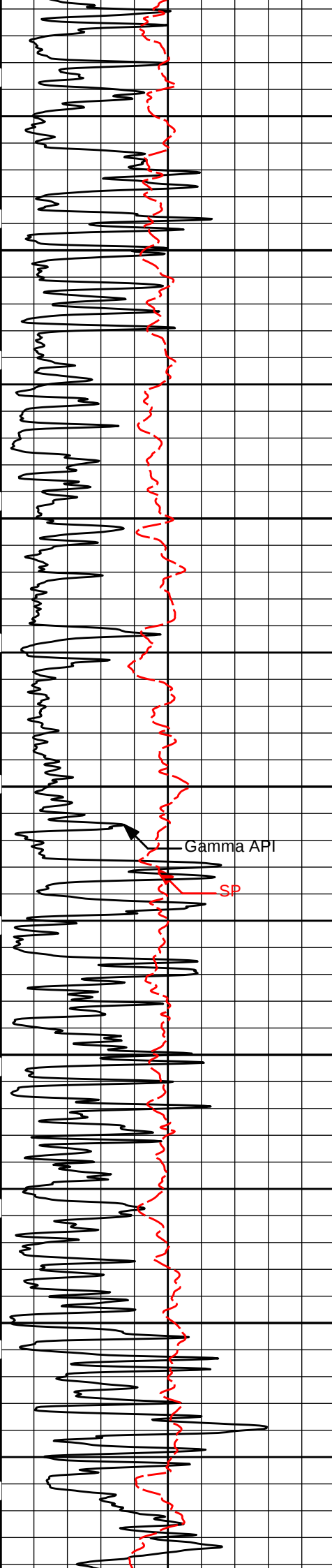
1700

1800

1900

2000





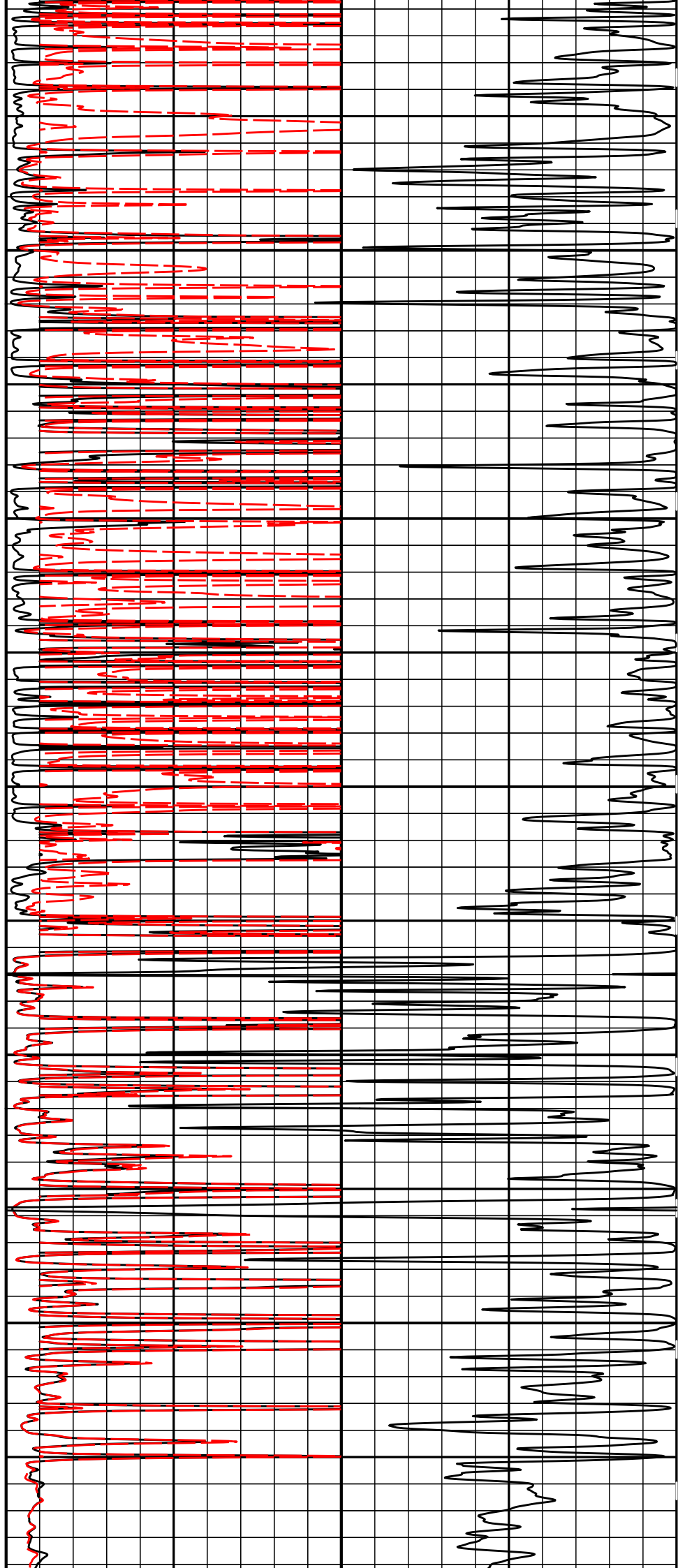
2100

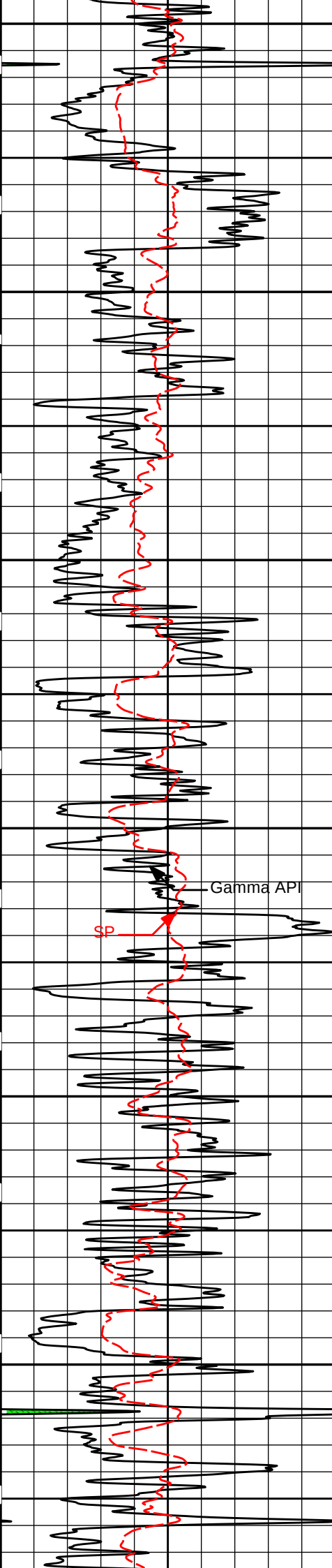
2200

2300

2400

2500





2600

