

HALLIBURTON

ARRAY COMPENSATED TRUE RESISTIVITY LOG

COMPANY	HERMAN LOEB		
WELL	HENRY TAYLOR 3-28		
FIELD	MCKINNEY		
COUNTY	MEADE		
STATE	KANSAS		
COMPANY	HERMAN LOEB	WELL	HENRY TAYLOR 3-28
FIELD	MCKINNEY	COUNTY	MEADE
COUNTY	MEADE	STATE	KANSAS
API No.	15-119-21342		Other Services:
Location	NW NW SE NW 1453' FNL & 1401' FWL		SDL DSN MICROLOG BSAT
Sect.	28	Twp.	34S
Rge.	26W		Elev.: 2358.0 ft
Drilling measured from	KB		Elev.: 2369.0 ft
Log measured from	KB		D.F.: 2369.0 ft
	KB		G.L.: 2358.0 ft

Date	11-Jul-13	
Run No.	ONE	
Depth - Driller	6600.00 ft	
Depth - Logger	6598.0 ft	
Bottom - Logged Interval	6596 ft	
Top - Logged Interval	1404 ft	
Casing - Driller	8.625 in @ 1404.0 ft	
Casing - Logger	1404.0 ft	
Bit Size	7.875 in	
Type Fluid in Hole	WATER BASED	
Density	9.0 ppg	60.00 s/qt
PH	10.00 pH	8.8 cp/m
Source of Sample	FLOW LINE	
Rm @ Meas. Temperature	0.800 ohmm @ 75.00 degF	
Rmf @ Meas. Temperature	0.70 ohmm @ 80.00 degF	
Rmc @ Meas. Temperature	0.900 ohmm @ 80.00 degF	
Source Rmf	MEASURED	MEASURED
Rm @ BHT	0.55 ohmm @ 112.0 degF	
Time Since Circulation	8.0 hr	
Time on Bottom	11-Jul-13 03:53	
Max. Rec. Temperature	112.0 degF @ 6596.0 ft	
Equipment	10549592	PVOK
Recorded By	CORY HANSSON	
Witnessed By	J. CHRISTENSEN	

Fold here

Service Ticket No.: 900572539		API Serial No.: 15-119-21342		PGM Version: WL INSITE R3.6.0 (Build 3)					
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-I	N/A	CENT	N/A	
Rmc @ Meas. Temp.		@	@		1989				
Source Rmf	Rmc								
Rm @ BHT		@	@						
Rmf @ BHT		@	@						
Rmc @ BHT		@	@						
EQUIPMENT DATA									
GAMMA		ACOUSTIC		DENSITY		NEUTRON			
Run No.	ONE	Run No.		Run No.		Run No.			
Serial No.	11021138	Serial No.		Serial No.		Serial No.			
Model No.	GTET	Model No.		Model No.		Model No.			
Diameter	3.625"	No. of Cent.		Diameter		Diameter			
Detector Model No.	T-102	Spacing		Log Type		Log Type			
Type	SCINT			Source Type		Source Type			
Length	8"	LSA [Y/N]		Serial No.		Serial No.			
Distance to Source	N/A	FWDA [Y/N]		Strength		Strength			
LOGGING DATA									
GENERAL		GAMMA		ACOUSTIC		DENSITY		NEUTRON	

Run No.	GENERAL		Speed ft/min	GAMMA		ACOUSTIC		Matrix	DENSITY		Matrix	NEUTRON		Matrix
	Depth			Scale		Scale			Scale			Scale		
	From	To		L	R	L	R		L	R		L	R	
ONE	TD	CSG	REC	0	150									

DIRECTIONAL INFORMATION

Maximum Deviation @ KOP @

Remarks: ANNULAR HOLE VOLUME CALCULATED USING 5.5-IN CASING

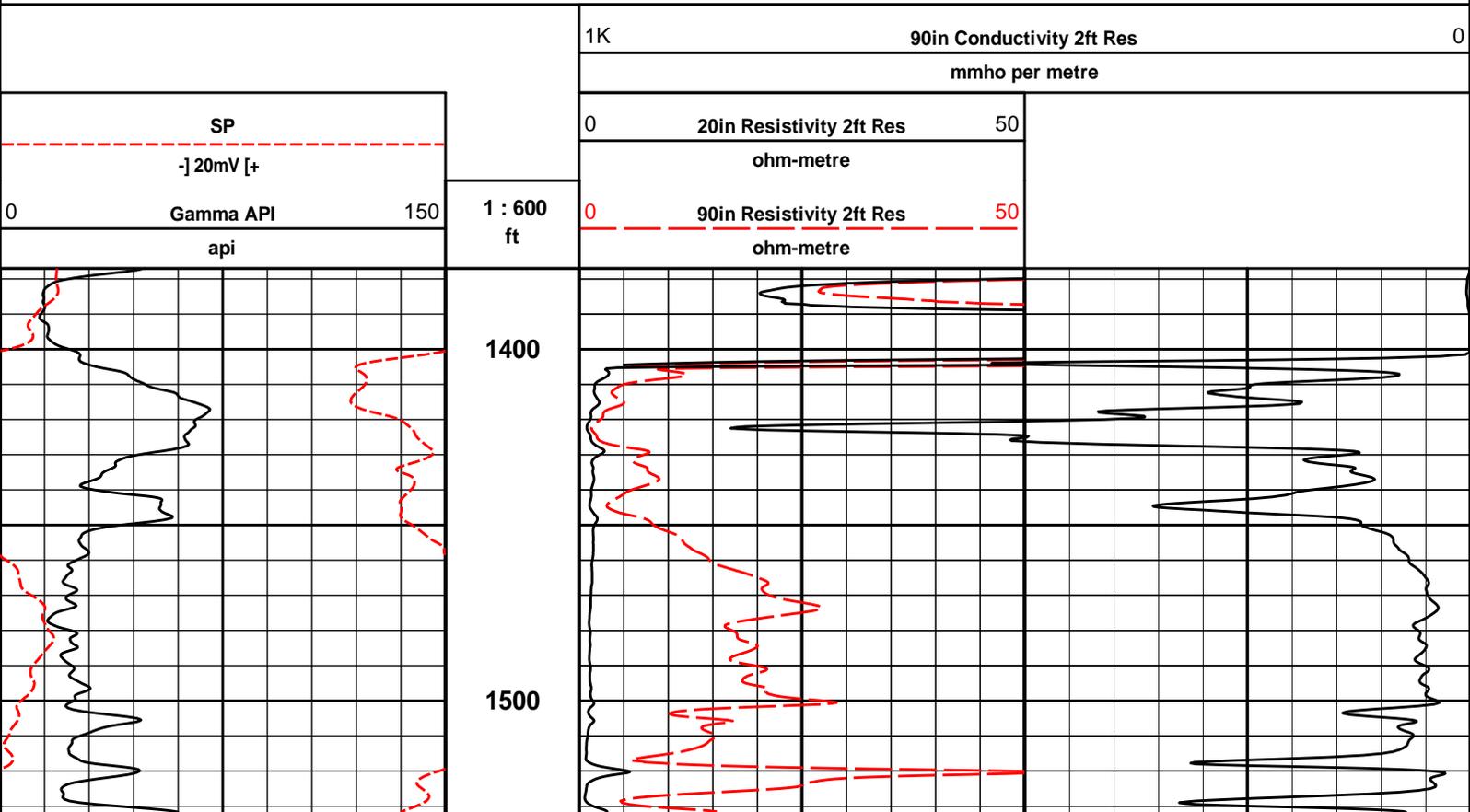
HALLIBURTON DOES NOT GUARANTEE THE ACCURACY OF ANY INTERPRETATION OF THE LOG DATA, CONVERSION OF LOG DATA TO PHYSICAL ROCK PARAMETERS OR RECOMMENDATIONS WHICH MAY BE GIVEN BY HALLIBURTON PERSONNEL OR WHICH APPEAR ON THE LOG OR IN ANY OTHER FORM. ANY USER OF SUCH DATA, INTERPRETATIONS, CONVERSIONS, OR 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.

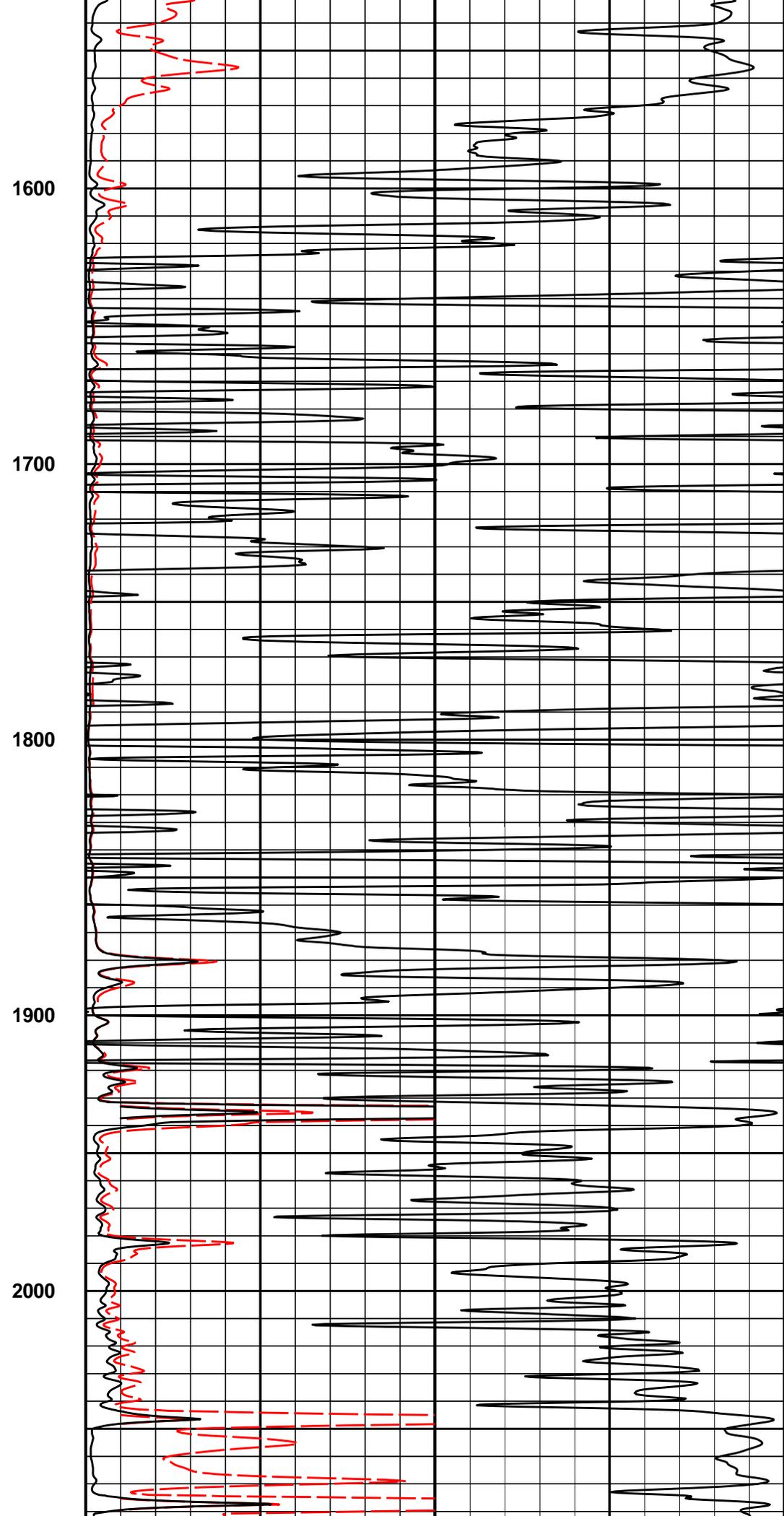
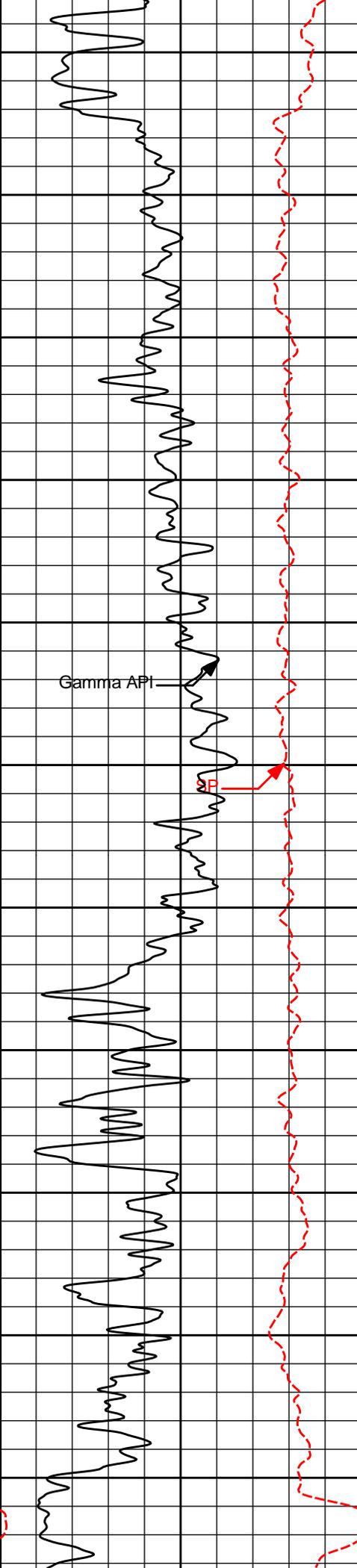
HALLIBURTON

