HALLIBURTON

ARRAY COMPENSATED TRUE RESISTIVITY

COMPANY	BLACK HILLS EXPLORATION & PRODUCTION
WELL	HOMER DEEP UNIT 9-41BH
FIELD/BLOCK	SOUTH SHALE RIDGE
COUNTY	GARFIELD
STATE	CO

COMPANY BLACK HILLS EXPLORATION & PRODUCTION
WELL HOMER DEEP UNIT 9-41BH
FIELD/BLOCK SOUTH SHALE RIDGE
COUNTY GARFIELD STATE CO

API No. 05-045-21934-00

Location NENE SEC9 TNS8S RNG98W
LAT: 39.37967
LONG: -108.32329

Sect. N/A Twp. N/A Rge. N/A

Other Services:
DSNT / SDLT

Permanent Datum	GL	Elev. 5482.0 ft	Elev.: K.B.	5507.0 ft
Log measured from	KB	25.0 ft above perm. Datum	D.F.	5507.0 ft
Drilling measured from	KB		G.L.	5482.0 ft

Date		05-Jul-14				
Run No.		ONE				
Depth - Driller		6550.00 ft				
Depth - Logger		6547.0 ft				
Bottom - Logged Interval		6544.0 ft				
Top - Logged Interval		1130.0 ft				
Casing - Driller		10.750 in @ 1132.0 ft		@		@
Casing - Logger		1130.0 ft				
Bit Size		9.875 in		@		@
Type Fluid in Hole		Water Based Mud				
Density	Viscosity	9.3 ppg	57.00 s/qt			
PH	Fluid Loss	9.30 pH	7.0 cptm			
Source of Sample		MUD TANK				
Rm @ Meas. Temperature		0.514 ohmm @ 85.20 degF		@		@
Rmf @ Meas. Temperature		0.39 ohmm @ 83.00 degF		@		@
Rmc @ Meas. Temperature		0.786 ohmm @ 83.20 degF		@		@
Source Rmf	Rmc	MEASURED	MEASURED			
Rm @ BHT		0.28 ohmm @ 165.0 degF		@		@
Time Since Circulation		9.9 hr				
Time on Bottom		05-Jul-14 21:58				
Max. Rec. Temperature		165.0 degF @ 6547.0 ft		@		@
Equipment	Location	11170614	ROCK SPRINC			
Recorded By		B. NEALON				
Witnessed By		K. HATFIELD				

Fold here

Service Ticket No.: 901469706 API Serial No.: 05-045-21934-00 PGM Version: WL INSITE R4.2.1 (Build 5)

CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE

Date	Sample No.				
Depth-Driller					
Type Fluid in Hole					
Density	Viscosity				
Ph	Fluid Loss				
Source of Sample					
Rm @ Meas. Temp		@		@	
Rmf @ Meas. Temp.		@		@	
Rmc @ Meas. Temp.		@		@	
Source Rmf	Rmc				
Rm @ BHT		@		@	
Rmf @ BHT		@		@	
Rmc @ BHT		@		@	

RESISTIVITY SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole

RESISTIVITY EQUIPMENT DATA

Run No.	Tool Type & No.	Pad Type	Tool Pos.	Other
ONE	ACRt	NONE	FREE-HANGING	N/A
	I10996988			
	S10988481			

EQUIPMENT DATA

GAMMA		ACOUSTIC		DENSITY		NEUTRON	
Run No.	ONE	Run No.		Run No.		Run No.	
Serial No.	11294346	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.	GTET	Spacing		Log Type		Log Type	
Type	SCINT			Source Type		Source Type	
Length	8"	LSA [Y/N]		Serial No.		Serial No.	
Distance to Source	10'	FWDA [Y/N]		Strength		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	
ONE	6544'	1130'	REC	0 API	150 API									

DIRECTIONAL INFORMATION

Maximum Deviation	@	KOP	@

Remarks:

ANNULAR HOLE VOLUME CALCUALTED FOR 7.625-INCH CASING

BOREHOLE RUGOSITY, TENSION PULLS, AND WASHOUTS MAY AFFECT LOG QUALITY AND REPEATABILITY

RIG: SST-66

CREW: D. PIEGER, T. CHASE, M. SKINNER, T. PETERSON

THANK YOU FOR USING HALLIBURTON: ROCK SPRINGS, WY 307-352-8600

HALLIBURTON

PARAMETERS REPORT

Depth (ft)	Tool Name	Mnemonic	Description	Value	Units
TOP					
	SHARED	BS	Bit Size	9.875	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	0.514	ohmm
	SHARED	TRM	Temperature of Mud	85.2	degF
	SHARED	CSD	Logging Interval is Cased?	No	
	SHARED	ICOD	AHV Casing OD	7.625	in
	SHARED	ST	Surface Temperature	75.0	degF
	SHARED	TD	Total Well Depth	6550.00	ft
	SHARED	BHT	Bottom Hole Temperature	156.0	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	Sandstone	
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	2.680	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 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	

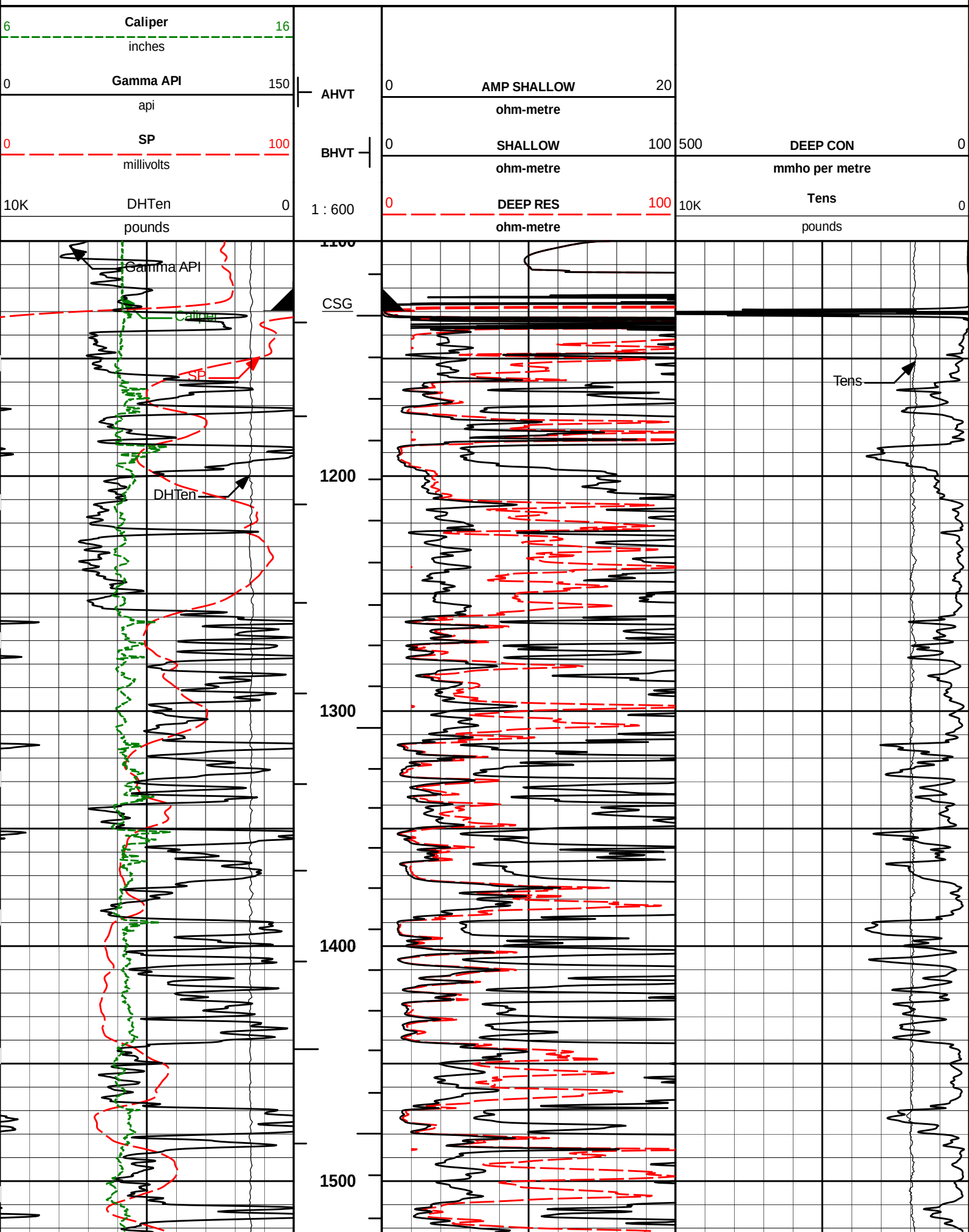
BOTTOM

Data: BH_HOMER_9-41AH\0001 TRIPLE\004 05-Jul-14 21:58 Up @6553.8f **Date: 05-Jul-14 23:59:54**

HALLIBURTON

Plot Time: 08-Jul-14 11:44:24
Plot Range: 1100 ft to 6552.17 ft
Data: BH_HOMER_9-41AH\Well Based\DAQ-0001-004*
Plot File: \\RES\BP_2IN_ACRT

