

Schlumberger

COMPENSATED NEUTRON-FORMATION DENSITY

SIMULTANEOUS

PROVINCE: YUKON TERRITORY
 FIELD: WILDCAT
 WELL: COLUMBIA GAS ET AL KJTANEELEE YT
 COMPANY: COLUMBIA GAS DEVELOPMENT OF CANADA LTD.

PROVINCE: YUKON TERRITORY
 FIELD: WILDCAT
 WELL: COLUMBIA GAS ET AL KJTANEELEE YT
 LOCATION: 60° 07' 16" N LAT
 124° 06' 03" W LONG
 Permanent Datum: G1 Elev: 2225
 Log Measured From: ASB 25 Ft Above Perm. Datum
 Other Services: DEL-GR, RUC, WF, MDL, HDI, TLL, JCS
 ELEV. MD: 2250
 CL: 2225
 CR:

Date	14 OCT 77
Run No.	THREE
First Reading	1278
Last Reading	1838
Feet Measured	1942
Depth Reached	12781
Bottom Driller	12789
Csg. SOC	1836
Csg. Driller	185
Mud Nature	KCC
Sp. Grav.	1.11
Visc.	3
Mud pH	11
Water Loss	15
Res	0.005
Ref	1.76
• BHT	37
• Prec	326
• ppm-Cl	52
BH Size	8 1/2
Equipment Type	CNT-A, PGT-E
Op. Rig Time	6 HRS
Truck No.	GSN-C-339 - PPG-1
Recorded By	SUNDQUIST
Witness	LANE

14 NOVEMBER 77 CAL CP
 REMARKS: LOG TAPED. 1st Run Service Order #: 12456
 Drilling Stopped 1715 / 13th ; Circulation Stopped 2130 / 13th ; Tool on Bottom 0730 / 14th ; B.H.T. -

EQUIPMENT DATA							
Run No.	CNP	CNC	CNB	NCS	SGC	CAL	Density Spg. Used
THREE	AB 17	A 569	A 162	T 112	-	-	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No

EQUIPMENT DATA									
Run No.	PGP	PGH	PGS	PDH	GSR	PND	NSR	SFT-116	SFT-106
THREE	EA 188	A 1173	E 257	D 334	B 2470	-	-	-	326

CALIBRATION DATA							
Run No.	Gamma Ray			CNL - Before Log - ACPS		CNL - After Log - ACPS	
	API Scale	Background CPS	Total CPS	Long Spacing	Short Spacing	Long Spacing	Short Spacing
THREE	165	-	-	58	130	58	130

CALIBRATION DATA									
Run No.	Before Log - SNP - After Log				Before Log - FDC - After Log				
	Drawer-in	Drawer-out	Drawer-in	Drawer-out	P1	P2	P1	P2	
THREE	-	-	-	-	426	714	426	714	

LOGGING DATA									
Run No.	General		Speed Ft./Min.	Tc	Gamma Ray		Matrix	CNL Selectors	
	From	To			API Scale	Auto Hole Size Corr.		Hole Size Setting (If not auto)	Porosity Scale
THREE	1278	1838	3	2	0-15	LIMESTONE	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No		45-15-15

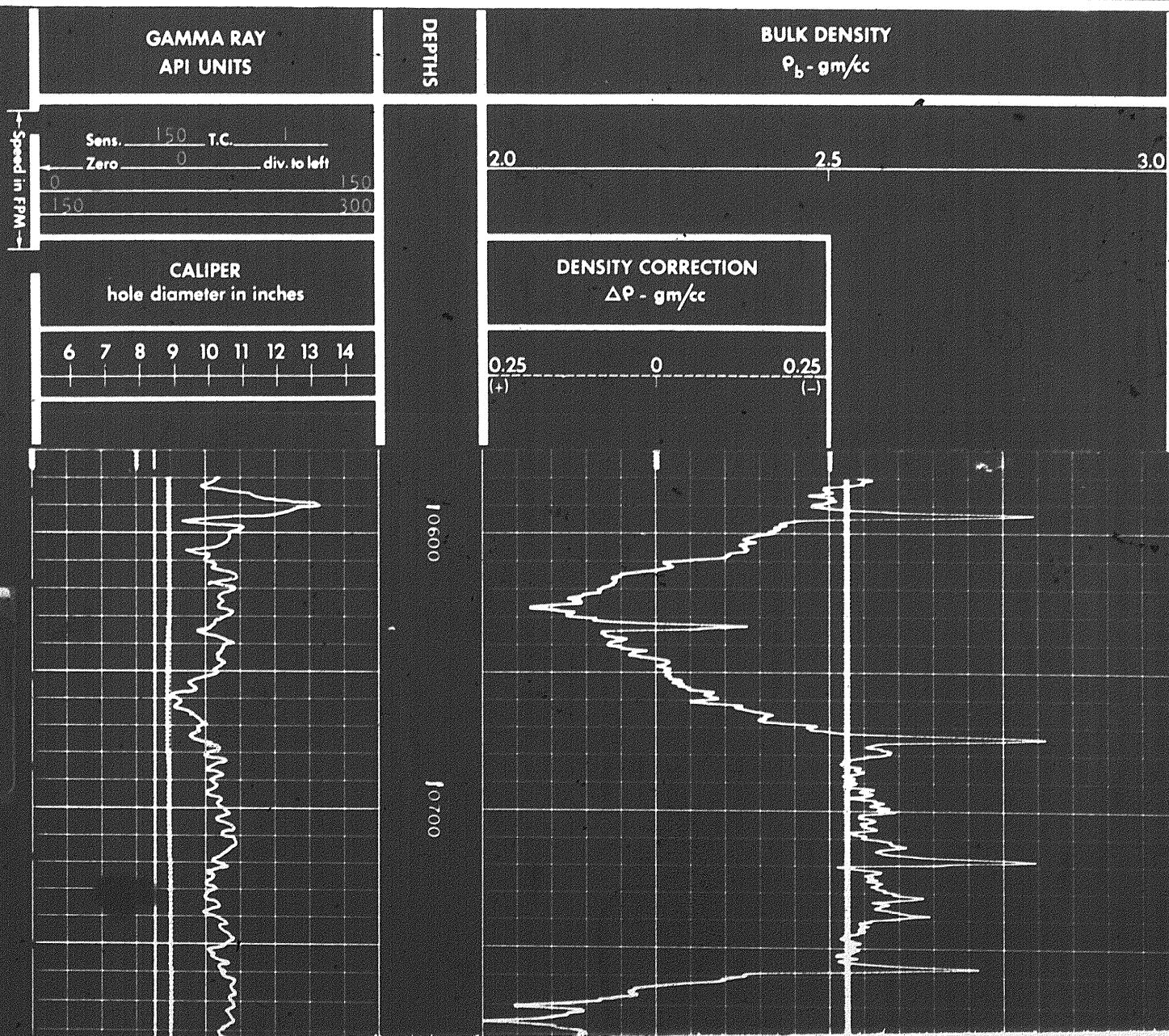
Run No.	General		Speed Ft./Min.	Tc	API Scale	Matrix	CWL Selectors		Hole Size Setting (If not auto)	Porosity Scale
	From	Depths To					Auto Hole Size Corr.	Hole Size Setting		
THREE	1278	1838	3	2	15	LIMESTONE	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		45-15-15
							<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
							<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
							<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		

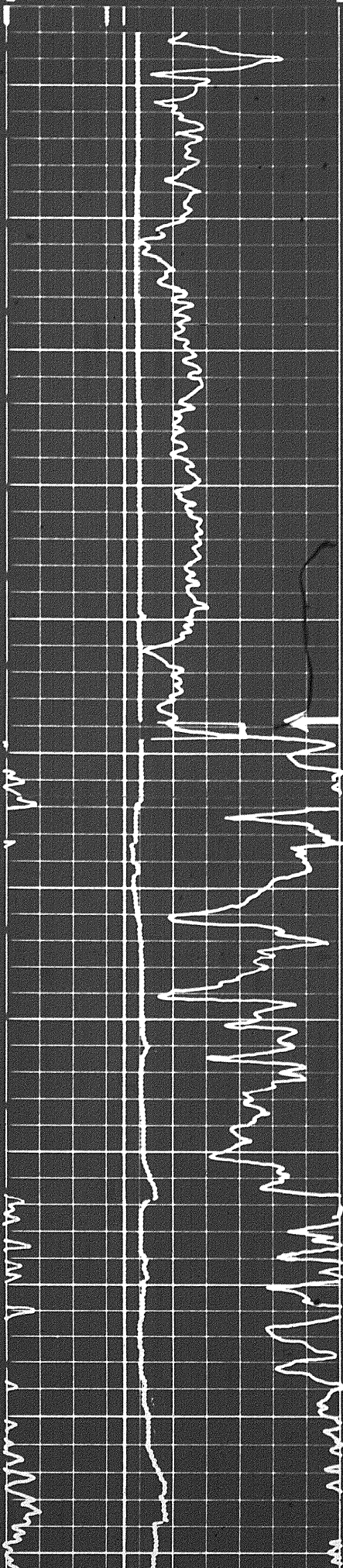
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, 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.

Time Entering Hole 5:00/14th
 Time Bottom Reached 7:30/14th *** SECOND THERMOMETER WAS BROKEN
 Time Last Off Bottom 7:45/14th *** GR RUN ON T.C = 1 THIS GR WAS TRACED BHT No. 1 285 °F
 Distance TD to Thermometer 32' FROM DIL-GR SINCE THE ONE ON THE BHT No. 2 °F
 Time Out Of Hole 11:00/14th FDC-CNL-GR BECAME TOO HOT TO OPERATE

Mud Resistivities
 Rm No. 1 0.218 ohm-m @ 90 °F = 0.066 ohm-m @ BHT
 Rm No. 2 0.214 ohm-m @ 89 °F = 0.064 ohm-m @ BHT
 Rm No. 3 ohm-m @ °F = ohm-m @ BHT

Rw from Drill Stem Test
 DST No. - Rw = - ohm-m @ - °F
 DST No. - Rw = - ohm-m @ - °F LOG TAPED
 DST No. - Rw = - ohm-m @ - °F Yes No





10600

10700

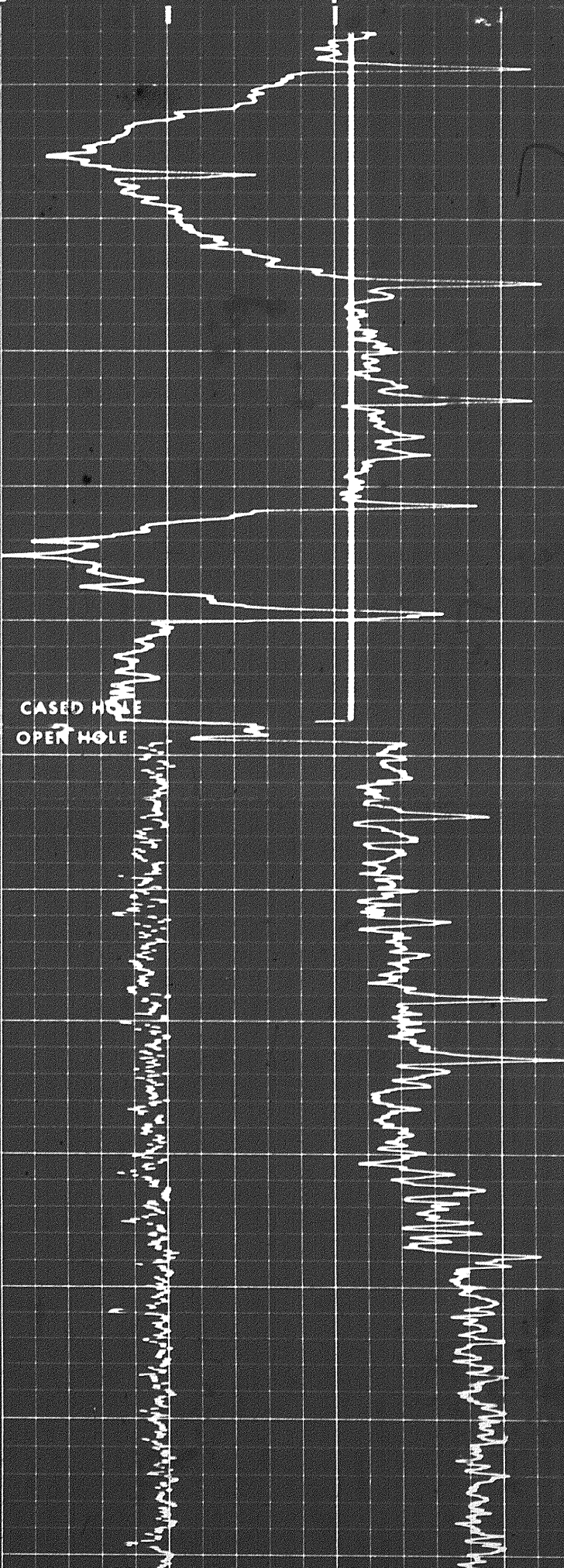
10800

10900

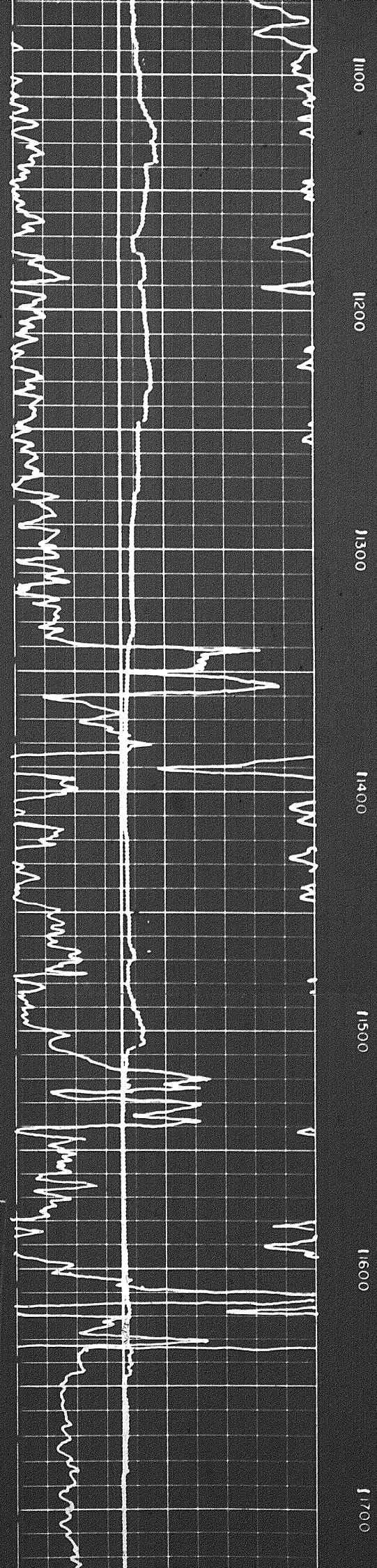
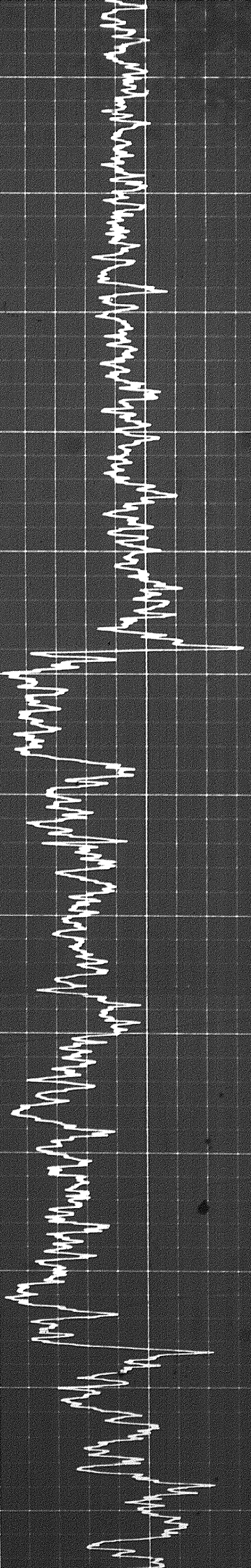
11000

11100

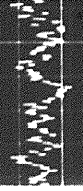
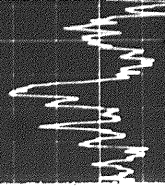
Casing