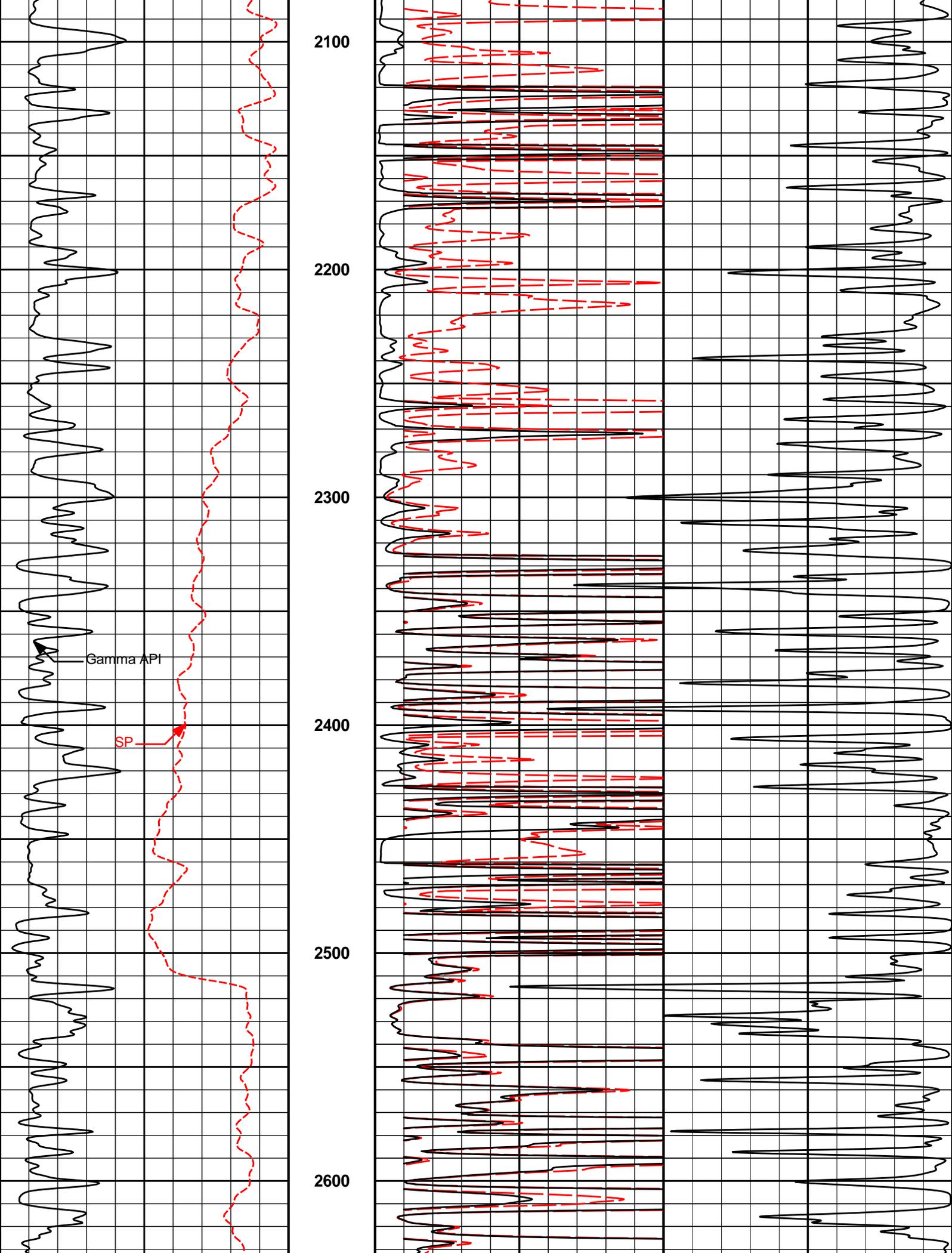


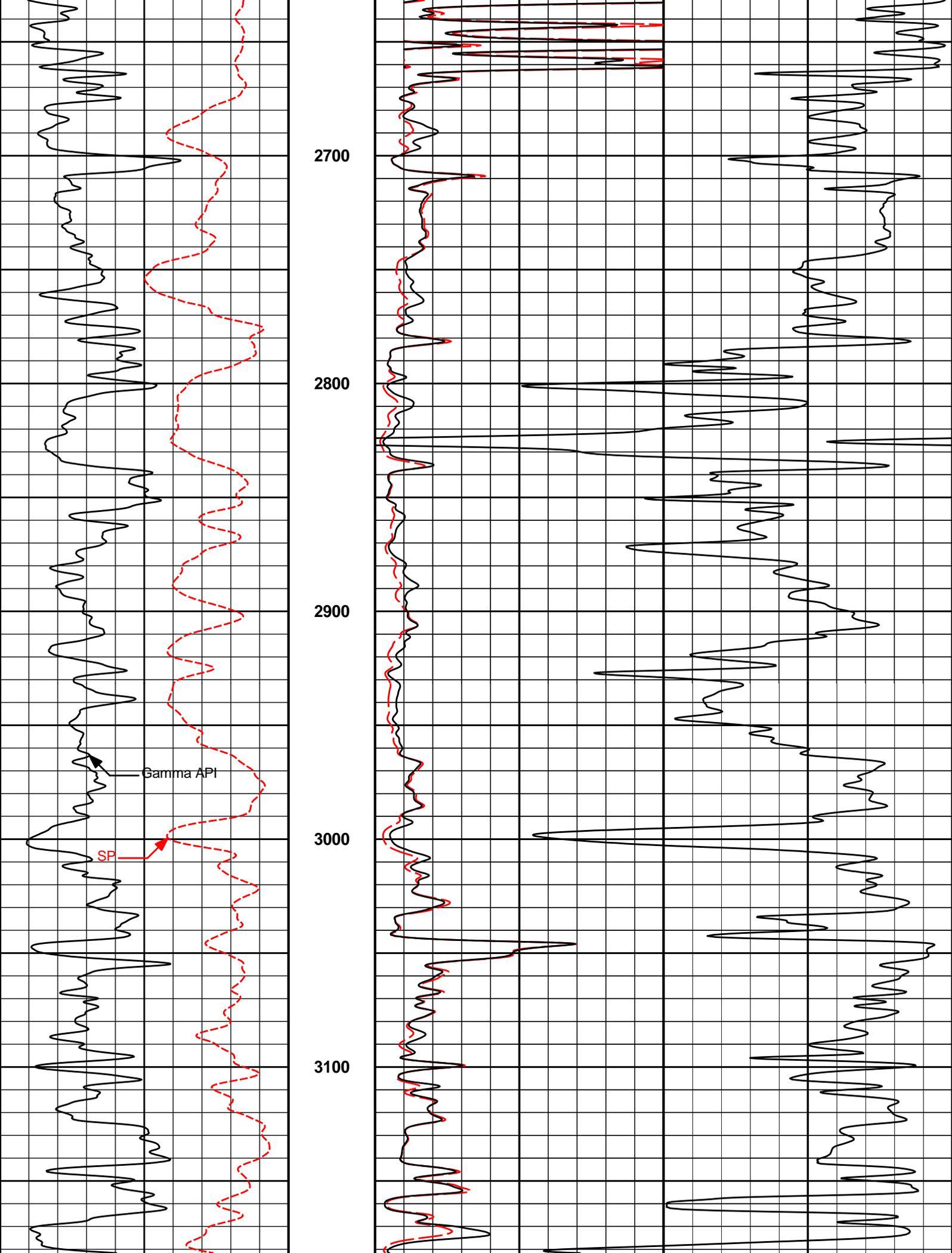
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 Plot Range: 1377 ft to 6599.5 ft
 Data: HENRY_TAYLOR328\Well Based\MAIN_RESIST_SONIC\
 Plot File: \\-LOCAL-\HENRY_TAYLOR328\0001 BLACK_BSAT_ACRT\RESIST1_ACRT_2inx

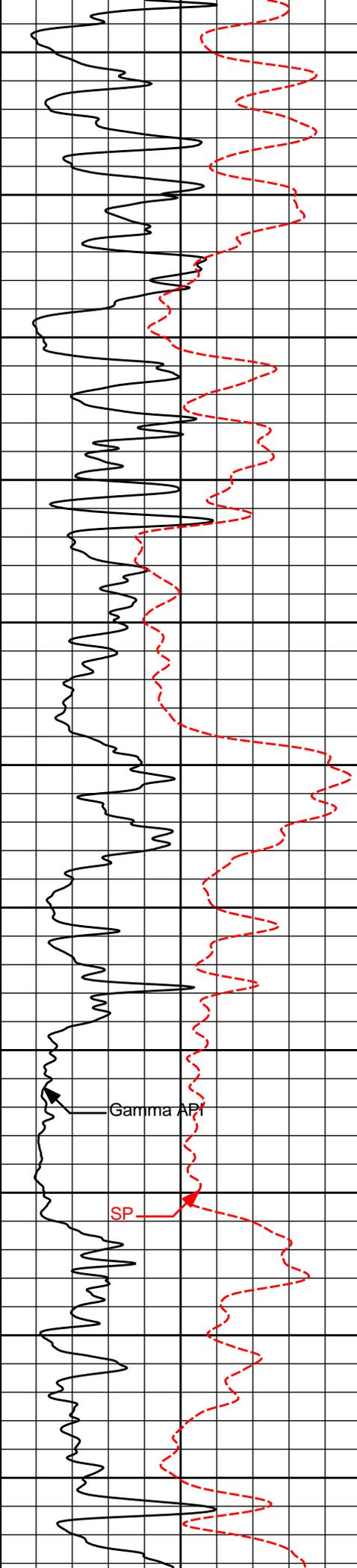
2 INCH MAIN LOG



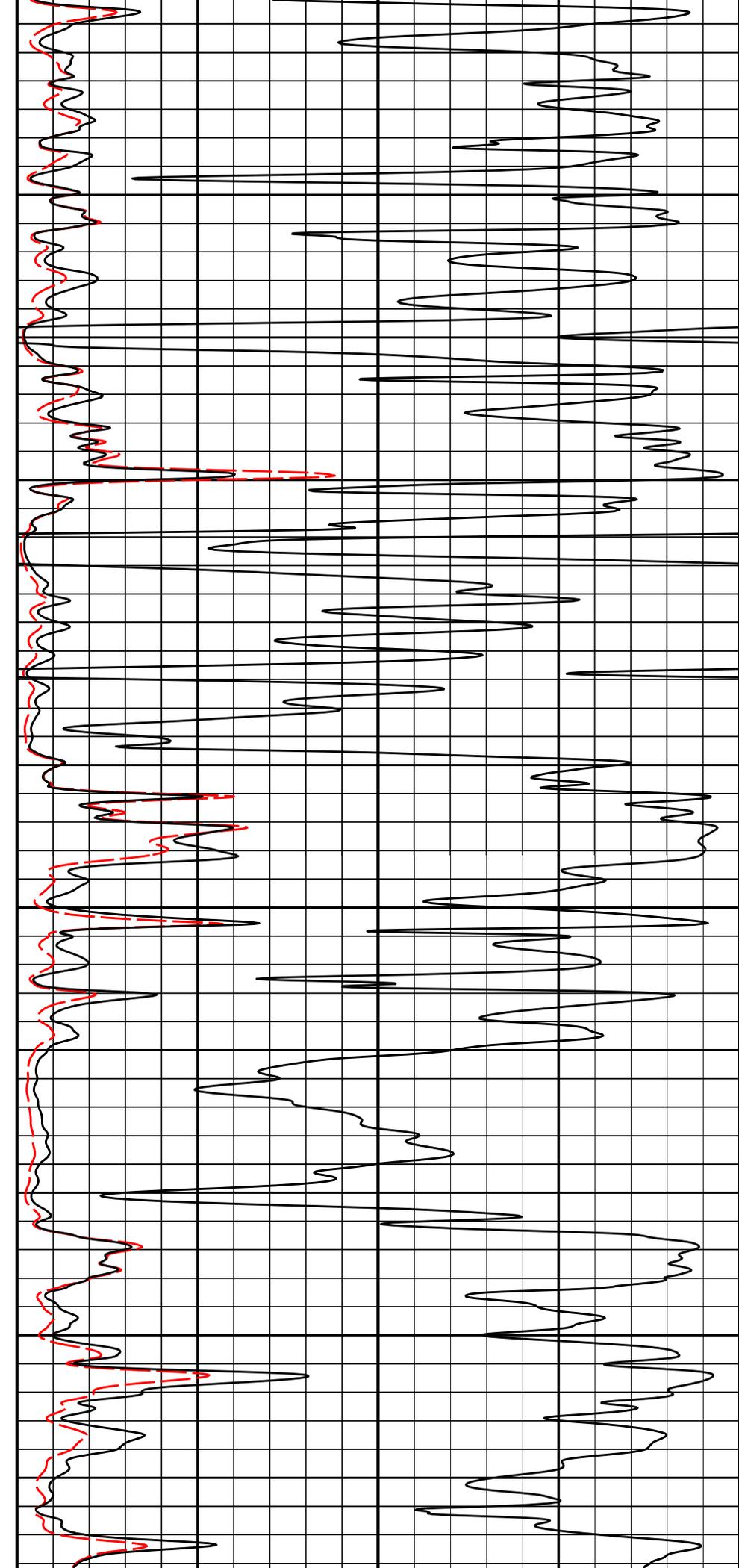


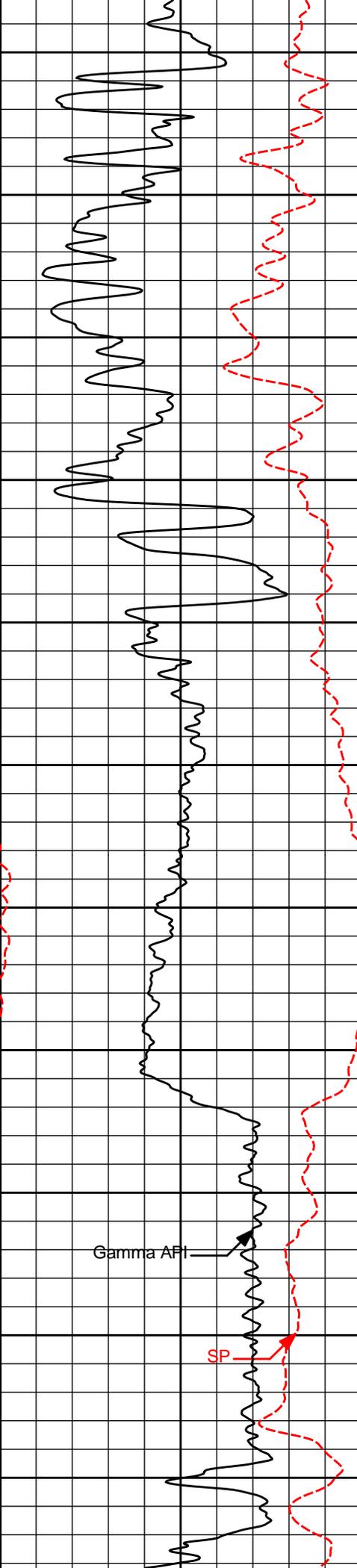






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3300
3400
3500
3600
3700





3800

3900

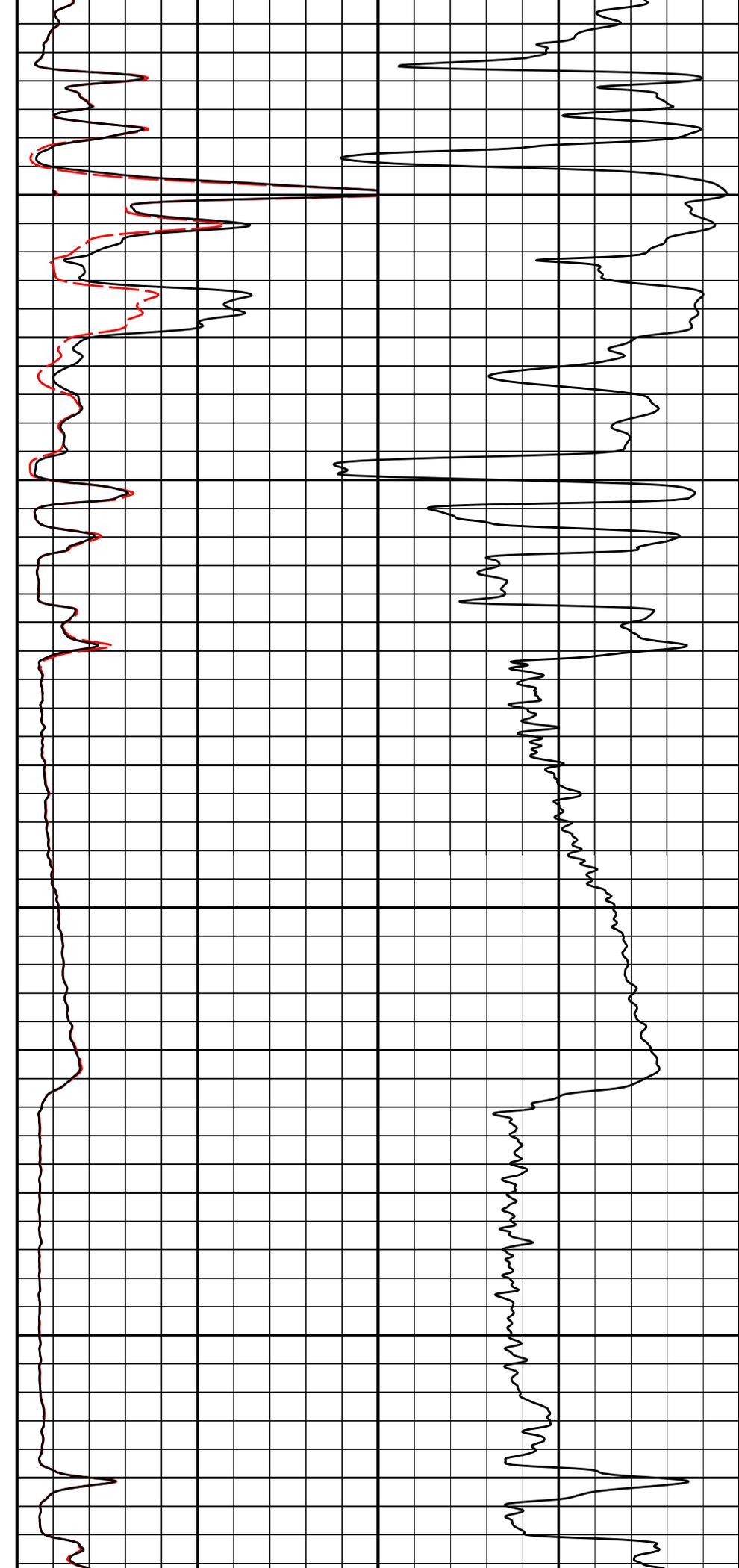
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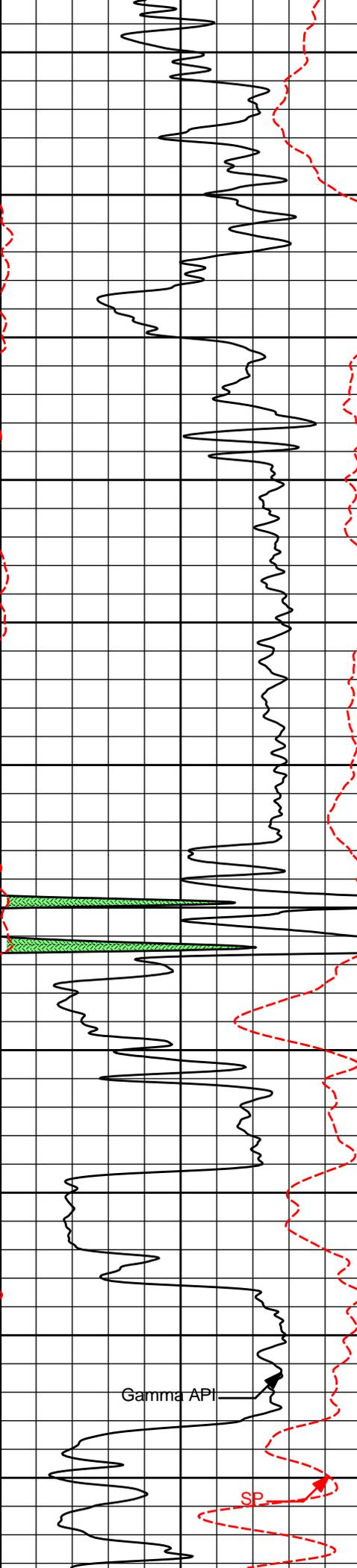
4100

