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LEVEL III

VOLUME IVB
SELF-TENSIONING ACOUSTICAL
HORIZONTAL LINE ARRAY
(SPRAY)
DATA ANALYSIS (U)

FINAL REPORT OF BEARING STAKE TESTS
JANUARY THRU MARCH 1976

9 JANUARY 1979

DDC FILE COPY

PREPARED FOR
NAVAL AIR DEVELOPMENT CENTER
WARMINSTER, PENNSYLVANIA

UNDER CONTRACTS
N62269-77-C-0139
and
N62269-78-M-6884



PREPARED BY
SANDERS ASSOCIATES, INC.
OCEAN SYSTEMS DIVISION
95 CANAL STREET
NASHUA, NEW HAMPSHIRE 03061

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VOLUME IVB

LEVEL III

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SELF-TENSIONING ACOUSTICAL
HORIZONTAL LINE ARRAY
(SPRAY)
DATA ANALYSIS.

FINAL REPORT OF BEARING STAKE TESTS

JANUARY THRU MARCH 1977.

Volume IVB, Data Points 10, 11
and 12 Raw Data (W)

9 JANUARY 1979

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VOLUME

IA	Summary - Test Results
IB	Detailed Description, Test Results
II	Data Analysis Facility and Data Reduction Methodology
IIIA	Data Points 1, 2 and 3 Raw Data
IIIB	Data Points 4, 5 and 6 Raw Data
IVA	Data Points 7, 8 and 9 Raw Data
IVB	Data Points 10, 11 and 12 Raw Data

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NOTE ALI Plot Scales for Beamformed and

Omni Data are NOT the same.

SNR comparisons cannot be taken directly
from plot comparisons.

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• OMNI NOISE LEVELS

19 JANUARY 1977		DATA POINT 1
290 Hz	+64.6	dBrepPa/1 Hz
295 Hz	+64.2	dBrepPa/1 Hz

19 JANUARY 1977		DATA POINT 2
290 Hz	+64.7	dBrepPa/1 Hz
295 Hz	+65.4	dBrepPa/1 Hz

7 FEBRUARY 1977		DATA POINT 3
140 Hz	+74.5	dBrepPa/1 Hz
290 Hz	+67.5	dBrepPa/1 Hz

7 FEBRUARY 1977		DATA POINT 4
140 Hz	+73.3	dBrepPa/1 Hz
290 Hz	+65.6	dBrepPa/1 Hz

7 FEBRUARY 1977		DATA POINT 5
140 Hz	+76.6	dBrepPa/1 Hz
290 Hz	+68.4	dBrepPa/1 Hz

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7 FEBRUARY 1977 DATA POINT 6

140 Hz +76.0 dBre μ Pa/1 Hz
290 Hz +68.9 dBre μ Pa/1 Hz

8 FEBRUARY 1977 DATA POINT 7

140 Hz +70.1 dBre μ Pa/1 Hz
290 Hz +62.2 dBre μ Pa/1 Hz

15 MARCH 1977 DATA POINT 8

140 Hz +67.3 dBre μ Pa/1 Hz
290 Hz +61.6 dBre μ Pa/1 Hz

15 MARCH 1977 DATA POINT 9

140 Hz +68.2 dBre μ Pa/1 Hz
290 Hz +65.2 dBre μ Pa/1 Hz

16 MARCH 1977 DATA POINT 10

140 Hz +74.2 dBre μ Pa/1 Hz
290 Hz +64.6 dBre μ Pa/1 Hz

16 MARCH 1977 DATA POINT 11

140 Hz +70.2 dBre μ Pa/1 Hz
290 Hz +62.2 dBre μ Pa/1 Hz

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● OMNI NOISE LEVELS

16 MARCH 1977

140 Hz
290 Hz

+72.0
+65.5

dBrepPa/1 Hz
dBrepPa/1 Hz

DATA POINT 12

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O M N I

OPERATIONAL DATA	AVG. SIGNAL LEVEL DBV	AVG. NOISE LEVEL DBV	BANDWIDTH CORRECT-YAW	BANDWIDTH CORRECT-YAW	AREA SENSITIVITY	APG CORRECT-YAW	SNR	LINEAR PROBING CORRECT-YAW	CORRECT-TO SNR
1. DATE: 1-17-77 TIME: 1651Z RANGE: 9.5 NM 290 HZ DEPTH: 1150 FM 295 HZ	-48.7 -52.3	-86.7 -87.1	-1.0 +15 -1.0 +15	+8 +8	+100 +100	7.0 3.8	-4.8 -5.8	+2.2 -2.0	
2. DATE: 1-17-77 TIME: 1608Z RANGE: 9.5 NM 290 HZ DEPTH: 1150 FM 295 HZ	-50.5 -51.2	-86.6 -86.9	-1.0 +15 -1.0 +15	+8 +8	+100 +100	5.0 4.7	-5.2 -5.4	-0.2 -0.7	
3. DATE: 2-7-77 TIME: 0134Z RANGE: 11.5 NM 140 HZ DEPTH: 1900 FM 280 HZ	-32.5 -39.6	-46.7 -48.7	-1.0 +10 -1.0 +10	+12 +8	+100 +100	13.2 10.1	-4.2 -4.3	9.0 5.6	
4. DATE: 2-7-77 TIME: 1018Z RANGE: 11.5 NM 140 HZ DEPTH: 1900 FM 280 HZ	-36.4 -37.6	-46.8 -50.6	-1.0 +10 -1.0 +10	+12 +8	+100 +100	12.5 11.0	-4.2 -4.2	8.3 6.9	
5. DATE: 2-7-77 TIME: 1512Z RANGE: 11.0 NM 140 HZ DEPTH: 1900 FM 280 HZ	-30.0 -33.1	-43.5 -47.8	-1.0 +10 -1.0 +10	+12 +8	+100 +100	13.5 14.7	-4.2 -4.2	9.3 10.3	
6. DATE: 2-7-77 TIME: 2038Z RANGE: 10.5 NM 140 HZ DEPTH: 1900 FM 280 HZ	-24.7 -23.0	-44.2 -47.3	-1.0 +10 -1.0 +10	+12 +8	+100 +100	19.5 24.3	-4.0 -4.0	15.5 20.3	

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O M N I

OPERATIONAL DATA	AVE. SIGNAL LEVEL DBV	AVE. RATE LEVEL DBV	BAUD-WIDTH CORREC-TION (MCPSS)	BAUD-WIDTH CORREC-TION (TO 112)	ARRAY SENSITIVITY (TO 112)	ARRAY SENSITIVITY (TO 112)	M% CONVERSION	SNR	LINEAR PROCESSING CORREC-TION	CORRECTED SNR
7 DATE: 3-27-77 TIME: 0202Z RANGE: 28NM 140 HZ DEPTH: 1800FM 290 HZ	-16.0 -17.5	-50.1 -59.0	-1.8 -1.8	+10 +10	+12 +8	+100 +100	37.1 36.5	-4.0 -4.0	30.1 32.5	
8 DATE: 3-15-77 TIME: 1501Z RANGE: 23NM 140 HZ DEPTH: 2800FM 290 HZ	-19.4 -15.2	-52.9 -54.6	-1.8 -1.8	+10 +10	+12 +8	+100 +100	33.5 39.4	-4.0 -4.0	29.5 35.4	
9 DATE: 3-15-77 TIME: 2132Z RANGE: 23NM 140 HZ DEPTH: 2800FM 290 HZ	-19.4 -13.5	-52.0 -51.0	-1.8 -1.8	+10 +10	+12 +8	+100 +100	36.6 38.5	-4.0 -4.0	32.6 34.5	
10 DATE: 3-16-77 TIME: 0633Z RANGE: 128 NM 140 HZ DEPTH: 2800FM 290 HZ	-23.3 -38.0	-44.0 -51.6	-1.8 -1.8	+10 +10	+12 +8	+100 +100	22.7 13.6	-4.0 -4.2	18.7 9.4	
11 DATE: 3-16-77 TIME: 0935Z RANGE: 128 NM 140 HZ DEPTH: 2800FM 290 HZ	-29.8 -41.5	-50.0 -54.0	-1.8 -1.8	+10 +10	+12 +8	+100 +100	20.2 12.5	-4.0 -4.2	16.2 8.3	
12 DATE: 3-16-77 TIME: 1148Z RANGE: 128 NM 140 HZ DEPTH: 2800 FM 290 HZ	-24.8 -38.6	-48.2 -50.7	-1.8 -1.8	+10 +10	+12 +8	+100 +100	23.4 12.1	-4.0 -4.2	19.4 7.9	

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ELEMENT ARRAY

OPERATIONAL DATA	SIGNAL LEVEL DBV	MOD-33				A+B+C	ATE	JTK	I+S	NOISE LEVEL DBV	MCR-33 CORRECT-TIME	BEAM-ATTN	BEAM-SPREAD	BEAM-ANGLE	TRAND-WIDTH CORRECT-TIME	RAUD-WIDTH CORRECT-TIME	ACDPT-SCAT-THRESHOLD	APD CORRECT-TIME	SNR M-F	LINEAR PROCESS-CORRECT-TIME	CORRECT-TIME	ITREQU-ANGLE	QTL
		A	B	C	D																		
1																							
DATE: 1-9-77 TIME: 1515Z																							
RANGE: 910M 250 NR	-60.4	910	910	910	28	-32.1	28	-36.1	-74.1	910	0	+7	-1.8	+15	78			17.7	-7.1	74.3			17.4
DEPTH: 1600M 215 NR	-68.8	910	910	910	28	-36.8	28	-38.1	-78.1	910	0	+8	-1.8	+15	78			9.3	-4.4	5.8			10.2
2																							
DATE: 1-9-77 TIME: 1600Z																							
RANGE: 910M 250 NR	-37.6	N/A	N/A	N/A	0	-37.1	0	-44.6	-86.6	N/A	0	+9	-1.8	+15	78			7.5	-9.8	7.6			8.4
DEPTH: 1100M 205 NR	-38.9	N/A	N/A	N/A	0	-38.3	0	-42.6	-84.6	N/A	0	+9	-1.8	+15	78			5.9	-8.0	7.8			6.5
3																							
DATE: 2-7-77 TIME: 0833Z																							
RANGE: 1750M 140 NR	-36.2	910	910	910	28	-26.2	28	-31.8	-69.8	910	+18	+2	-1.8	+10	112			23.6	-4.0	19.8			23.8
DEPTH: 1900M 250 NR	-37.4	910	910	910	28	-26.5	28	-34.4	-68.4	910	+18	+2	-1.8	+10	112			23.3	-4.0	20.1			24.1
4																							
DATE: 2-7-77 TIME: 1612Z																							
RANGE: 1500M 190 NR	-38.4	910	910	910	28	-14.4	28	-27.1	-58.1	910	+18	+2	-1.8	+10	112			16.7	-9.2	11.7			16.9
DEPTH: 1500M 210 NR	-42.5	910	910	910	28	-17.2	28	-37.0	-66.0	910	+18	+2	-1.8	+10	112			20.6	-9.0	17.2			21.2
5																							
DATE: 2-7-77 TIME: 1642Z																							
RANGE: 1100M 170 NR	-30.0	910	910	910	28	-11.0	28	-32.1	-60.1	910	+18	+2	-1.8	+10	112			31.1	-4.0	27.3			31.3
DEPTH: 1000M 230 NR	-34.4	910	910	910	28	-12.4	28	-34.8	-64.8	910	+18	+2	-1.8	+10	112			26.7	-4.0	23.3			27.3
6																							
DATE: 2-7-77 TIME: 2033Z																							
RANGE: 700M 140 NR	-28.7	910	910	910	28	-7.7	28	-24.7	-56.7	910	+18	+2	-1.8	+10	112			26	-4.0	24.2			26.2
DEPTH: 1800M 210 NR	-35.9	910	910	910	28	-8.7	28	-32.0	-58.2	910	+18	+2	-1.8	+10	112			24.9	-4.0	21.5			27.5

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ELEMENT

ARRAY

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OPERATIONAL DATA	STATION LEVEL DBV	WIND CORRECTION	BEAM ANGLE	B+C	A+E	J+K	I+G	NOISE LEVEL DBV	PROPAGATION LOSS	BEAM WIDTH CORRECTION	WIND WAVE CORRECTION	ARRAY SEPARATION	A/D CONVERSION	SNR H-F	LINEAR PROCESSING	COMPARISON SNR	STATION ANGLE	QUAL			
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R			
7 DATE: 2-8-77 TIME: 0202Z RANGE: 28 NM, 140 Hz DEPTH: 1800 FM, 280 Hz	-22.8	+10	+24	+2	24	+1.2	-41.4	-65.4	+10	+24	+2	+1.2	-1.8	+10	+12	+100	43.6	-4.0	39.8	-24.5	47.8
8 DATE: 3-15-77 TIME: 1501Z RANGE: 22 NM, 140 Hz DEPTH: 2800 FM, 240 Hz	-21.5	+10	+18	+8	28	+5.4	-33.6	-61.6	+10	+18	+8	+2	-1.8	+10	+8	+100	51.8	-4.0	18.6	+30.0	53.6
9 DATE: 3-15-77 TIME: 2101Z RANGE: 72 NM, 140 Hz DEPTH: 2800 FM, 240 Hz	-22.5	+10	+12	+1	22	-0.5	-36.7	-58.7	+10	+12	+1	+1	-1.8	+10	+12	+100	26.2	-4.0	22.3	+51.5	36.3
10 DATE: 3-16-77 TIME: 0613Z RANGE: 128 NM, 140 Hz DEPTH: 2800 FM, 240 Hz	-16.8	+10	+12	+2	22	+5.2	-23.6	-65.6	+10	+12	+2	+1.2	-1.8	+10	+12	+100	28.8	-4.0	35.0	+51.0	38.0
11 DATE: 3-16-77 TIME: 0935Z RANGE: 122 NM, 140 Hz DEPTH: 2800 FM, 240 Hz	-28.0	+10	+18	+2	28	-0.8	-28.2	-56.2	+10	+18	+2	+1.2	-1.8	+10	+12	+100	27.4	-4.0	23.6	+62.0	27.6
12 DATE: 3-16-77 TIME: 1108Z RANGE: 122 NM, 140 Hz DEPTH: 2800 FM, 240 Hz	-39.9	+10	+18	+8	28	+6.2	-27.1	-55.1	+10	+18	+8	+1.8	-1.8	+10	+12	+100	32.3	-4.0	28.5	+61.0	22.5

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ELEMENT

ARRAY

P O S I T I O N	O P E R A T I O N A L D A T A	S I G N A L L E V E L D B V	M O D E L C O R R E C T I O N			B E A M P O W E R A T T E N T I O N			B E A M W I D T H C O R R E C T I O N			B E A M W I D T H C O R R E C T I O N			A R M Y S C A N T I V I T Y	M I S C O M M U N I C A T I O N	S N R H - F	M I S C P A R A M E T E R S W A R E T R A C T I O N	C O R R E C T I O N S N R	S T E E R A N G E A N G L E	Q T L
			A	B	C	D	E	F	G	H	I	J	K	L							
1	DATE: 1-13-77 TIME: 1551Z RANGE: 110 NM 280 Hz DEPTH: 1150 FM 285 Hz	-57.2 -65	+10 +10	+18 +18	+1.8 +1.8	+28 +28	+24 +24	+18 +18	+18 +18	+10 +10	+10 +10	+18 +18	+15 +15	+8 +8	+100 +100	17.7 9.8	-4.1 -4.4	14.1 6.2	-59° -59°	18.5 10.6	
2	DATE: 1-13-77 TIME: 1600Z RANGE: 91 NM 280 Hz DEPTH: 1150 FM 285 Hz	-55.8 -61.3	+10 +10	+18 +18	+1.8 +1.8	+28 +28	+24 +24	+18 +18	+18 +18	+10 +10	+10 +10	+18 +18	+15 +15	+8 +8	+100 +100	17.2 7.7	-4.2 -4.7	9.8 3.8	-52.5° -52.5°	14.0 8.5	
3	DATE: 2-27-77 TIME: 0130Z RANGE: 117 NM 190 Hz DEPTH: 1100 FM 280 Hz	-36.6 -45.2	+10 +10	+24 +24	+1.8 +1.8	+34 +34	+34 +34	+24 +24	+24 +24	+10 +10	+10 +10	+18 +18	+10 +10	+12 +8	+100 +100	24.5 23.8	-4.0 -4.0	20.7 20.7	25.5° 25.5°	24.7 24.7	
4	DATE: 2-27-77 TIME: 1018Z RANGE: 155 NM 190 Hz DEPTH: 1900 FM 280 Hz	-37.2 -54.4	+10 +10	+24 +24	+1.8 +1.8	+34 +34	+34 +34	+24 +24	+24 +24	+10 +10	+10 +10	+18 +18	+10 +10	+12 +8	+100 +100	18.6 14.4	-4.0 -4.2	15.3 11.0	25.5° 25.5°	18.2 15.2	
5	DATE: 2-27-77 TIME: 1548Z RANGE: 110 NM 190 Hz DEPTH: 1900 FM 280 Hz	-31.3 -41.2	+10 +10	+24 +24	+1.8 +1.8	+34 +34	+34 +34	+24 +24	+24 +24	+10 +10	+10 +10	+18 +18	+10 +10	+12 +8	+100 +100	29.5 21.7	-4.0 -4.0	26.6 26.6	49° 49°	21.7 30.6	
6	DATE: 2-27-77 TIME: 2033Z RANGE: 70 NM 190 Hz DEPTH: 1900 FM 280 Hz	-29.8 -29.2	+10 +10	+24 +24	+1.8 +1.8	+34 +34	+34 +34	+24 +24	+24 +24	+10 +10	+10 +10	+18 +18	+10 +10	+12 +8	+100 +100	30.5 25.3	-4.0 -4.0	26.7 22.1	17° 17°	20.7 26.1	

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ELEMENT

ARRAY

QTL

OPERATIONAL DATA	SIGNAL LEVEL DBV	MEDIA CAL CORREC-TION	TEAM-FORMER ATTN	BEAM-FORMER CORREC-TION	BEAM-WIDTH CORREC-TION	BOARDS WITH CORREC-TION	ARMY SEATI-VITY	NUMBER OF SIM	SMR H-F	MINIMUM RANGE-TION	CONVERTED SMR	STEER ANGLE	QTL					
	A	B	C	D	E	F	G	H	I	J	K	L	M					
7 DATE: 2-27-77 TIME: 0202Z RANGE: 2000 FT 150 HZ DEPTH: 1500 FT 200 HZ 265 HZ	-25.1	110	+30	+3	+40	+149	360	-22.2	-67.2	+30	+3	+1.3	+100	42.1	-4.0	38.4	-21.5	42.4
8 DATE: 3-15-77 TIME: 0501Z RANGE: 2200 FT 150 HZ DEPTH: 2000 FT 200 HZ 215 HZ	-27.2	110	+30	+2	+40	+13.8	+40	-35.1	-77.1	+30	+2	+1.8	+100	47.9	-4.0	44.1	+20	48.1
9 DATE: 3-15-77 TIME: 0510Z RANGE: 2200 FT 150 HZ DEPTH: 2000 FT 200 HZ 215 HZ	-28.2	110	+30	+2	+40	+16.2	+40	-35.2	-75.2	+20	+2	+1.8	+100	51.4	-4.0	47.4	+20	52.2
10 DATE: 3-15-77 TIME: 0617Z RANGE: 1500 FT 150 HZ DEPTH: 2000 FT 200 HZ 215 HZ	-32.7	110	+30	+2	+40	-35.4	+40	-38.4	-74.4	+30	+2	+1.8	+100	14.0	-4.2	10.2	+20	14.8
11 DATE: 3-15-77 TIME: 0835Z RANGE: 1500 FT 150 HZ DEPTH: 2000 FT 200 HZ	-18.5	110	+18	+2	+28	+4.4	+30	-20.5	-64.5	+24	+2	+2.2	+100	42.6	-4.0	38.6	+51.5	43.8
12 DATE: 3-15-77 TIME: 1402Z RANGE: 1500 FT 150 HZ DEPTH: 2000 FT 200 HZ	-35.6	110	+24	+7	+34	-11.2	+34	-34.9	-67.9	+24	+7	+1.8	+100	23.3	-4.0	19.3	+61.5	24.5
13 DATE: 3-15-77 TIME: 1402Z RANGE: 1500 FT 150 HZ DEPTH: 2000 FT 200 HZ	-18.9	110	+12	+2	+28	+9.1	+30	-26.6	-60.6	+10	+2	+1.8	+100	31.7	-4.0	27.7	+62	31.9
14 DATE: 3-15-77 TIME: 1402Z RANGE: 1500 FT 150 HZ DEPTH: 2000 FT 200 HZ	-35.8	110	+18	+2	+28	-7.8	+28	-31.1	-58.1	+10	+10	+1.8	+100	23.3	-4.0	19.3	+62	24.0

SECRET

OPERATIONAL DATA		MAX. ELEMENT ARRAY										CORRECT-STEER-AD INR ANGLE		Q+L								
DATE	TIME	SIGNAL LEVEL DIV	INCR-ENL CASE-TIME	BEAM-ATTN	REAR-ANGLE-TIME	B+C	A+E	THK	IT+5	NO. 2 LEVEL DIV	MCPDZ CAL CORREC-TIME	Z	L	H	N	O	P	Q	R	S	T	U
1	DATE: 1-27-77 TIME: 1508Z RANGE: 910M 210 MZ DEPTH: 1500FX 215 MZ	-24 -31	NA NA	0 0	+0 +0	0 0	-224 -371	0 0	-427 -457	-427 -427	NA NA	0 0	0 0	+0 +0	+0 +0	+0 +0	+100 +100	15.3 6.6	-4.2 -4.7	11.9 3.5	-31° -38°	16.1 7.4
2	DATE: 1-27-77 TIME: 1508Z RANGE: 1100M 140 MZ DEPTH: 1500FX 215 MZ	1.0 -11.2	NA NA	0 0	+0 +0	0 0	-25.0 -32.2	0 0	-324 -324	-324 -324	NA NA	0 0	0 0	+0 +0	+0 +0	+0 +0	+100 +100	14.4 7.2	-4.2 -4.8	11.0 3.2	-32.8° -38.5°	15.2 8.0
3	DATE: 2-7-77 TIME: 1012Z RANGE: 1750M 140 MZ DEPTH: 1500FX 210 MZ	-37.5 -47.4	NA NA	0 0	+0 +0	0 0	-25.0 -7.4	0 0	-324 -324	-324 -324	NA NA	0 0	0 0	+0 +0	+0 +0	+0 +0	+100 +100	28.3 25.8	-4.0 -4.0	24.5 32.6	25.5° 33.5°	28.5 26.4
4	DATE: 2-7-77 TIME: 1012Z RANGE: 1590M 140 MZ DEPTH: 1500FX 210 MZ	-42.4 -51.9	NA NA	0 0	+0 +0	0 0	-21.4 -11.4	0 0	-23.6 -31.4	-23.6 -31.4	NA NA	0 0	0 0	+0 +0	+0 +0	+0 +0	+100 +100	21.2 15.5	-4.0 -4.0	17.4 16.3	35.5° 35.5°	31.4 20.3
5	DATE: 2-27-77 TIME: 1508Z RANGE: 1100M 140 MZ DEPTH: 1500FX 210 MZ	-30.2 -47.4	NA NA	0 0	+0 +0	0 0	-43.0 -3.0	0 0	-24.2 -37.2	-24.2 -37.2	NA NA	0 0	0 0	+0 +0	+0 +0	+0 +0	+100 +100	28.0 25.4	-4.0 -4.0	24.2 22.2	48° 47°	30.2 26.2
6	DATE: 2-7-77 TIME: 2012Z RANGE: 2010M 140 MZ DEPTH: 1500FX 210 MZ	-32.0 -34.1	NA NA	0 0	+0 +0	0 0	-47.2 -55.9	0 0	-26.0 -37.0	-26.0 -37.0	NA NA	0 0	0 0	+0 +0	+0 +0	+0 +0	+100 +100	34.0 28.7	-4.0 -4.0	30.2 22.5	17° 17°	34.2 26.5

SECRET

SECRET

MAX.

ELEMENT

ARRAY

OPERATIONAL DATA	SIGNAL LEVEL		MCP-32 CAL		B+C		A+E		J+L		I+G		H		K		L		M		N		O		P		Q		R		S		T		U					
	DBV	DBV	TIME	ATTN	FORWARD	FORWARD	FORWARD	FORWARD	FORWARD	FORWARD	FORWARD	FORWARD	FORWARD	FORWARD	FORWARD	FORWARD	FORWARD	FORWARD	FORWARD	FORWARD	FORWARD	FORWARD	FORWARD	FORWARD	FORWARD	FORWARD	FORWARD	FORWARD	FORWARD	FORWARD	FORWARD	FORWARD	FORWARD	FORWARD	FORWARD					
7	DATE: 2-8-77	TIME: 0202Z																																						
	RANGE: 214-4	140 HZ																																						
	DEPTH: 1800 FM	240 HZ																																						
	DEPTH: 200 FM	245 HZ																																						
8	DATE: 2-15-77	TIME: 1501Z																																						
	RANGE: 224-4	140 HZ																																						
	DEPTH: 200 FM	240 HZ																																						
	DEPTH: 200 FM	245 HZ																																						
9	DATE: 3-15-77	TIME: 2312Z																																						
	RANGE: 724-4	140 HZ																																						
	DEPTH: 200 FM	240 HZ																																						
	DEPTH: 200 FM	245 HZ																																						
10	DATE: 3-15-77	TIME: 0037Z																																						
	RANGE: 1282-4	140 HZ																																						
	DEPTH: 2800 FM	240 HZ																																						
	DEPTH: 2800 FM	245 HZ																																						
11	DATE: 3-15-77	TIME: 0932Z																																						
	RANGE: 122-4	140 HZ																																						
	DEPTH: 2800 FM	240 HZ																																						
	DEPTH: 2800 FM	245 HZ																																						
12	DATE: 3-16-77	TIME: 1412Z																																						
	RANGE: 122-4	140 HZ																																						
	DEPTH: 2800 FM	240 HZ																																						
	DEPTH: 2800 FM	245 HZ																																						

SECRET

UNCLASSIFIED

SECTION 2

NOISE SPECTRAL DENSITY CALCULATIONS FOR SPRAY/BEARING STAKE (U)

DATA POINT 10 DATE 3-16-77 TIME 0633Z

FREQUENCY 140 HZ

INDICATED NOISE LEVEL $\frac{dBV}{\mu B}$ -46.0

SYSTEM SENSITIVITY $\frac{dB}{\mu B}$ -34.0

BANDWIDTH CONVERSION TO 1 HZ BAND +8.2

CONVERSION TO $\frac{dBrePa}{1HZ}$ +74.2

NOISE SPECTRAL DENSITY CALCULATIONS FOR SPRAY/BEARING STAKE (U)

DATA POINT 10

DATE 3-16-77

TIME 0633Z

FREQUENCY 290 HZ

INDICATED NOISE LEVEL $\frac{\text{dBV}}{\sqrt{\text{Hz}}}$ -51.6

SYSTEM SENSITIVITY $\text{dB}/\mu\text{B}$ -(-8)

BANDWIDTH CONVERSION TO 1 HZ BAND +6.2

CONVERSION TO $\text{dBre}\mu\text{Pa}/1\text{HZ}$ +100

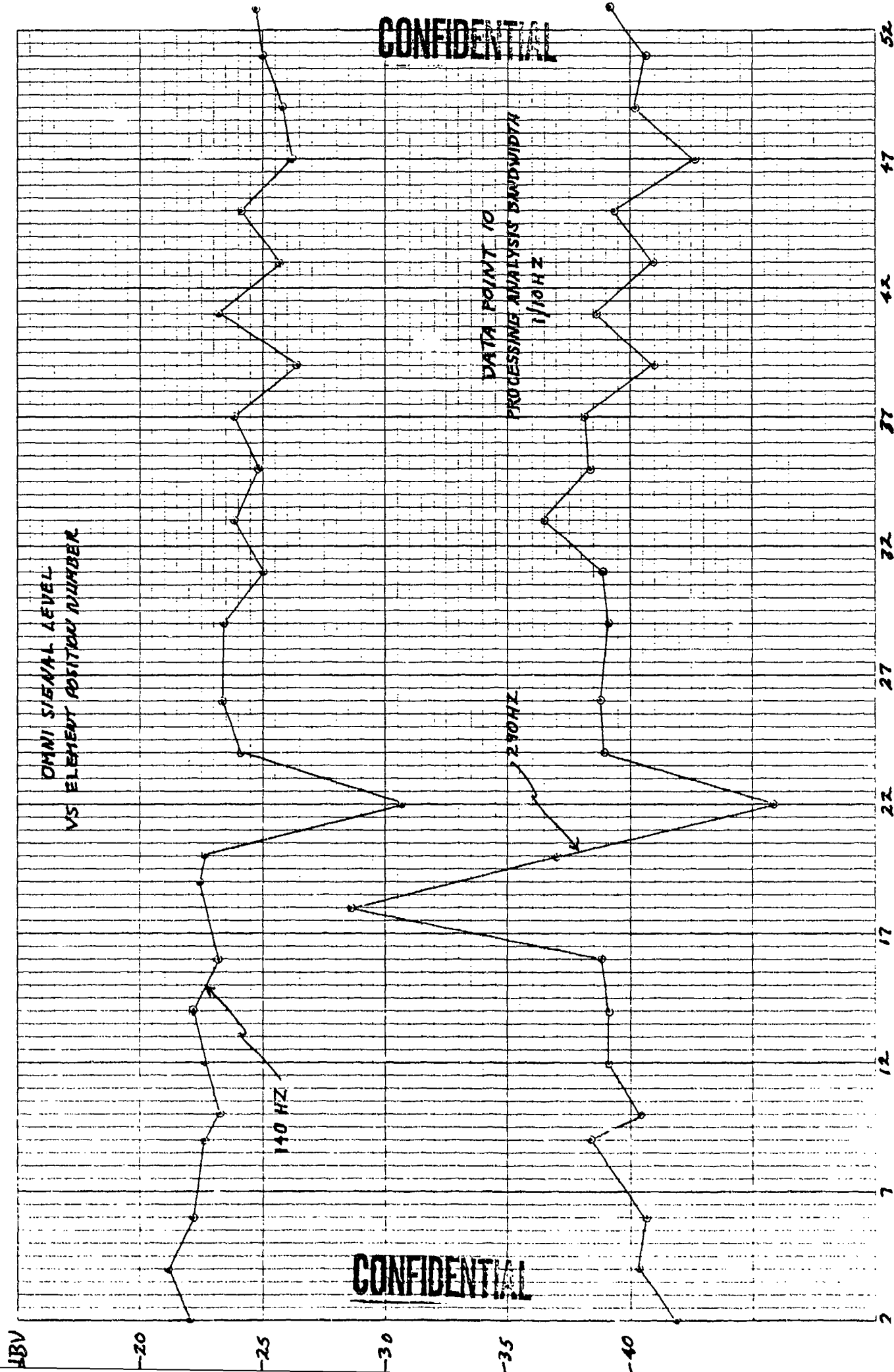
-43.6

-35.4

+14.6

UNCLASSIFIED

UNCLASSIFIED



CONFIDENTIAL

CONFIDENTIAL

K-2 10 X 10 TO THE INCH * 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

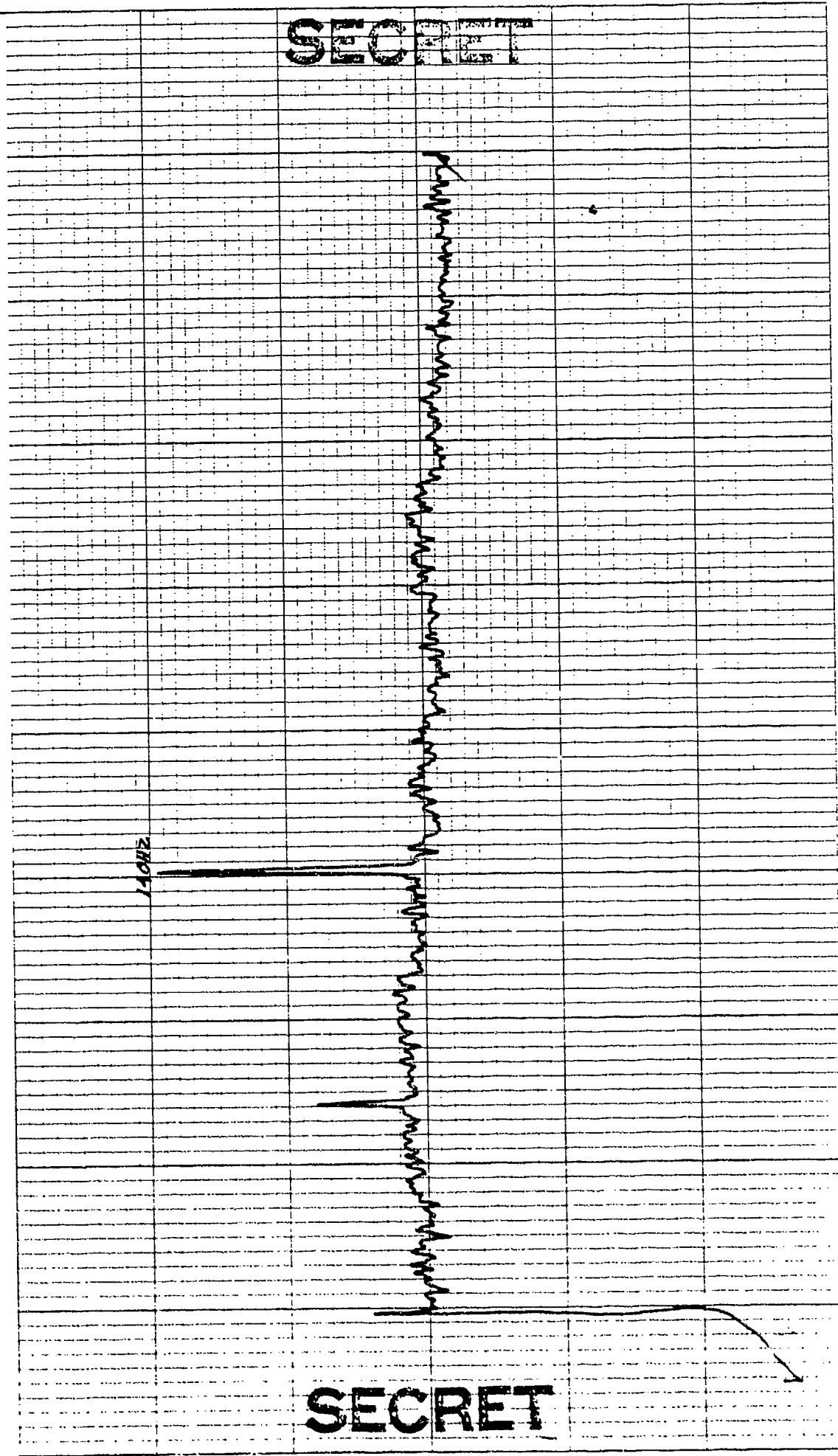
CONTROL: 3-16 - 6633 (27)
OMNI SPECTRUM (ELEMENT 2)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0633 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: M19 INDEX 1637

INTEGRATION TIME 320 SECS
FILTER WTC: HANNING



SECRET

SECRET

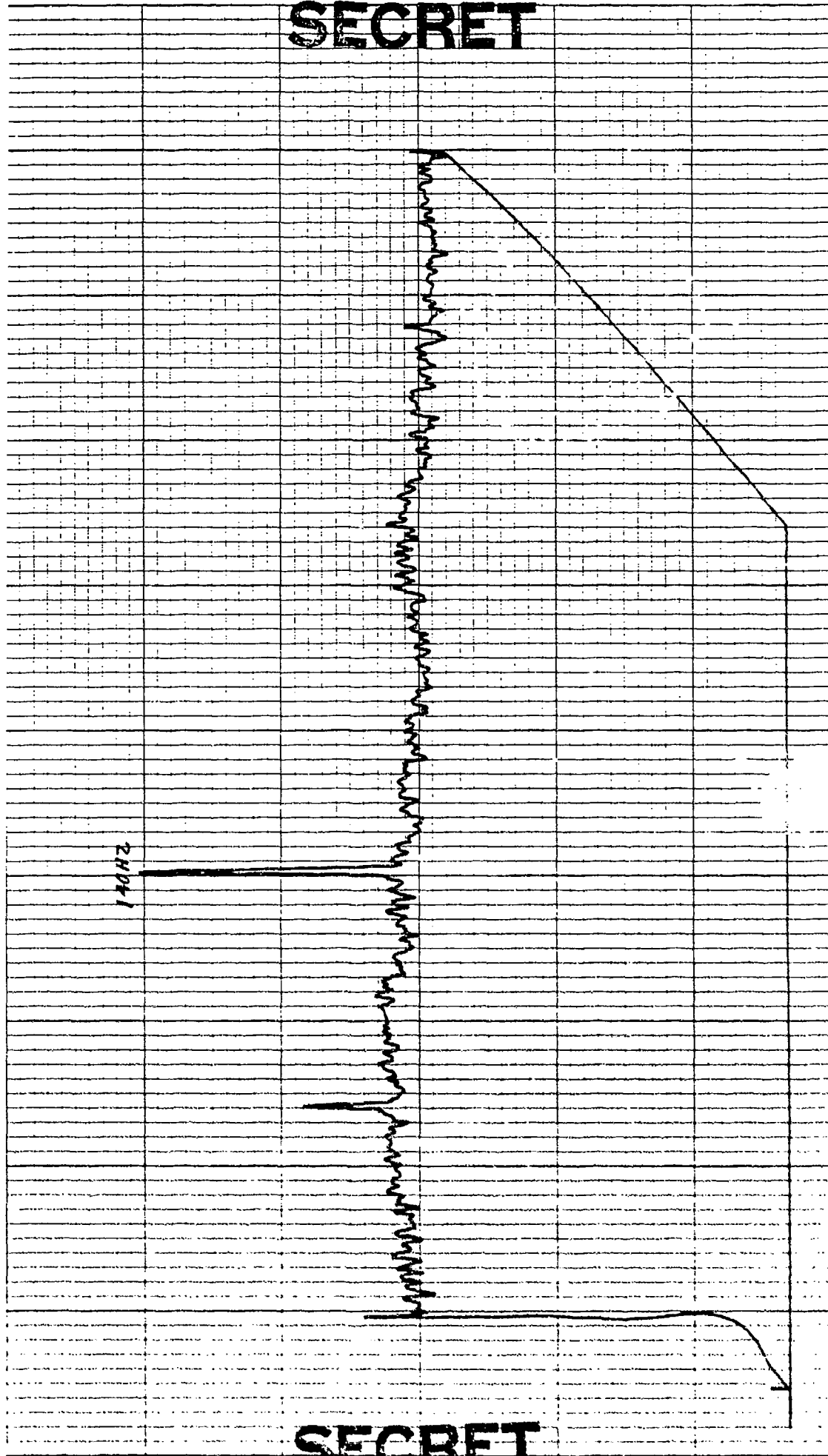
CONTROL: 3-16 - 0633 (28)
OMNI SPECTRUM (ELEMENT 4)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0633 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: M19 INDEX: 1637

INTEGRATION TIME 320 SECS ATTEN: — DB
FILTER: WTG WING



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10 X 10 TO THE INCH • 1 X 10 INCHES
HEUPTTEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-16-063 (29)
OMNI SPECTRUM (ELEMENT 6)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

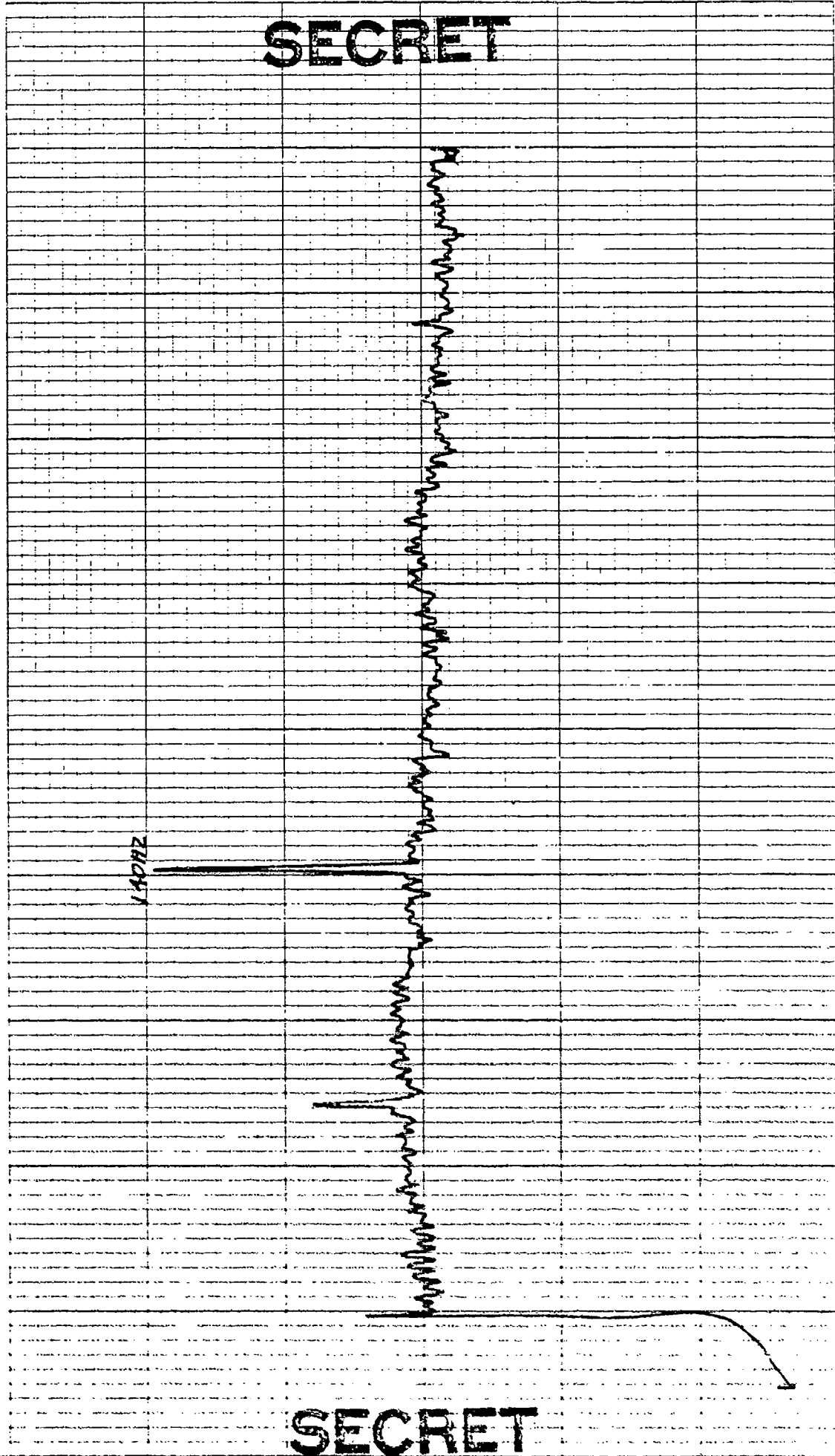
DATE/TIME: 3-16-77 - 0633Z

ANALYSIS BANDWIDTH: 1/10 HZ
DEC AZ STEERING

REEL: M19

INDEX: 1637

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER
WTG: HANNING



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10 X 10 TO THE INCH
NEUFEL & ESSER CO. MADE IN U.S.A.

CONTROL: 0633 - 49 (DPW)
OMNI SPECTRUM (ELEMENT 9)
EXERCISE: BEARING STAKE
CENTER FREQ: 140 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-6-77 - 0633 Z

ANALYSIS BANDWIDTH: 1/10 HZ

- DEG AZ STEERING

REEL: M19

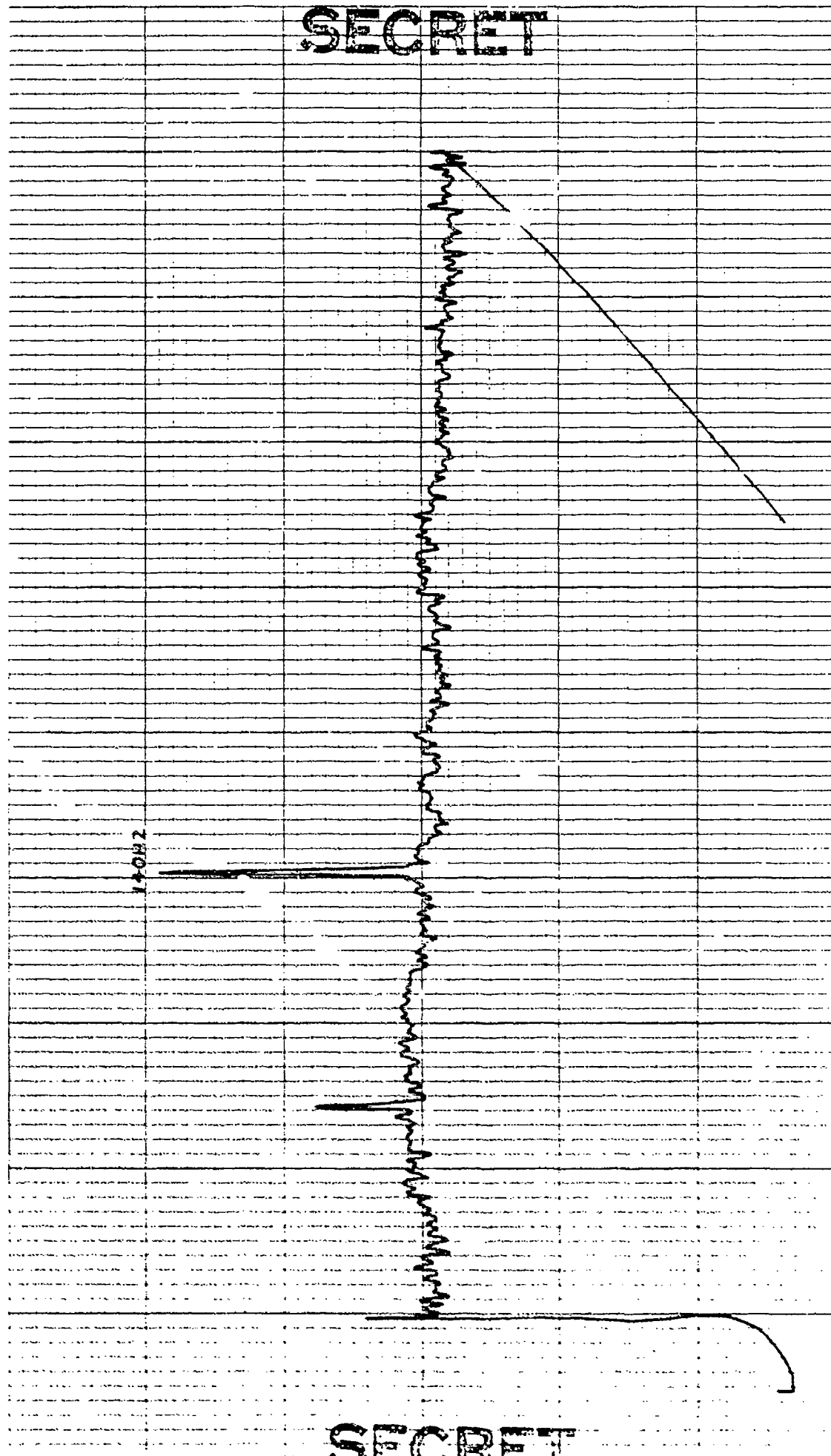
INDEX: 637

INTEGRATION TIME 320 SECS

FILTER

ATTEN: - DB

WTG: HANNING



KOE 10 X 10 TO THE INCH • / X 10 ENCMFS
NEUFEL & ESSER CO. MADE IN U.S.A.

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CONTROL: 3-16-0633 (31)
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

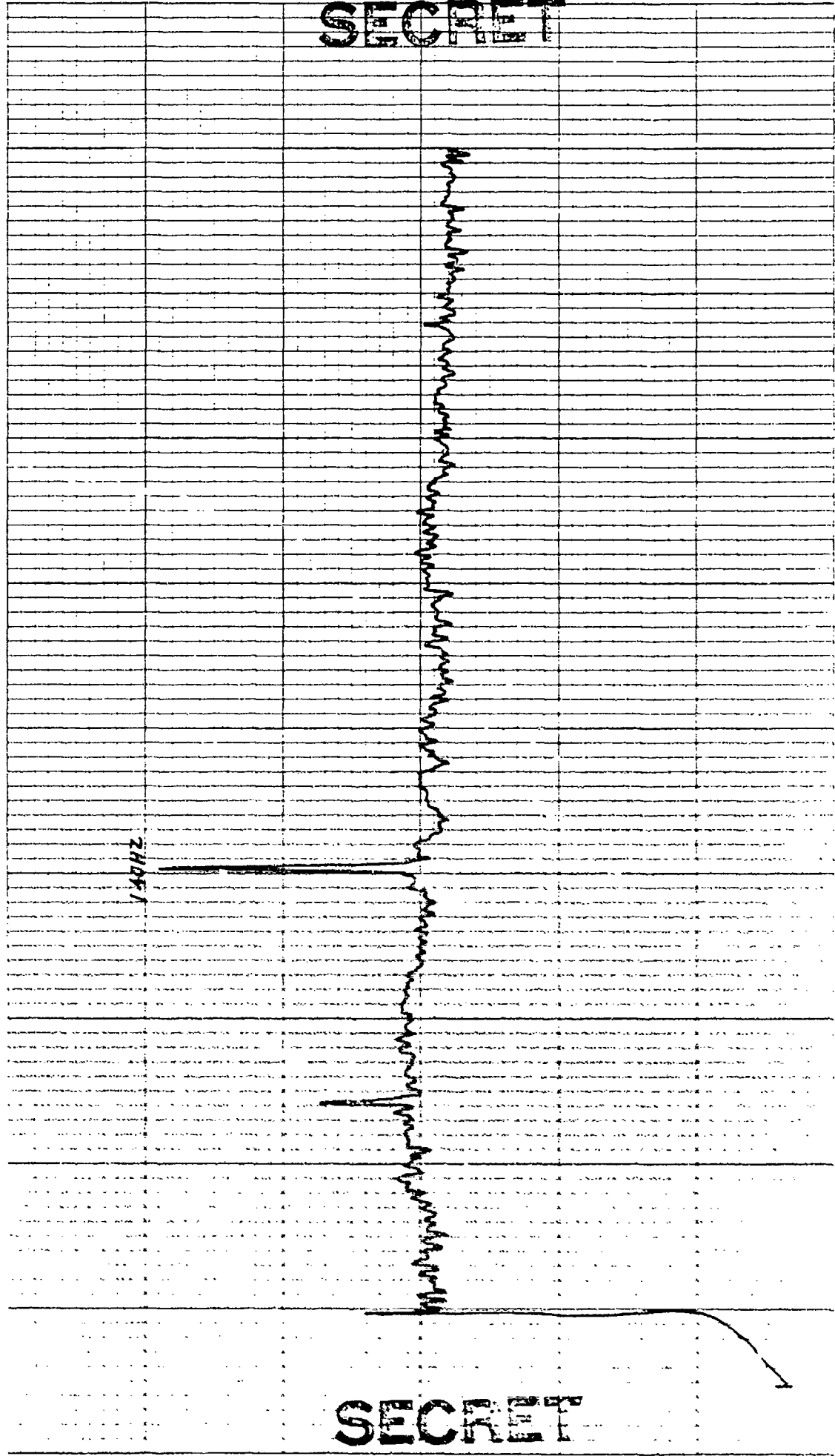
DATE/TIME: 3-16-77 - 0633Z

ANALYSIS BANDWIDTH: 1/10 HZ
DEG AZ STEERING

REEL: M19

INDEX: 637

INTEGRATION TIME 320 SECS
ATTEN: - DB
FILTER WTG: HANNING



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CONTROL: 376-0622 (32)
OMNI SPECTRUM (ELEMENT 12)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

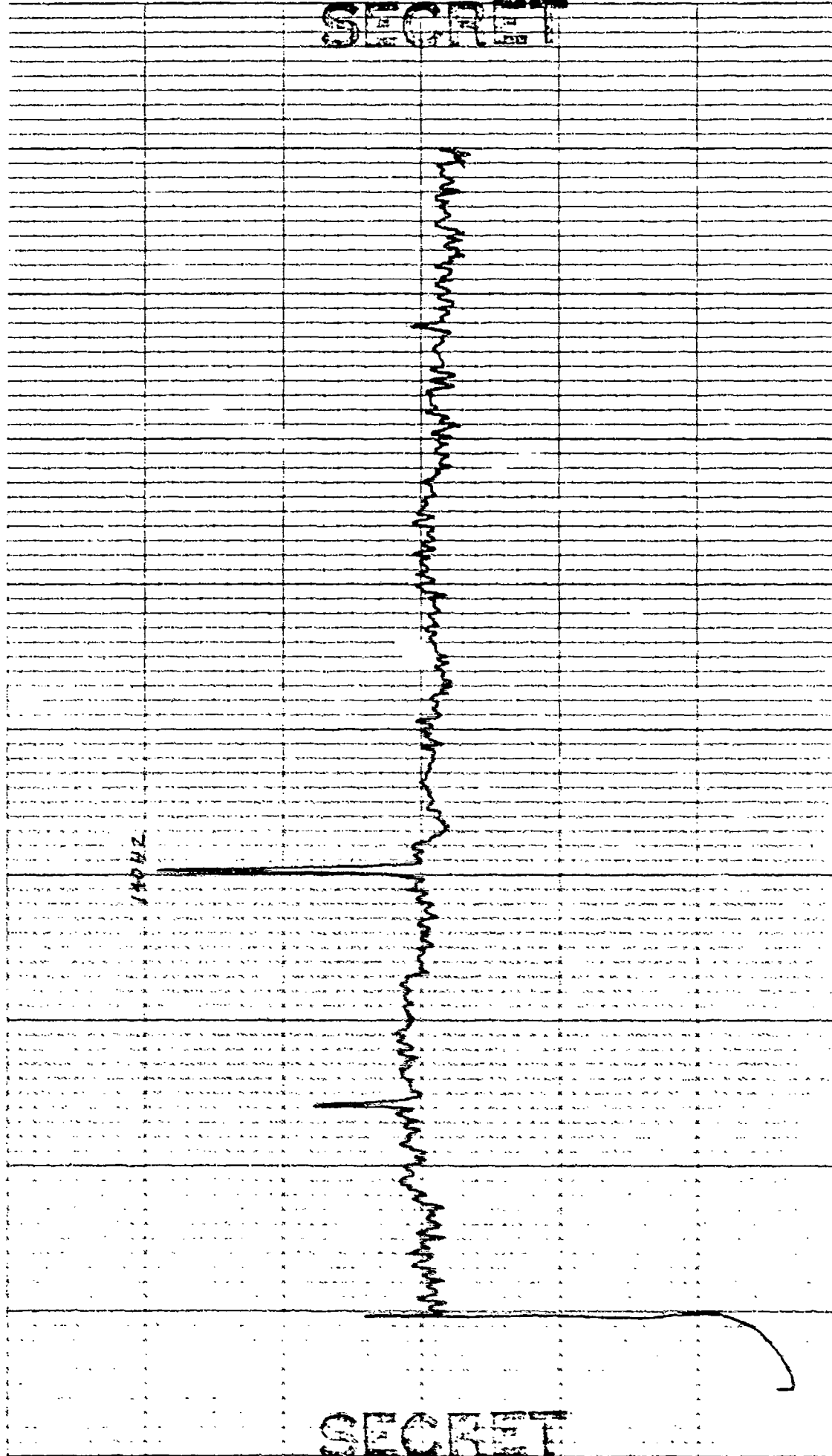
DATE/TIME: 376-77-0003 Z

ANALYSIS BANDWIDTH: 1/10 HZ
_____ DEG AZ STEERING

REEL: 119

INDEX: 1637

INTEGRATION TIME 320 SECS
ATTEN: - DB
FILTER WTC: HANNING



10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

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CONTROL: 3-16 - 0633 (33)
OMNI SPECTRUM (ELEMENT 14)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

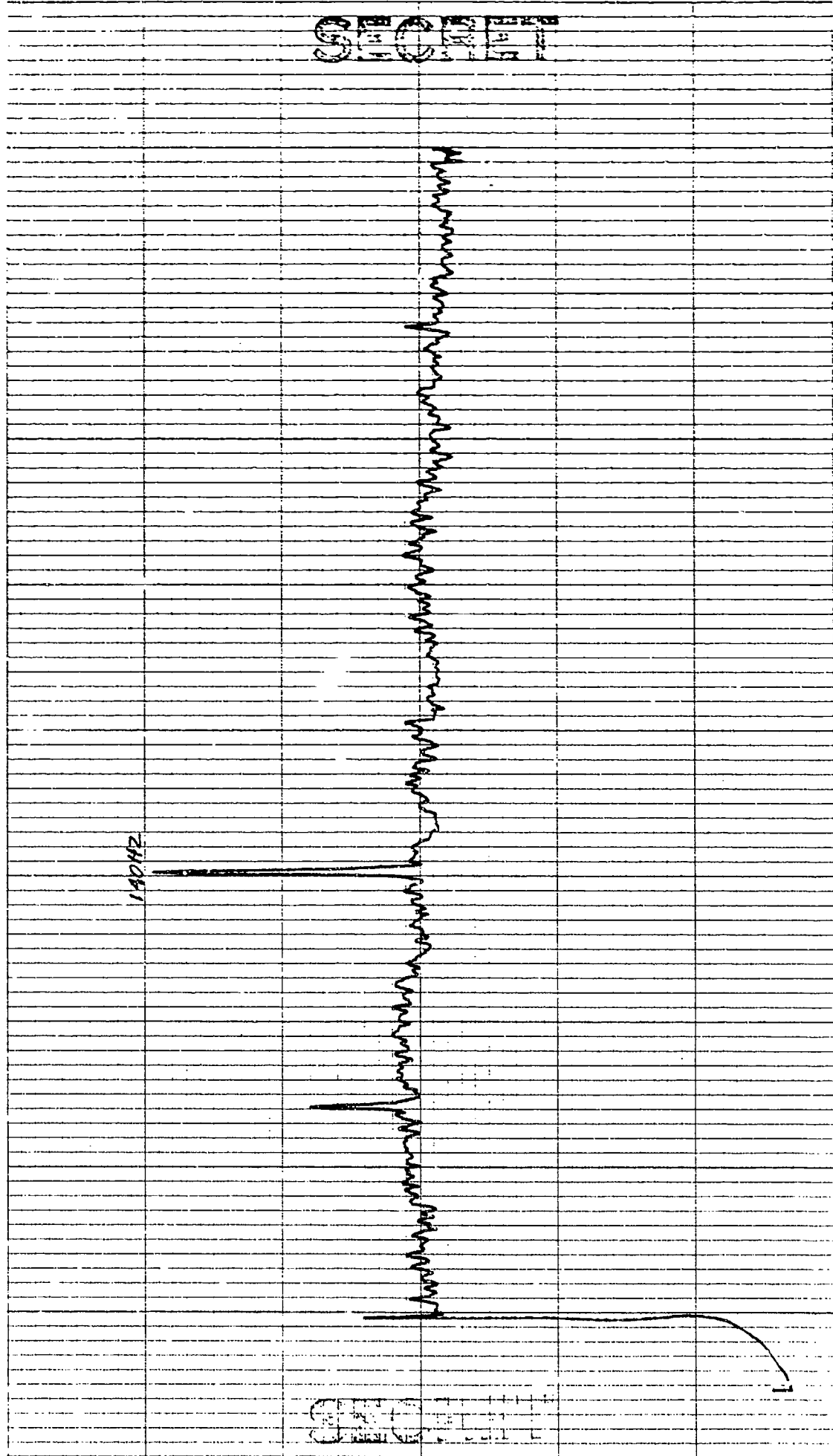
DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0633Z

ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: M19 INDEX: 157Z

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING



K-E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

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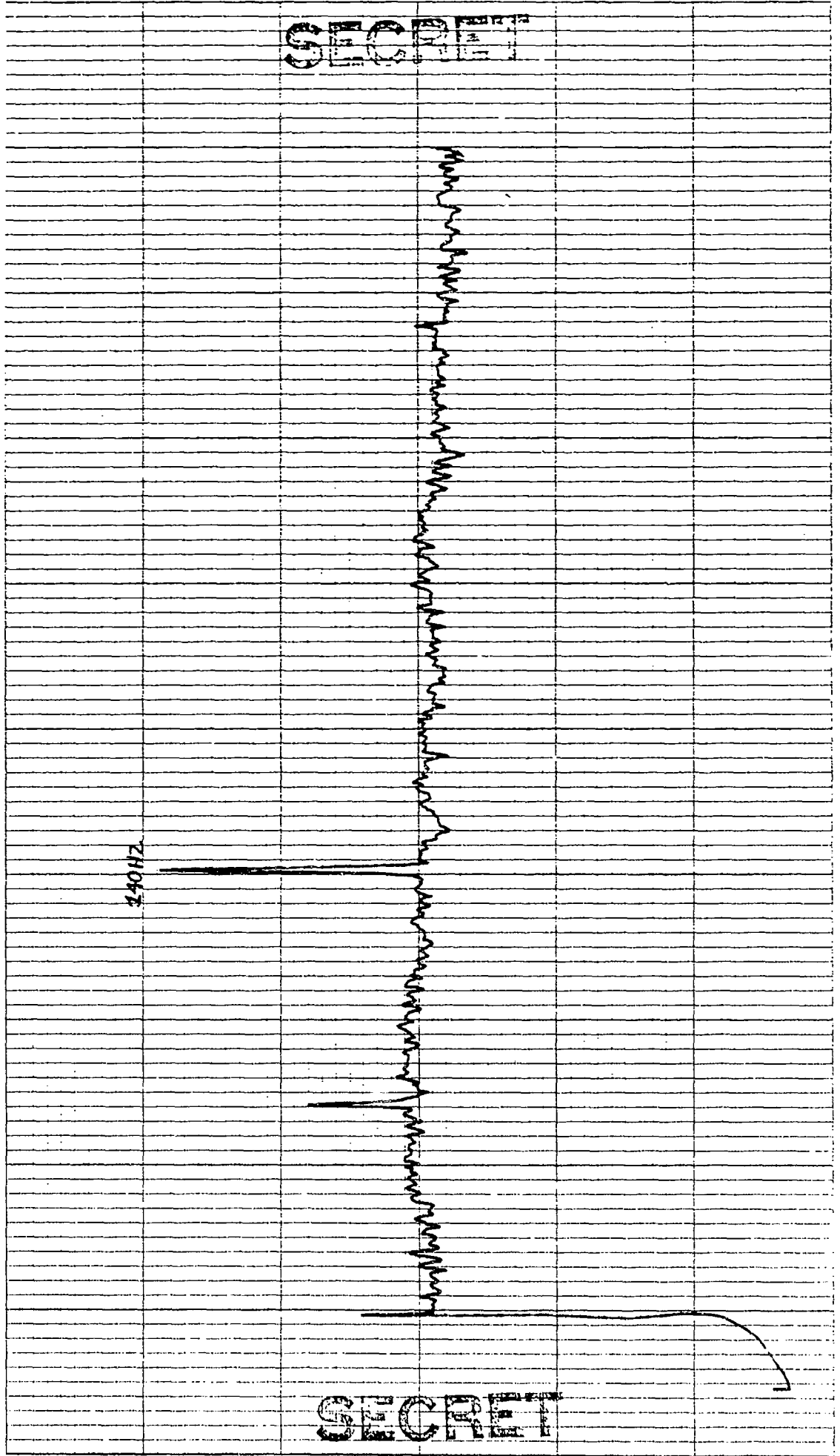
CONTROL: 3-16 - 0633 (34)
OMNI SPECTRUM (ELEMENT 16)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0633 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: 119

INTEGRATION TIME 320 SECS
ATTEN: — DB
FILTER WTG: HANNING



K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

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CONTROL: 3-16-0633 (35)
OMNI SPECTRUM (ELEMENT 19)
EXERCISE: BL. RING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

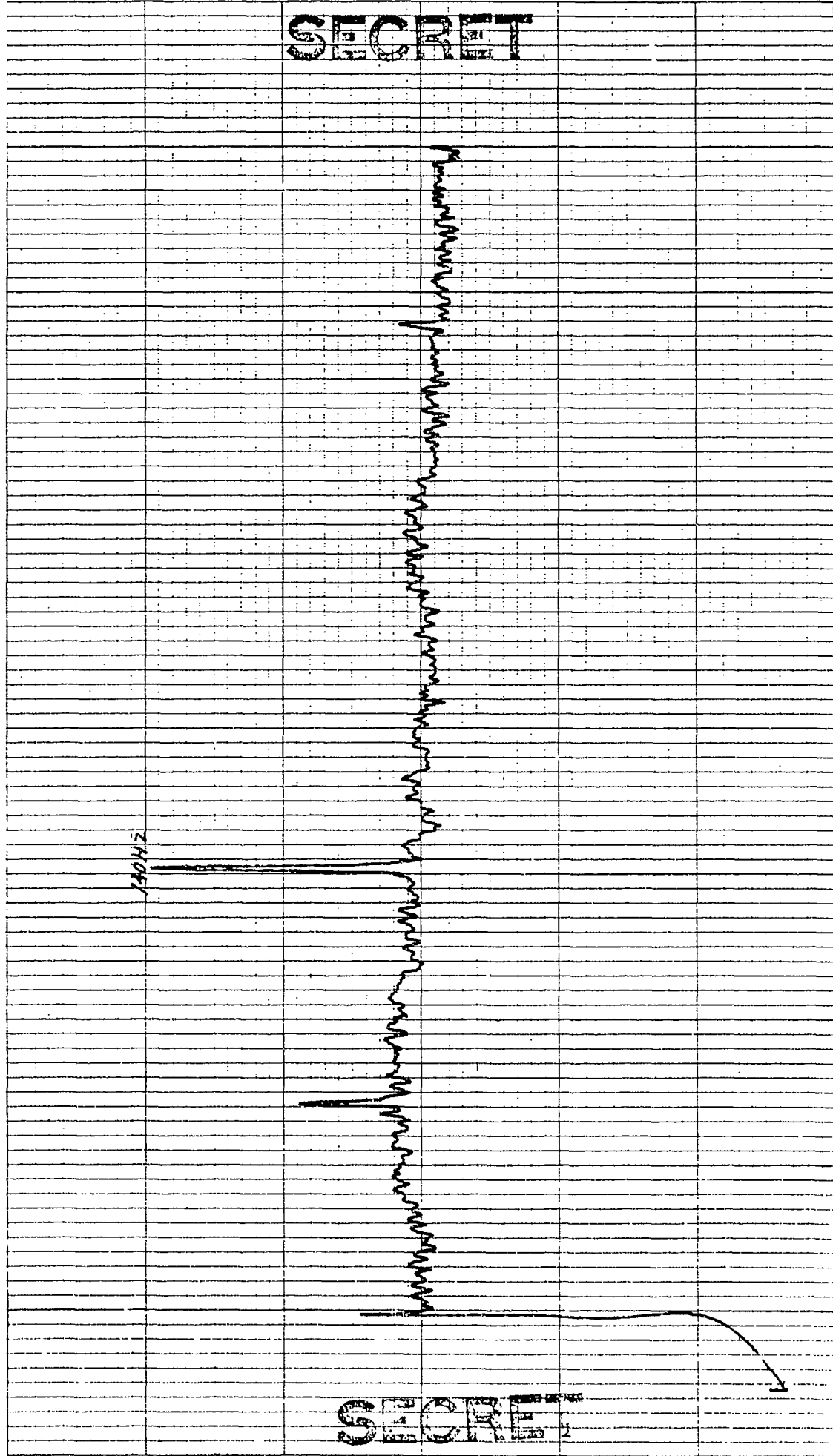
DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0633 Z
ANALYSIS BANDWIDTH: 1/10HZ
 DEG AZ STEERING

REEL: M19

INDEX: 1637

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTC WTC: HANNING



10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

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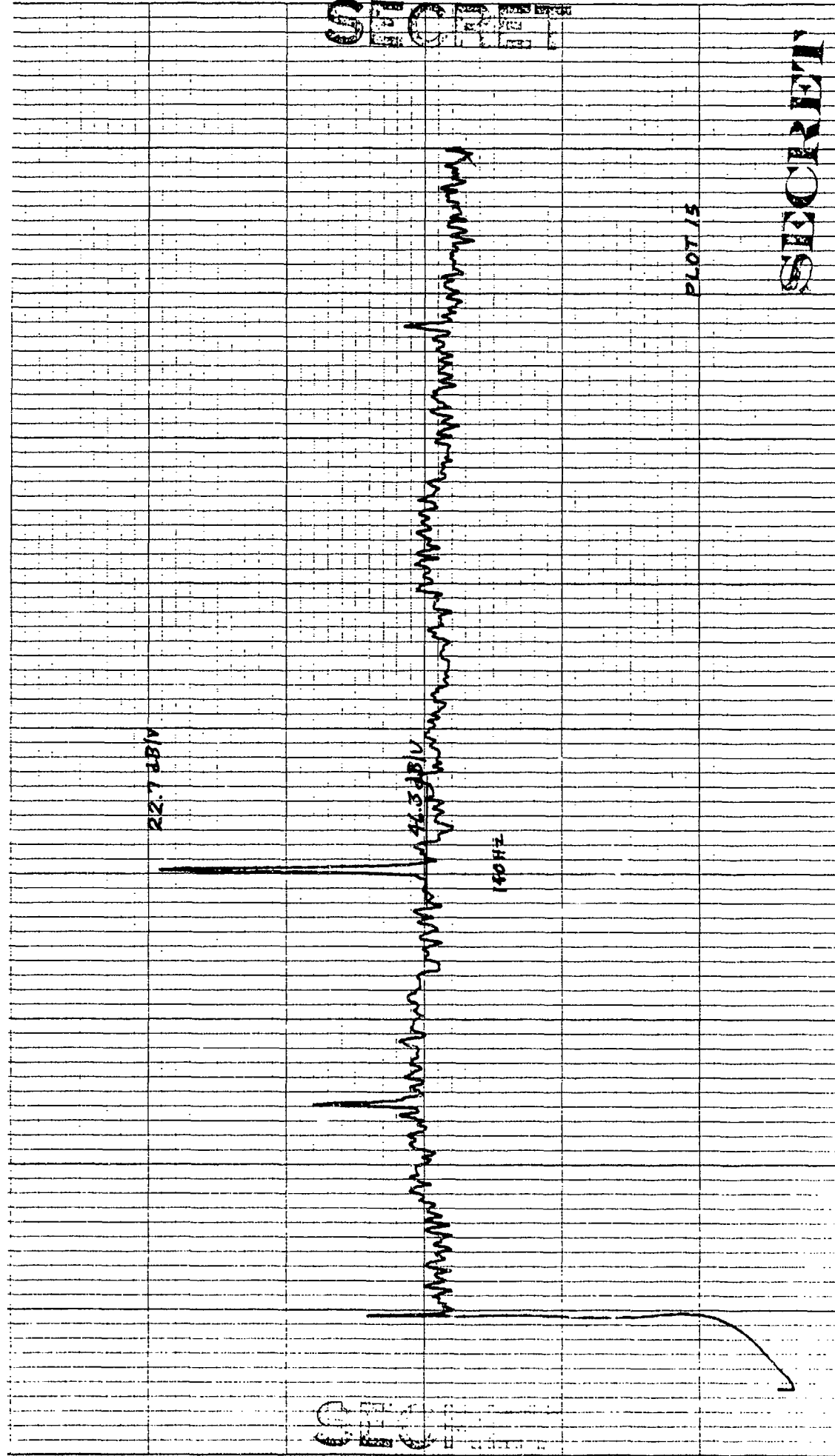
CONTROL: 0633 - 49 (DP10)
OMNI SPECTRUM (ELEMENT 20)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0633 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: M19 INDEX: 1637

INTEGRATION TIME 320 SECS ATTN: — DB
FILTER WTG: HANNING



PLOT 15

SECRET

160HZ

K&E 10 X 10 TO THE INCH, 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

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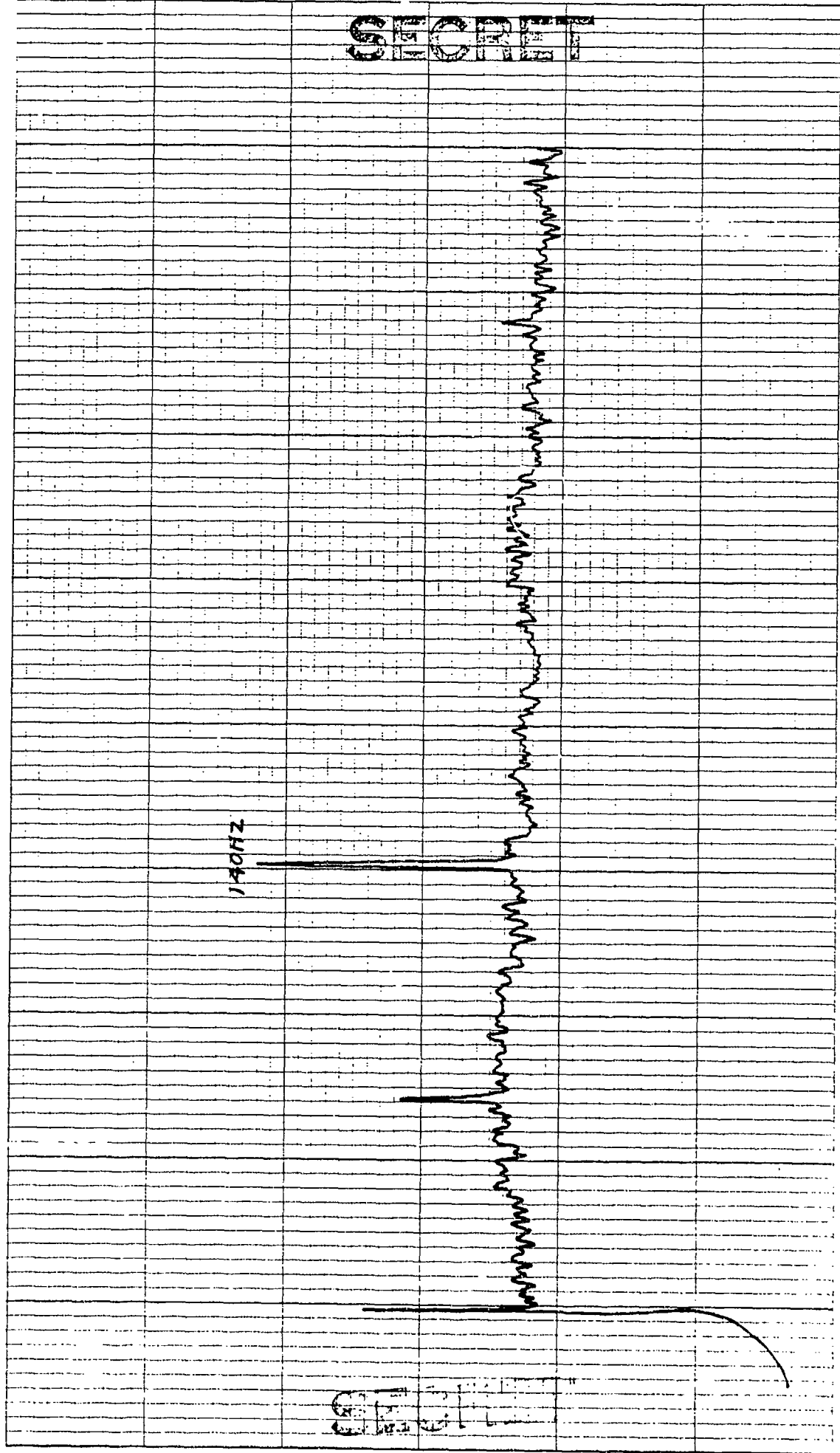
CONTROL: 376 -1633 (37)
OMNI SPECTRUM (ELEMENT 22)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 376-77 -0633Z
ANALYSIS BANDWIDTH: 1/10HZ
 DEG AZ STEERING

REEL: 419 INDEX: 1637

INTEGRATION TIME 320 SECS ATTN: — DB
FILTER WTG: HANNING



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SECRET

10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

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CONTROL: 3-16 - 0633 (38)
OMNI SPECTRUM (ELEMENT 26)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

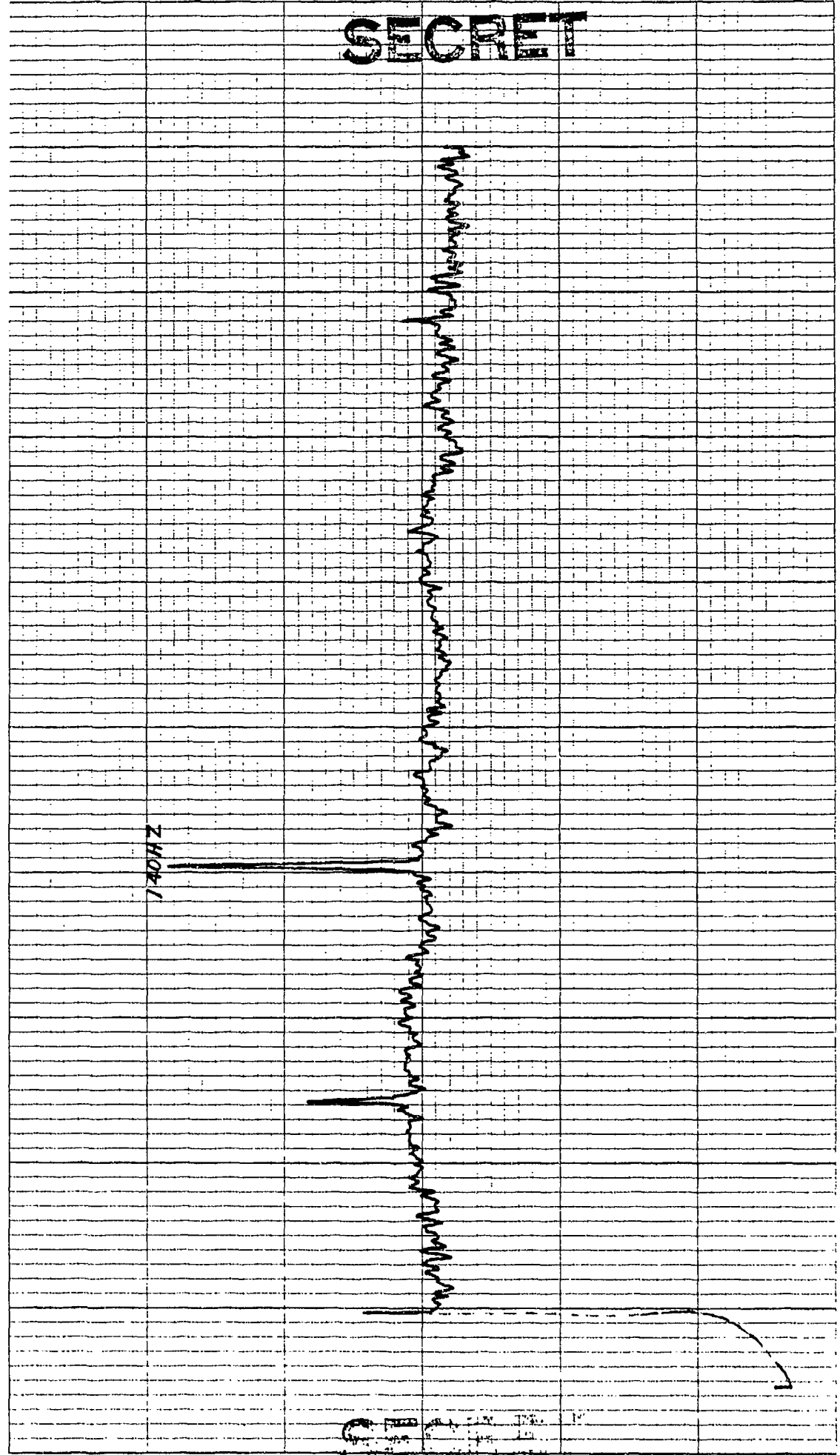
DATE OF ANALYSIS:

DATE/TIME: 3-11-77 - 0633 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: M19

INDEX: 637

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



K-2 10 X 10 TO THE INCH 0.7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

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CONTROL: 3-16-0633 (39)
OMNI SPECTRUM (ELEMENT 24)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

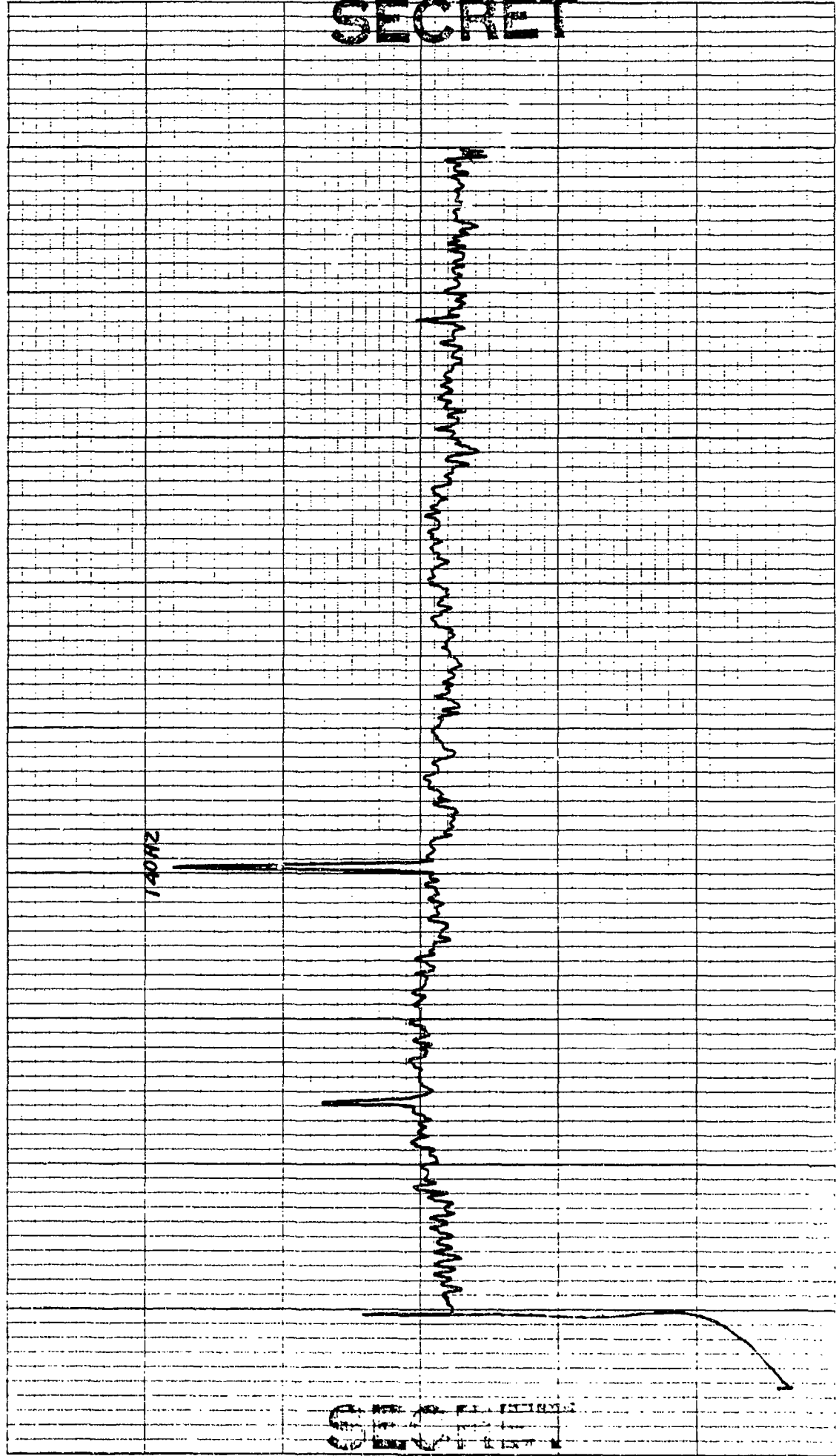
DATE OF ANALYSIS:

DATE/TIME: 3-16-77-0633Z

ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: M19 INDEX 1637

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING



10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A

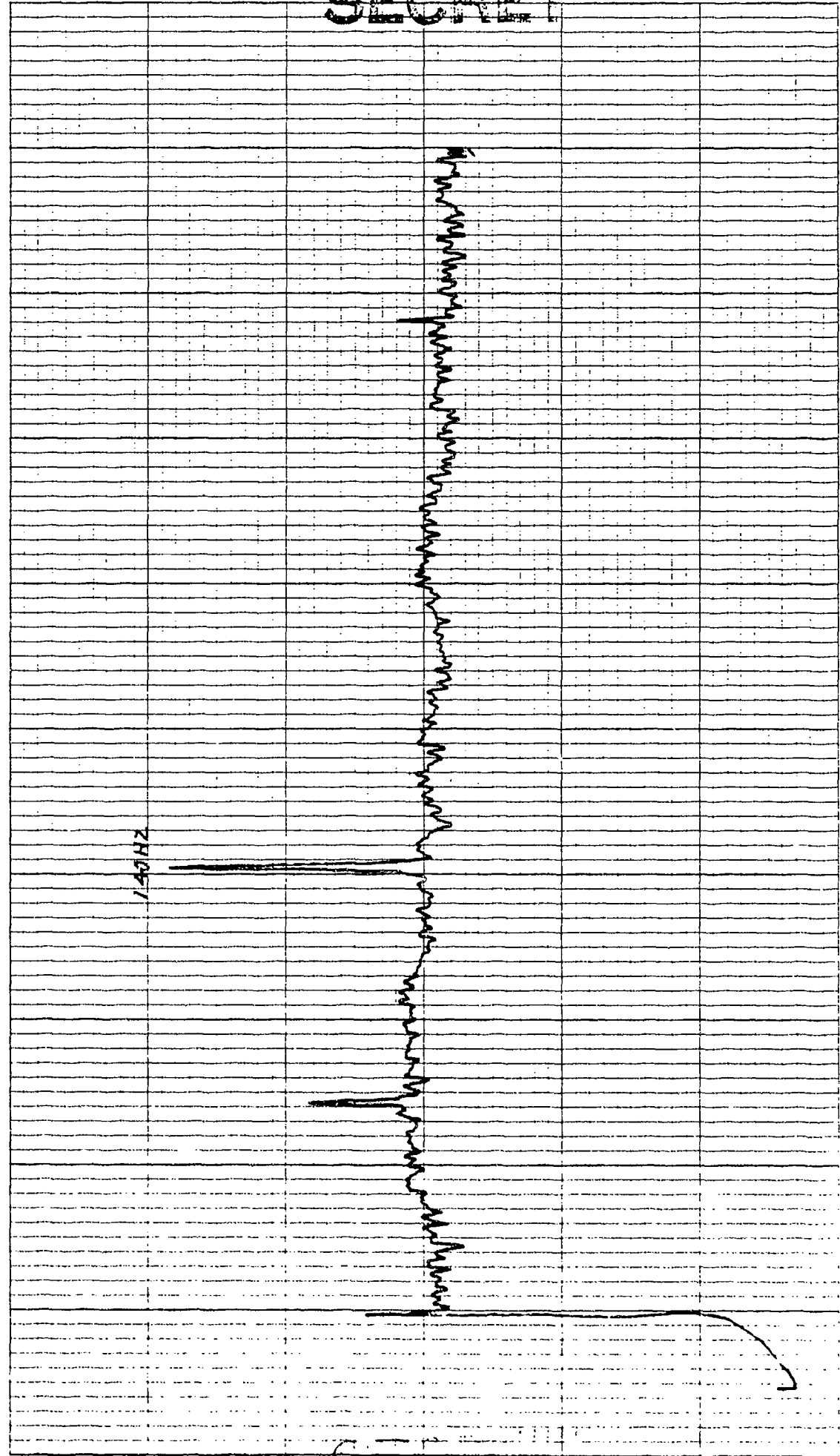
46 0703

CONTROL: 3-16 -0633 (40)
OMNI SPECTRUM (ELEMENT 29)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 -0633 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: H19 INDEX: 637
INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



SECRET

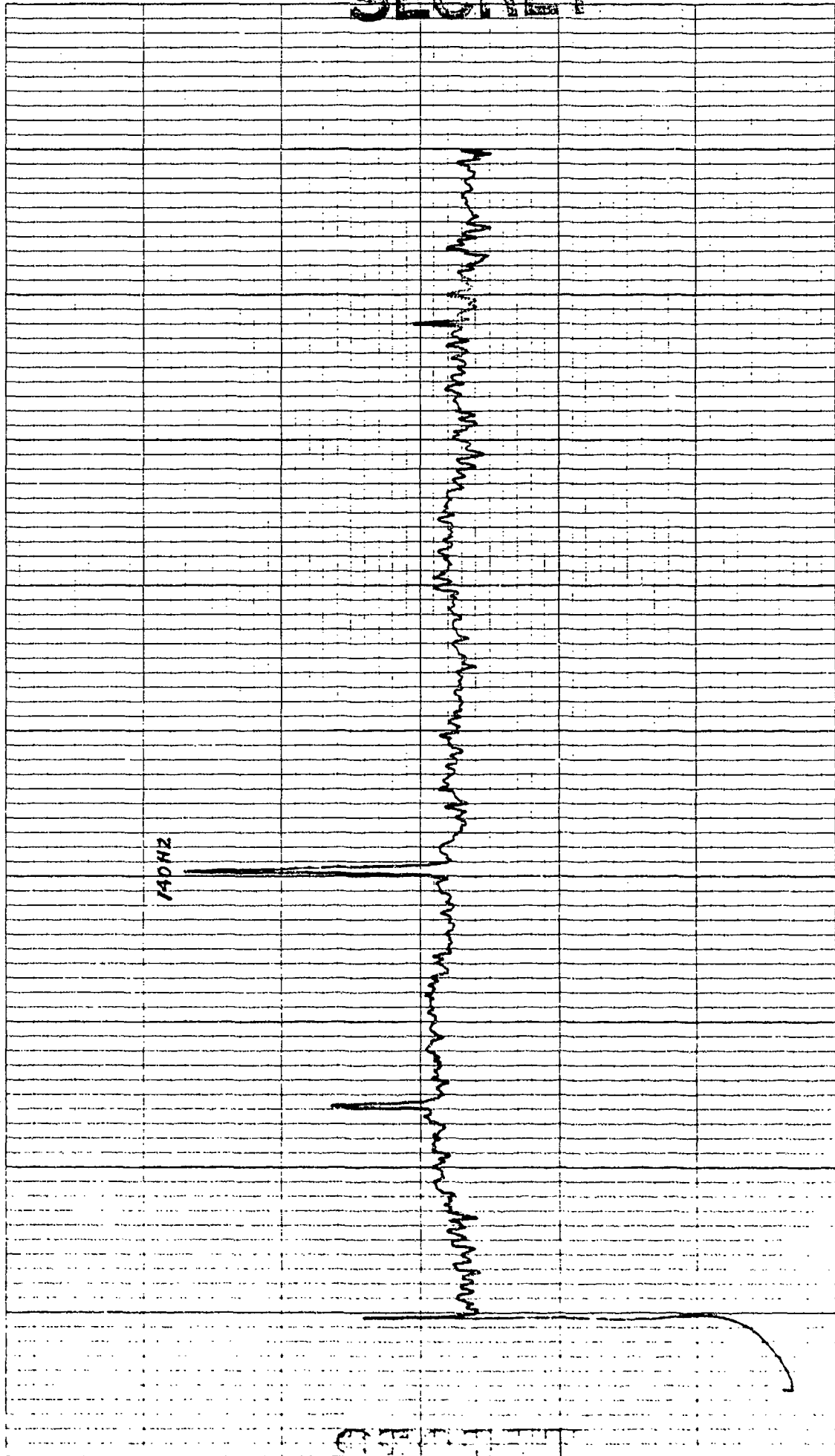
10 X 10 TO THE INCH * 7 X 10 INCHES
KEUFFEL & ESSLER CO. MADE IN U.S.A.

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CONTROL: 3-16-0633 (41) DATE OF ANALYSIS: REEL: M19 INDEX: 637
OMNI SPECTRUM (ELEMENT 31)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTC: HANNING

DATE/TIME: 3-6-77 - 0633 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING



SECRET

SECRET

K&E 10 X 10 TO THE INCH • 7 X 10 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

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CONTROL: 3-16 -0633 (42)
OMNI SPECTRUM (ELEMENT 33)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

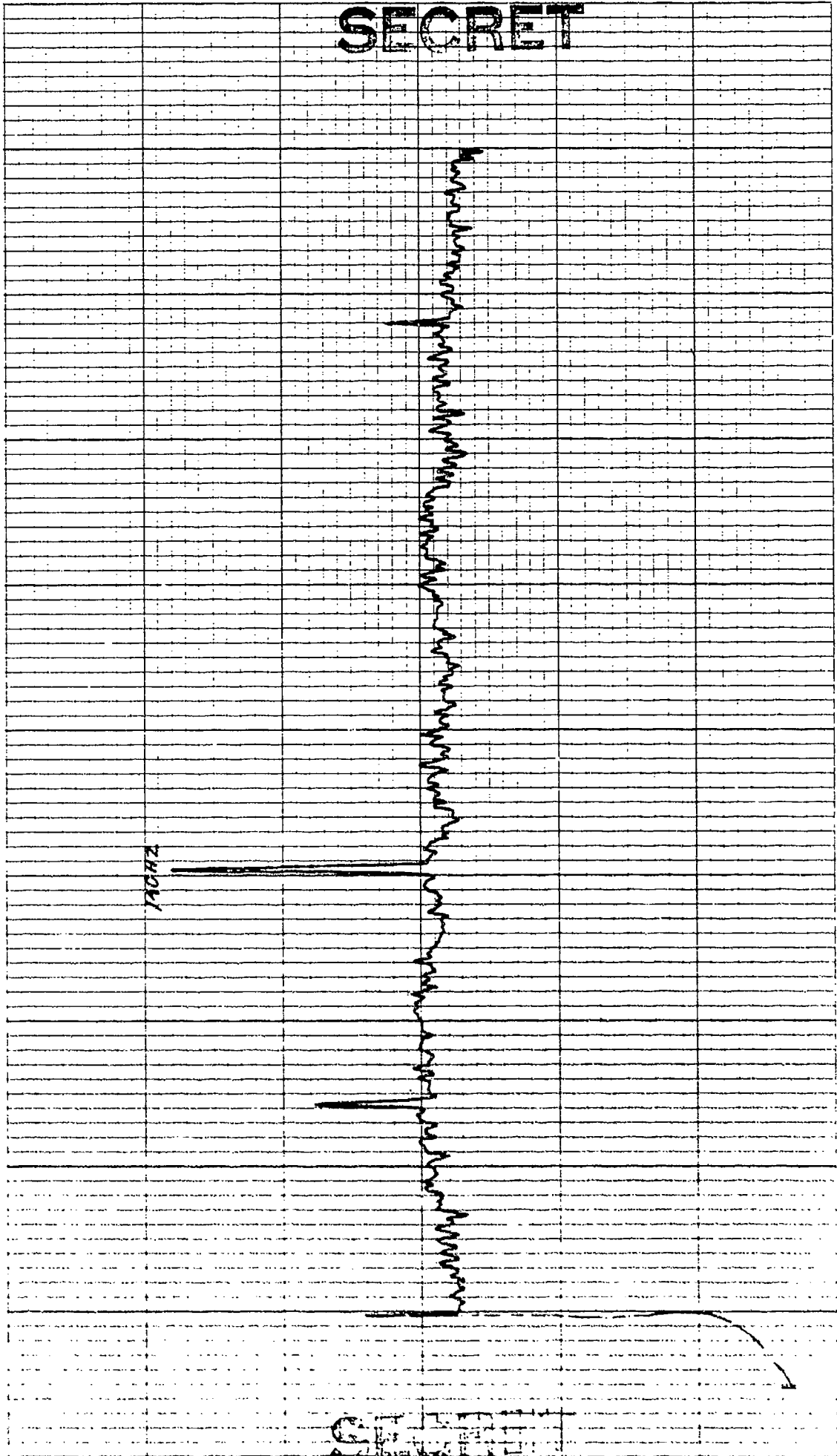
DATE OF ANALYSIS:

DATE/TIME: 3-16-77 -0633 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

KEEL: M19

INDEX: 637

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



K-2 10 X 10 TO THE INCH 7 X 10 INCHES
HEUFFEL & CRESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-16 - 0633 (43)
OMNI SPECTRUM (ELEMENT 35)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

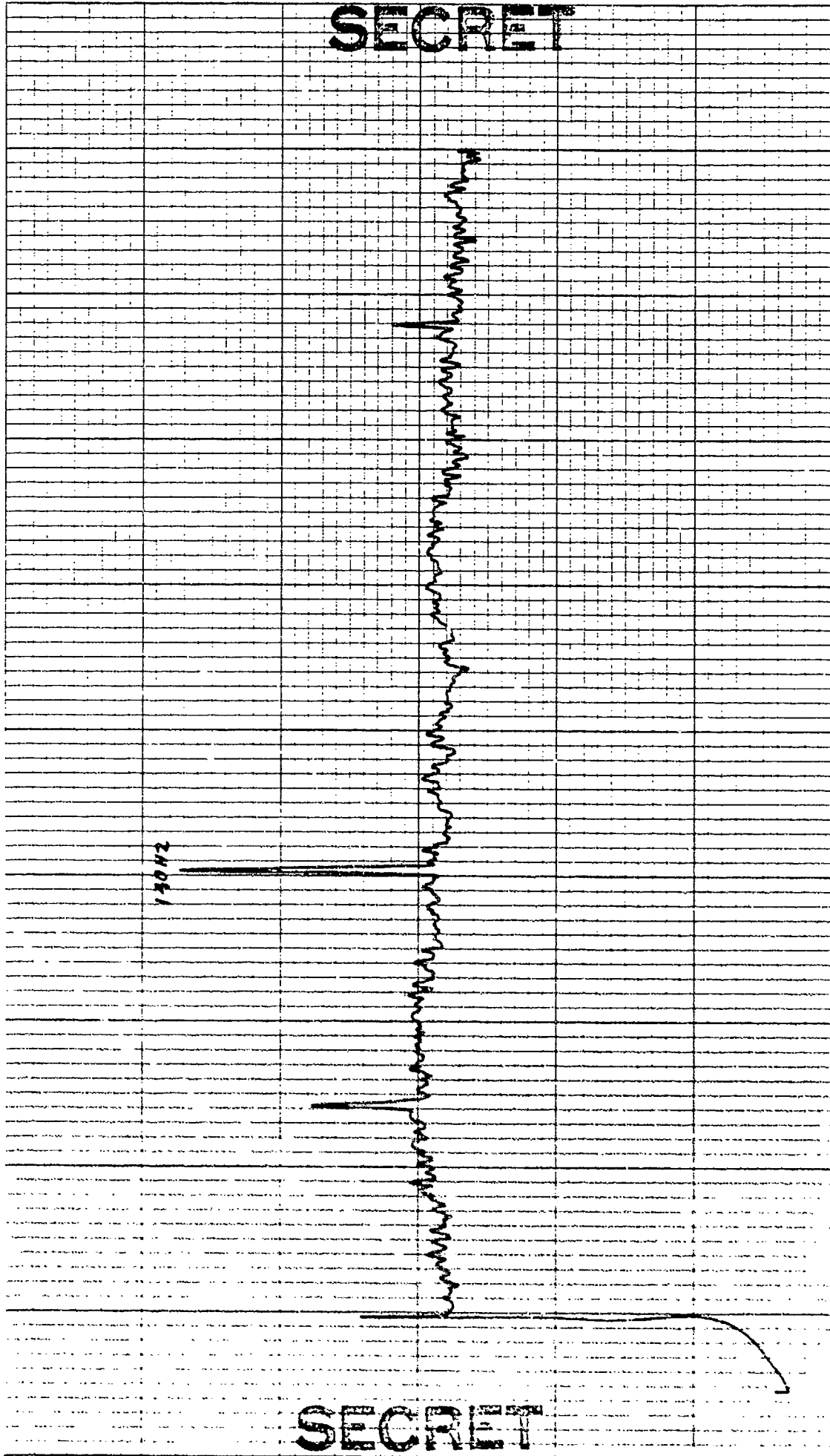
DATE/TIME: 3767-0633Z

ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

REEL: 419

INDEX: 637

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER WTG: HANNING



16 X 10 TO THE INCHES
K&E REUPTEL & ENGINEERING CO. MADE IN U.S.A.

46 0703

CONTROL: 3-16-0633 (44)
OMNI SPECTRUM (ELEMENT 37)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

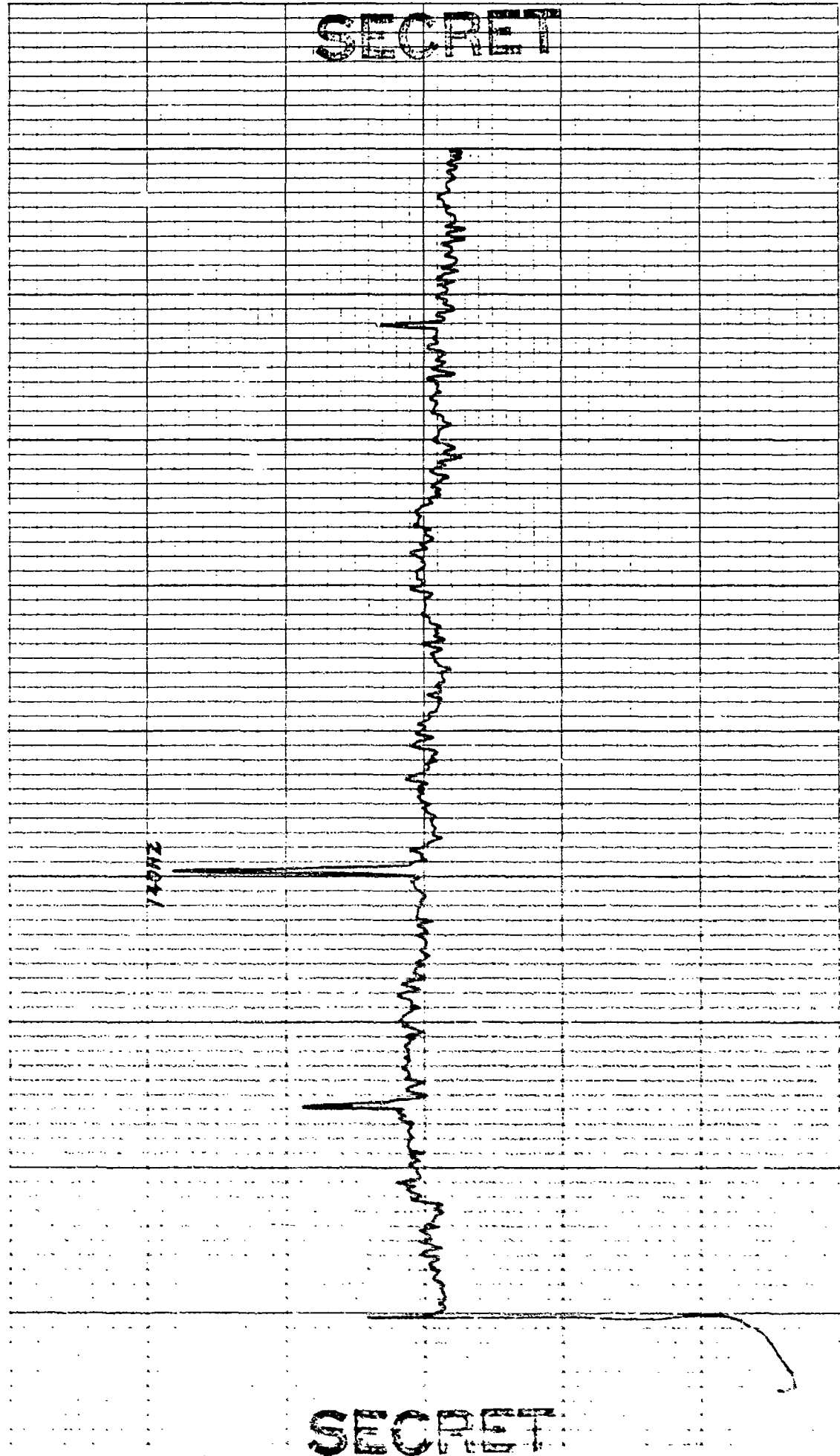
DATE OF ANALYSIS:

DATE/TIME: 3-16-77 -0633 Z

ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

REEL: M19 INDEX: 1637

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



SECRET

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14-E 10 X 15 TO THE INCH. MADE IN U.S.
ALLEN & BREWER CO.

46 0703

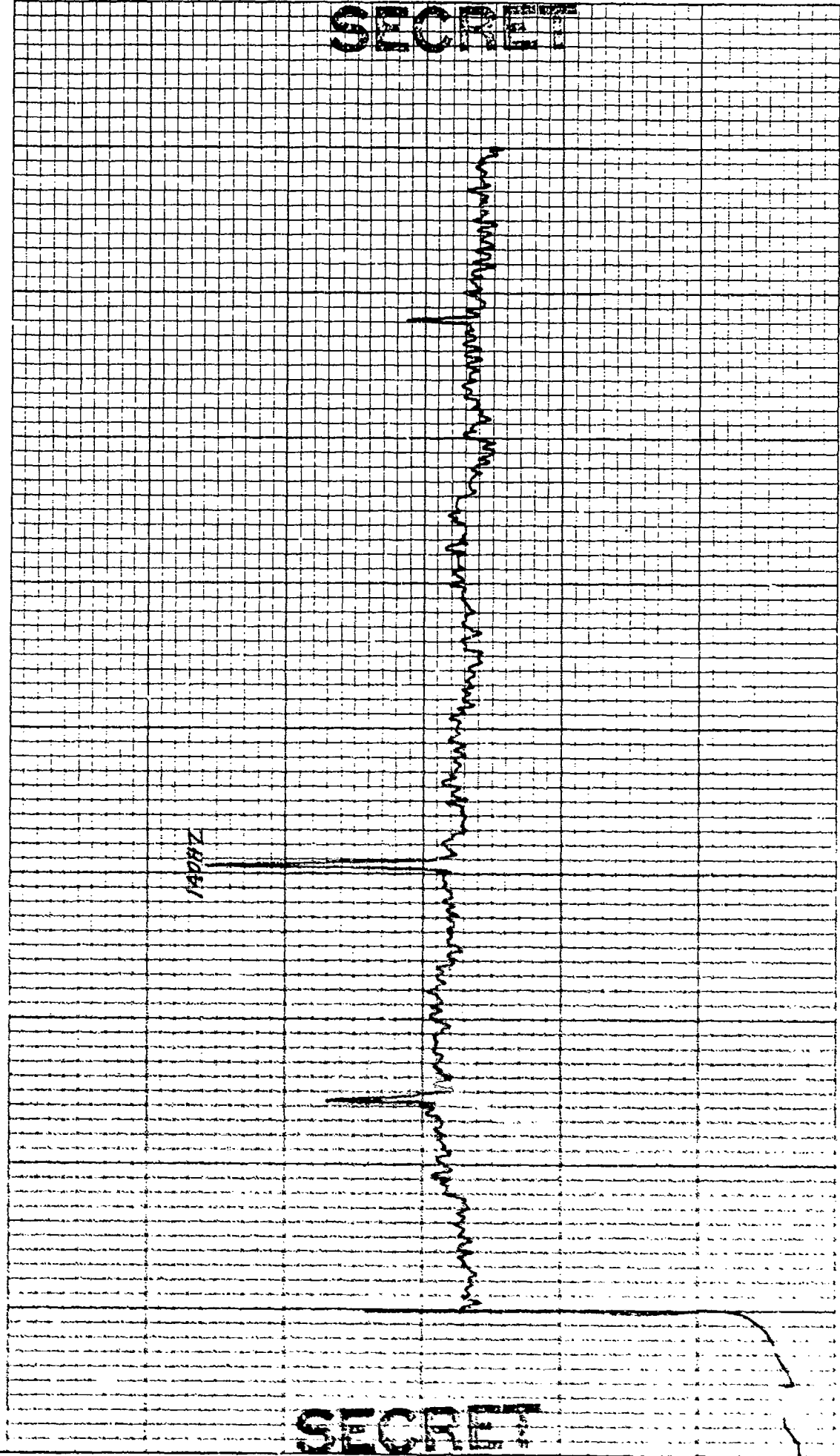
CONTROL: 3-16 - 0633 (45)
OMNI SPECTRUM (ELEMENT 39)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-6-77 - 0633 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

REEL: 419 INDEX 1637

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING



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SECRET

KOE 10 X 10 TO THE INCH...
REPT. & COVER CD...
#488 10 #11

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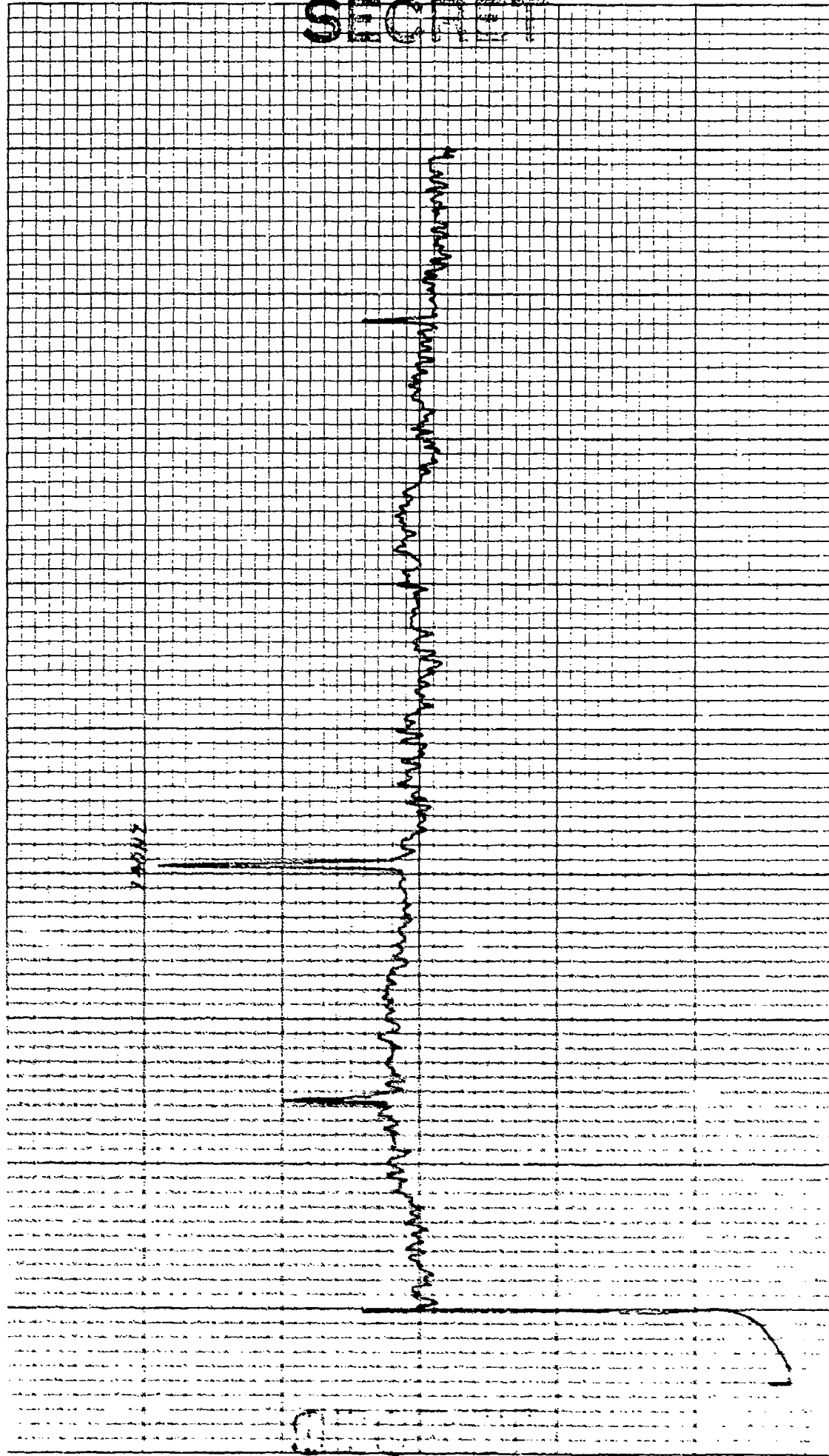
CONTROL: J-16 - 0633 (46)
OMNI SPECTRUM (ELEMENT 41)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-7-77 - 0633 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

REEL: M19 INDEX 1637

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING



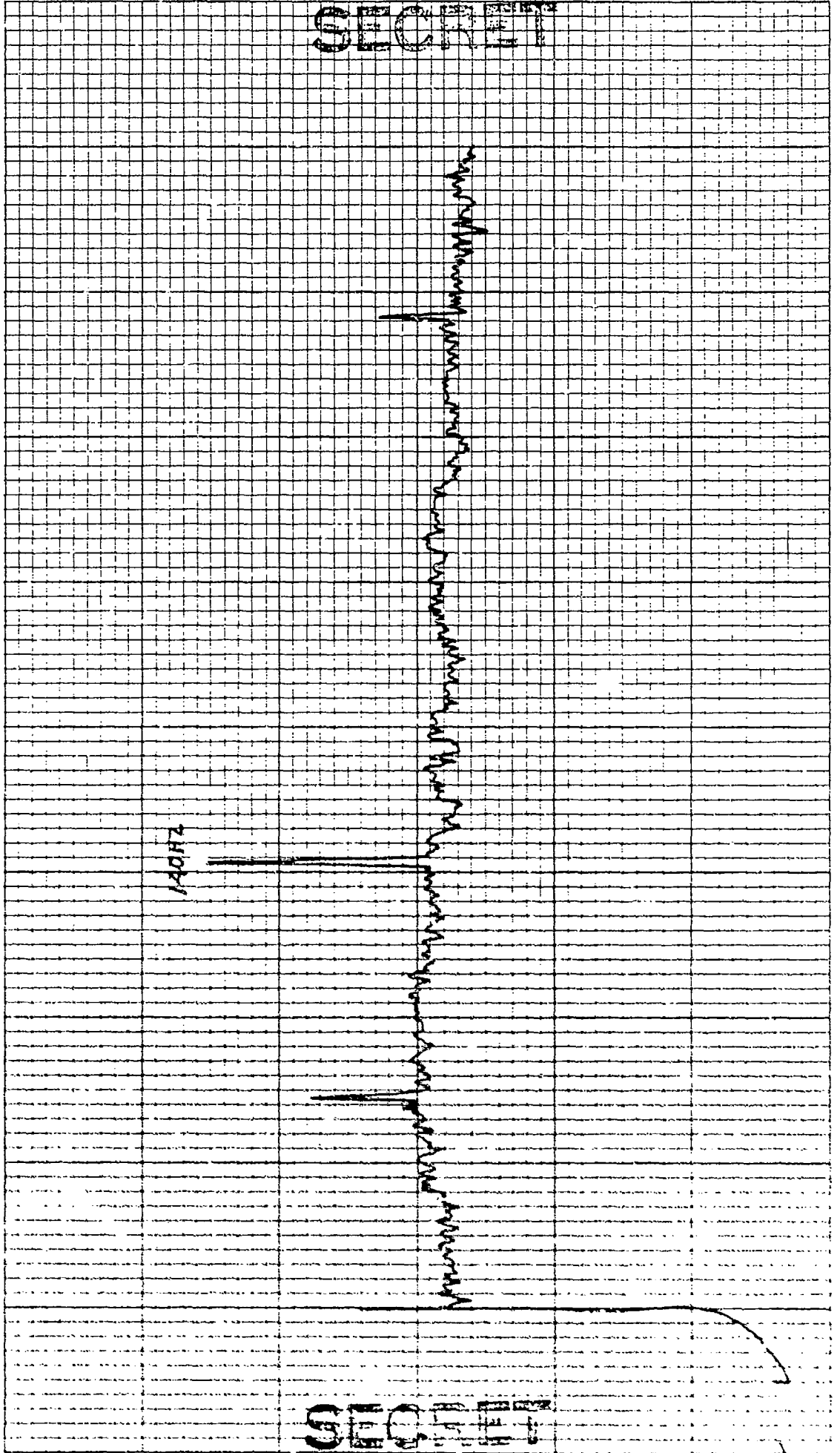
CONTROL: 3-16 - 0L33 (47)
OMNI SPECTRUM (ELEMENT 43)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0133 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

REEL: M19 INDEX: 1037

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING



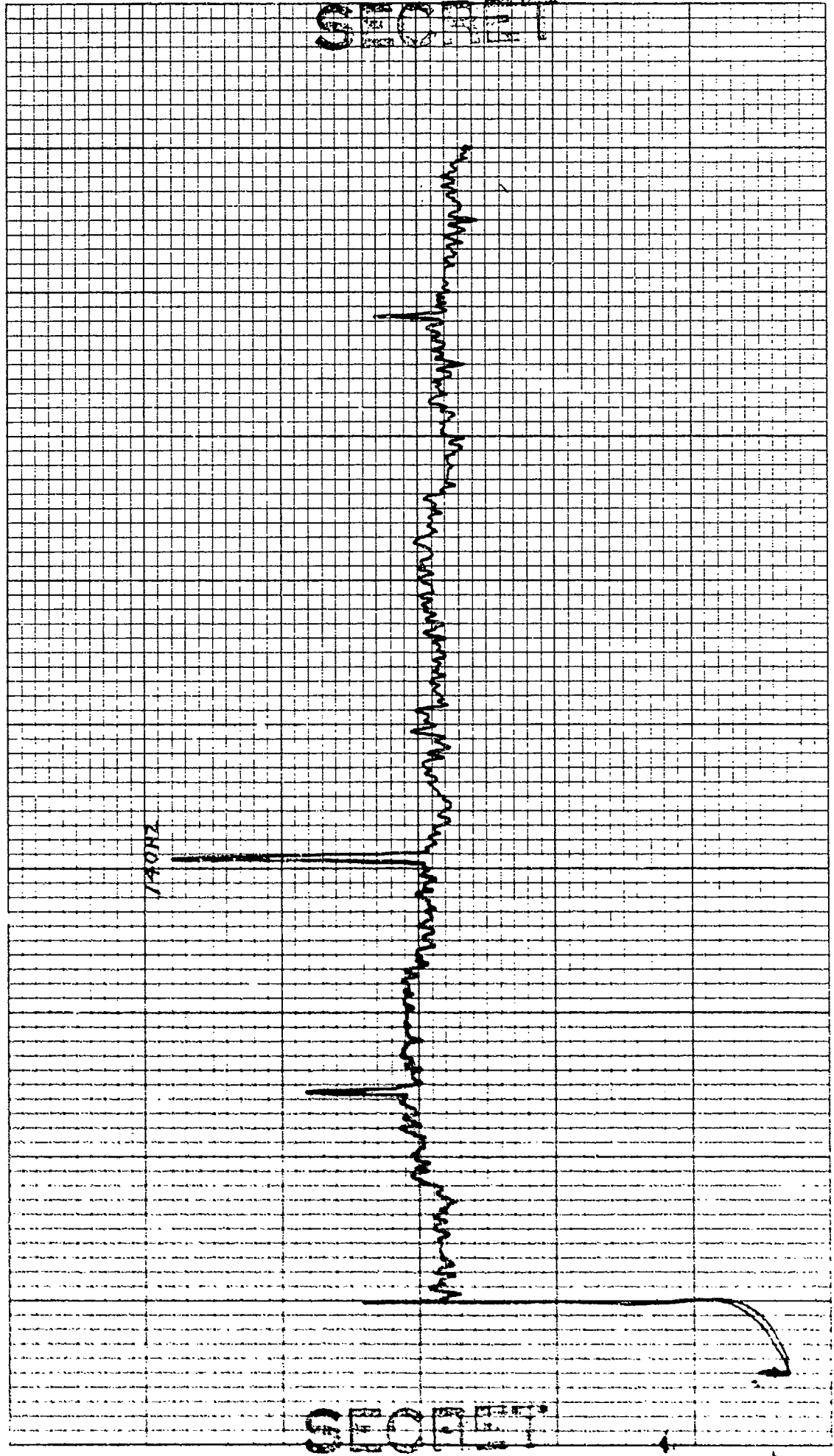
SECRET

SECRET

10 X 10 TO THE INCH • 7 X 10 INCHES
ALUPPEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-16 -0613 (40) DATE OF ANALYSIS: REEL: 419 INDEX: 637
OMNI SPECTRUM (ELEMENT 45)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING
— DEC AZ STEERING



10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

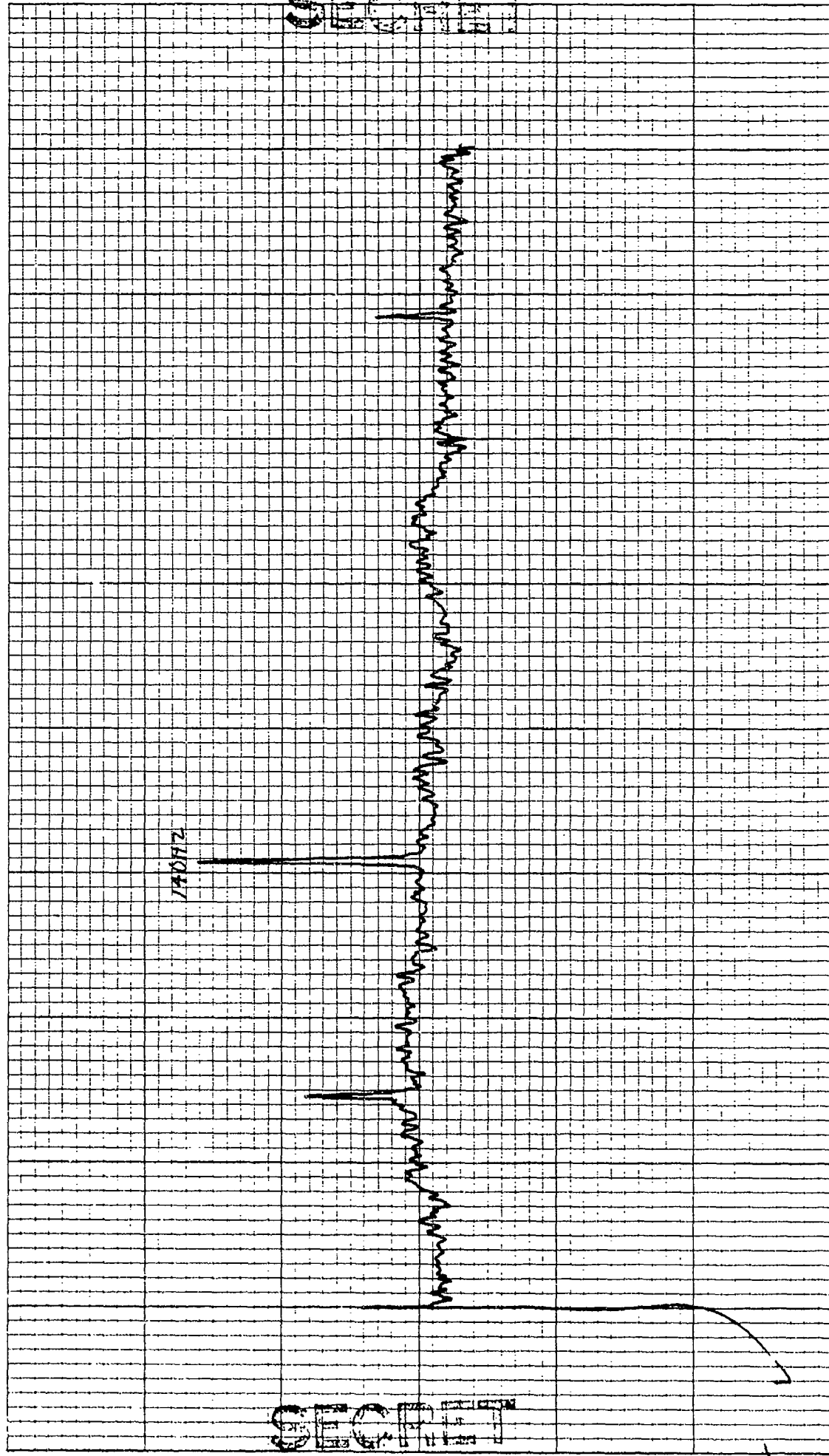
CONTROL: 3-16 - 0133 (49)
OMNI SPECTRUM (ELEMENT 47)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0133 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: M19 INDEX: 1637

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING



K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

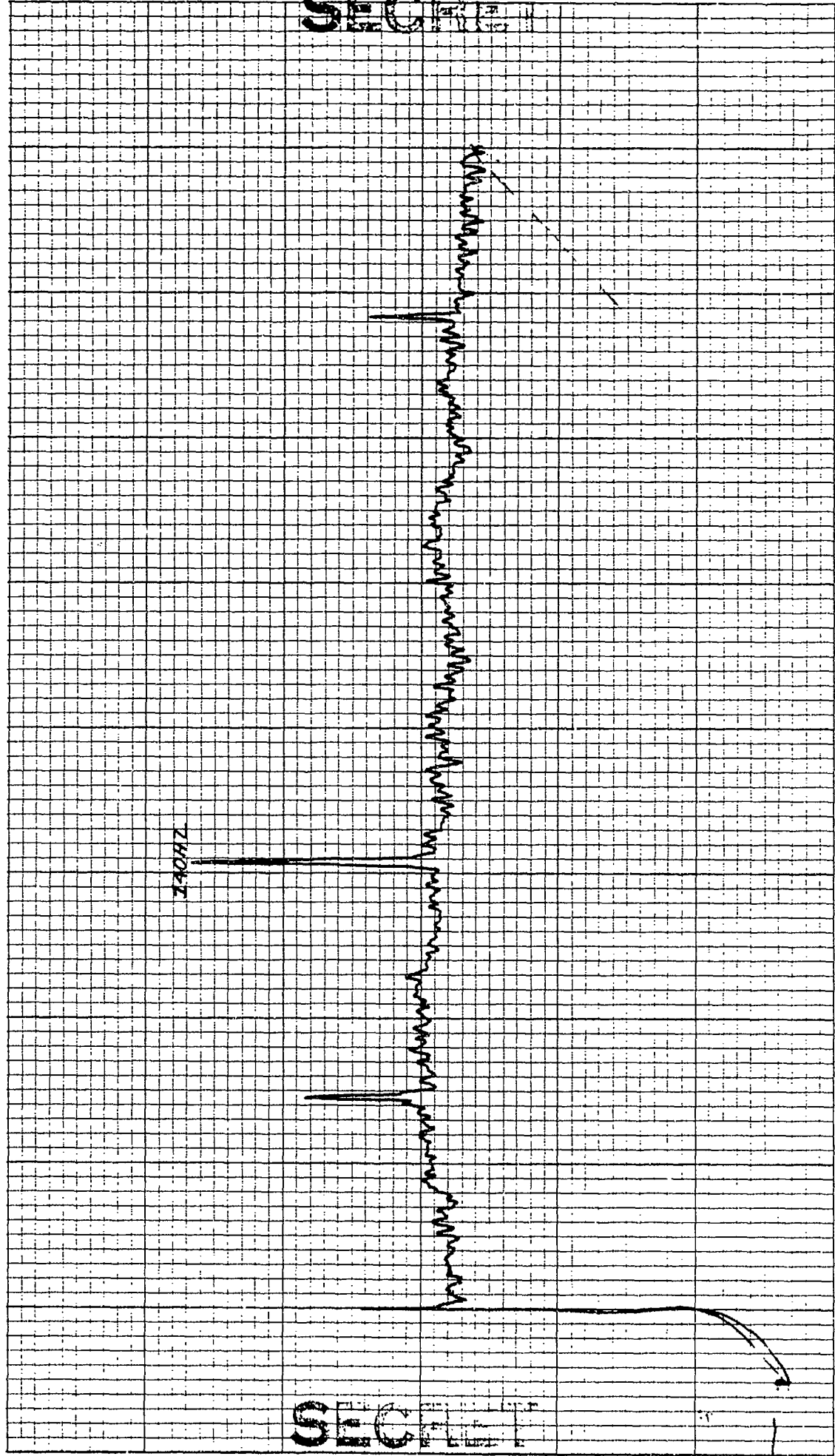
CONTROL: 3-16 -0033 (50)
OMNI SPECTRUM (ELEMENT 49)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0033 Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ STEERING

REEL: M19 INDEX 1627

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING



KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-16 -0633 (61)
OMNI SPECTRUM (ELEMENT 51)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

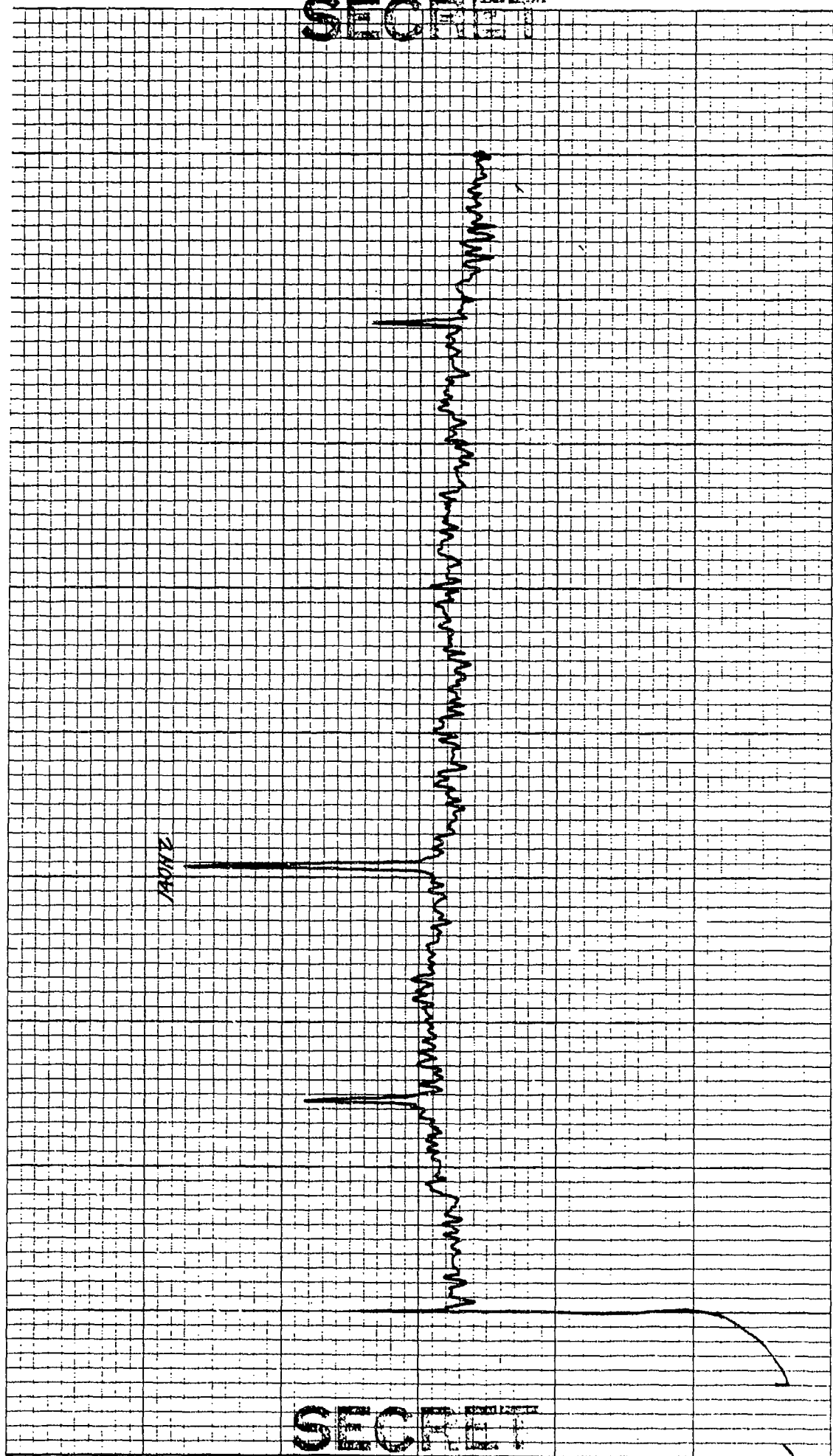
DATE/TIME: 3-7-67 -0633 Z

ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: M19

INDEX: 637

INTEGRATION TIME 320 SECS
FILTER WTC: HANNING



SECRET

SECRET

CONTROL: 3-16 - 0633 (52)
OMNI SPECTRUM (ELEMENT 53)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
ELEMENT

DATE OF ANALYSIS:

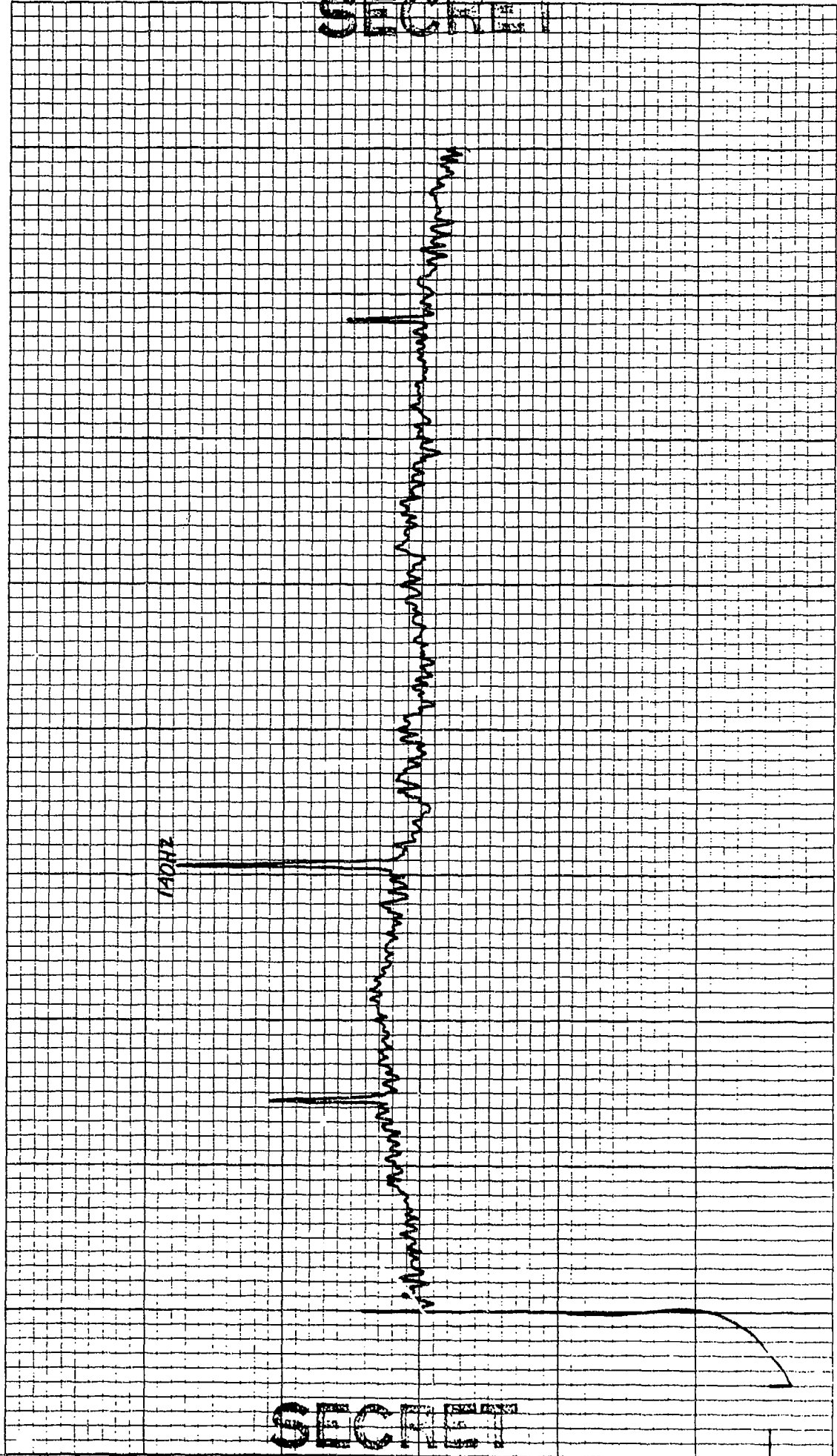
DATE/TIME: 3-16-77 - 0633 Z

ANALYSIS BANDWIDTH: 1/10 HZ
DEG AZ STEERING

REEL: M19

INDEX: 637

INTEGRATION TIME 320 SECS
FILTER
ATTEN: - DB
WTG: HANNING



SECRET

SECRET

K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

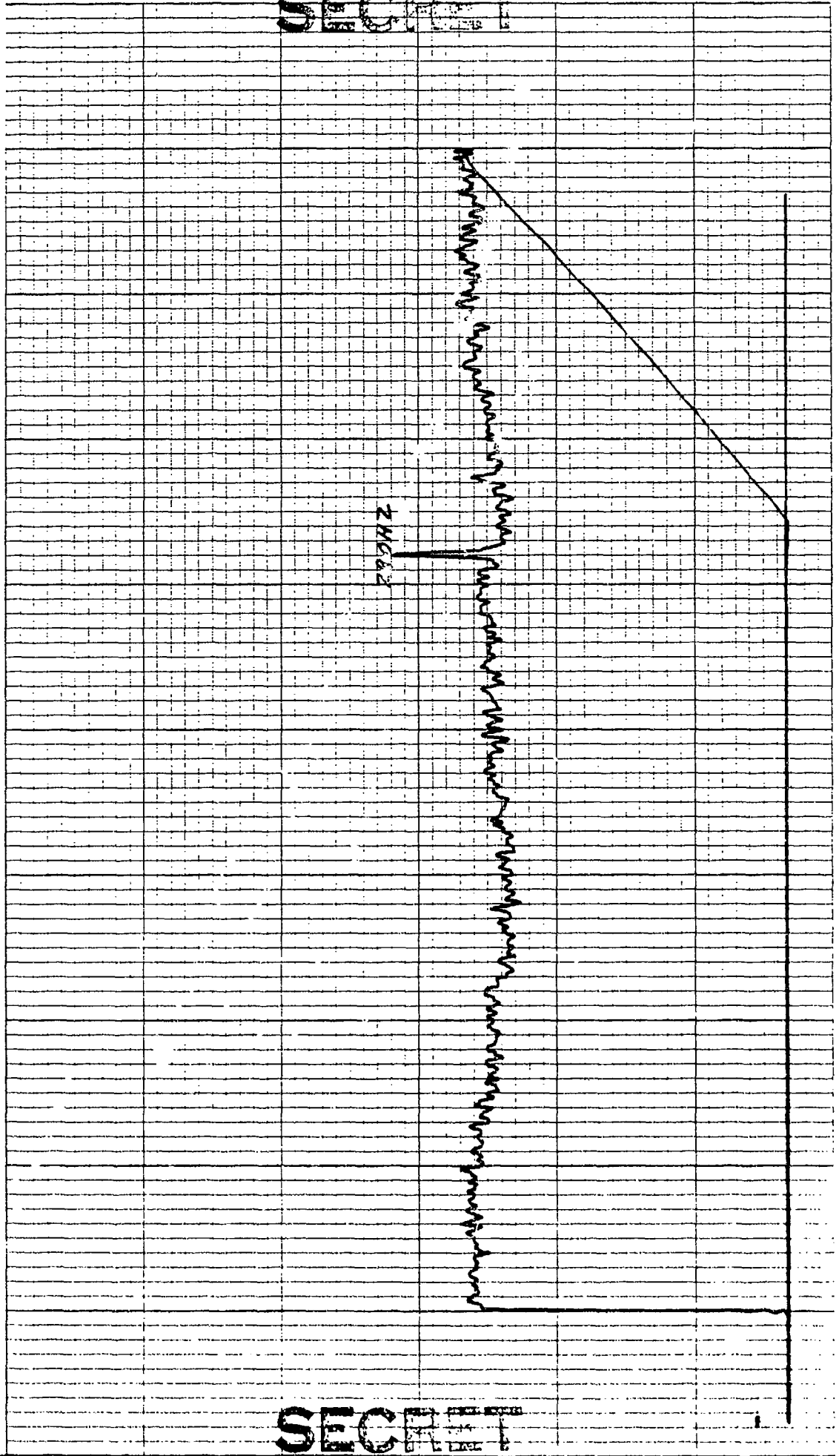
CONTROL: 3-16 - 0633 (1)
OMNI SPECTRUM (ELEMENT 2)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0633Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: M/9 INDEX: 637

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING



SECRET

SECRET

K-E 10 X 10 TO THE INCH. X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

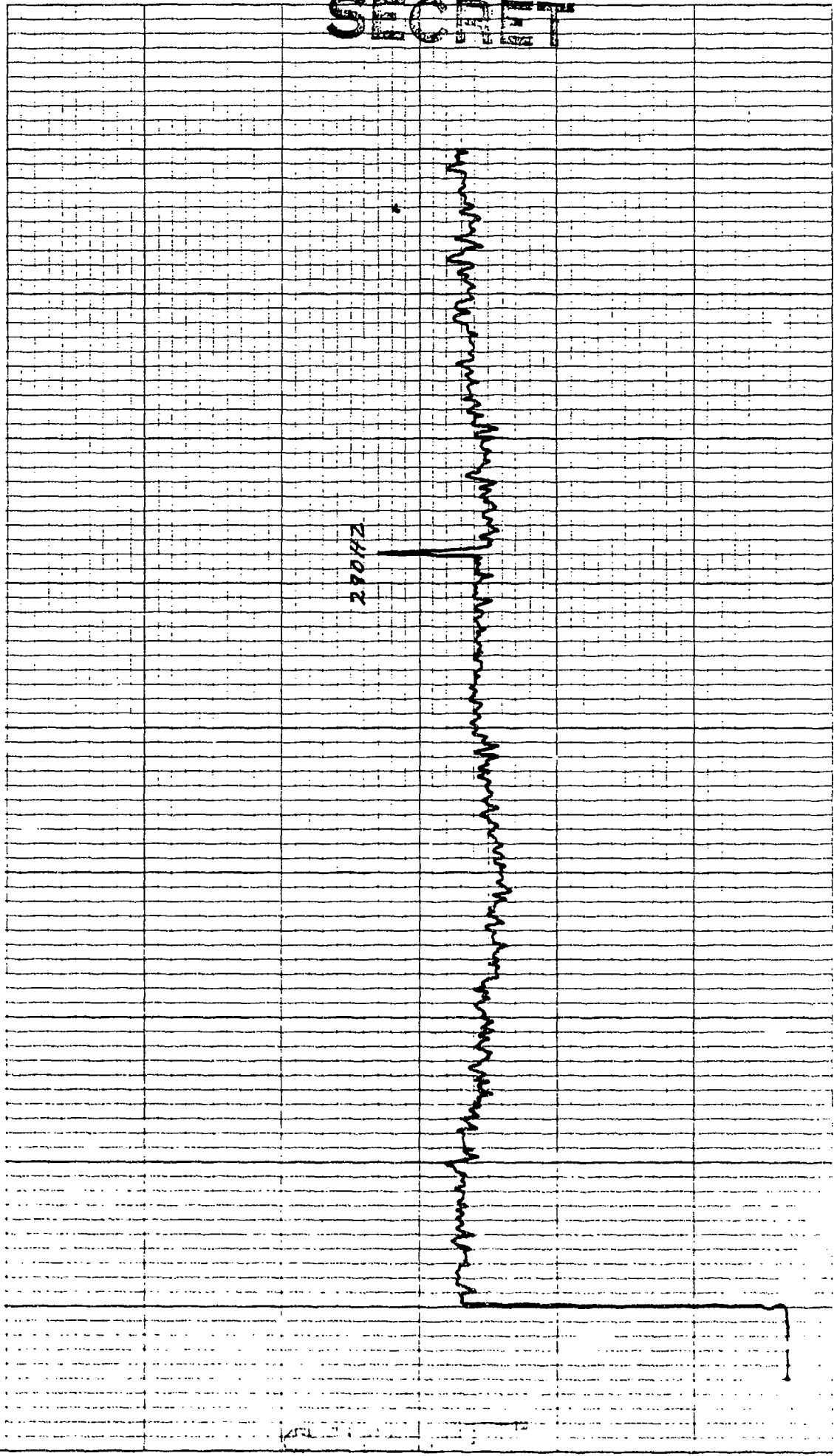
CONTROL: 376-0633 (2)
OMNI SPECTRUM (ELEMENT 4)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 037677-0633 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: M19 INDEX 1637

INTEGRATION TIME 320 SECS ATTN: — DB
FILTER WTC: HANNING



SECRET

K₀₂ 10 X 10 TO THE INCH * 7 X 10 INCHES
NEUFFEL & ESSER CO. MARK IN U.S.A.

46 0703

CONTROL: 3-16 - 0633 (3)
OMNI SPECTRUM (ELEMENT 6)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

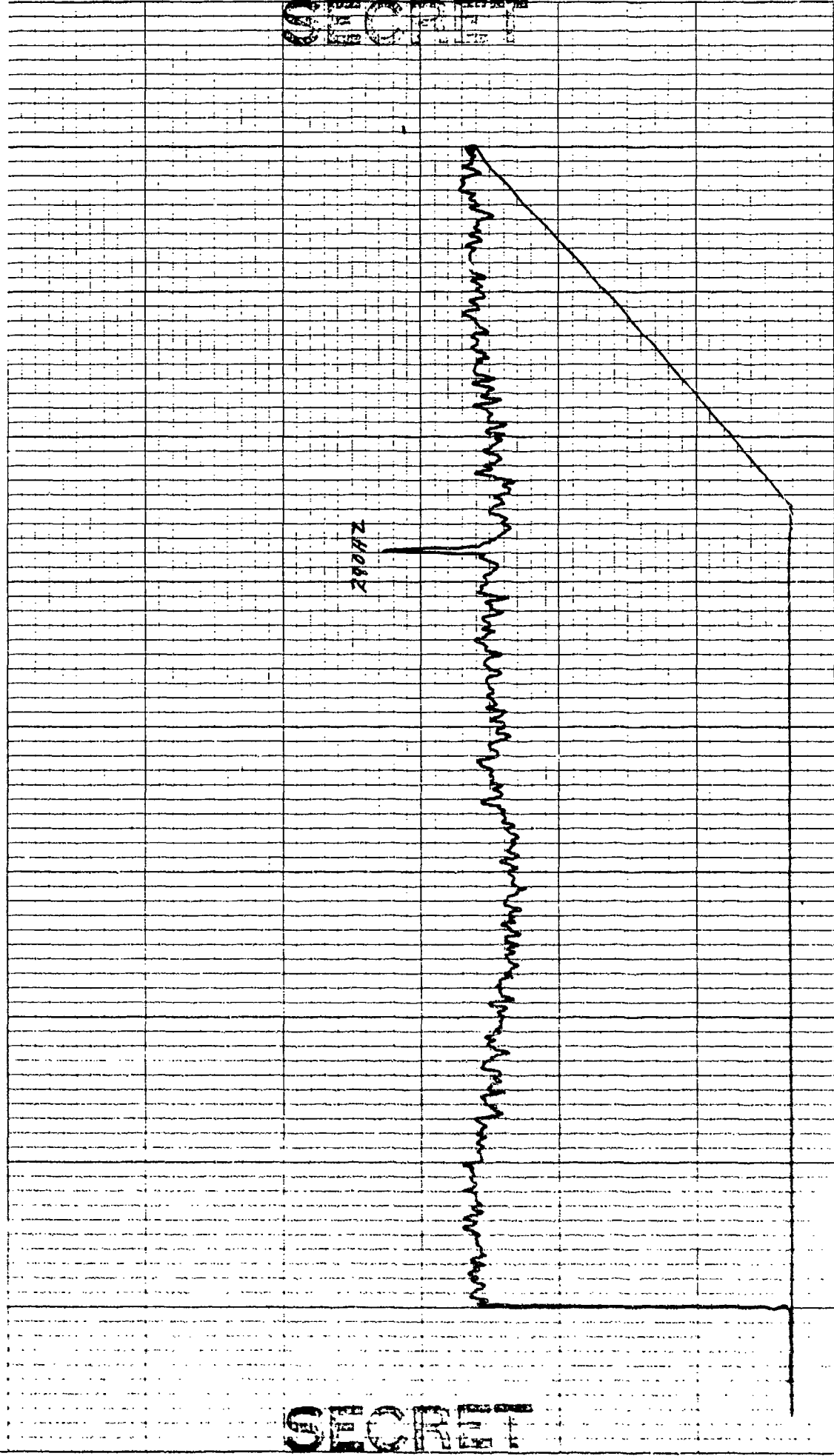
DATE OF ANALYSIS:

DATE/TIME: 3-16-33 - 0633 Z

ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: M19 INDEX 1637

INTEGRATION TIME 320 SECS ATTEN: - DB
FILTER WTG: HANNING



10 X 10 TO THE INCHES
MEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-16 - 0633 (4)
OMNI SPECTRUM (ELEMENT 9)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

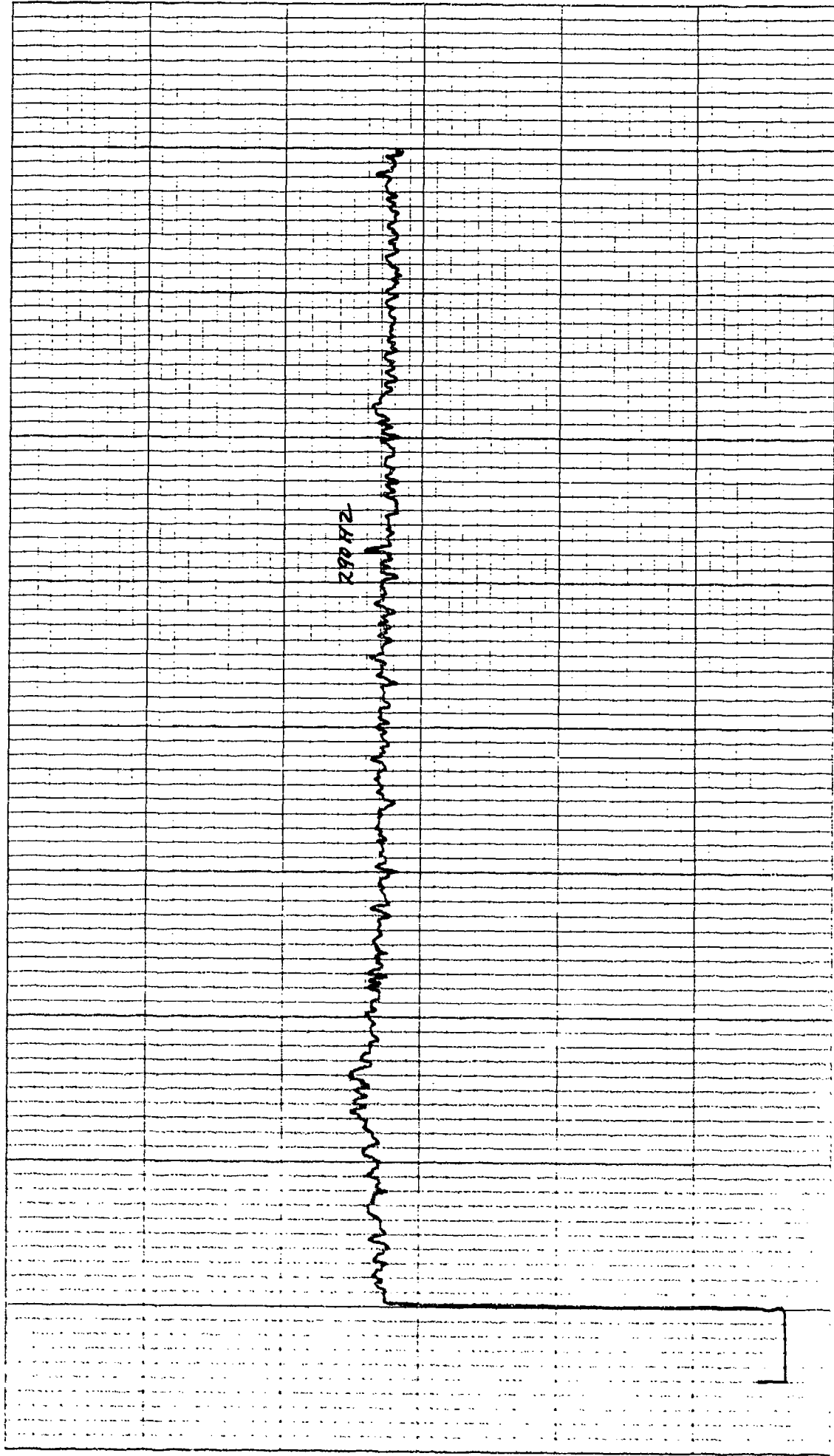
DATE/TIME: 3-16-77 - 0633 Z

ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: M19

INDEX: 637

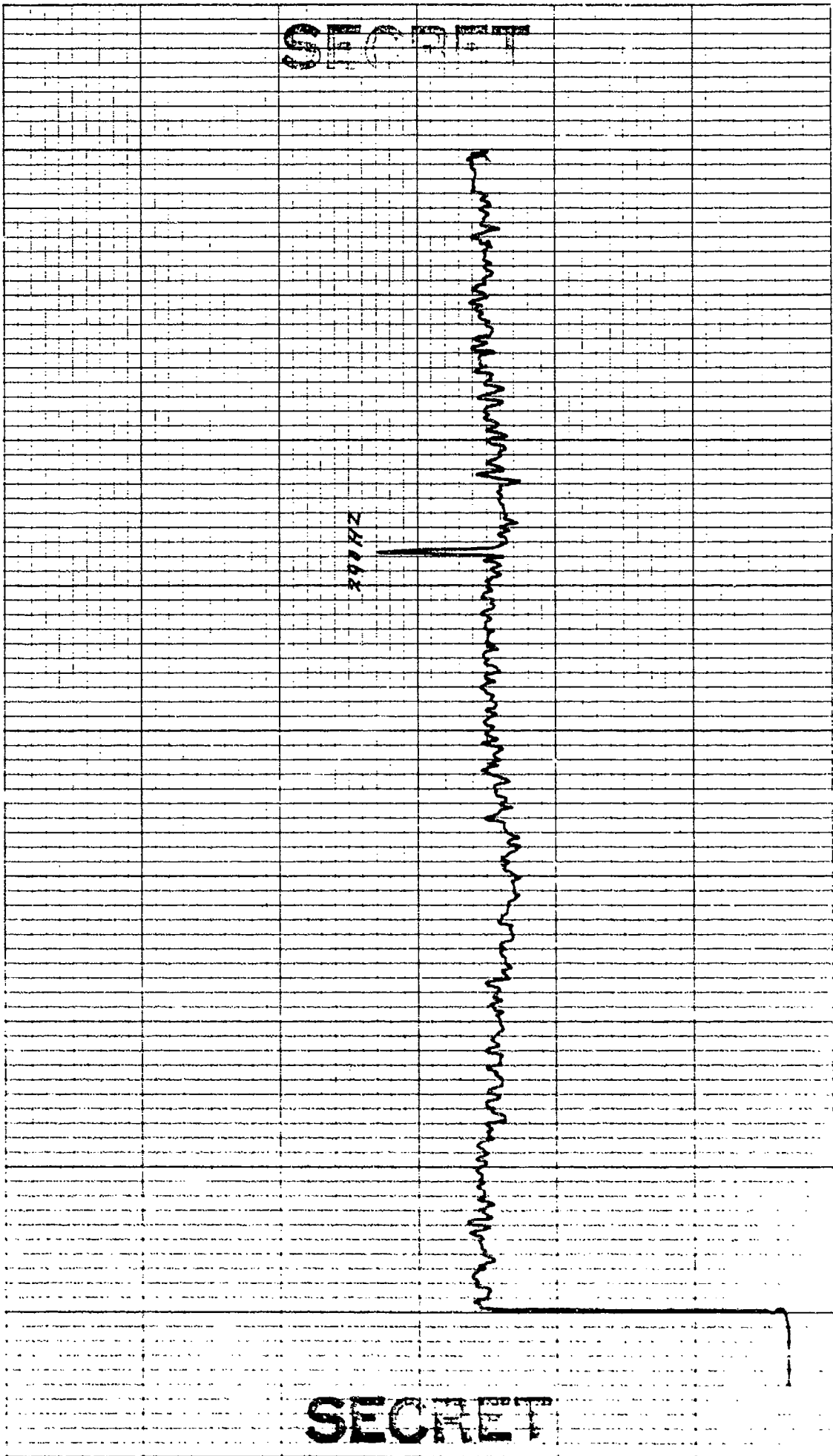
INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



K&E 10 X 10 TO THE INCH .7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-16-77-0633 (5) DATE OF ANALYSIS: REEL: M19 INDEX: 6JZ
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: - DB
1 ELEMENT _____ DEG AZ STEERING FILTER WTG: HANNING



SECRET

SECRET

10 X 10 TO THE INCH
NEUFEL & ESSER CO. MADE IN U.S.A.

SECRET

46 0703

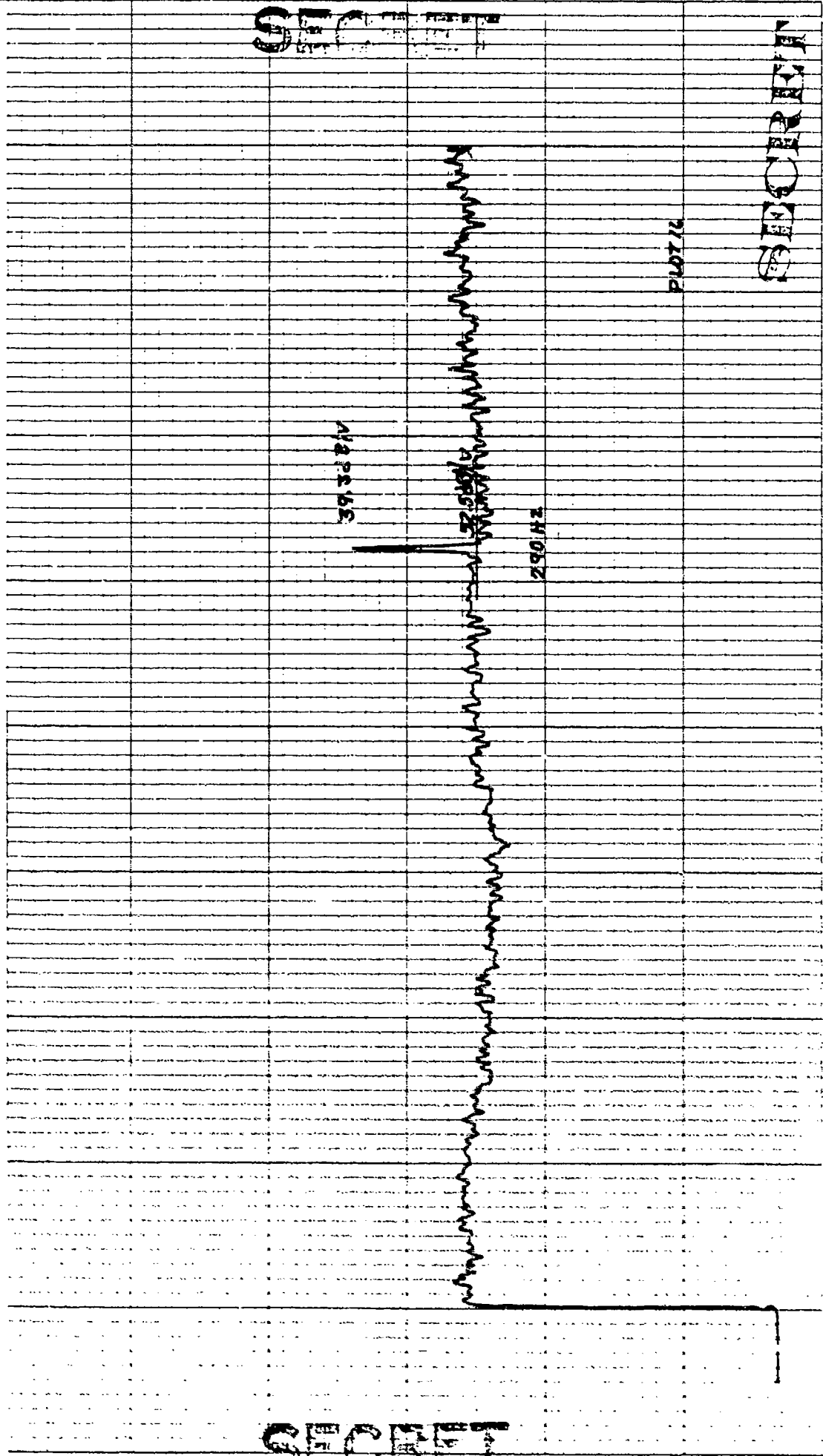
CONTROL: 0633-49 (DPIO)
OMNI SPECTRUM (ELEMENT 12)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: J-16-77 -0633 Z
ANALYSIS BANDWIDTH: 1/10HZ
- DEG AZ STEERING

REEL: M17 INDEX 1637

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING



24HZ

280HZ

310HZ

KOE 10.4 IN TO THE INCHES 1 TO 1000 FT
REPRODUCED FROM THE ORIGINAL RECORD

46 0703

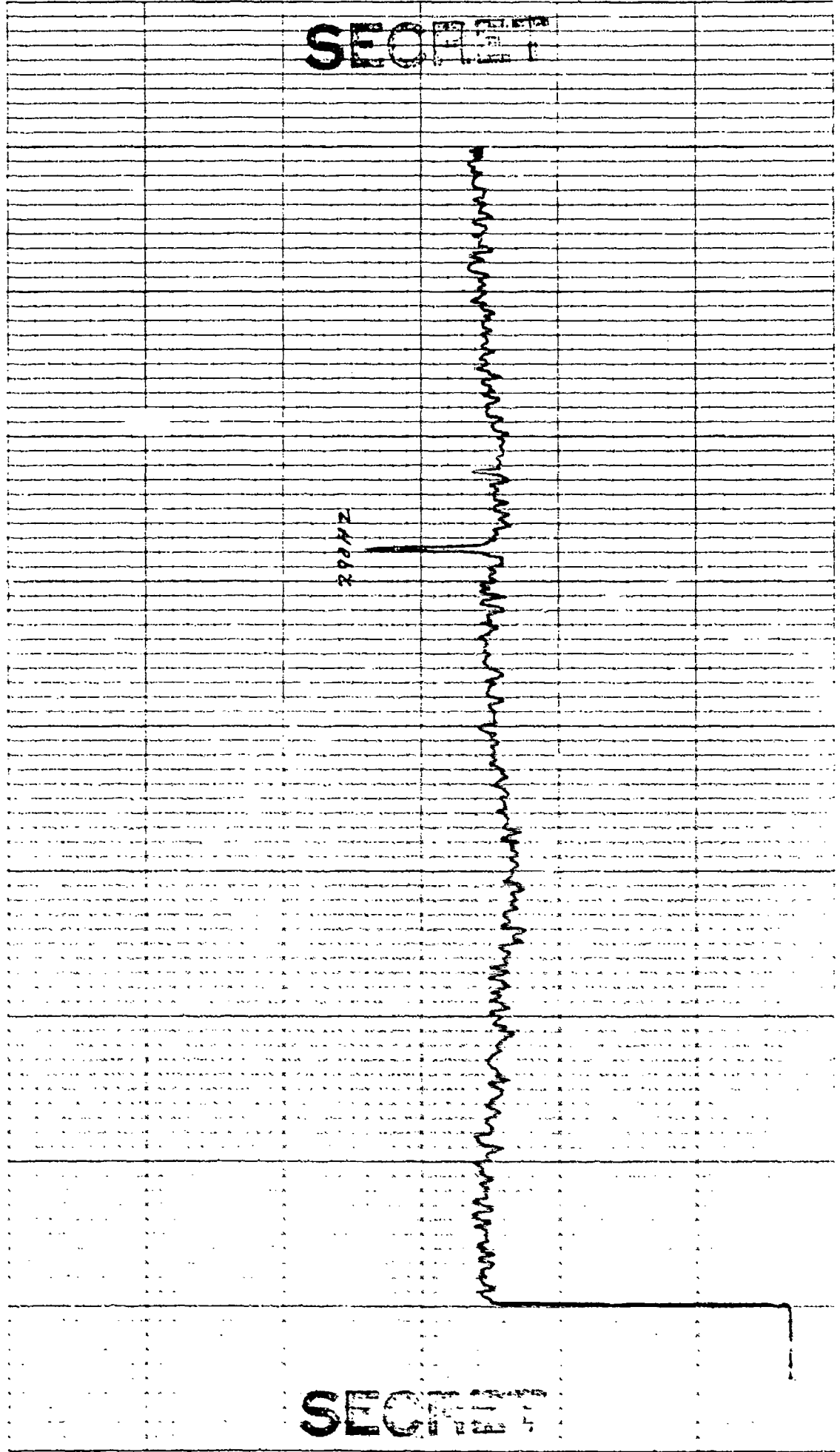
CONTROL: 3-16 - 0633 (2)
OMNI SPECTRUM(ELEMENT 14)
EXERCISE: BEARING STAKE
CENTER FREQ: 260 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: J76.77 - 0833 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

REEL: M/9 INDEX/637

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING



SECRET

SECRET

REF ID: A660703
REF ID: A660703

46 0703

CONTROL: 1-16 - 0633(8)
OMNI SPECTRUM(ELEMENT 16)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0633 Z

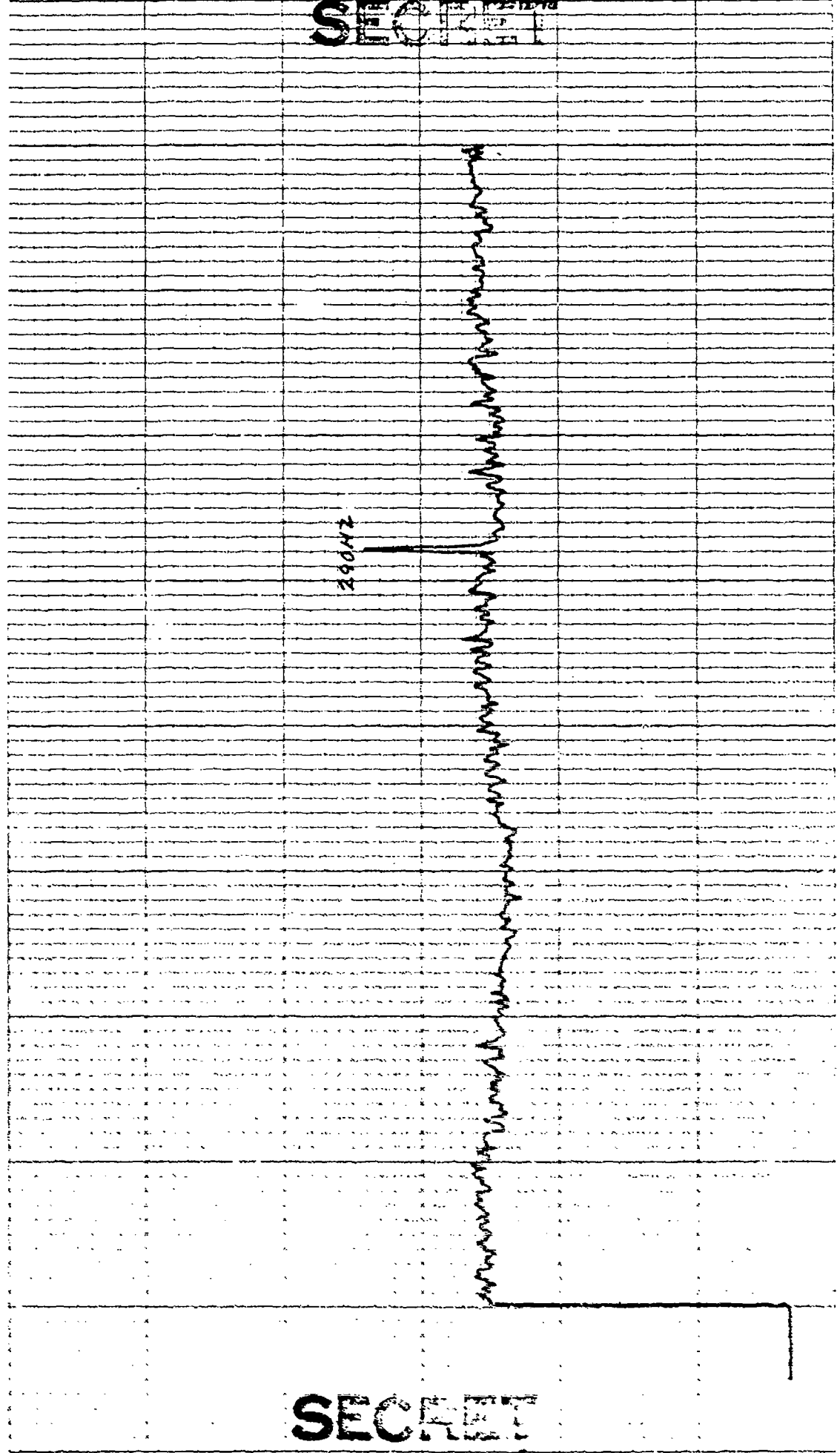
ANALYSIS BANDWIDTH: 1/10 HZ
DEC AZ STEERING

REEL: N19

INDEX: 617

INTEGRATION TIME 320 SECS
FILTER

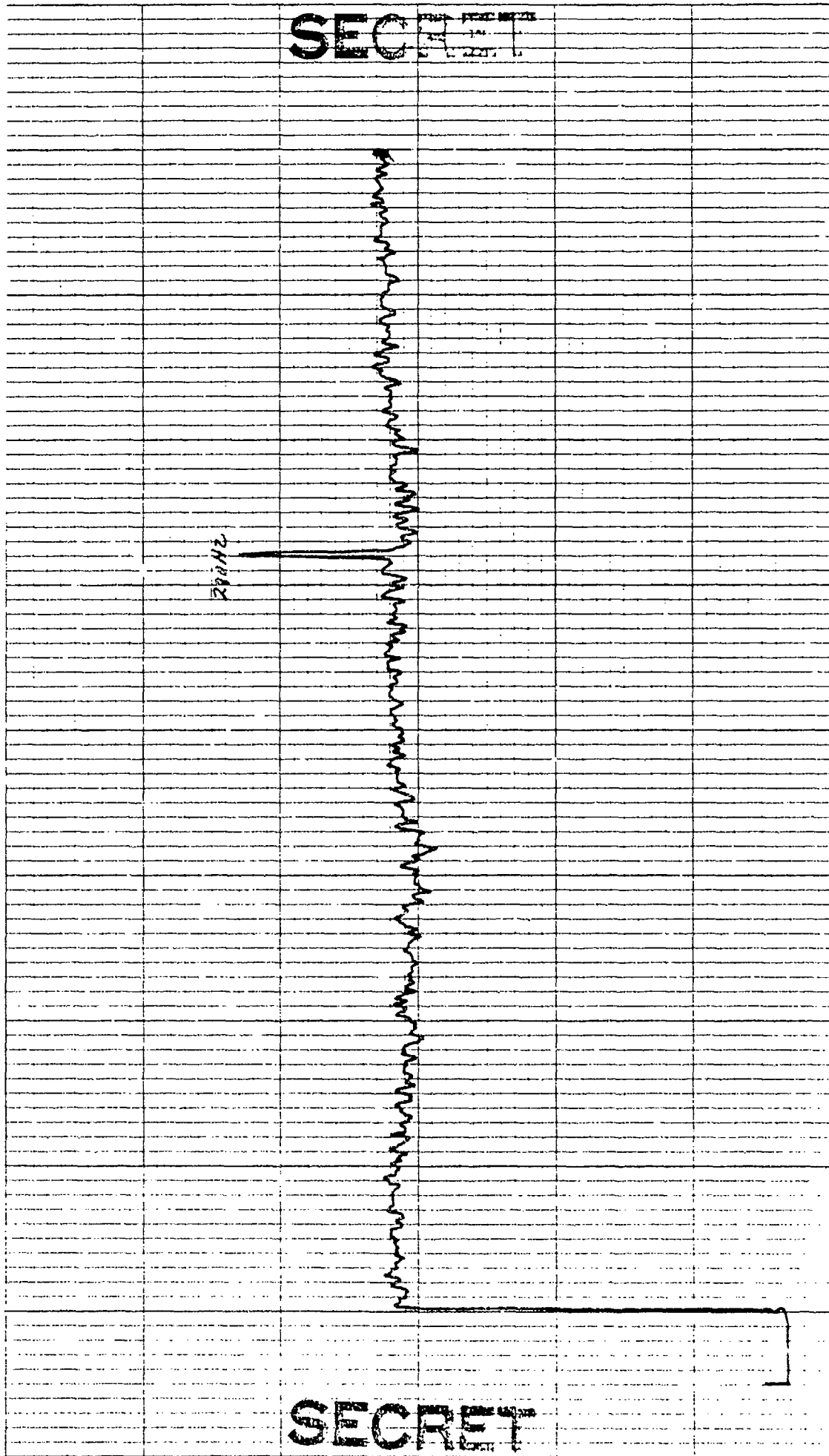
ATTEN: DB
WTC: HANNING



SECRET

CONTROL: 3-14 -0633 (9) DATE OF ANALYSIS: REEL: 119 INDEX: 127
 OMNI SPECTRUM (ELEMENT 18)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 290 HZ
 1 ELEMENT

DATE/TIME: 3-16-77 - 0633 Z INTEGRATION TIME 320 SECS ATTN: DB
 ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 DEG AZ STEERING



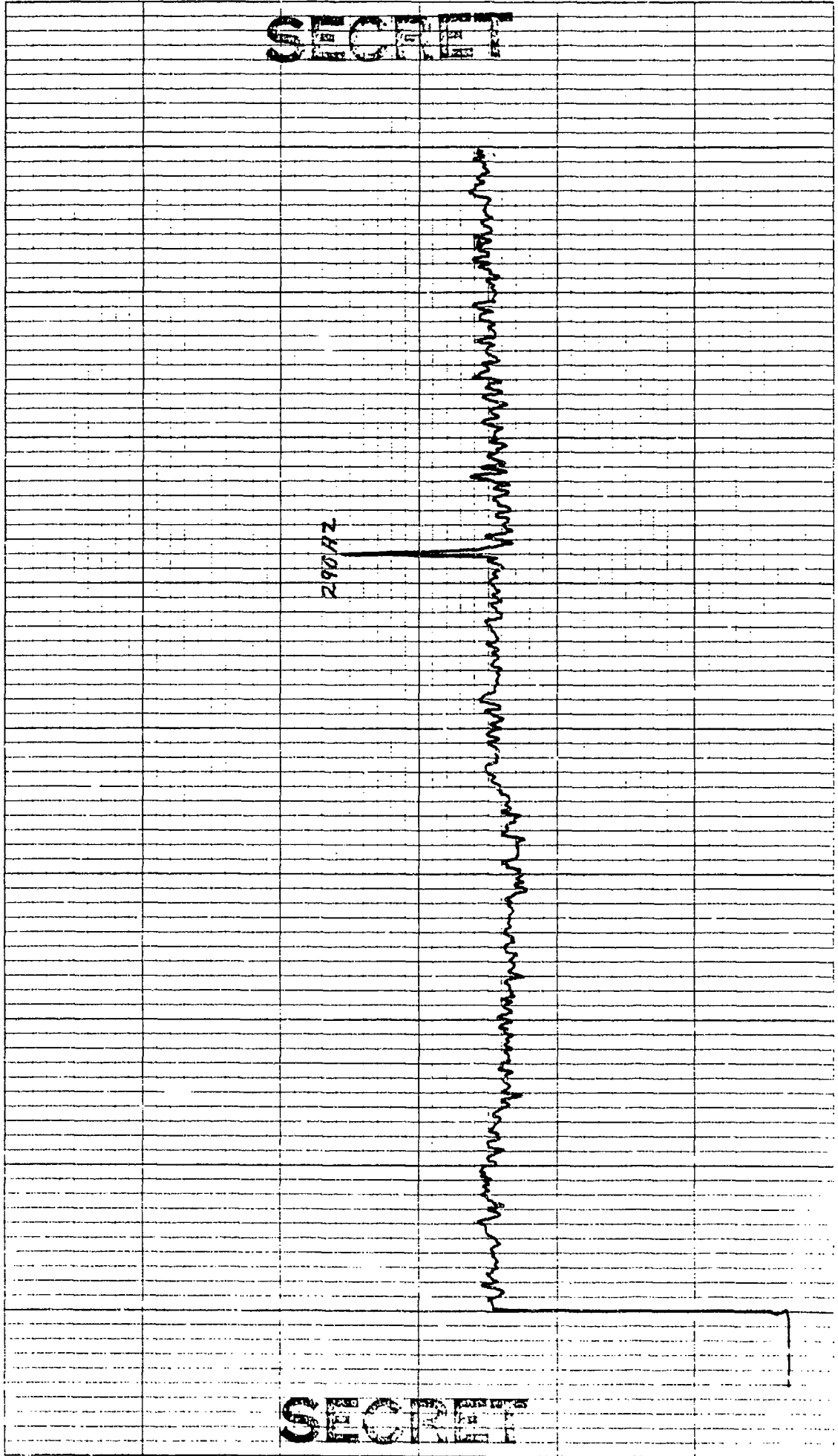
CONTROL: 3-16-0633 (10)
OMNI SPECTRUM (ELEMENT 20)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0633 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: M19 INDEX: 1637

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



10 X 10 TO THE INCH • 7 X 10 INCHES
NEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-14 - 0623 (11)
OMNI SPECTRUM (ELEMENT 22)
EXERCISE: BEARING STAKE
CENTER FREQ: 286 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-6-77 - 0623 Z

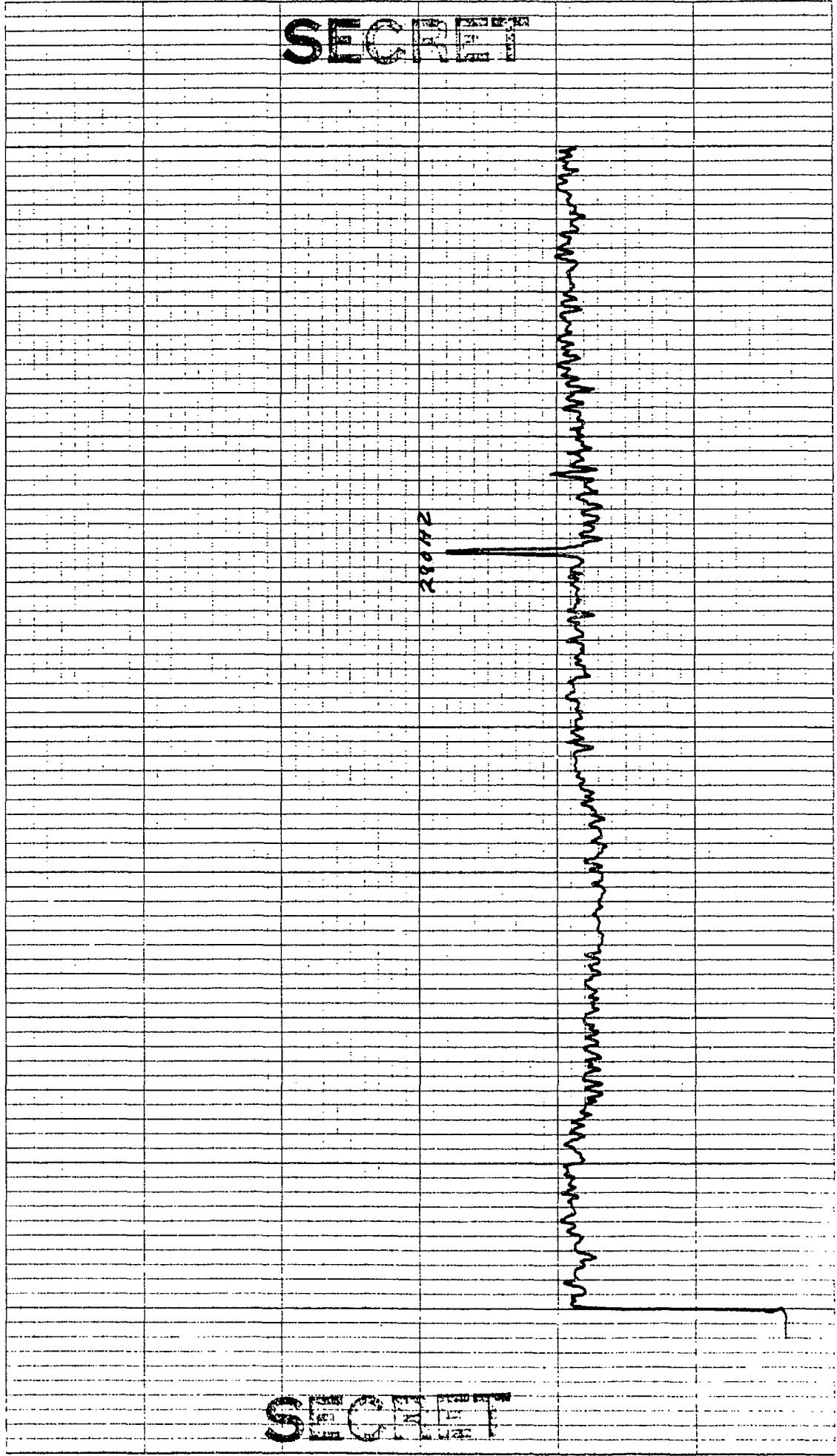
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: 119

INDEX: 1637

INTEGRATION TIME 320 SECS
FILTER

ATTEN: - DB
WTG: HANNING



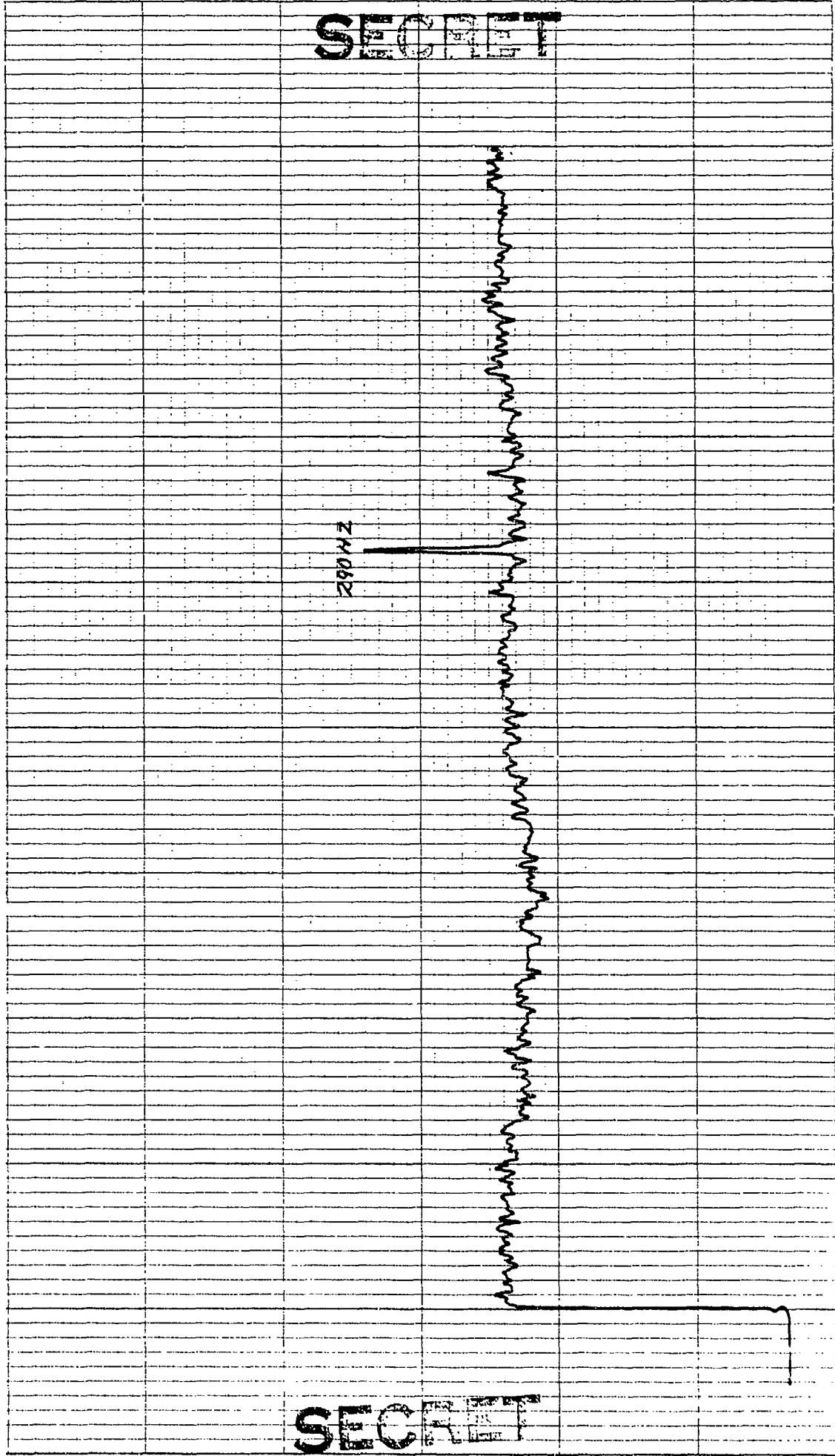
SECRET

SECRET

K-E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A

46 0703

CONTROL: 3-6 -0633 (12)
OMNI SPECTRUM(ELEMENT 24)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
DATE OF ANALYSIS: REEL: M19 INDEX/637
DATE/TIME: 3-6-77 -0633Z INTEGRATION TIME 320 SECS ATTEN: - DB
ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
1 ELEMENT 1 DEG AZ STEERING



KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-16-0633 (13)
OMNI SPECTRUM (ELEMENT 26)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
ELEMENT

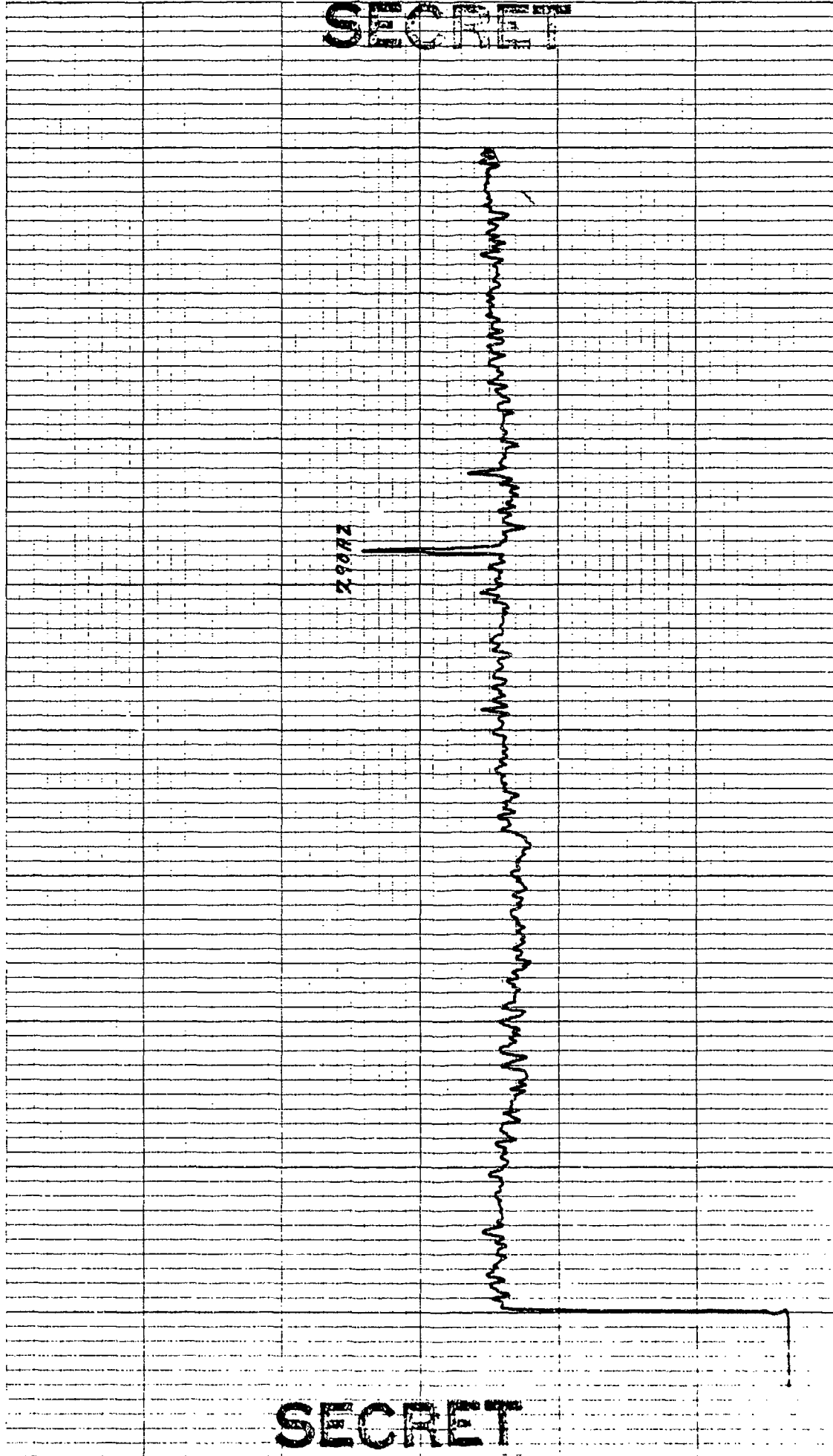
DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0633 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: M19

INDEX: 1637

INTEGRATION TIME 320 SECS ATTN: — DB
FILTER WTC: HANNING



SECRET

29972

SECRET

K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-16 - 0633 (14)
OMNI SPECTRUM (ELEMENT 29)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0633Z

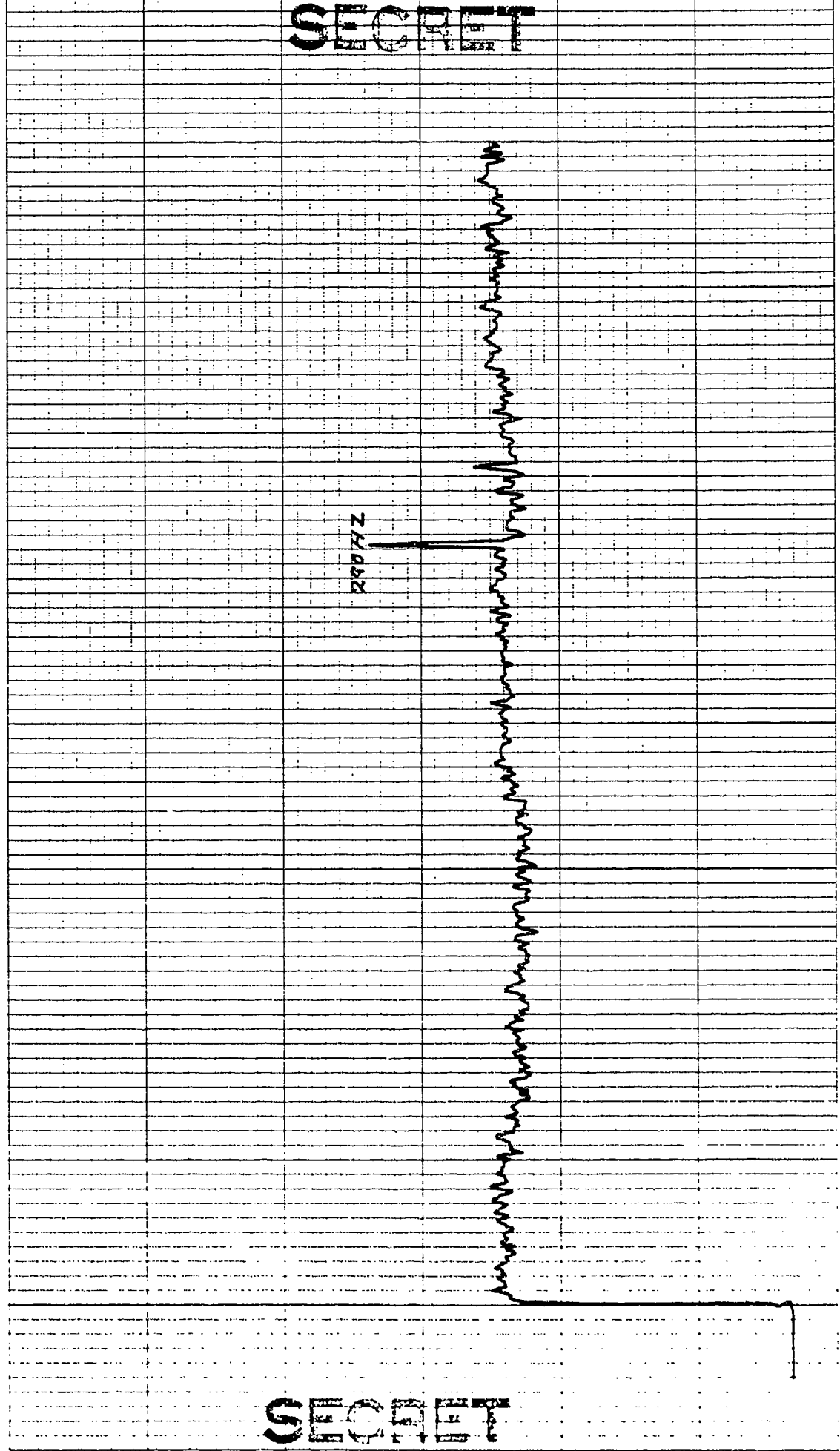
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

REEL: H19

INDEX: 637

INTEGRATION TIME 320 SECS
FILTER

ATTEN: DB
WTG: HANNING



SECRET

SECRET

K&E 10 X 10 TO THE INCH .7 X 10 INCHES
KEUFFEL & ESSER CO MADE IN U.S.A.