CAGED HOLE
OPEN HOLE

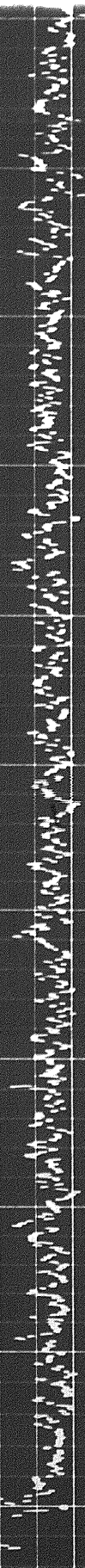
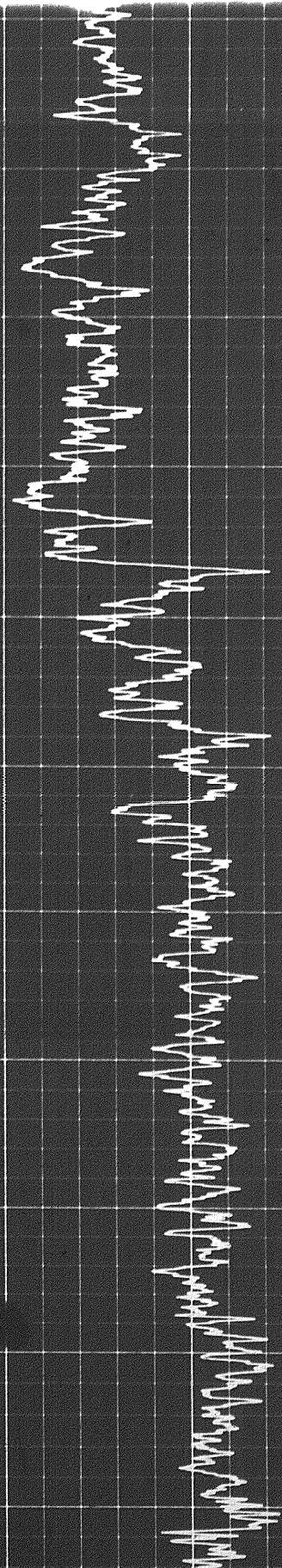


2 of



1700

88



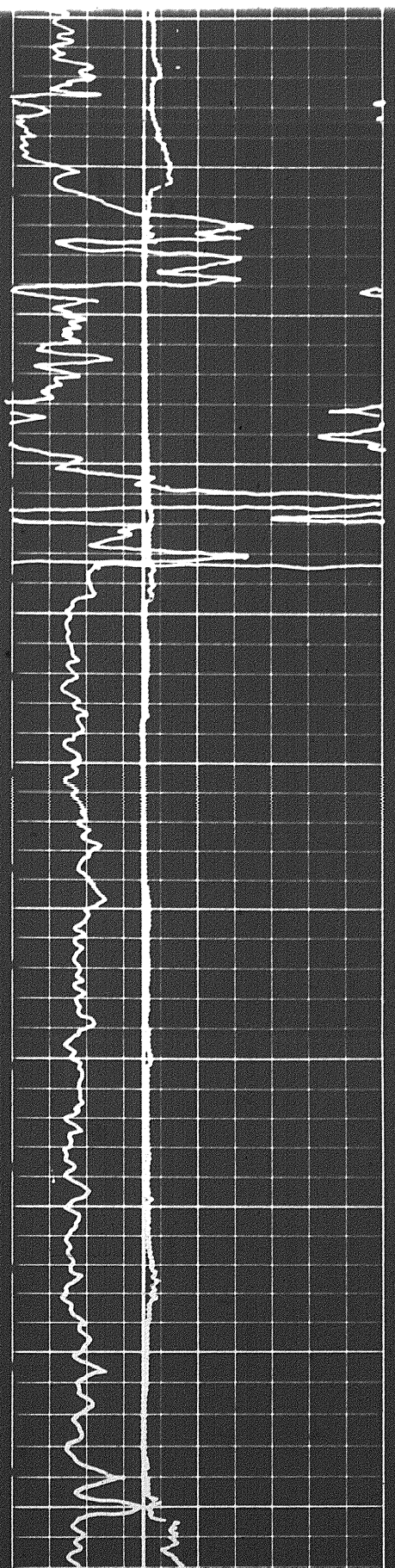
1500

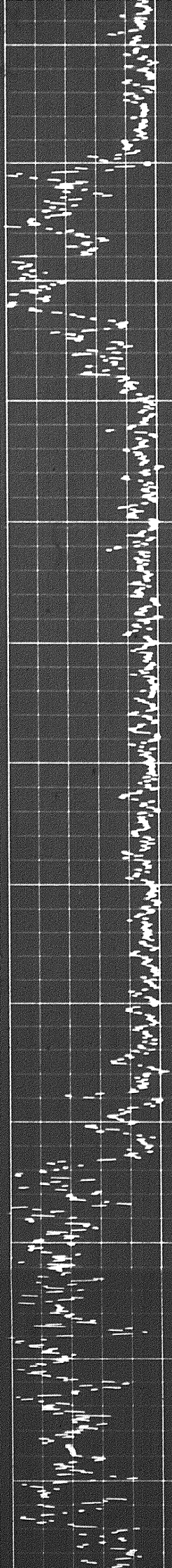
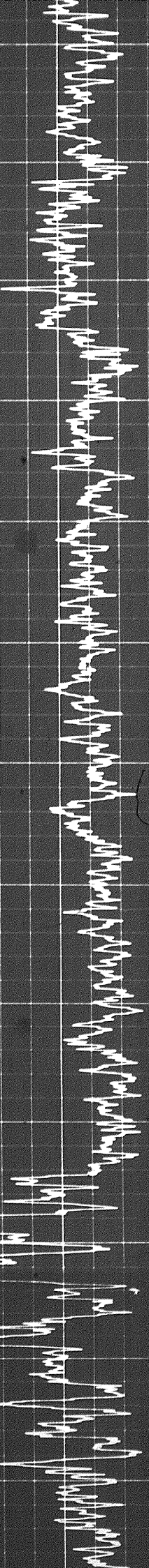
1600