4200

Gamma AFI

SP





4300

4400

4500

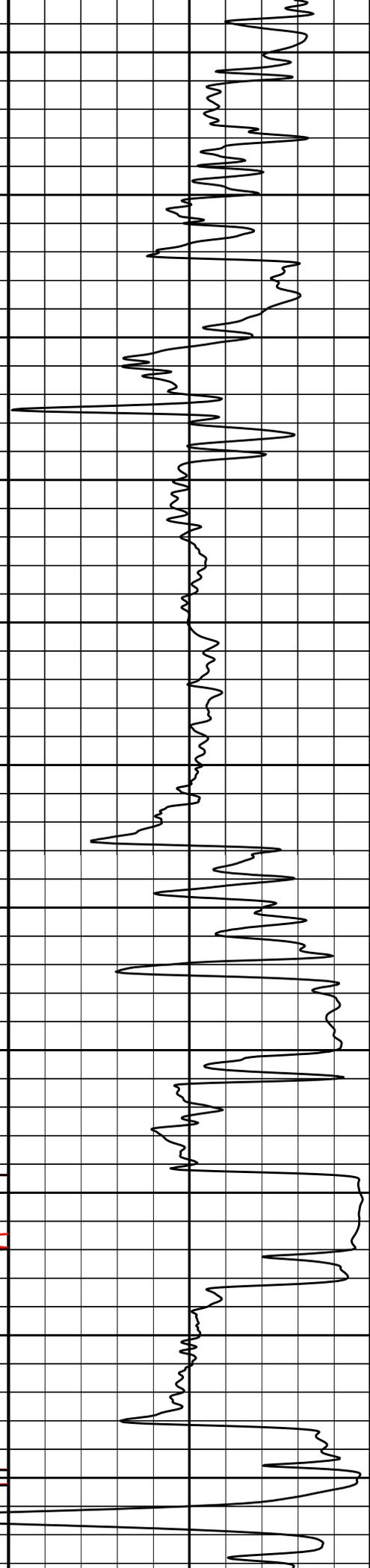
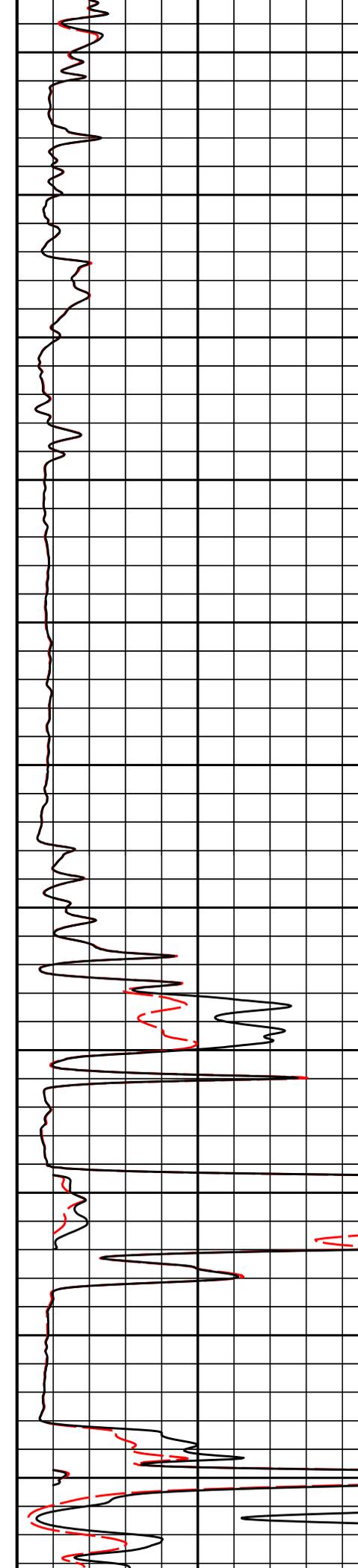
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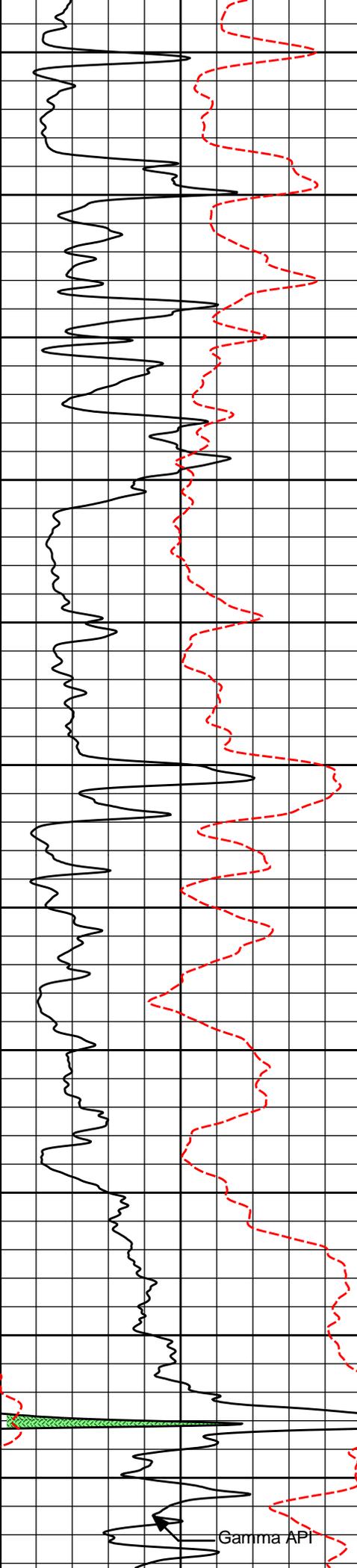
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4800

Gamma API

sp





4900

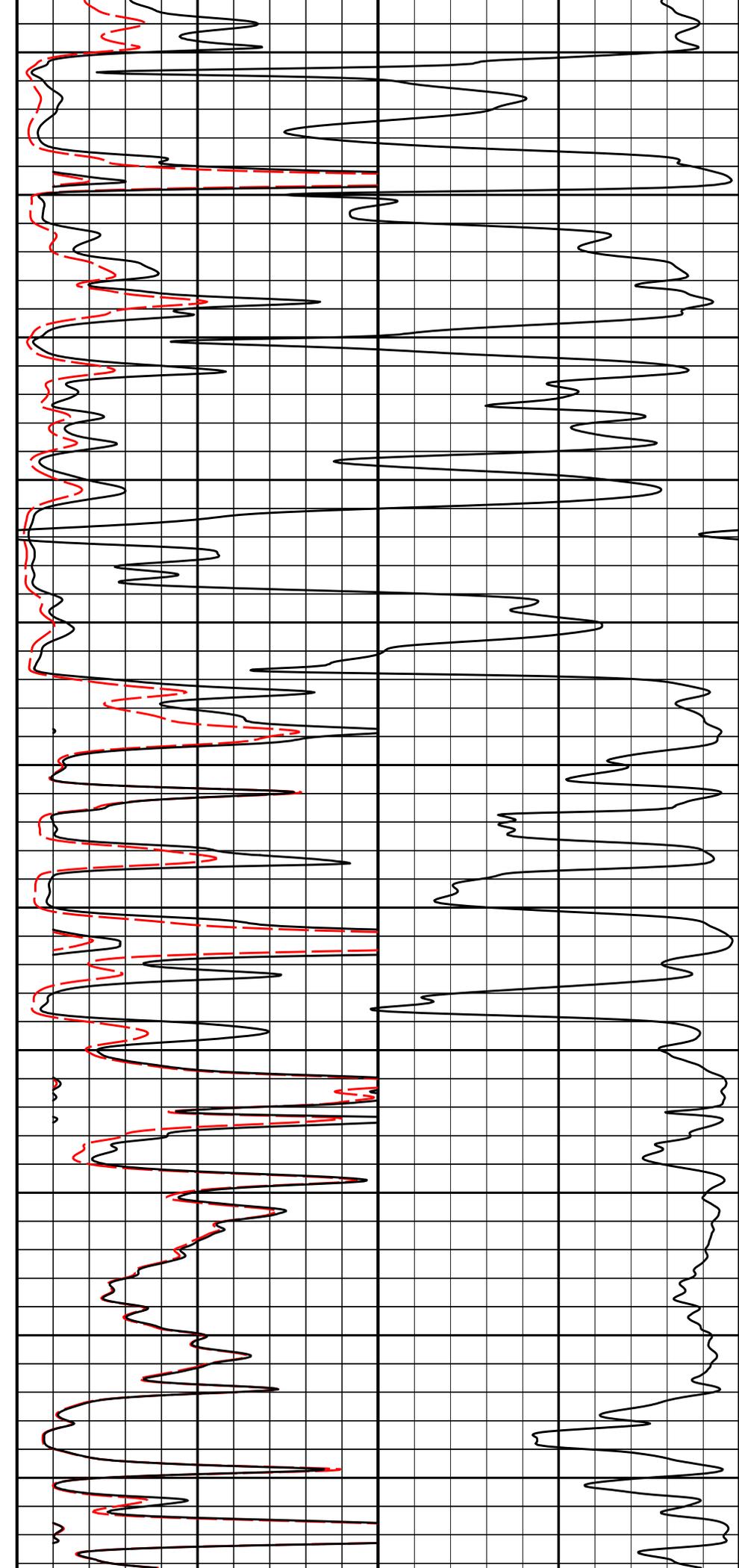
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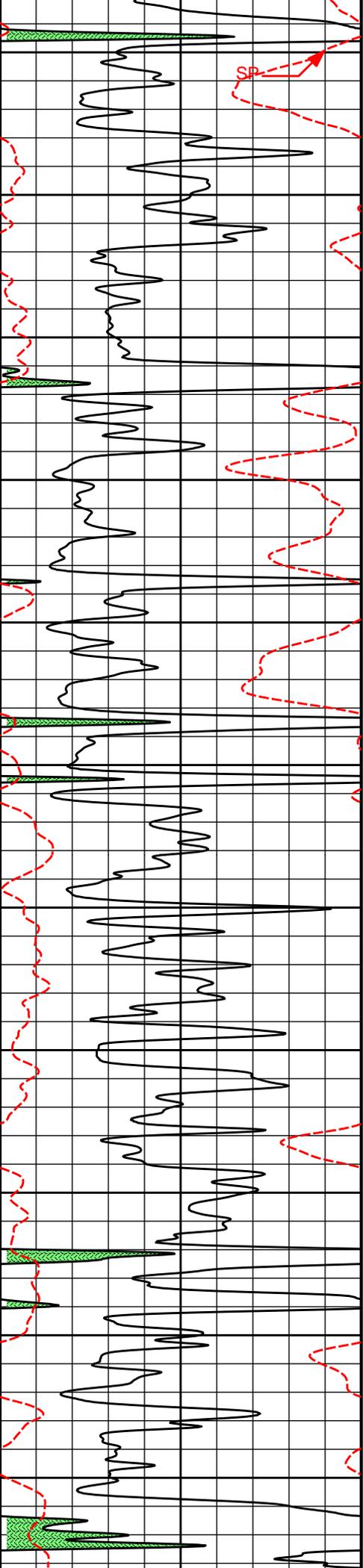
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5200

5300

Gamma API





5400

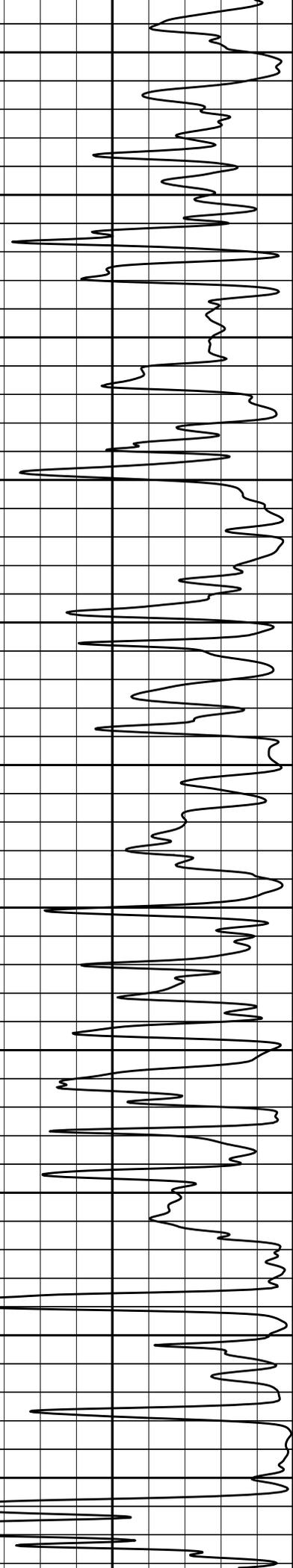
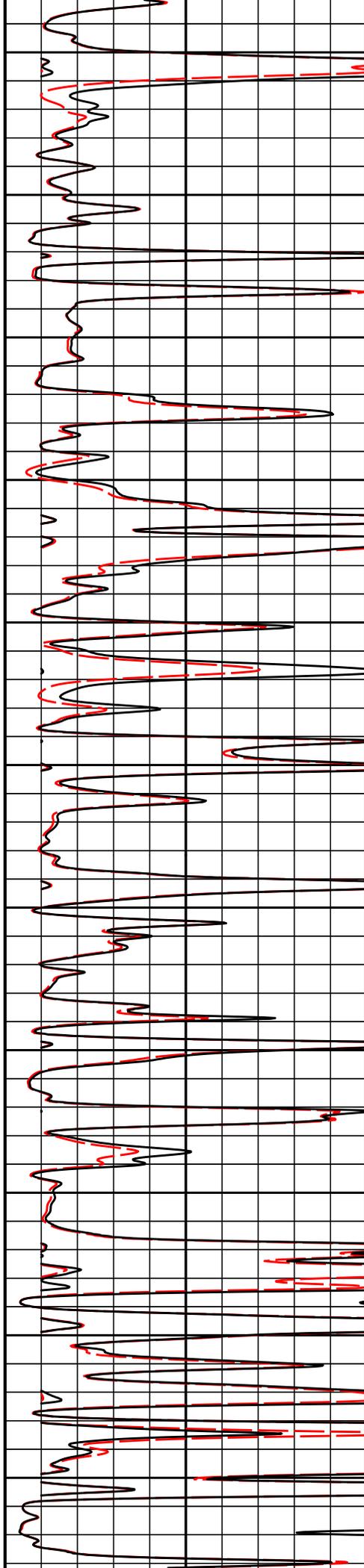
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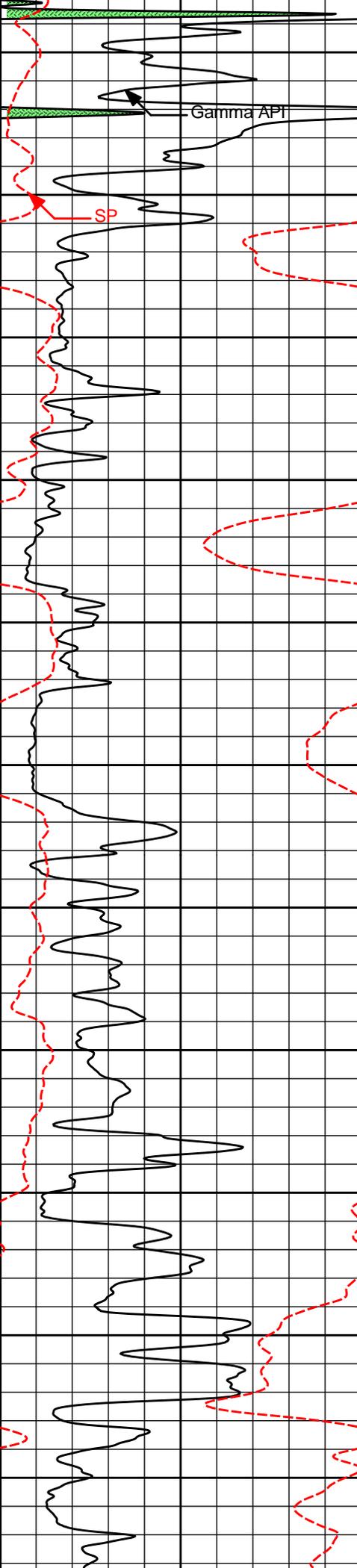
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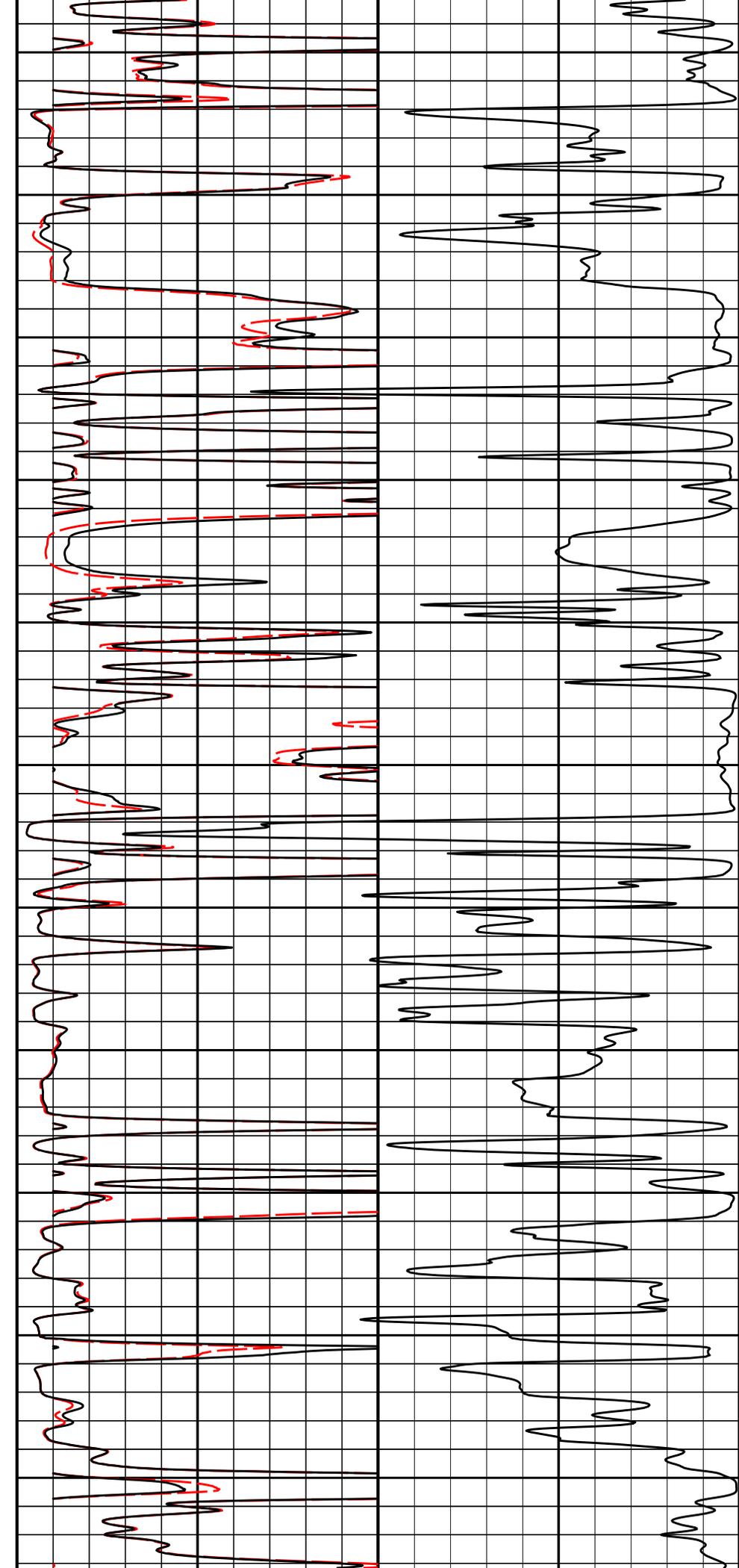
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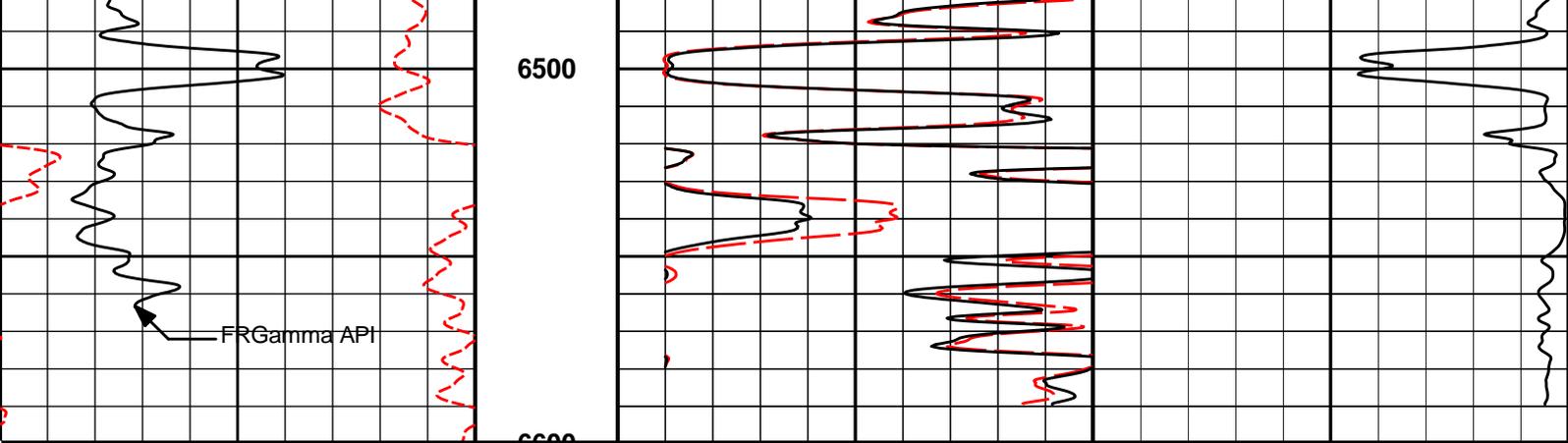
6100