46 0703

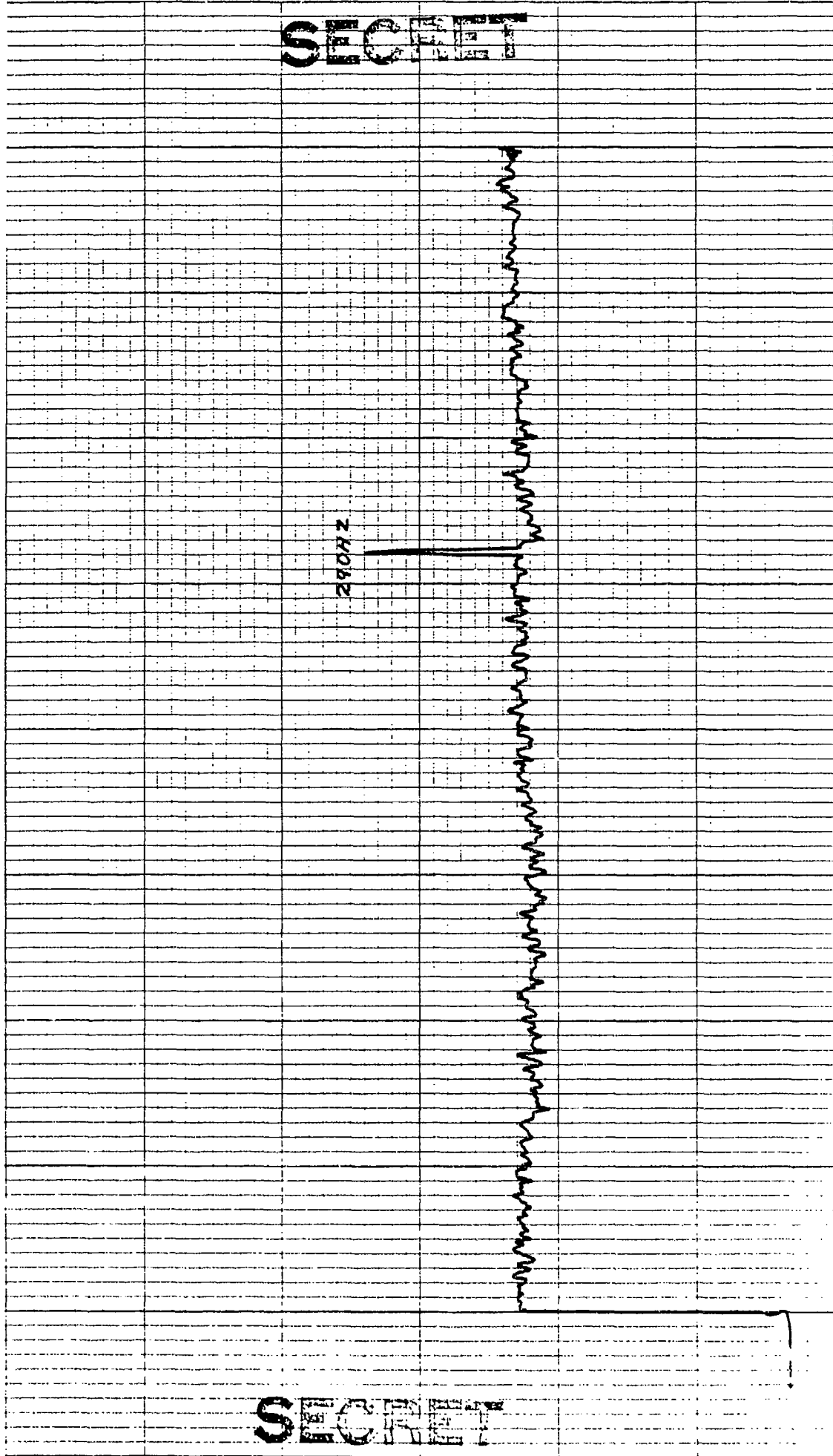
CONTROL: 3-16-0633 (15)
OMNI SPECTRUM (ELEMENT 31)
EXERCISE: BEARING STAKE
CENTER FREQ: 281 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0633Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

REEL: 419 INDEX/637

INTEGRATION TIME 320 SECS
ATTEN: - DB
FILTER WTG: HANNING



K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: J-16 - 0623 (16)
OMNI SPECTRUM (ELEMENT 33)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0630 Z

ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: M19

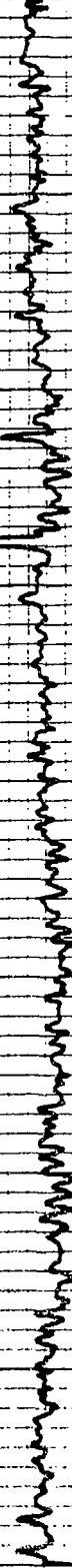
INDEX: 437

INTEGRATION TIME 320 SECS
FILTER ATEN: DB
WTG: HANNING

SECRET

290HZ

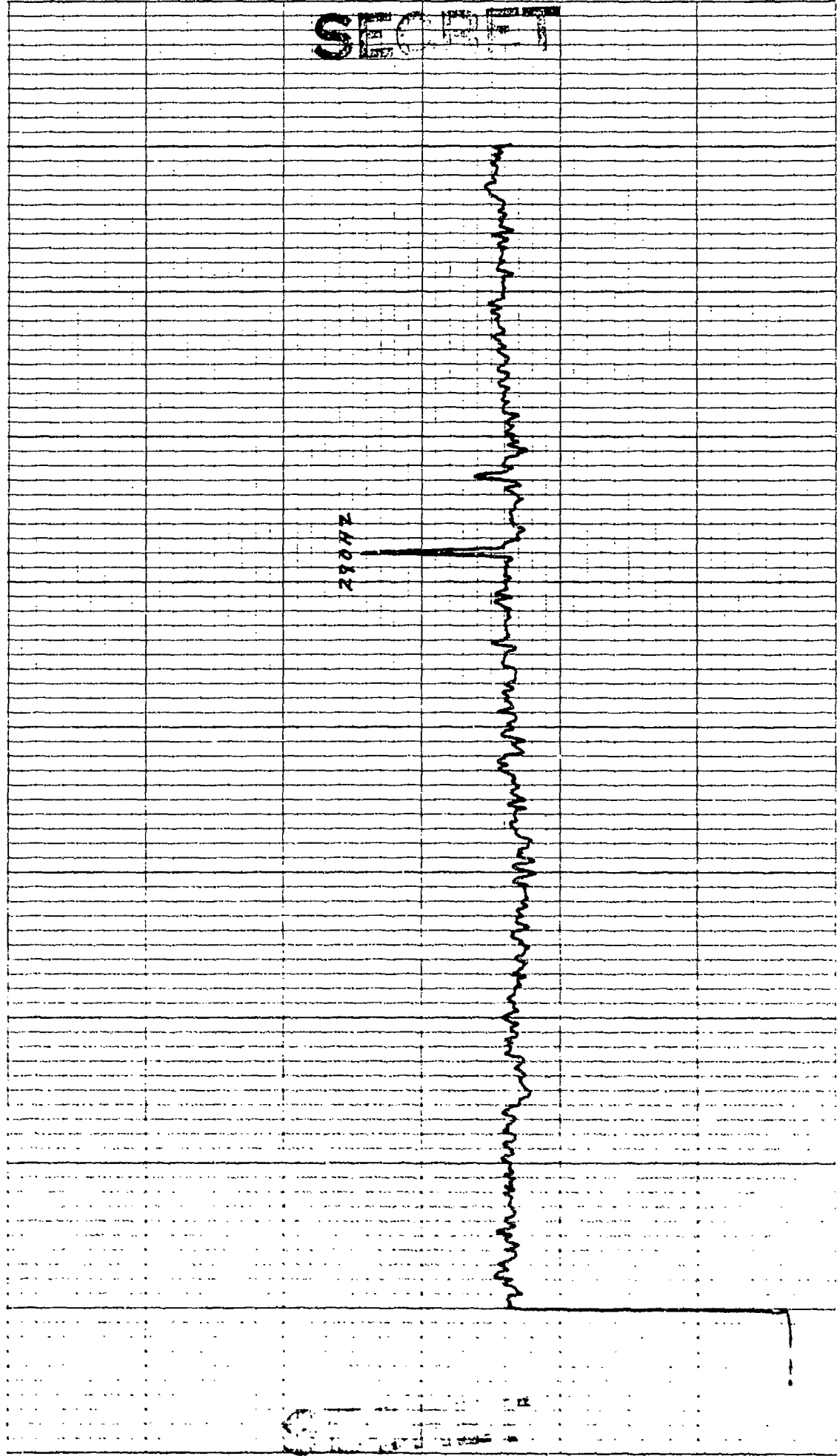
SECRET



10 X 10 TO THE INCH
KUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 376 -0633 (17)
OMNI SPECTRUM(ELEMENT 35)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
DATE OF ANALYSIS:
DATE/TIME: 3-16-77 -0633Z
ANALYSIS BANDWIDTH: 1/10HZ
_____ DEG AZ STEERING
REEL: M19 INDEX: 1637
INTEGRATION TIME 320 SECS ATTEN: DB
FILTER, WTG: HANNING



K&E 10 X 10 TO 11 1/2 INCHES
REUFFEL & FISER CO. MILWAUKEE

46 0703

CONTROL: 3-16 - 0633 (18)
OMNI SPECTRUM (ELEMENT 37)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

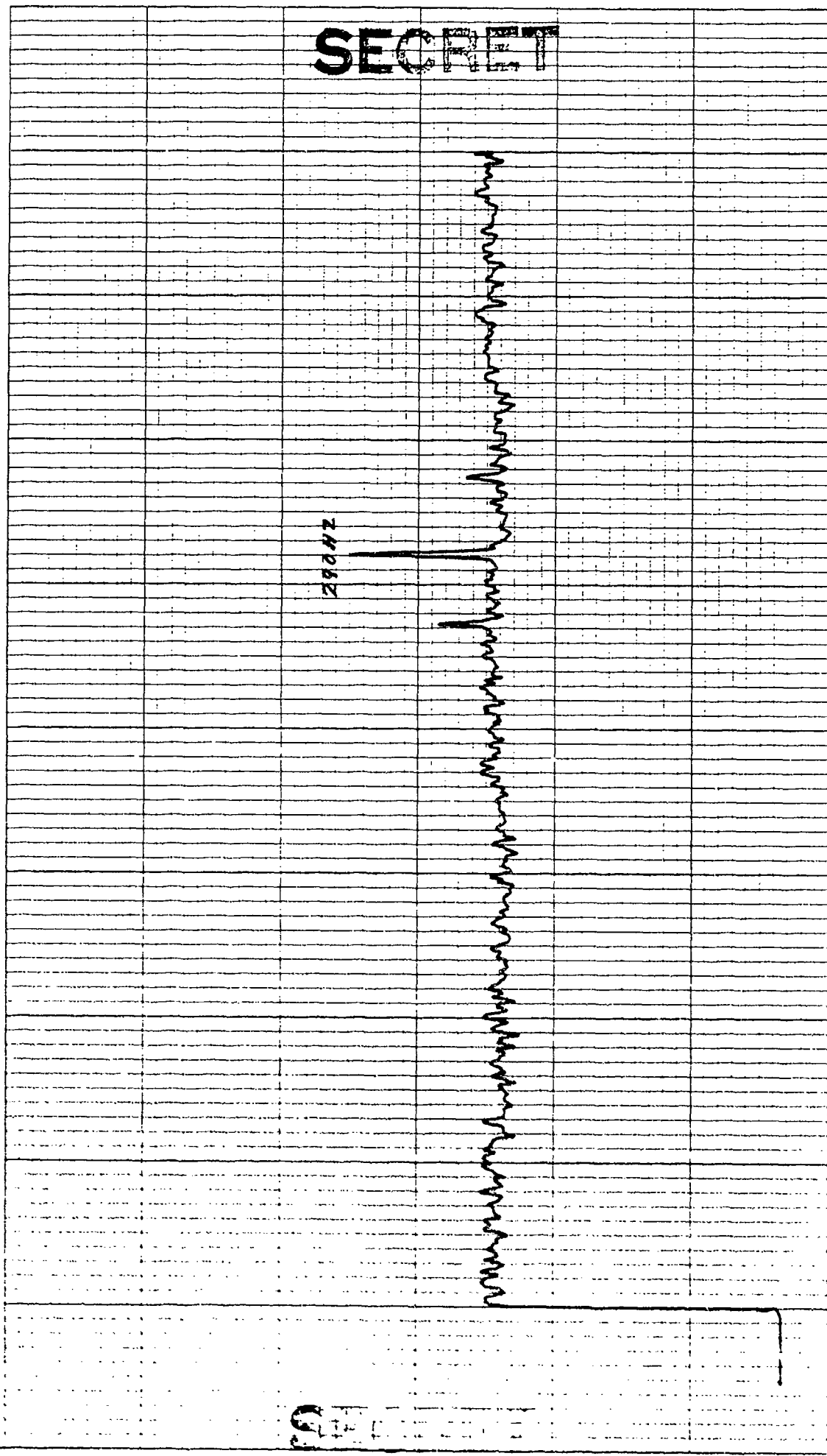
DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0633 Z

ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: M19 INDEX 1637

INTEGRATION TIME 320 SECS
FILTER WTG: HANNING



SECRET

KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-16 - 0638 (19)
OMNI SPECTRUM (ELEMENT 39)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

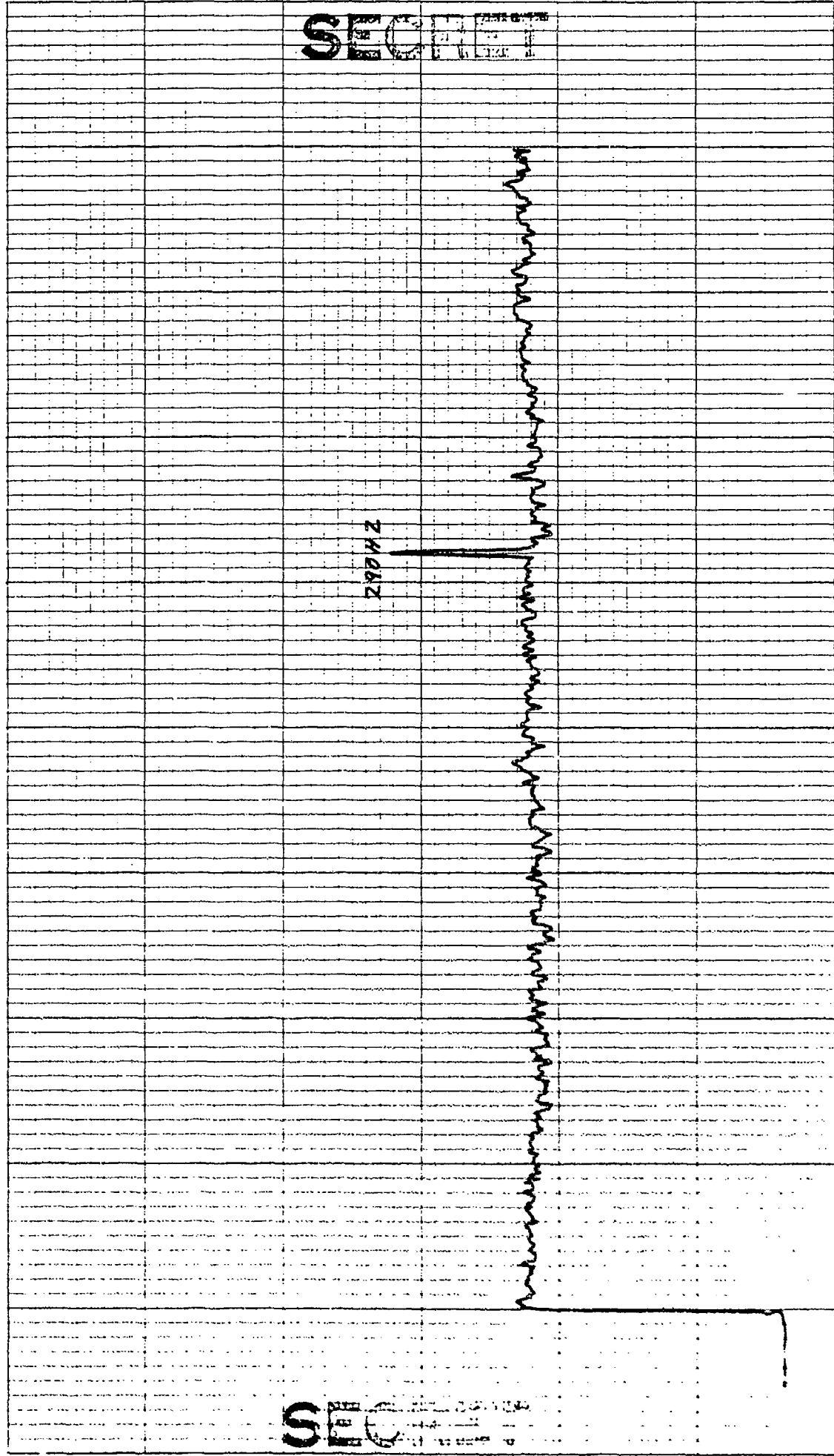
DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0633 Z

ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

REEL: M19 INDEX/637

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING



NOE 10 X 10 TO THE INCH • 7 X 10 INCHES
PERFEL & FISHER CO. MADE IN U.S.A.

46 0703

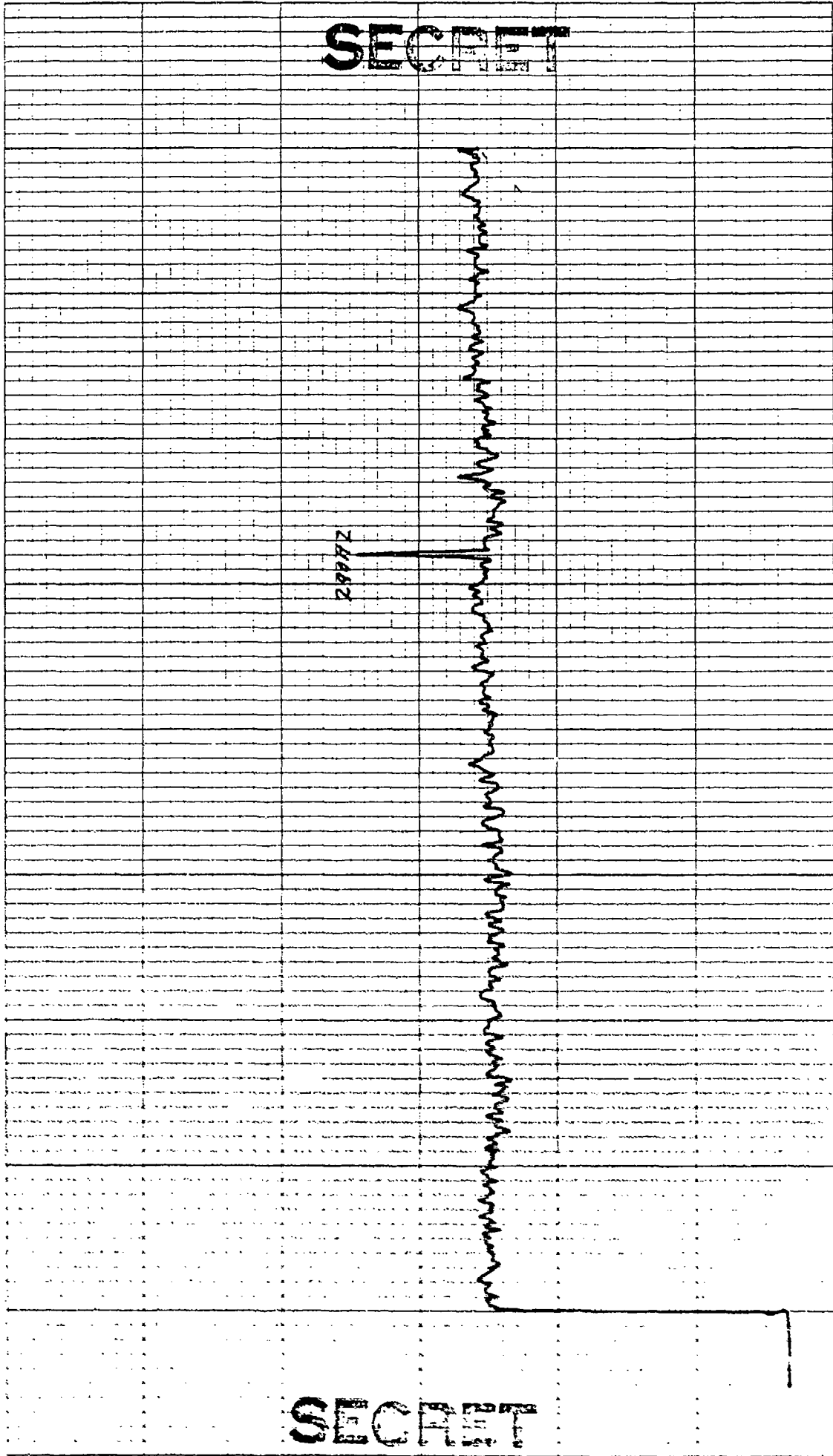
CONTROL: 376 - 0637 (20)
OMNI SPECTRUM (ELEMENT 41)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0637 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEC AZ STEERING

REEL: M19 INDEX: 437

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



CONTROL: 3-16 -0633 (21)
OMNI SPECTRUM(ELEMENT 43)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

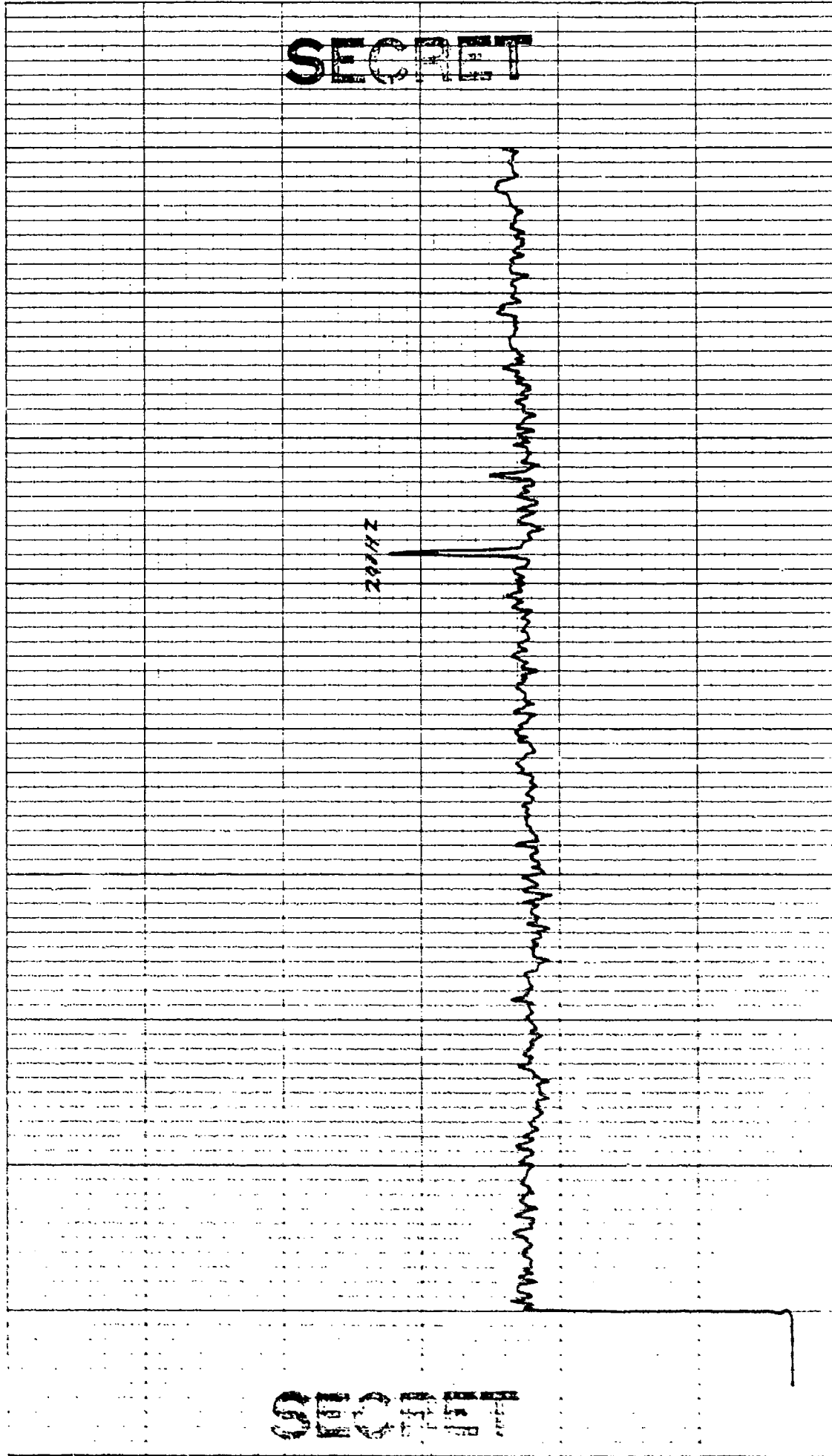
DATE OF ANALYSIS:

DATE/TIME: 3-16-77 -0633 Z

ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

REEL: M19 INDEX: 637

INTEGRATION TIME 320 SECS ATTEN: DB
FILTER WTC: HANNING



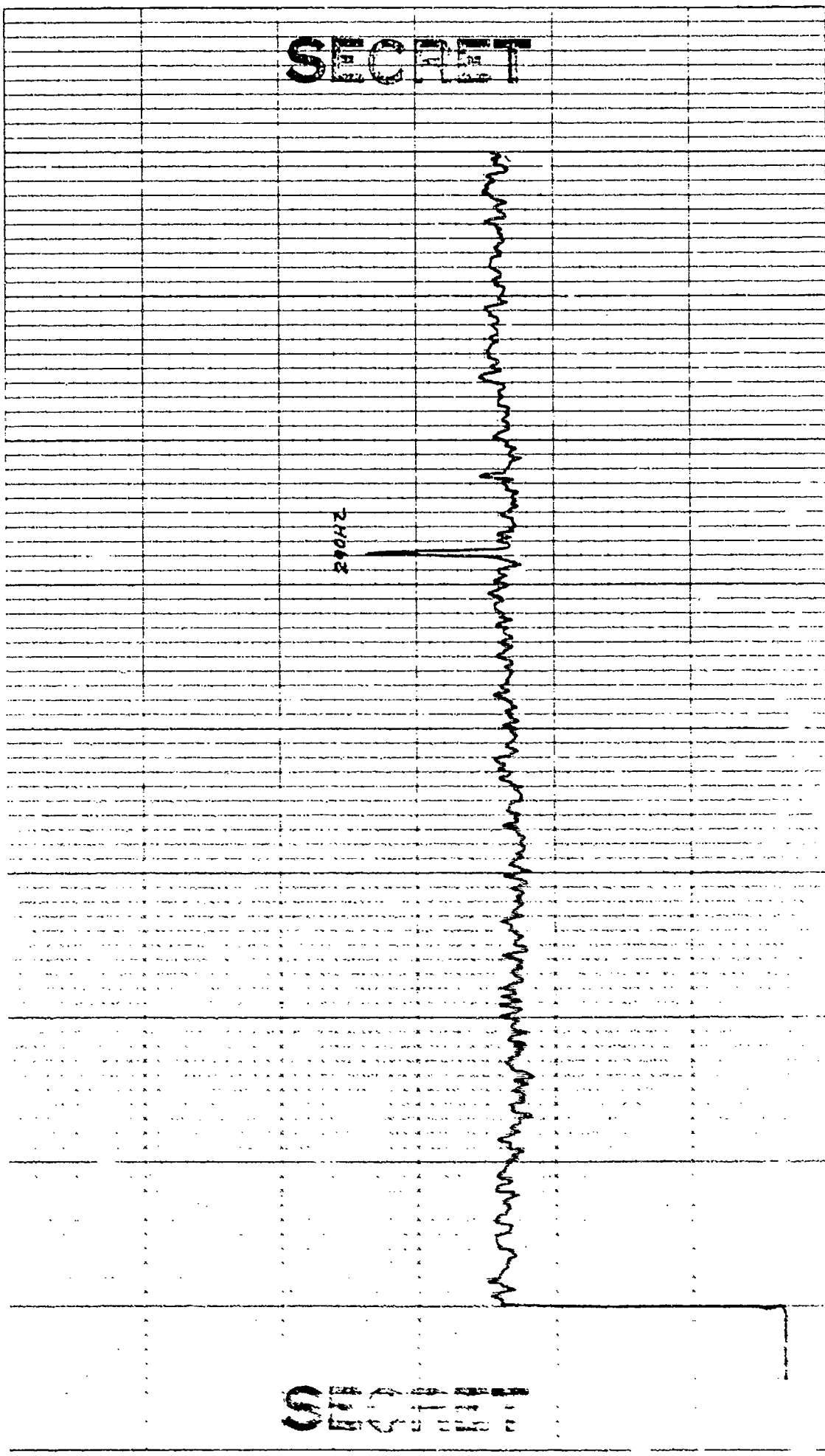
SECRET

SECRET

14-00000 TO THE INCHES
REPRODUCED BY RANDOLPH CO. WASHINGTON

46 0703

CONTROL: Q033 - 49 (DP10) DATE OF ANALYSIS: REEL: M19 INDEX/637
OMNI SPECTRUM (ELEMENT 45) DATE/TIME: 3-6-77 - 0633 Z INTEGRATION TIME 320 SECS ATTN: - DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 280 HZ DEG AZ STEERING



SECRET

SECRET

CONTROL: 3-16 -0633 (23)
OMNI SPECTRUM (ELEMENT 47)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

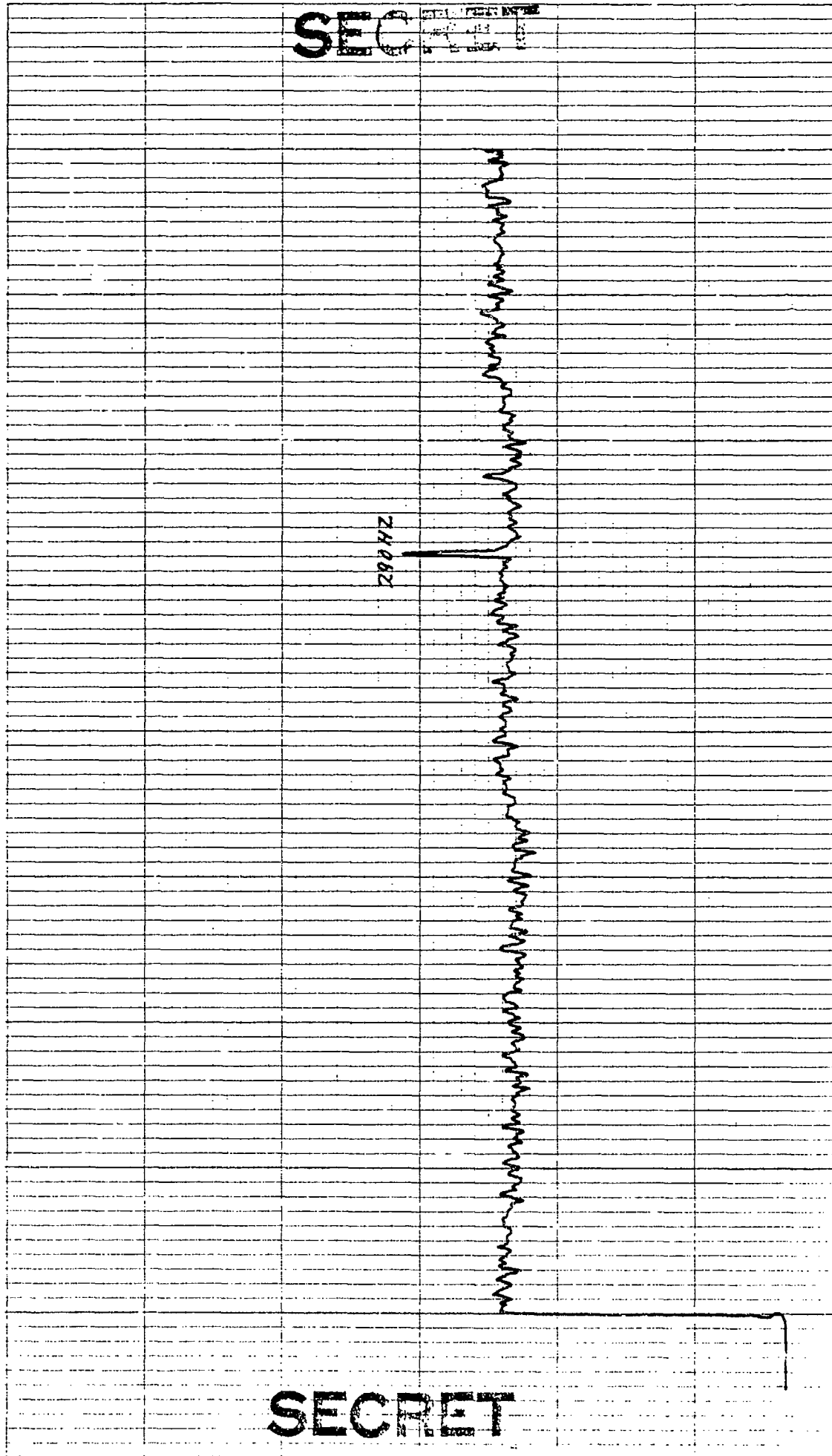
DATE OF ANALYSIS:

DATE/TIME: 3-16-77 -0633 Z

ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: M19 INDEX: 1637

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING



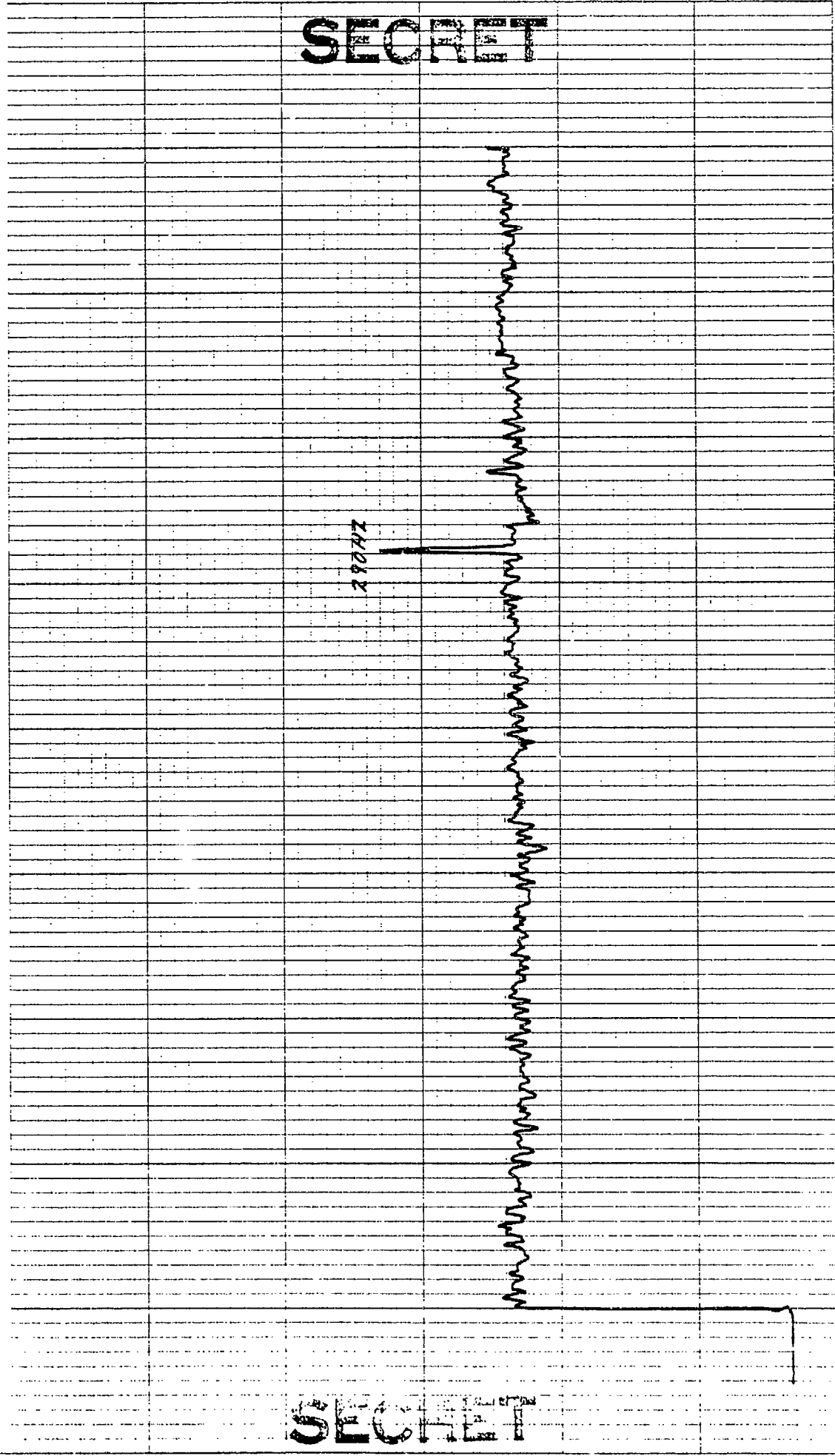
SECRET

SECRET

10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-16-0633 (24) DATE OF ANALYSIS: REEL: M.9 INDEX: 637
OMNI SPECTRUM (ELEMENT 49)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
INTEGRATION TIME 320 SECS ATTEN: - DB
FILTER WTG: HANNING
ANALYSIS BANDWIDTH: 1/10 HZ
DEG AZ STEERING



SECRET

SECRET

10 X 10 TO THE INCH * 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

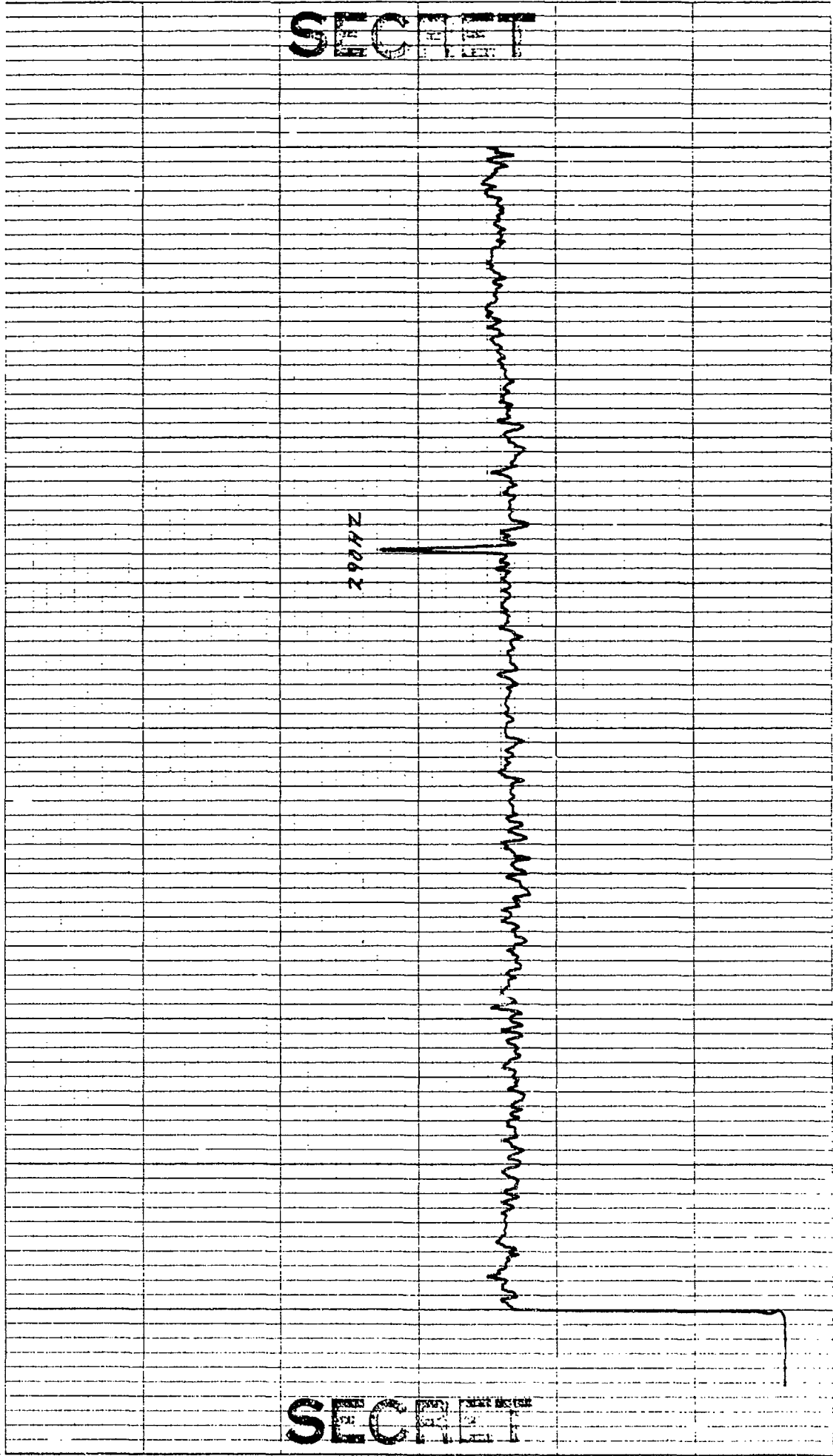
CONTROL: 3-16 - 0633 (25)
OMNI SPECTRUM (ELEMENT 51)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0633 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: 119 INDEX: 637

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING



K&E 10 X 10 TO THE INCH • 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-16 -0633 (26)
OMNI SPECTRUM(ELEMENT 53)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

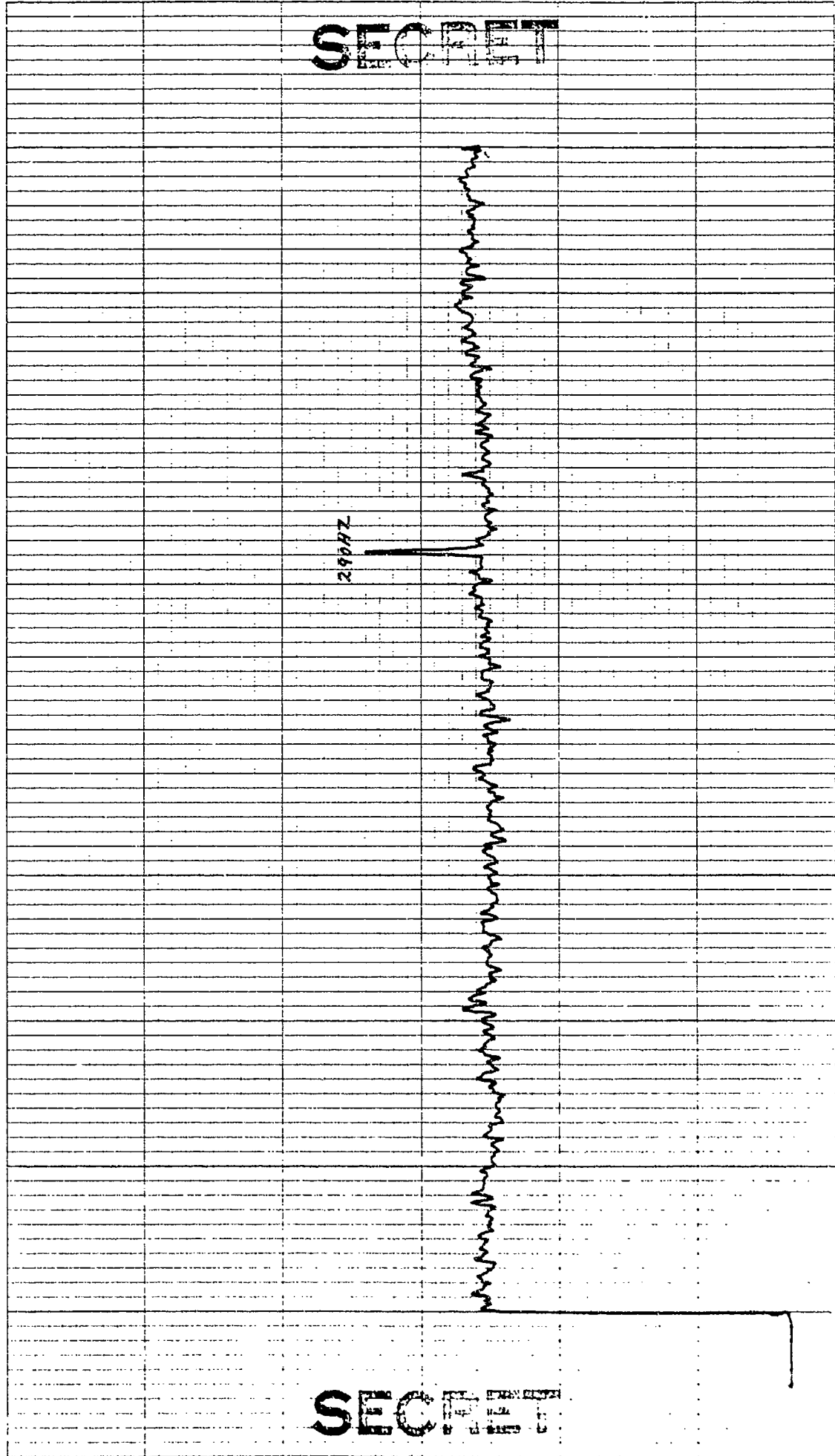
DATE OF ANALYSIS:

DATE/TIME: 3-16-77 -0633 Z

ANALYSIS BANDWIDTH: 1/10HZ
_____ DEG AZ STEERING

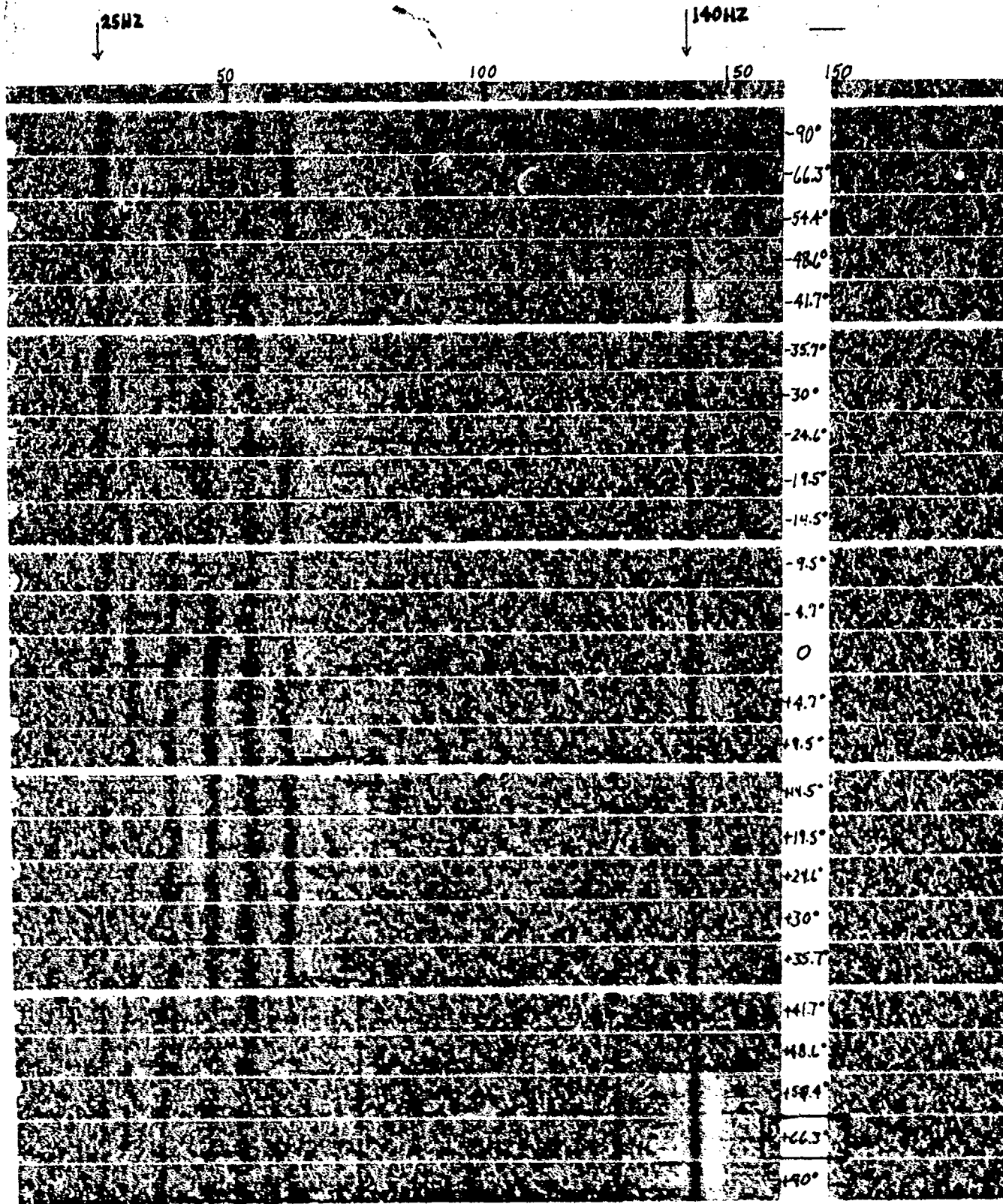
REEL: M19 INDEX/637

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



SECRET

SECRET



CONTROL NUMBER 06337-51-DPIC
 NUMBER OF ELEMENTS 25
 FREQUENCY BAND 10 TO 300 HZ
 RANGE 128 N.M.

HISTOPRAZ
 TAPE REEL NUMBER M19
 ANALYSIS BAND WIDTH .2 HZ
 WATER DEPTH 200 FMS

2

140HZ

SECRET

290HZ

295HZ

150

150

200

250

300

-90°

-66.3°

-54.4°

-48.6°

-41.7°

-35.7°

-30°

-24.6°

-19.5°

-14.5°

-9.5°

-4.7°

0

+4.7°

+9.5°

+14.5°

+19.5°

+24.6°

+30°

+35.7°

+41.7°

+48.6°

+54.4°

+66.3°

+90°

HISTORAZ

TAPE REEL NUMBER M19

TAPE COUNT 1637

SECRET

ANALYSIS BAND WIDTH .2 HZ

WATER DEPTH 2500 FMS

ELEMENT NUMBERS 1 TO 25 SAN-XXX-78-0140

DATE 3-16-77

EXERCISE: BEARING STAKE

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 10

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-16.0</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-6.8
BEAMFORMER GAIN	<u>+12</u>	+5.2 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	+5.4 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-45.6</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-35.6
BEAMFORMER GAIN	<u>+12</u>	-23.6 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR	<u>+5.2</u>	
SIGNAL LEVEL FOR SNR	<u>-23.6</u>	28.8
PROCESSOR CORRECTION	<u>-4.0</u>	24.8
MRA CORRECTION	<u>+ .2</u>	25 SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-0.2</u>	16.8 SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR
CALCULATIONS

DATA POINT 10

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -35.8

MCPS-32 CAL. CORRECTION +10 -25.8

BEAMFORMER GAIN +12 -13.8 SIG. LEVEL FOR SNR CALCULATION

MRA CORRECTION + .8 -13.0 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -59.4

MCPS-32 CAL. CORRECTION +10 -49.4

BEAMFORMER GAIN +12 -37.4 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR -13.8

SIGNAL LEVEL FOR SNR -37.4 23.6

PROCESSOR CORRECTION - 4.0 19.6

MRA CORRECTION + .8 20.4 SNR 1/10 HZ BAND

BANDWIDTH CONVERSION -8.2 12.2 SNR 1 HZ BAND

CONFIDENTIAL

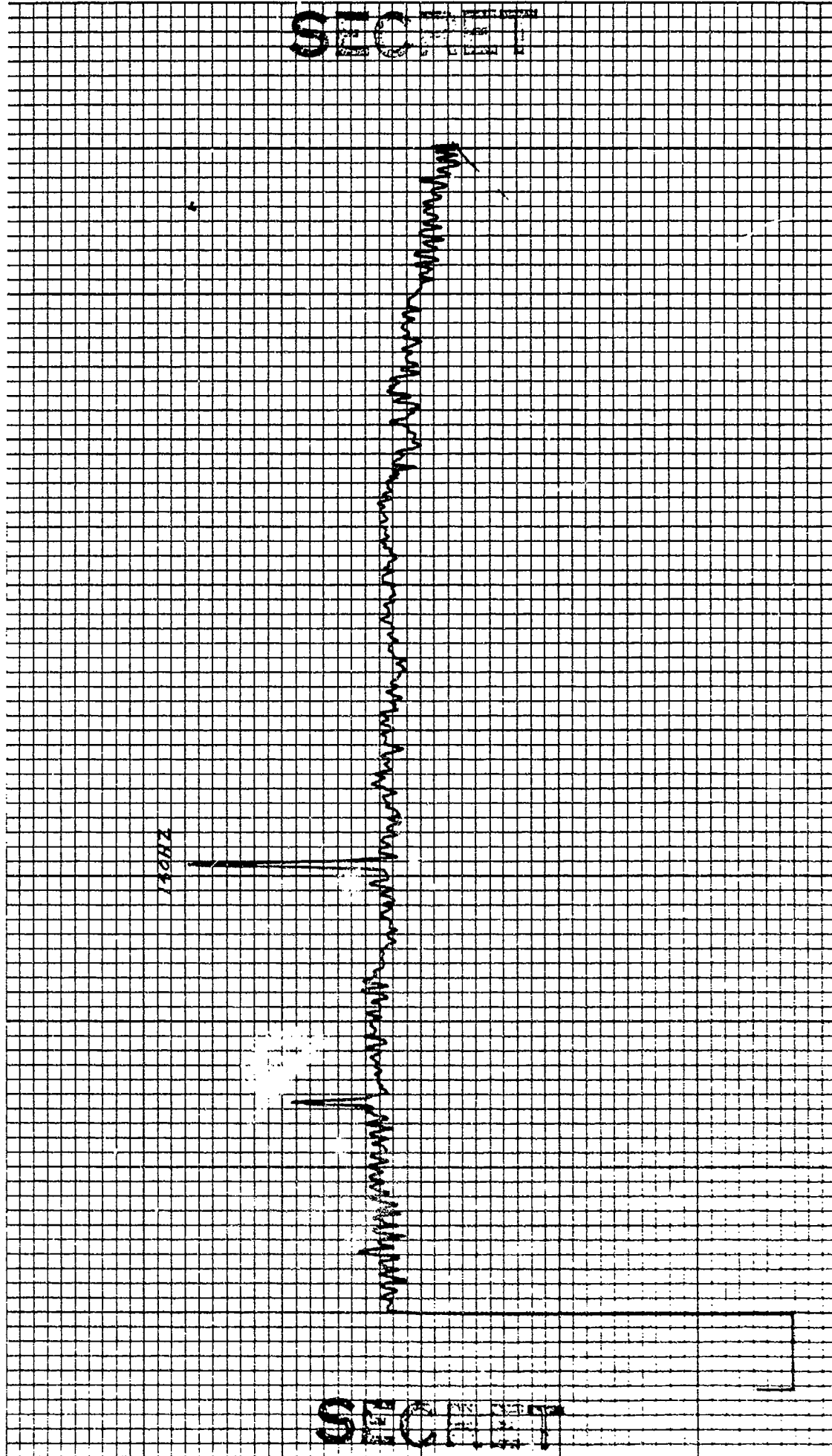
DATA POINT 10SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>23.3</u>	<u>38.0</u>	<u> </u>
MRA SIGNAL LEVEL	<u>+ 5.4</u>	<u>-13.0</u>	<u> </u>
ARRAY SIGNAL GAIN	<u>28.7</u>	<u>25.0</u>	<u> </u>
20 LOG <u>16</u>	<u>24</u>	<u>24</u>	<u> </u>
# of elements			
DIFFERENCE	<u>+ 4.7</u>	<u>+1.0</u>	<u> </u>

ARRAY GAIN

MRA SNR	<u>25.0</u>	<u>20.4</u>	<u> </u>
MEAN OMNI SNR	<u>18.7</u>	<u>9.4</u>	<u> </u>
ARRAY GAIN	<u>6.3</u>	<u>11.0</u>	<u> </u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>7.7</u>	<u>10.1</u>	<u> </u>
DIFFERENCE	<u>- 1.4</u>	<u>+ .9</u>	<u> </u>

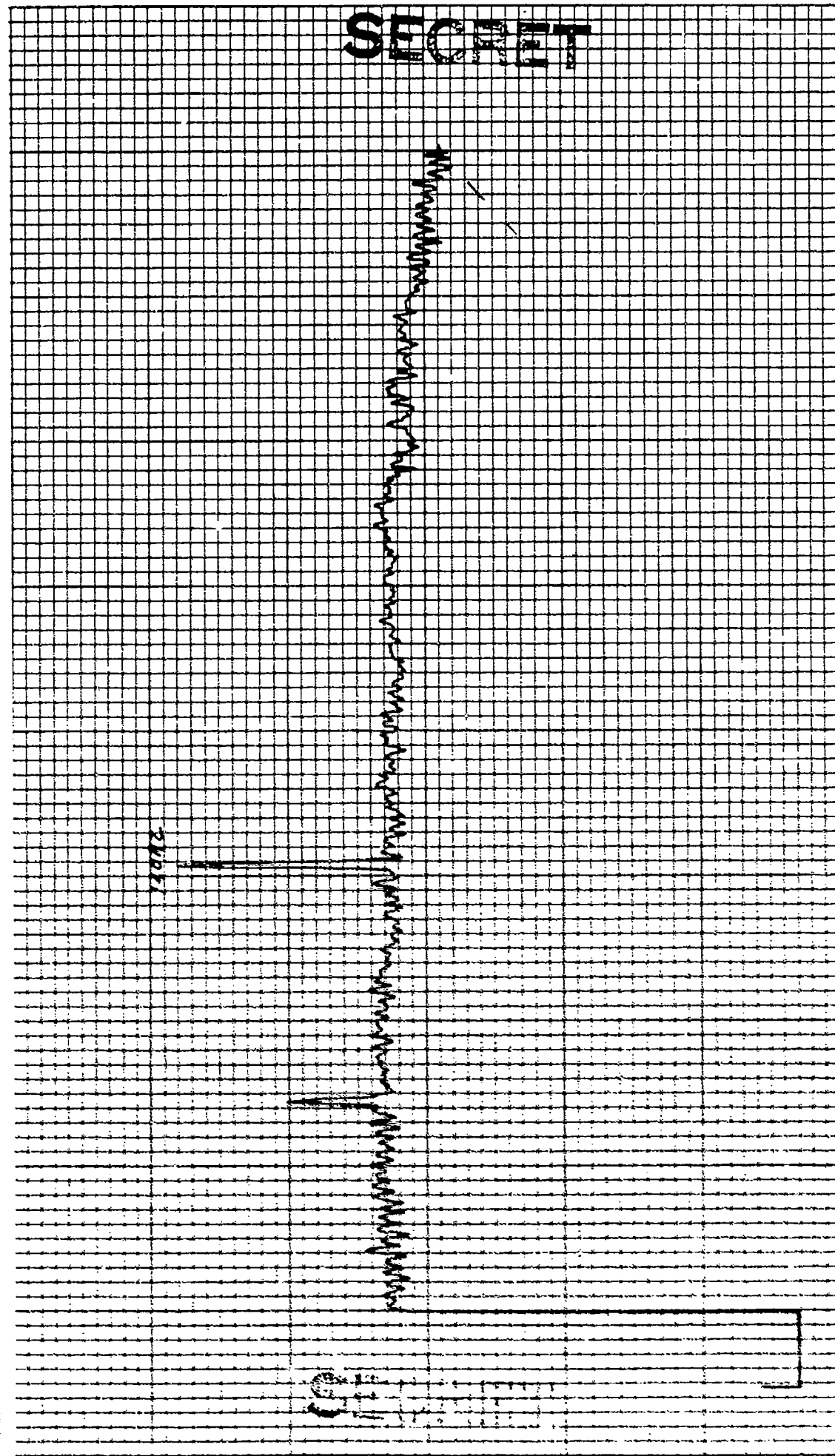
CONTROL: 0633 - 16 (DP10) REEL: X19 INDE X / 637
 BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-6-77
 EXERCISE: BEARING STAKE / 9-17) INTEGRATION TIME 320 SECS ATTN: -72 DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 / 16 ELEMENTS + 50 DEG. AZ STEERING



KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KELPTEL & ESSER CO. MADE IN U.S.A.

46 0703

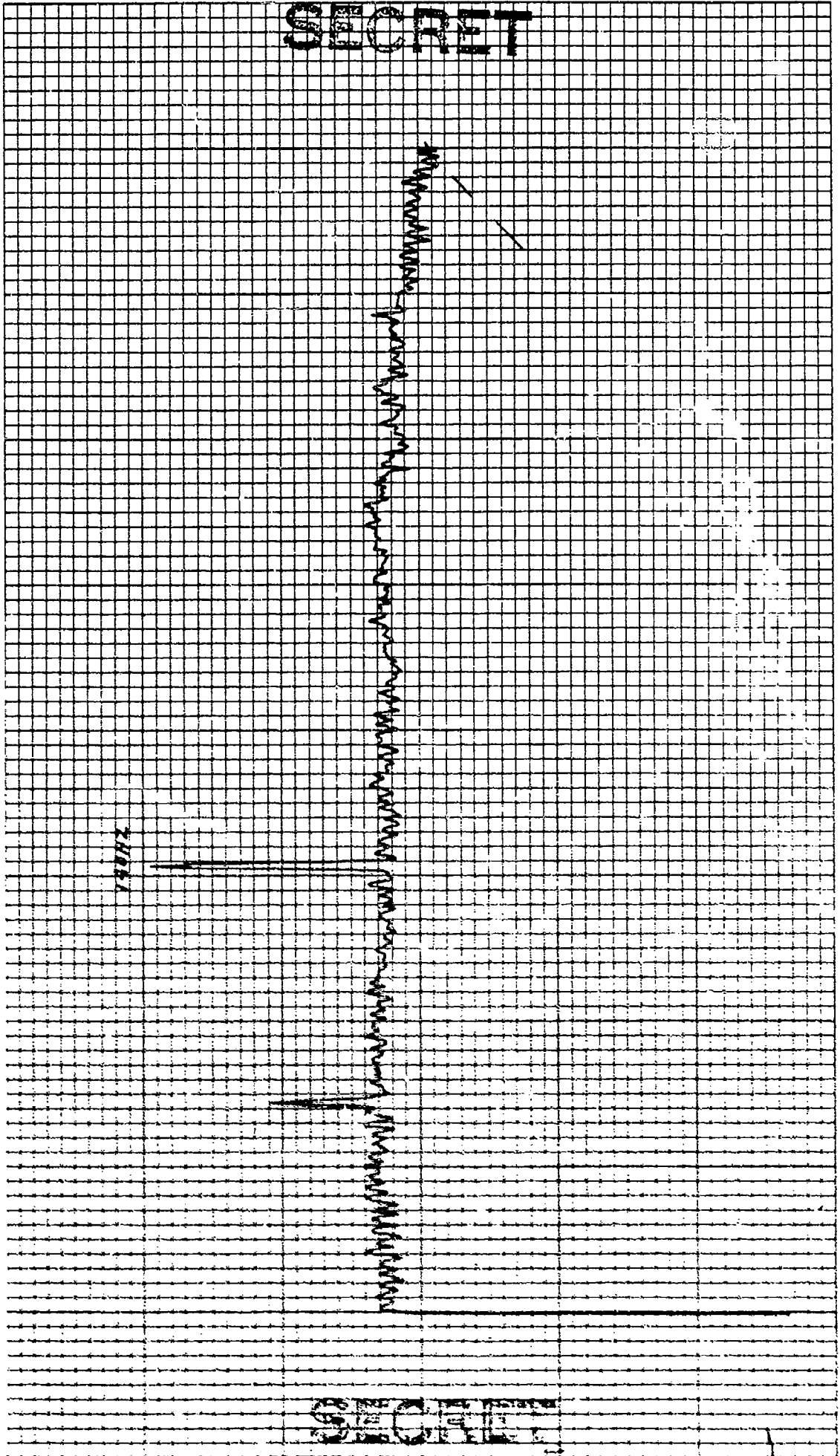
CONTROL: 0633 - 16 (DP10) REEL: M19 INDE X/637
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: - - - -
EXERCISE: BEARING STAKE / - 6 4 9 - 17)
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: -/2 DB
16 ELEMENTS + 52 DEG. AZ STEERING FILTER WTG: HANNING



KOE 10 X 10 TO THE INCH .7 X 10 INCHES
KELVIN & ELSON CO. MADE IN U.S.A.

46 0703

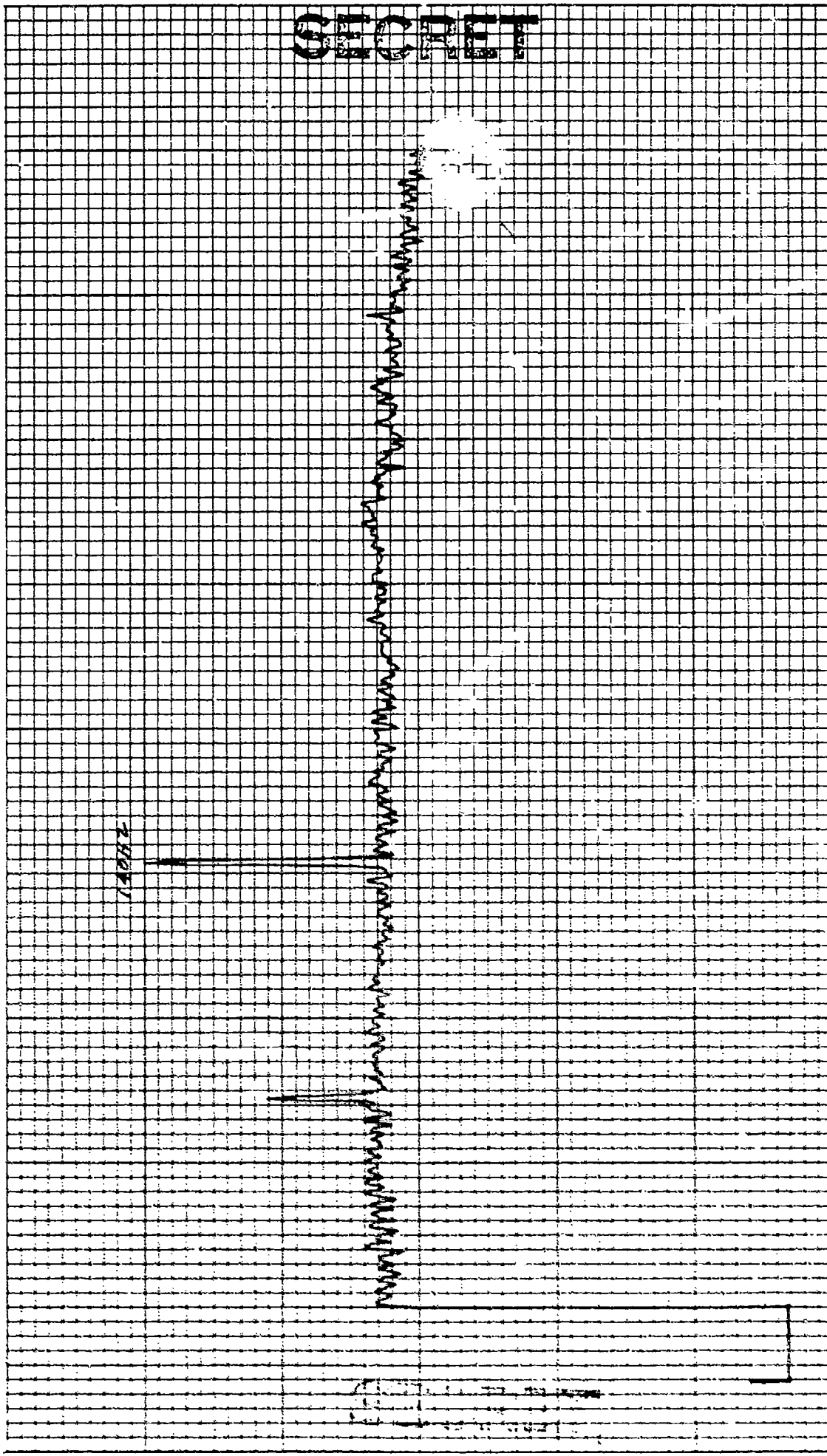
CONTROL: 0633 - 16 (DP10) DATE OF ANALYSIS: 1-6-77 REEL: A19 INDE X0633
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-16-77 - 0633 Z INTEGRATION TIME 320 SECS ATTN: -12 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 150 HZ +54 DEG. AZ STEERING



K·E 10 X 10 TO THE INCH .7 X 10 INCHES
KELPPER & ASSOCIATES CO. MADE IN U.S.A.

46 0703

CONTROL: 0613 - 16 (DP10) REEL: 419 INDE X 1637
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: - - - - -
EXERCISE: BEARING STAKE -648-17)
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: 72-DB
16 ELEMENTS 456 DEG. AZ STEERING FILTER WTG: HANNING



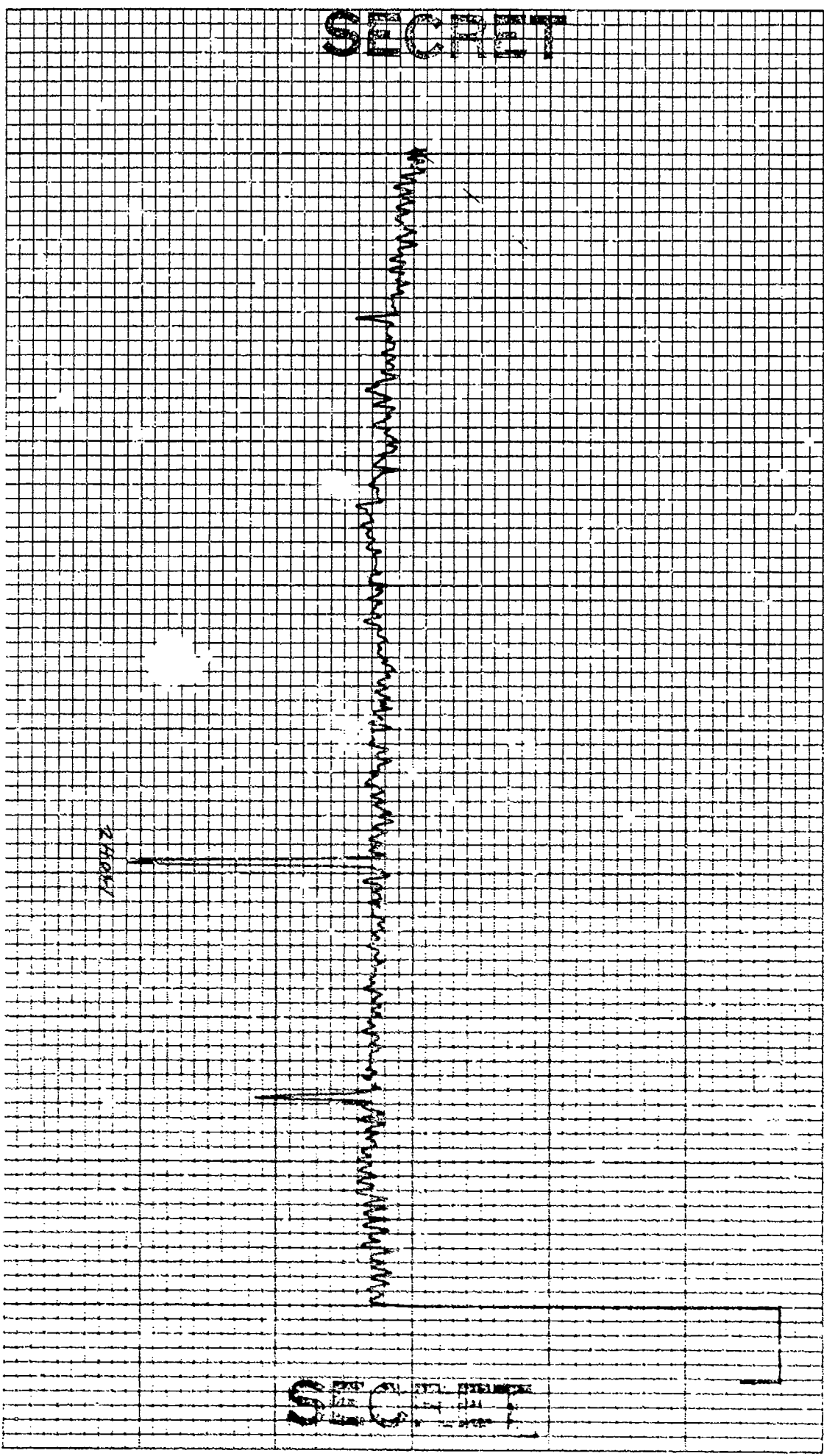
CONTROL: 0633 - 16 (DPD) DATE OF ANALYSIS: 1-6-68 REEL: 419 INDE X/637

BEAMFORMED SPECTRUM (ELEMENTS) 8-17 INTEGRATION TIME 320 SECS ATTEN: -12 DB

EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING

CENTER FREQ: 150 HZ 50 DEG. AZ STEERING

16 ELEMENTS



SECRET

SECRET

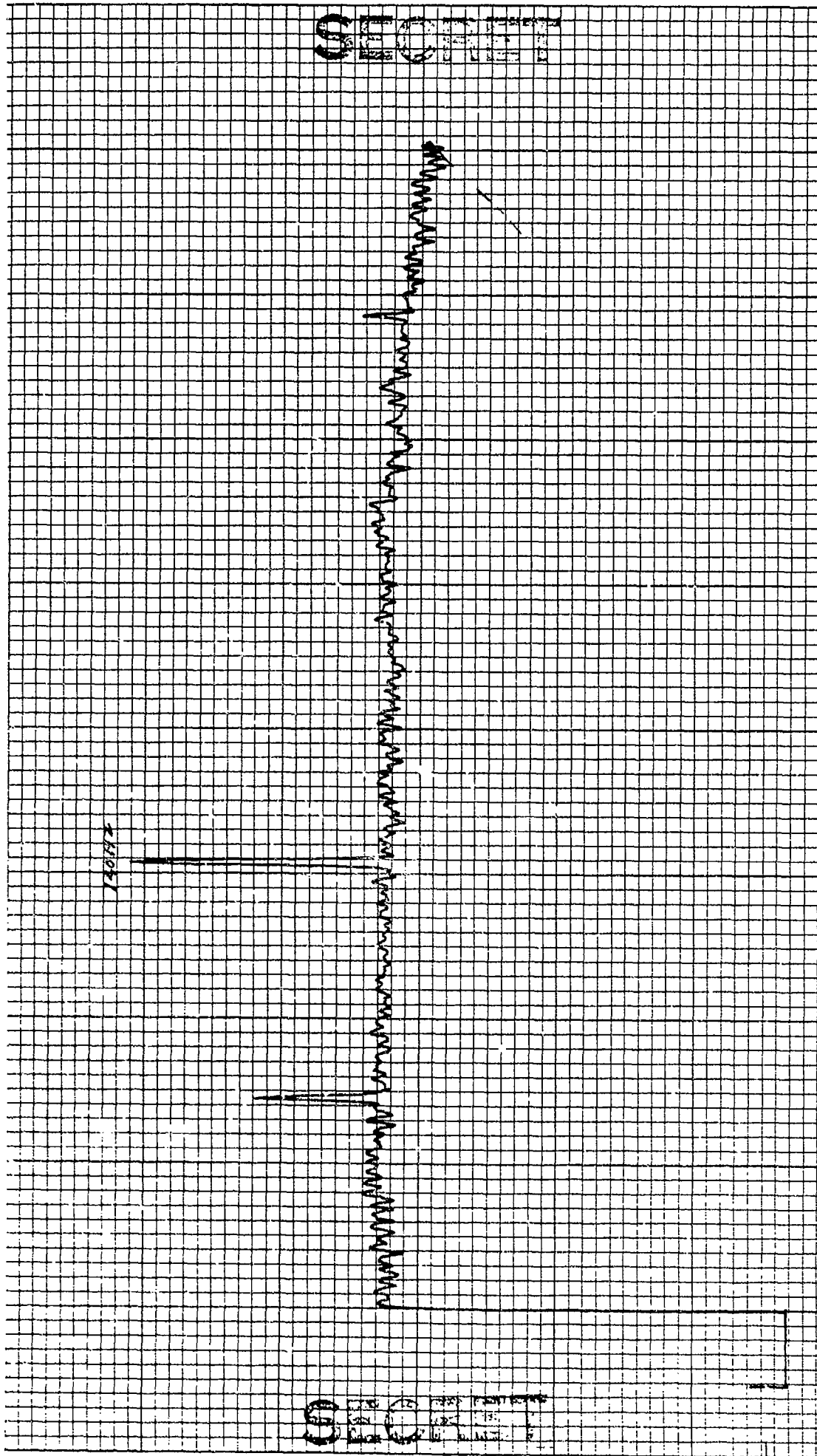
K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0633 - /6 (LPI6)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
/6 ELEMENTS

DATE OF ANALYSIS: - - - - -
/ - 6 4 8 - 17)
DATE/TIME: J-16-77 - 0633 Z
ANALYSIS BANDWIDTH: 1/10HZ
+60 DEG. AZ STEERING

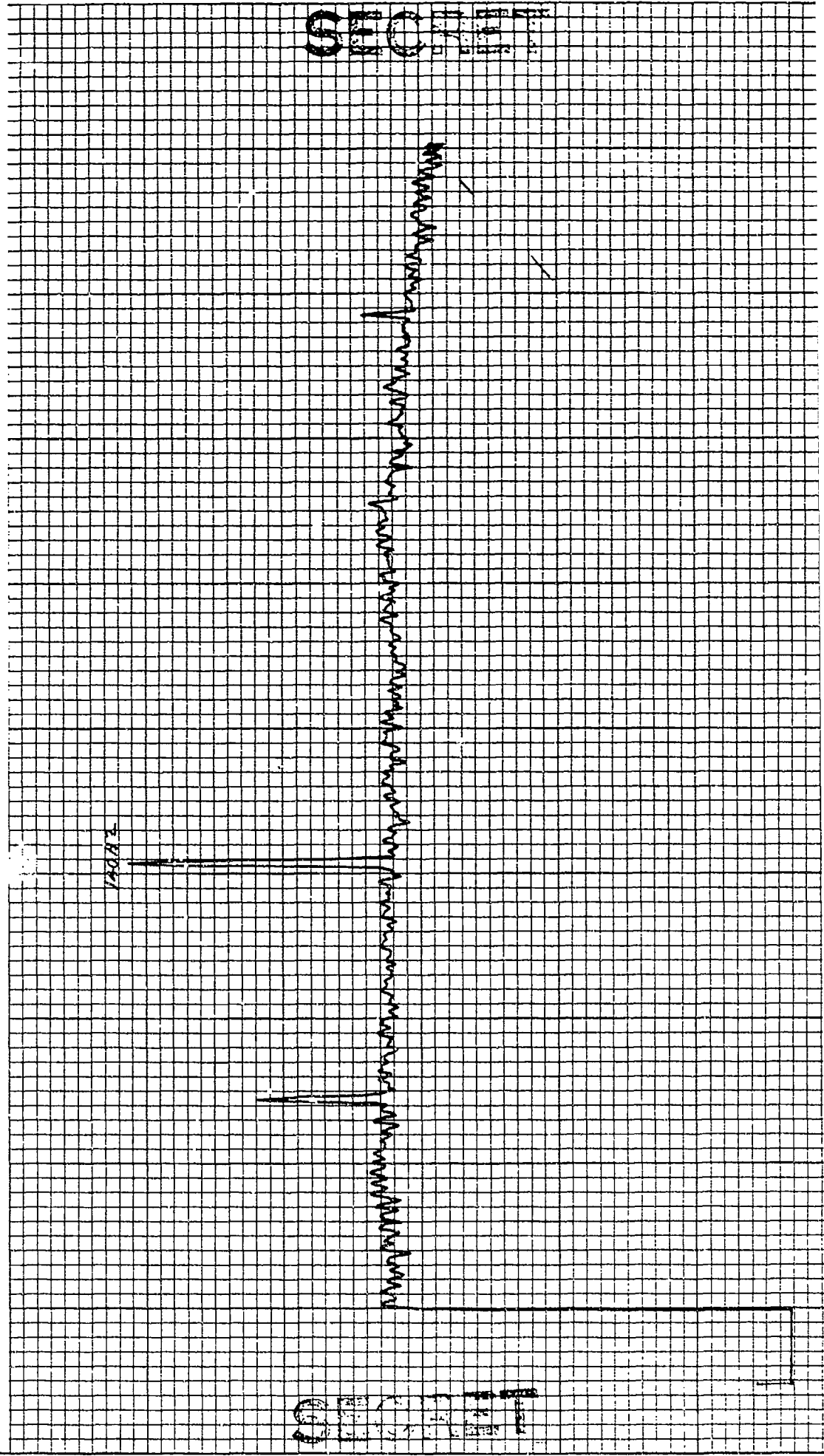
REEL: 119 INDE X637
INTEGRATION TIME 320 SECS ATTN: -/2 DB
FILTER WTC: HANNING



K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

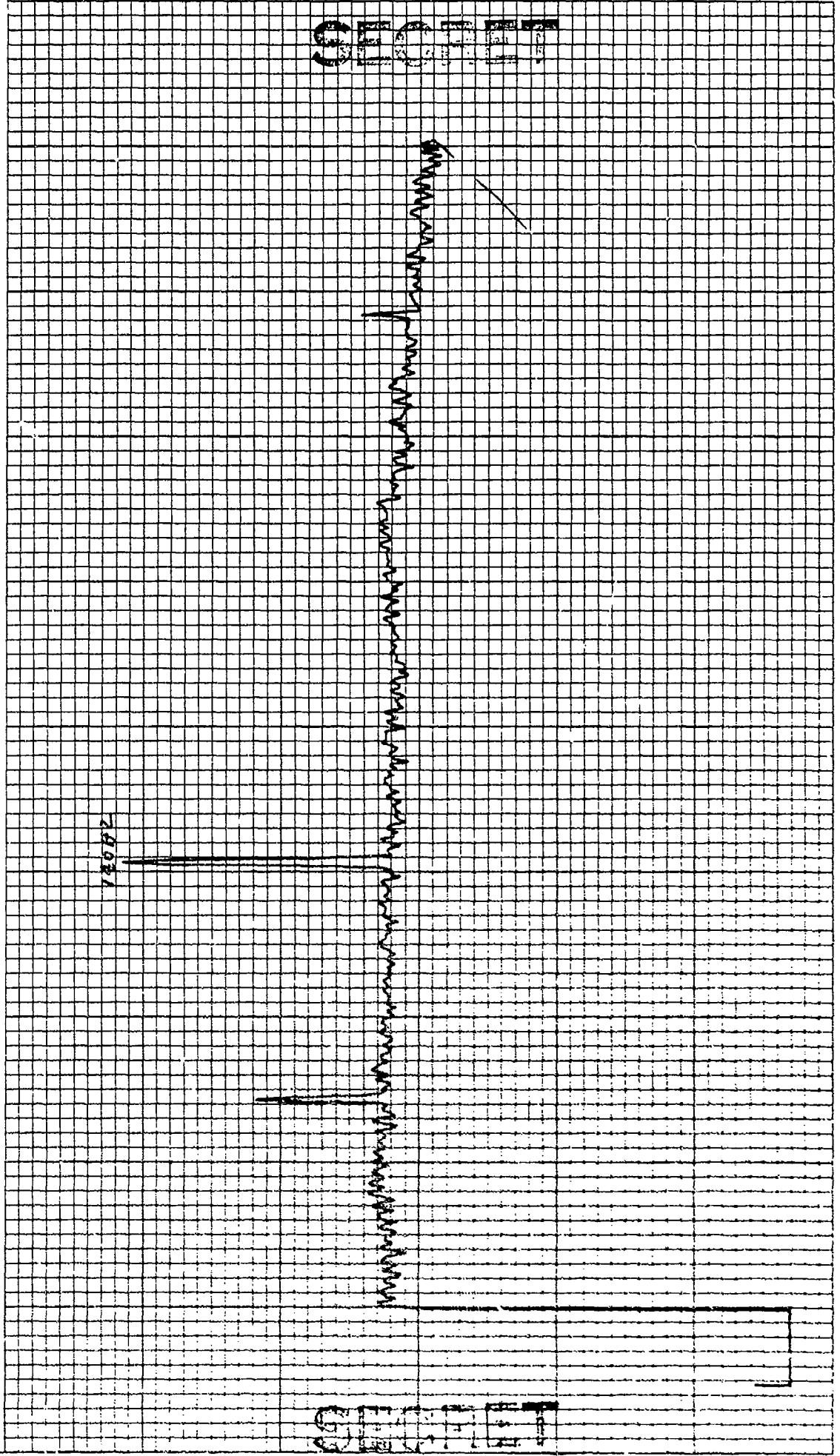
CONTROL: 0633 - 16 (D10) DATE OF ANALYSIS: 1-6-77 - 0633Z REEL: #19 INDE X/637
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 1-6-77 - 0633Z INTEGRATION TIME 320 SECS ATTN: -12-DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
16 ELEMENTS + 60 DEG. AZ STEERING



K+E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

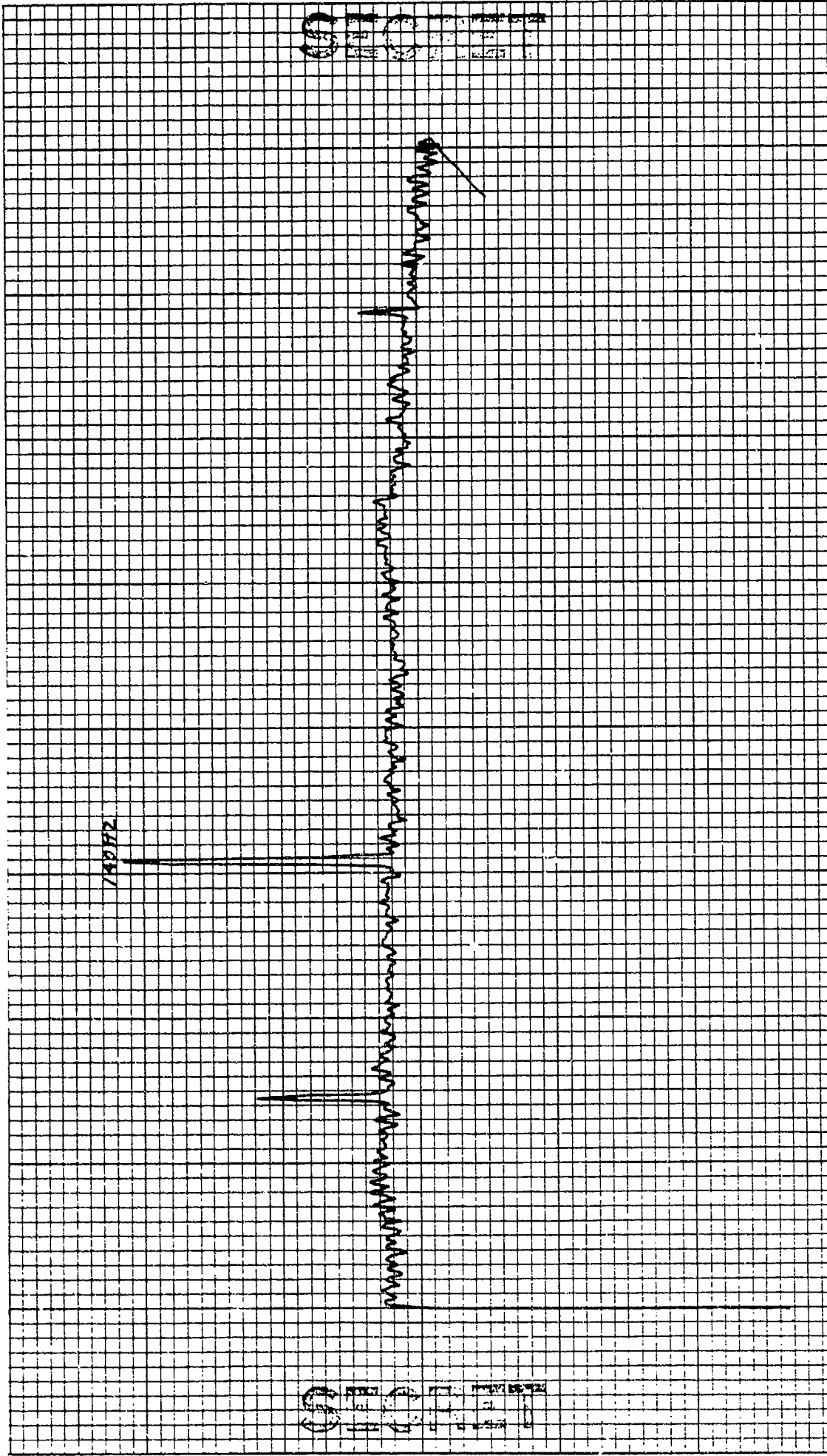
CONTROL: 0633 - 16 (DP10) DATE OF ANALYSIS: 1-6-8-77 REEL: H19 INDE X/637
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-16-77 - 0633 Z
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10 HZ
CENTER FREQ: 150 HZ +63 DEG. AZ STEERING INTEGRATION TIME 320 SECS ATTN: 7.5 DB
16 ELEMENTS FILTER WTG: HANNING



K-E 10 X 10 TO THE INCH • 7 X 10 INCHES
KLUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 033-16 (DP10) REEL: M19 INDE X/677
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-6-79 9-17
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 033Z INTEGRATION TIME 320 SECS ATTN: 72-DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
16 ELEMENTS 72.5 DEG. AZ STEERING

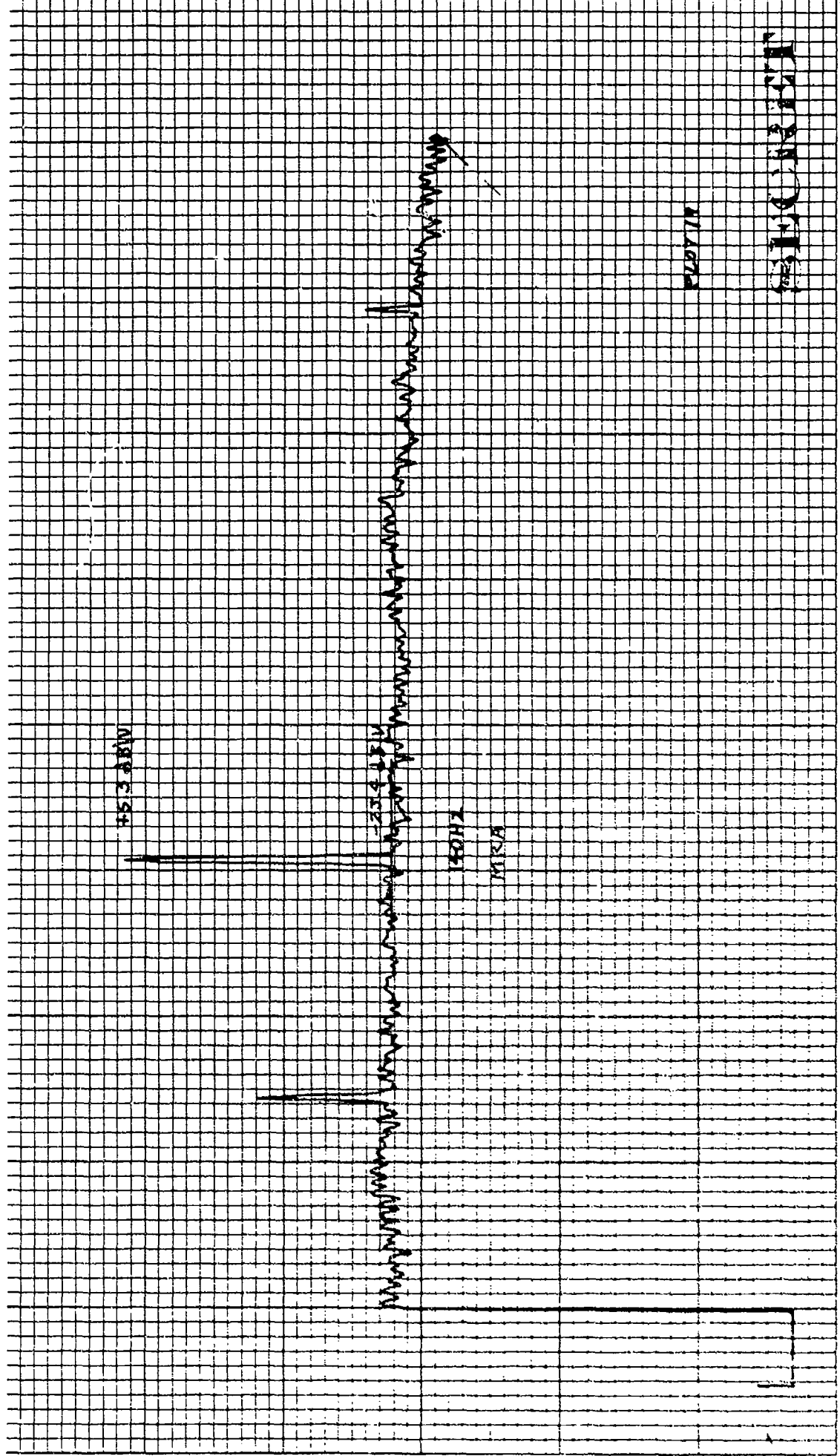


KOE 10 X 10 TO THE INCH .7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

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CONTROL: 0633 - 49 (DPIe) DATE OF ANALYSIS: _____ INDE X/1637
 BEAMFORMED SPECTRUM(ELEMENTS 1706 6 97017)
 EXERCISE: BEARING STAKE DATE/TIME: 3-16-77-0633 Z INTEGRATION TIME 320 SECS ATTN: - DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
16 ELEMENTS +64.0 DEG. AZ STEERING



11/16/77

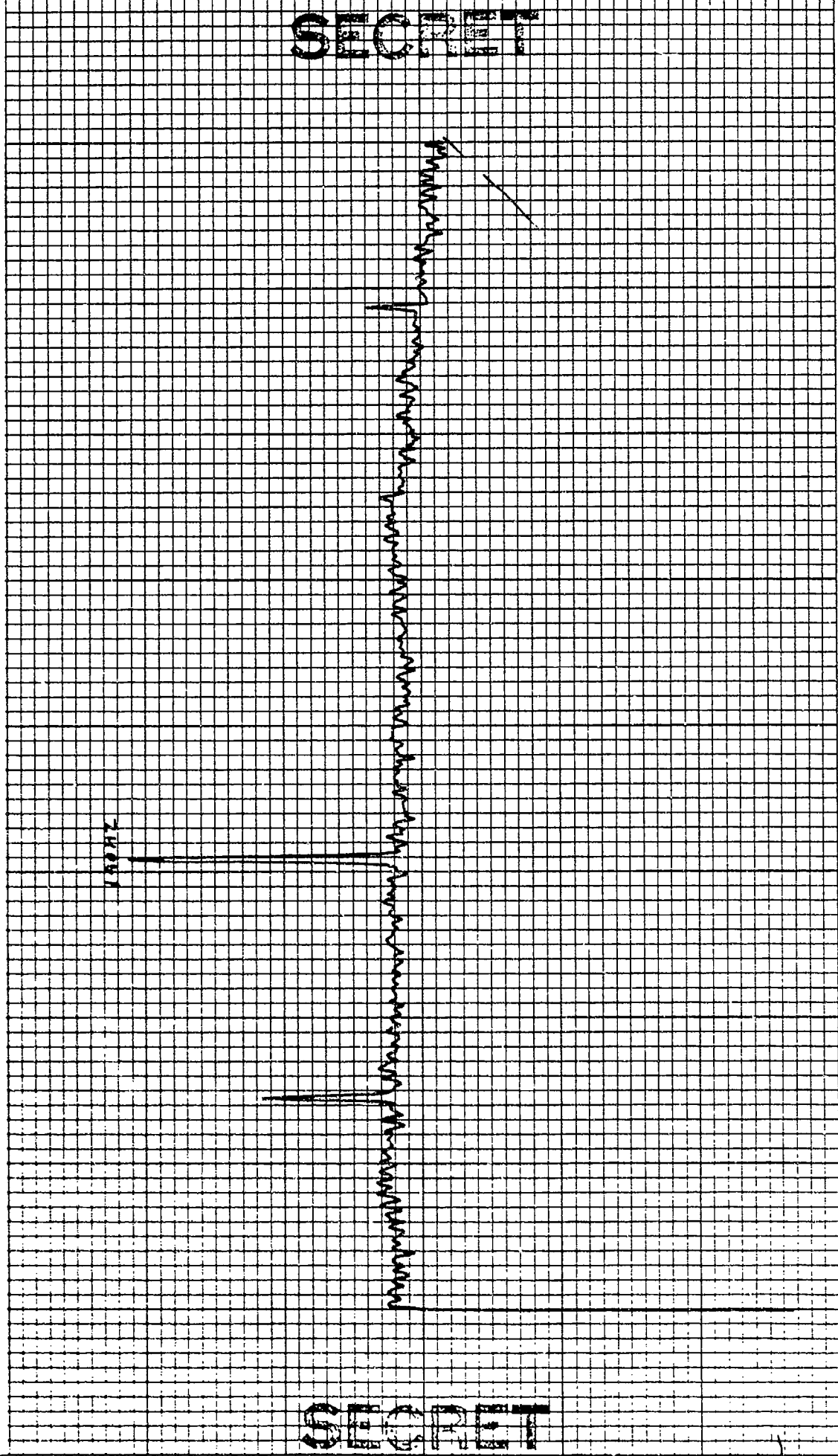
SECRET

100HZ

1402 10 X 10 TO THE INCH 0.7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0633 - 16 (DP10) DATE OF ANALYSIS: REEL: M19 INDE X1637
BEAMFORMED SPECTRUM (ELEMENTS) 1-6 49-17)
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 0633 Z INTEGRATION TIME 320 SECS ATTEN: -12 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
16 ELEMENTS +24.5 DEG. AZ STEERING



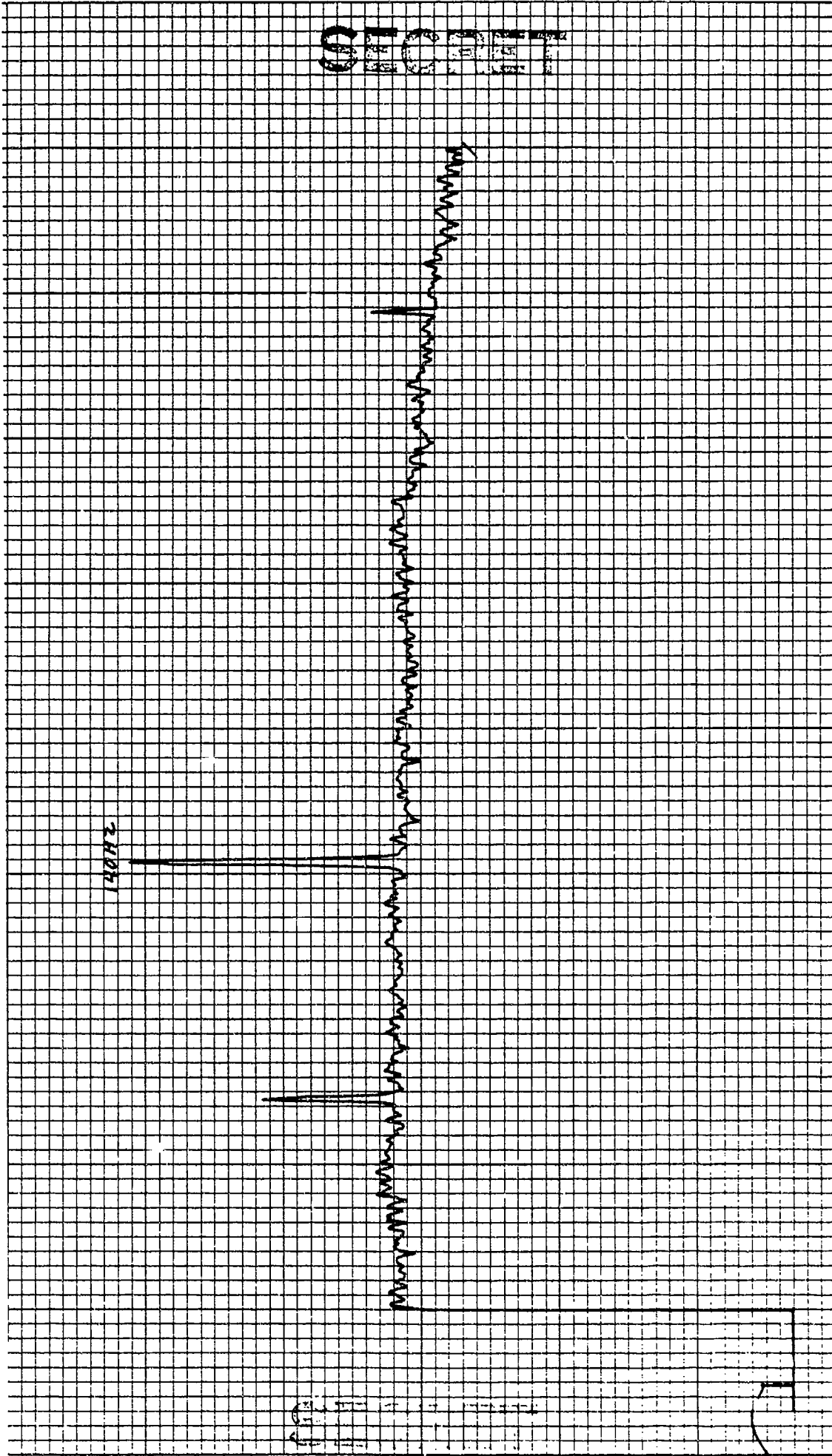
SECRET

SECRET

K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

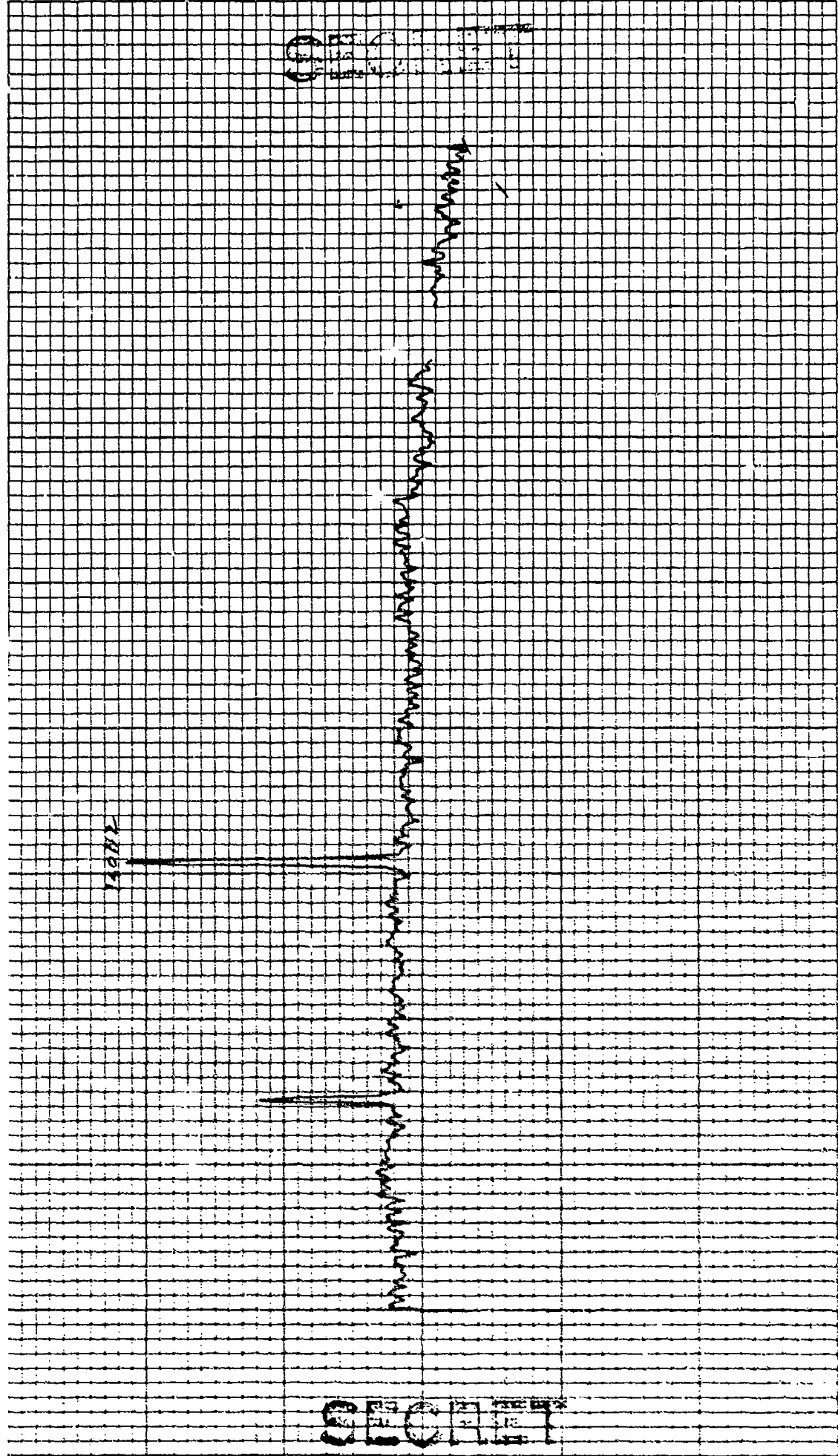
CONTROL: 0633 - 16 (0P10) DATE OF ANALYSIS: 1-6-88-17 REEL: 419 INDE X/637
BEAMFORMED SPECTRUM(ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 0633 Z INTEGRATION TIME 320 SECS ATTN: -12-DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
16 ELEMENTS 466 DEG. AZ STEERING



K-E 10 X 10 TO THE INCH, 0.7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

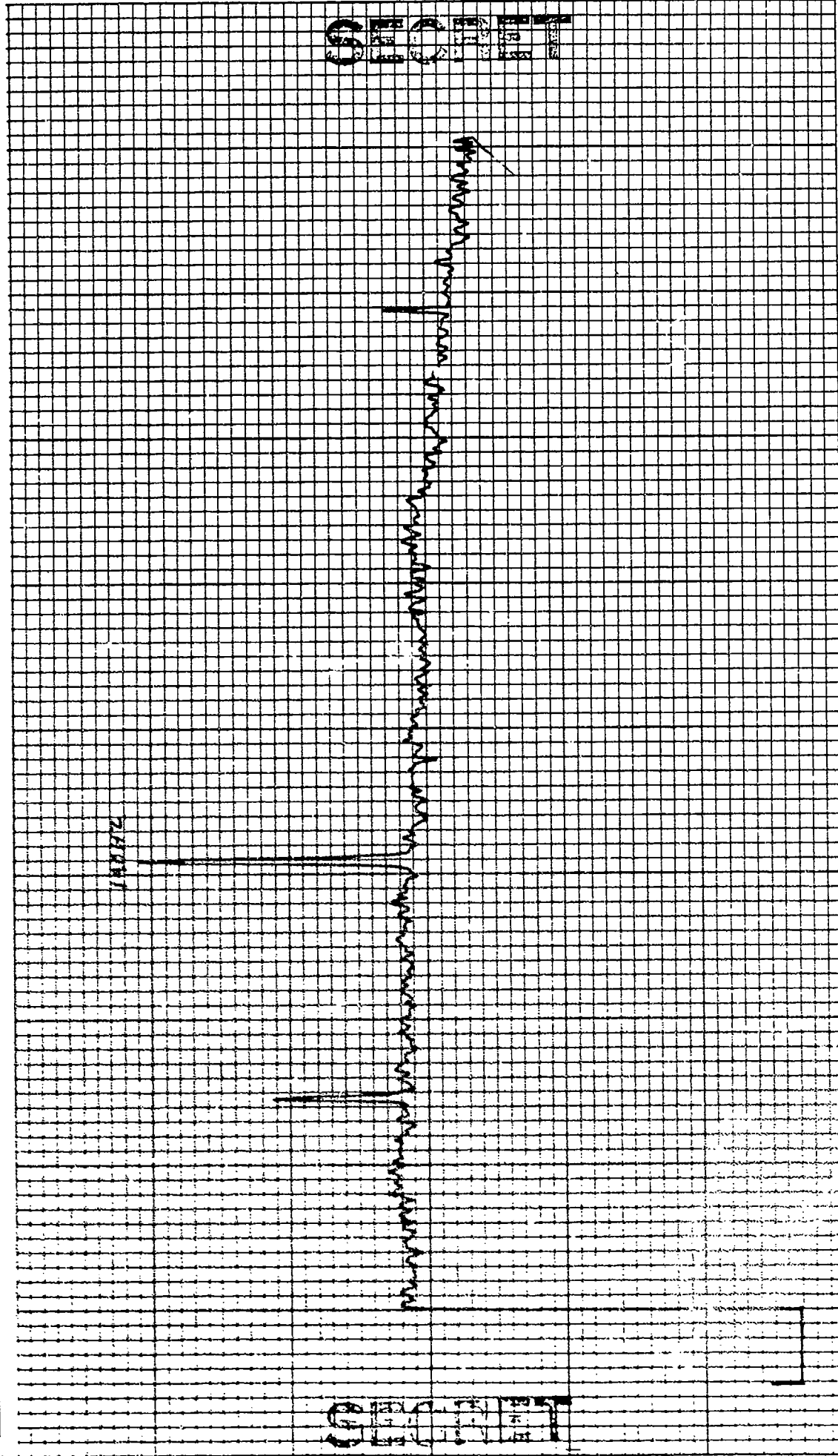
CONTROL: 0633 - 16 (DP10) REEL: 419 INDE X 637
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: - - -
EXERCISE: BEARING STAKE 1-68 9-17) INTEGRATION TIME 320 SECS ATTN: -12-DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
16 ELEMENTS +60 DEG. AZ STEERING



KOE 10 X 10 TO THE INCH = 7 X 10 INCHES
REDFILL & ESSER CO. MADE IN U.S.A.

46 0703

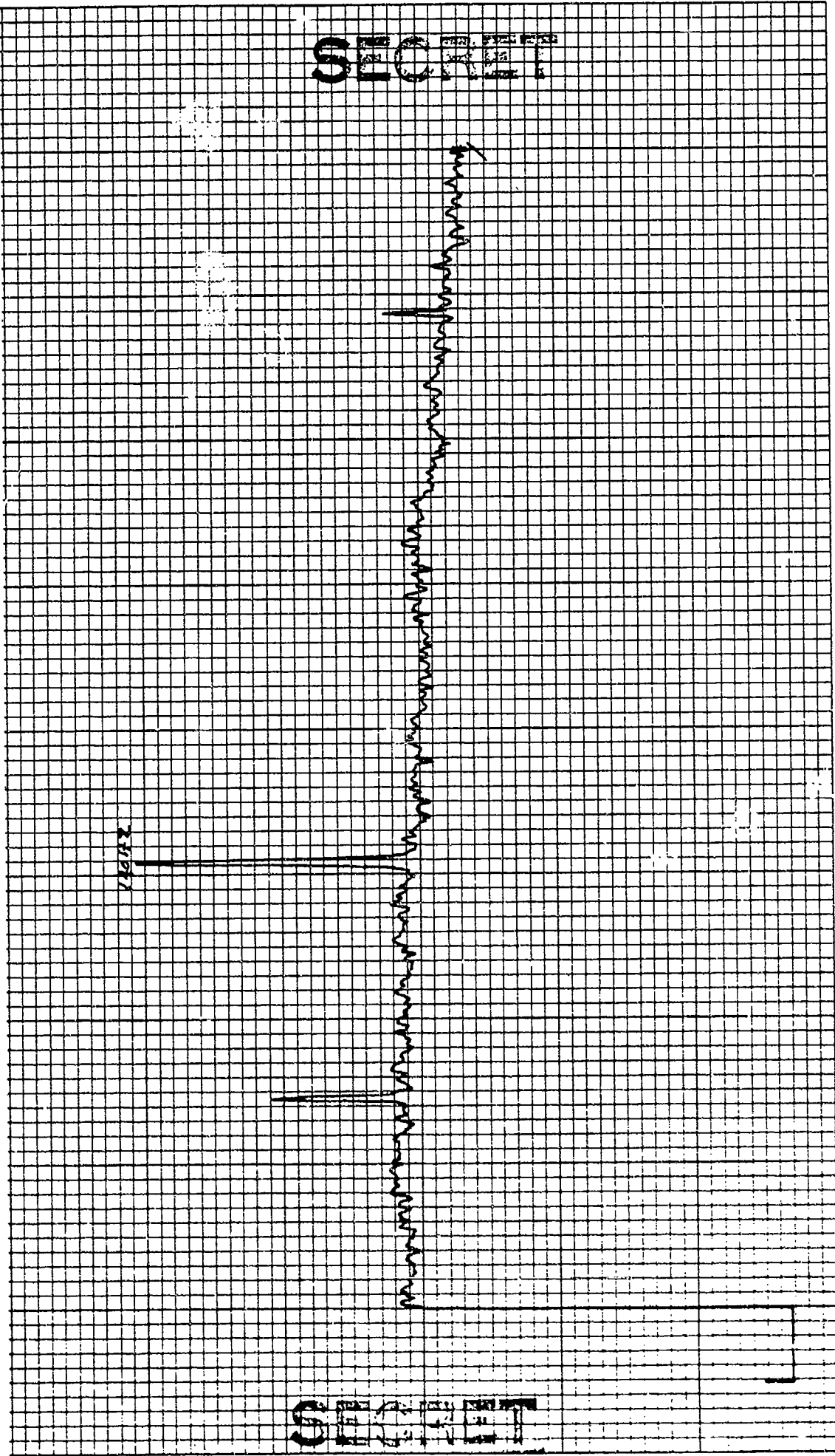
CONTROL: 0633 - 16 (DP10) REEL: M19 INDE X/637
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: - - - -
EXERCISE: BEARING STAKE /-6 & 9-17)
CENTER FREQ: 150 HZ DATE/TIME: 3-16-77-0633 Z INTEGRATION TIME 320 SECS ATTN: -12 DB
/6 ELEMENTS + 70 DEG. AZ STEERING FILTER WTC: HANNING



KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
MELFFEL & ESSER CO. MADE IN U.S.A.

46 0703

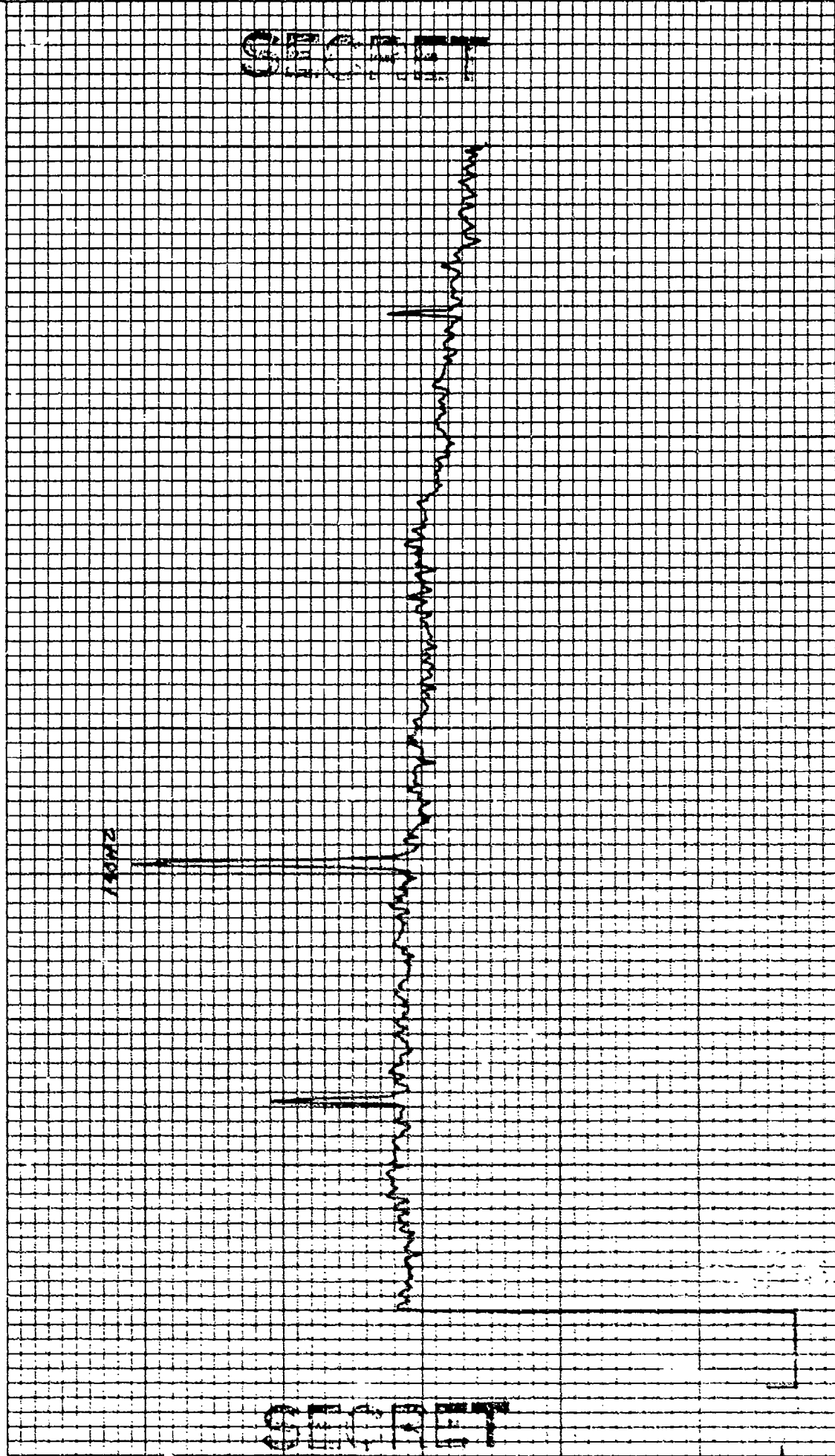
CONTROL: 0633 - 16 (DP10) DATE OF ANALYSIS: 1-6-77 REEL: M19 INDE X 1627
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 3-12-77 - 0633 Z INTEGRATION TIME 320 SECS ATTN: -12 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
1/2 ELEMENTS +72 DEG. AZ STEERING



10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

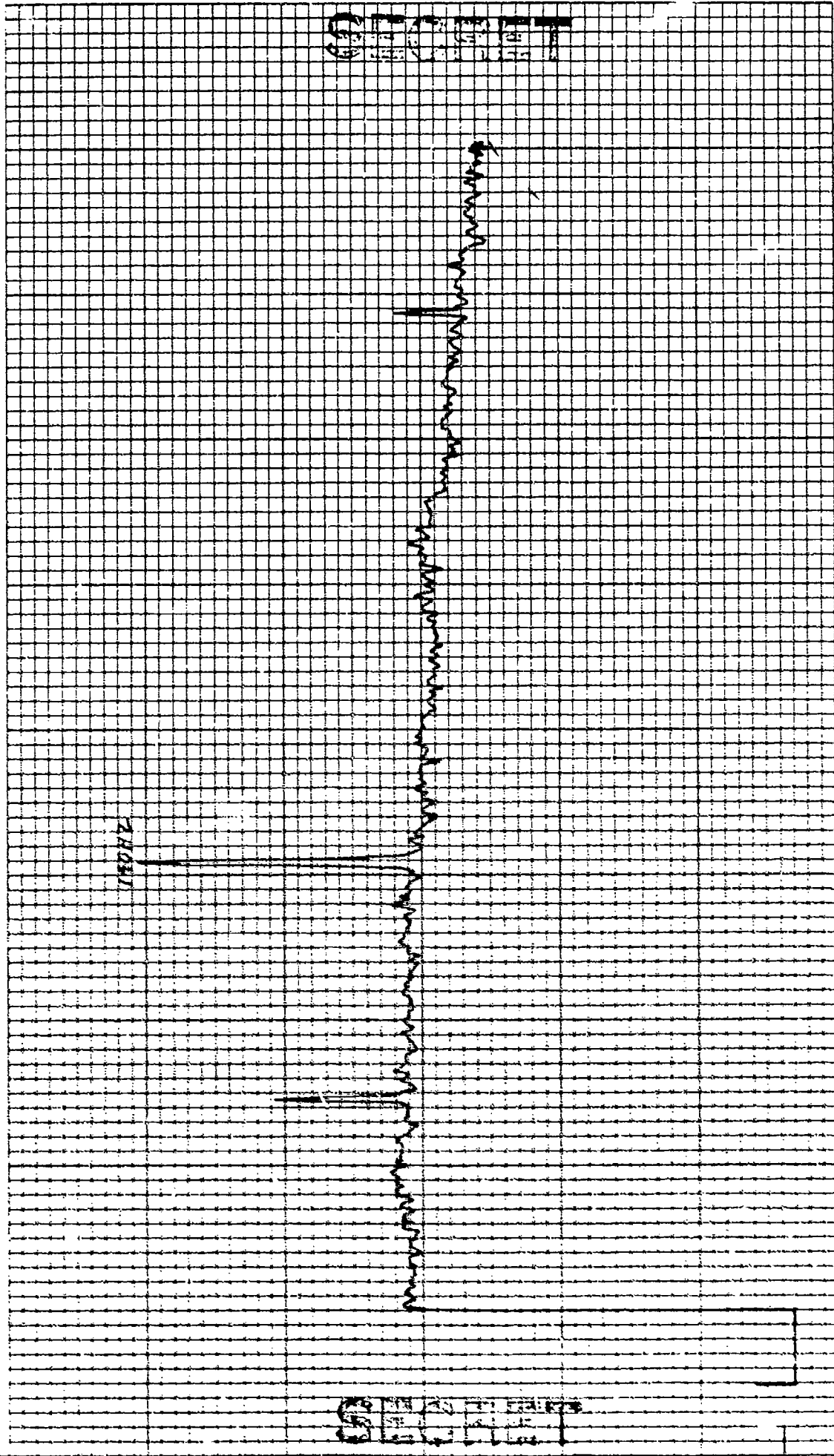
CONTROL: 0633 - 16 (D910) DATE OF ANALYSIS: 1-6 & 8-17 REEL: H19 INDE X/637
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 376-77 - 0633 Z INTEGRATION TIME 320 SECS ATTN: -12 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 150 HZ +74 DEG. AZ STEERING



KOE 10 X 10 TO THE INCH 7 X 10 INCHES
KUPFEL & ESSCH CO. MADE IN U.S.A.

46 0703

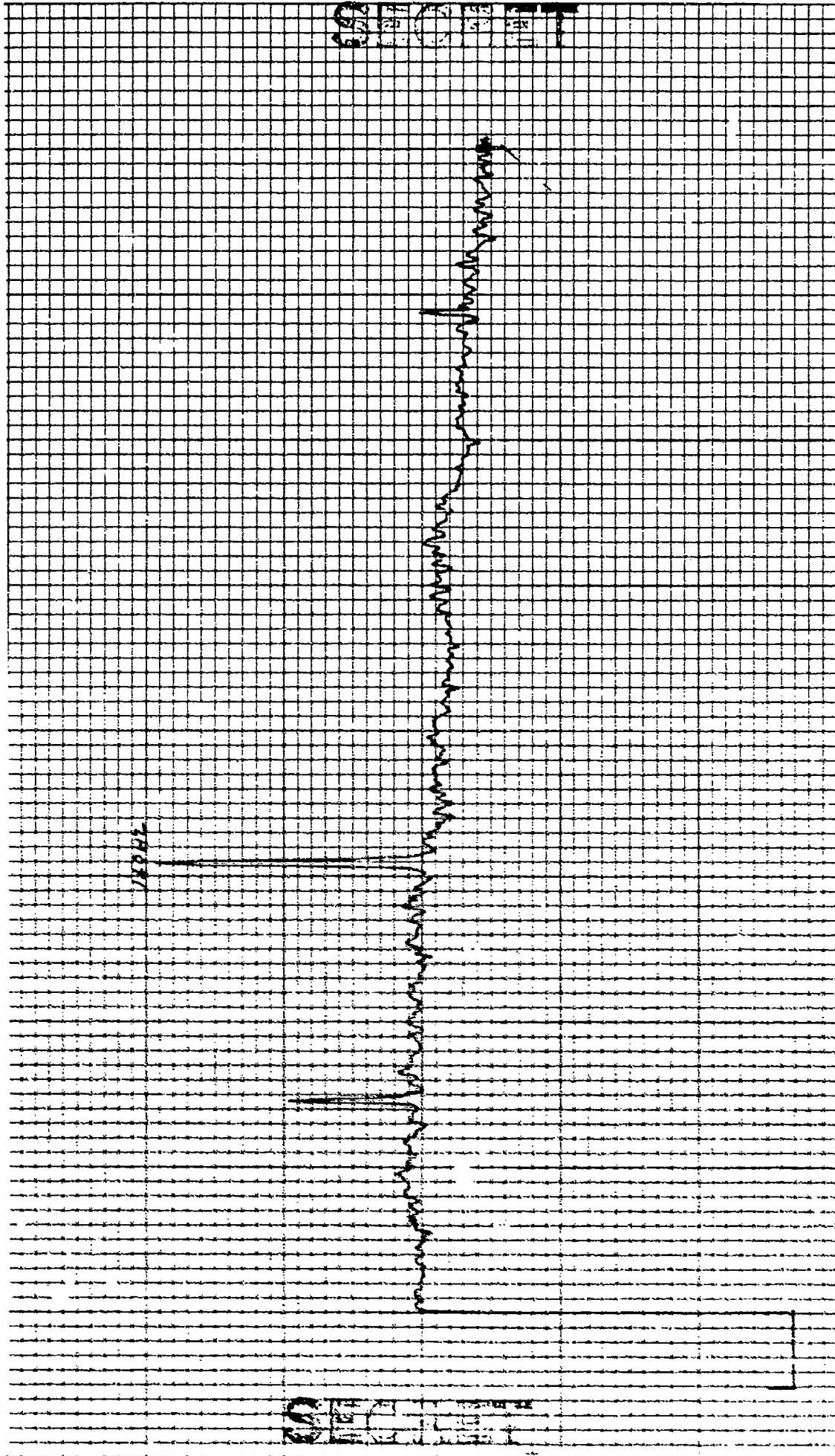
CONTROL: 0633 - 16 (D910) DATE OF ANALYSIS: - - - - - REEL: M19 INDE X1637
BEAMFORMED SPECTRUM (ELEMENTS) /-6 & 9-17)
EXERCISE: BEARING STAKE DATE/TIME: 7-26-77 - 0633 Z INTEGRATION TIME 320 SECS ATTN: -12 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
16 ELEMENTS 776 DEG. AZ STEERING



K&E 18 X 18 TO FIVE INCH .7 X .10 INCHES
MEMPHIS, TN. K&E CO. MADE IN U.S.A.

46 0703

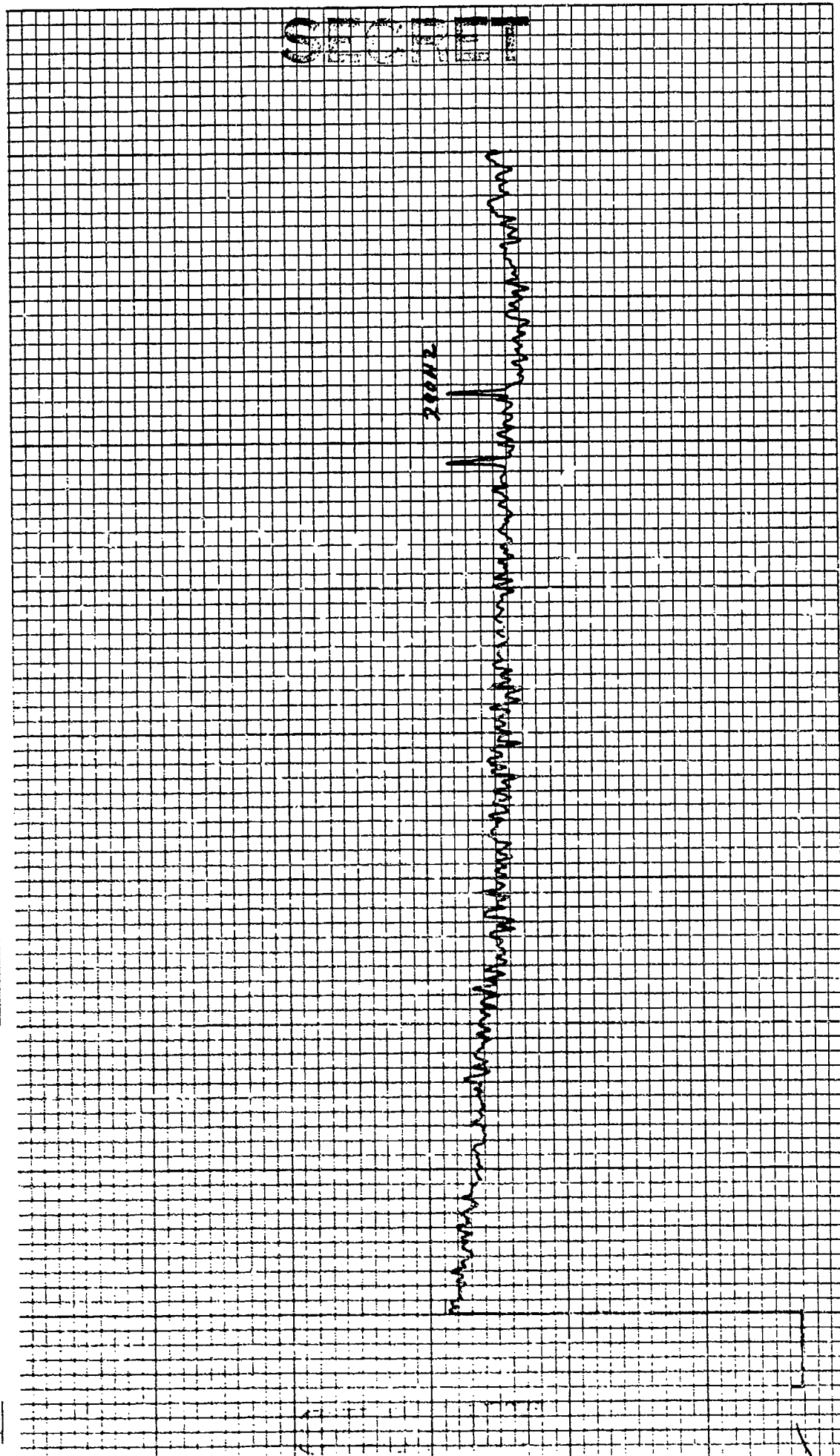
CONTROL: 0633 - 16 (DP10) REEL: M/9 INDE X/637
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: - - -
EXERCISE: BEARING STAKE 1-68 8-17
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
16 ELEMENTS 478 DEG. AZ STEERING INTEGRATION TIME 320 SECS FILTER WTG: HANNING ATTN: -7.2 DB



46 0703

KOE 10 X 10 TO TAPE INCH-7 X 10 INCHES
KELPPEL & RUBBER CO. MADE IN U.S.A.

CONTROL: 0833 - 16 (D910) DATE OF ANALYSIS: 1-6-77 REEL: 119 INDE X637
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-16-77 - 0833 Z INTEGRATION TIME 320 SECS ATTN: -12 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 CENTER FREQ: 270 HZ +50 DEG. AZ STEERING



SECRET

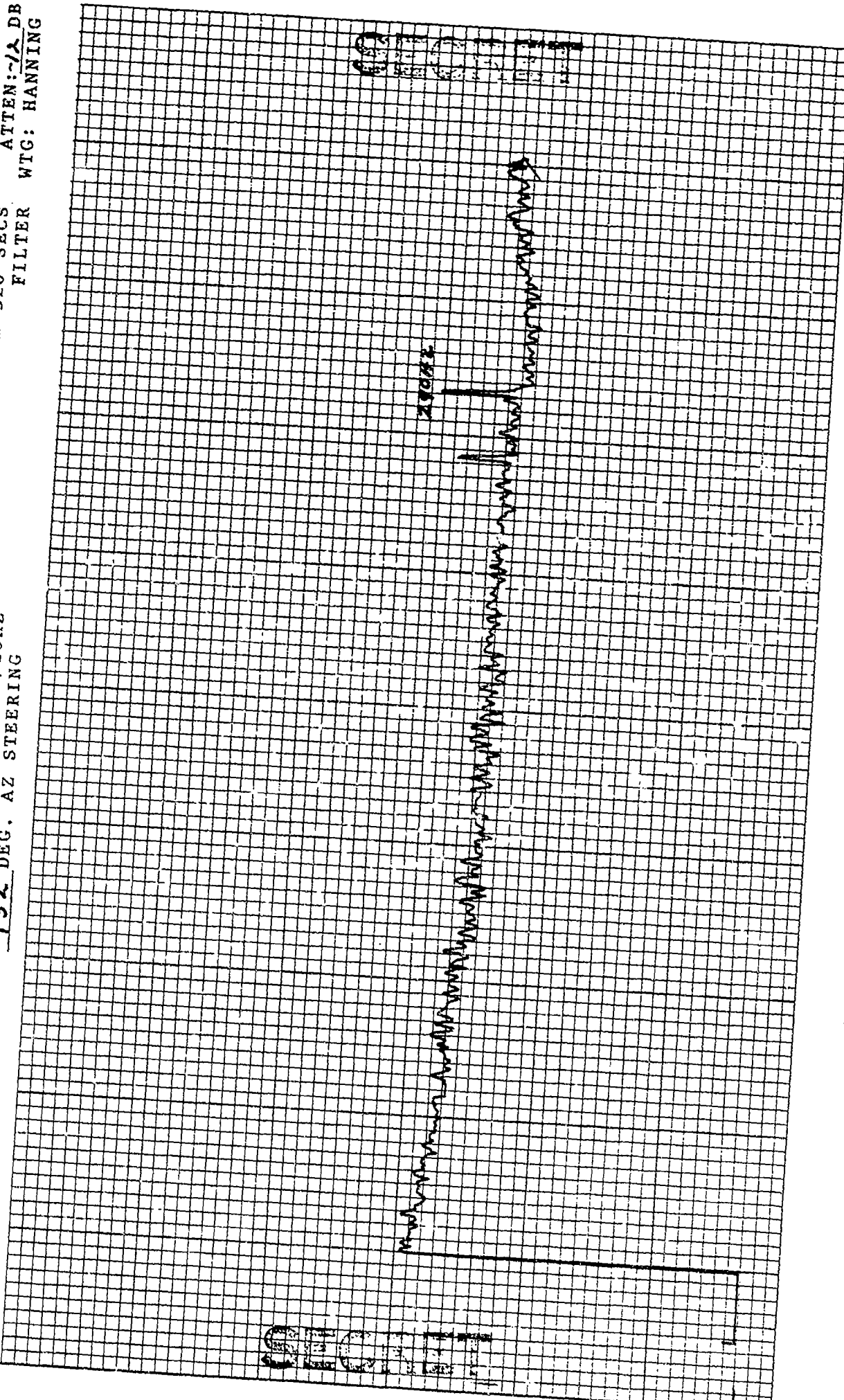
K&W 10 X 10 TO THE INCH • 7 X 10 INC. AES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0693 - 16 (DP10)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-6-77
DATE/TIME: 3-6-77 - 0633 Z
ANALYSIS BANDWIDTH: 1/10 HZ
452 DEG. AZ STEERING

REEL: A19 INDE X/637
INTEGRATION TIME 320 SECS ATTEM: 1A DB
FILTER WTG: HANNING



KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

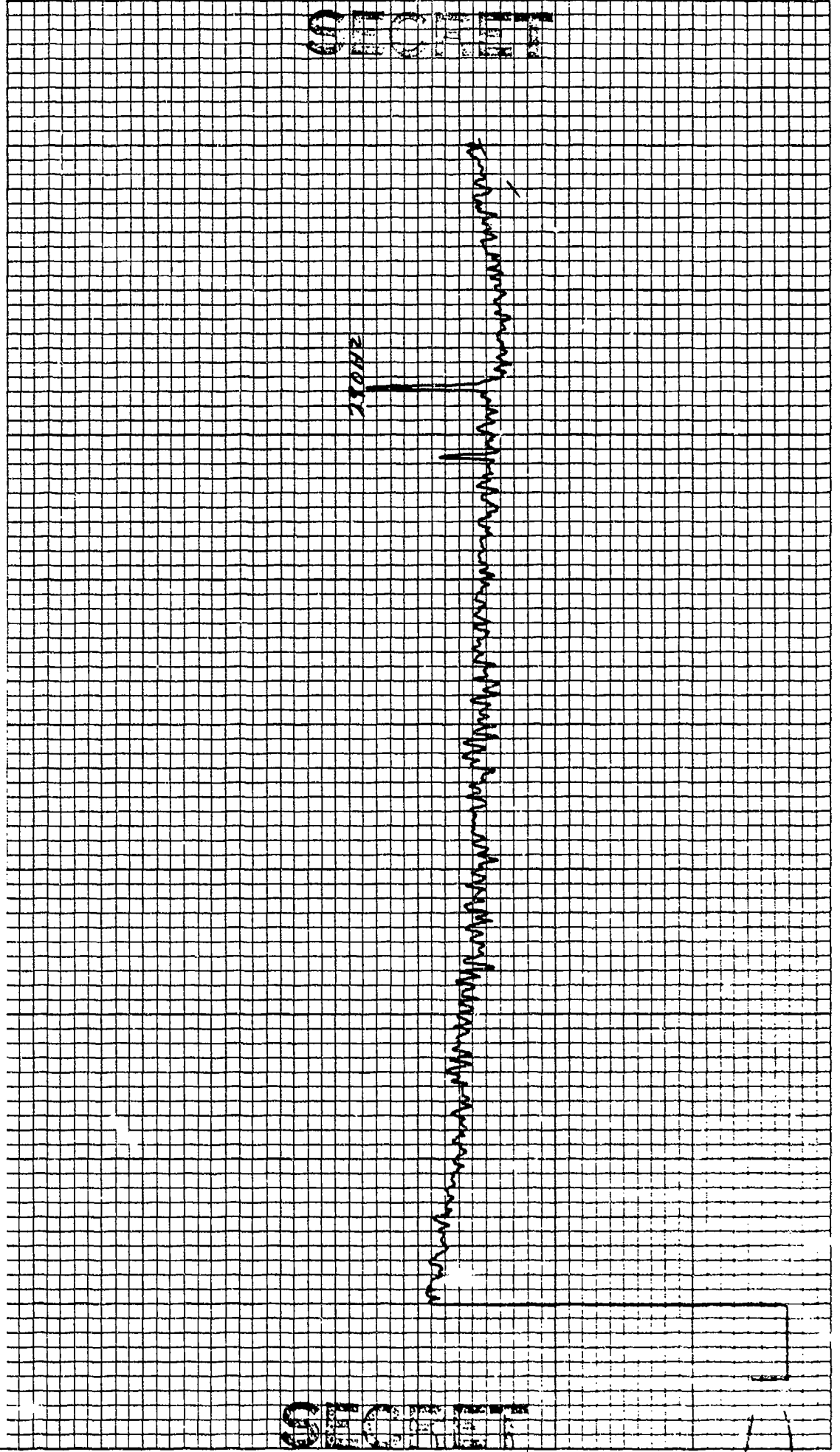
46 0703

CONTROL: 0633 - 16 (0910)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-6-77
DATE/TIME: 3-16-77 - 0833Z
ANALYSIS BANDWIDTH: 1/10HZ
+54 DEG. AZ STEERING

REEL: M19
INTEGRATION TIME 320 SECS
FILTER
ATTEN: -12 DB
WTG: HANNING

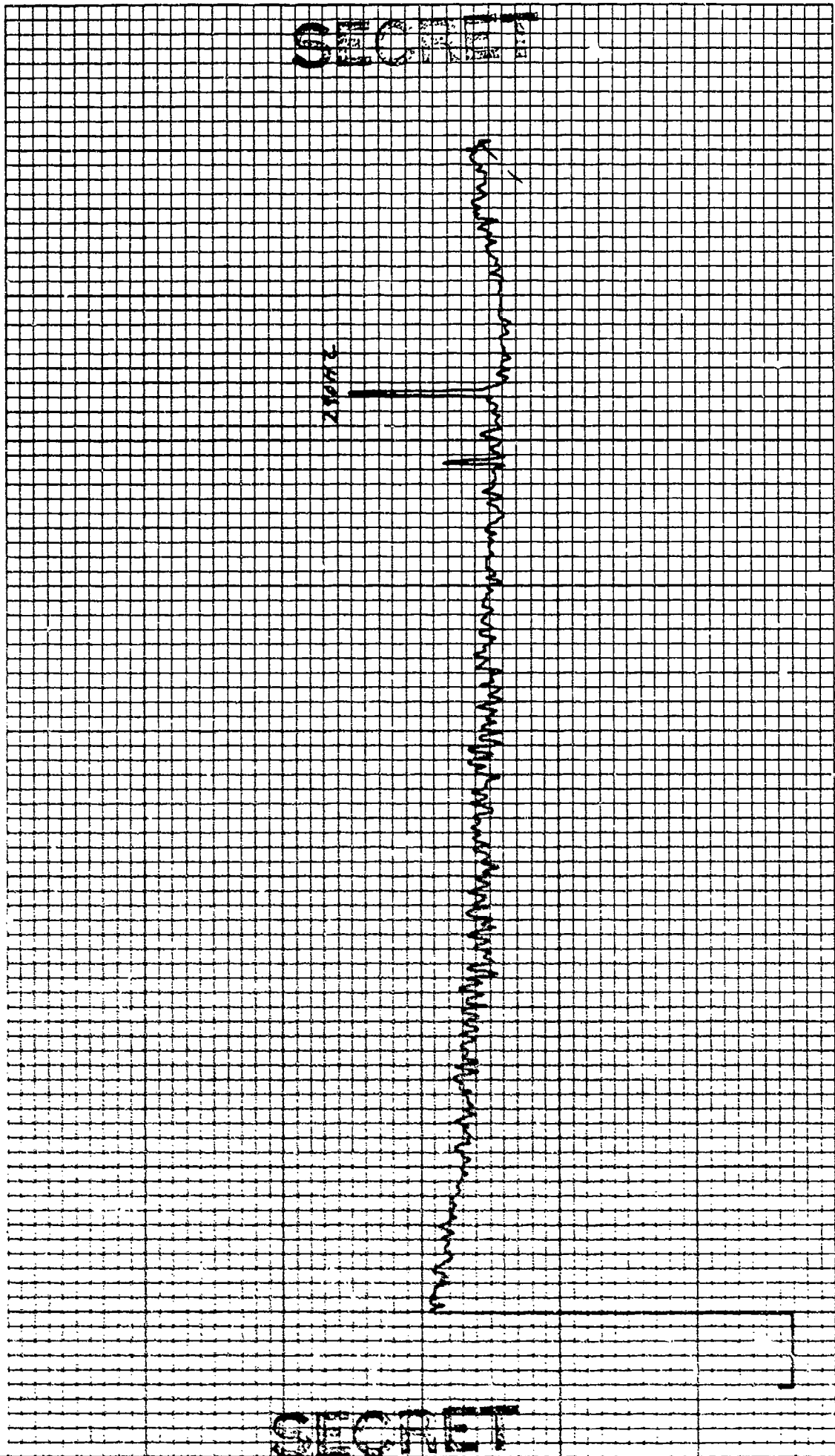
INDE X/637



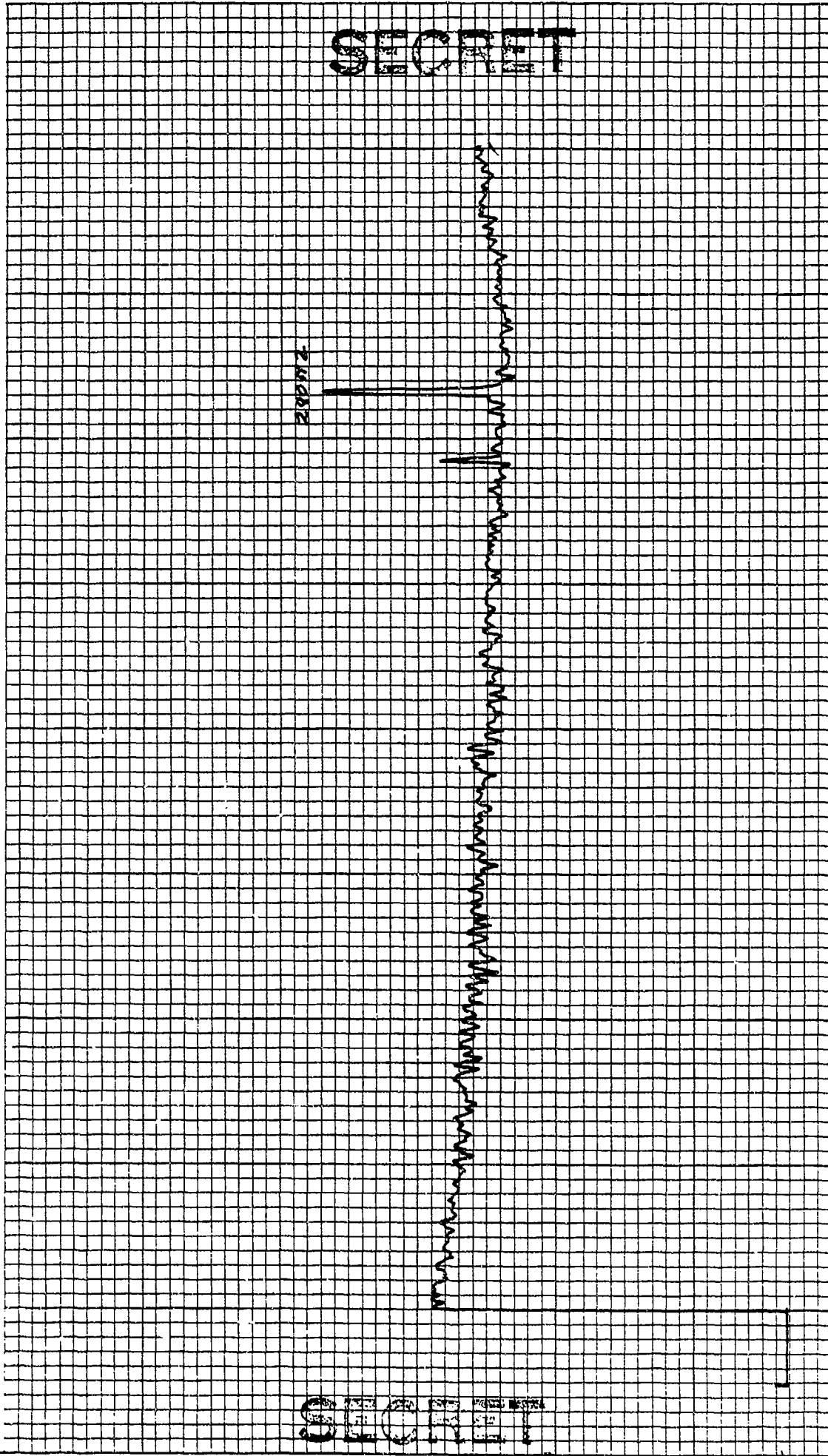
KSE 10 X 10 TO THE INCH • 7 X 10 INCHES
KLUFFEL & ROSEY CO. MADE IN U.S.A.

46 0703

CONTROL: 0633 - 16 (DP16) DATE OF ANALYSIS: 1-6-77 REEL: M19 INDE X/637
BEAMFORMED SPECTRUM(ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 3-75-77 - 0633 Z INTEGRATION TIME 320 SECS ATTN: -1A DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
16 ELEMENTS 4.56 DEG. AZ STEERING



CONTROL: 0633-16 (DP10) DATE OF ANALYSIS: 1-6-77 REEL: M19 INDE X1637
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 0633 Z INTEGRATION TIME 320 SECS ATTEN: -12 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
16 ELEMENTS +50 DEG. AZ STEERING



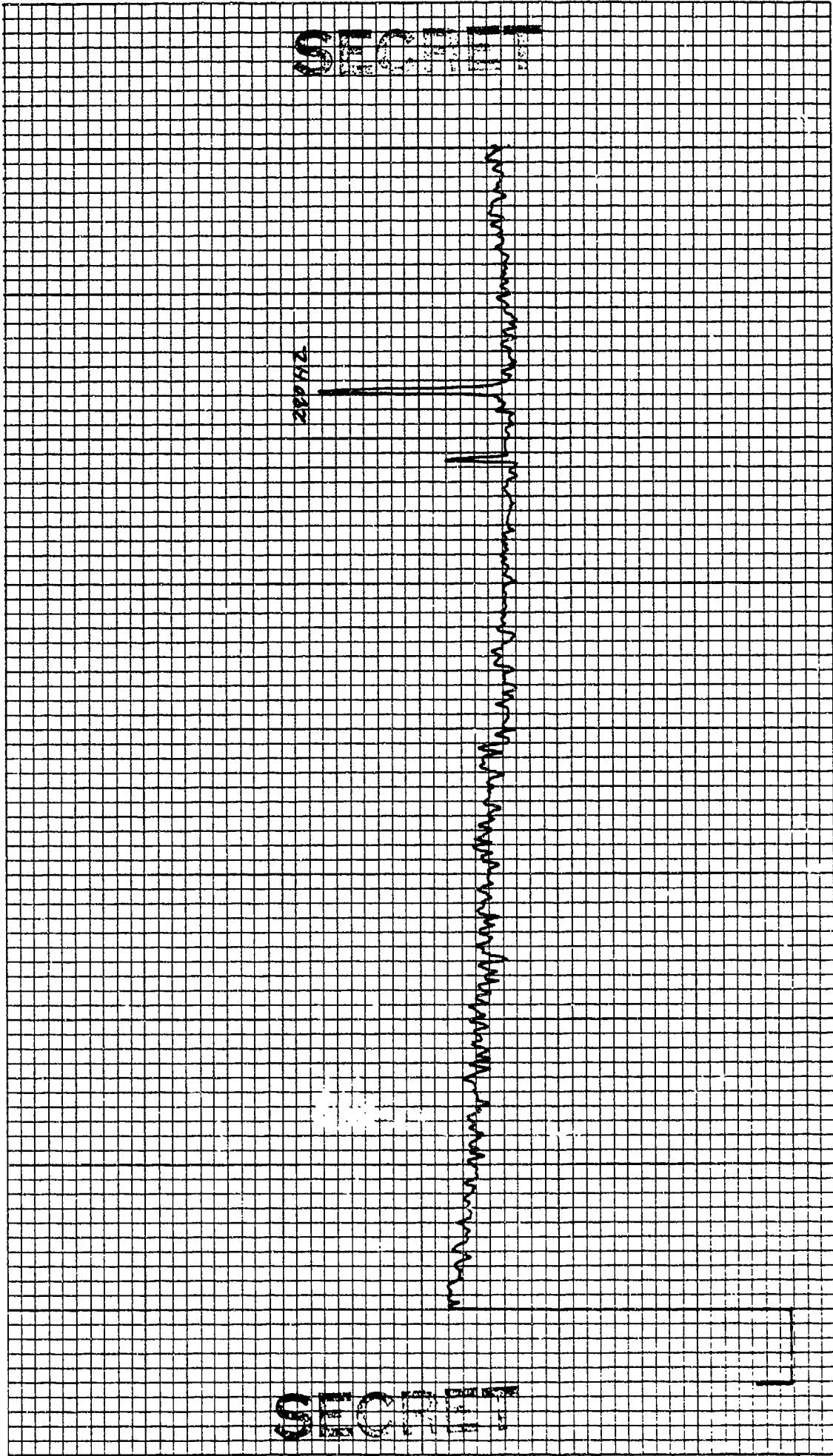
SECRET

SECRET

K•E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

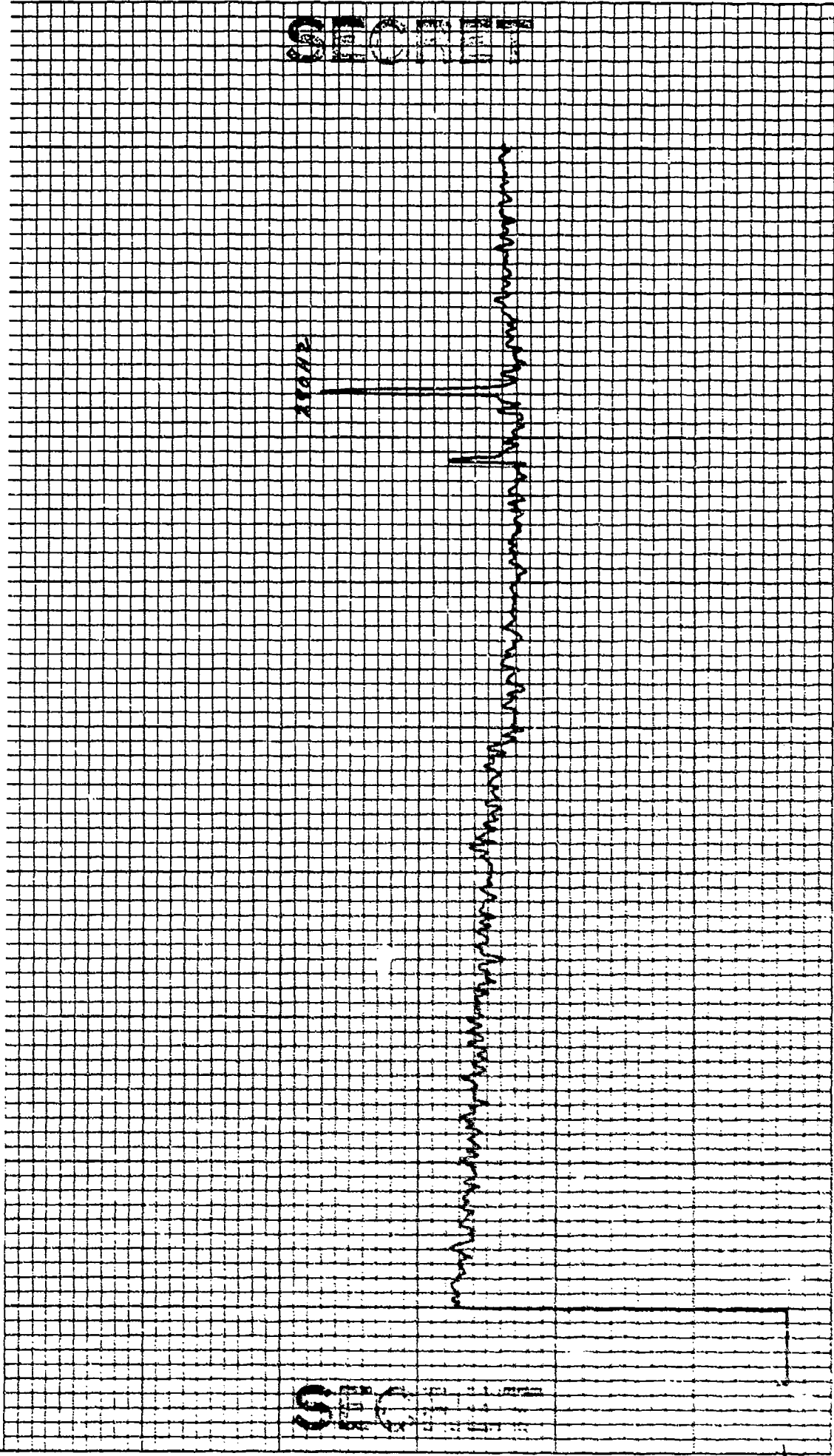
CONTROL: 0633 - 16 (Df10) DATE OF ANALYSIS: 1-6 d 8-17 REEL: M19 INDE X: 637
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 0633 Z INTEGRATION TIME 320 SECS ATEN: -12 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
16 ELEMENTS +60 DEG. AZ STEERING



K•E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

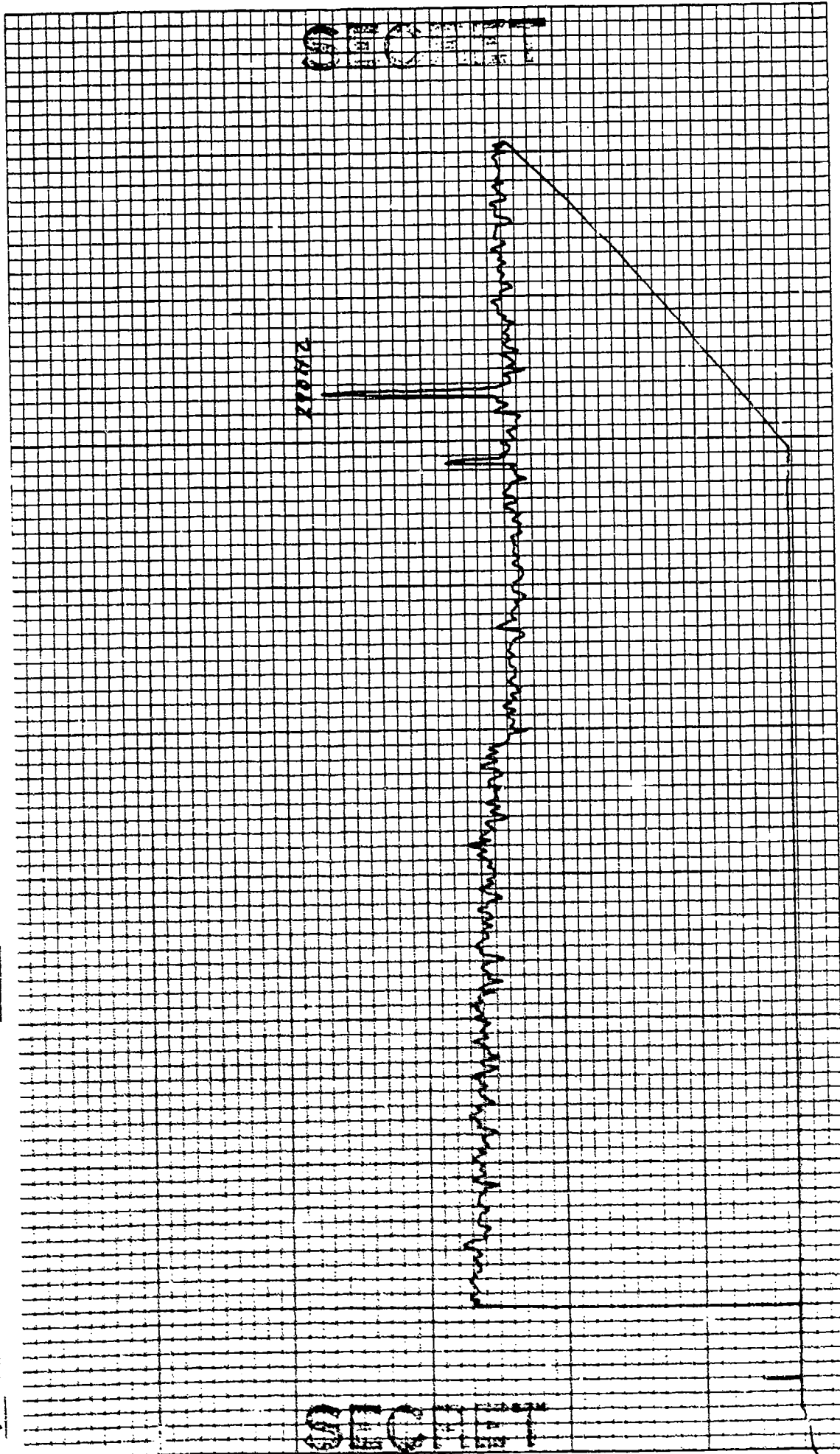
CONTROL: 0633 - 16 0P10 DATE OF ANALYSIS: 1-6-77 REEL: M19 INDE X 1637
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 0633 Z INTEGRATION TIME 320 SECS ATTN: -72 DB
CENTER FREQ: 070 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
16 ELEMENTS +62 DEG. AZ STEERING



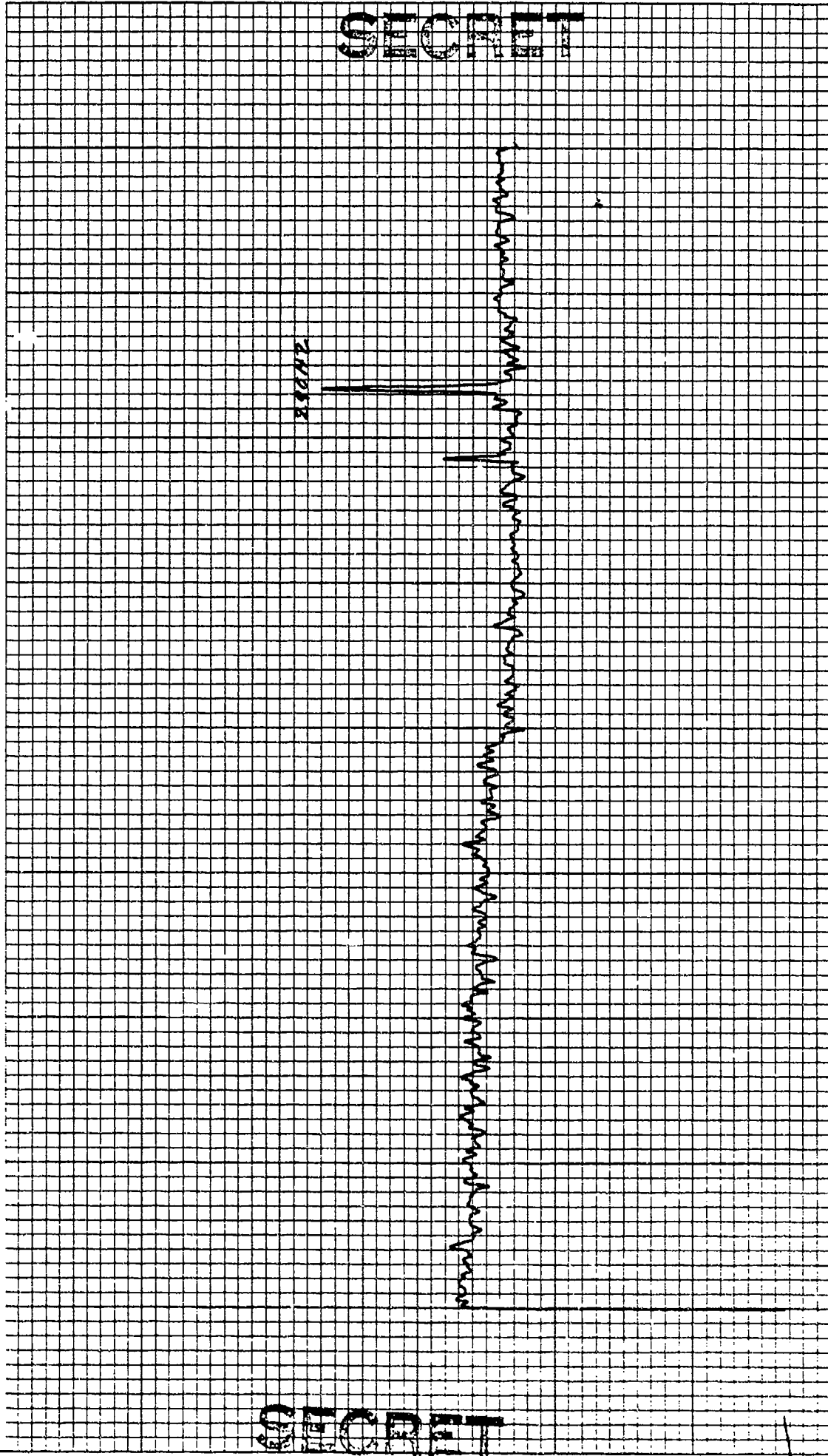
K&E 10 X 10 TO THIS (74.7 X 10 INCHES)
HILFEL & ESSERIK 1 MADE IN U.S.A.

46 0703

CONTROL: 0633-16 (DP10) DATE OF ANALYSIS: 1-6-77 REEL: M19 INDE X 677
BEAMFORMED SPECTRUM (ELEMENTS) 16 INTEGRATION TIME 320 SECS ATTN: -12 DB
EXERCISE: BEARING STAKE FILTER WTG: HANNING
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ
16 ELEMENTS +63 DEG. AZ STEERING



CONTROL: 0633-16 (DPI6) DATE OF ANALYSIS: 1-6-77 REEL: M19 INDE X/637
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77-0633 Z INTEGRATION TIME 320 SECS ATTN: -12 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
16 ELEMENTS +63.5 DEG. AZ STEERING



SECRET

SECRET

KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

SECRET

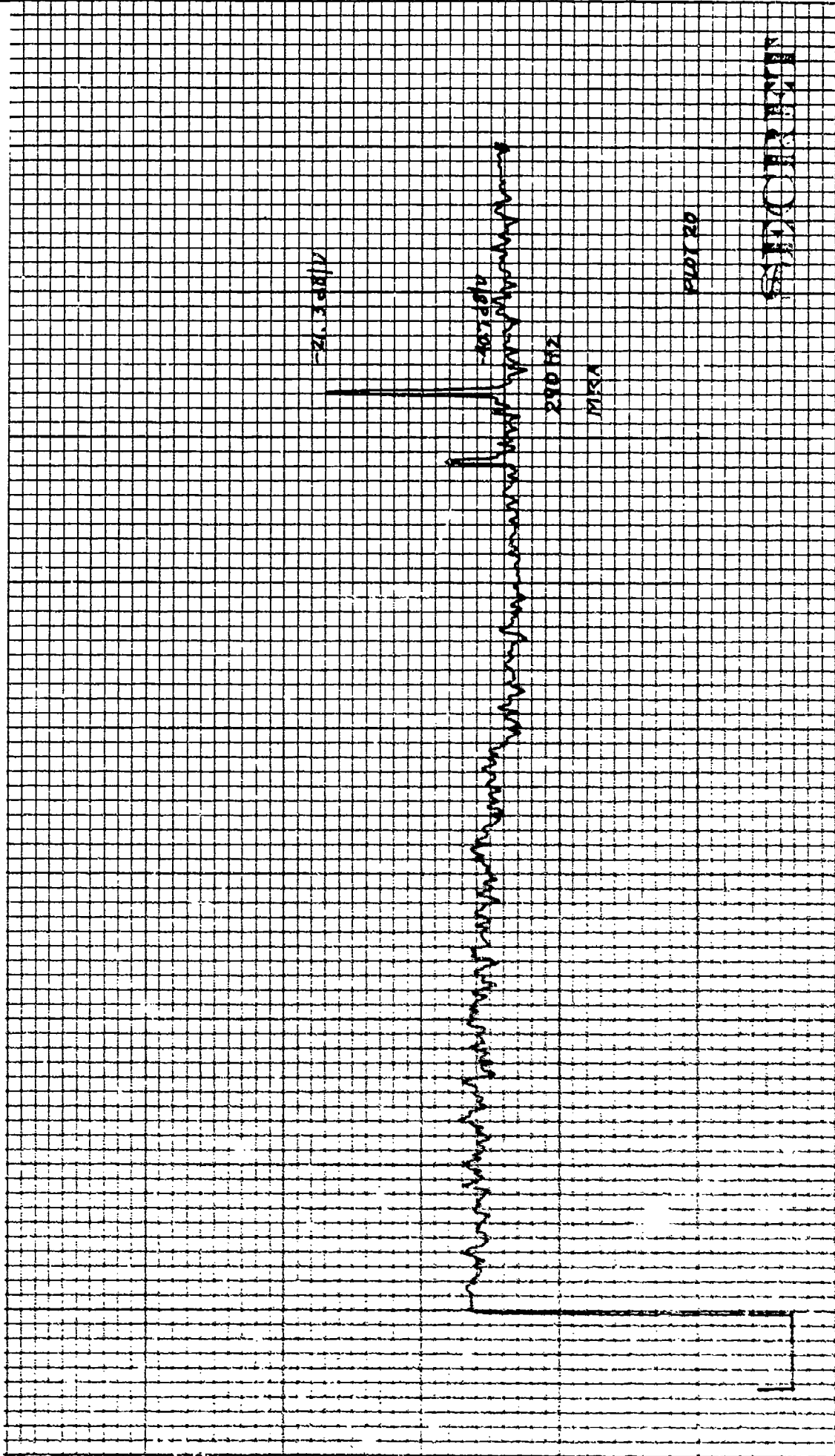
CONTROL: 0633 - 49 (DP10) DATE OF ANALYSIS: _____ REEL: M19 INDE X/637

BEANFORMED SPECTRUM(ELEMENTS 1706 & 97017)

EXERCISE: BEARING STAKE DATE/TIME: 3-26-77 - 0633 Z INTEGRATION TIME 320 SECS ATTN: - DB

CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING

16 ELEMENTS +64.0 DEG. AZ STEERING



232

270 HZ

308

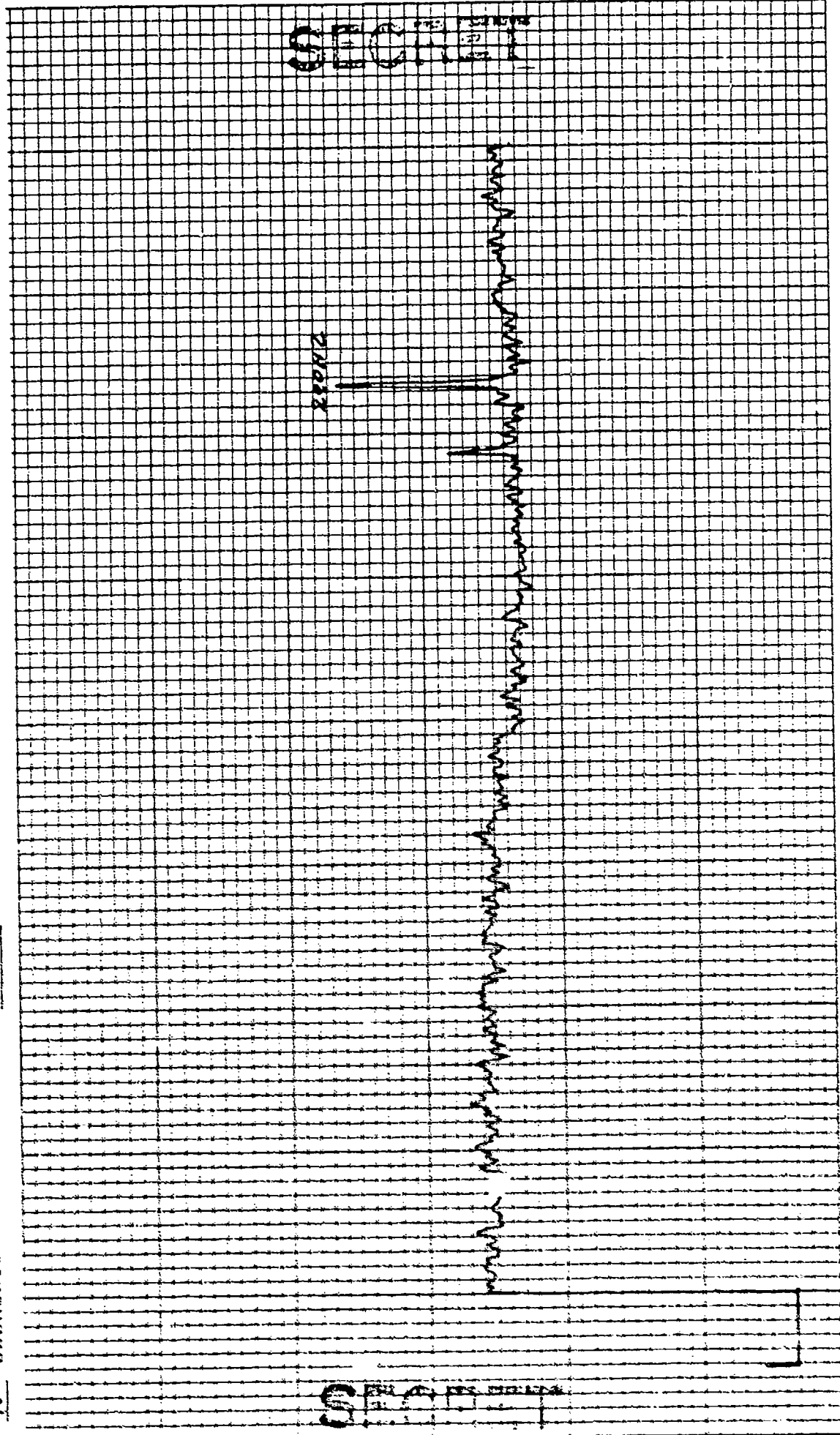
1402
10 X 10 TO THE INCH • 7 X 10 PAGES
REDFIELD & EGGERS CO. MADE IN U.S.A.

