

Schlumberger

SCHLUMBERGER OF CANADA

Calgary, Alberta

**CEMENT BOND  
VARIABLE DENSITY LOG**

PROVINCE \_\_\_\_\_  
FIELD \_\_\_\_\_  
WELL \_\_\_\_\_  
COMPANY \_\_\_\_\_

LOCATION  
LSD \_\_\_\_\_ SEC. \_\_\_\_\_ TWP. \_\_\_\_\_ RANGE \_\_\_\_\_  
Other Services \_\_\_\_\_  
COMPANY \_\_\_\_\_  
WELL \_\_\_\_\_  
FIELD \_\_\_\_\_  
PROVINCE \_\_\_\_\_

Permanent Datum \_\_\_\_\_ Elev \_\_\_\_\_ m  
Log Measured From \_\_\_\_\_ m Above Perm Datum  
Drilling Measured From \_\_\_\_\_ m  
Date \_\_\_\_\_  
Run No. \_\_\_\_\_  
P.B.T.D. Driller \_\_\_\_\_  
Depth Logger (Schl.) \_\_\_\_\_  
Annulus Log Interval \_\_\_\_\_ m  
Top Log Interval \_\_\_\_\_ m  
Open Hole Size \_\_\_\_\_ mm  
Bottom Hole Temp. \_\_\_\_\_ °C

Maximum WHP \_\_\_\_\_ kPa  
Casing Fluid Type \_\_\_\_\_  
Casing Fluid Salinity \_\_\_\_\_  
Casing Fluid Level \_\_\_\_\_ m  
Annulus Fluid \_\_\_\_\_  
Unit \_\_\_\_\_  
District \_\_\_\_\_  
Recorded By \_\_\_\_\_  
Witnessed By \_\_\_\_\_

**TUBING & CASING RECORD**

Size (mm)	Wt (kg/m)	Grade	Type Joint	Top (m)	Bottom (m)
Surface Casing					
Protection Casing					
Production Casing					
Line					
Tubing					
Tubing					

**MISCELLANEOUS**

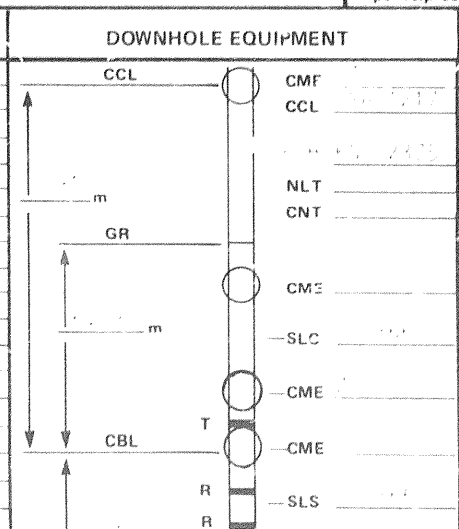
Production Packer @	Minimum ID =	FROM	TO	FROM	TO
		m	m	m	m
		m	m	m	m
		m	m	m	m
		m	m	m	m

PRIMARY CEMENTING PROCEDURE	CORRELATION LOG:	Service Order No. 700656
Hour - Date	Type: _____	Collars Recorded _____ m Deep
Started pumping cement	Curve: _____	
Release pressure	Service Co.: _____	
Start Cement Bond Log	Date: _____	
Finish Cement Bond Log	Other: _____	

PRIMARY CEMENTING DATA		Sonde Mode:
STRING		Detection Mode:
Volume of Cement		Cartridge Gain:
Type of Cement		Spacing:
Additive		Amplitude _____ m
Retarder		Variable Density _____ m
Wt. of Slurry		Preceding fluid: _____ Volume: _____ m <sup>3</sup>
Water loss		Cement pumped @ _____ m <sup>3</sup> /m n
Type fluid in csg.		Pipe reciprocated during pumping: Yes <input type="checkbox"/> No <input type="checkbox"/>
Fluid wt.		Pipe reciprocated after plug down: Yes <input type="checkbox"/> No <input type="checkbox"/>

**SQUEEZE JOB DETAIL**

	1	2
Squeeze number	1	2
Date		
Depth Interval		
Type cement		
Volume of cement		
Additive		
Retarder		
Weight of slurry		
Preceding fluid		
Breakdown pressure		
Max. pressure-stage 1		
" " " 2		
" " " 3		
Final maximum pressure		
Started pumping cement		
Released pressure		



**SURFACE EQUIPMENT**

	TYPE	MOD.	S.N.
Sonic Panel			
Memorizer			
GNP			
CRP			
OWE			
Casing Centralizer Pattern			
/ Joint from			to
/ Joint from			to
/ Joint from			to
Casing Scratcher Pattern			
/ Joint from			to
/ Joint from			to
/ Joint from			to
REMARKS			SS



400 200

GAMMA RAY  
activity  
API units

X UNCALIBRATED

1 Minute

X4010A

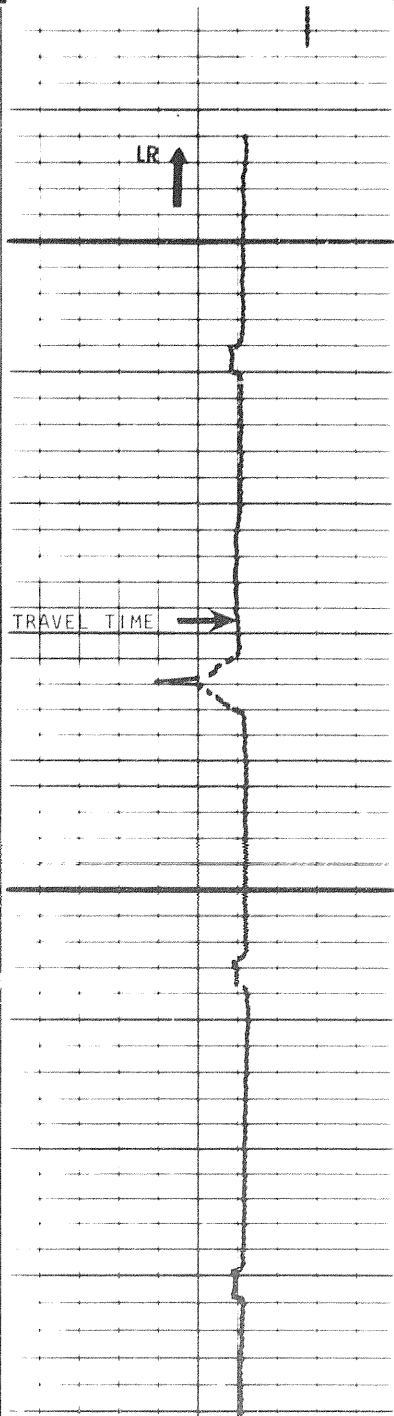
INTERPRETATION OF  
HYDRAULIC ISOLATION

BONDING INCREASES

RECORDED  
CASING COLLARS

(\_\_\_\_\_ m DEEP)

Sonoe Mode \_\_\_\_\_  
Detection Mode \_\_\_\_\_  
Cartridge Gain \_\_\_\_\_  
Wellhead Pressure \_\_\_\_\_ kPa

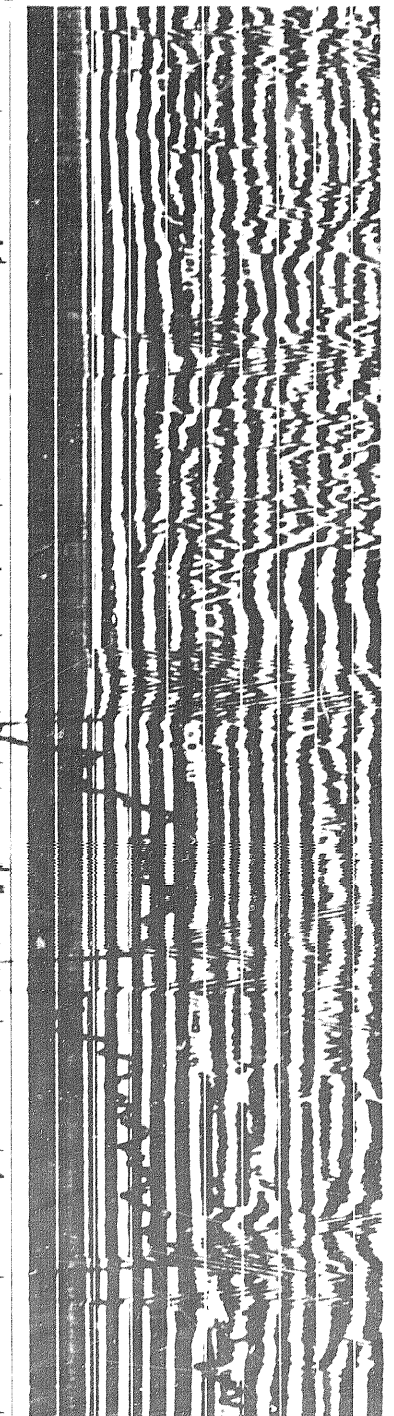
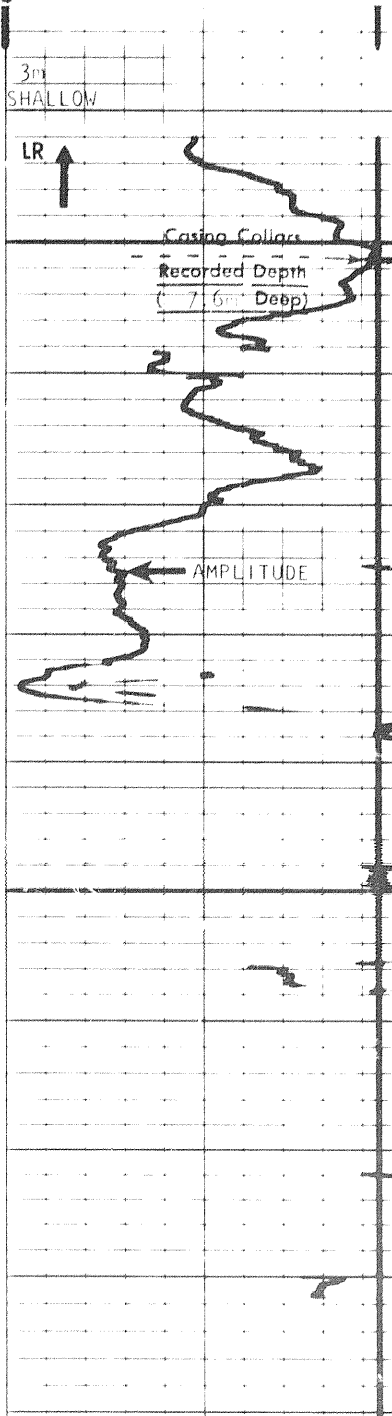


3m  
SHALLOW

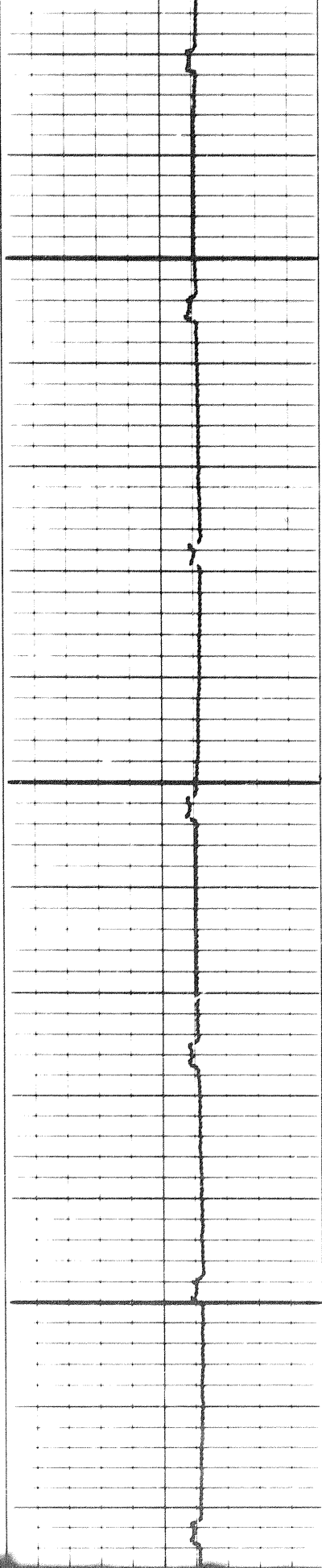
LR ↑

Casing Collars  
Recorded Depth  
(7.6m Deep)

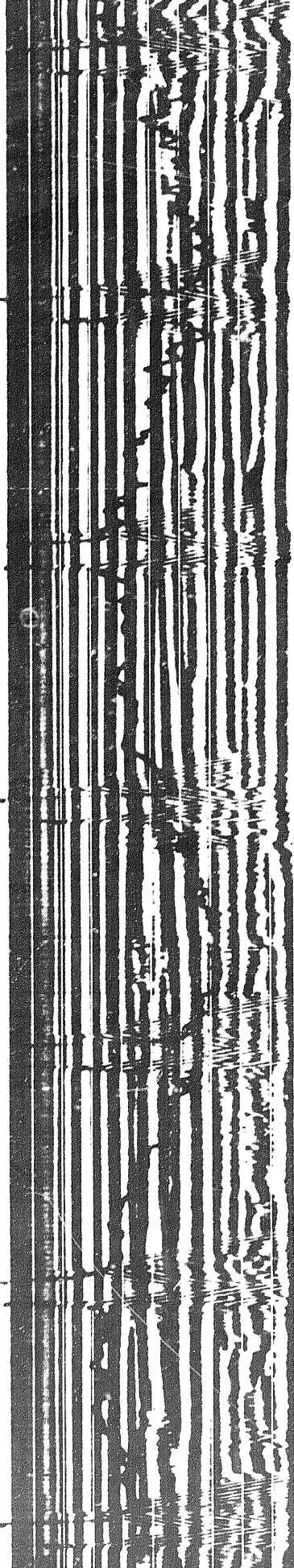
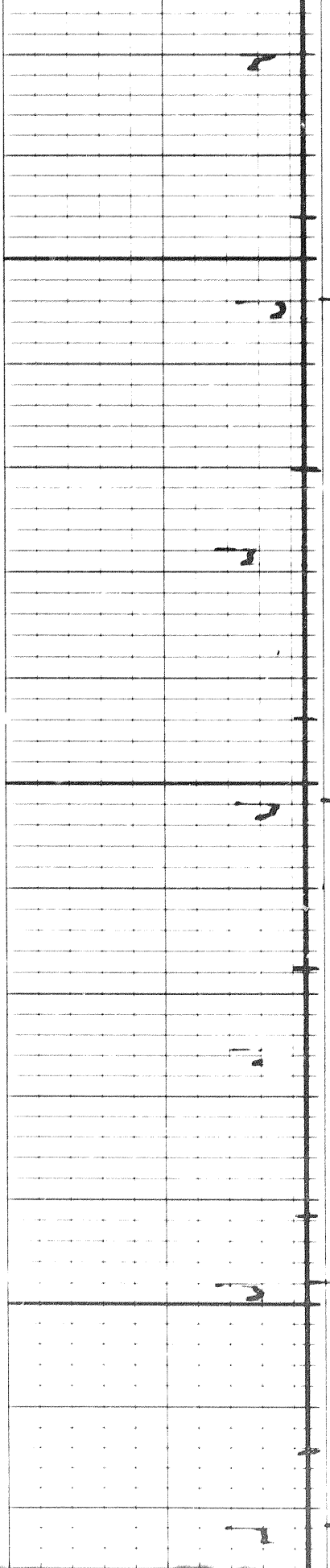
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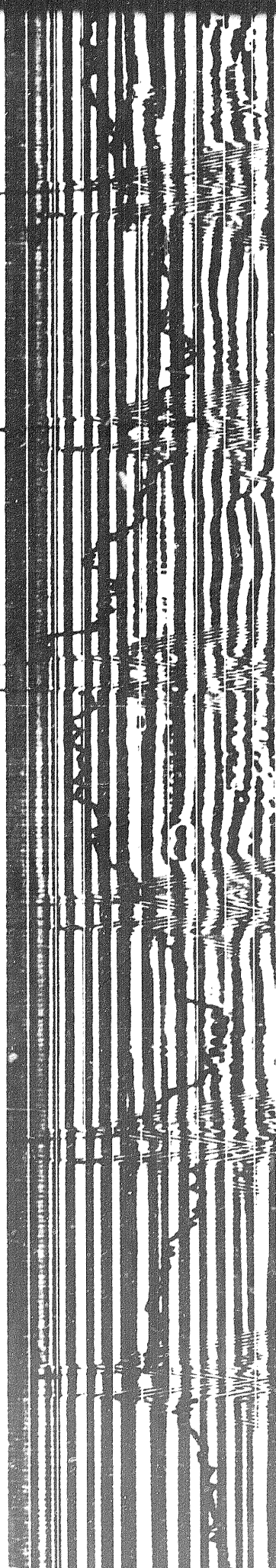
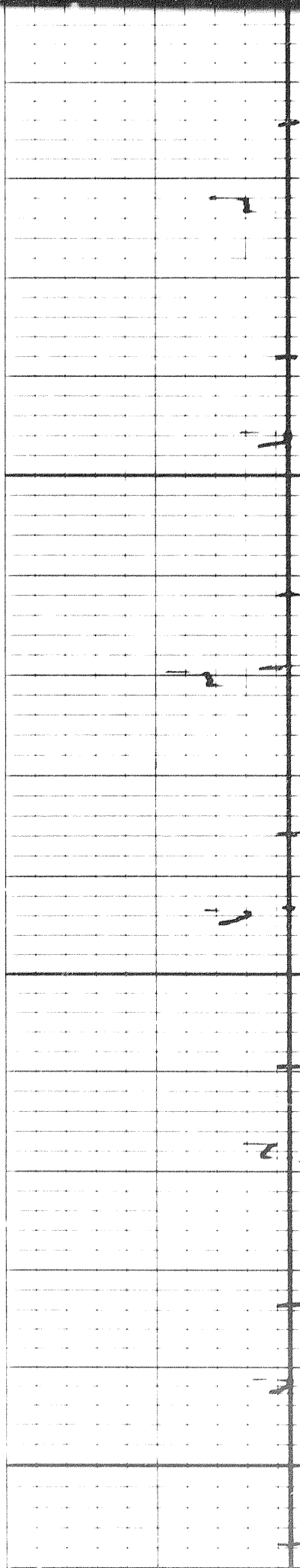
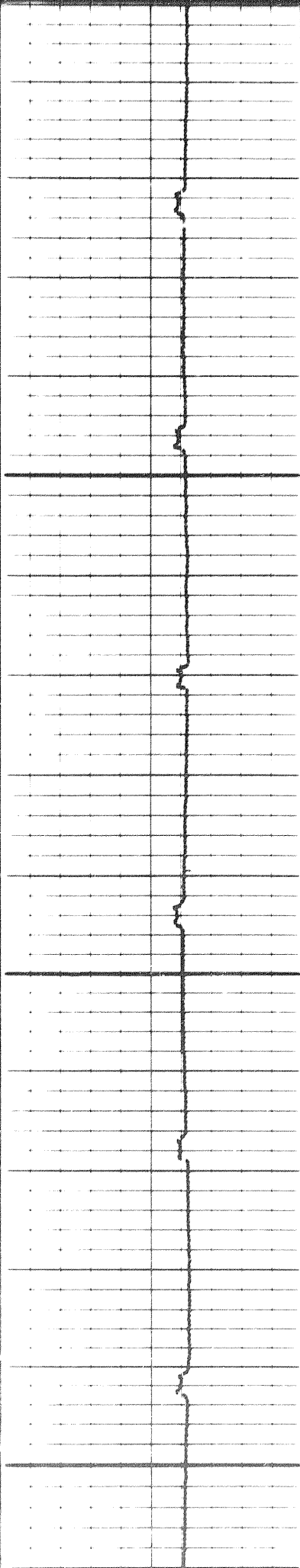


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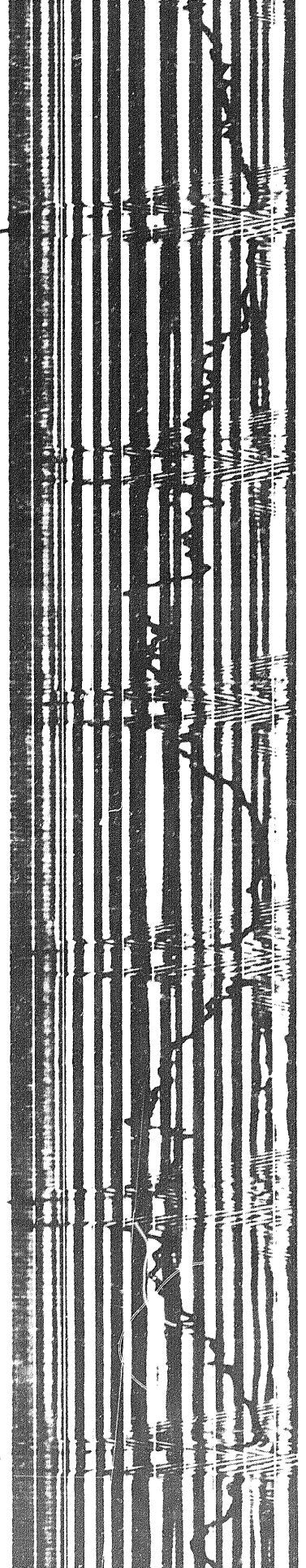
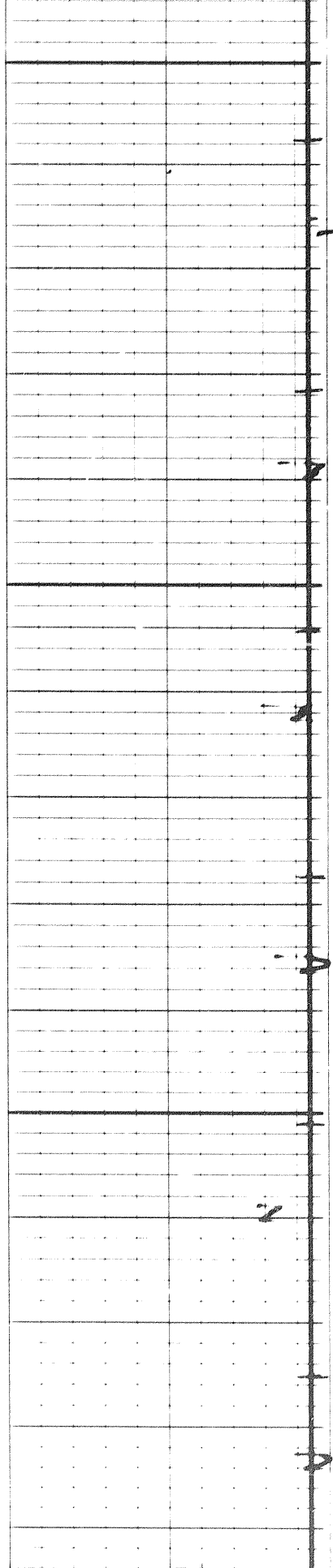
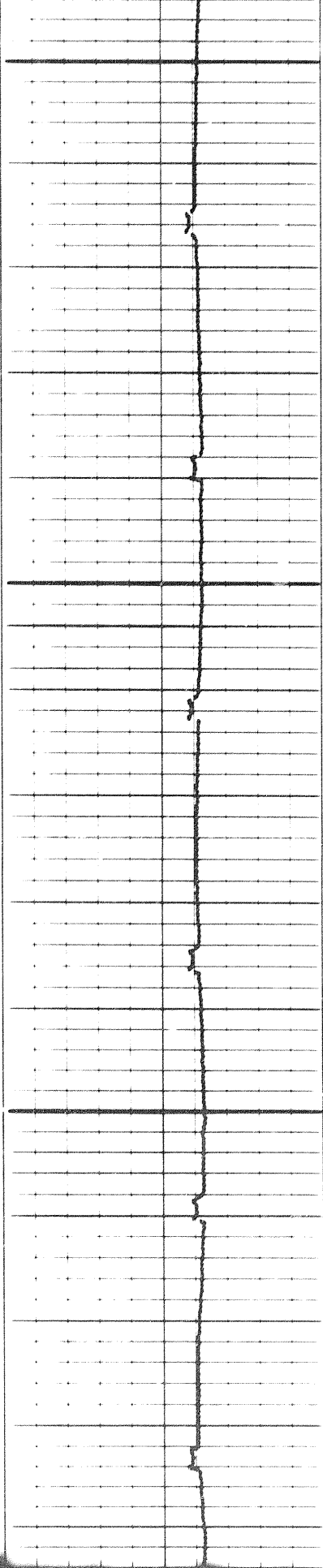


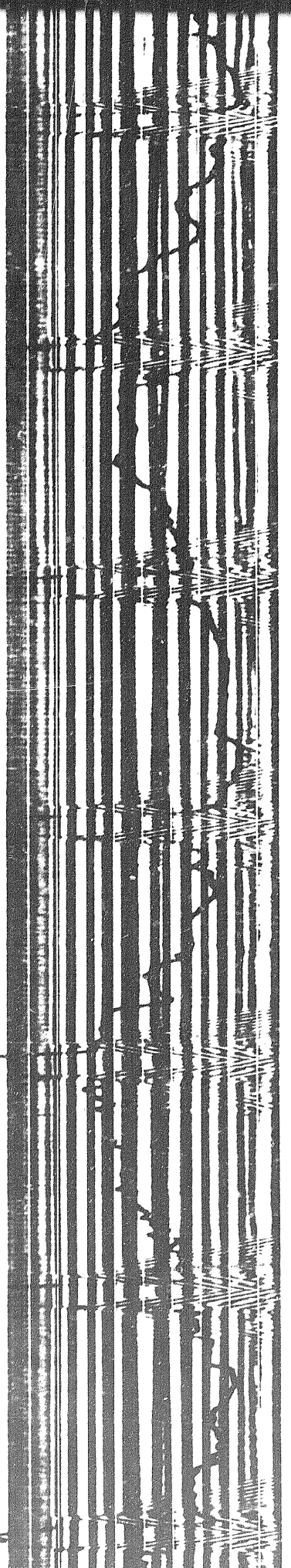
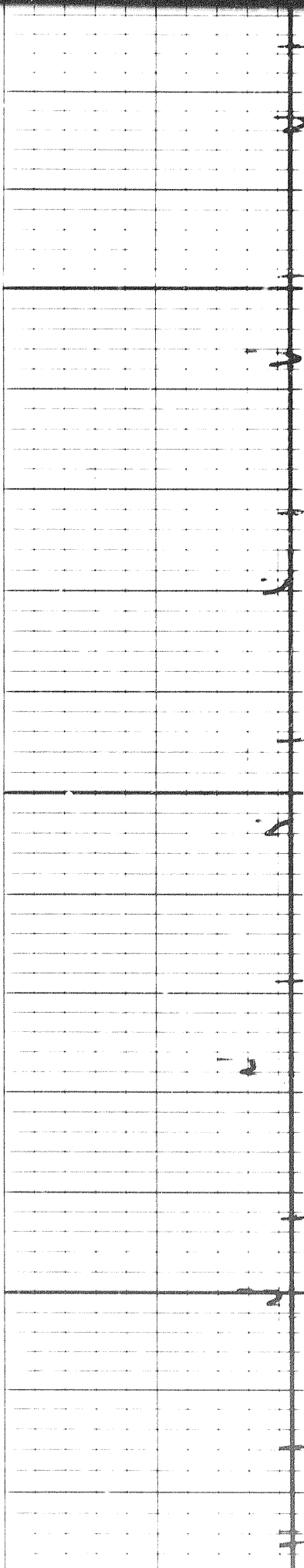
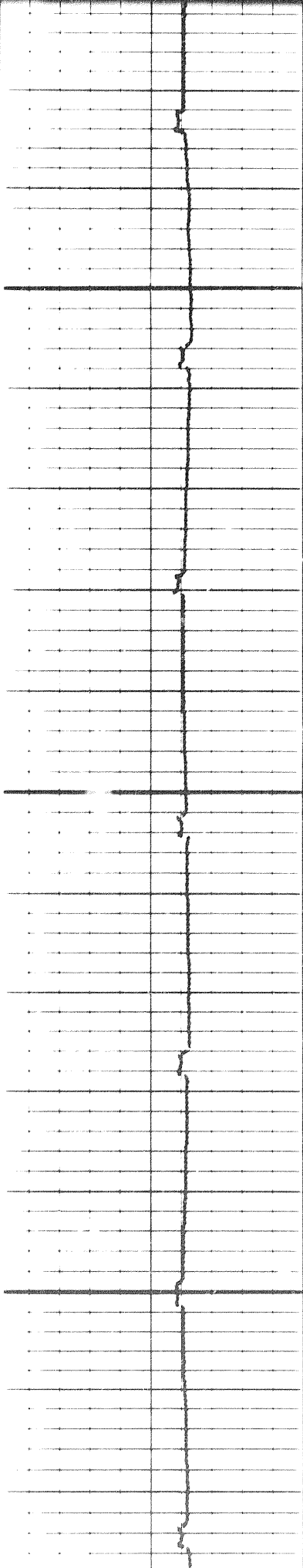
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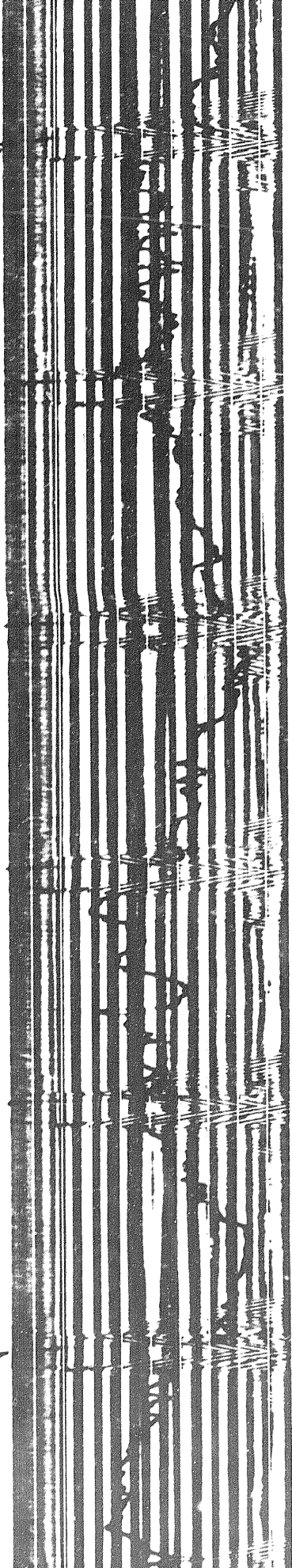
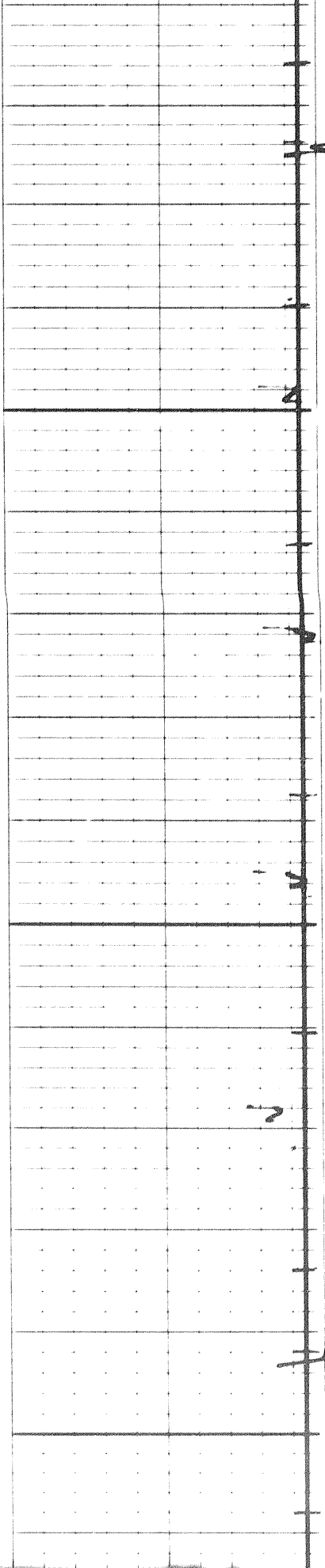
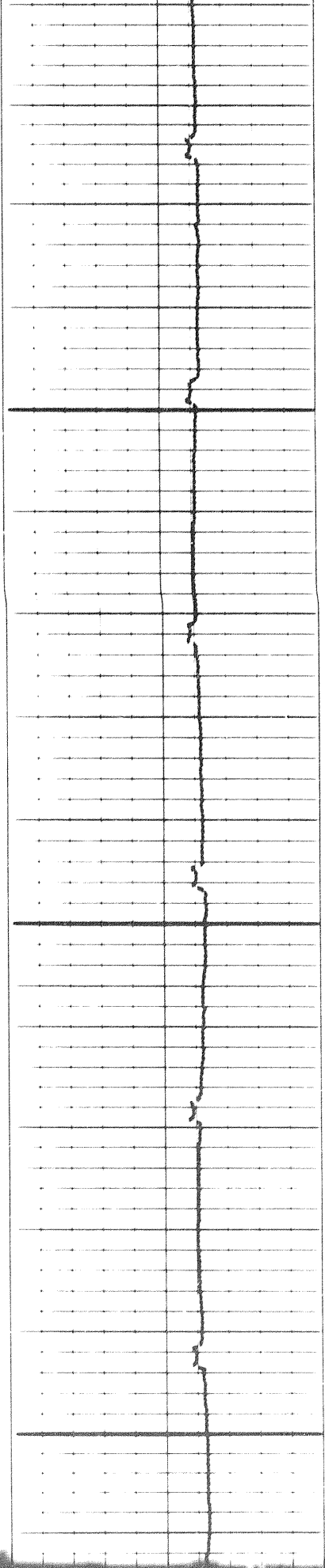


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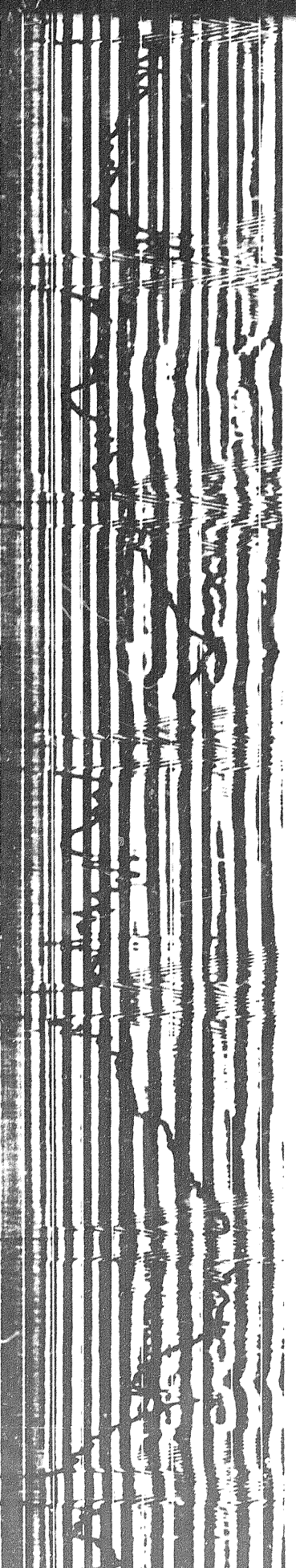
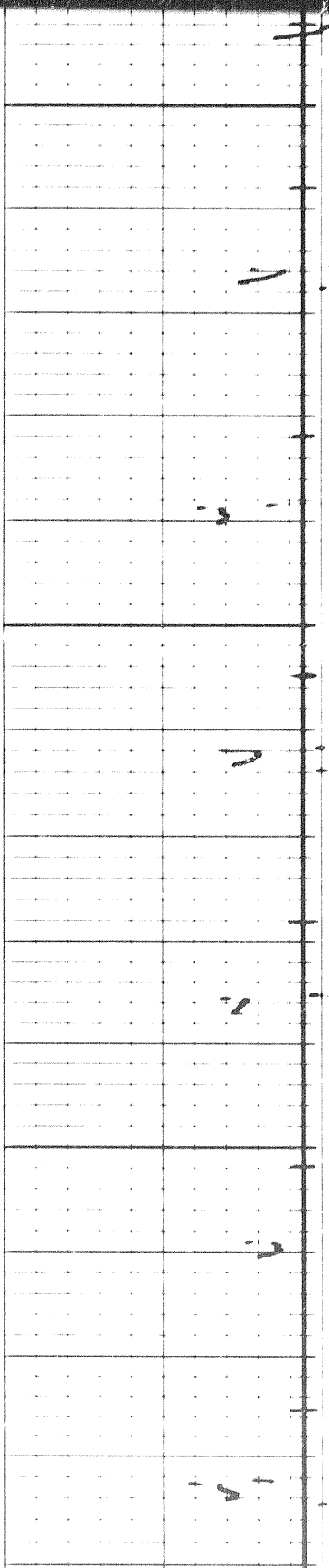
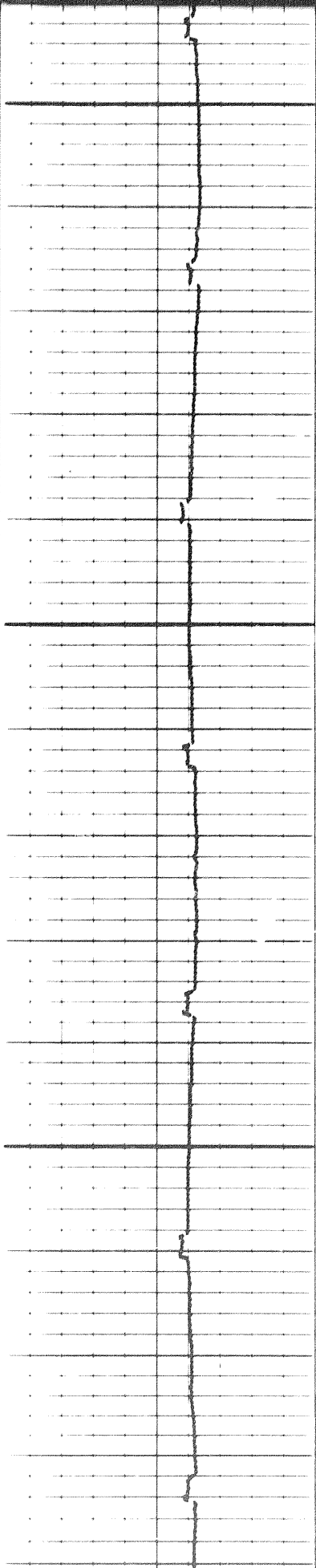




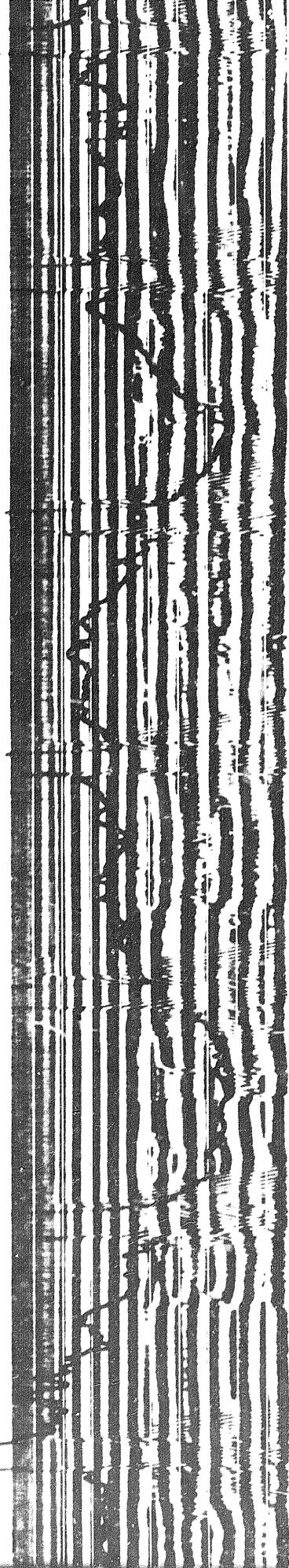
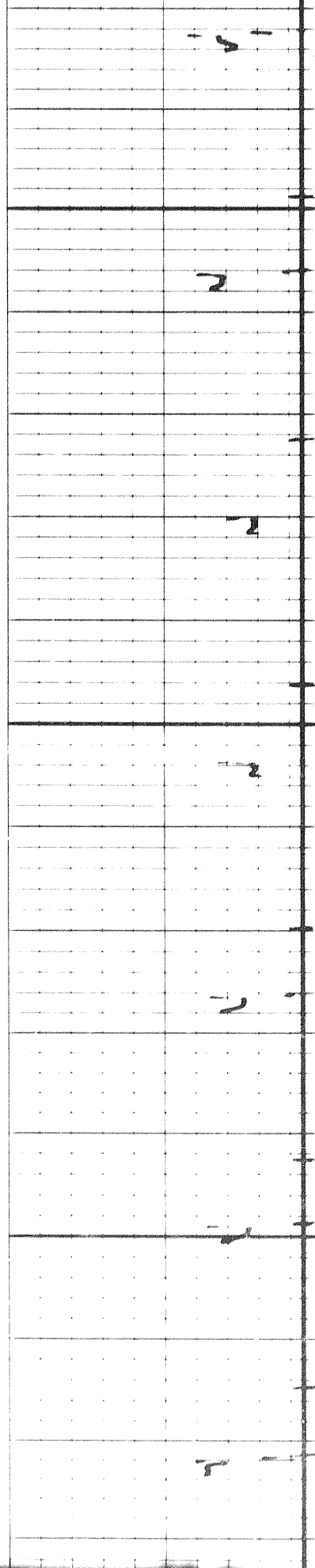
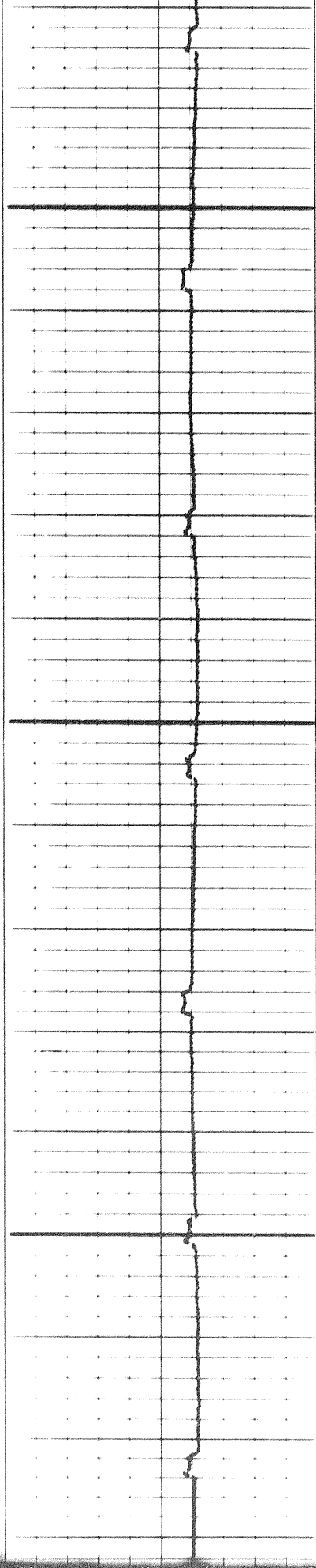
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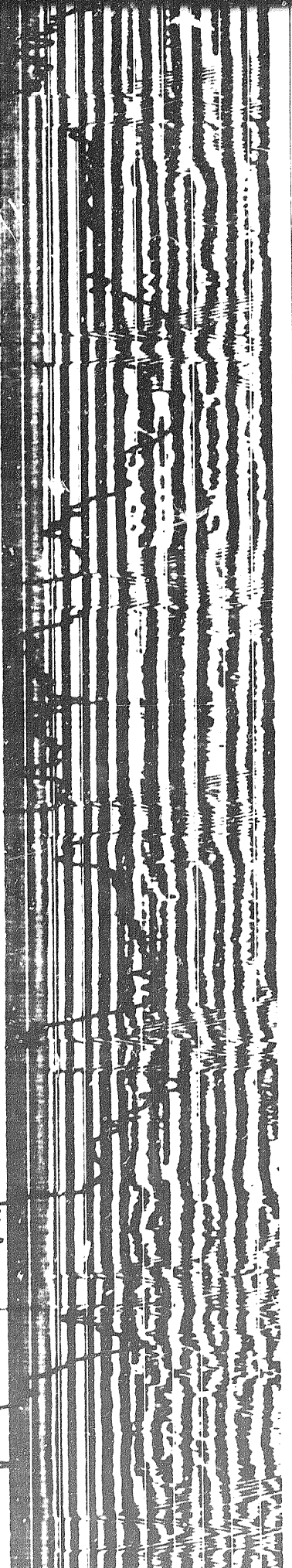
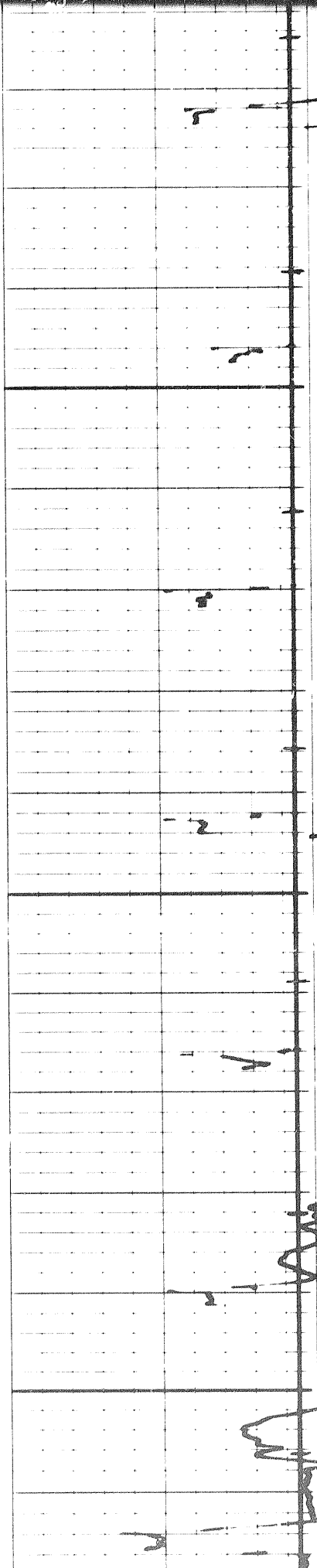
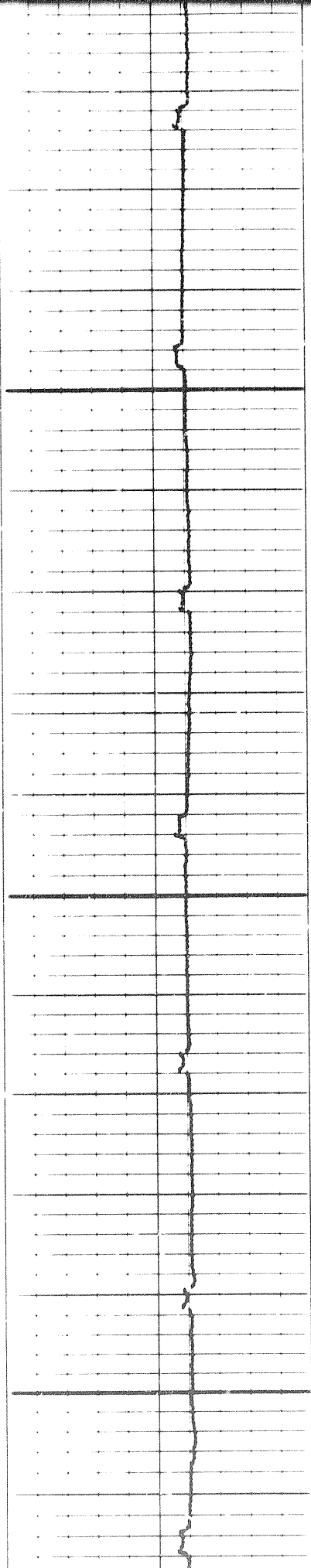




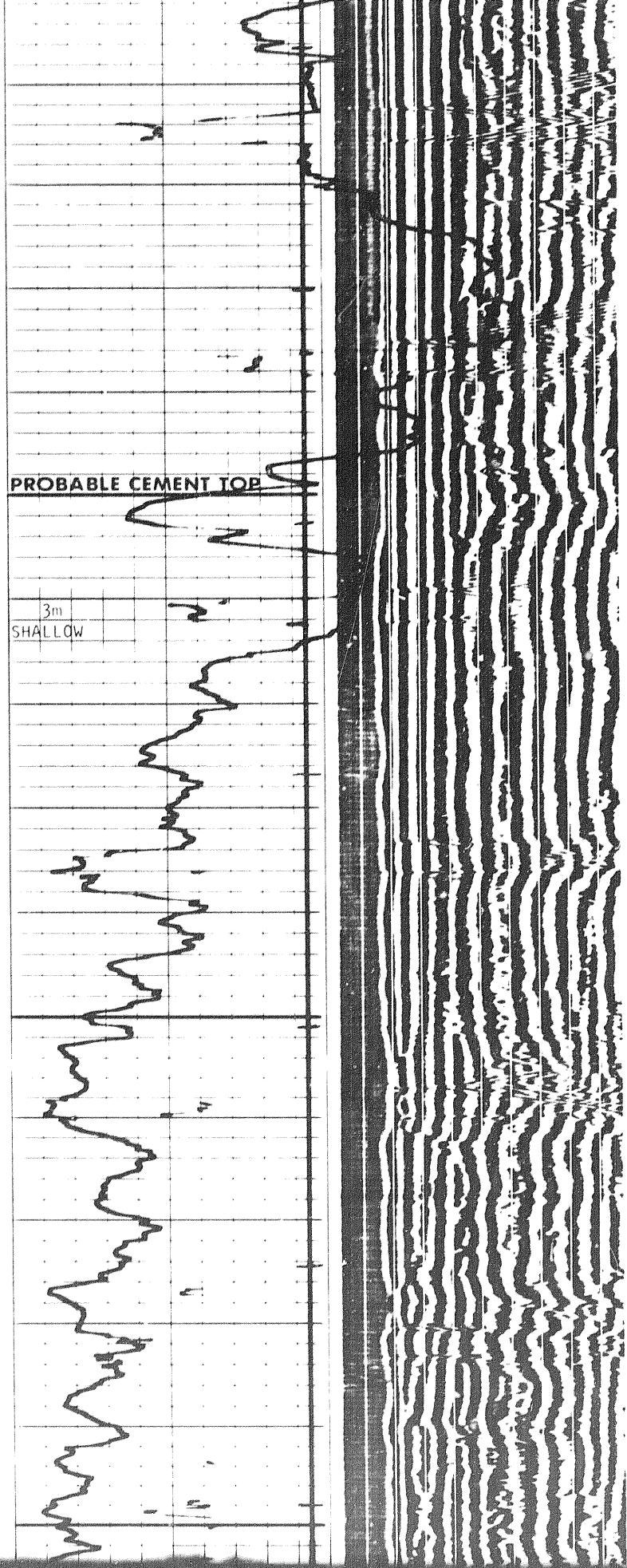
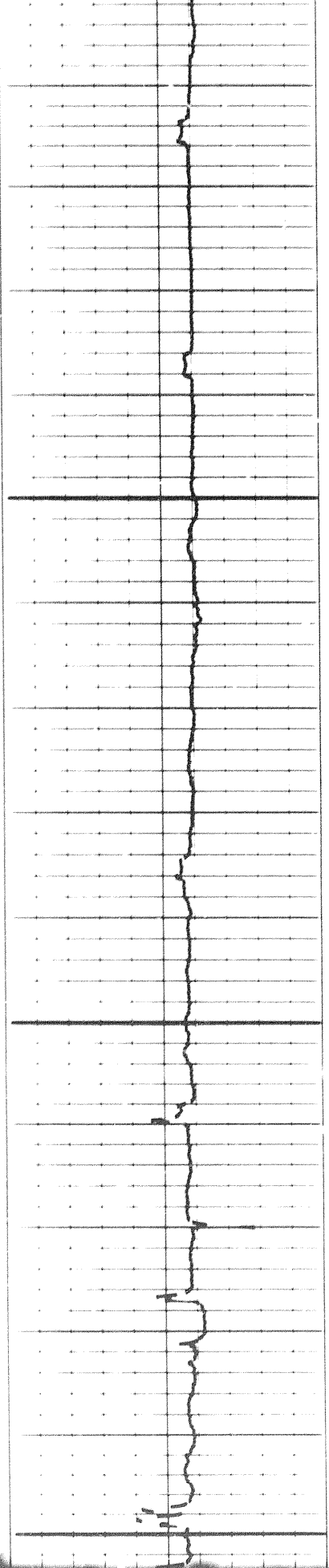


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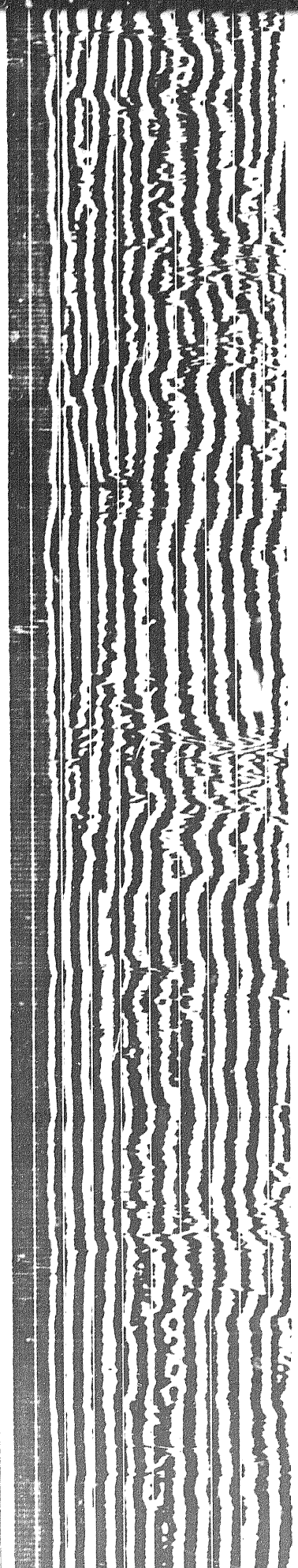
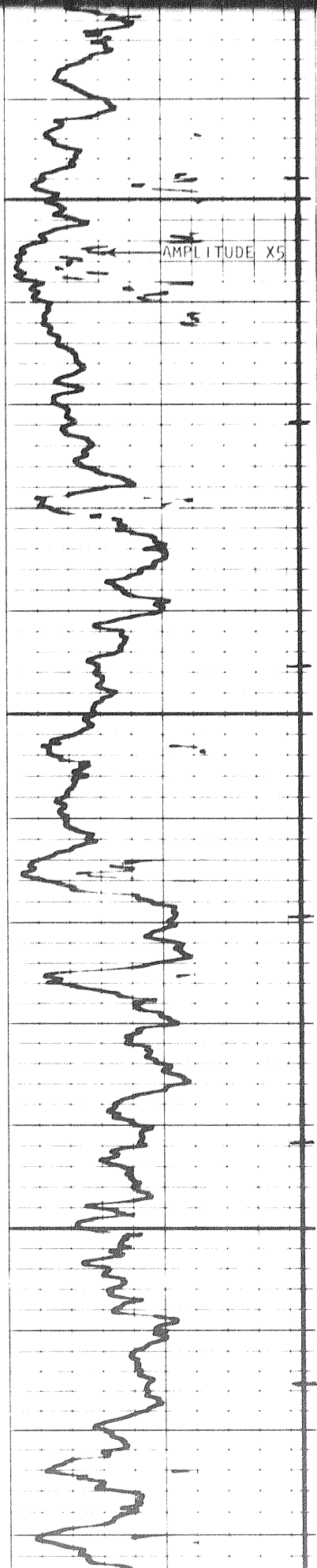
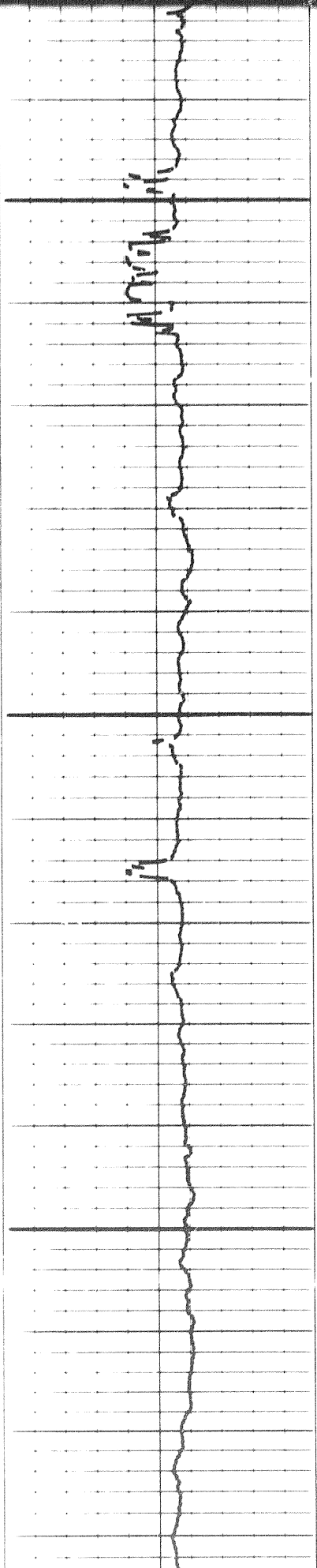