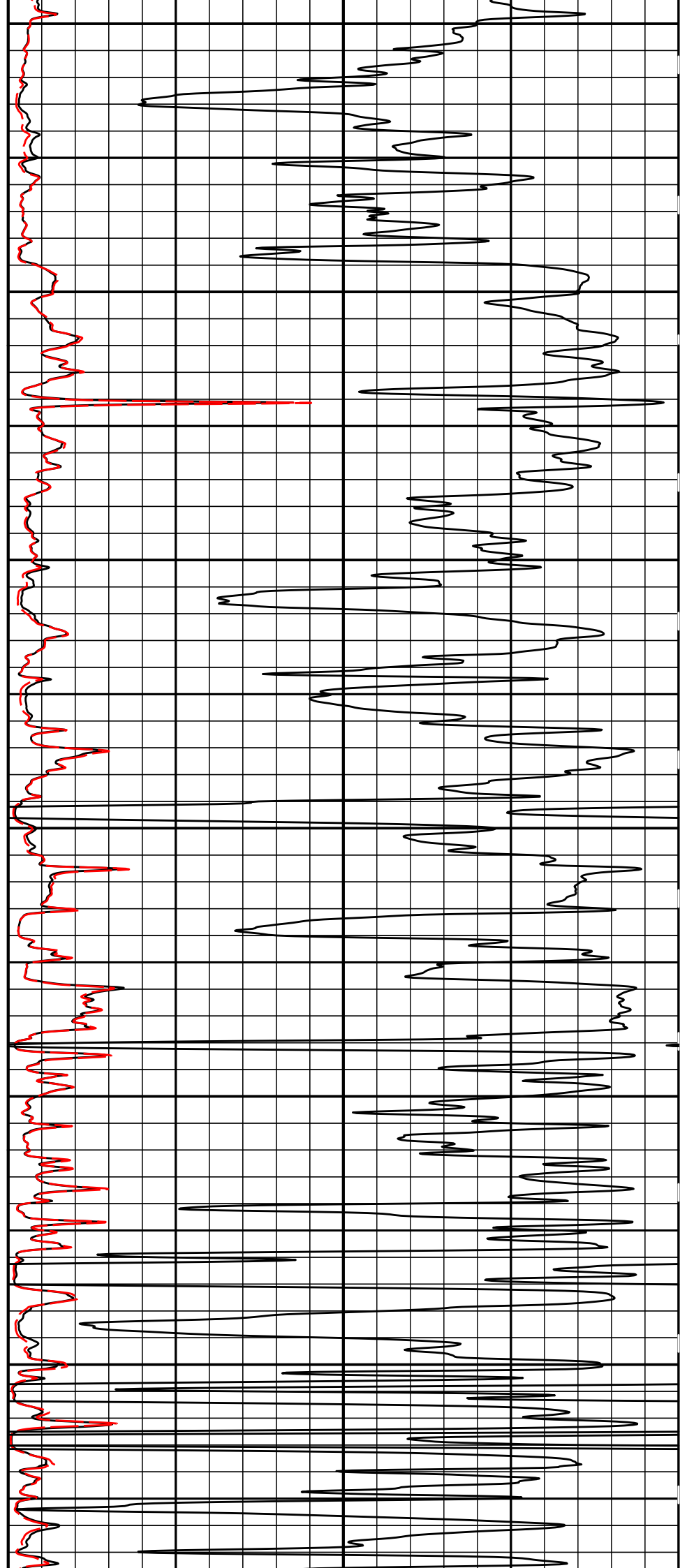
2700

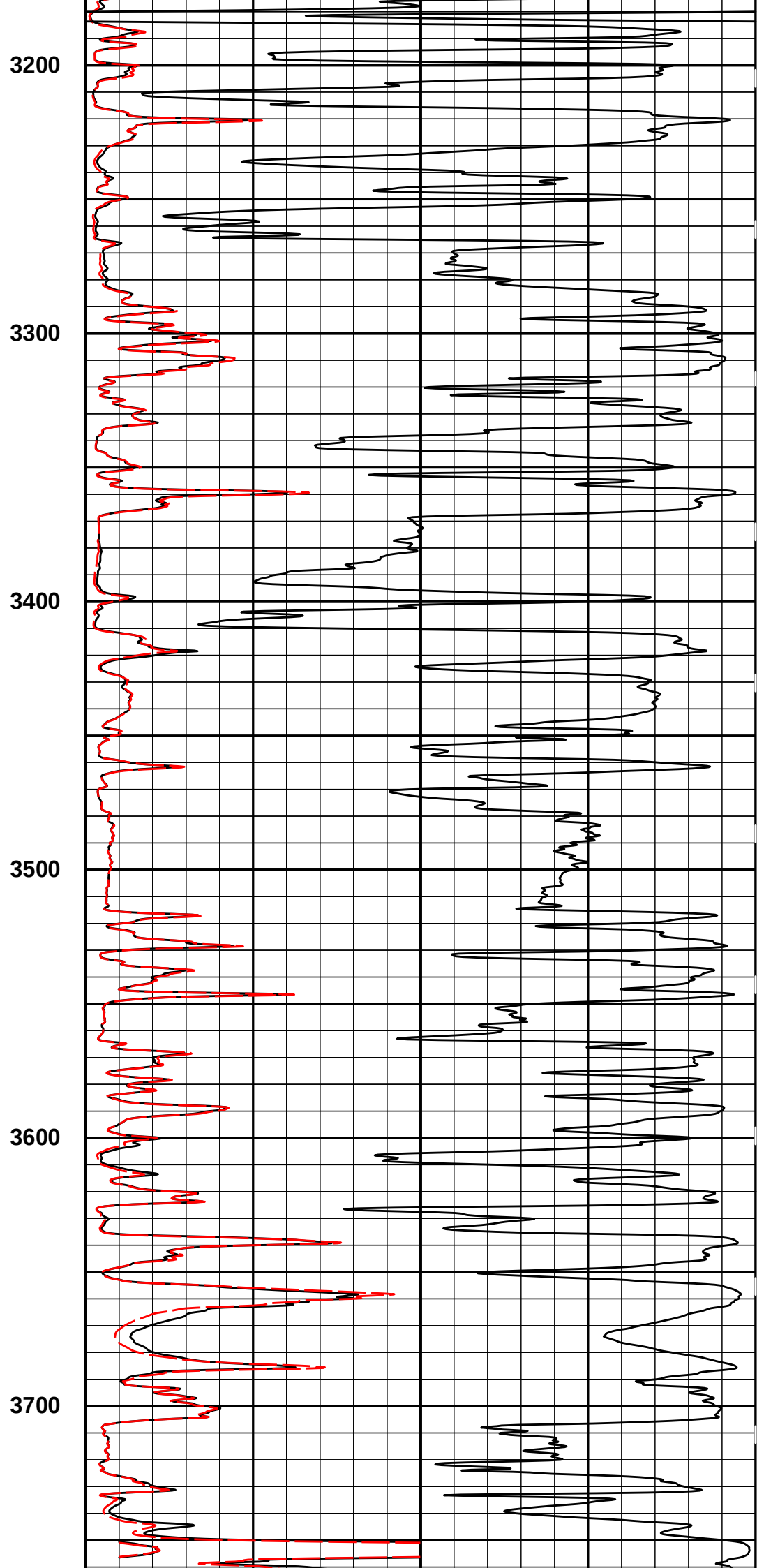
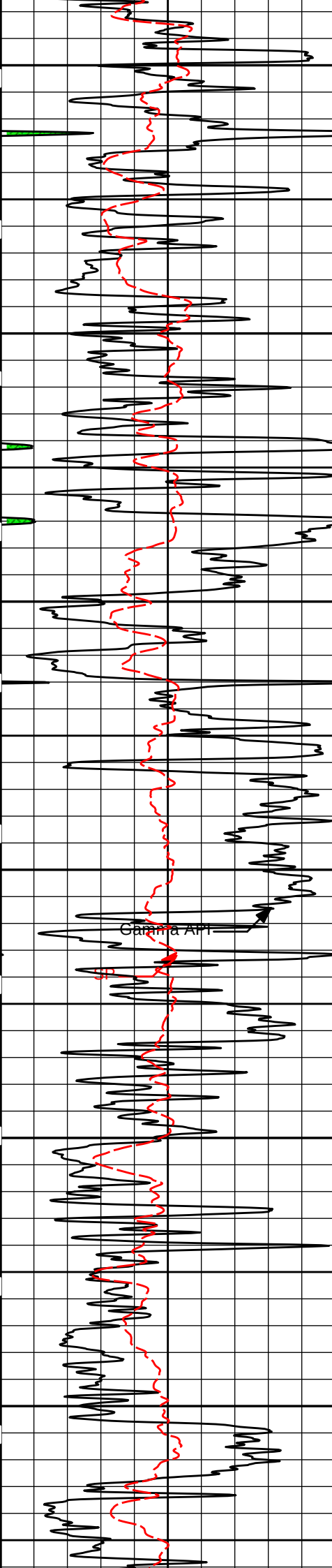
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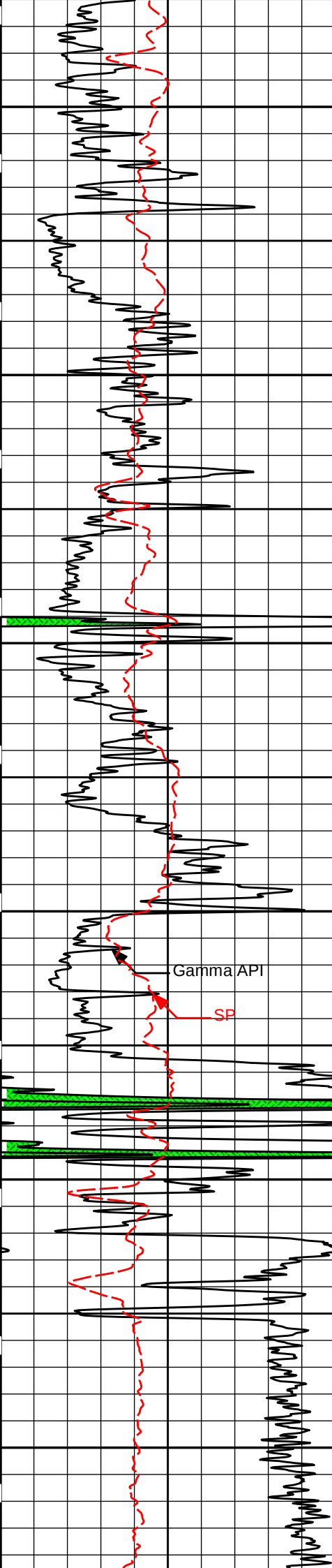
2900