46 0703

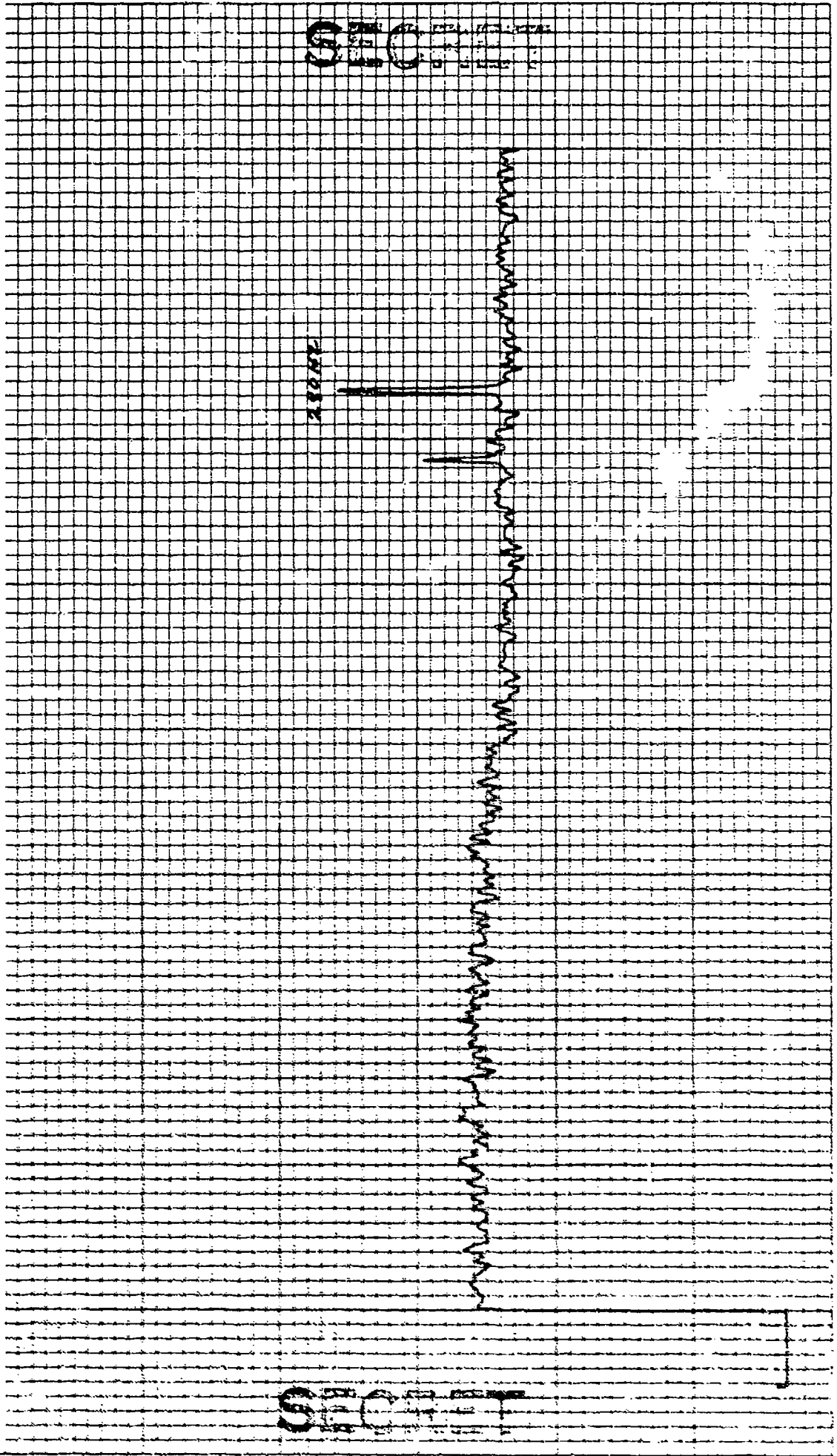
REEL: M19 INDE X677

CONTROL: 0633 - 16 (DP10) DATE OF ANALYSIS: 1-6-77 - 9-17)
BEAMFORMED SPECTRUM (ELEMENTS) 0633 Z
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10 HZ
CENTER FREQ: 270 HZ
16 ELEMENTS 164.5 DEG. AZ STEERING

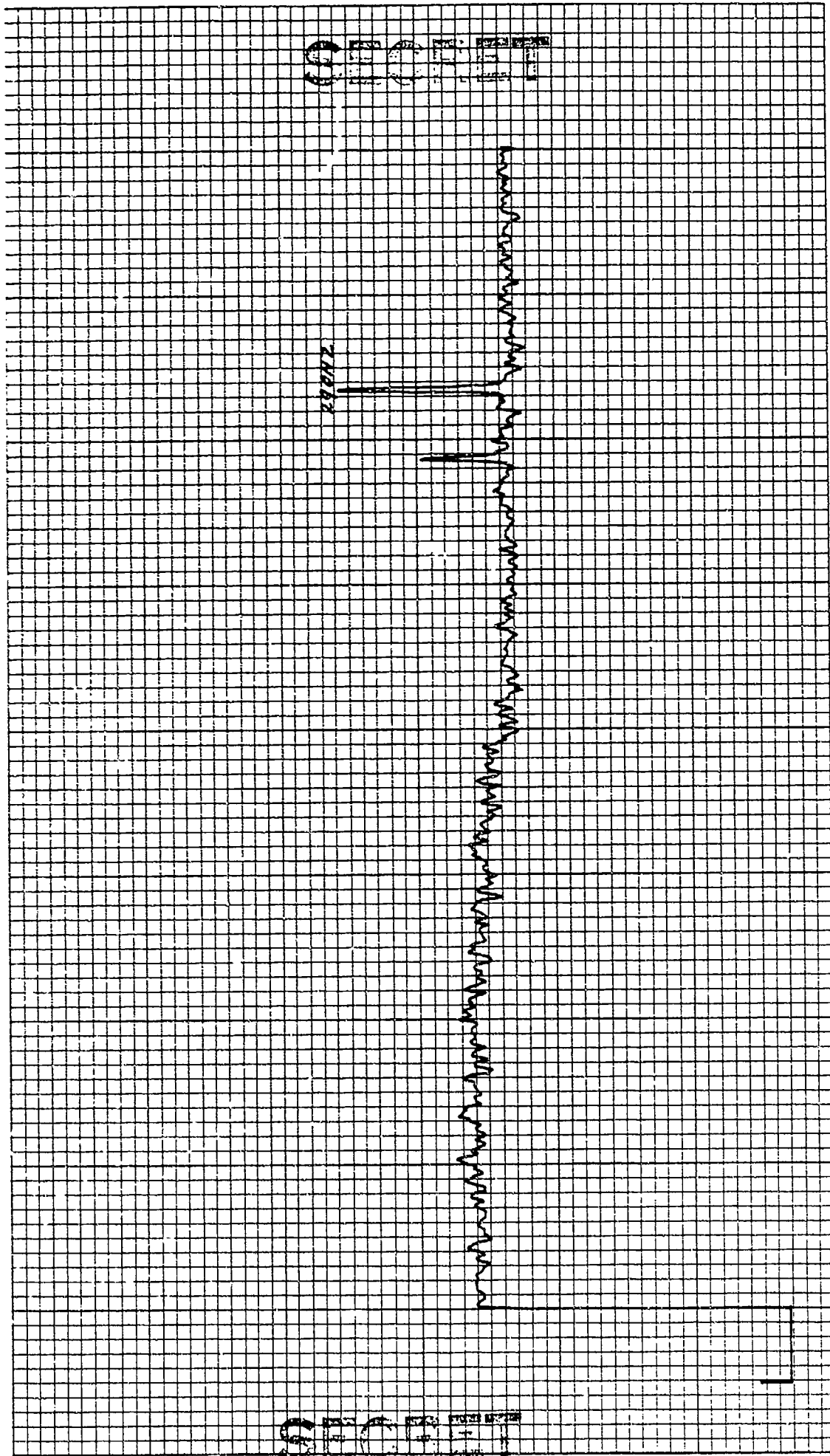
INTEGRATION TIME 320 SECS ATTN: 17 DB
FILTER WTG: HANNING



CONTROL: 0633 - 16 (DD10) DATE OF ANALYSIS: 1-6-68-17 REEL: M18 INDEX: 1637
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-6-77 - 0633Z INTEGRATION TIME: 320 SECS ATTN: 1A DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
CENTER FREQ: 270 HZ 16 ELEMENTS 466 DEG. AZ STEERING



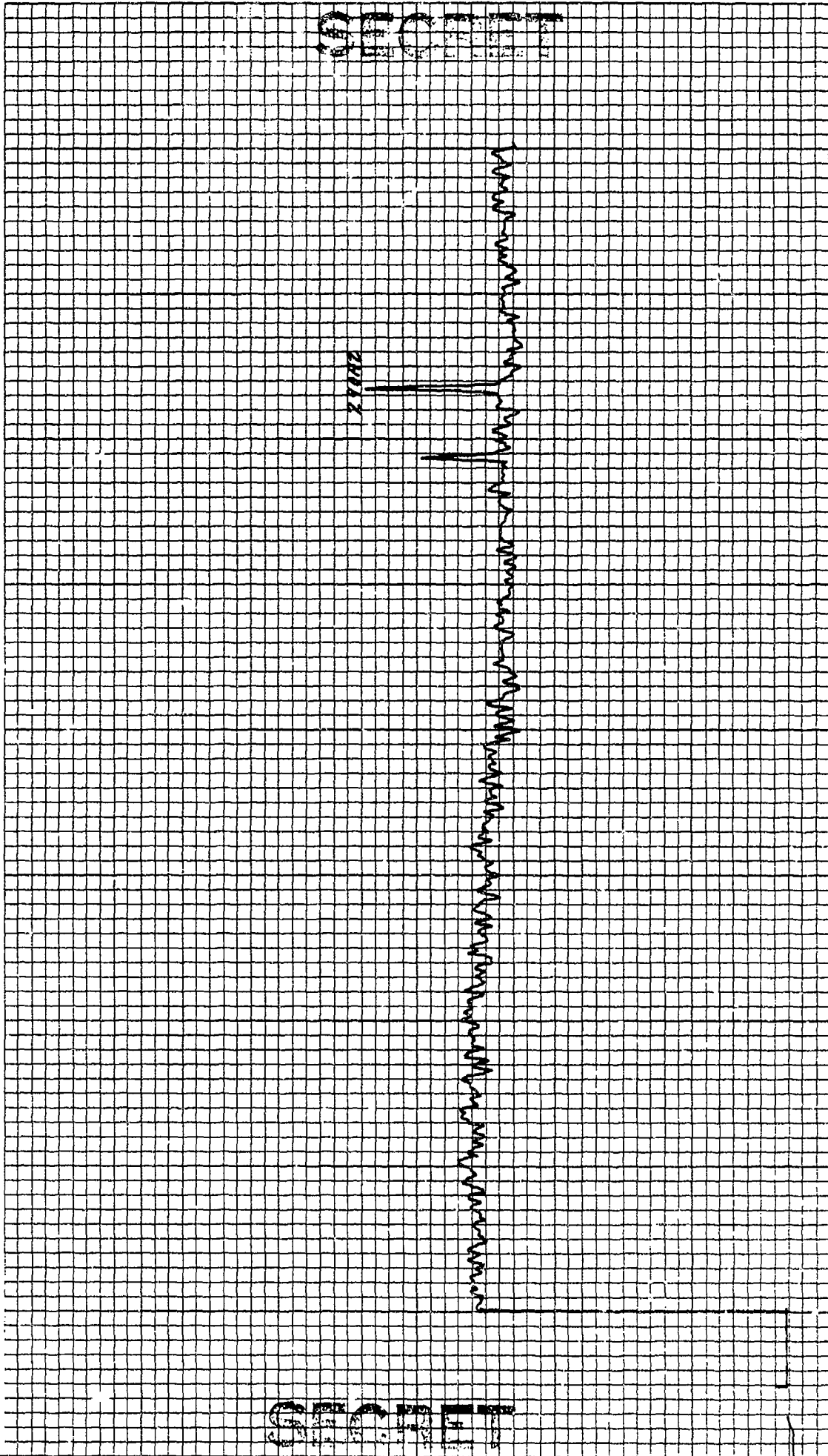
CONTROL: 0633-16 (DP10) DATE OF ANALYSIS: 1-6-77 REEL: M19 INDE X637
 BEAMFORMED SPECTRUM: (ELEMENTS))
 EXERCISE: BEARING STAKE DATE/TIME: 3-16-77-0633Z INTEGRATION TIME 320 SECS ATTN: -1.2 DB
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
16 ELEMENTS +60 DEG. AZ STEERING



K·E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

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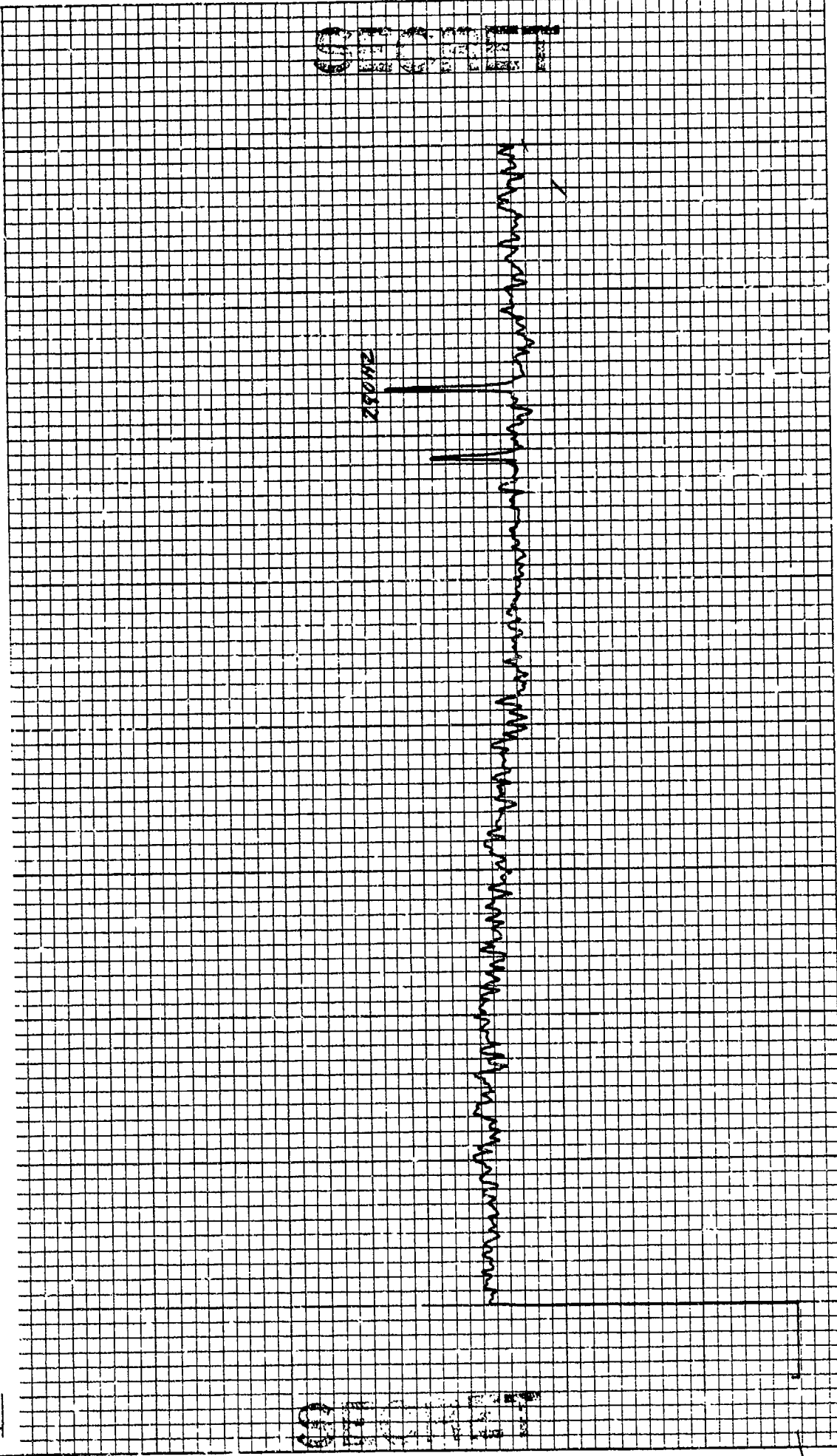
CONTROL: 0633 - 16 (DP10) REEL: M19 INDE X/637
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS
DATE OF ANALYSIS: 1-6-77
DATE/TIME: 3-16-77 - 0633 Z
ANALYSIS BANDWIDTH: 1/10 Hz
+70 DEG. AZ STEERING
INTEGRATION TIME 320 SECS ATTN: -2 DB
FILTER WTG: HANNING



K-E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

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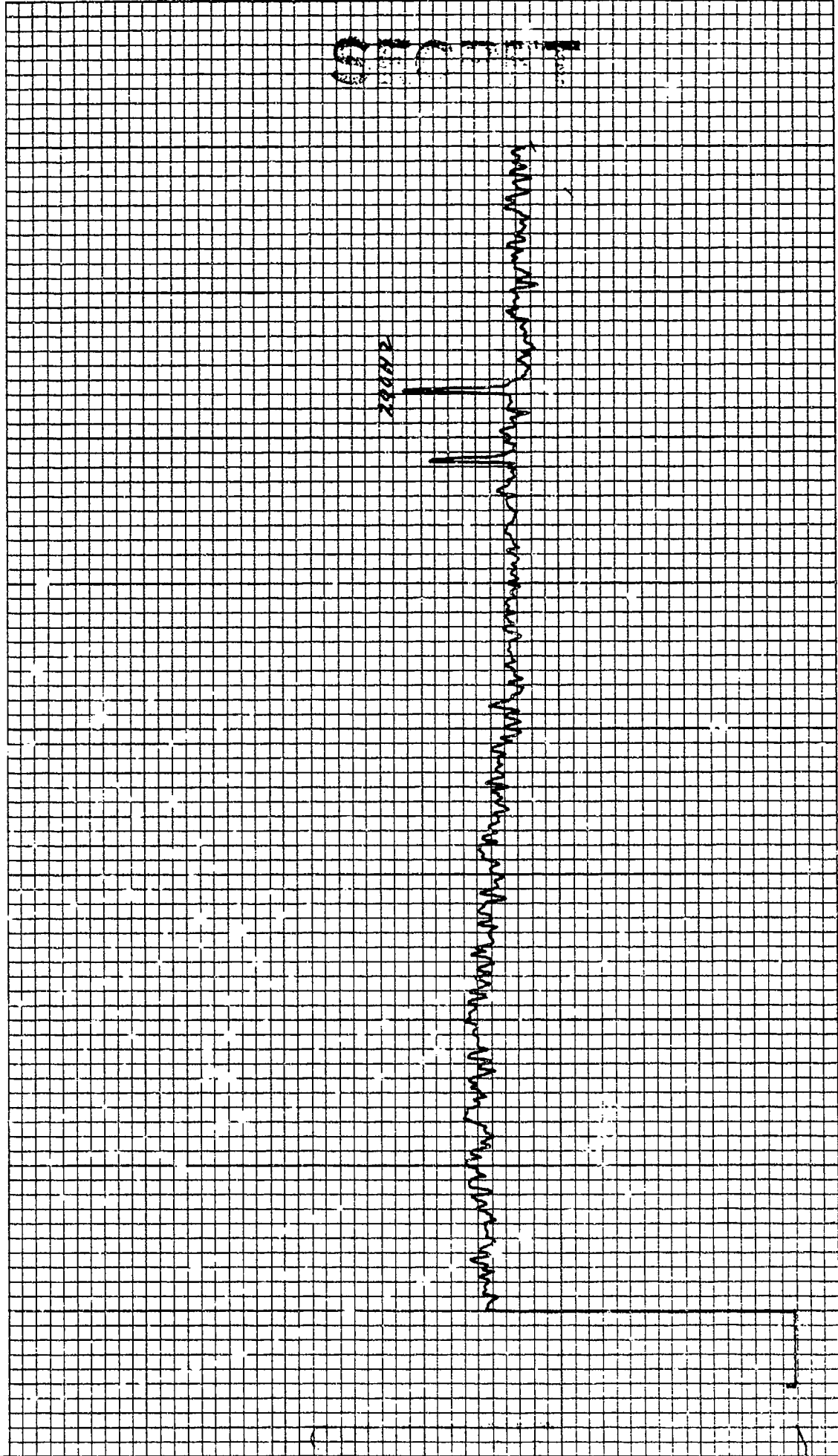
CONTROL: 0633 - 16 (DP10) REEL: M19 INDE X/637
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-6-79-17
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 0633 Z INTEGRATION TIME 320 SECS ATTN: -12 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
16 ELEMENTS +72 DEG. AZ STEERING



0633

0633

CONTROL: 0633 - 16 (DP10) DATE OF ANALYSIS: 1-6-77 REEL: M19 INDF. X: 637
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 3-6-77 - 0633 INTEGRATION TIME 320 SECS ATTN: -1.2 DB
CENTEK FREQ: 273 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
16 ELEMENTS +74 DEG. AZ STEERING



KOE 10 X 10 TO THE INCH * 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

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CONTROL: 0833 - 16 (DP10)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-6-68-17

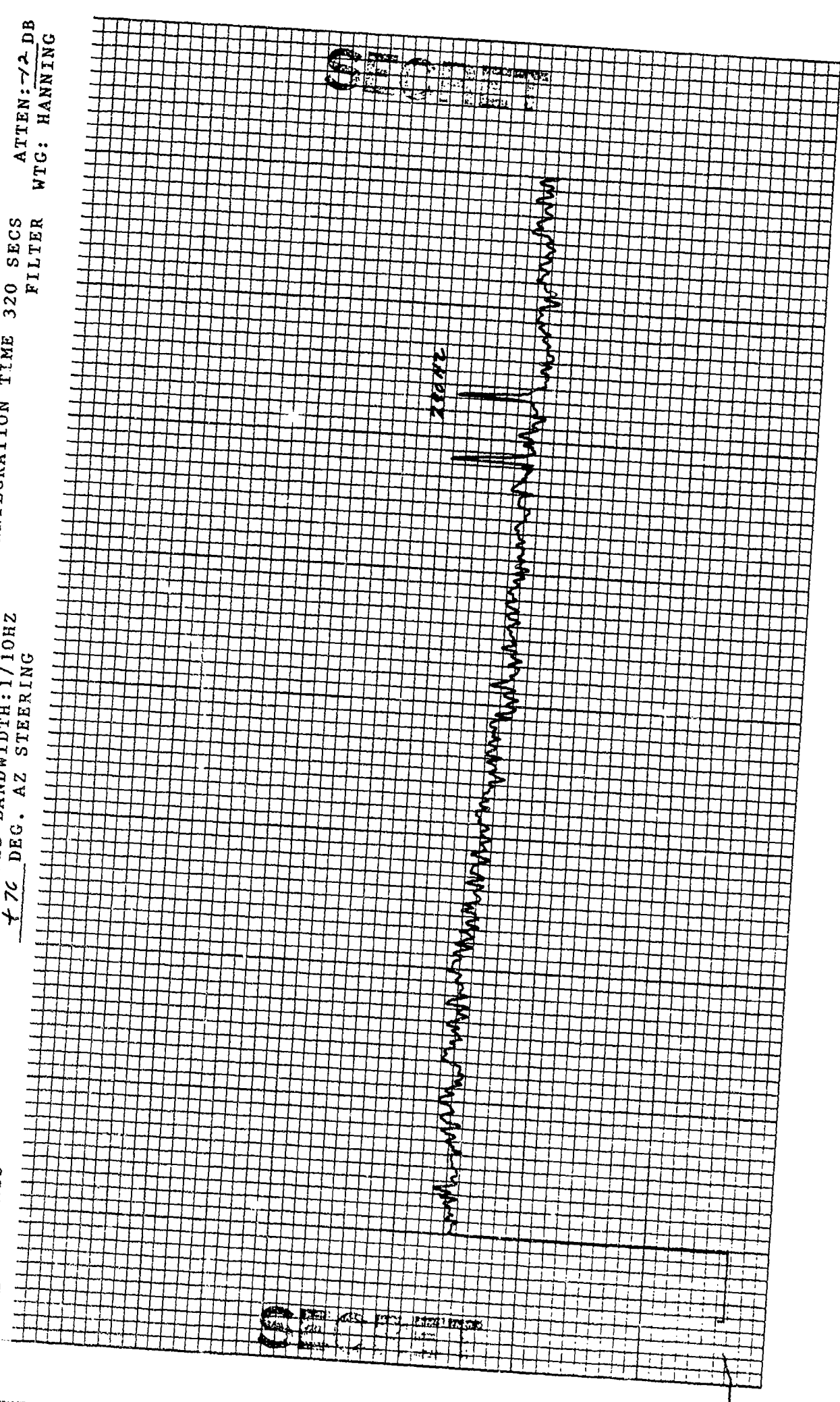
DATE/TIME: 3-16-77 - 0633 Z

ANALYSIS BANDWIDTH: 1/10 HZ
± 76 DEG. AZ STEERING

REEL: M19

INTEGRATION TIME 320 SECS ATTN: -7.2 DB
FILTER WTG: HANNING

INDE X1637



0833 - 16 (DP10)

270 HZ

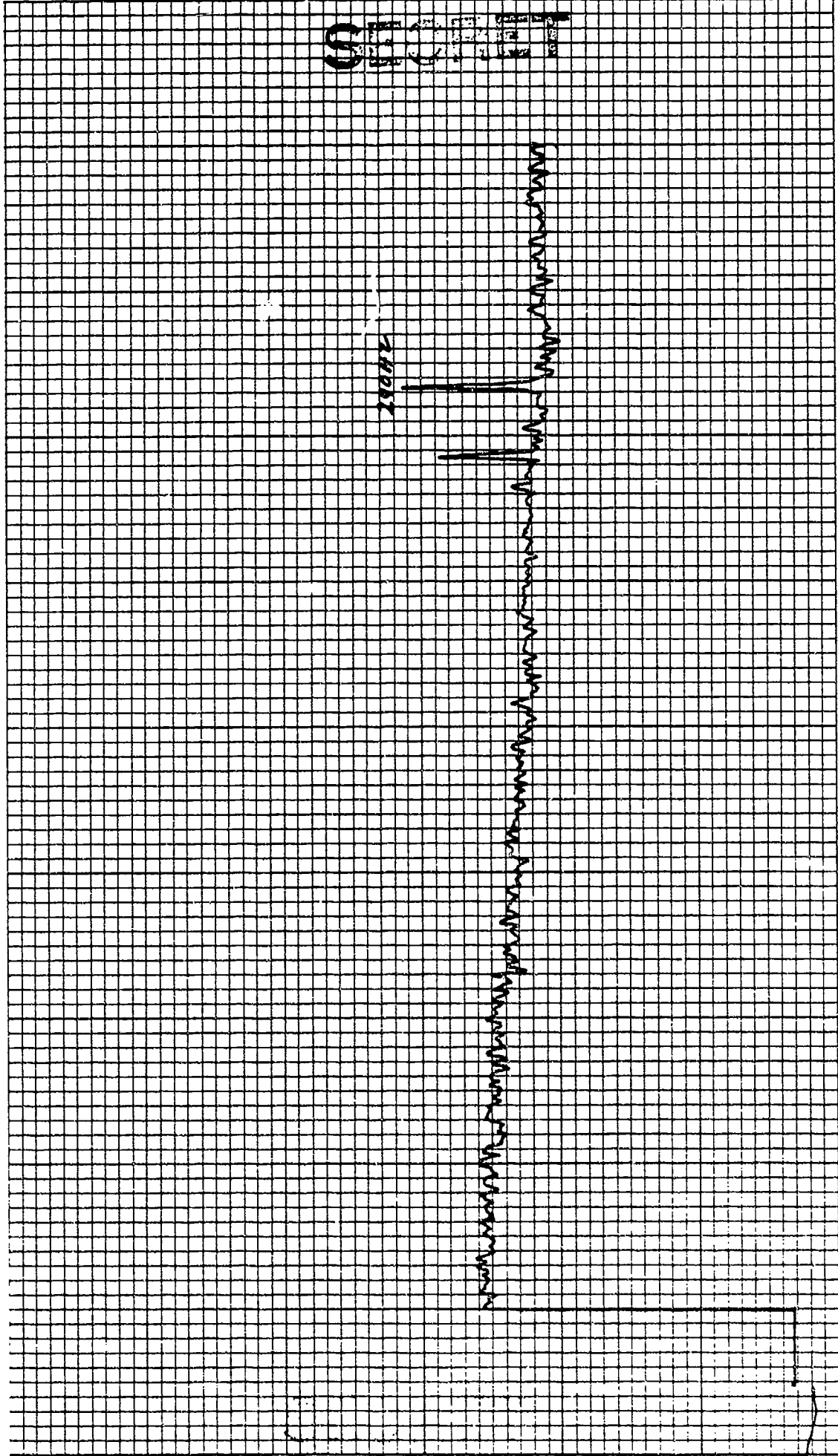
K·E

10 X 10 TO THE INCH • 7 X 10 INCHES
KEUPPEL & ESSER CO. MADE IN U.S.A.

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CONTROL: 0633 - 16 (DP16) DATE OF ANALYSIS: 1-6-77 REEL: 119 INDE X1632
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-16-77 - 0633 Z INTEGRATION TIME 320 SECS ATTN: -1 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 CENTER FREQ: 270 HZ +70 DEC. AZ STEERING

16 ELEMENTS



0632

SIGNAL LEVEL AND SNR
CALCULATIONS

DATA POINT 10

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-18.4</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-8.4
BEAMFORMER GAIN	<u>+18</u>	+10.4 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	+10.2 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-50.0</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-40.0
BEAMFORMER GAIN	<u>+18</u>	-22.0 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR	<u>+10.4</u>	
SIGNAL LEVEL FOR SNR	<u>-22.0</u>	32.4
PROCESSOR CORRECTION	<u>-4.0</u>	28.4
MRA CORRECTION	<u>+ .2</u>	28.6 SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	20.4 SNR 1 HZ BAND

~~CONFIDENTIAL~~

SIGNAL LEVEL AND SNR
CALCULATIONS

DATA POINT 10

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -35.8

MCPS-32 CAL. CORRECTION +10 -25.8

BEAMFORMER GAIN +18 -7.8 SIG. LEVEL FOR SNR CALCULATION

MRA CORRECTION + .9 -6.9 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -59.8

MCPS-32 CAL. CORRECTION +10 -49.8

BEAMFORMER GAIN +18 -31.8 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR -7.8

SIGNAL LEVEL FOR SNR -31.8 24.0

PROCESSOR CORRECTION -4.0 20.0

MRA CORRECTION + .9 20.9 SNR 1/10 HZ BAND

BANDWIDTH CONVERSION -8.2 12.7 SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

DATA POINT 10

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-23.3</u>	<u>-38.0</u>	<u> </u>
MRA SIGNAL LEVEL	<u>+10.6</u>	<u>-6.4</u>	<u> </u>
ARRAY SIGNAL GAIN	<u>33.9</u>	<u>31.1</u>	<u> </u>
20 LOG <u>32</u>	<u>30.1</u>	<u>30.1</u>	<u> </u>
# of elements			
DIFFERENCE	<u>+3.8</u>	<u>+1.0</u>	<u> </u>

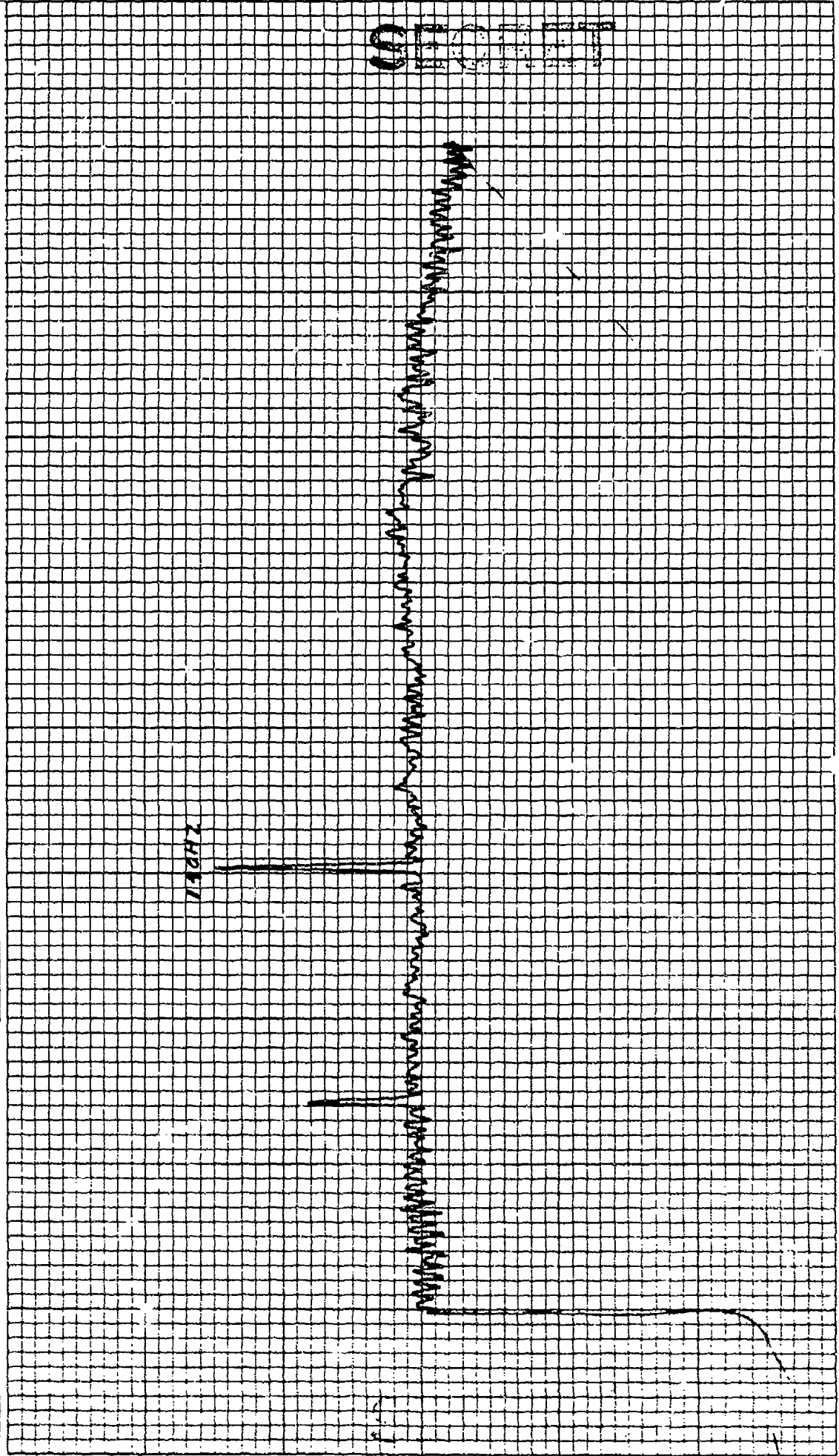
ARRAY GAIN

MRA SNR	<u>28.6</u>	<u>20.9</u>	<u> </u>
MEAN OMNI SNR	<u>18.7</u>	<u>8.4</u>	<u> </u>
ARRAY GAIN	<u>9.9</u>	<u>11.5</u>	<u> </u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>10.8</u>	<u>17.4</u>	<u> </u>
DIFFERENCE	<u>-0.9</u>	<u>-1.9</u>	<u> </u>

KSE 10 X 10 TO THE INCH #7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0633 - 32 (DP10) DATE OF ANALYSIS: --- REEL: M11 INDE X: 632
BEAMFORMED SPECTRUM (ELEMENTS) 1-6 9-26 88-35)
EXERCISE: BEARING STAKE DATE/TIME: 3-6-77 - 0633 Z INTEGRATION TIME 320 SECS ATTN: -18 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
32 ELEMENTS 154 DEG. AZ STEERING



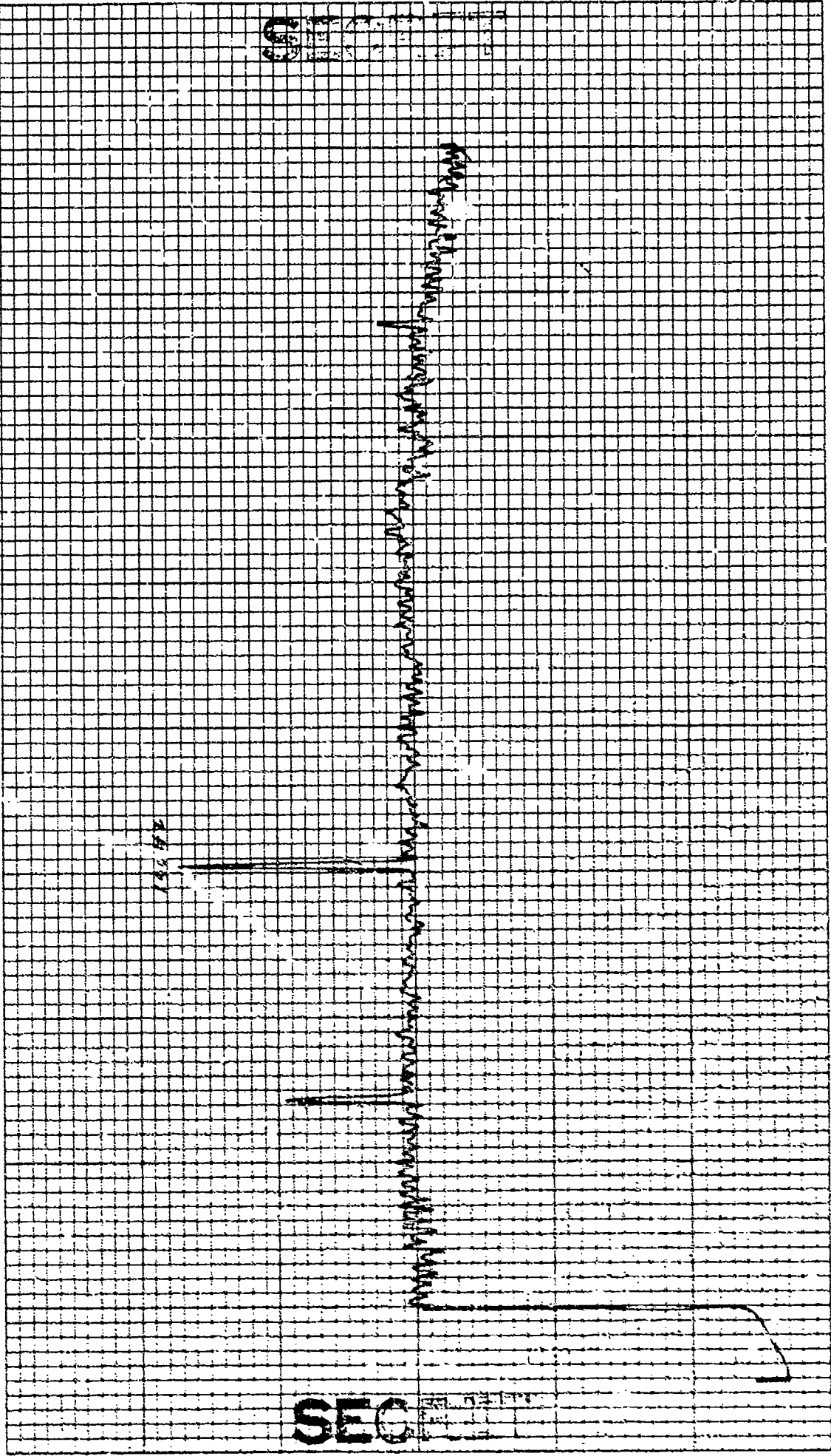
KOE 10 X 10 TO THE INCH • 7 1/2 INCHES
RECAPITAL & ESSER CO. MADE IN U.S.A.

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14-201
CONTRL: 0633 - 32 (DP16)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS

DATE OF ANALYSIS: _____
1-64 9-26 4 29-35
DATE/TIME: 376.77 - 0633 Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 56 DEG. AZ STEERING

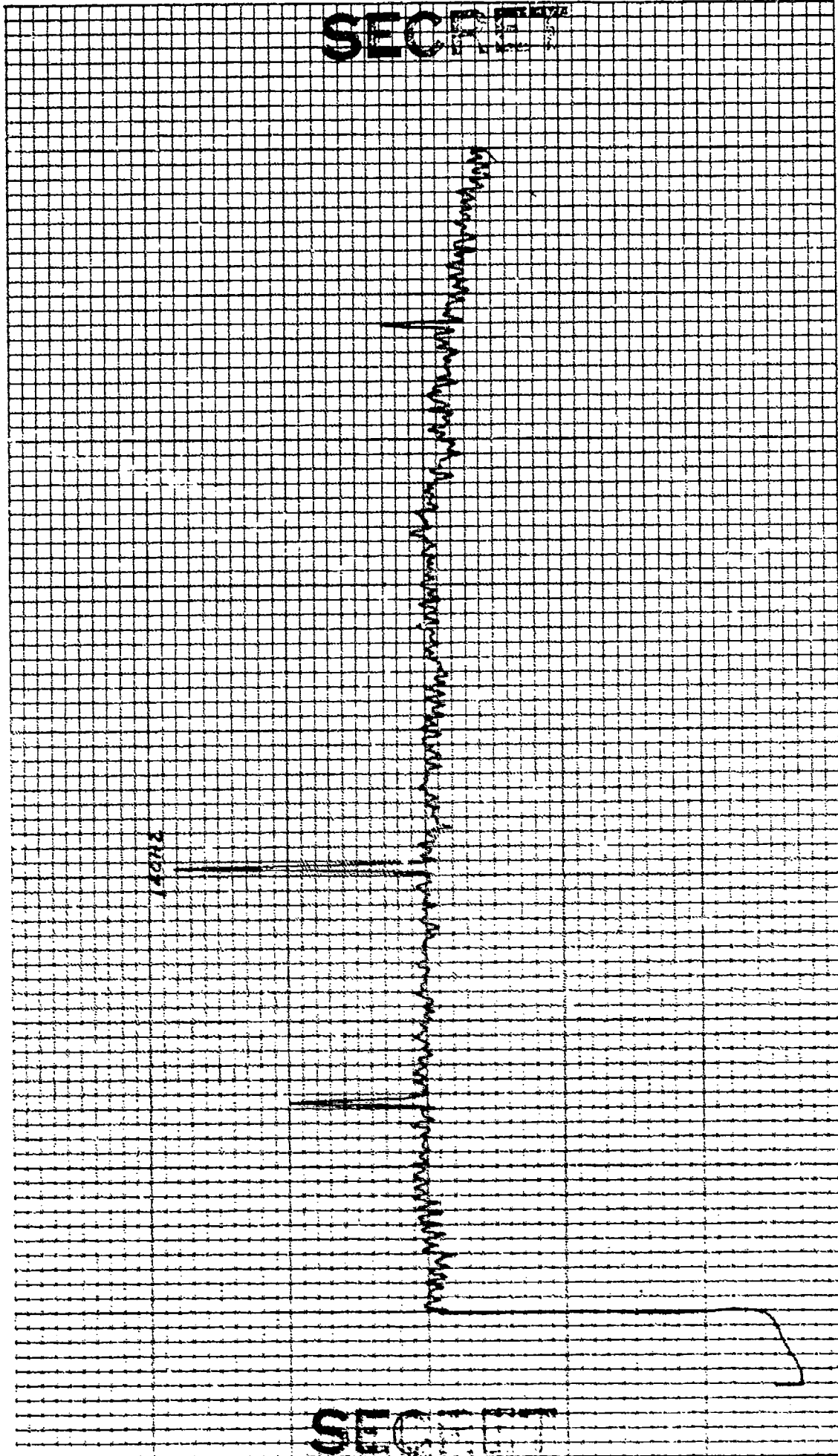
REEL: M19 INDE X107
INTEGRATION TIME 320 SECS ATTN: 78 DB
FILTER WTG: HANNING



KOE 12 X 10 TO THE INCH 1.7 X 10 INCHES
RELIABLE DESIGN CO. MADE IN U.S.A.

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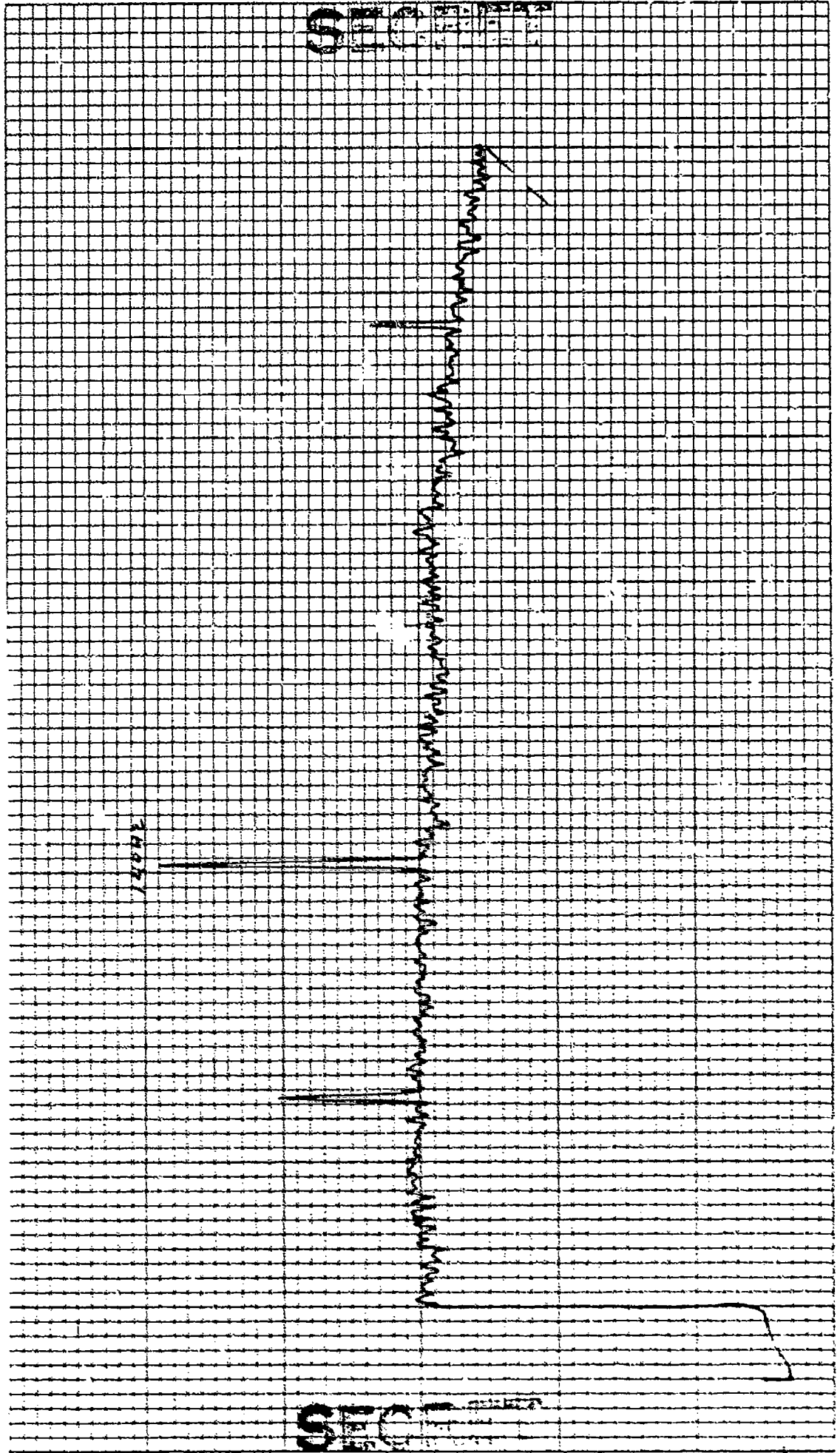
CONTROL: 0677 - 72 (DP14) DATE OF ANALYSIS: REEL: H19 INDE X637
BEAMFORMED SPECTRUM (ELEMENTS) 1-6 8-26 8 21-35)
EXERCISE: BEARING STAKE DATE/TIME: 7-6-77 - 033 Z INTEGRATION TIME 320 SECS ATTEN: -18 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
72 ELEMENTS +50 DEG. AZ STEERING



KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KELUPEL & EISEN CO. MADE IN U.S.A.

45 0703

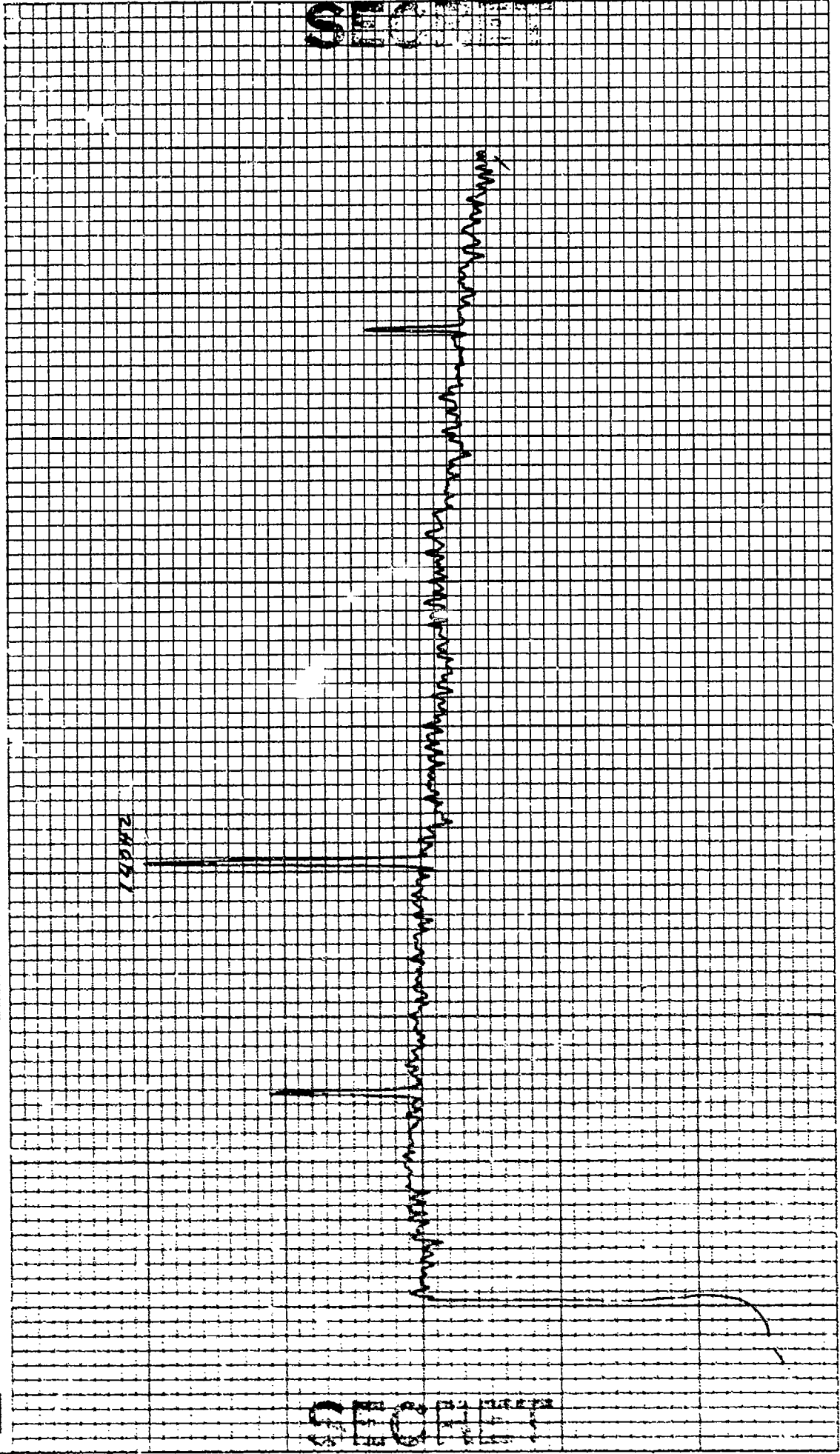
CONTROL: 0633 - 32 (2010) DATE OF ANALYSIS: 1-68 9-26 8 20-35
BEAMFORMED SPECTRUM (ELEMENTS) REEL: M19 INDE X/672
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTEN: -18 DB
CENTER FREQ: 150 HZ FILTER WTG: HANNING
12 ELEMENTS +10 DEG. AZ STEERING



CONTROL: 0633 - 32 (D₁₀) DATE OF ANALYSIS: _____
 BEAMFORMED SPECTRUM (ELEMENTS) 1-64 9-26 8 28-35
 EXERCISE: BEARING STAKE DATE/TIME: 376-77-0633 Z
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ
32 ELEMENTS 711 DEG. AZ STEERING

REEL: M18 INDE X1637

INTEGRATION TIME 320 SECS ATEN: 70 DB
 FILTER WTG: HANNING



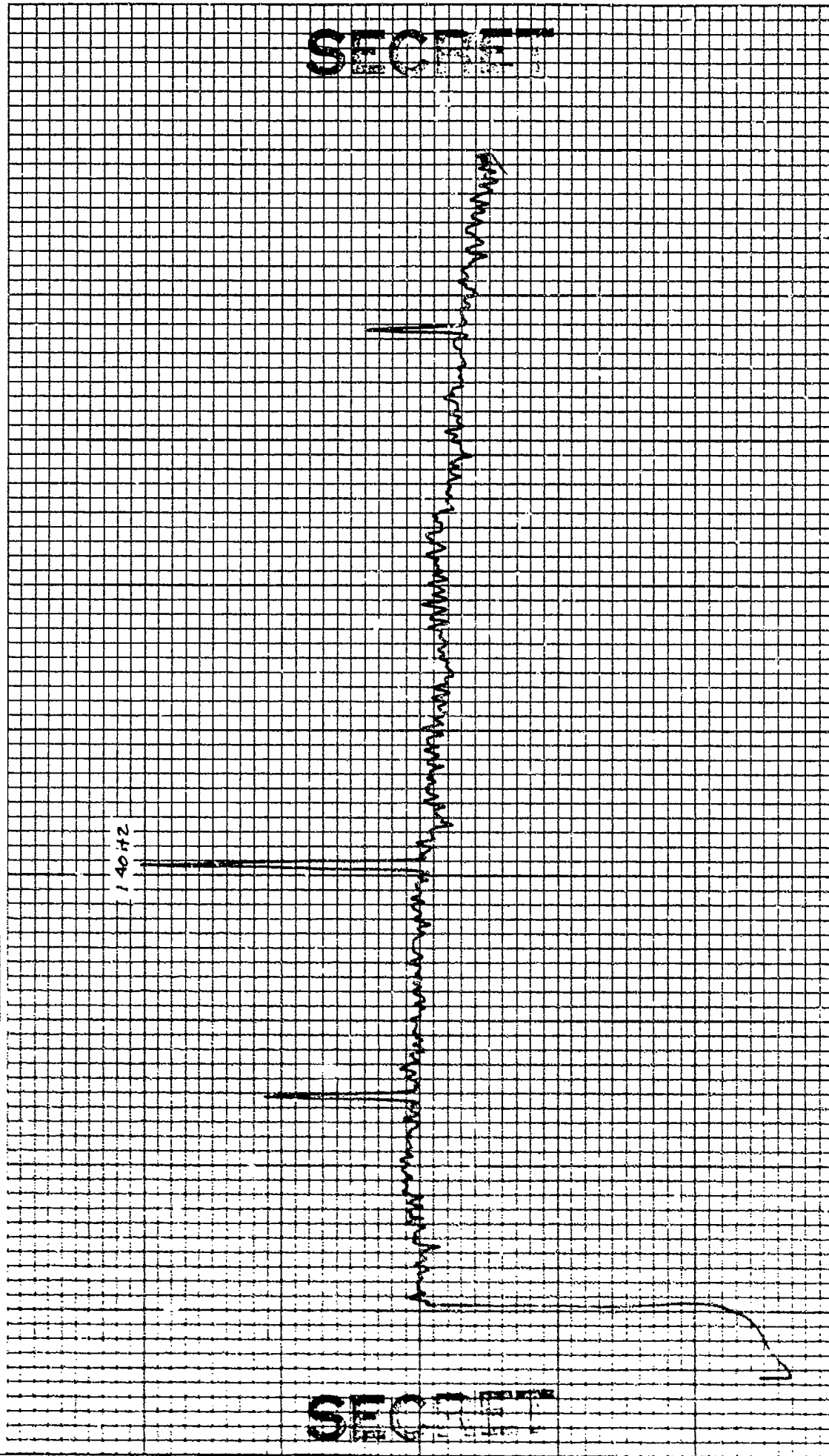
SECRET

SECRET

KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN USA

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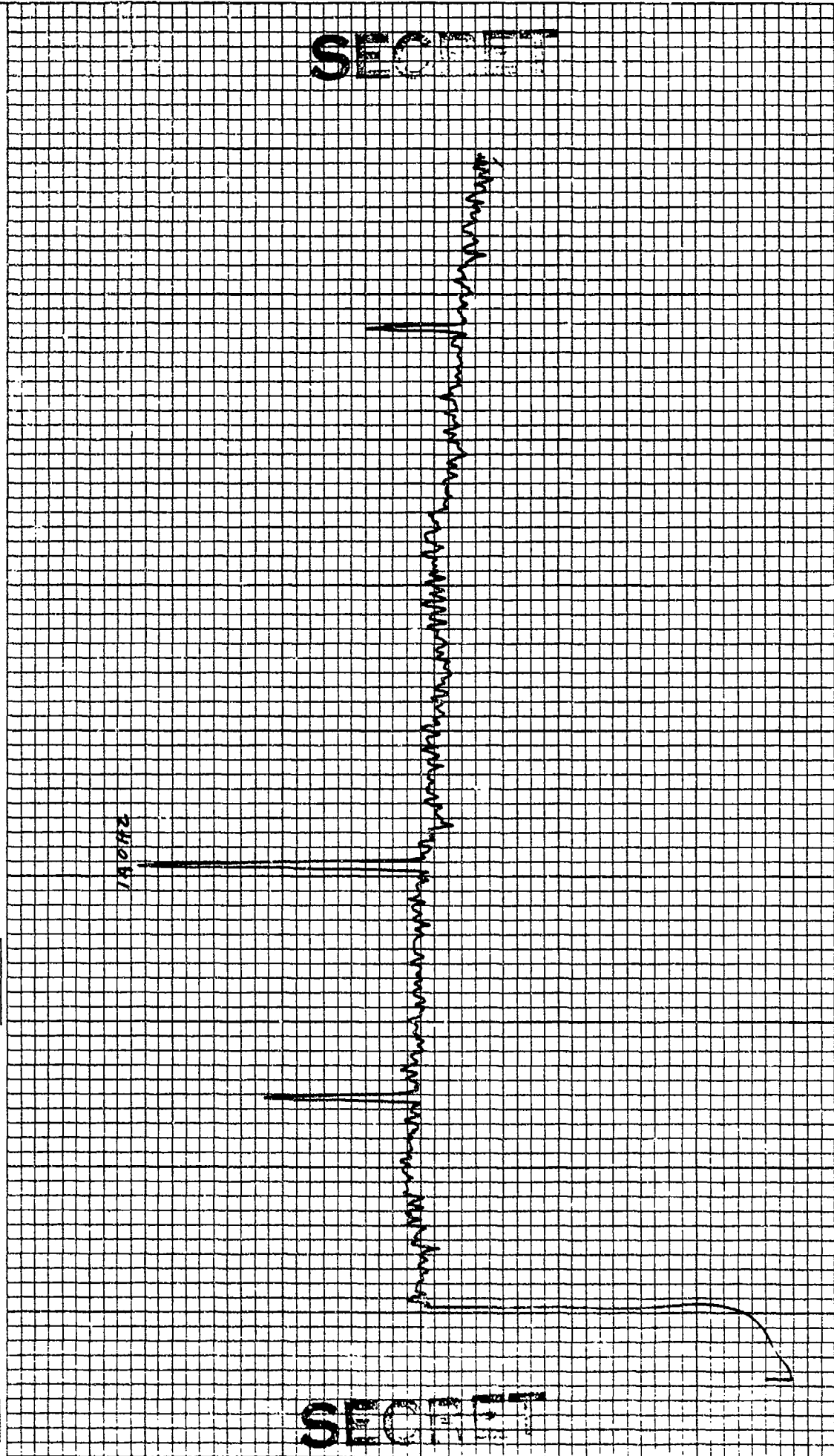
CONTROL: 0633 - 32 (D010) DATE OF ANALYSIS: 1-6-77-26 438-35 REEL: M19 INDE X1637
BEAMFORMED SPECTRUM (ELEMENTS) EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTEN: 70 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
32 ELEMENTS +66.25 DEG. AZ STEERING



KOE 16 X 10 TO THE INCH 0.7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

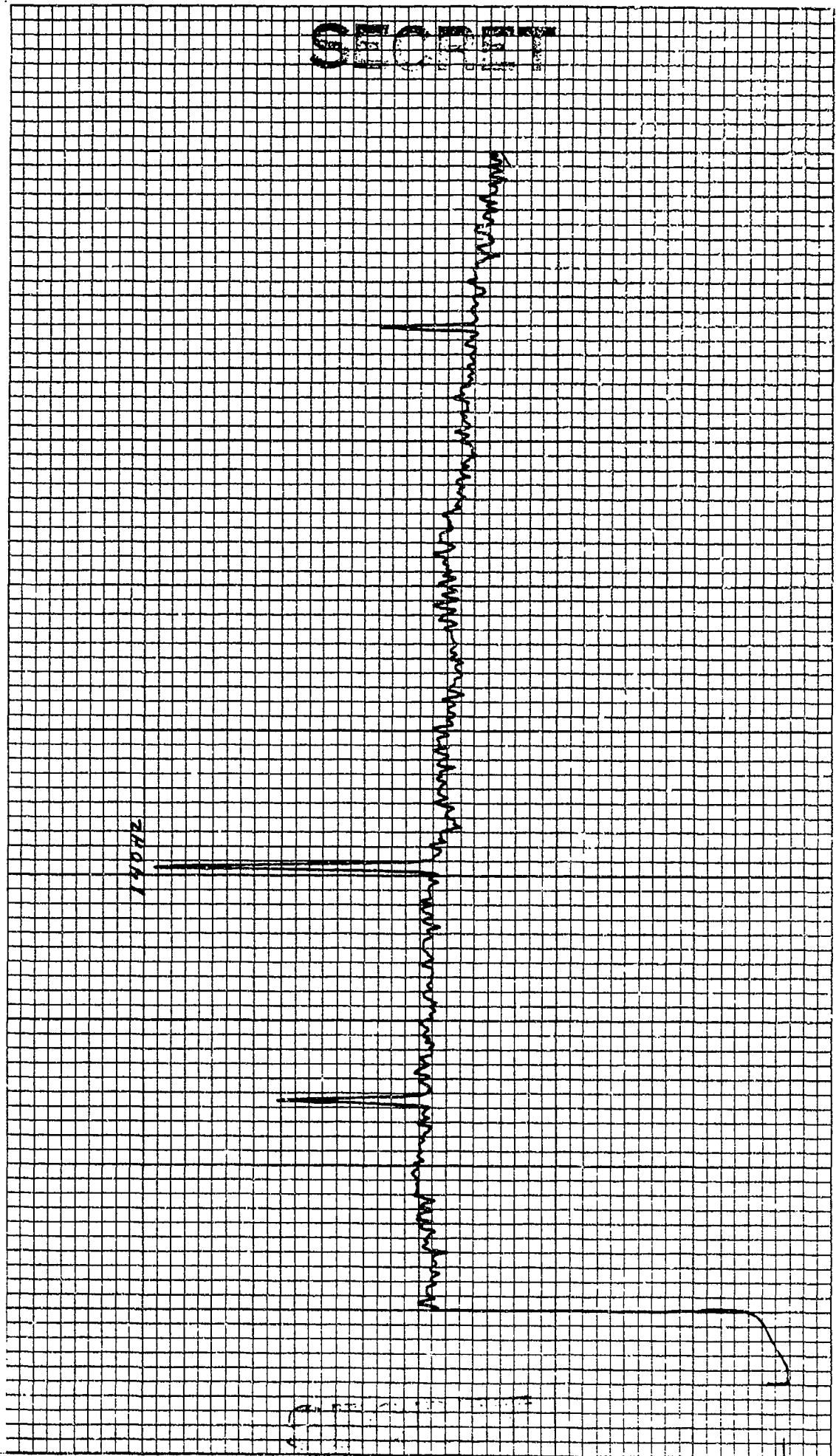
CONTROL: 062 - 32 (DP10) DATE OF ANALYSIS: REEL: M19 INDE X1637
 BEAMFORMED SPECTRUM (ELEMENTS) 1-648-264 29-35)
 EXERCISE: BEARING STAKE DATE/TIME: 3-6-77 - 0633Z INTEGRATION TIME 320 SECS ATEN: 70 DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
32 ELEMENTS 46.5 DEG. AZ STEERING



KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0702

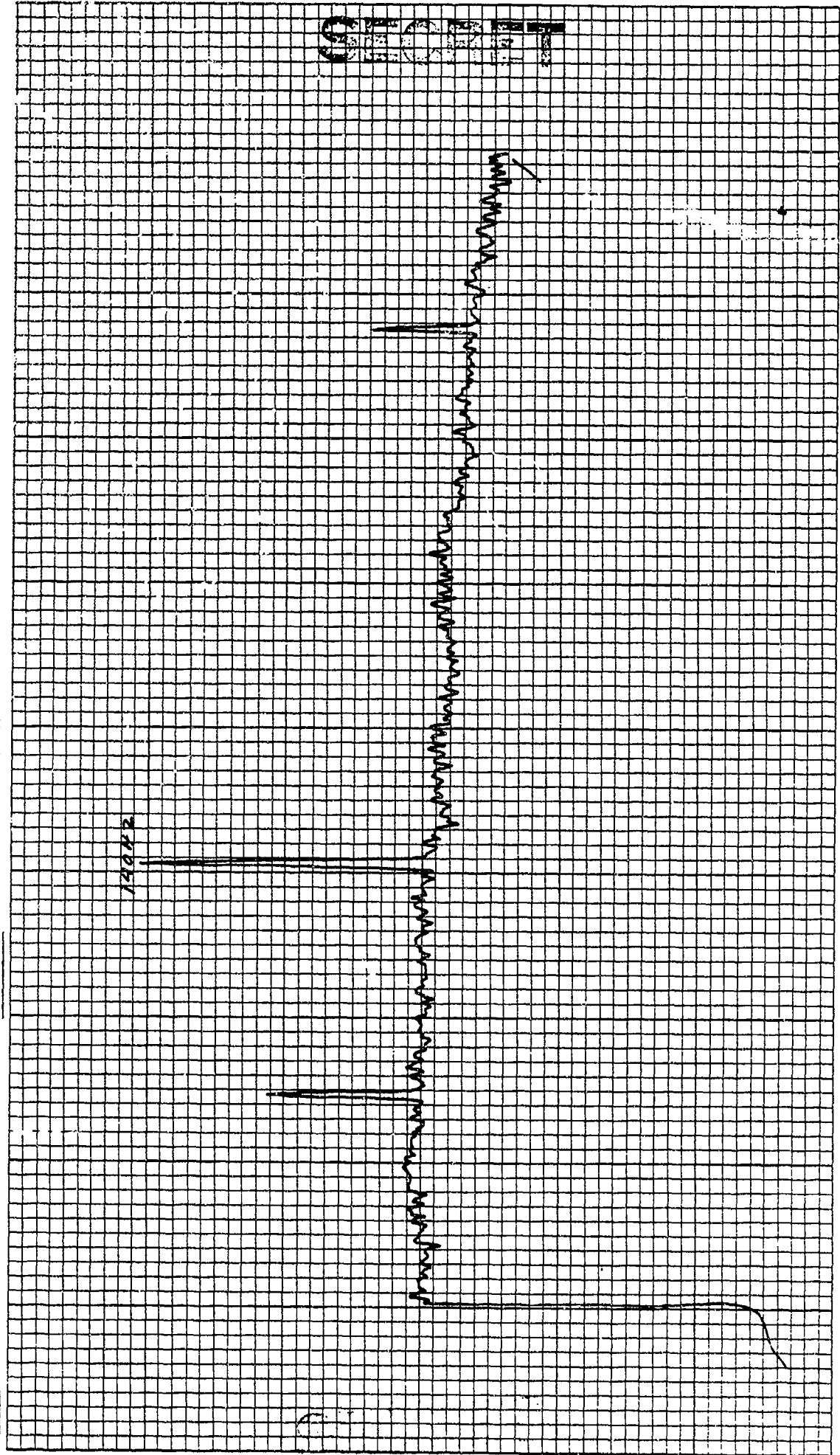
CONTROL: 0633 - 32 (DP10) DATE OF ANALYSIS: REEL: M19 INDE X 1637
BEAMFORMED SPECTRUM (ELEMENTS 1-6 & 8-26 & 28-35)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: -10 DB
32 ELEMENTS + 62 DEG. AZ STEERING FILTER WIG: HANNING



K-E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0633 - 32 (DP10) DATE OF ANALYSIS: REEL: M19 INDE X/637
BEAMFORMED SPECTRUM (ELEMENTS) 1-649-26888-35)
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 0633 Z INTEGRATION TIME 320 SECS ATTN: -70 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
32 ELEMENTS +62.5 DEG. AZ STEERING

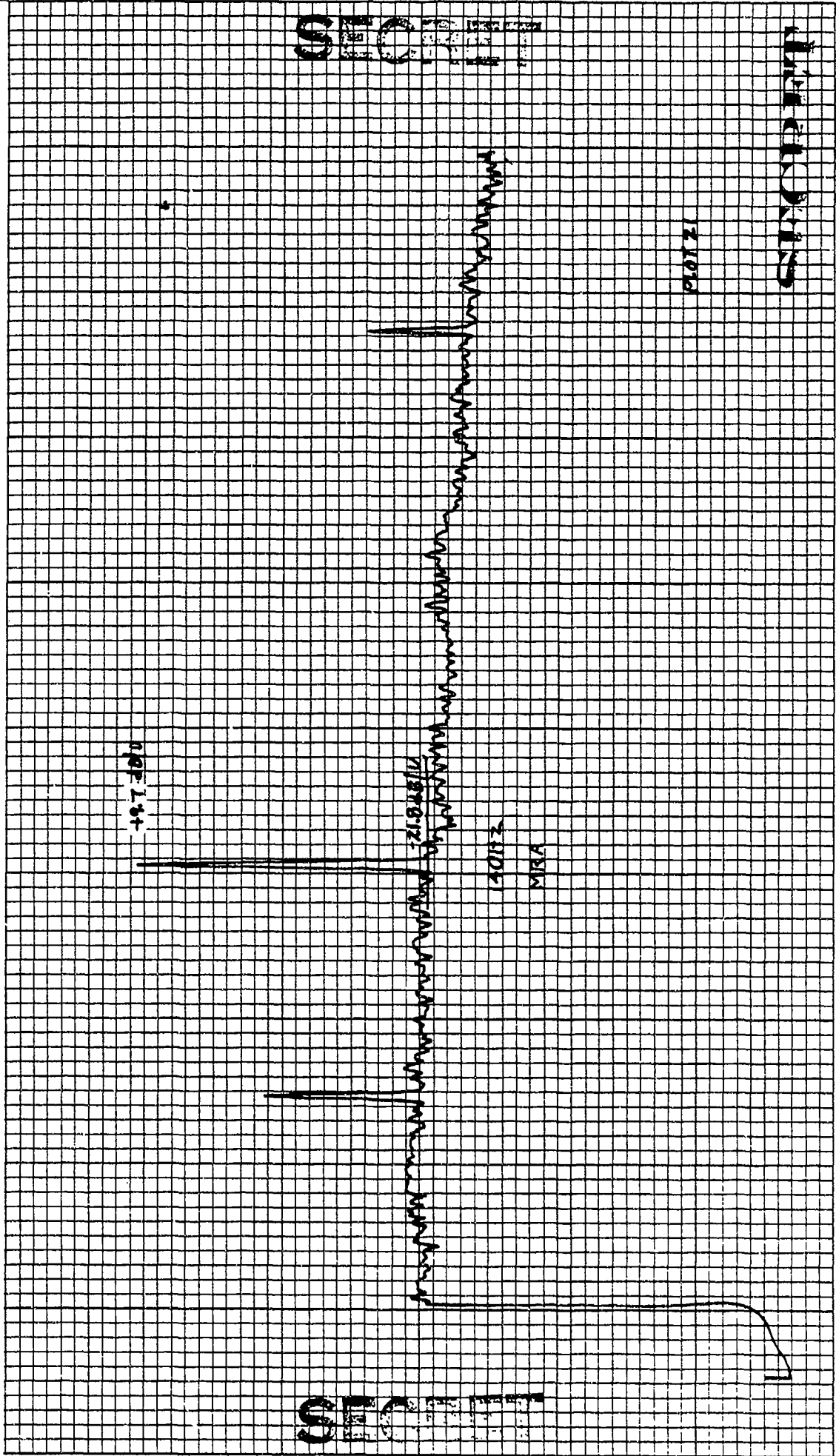


KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

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SECRET

CONTROL: 0633 - 49 (DP10) DATE OF ANALYSIS: _____ REEL: M19 INDE X 1637
 BEAMFORMED SPECTRUM (ELEMENTS 1706 97026 247035)
 EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 0633 Z INTEGRATION TIME 320 SECS ATTN: - DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
32 ELEMENTS 163.0 DEG. AZ STEERING



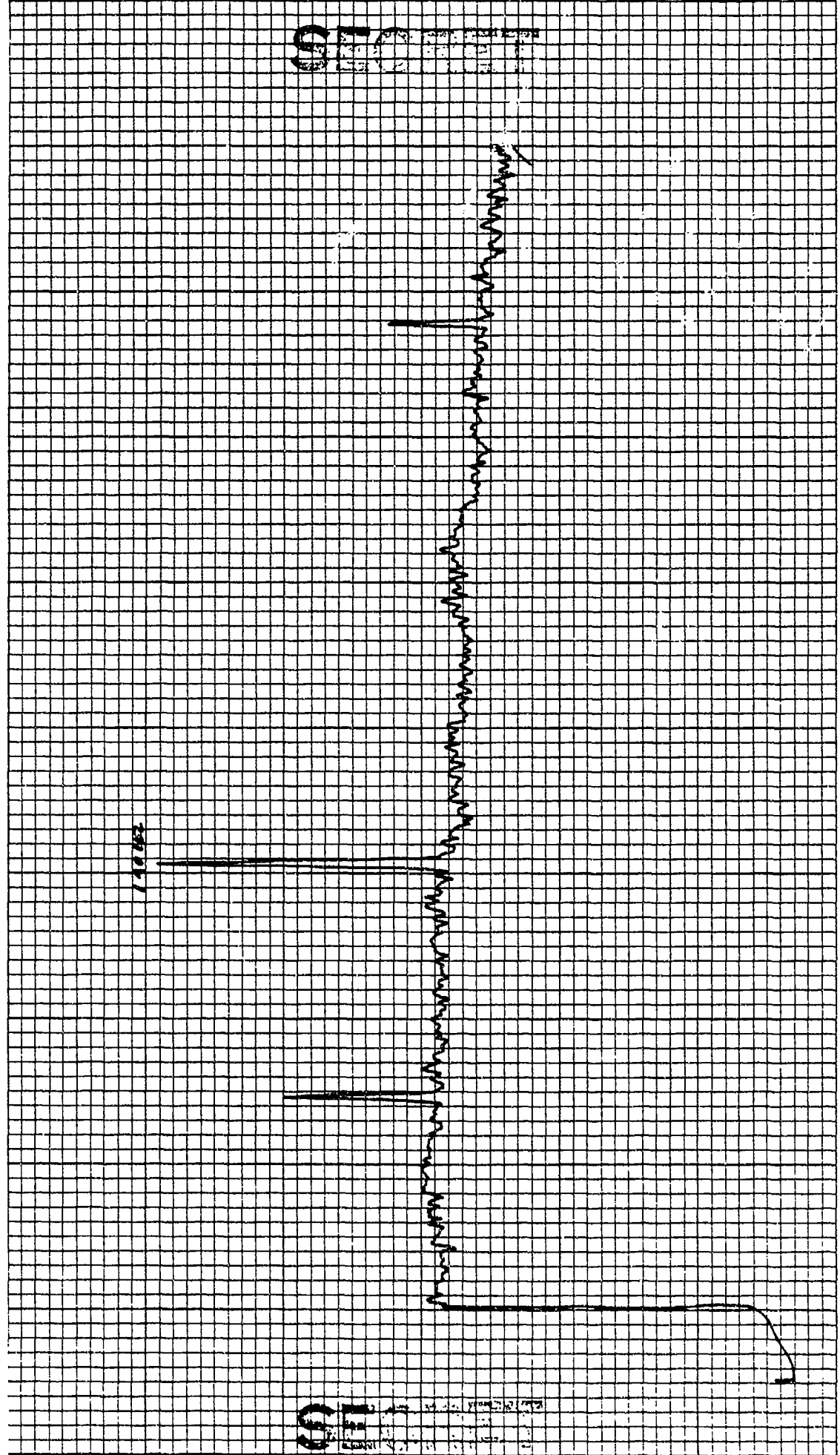
10Hz

100Hz

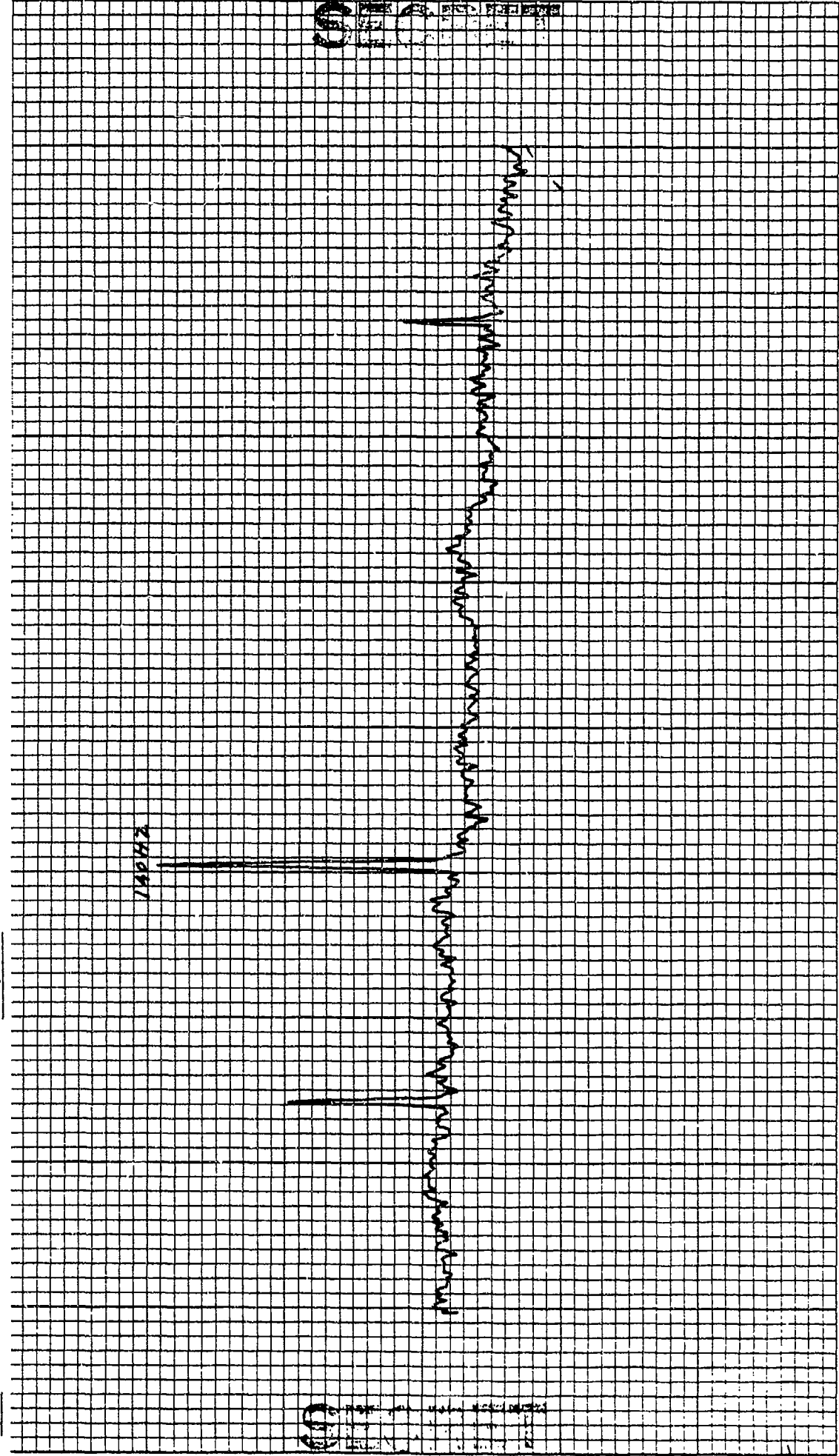
K-E 10 X 10 TO THE INCH 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

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CONTROL: 0633 - 32 (0810) DATE OF ANALYSIS: 1-24-56 REEL: M18 INDE X 1637
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE)
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: -18 DB
32 ELEMENTS 169 DEG. AZ STEERING FILTER WTG: HANNING



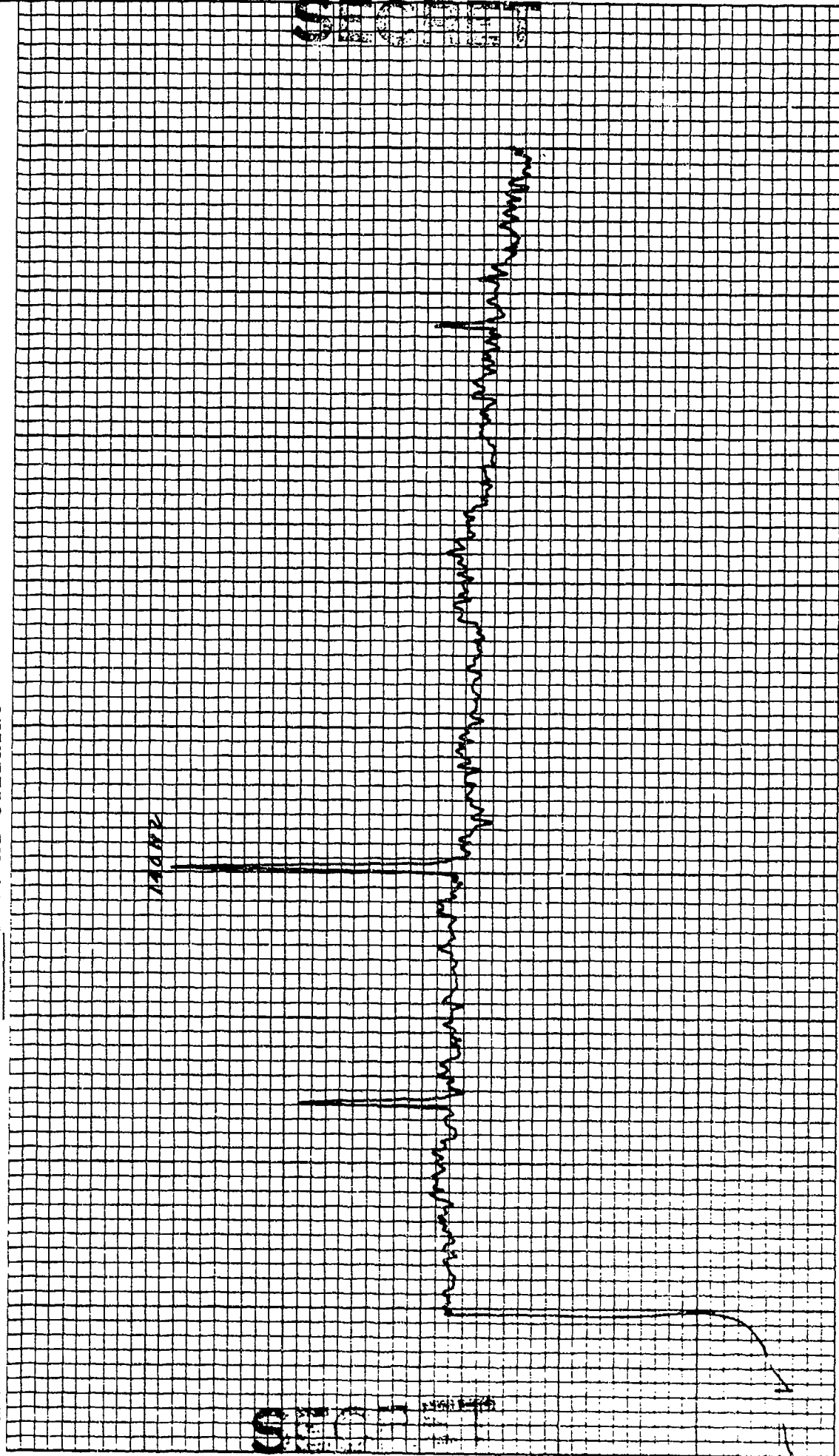
CONTROL: 0633-32 (DP16) DATE OF ANALYSIS: 1-6-89-26828-35 REEL: M19 INDE X: 1637
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-76-77 -0633 Z INTEGRATION TIME 320 SECS ATTN: 78 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 150 HZ 466 DEG. AZ STEERING



CONTROL: 0633 - 32 (DP10)
BEAMFORMED SPECTRUM (ELEMENTS 1-64 9-26 491-55)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS

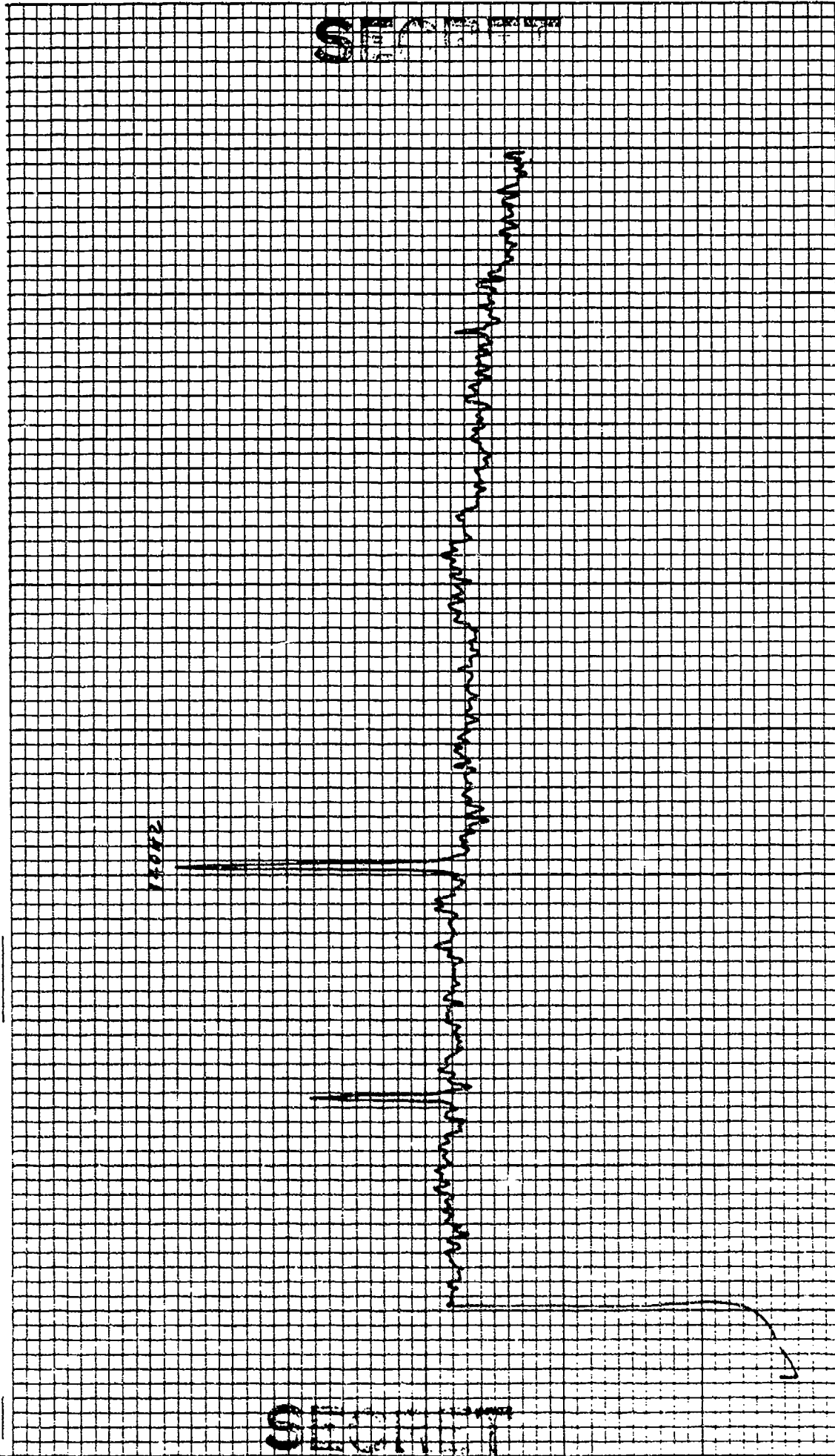
DATE OF ANALYSIS: - - - - -
DATE/TIME: 3-16-77 - 0633 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+ 60 DEG. AZ STEERING

REEL: M19 INDE X/637
INTEGRATION TIME 320 SECS ATTN: -10 DB
FILTER WTC: HANNING



CONTROL: 0633 - 32 (M10) DATE OF ANALYSIS:
BEAMFORMED SPECTRUM (ELEMENTS 1-649-26 + 89-35)
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 0633 Z
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ
32 ELEMENTS + 72 DEG. AZ STEERING

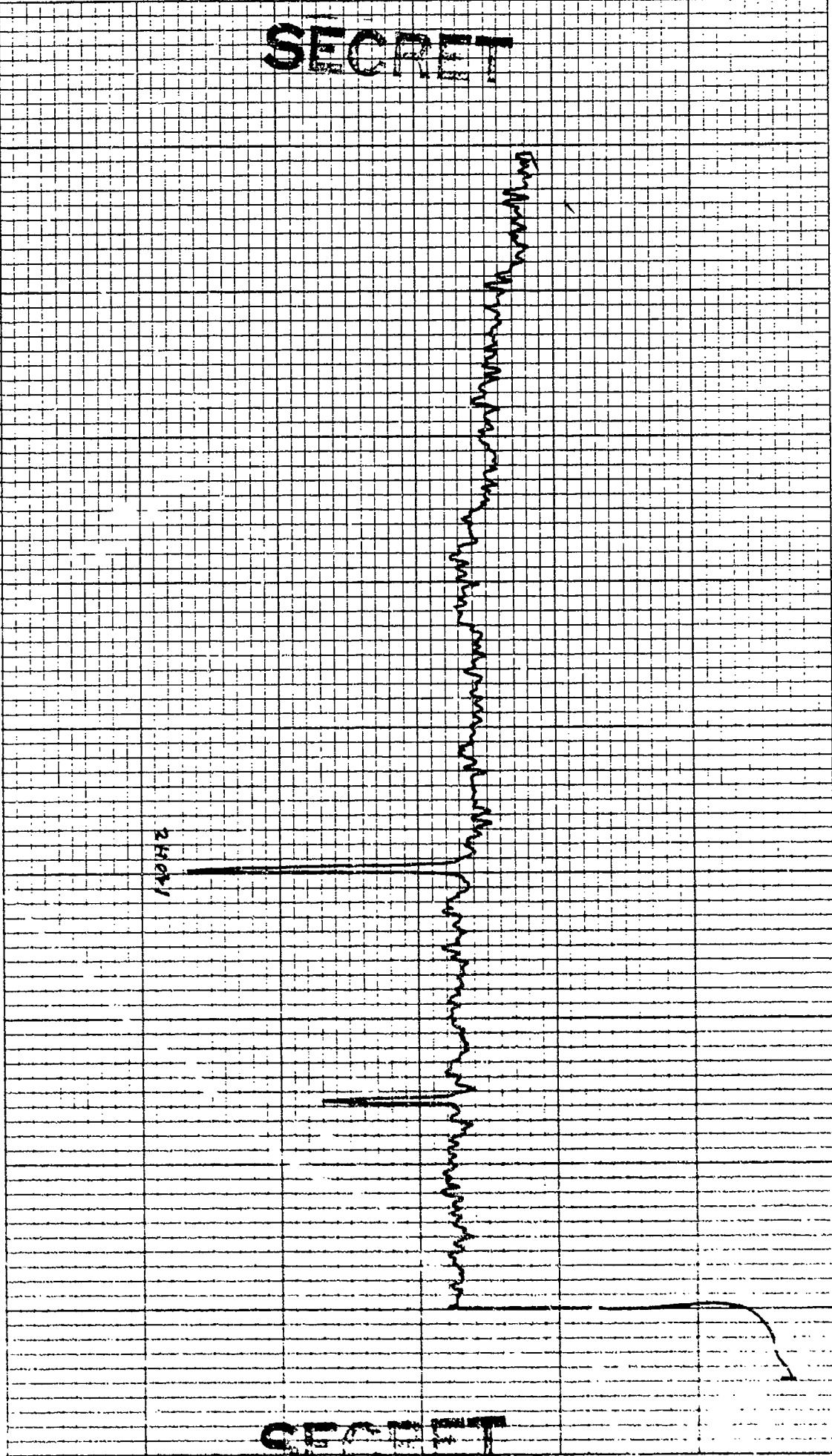
REEL: M19 INDE X 1637
INTEGRATION TIME 320 SECS ATTEN: -10 DB
FILTER WTG: HANNING



0633

0633

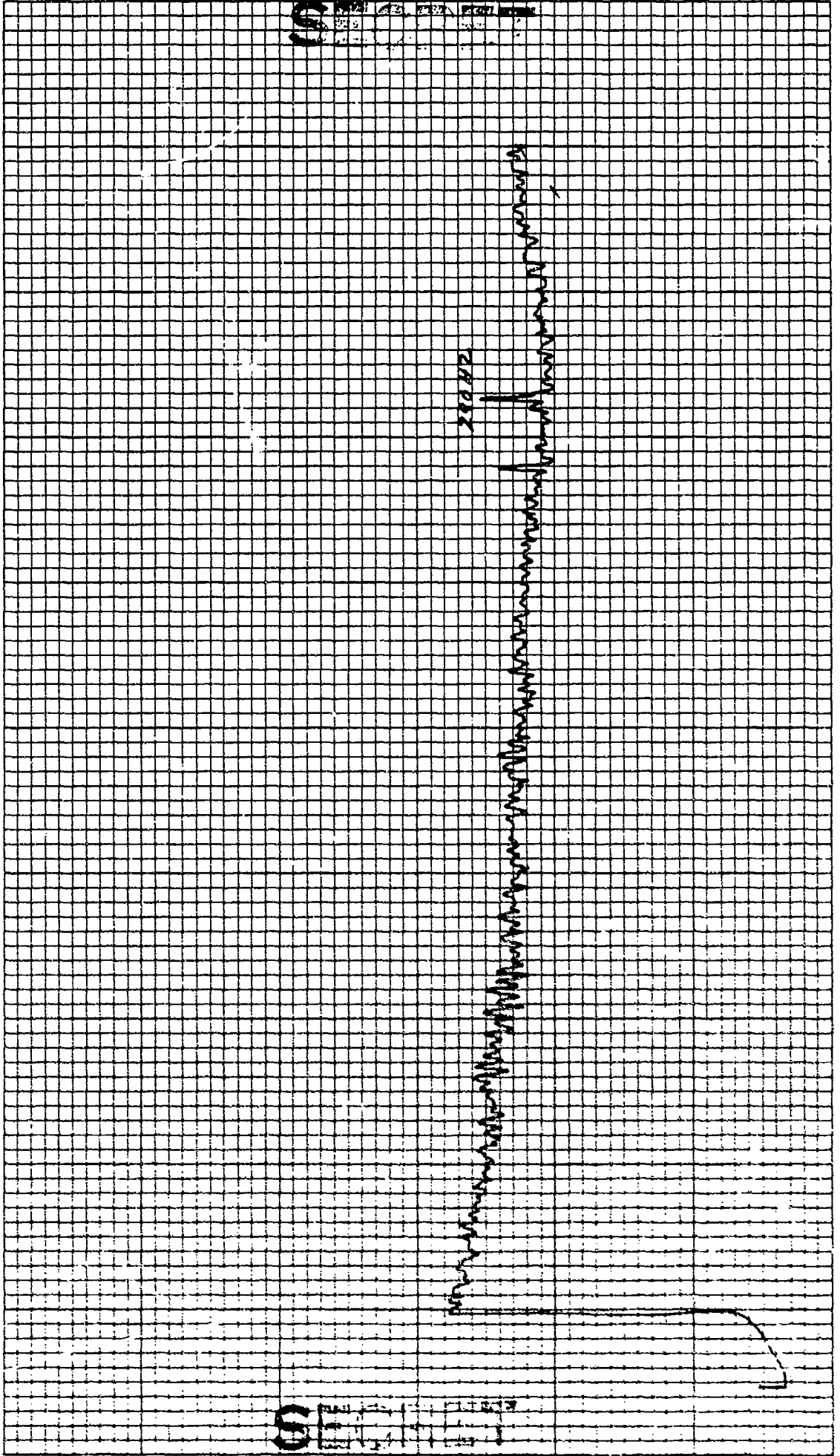
CONTROL: 0633 - 32 (0810) DATE OF ANALYSIS: 1-6-49-26 * 09-35 REEL: M19 INDE X 1677
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-76-77 - 0633 Z INTEGRATION TIME 320 SECS ATTN: -7# DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 CENTER FREQ: 150 HZ + 74 DEG. AZ STEERING



SECRET

SECRET

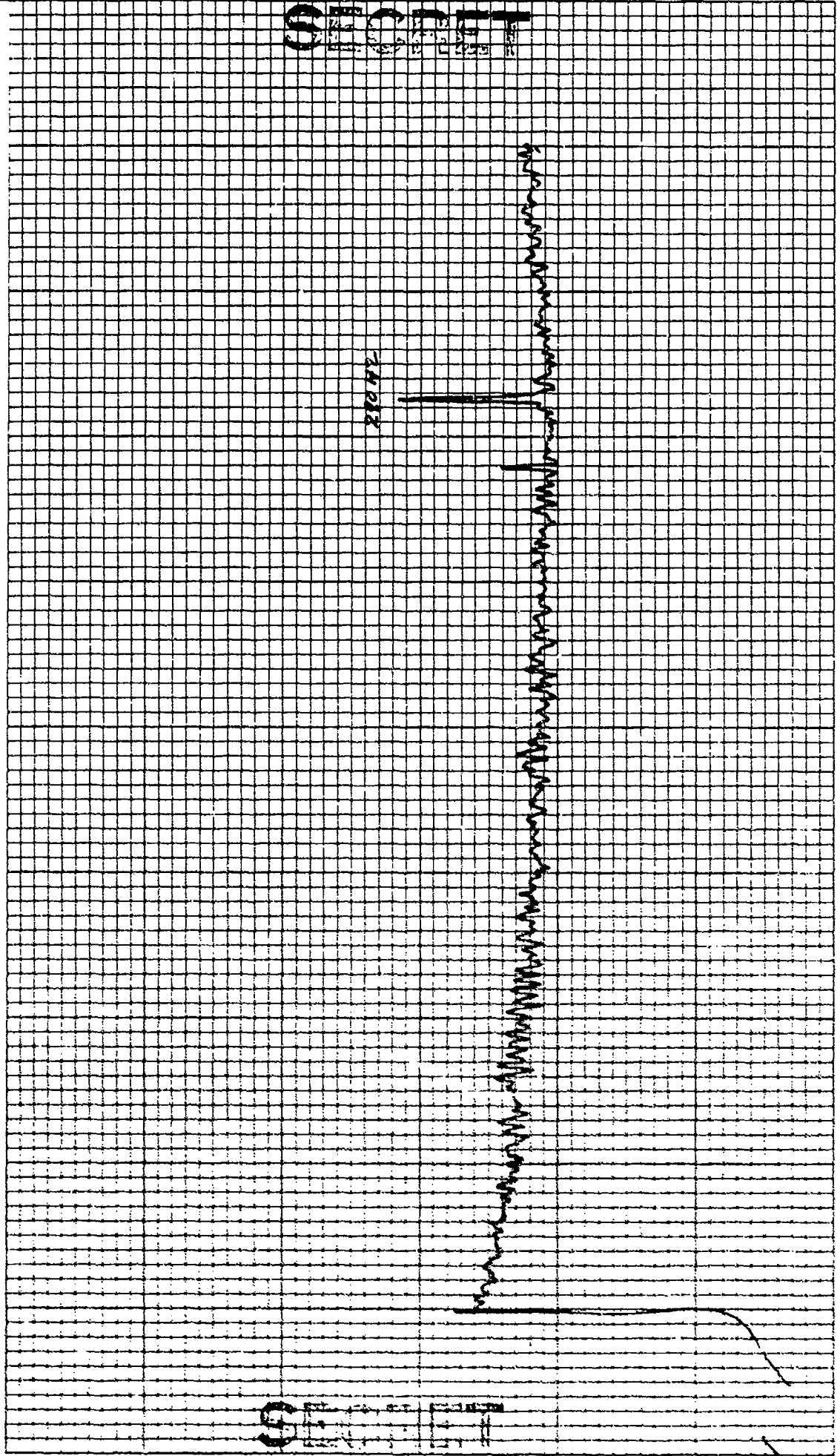
CONTROL: 0633 - 32 (DP10) DATE OF ANALYSIS: REEL: M19 INDE X 1637
 BEAMFORMED SPECTRUM (ELEMENTS) 1-6 8-26 488-35
 EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 0633Z INTEGRATION TIME 320 SECS ATTN: -10 DB
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
32 ELEMENTS +54 DEG. AZ STEERING



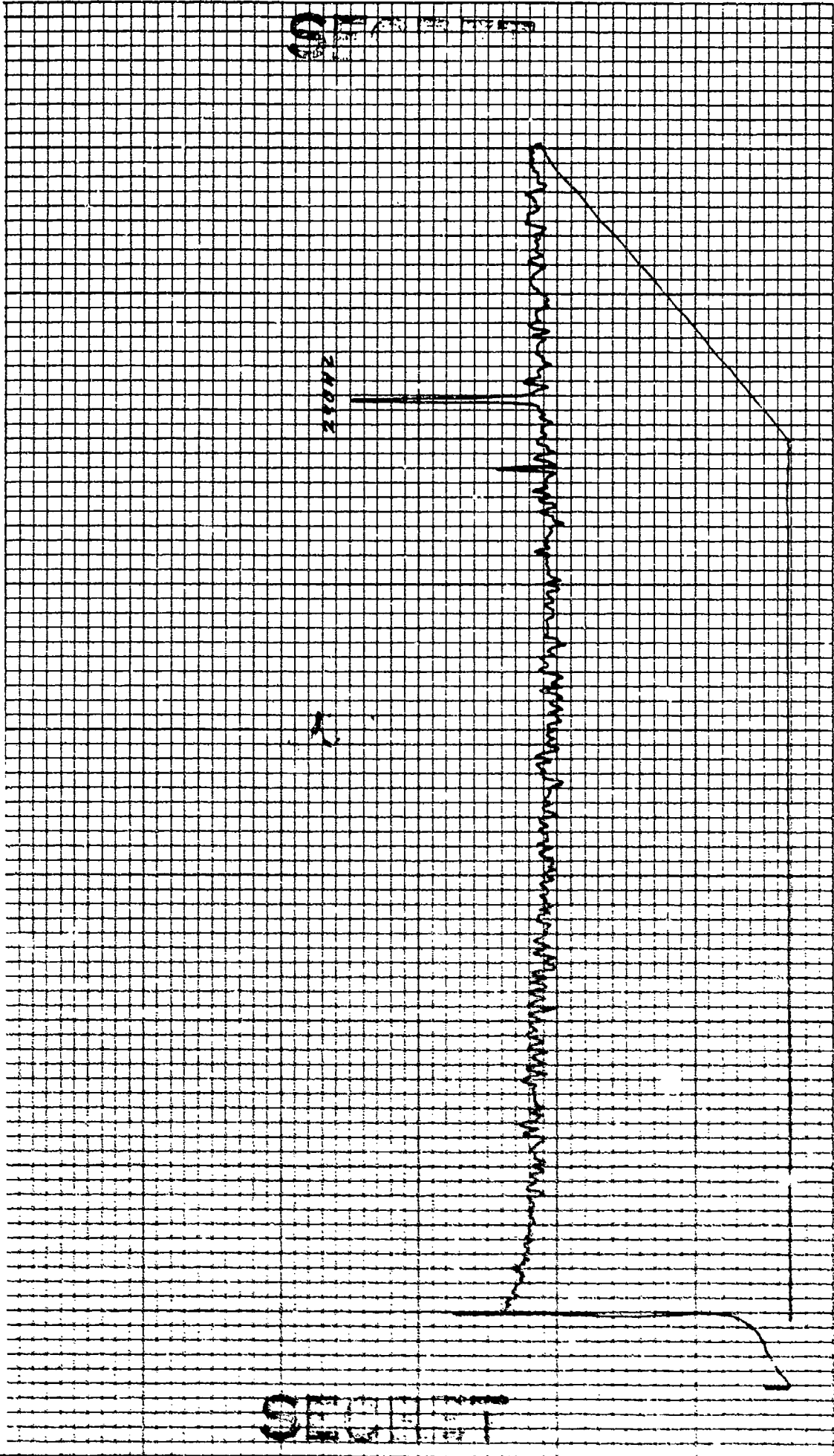
KOE 10 X 10 TO THE INCH 6.7 X 10 INCHES
NEUPPILL & LESER CO. MADE IN GERMANY

46 0703

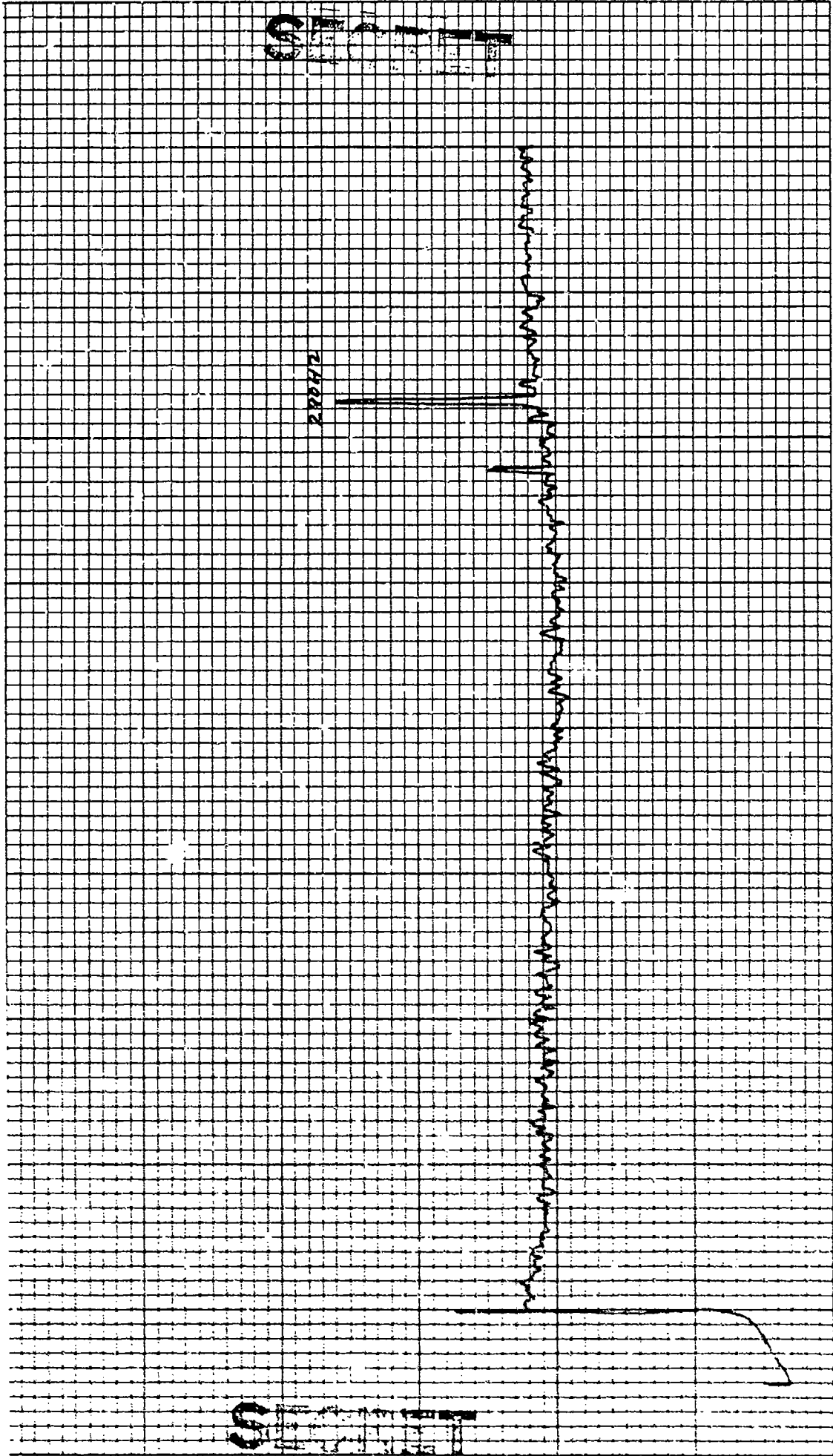
CONTROL: 0633 - 32 (DP10) DATE OF ANALYSIS: 1-6-69-268 28-35 REEL: M19 INDE X1637
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 37677-0633Z INTEGRATION TIME 320 SECS ATTN: -70 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 270 HZ +56 DEG. AZ STEERING



CONTROL: 0633 - 72 (DP10) DATE OF ANALYSIS: -- -- -- REEL: K19 INDE X1637
 BEAMFORMED SPECTRUM (ELEMENTS 1-6 & 9-26 & 29-35)
 EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: -18 DB
 CENTER FREQ: 270 HZ FILTER WTG: HANNING
32 ELEMENTS ANALYSIS BANDWIDTH: 1/10 HZ
+50 DEG. AZ STEERING



CONTROL: 0633 - 32 (2010) DATE OF ANALYSIS: 1-6-68 26 48-35 REEL: M19 INDE X 1637
UNFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-16-77 - 0633Z INTEGRATION TIME 320 SECS ATTN: 78 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 270 HZ 460 DEG. AZ STEERING

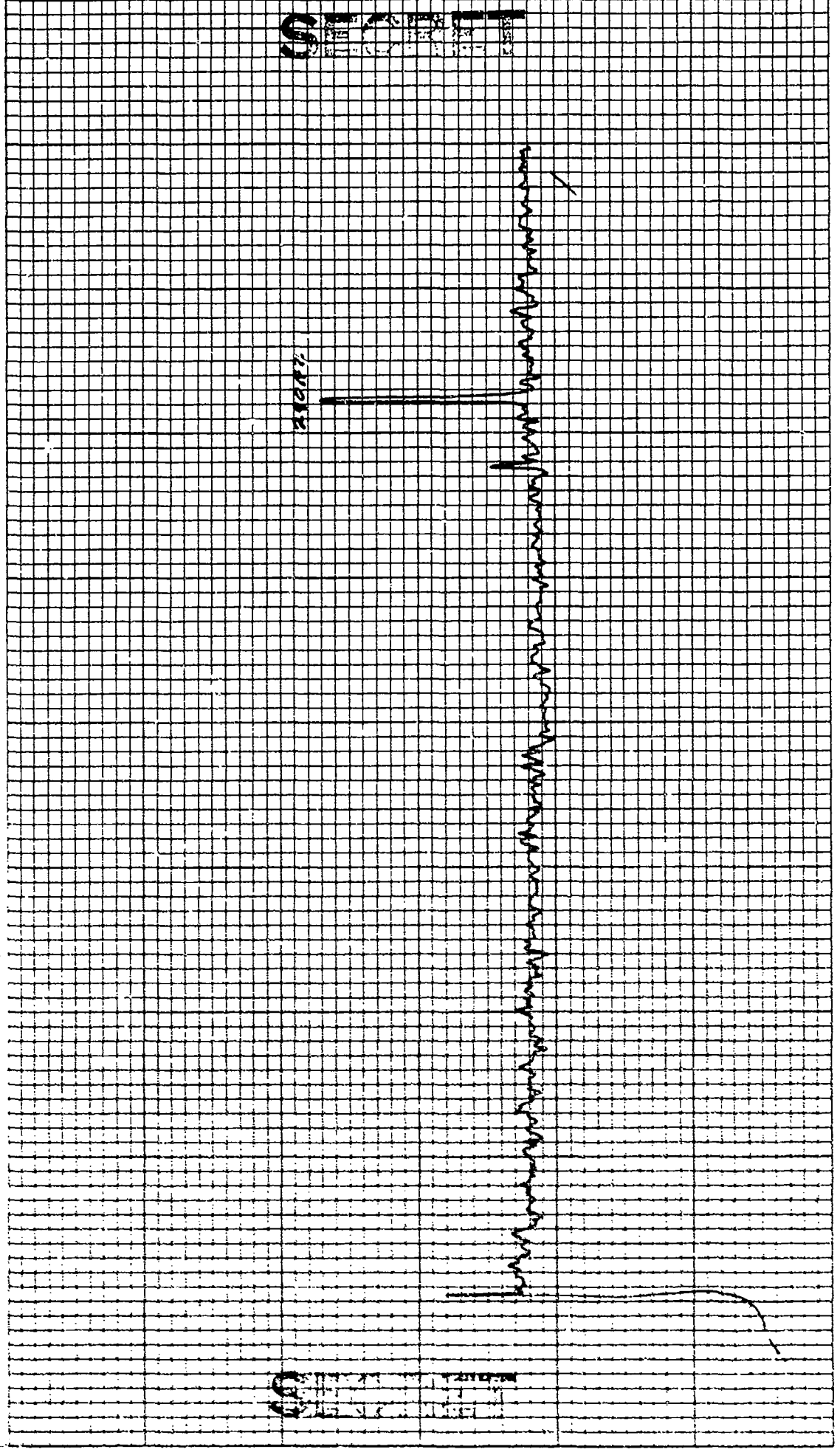


KOE 10 X 10 TO THE INCH. 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0633 - 32 (DP16) DATE OF ANALYSIS: - - - -
BEAMFORMED SPECTRUM (ELEMENTS) 1-68 2-26 4-08-35)
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 0633 Z
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ
32 ELEMENTS +61 DEG. AZ STEERING

REEL: M19 INDE X1637
INTEGRATION TIME 320 SECS ATTEN: -70 DB
FILTER WIG: HANNING

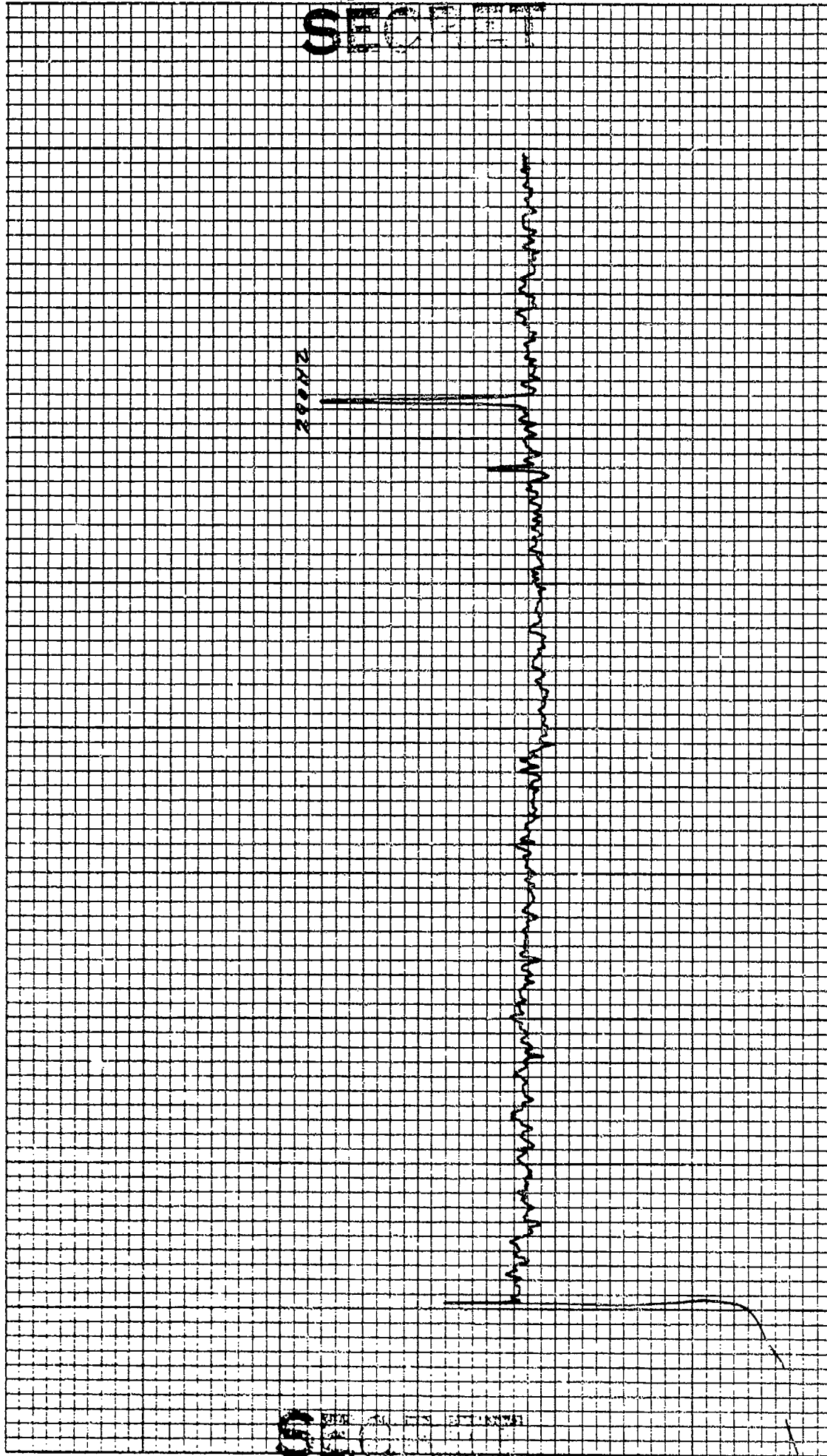


K-E 10 X 10 TO THE INCH • 7 X 10 INCHES
KUPPEL & FISHER CO. MADE IN U.S.A.

46 0703

CONTROL: 0077 - 32 (2010) DATE OF ANALYSIS: - - - -
BEAMFORMED SPECTRUM (ELEMENTS 1-6 & 8-26 & 28-35)
EXERCISE: BEARING STAKE DATE/TIME: 3-6-77 - 0033 Z
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ
32 ELEMENTS 1/105 DEG. AZ STEERING

REEL: M19 INDE X1677
INTEGRATION TIME 320 SECS ATTEN: -10 DB
FILTER WTG: HANNING

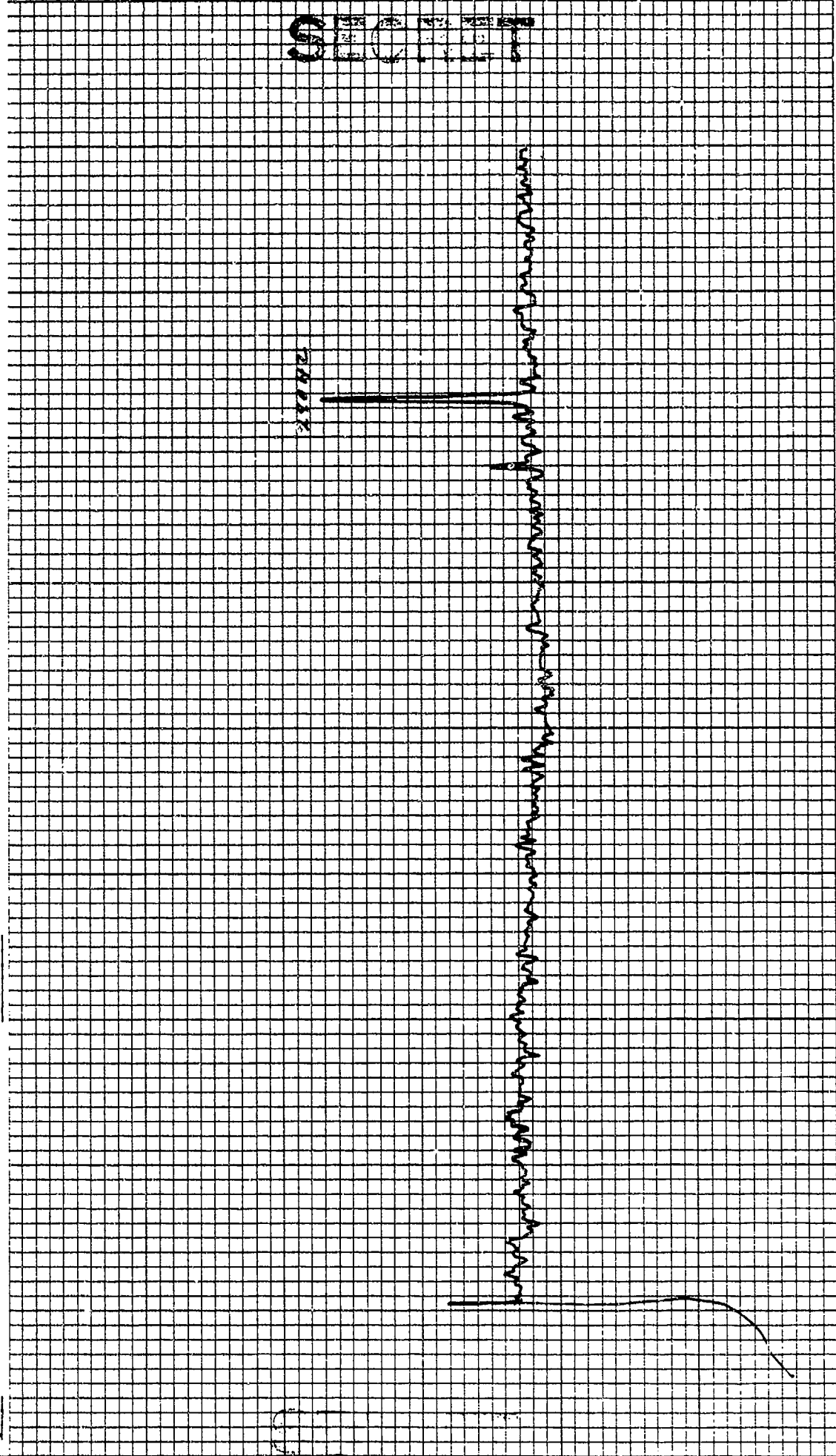


KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0633 - 32 (0810) DATE OF ANALYSIS: - - - -
BEAMFORMED SPECTRUM (ELEMENTS 1-6 48-26 4 28-35)
EXERCISE: BEARING STAKE DATE/TIME: 3-76-97 - 0633 Z
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ
32 ELEMENTS +66.5 DEG. AZ STEERING

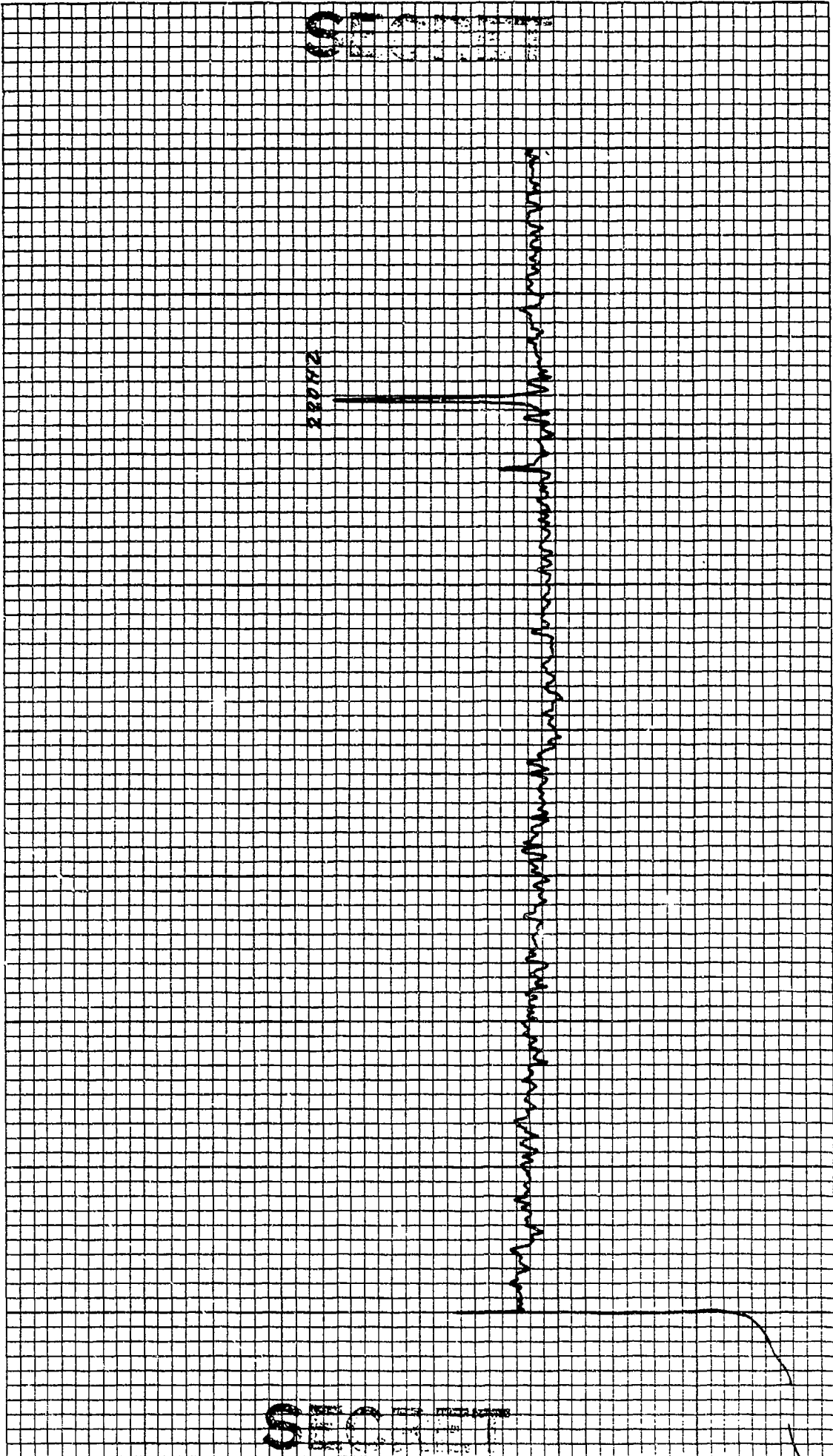
REEL: 1819 INDE X1637
INTEGRATION TIME 320 SECS ATTN: 10 DB
FILTER HANNING WTC: HANNING



K•E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

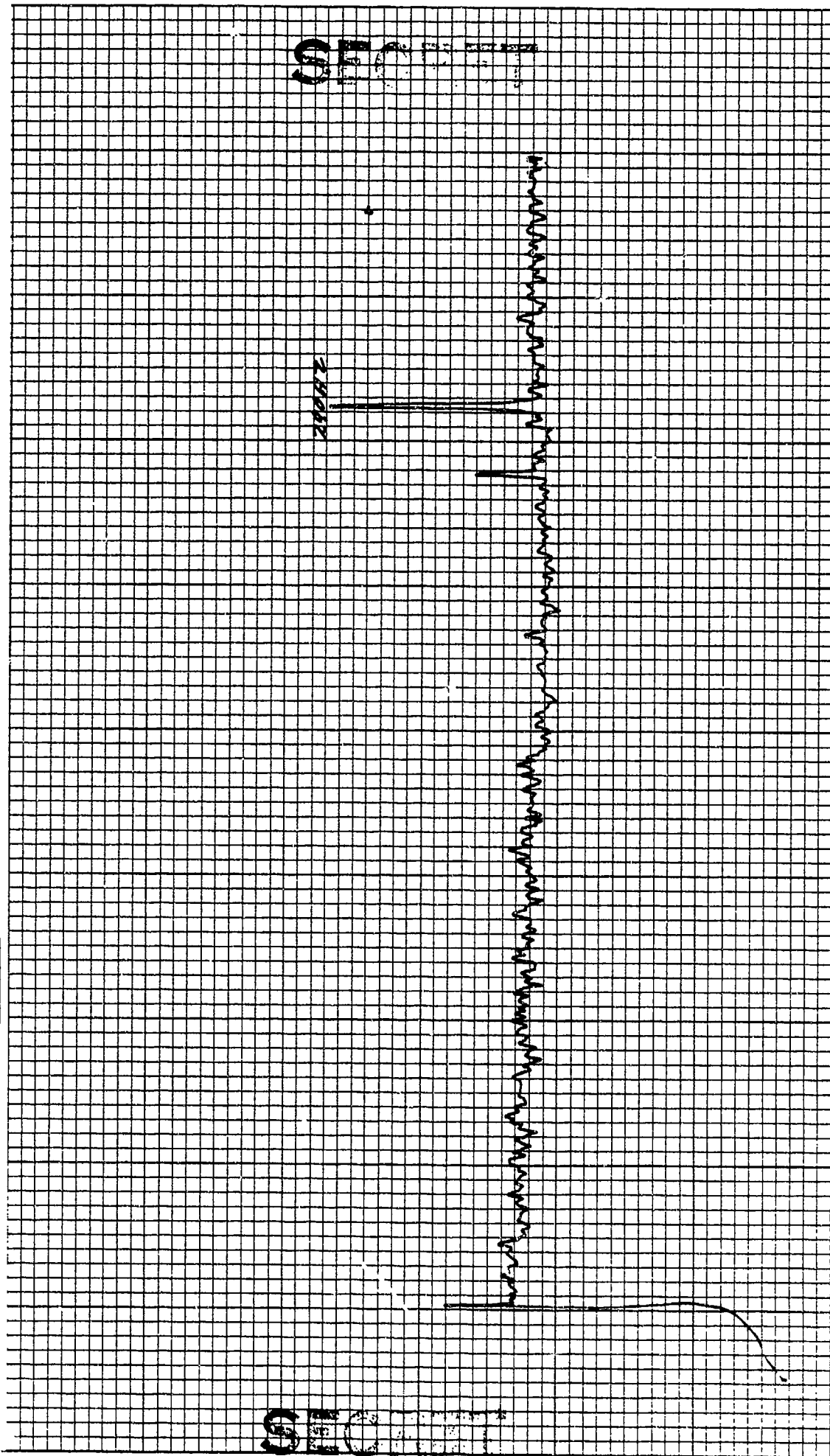
CONTROL: 0633 - 32 (D16) DATE OF ANALYSIS: 1-6-89-26 X 88-35 REEL: M19 INDE X032
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 376-77 - 00.33 Z INTEGRATION TIME 320 SECS ATTEN: -18 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 270 HZ 62 DEG. AZ STEERING



K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0633-32 (DP10) DATE OF ANALYSIS: 1-6-86 (29-35) REEL: M19 INDE X1637
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-16-77 - 0633 Z INTEGRATION TIME 320 SECS ATTN: -70 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 270 HZ +62.5 DEG. AZ STEERING



KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

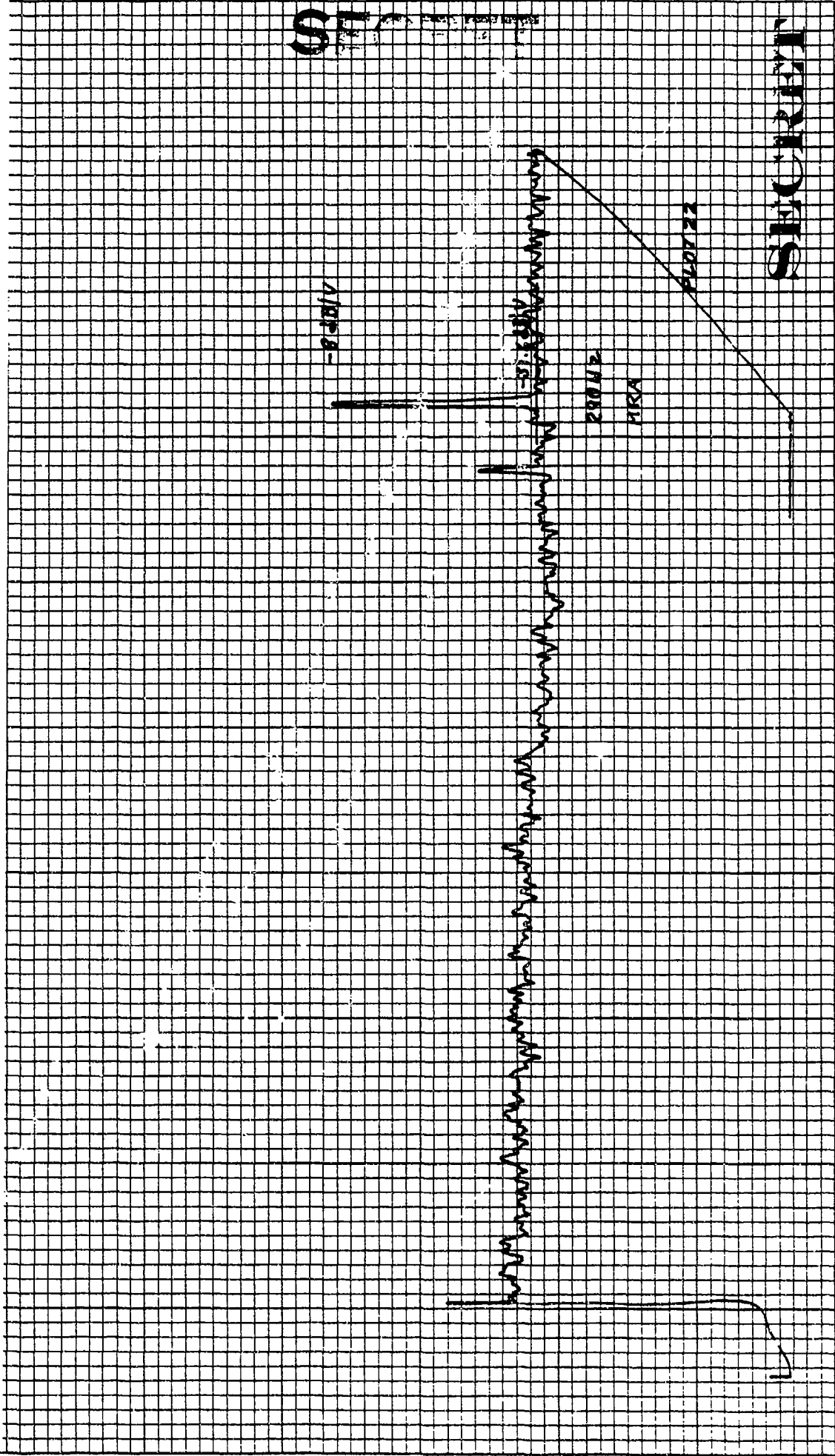
46 0703

SECRET

CONTROL: 0633 - 49 (DP10) DATE OF ANALYSIS: _____
BEAMFORMED SPECTRUM (ELEMENTS 1706 97026 297035)
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 0633 Z
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ
32 ELEMENTS 163.0 DEG. AZ STEERING

REEL: M19 INDE X/677

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING



232 Hz

270 Hz

308 Hz

SECRET

K-E 10 X 10 TO THE INCH • 7 X 10 INCHES
REUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

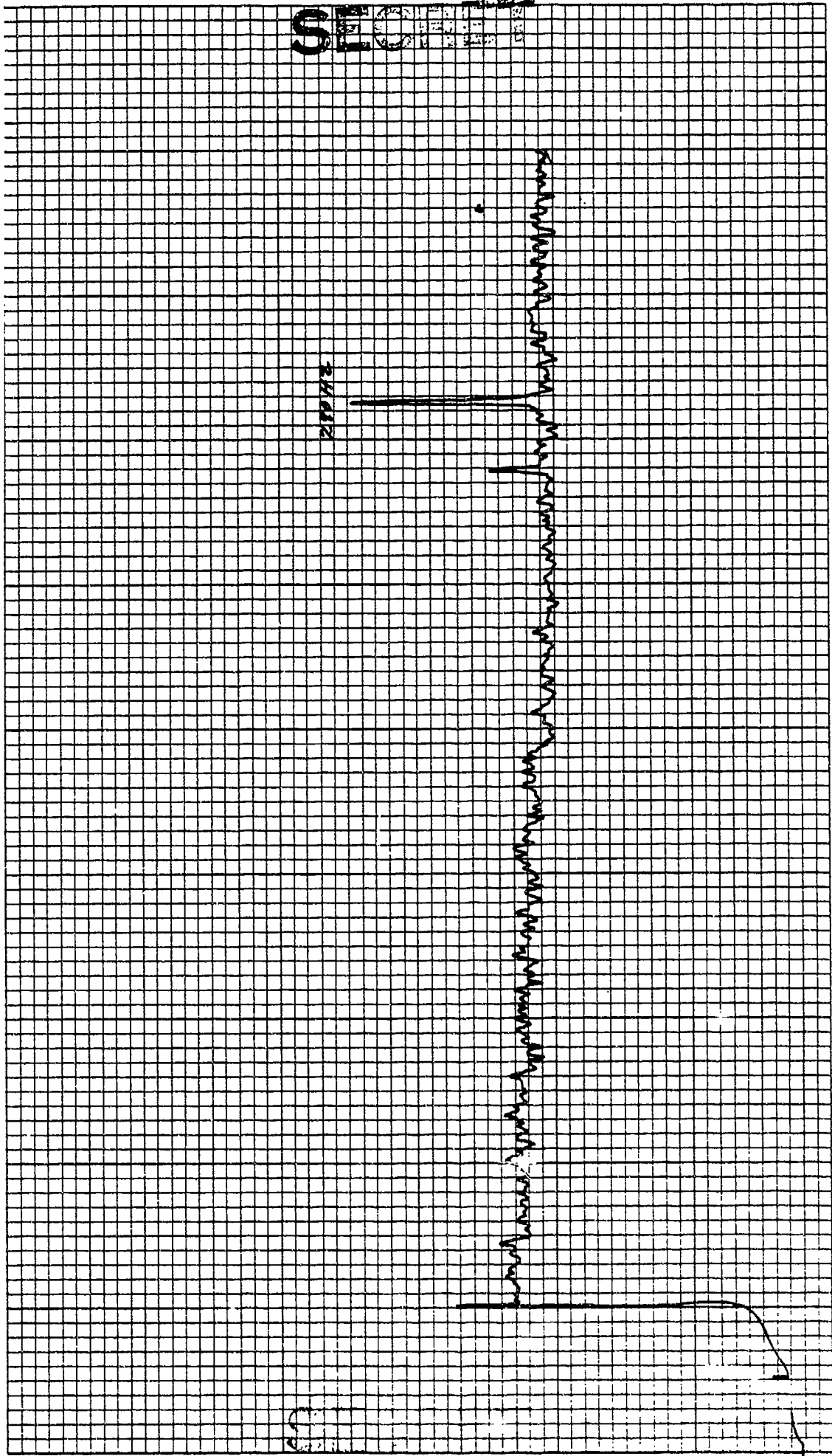
CONTROL: 0633 - 32 (DP10) REEL: M19 INDE X/637

BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-6-49-26 & 28-35

EXERCISE: BEARING STAKE DATE/TIME: 3-6-77 - 0633 Z INTEGRATION TIME 320 SECS ATTN: -10 DB

CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING

32 ELEMENTS +64 DEG. AZ STEERING

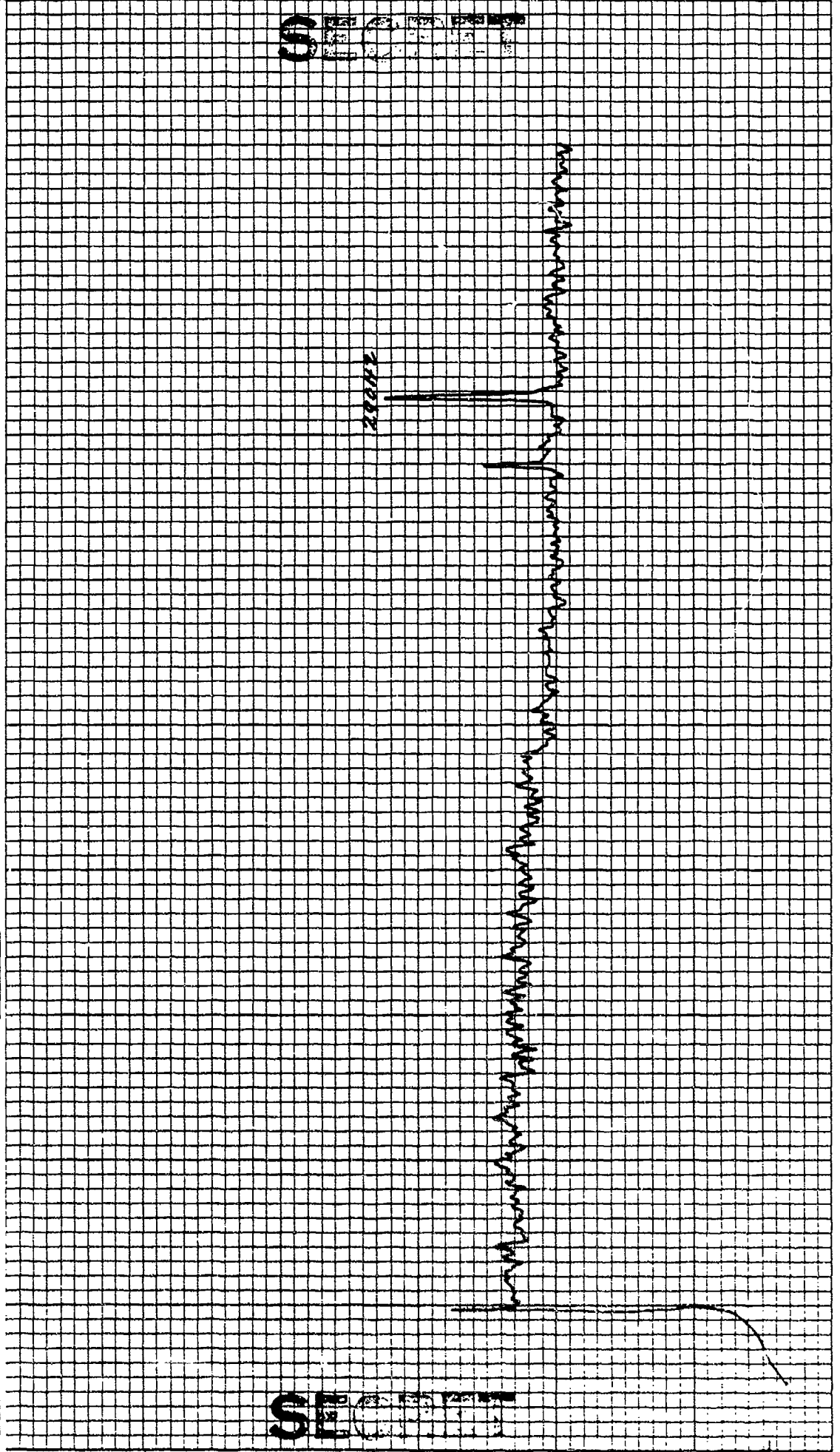


SECRET

KOE 16 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0633 - 32 (DPI0) DATE OF ANALYSIS: ---
BEAMFORMED SPECTRUM (ELEMENTS 1-6 of 8-26 of 28-35)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS
REEL: M18 INDE X 1637
INTEGRATION TIME 320 SECS ATTEN: -10 DB
FILTER WTG: HANNING
ANALYSIS BANDWIDTH: 1/10 HZ
+66 DEG. AZ STEERING



KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0633-32 (0910) DATE OF ANALYSIS: 1-6-68 REEL: M19 INDE X 1637
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-16-77-0233 Z INTEGRATION TIME 320 SECS ATTN: 7/8 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 CENTER FREQ: 270 HZ 168 DEG. AZ STEERING

SECRET

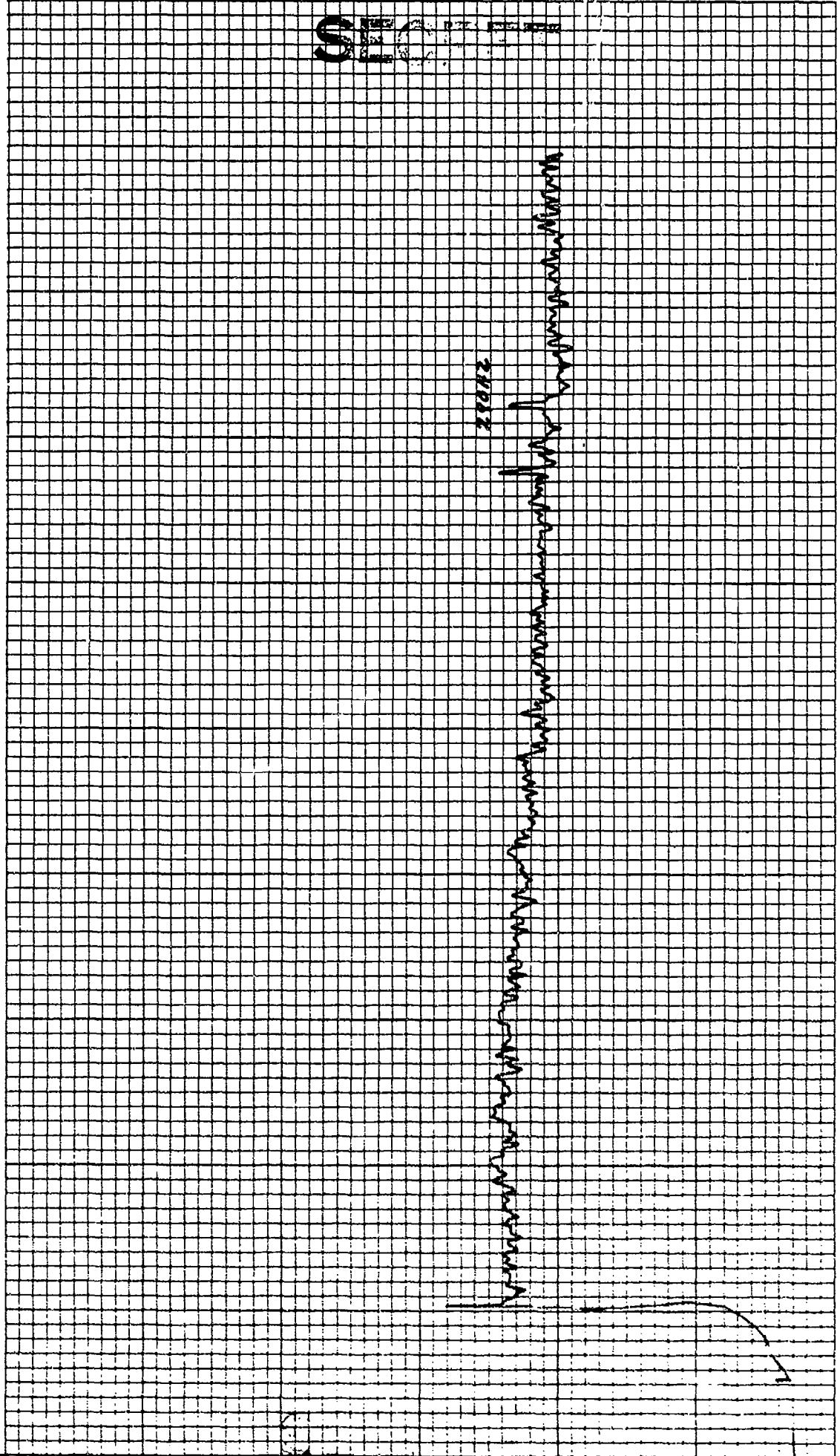
29072

[Handwritten scribbles and lines across the grid]

KOE 10 X 10 TO THE INCH .7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0633 - 32 (DP10) DATE OF ANALYSIS: 1-08-77 (08-35) REEL: M19 INDE X1677
BEAMFORMED SPECTRUM (ELEMENTS) EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTEN: 10 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
32 ELEMENTS + 72 DEG. AZ STEERING



SECRET

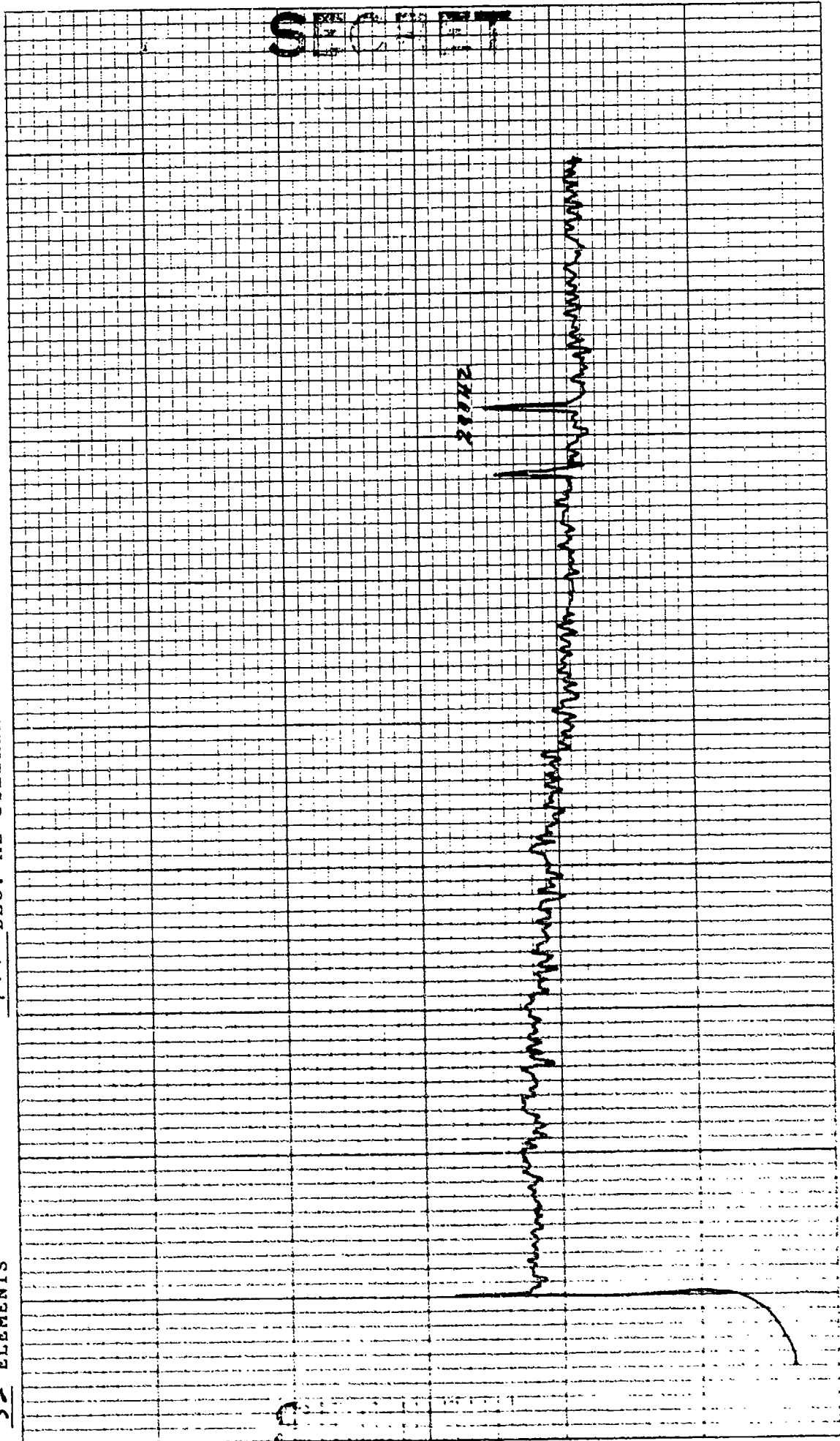
CONTROL: 0633 - 32 (DP10)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-6 29-26 29-75
DATE/TIME: 3-16-77 - 0633Z
ANALYSIS BANDWIDTH: 1/10HZ
+74 DEG. AZ STEERING

REEL: M19
INTEGRATION TIME 320 SECS
FILTER WTC: HANNING

INDE X/637

ATTEN: -10 DB



SECRET

~~CONFIDENTIAL~~

SIGNAL LEVEL AND SNR
CALCULATIONS

DATA POINT 10

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 49

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-21.6</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-11.6
BEAMFORMER GAIN	<u>+24</u>	+12.4 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	+12.6 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-54.4</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-44.4
BEAMFORMER GAIN	<u>+24</u>	-20.4 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR	<u>+12.6</u>	
SIGNAL LEVEL FOR SNR	<u>-20.4</u>	33.0
PROCESSOR CORRECTION	<u>-4.0</u>	29.0
MRA CORRECTION	<u>+ .2</u>	29.2 SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	21.0 SNR 1 HZ BAND

~~CONFIDENTIAL~~

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 10

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 49

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-39.0</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-29.0
BEAMFORMER GAIN	<u>+24</u>	-5.0 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .9</u>	-4.1 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-64.1</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-54.1
BEAMFORMER GAIN	<u>+24</u>	-30.1 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR	<u>-5.0</u>	
SIGNAL LEVEL FOR SNR	<u>-30.1</u>	25.1
PROCESSOR CORRECTION	<u>-4.0</u>	21.1
MRA CORRECTION	<u>+ .9</u>	22.0 SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	13.8 SNR 1 HZ BAND

CONFIDENTIAL

DATA POINT 10

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-23.3</u>	<u>-38.0</u>	<u> </u>
MRA SIGNAL LEVEL	<u>+12.6</u>	<u>-4.1</u>	<u> </u>
ARRAY SIGNAL GAIN	<u>35.9</u>	<u>33.9</u>	<u> </u>
20 LOG <u>49</u>	<u>33.8</u>	<u>33.8</u>	<u> </u>
# of elements			
DIFFERENCE	<u>+2.1</u>	<u>+ .1</u>	<u> </u>

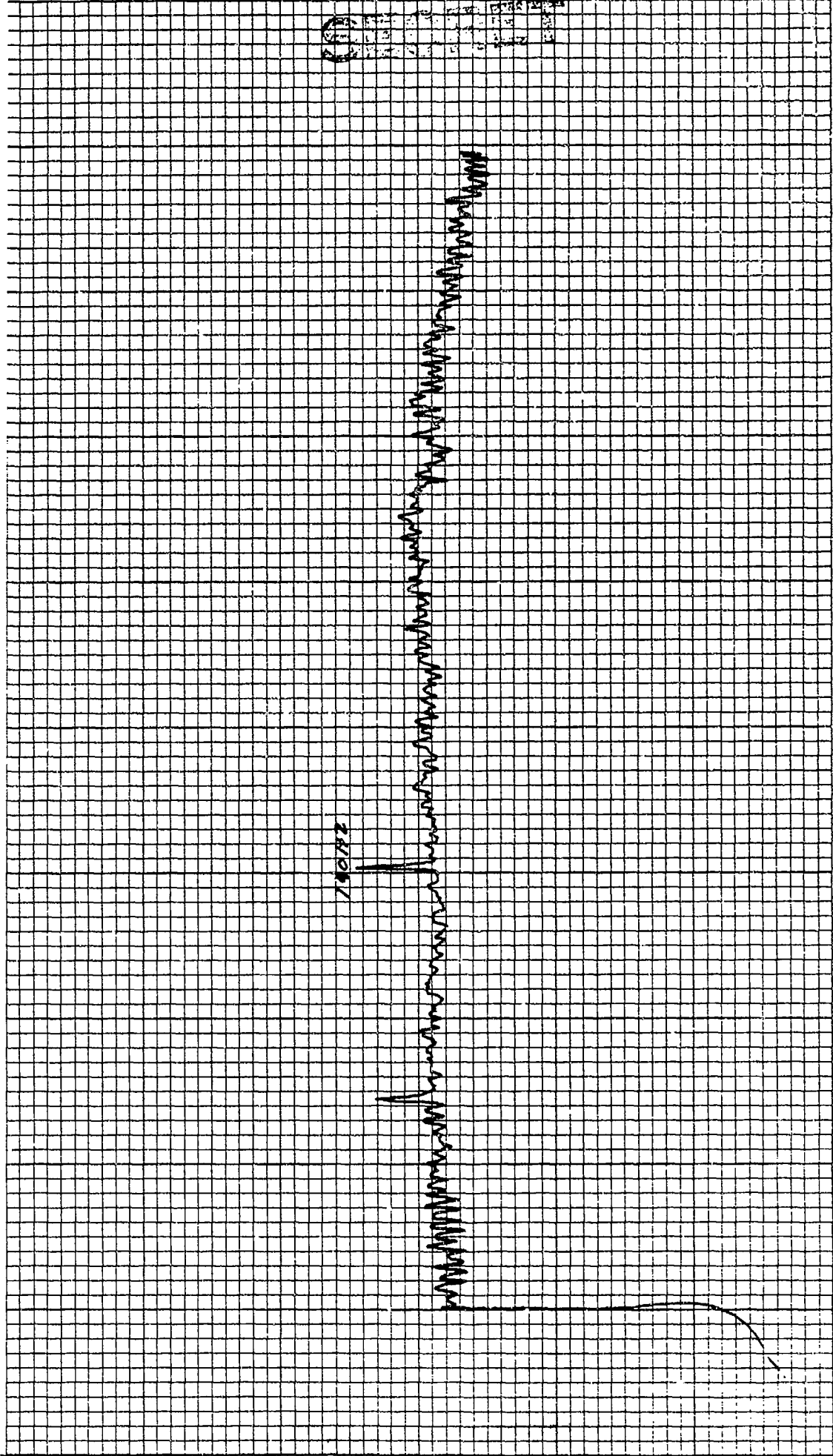
ARRAY GAIN

MRA SNR	<u>29.2</u>	<u>22.0</u>	<u> </u>
MEAN OMNI SNR	<u>18.7</u>	<u>8.4</u>	<u> </u>
ARRAY GAIN	<u>10.5</u>	<u>12.6</u>	<u> </u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>12.4</u>	<u>15.0</u>	<u> </u>
DIFFERENCE	<u>-1.9</u>	<u>-2.4</u>	<u> </u>

KΣ 10 X 10 TO THE INCH • 7 X 10 INCHES
HEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0633 - 49 (DP10) REEL: 419 INDE X1637
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-6-8-26 4 08-53 ATEN: 24 DB
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 0633 Z FILTER WTG: HANNING
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ
49 ELEMENTS 154 DEG. AZ STEERING



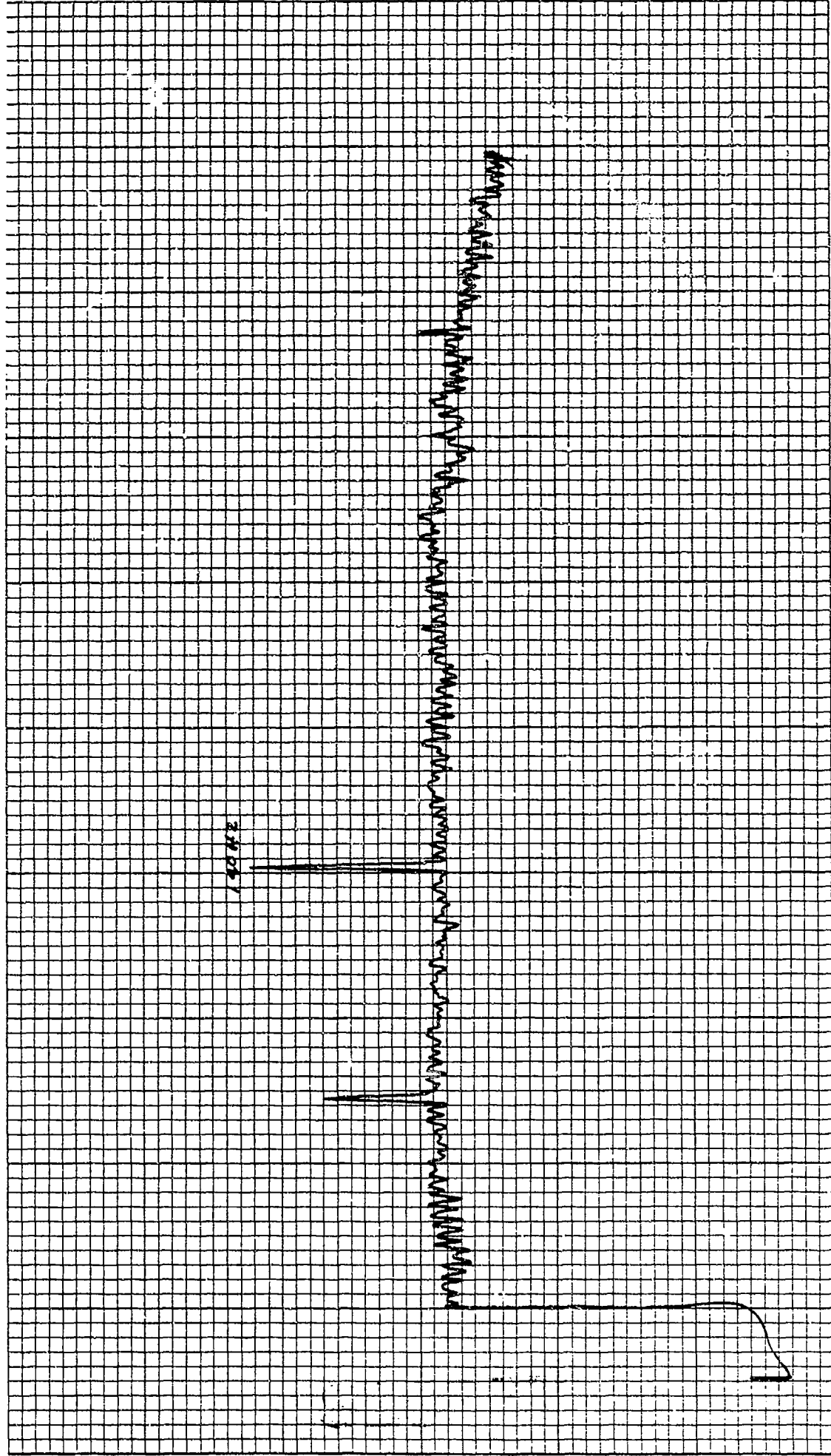
KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

45 0703

CONTROL: 0633 - 49 (DP10)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
19 ELEMENTS

DATE OF ANALYSIS: 1-6-69-26 (88-53)
DATE/TIME: 3-16-77 - 0633Z
ANALYSIS BANDWIDTH: 1/10HZ
156 DEG. AZ STEERING

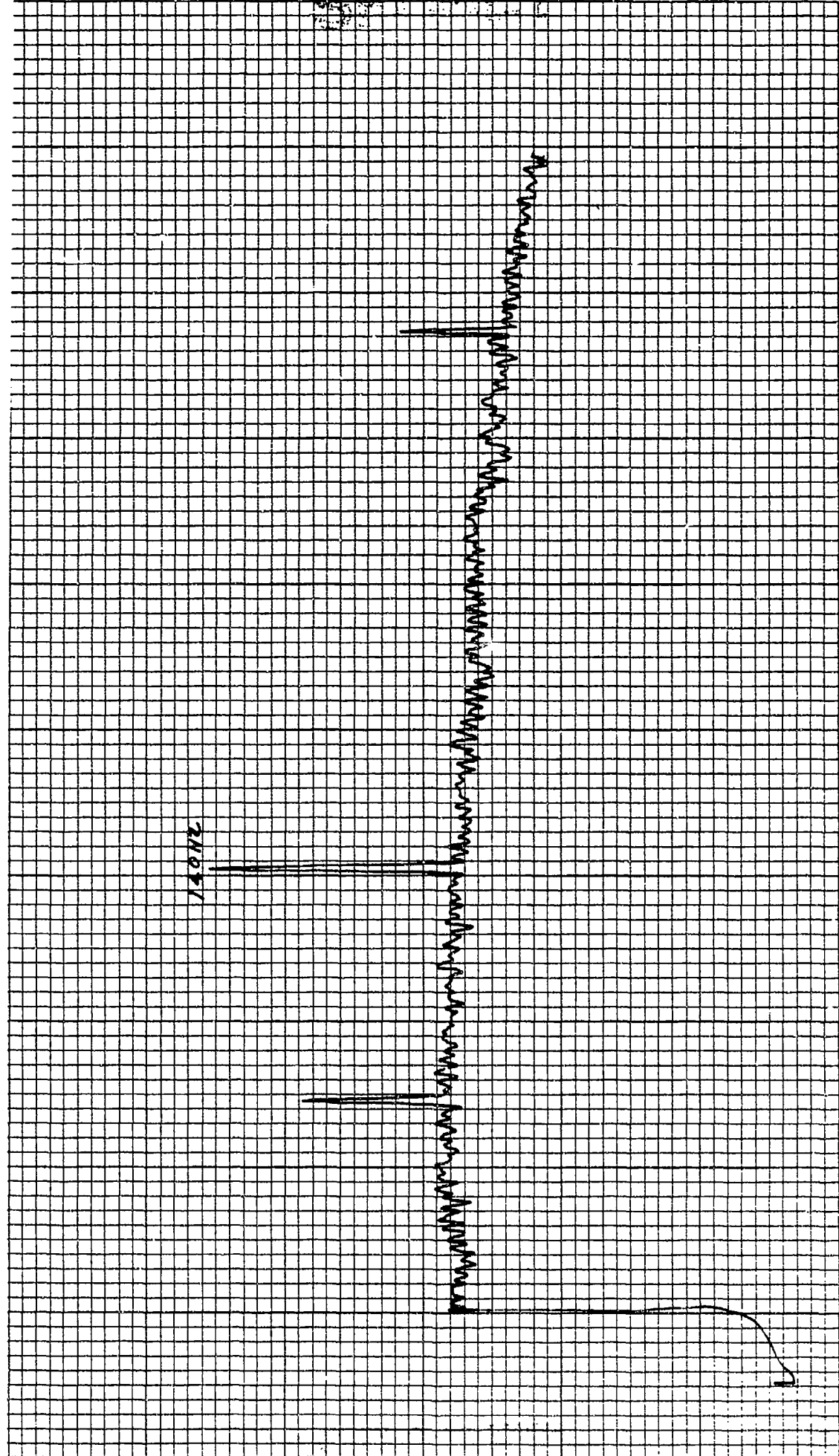
REEL: M19 INDE X/637
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING



KOE 10 X 10 TO THE INCH, 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

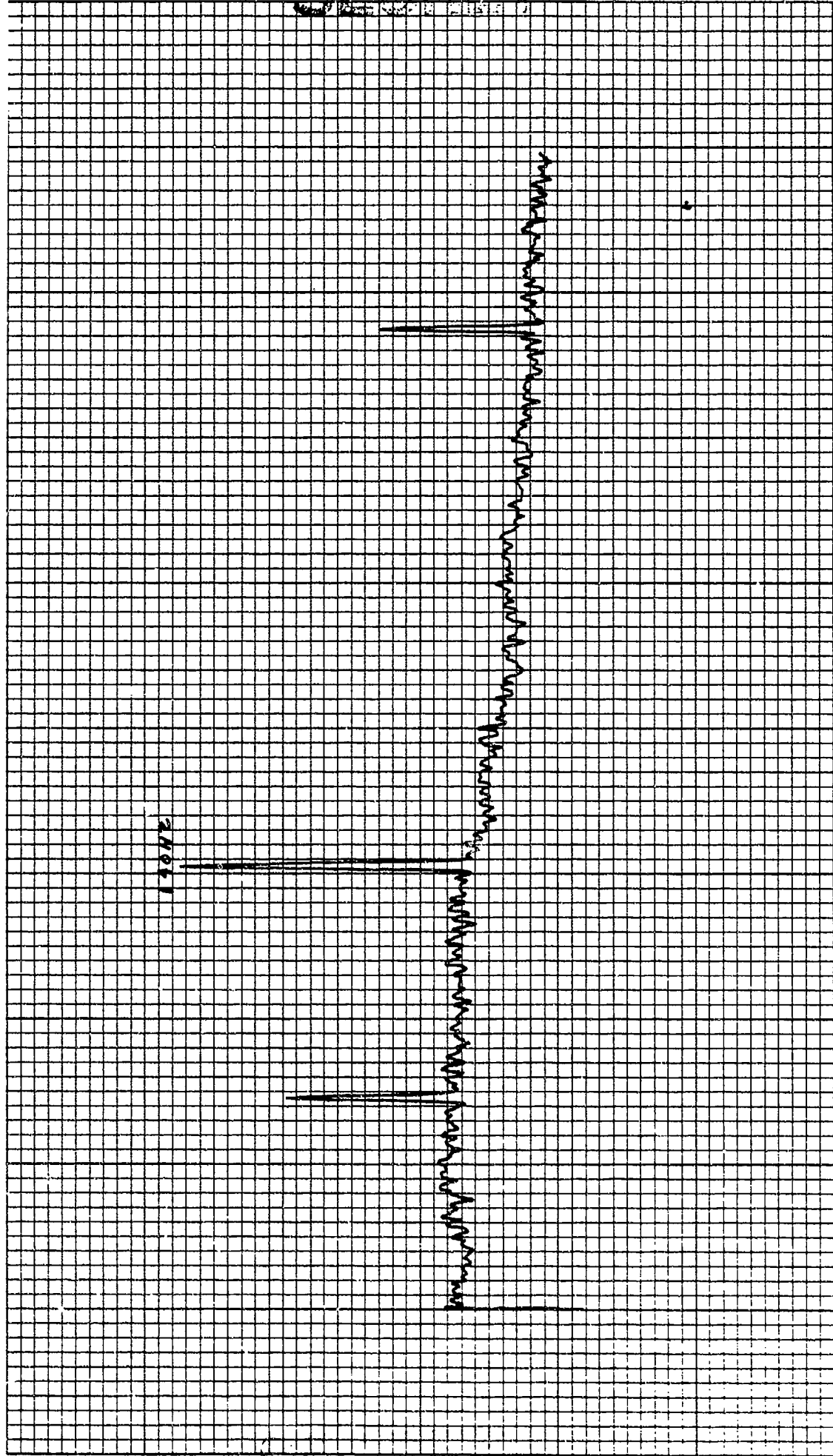
CONTROL: 0633 - 49 (D910) DATE OF ANALYSIS: 1-68 8-26 4 00-53 REEL: M18 INDE X1637
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-16-77 - 0633 Z INTEGRATION TIME 320 SECS ATTEM: 24 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 150 HZ +50 DEG. AZ STEERING



K•E 10 X 10 TO THE INCH • 7 X 10 INCHES
NEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0633 - 49 (Dpio) DATE OF ANALYSIS: REEL: M19 INDE X/137
BEAMFORMED SPECTRUM (ELEMENTS) 1-6 4 9 - 2 6 4 2 9 - 53 INTEGRATION TIME 320 SECS ATTN: -24 DB
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 0633 Z FILTER WTG: HANNING
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
49 ELEMENTS 460 DEG. AZ STEERING



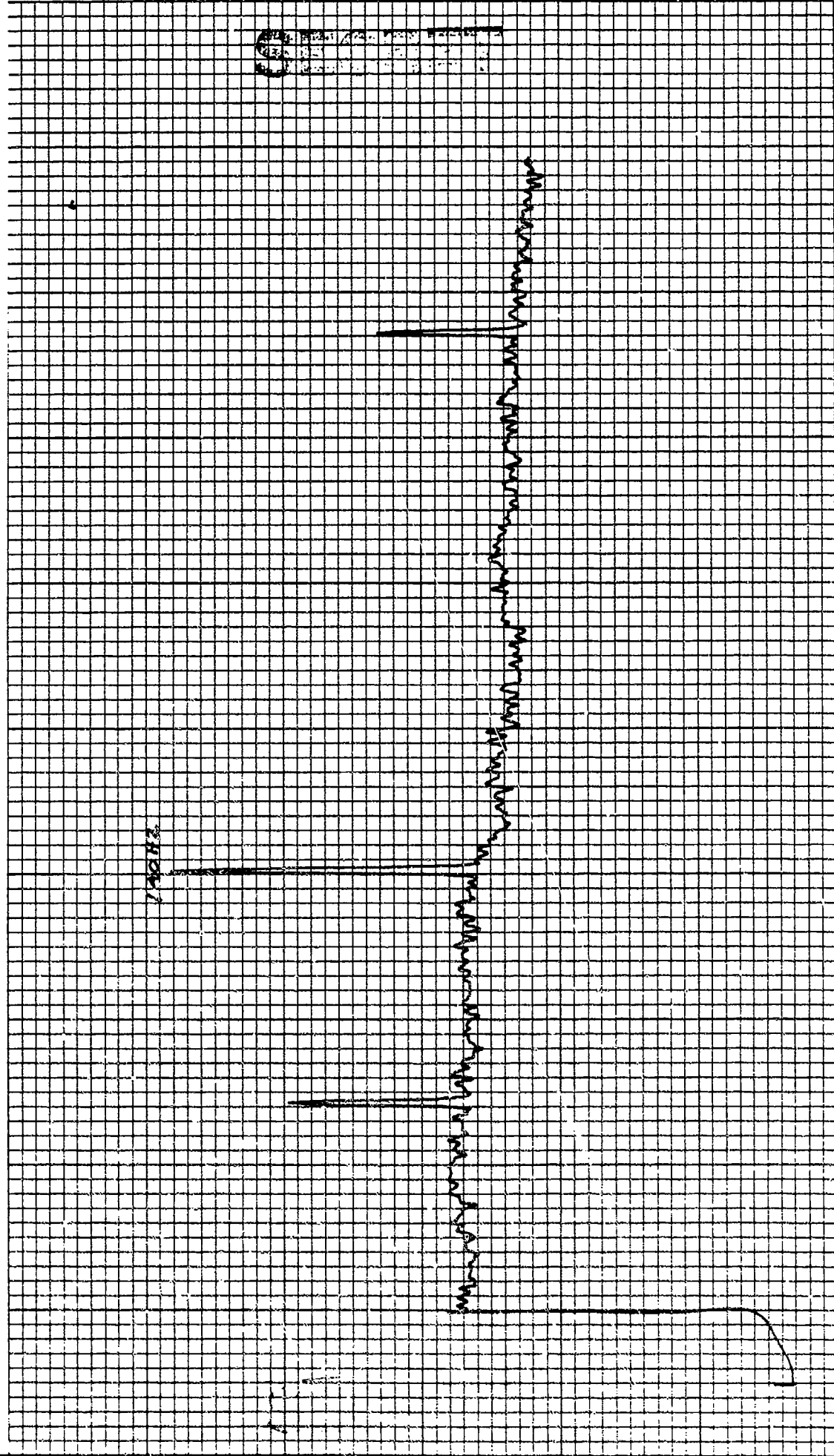
K-E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0633 - 49 (DP10)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 152 HZ
49 ELEMENTS

DATE OF ANALYSIS: 1-6-89
DATE/TIME: 3-16-77 - 0633 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+6.5 DEG. AZ STEERING

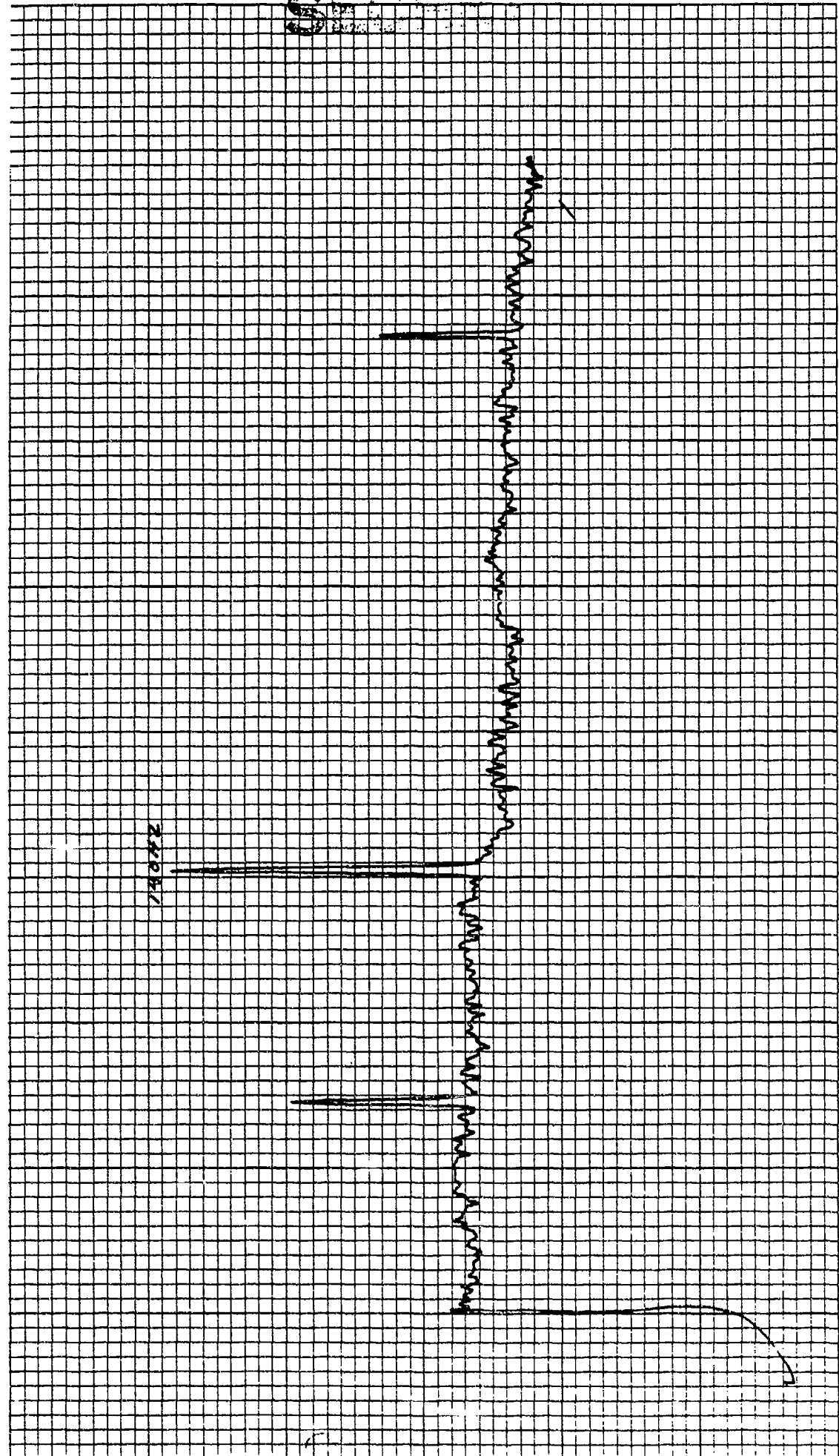
REEL: M19 INDE X1637
INTEGRATION TIME: 320 SECS
FILTER: WTG: HANNING



KOE 10 X 10 TO THE INCH .7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

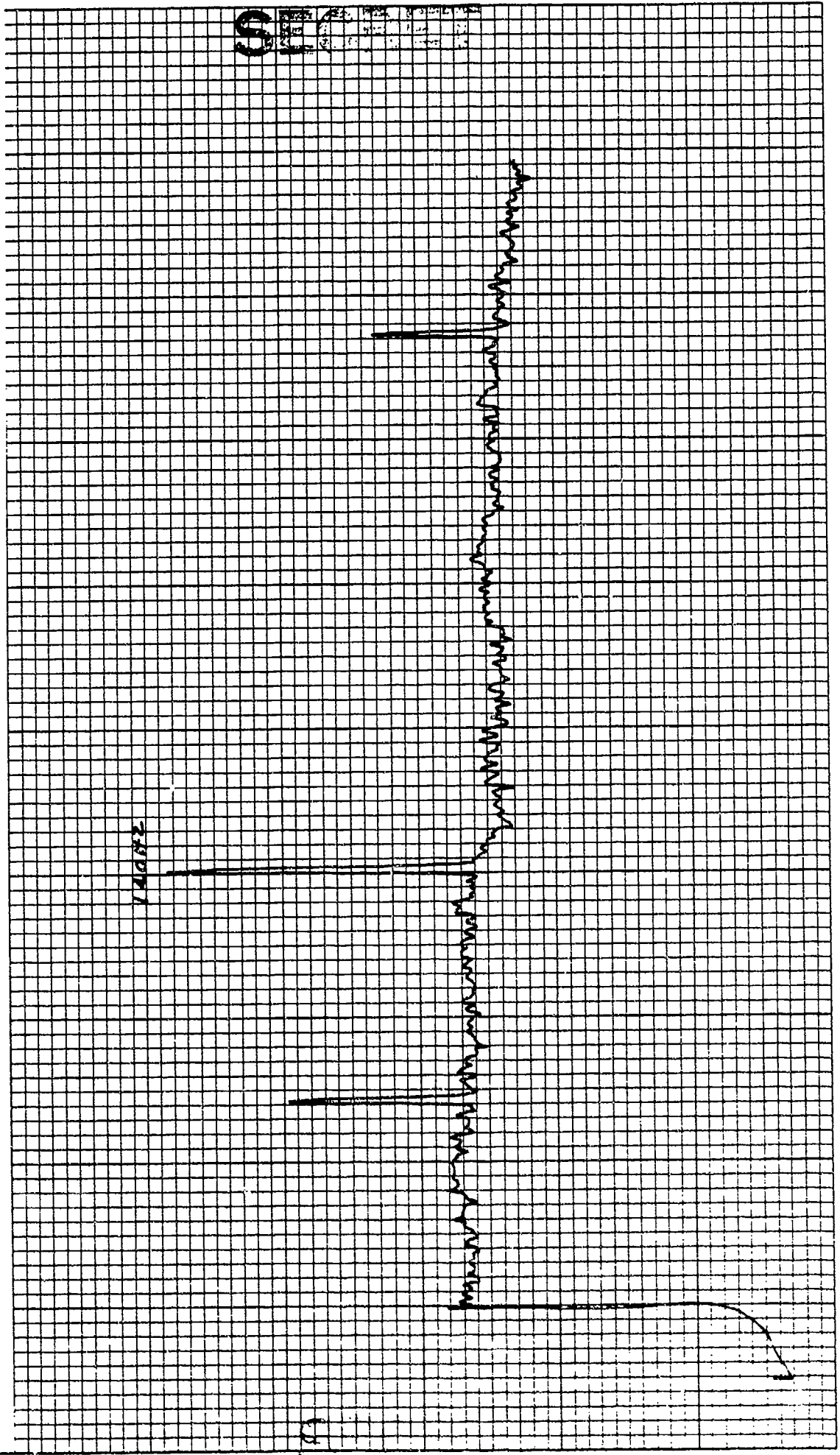
CONTROL: 0633 - 49 (DP16) DATE OF ANALYSIS: 1-6-68 08:58-53 REEL: M19 INDE X/637
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-16-77 - 0633 Z INTEGRATION TIME 320 SECS ATTN: -24 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
CENTER FREQ: 150 HZ + 62 DEG. AZ STEERING



K-E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0637 - 49 (DB10) REEL: M19 INDE X 1637
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-6-77-08-35
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77-0633Z INTEGRATION TIME 320 SECS ATTN: 2Y DB
CENTER FREQ: 350 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
49 ELEMENTS 462.25 DEG. AZ STEERING



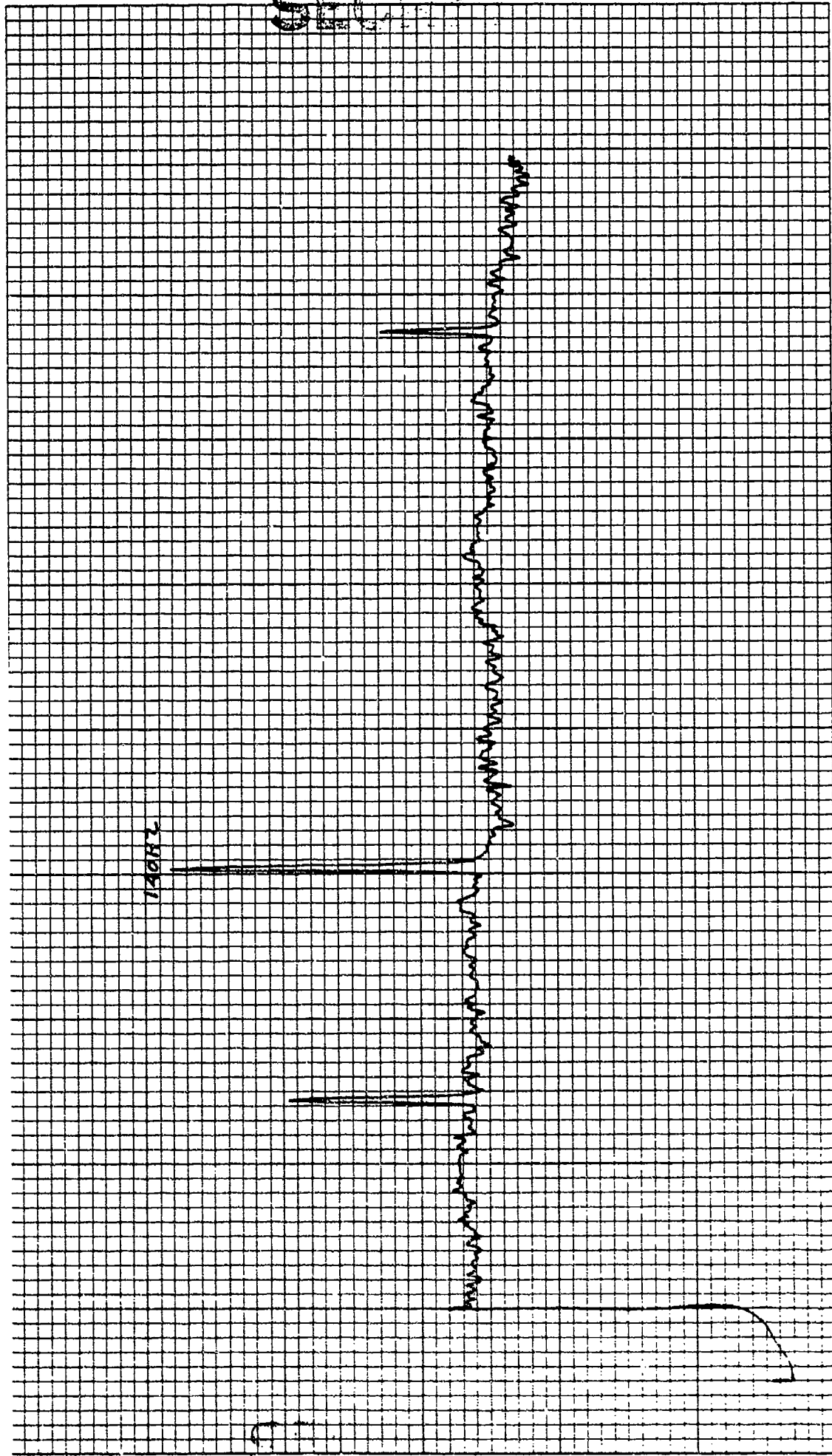
KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUPPEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0633 - 49 (DP10) DATE OF ANALYSIS: 1-6-68 - 26-30-35
BEAMFORMED SPECTRUM (ELEMENTS) ANALYSIS BANDWIDTH: 1/10 HZ
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10 HZ
CENTER FREQ: 150 HZ
49 ELEMENTS 463 DEG AZ STEERING

REEL: X19 INDE X163Z

INTEGRATION TIME 320 SECS FILTER WTG: HANNING



SECRET

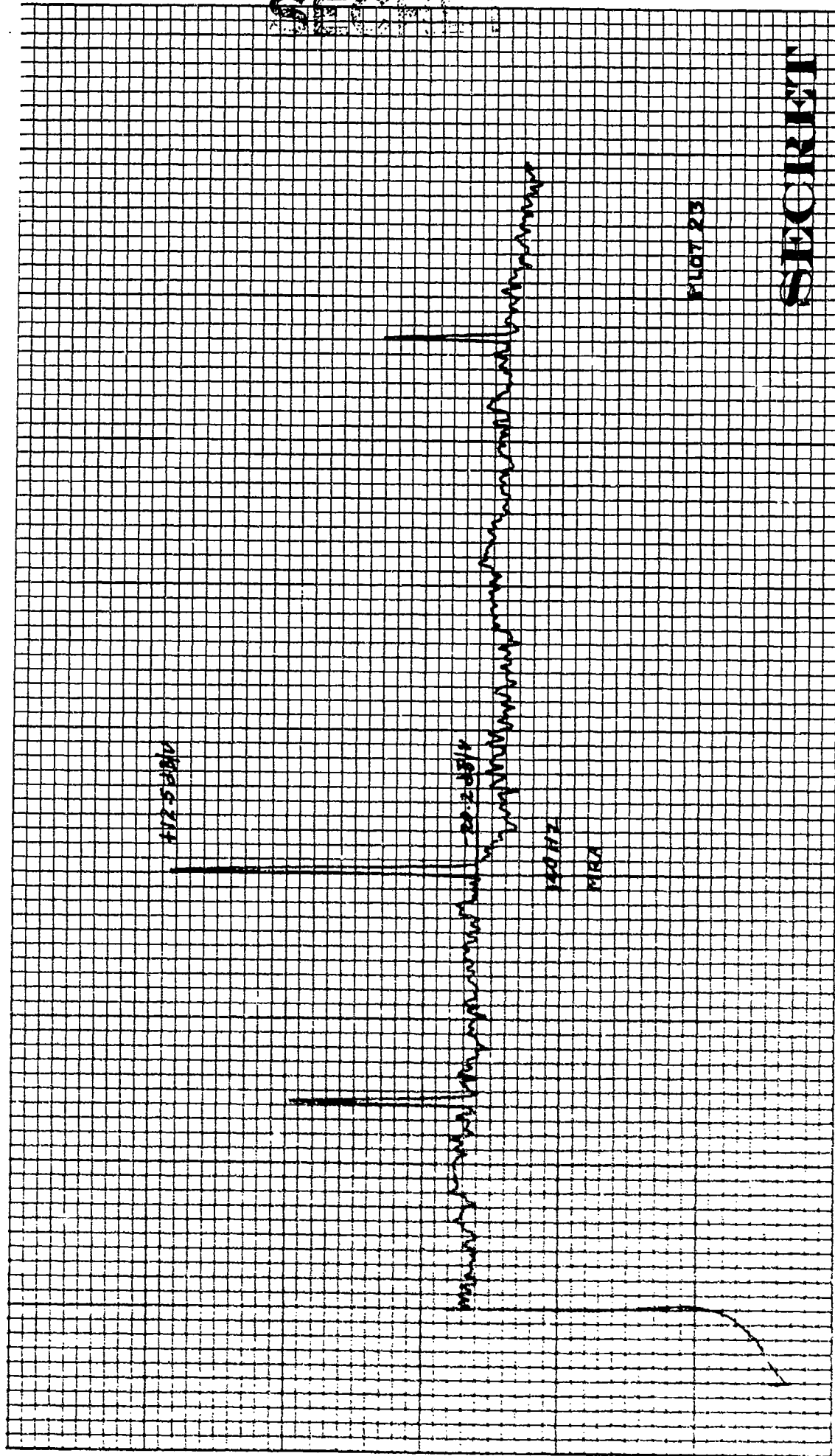
KOE 10 X 10 TO THE INCH, 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

SECRET

CONTROL: 0633 - 49 (D710) DATE OF ANALYSIS: _____
 BEAMFORMED SPECTRUM(ELEMENTS 170.6 97026 297053)
 EXERCISE: BEARING STAKE REEL: M19 INDE X/637
 CENTER FREQ: 150 HZ INTEGRATION TIME 320 SECS ATTN: - DB
49 ELEMENTS FILTER WTG: HANNING

DATE/TIME: 3-16-77 - 0633 Z
 ANALYSIS BANDWIDTH: 1/10HZ
+22.5 DEG. AZ STEERING



111 HZ

150 HZ

160 HZ

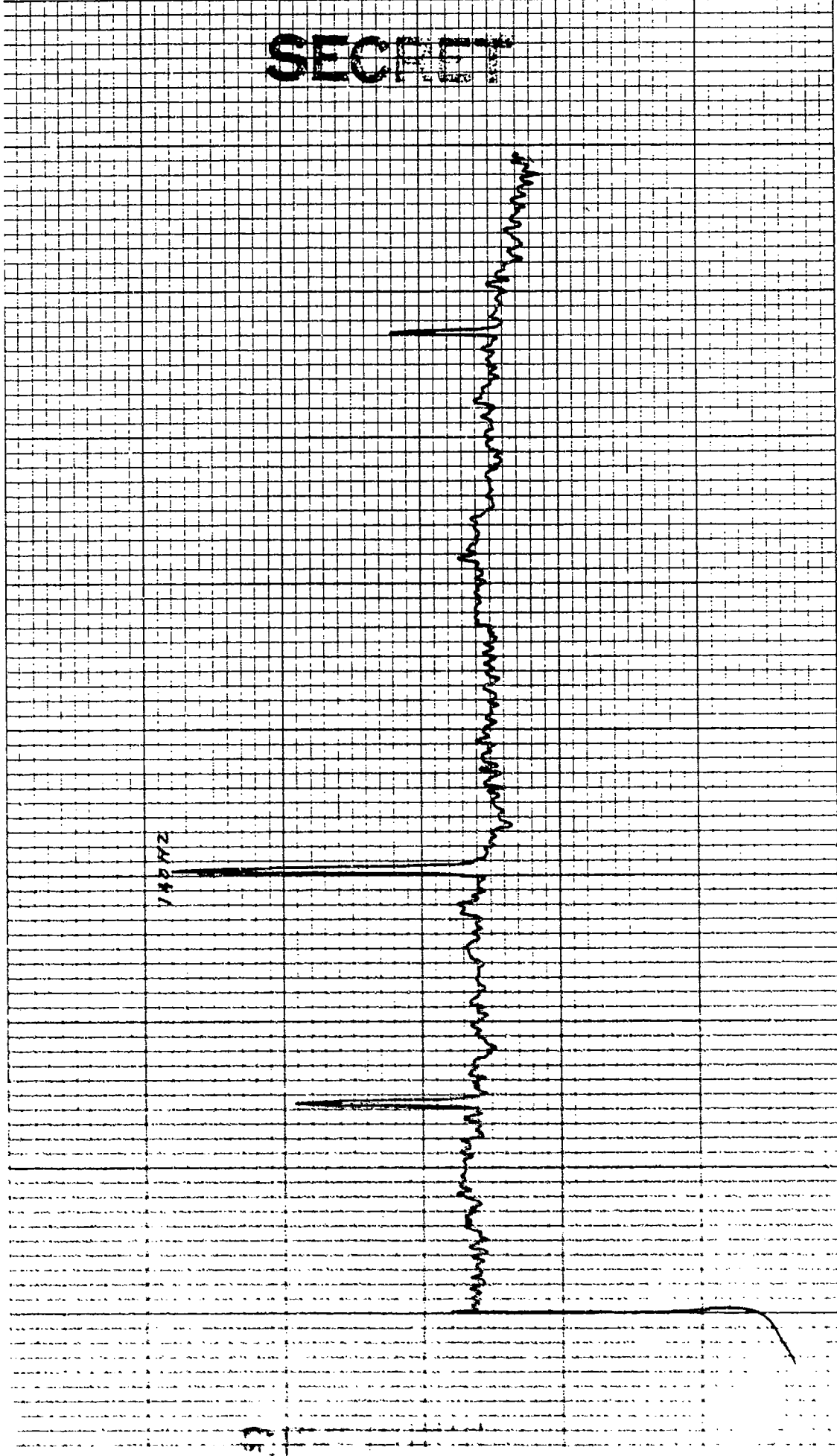
SECRET

McE 10 X 10 TO THE INCHES
KUFFEL & ESSER CO. MADE IN U.S.