MAIN PASS 2" = 100'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SP
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10K
DHTen
0
pounds
AHVT
BHVT
1 : 600
0
AMP SHALLOW
20
ohm-metre
0
SHALLOW
100
ohm-metre
0
DEEP RES
100
ohm-metre
500
DEEP CON
0
mmho per metre
10K
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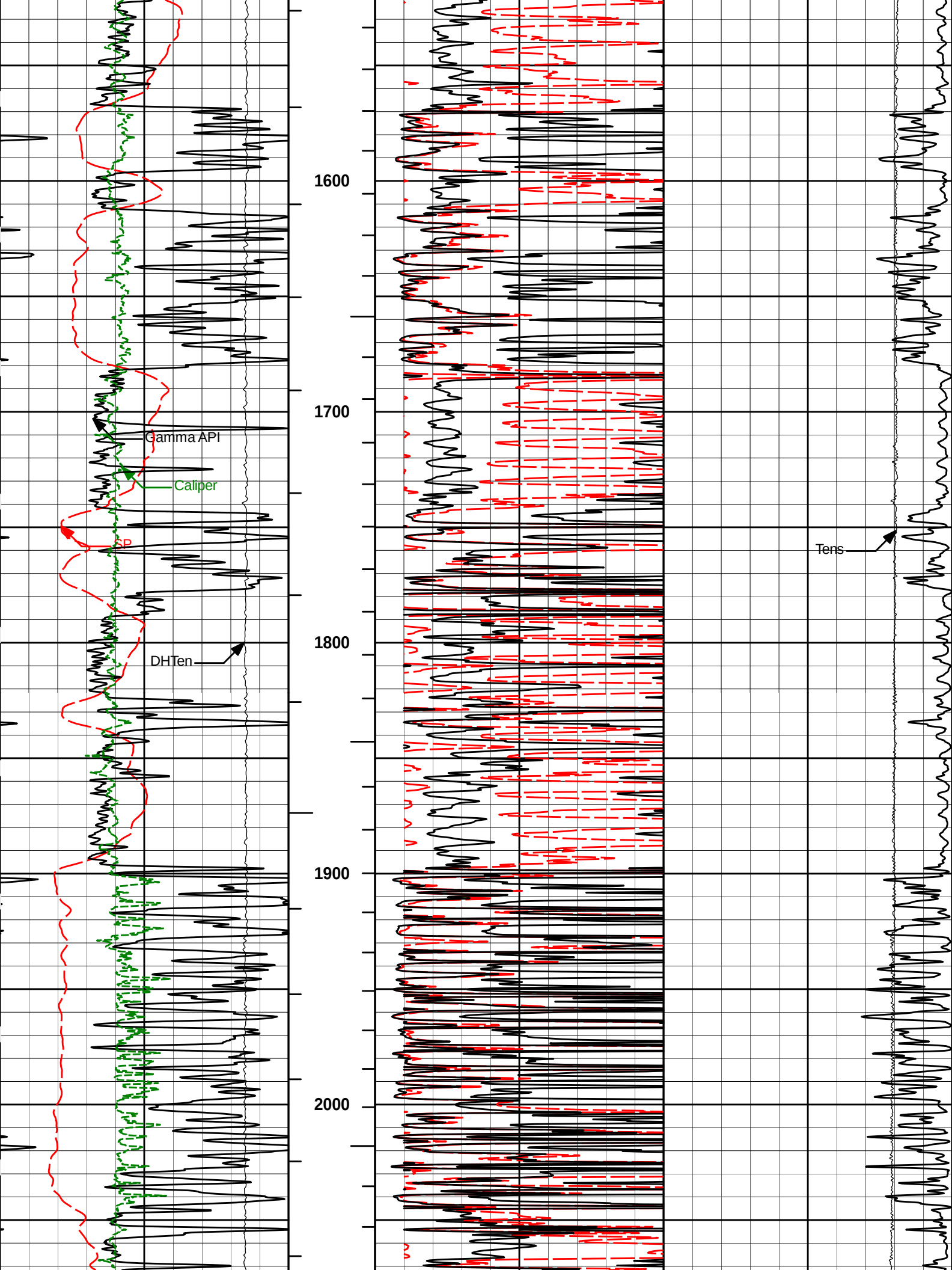
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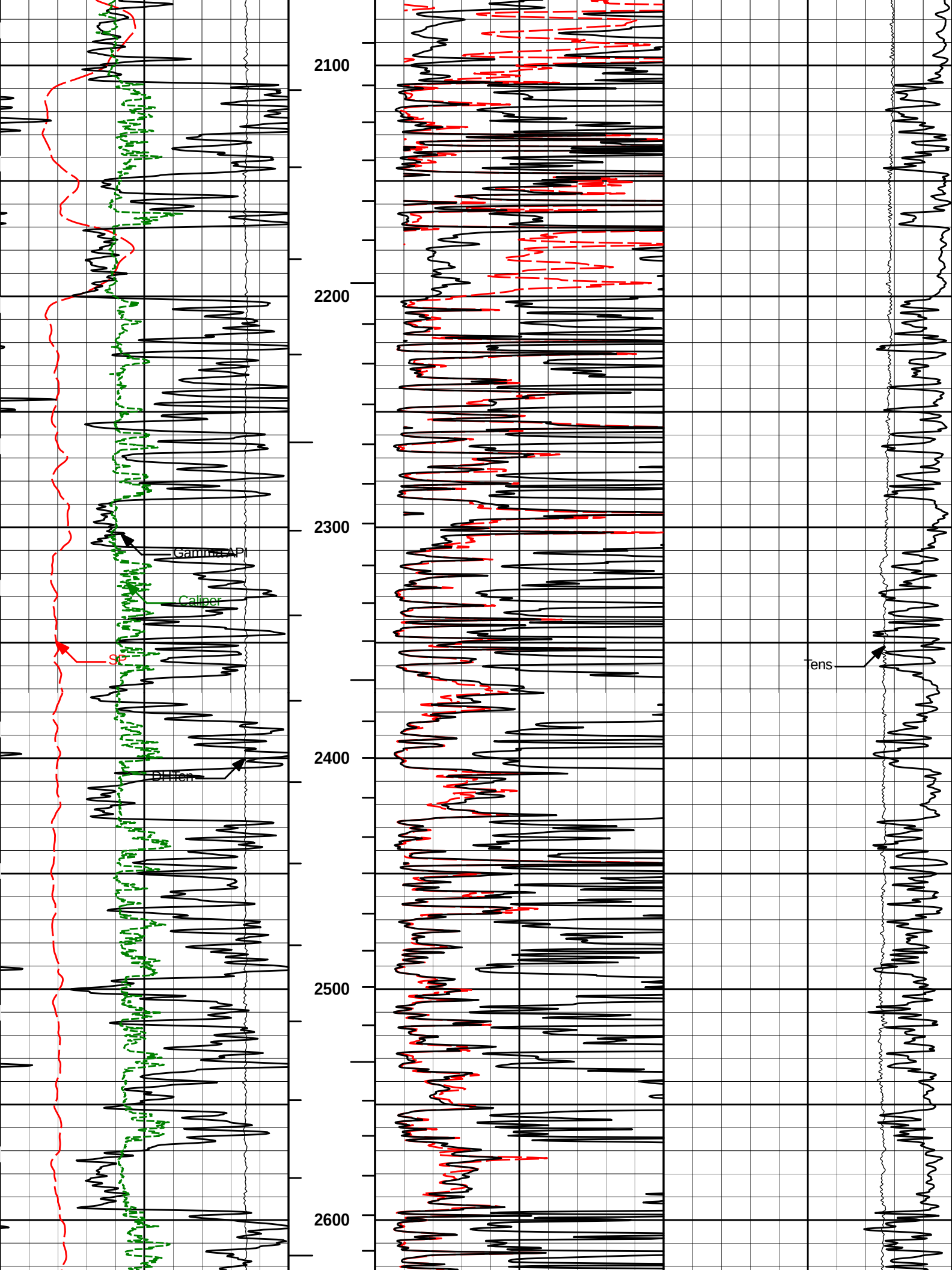
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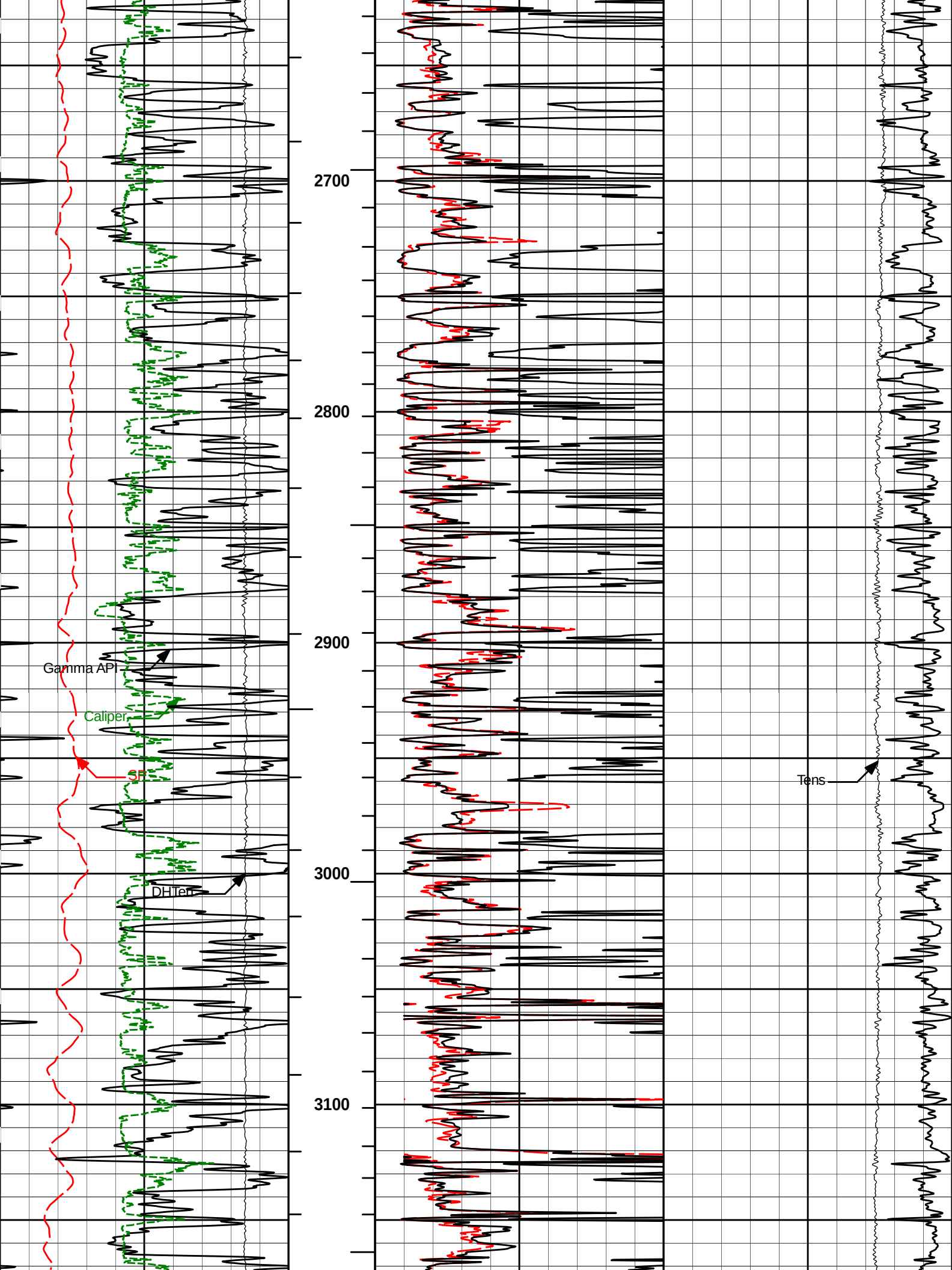
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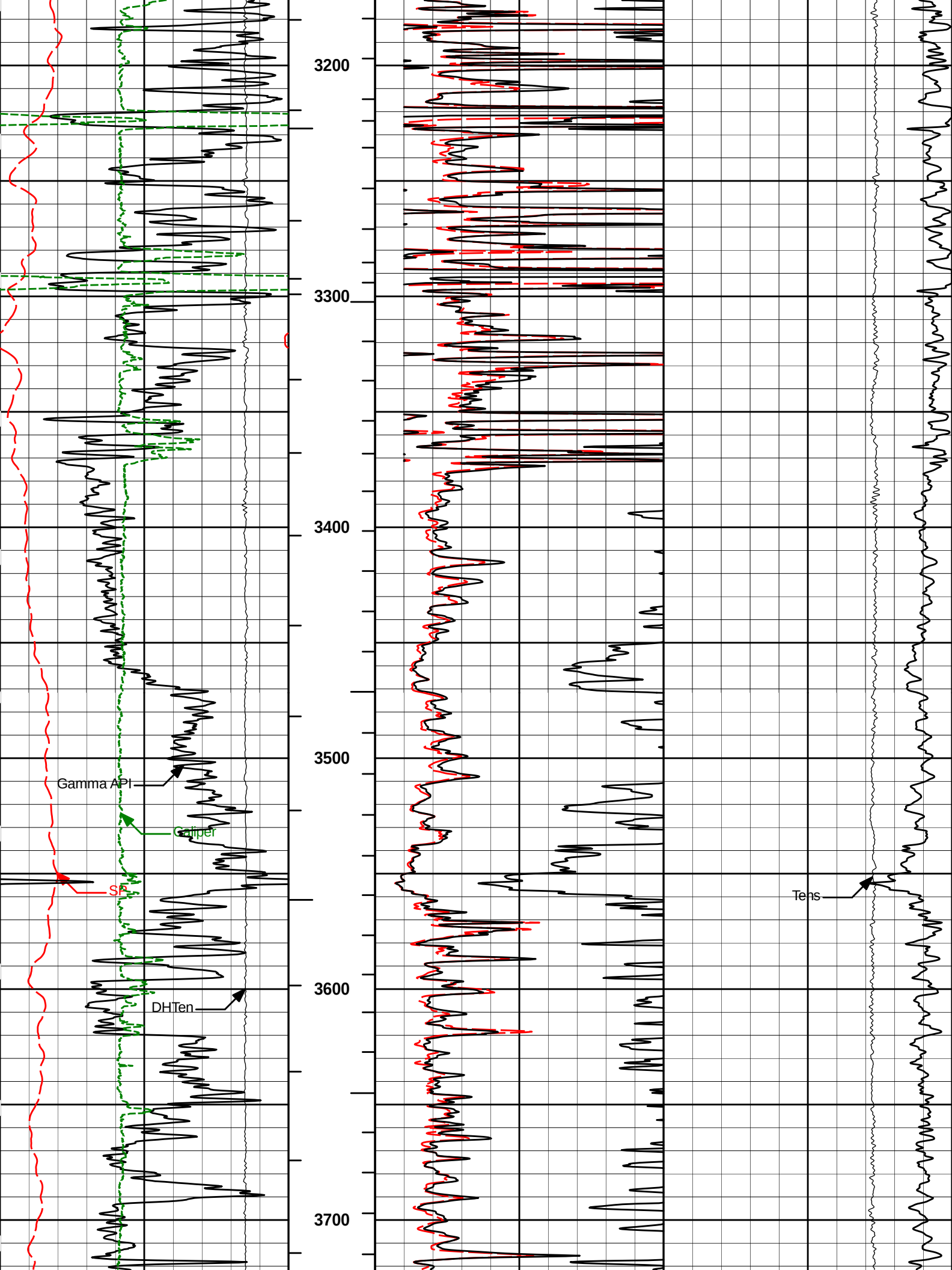
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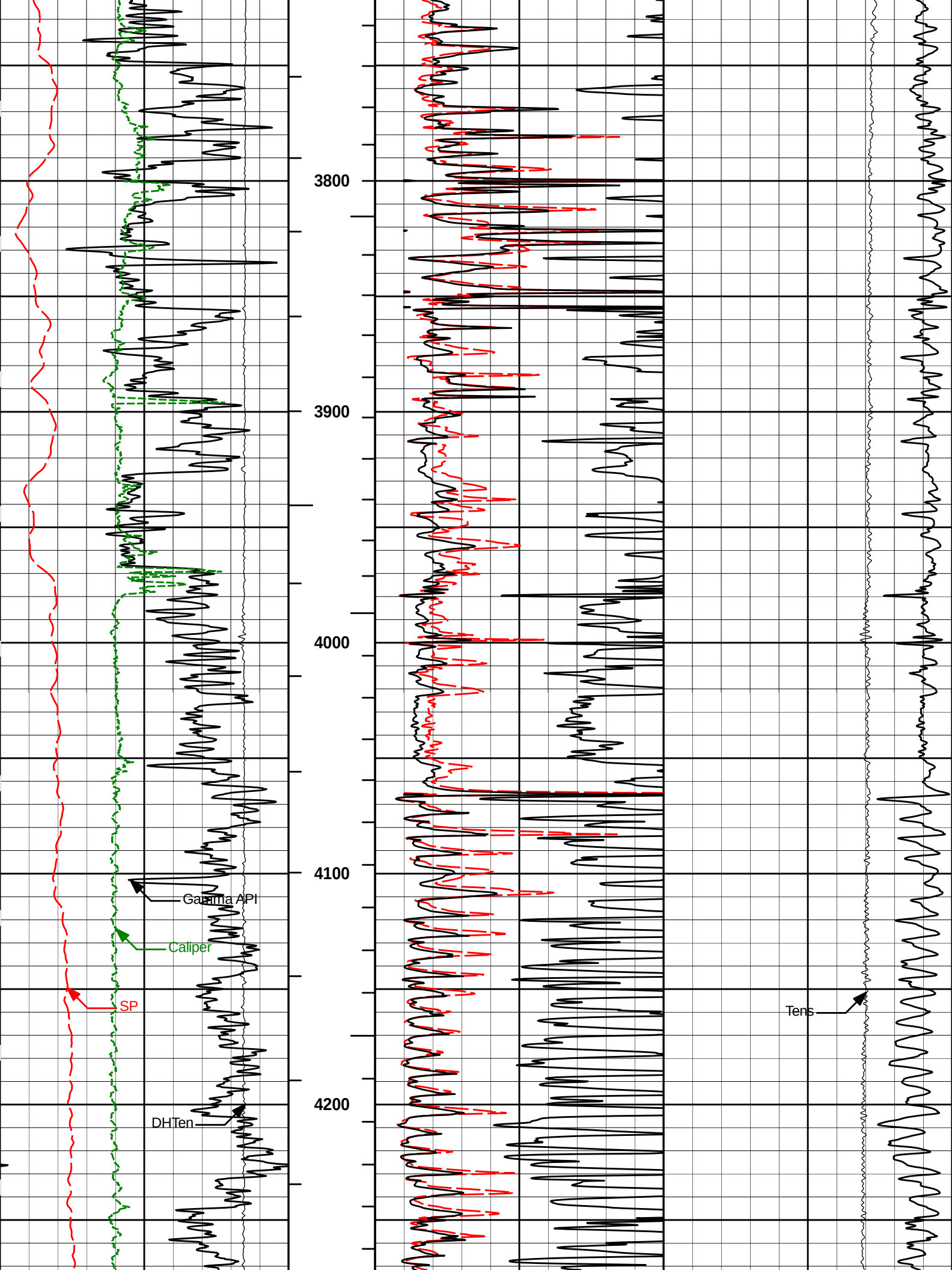
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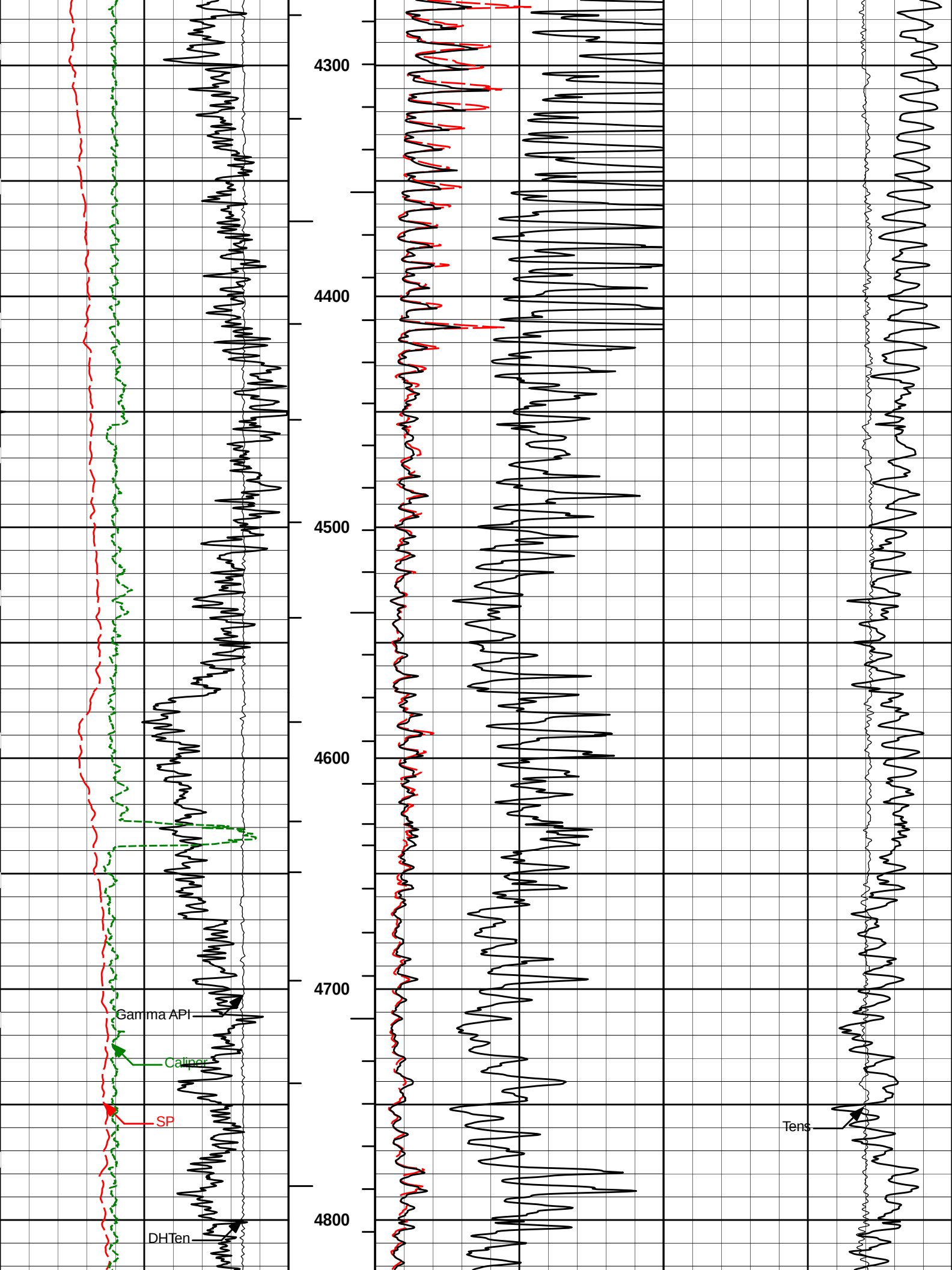
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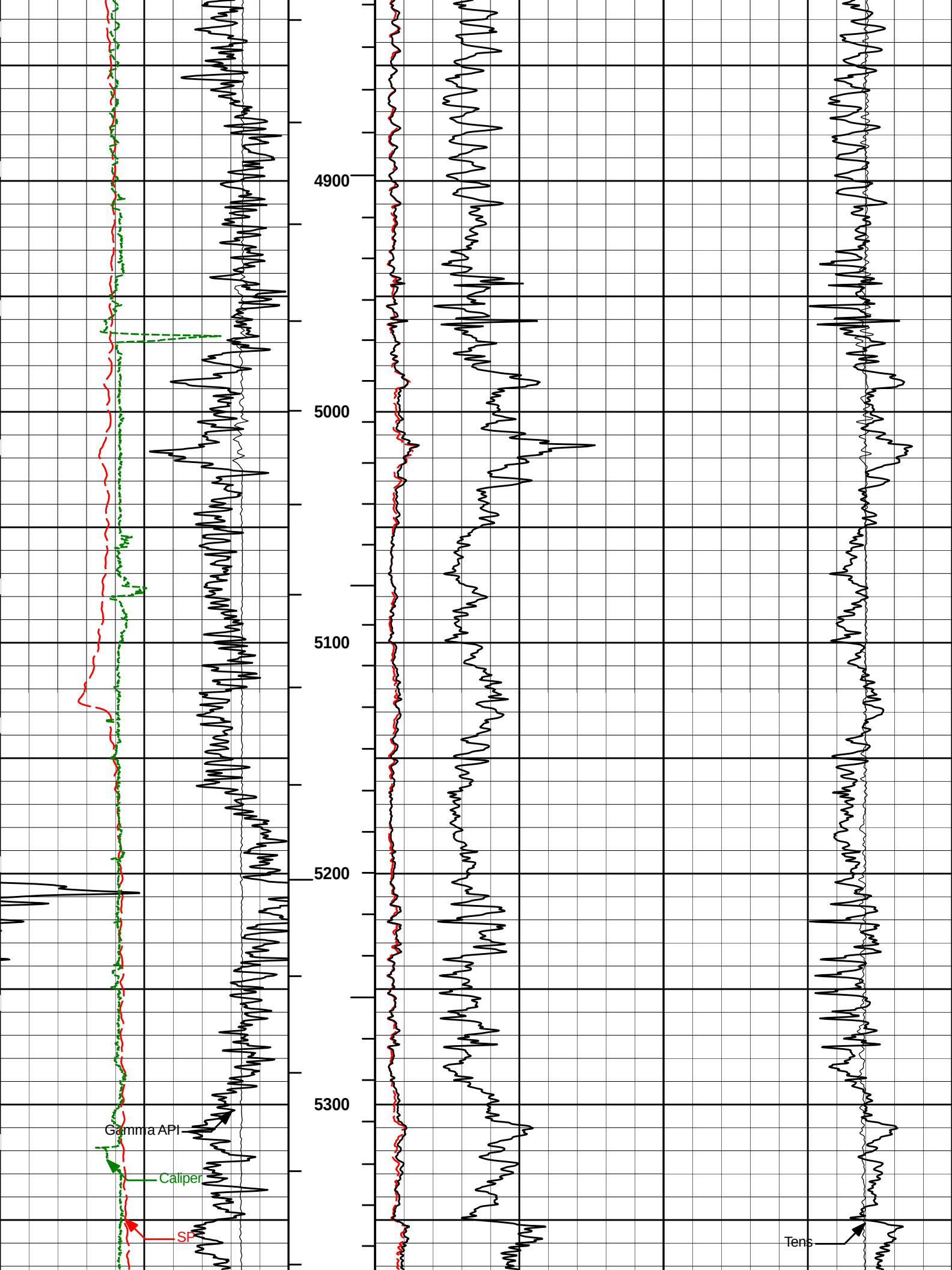
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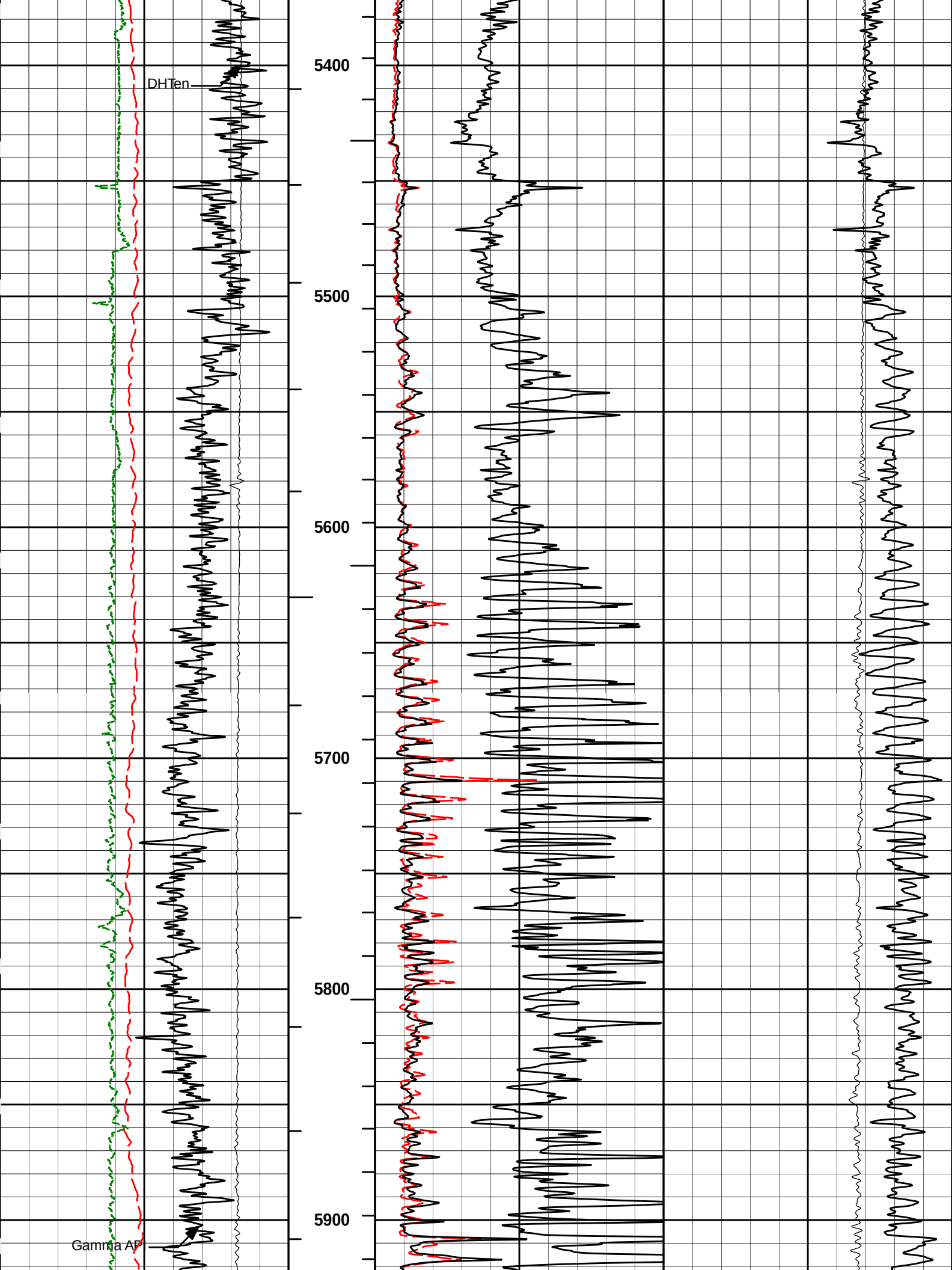
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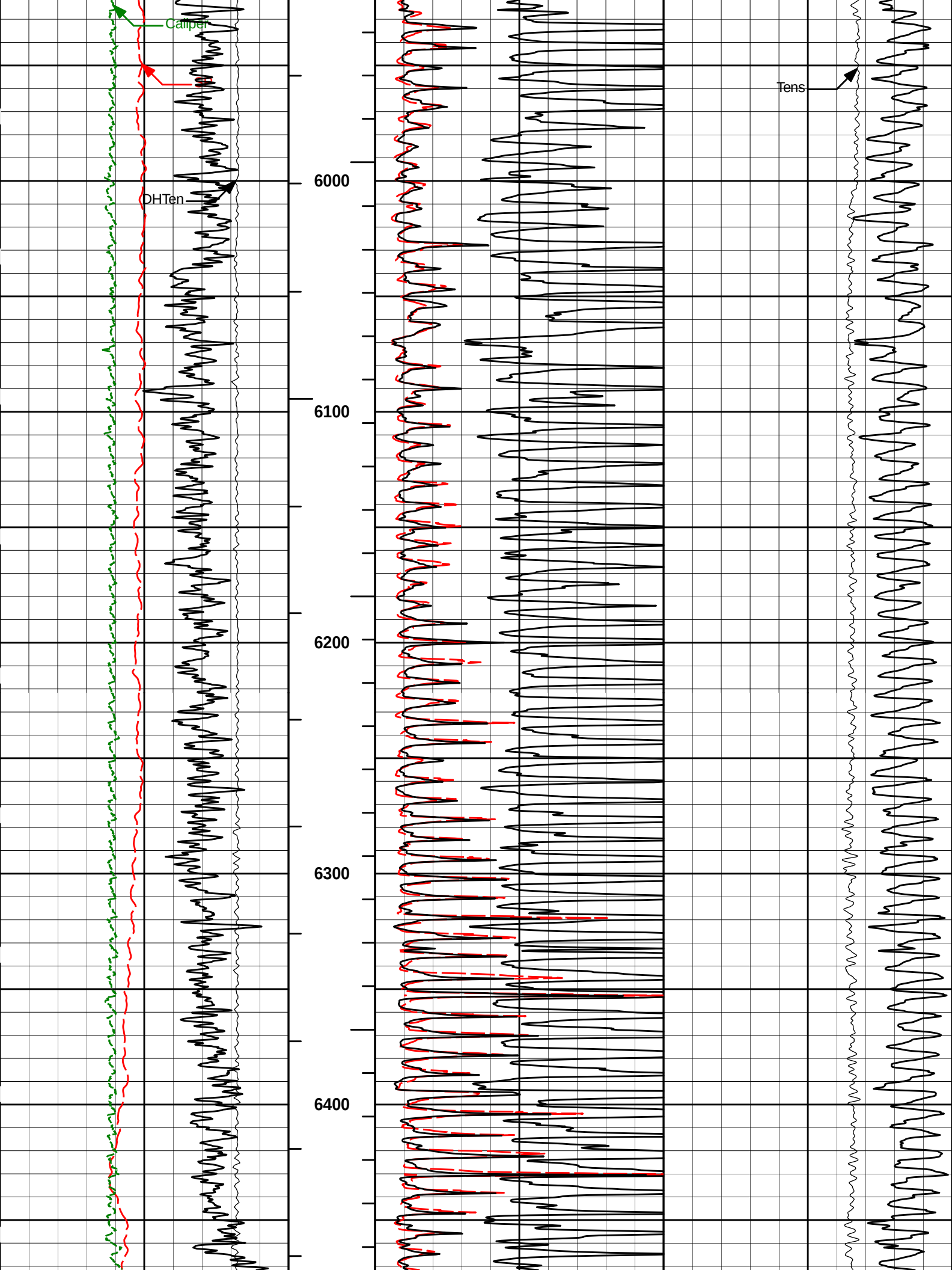
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OHTen
Tens
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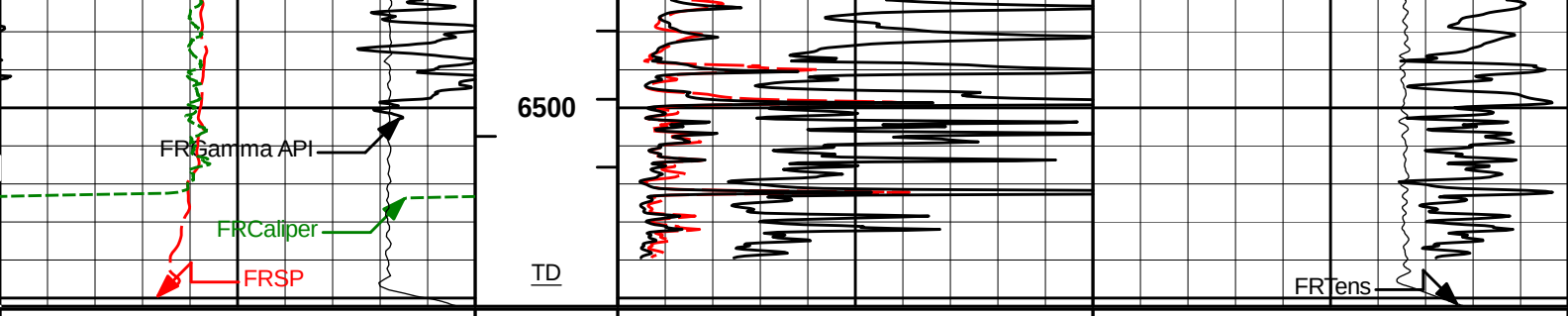