3000

3100







3800

3900

4000

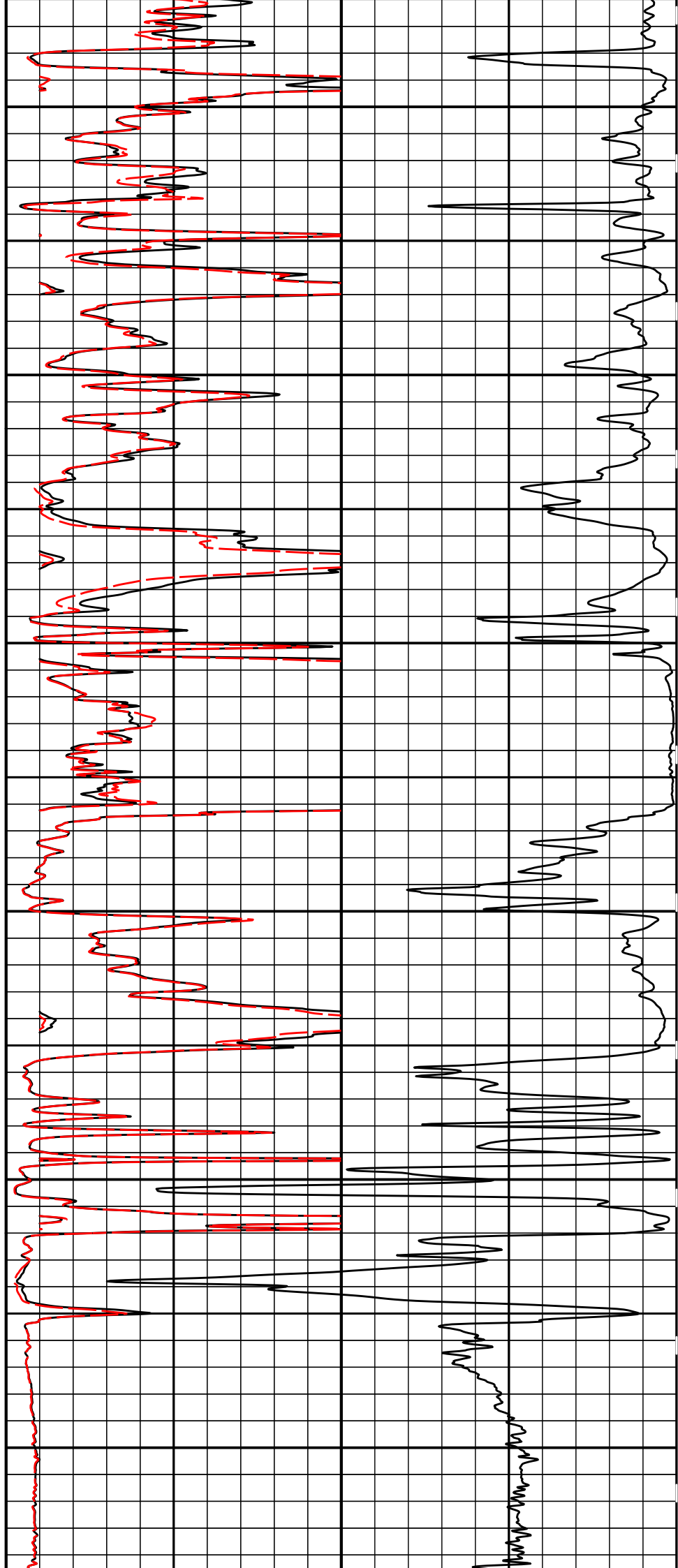
4100

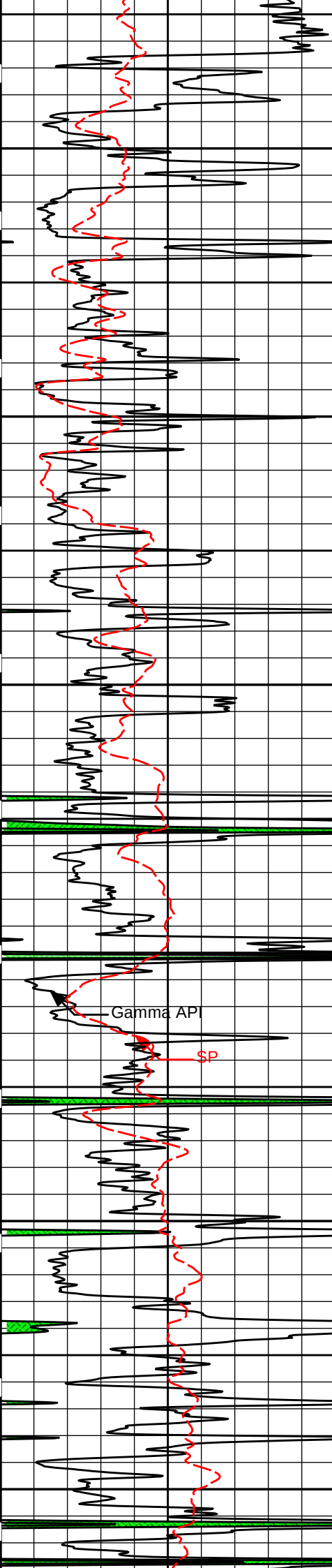
4200

4300

Gamma API

SP





4400

4500

4600

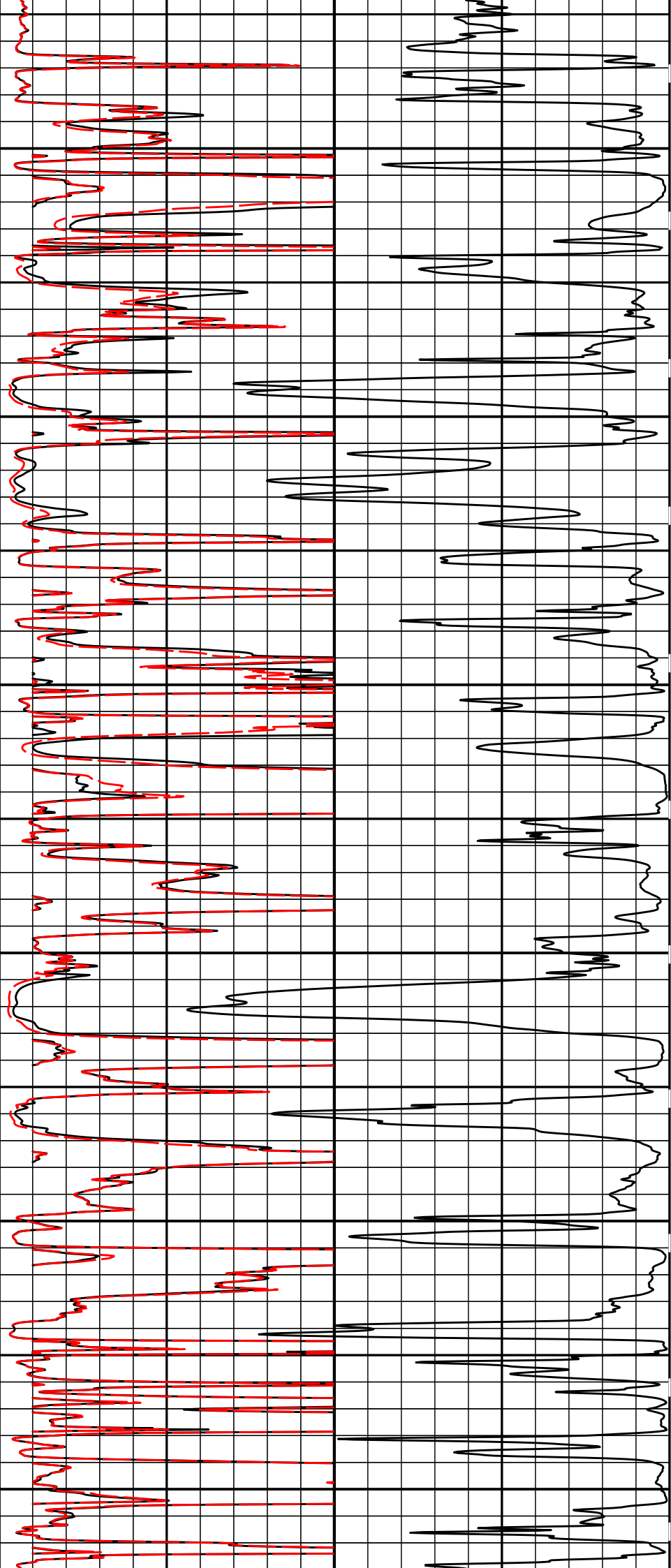
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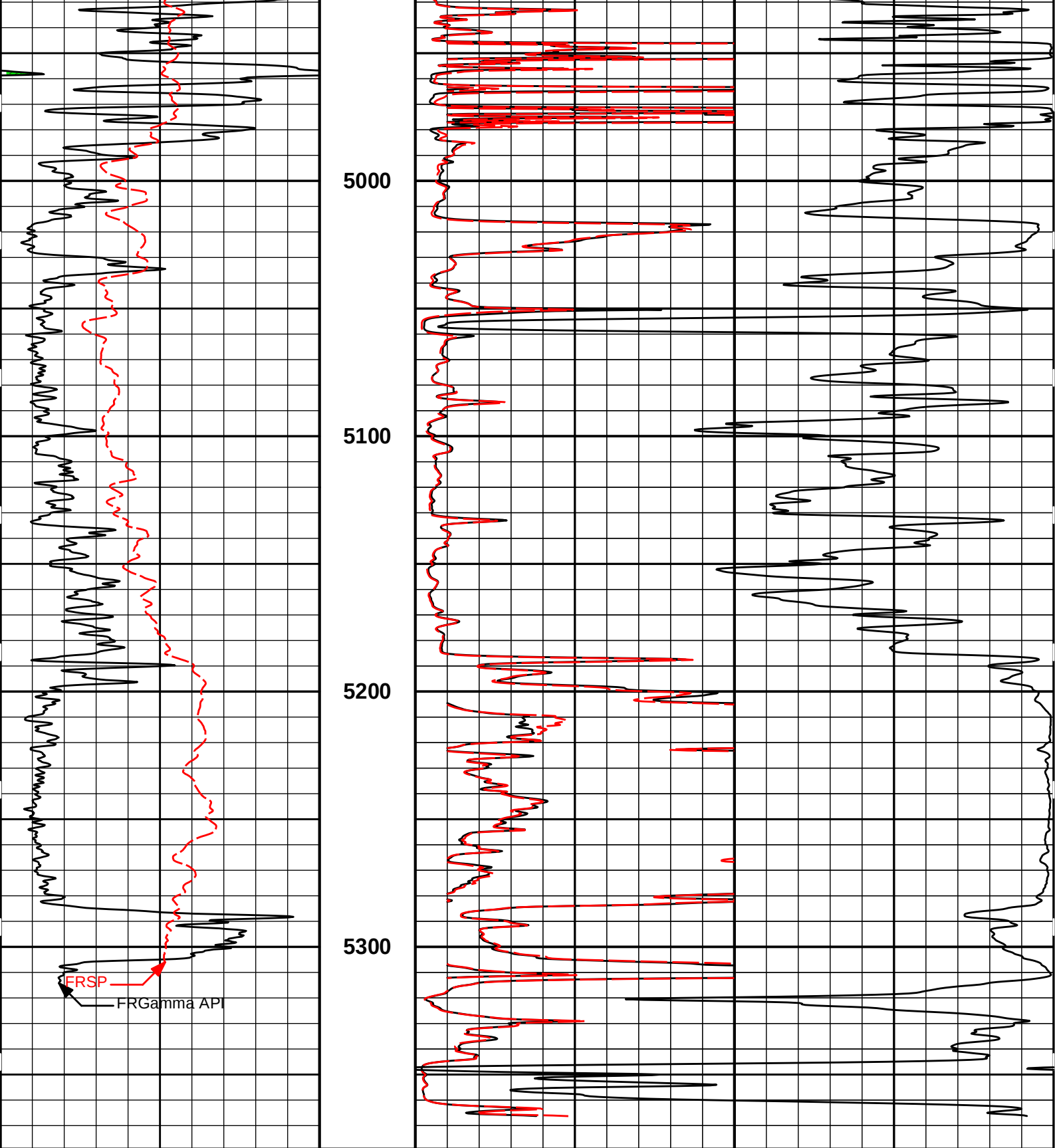
4800

4900

Gamma API

SP





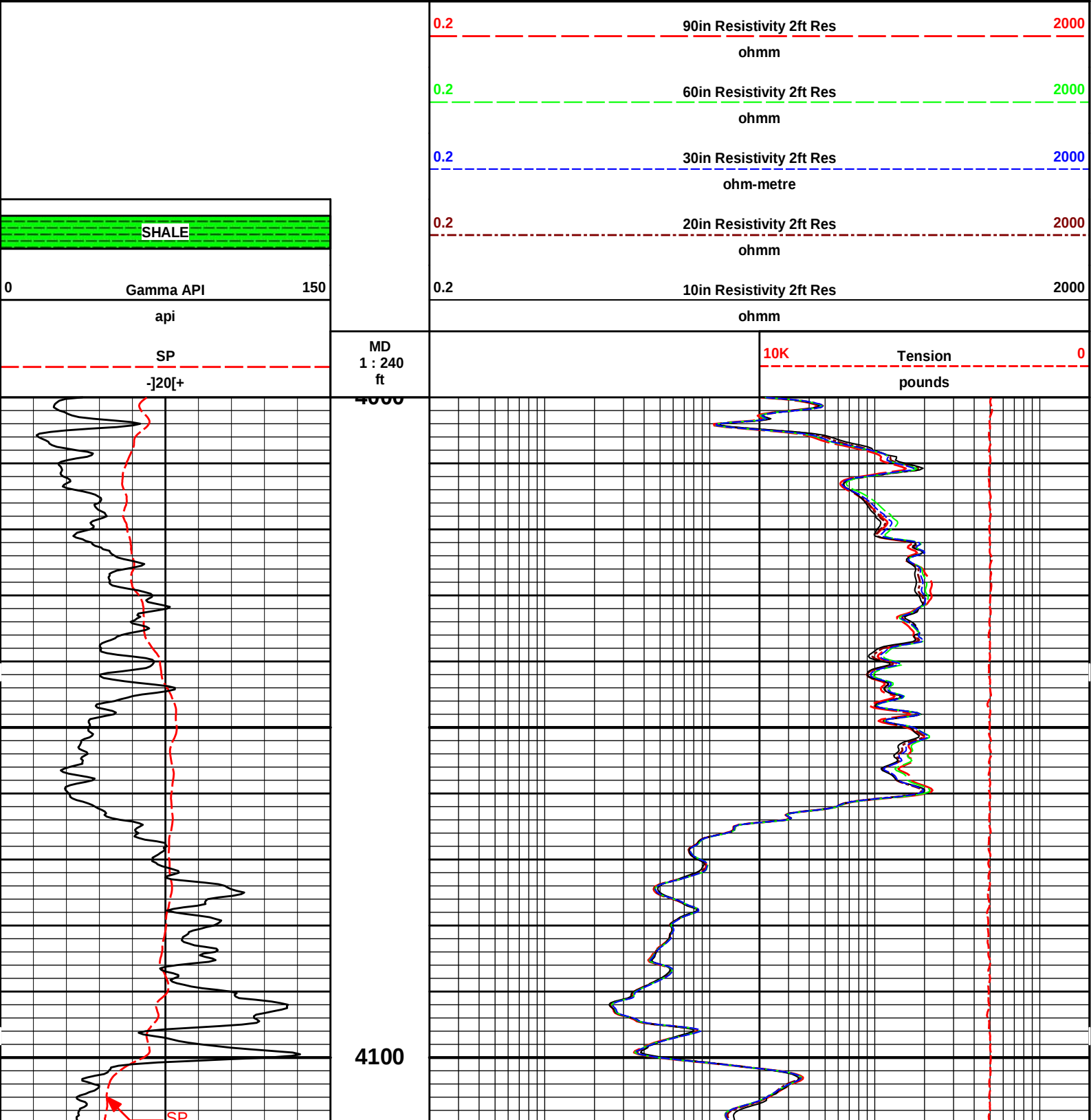
0	Gamma API	150	MD 1 : 600 ft	0	20in Resistivity 2ft Res	50	
	api				ohm-metre		
	SP			0	90in Resistivity 2ft Res	50	
	-]20[+				ohm-metre		
				1000	90in Conductivity 2ft Res	0	
					mmho per metre		

