

# HALLIBURTON

## SPECTRAL DENSITY DUAL SPACED NEUTRON LOG

COMPANY	<b>SANDRIDGE ENERGY</b>		
WELL	<b>BUERKLE 2133 1-7</b>		
FIELD/BLOCK	<b>BUERKLE</b>		
COUNTY	<b>FINNEY</b>		
STATE	<b>KANSAS</b>		
COMPANY	<b>SANDRIDGE ENERGY</b>	API No.	15-055-22199-00-00
WELL	<b>BUERKLE 2133 1-7</b>	Location	(SHL) 350' FNL & 660' FEL
FIELD/BLOCK	<b>BUERKLE</b>		
COUNTY	<b>FINNEY</b>		
STATE	<b>KANSAS</b>		
Sect.	7	Twsp.	21S
Rge.			33W
Elev.	2917.0 ft		
D.F.			2937.0 ft
G.L.			2917.0 ft
Other Services:			
SDL / DSN			
MICROLOG			
CSNG			
ACRT			
XRMI			
WSTT			
MIRIL			

Permanent Datum	GL	Elev. 2917.0 ft
Log measured from	KB	D.F. 2937.0 ft
Drilling measured from	KB	G.L. 2917.0 ft
		20.0 ft above perm. Datum

Date	20-Mar-13	Run No.	ONE
Depth - Driller	5510.00 ft	Depth - Logger	5466.0 ft
Bottom - Logged Interval	5378	Top - Logged Interval	1831
Casing - Driller	9.625 in	Casing - Logger	1831.0 ft
Bit Size	7.875 in	Type Fluid in Hole	WATER BASED
Density	9.2 ppg	Viscosity	45.00 s/qt
PH	13.00 pH	Fluid Loss	4.4 cphm
Source of Sample	MUD PIT	Rm @ Meas. Temperature	0.600 ohmm @ 65.00 degF
Rmf @ Meas. Temperature	0.51 ohmm @ 65.00 degF	Rmc @ Meas. Temperature	0.710 ohmm @ 65.00 degF
Source Rmf	MEASURED	Rmc	MEASURED
Rm @ BHT	0.31 ohmm @ 132.0 degF	Time on Bottom	20-Mar-13 20:40
Time Since Circulation	10.0 hr	Max. Rec. Temperature	132.0 degF @ 5466.0 ft
Equipment	10782954	Location	LIBERAL
Recorded By	S. INGERSOLL	Witnessed By	J. NEW

Fold here

Service Ticket No.: 900298250		API Serial No.: 15-055-22199-00-00		PGM Version: WL INSITE R3.8.4 (Build 5)			
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	N/A	1.5"		
Rmc @ Meas. Temp.	@		10929775				
Source Rmf	Rmc						
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.	107483774	Serial No.	10753396	Serial No.	10673803	Serial No.	10735145
Model No.	GTET	Model No.	WSTT	Model No.	SDLT	Model No.	DSNT
Diameter	3.625"	No. of Cent.	2	Diameter	5.3"	Diameter	3.625"
Detector Model No.	T-102	Spacing	.5'	Log Type	GAM-GAMK	Log Type	NEU-NEU
Type	SCINT			Source Type	CS-137	Source Type	AM-241BE
Length	8"	LSA [Y/N]	YES	Serial No.	5073GW	Serial No.	DSN-436
Distance to Source	N/A	FWDA [Y/N]	YES	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	5466	1831	REC	0	150	30	150	47.6 us/ft	30	-10	2.71 gm/cc	30	-10	LIME

DIRECTIONAL INFORMATION

Maximum Deviation	@	KOP	@
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Remarks: ANNULAR HOLE VOLUME CALCULATED FOR 4.5 INCH CASING.

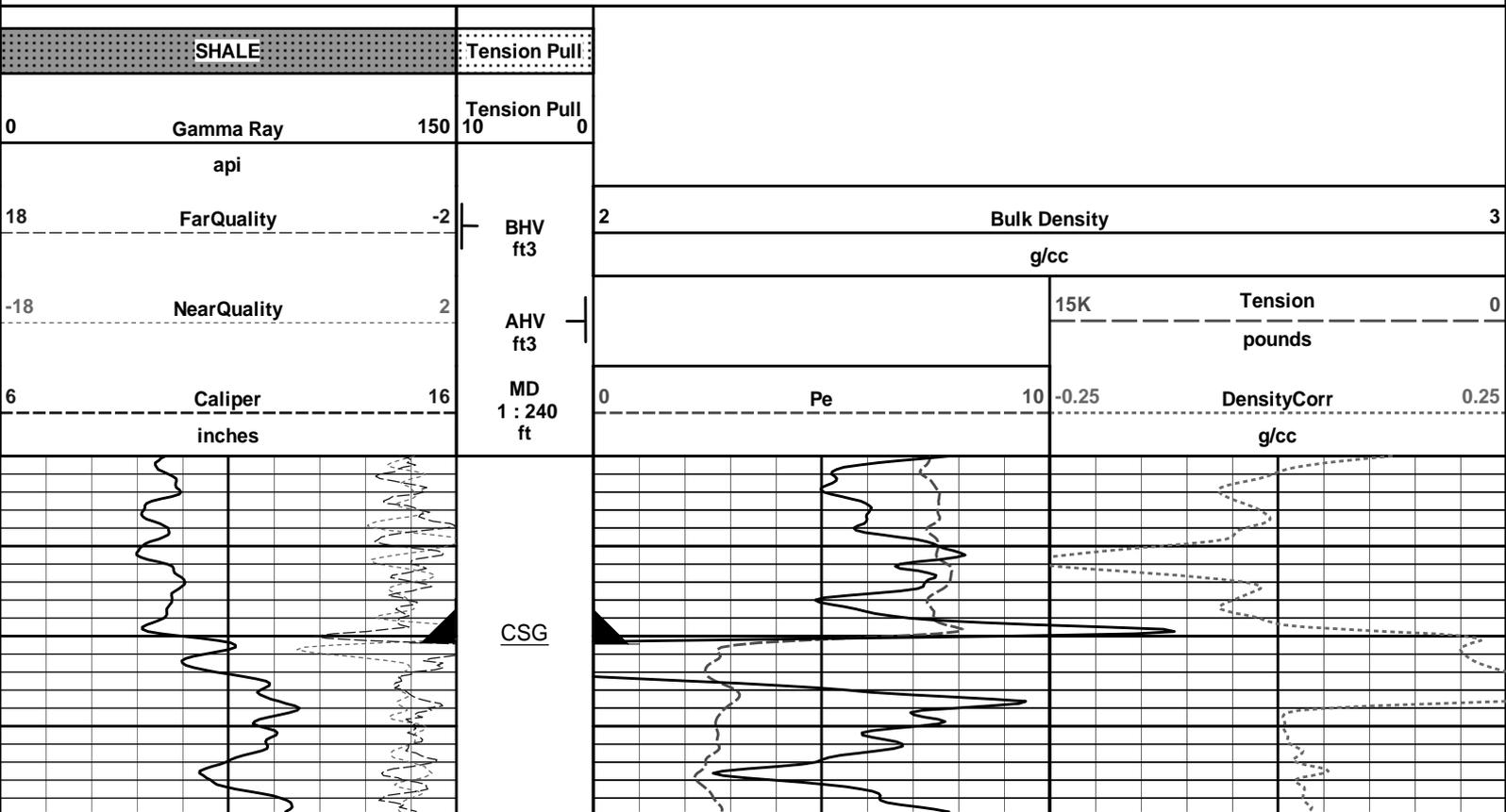
HALLIBURTON DOES NOT GUARANTEE THE ACCURACY OF ANY INTERPRETATION OF THE LOG DATA, CONVERSION OF LOG DATA TO PHYSICAL ROCK PARAMETERS OR RECOMMENDATIONS WHICH MAY BE GIVEN BY HALLIBURTON PERSONNEL OR WHICH APPEAR ON THE LOG OR IN ANY OTHER FORM. ANY USER OF SUCH DATA, INTERPRETATIONS, CONVERSIONS, OR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

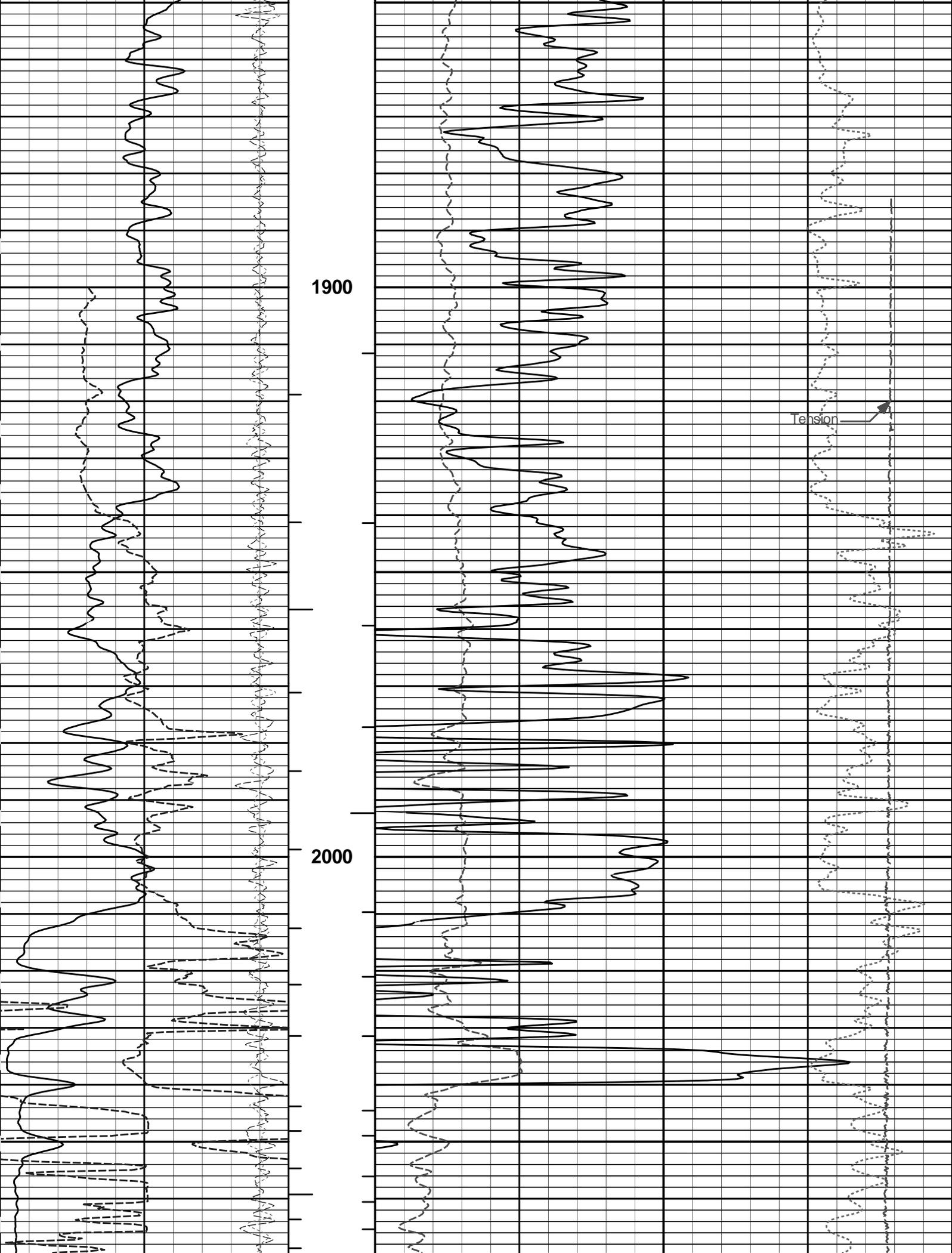
HALLIBURTON

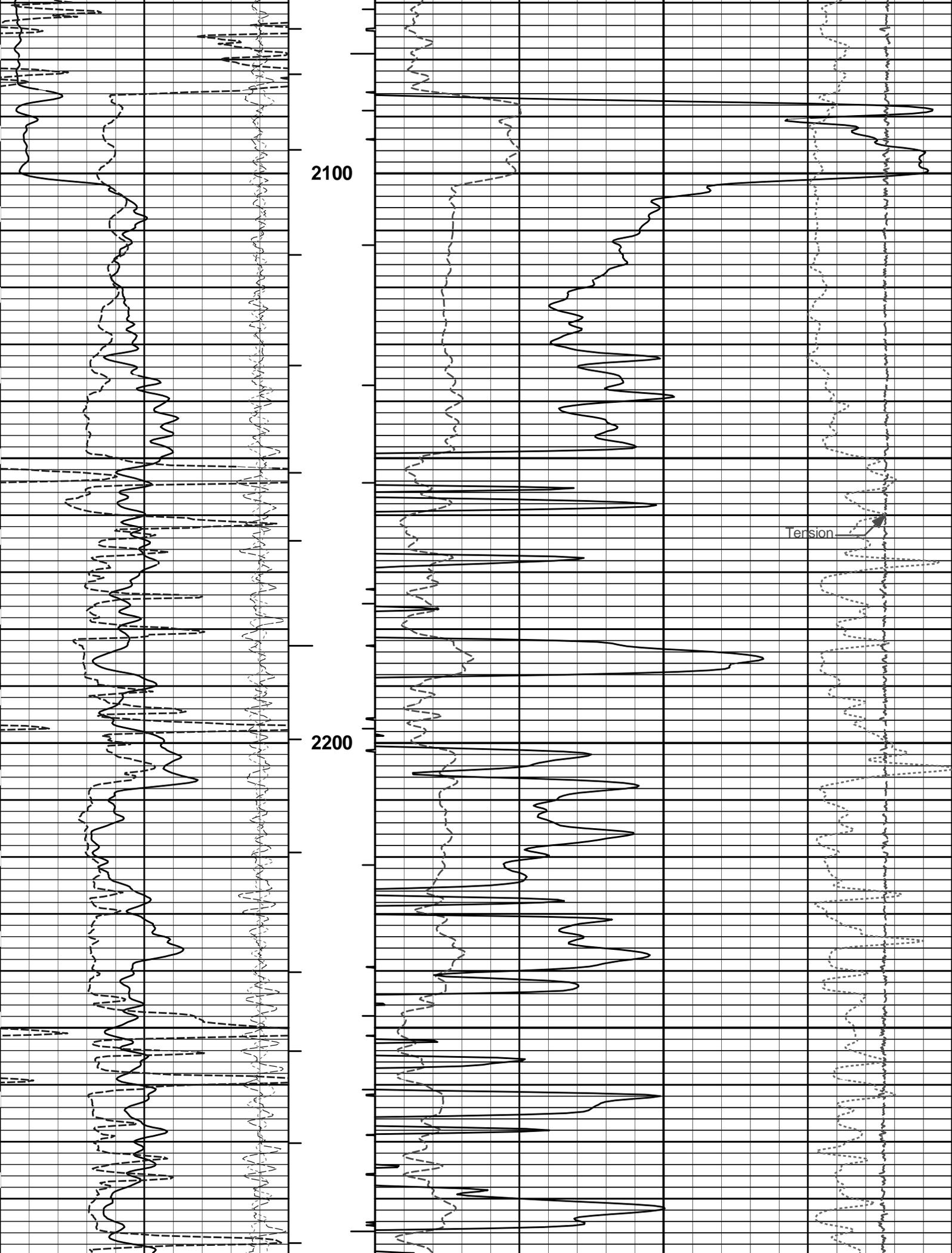


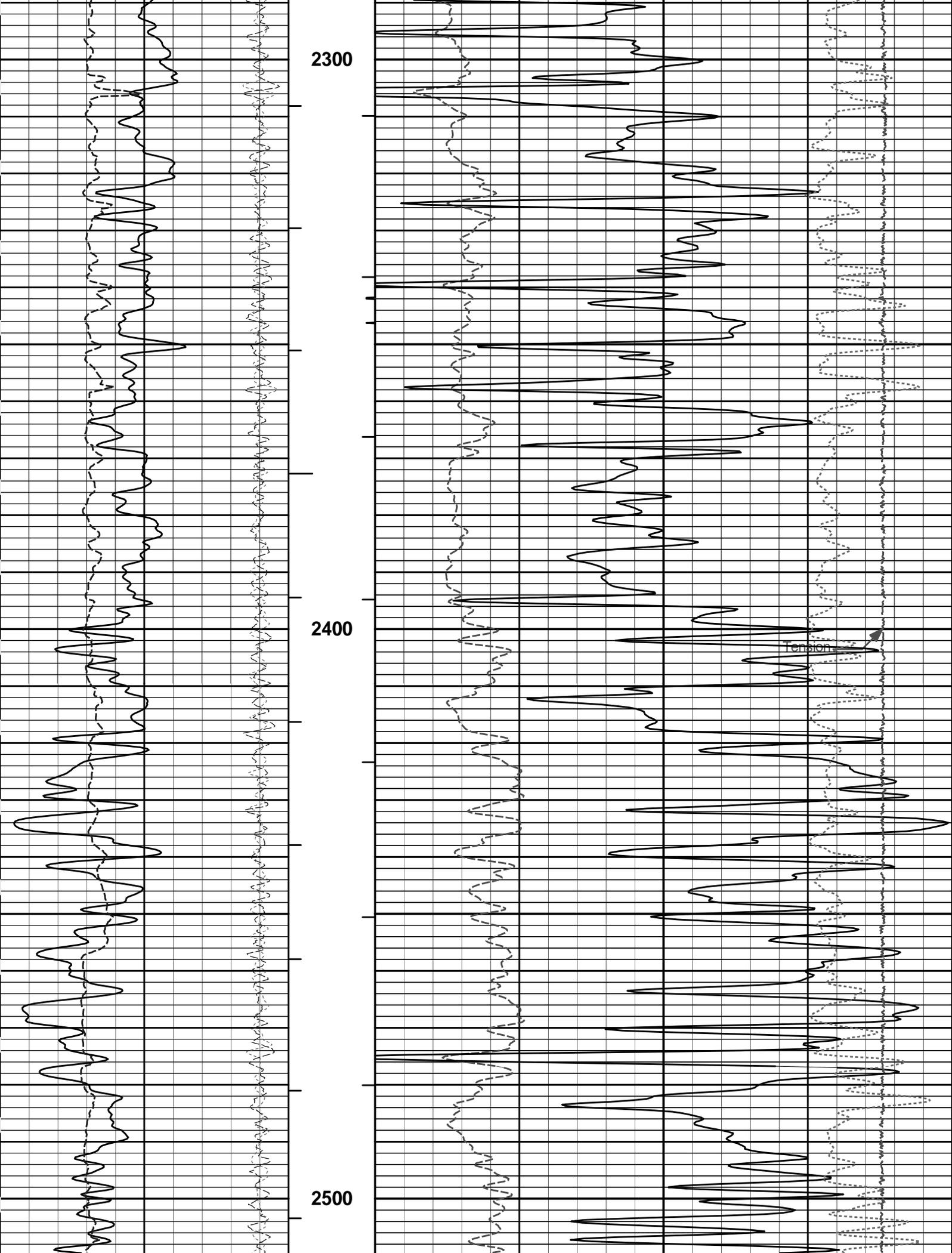
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 Plot Range: 1810 ft to 5469.42 ft  
 Data: BUERKLE2133\_1-7\Well Based\DAQ-0003-005\  
 Plot File: \\-LOCAL-IPOROSITY\BULKD\_5\_MAIN\_LIB

