HALLIBURTON

ARRAY COMPENSATED TRUE RESISTIVITY MICRO LOG

COMPANY	RAMSHORN RESOURCES, LLC
WELL	MARSH #1-27
FIELD/BLOCK	DEARHEAD
COUNTY	BARBER
STATE	KANSAS

API No. 15-007-24325-00-00

Location (SHL) 1840' FNL & 1685' FEL
SW NE

Sect. 27 Twp. 32S Rge. 15W

Other Services:
GTET
DSNT
SDLT
MICROLOG
WSTT
ACRT

Permanent Datum	GL	Elev. 1869.0 ft	Elev.: K.B. 1877.0 ft
Log measured from	KB	8.0 ft above perm. Datum	D.F. 1877.0 ft
Drilling measured from	KB		G.L. 1869.0 ft

Date		20-Mar-18					
Run No.		ONE					
Depth - Driller		5218.0 ft					
Depth - Logger		5220.0 ft					
Bottom - Logged Interval		5211.0 ft					
Top - Logged Interval		300.0 ft					
Casing - Driller		8.625 in	@ 305.0 ft	@		@	
Casing - Logger		300.0 ft					
Bit Size		7.875 in		@		@	
Type Fluid in Hole		Water Based Mud					
Density	Viscosity	9.3 ppg	55.00 s/qt				
PH	Fluid Loss	10.50 pH	9.6 cptm				
Source of Sample		MUD PIT					
Rm @ Meas. Temperature		0.61 ohmm	@ 75.00 degF	@		@	
Rmf @ Meas. Temperature		0.50 ohmm	@ 75.00 degF	@		@	
Rmc @ Meas. Temperature		0.73 ohmm	@ 75.00 degF	@		@	
Source Rmf	Rmc	MEAS	MEAS				
Rm @ BHT		0.18 ohmm	@ 134.0 degF	@		@	
Time Since Circulation		08:53 hr					
Time on Bottom		20-Mar-18 10:49					
Max. Rec. Temperature		130.00 degF	@ 5220.0 ft	@		@	
Equipment	Location	12147634	EL RENO				
Recorded By		SEAN WOLTEMATH					
Witnessed By		JERRY AULD		CURTIS COVEY			

RAMSHORN RESOURCES, LLC | MARSH #1-27 | DEARHEAD | BARBER | KANSAS
COMPANY | WELL | FIELD/BLOCK | COUNTY | STATE

Fold here

Service Ticket No.: 904705053

API No.: 15-007-24325-00-00

PGM Version: WL INSITE R5.0.5 (Build 8)

CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE

	Sample No.					
Date						
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	N/A	CENT.	N/A
	I-11026095			
	S-11005908			

EQUIPMENT DATA

GAMMA							ACOUSTIC							DENSITY							NEUTRON						
Run No.	ONE						Run No.	ONE						Run No.	ONE						Run No.	ONE					
Serial No.	11958947						Serial No.	10055644						Serial No.	10865873						Serial No.	11055304					
Model No.	GTET						Model No.	WSTT						Model No.	SDLT						Model No.	DSNT					
Diameter	3.625"						No. of Cent.	3.625"						Diameter	5.5"						Diameter	3.625"					
Detector Model No.	GTET						Spacing	EVEN						Log Type	GAM-GAM						Log Type	NEU-NEU					
Type	SCINT													Source Type	CS137						Source Type	AM241BE					
Length	8"						LSA [Y/N]							Serial No.	5168GW						Serial No.	DSN-424					
Distance to Source	10'						FWDA [Y/N]							Strength	1.5 Ci						Strength	15.0 Ci					

LOGGING DATA

GENERAL				GAMMA			ACOUSTIC			DENSITY			NEUTRON		
Run No.	Depth From	Depth To	Speed ft/min	Scale L	Scale R	Matrix	Scale L	Scale R	Matrix	Scale L	Scale R	Matrix	Scale L	Scale R	Matrix
ONE	TD	CSG	REC	0	150		30	10	47.6 uSec/ft	30	10	2.71 g/cc	30	10	LIME

ONE	TD	CSG	REC	0	150	30	-10	47.6 uSec/ft	30	-10	2.71 g/cc	30	-10	LIME

DIRECTIONAL INFORMATION

Maximum Deviation	@	KOP	@

Remarks: ANNULAR HOLE VOLUME CALCULATED FOR 5.5 INCH CASING

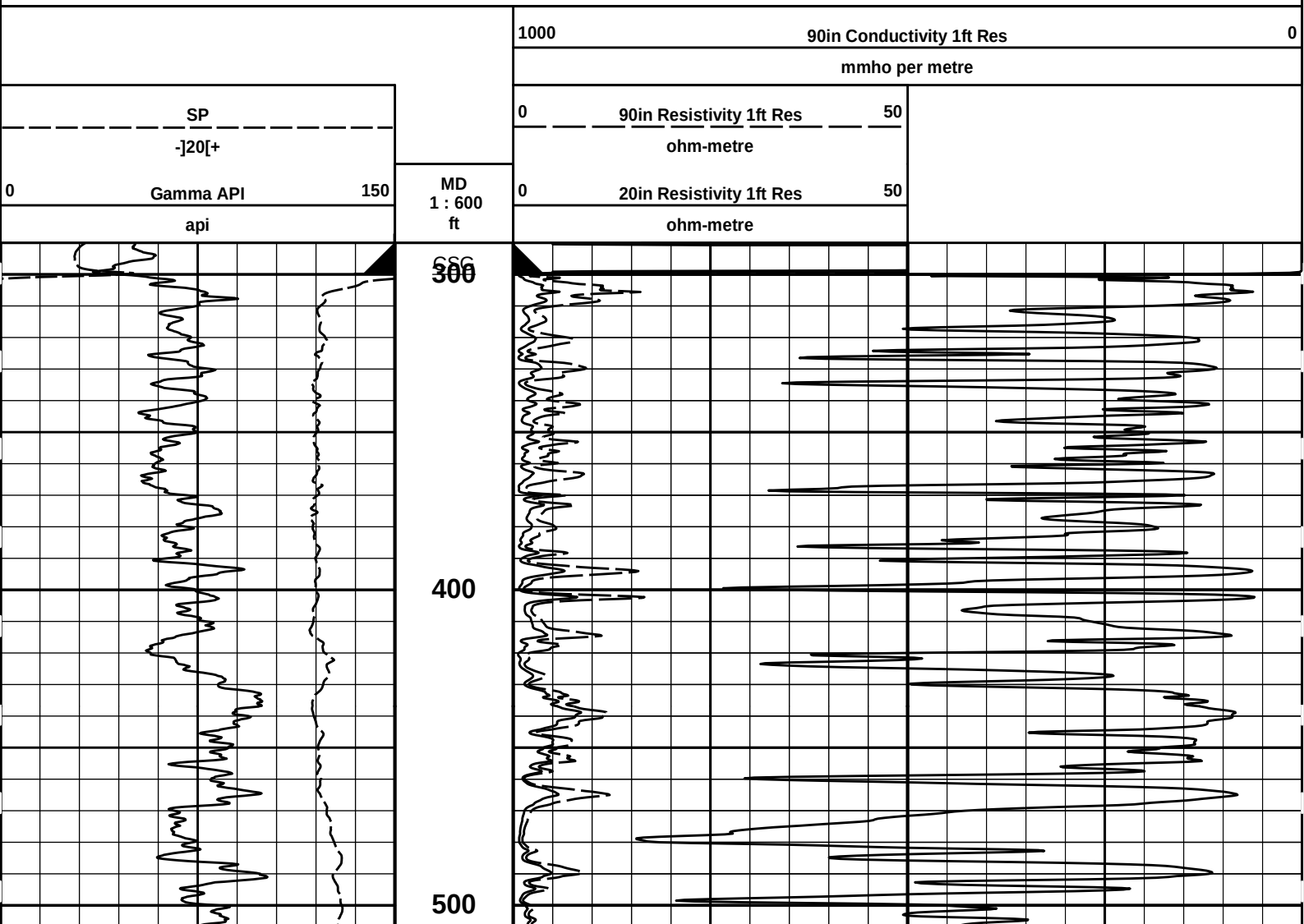
GTET-DSNT-SDLT-WSTT-ACRT RUN IN COMBINATION

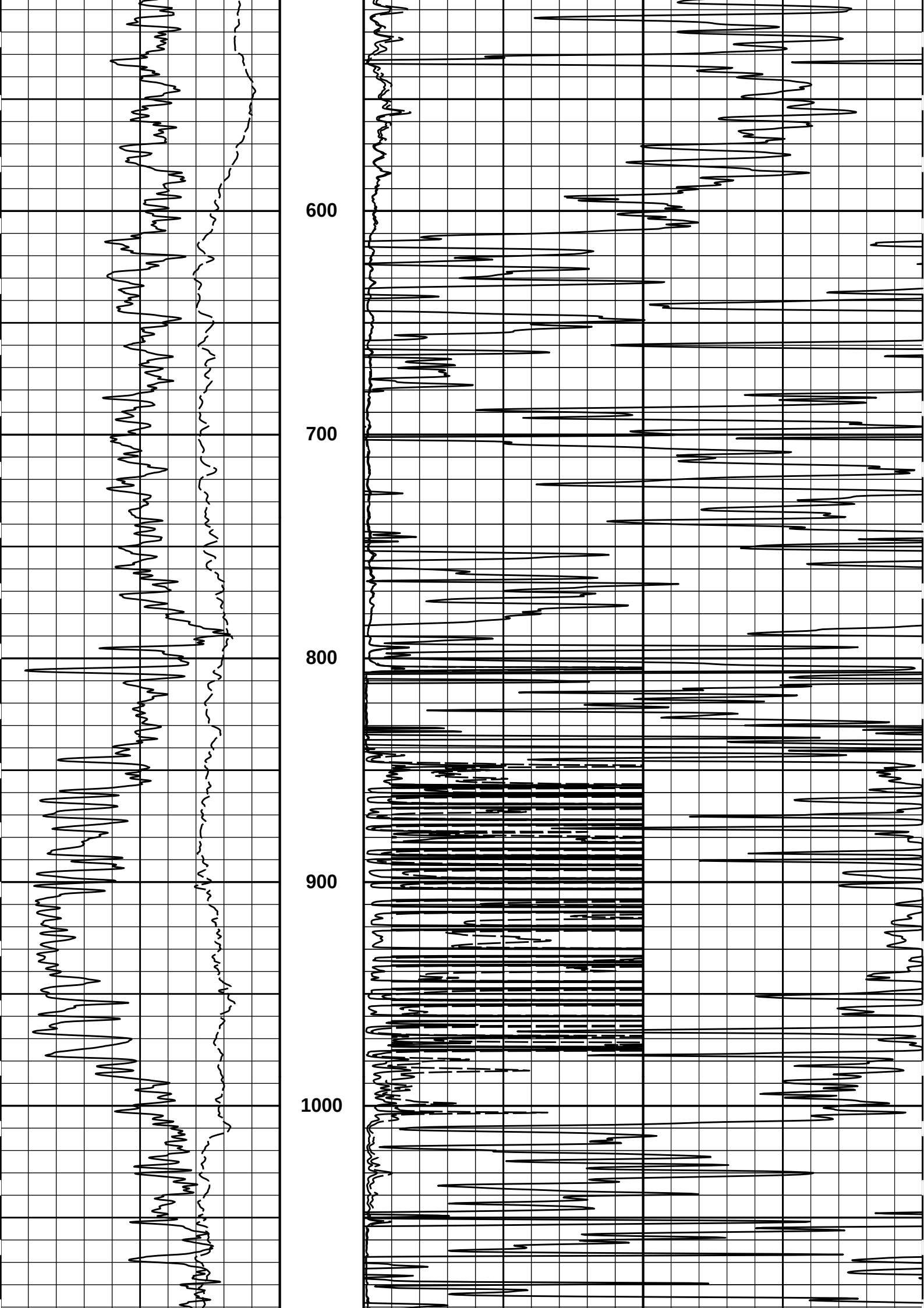
CHLORIDES REPORTED AT 7500 ppm

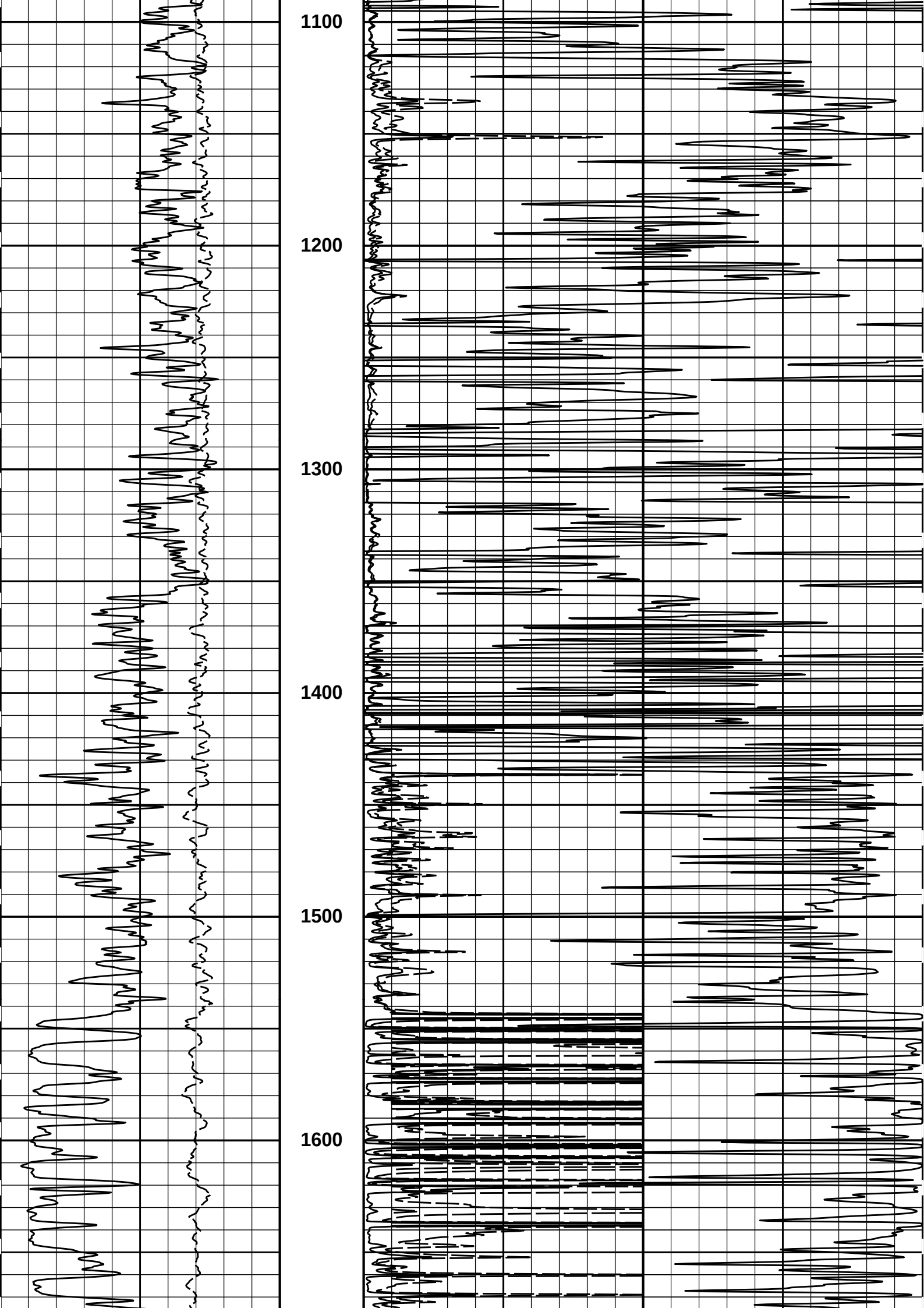
HALLIBURTON

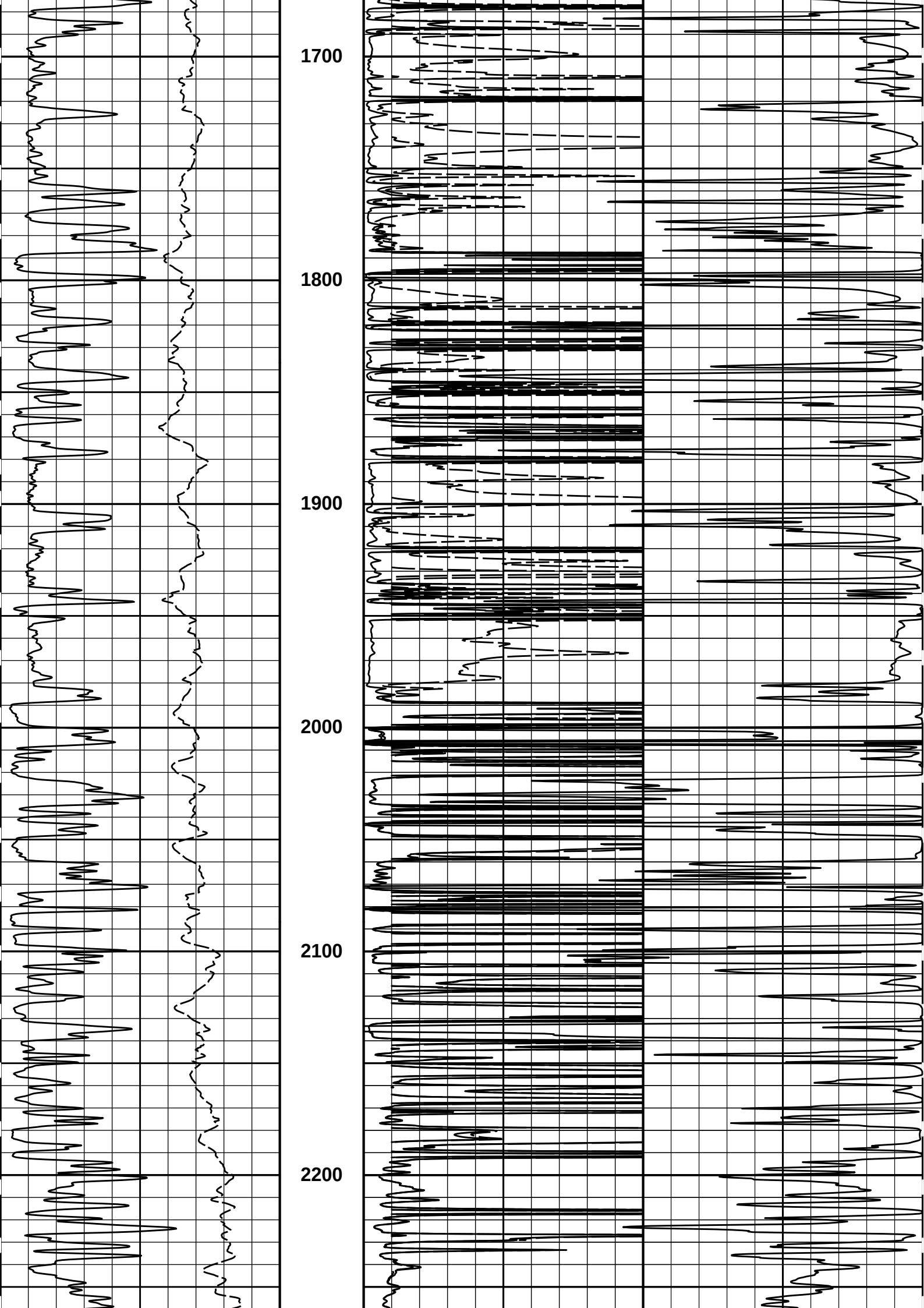
Plot Time: 20-Mar-18 18:04:59
Plot Range: 290 ft to 5224.75 ft
Data: RAMSHORN_MARSH\Well Based\MAIN SPLICE
Plot File: \\-LOCAL-\RAMSHORN_MARSH\Well Based\ACRT\ACRT_2_lib