46 0703

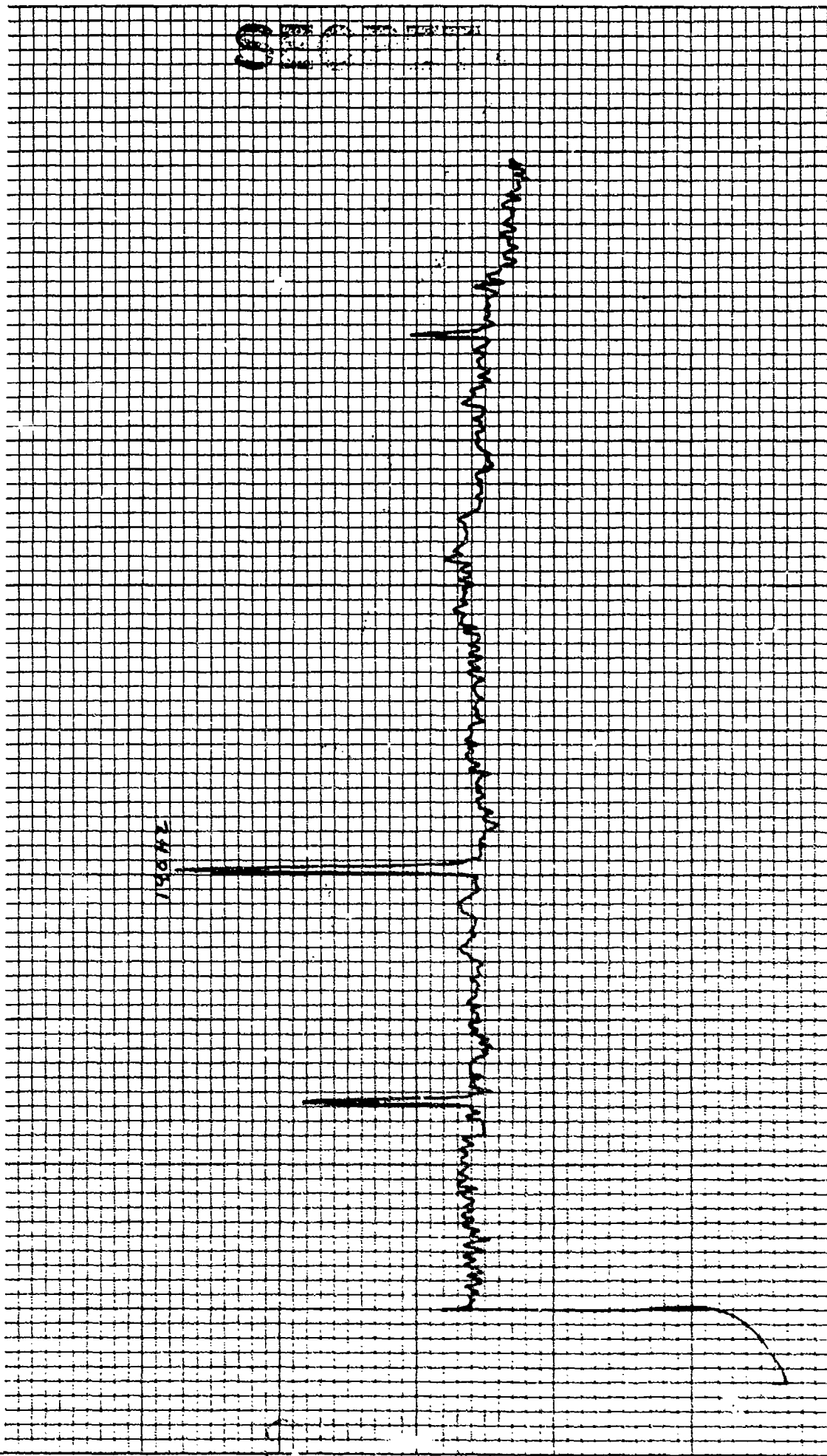
CONTROL: 0100 - 49 (0010) DATE OF ANALYSIS: -- -- --
BEAMFORMED SPECTRUM (ELEMENTS) 1-68 8-06 08-53
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: -2Y DB
CENTER FREQ: 150 HZ FILTER WTG: HANNING
49 ELEMENTS +24 DEG. AZ STEERING

REEL: M19 INDE X 1637



SECRET

CONTROL: 0637 - 49 (DPIG) REEL: M19 INDE X1637
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-6 68-26 418-53)
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 0637 Z INTEGRATION TIME 320 SECS ATTN: -24 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
49 ELEMENTS +66 DEG. AZ STEERING



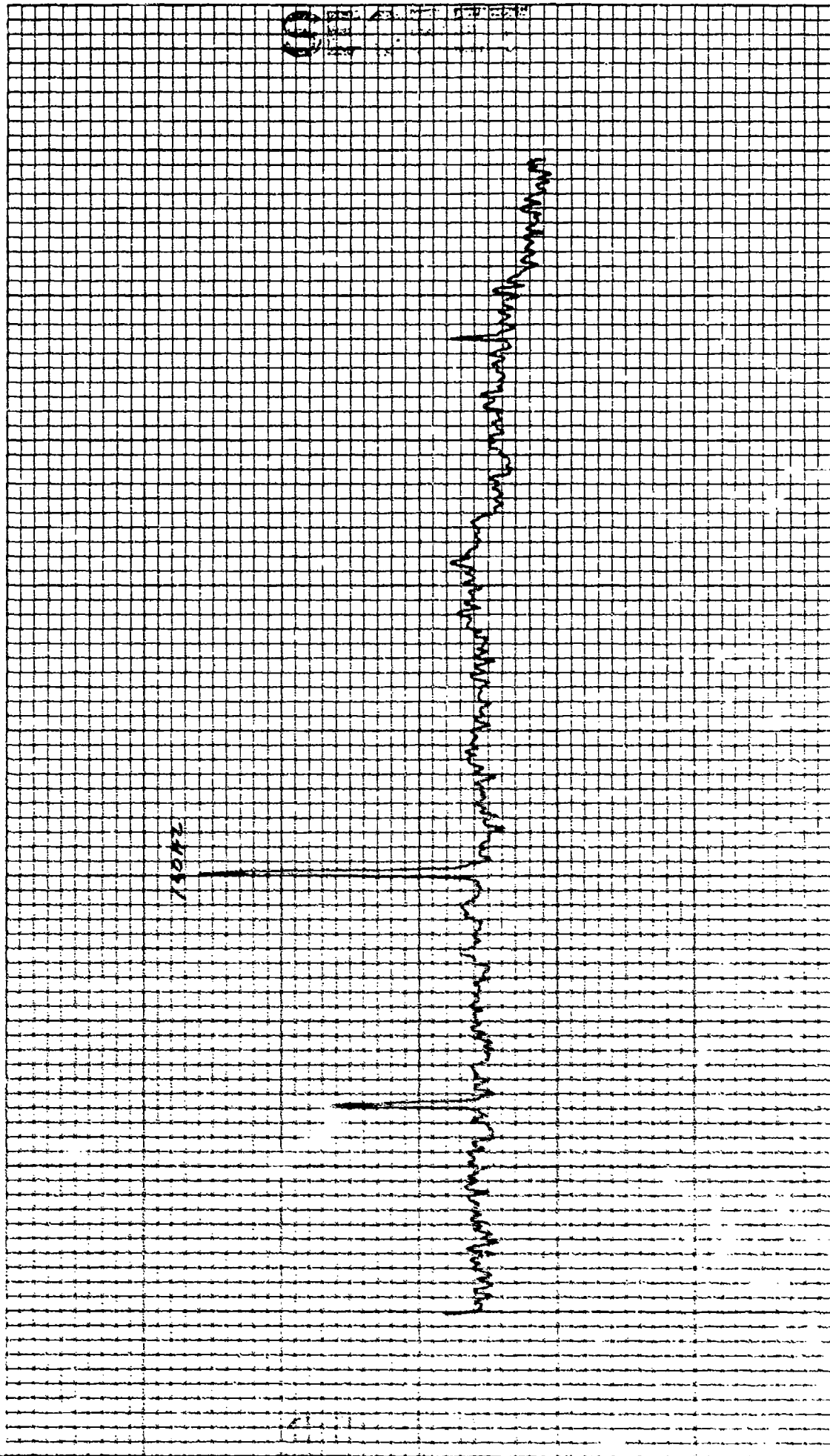
KOE 10 X 10 TO THE INCH .1 X .20 INCHES
KELLOGG PAPER CO. MADE IN U.S.A.

46 0703

CONTROL: 0633 - 49 (DP10) DATE OF ANALYSIS: - - -
BEAMFORMED SPECTRUM (ELEMENTS) 1-6 4 9-26 4 09-53
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ
CENTER FREQ: 150 HZ +60 DEG. AZ STEERING
ELEMENTS

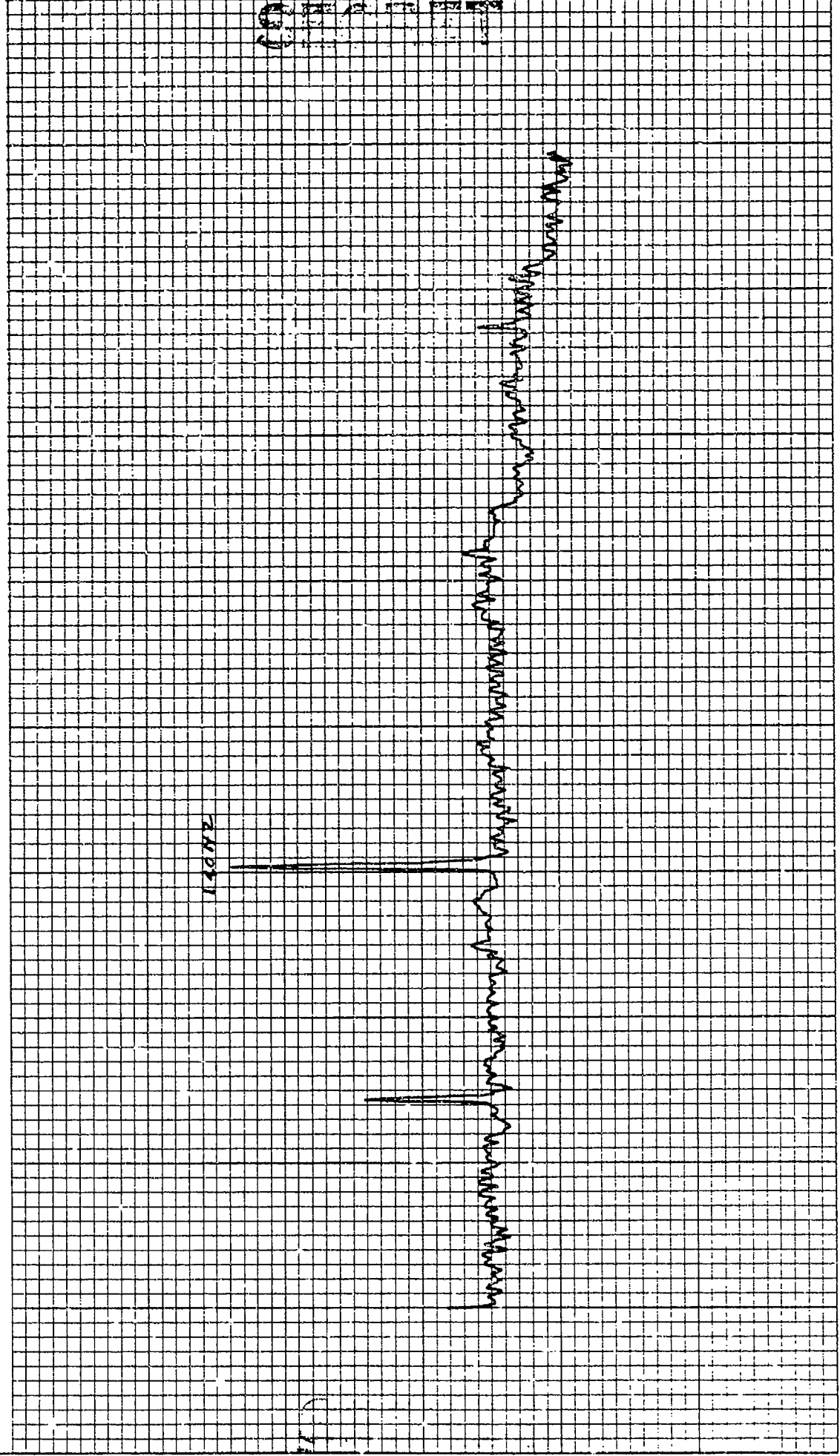
REEL: M19 INDE X/637

INTEGRATION TIME 320 SECS ATTN: -29 DB
FILTER WTG: HANNING



46-496

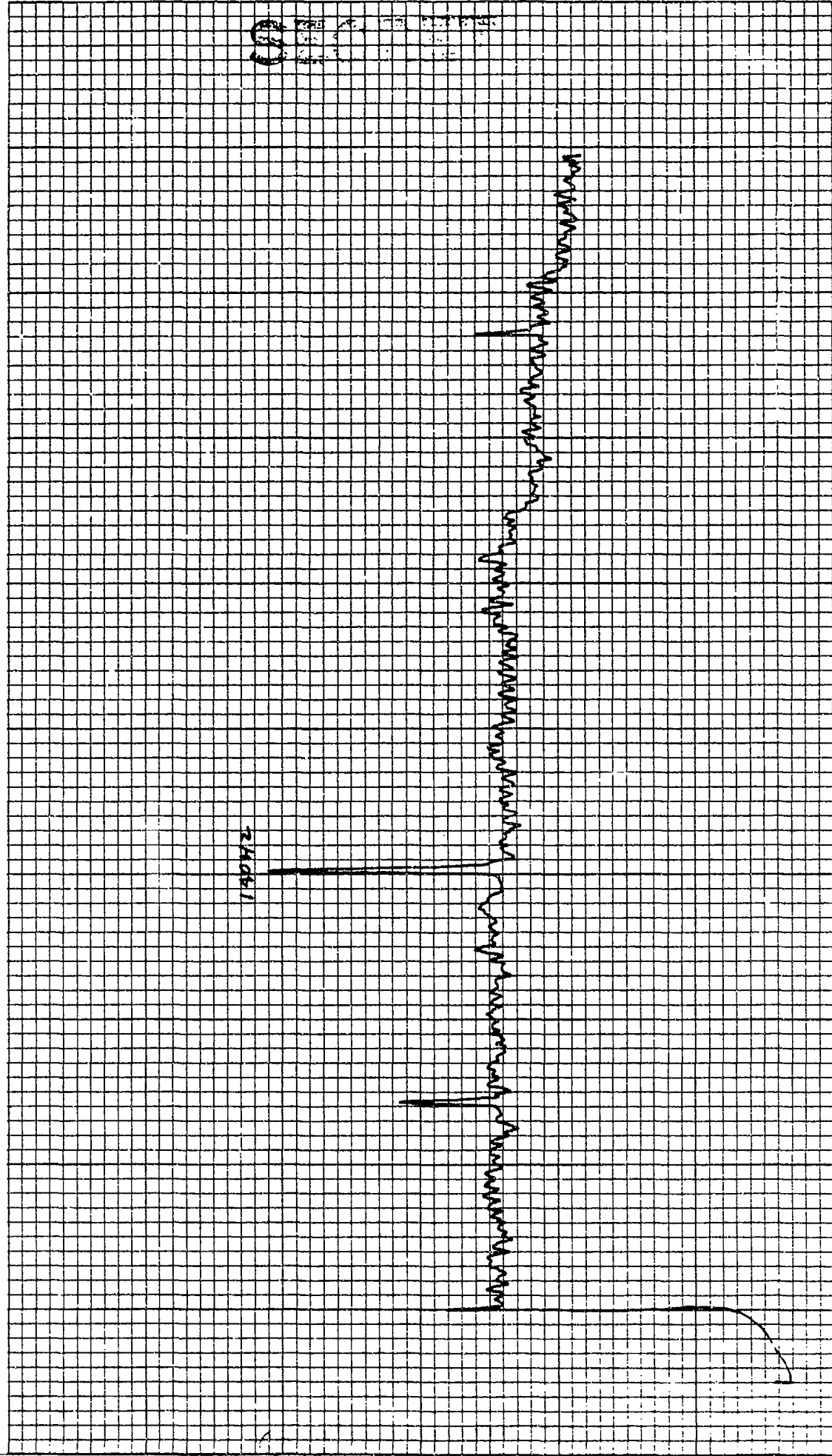
CONTROL: 0633 - 47 (DP10) DATE OF ANALYSIS: 1-6 9-26 4 88-53 REEL: M19 INDE X1677
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 376-77 - 0633 Z INTEGRATION TIME 320 SECS ATTN: -24 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
CENTER FREQ: 150 HZ +70 DEG. AZ STEERING



K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0633-49 (DP16) DATE OF ANALYSIS: 1-6-89-26 f 28-35 REEL: M19 INDE X 1637
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-6-77-0613 Z INTEGRATION TIME 320 SECS ATTN: -24 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 150 HZ +72 DEG. AZ STEERING



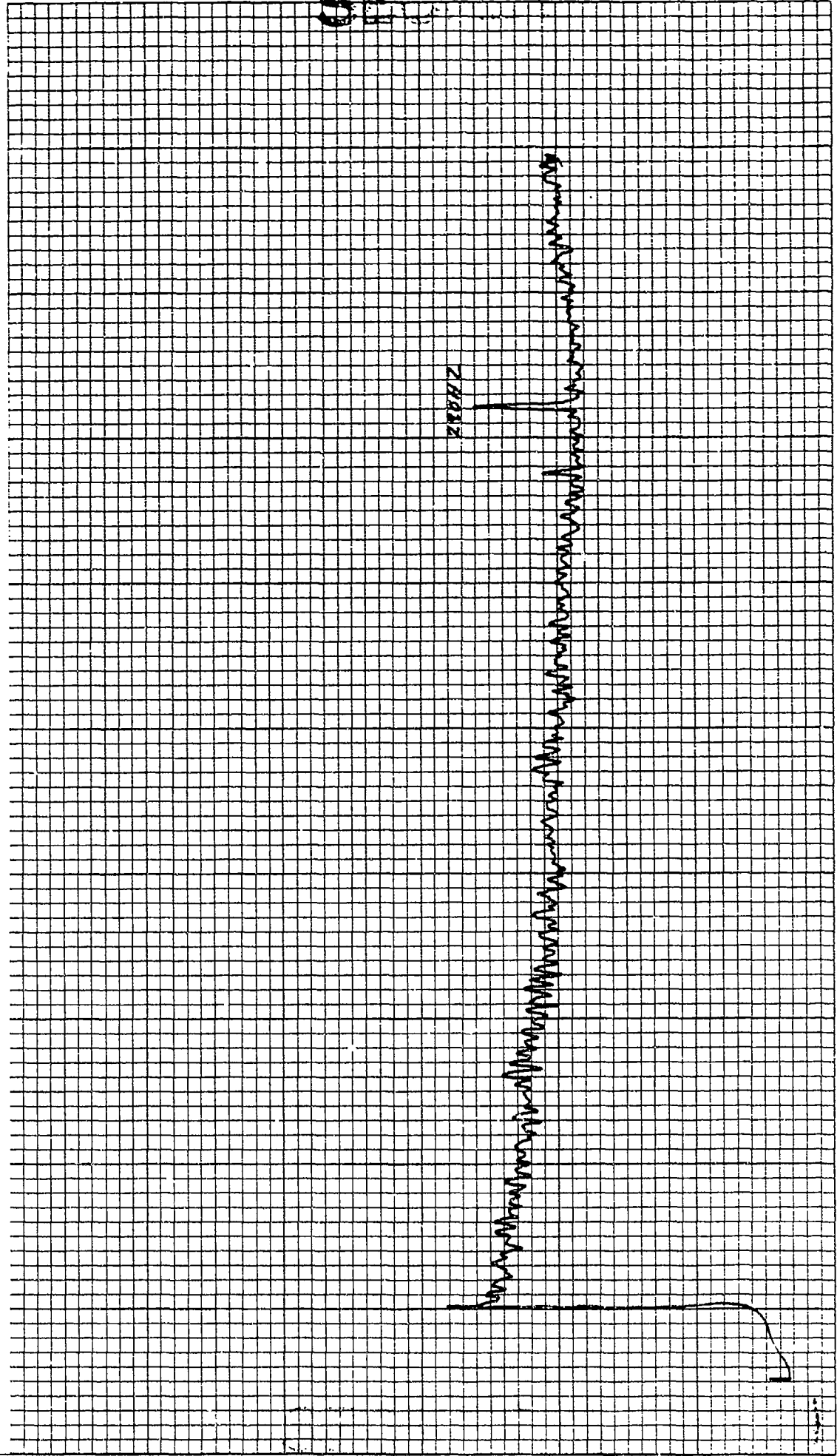
KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0633 - 49 (DP10)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
49 ELEMENTS

DATE OF ANALYSIS: 1-6-79 269 29-53
DATE/TIME: 3-76-77 - 0633 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+ 54 DEG. AZ STEERING

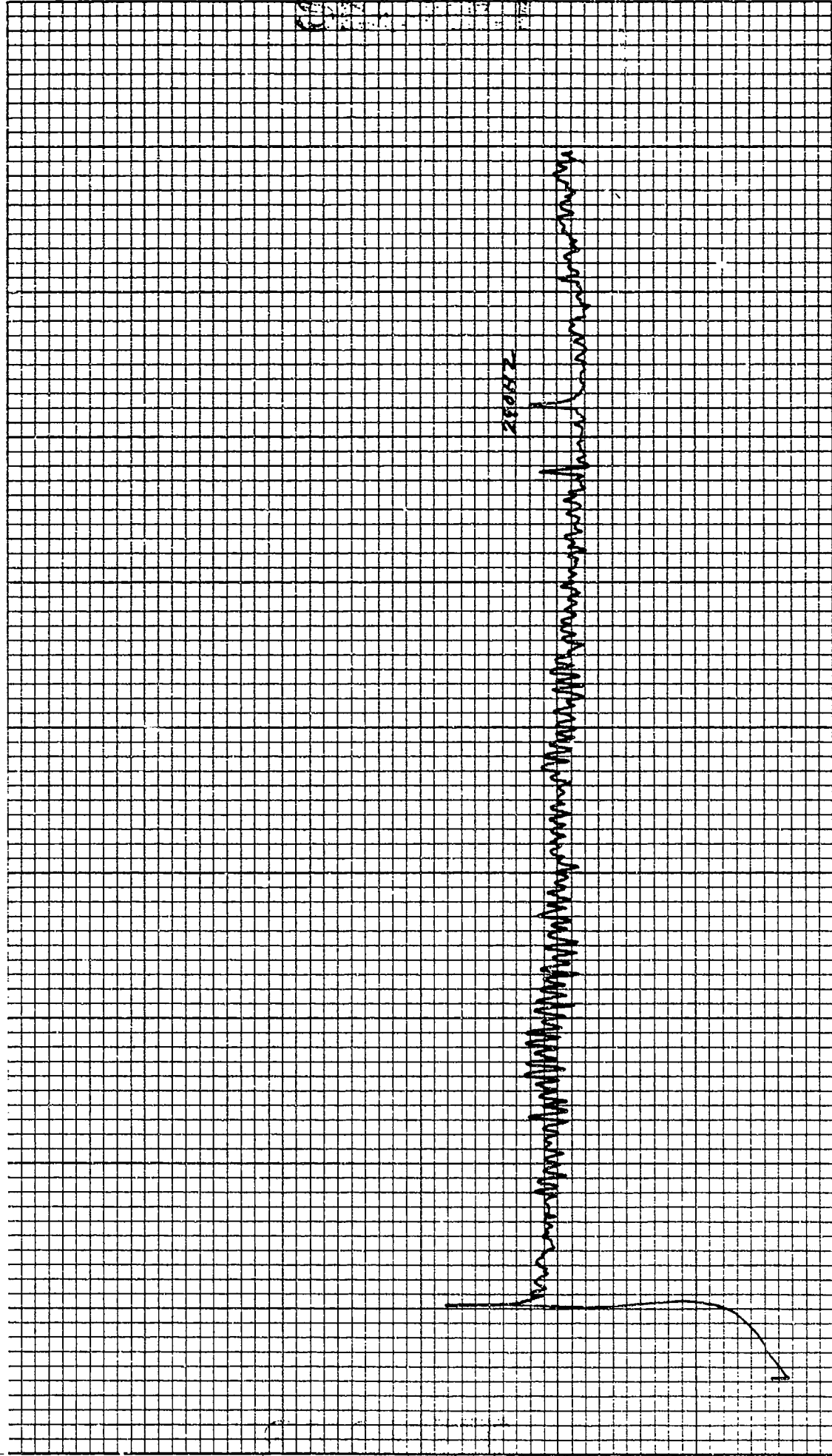
REEL: M19 INDE X1637
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING



KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

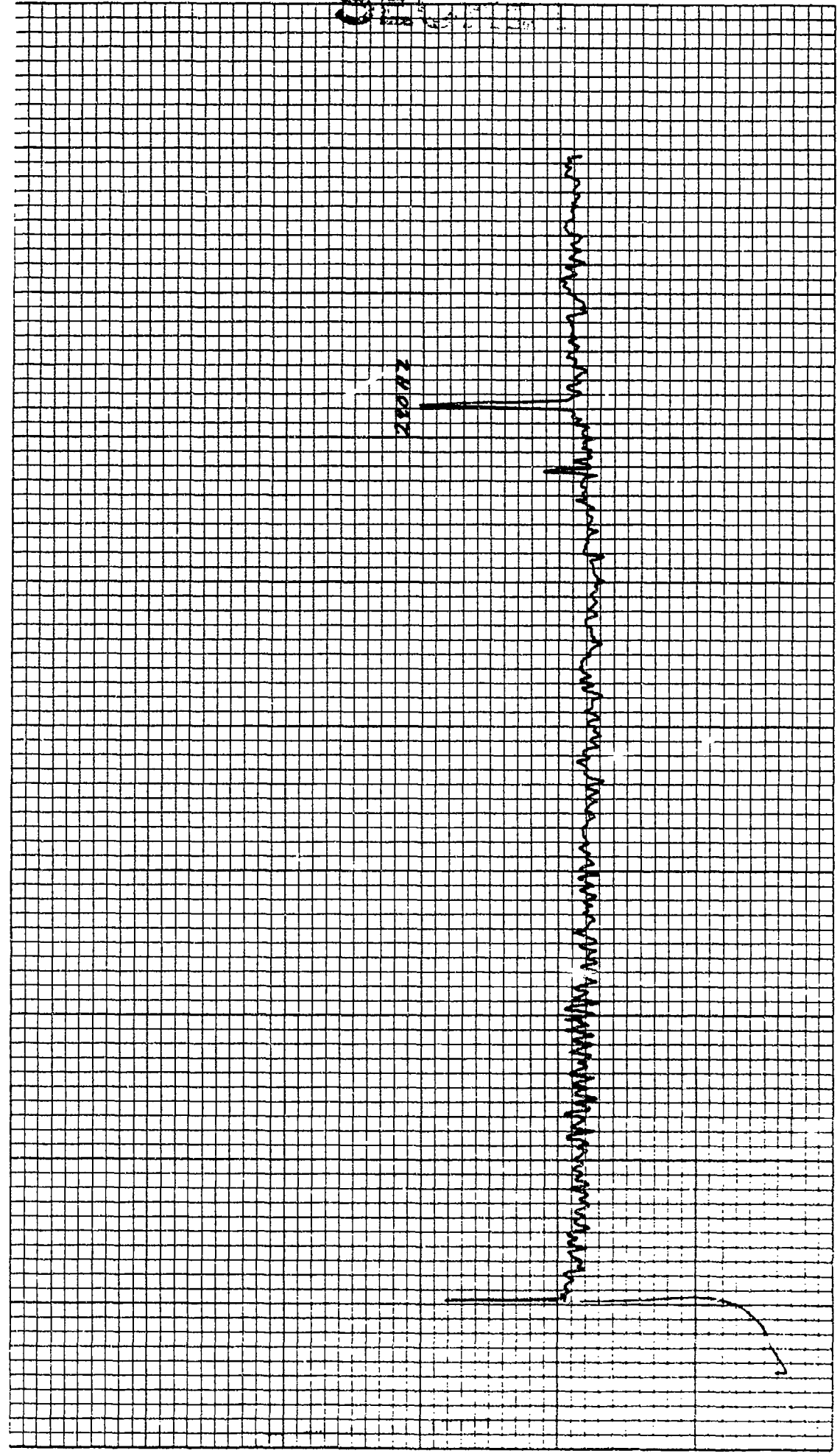
CONTROL: 0633 - 49 (DPI) DATE OF ANALYSIS: 1-6-68 26498-53 REEL: M19 INDE X/637
BEAMFORMED SPECTRUM (ELEMENTS) INTEGRATION TIME 320 SECS ATEN: -34 DB
EXERCISE: BEARING STAKE FILTER WTG: HANNING
CENTER FREQ: 270 HZ
49 ELEMENTS ANALYSIS BANDWIDTH: 1/10 HZ
+56 DEG. AZ STEERING



KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0633 - 49 (DP10) DATE OF ANALYSIS: 1-26-79-26988-53 REEL: M19 INDE X 1637
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-16-77 - 0633 Z INTEGRATION TIME 320 SECS ATTEN: -24 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ
49 ELEMENTS +50 DEG. AZ STEERING



0101

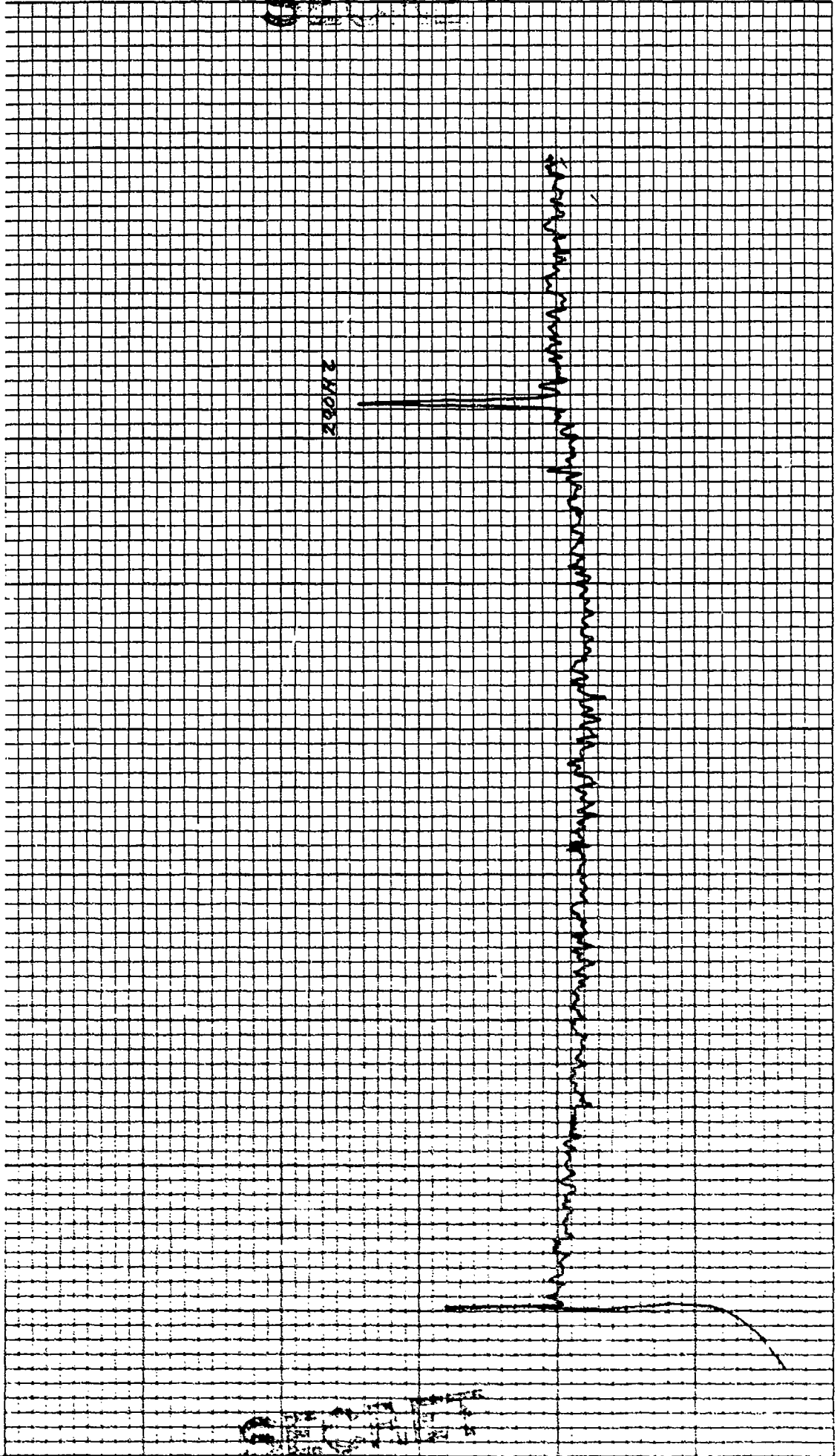
K·E 10 X 10 TO THE INCH • 7 X 10 INCHES
REUPPEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0637 - 49 (DP10)
BEAMFORMED SPECTRUM (ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
49 ELEMENTS

DATE OF ANALYSIS: 1-69 8-26 8 28-35
DATE/TIME: 3-6-77 - 0637Z
ANALYSIS BANDWIDTH: 1/10HZ
±60 DEG. AZ STEERING

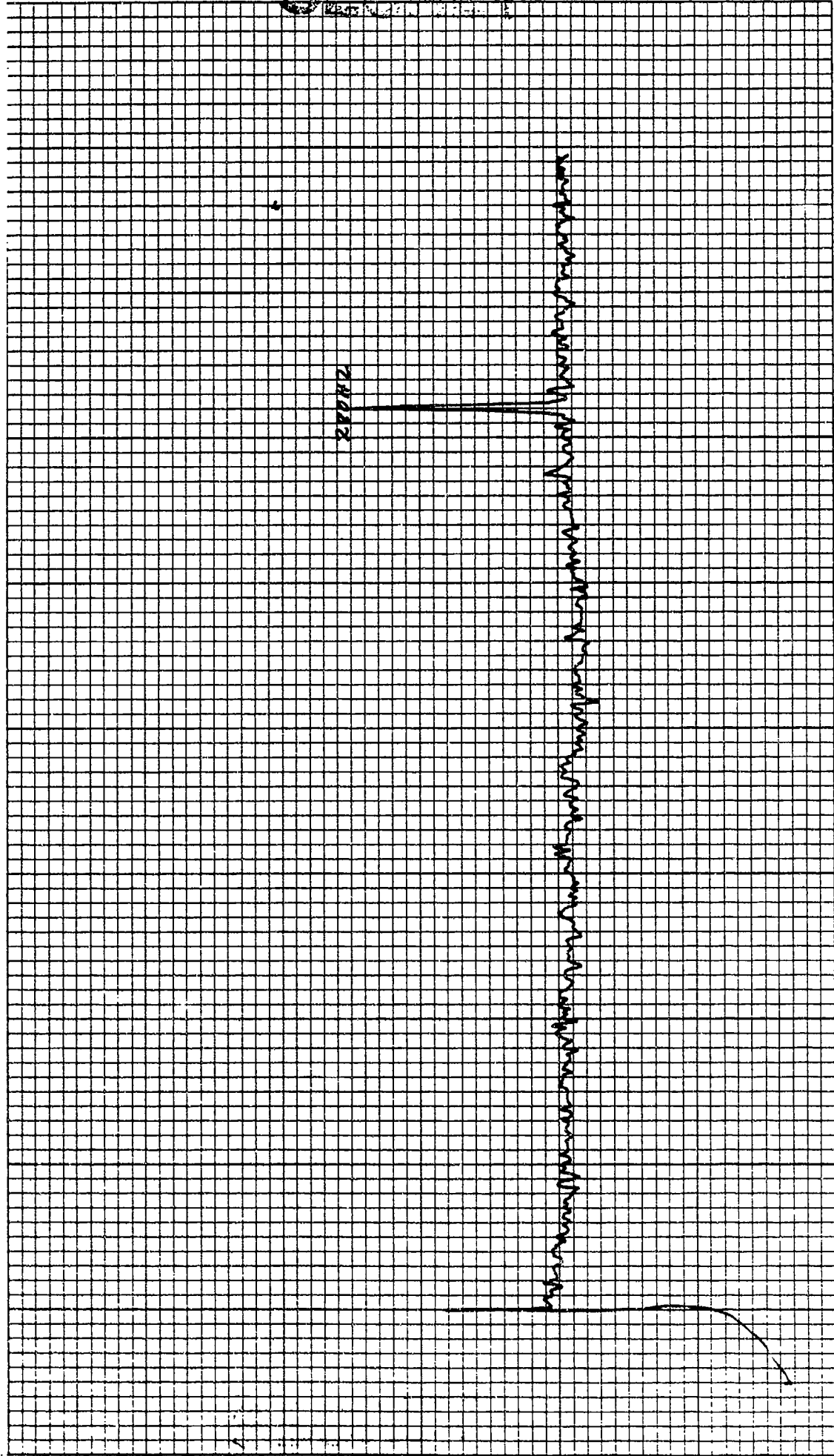
REEL: M19 INDE X 1637
INTEGRATION TIME 320 SECS ATTN: -24 DB
FILTER WTG: HANNING



KOE 10 X 10 TO THE INCH .7 X 10 INCHES
KELPPEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0337 - 49 (DP10) REEL: M19 INDE X 1637
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-6-77 - 26-59-53
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 0633 Z INTEGRATION TIME 320 SECS ATTN: -24 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
49 ELEMENTS +61.5 DEG. AZ STEERING

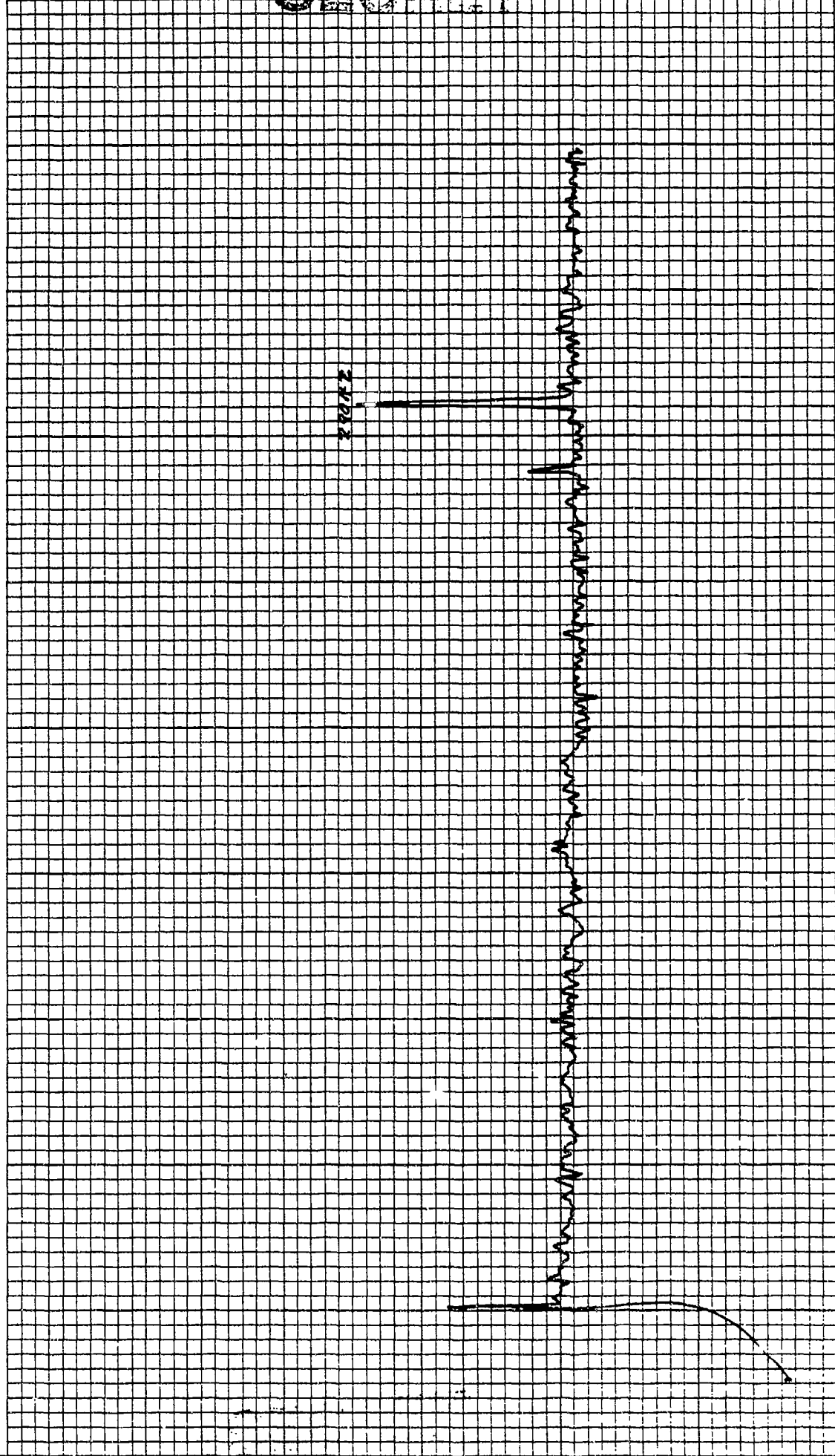


KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0633-49 (DPIO) DATE OF ANALYSIS: - - -
BEAMFORMED SPECTRUM (ELEMENTS) 1-6 4 8-26 4 08 -35)
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: ~24 DB
CENTER FREQ: 270 HZ FILTER WTG: HANNING
49 ELEMENTS ANALYSIS BANDWIDTH: 1/10HZ
+62 DEG. AZ STEERING

REEL: M19 INDE X/637



SECRET

K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0633-49 (DP10)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
49 ELEMENTS

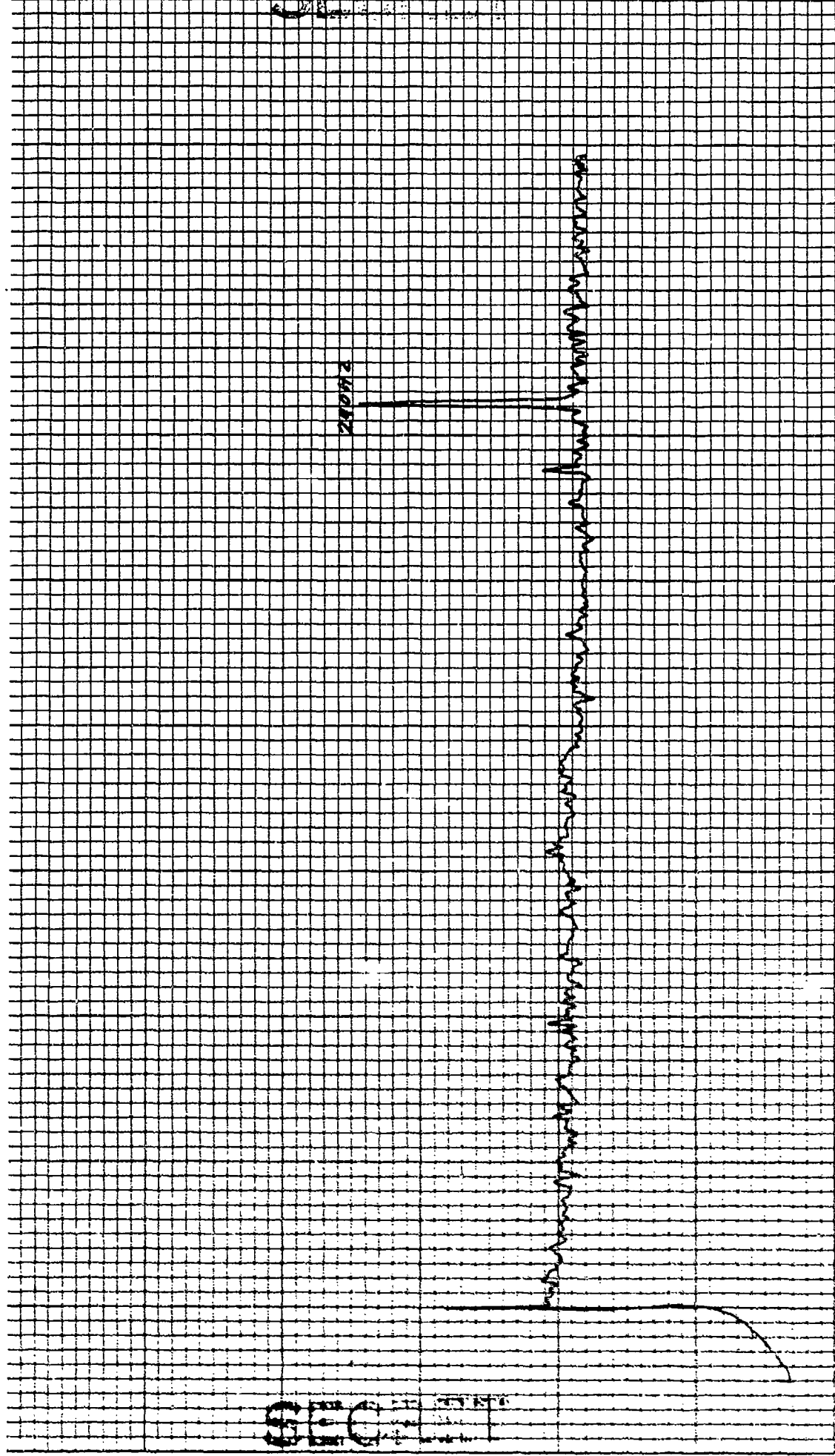
DATE OF ANALYSIS: 1-6-78-26408-53
DATE/TIME: 3-16-77-0633Z
ANALYSIS BANDWIDTH: 1/10HZ
+69.25 DEG. AZ STEERING

REEL: M19

INDE X/637

INTEGRATION TIME 320 SECS
FILTER WTG: HANNING

ATTEN: 24 DB



SPECTRUM

270 Hz

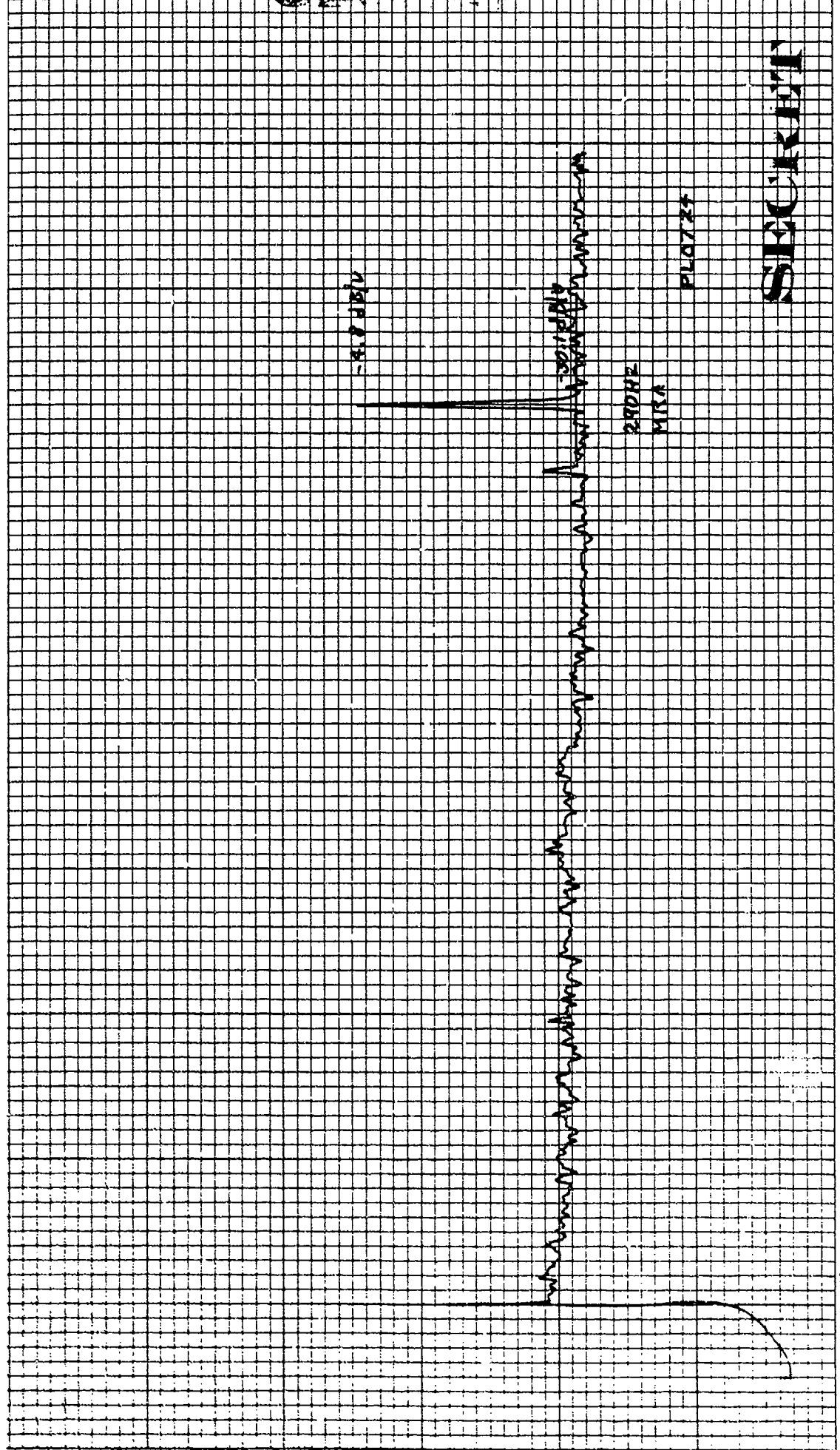
Bearing Stake

K-E 10 X 10 TO THE INCH .7 X 10 INCHES
KELUPPEL & ESSER CO. MADE IN U.S.A.

46 0703

SECRET

CONTROL: 0633-49 (DP10) DATE OF ANALYSIS: _____ REEL: M19 INDE X/637
BEAMFORMED SPECTRUM (ELEMENTS) 176 97026 24753 INTEGRATION TIME 320 SECS ATTN: -- DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
49 ELEMENTS 422.5 DEG. AZ STEERING



270 Hz

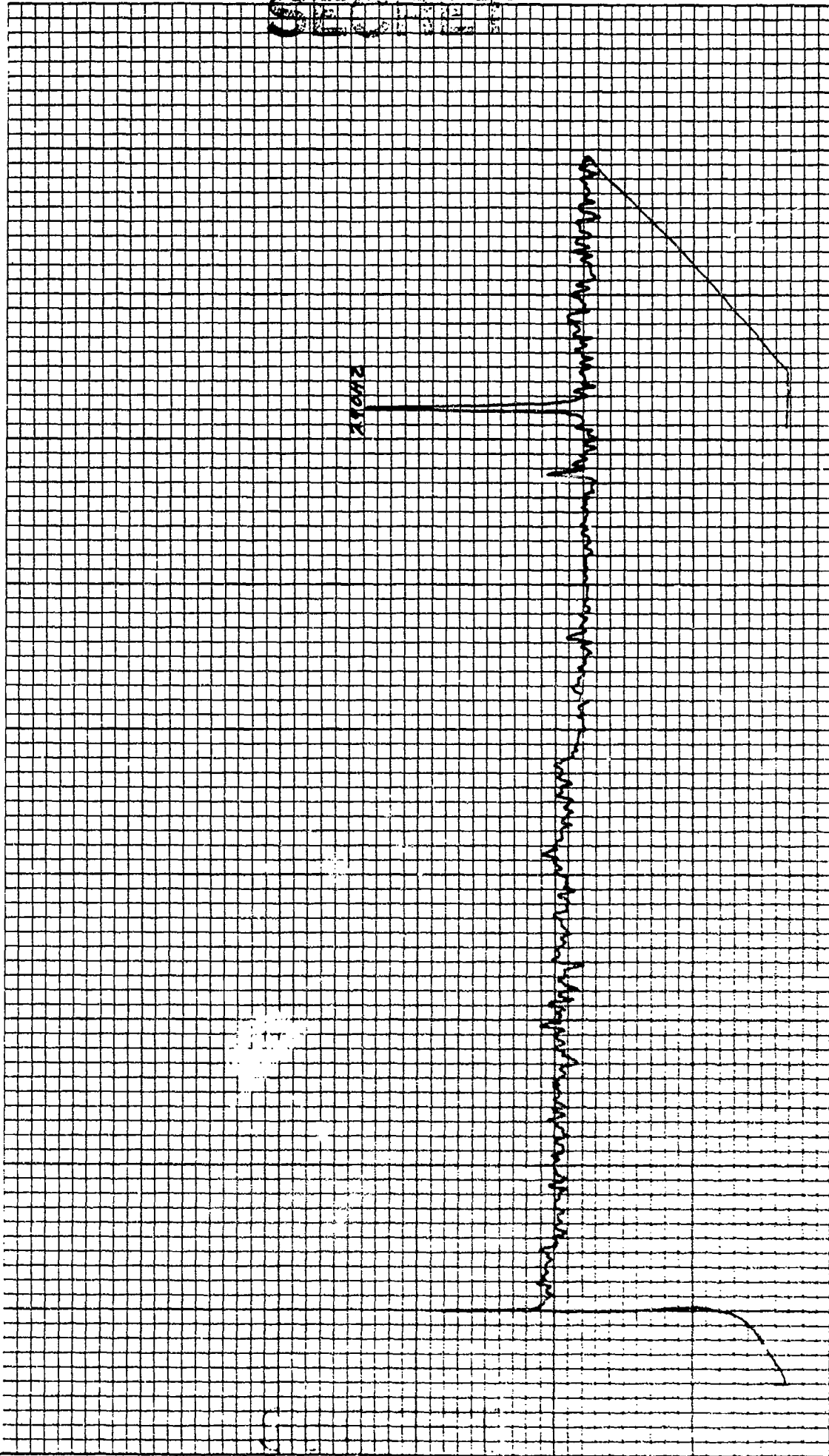
308 Hz

SECRET

K&E 10 X 10 TO THE INCH 0.7 X 10 INCHES
KELUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

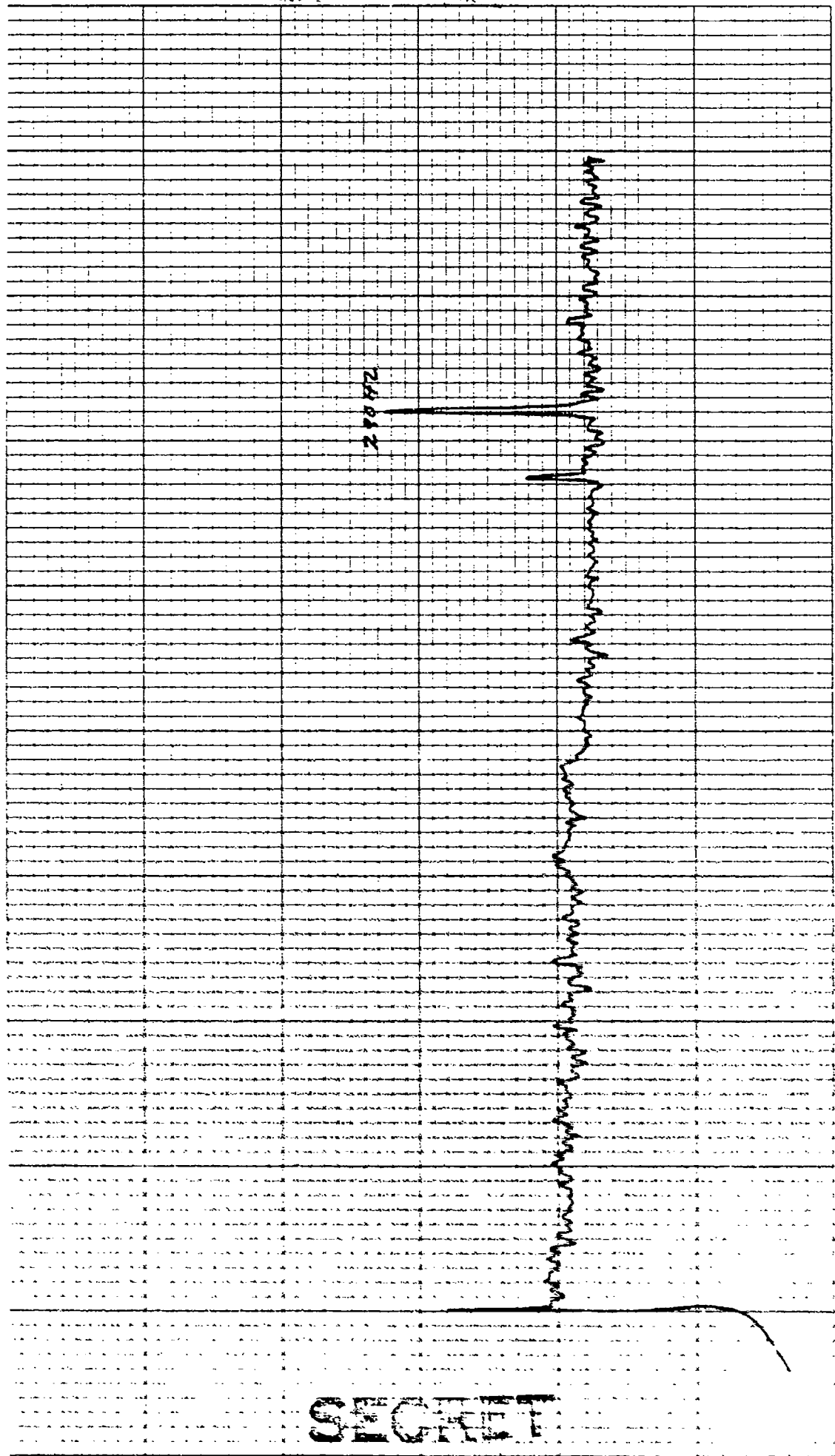
CONTROL: 0673 - 49 (bpio)
BEAMFORMED SPECTRUM (ELEMENTS 1-64 9-26 428-53)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
49 ELEMENTS
DATE OF ANALYSIS: - - - - -
REEL: M19
INDE X / 637
INTEGRATION TIME 320 SECS
ATTEN: -24 DB
FILTER WTG: HANNING
ANALYSIS BANDWIDTH: 1/10HZ
f63 DEG. AZ STEERING



10 X 10 TO THE INCH. A 10 IN. HRS
REPAIR & REPAIR CO. WASH DC

46 0703

CONTROL: 0633 - 49 (DP10) REEL: M19 INDE X 1637
 BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-6-77 26-28-35
 EXERCISE: BEARING STAKE DATE/TIME: 3-6-77 -0633Z INTEGRATION TIME 320 SECS ATTN: -34DB
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
49 ELEMENTS +64 DEG. AZ STEERING

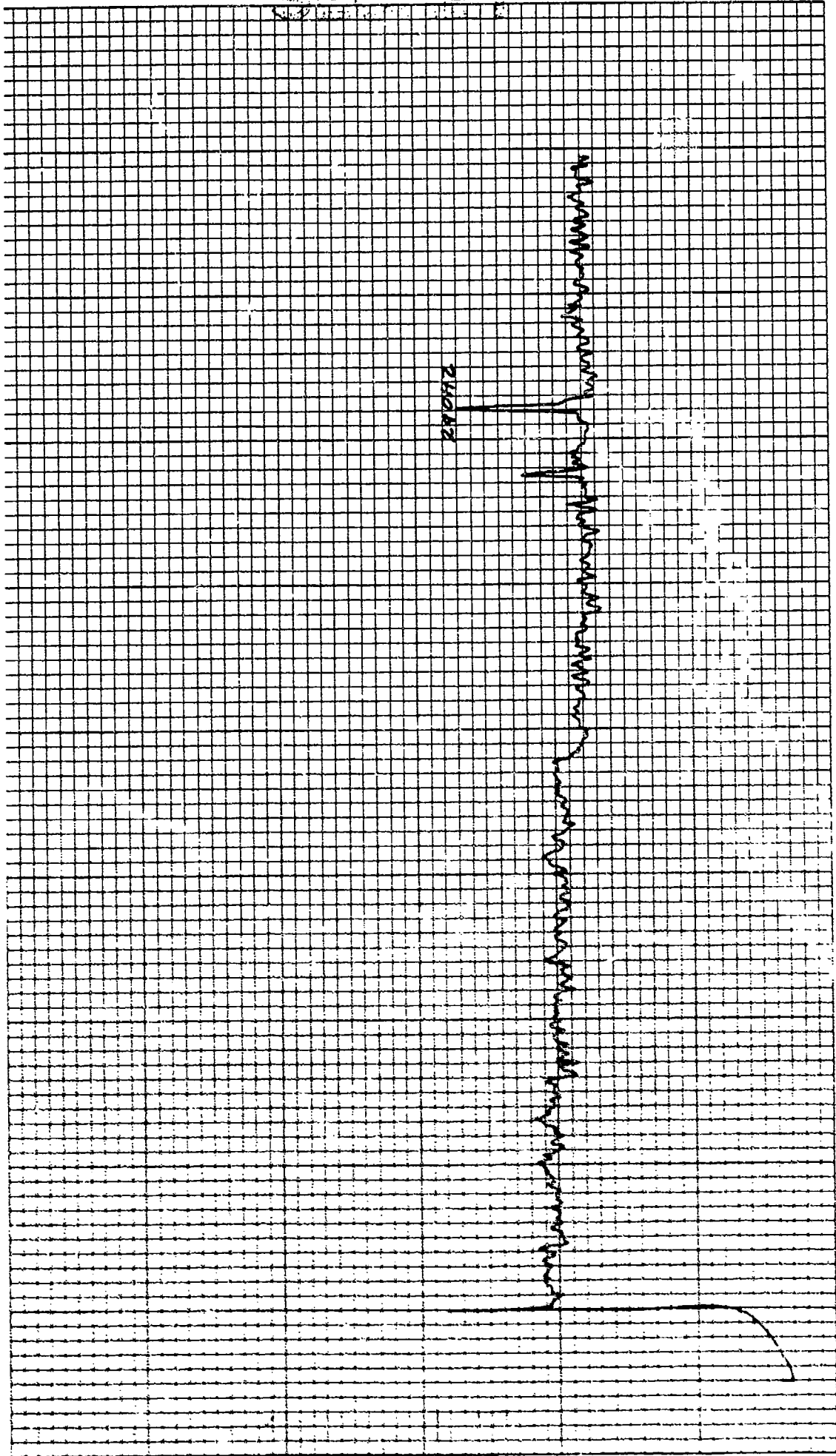


SECRET

CONTROL: 0633 - 49 QPD)
BEAMFORMED SPECTRUM (ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
49 ELEMENTS

DATE OF ANALYSIS: - - -
1-6-79-26 (29-53)
DATE/TIME: 3-16-77 - 0633 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+66 DEG. AZ STEERING

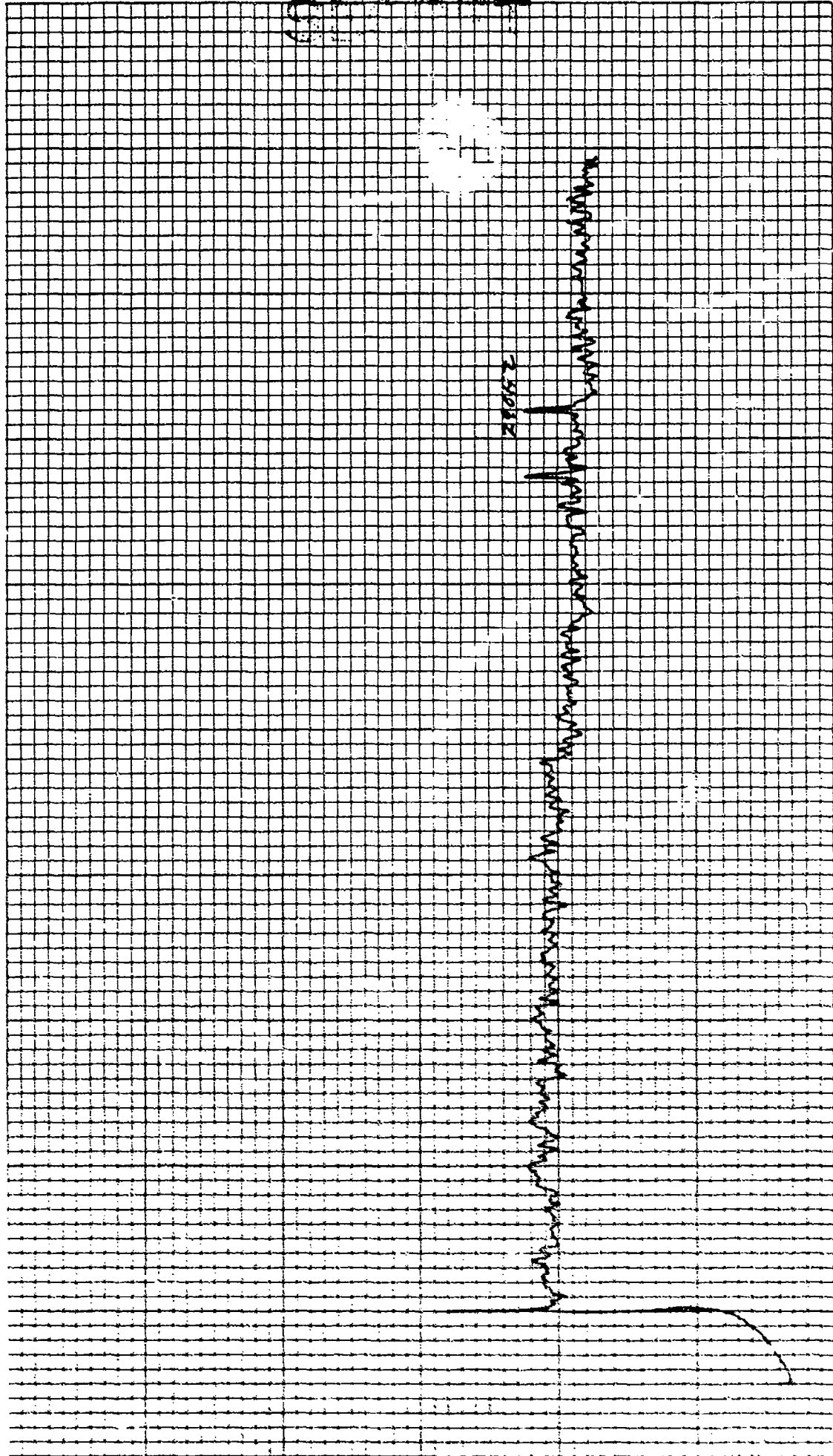
REEL: M19 INDE X1637
INTEGRATION TIME 320 SECS ATTN: -24 DB
FILTER WTG: HANNING



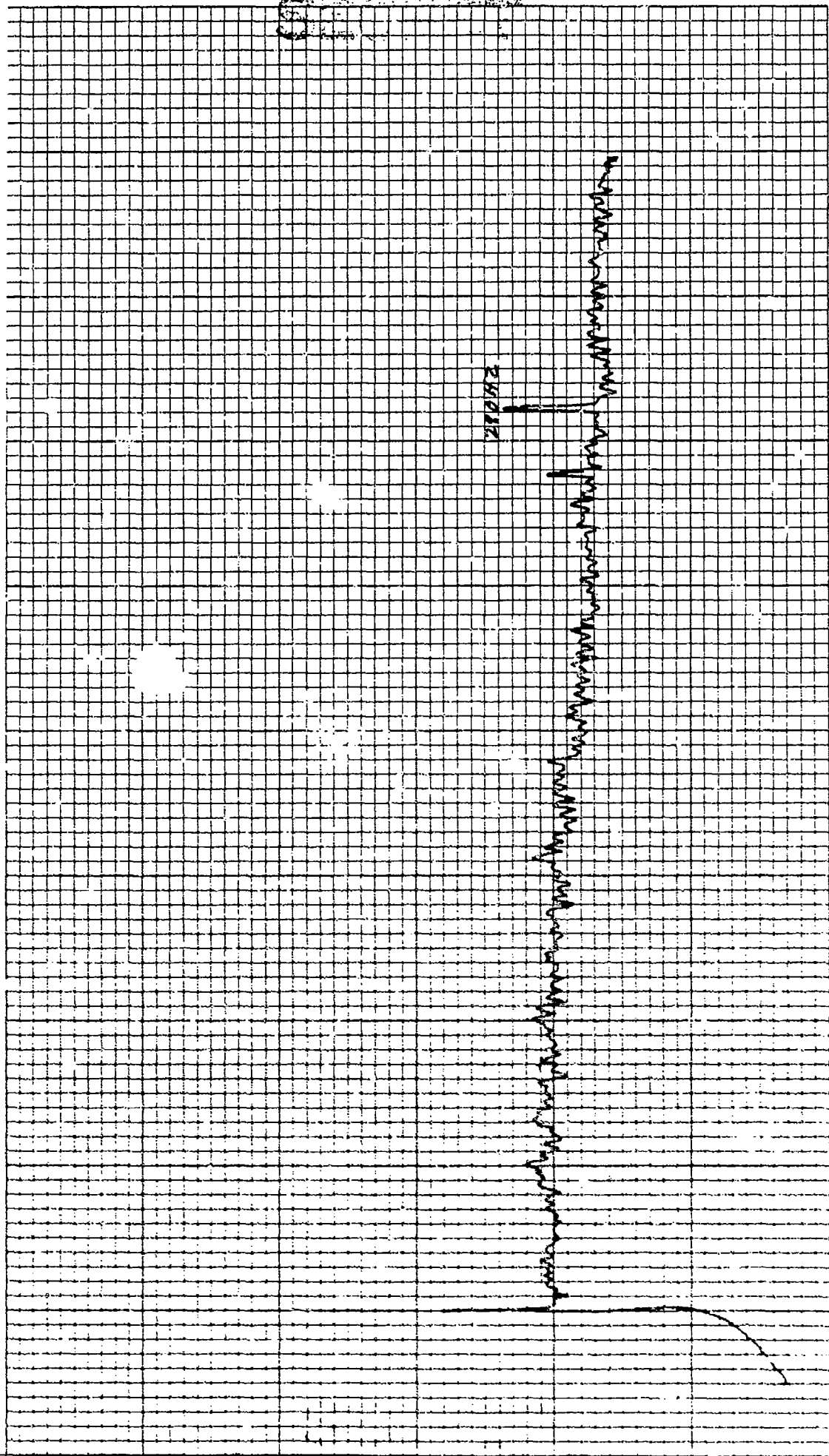
KOE 10 X 10 TO THE INCH .7 X 10 INCHES
REUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0633 - 49 (D910) REEL: M19 INDE X 1637
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-64 9-26 29-53
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 0633Z INTEGRATION TIME 320 SECS ATTN: -2YDB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
49 ELEMENTS +60 DEG. AZ STEERING



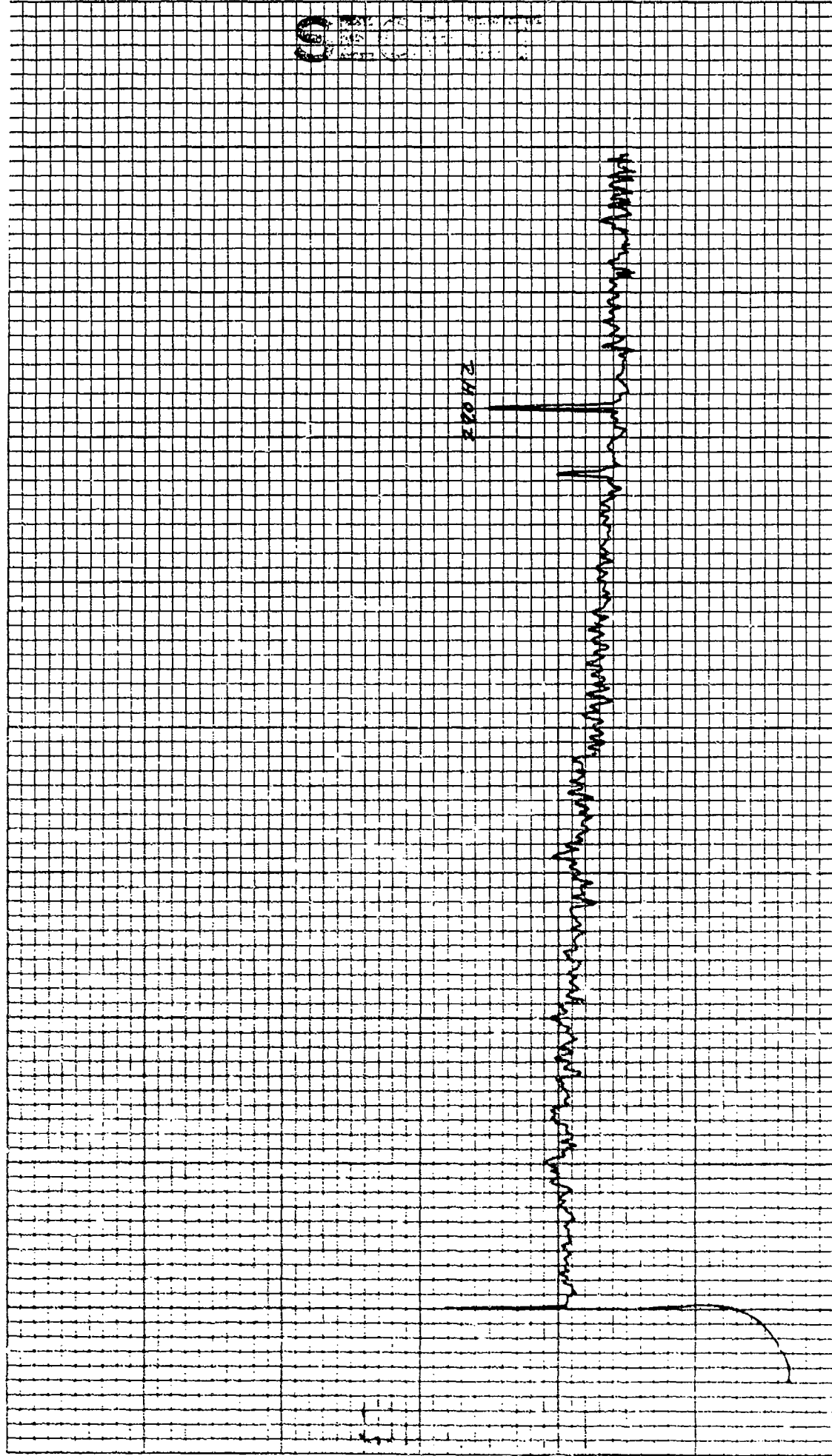
CONTROL: 0633-49 (DP10) DATE OF ANALYSIS: 1-689-26 (839-53) REEL: 4/9 INDE X/672
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-7-677-0633 Z INTEGRATION TIME 320 SECS ATTN: -2#DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
CENTER FREQ: 220 HZ +70 DEG. AZ STEERING



KOE 10 X 10 TO THE INCH .7 X 10 INCHES
MELTZER & LESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0633 - 49 (DP10) DATE OF ANALYSIS: 1-14-77 (20-53) REEL: M19 INDE X1637
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-16-77 - 0633Z INTEGRATION TIME 320 SECS ATTN: -29 DB
EXERCISE: BEARING STAKE ANALYSIS LANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 270 HZ +72 DEG. AZ STEERING



NOISE SPECTRAL DENSITY CALCULATIONS FOR SPRAY/BEARING STAKE (U)

DATA POINT 11

DATE 3-16-77

TIME 0935Z

FREQUENCY 140 HZ

INDICATED NOISE LEVEL dBV $\frac{1}{10}$ ABW

-50.0

SYSTEM SENSITIVITY dB/ μ B

-(-12) = -38.0

BANDWIDTH CONVERSION TO 1 HZ BAND

+8.2 = -29.8

CONVERSION TO dBre μ Pa/1HZ

+100 = +70.2

UNCLASSIFIED

UNCLASSIFIED

NOISE SPECTRAL DENSITY CALCULATIONS FOR SPRAY/BEARING STAKE (U)

DATA POINT 11 DATE 3-16-77 TIME 0935Z

FREQUENCY 290 HZ

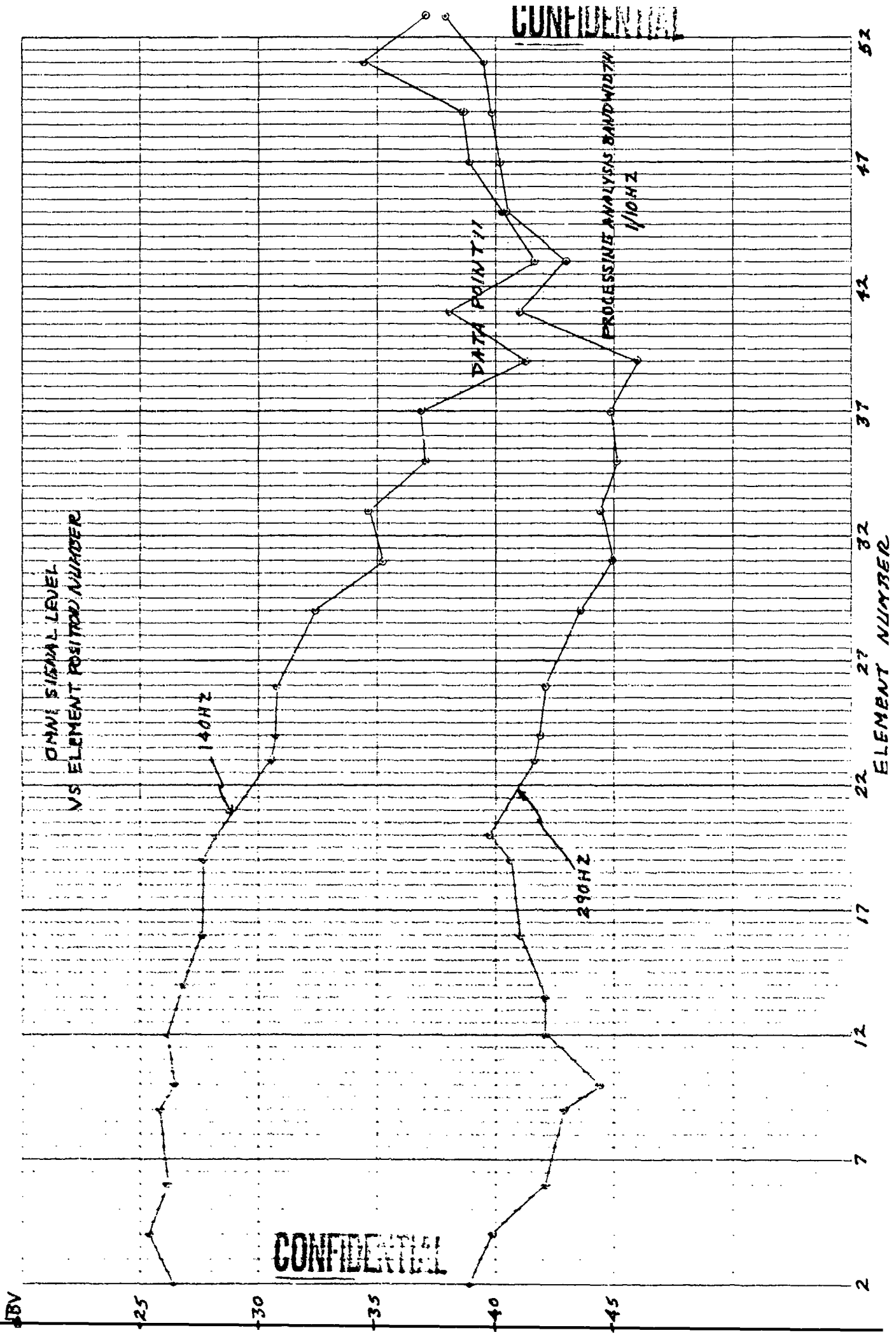
INDICATED NOISE LEVEL dBV $\frac{1}{\mu}$ ABW	<u>-54.0</u>
SYSTEM SENSITIVITY dB/ μ B	<u>-(-8)</u>
BANDWIDTH CONVERSION TO 1 HZ BAND	<u>+6.2</u>
CONVERSION TO dBre μ Pa/1HZ	<u>+100</u>
	<u>-37.8</u>
	<u>+62.2</u>

UNCLASSIFIED

UNCLASSIFIED

REF ID: A6 10 TO THE INCHES 1 X 10 INCHES
REURTEL & POWER CO. WASH DC

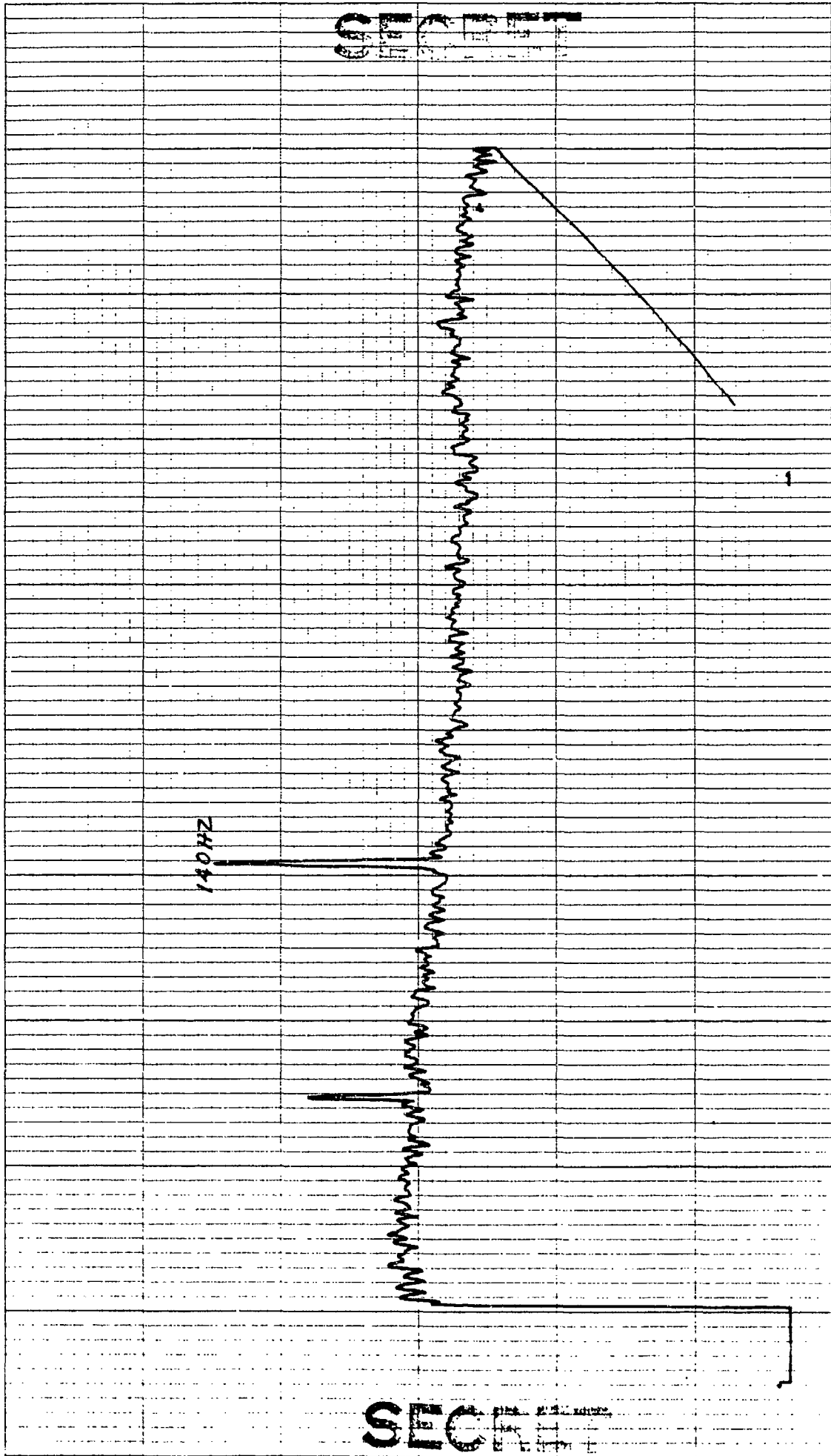
46 0703



10 X 10 TO THE INCH • 7 X 10 INCHES
NEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-16-0935 (27) DATE OF ANALYSIS: REEL: M22 INDEX 566
OMNI SPECTRUM (ELEMENT 2)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: DB
1 ELEMENT DEG AZ STEERING FILTER WTC: HANNING



SECRET

SECRET

10 X 10 TO THE INCH 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

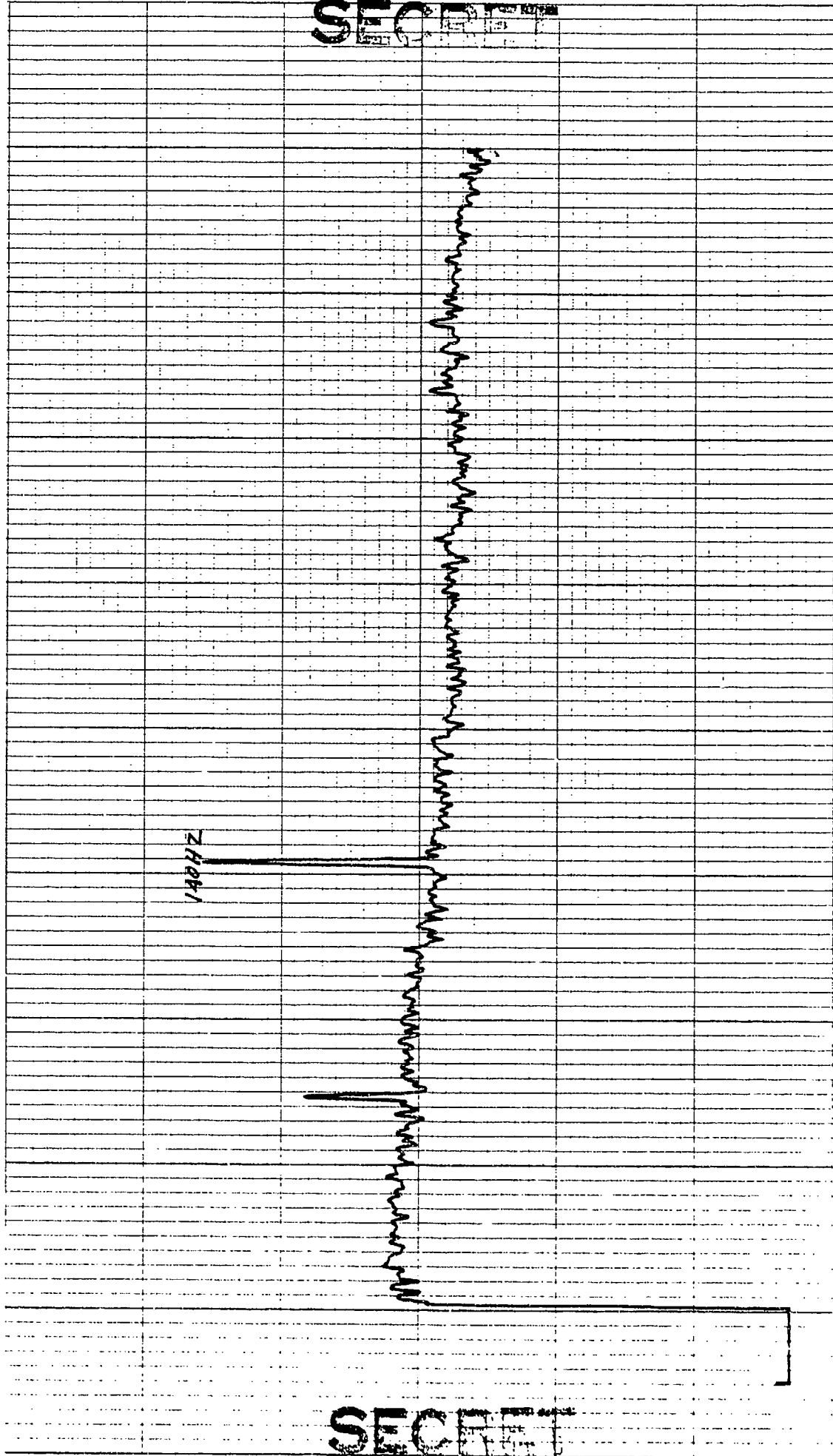
CONTROL: 3-16 -0935 (28)
OMNI SPECTRUM (ELEMENT 4)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0935 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: M22 INDEX 566

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



SECRET

SECRET

10 X 10 TO THE INCH • 7 X 10 IFC HFS
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-16 -0935 (29)
OMNI SPECTRUM (ELEMENT 6)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

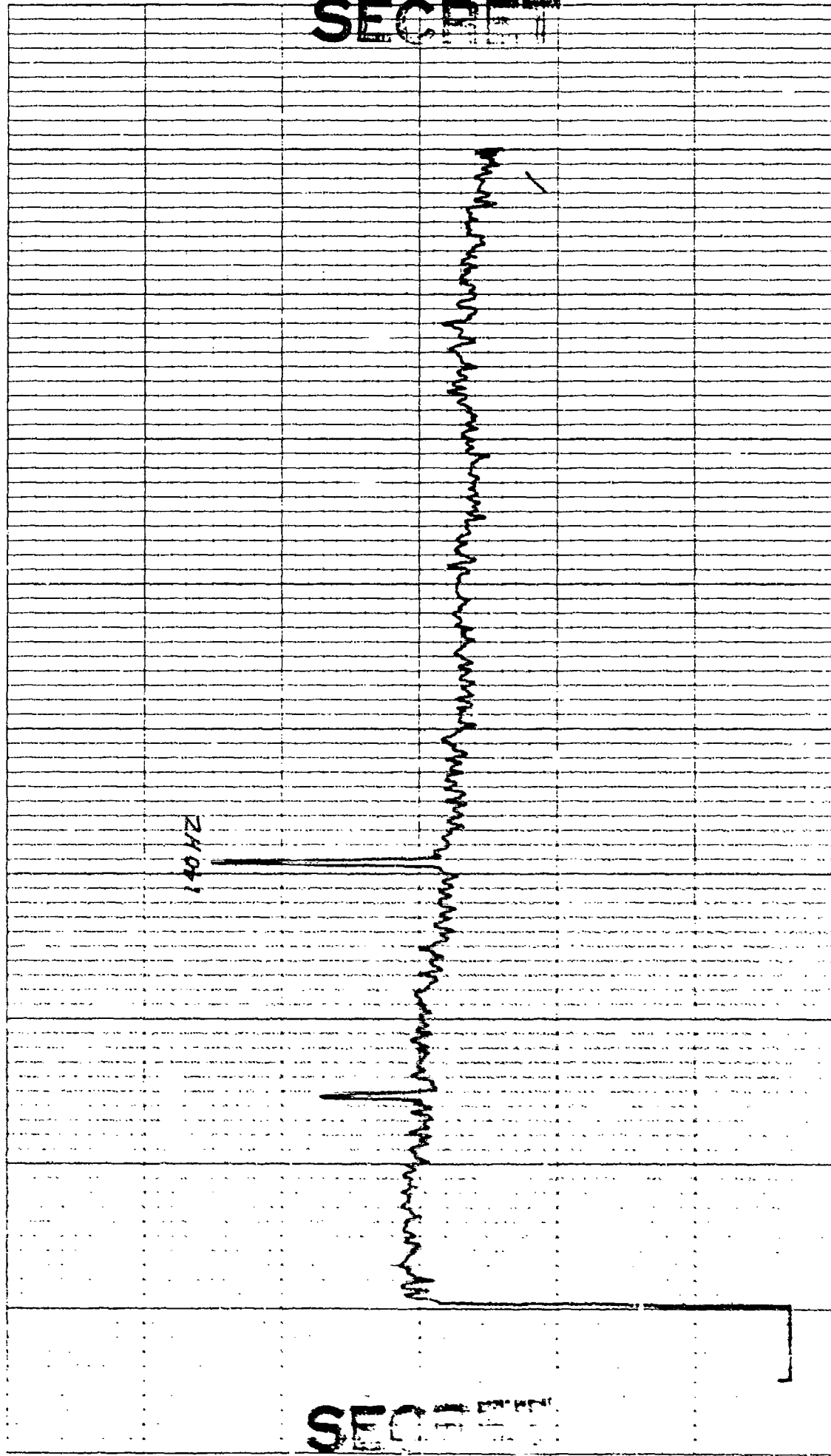
DATE OF ANALYSIS:

DATE/TIME: 3-16-77 -0935 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

REEL: M22

INDEX 566

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING



NO. 10 TO THE INCHES. 3 TO THE FEET.
REURTEL & POWER CO. MADE IN U.S.A.

46 0703

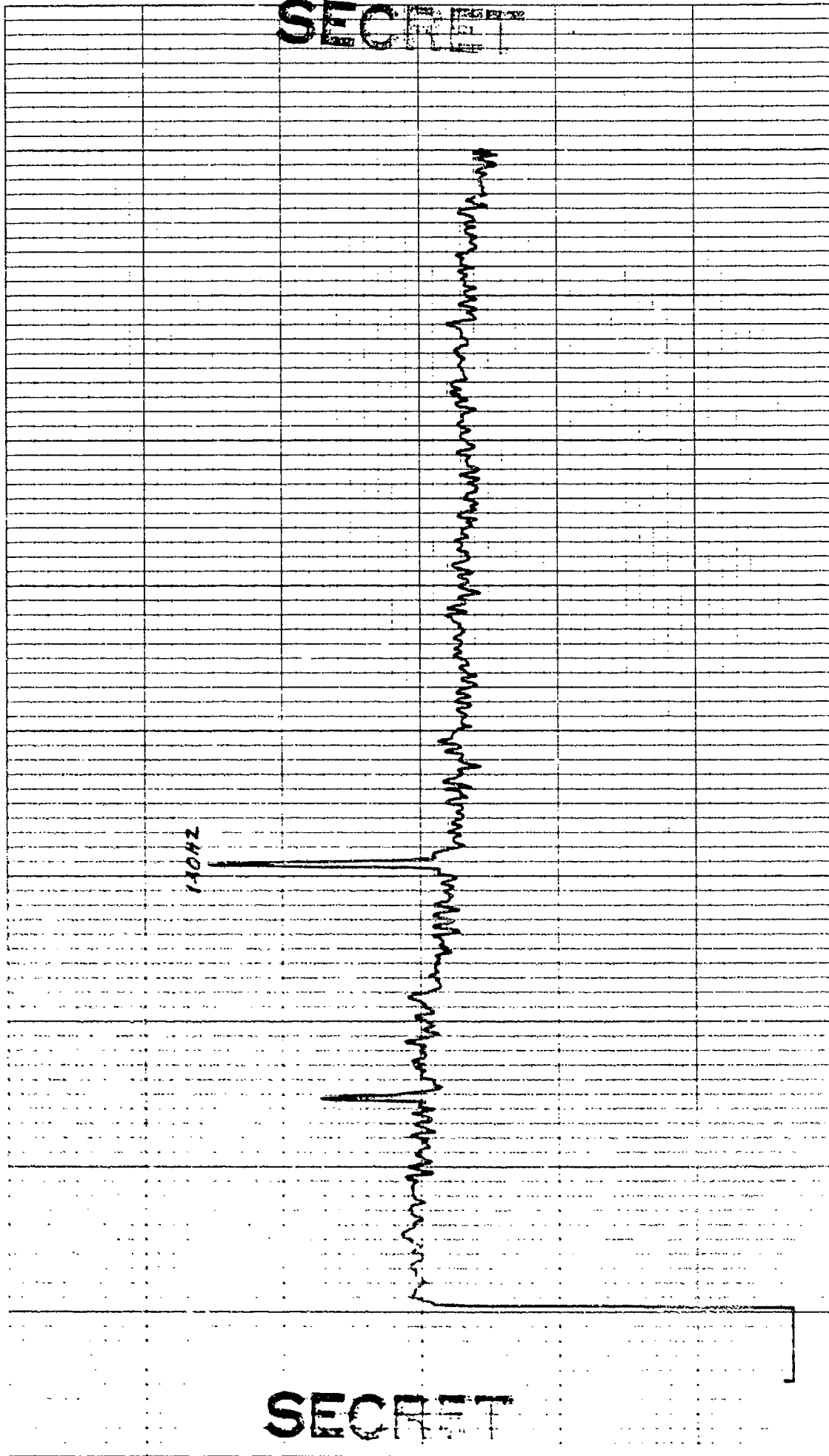
CONTROL: 3-16 - 0122 (20)
OMNI SPECTRUM (ELEMENT 9)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 MZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0835 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: M22 INDEX 566

INTEGRATION TIME 320 SECS ATTN: — DB
FILTER WTG: HANNING



SECRET

SECRET

10 X 10 TO THE INCH • 7 X 10 INCHES
REUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-16 - 0935 (31)
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

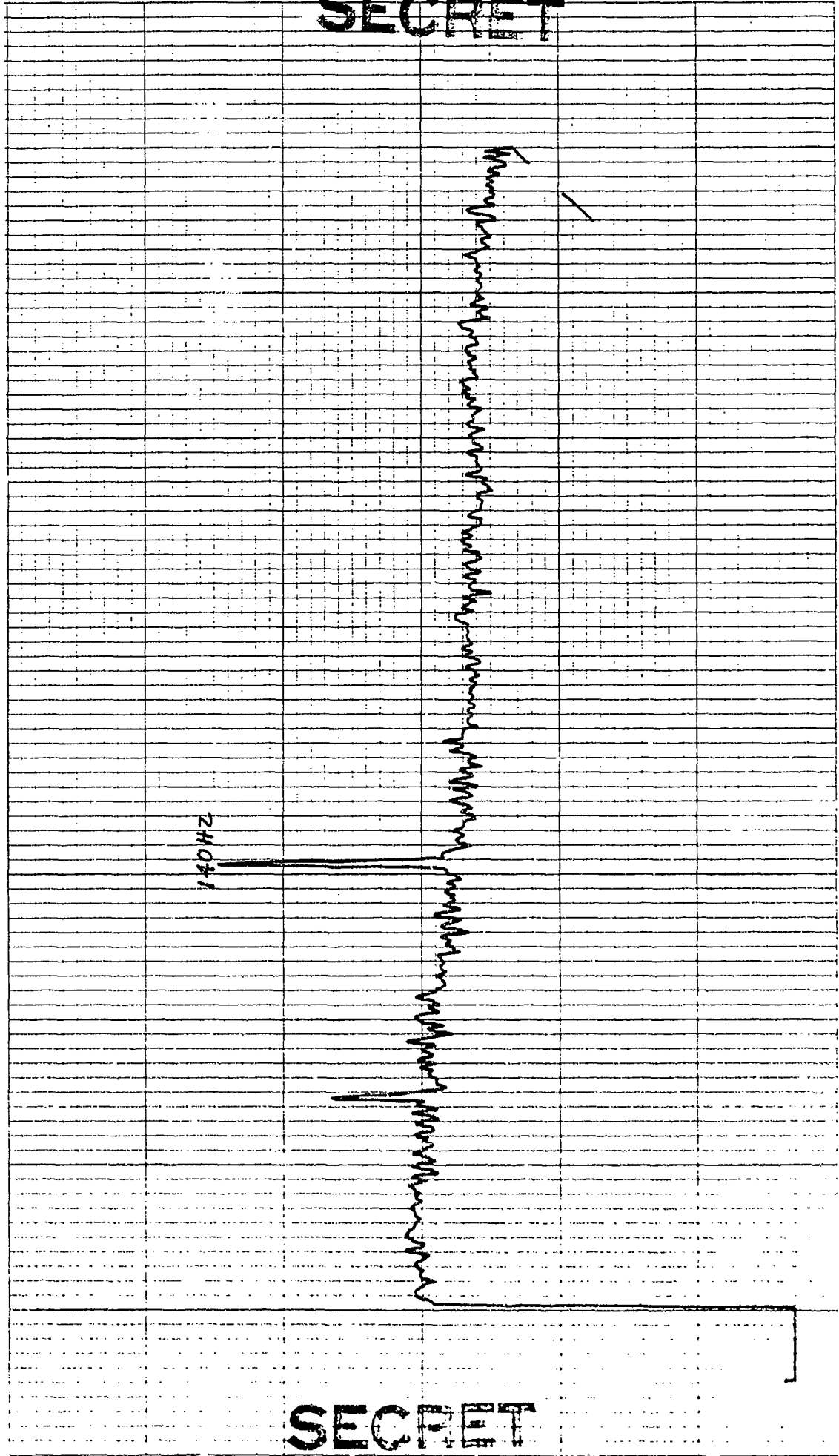
DATE/TIME: 3-16-77 - 0935 Z

ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: M22

INDEX: 566

INTEGRATION TIME 320 SECS
FILTER
ATTEN: 1 DB
WTG: HANNING



SECRET

SECRET

KOE 10 X 10 TO THE INCHES
REDFIELD WYSSER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-16-0935 (12)
OMNI SPECTRUM (ELEMENT 12)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

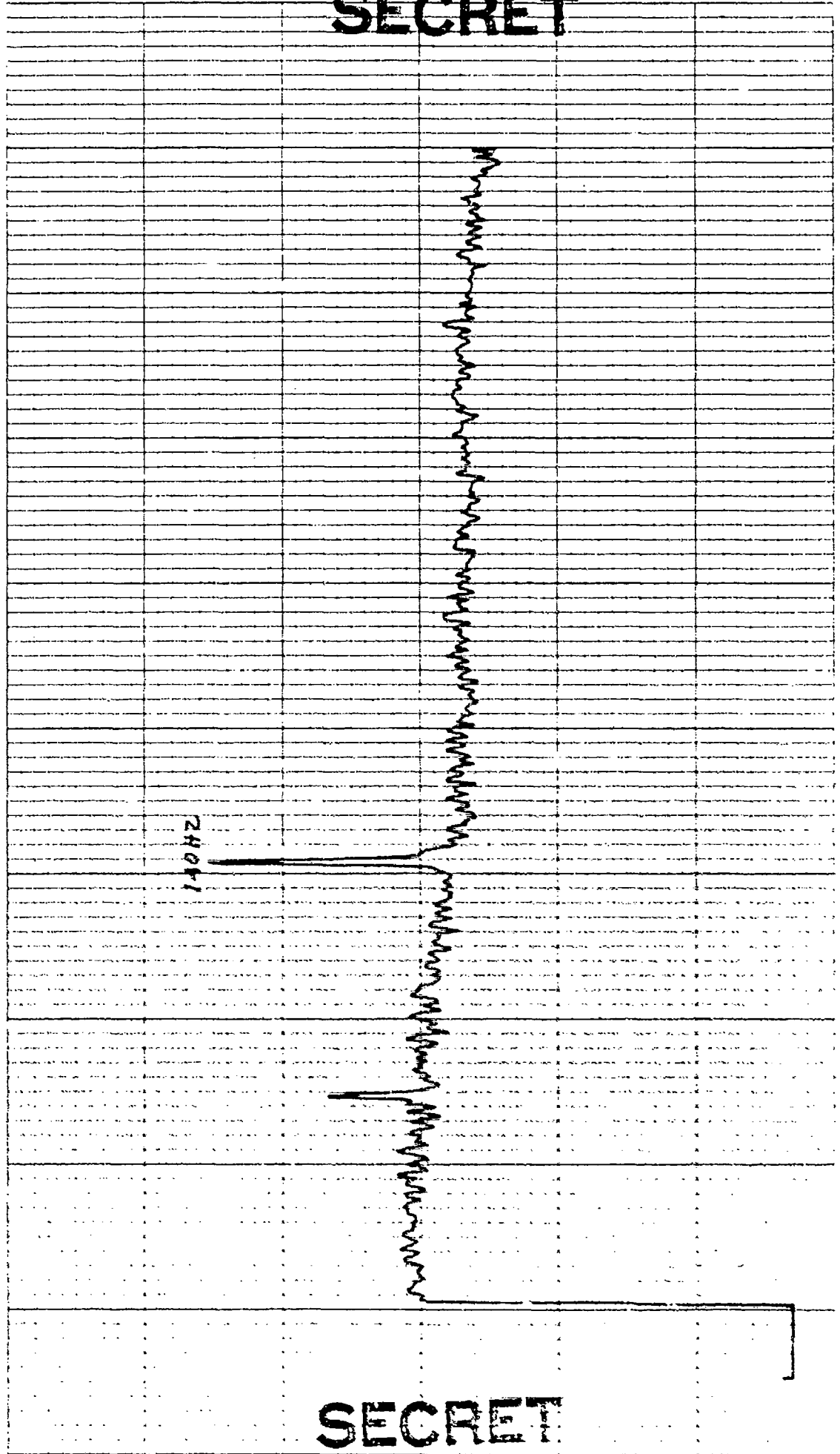
DATE OF ANALYSIS:

DATE/TIME: 3-16-77 -0935 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: M22

INDEX: 566

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER
WTG: HANNING



SECRET

SECRET

46 0703

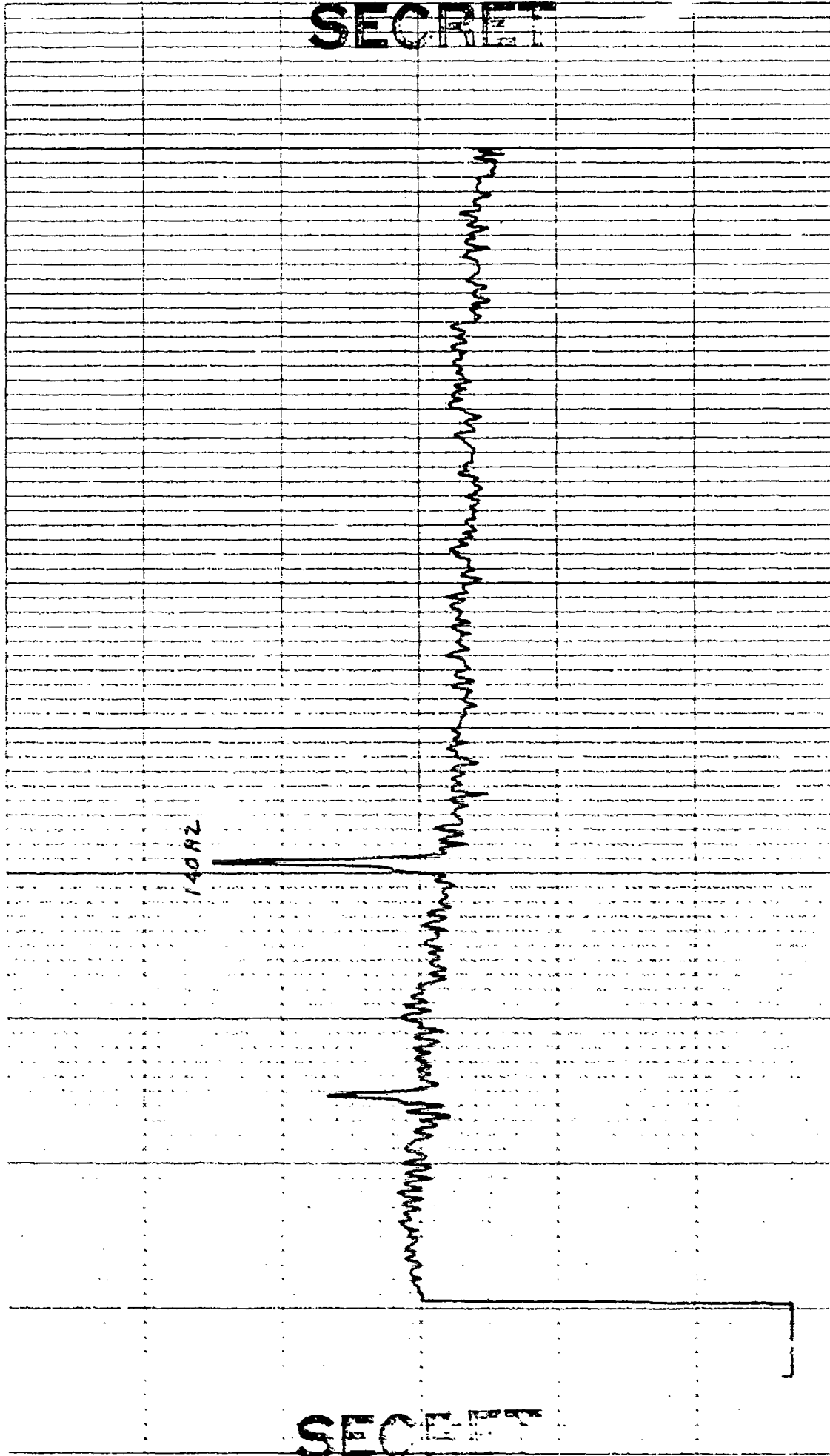
CONTROL: 3-16-0935 (J3)
OMNI SPECTRUM (ELEMENT 14)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0935Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

REEL: M22 INDEX 566

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC HANNING



SECRET

REF ID: A66003

46 0703

CONTROL: 3-16 -0935 (34)
OMNI SPECTRUM (ELEMENT 16)
EXERCISE: BEARING SIAKE
CENTER FREQ: 150 HZ
1 ELEMENT

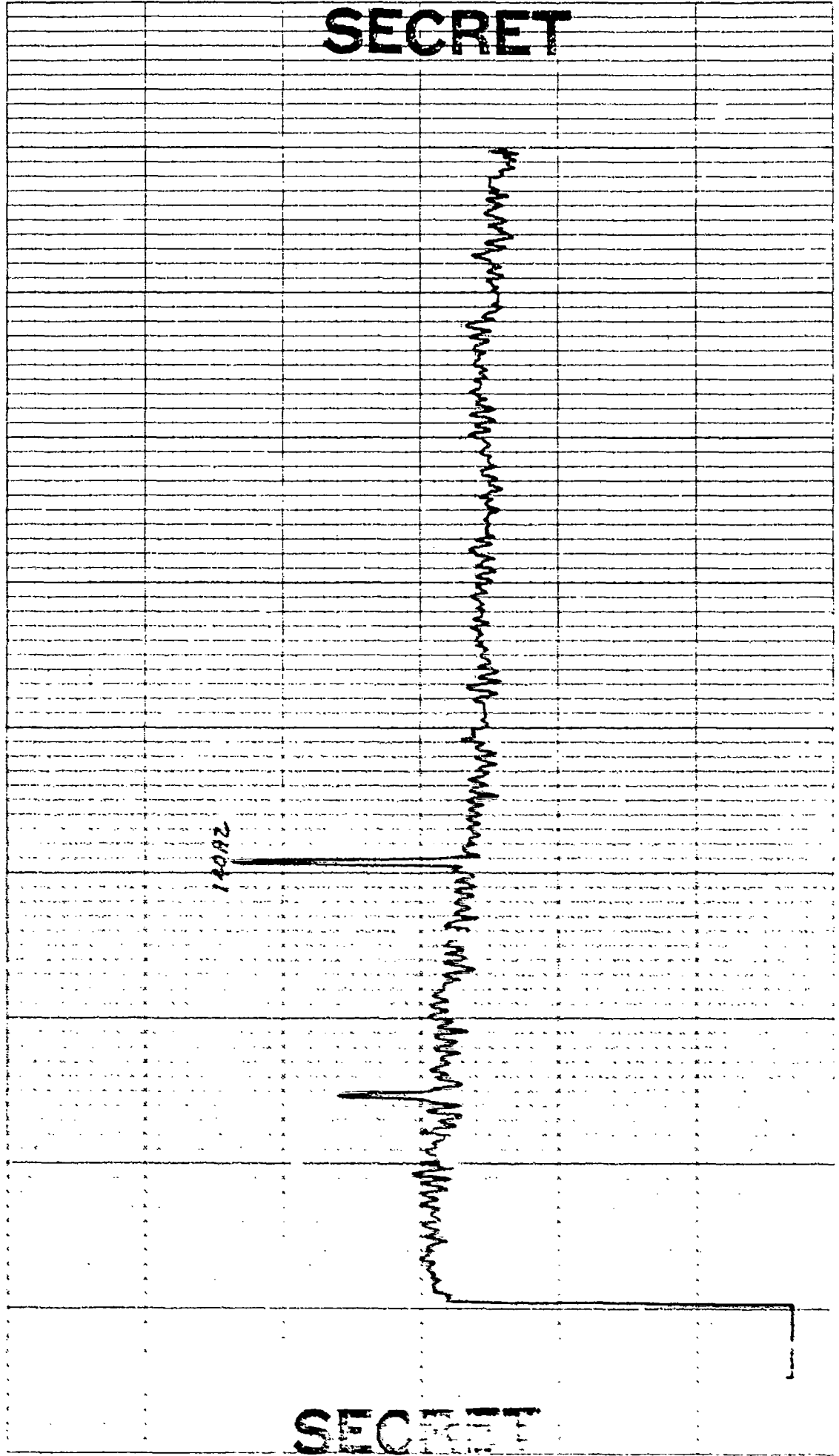
DATE OF ANALYSIS:

DATE/TIME: 3-16-77 -0935 Z

ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

REEL: M22 INDEX 566

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING



SECRET

SECRET

NO. 10 X 10 TO THE INCH. K. 10 INCHES
KEUFFEL & ESSNER CO. MADE IN U.S.A.

46 0703

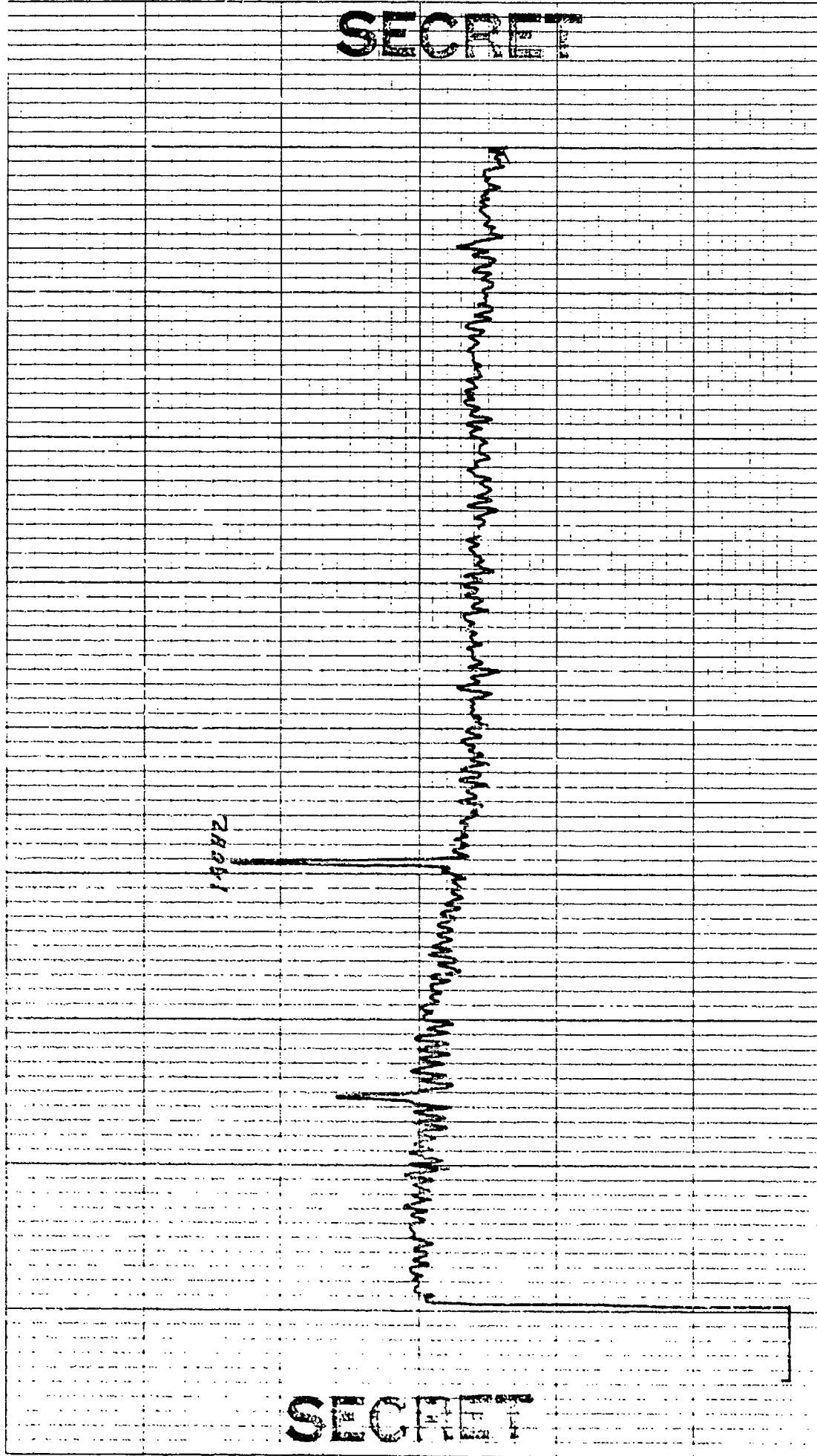
CONTROL: 3-16 - 0935 (35)
OMNI SPECTRUM (ELEMENT 19)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-16-77 - 0935 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: M22 INDEX 566

INTEGRATION TIME 320 SECS ATTN: — DB
FILTER WTG: HANNING



SECRET

SECRET

K-E 10 X 10 TO THE INCH • 7 X 10 INCHFS
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

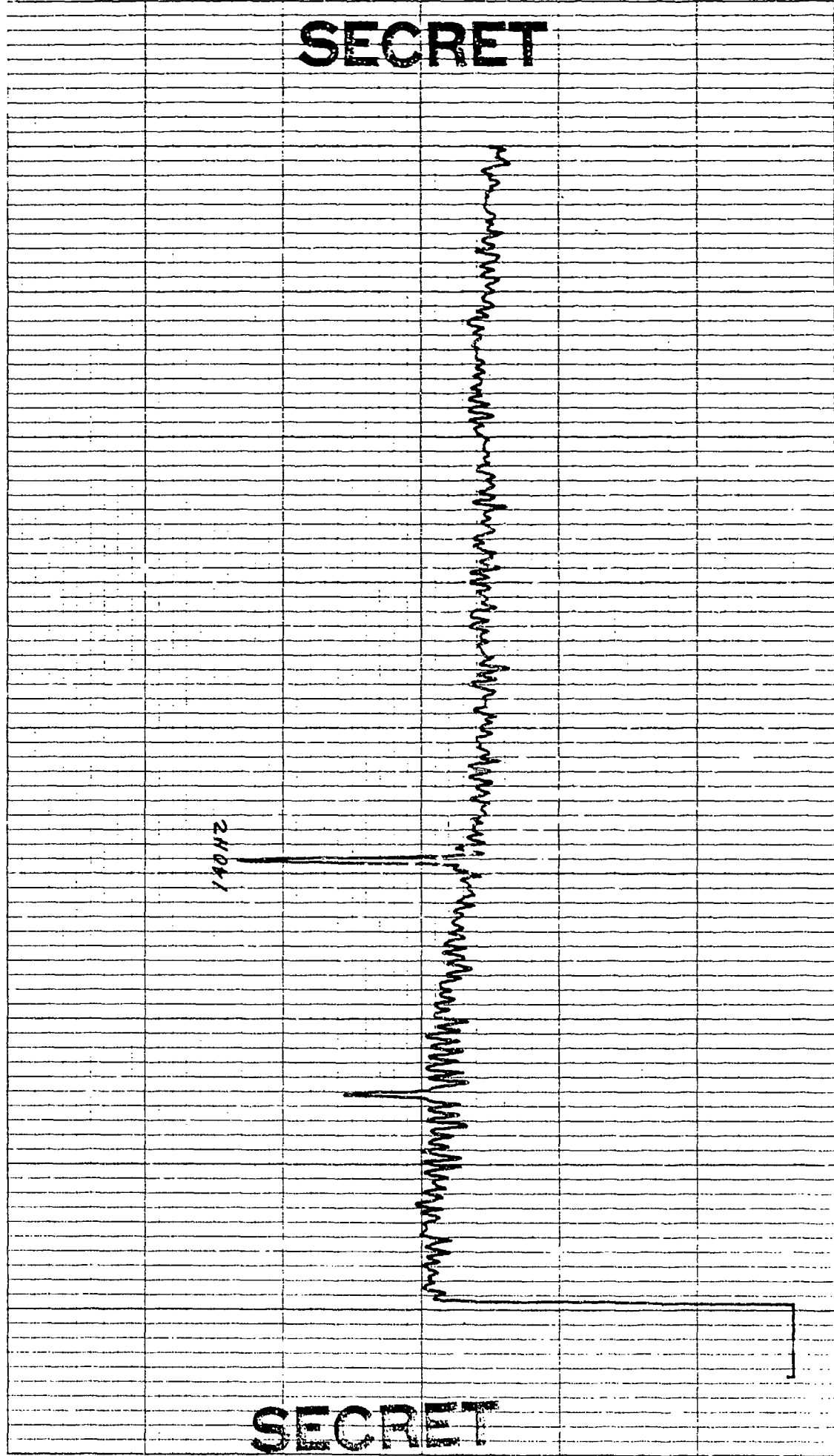
CONTROL: 3-16-0935 (36)
OMNI SPECTRUM (ELEMENT 20)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 -0935 Z
ANALYSIS BANDWIDTH: 1/10HZ
1 DEG AZ STEERING

REEL: M22 INDEX 566

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING



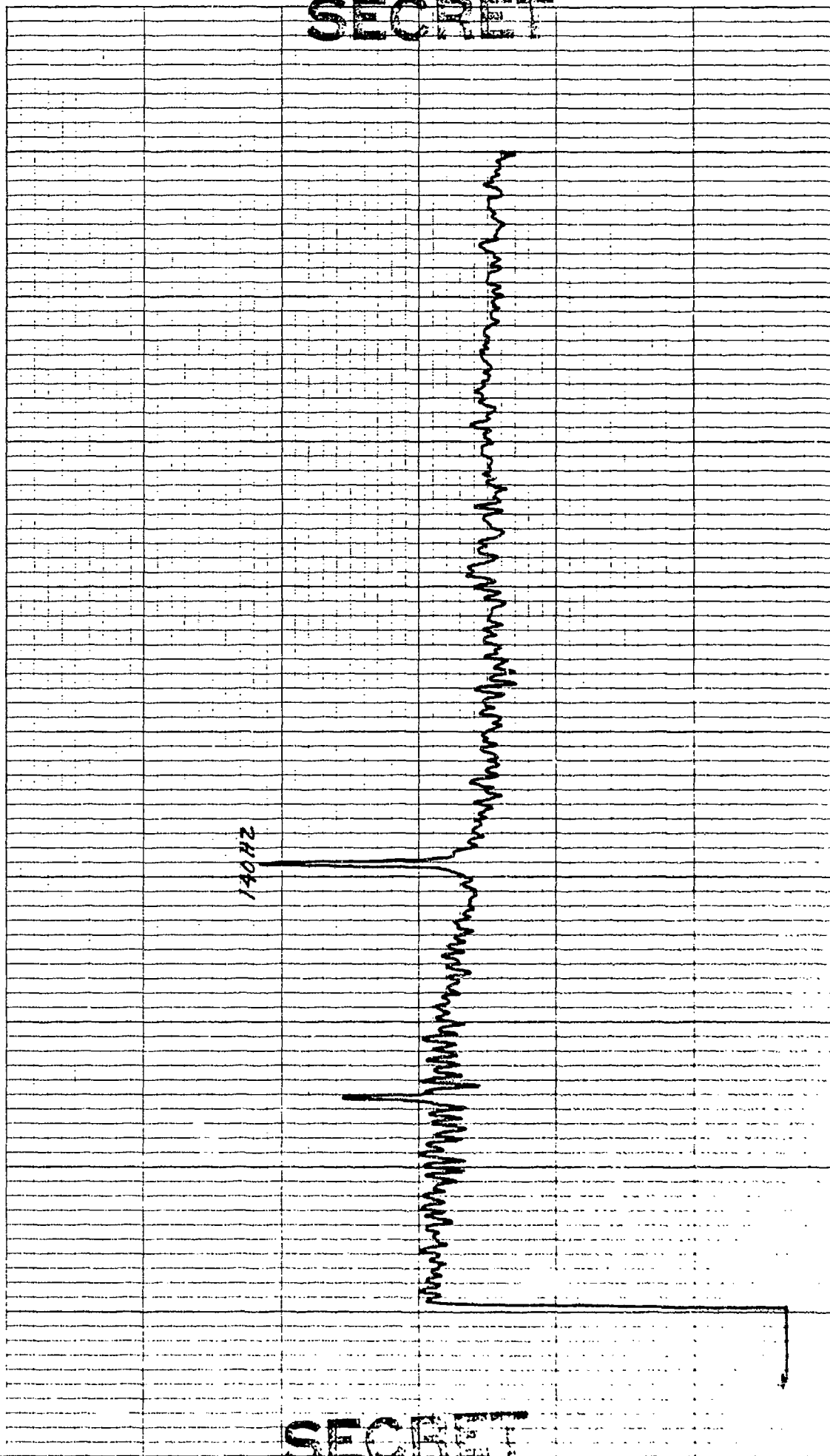
SECRET

SECRET

K-E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 C703

CONTROL: 376-0935 (37) DATE OF ANALYSIS: REEL: 1122 INDEX 566
OMNI SPECTRUM (ELEMENT 23)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT
INTEGRATION TIME 320 SECS ATTEN: - DB
FILTER WTG: HANNING
ANALYSIS BANDWIDTH: 1/10 HZ
_____ DEG AZ STEERING



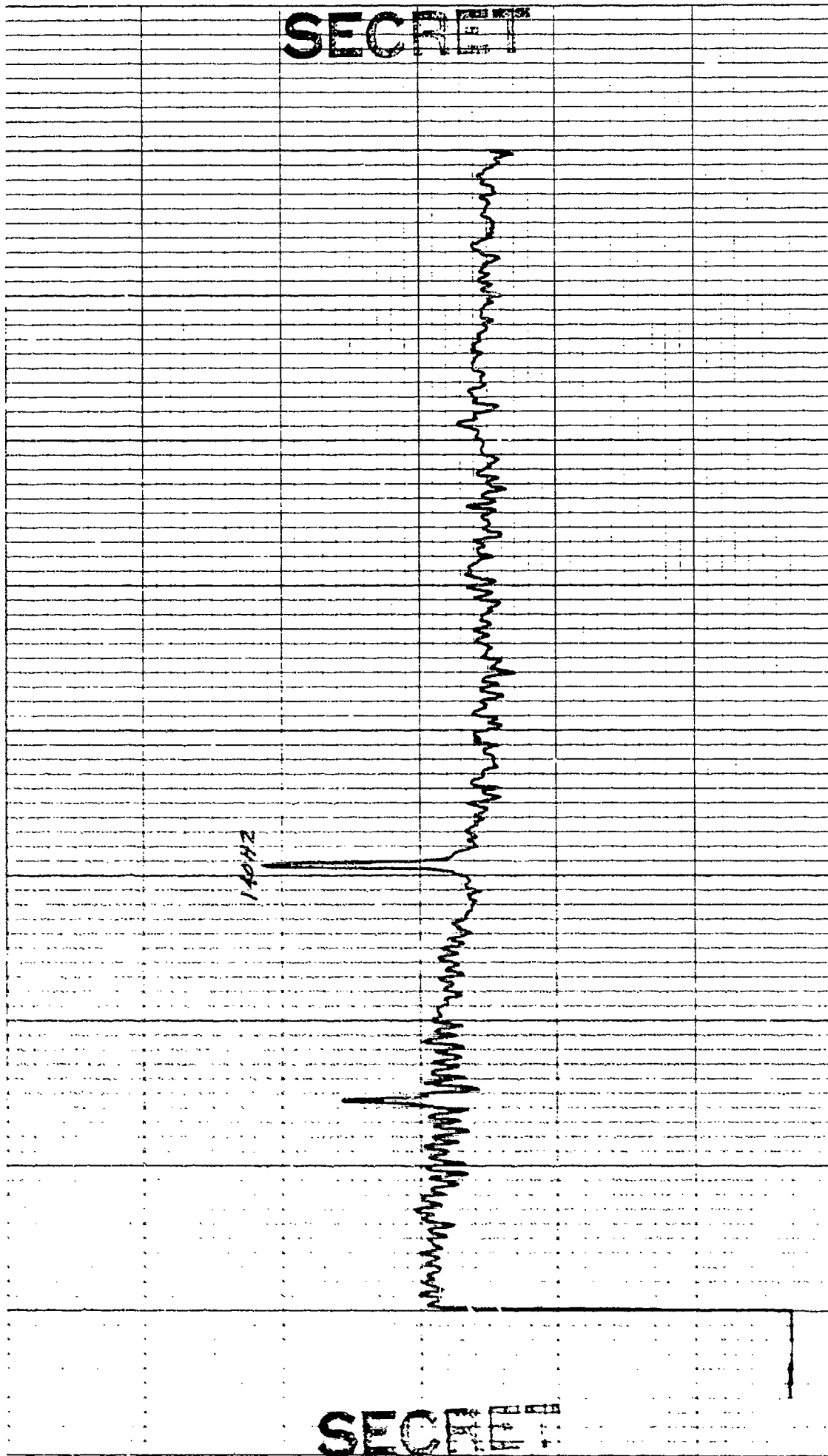
SECRET

SECRET

10 1/2 TO 12 1/2 INCHES
NEUTRAL W. PAPER CO. MADE IN U.S.A.

46 0703

CONTROL: J-16 - 0935 (30) REEL: M22 INDEX: 566
OMNI SPECTRUM (ELEMENT 24)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT
DATE OF ANALYSIS:
DATE/TIME: 3-16-77 - 0935Z
ANALYSIS BANDWIDTH: 1/10HZ
INTEGRATION TIME 320 SECS AITEN: - DB
FILTER WTC WTC: HANNING
DEC AZ STEERING



KOE 10 X 10 TO THE INCH .7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

REEL: M22 INDEX 566

DATE OF ANALYSIS:

CONTROL: 3-16-0935 (39)

OMNI SPECTRUM (ELEMENT 26)

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

1 ELEMENT

DATE/TIME: 3-16-77 - 0335Z

ANALYSIS BANDWIDTH: 1/10 HZ

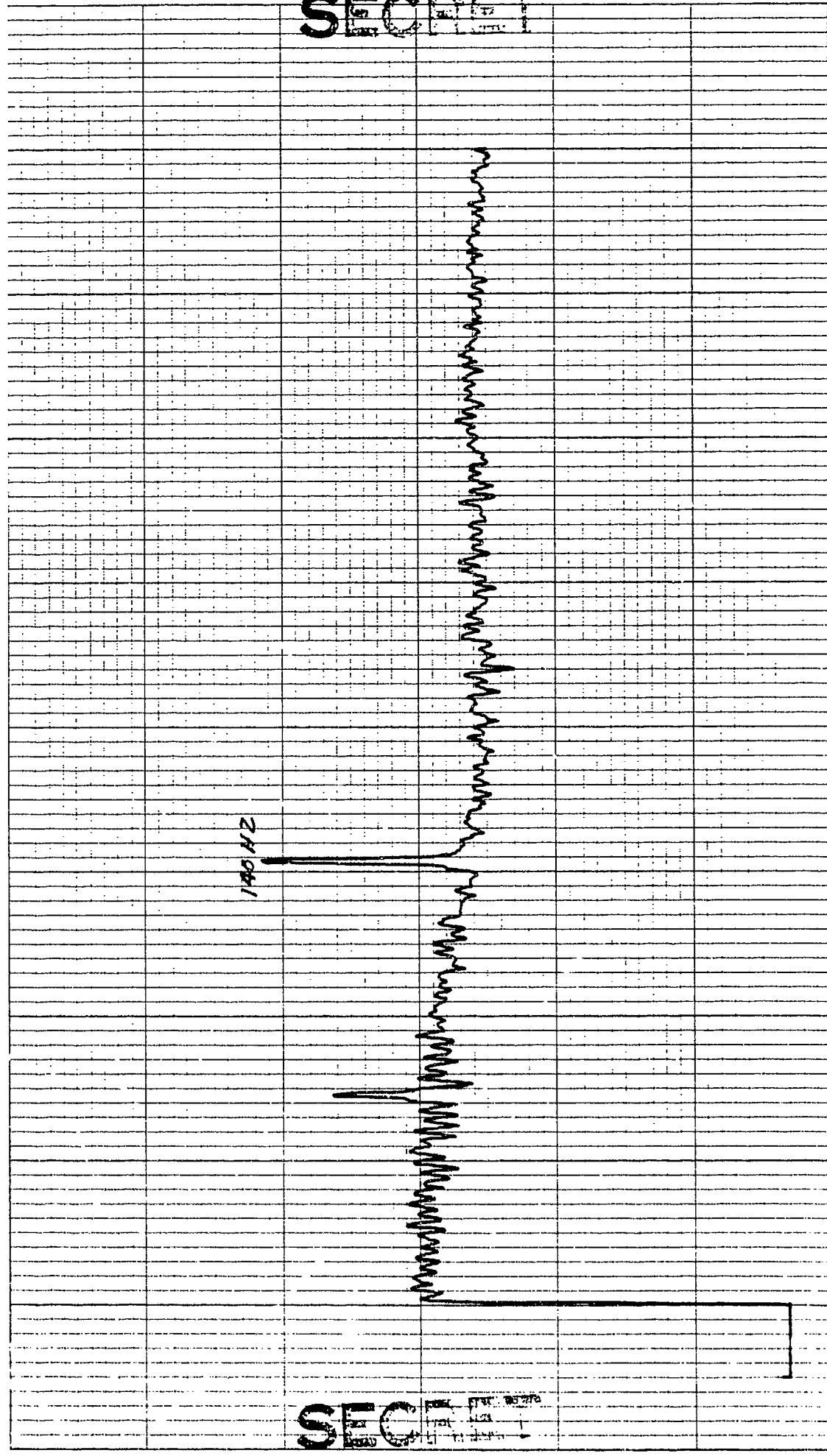
— DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

ATTEN: — DB

WTG: HANNING



SECRET

SECRET

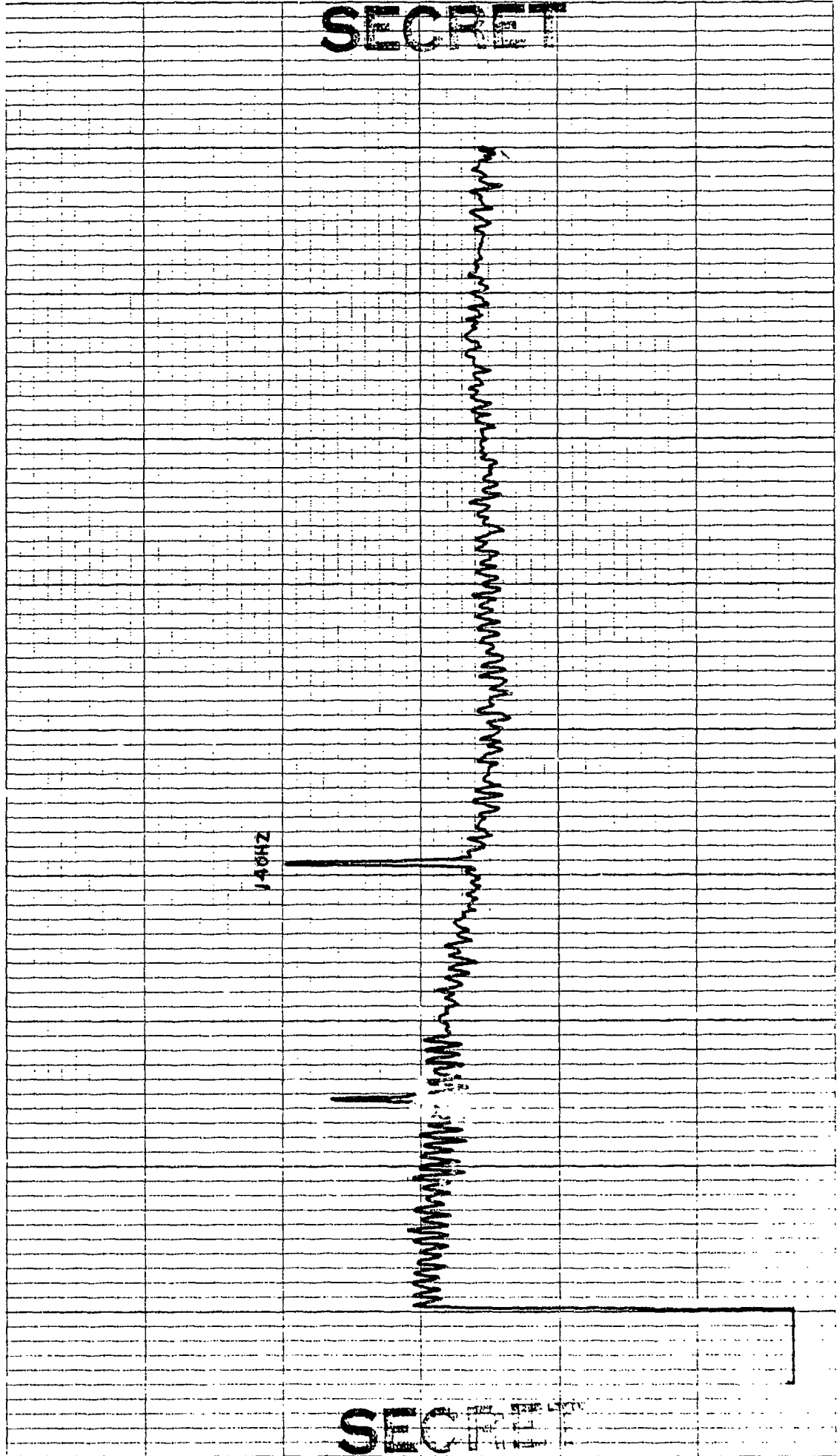
K-2 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0935 - 51 (DP11)
OMNI SPECTRUM (ELEMENT 29)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:
DATE/TIME: 3-16-77 - 0935 Z
ANALYSIS BANDWIDTH: 1/10 HZ
INTEGRATION TIME 320 SECS
ATTEN: - DB
FILTER WTG: HANNING

REEL: M22 INDEX 566



SECRET

SECRET

10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

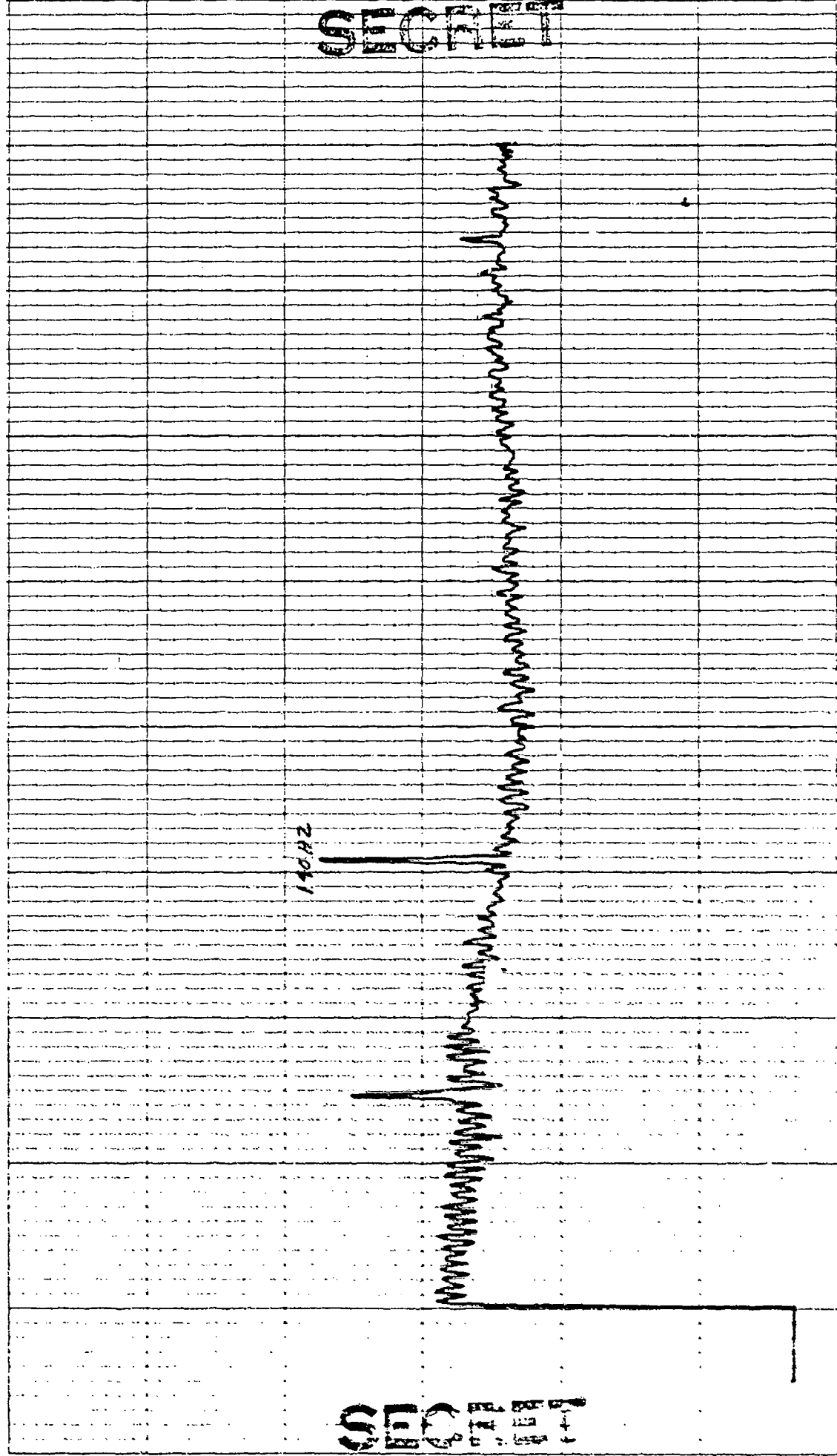
CONTROL: 3-16 - 0935 (41)
OMNI SPECTRUM (ELEMENT 31)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0935 Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ STEERING

REEL: M22 INDEX 566

INTEGRATION TIME 320 SECS ATTN: — DB
FILTER WTG: HANNING



31

150 HZ

140 HZ

46 0703

REF ID: A60703

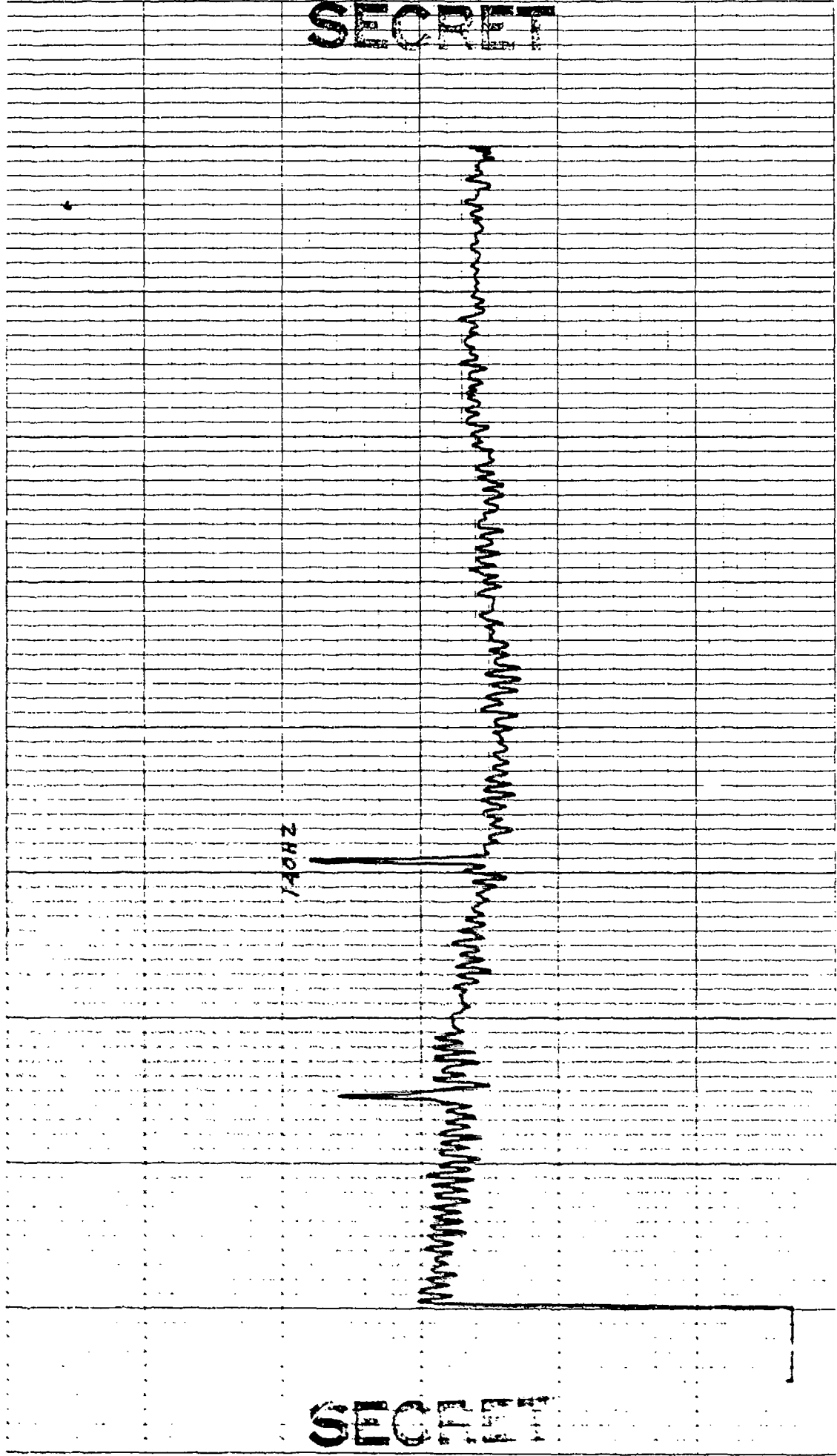
CONTROL: 3-16 - 0235 (42)
OMNI SPECTRUM (ELEMENT 33)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0235 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEC AZ STEERING

REEL: M22 INDEX 566

INTEGRATION TIME 320 SECS ATTN: — DB
FILTER WTG: HANNING



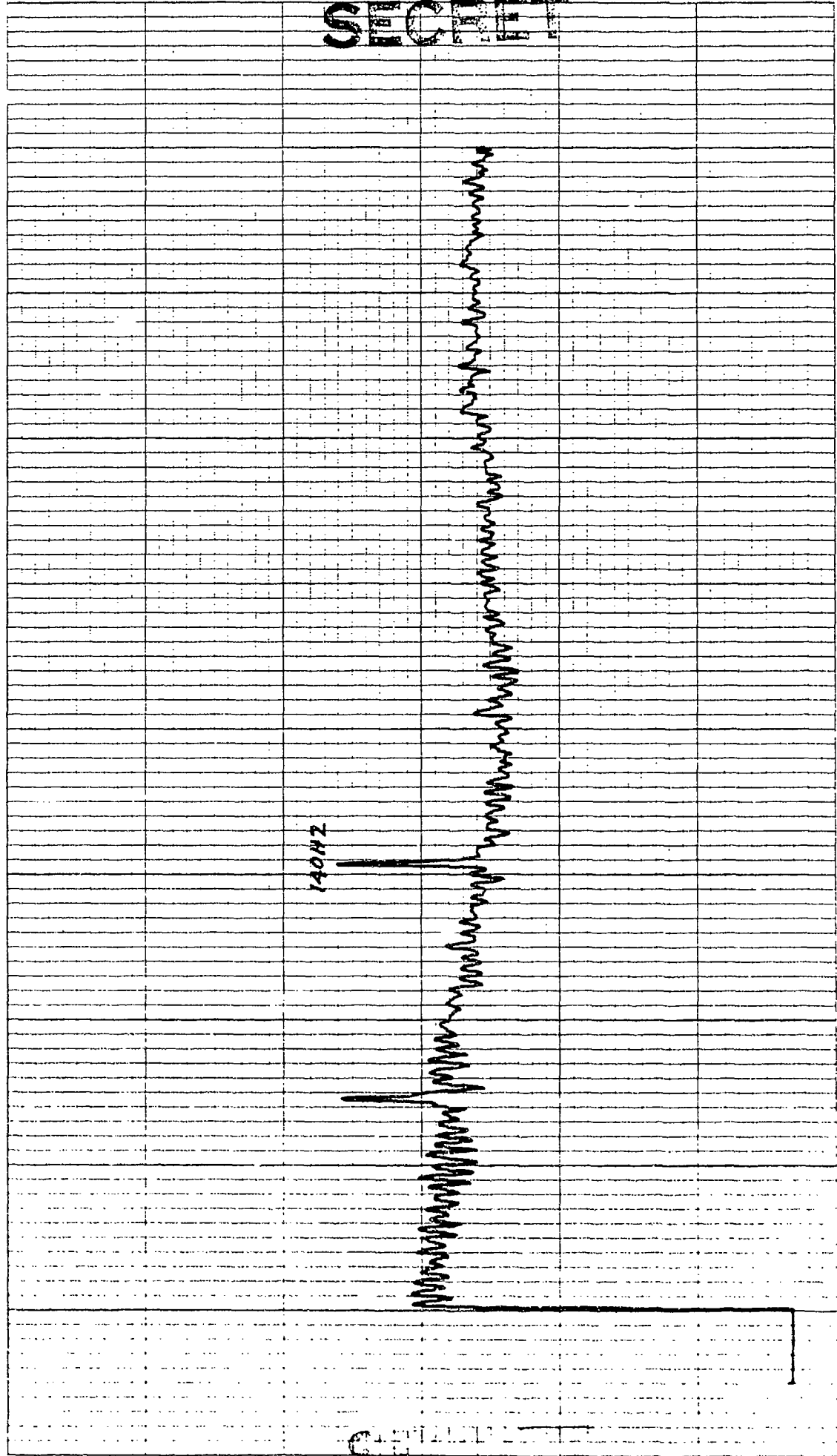
SECRET

SECRET

KOE 10 X 10 TO THE INCH • / X 10 INCHES
KEUFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 376 - 0135 (13) DATE OF ANALYSIS: REEL: M22 INDEX 566
OMNI SPECTRUM (ELEMENT 35)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: - DB
1 ELEMENT DEG AZ STEERING FILTER WTG: HANNING



10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

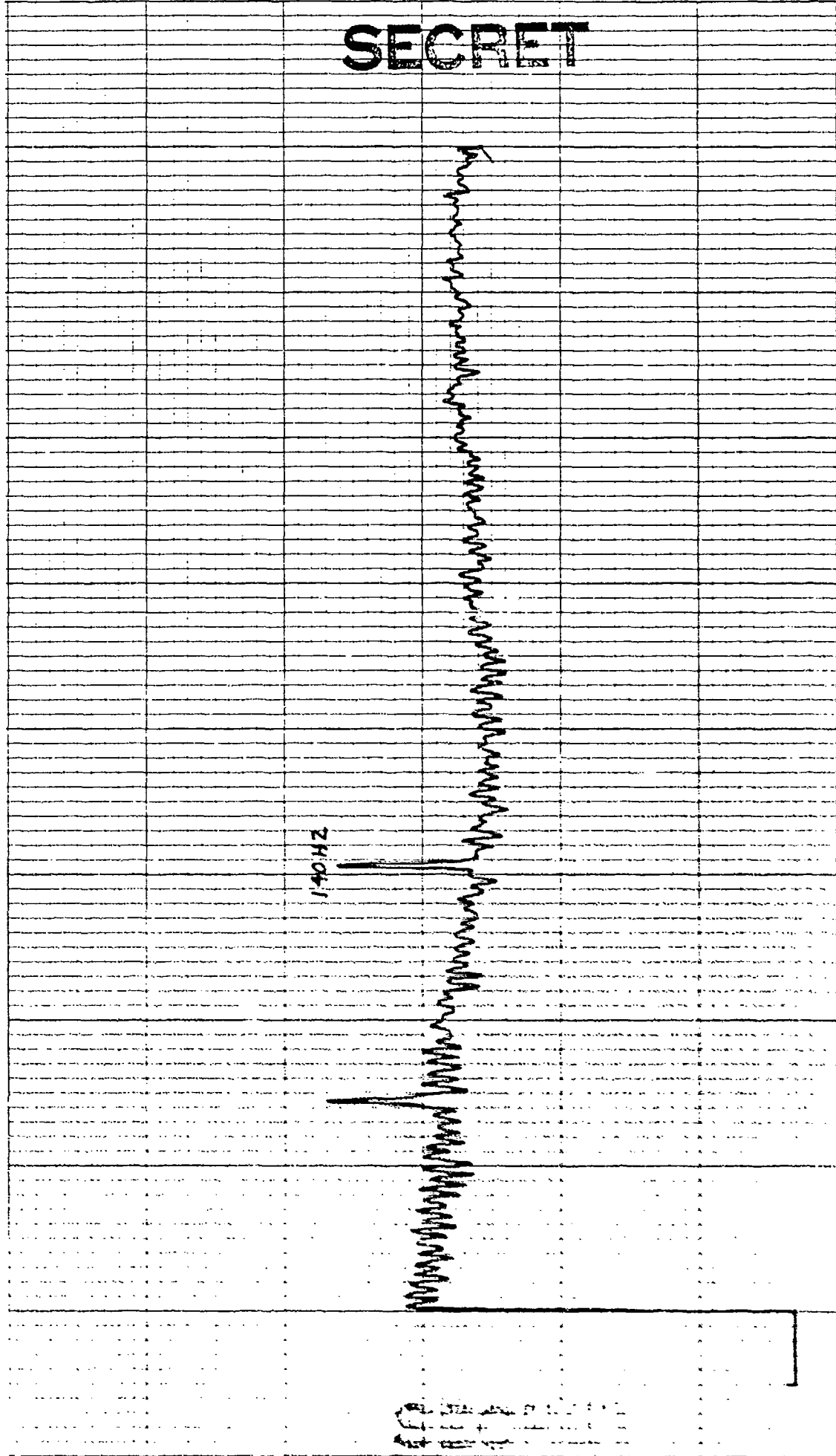
CONTROL: 376-0935 (44)
OMNI SPECTRUM (ELEMENT 37)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77-0935 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: M22 INDEX: 566

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



SECRET

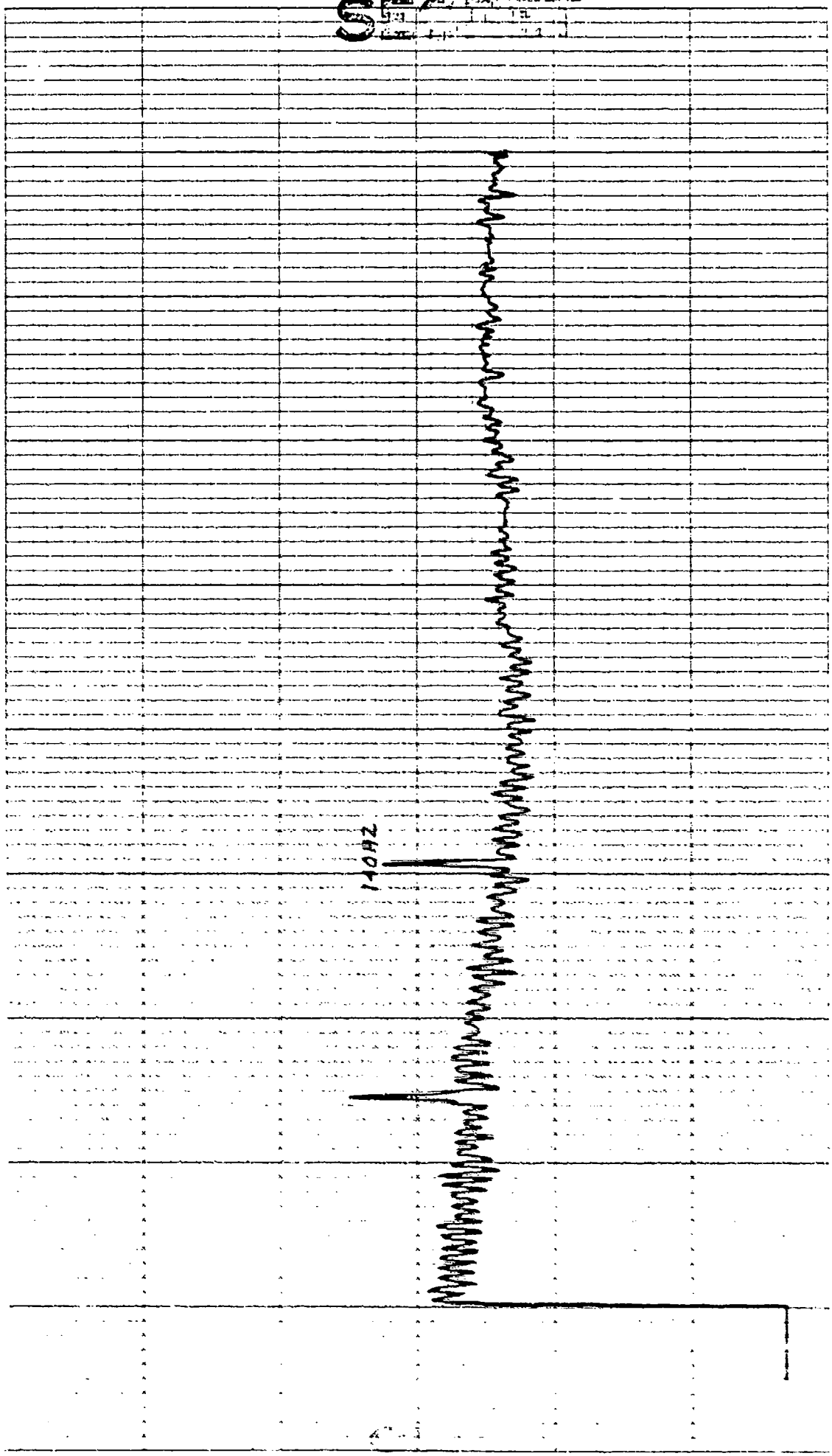
CONTROL: 3-16-0935 (45)
OMNI SPECTRUM (ELEMENT 39)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0935 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEG AZ STEERING

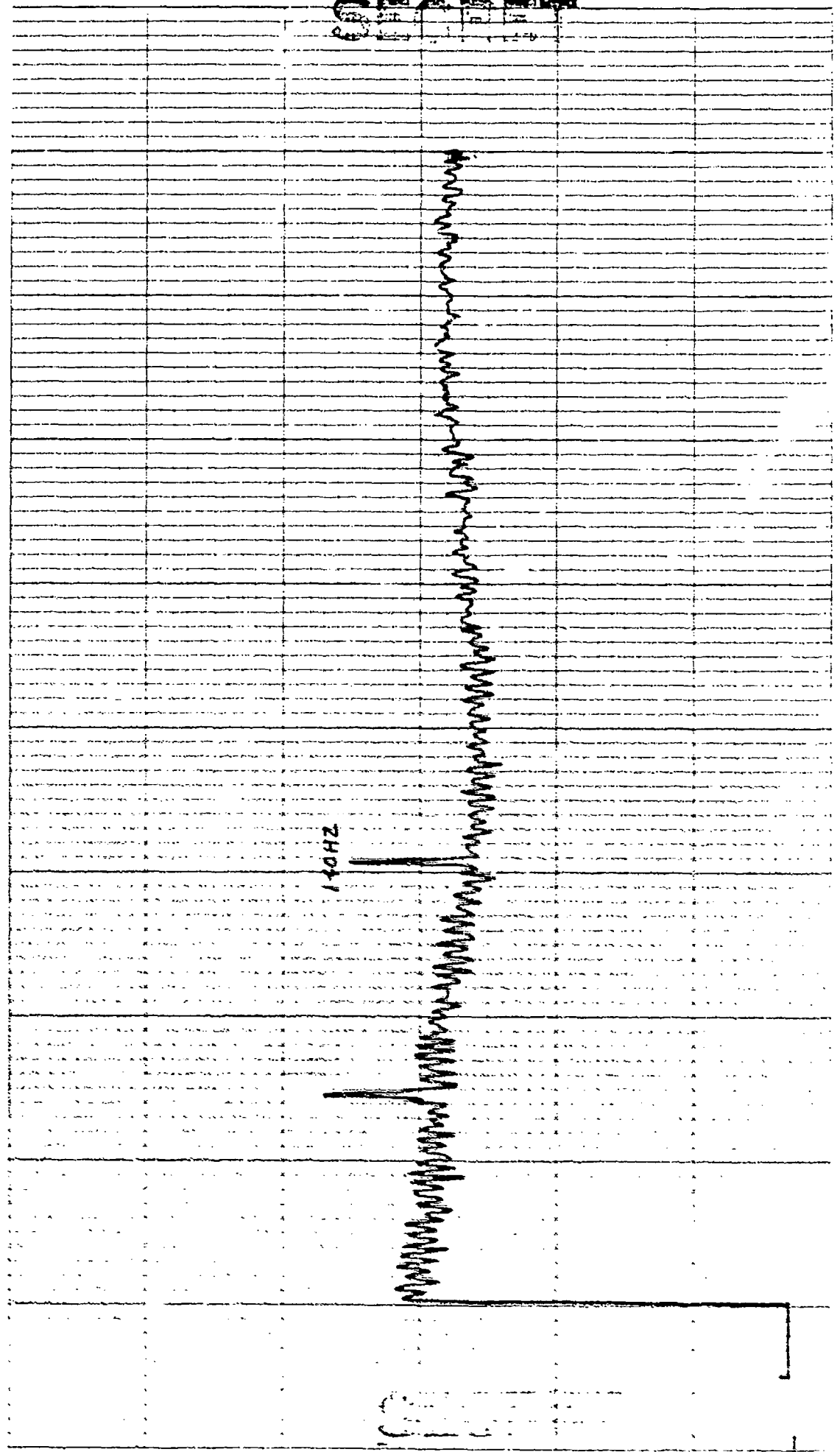
REEL: M19

INTEGRATION TIME 320 SECS
ATTEN: — DB
FILTER WTG: HANNING



SECRET

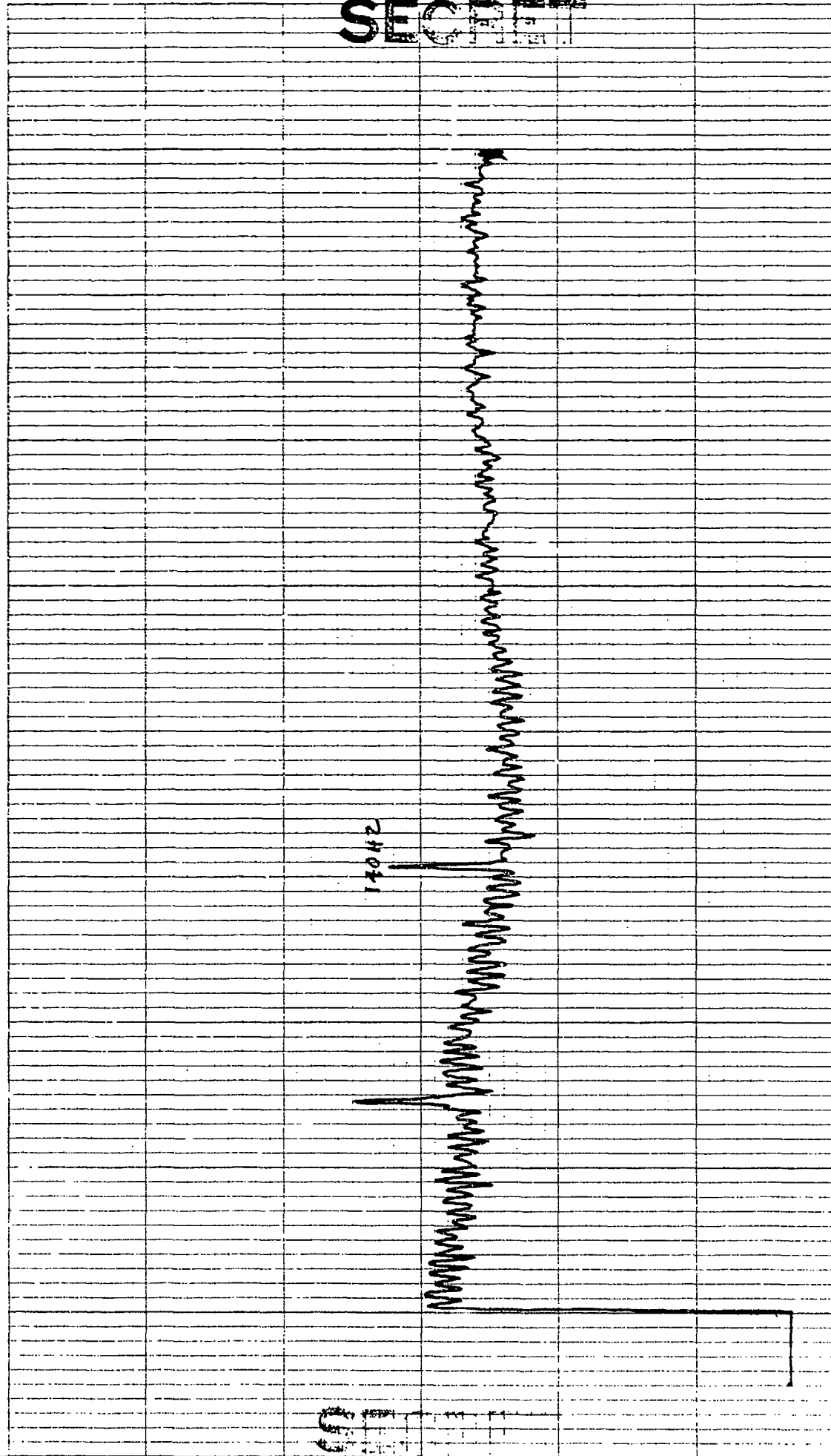
CONTROL: 3-16-0935 (46) DATE OF ANALYSIS: REEL: 122 INDEX: 566
OMNI SPECTRUM (ELEMENT 41)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTC: HANNING
DATE/TIME: 3-16-77-0935Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEG AZ STEERING