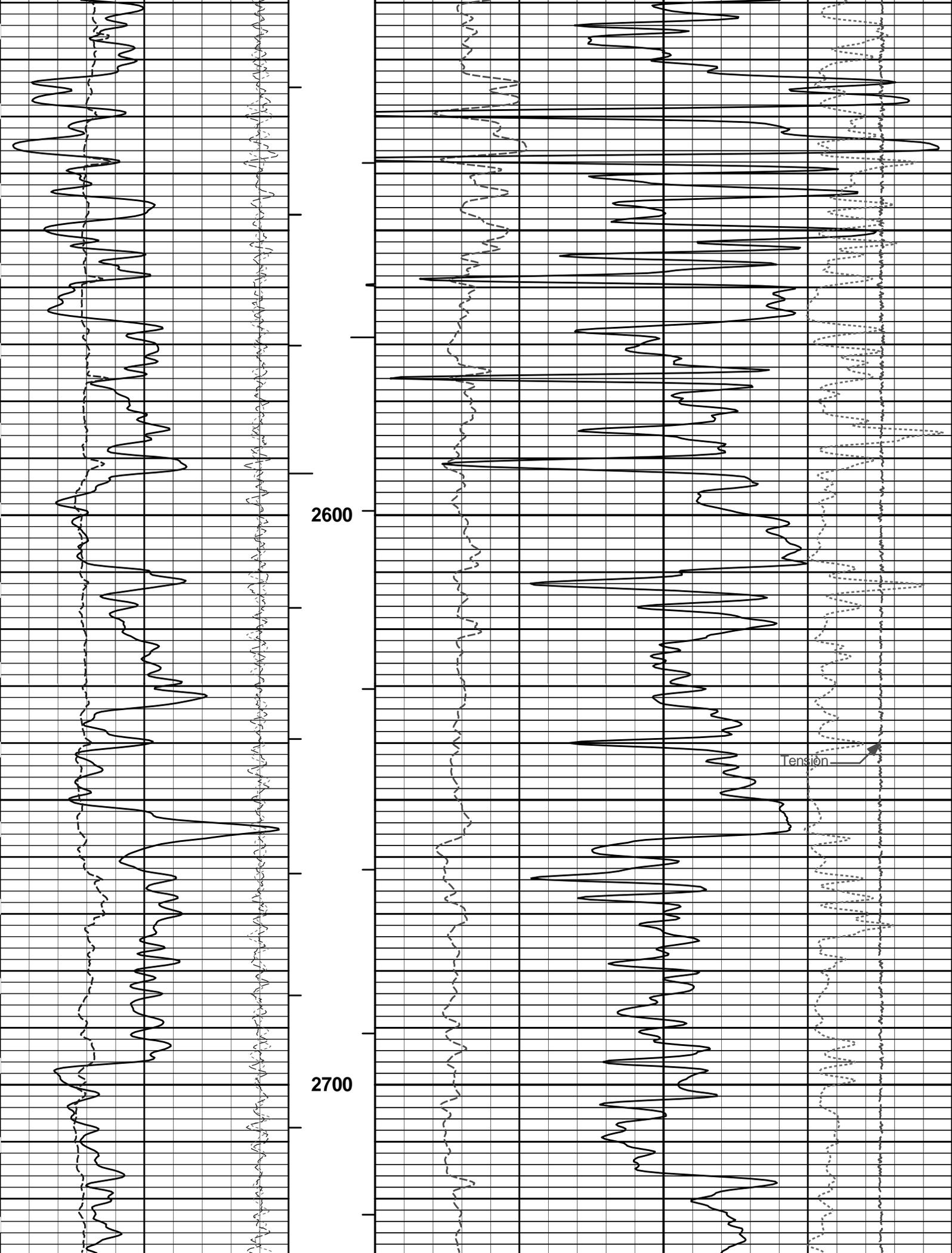
# 5 INCH MAIN LOG

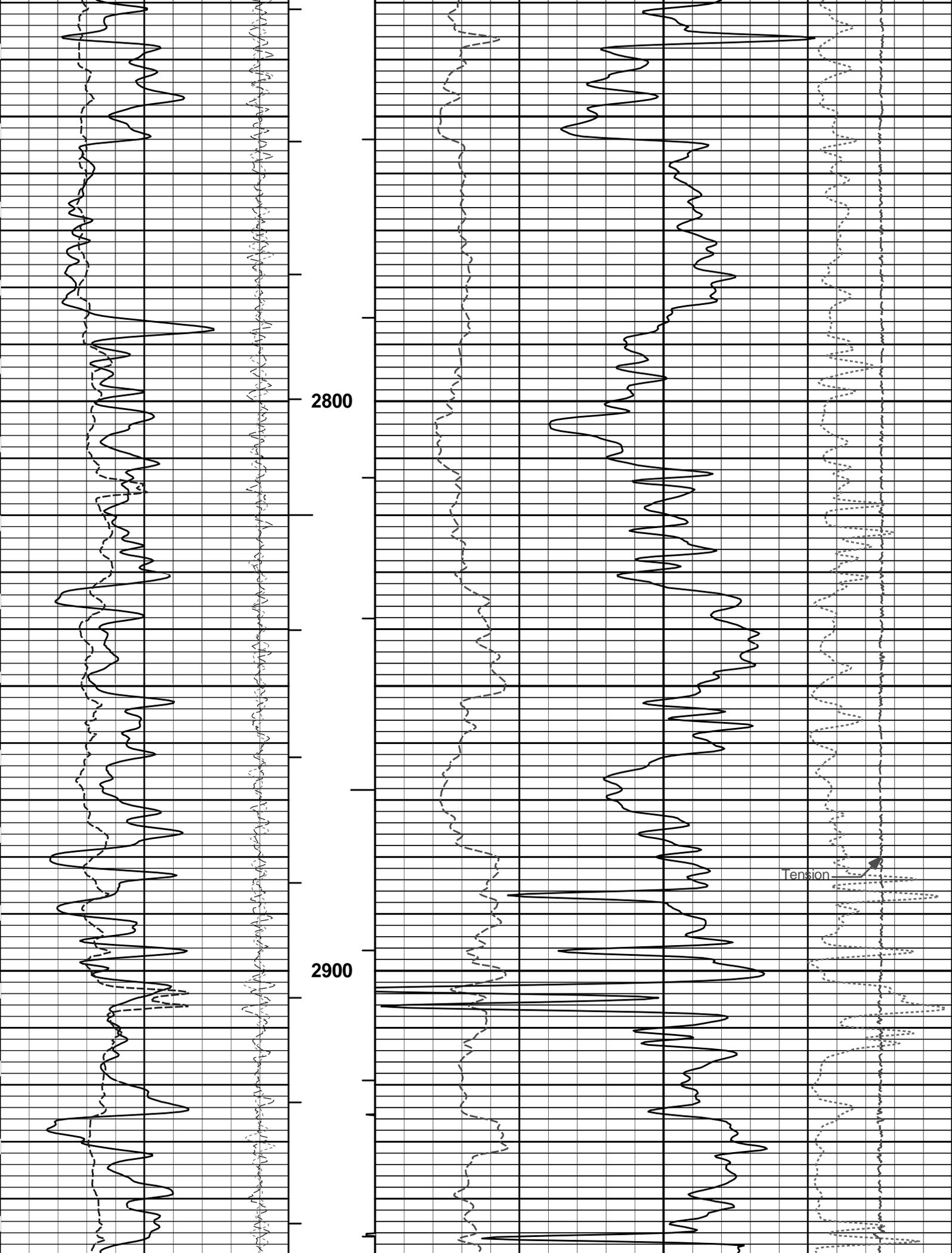


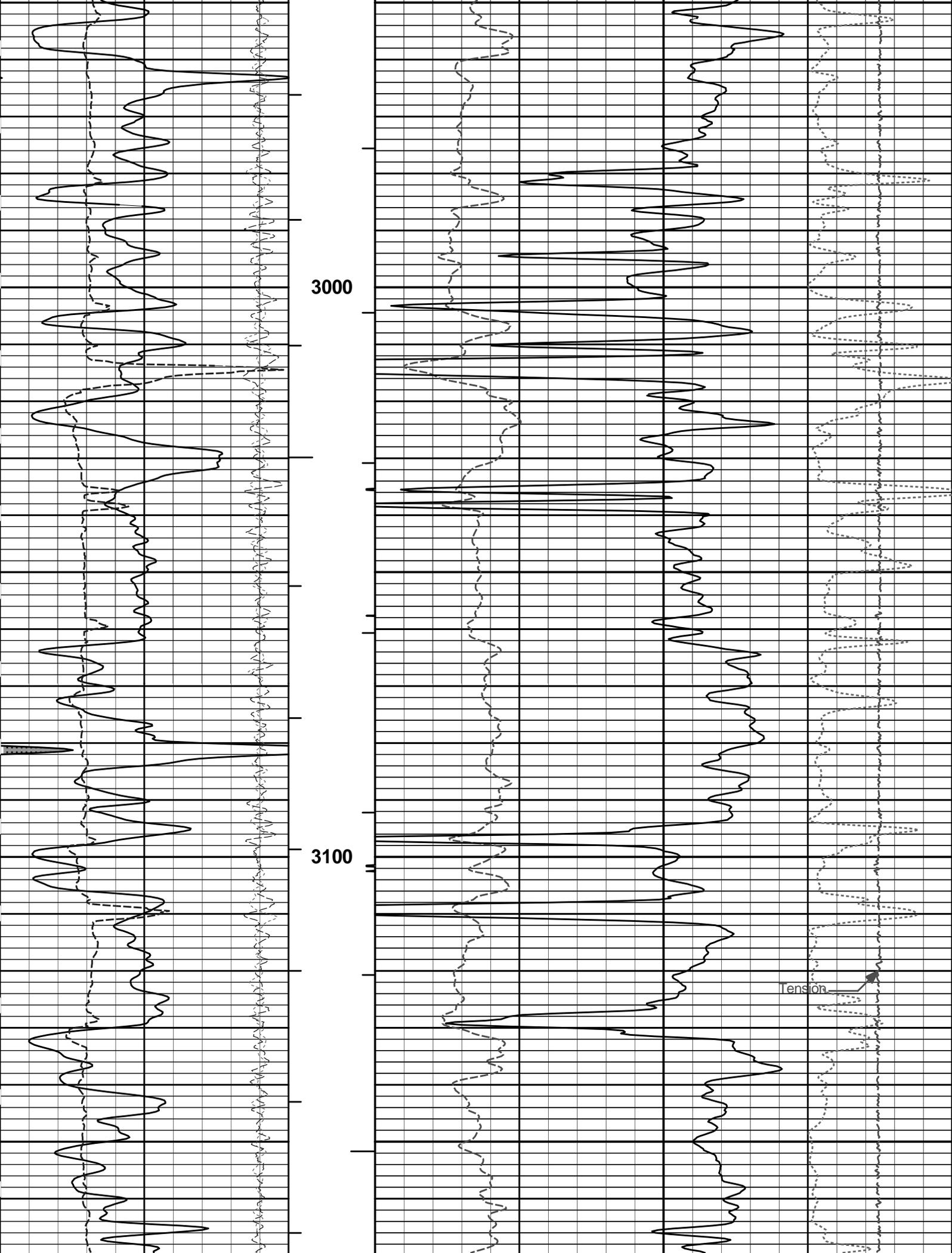


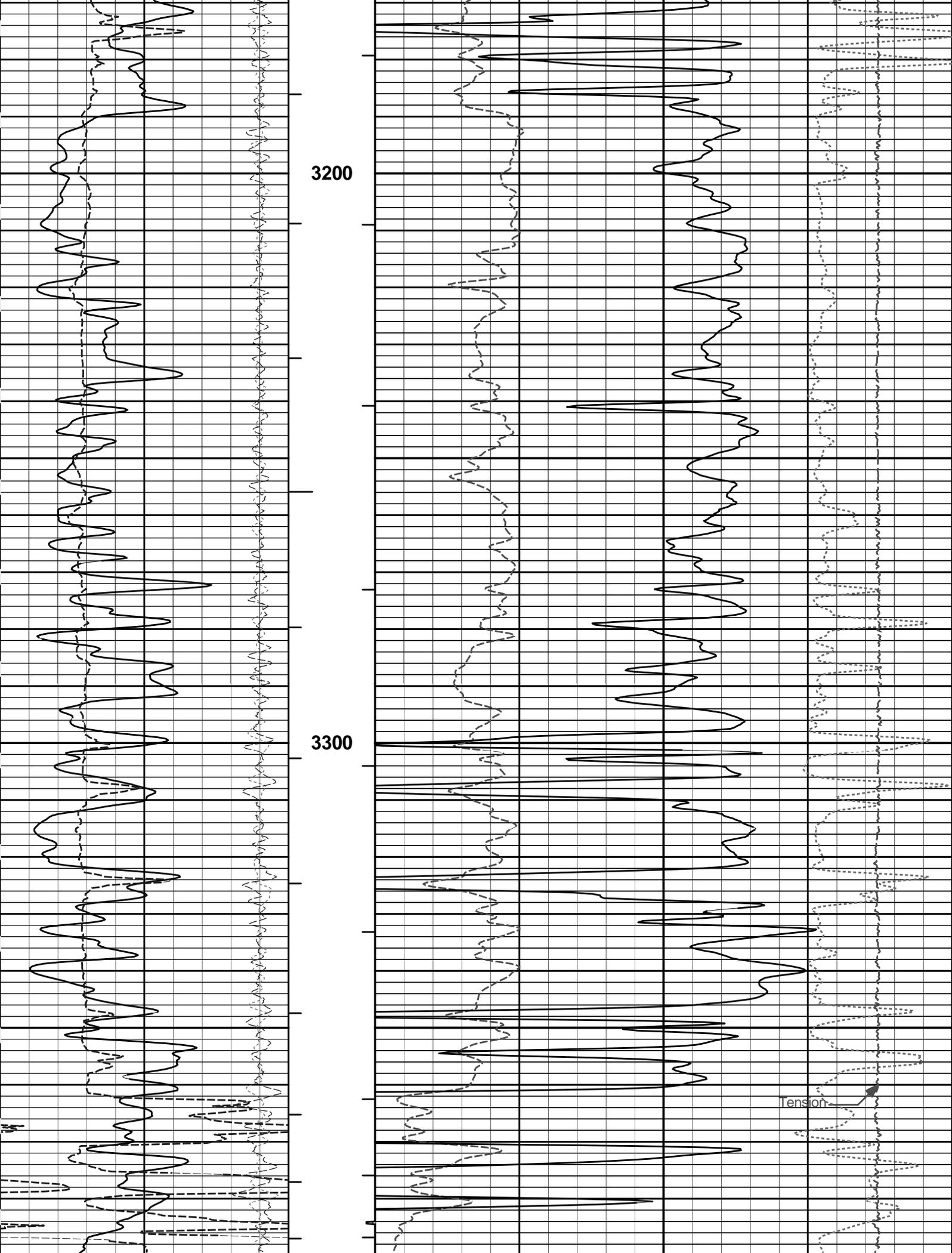


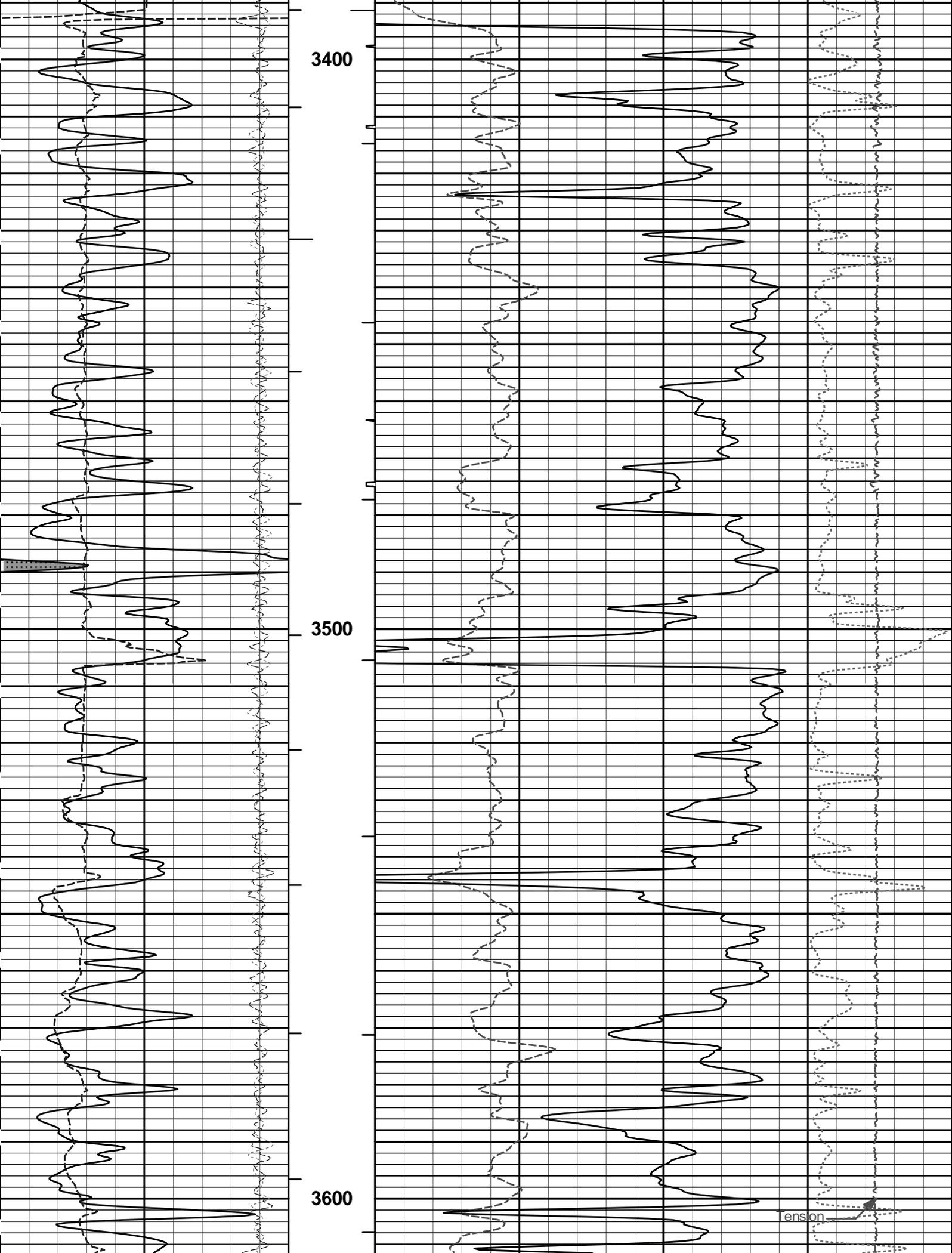


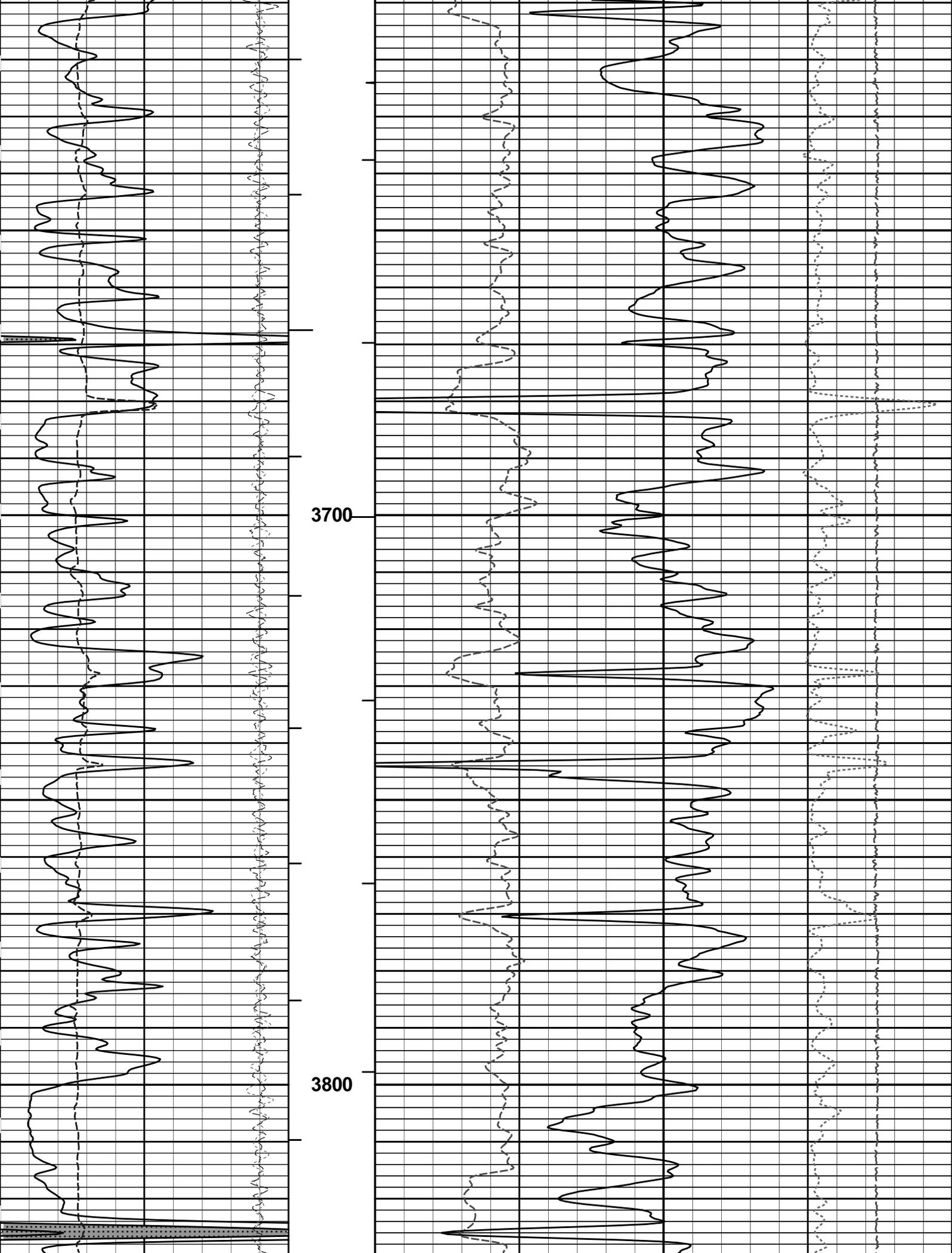


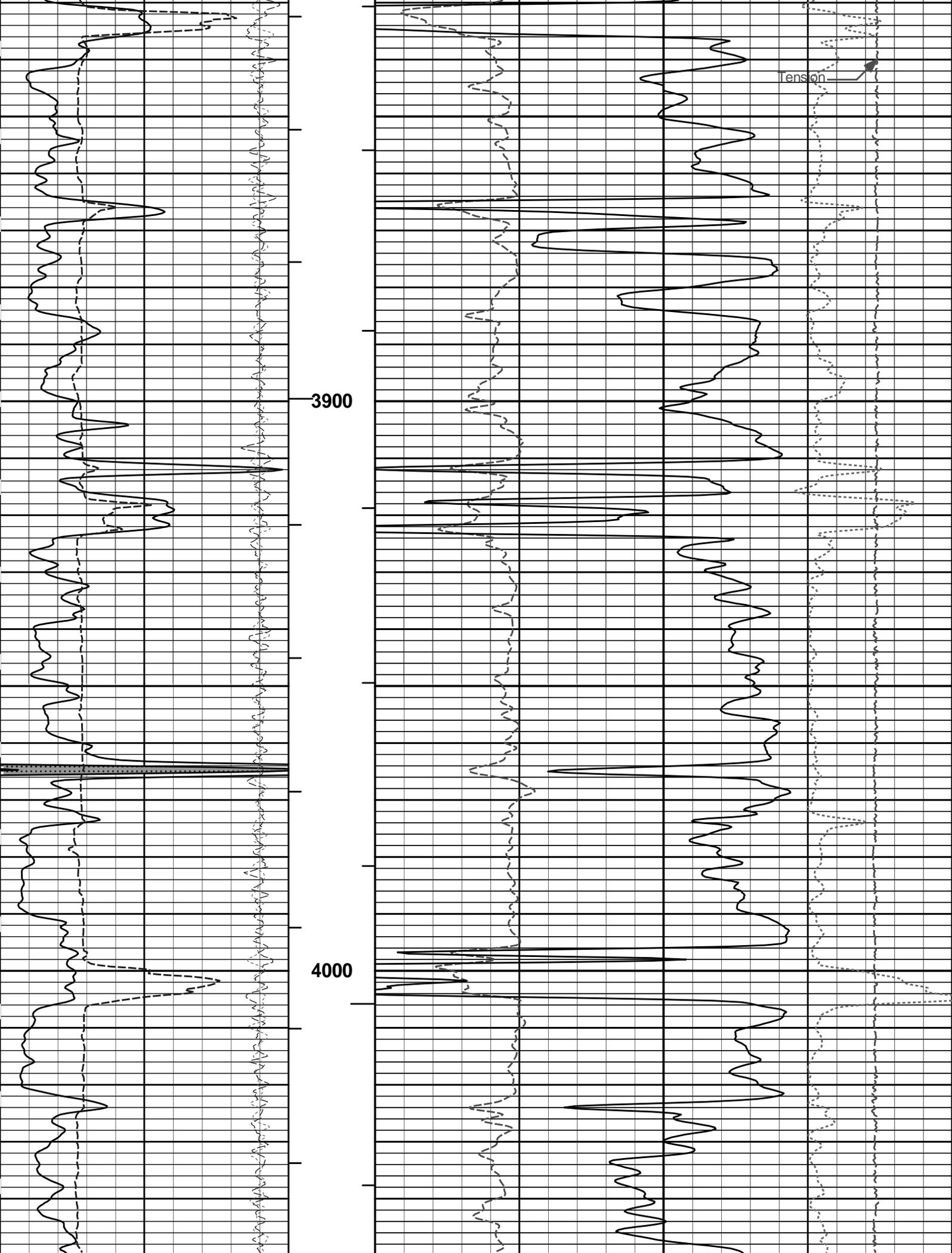


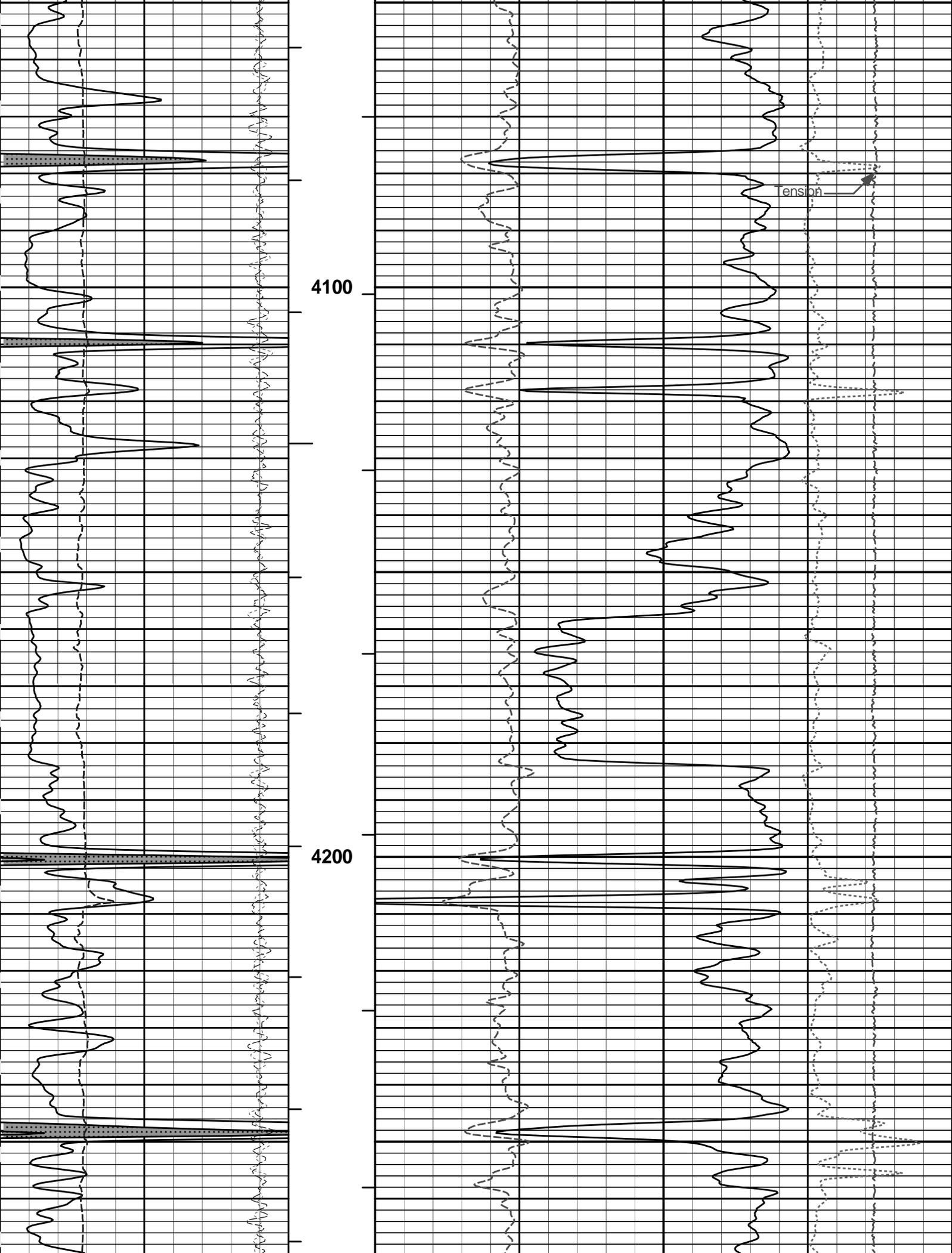


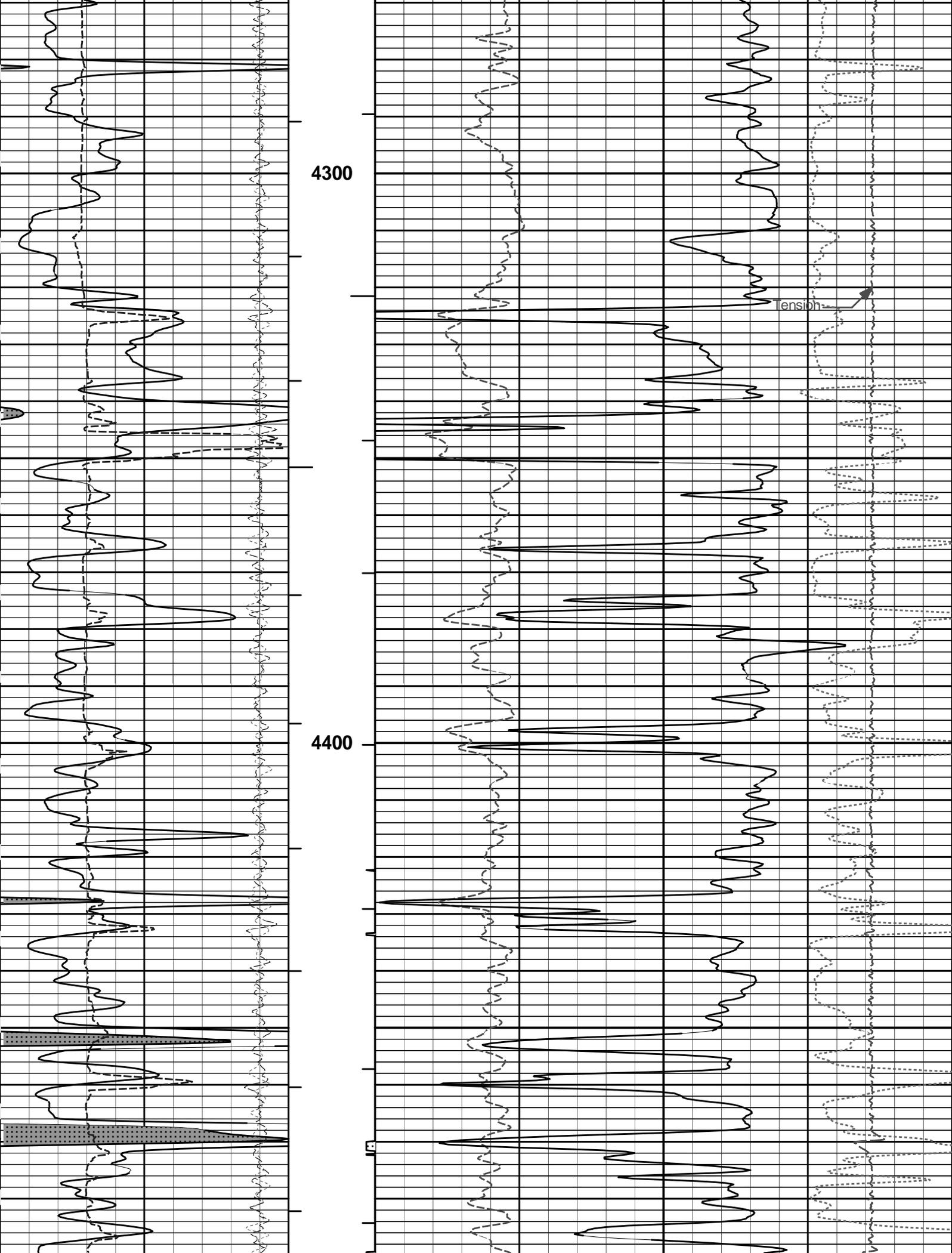


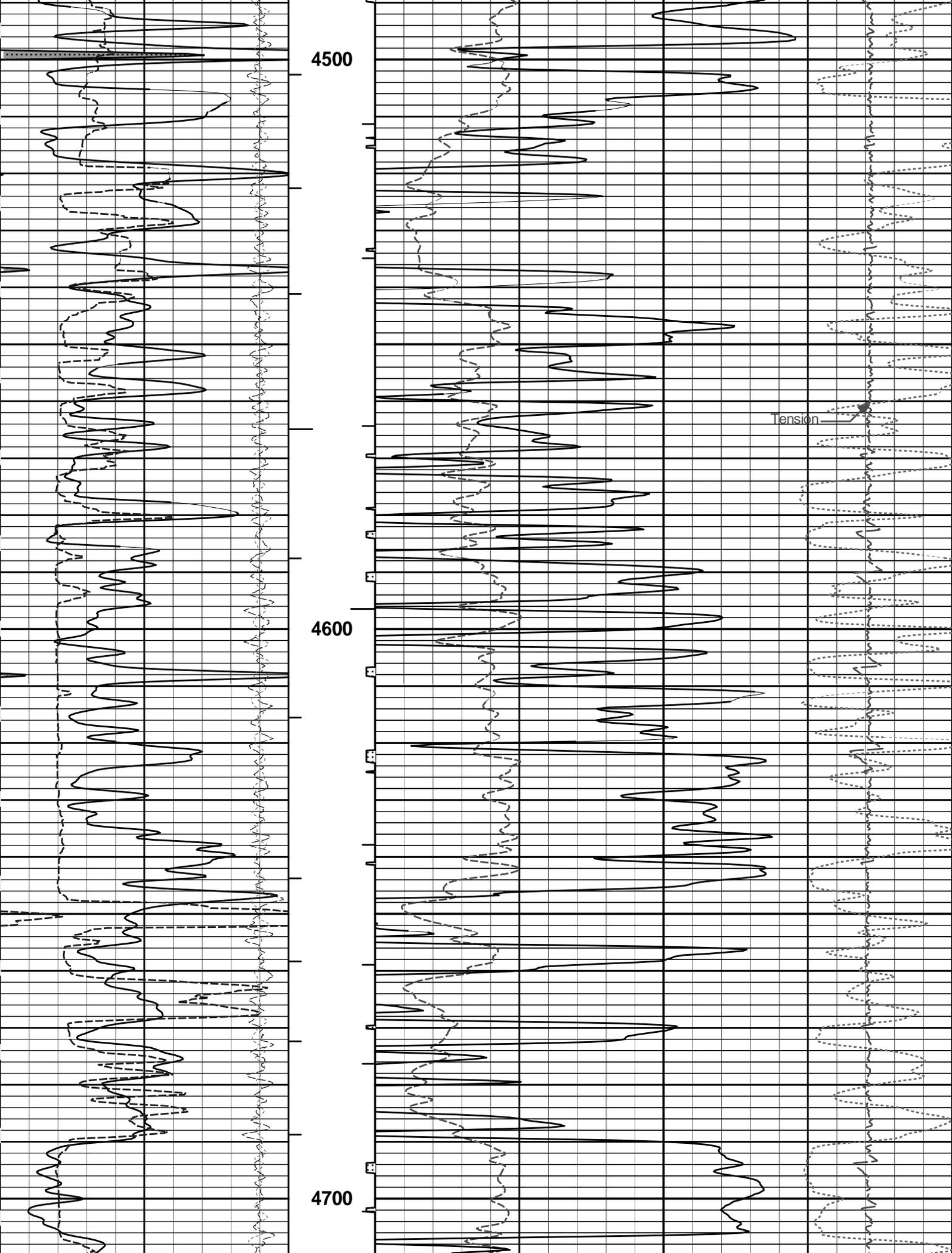


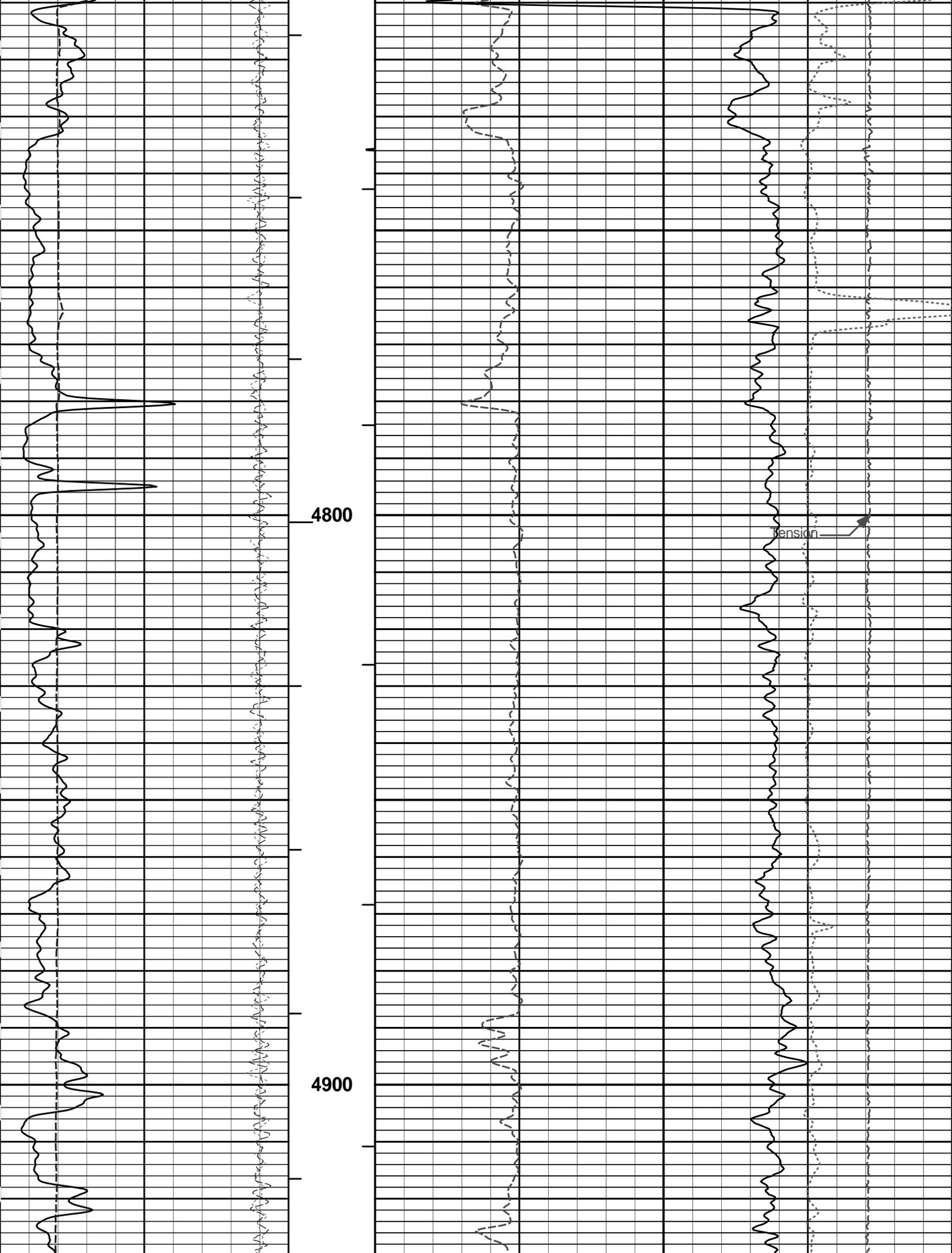


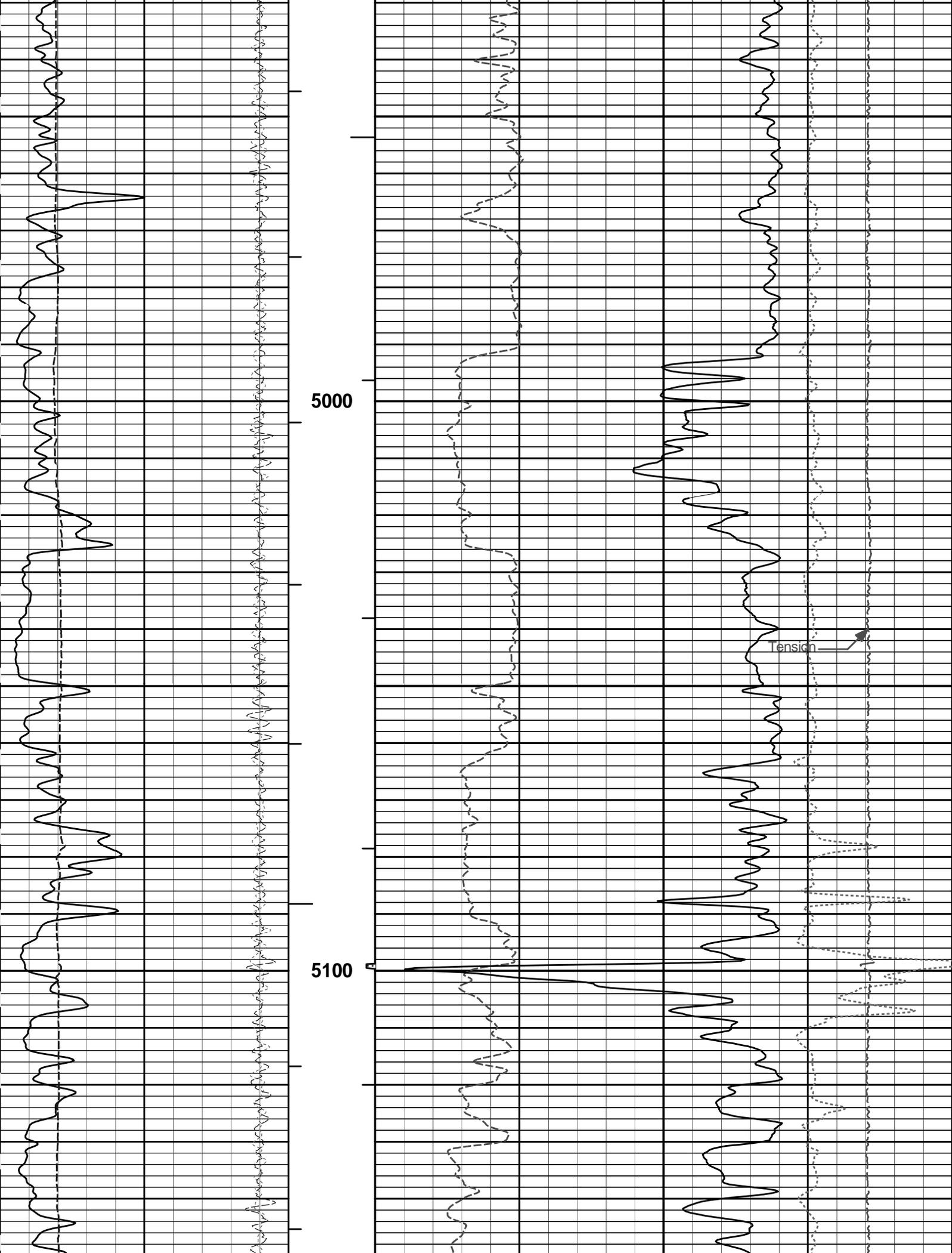


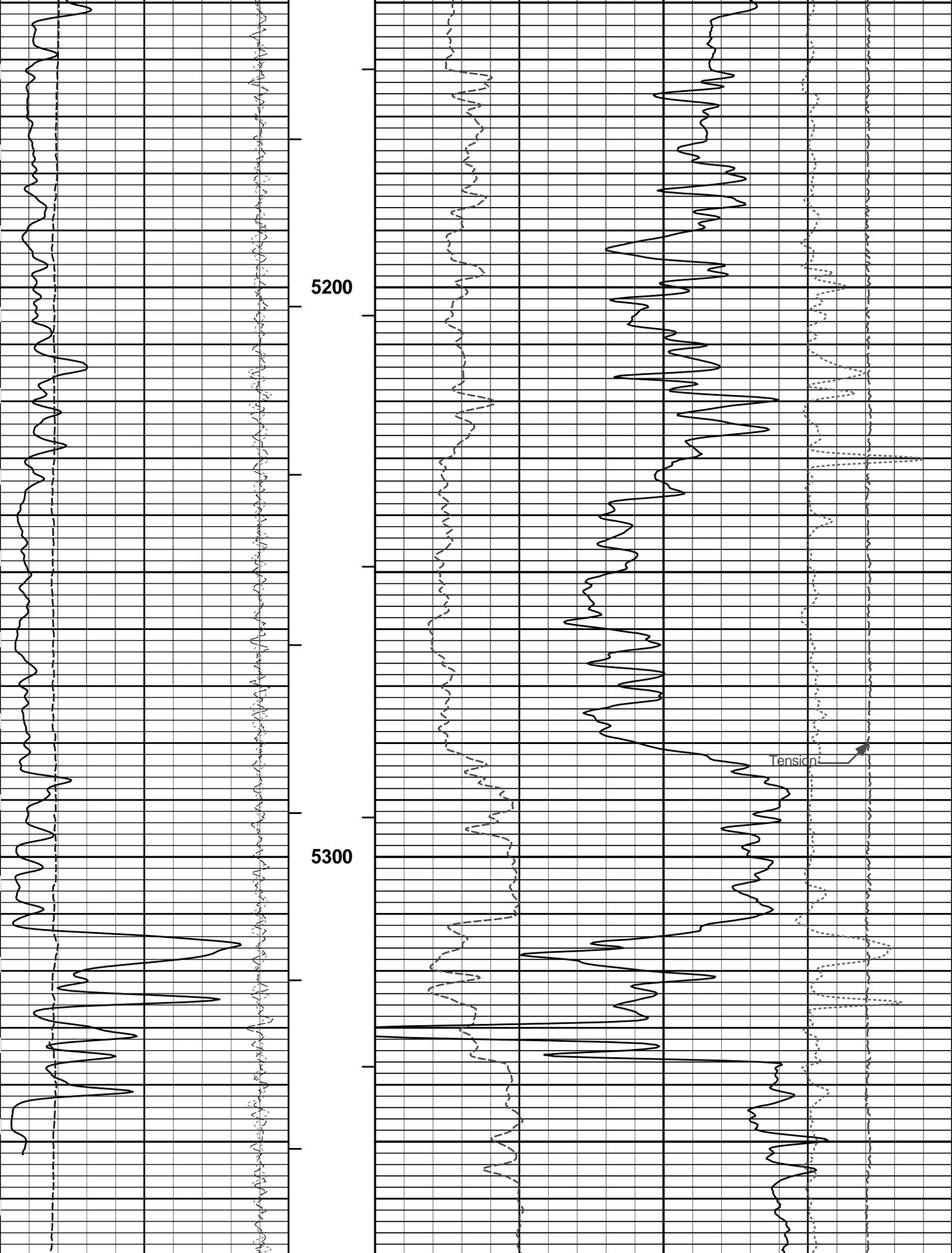


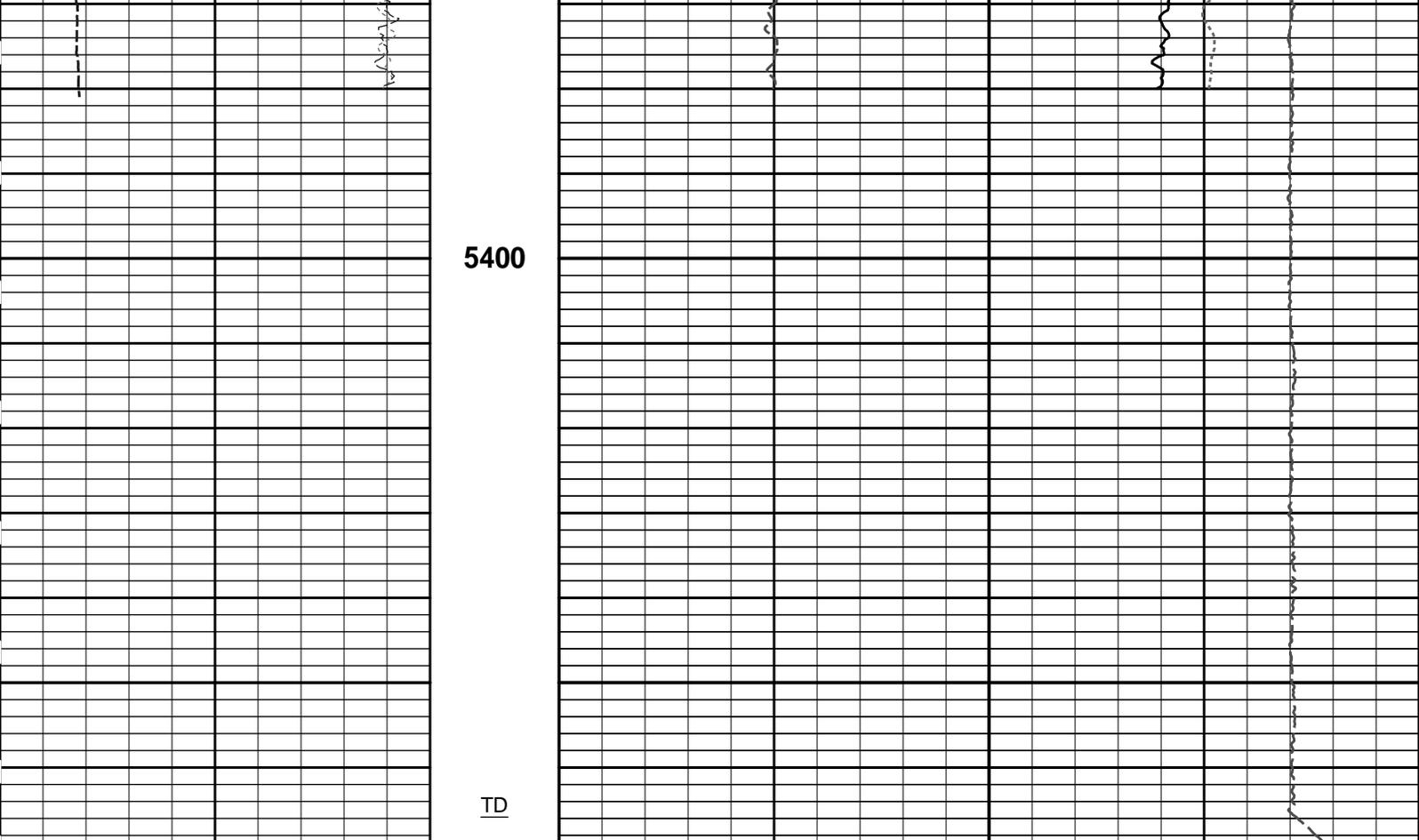












5400

TD

6	Caliper	16	MD	0	Pe	10	-0.25	DensityCorr	0.25
	inches		1 : 240					g/cc	
-18	NearQuality	2	AHV				15K	Tension	0
			ft3					pounds	
18	FarQuality	-2	BHV	2	Bulk Density				3
			ft3		g/cc				
0	Gamma Ray	150	Tension Pull	10	0				
	api								
SHALE			Tension Pull						

**HALLIBURTON**

Plot Time: 21-Mar-13 07:51:01  
 Plot Range: 1810 ft to 5469.42 ft  