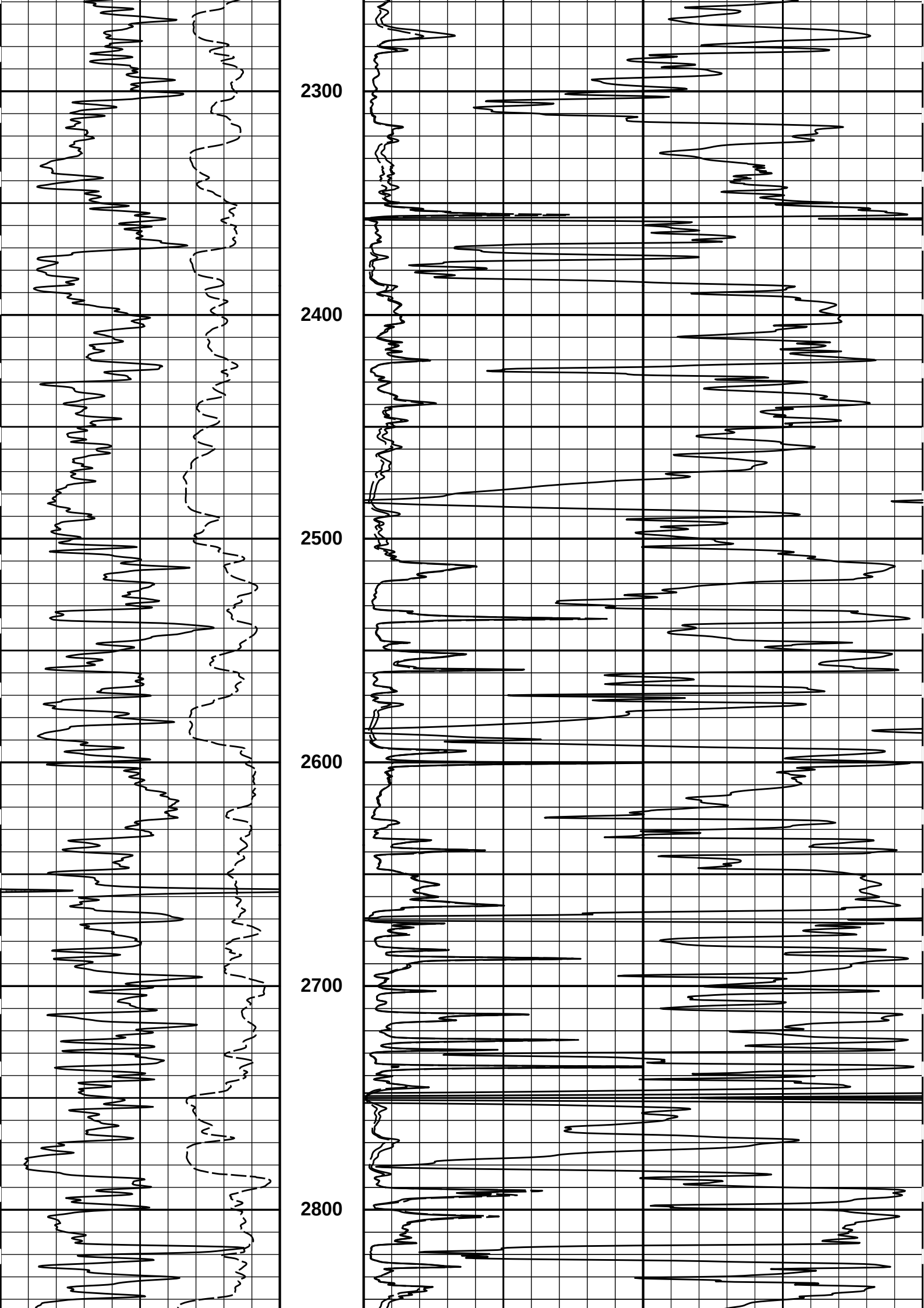
2 INCH MAIN LOG

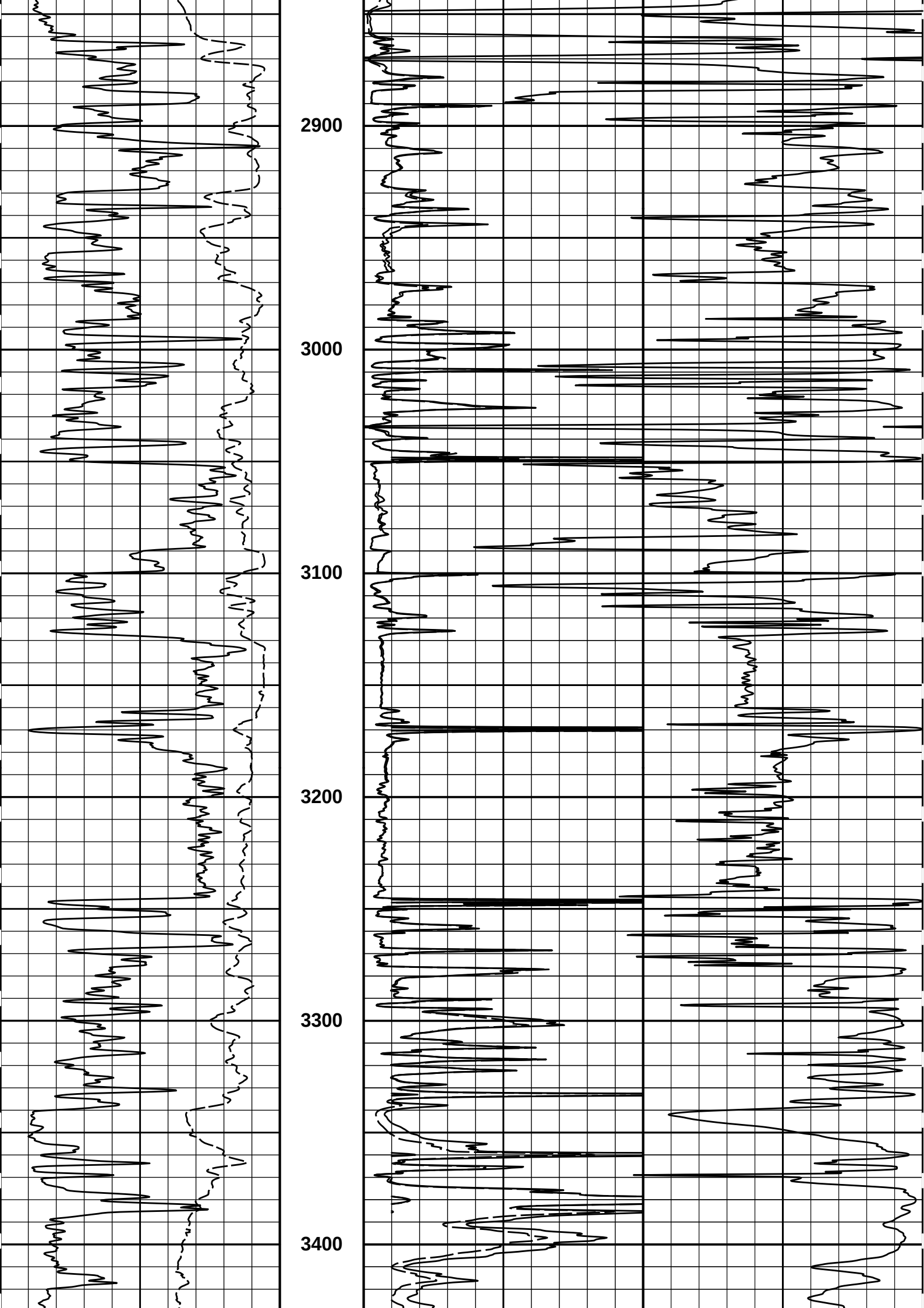


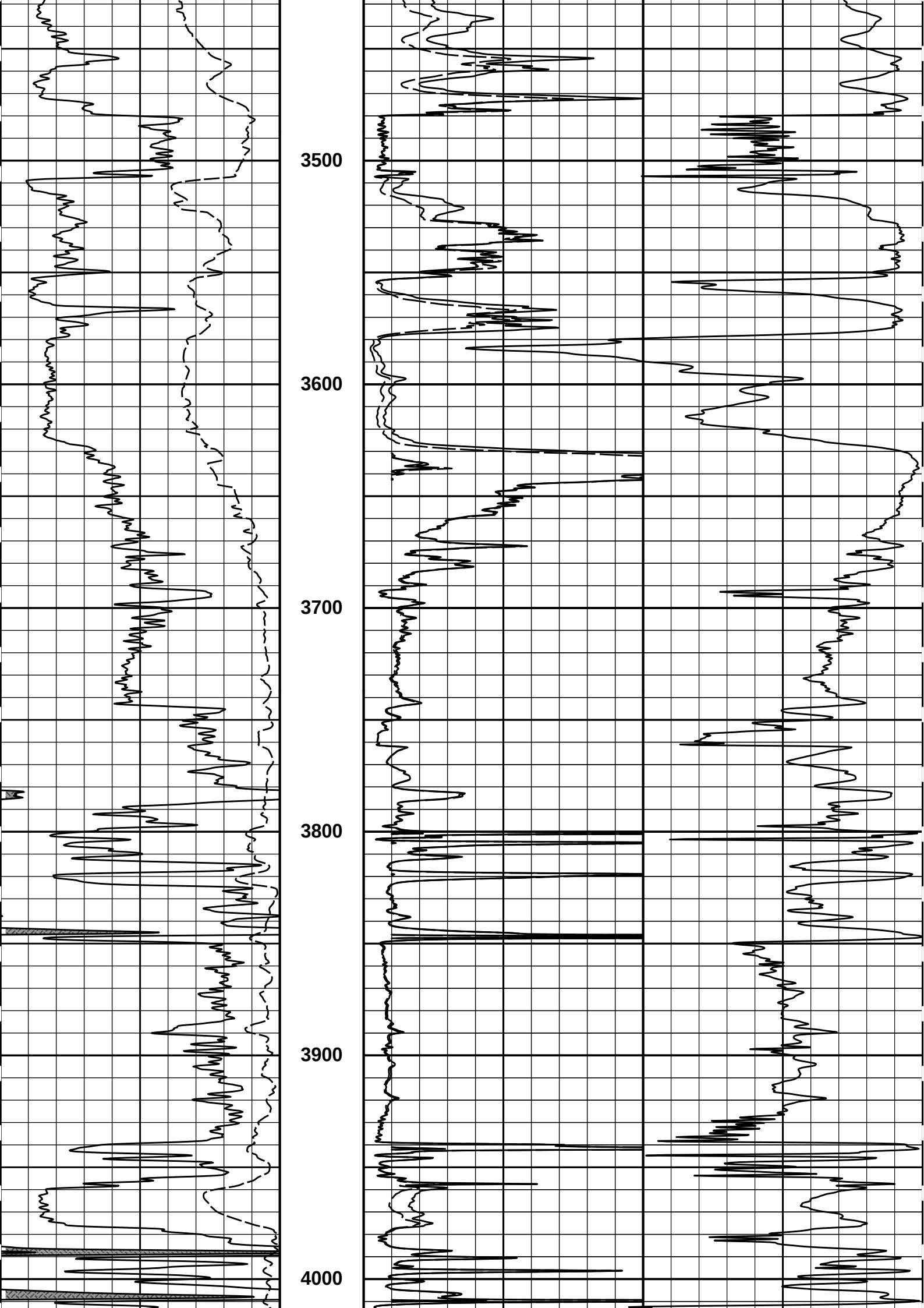

600
700
800
900
1000

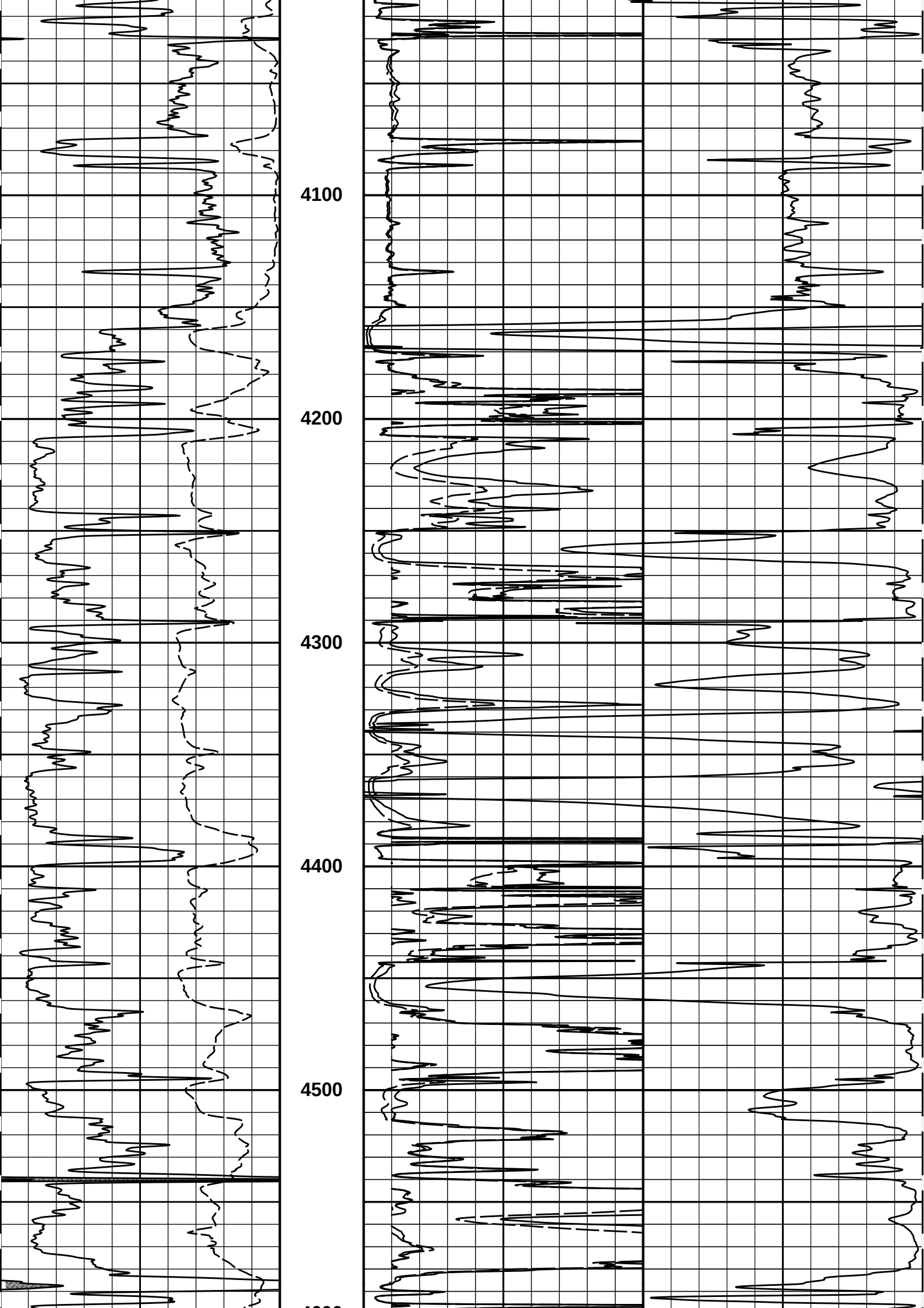

1100
1200
1300
1400
1500
1600

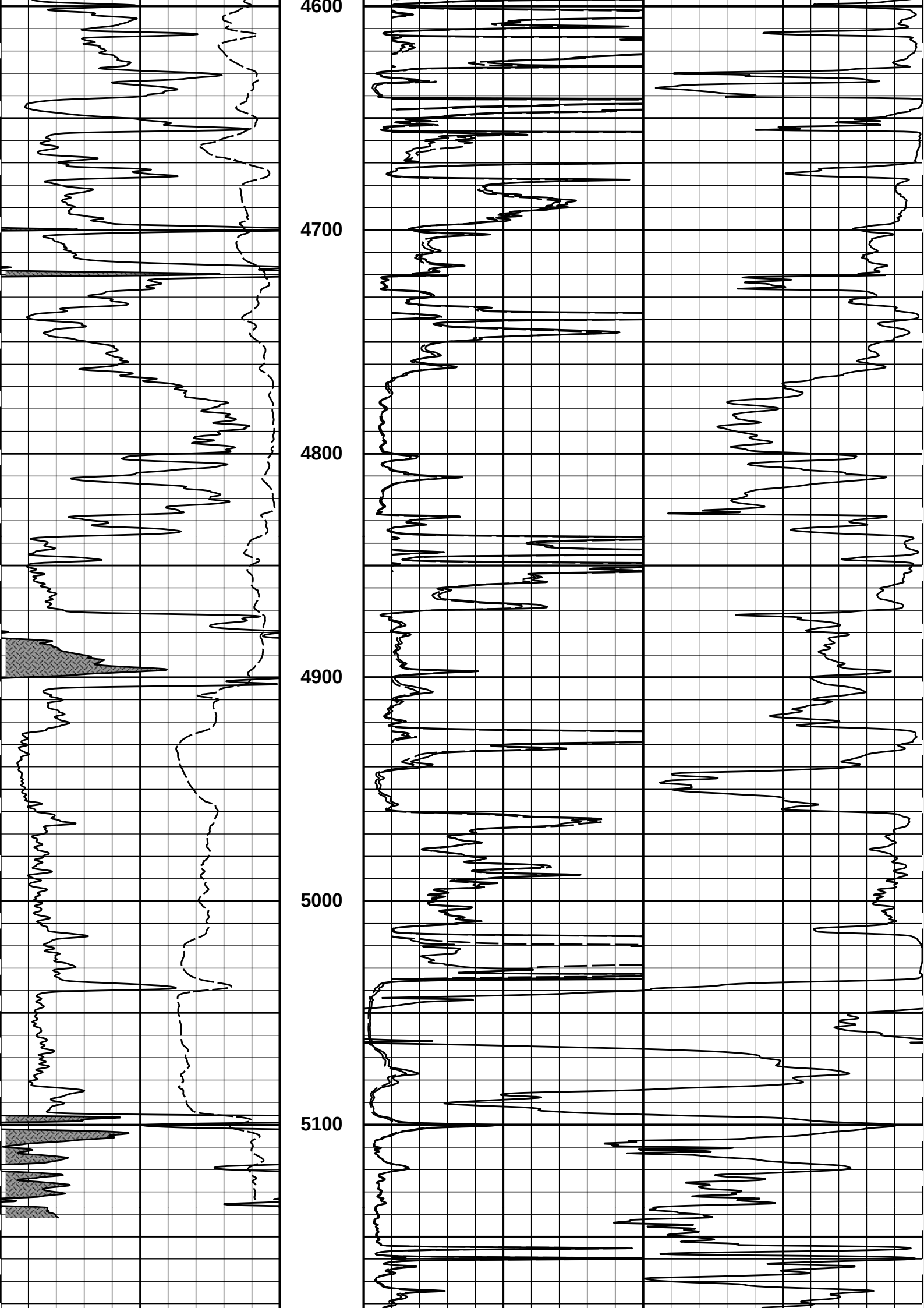

1700
1800
1900
2000
2100
2200

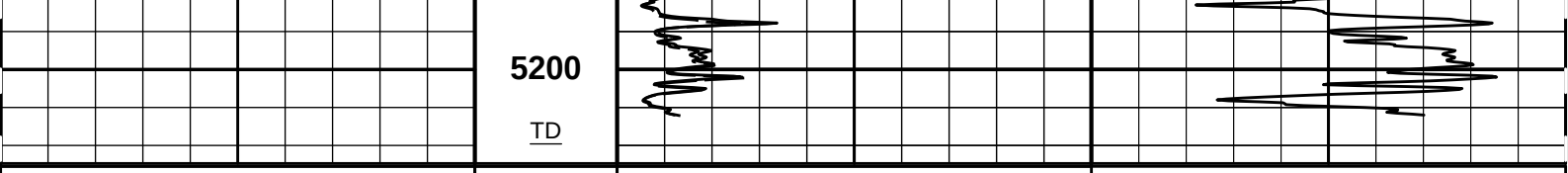

2300
2400
2500
2600
2700
2800

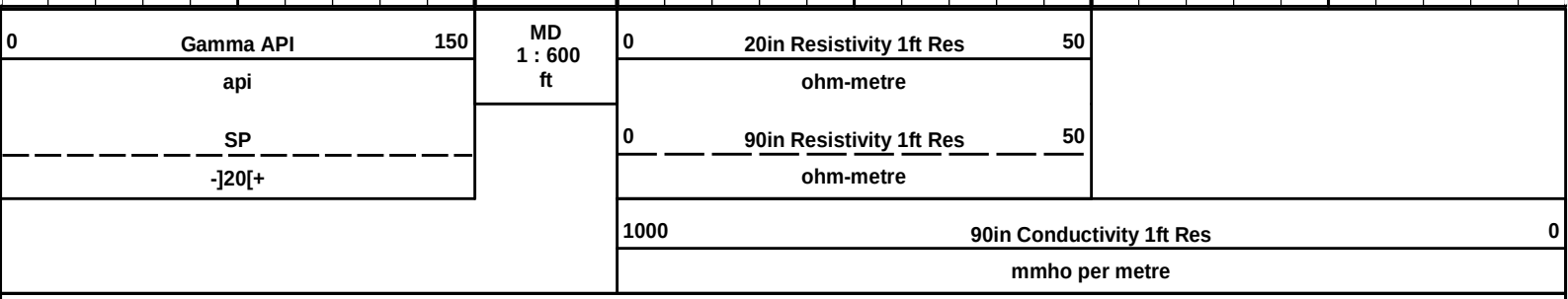

2900
3000
3100
3200
3300
3400


3500
3600
3700
3800
3900
4000


4100
4200
4300
4400
4500


4600
4700
4800
4900
5000
5100





HALLIBURTON

Plot Time: 20-Mar-18 18:05:06
Plot Range: 290 ft to 5224.75 ft
Data: RAMSHORN_MARSH\Well Based\MAIN SPLICE
Plot File: \\-LOCAL-\RAMSHORN_MARSH\Well Based\ACRT\ACRT_2_lib