1700

1800

1900





11900

12000

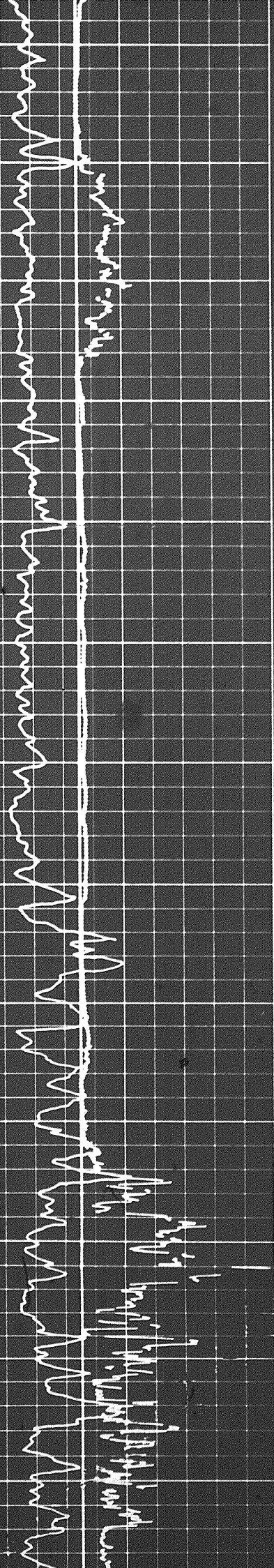
12100

12200

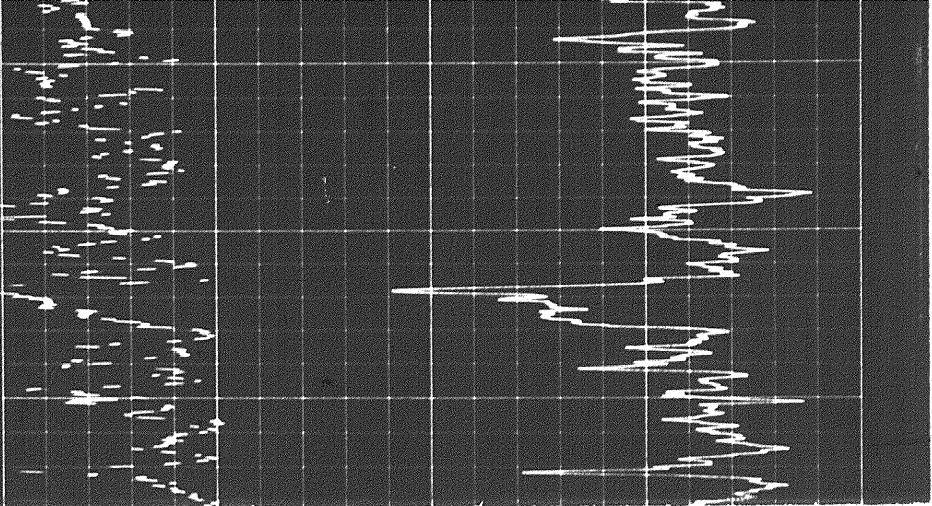
12300

12400

12500

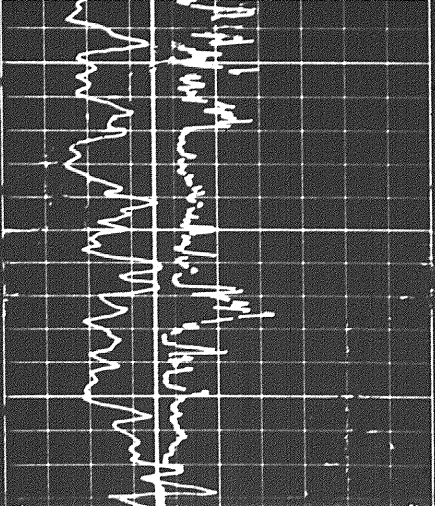


3 of

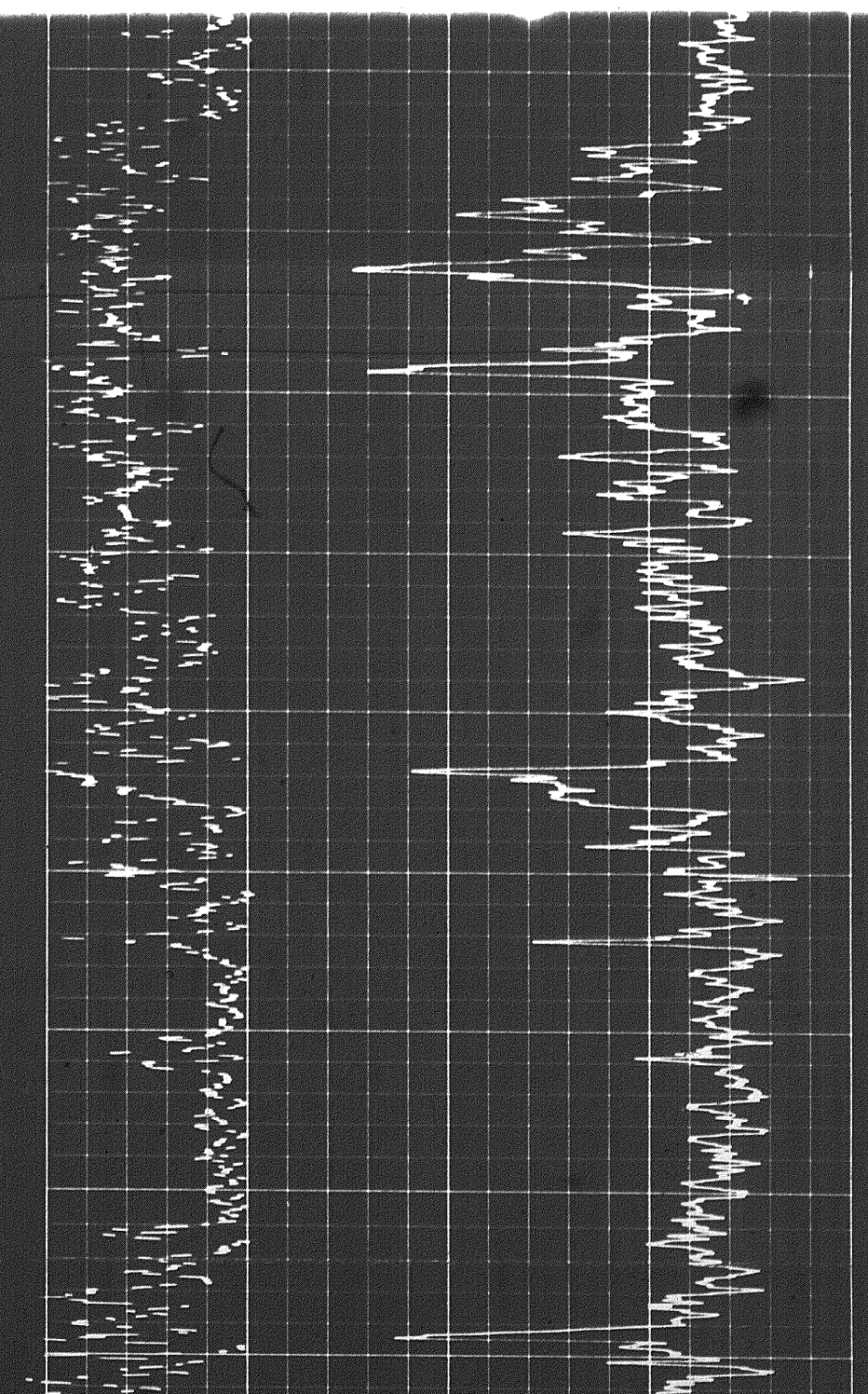


12500

12600



3

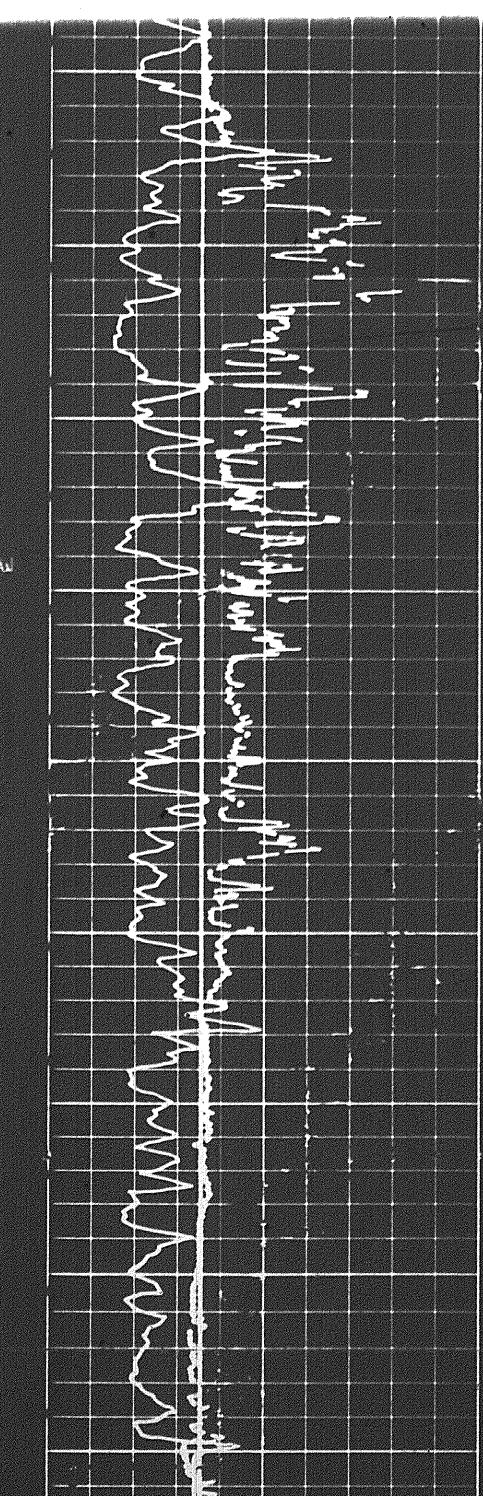


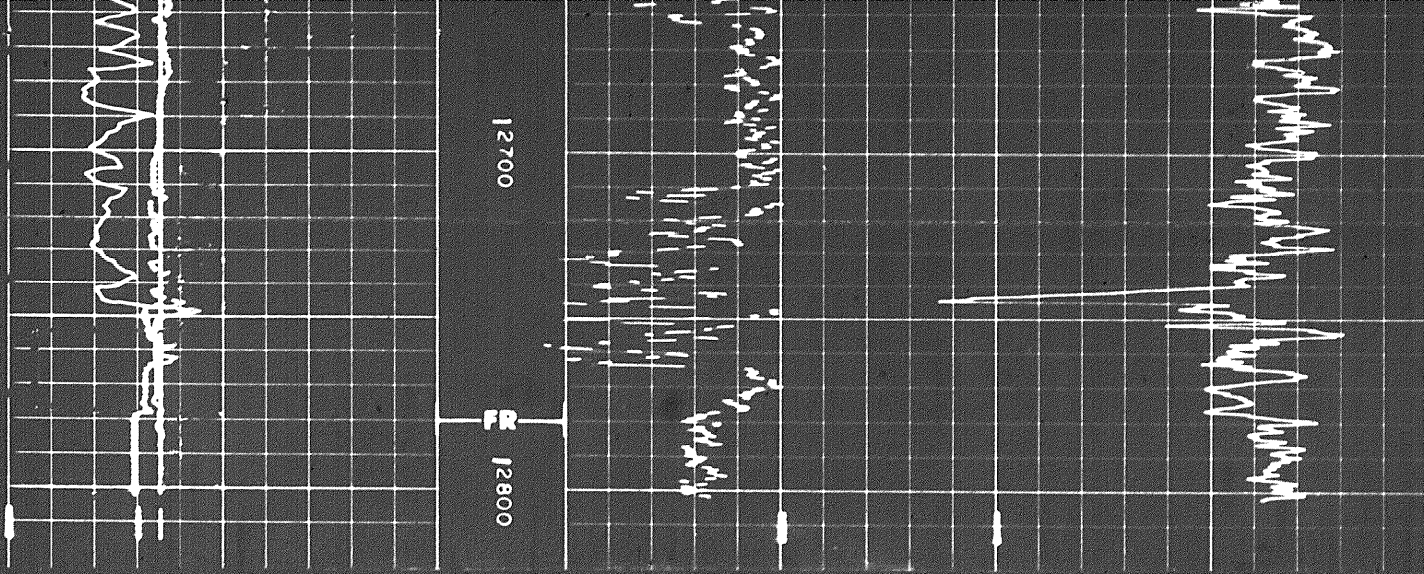
12400

12500

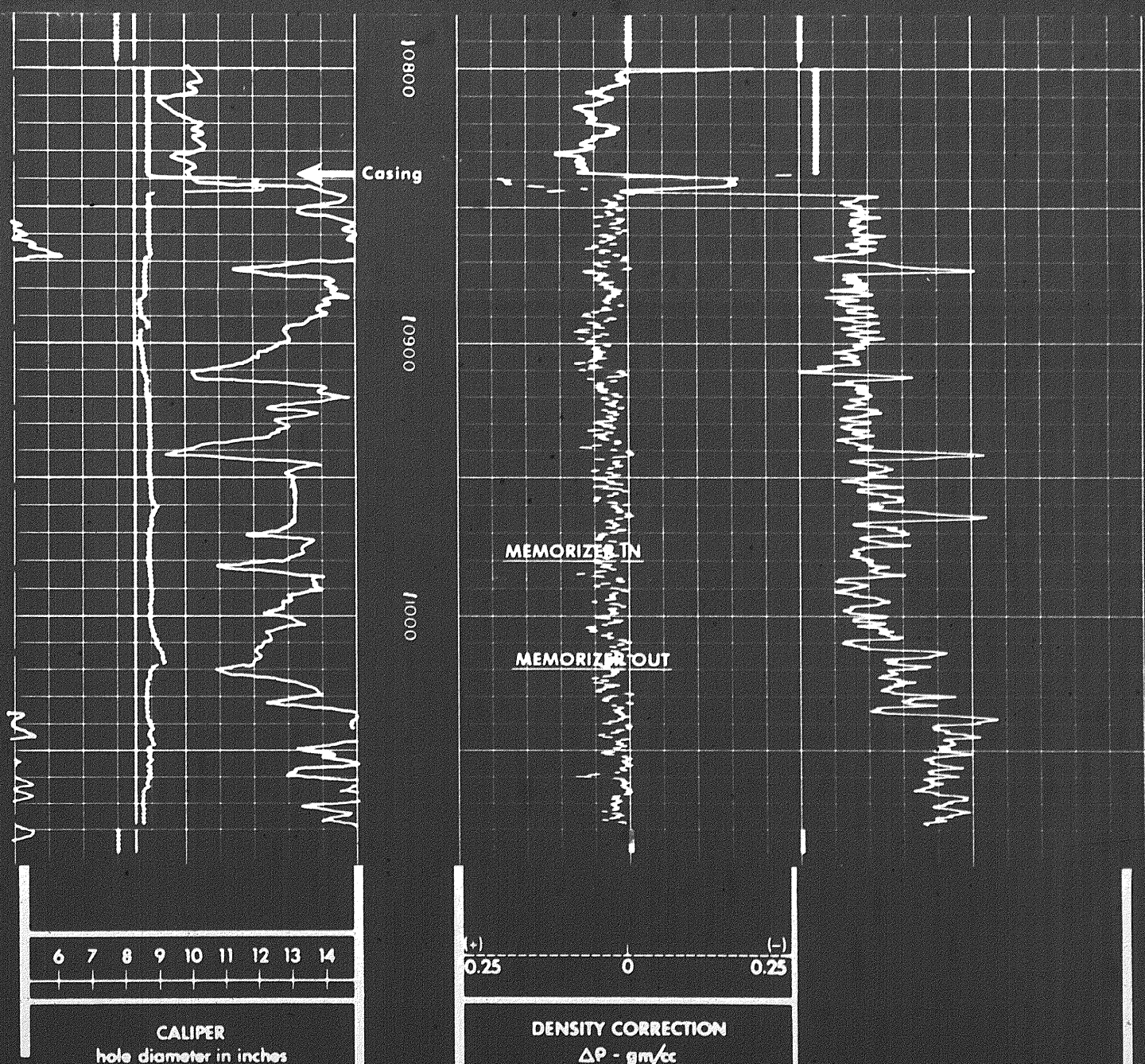
12600

12700





REPEAT SECTION



<p>6 7 8 9 10 11 12 13 14</p> <p>CALIPER hole diameter in inches</p>		<p>(+) 0.25 0 0.25 (-)</p> <p>DENSITY CORRECTION $\Delta\rho - \text{gm/cc}$</p>	
<p>Speed in FPM</p> <p>Sens. _____ T.C. _____</p> <p>Zero _____ div. to left</p>		<p>2.0 2.5 3.0</p>	
<p>GAMMA RAY API UNITS</p>		<p>DEPTHS</p>	<p>BULK DENSITY $\rho_b - \text{gm/cc}$</p>
<p>DETAIL LOG 5" = 100'</p>			
<p>6 7 8 9 10 11 12 13 14</p> <p>CALIPER hole diameter in inches</p>		<p>DEPTHS</p> <p>POROSITY (%)</p>	
<p>Speed in FPM</p> <p>GAMMA RAY API UNITS</p>		<p>NEUTRON DENSITY</p>	

<p>6 7 8 9 10 11 12 13 14</p> <p>CALIPER hole diameter in inches</p>		<p>(+) 0.25 0 0.25 (-)</p> <p>DENSITY CORRECTION $\Delta\rho - \text{gm/cc}$</p>	
<p>Speed in FPM</p> <p>Sens. _____ T.C. _____</p> <p>Zero _____ div. to left</p>		<p>2.0 2.5 3.0</p>	
<p>GAMMA RAY API UNITS</p>		<p>DEPTHS</p>	<p>BULK DENSITY $\rho_b - \text{gm/cc}$</p>
<p>DETAIL LOG 5" = 100'</p>			
<p>6 7 8 9 10 11 12 13 14</p> <p>CALIPER hole diameter in inches</p>		<p>DEPTHS</p> <p>POROSITY (%)</p>	
<p>Speed in FPM</p> <p>GAMMA RAY API UNITS</p>		<p>NEUTRON DENSITY</p>	

CALIPER
hole diameter in inches

DEPTH

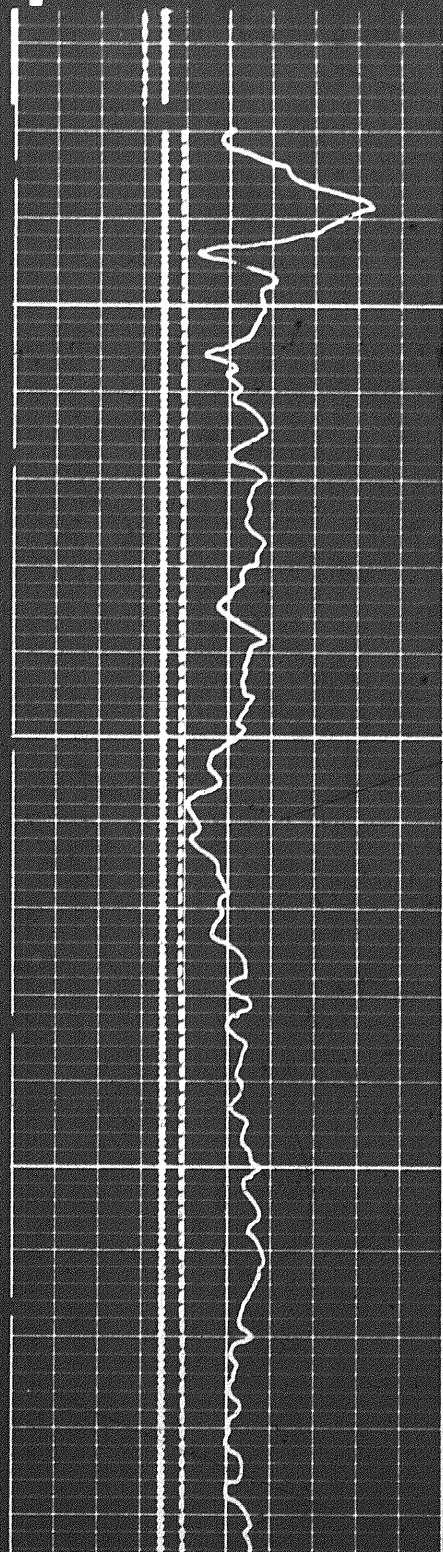
POROSITY (%)



GAMMA RAY
API UNITS

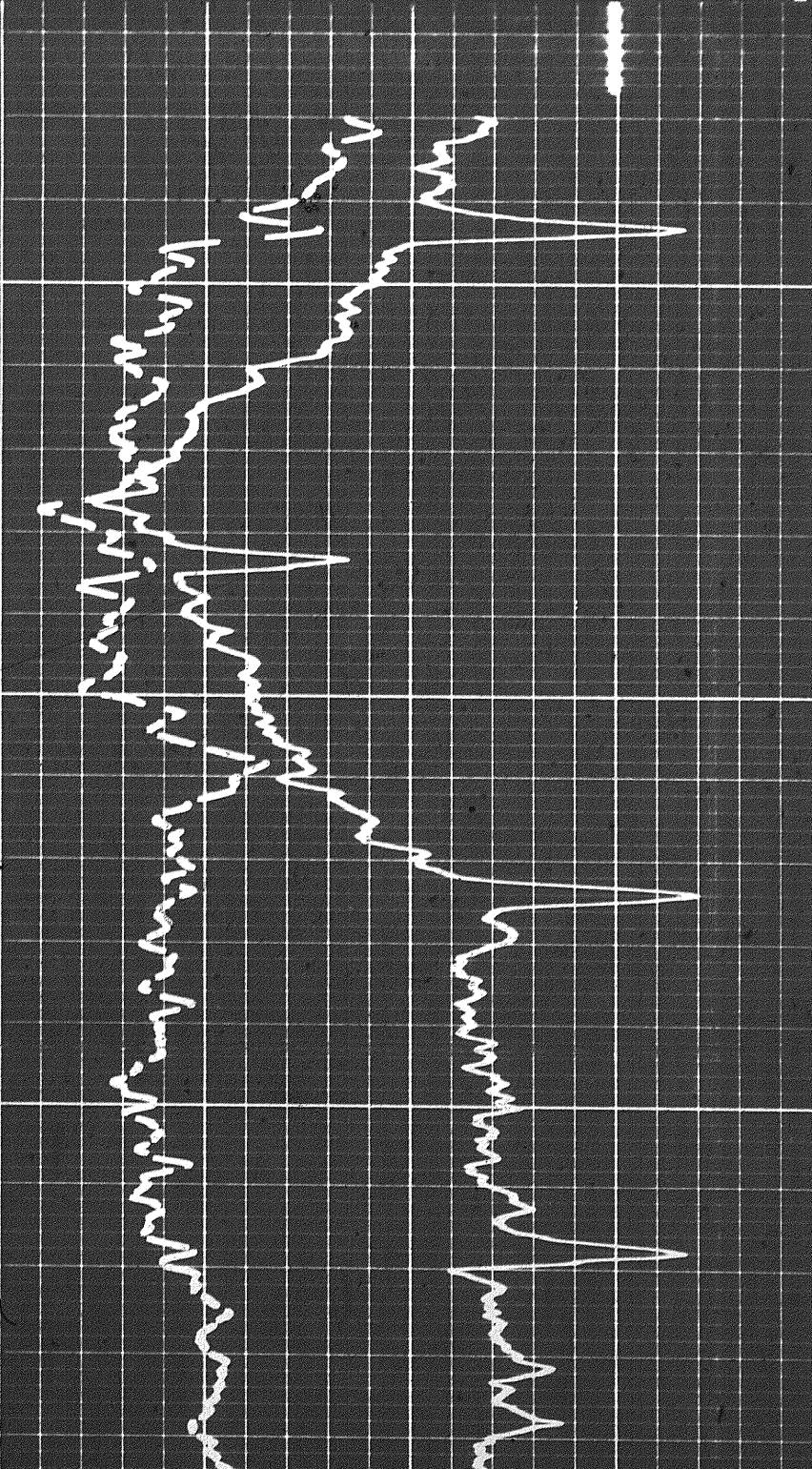
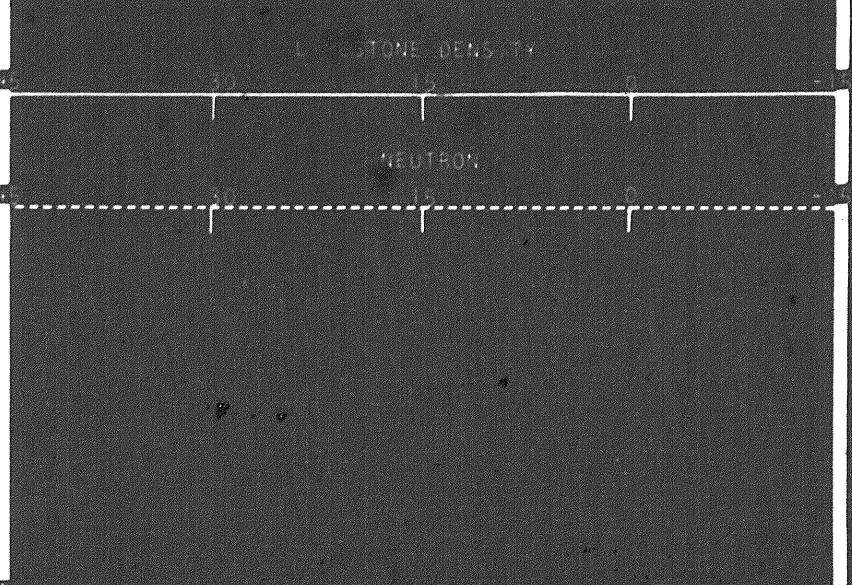
Sens. 150 T.C. 1
Zero 0 div. to left