10K DHTen 0	1 : 600	0 DEEP RES 100
pounds		ohm-metre
0 SP 100	BHVT	0 SHALLOW 100
millivolts		ohm-metre
0 Gamma API 150	AHVT	0 AMP SHALLOW 20
api		ohm-metre
6 Caliper 16		
inches		

10K Tens 0
pounds
500 DEEP CON 0
mmho per metre

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Data: BH_HOMER_9-41AH\Well Based\DAQ-0001-004*
Plot File: \\RES\BP_2IN_ACRT

MAIN PASS 2" = 100'

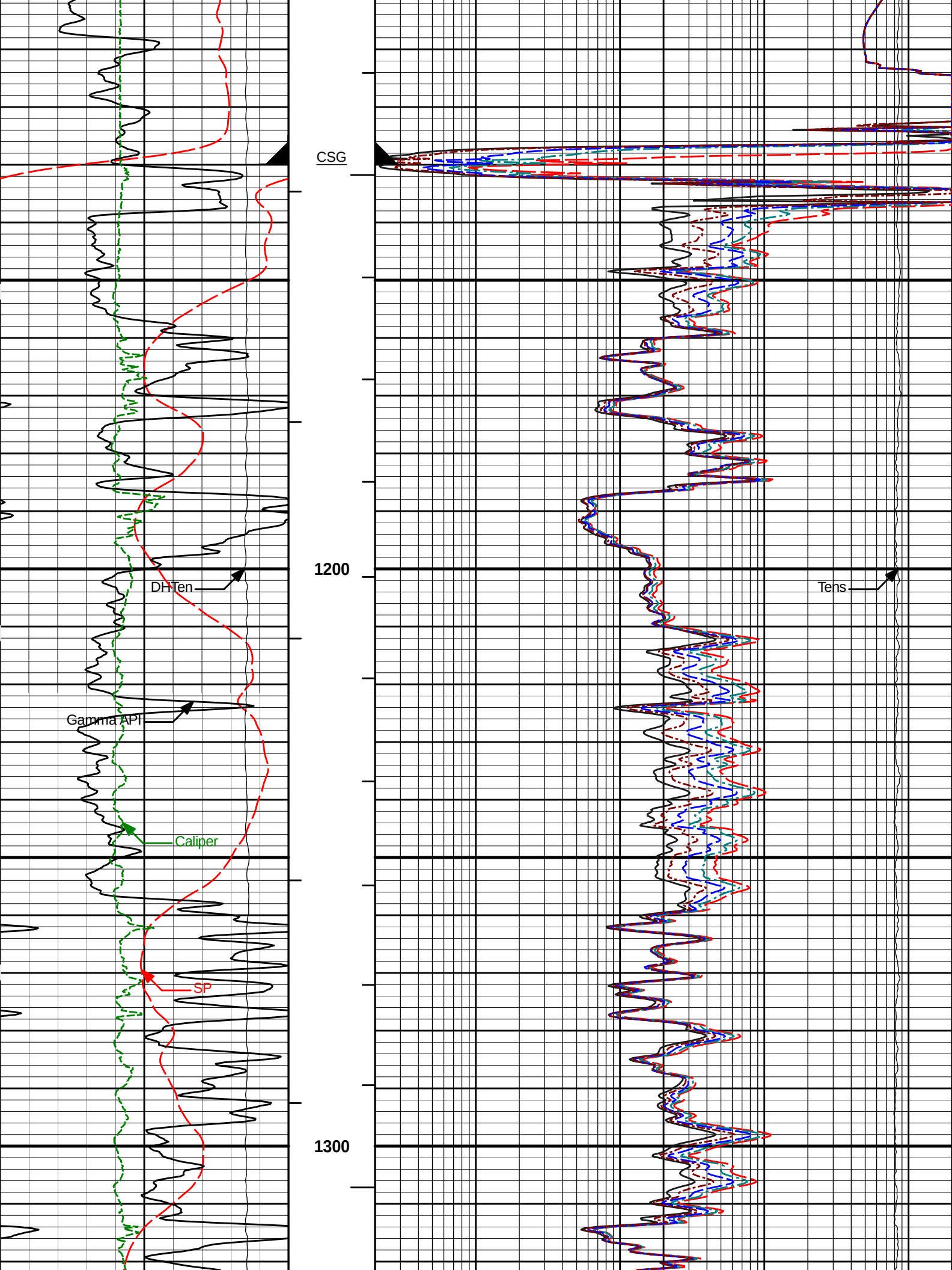
HALLIBURTON

Plot Time: 08-Jul-14 11:44:28
Plot Range: 1100 ft to 6552.17 ft
Data: BH_HOMER_9-41AH\Well Based\DAQ-0001-004
Plot File: \\RES\BP_5IN_ACRT

MAIN PASS 5" = 100'

		0.2 RT10 2K
		Ohm-m
		0.2 RT20 2K
		Ohm-m
0 Gamma API 150		0.2 RT30 2K
api		Ohm-m
6 Caliper 16	AHVT	0.2 RT60 2K
inches		Ohm-m
0 SP 100	BHVT	0.2 RT90 2K
millivolts		Ohm-m
10K DHTen 0	1 : 240	
pounds		