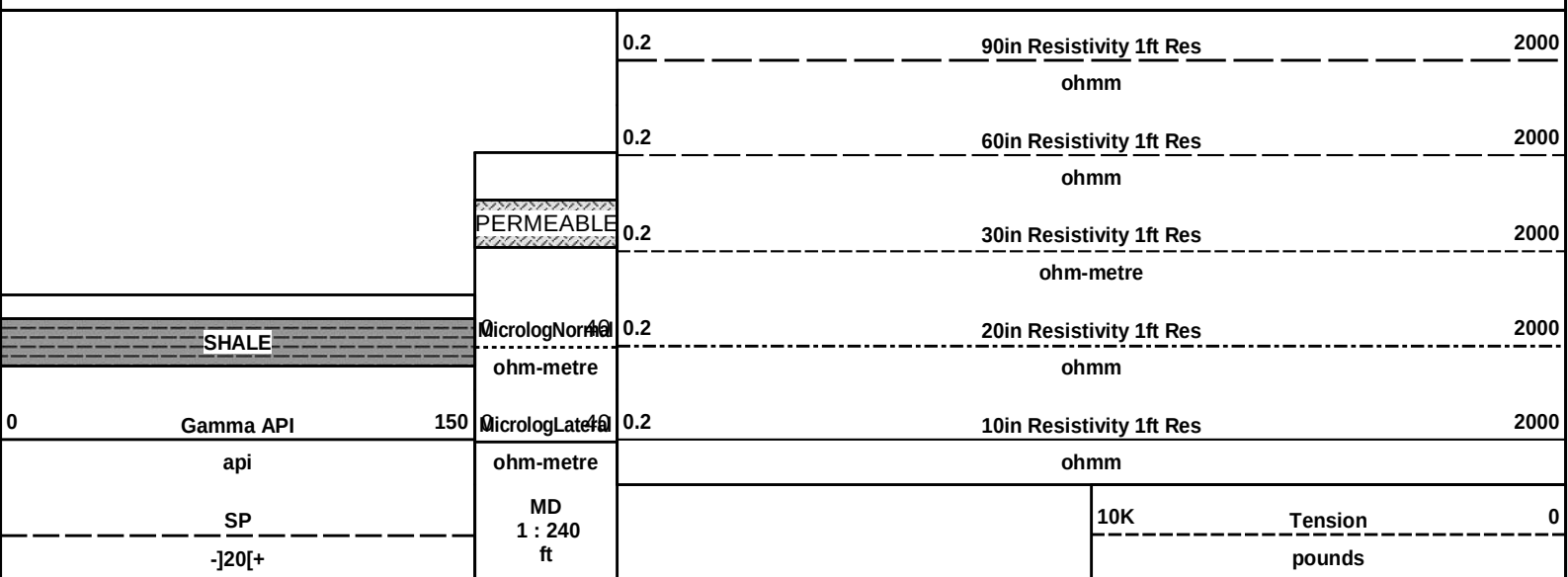
2 INCH MAIN LOG

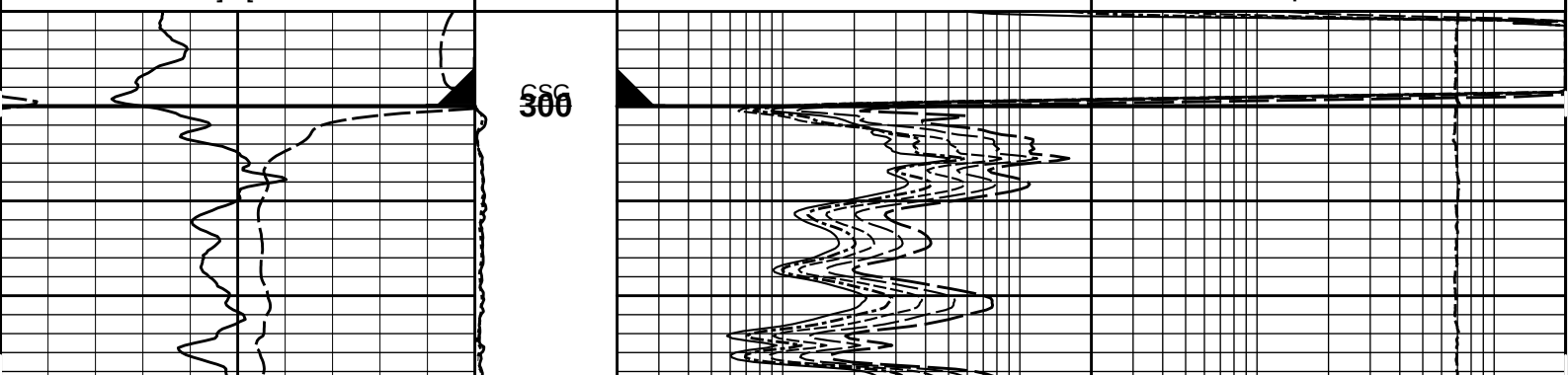
HALLIBURTON

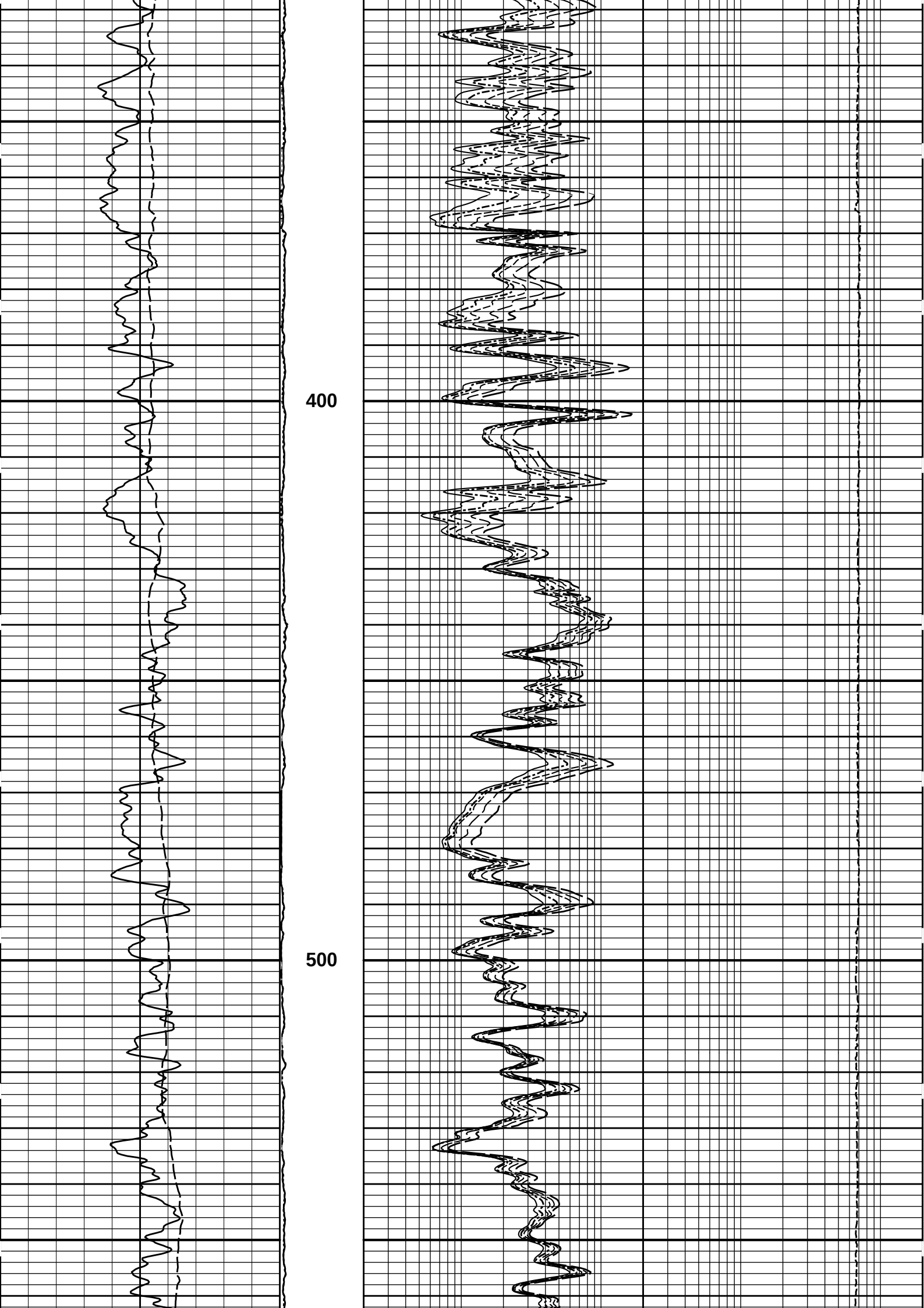
Plot Time: 20-Mar-18 18:05:06
Plot Range: 290 ft to 5224.75 ft
Data: RAMSHORN_MARSH\Well Based\MAIN SPLICE
Plot File: \\-LOCAL-\RAMSHORN_MARSH\Well Based\ACRT\ACRT_5_main_lib

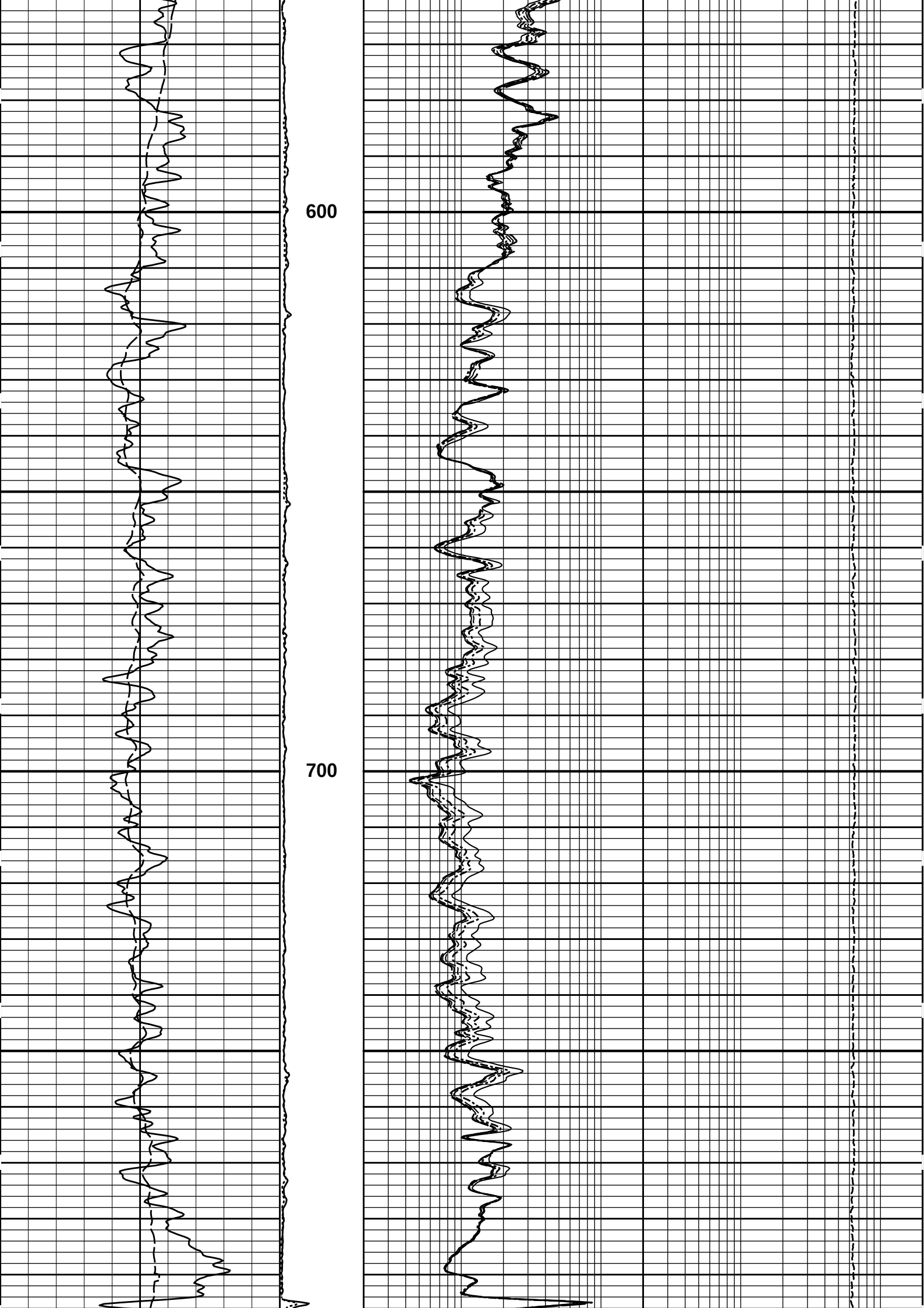
5 INCH MAIN LOG

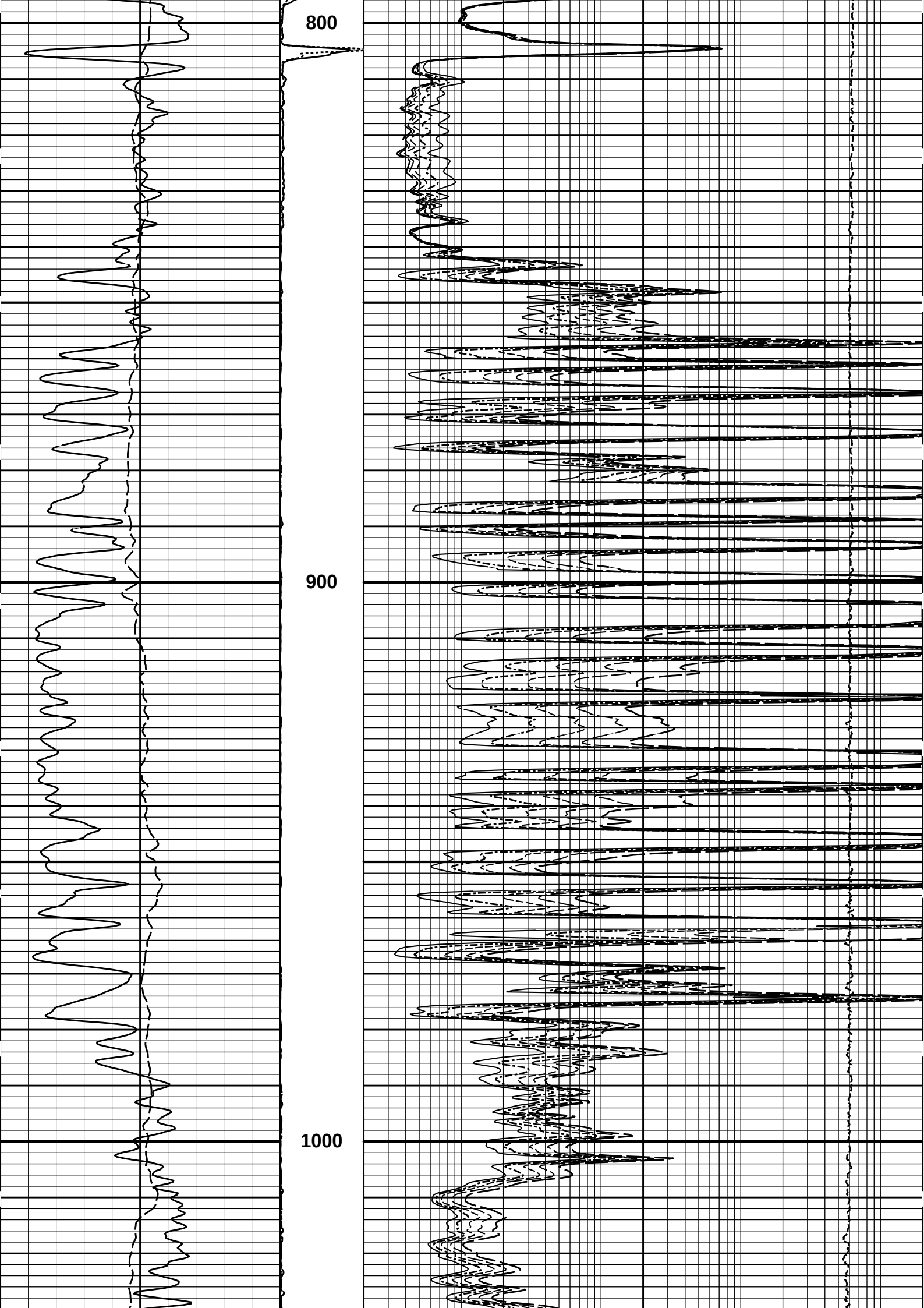
MEASURED DEPTH
MAIN SECTION 5" PER 100'