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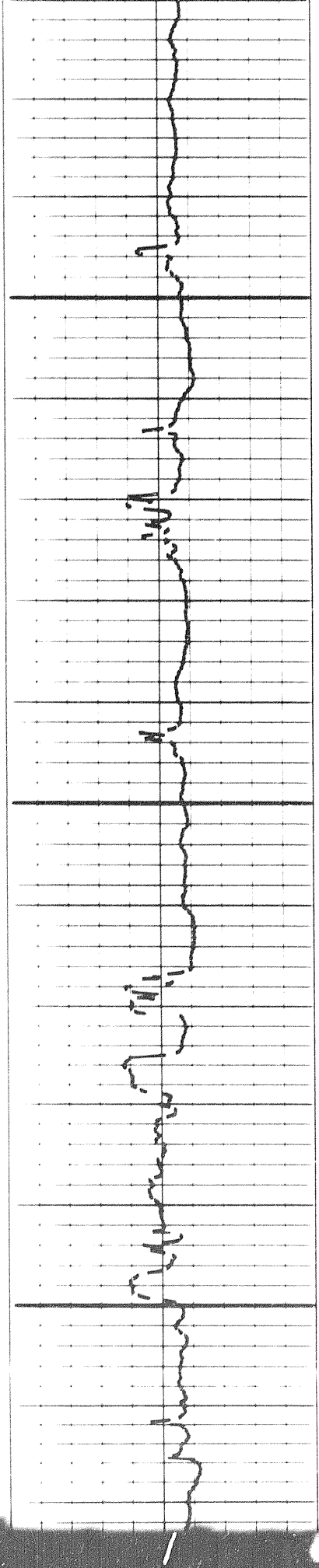


PROBABLE CEMENT TOP

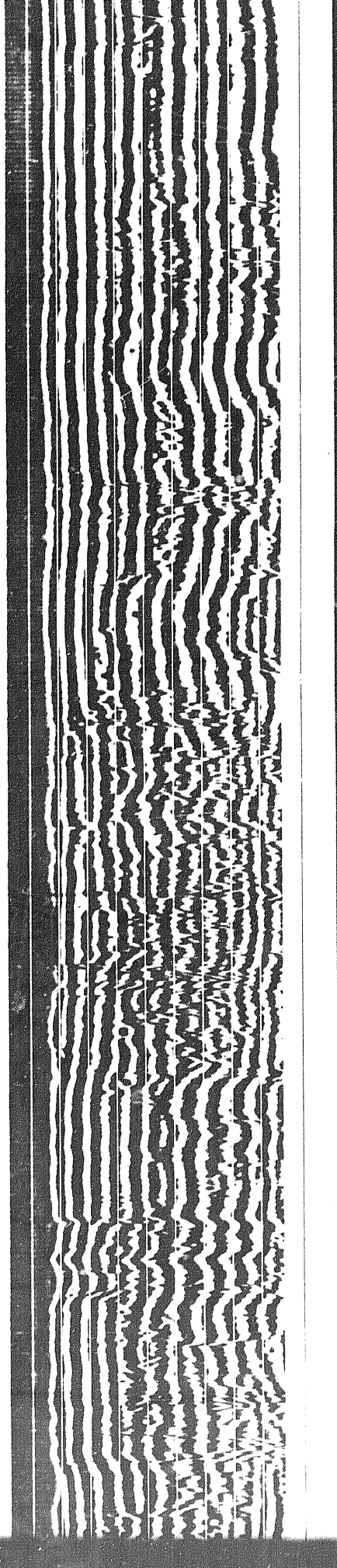
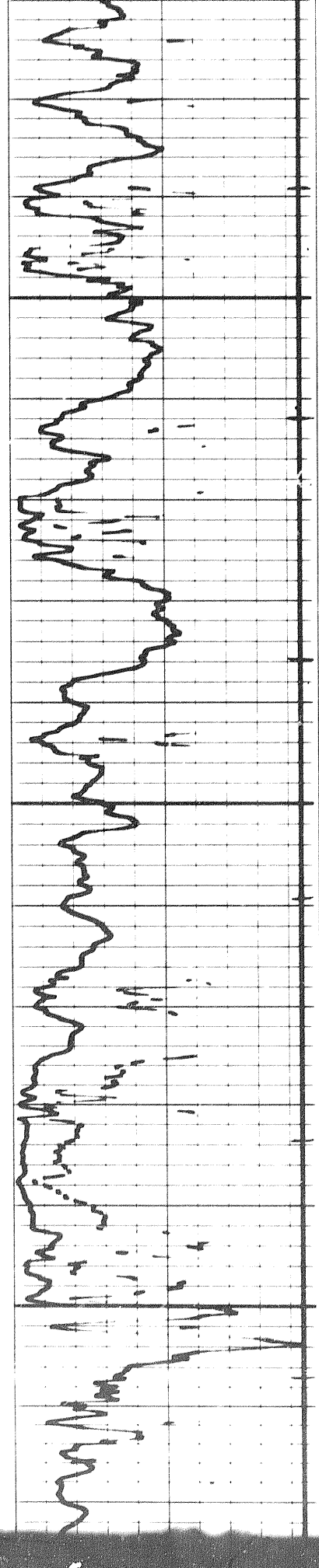
3m  
SHALLOW

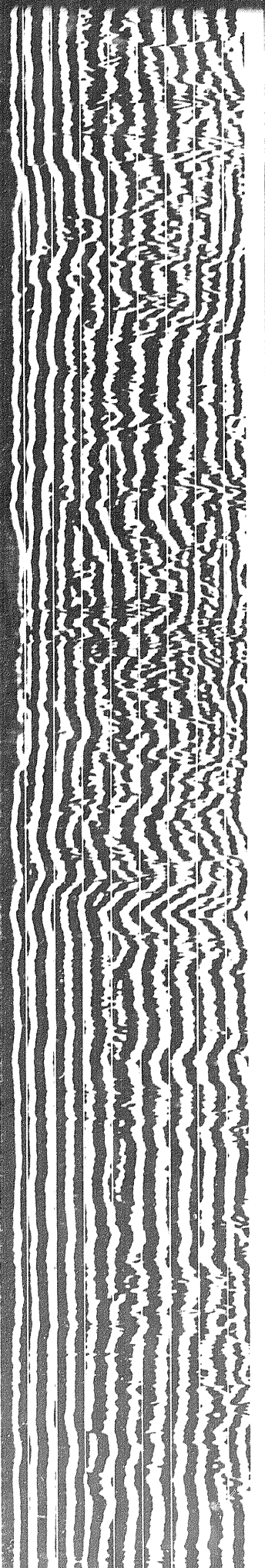
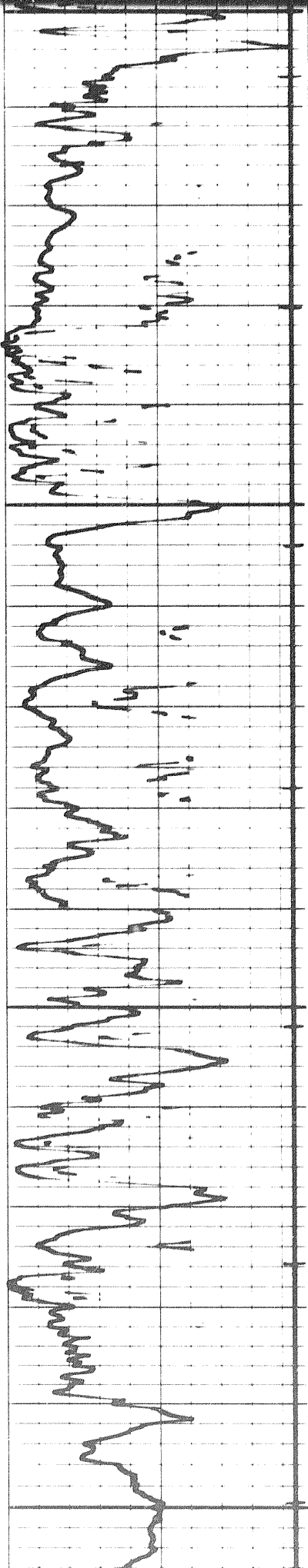
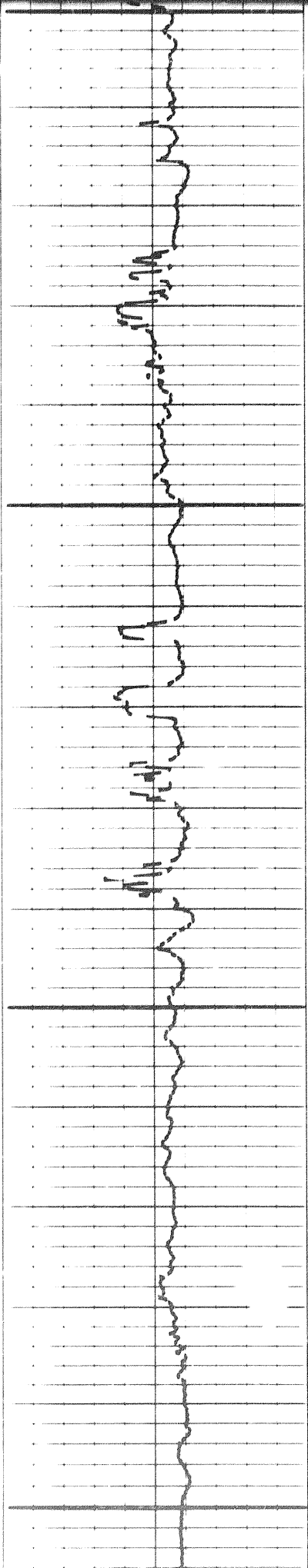


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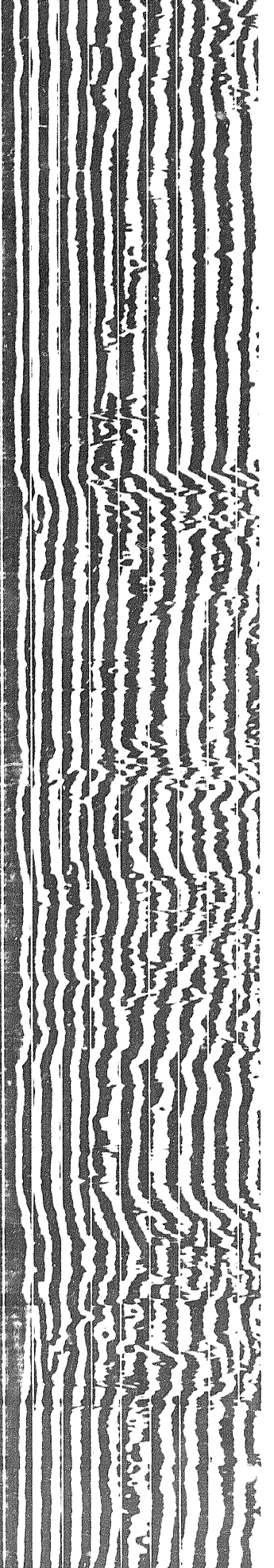
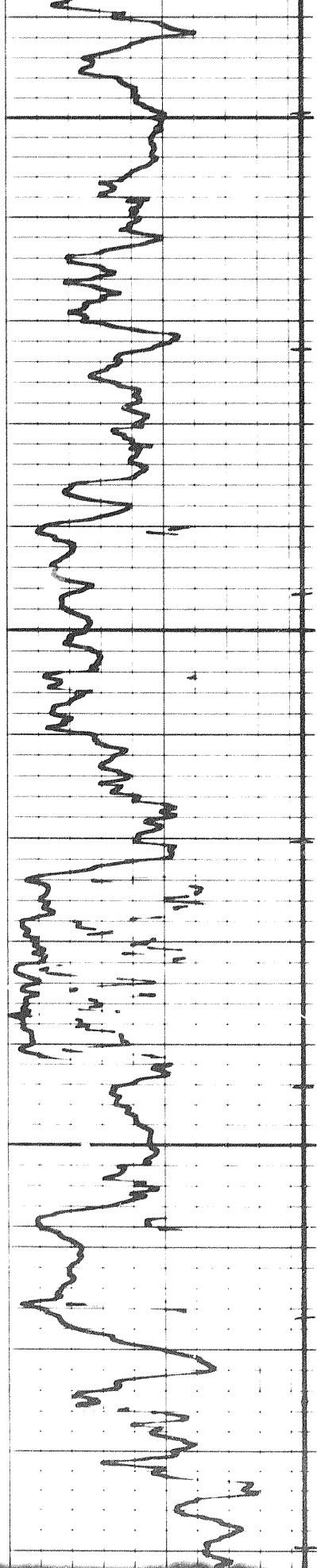
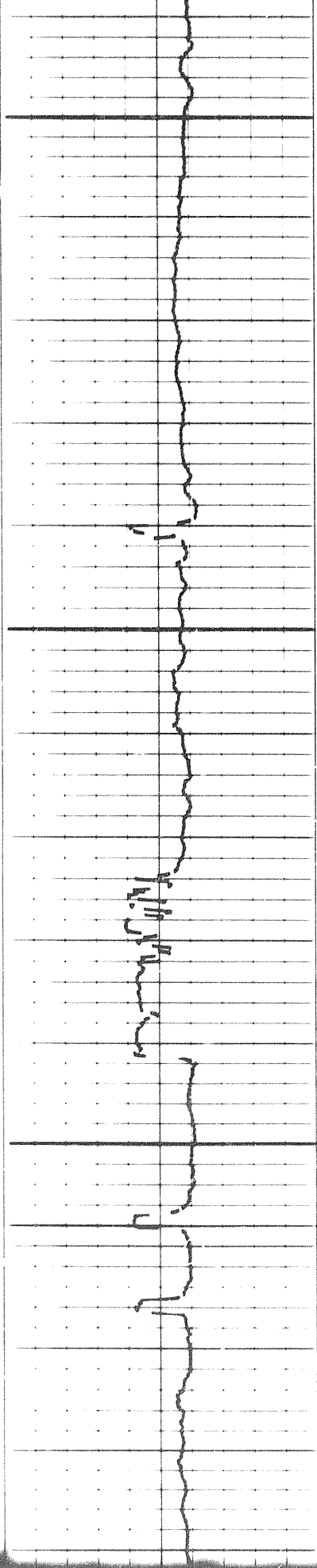


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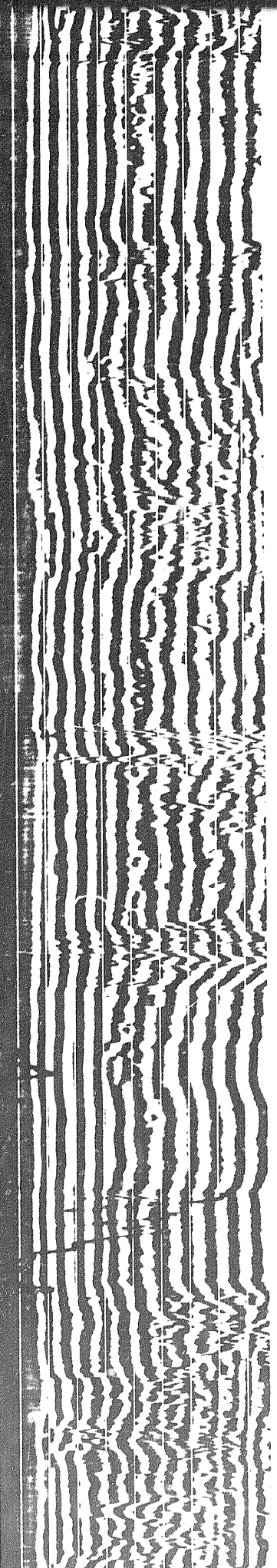
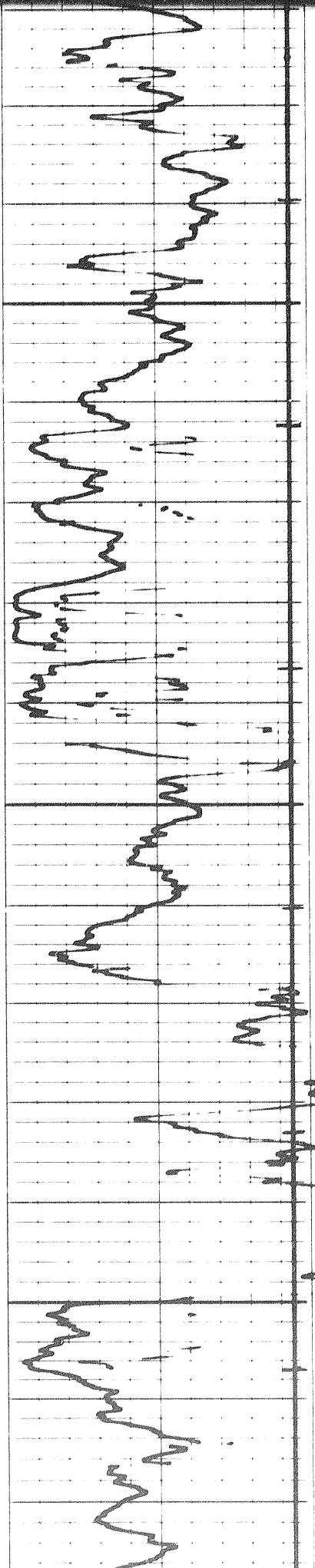
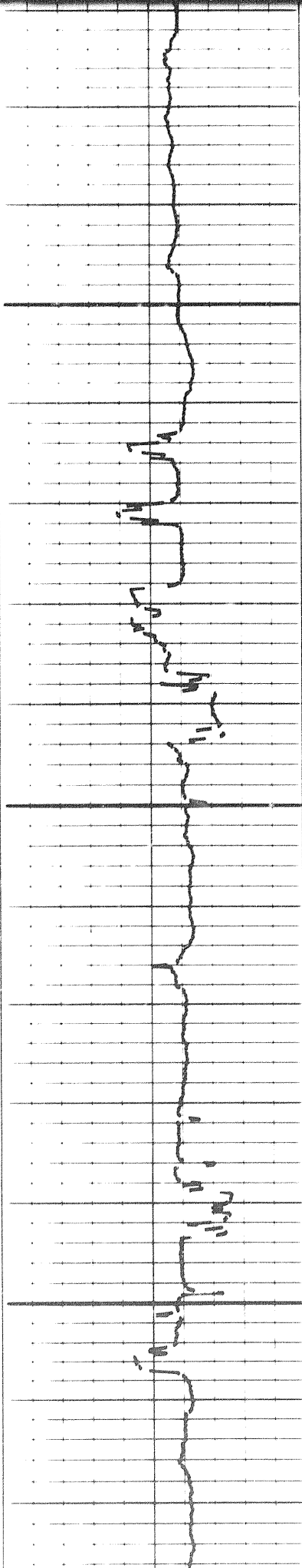




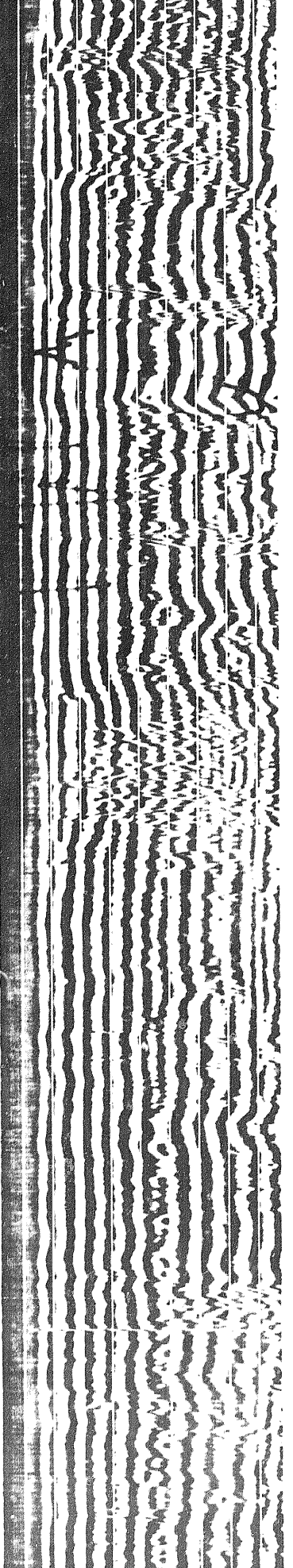
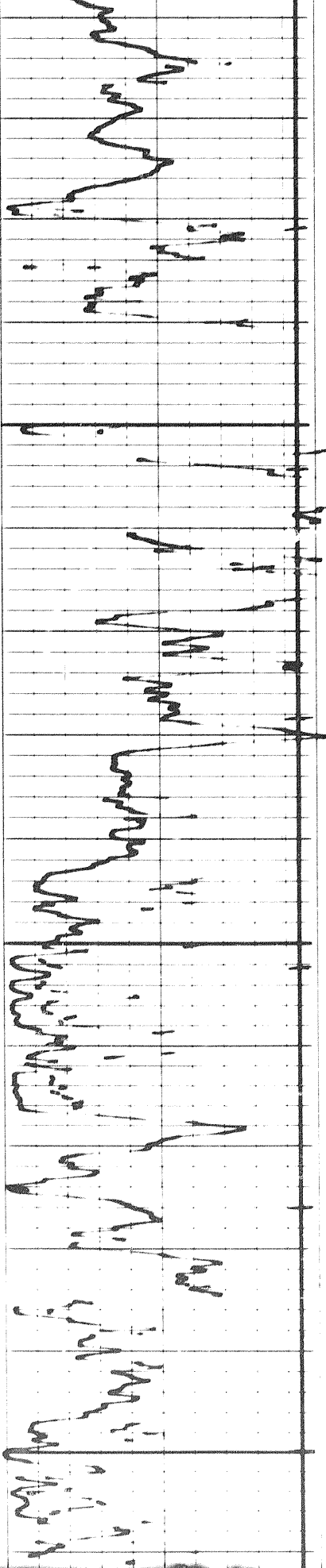
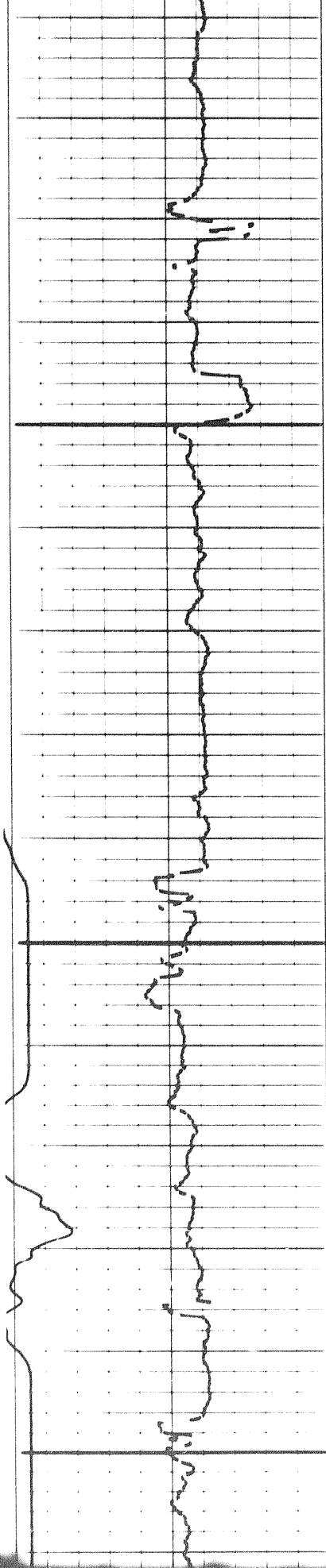
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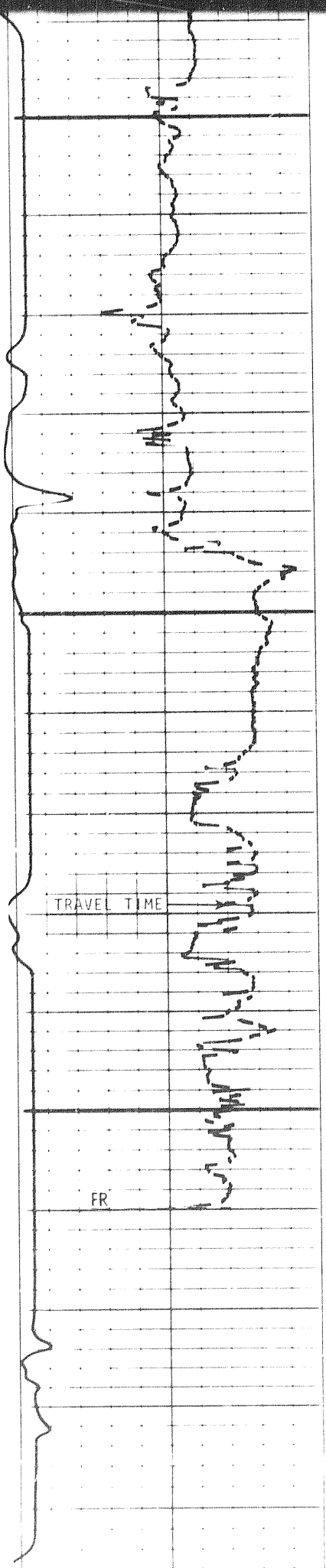






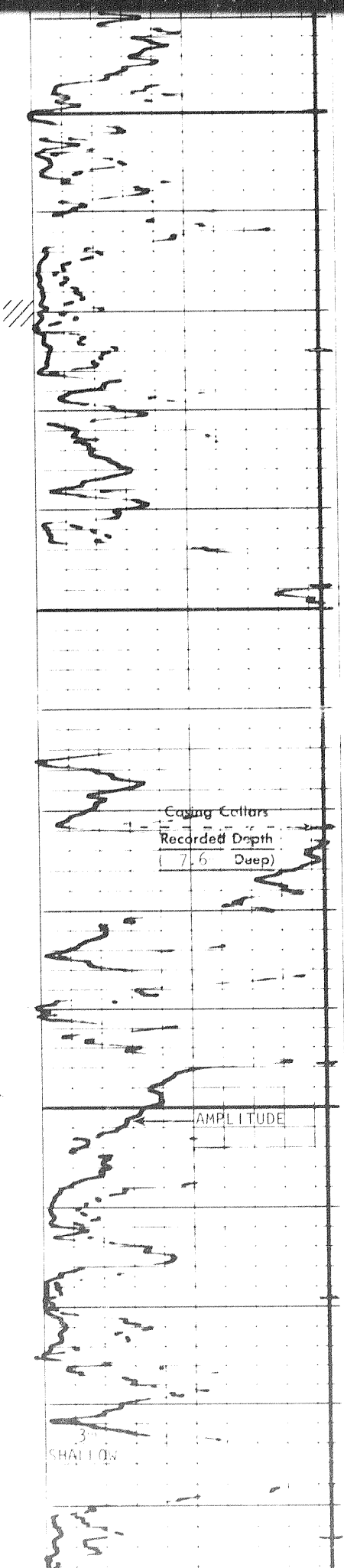
926





TRAVEL TIME

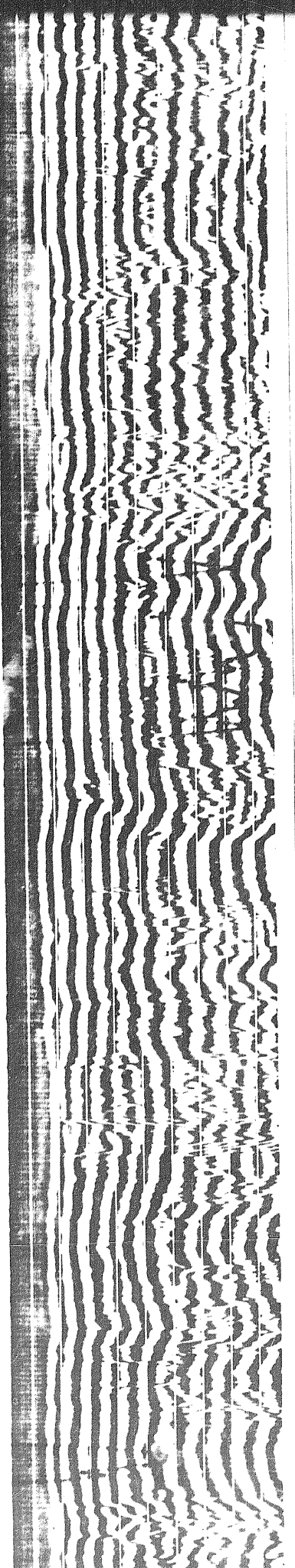
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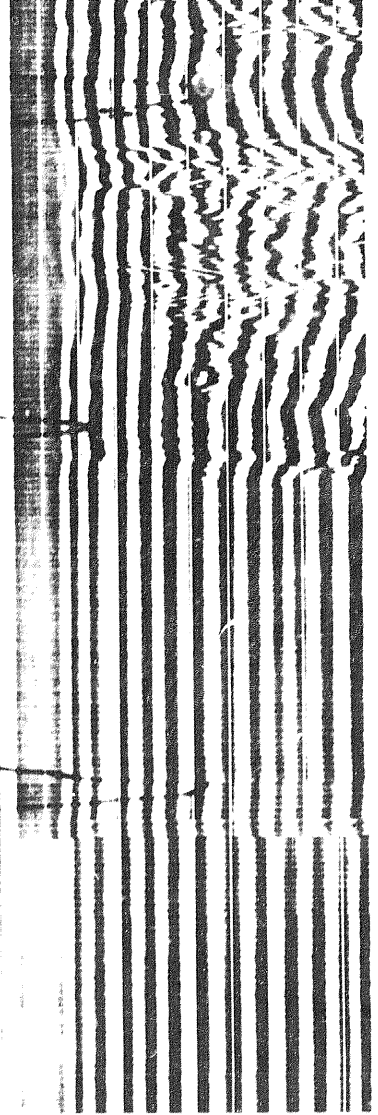
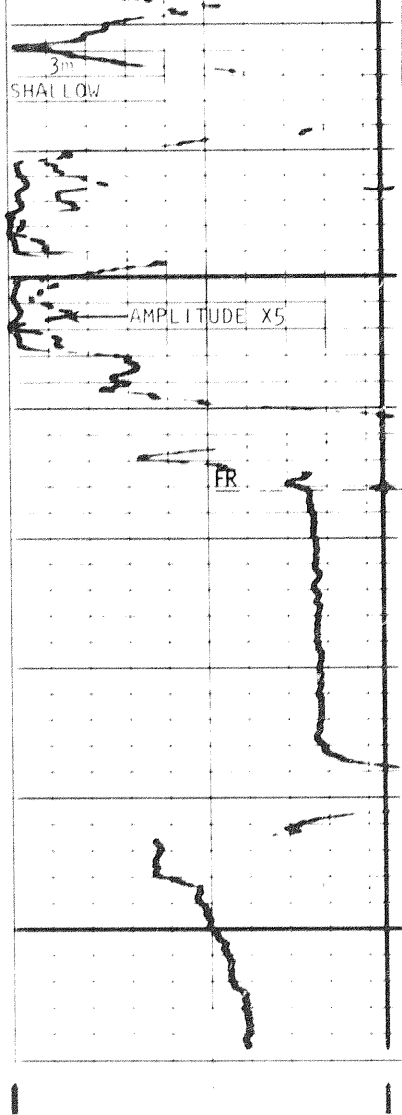
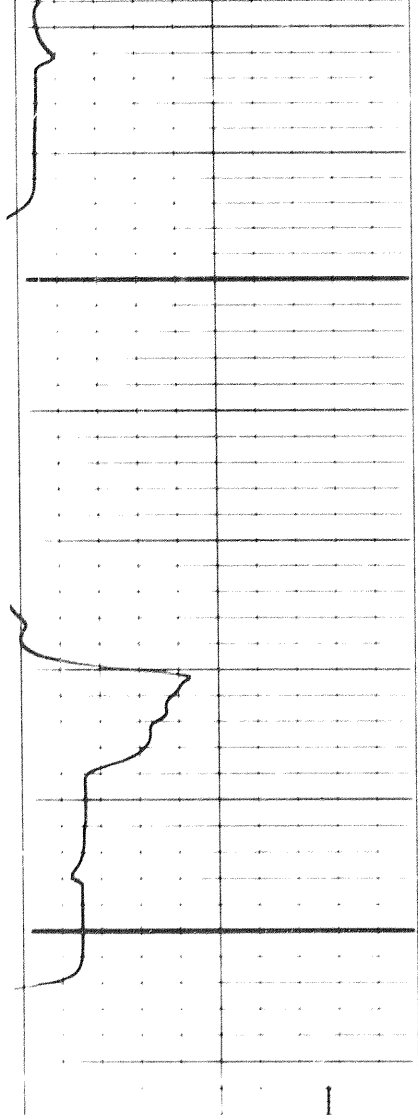


Casing Collars  
Recorded Depth  
(7.6 Deep)

AMPLITUDE

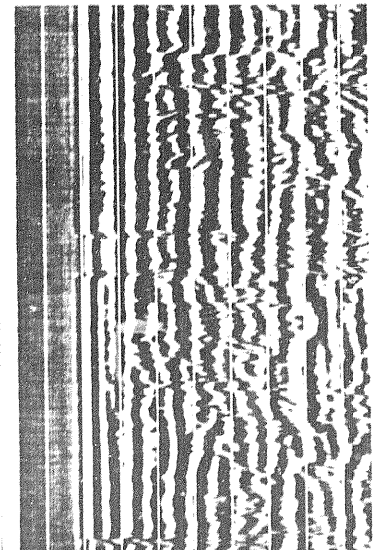
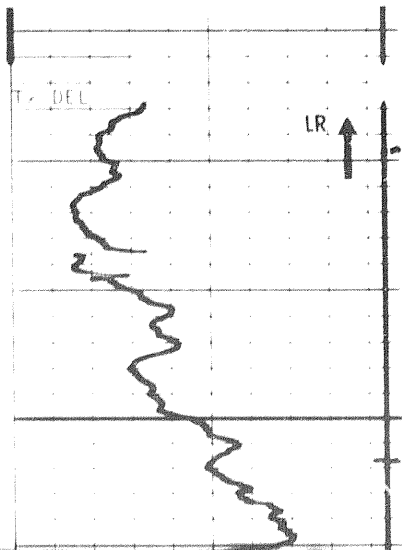
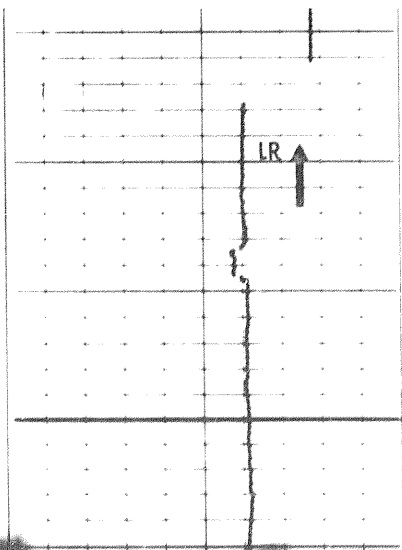
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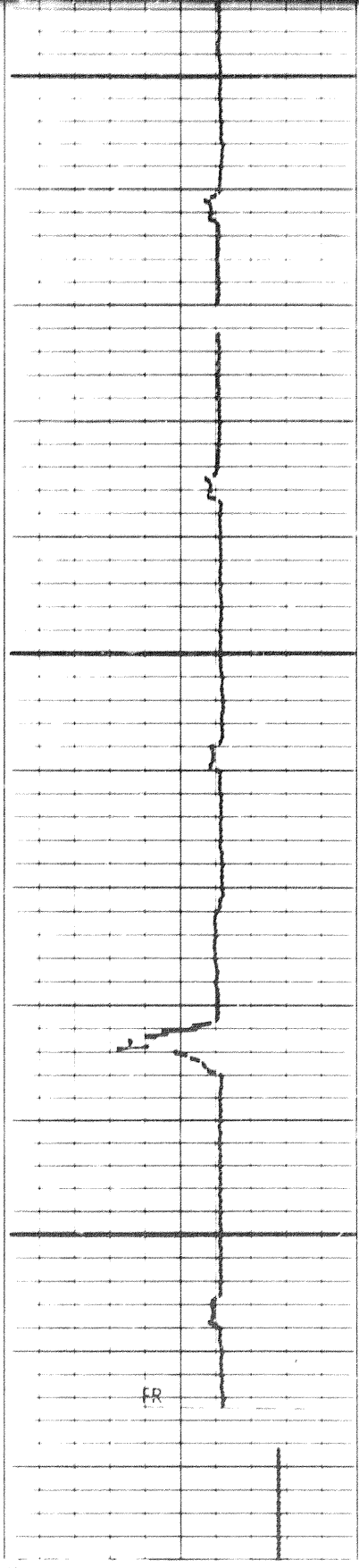


REPEAT SECTION

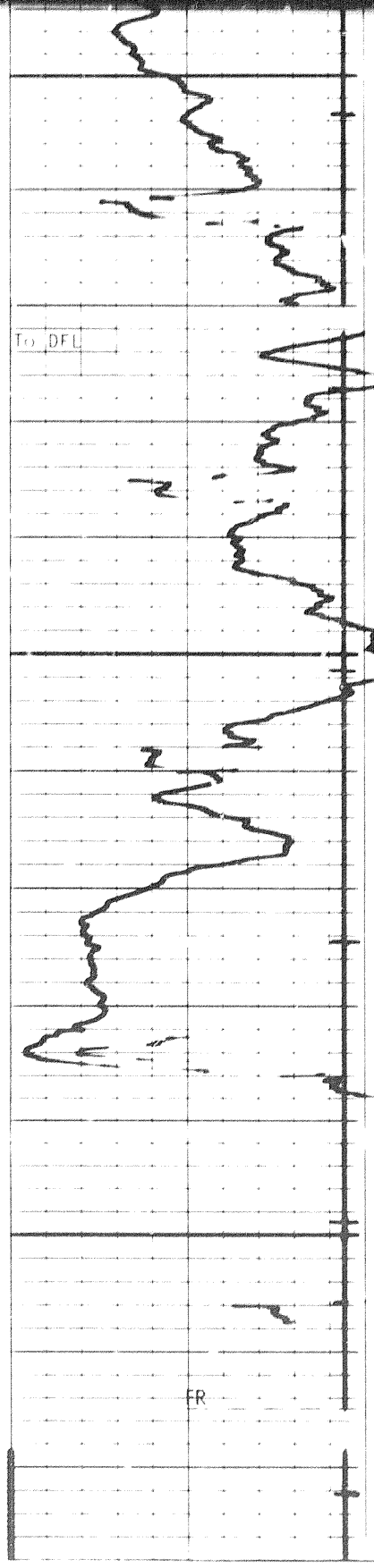
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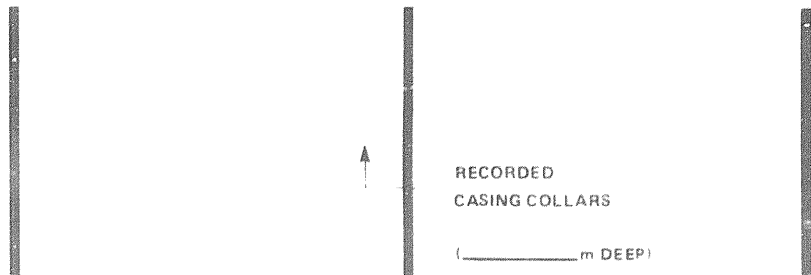
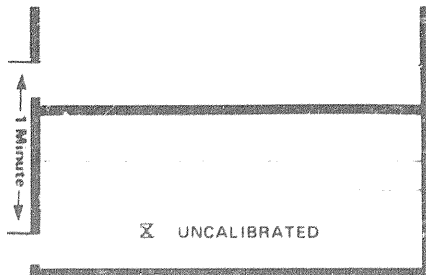
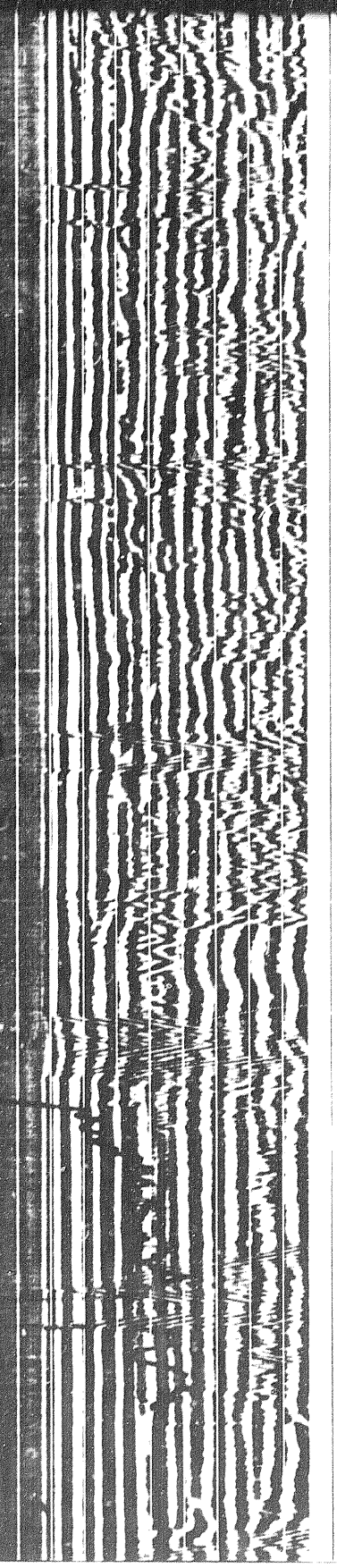


FR



To DFL

FR



1 Minute

UNCALIBRATED

GAMMA RAY activity API units

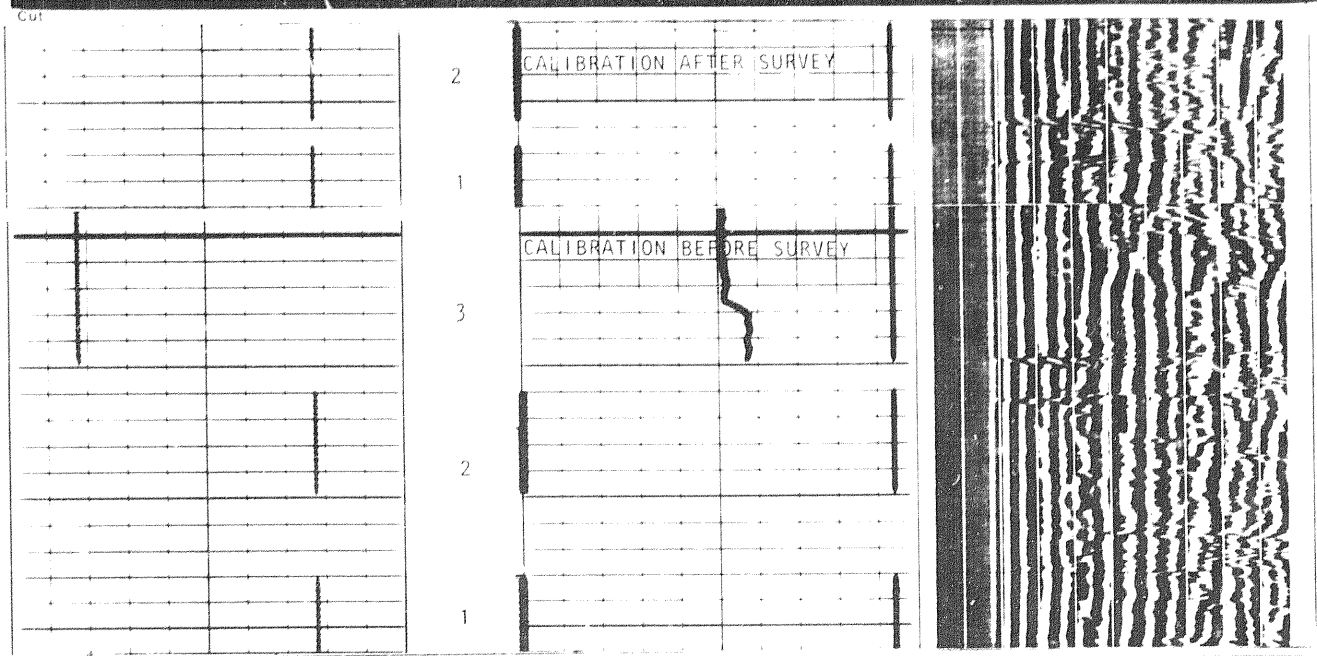
400 200

RECORDED CASING COLLARS (\_\_\_\_\_ m DEEP)

BONDING INCREASES

SINGLE RECEIVER TOTAL TRAVEL TIME MICROSECONDS	DEPTH METRES	AMPLITUDE VOLTAGE MILLIVOLTS	VARIABLE DENSITY TIME SPAN MICROSECONDS
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CALIBRATION RECORD



CALIBRATION RECORD

CEMENT BOND CALIBRATION CODING

	TRANSIT TIME	AMPLITUDE
1.	MECHANICAL ZERO	MECHANICAL ZERO
2.	μs	ELECTRICAL ZERO
3.	μs	CALIBRATE

COMPANY \_\_\_\_\_

WELL \_\_\_\_\_

FIELD \_\_\_\_\_

PROVINCE \_\_\_\_\_

SCHL. FR \_\_\_\_\_ m

SCHL. TD \_\_\_\_\_ m

DRLR. TD \_\_\_\_\_ m

Elev.: KB \_\_\_\_\_ m

DF \_\_\_\_\_ m

GL \_\_\_\_\_ m

5010108

GAMMA RAY

Activity  
API units

T.C. 2

Zero 0 div. to left

0 150  
150 300

CALIPER

hole diameter  
mm

150 275 400

DEPTH  
METRES

INTERVAL TRANSIT TIME

$\mu$  s/m

500 300 100  
900 700 500

X2000

Rur 2

CASING SHOES

Bit Size

Caliper

GR

Casing Check (187  $\mu$  s/m)

SONIC

One Millisecond Travel Time

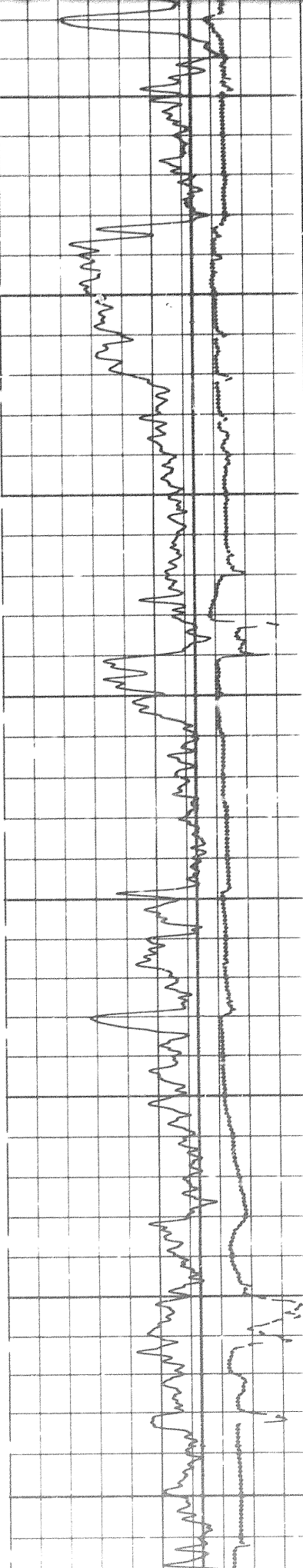
Ten Millisecond Travel Time

1050

1100

1150

101

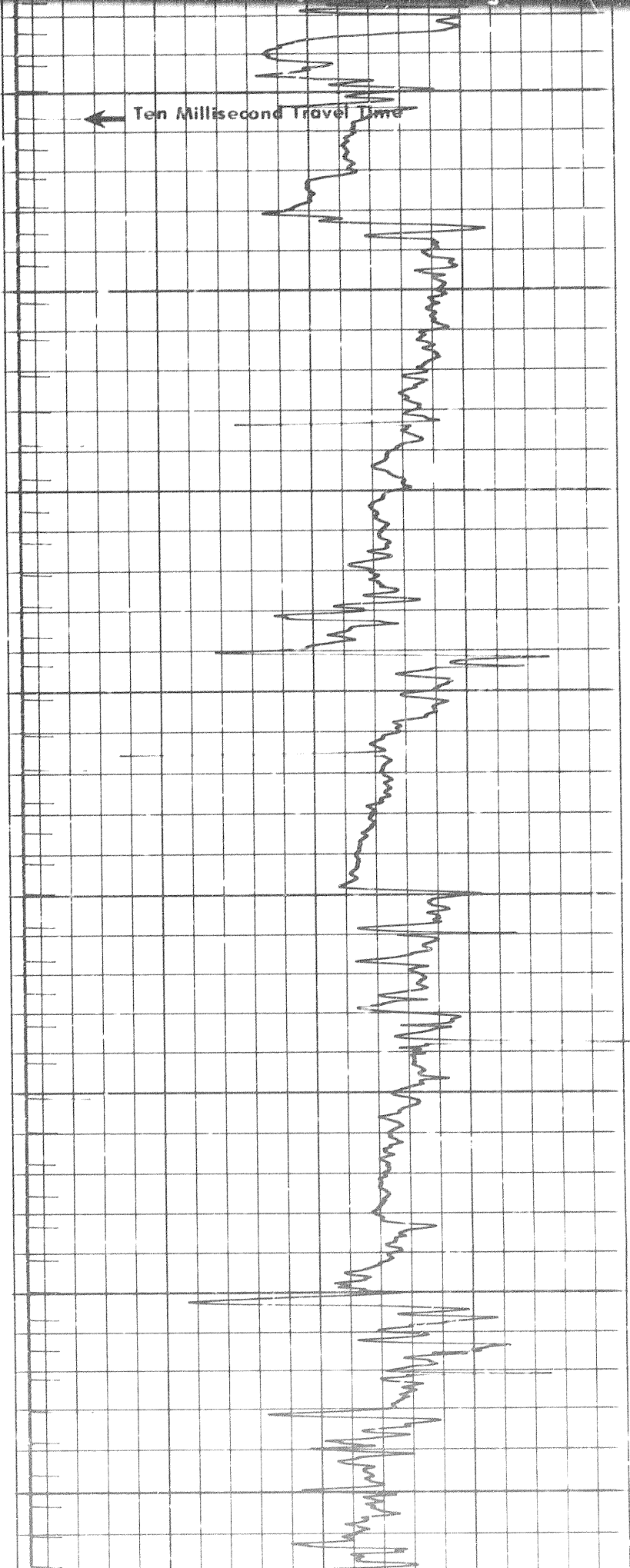


1150

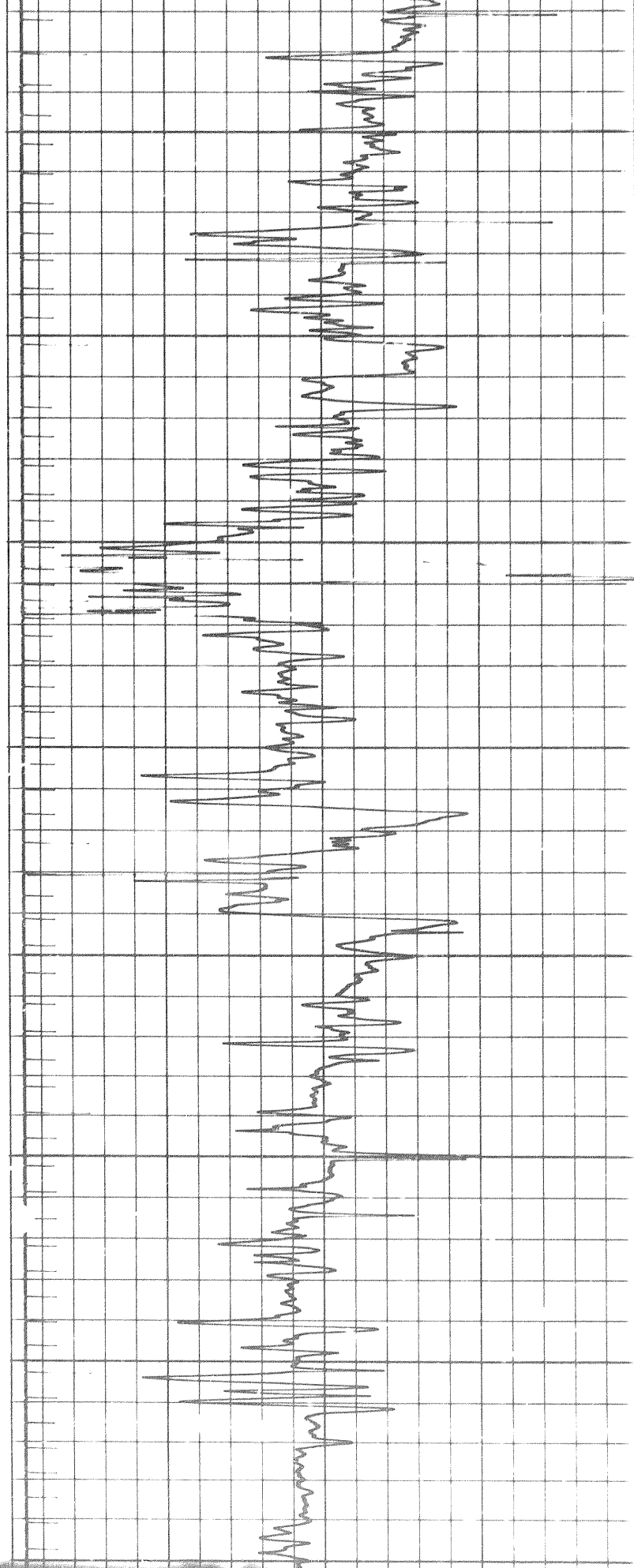
1200

1250

1300





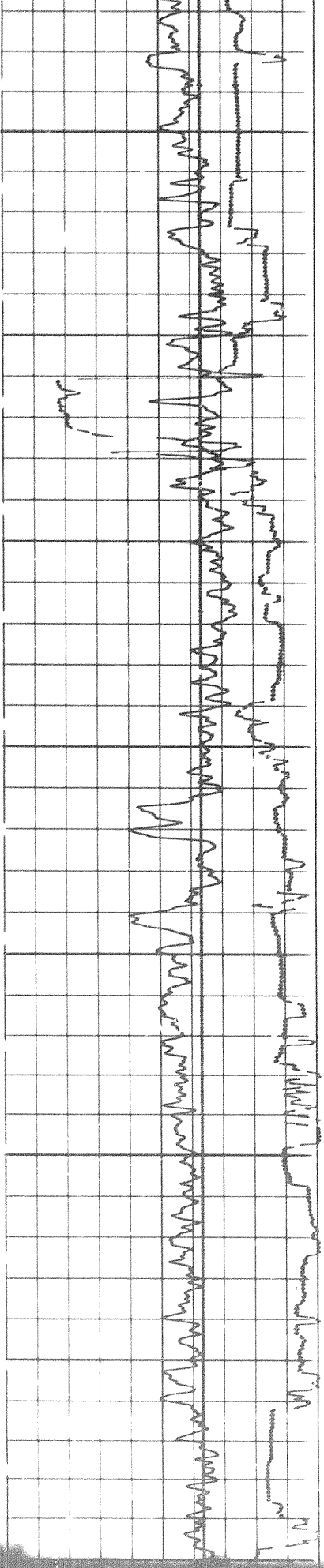


1300

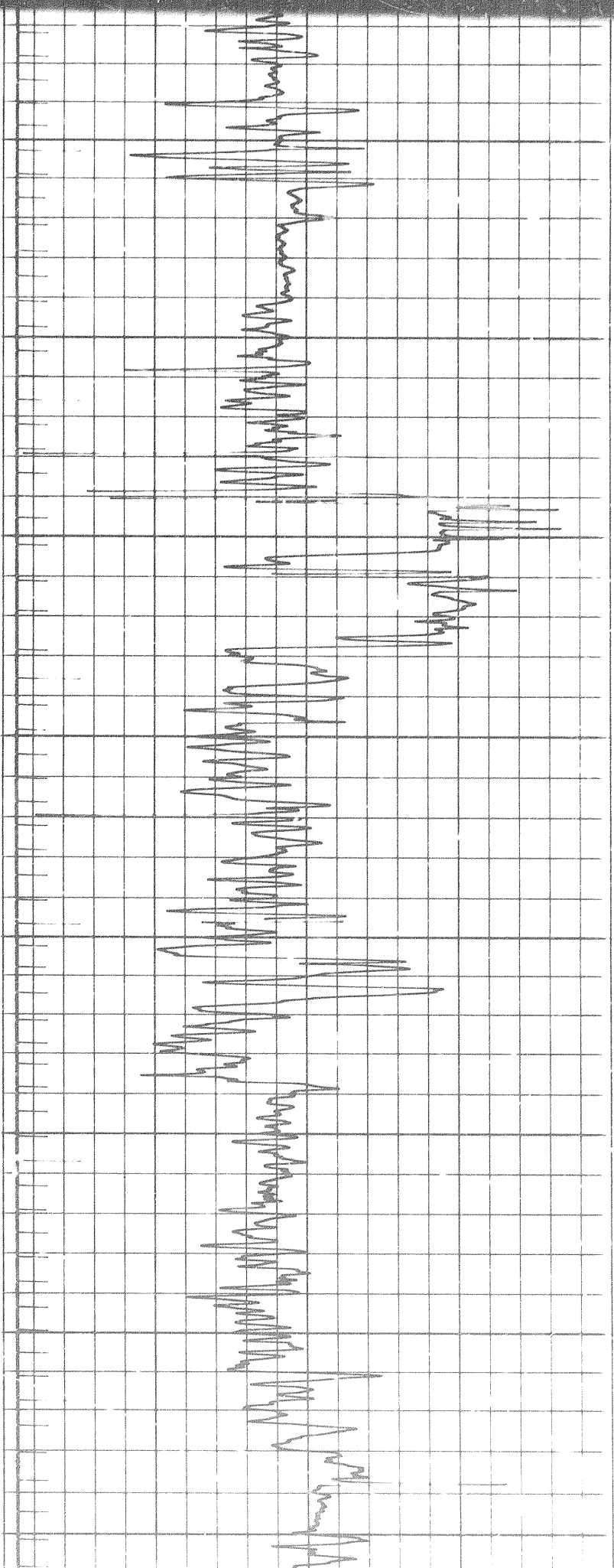
1350

1400

1450



2 of

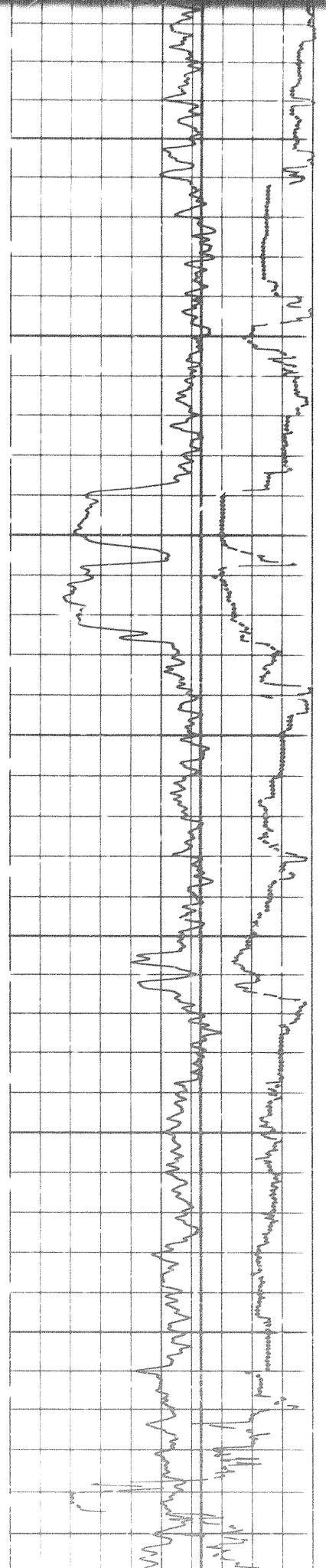


1450

1500

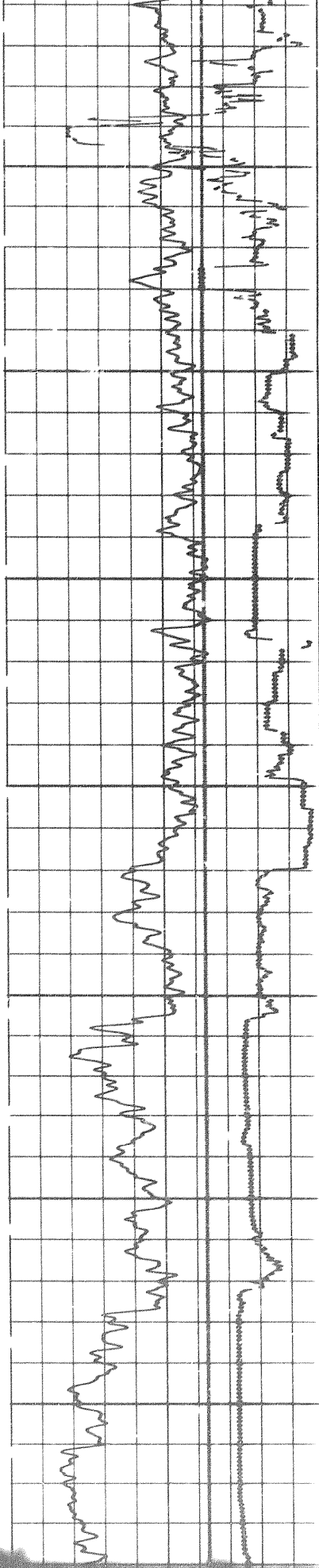
1550

1600



2

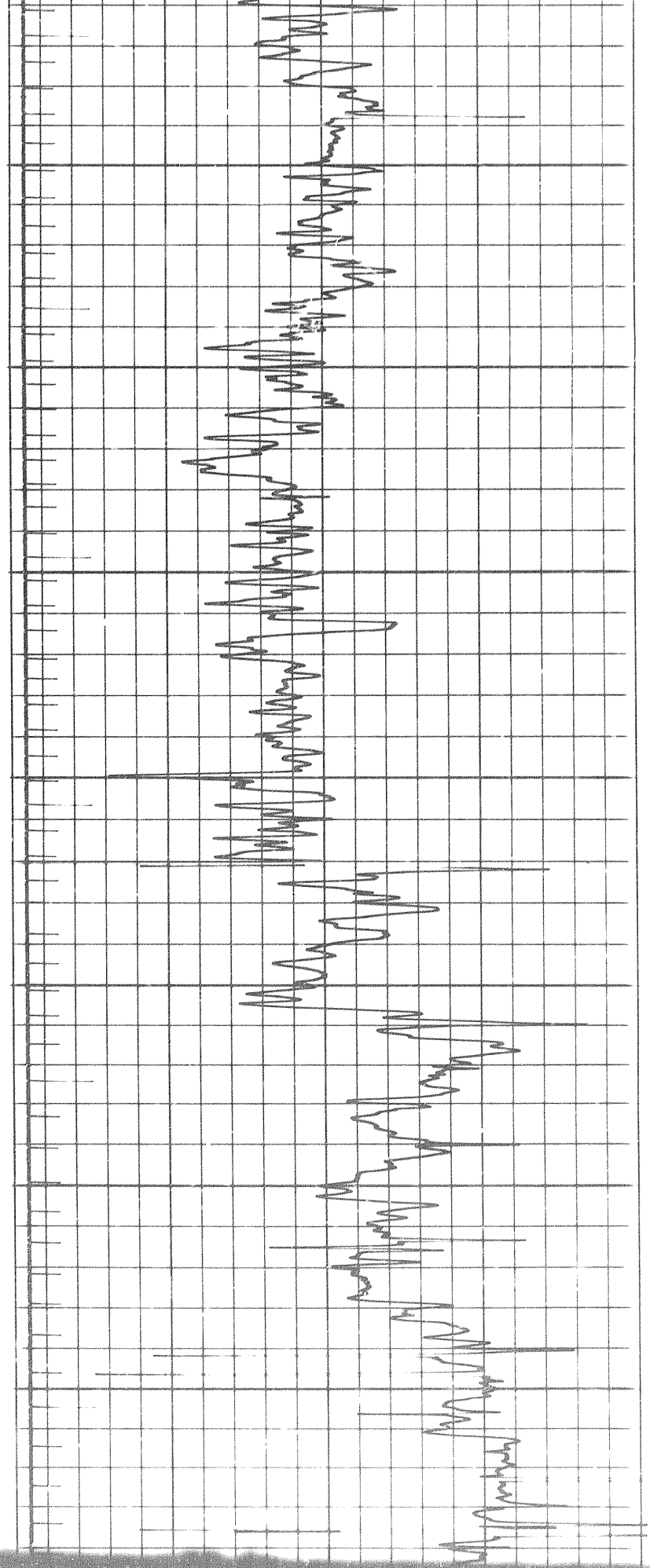
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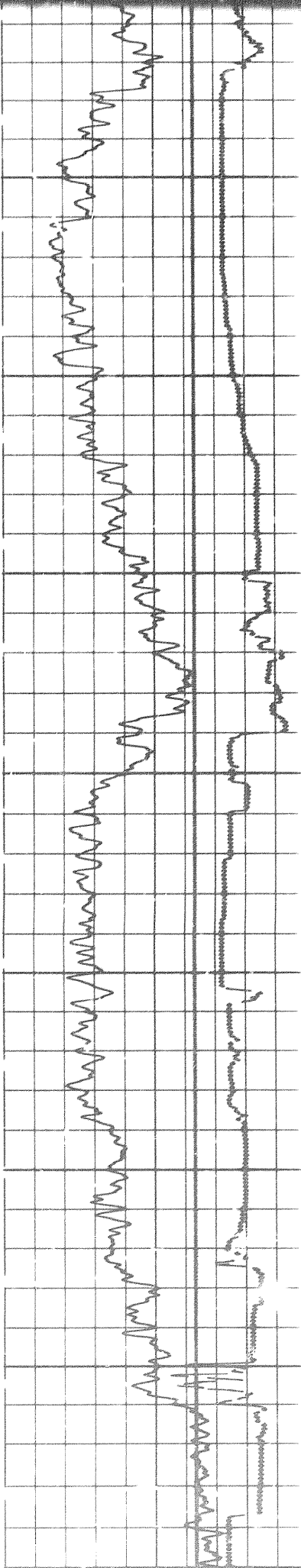


