



CEMENT BOND - VARIABLE DENSITY LOG
 SCHLUMBERGER OF CANADA
 Calgary, Alberta

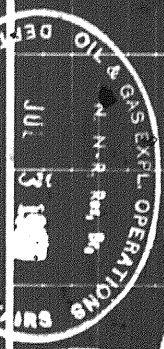
PROVINCE NORTHWEST TERRITORIES
 FIELD WILDCAT
 WELL COLUMBIA ET AL KOTANFELLEE Y.T. E-37
 COMPANY COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

LOCATION
 LSD 609 16 270 N 121 W
 SEC 1240 7 12 N 10 E
 RANGE
 COMPANY COLUMBIA GAS DEVELOPMENT OF CANADA LTD.
 WELL COLUMBIA ET AL KOTANFELLEE Y.T. E-37
 FIELD WILDCAT
 PROVINCE NORTHWEST TERRITORIES

Permanent Datum 613.5 m Elev. 421.7 m
 Log Measured From 8.81 m Above Perm. Datum Elev. 414.7 m
 Drilling Measured From 8.81 m Above Perm. Datum Elev. 414.7 m
 Date 21 MAR 80
 Run No. ONE
 P.B.I.D. Driller ONE
 Depth-Logger (Schl.) 414.0 m
 Stem Log Interval 309.0 m
 Top Log Interval 275.0 m
 Open Hole Size 114.3 mm
 Bottom Hole Temp. 14.4 C
 Maximum WHP 0 KPa
 Casing Fluid Type WATER
 Casing Fluid Salinity FULL
 Annulus Fluid Unit DISTRICT
 Recorded By BULLEN
 Witnessed By McDONALD

TUBING & CASING RECORD
 Surface Casing Size (mm) 114.3 Wt. (kg/m) 10.0 Grade Type Joint
 Protection Casing 114.3
 Production Casing 114.3
 Liner
 Tubing
 Tubing

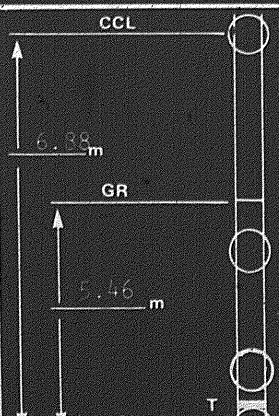
MISCELLANEOUS
 Production Packer @ 409.9 m
 Minimum ID = 114.3 mm
 EXISTING REFORATIONS
 TO 409.9 m FROM 409.9 m TO 409.9 m



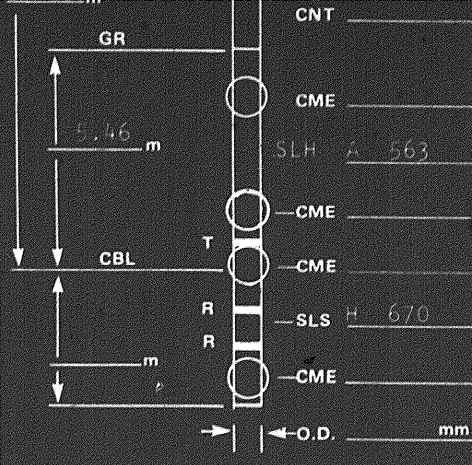
PRIMARY CEMENTING PROCEDURE	CORRELATION LOG:	Service Order No. 200105
Hour - Date	Type: FDC-CNL-GR	Collars Recorded 6.88 m Deep
Started pumping cement	Curve: GAMMA RAY	
Release pressure	Service Co.: SCHLUMBERGER	
Start Cement Bond Log	Date: 10 SEPT 78	
Finish Cement Bond Log	Other:	

PRIMARY CEMENTING DATA		Sonde Mode: UT TO DELAY 2.5
STRING		Detection Mode: E1 MAN
Volume of Cement 38.6 CU/M		Cartridge Gain: 1/20
Type of Cement OILWELL CLASS G		Spacing:
Additive 30% SILICA FLOUR		Amplitude .91 m
Retarder 1 R-58		Variable Density 1.52 m
Retarder 1.75 D-21		Preceding fluid: Volume: m ³
Wt. of Slurry 1.5 T 10		Cement pumped @ m ³ /min
Water loss ABOUT 365.7% OF CEMENT WAS LEFT INSIDE THE CASING PLUG WAS NOT BUMPED.		Pipe reciprocated during pumping: Yes <input type="checkbox"/> No <input type="checkbox"/>
Type fluid in csg.		Pipe reciprocated after plug down: Yes min, No <input type="checkbox"/>
Fluid wt.		

SQUEEZE JOB DETAIL		DOWNHOLE EQUIPMENT	SURFACE EQUIPMENT
Squeeze number 1	2	CCL	TYPE MOD. S.N.
Date		CME CAL RA 1121	Sonic Panel SLP J 316
Depth Interval		ECH KG 118	Memorizer MMP B 527
Type cement		NLT	GNP GNP D 791 F
Volume of cement		CNT	CRP CRP BA 134
Additive			OWE
Retarder			Casing Centralizer Pattern
Weight of slurry		CME	/ Joint from to
Preceding fluid		SLH A 563	/ Joint from to
Breakdown pressure		CME	/ Joint from to
Max. pressure-stage 1		CME	/ Joint from to
" " 2			/ Joint from to
" " 3			/ Joint from to



Additive		
Retarder		
Weight of slurry		
Preceding fluid		
Breakdown pressure		
Max. pressure-stage 1		
" " " 2		
" " " 3		
Final maximum pressure		
Started pumping cement		
Released pressure		
Start CBL		
Finish CBL		
AVERAGE WELL DRIFT	° from	to
	° from	to



CNT	Casing Centralizer Pattern	
	/ Joint from	to
CME	/ Joint from	to
SLH A 563	Casing Scratcher Pattern	
	/ Joint from	to
CME	/ Joint from	to
CME	/ Joint from	to
T		
CME		
SLS H 670	REMARKS	
	20 APR 87 EDM/DD	
	UNABLE TO RUN PRESSURE	
	PASS DUE TO PERFORATIONS	
CME		

NOTE: DO NOT USE LOG FOR CORRELATION PURPOSE.
LOG IS OFF DEPTH.

X4010

FIELD INTERPRETATION

$$\text{BOND INDEX} = \frac{\text{ATTENUATION IN ZONE OF INTEREST (db/m)}}{\text{ATTENUATION IN WELL CEMENTED ZONE (db/m)}}$$

$$1.0 \text{ BOND INDEX} \Rightarrow 2.0 \text{ mv} \Rightarrow 34.1 \text{ db/m}$$

$$0.8 \text{ BOND INDEX} \Rightarrow 27.3 \text{ db/m} \Rightarrow 4.1 \text{ mv}$$

HYDRAULIC ISOLATION IN 178m CASING

REQUIRES 3.0 METRES OF 0.8 BOND INDEX

INTERPRETATION:

UNABLE RUN PRESSURE PASS DUE TO PERFORATIONS.

All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to Clause 4 of our General Terms and Conditions as set out in our current Price Schedule.

SINGLE RECEIVER TOTAL TRAVEL TIME MICROSECONDS	DEPTH METRES	AMPLITUDE VOLTAGE MILLIVOLTS	VARIABLE DENSITY TIME SPAN MICROSECONDS
400 ————— 200		0 ————— 50	200 ————— 1200
GAMMA RAY activity API units	INTERPRETATION OF HYDRAULIC ISOLATION	0 ————— 10	
<input checked="" type="checkbox"/> UNCALIBRATED			
		BONDING INCREASES	RECORDED CASING COLLARS

1 Minute

400 200

GAMMA RAY activity API units

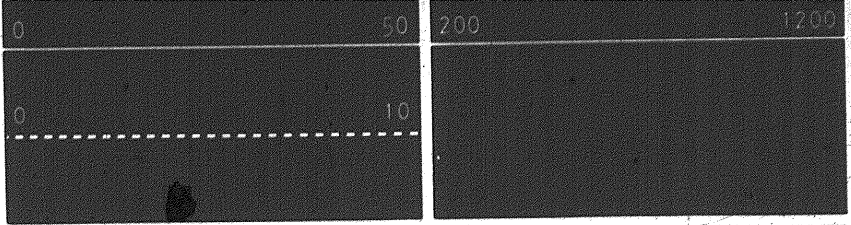
UNCALIBRATED

1 Minute

CASING COLLARS CORRECT DEPTH

X4010A

INTERPRETATION OF HYDRULIC ISOLATION

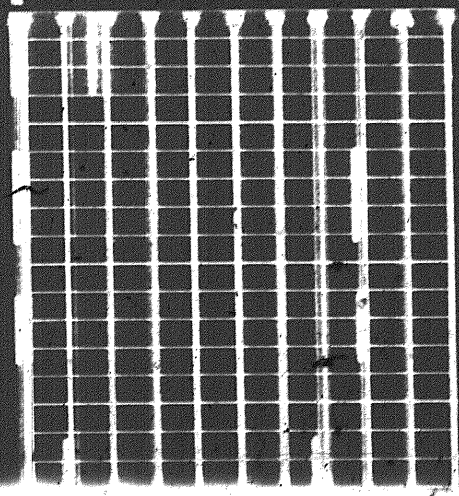


BONDING INCREASES

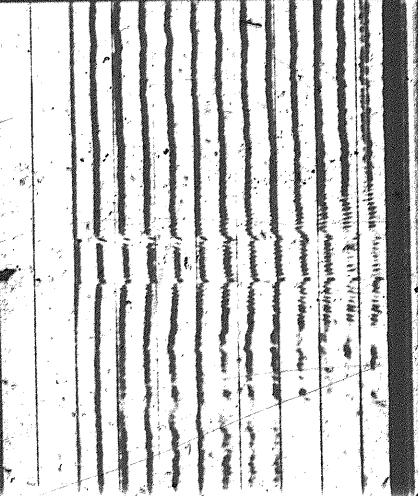
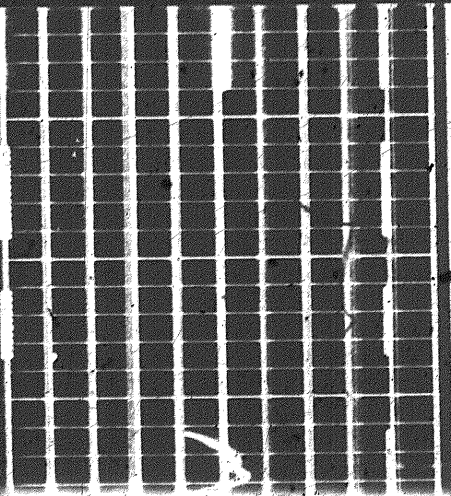
RECORDED CASING COLLARS

6.33 m DEEP

Sonde Mode: UT TO DELAY 2.5
 Detection Mode: E1 MAN
 Cartridge Gain: 1720
 Wellhead Pressure = 0 kPa



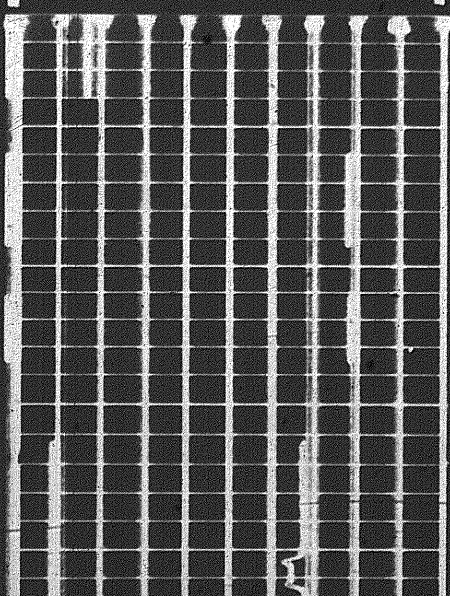
3 2 1



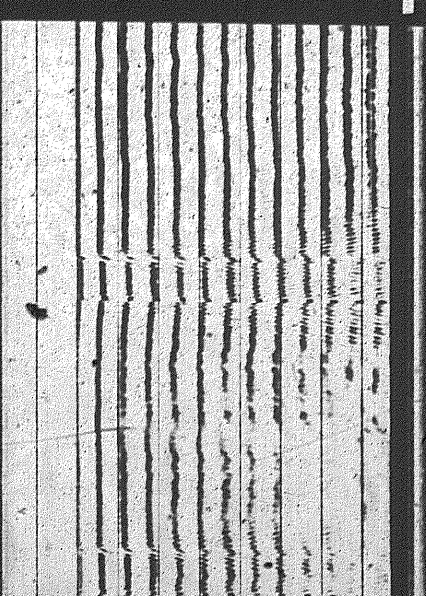
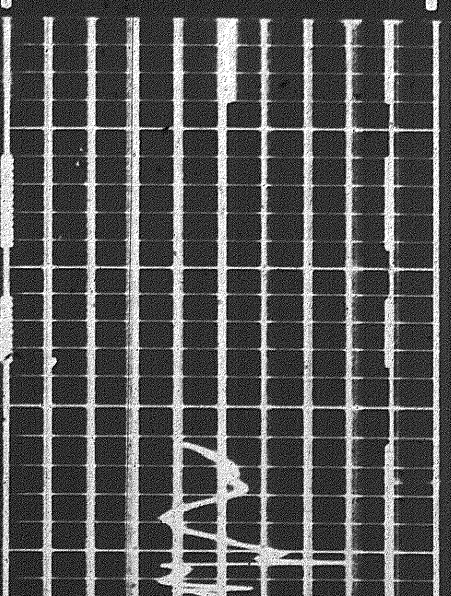
CORRECT DEPTH

Cartridge Gain: _____
 Wellhead Pressure _____ kPa

X4010A



3 2 1



Travel Time

GR

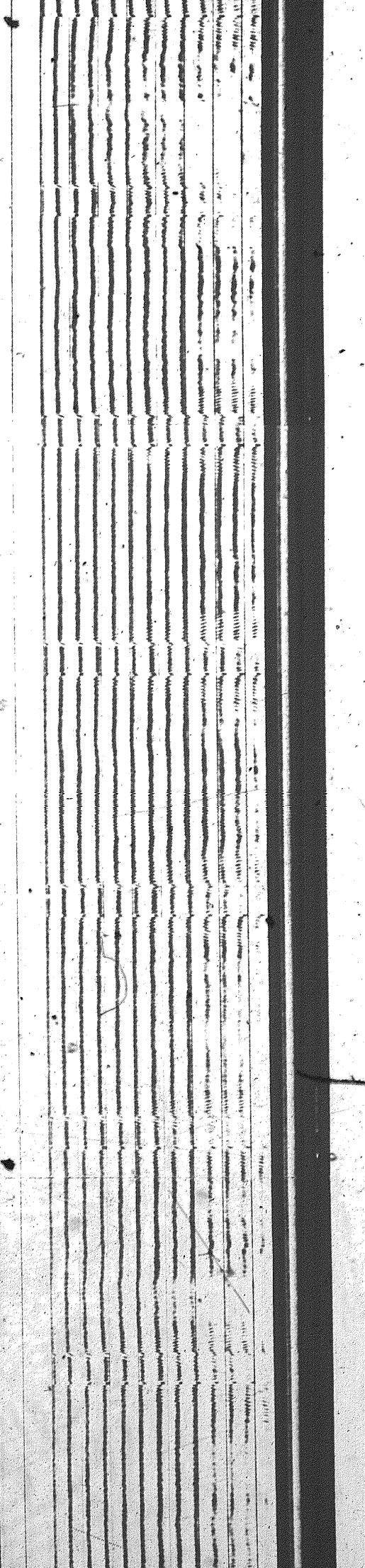
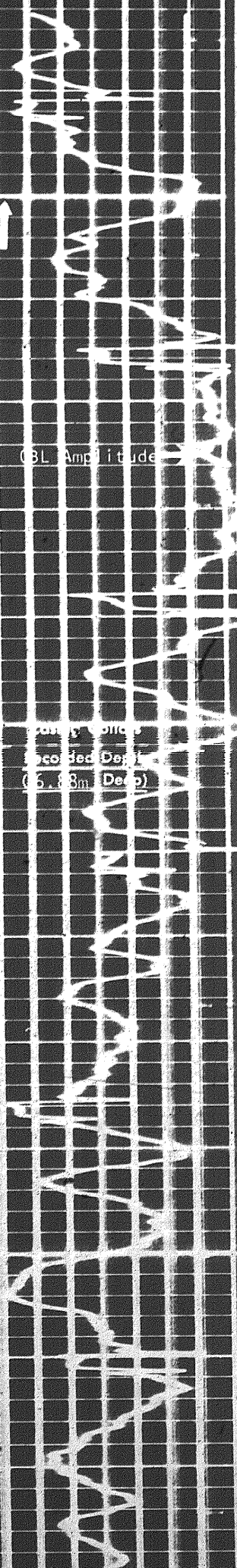
3090