6200

6300

6400





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

HALLIBURTON

Plot Time: 11-Jul-13 06:37:39
 Plot Range: 1377 ft to 6599.5 ft
 Data: HENRY_TAYLOR328\Well Based\MAIN_RESIST_SONIC\
 Plot File: \\LOCAL\HENRY_TAYLOR328\0001 BLACK_BSAT_ACRT\RESIST1_ACRT_2inx

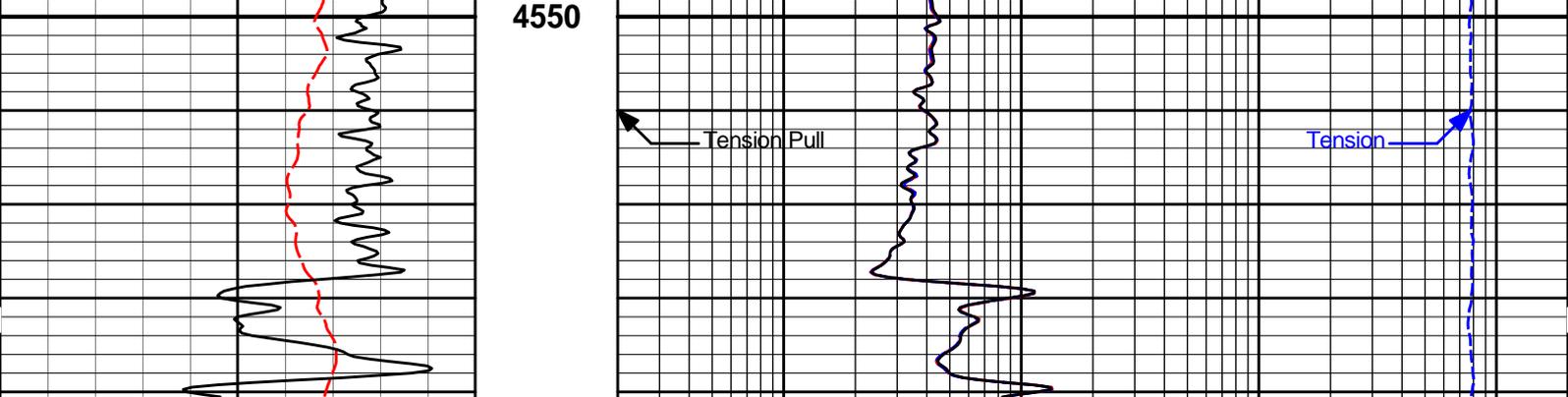
2 INCH MAIN LOG

HALLIBURTON

Plot Time: 11-Jul-13 06:37:39
 Plot Range: 4548 ft to 6602.17 ft
 Data: HENRY_TAYLOR328\Well Based\MAIN_RESIST_SONIC\
 Plot File: \\LOCAL\HENRY_TAYLOR328\0001 BLACK_BSAT_ACRT\RESIST1_ACRT_5_mainx

5 INCH MAIN LOG

			0.2	90in Resistivity 2ft Res	2000	
				ohm-metre		
			0.2	60in Resistivity 2ft Res	2000	
				ohm-metre		
0	Gamma API	150	Tension Pull	0.2	20in Resistivity 2ft Res	2000
	api		10		ohm-metre	
	SP		1 : 240 ft	15K	Tension	0
	-] 20 mV [+]				pounds	





4600

4650

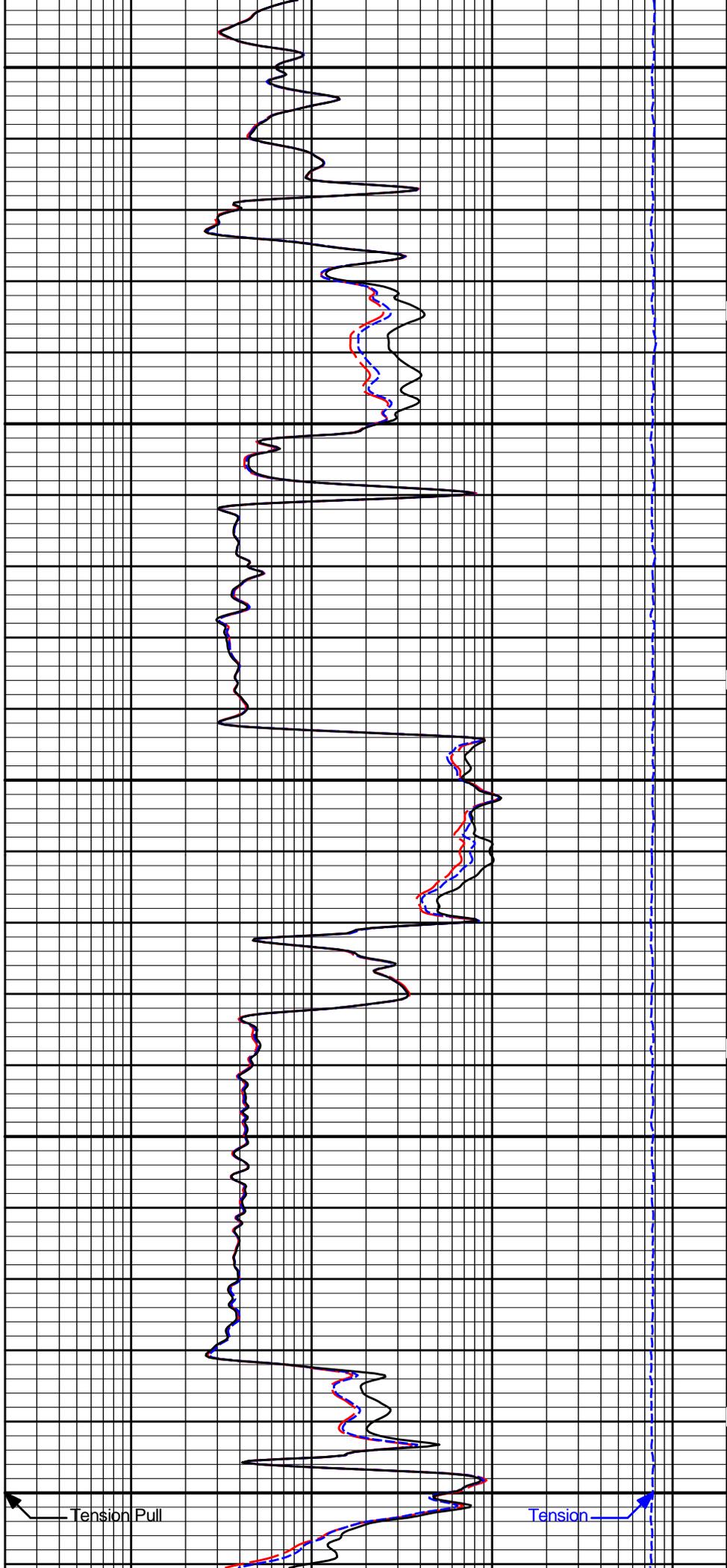
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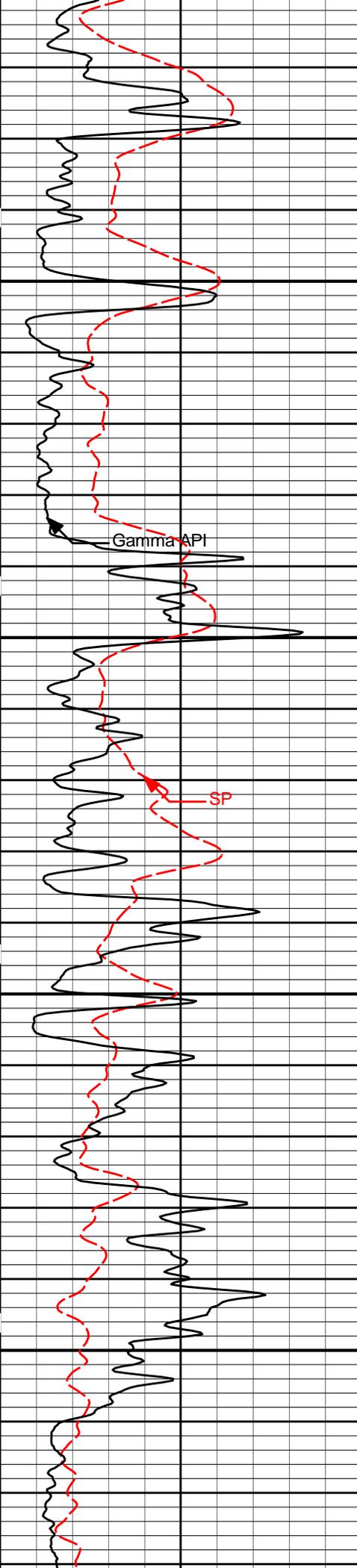
Gamma API