 Data: BUERKLE2133\_1-7\Well Based\DAQ-0003-005\  
 Plot File: \\-LOCAL-IPOROSITY\BULKD\_5\_MAIN\_LIB

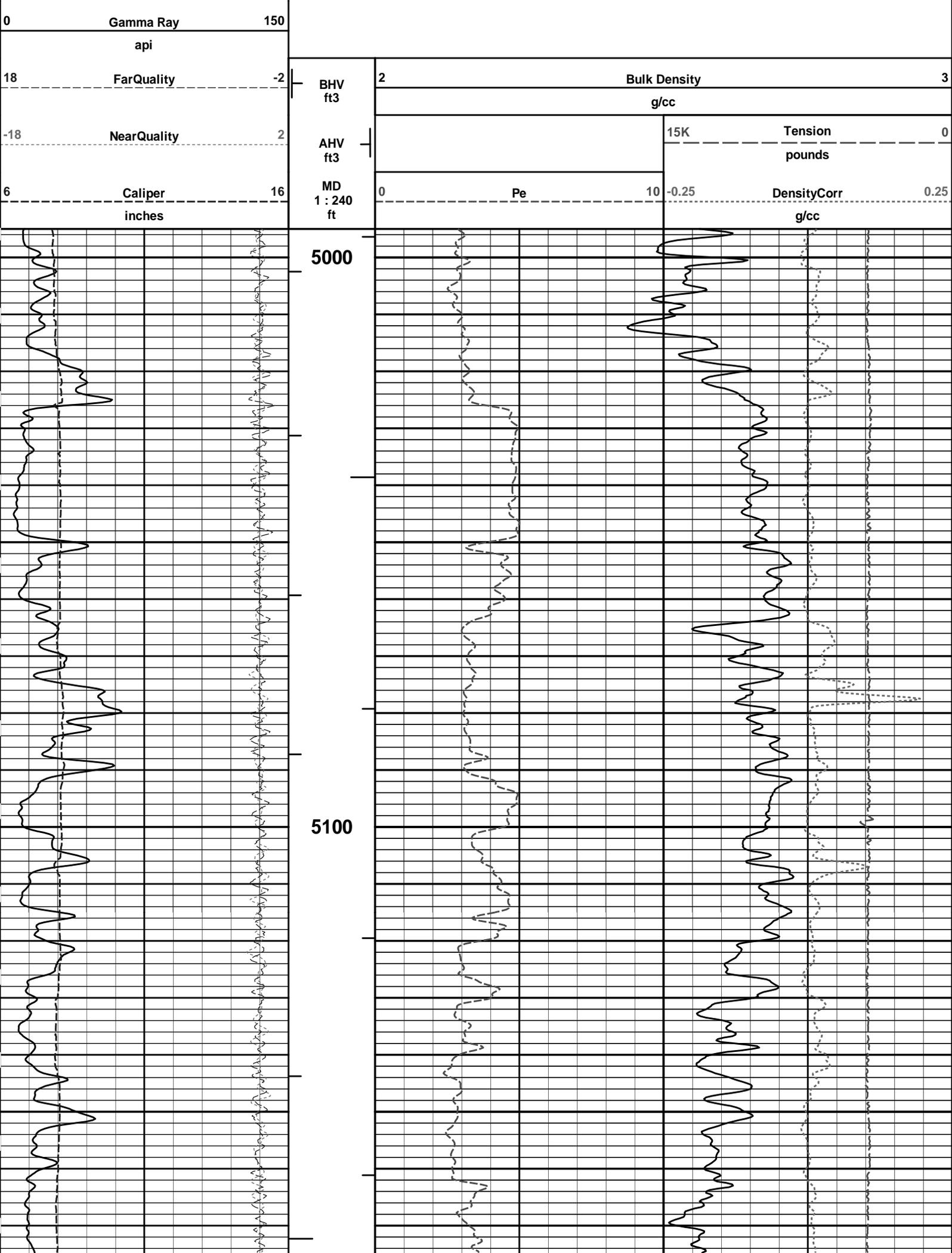
**5 INCH MAIN LOG**

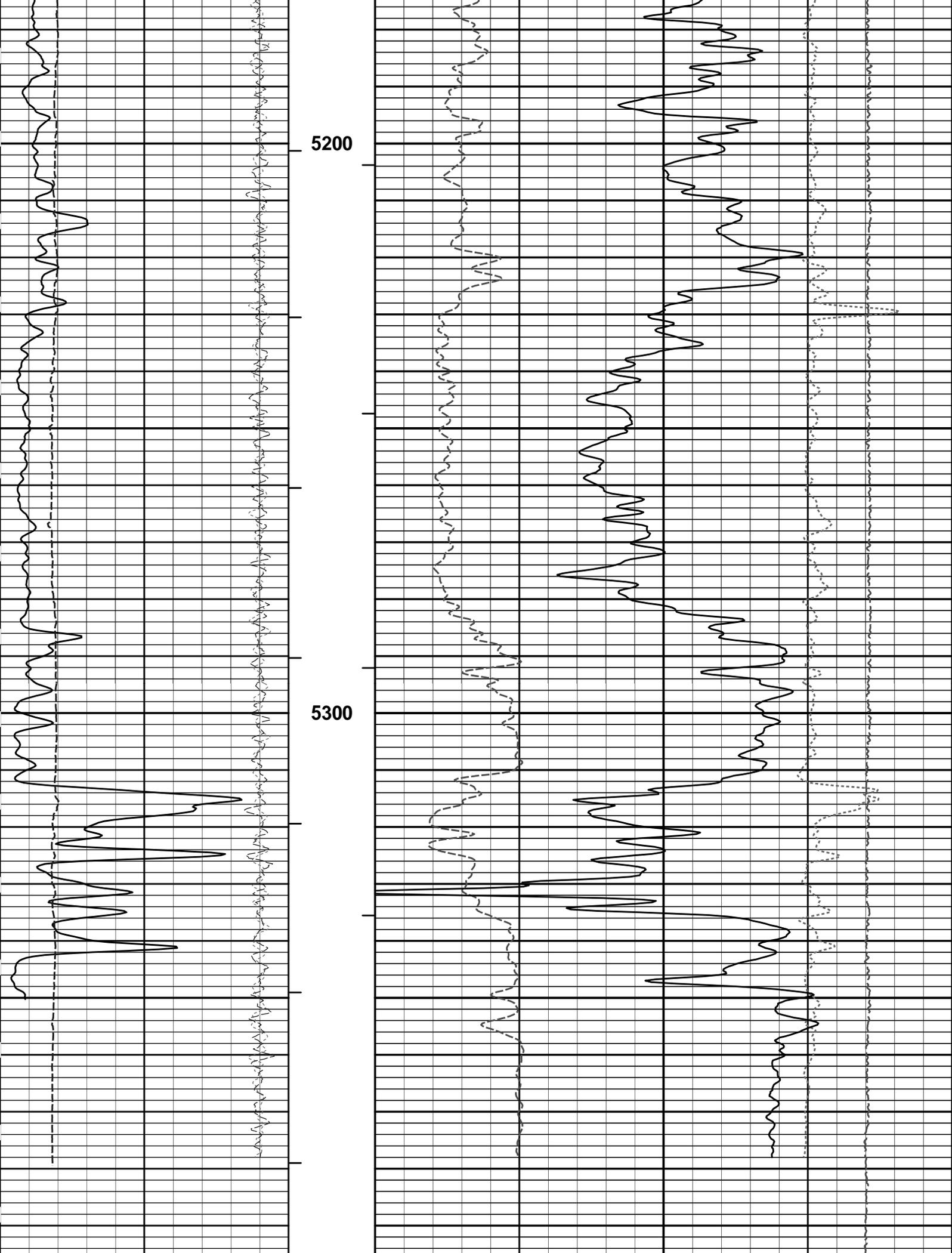
**HALLIBURTON**

Plot Time: 21-Mar-13 07:51:01  
 Plot Range: 4995 ft to 5467.5 ft  
 Data: {ActiveWell}\Well Based\REPEAT\  
 Plot File: \\-LOCAL-IPOROSITY\BULKD\_5\_REP\_LIB

**REPEAT SECTION**

SHALE
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5400

6	Caliper	16
	inches	
-18	NearQuality	2
18	FarQuality	-2
0	Gamma Ray	150
	api	
SHALE		

MD	1 : 240	ft
AHV	ft3	
BHV	ft3	

0	Pe	10	-0.25	DensityCorr	0.25
				g/cc	
			15K	Tension	0
				pounds	
2	Bulk Density			3	
				g/cc	

### HALLIBURTON

Plot Time: 21-Mar-13 07:51:04  
 Plot Range: 4995 ft to 5467.5 ft  
 Data: {ActiveWell}\Well Based\REPEAT\  
 Plot File: \\-LOCAL-1POROSITY\BULKD\_5\_REP\_LIB

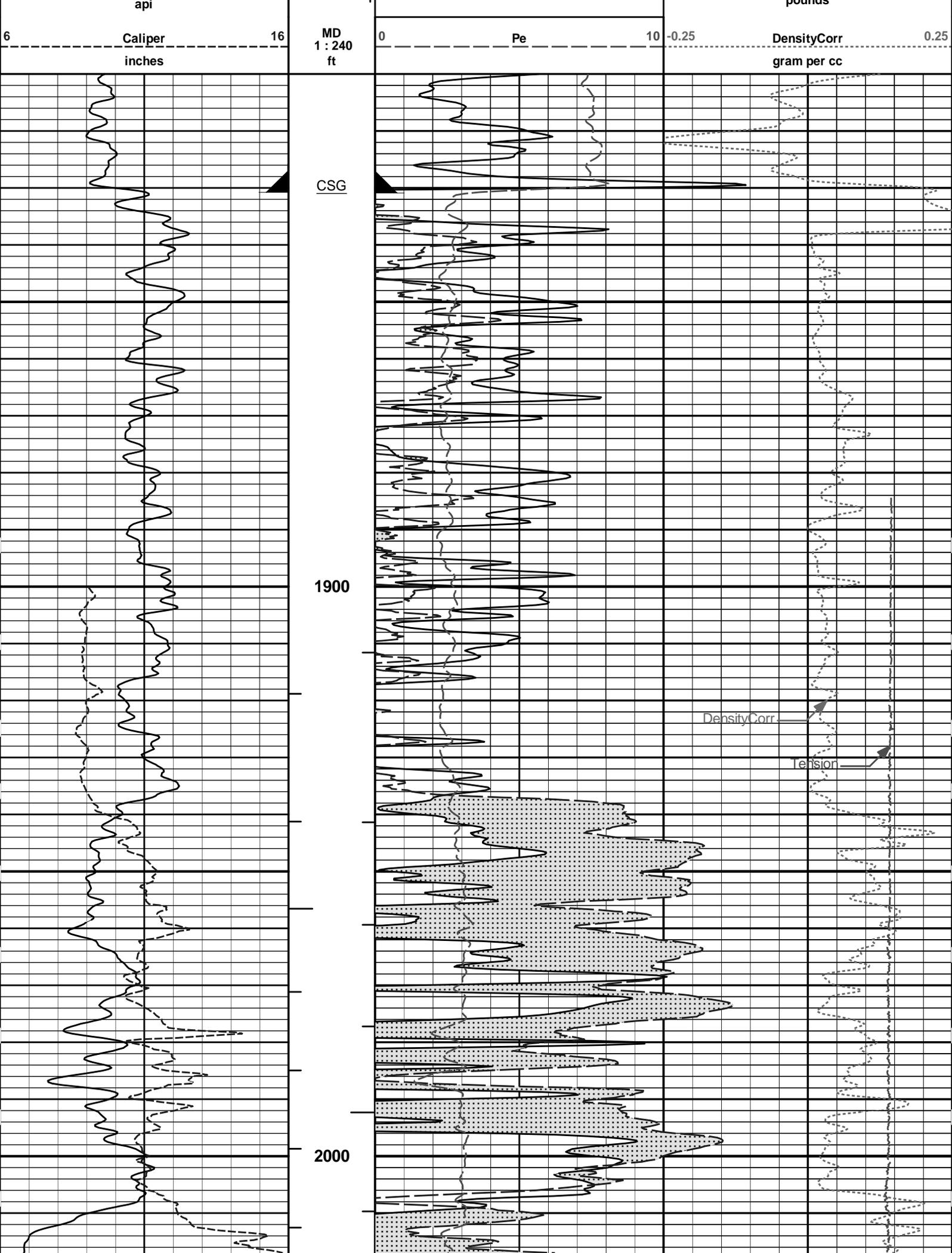
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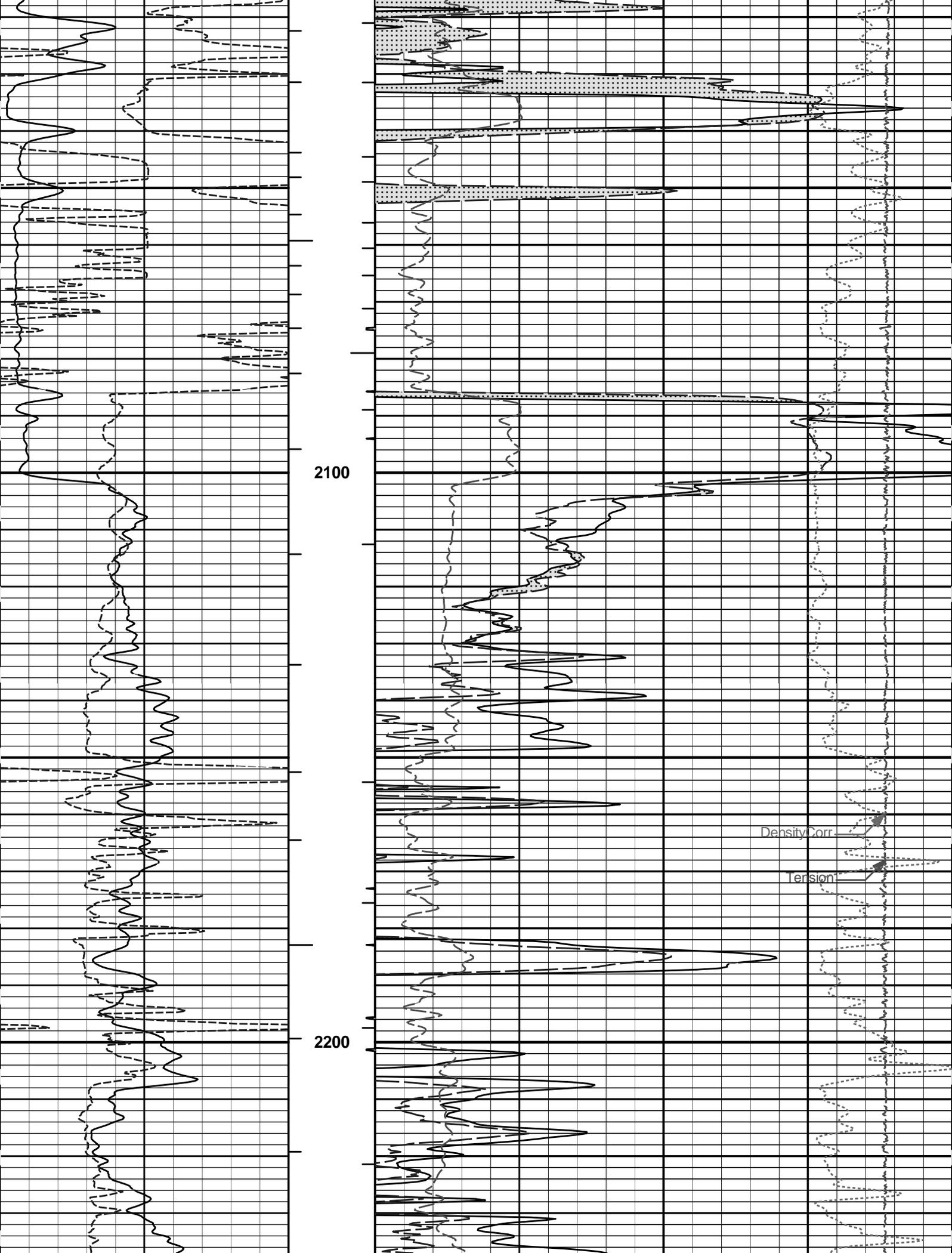
### HALLIBURTON