10K Tens 0
pounds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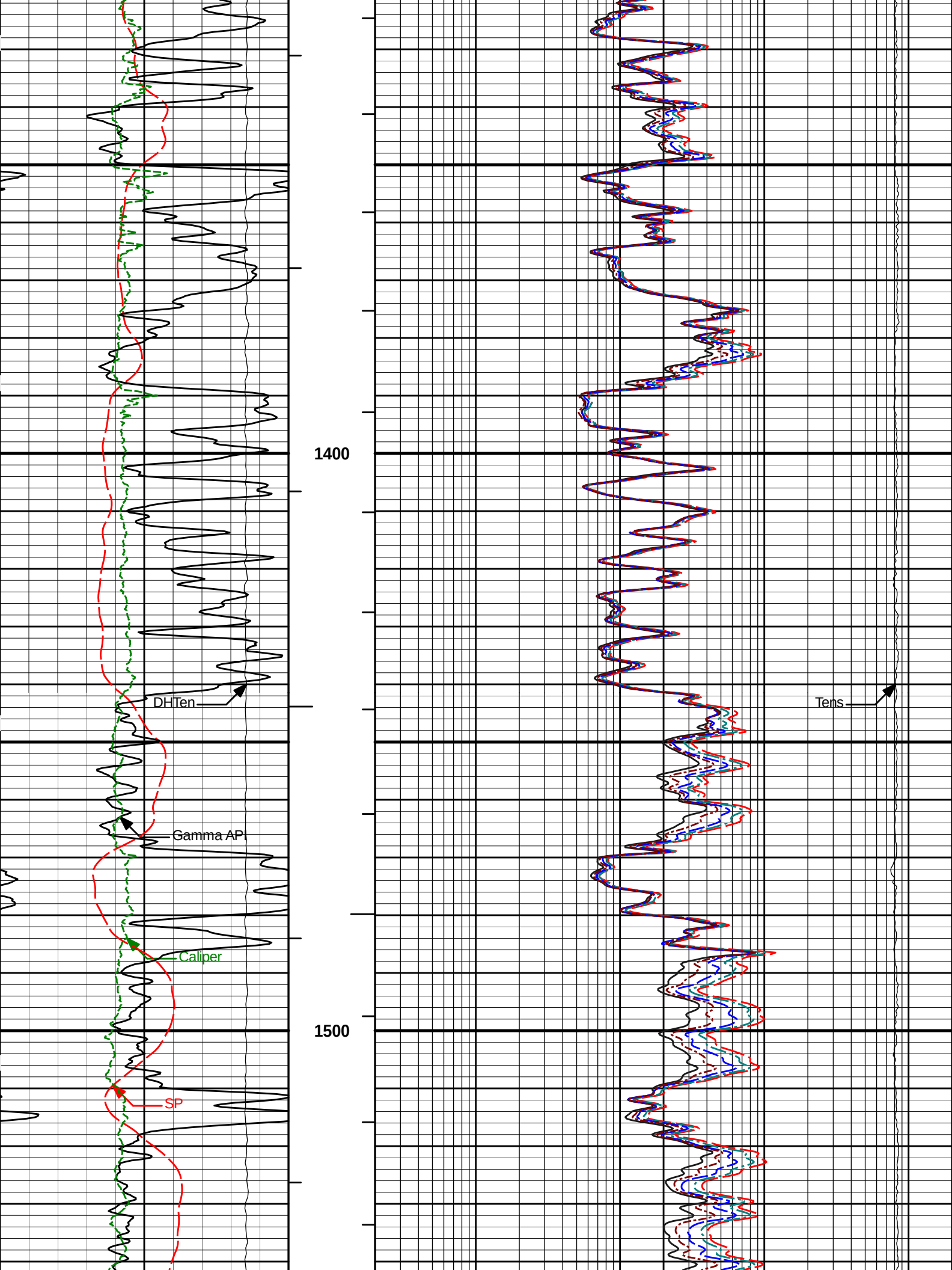
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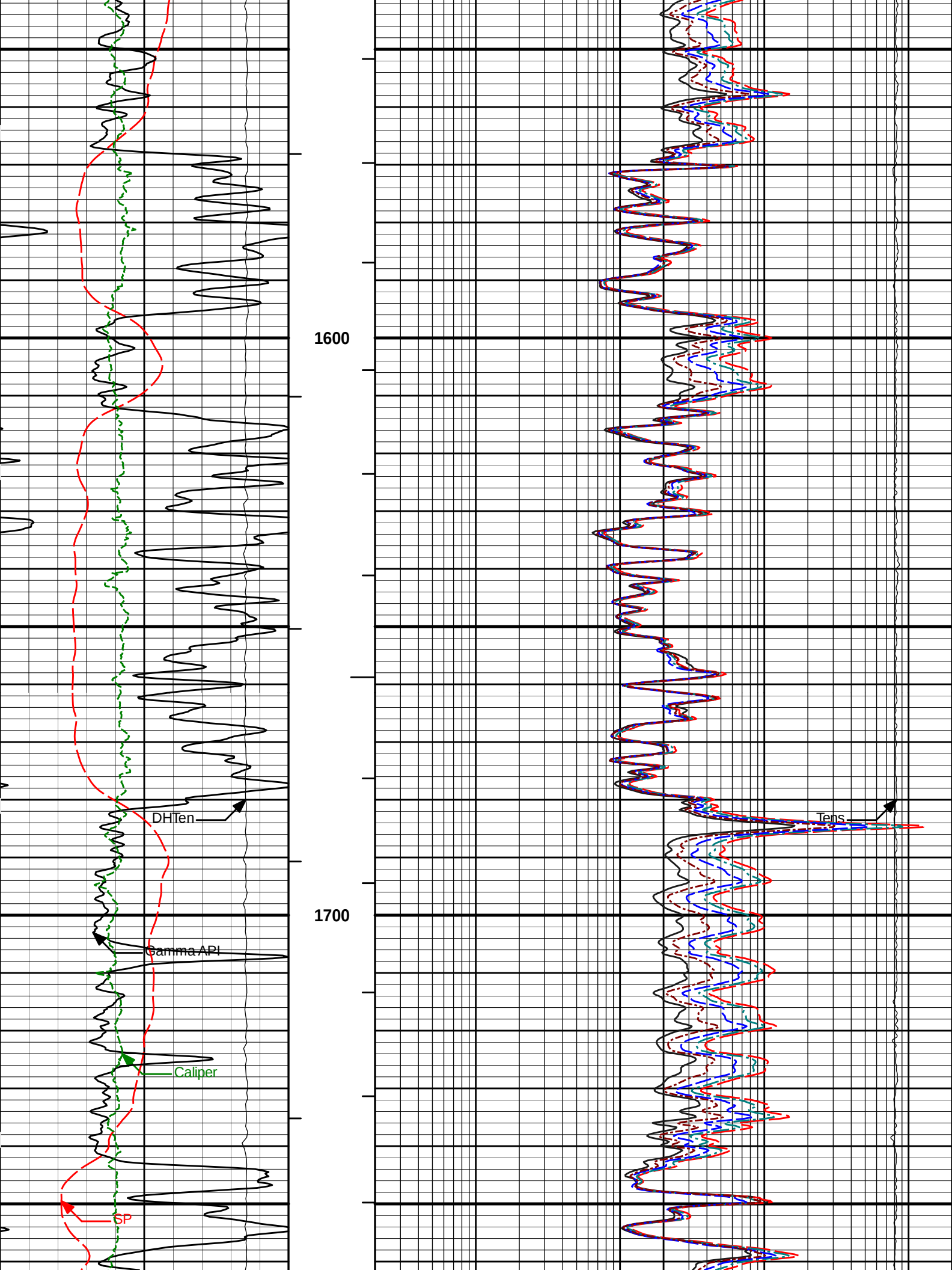
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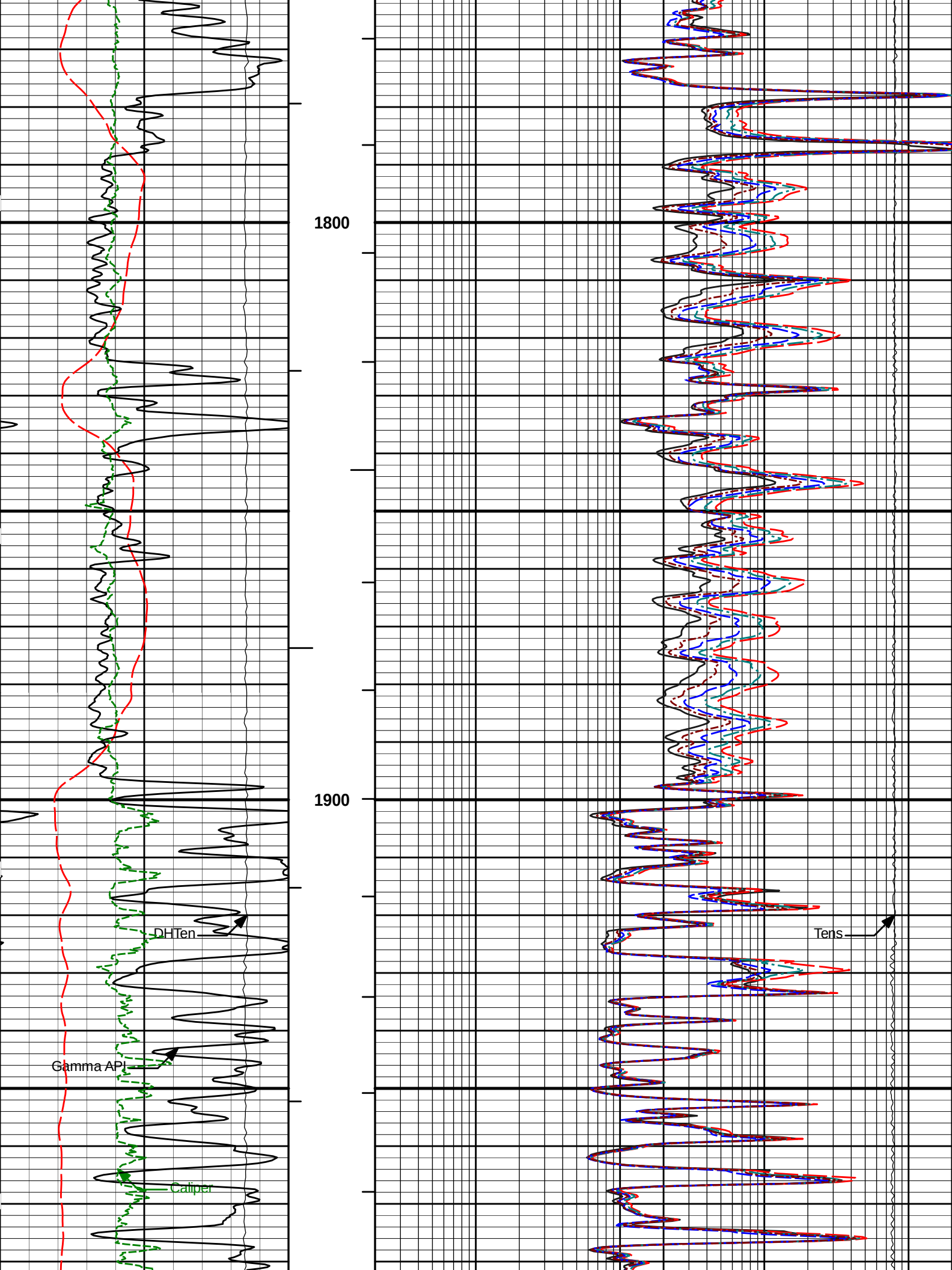
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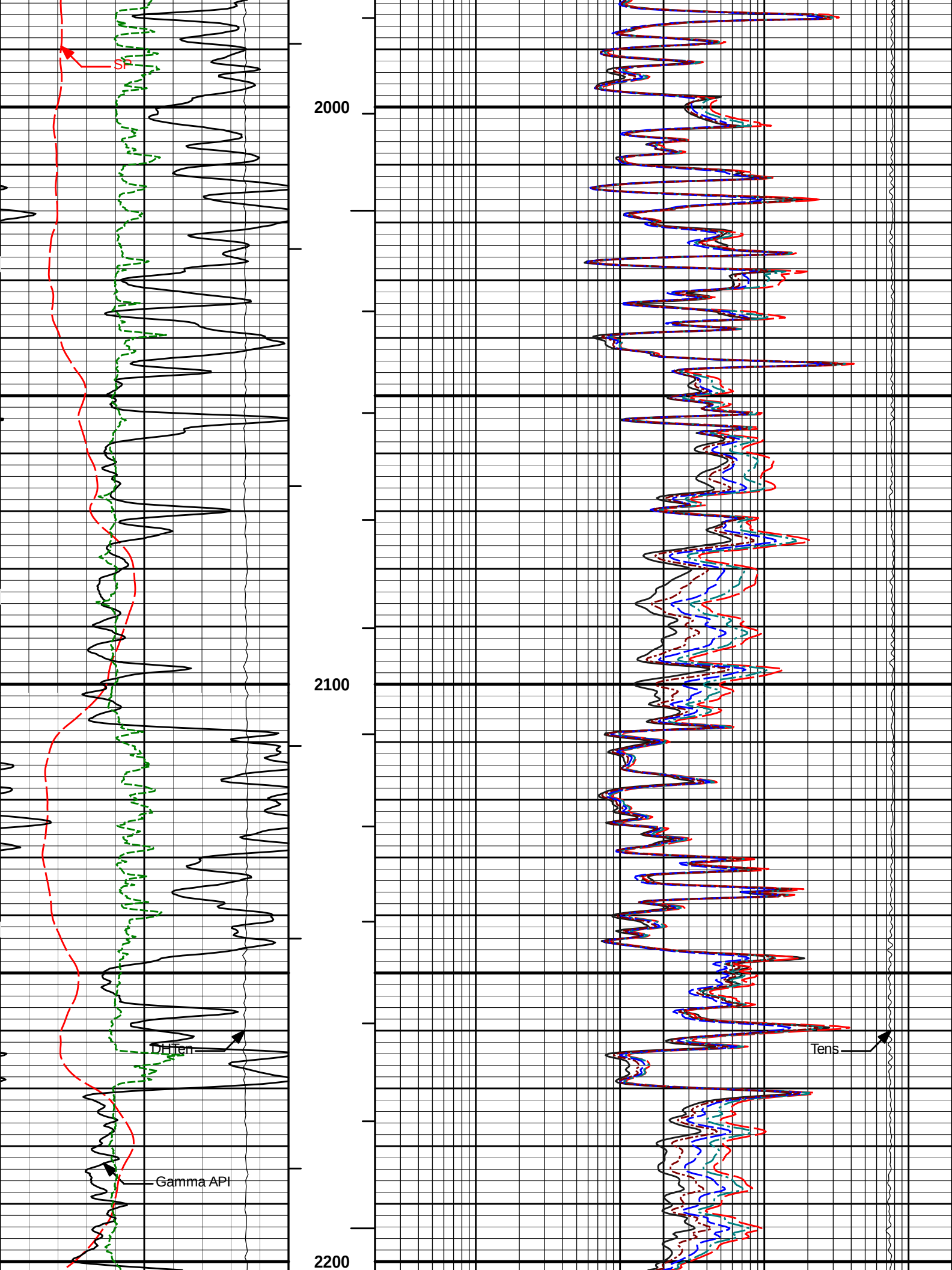
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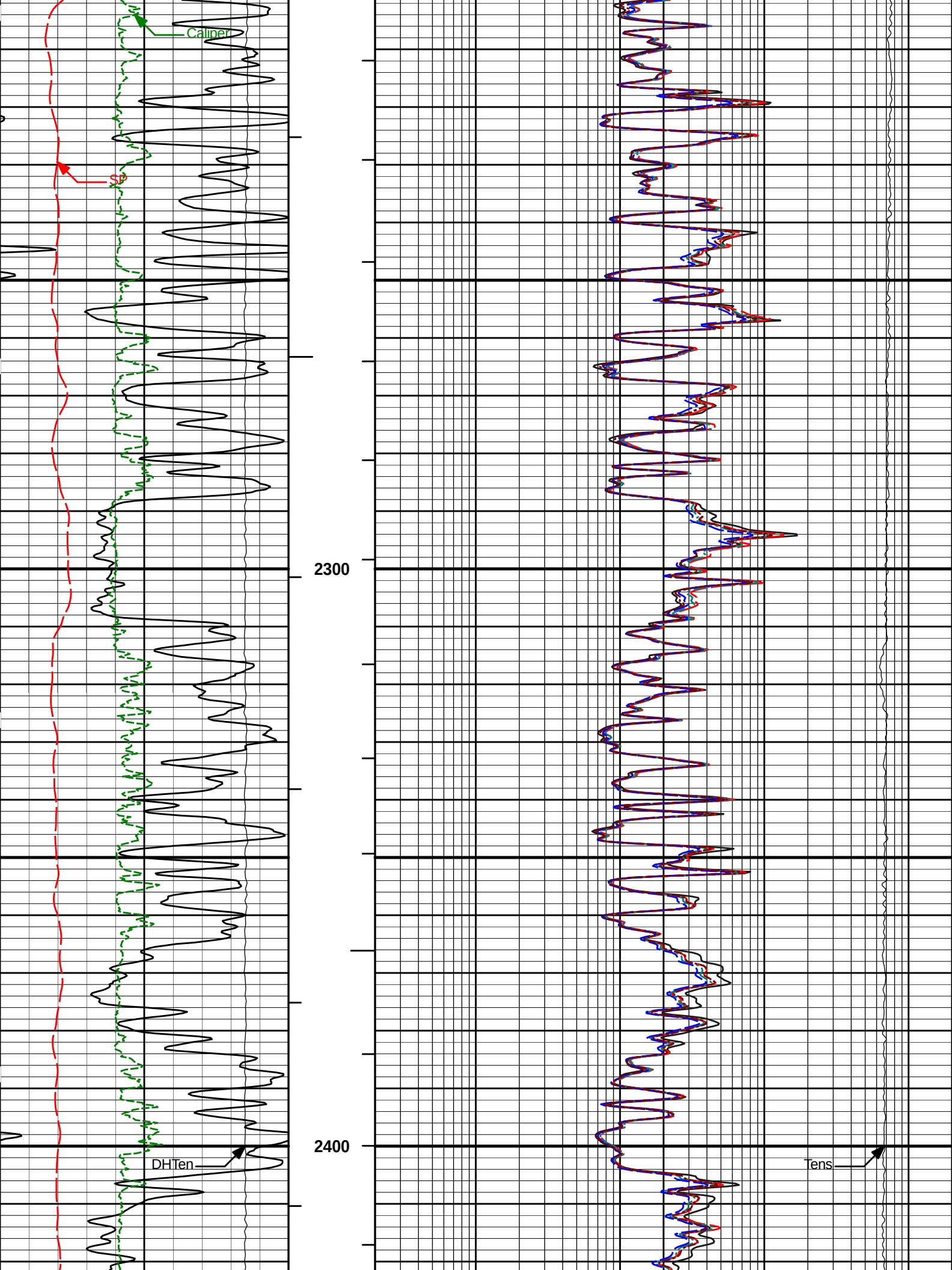
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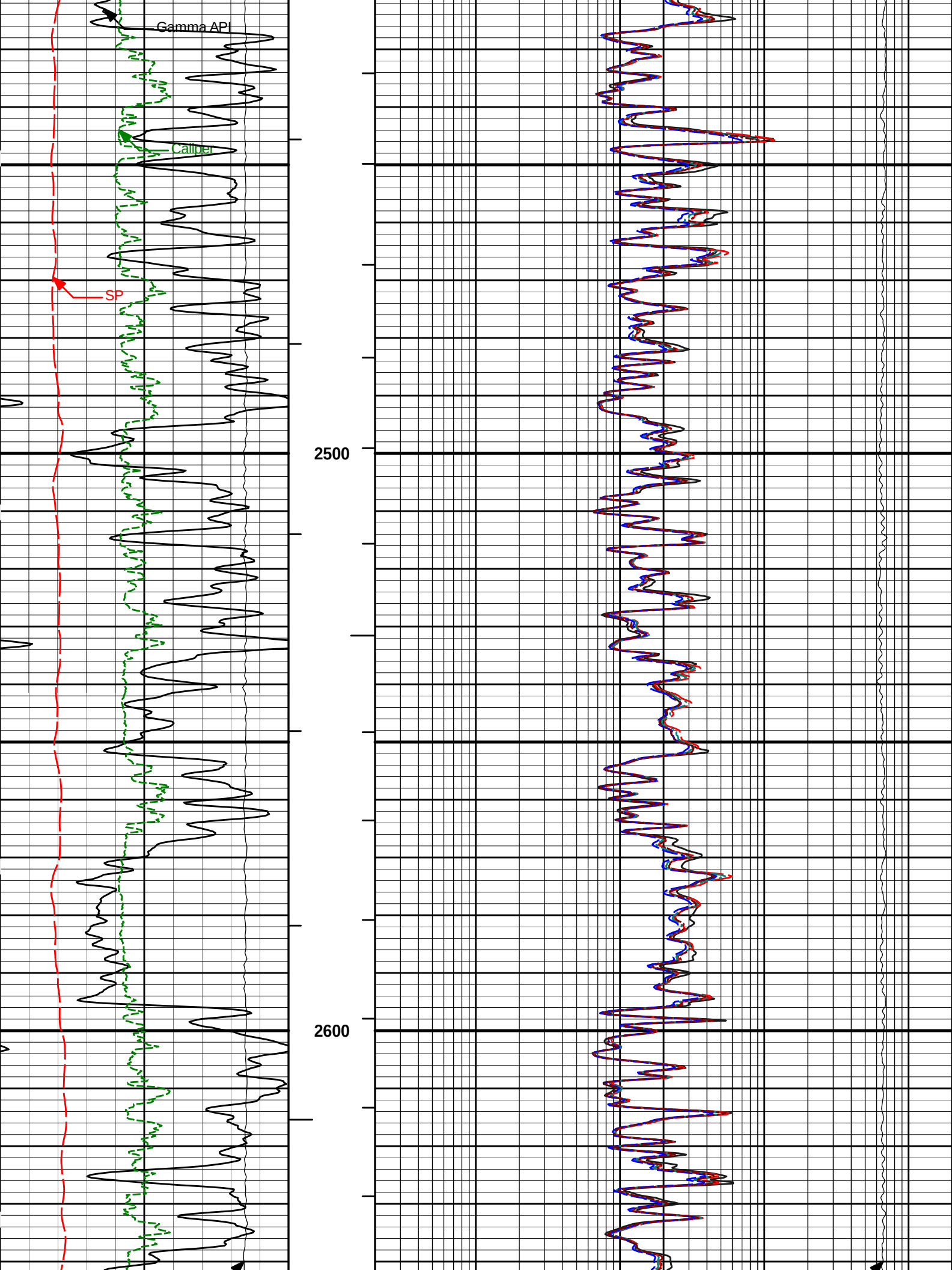
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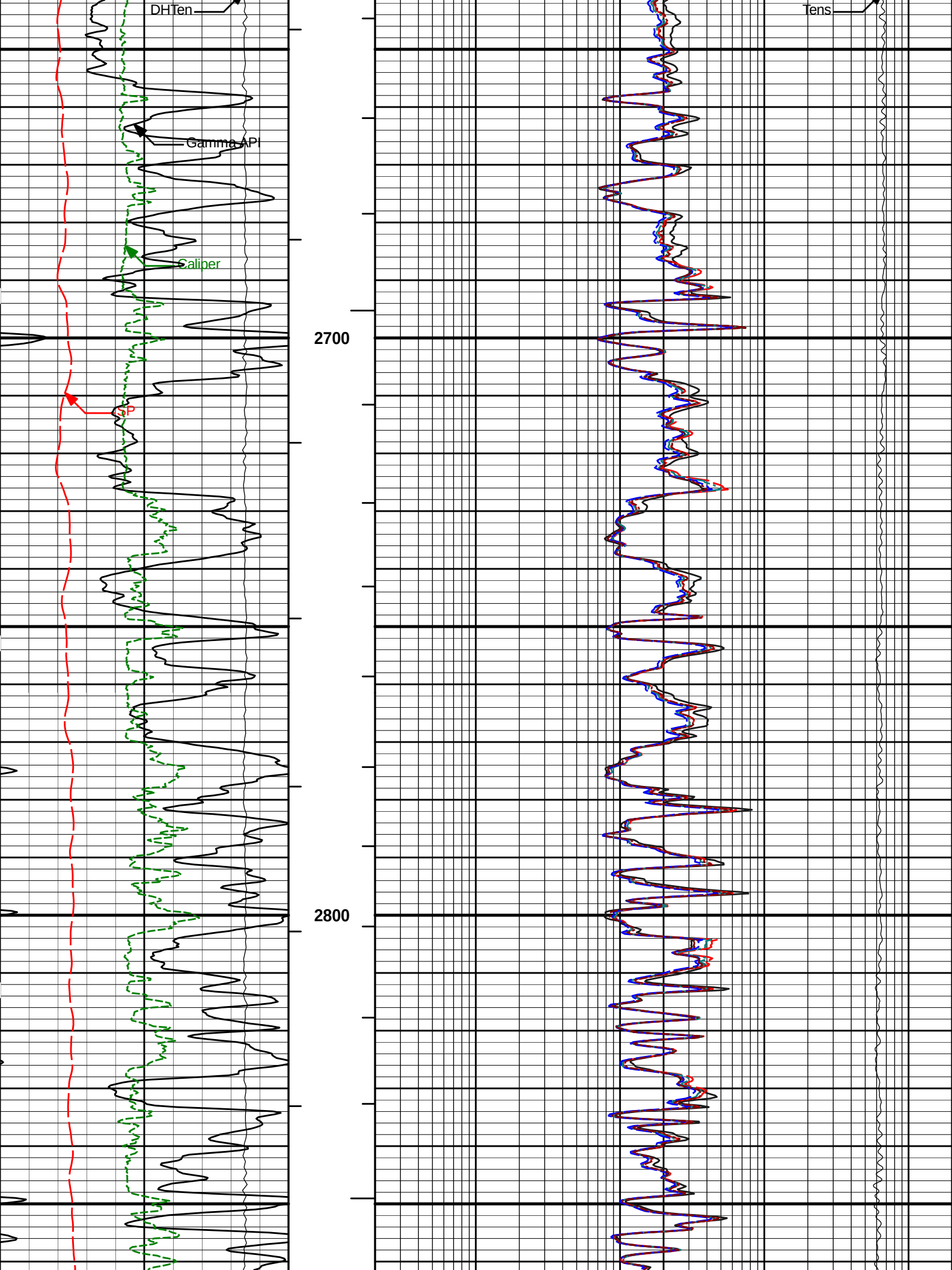