3100

LR

08L Amplitude

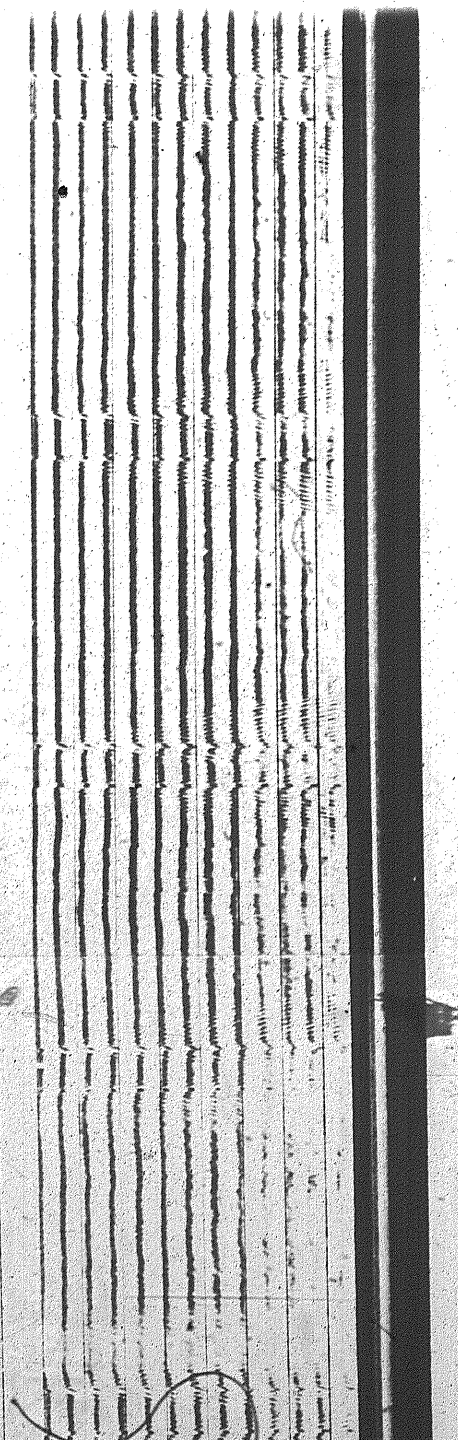
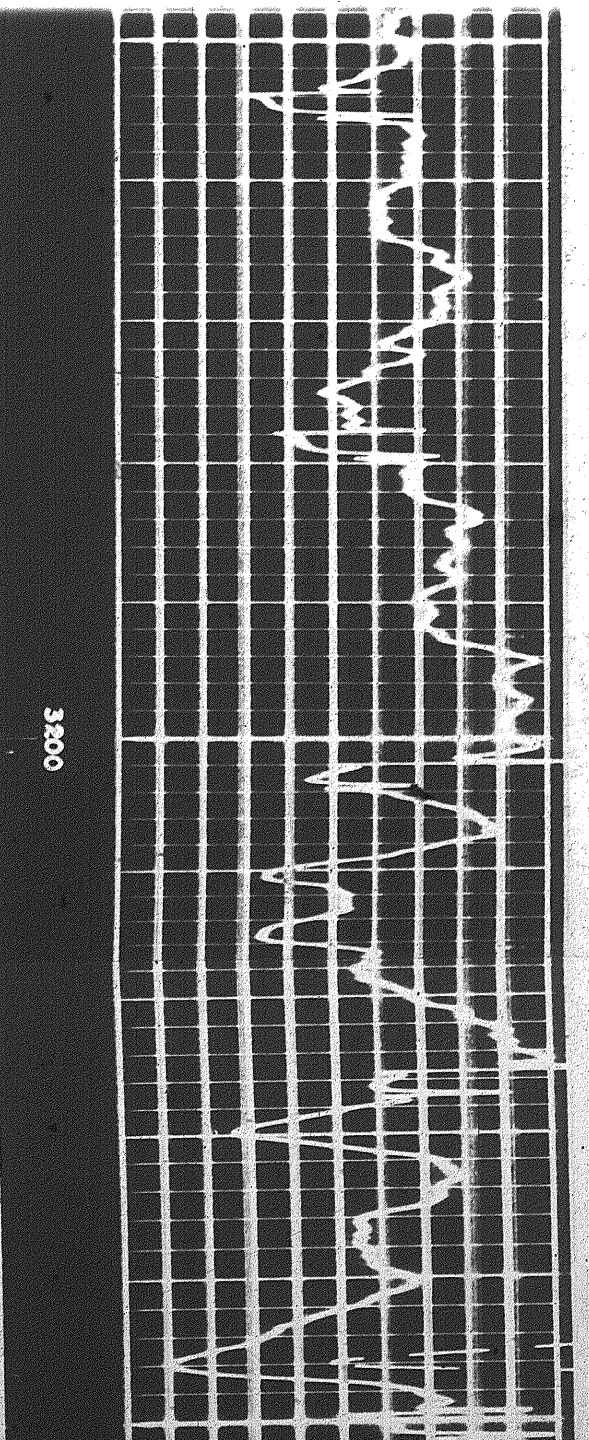
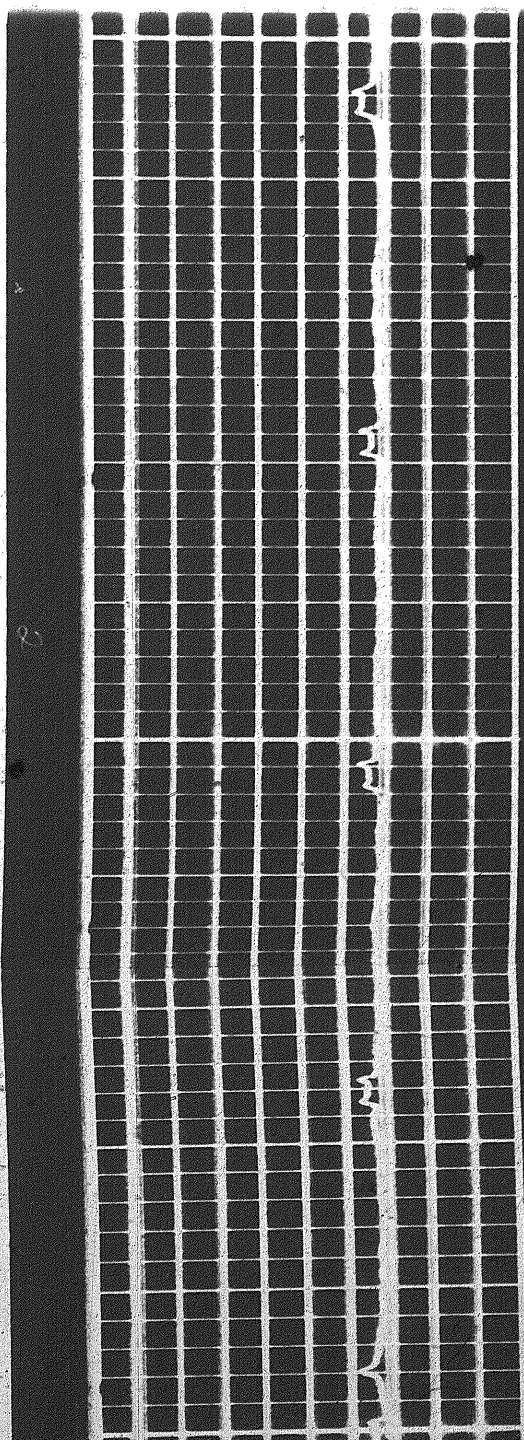
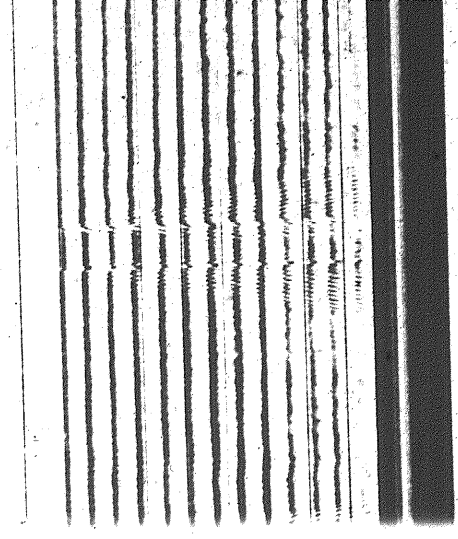
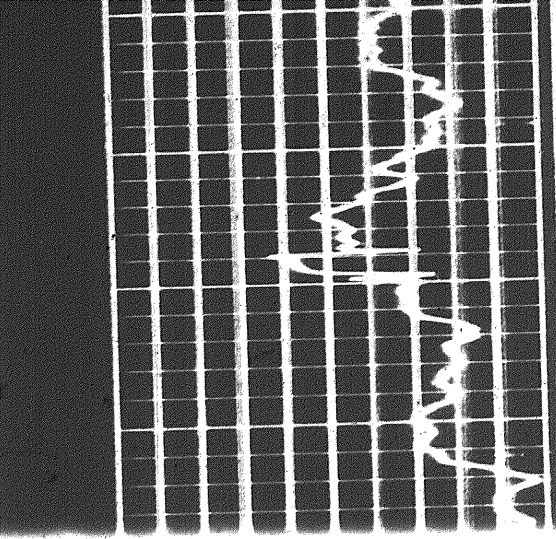
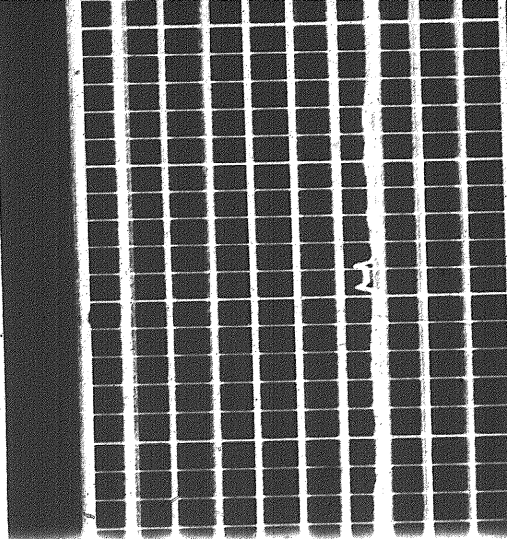
08L Amplitude
Recorded Depth
(6.38m Depth)



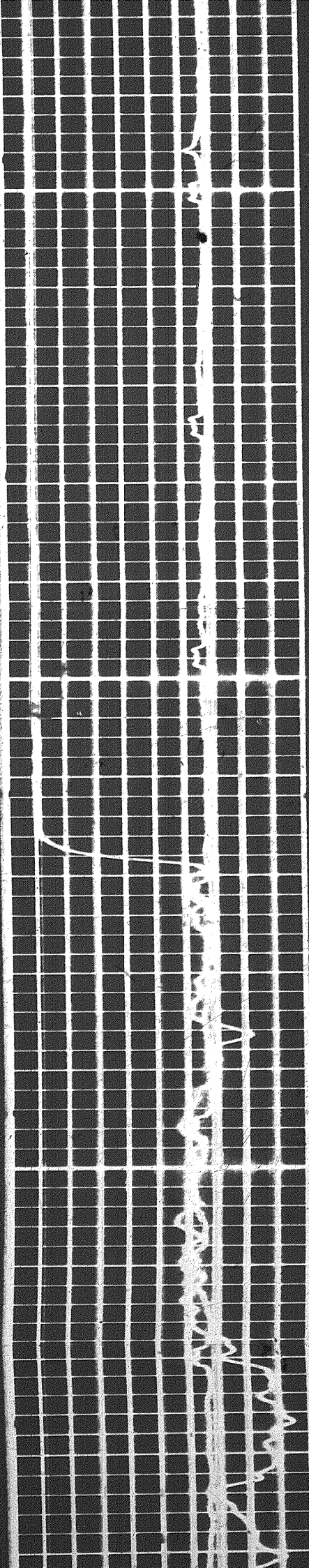
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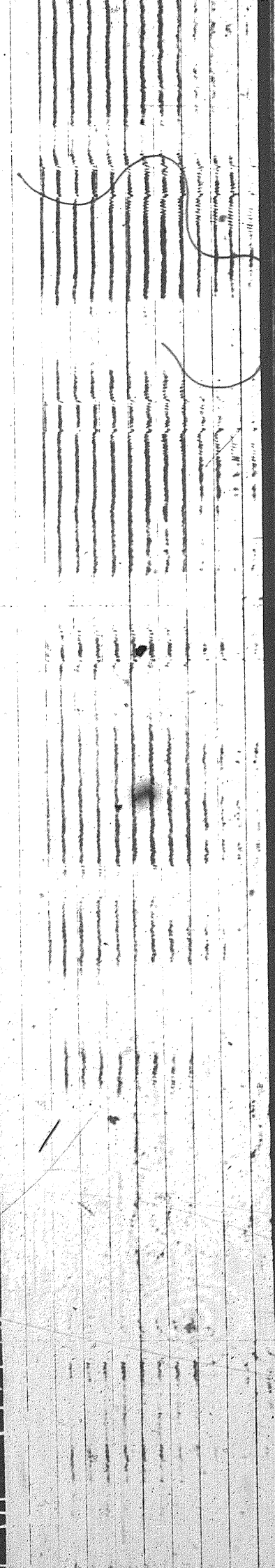
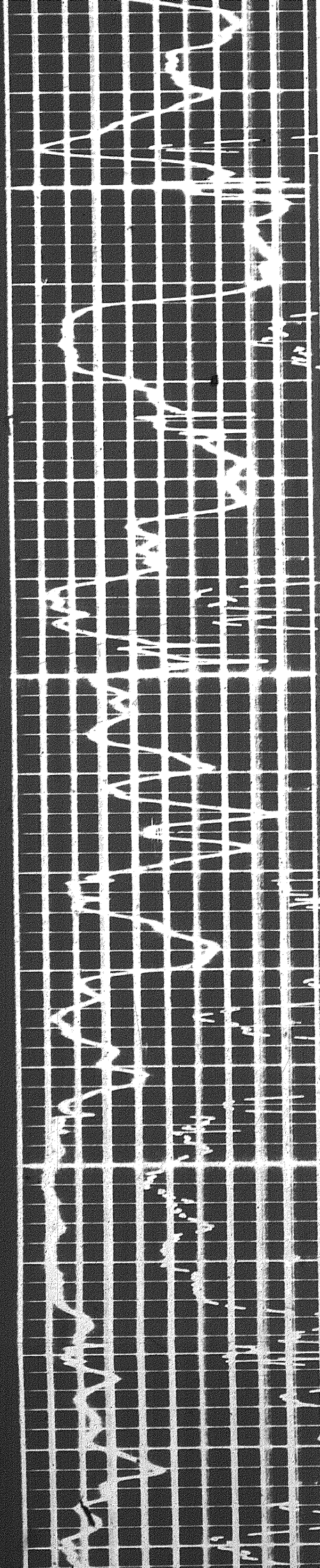
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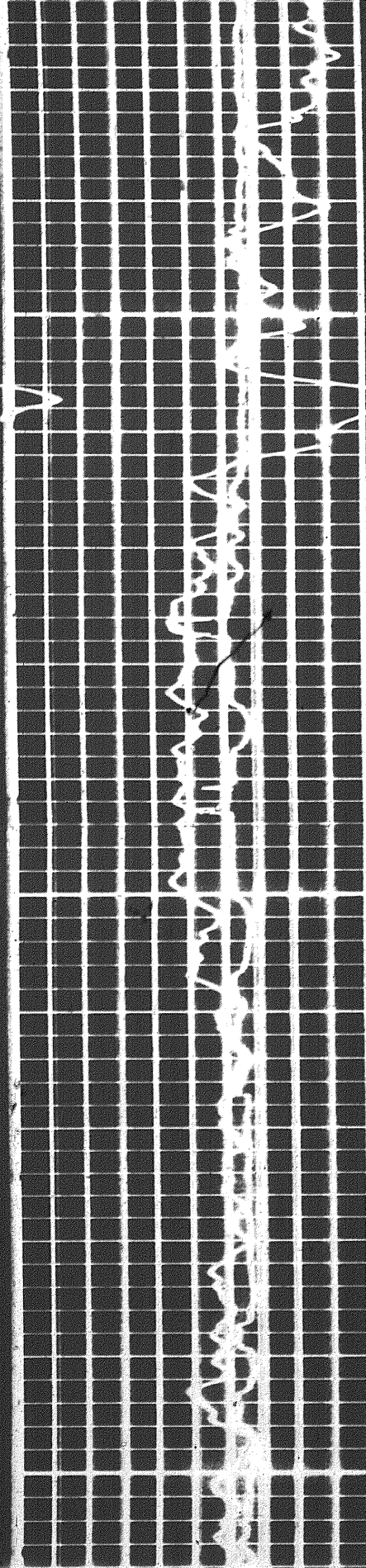