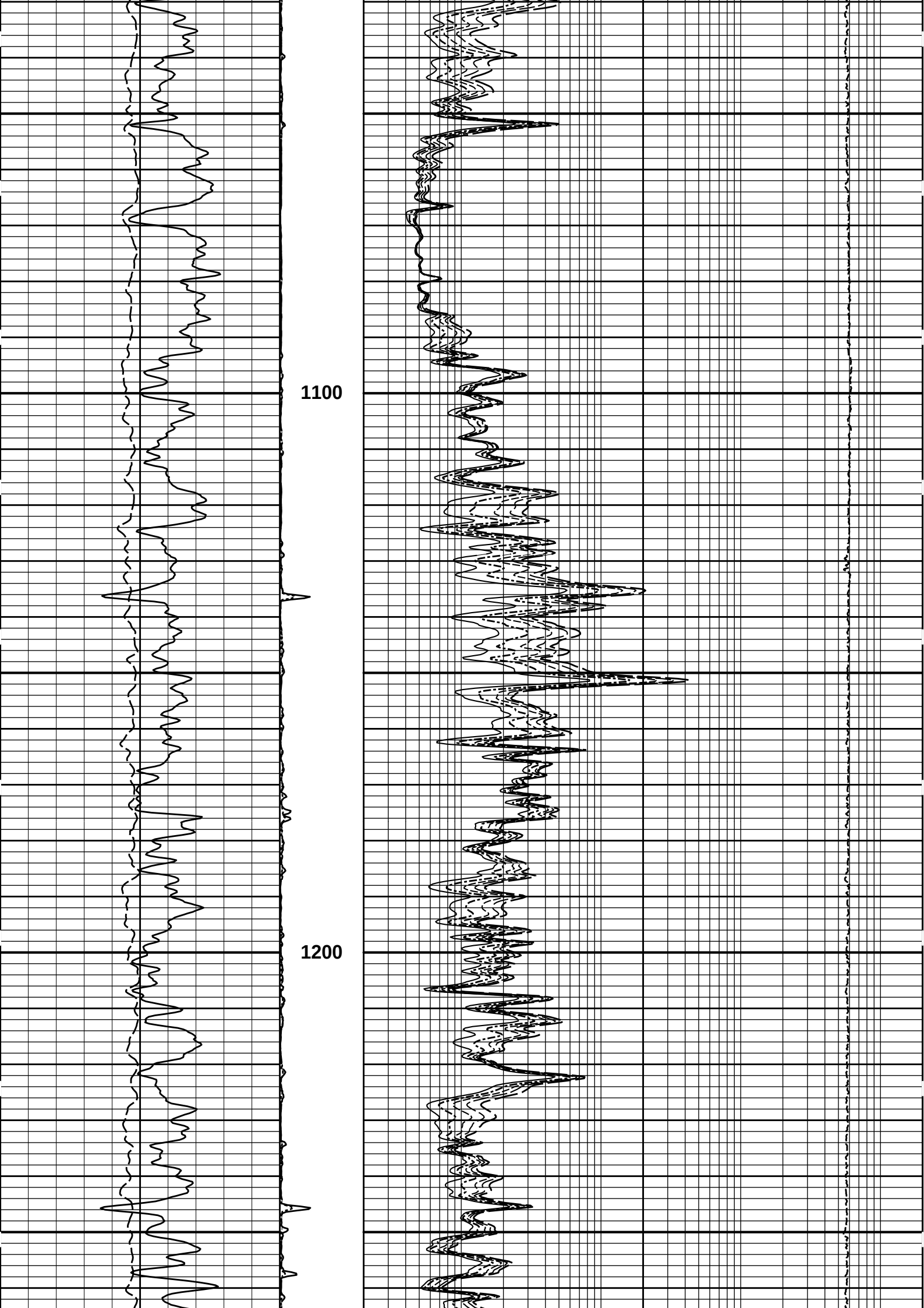


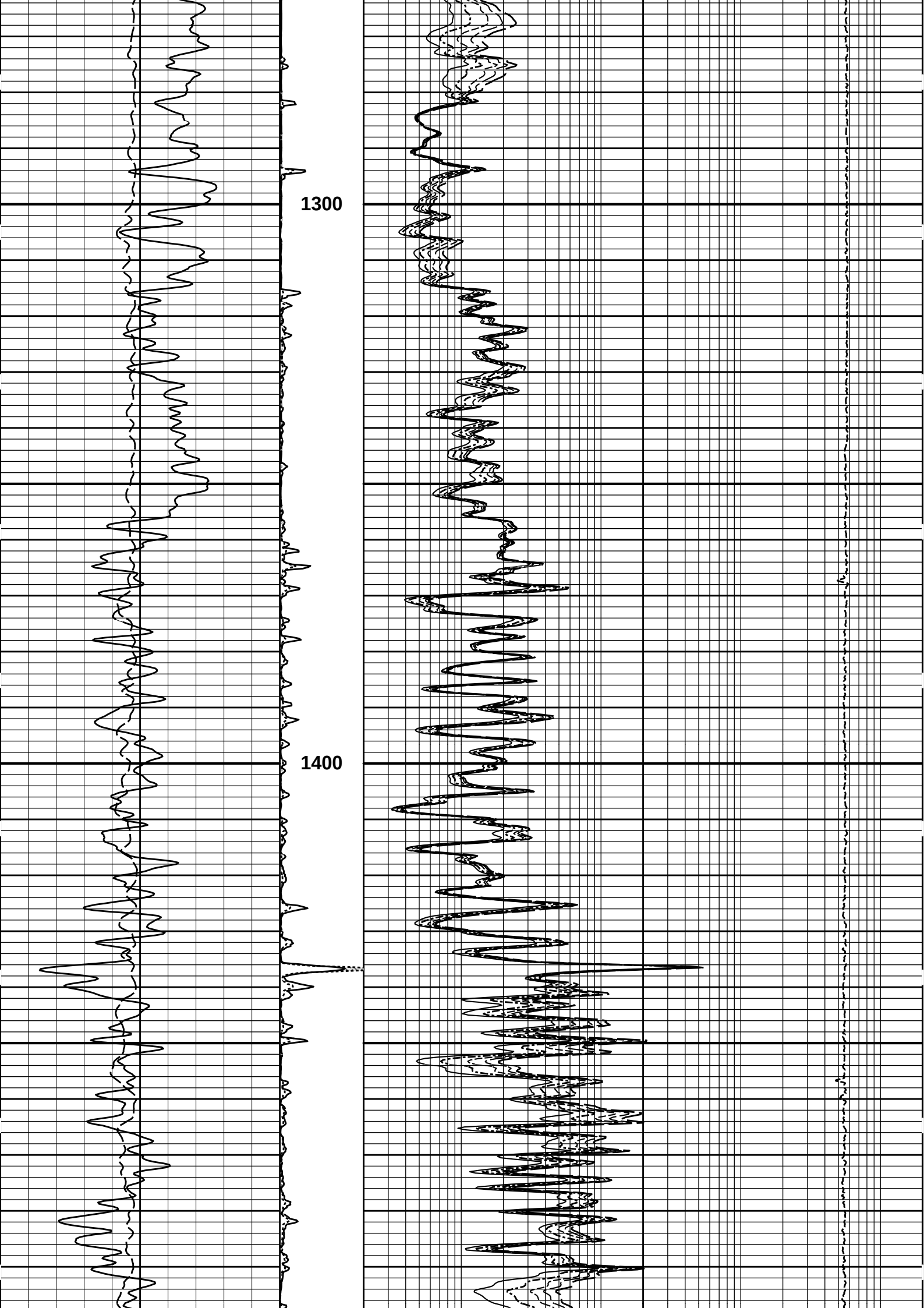


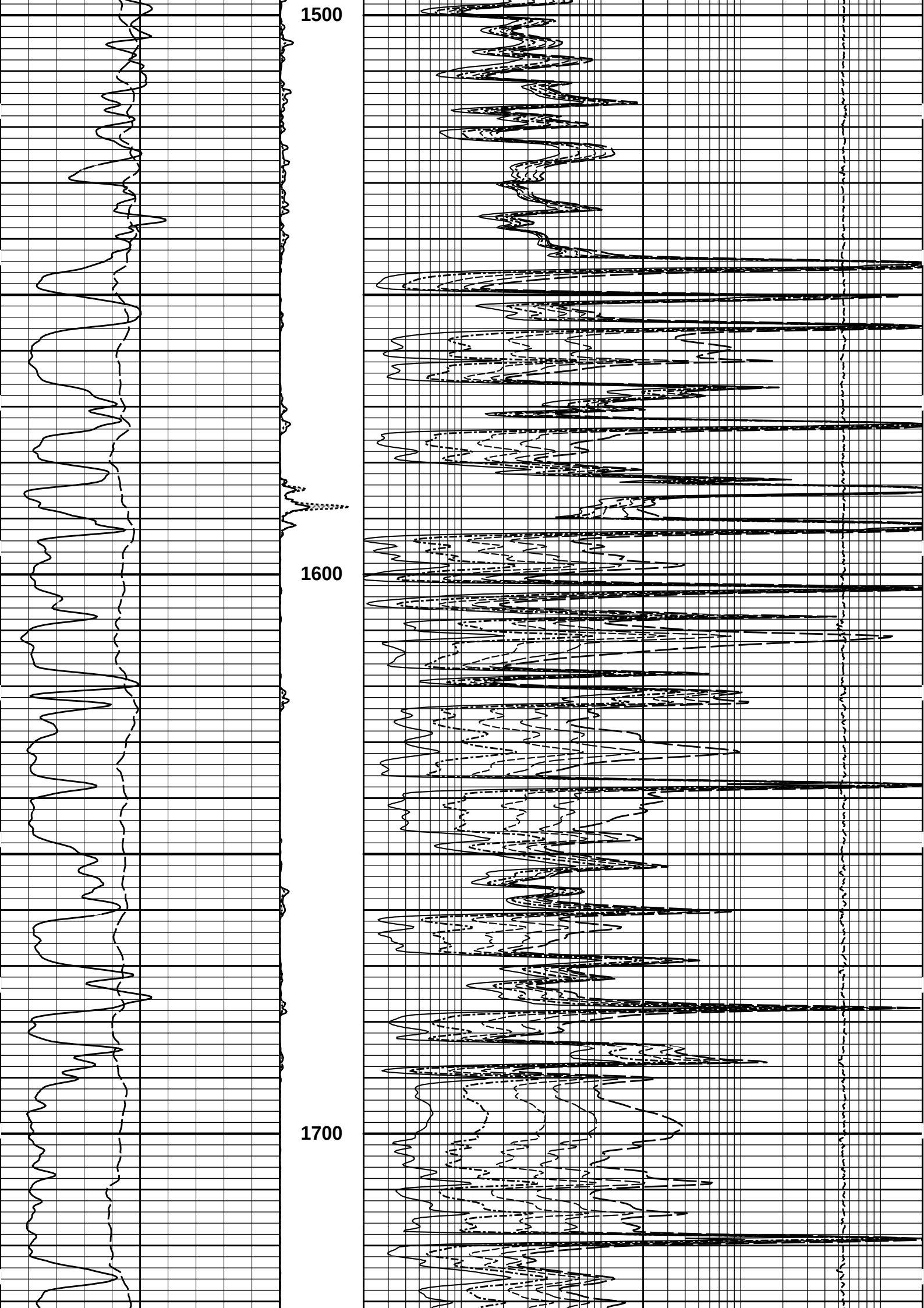

400
500

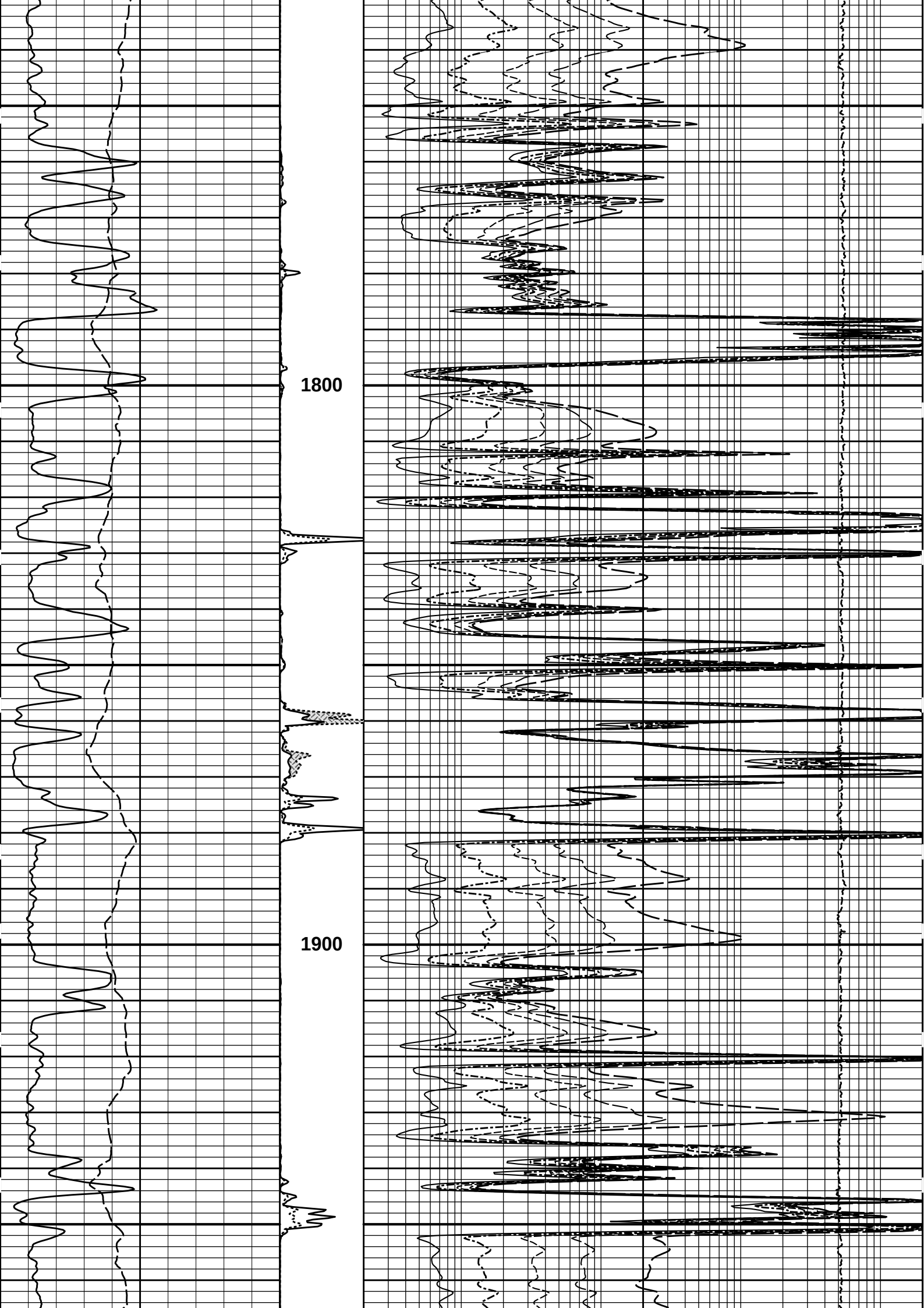

600
700

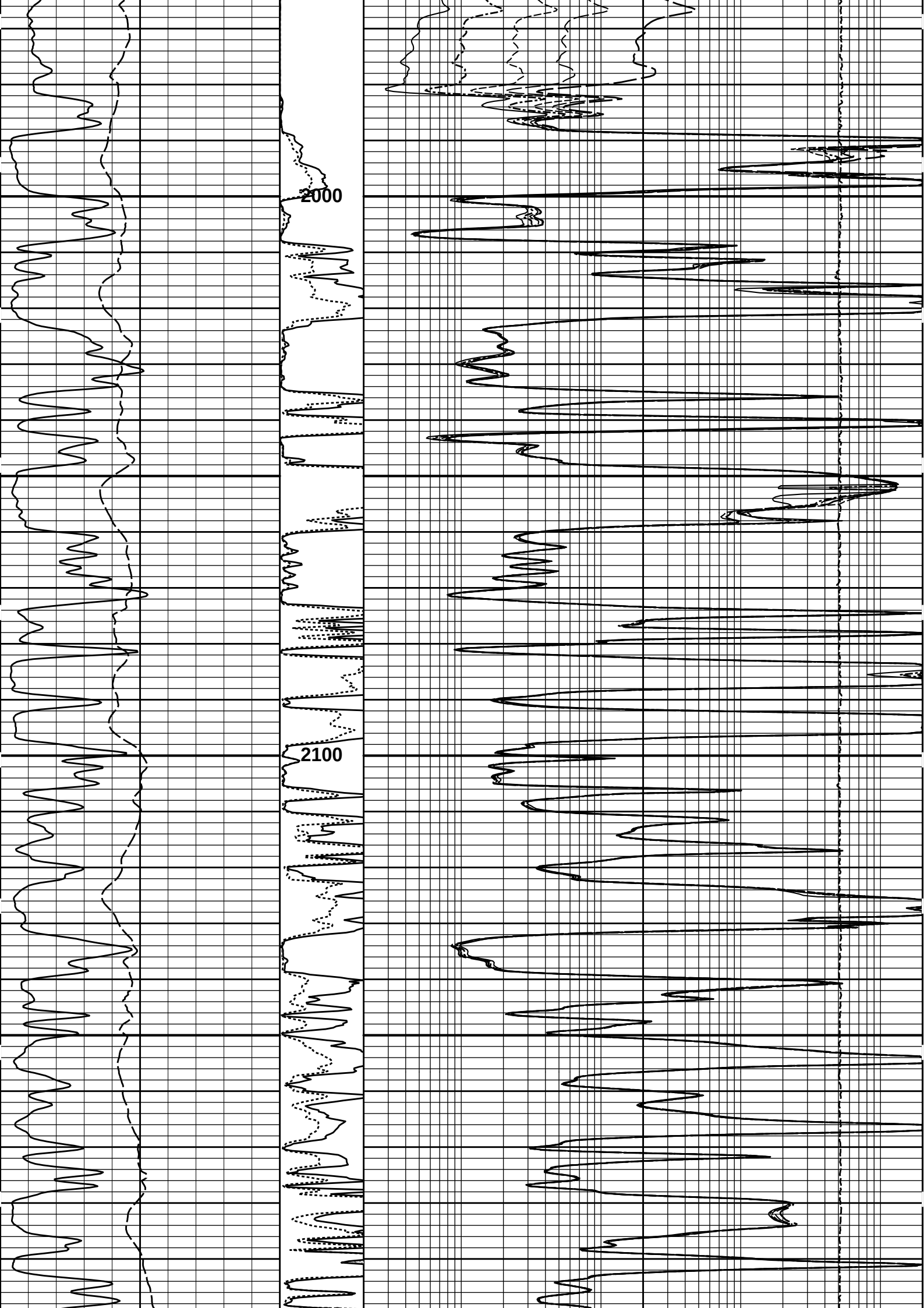

800
900
1000

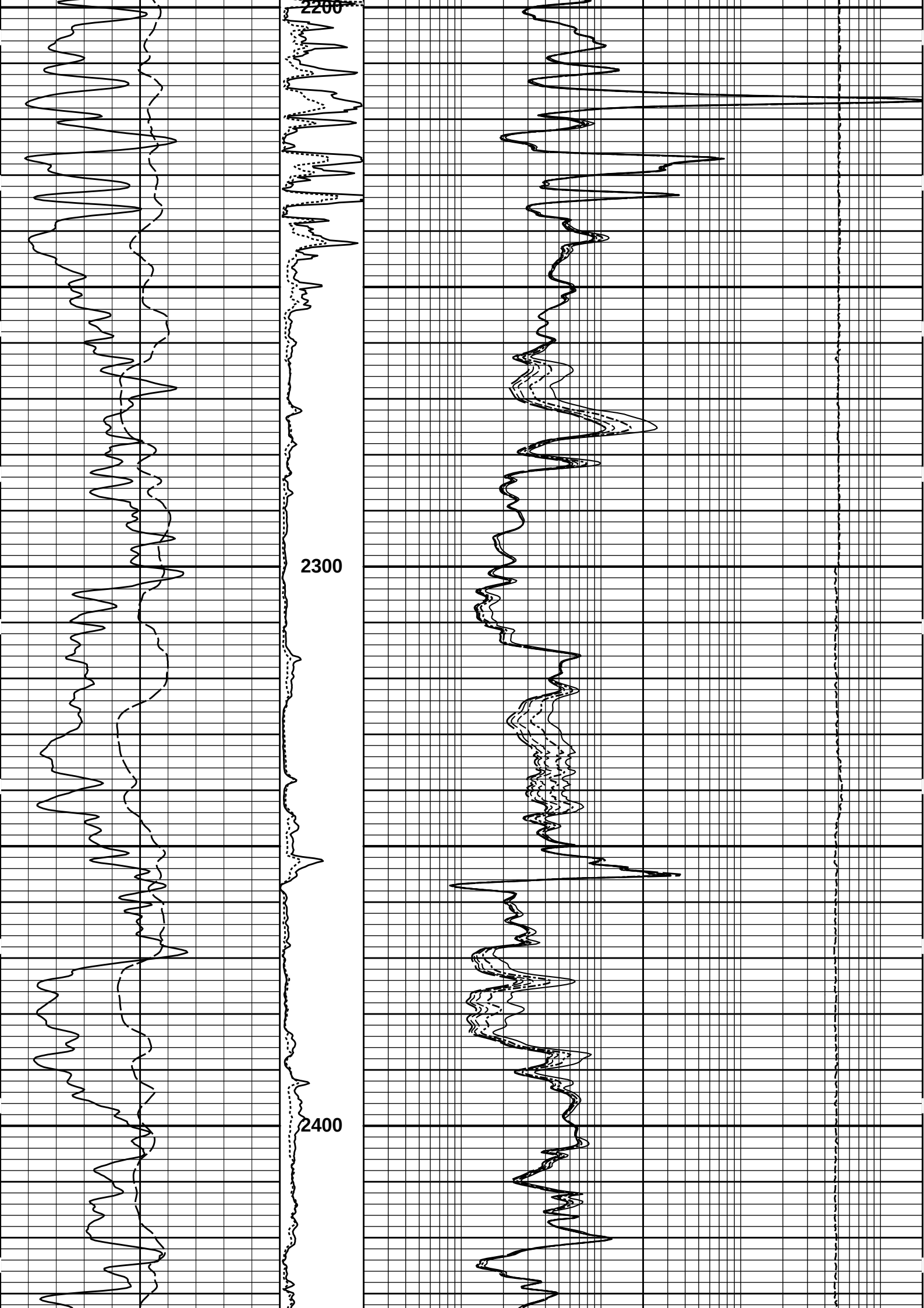

1100
1200

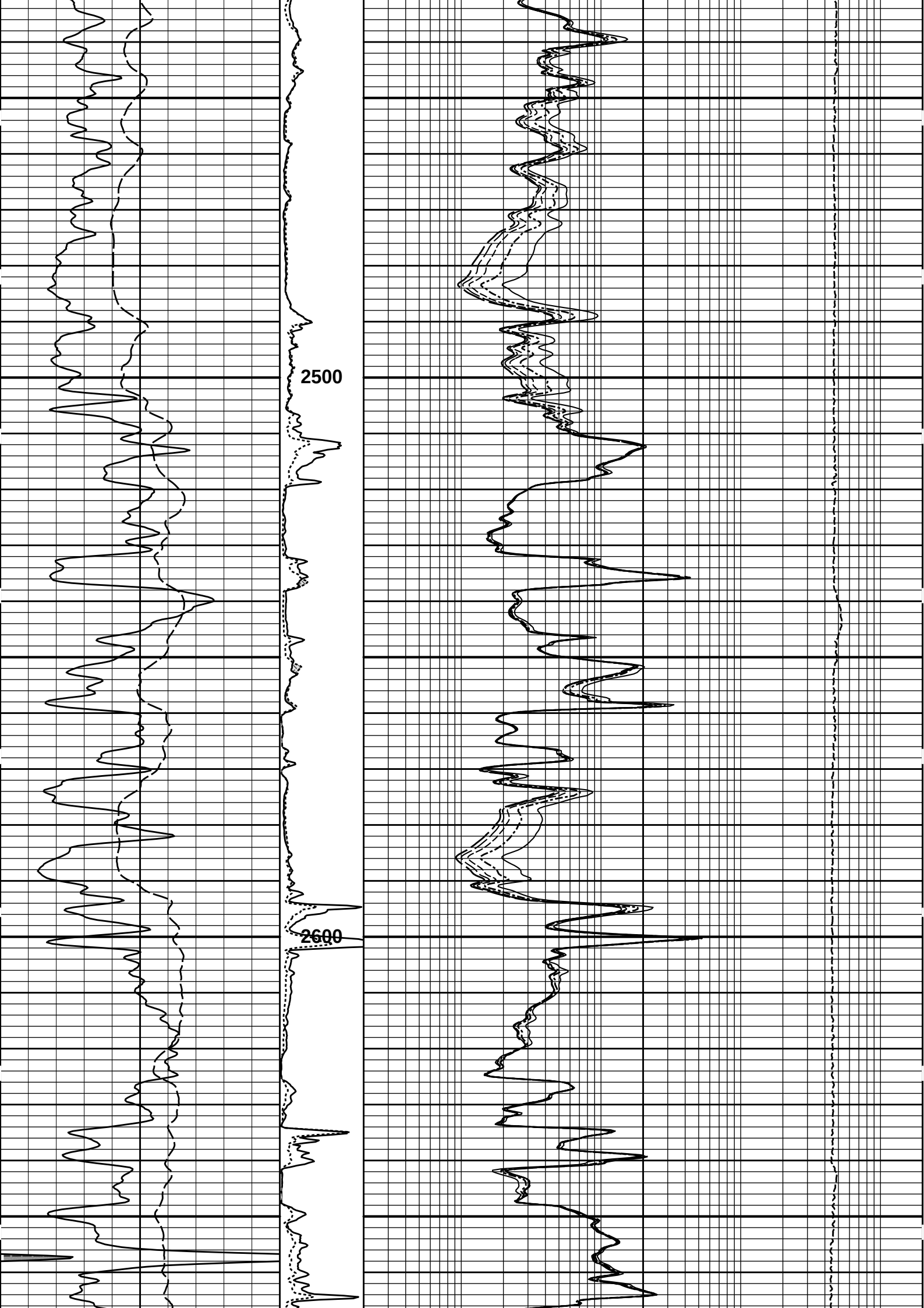

1300
1400

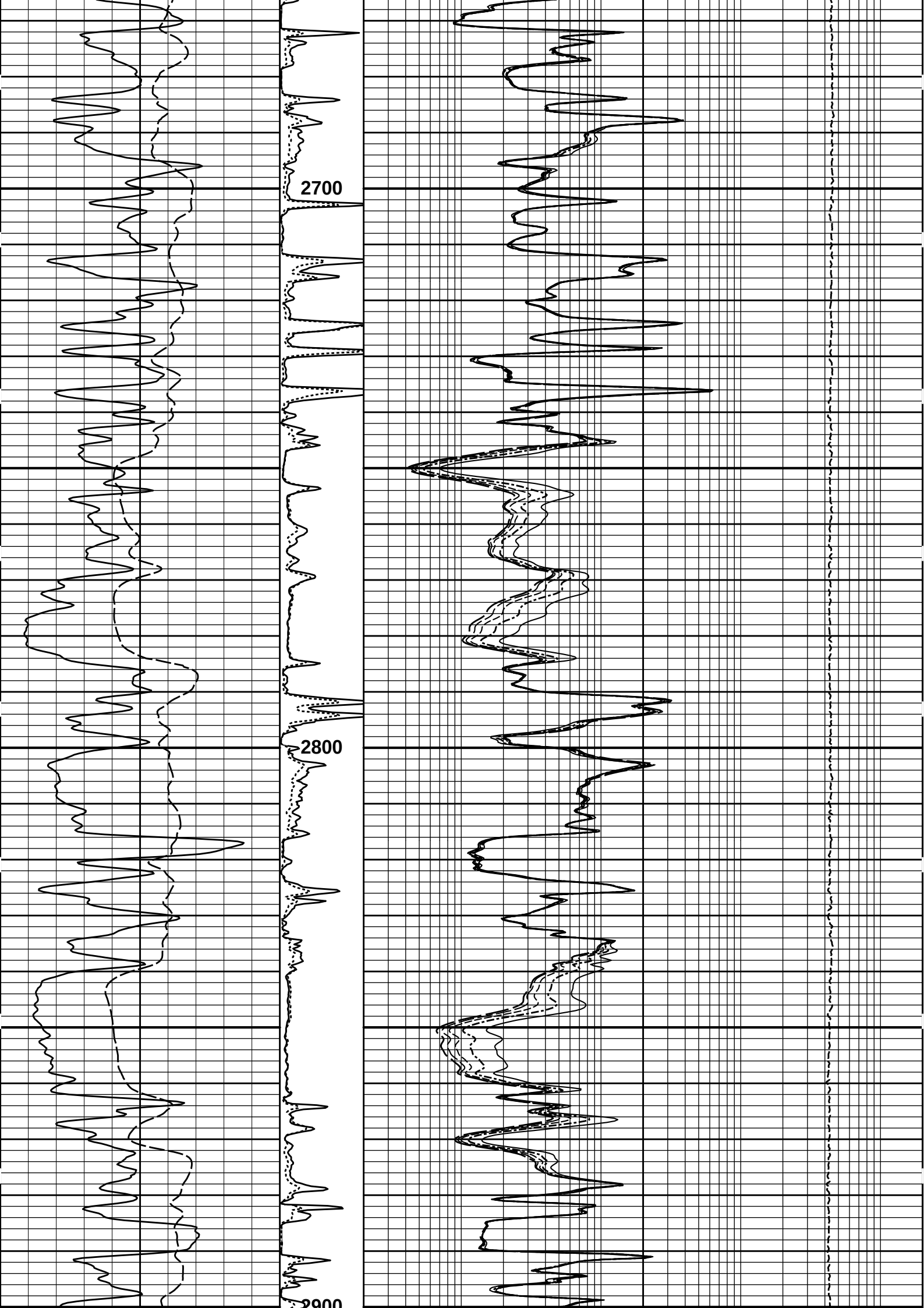

1500
1600
1700

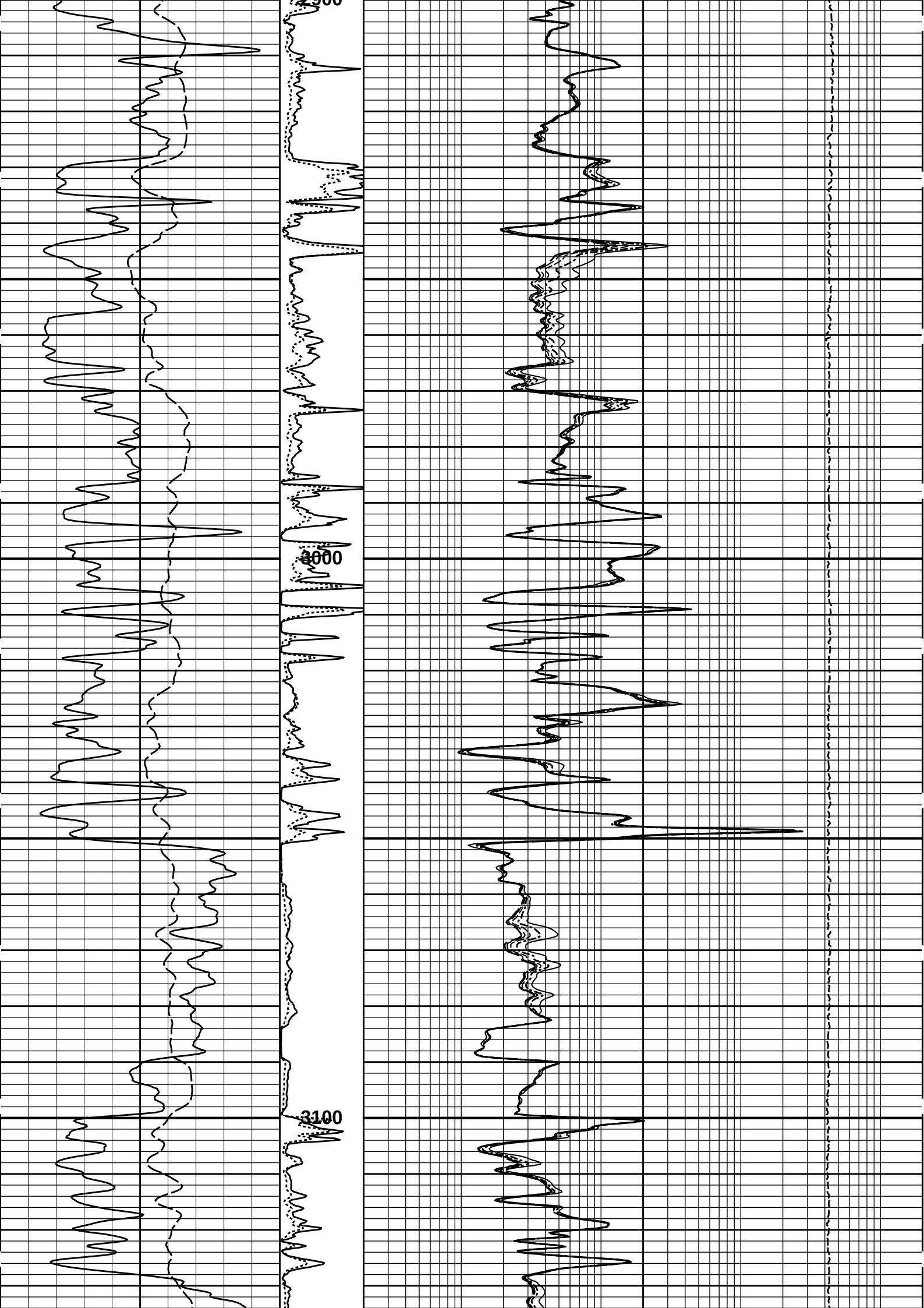

1800
1900