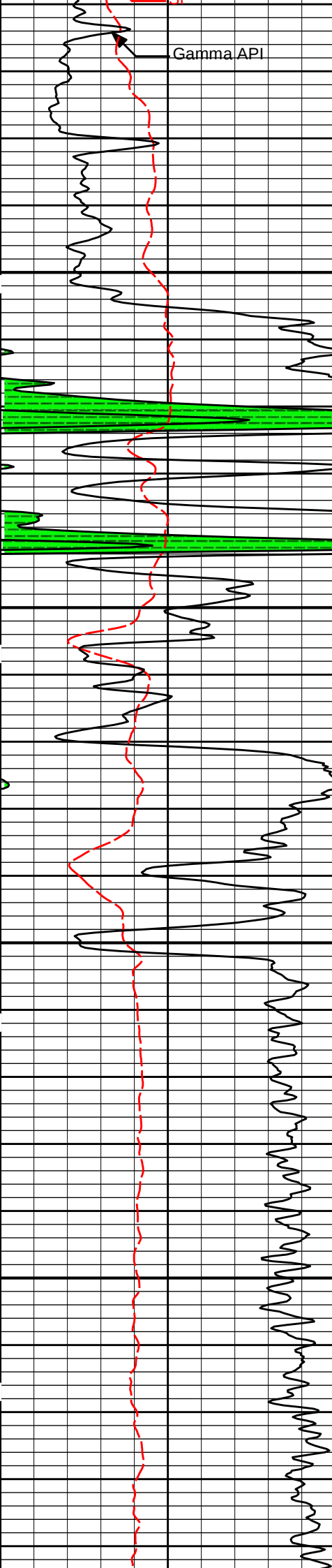
HALLIBURTON

Plot Time: 12-Apr-15 08:33:31
Plot Range: 620 ft to 5379 ft
Data: PETRA_1-8\Well Based\CASING\
Plot File: \\-LOCAL-\\PETRA_1-8\\0001 SP-GTET-DSN-SDL-FLEX-BSAT-BNIACRTIACRT_2_lib

5 INCH MAIN LOG

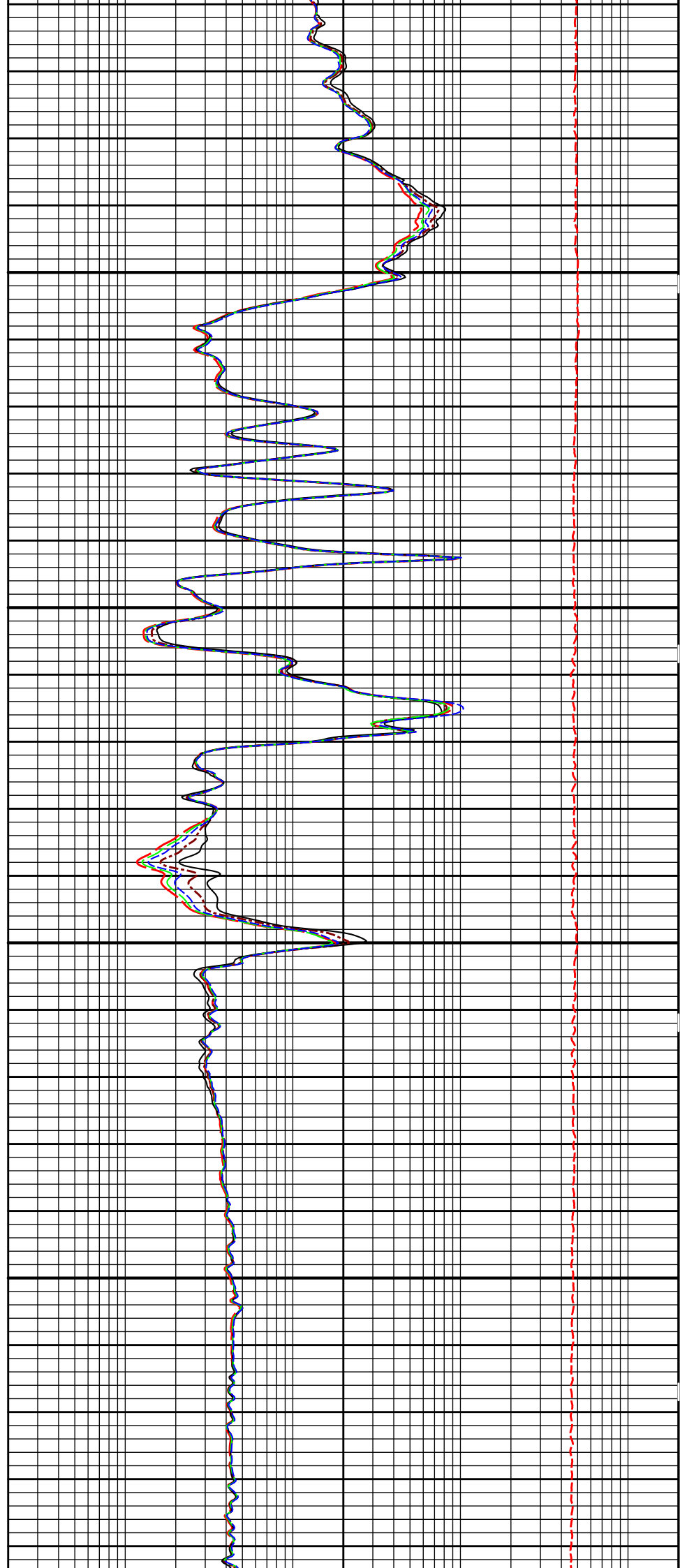
MEASURED DEPTH
MAIN SECTION 5" PER 100'