CONTROL: 3-16-0935 (47) DATE OF ANALYSIS: REEL: M22 INDEX: 566
OMNI SPECTRUM (ELEMENT 43)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE/TIME: 3-16-77 - 0935 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING



SECRET

K-2 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

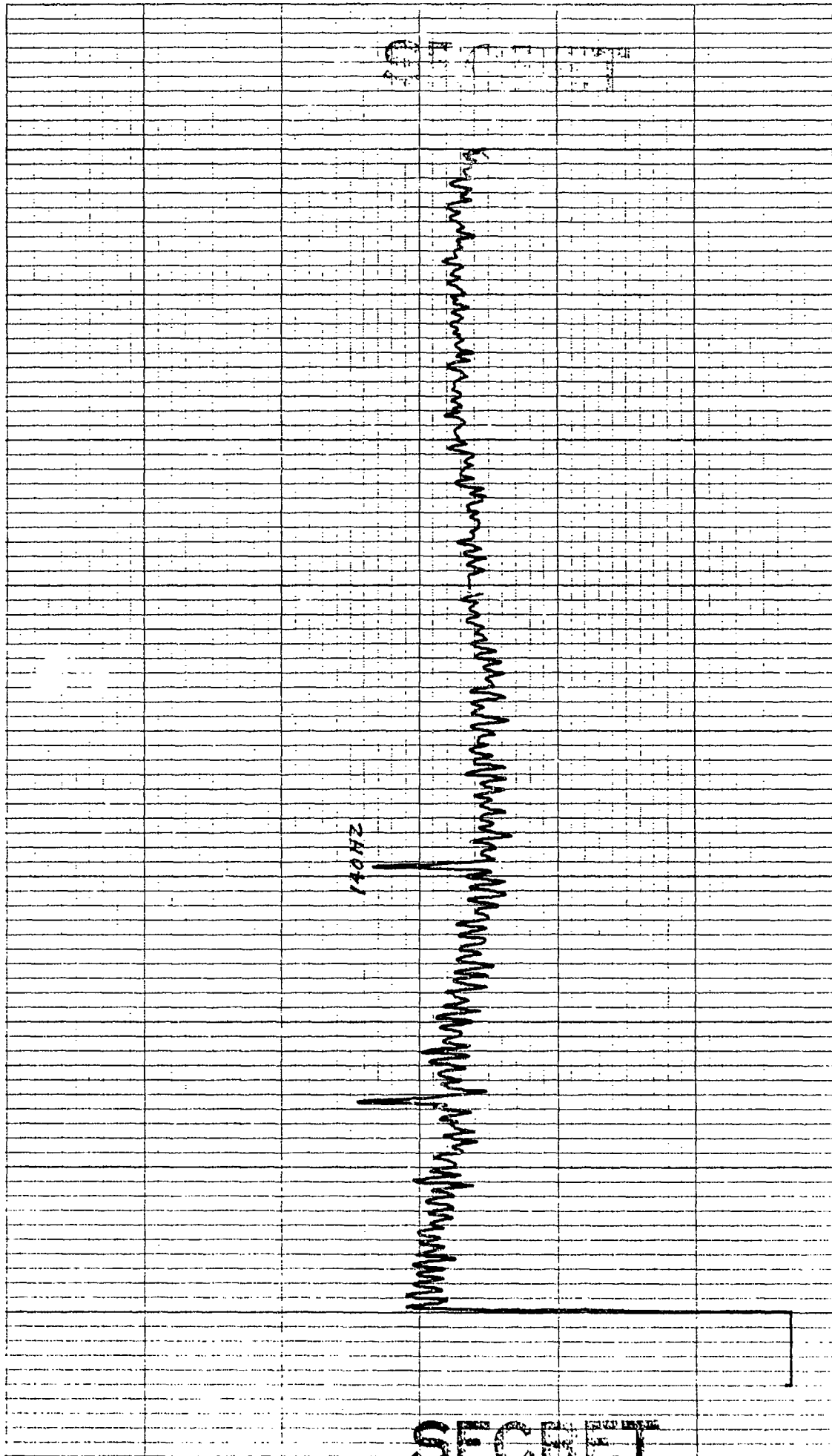
CONTROL: 3-16-0935 (48)
OMNI SPECTRUM (ELEMENT 45)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0935 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

REEL: M22 INDEX 566

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTC: HANNING



SECRET

K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-16-0935 (49)
OMNI SPECTRUM (ELEMENT 47)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

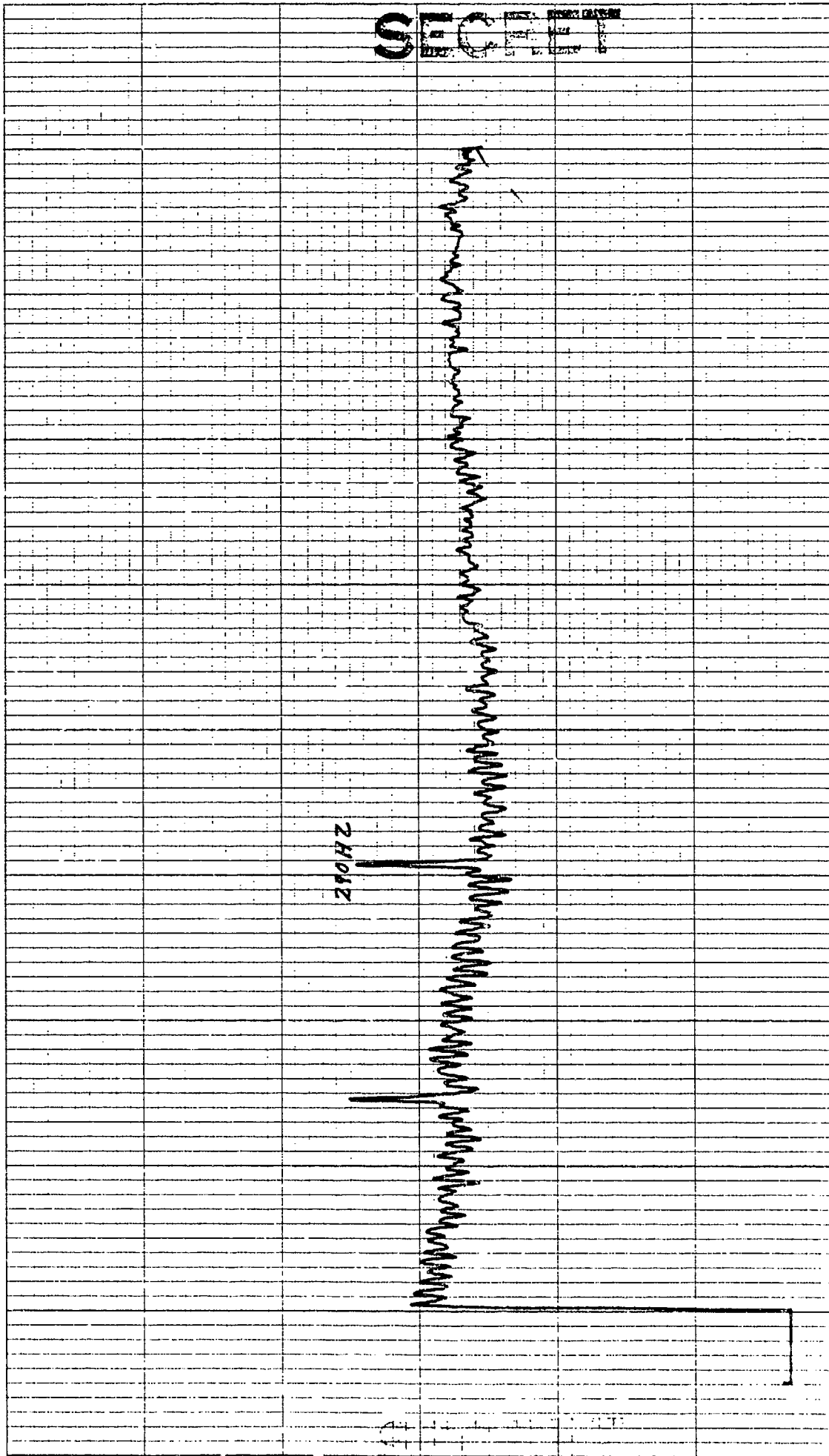
DATE OF ANALYSIS:

DATE/TIME: 3-16-77 -0935 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

REEL: 122

INDEX 566

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING



SECRET

10 X 10 TO THE INCH • 7 X 10 INCHES
KEUPFEL & ESSER CO. MADE IN U.S.A.

46 0703

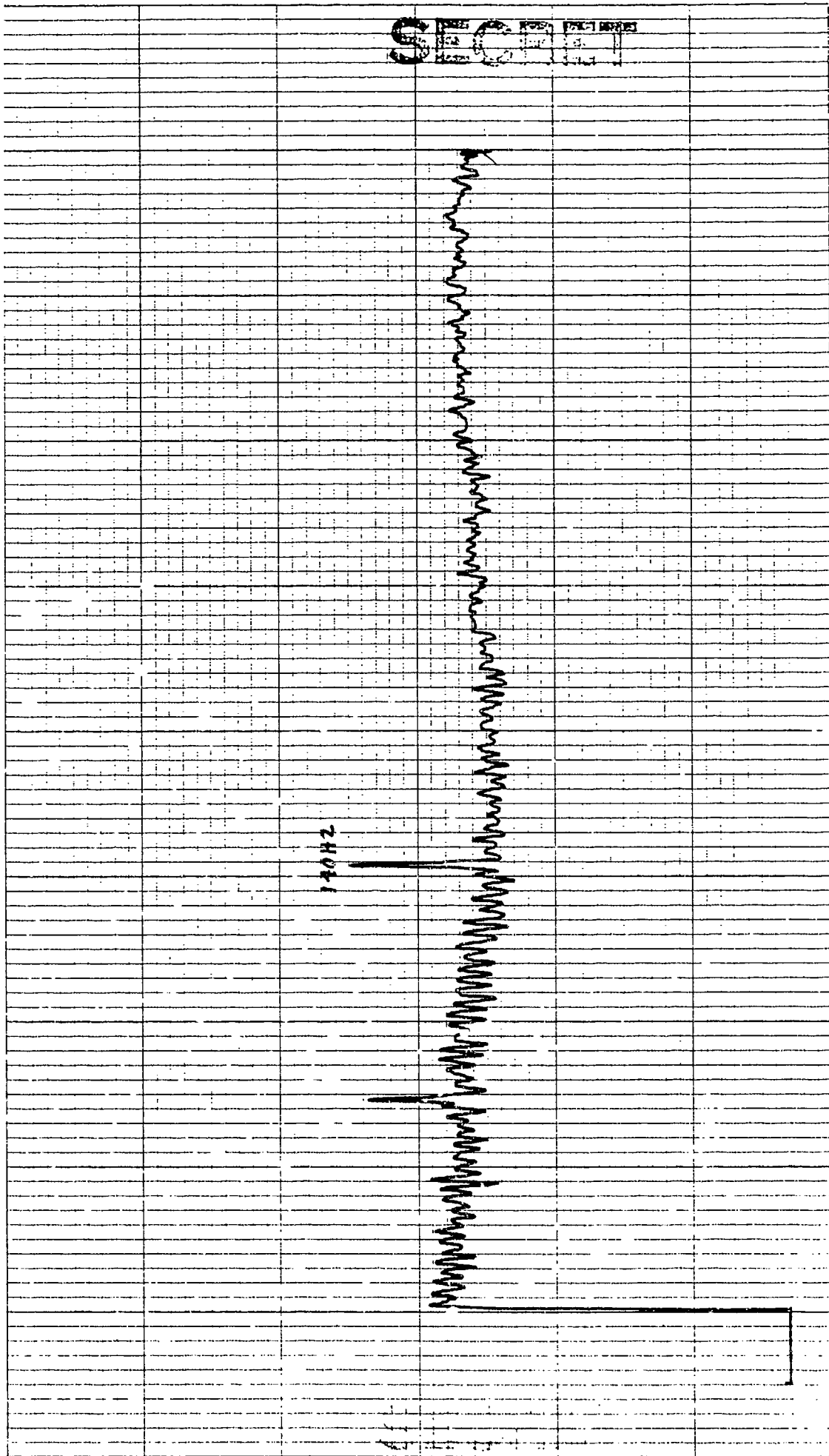
CONTROL: 3-16-0935 (50)
OMNI SPECTRUM (ELEMENT 49)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0935 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEC AZ STEERING

REEL: M22 INDEX 566

INTEGRATION TIME 320 SECS A/T L N: - DB
FILTER WTG: HANNING



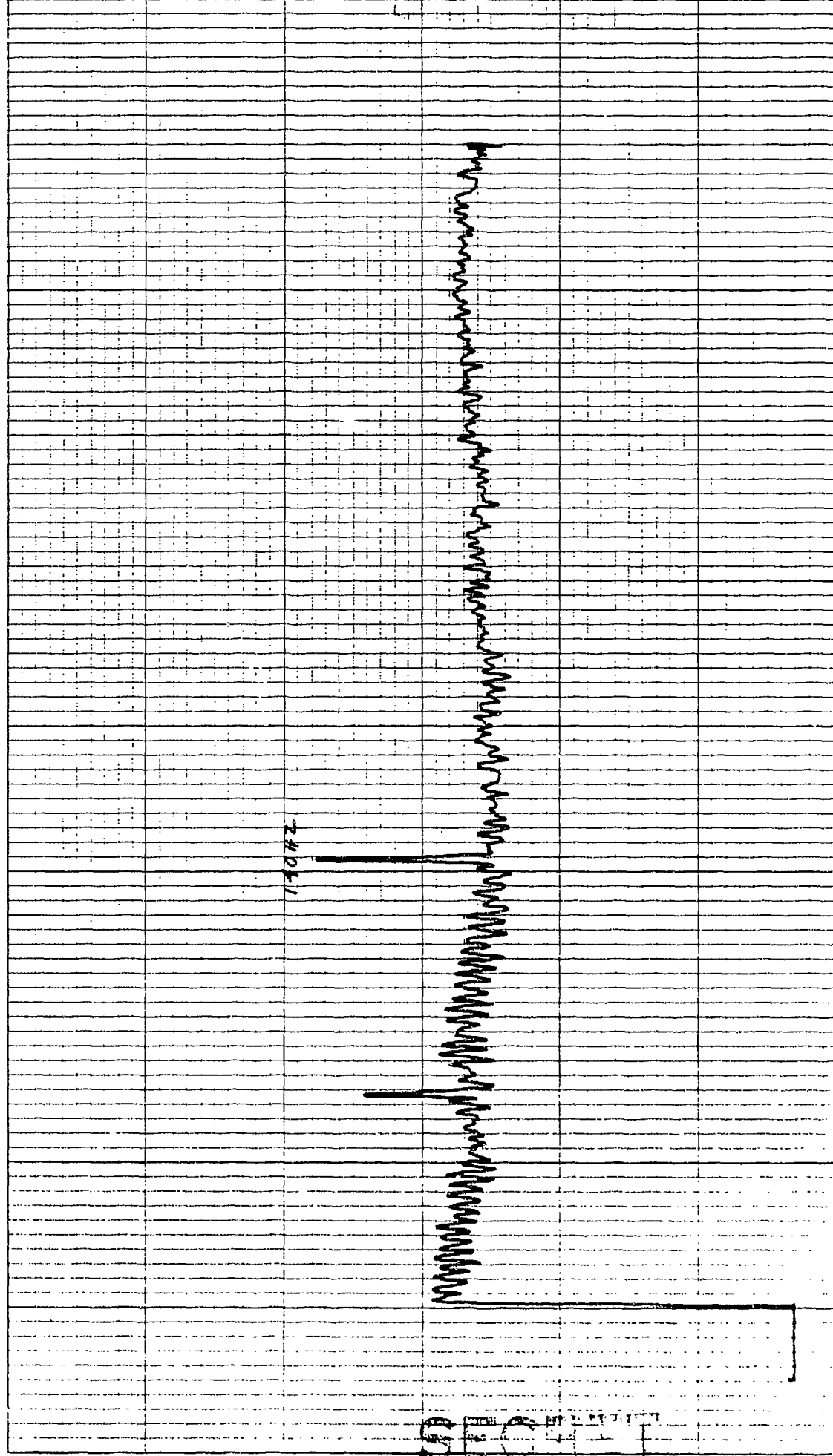
K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 516 - 0935 (51) DATE OF ANALYSIS: REEL: M22 INDEX 566
OMNI SPECTRUM (ELEMENT 51)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING

DATE/TIME: 3-1677 - 0935 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING



16 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

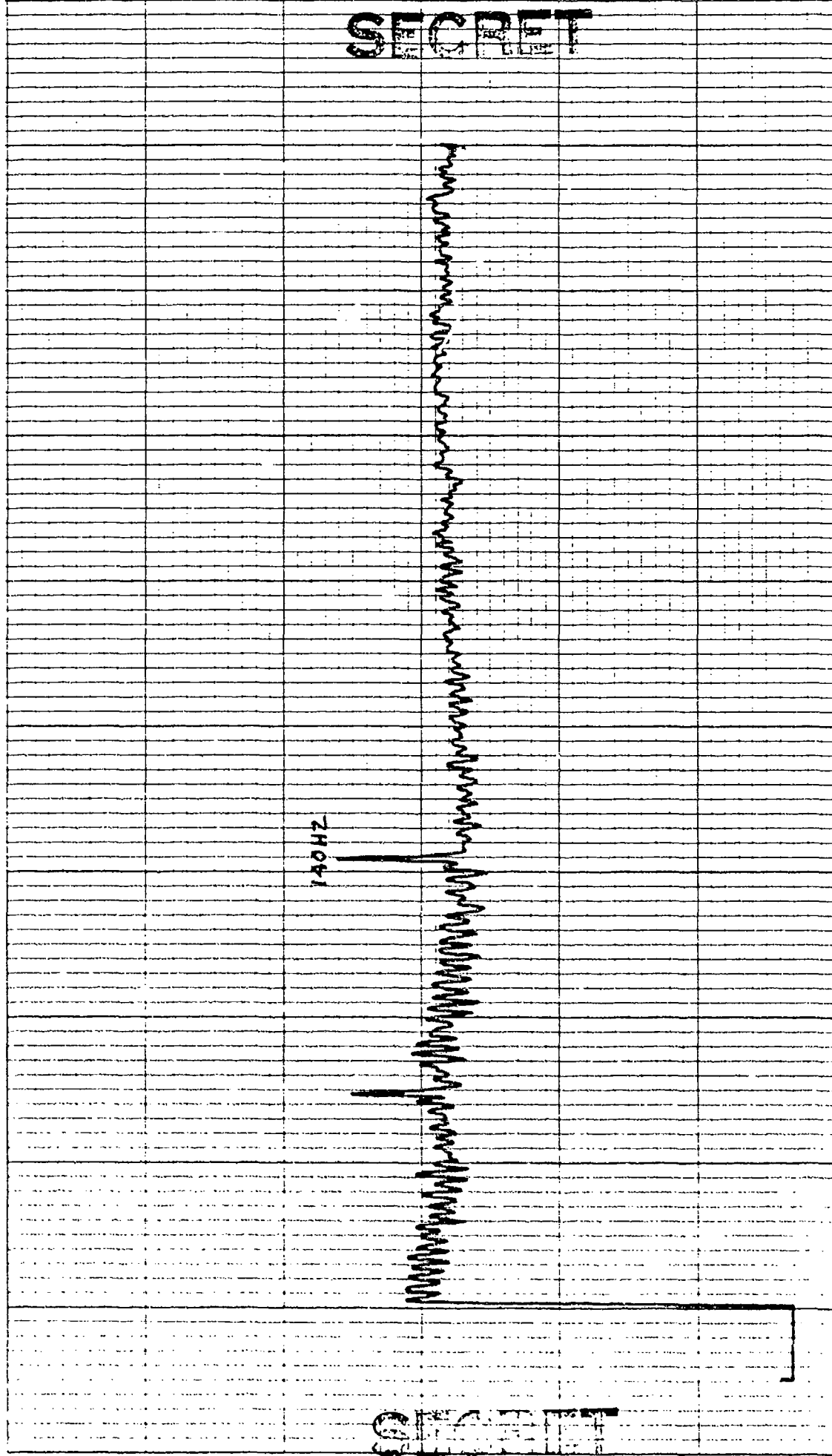
CONTROL: J-16-0935 (52)
OMNI SPECTRUM (ELEMENT 53)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
ELEMENT

DATE OF ANALYSIS:

DATE/TIME: J-16-77 - 0935 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

REEL: M22 INDEX 566

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



CONTROL: 3-76 - 0885 (53)
OMNI SPECTRUM (ELEMENT 2)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

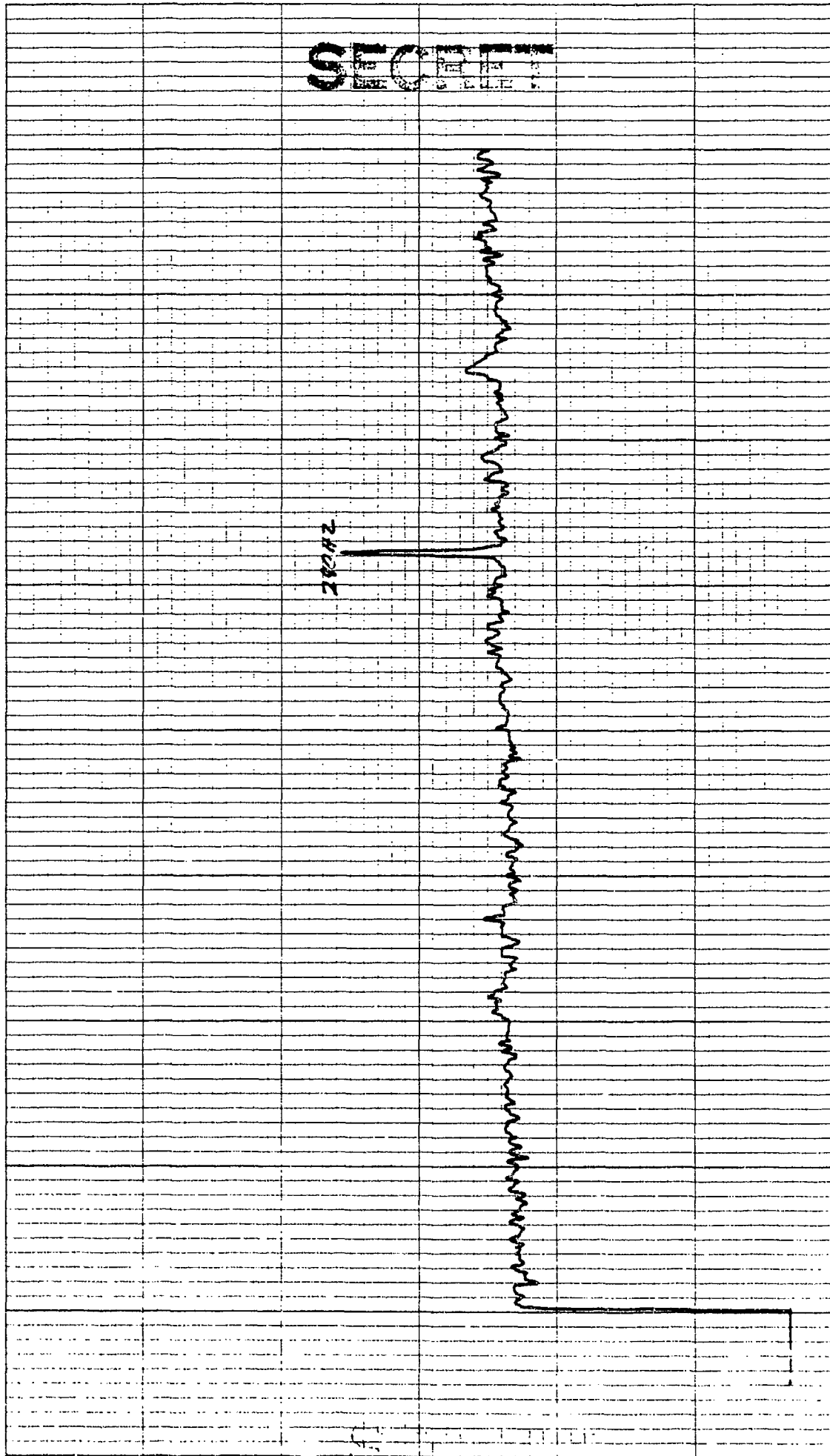
DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0835 Z
ANALYSIS BANDWIDTH: 1/10 HZ
_____ DEG AZ STEERING

REEL: M22

INDEX 566

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING



10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-16 - 0935 (54)
OMNI SPECTRUM (ELEMENT 4)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

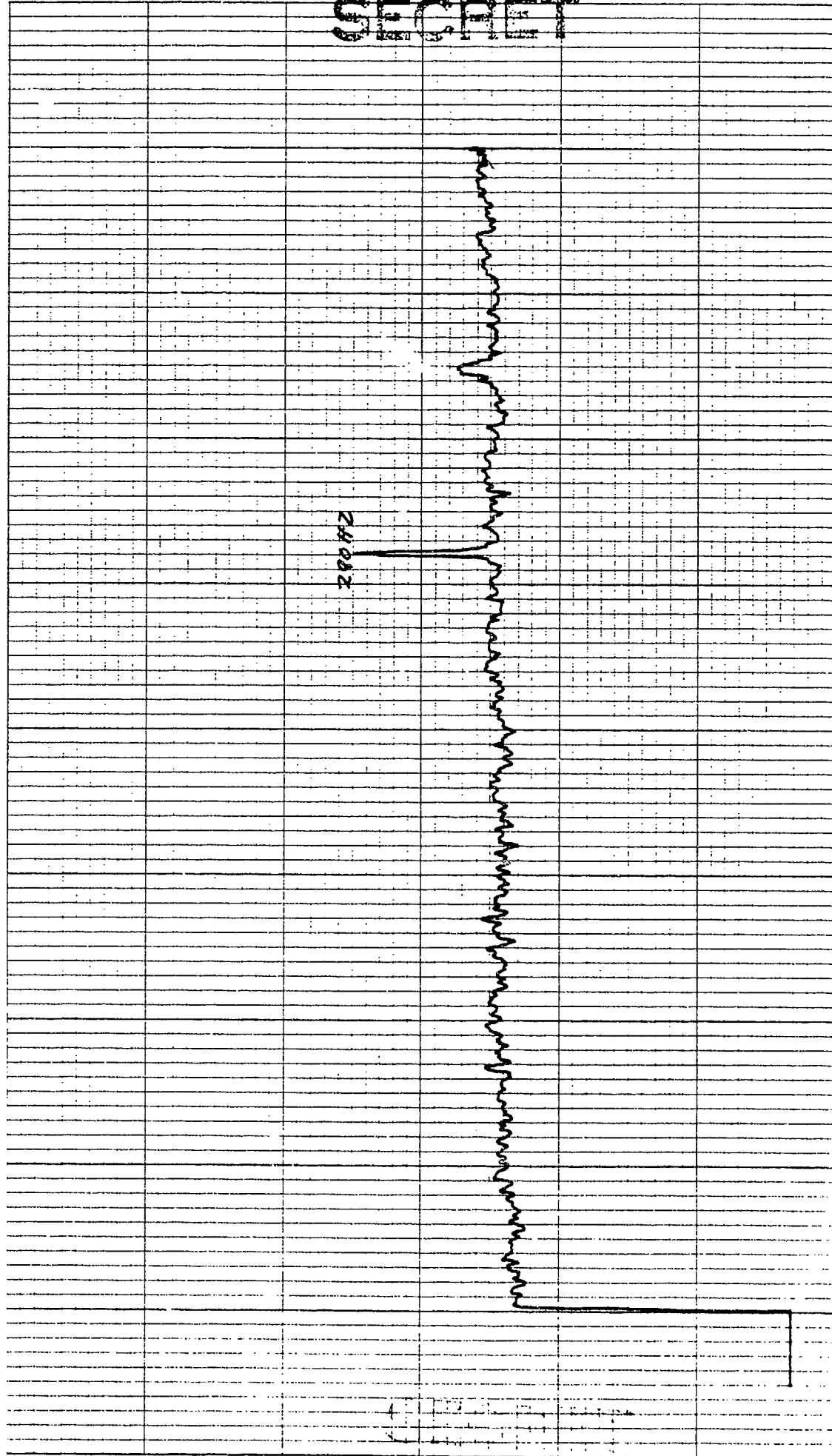
DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0935 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: 122

INDEX: 56

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING



SECRET

CONTROL: 3-76-0935 (55)
OMNI SPECTRUM (ELEMENT 6)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

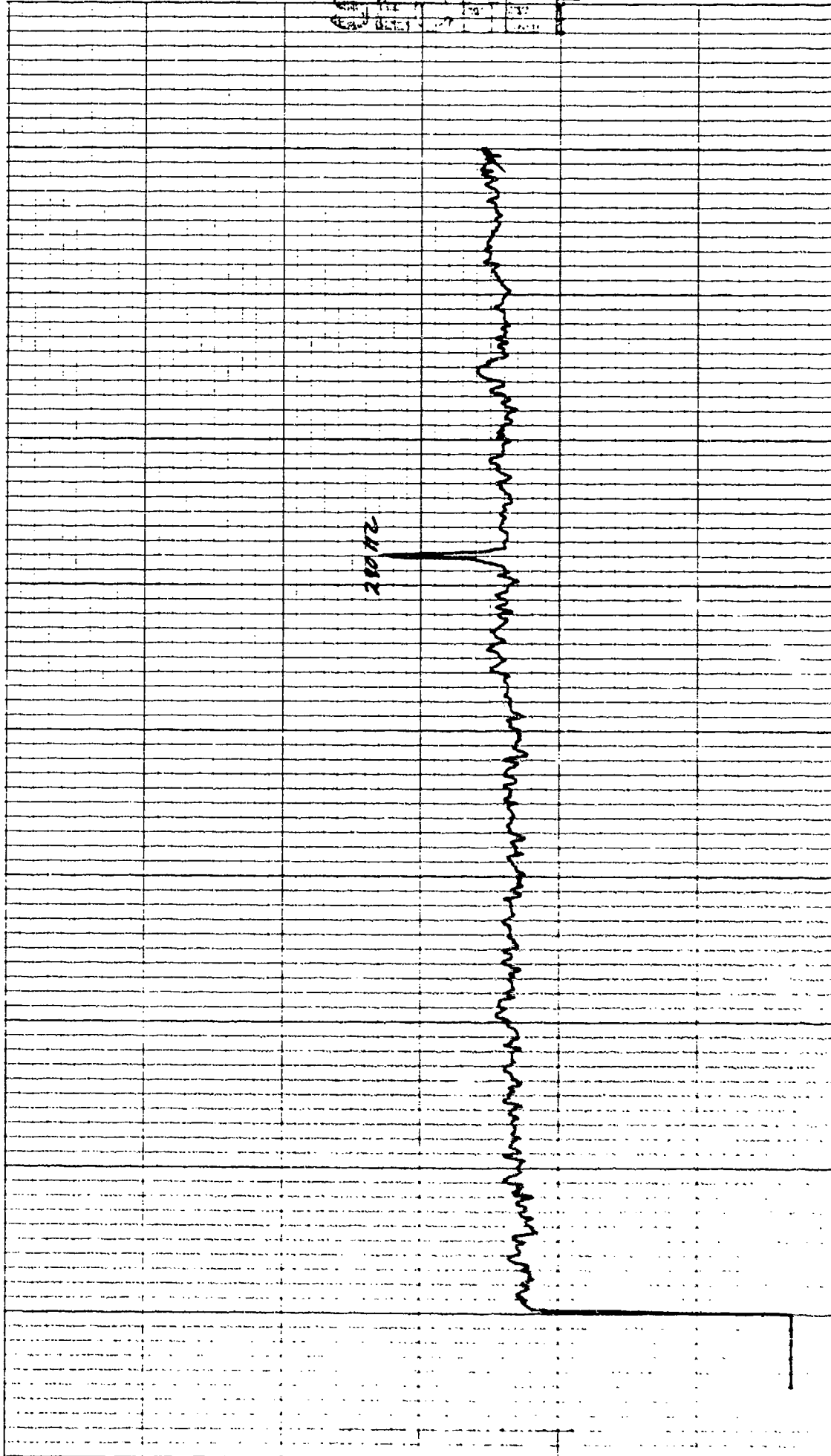
DATE OF ANALYSIS:

DATE/TIME: 3-76-77 -0935 Z
ANALYSIS BANDWIDTH: 1/10 HZ
1 DEG AZ STEERING

REEL: M22

INDEX 566

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING



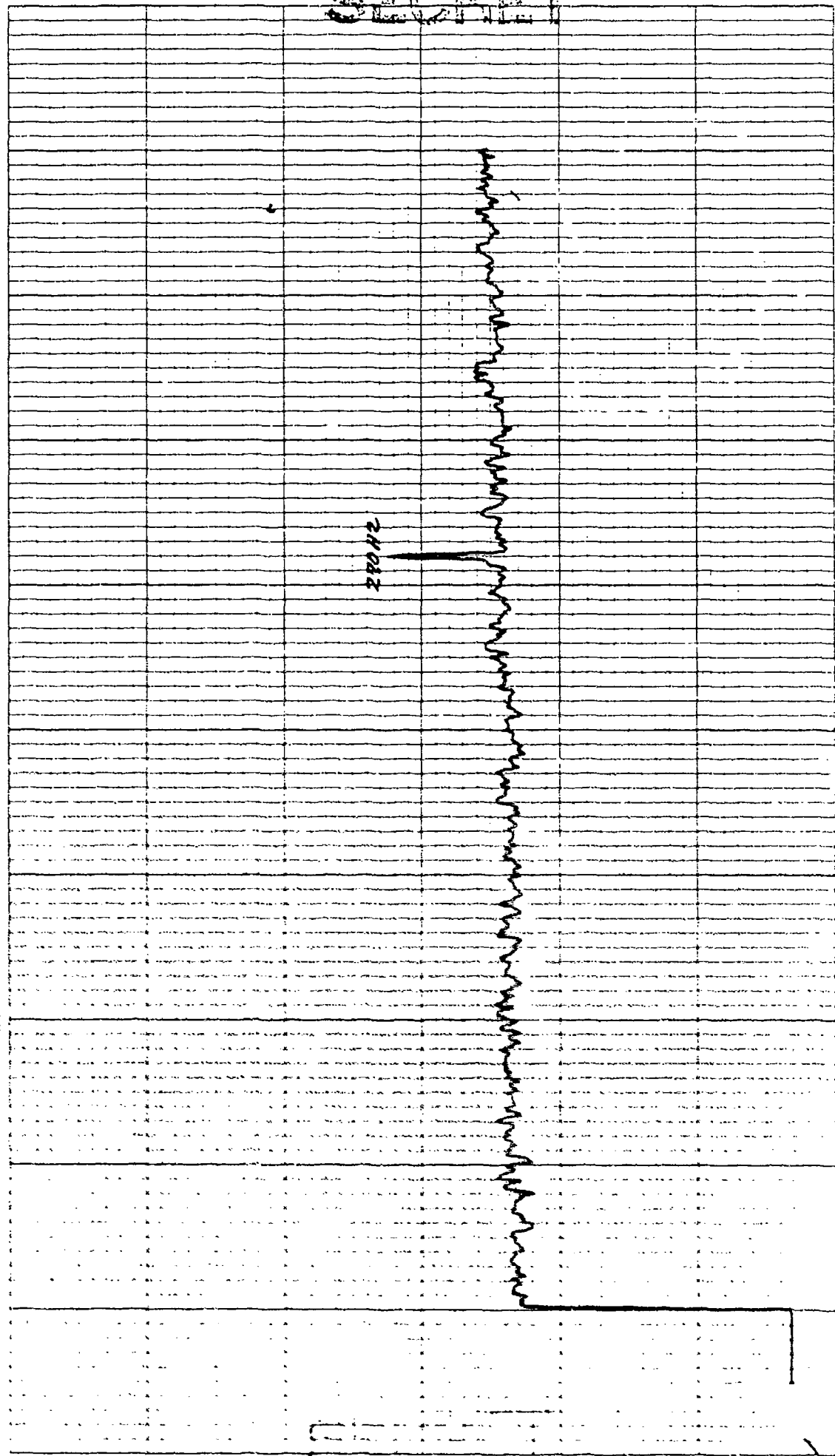
CONTROL: 376-0835 (56)
OMNI SPECTRUM (ELEMENT 9)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 7-16-77 - 0835 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: 122 INDEX 566

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING



SECRET

KOE 10 X 10 TO THE INCH • X 10 INCHES
KEUFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-16 - 0935 (57)
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

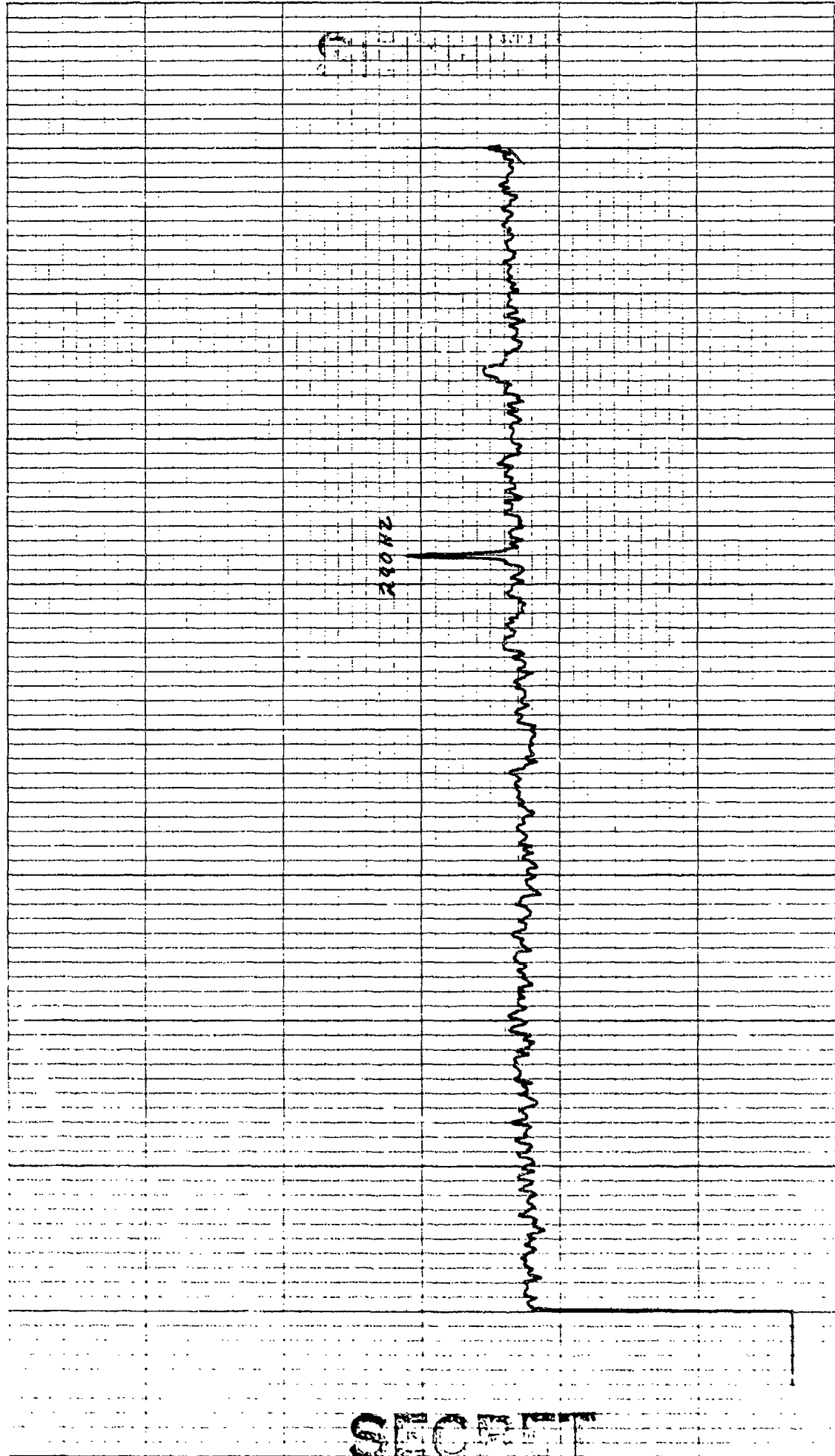
DATE/TIME: 3-6-77 - 0935 Z

ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: M22

INDEX 666

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG. HANNING



SECRET

10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSNER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-6 - 0935 (59)
OMNI SPECTRUM (ELEMENT 12)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

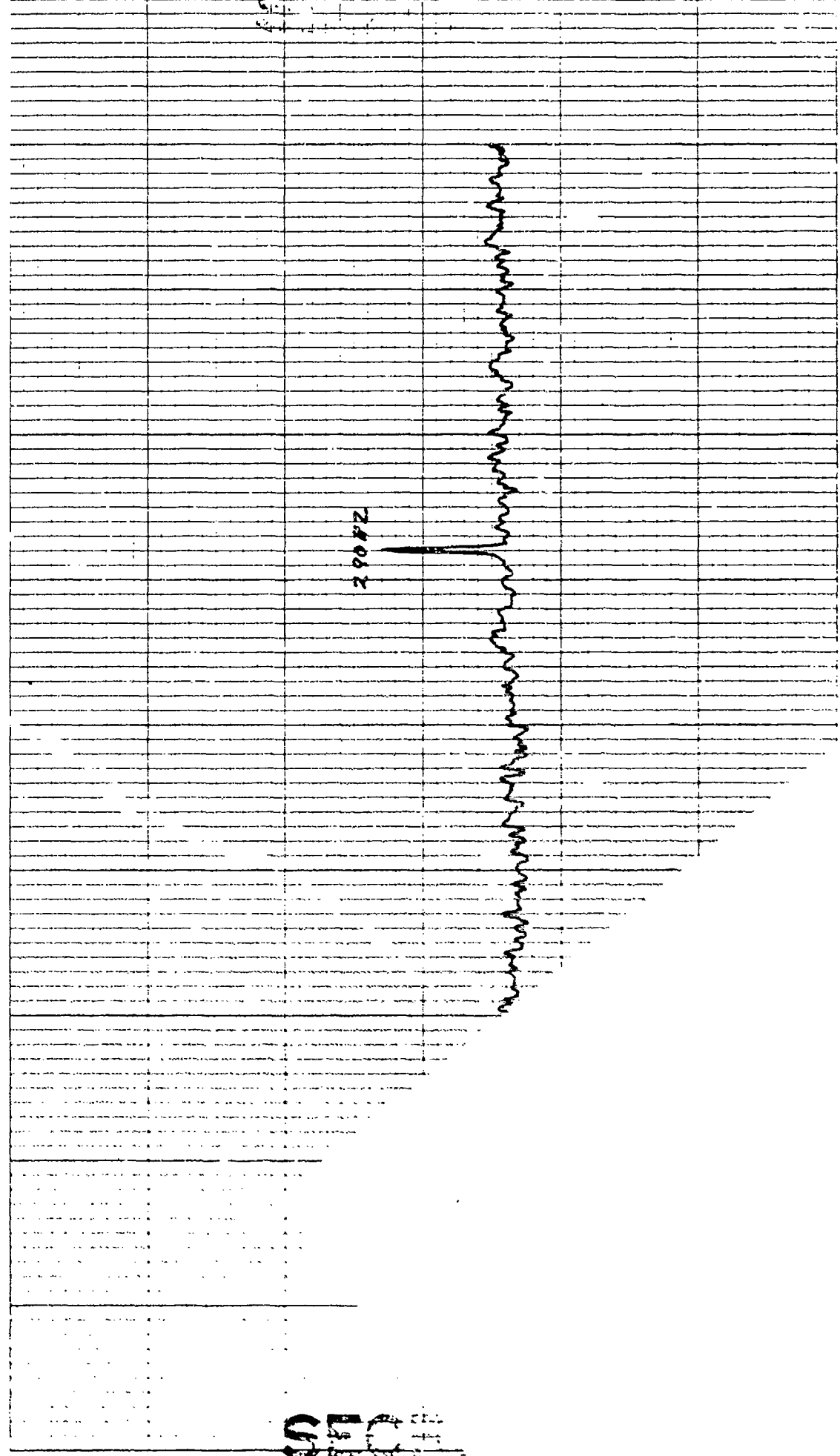
DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0935 Z
ANALYSIS BANDWIDTH: 1/1 CHZ
— DEG AZ STEERING

REEL: 122

INDEX 566

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTC: HANNING



50

10 X 10 TO JUNE 1962
REURTEL 4 202200 COT WASH DC 054

46 0703

CONTROL: 1-16 -0035 (59)
OMNI SPECTRUM (ELEMENT 14)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

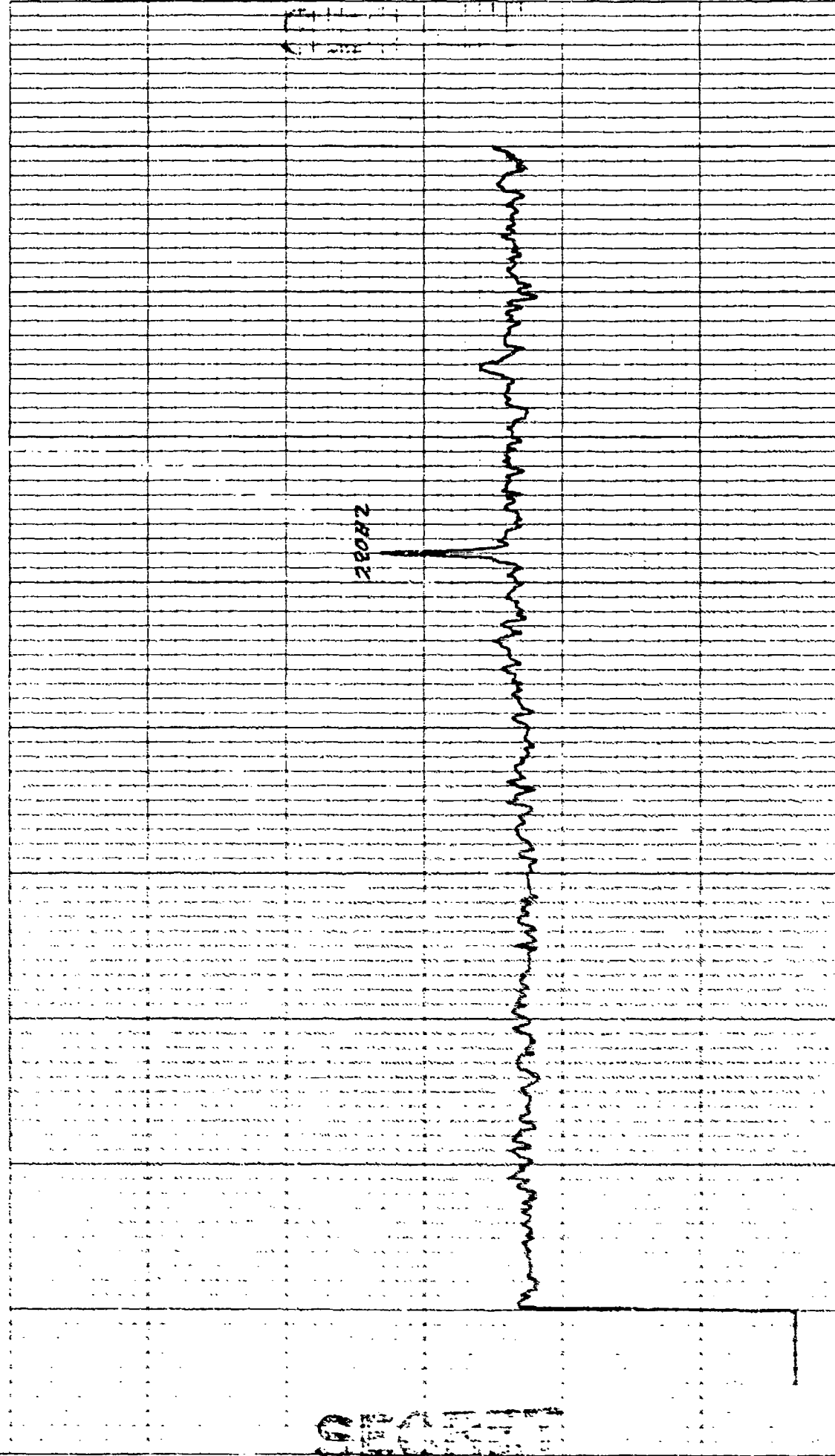
DATE OF ANALYSIS:

DATE/TIME: 3-16-77 -0935 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: M22

INDEX 566

INTEGRATION TIME 320 SECS
ATTEN: — DB
FILTER WTG: HANNING



K&E 10.5 TO 10.7 MHz (PARTIAL) 4. IN AND 100V
RELIABLE & ROBUST CO. MADE IN U.S.A.

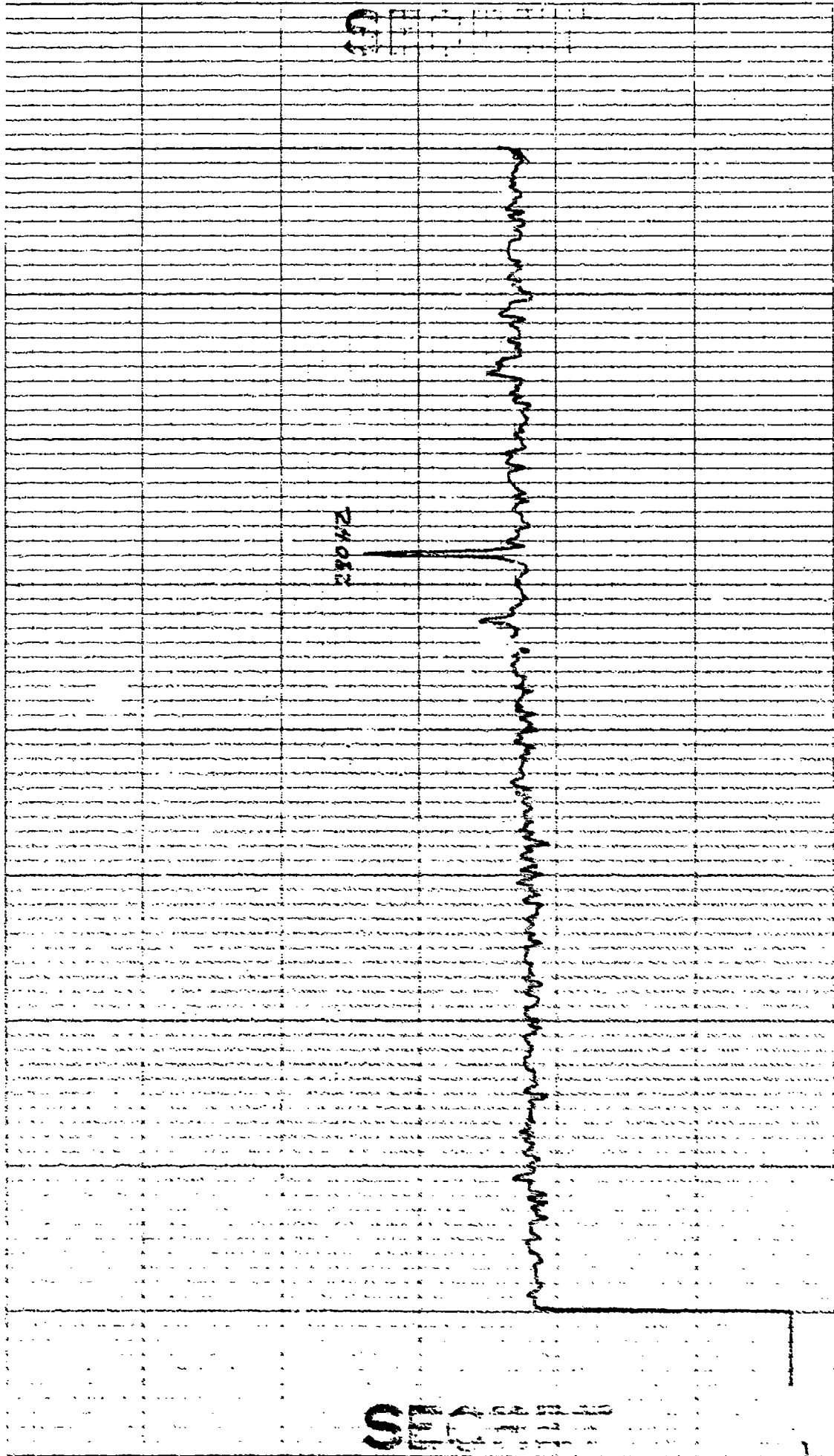
46 0703

CONTROL: 316 - 0035 (60)
OMNI SPECTRUM (ELEMENT 16)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0935Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

REEL: M22 INDEX 566
INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING



SECRET

10 X 10 TO THE INCHES . . . 10 PER INCH . . .
HARRIS ENGINEERING CO. WASHINGTON, D. C.

46 C703

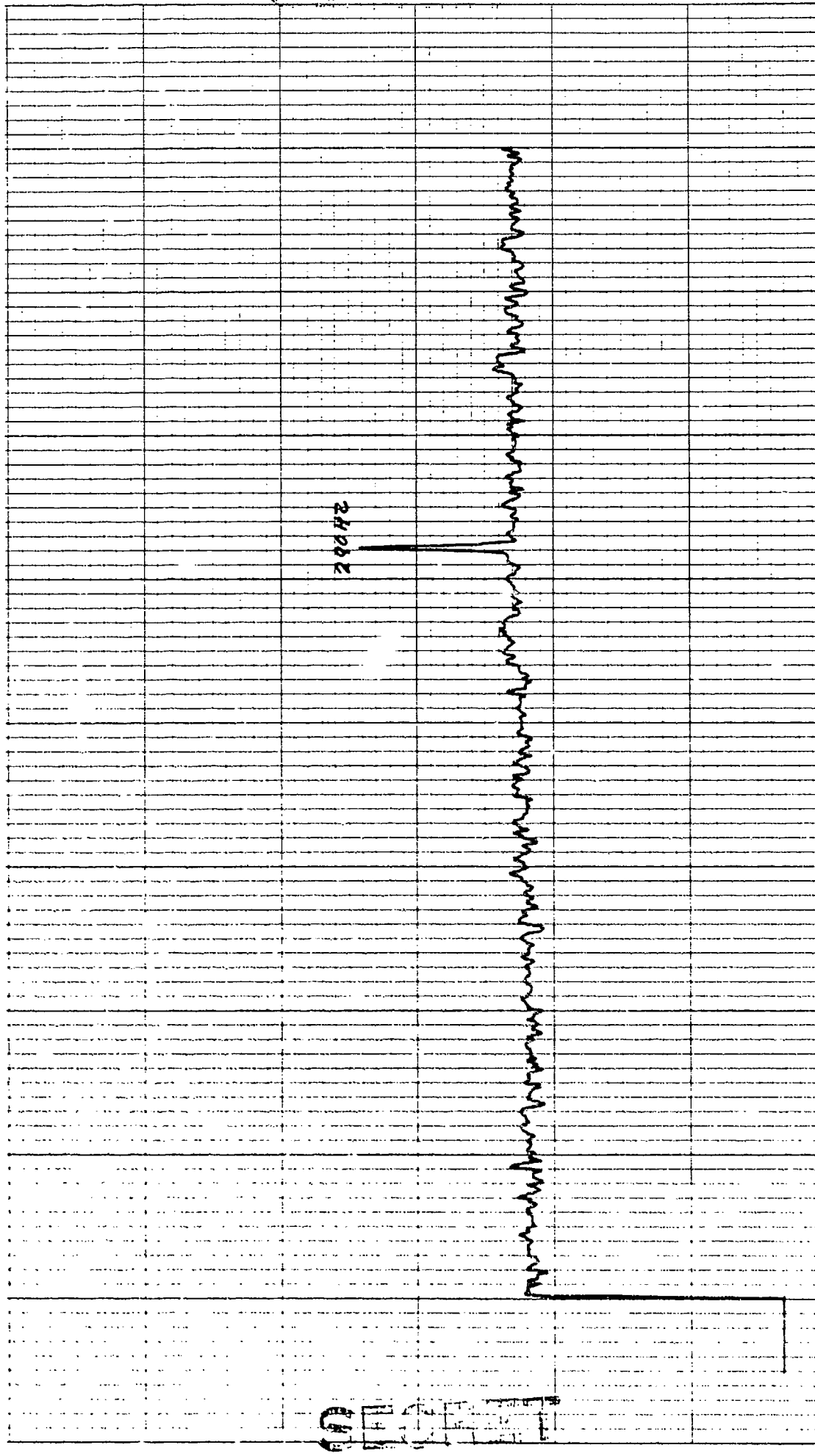
CONTROL: 3-16-0935 (6/)
OMNI SPECTRUM (ELEMENT 19)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0935 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: M22 INDEX 566

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING



19

10 X 10 TO THE INCH • 7 X 10 INI HES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

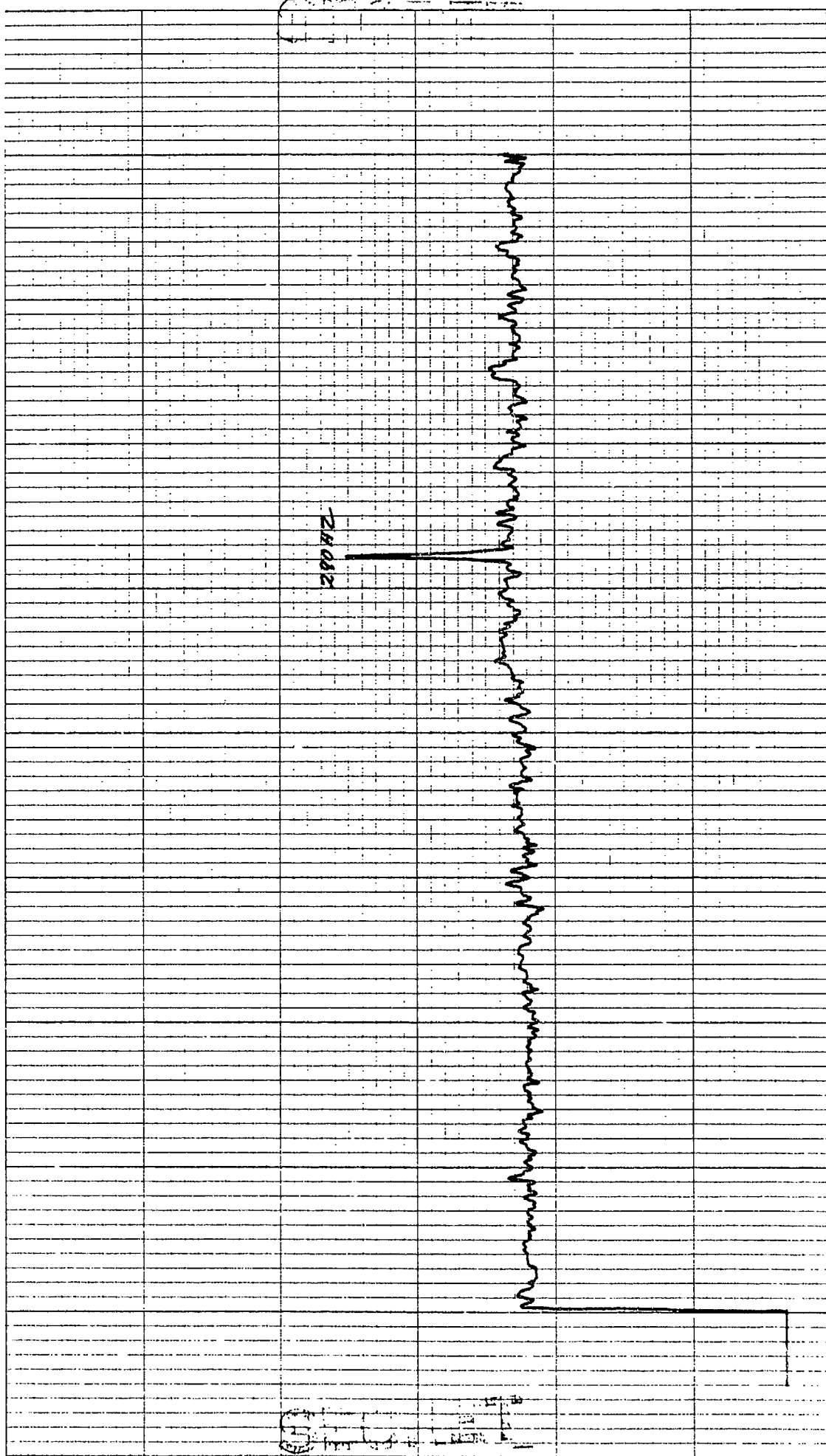
CONTROL: 316 - 0835 (62)
OMNI SPECTRUM (ELEMENT 20)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0833 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: M22 INDEX 566

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING



K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-16-0935 (63)
OMNI SPECTRUM (ELEMENT 23)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

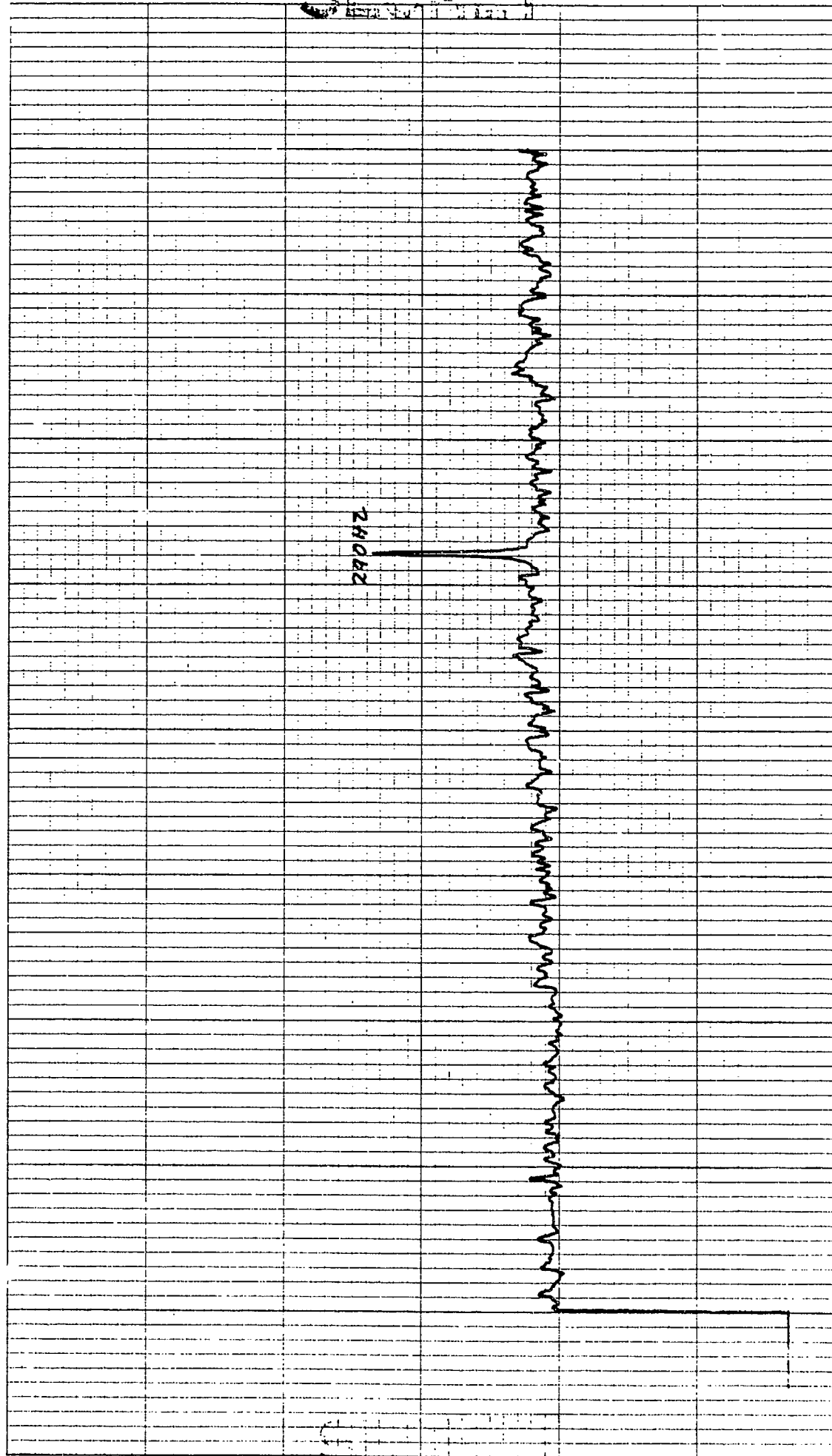
DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0935 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: M22

INDEX 566

INTEGRATION TIME 320 SECS
ATTEN: — DB
FILTER
WTG: HANNING



SECRET

K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

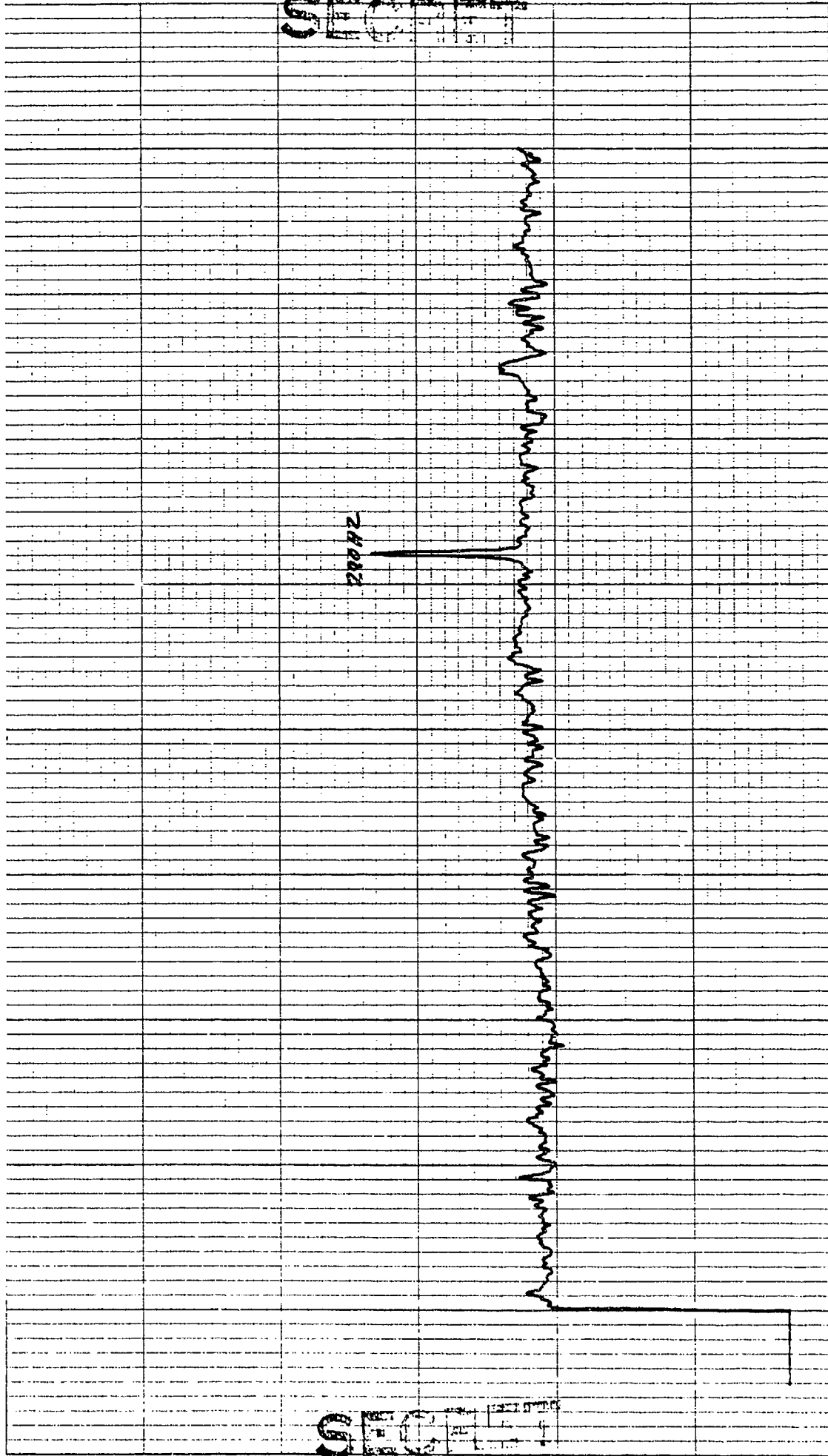
46 0703

CONTROL: 3-16 - 0935 (64)
OMNI SPECTRUM (ELEMENT 24)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0935 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: M22 INDEX 566
INTEGRATION TIME 320 SECS ATTN: — DB
FILTER WTG: HANNING



10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

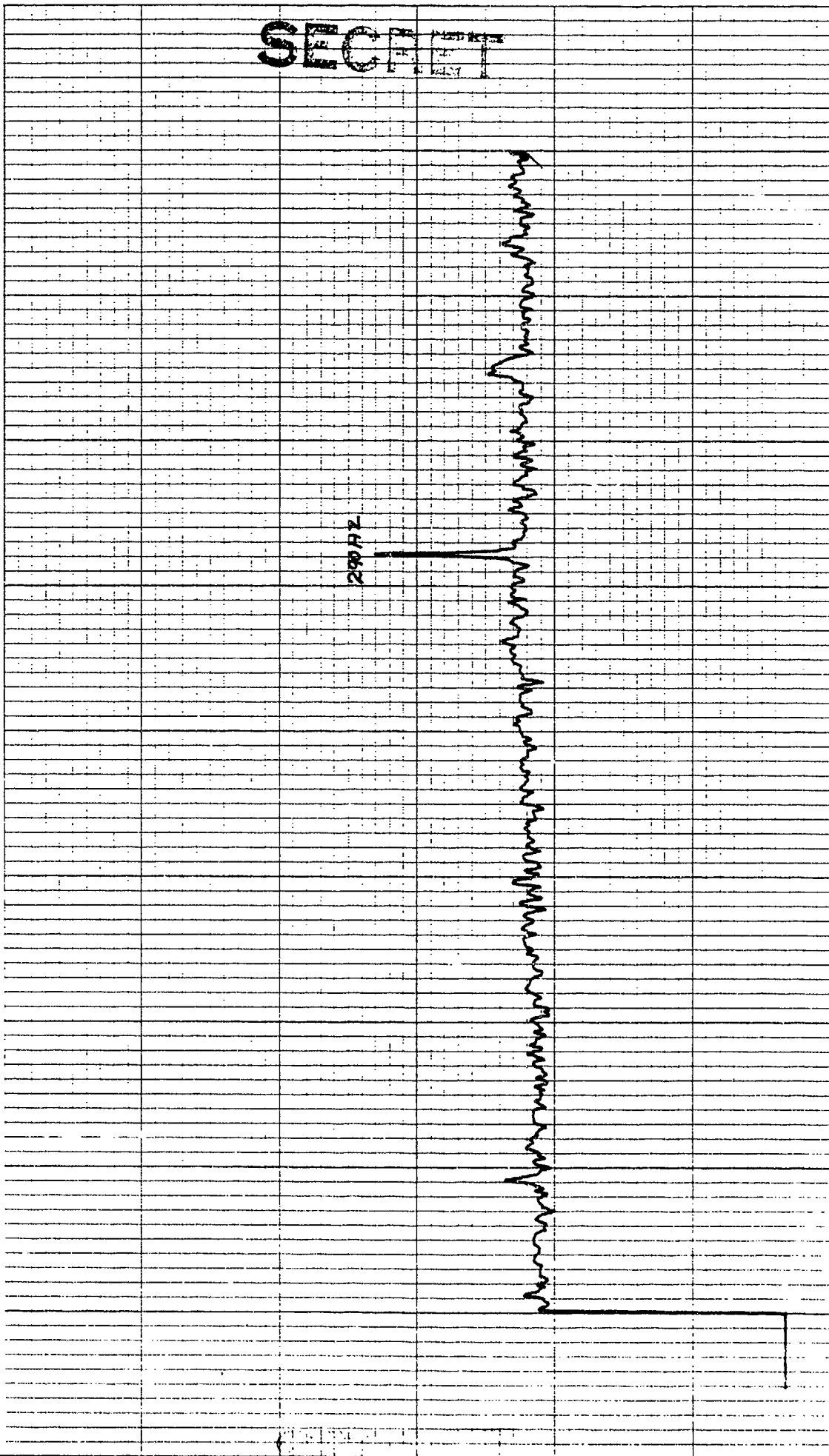
CONTROL: 0935 - 51 (DP11)
OMNI SPECTRUM (ELEMENT 26)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0935 Z
ANALYSIS BANDWIDTH: 1/10HZ
- DEG AZ STEERING

REEL: M22 INDEX 566

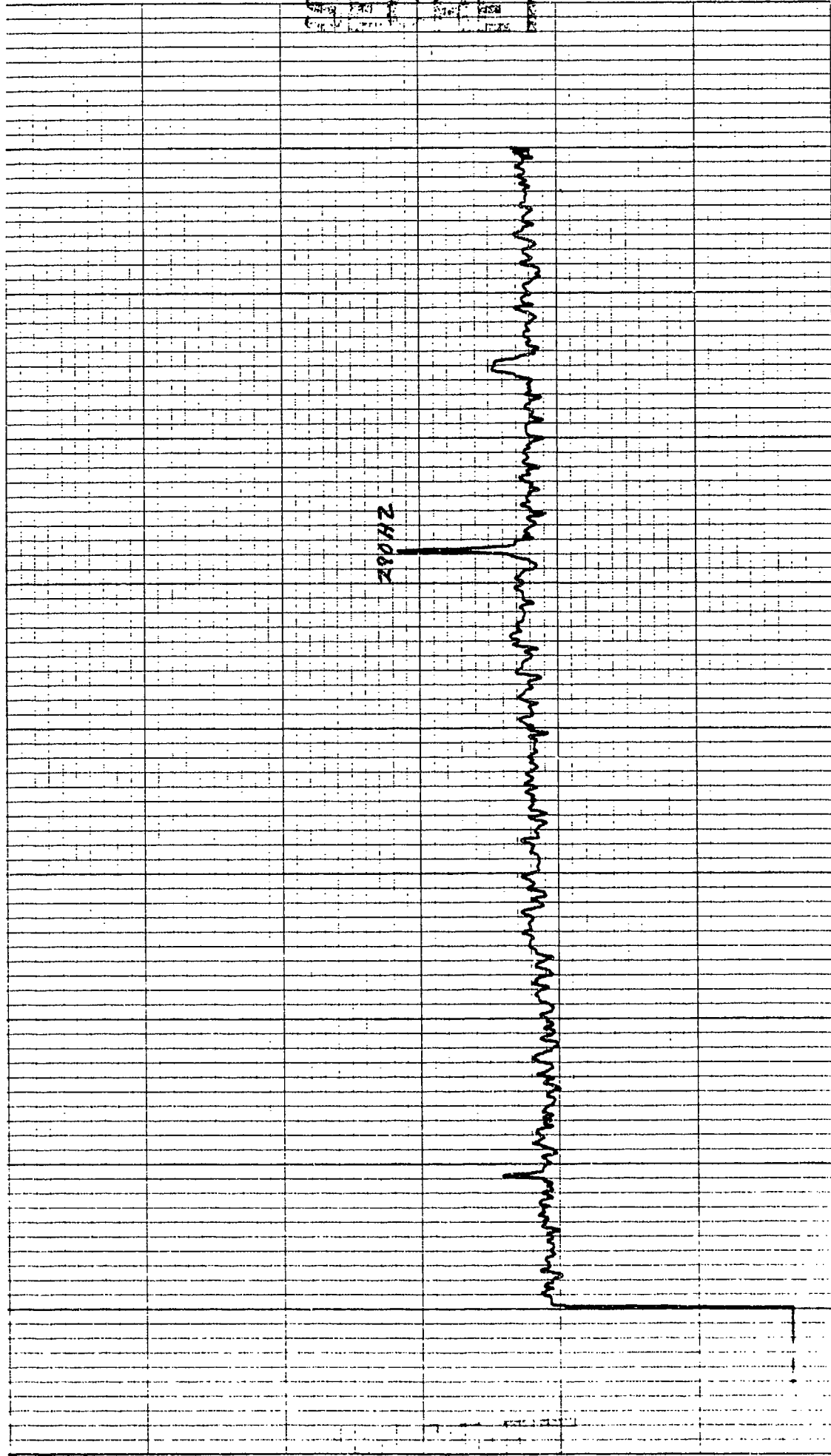
INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING



K-E 10 X 10 TO THE INCH 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

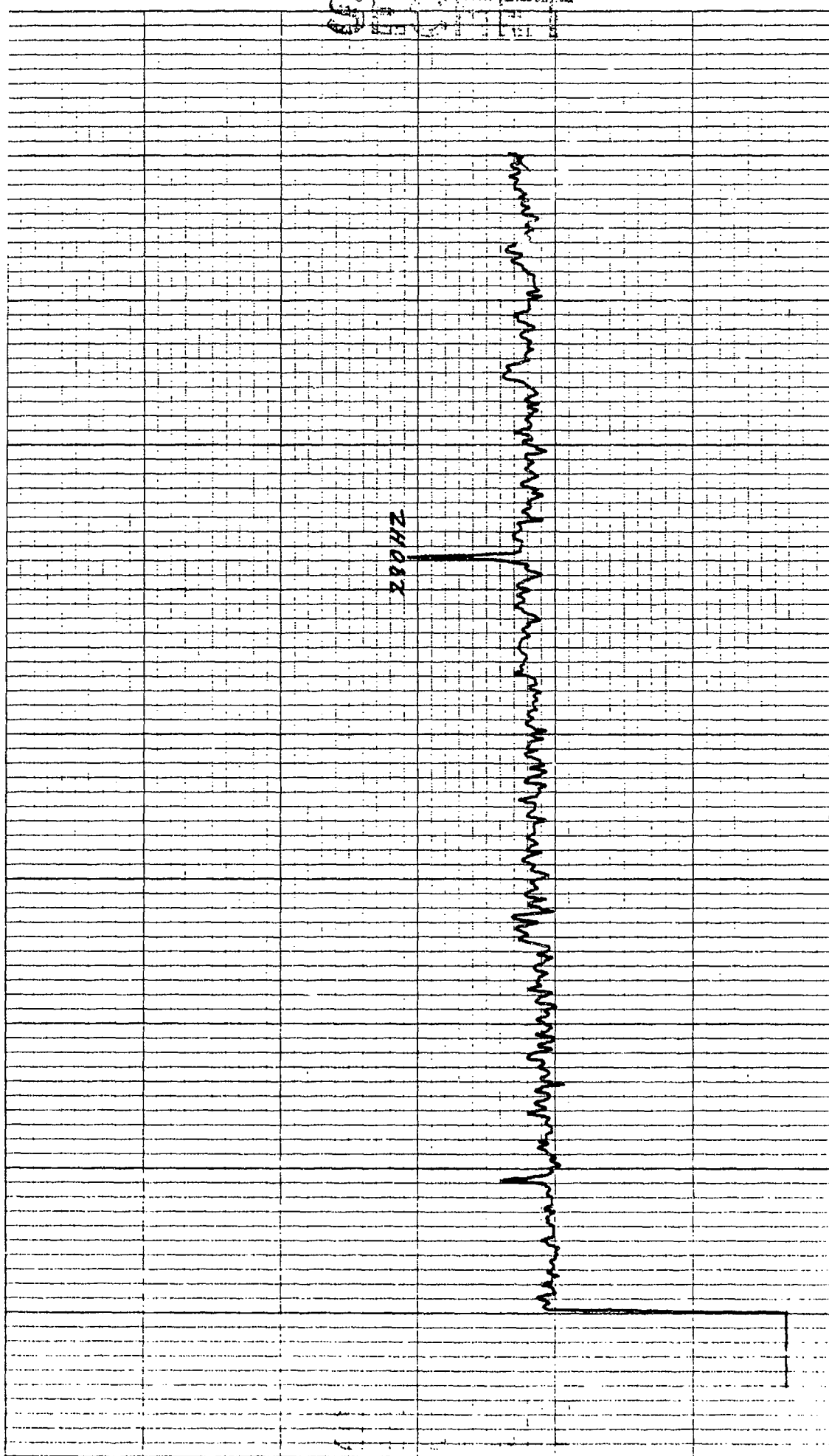
CONTROL: 3-16-0935 (66) REEL: M22 INDEX 566
OMNI SPECTRUM (ELEMENT 29)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
DATE OF ANALYSIS:
DATE/TIME: 3-16-77 - 0935 Z
ANALYSIS BANDWIDTH: 1/10 HZ
INTEGRATION TIME 320 SECS ATTN: DB
— DEG AZ STEERING FILTER WTC: HANNING



K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-16-0035 (67) DATE OF ANALYSIS: REEL: 122 INDEX 566
OMNI SPECTRUM (ELEMENT 31)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: DB
1 ELEMENT — DEG AZ STEERING FILTER WTG: HANNING



K-E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

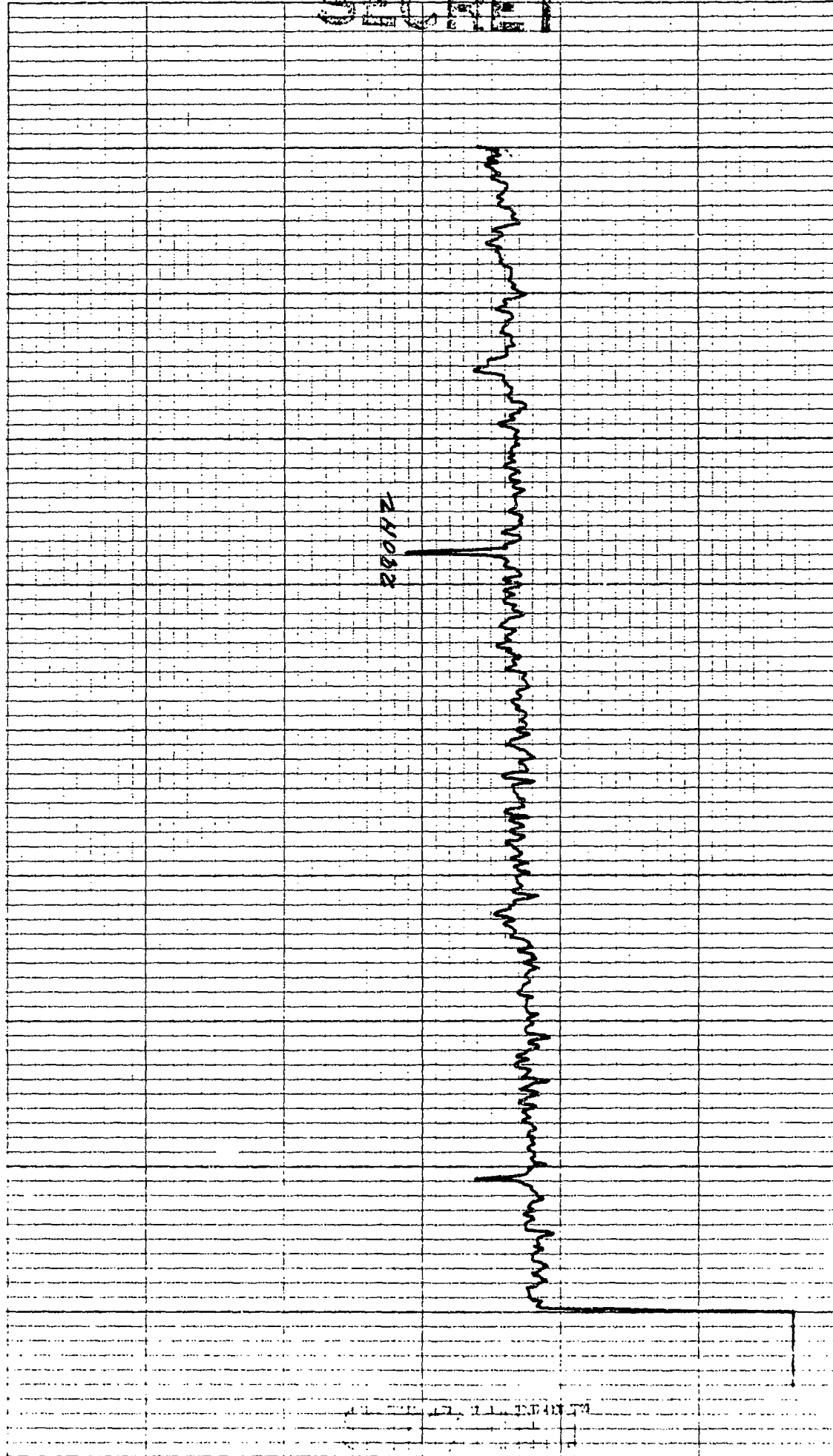
CONTROL: 3-16-0935 (18)
OMNI SPECTRUM (ELEMENT 33)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0935Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: M22 INDEX 561

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING

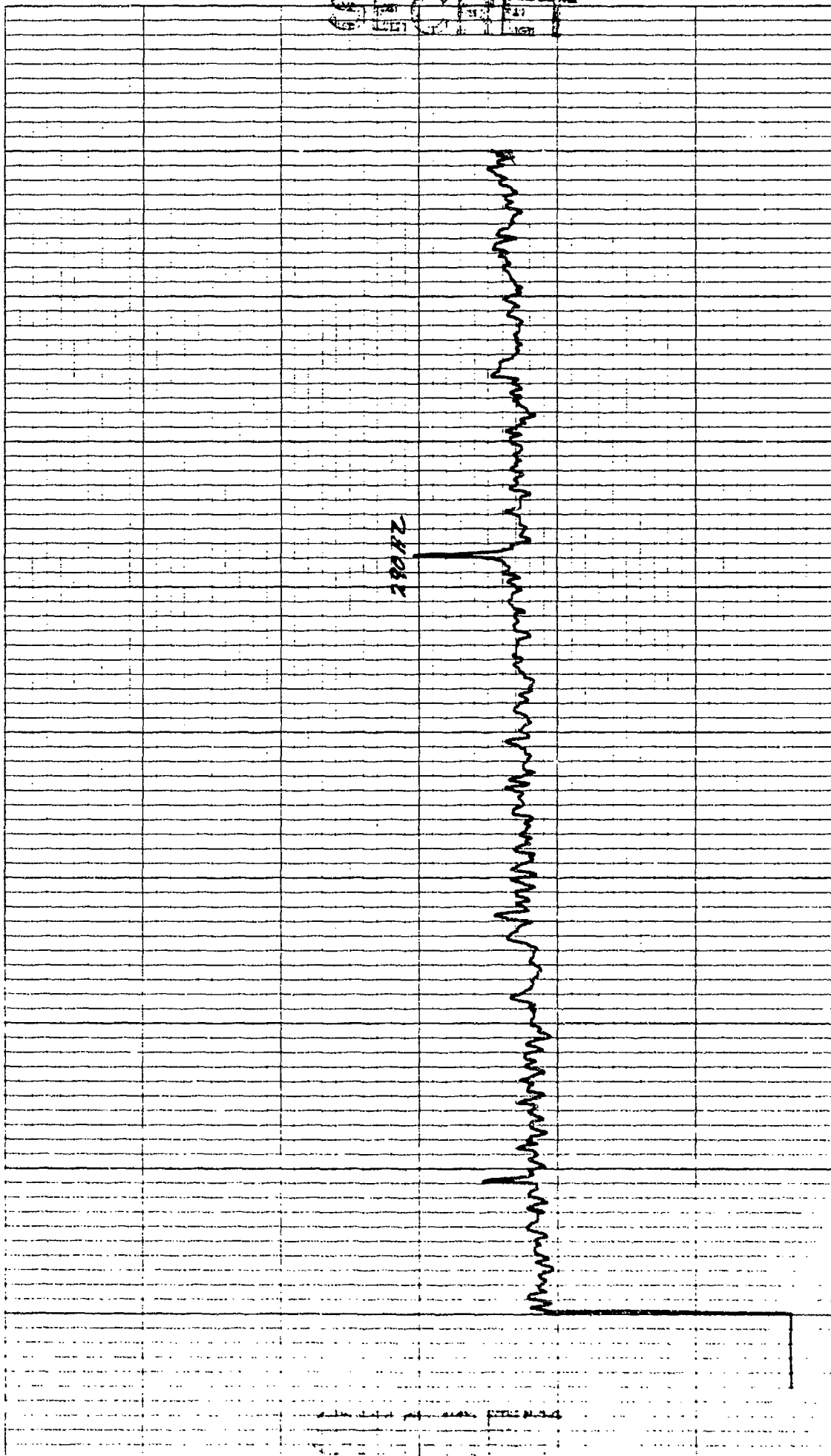


SECRET

K⁵E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-16-0835 (61) DATE OF ANALYSIS: REEL: 422 INDEX 566
OMNI SPECTRUM (ELEMENT 35)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING



K-5E 10 X 10 TO THE INCH. : X 10 INCHES
HEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

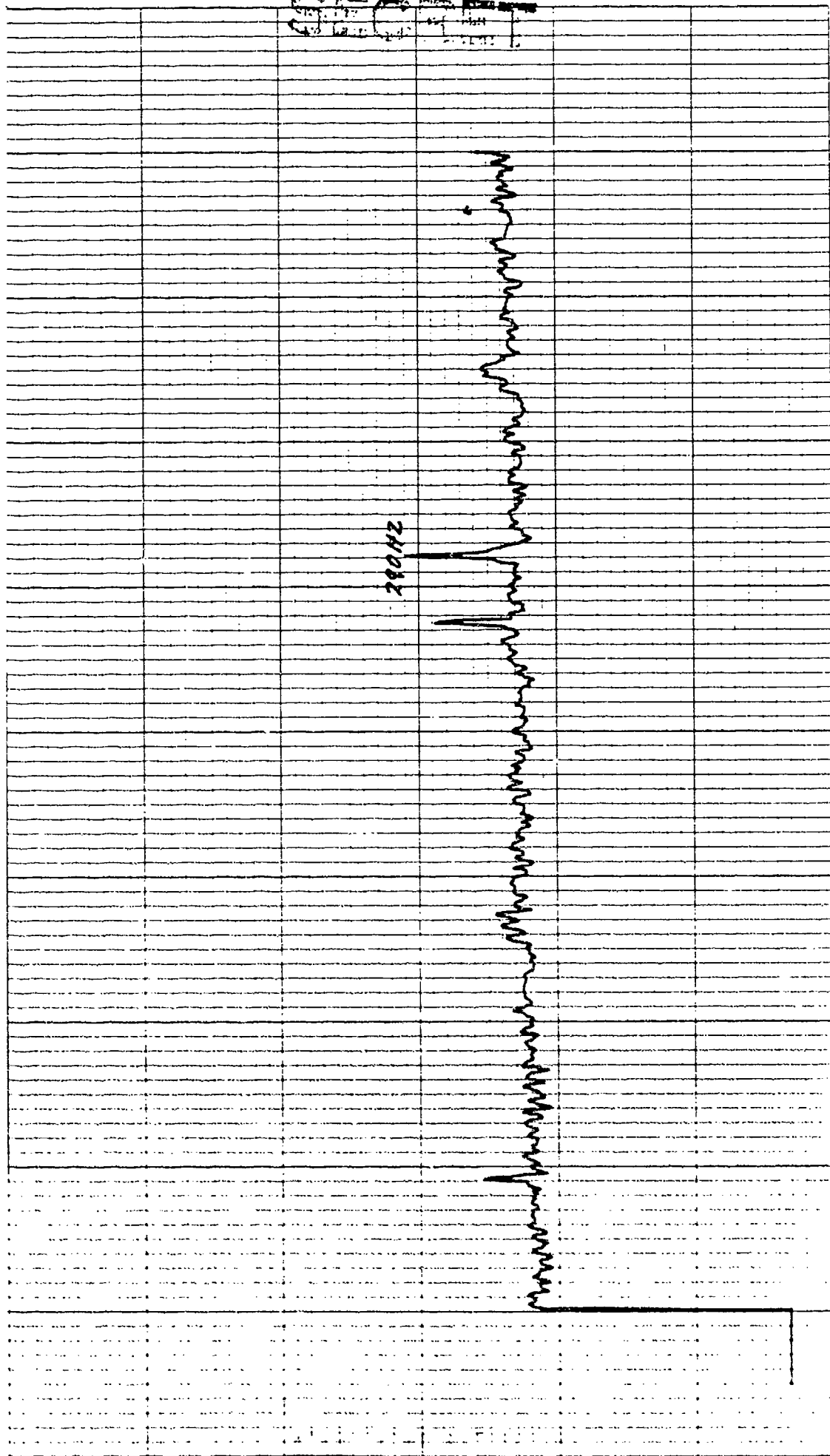
CONTROL: 3-16-0935 (70)
OMNI SPECTRUM (ELEMENT 37)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0935 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: M22 INDEX 566

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING



KOE 10 X 10 TO THE INCH .7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

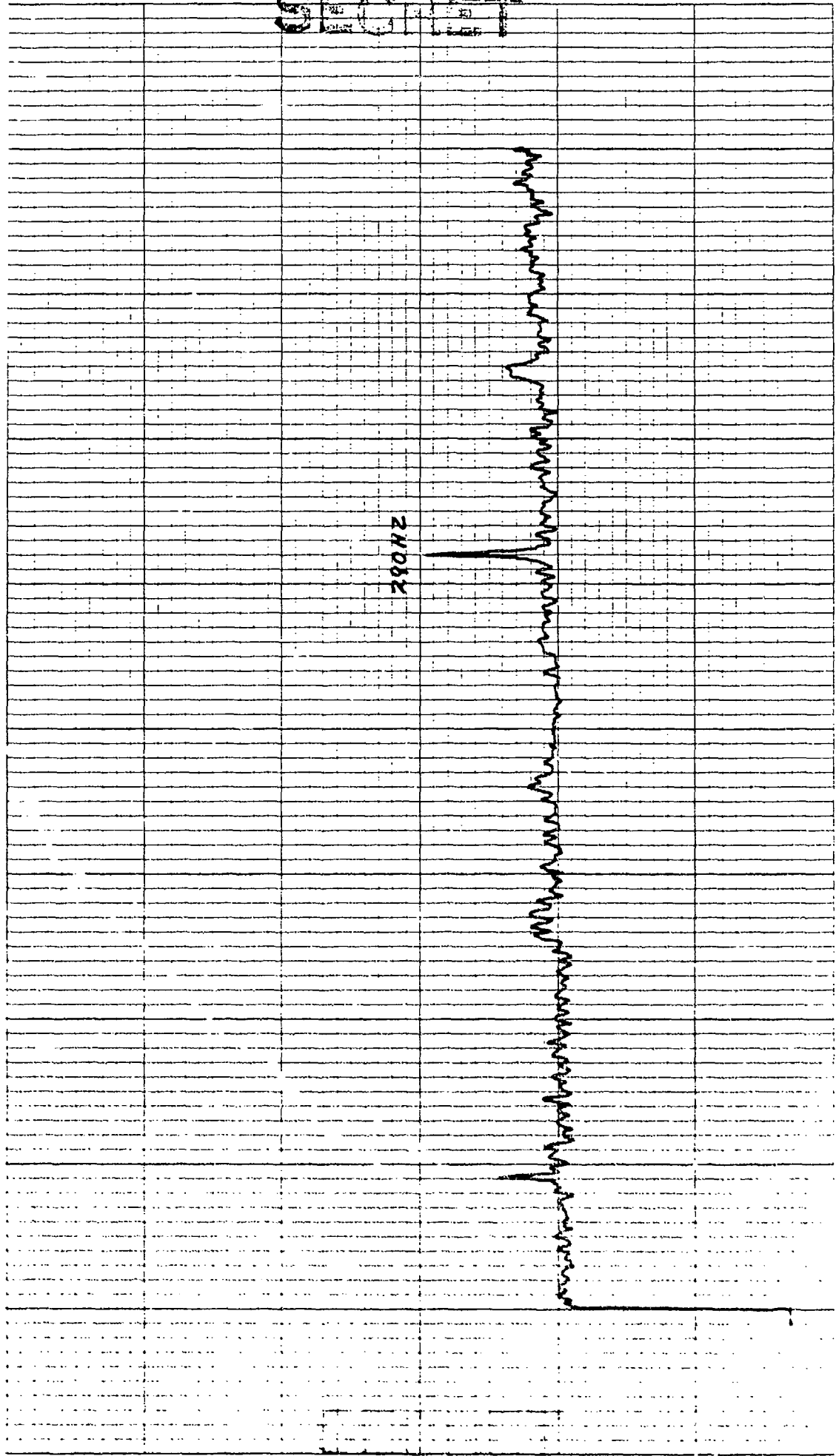
CONTROL: 3-16-0935 (71)
OMNI SPECTRUM (ELEMENT 39)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0935 Z
ANALYSIS BANDWIDTH: 1/10HZ
 DEG AZ STEERING

REEL: M22 INDEX 566

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING



K&E 10 X 10 TO THE INCH 1/2 X 10 INCHES
NEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-16-0935 (22)
OMNI SPECTRUM (ELEMENT 41)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

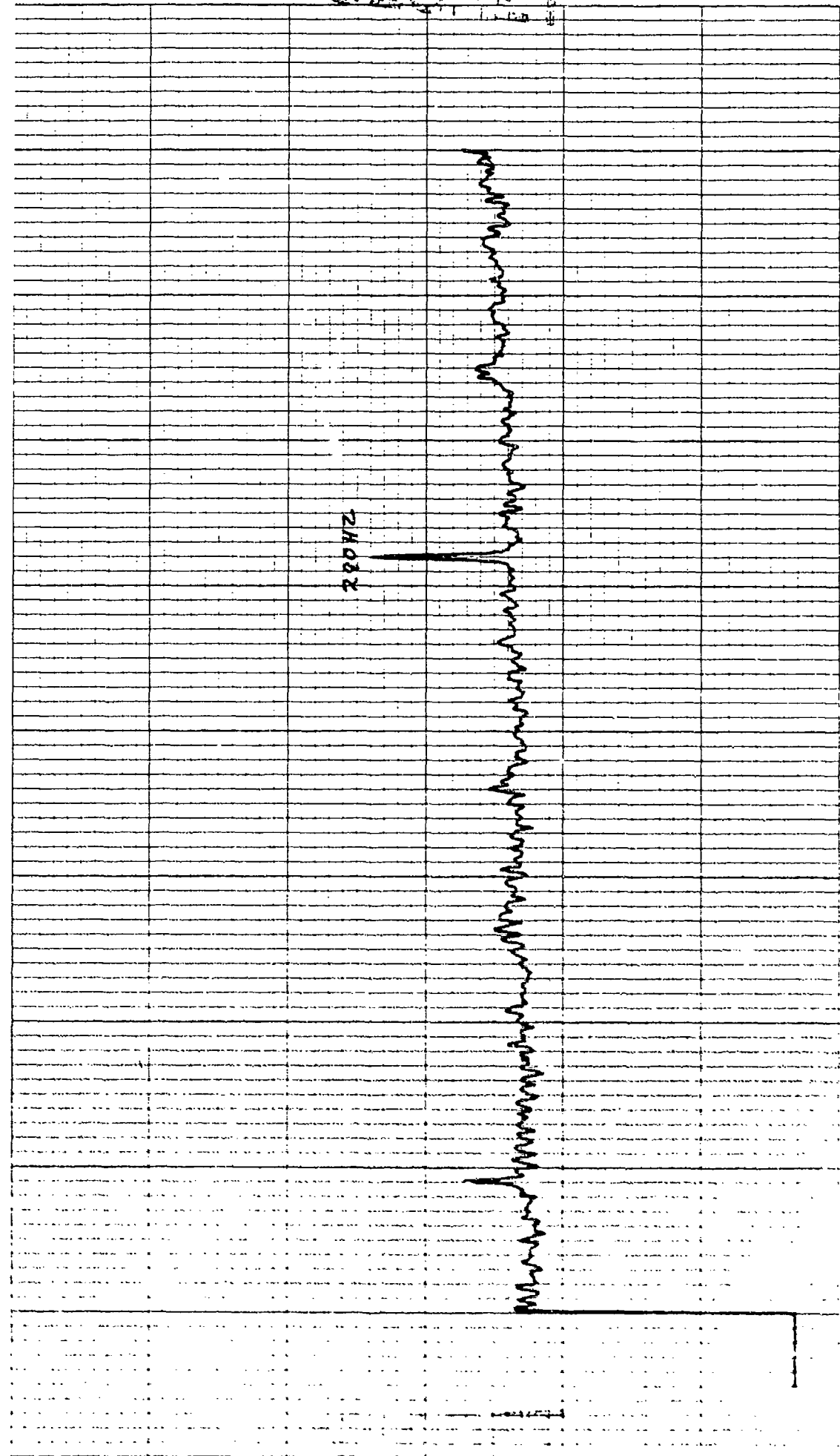
DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 0935 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEC AZ STEERING

REEL: M22

INDEX 522

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING

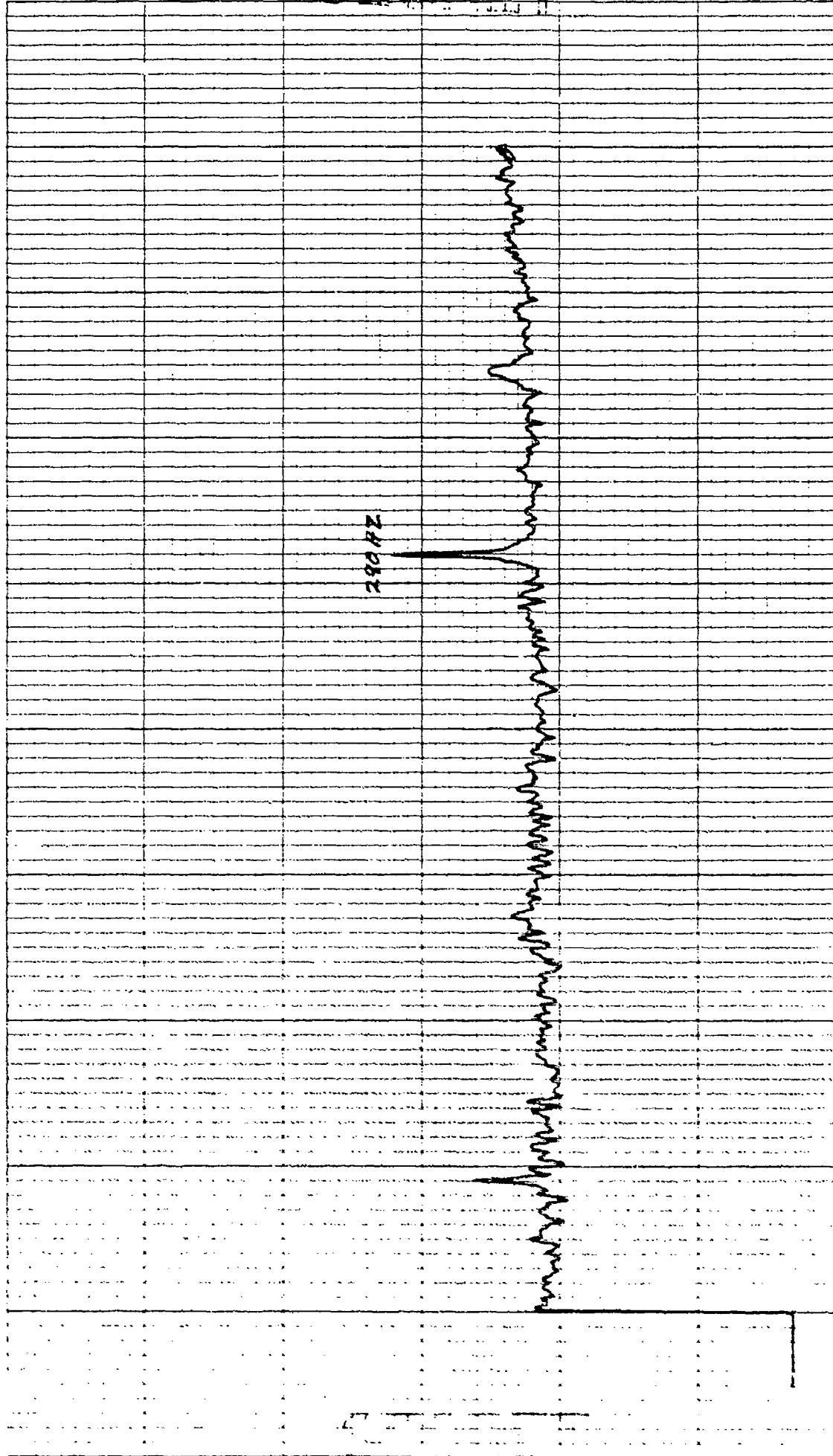


SECRET

10 X 10 TO THE INCH. x 10 INCH.
MURPHY & BAKER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-16 -0935 (73) DATE OF ANALYSIS: REEL: 1223 INDEX: 566
OMNI SPECTRUM (ELEMENT 43)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: DB
1 ELEMENT DEG AZ STEERING FILTER WTC: HANNING



REF ID: A61010
REF ID: A61010

46 0703

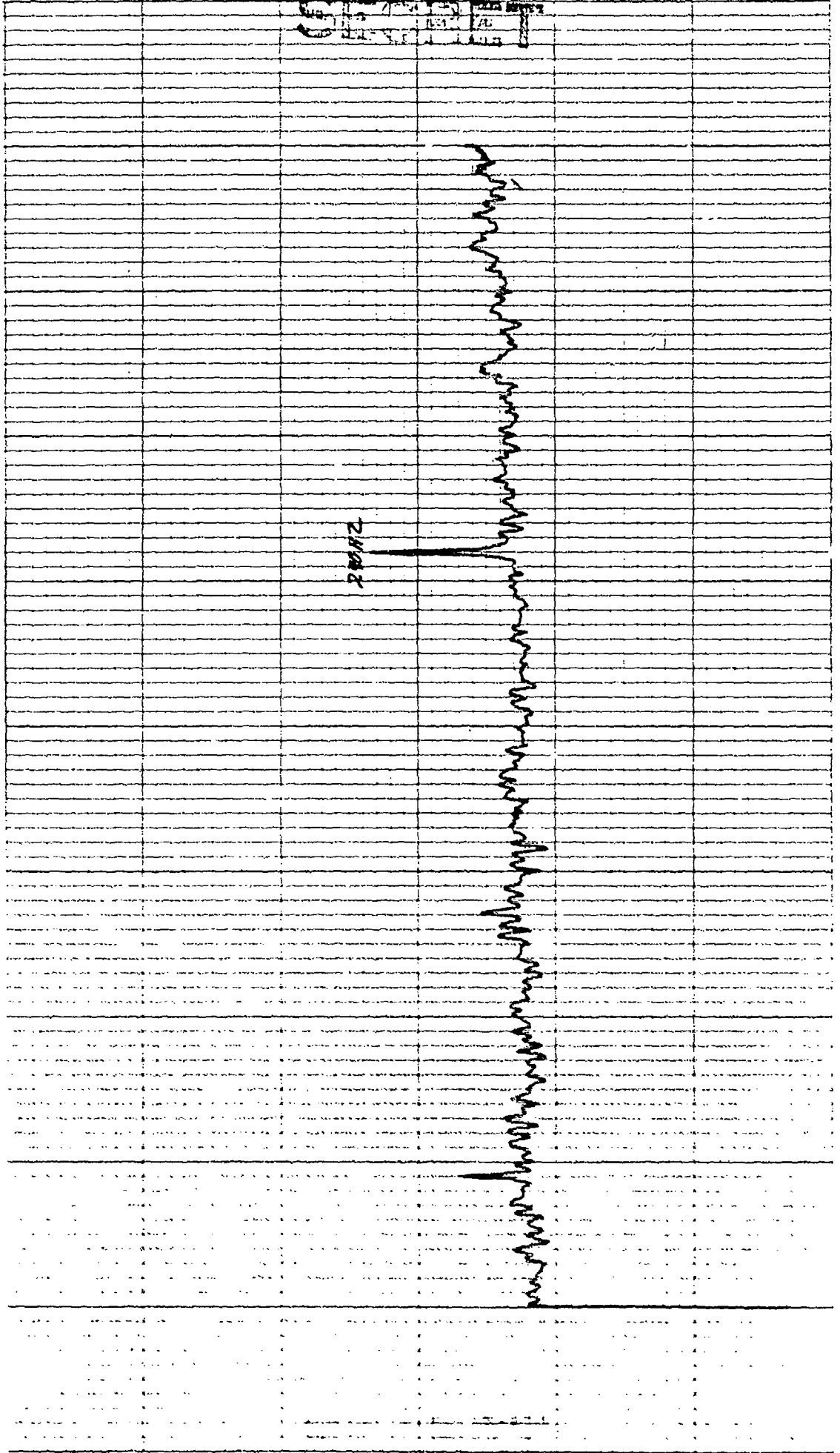
CONTROL: 376 - 0075 (74)
OMNI SPECTRUM (ELEMENT 45)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

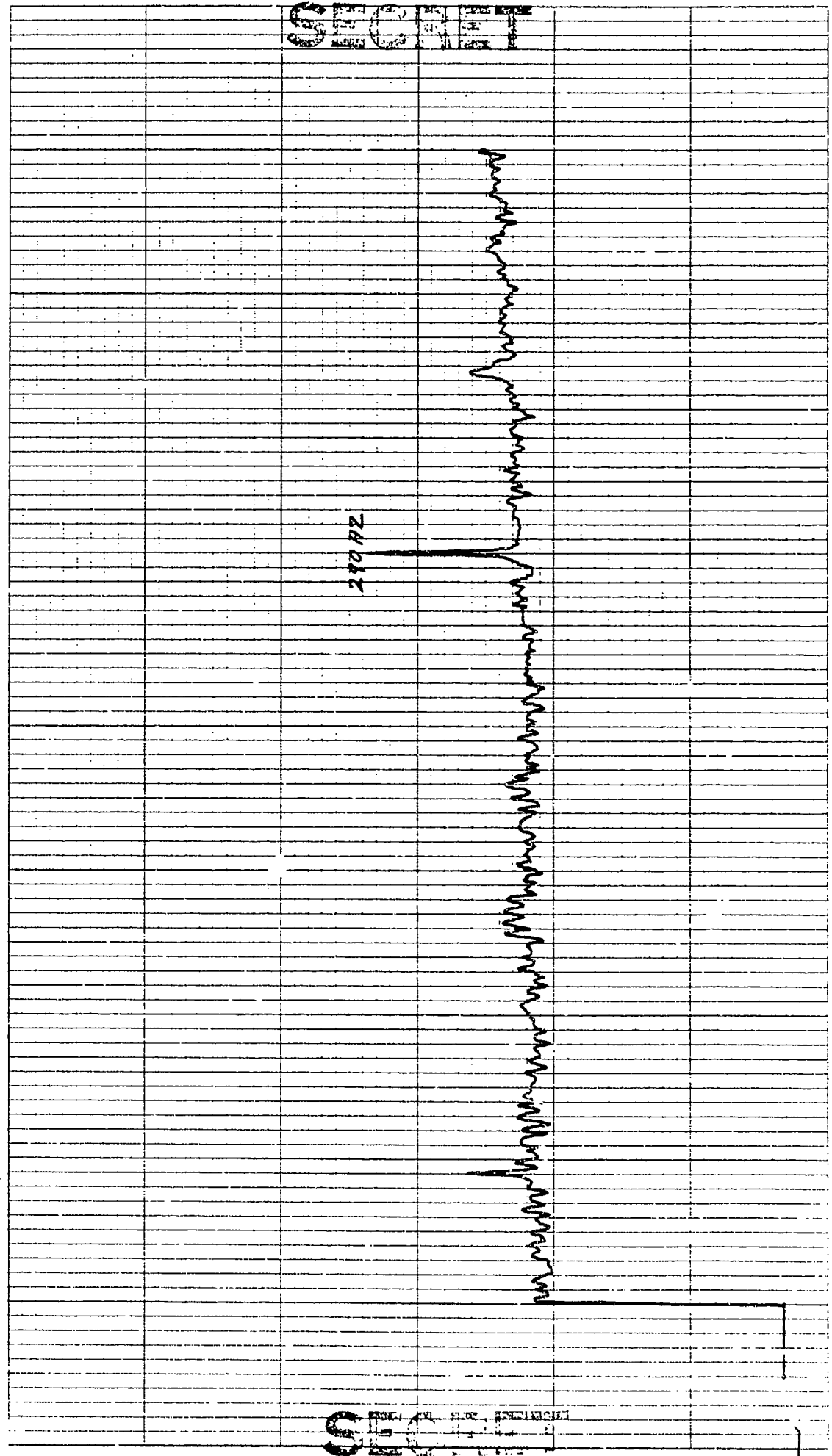
DATE/TIME: 3-16-77 - 0135 Z
ANALYSIS BANDWIDTH: 1/10HZ
_____ DEG AZ STEERING

REEL: 122 INDEX 566

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



CONTROL: 3-16 - 0935 (75) DATE OF ANALYSIS: REEL: 122 INDEX: 566
OMNI SPECTRUM (ELEMENT 47)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: - DB
1 ELEMENT DEG AZ STEERING FILTEF WTG: HANNING



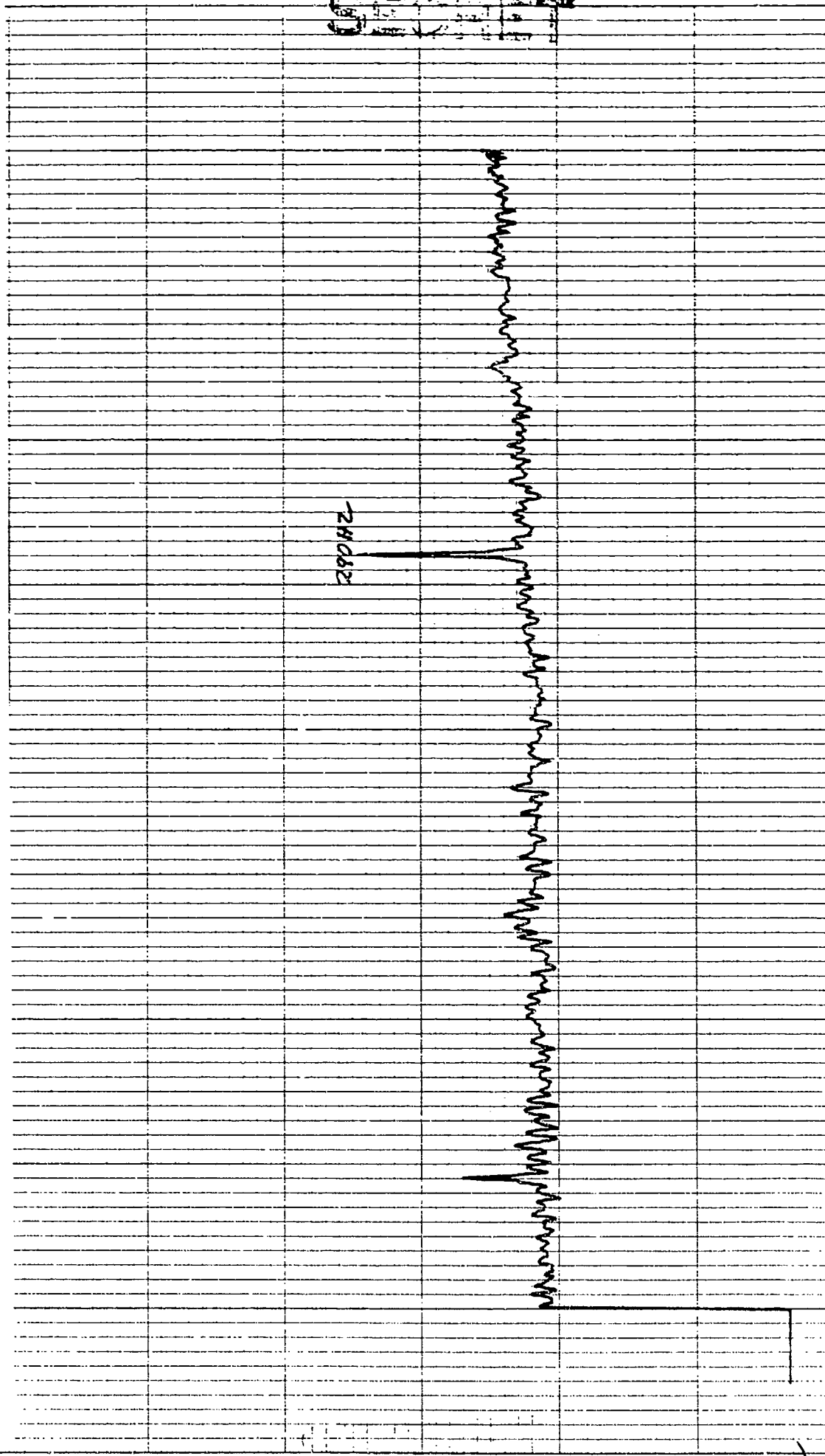
SECRET

SECRET

10 X 10 TO THE INCH • 7 X 10 MILLI'S
RUFFEL & L'ISER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-16-0935 (76) DATE OF ANALYSIS: REEL: 122 INDEX 546
 OMNI SPECTRUM (ELEMENT 49)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: DB
 1 ELEMENT DEG AZ STEERING FILTER WTG: HANNING

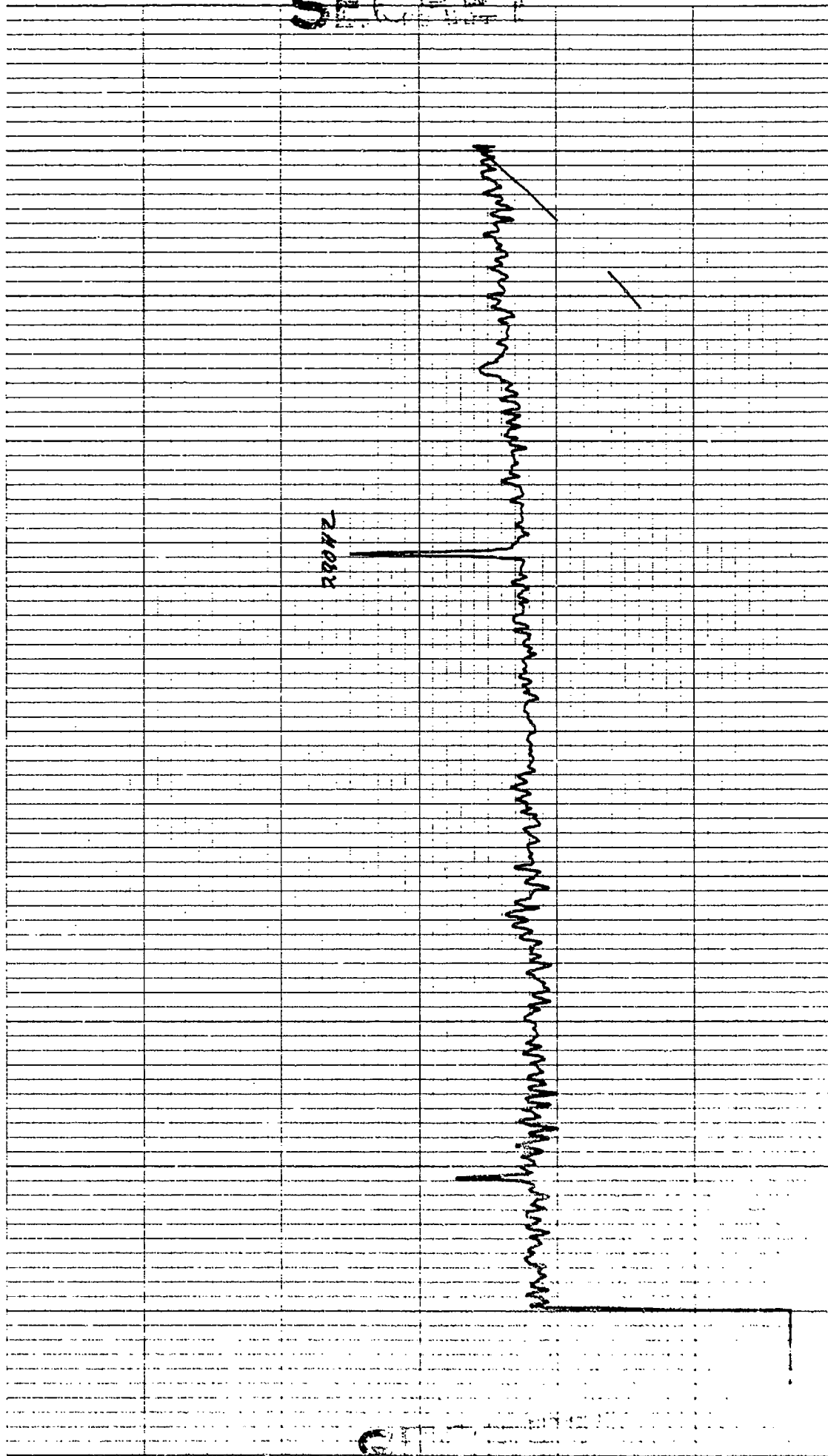


SECRET

10 X 10 TO THE INCH • 1 X 10 INCHES
HEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

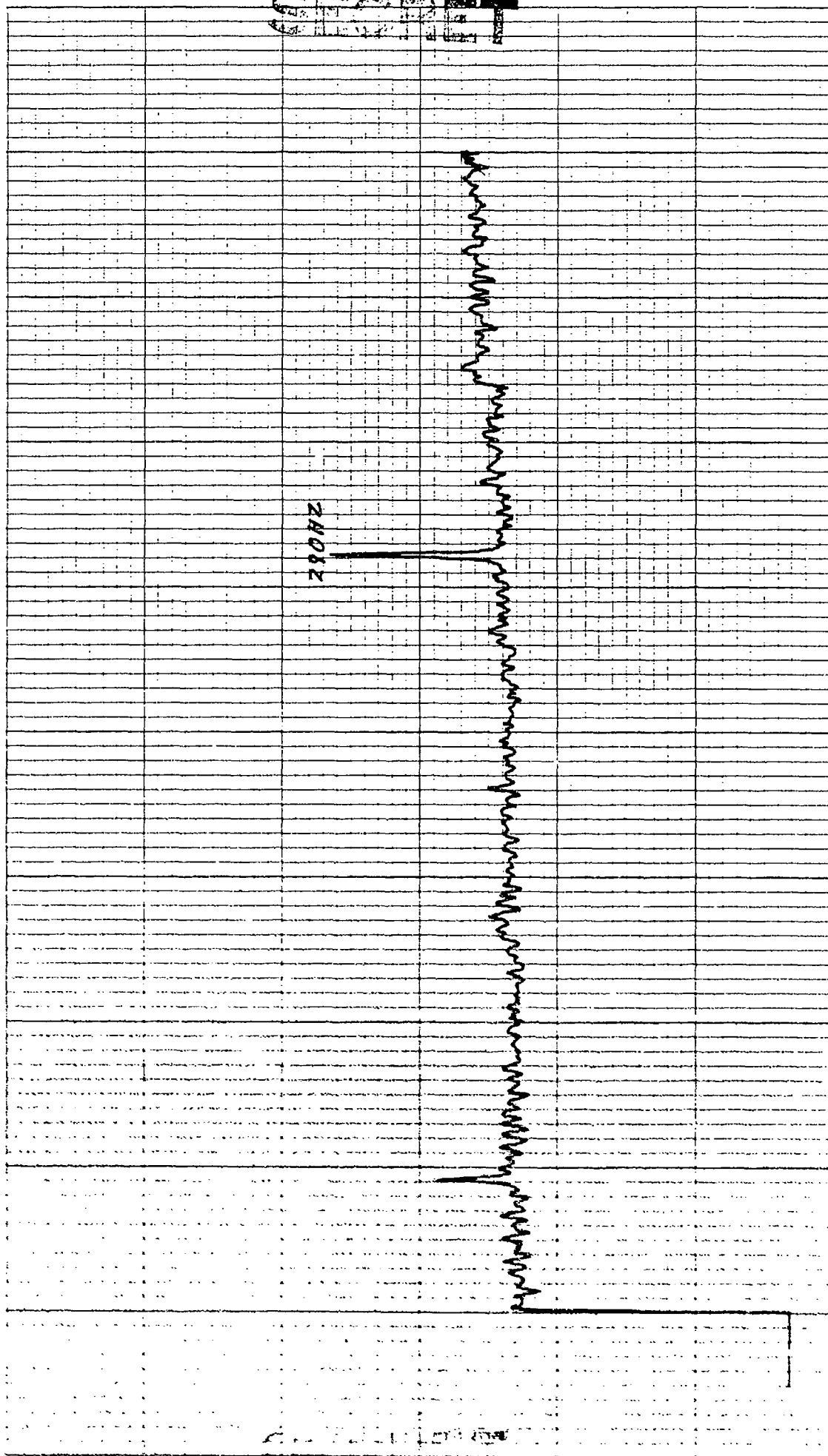
CONTROL: 3-16 - 0935 (77) DATE OF ANALYSIS: REEL: 1722 INDEX 566
OMNI SPECTRUM (ELEMENT 51)
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 0935 Z
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: DB
1 ELEMENT DEG AZ STEERING FILTER WTC: HANNING



KOE 10 X 10 TO THE INCH 7 X 10 INCHES
NEUFEL & ESSER CO. MADE IN U.S.A.

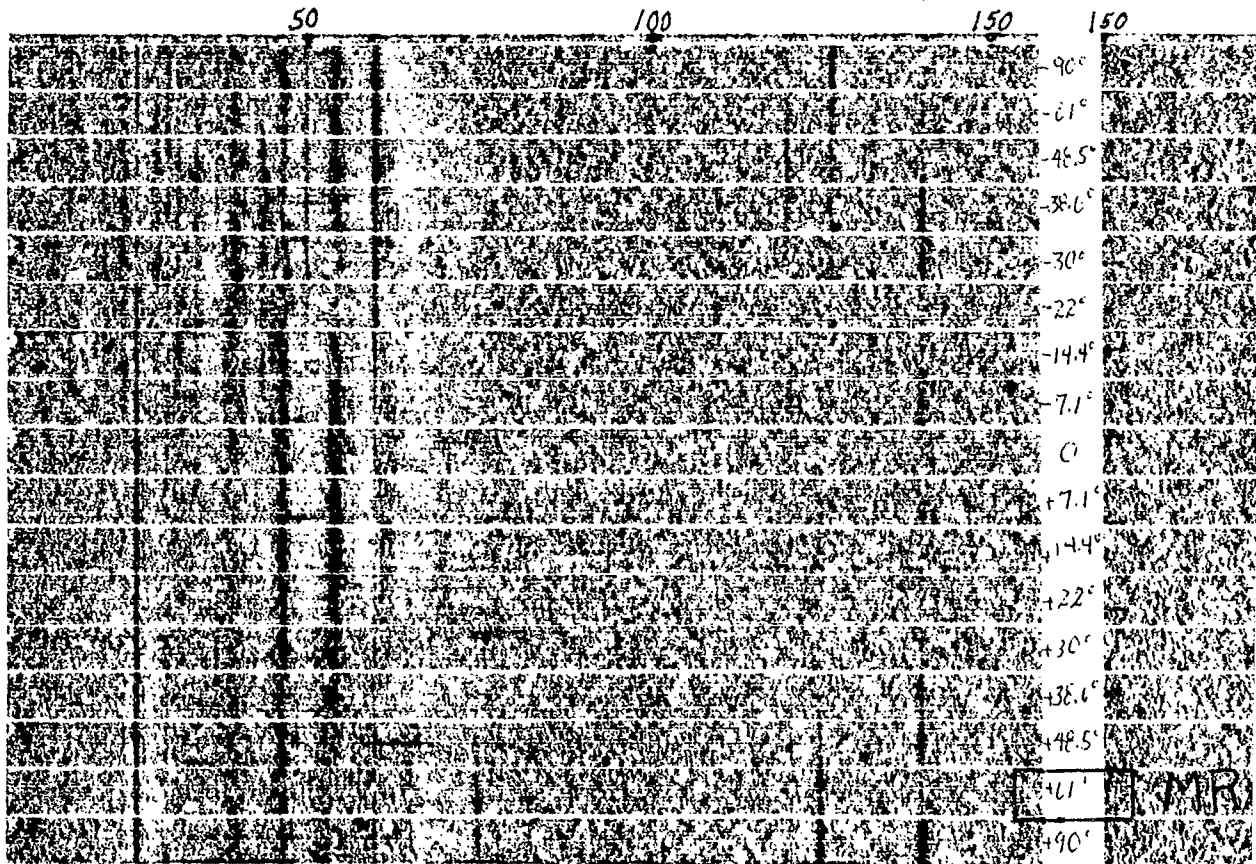
46 0703

CONTROL: 376 - 0935 (70) DATE OF ANALYSIS: REEL: M22 INDEX 566
OMN1 SPECTRUM (ELEMENT 53)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: DB
1 ELEMENT 1 DEG AZ STEERING FILTER WTG: HANNING



25Hz

140HZ



CONTROL NUMBER 09352-49-DP11
NUMBER OF ELEMENTS 16
FREQUENCY BAND 10 TO 300 HZ
RANGE 122 N.M.

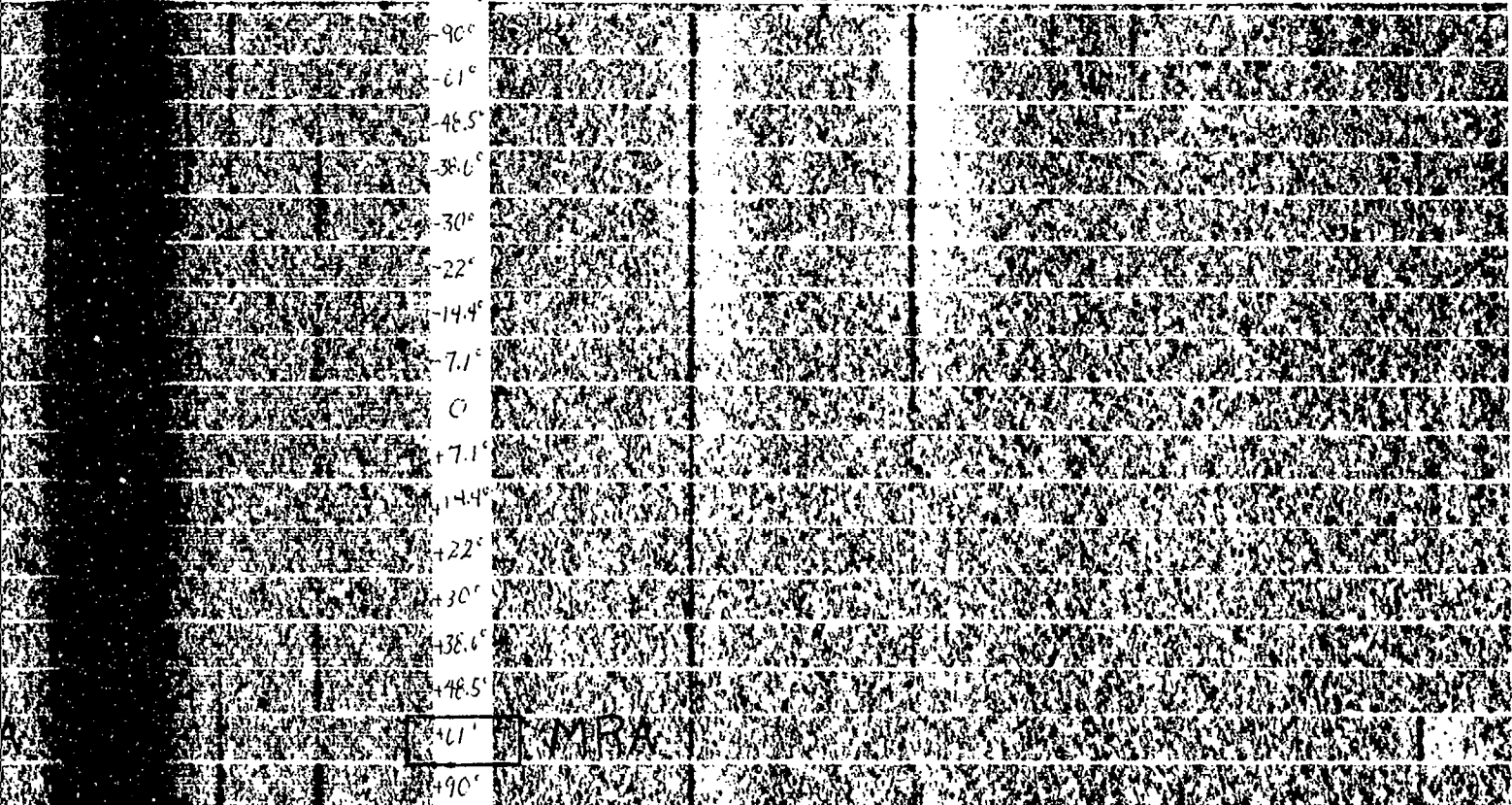
HISTOGRAM
TAPE REEL NUMBER 122
ANALYSIS BAND WIDTH .2
WATER DEPTH 2000 F

140HZ
↓

290HZ
↓
295HZ
↓

SECRET

150 150 200 250 300



HISTOPRAZ

TAPE REEL NUMBER M22

TAPE COUNT 566

SECRET

ANALYSIS BAND WIDTH .2 HZ

ELEMENT NUMBERS 1 T. 16 SAN-XXX-78-0139

WATER DEPTH 2800' FMS

DATE 3-16-77
EXERCISE: BEARING STAKE

HZ
FMS

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 11

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-28.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-18.8	
BEAMFORMER GAIN	<u>+18</u>	- .8	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	- .6	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-56.2</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-46.2	
BEAMFORMER GAIN	<u>+18</u>	-28.2	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>- .8</u>	
SIGNAL LEVEL FOR SNR	<u>-28.2</u>	27.4	
PROCESSOR CORRECTION	<u>-4.0</u>	23.4	
MRA CORRECTION	<u>+ .2</u>	23.6	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	15.4	SNR 1 HZ BAND

~~CONFIDENTIAL~~
SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 11

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-45.4</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-35.4</u>	
BEAMFORMER GAIN	<u>+10</u>	<u>-17.4</u>	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	<u>-16.6</u>	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-64.7</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-54.7</u>	
BEAMFORMER GAIN	<u>+10</u>	<u>-36.7</u>	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-17.4</u>	
SIGNAL LEVEL FOR SNR	<u>-36.7</u>	<u>19.3</u>	
PROCESSOR CORRECTION	<u>-4.0</u>	<u>15.3</u>	
MRA CORRECTION	<u>+ .8</u>	<u>16.1</u>	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	<u>7.9</u>	SNR 1 HZ BAND

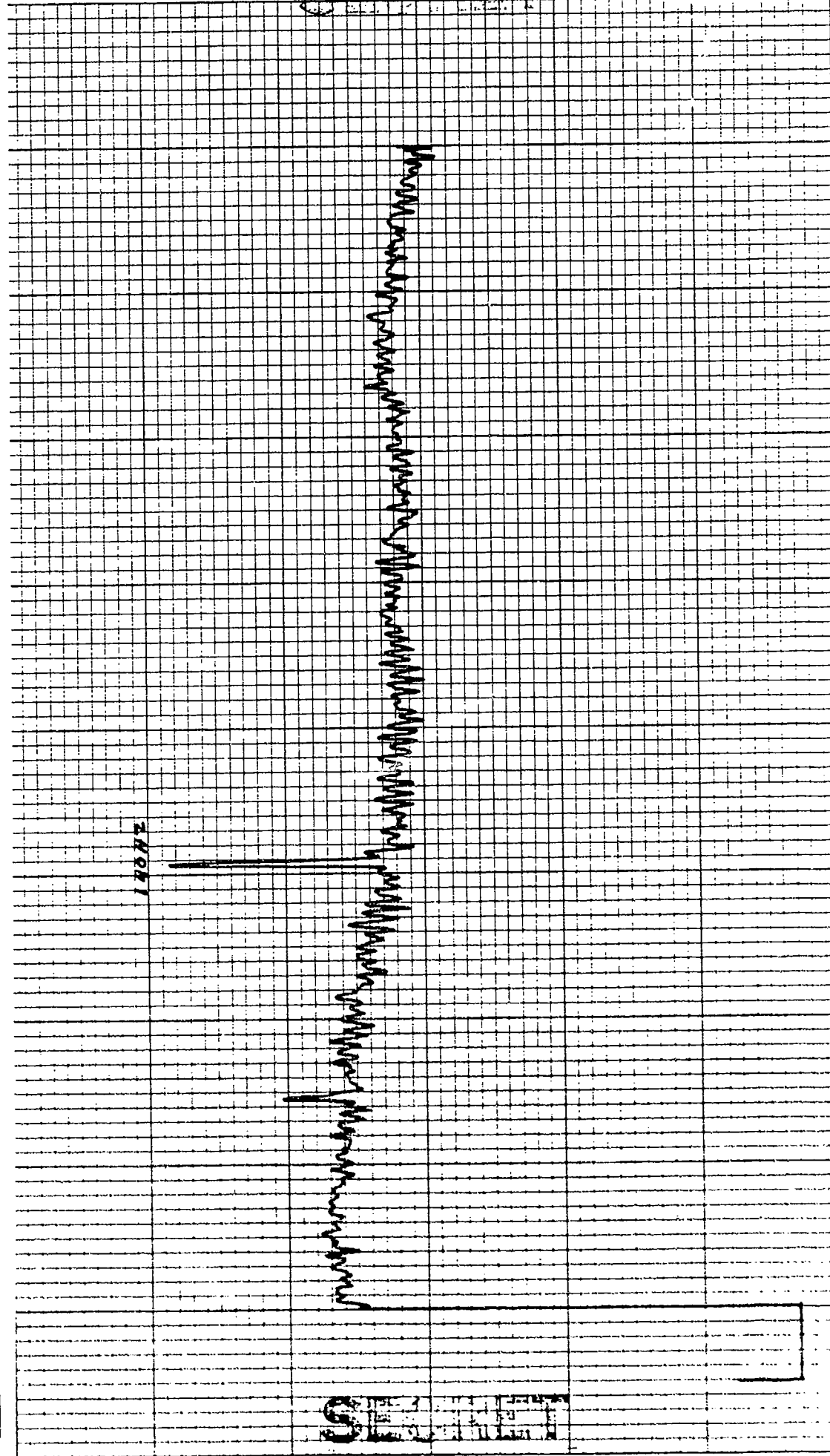
SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-29.8</u>	<u>-31.4</u>	<u> </u>
MRA SIGNAL LEVEL	<u>- .6</u>	<u>-16.6</u>	<u> </u>
ARRAY SIGNAL GAIN	<u>29.2</u>	<u>24.8</u>	<u> </u>
20 LOG <u>16</u>	<u>34.1</u>	<u>34.1</u>	<u> </u>
# of elements			
DIFFERENCE	<u>- 4.9</u>	<u>9.3</u>	<u> </u>

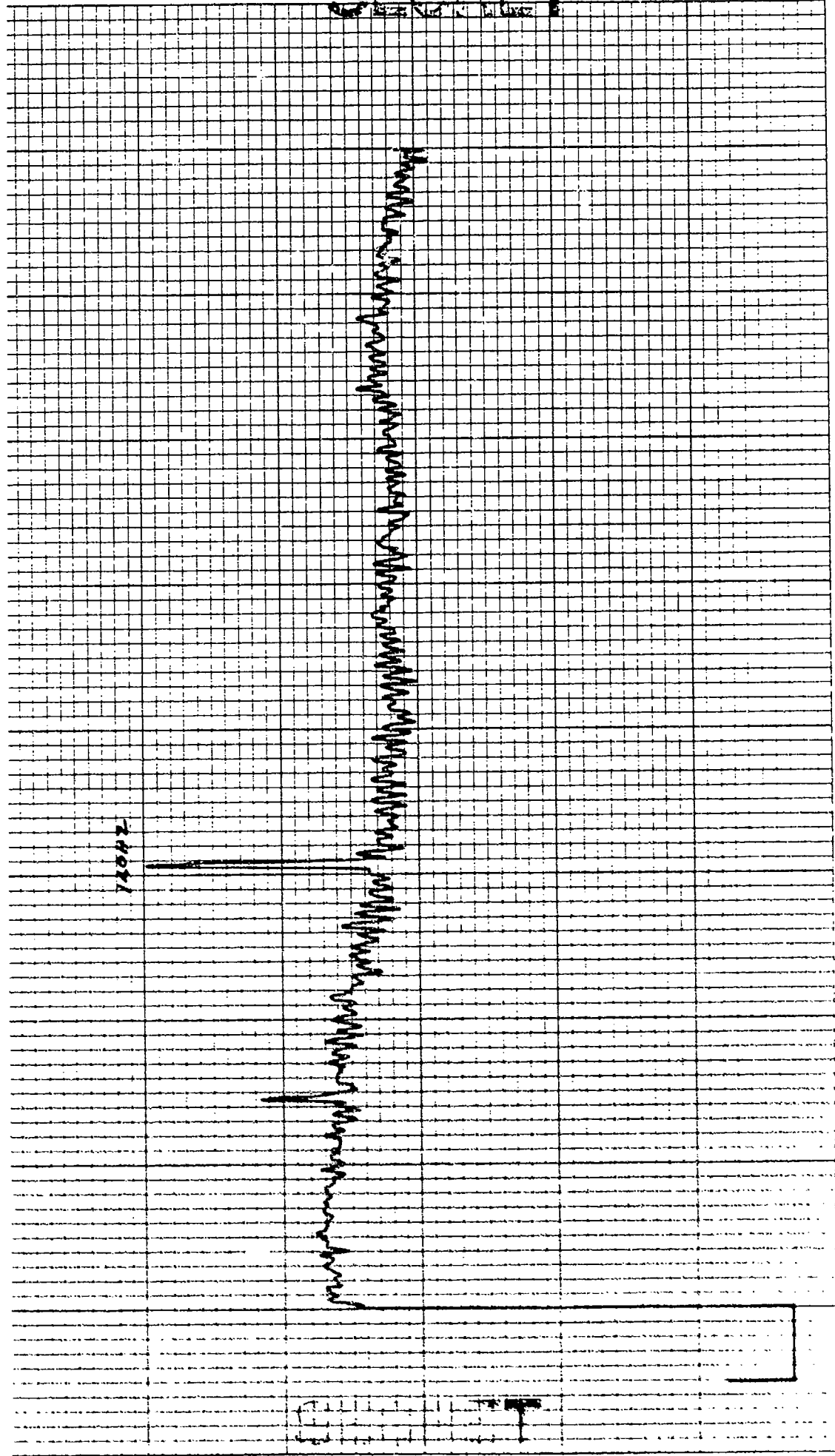
ARRAY GAIN

MRA SNR	<u>23.6</u>	<u>16.1</u>	<u> </u>
MEAN OMNI SNR	<u>16.2</u>	<u>8.4</u>	<u> </u>
ARRAY GAIN	<u>7.4</u>	<u>7.7</u>	<u> </u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>7.6</u>	<u>9.4</u>	<u> </u>
DIFFERENCE	<u>- .2</u>	<u>-1.7</u>	<u> </u>

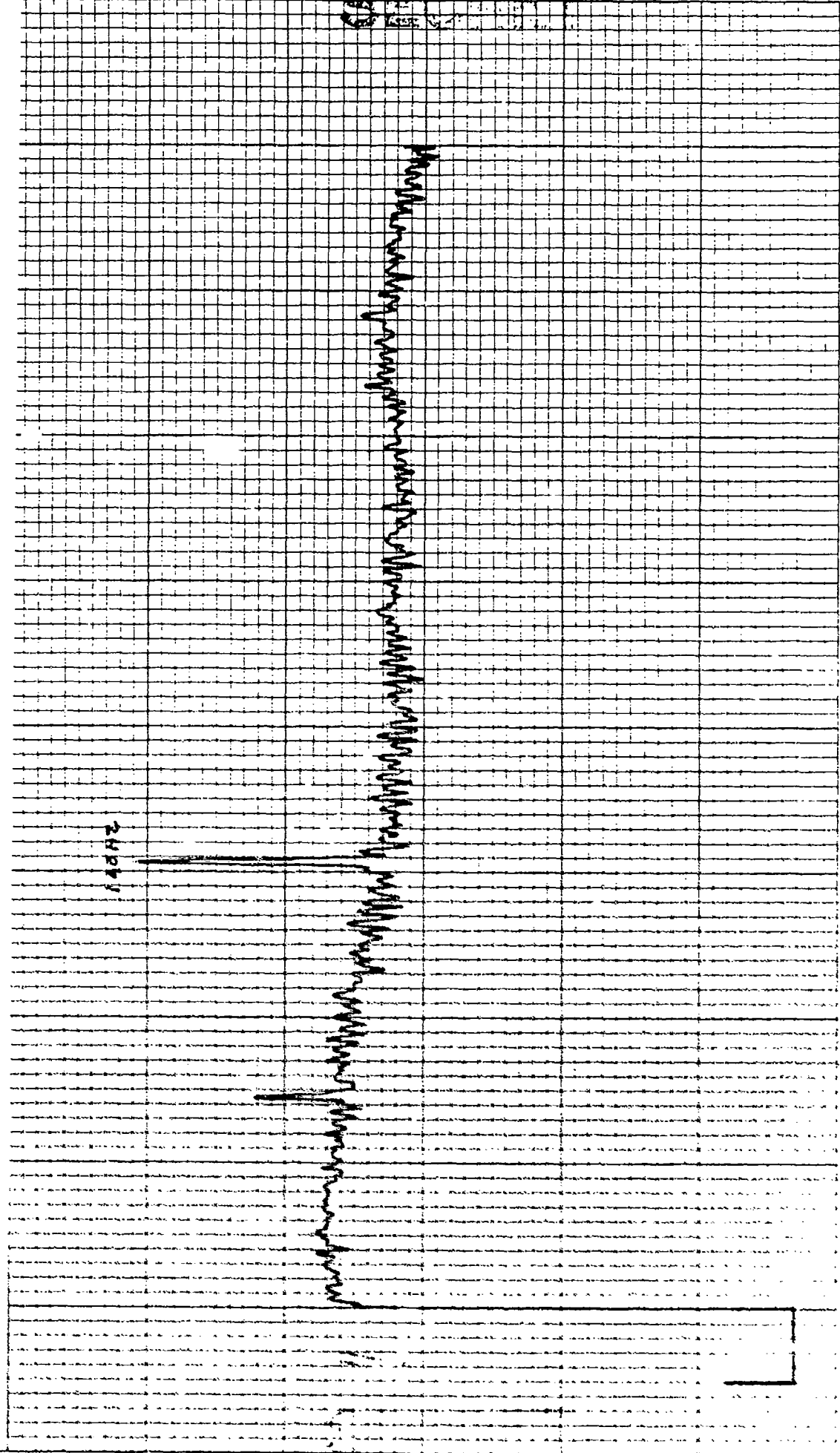
CONTROL: 0935-16 (DP11) REEL: 422 INDE X 566
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-16
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77-0935Z INTEGRATION TIME 320 SECS ATTN: 70 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
16 ELEMENTS 44 DEG. AZ STEERING



CONTROL: 0935 - 16 (DP11) REEL: M22 INDE X 566
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: - - -
EXERCISE: BEARING STAKE 1-16)
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: -18 DB
16 ELEMENTS +46 DEG. AZ STEERING FILTER WTG: HANNING



CONTROL: 0935 - 16 (DP11) REEL: M2A INDE X 566
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-16
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTEN: -10 DB
CENTER FREQ: 150 HZ + 40 DEG. AZ STEERING FILTER WTG: HANNING
16 ELEMENTS



NOE 10 X 10 TO THE INCHES 3 TO 200 MHz
REDFIELD & BASSER CO. WASH DC 20541

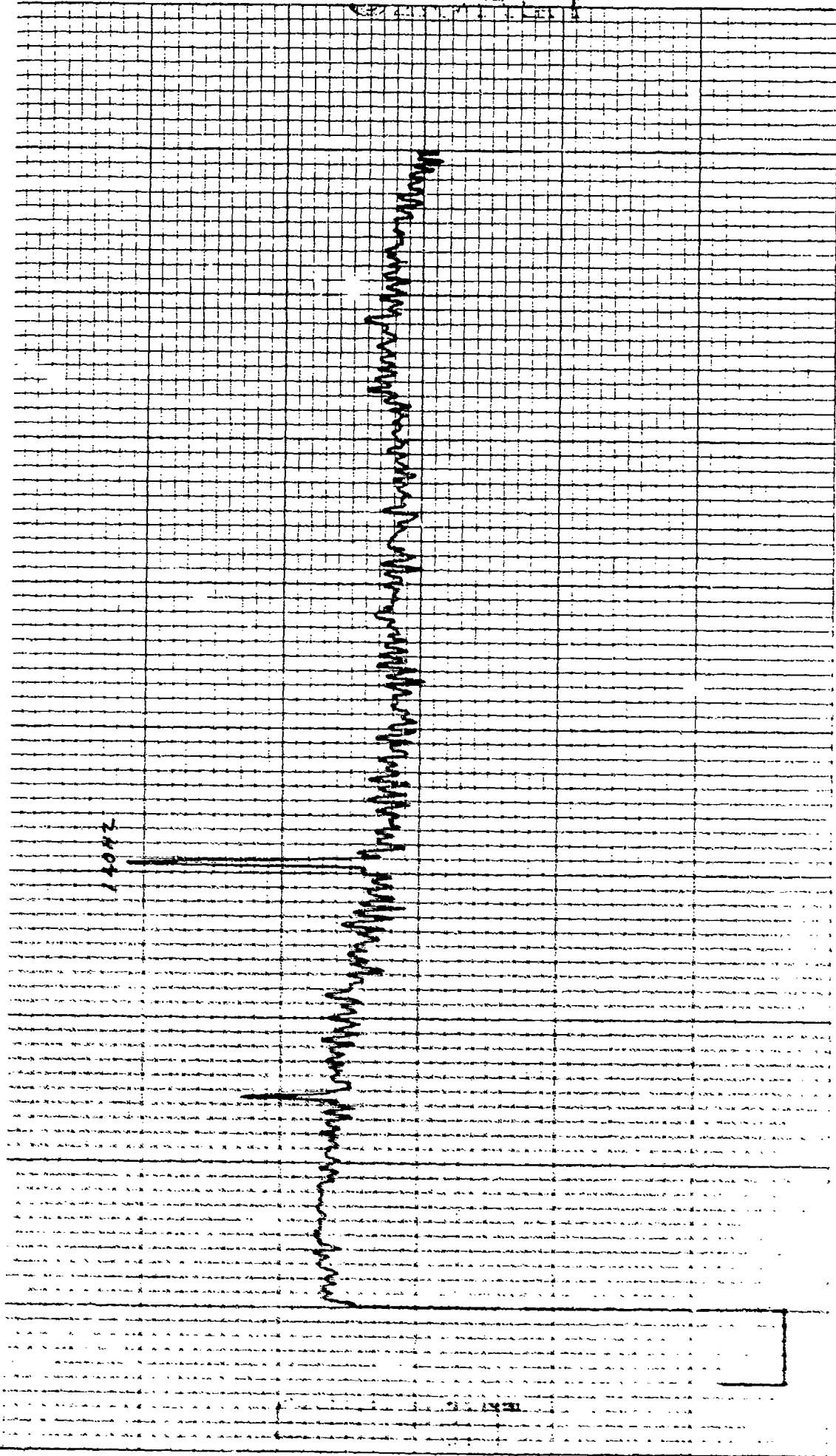
46 0703

CONTROL: 0935 - 16 (2P11)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 MHz
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 3-76-77 - 0935 Z
ANALYSIS BANDWIDTH: 1/10 HZ
400 DEG. AZ STEERING

REEL: H 22
INDE X 566

INTEGRATION TIME 320 SECS
ATTEN: 70 DB
FILTER WTG: HANNING

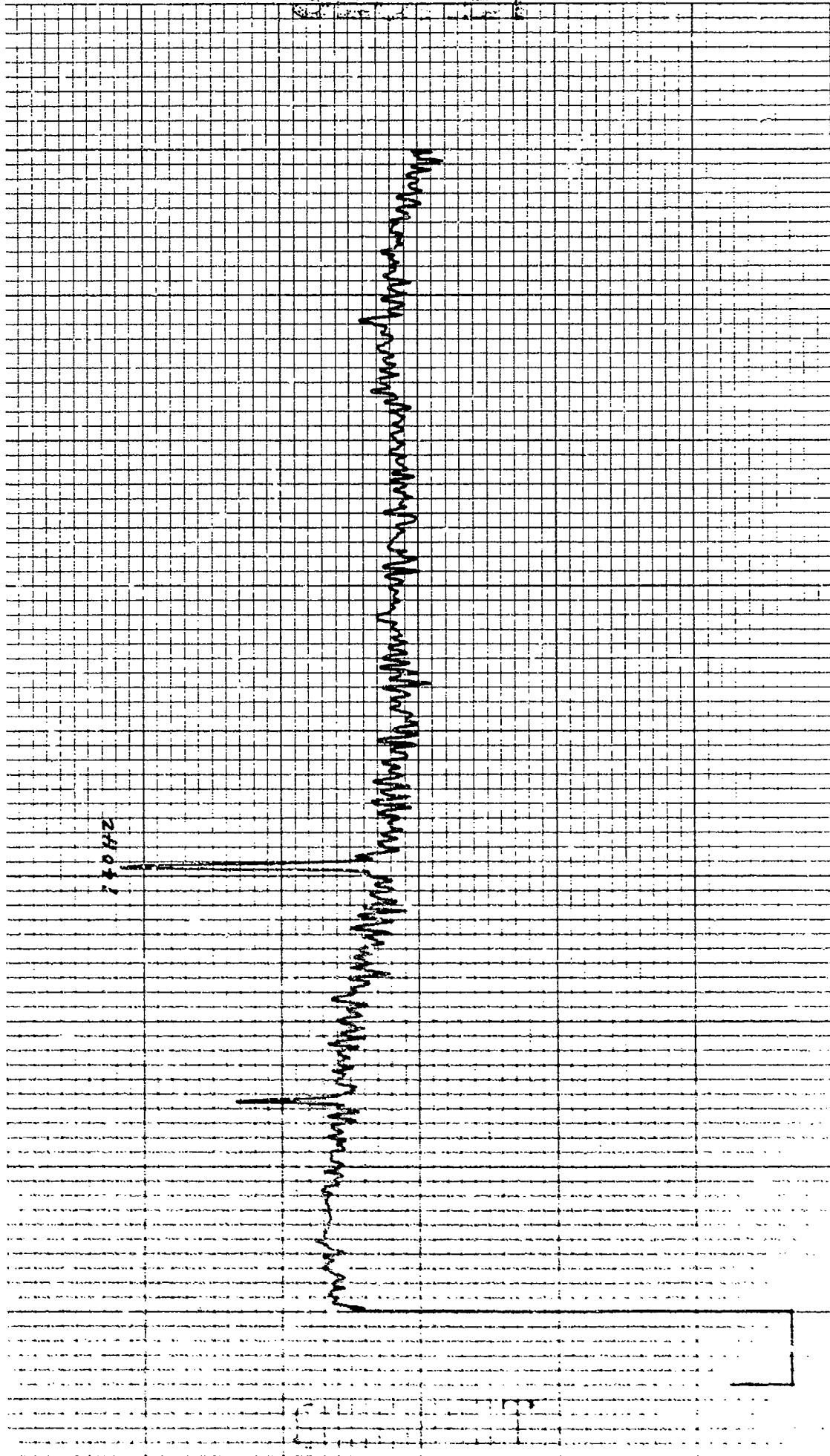


SECRET

CONTROL: 0935 - 16 (DP1)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-6
DATE/TIME: 3-16-77 - 0935 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+ 52 DEG. AZ STEERING

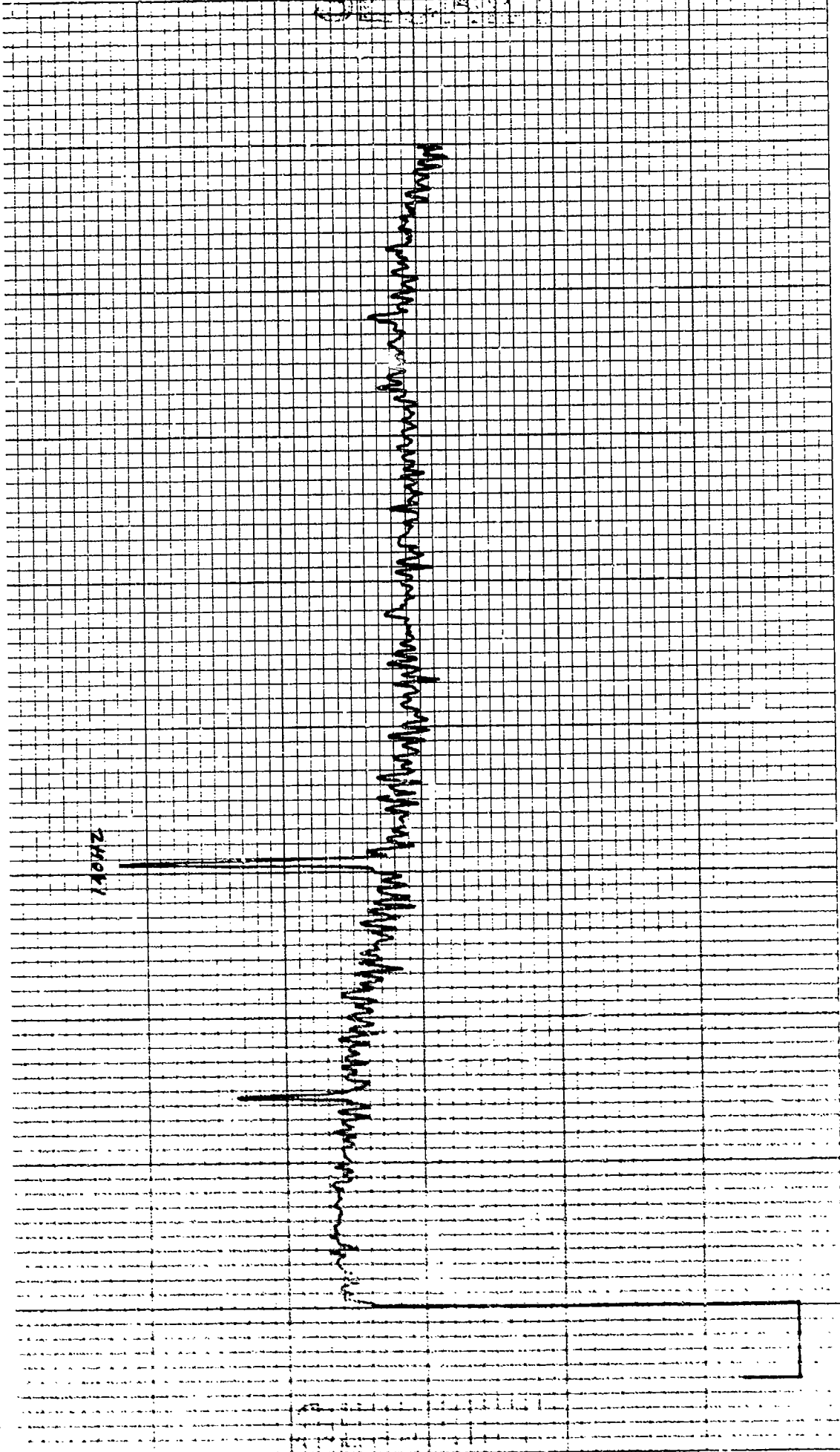
REEL: M22 INDE X 566
INTEGRATION TIME 320 SECS ATTN: -10 DB
FILTER WTG: HANNING



KSE 10 X 10 TO THE INCH .7 X 10 INCHES
MUEFFEL & E-SFR CO MADE IN U.S.A.

46 0703

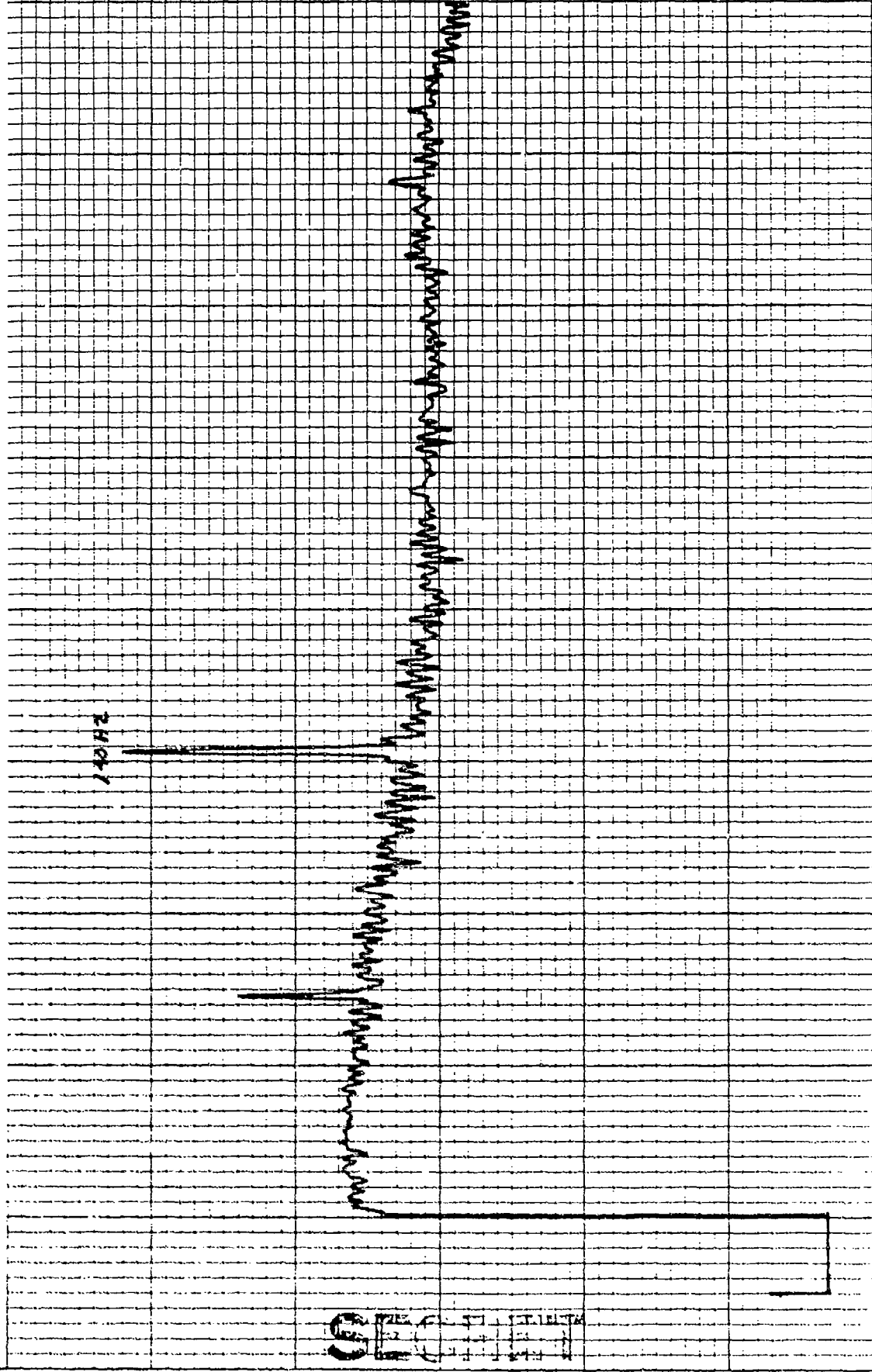
CONTROL: 0935 - 16 (PPI) DATE OF ANALYSIS: 1-16 REEL: M22 INDE X 1637
BEAMFORMED SPECTRUM (ELEMENTS) INTEGRATION TIME 320 SECS ATEN: -10 DB
EXERCISE: BEARING STAKE FILTER WTG: HANNING
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1710 HZ
16 ELEMENTS + 54 DEG. AZ STEERING



10 X 10 TO THE INCH 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0935 - 16 (DP11) REEL: M22 INDE X566
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-16
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: -70 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
16 ELEMENTS 456 DEG. AZ STEERING



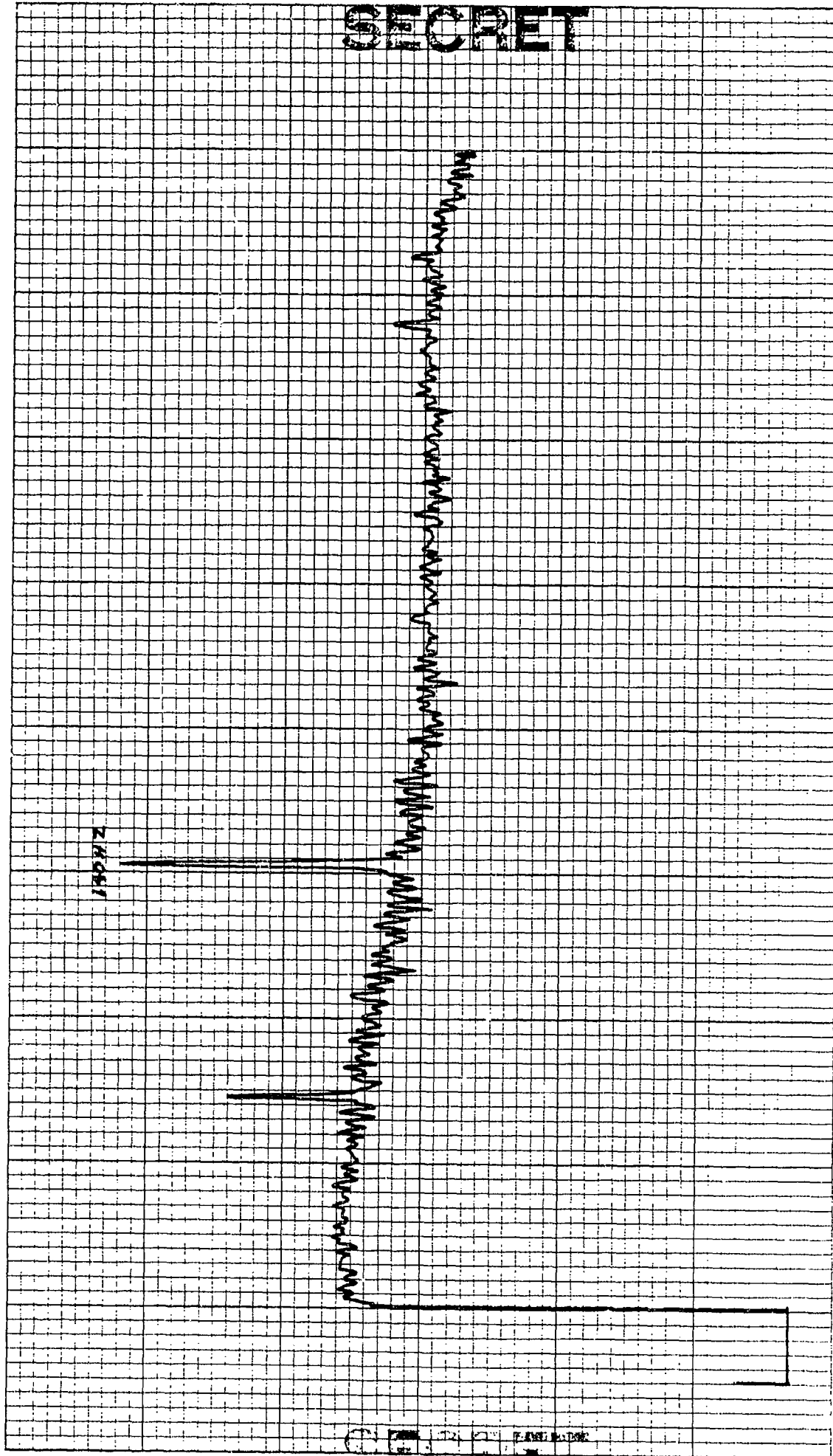
K-2 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0935 - 51 (DP11)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: _____
1-16
DATE/TIME: 3-16-77 - 0935 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+50 DEG. AZ STEERING

REEL: M22 INDE X566
INTEGRATION TIME 320 SECS ATTN: 18 DB
FILTER WTG: HANNING

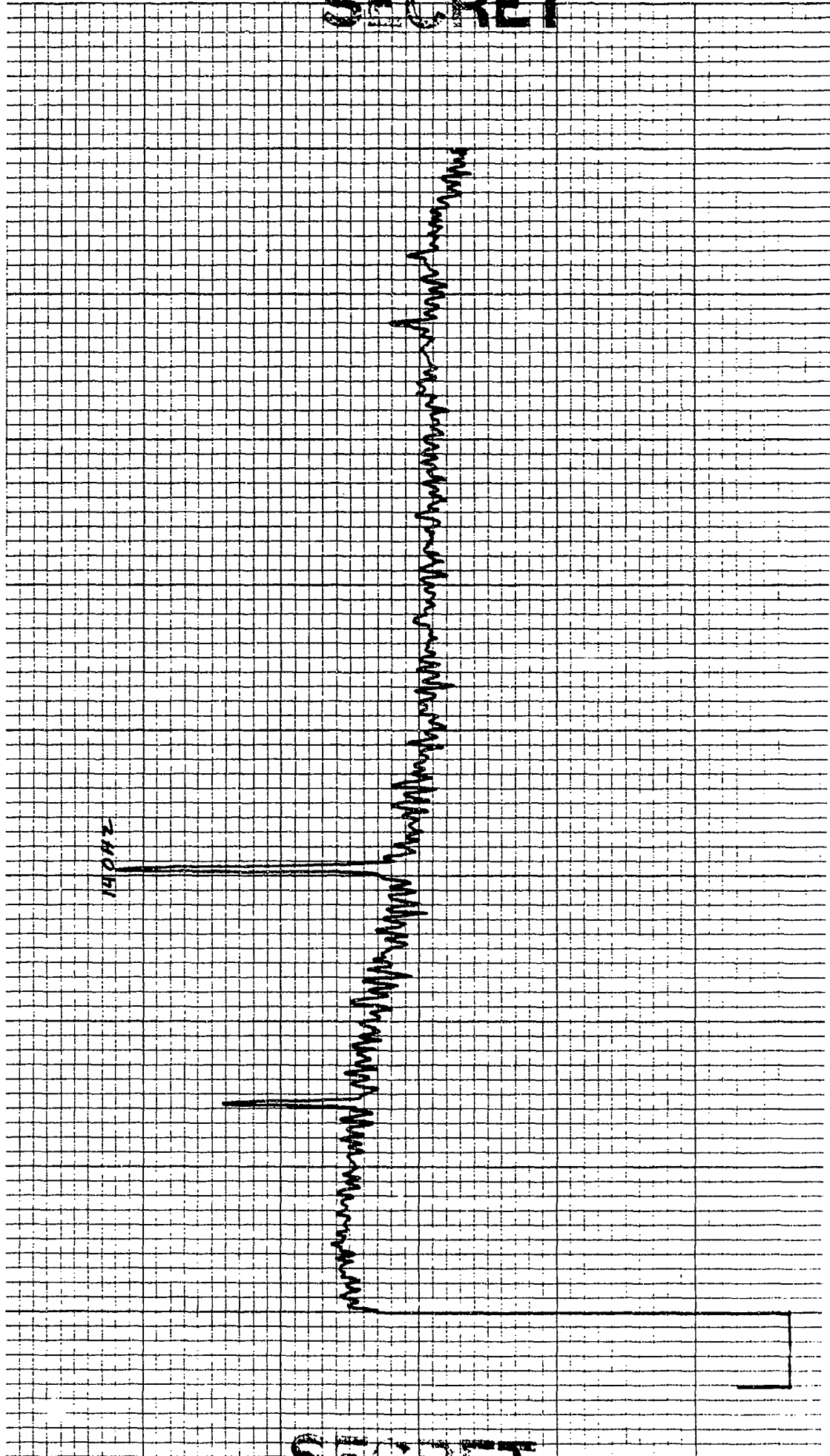


SECRET

KSE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0935 - 16 (D011) DATE OF ANALYSIS: 1-16 REEL: M22 INDE X566
BEAMFORMED SPECTRUM (ELEMENTS) INTEGRATION TIME 320 SECS ATTEN: -10 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 150 HZ 760 DEG. AZ STEERING



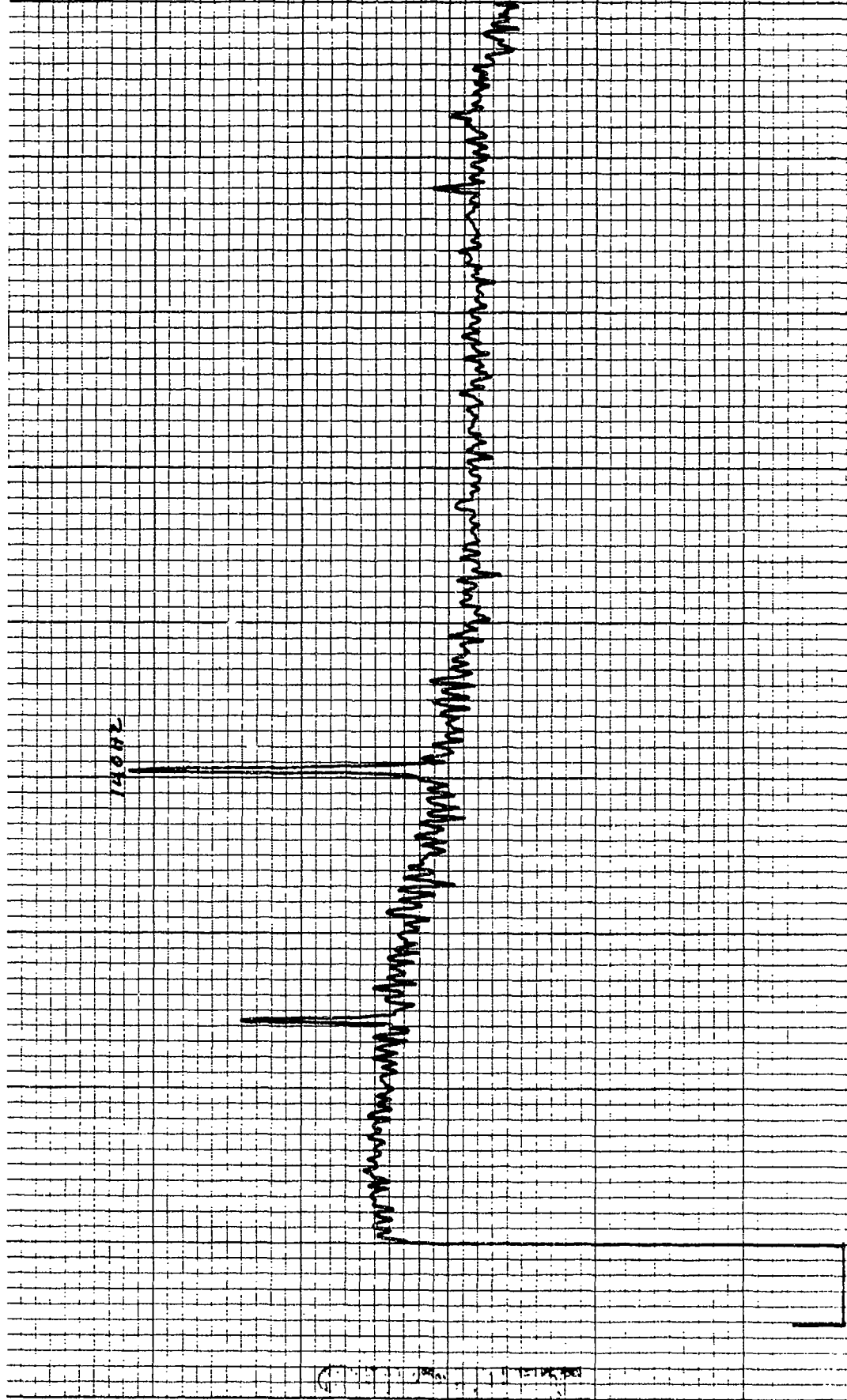
SECRET

SECRET

K-E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO MADE IN U.S.A.