SP



Tension Pull

Tension

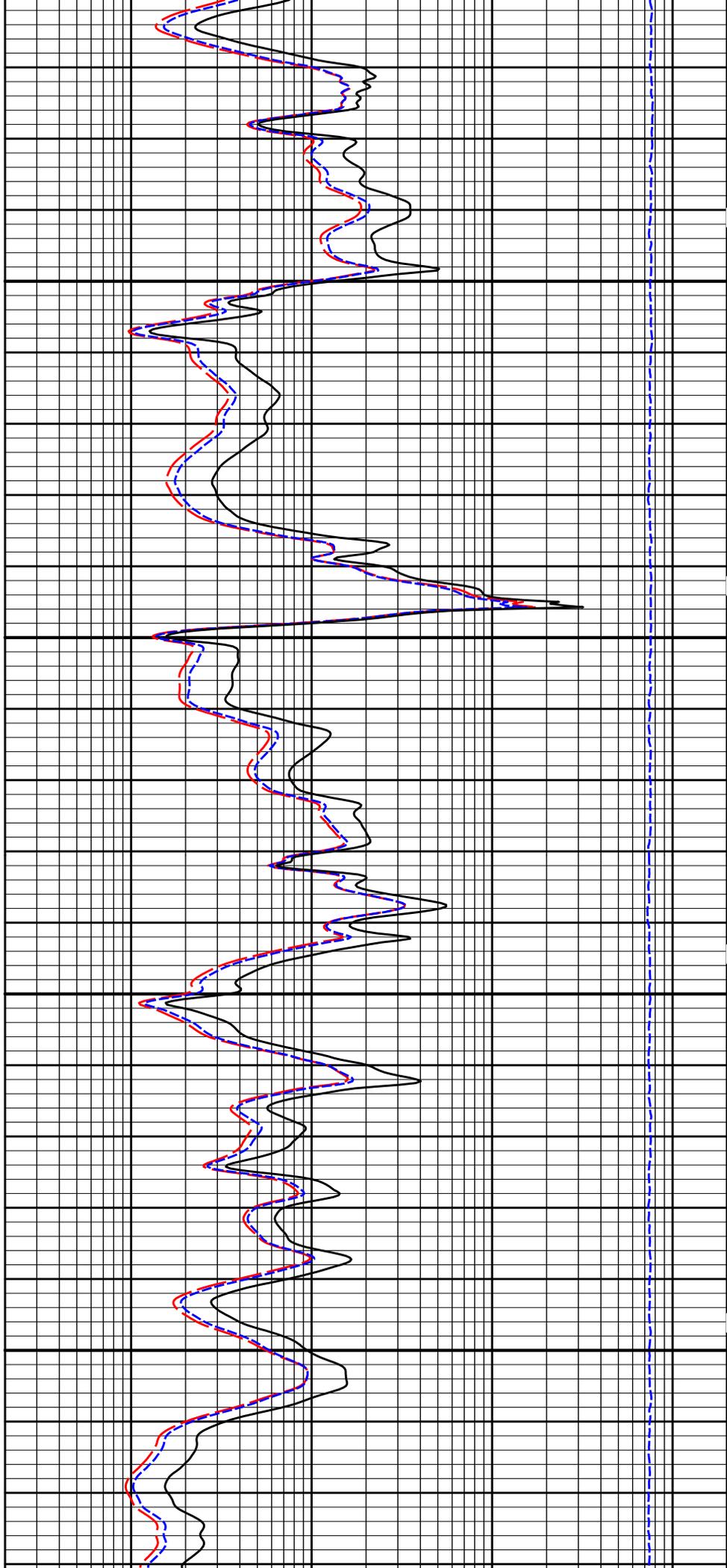


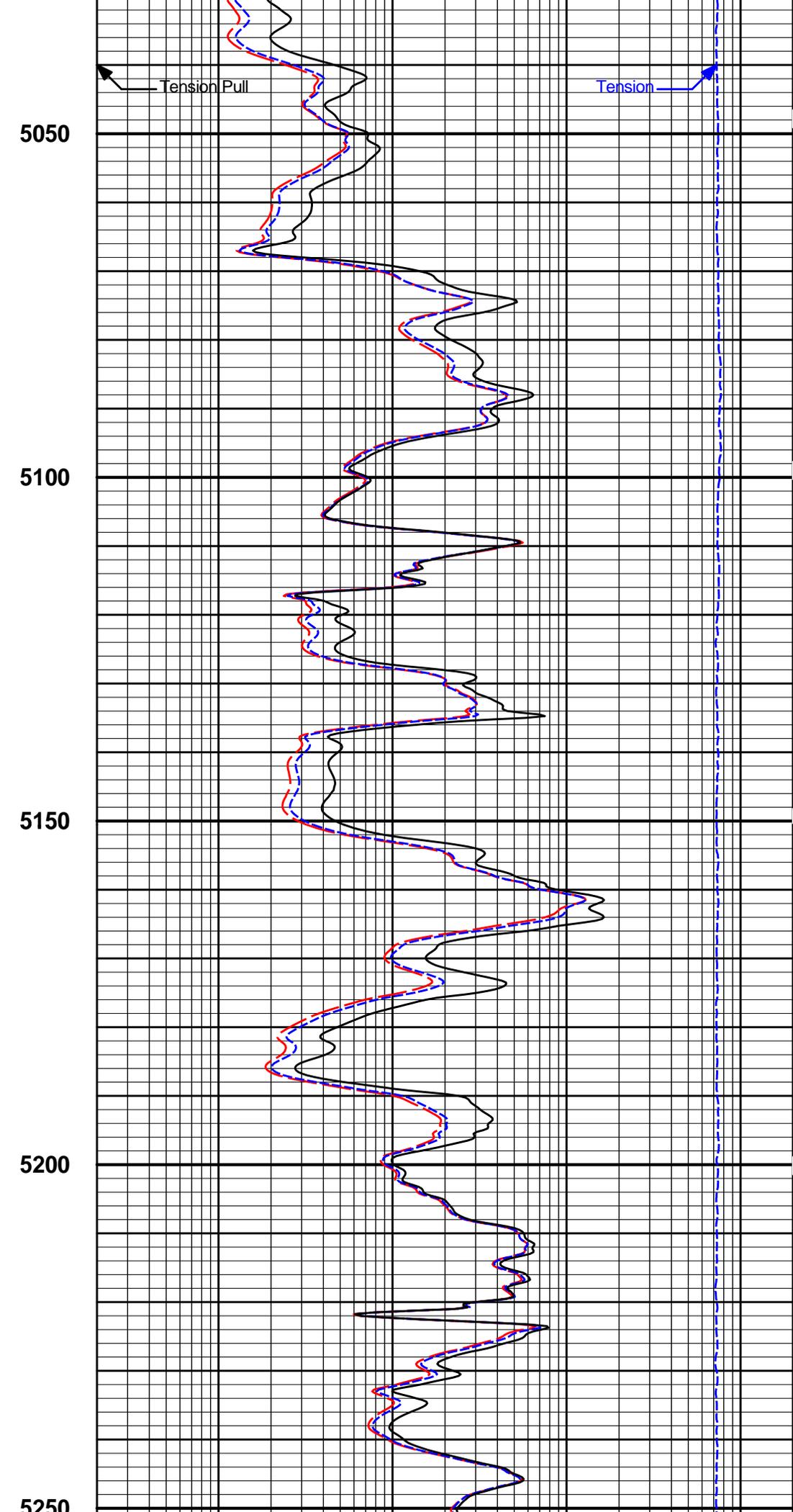
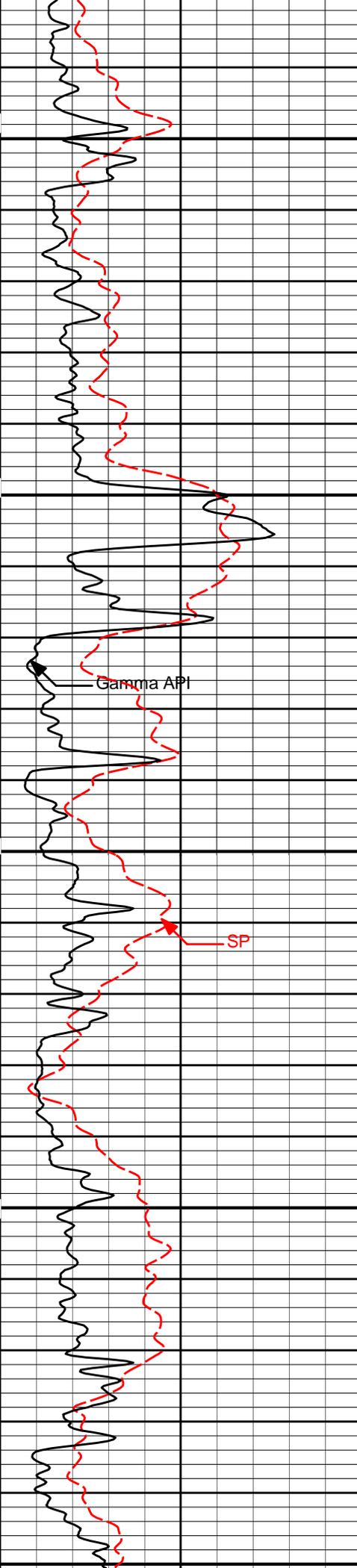
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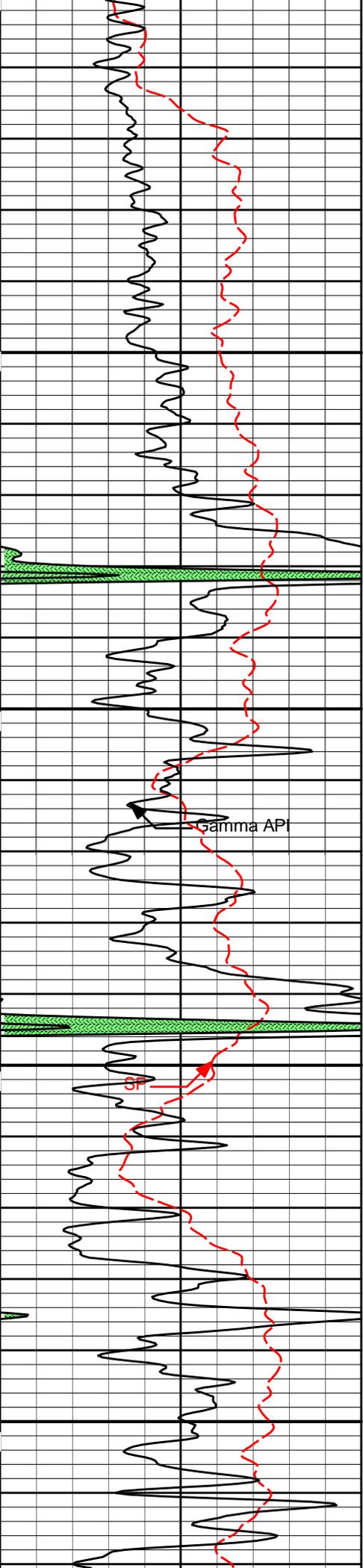
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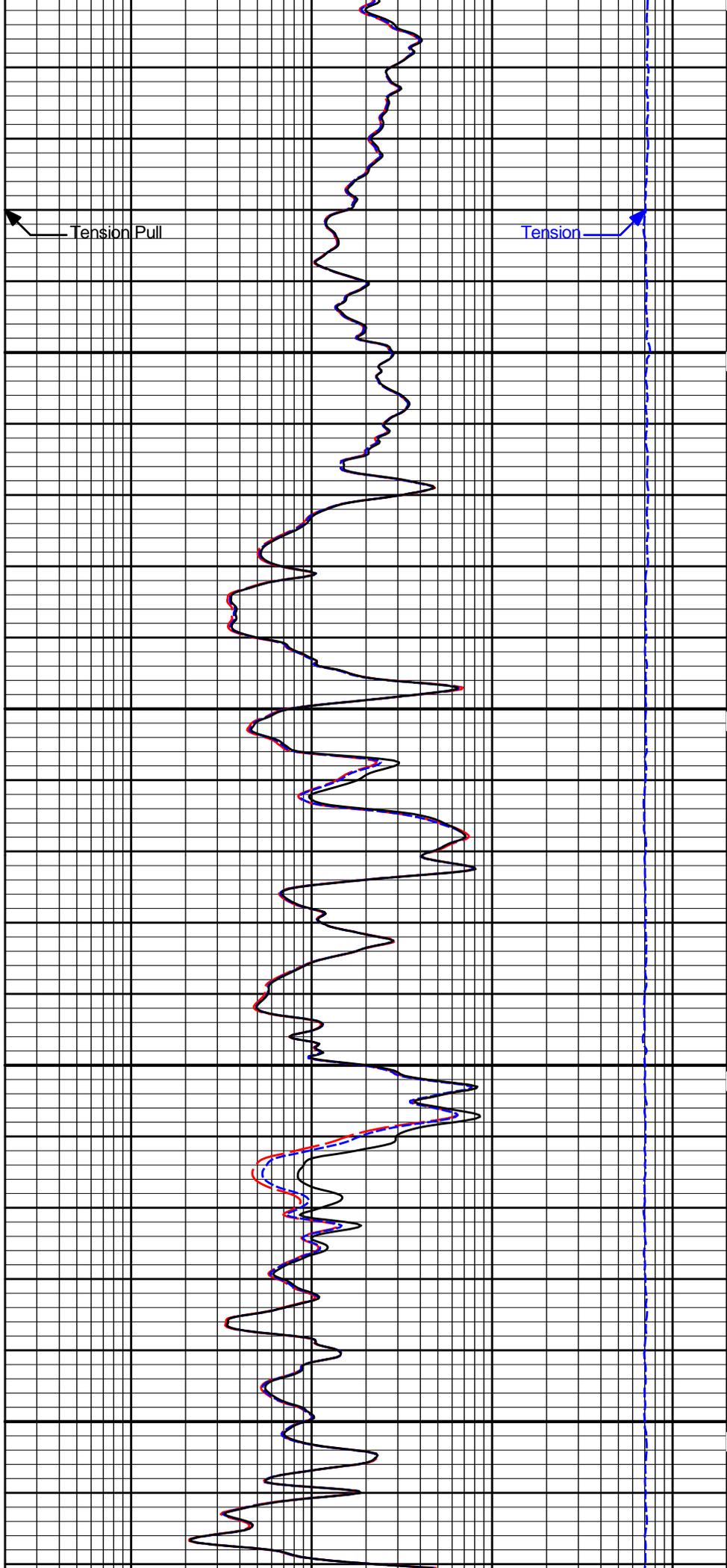
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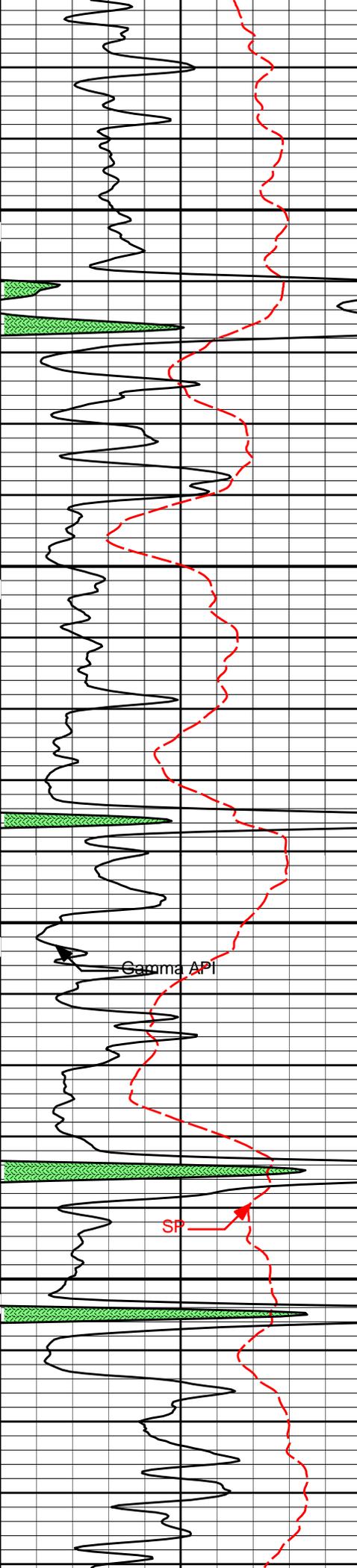






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5300
5350
5400
5450



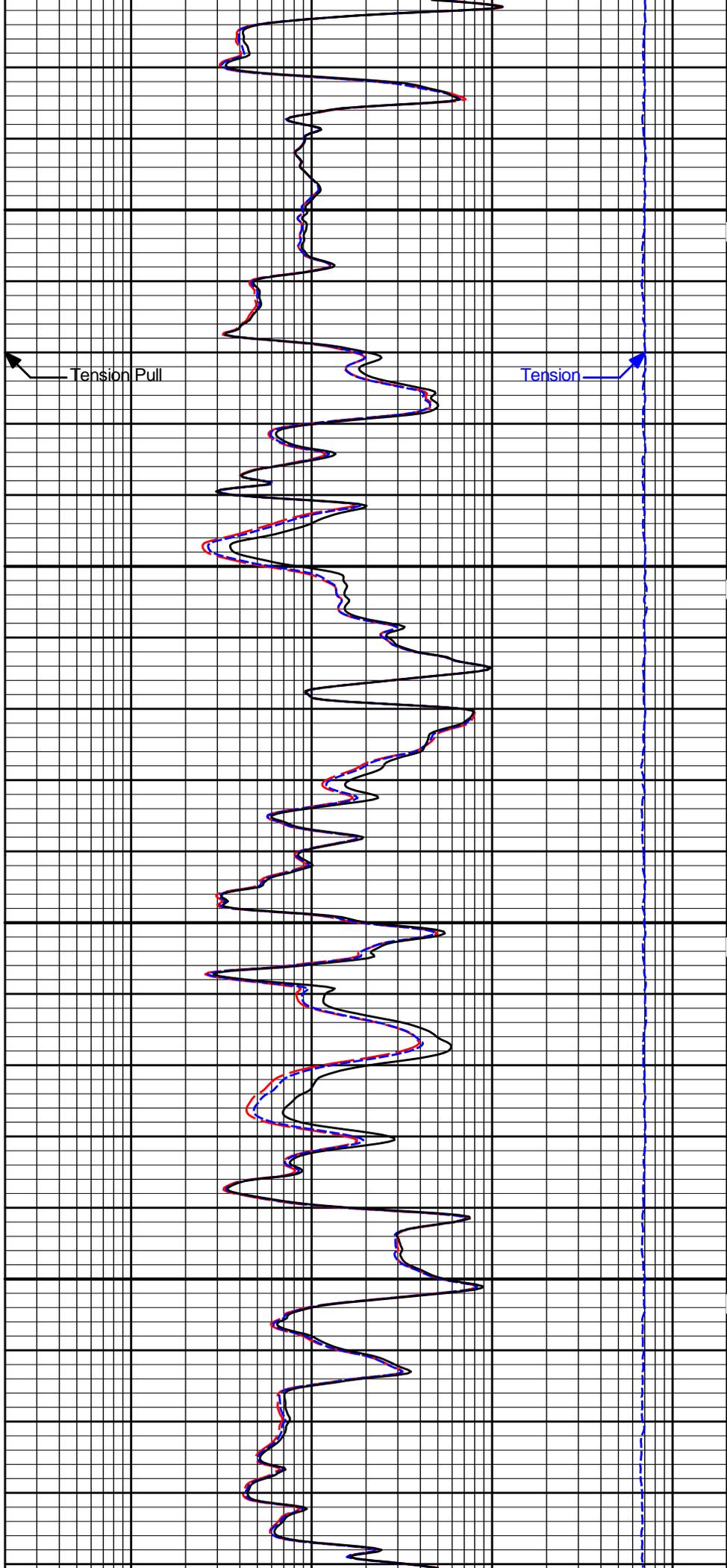


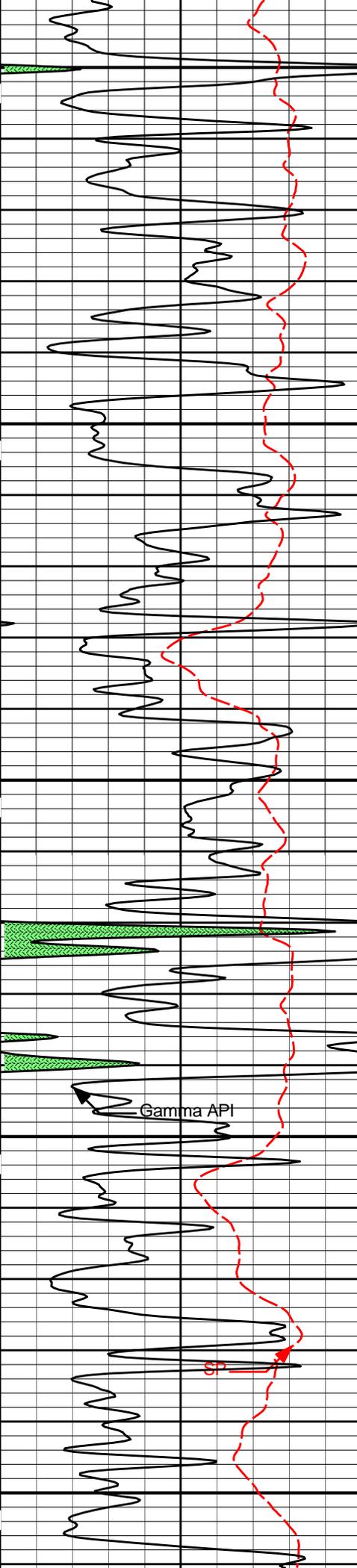
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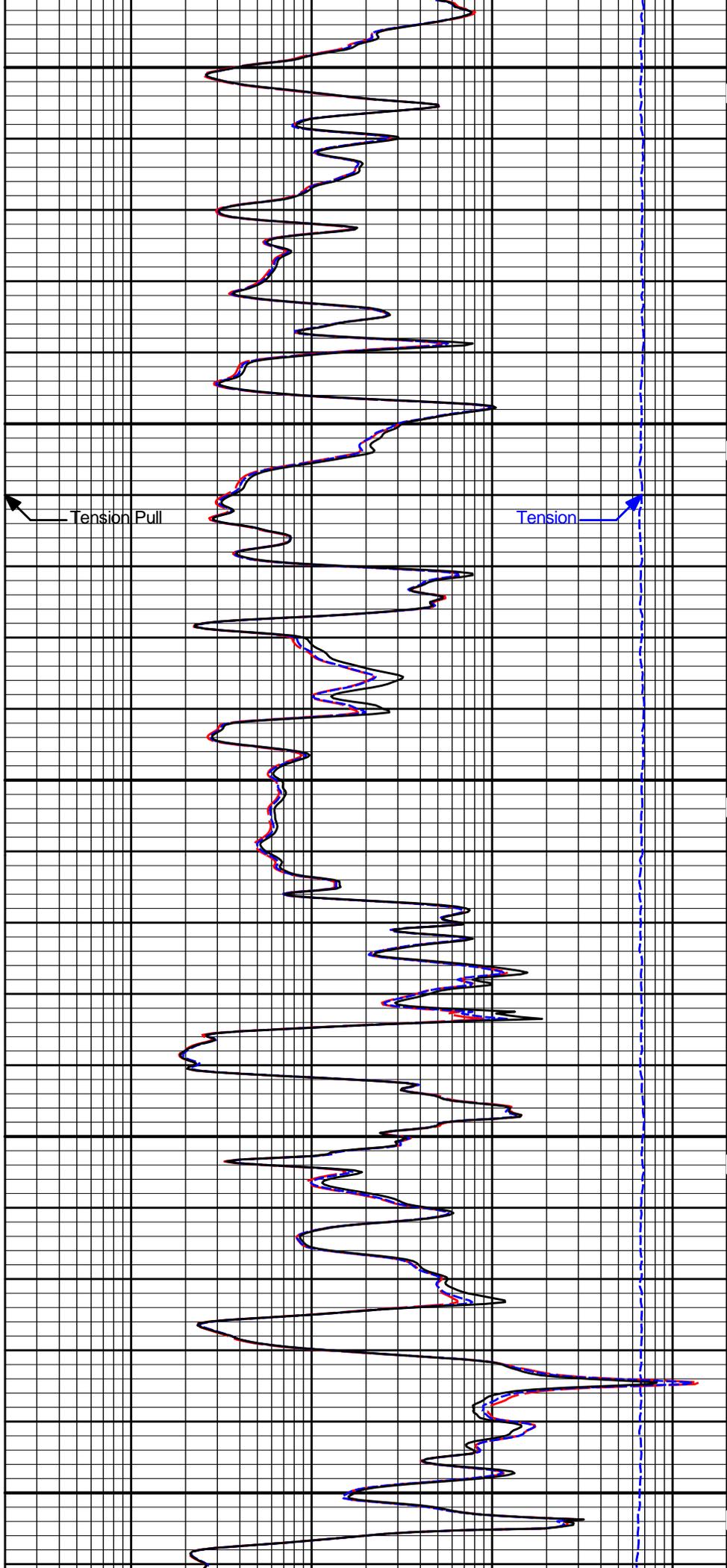
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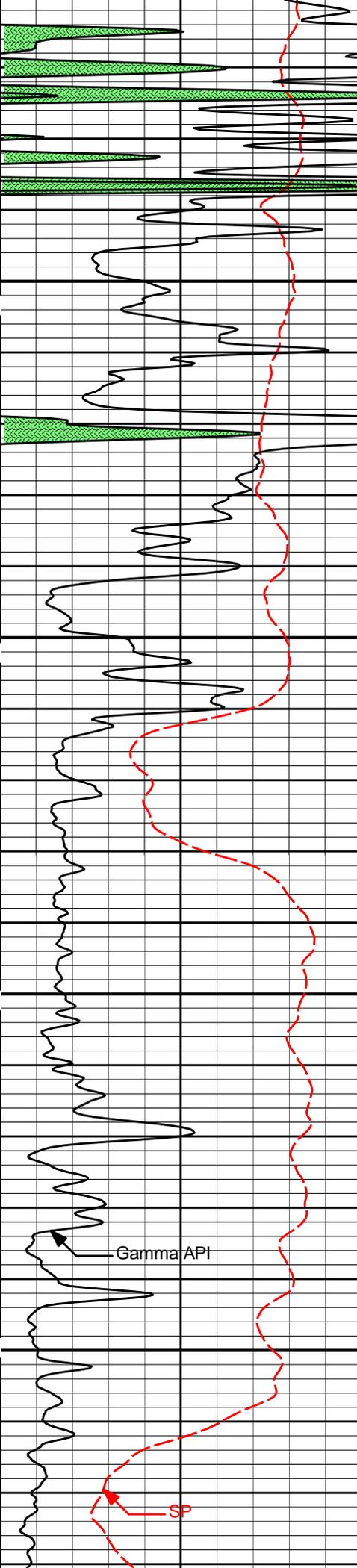
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5900