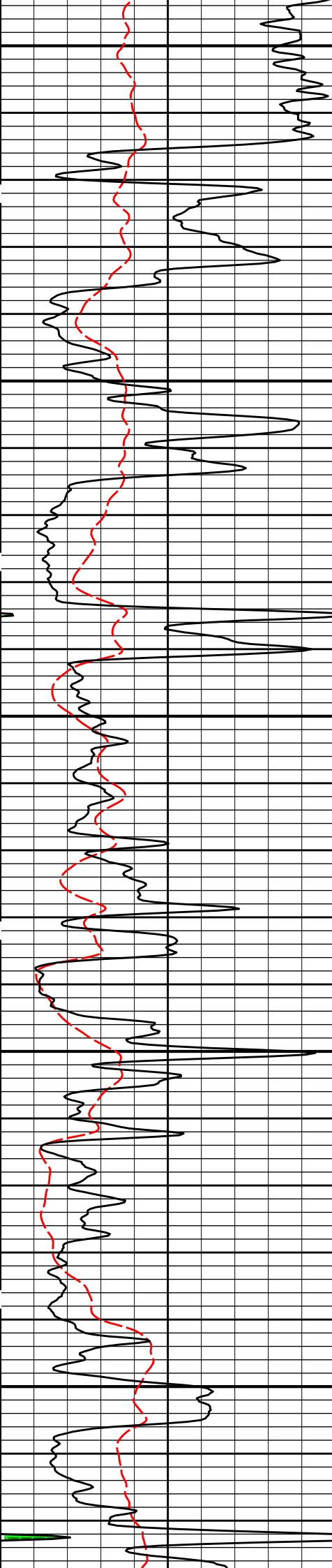




4200

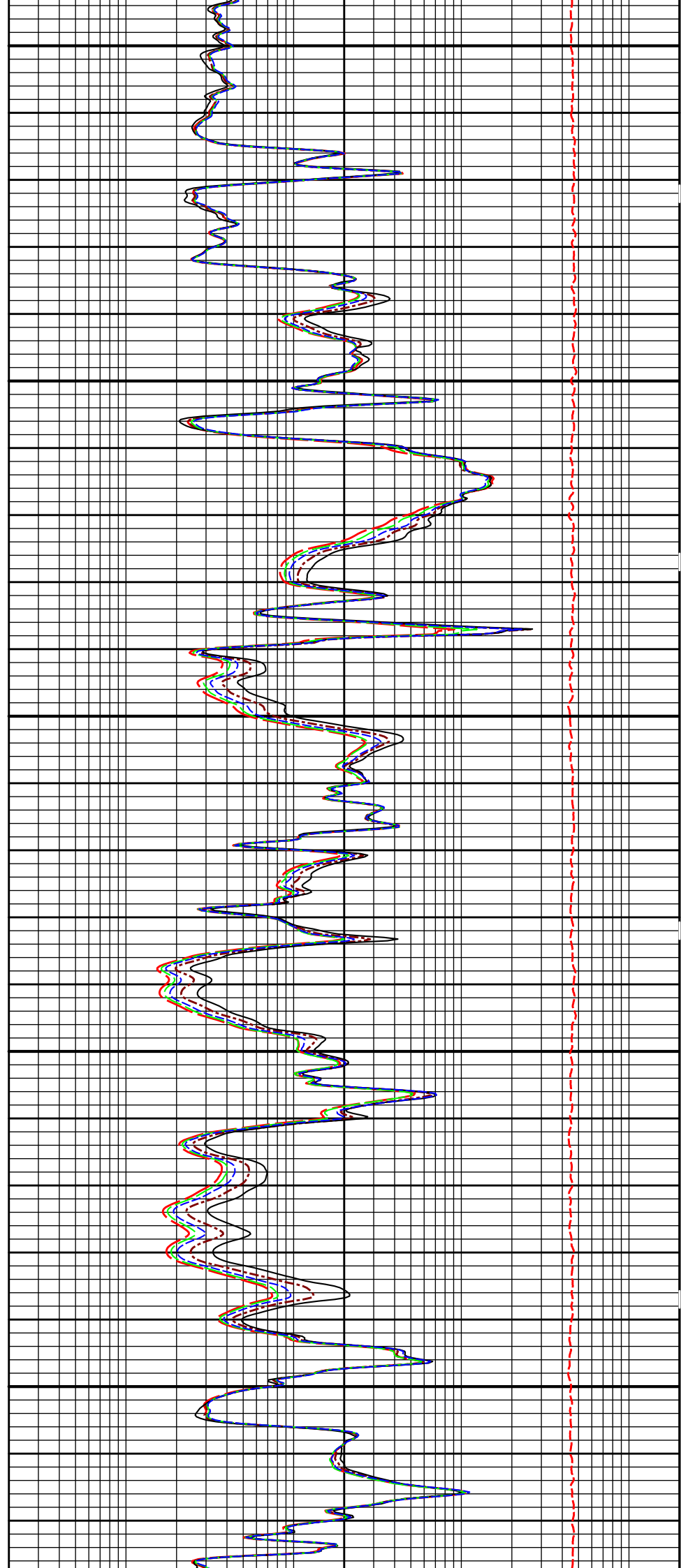
4300

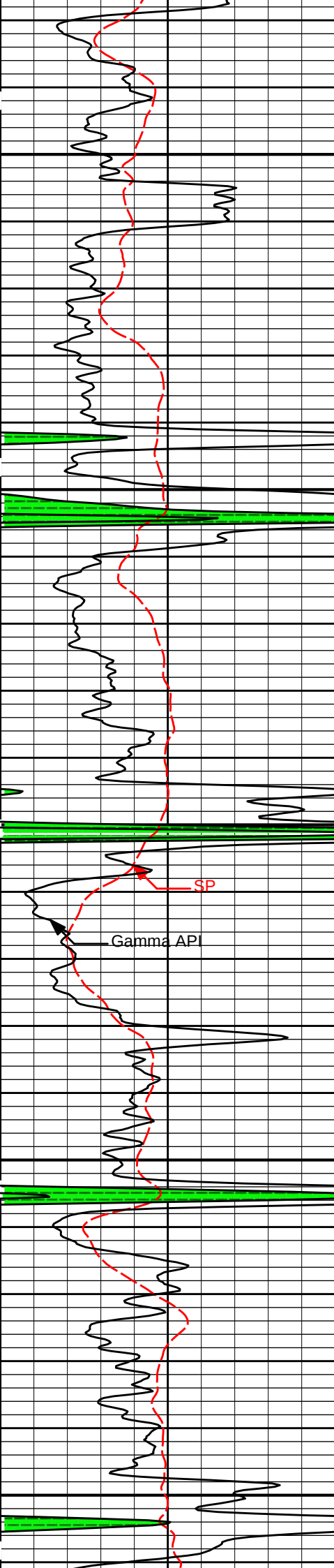




4400

4500

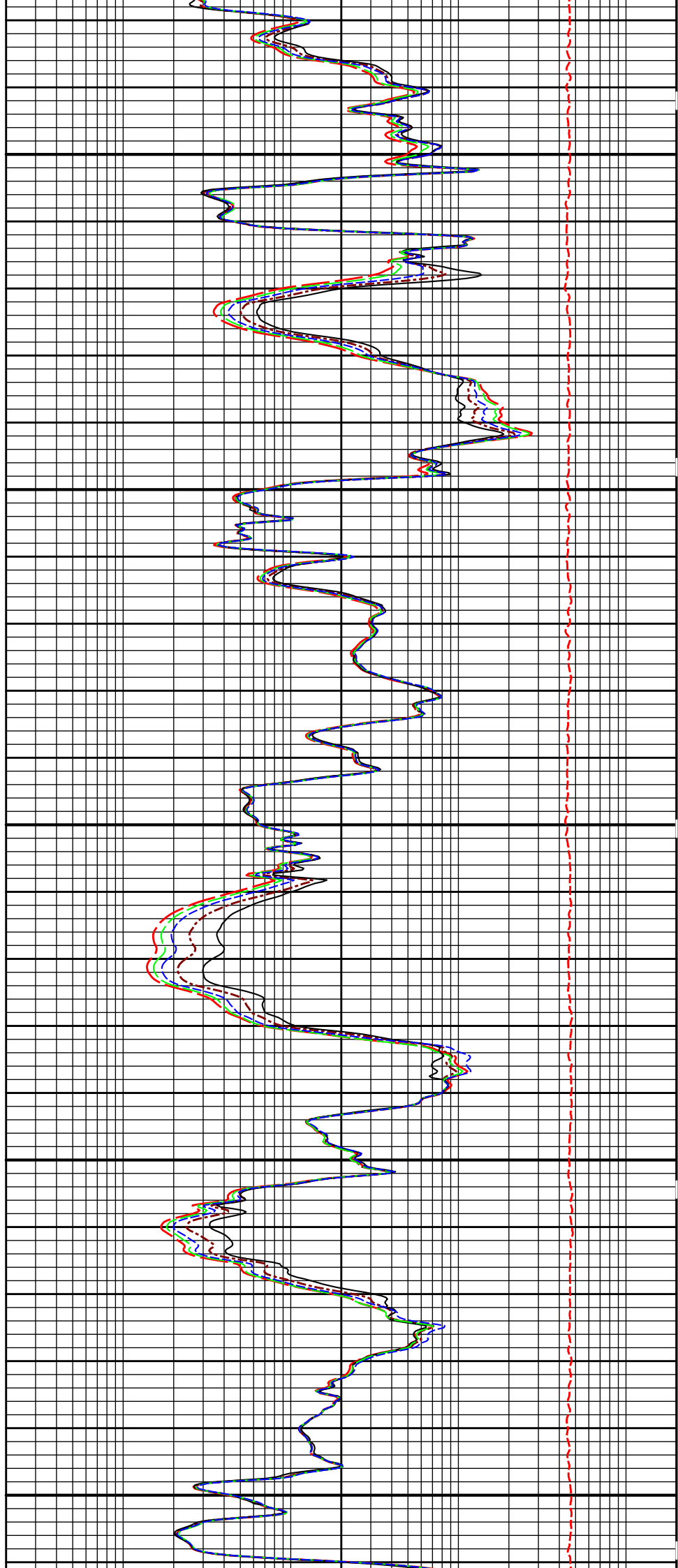


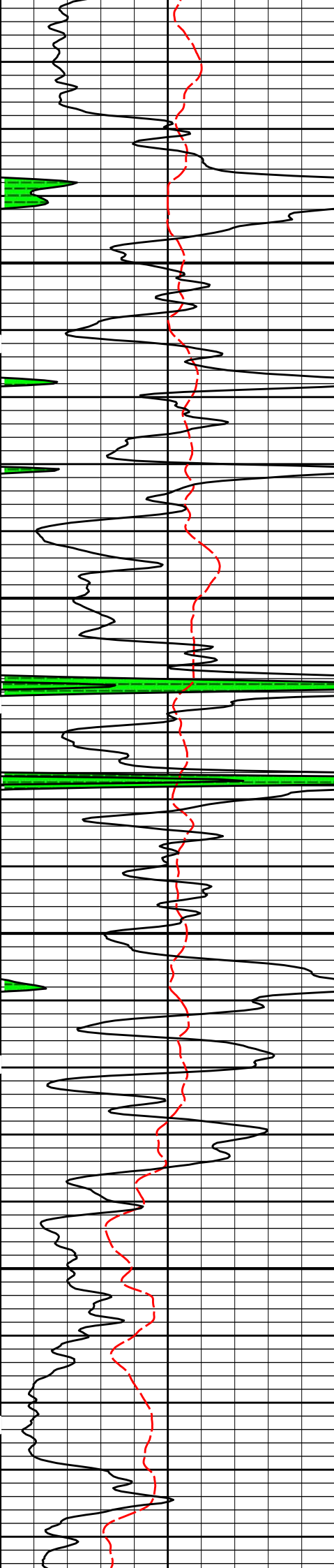


4600

4700

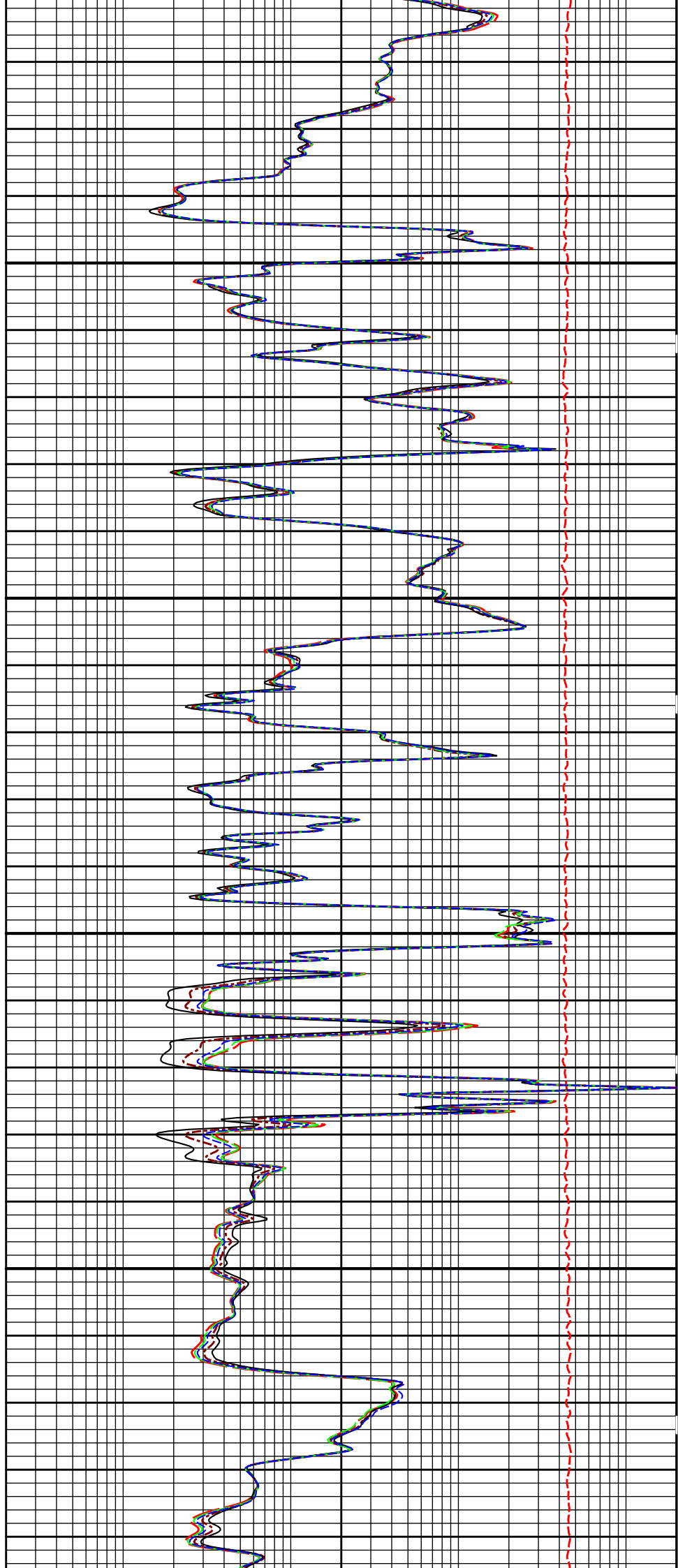
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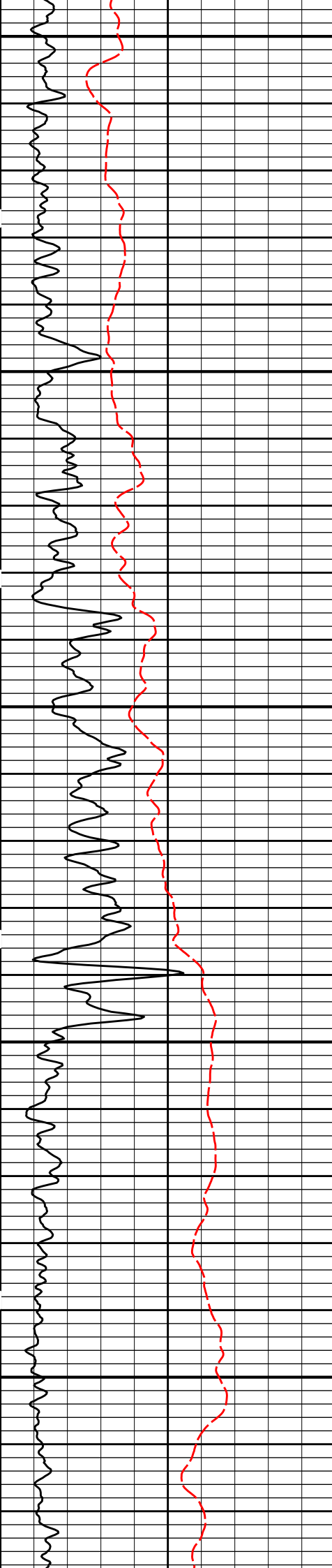