46 0703

CONTROL: 0835 - 16 (DP11) REEL: 122 INDE X 566
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-16
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 0835 Z INTEGRATION TIME 320 SECS ATTEN: -10 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
16 ELEMENTS +62 DEG. AZ STEERING

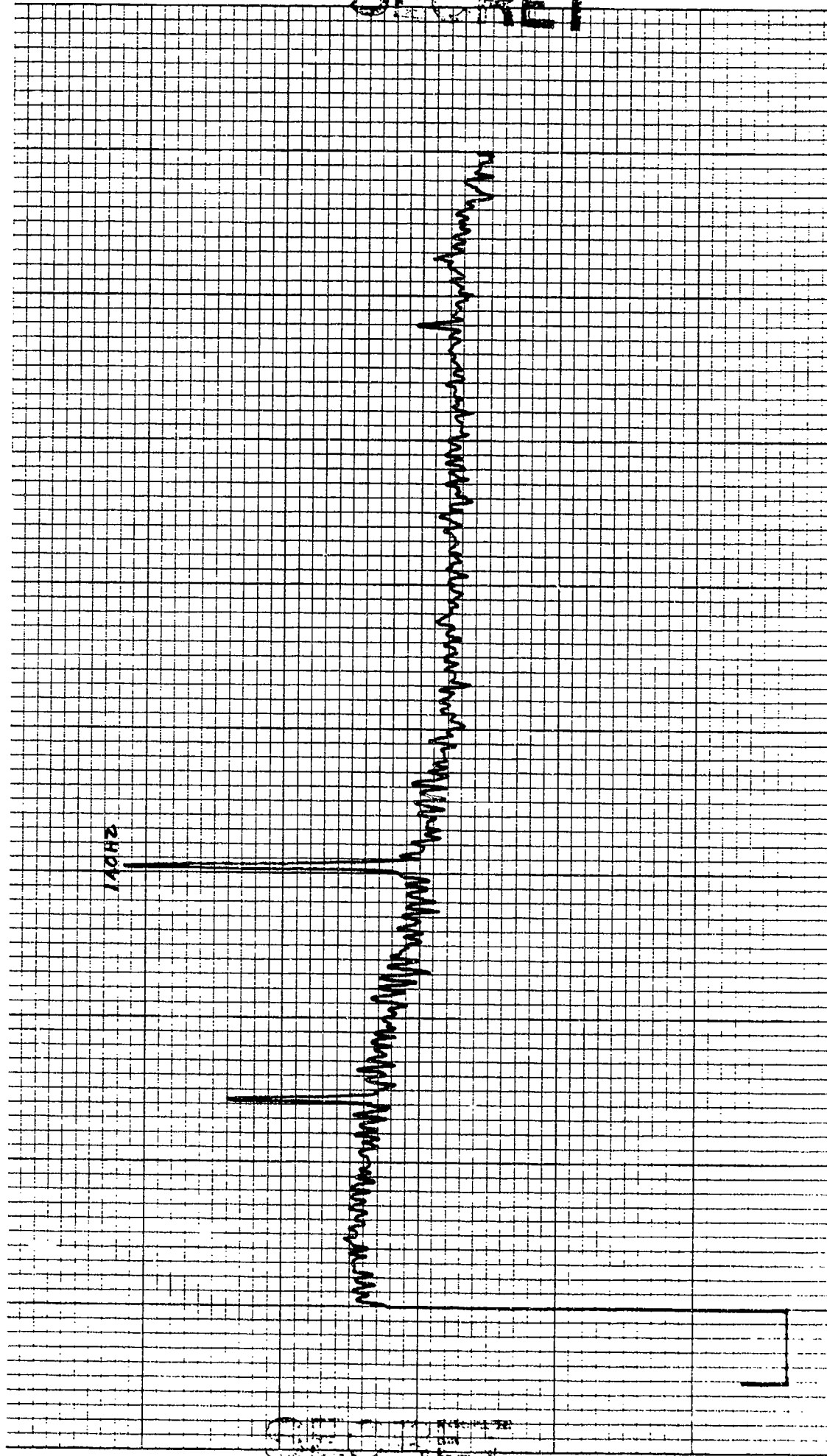


SECRET

K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

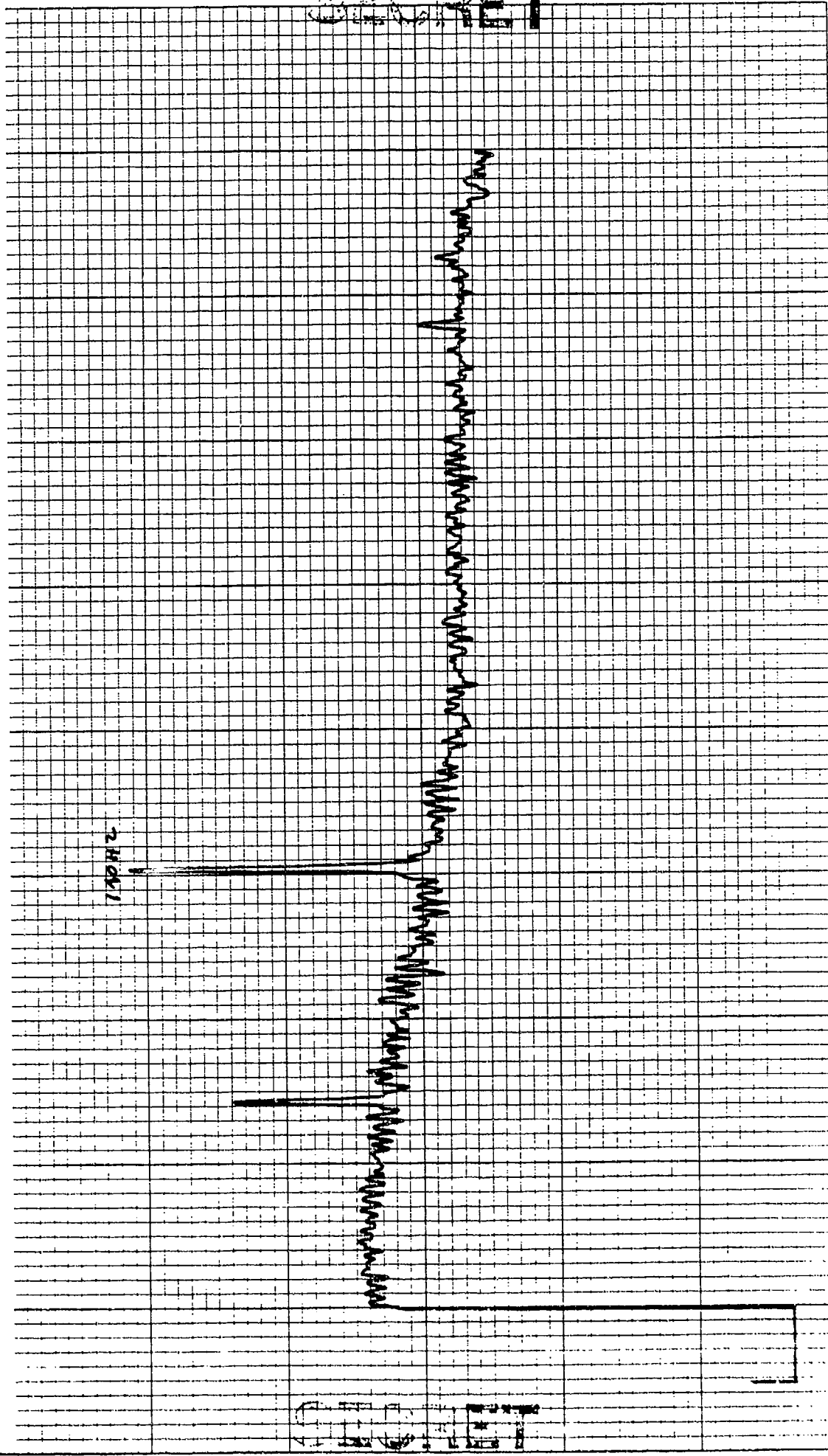
CONTROL: 0935-16 (DAU) DATE OF ANALYSIS: 1-16 REEL: 122 INDE X 566
BEAMFORMED SPECTRUM (ELEMENTS) 16
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATEN: 70 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
16 ELEMENTS 464 DEG. AZ STEERING



KE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

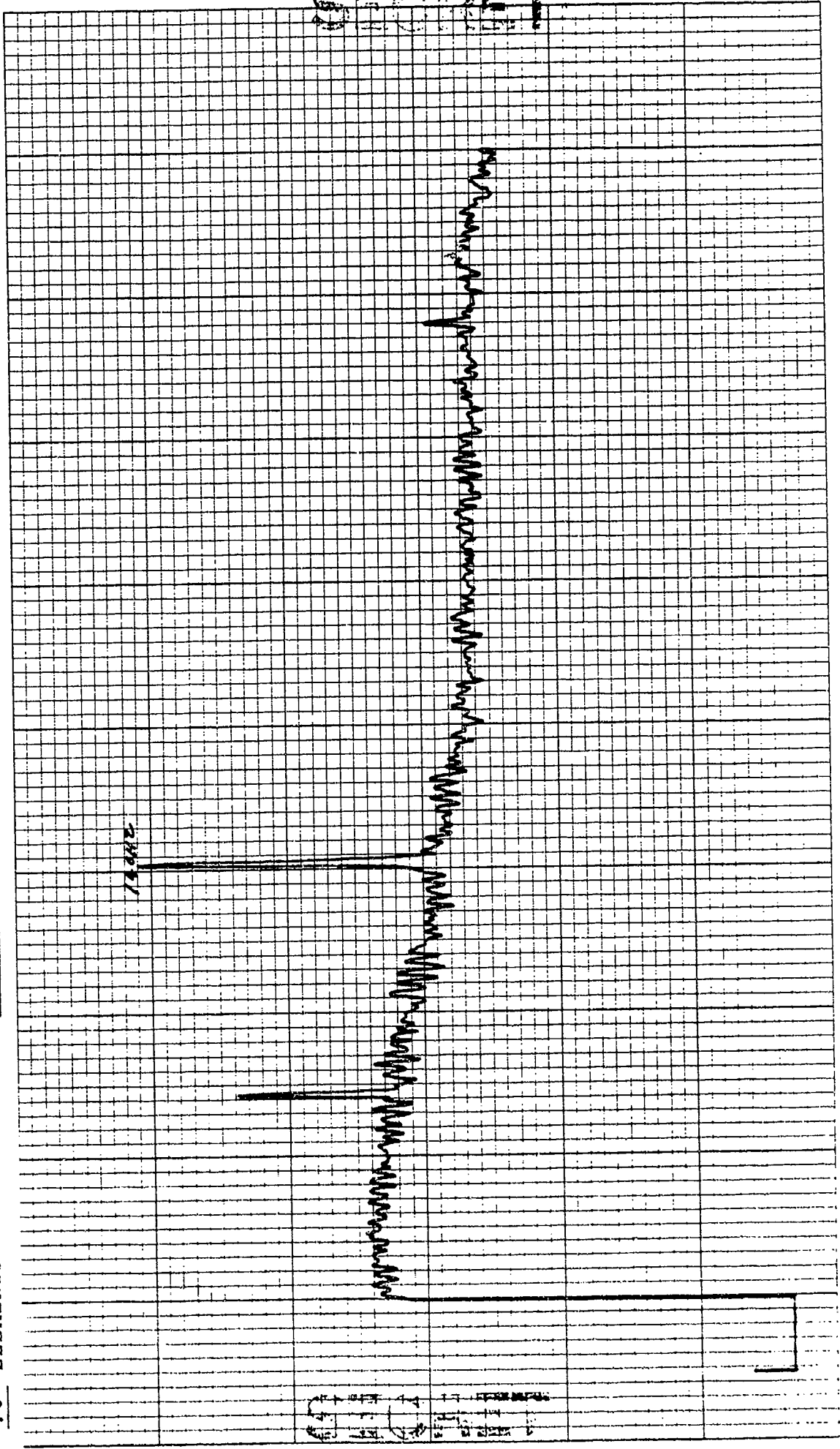
CONTROL: 0935 - 16 (DP11) REEL: 422 INDE X 566
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: -10 DB
CENTER FREQ: 150 HZ FILTER WTG: HANNING
16 ELEMENTS ANALYSIS BANDWIDTH: 1/10 HZ
DATE OF ANALYSIS: 1-16 +66 DEG. AZ STEERING



10 X 10 TO THE INCH, 0.7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0935 - 16 (DPII) REEL: M?? INDE X 566
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-16 ATTN: -6 DB
EXERCISE: BEARING STAKE DATE/TIME: 7-16-77 - 0935Z FILTER WTG: HANNING
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
16 ELEMENTS 160 DEG. AZ STEERING



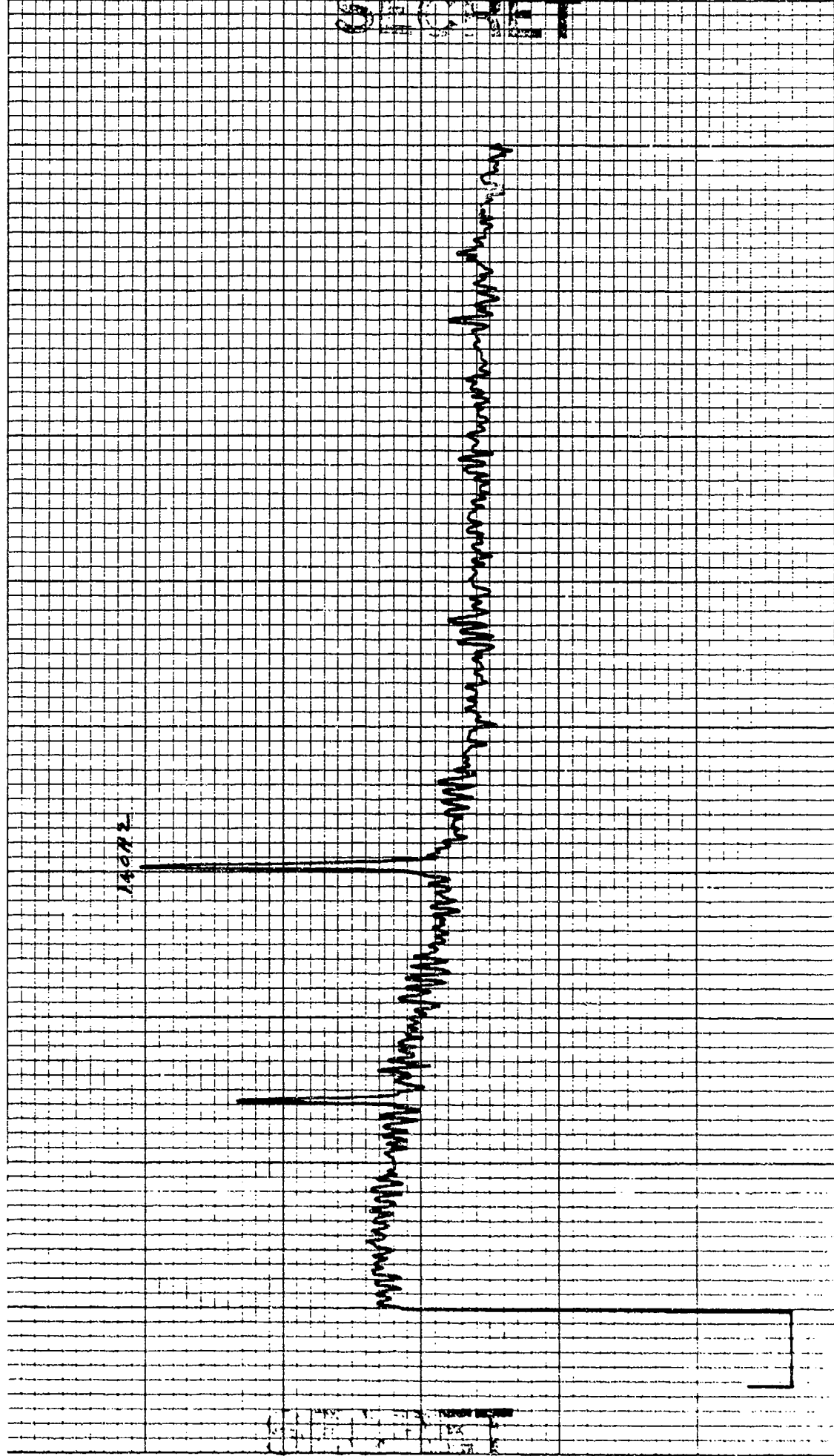
150 HZ

150 HZ

KOE 10 X 10 TO THE INCH 7 X 10 INCHES
REUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0935 - 16 (DP(1)) REEL: M22 INDE X 586
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-16
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 0935 Z INTEGRATION TIME 320 SECS ATTN: 78 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
16 ELEMENTS +70 DEG. AZ STEERING



KSE 10 X 10 TO THE INCH 7 X 10 INCHES
REUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

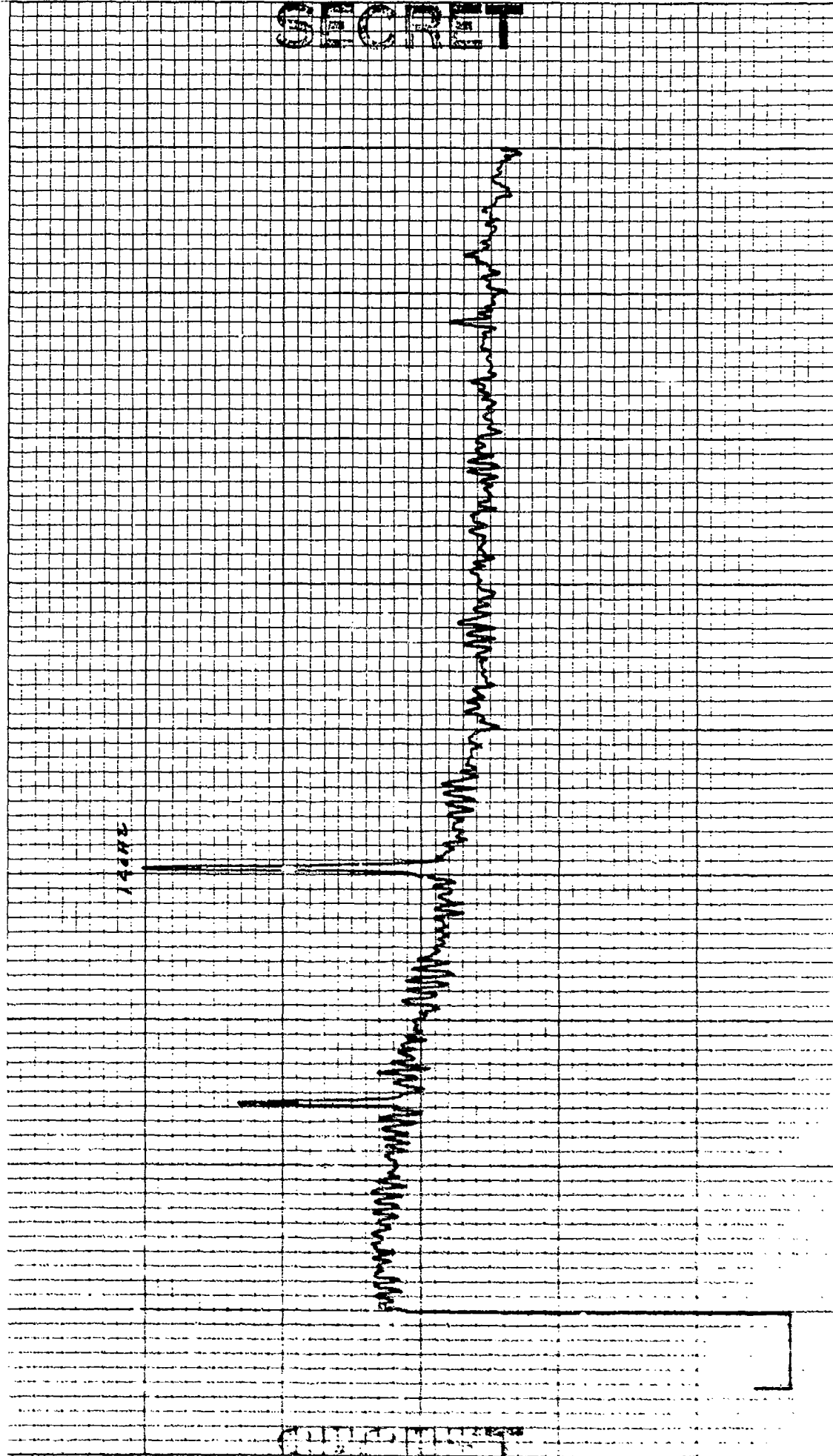
CONTROL: 0935 - 16 (DP11)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16

REEL: 422 INDE X 566

INTEGRATION TIME 320 SECS ATTN: -10 DB
 FILTER WTG: HANNING

ANALYSIS BANDWIDTH: 1/10HZ
+72 DEG. AZ STEERING



10 X 10 TO THE INCHES
REDFIL & ESSER CO. MADE IN U.S.A.

46 0703

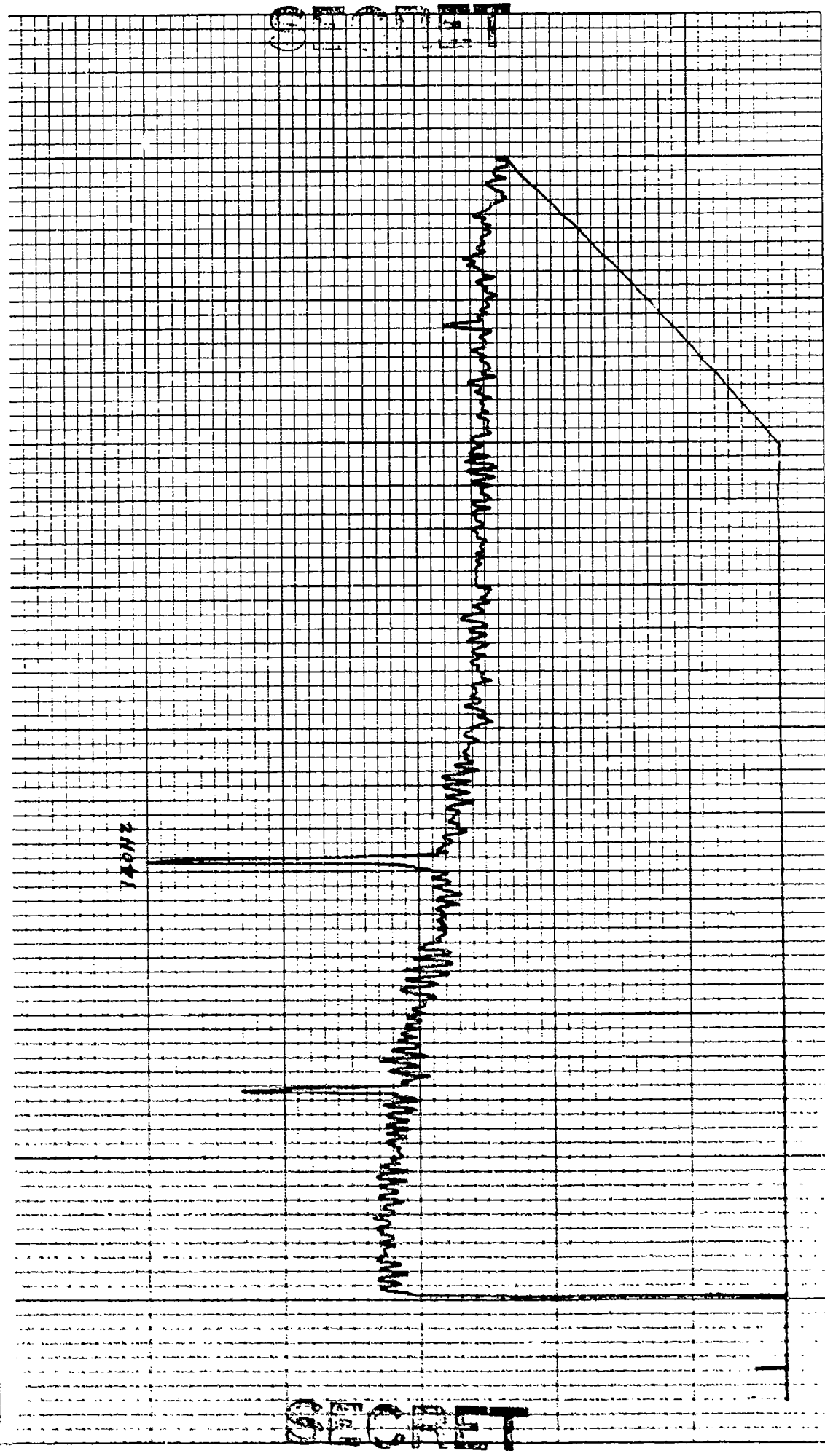
CONTROL: 0935 - 16 (DPH) DATE OF ANALYSIS: 1-16 REEL: M22 INDE X 566

BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 7-16-77 - 0935 Z INTEGRATION TIME 320 SECS ATTEN: -10 DB

EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING

CENTER FREQ: 150 HZ + 74 DEG. AZ STEERING

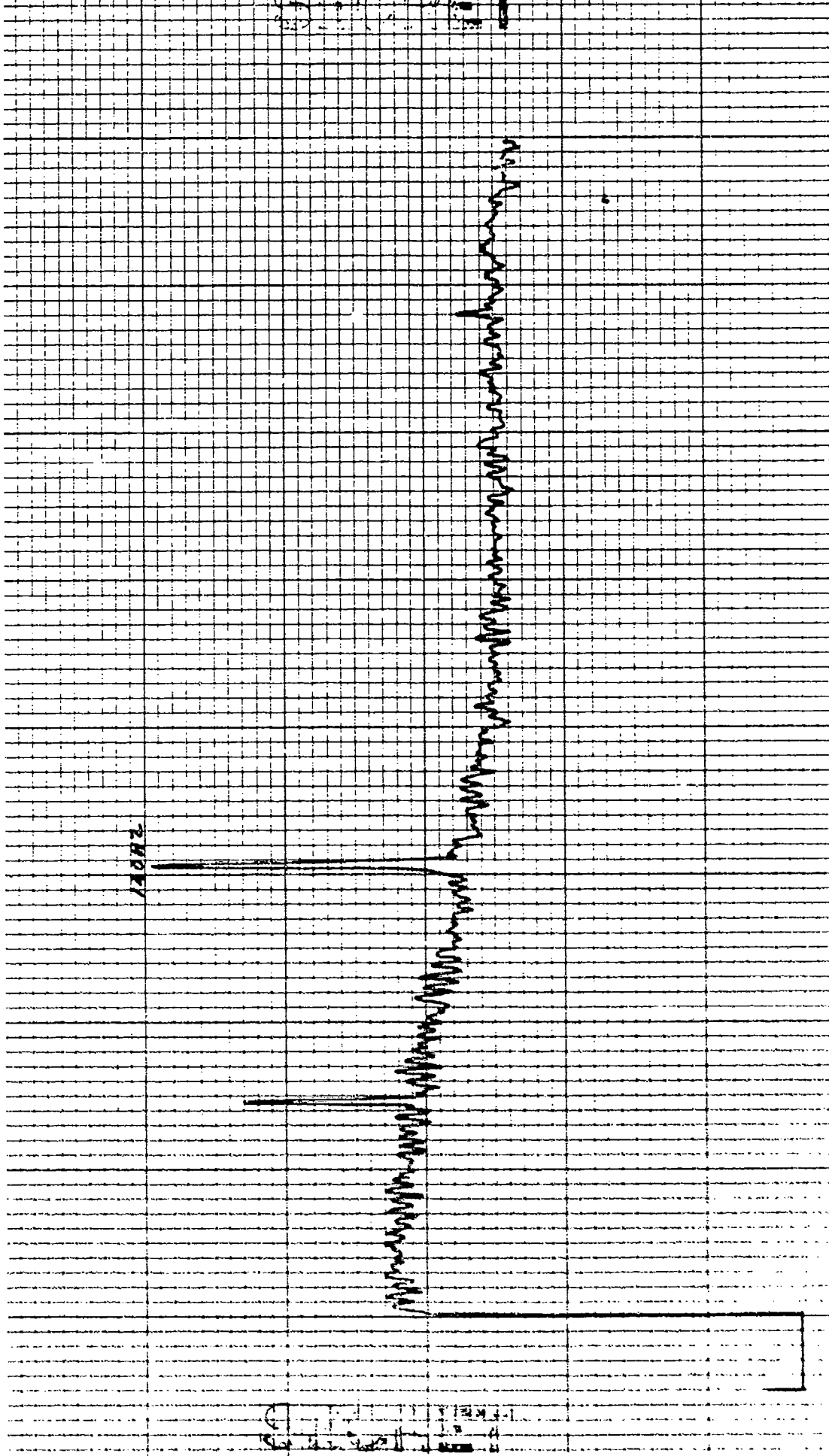
16 ELEMENTS



KOE 10 X 10 TO THE INCHES 1 X 10 INCHES
REUPTEL & FISHER CO. MADE IN U.S.A.

46 0703

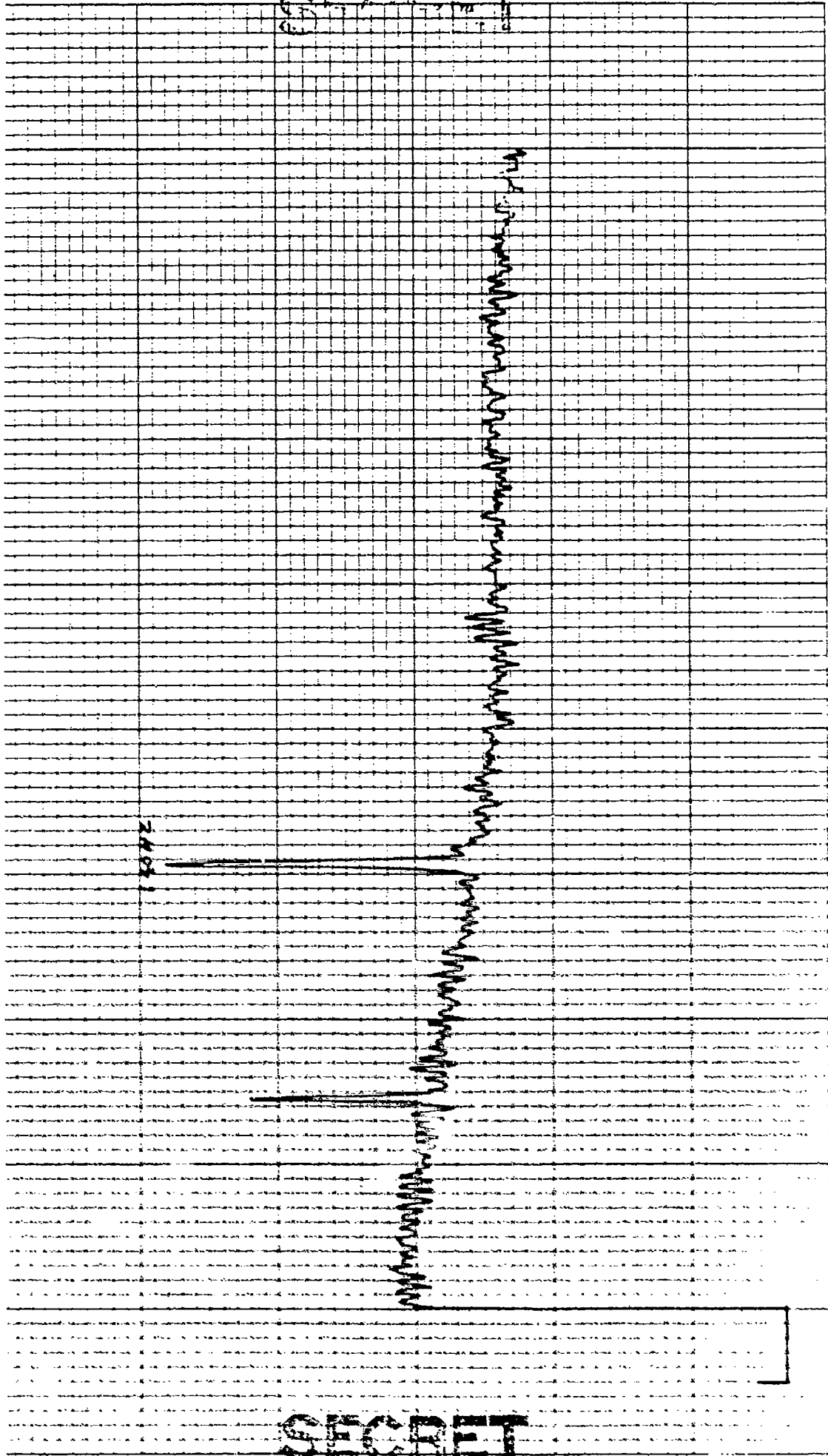
CONTROL: 0935 - 16 (DP11) DATE OF ANALYSIS: 1-16 REEL: 1102 INDE X 566
BEAMFORMED SPECTRUM (ELEMENTS) INTEGRATION TIME 320 SECS ATTEN: 70 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTC: HANNING
CENTER FREQ: 150 HZ +76 DEG. AZ STEERING



46 0703

K&E 10 X 10 TIME INCHES : 8.10 INCHES
REUFEL & FOSBERG CO. MADE IN U.S.A.

CONTROL: 0935 - 16 (DPI/L) REEL: MP-1 INDE X 526
 BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: - - - -
 EXERCISE: BEARING STAKE / - / 6 INTEGRATION TIME 320 SECS ATTN: ✓ DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 16 ELEMENTS + 70 DEG. AZ STEERING



0935 16

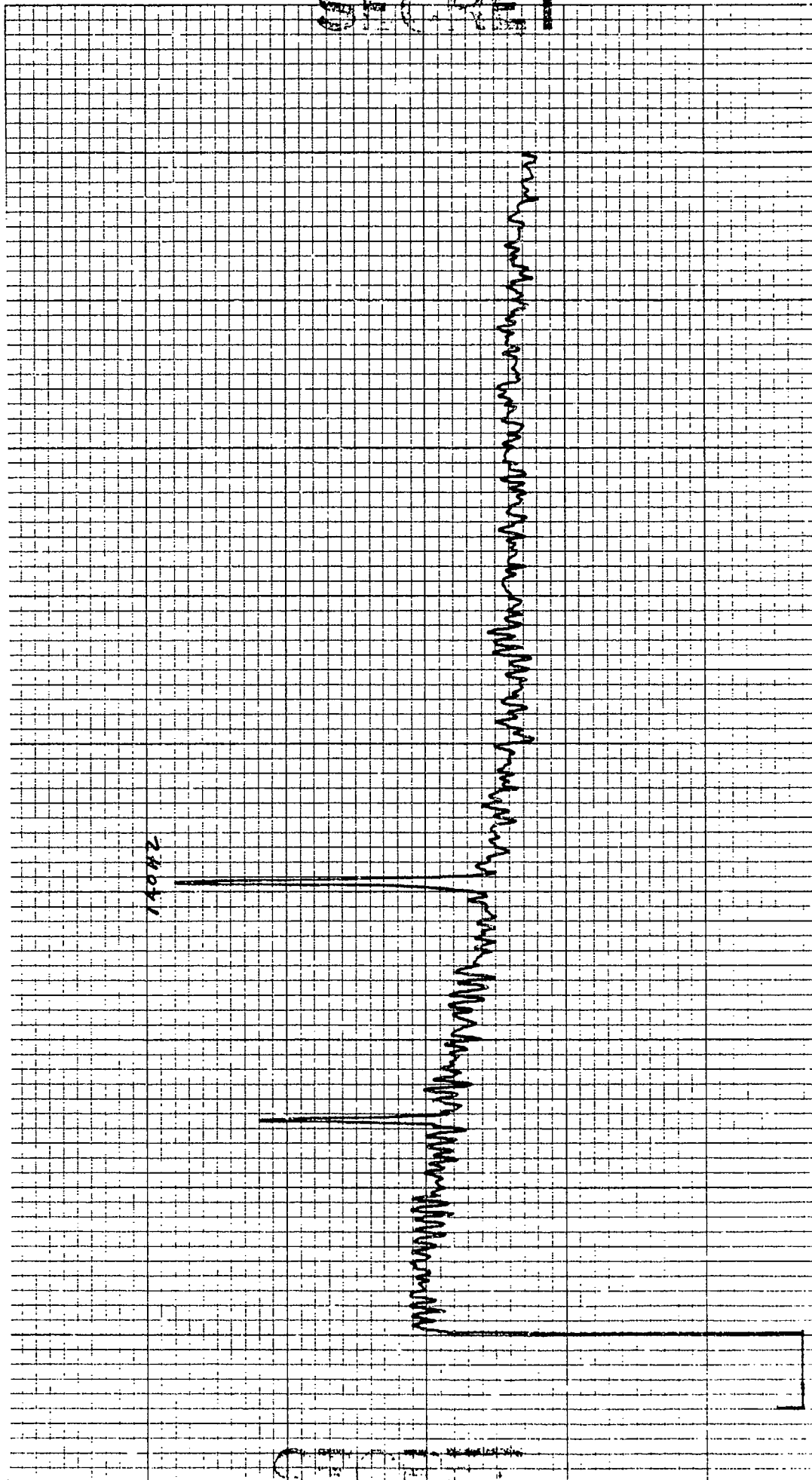
0935 16

CONTROL: 0935 - 16 (bpi)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 7-16-77 - 0935Z
ANALYSIS BANDWIDTH: 1/10HZ
+90 DEG. AZ STEERING

REEL: M22 INDE X 566

INTEGRATION TIME 320 SECS ATTN: -10 DB
FILTER WTG: HANNING



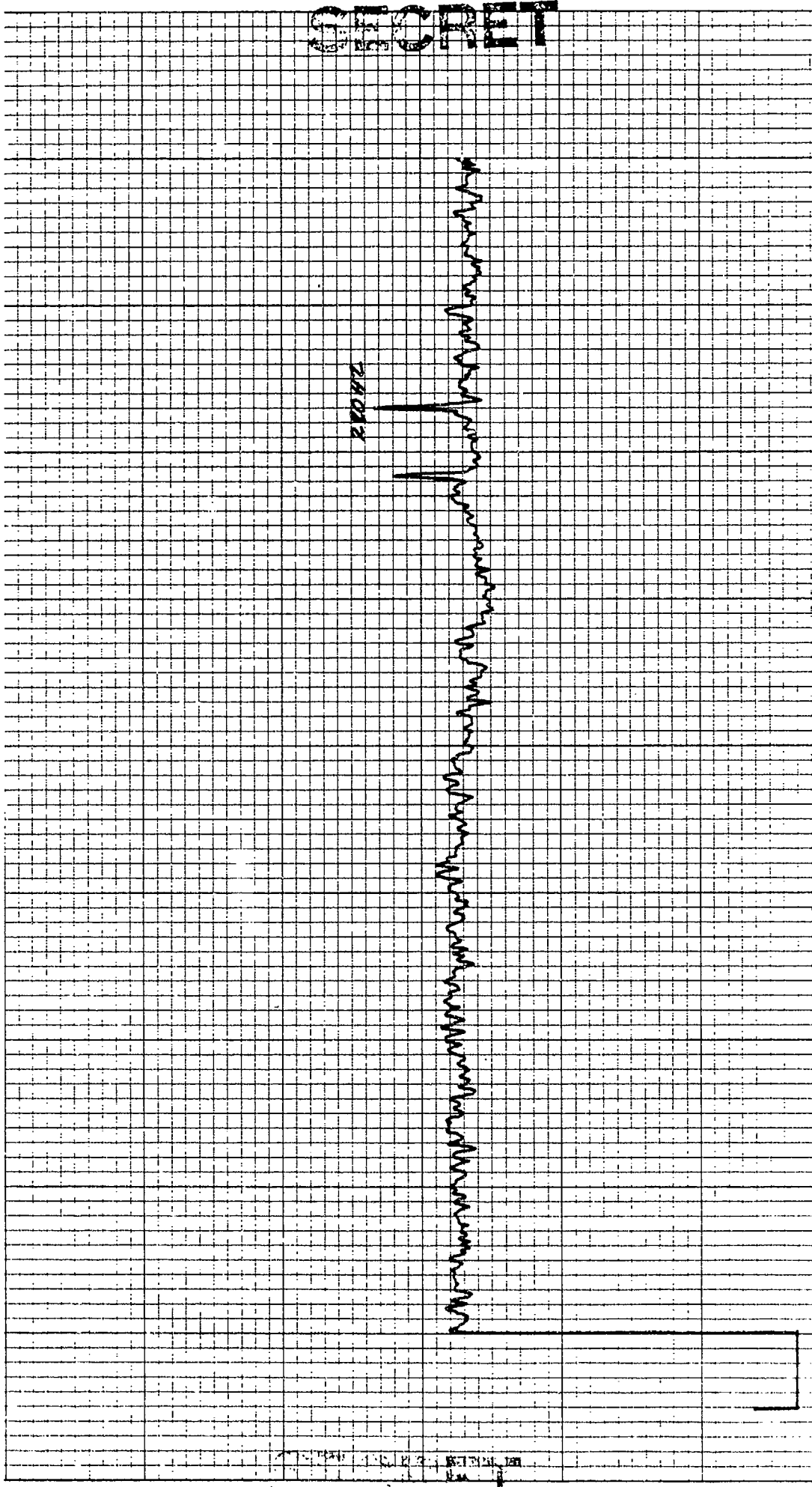
SECRET

SECRET

K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFTEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0935 - 16 (DRI) DATE OF ANALYSIS: 1-16 REEL: M22 INDE X 566
 BEAMFORMED SPECTRUM (ELEMENTS))
 EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 0935 Z INTEGRATION TIME 320 SECS ATEN: -10 DB
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
16 ELEMENTS +50 DEG. AZ STEERING



SPECTRUM

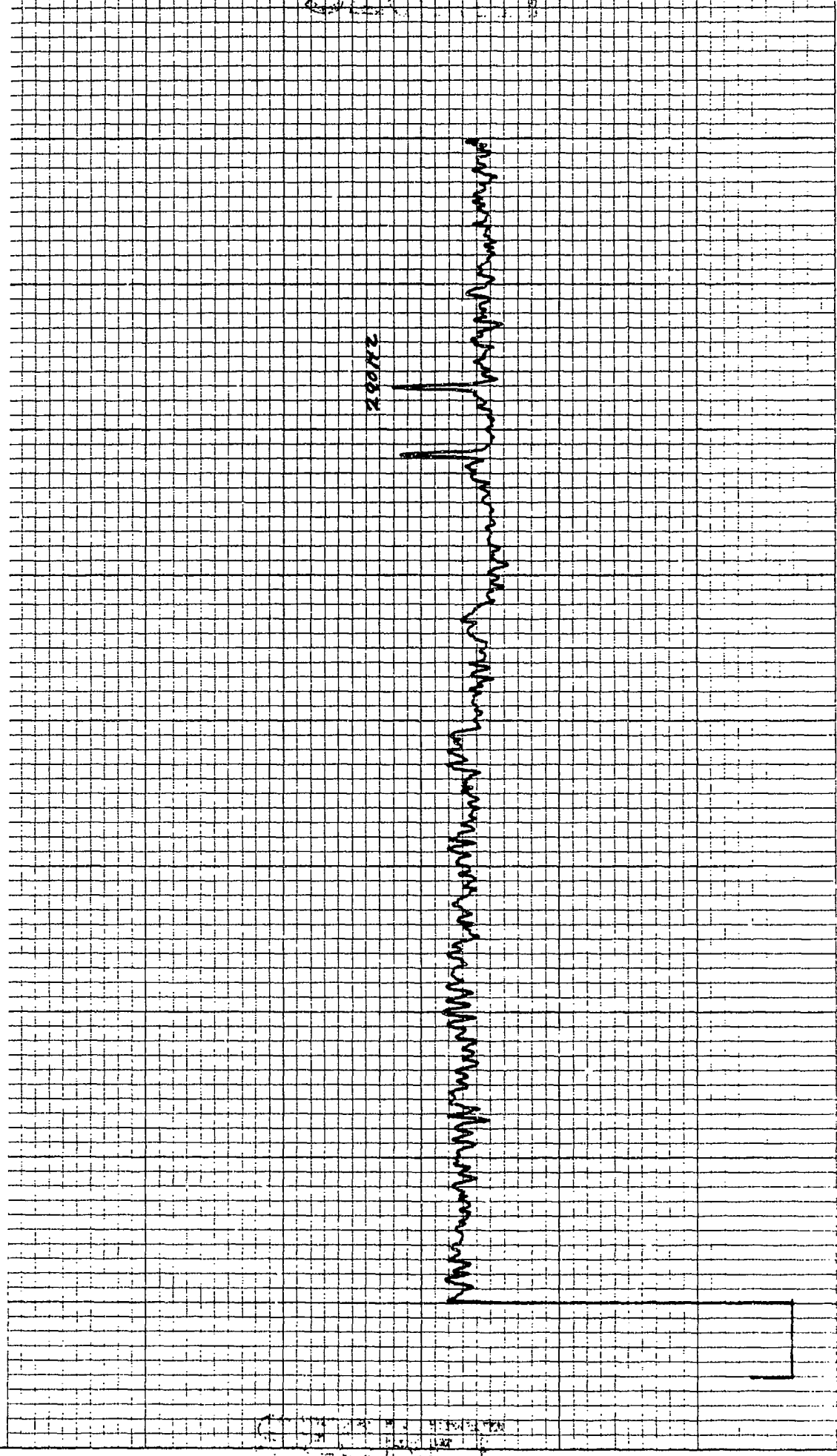
10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0935 - 16 (DP11)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 3-16-77 - 0935 Z
ANALYSIS BANDWIDTH: 1/10HZ
752 DEG. AZ STEERING

REEL: M22 INDE X 566
INTEGRATION TIME 320 SECS ATTEN: 70 DB
FILTER WTG: HANNING



K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0935 - 16 (DP11)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16

DATE/TIME: 3-16-77-0935Z
ANALYSIS BANDWIDTH: 1/10 HZ
±54 DEG. AZ STEERING

REEL: A22

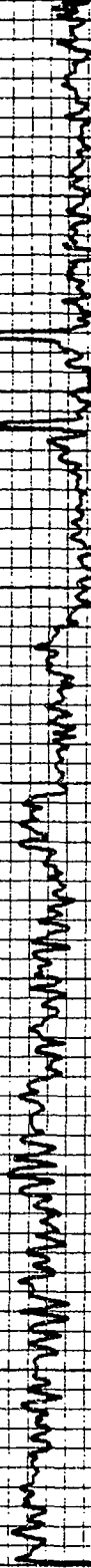
INTEGRATION TIME 320 SECS
FILTER

INDE X 566

ATTEN: 70 DB
WTG: HANNING

SECRET

X 30 Hz

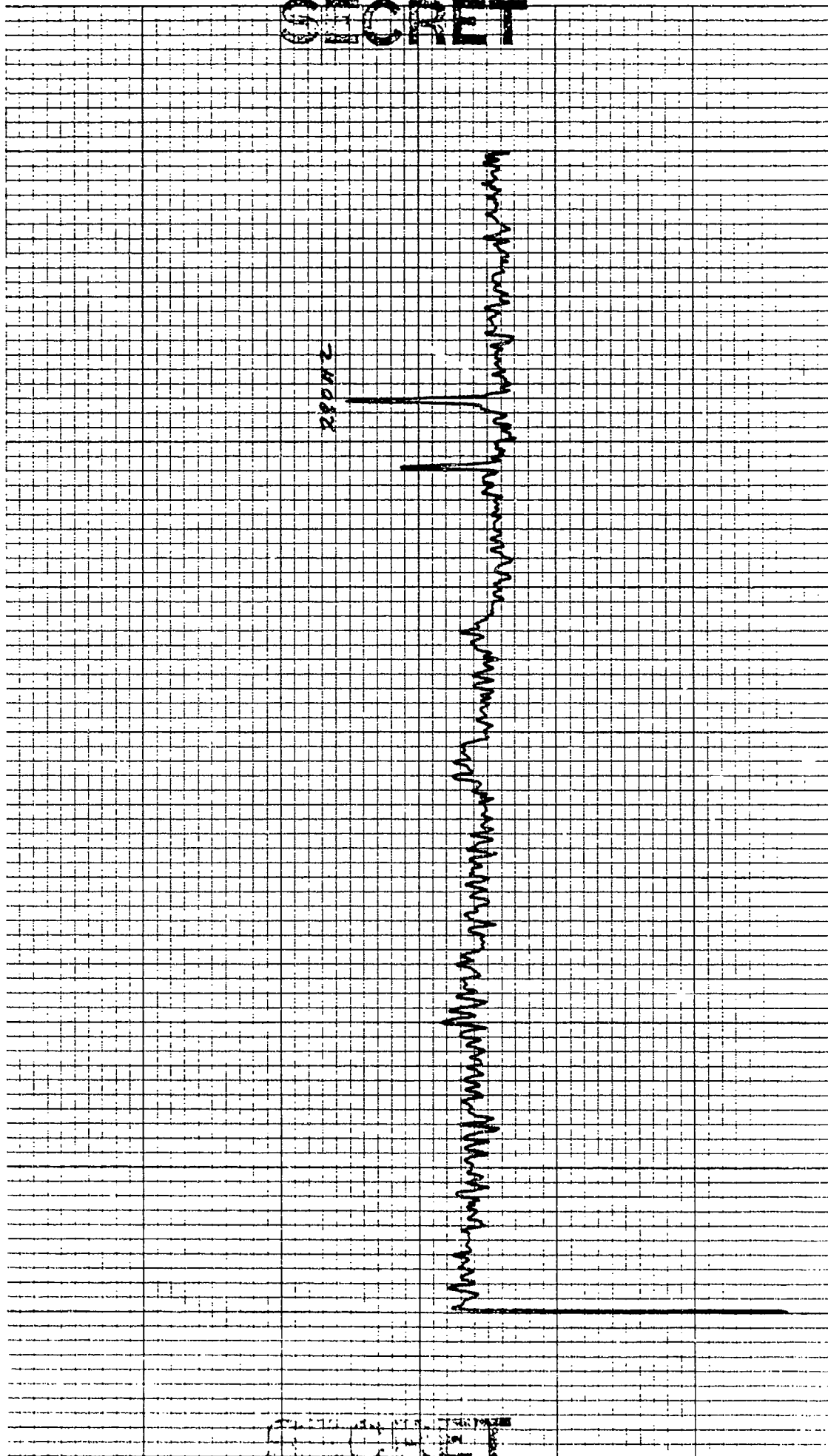


SECRET

10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0935-16 (DP11) DATE OF ANALYSIS: 1-16 REEL: 482 INDE X 566
BEAMFORMED SPECTRUM (ELEMENTS) INTEGRATION TIME 320 SECS ATTN: -10 DB
EXERCISE: BEARING STAKE FILTER WIG: HANNING
CENTER FREQ: 370 HZ
16 ELEMENTS 56 DEG. AZ STEERING



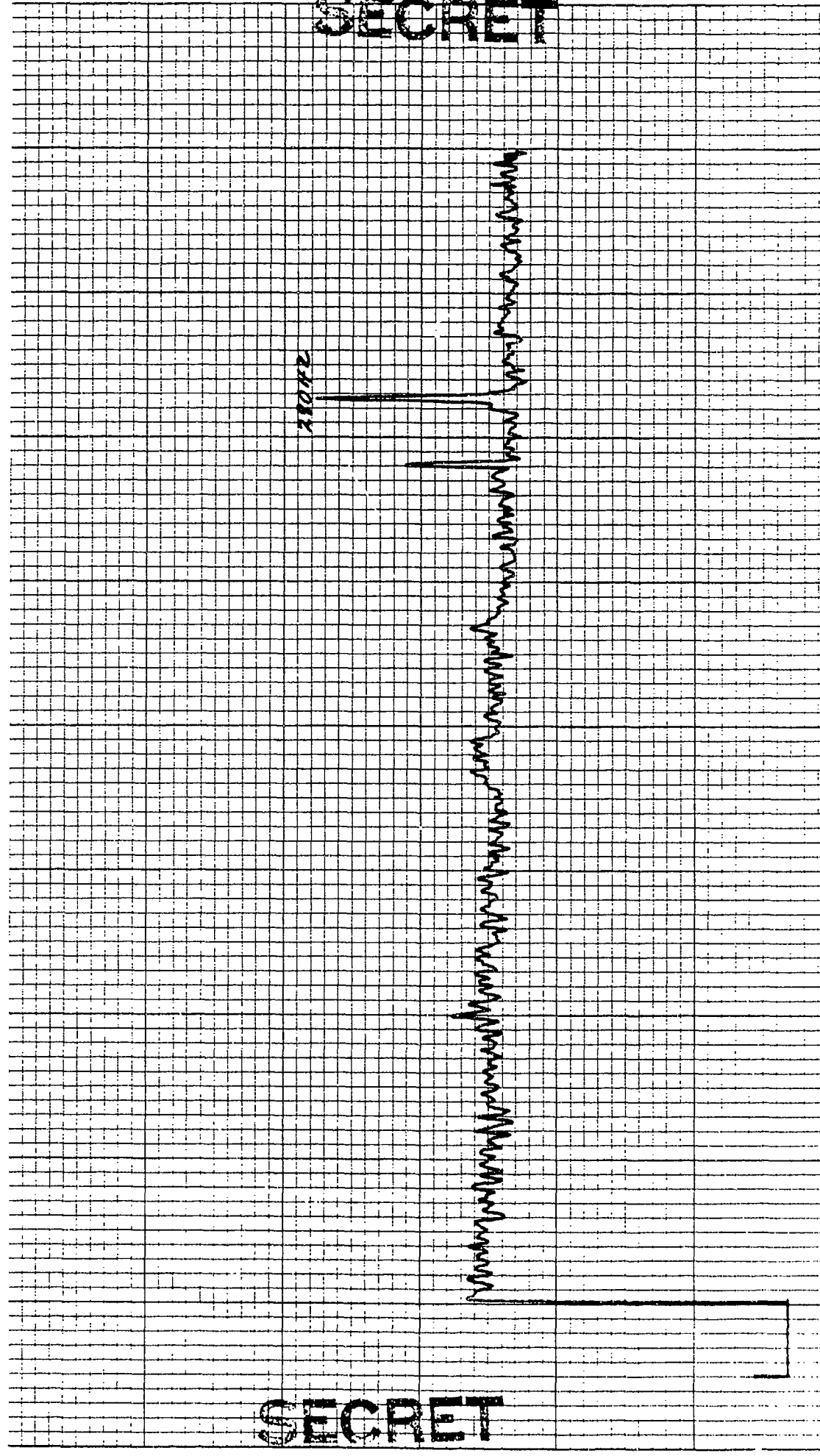
K&E 10 X 10 TO THE INCH 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0935-16 (DPH)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 3-16-77 - 0935 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+50 DEG. AZ STEERING

REEL: A22 INDE X566
INTEGRATION TIME 320 SECS ATTN: -10 DB
FILTER WTG: HANNING



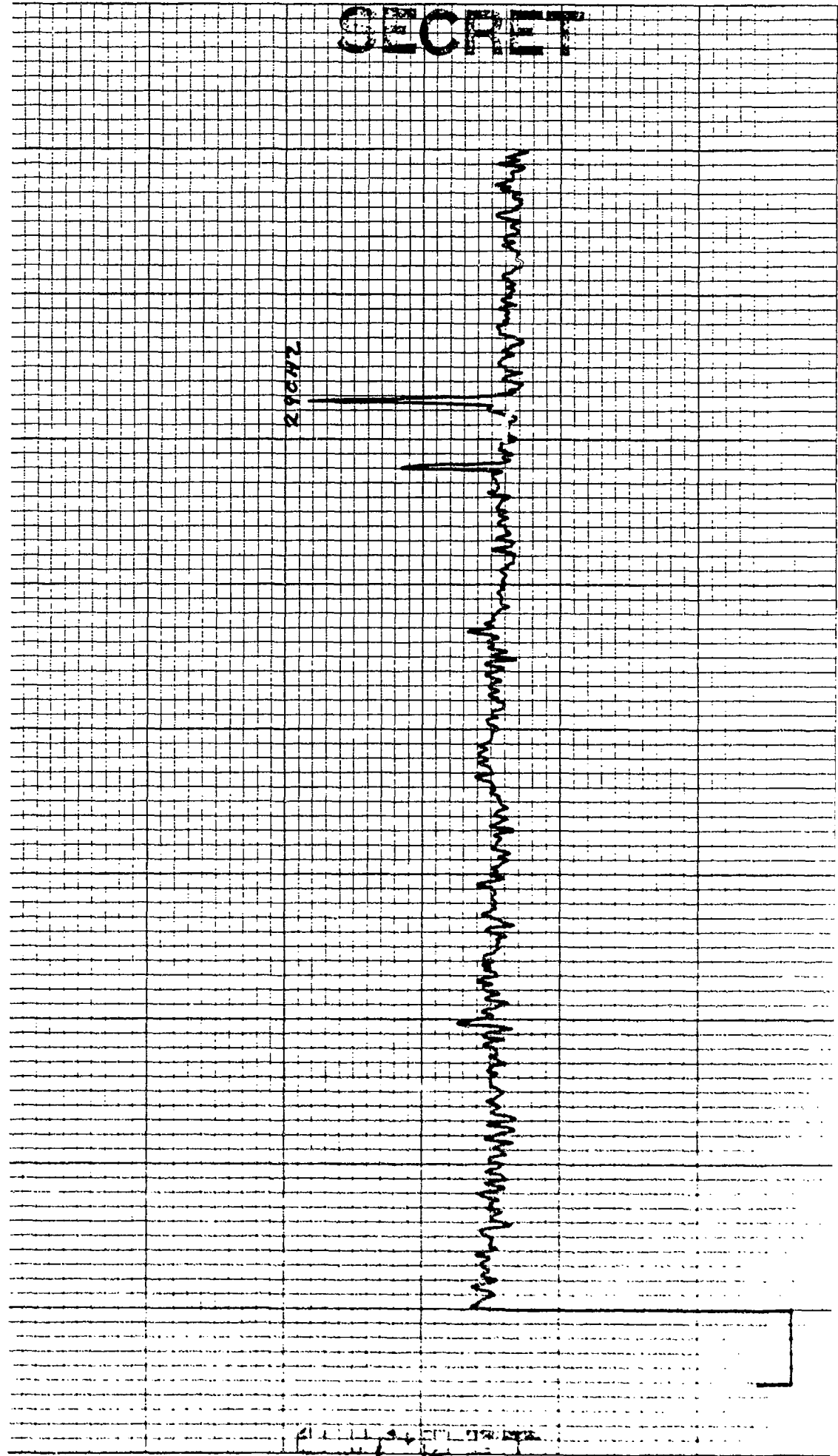
SECRET

SECRET

K-2 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO • MADE IN U.S.A.

46 0703

CONTROL: 0935-16 (DPH) REEL: 422 INDE X 564
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-16
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: 18 DB
CENTER FREQ: 270 HZ FILTER WTC: HANNING
16 ELEMENTS +60 DEG. AZ STEERING



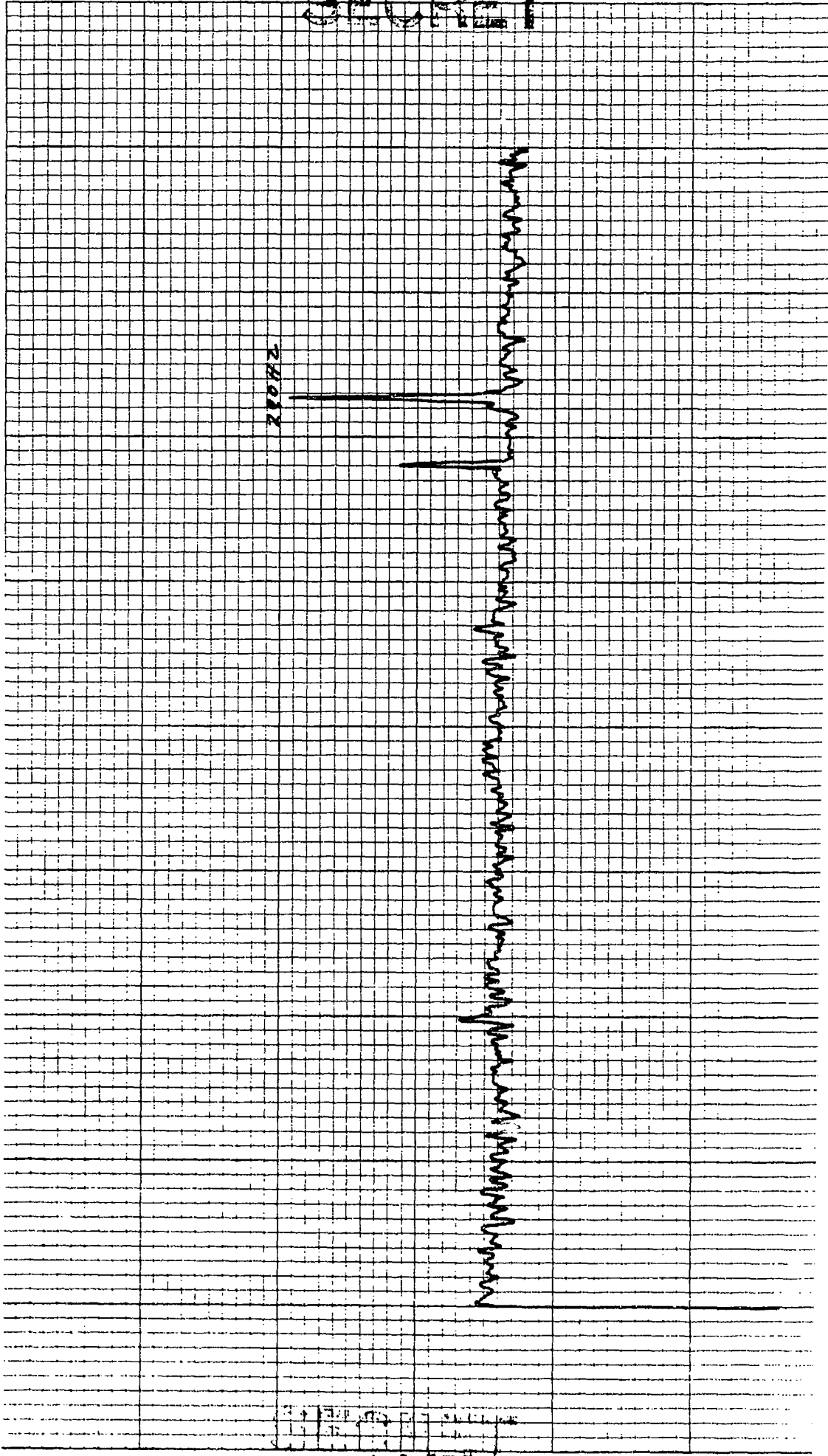
K-2 10 X 10 TO THE INCH • 7 X 10 INCHES
NEUFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0935 - 16 (DAI)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 3-16-77 - 0935 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+ 62 DEG. AZ STEERING

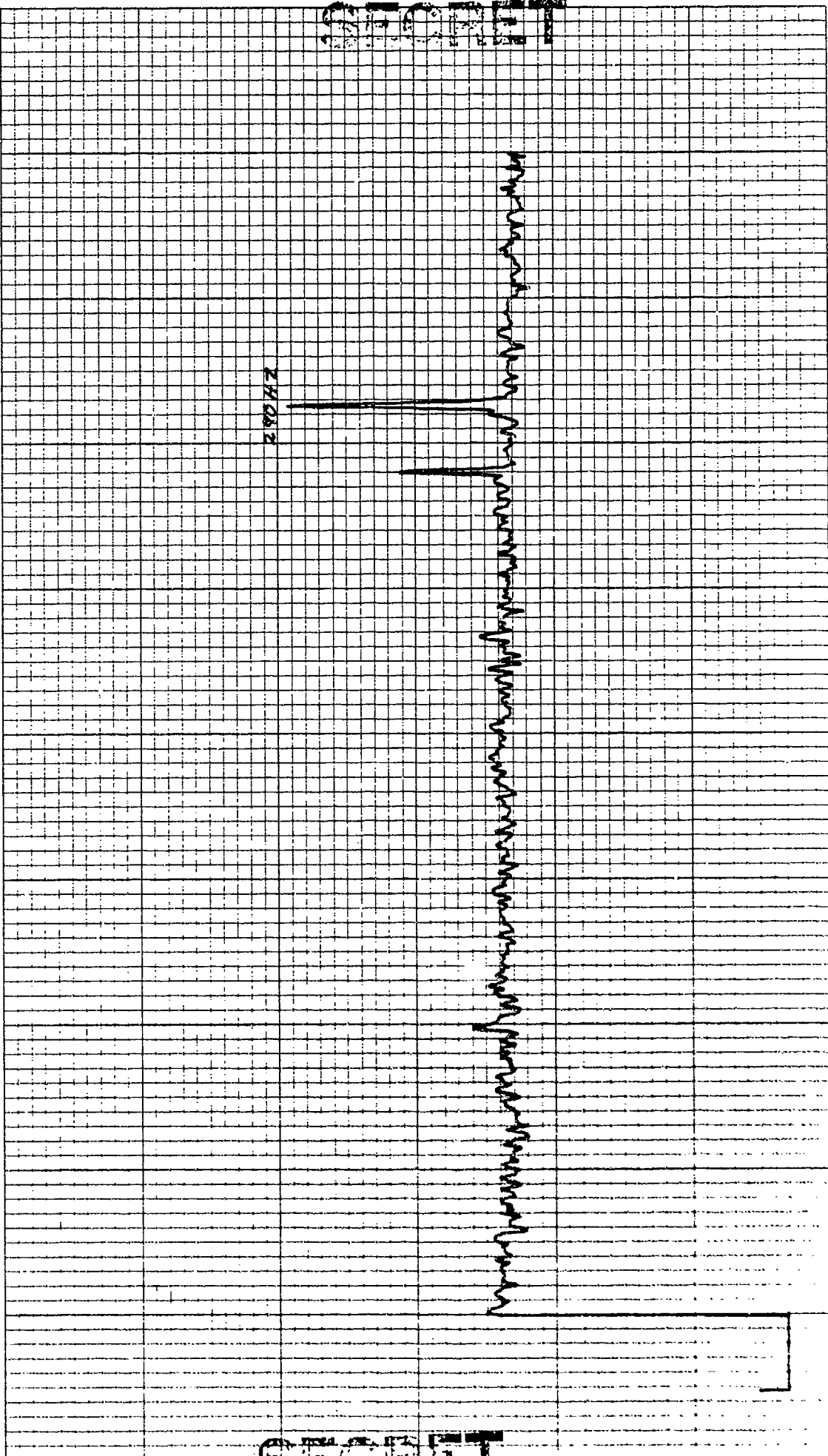
REEL: 1122 INDE X 566
INTEGRATION TIME 320 SECS ATTN: -18 DB
FILTER WTG: HANNING



K&E 10 X 10 TO THE INCH .7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0935 - 5/ (DP11) DATE OF ANALYSIS: _____ INDE X 566
BEAMFORMED SPECTRUM (ELEMENTS) 1 - /6
EXERCISE: BEARING STAKE DATE/TIME: 3-6-77 - 0935 Z INTEGRATION TIME 320 SECS ATTN: 18 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
/6 ELEMENTS +64 DEG. AZ STEERING



SPECTRUM

270 HZ

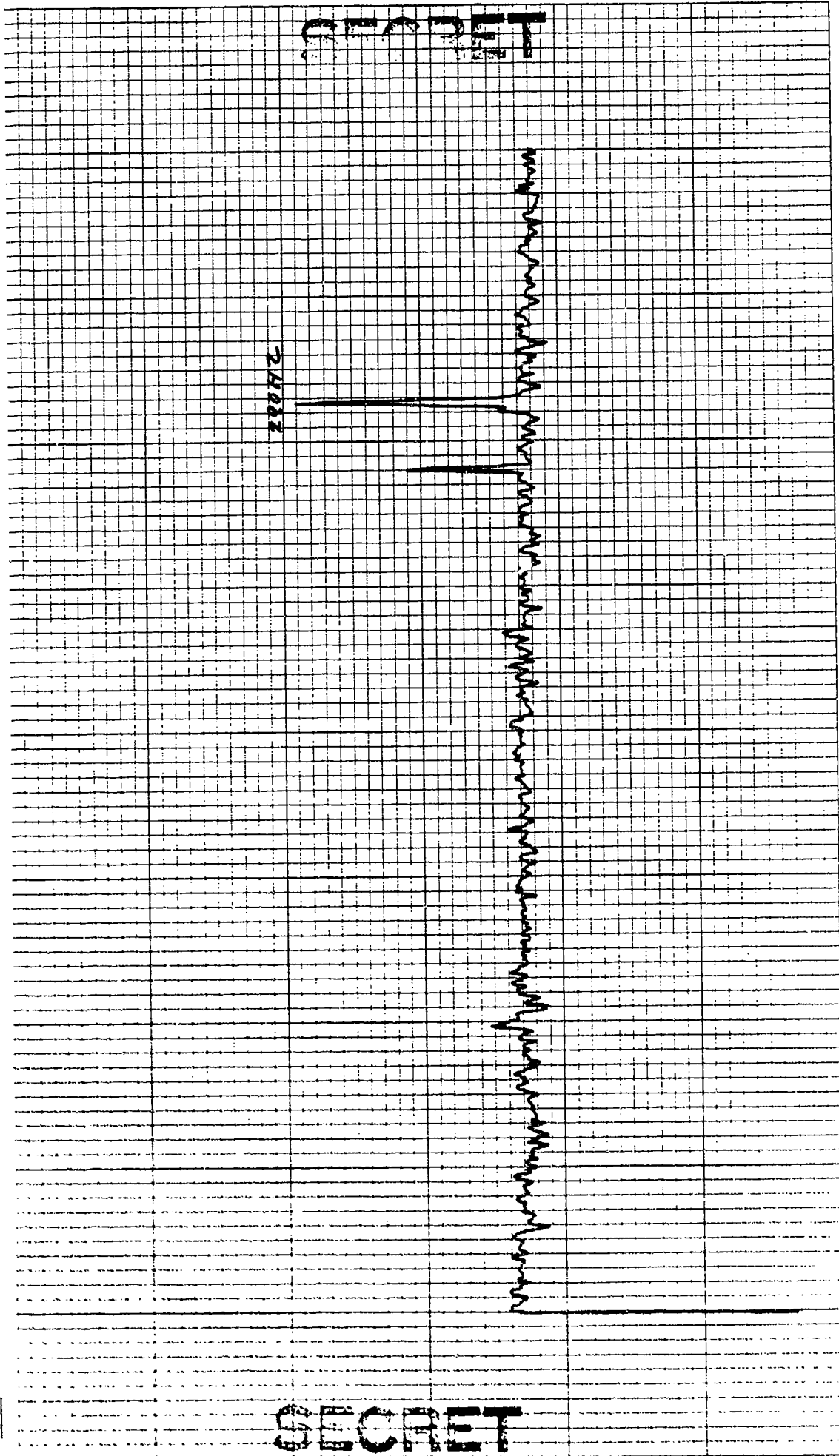
10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0935-16 (DP11)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 3-16-77-0935 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+66 DEG. AZ STEERING

REEL: M22 INDE X 566
INTEGRATION TIME 320 SECS
ATTEN: -10 DB
FILTER WTG: HANNING



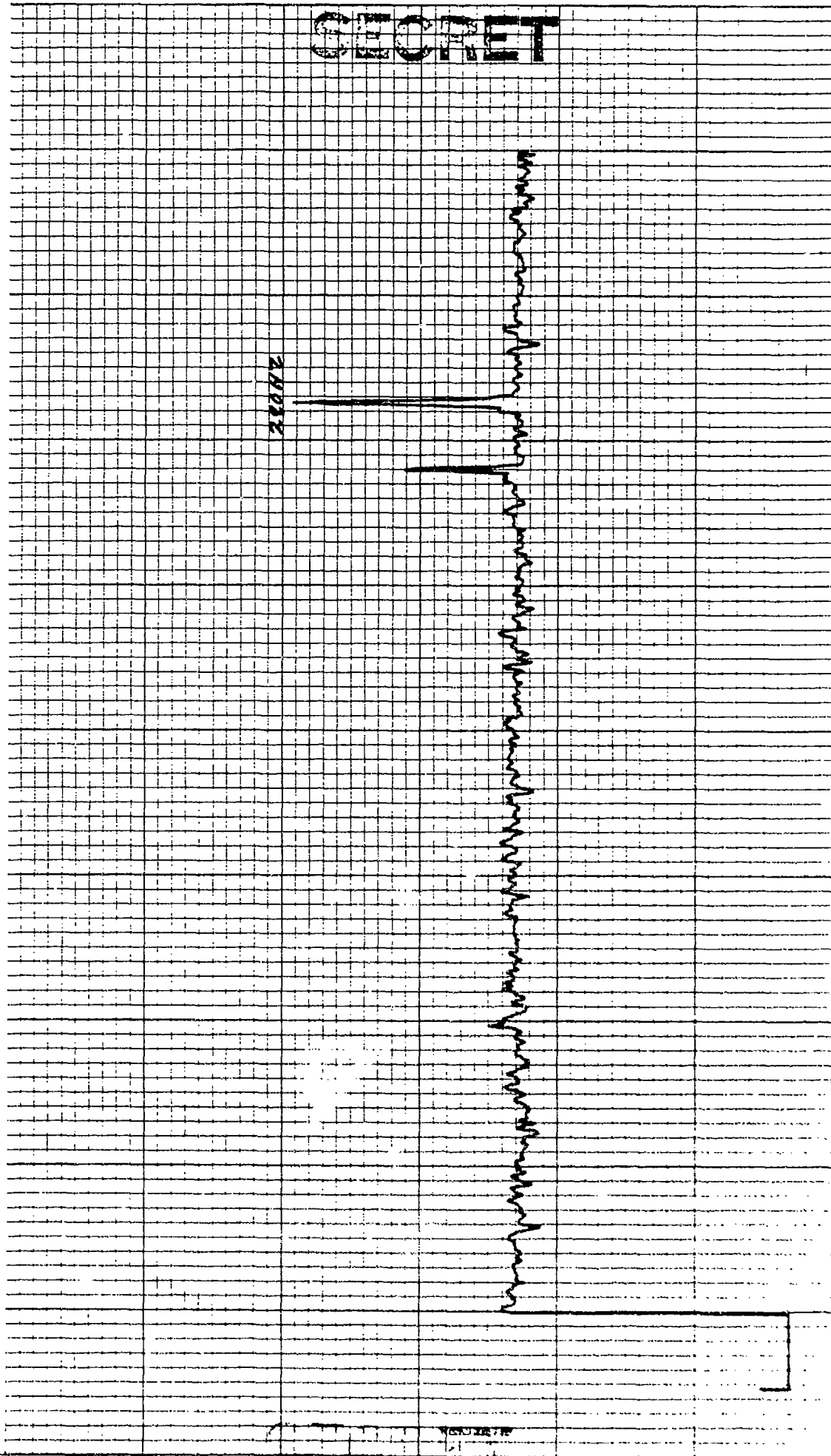
SECRET

SECRET

KOE 10 X 10 TO THE INCH * 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0935 - 16 (DP11) DATE OF ANALYSIS: 1-16 REEL: 111 INDE X 566
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: -18 DB
16 ELEMENTS 460 DEG. AZ STEERING FILTER WTG: HANNING



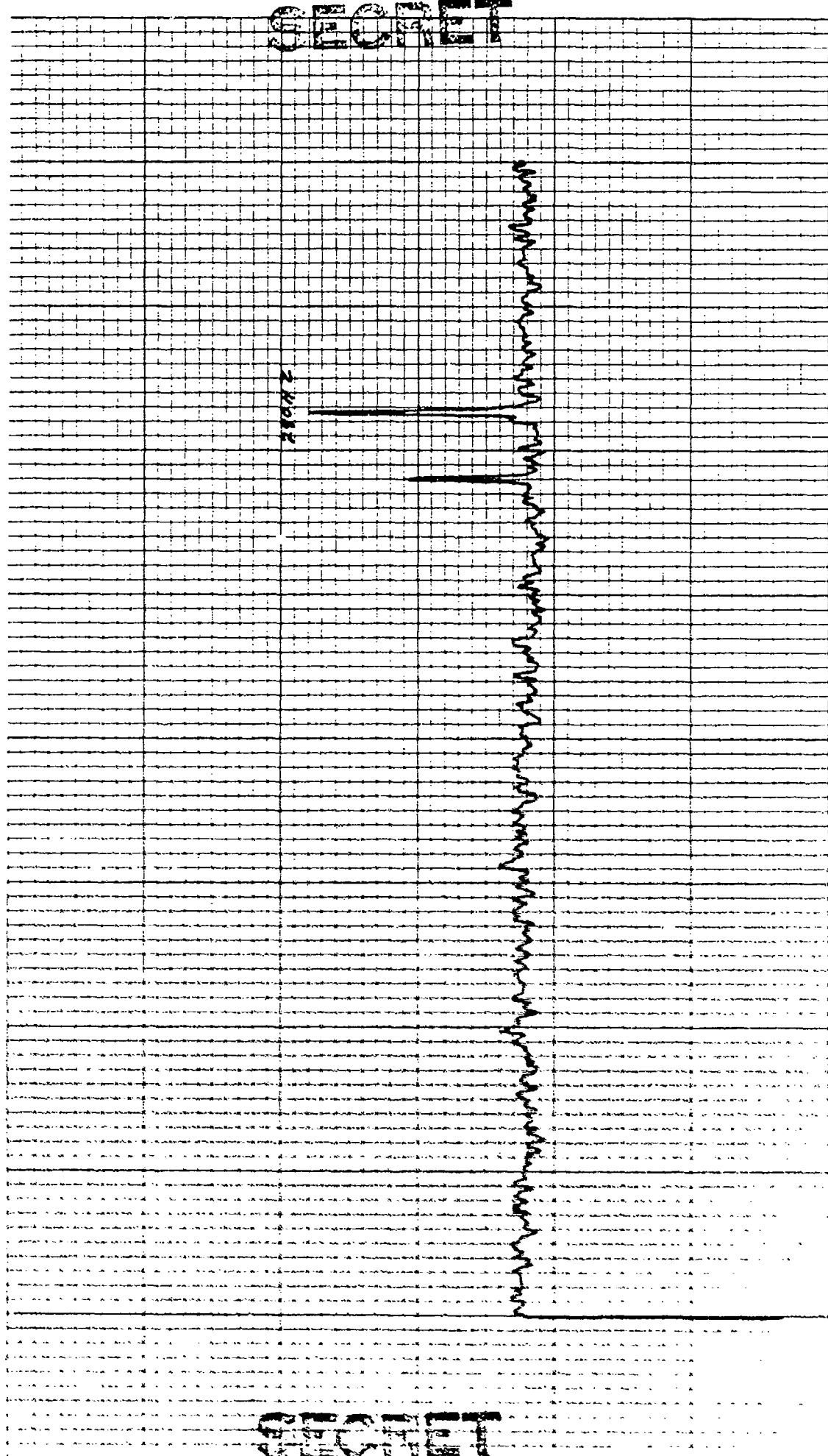
10 X 10 TO THE INCHES 3 1/2 IN. HIGHER
PULTEC, BOSTON, MASS. U.S.A.

46 0703

CONTROL: 0935 - 16 (DP11)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16)
 DATE/TIME: 3-16-77 - 0935 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
+70 DEC. AZ STEERING

REEL: M12 INDE X566
 INTEGRATION TIME 320 SECS ATTEN: -10 DB
 FILTER WTG: HANNING



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SECRET

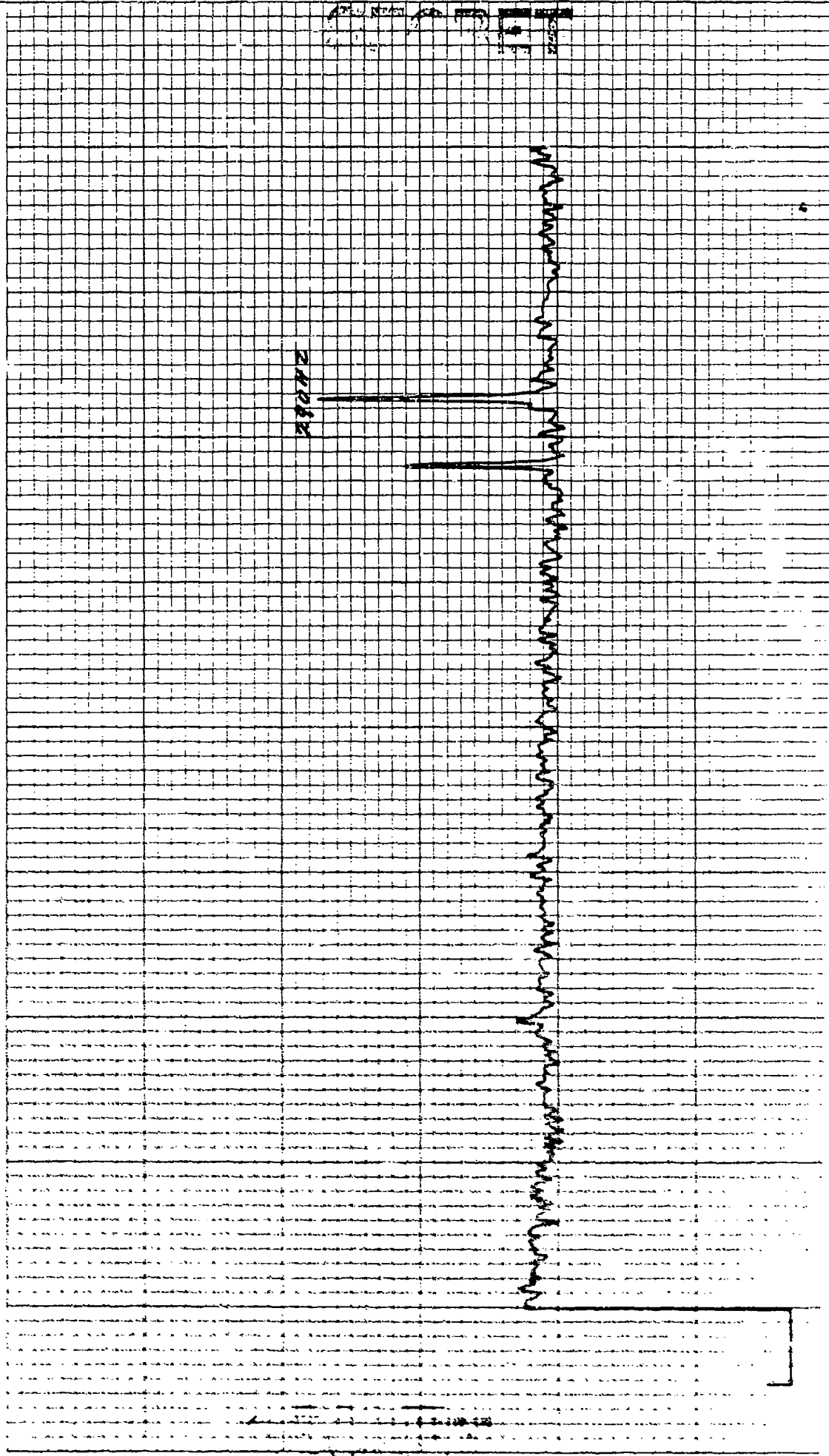
NOE 10 X 10 TO THE INCHES
REDFLEX A BEAUMONT CO. MADE IN U.S.A.

46 0703

CONTROL: 0935 - 16 (D911)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 170 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 3-16-77 - 0935 Z
ANALYSIS BANDWIDTH: 1/10 HZ
172 DEG. AZ STEERING

REEL: H22 INDE X566
INTEGRATION TIME 320 SECS
ATTEN: -18 DB
FILTER WTG: HANNING



15 X 10 TO THE INCHES X 10 INCHES
REIMPEL & PETER CO. MADE IN U.S.A.

46 0703

INDE X 566

REEL: N22

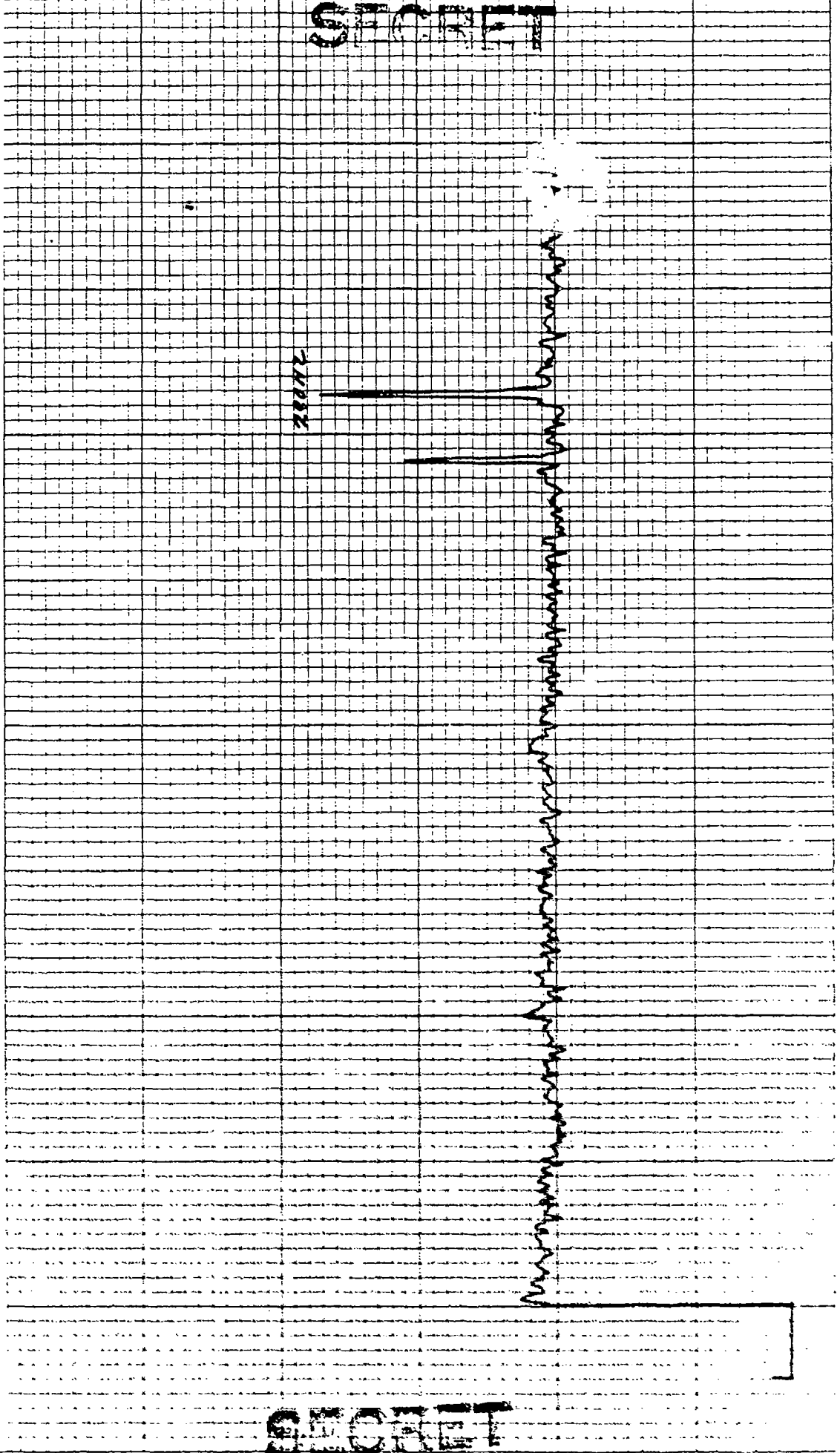
DATE OF ANALYSIS: 1-16

CONTROL: 0935 - 16 (2P11)

INTEGRATION TIME 320 SECS
ATTEN: -10 DB
FILTER WTC: HANNING

DATE/TIME: 3-16-77 - 0935Z
ANALYSIS BANDWIDTH: 1/10HZ
+74 DEG. AZ STEERING

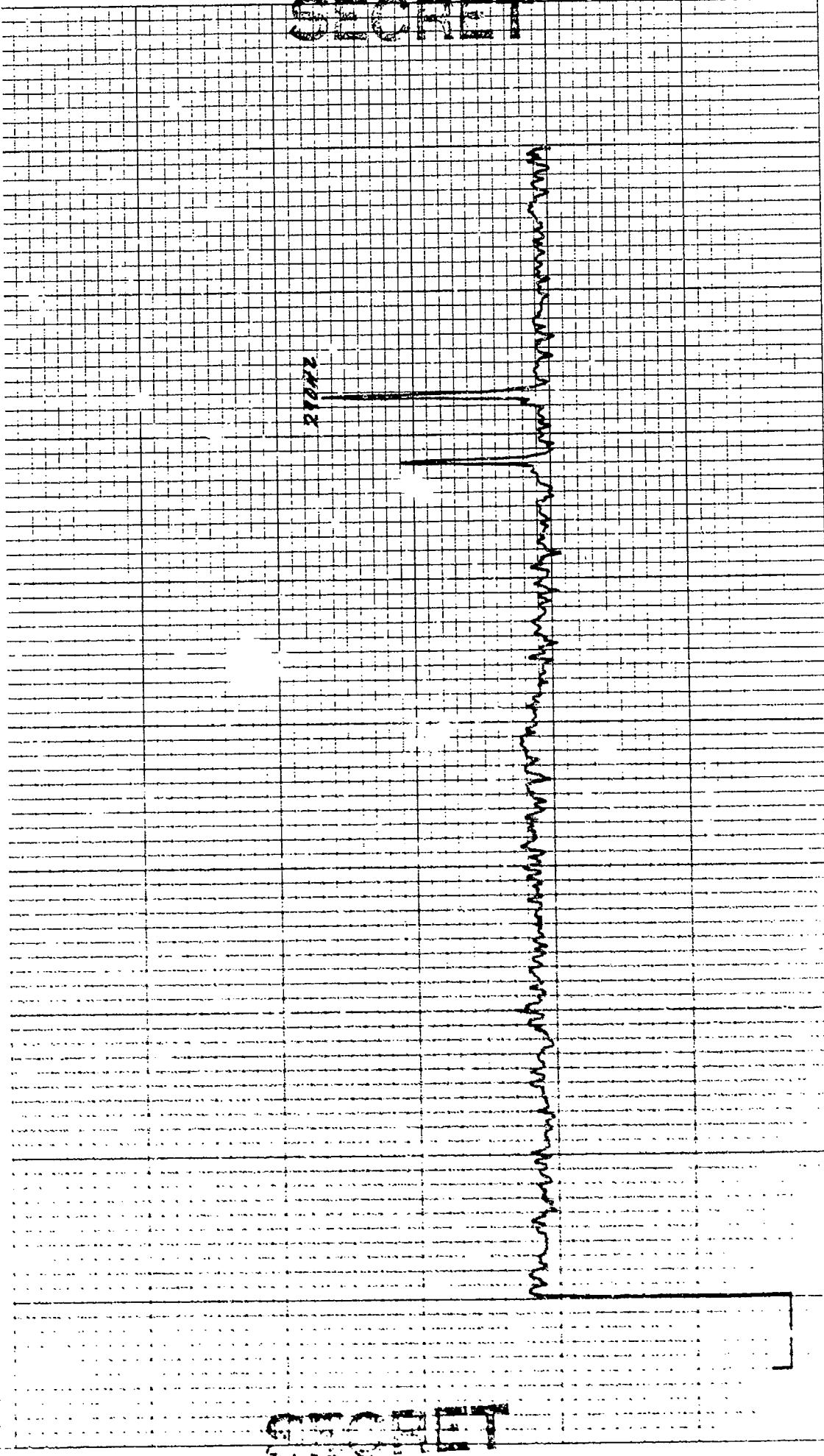
BEAMFORMED SPECTRUM (ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS



CONTROL: 0935-16 (DP11)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 3-16-77 - 0935 Z
ANALYSIS BANDWIDTH: 1710 HZ
775 DEG. AZ STEERING

REEL: 122 INDE X 566
INTEGRATION TIME 320 SECS
ATTEN: -16 DB
FILTER WTG: HANNING

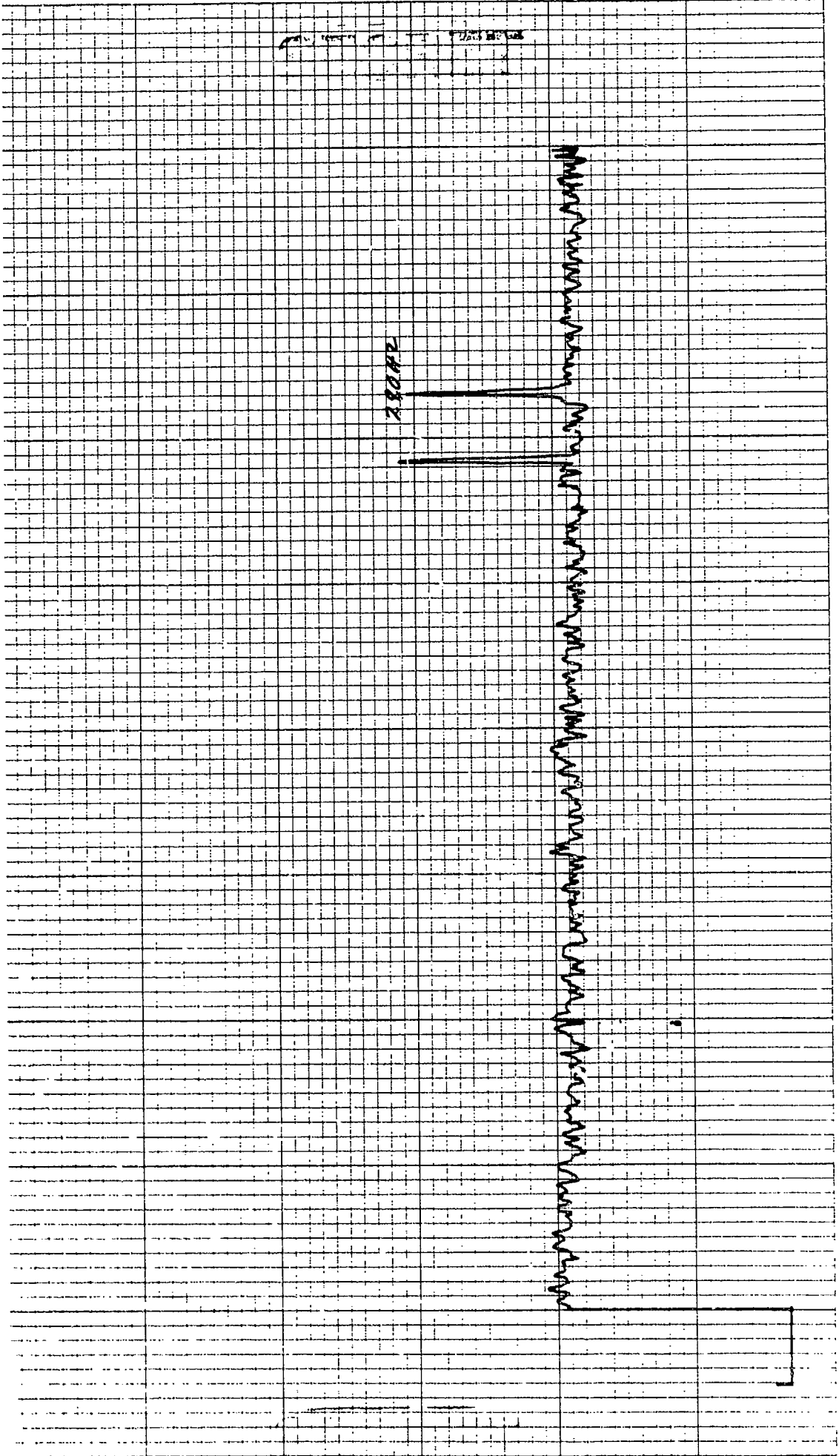


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CONTROL: 0975-16 (DP11) REEL: MAR INDE X 566
BEAMFORMED SPECTRUM (ELEMENTS) INTEGRATION TIME 320 SECS ATTN: -18 DB
EXERCISE: BEARING STAKE FILTER WTG: HANNING
CENTER FREQ: 270 HZ
16 ELEMENTS

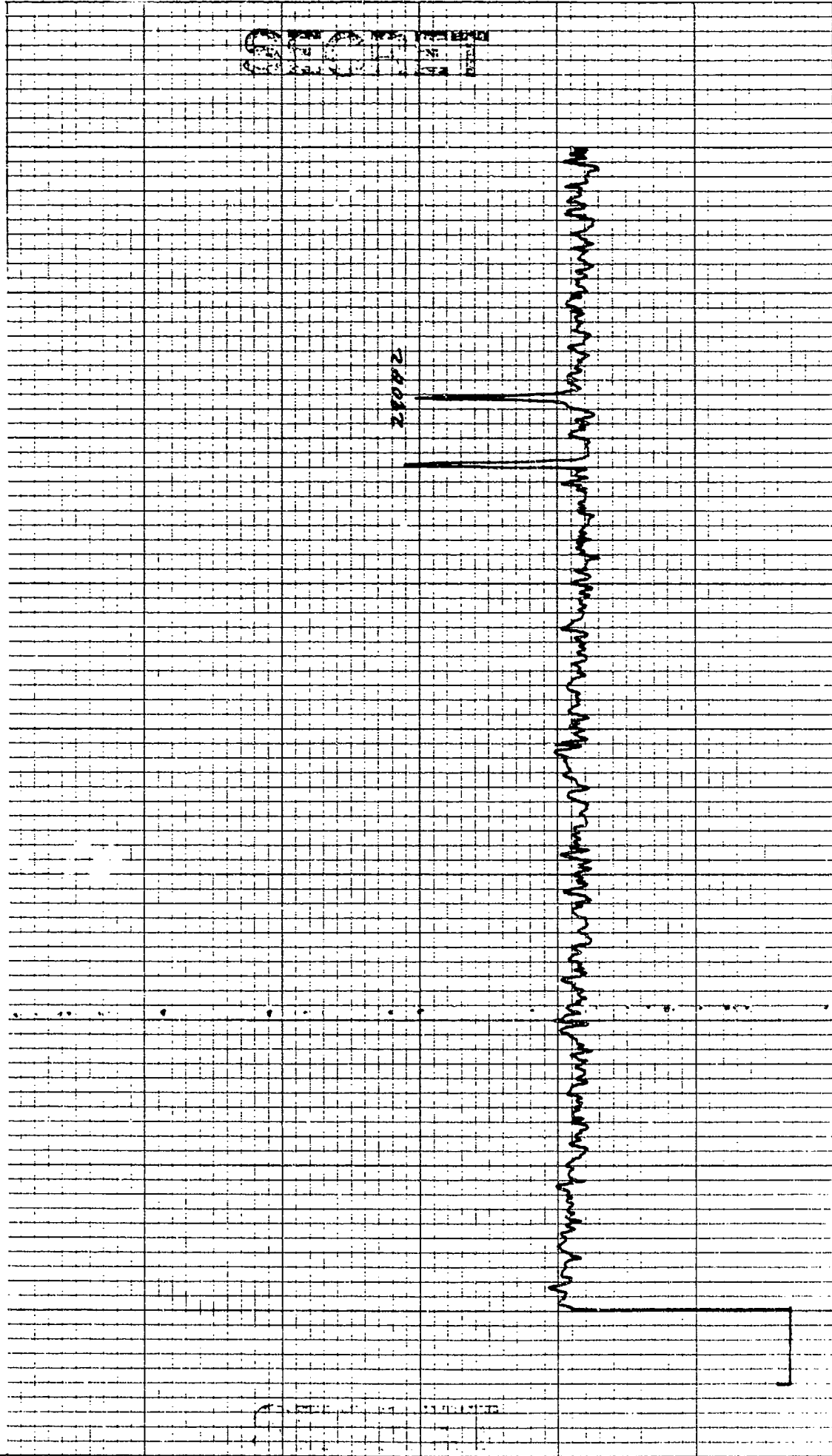
DATE OF ANALYSIS: 1-16
DATE/TIME: 3-16-77 - 0935 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+78 DEG. AZ STEERING



10 X 10 KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0935 - 16 (DP11) DATE OF ANALYSIS: 1-76 REEL: M28 INDE X566
 BEAMFORMED SPECTRUM (ELEMENTS) INTEGRATION TIME 320 SECS ATTN: -18 DB
 EXERCISE: BEARING STAKE FILTER WTG: HANNING
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ
16 ELEMENTS +90 DEG. AZ STEERING



CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 11

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-30.6</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-20.6	
BEAMFORMER GAIN	<u>+24</u>	+3.4	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	+3.6	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-59.4</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-49.4	
BEAMFORMER GAIN	<u>+24</u>	-25.0	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+3.4</u>	
SIGNAL LEVEL FOR SNR	<u>-25.0</u>	28.4	
PROCESSOR CORRECTION	<u>-4.0</u>	24.4	
MRA CORRECTION	<u>+ .2</u>	24.6	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	16.4	SNR 1 HZ BAND

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 11FREQUENCY 290 HZNUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-45.6</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-35.6	
BEAMFORMER GAIN	<u>+24</u>	-11.6	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	-12.4	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-68.9</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-58.9	
BEAMFORMER GAIN	<u>+24</u>	-34.9	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-11.6</u>	
SIGNAL LEVEL FOR SNR	<u>-34.9</u>	23.3	
PROCESSOR CORRECTION	<u>-4.0</u>	19.3	
MRA CORRECTION	<u>+ .8</u>	20.1	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	11.9	SNR 1 HZ BAND

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-29.8</u>	<u>-41.4</u>	<u> </u>
MRA SIGNAL LEVEL	<u>+ 3.6</u>	<u>-12.4</u>	<u> </u>
ARRAY SIGNAL GAIN	<u>33.4</u>	<u>29.0</u>	<u> </u>
20 LDG <u>32</u>	<u>34.1</u>	<u>34.1</u>	<u> </u>
# of elements			
DIFFERENCE	<u>- .7</u>	<u>- 5.1</u>	<u> </u>

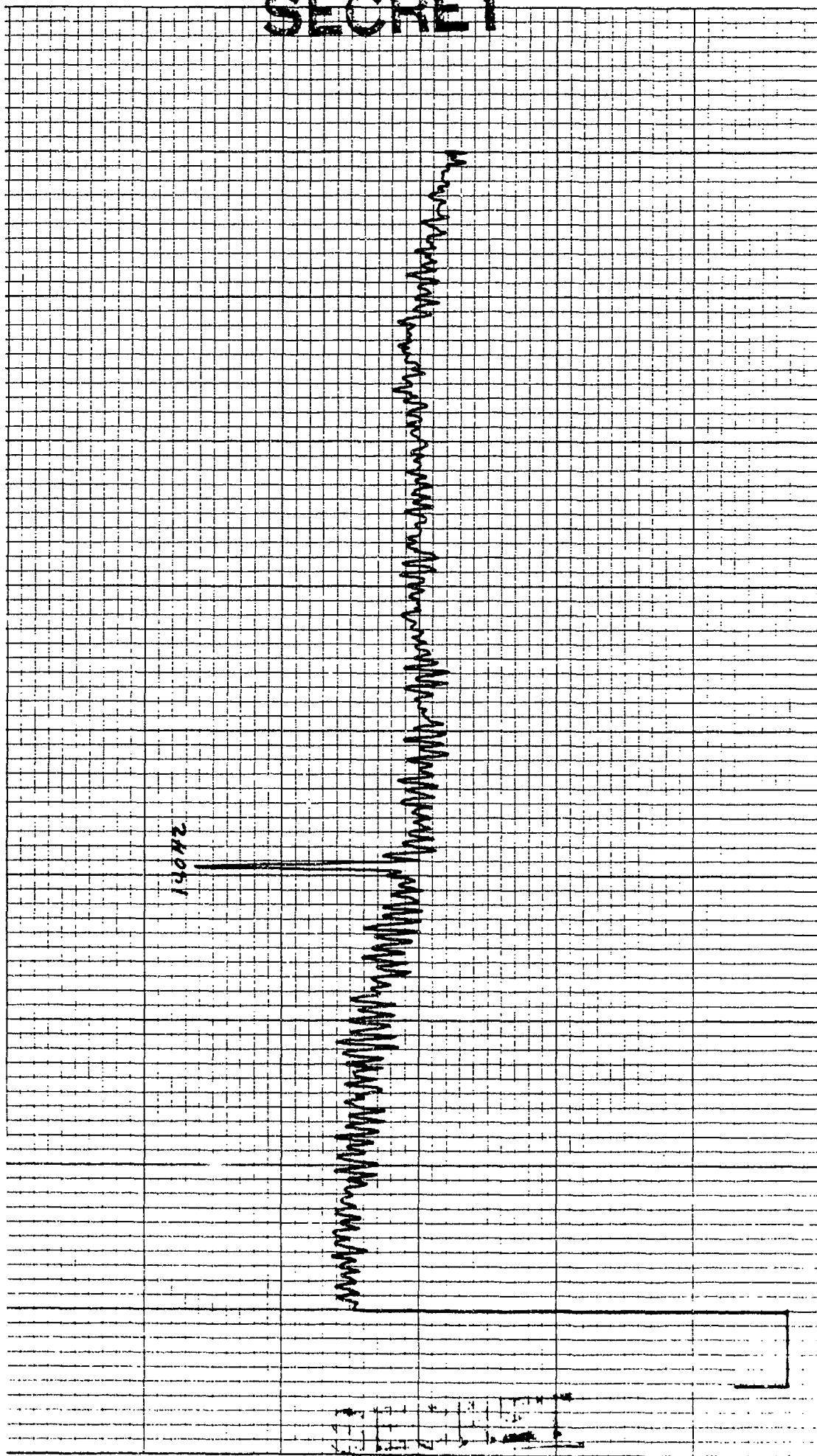
ARRAY GAIN

MRA SNR	<u>24.6</u>	<u>20.1</u>	<u> </u>
MEAN OMNI SNR	<u>16.2</u>	<u>8.4</u>	<u> </u>
ARRAY GAIN	<u>8.4</u>	<u>11.7</u>	<u> </u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>10.9</u>	<u>13.0</u>	<u> </u>
DIFFERENCE	<u>-2.5</u>	<u>-1.3</u>	<u> </u>

K·Σ 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

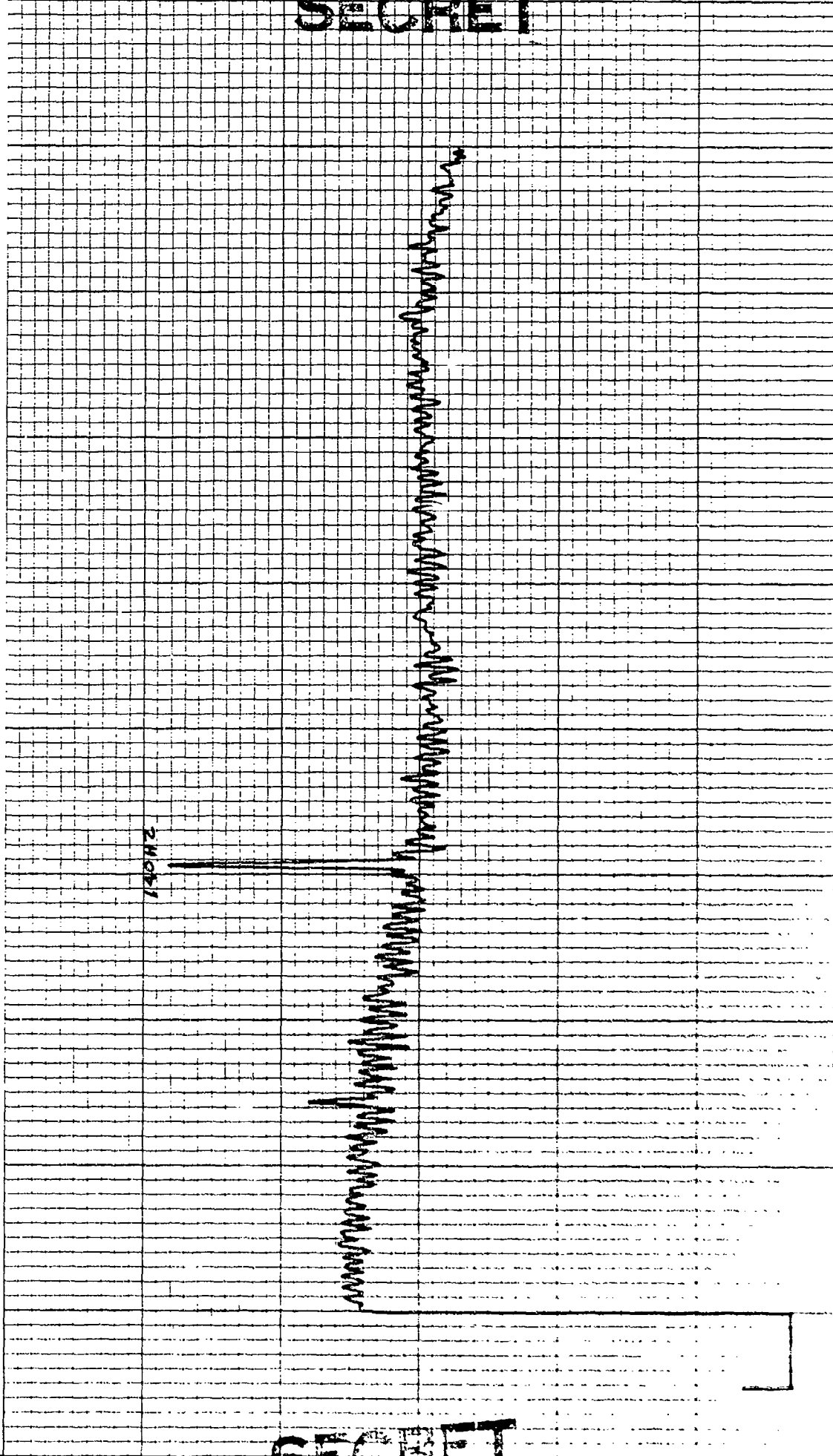
CONTROL: 0936 - 32 (201) DATE OF ANALYSIS: 1-26-58-34 REEL: M22 INDE X566
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-26-77 - 0935Z INTEGRATION TIME 320 SECS ATTN: 2Y DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 150 HZ 750 DEG. AZ STEERING



K-Σ 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0275-32 (DPH) DATE OF ANALYSIS: 1-26-54 REEL: M22 INDE X 546
BEAMFORMED SPECTRUM (ELEMENTS) 1-26-54
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 0025 Z INTEGRATION TIME 320 SECS ATTN: -94 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
32 ELEMENTS +52 DEG. AZ STEERING



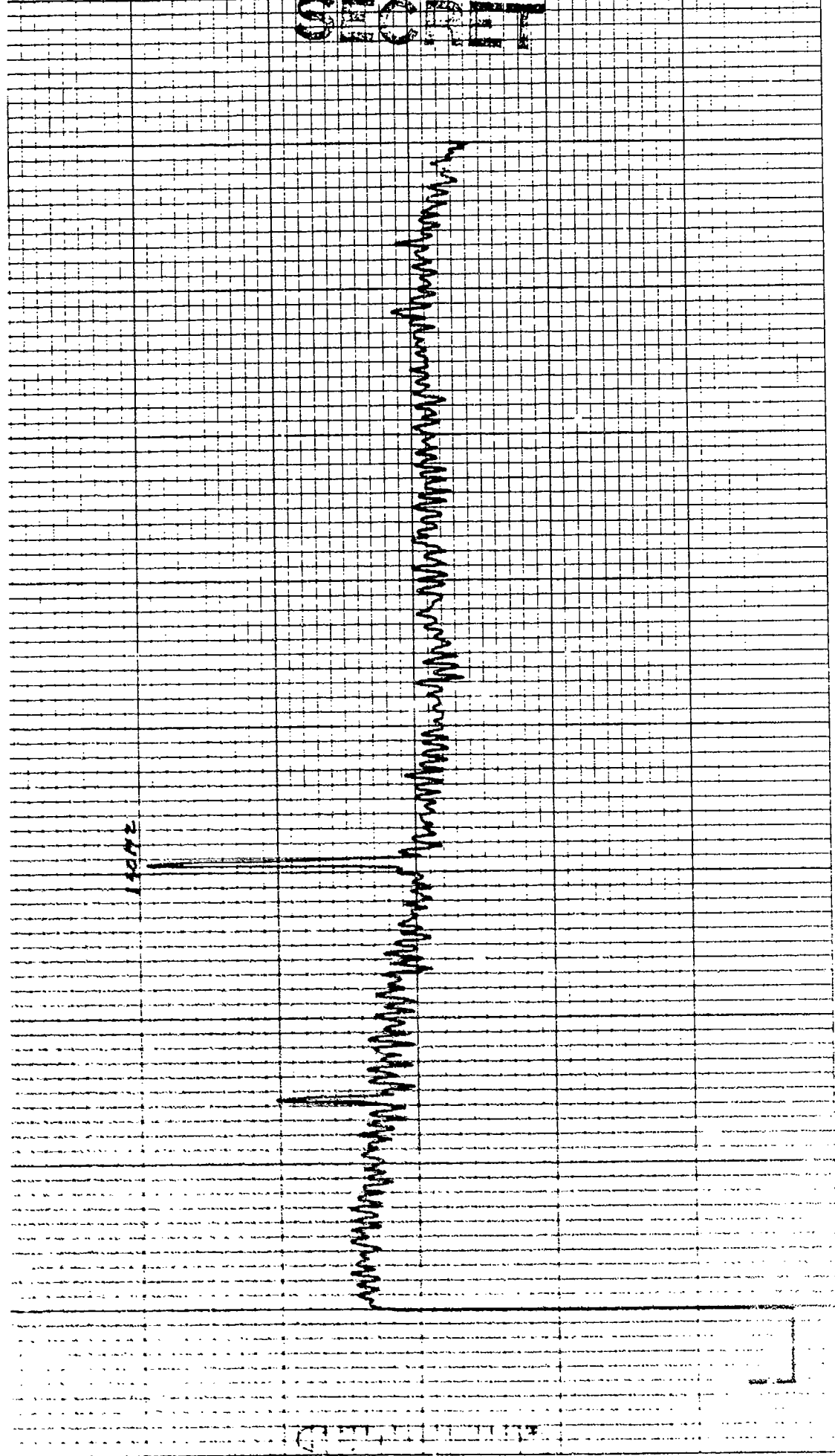
SECRET

SECRET

46 0703

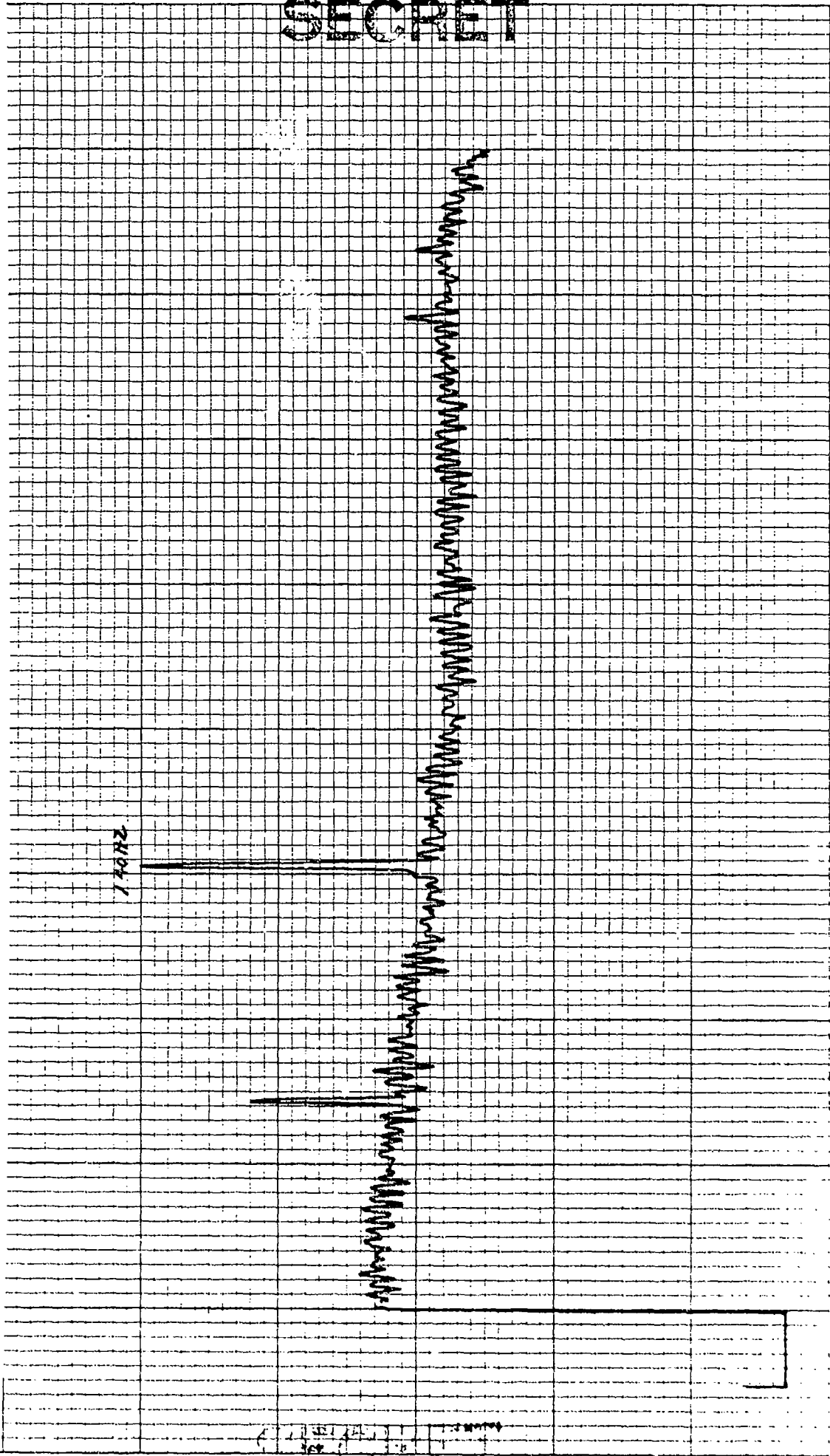
10 X 10 TO THE INCHES
REAR END OF THE AIRCRAFT

CONTROL: 0925 - 32 (DP4) DATE OF ANALYSIS: 1-26-77 REEL: 122 INDE: X526
 BEAMFORMED SPECTRUM (ELEMENTS))
 EXERCISE: BEARING STAKE DATE/TIME: 3-26-77-0925 Z INTEGRATION TIME 320 SECS ATTN: 2Y DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WIG: HANNING
32 ELEMENTS +54 DEG. AZ STEERING

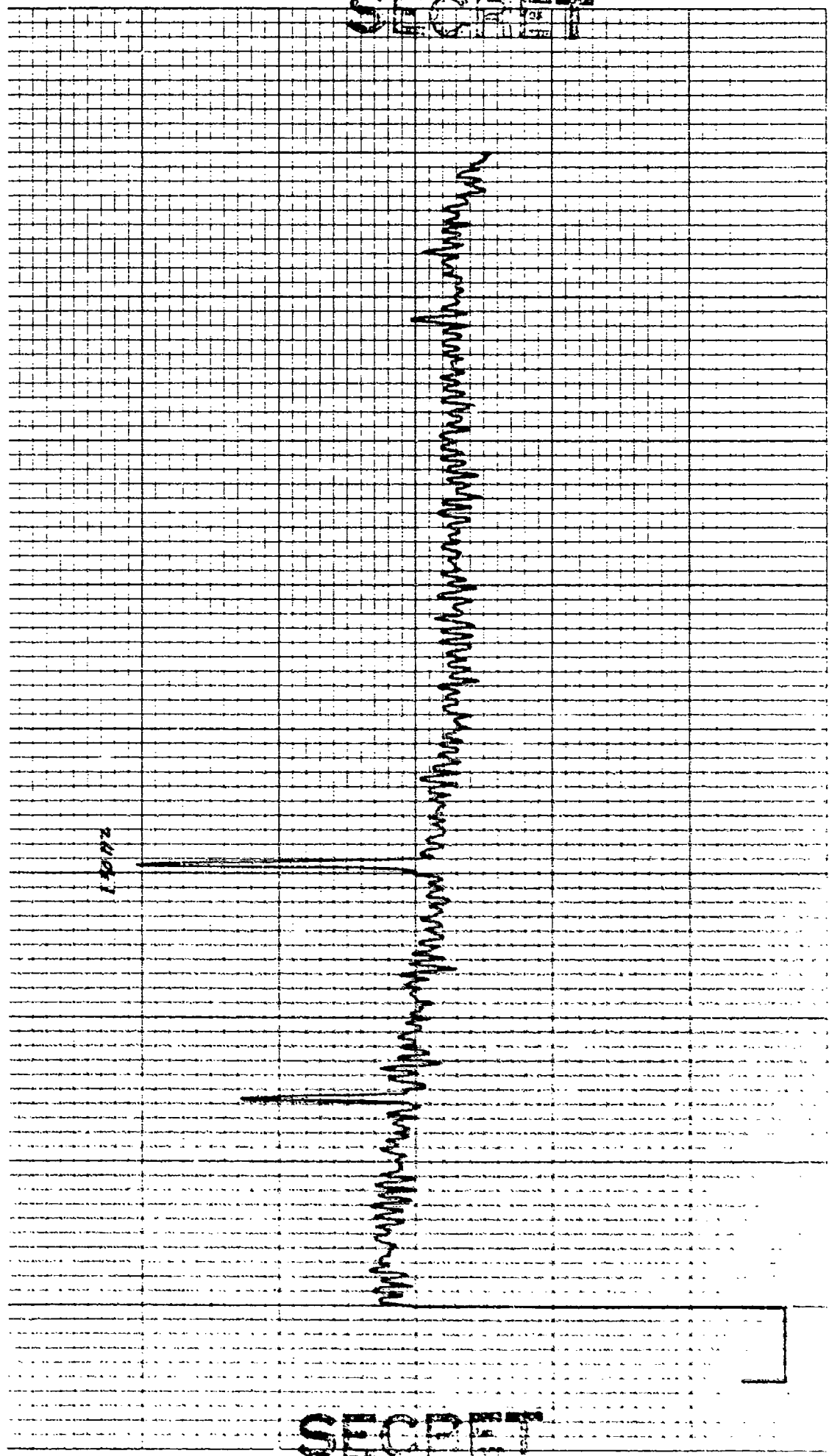


SECRET

CONTROL: 0935 - 32 (DP11) REEL: 1022 INDE X 566
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-26-77 08-34
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: -24 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
32 ELEMENTS 4-56 DEG. AZ STEERING



CONTROL: 0935 - 32 (0911) REEL: M22 INDE X 566
 BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: 1-26-77 09-34
 EXERCISE: BEARING STAKE DATE/TIME: 3-6-77 - 0935 Z INTEGRATION TIME 320 SECS ATTN: -24 DB
 CENTER FREQ: 250 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
32 ELEMENTS +50 DEG. AZ STEERING



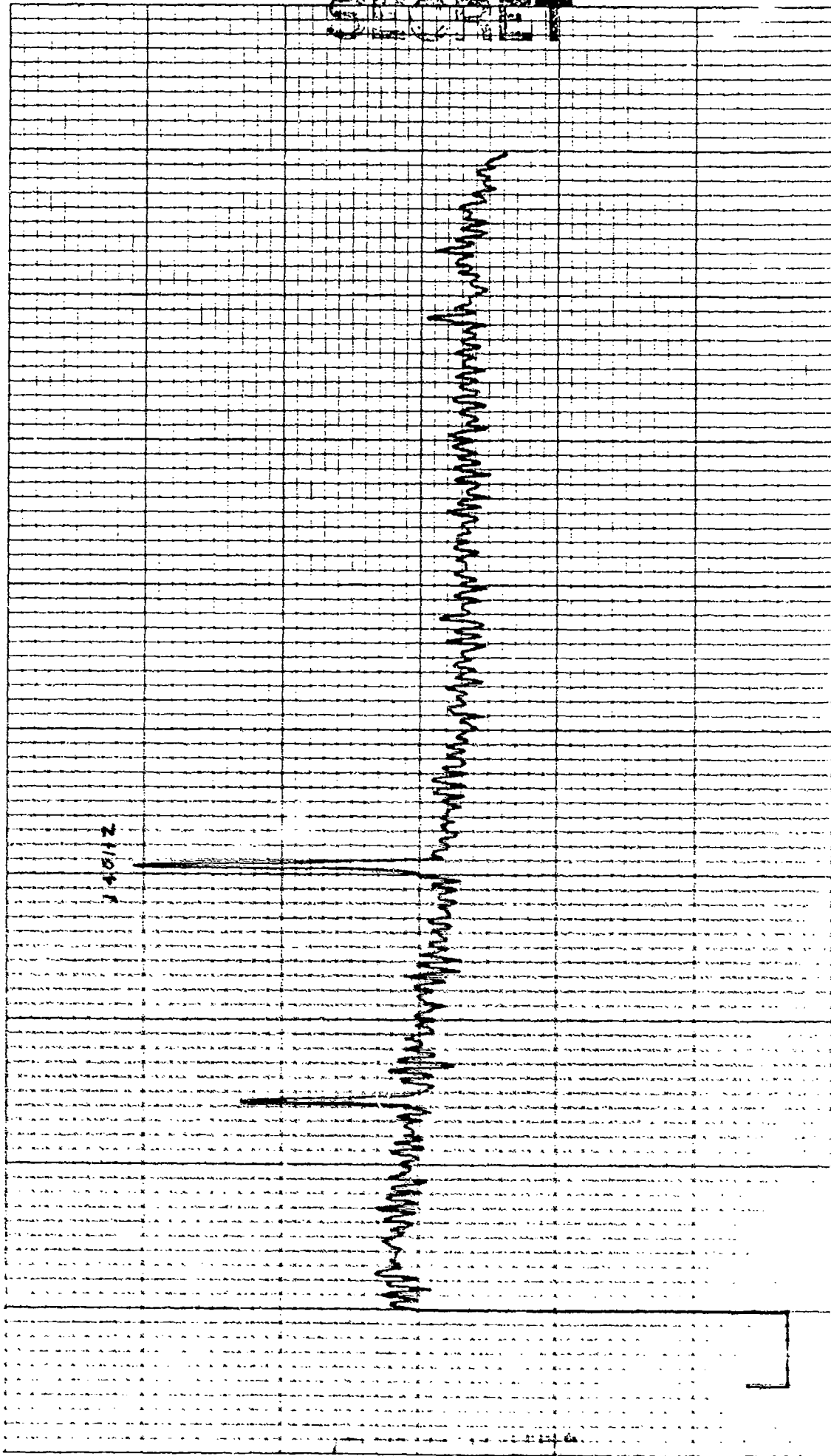
SECRET

SECRET

KOE 10 X 10 TO FIVE INCHES
NEUTRAL A POWER 1/2 WAVE 1/2

46 0703

CONTROL: 0925 - 51 (DP11) DATE OF ANALYSIS: _____ REEL: MZZ INDEX 522
BEAMFORMED SPECTRUM (ELEMENTS) 1-26 & 29-34
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 0925 Z INTEGRATION TIME 320 SECS ATTN: 24 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
72 ELEMENTS 459 DEG. AZ STEERING



46 0703

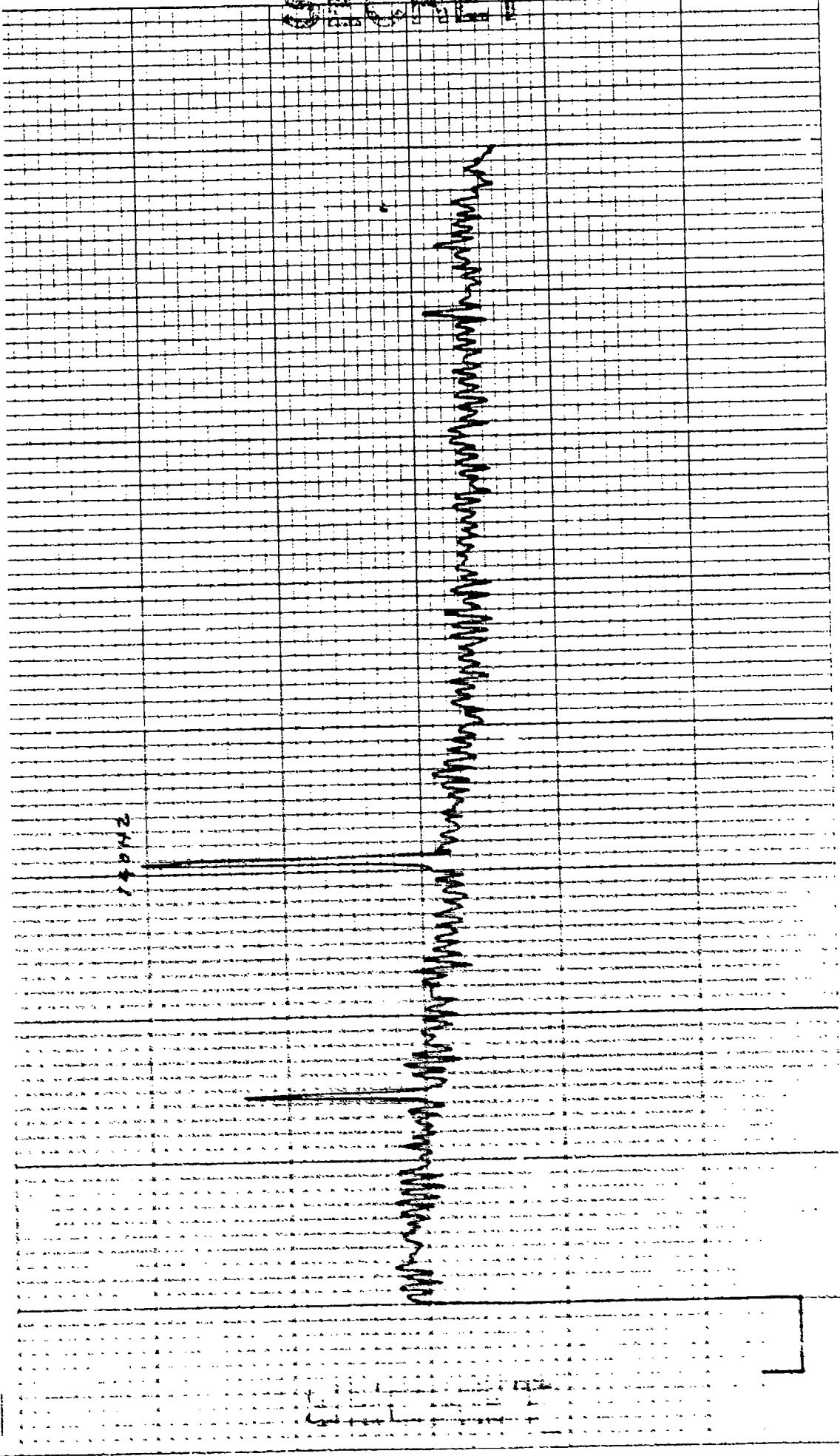
10 2 10 TO TIME IN HOURS
RECEIVED 4 19 58 10 11 10 15

CONTROL: 0935 - 72 (DP11)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 72 ELEMENTS

DATE OF ANALYSIS: 1-26-77 (0834)
 DATE/TIME: 3-16-77 - 0835Z
 ANALYSIS BANDWIDTH: 1/10HZ
 460 DEG. AZ STEERING

REEL: 1102
 INTEGRATION TIME 320 SECS
 FILTER
 WTG: HANNING

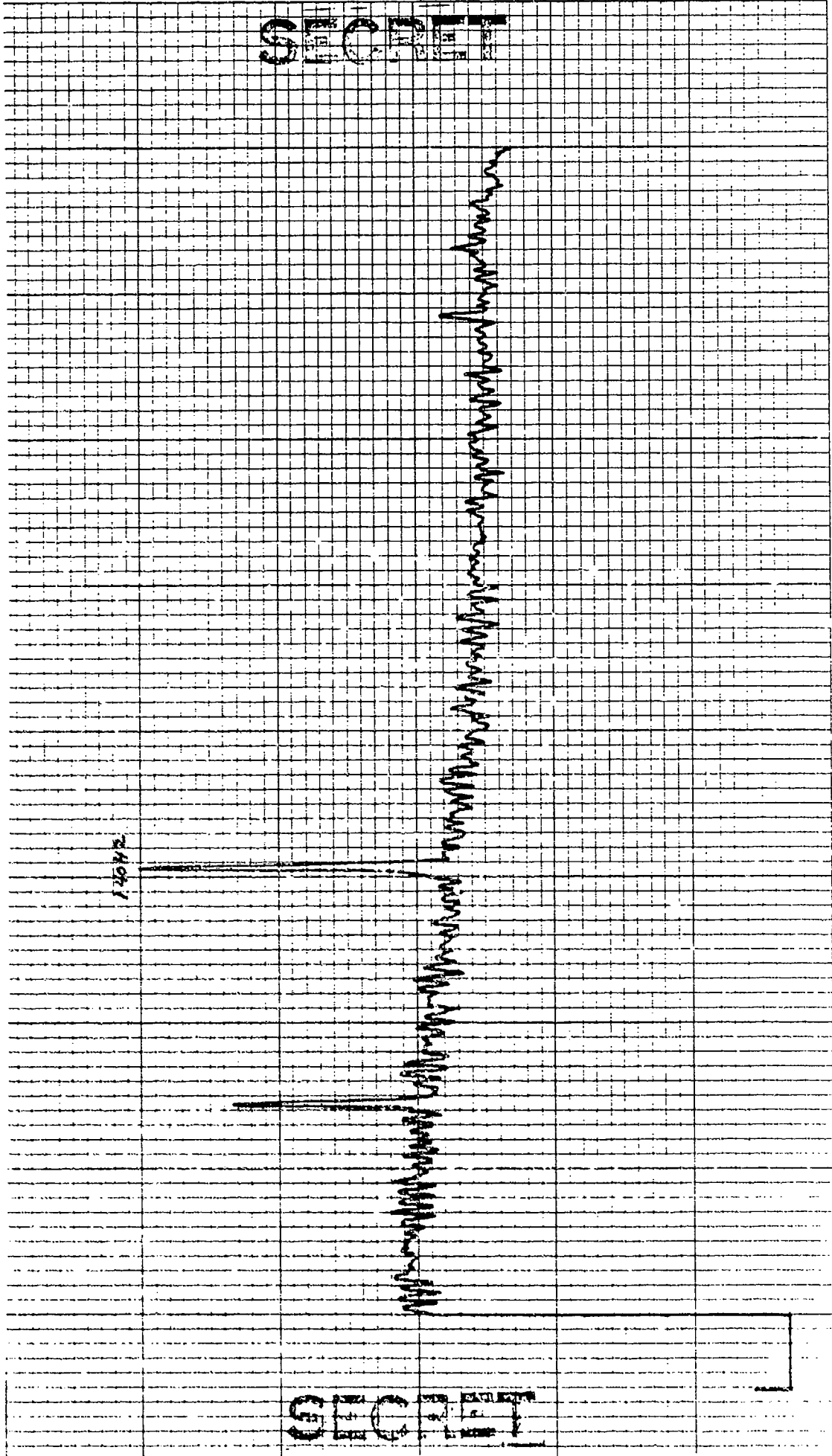
INDE X 566



SECRET

SECRET

CONTROL: 0935 - 32 (DFH) DATE OF ANALYSIS: 1-26-77
 BEAMFORMED SPECTRUM (ELEMENTS) REEL: 1122 INDE X 566
 EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATEN: 24 DB
 CENTER FREQ: 150 HZ FILTER WTG: HANNING
 32 ELEMENTS + 62 DEG. AZ STEERING
 ANALYSIS BANDWIDTH: 1/10 HZ



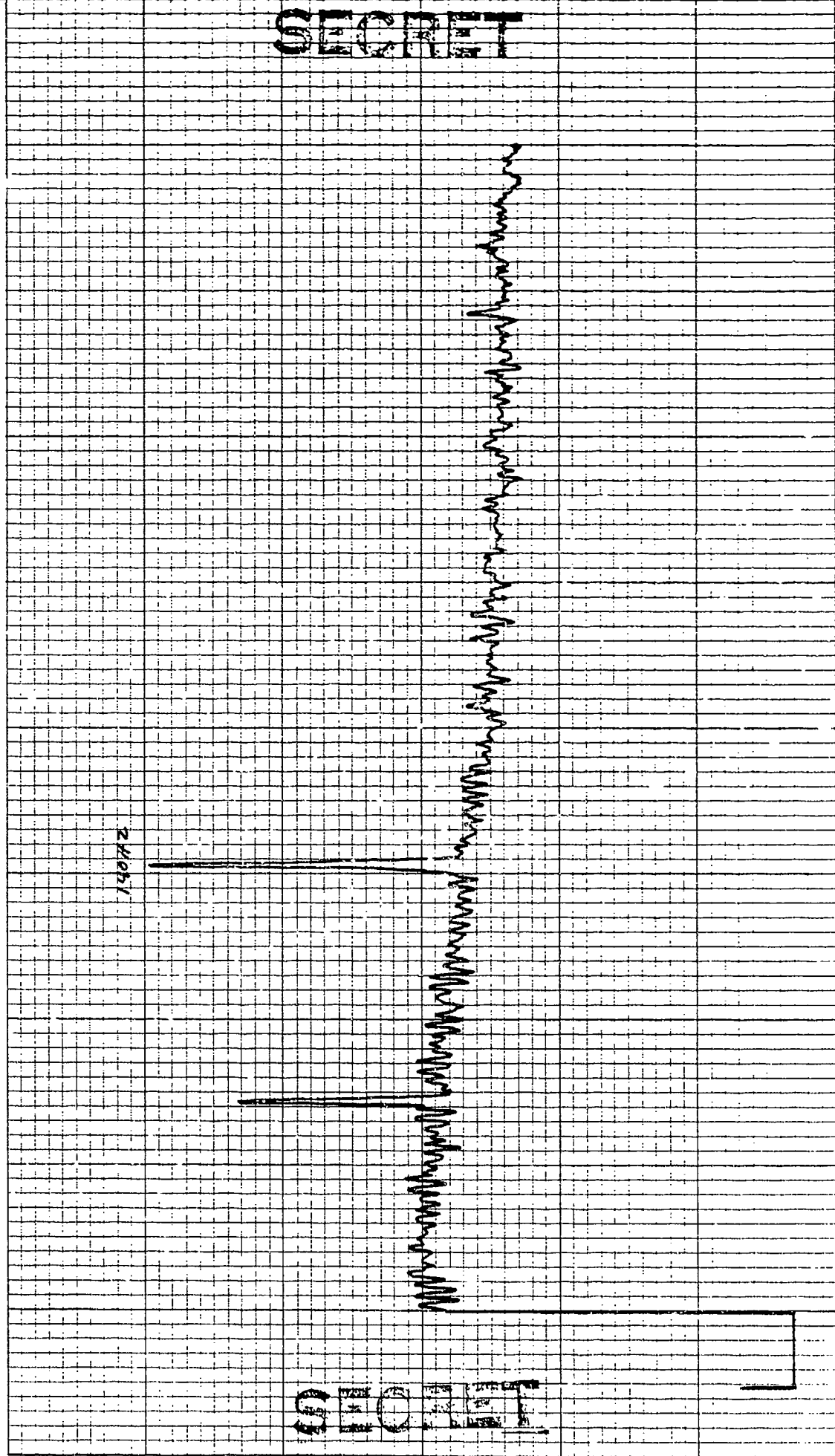
DFH

DFH

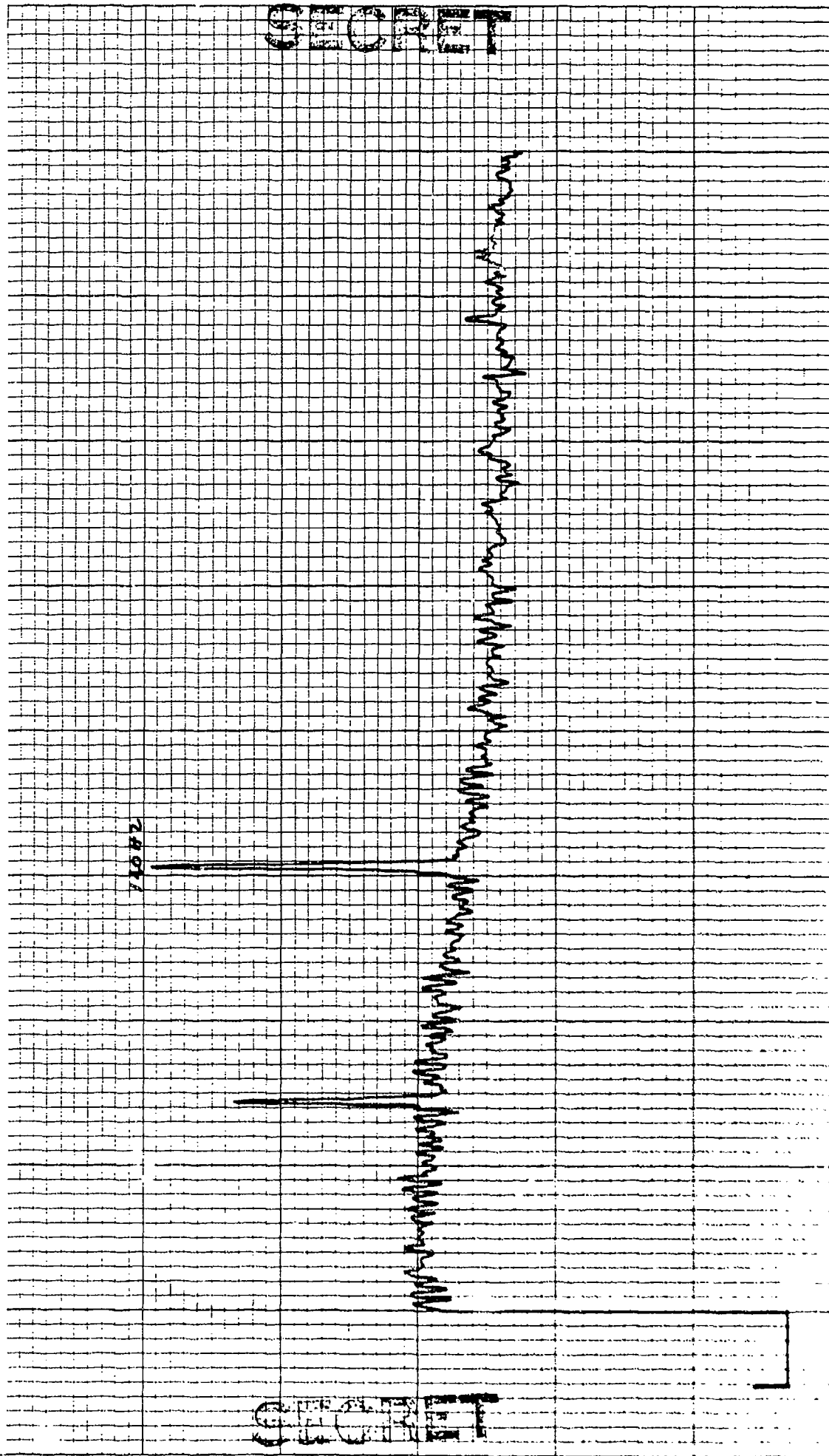
10 X 10 TO THE INCH * 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0935 - 32 (SPII) DATE OF ANALYSIS: 1-26-77 REEL: M22 INDE X 526
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77-0835 Z INTEGRATION TIME 320 SECS ATTEN: -24 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
32 ELEMENTS +63 DEG. AZ STEERING



CONTROL: 0935 - 32 (0911) DATE OF ANALYSIS: 1-26-98-34 REEL: M-2 INDE X 526
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 3-6-77 - 0935 Z INTEGRATION TIME 320 SECS ATTEN: -24 DB
CENTER FREQ: 250 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
32 ELEMENTS +64 DEG. AZ STEERING



KOE 10 X 10 TO THE INCH ••• X 10 INCHES
HEUFFEL & PETER CO. MADE IN U.S.A.

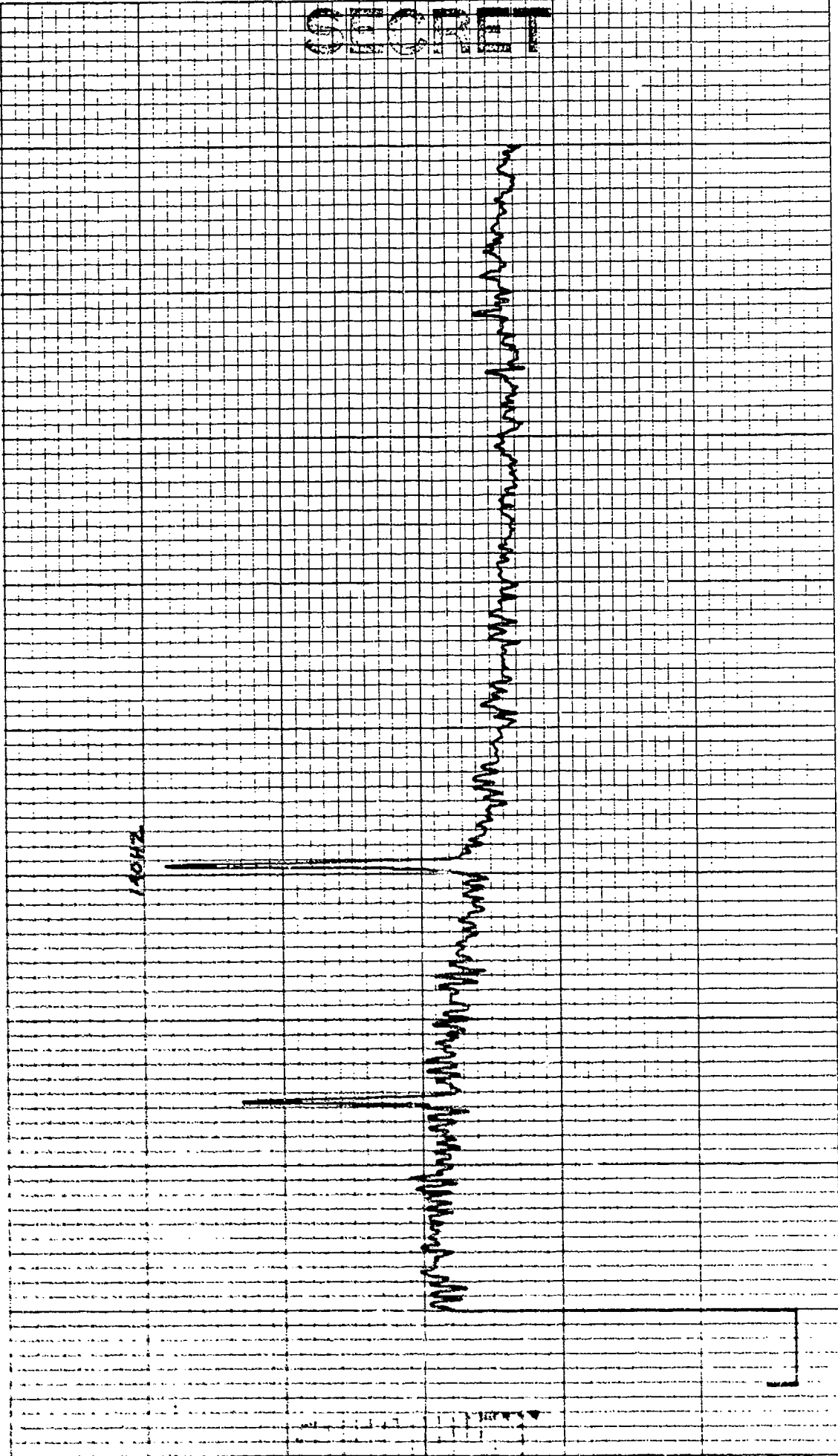
46 0703

CONTROL: 0935 - 32 (DPI)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS

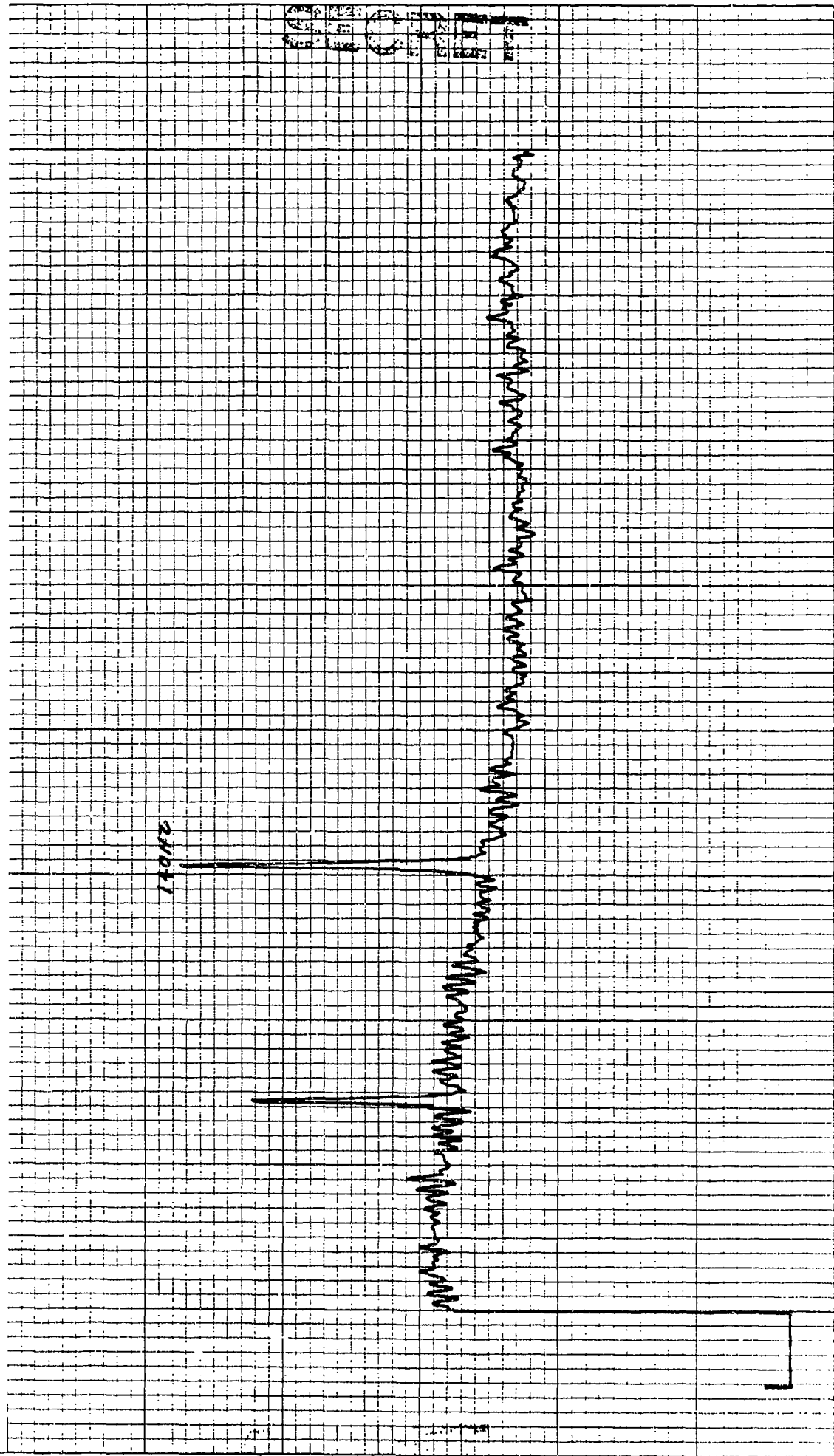
DATE OF ANALYSIS: 1-26-77
DATE/TIME: 0935 Z
ANALYSIS BANDWIDTH: 1/10HZ
+66 DEG. AZ STEERING

REEL: M02
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING

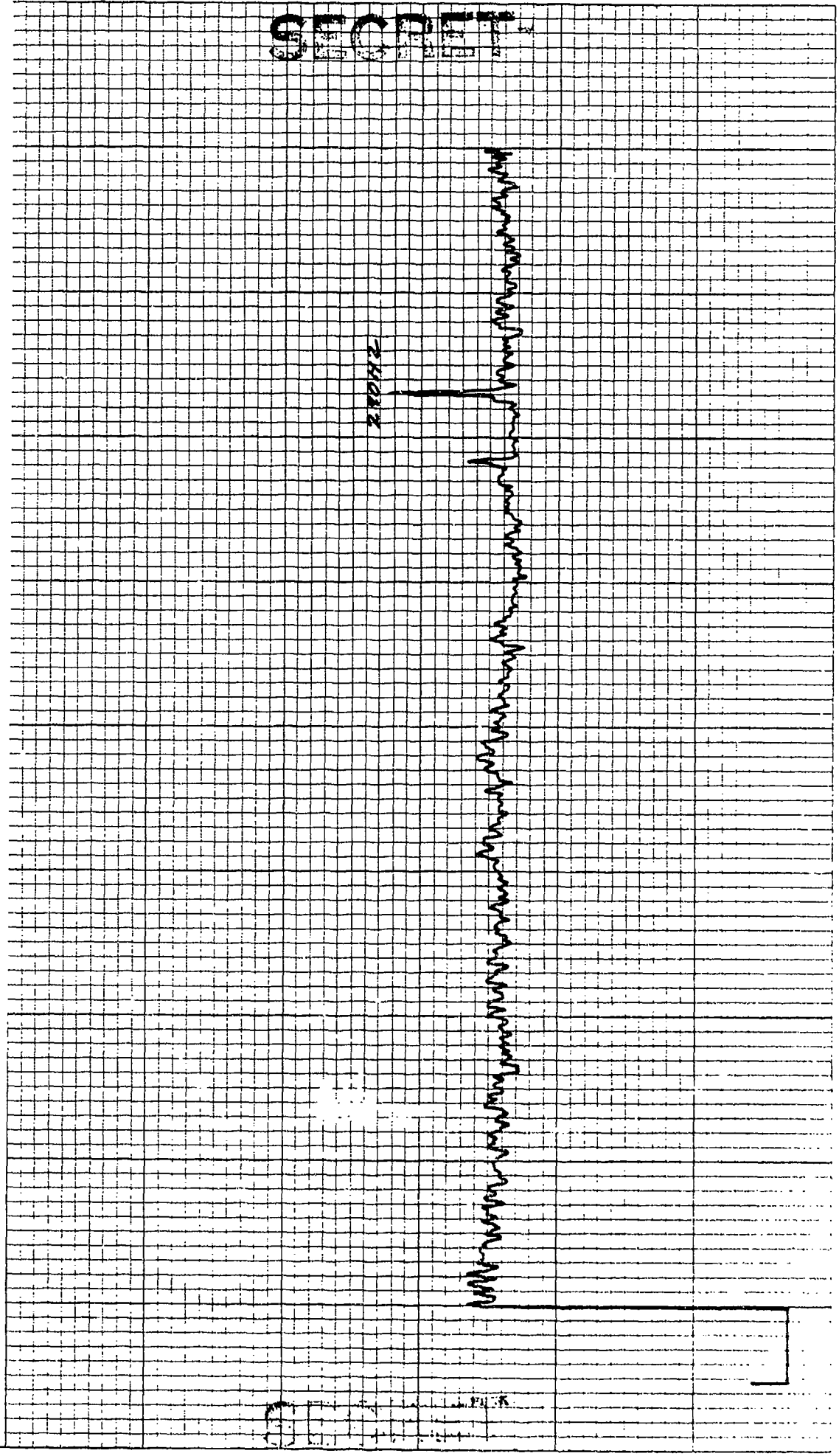
INDE X 506



CONTROL: 0935 - 32 (D011) DATE OF ANALYSIS: 1-26-77 REEL: H22 INDEX: 566
BEAMFORMED SPECTRUM (ELEMENTS) 89-34 INTEGRATION TIME 320 SECS ATTEN: -24 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 150 HZ +68 DEG. AZ STEERING



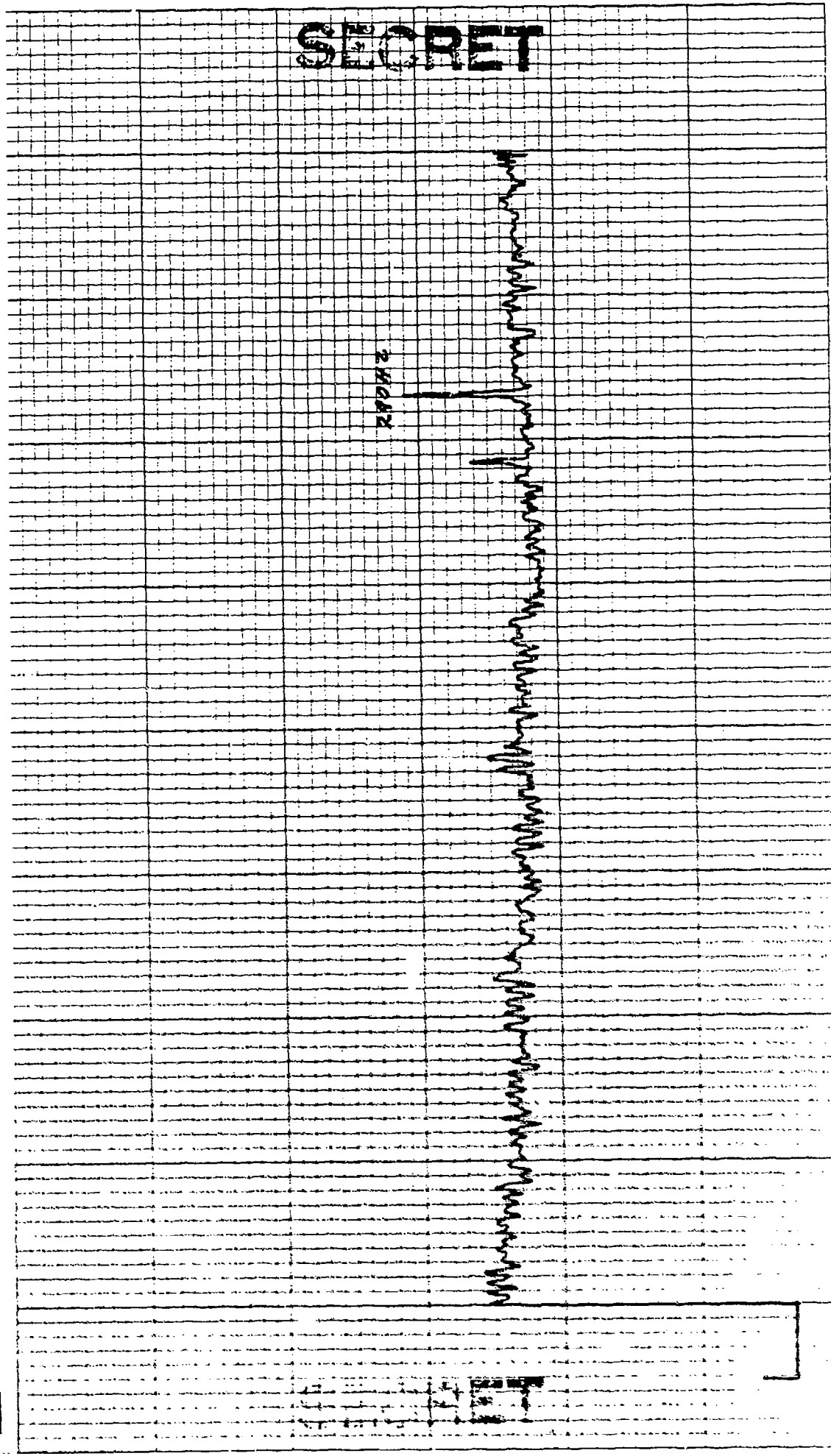
CONTROL: 0935 - 32 (DF11) DATE OF ANALYSIS: REEL: M 22 INDE X 566
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 1-26 8 28-34)
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 0935 Z INTEGRATION TIME 320 SECS ATTN: -24 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
32 ELEMENTS +50 DEG. AZ STEERING



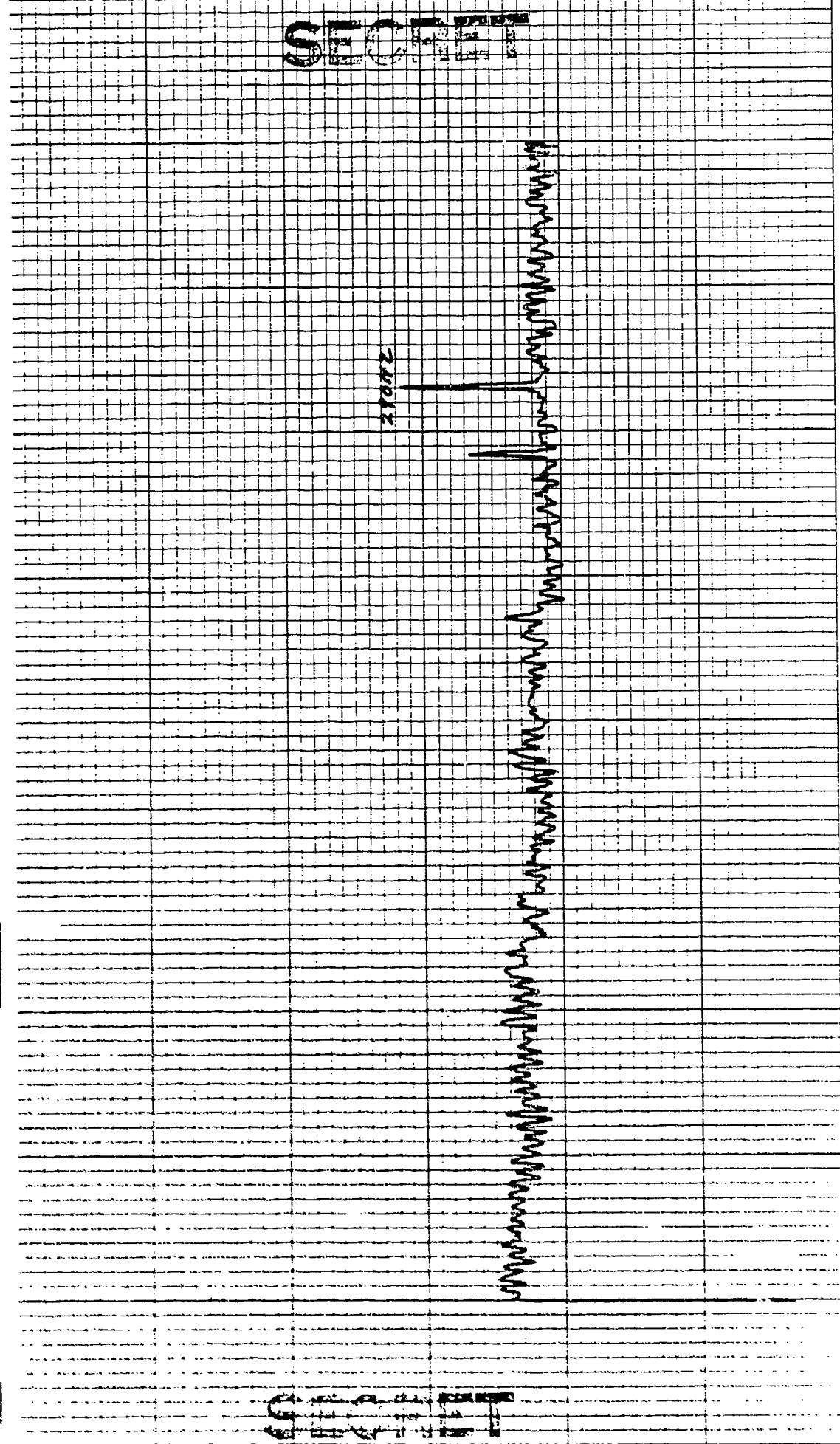
KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0935 - J2 (DPH) REEL: M22 INDE X 566
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-26-77
EXERCISE: BEARING STAKE 09-34)
CENTER FREQ: 270 HZ DATE/TIME: 3-16-77 - 0935Z
J2 ELEMENTS ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: -24 DB
+ 52 DEG. AZ STEERING FILTER WTG: HANNING



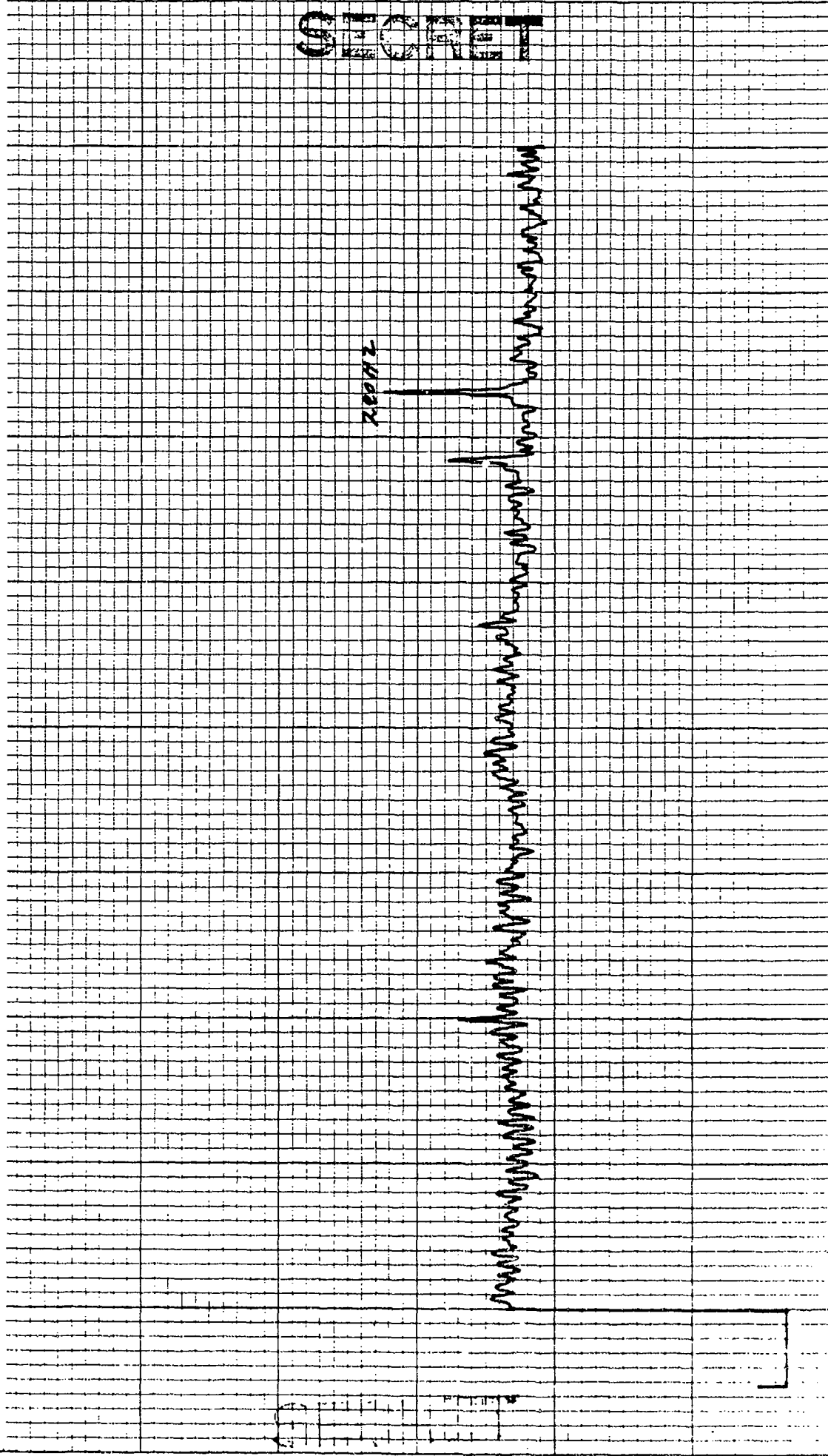
CONTROL: 0035 - 72 (2011) DATE OF ANALYSIS: REEL: 100 INDE X 566
 BEAMFORMED SPECTRUM (ELEMENTS) 1-26-77 09-34
 EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 0035 Z INTEGRATION TIME 320 SECS ATTEN: -24 DB
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTC: HANNING
32 ELEMENTS 754 DEG. AZ STEERING



SECRET

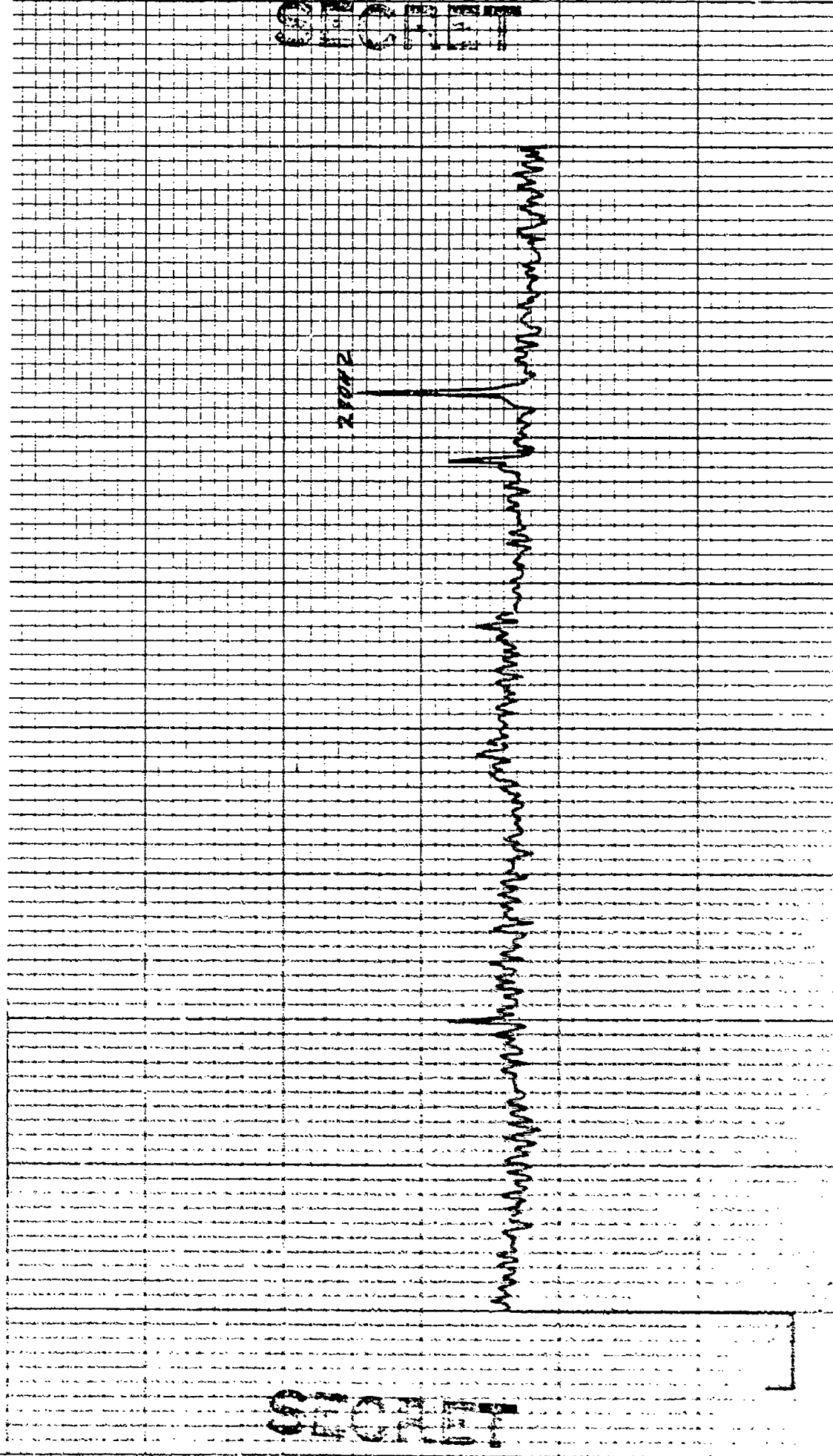
SECRET

CONTROL: 0935 - 32 (DB11) DATE OF ANALYSIS: 1-26-88 REEL: M22 INDE X 566
BEAMFORMED SPECTRUM (ELEMENTS) 88-34) INTEGRATION TIME 320 SECS ATTN: -24 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 270 HZ 456 DEG. AZ STEERING



REPORT

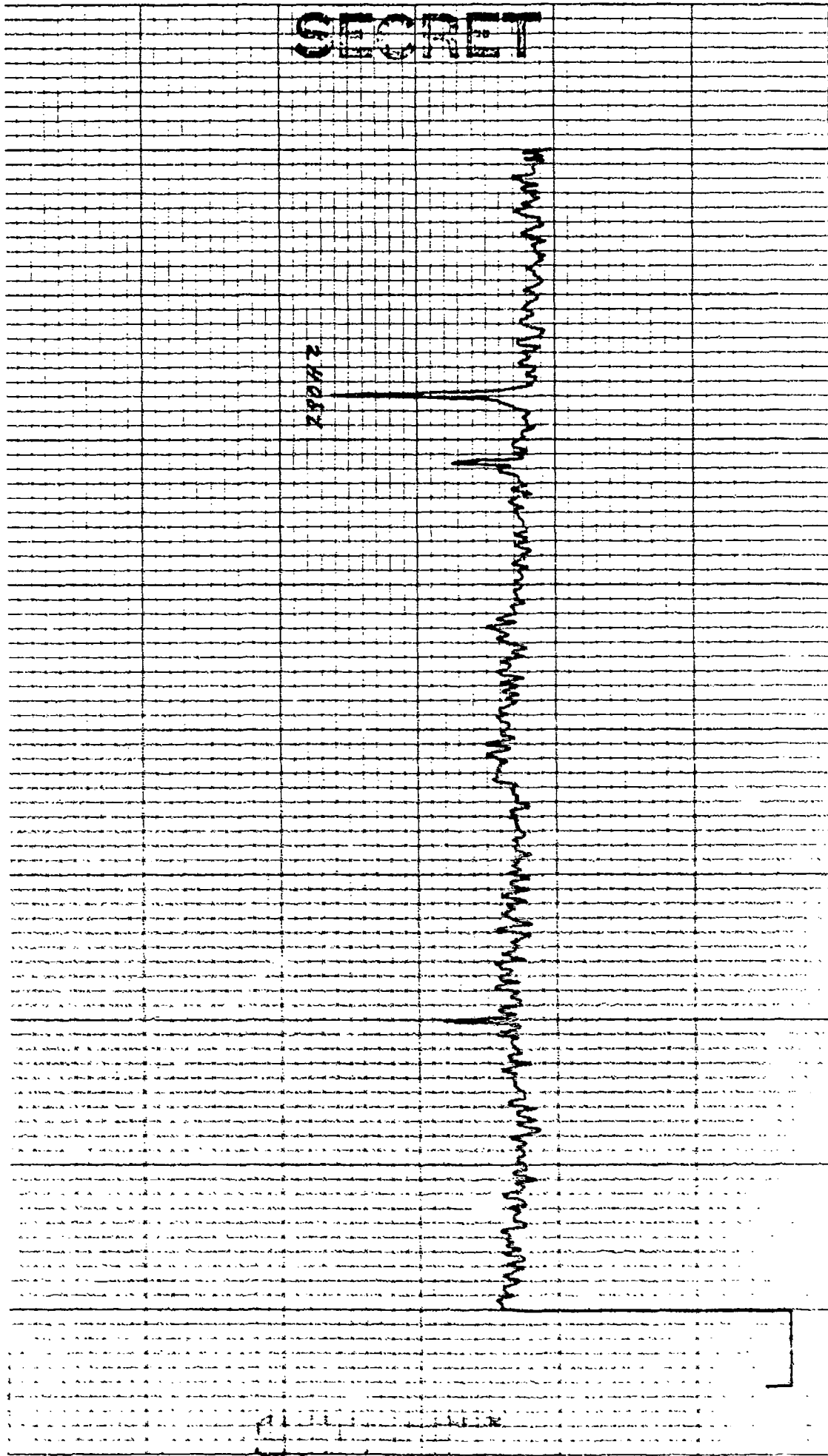
CONTROL: 0935 - 32 (0911) DATE OF ANALYSIS: 1-26-77 REEL: M22 INDE X566
 BEAMFORMED SPECTRUM (ELEMENTS) ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: -24 DB
 EXERCISE: BEARING STAKE + 50 DEC. AZ STEERING FILTER WTG: HANNING
 CENTER FREQ: 270 HZ 32 ELEMENTS



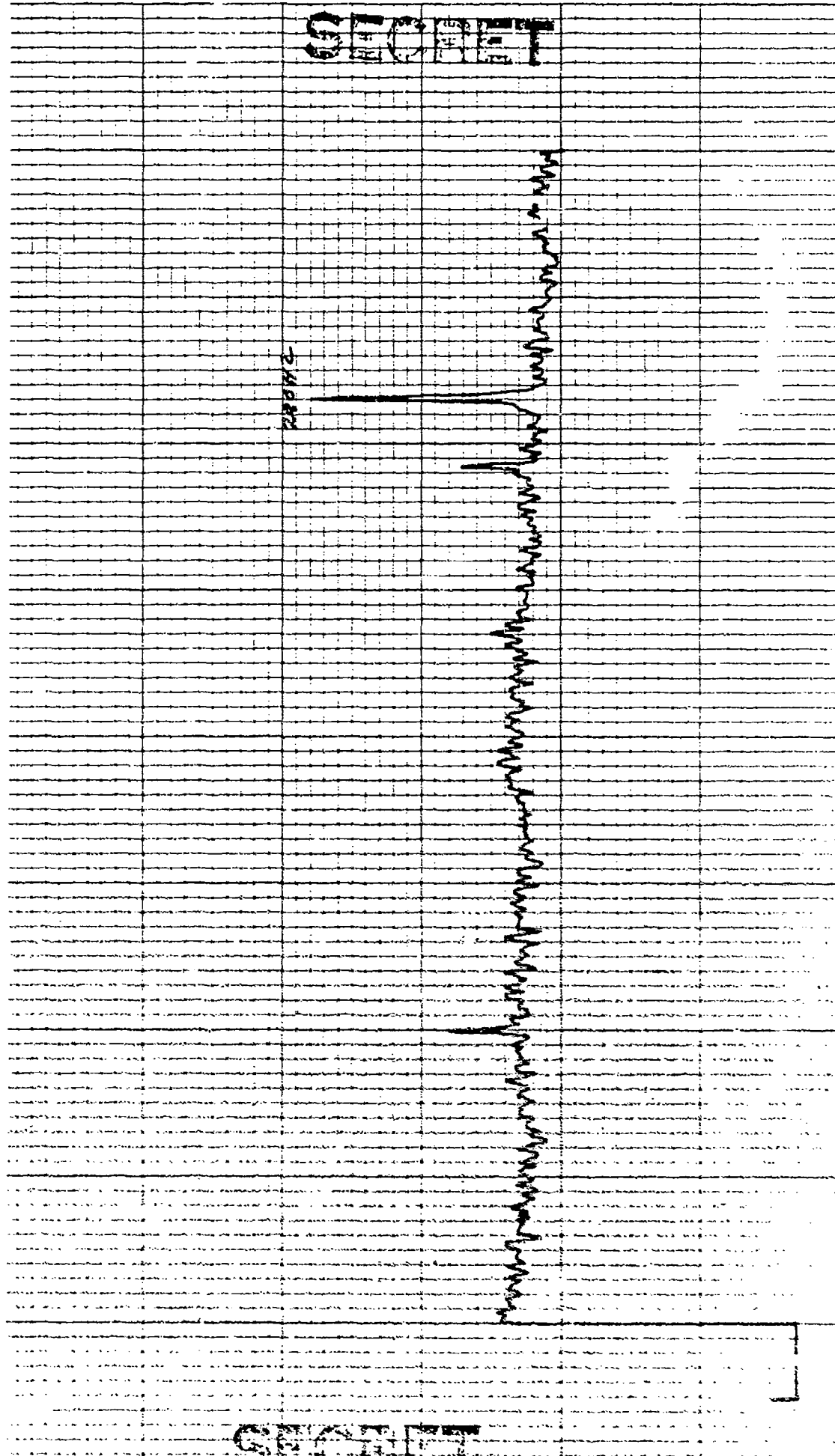
0911

0911

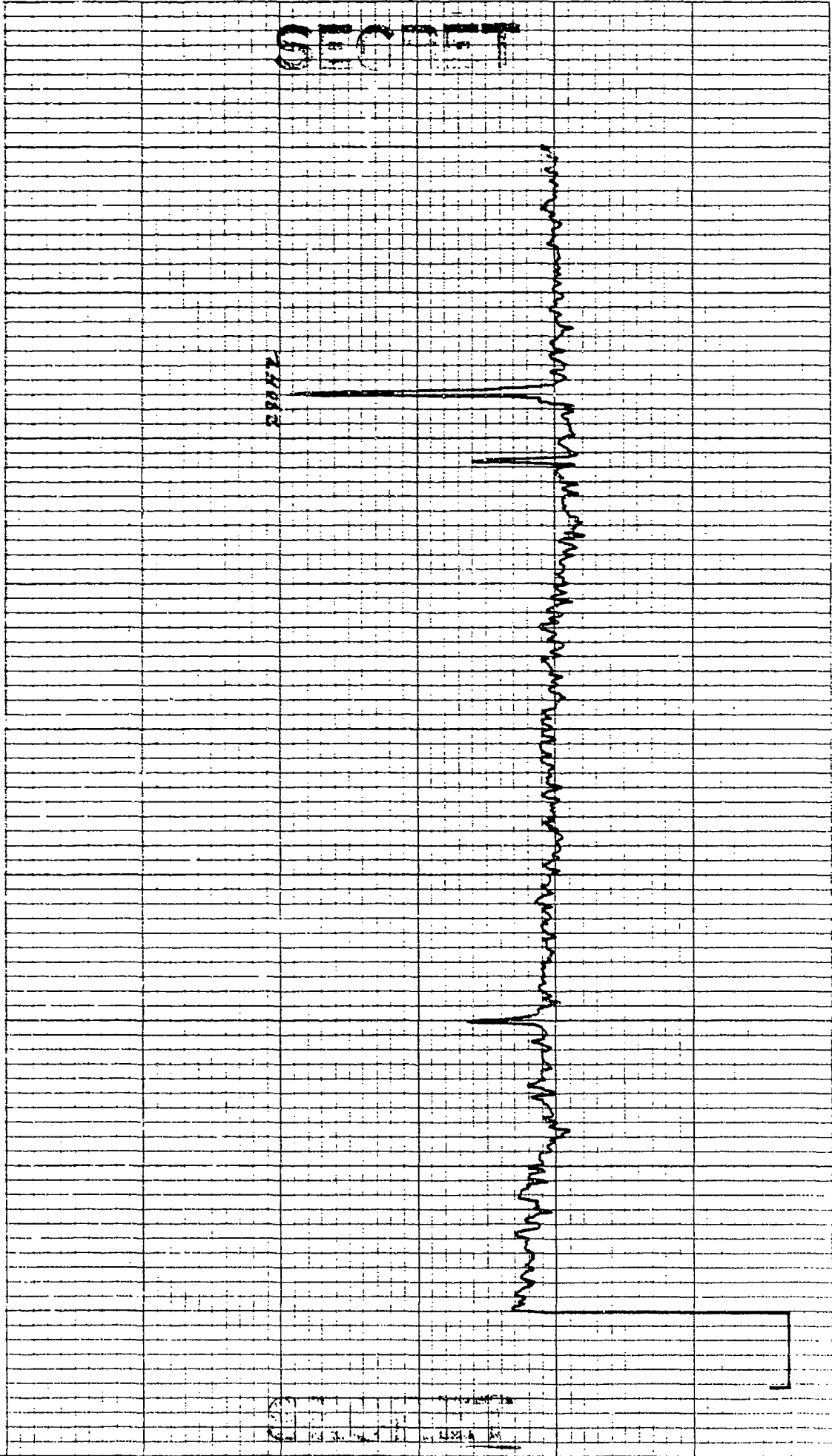
CONTROL: 093A - 12 (DP11) REEL: A22 INDEX: X566
 BLAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: 1-26-58 28-34
 EXERCISE: BEARING STAKE DATE/TIME: 3-16-77-0935 Z INTEGRATION TIME 320 SECS ATTN: 27 DB
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1710HZ FILTER WTC: HANNING
12 ELEMENTS +59 DEG. AZ STEERING



CONTROL: 0935 - 32 (2011) REEL: M22 INDE X 566
 BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-26-77 (20-34) ---
 EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 0935 Z INTEGRATION TIME 320 SECS ATTN: 24 DB
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTC: HANNING
32 ELEMENTS +60 DEG. AZ STEERING



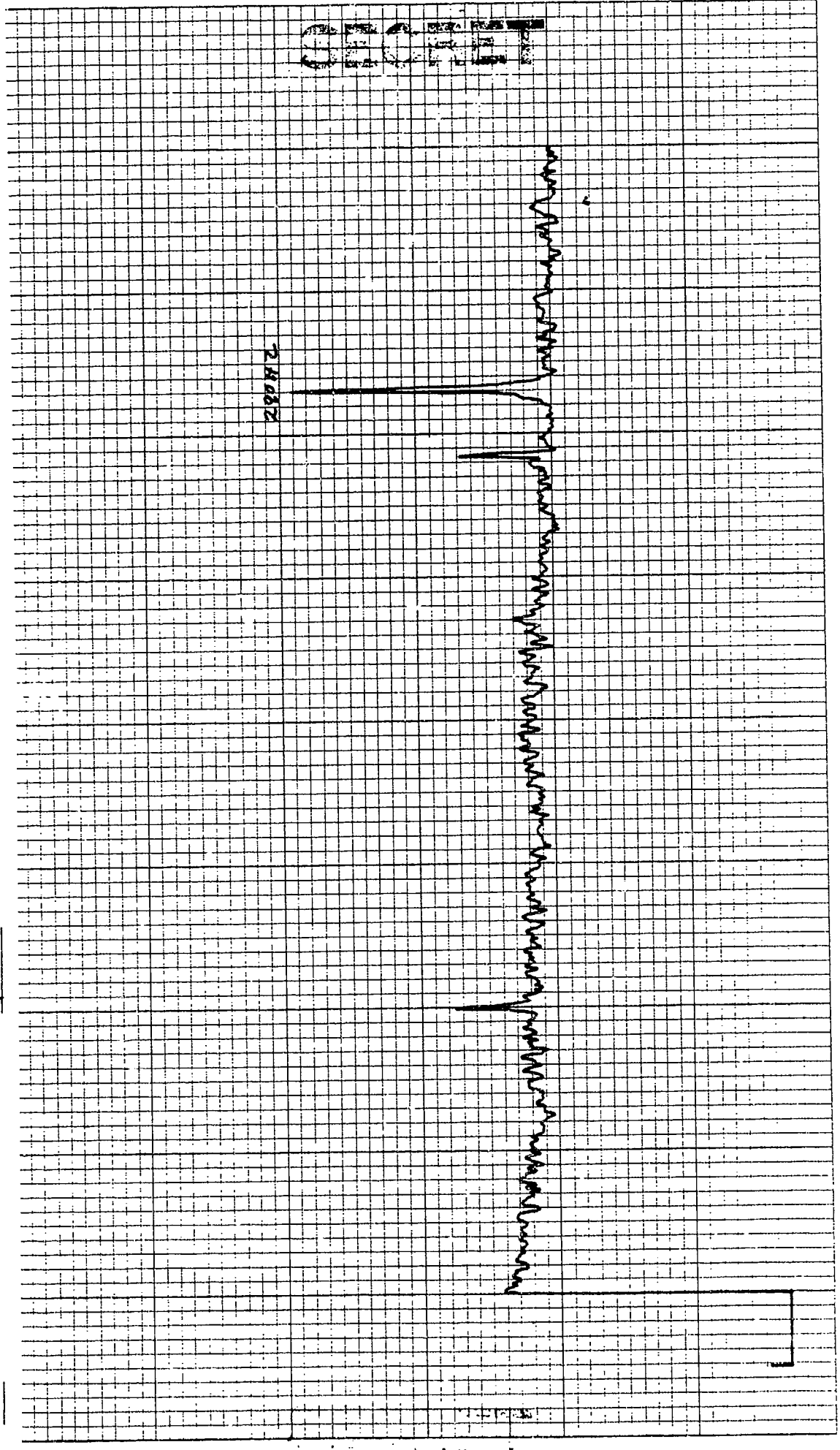
CONTROL: 0935 - 51 (0P11) DATE OF ANALYSIS: _____ REEL: M22 INDEX X 566
BEAMFORMED SPECTRUM(ELEMENTS 1-26 & 29-34)
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: 24 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
32 ELEMENTS 463 DEG. AZ STEERING



10 X 10 TO THE INCH * 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

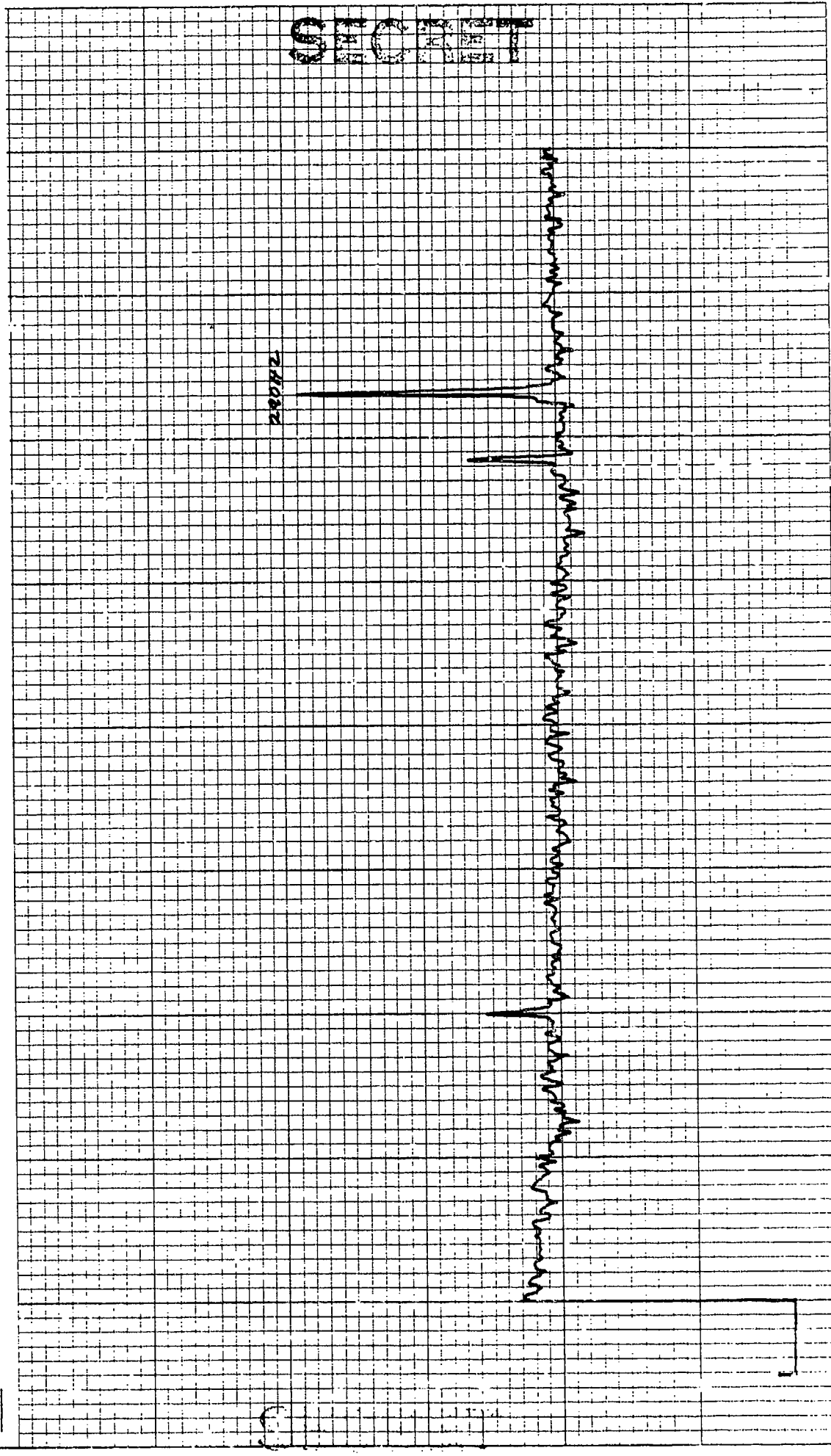
CONTROL: 0935 - 32 (DPII) DATE OF ANALYSIS: 1-26-77 REEL: M22 INDE X 566
BEAMFORMED SPECTRUM (ELEMENTS) 09-34
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 0935Z INTEGRATION TIME 320 SECS ATTN: -24 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
32 ELEMENTS +62 DEG. AZ STEERIN



10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

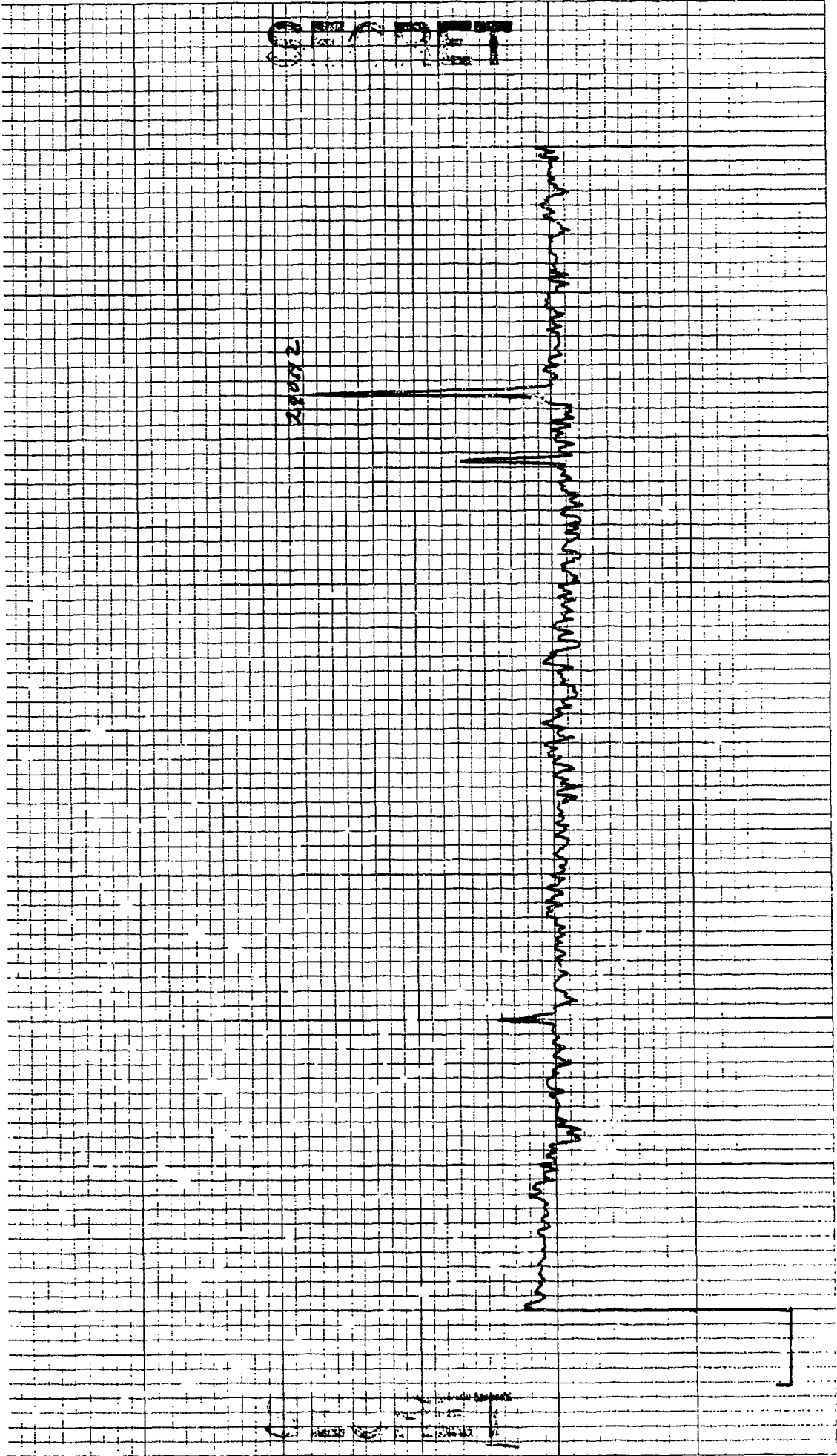
CONTROL: 0035 - 32 (DP4) DATE OF ANALYSIS: 1-26-77 REEL: A22 INDE X566
BEAMFORMED SPECTRUM (ELEMENTS) 0035 Z
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: -24 DB
CENTER FREQ: 270 HZ 164 DEG. AZ STEERING FILTER WTG: HANNING



K-2 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

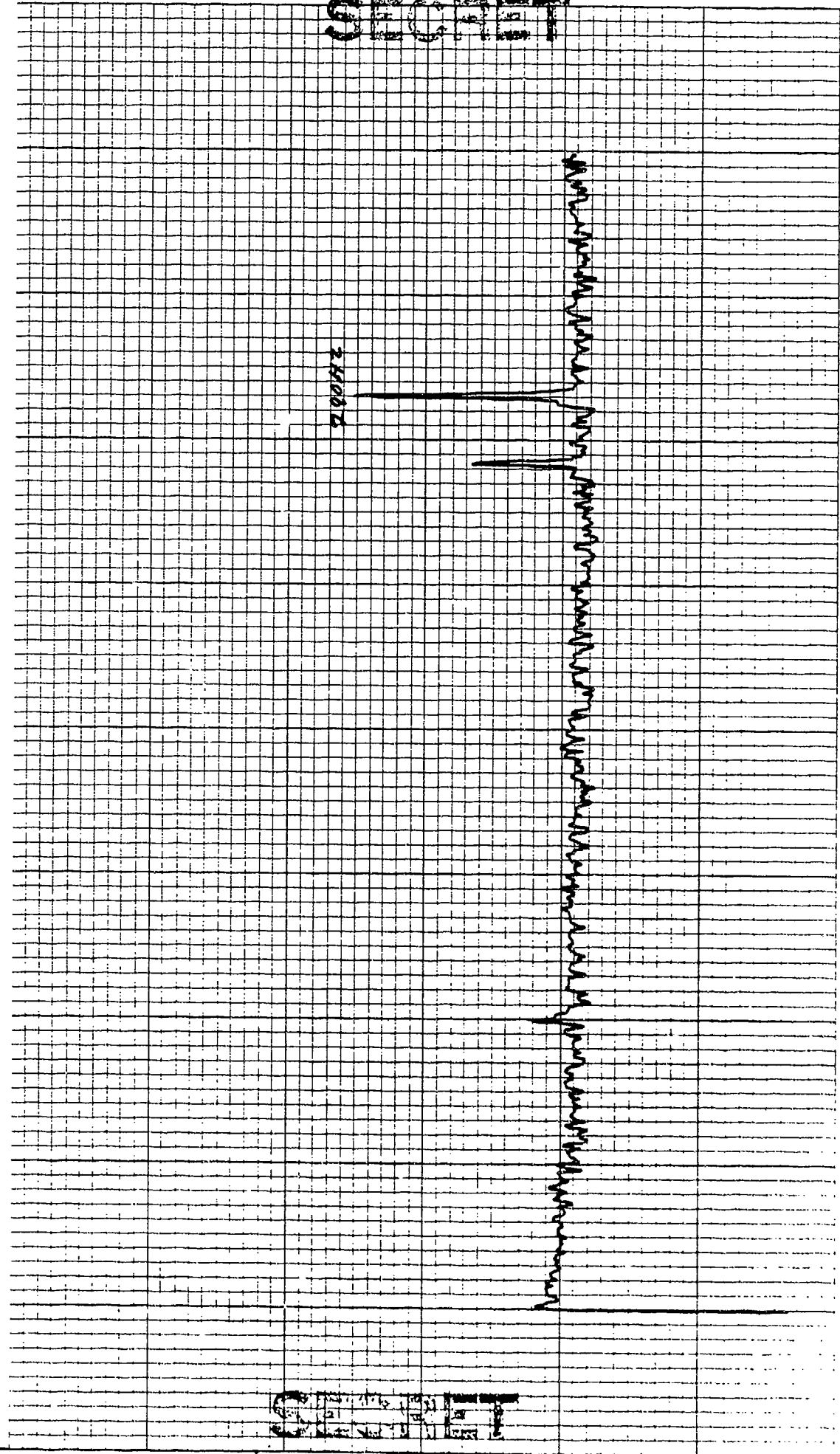
46 0703

CONTROL: 0935 - 32 (DPII) DATE OF ANALYSIS: 1-26-79 REEL: 122 INDE X 565
BEAMFORMED SPECTRUM (ELEMENTS) ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: -24 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
CENTER FREQ: 270 HZ +16 DEG. AZ STEERING



CONTROL: 0935 - 72 (DP11) DATE OF ANALYSIS: 1-26-49 REEL: M22 INDE X 566
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-16-77 - 0935 Z INTEGRATION TIME 320 SECS ATTN: 24 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
CENTER FREQ: 270 HZ + 60 DEG. AZ STEERING

32 ELEMENTS



SECRET

SECRET

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 11

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 51

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-30.4</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-20.4	
BEAMFORMER GAIN	<u>+24</u>	+3.6	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	+3.8	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-57.6</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-47.6	
BEAMFORMER GAIN	<u>+24</u>	-23.6	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+3.6</u>	
SIGNAL LEVEL FOR SNR	<u>-23.6</u>	27.2	
PROCESSOR CORRECTION	<u>-4.0</u>	23.2	
MRA CORRECTION	<u>+ .2</u>	23.4	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	15.2	SNR 1 HZ BAND

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 11

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 51

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-42.4</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-32.4	
BEAMFORMER GAIN	<u>+24</u>	-8.4	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	-7.6	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-66.1</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-56.1	
BEAMFORMER GAIN	<u>+24</u>	-32.1	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-8.4</u>	
SIGNAL LEVEL FOR SNR	<u>-32.1</u>	23.7	
PROCESSOR CORRECTION	<u>-4.0</u>	19.7	
MRA CORRECTION	<u>+ .8</u>	20.5	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	12.3	SNR 1 HZ BAND

~~CONFIDENTIAL~~

CONFIDENTIAL

DATA POINT 11

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-29.8</u>	<u>-41.4</u>	<u> </u>
MRA SIGNAL LEVEL	<u>+ 3.8</u>	<u>- 7.6</u>	<u> </u>
ARRAY SIGNAL GAIN	<u>33.6</u>	<u>33.8</u>	<u> </u>
20 LOG <u>51</u>	<u>34.1</u>	<u>34.1</u>	<u> </u>
# of elements			
DIFFERENCE	<u>- .5</u>	<u>- .3</u>	<u> </u>

ARRAY GAIN

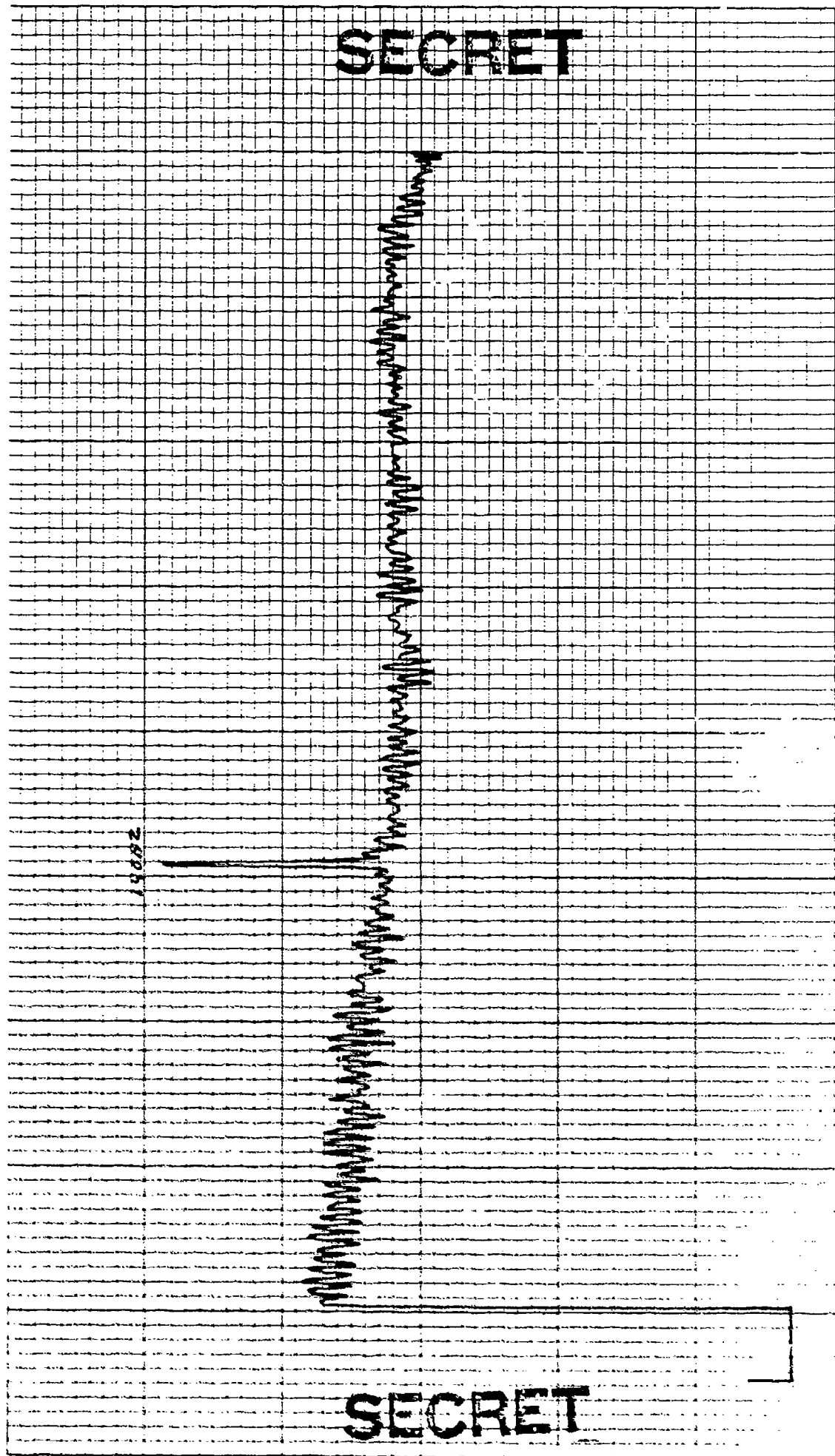
MRA SNR	<u>23.4</u>	<u>20.5</u>	<u> </u>
MEAN OMNI SNR	<u>16.2</u>	<u>8.4</u>	<u> </u>
ARRAY GAIN	<u>7.2</u>	<u>12.1</u>	<u> </u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>12.4</u>	<u>14.8</u>	<u> </u>
DIFFERENCE	<u>-5.2</u>	<u>-2.7</u>	<u> </u>

CONFIDENTIAL

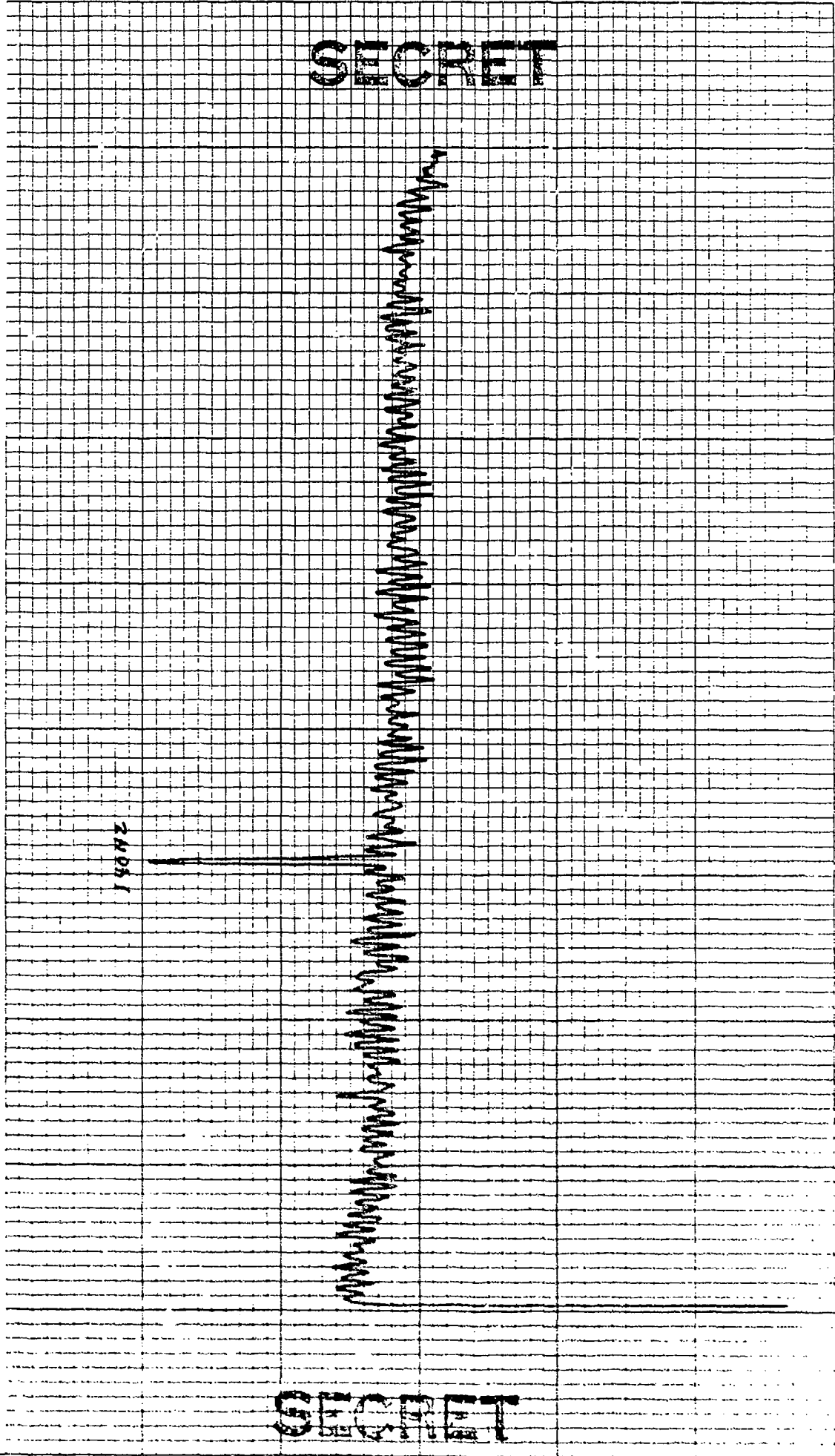
10 X 10 TO THE INCHES
RUSSELL & SPENCER CO. MADE IN U.S.A.