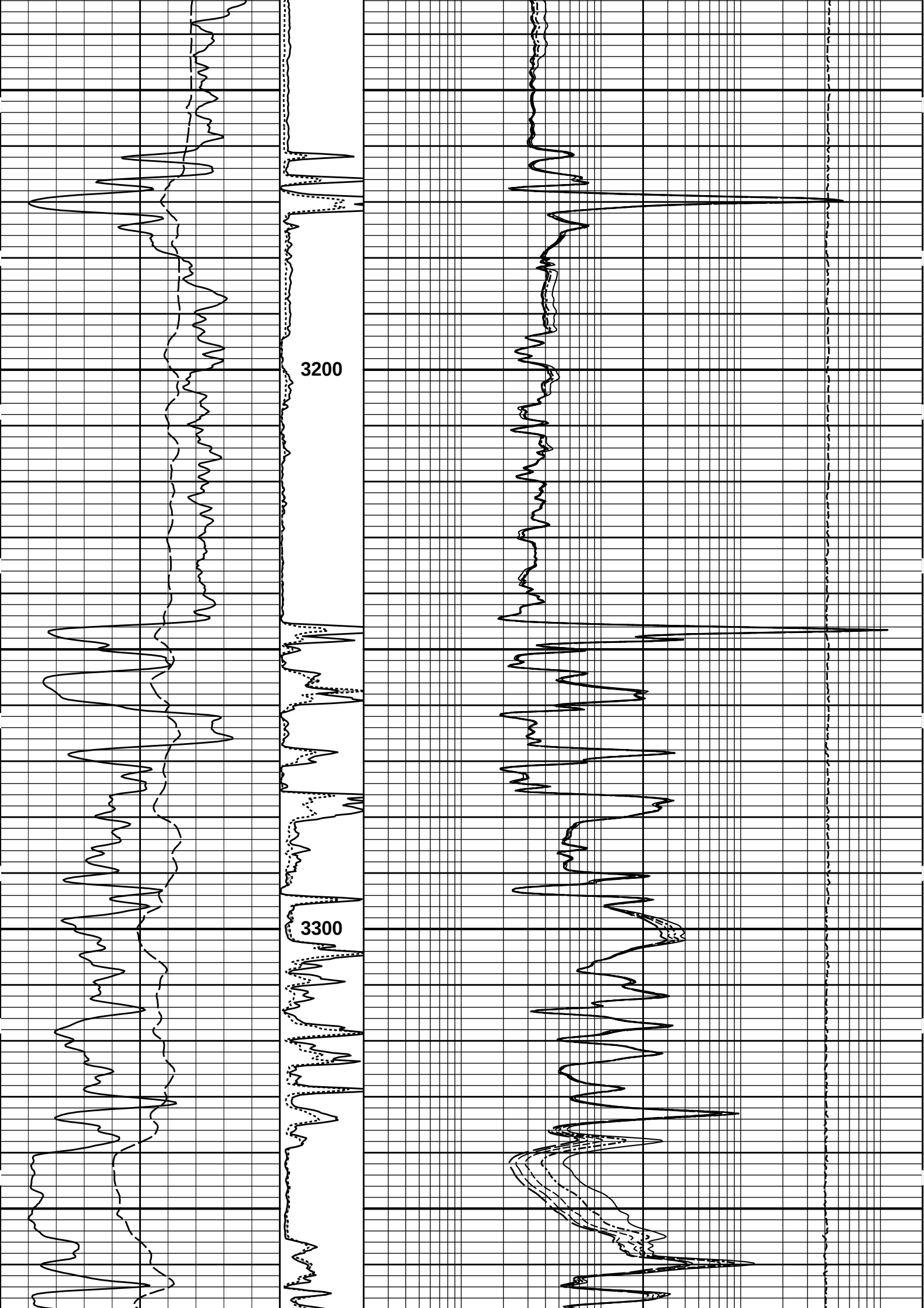

2000
2100

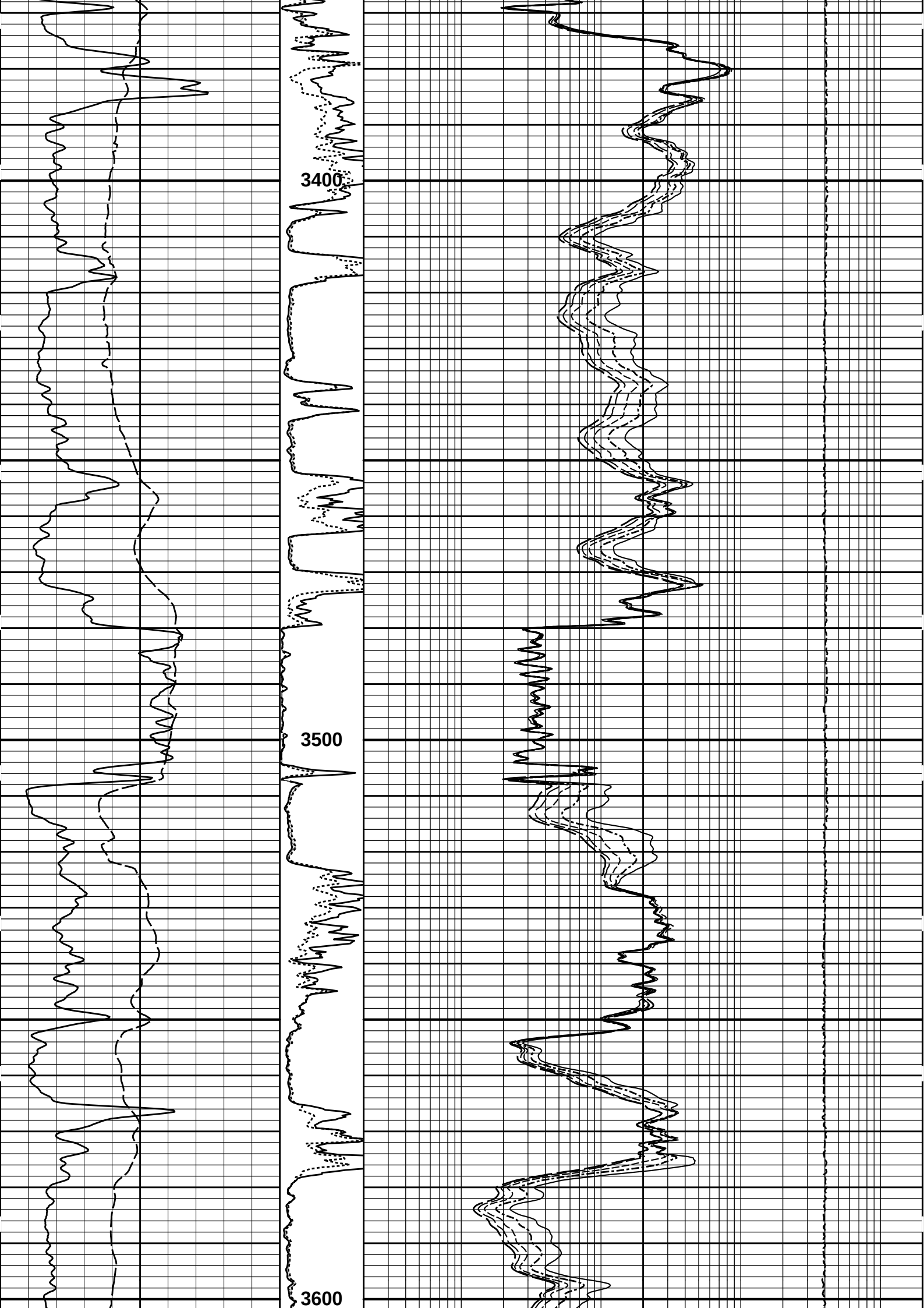

2200
2300
2400

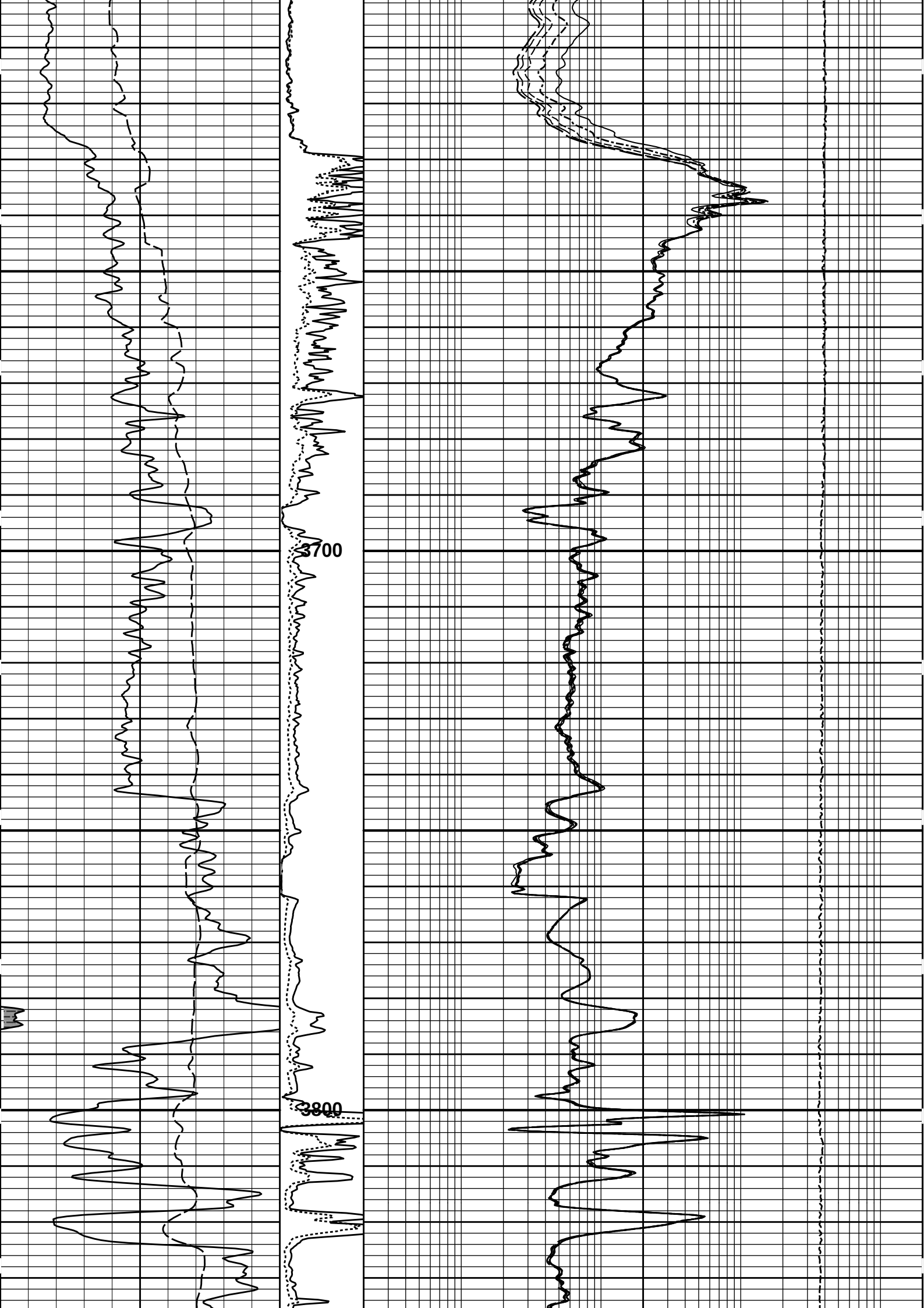

2500
2600

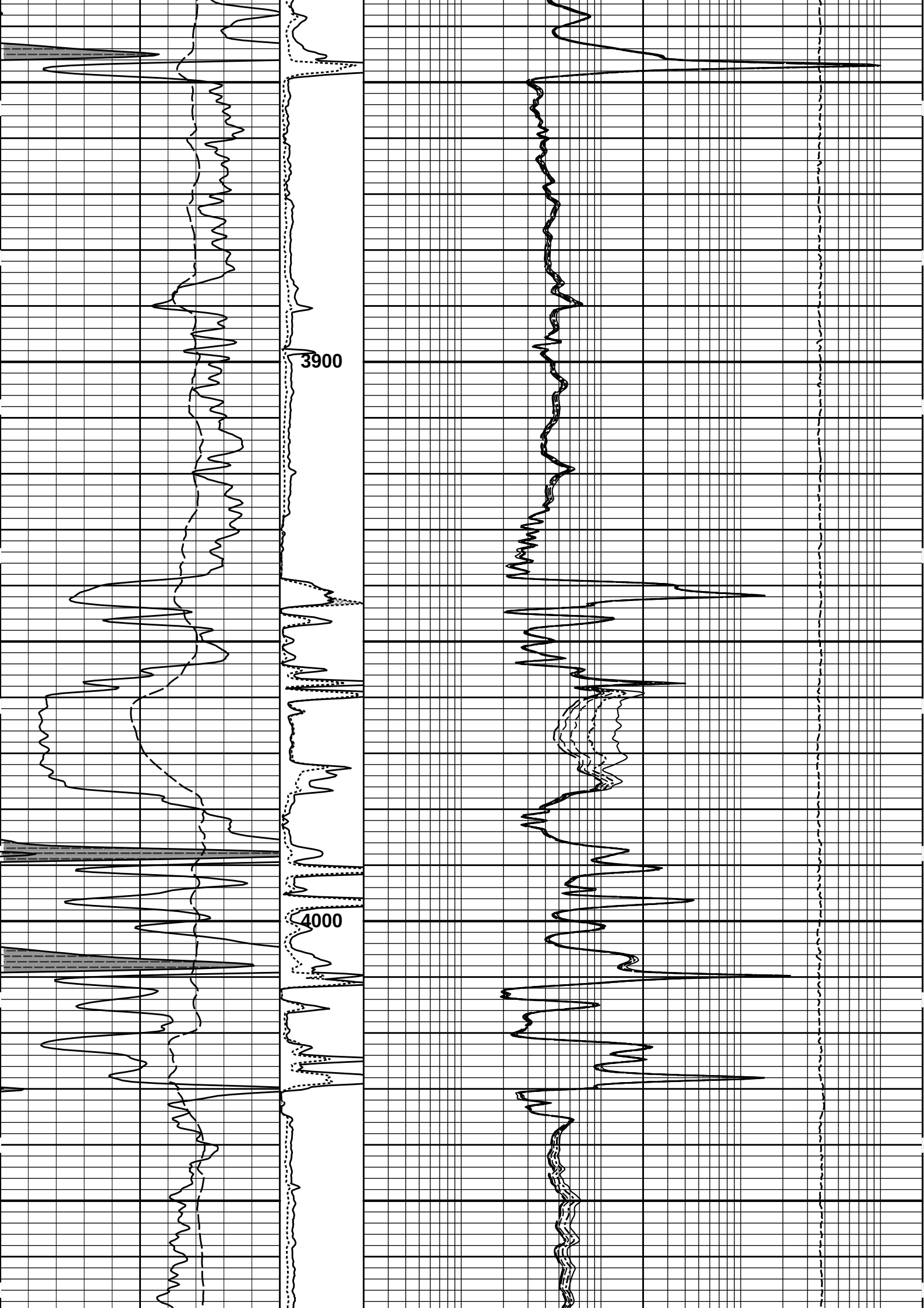

2700
2800
2900

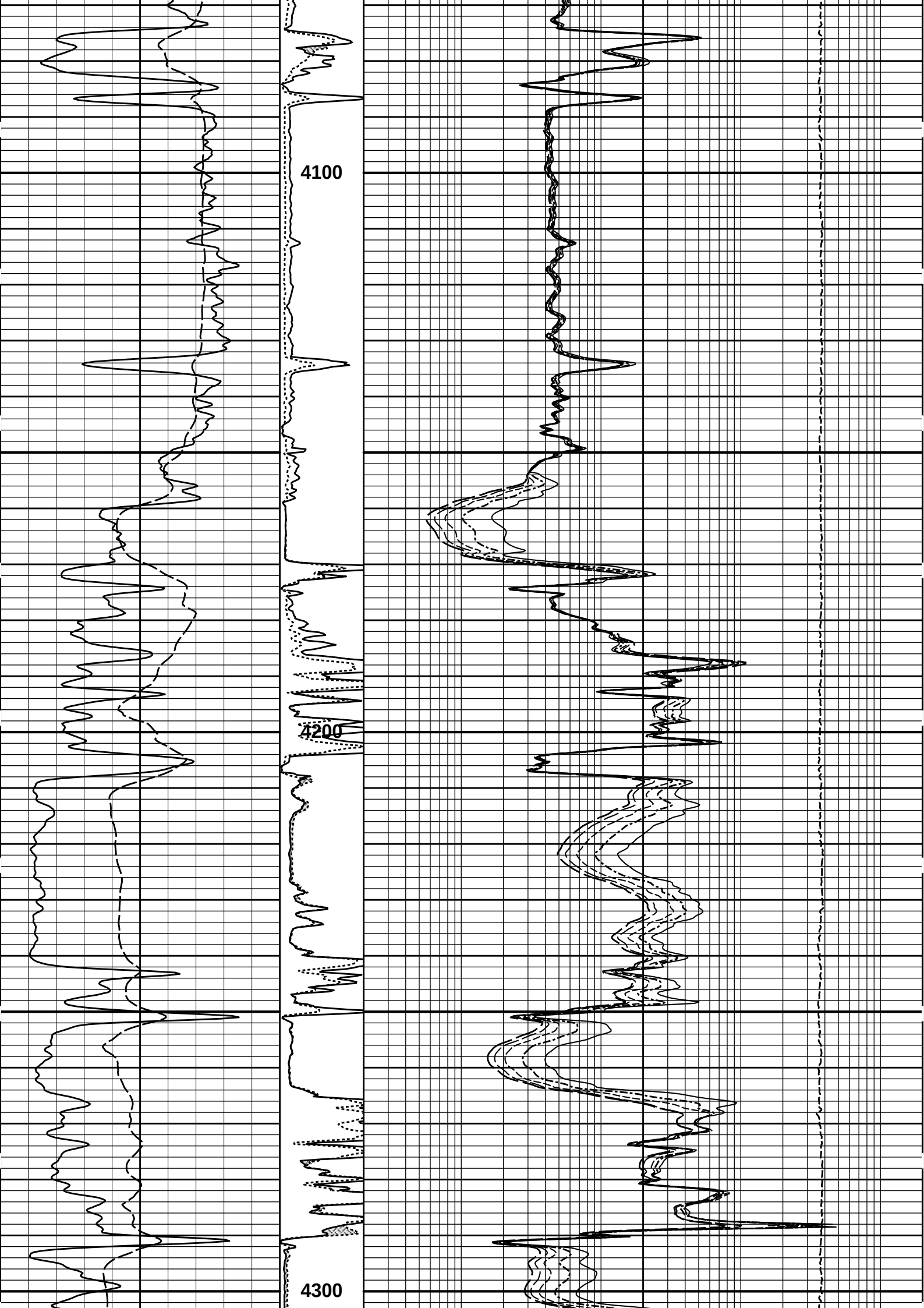

3000
3100

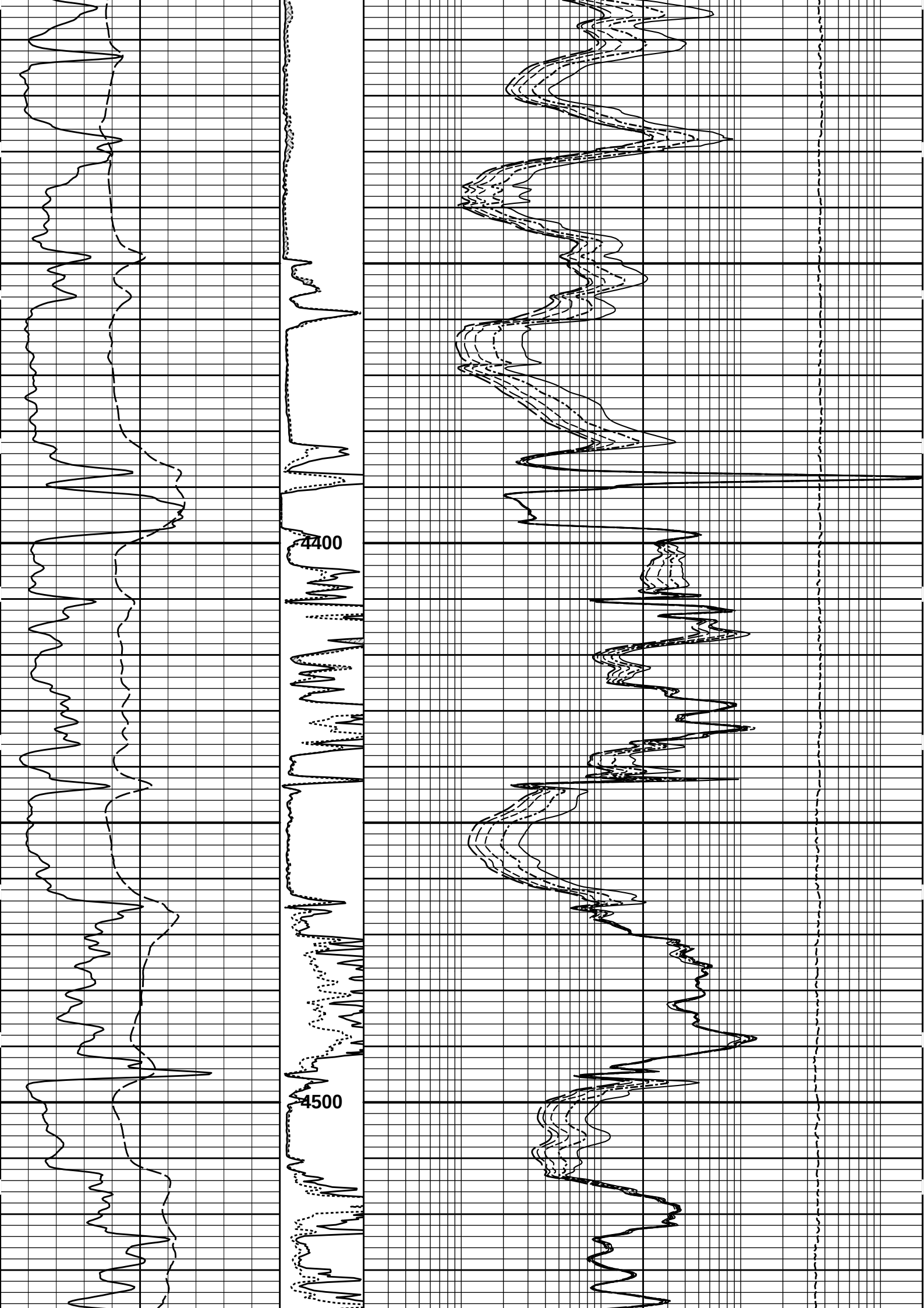

3200
3300

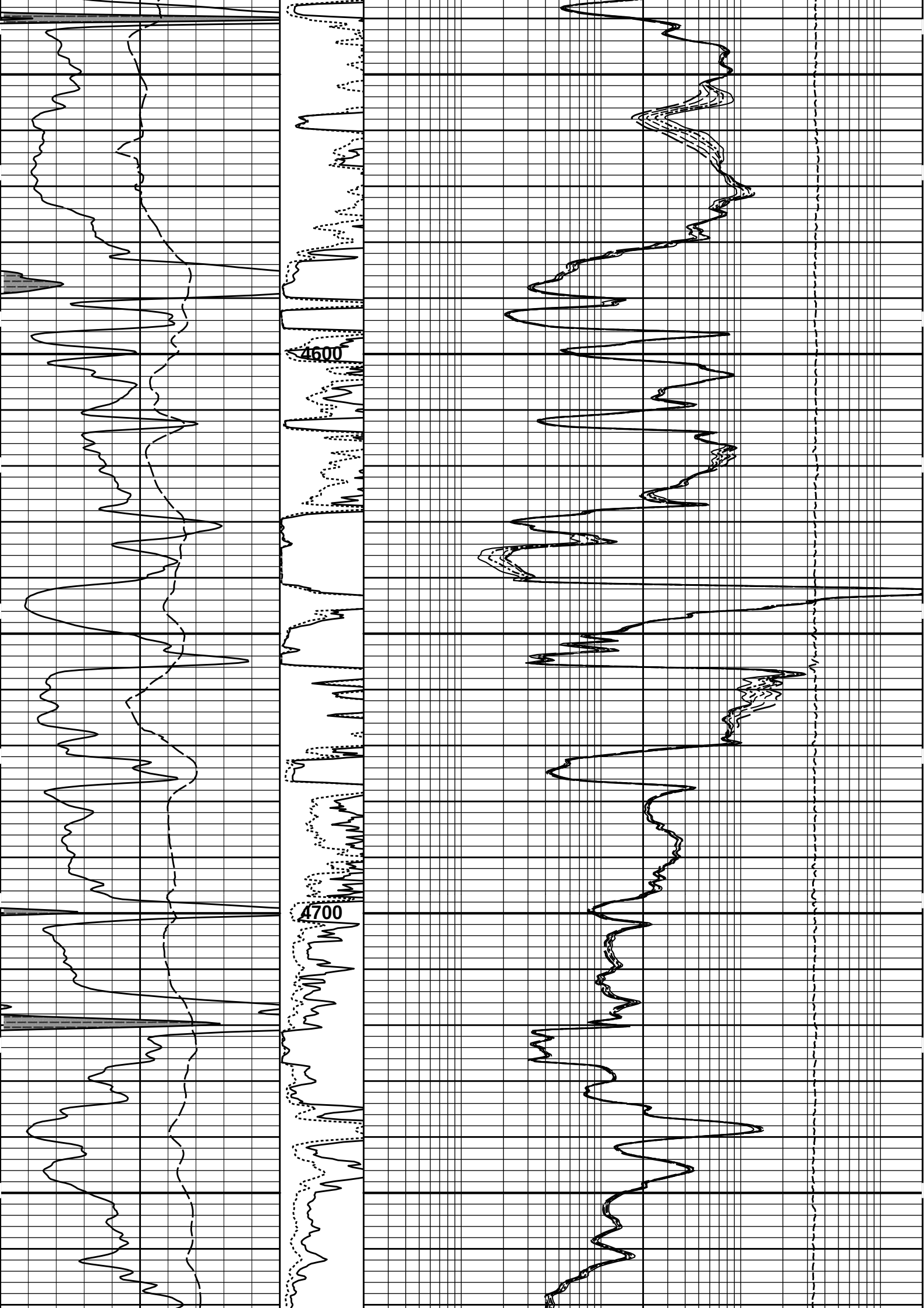

3400
3500
3600

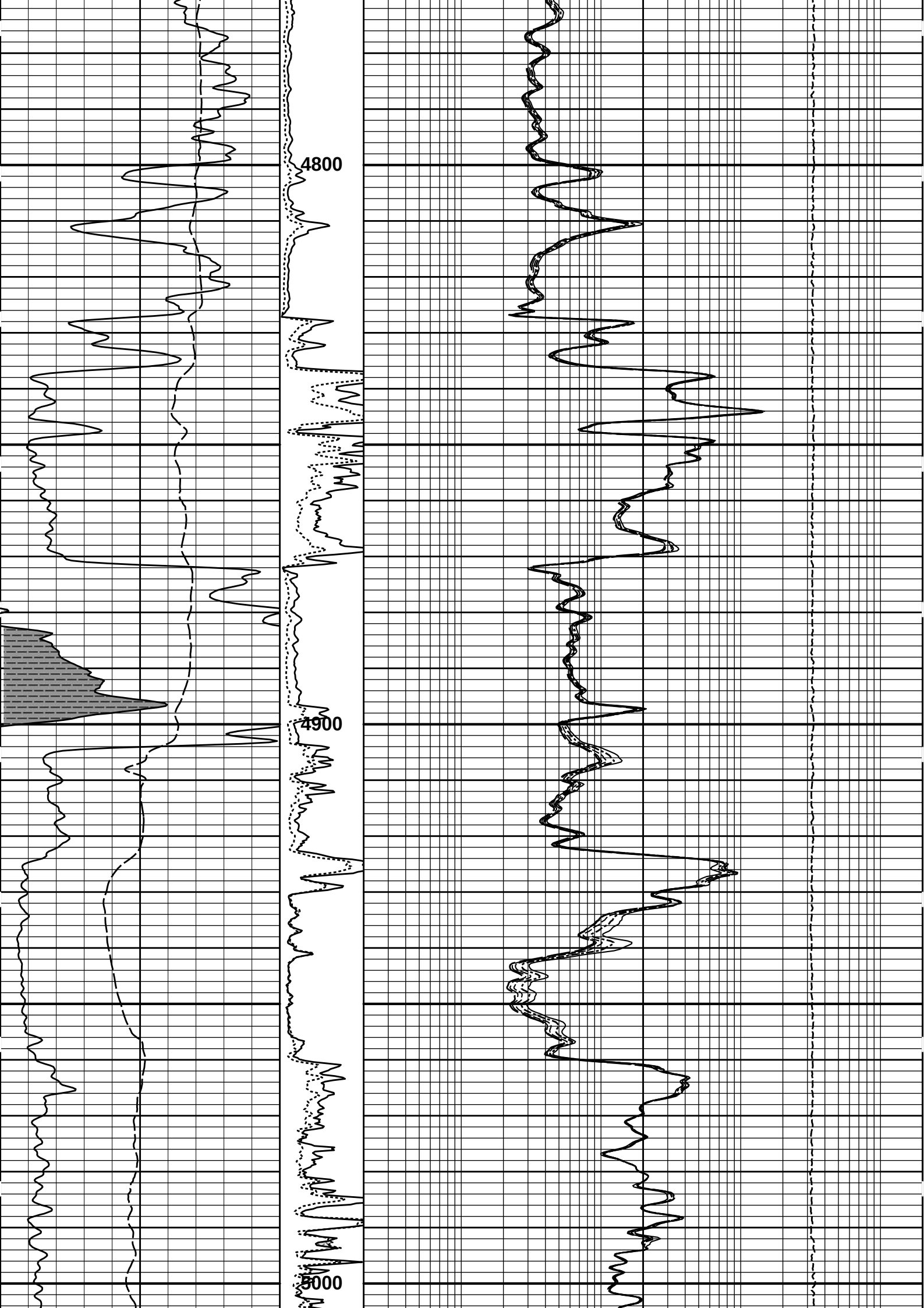

3700
3800

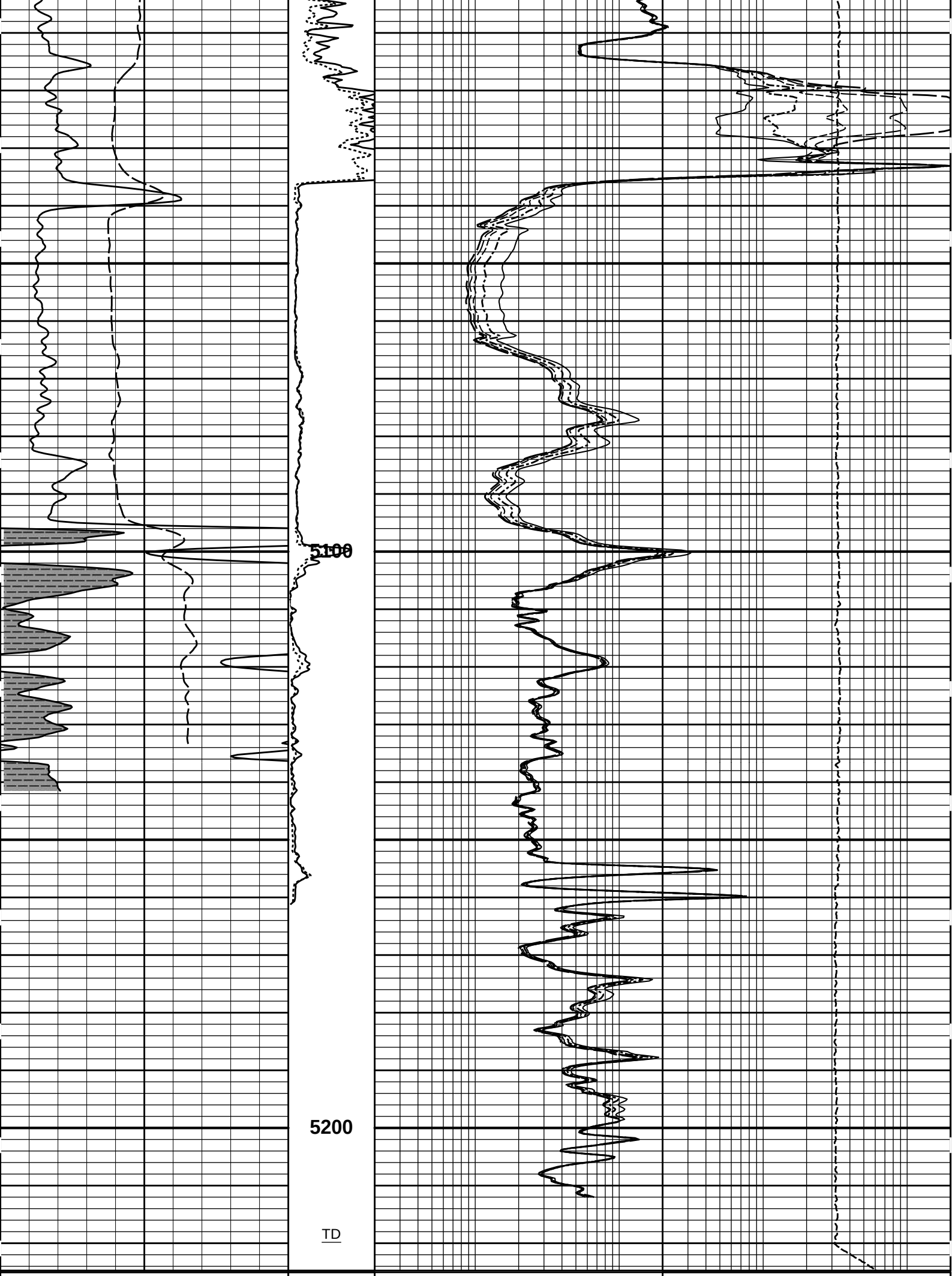