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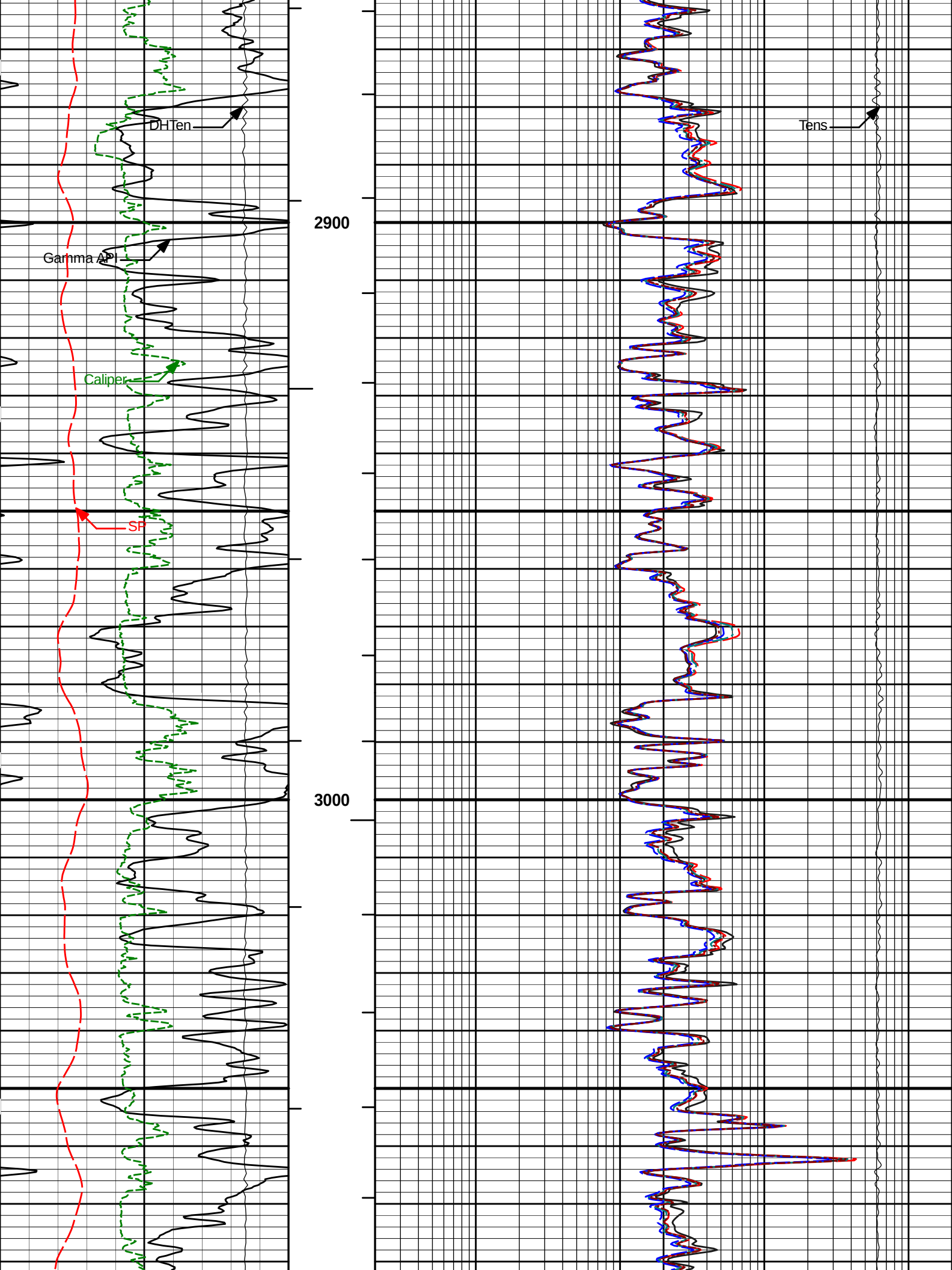
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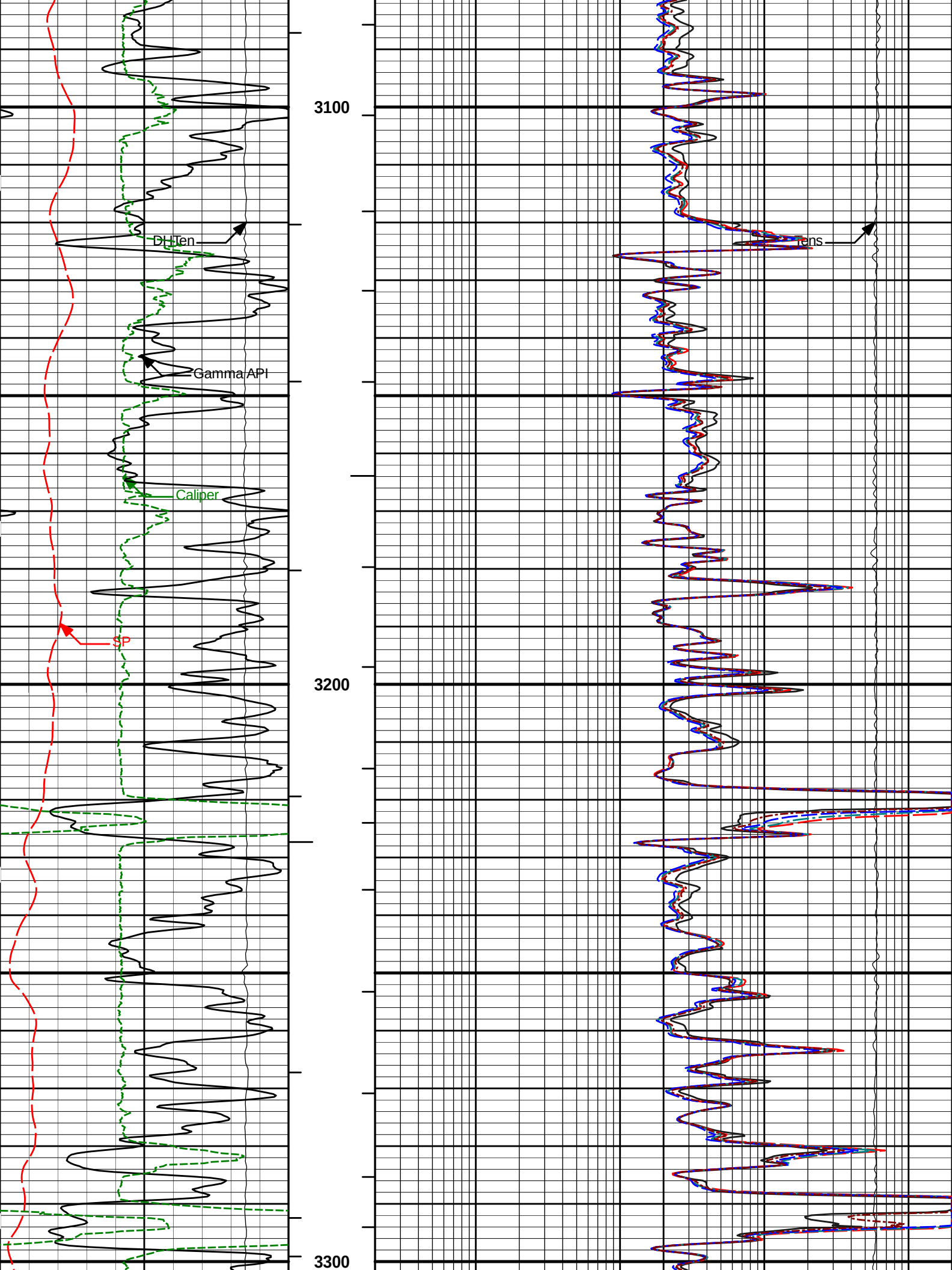
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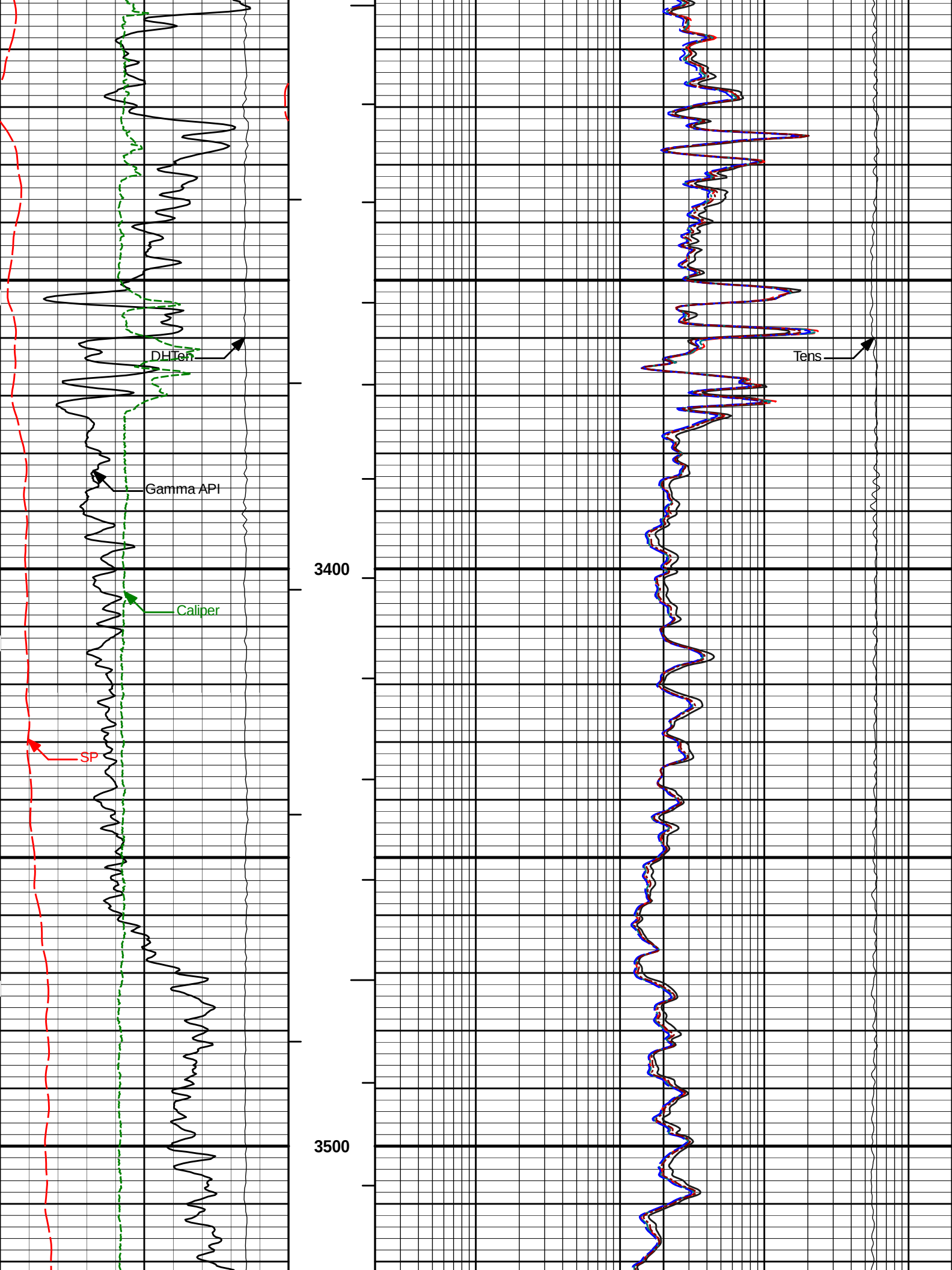
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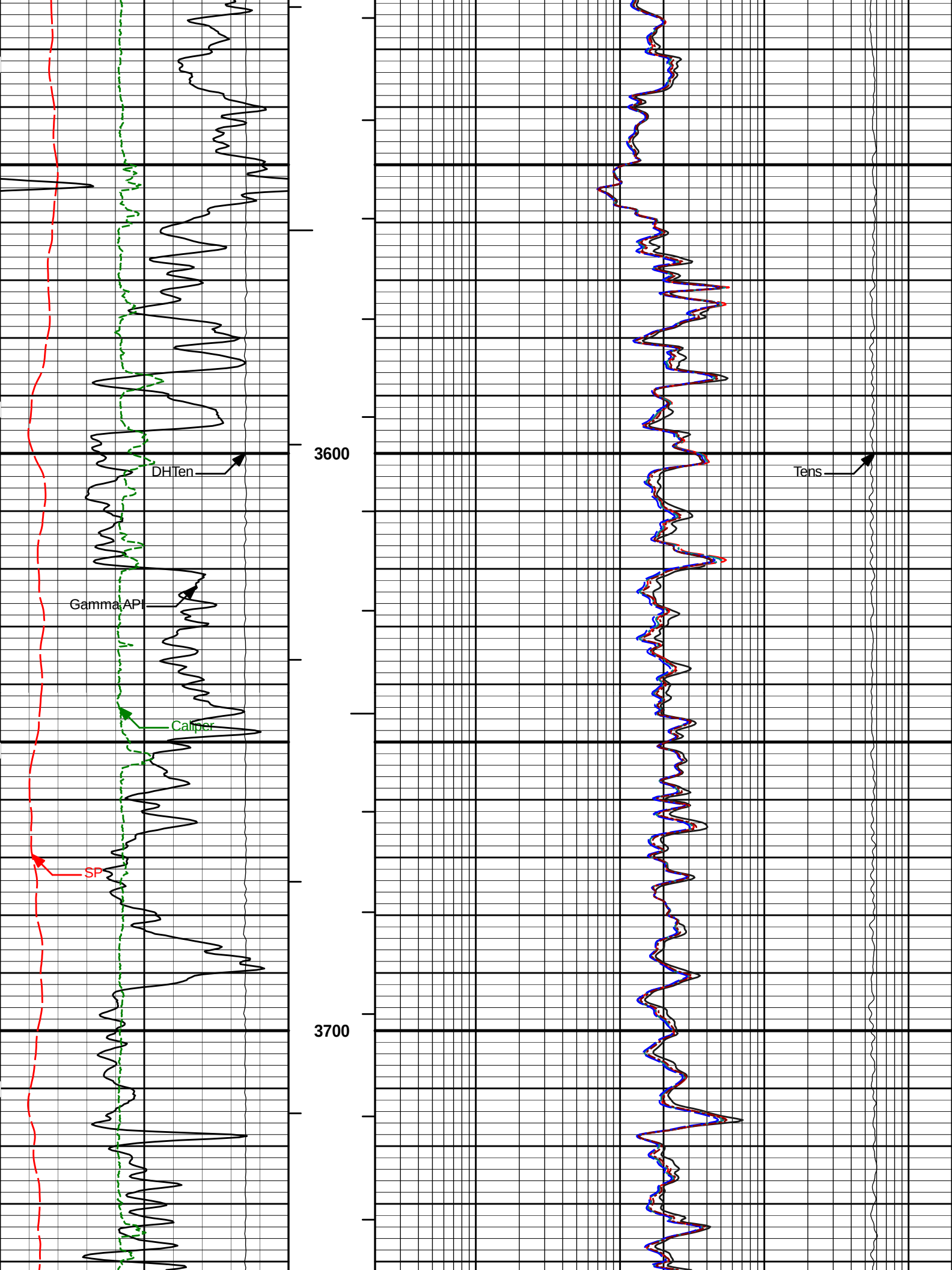
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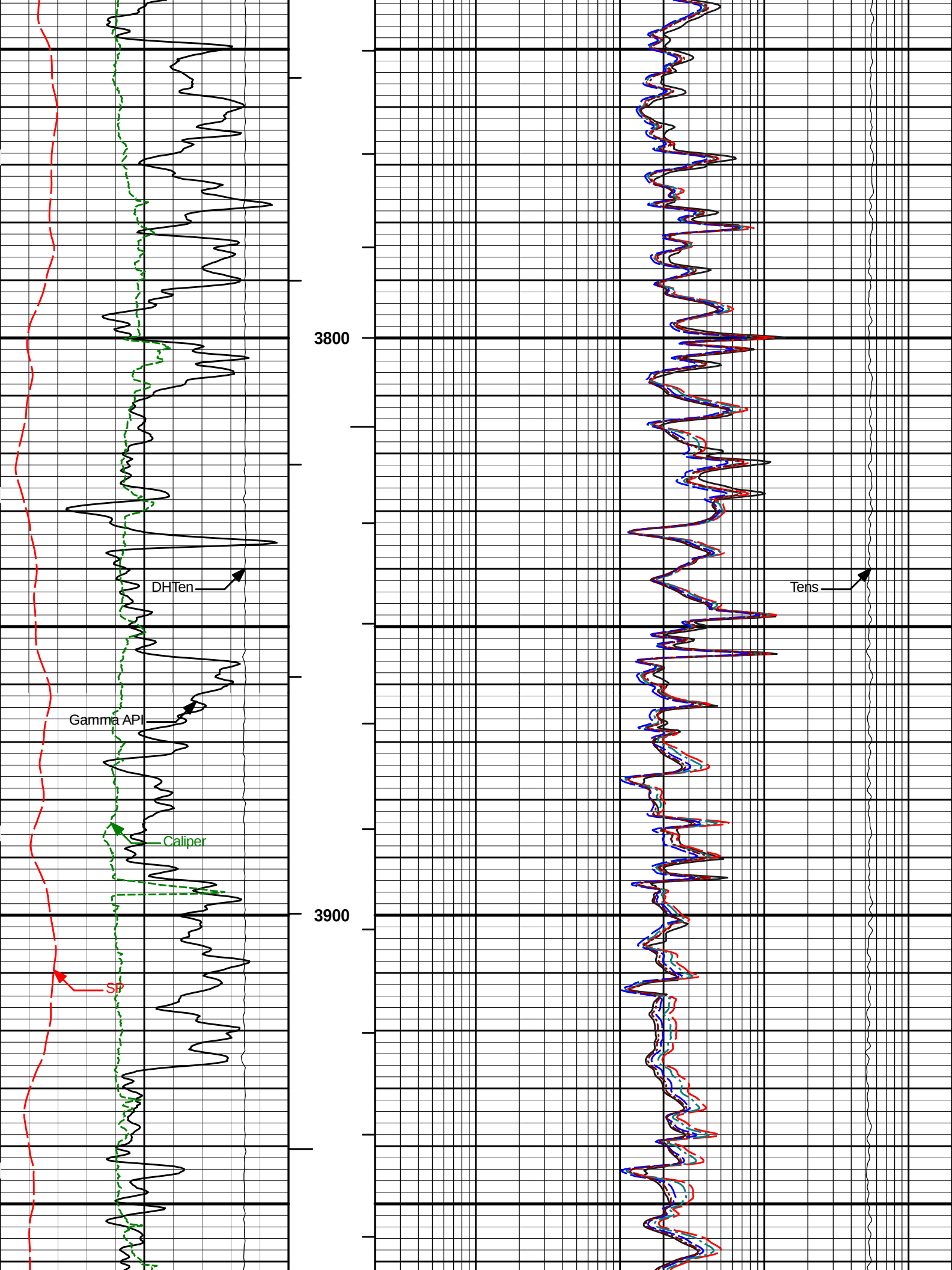
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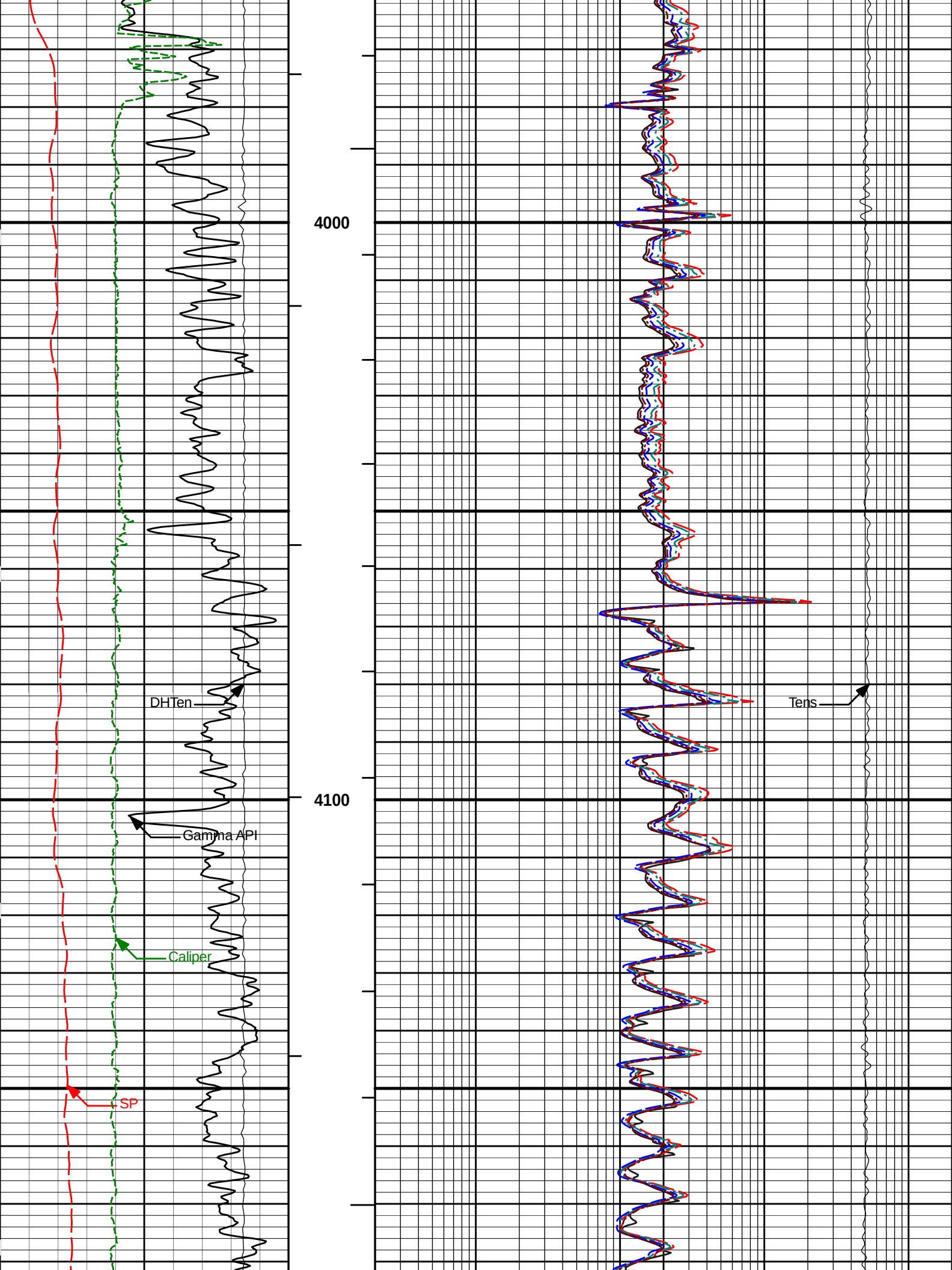
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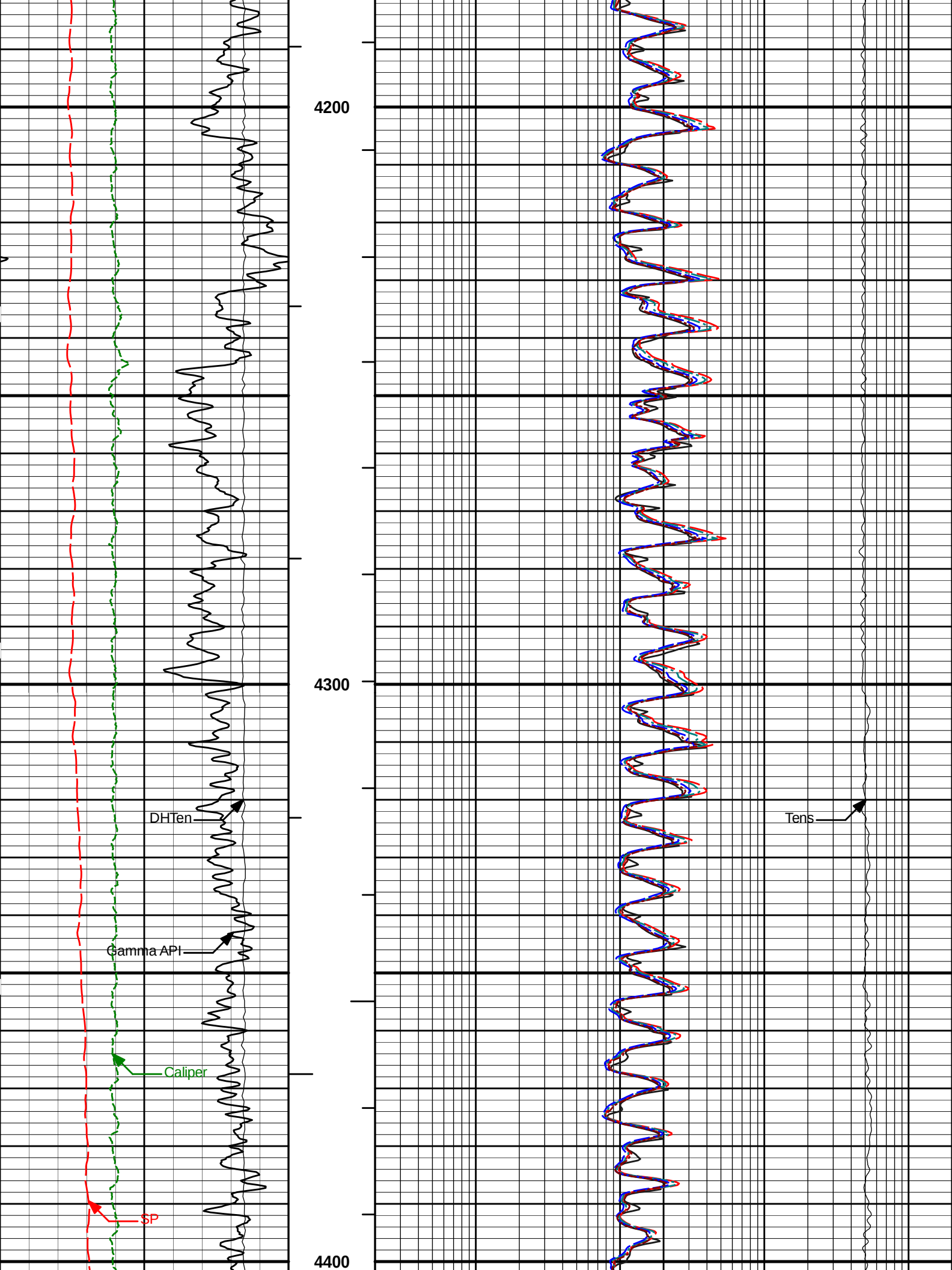