Tension Pull

Tension

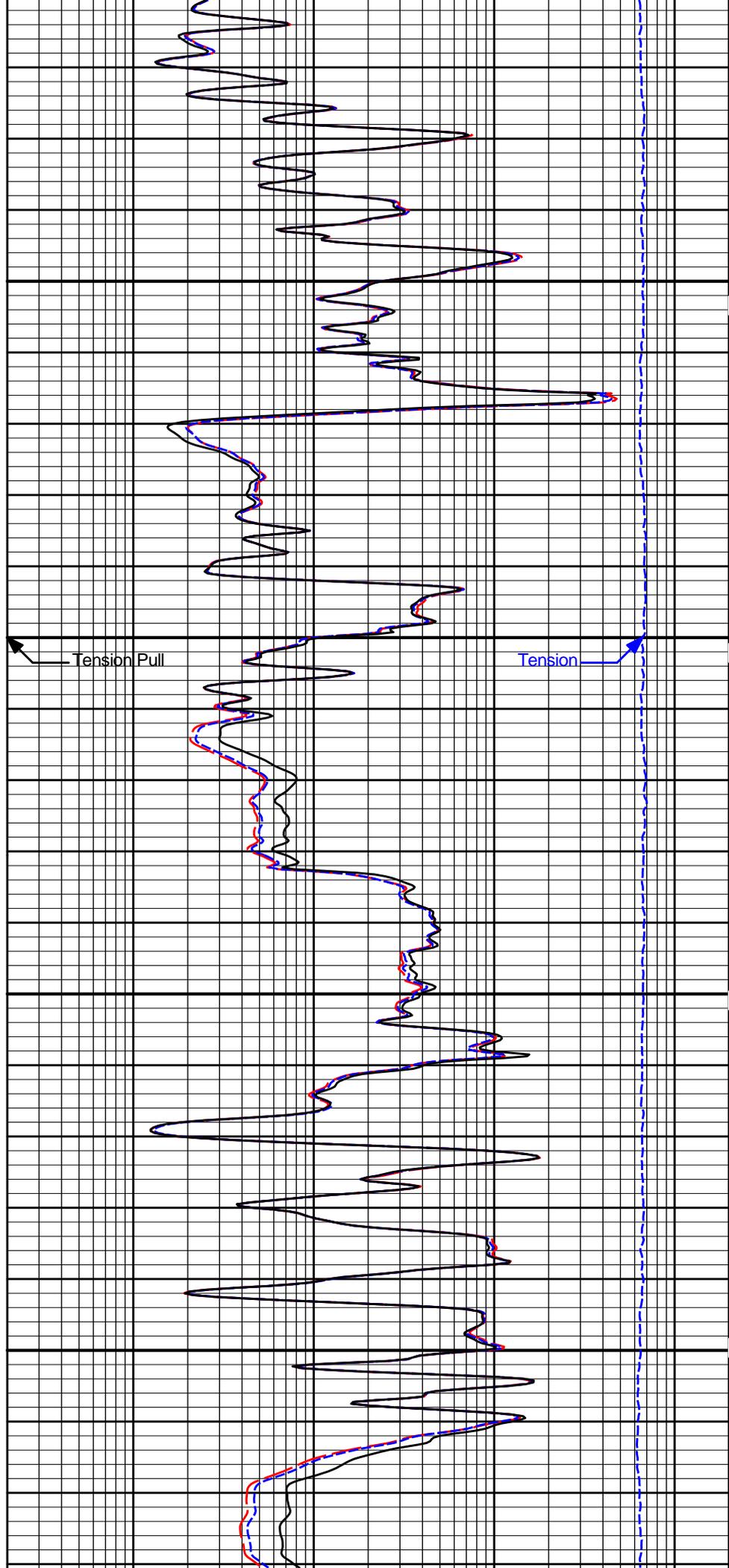


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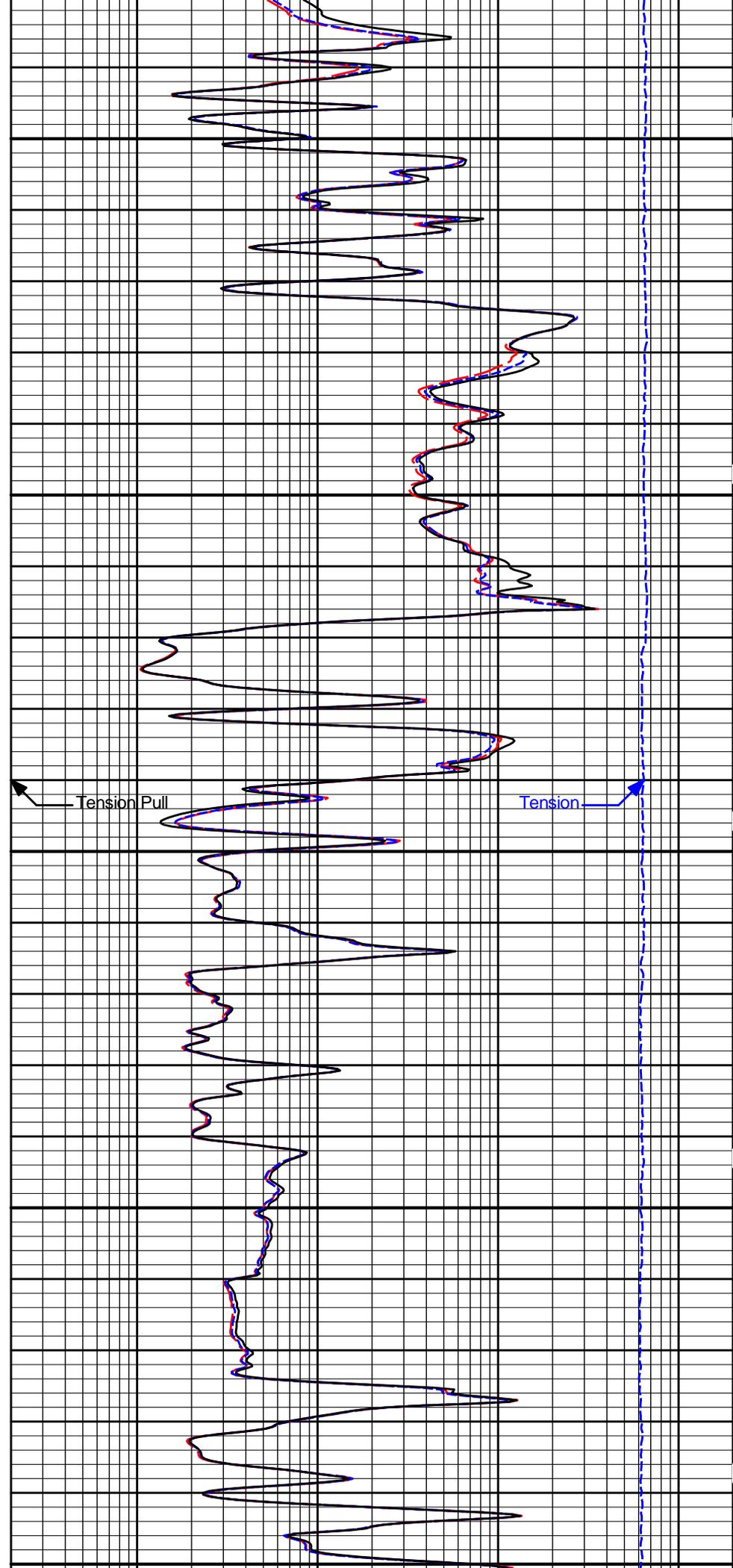
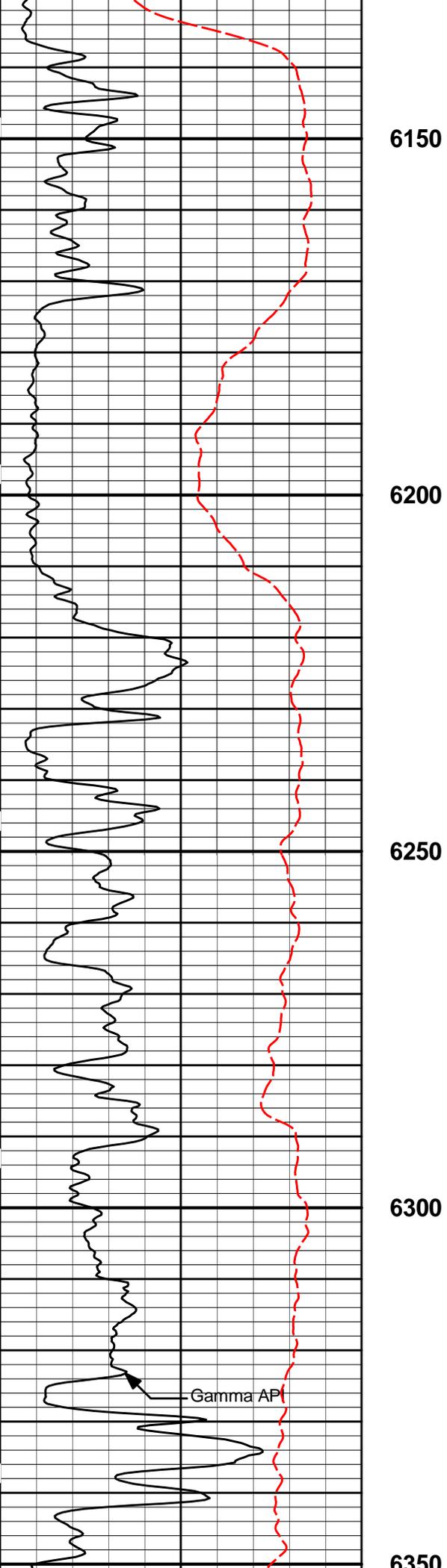
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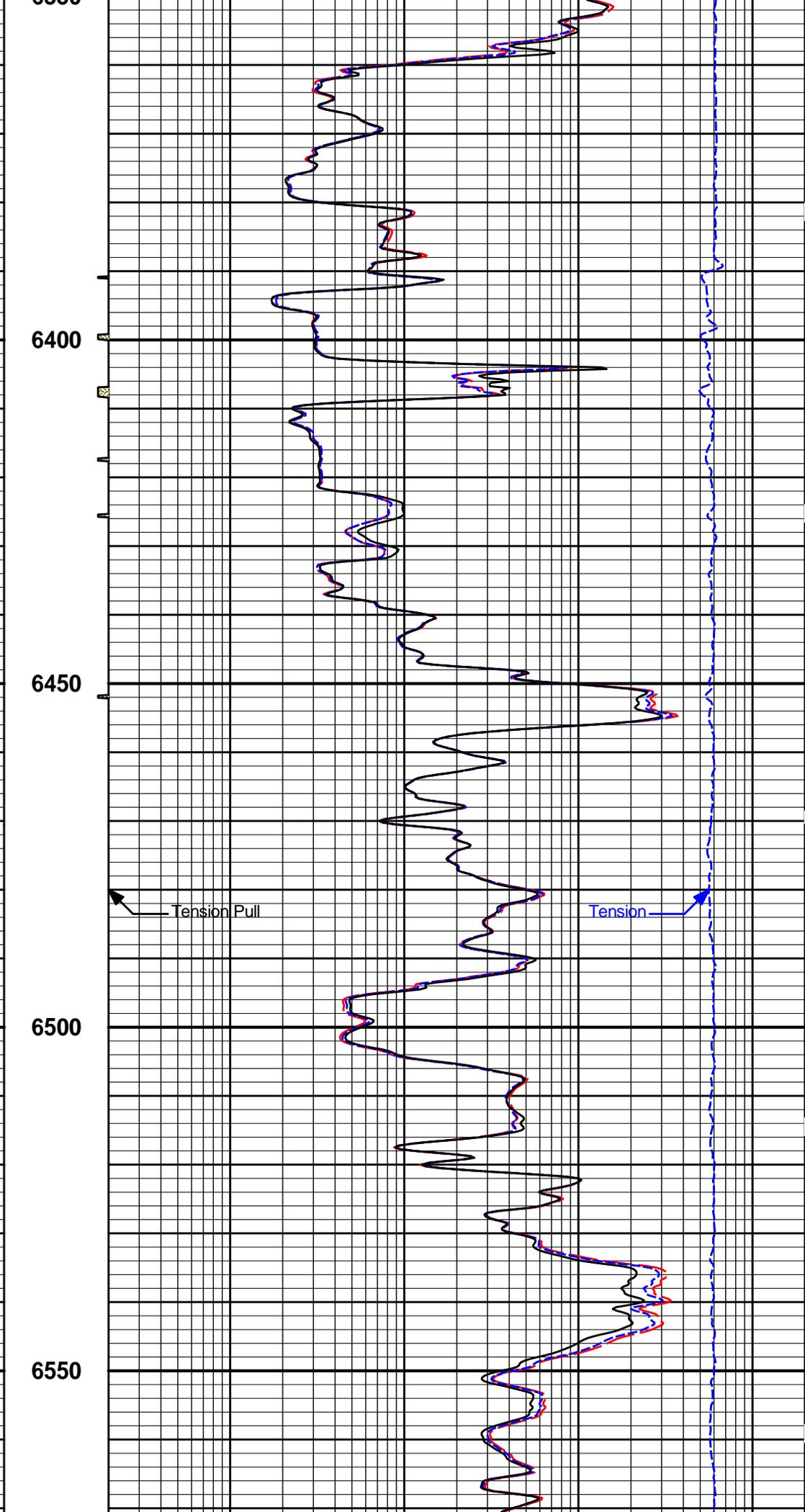
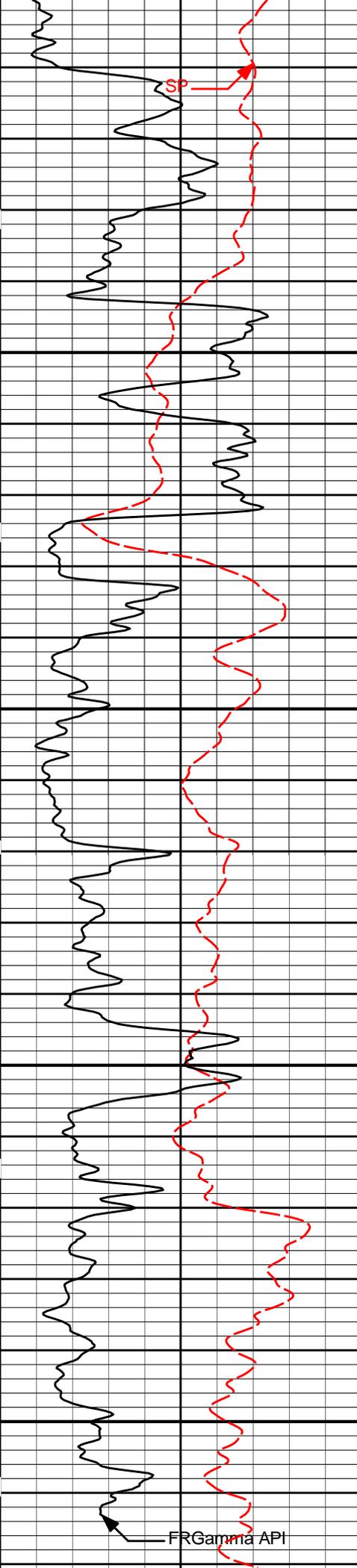
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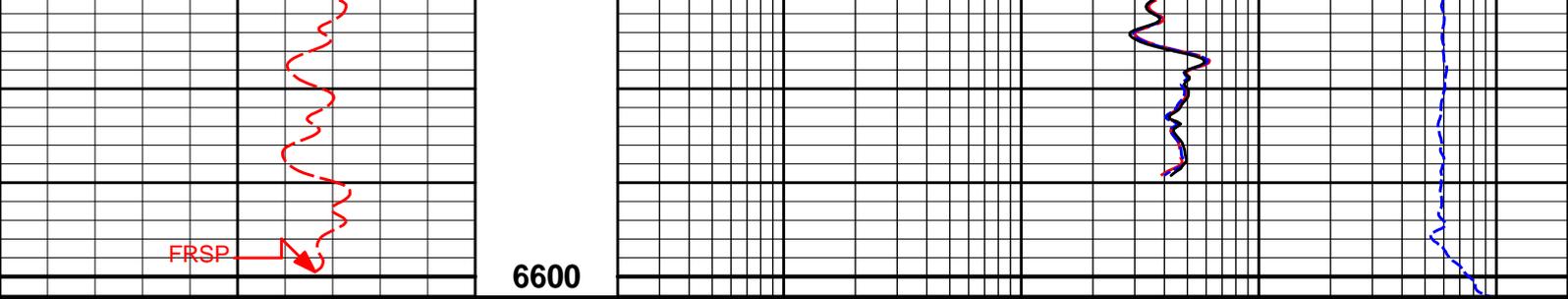


Tension Pull

Tension







FRSP

6600

SP -] 20 mV [+ Gamma API api	150	Tension Pull 10	1 : 240 ft	0.2	20in Resistivity 2ft Res ohm-metre	2000	15K	Tension pounds	0
				0.2	60in Resistivity 2ft Res ohm-metre	2000			
				0.2	90in Resistivity 2ft Res ohm-metre	2000			

HALLIBURTON

Plot Time: 11-Jul-13 06:37:42
 Plot Range: 4548 ft to 6602.17 ft
 Data: HENRY_TAYLOR328\Well Based\MAIN_RESIST_SONIC\
 Plot File: \\-LOCAL-HENRY_TAYLOR328\0001 BLACK_BSAT_ACRTRESIST1_ACRT_5_mainx