4900

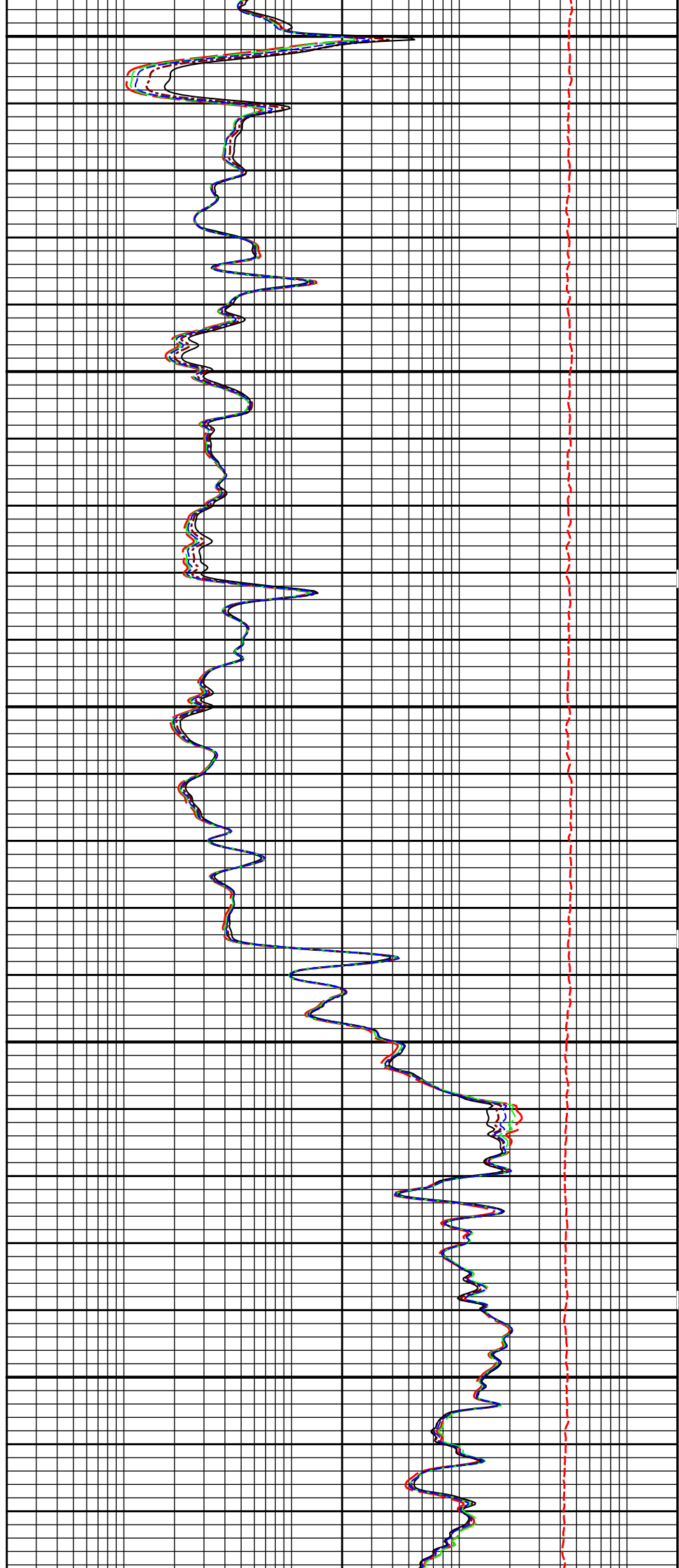
5000

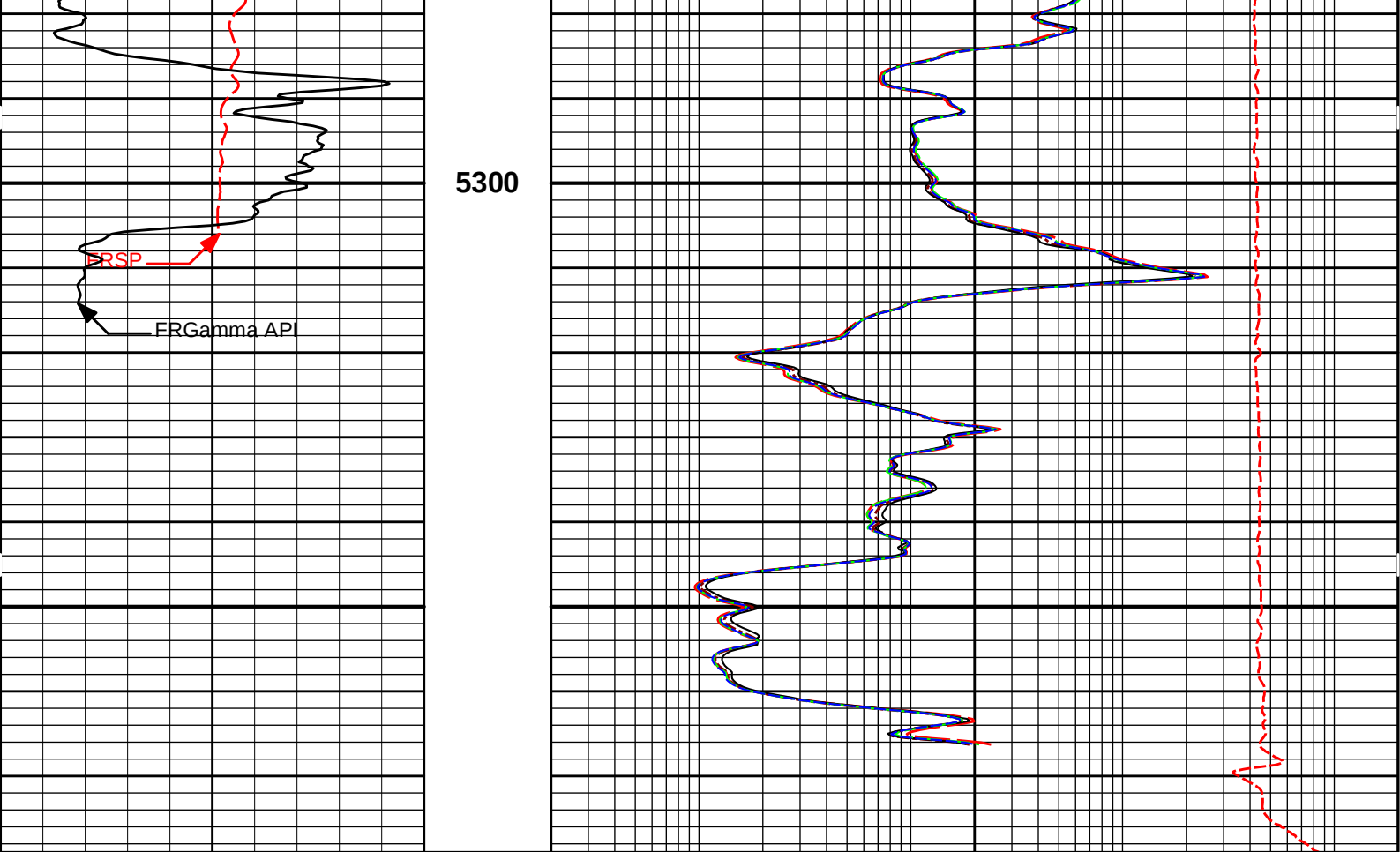




5100

5200





0	SP -120[+]	MD 1 : 240 ft	10K Tension pounds 0	
	Gamma API 150 api		0.2	10in Resistivity 2ft Res 2000 ohmm
SHALE			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 2000 ohmm

HALLIBURTON

Plot Time: 12-Apr-15 08:33:34
Plot Range: 4000 ft to 5379 ft
Data: PETRA_1-8\Well Based\DETAIL\
Plot File: \\-LOCAL-\\PETRA_1-8\\0001 SP-GTET-DSN-SDL-FLEX-BSAT-BN\\ACRT\\ACRT_5_main_lib