46 0703

CONTROL: 0925 - 51 (DP11) REEL: N22 INDE X566
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-26-77
EXERCISE: BEARING STAKE 28-53)
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1710 HZ INTEGRATION TIME 320 SECS ATTN: -24 DB
51 ELEMENTS 452 DEG. AZ STEERING FILTER WTG: HANNING



CONTROL: 0935 - 51 (DP11) REEL: N22 INDE X 566
 BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-26-89-53
 EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 0935 Z INTEGRATION TIME 320 SECS ATTEN: -24 DB
 CENTER FREQ: 250 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
51 ELEMENTS + 54 DEG. AZ STEERING



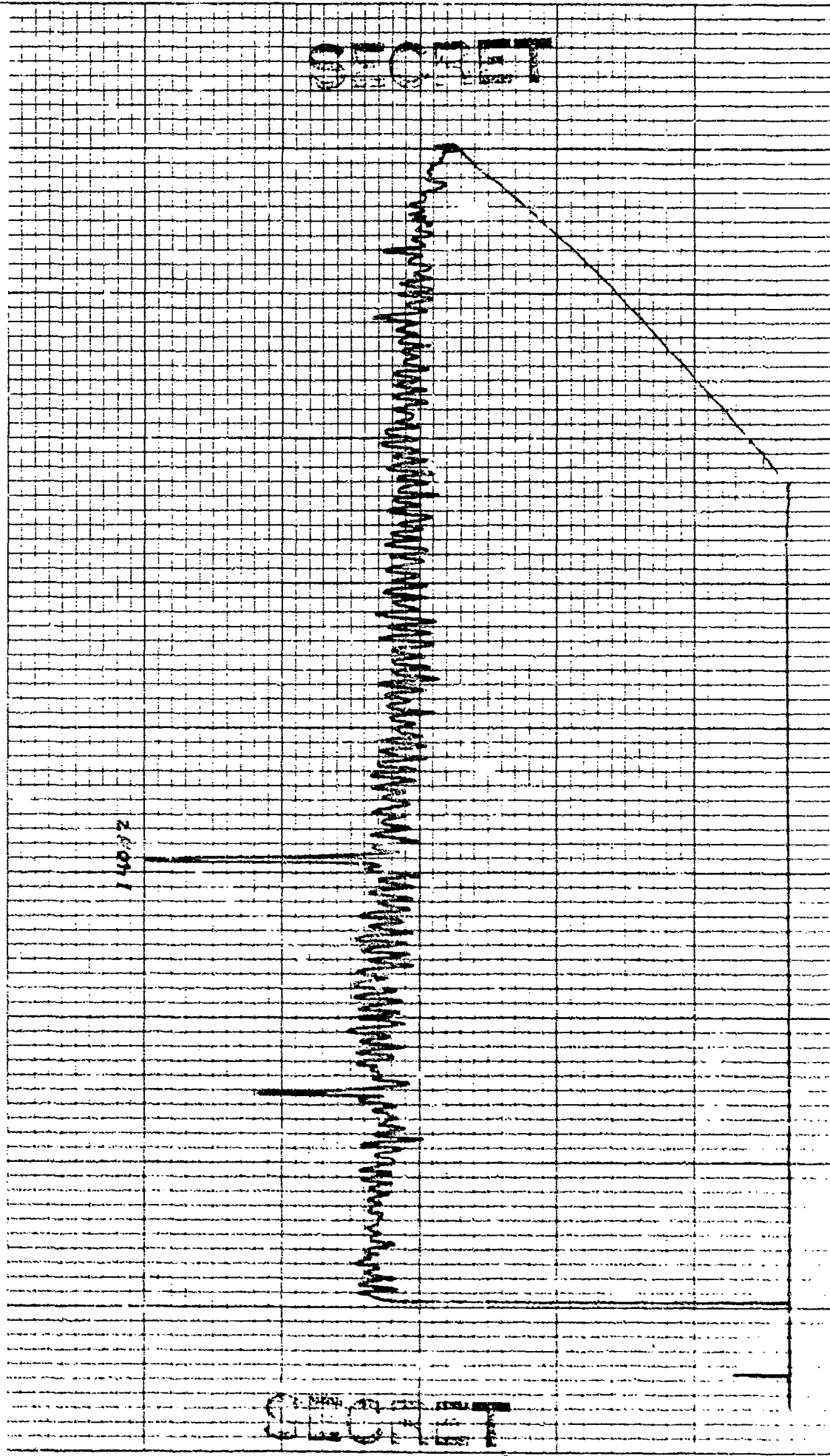
SECRET

SECRET

10 X 10 TO THE INCH 4.7 X 10 INCHES
NEUPPEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0925 - 51 (Q#1) DATE OF ANALYSIS: 1-26-77 REEL: M22 INDE: X566
 BEAMFORMED SPECTRUM(ELEMENTS) 28-53
 EXERCISE: BEARING STAKE DATE/TIME: 3-26-77-0935Z INTEGRATION TIME 320 SECS ATTN: JYDB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1719HZ FILTER WTG: HANNING
51 ELEMENTS +56 DEG. AZ STEERING

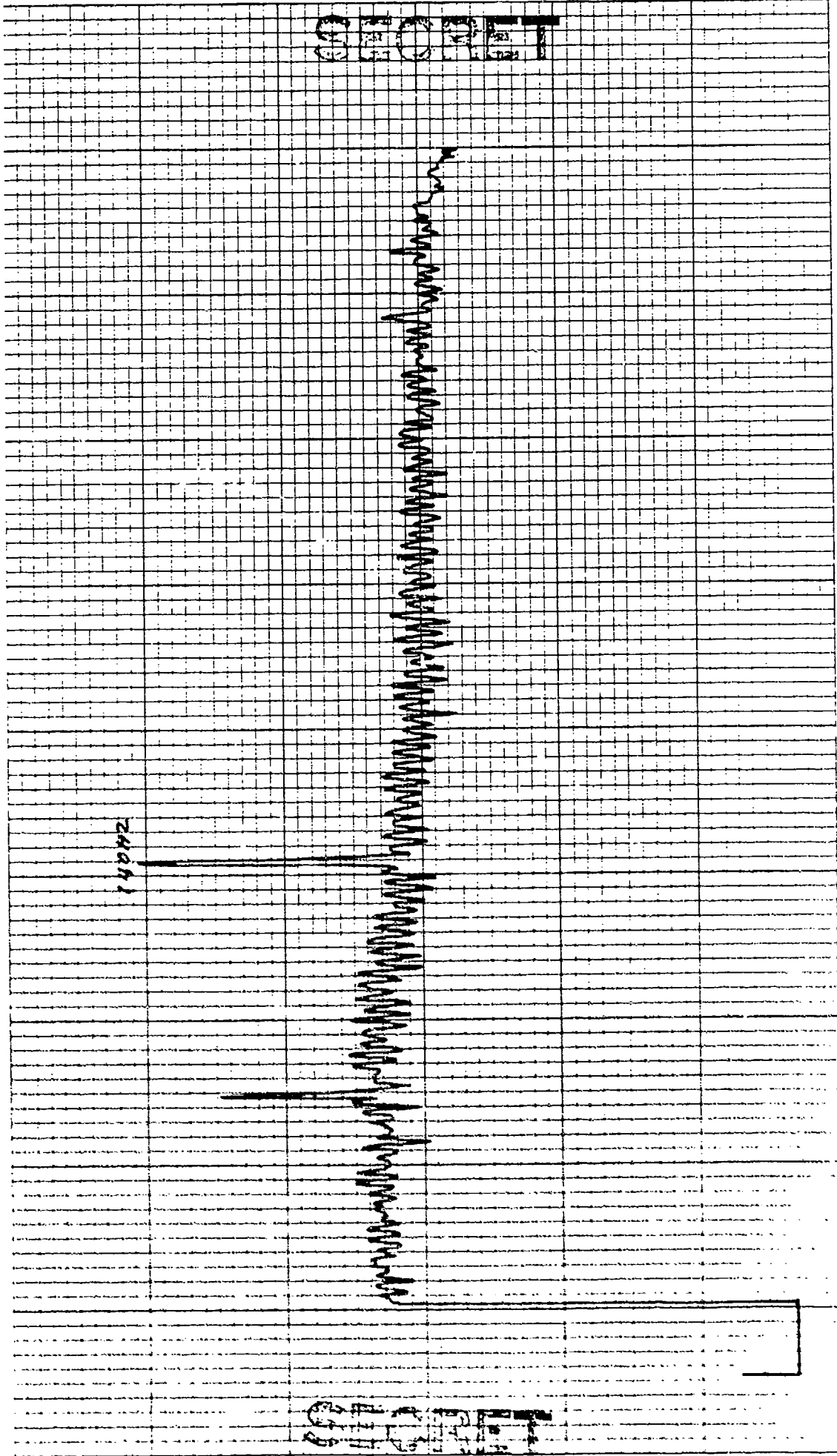


10 X 10 TO THE INCH • / X 10 INCHES
KEUFEL & ESER CO. MADE IN U.S.A.

46 0703

CONTROL: 0935 - 51 (0911) DATE OF ANALYSIS: 1-26-53
BEAMFORMED SPECTRUM (ELEMENTS) ANALYSIS BANDWIDTH: 1/10HZ
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
51 ELEMENTS ANALYSIS BANDWIDTH: 1/10HZ

REEL: A-2 INDE X 566
INTEGRATION TIME 320 SECS ATTN: -9Y DB
FILTER WTG: HANNING



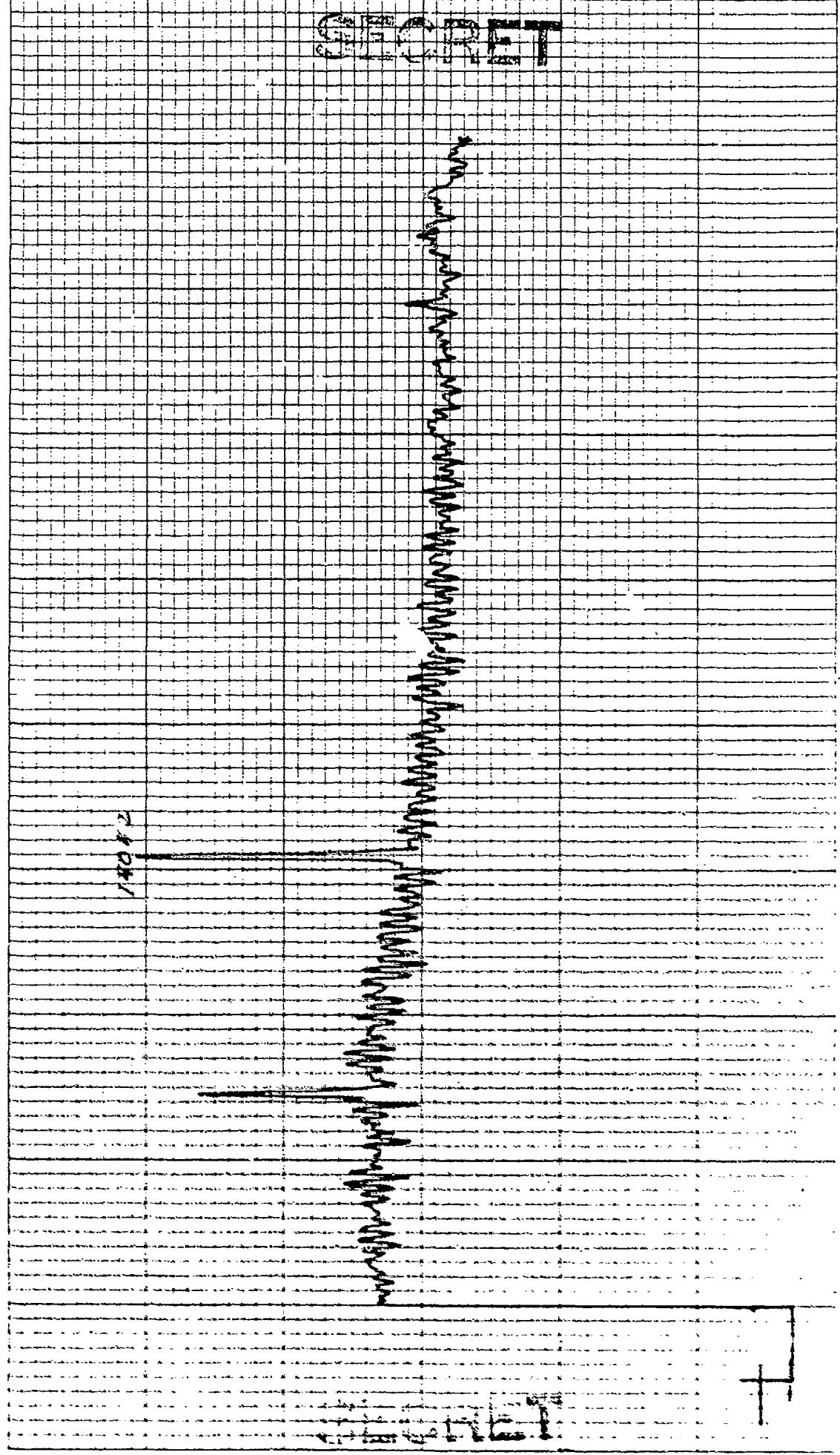
SECRET

SECRET

10 X 10 TO THE INCHES 1 X 10 DIVISIONS
REUPPEL & WISER CO. MADE IN U.S.A.

46 0703

CONTROL: 0935 - 51 (2P11) DATE OF ANALYSIS: REEL: M 2 INDEX X 566
BEAMFORMED SPECTRUM (ELEMENTS 1-26 & 28-53)
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTEN: -24 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
51 ELEMENTS 460 DEG. AZ STEERING



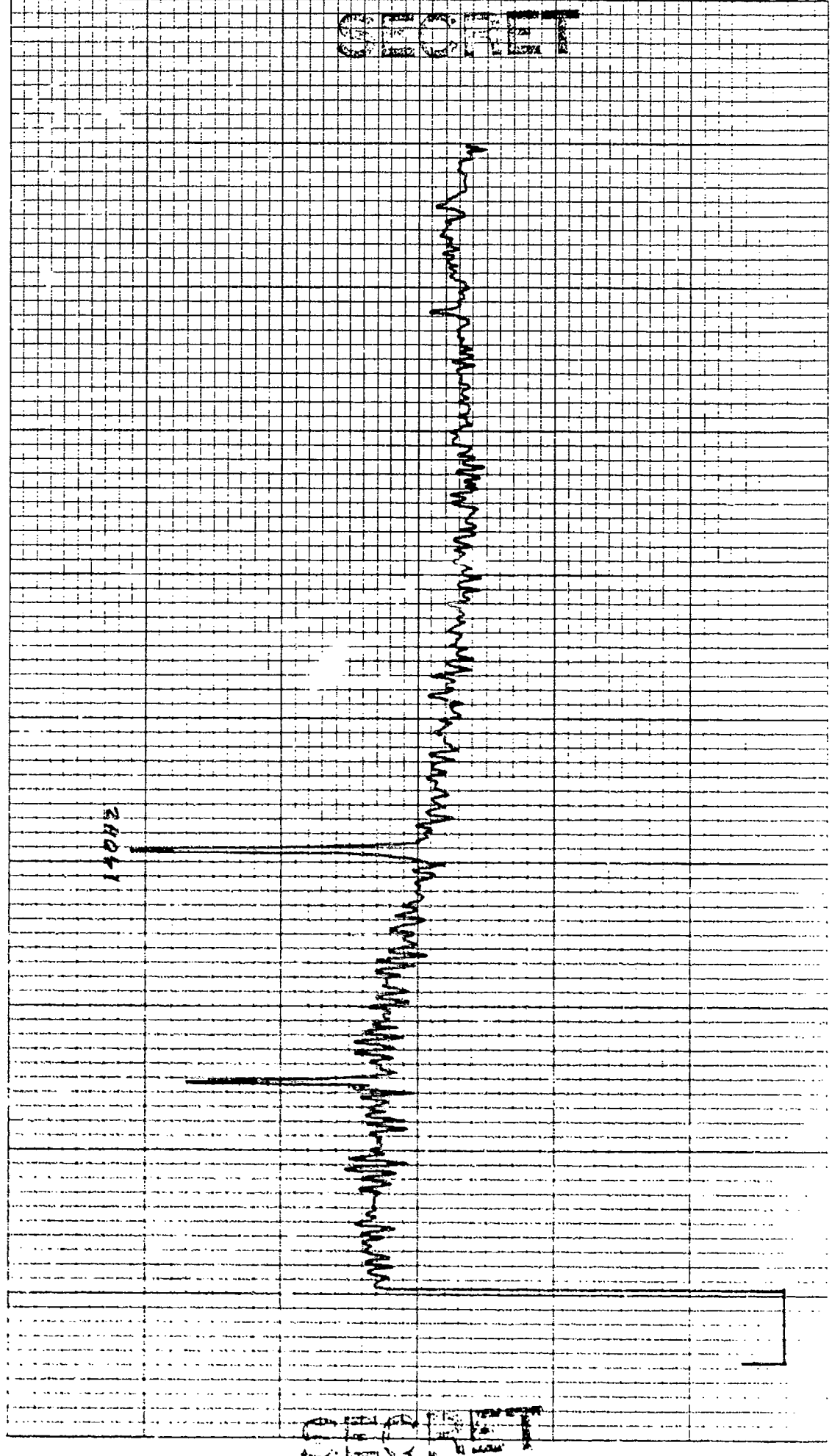
CONTROL: 0935 - 51 (DFH) REEL: M22 INDE X 566

BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: _____

EXERCISE: BEARING STAKE DATE/TIME: 3-26-77 - 0935 Z INTEGRATION TIME 320 SECS ATTEN: 29 DB

CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING

51 ELEMENTS 662 DEG. AZ STEERING



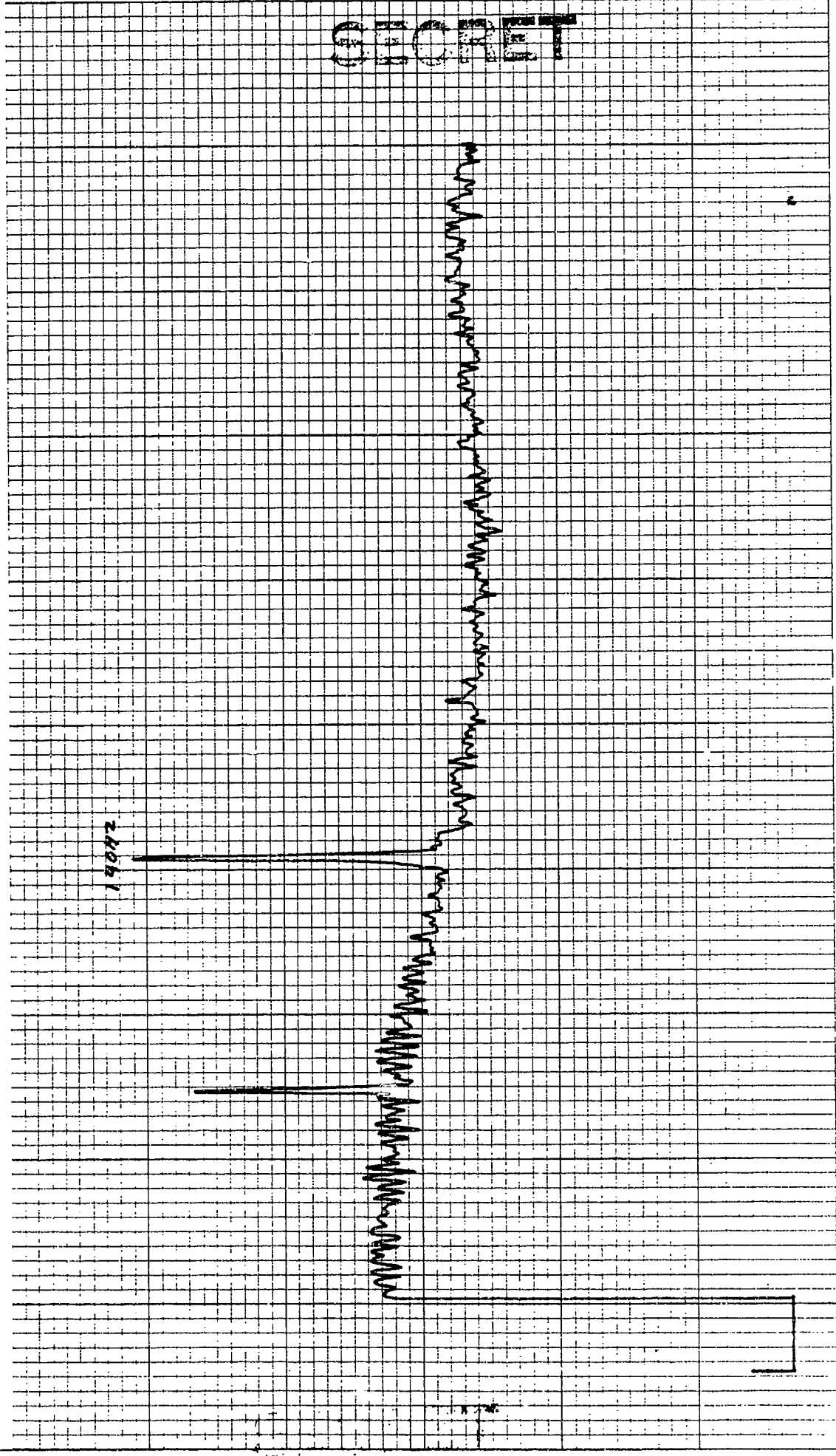
K&E 10 X 10 TO THE INCH • 7 X 12 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

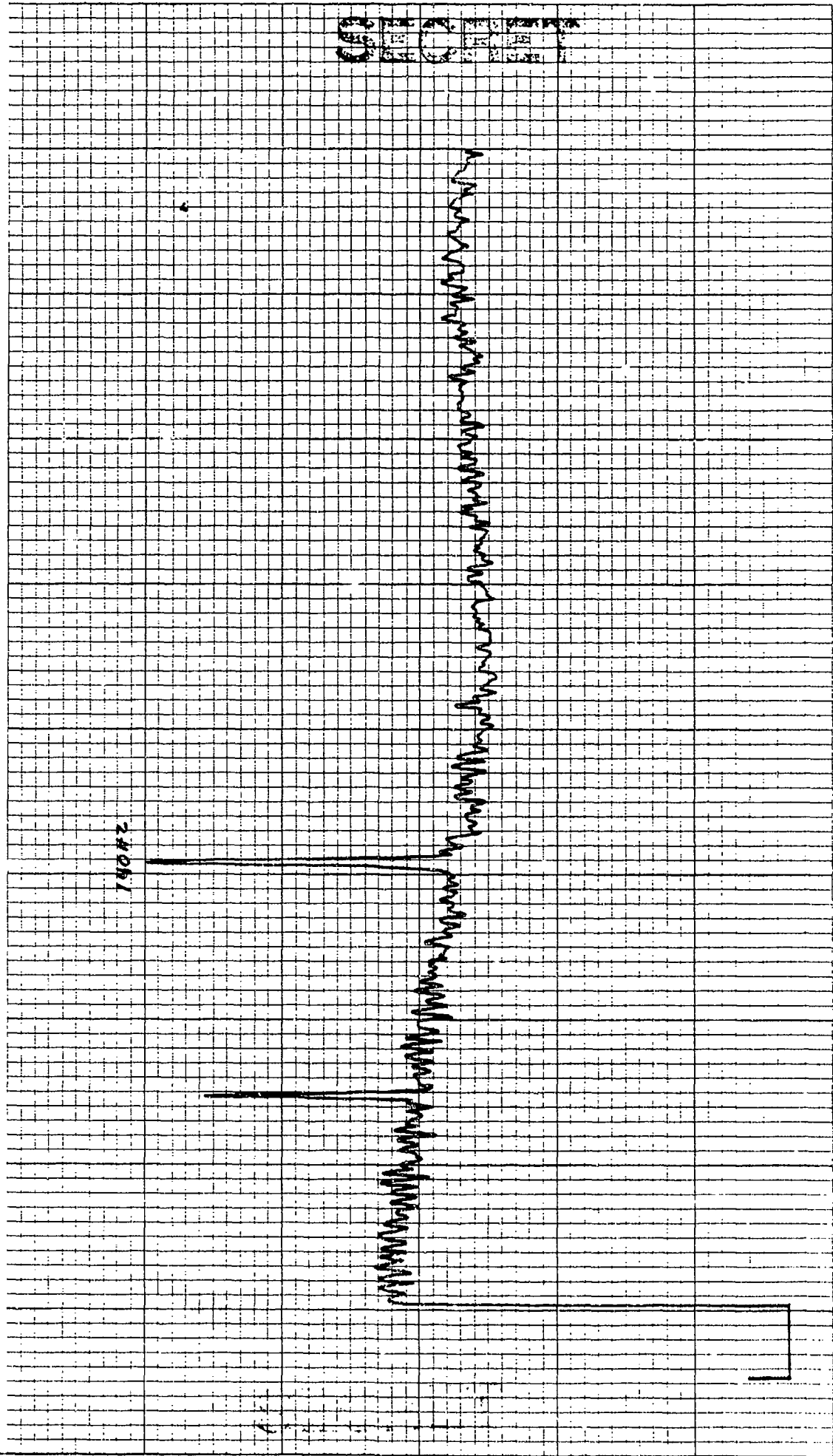
CONTROL: 0935 - 51 (DP1)
BEAMFORMED SPECTRUM (ELEMENTS 1-26 & 28-53)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
51 ELEMENTS

DATE OF ANALYSIS: - - -
INTEGRATION TIME 320 SECS
ATTEN: -34 DB
FILTER WTG: HANNING

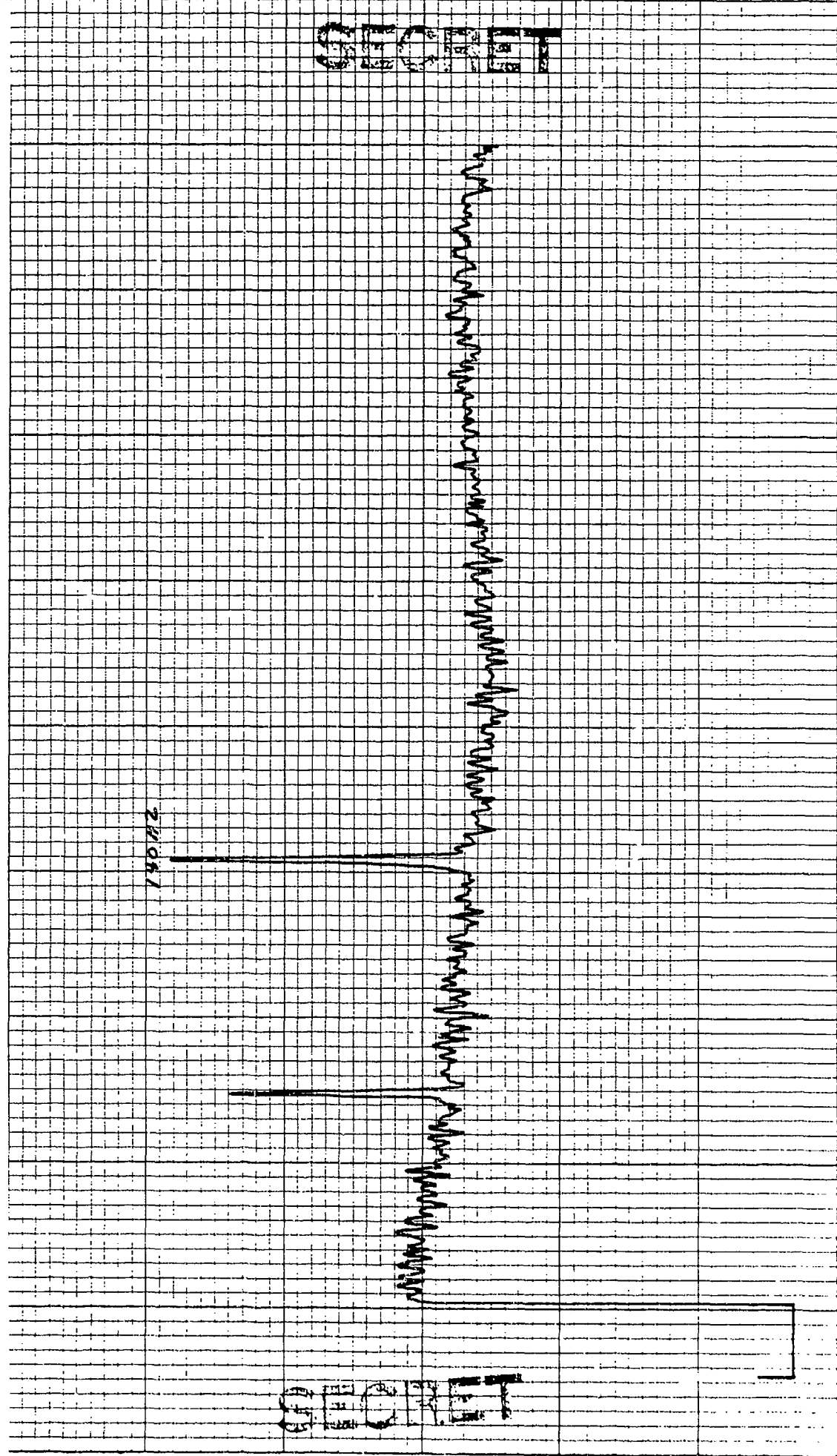
REEL: M22 INDE X 566



CONTROL: 0935 - 51 (DPI) DATE OF ANALYSIS: REEL: 422 INDE X 566
BEAMFORMER: SPECTRUM(ELEMENTS) 1-26 & 28-53 INTEGRATION TIME 320 SECS ATTN: -24 DB
EXERCISE: EARING STAKE FILTER WTG: HANNING
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
51 ELEMENTS +66 DEG. AZ STEERING

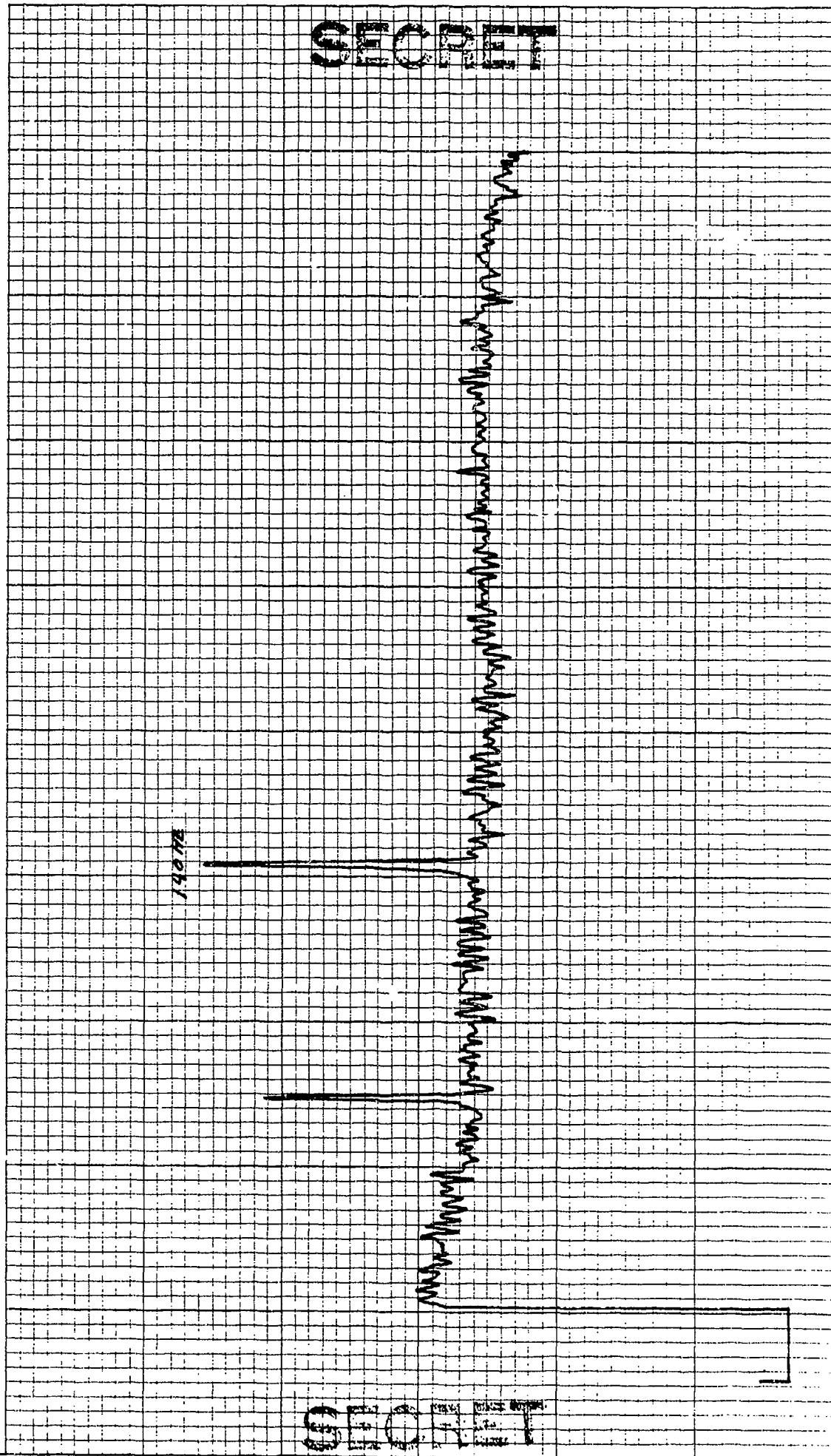


CONTROL: 0935 - 51 (DP11) DATE OF ANALYSIS: 1-26-53 REEL: 422 INDE X 566
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-16-77 - 0935Z INTEGRATION TIME 320 SECS ATTN: 24 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 CENTER FREQ: 450 HZ +18 DEG. AZ STEERING



46 0703

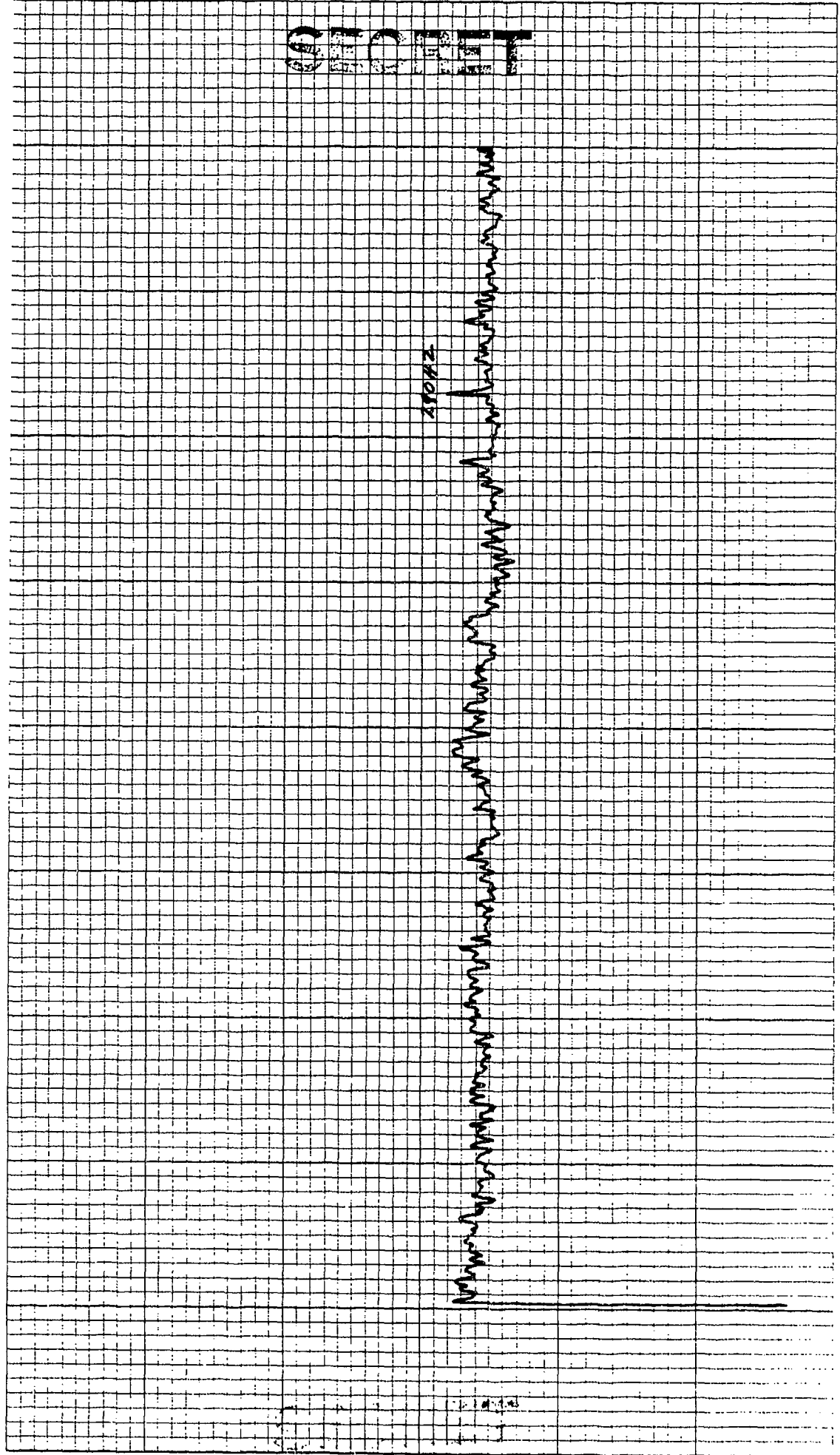
CONTROL: 0935-51 (0911) DATE OF ANALYSIS: 1-26-77 REEL: M22 INDEX: 566
 BEAMFORMED SPECTRUM (ELEMENTS) 29-53
 EXERCISE: BEARING STAKE DATE/TIME: 3-6-77 - 0935 Z INTEGRATION TIME: 320 SECS ATTN: -29 DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER: WTG: HANNING
51 ELEMENTS +70 DEG. AZ STEERING



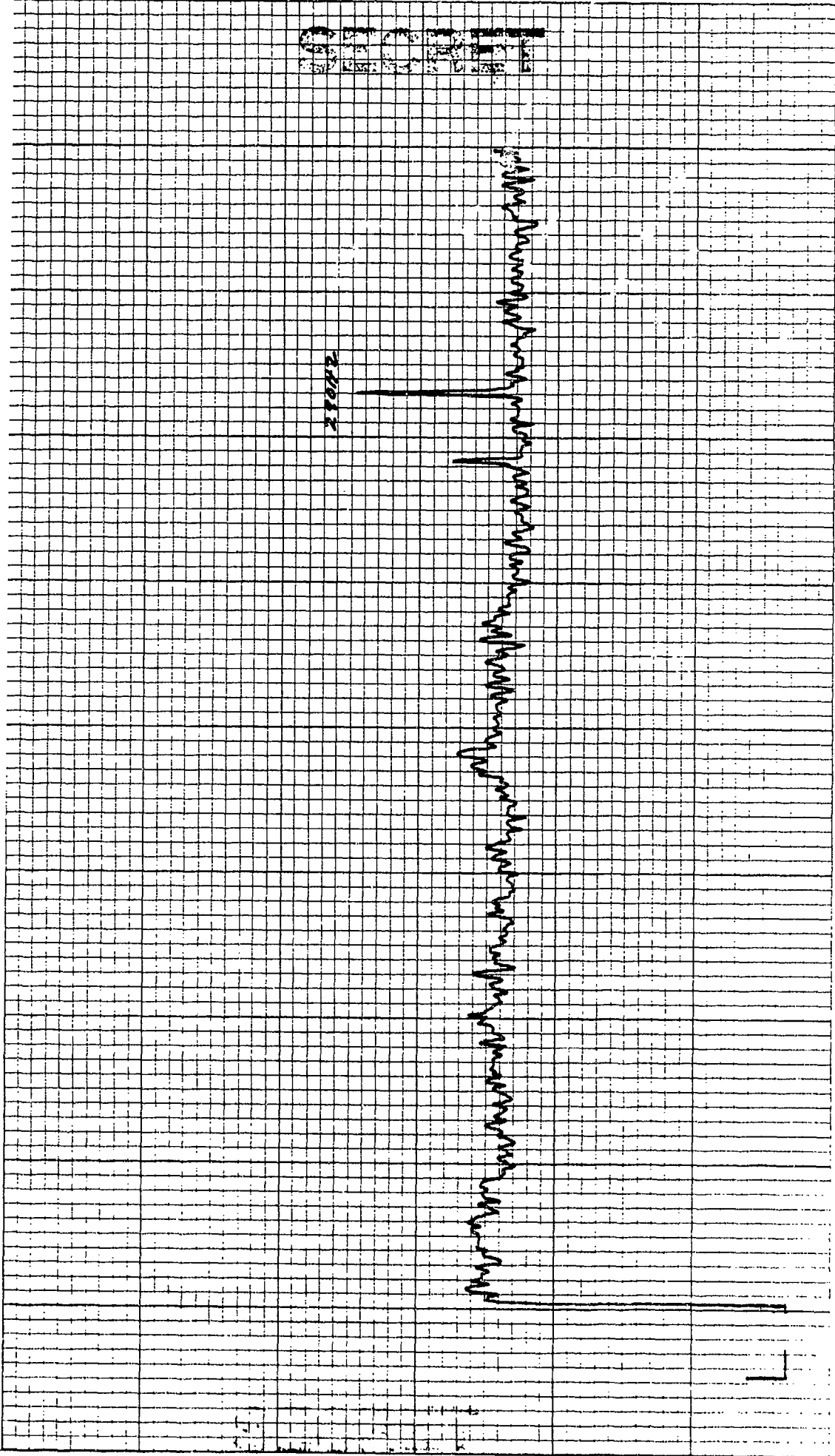
SECRET

SECRET

CONTROL: 0935-51 (DPR) DATE OF ANALYSIS: 1-26-53 REEL: A22 INDE X 566
BEAMFORMED SPECTRUM (ELEMENTS) ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTEN: -24 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 270 HZ +52 DEG. AZ STEERING



CONTROL: 0835 - 51 (JPII) DATE OF ANALYSIS: 1-26-77 - 0835Z REEL: 122 INDE X521
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: -34 DB
CENTER FREQ: 270 HZ +54 DEG. AZ STEERING FILTER WTG: HANNING
51 ELEMENTS



K-Σ 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

INDE X 566

REEL: 1422

DATE OF ANALYSIS: 1-26-53

CONTROL: 0935 - 51 (DP11)

BEAMFORMED SPECTRUM (ELEMENTS)

EXERCISE: BEARING STAKE

CENTER FREQ: 270 HZ

51 ELEMENTS

DATE/TIME: 3-16-77 - 0935Z

ANALYSIS BANDWIDTH: 1/10HZ

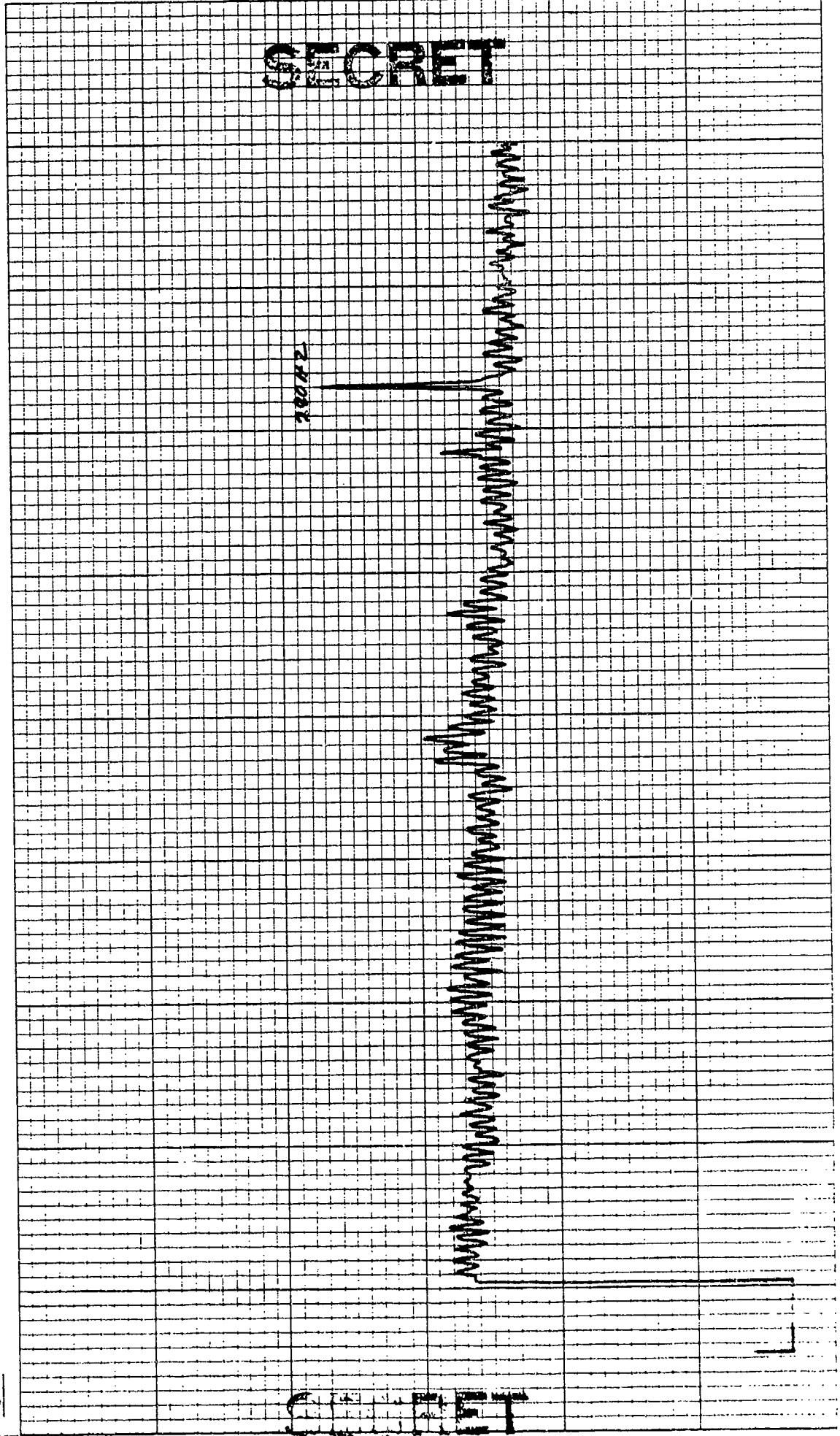
+56 DEG. AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

ATTEN: -24 DB

WTG: HANNING



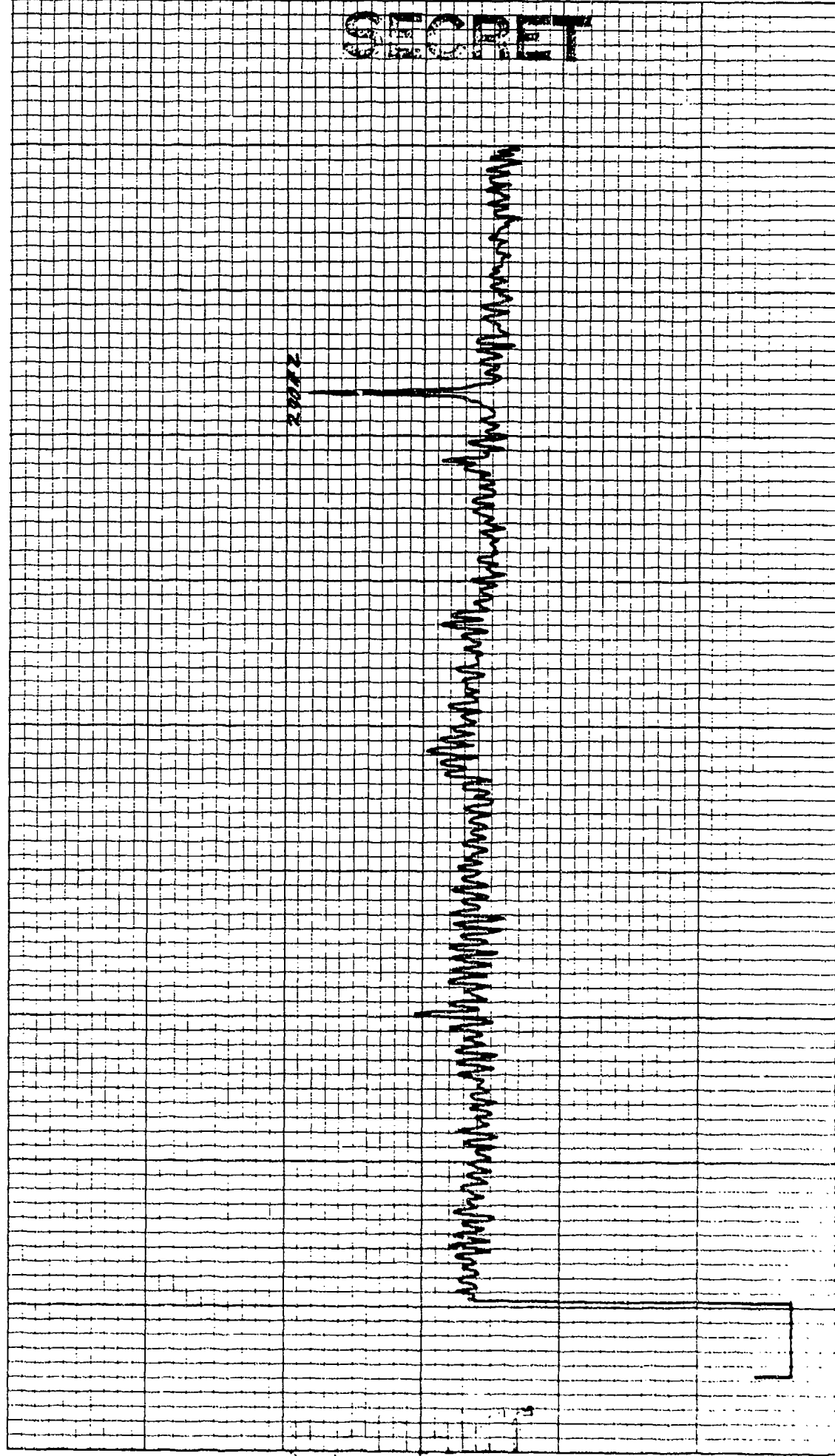
SECRET

SECRET

K₀E 10 X 10 TO THE INCH 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

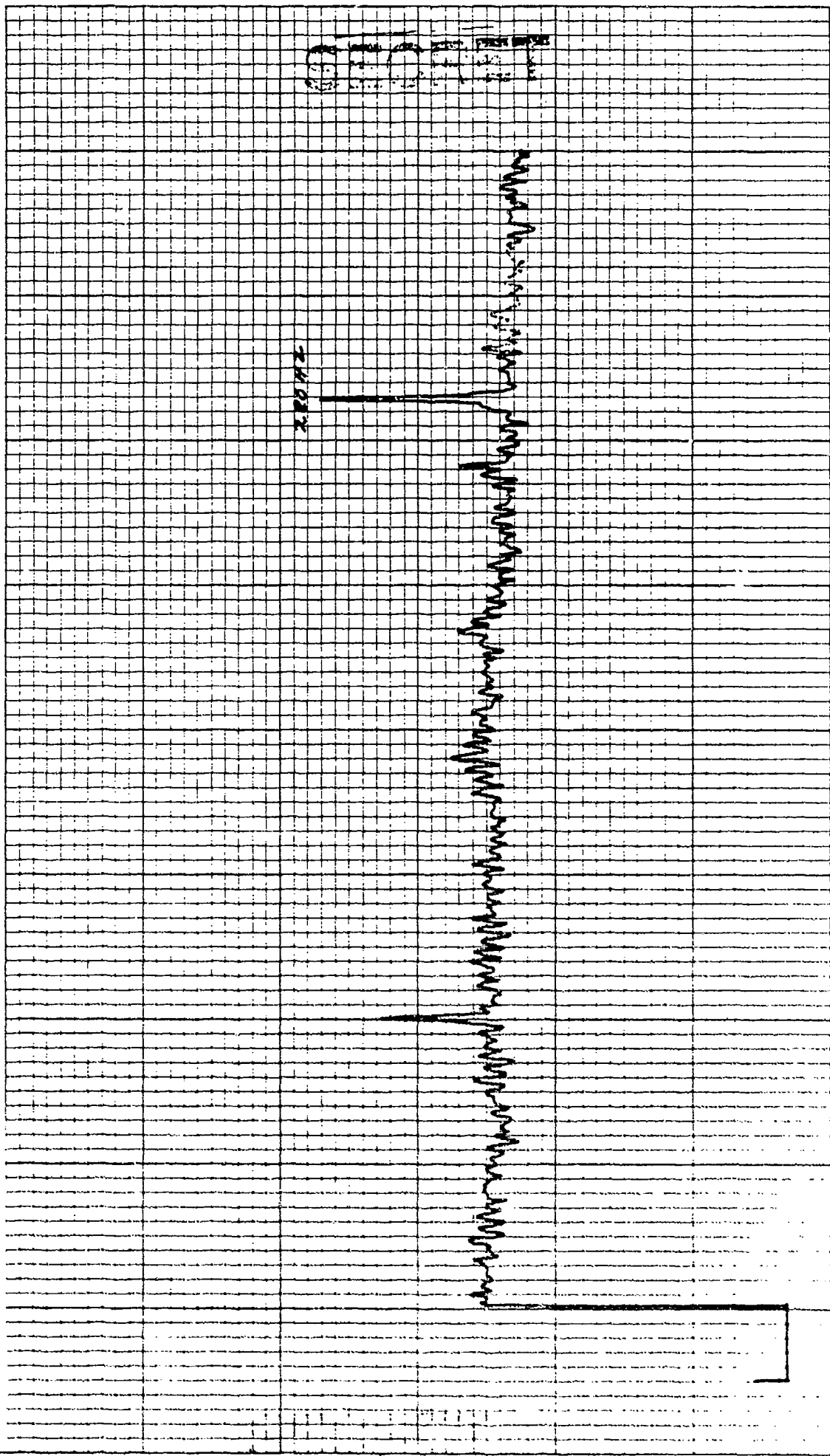
CONTROL: 003 - 51 (001) DATE OF ANALYSIS: 1-26-53 REEL: 412 INDEX: 525
BEAMFORMED SPECTRUM (ELEMENTS) INTEGRATION TIME 320 SECS ATTN: -2YDB
EXERCISE: BEARING STAKE FILTER WTG: HANNING
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ
51 ELEMENTS + 50 DEG. AZ STEERING



K&S 10 X 10 TO THE INCH, 2.7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0935 - 51 (DP11) DATE OF ANALYSIS: 1-26-53 REEL: 422 INDE X 566
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-6-77 - 0935 Z INTEGRATION TIME 320 SECS ATTEN: -2Y DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 270 HZ +60 DEG. AZ STEERING



10 X 10 TO THE INCH • 2 X 10 INCHES
KODAK SAFETY FILM • KODAK SAFETY FILM CO. MADE IN U.S.A.

46 0703

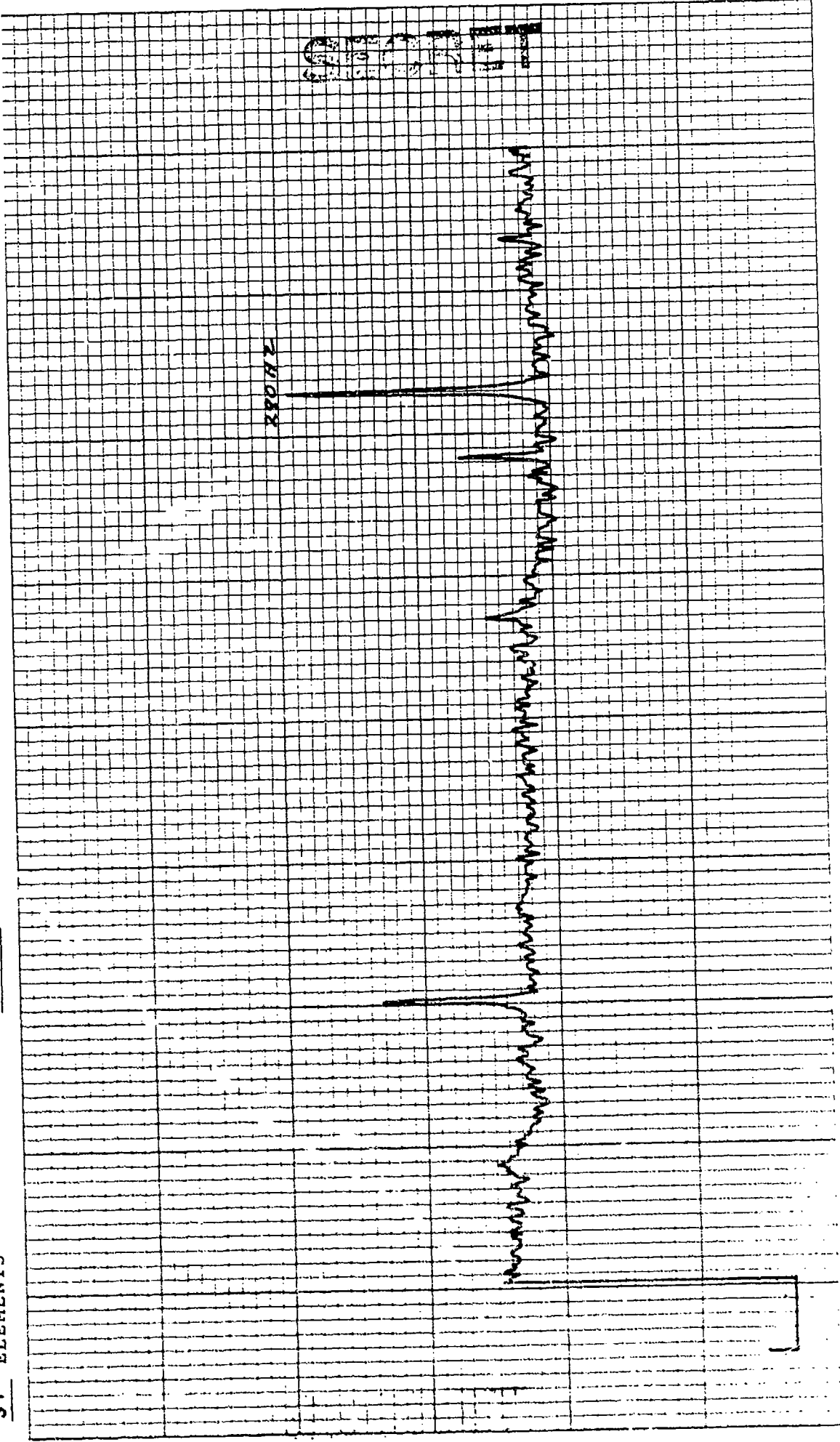
INDE X 566

REEL: N 12

INTEGRATION TIME 320 SECS
ATTEN: -24 DB
FILTER WTG: HANNING

DATE OF ANALYSIS: 1-26-53
DATE/TIME: 3-6-7-035Z
ANALYSIS BANDWIDTH: 1/10HZ
+62 DEG. AZ STEERING

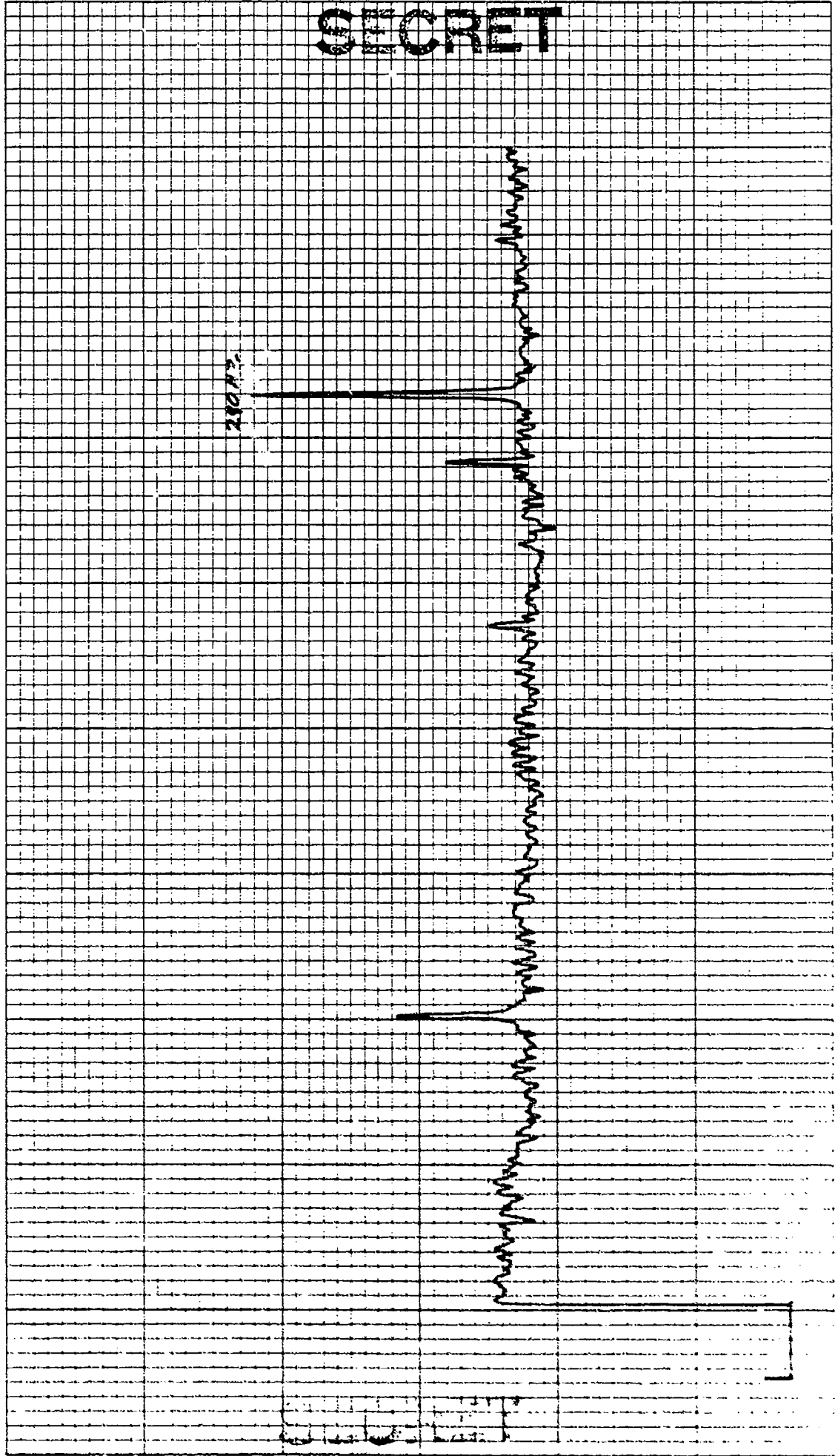
CONTROL: 0935-51 (DP11)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
51 ELEMENTS



K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFYCEL A ESSER CO MADE IN U.S.A.

46 0703

CONTROL: 0935 - 51 (DP11) REEL: M22 INDE X 566
BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: _____
EXERCISE: BEARING STAKE DATE/TIME: 1-26 @ 21-53 INTEGRATION TIME 320 SECS ATTN: 24 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
51 ELEMENTS 464 DEG. AZ STEERING



SECRET

10 X 10 TO THE INCH
MURPHY & PERRY CO. MADE IN U.S.A.

46 0703

INDE X 526

REEL: 1422

DATE OF ANALYSIS: 1-26-66

DATE/TIME: 3-16-77-0835 Z

ANALYSIS BANDWIDTH: 1/10HZ

+66 DEG. AZ STEERING

CONTROL: 0835-51 (DP11)

BEAMFORMED SPECTRUM (ELEMENTS)

EXERCISE: BEARING STAKE

CENTER FREQ: 270 HZ

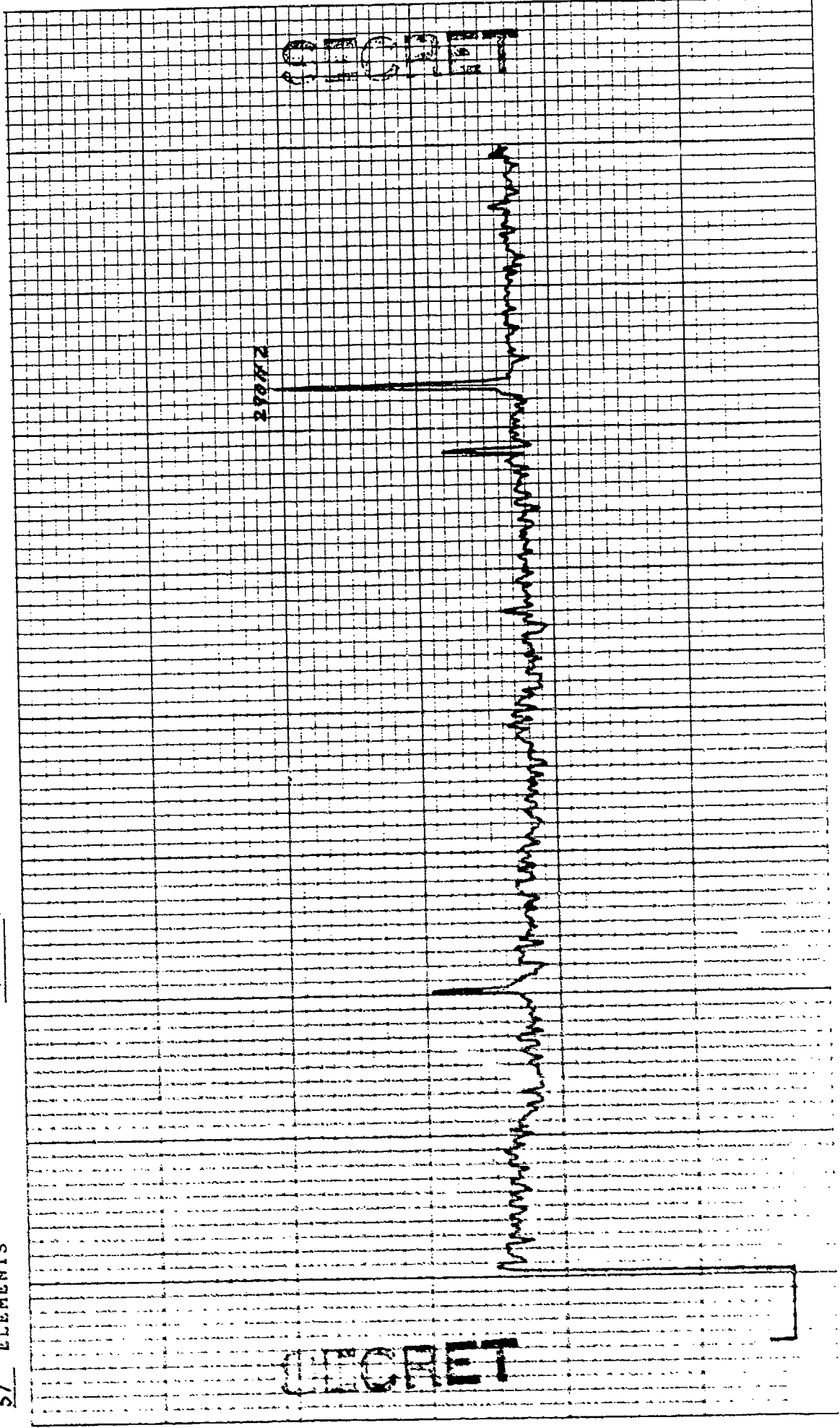
51 ELEMENTS

INTEGRATION TIME 320 SECS

FILTER

ATTEN: -2Y DB

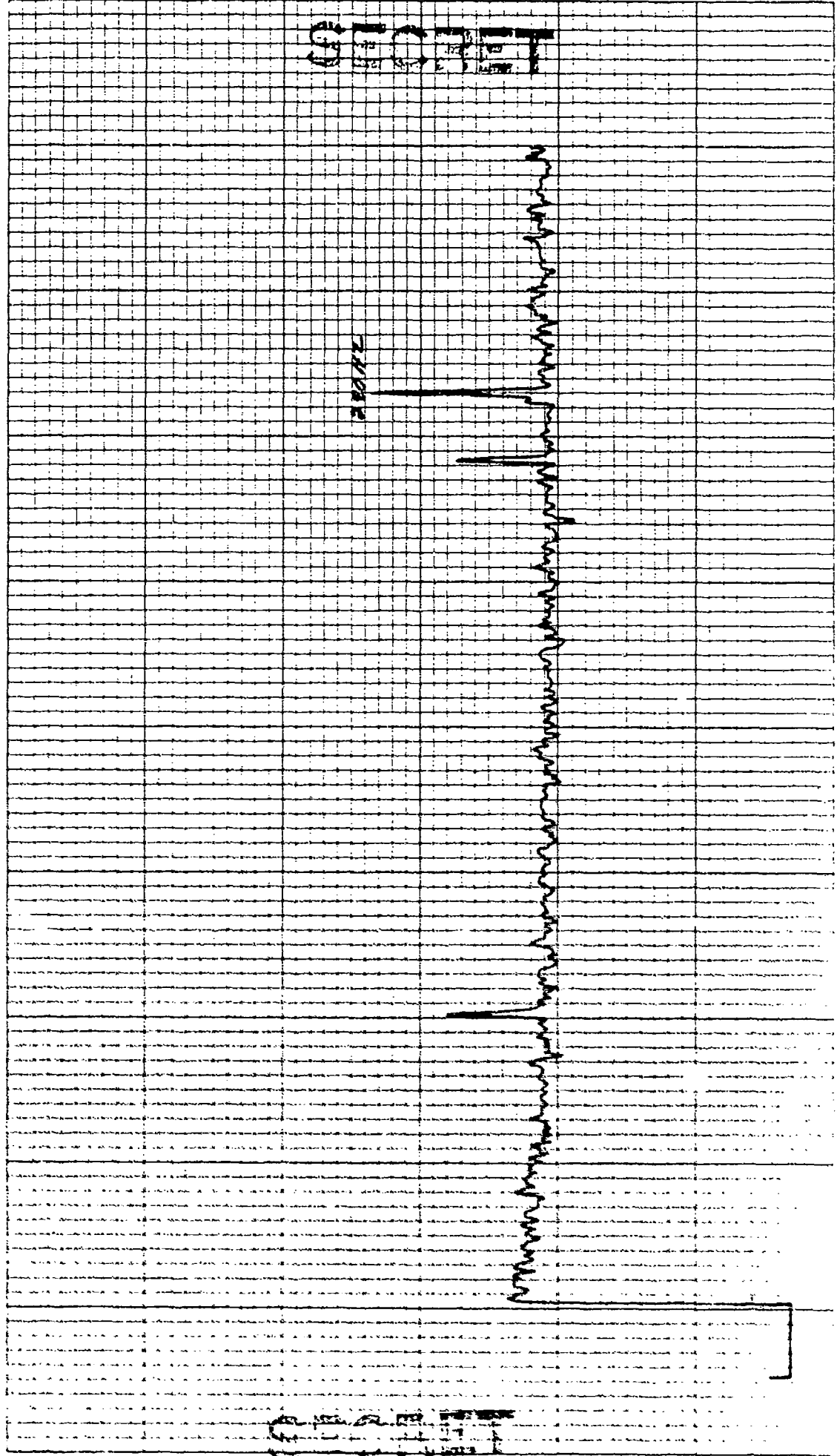
WTG: HANNING



10. 10 TO THE INCHES 1. 1. 10 INCHES
REUSEL B. EGGERS CO. WASH. D.C.

46 0703

CONTROL: 0935 - 51 (DPH) REEL: M99 INDE X 566
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-26-53
EXERCISE: BEARING STAKE DATE/TIME: 376.77 - 0935 Z INTEGRATION TIME 320 SECS ATTN: 4Y DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
51 ELEMENTS +60 DEG. AZ STEERING



NOISE SPECTRAL DENSITY CALCULATIONS FOR SPRAY/BEARING STAKE (U)

DATA POINT 12 DATE 3-16-77 TIME 1148Z

FREQUENCY 140 HZ

INDICATED NOISE LEVEL dBV .1 HZ
ABW -48.2 dBV

SYSTEM SENSITIVITY dB/ μ B -36.2

BANDWIDTH CONVERSION TO 1 HZ BAND -28.0

CONVERSION TO dBre μ Pa/1HZ +72

UNCLASSIFIED

UNCLASSIFIED

NOISE SPECTRAL DENSITY CALCULATIONS FOR SPRAY/BEARING STAKE (U)

DATA POINT 12

DATE 3-16-77

TIME 1118Z

FREQUENCY 290 HZ

INDICATED NOISE LEVEL dBV .1 HZ
ABW

-50.7 dBV

SYSTEM SENSITIVITY dB/μB

-(-8) - -42.7

BANDWIDTH CONVERSION TO 1 HZ BAND

+8.2 - -34.5

CONVERSION TO dBrePa/1HZ

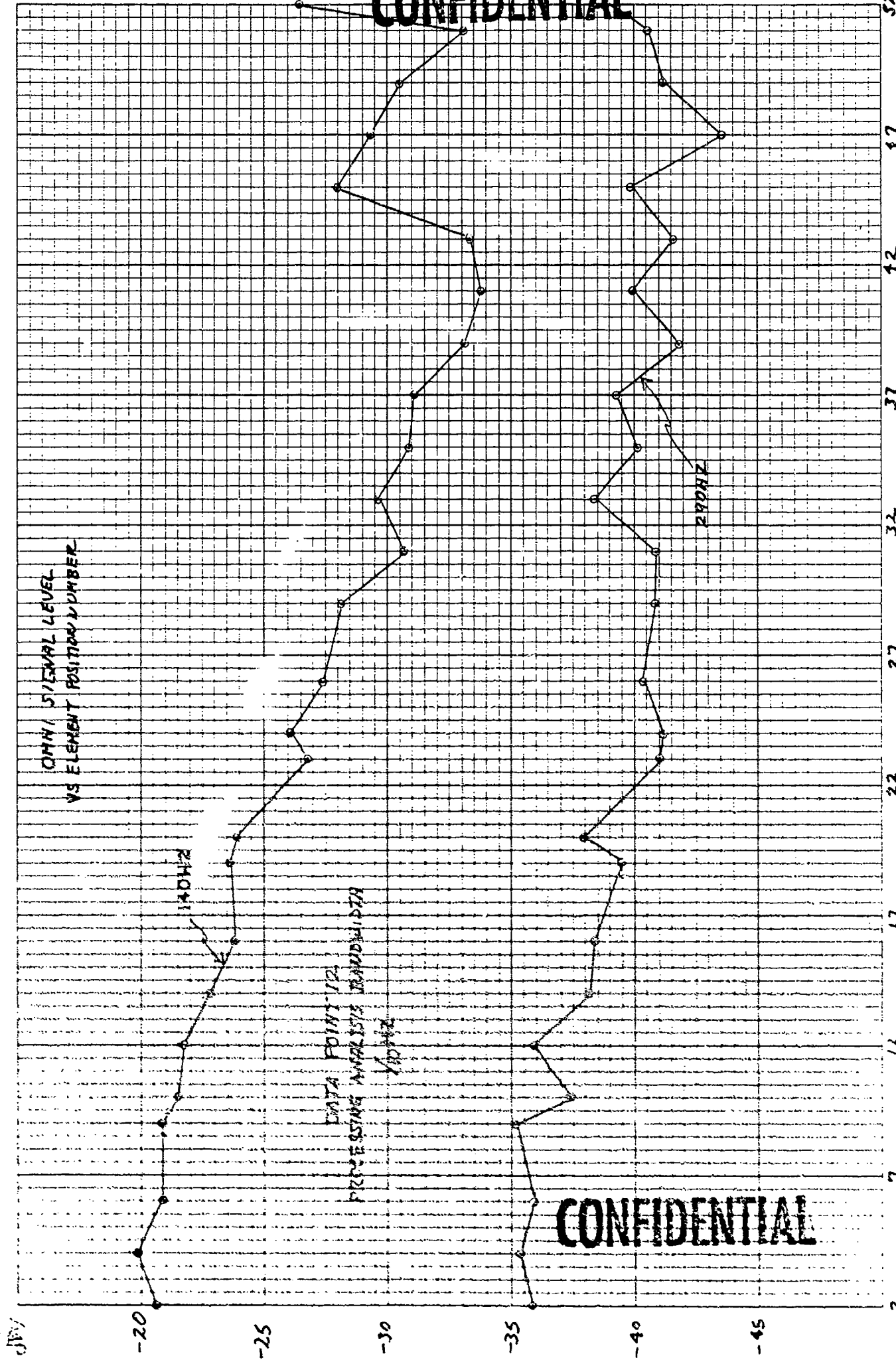
+100 - +65.5

UNCLASSIFIED

UNCLASSIFIED

16 X 10 TO THE INCH .7 X 10 INCHES
KUPFEL & PYSER CO. MADE IN U.S.A.

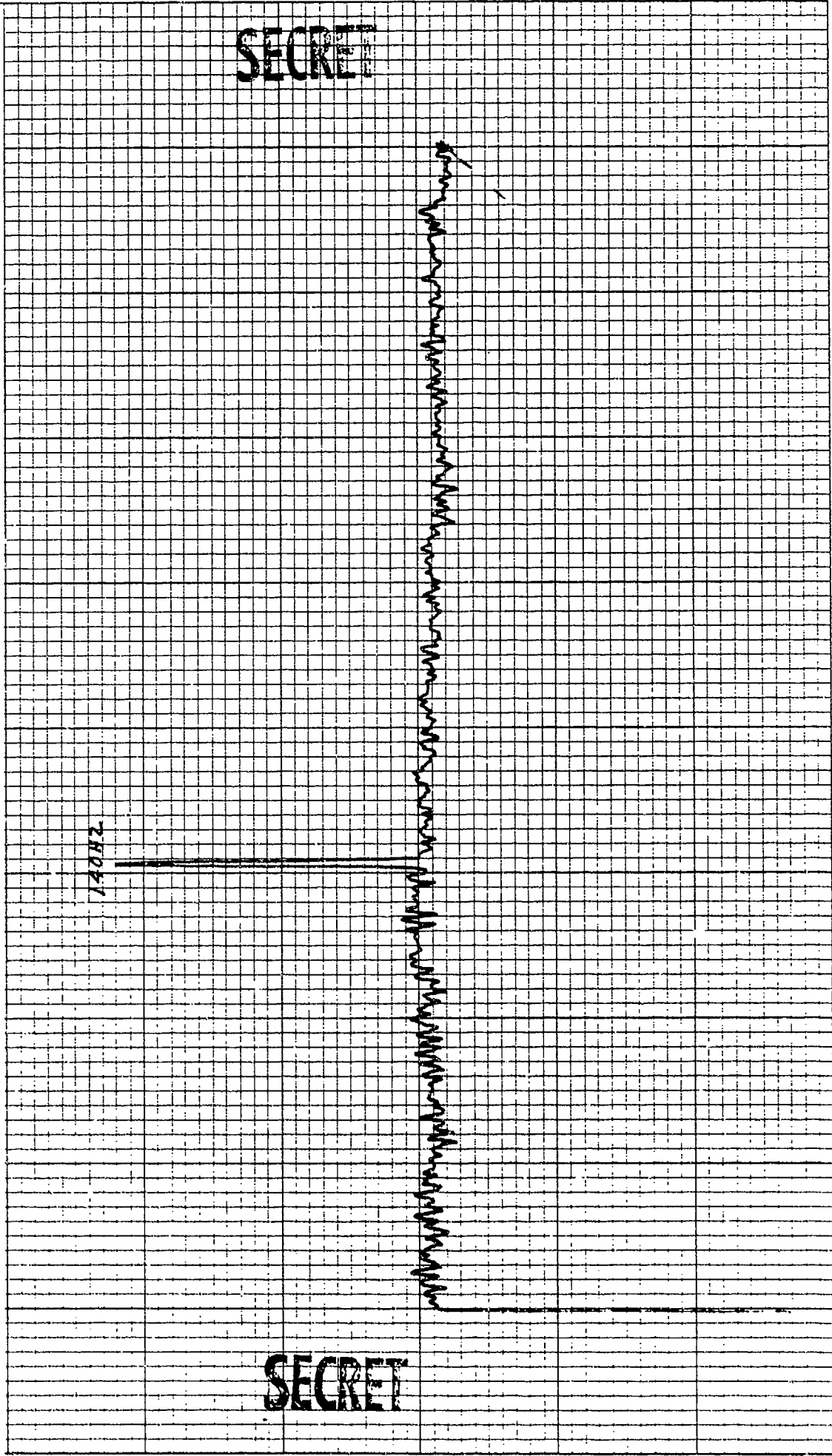
46 0703



10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

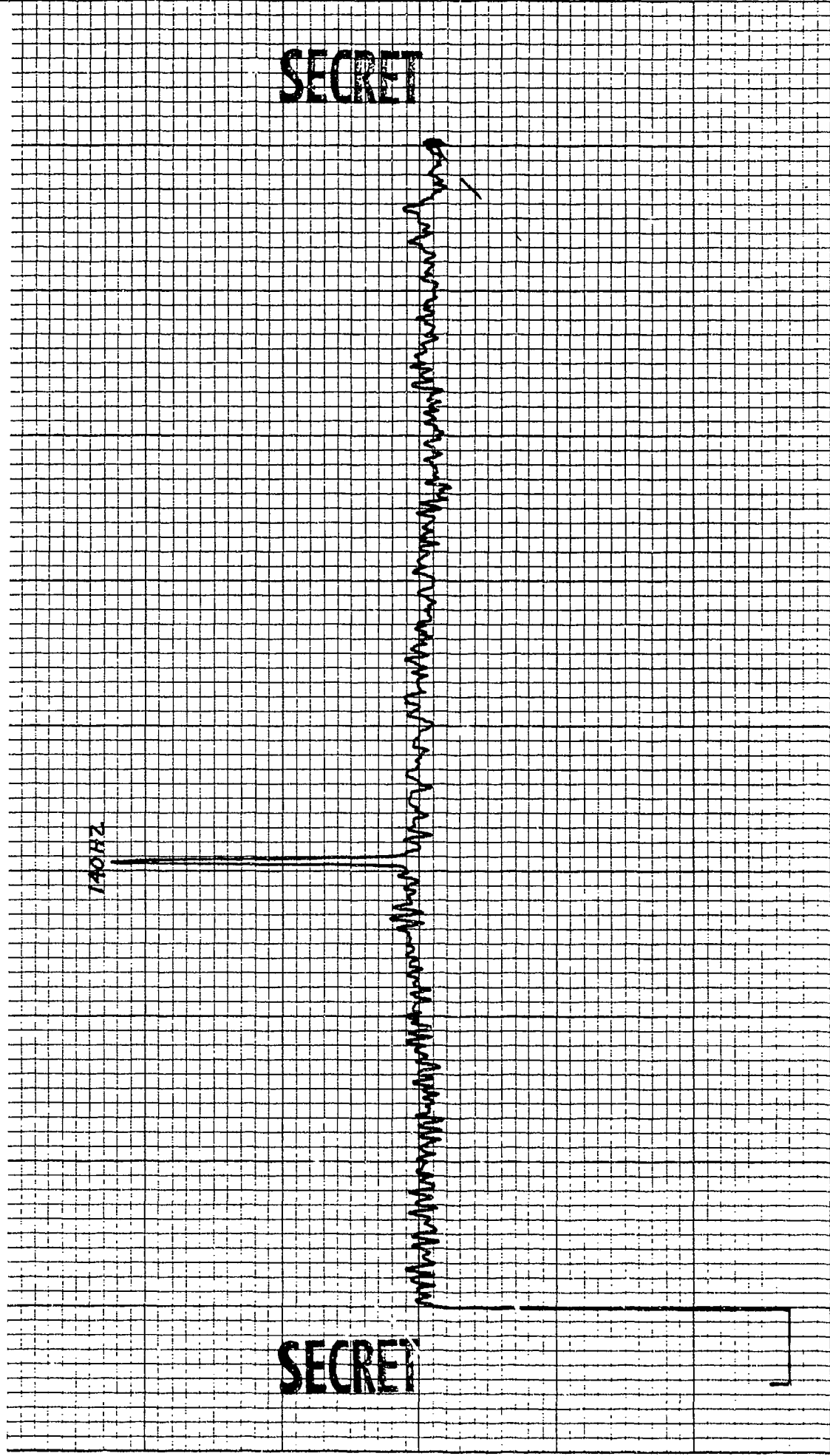
CONTROL: 376-1140 (27) DATE OF ANALYSIS: REEL: 124 INDEX: 1980
OMNI SPECTRUM (ELEMENT 2)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: - DB
1 ELEMENT _____ DEG AZ STEERING FILTER WTG: HANNING



KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-16 - 1148 (28) DATE OF ANALYSIS: REEL: M 24 INDEX: 1980
OMNI SPECTRUM (ELEMENT 4)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: - DB
1 ELEMENT DEG AZ STEERING FILTER WTG: HANNING



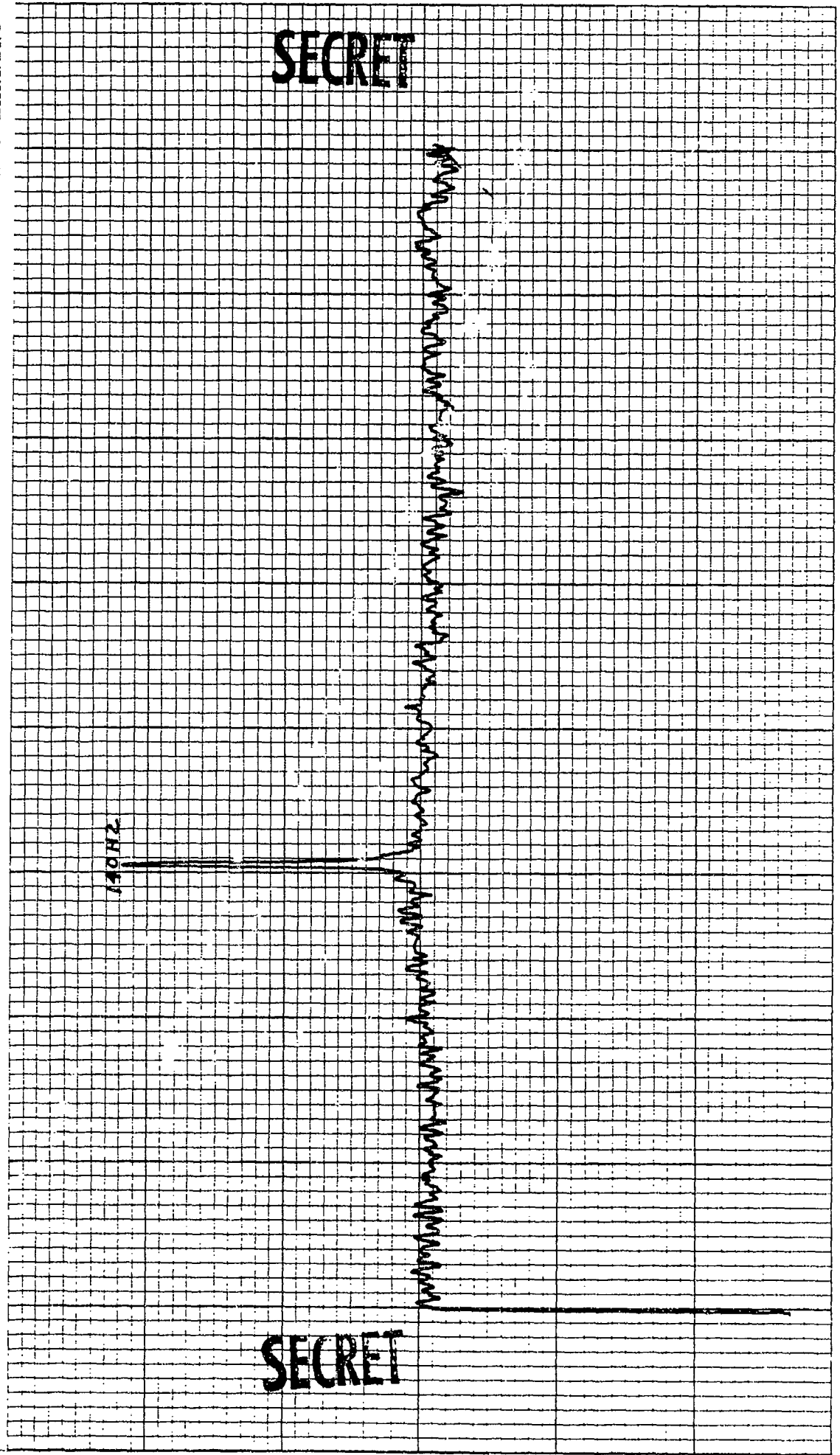
SECRET

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CONTROL: 3-16 - 1146 (29)) REEL: M24 INDEX: 1980
 OMNI SPECTRUM (ELEMENT 6)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ INTEGRATION TIME 320 SECS ATTEN: - DB
 1 ELEMENT FILTER WTG: HANNING

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 1148 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 ———— DEG AZ STEERING



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CONTROL: 3-16 - 148 (30)
OMNI SPECTRUM (ELEMENT 9)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 1148 Z

ANALYSIS BANDWIDTH: 1/10 HZ
DEG AZ STEERING

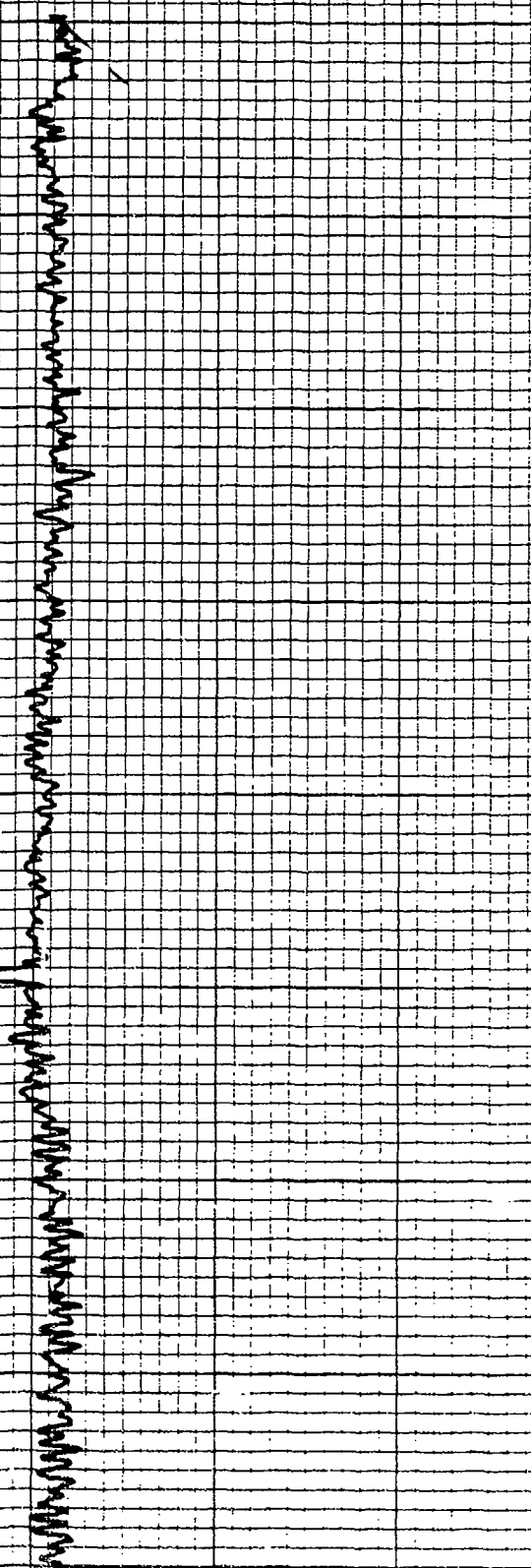
REEL: M24 INDEX 1980

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING

140 HZ

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CONTROL: 3-16-1148 (31)
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-6-77 - 1148 Z

ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

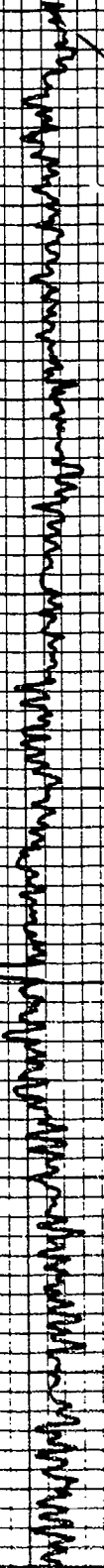
REEL: 124 INDEX: 1880

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTC: HANNING

1148 HZ

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REEL: M24 INDEX: 1990

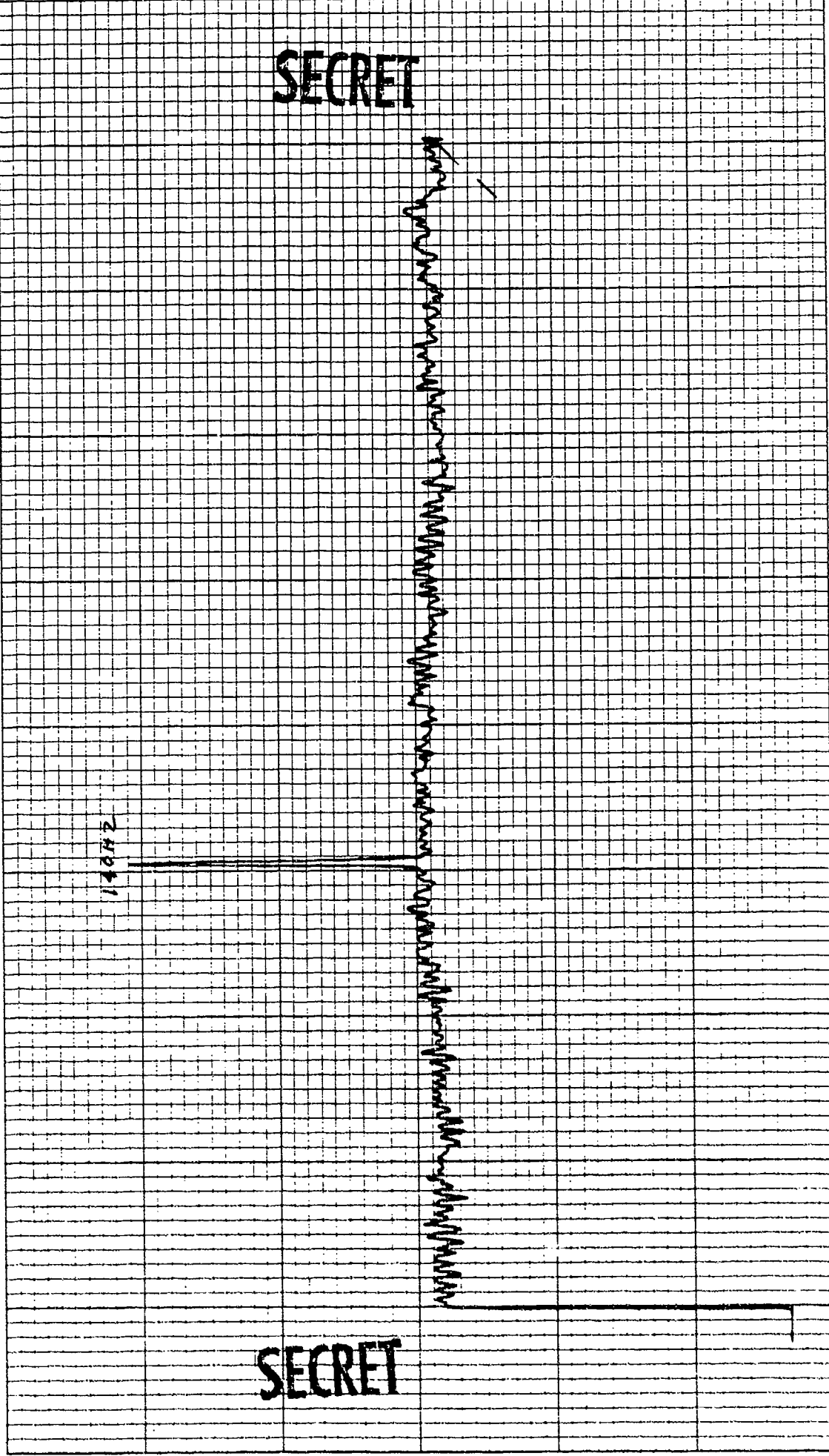
DATE OF ANALYSIS:

CONTROL: 3-16-1140 (32)
OMNI SPECTRUM (ELEMENT 12)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE/TIME: 3-16-77-1148 Z

ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



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CONTROL: 3-16 - 1140 (33)
OMNI SPECTRUM (ELEMENT 14)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

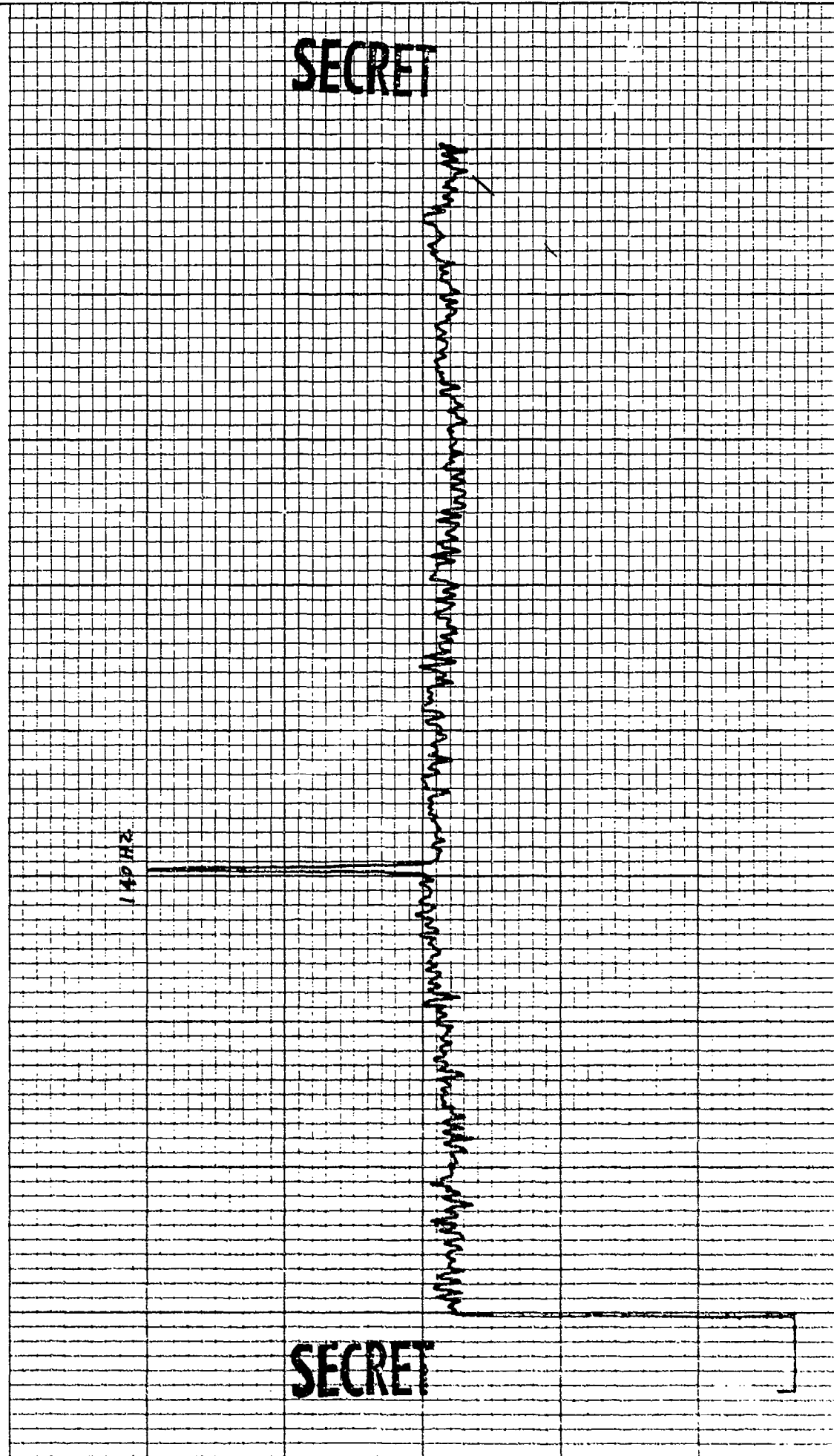
DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 1140 Z
ANALYSIS BANDWIDTH: 1/10 HZ
1 DEG AZ STEERING

REEL: M24

INTEGRATION TIME 320 SECS
ATTEN: - DB
FILTER WTG: HANNING

INDEX 1980



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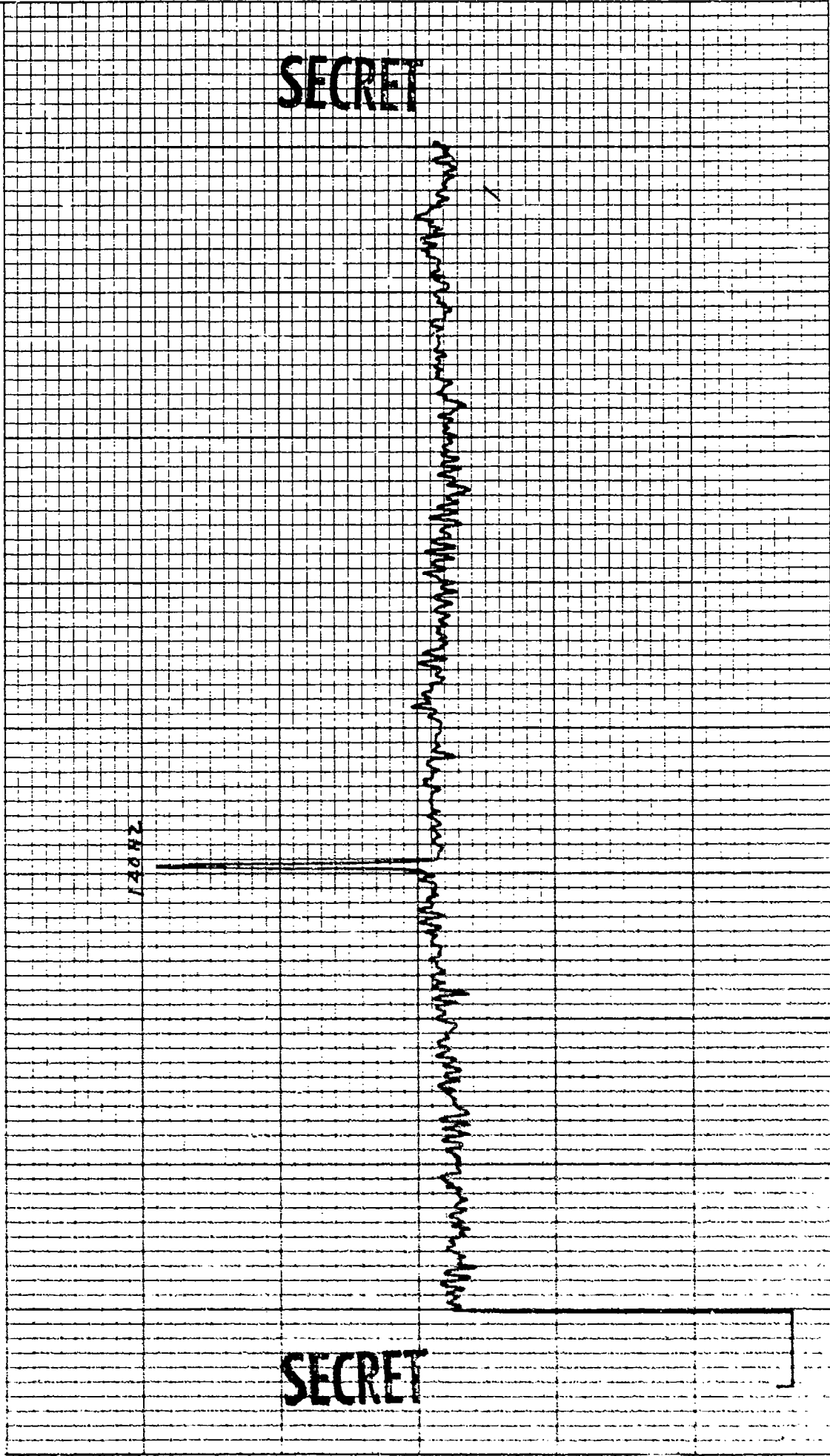
CONTROL: 376 - 1148 (34)
OMNI SPECTRUM (ELEMENT 16)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 1148 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: M24 INDEX 196

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING



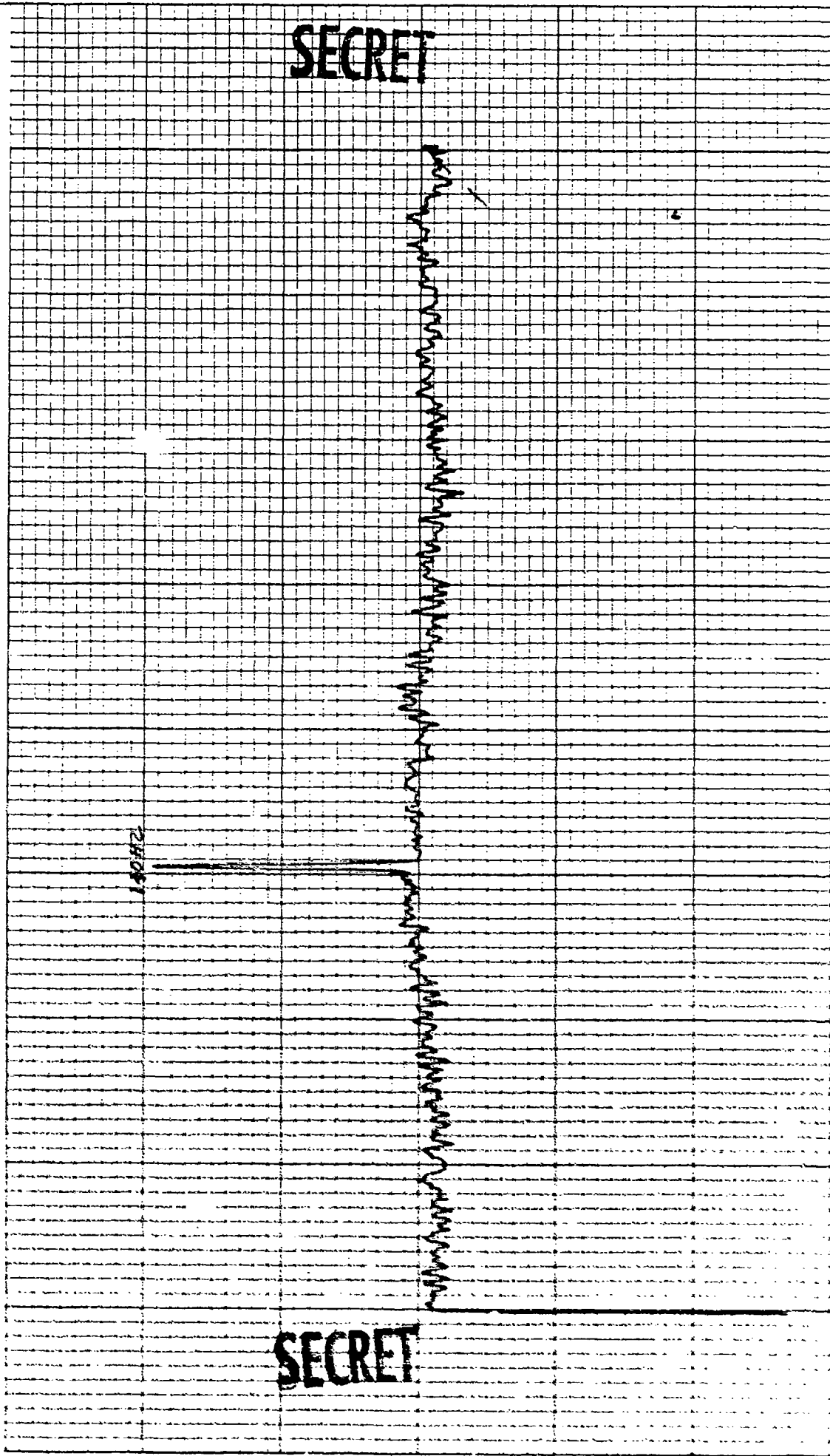
SECRET

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NO. 10 TO THE INCHES
REUFEL & FOSLER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-16 - 1140 (35) DATE OF ANALYSIS: REEL: M24 INDEX: 180
OMNI SPECTRUM (ELEMENT 19)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: - DB
ELEMENT DEG AZ STEERING FILTER WTG: HANNING



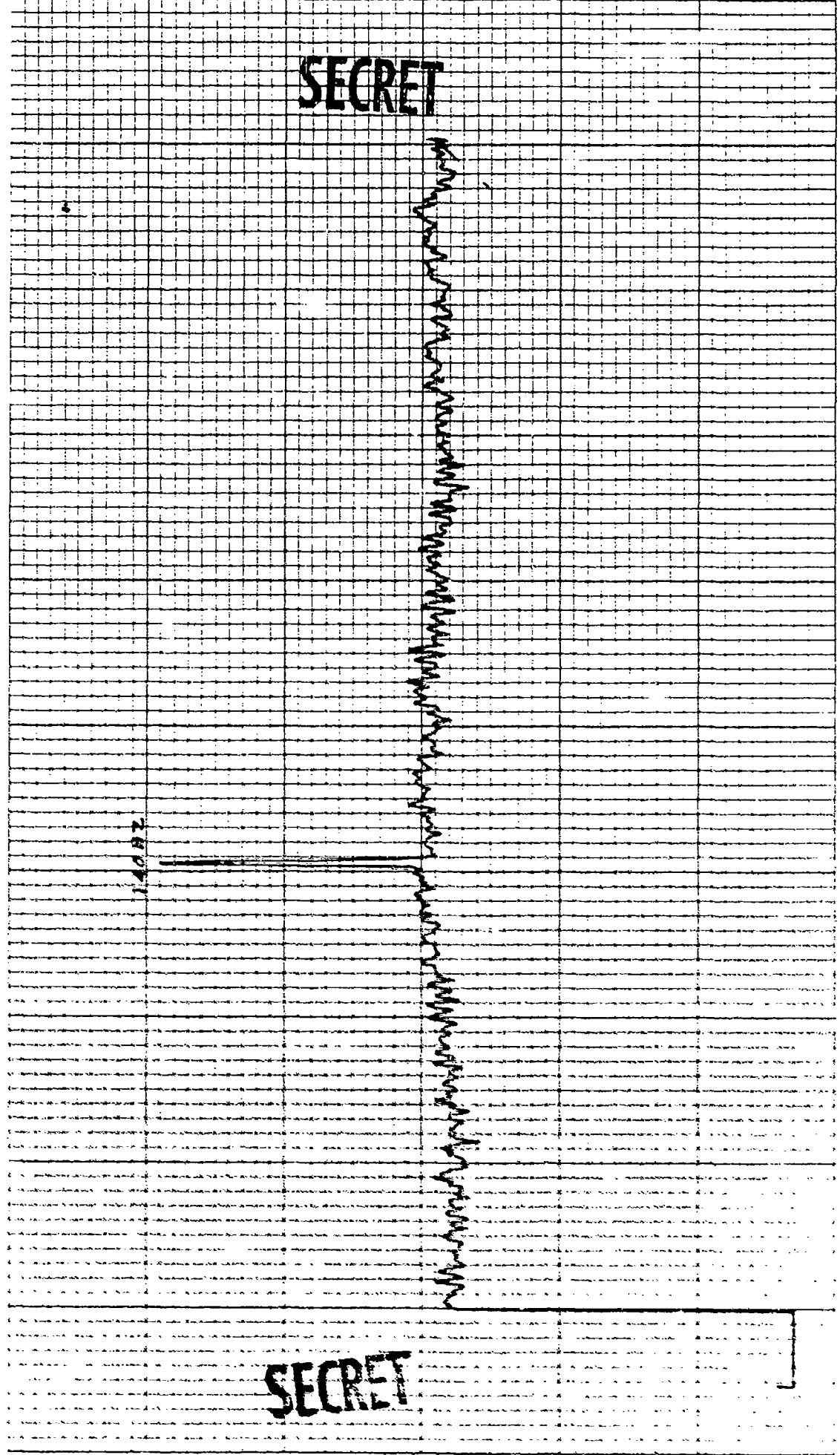
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K*Σ 16 X 10 TO THE 10th PLS. H. A. IN THE U.S.
ACAPPELL & CO. INC. NEW YORK

46 0703

CONTROL: J-16 - 1148 (J6) REEL: M24 INDEX: 1980
OMNI SPECTRUM (ELEMENT 20)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT
DATE OF ANALYSIS:
DATE/TIME: 3-16-77 - 1148Z
ANALYSIS BANDWIDTH: 1/10 HZ
INTEGRATION TIME 320 SECS
ATTEN: - DB
FILTER WTC
WTC: HANNING



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INDEX 1980

REEL: 124

DATE OF ANALYSIS:

CONTROL: 3-16 - 1140 (J7)

OMNI SPECTRUM (ELEMENT 23)

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

1 ELEMENT

DATE/TIME: 3-16-77 - 1140Z

ANALYSIS BANDWIDTH: 1/10HZ

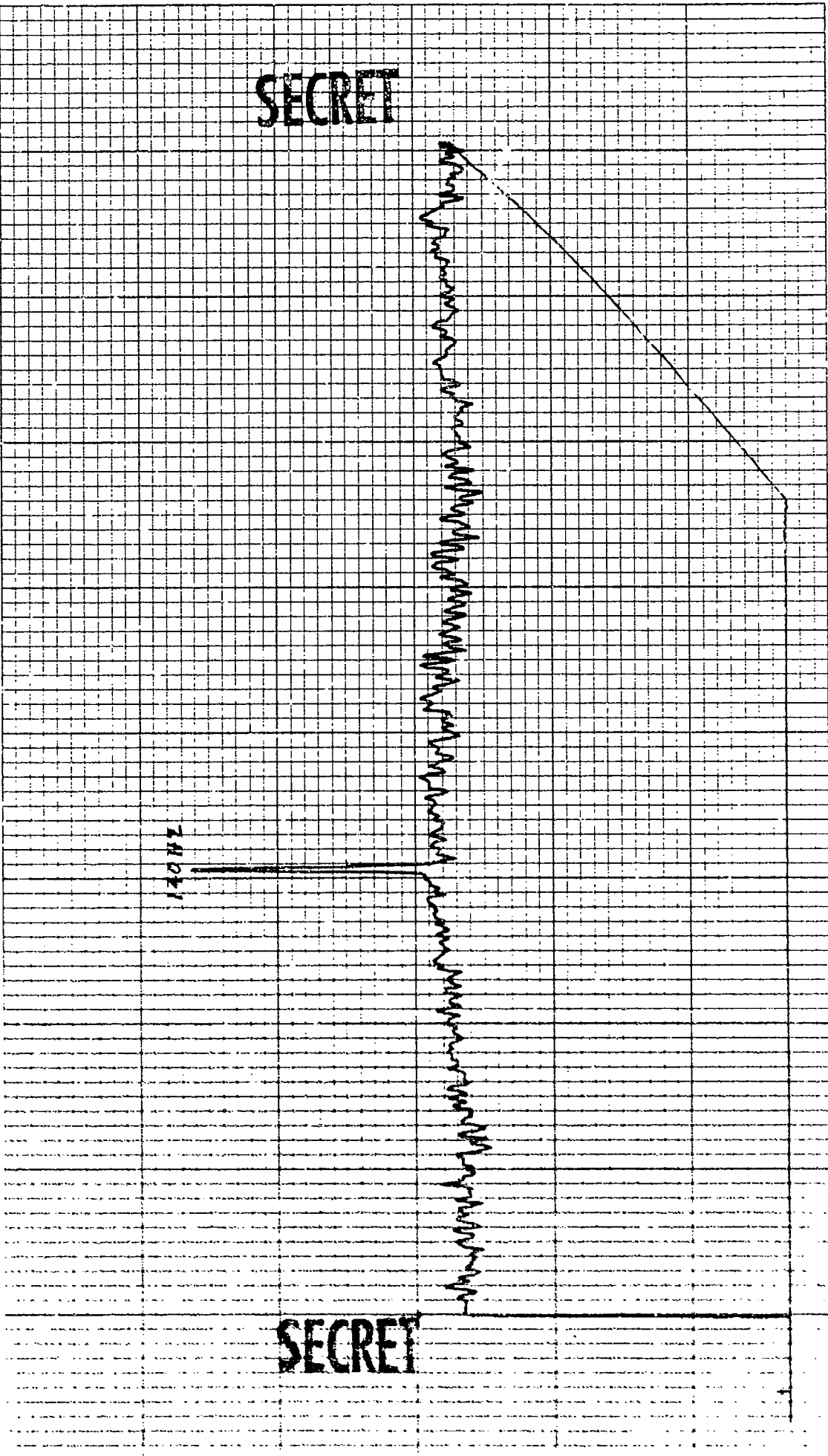
DEG AZ STEERING

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING

140 HZ

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KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
NEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-16-1148 (38)
OMNI SPECTRUM (ELEMENT 24)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77-1148 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

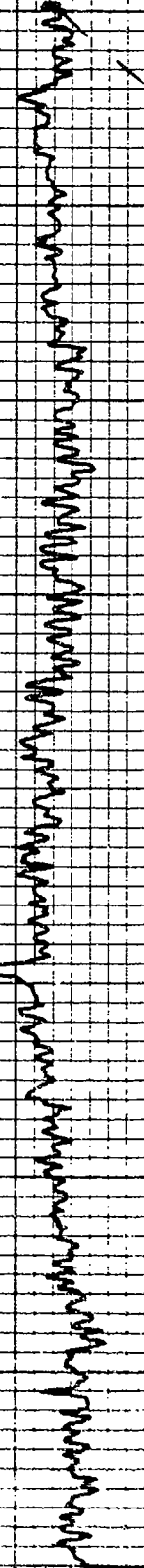
REEL: M24 INDEX 1148

INTEGRATION TIME 320 SECS ATTN: — DB
FILTER WTG: HANNING

140 HZ

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10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-14-1148 (39)
OMNI SPECTRUM (ELEMENT 26)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

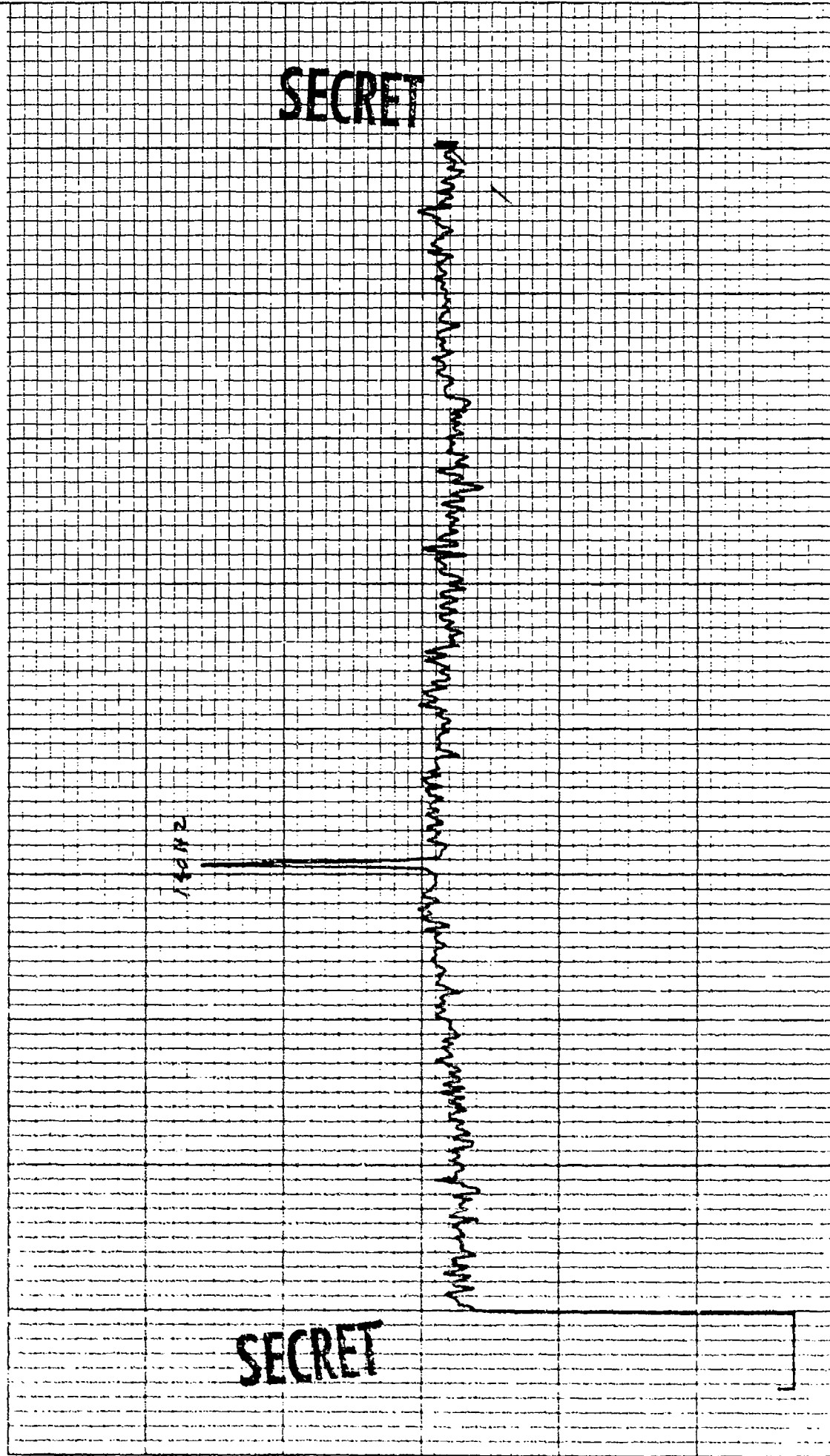
DATE/TIME: 3-6-77 -1148 Z

ANALYSIS BANDWIDTH: 1/10 HZ
DEC AZ STEERING

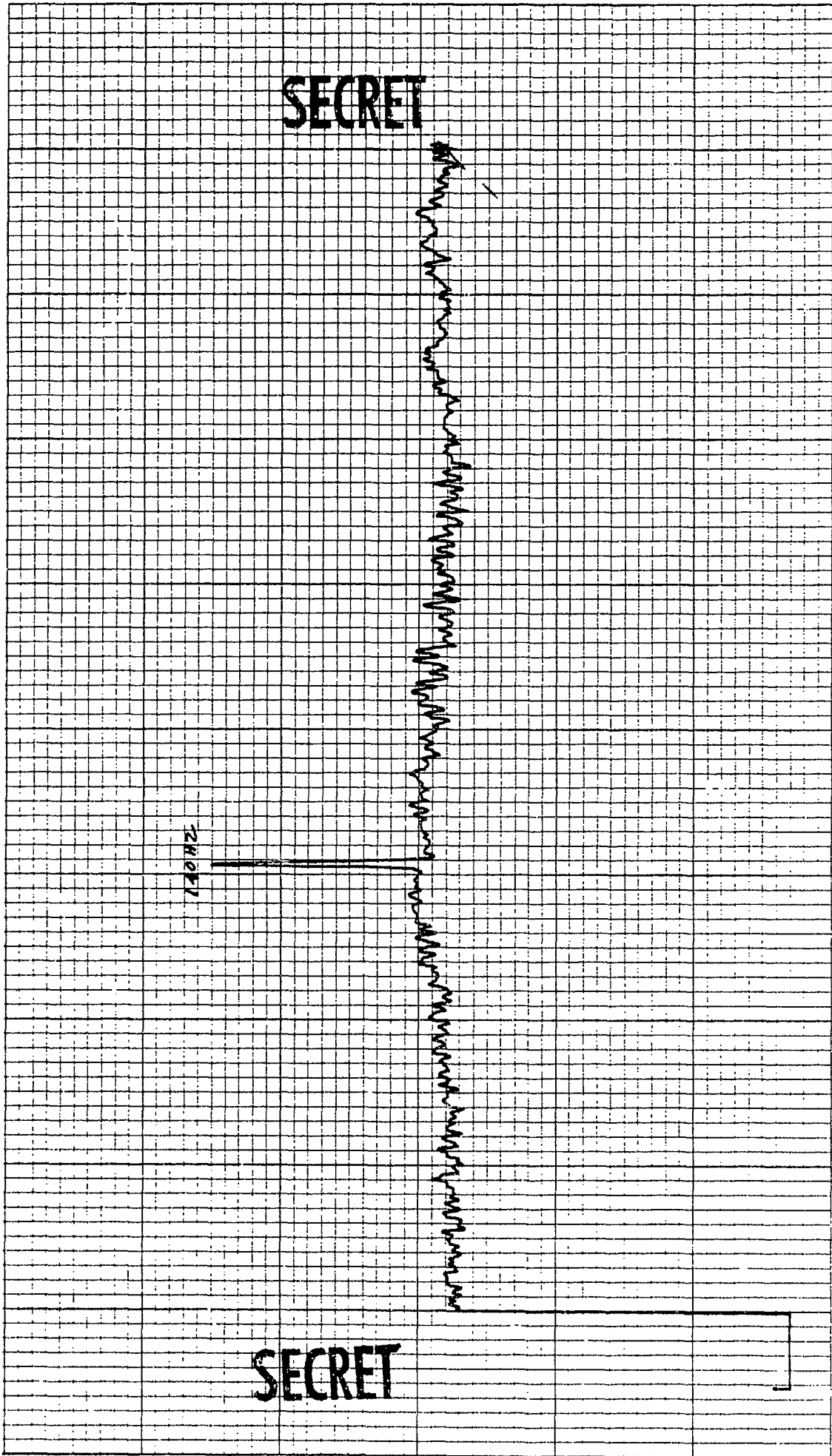
REEL: M24

INDEX 1980

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER WTC: HANNING



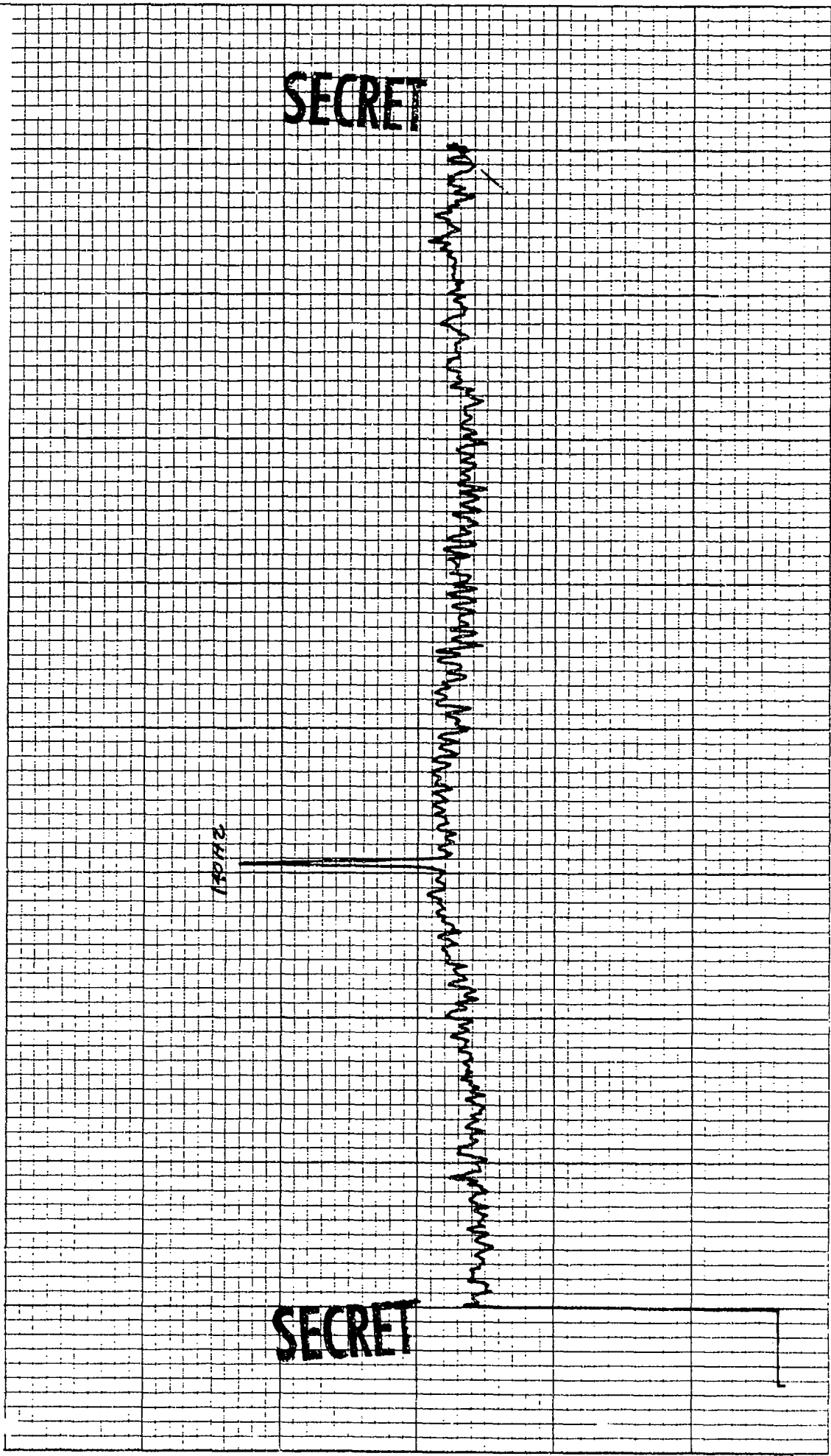
CONTROL: 3-16-1148 (40) REEL: H2Y INDEX: 1160
 OMNI SPECTRUM (ELEMENT 29)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ INTEGRATION TIME 320 SECS ATTN: DB
 1 ELEMENT FILTER WTC: HANNING
 DATE OF ANALYSIS: ANALYSIS BANDWIDTH: 1/10 HZ
 DATE/TIME: 3-16-77 - 1148 Z
— DEG AZ STEERING



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CONTROL: 3-6 - 1148 (41) DATE OF ANALYSIS: REEL: M24 INDEX: 980
 OMNI SPECTRUM (ELEMENT 31)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ INTEGRATION TIME 320 SECS ATTN: - DB
 1 ELEMENT FILTER WTG: HANNING
 ANALYSIS BANDWIDTH: 1/10 HZ DEG AZ STEERING



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CONTROL: 3-16 - 1140 (42)
OMNI SPECTRUM (ELEMENT 33)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 1140 Z

ANALYSIS BANDWIDTH: 1/10 HZ
DEG AZ STEERING

REEL: 1234 INDEX: 1980

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING

1408Z

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[Handwritten scribbles and illegible text on the grid]

K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-16 - 1148 (43)
OMNI SPECTRUM (ELEMENT 35)
EXERCISE: BEARING STAKE
CENTER FREQ: 50 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 1148 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

REEL: 124

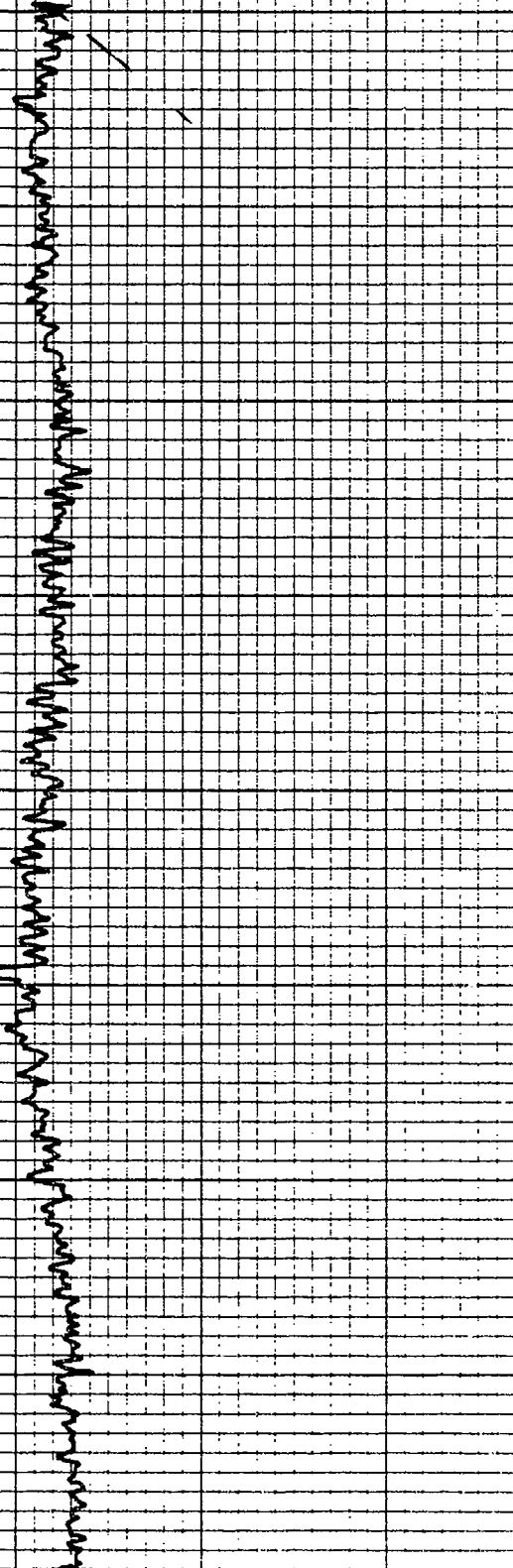
INDEX: 1880

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING

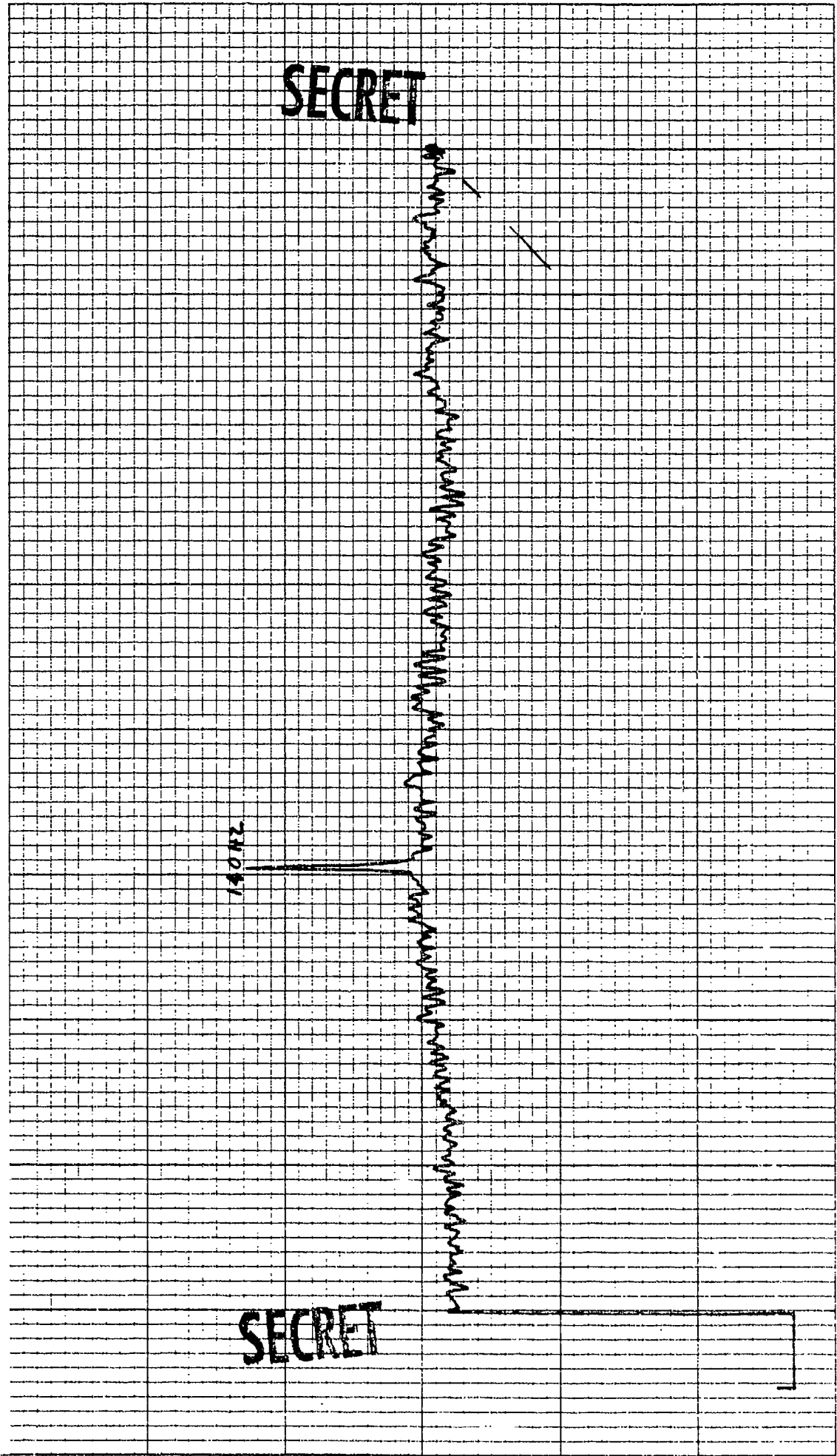
140 HZ

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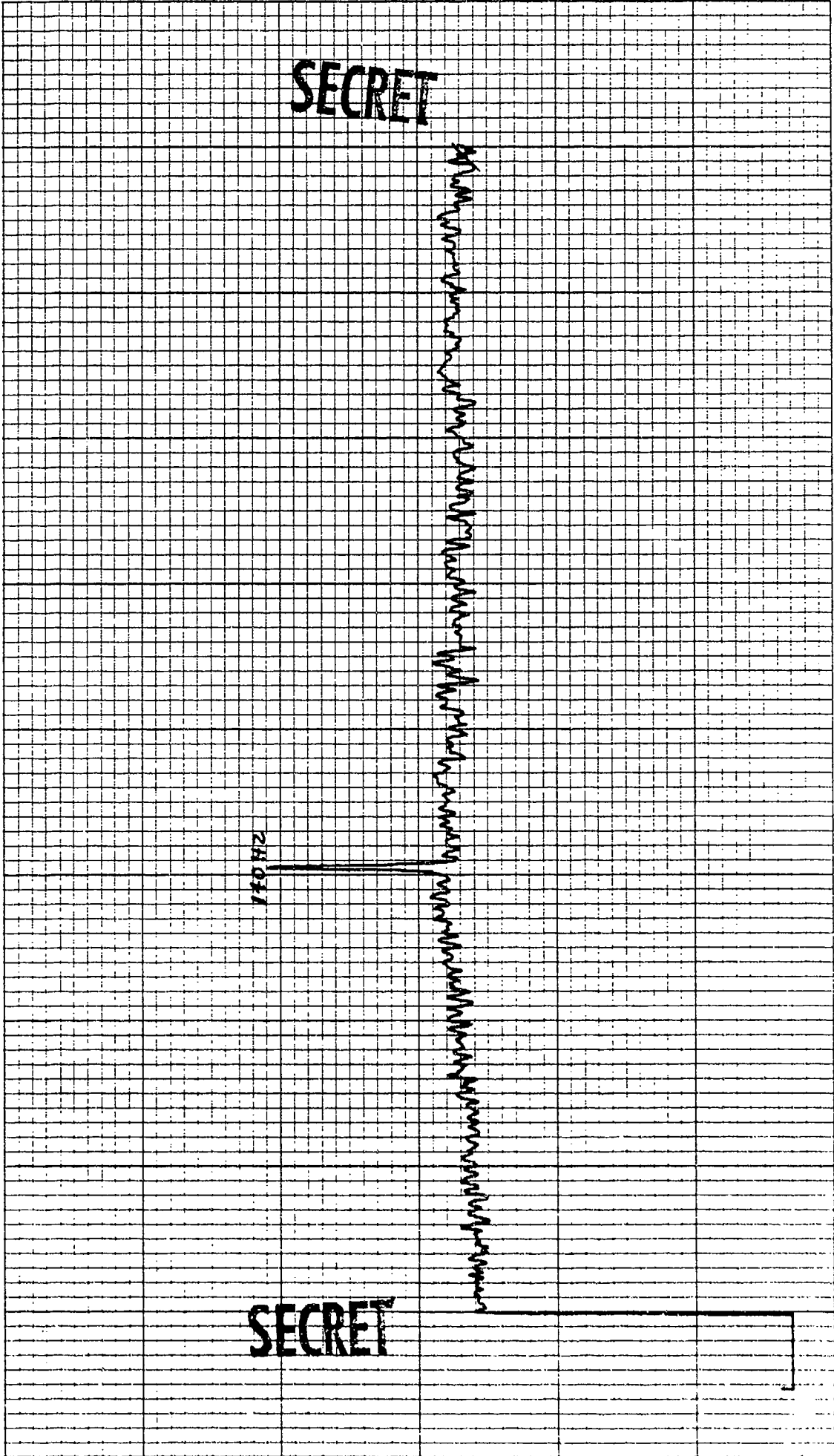
CONTROL: 3-76-1148 (44) DATE OF ANALYSIS: REEL: M2Y INDEX 1980
OMNI SPECTRUM (ELEMENT 37)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: - DB
1 ELEMENT DEG AZ STEERING FILTER WTG: HANNING



K·Σ 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

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CONTROL: 3-16 - 1148 (45) DATE OF ANALYSIS: REEL: M2Y INDEX: 1980
OMNI SPECTRUM (ELEMENT 39)
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 1148 Z INTEGRATION TIME 320 SECS ATTN: - DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
1 ELEMENT - DEG AZ STEERING



10 X 10 TO THE INCH 1.7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

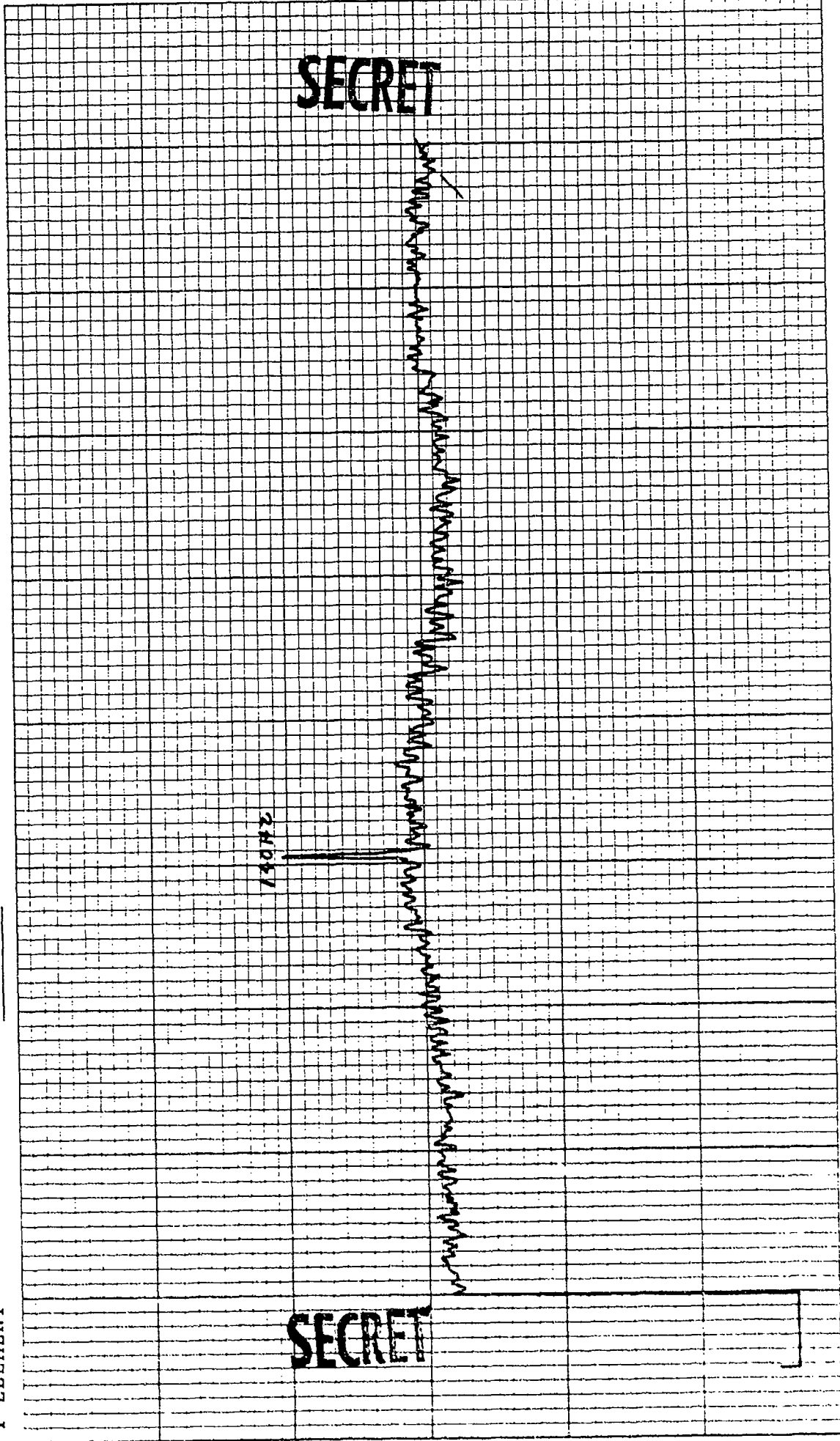
46 0703

INDEX 1980

REEL: 124

CONTROL: 3-16 - 1140 (46) DATE OF ANALYSIS:
OMNI SPECTRUM (ELEMENT 41) DATE/TIME: 3-16-77 - 1140 Z
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ
CENTER FREQ: 150 HZ DEG AZ STEERING
1 ELEMENT

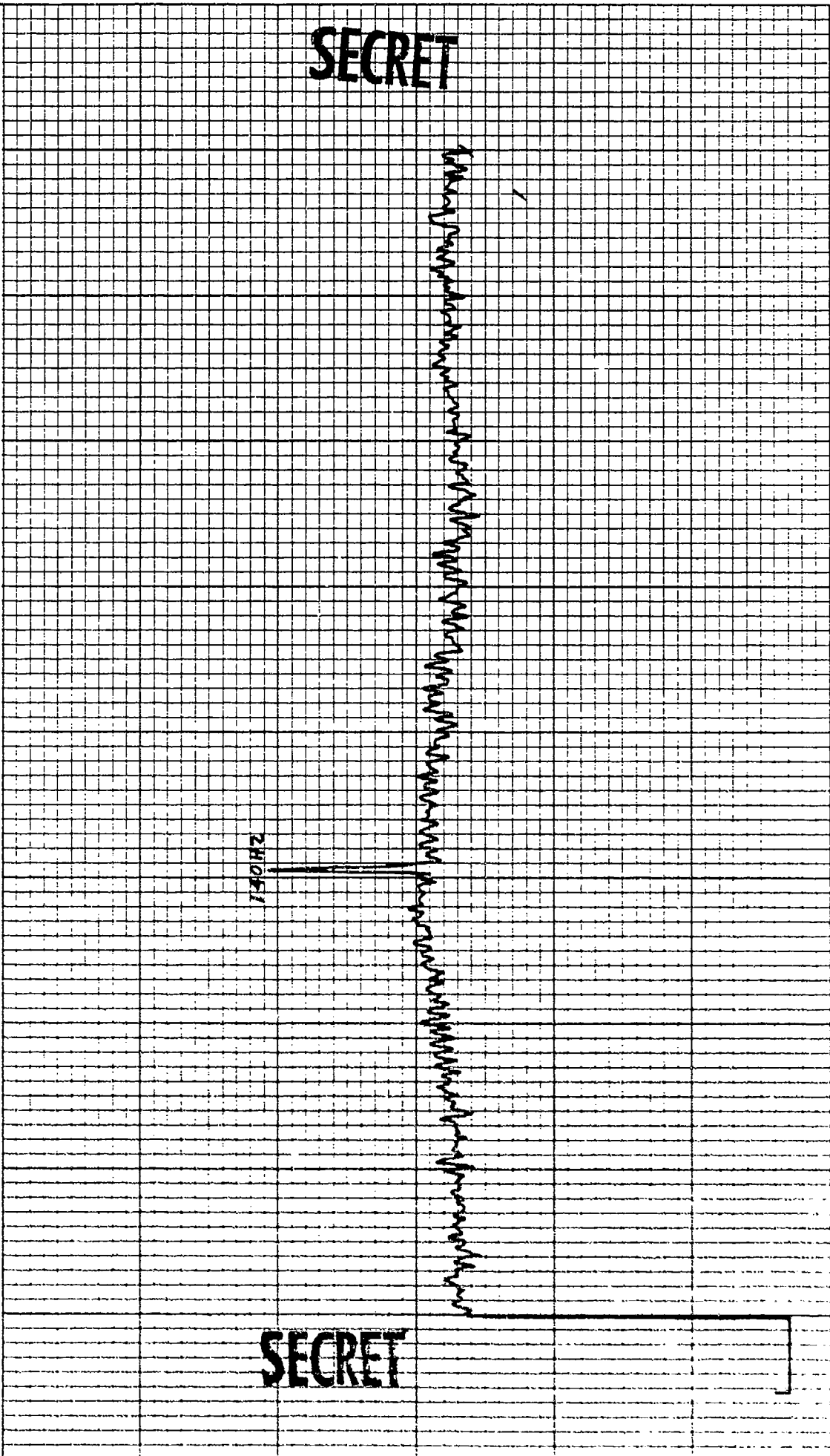
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING



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CONTROL: 3-16 - 1148 (47) DATE OF ANALYSIS: REEL: M24 INDEX 1980
 OMNI SPECTRUM (ELEMENT 43)
 EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 1148 Z INTEGRATION TIME 320 SECS ATTN: - DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTC: HANNING
 1 ELEMENT DEG AZ STEERING



10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFEL & ESSER CO. MADE IN U.S.A.

46 0703

REEL: M24 INDEX: 148

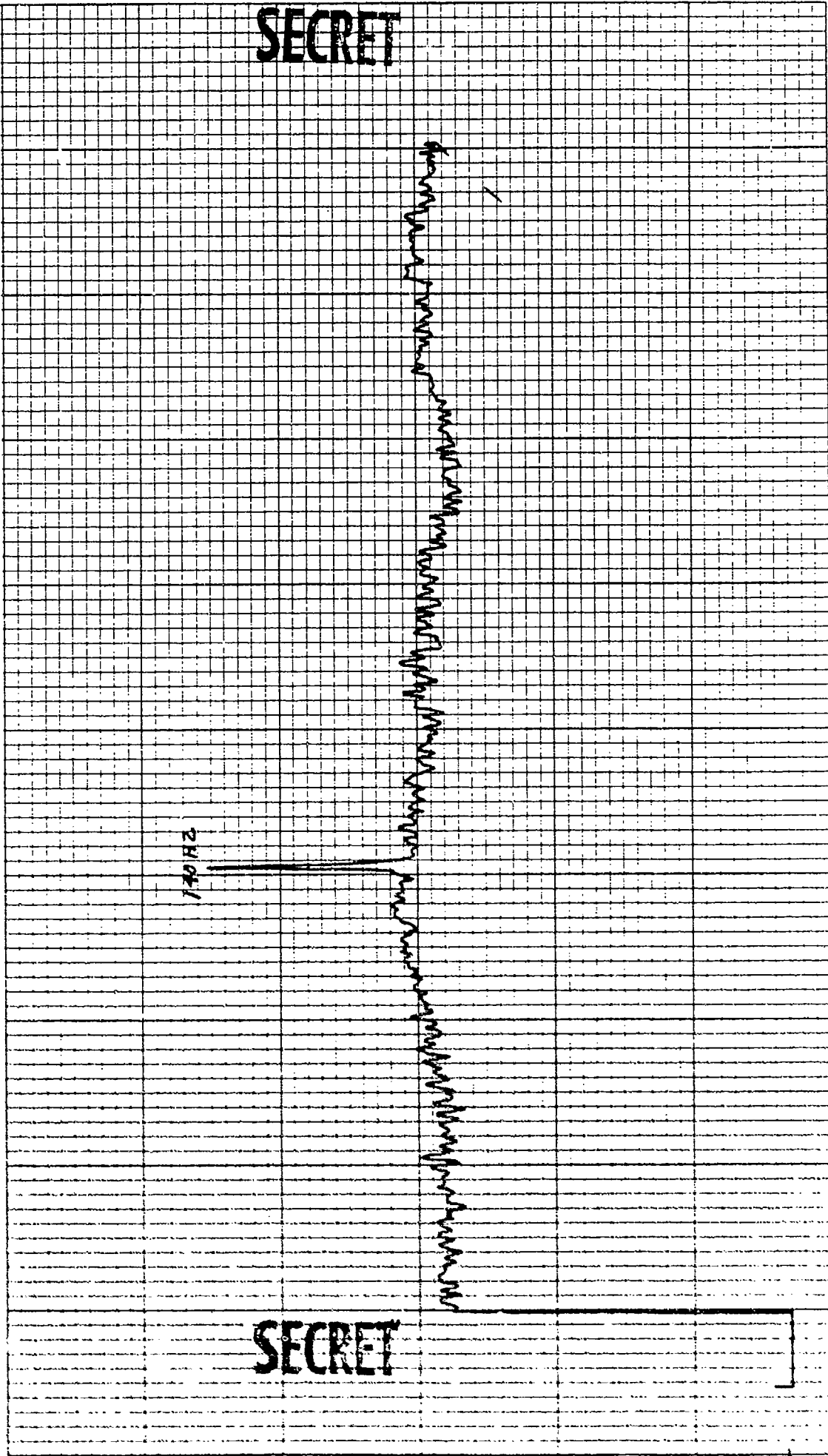
DATE OF ANALYSIS:

CONTROL: 3-76 - 1148 (40)
OMNI SPECTRUM (ELEMENT 45)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE/TIME: 3-76-77 - 1148 Z

ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



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CONTROL: 3-16 - 1140 (49)
OMNI SPECTRUM (ELEMENT 47)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

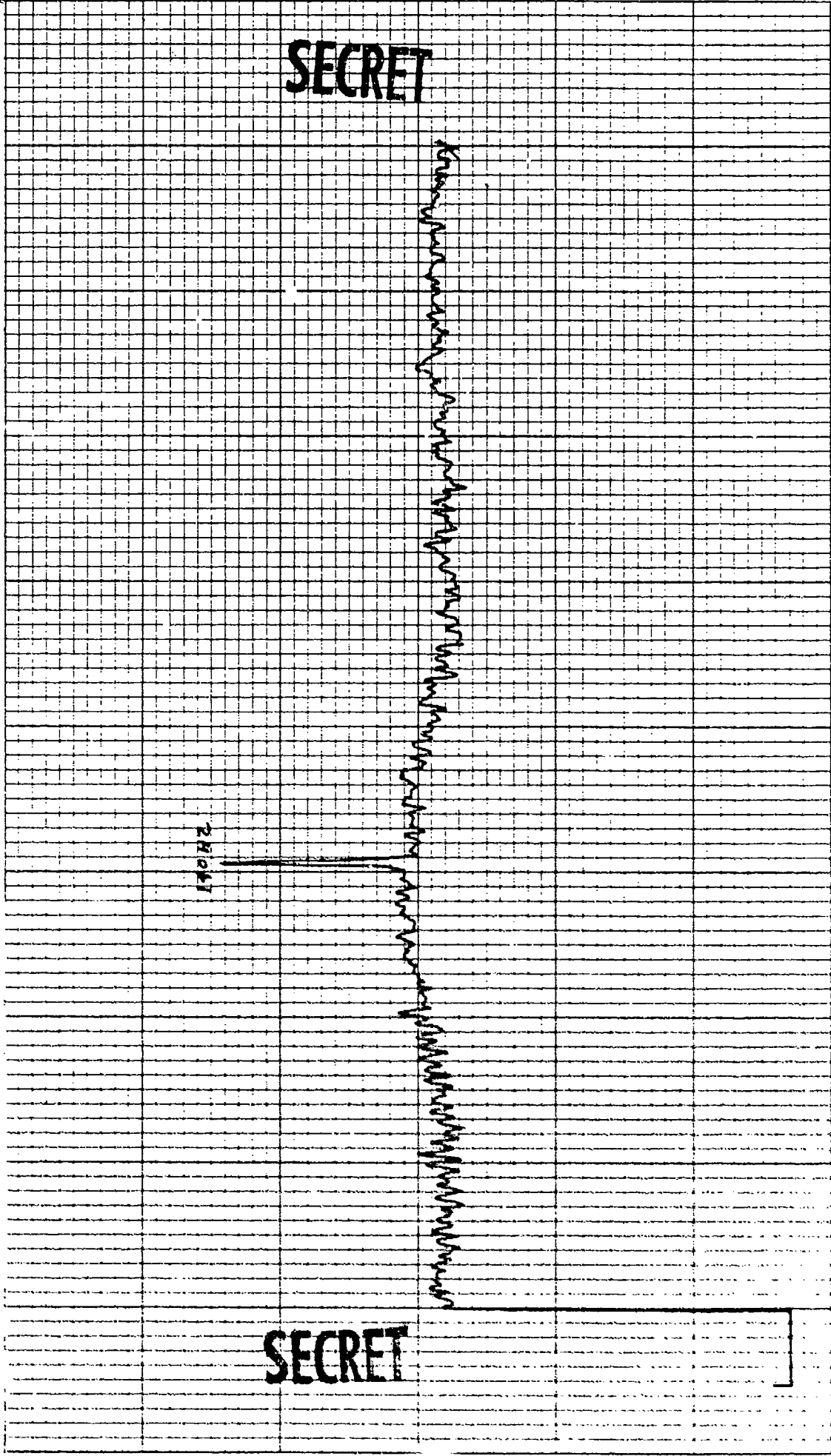
DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 1140 Z

ANALYSIS BANDWIDTH: 1/10 HZ
DEC AZ STEERING

REEL: M24 INDEX: 190

INTEGRATION TIME 320 SECS
ATTEN: - DB
FILTER WTG: HANNING



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REUPREL A-558R CO WITH A-012

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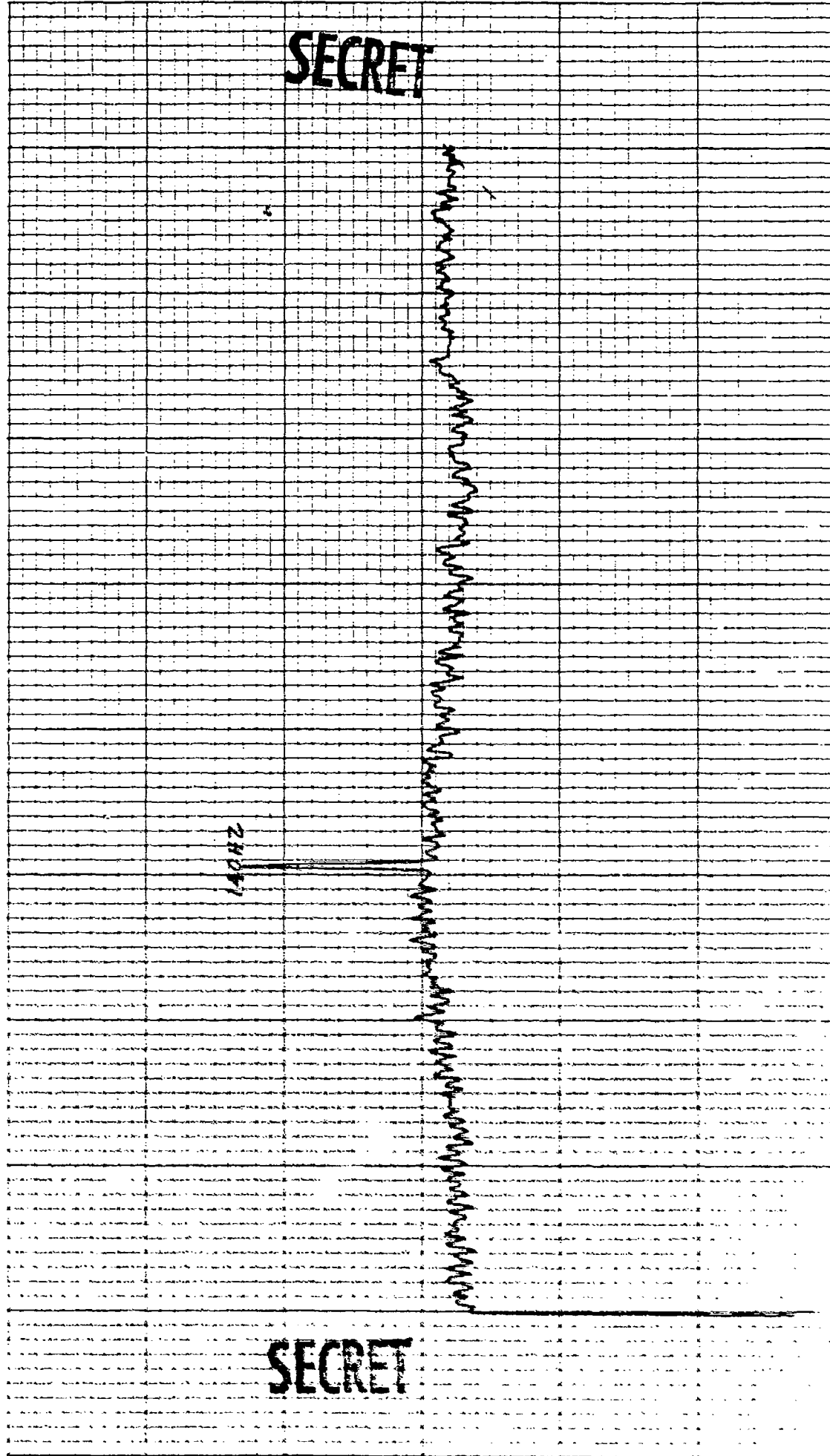
CONTROL: 3-16 - 1140 (50)
OMNI SPECTRUM (ELEMENT 49)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 1140 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

REEL: 124 INDEX 1980

INTEGRATION TIME 320 SECS
FILTER WTG: HANNING



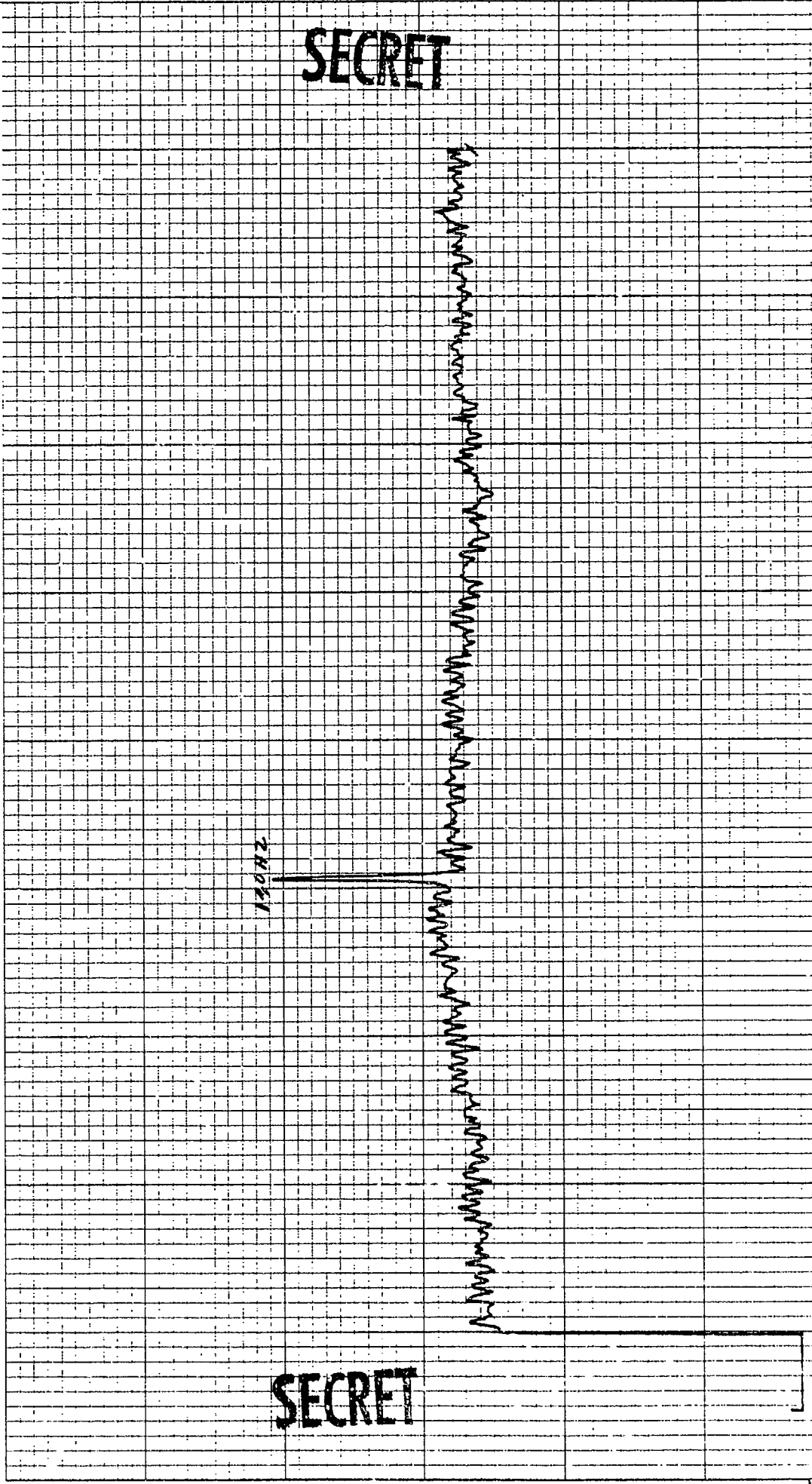
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K&E 10 X 10 TO THE INCH 7 X 10 ILLUMINATED
KREIFFEL & ESSER CO. MADE IN U.S.A.