150
300



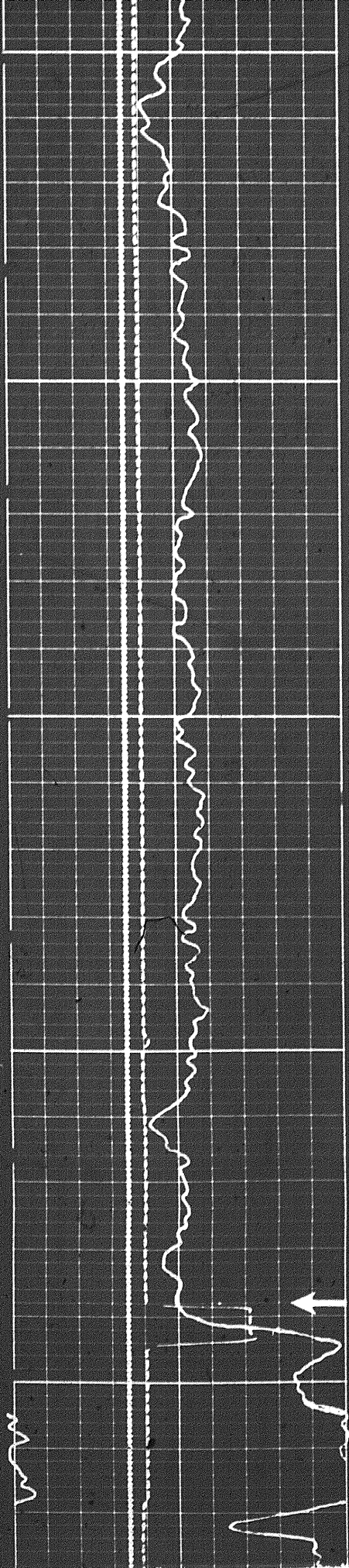
10600

10700



X821

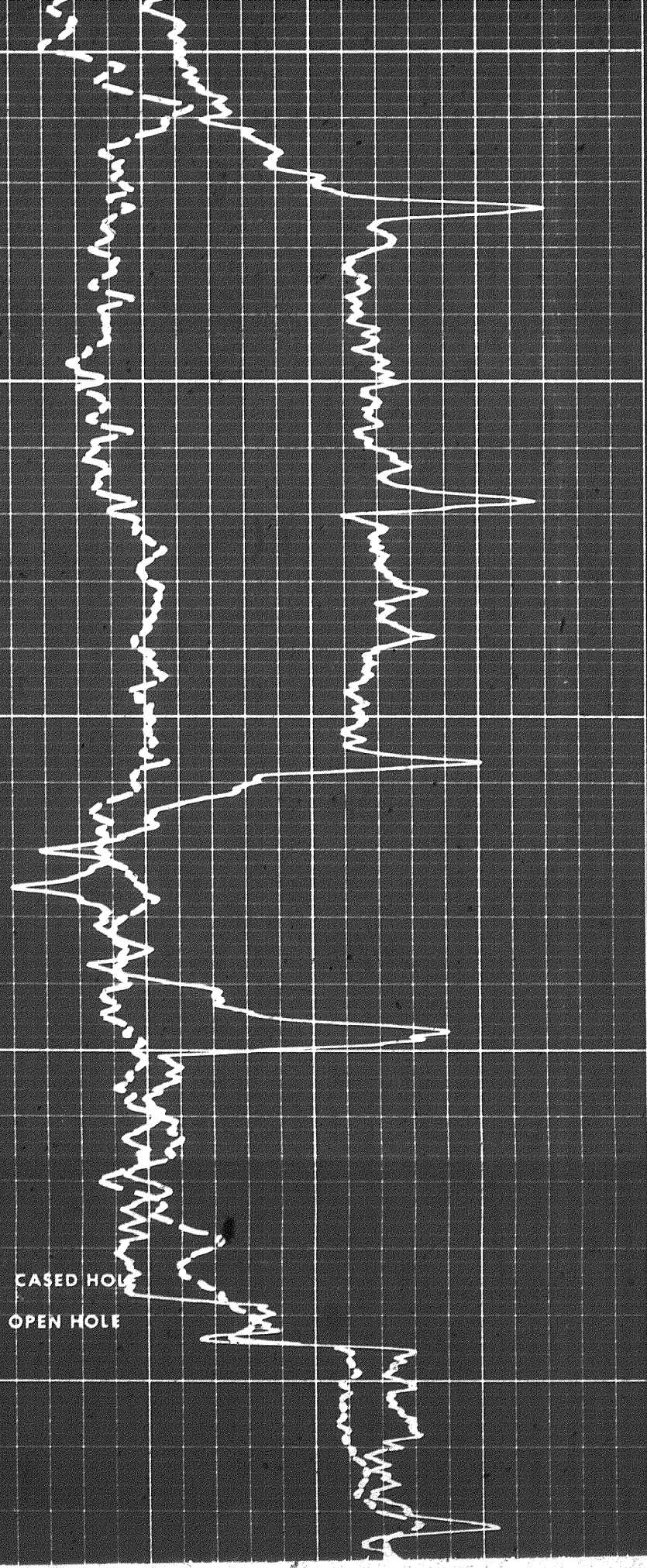
5 of 20

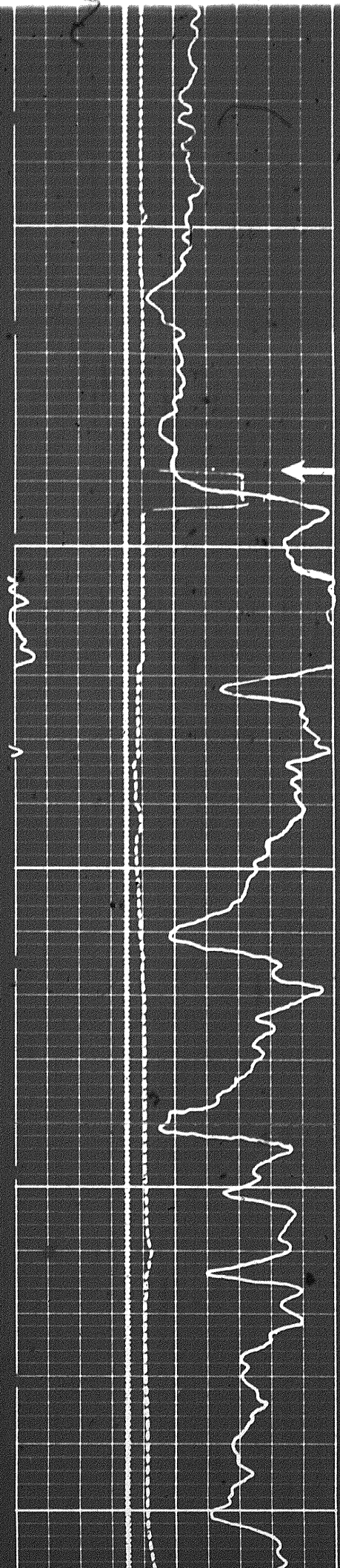


10700

10800

Casing





00801

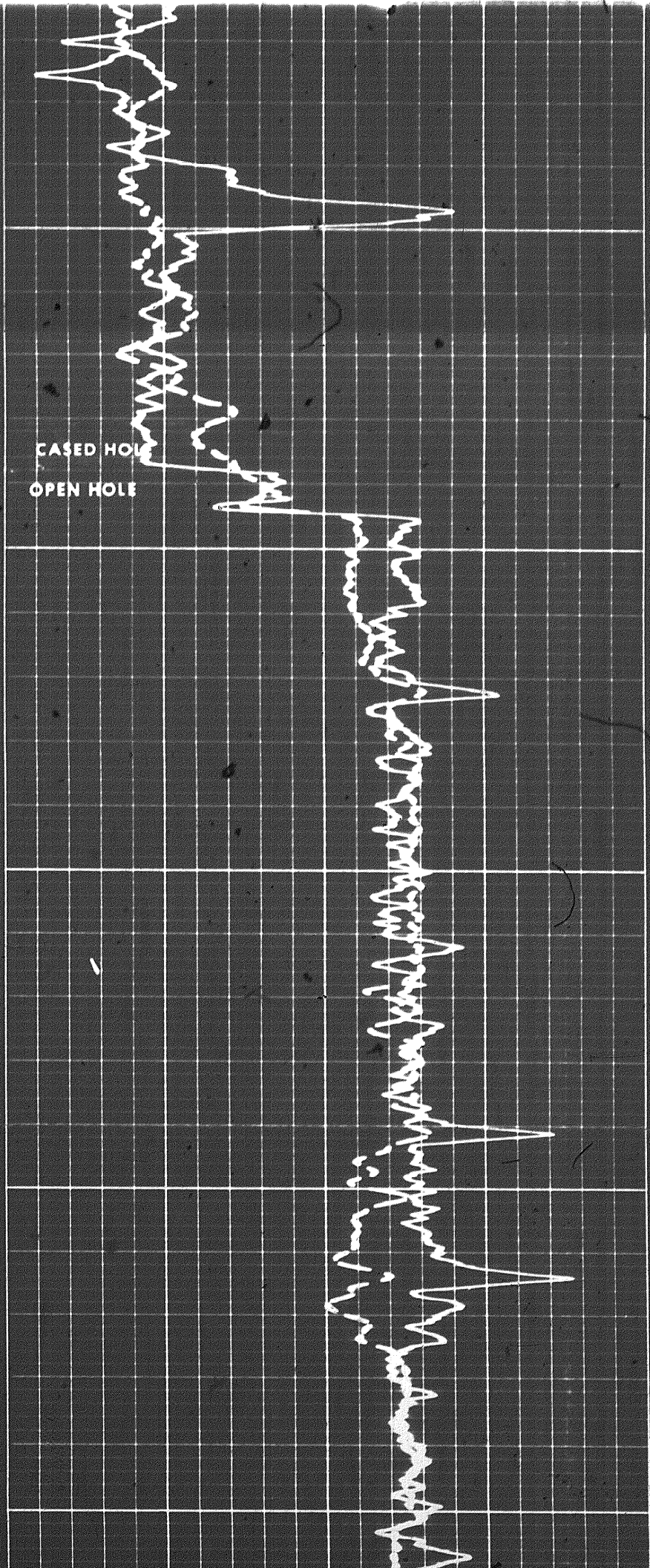
10900

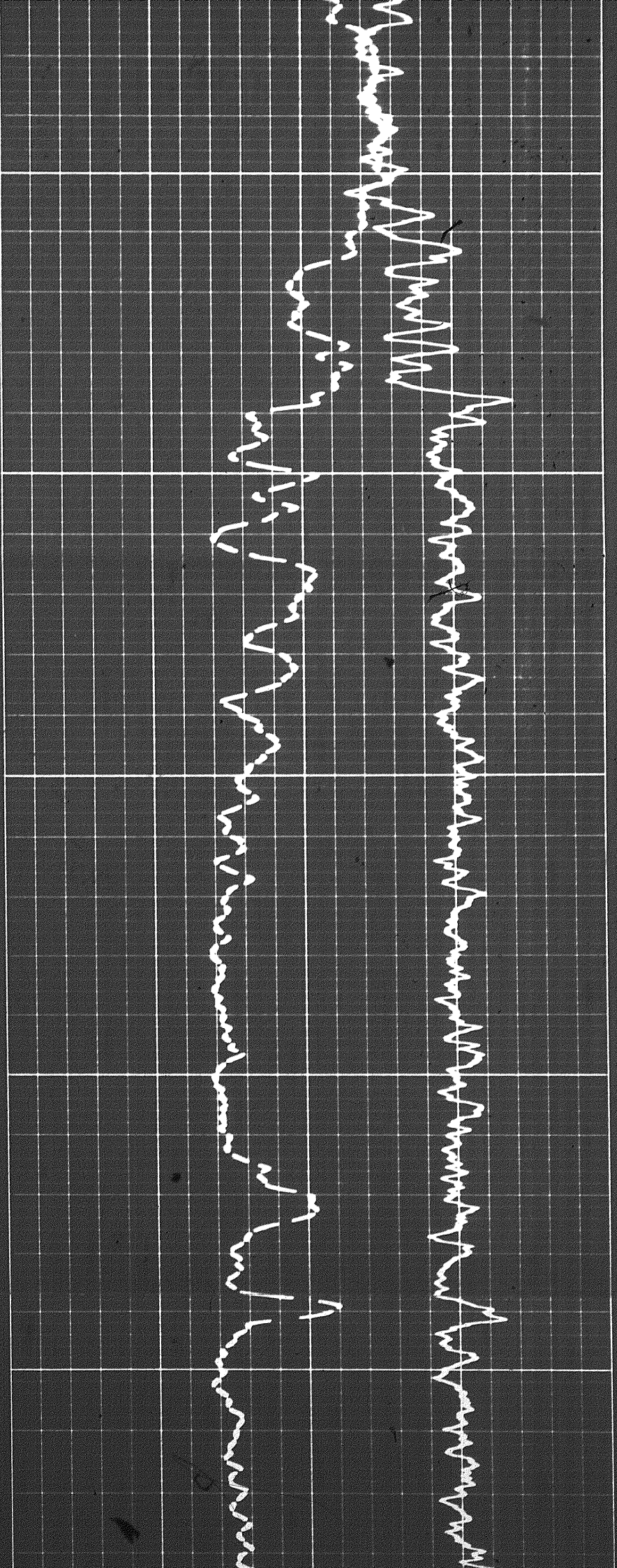
11000

Casing



CASED HOLE
OPEN HOLE

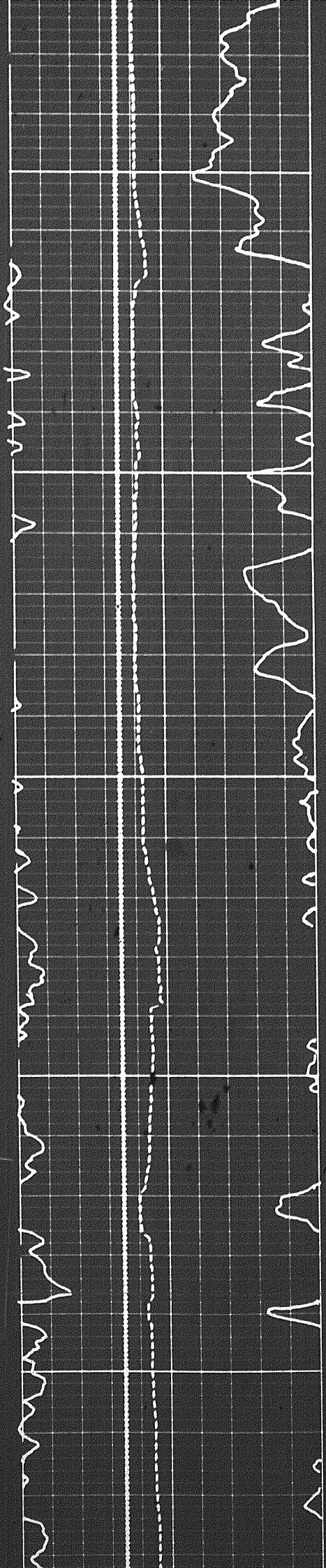




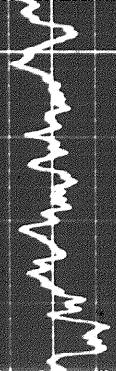
11000

11100

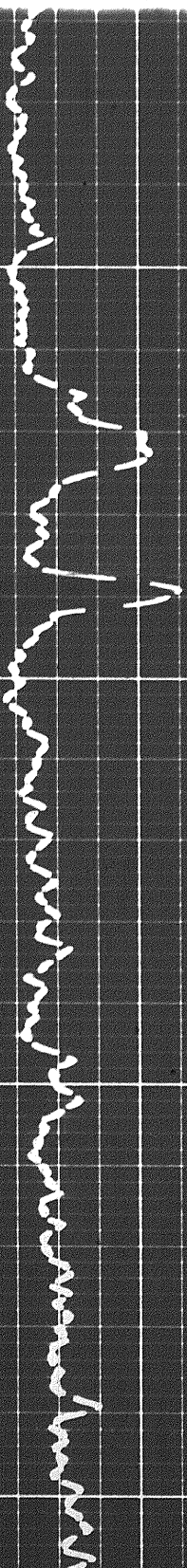
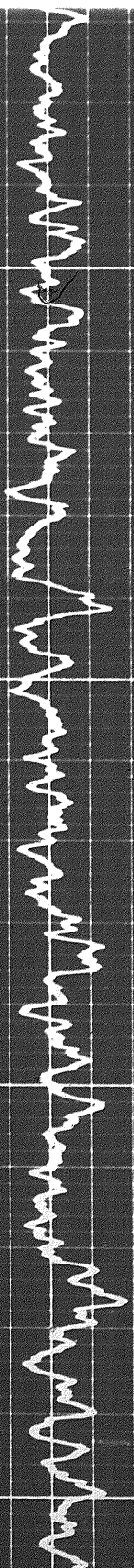
11200