3900
4000

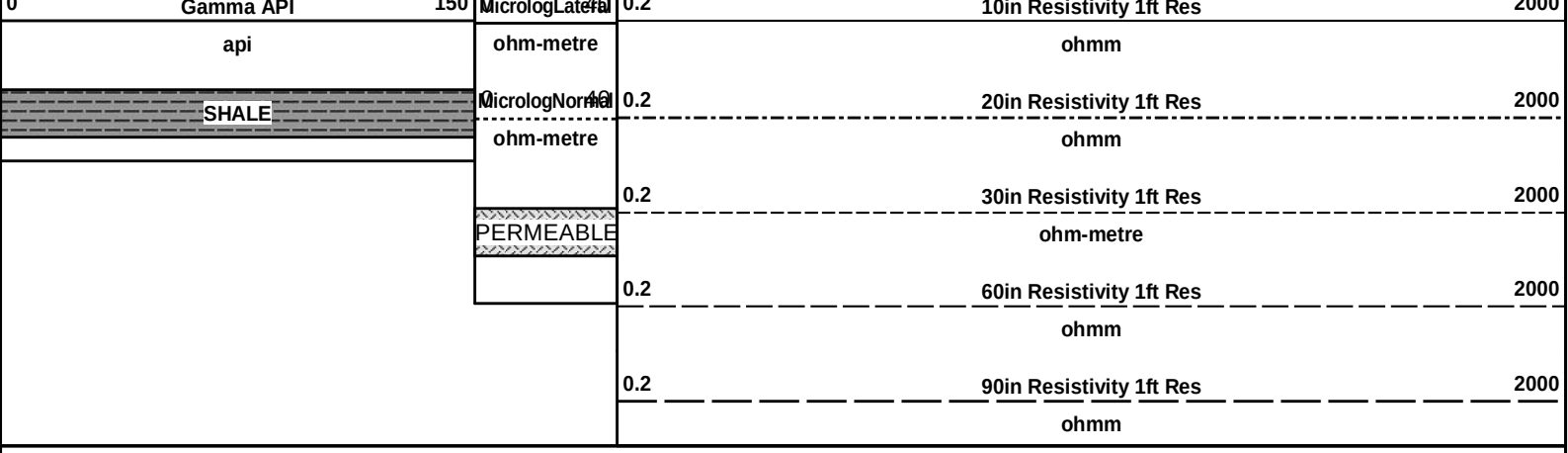

4100
4200
4300


4400
4500


4600
4700


4800
4900
5000


5100
5200
TD
SP
-]20[+
MD
1 : 240
ft
10K
Tension
0
pounds



HALLIBURTON

Plot Time: 20-Mar-18 18:05:27
Plot Range: 290 ft to 5224.75 ft
Data: RAMSHORN_MARSH\Well Based\MAIN SPLICE
Plot File: \\-LOCAL-\RAMSHORN_MARSH\Well Based\ACRT\ACRT_5_main_lib

5 INCH MAIN LOG

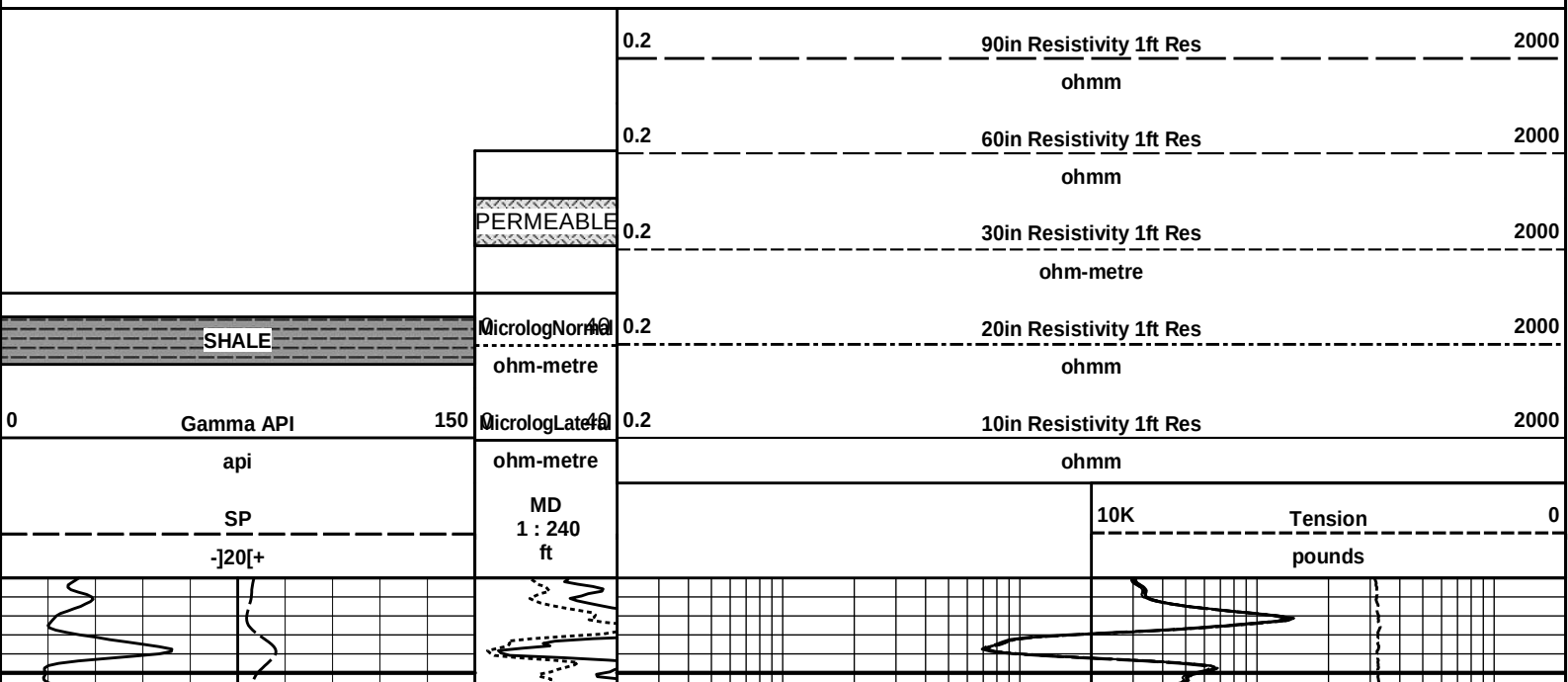
MEASURED DEPTH
MAIN SECTION 5" PER 100'