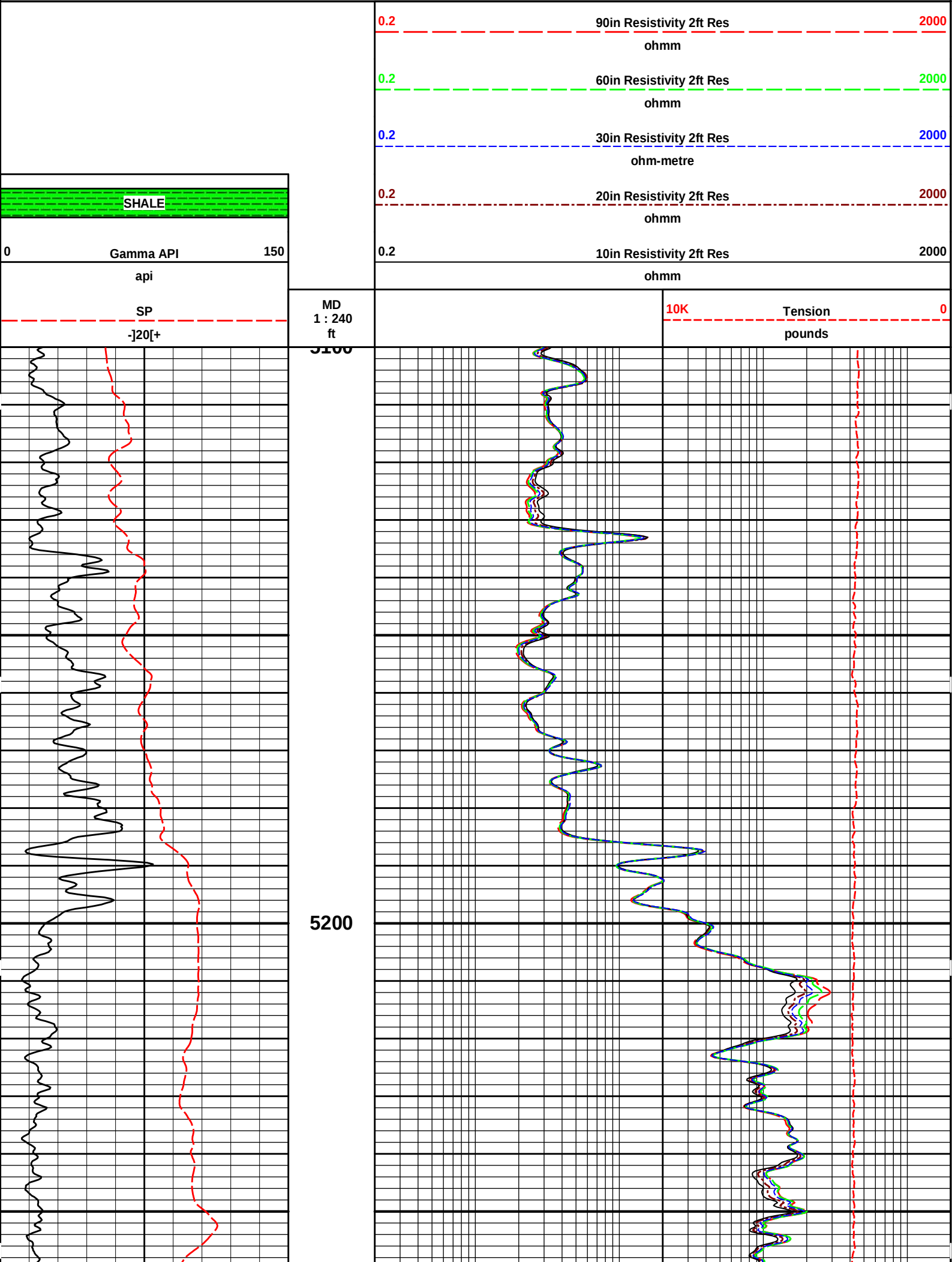
5 INCH MAIN LOG

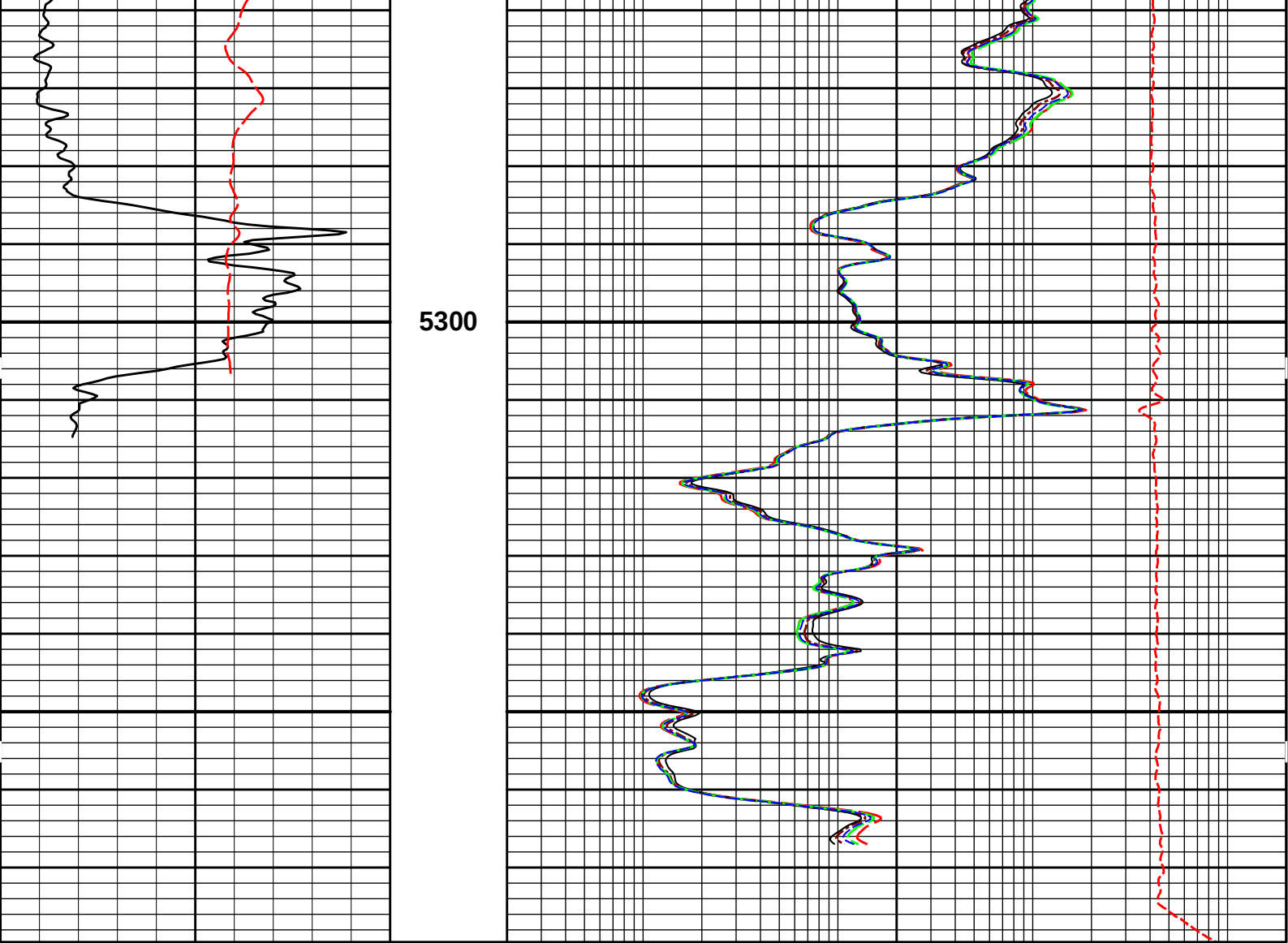
MEASURED DEPTH
MAIN SECTION 5" PER 100'

HALLIBURTON

Plot Time: 12-Apr-15 08:33:34
Plot Range: 5100 ft to 5379.58 ft
Data: PETRA_1-8\Well Based\\REPEAT\
Plot File: \\-LOCAL-\\PETRA_1-8\\0001 SP-GTET-DSN-SDL-FLEX-BSAT-BN\\ACRT\\ACRT_5_repeat_lib

REPEAT SECTION





SP		MD 1 : 240 ft	10K Tension 0	
-]20[+			pounds	
0	Gamma API 150		0.2 10in Resistivity 2ft Res 2000	
api			ohmm	
SHALE			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 2000	
			ohmm	

HALLIBURTON

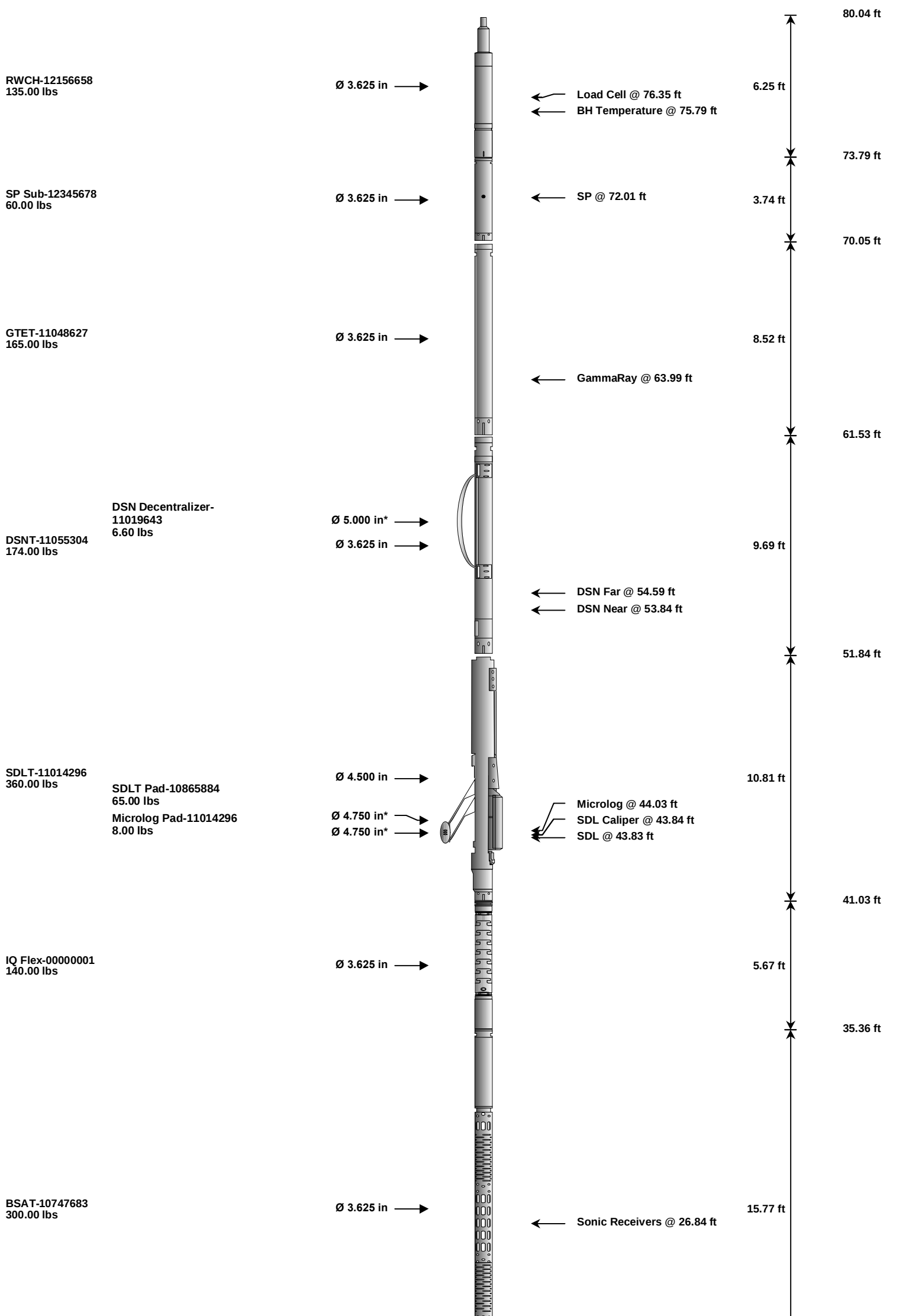
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Plot Range: 5100 ft to 5379.58 ft
Data: PETRA_1-8\Well Based\REPEAT\
Plot File: \\-LOCAL-\\PETRA_1-8\\0001 SP-GTET-DSN-SDL-FLEX-BSAT-BNIACRTIACRT_5_repeat_lib