1650

1700

1750



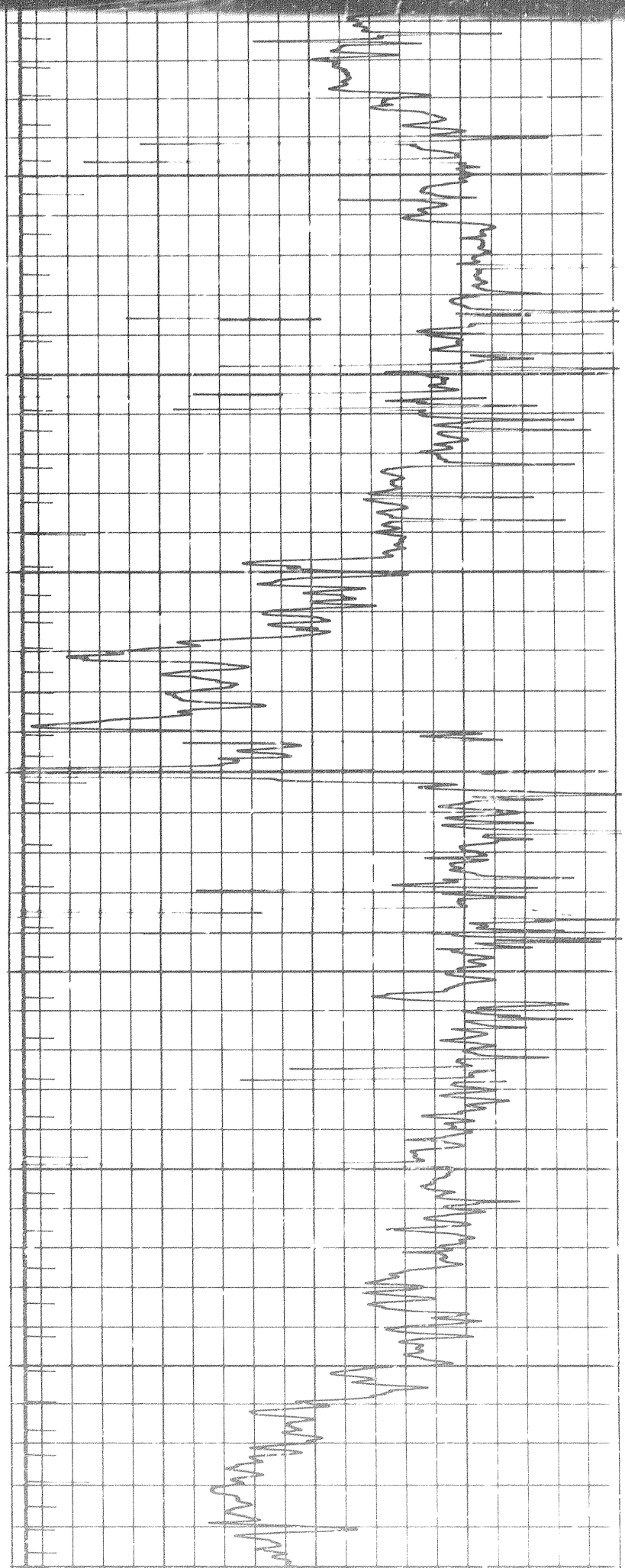


1800

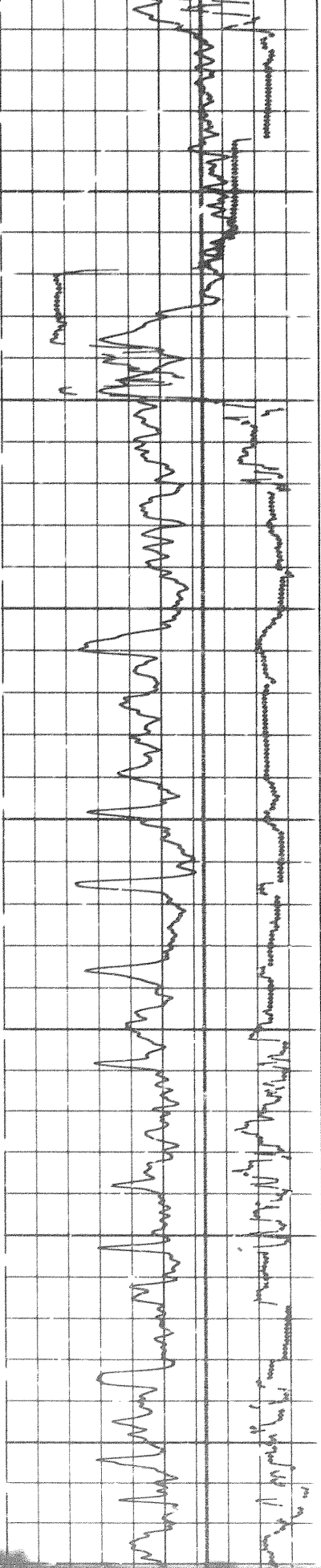
1850

1900

1950



404

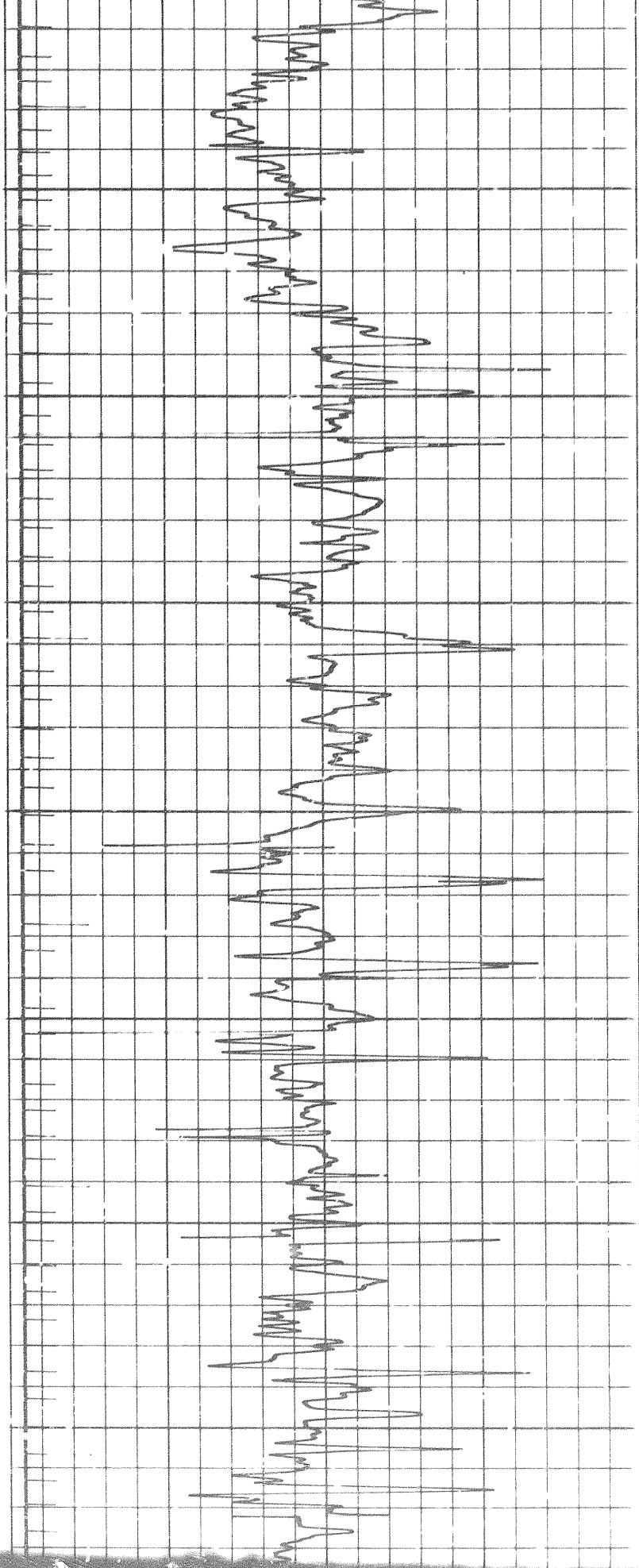


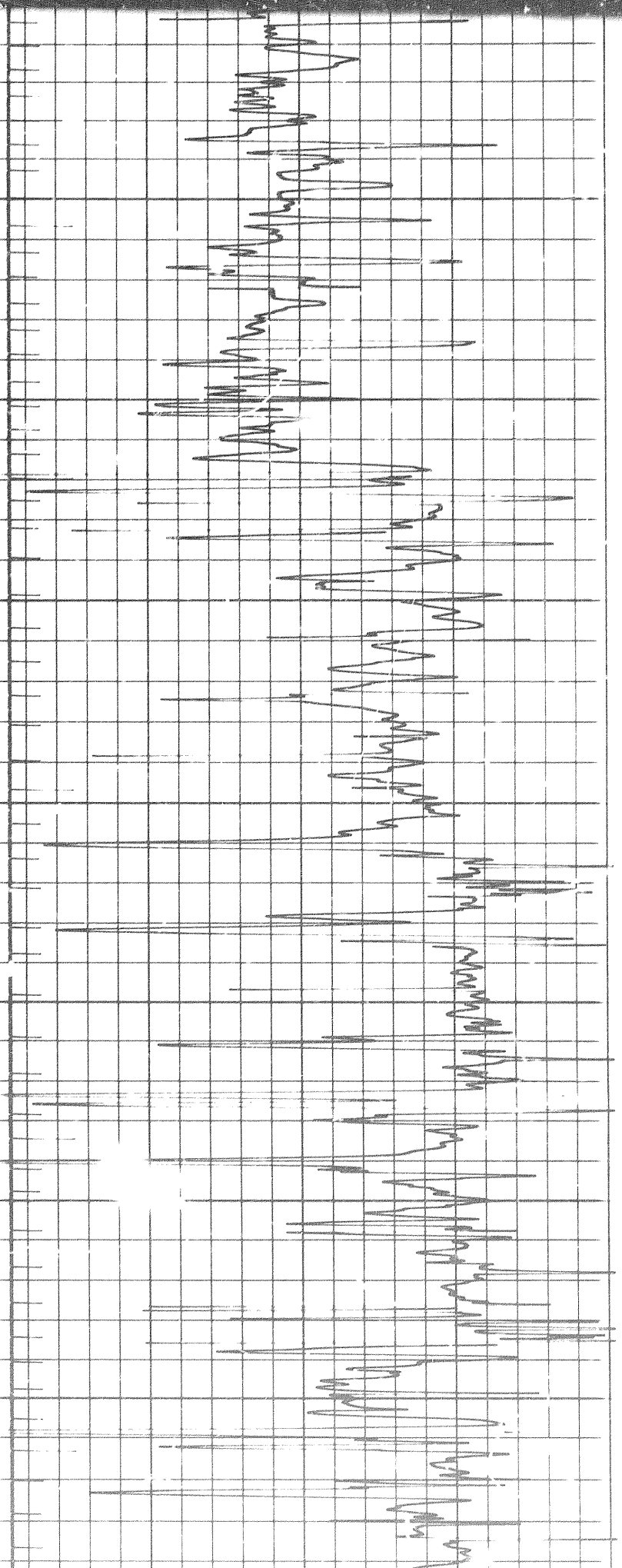
1950

2000

2050

2100



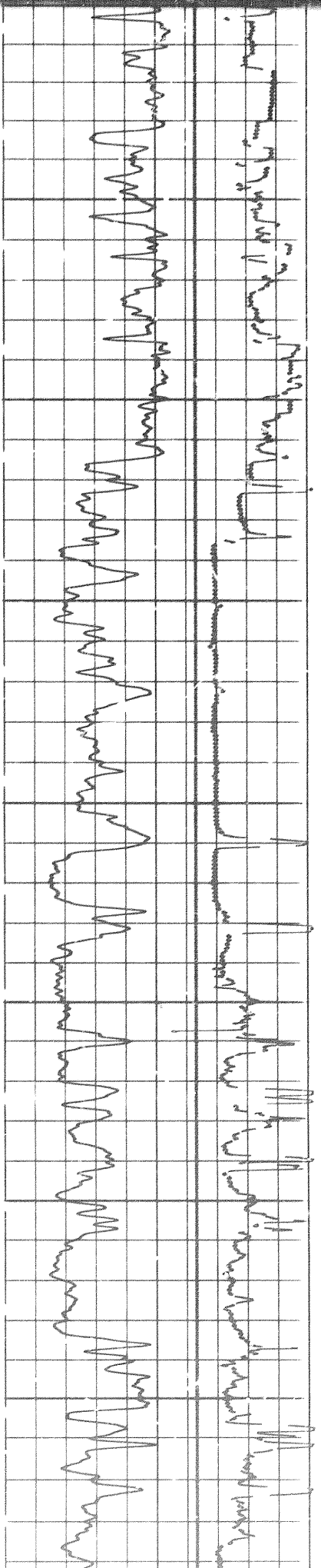


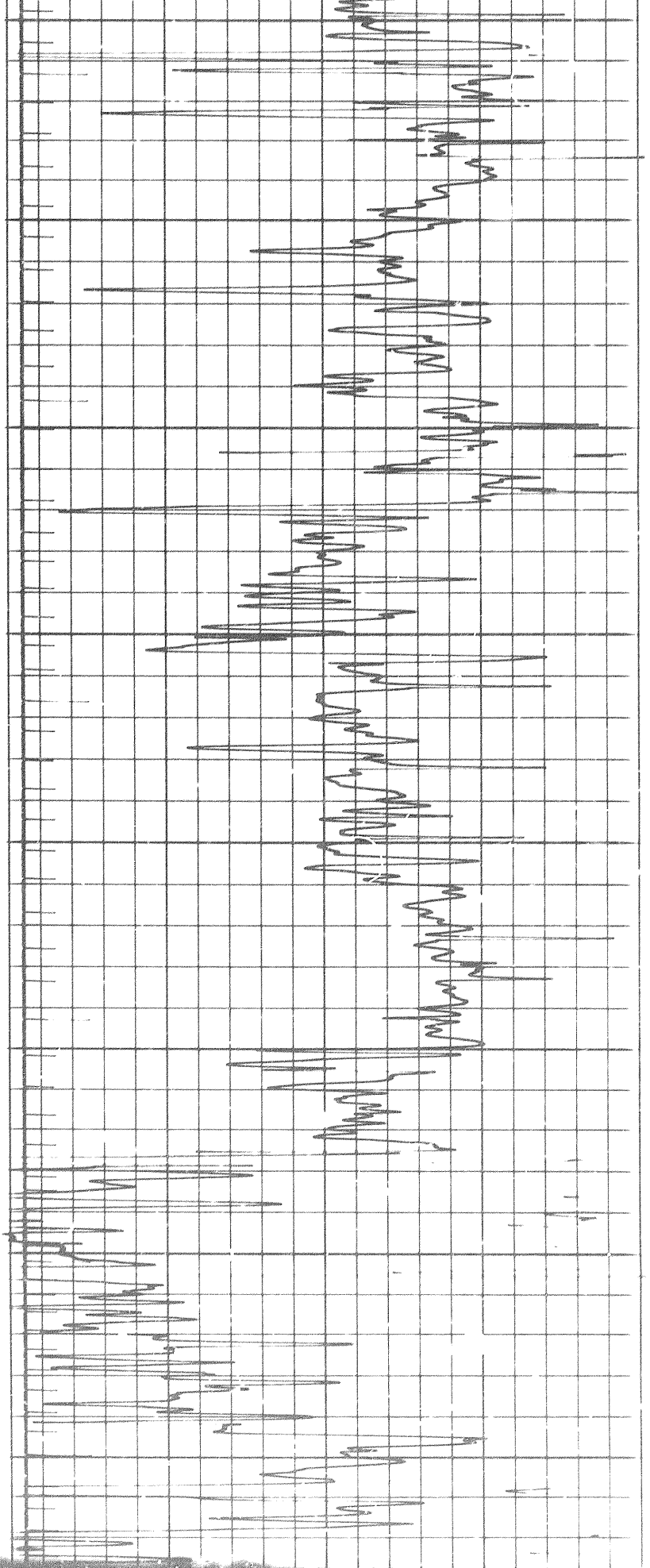
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2150

2200

2250



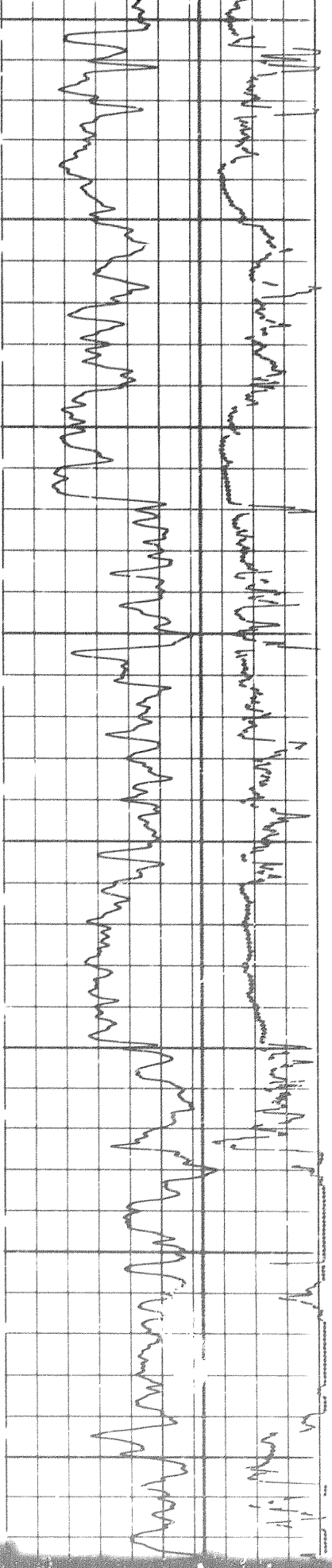


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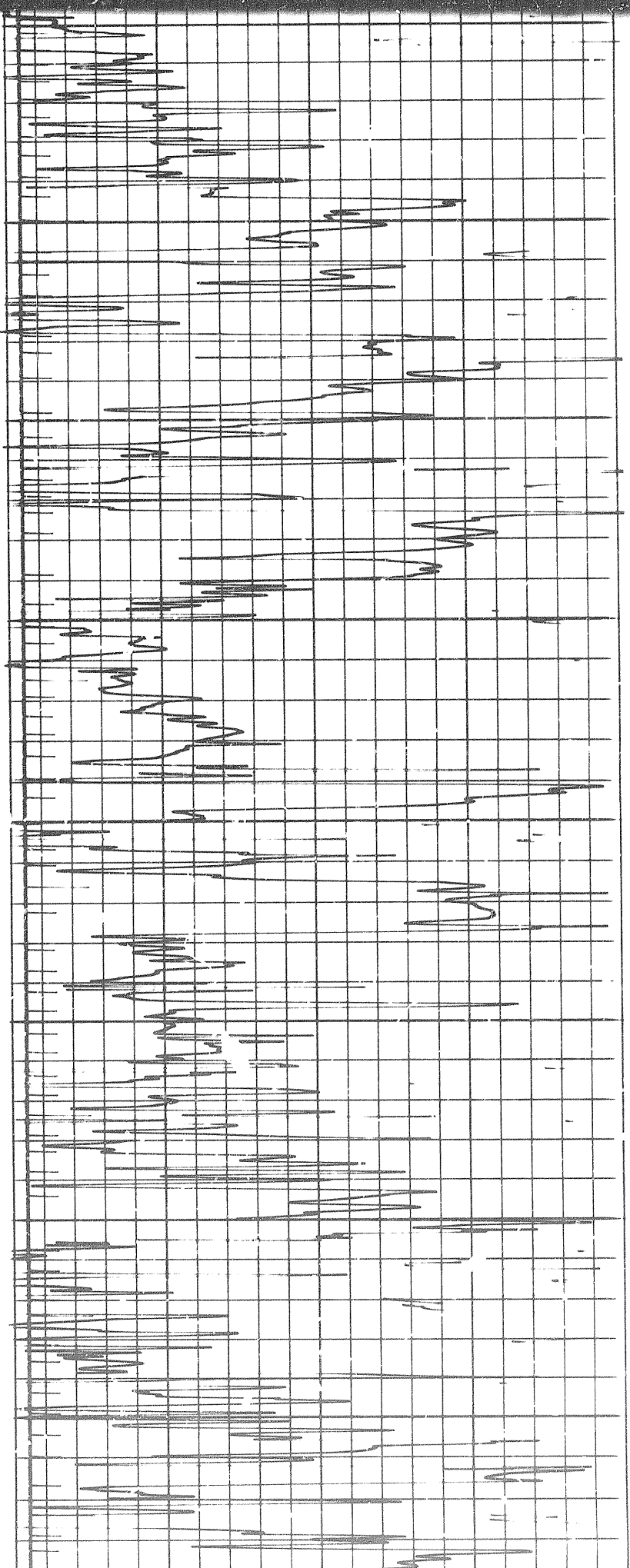
2300

2350

2400



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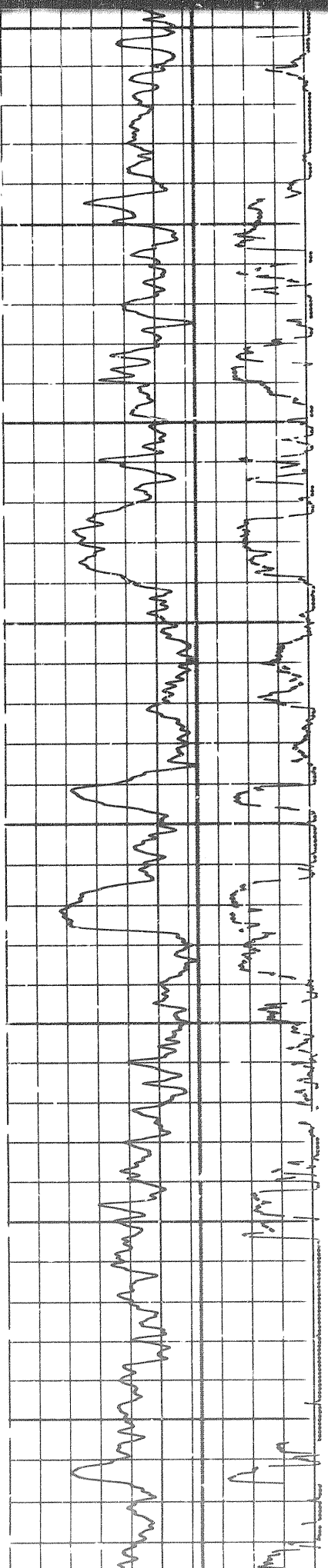


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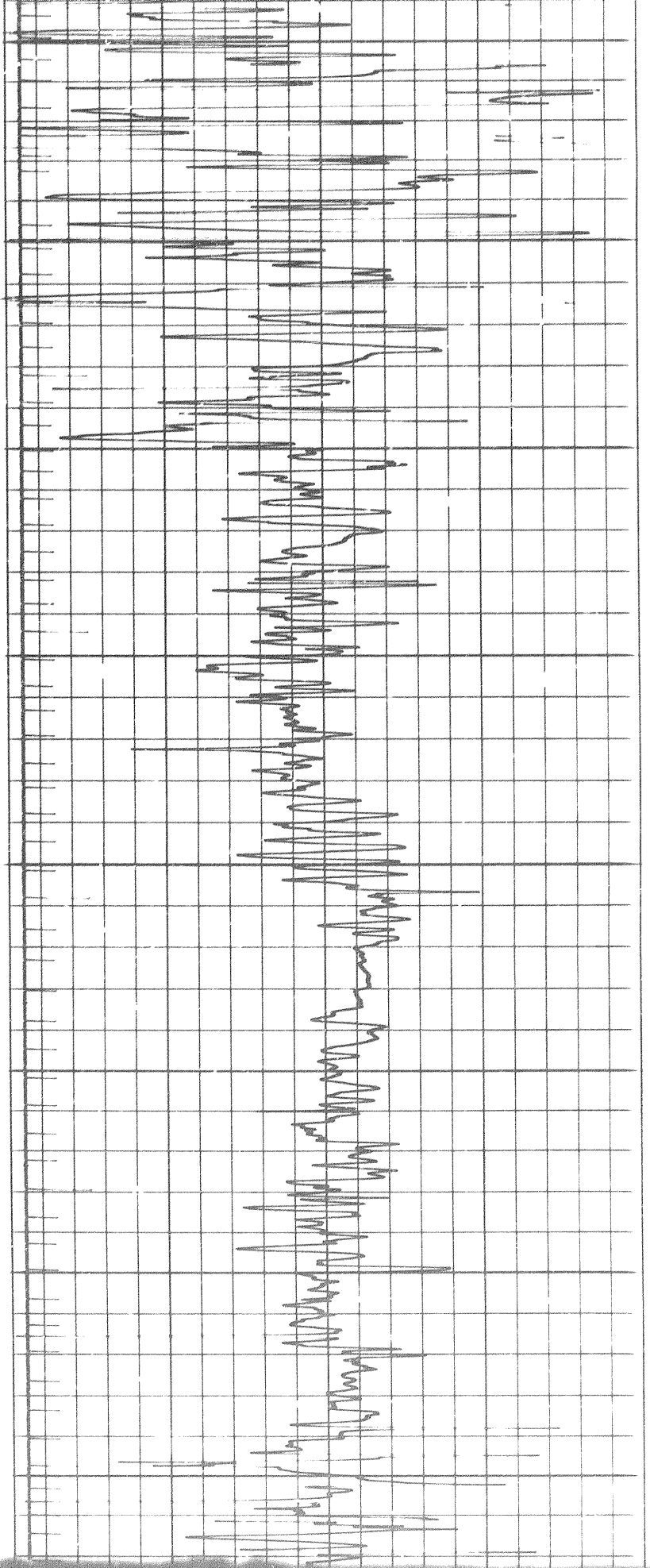
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2550





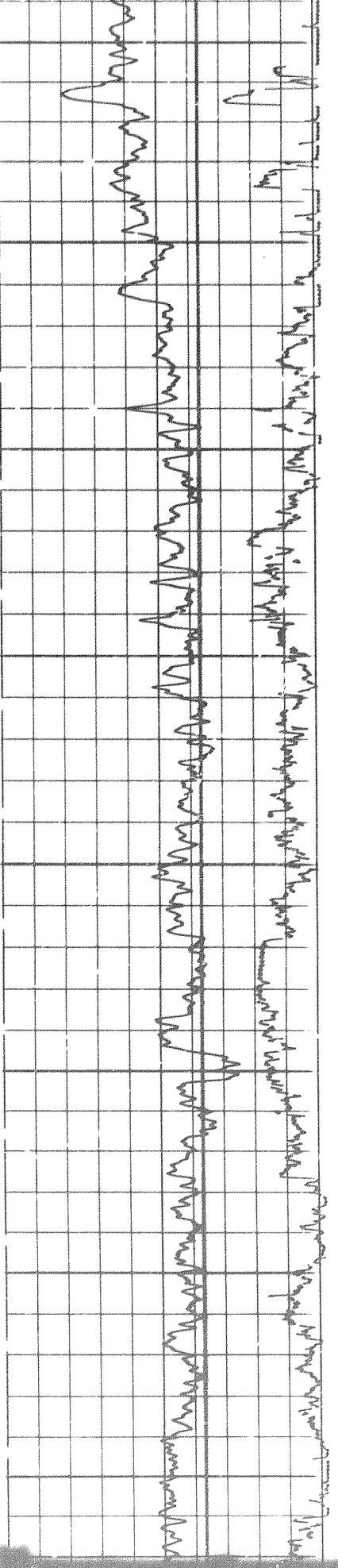


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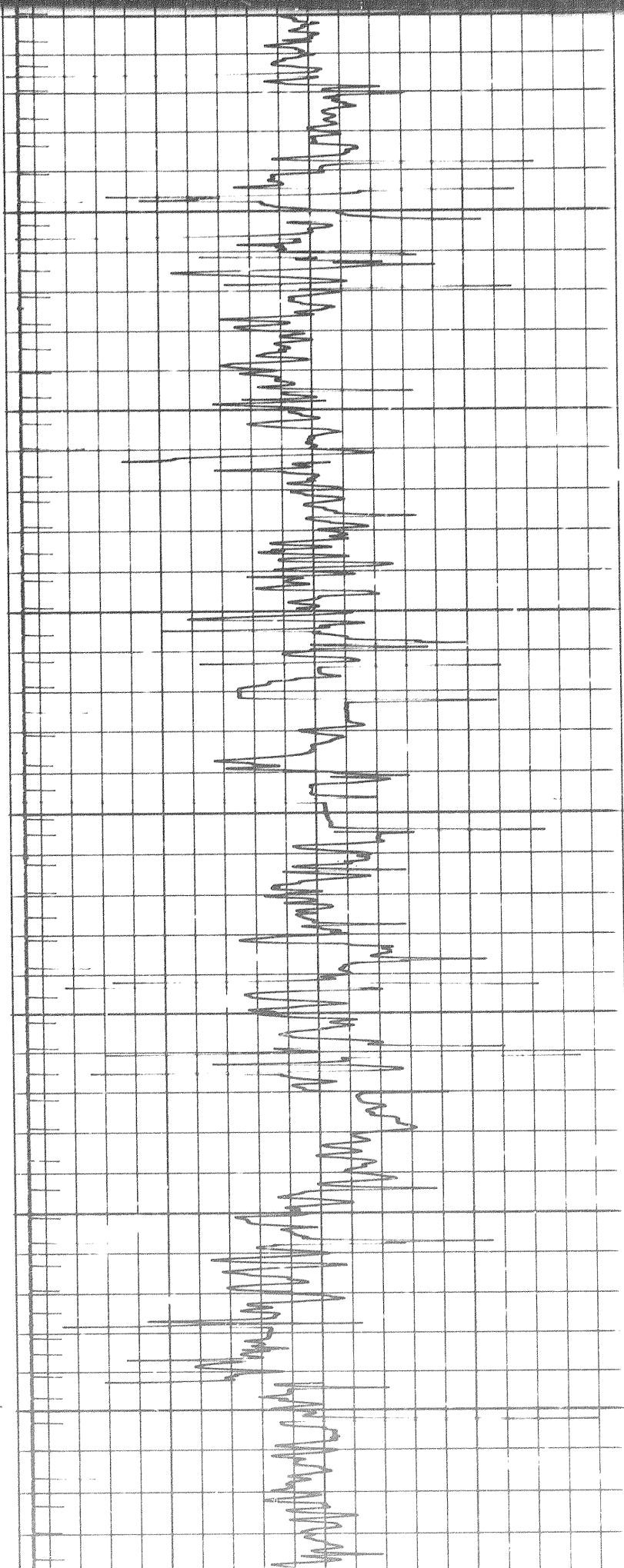
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2750



6/2

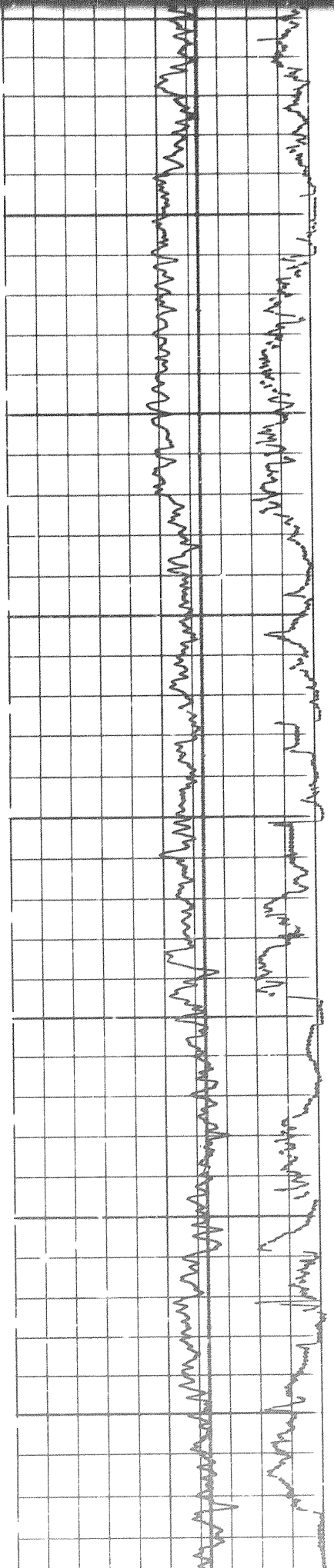


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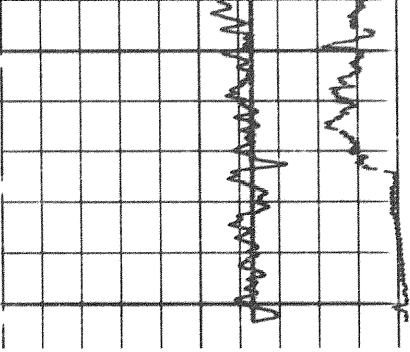
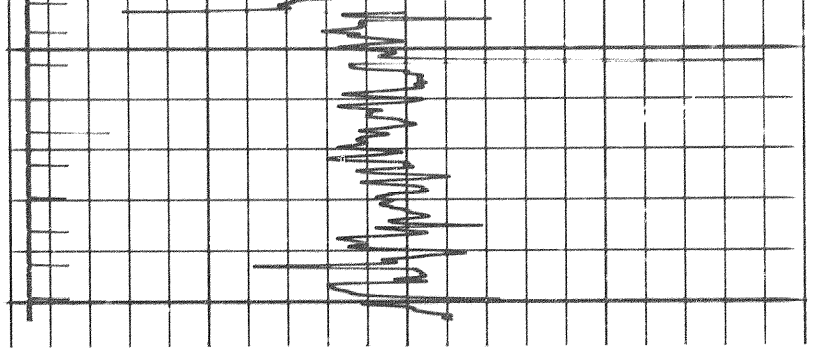
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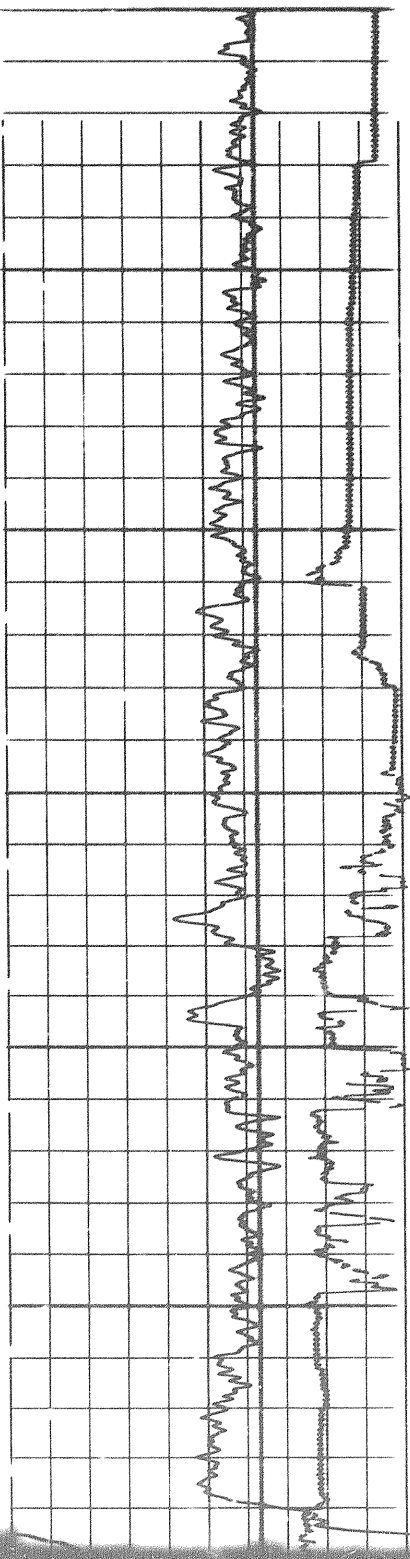
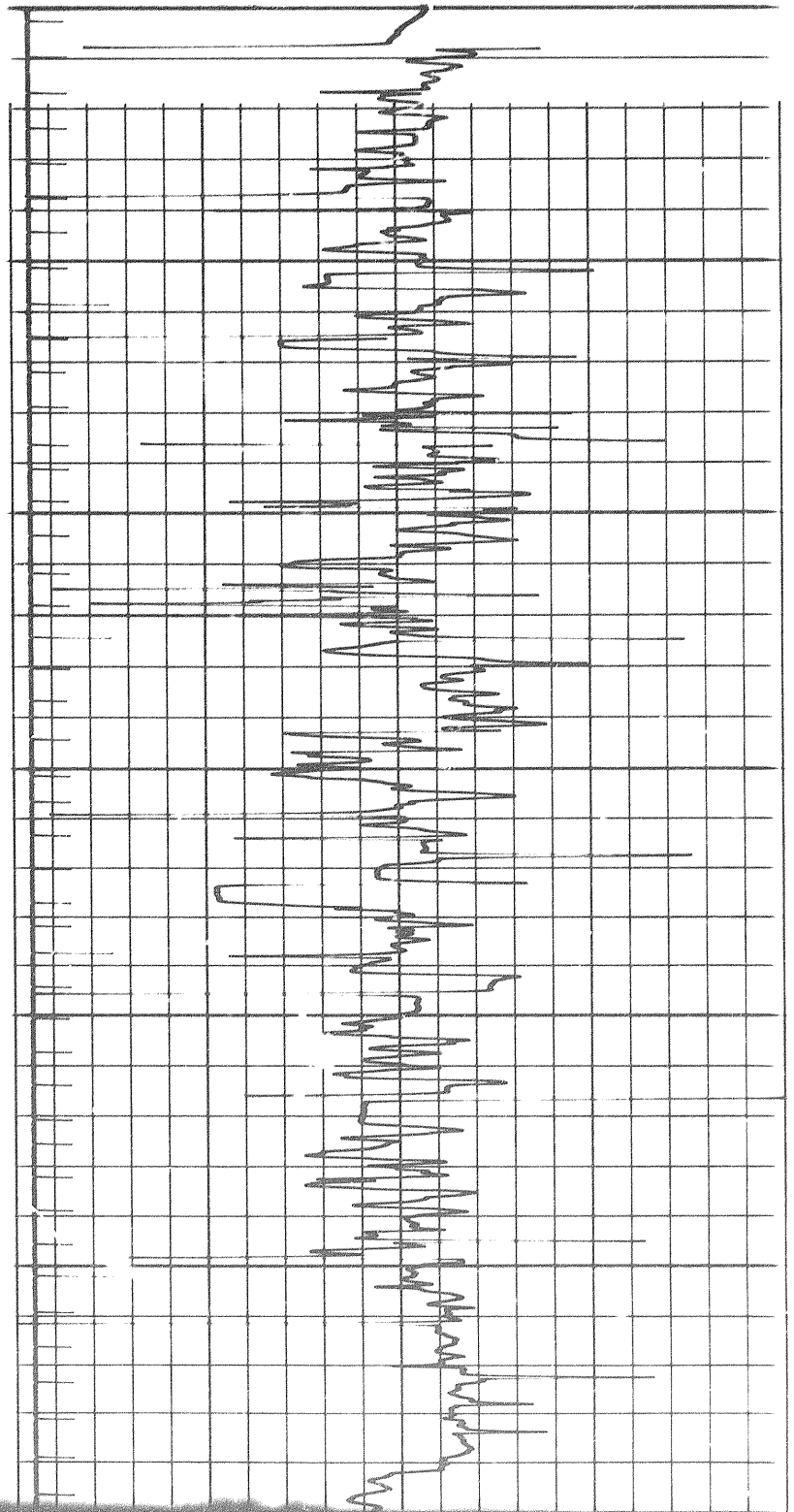


6

6



TOOL STUCK



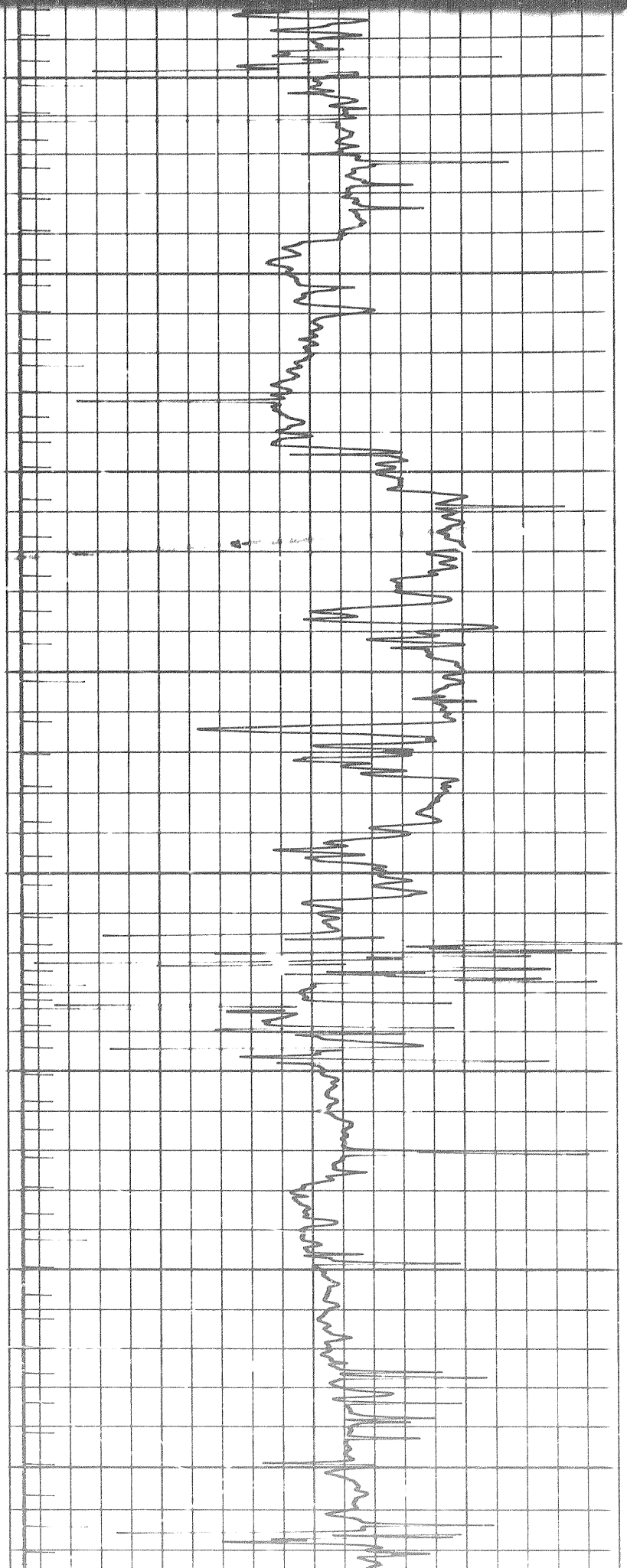
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2950

3000

3050

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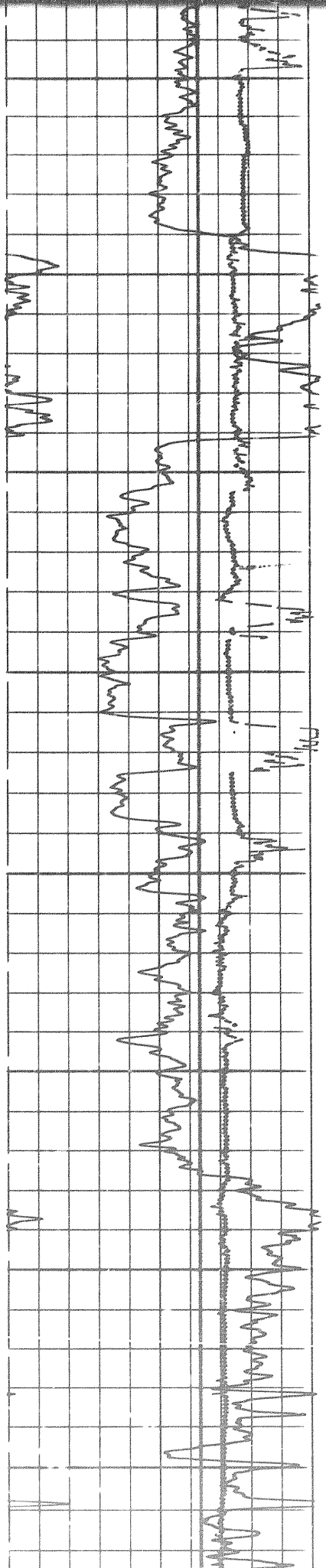


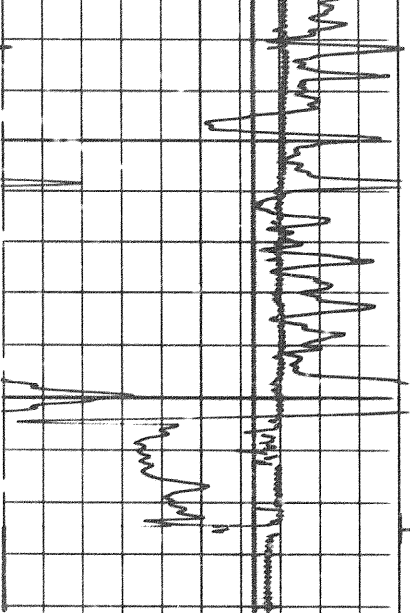
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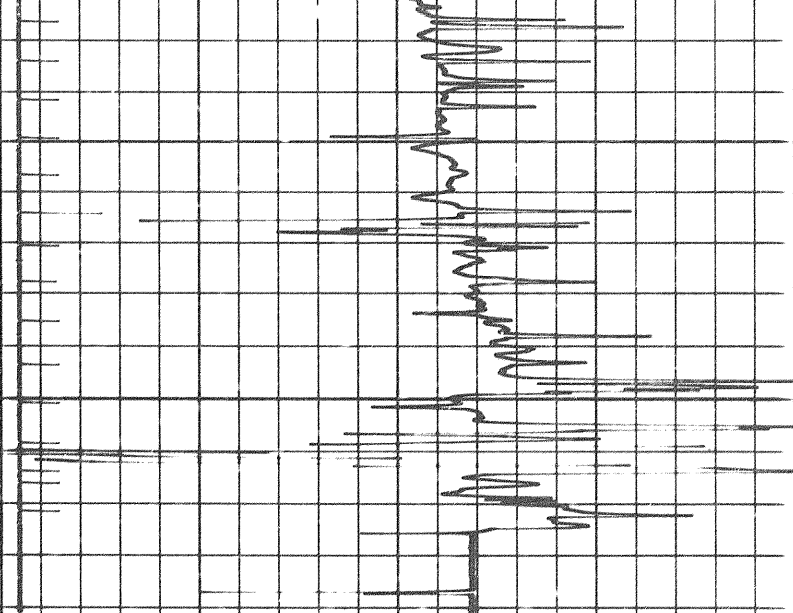
3200