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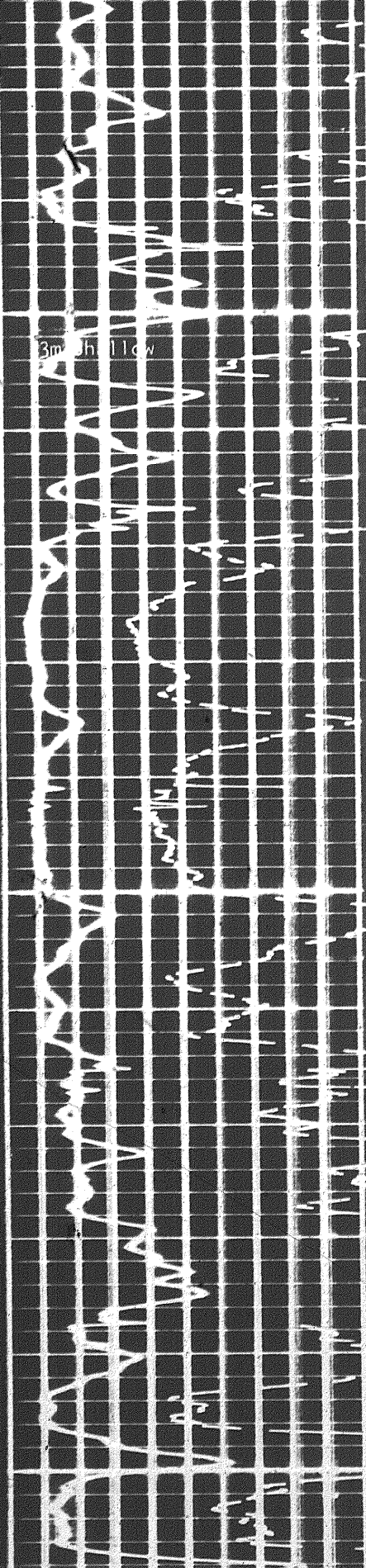


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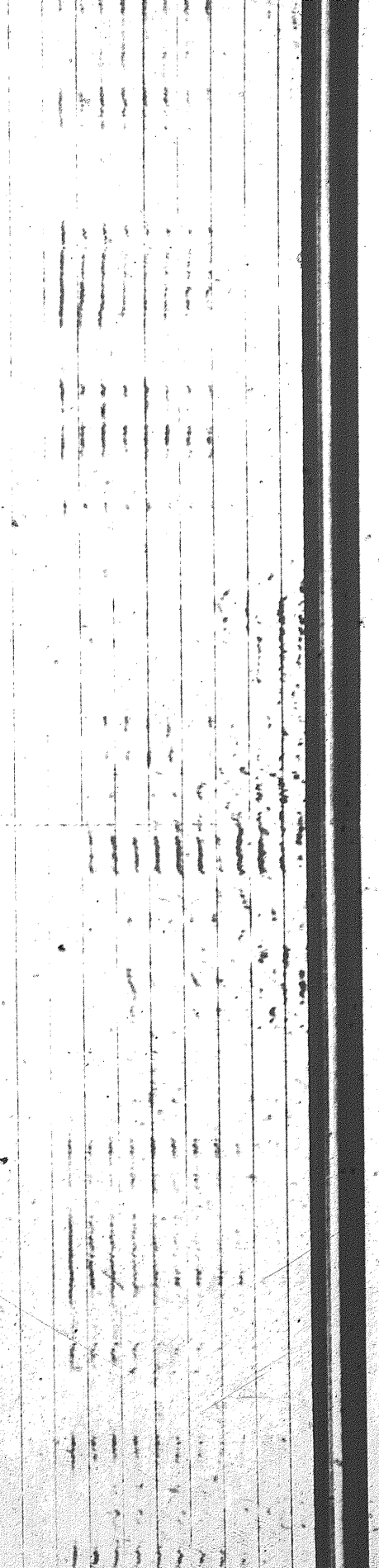


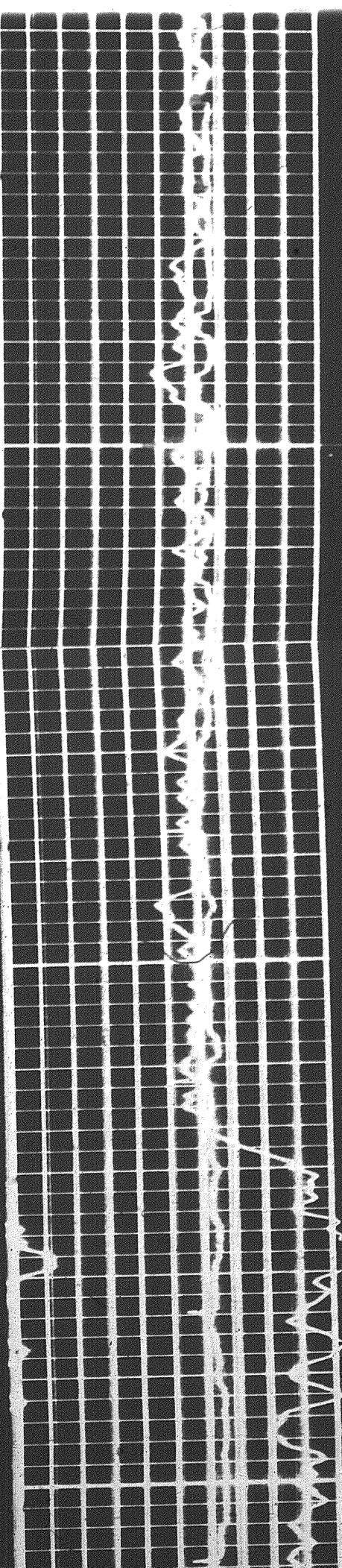
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3mm/h 1lw

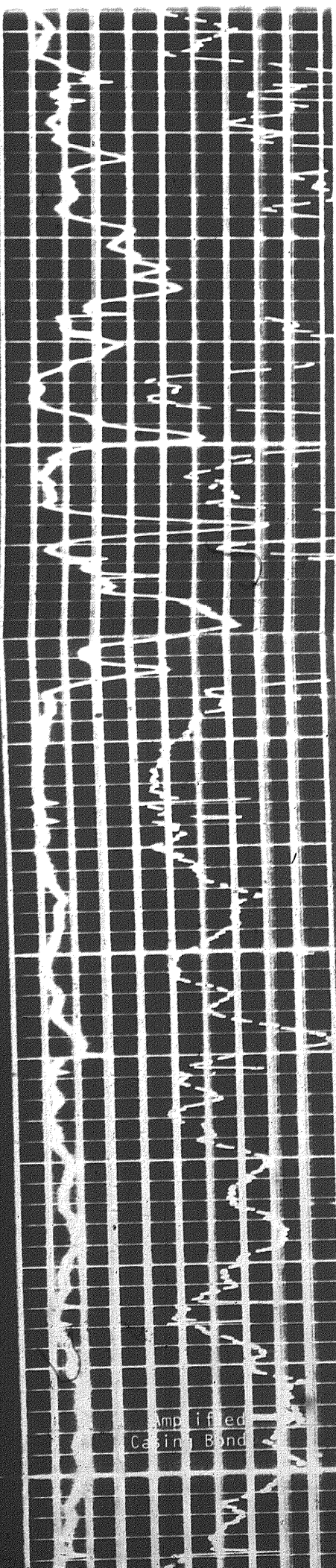
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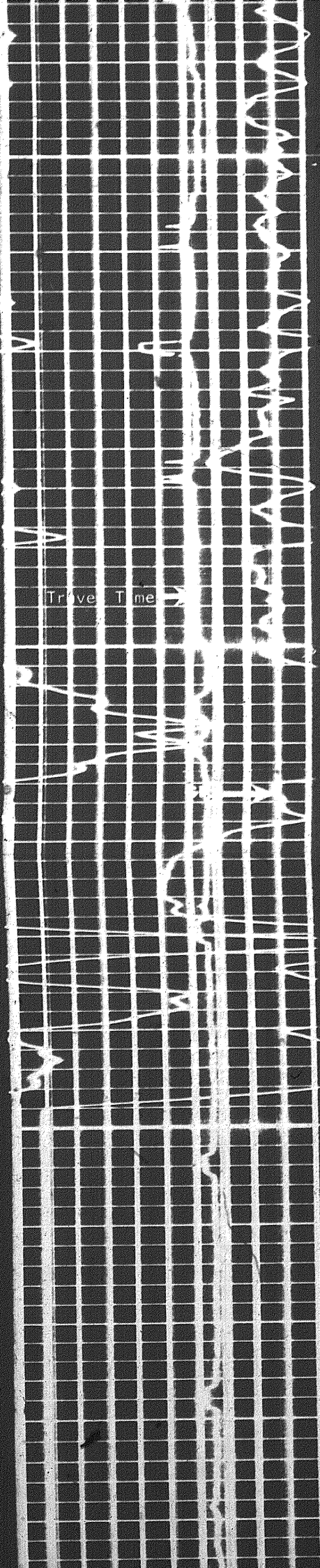
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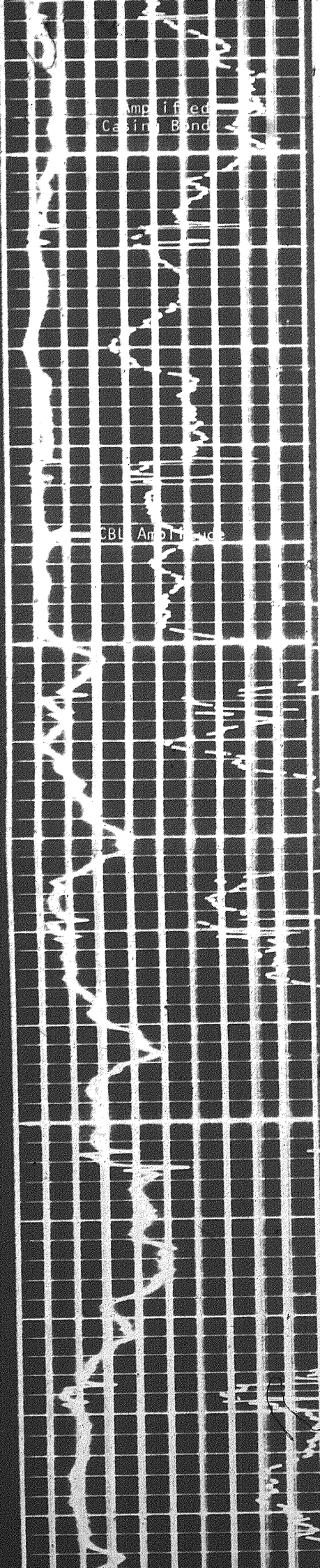
Amplified
Chest Bond



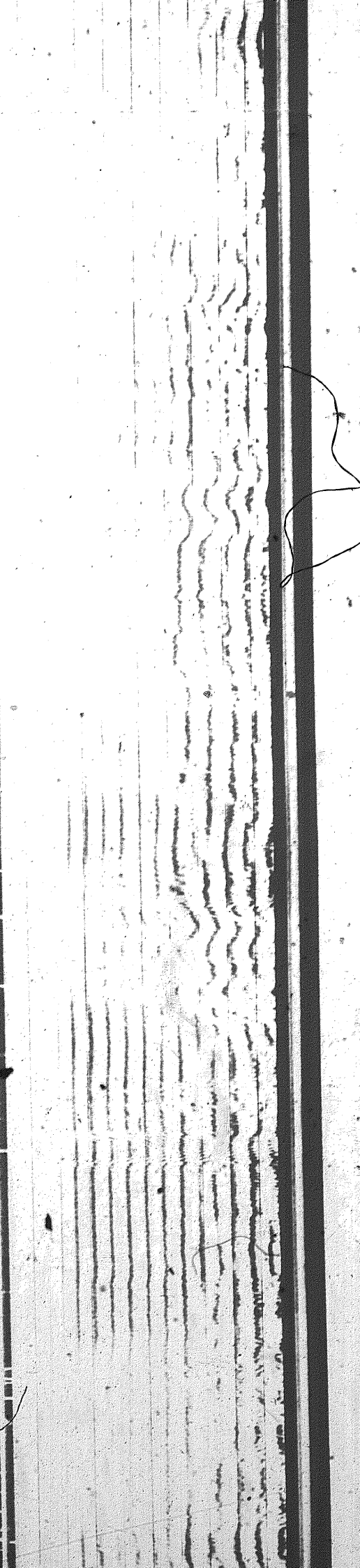


3400

Amplified
Casino Bond



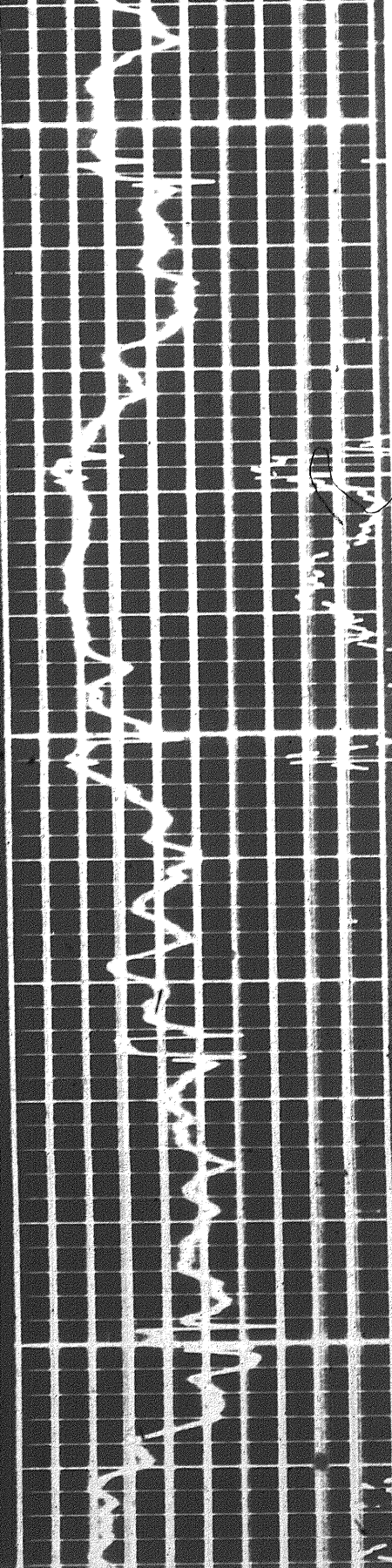
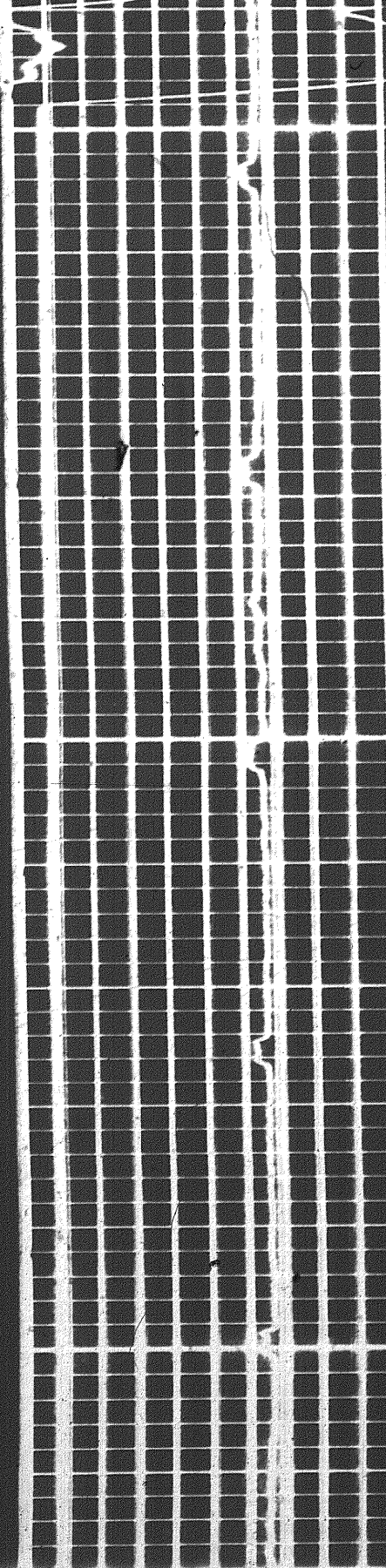
CBI Amplified