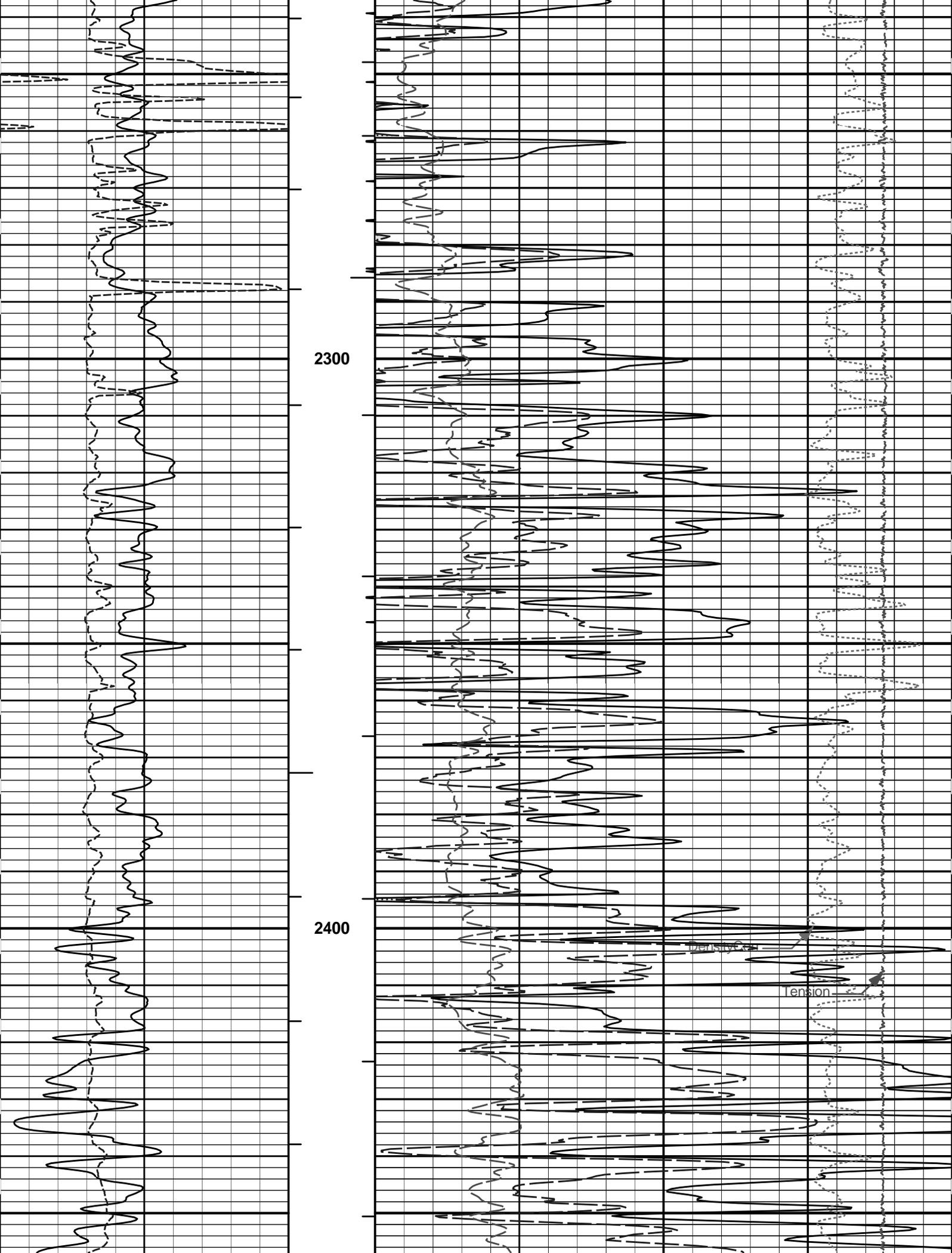
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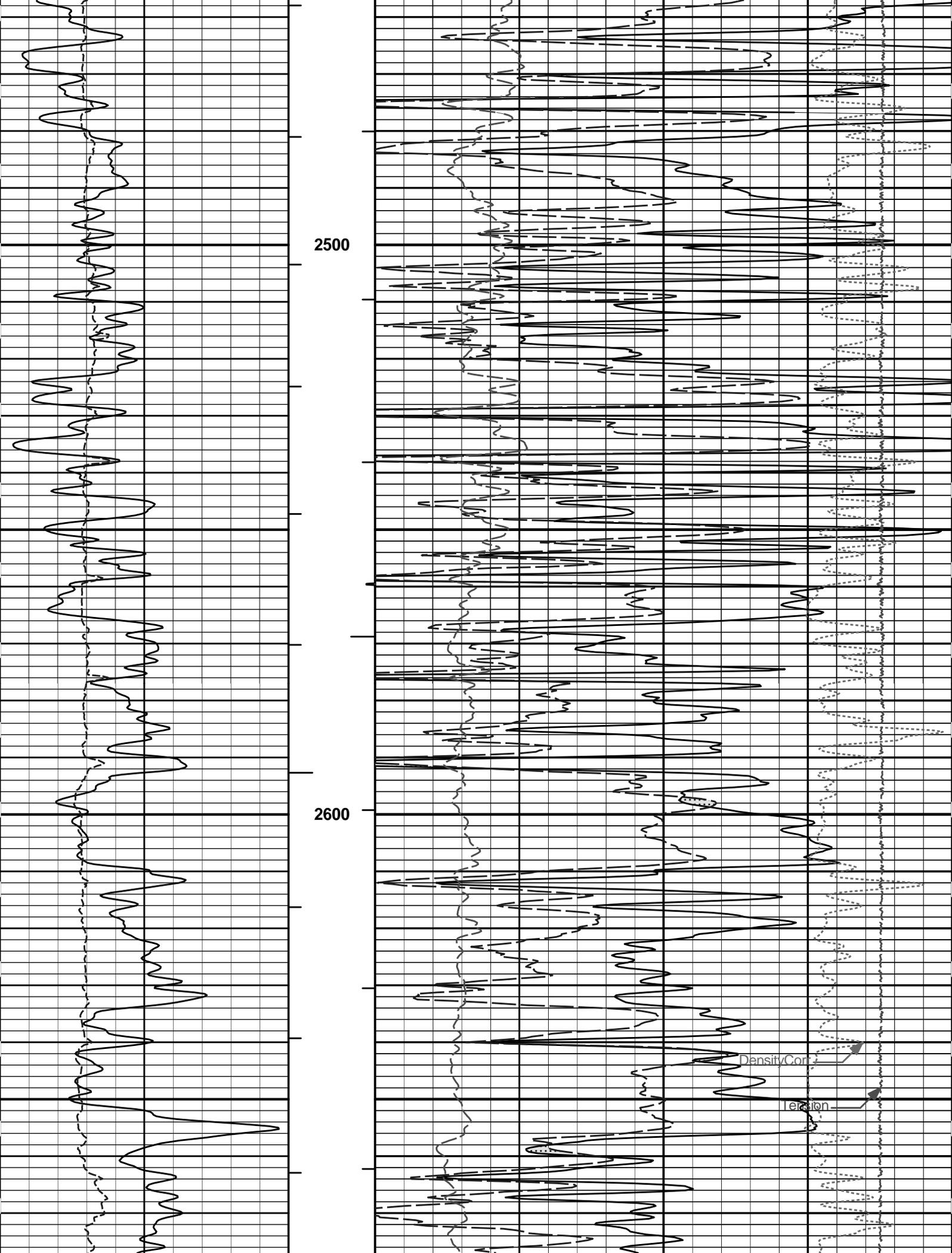
## 5 INCH MAIN LOG

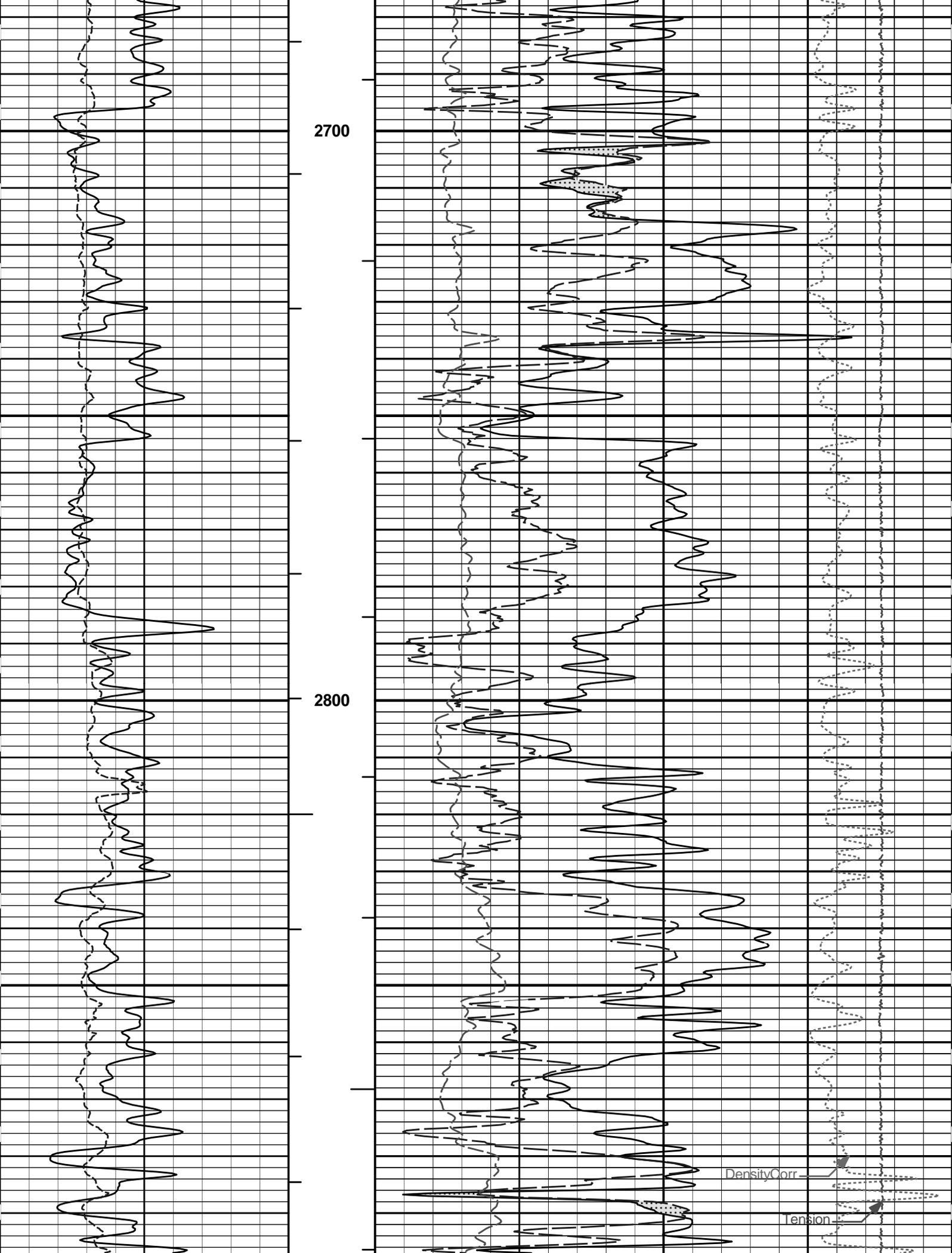
		CROSSOVER			
0	Tension Pull	30	Neutron Porosity		-10
			%		
SHALE		BHVT	30	DensityPorosity	-10
			%		
0	Gamma API	150	AHVT	15K	Tension
					pounds