3250

FR



**GAMMA RAY**

activity  
API units

T.C. 2

Zero 0 div. to left

0 150  
150 300

**CALIPER**

hole diameter  
mm

150 275 400

500 300 100  
900 700 500

DEPTH  
METRES

**INTERVAL TRANSIT TIME**  
 $\mu s/m$

**GAMMA RAY**

activity  
API units

T.C. 2

Zero 0 div. to left

0 150  
150 300

**CALIPER**

hole diameter  
mm

150 275 400

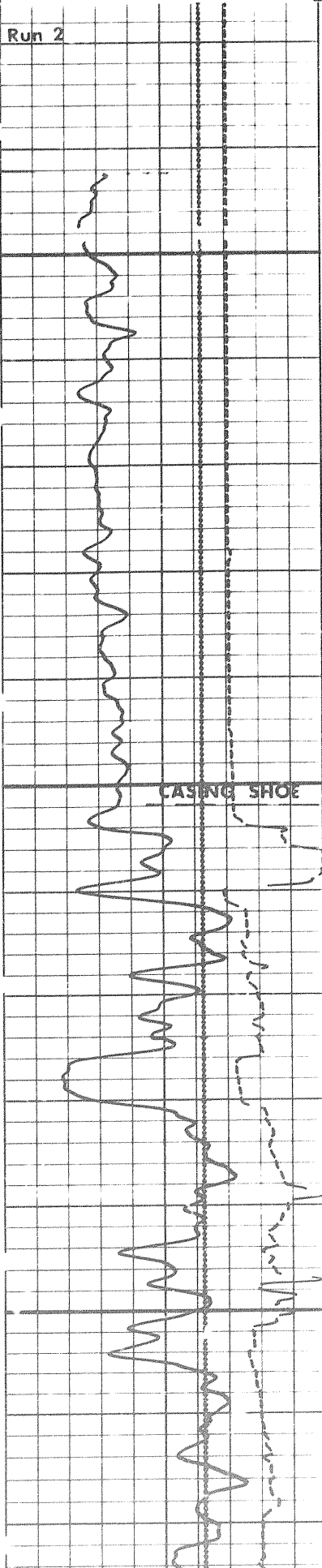
500 300 100  
900 700 500

Run 2

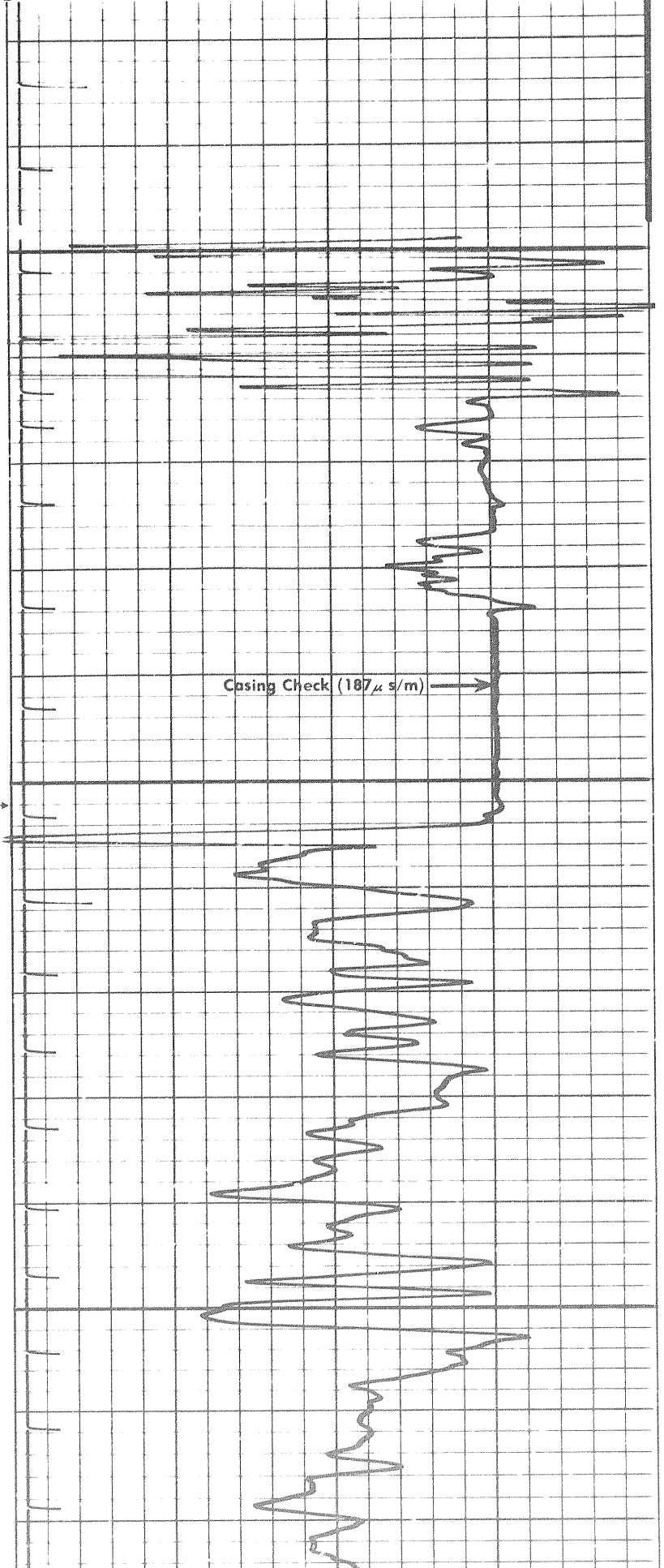
X2000A

8  
9

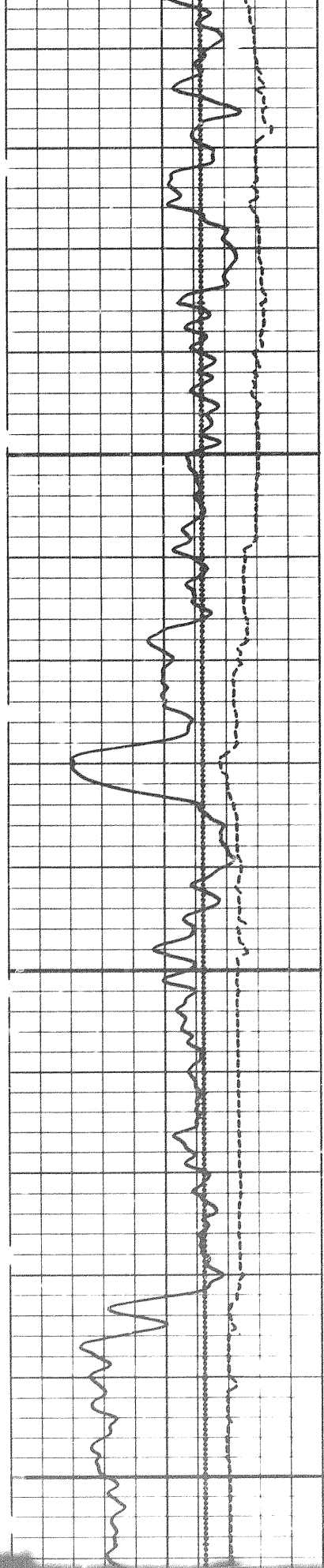
Run 2



1050

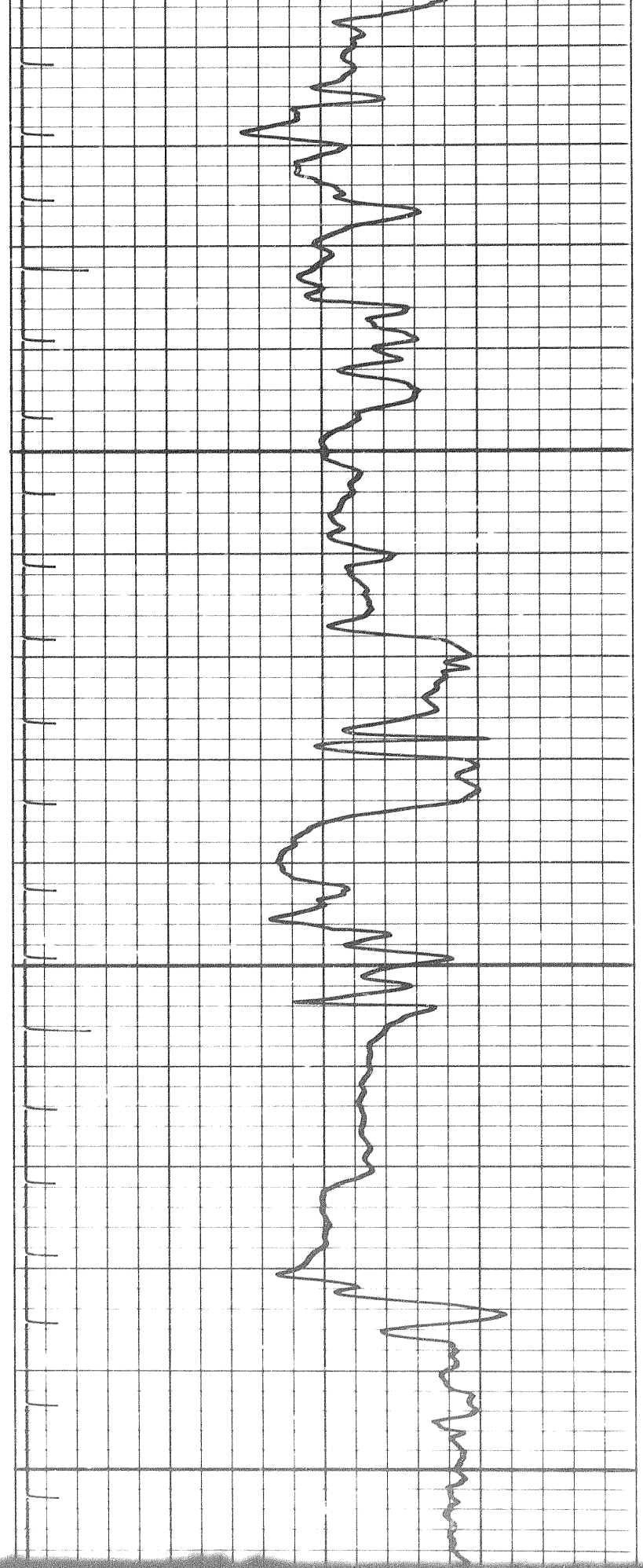


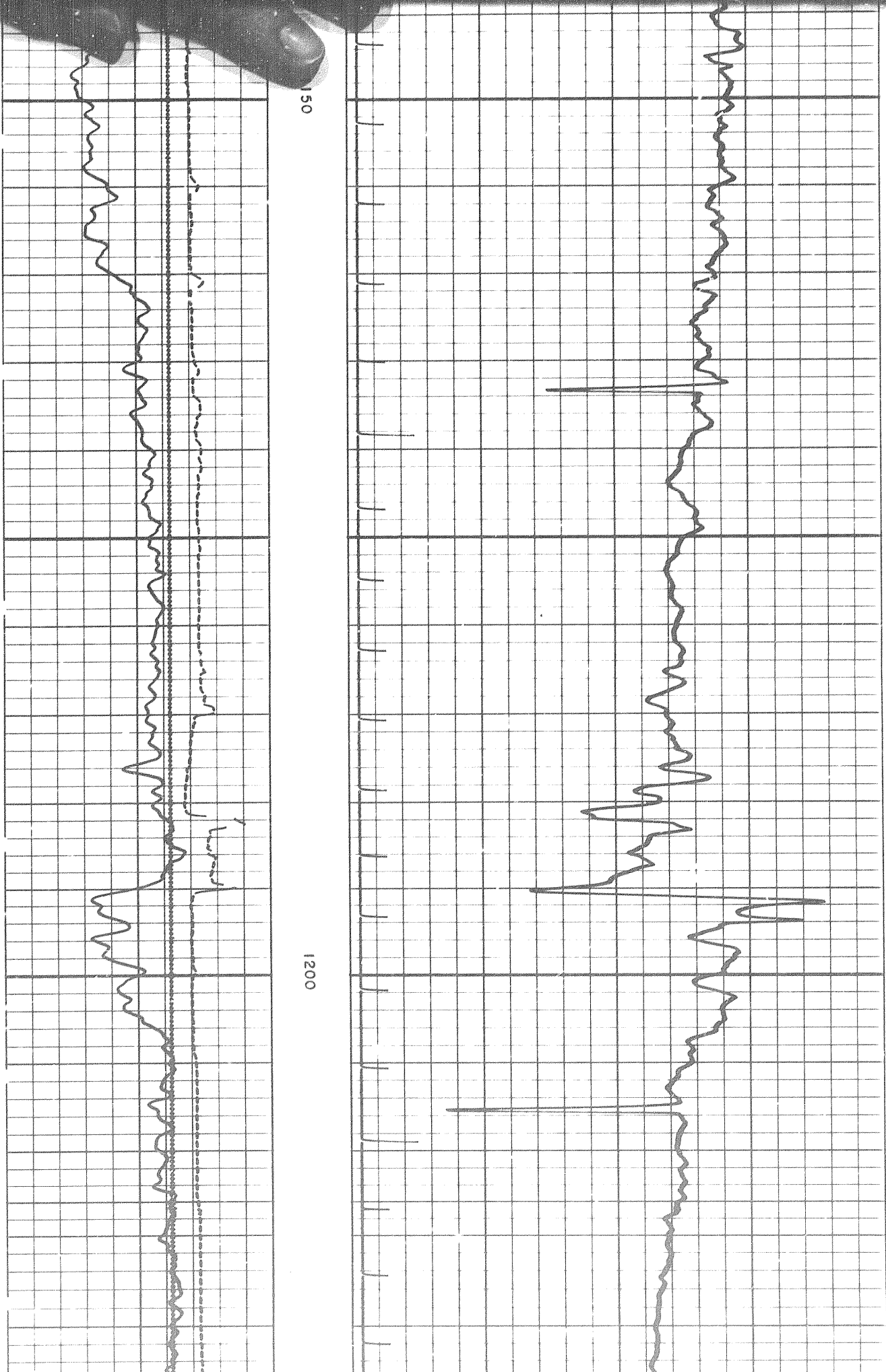
9 of



1100

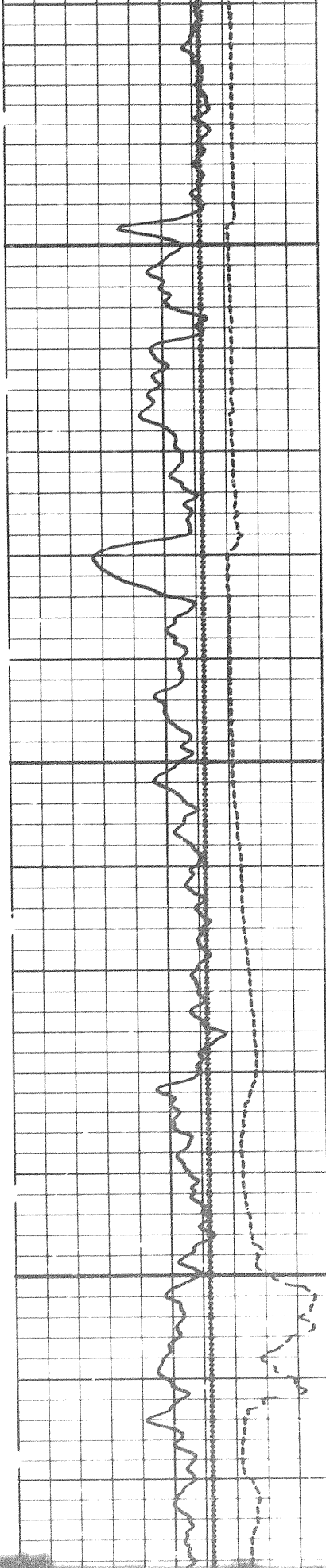
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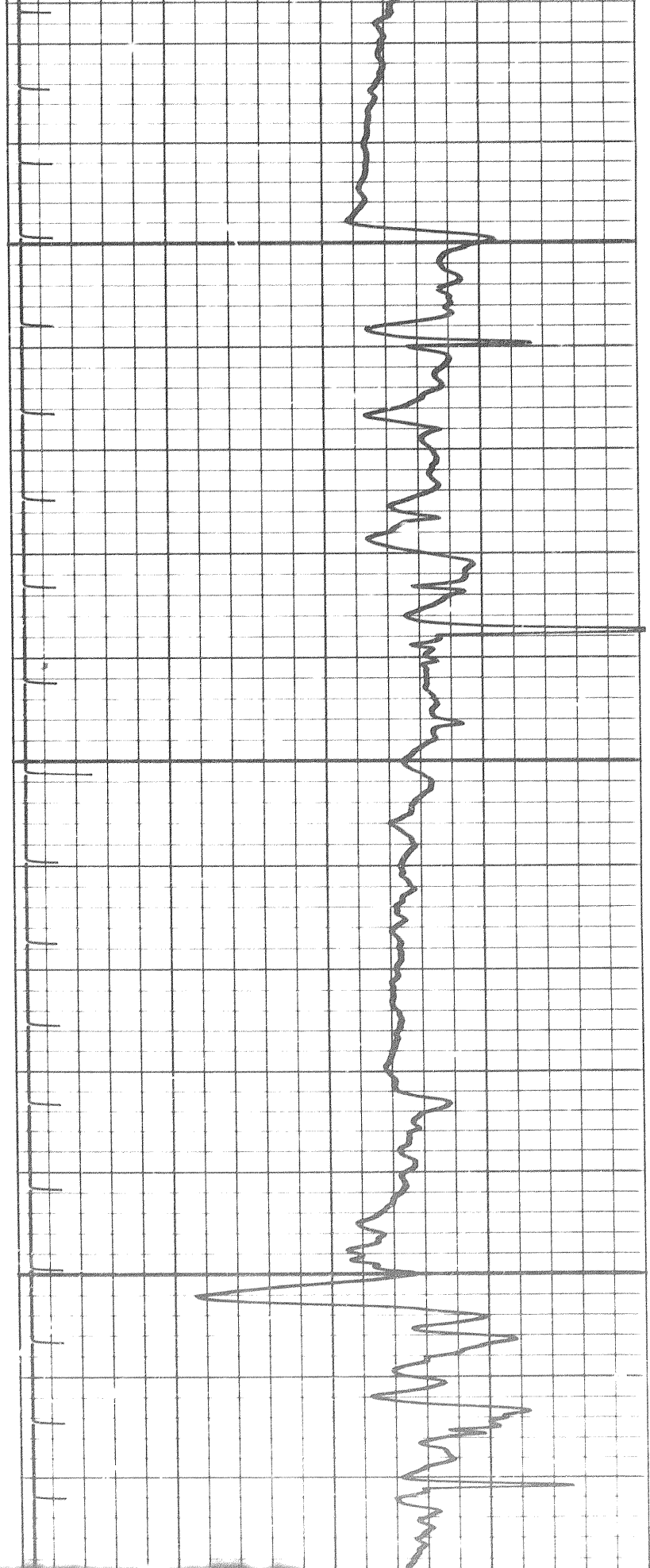


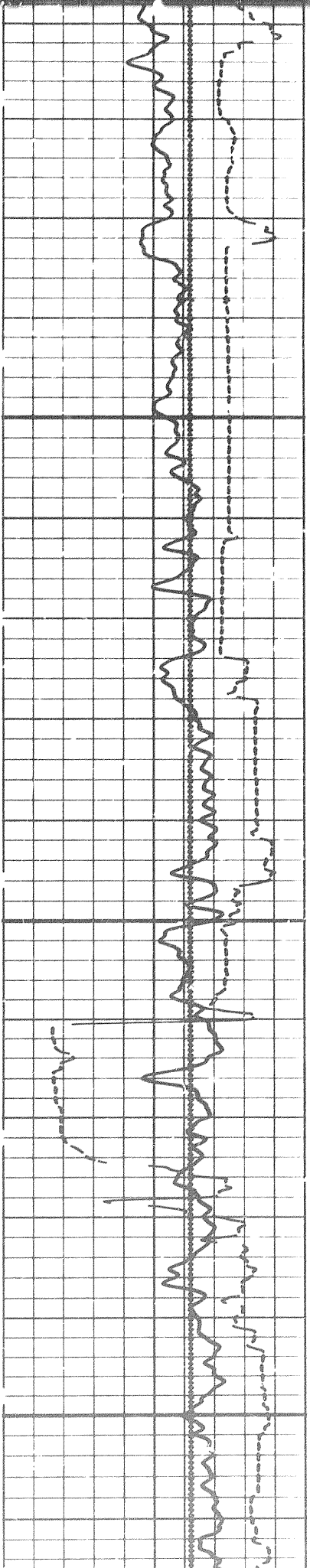


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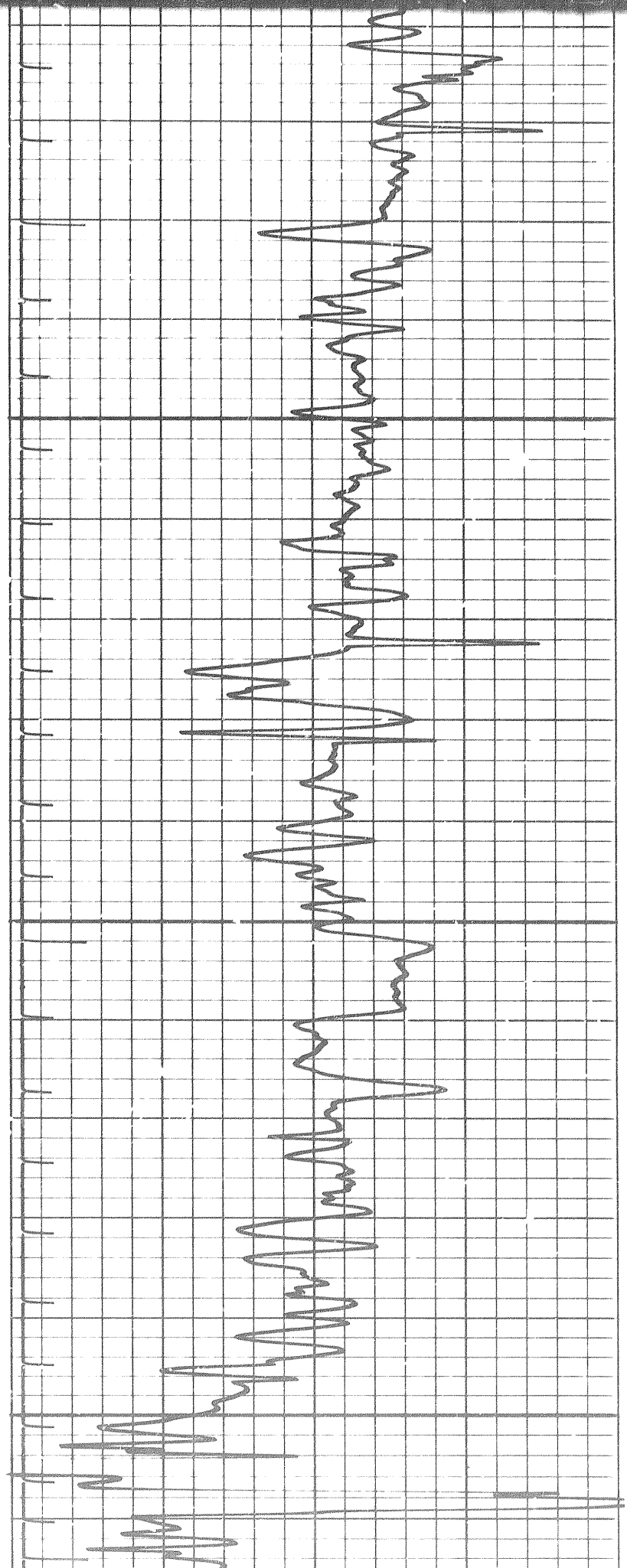


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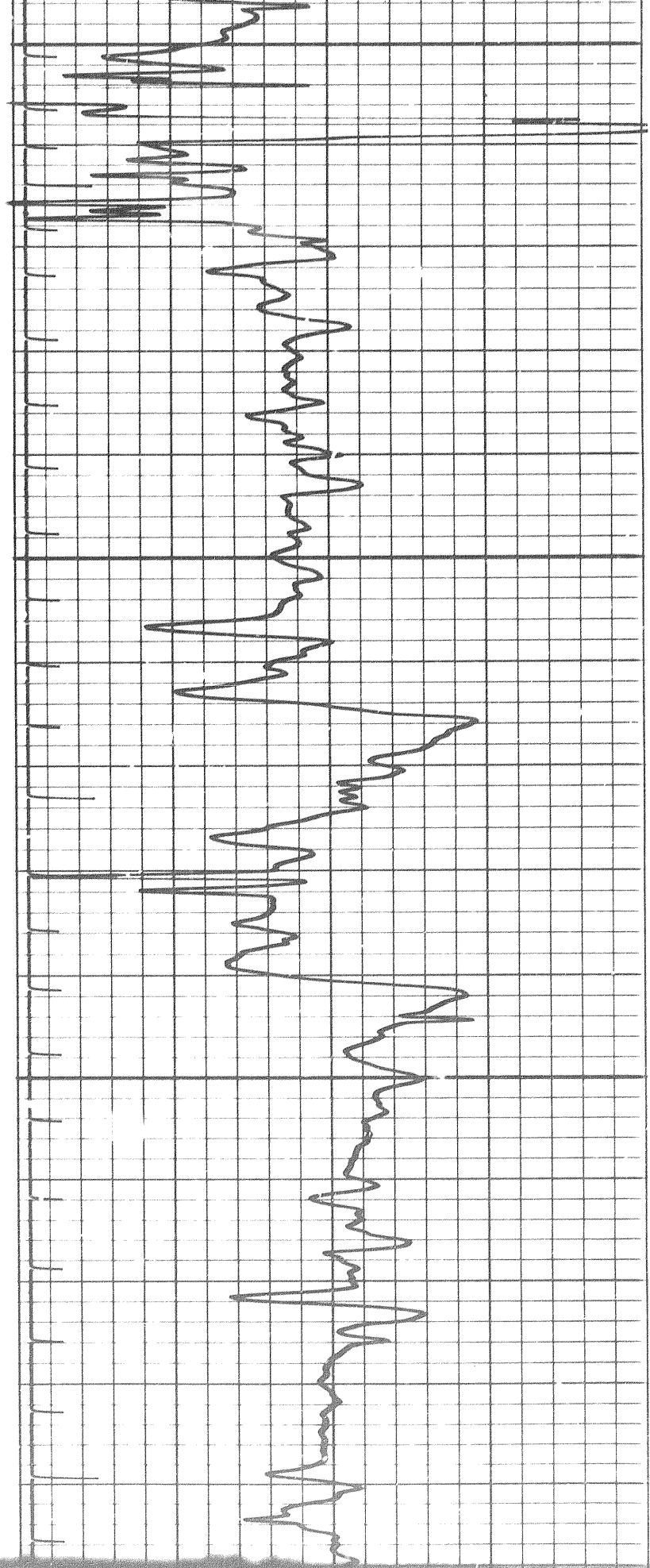




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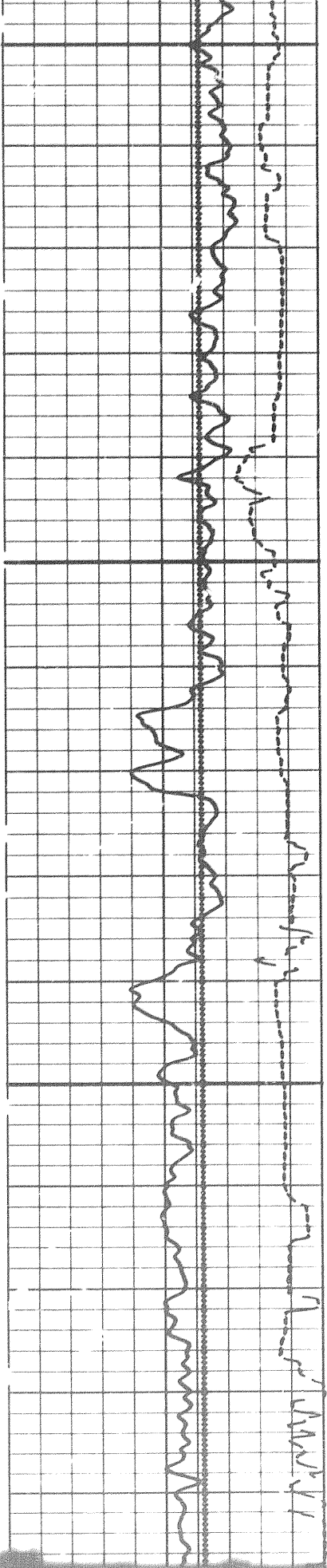


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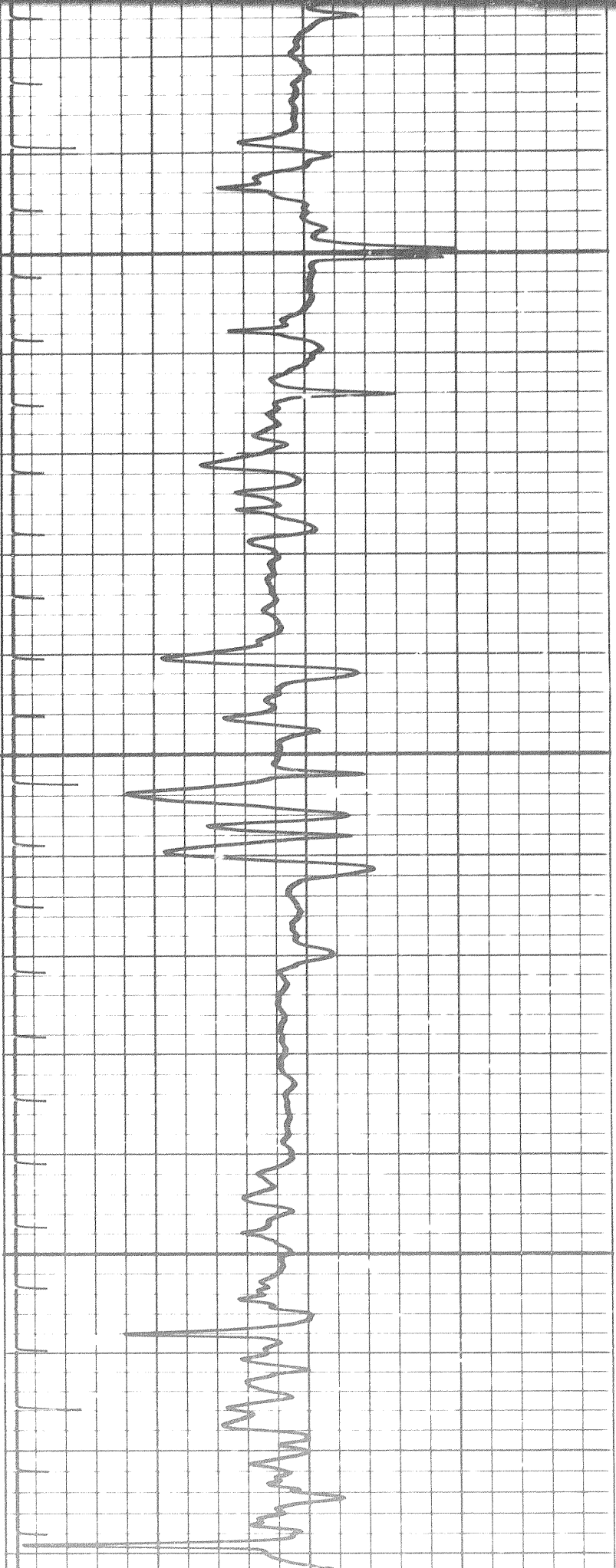


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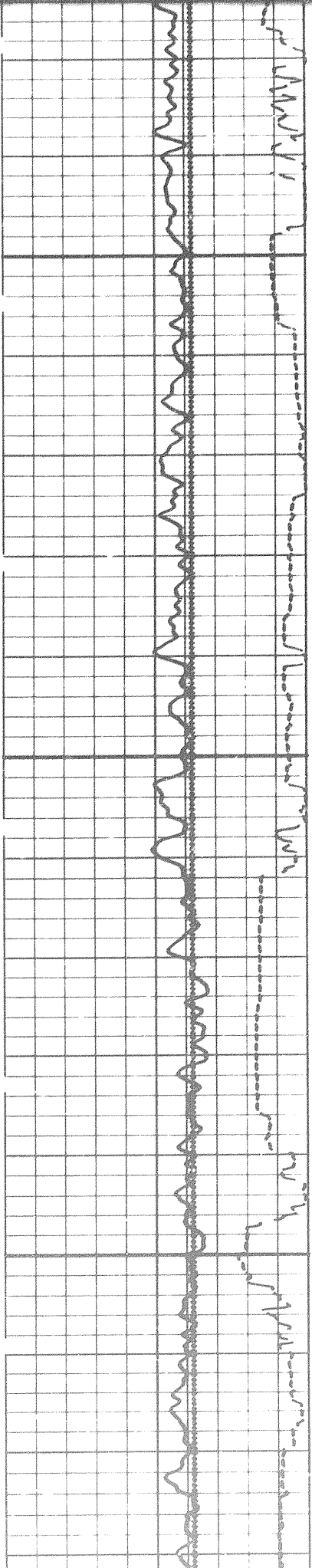
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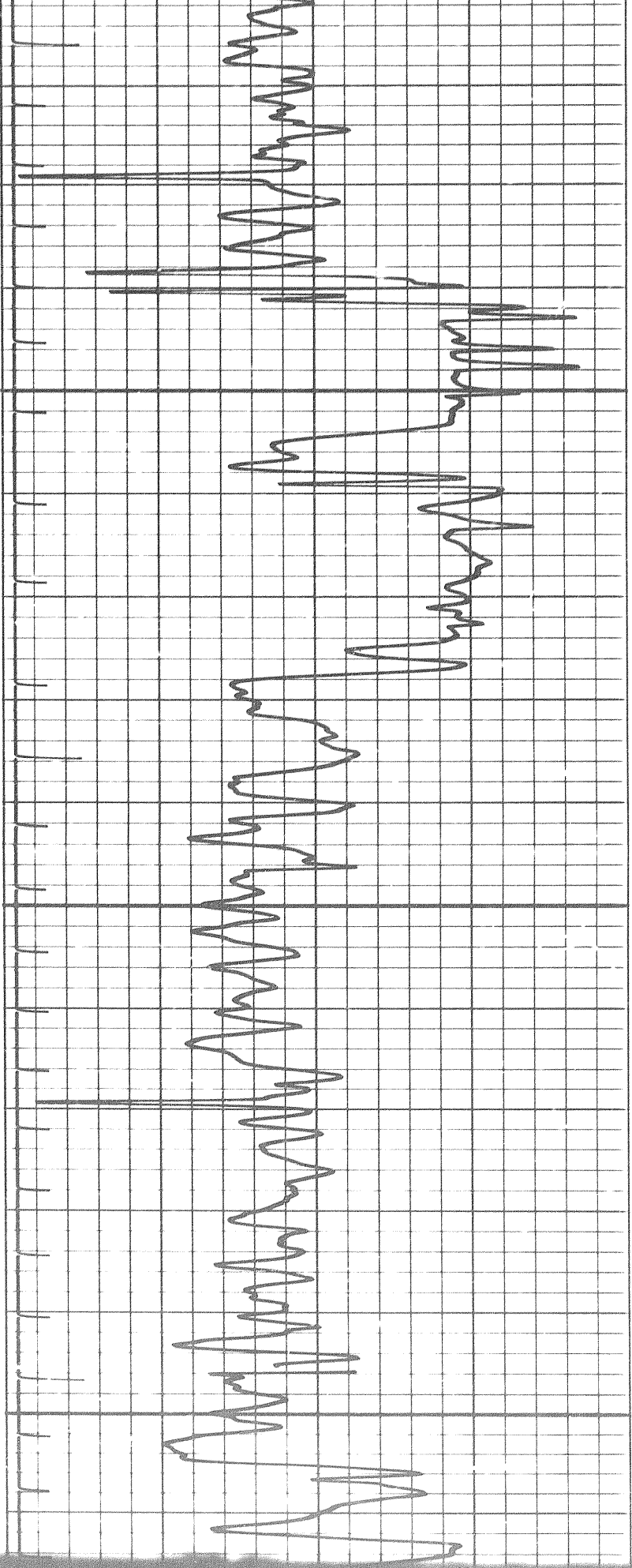


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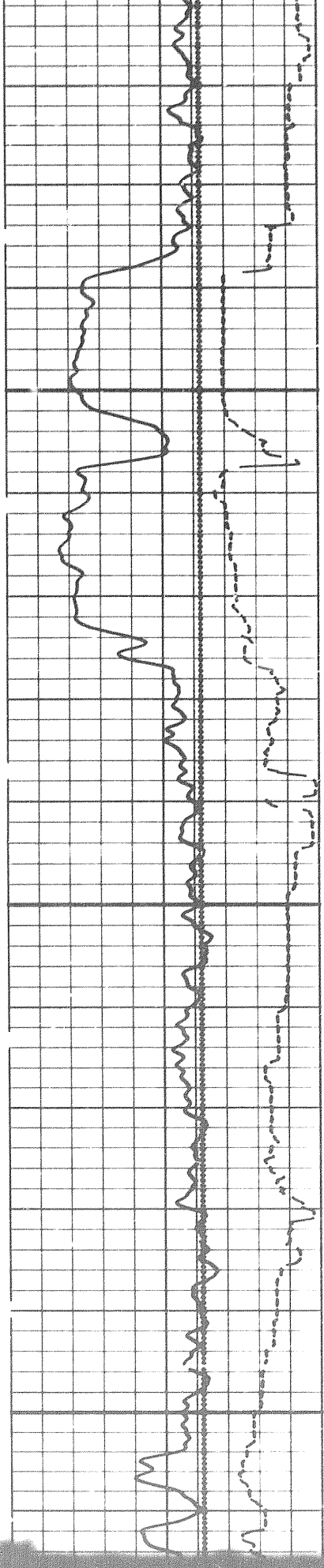
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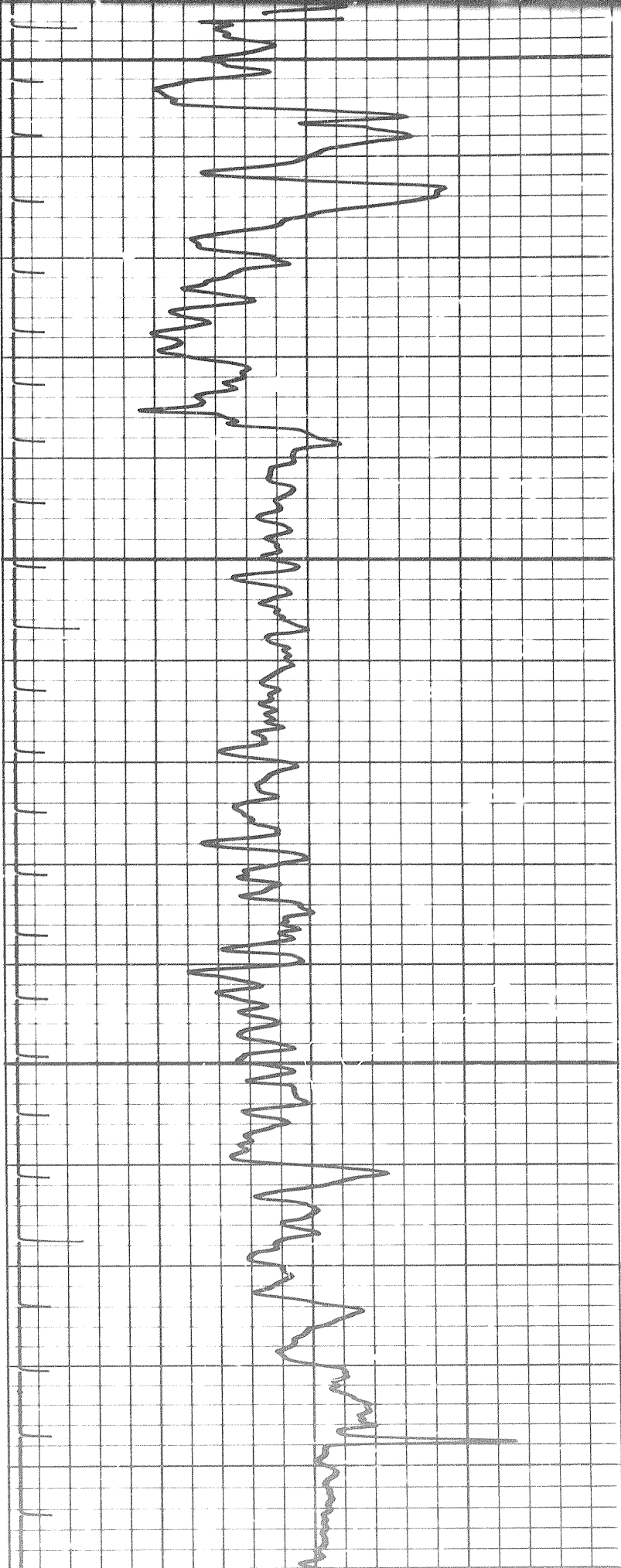
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1550



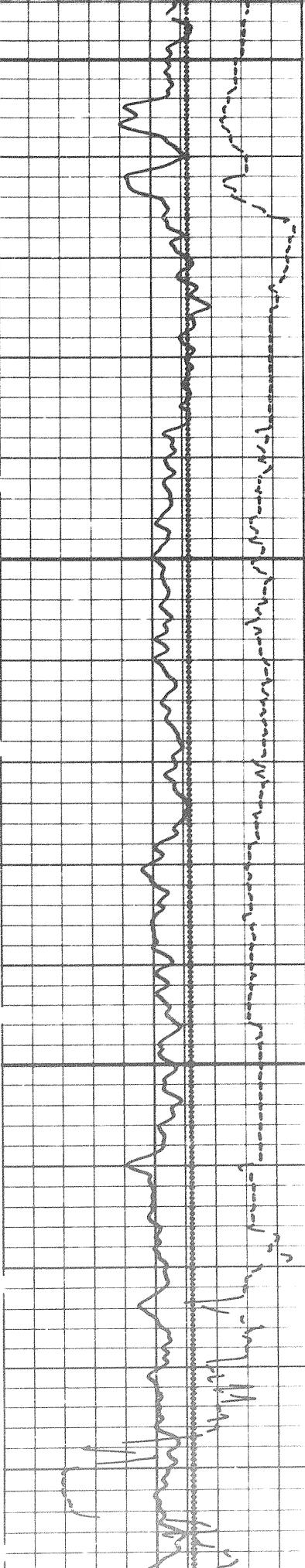
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12

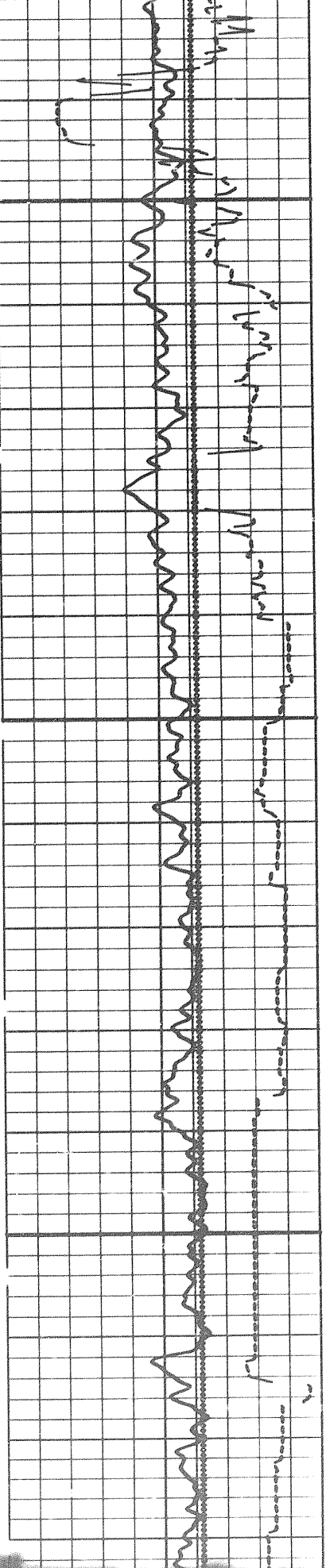


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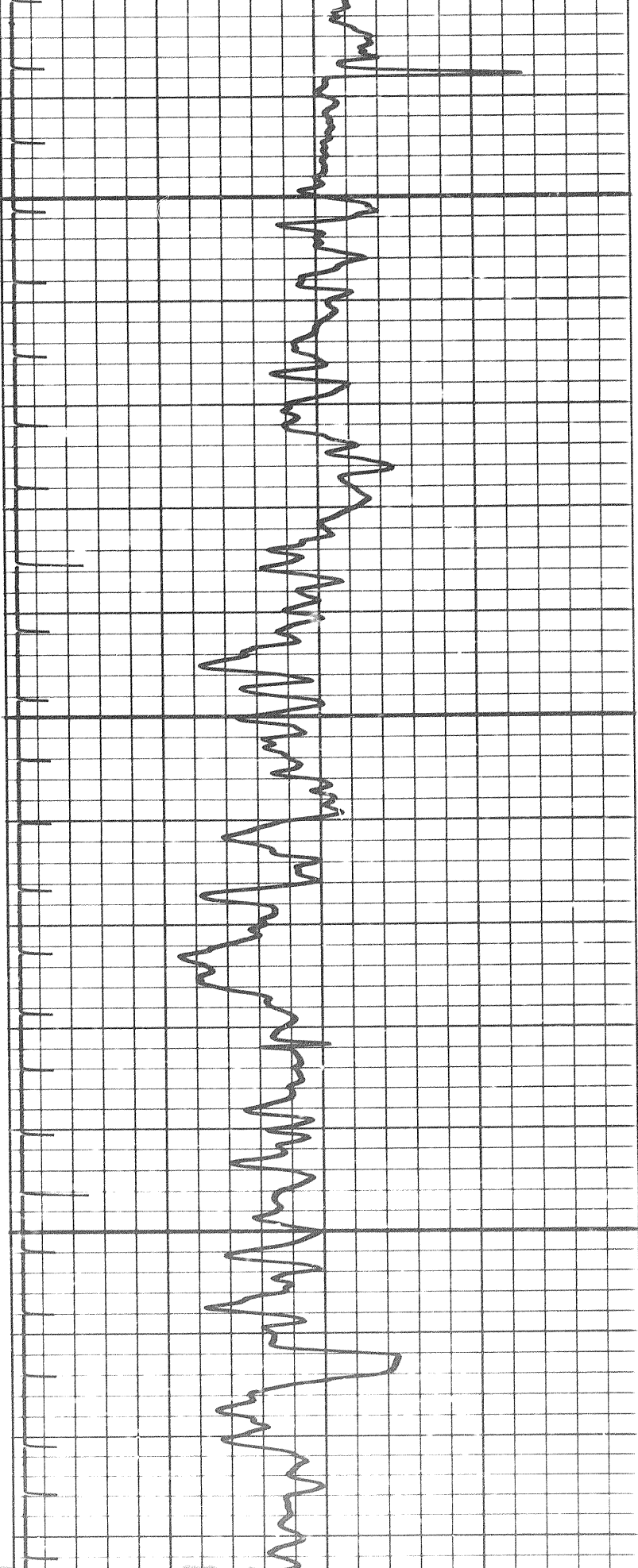
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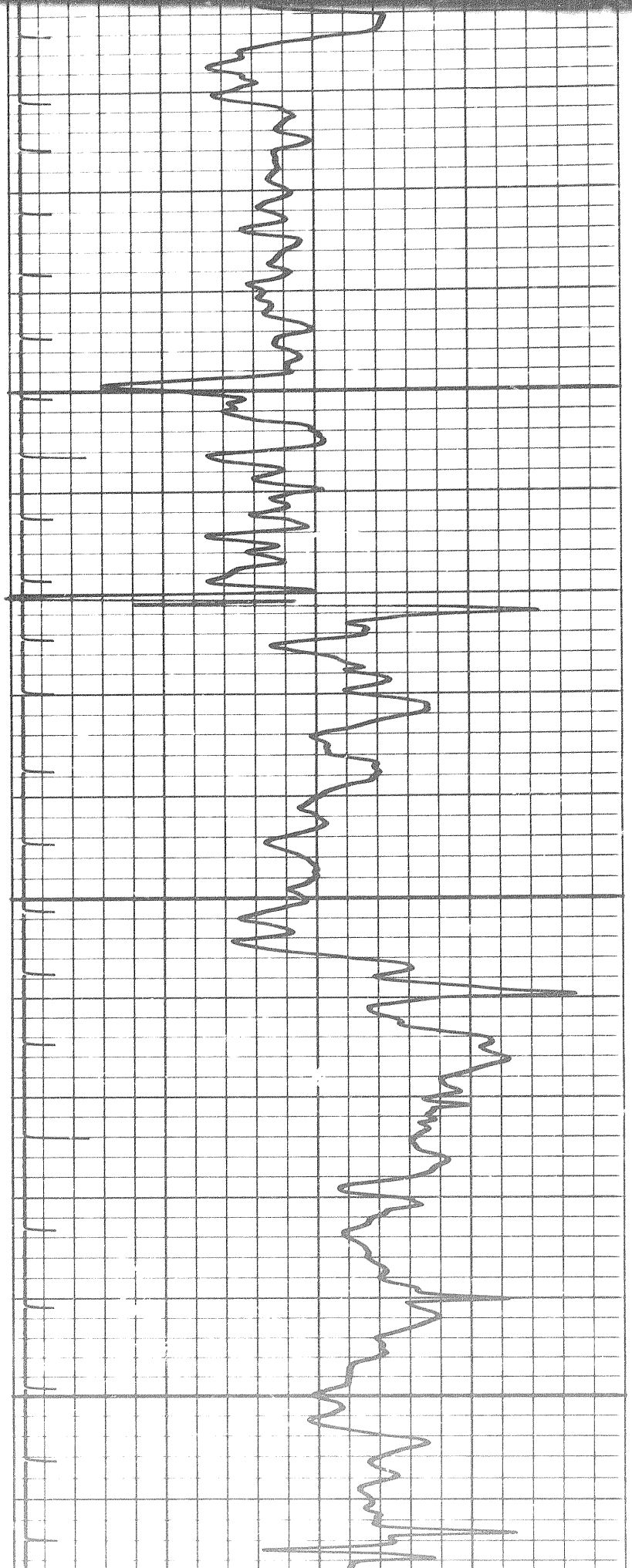


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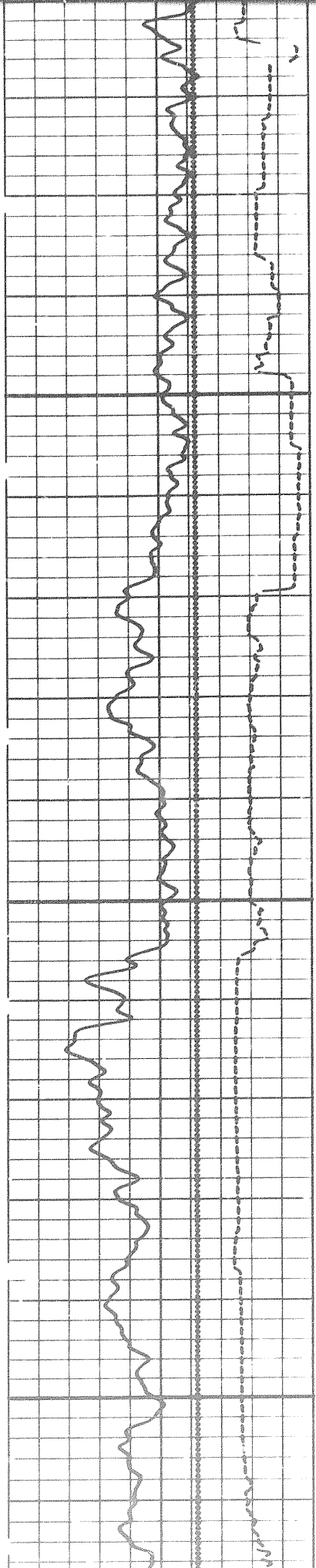
1650





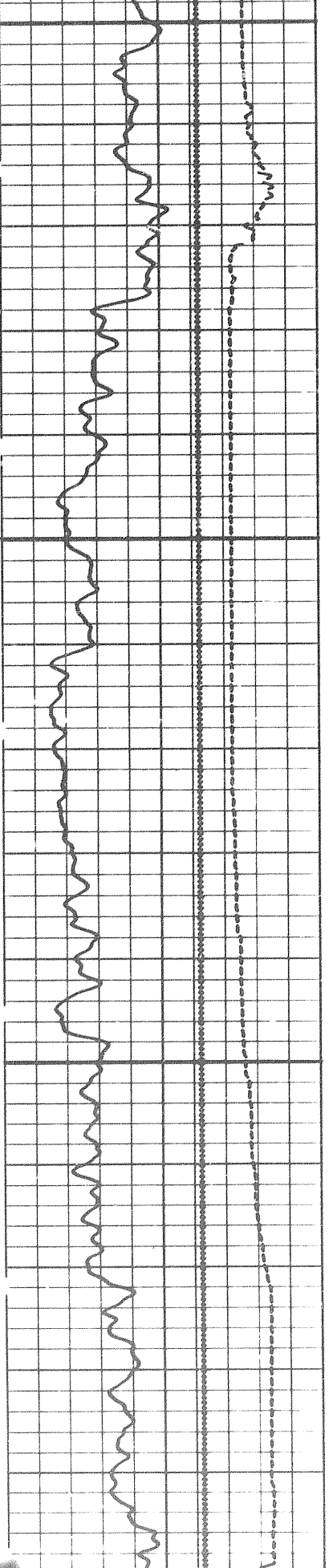
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1750



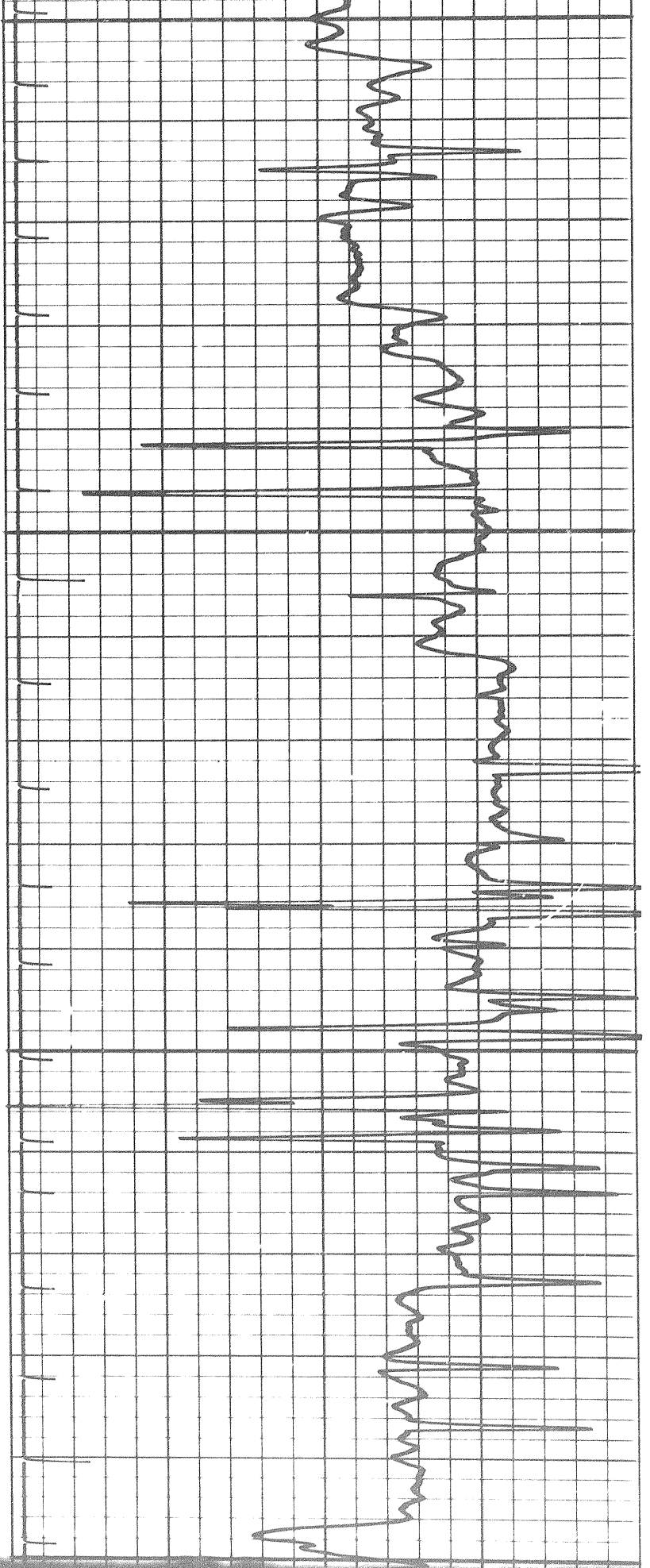


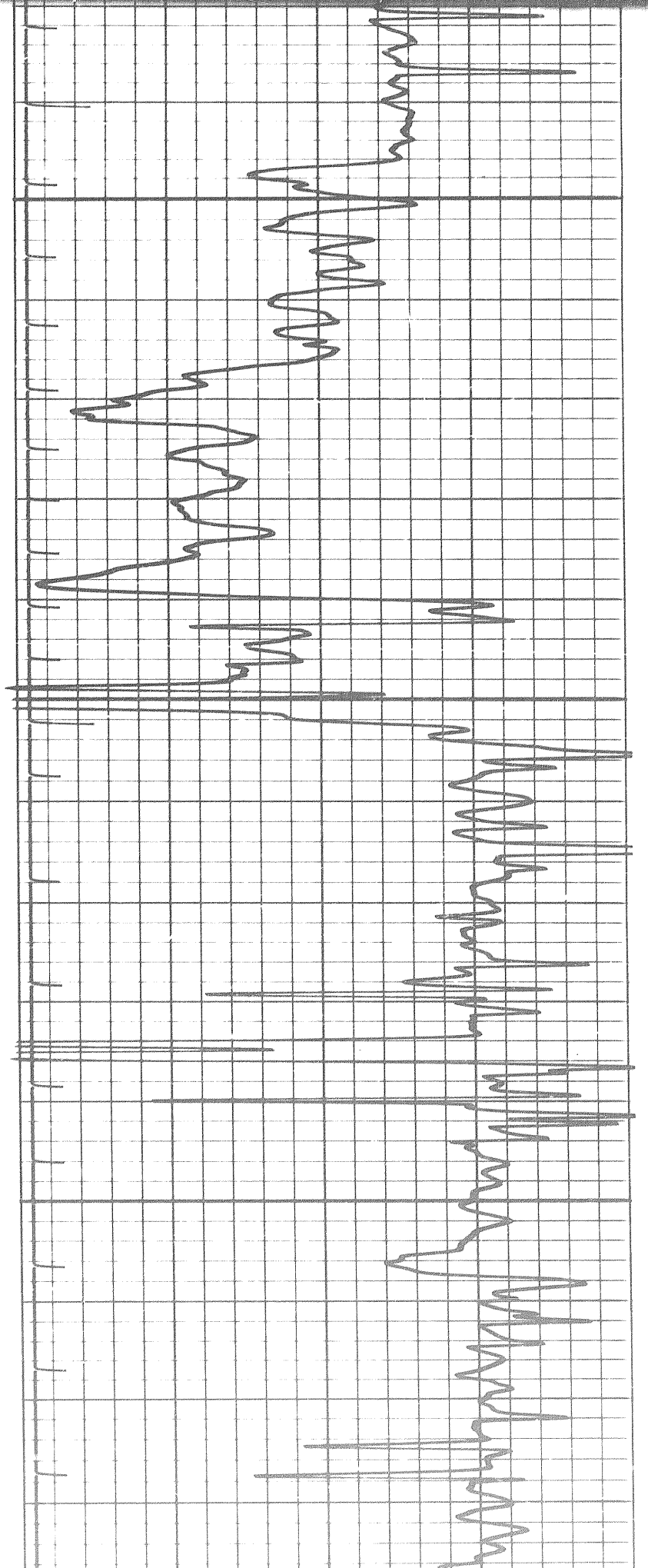
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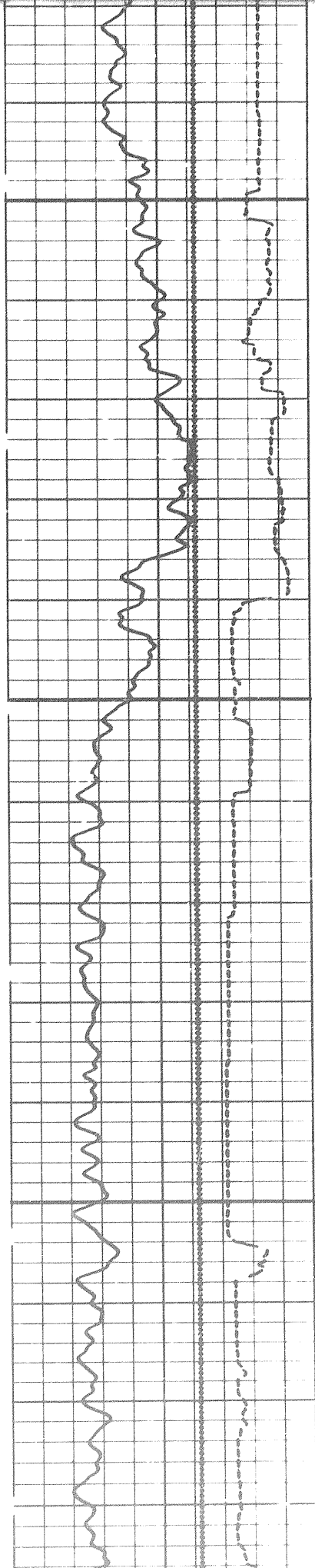
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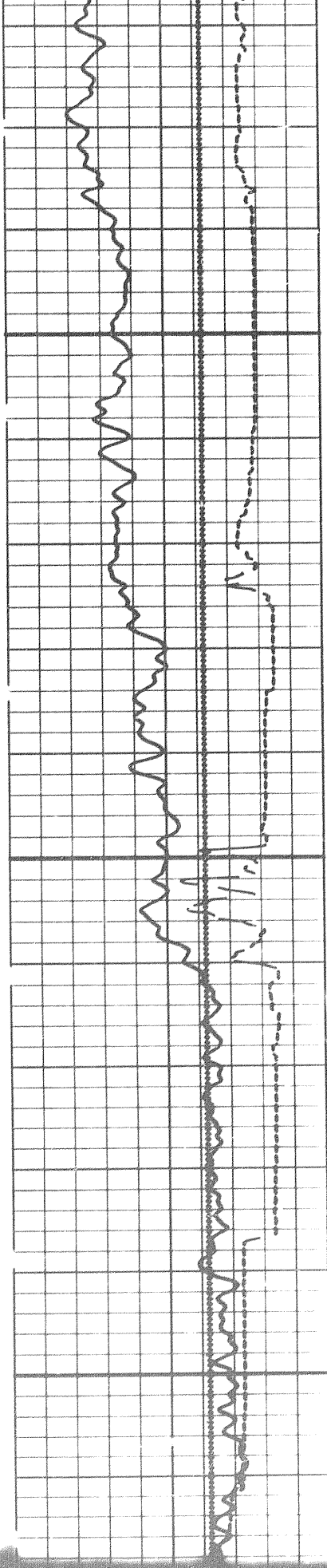