3480

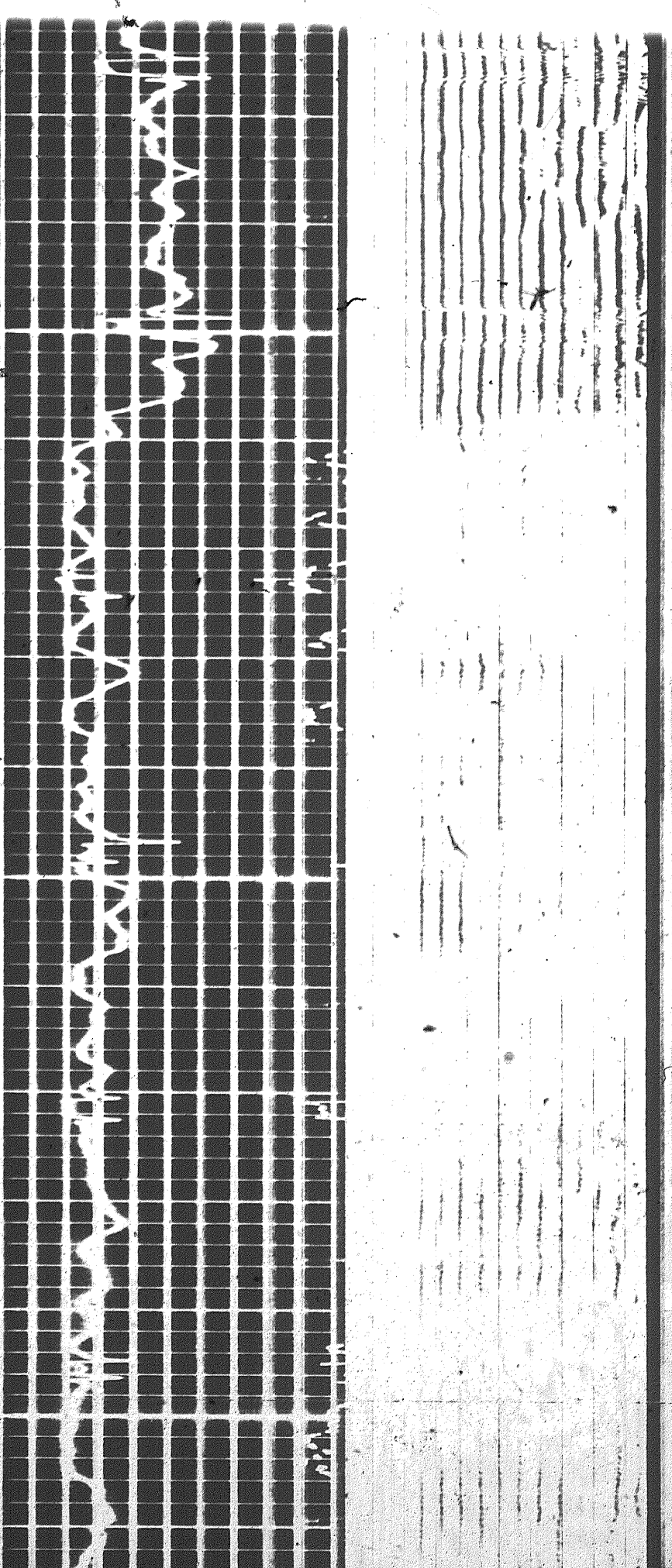
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3500



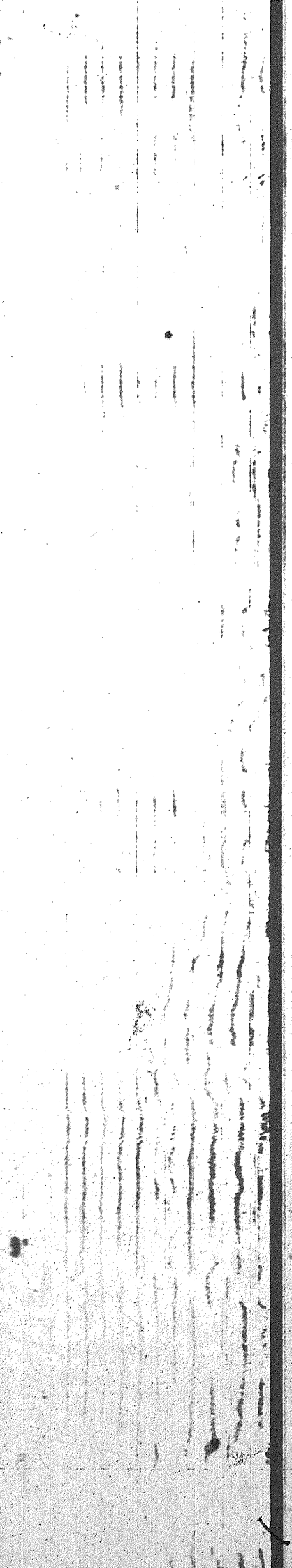
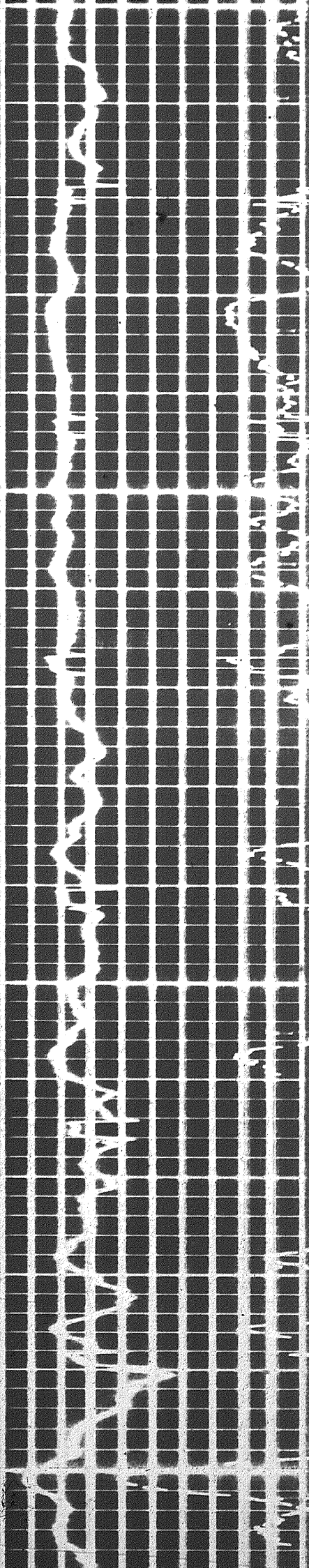
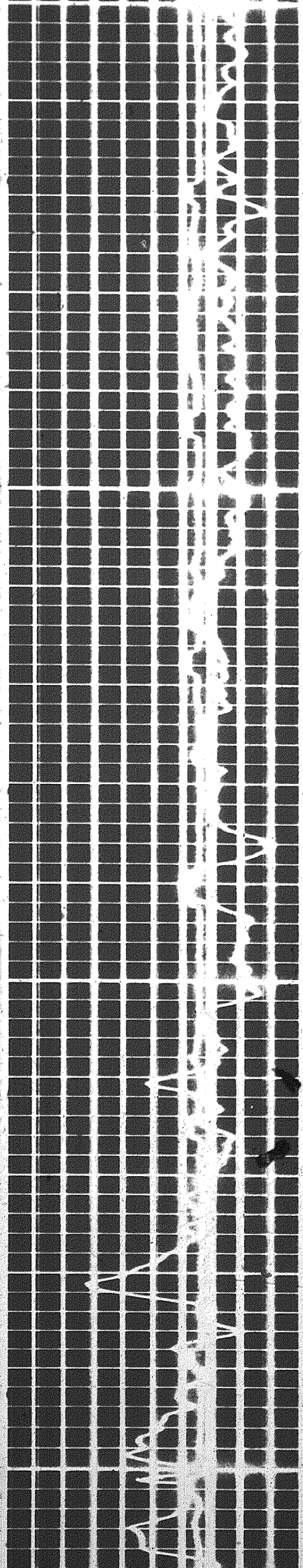
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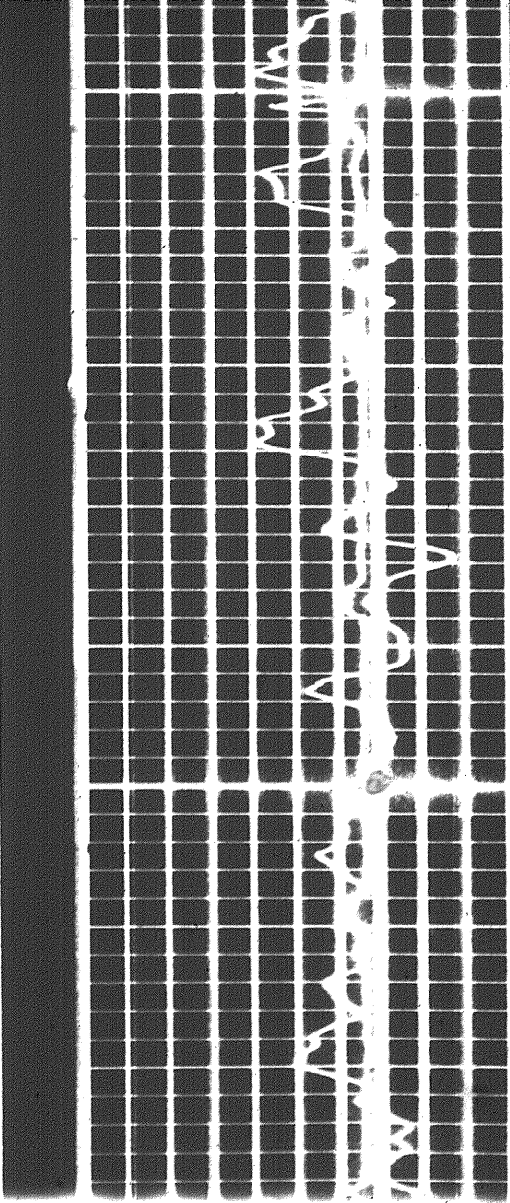
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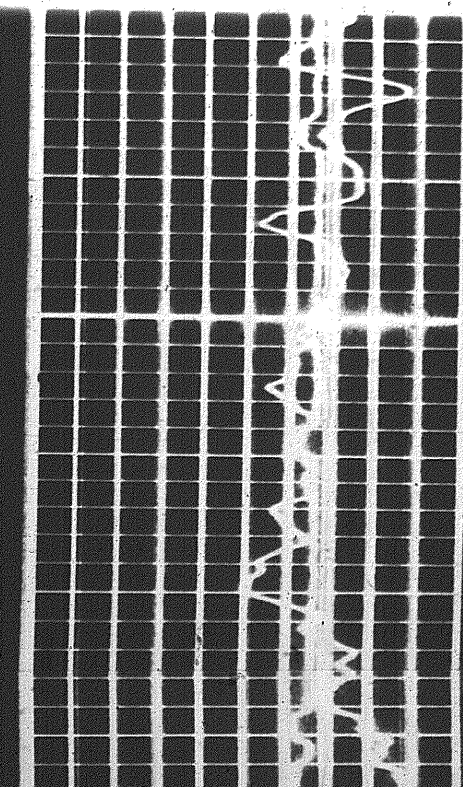
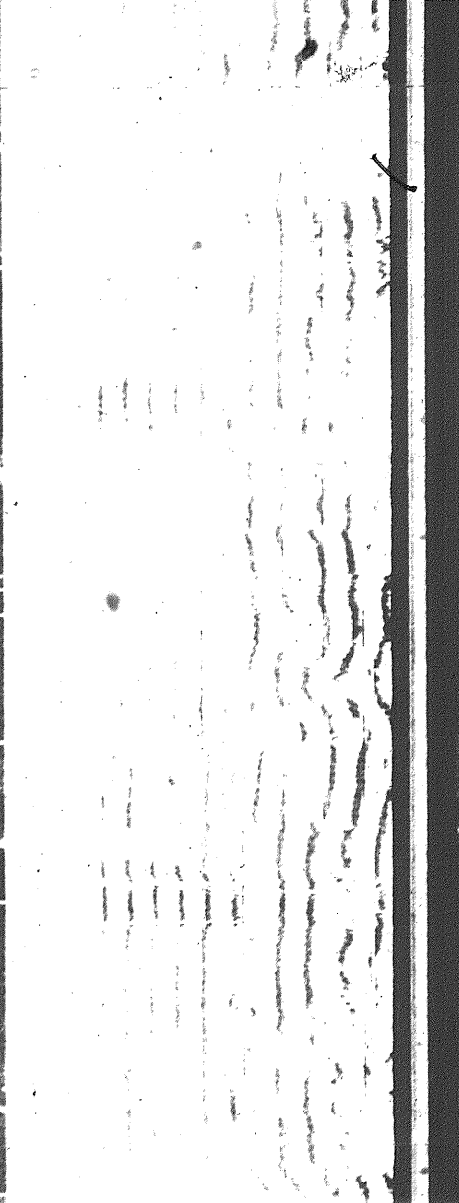
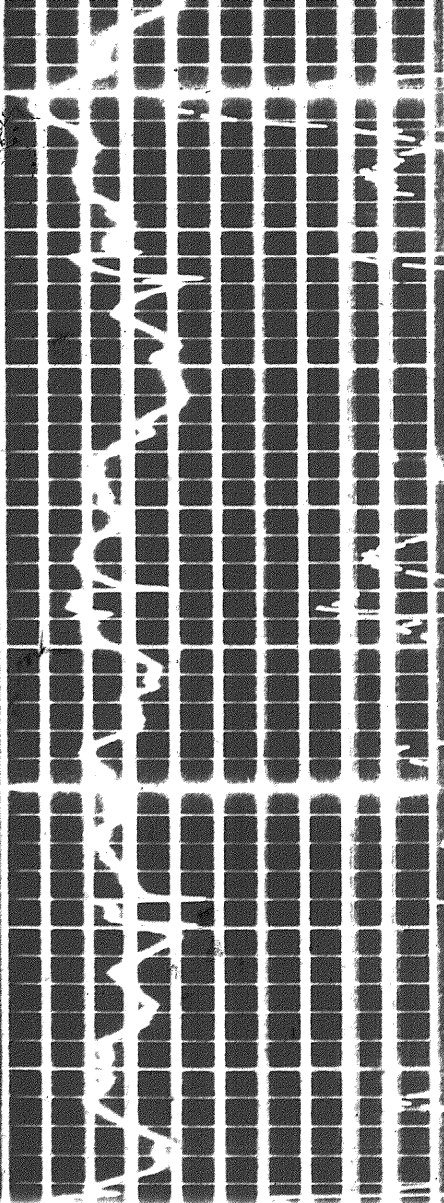
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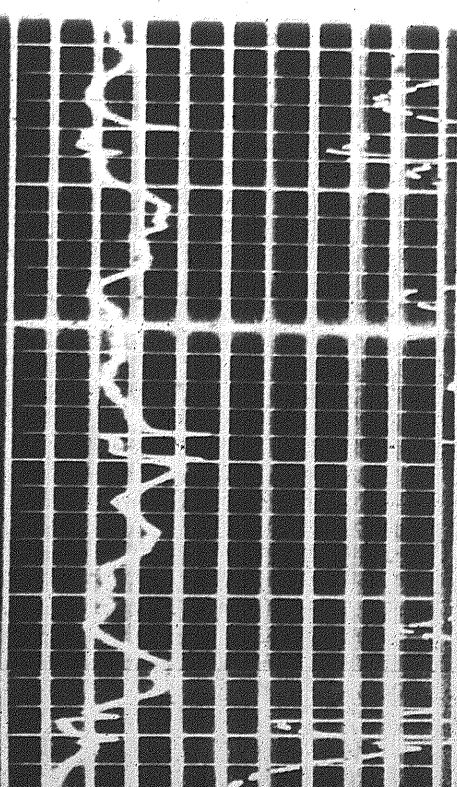