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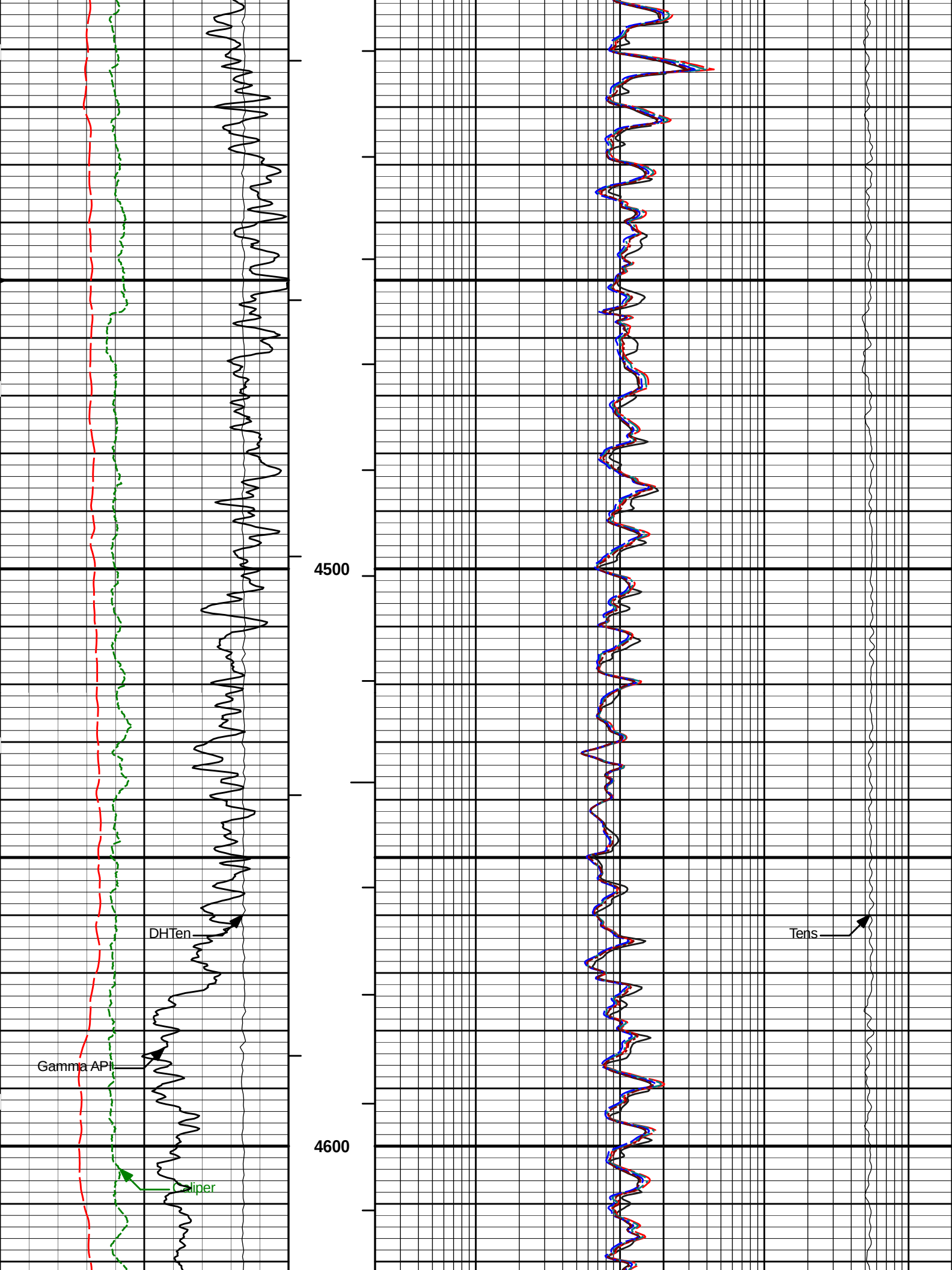
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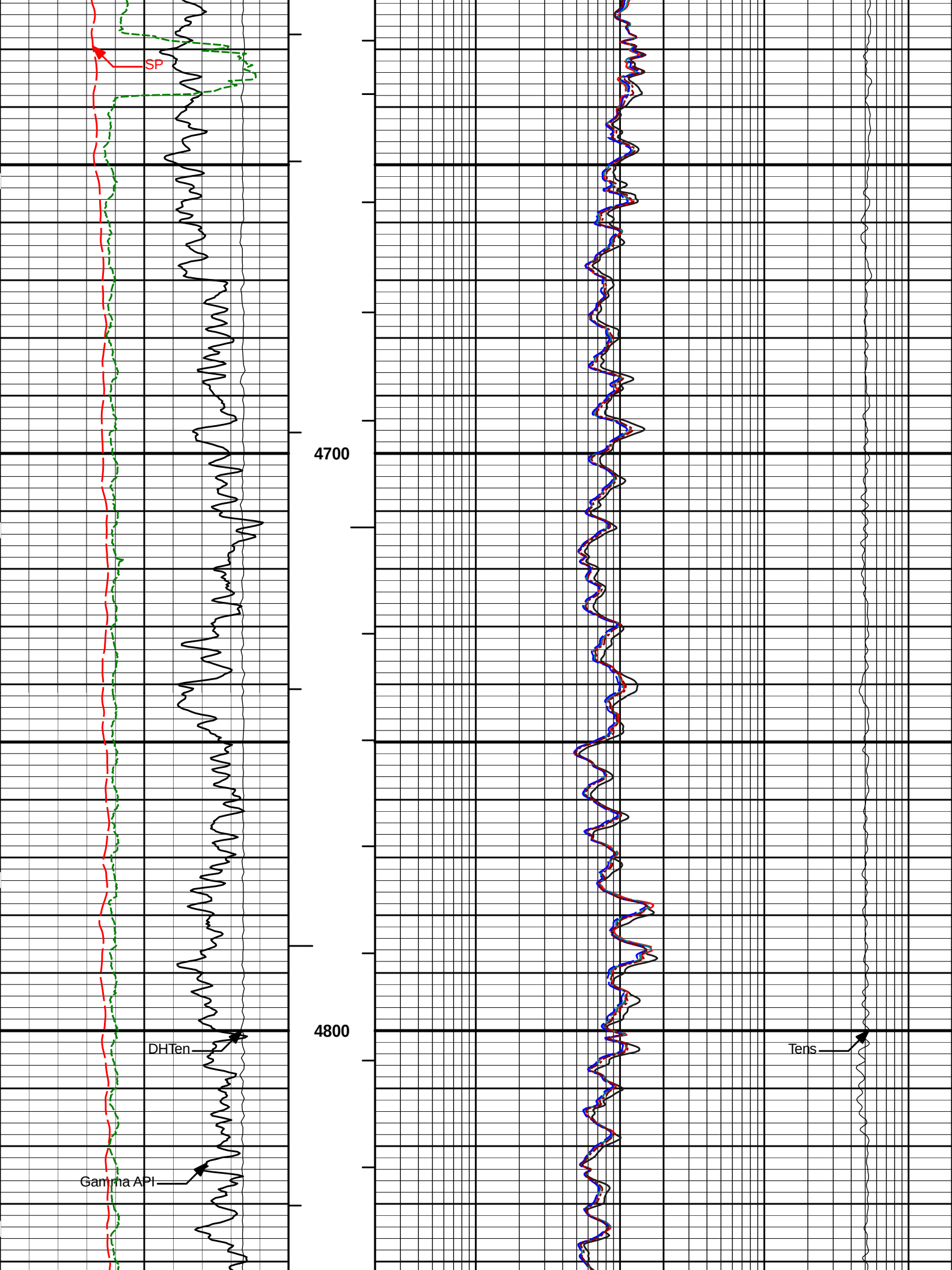
Tens
Gamma API
Caliper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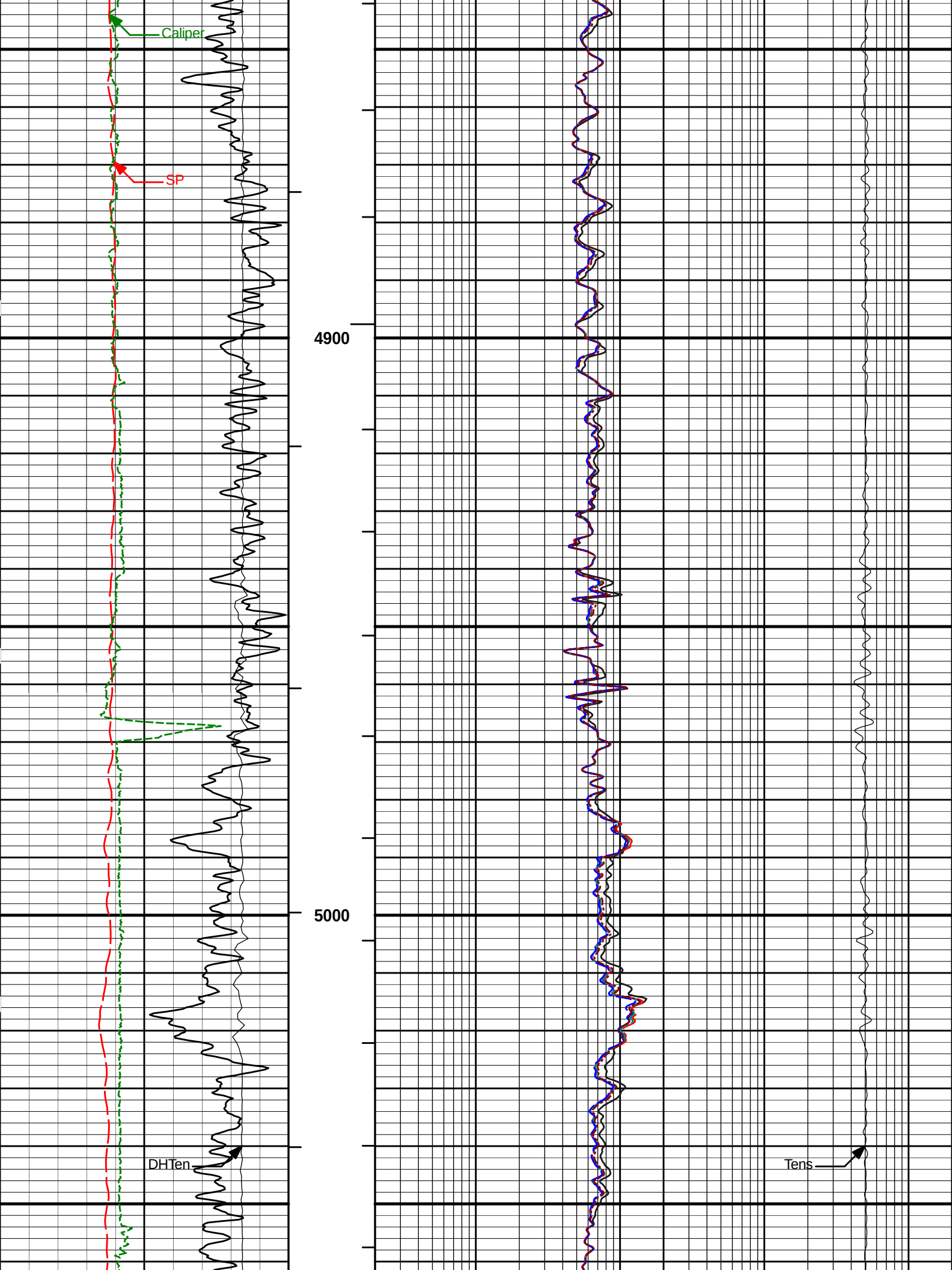
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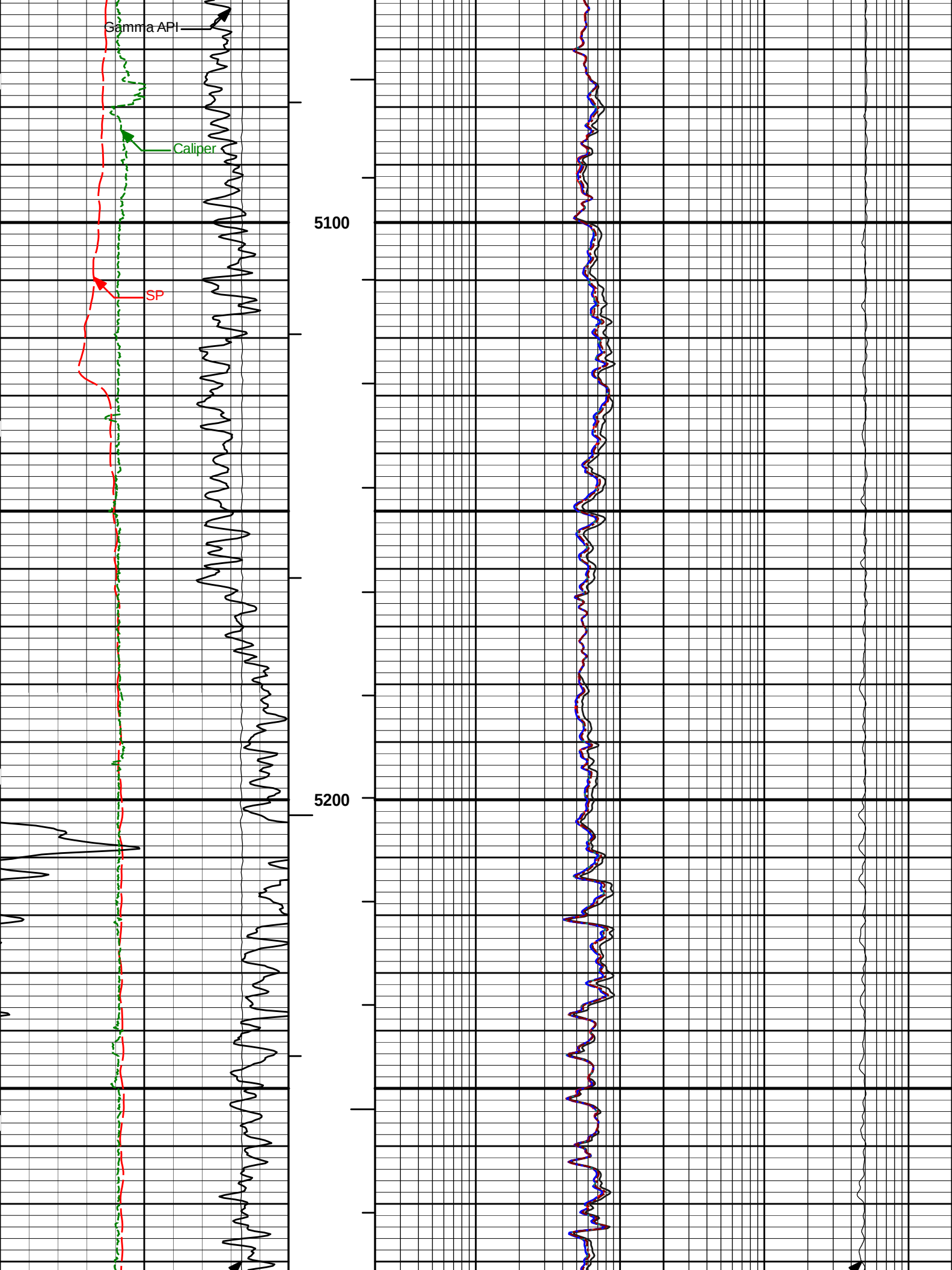
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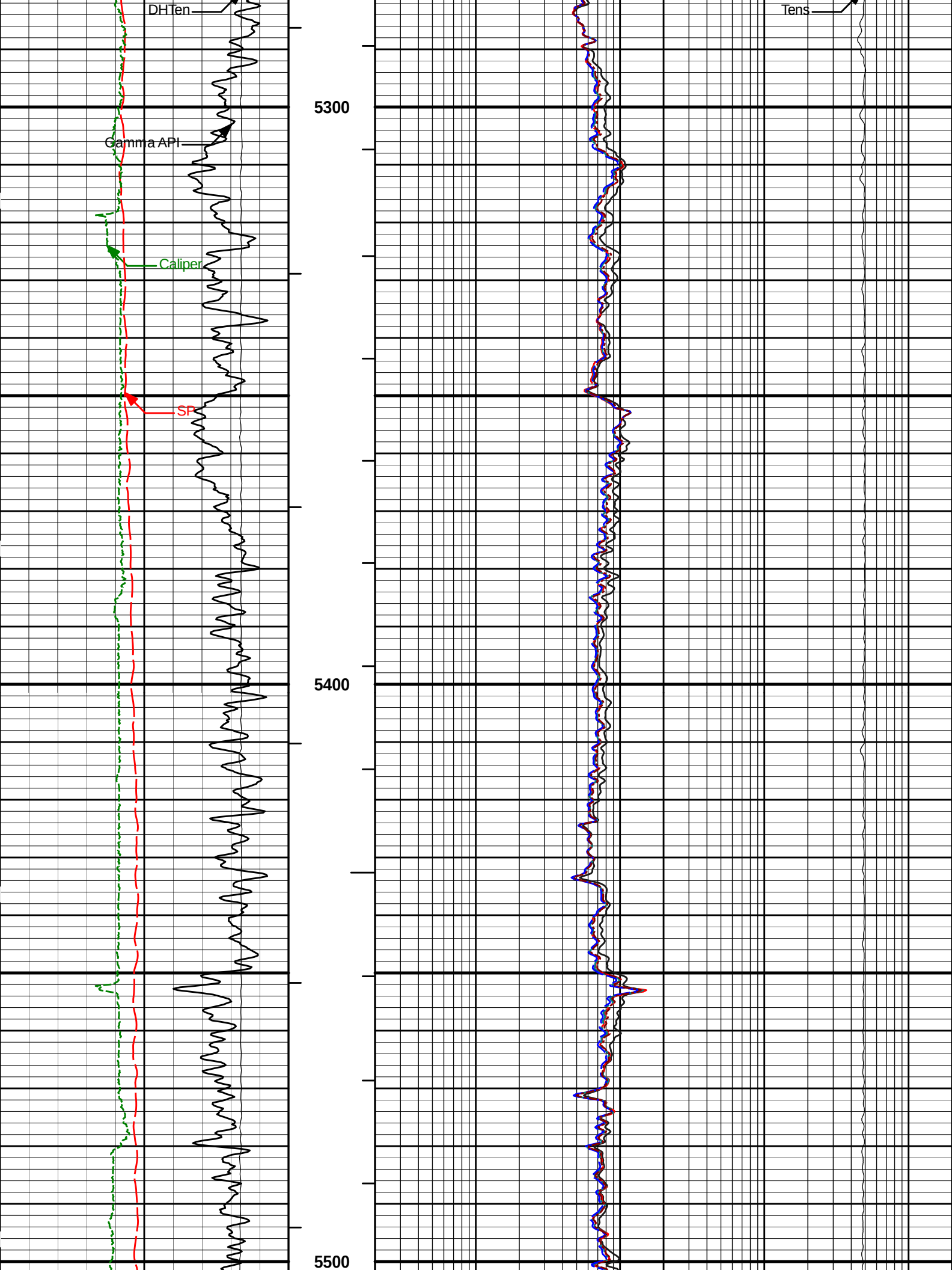
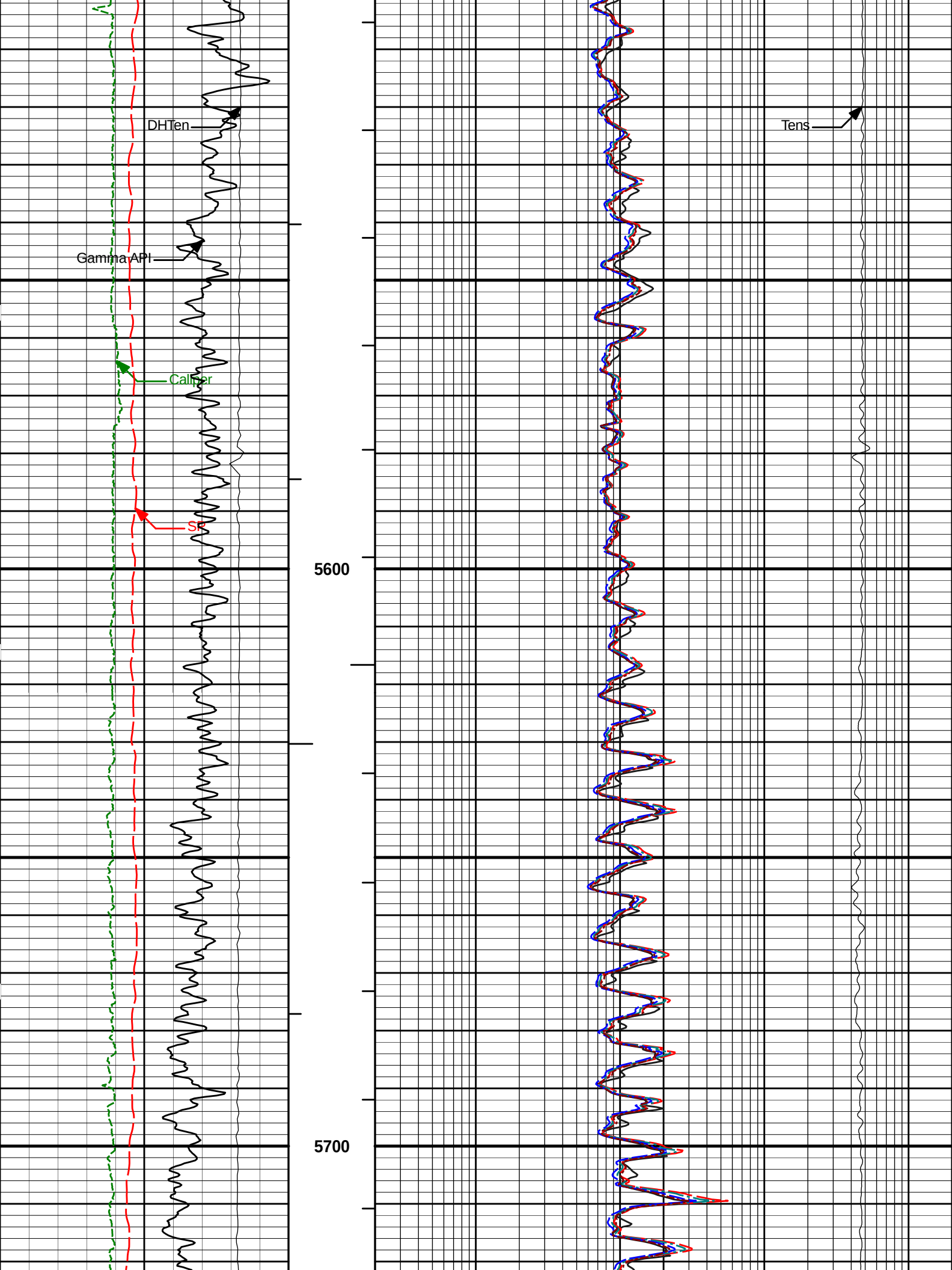
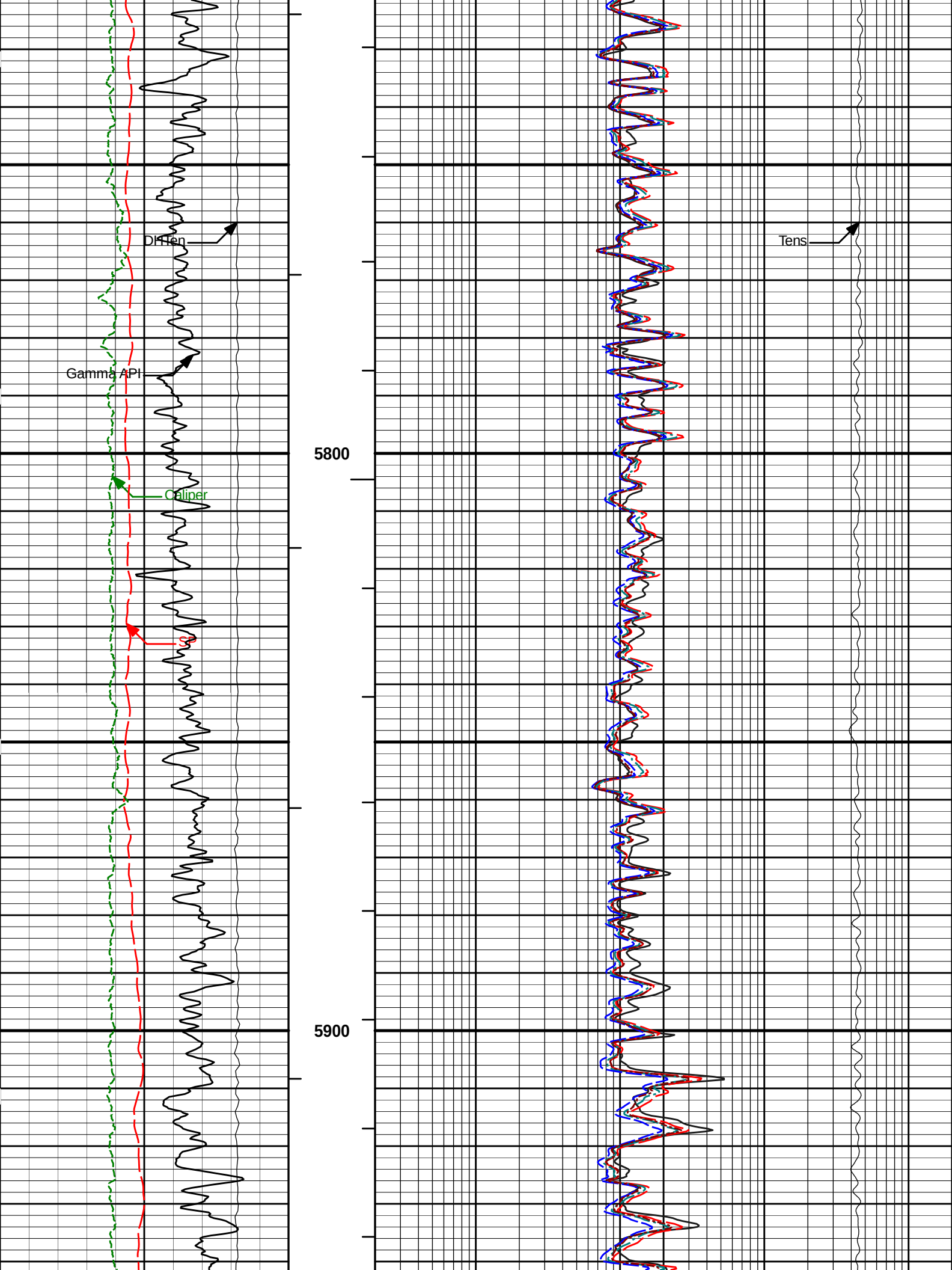
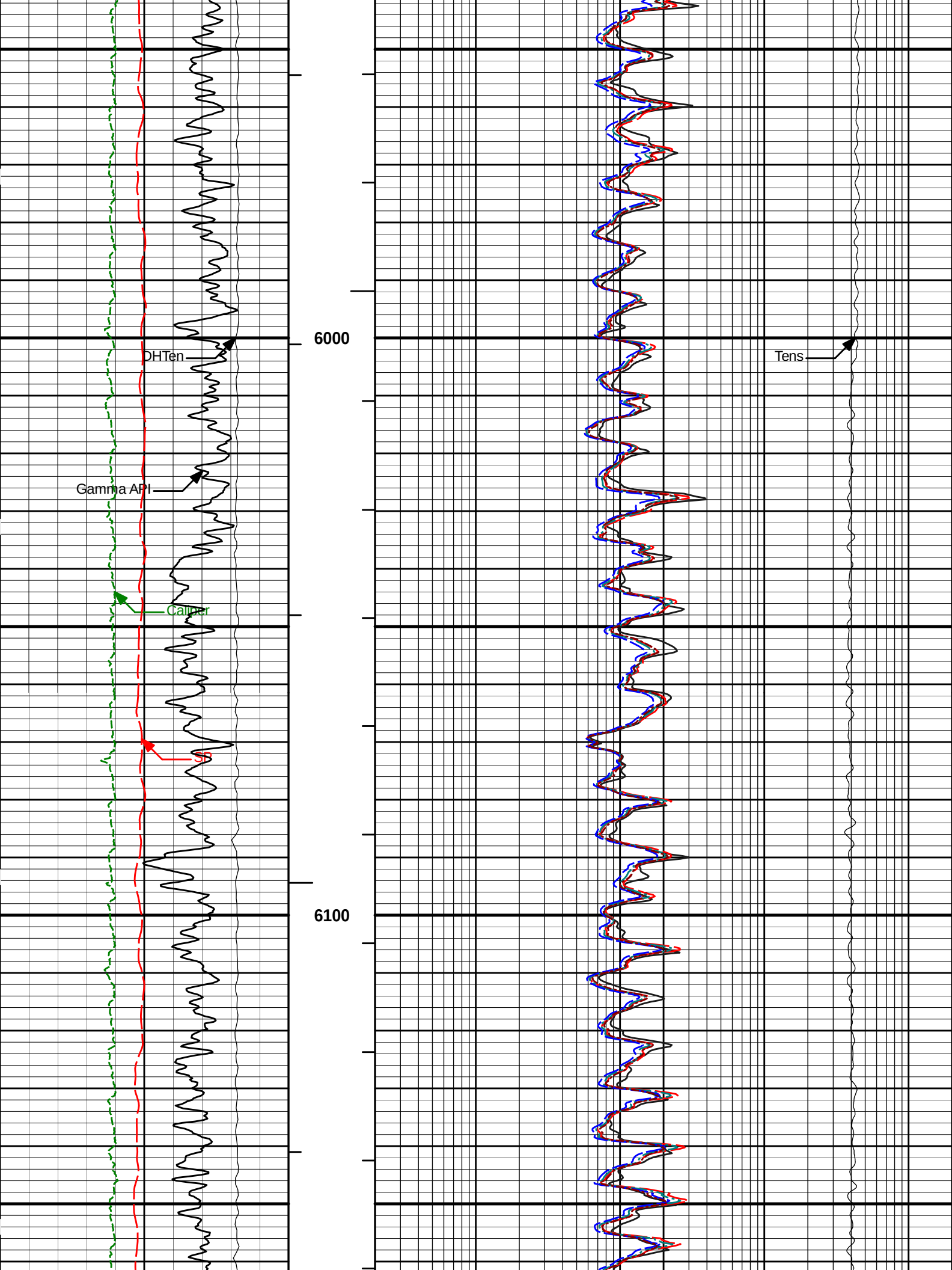
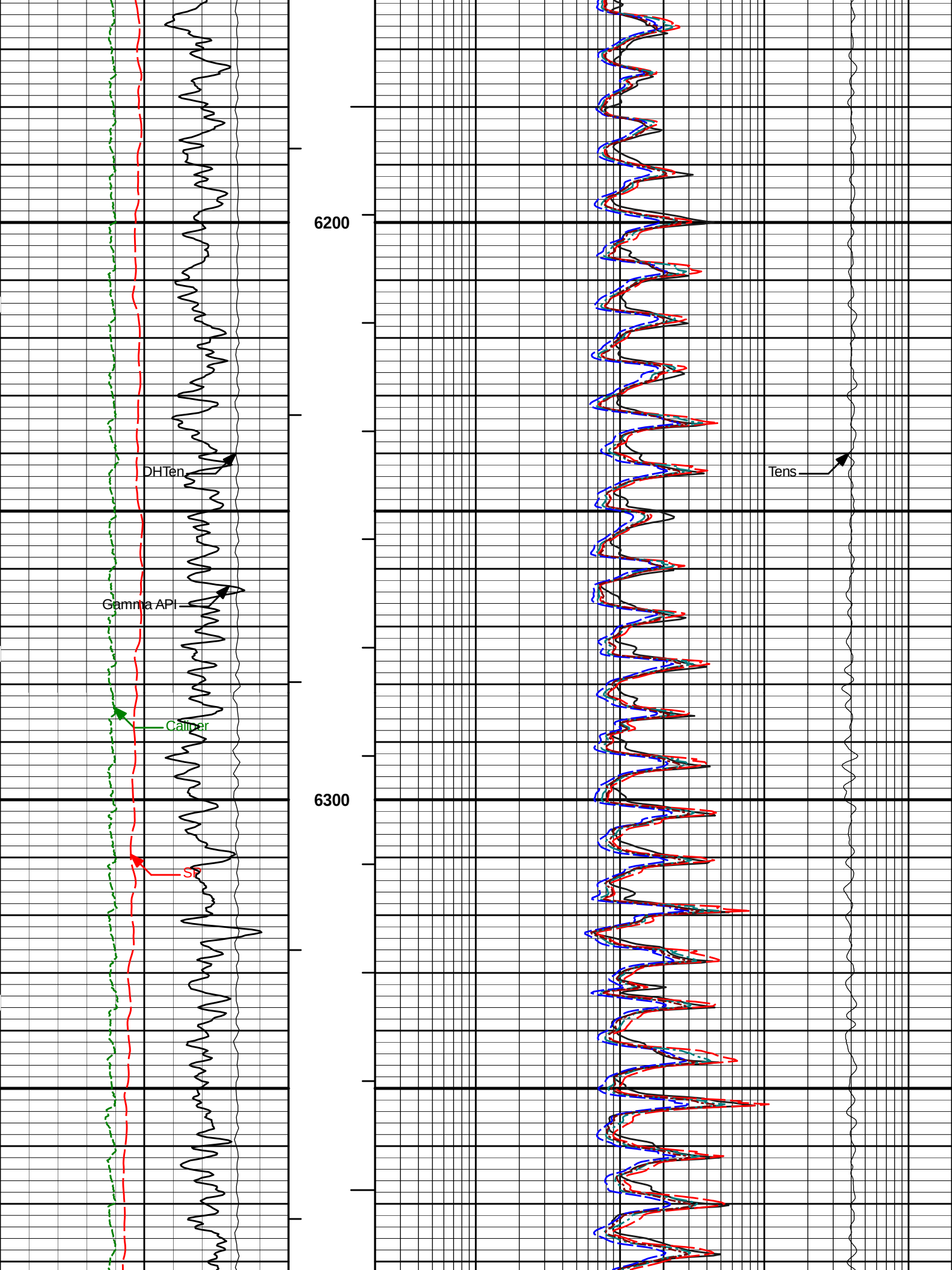
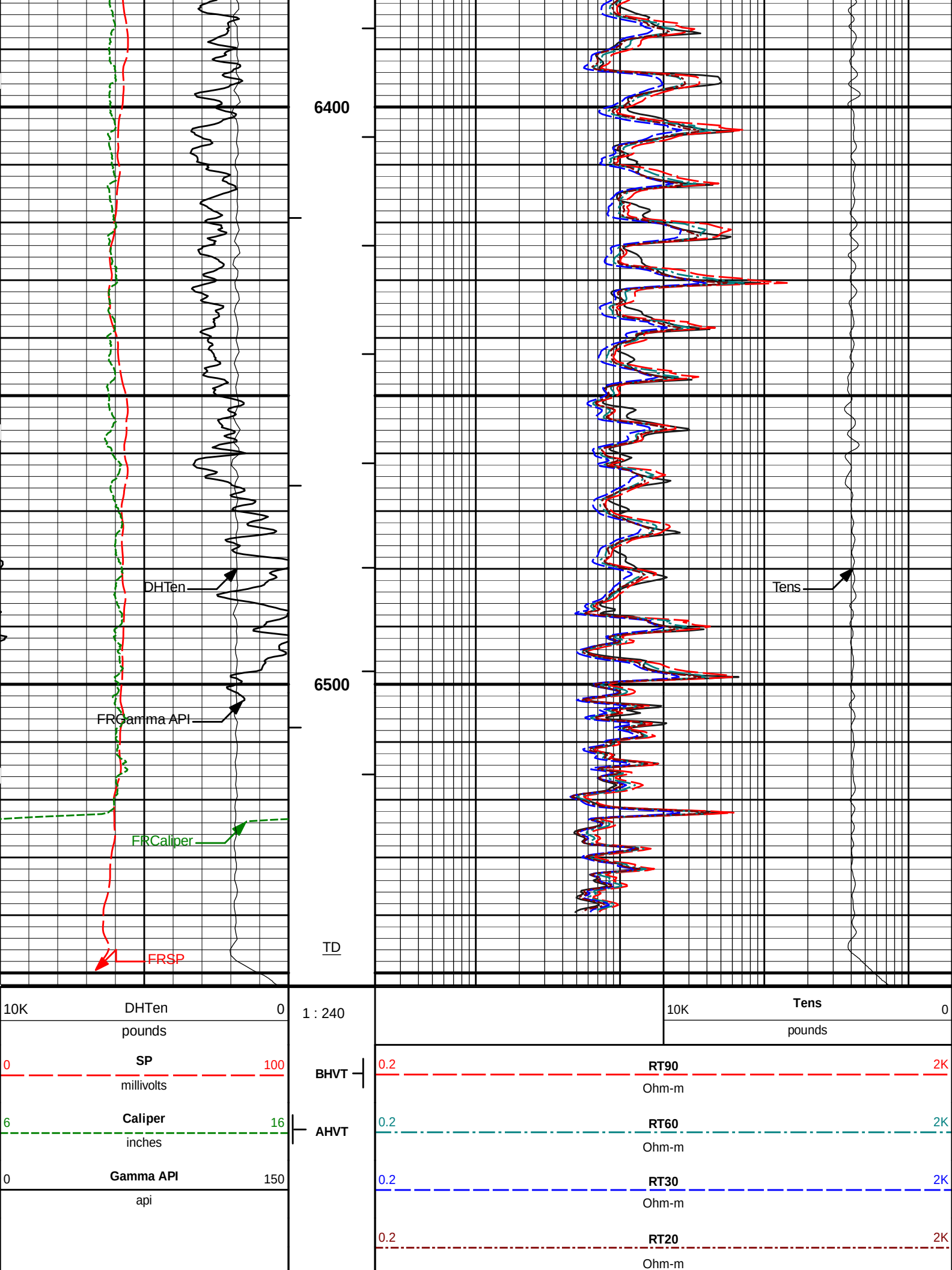