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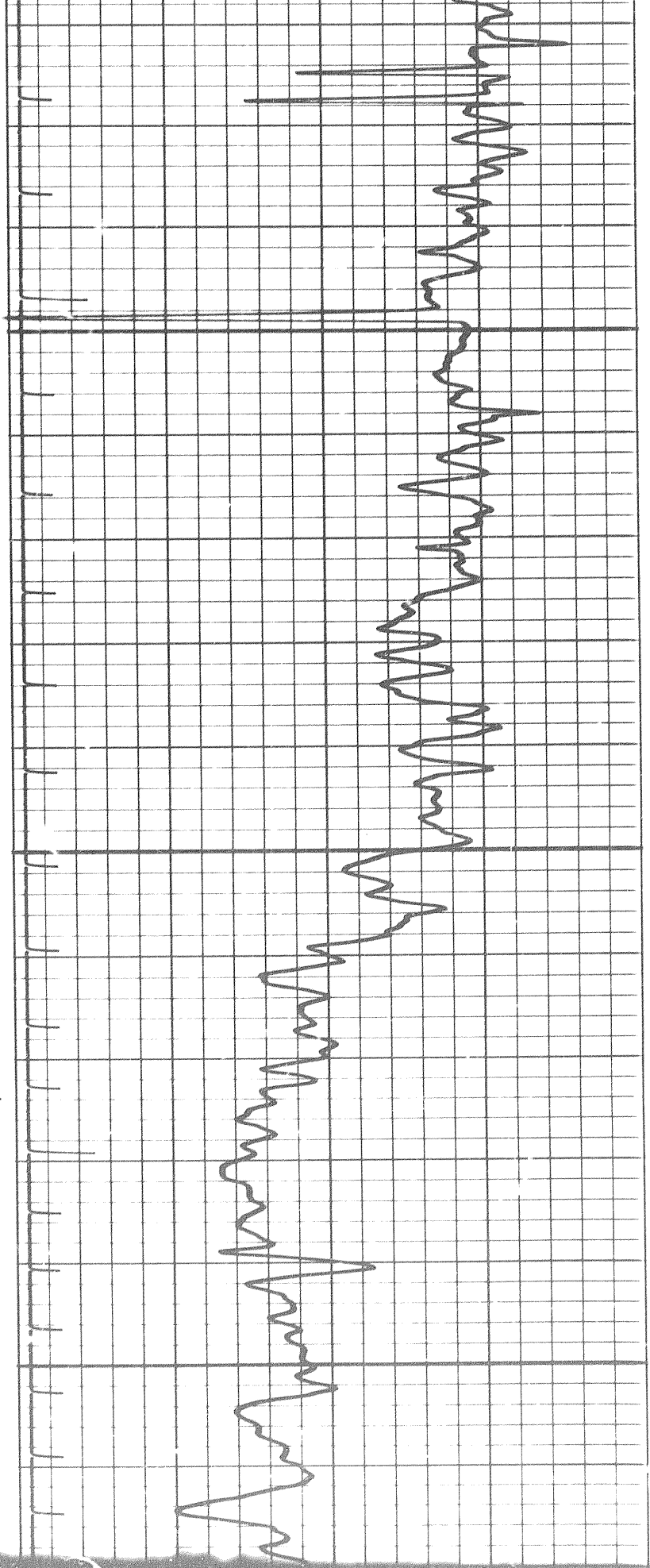


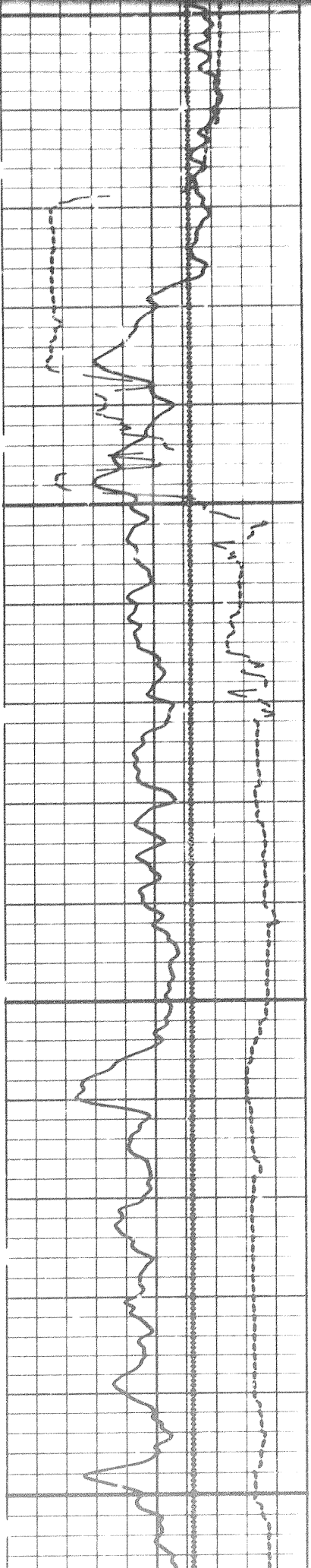
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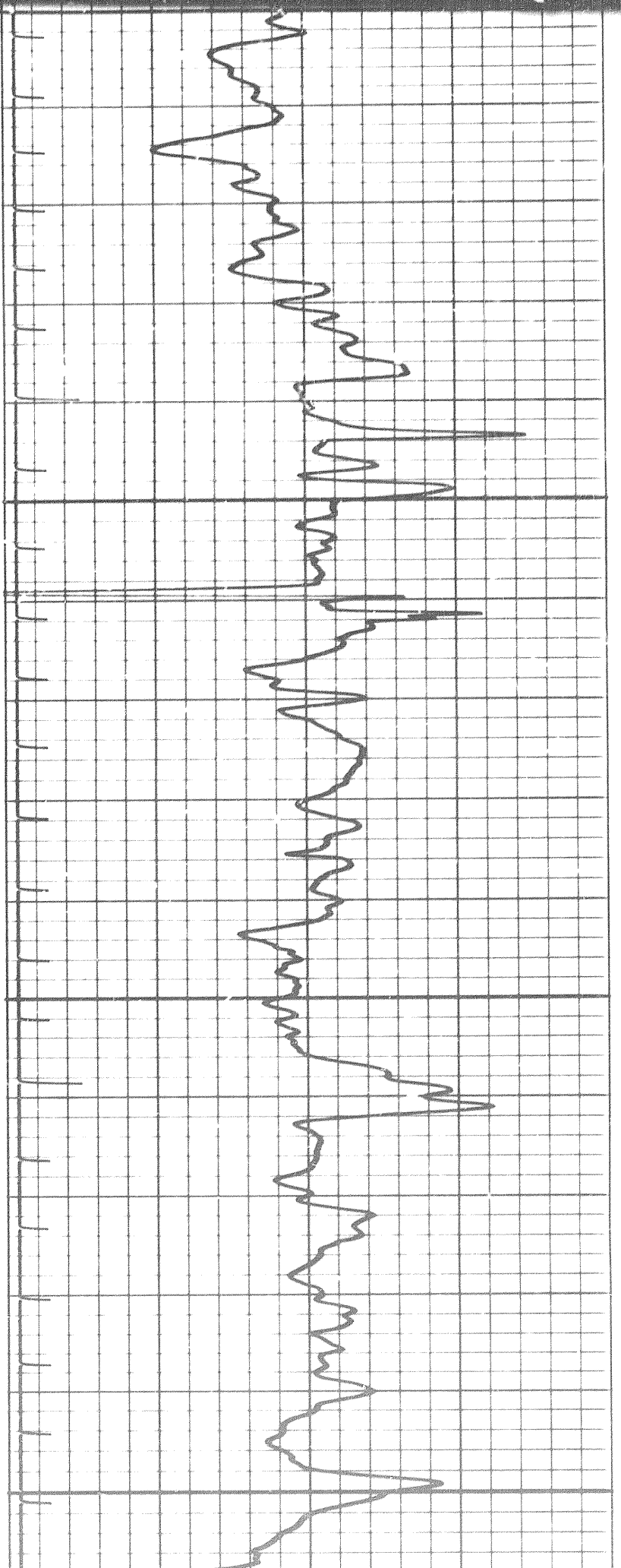
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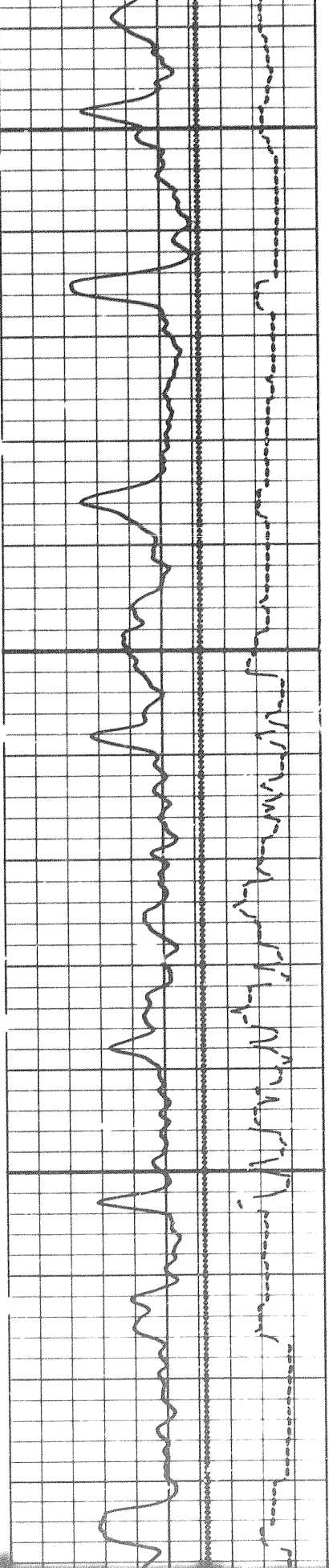




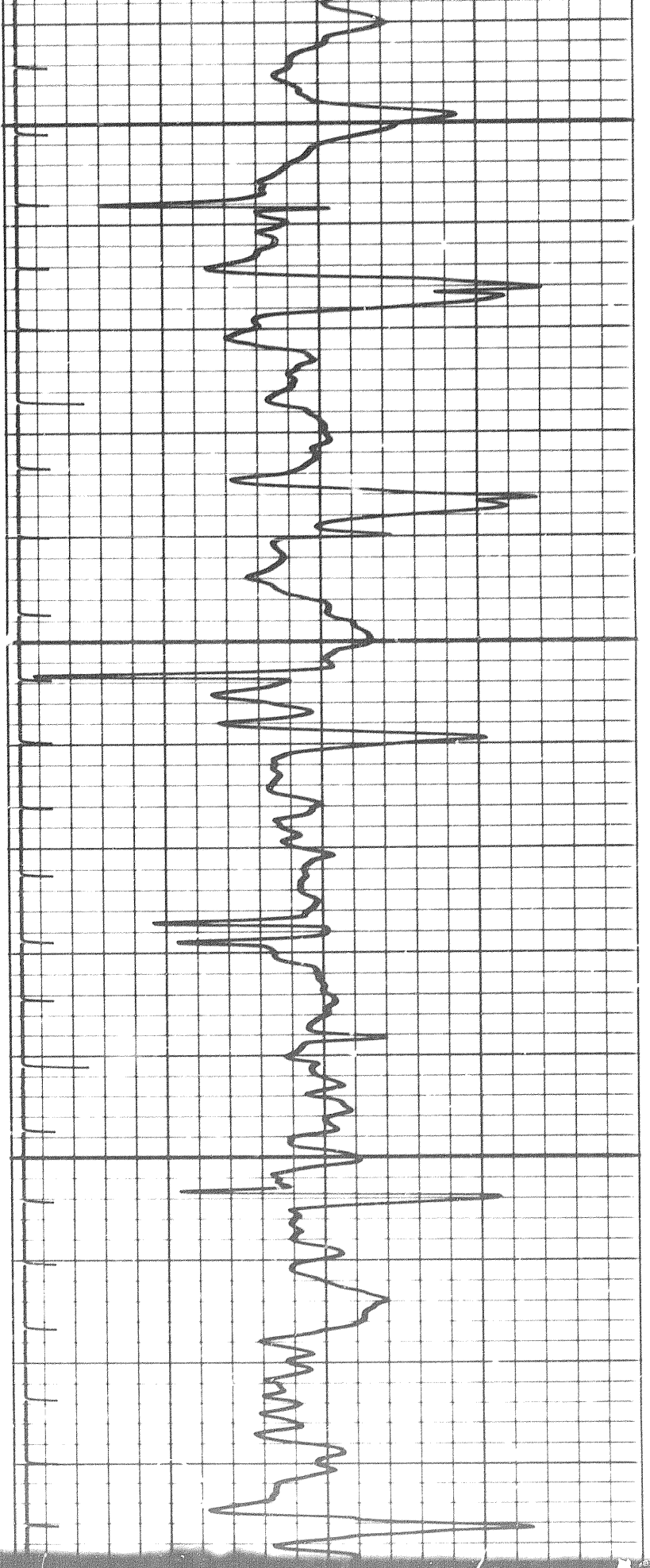
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2000

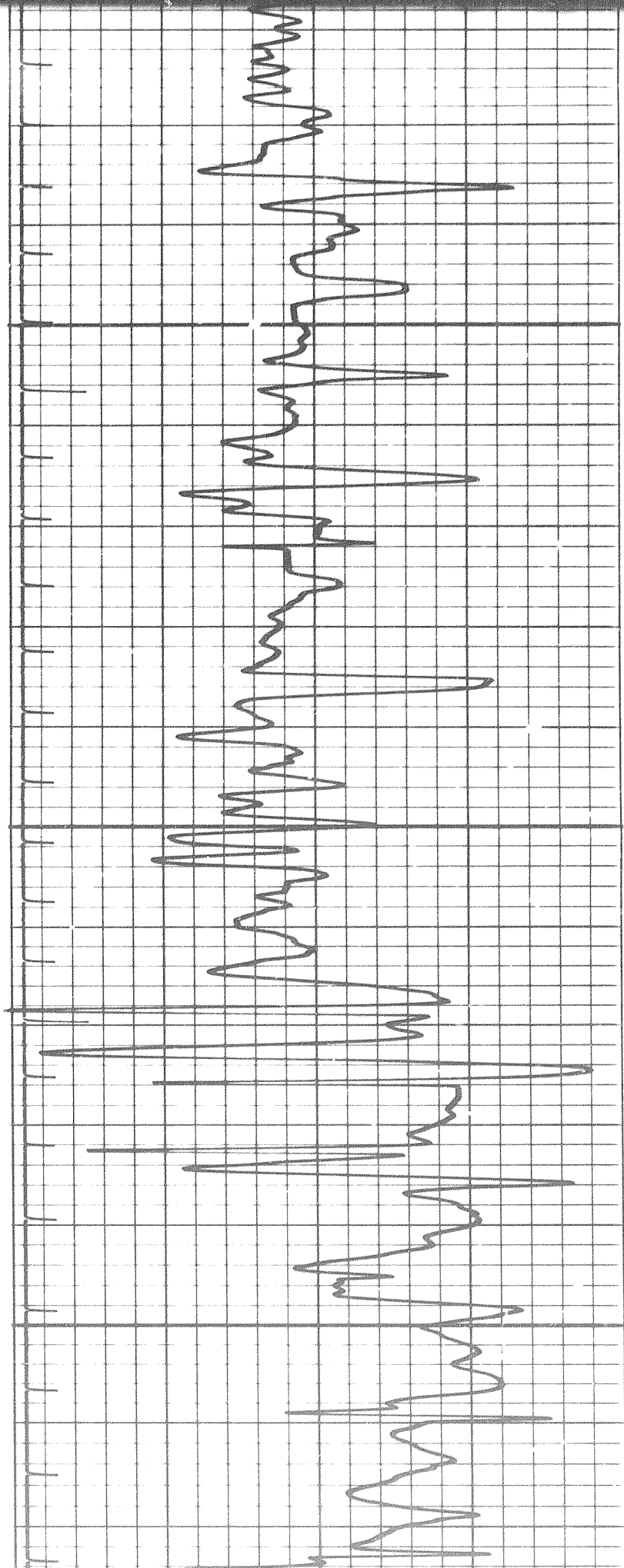




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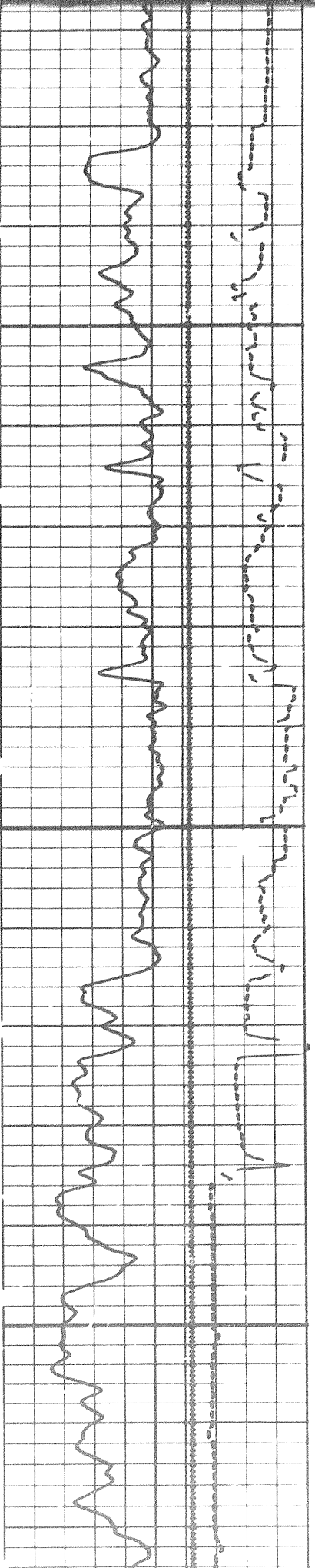


1691

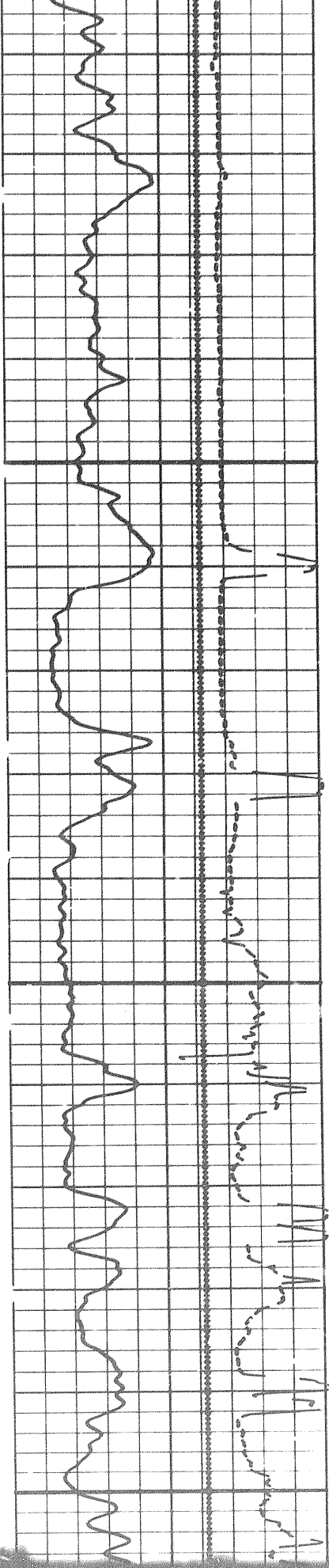


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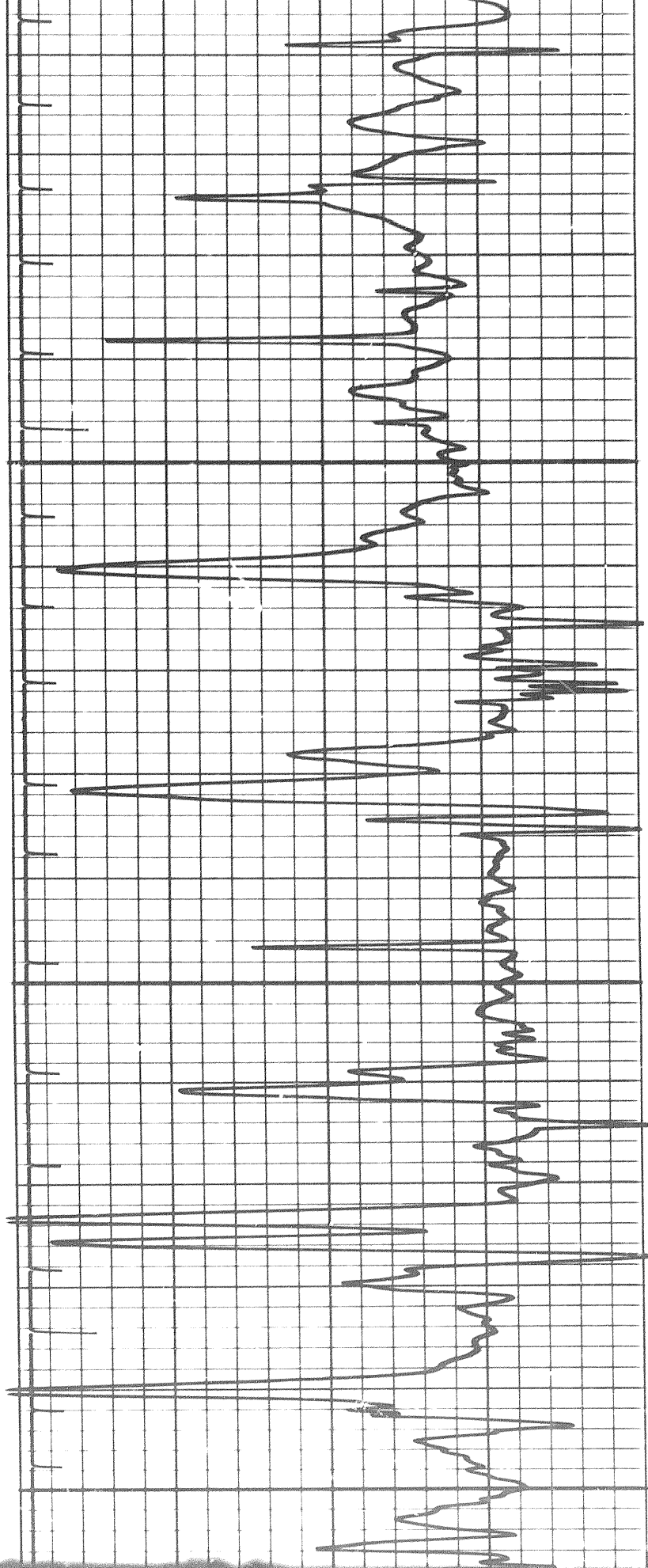
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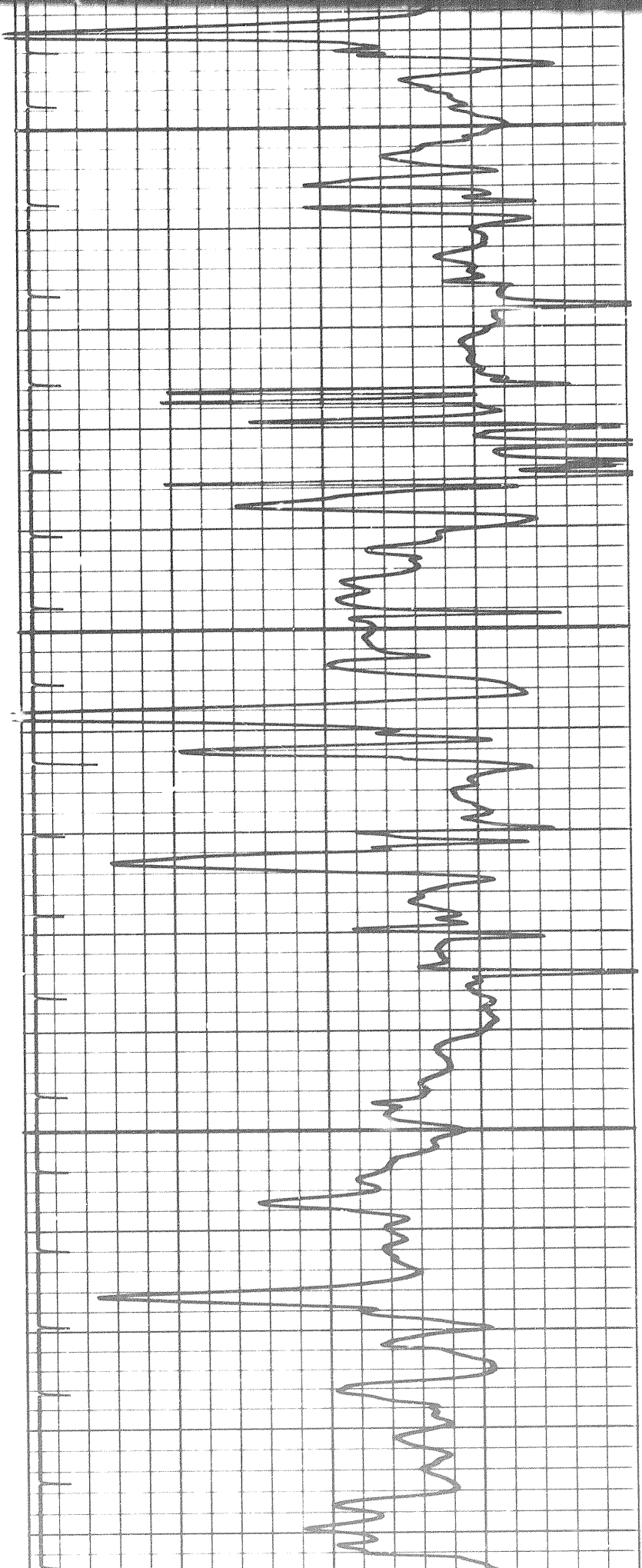


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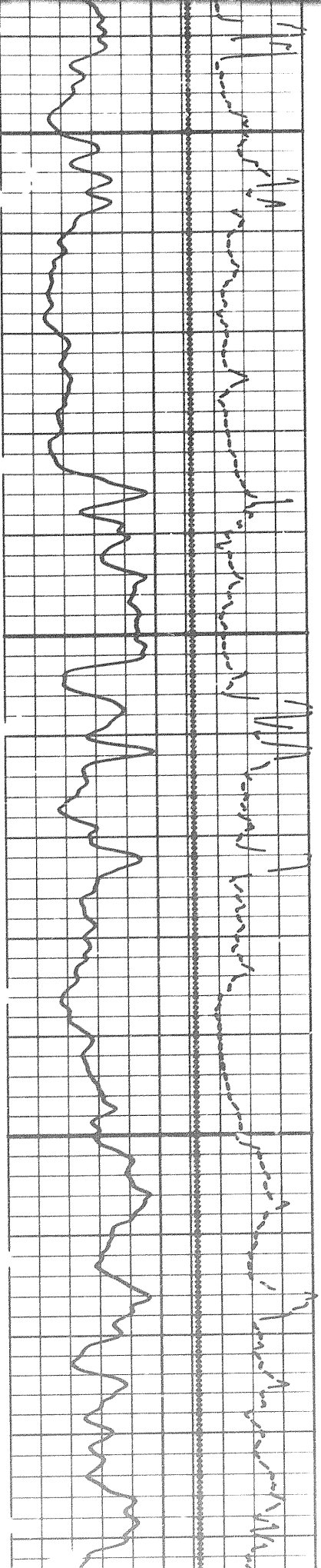


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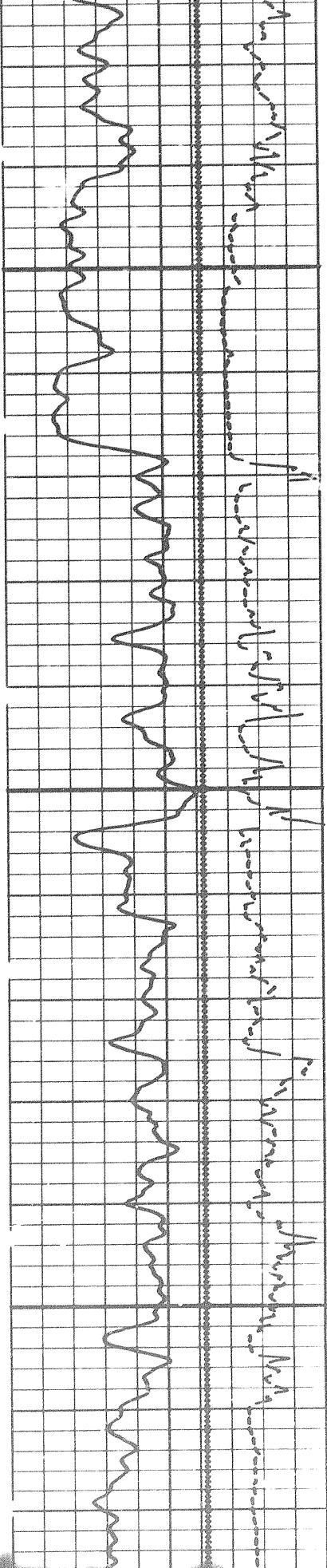


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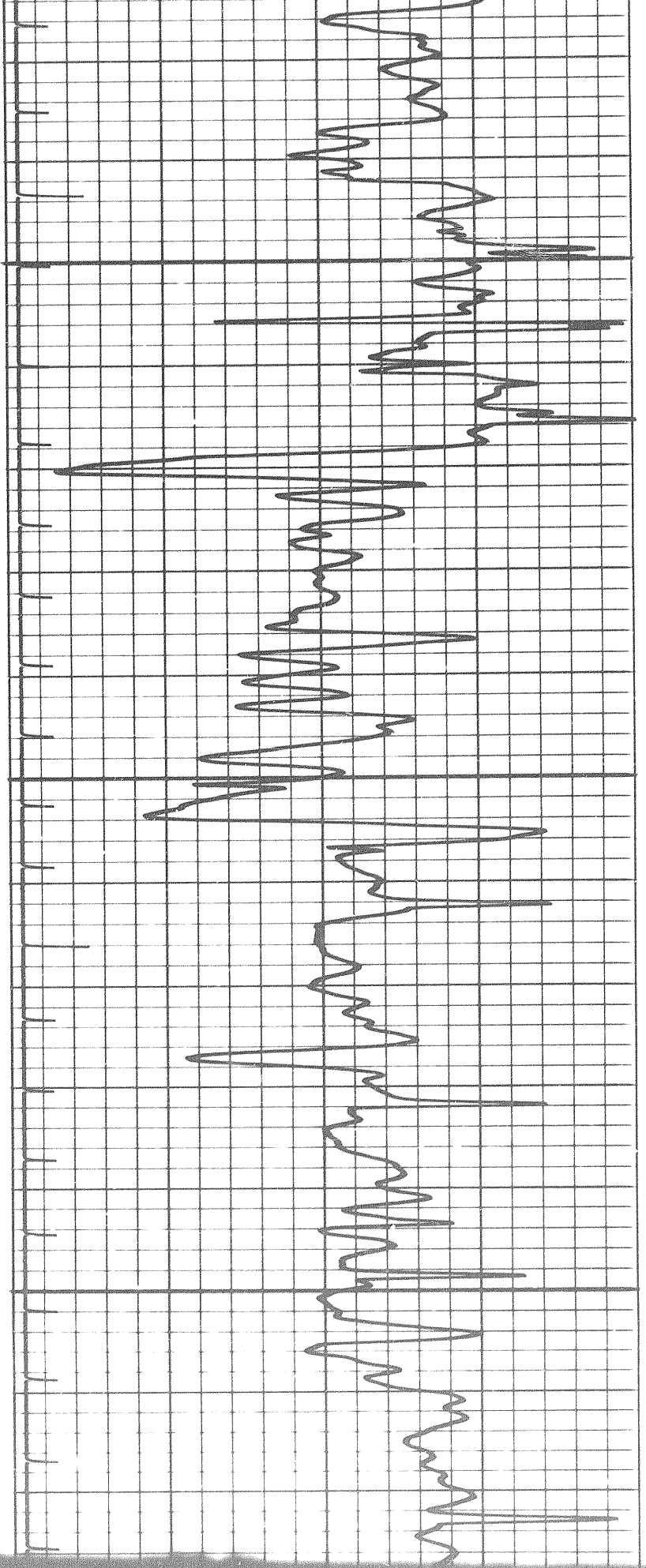




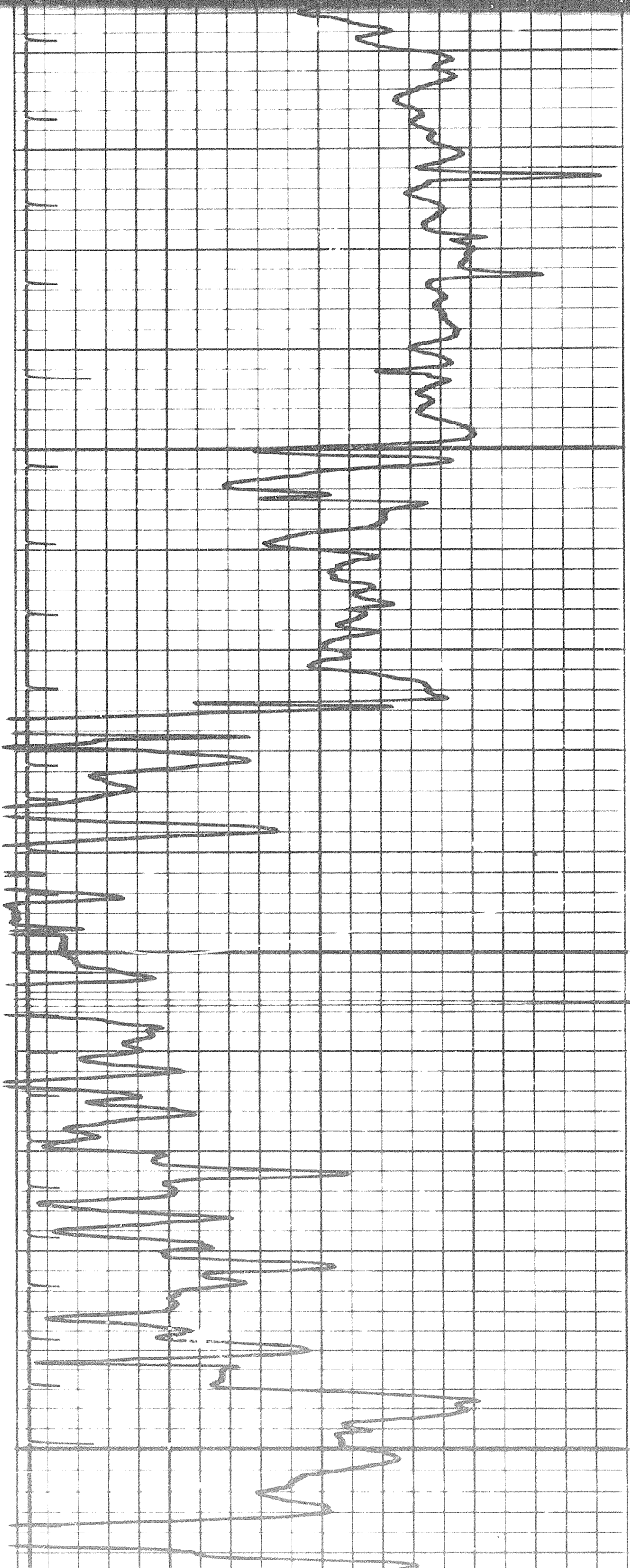
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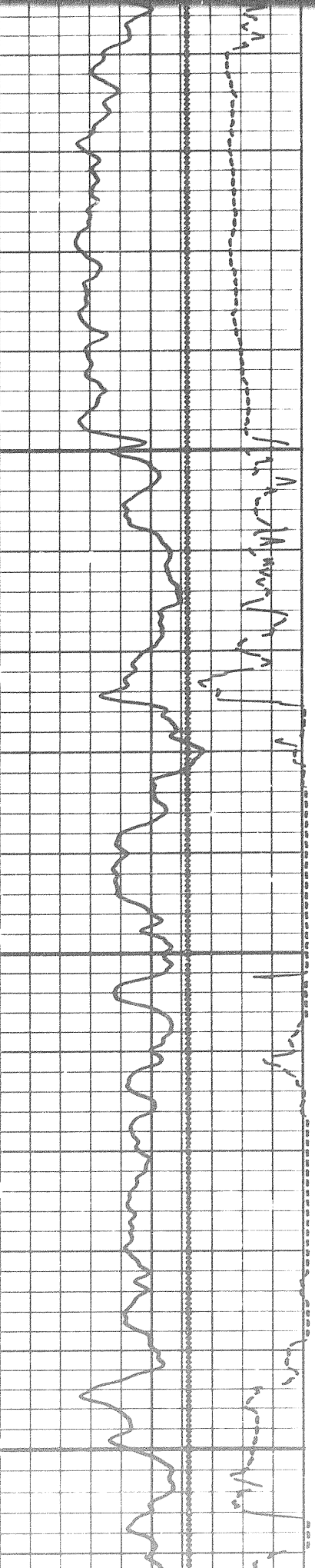
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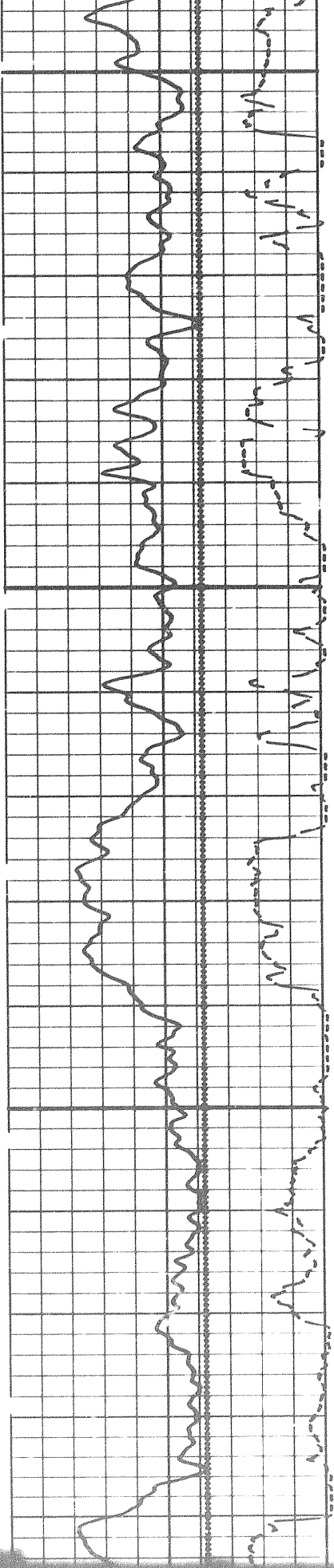
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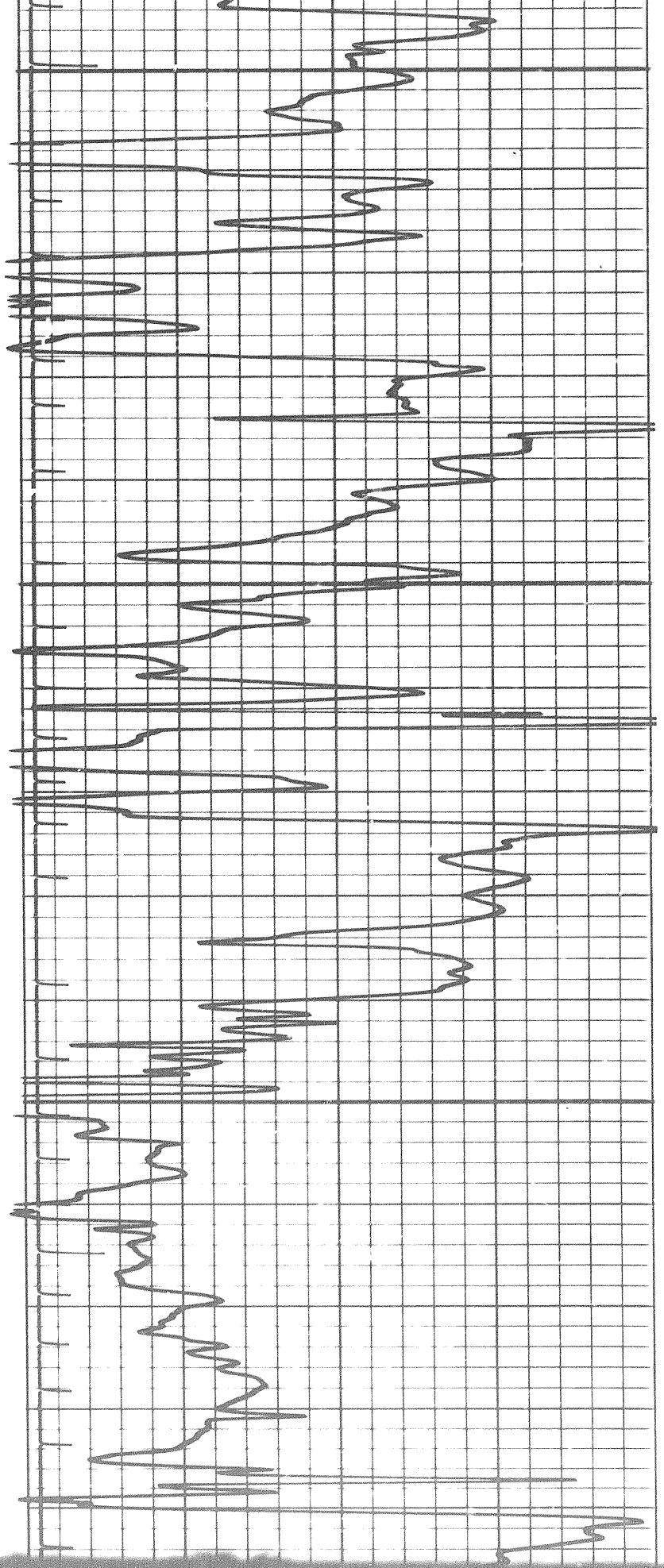
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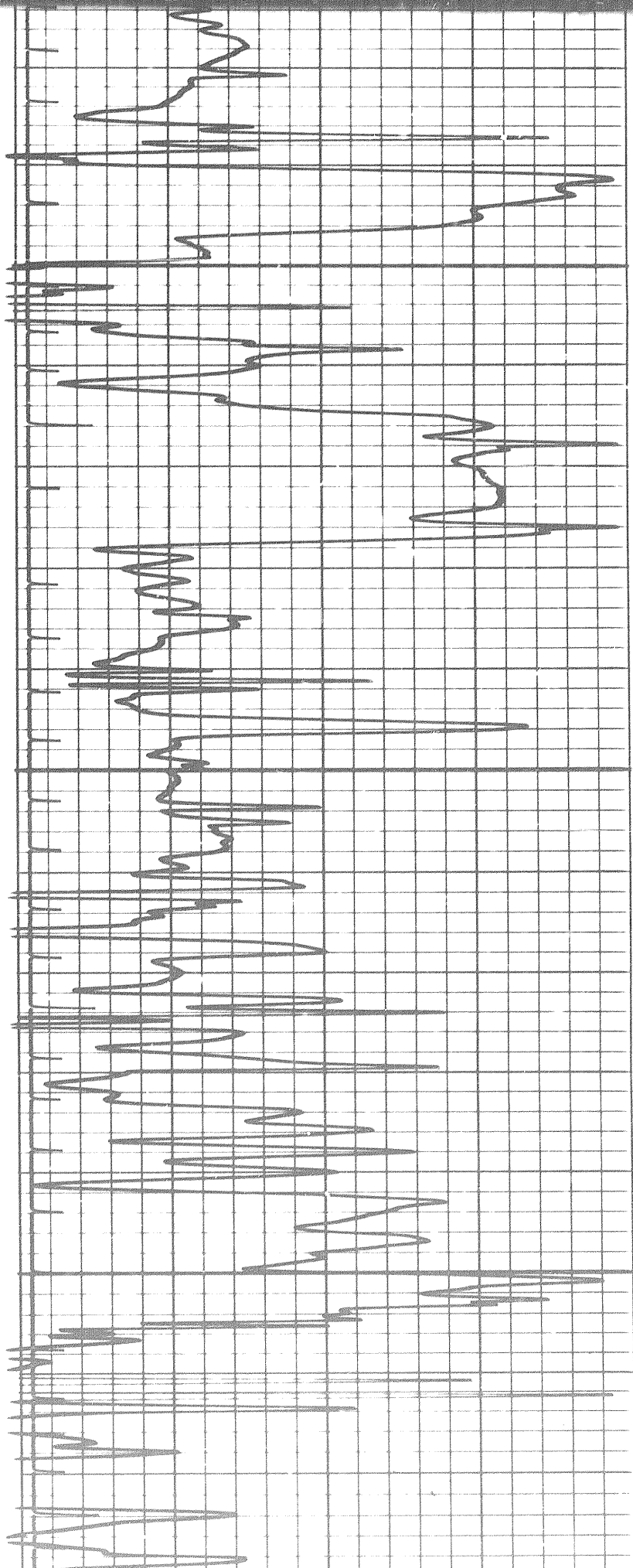


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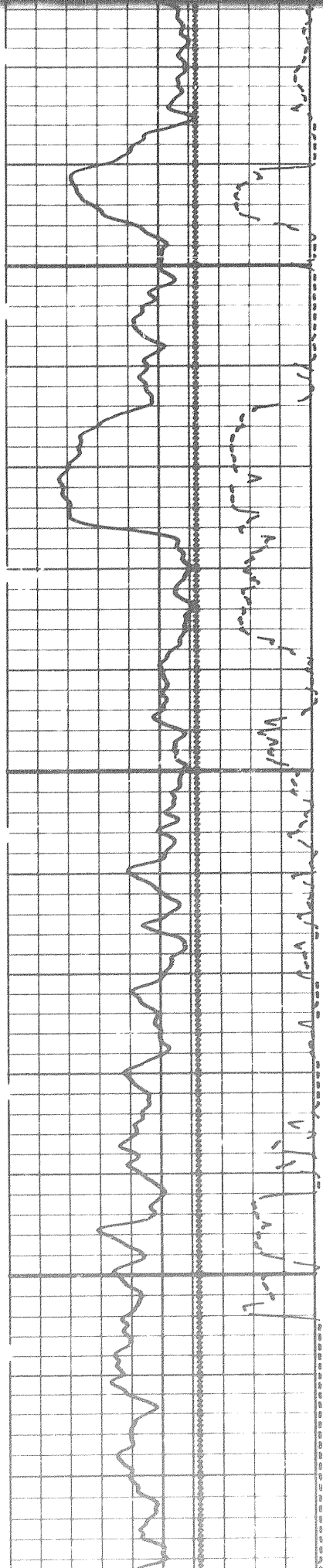
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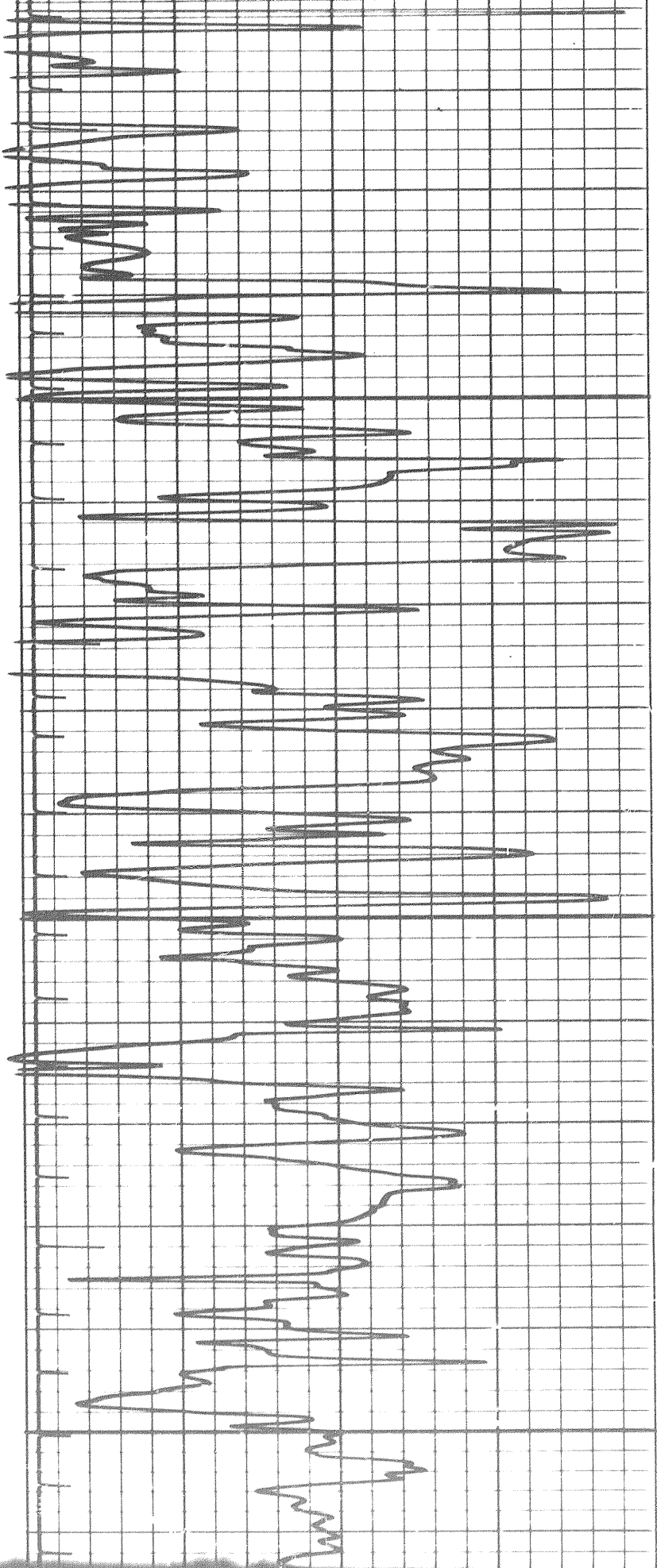


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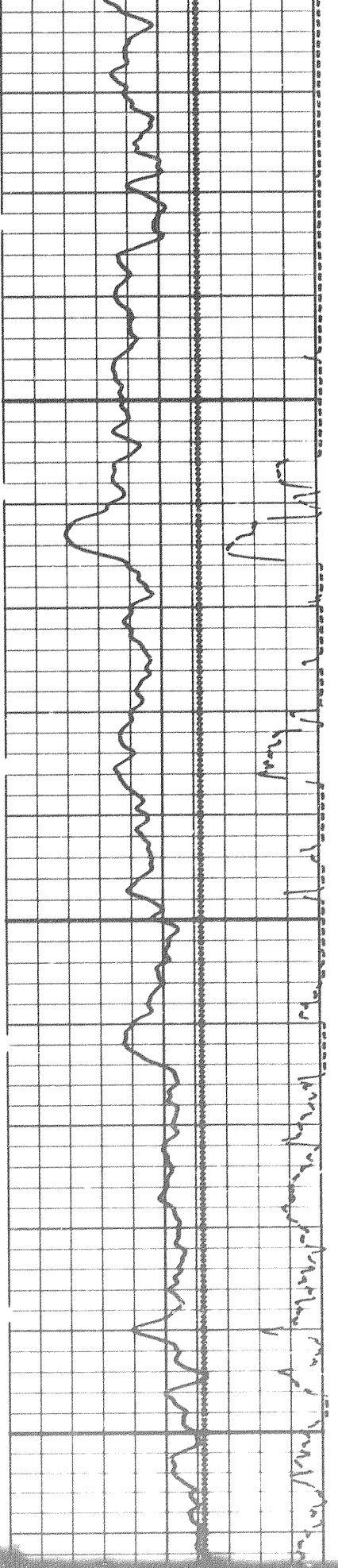
2550



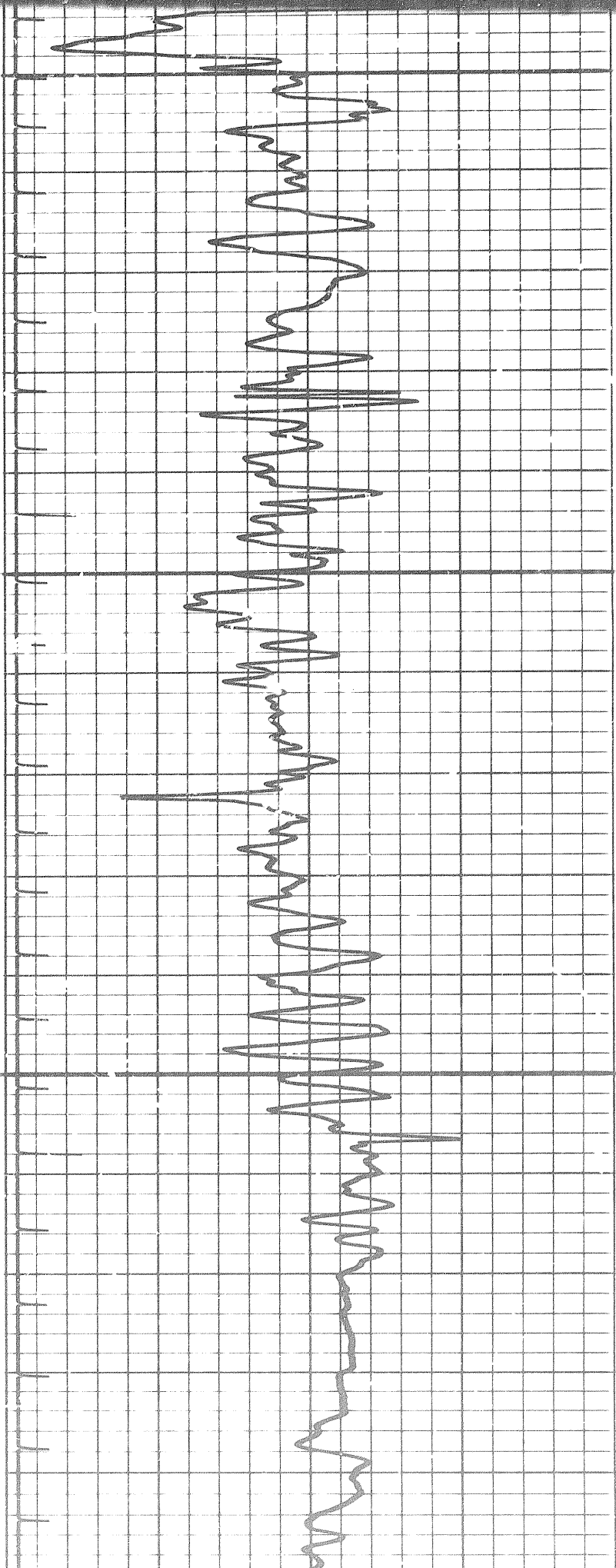
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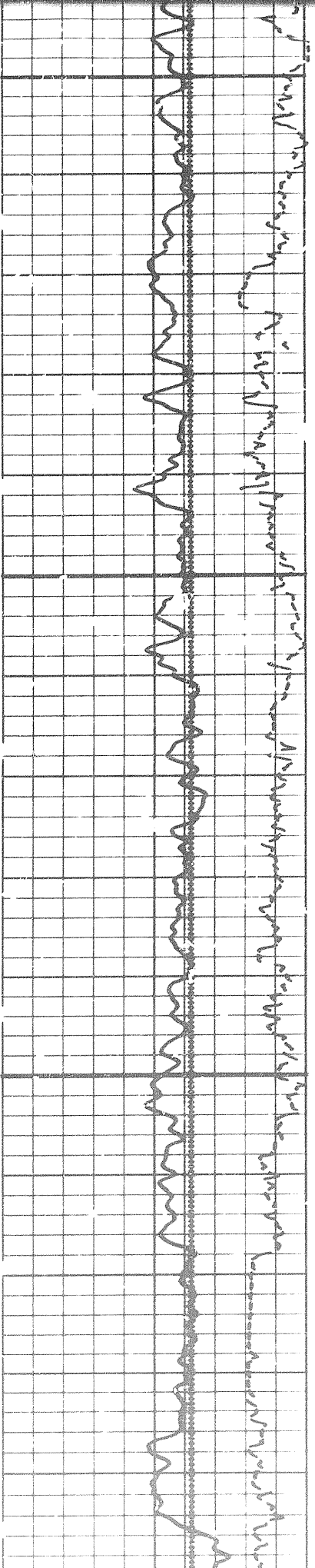
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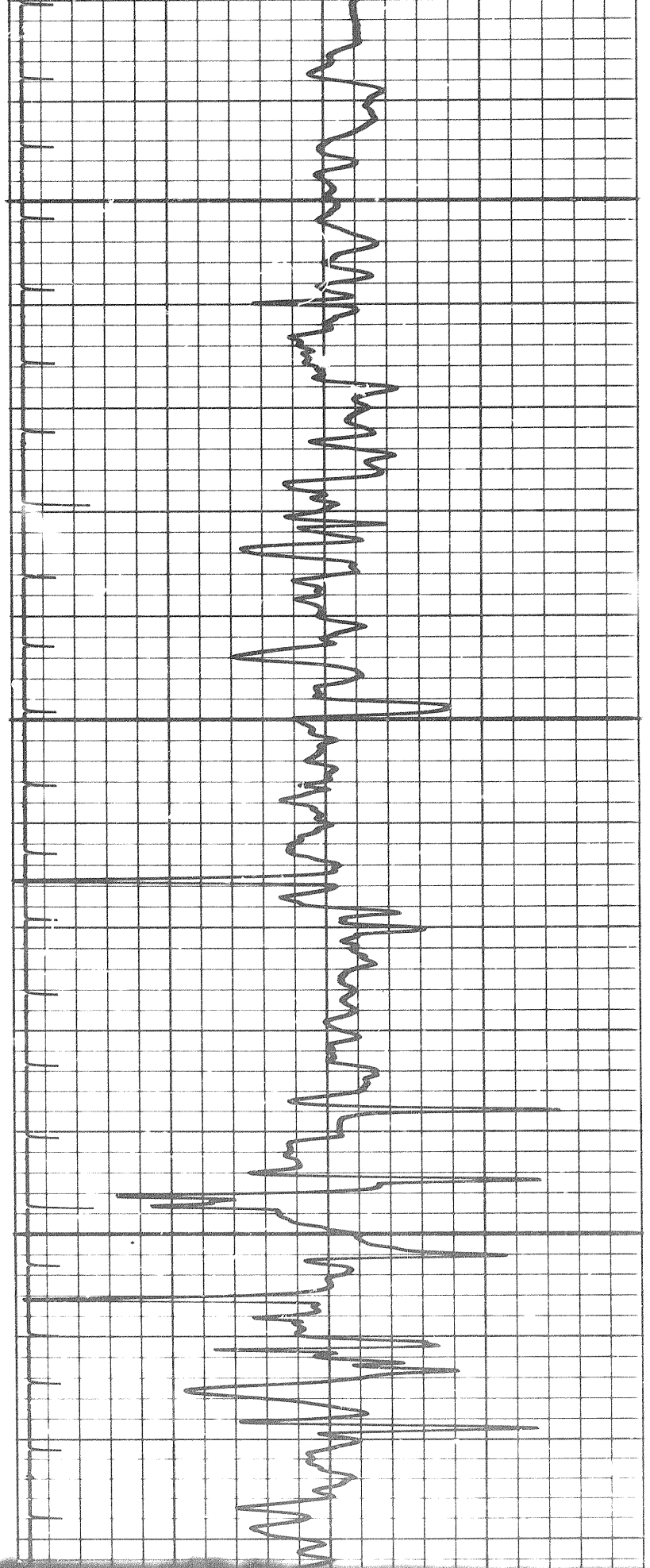