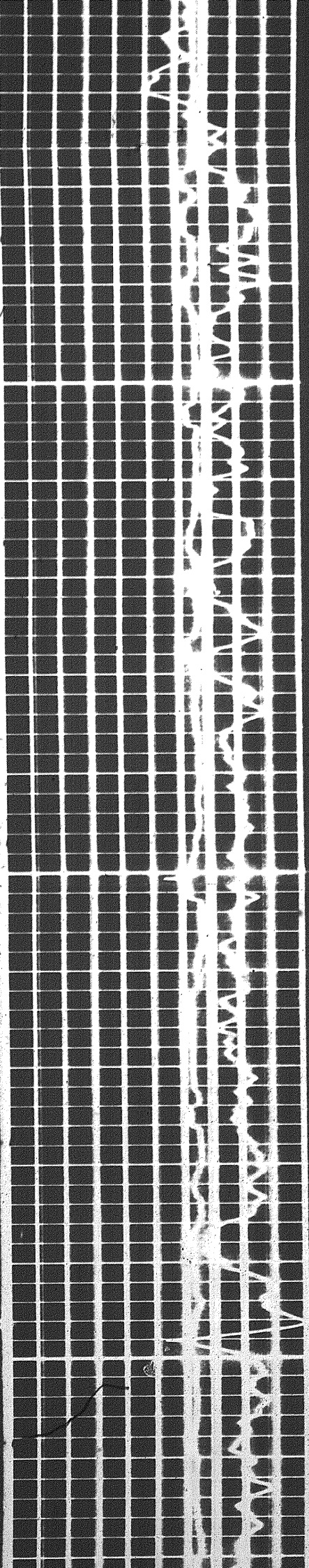


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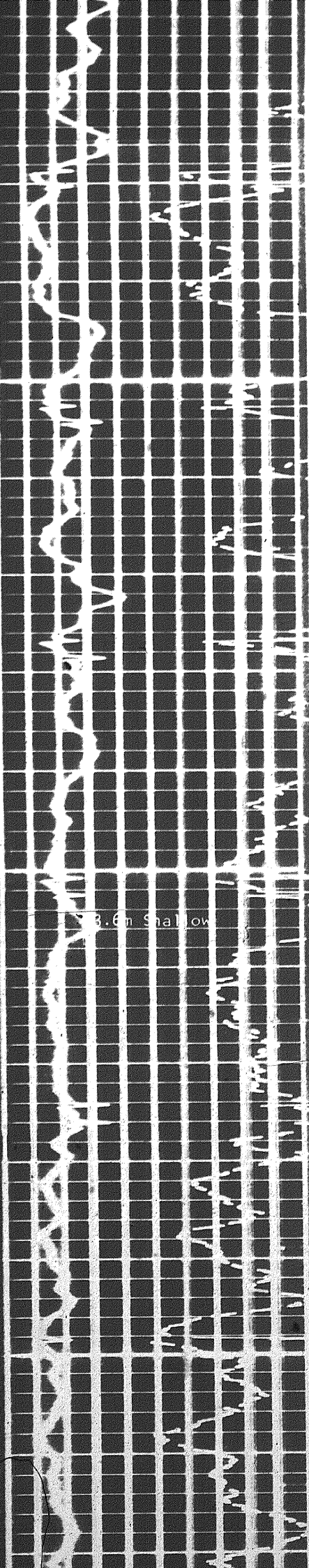


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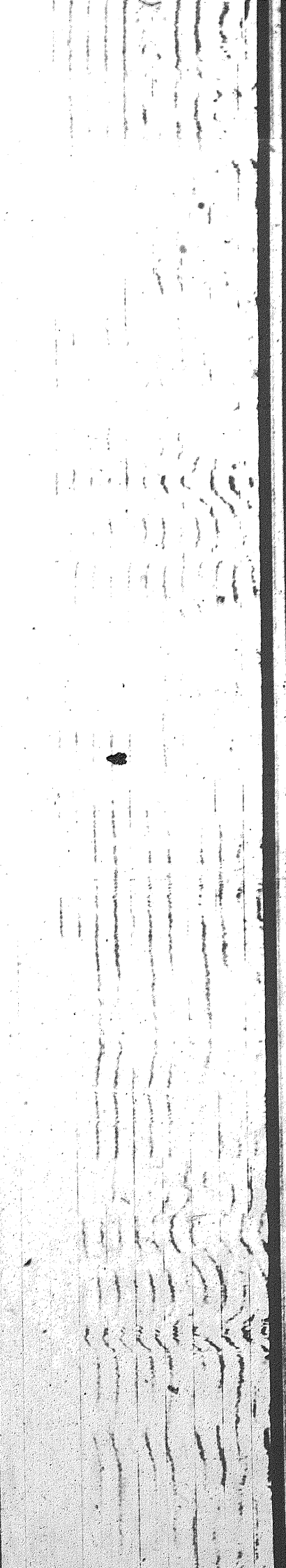




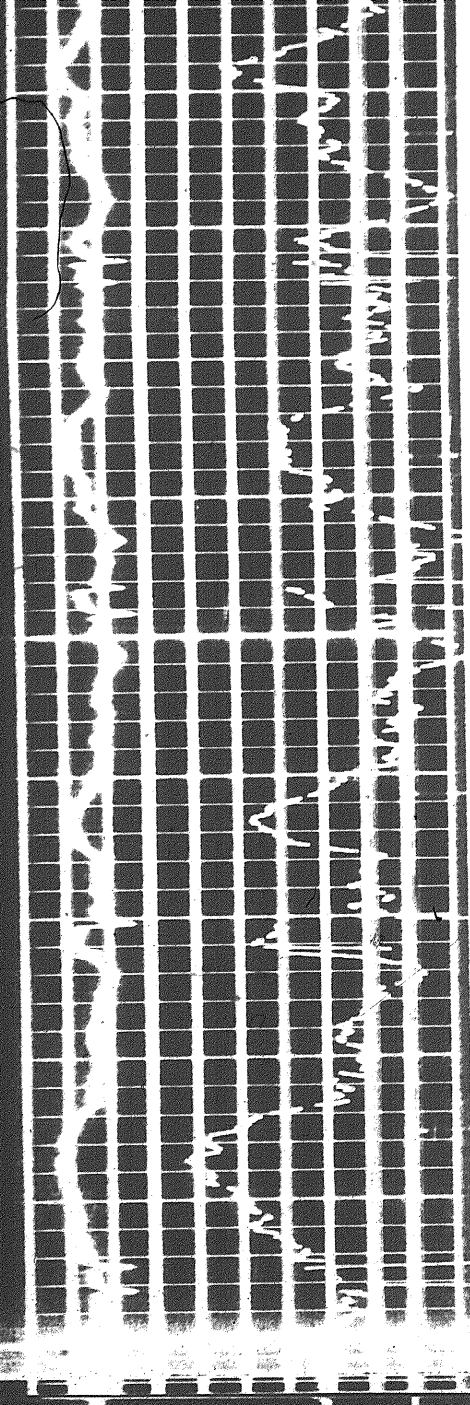
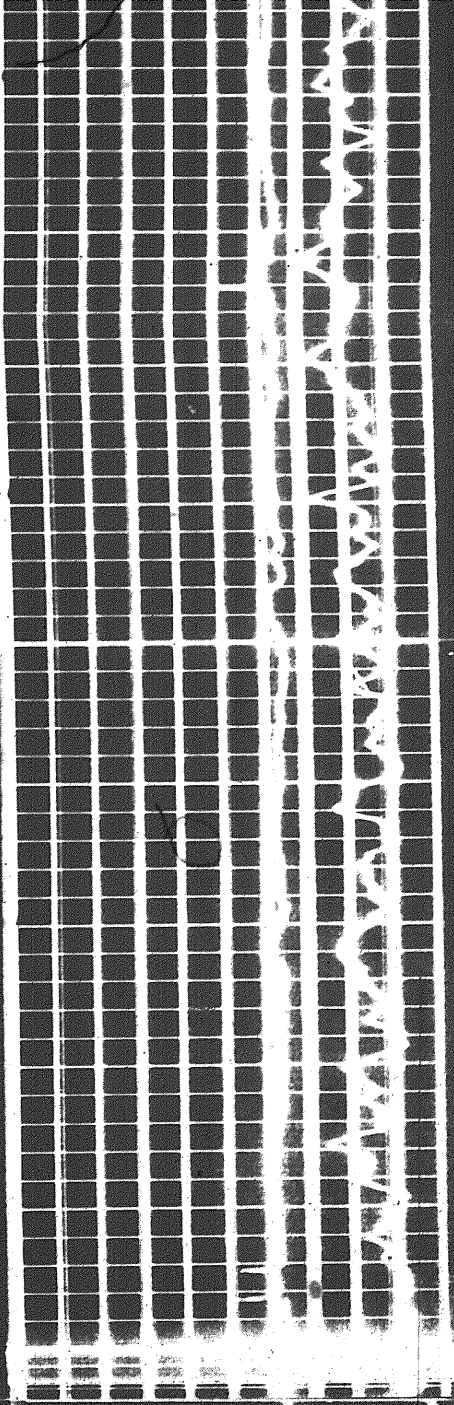
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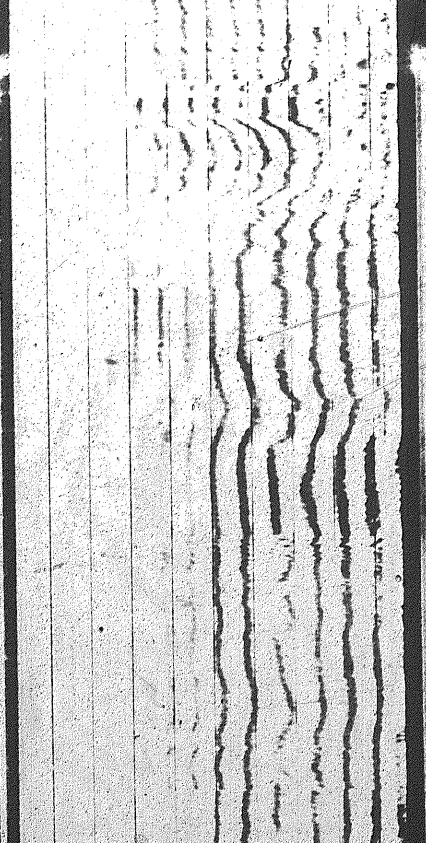
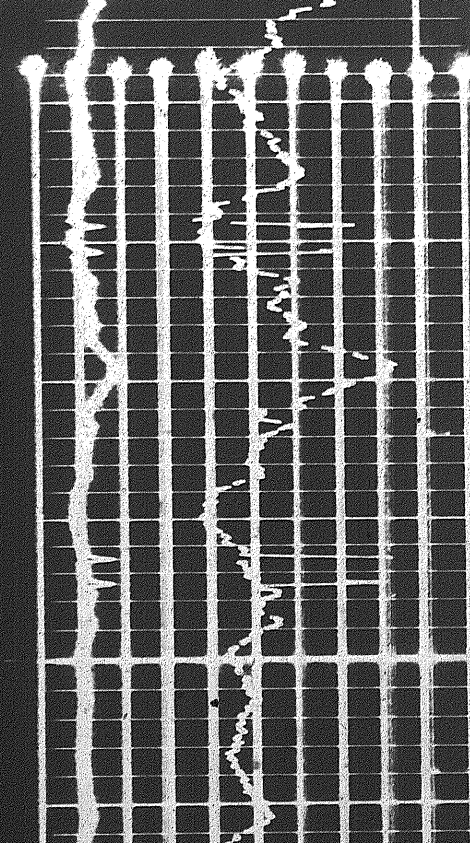
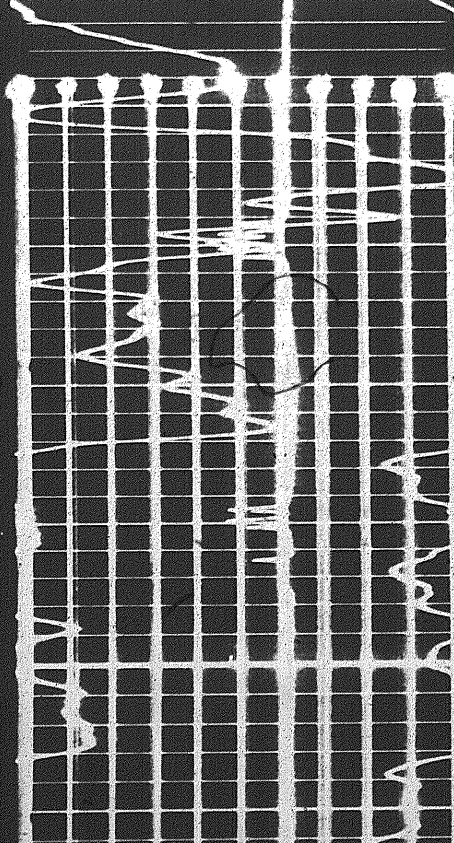
3.6m Shallow