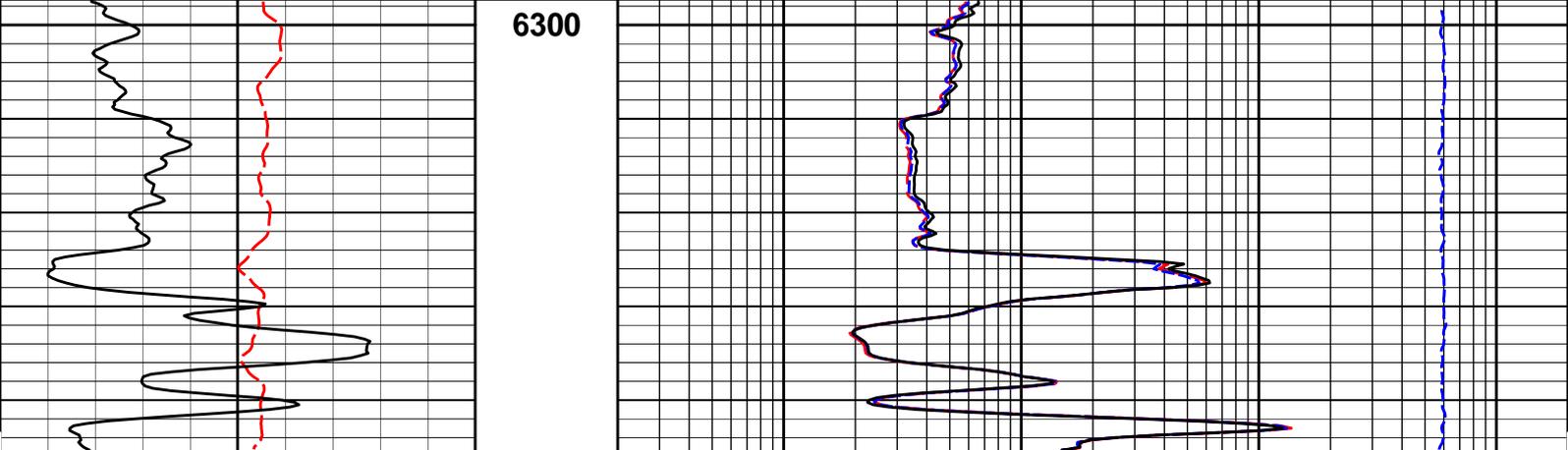
5 INCH MAIN LOG

HALLIBURTON

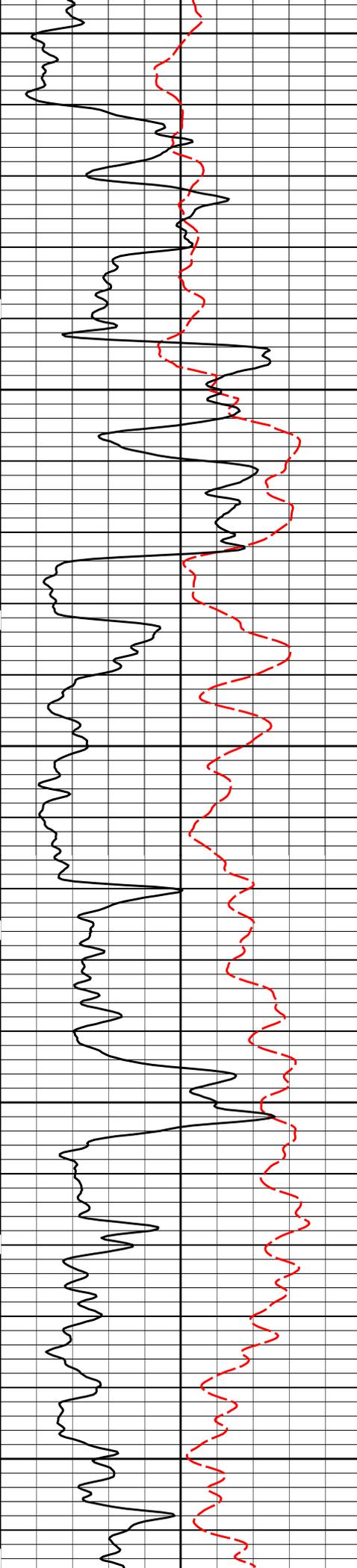
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 Plot File: \\-LOCAL-HENRY_TAYLOR328\0001 BLACK_BSAT_ACRTRESIST1_ACRT_5_rptx

REPEAT SECTION

				0.2	90in Resistivity 2ft Res ohm-metre	2000			
				0.2	60in Resistivity 2ft Res ohm-metre	2000			
SP -] 20 mV [+ Gamma API api	150	Tension Pull 10	1 : 240 ft	0.2	20in Resistivity 2ft Res ohm-metre	2000	15K	Tension pounds	0



6300



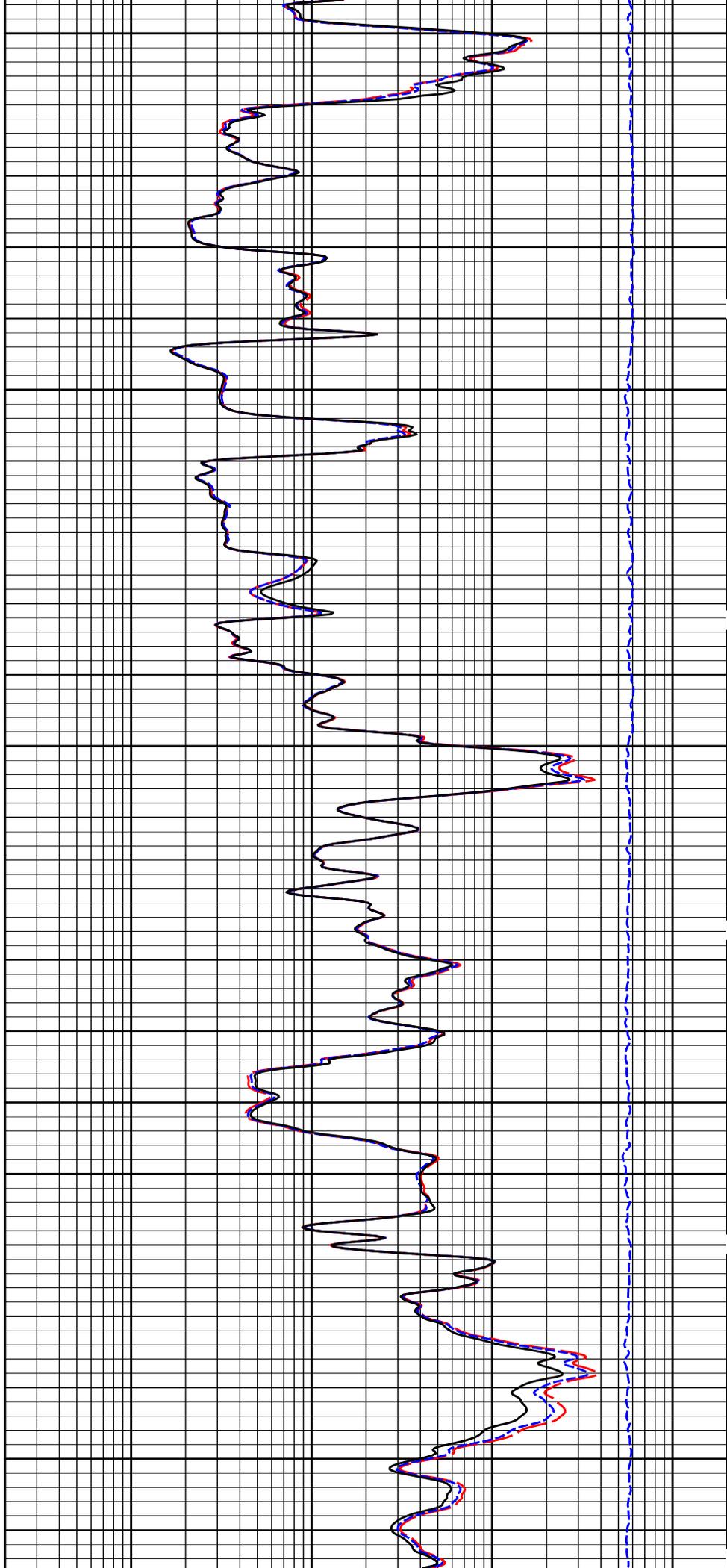
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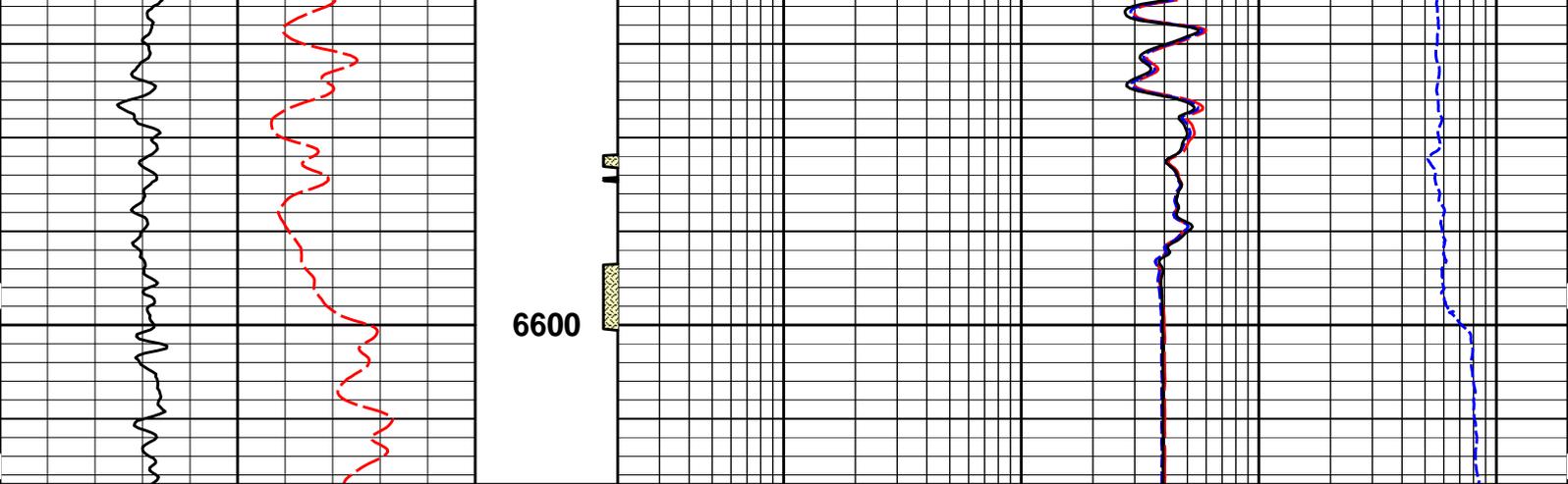
6400

6450

6500

6550





0	Gamma API	150	1 : 240	15K	Tension	0
	api		ft		pounds	
	SP		Tension Pull	0.2	20in Resistivity 2ft Res	2000
	-] 20 mV [+]		10		ohm-metre	
				0.2	60in Resistivity 2ft Res	2000
					ohm-metre	
				0.2	90in Resistivity 2ft Res	2000
					ohm-metre	

HALLIBURTON

Plot Time: 11-Jul-13 06:37:43
 Plot Range: 6297.25 ft to 6617 ft
 Data: HENRY_TAYLOR328\Well Based\REPEAT_RESIST_SONIC\
 Plot File: \\-LOCAL-HENRY_TAYLOR328\0001 BLACK_BSAT_ACRTRESIST1_ACRT_5_rptx

REPEAT SECTION

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	9.500	ppg
	SHARED	WAGT	Weighting Agent	Barite	
	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	10000.00	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	
SHARED	BHSM	Borehole Size 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	
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	
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	Limestone 47.5	
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	1.50	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

BOTTOM

Data: HENRY_TAYLOR328\0001 BLACK_BSAT_ACRTIDLE

Date: 11-Jul-13 06:33:34

HALLIBURTON

CALIBRATION REPORT

NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name: GTET - 11021138

Reference Calibration Date: 03-Mar-13 22:17:26

Engineer: JEREMY COTHREN

Calibration Date: 08-Mar-13 19:09:21

Software Version: WL INSITE R3.6.0 (Build 3)

Calibration Version: 1

Calibrator Source S/N: 150

Calibrator API Reference:225.00 api

Equivalent Calibrator API Reference:228.9 api

Measurement	Measured	Calibrated	Units
Background	36.3	33.9	api
Background + Calibrator	276.8	258.9	api
Calibrator	222.7	225.0	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name: GTET - 11021138

Reference Calibration Date: 08-Mar-13 19:09:21

Engineer: JEREMY COTHREN

Calibration Date: 04-Jul-13 13:06:45

Software Version: WL INSITE R3.6.0 (Build 3)

Calibration Version: 1

Calibrator Source S/N: 150

Calibrator API Reference:225.00 api

Equivalent Calibrator API Reference:228.9 api

Field Verification	Shop	Field	Units
Background	33.9	34.0	api
Background + Calibrator	258.9	257.7	api
Calibrator	225.0	223.7	api
Shop	Field	Difference	Tolerance
225.0	223.7	1.3	+/- 9.00

BSAT FIELD CASING CHECK

Tool Name: BSAT - 10939050

Calibration Date: 20-May-13 04:44:47

Engineer: HANSON

Software Version: WL INSITE R3.6.0 (Build 3)

Calibration Version: 1

Pre-Log Check	Check Depth	Shop	Field	Difference	Tolerance	Units
Delta-T Compensated	1849.28	57.00	56.77	0.2300	1.00	uspf

ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION

Tool Name: ACRt Sonde - 90144321-e989-s

Reference Calibration Date: 26-Nov-12 11:33:47

Engineer: JEREMY COTHREN

Calibration Date: 14-Jun-13 12:50:34

Software Version: WL INSITE R3.6.0 (Build 3)

Calibration Version: 1

Host Tool Name: ACRt Instrument - 989

TYPICAL GAIN RANGE

Subarray	R12KHz			R36KHz			R72KHz		
	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper
A1 (80")	0.95	1.00	1.05	0.95	1.01	1.05	0.95	1.01	1.05
A2 (50")	0.95	1.03	1.05	0.95	1.02	1.05	0.95	1.02	1.05
A3 (29")	0.95	1.01	1.05	0.95	1.01	1.05	0.95	1.01	1.05
A4 (17")	0.95	1.00	1.05	0.95	1.00	1.05	0.95	0.99	1.05
A5 (10")	N/A	N/A	N/A	0.95	0.99	1.05	0.95	0.99	1.05
A6 (6")	N/A	N/A	N/A	0.95	0.98	1.05	0.95	0.98	1.05

TYPICAL SONDE OFFSET RANGE

Subarray	R12KHz			R36KHz			R72KHz		
	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper
A1 (80")	-5	-0.31	2	-6	-3.18	-2	-8	-5.09	-2
A2 (50")	-7	-1.59	0	-7	-4.02	0	-7	-4.42	0
A3 (29")	-27	-12.33	-9	-9	-3.22	-3	-7	-3.23	-1
A4 (17")	-180	-101.71	-60	-45	-31.65	-15	-39	-24.15	-13
A5 (10")	N/A	N/A	N/A	-150	-91.85	-50	-80	-43.88	-10
A6 (6")	N/A	N/A	N/A	175	323.02	525	90	164.41	270

TRANSMITTER CURRENT GAIN

Signal **Lower** **R** **Upper**

R-MUD VERIFICATION

Signal **Lower (ohm-m)** **Measured (ohm-m)** **Upper (ohm-m)**

12K	0.6	0.92	1.3	Mud Cell	0.95	1.00	1.05
36K	1.0	1.41	2.0				
72K	1.0	1.66	2.0				

PASS/FAIL SUMMARY	
GAIN RANGE CHK	PASS
SONDE OFFSET RANGE CHK	PASS
Tx CURRENT GAIN	PASS
Rmud VERIFICATION	PASS

TOOL OK TO LOG

CALIBRATION SUMMARY

Sensor	Shop	Field	Post	Difference	Tolerance	Units
GTET-11021138						
Gamma Ray Calibrator	225.0	223.7	-----	1.3	+/- 9.00	api
ACRt Sonde-90144321-e989-s						
Mud Cell	1.00	-----	-----	0.00	-----	ohm-m

Data: HENRY_TAYLOR328\0001 BLACK_BSAT_ACRTIDLE Date: 11-Jul-13 06:34:19

HALLIBURTON TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
CH_HOS-590_RED 37.50 lbs		Ø 2.750 in →		← Temperature @ 47.08 ft	3.03 ft	48.10 ft
XOHD-01 20.00 lbs		Ø 2.750 in → Ø 3.625 in →		←	0.95 ft	45.08 ft
GTET-11021138 165.00 lbs		Ø 3.625 in →		← GammaRay @ 38.06 ft	8.52 ft	44.13 ft
Centralizer 25-01 8.00 lbs		Ø 4.000 in* →				35.61 ft
BSAT-10939050 300.00 lbs		Ø 3.625 in →		← Sonic Receivers @ 27.09 ft	15.77 ft	

ACRt Instrument-989
50.00 lbs

Centralizer 25-02
8.00 lbs

ShortAxisKit-989
60.00 lbs

ACRt Sonde-90144321-e989-s
200.00 lbs

SP Ring-10916987
0.00 lbs

Cabbage Head-01
10.00 lbs



Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max.Log. Speed (fpm)
CH_HOS	Hostile Cable Head with Load Cell	590_RED	37.50	3.03	45.08	300.00
XOHD	Hostile to Dits Cross Over	01	20.00	0.95	44.13	300.00
GTET	Gamma Telemetry Tool	11021138	165.00	8.52	35.61	60.00
BSAT	Borehole Sonic Array Tool	10939050	300.00	15.77	19.83	60.00
OBCEN	Centralizer - 25 in. Overbody	01	8.00	2.08 *	32.77	300.00
ACRt	Array Compensated True Resistivity Instrument Section	989	50.00	5.03	14.80	300.00
SAK	Short Axis Kit for logging short axis of a borehole.	989	60.00	1.02 *	14.80	300.00
OBCEN	Centralizer - 25 in. Overbody	02	8.00	2.08 *	16.07	300.00
ACRt	Array Compensated True Resistivity Sonde Section	90144321-e989-s	200.00	14.22	0.58	300.00
SP	SP Ring	10916987	0.00	0.25 *	1.86	300.00
CBHD	Cabbage Head	01	10.00	0.58	0.00	300.00
Total			858.50	48.10		