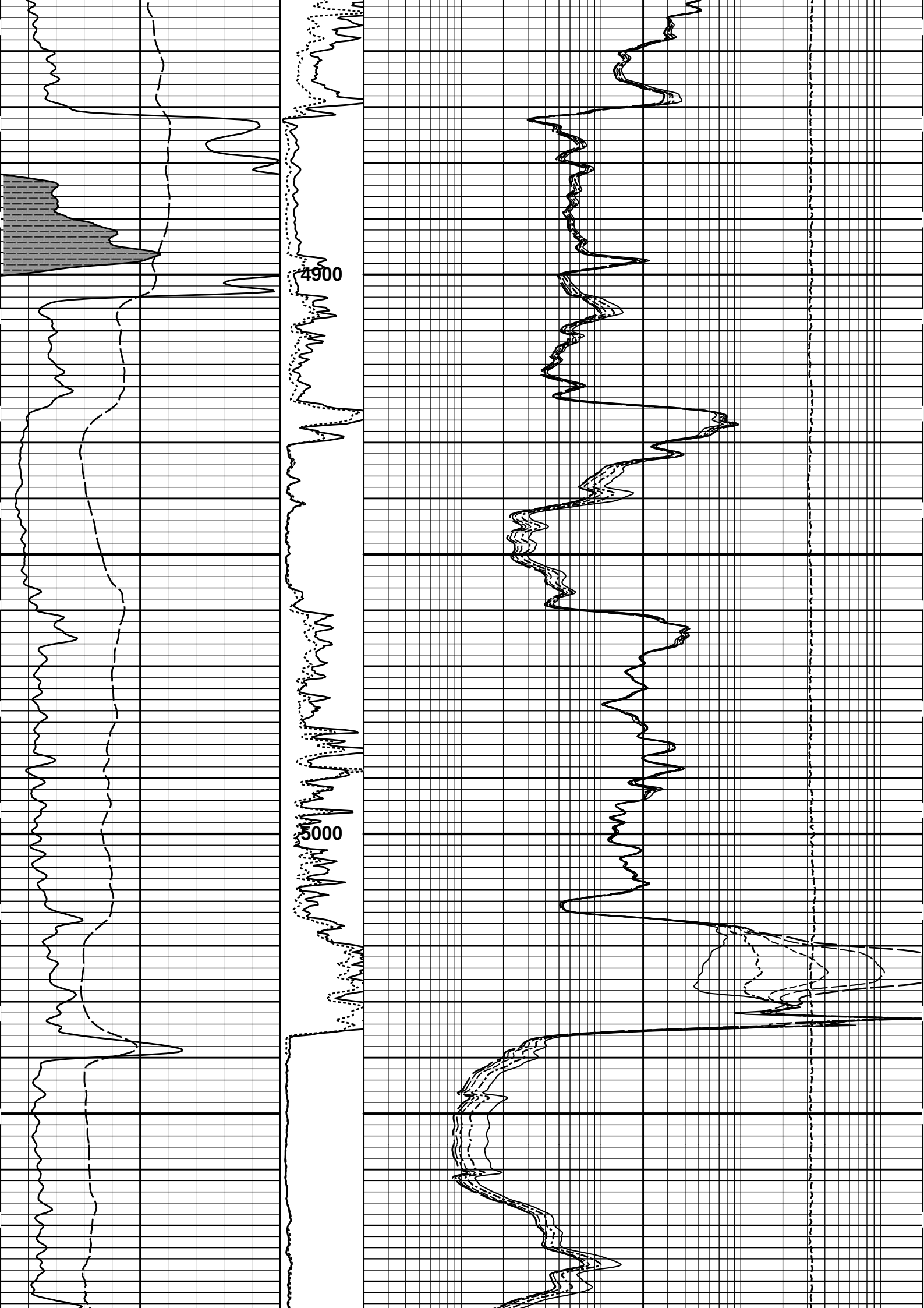
HALLIBURTON

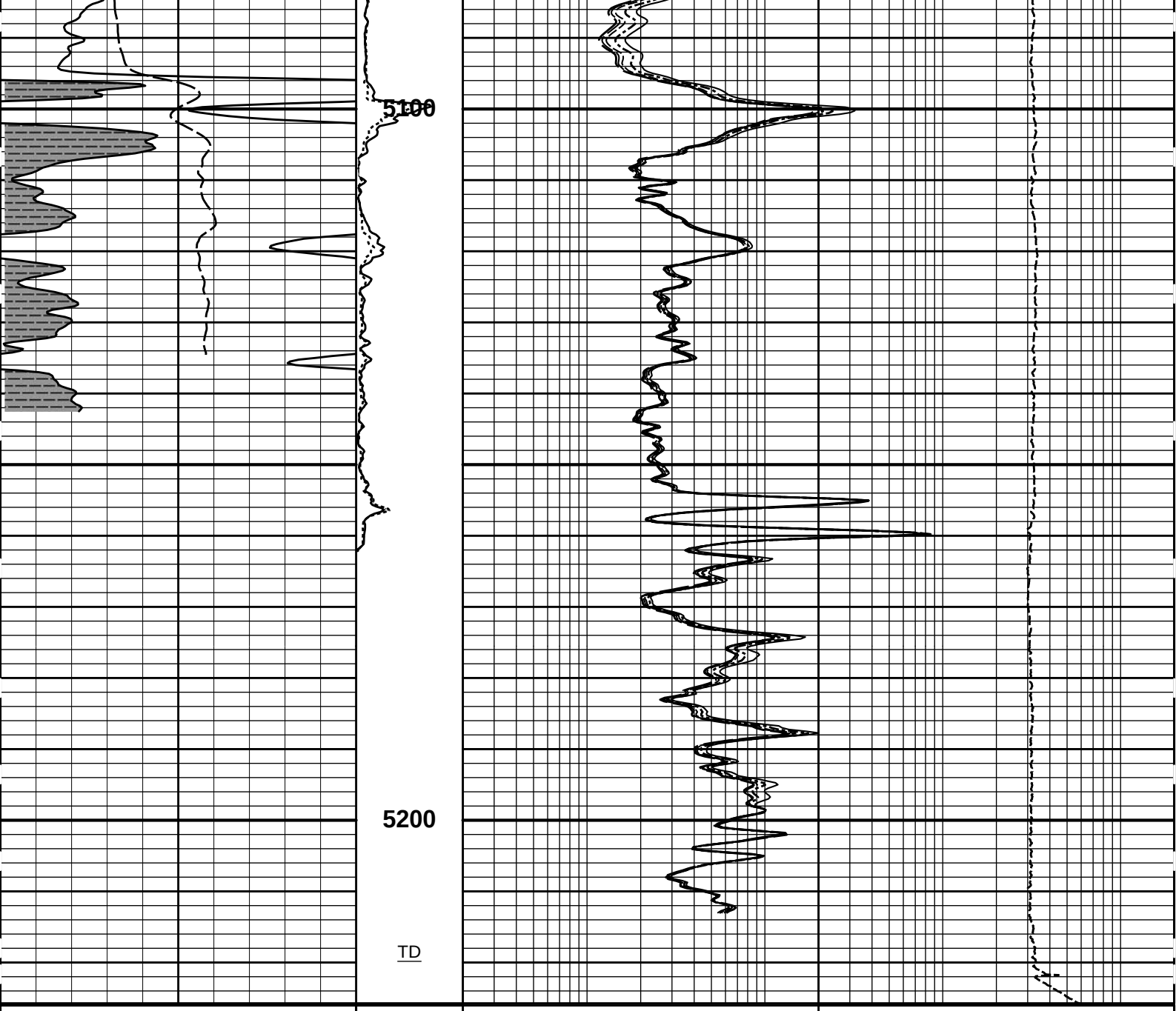
Plot Time: 20-Mar-18 18:05:27
Plot Range: 4840 ft to 5225.75 ft
Data: RAMSHORN_MARSH\Well Based\REPEAT
Plot File: \\-LOCAL-\RAMSHORN_MARSH\Well Based\ACRT\ACRT_5_repeat_lib

5 INCH REPEAT LOG

MEASURED DEPTH
REPEAT SECTION 5" PER 100'




4900
5000



SP	MD 1 : 240 ft		10K Tension 0
-]20[+			pounds
0 Gamma API 150	0 MicrologLateral 40	0.2 10in Resistivity 1ft Res 2000	
api	ohm-metre	ohmm	
SHALE	0 MicrologNormal 40	0.2 20in Resistivity 1ft Res 2000	
	ohm-metre	ohmm	
	PERMEABLE	0.2 30in Resistivity 1ft Res 2000	
		ohm-metre	
		0.2 60in Resistivity 1ft Res 2000	
		ohmm	
		0.2 90in Resistivity 1ft Res 2000	
		ohmm	

HALLIBURTON

Plot Time: 20-Mar-18 18:05:33
Plot Range: 4840 ft to 5225.75 ft
Data: RAMSHORN_MARSH\Well Based\REPEAT\
Plot File: \\-LOCAL-\RAMSHORN_MARSH\Well Based\ACRT\ACRT_5_repeat_lib

5 INCH REPEAT LOG

MEASURED DEPTH
REPEAT SECTION 5" PER 100'

HALLIBURTON

PARAMETERS REPORT

Depth (ft)	Tool Name	Mnemonic	Description	Value	Units
TOP					
	SHARED	BS	Bit Size	7.875	in
	SHARED	UBS	Use Bit Size instead of Caliper for all applications.	No	
	SHARED	MDBS	Mud Base	Water	
	SHARED	MDWT	Borehole Fluid Weight	9.300	ppg
	SHARED	WAGT	Weighting Agent	Natural	
	SHARED	BSAL	Borehole salinity	0.00	ppm
	SHARED	FSAL	Formation Salinity NaCl	0.00	ppm
	SHARED	KPCT	Percent K in Mud by Weight?	0.00	%
	SHARED	RMUD	Mud Resistivity	0.610	ohmm
	SHARED	TRM	Temperature of Mud	75.0	degF
	SHARED	CSD	Logging Interval is Cased?	No	
	SHARED	ICOD	AHV Casing OD	5.500	in
	SHARED	CSTR	Compressive Strength	1000.00	psia
	SHARED	ST	Surface Temperature	75.0	degF
	SHARED	TD	Total Well Depth	5218.00	ft
	SHARED	BHT	Bottom Hole Temperature	140.0	degF
	SHARED	SVTM	Navigation and Survey Master Tool	NONE	
	SHARED	AZTM	High Res Z Accelerometer Master Tool	GTET	
	SHARED	TEMM	CBM Temperature Master Tool	GTET	
	Rwa / CrossPlot	XPOK	Process Crossplot?	Yes	
	Rwa / CrossPlot	FCHO	Select Source of F	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	
	Rwa / CrossPlot	ROIN	Input for RO Calculation	Rwa	
	GTET	GROK	Process Gamma Ray?	Yes	
	GTET	GEOK	Process Gamma Ray EVR?	Yes	
	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?	Yes	
	DSNT	NLIT	Neutron Lithology	Limestone	
	DSNT	DNSO	DSN Standoff - 0.25 in (6.35 mm) Recommended	0.250	in
	DSNT	DNTT	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	
Microlog Pad	MLOK	Process MicroLog 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
SDLT Pad	BHSM	Borehole Size Source Tool	SDLT	
WSTT-I Receivers	WSOK	Process WSTT?	Yes	
WSTT-I Receivers	AFIL	Adaptive Filtering?	No	
WSTT-I Receivers	PINT	Process 1 Sample and Skip	0	
WSTT-I Receivers	PROM	Process Mode: M=1,MX=2,MY=3,MXY=4	4	
WSTT-I Receivers	DTSH	Delta -T Shale	100.00	uspf
WSTT-I Receivers	DTMT	Delta -T Matrix Type	User define	
WSTT-I Receivers	DTMA	Delta -T Matrix	57.00	uspf
WSTT-I Receivers	DTFL	Delta -T Pore Fluid	189.00	uspf
WSTT-I Receivers	RHOM	Matrix Density	2.7100	g/cc
WSTT-I Receivers	RHOF	Fluid Density	1.0000	g/cc
WSTT-I Receivers	SMTH	Semblance Threshold	0.25	
WSTT-I Receivers	VPVS	VPVS Ratio for Porosity	1.40	
WSTT-I Receivers	APEQ	Acoustic Porosity Equation	Wylie	
WSTT-I Receivers	NAVS	Navigation Source Tool	GTET	
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	Centered	
ACRt Sonde	RMOP	Rmud Source	Mud Cell	
ACRt Sonde	RMIN	Minimum Resistivity for MAP	0.20	ohmm
ACRt Sonde	RMAX	Maximum Resistivity for MAP	200.00	ohmm
ACRt Sonde	THQY	Threshold Quality	0.50	
ACRt Sonde	MRFX	Fixed mud resistivity	2000	ohmm
ACRt Sonde	BHSM	Borehole Size Source Tool	SDLT	
ACRt Sonde	MBFL	Apply Corkscrew Effect?	No	

BOTTOM

HALLIBURTON

CALIBRATION REPORT

NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name: **GTET - 11958947** **Reference Calibration Date:** **20-Feb-18 09:19:12**

Engineer:	**JORGE ORLANDO PEREZ**	**Calibration Date:**	**20-Feb-18 09:23:22**
Software Version:	**WL INSITE R5.0.5 (Build 8)**	**Calibration Version:**	**1**

Calibrator Source S/N: TB-146
Calibrator API Reference:225.00 api
Equivalent Calibrator API Reference:228.9 api

Measurement	Measured	Calibrated	Units
Background	29.2	29.5	api
Background + Calibrator	256.0	258.4	api
Calibrator	226.8	228.9	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name:	**GTET - 11958947**	**Reference Calibration Date:**	**20-Feb-18 09:23:22**
Engineer:	**JORGE ORLANDO PEREZ**	**Calibration Date:**	**07-Mar-18 09:29:45**
Software Version:	**WL INSITE R5.0.5 (Build 8)**	**Calibration Version:**	**1**

Calibrator Source S/N: TB-146
Calibrator API Reference:225.00 api
Equivalent Calibrator API Reference:228.9 api

Field Verification	Shop	Field	Units
Background	29.5	23.3	api
Background + Calibrator	258.4	253.5	api
Calibrator	228.9	230.1	api

Shop	Field	Difference	Tolerance
228.9	230.1	-1.2	+/- 9.00

DUAL SPACED NEUTRON SHOP CALIBRATION

Tool Name:	**DSNT - 11055304**	**Reference Calibration Date:**	**13-Mar-18 15:42:08**
Engineer:	**JORGE ORLANDO PEREZ**	**Calibration Date:**	**13-Mar-18 16:05:22**
Software Version:	**WL INSITE R5.0.5 (Build 8)**	**Calibration Version:**	**1**

Logging Source S/N: DSN-424
Tank Serial Number: 12345678
Reference value assigned to Tank: 56.100
Snow Block S/N: 12345678
Calibration Tank Water Temperature: 68 degF
Min. Tool Housing Outside Diameter: 3.625 in

CALIBRATION CONSTANTS

Measurement	Prev. Value	New Value	Control Limit On New Value
Gain:	1.04035	1.03906	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):	0.2362	0.2358	0.0004	+/- 0.0020
Calibrated Ratio:	10.5726	10.5595	0.013	+/- 0.050

VERIFIER

Measurement	Value	Control Limit
Snow-Block Porosity (decp):	0.0642	0.02000 - 0.09000

PASS/FAIL SUMMARY

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

DUAL SPACED NEUTRON FIELD CALIBRATION

Tool Name:	**DSNT - 11055304**	**Reference Calibration Date:**	**13-Mar-18 16:05:22**
Engineer:	**JORGE ORLANDO PEREZ**	**Calibration Date:**	**13-Mar-18 16:06:43**
Software Version:	**WL INSITE R5.0.5 (Build 8)**	**Calibration Version:**	**1**

Logging Source S/N: DSN-424

Snow Block S/N: 12345678

NEUTRON FIELD-CHECK SUMMARY

	Shop	Field	Difference	Control Limit On Change
Snow-Block Porosity (decp):	0.0642	0.0649	0.0007	+/- 0.0150

PASS/FAIL SUMMARY

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

DENSITY CALIPER SHOP CALIBRATION

Tool Name:	**SDLT - 10951315**	**Reference Calibration Date:**	**07-Mar-18 09:39:58**
Engineer:	**JORGE ORLANDO PEREZ**	**Calibration Date:**	**07-Mar-18 09:48:53**
Software Version:	**WL INSITE R5.0.5 (Build 8)**	**Calibration Version:**	**1**
Host Tool Name:	**DSNT - 11055304**		

CALIBRATION COEFFICIENTS

Measurement	Previous Value	New Value	Control Limit On New Value
Pad Offset	-3522.85	-3549.59	-7000.00 - -1000.00
Pad Gain	0.0003722	0.0003749	0.0002000 - 0.0006000
Arm Offset	-3023.66	-2454.88	-5000.00 - 3000.00
Arm Gain	0.0005295	0.0004796	0.000300 - 0.000700
Arm Power	-0.000006101	-0.000003067	-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)	3.73	3.75	0.02	+/- 0.20
RING DIAMETER:				
Small Ring (in)	6.40	6.50	0.10	+/- 0.20
Medium Ring (in)	8.27	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 - 10951315**	**Reference Calibration Date:**	**07-Mar-18 09:48:53**
Engineer:	**JORGE ORLANDO PEREZ**	**Calibration Date:**	**07-Mar-18 09:51:03**
Software Version:	**WL INSITE R5.0.5 (Build 8)**	**Calibration Version:**	**1**

MEASURED CALIPER VALUES

Measurement	Shop	Field	Change	Control Limit On New Value

Pad Extension	3.75	3.75	0.00	+/- 0.10
Ring Diameter	8.25	8.25	0.00	+/- 0.15

PASS/FAIL SUMMARY

Pad Extension Check:	Passed
Diameter Check:	Passed

MICRO LOG SHOP CALIBRATION

Tool Name: Microlog Pad - 10951315
Engineer: JORGE ORLANDO PEREZ
Software Version: WL INSITE R5.0.5 (Build 8)
Host Tool Name: DSNT - 11055304
Reference Calibration Date: 13-Mar-18 17:19:18
Calibration Date: 13-Mar-18 17:22:52
Calibration Version: 1

CALIBRATION COEFFICIENT SUMMARY

Measurement	Micro Log Normal		Micro Log Lateral		
	Measured	Calibrated	Measured	Calibrated	Units
Tool Zero	-0.09	-0.10	-0.01	-0.01	ohmm
Calibration Point #1	0.01	0.00	0.00	0.00	ohmm
Calibration Point #2	20.02	20.00	20.03	20.00	ohmm
Internal Reference	19.91	19.88	20.00	19.97	ohmm

Measurement	Micro Log Normal Tool Value	Micro Log Lateral Tool Value	Units
Tool Zero	2.05	-1.17	V
Calibration Point #1	27.43	1.85	V
Calibration Point #2	5351.08	6909.42	V
Internal Reference	5319.92	6898.68	V

MICRO LOG FIELD CHECK

Tool Name: Microlog Pad - 10951315
Engineer: JORGE ORLANDO PEREZ
Software Version: WL INSITE R5.0.5 (Build 8)
Reference Calibration Date: 13-Mar-18 17:22:52
Calibration Date: 13-Mar-18 17:24:28
Calibration Version: 1

Measurement	Micro Log Normal		Micro Log Lateral		
	Shop	Field	Shop	Field	Units
Tool Zero	-0.10	-0.07	-0.01	-0.02	ohmm
Internal Reference	19.88	19.89	19.97	19.98	ohmm

Summary

Signal	Shop	Field	Difference	Tolerence
Microlog Normal	19.88	19.89	-0.01	+/- 0.80
Microlog Lateral	19.97	19.98	-0.01	+/- 0.80

SPECTRAL DENSITY SHOP CALIBRATION

Tool Name: SDLT Pad - 10865873
Engineer: JORGE ORLANDO PEREZ
Software Version: WL INSITE R5.0.5 (Build 8)
Reference Calibration Date: 13-Mar-18 10:51:36
Calibration Date: 13-Mar-18 11:16:20
Calibration Version: 1

Logging Source S/N: 5168GW

Aluminum Block S/N: EL RENO STD ALUMINUM	Density: 2.581g/cc	Pe: 3.170
Magnesium Block S/N: EL RENO	Density: 1.687g/cc	Pe: 2.594

DENSITY CALIBRATION SUMMARY

Measurement	Previous Value	New Value	Control Limit
Near Bar Gain	1.0157	1.0357	0.90 - 1.10
Near Dens Gain	1.0196	1.0142	0.90 - 1.10
Near Peak Gain	1.0395	1.0317	0.90 - 1.10
Near Lith Gain	1.0541	1.0327	0.90 - 1.10