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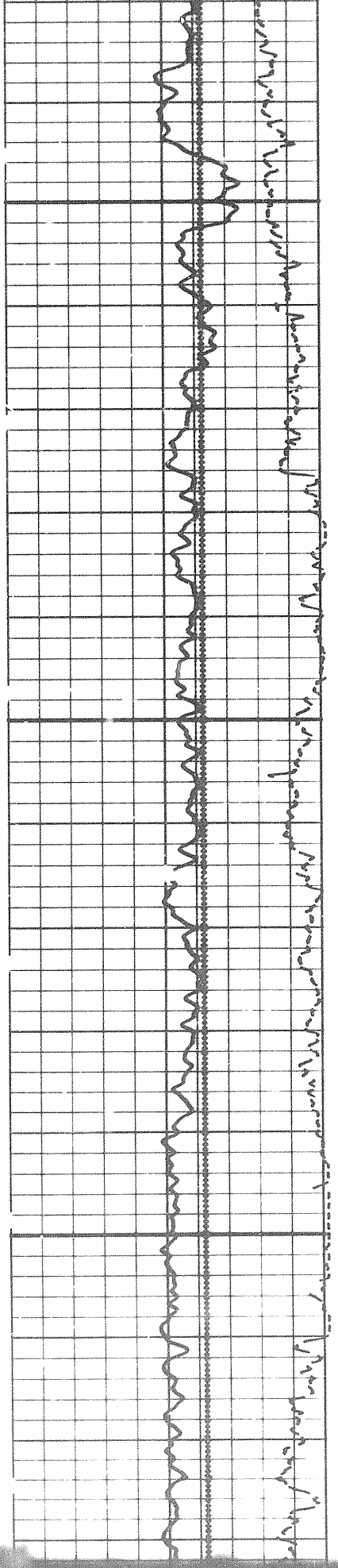
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27

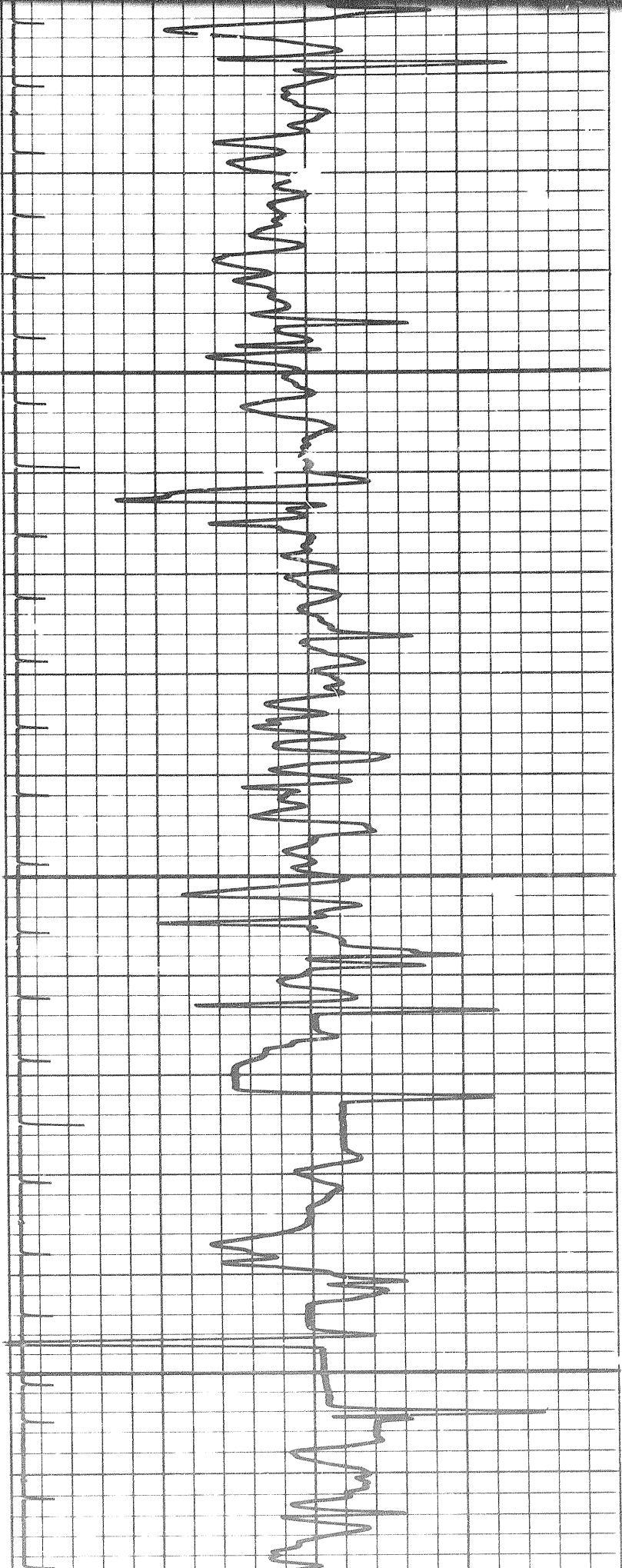


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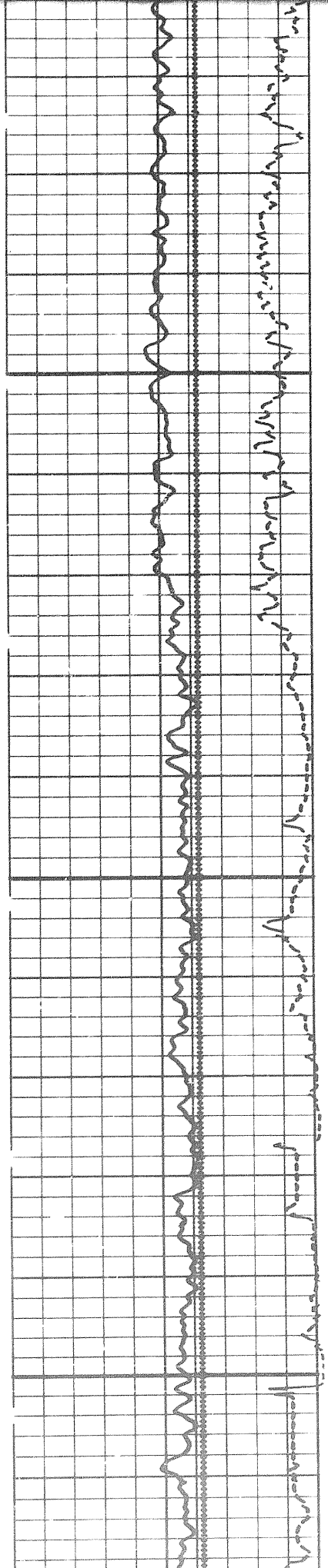
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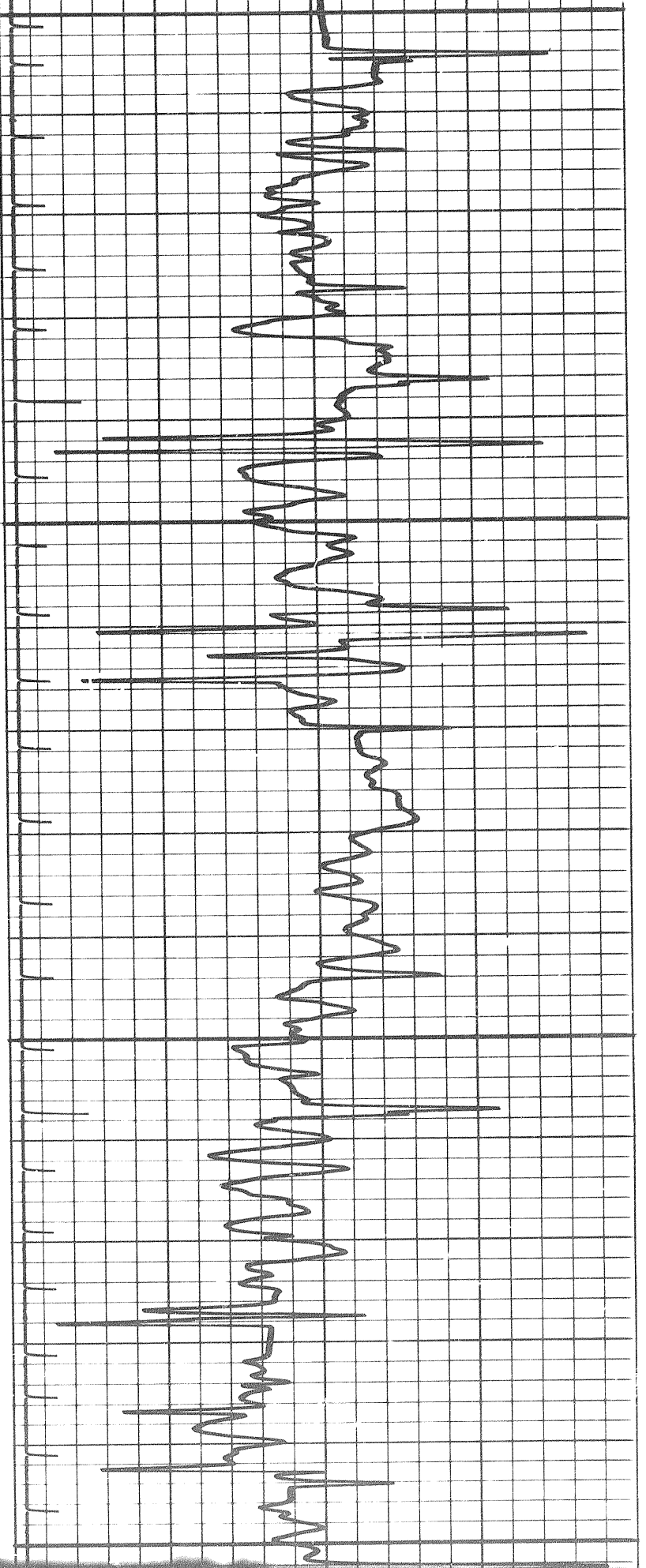
21 of



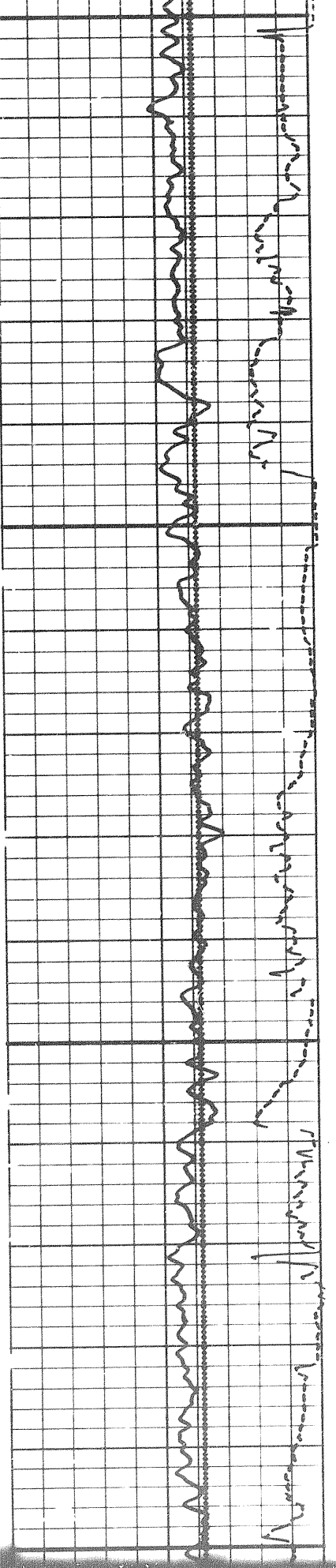
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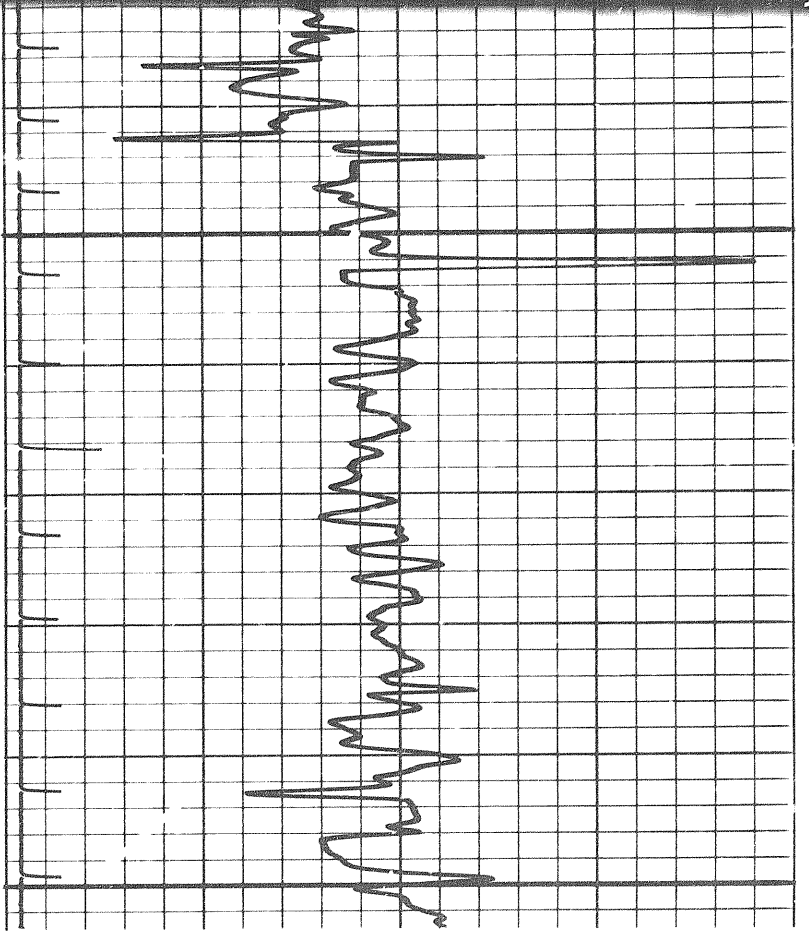


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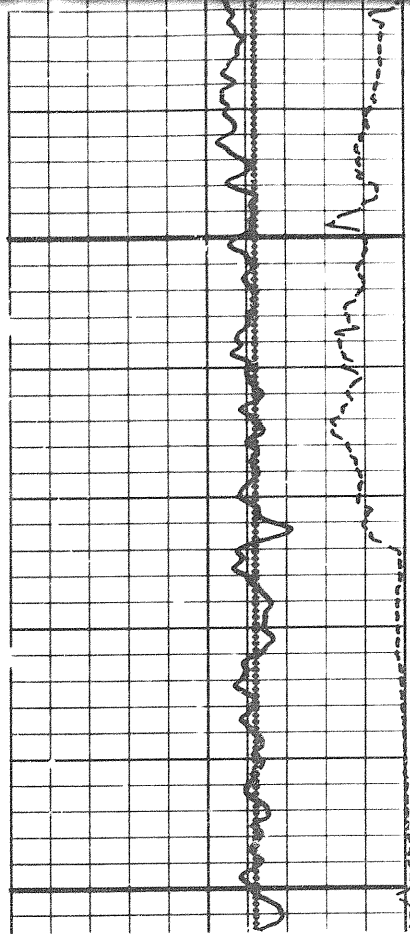


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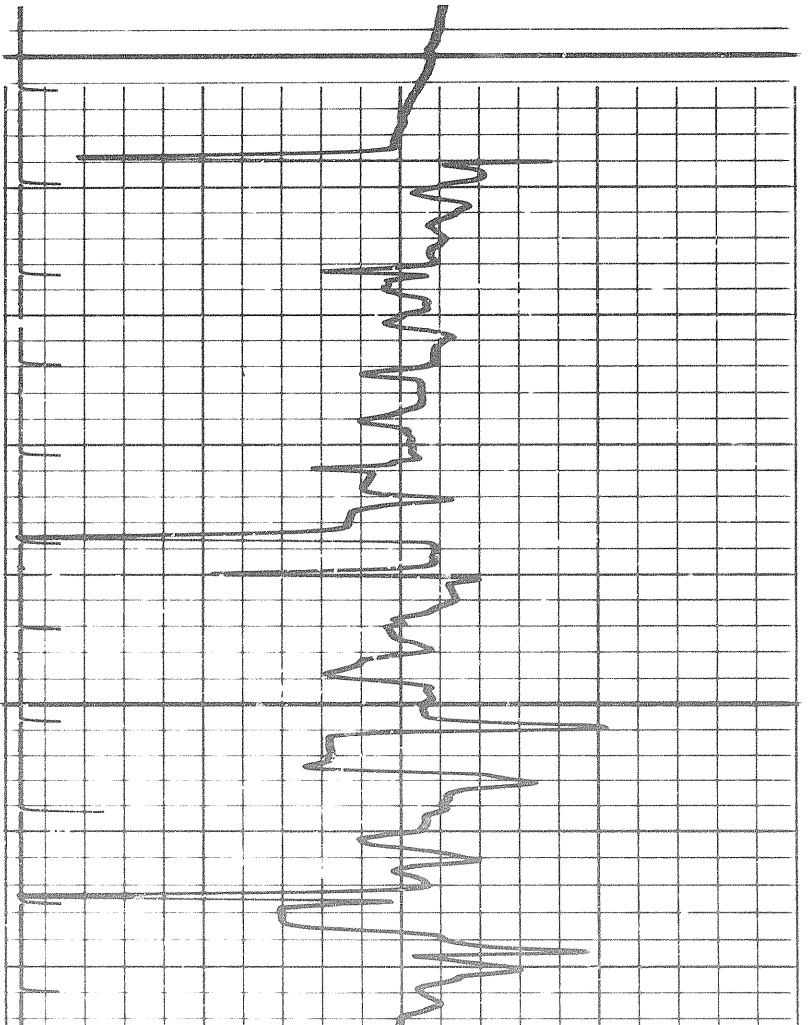
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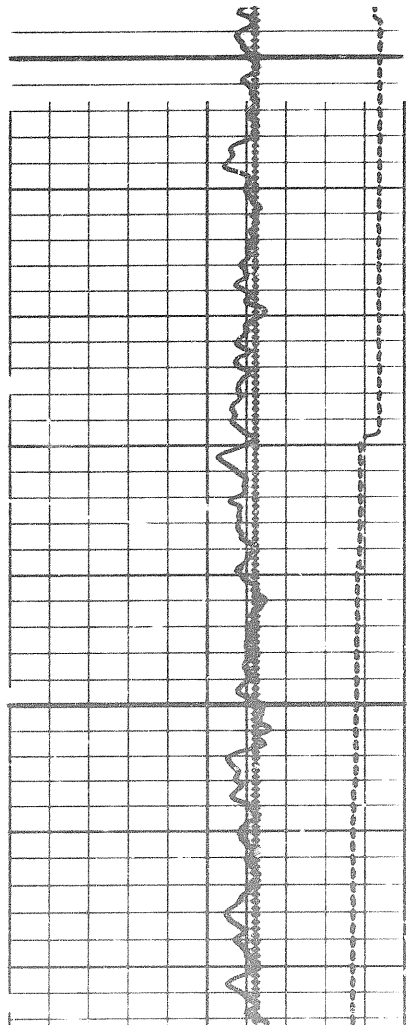
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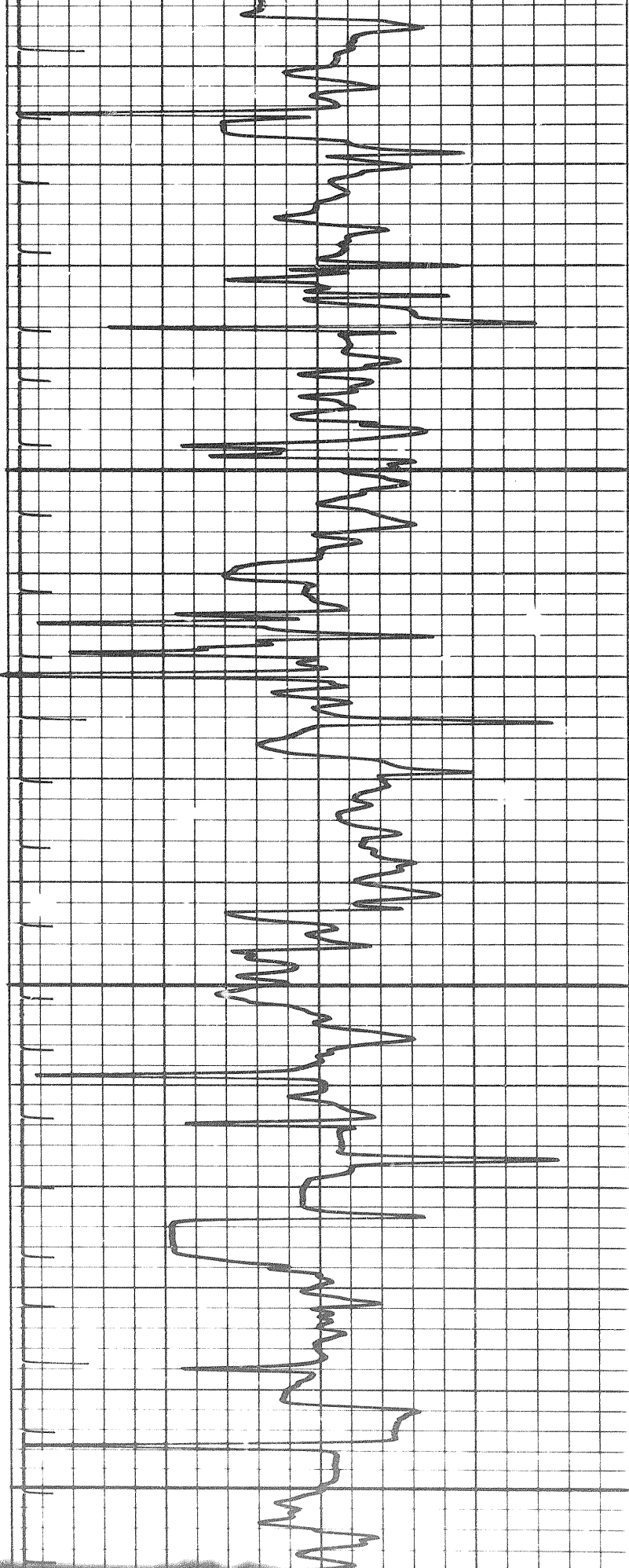


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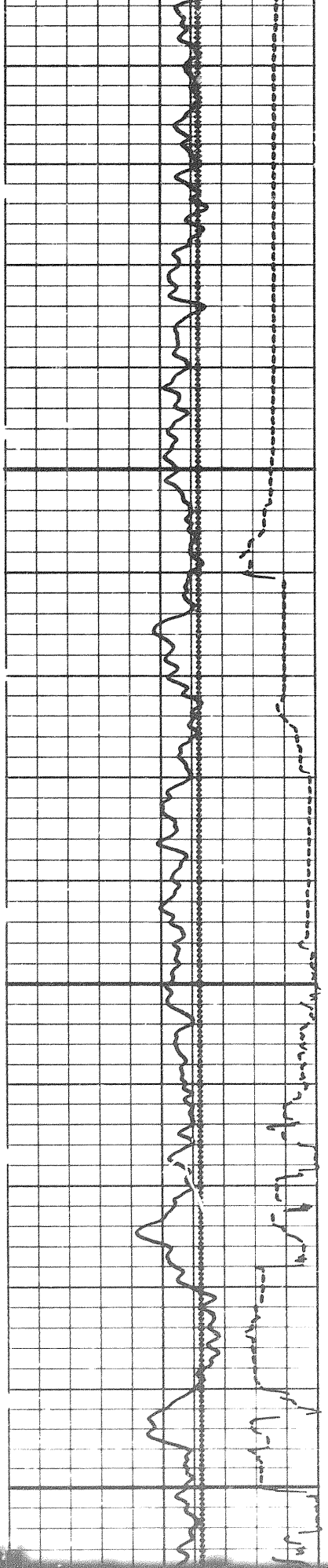


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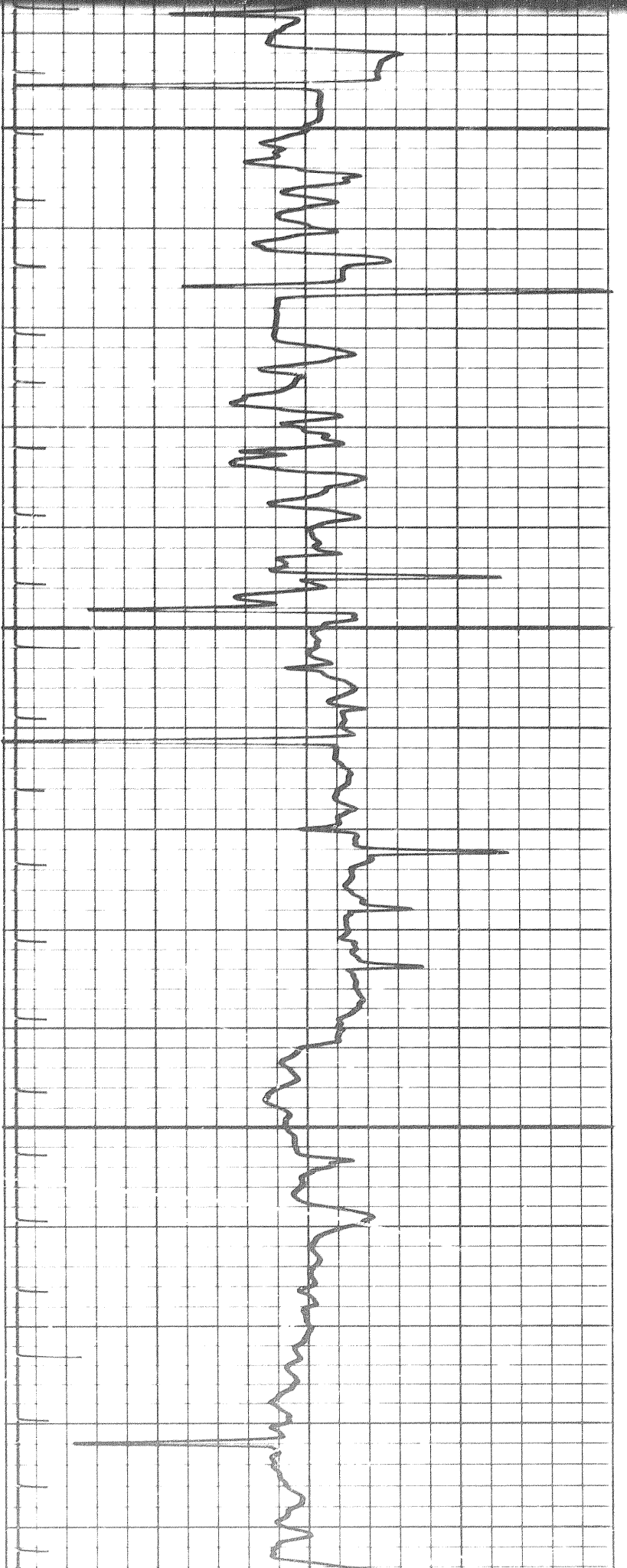




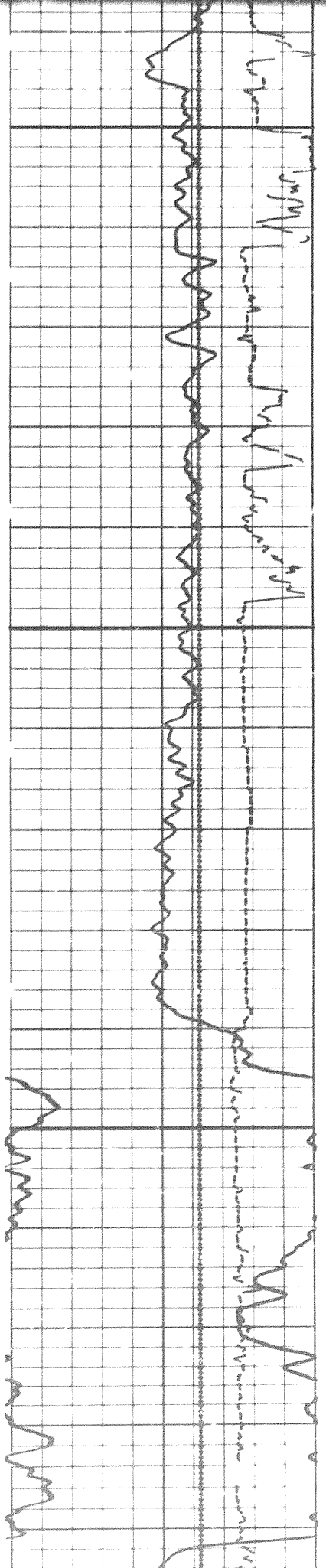
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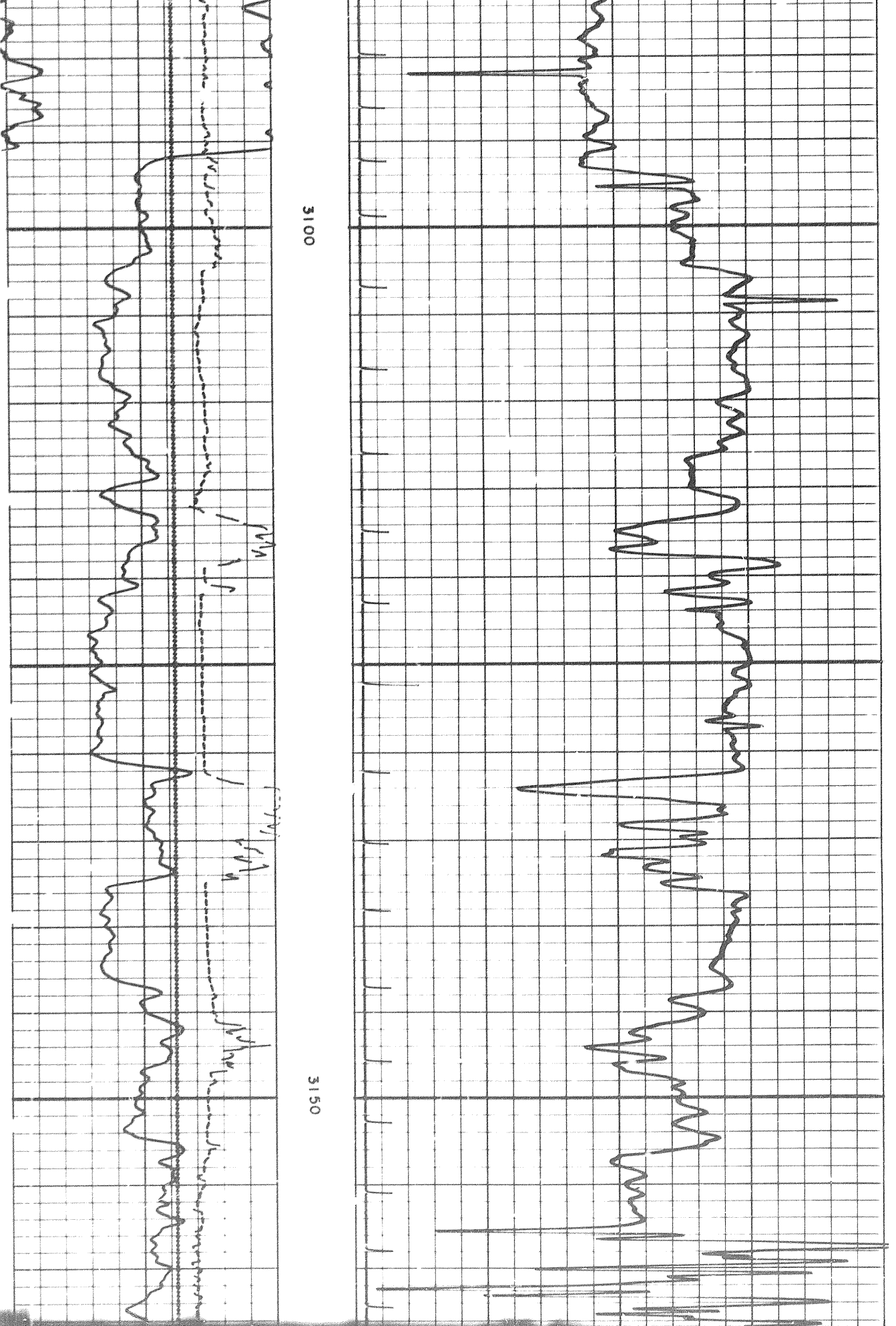


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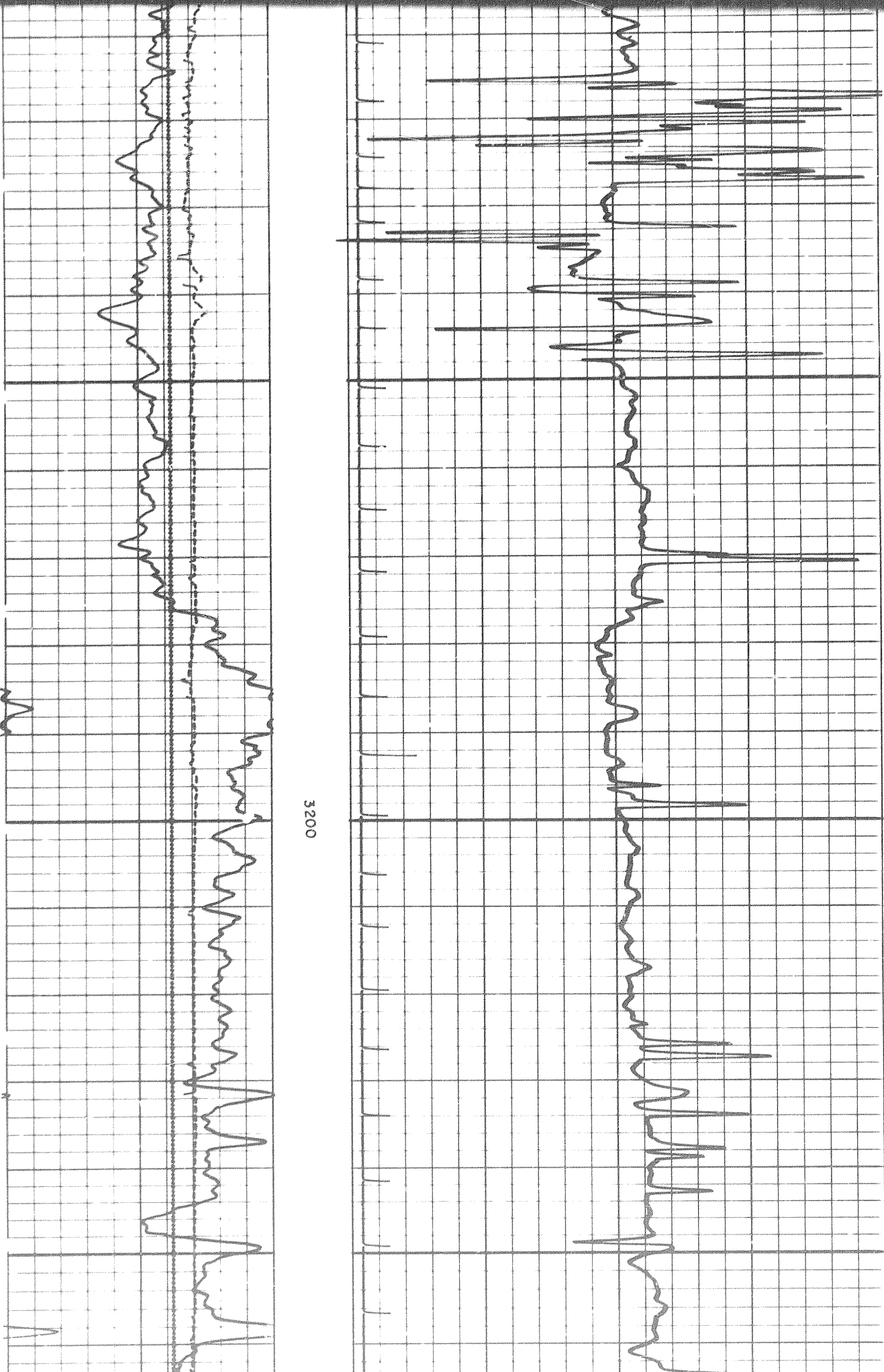


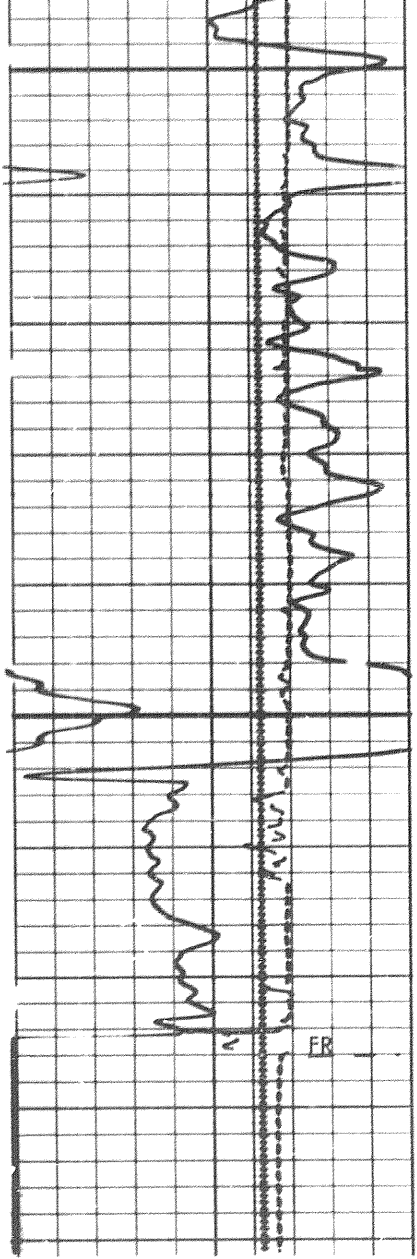
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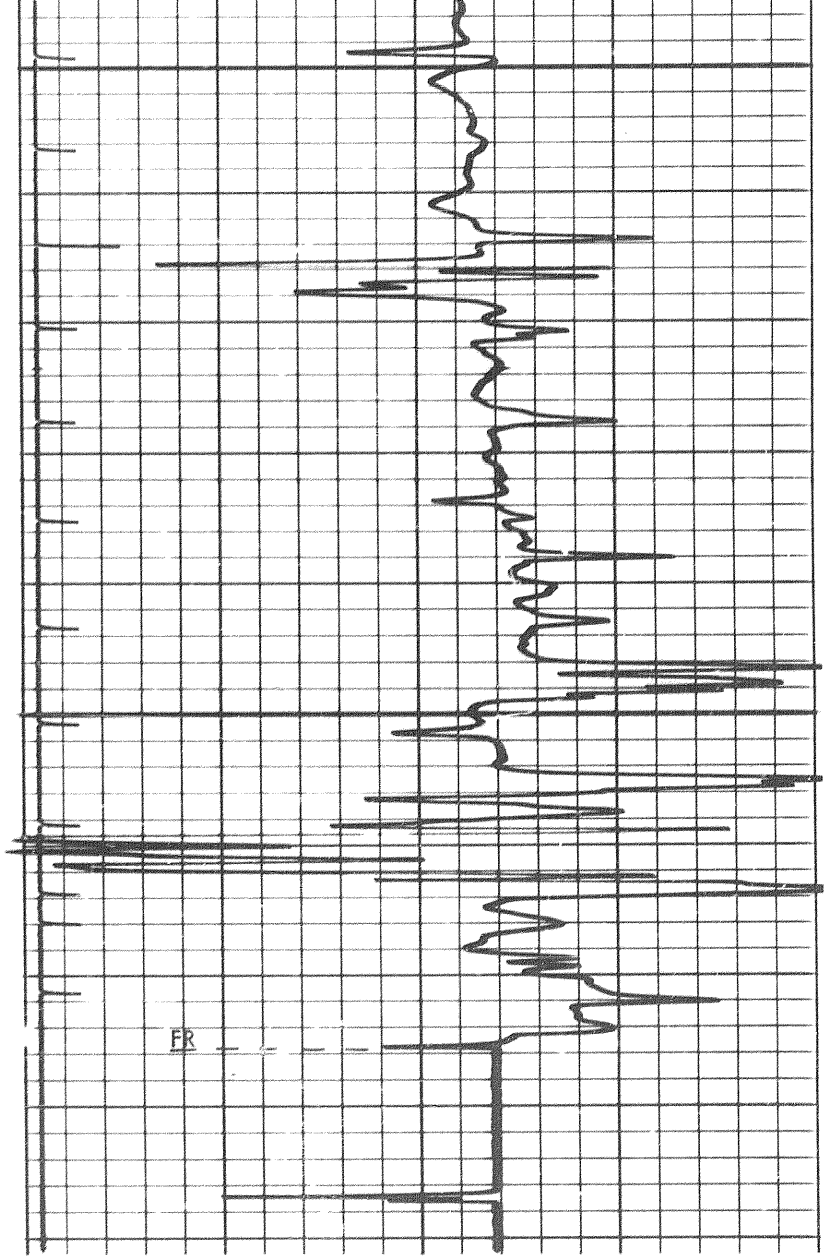


2407





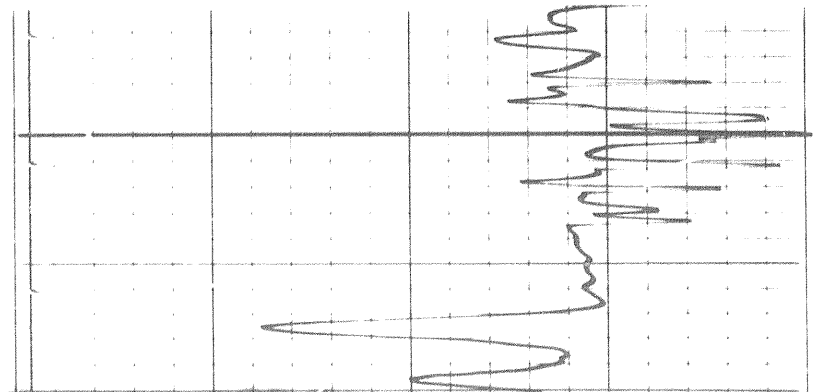
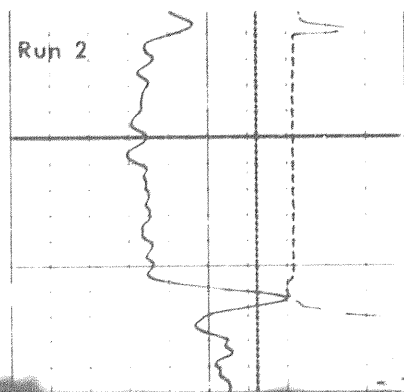
3250



REPEAT SECTION

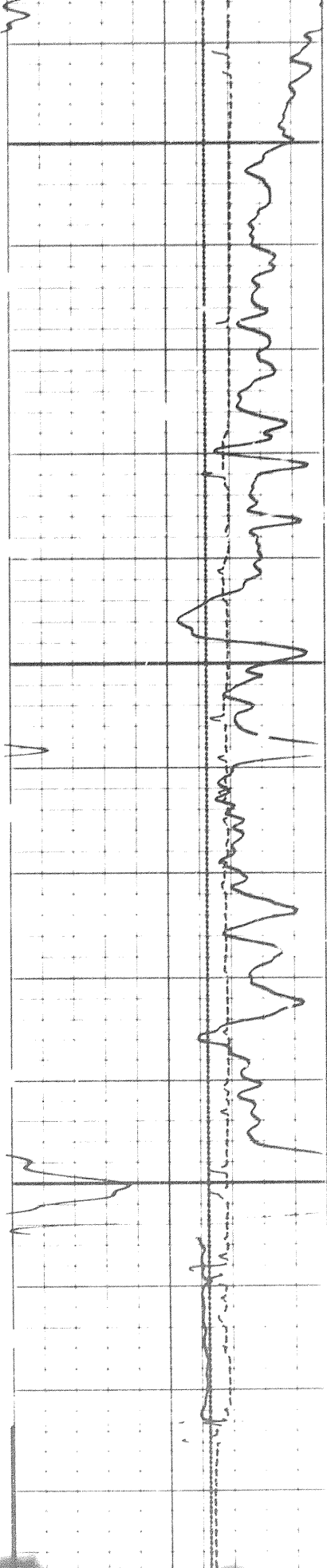
↓

X 3000



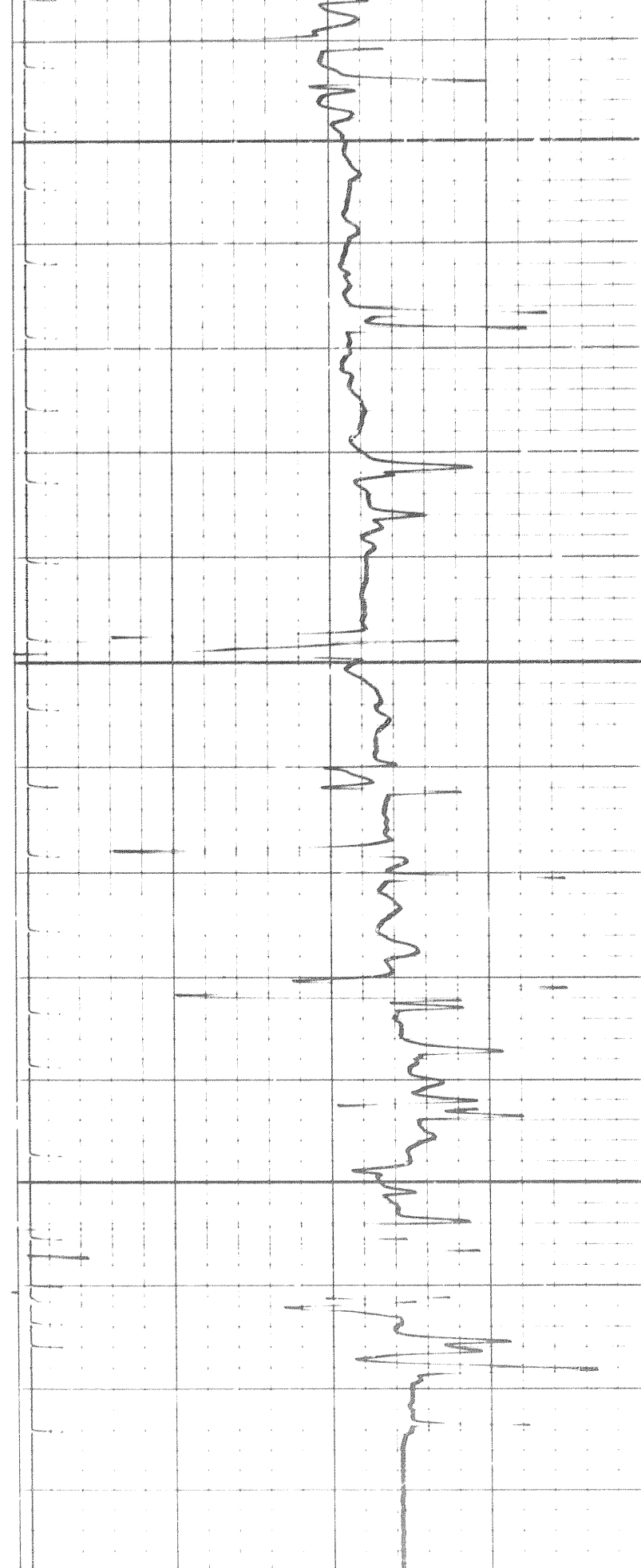
2597

3607

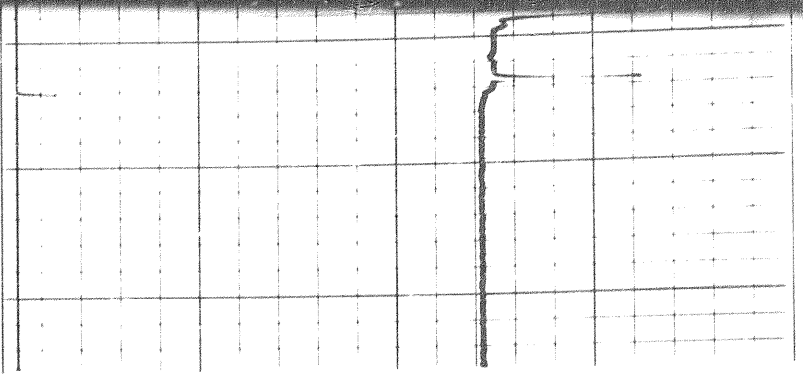
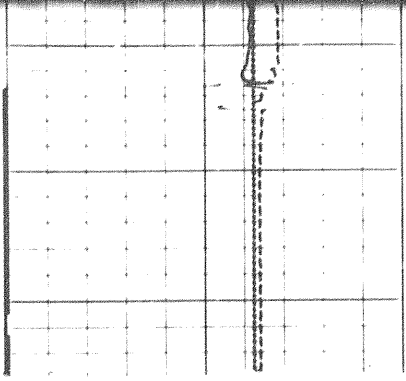