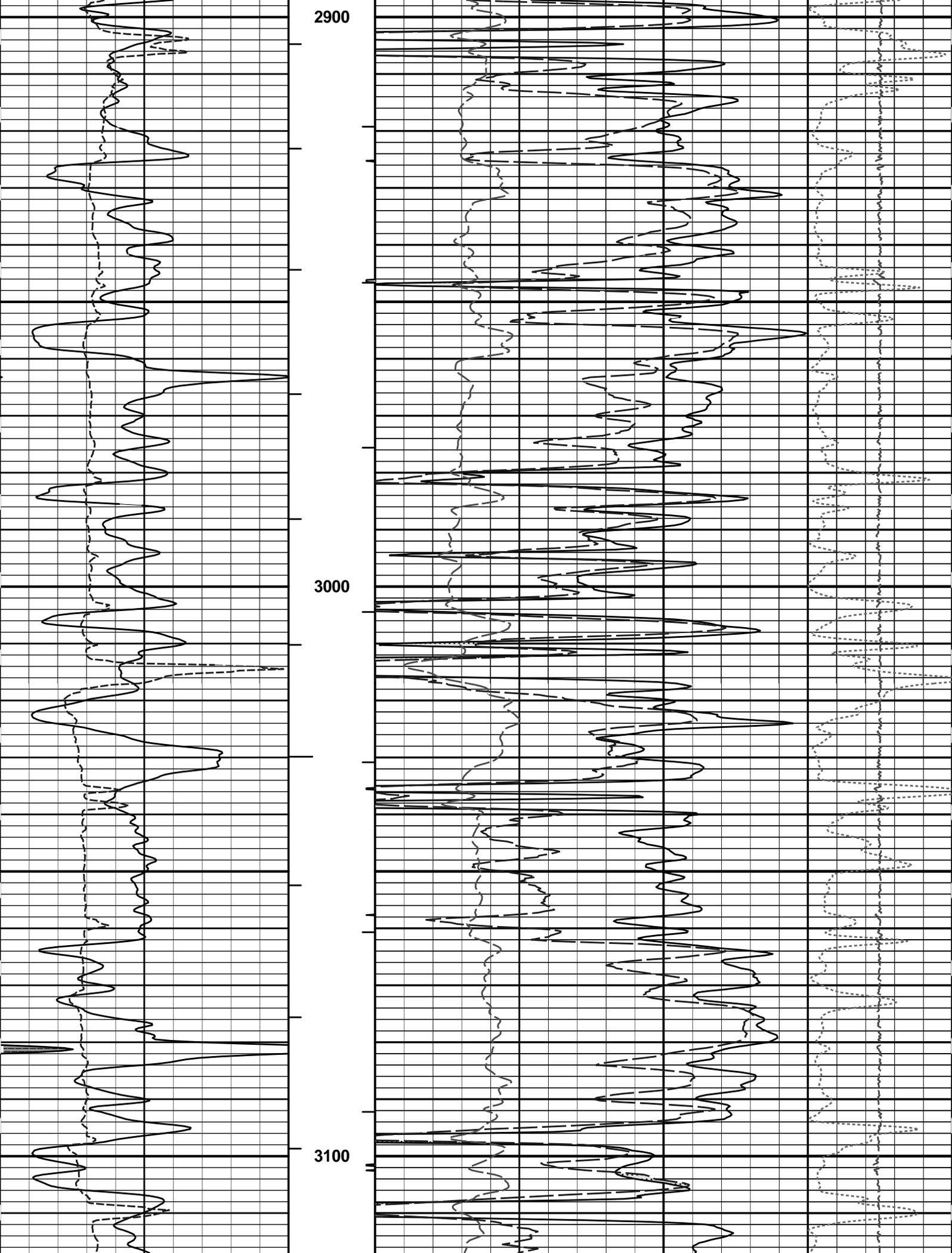


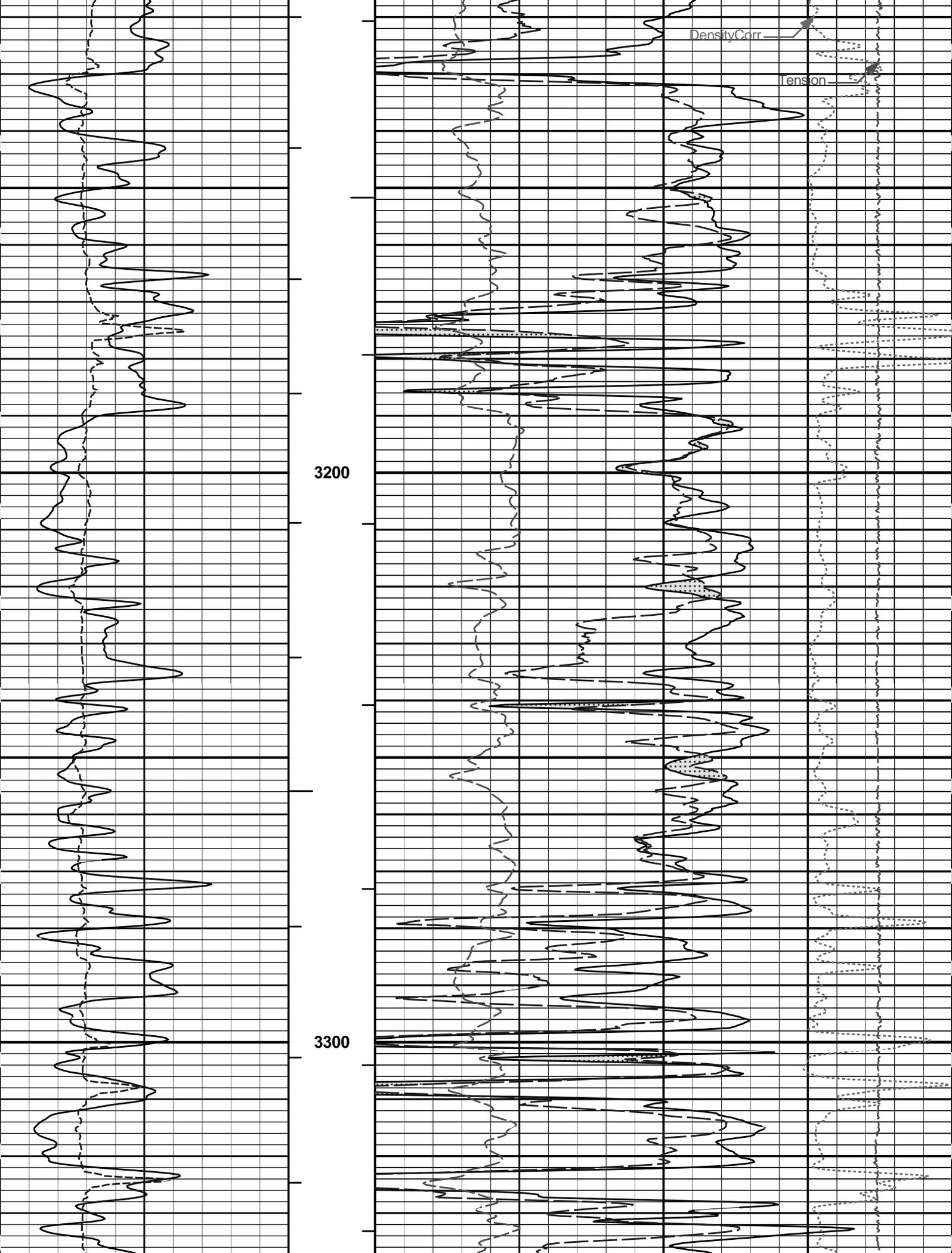


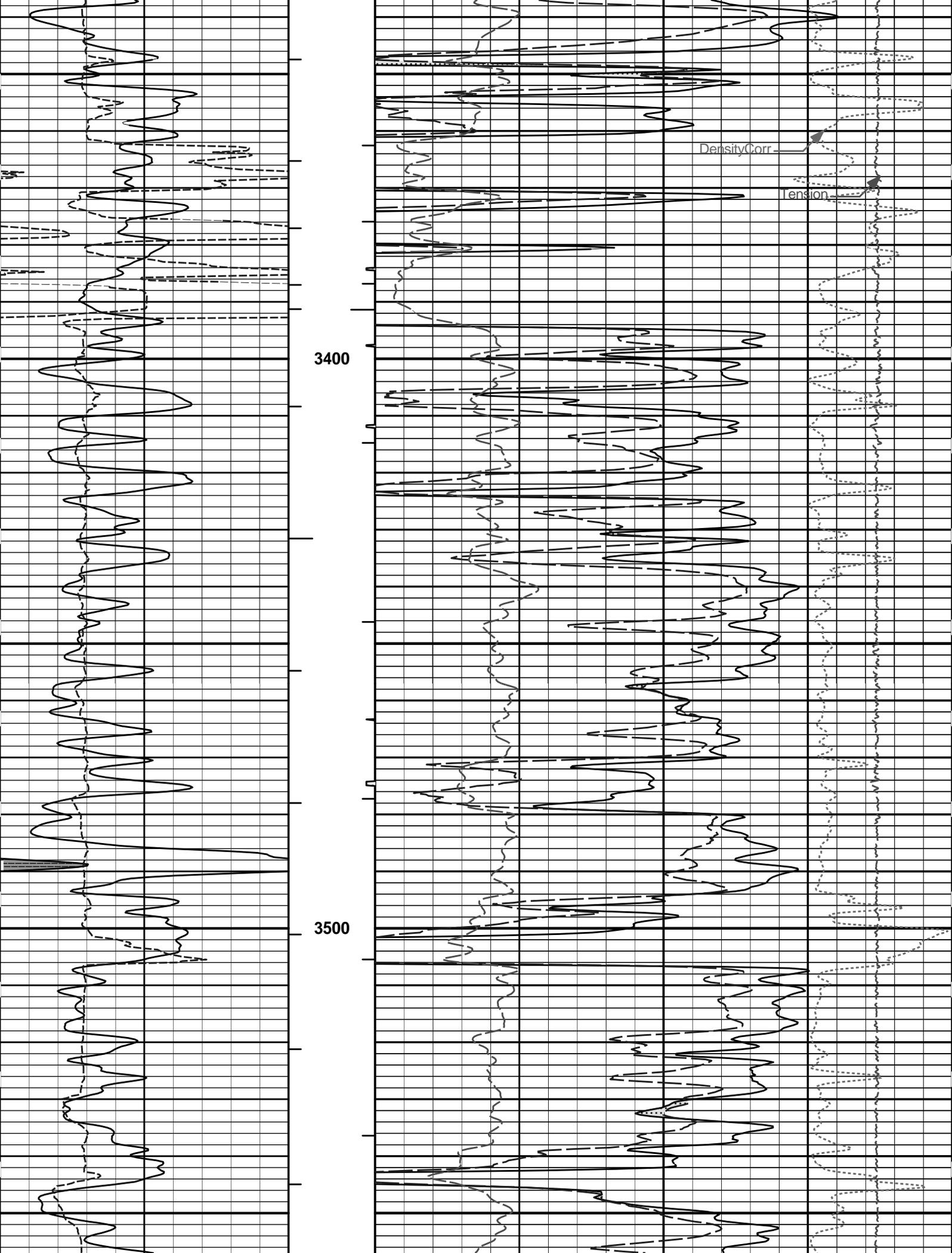


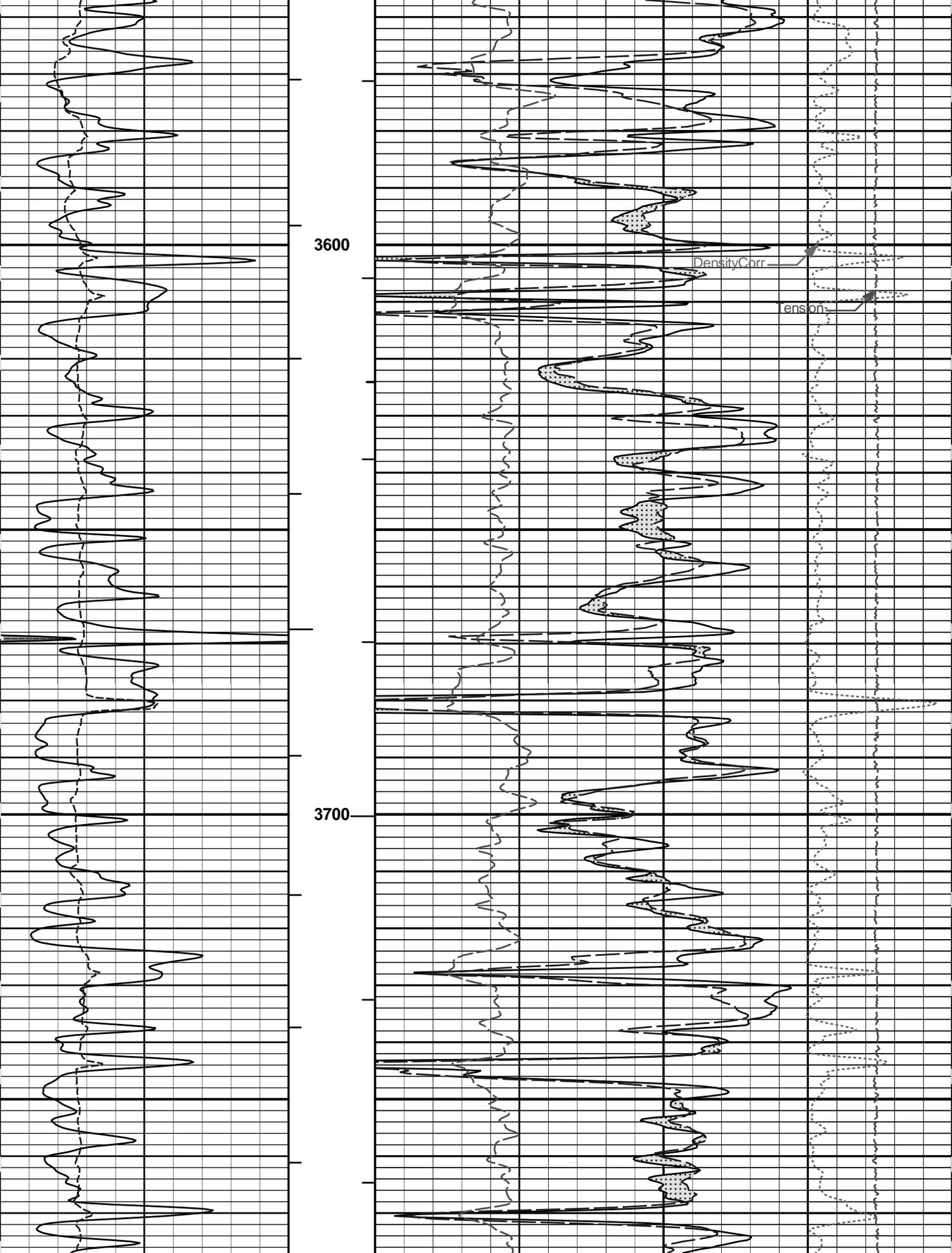


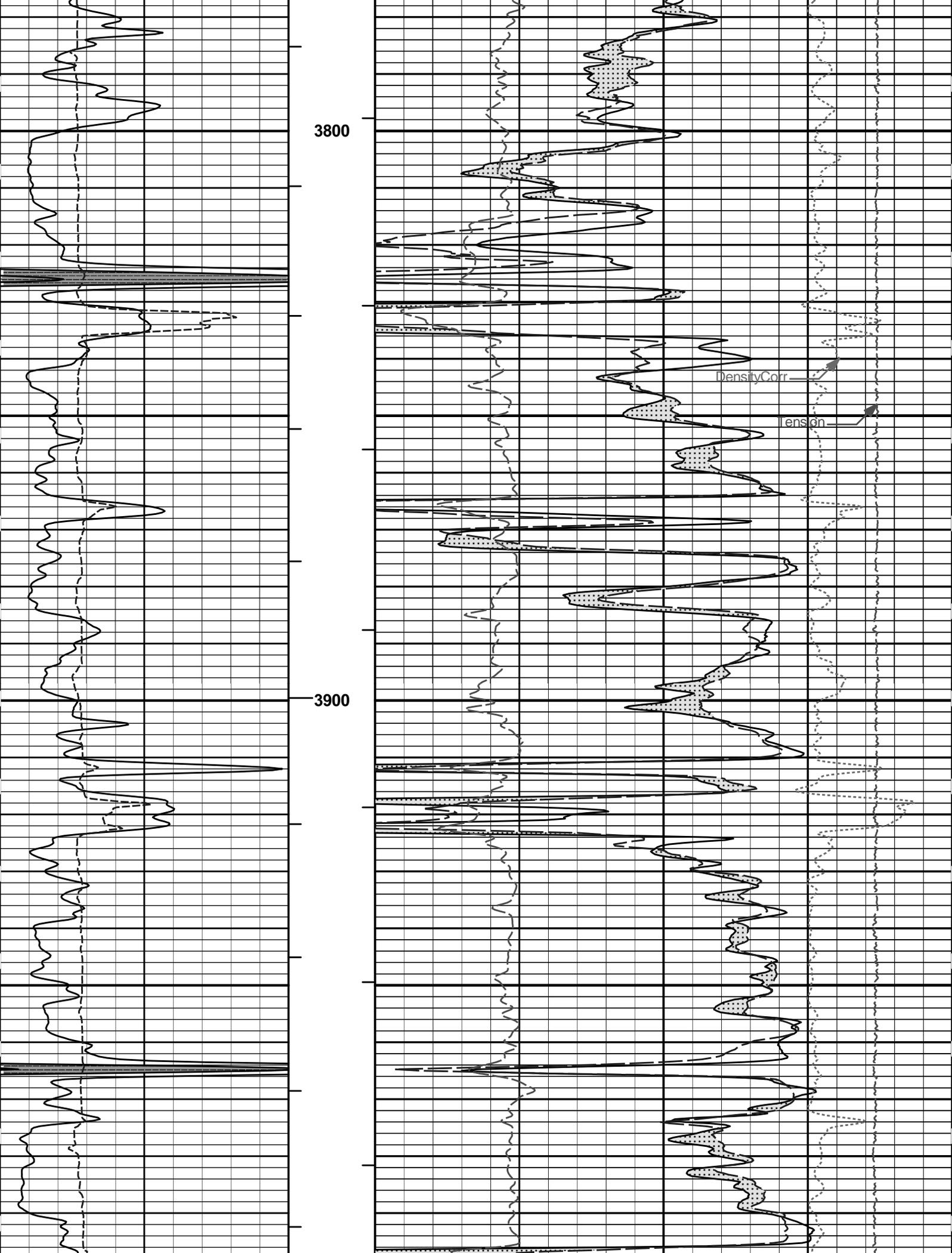


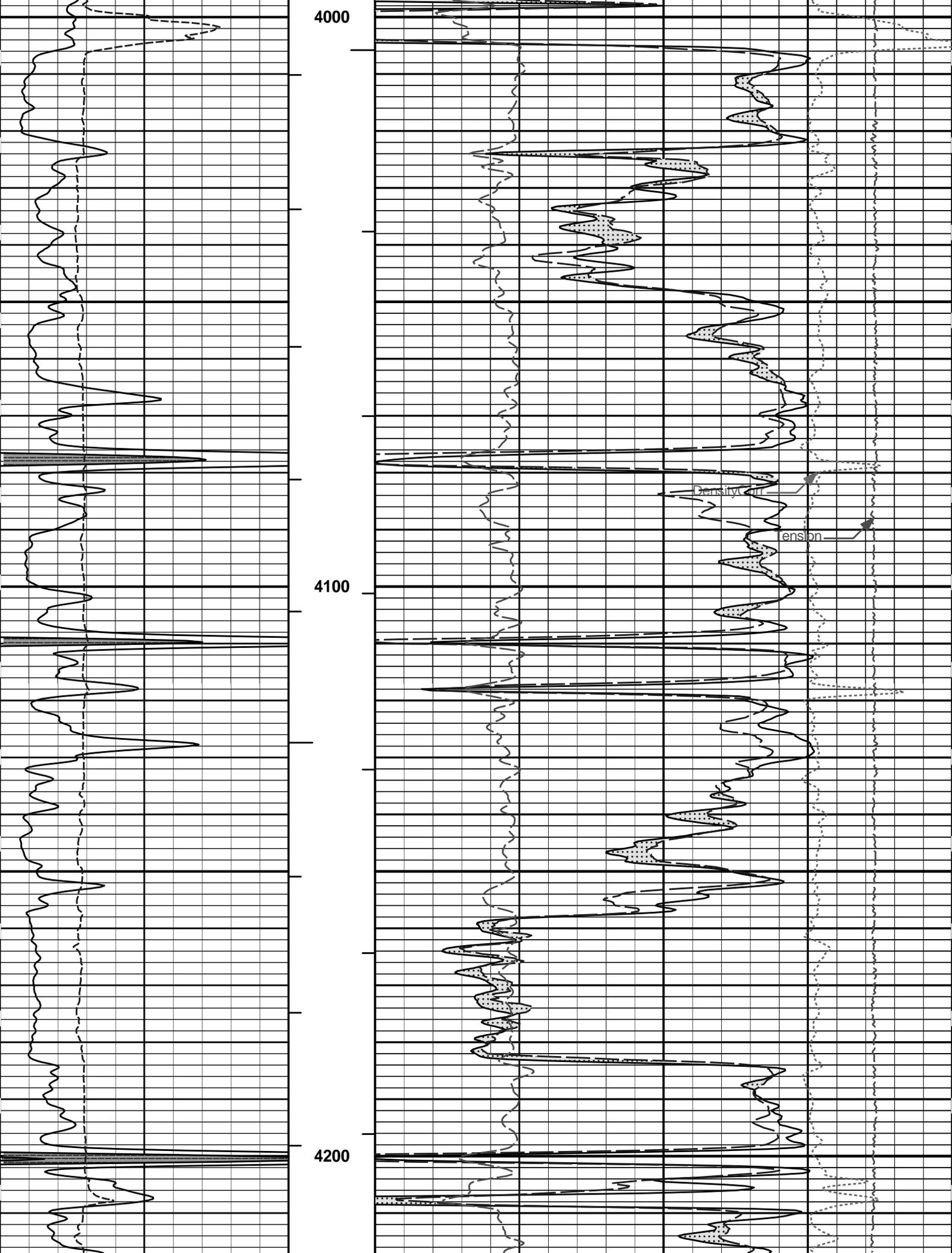


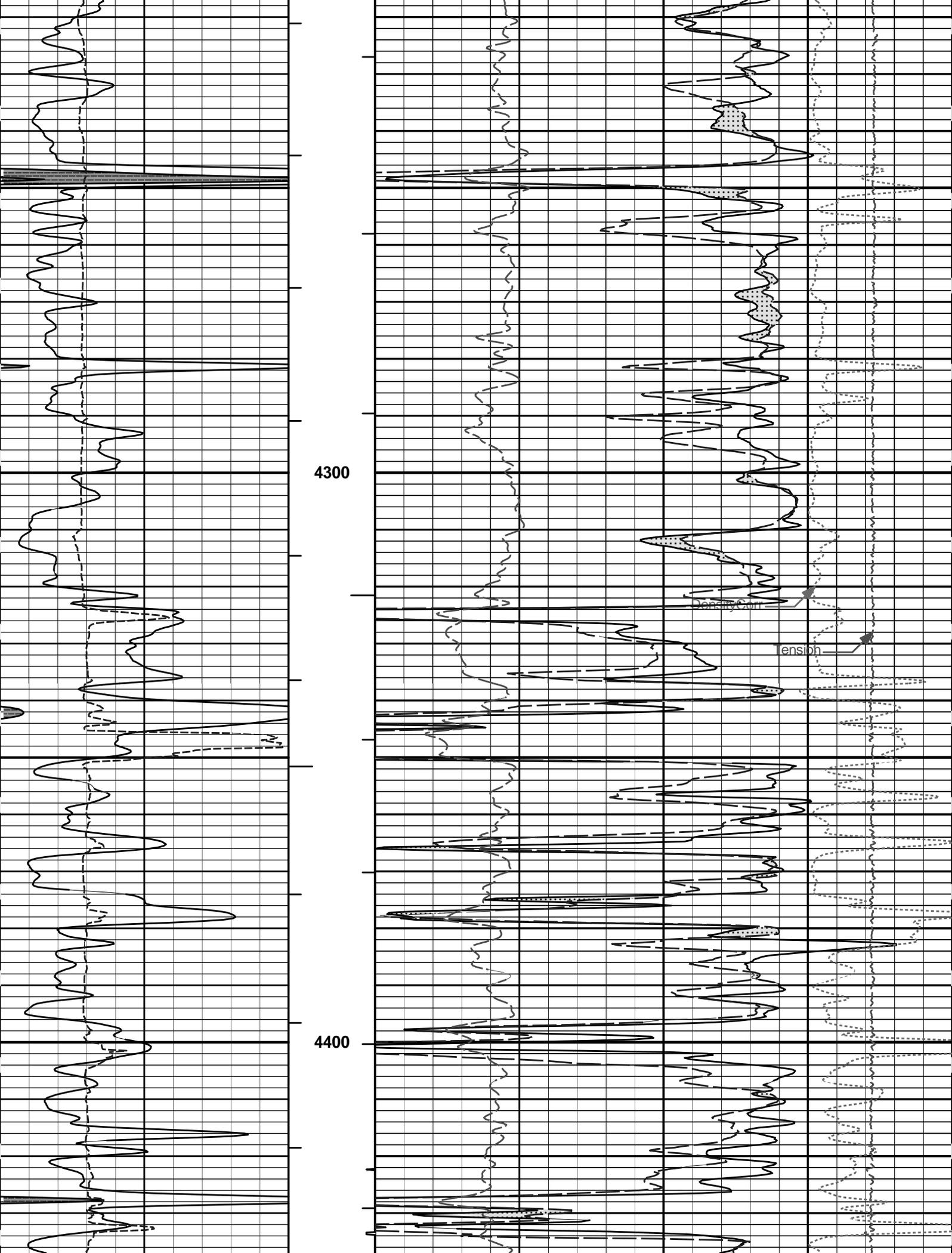


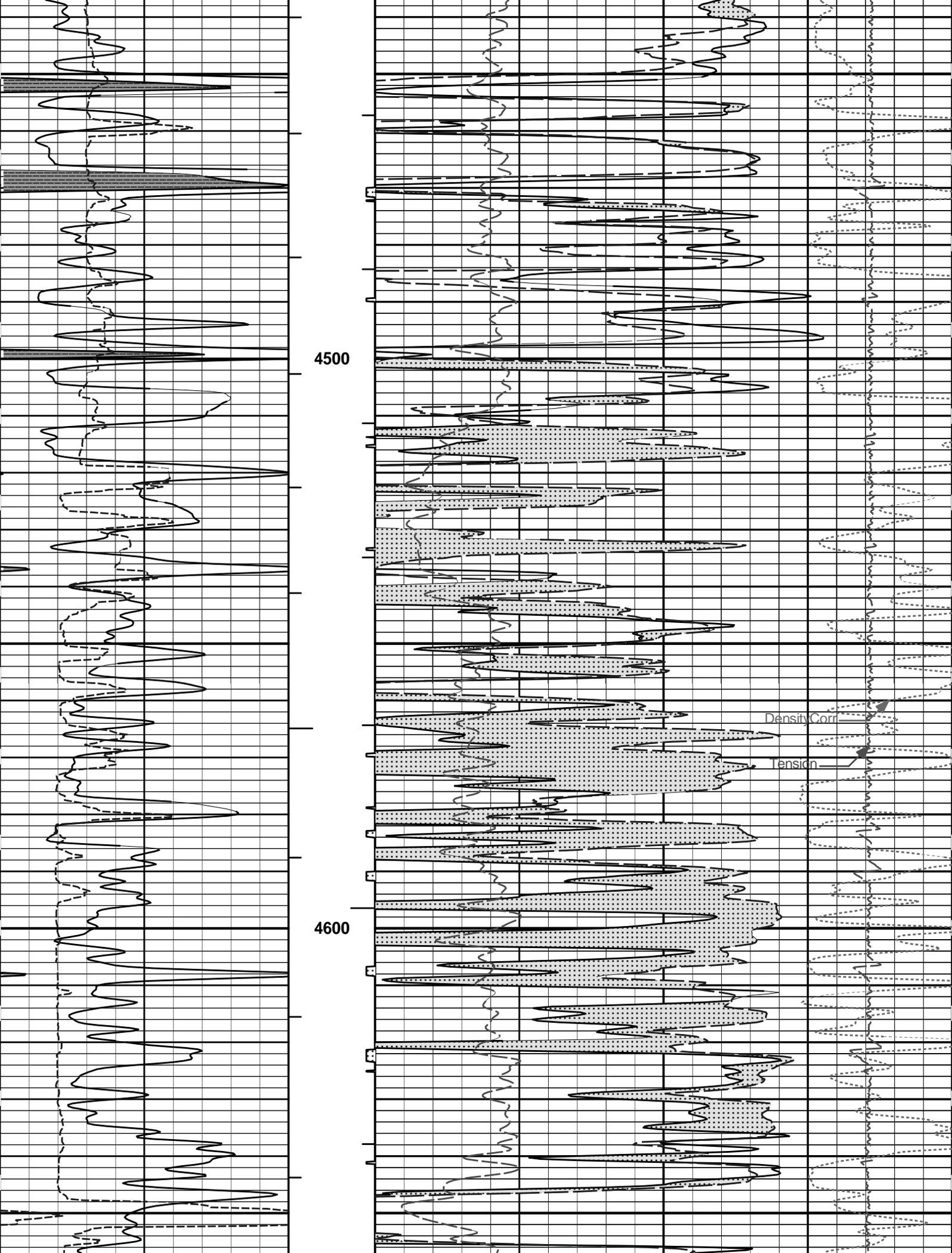


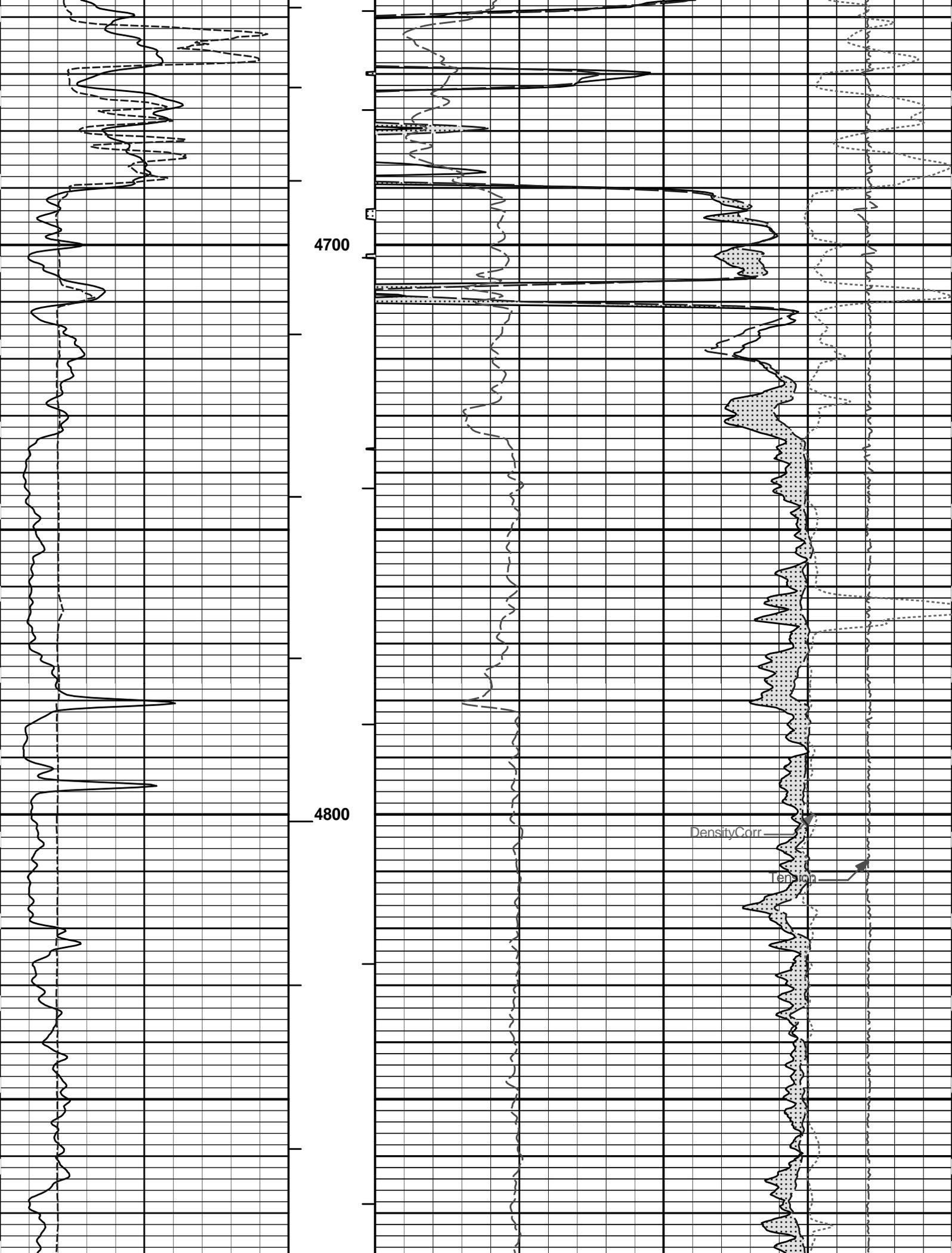


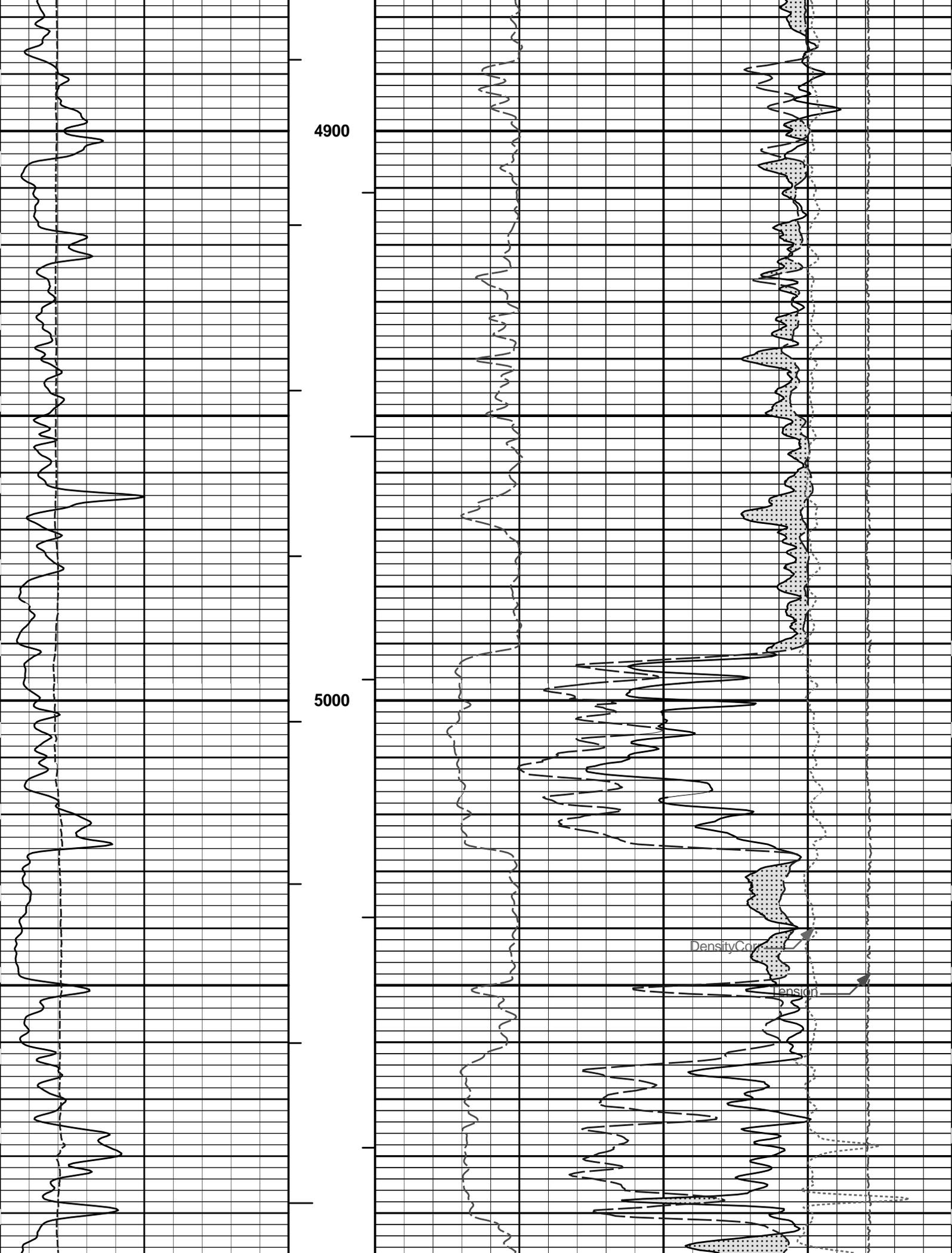


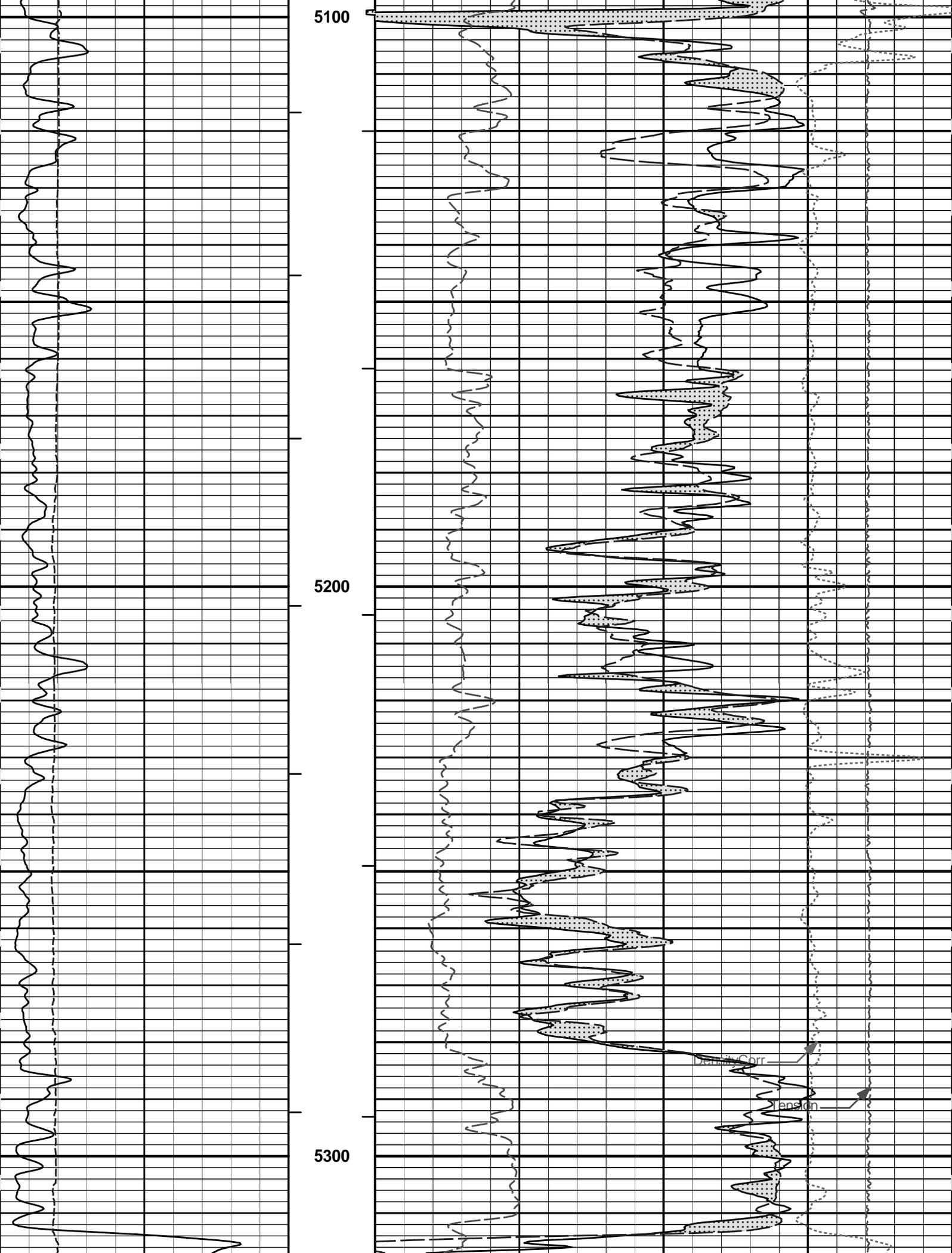


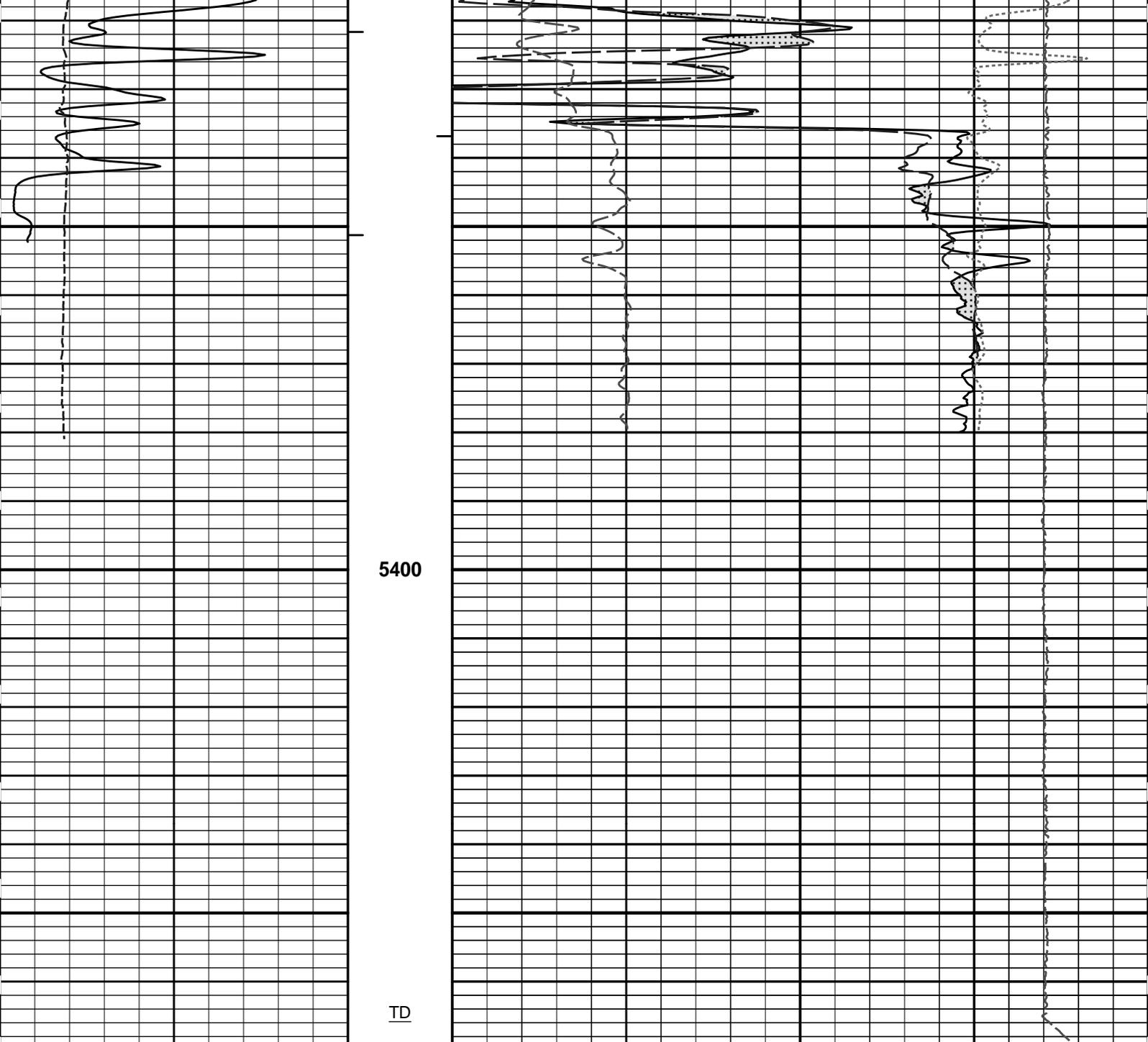












6	Caliper	16	MD	0	Pe	10	-0.25	DensityCorr	0.25
	inches		1 : 240					gram per cc	
0	Gamma API	150	AHVT				15K	Tension	0
	api							pounds	
	SHALE		BHVT	30	DensityPorosity				-10
						%			
			Tension Pull	10	0	30	Neutron Porosity		-10
								%	
			Tension Pull				CROSSOVER		