609



11200

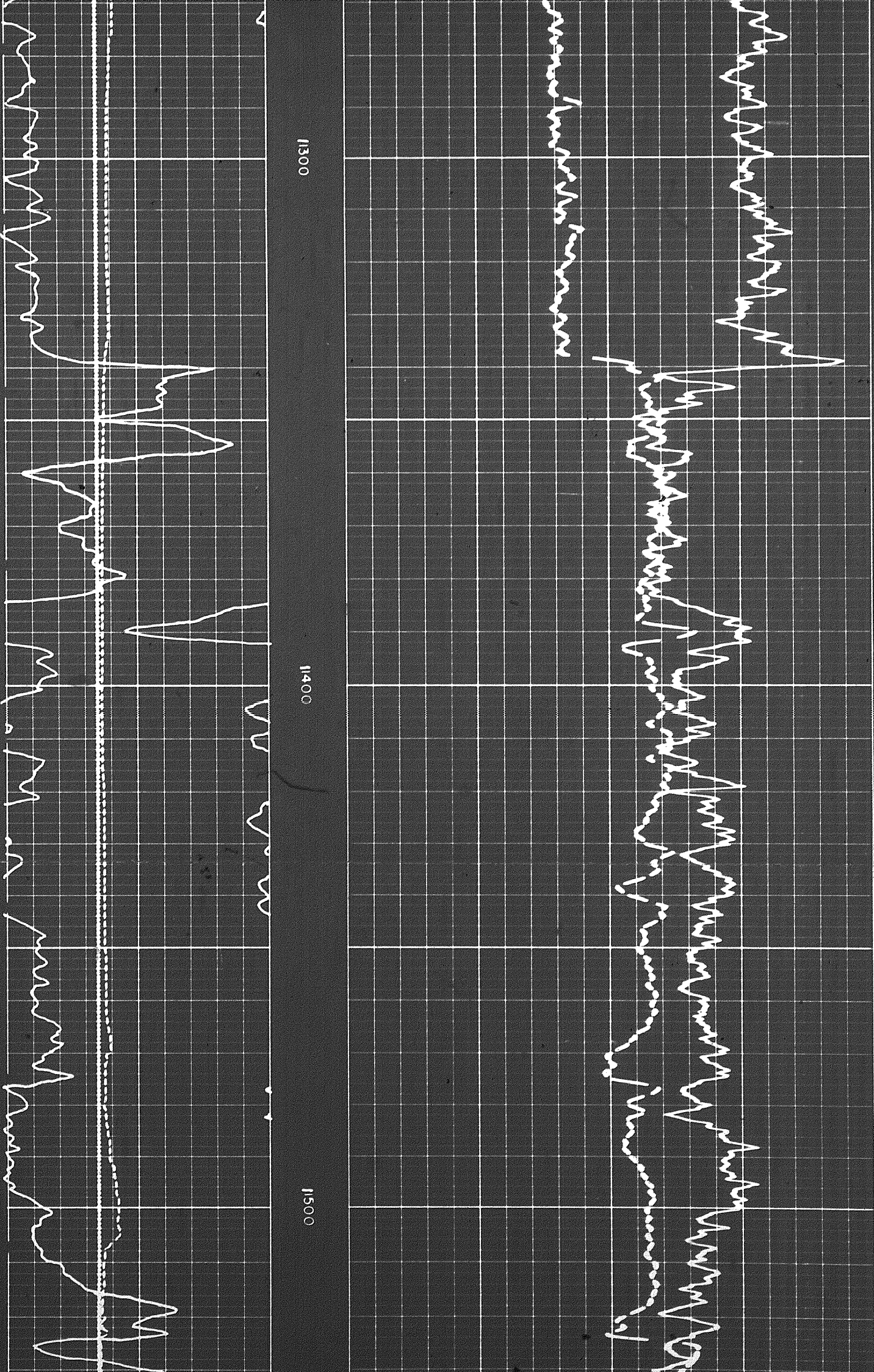


11200



11300





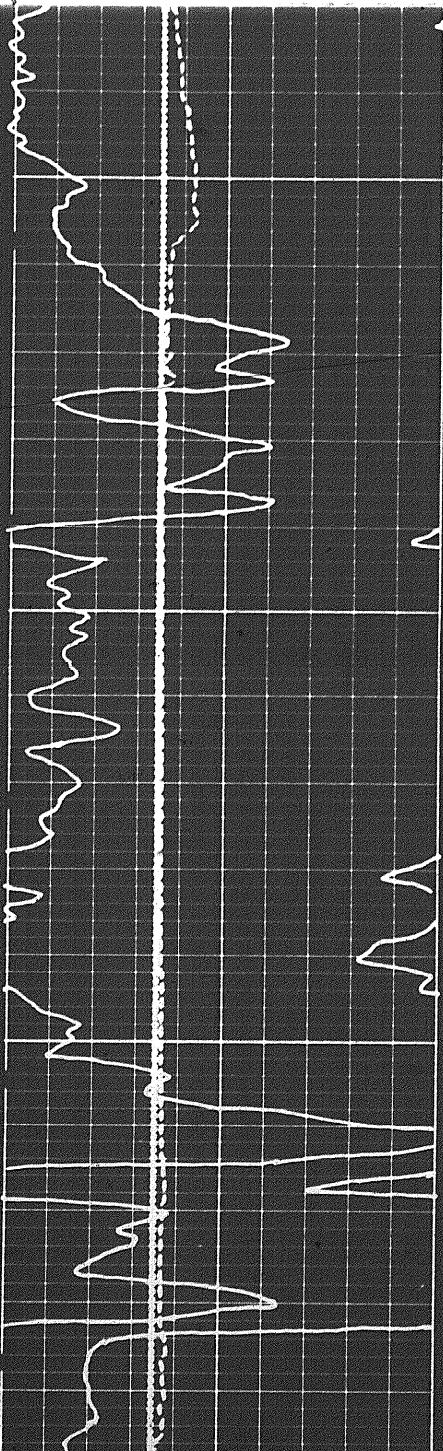
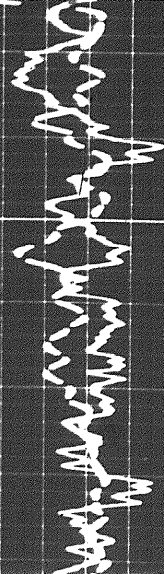
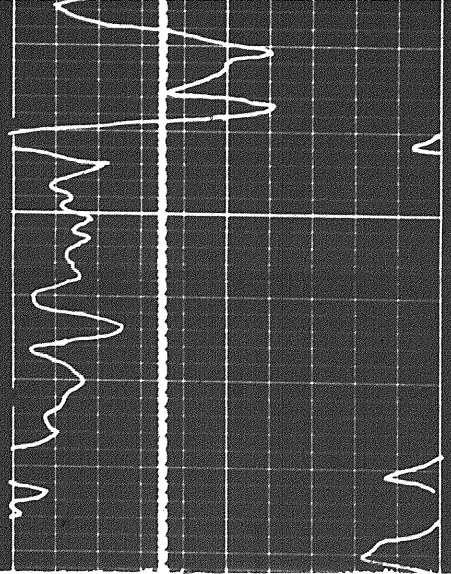
11300

11400

11500

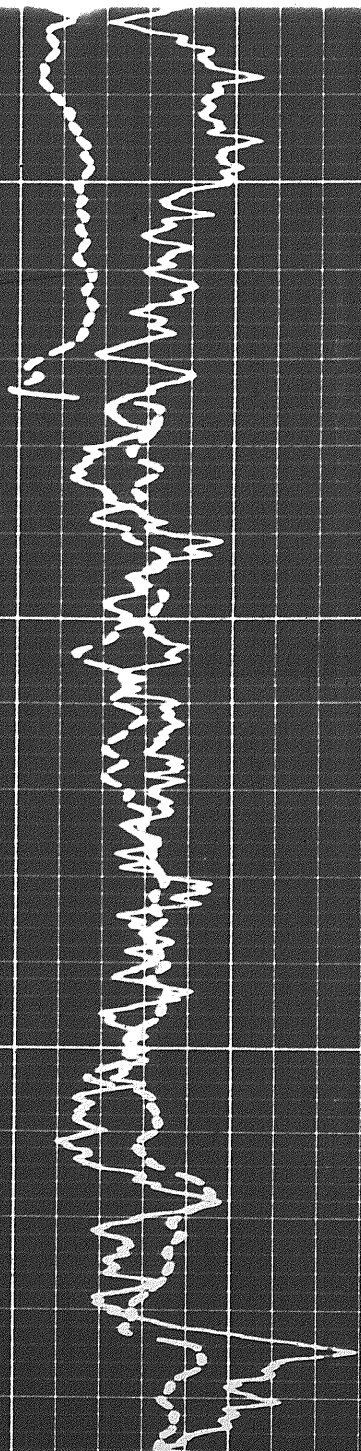
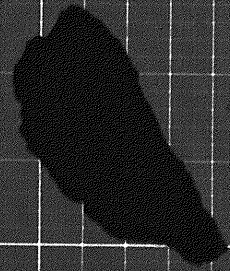
4/1

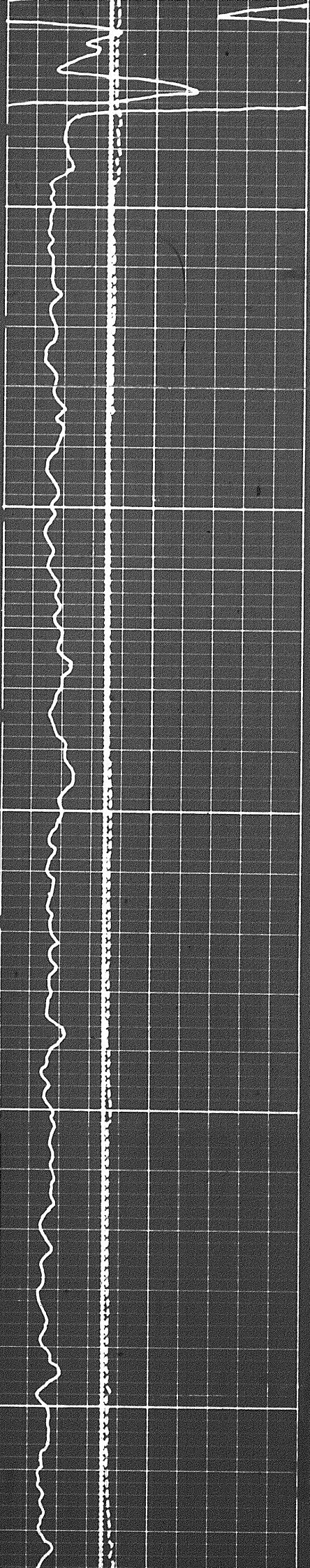
5 of



11500

1600

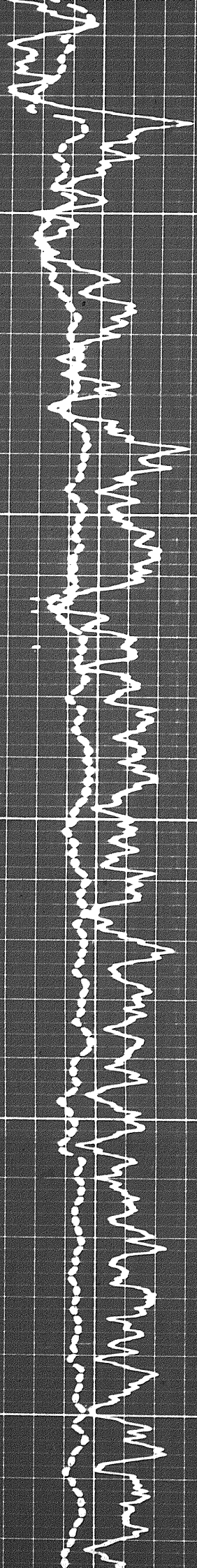




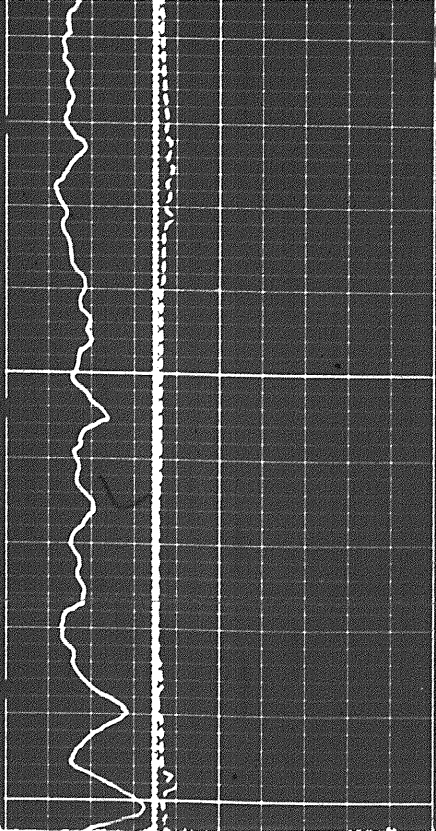
11700

1800

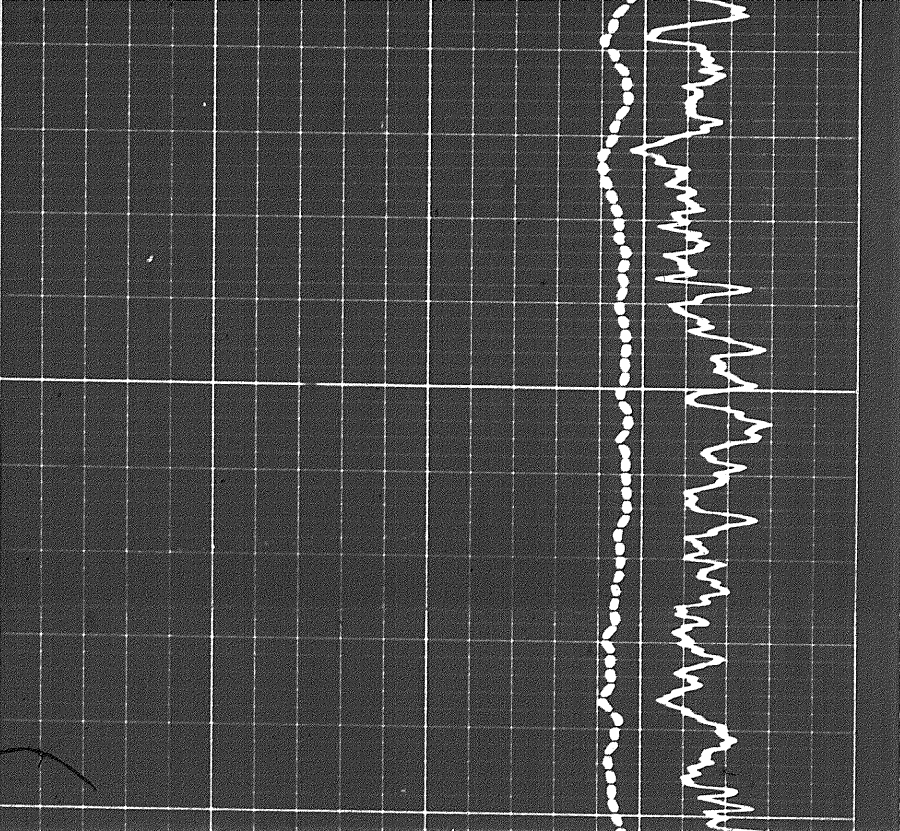
Handwritten signature or initials.