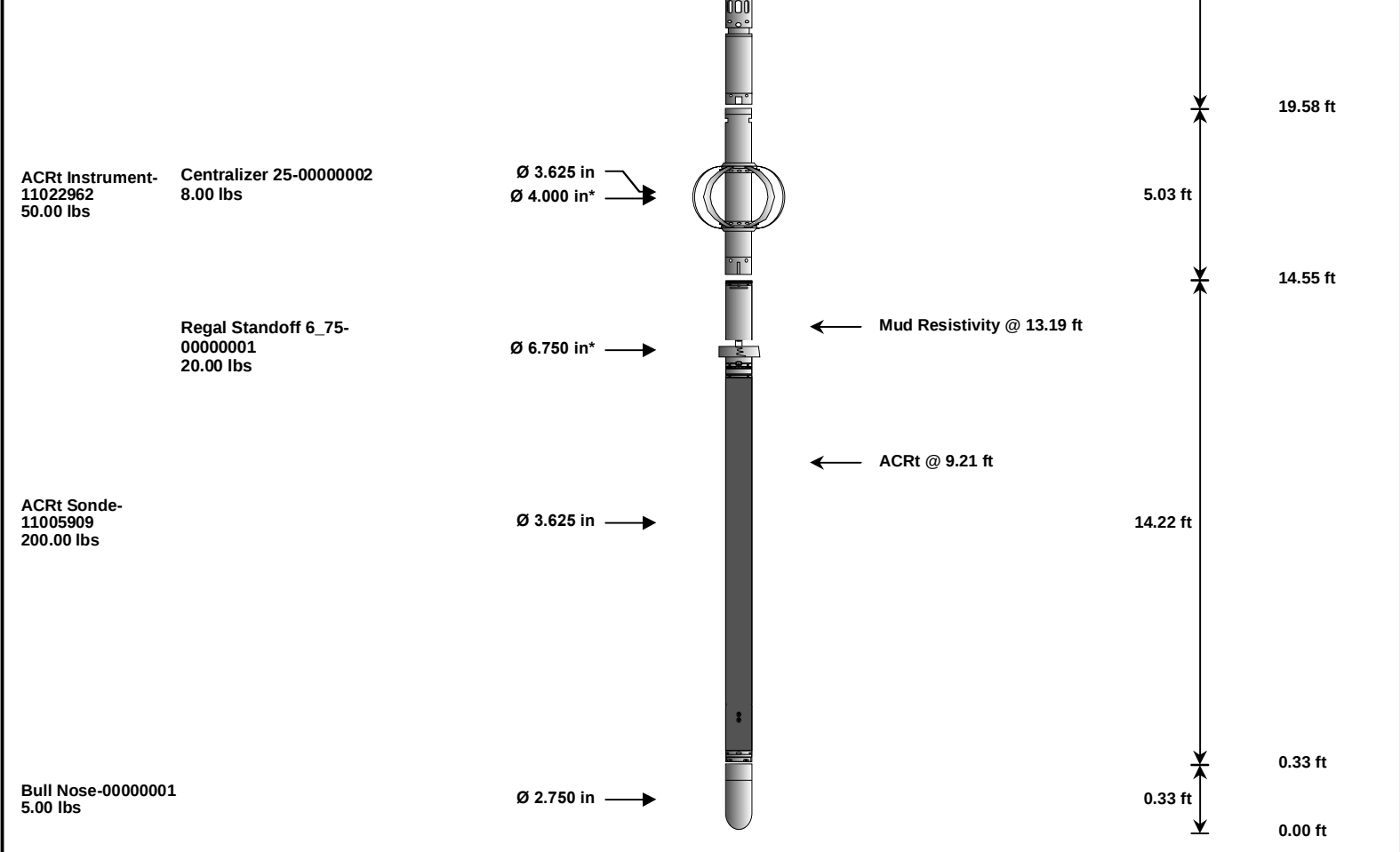
REPEAT SECTION

HALLIBURTON

TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
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Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max.Log. Speed (fpm)	
RWCH	Releasable Wireline Cable Head	12156658	135.00	6.25	73.79	300.00	
SP	SP Sub	12345678	60.00	3.74	70.05	300.00	
GTET	Gamma Telemetry Tool	11048627	165.00	8.52	61.53	60.00	
DSNT	Dual Spaced Neutron	11055304	174.00	9.69	51.84	60.00	
DCNT	DSN Decentralizer	11019643	6.60	5.13	*	55.17	300.00
SDLT	Spectral Density Tool	11014296	360.00	10.81	41.03	60.00	
SDLP	Density Insite Pad	10865884	65.00	2.55	*	43.24	60.00
MICP	Microlog Pad	11014296	8.00	1.00	*	43.53	60.00
IQF	IQ Flex tool	00000001	140.00	5.67	35.36	300.00	
BSAT	Borehole Sonic Array Tool	10747683	300.00	15.77	19.58	60.00	
ACRt	Array Compensated True Resistivity Instrument Section	11022962	50.00	5.03	14.55	120.00	
OBCEN	Centralizer - 25 in. Overbody	00000002	8.00	2.08	*	15.92	300.00
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			1,696.60	80.04			
* Not included in Total Length and Length Accumulation.							
Data: PETRA_1-8\0001 SP-GTET-DSN-SDL-FLEX-BSAT-BN\IDLE							
Date: 12-Apr-15 05:54:05							

HALLIBURTON			
CALIBRATION REPORT			
NATURAL GAMMA RAY TOOL SHOP CALIBRATION			
Tool Name:	GTET - 11048627	Reference Calibration Date:	30-Mar-15 15:50:45
Engineer:	SUHAIL BISHTI	Calibration Date:	30-Mar-15 15:53:53
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	52.6	52.1	api				
		Background + Calibrator	324.9	321.7	api				
		Calibrator	272.3	269.6	api				
NATURAL GAMMA RAY TOOL FIELD CALIBRATION									
Tool Name:		GTET - 11048627		Reference Calibration Date:	30-Mar-15 15:53:53				
Engineer:		SUHAIL BISHTI		Calibration Date:	04-Apr-15 11:01:45				
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	51.2	api				
		Background + Calibrator	321.7	320.0	api				
		Calibrator	269.6	268.8	api				
		Shop	Field	Difference	Tolerance				
		269.6	268.8	0.8	+/- 9.00				
ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION									
Tool Name:		ACRt Sonde - 11005909		Reference Calibration Date:	29-Dec-14 10:31:07				
Engineer:		J. BOLLLOM		Calibration Date:	18-Feb-15 09:38:01				
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	1.0335	1.05	0.95	1.0347	1.05	0.95	1.0301	1.05
A2 (50")	0.95	1.0208	1.05	0.95	1.0224	1.05	0.95	1.0199	1.05
A3 (29")	0.95	1.0209	1.05	0.95	1.0226	1.05	0.95	1.0184	1.05
A4 (17")	0.95	1.0226	1.05	0.95	1.0210	1.05	0.95	1.0182	1.05
A5 (10")	N/A	N/A	N/A	0.95	1.0245	1.05	0.95	1.0188	1.05
A6 (6")	N/A	N/A	N/A	0.95	0.9939	1.05	0.95	0.9899	1.05
SONDE OFFSET									
Subarray	R12KHz			R36KHz			R72KHz		
	(mmho/m)			(mmho/m)			(mmho/m)		
A1 (80")	-0.341			-3.614			-5.292		
A2 (50")	-1.566			-3.514			-4.651		
A3 (29")	-14.315			-4.432			-2.846		
A4 (17")	-103.295			-30.860			-26.404		
A5 (10")	N/A			-102.126			-46.126		
A6 (6")	N/A			286.597			151.999		
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	1.34	2.0						
72K	1.0	1.58	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	268.8	-----	0.8	+/- 9.00	api
ACRt Sonde-11005909						
Mud Cell	1.00	-----	-----	0.00	-----	ohm-m
Data: PETRA_1-8I0001 SP-GTET-DSN-SDL-FLEX-BSAT-BNIDLE					Date: 12-Apr-15 06:08:20	

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	9.300	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	5375.00	ft
	SHARED	BHT	Bottom Hole Temperature	200.0	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	SDLT	
	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	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	DNTP	Temperature Correction Type	None	
DSNT	DPRS	DSN Pressure Correction Type	None	
DSNT	SHCO	View More Correction Options	No	
DSNT	UTVD	Use TVD for Gradient Corrections?	No	
DSNT	LHWT	Logging Horizontal Water Tank?	No	
DSNT	BHSM	Borehole Size Source Tool	SDLT	
SDLT	CLOK	Process Caliper Outputs?	Yes	
SDLT Pad	DNOK	Process Density?	Yes	
SDLT Pad	DNOK	Process Density EVR?	No	
SDLT Pad	CB	Logging Calibration Blocks?	No	
SDLT Pad	SPVT	SDLT Pad Temperature Valid?	Yes	
SDLT Pad	DTWN	Disable temperature warning	No	
SDLT Pad	DMA	Formation Density Matrix	2.710	g/cc
SDLT Pad	DFL	Formation Density Fluid	1.000	g/cc
SDLT Pad	BHSM	Borehole Size Source Tool	SDLT	
Microlog Pad	MLOK	Process MicroLog Outputs?	Yes	
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 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	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	SDLT	
ACRt Sonde	MBFL	Apply Corkscrew Effect?	No	
BOTTOM				
Data: PETRA_1-8I0001 SP-GTET-DSN-SDL-FLEX-BSAT-BNIDLE			Date: 12-Apr-15 05:55:28	

COMPANY	HERMAN L. LOEB, LLC		
WELL	PETRA 1-8		
FIELD	ALFORD		
COUNTY	KIOWA	STATE	KANSAS
HALLIBURTON		ARRAY COMPENSATED TRUE RESISTIVITY LOG	