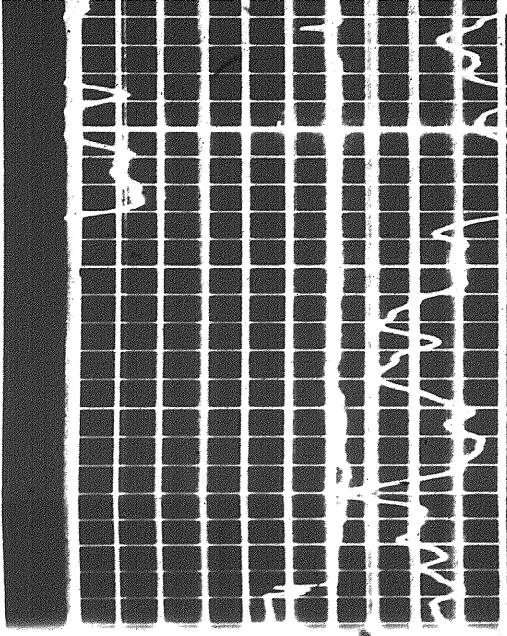
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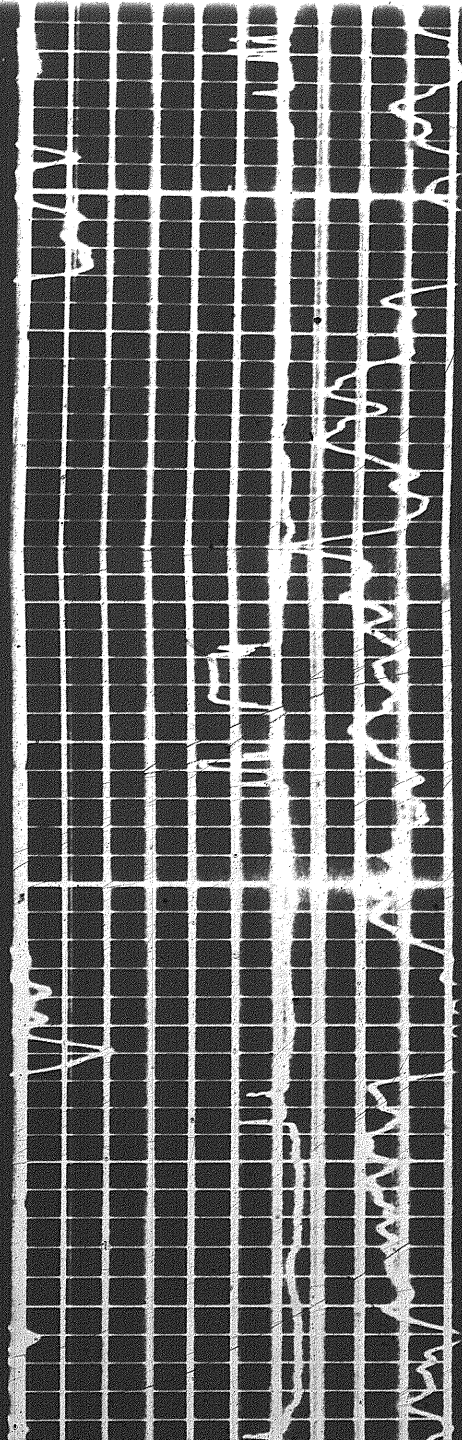
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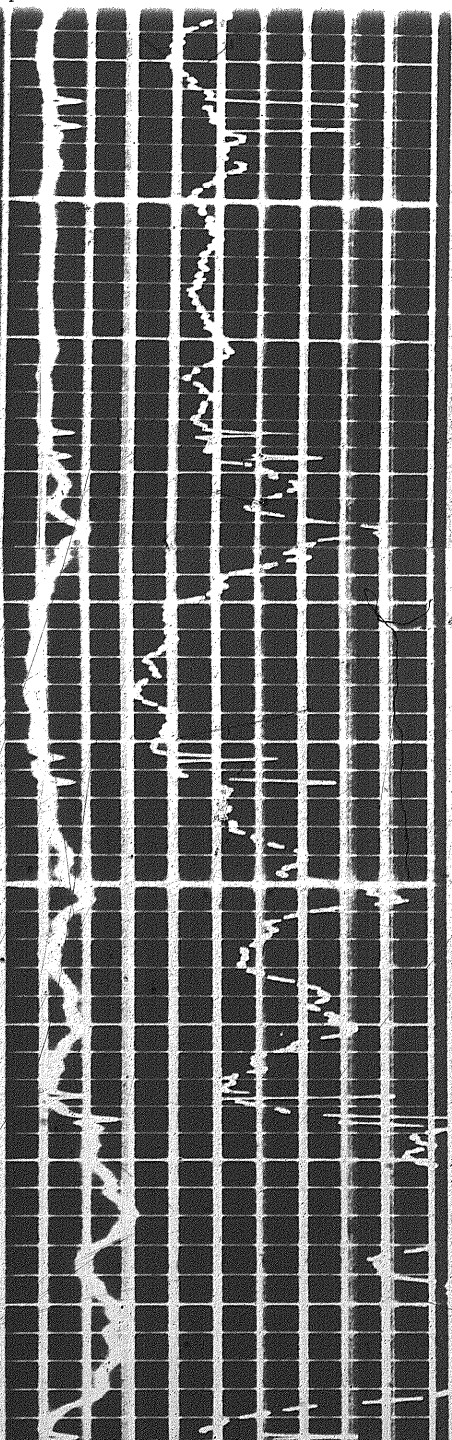
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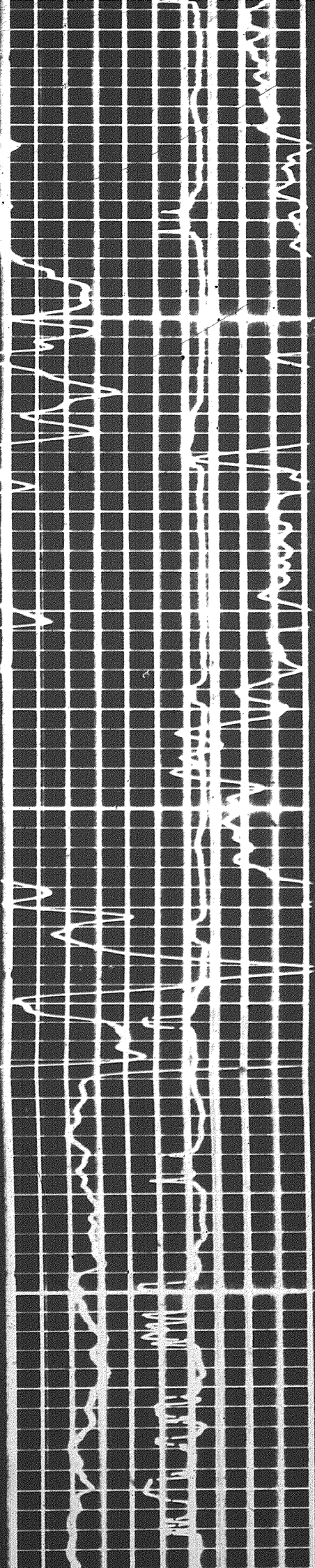


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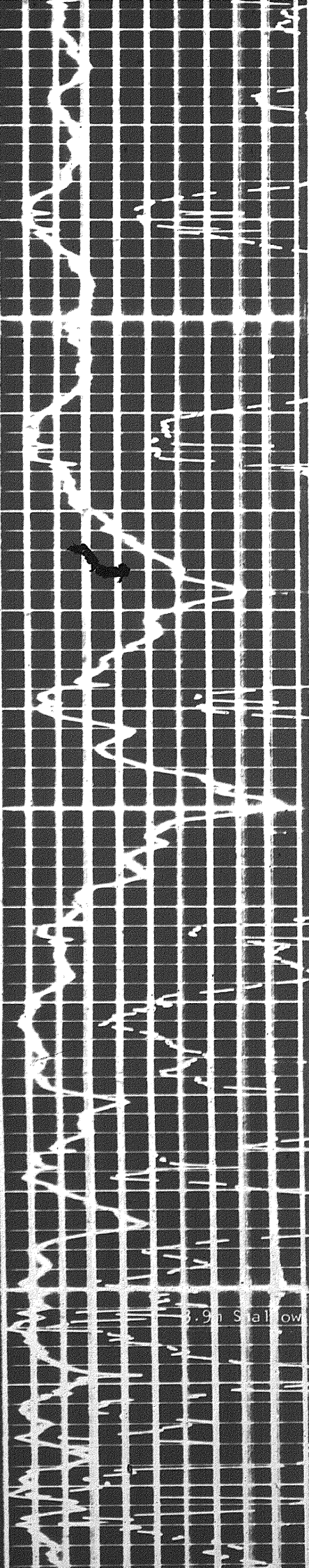


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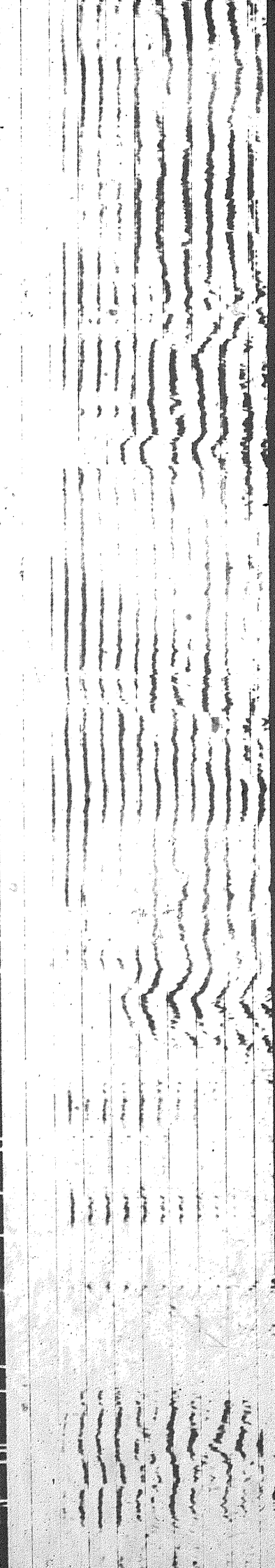


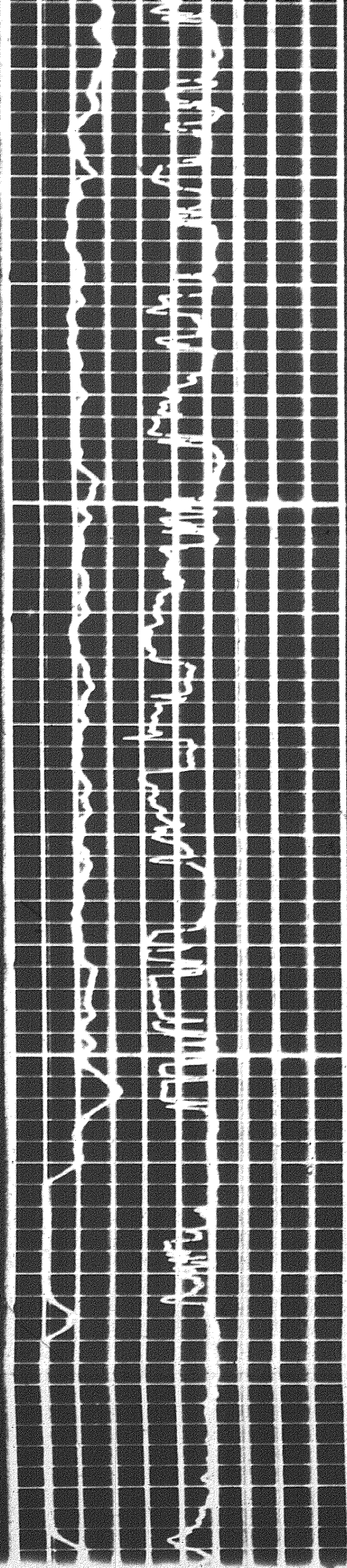
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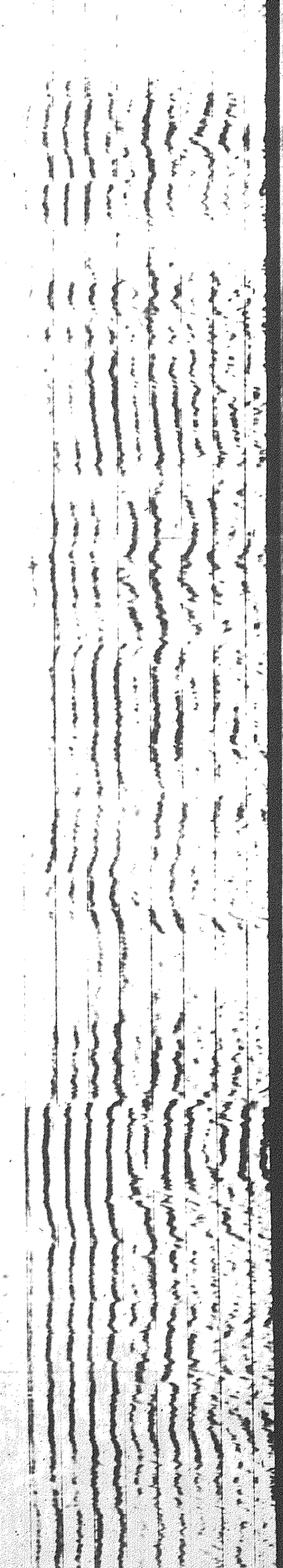
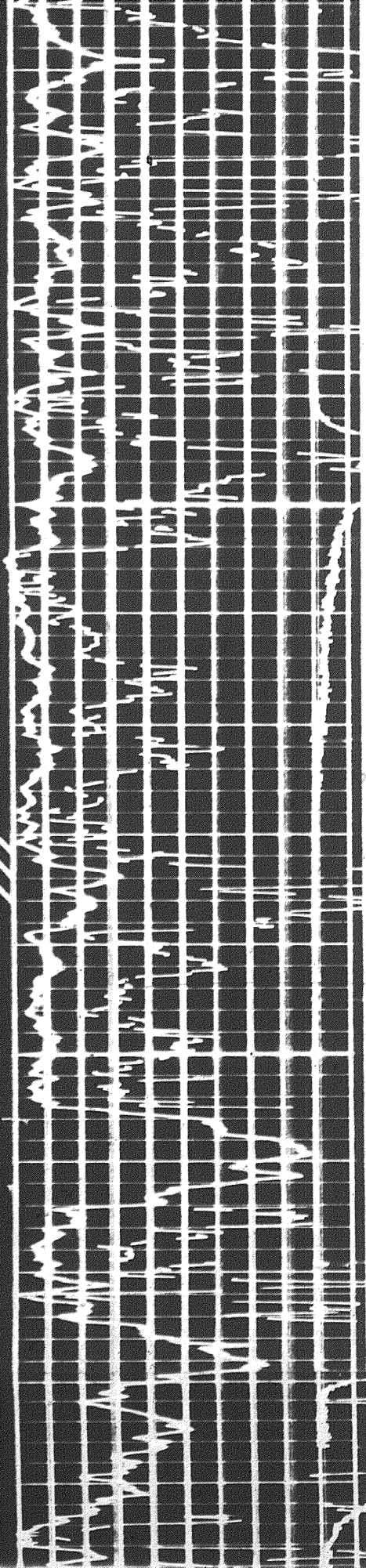
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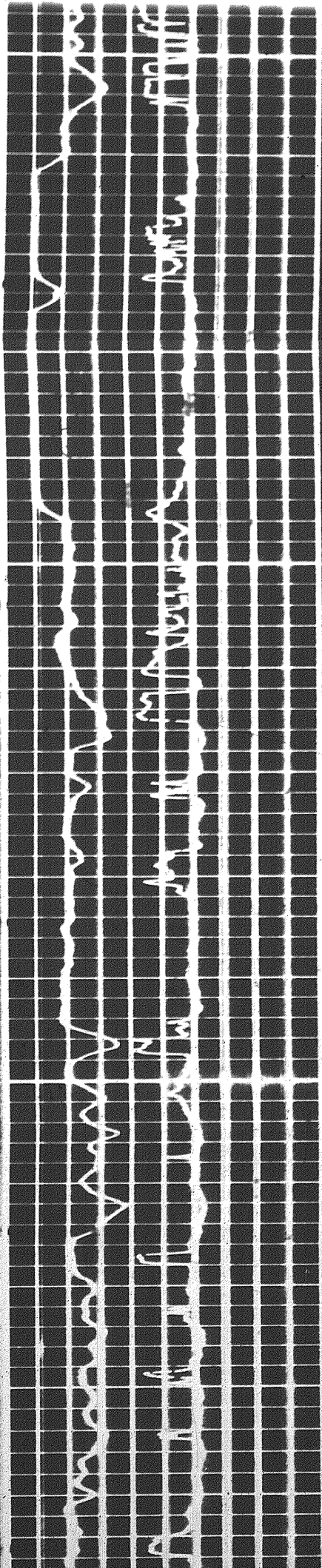
3.9h Stal ow