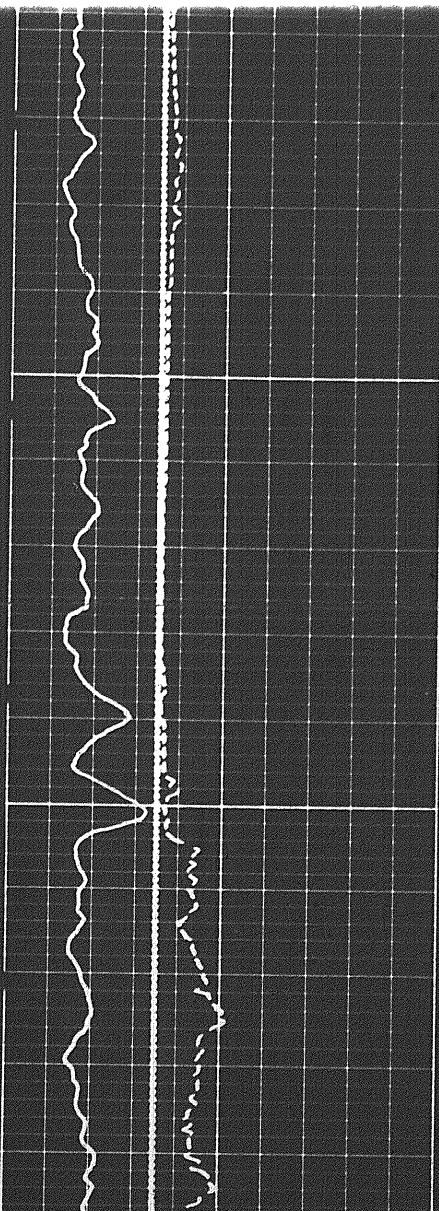
8 21



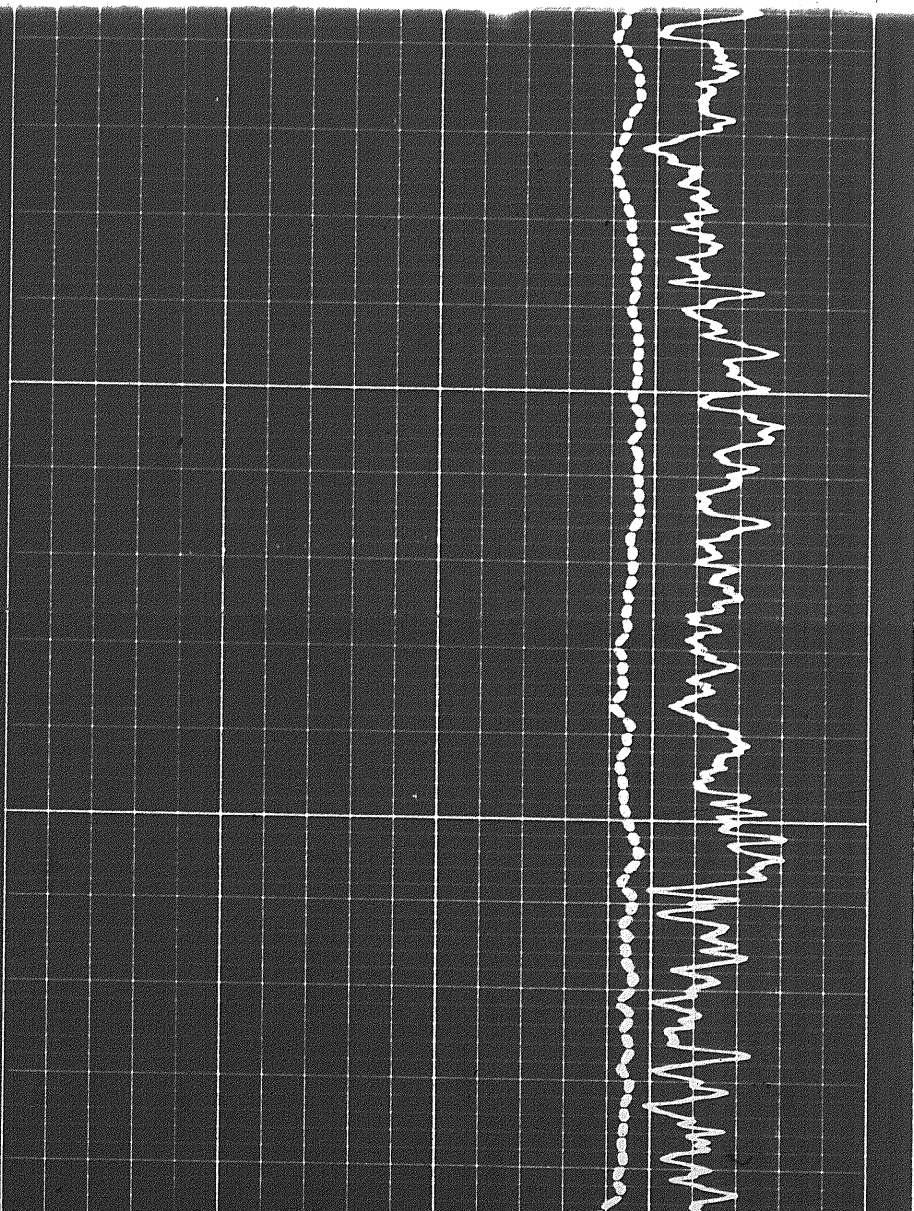
00611

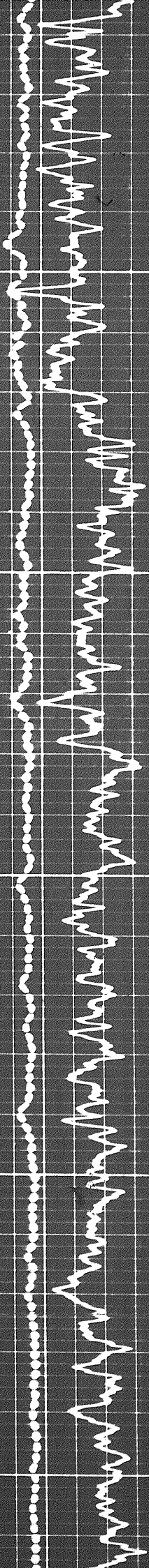


8



00611

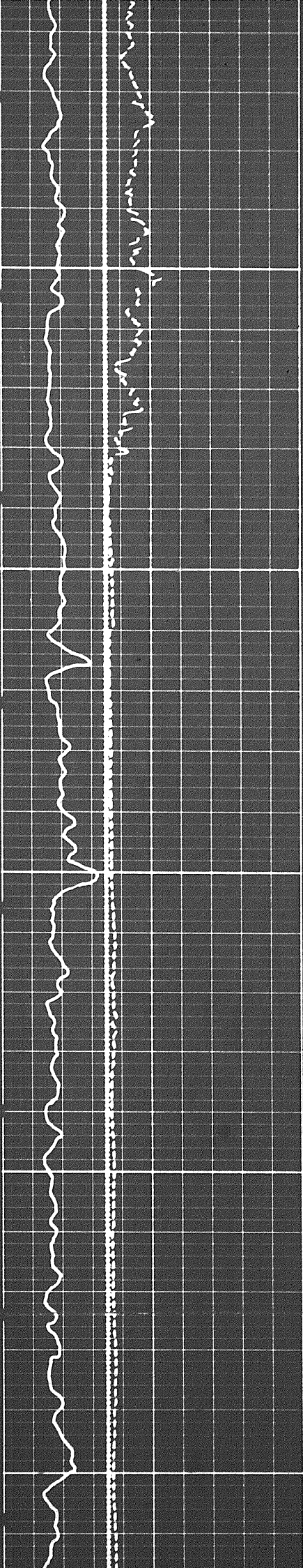


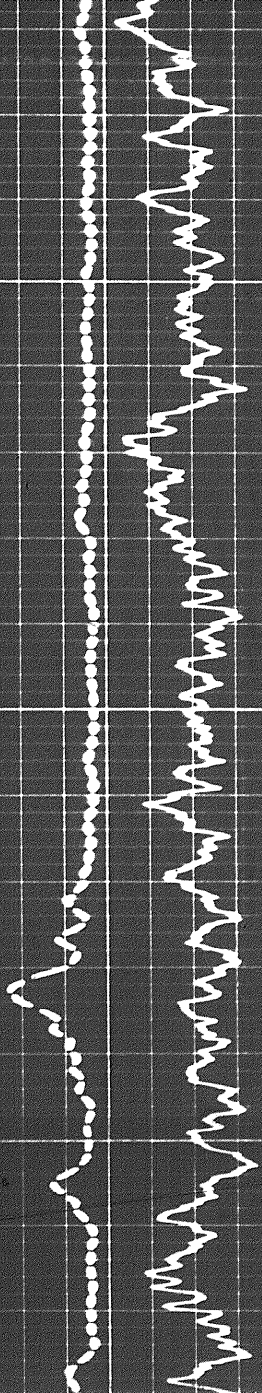


12000

12100

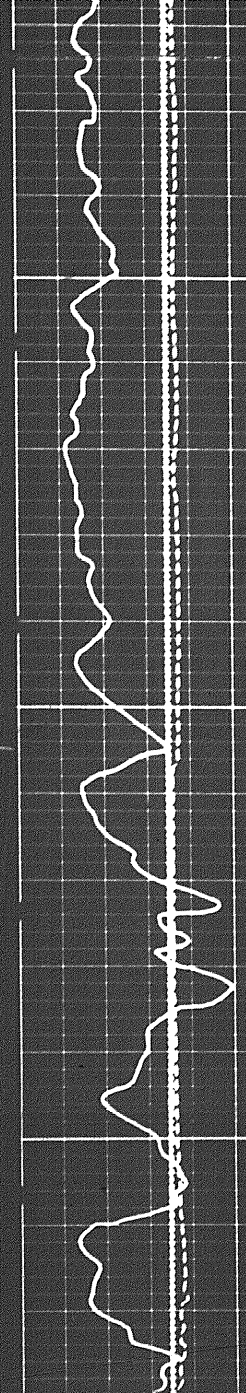
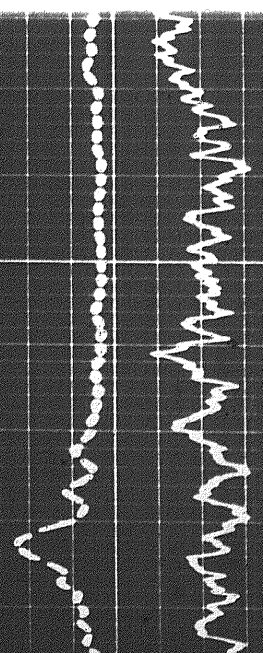
12200



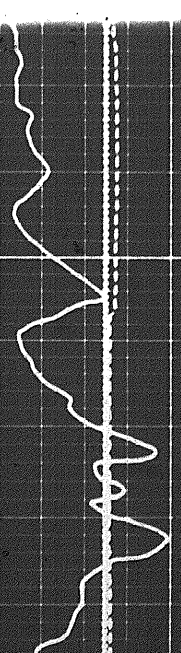


12200

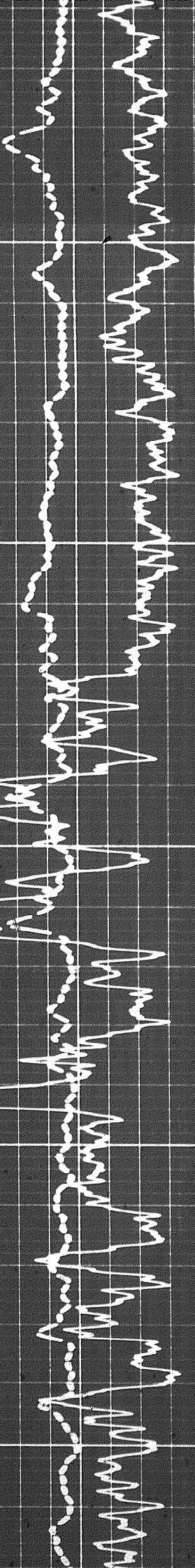
12300



9/2



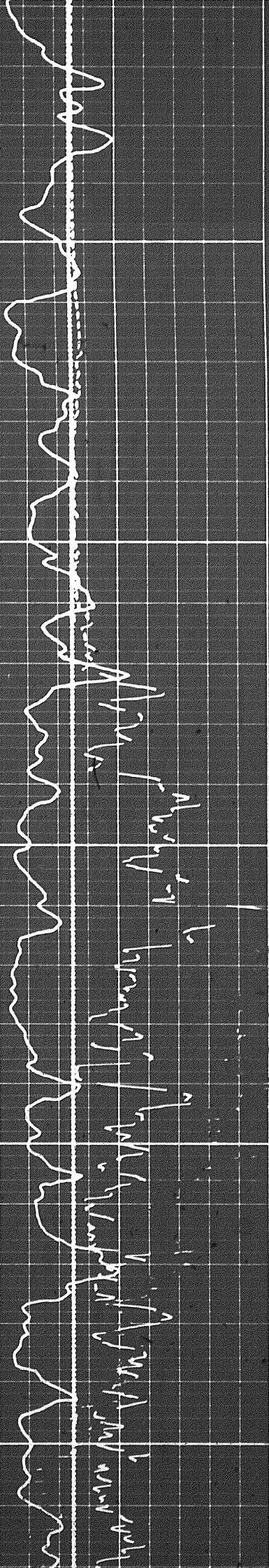
9



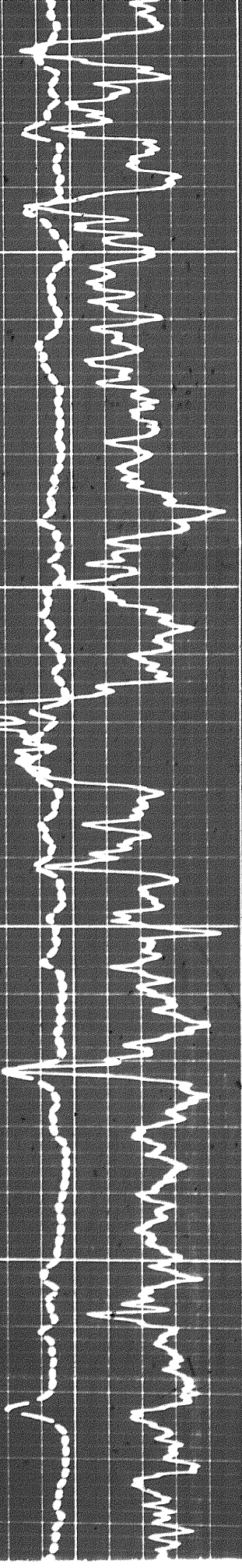
12300

12400

12500

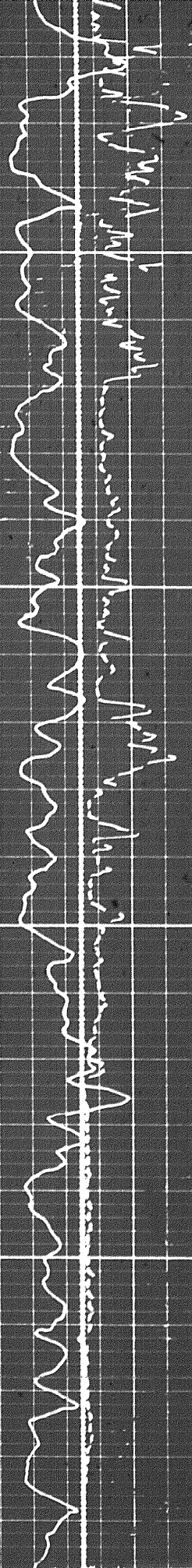


Atrial fibrillation
 irregularly irregularly
 narrow QRS complexes
 normal PR interval
 normal QT interval
 normal QTc interval
 normal ST segment
 normal T waves