**HALLIBURTON**

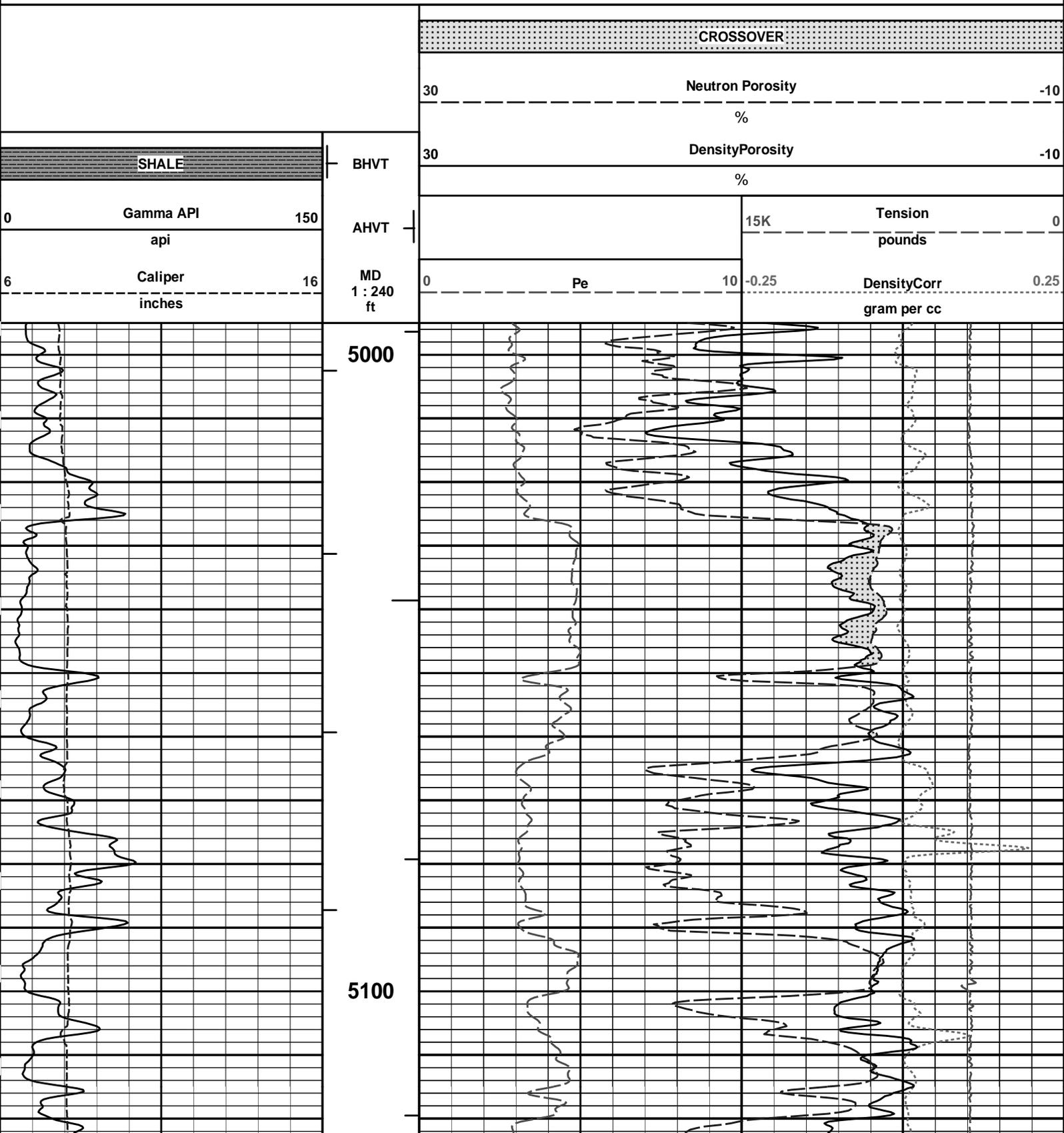
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 Plot File: \\POROSITY\Porosity\_IQ\_5\_MAIN\_LIB

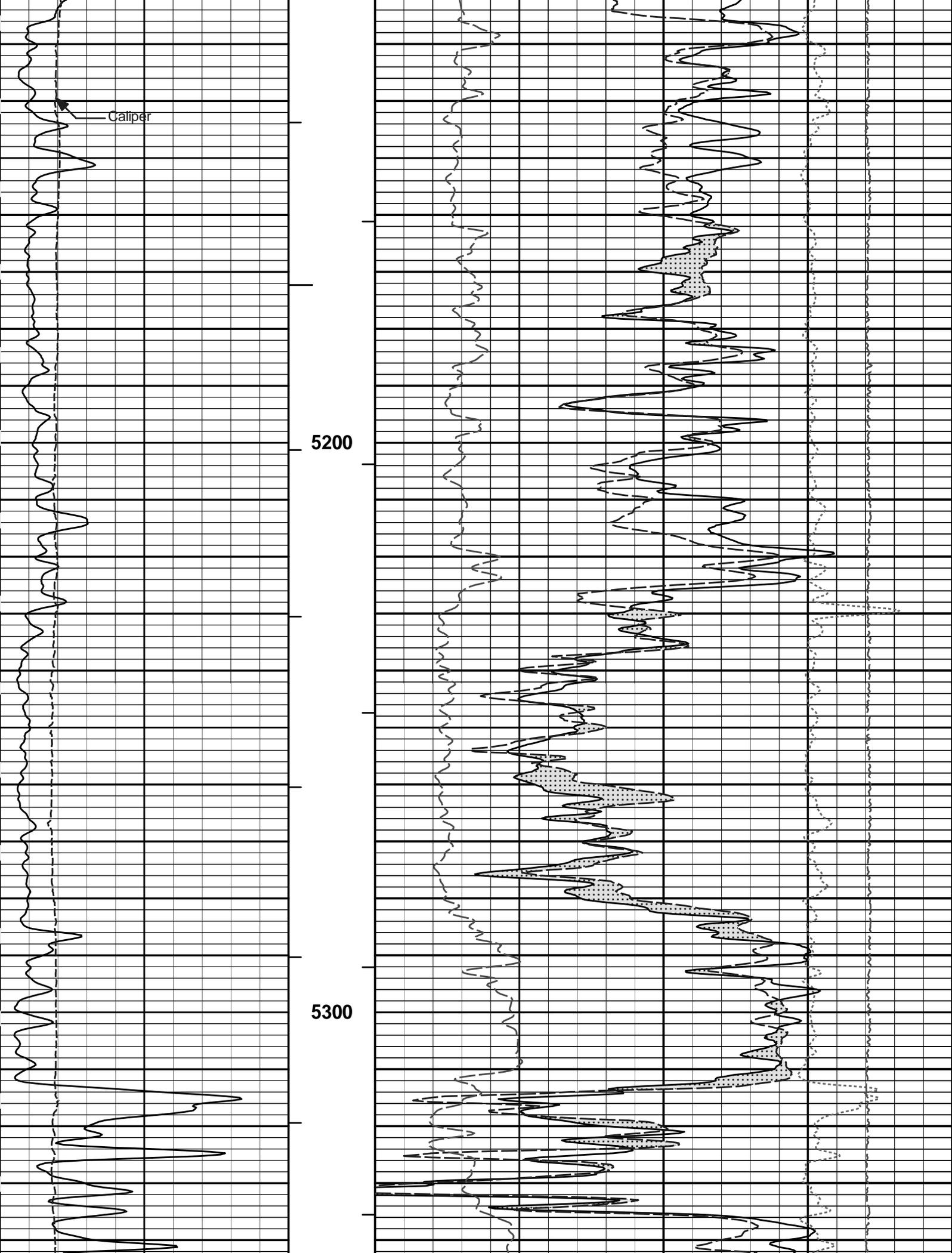
# 5 INCH MAIN LOG

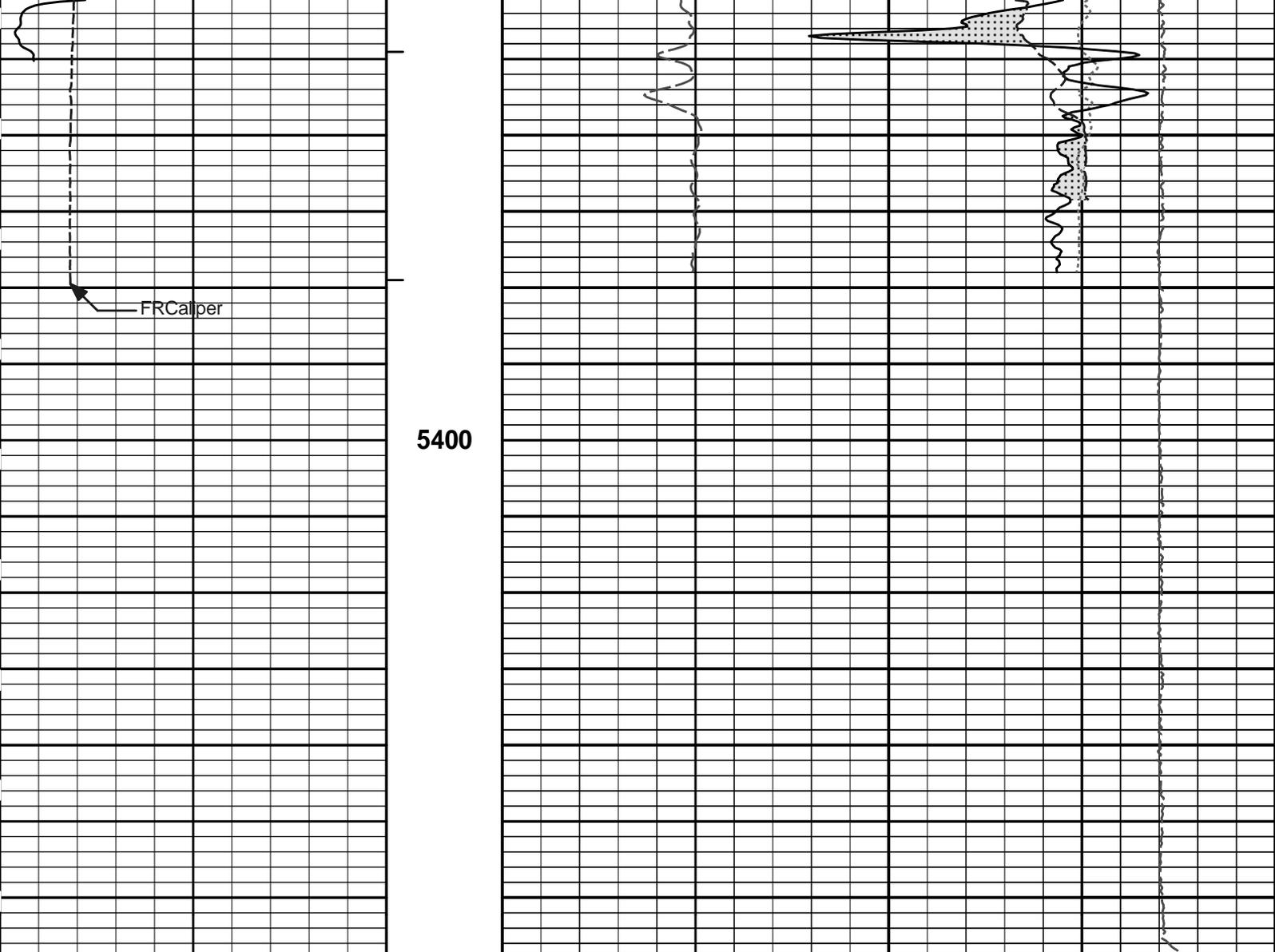
**HALLIBURTON**

Plot Time: 21-Mar-13 07:51:12  
 Plot Range: 4995 ft to 5467.5 ft  
 Data: BUERKLE2133\_1-7\Well Based\REPEAT\  
 Plot File: \\POROSITY\Poro\_IQ\_5\_REP\_LIB

## REPEAT SECTION







6	Caliper	16	MD	0	Pe	10	-0.25	DensityCorr	0.25
	inches		1 : 240					gram per cc	
0	Gamma API	150	AHVT				15K	Tension	0
	api							pounds	
	SHALE		BHVT	30	DensityPorosity				-10
					%				
				30	Neutron Porosity				-10
					%				
					CROSSOVER				

**HALLIBURTON**

Plot Time: 21-Mar-13 07:51:13  
 Plot Range: 4995 ft to 5467.5 ft  
 Data: BUERKLE2133\_1-7Well Based\REPEAT\  
 Plot File: \\POROSITY\Poro\_IQ\_5\_REP\_LIB

**REPEAT SECTION**

**HALLIBURTON**

**TOOL STRING DIAGRAM REPORT**



Centralizer 25-00000001  
8.00 lbs

Ø 4.000 in\* →



Wavesonic-I-  
10753396  
520.00 lbs

Ø 3.625 in →

34.07 ft

← Wavesonic Delay @ 56.79 ft

Centralizer 25-00000002  
8.00 lbs

Ø 4.000 in\* →



XRMI Isolator-  
00000001  
32.50 lbs

Ø 4.500 in →

1.30 ft

45.29 ft

XRMI-I Instrument-  
11682412  
290.00 lbs

Ø 4.500 in →

13.00 ft

43.99 ft

XRMI-I Mandrel-  
11682413  
206.00 lbs

Ø 5.000 in →

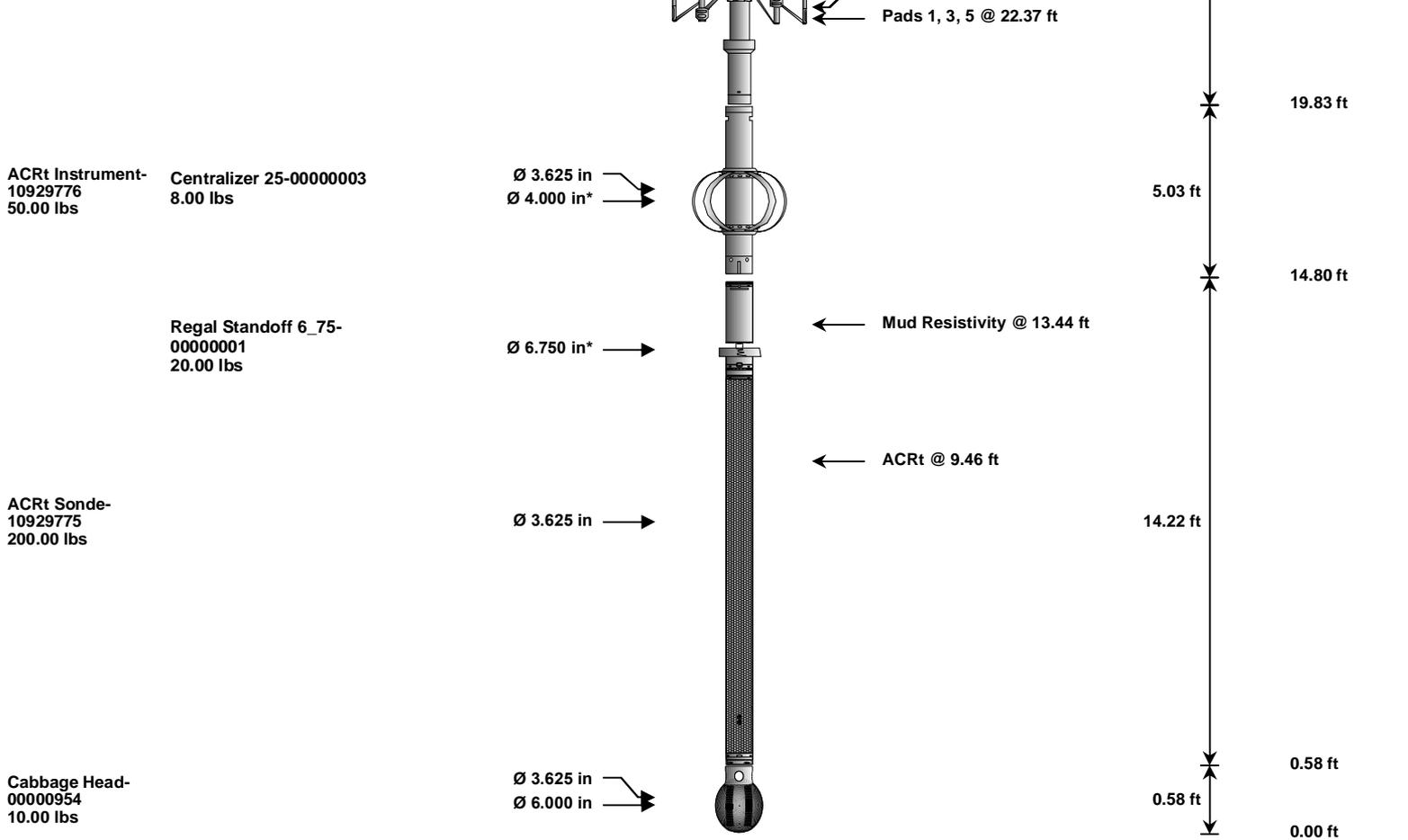
Ø 4.500 in →

11.16 ft

30.99 ft



Pads 2, 4, 6 @ 22.60 ft



Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max. Log. Speed (fpm)
CH_HOS	Hostile Cable Head with Load Cell	954	37.50	3.03	125.96	300.00
SP	SP Sub	12345678	60.00	3.74	122.22	300.00
GTET	Gamma Telemetry Tool	10748374	165.00	8.52	113.70	60.00
CSNG	Compensated Spectral Natural Gamma	10965402	114.00	8.17	105.53	15.00
DSNT	Dual Spaced Neutron	10735145	174.00	9.69	95.85	60.00
DCNT	DSN Decentralizer	10735145	6.60	5.13	* 99.18	300.00
SDLT	Spectral Density Tool	10673803	360.00	10.81	85.03	60.00
MICP	Microlog Pad	10673803	8.00	1.00	* 87.53	60.00
SDLP	Density Insite Pad	10673790	65.00	2.55	* 87.24	60.00
IQF	IQ Flex tool	10000954	140.00	5.67	79.36	300.00
WSTT	WaveSonic Insite	10753396	520.00	34.07	45.29	30.00
OBCEN	Centralizer - 25 in. Overbody	00000002	8.00	2.08	* 49.26	300.00
OBCEN	Centralizer - 25 in. Overbody	00000001	8.00	2.08	* 74.55	300.00
	Isolator for the XRMI tool	00000001	32.50	1.30	43.99	300.00
XRMI	XRMI Navigation - Insite	11682412	290.00	13.00	30.99	30.00
XRMI-I	XRMI Imager - Insite	11682413	206.00	11.16	19.83	30.00
ACRt	Array Compensated True Resistivity Instrument Section	10929776	50.00	5.03	14.80	300.00
OBCEN	Centralizer - 25 in. Overbody	00000003	8.00	2.08	* 16.01	300.00
ACRt	Array Compensated True Resistivity Sonde Section	10929775	200.00	14.22	0.58	300.00
RSOF	Regal Standoff 6.75in	00000001	20.00	0.52	* 12.45	300.00
CBHD	Cabbage Head	00000954	10.00	0.58	0.00	300.00

**Total** **2,482.60** **128.99**

\* Not included in Total Length and Length Accumulation.

Data: BUERKLE2133\_1-70003 SP-GTET-CSNG-DSN-SDL-FLEX-WAVE-XRMI-ACRT-CHNDLE Date: 20-Mar-13 16:41:54

# HALLIBURTON

## PARAMETERS REPORT

Depth

Depth (ft)	Tool Name	Mnemonic	Description	Value	Units
TOP					
	GTET	GEOK	Process Gamma Ray EVR?	No	
	DSNT	DEOK	Process DSN EVR?	No	
	SDLT Pad	DNOK	Process Density EVR?	No	
4300.00					
	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	9.200	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	1.000	ohmm
	SHARED	TRM	Temperature of Mud	75.0	degF
	SHARED	CSD	Logging Interval is Cased?	No	
	SHARED	ICOD	AHV Casing OD	4.500	in
	SHARED	ST	Surface Temperature	75.0	degF
	SHARED	TD	Total Well Depth	5510.00	ft
	SHARED	BHT	Bottom Hole Temperature	135.0	degF
	SHARED	SVTM	Navigation and Survey Master Tool	XRMI-I Instrument	
	SHARED	AZTM	High Res Z Accelerometer Master Tool	XRMI-I Instrument	
	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?	Yes	
	GTET	TPOS	Tool Position for Gamma Ray Tools.	Eccentered	
	CSNG	CGOK	Process CSNG Data?	Yes	
	CSNG	CENT	Is Tool Centralized?	No	
	CSNG	GBOK	Gamma Enviromental Corrections?	Yes	
	CSNG	BARF	Barite Correction Factor	1.00	
	CSNG	ORDG	Use Fixed Gain	No	
	CSNG	ORDO	Use Fixed Offset	No	
	CSNG	ORDR	Use Fixed Resolution Degradation Factor	No	
	DSNT	DNOK	Process DSN?	Yes	
	DSNT	DEOK	Process DSN EVR?	Yes	
	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	DNOC	Use Mud Correction Coef	No	

DSNT	SHCO	View More Correction Options	No	
DSNT	UTVD	Use TVD for Gradient Corrections?	No	
DSNT	LHWT	Logging Horizontal Water Tank?	No	
SDLT	CLOK	Process Caliper Outputs?	Yes	
SDLT Pad	DNOK	Process Density?	Yes	
SDLT Pad	DNOK	Process Density EVR?	Yes	
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
Microlog Pad	MLOK	Process MicroLog Outputs?	Yes	
Wavesonic-I	WSOK	Process WSTT?	Yes	
Wavesonic-I	AFIL	Adaptive Filtering?	No	
Wavesonic-I	PINT	Process 1 Sample and Skip	0	
Wavesonic-I	PROM	Process Mode: M=1,MX=2,MY=3,MXY=4	4	
Wavesonic-I	DTSH	Delta -T Shale	100.00	uspf
Wavesonic-I	DTMT	Delta -T Matrix Type	User define	
Wavesonic-I	DTMA	Delta -T Matrix	47.60	uspf
Wavesonic-I	DTFL	Delta -T Fluid	189.00	uspf
Wavesonic-I	RHOM	Matrix Density	2.7100	g/cc
Wavesonic-I	RHOF	Fluid Density	1.0000	g/cc
Wavesonic-I	SMTH	Semblance Threshold	0.25	
Wavesonic-I	VPVS	VPVS Ratio for Porosity	1.40	
Wavesonic-I	APEQ	Acoustic Porosity Equation	Wylie	
Wavesonic-I	NAVS	Navigation Source Tool	XRMI-I Instrument	
XRMI-I Instrument	WRTI	Survey Writing Interval	30	ft
XRMI-I Instrument	SOPT	Smoothing Option	None	
XRMI-I Mandrel	DIMG	Process XRMI?	Yes	
XRMI-I Mandrel	ROTI	Rotate Image (N-E-S-W-N)?	Yes	
XRMI-I Mandrel	AGN	Use Button Auto Gain?	Yes	
XRMI-I Mandrel	BCLR	Button Auto Gain Color	127	
XRMI-I Mandrel	BFIL	Button Auto Gain Filter	0.020	
XRMI-I Mandrel	BGAN	Button Gain Value	0.001	
XRMI-I Mandrel	BOFF	Button Offset	0	
XRMI-I Mandrel	DIPE	Process Dipmeter Calculations?	Yes	
XRMI-I Mandrel	BHCS	Process Borehole Corrections?	Yes	
XRMI-I Mandrel	CLOK	Process Caliper Outputs?	Yes	
XRMI-I Mandrel	CMAX	Caliper Maximum Limit	100.0	in
XRMI-I Mandrel	CMIN	Caliper Mimimum Limit	3.5	in
XRMI-I Mandrel	NAVS	Navigation Source Tool	XRMI-I Instrument	
XRMI-I Mandrel	BHVC	Radius type for borehole volume calcuations	Elliptical	
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

## CALIBRATION REPORT

### NATURAL GAMMA RAY TOOL SHOP CALIBRATION

**Tool Name:** GTET - 10748374      **Reference Calibration Date:** 17-Jan-13 13:03:23  
**Engineer:** THOMAS HYDE      **Calibration Date:** 12-Mar-13 13:11:16  
**Software Version:** WL INSITE R3.8.4 (Build 5)      **Calibration Version:** 1

Calibrator Source S/N: TB-185  
 Calibrator API Reference: 228.00 api  
 Equivalent Calibrator API Reference: 232.0 api

Measurement	Measured	Calibrated	Units
Background	43.5	43.2	api
Background + Calibrator	277.4	275.2	api
Calibrator	233.9	232.0	api

### NATURAL GAMMA RAY TOOL FIELD CALIBRATION

**Tool Name:** GTET - 10748374      **Reference Calibration Date:** 12-Mar-13 13:11:16  
**Engineer:** S. INGERSOLL      **Calibration Date:** 19-Mar-13 21:54:54  
**Software Version:** WL INSITE R3.8.4 (Build 5)      **Calibration Version:** 1

Calibrator Source S/N: TB-185  
 Calibrator API Reference: 228.00 api  
 Equivalent Calibrator API Reference: 232.0 api

Field Verification	Shop	Field	Units
Background	43.2	24.4	api
Background + Calibrator	275.2	253.6	api
Calibrator	232.0	229.2	api

Shop	Field	Difference	Tolerance
232.0	229.2	2.8	+/- 9.00

### DUAL SPACED NEUTRON SHOP CALIBRATION

**Tool Name:** DSNT - 10735145      **Reference Calibration Date:** 12-Feb-13 16:21:29  
**Engineer:** THOMAS HYDE      **Calibration Date:** 12-Mar-13 13:50:23  
**Software Version:** WL INSITE R3.8.4 (Build 5)      **Calibration Version:** 1

Logging Source S/N: DSN-436  
 Tank Serial Number: 105060  
 Reference value assigned to Tank: 51.680  
 Snow Block S/N: TRK\_954  
 Calibration Tank Water Temperature: 65 degF  
 Min. Tool Housing Outside Diameter: 3.620 in

#### CALIBRATION CONSTANTS

Measurement	Prev. Value	New Value	Control Limit On New Value
Gain:	0.940	0.936	0.900 - 1.100

#### WATER TANK SUMMARY (Horizontal Water Tank)

Measurement	Current Reading (Previous Coef.)	Calibrated (New Coef.)	Change	Control Limit On Change
Porosity (decp):	0.2119	0.2106	0.0012	+/- 0.0020

**VERIFIER**

Measurement	Value	Control Limit
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Snow-Block Porosity (decp):	0.0540	0.02000 - 0.09000
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**PASS/FAIL SUMMARY**

Background Check:	Passed
Gain-Range Check:	Passed
Snow-Block Check:	Passed

**DUAL SPACED NEUTRON FIELD CALIBRATION**

<b>Tool Name:</b> DSNT - 10735145	<b>Reference Calibration Date:</b> 12-Mar-13 13:50:23
<b>Engineer:</b> S. INGERSOLL	<b>Calibration Date:</b> 19-Mar-13 22:34:45
<b>Software Version:</b> WL INSITE R3.8.4 (Build 5)	<b>Calibration Version:</b> 1

Logging Source S/N: DSN-436  
Snow Block S/N: TRK\_954

**NEUTRON FIELD-CHECK SUMMARY**

	Shop	Field	Difference	Control Limit On Change
Snow-Block Porosity (decp):	0.0540	0.0453	-0.0087	+/- 0.0150

**PASS/FAIL SUMMARY**

Block Change Check:	Passed
Snow Block Stat Check:	Passed
Temperature Check:	Passed

**DENSITY CALIPER SHOP CALIBRATION**

<b>Tool Name:</b> SDLT - 10673803	<b>Reference Calibration Date:</b> 12-Mar-13 13:14:02
<b>Engineer:</b> THOMAS HYDE	<b>Calibration Date:</b> 12-Mar-13 13:18:16
<b>Software Version:</b> WL INSITE R3.8.4 (Build 5)	<b>Calibration Version:</b> 1
<b>Host Tool Name:</b> DSNT - 10735145	