DHTen
Tens
Gamma API
Caliper
SP
5300
5400
5500


DHTen
Tens
Gamma API
Caliper
SP
5600
5700


DHTen
Gamma API
Caliper
SP
5800
5900
Tens


6000
6100
DHTen
Gamma API
Caliper
SP
Tens


6200
6300
DHTen
Gamma API
Caliper
SP
Tens


6400
6500
DHTen
FRGamma API
FRCaliper
FRSP
TD
Tens
10K
DHTen
0
pounds
1 : 240
10K
Tens
0
pounds
0
SP
100
millivolts
6
Caliper
16
inches
0
Gamma API
150
api
BHVT
AHVT
0.2
RT90
2K
Ohm-m
0.2
RT60
2K
Ohm-m
0.2
RT30
2K
Ohm-m
0.2
RT20
2K
Ohm-m

0.2 **RT10** 2K
Ohm-m

HALLIBURTON

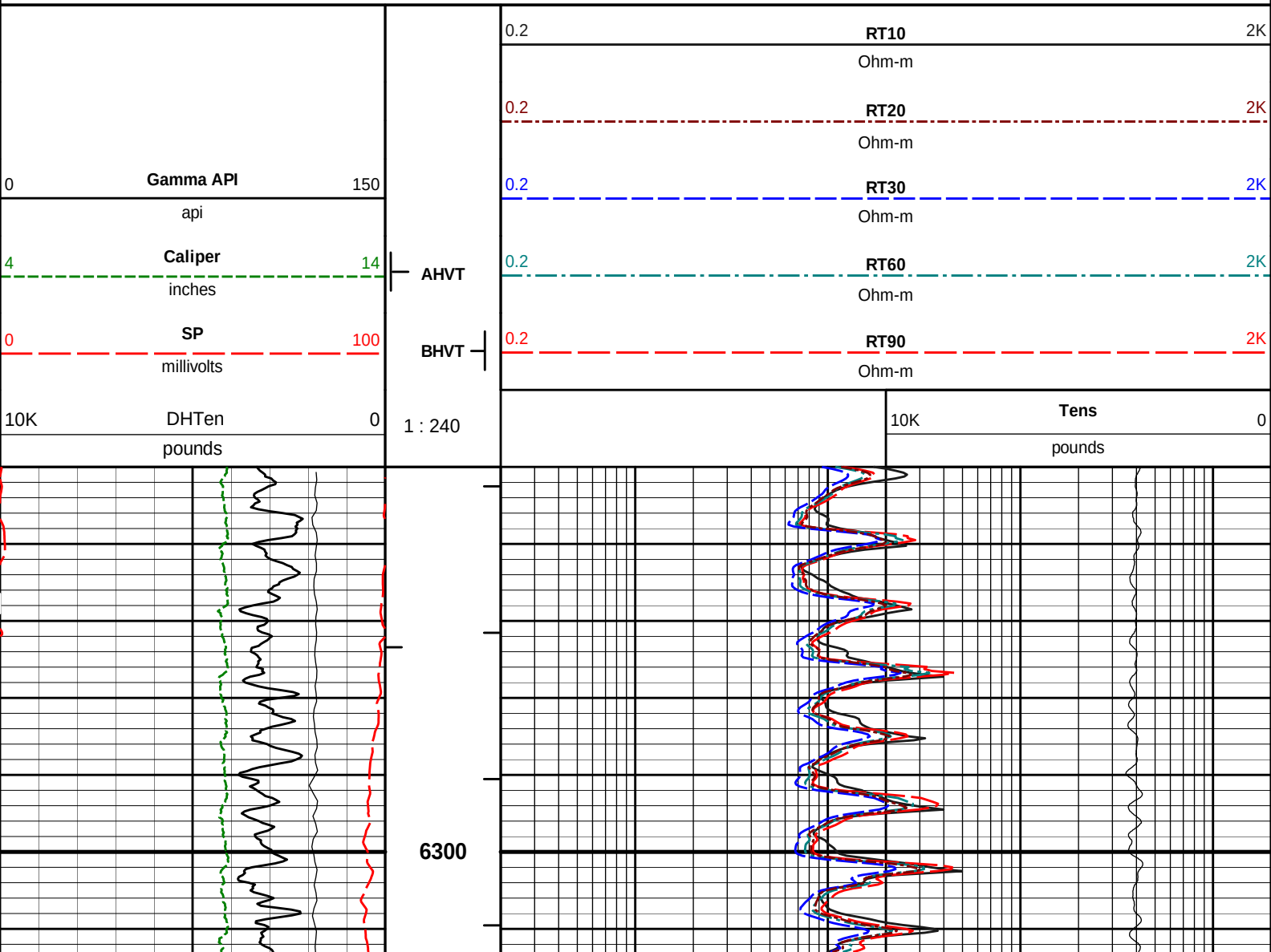
Plot Time: 08-Jul-14 11:44:33
Plot Range: 1100 ft to 6552.17 ft
Data: BH_HOMER_9-41AH\Well Based\DAQ-0001-004
Plot File: \\RES\BP_5IN_ACRT

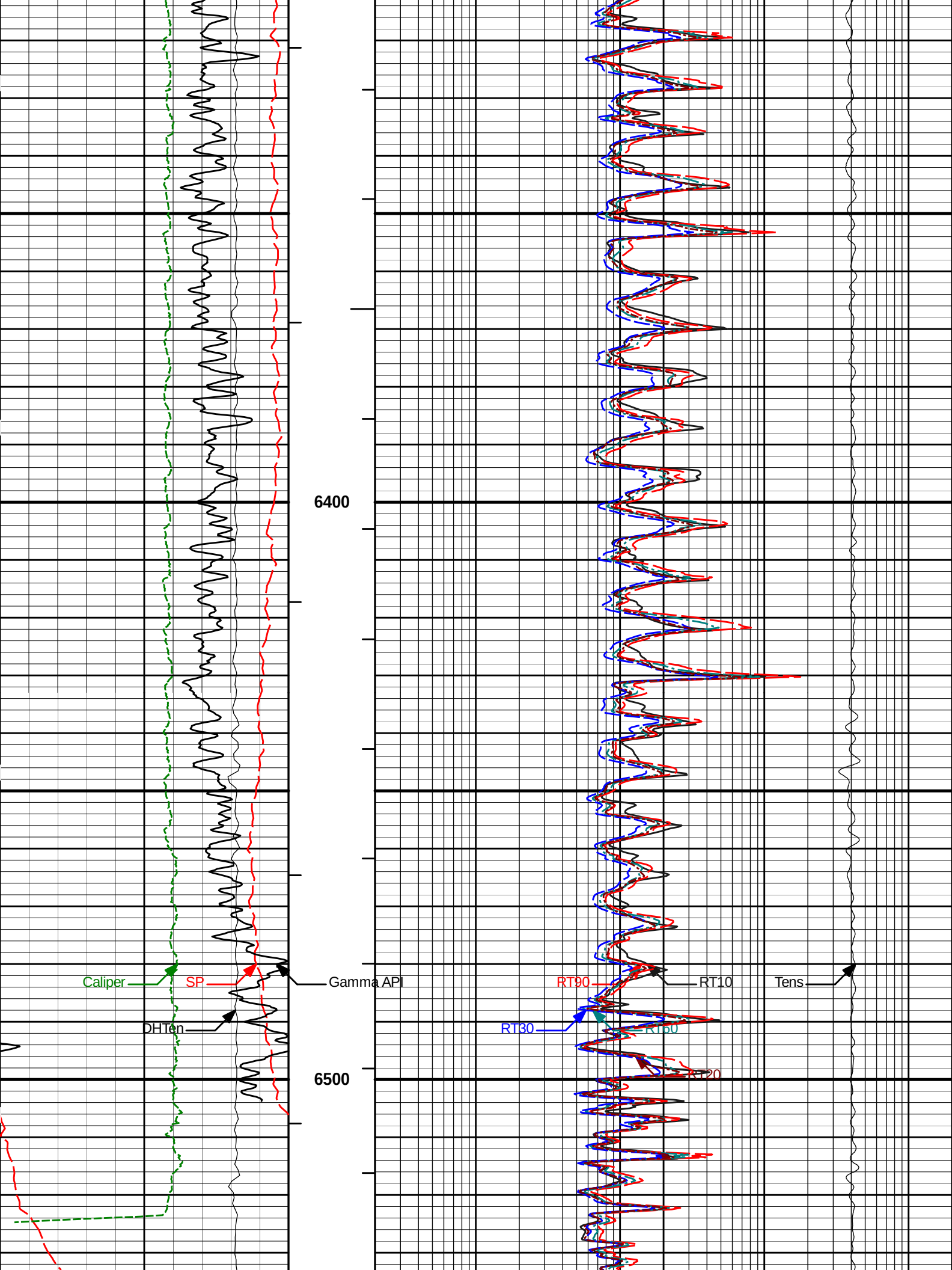
MAIN PASS 5" = 100'