3200

3250

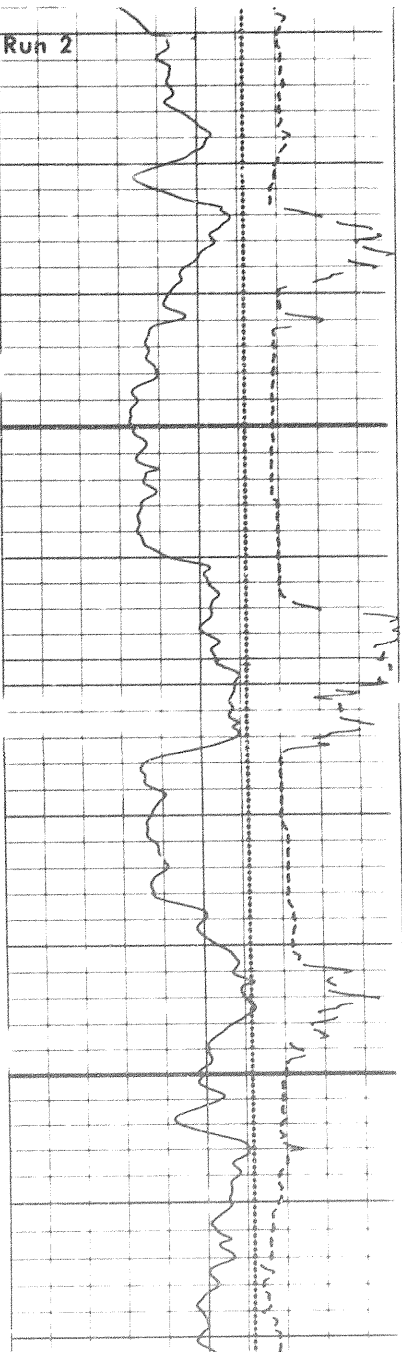




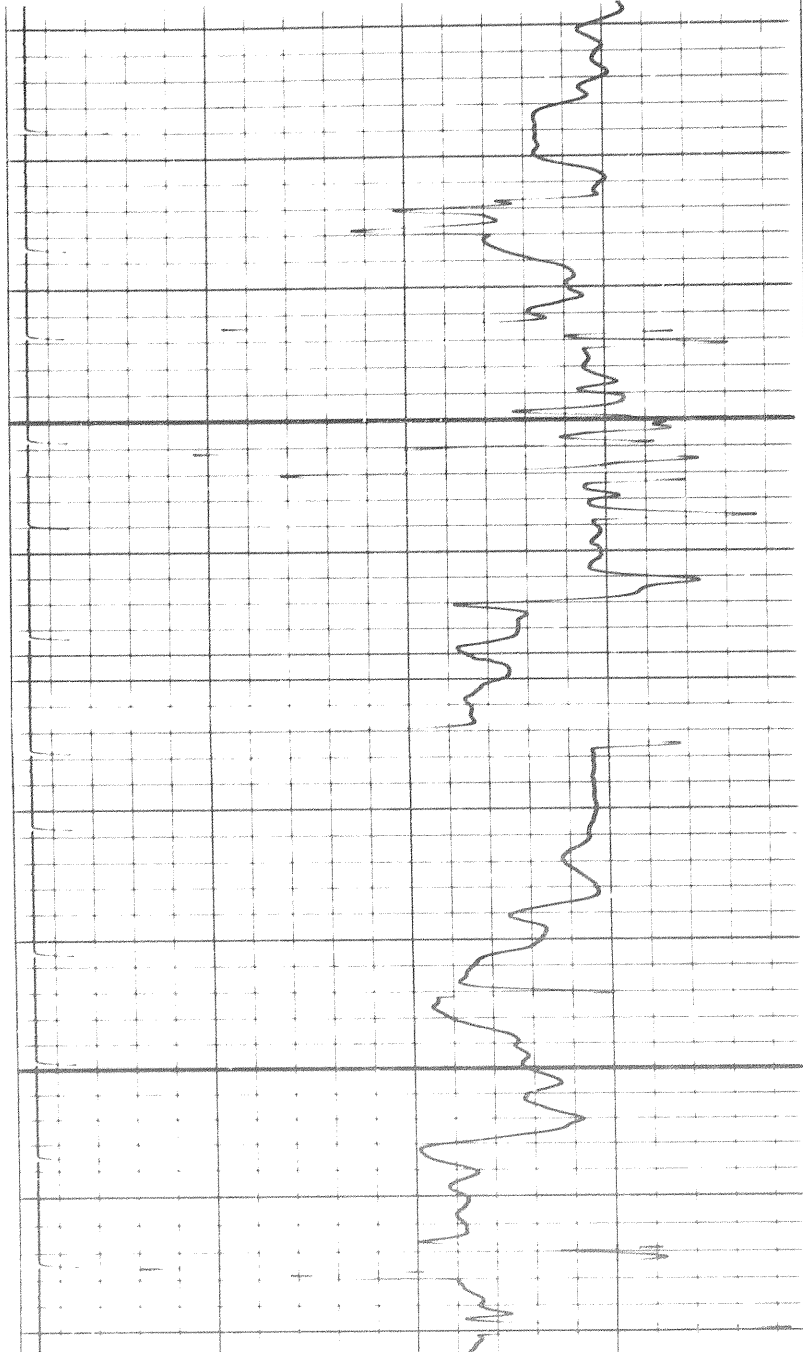


0000X

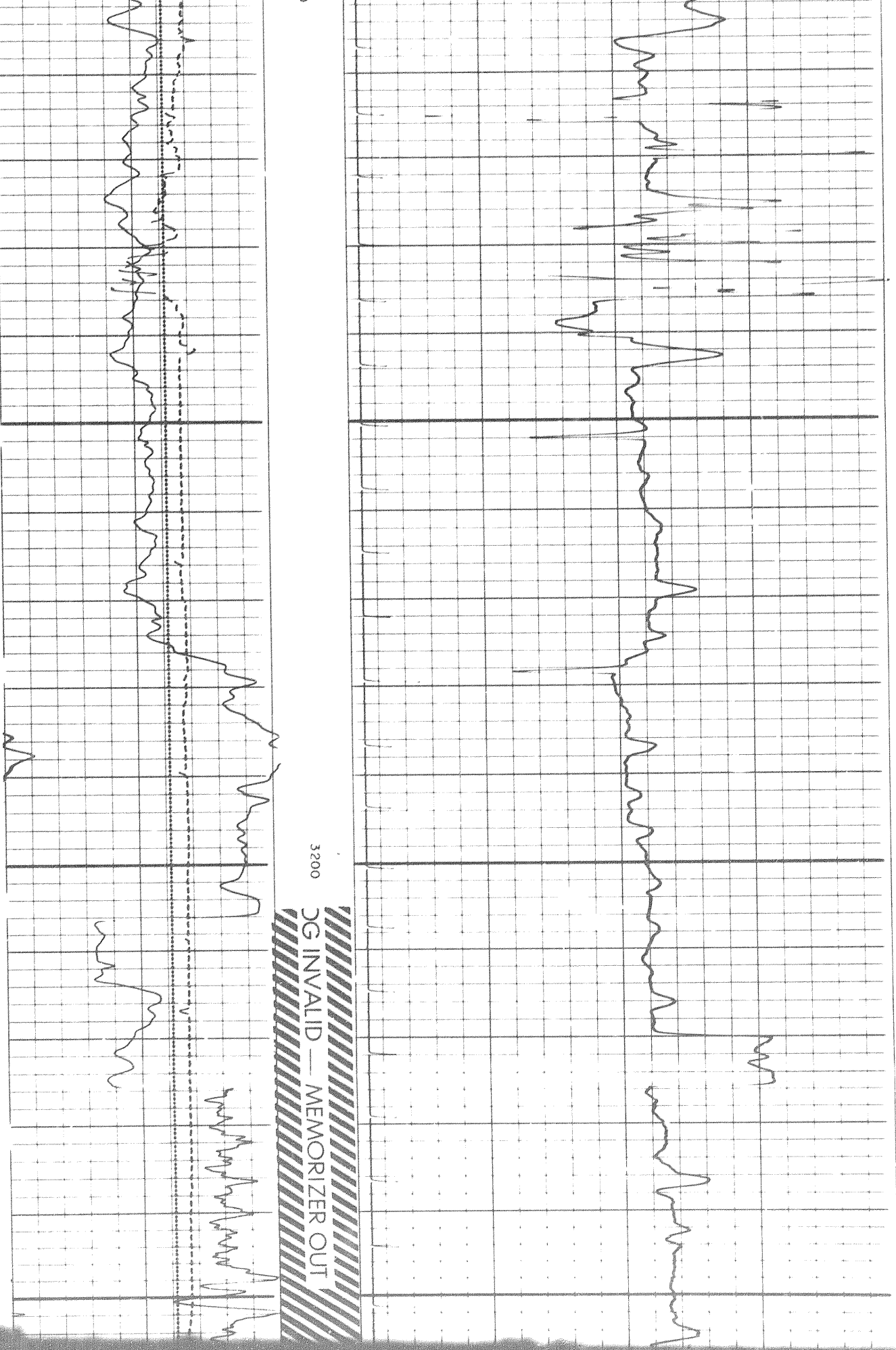
REPEAT SECTION




3150

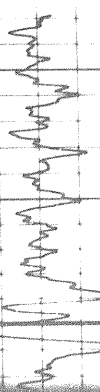


28



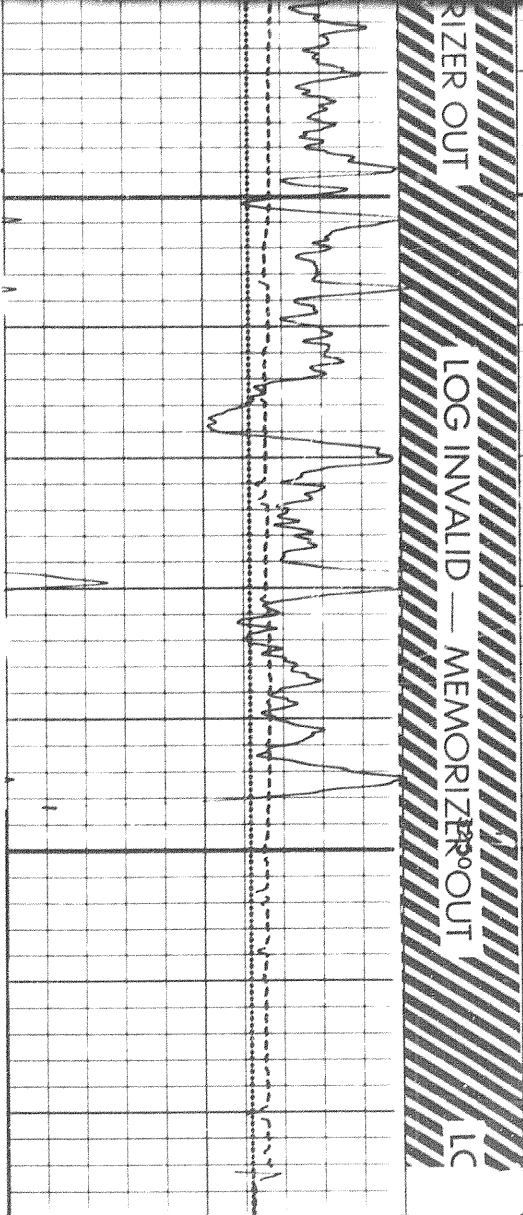
3200


 DG INVALID — MEMORIZER OUT

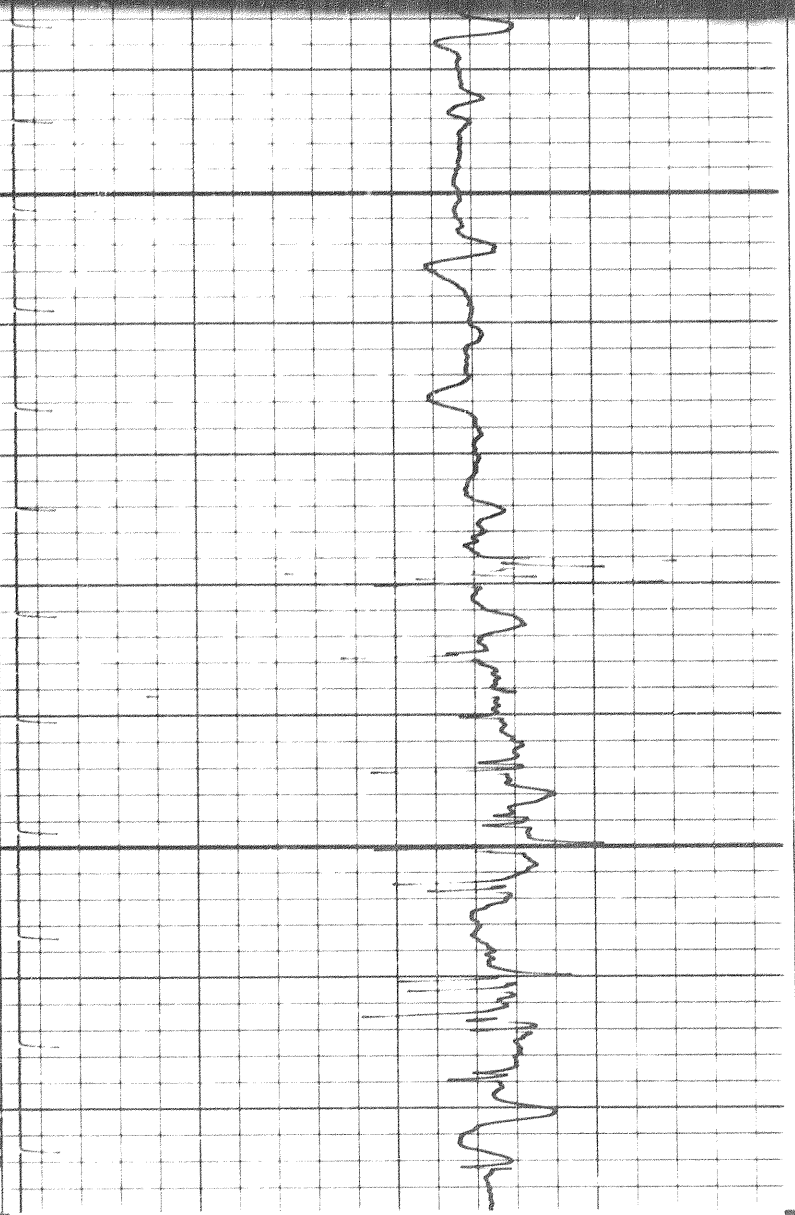


27 of

27



RIZER OUT  
 LOG INVALID — MEMORIZER OUT  
 LC



GAMMA RAY	
activity API units	
T.C. <u>2</u>	
Zero <u>0</u>	div. to left
0	150
150	300

CALIPER	
hole diameter mm	
150	275
275	400

DEPTH  
METRES

GAMMA RAY	
activity API units	
T.C. <u>2</u>	
Zero <u>0</u>	div. to left
0	150
150	300

CALIPER	
hole diameter mm	
150	275
275	400

500	300	100
900	700	100

INTERVAL TRANSIT TIME		
$\mu s/m$		
100	200	300
400	500	600

100	200	300
400	500	600

activity  
API units

T.C. 4.10

Zero 0 div. to left

0 200  
200 400

CALIPER

hole diameter  
mm

125 250 375

X2000A

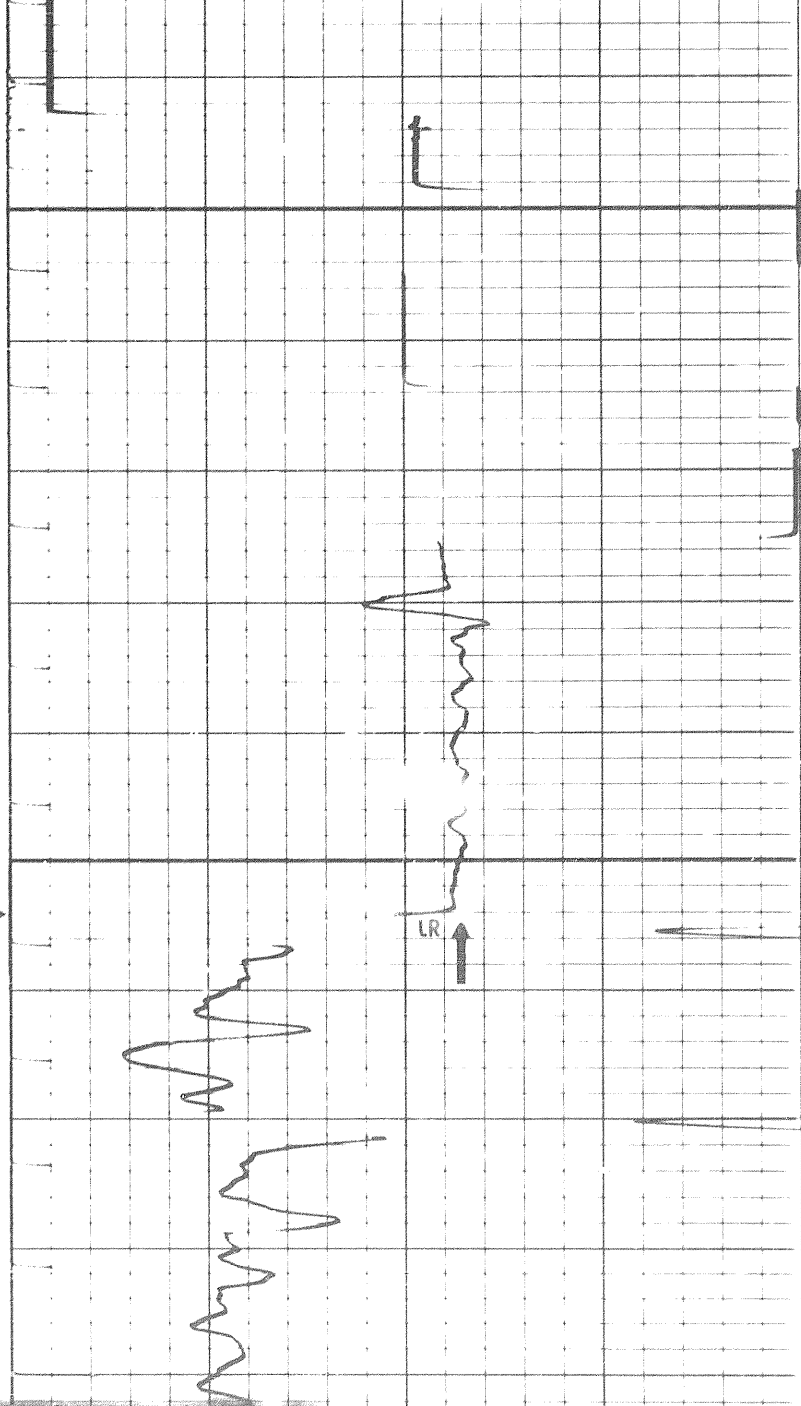
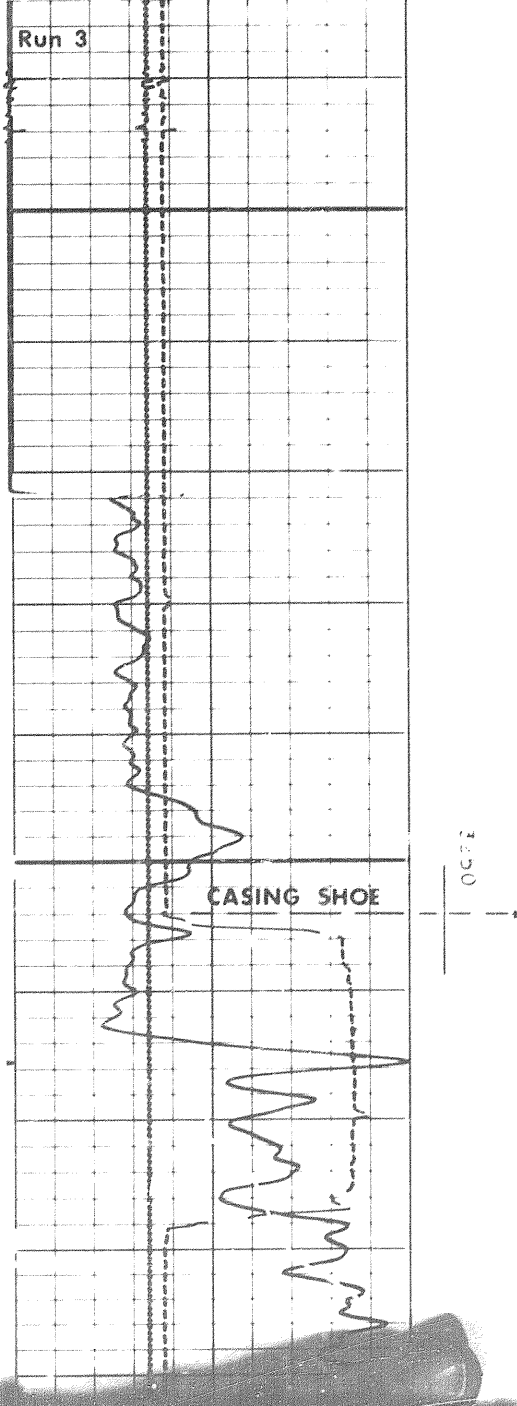
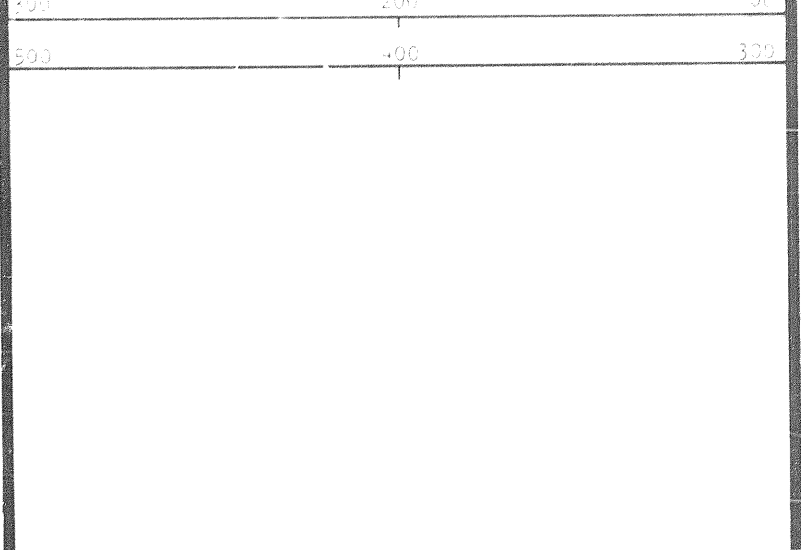
Run 3

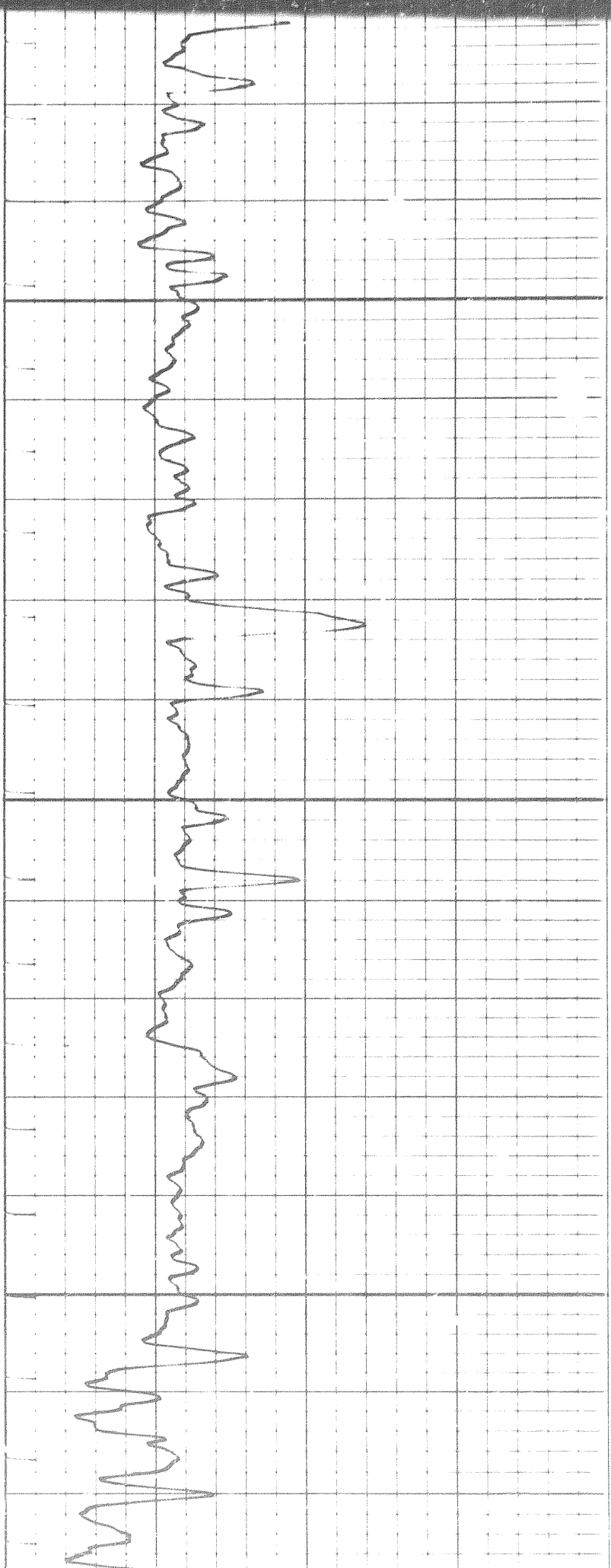
CASING SHOE

0.50

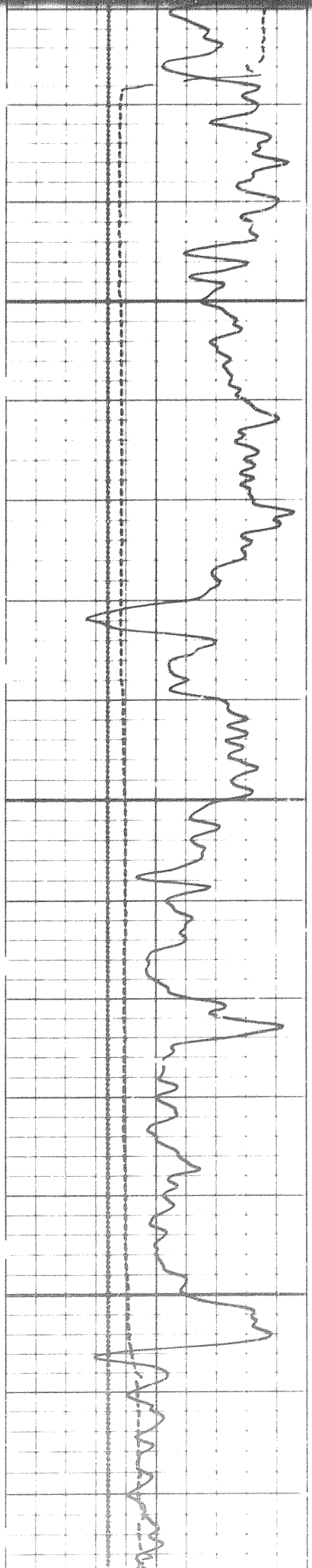
LR ↑

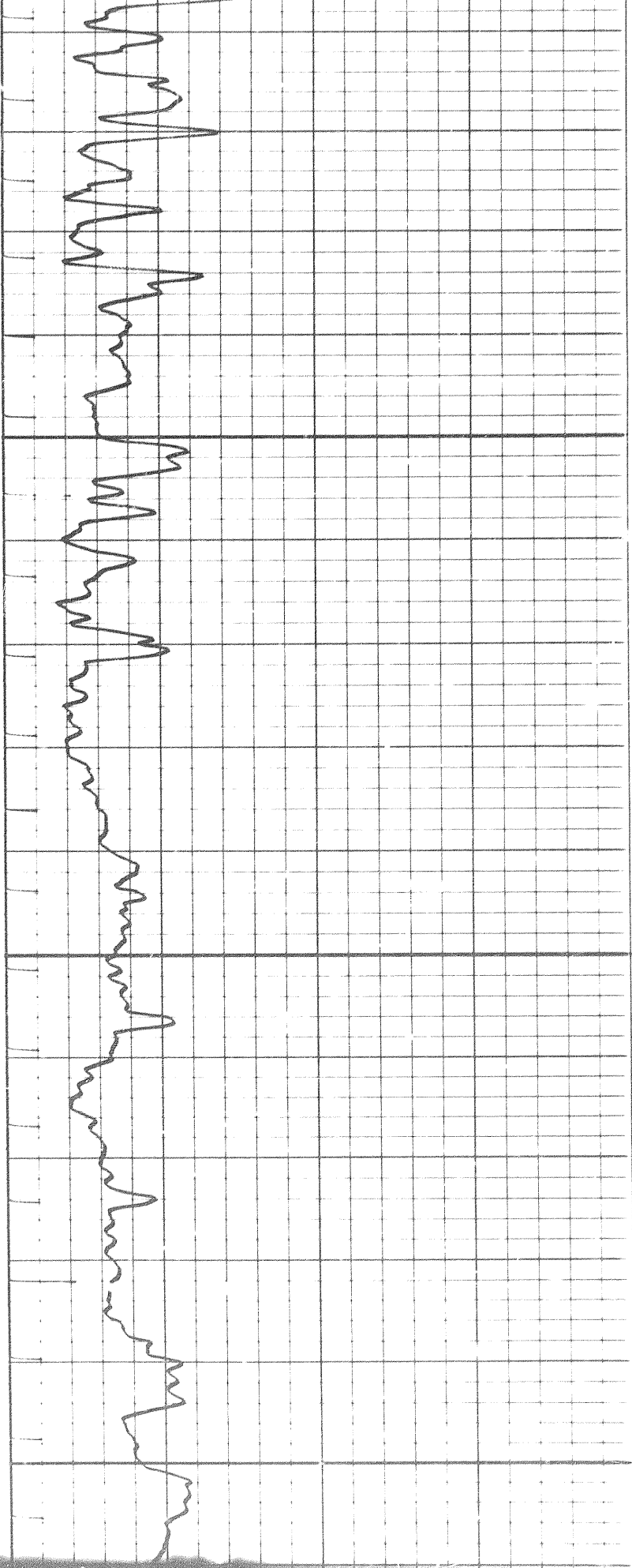
28 of





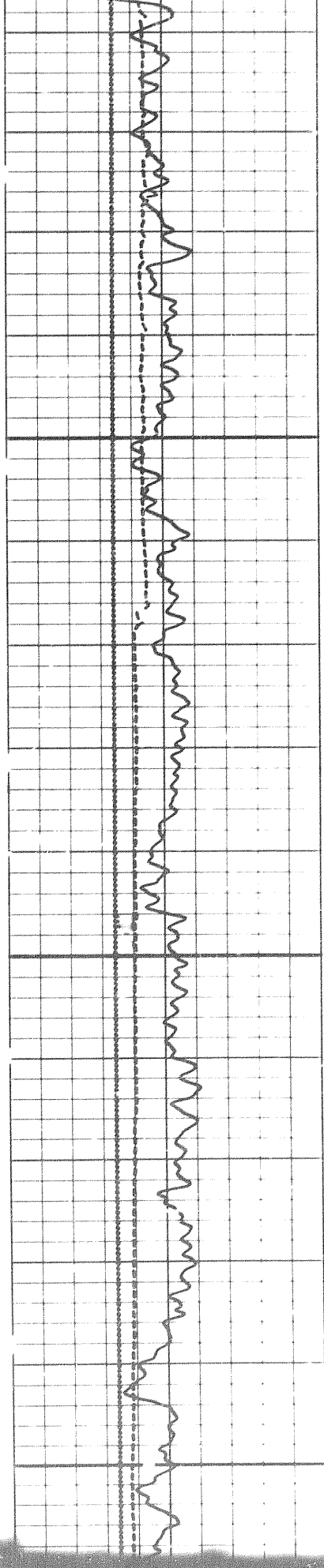
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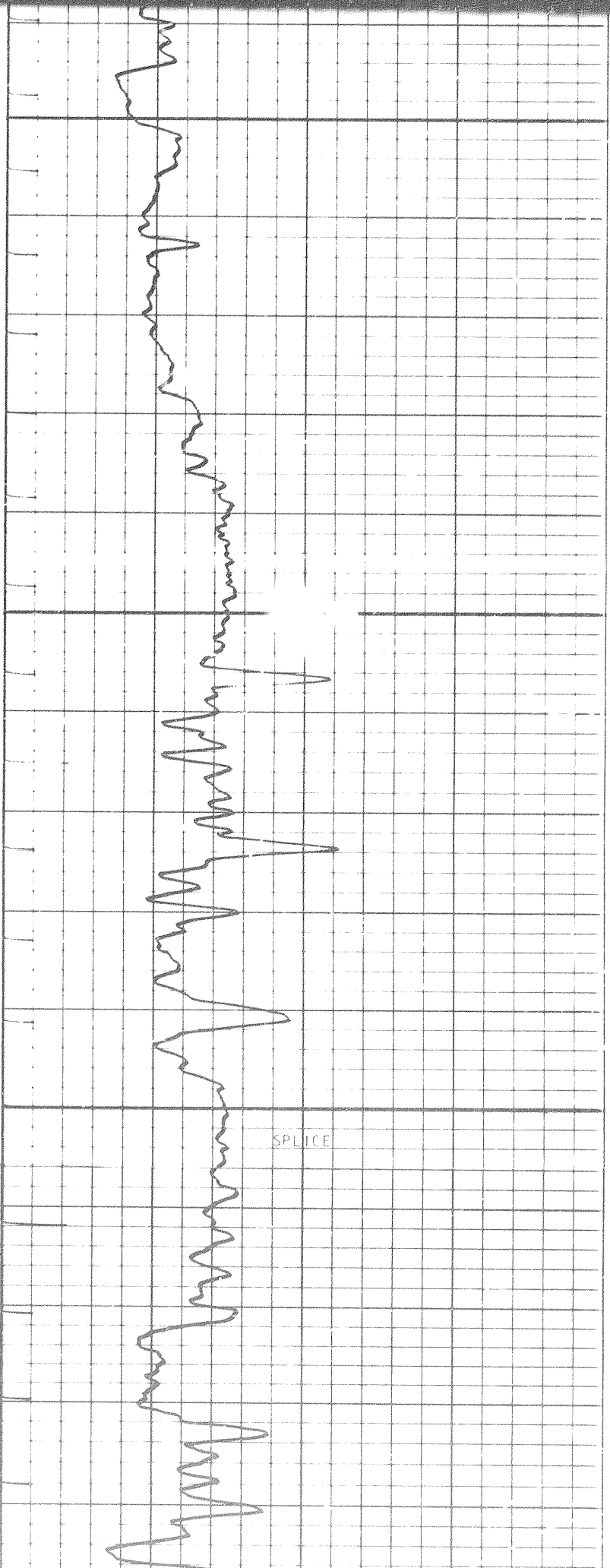