**CALIBRATION COEFFICIENTS**

Measurement	Previous Value	New Value	Control Limit On New Value
Pad Offset	-3713.67	-3673.34	-7000.00 - -1000.00
Pad Gain	0.0003799	0.0003767	0.000200 - 0.000600
Arm Offset	-4381.70	-4510.72	-5000.00 - 3000.00
Arm Gain	0.0005135	0.0005258	0.000300 - 0.000700
Arm Power	-0.000005109	-0.000005867	-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
<b>PAD EXTENSION:</b>				
Small Ring (in)	2.00	2.00	0.00	+/- 0.20
Medium Ring (in)	3.77	3.75	-0.02	+/- 0.20
<b>RING DIAMETER:</b>				
Small Ring (in)	6.51	6.50	-0.01	+/- 0.20
Medium Ring (in)	8.23	8.25	0.02	+/- 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 - 10673803 **Reference Calibration Date:** 12-Mar-13 13:18:16  
**Engineer:** S. INGERSOLL **Calibration Date:** 19-Mar-13 22:15:20  
**Software Version:** WL INSITE R3.8.4 (Build 5) **Calibration Version:** 1

**MEASURED CALIPER VALUES**

Measurement	Shop	Field	Change	Control Limit On New Value
Pad Extension	3.75	3.71	-0.04	+/- 0.10
Ring Diameter	8.25	8.23	-0.02	+/- 0.15

**PASS/FAIL SUMMARY**

Pad Extension Check: Passed  
 Diameter Check: Passed

**SPECTRAL DENSITY SHOP CALIBRATION**

**Tool Name:** SDLT Pad - 10673790 **Reference Calibration Date:** 23-Feb-13 10:46:34  
**Engineer:** S. INGERSOLL **Calibration Date:** 08-Mar-13 10:59:51  
**Software Version:** WL INSITE R3.8.4 (Build 5) **Calibration Version:** 1

Logging Source S/N: 5073GW

Aluminum Block S/N: LIBERAL

Density: 2.598g/cc

Pe: 3.170

Magnesium Block S/N: LIBERAL

Density: 1.684g/cc

Pe: 2.598

**DENSITY CALIBRATION SUMMARY**

Measurement	Previous Value	New Value	Control Limit
Near Bar Gain	1.0285	1.0454	0.90 - 1.10
Near Dens Gain	1.0170	1.0294	0.90 - 1.10
Near Peak Gain	0.9801	1.0365	0.90 - 1.10
Near Lith Gain	0.9508	1.0200	0.90 - 1.10
Far Bar Gain	1.0147	1.0122	0.90 - 1.10
Far Dens Gain	1.0028	0.9984	0.90 - 1.10
Far Peak Gain	0.9907	0.9923	0.90 - 1.10
Far Lith Gain	0.9605	0.9628	0.90 - 1.10
Near Bar Offset	-0.0144	-0.1593	NONE
Near Dens Offset	0.0948	-0.0054	NONE
Near Peak Offset	0.4185	-0.0399	NONE
Near Lith Offset	0.6513	0.0863	NONE
Far Bar Offset	0.0418	0.0668	NONE
Far Dens Offset	0.1208	0.1592	NONE
Far Peak Offset	0.1906	0.1733	NONE
Far Lith Offset	0.3645	0.3389	NONE
Near Bar Background	867.88	865.49	700 - 1450
Near Dens Background	283.44	284.22	230 - 480
Near Peak Background	125.35	124.49	100 - 210
Near Lith Background	155.64	154.41	125 - 260

Far Bar Background	584.38	581.01	450 - 900
Far Dens Background	228.93	229.46	175 - 345
Far Peak Background	91.64	91.16	70 - 140
Far Lith Background	95.52	95.46	75 - 145

CALIBRATION BLOCK SUMMARY				
Measurement	Current Reading (Previous Coef)	Calibrated (New Coef)	Change	Control Limit On Change
MAGNESIUM				
Density (g/cc)	1.671	1.684	0.013	+/- 0.015
Pe	2.576	2.557	-0.019	+/- 0.150
ALUMINUM				
Density (g/cc)	2.592	2.598	0.006	+/- 0.01500
Pe	3.056	3.126	0.070	+/- 0.150

TOOL SUMMARY				
Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	-0.0008	+/- 0.0110	-0.0005	+/- 0.0140
Magnesium Block	0.0003	+/- 0.0110	-0.0030	+/- 0.0140
Aluminum Block	0.0008	+/- 0.0110	0.0005	+/- 0.0140
Resolution	8.72	6.00 - 11.50	8.98	6.00 - 11.50
Internal Verifier(B+D+P+L)	1429	1200 - 2700	997	800 - 1700

PASS/FAIL SUMMARY	
Background Quality Check:	Passed
Background Range Check:	Passed
Background Resolution Check:	Passed
Background Verification Check:	Passed
Magnesium Quality Check:	Passed
Aluminum Quality Check:	Passed
Gains Check:	Passed
Changes in Calibration Blocks:	Passed

### SPECTRAL DENSITY FIELD CHECK

<b>Tool Name:</b>	<b>SDLT Pad - 10673790</b>	<b>Reference Calibration Date:</b>	<b>08-Mar-13 10:59:51</b>
<b>Engineer:</b>	<b>S. INGERSOLL</b>	<b>Calibration Date:</b>	<b>19-Mar-13 22:01:24</b>
<b>Software Version:</b>	<b>WL INSITE R3.8.4 (Build 5)</b>	<b>Calibration Version:</b>	<b>1</b>

Pad Temperature: 50.5 degF

DENSITY FIELD CALIBRATION SUMMARY				
Measurement	Shop	Field	Change	Control Limit +/-
Near (B+D+P+L) cps	1428.606	1437.022	8.416	15.254
Far (B+D+P+L) cps	997.097	1006.492	9.395	16.908
Near Resolution	8.72	9.04	0.320	0.50
Far Resolution	8.98	9.80	0.820	1.00

PASS/FAIL SUMMARY	
Bkg Quality Check:	Passed
Bkg Resolution Check:	Passed
Bkg Verification Check:	Passed

## CALIBRATION SUMMARY

Sensor	Shop	Field	Post	Difference	Tolerance	Units
<b>GTET-10748374</b>						
Gamma Ray Calibrator	232.0	229.2	-----	2.8	+/- 9.00	api
<b>DSNT-10735145</b>						
Snow-Block Porosity	0.0540	0.0453	-----	0.0087	+/- 0.0150	decg
<b>SDLT-10673803</b>						
Pad Extension	3.75	3.71	-----	0.04	+/-0.10	in
Ring Diameter	8.25	8.23	-----	0.02	+/-0.15	in
<b>SDLT Pad-10673790</b>						
Near(B+D+P+L)	1428.606	1437.022	-----	-8.416	+/-15.254	cps
Far(B+D+P+L)	997.097	1006.492	-----	-9.395	+/-16.908	cps

Data: BUERKI E2133 1-70003 SP-GTET-CSNG-DSN-SDLI-FLEX-WAVE-XRMI-ACRT-CH005 20-Mar-13 20:38 Up @5469.5f Date: 20-Mar-13 23:49:52

# HALLIBURTON

## INPUTS, DELAYS AND FILTERS TABLE

Mnemonic	Input Description	Delay (ft)	Filter Type	Filter Length (ft)
<b>Depth Panel</b>				
TENS	Tension	0.00	NO	
<b>CH_HOS</b>				
DHTN	Downhole Tension	0.00	BLK	0.000
<b>SP Sub</b>				
PLTC	Plot Control Mask	124.18	NO	
SP	Spontaneous Potential	124.18	BLK	1.250
SPR	Raw Spontaneous Potential	124.18	NO	
SPO	Spontaneous Potential Offset	124.18	NO	
<b>GTET</b>				
TPUL	Tension Pull	116.16	NO	
GR	Natural Gamma Ray API	116.16	TRI	1.750
GRU	Unfiltered Natural Gamma Ray API	116.16	NO	
EGR	Natural Gamma Ray API with Enhanced Vertical Resolution	116.16	W	1.416 , 0.750
ACCZ	Accelerometer Z	0.00	BLK	0.083
DEVI	Inclination	0.00	NO	
<b>CSNG</b>				
TPUL	Tension Pull	108.07	NO	
STAT	Status	108.07	NO	
FRMC	Tool Frame Count	108.07	BLK	0.250
TFRM	Total Frames	108.07	NO	
LSPD	Line Speed	108.07	BLK	0.250
CTIM	Accumulation time for sample	108.07	BLK	0.250
NOIS	Spectral Noise	108.07	BLK	0.250
STAB	Stabilizer Voltage in mv	108.07	BLK	0.250
STBP	Stabilizer 60 KEV Peak	108.07	BLK	0.250
AMER	Americium	108.07	BLK	0.250
FTMP	Flask PCB Temperature	108.07	BLK	0.250
SPEL	Low Energy Spectrum	108.07	BLK	0.250
SPEH	High Energy Spectrum	108.07	BLK	0.250

SSP	Stabilization Energy Spectrum	108.07	BLK	0.250
CSPC	CSNG Lo Hi Spectrum Data	108.07	NO	
<b>DSNT</b>				
TPUL	Tension Pull	97.75	NO	
RNDS	Near Detector Telemetry Counts	97.85	BLK	1.417
RFDS	Far Detector Telemetry Counts	98.60	TRI	0.583
DNTT	DSN Tool Temperature	97.85	NO	
DSNS	DSN Tool Status	97.75	NO	
ERND	Near Detector Telemetry Counts EVR	97.85	BLK	0.000
ERFD	Far Detector Telemetry Counts EVR	98.60	BLK	0.000
ENTM	DSN Tool Temperature EVR	97.85	NO	
<b>SDLT</b>				
TPUL	Tension Pull	87.85	NO	
PCAL	Pad Caliper	87.85	TRI	0.250
ACAL	Arm Caliper	87.85	TRI	0.250
<b>Wavesonic-I</b>				
TPUL	Tension Pull	56.79	NO	
DPSX	Dipole Source X StructureI	45.29	NO	
DPSY	Dipole Source Y StructureI	45.29	NO	
DP5M	Monopole Source Structure	45.29	NO	
WVST	Wavesonic Compressed Data	56.79	NO	
TPUL	Tension Pull	56.79	NO	
XMS1	Wave Sonic Status Word 1	45.29	NO	
XMS2	Wave Sonic Status Word 2	45.29	NO	
XMS1	Wave Sonic XMITStatus Word 1	45.29	NO	
XMS1	Wave Sonic XMITStatus Word 2	45.29	NO	
F1HA	Dipole 1 HV After	45.29	NO	
F1HB	Dipole 1 HV Before	45.29	NO	
F2HA	Dipole 2 HV After	45.29	NO	
F2HB	Dipole 2 HV Before	45.29	NO	
F3HA	Monopole HV After	45.29	NO	
F3HB	Monopole HV Before	45.29	NO	
INVT	Input Voltage	45.29	NO	
5VOL	5 Volts	45.29	NO	
MI5A	Minus 5 Volts Analog	45.29	NO	
ITMP	Instrument Temperature	45.29	NO	
PL5A	Plus 5 Volts Analog	45.29	NO	
5VD	Plus 5 Volts Digital	45.29	NO	
TCUR	Tool Current	45.29	NO	
SUPV	Supply Voltage	45.29	NO	
PRVT	Preregulated voltage	45.29	NO	
PRVT	Pre-regulated voltage Xmter	45.29	NO	
TEMP	Temperature	45.29	NO	
ACQN	Acquisition Number	45.29	NO	
XDP	Delay Reference	56.79	NO	
MITM	MIT Mode	56.79	NO	
VERS	Version	45.29	NO	
D1CT	Dipole 1 Compressed Word Count	56.79	NO	
D2CT	Dipole 2 Compressed Word Count	56.79	NO	
MCNT	Monopole Compressed Word Count	56.79	NO	
SEQN	Sequence Number	45.29	NO	
FREV	Firmware Revision	45.29	NO	
MSMP	Monopole Sample Rate	45.29	NO	

MSMP	Dipole Sample Rate	45.29	NO
MFWF	Monopole Firing Waveform	45.29	NO
MFRQ	Monopole Frequency	45.29	NO
MDLY	Monopole Delay	45.29	NO
DXWF	Dipole X Firing Waveform	45.29	NO
XFRQ	Dipole X Frequency	45.29	NO
XDLY	Dipole X Delay	45.29	NO
DYWF	Dipole Y Firing Waveform	45.29	NO
YFRQ	Dipole Y Frequency	45.29	NO
YDLY	Dipole Y Delay	45.29	NO
DPSX	Dipole Source X Structurel	45.29	NO
DPSY	Dipole Source Y Structurel	45.29	NO
DPSM	Monopole Source Structure	45.29	NO
WVST	Wavesonic Compressed Data	56.79	NO
AUTM	Auto Mode	45.29	NO
SONM	tool mode for sonic - 0 for normal or 3 for calibration	45.29	NO
MSL	Monopole Lower Travel Time	56.79	NO
MSH	Monopole Upper Travel Time	56.79	NO
MLFC	Monopole-1 Lower Filter Bandpass Frequency Cut-off	45.29	NO
MUFC	Monopole-1 Upper Filter Bandpass Frequency Cut-off	45.29	NO
DLTT	Dipole Lower Travel Time	45.29	NO
DUTT	Dipole Upper Travel Time	45.29	NO
DLFC	Dipole Lower Filter Bandpass Frequency Cut-off	45.29	NO
DUFC	Dipole Upper Filter Bandpass Frequency Cut-off	45.29	NO
MUTE	WaveSonic Mute/Enable Channels and Sides map	45.29	NO
MUTS	Mute/Enable Sides	45.29	NO
WSRB	Relative Bearing	56.79	NO
WSAZ	WSX Azimuth Pad 1	56.79	NO
TPUL	Tension Pull	56.79	NO
WMP	Summed array of Monopole for SIDES - A,B,C,D	56.79	NO
WXX	Dipole X for SIDES - A-C	56.79	NO
WYY	Dipole Y for SIDES - B-D	56.79	NO
WXY	Dipole X for SIDES - B-D	56.79	NO
WYX	Dipole Y for SIDES - A-C	56.79	NO
TPUL	Tension Pull	56.79	NO
WMA	Monopole Waveform Side A - Channel 1 to Channel 8 Receivers	56.79	NO
WMB	Monopole Waveform Side B - Channel 1 to Channel 8 Receivers	56.79	NO
WMC	Monopole Waveform Side C - Channel 1 to Channel 8 Receivers	56.79	NO
WMD	Monopole Waveform Side D - Channel 1 to Channel 8 Receivers	56.79	NO
WXA	Dipole X Waveform Side A - Channel 1 to Channel 8 Receivers	56.79	NO
WXB	Dipole X Waveform Side B - Channel 1 to Channel 8 Receivers	56.79	NO
WXC	Dipole X Waveform Side C - Channel 1 to Channel 8 Receivers	56.79	NO
WXD	Dipole X Waveform Side D - Channel 1 to Channel 8 Receivers	56.79	NO
WYA	Dipole Y Waveform Side A - Channel 1 to Channel 8 Receivers	56.79	NO
WYB	Dipole Y Waveform Side B - Channel 1 to Channel 8 Receivers	56.79	NO
WYC	Dipole Y Waveform Side C - Channel 1 to Channel 8 Receivers	56.79	NO
WYD	Dipole Y Waveform Side D - Channel 1 to Channel 8 Receivers	56.79	NO
GAR1	Gain Side A Receiver 1	45.29	NO
GAR2	Gain Side A Receiver 2	45.29	NO

GAR3	Gain Side A Receiver 3	45.29	NO
GAR4	Gain Side A Receiver 4	45.29	NO
GAR5	Gain Side A Receiver 5	45.29	NO
GAR6	Gain Side A Receiver 6	45.29	NO
GAR7	Gain Side A Receiver 7	45.29	NO
GAR8	Gain Side A Receiver 8	45.29	NO
GBR1	Gain Side B Receiver 1	45.29	NO
GBR2	Gain Side B Receiver 2	45.29	NO
GBR3	Gain Side B Receiver 3	45.29	NO
GBR4	Gain Side B Receiver 4	45.29	NO
GBR5	Gain Side B Receiver 5	45.29	NO
GBR6	Gain Side B Receiver 6	45.29	NO
GBR7	Gain Side B Receiver 7	45.29	NO
GBR8	Gain Side B Receiver 8	45.29	NO
GCR1	Gain Side C Receiver 1	45.29	NO
GCR2	Gain Side C Receiver 2	45.29	NO
GCR3	Gain Side C Receiver 3	45.29	NO
GCR4	Gain Side C Receiver 4	45.29	NO
GCR5	Gain Side C Receiver 5	45.29	NO
GCR6	Gain Side C Receiver 6	45.29	NO
GCR7	Gain Side C Receiver 7	45.29	NO
GCR8	Gain Side C Receiver 8	45.29	NO
GDR1	Gain Side D Receiver 1	45.29	NO
GDR2	Gain Side D Receiver 2	45.29	NO
GDR3	Gain Side D Receiver 3	45.29	NO
GDR4	Gain Side D Receiver 4	45.29	NO
GDR5	Gain Side D Receiver 5	45.29	NO
GDR6	Gain Side D Receiver 6	45.29	NO
GDR7	Gain Side D Receiver 7	45.29	NO
GDR8	Gain Side D Receiver 8	45.29	NO

**XRMI-I Mandrel**

TPUL	Tension Pull	22.60	NO
PAD1	XRMI Pad 1 values	22.36	NO
PAD2	XRMI Pad 2 values	22.36	NO
PAD3	XRMI Pad 3 values	22.36	NO
PAD4	XRMI Pad 4 values	22.36	NO
PAD5	XRMI Pad 5 values	22.36	NO
PAD6	XRMI Pad 6 values	22.36	NO
OD1	EMI Odd Button Values Pad 1	22.36	NO
OD2	EMI Odd Button Values Pad 2	22.60	NO
OD3	EMI Odd Button Values Pad 3	22.36	NO
OD4	EMI Odd Button Values Pad 4	22.60	NO
OD5	EMI Odd Button Values Pad 5	22.36	NO
OD6	EMI Odd Button Values Pad 6	22.60	NO
EV1	EMI Even Button Values Pad 1	22.39	NO
EV2	EMI Even Button Values Pad 2	22.57	NO
EV3	EMI Even Button Values Pad 3	22.39	NO
EV4	EMI Even Button Values Pad 4	22.57	NO
EV5	EMI Even Button Values Pad 5	22.39	NO
EV6	EMI Even Button Values Pad 6	22.57	NO
ITMP	Instrument Temperature	19.83	NO
EMIM	Tool Mode	19.83	NO
HAZI	Hole Azimuth	22.11	NO
HAZI	Hole Azimuth - Down Delay	22.61	NO

ZACC	Accelerometer Z	22.36	NO	
TPUL	Tension Pull	22.60	NO	
FIR1	Current Button R - Pad 1	22.36	NO	
FIR2	Current Button R - Pad 2	22.60	NO	
FIR3	Current Button R - Pad 3	22.36	NO	
FIR4	Current Button R - Pad 4	22.60	NO	
FIR5	Current Button R - Pad 5	22.36	NO	
FIR6	Current Button R - Pad 6	22.60	NO	
FIX1	Current Button X - Pad 1	22.36	NO	
FIX2	Current Button X - Pad 2	22.60	NO	
FIX3	Current Button X - Pad 3	22.36	NO	
FIX4	Current Button X - Pad 4	22.60	NO	
FIX5	Current Button X - Pad 5	22.36	NO	
FIX6	Current Button X - Pad 6	22.60	NO	
SIR1	Current Slow Button R - Pad 1	22.36	BLK	3.000
SIR2	Current Slow Button R - Pad 2	22.60	BLK	3.000
SIR3	Current Slow Button R - Pad 3	22.36	BLK	3.000
SIR4	Current Slow Button R - Pad 4	22.60	BLK	3.000
SIR5	Current Slow Button R - Pad 5	22.36	BLK	3.000
SIR6	Current Slow Button R - Pad 6	22.60	BLK	3.000
SIX1	Current Slow Button X - Pad 1	22.36	BLK	3.000
SIX2	Current Slow Button X - Pad 2	22.60	BLK	3.000
SIX3	Current Slow Button X - Pad 3	22.36	BLK	3.000
SIX4	Current Slow Button X - Pad 4	22.60	BLK	3.000
SIX5	Current Slow Button X - Pad 5	22.36	BLK	3.000
SIX6	Current Slow Button X - Pad 6	22.60	BLK	3.000
EMMR	Phasor Voltage - Real Part	22.36	NO	
EMMX	Phasor Voltage - Imaginary Part	22.36	NO	
PADV	Pad Voltage	19.83	BLK	0.250
ITMP	Instrument Temperature	19.83	BLK	0.000
CON1	Conductivity Pad 1	22.36	BLK	3.000
CON2	Conductivity Pad 2	22.60	BLK	3.000
CON3	Conductivity Pad 3	22.36	BLK	3.000
CON4	Conductivity Pad 4	22.60	BLK	3.000
CON5	Conductivity Pad 5	22.36	BLK	3.000
CON6	Conductivity Pad 6	22.60	BLK	3.000
UIR2	Current Button R No Delay - Pad 2	22.36	NO	
UIR4	Current Button R No Delay - Pad 4	22.36	NO	
UIR6	Current Button R No Delay - Pad 6	22.36	NO	
UIX2	Current Button X No Delay - Pad 2	22.36	NO	
UIX4	Current Button X No Delay - Pad 4	22.36	NO	
UIX6	Current Button X No Delay - Pad 6	22.36	NO	
TPUL	Tension Pull	22.60	NO	
ARM1	Caliper 1 measurement	22.36	BLK	0.000
ARM2	Caliper 2 measurement	22.36	BLK	0.000
ARM3	Caliper 3 measurement	22.36	BLK	0.000
ARM4	Caliper 4 measurement	22.36	BLK	0.000
ARM5	Caliper 5 measurement	22.36	BLK	0.000
ARM6	Caliper 6 measurement	22.36	BLK	0.000
MOTV	Motor Voltage Monitor 1	22.36	BLK	0.000
PRES	Caliper percentage of total compression of the spring	19.83	BLK	0.000
HAZI	Hole Azimuth	22.36	NO	
RB	Relative Bearing	22.36	NO	
AZI1	PAD1 Azimuth	22.36	NO	
DEVI	Inclination	22.36	NO	

**ACRt Sonde**

TPUL	Tension Pull	2.97	NO	
F1R1	ACRT 12KHz - 80in R value	9.22	BLK	0.000
F1X1	ACRT 12KHz - 80in X value	9.22	BLK	0.000
F1R2	ACRT 12KHz - 50in R value	6.72	BLK	0.000
F1X2	ACRT 12KHz - 50in X value	6.72	BLK	0.000
F1R3	ACRT 12KHz - 29in R value	5.22	BLK	0.000
F1X3	ACRT 12KHz - 29in X value	5.22	BLK	0.000
F1R4	ACRT 12KHz - 17in R value	4.22	BLK	0.000
F1X4	ACRT 12KHz - 17in X value	4.22	BLK	0.000
F1R5	ACRT 12KHz - 10in R value	3.72	BLK	0.000
F1X5	ACRT 12KHz - 10in X value	3.72	BLK	0.000
F1R6	ACRT 12KHz - 6in R value	3.47	BLK	0.000
F1X6	ACRT 12KHz - 6in X value	3.47	BLK	0.000
F2R1	ACRT 36KHz - 80in R value	9.22	BLK	0.000
F2X1	ACRT 36KHz - 80in X value	9.22	BLK	0.000
F2R2	ACRT 36KHz - 50in R value	6.72	BLK	0.000
F2X2	ACRT 36KHz - 50in X value	6.72	BLK	0.000
F2R3	ACRT 36KHz - 29in R value	5.22	BLK	0.000
F2X3	ACRT 36KHz - 29in X value	5.22	BLK	0.000
F2R4	ACRT 36KHz - 17in R value	4.22	BLK	0.000
F2X4	ACRT 36KHz - 17in X value	4.22	BLK	0.000
F2R5	ACRT 36KHz - 10in R value	3.72	BLK	0.000
F2X5	ACRT 36KHz - 10in X value	3.72	BLK	0.000
F2R6	ACRT 36KHz - 6in R value	3.47	BLK	0.000
F2X6	ACRT 36KHz - 6in X value	3.47	BLK	0.000
F3R1	ACRT 72KHz - 80in R value	9.22	BLK	0.000
F3X1	ACRT 72KHz - 80in X value	9.22	BLK	0.000
F3R2	ACRT 72KHz - 50in R value	6.72	BLK	0.000
F3X2	ACRT 72KHz - 50in X value	6.72	BLK	0.000
F3R3	ACRT 72KHz - 29in R value	5.22	BLK	0.000
F3X3	ACRT 72KHz - 29in X value	5.22	BLK	0.000
F3R4	ACRT 72KHz - 17in R value	4.22	BLK	0.000
F3X4	ACRT 72KHz - 17in X value	4.22	BLK	0.000
F3R5	ACRT 72KHz - 10in R value	3.72	BLK	0.000
F3X5	ACRT 72KHz - 10in X value	3.72	BLK	0.000
F3R6	ACRT 72KHz - 6in R value	3.47	BLK	0.000
F3X6	ACRT 72KHz - 6in X value	3.47	BLK	0.000
RMUD	Mud Resistivity	12.76	BLK	0.000
F1RT	Transmitter Current Raw 12K X Receiver	2.97	BLK	0.000
F1XT	Transmitter Reference 12 KHz Imaginary Signal	2.97	BLK	0.000
F2RT	Transmitter Reference 36 KHz Real Signal	2.97	BLK	0.000
F2XT	Transmitter Reference 36 KHz Imaginary Signal	2.97	BLK	0.000
F3RT	Transmitter Reference 72 KHz Real Signal	2.97	BLK	0.000
F3XT	Transmitter Reference 72 KHz Imaginary Signal	2.97	BLK	0.000
TFPU	Upper Feedpipe Temperature Calculated	2.97	BLK	0.000
TFPL	Lower Feedpipe Temperature Calculated	2.97	BLK	0.000
ITMP	Instrument Temperature	2.97	BLK	0.000
TCVA	Temperature Correction Values Loop Off	2.97	NO	
TIDV	Instrument Temperature Derivative	2.97	NO	
TUDV	Upper Temperature Derivative	2.97	NO	
TLDV	Lower Temperature Derivative	2.97	NO	
TRBD	Receiver Board Temperature	2.97	NO	

SDLT Pad

TPUL	Tension Pull	87.84	NO	
NAB	Near Above	87.66	BLK	0.920
NHI	Near Cesium High	87.66	BLK	0.920
NLO	Near Cesium Low	87.66	BLK	0.920
NVA	Near Valley	87.66	BLK	0.920
NBA	Near Barite	87.66	BLK	0.920
NDE	Near Density	87.66	BLK	0.920
NPK	Near Peak	87.66	BLK	0.920
NLI	Near Lithology	87.66	BLK	0.920
NBAU	Near Barite Unfiltered	87.66	BLK	0.250
NLIU	Near Lithology Unfiltered	87.66	BLK	0.250
FAB	Far Above	88.01	BLK	0.250
FHI	Far Cesium High	88.01	BLK	0.250
FLO	Far Cesium Low	88.01	BLK	0.250
FVA	Far Valley	88.01	BLK	0.250
FBA	Far Barite	88.01	BLK	0.250
FDE	Far Density	88.01	BLK	0.250
FPK	Far Peak	88.01	BLK	0.250
FLI	Far Lithology	88.01	BLK	0.250
PTMP	Pad Temperature	87.85	BLK	0.920
NHV	Near Detector High Voltage	87.24	NO	
FHV	Far Detector High Voltage	87.24	NO	
ITMP	Instrument Temperature	87.24	NO	
DDHV	Detector High Voltage	87.24	NO	

Microlog Pad

TPUL	Tension Pull	88.03	NO	
MINV	Microlog Lateral	88.03	BLK	0.750
MNOR	Microlog Normal	88.03	BLK	0.750