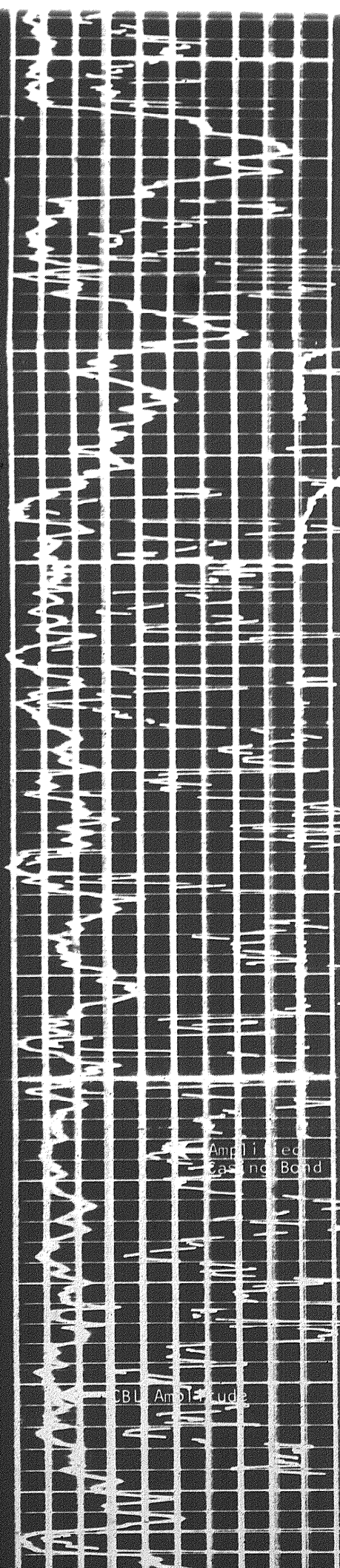
0360





0666

4000



Amplified Baseline

ECG Amplified

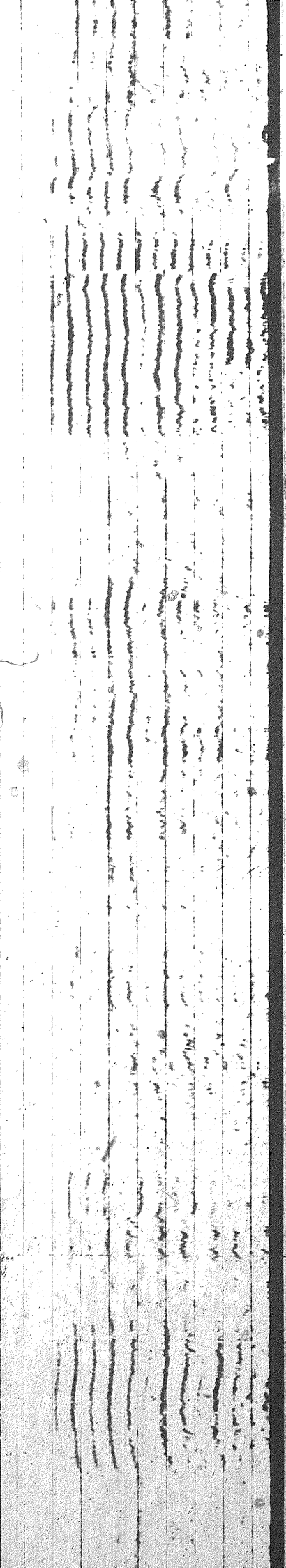
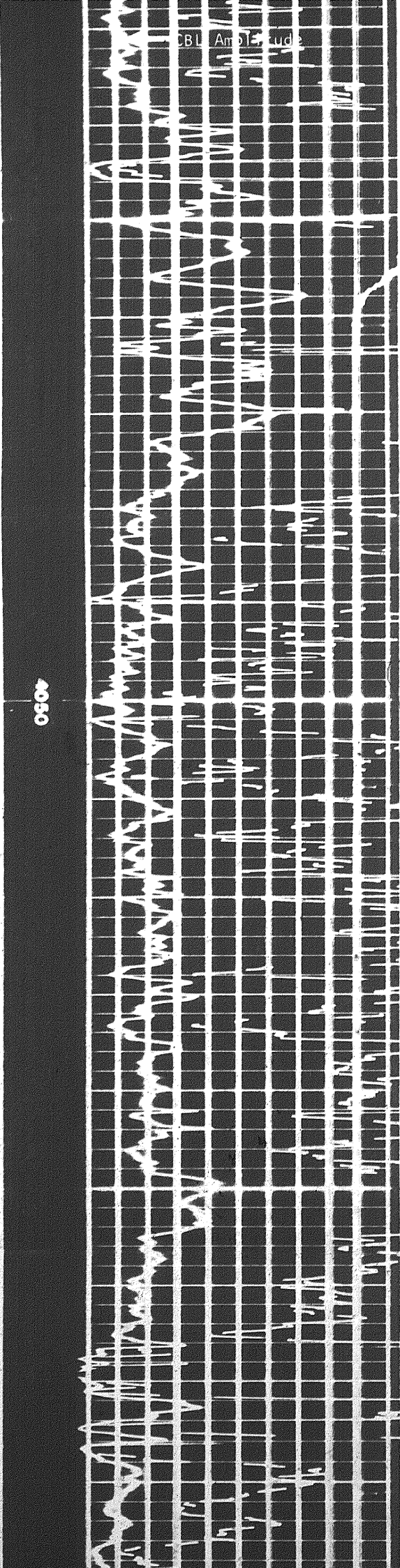
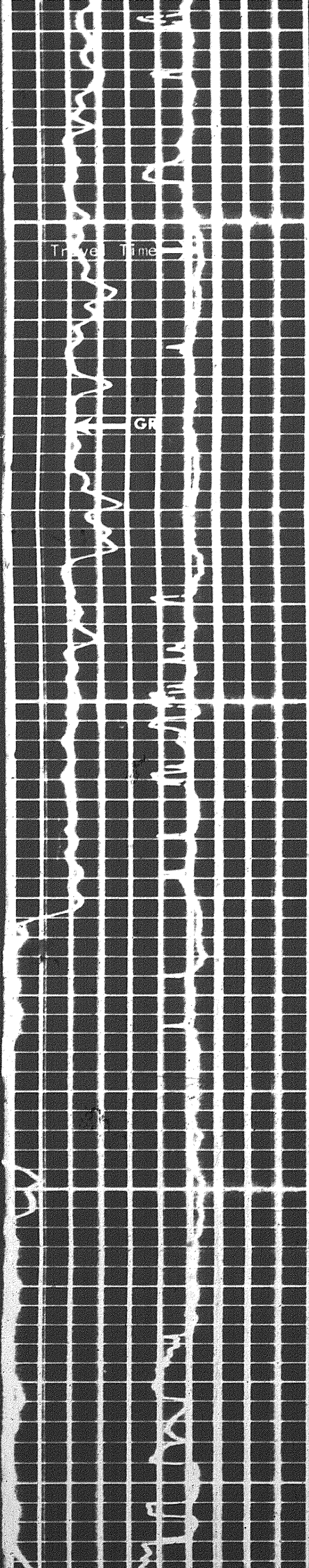


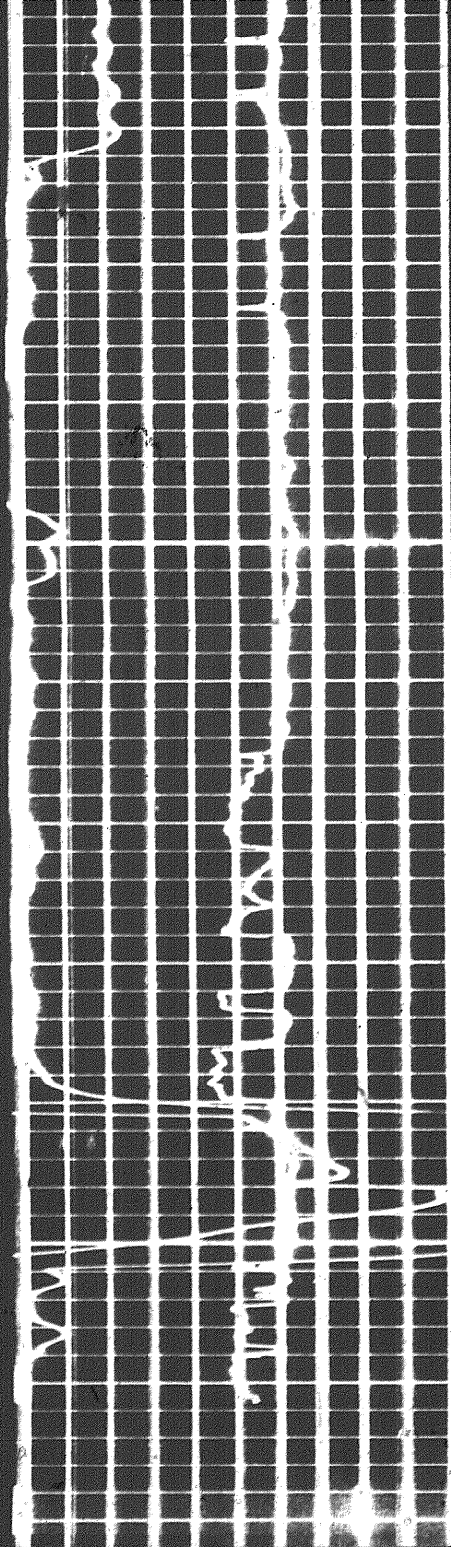
CBL Amplitude

Travel Time

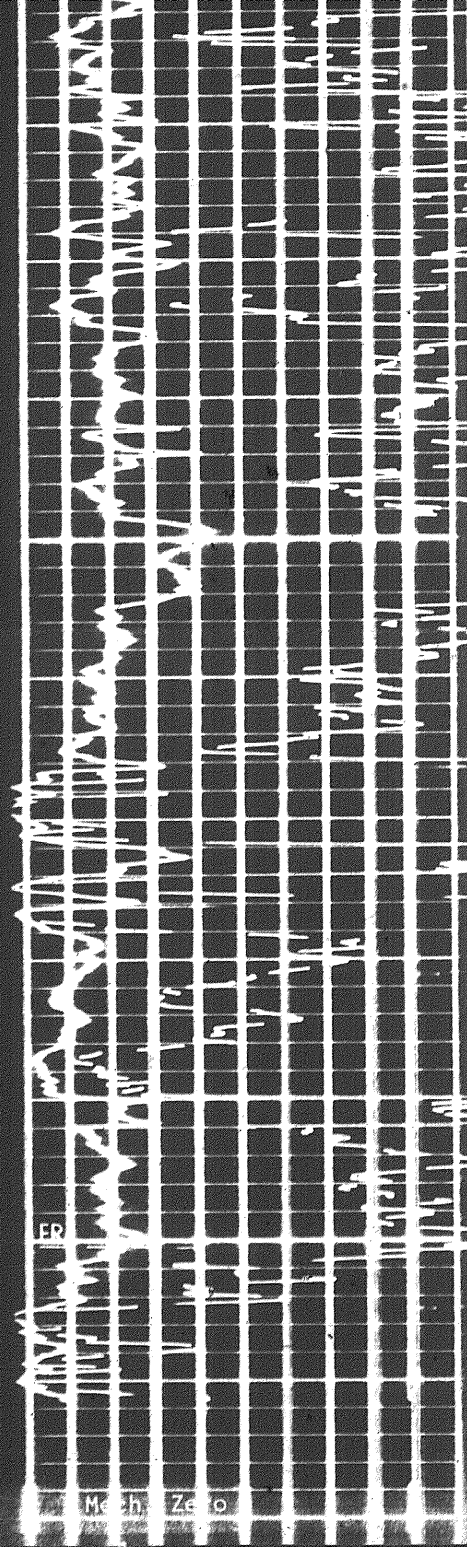
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4030

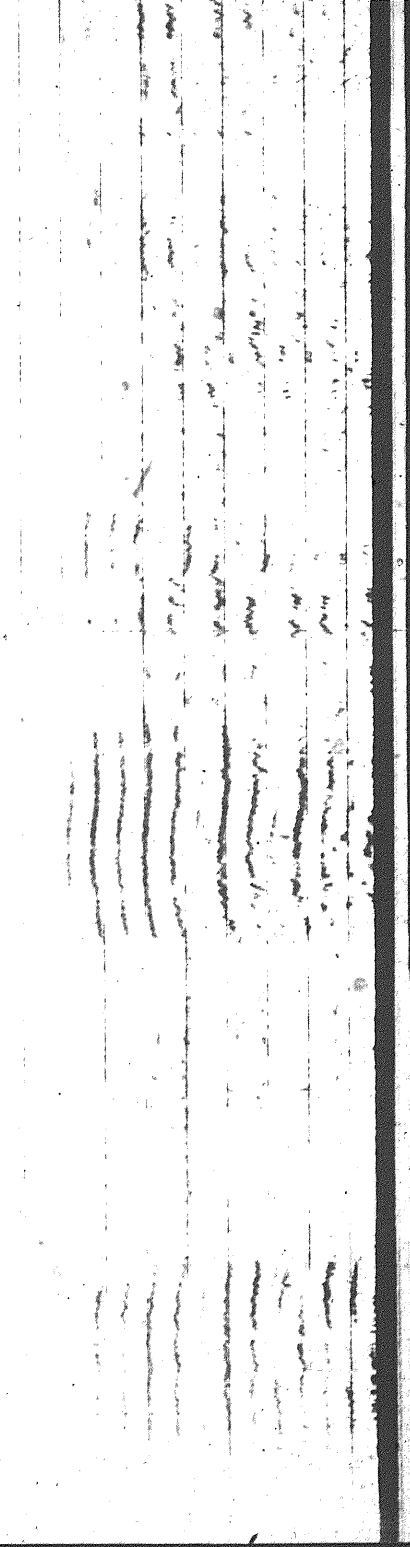




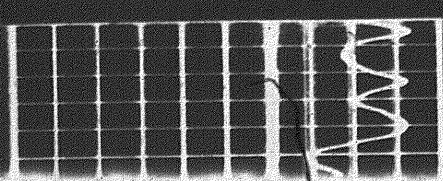
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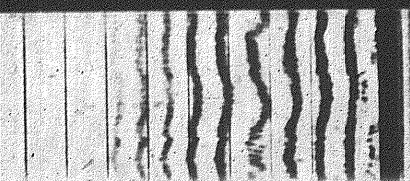
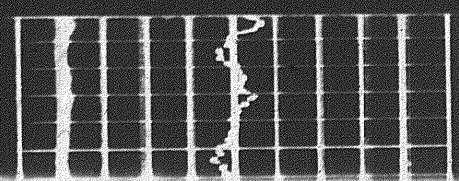
Mech Zero