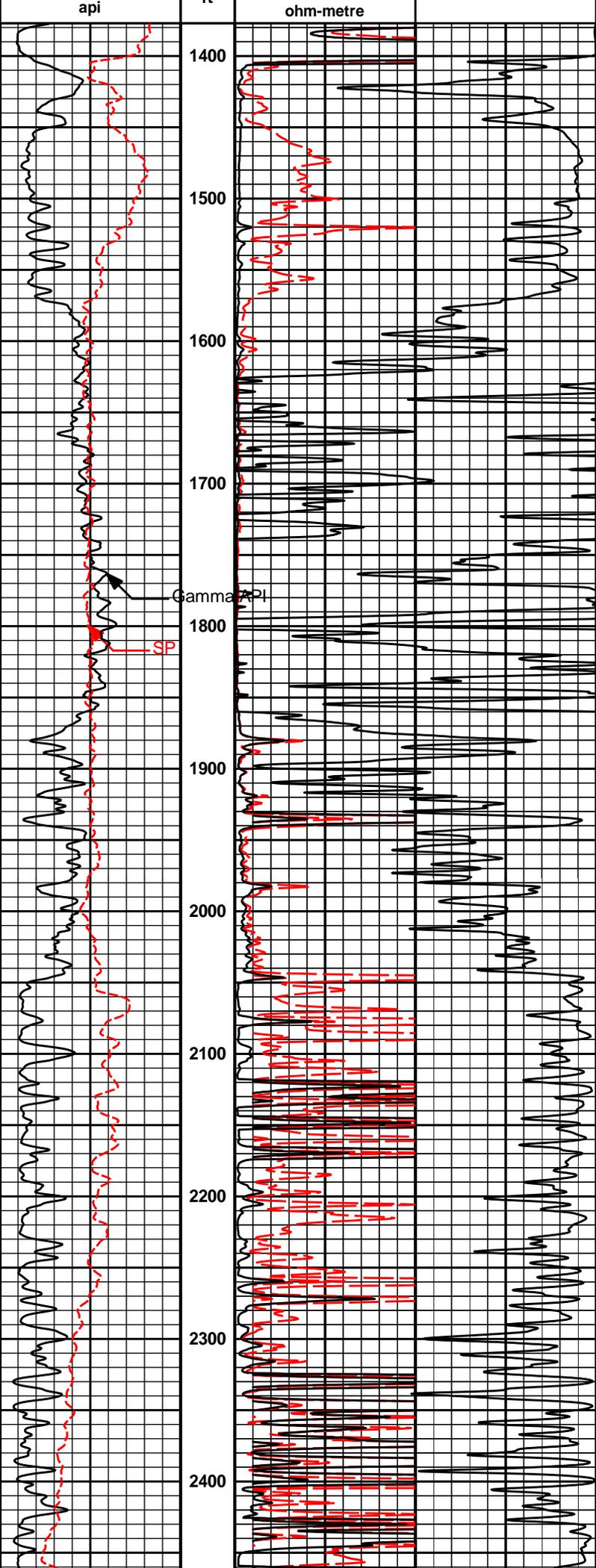
* Not included in Total Length and Length Accumulation.

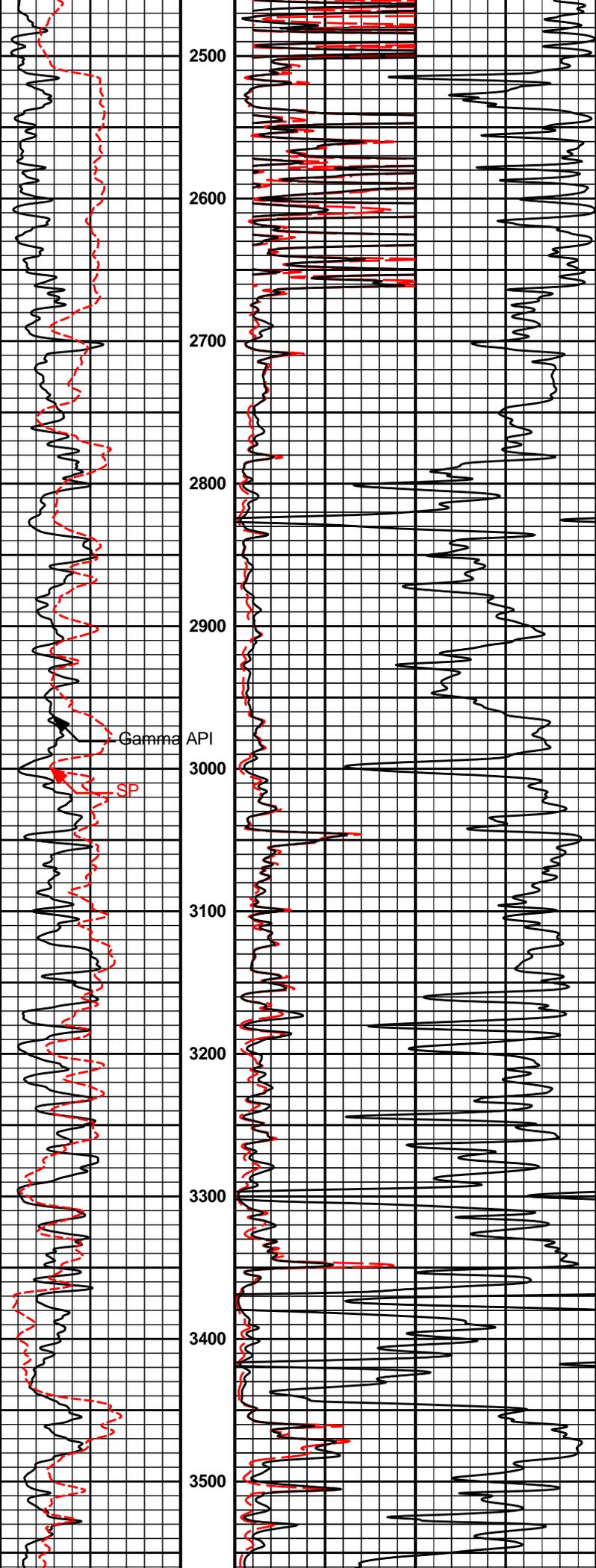
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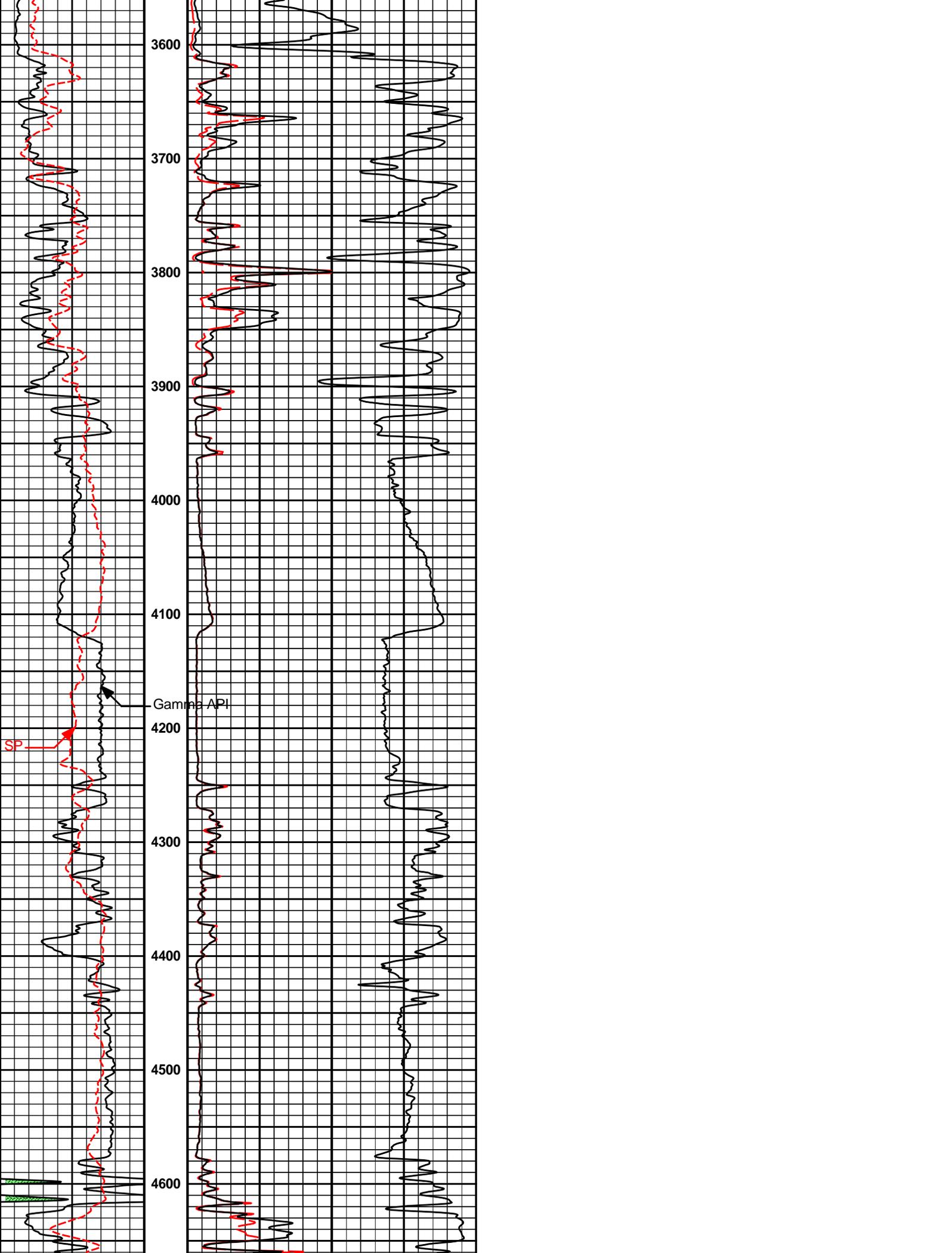
HALLIBURTON Plot Time: 11-Jul-13 06:37:43
 Plot Range: 1377 ft to 6599.5 ft
 HENRY_TAYLOR328\...
 Plot File: \\...\\1_ACRt_1inx

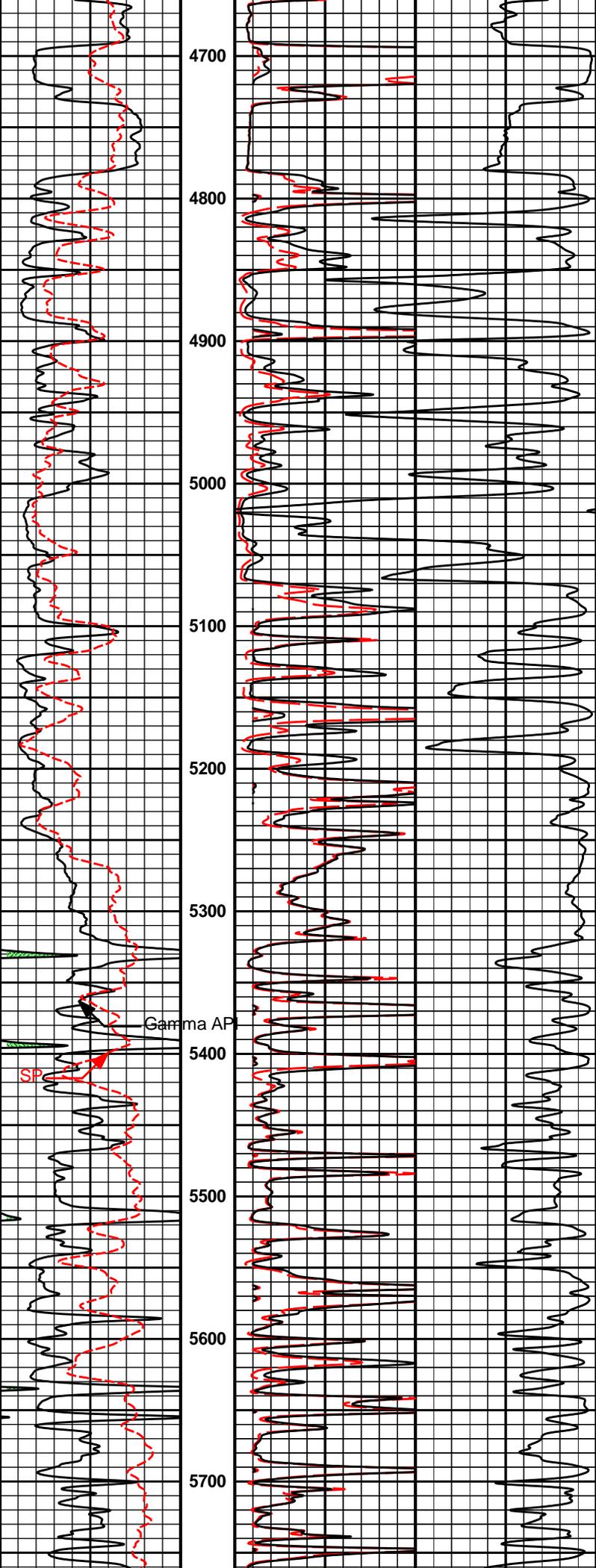
1 INCH MAIN LOG

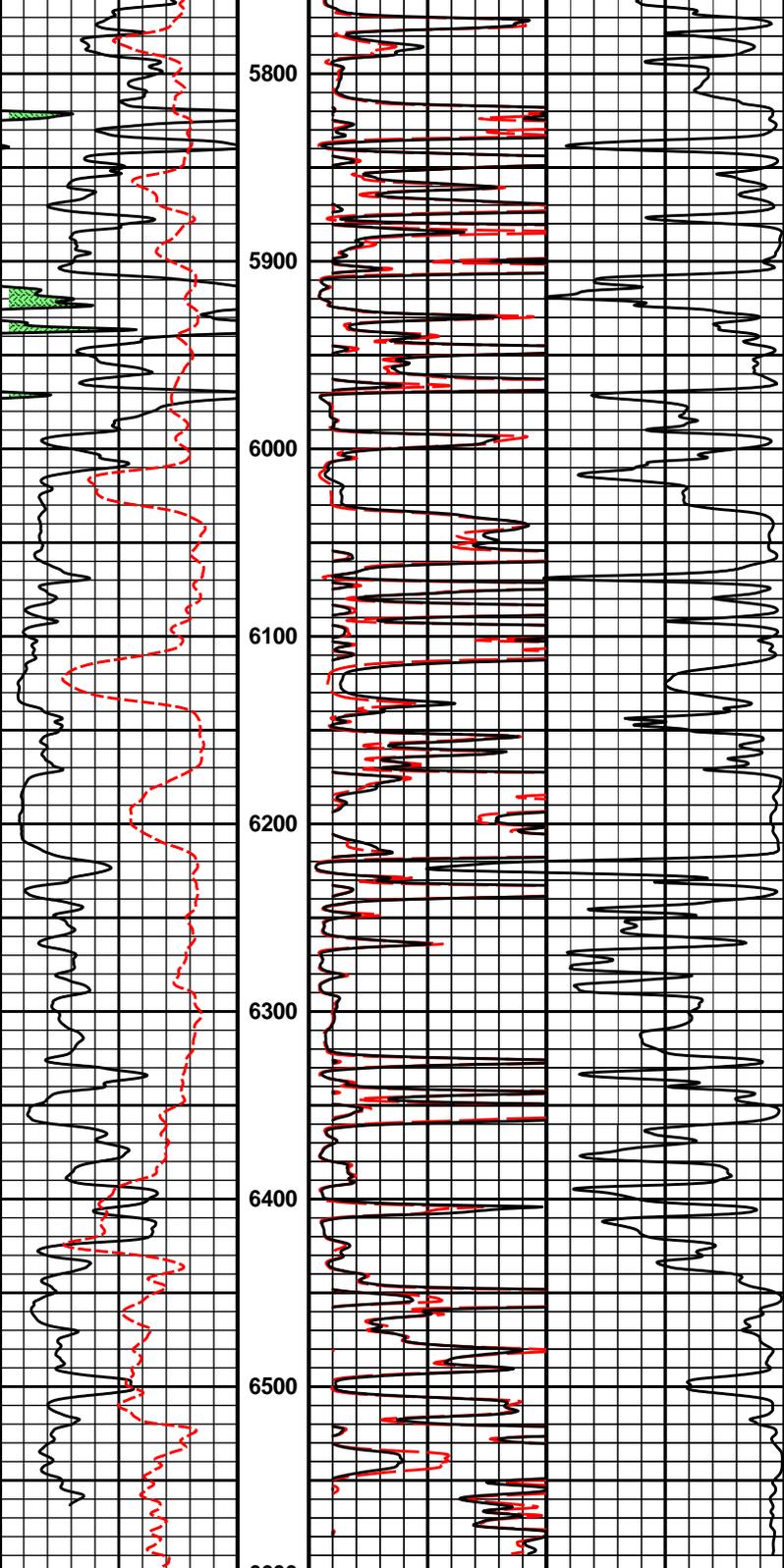
	1K	90in Conductivity 2ft Res	0
mmho per metre			
SP		90in Resistivity 2ft Res	
-] 20mV [+]		0 50	
Gamma API	150	ohm-metre	
0	1 : 1200	20in Resistivity 2ft Res	
ft		0 50	











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

HALLIBURTON

Plot Time: 11-Jul-13 06:37:46
 Plot Range: 1377 ft to 6599.5 ft
 HENRY_TAYLOR328\...\...
 Plot File: \\...\...1_ACRT_1inx

1 INCH MAIN LOG

FIRST MAIN LOG

COMPANY	HERMAN LOEB		
WELL	HENRY TAYLOR 3-28		
FIELD	MCKINNEY		
COUNTY	MEADE	STATE	KANSAS

HALLIBURTON

ARRAY COMPENSATED
TRUE RESISTIVITY
LOG