Far Bar Gain	1.0110	1.0122	0.90 - 1.10
Far Dens Gain	1.0025	1.0022	0.90 - 1.10
Far Peak Gain	0.9984	0.9998	0.90 - 1.10
Far Lith Gain	0.9749	0.9761	0.90 - 1.10
Near Bar Offset	0.1609	-0.0201	NONE
Near Dens Offset	0.1178	0.1665	NONE
Near Peak Offset	-0.0532	0.0109	NONE
Near Lith Offset	-0.1910	-0.0138	NONE
Far Bar Offset	0.1786	0.1672	NONE
Far Dens Offset	0.2184	0.2226	NONE
Far Peak Offset	0.2132	0.2040	NONE
Far Lith Offset	0.3427	0.3343	NONE
Near Bar Background	823.98	821.51	700 - 1450
Near Dens Background	269.05	269.15	230 - 480
Near Peak Background	119.85	118.90	100 - 210
Near Lith Background	144.86	144.31	125 - 260
Far Bar Background	600.14	599.08	450 - 900
Far Dens Background	236.51	236.11	175 - 345
Far Peak Background	92.88	92.59	70 - 140
Far Lith Background	96.04	96.48	75 - 145

CALIBRATION BLOCK SUMMARY

Measurement	Current Reading (Previous Coef)	Calibrated (New Coef)	Change	Control Limit On Change
MAGNESIUM				
Density (g/cc)	1.687	1.687	0.000	+/- 0.015
Pe	2.525	2.551	0.026	+/- 0.150
ALUMINUM				
Density (g/cc)	2.580	2.581	0.001	+/- 0.01500
Pe	3.157	3.123	-0.034	+/- 0.150

TOOL SUMMARY

Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	0.0003	+/- 0.0110	-0.0014	+/- 0.0140
Magnesium Block	-0.0011	+/- 0.0110	-0.0013	+/- 0.0140
Aluminum Block	-0.0011	+/- 0.0110	-0.0008	+/- 0.0140
Resolution	10.05	6.00 - 11.50	9.01	6.00 - 11.50
Internal Verifier(B+D+P+L)	1354	1200 - 2700	1024	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

Tool Name: SDLT Pad - 10865873
Reference Calibration Date: 13-Mar-18 11:16:20
Engineer: JORGE ORLANDO PEREZ
Calibration Date: 13-Mar-18 11:19:41
Software Version: WL INSITE R5.0.5 (Build 8)
Calibration Version: 1

Software Version: WL INSITE R5.0.5 (Build 8) **Calibration Version:** 1

Pad Temperature: 68.2 degF

DENSITY FIELD CALIBRATION SUMMARY

Measurement	Shop	Field	Change	Control Limit +/-
Near (B+D+P+L) cps	1353.863	1357.958	4.095	14.876
Far (B+D+P+L) cps	1024.257	1029.378	5.121	17.069
Near Resolution	10.05	9.94	-0.110	0.50
Far Resolution	9.01	8.96	-0.050	1.00

PASS/FAIL SUMMARY

Bkg Quality Check:	Passed
Bkg Resolution Check:	Passed
Bkg Verification Check:	Passed

ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION

Tool Name: ACRt Sonde - 11005908 **Reference Calibration Date:** 24-Jan-18 11:50:13

Engineer: JORGE ORLANDO PEREZ **Calibration Date:** 16-Mar-18 10:34:00

Software Version: WL INSITE R5.0.5 (Build 8) **Calibration Version:** 1

Host Tool Name: ACRt Instrument - 11026095

TYPICAL GAIN RANGE

Subarray	R12KHz			R36KHz			R72KHz		
	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper
A1 (80")	0.95	1.0415	1.05	0.95	1.0202	1.05	0.95	1.0109	1.05
A2 (50")	0.95	1.0485	1.05	0.95	1.0233	1.05	0.95	1.0144	1.05
A3 (29")	0.95	1.0353	1.05	0.95	1.0139	1.05	0.95	1.0048	1.05
A4 (17")	0.95	1.0423	1.05	0.95	1.0194	1.05	0.95	1.0121	1.05
A5 (10")	N/A	N/A	N/A	0.95	1.0134	1.05	0.95	1.0048	1.05
A6 (6")	N/A	N/A	N/A	0.95	1.0044	1.05	0.95	0.9956	1.05

SONDE OFFSET

Subarray	R12KHz	R36KHz	R72KHz
	(mmho/m)	(mmho/m)	(mmho/m)
A1 (80")	1.428	-4.149	-5.990
A2 (50")	-0.217	-4.118	-5.417
A3 (29")	-14.051	-4.501	-3.906
A4 (17")	-92.668	-28.984	-24.290
A5 (10")	N/A	-111.115	-48.871
A6 (6")	N/A	354.229	183.875

TRANSMITTER CURRENT GAIN

Signal	Lower	R	Upper
12K	0.6	0.92	1.3
36K	1.0	1.93	2.0
72K	1.0	1.27	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

QUALITY CHECK SHOP CALIBRATION

Tool Name: ACRt Sonde - 11005908 **Reference Calibration Date:** 16-Mar-18 10:35:27

Engineer: JORGE ORLANDO PEREZ **Calibration Date:** 16-Mar-18 10:36:37

Software Version: WL INSITE R5.0.5 (Build 8) **Calibration Version:** 1

Host Tool Name: ACRt Instrument - 11026095

STANDARD DEVIATIONS

	R12KHz			R36KHz			R72KHz		
	Measured (mmho/m)	Expected (mmho/m)	Pass/Fail	Measured (mmho/m)	Expected (mmho/m)	Pass/Fail	Measured (mmho/m)	Expected (mmho/m)	Pass/Fail
A1 (80")	0.000	< 0.750	Pass	0.000	< 0.750	Pass	0.000	< 0.750	Pass
A2 (50")	0.000	< 0.750	Pass	0.000	< 0.750	Pass	0.000	< 0.750	Pass
A3 (29")	0.000	< 0.750	Pass	0.000	< 0.750	Pass	0.000	< 0.750	Pass
A4 (17")	0.000	< 0.750	Pass	0.000	< 0.750	Pass	0.000	< 0.750	Pass
A5 (10")	0.000	< 0.750	Pass	0.000	< 0.750	Pass	0.000	< 0.750	Pass
A6 (6")	0.000	< 0.750	Pass	0.000	< 0.750	Pass	0.000	< 0.750	Pass

AVERAGES

	R12KHz			R36KHz			R72KHz		
	Measured (mmho/m)	Expected (mmho/m)	Pass/Fail	Measured (mmho/m)	Expected (mmho/m)	Pass/Fail	Measured (mmho/m)	Expected (mmho/m)	Pass/Fail
A1 (80")	0.000	< 0.500	Pass	-0.001	> -0.500	Pass	-0.006	> -0.500	Pass
A2 (50")	0.000	< 0.500	Pass	-0.001	> -0.500	Pass	-0.005	> -0.500	Pass
A3 (29")	-0.000	< 0.500	Pass	-0.001	> -0.500	Pass	-0.004	> -0.500	Pass
A4 (17")	-0.002	> -0.500	Pass	-0.007	> -0.500	Pass	-0.024	> -0.500	Pass
A5 (10")	-0.013	> -0.500	Pass	-0.026	> -0.500	Pass	-0.049	> -0.500	Pass
A6 (6")	0.016	< 0.500	Pass	0.078	< 0.500	Pass	0.169	< 0.500	Pass

GAIN TOLERANCE

R12KHz

	Measured (mmho/m)	Last Month (mmho/m)	Difference (mmho/m)	Tolerance (mmho/m)	Pass/Fail
A1 (80")	-212634064.000	-212633888.000	176.000	10631694.400	Pass
A2 (50")	-209134528.000	-209132944.000	1584.000	10456647.200	Pass
A3 (29")	-209198784.000	-209198864.000	80.000	10459943.200	Pass
A4 (17")	-212472320.000	-212469504.000	2816.000	10623475.200	Pass
A5 (10")	-215806928.000	-215805120.000	1808.000	10790256.000	Pass
A6 (6")	-216964560.000	-217024160.000	59600.000	10851208.000	Pass

R36KHz

	Measured (mmho/m)	Last Month (mmho/m)	Difference (mmho/m)	Tolerance (mmho/m)	Pass/Fail
A1 (80")	45945148.000	45942224.000	2924.000	2297111.200	Pass
A2 (50")	42617908.000	42614540.000	3368.000	2130727.000	Pass
A3 (29")	35212352.000	35209964.000	2388.000	1760498.200	Pass
A4 (17")	36200304.000	36198396.000	1908.000	1809919.800	Pass
A5 (10")	42031348.000	42028092.000	3256.000	2101404.600	Pass
A6 (6")	42711908.000	42592740.000	119168.000	2129637.000	Pass

R72KHz

	Measured (mmho/m)	Last Month (mmho/m)	Difference (mmho/m)	Tolerance (mmho/m)	Pass/Fail
A1 (80")	-93057816.000	-93058472.000	656.000	4652923.600	Pass
A2 (50")	-87051256.000	-87047392.000	3864.000	4352369.600	Pass
A3 (29")	-89096656.000	-89095584.000	1072.000	4454779.200	Pass
A4 (17")	-87151120.000	-87148272.000	2848.000	4357413.600	Pass
A5 (10")	-86683120.000	-86681608.000	1512.000	4334080.400	Pass
A6 (6")	-87306328.000	-87322176.000	15848.000	4366108.800	Pass

PASS/FAIL SUMMARY

Std Deviation Verification	Pass
Average Verification	Pass

Average Verification	Pass
Gain Tolerance Verification	Pass

CALIBRATION SUMMARY

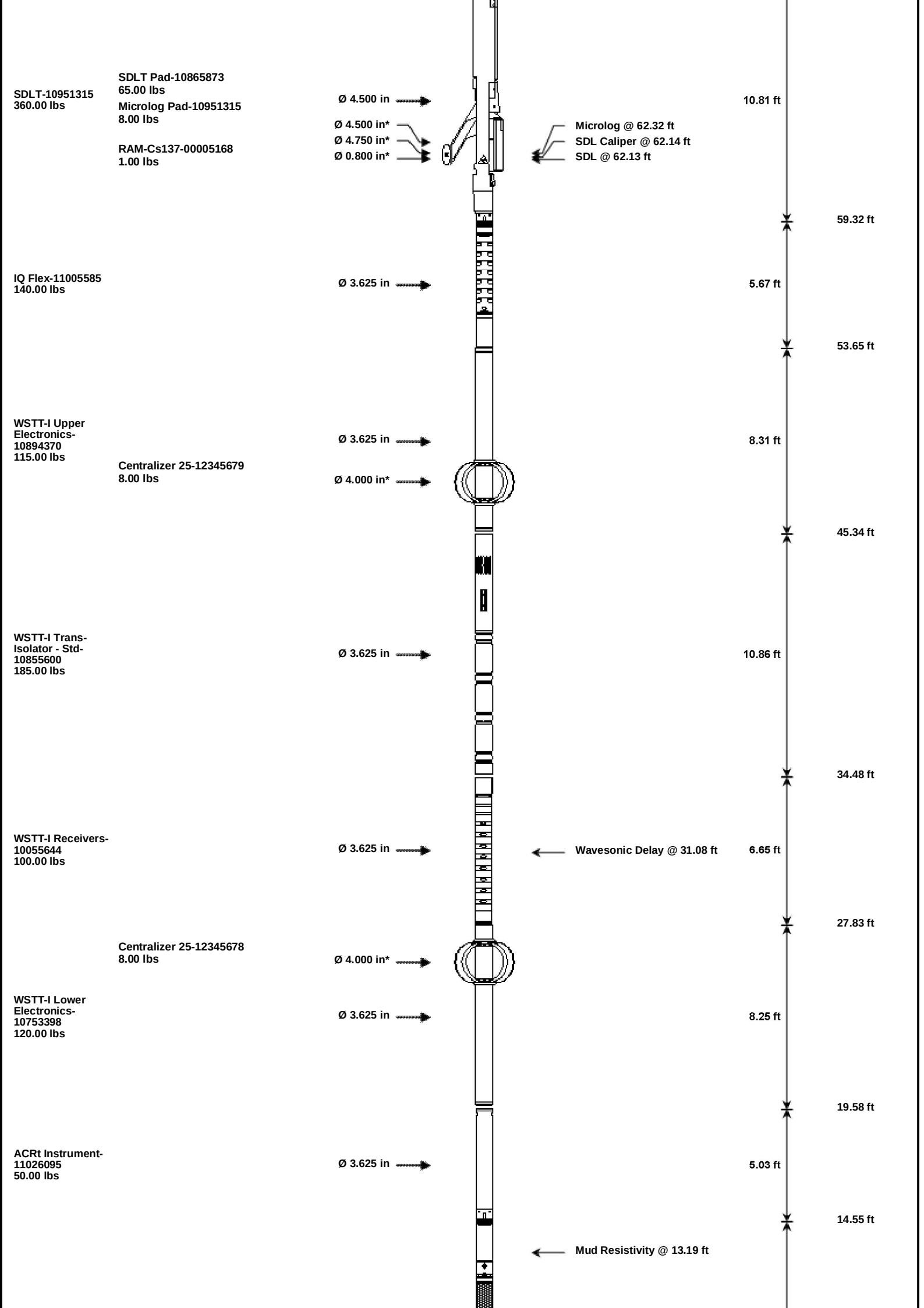
Sensor	Shop	Field	Post	Difference	Tolerance	Units
GTET-11958947						
Gamma Ray Calibrator	228.9	230.1	----------	-1.2	+/- 9.00	api
DSNT-11055304						
Snow-Block Porosity	0.0642	0.0649	----------	-0.0007	+/- 0.0150	decp
SDLT-10951315						
Pad Extension	3.75	3.75	----------	0.00	+/-0.10	in
Ring Diameter	8.25	8.25	----------	0.00	+/-0.15	in
Microlog Pad-10951315						
MicroLog Normal	19.88	19.89	----------	-0.01	+/-0.80	ohmm
MicroLog Lateral	19.97	19.98	----------	-0.01	+/-0.80	ohmm
SDLT Pad-10865873						
Near(B+D+P+L)	1353.863	1357.958	----------	-4.095	+/-14.876	cps
Far(B+D+P+L)	1024.257	1029.378	----------	-5.121	+/-17.069	cps
ACRt Sonde-11005908						
Mud Cell	1.00	----------	----------	0	----------	ohm-m

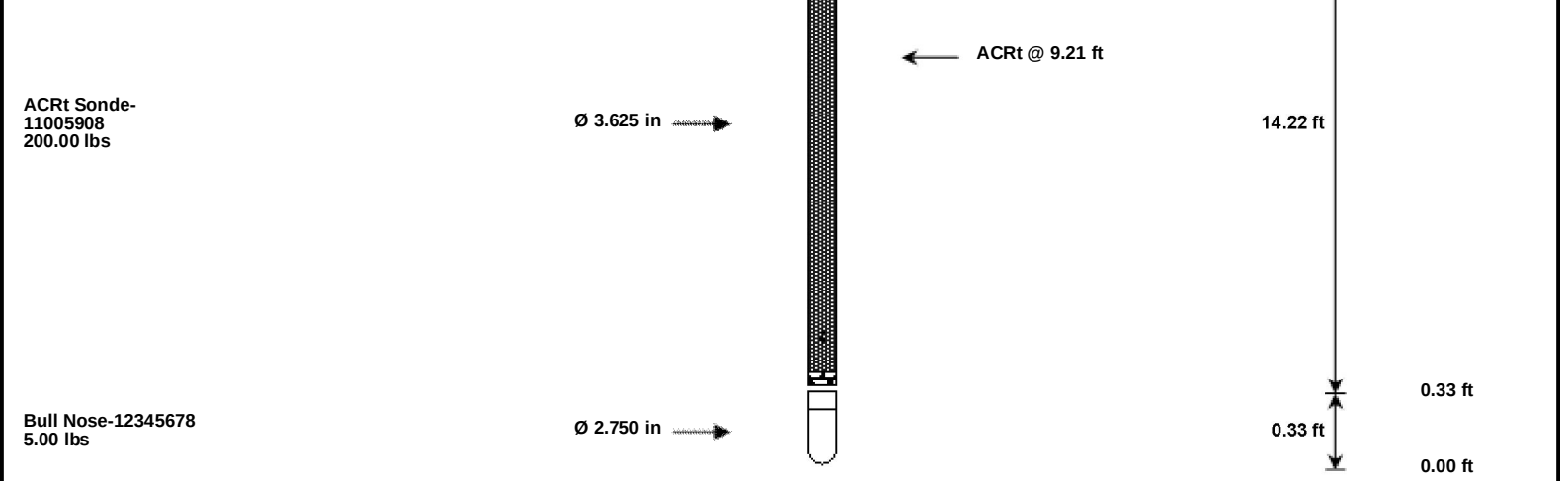
Data: RAMSHORN_MARSH\0001 GTET-DSNT-SDLT-WSTT-ACRT\IDLE **Date: 20-Mar-18 12:34:04**

HALLIBURTON

TOOL STRING DIAGRAM REPORT

Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length
				Temperature @ 95.03 ft		95.53 ft
CH_HOS-11459024 37.50 lbs	Weak Point 7000 lbs-00000025 0.01 lbs	Ø 2.750 in Ø 0.010 in*			2.50 ft	
						93.03 ft
XOHD-11569312 20.00 lbs		Ø 2.750 in Ø 3.625 in			0.95 ft	
						92.08 ft
SP Sub-11153357 60.00 lbs		Ø 3.625 in		SP @ 90.30 ft	3.74 ft	
						88.34 ft
				Z-Accelerometer @ 87.89 ft		
GTET-11958947 165.00 lbs		Ø 3.625 in			8.52 ft	
				GammaRay @ 82.28 ft		
						79.82 ft
	DSN Decentralizer-11055304 6.60 lbs	Ø 5.000 in*				
DSNT-11055304 174.00 lbs		Ø 3.625 in			9.69 ft	
				DSN Far @ 72.89 ft		
				DSN Near @ 72.14 ft		
						70.14 ft


SDLT Pad-10865873
65.00 lbs
SDLT-10951315
360.00 lbs
Microlog Pad-10951315
8.00 lbs
RAM-Cs137-00005168
1.00 lbs
Ø 4.500 in
Ø 4.500 in*
Ø 4.750 in*
Ø 0.800 in*
Microlog @ 62.32 ft
SDL Caliper @ 62.14 ft
SDL @ 62.13 ft
10.81 ft
59.32 ft
IQ Flex-11005585
140.00 lbs
Ø 3.625 in
5.67 ft
53.65 ft
WSTT-I Upper
Electronics-
10894370
115.00 lbs
Ø 3.625 in
8.31 ft
Centralizer 25-12345679
8.00 lbs
Ø 4.000 in*
45.34 ft
WSTT-I Trans-
Isolator - Std-
10855600
185.00 lbs
Ø 3.625 in
10.86 ft
34.48 ft
WSTT-I Receivers-
10055644
100.00 lbs
Ø 3.625 in
Wavesonic Delay @ 31.08 ft
6.65 ft
27.83 ft
Centralizer 25-12345678
8.00 lbs
Ø 4.000 in*
WSTT-I Lower
Electronics-
10753398
120.00 lbs
Ø 3.625 in
8.25 ft
19.58 ft
ACRt Instrument-
11026095
50.00 lbs
Ø 3.625 in
5.03 ft
14.55 ft
Mud Resistivity @ 13.19 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	11459024	37.50	2.50		93.03	300.00
WP7K	Weak Point 7000 lbs	00000025	0.01	0.01	*	93.83	300.00
XOHD	Hostile to Dits Cross Over	11569312	20.00	0.95		92.08	300.00
SP	SP Sub	11153357	60.00	3.74		88.34	300.00
GTET	Gamma Telemetry Tool	11958947	165.00	8.52		79.82	60.00
DSNT	Dual Spaced Neutron	11055304	174.00	9.69		70.14	60.00
DCNT	DSN Decentralizer	11055304	6.60	5.13	*	73.47	300.00
SDLT	Spectral Density Tool	10951315	360.00	10.81		59.32	60.00
SDLP	Density Insite Pad	10865873	65.00	2.55	*	61.53	60.00
Cs137	Logging Source, SDLT-I, 1.78 Ci - Cs137	00005168	1.00	0.80	*	61.76	300.00
MICP	Microlog Pad	10951315	8.00	1.00	*	61.82	60.00
IQF	IQ Flex tool	11005585	140.00	5.67		53.65	300.00
WSTT	WaveSonic Insite - Upper Electronics	10894370	115.00	8.31		45.34	100.00
OBCEN	Centralizer - 25 in. Overbody	12345679	8.00	2.08	*	46.64	300.00
WSTT	WaveSonic Insite - Trans-Isolator - Std	10855600	185.00	10.86		34.48	100.00
WSTT	WaveSonic Insite - Receivers	10055644	100.00	6.65		27.83	30.00
WSTT	WaveSonic Insite - Lower Electronics	10753398	120.00	8.25		19.58	100.00
OBCEN	Centralizer - 25 in. Overbody	12345678	8.00	2.08	*	25.14	300.00
ACRt	Array Compensated True Resistivity Instrument Section	11026095	50.00	5.03		14.55	120.00
ACRt	Array Compensated True Resistivity Sonde Section	11005908	200.00	14.22		0.33	120.00
BLNS	Bull Nose	12345678	5.00	0.33		0.00	300.00
Total			**1,828.11**	**95.53**			

* Not included in Total Length and Length Accumulation.

Data: RAMSHORN_MARSH\0001 GTET-DSNT-SDLT-WSTT-ACRT\005 20-Mar-18 10:49 Up @5225.3f **Date: 20-Mar-18 12:33:11**

COMPANY	**RAMSHORN RESOURCES, LLC**		
WELL	**MARSH #1-27**		
FIELD	**DEARHEAD**		
COUNTY	**BARBER**	STATE	**KANSAS**

HALLIBURTON

ARRAY COMPENSATED TRUE RESISTIVITY MICRO LOG