3350

3400



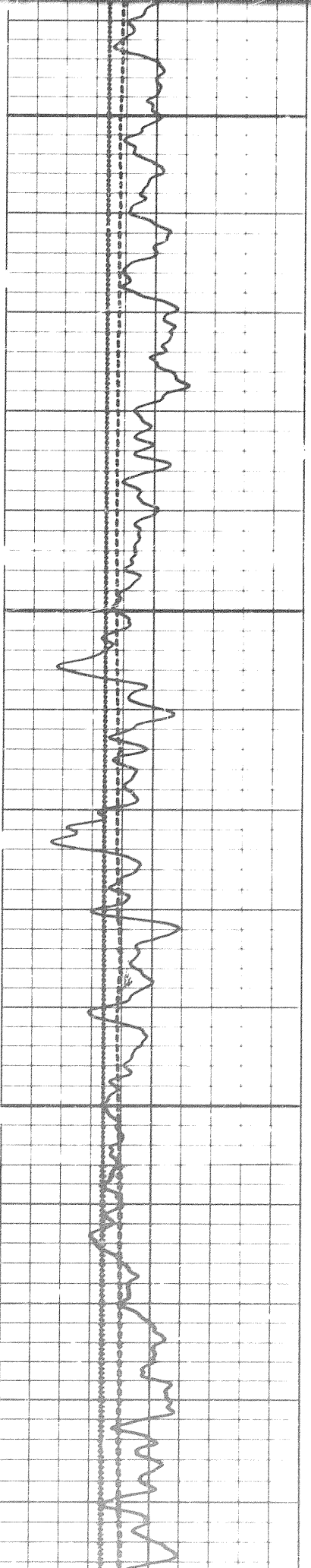
29 of



SPLICE

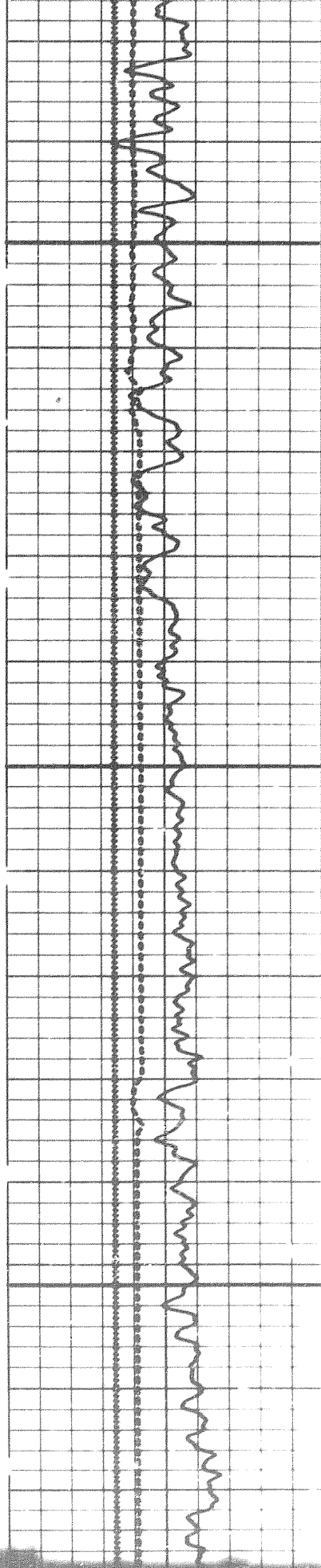
3400

3450

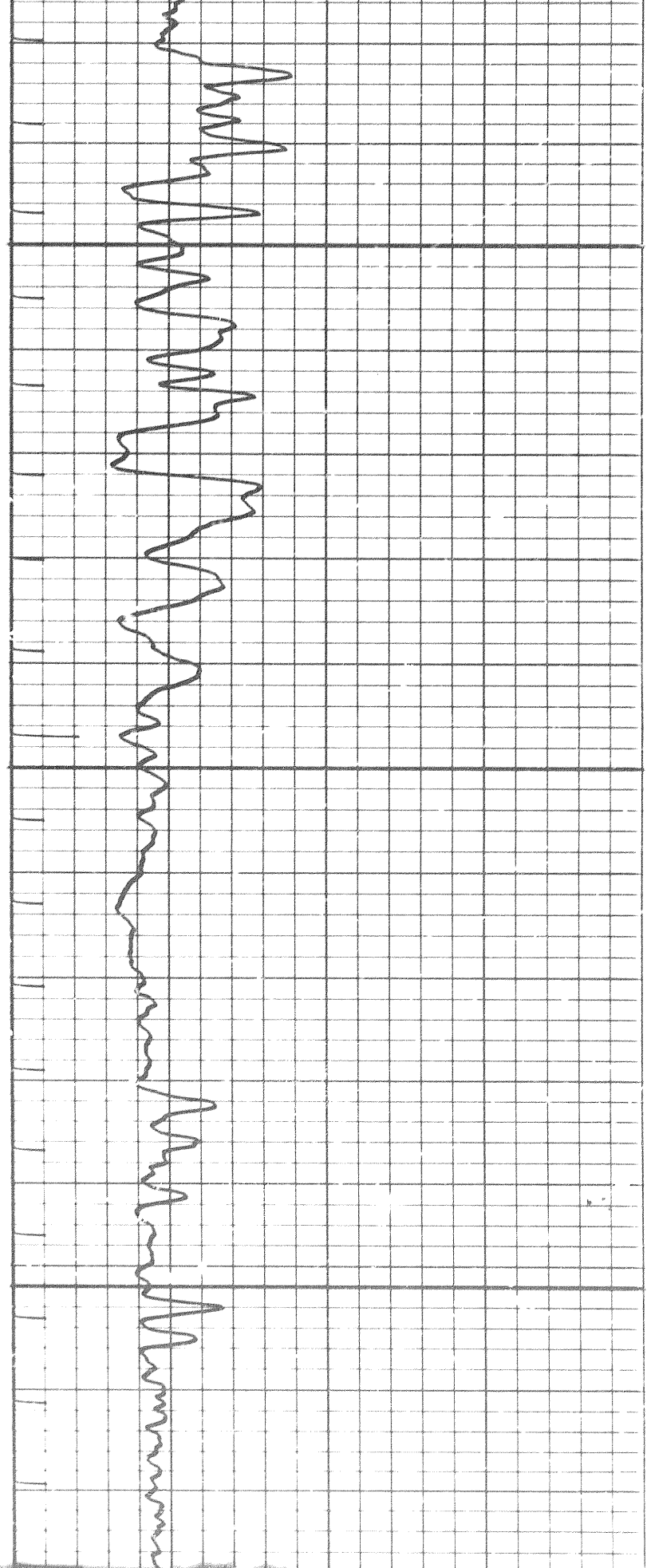


34

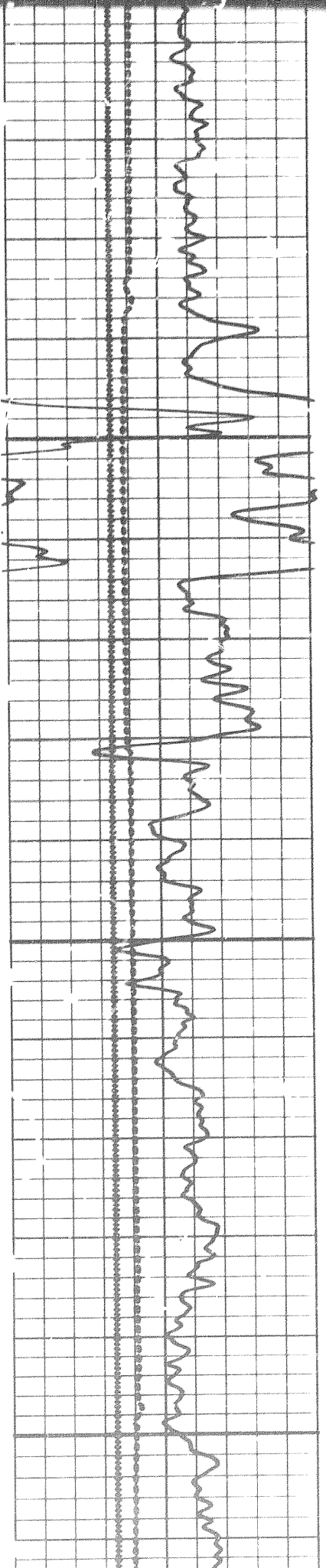
304



3570

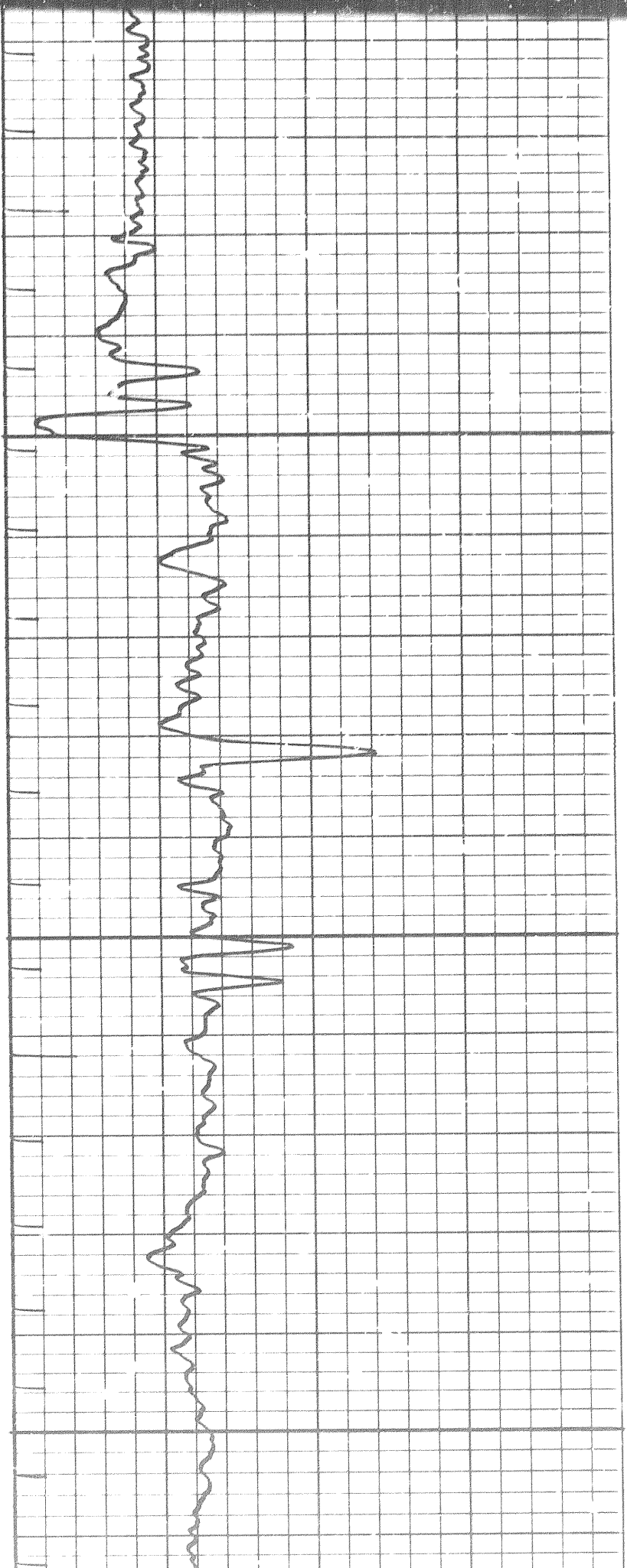




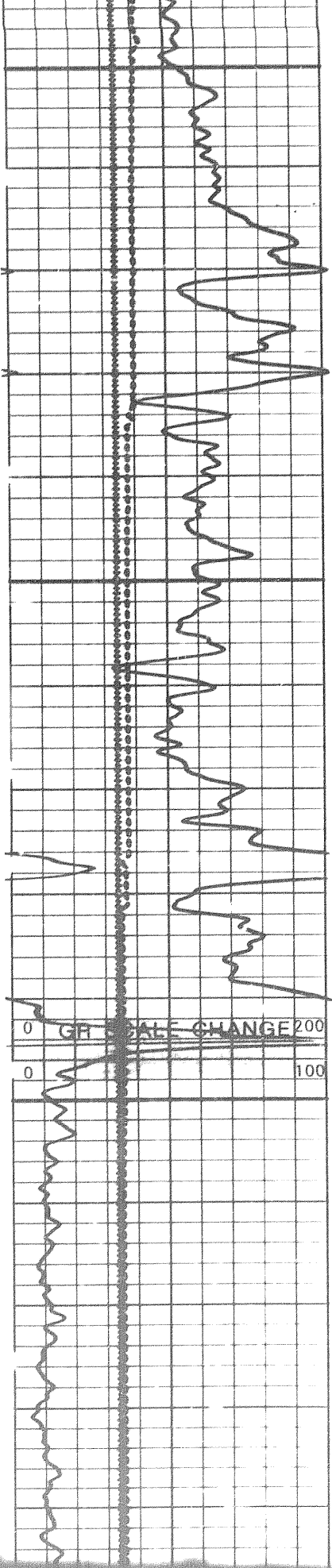


3550

3600

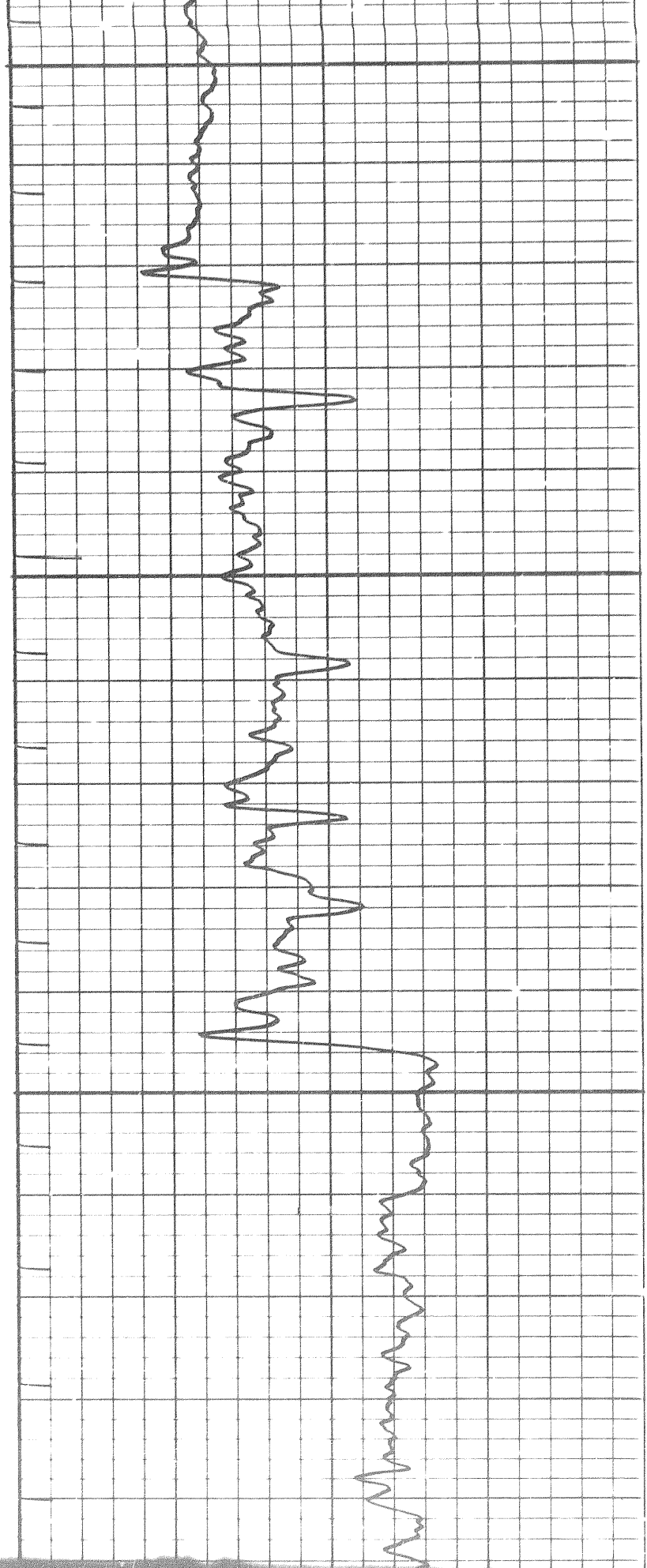


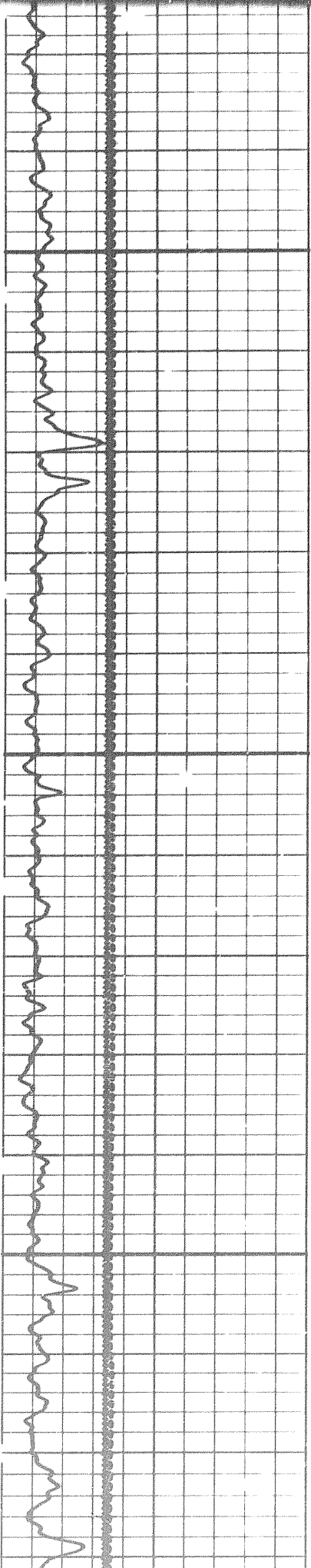
3104



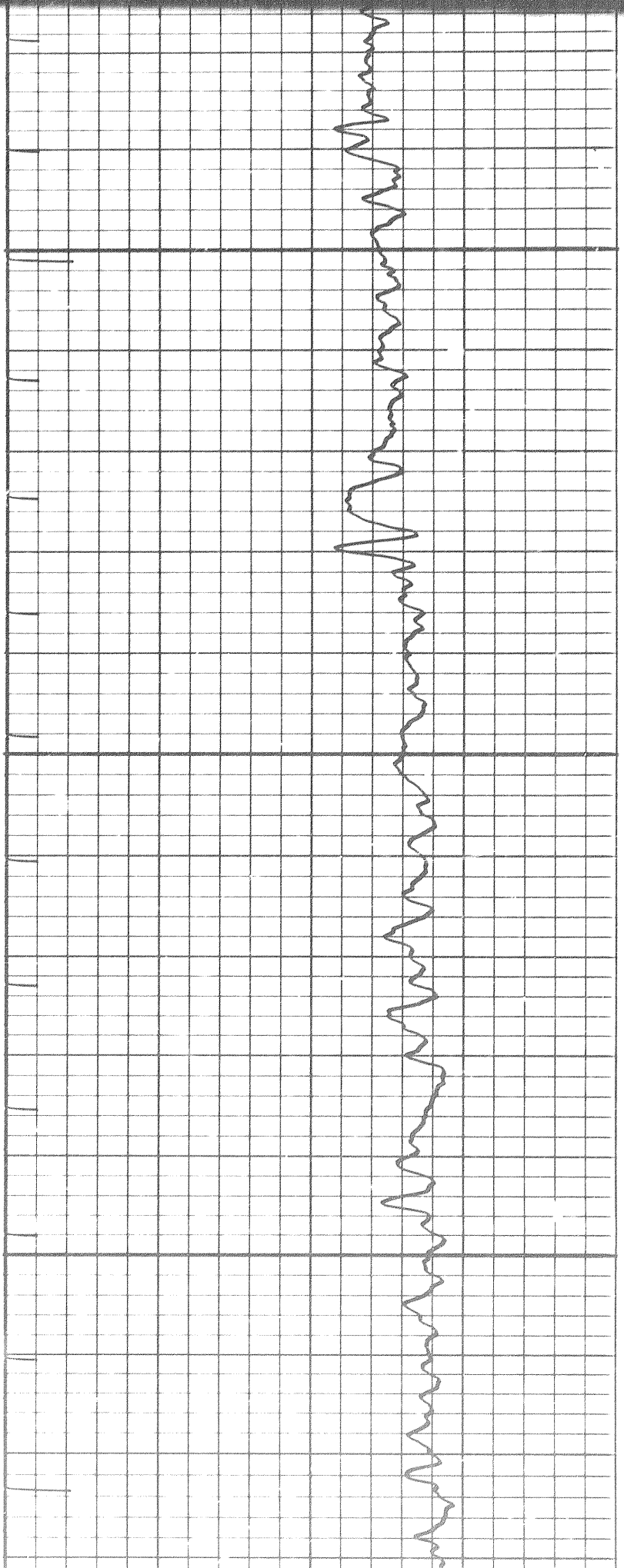
3600

3650

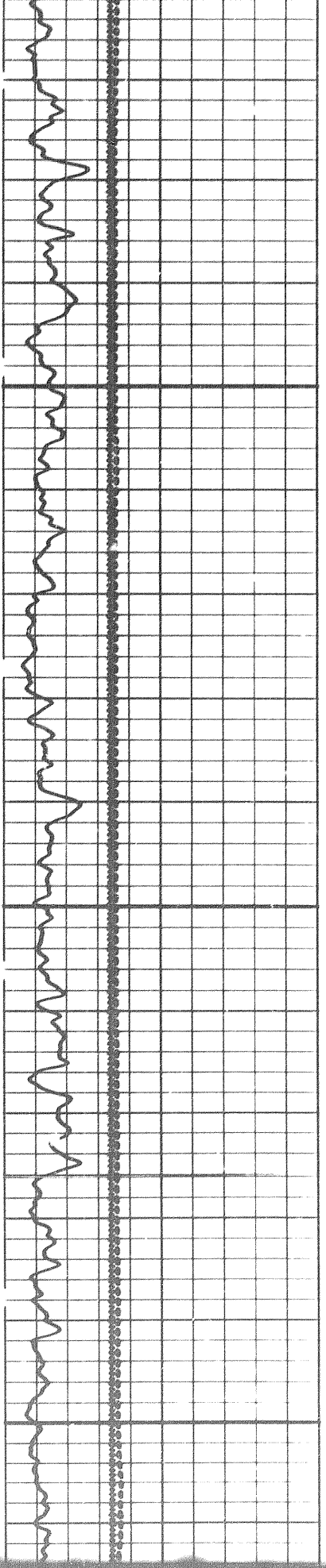




3700

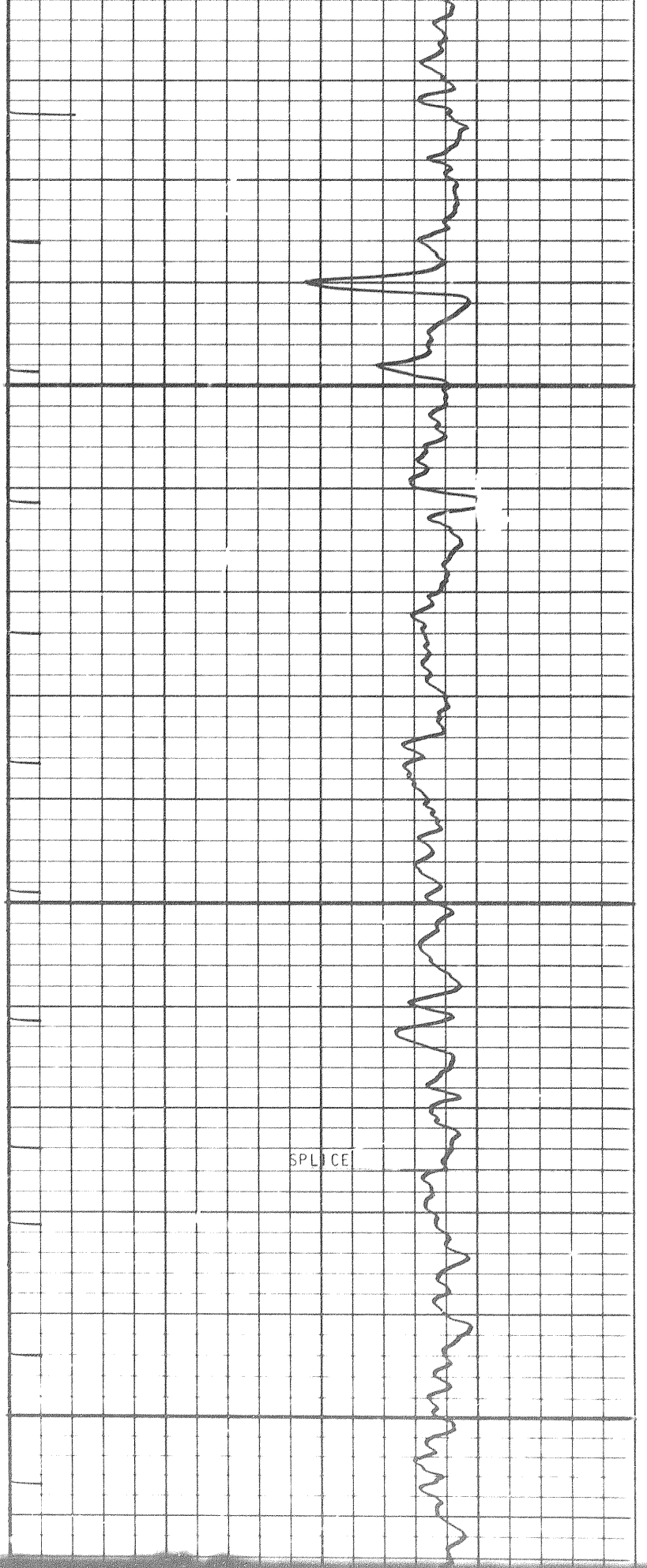


3204

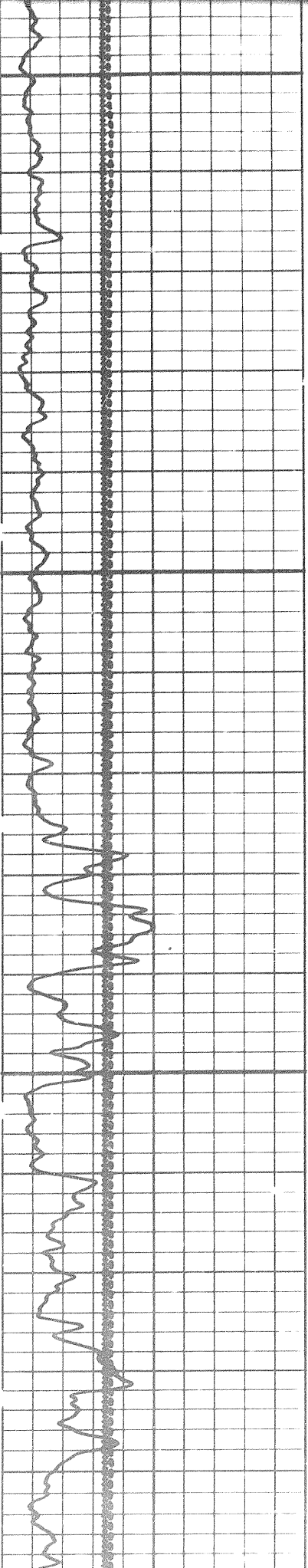


3750

3800

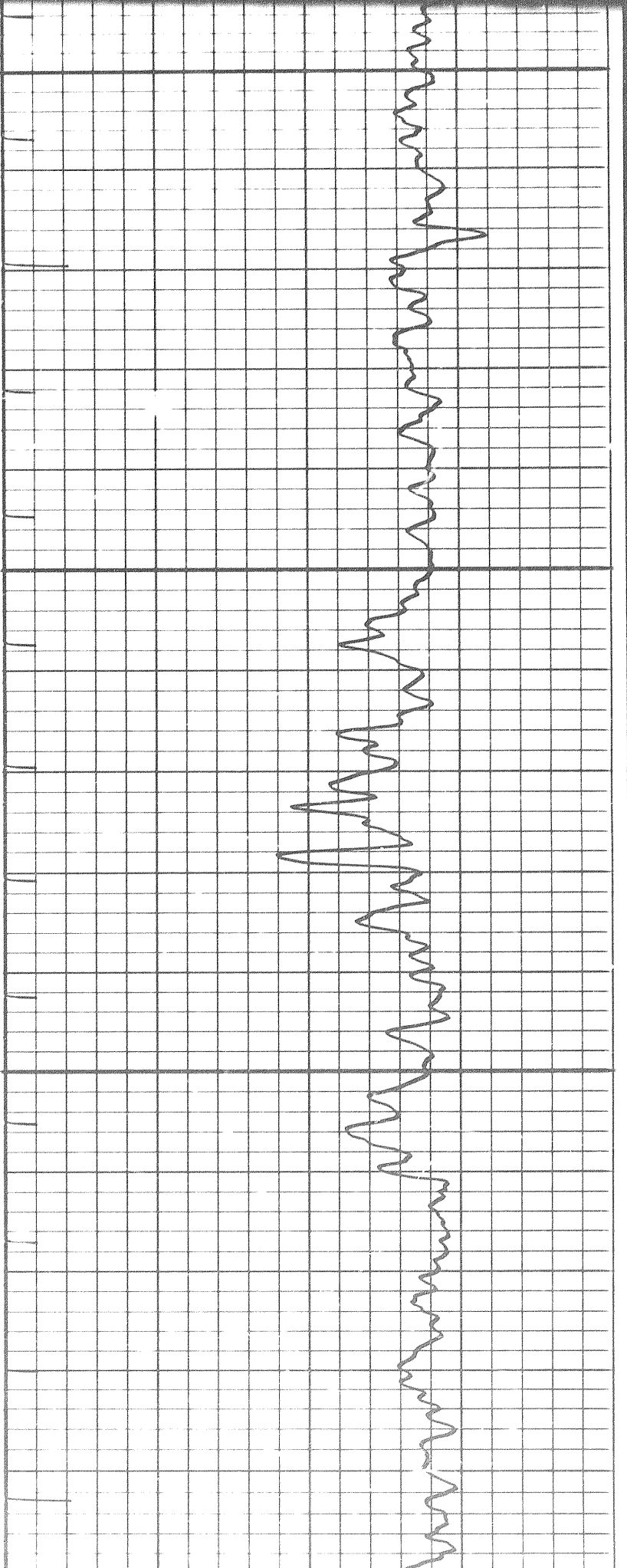


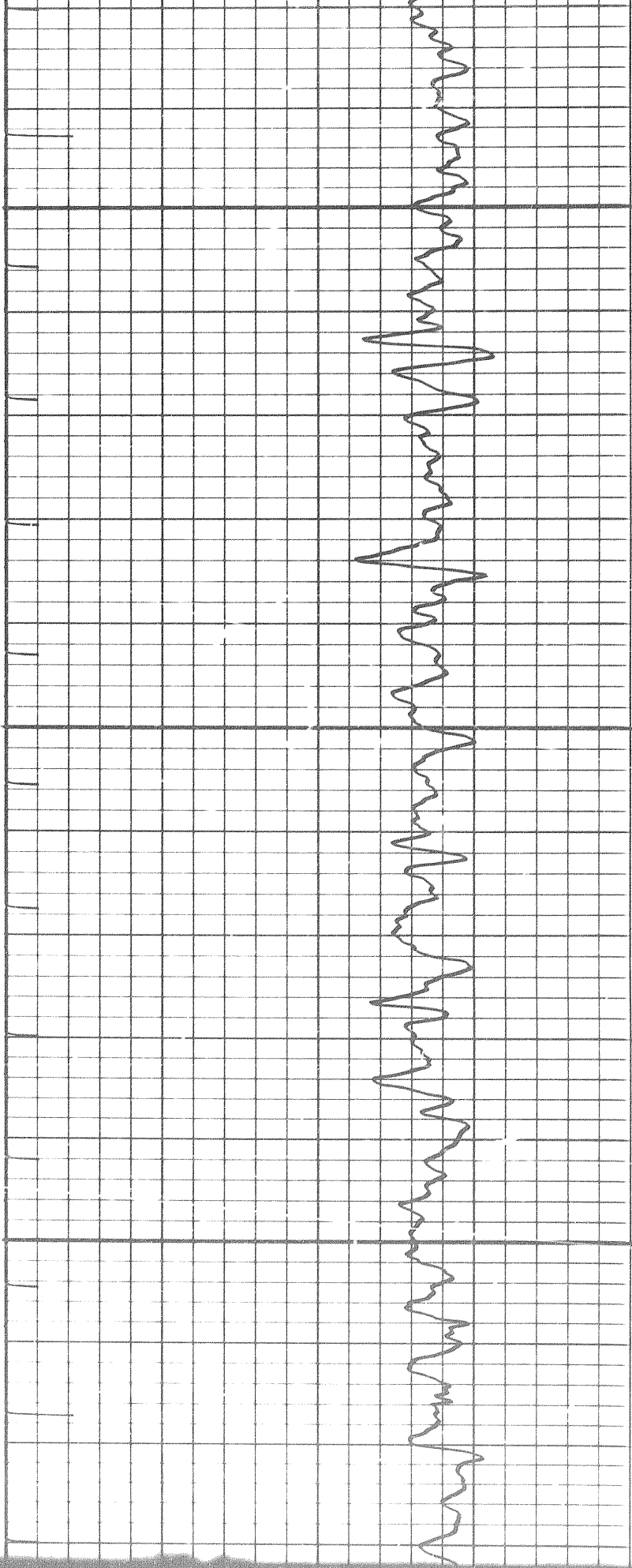
SPLICE



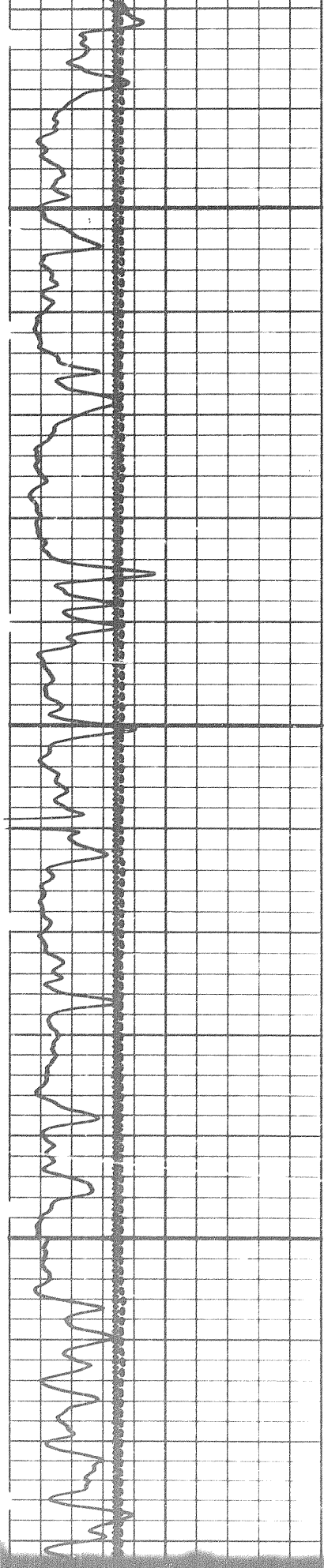
3800

3850

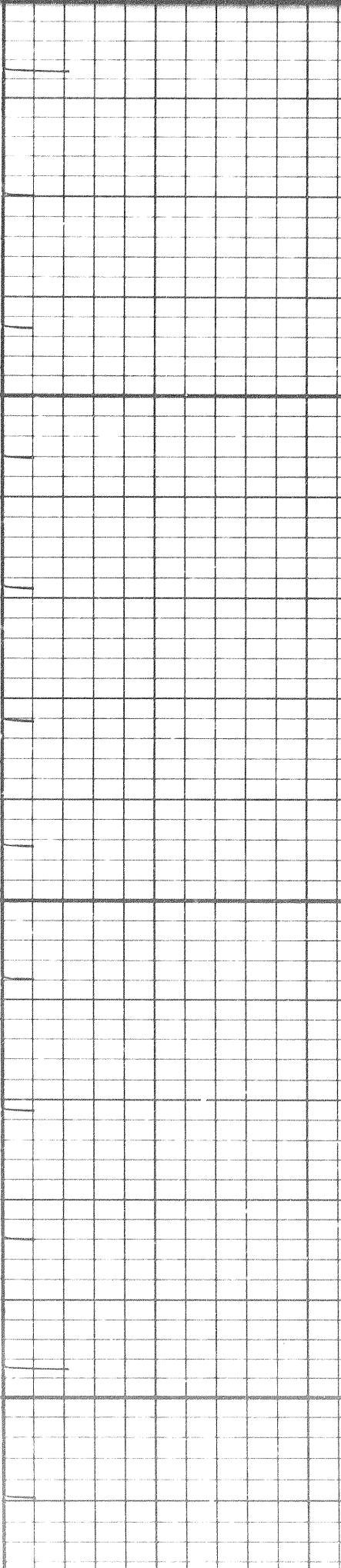
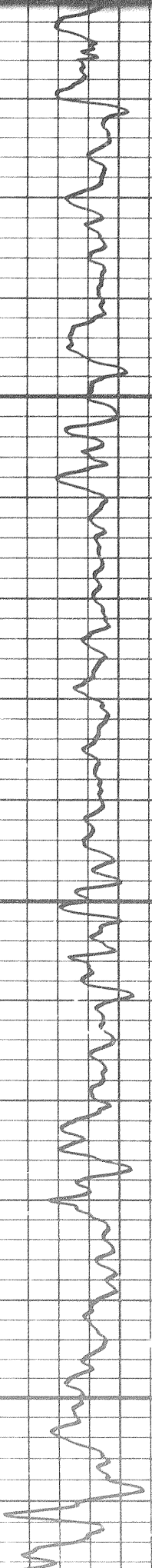




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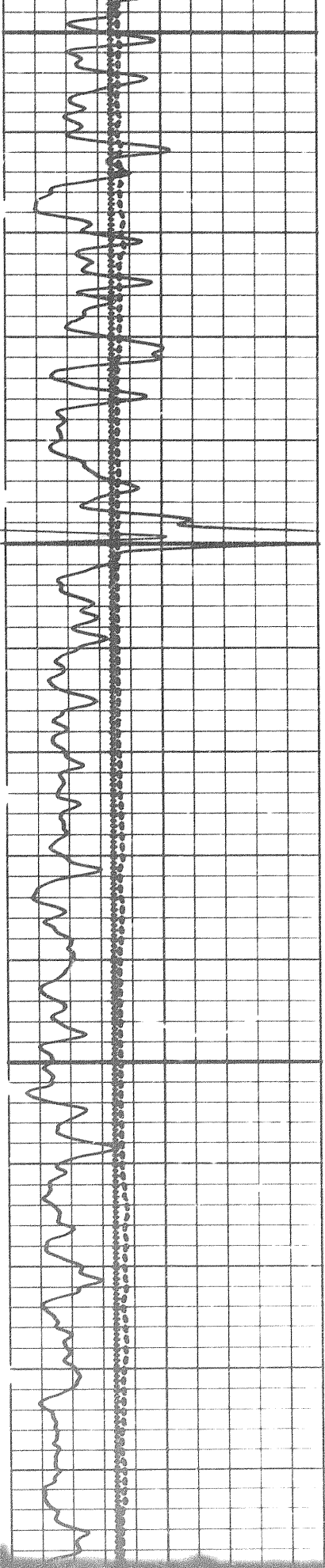
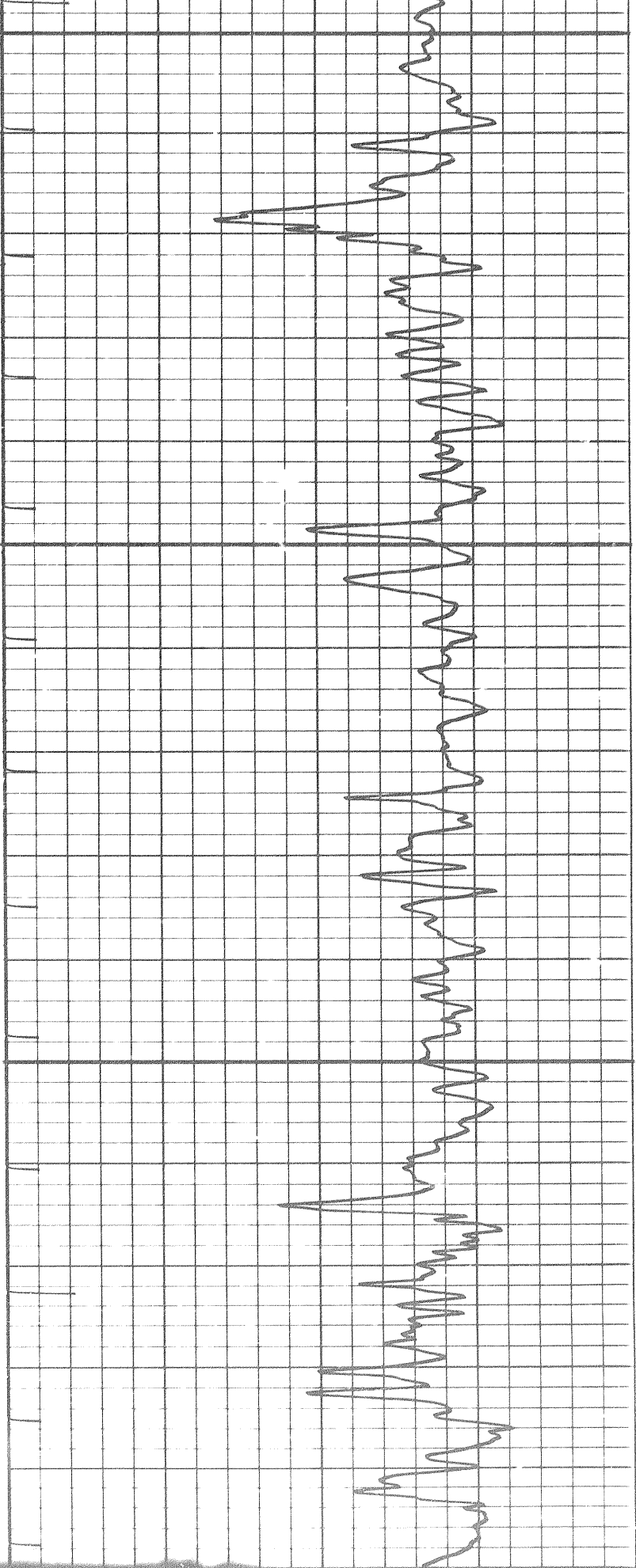


334



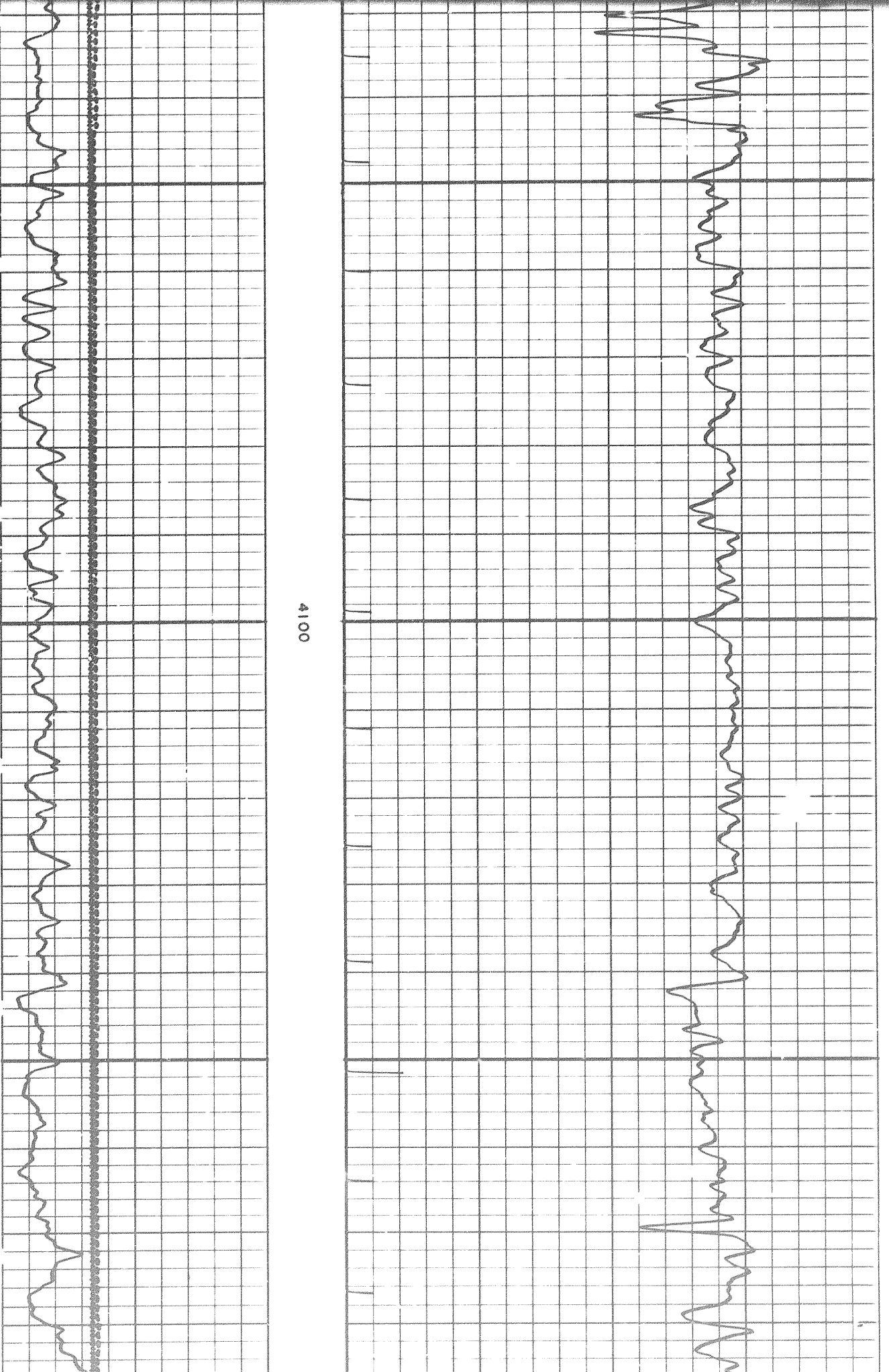
3950

4000



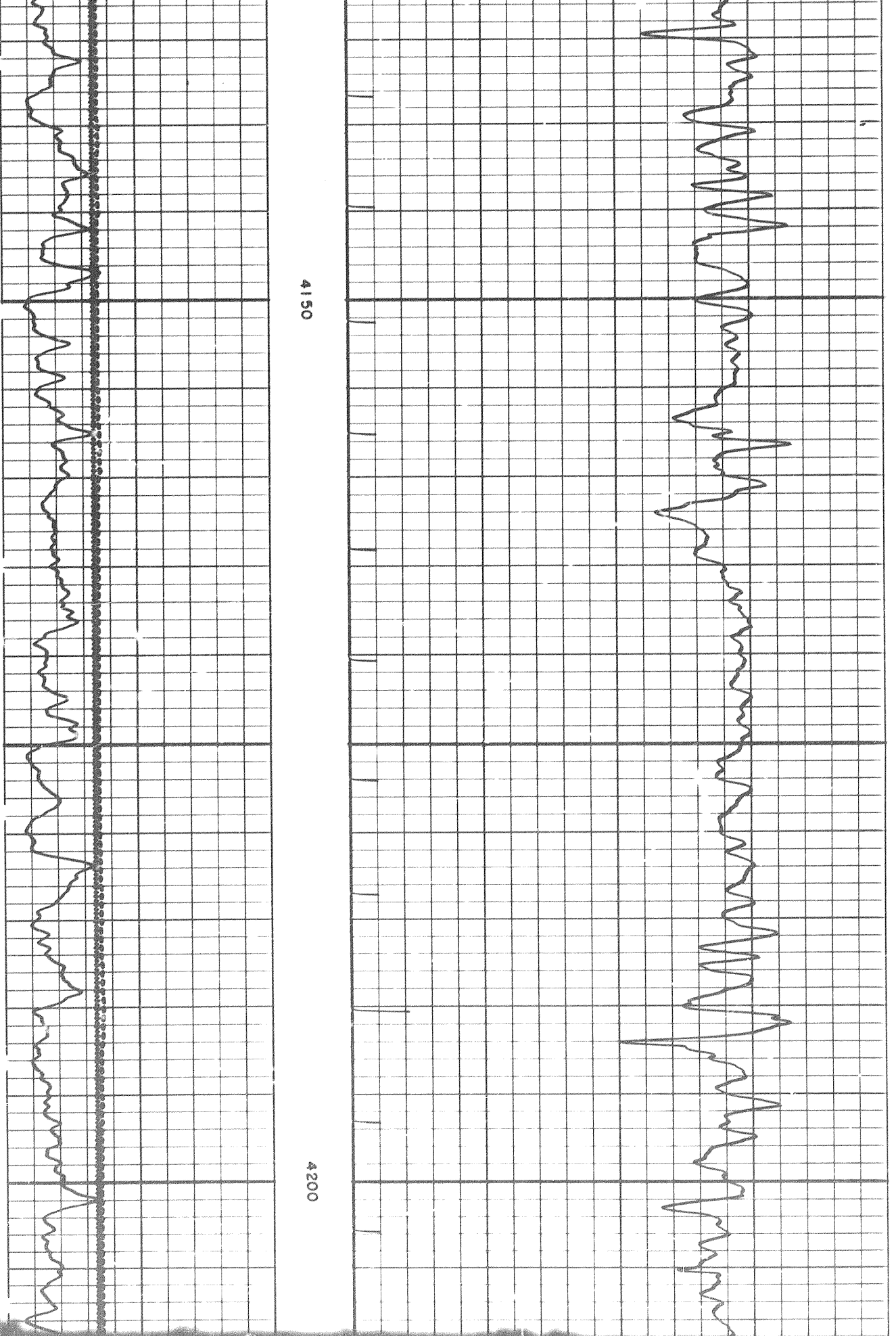
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4100

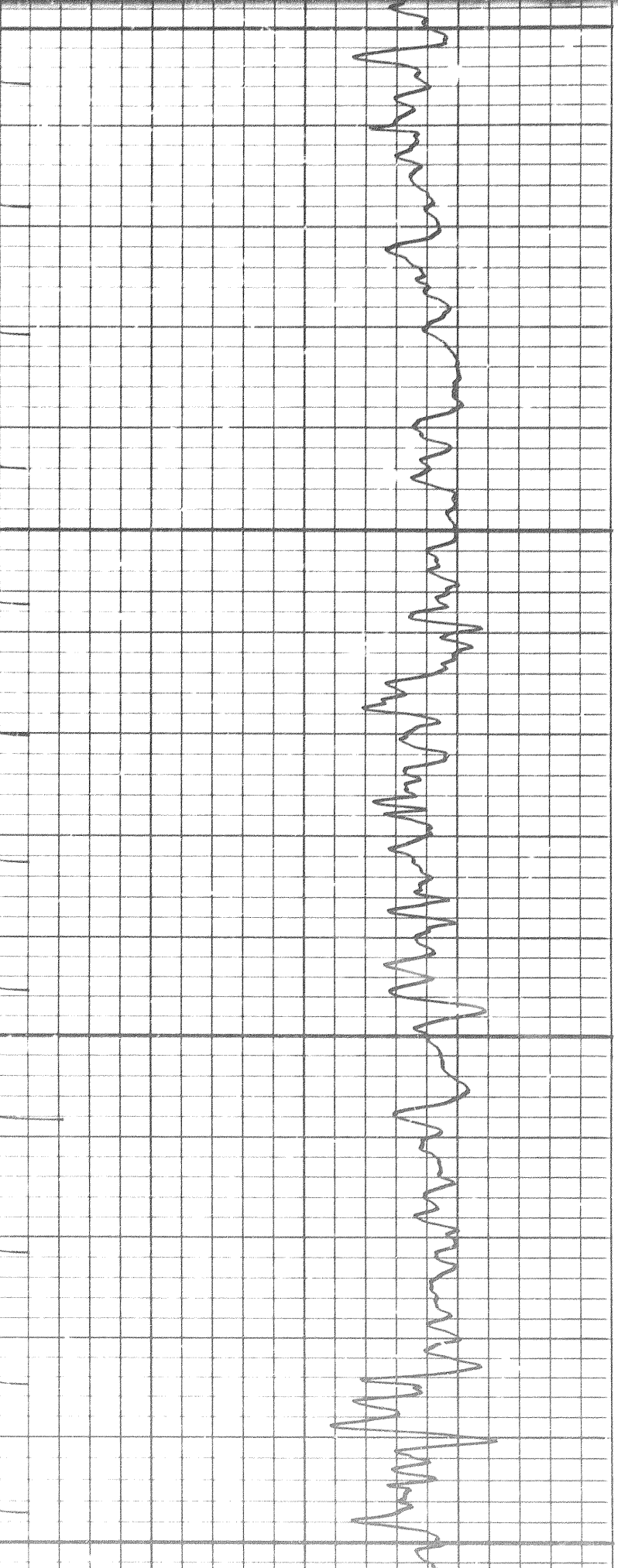
24



4150

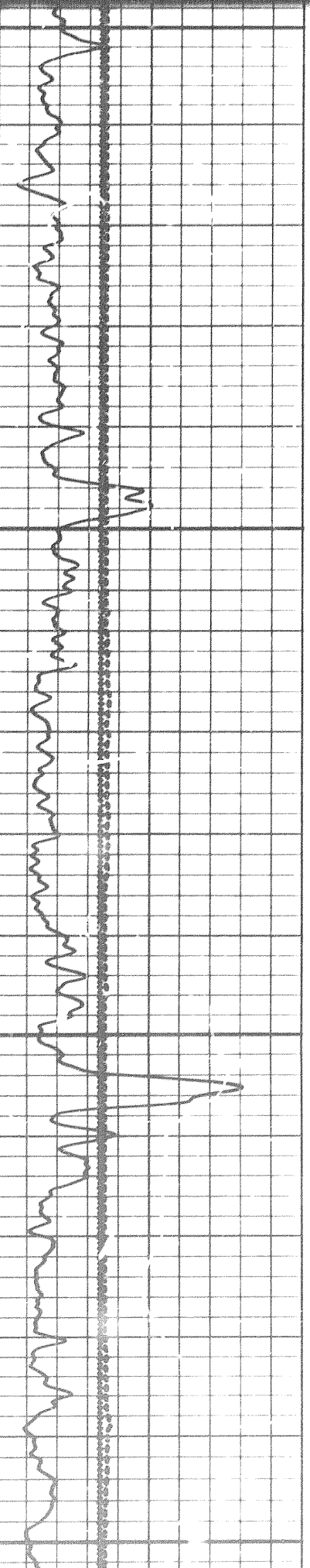
4200

354

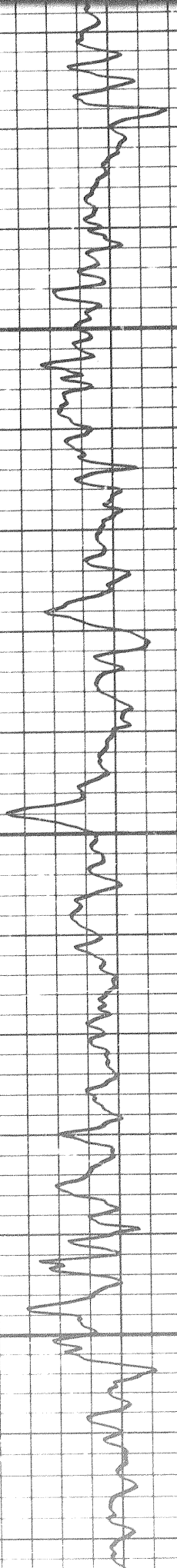


4200

4250

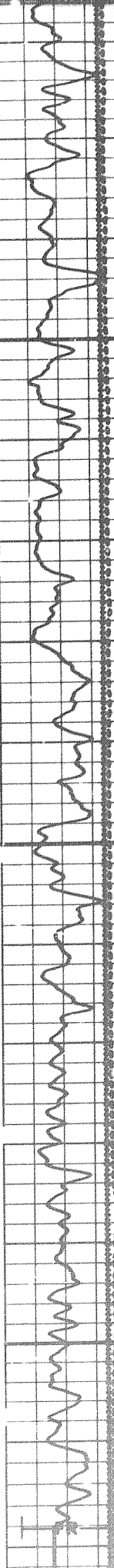


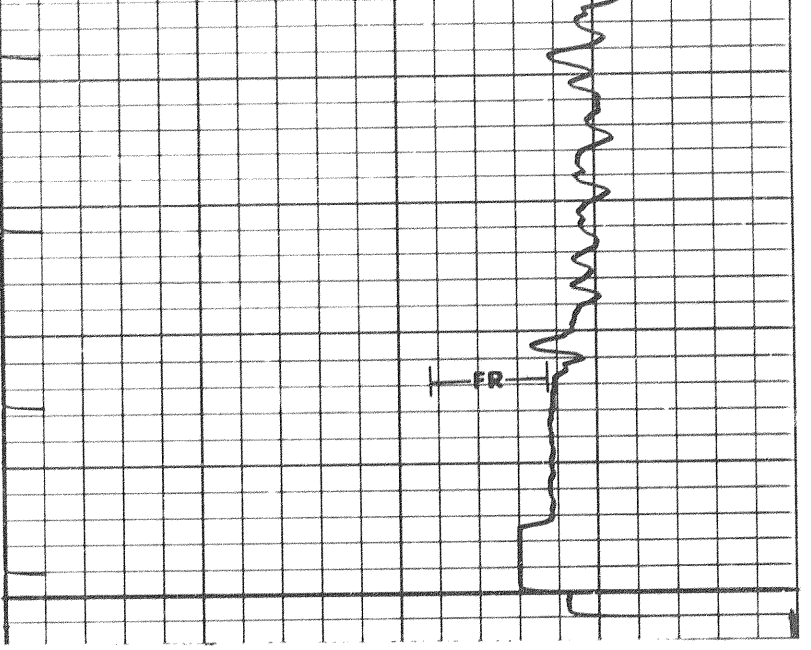
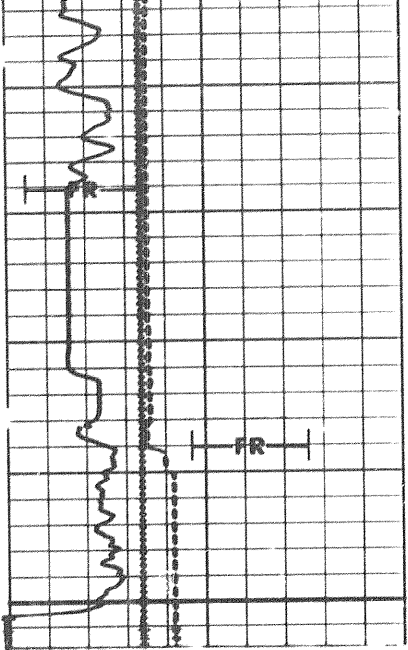




4350

4400

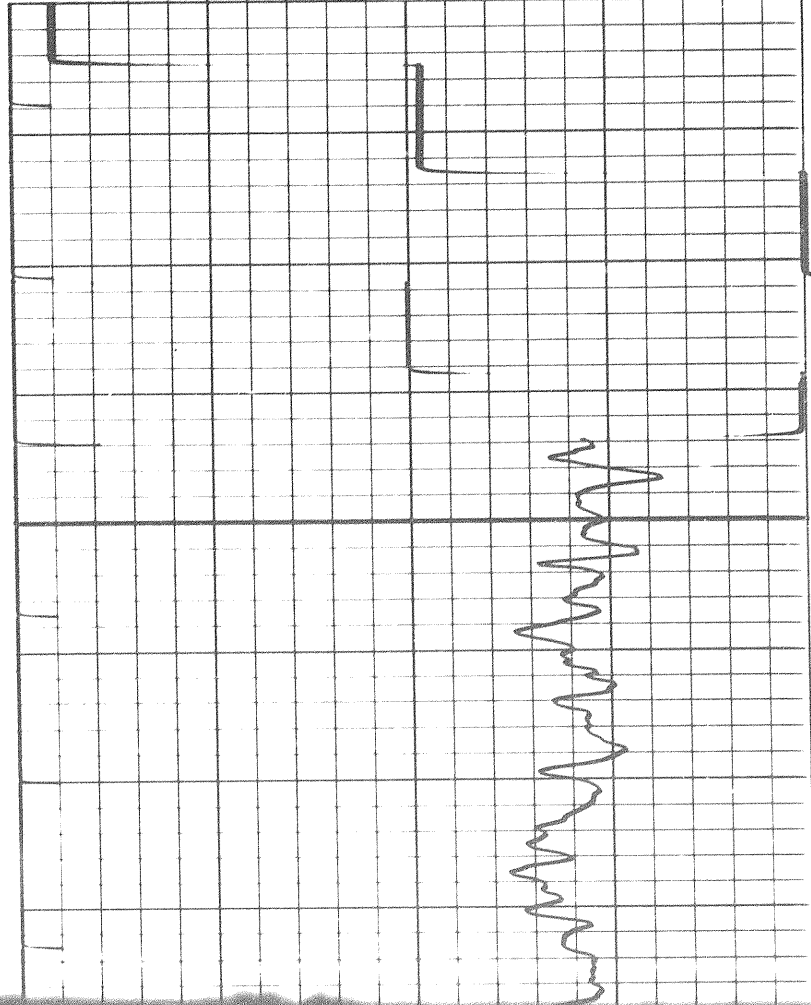
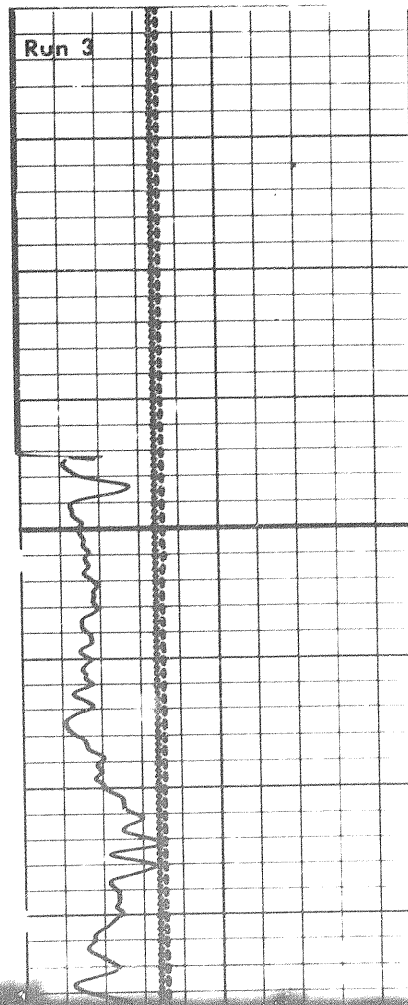




REPEAT SECTION

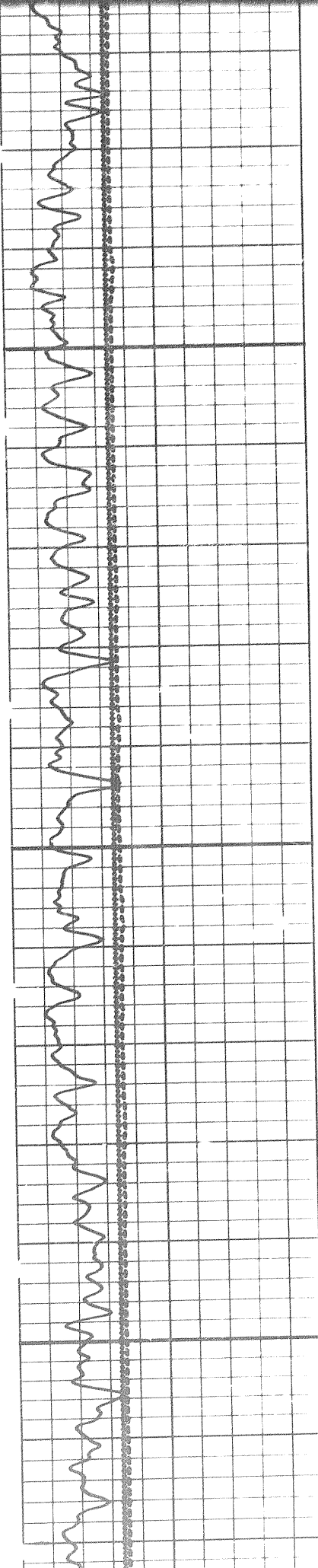
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X3000

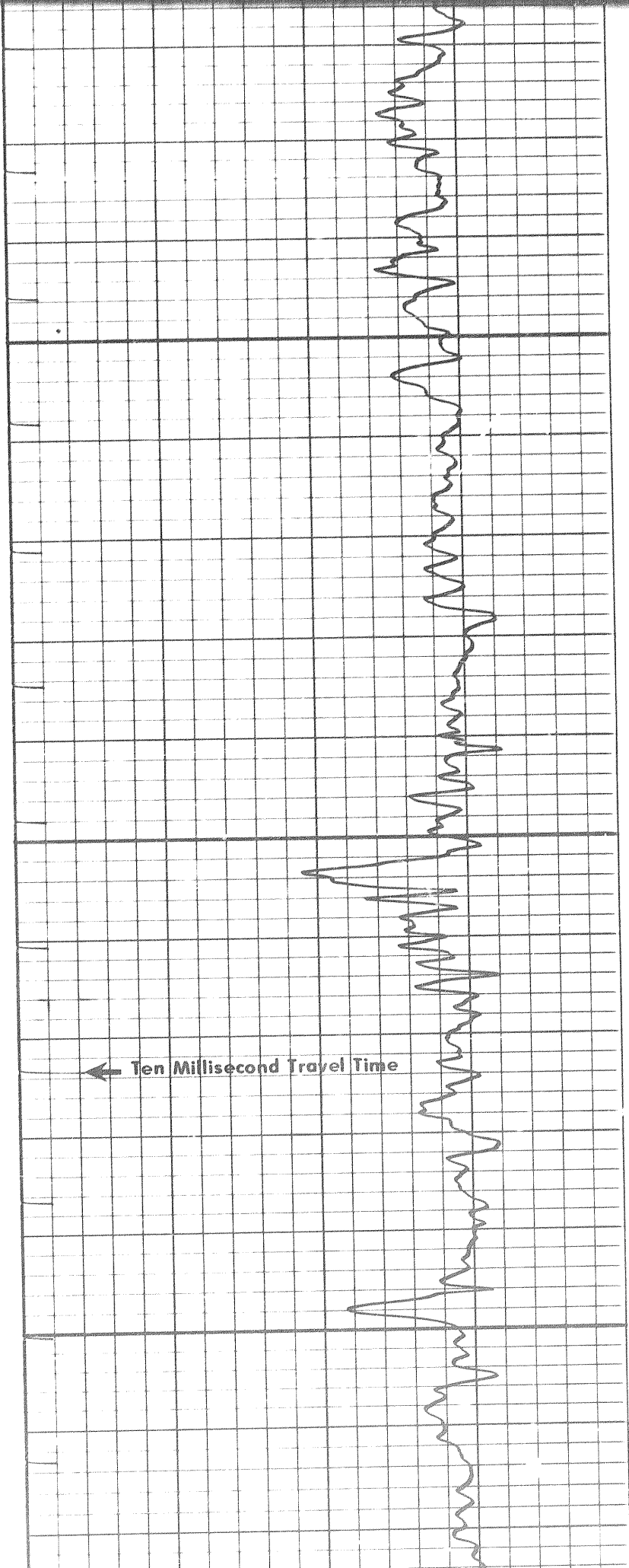


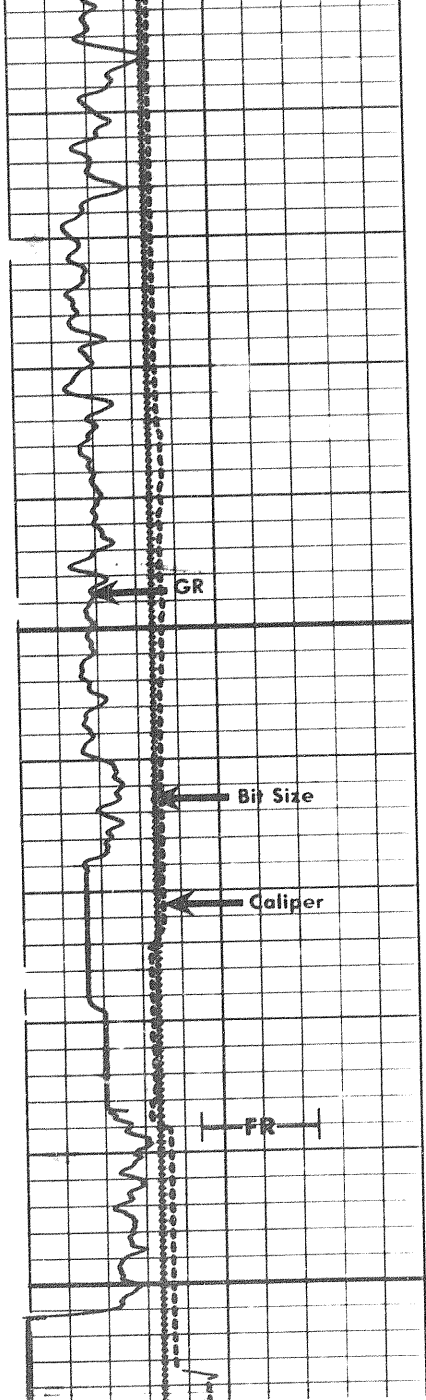
4300

374

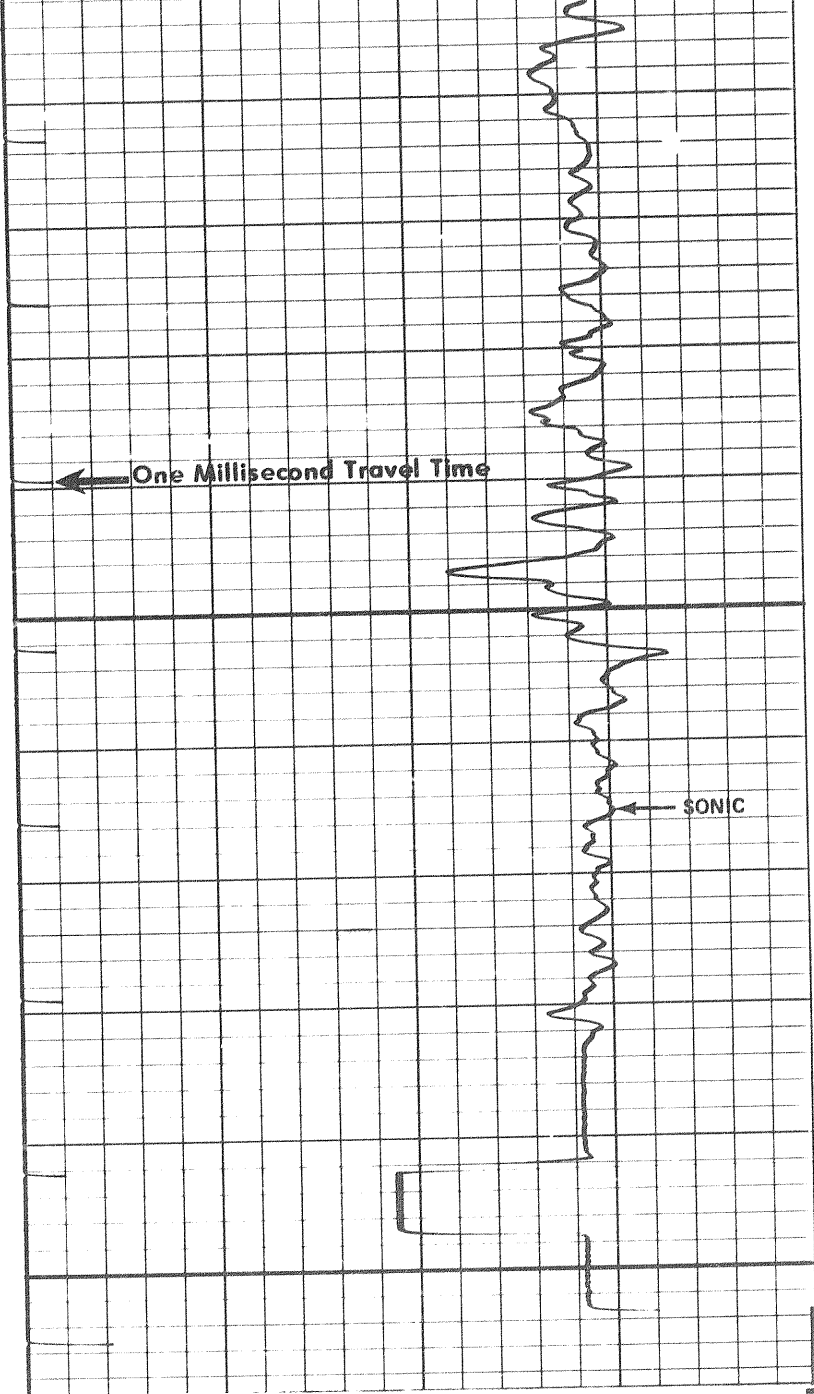


4350





4400



**GAMMA RAY**

activity  
API units

T.C. AUTO

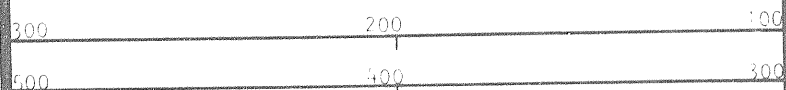
Zero 0 div. to left



**CALIPER**

hole diameter  
mm

125 250 375

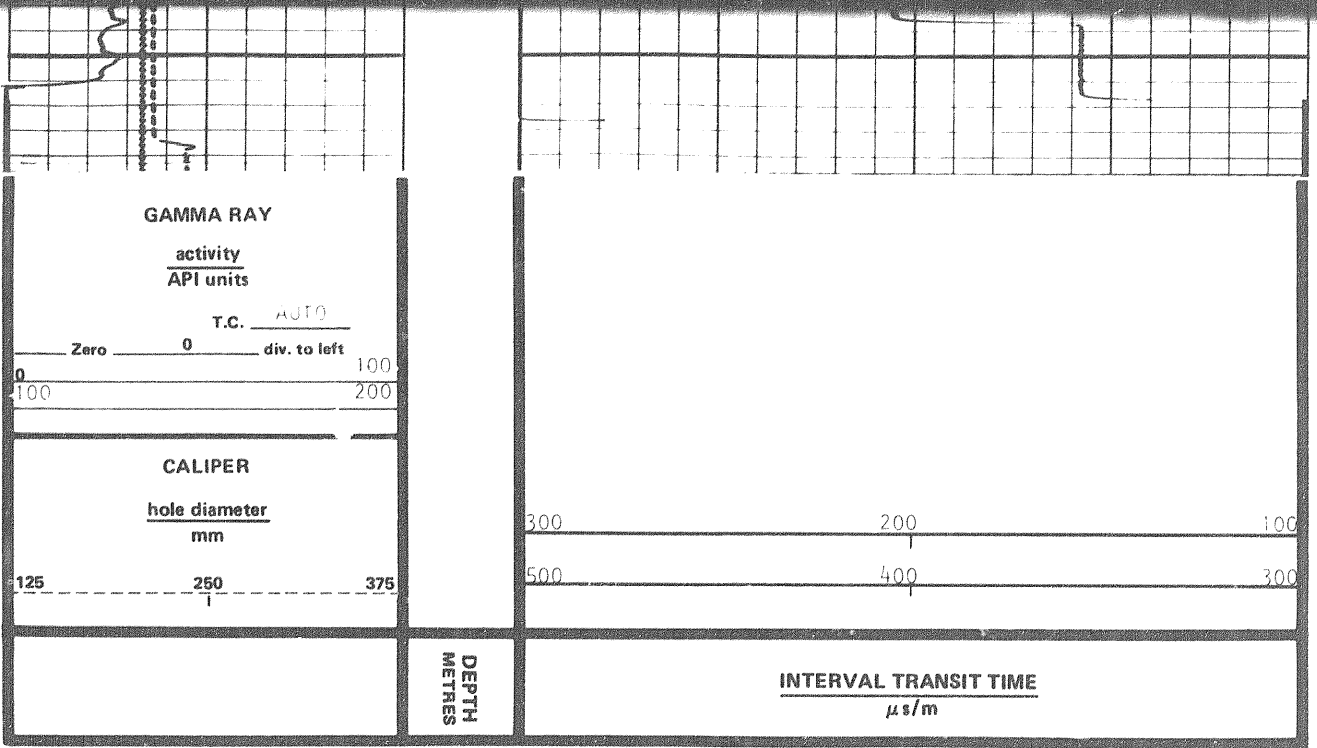


DEPTH  
METRES

INTERVAL TRANSIT TIME  
 $\mu\text{s}/\text{m}$

384

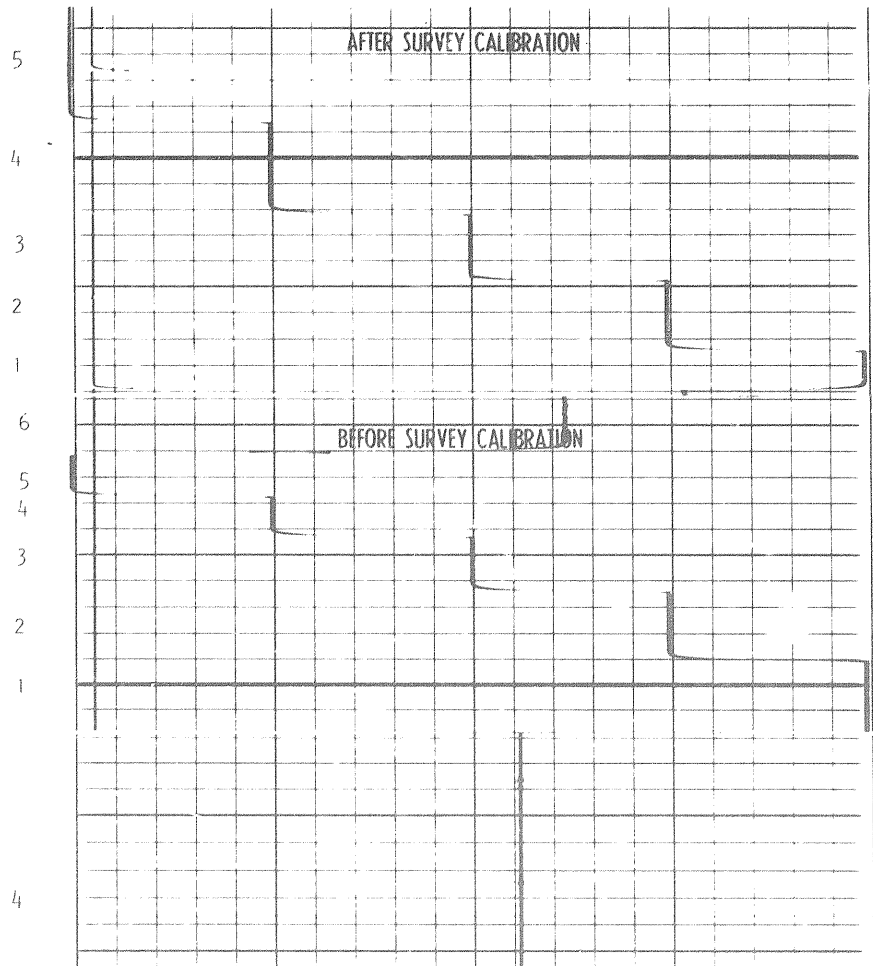
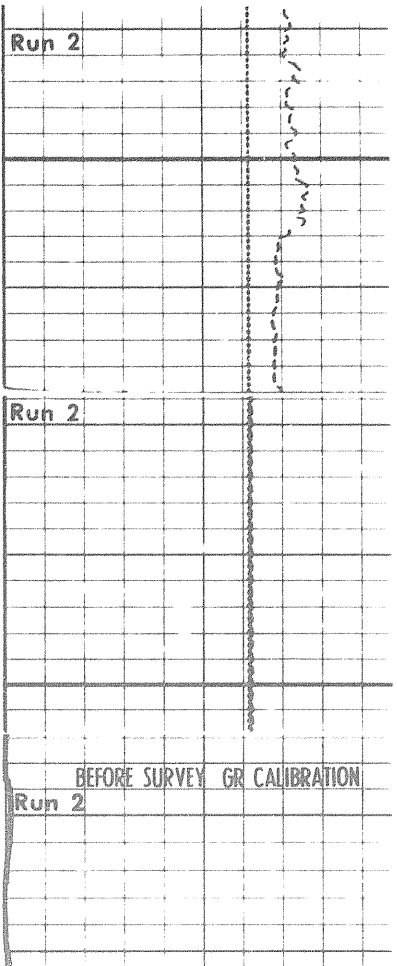


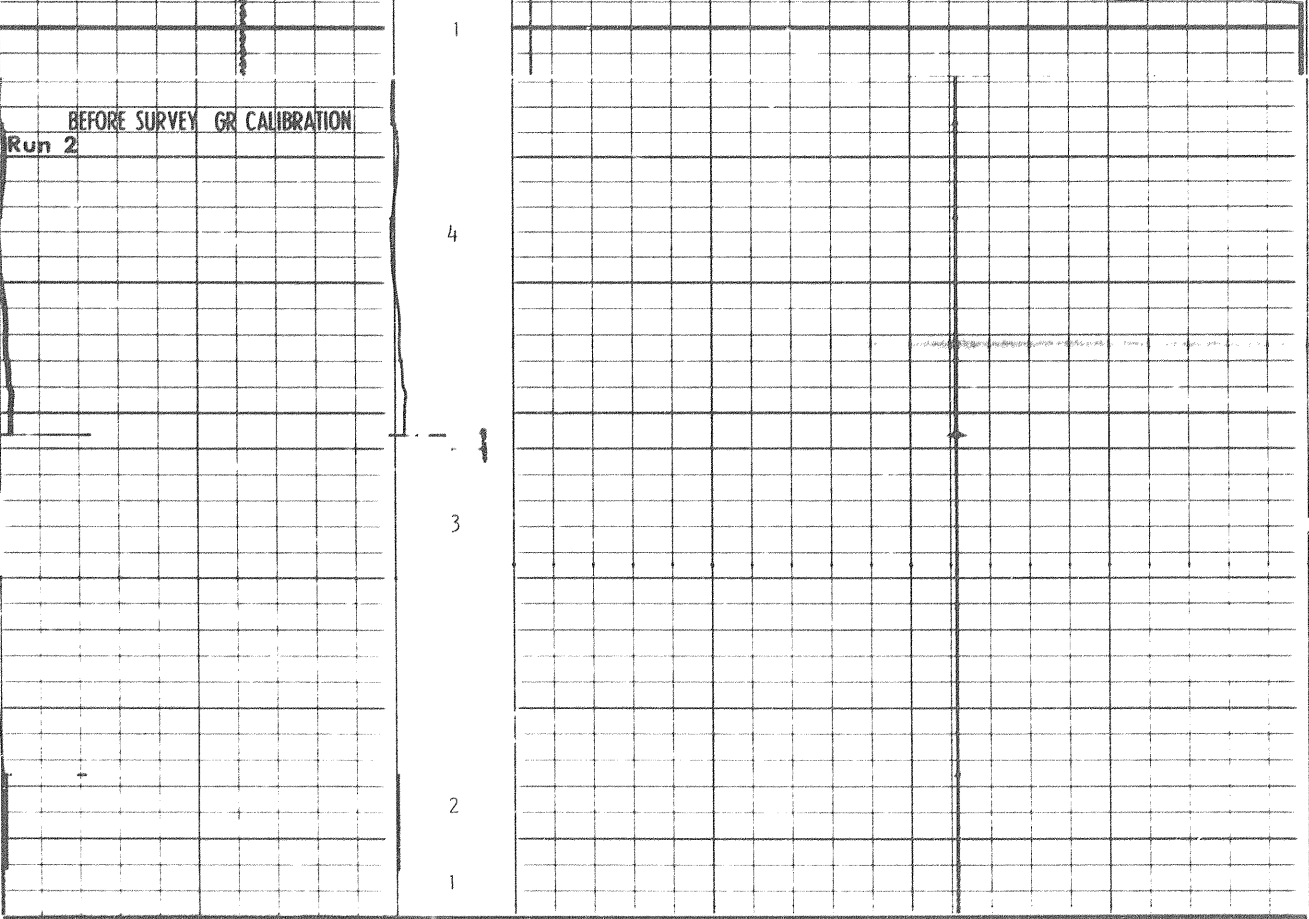


**CALIBRATION RECORD**

↓

X20006





**BOREHOLE COMPENSATED SONIC CALIBRATION CODING**

- 1. MECHANICAL ZERO
- 2. 100  $\mu$ s/m
- 3. 200  $\mu$ s/m
- 4. 300  $\mu$ s/m
- 5. 400  $\mu$ s/m
- 6. 500  $\mu$ s/m

**GAMMA RAY CALIBRATION CODING**

- 1. MECHANICAL ZERO
- 2. ELECTRICAL ZERO
- 3. RECORDER SENSITIVITY
- 4. MEMORIZER SENSITIVITY
- 5. BACKGROUND
- 6. CALIBRATION

**CALIPER CALIBRATION CODING**

- 1. MECHANICAL ZERO CALIPER
- 2. 203 mm RING
- 3. 305 mm RING

COMPANY COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

WELL COLUMBIA EL AL KOSHEELEE T1-1-18

FIELD WILDGAT

PROVINCE Y. KON. TERRITORY

SCHL. FR 4419.0 m

SCHL. TD 4420.0 m

DRLR. TD 4430.0 m

Elev.: KB 434.95 m

DF         m

GL 437.0 m

X2000C

39439