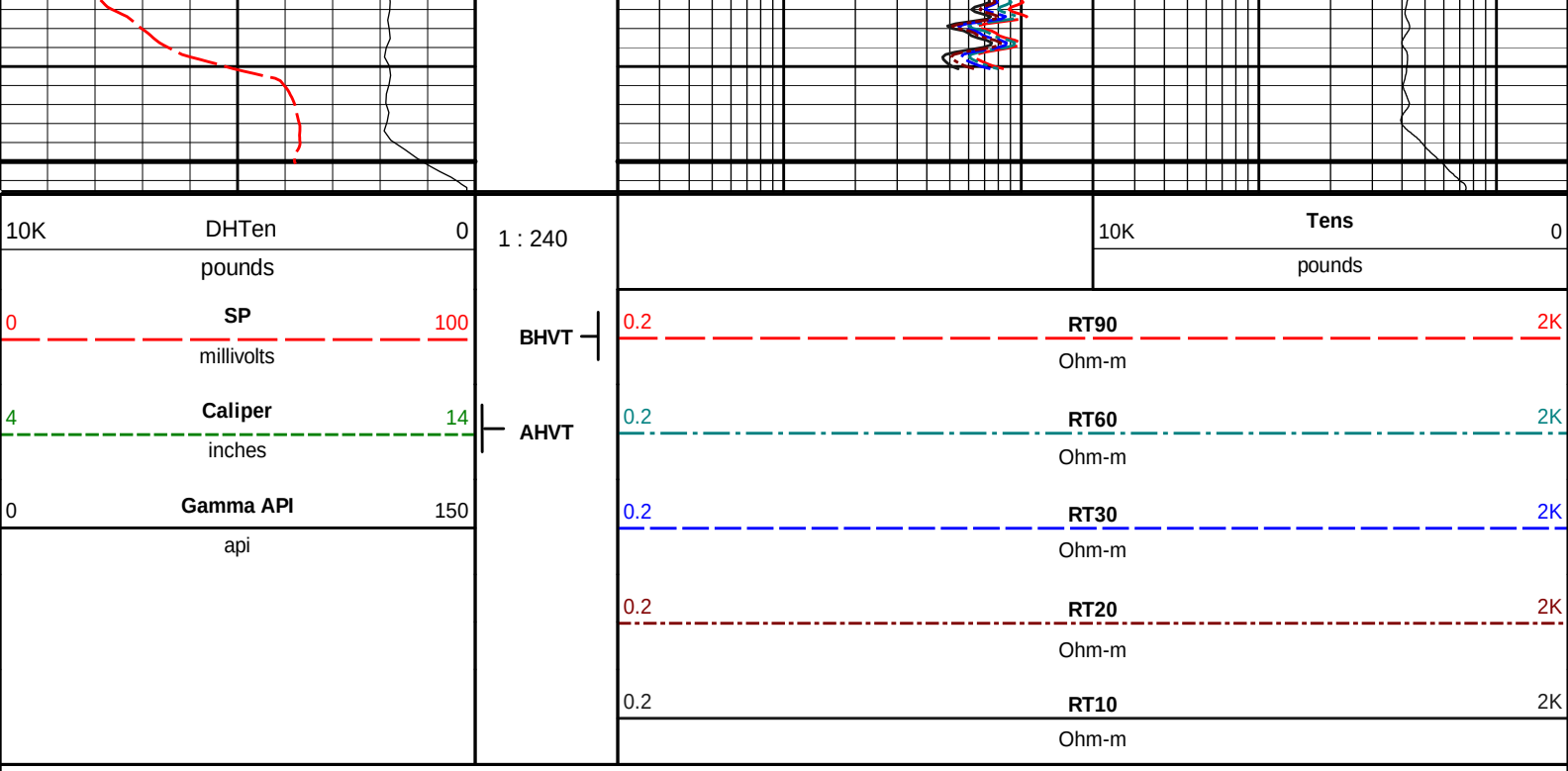
HALLIBURTON

Plot Time: 08-Jul-14 11:44:33
Plot Range: 6250 ft to 6553.17 ft
Data: BH_HOMER_9-41AH\Well Based\DAQ-0001-003
Plot File: \\RES\BP_5IN_ACRT_R

REPEAT SECTION 5" = 100'




6400
6500
Caliper
SP
Gamma API
DHTen
RT90
RT10
Tens
RT30
RT60
RT20



HALLIBURTON

Plot Time: 08-Jul-14 11:44:34
Plot Range: 6250 ft to 6553.17 ft
Data: BH_HOMER_9-41AH\Well Based\DAQ-0001-003
Plot File: \\RES\BP_5IN_ACRT_R

REPEAT SECTION 5" = 100'

HALLIBURTON

CALIBRATION REPORT

SURFACE TENSION SHOP CALIBRATION

Tool Name:	**Depth Panel - 12345678**	**Reference Calibration Date:**	**05-Jul-14 16:31:37**
Engineer:	**B. NEALON**	**Calibration Date:**	**05-Jul-14 16:32:10**
Software Version:	**WL INSITE R4.2.1 (Build 5)**	**Calibration Version:**	**1**

SURFACE TENSION LOAD CELL

Measurement	Load Cell Value	Measurement	Calibrated	Units
Low	10694.68	-2.24	0.00	lbs
High	17252.19	7828.09	7830.00	lbs

DOWNHOLE TENSION SHOP CALIBRATION

Tool Name:	**RWCH - 11830878**	**Reference Calibration Date:**	**03-Jul-14 14:12:29**
Engineer:	**B. NEALON**	**Calibration Date:**	**05-Jul-14 16:34:31**
Software Version:	**WL INSITE R4.2.1 (Build 5)**	**Calibration Version:**	**1**

DOWNHOLE LOAD CELL

Measurement	Tool Value	Measurement	Calibrated	Units
Low	-911.21	26.35	0.00	lbs
High	3619.83	1468.65	1430.00	lbs

NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name:	**GTET - 11294346**	**Reference Calibration Date:**	**26-Jun-14 05:42:02**
Engineer:	**B. CRAWFORD**	**Calibration Date:**	**29-Jun-14 04:56:03**
Software Version:	**WL INSITE R4.2.1 (Build 5)**	**Calibration Version:**	**1**

Calibrator Source S/N: TB-270

Calibrator API Reference:259.00 api

Equivalent Calibrator API Reference:263.5 api

Measurement	Measured	Calibrated	Units
Background	45.0	48.1	api
Background + Calibrator	287.0	307.1	api
Calibrator	262.2	259.0	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name:	**GTET - 11294346**	**Reference Calibration Date:**	**29-Jun-14 04:56:03**
Engineer:	**B. NEALON**	**Calibration Date:**	**04-Jul-14 20:43:00**
Software Version:	**WL INSITE R4.2.1 (Build 5)**	**Calibration Version:**	**1**

Calibrator Source S/N: TB-270

Calibrator API Reference:259.00 api

Equivalent Calibrator API Reference:263.5 api

Field Verification	Shop	Field	Units
Background	48.1	47.9	api
Background + Calibrator	307.1	311.0	api
Calibrator	259.0	263.0	api

Shop	Field	Difference	Tolerance
259.0	263.0	-4.0	+/- 9.00

ACCELEROMETER SHOP CALIBRATION

Tool Name:	**GTET - 11294346**	**Reference Calibration Date:**	**06-May-14 15:42:50**
Engineer:	**B. CRAWFORD**	**Calibration Date:**	**06-Jun-14 19:46:06**
Software Version:	**WL INSITE R4.2.1 (Build 5)**	**Calibration Version:**	**1**

Horizontal-1 Telemetry	Horizontal-2 Telemetry	Vertical Telemetry	Units
-250.27	-304.91	-16483.64	cnts

Coefficient	Coefficient Value	Tolerance
Gain	-0.000062	-----
Offset	-0.017	-----
Noise	0.0013	0.0000 - 0.0030

Orientation	Measured	Tolerance	Calibrated	Tolerance
Horizontal	0.01	-0.10 - 0.10	0.00	-0.10 - 0.10
Vertical	0.99	0.90 - 1.10	1.00	0.90 - 1.10

DENSITY CALIPER SHOP CALIBRATION

Tool Name:	**SDLT - 10947725**	**Reference Calibration Date:**	**01-Jan-70 00:00:00**
Engineer:	**B. CRAWFORD**	**Calibration Date:**	**26-Jun-14 05:42:56**
Software Version:	**WL INSITE R4.2.1 (Build 5)**	**Calibration Version:**	**1**
Host Tool Name:	**DSNT - 10846353**		

CALIBRATION COEFFICIENTS

Measurement	Previous Value	New Value	Control Limit On

Measurement	Previous Value	New Value	New Value
Pad Offset	-3141.15	-3141.15	-7000.00 - -1000.00
Pad Gain	0.0003759	0.0003759	0.000200 - 0.000600
Arm Offset	-4705.64	-4705.64	-5000.00 - 3000.00
Arm Gain	0.0005524	0.0005524	0.000300 - 0.000700
Arm Power	-0.000005103	-0.000005103	-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 - 10947725
Reference Calibration Date: 26-Jun-14 05:42:56
Engineer: B. NEALON
Calibration Date: 04-Jul-14 20:45:02
Software Version: WL INSITE R4.2.1 (Build 5)
Calibration Version: 1

MEASURED CALIPER VALUES				
Measurement	Shop	Field	Change	Control Limit On New Value
Pad Extension	3.75	3.74	-0.01	+/- 0.10
Ring Diameter	8.25	8.26	0.01	+/- 0.15

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

ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION

Tool Name: ACRt Sonde - 10988481
Reference Calibration Date: 18-Jun-14 11:44:20
Engineer: B. CRAWFORD
Calibration Date: 18-Jun-14 11:58:20
Software Version: WL INSITE R4.2.1 (Build 5)
Calibration Version: 1
Host Tool Name: ACRt Instrument - 10996988

TYPICAL GAIN RANGE									
Subarray	R12KHz			R36KHz			R72KHz		
	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper
A1 (80")	0.95	1.0134	1.05	0.95	1.0141	1.05	0.95	1.0147	1.05
A2 (50")	0.95	1.0177	1.05	0.95	1.0168	1.05	0.95	1.0144	1.05
A3 (29")	0.95	1.0052	1.05	0.95	1.0047	1.05	0.95	1.0058	1.05
A4 (17")	0.95	1.0020	1.05	0.95	0.9993	1.05	0.95	1.0022	1.05
A5 (10")	N/A	N/A	N/A	0.95	0.9927	1.05	0.95	0.9930	1.05

A6 (6")	N/A	N/A	N/A	0.95	0.9852	1.05	0.95	0.9870	1.05

SONDE OFFSET

Subarray	R12KHz (mmho/m)	R36KHz (mmho/m)	R72KHz (mmho/m)
A1 (80")	-1.191	-4.002	-4.991
A2 (50")	-2.593	-4.064	-4.474
A3 (29")	-14.254	-4.878	-3.126
A4 (17")	-97.382	-30.031	-24.202
A5 (10")	N/A	-103.181	-50.304
A6 (6")	N/A	303.098	149.312

TRANSMITTER CURRENT GAIN

Signal	Lower	R	Upper
12K	0.6	0.79	1.3
36K	1.0	1.23	2.0
72K	1.0	1.43	2.0

R-MUD VERIFICATION

Signal	Lower (ohm-m)	Measured (ohm-m)	Upper (ohm-m)
Mud Cell	0.95	1.00	1.05

PASS/FAIL SUMMARY

GAIN RANGE CHK	PASS
SONDE OFFSET CHK	PASS

TOOL OK TO LOG

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-11830878						
DH Tension Zero	0.00	----------	----------	0.00	----------	lbs
DH Tension Cal	1430.00	----------	----------	0.00	----------	lbs
GTET-11294346						
Gamma Ray Calibrator	259.0	263.0	----------	-4.0	+/- 9.00	api
SDLT-10947725						
Pad Extension	3.75	3.74	----------	0.01	+/-0.10	in
Ring Diameter	8.25	8.26	----------	-0.01	+/-0.15	in
ACRt Sonde-10988481						
Mud Cell	1.00	----------	----------	0.00	----------	ohm-m

Data: BH_HOMER_9-41AH\0001 TRIPLE\004 05-Jul-14 21:58 Up @6553.8f **Date: 06-Jul-14 00:02:18**

HALLIBURTON

CUSTOMER EVENT LOG

Event Type	Time & Date	Depth (ft)	Event Description
	05-Jul-14 21:09:22	350.00	Logging 001 05-Jul-14 21:09 Up @350.0f
	05-Jul-14 21:11:58	277.75	Halting 001 05-Jul-14 21:09 Up @350.0f
	05-Jul-14 21:21:16	726.50	Logging 002 05-Jul-14 21:21 Dn @726.5f
	05-Jul-14 21:47:59	6536.84	Halting 002 05-Jul-14 21:21 Dn @726.5f

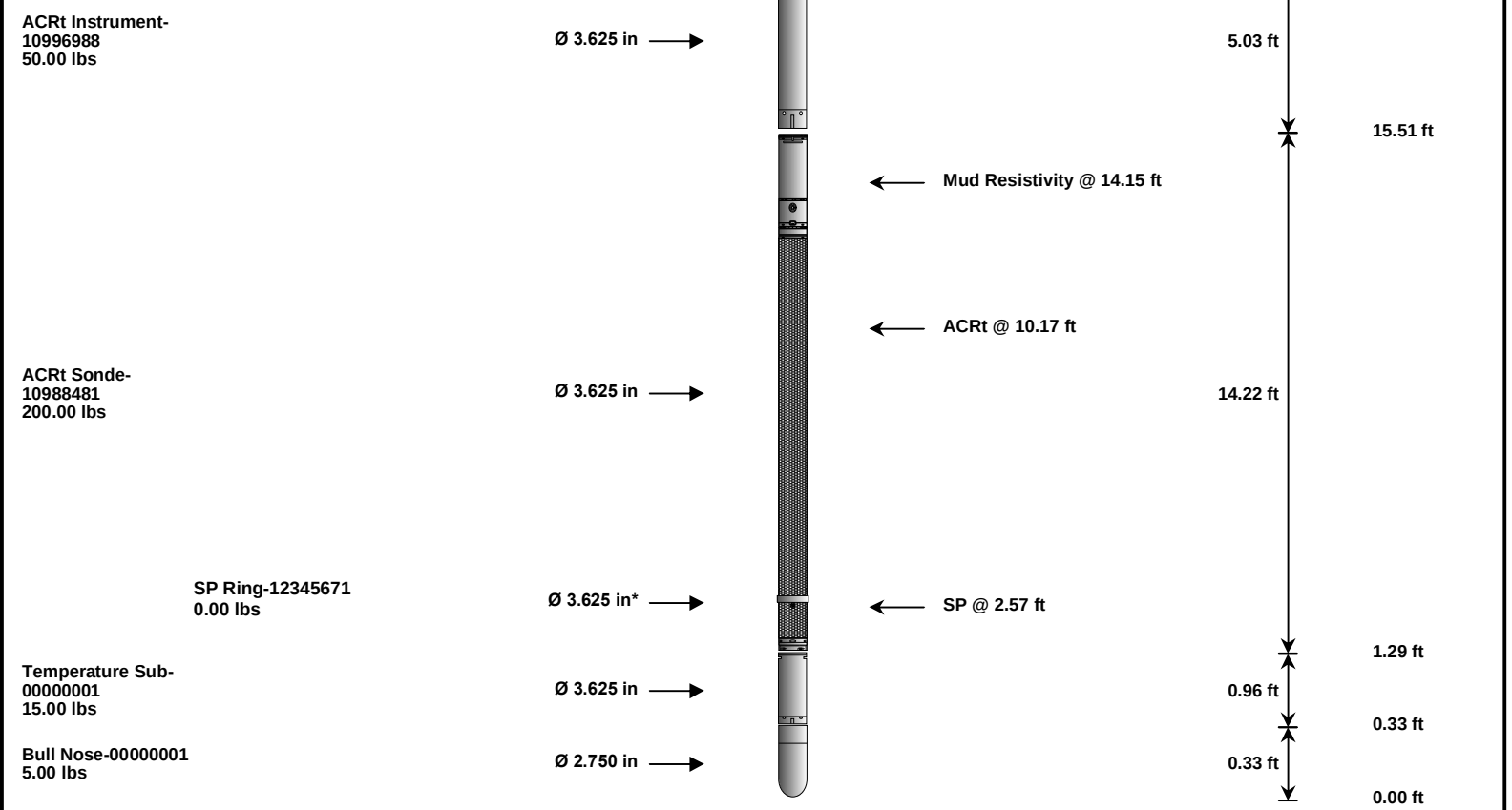
05-Jul-14 21:48:22	6554.25	Logging 003 05-Jul-14 21:48 Up @6554.3f
05-Jul-14 21:54:17	6212.61	Halting 003 05-Jul-14 21:48 Up @6554.3f
05-Jul-14 21:58:11	6553.75	Logging 004 05-Jul-14 21:58 Up @6553.8f
05-Jul-14 23:30:23	1080.19	Halting 004 05-Jul-14 21:58 Up @6553.8f

Data: BH_HOMER_9-41AH\0001 TRIPLE\HW10997 **Date: 06-Jul-14 00:00:17**

HALLIBURTON

TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
						61.48 ft
RWCH-11830878 135.00 lbs		Ø 3.625 in		Load Cell @ 57.80 ft BH Temperature @ 57.23 ft	6.25 ft	
						55.23 ft
GTET-11294346 165.00 lbs		Ø 3.625 in		GammaRay @ 49.17 ft	8.52 ft	
						46.71 ft
DSNT-10846353 174.00 lbs		Ø 3.625 in		DSN Far @ 39.78 ft DSN Near @ 39.03 ft	9.69 ft	
						37.03 ft
SDLT-10947725 360.00 lbs		Ø 4.500 in			10.81 ft	
	SDLT Pad-10844773 65.00 lbs	Ø 4.750 in*		SDL Caliper @ 29.03 ft SDL @ 29.02 ft		
						26.21 ft
Flex Joint-11005587 140.00 lbs		Ø 3.625 in			5.67 ft	
						20.54 ft



Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)		Accumulated Length (ft)	Max.Log. Speed (fpm)
RWCH	Releasable Wireline Cable Head	11830878	135.00	6.25		55.23	300.00
GTET	Gamma Telemetry Tool	11294346	165.00	8.52		46.71	60.00
DSNT	Dual Spaced Neutron	10846353	174.00	9.69		37.03	60.00
SDLT	Spectral Density Tool	10947725	360.00	10.81		26.21	60.00
SDLP	Density Insite Pad	10844773	65.00	2.55	*	28.42	60.00
FLEX	Flex Joint	11005587	140.00	5.67		20.54	300.00
ACRt	Array Compensated True Resistivity Instrument Section	10996988	50.00	5.03		15.51	120.00
ACRt	Array Compensated True Resistivity Sonde Section	10988481	200.00	14.22		1.29	120.00
SP	SP Ring	12345671	0.00	0.25	*	2.57	300.00
TMAX	Temperature Sub - 3_625 OD	00000001	15.00	0.96		0.33	300.00
BLNS	Bull Nose	00000001	5.00	0.33		0.00	300.00
Total			**1,309.00**	**61.48**			

* Not included in Total Length and Length Accumulation.

Data: BH_HOMER_9-41AH\0001 TRIPLE\004 05-Jul-14 21:58 Up @6553.8f

Date: 05-Jul-14 23:58:08

COMPANY	**BLACK HILLS EXPLORATION & PRODUCTION**		
WELL	**HOMER DEEP UNIT 9-41BH**		
FIELD	**SOUTH SHALE RIDGE**		
COUNTY	**GARFIELD**	STATE	**CO**

HALLIBURTON

ARRAY COMPENSATED TRUE RESISTIVITY