REPEAT SECTION

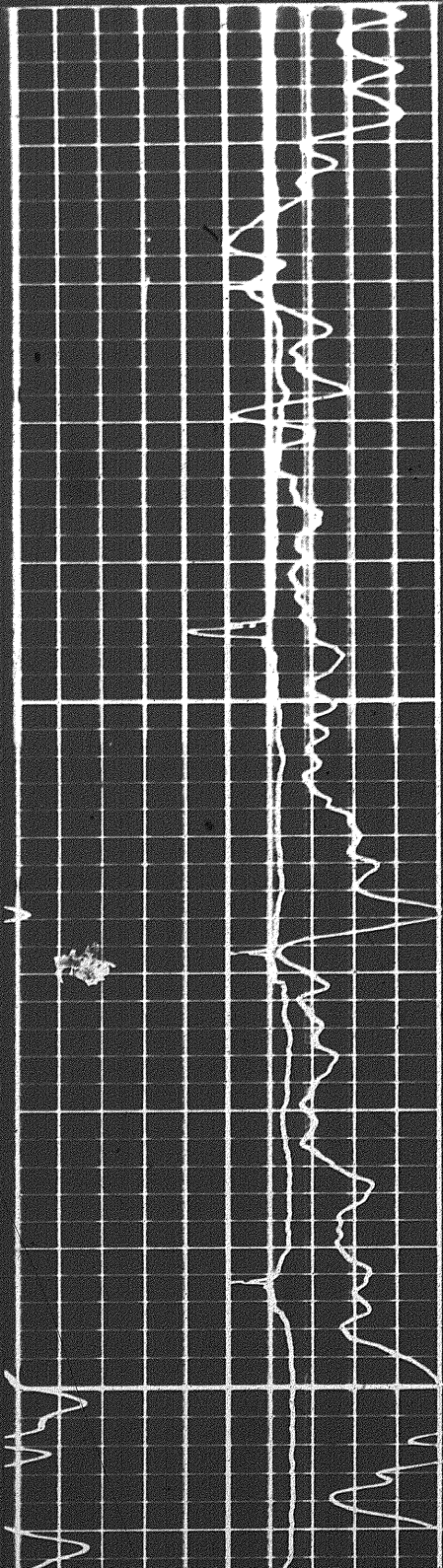


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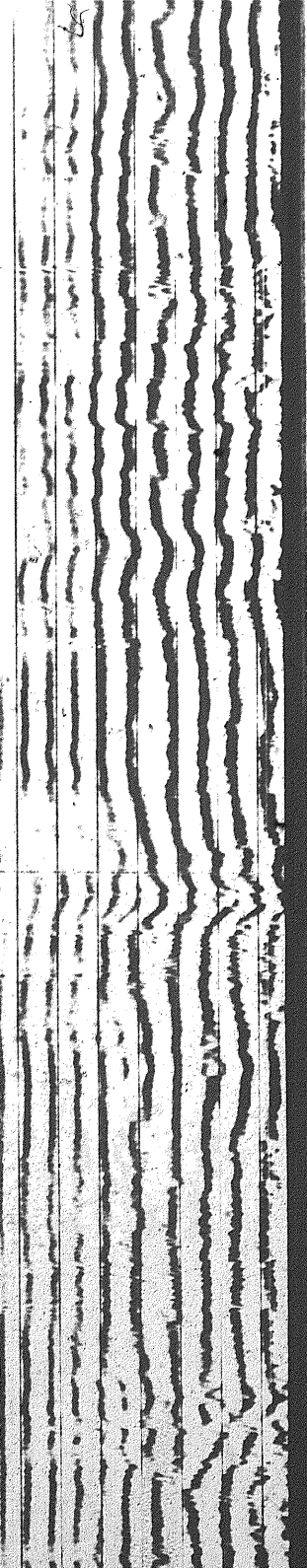
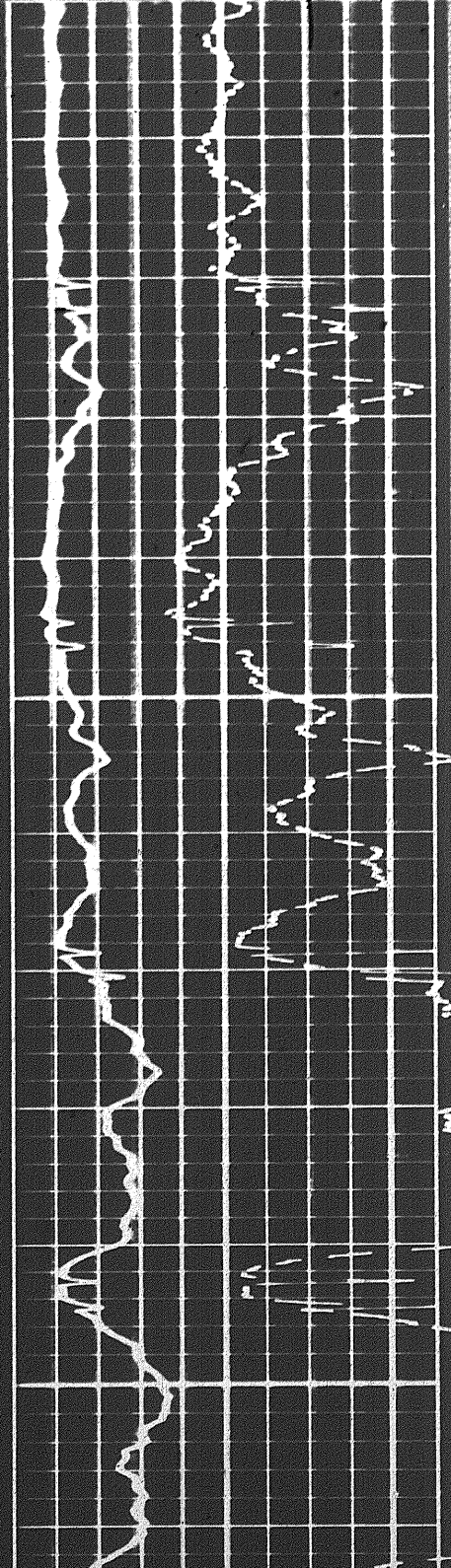
Mech. Zero

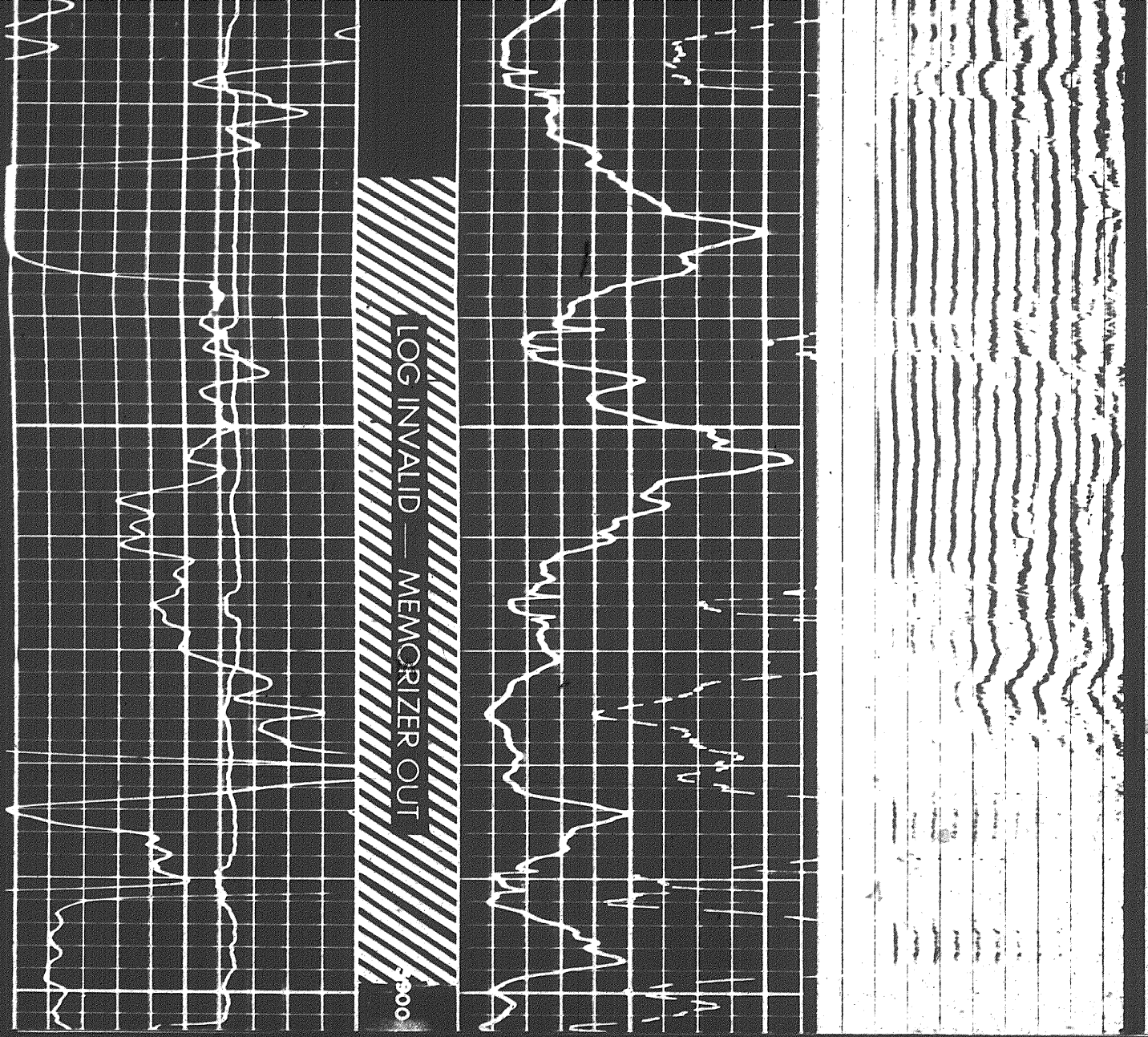
REPEAT SECTION



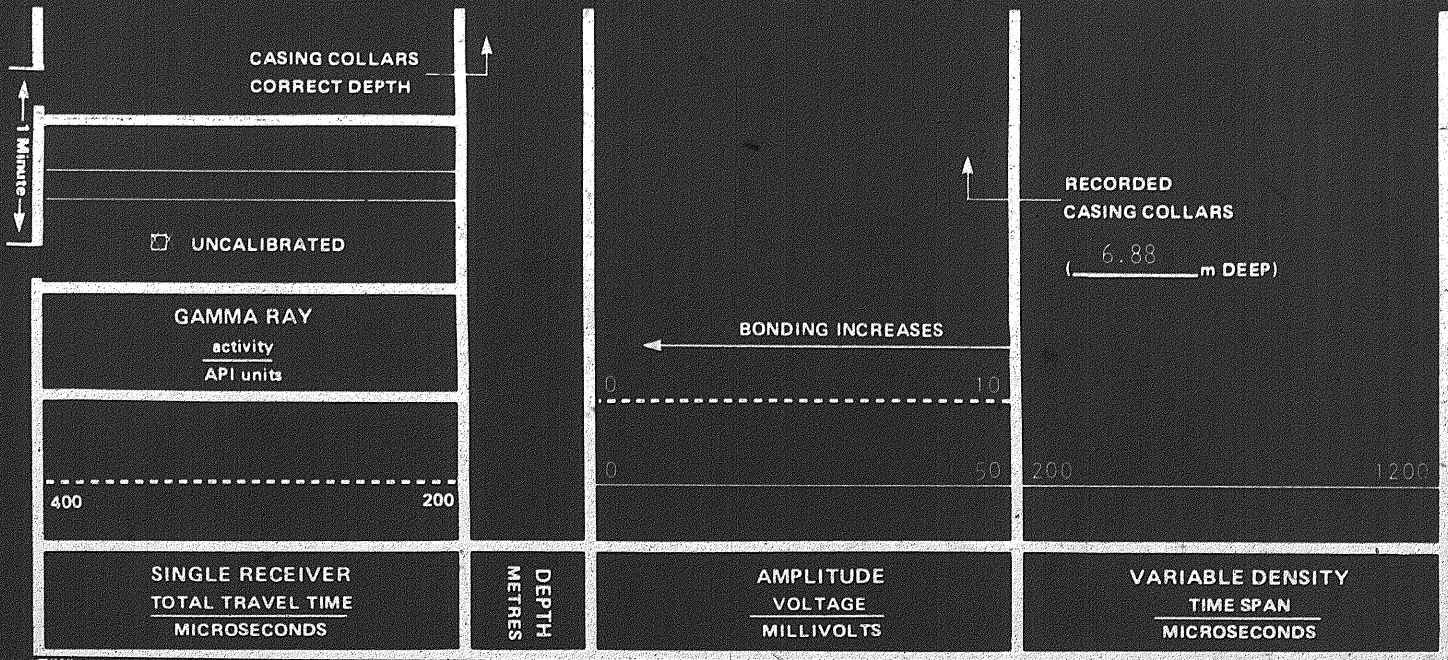
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3850





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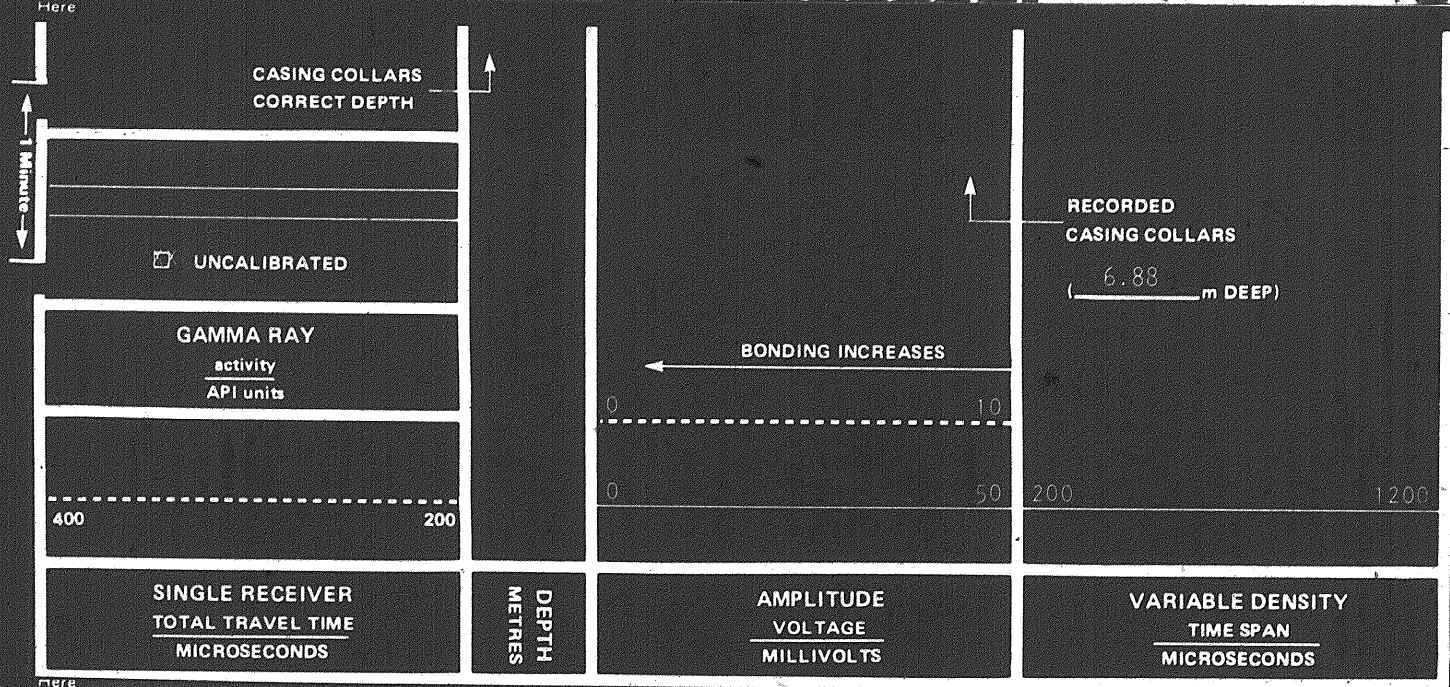
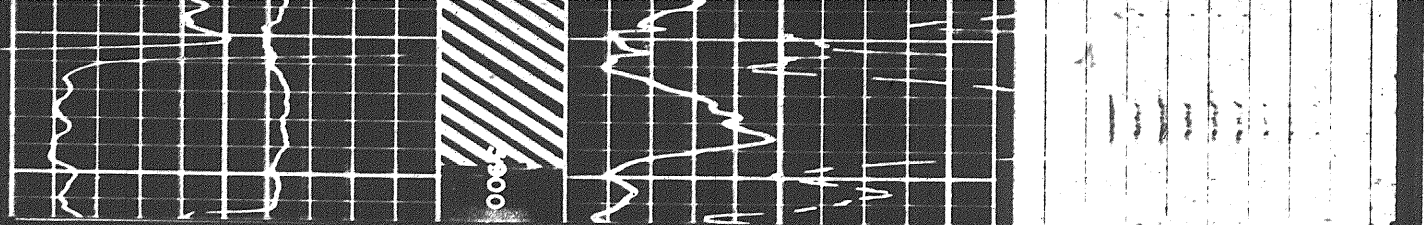


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CALIBRATION RECORD

CEMENT BOND CALIBRATION CODING

	TRANSIT TIME	AMPLITUDE
1.	MECHANICAL ZERO	MECHANICAL ZERO
2.	244 μ s	ELECTRICAL ZERO



CALIBRATION RECORD

CEMENT BOND CALIBRATION CODING

	<u>TRANSIT TIME</u>	<u>AMPLITUDE</u>
1.	MECHANICAL ZERO	MECHANICAL ZERO
2.	244 μ s	ELECTRICAL ZERO
3.	366 μ s	CALIBRATE

COMPANY COLUMBIA GAS DEVELOPMENT OF CANADA LTD.
 WELL COLUMBIA ET AL KOTANEELEE YT E-37
 FIELD _____
 PROVINCE NORTHWEST TERRITORIES

SCHL. FR 4100.0 m
 SCHL. TD _____ m
 DRLR. TD 1143.5 m
 Elev.: KB 621.4 m
 DF _____ m
 GL 613.5 m

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