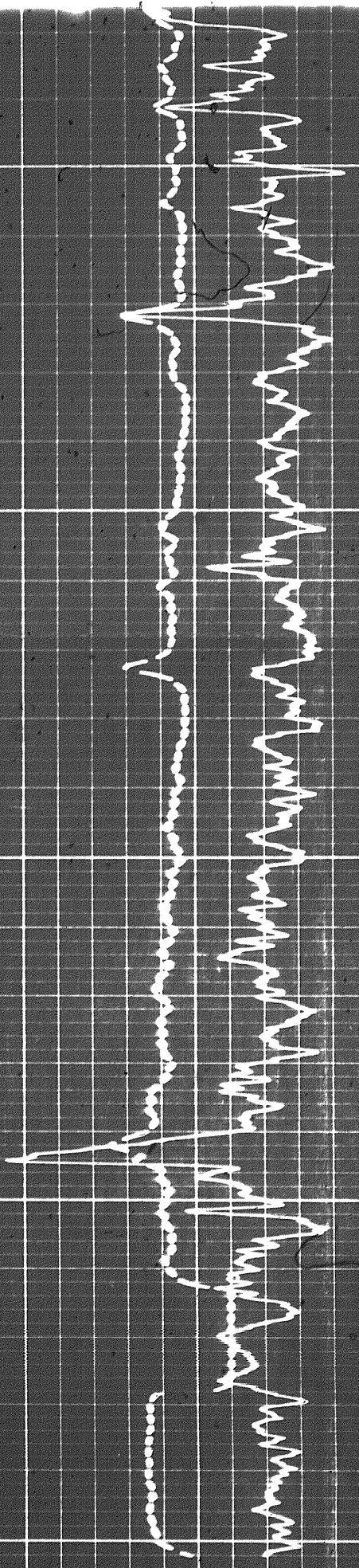


12500

12600



100

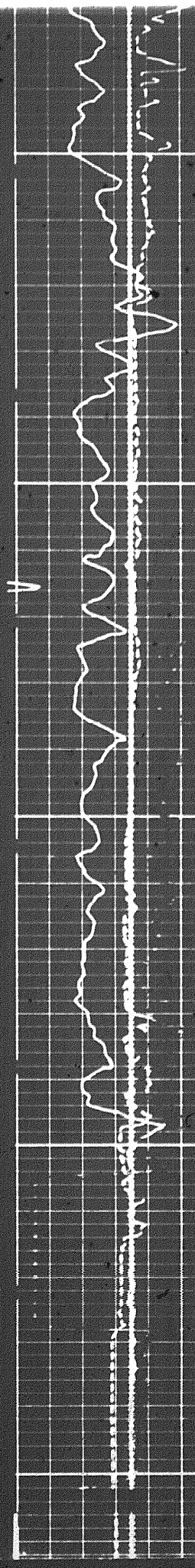


12600

12700

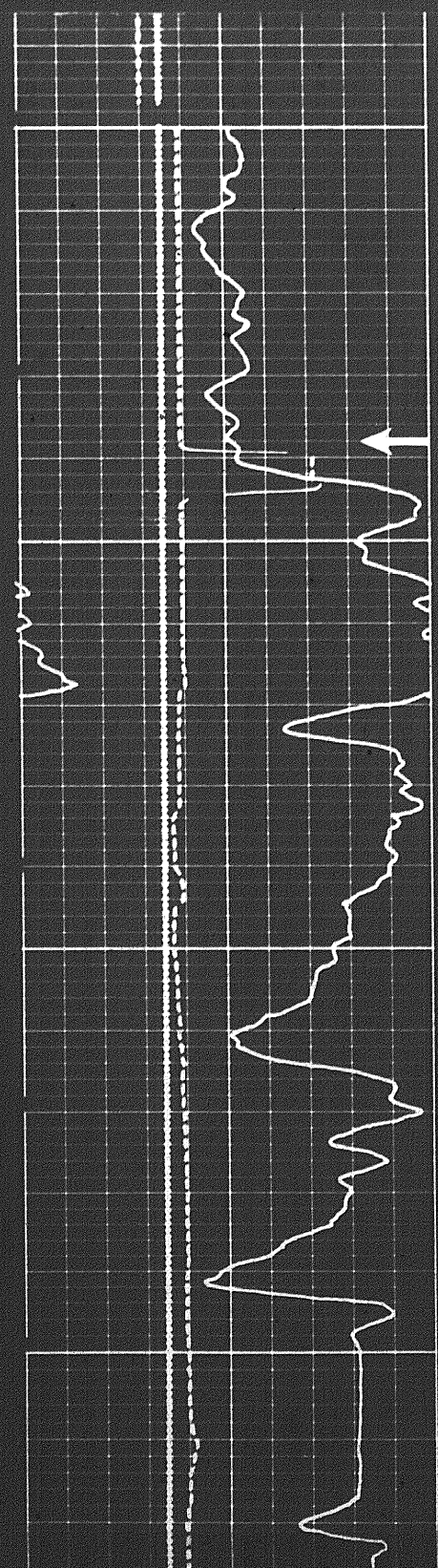
FR

12800



10

11/20

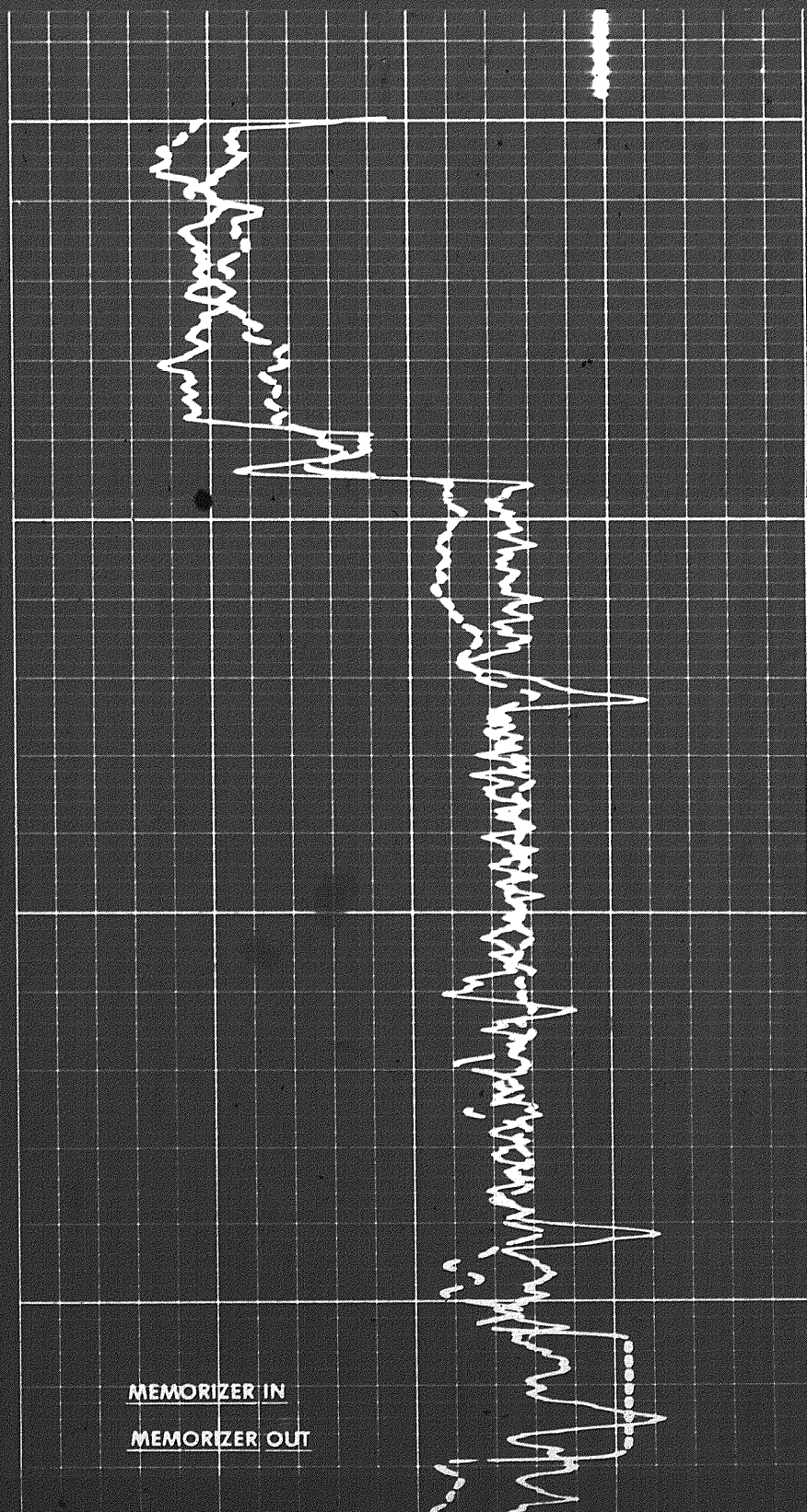


Casing

10800

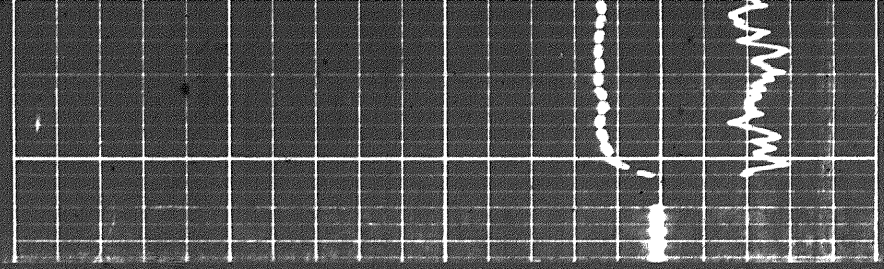
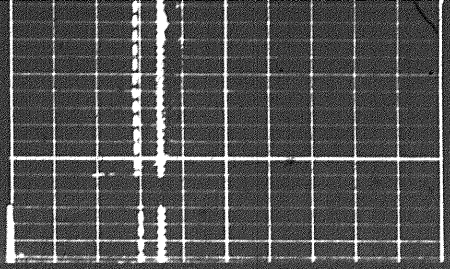
10900

REPEAT SECTION



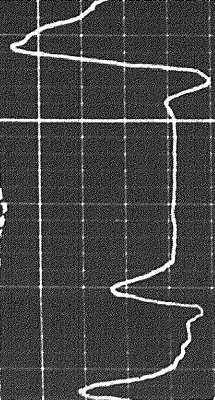
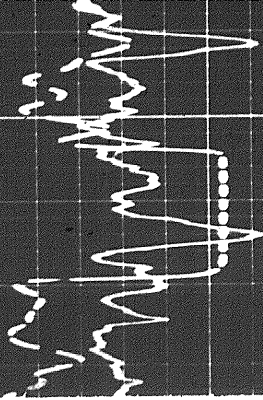
MEMORIZER IN
MEMORIZER OUT

12800



WAWAWAW

MEMORIZER IN
MEMORIZER OUT

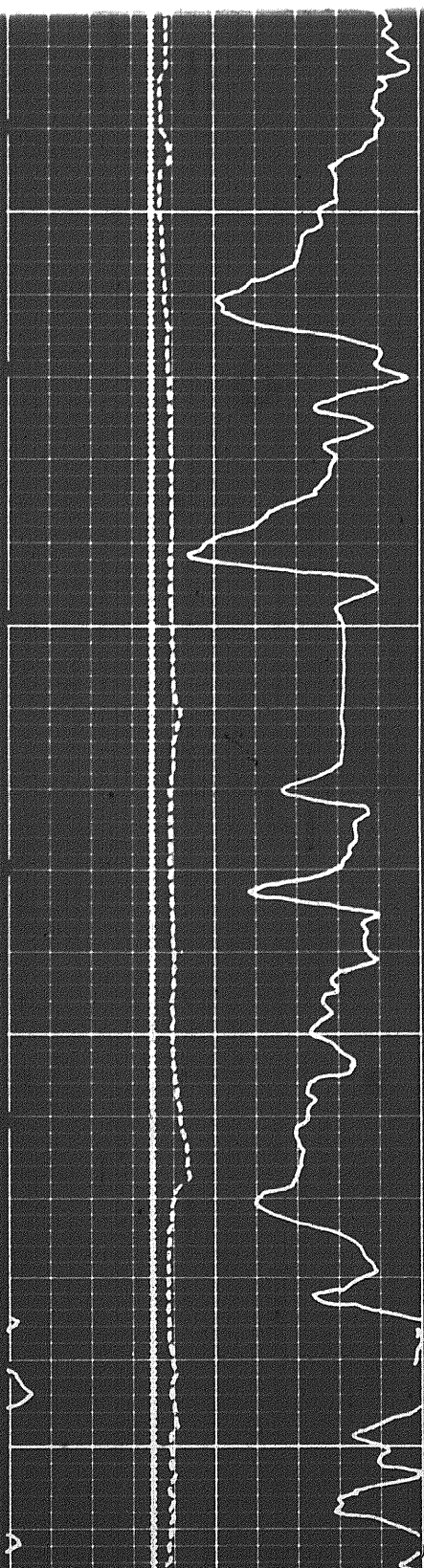


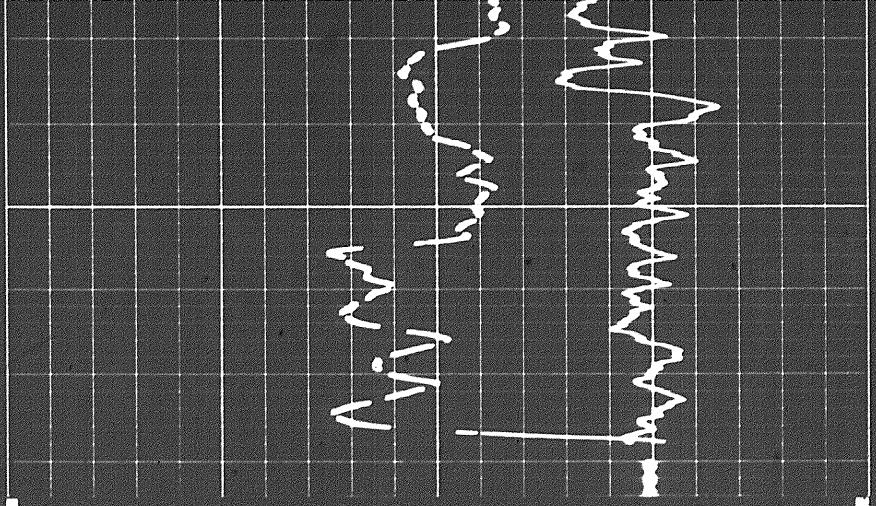
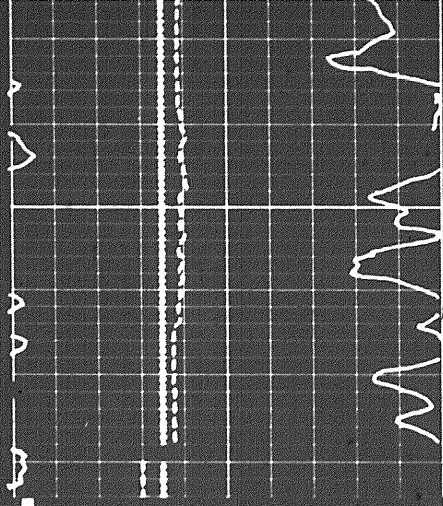
MEMORIZER IN
MEMORIZER OUT



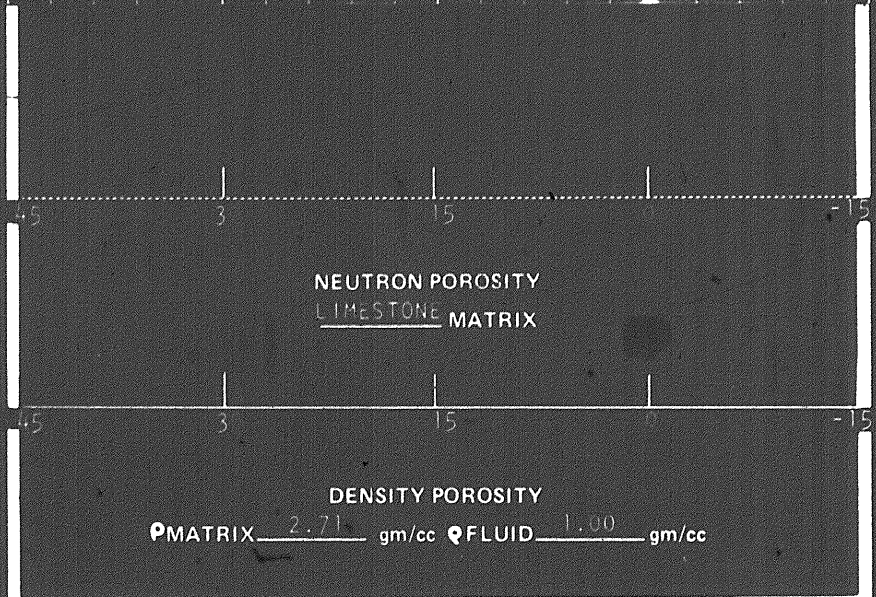
00601

00011





Sens. 15 T.C. _____
 Zero _____ div. to left 15
15 3



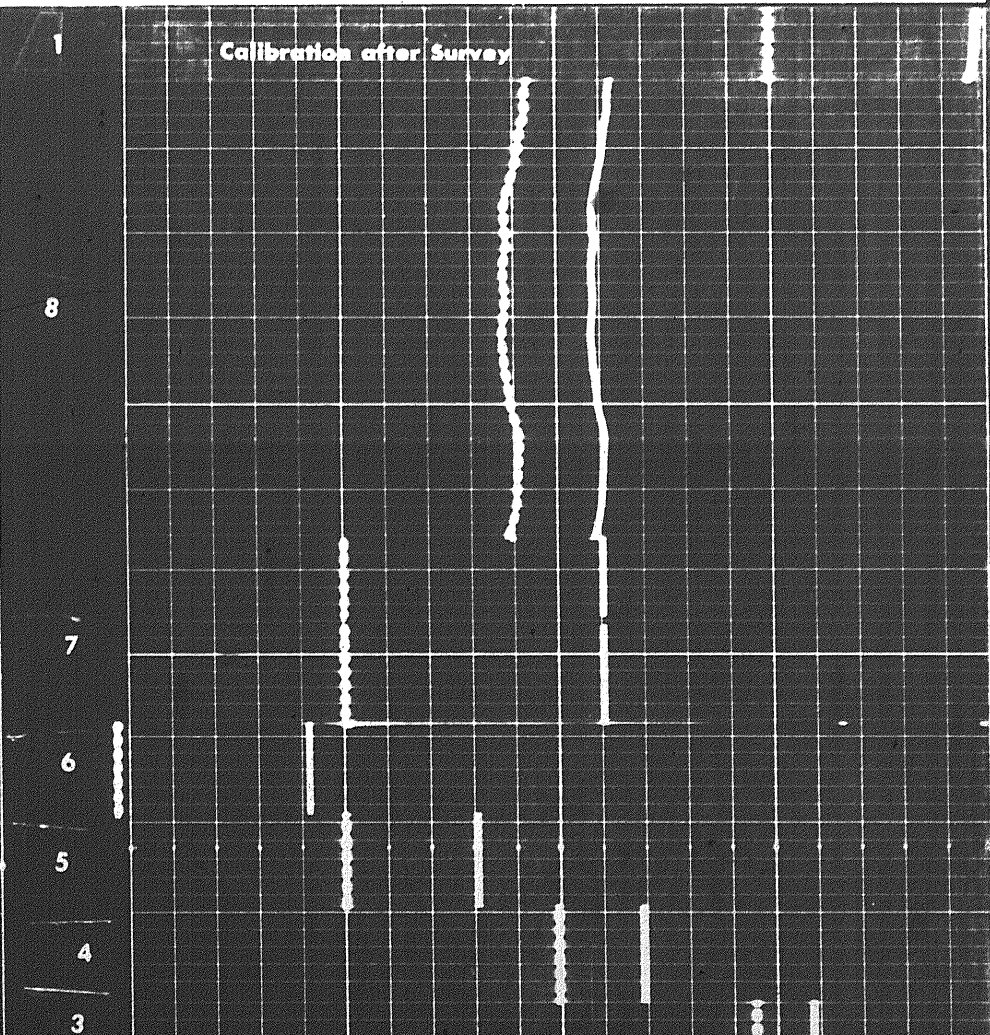
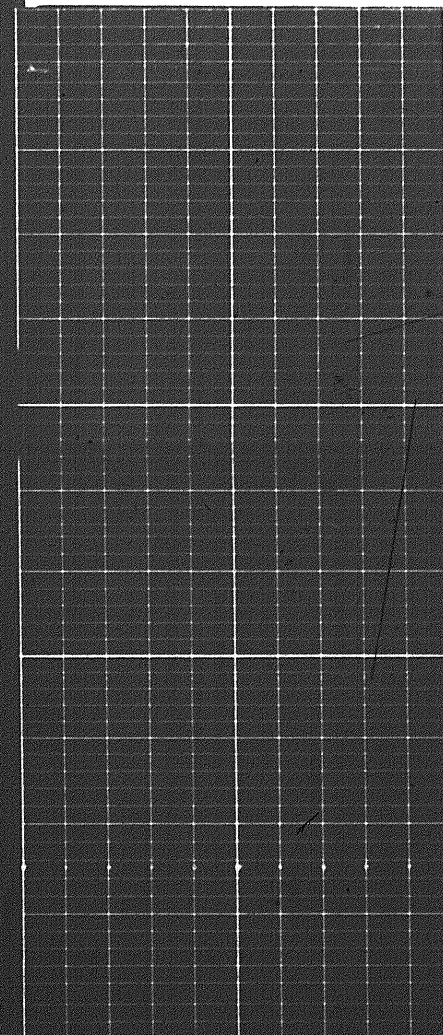
GAMMA RAY
API UNITS

Speed in fpm
 6 7 8 9 10 11 12 13 14

CALIPER
hole diameter in inches

DEPTH

POROSITY (%)