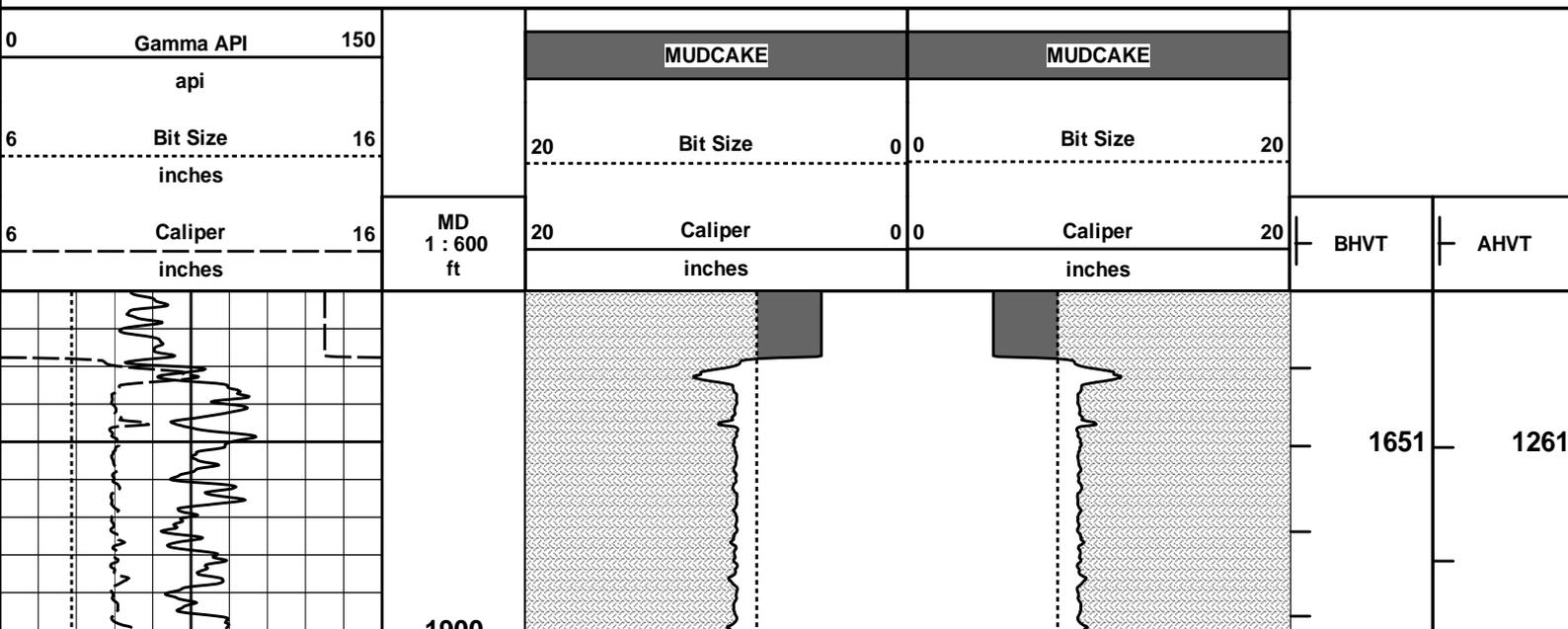
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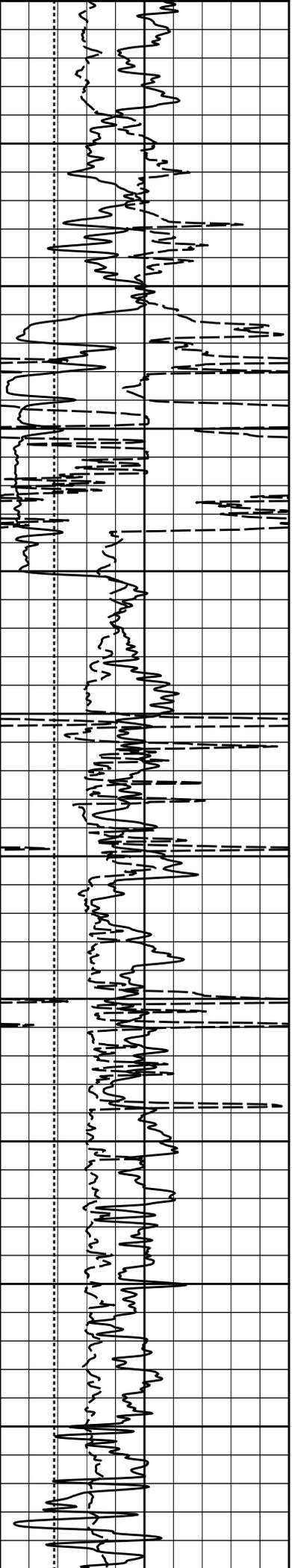
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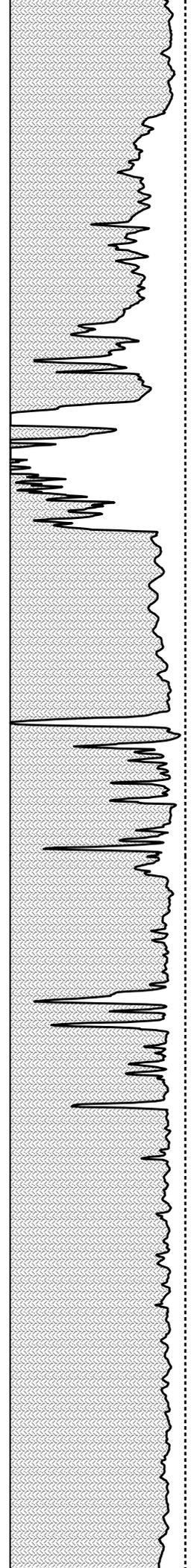
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# ANNULAR HOLE VOLUME PLOT

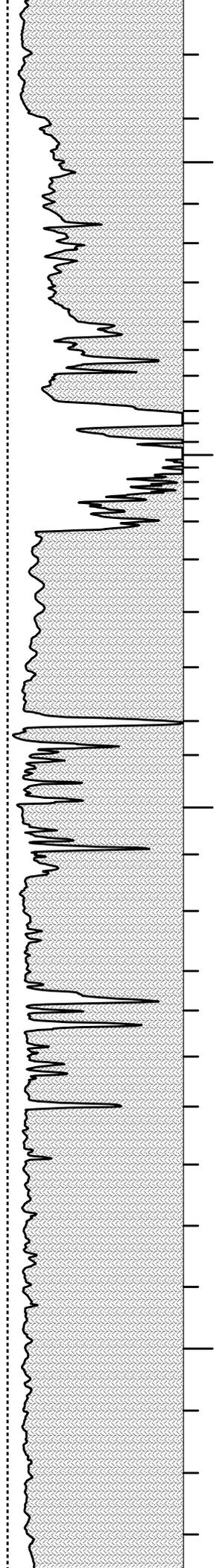




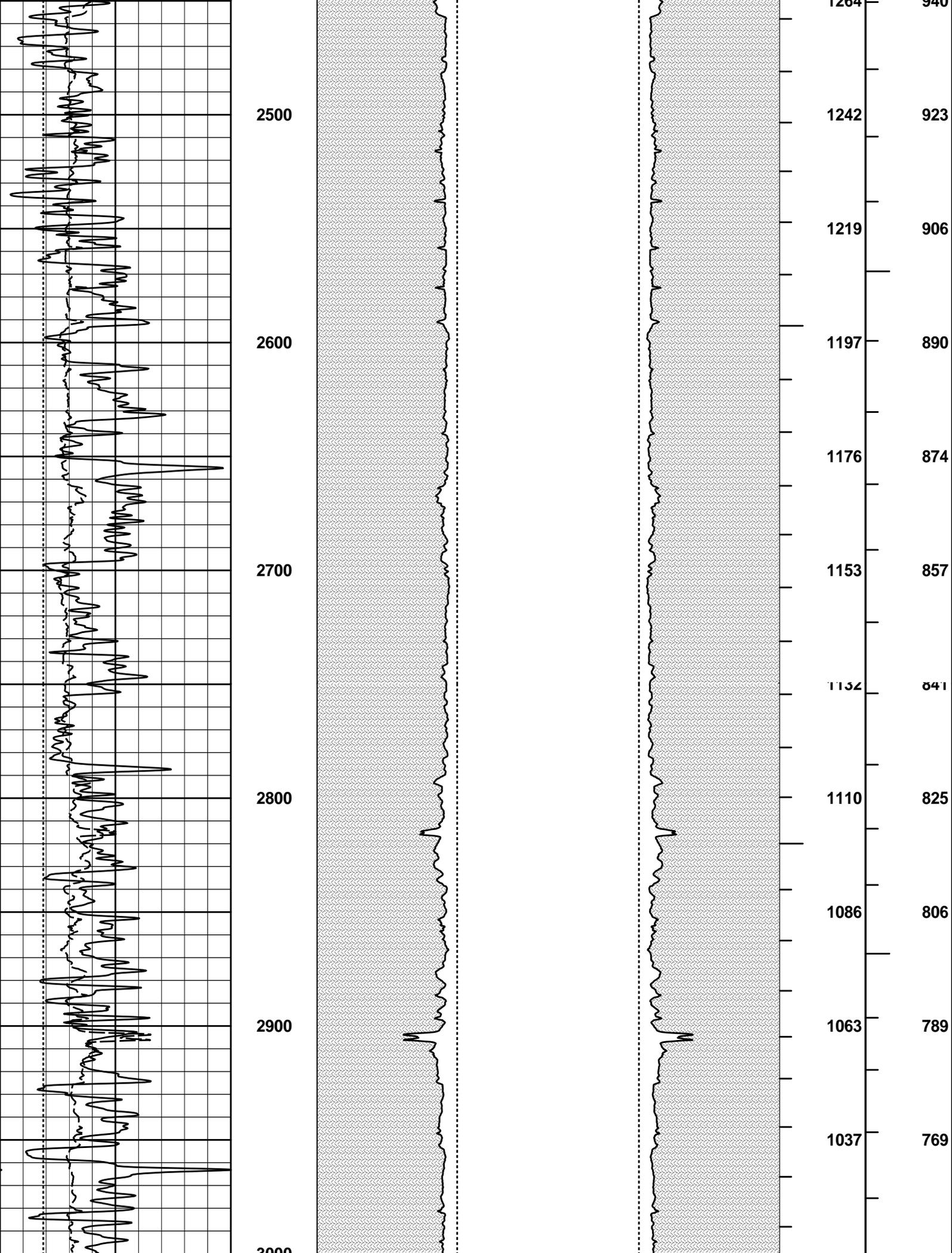
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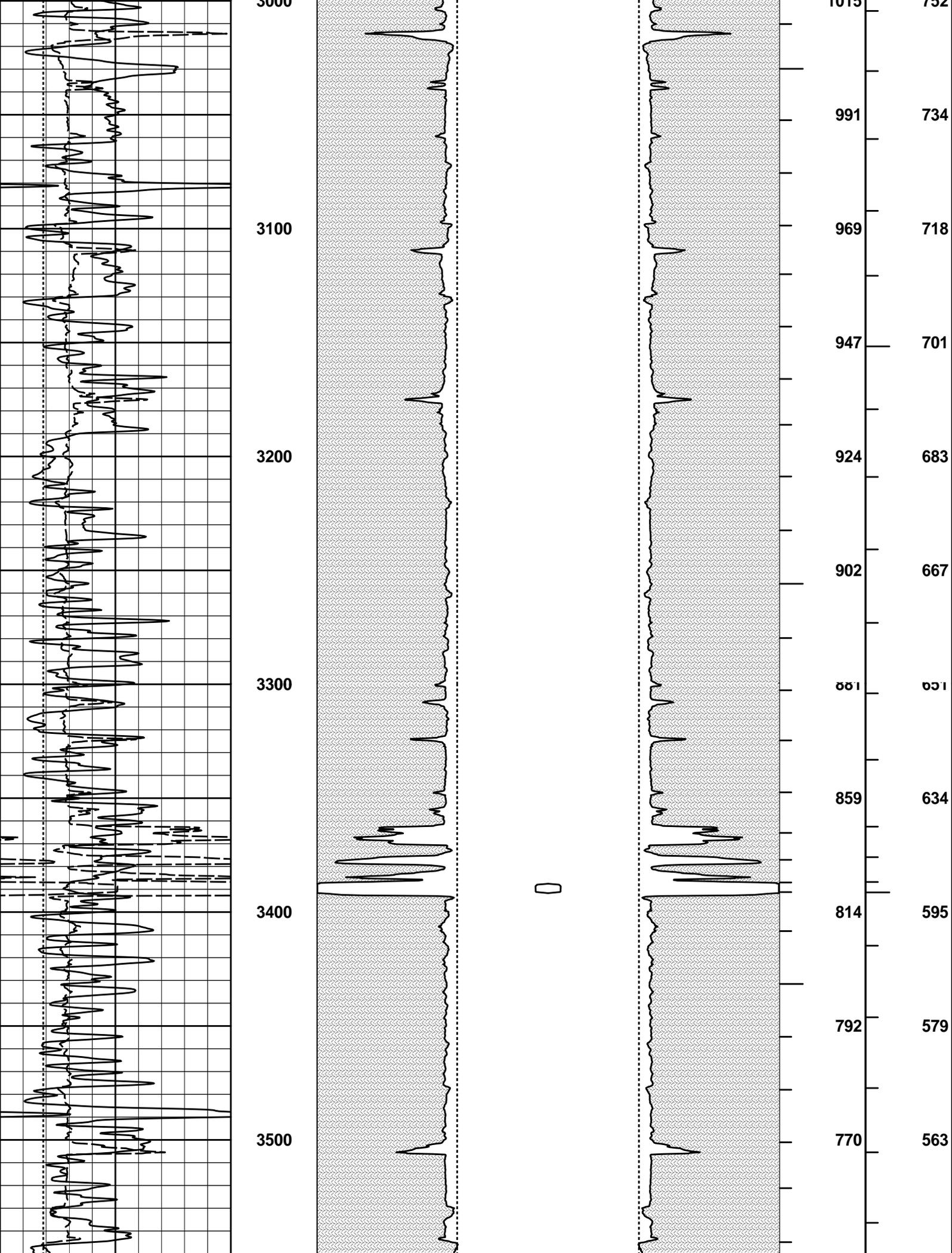


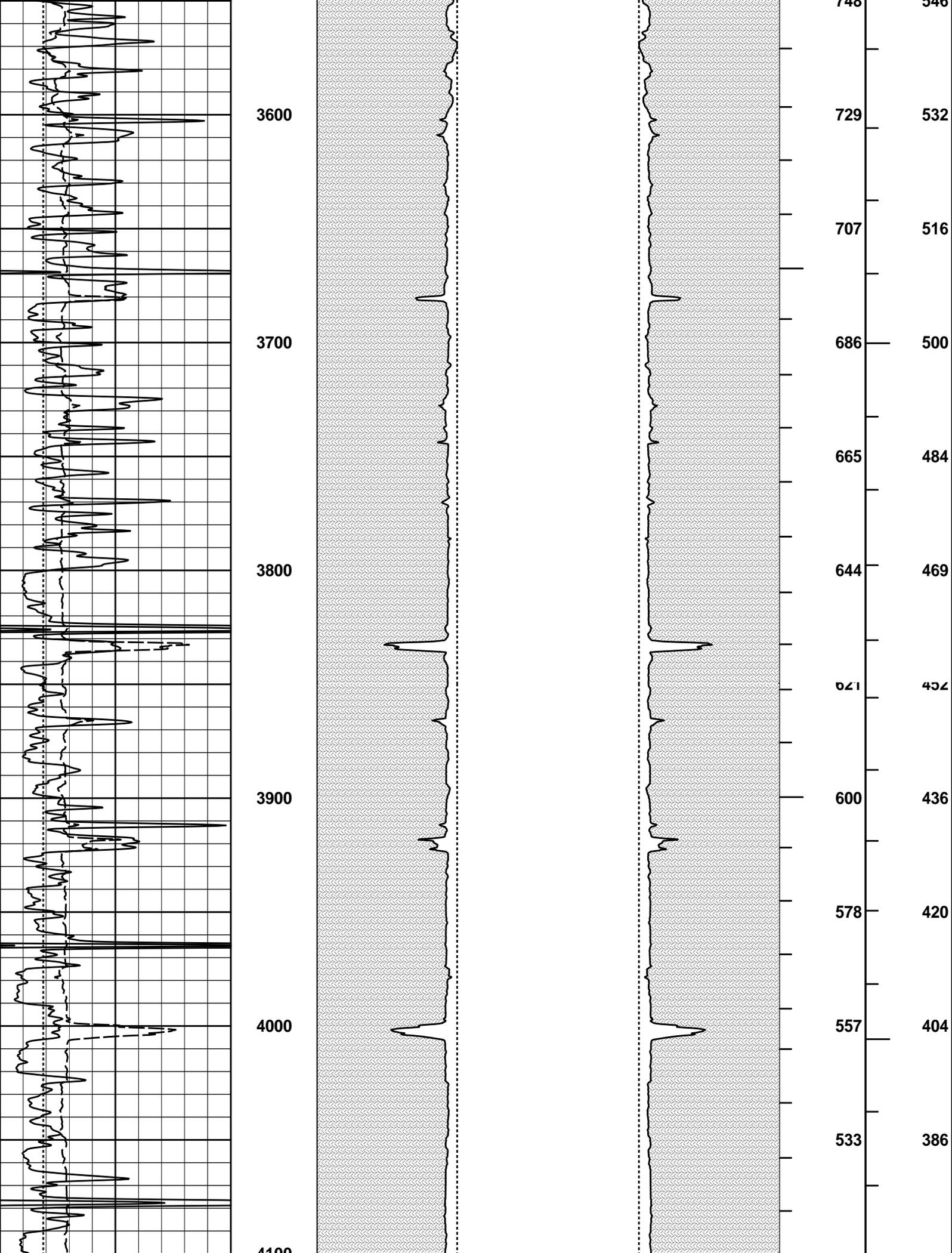
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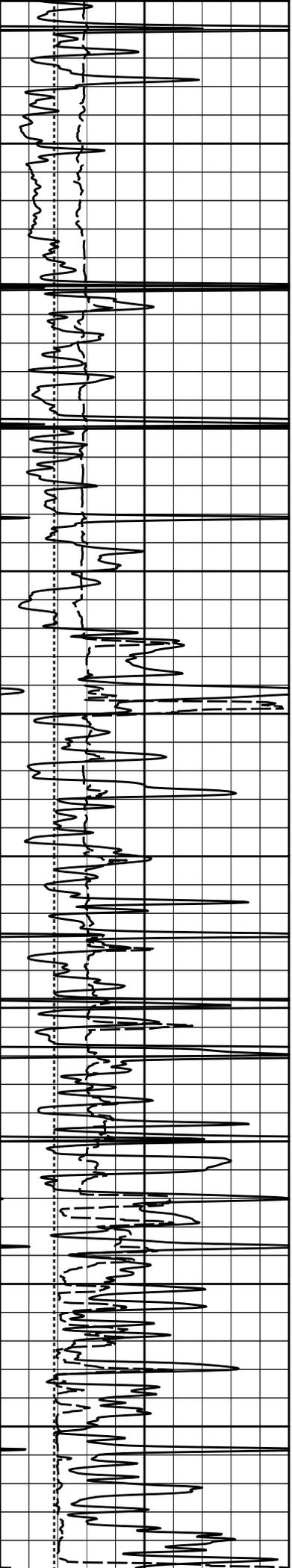


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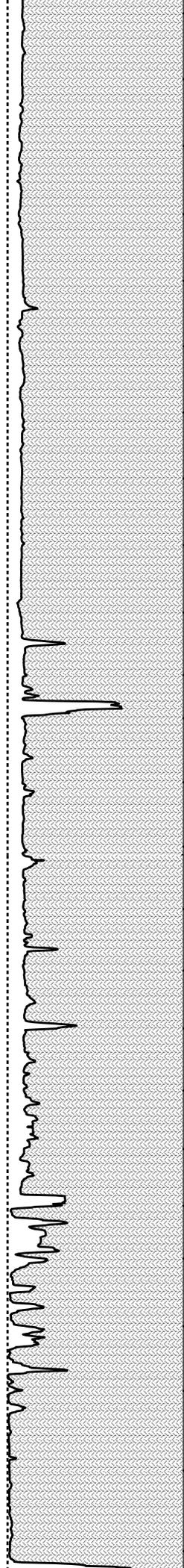
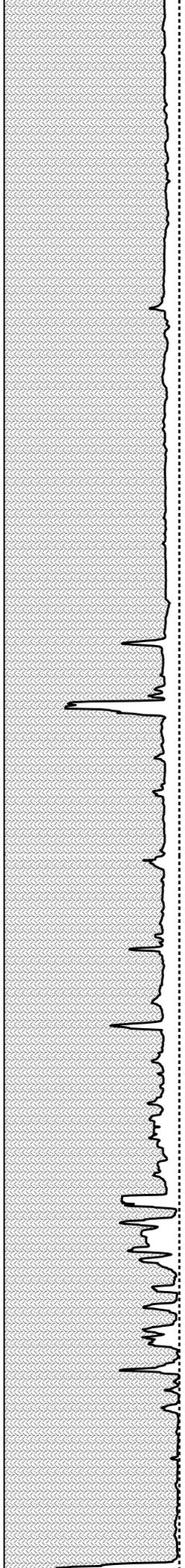
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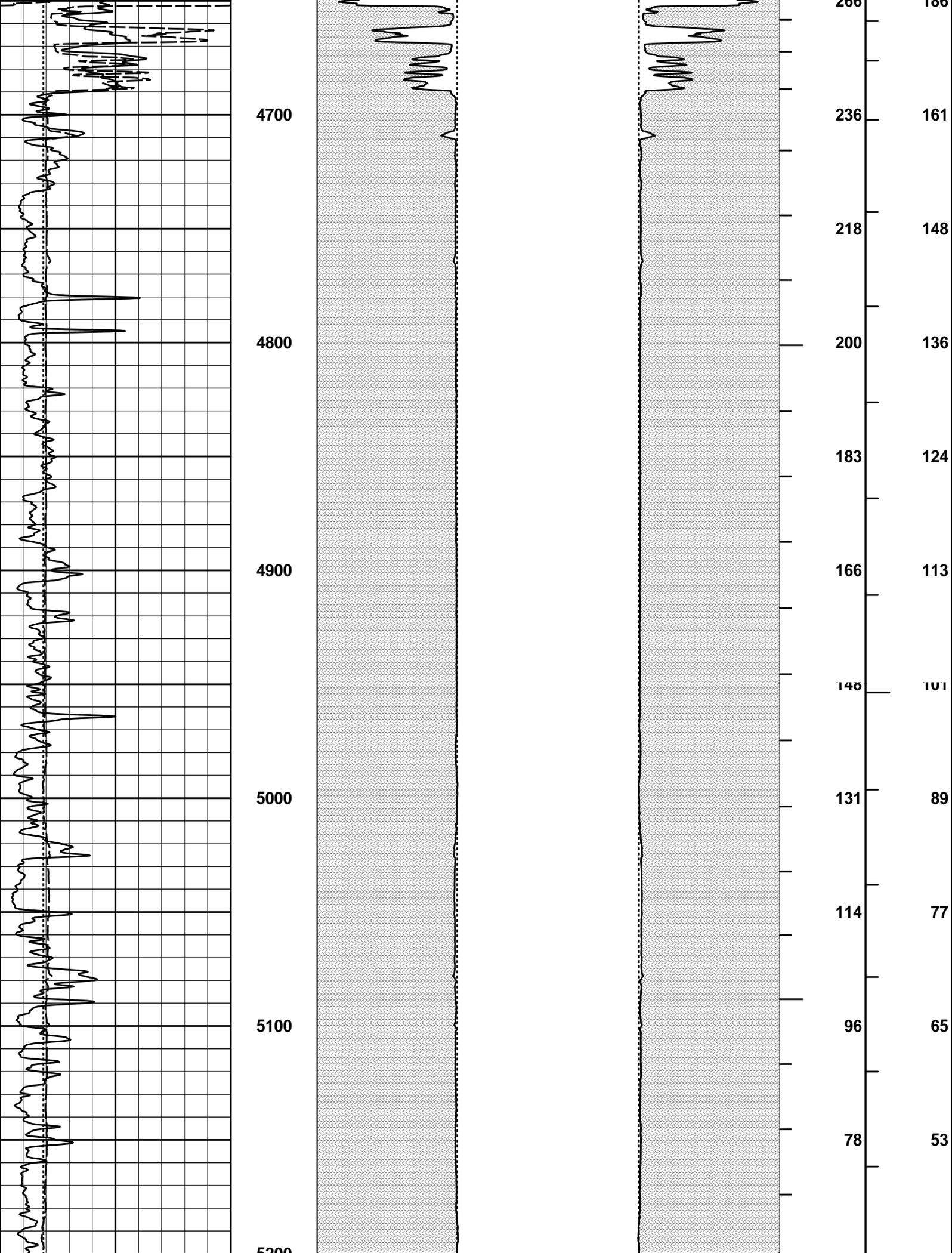
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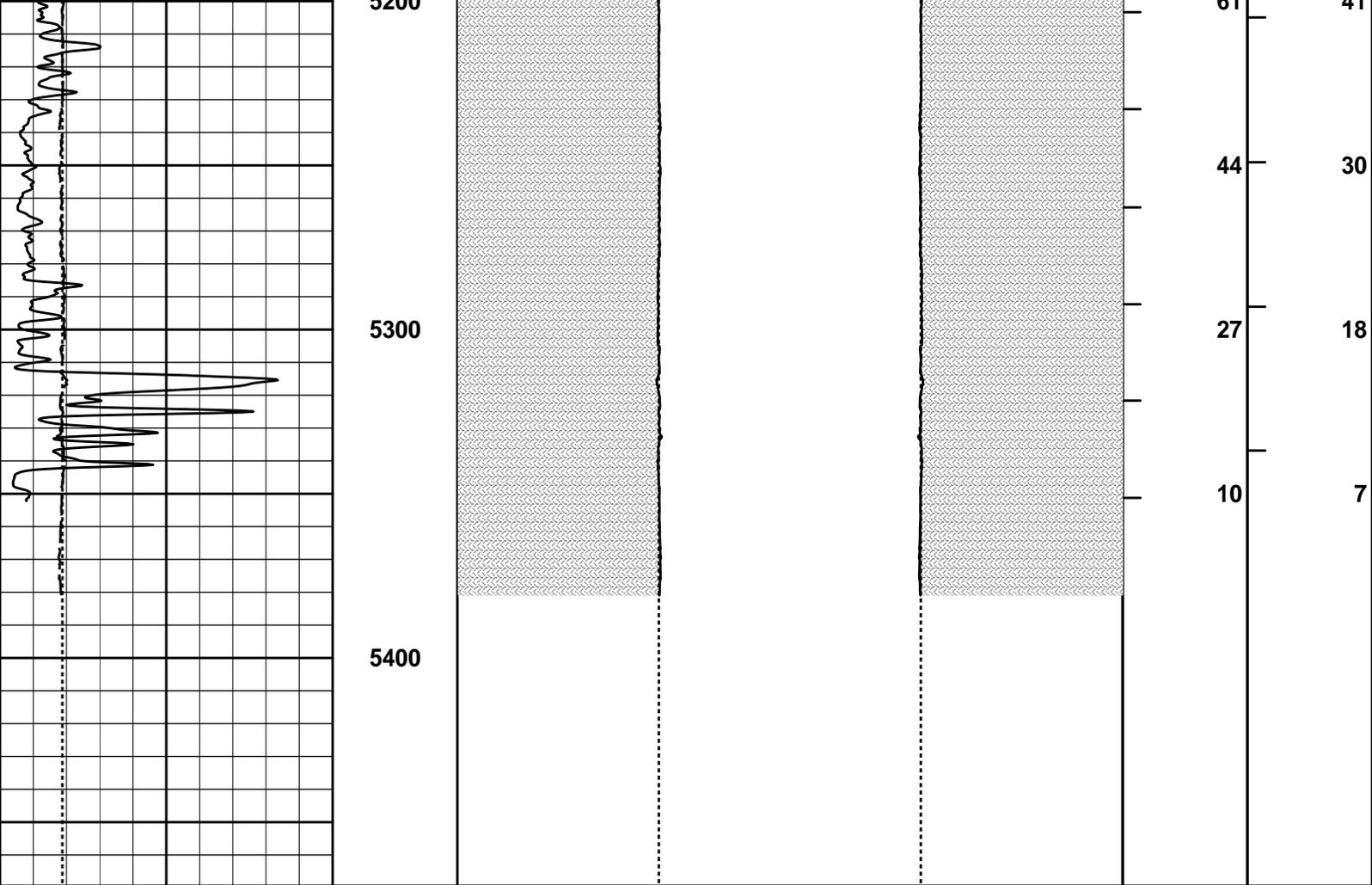
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199





6	Caliper	16	MD 1 : 600 ft	20	Caliper	0 0	20	BHVT	AHVT
	inches				inches		inches		
6	Bit Size	16		20	Bit Size	0 0	20		
	inches								
0	Gamma API	150							
	api								

**HALLIBURTON**

Plot Time: 21-Mar-13 07:51:19  
 Plot Range: 1810 ft to 5469.42 ft  
 Data: BUERKLE2133\_1-7\Well Based\SPLICE\  
 Plot File: \\-LOCAL-IPOROSITY\AHV\_2\_IQ\_LIB

## ANNULAR HOLE VOLUME PLOT

COMPANY	SANDRIDGE ENERGY		
WELL	BUERKLE 2133 1-7		
FIELD	BUERKLE		
COUNTY	FINNEY	STATE	KANSAS

<b>HALLIBURTON</b>	SPECTRAL DENSITY DUAL SPACED NEUTRON LOG
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