1
8
7
6
5
4
3

1201

6

5

4

3

2

1

1

Calibration before Survey

6

5

4

3

2

1

1

Calibration before Survey

8

8

7

6

5

4

3

2

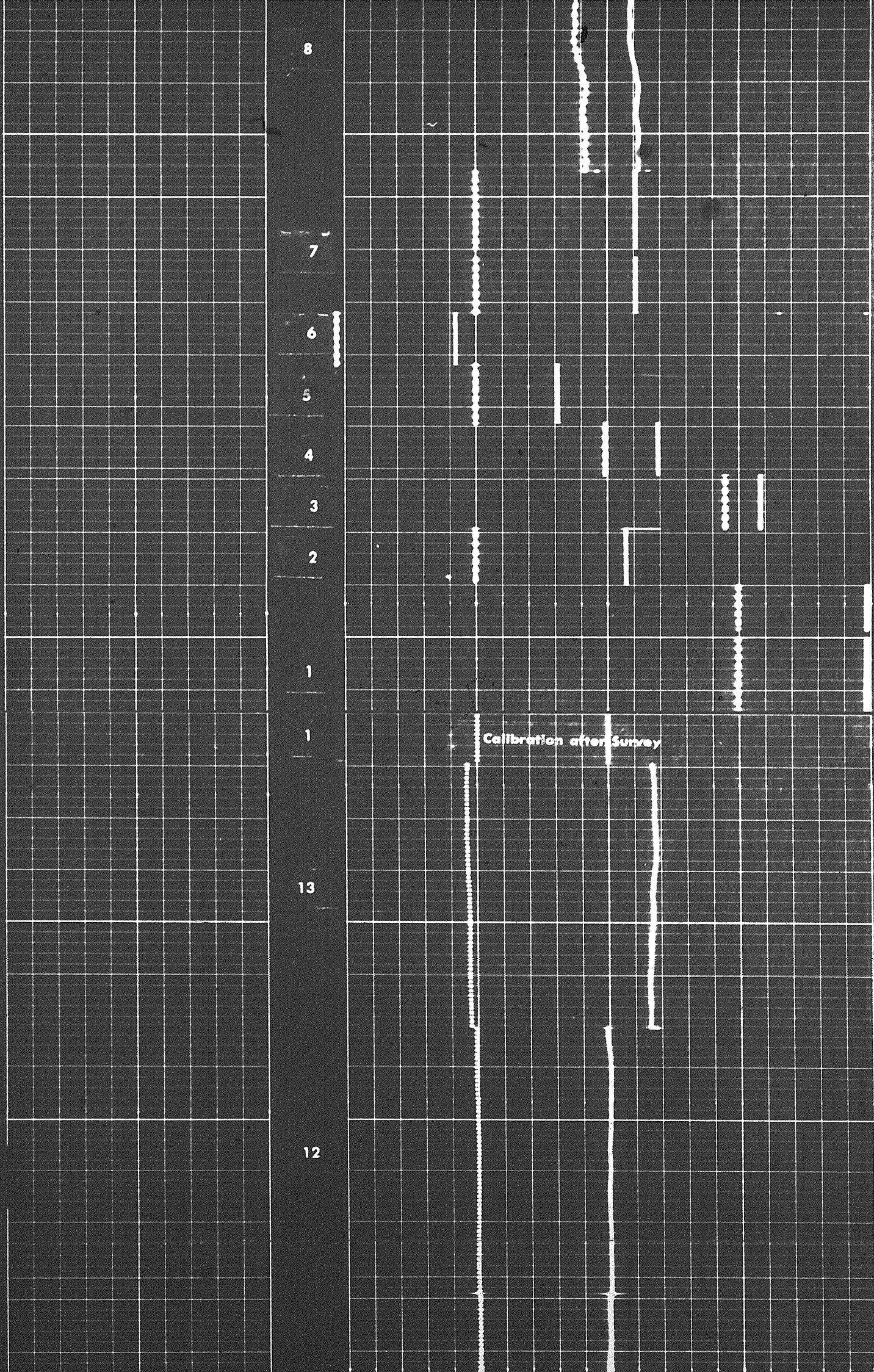
1

1

13

12

Calibration after Survey



13

12

11

10

9

8

7

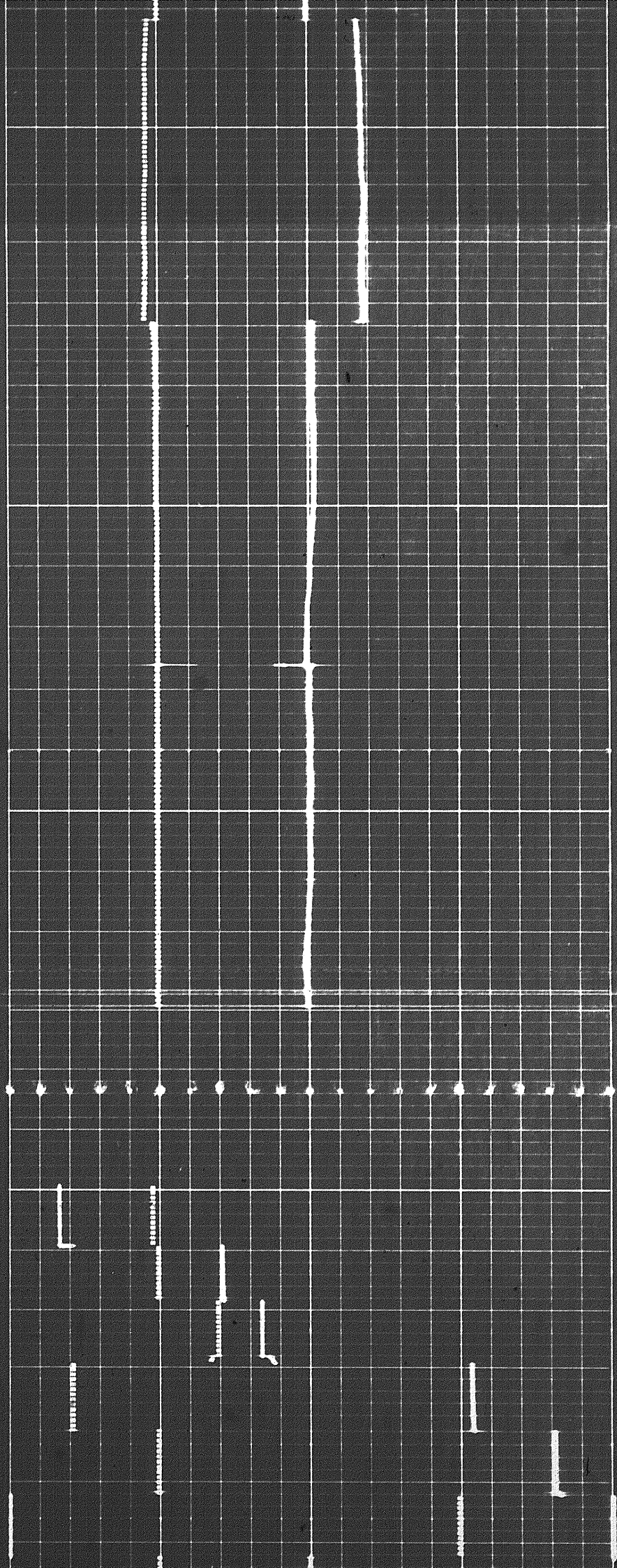
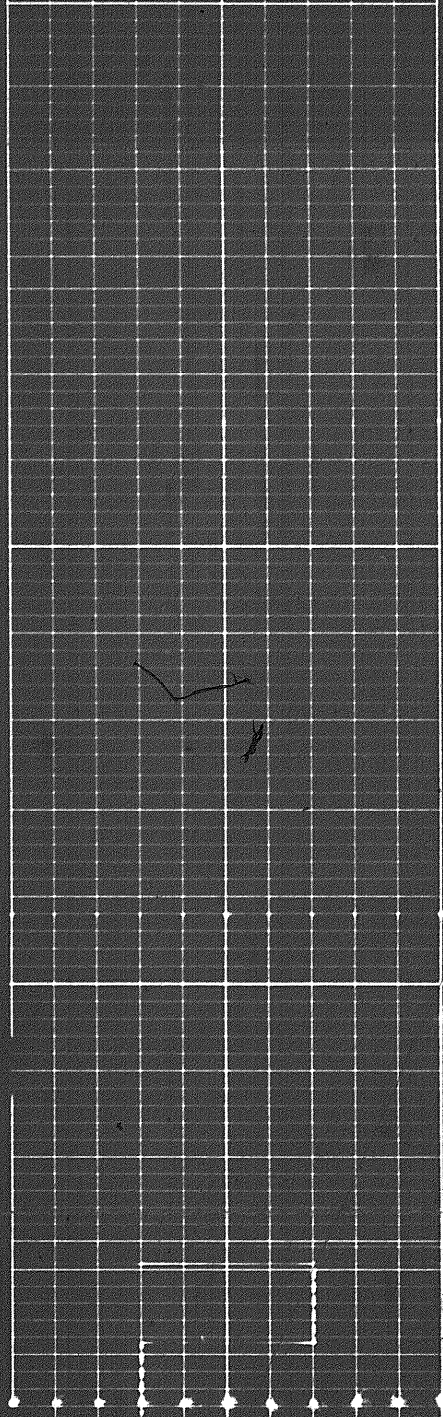
6

5

4

3

2



FORMATION DENSITY COMPENSATED CALIBRATION CODING

1. MECHANICAL ZERO
2. RECORDER SENSITIVITY
PANEL TEST

<u>FDC LIQUID</u>		
<u>POS</u>	<u>ρ</u>	<u>$\Delta\rho$</u>
3. H 1	2.92	.00
4. H 2	2.78	+ .14
5. H 3	2.42	- .10
6. H 4	2.35	.00
7. H 5	2.08	.01
8. MECHANICAL ZERO CALIPER
9. 8" RING
10. 12" RING
11. TOOL CALIBRATE H 1 SET $\rho = 2.50$
12. TOOL CALIBRATE H 2 SET $\Delta\rho = .00$
13. LOG POSITION $\rho = 2.59, \Delta\rho = .015$

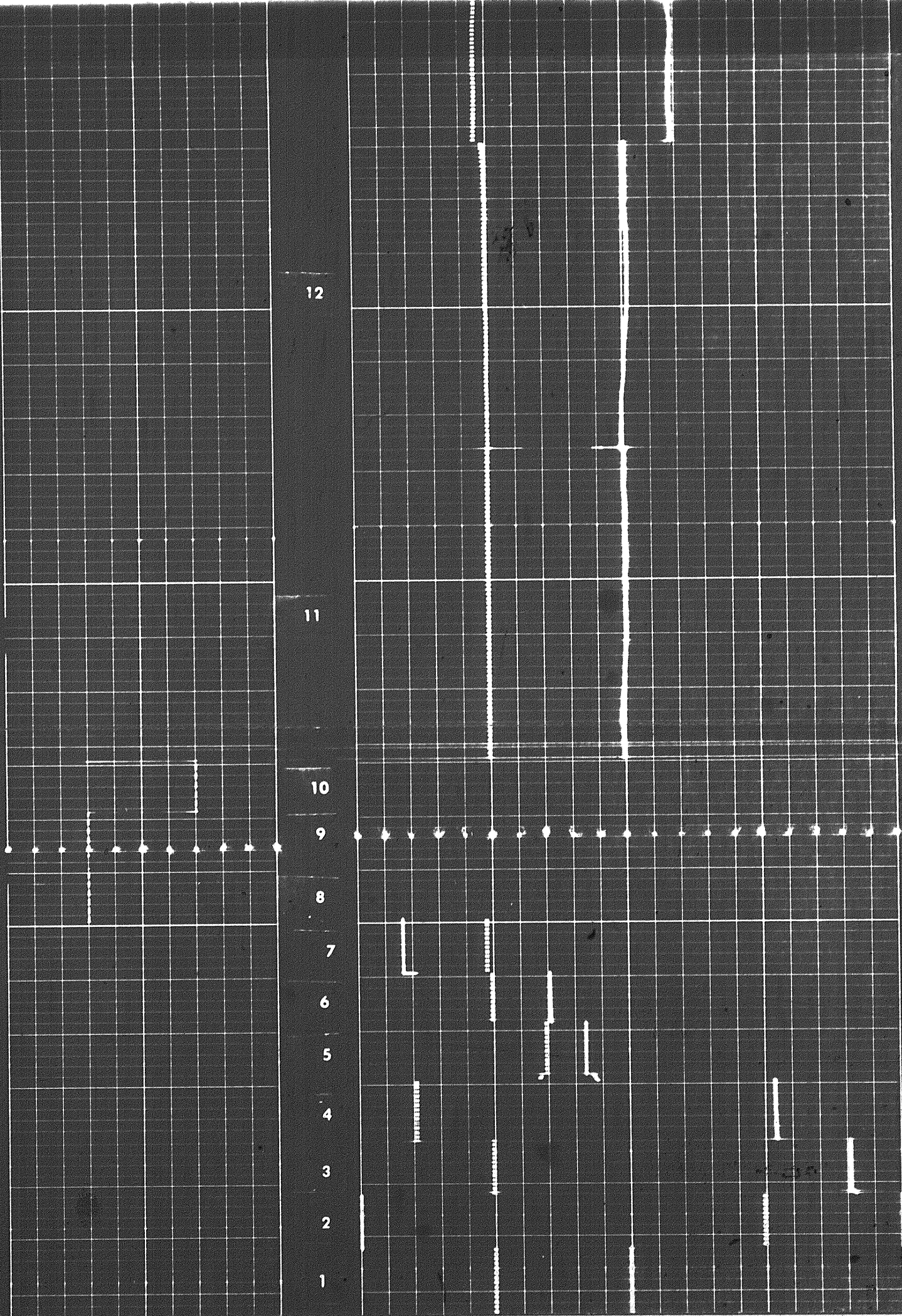
GAMMA RAY CALIBRATION CODING

1. MECHANICAL ZERO
2. ELECTRICAL ZERO
3. RECORDER SENSITIVITY
4. MEMORIZER ADJUSTMENT
5. BACKGROUND
6. CALIBRATE - SOURCE IN PLACE

COMPENSATED NEUTRON CALIBRATION CODING

1. MECHANICAL ZERO
2. RECORDED SENSITIVITY (THRU MEMORIZER IF USED)

	<u>RATIO</u>	<u>PANEL TEST</u>					
		<u>OH</u>			<u>POROSITY</u>		
		<u>LS</u>	<u>SS</u>	<u>DOL</u>	<u>SS</u>	<u>LS</u>	
3.	1	1.6	4.9	0.2	2.4	0.1	
4.	2	15.6	19.7	8.1	13.0	9.0	
5.	3	30.5	36.0	25.2	29.1	24.1	
6.	4	45.4	53.1	47.5	47.4	43.2	
7.		POROSITY NORMALIZED WITH CNB-A IN PLACE					



FORMATION DENSITY COMPENSATED CALIBRATION CODING

1. MECHANICAL ZERO
 2. RECORDER SENSITIVITY
- PANEL TEST

FDC LIQUID

FORMATION DENSITY COMPENSATED CALIBRATION CODING

1. MECHANICAL ZERO
2. RECORDER SENSITIVITY
PANEL TEST
FDC LIQUID

POS	ρ	$\Delta \rho$
3. #1	2.92	.00
4. #2	2.78	+ .14
5. #3	2.42	.10
6. #4	2.35	.00
7. #5	2.08	.01
8. MECHANICAL ZERO CALIPER
9. 8" RING
10. 12" RING
11. TOOL CALIBRATE #1 SET $\rho = 2.50$
12. TOOL CALIBRATE #2 SET $\Delta \rho = .00$
13. LOG POSITION $\rho = 2.59, \Delta \rho = .015$

GAMMA RAY CALIBRATION CODING

1. MECHANICAL ZERO
2. ELECTRICAL ZERO
3. RECORDER SENSITIVITY
4. MEMORIZER ADJUSTMENT
5. BACKGROUND
6. CALIBRATE - SOURCE IN PLACE

COMPENSATED NEUTRON CALIBRATION CODING

1. MECHANICAL ZERO
2. RECORDED SENSITIVITY (THRU MEMORIZER IF USED)

	RATIO	PANEL TEST					
		OH			CH		
		LS <input type="checkbox"/>	SS <input type="checkbox"/>	DOL <input type="checkbox"/>	SS <input type="checkbox"/>	LS <input type="checkbox"/>	
3.	1	1.6	4.9	0.2	2.4	0.1	
4.	2	15.6	19.7	8.1	13.0	9.0	
5.	3	30.5	36.0	25.2	29.1	24.1	
6.	4	45.4	53.1	47.5	47.4	43.2	
7.	POROSITY NORMALIZED WITH CNB-A IN PLACE						
	7A. TOOL IN NCT-B						
8.	LOG POSITION WITH CNB-A IN PLACE						
	8A. LOG POSITION WITH TOOL IN NCT-B						
		OH			CH		
		LS	SS	DOL	SS	LS	
		18	22.2	10.4	15.3	11.2	
	$\text{RATIO (NORMALIZED)} = \frac{2.17}{\text{RATIO (NCT-B)}} \quad \text{RATIO (LOG)}$						

COMPANY _____
WELL _____
FIELD _____
PROVINCE _____

SCHL. FR _____
SCHL. TD _____
DRLR. TD _____
Elev.: _____
KB _____
DF _____
GL _____

15/10/81