CONTROL: 3-16 - 1148 (51) DATE OF ANALYSIS: REEL: MZY INDEX: 1980
 OMNI SPECTRUM (ELEMENT 51)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: DB
 1 ELEMENT DEG AZ STEERING FILTER WTC: HANNING



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K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
NEUFEL & ESSER CO. MADE IN U.S.A.

46 0703

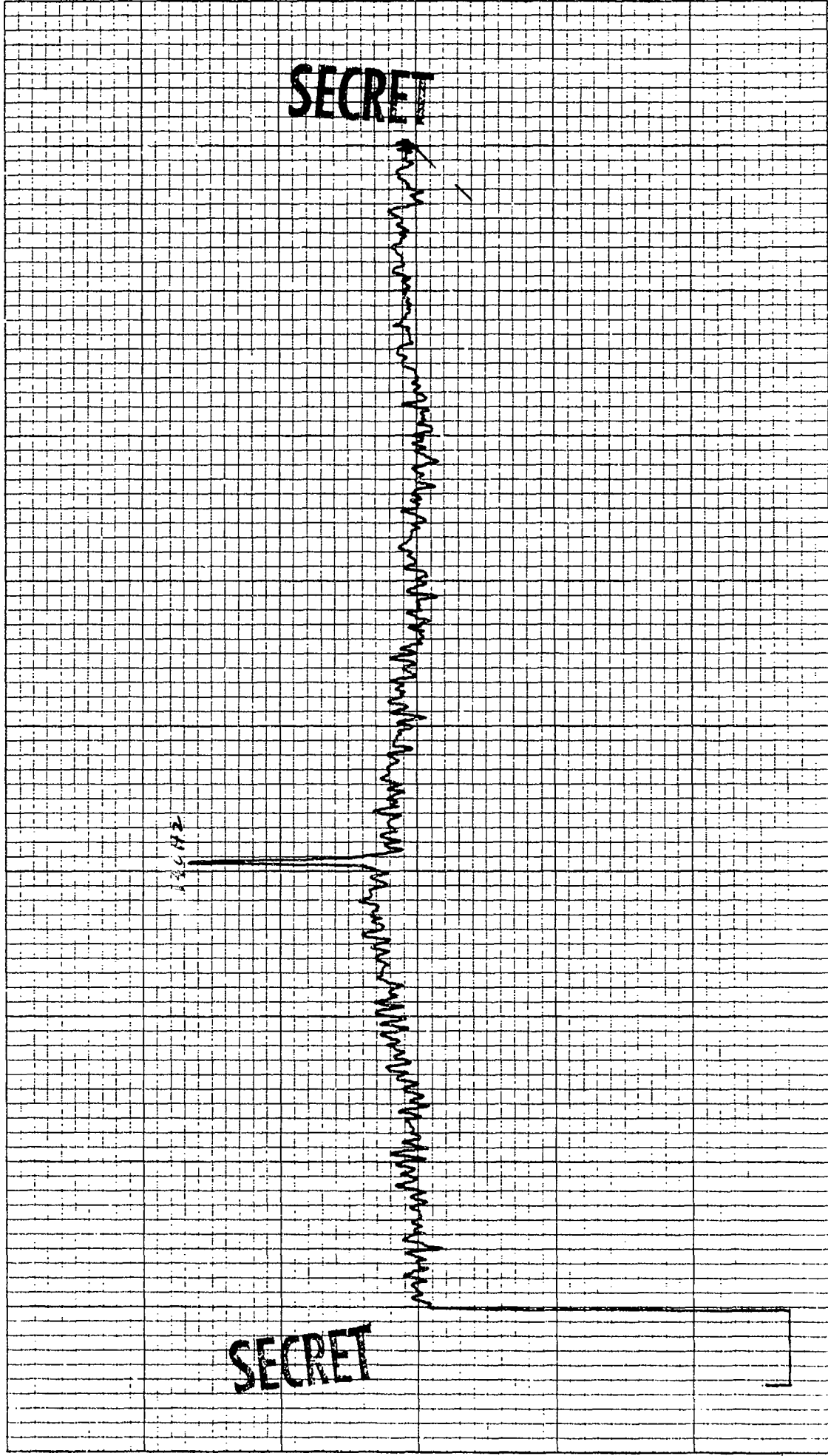
CONTROL: 3-16-1148 (52)
OMNI SPECTRUM (ELEMENT 52)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 1148 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: 424 INDEX 1980

INTEGRATION TIME 320 SECS
FILTER
ATTEN: - DB
WTG: HANNING



CONTROL: 3-16 - 1140 (1)
OMNI SPECTRUM (ELEMENT 2)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

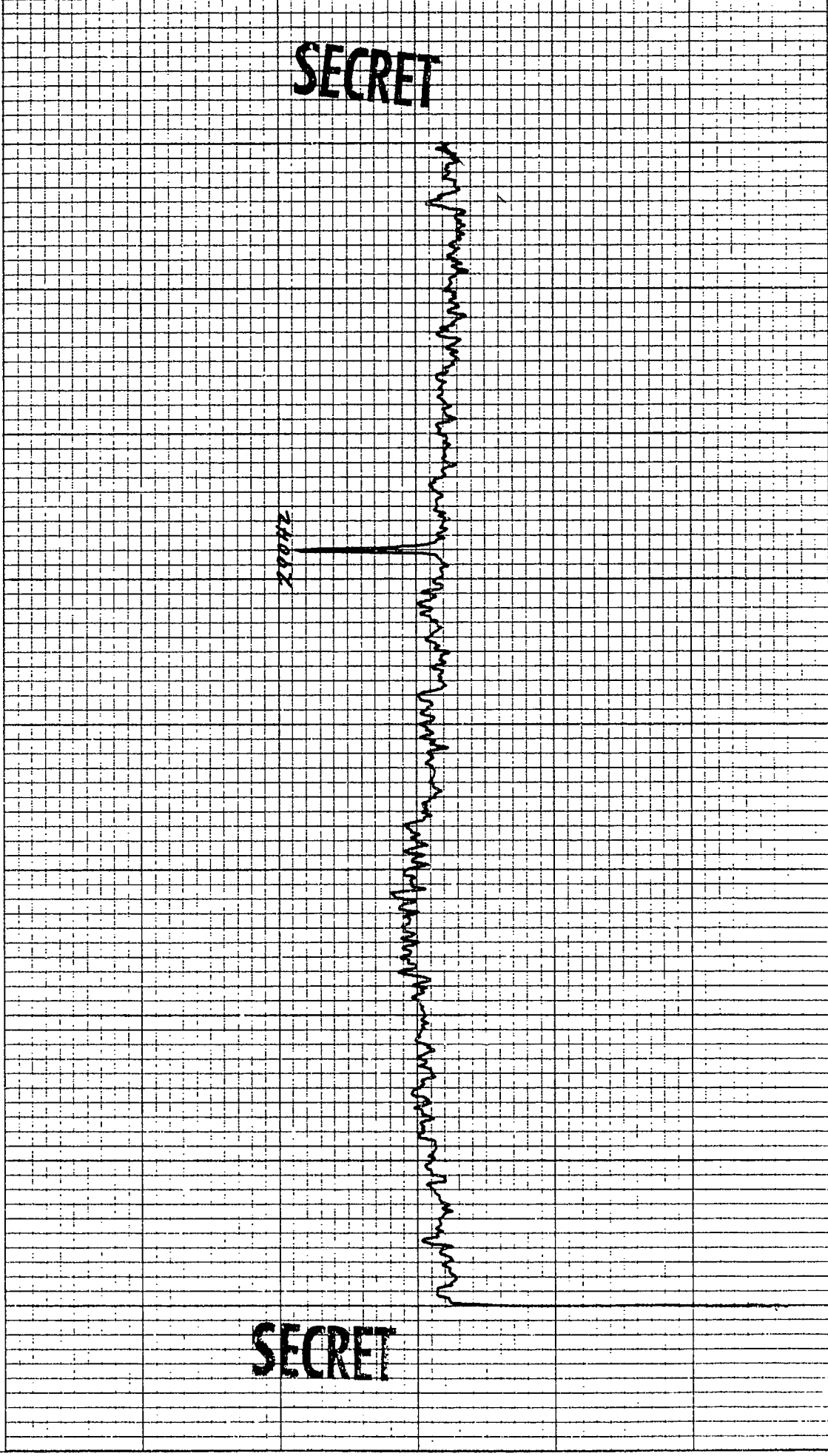
DATE/TIME: 3-16-77 - 1140 Z

ANALYSIS BANDWIDTH: 1/10 HZ
DEG AZ STEERING

REEL: M24

INDEX: 1980

INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING



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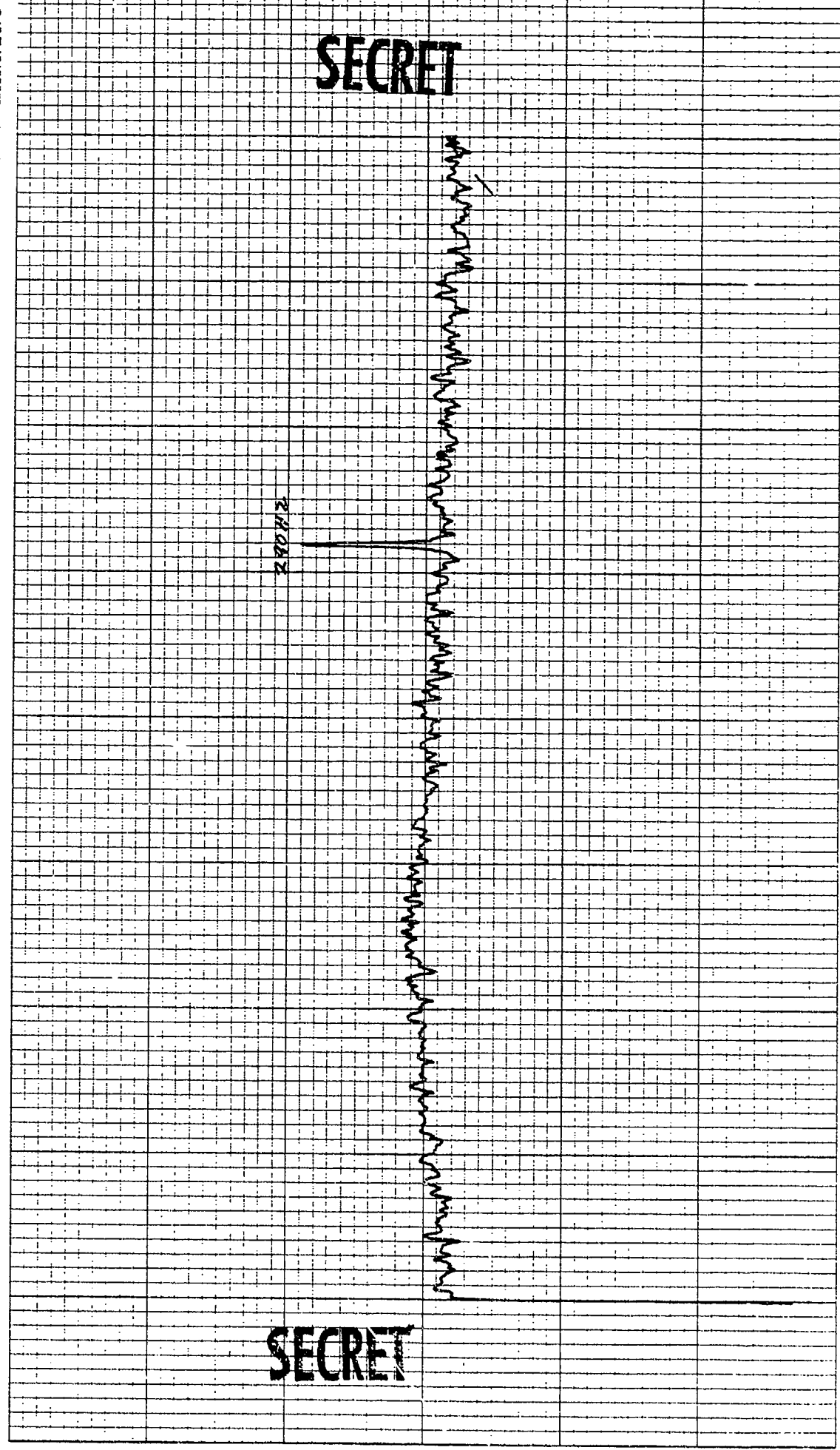
K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
NEUFTEL & FESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-16-1148 (2)
OMNI SPECTRUM (ELEMENT 4)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:
DATE/TIME: 3-16-77 - 1148 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

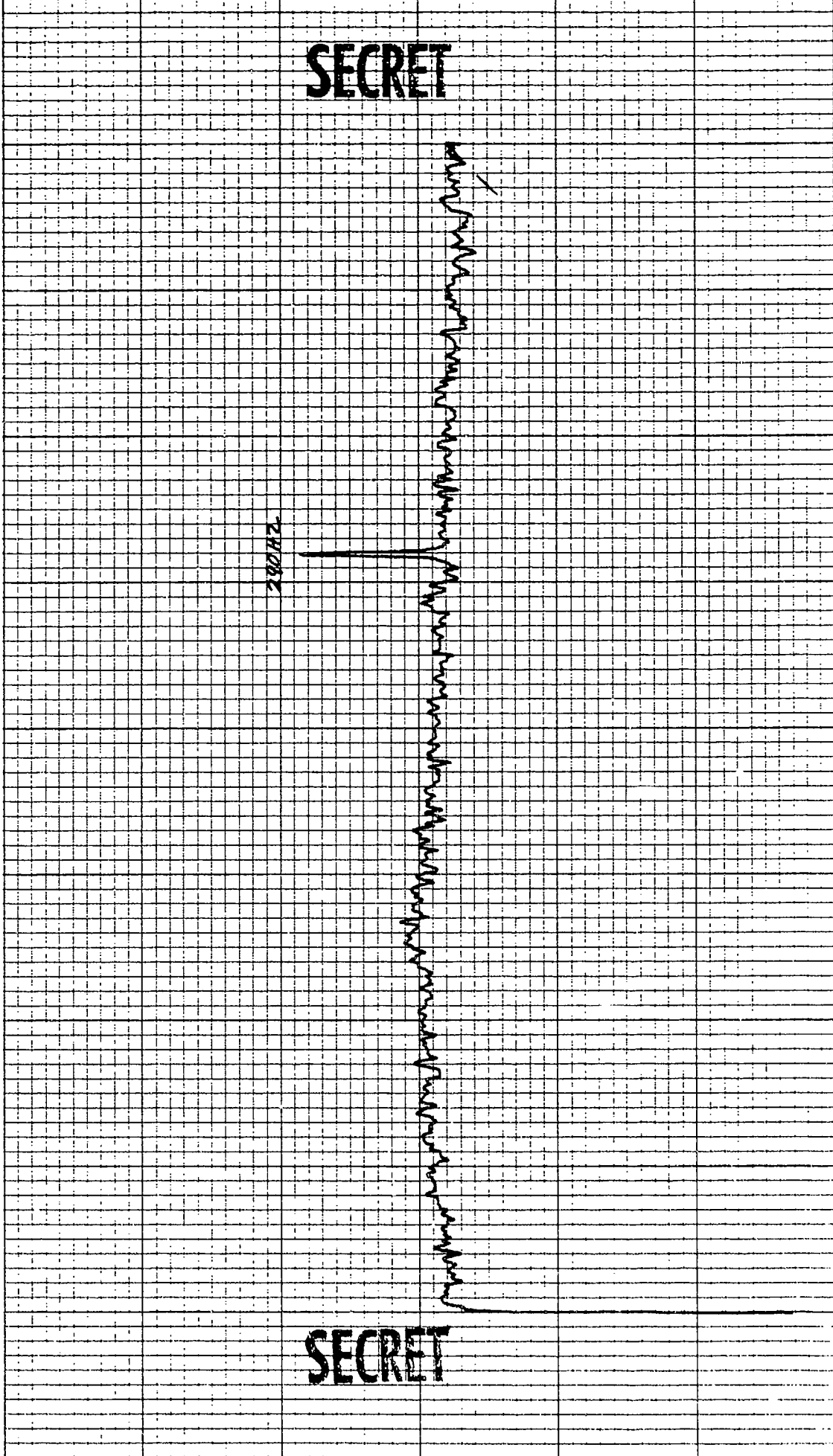
REEL: 1724 INDEX 1980
INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING



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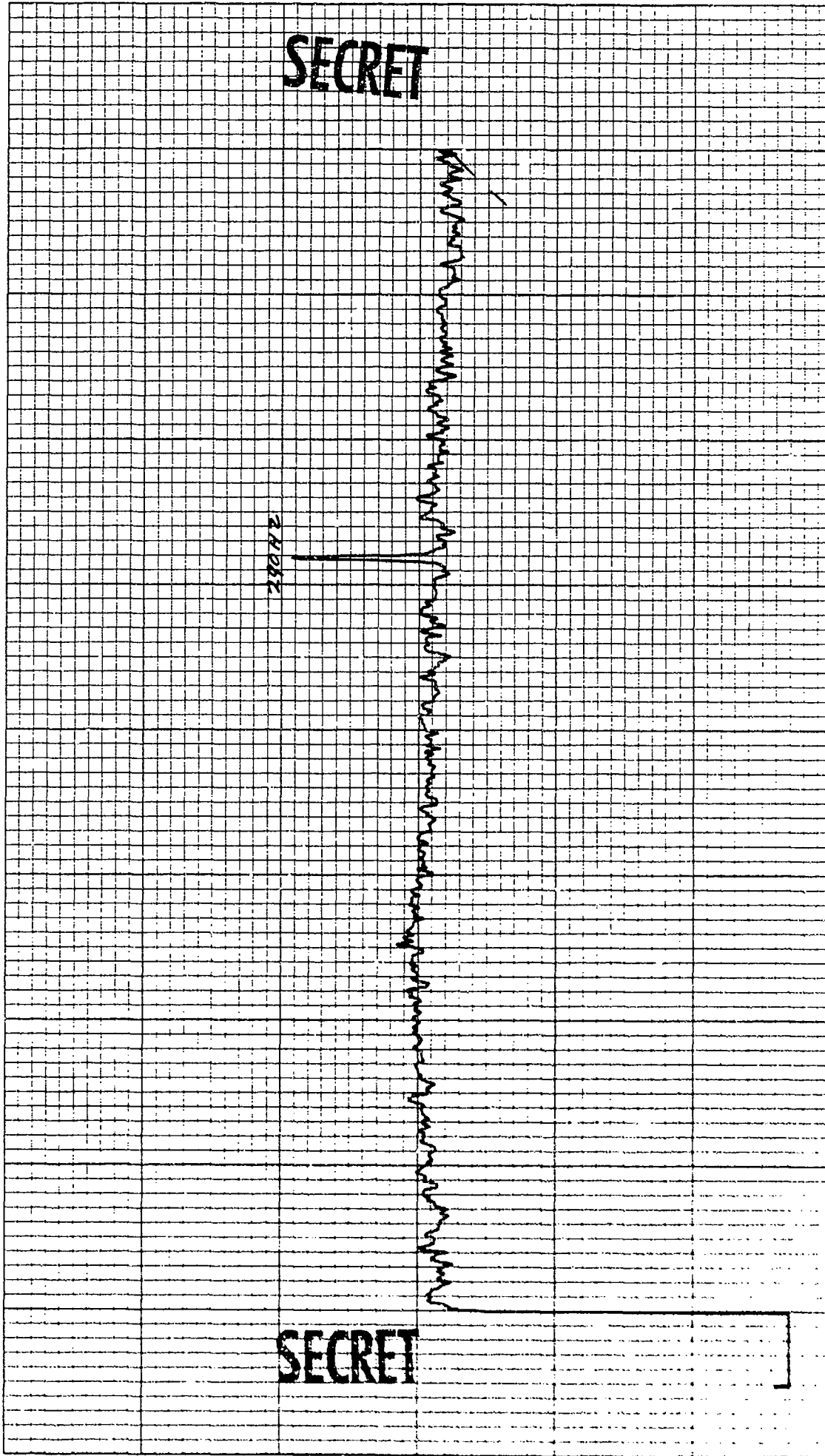
CONTROL: 3-16 - 1148 (3) REEL: 1124 INDEX/990
OMNI SPECTRUM (ELEMENT 6)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
DATE OF ANALYSIS: INTEGRATION TIME 320 SECS ATTN: DB
ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
DEC AZ STEERING



10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

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CONTROL: 3-16-1148 (4) DATE OF ANALYSIS: REEL: M34 INDEX: 1990
OMNI SPECTRUM (ELEMENT 9)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: - DB
1 ELEMENT — DEG AZ STEERING FILTER WTG: HANNING



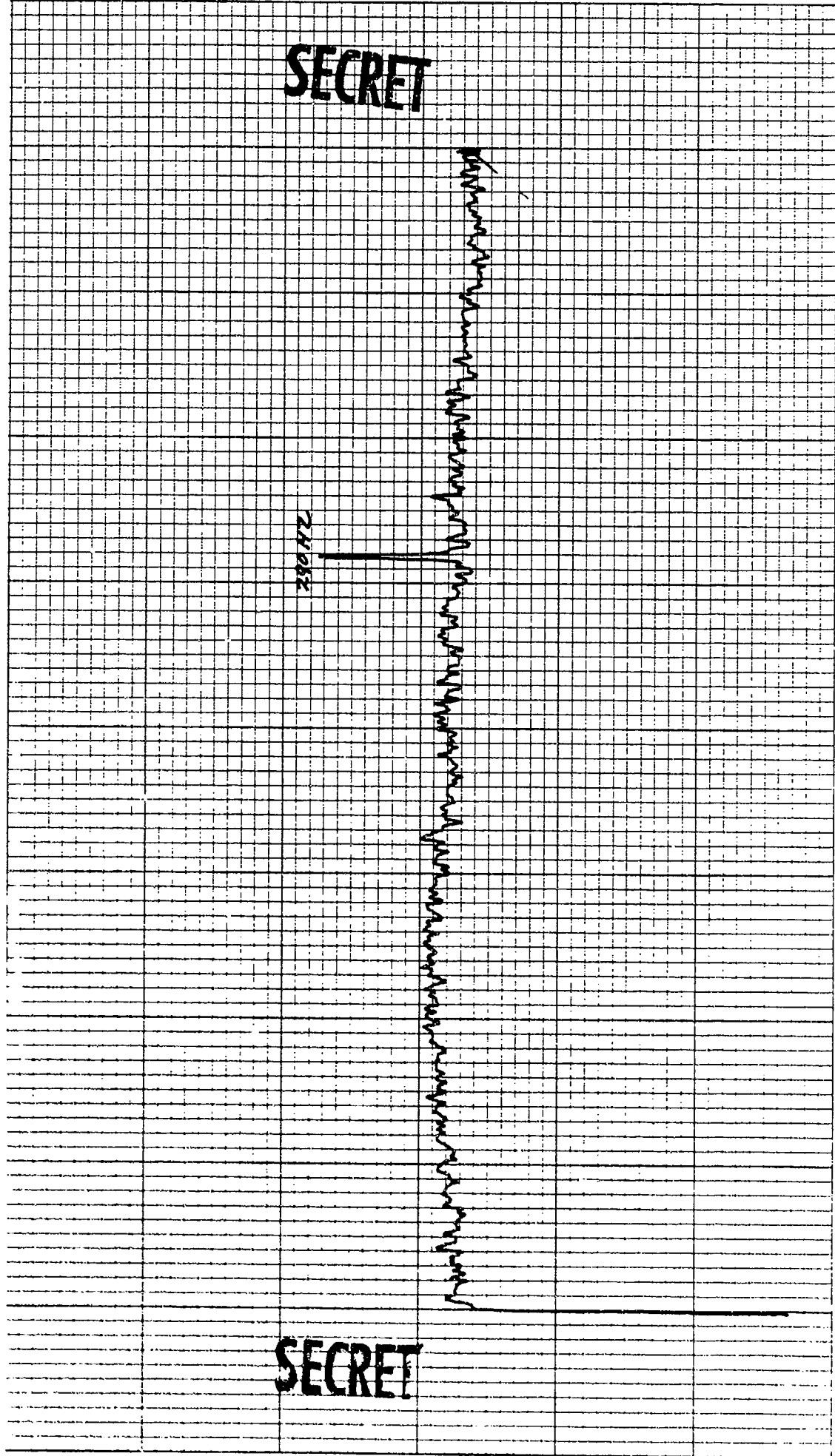
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10 X 10 TO THE INCH • 7 X 10 INCHES
KRUPP & PYSER CO. MADE IN G.F.A.

46 0703

CONTROL: 376-1148 (5) DATE OF ANALYSIS: REEL: M24 INDEX 1980
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ INTEGRATION TIME 320 SECS ATTEN: DB
1 ELEMENT _____ DEG AZ STEERING FILTER WTG: HANNING



INDEX 180

REEL: M24

DATE OF ANALYSIS:

CONTROL: 376 - 1148 (6)

OMNI SPECTRUM (ELEMENT 12)

EXERCISE: BEARING STAKE

CENTER FREQ: 280 HZ

1 ELEMENT

DATE/TIME: 3-16-77-1148 Z

ANALYSIS BANDWIDTH: 1/10HZ

DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

ATTEN: - DB

WTG: HANNING

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KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

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CONTROL: 3-16 - 1148 (7)
OMNI SPECTRUM (ELEMENT 14)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 1148 Z

ANALYSIS BANDWIDTH: 1/10 HZ
DEG AZ STEERING

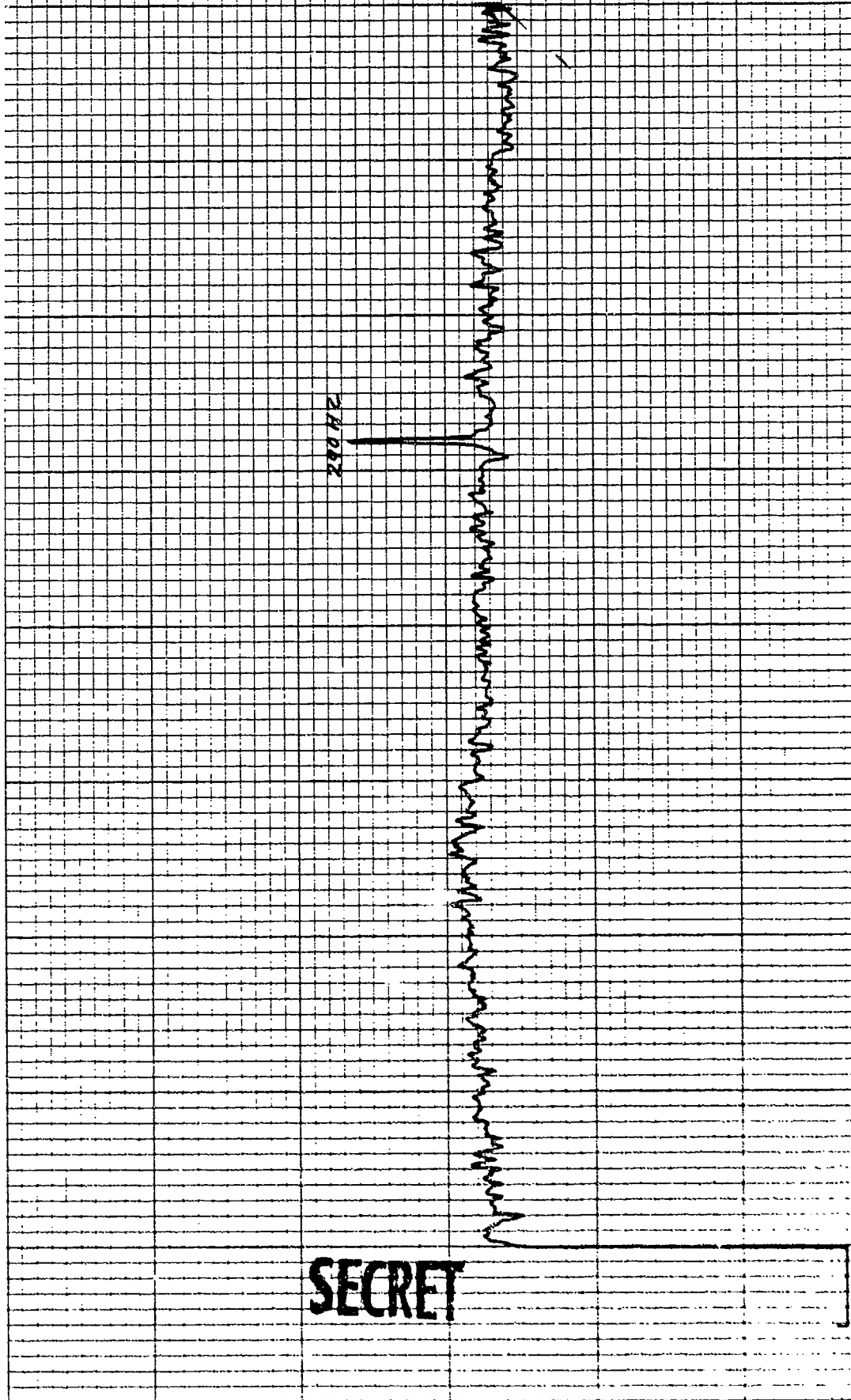
REEL: M24

INDEX 1980

INTEGRATION TIME 320 SECS
FILTER
ATTEN: - DB
WTG: HANNING

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1402 10 X 10 TO THE INCHES 3 10 INCHES
RUPPEL & SEIBER CO. MADE IN U.S.A.

46 0703

REEL: 124 INDEX 198

DATE OF ANALYSIS:

CONTROL: 3-14-1148 (6)

OMNI SPECTRUM (ELEMENT 16)

EXERCISE: BEARING STAKE

CENTER FRFQ: 290 HZ

1 ELEMENT

DATE/TIME: 3-16-77 - 1148 Z

ANALYSIS BANDWIDTH: 1/10 HZ

DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

ATTEN: - DB

WTG: HANNING

SECRET

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290 HZ



CONTROL: 3-16-1140 (9)
OMNI SPECTRUM (ELEMENT 19)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

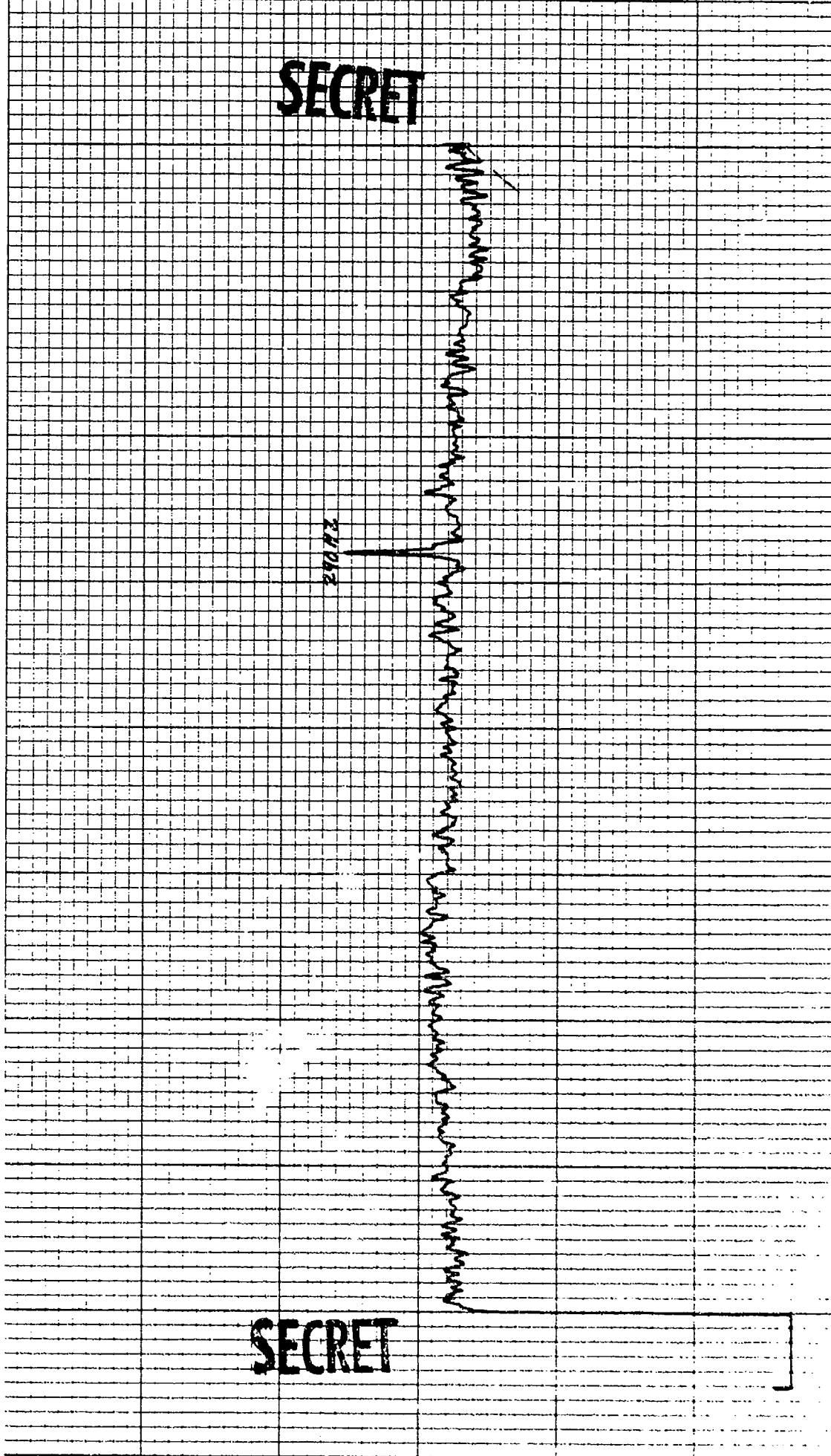
DATE OF ANALYSIS:

DATE/TIME: 3-16-77 -1140 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

INDEX: 1910

REEL: M22

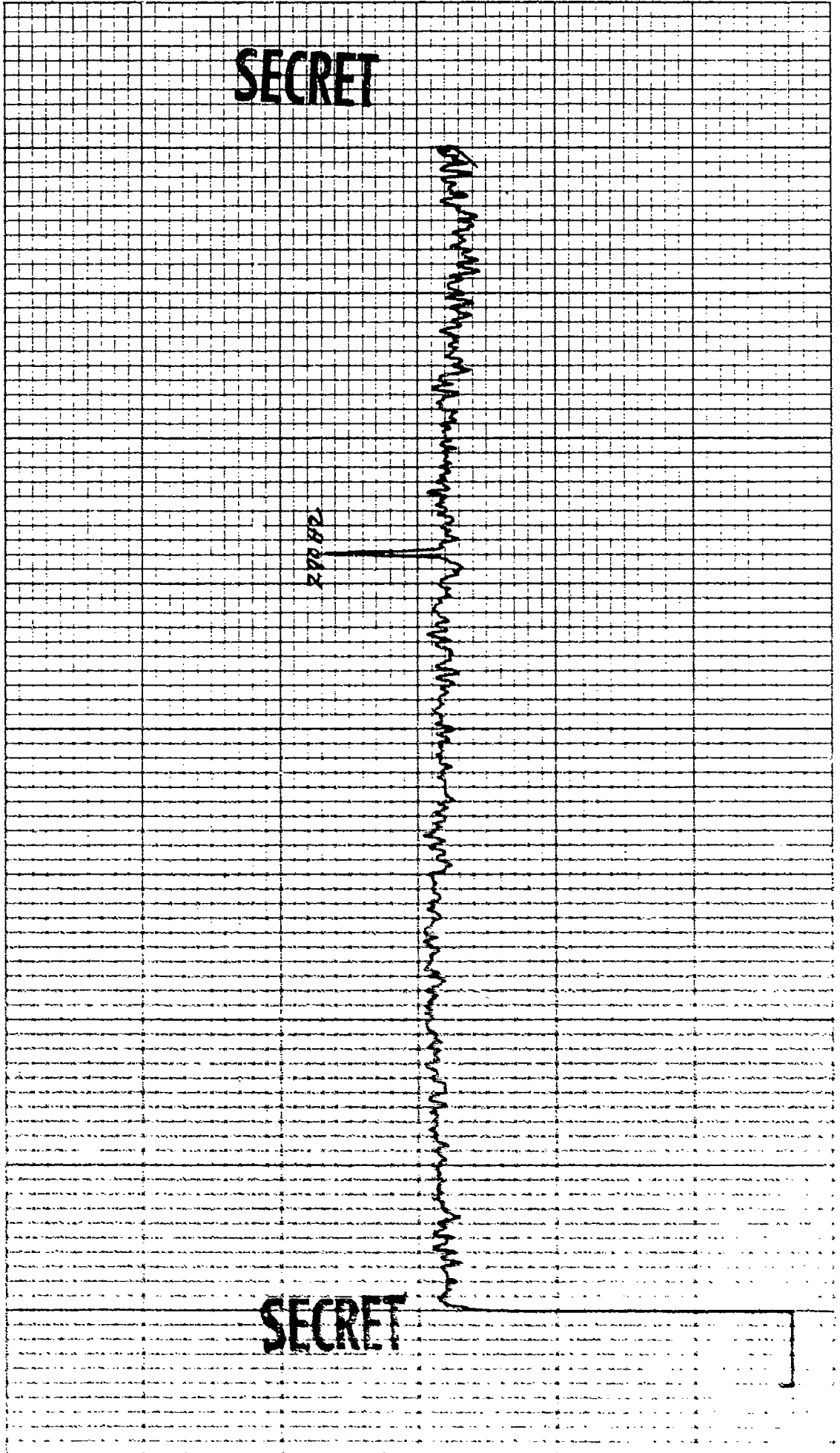
INTEGRATION TIME 320 SECS
ATTEN: - DB
FILTER WTG: HANNING



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CONTROL: 3-6 - 1148 (10) DATE OF ANALYSIS: REEL: M24 INDEX: 1900
 OMNI SPECTRUM (ELEMENT 20)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: DB
 1 ELEMENT — DEC AZ STEERING FILTER WTG: HANNING



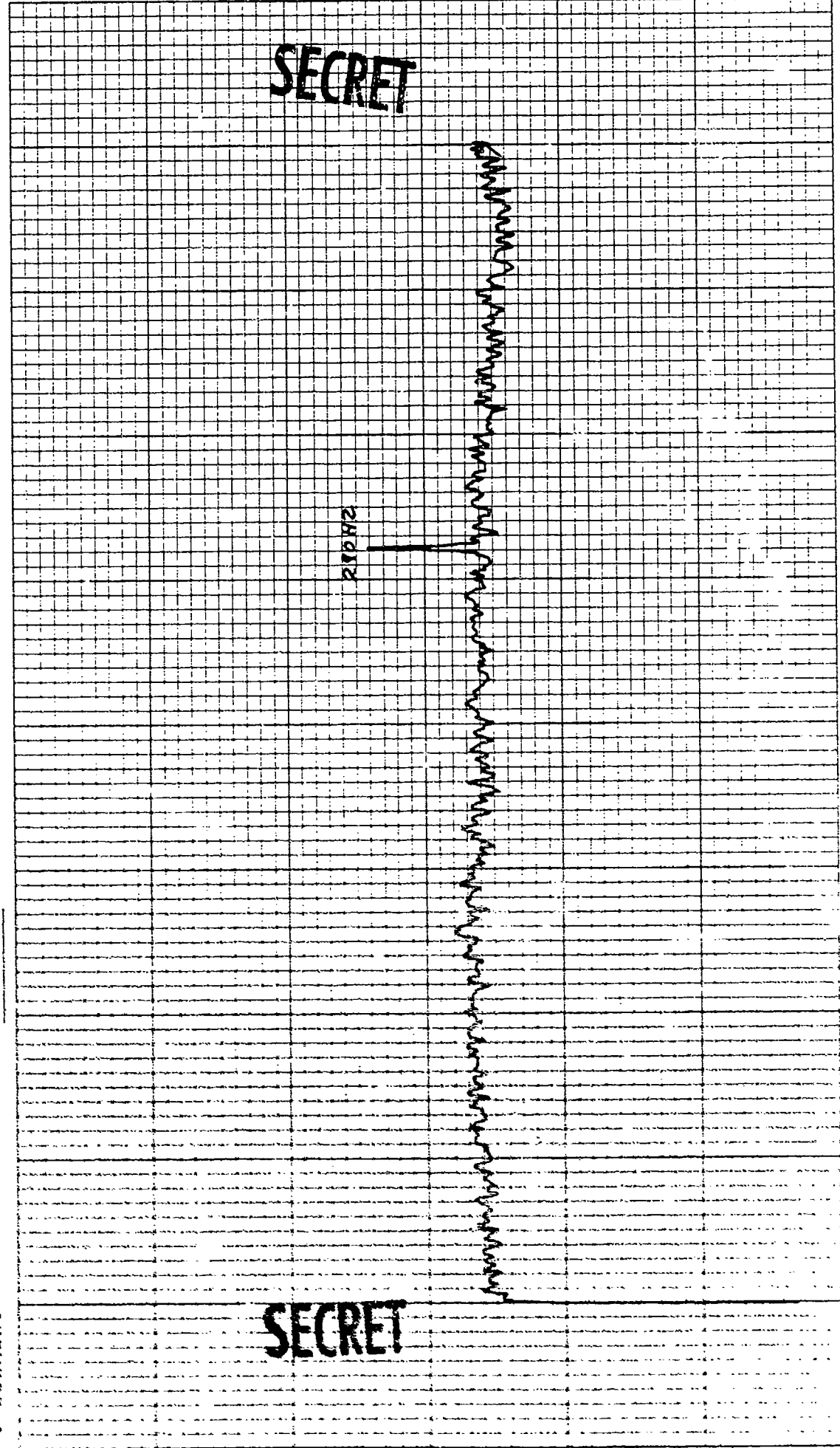
REEL: M 24 INDEX: 1960

DATE OF ANALYSIS:

CONTROL: 3-16 - 1148 (11)
OMNI SPECTRUM (ELEMENT 23)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE/TIME: 3-16-77 - 1148 Z
ANALYSIS BANDWIDTH: 1/10 HZ
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING

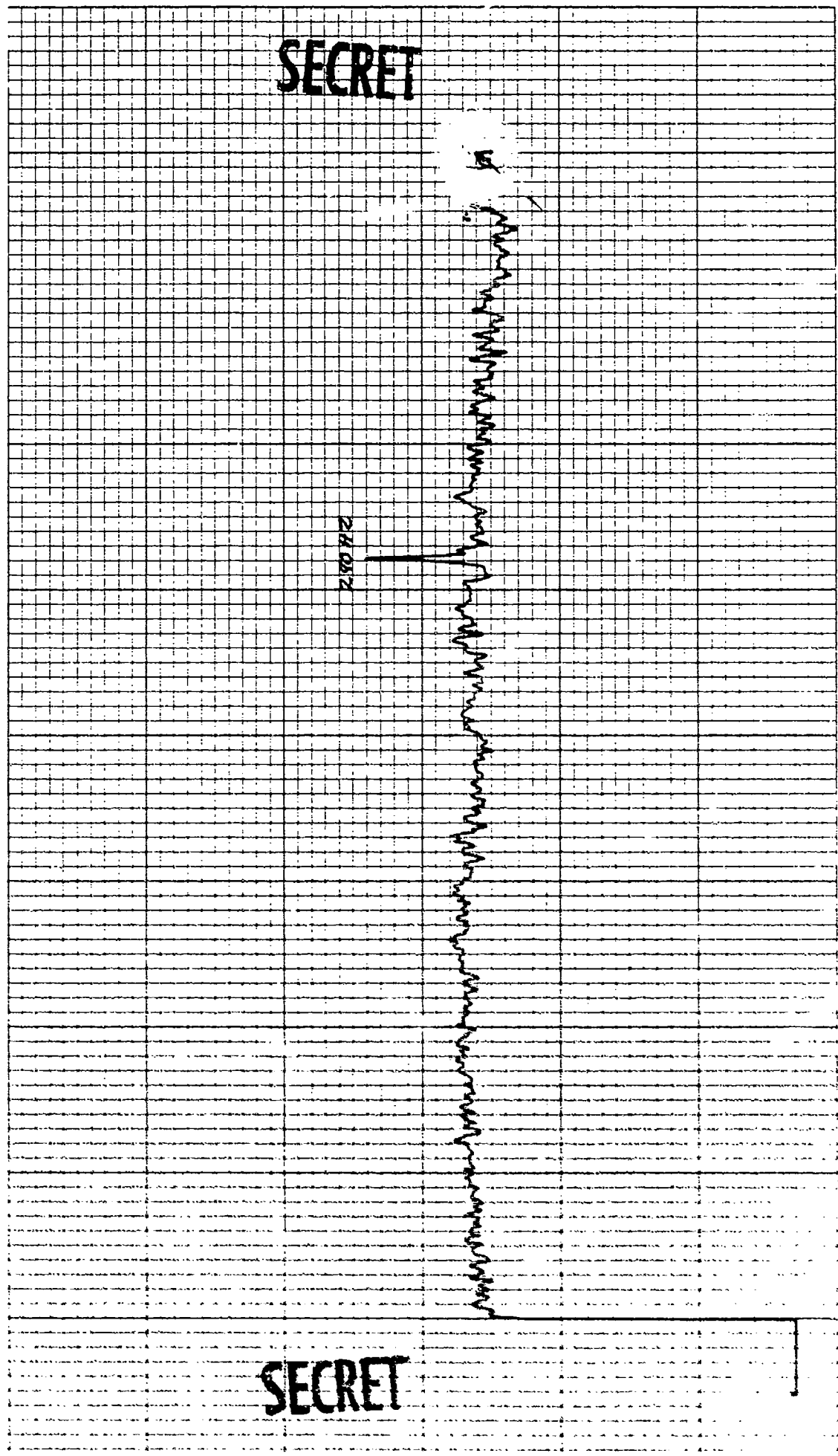
DEG AZ STEERING



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CONTROL: 3-16-1140 (12) DATE OF ANALYSIS: REEL: M24 INDEX: 1980
OMNI SPECTRUM (ELEMENT 24)
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: DB
CENTER FREQ: 280 HZ FILTER WTC: HANNING
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING



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CONTROL: 3-12-1140 (13)
OMNI SPECTRUM (ELEMENT 26)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

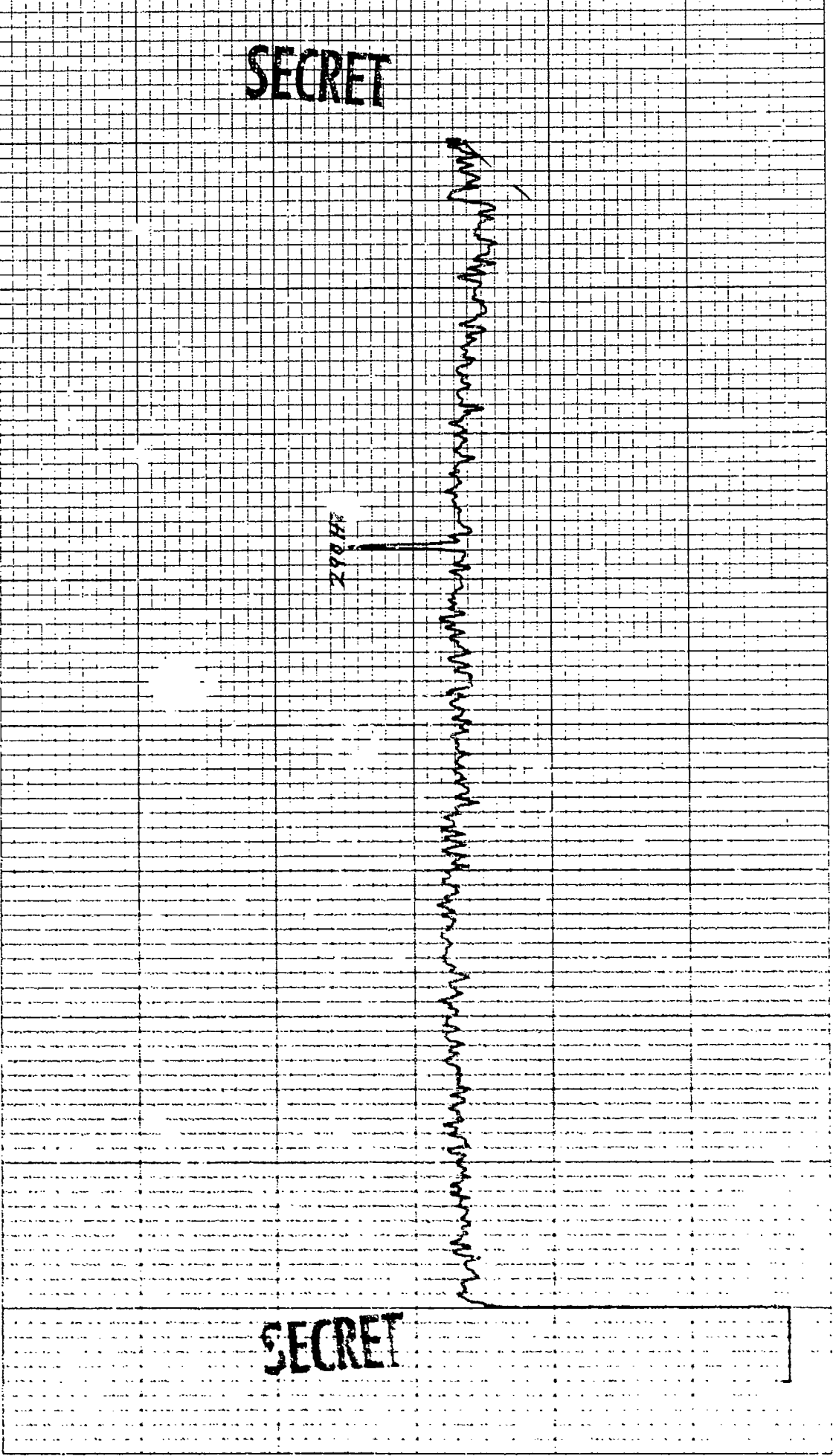
DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 1149 L

ANALYSIS BANDWIDTH: 1/10 HZ
DEG AZ STEERING

REEL: M24 INDEX: 1980

INTEGRATION TIME 3.0 SECS ATTN: DB
FILTER WTG: HANNING



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10 X 10 TO THE INCHES IN ELEMENTS
WEITEL & FISER CO. MADE IN U.S.A.

46 0703

CONTROL: 3-16 - 1148 (14)
OMNI SPECTRUM (ELEMENT 29)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 1148 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEG AZ STEERING

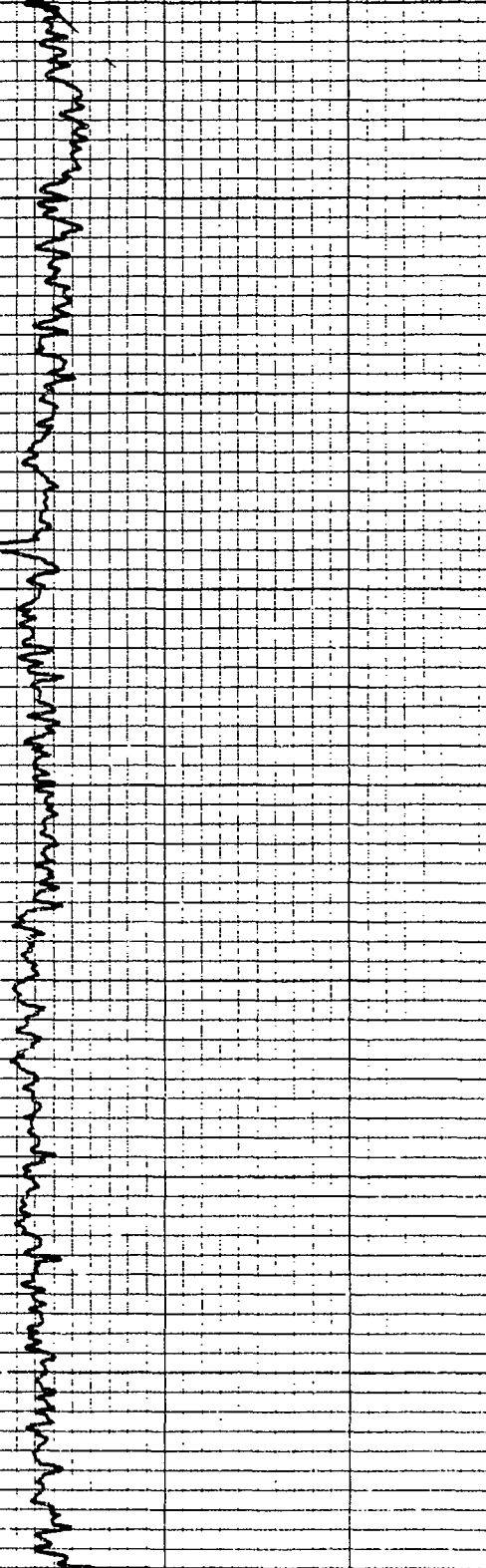
REEL: M24 INDEX 1980

INTEGRATION TIME 320 SECS
FILTER
ATTN: - DB
WTG: HANNING

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290HZ



19 X 10 TO THE INCH • 7 X 19 INCHES
KEUFEL & ESSER CO. MADE IN USA

46 0703

CONTROL: 3-16 - 1140 (15)
OMNI SPECTRUM (ELEMENT 31)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

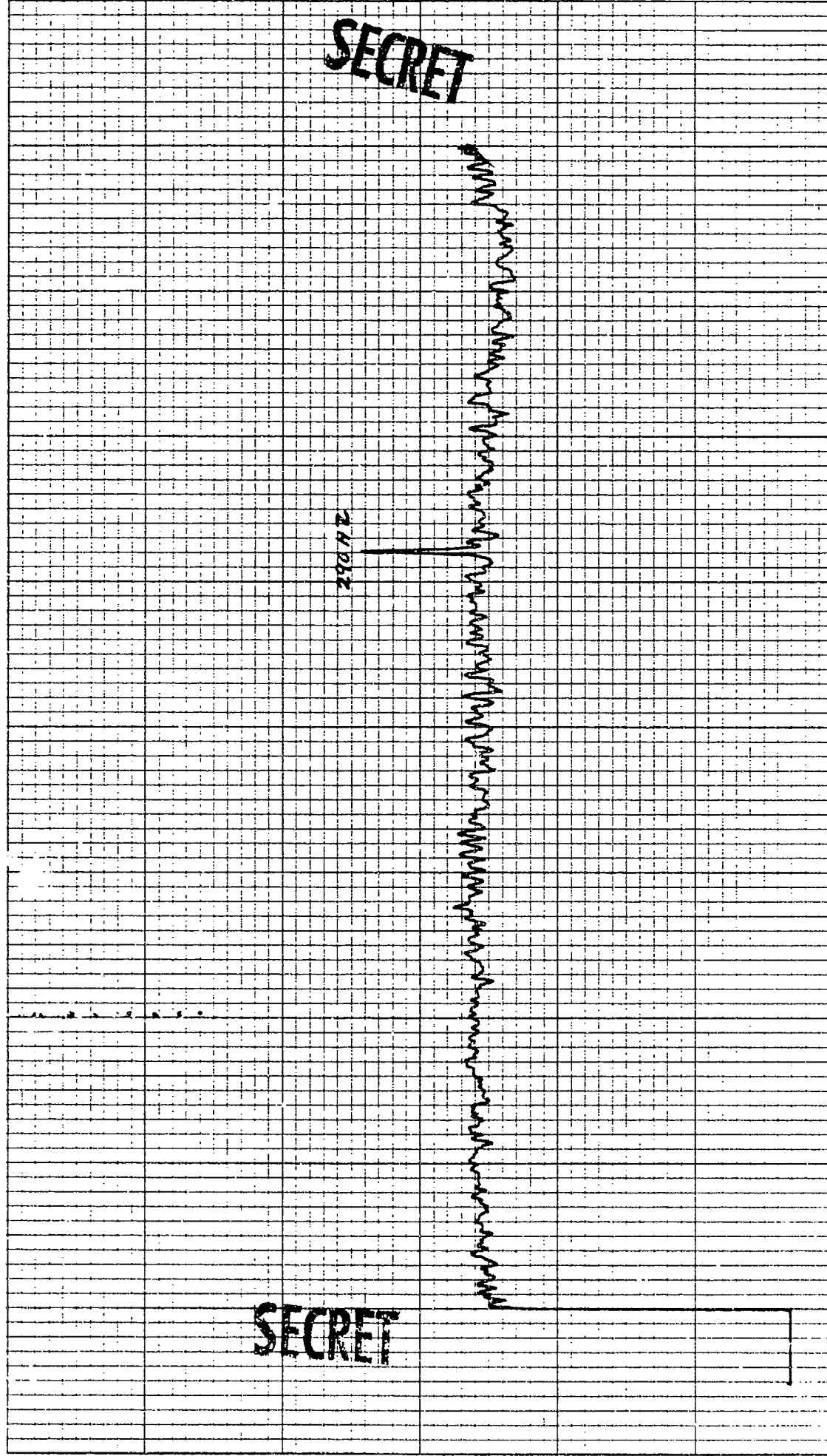
DATE/TIME: 3-16-77 - 1140 Z

ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ STEERING

REEL: M24

INDEX 1980

INTEGRATION TIME 320 SECS ATTN: — DB
FILTER WTG: HANNING



SECRET

280 Hz

SECRET

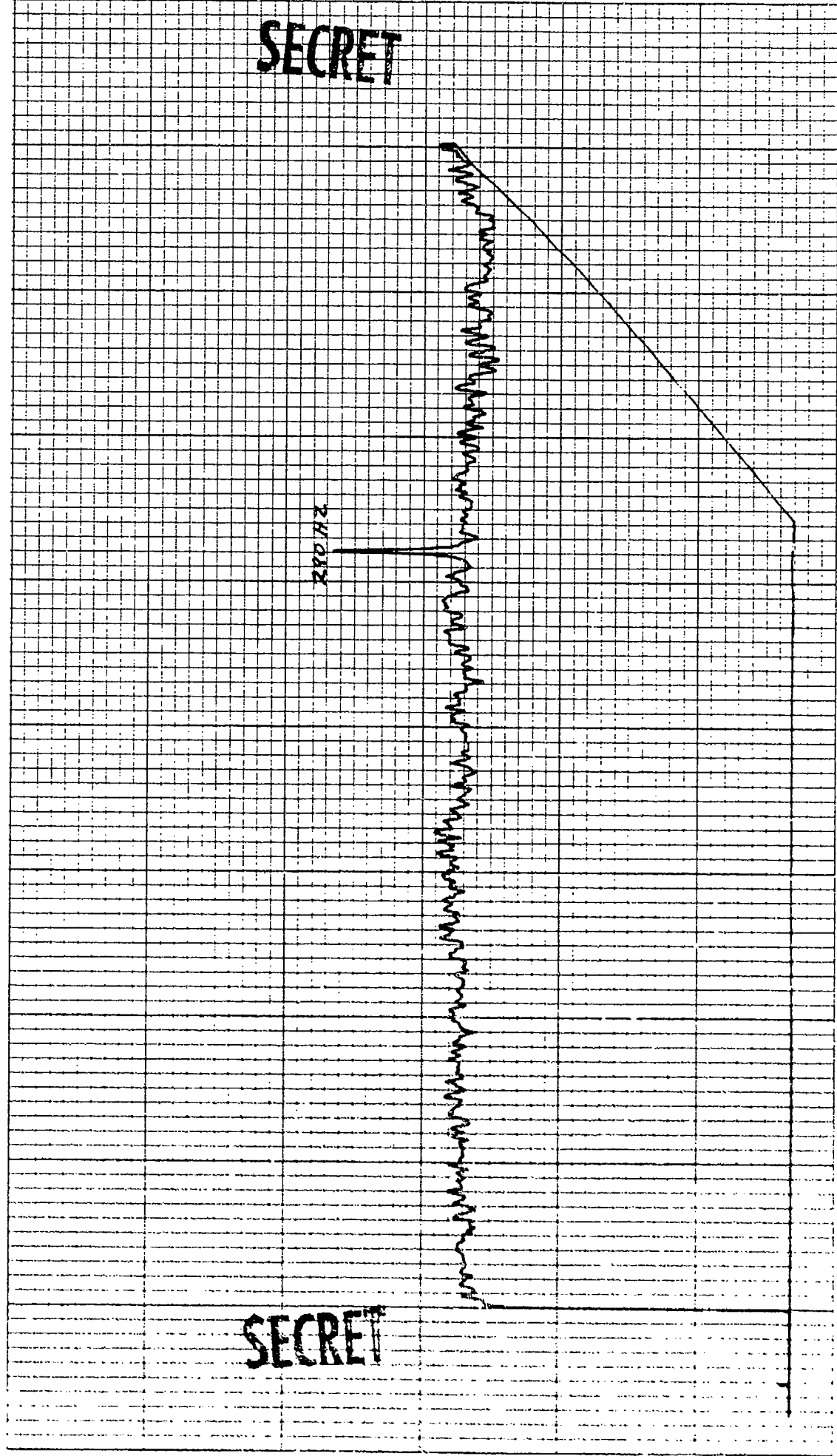
CONTROL: 3-16 - 1148 (16)
OMNI SPECTRUM (ELEMENT 33)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 1148 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: M24 INDEX: 1980

INTEGRATION TIME 320 SECS ATTN: ~ DB
FILTER WTG: HANNING



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K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
HEUFEL & ESSER CO. MADE IN U.S.A.

46 0703

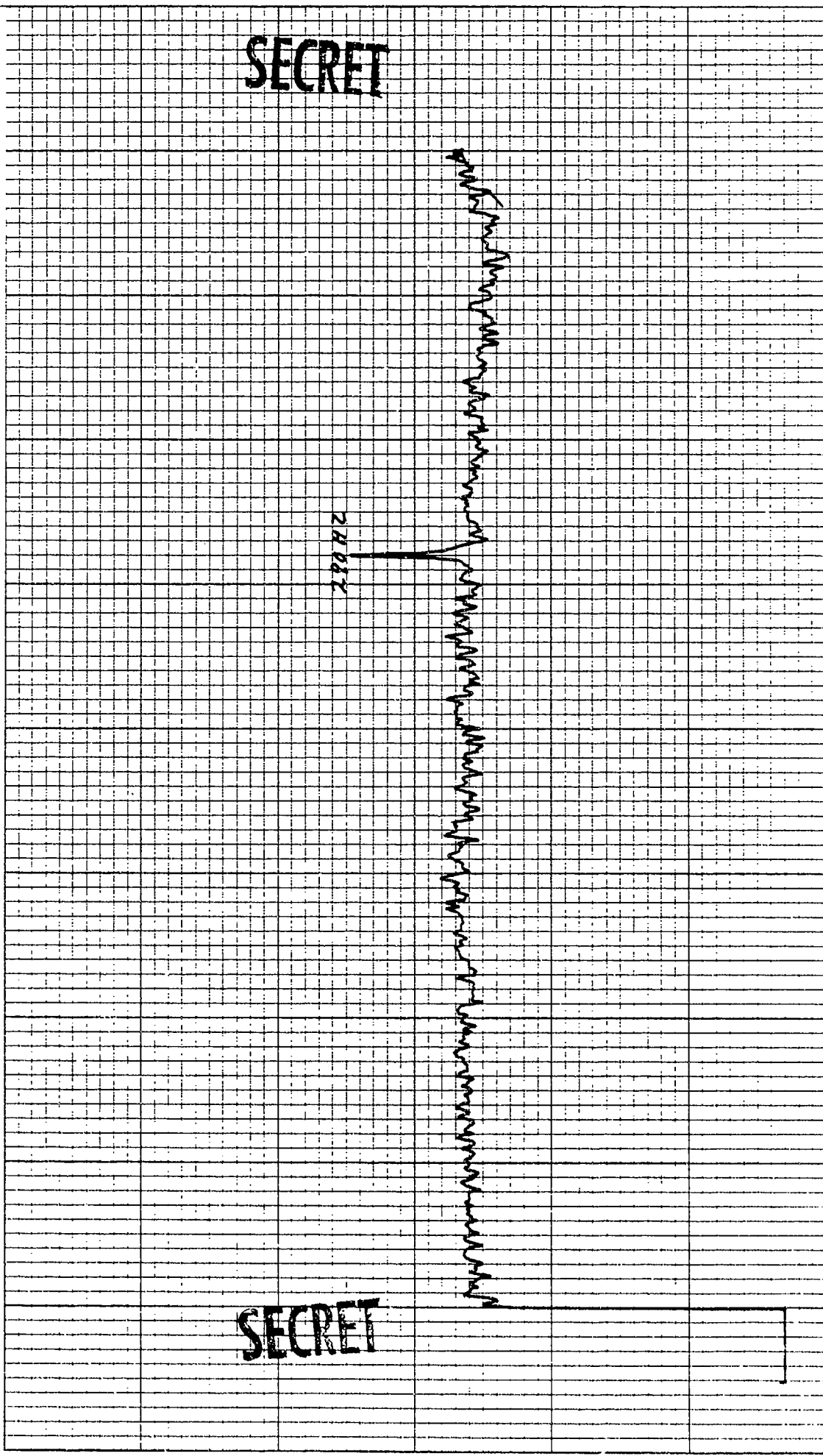
CONTROL: 3-16 - 1148 (17)
OMNI SPECTRUM (ELEMENT 35)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 1148 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: H24 INDEX 198c

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



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10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 376-1148 (18) DATE OF ANALYSIS: REEL: 424 INDEX 1980
OMNI SPECTRUM (ELEMENT 37)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
INTEGRATION TIME 320 SECS ATTN: - DB
1 ELEMENT FILTER WTC: HANNING
DATE/TIME: 3-16-77 - 1148 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEG AZ STEERING

SECRET

210112

SECRET

1000 10 X 10 TO THE INCHES X 1000 HZ
REDFIELD A-5000 CO. WINDING

46 0703

INDEX 1990

REEL: M24

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 1140 Z

CONTROL: 376 - 1140 (19)

OMNI SPECTRUM (ELEMENT 37)

EXERCISE: BEARING STAKE

CENTER FREQ: 280 HZ

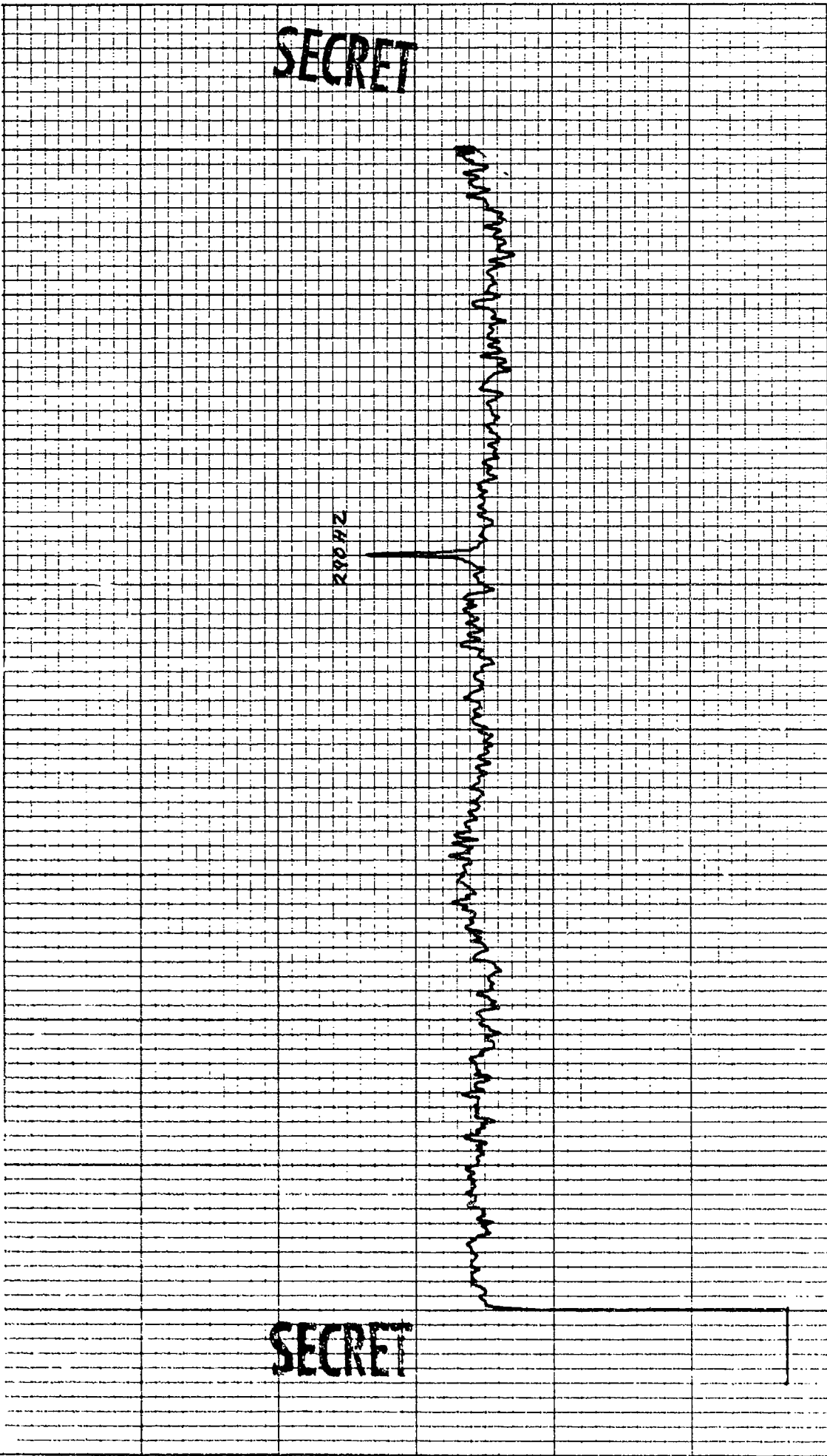
1 ELEMENT

ANALYSIS BANDWIDTH: 1/10HZ

DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER WTG: HANNING



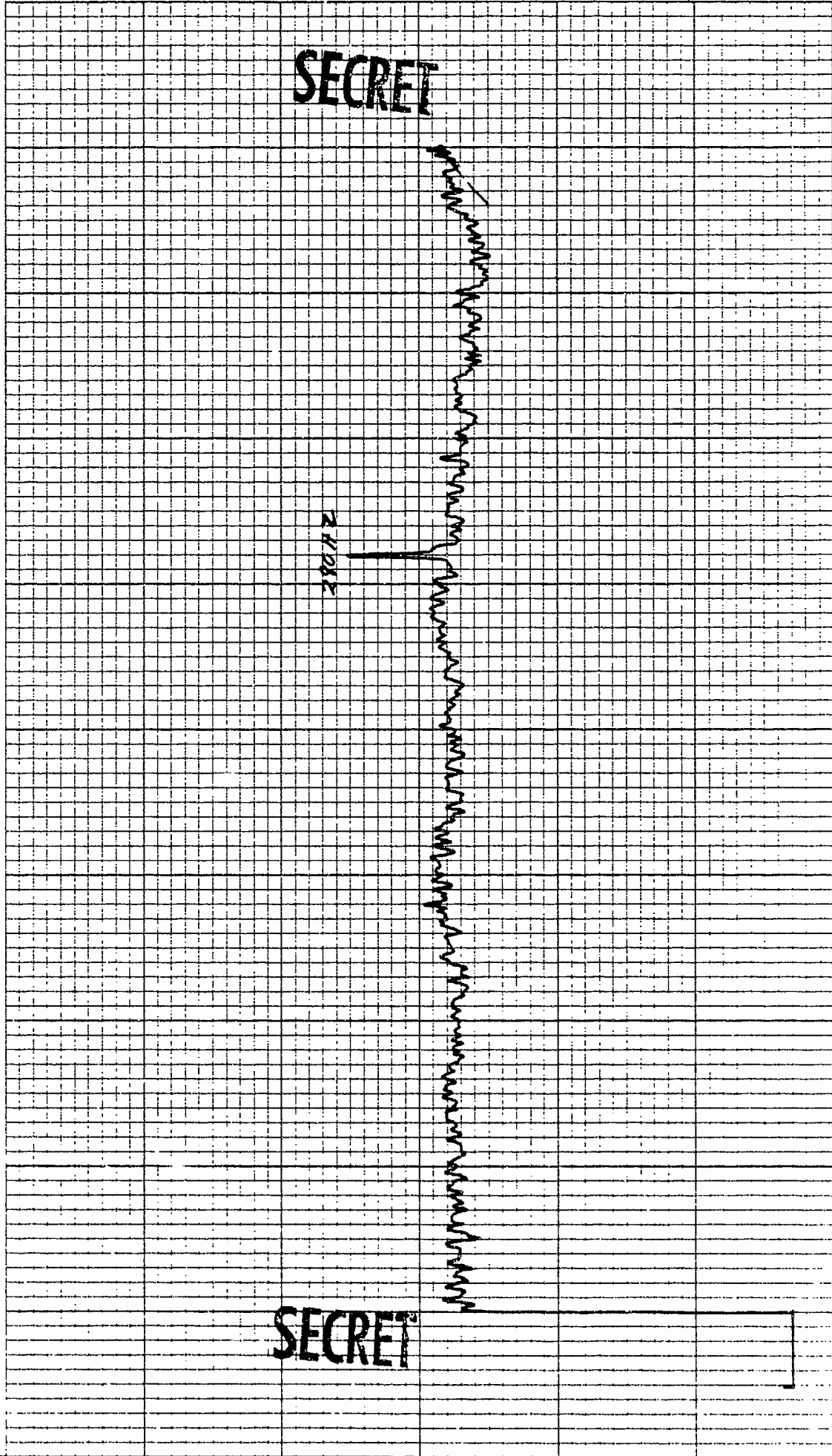
CONTROL: 3-16 - 1148 (20)
OMNI SPECTRUM (ELEMENT 41)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-6-77 - 1148 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: M24 INDEX: 1960

INTEGRATION TIME 320 SECS
ATTEN: — DB
FILTER WTG: HANNING



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K^oE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

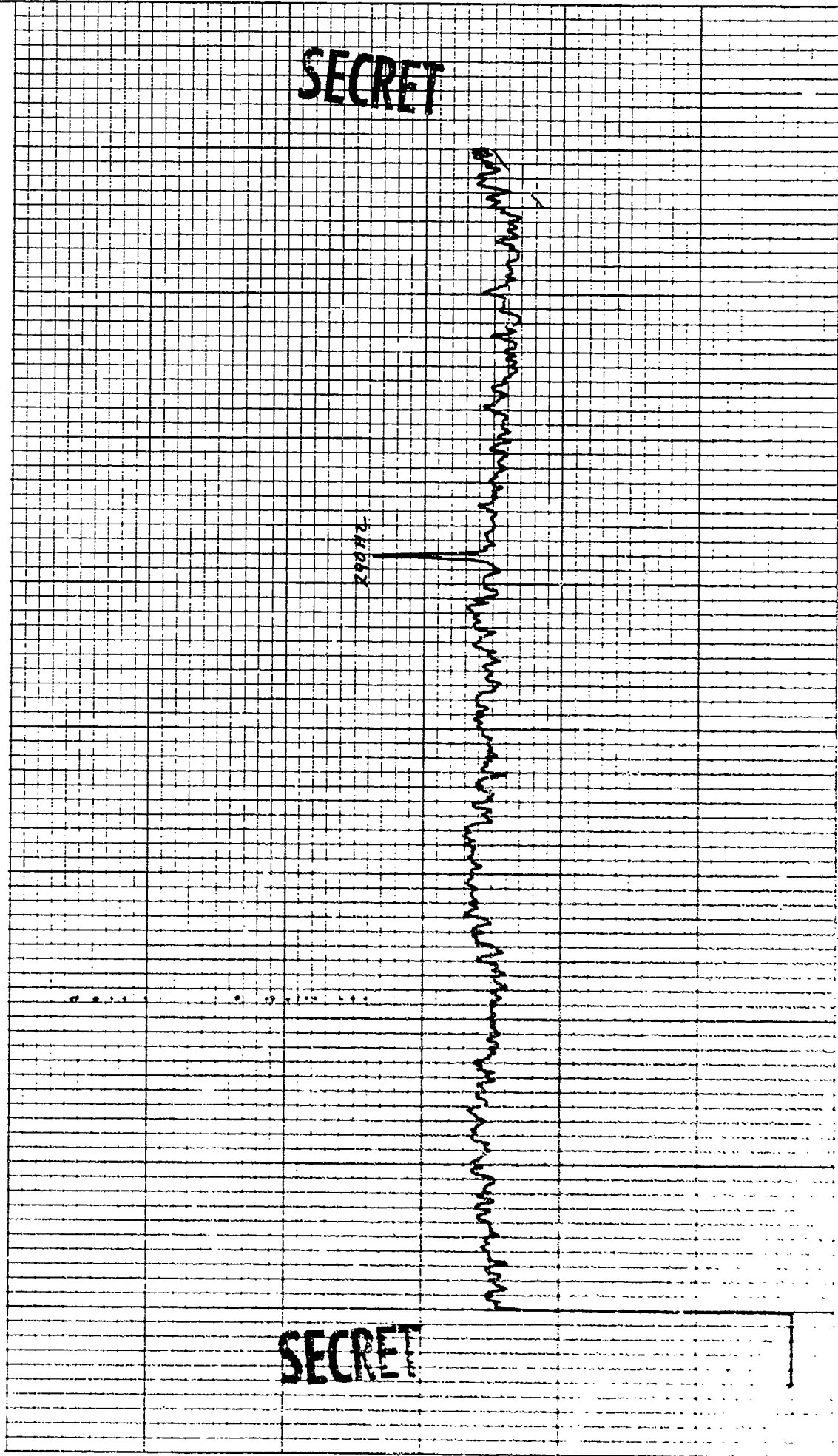
CONTROL: 3-16 - 1148 (e1)
OMNI SPECTRUM (ELEMENT 43)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 1148 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: M24 INDEX 1980

INTEGRATION TIME 320 SECS ATTN: — DB
FILTER WTG: HANNING



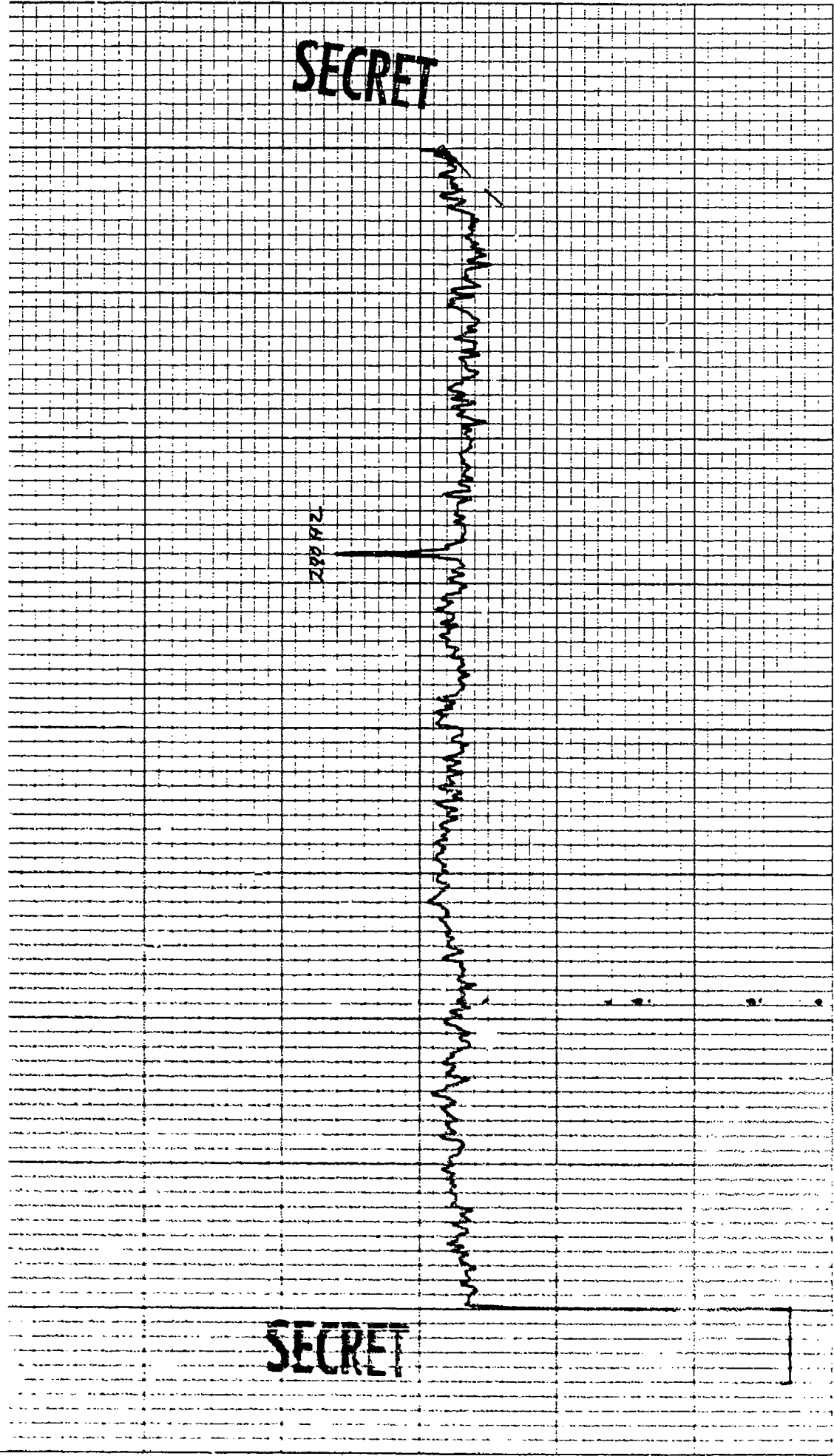
SECRET

SECRET

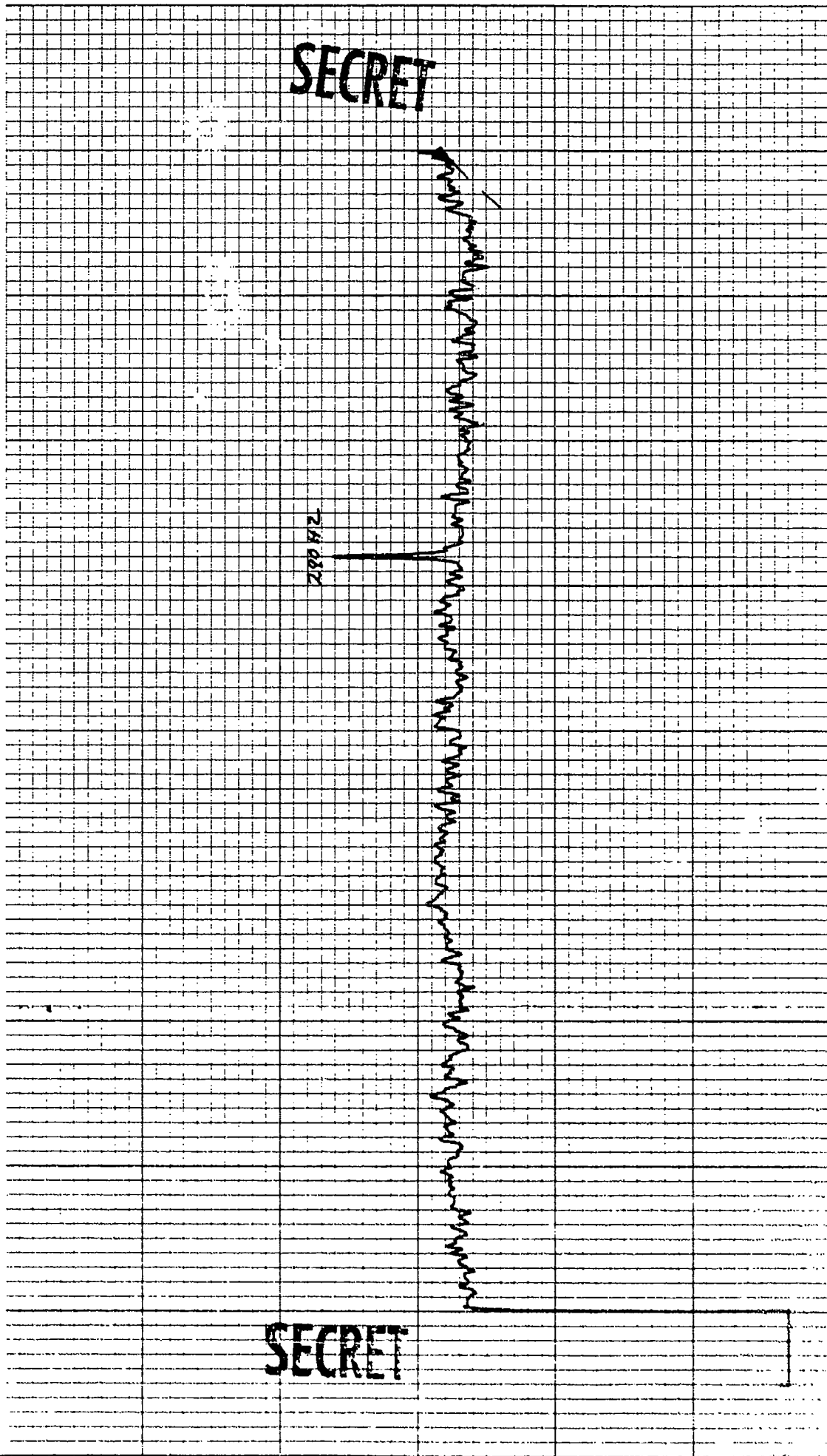
19.2 IN TO THE TRACK. 1 TO FACTORY
RECEIVED 5-20-77 03 46 0703

46 0703

CONTROL: 3-16-1149 (22) REEL: M24 INDEX: 1980
 OMNI SPECTRUM (ELEMENT 45)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 HZ
 DATE OF ANALYSIS:
 DATE/TIME: 3-16-77 -1140 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 INTEGRATION TIME 320 SECS ATTEN: - DB
 FILTER WTG: HANNING
1 ELEMENT DEC AZ STEERING



CONTROL: 3-16 -148 (22) DATE OF ANALYSIS: REEL: M24 INDEX 1860
OMNI SPECTRUM (ELEMENT 45)
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATEN: - DB
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
1 ELEMENT _____ DEG AZ STEERING



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SECRET

10 X 10 TO THE INCHES
HEUFFEL & FESSER CO. - MADE IN U.S.A.

46 0703

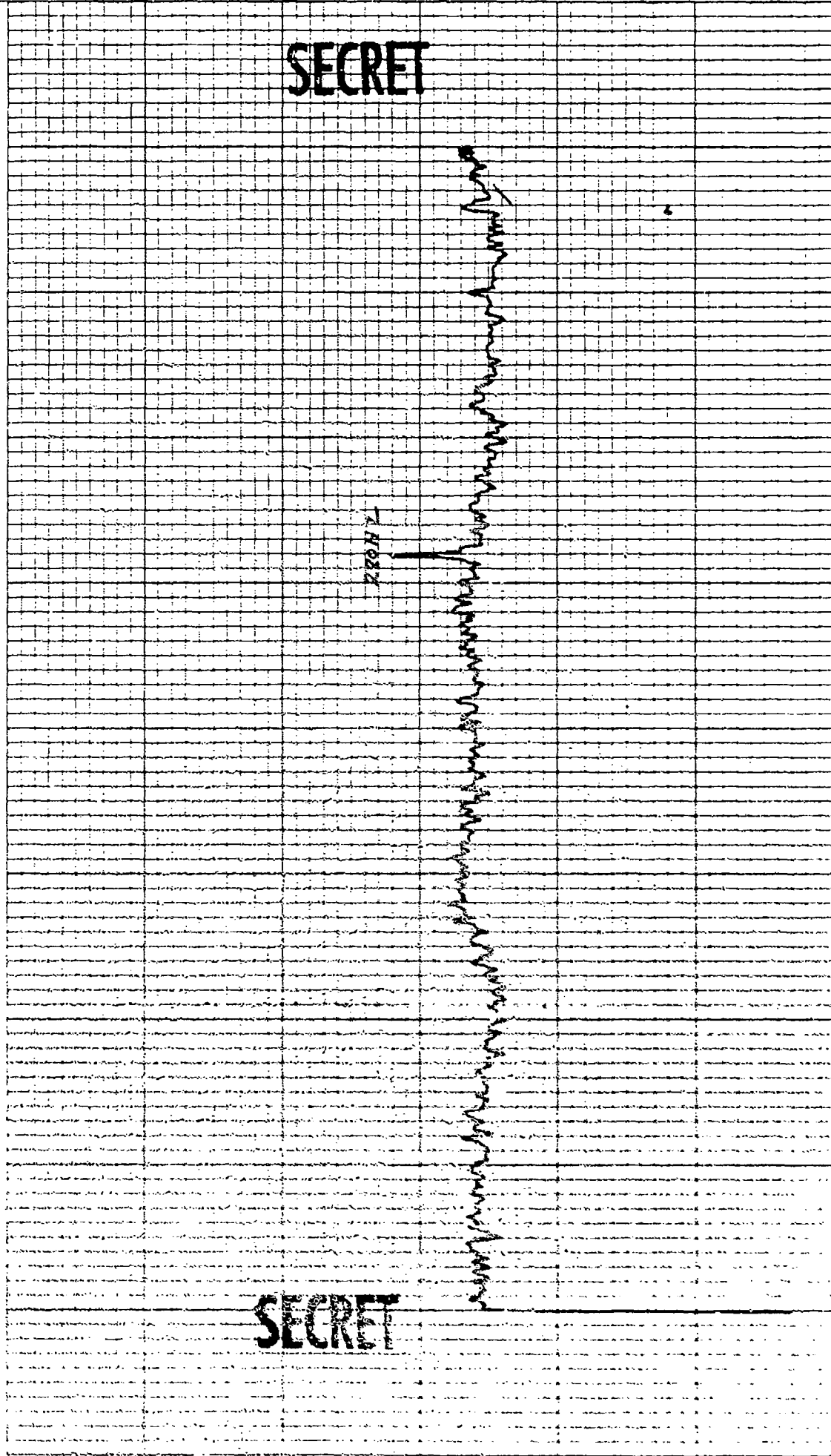
CONTROL: 37 - 1140 (23)
OMNI SPECTRUM (ELEMENT 47)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 7-1-77 - 1140 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: M24 INDEX 180

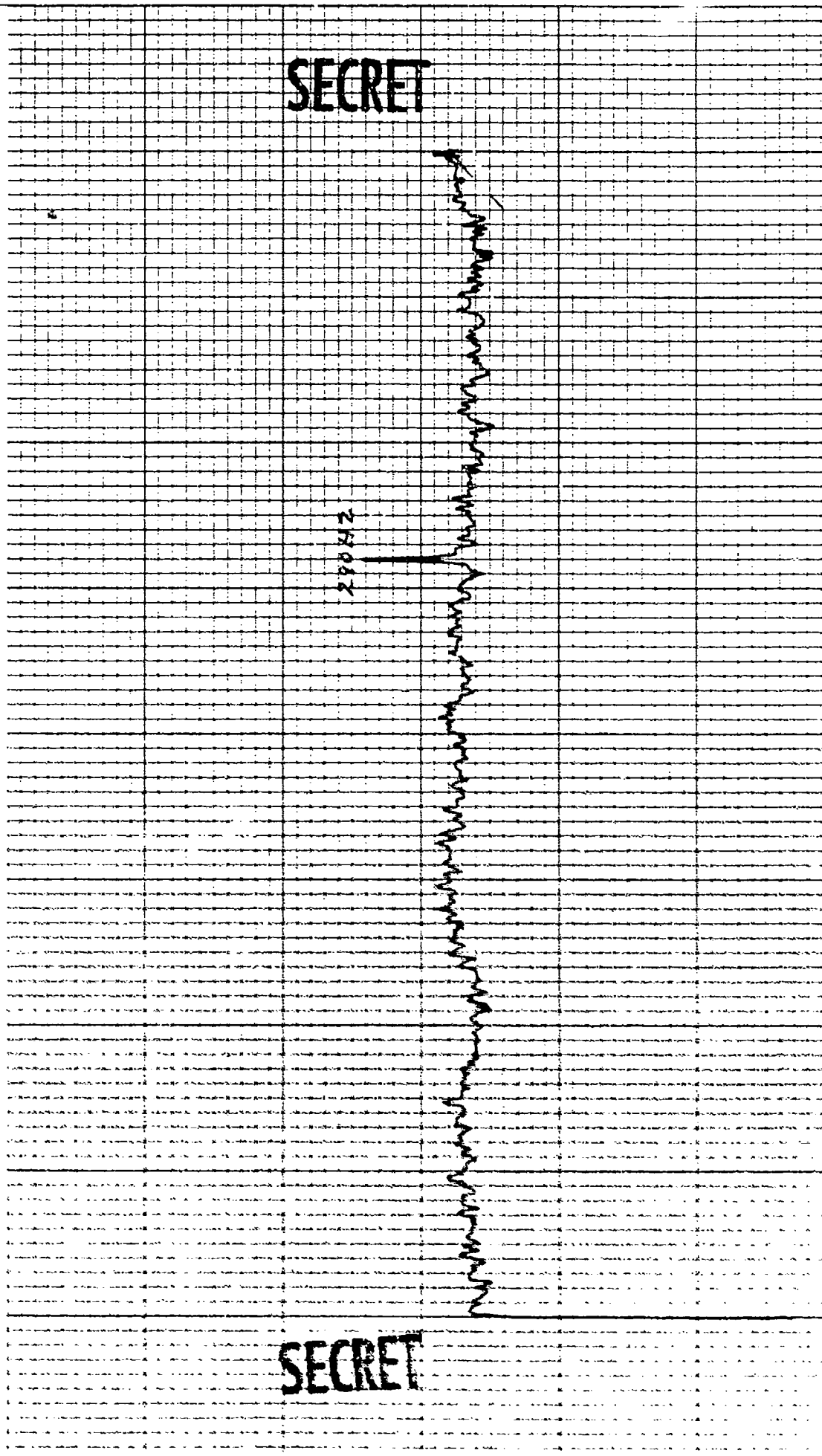
INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING



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CONTROL: 3-6 - 1/48 (24) REEL: M24 INDEX: 1980
 OMNI SPECTRUM (ELEMENT 19)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ INTEGRATION TIME 320 SECS ATTN: - DB
 1 ELEMENT FILTER WTG: HANNING
 DATE OF ANALYSIS: ANALYSIS BANDWIDTH: 1/10HZ
 ANALYSIS BANDWIDTH: 1/10HZ DEC AZ STEERING



SECRET

SECRET

12-10-77 1400 HZ 1.00 HZ
RECEIVED 12-10-77 1400 HZ

46 0703

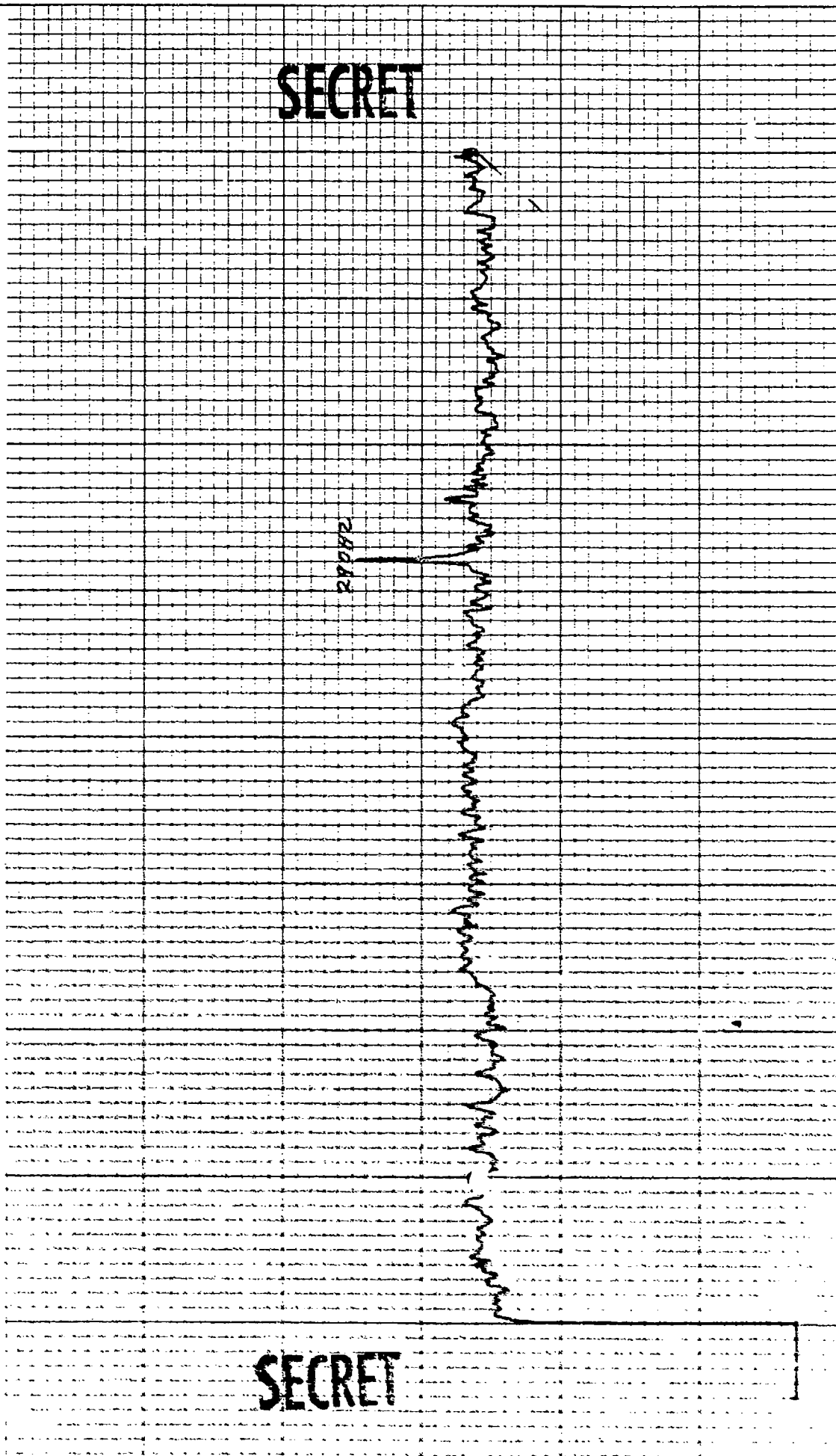
CONTROL: 346-140 (25) DATE OF ANALYSIS: REEL: M24 INDEX 1980
OMNI SPECTRUM (ELEMENT 51)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE/TIME: 3-6-77 - 1140 Z
ANALYSIS BANDWIDTH: 1/10 HZ
INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTC WTC: HANNING
DEC AZ STEERING

SECRET

SECRET

2400Z



INDEX/960

REEL: 424

DATE OF ANALYSIS:

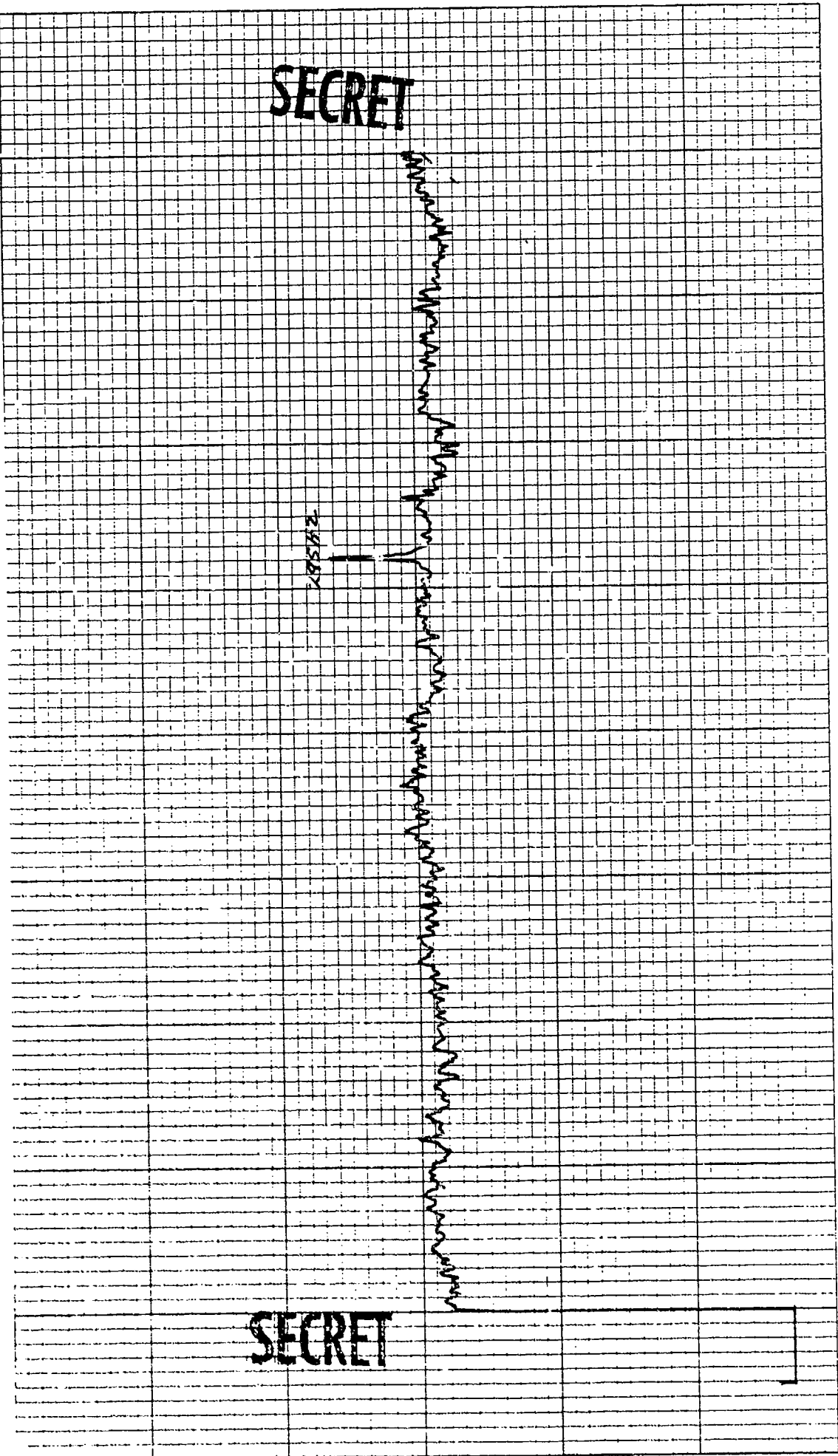
CONTROL: 3-16 - 1148 (26)

INTEGRATION TIME 320 SECS
FILTER

DATE/TIME: 3-16-77 - 1148 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

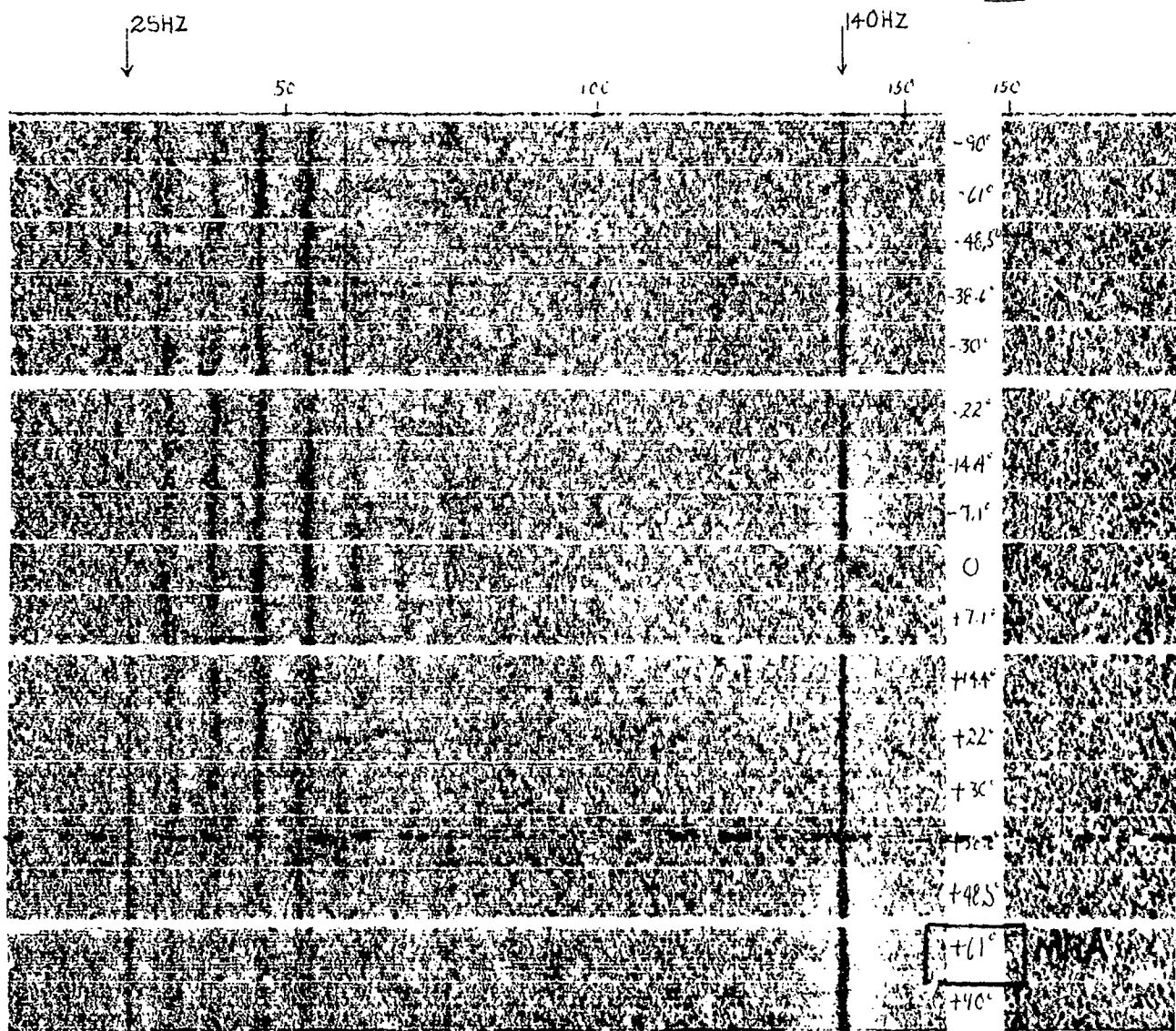
OMNI SPECTRUM (ELEMENT 53)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

ATTEN: DB
WTG: HANNING



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CONTROL NUMBER 1148Z-51-DP12
 NUMBER OF ELEMENTS 16
 FREQUENCY BAND 10 TO 300 HZ
 RANGE 122 N.M.

HISTOPRAZ
 TAPE REEL NUMBER M24
 ANALYSIS BAND WIDTH .2
 WATER DEPTH 2800 F

SECRET

290HZ
295H

2

140HZ

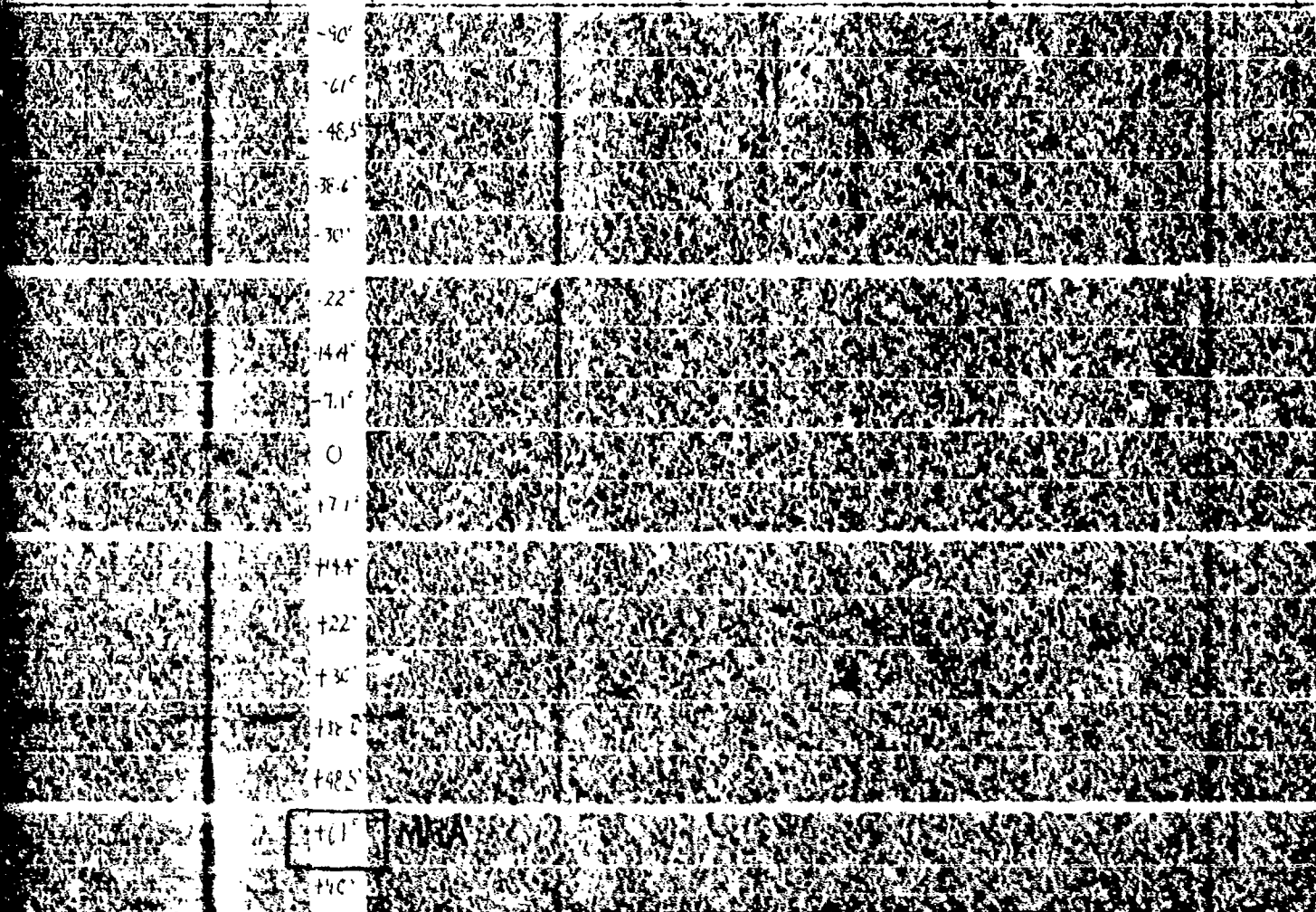
150'

150'

200'

250'

300'



MBA

HISTORICAL

TAPE REEL NUMBER M24

ANALYSIS BAND WIDTH .2 Hz

WATER DEPTH 2800 FMS

TAPE COUNT 1980

SECRET

ELEMENT NUMBER 1 R 16

DATE 3-16-77

EXERCISE: BEARING STAKE

SAN-XXX-78-0131

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 12

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-22.7</u> dBV	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-12.7
BEAMFORMER GAIN	<u>+18</u>	+5.3 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .18</u>	+5.5 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-54.6</u> dBV	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-44.6
BEAMFORMER GAIN	<u>+18</u>	-26.6 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR	<u>+5.3</u>	
NOISE LEVEL FOR SNR	<u>-26.6</u>	31.9
PROCESSOR CORRECTION	<u>-4.0</u>	27.9
MRA CORRECTION	<u>+ .2</u>	28.1 SNR 1 HZ BAND
BANDWIDTH CONVERSION	<u> </u>	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 12

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -39.9 dBV
MCPS-32 CAL. CORRECTION +10 -29.9
BEAMFORMER GAIN +18 -11.9 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION + .8 -11.1 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -57.8 dBV
MCPS-32 CAL. CORRECTION +10 -47.8
BEAMFORMER GAIN +18 -29.8 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR -11.9
NOISE LEVEL FOR SNR -29.9 18.0
PROCESSOR CORRECTION -4.2 13.8
MRA CORRECTION + .8 14.6 SNR .013 HZ BAND
BANDWIDTH CONVERSION _____ SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

DATA POINT 12

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-24.8</u>	<u>-38.6</u>	<u>_____</u>
MRA SIGNAL LEVEL	<u>+5.5</u>	<u>-11.1</u>	<u>_____</u>
ARRAY SIGNAL GAIN	<u>30.3</u>	<u>27.5</u>	<u>_____</u>
20 LOG <u>16</u>	<u>24</u>	<u>24</u>	<u>_____</u>
# of elements			
DIFFERENCE	<u>+6.3</u>	<u>+3.5</u>	<u>_____</u>

ARRAY GAIN

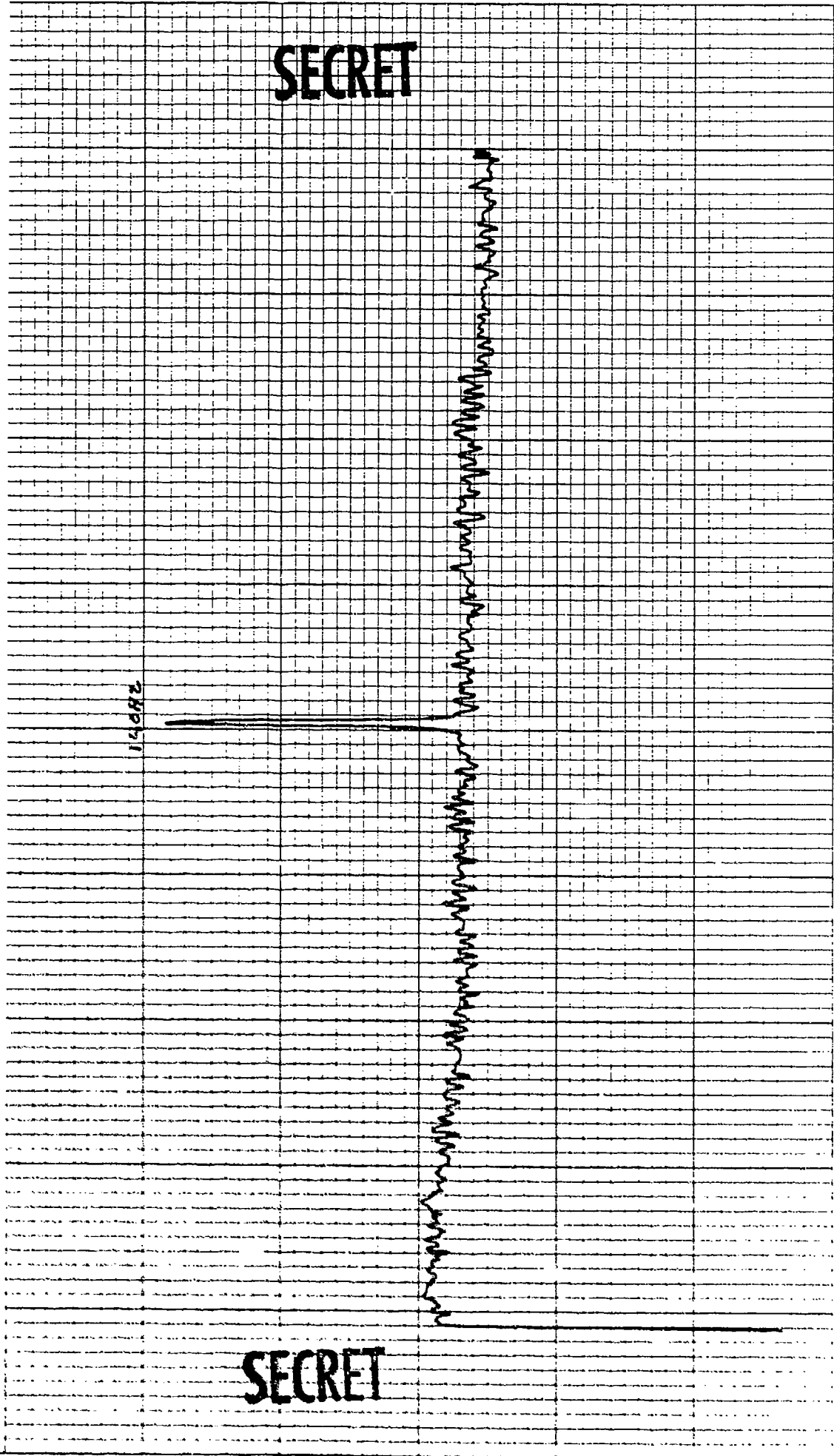
MRA SNR	<u>28.1</u>	<u>14.6</u>	<u>_____</u>
MEAN OMNI SNR	<u>19.4</u>	<u>7.9</u>	<u>_____</u>
ARRAY GAIN	<u>8.7</u>	<u>6.7</u>	<u>_____</u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>7.4</u>	<u>9.8</u>	<u>_____</u>
DIFFERENCE	<u>+ .7</u>	<u>- 3.1</u>	<u>_____</u>

CONFIDENTIAL

CONTROL: 148 - 16 (DPA) DATE OF ANALYSIS: 1-16 REEL: 434 INDE X 1985
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 140 HZ
16 ELEMENTS

INTEGRATION TIME 320 SECS ATTN: -10 DB
 FILTER WTG: HANNING

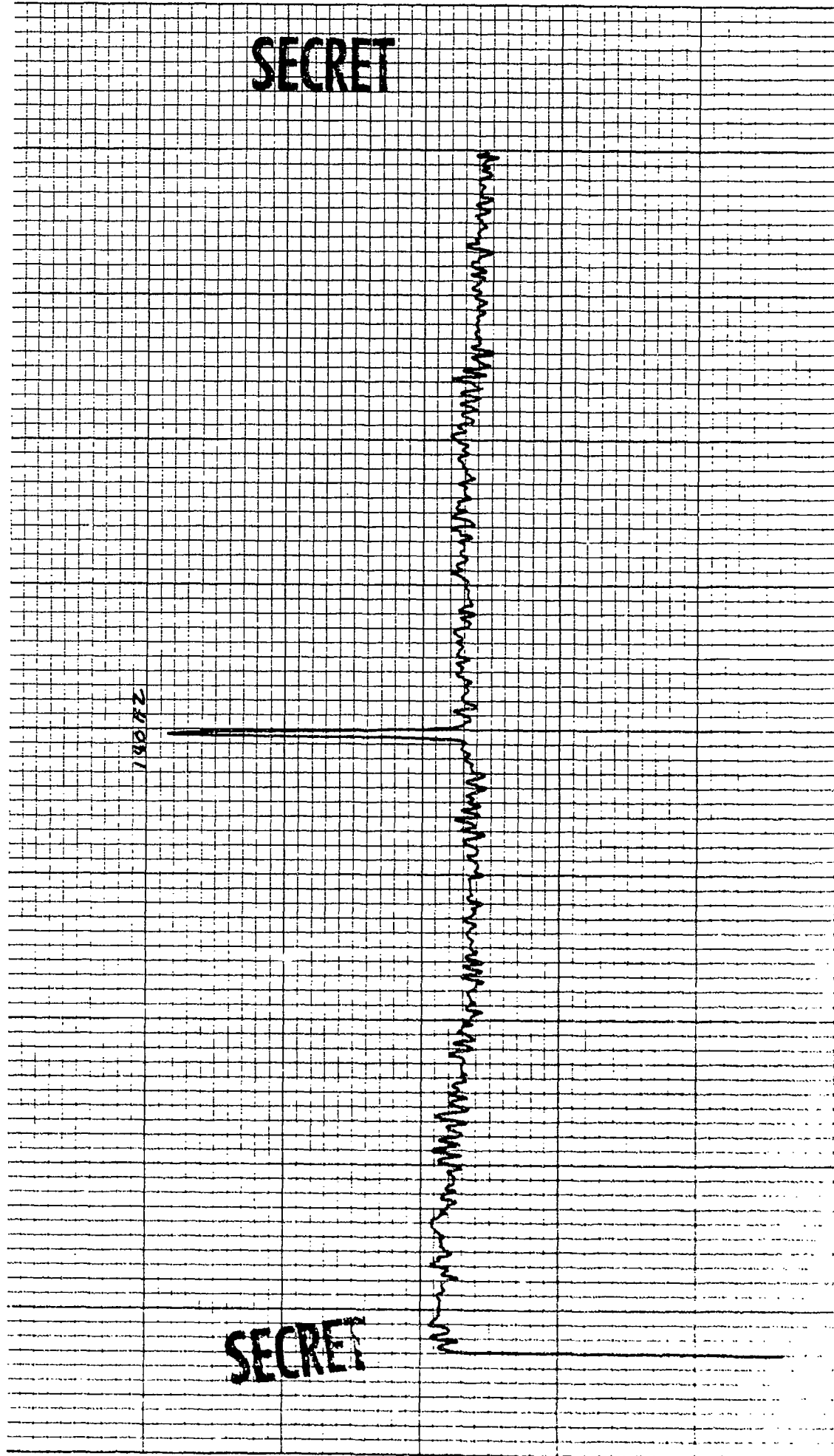
DAT / TIME: 3-2-77 - 1148 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
+ 40 DEG. AZ STEERING



K-2 10 X 10 TO THE INCH • 7 X 10 INCHES
NEUFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 1146 - 16 (D012) REEL: 1124 INDE X1995
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-16
EXERCISE: BEARING STAKE DATE/TIME: 3-76-77 - 1146 Z INTEGRATION TIME 320 SECS ATTN: -/6 DB
CENTER FREQ: 140 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
16 ELEMENTS + 50 DEG. AZ STEERING



USE 10 X 10 TO TAKE INCHES 1 TO 100 PER INCH
OR 10 X 10 TO TAKE INCHES 1 TO 100 PER INCH

46 0703

CONTROL: 1149 - 16 (Dpio.) REEL: MBY INDE X/1995

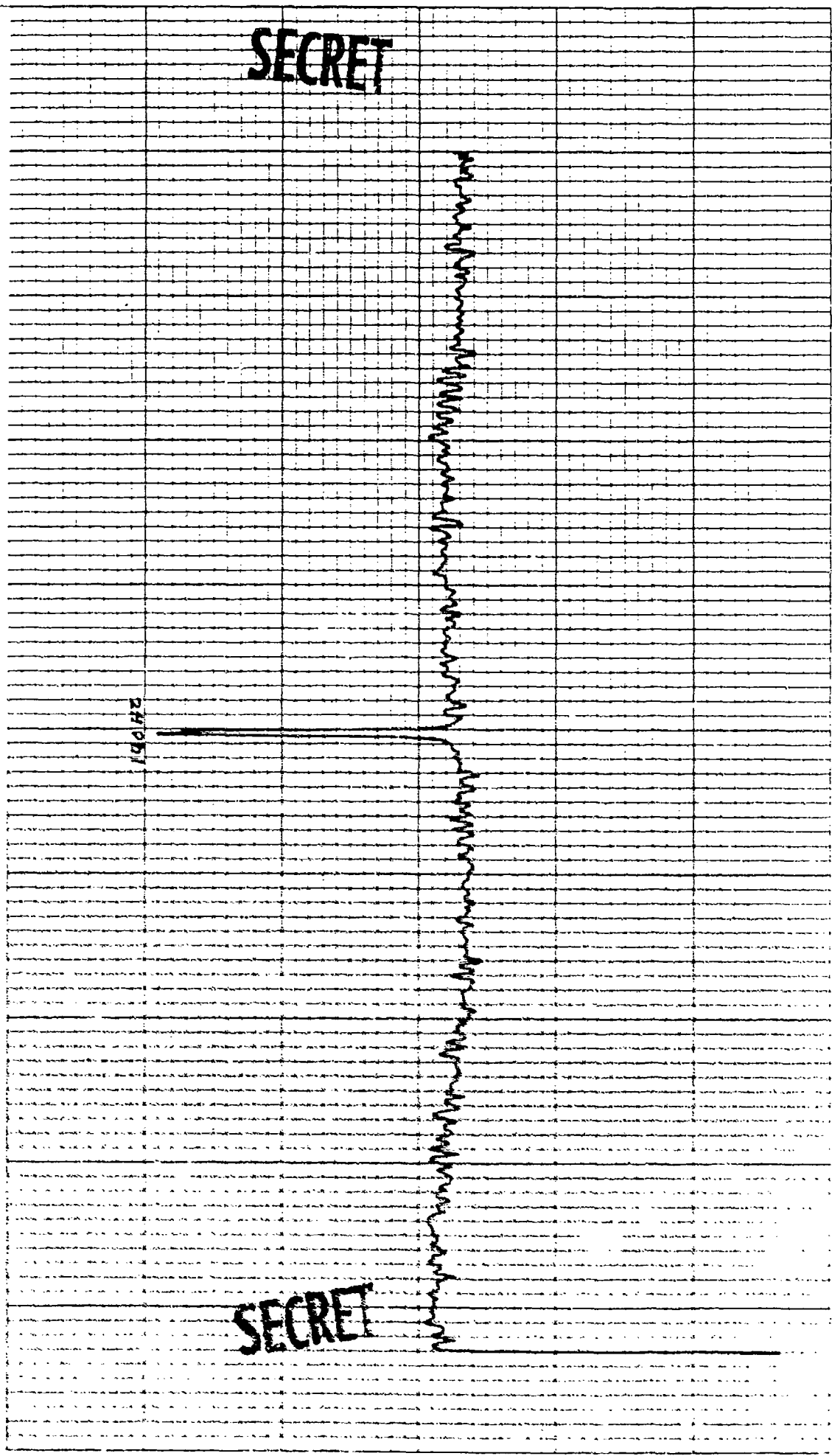
BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: - - - -

EXERCISE: BEARING STAKE 1-16

CENTER FREQ: 140 HZ DATE/TIME: 3-16-77 - 1149 Z INTEGRATION TIME 320 SECS ATTEN: -10 DB

14 ELEMENTS ANALYSIS BANDWIDTH: 1710HZ FILTER WIG: HANNING

+52 DEG. AZ STEERING



KOE 10 X 10 TO THE INCH • 1 X 10 INCHES
REMPER & ESSER CO. MADE IN U.S.A.

46 0703

616.5

CONTROL: 1148 - 16 (DPI 2)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 140 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-76

REEL: 1134

INTEGRATION TIME 320 SECS

INDE X/1985

ATTEN: -18 DB

FILTER WTG: HANNING

DATE/TIME: 3-16-77 - 1148 Z

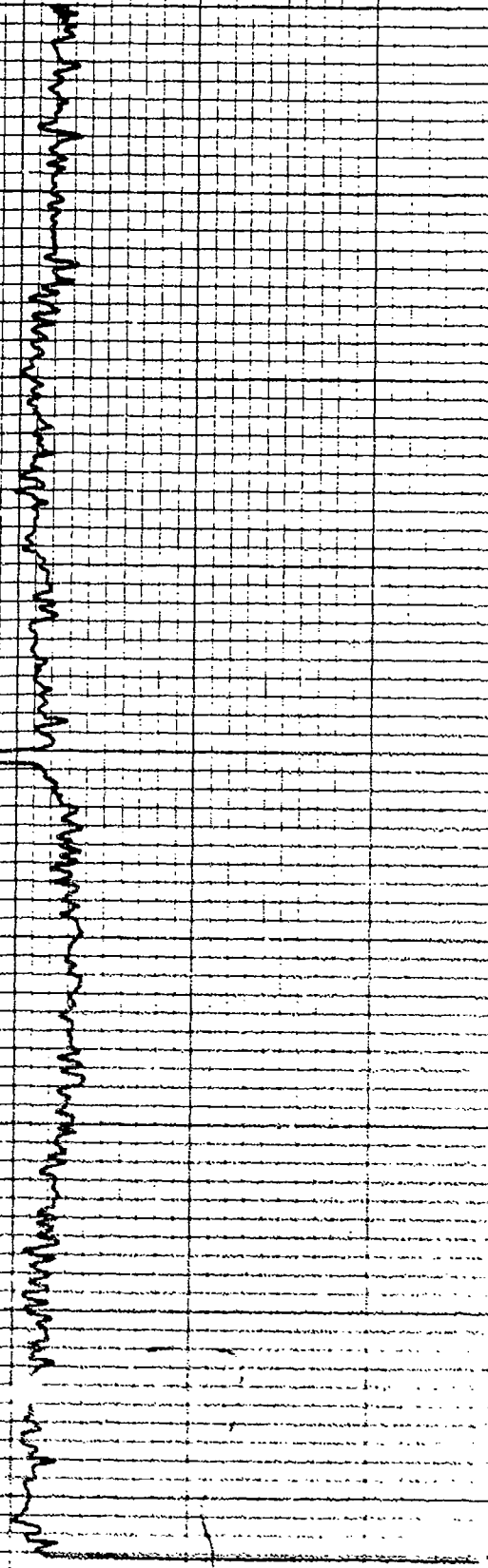
ANALYSIS BANDWIDTH: 1710 HZ

+54 DEG. AZ STEERING

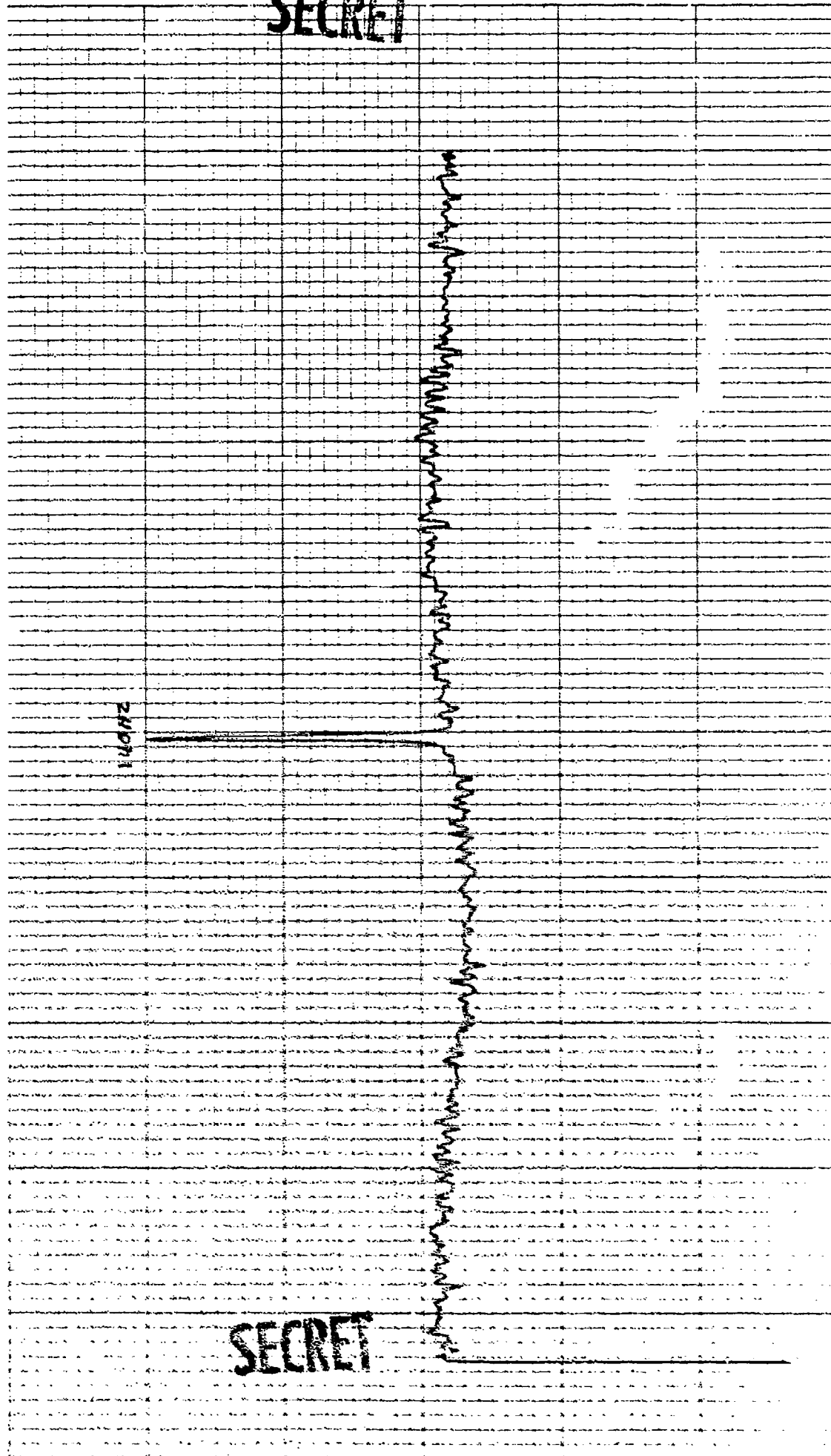
140 HZ

SECRET

SECRET



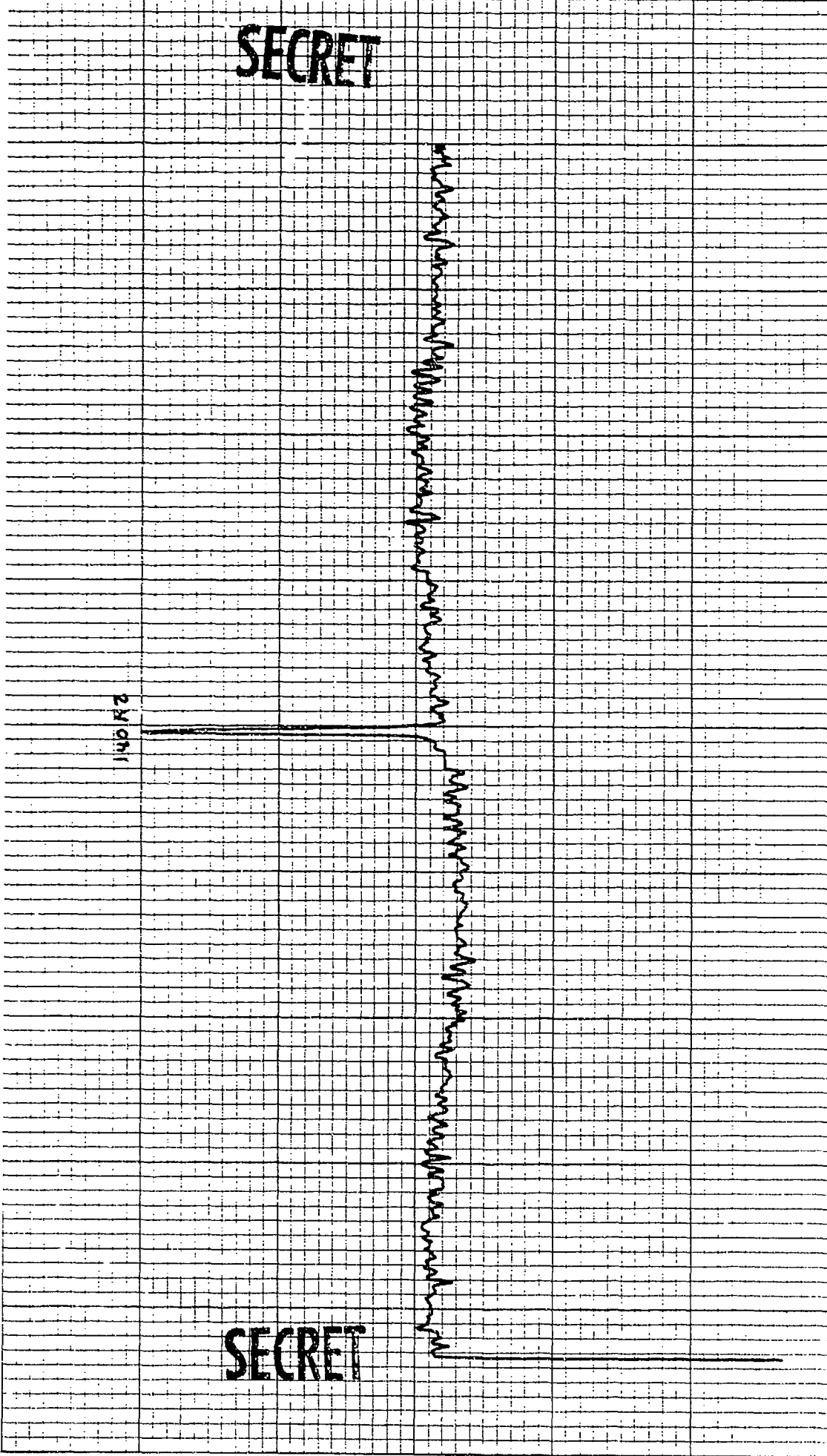
CONTROL: 1140 - 16 (2P12) DATE OF ANALYSIS: 1-16 REEL: 129 INDE X: 1995
 BEAMFORMED SPECTRUM (ELEMENTS) INTEGRATION TIME 320 SECS ATEN: -18 DB
 EXERCISE: BEARING STAKE FILTER WTG: HANNING
 CENTER FREQ: 140 HZ
16 ELEMENTS ANALYSIS BANDWIDTH: 1/10 HZ
456 DEG. AZ STEERING



SECRET

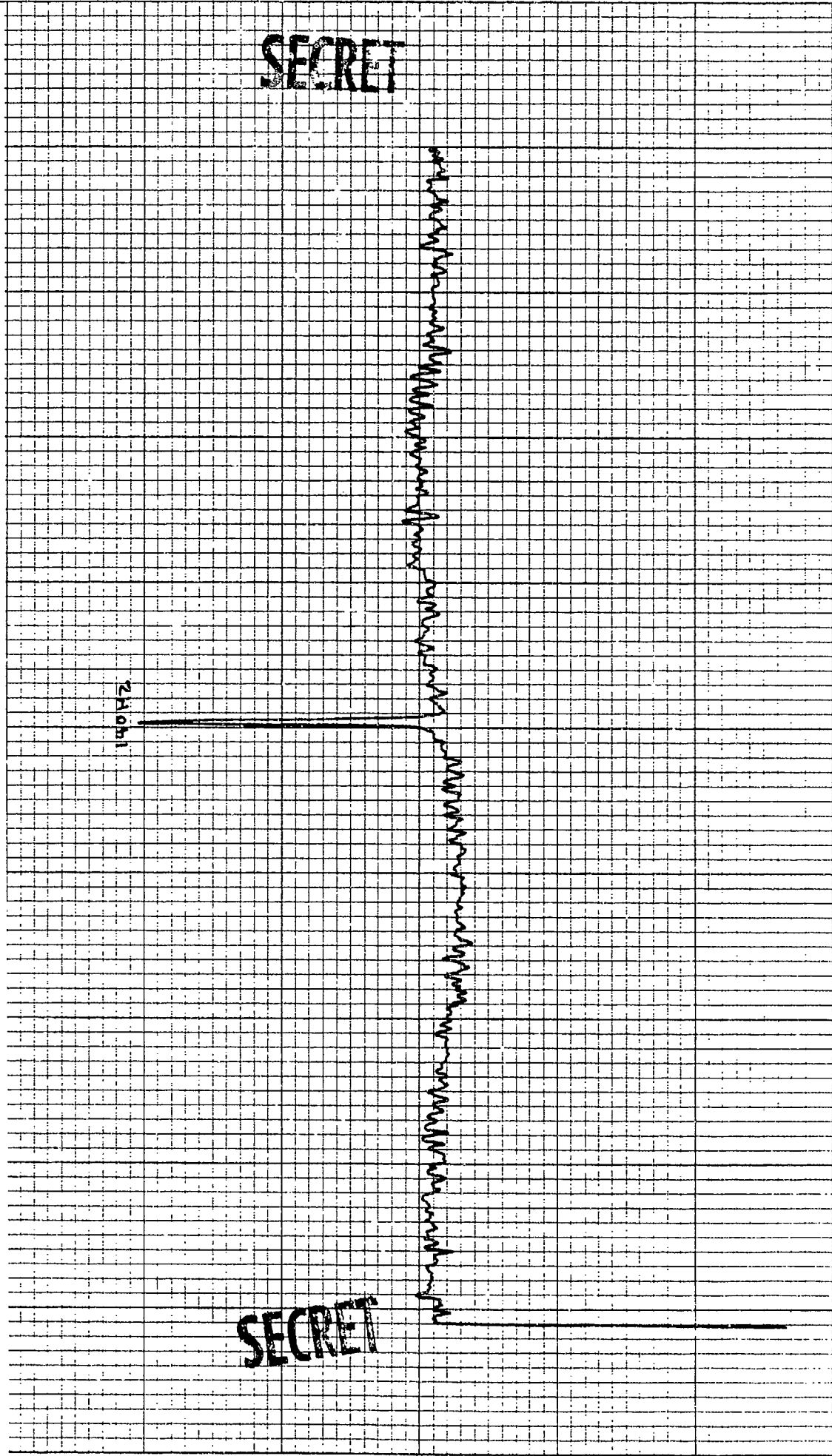
SECRET

CONTROL: 1140 - 16 (D/12) REEL: M24 INDE X1995
 BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-16
 EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 1148 Z INTEGRATION TIME 320 SECS ATTN: -18 DB
 CENTER FREQ: 140 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
16 ELEMENTS +58 DEG. AZ STEERING



11/73

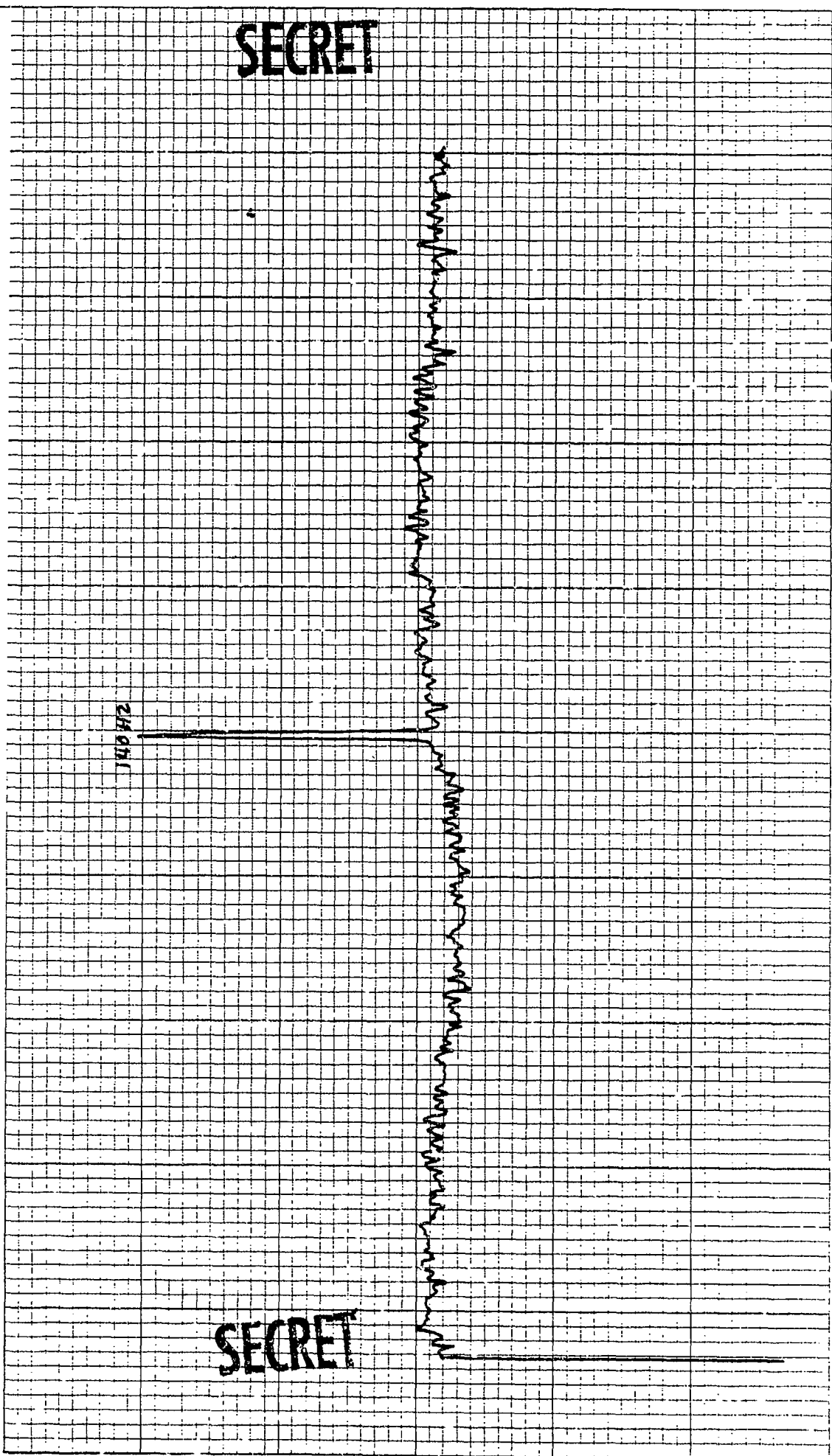
CONTROL: 1148 - 16 (DP11) DATE OF ANALYSIS: 1-16 REEL: M24 INDE X1065
BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 3-16-77 - 1148 INTEGRATION TIME 320 SECS ATTEN: -10 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/1 CHZ FILTER WTG: HANNING
CENTER FREQ: 140 HZ + 59 DEG. AZ STEERING



SECRET

SECRET

CONTROL: 1140 - 16 (DP12) DATE OF ANALYSIS: 1-16 REEL: M24 INDE X/995
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 1148 Z INTEGRATION TIME 320 SECS ATTN: -70 DB
CENTER FREQ: 140 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTC: HANNING
16 ELEMENTS 400 DEG. AZ STEERING



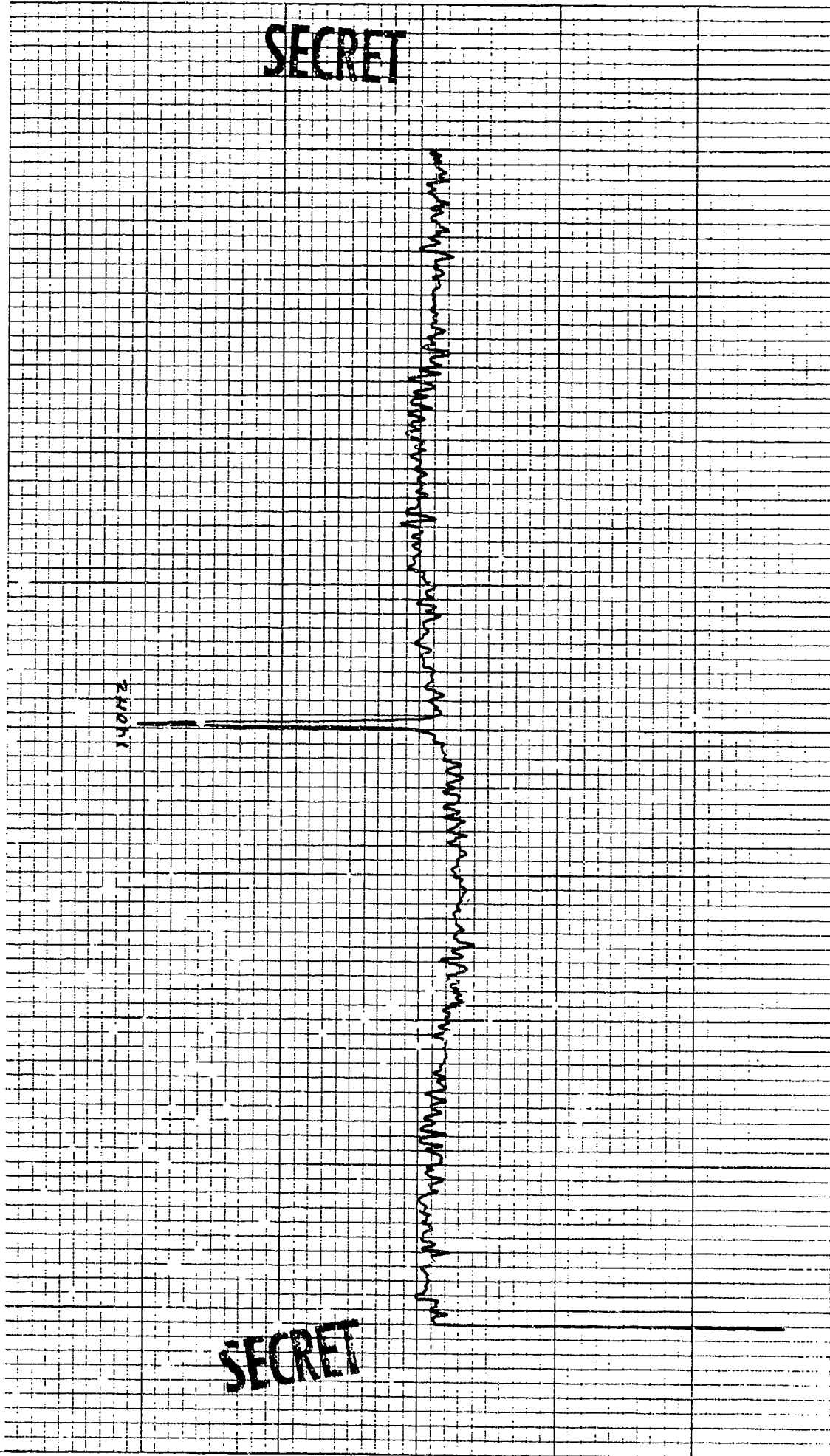
SECRET

SECRET

B10/35

CONTROL: 1140 - 16 (DP2) DATE OF ANALYSIS: 1-16
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 3-26-77 - 140 Z
CENTER FREQ: 140 HZ ANALYSIS BANDWIDTH: 1/16 HZ
16 ELEMENTS +6/ DEG. AZ STEERING

REEL: M14 INDE X1995
INTEGRATION TIME 320 SECS ATTN: -70 DB
FILTER WTC: HANNING



SECRET

SECRET

K-E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

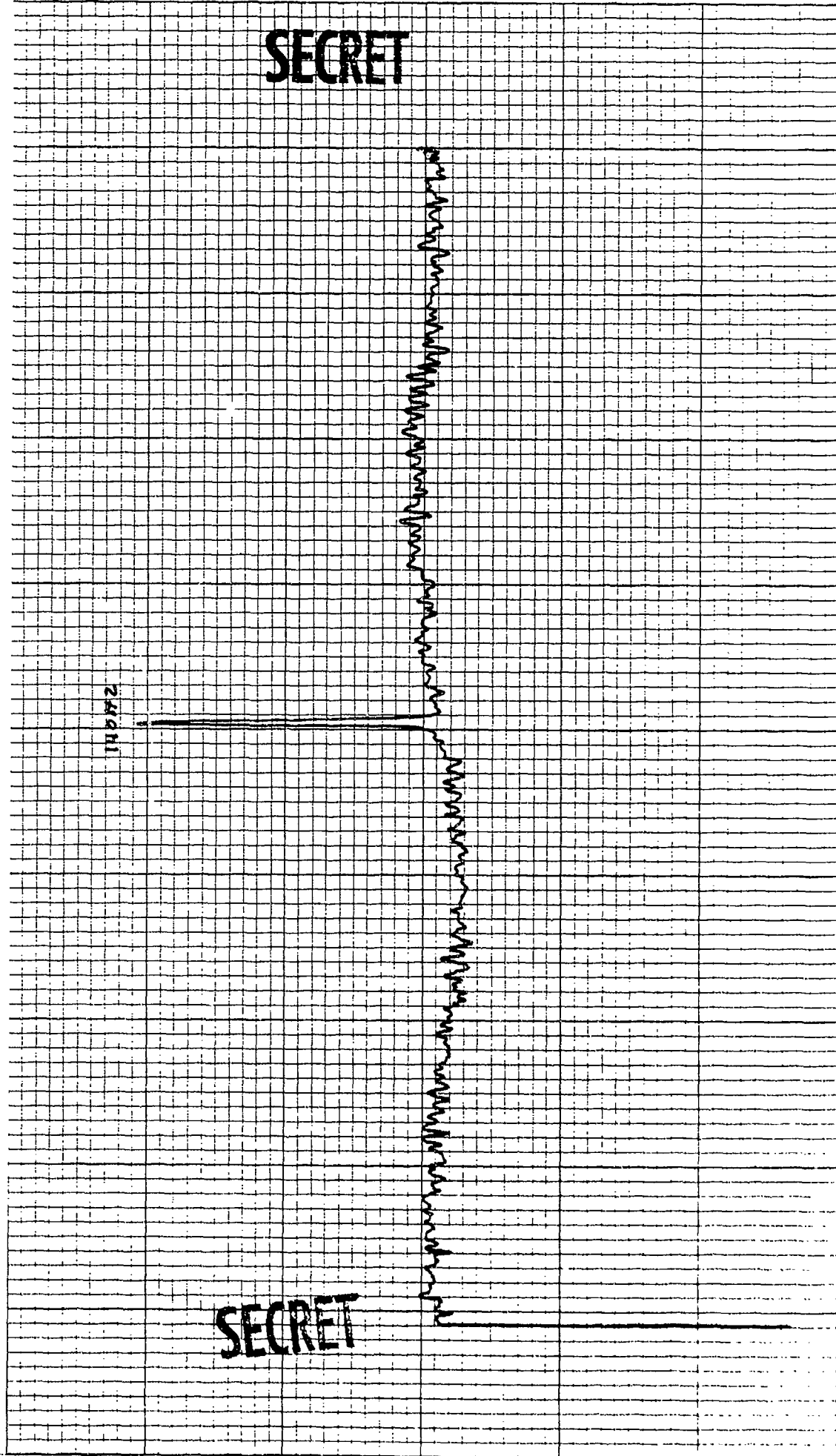
46 0703

V1637

CONTROL: 1148 - 16 (DP12)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 140 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 3-16-77 - 1148 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+61.5 DEG. AZ STEERING

REEL: N24 INDE X 1996
INTEGRATION TIME 320 SECS ATTN: -18 DB
FILTER WTG: HANNING

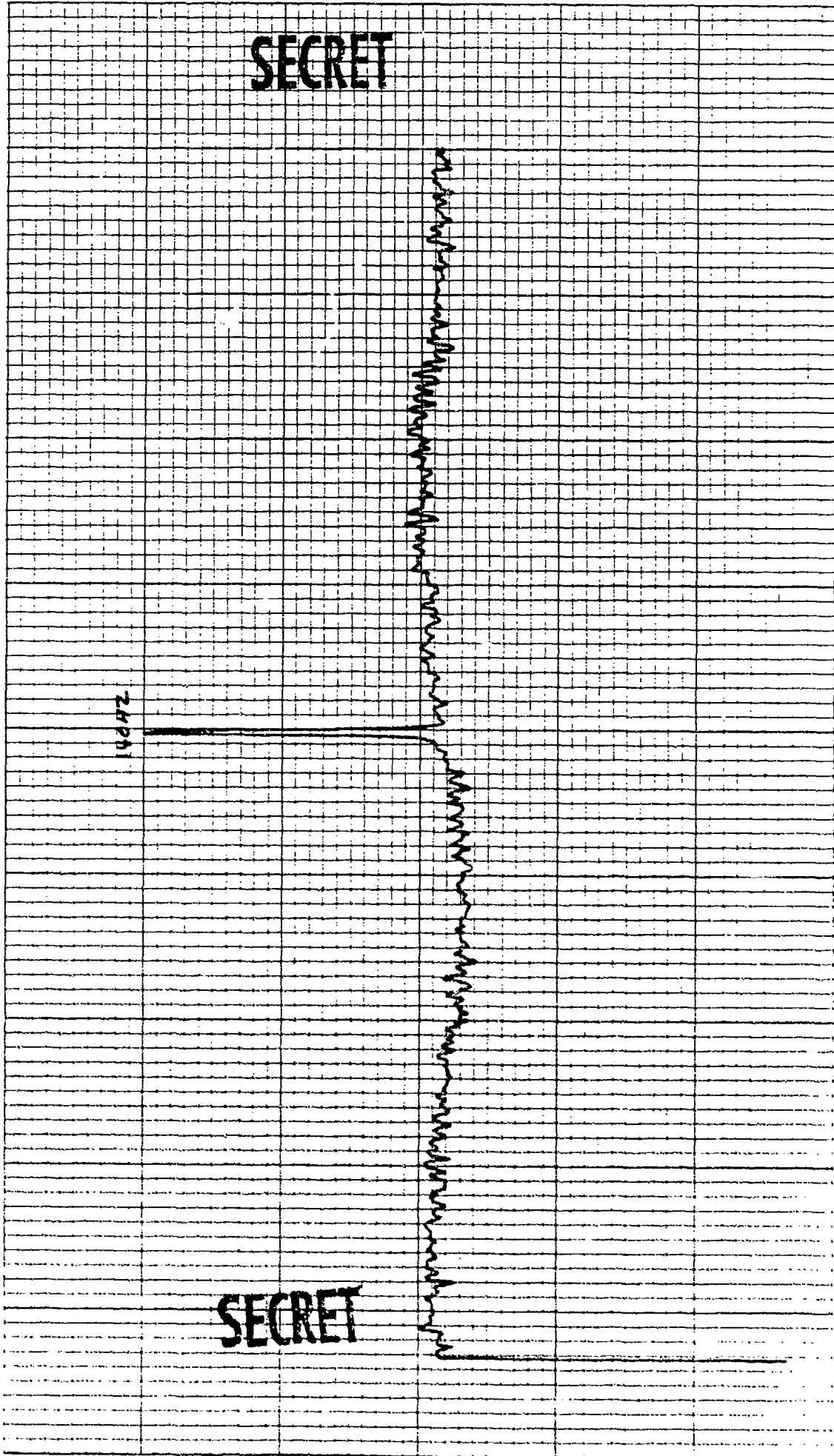


KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
REUFEL & ESSER CO. MADE IN U.S.A.

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Page 13

CONTROL: 1140 - 16 (DP12) DATE OF ANALYSIS: 1-16-77
BEAMFORMED SPECTRUM (ELEMENTS) REEL: May INDE X199S
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: -18 DB
CENTER FREQ: 140 HZ FILTER WTG: HANNING
16 ELEMENTS +62 DEG. AZ STEERING



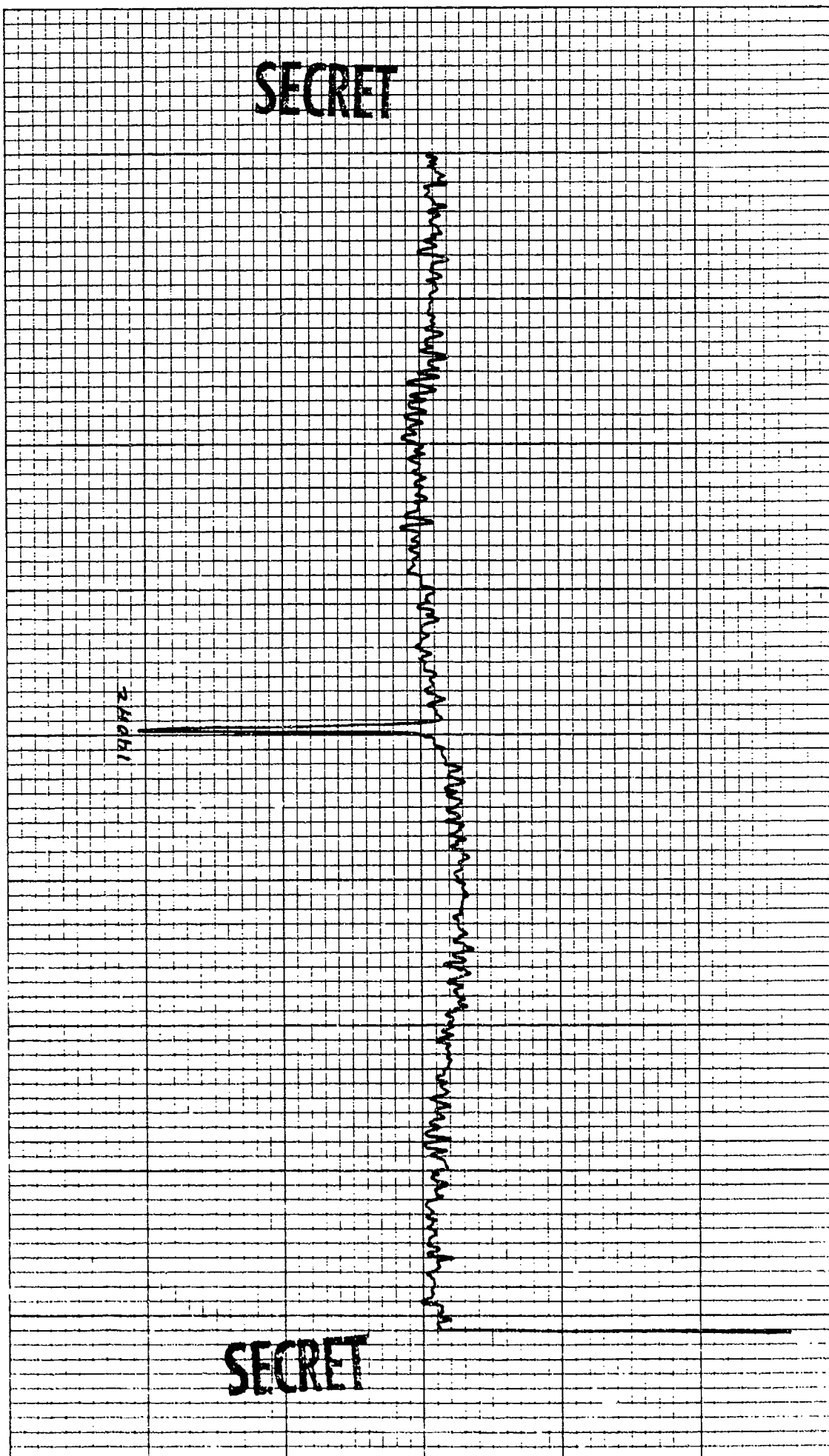
KOE 10 X 10 TO THE INCH • 7 X 10 IMP-HFS
KEUFFEL & ESSER CO. MADE IN U.S.A.

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CONTROL: 1140 - 16 (SP1A)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 140 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 3-6-77 - 1140 Z
ANALYSIS BANDWIDTH: 1/10HZ
+63 DEG. AZ STEERING

REEL: M24 INDE X/1995
INTEGRATION TIME 320 SECS ATTEN: -70 DB
FILTER WTG: HANNING



SECRET

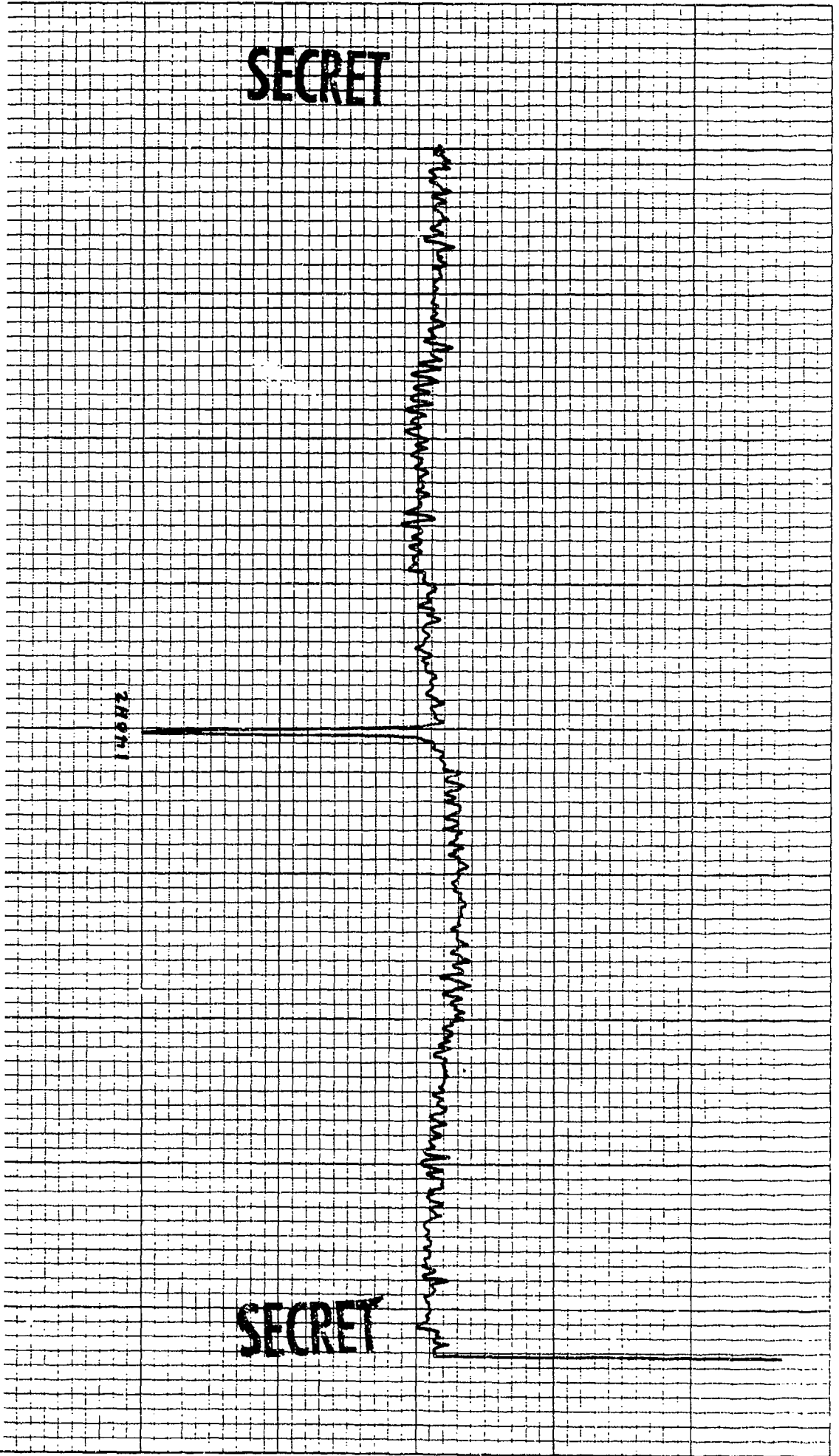
SECRET

KSE 10 X 10 TO THE INCH • 7 X 10 INCHES
NEUFFEL & ESSER CO. MADE IN U.S.A.

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81-15

CONTROL: 1140 - 16 (DP12) DATE OF ANALYSIS: 1-16 REEL: M24 INDE X1885
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE
CENTER FREQ: 140 HZ
16 ELEMENTS
INTEGRATION TIME 320 SECS AT TEN: -10 DB
FILTER WTG: HANNING
DATE/TIME: 3-16-77 - 1140 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+44 DEG. AZ STEERING



SECRET

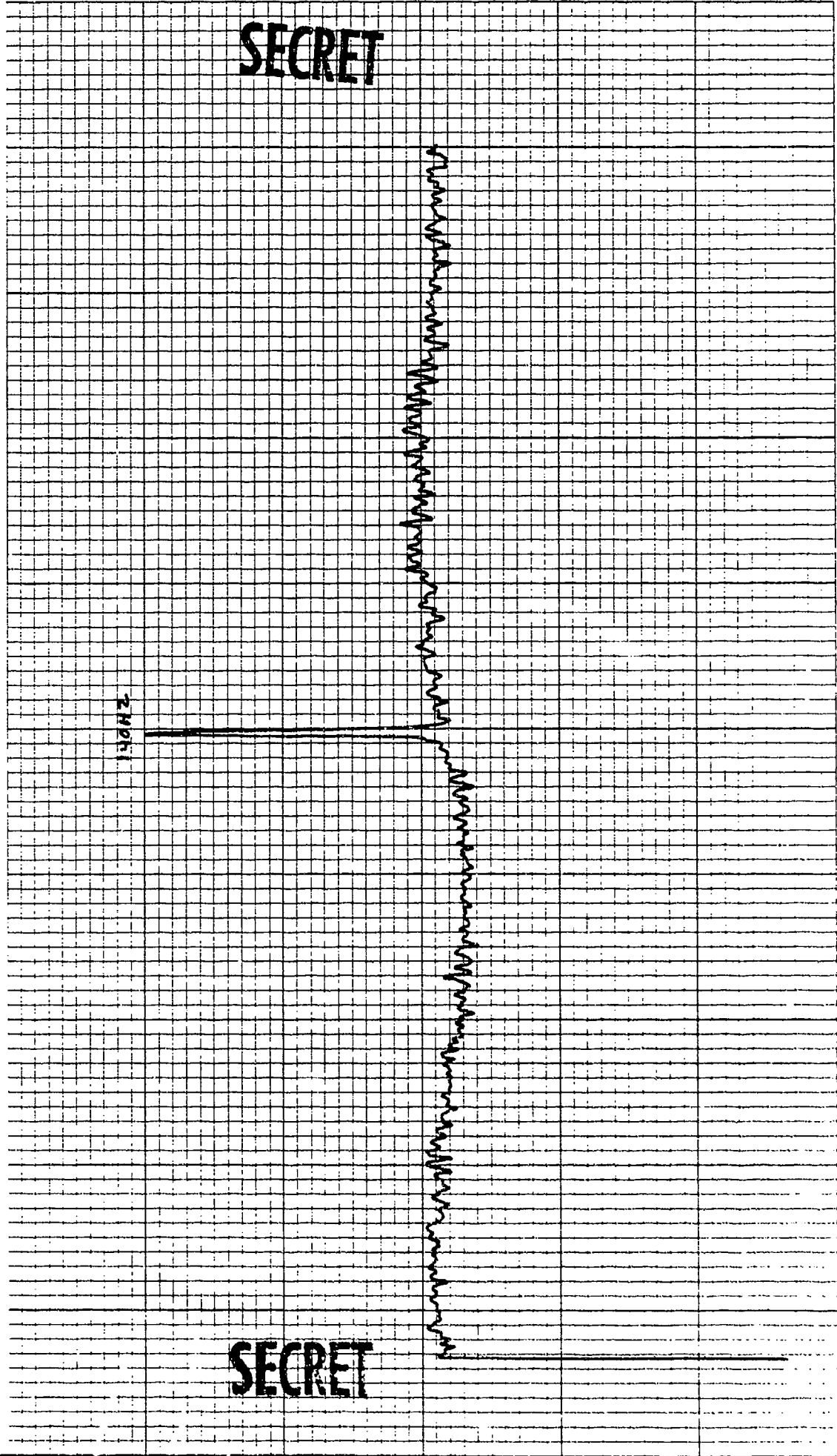
SECRET

K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

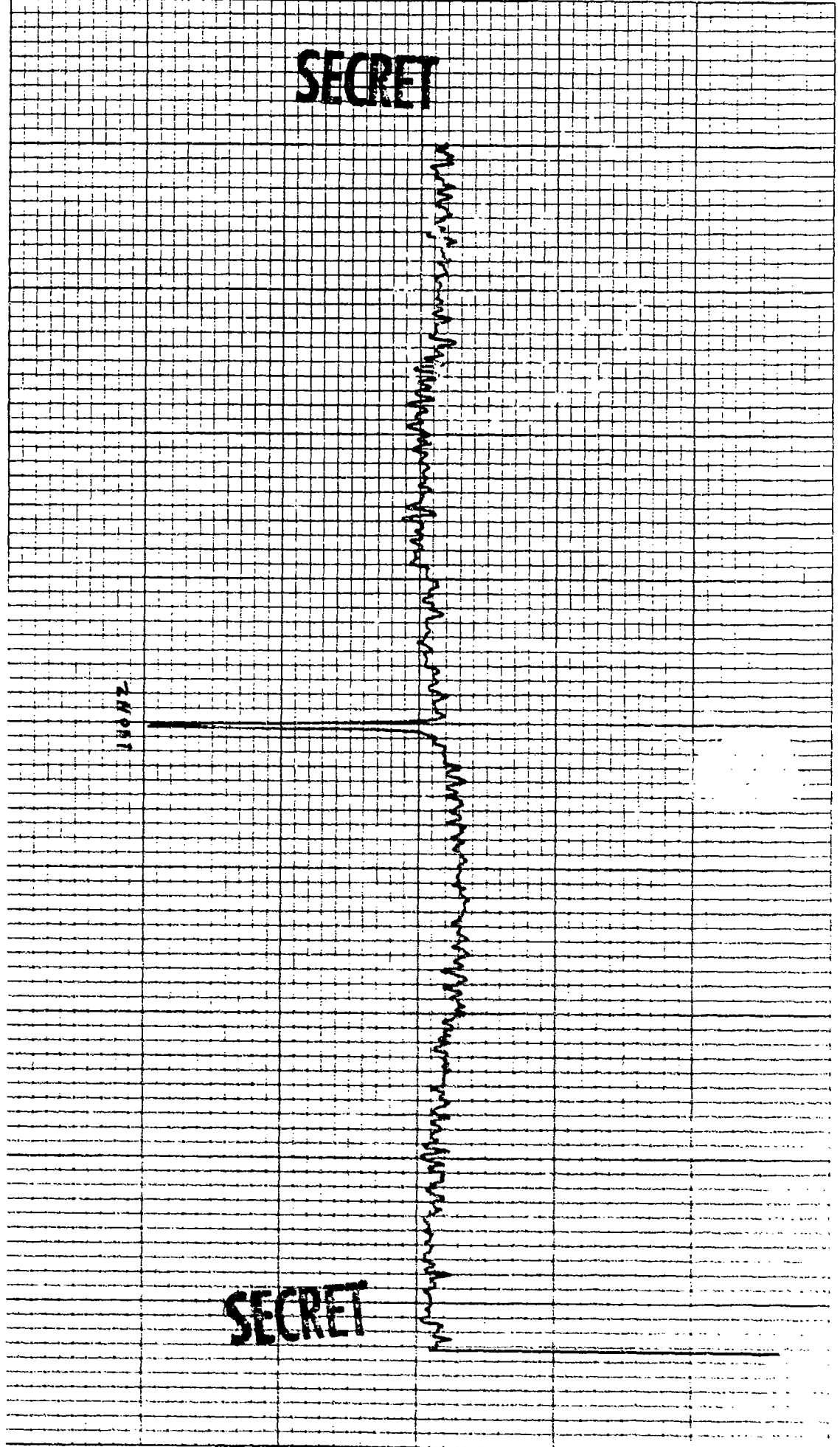
P16/17

CONTROL: 1148 - 16 (DPI2) DATE OF ANALYSIS: 1-16 REEL: M24 INDE X 1986
 BEAMFORMED SPECTRUM (ELEMENTS))
 EXERCISE: BEARING STAKE DATE/TIME: 3-16-79 - 1148 Z INTEGRATION TIME 320 SECS ATTN: -10 DB
 CENTER FREQ: 140 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
16 ELEMENTS +66 DEG. AZ STEERING



1 14/10

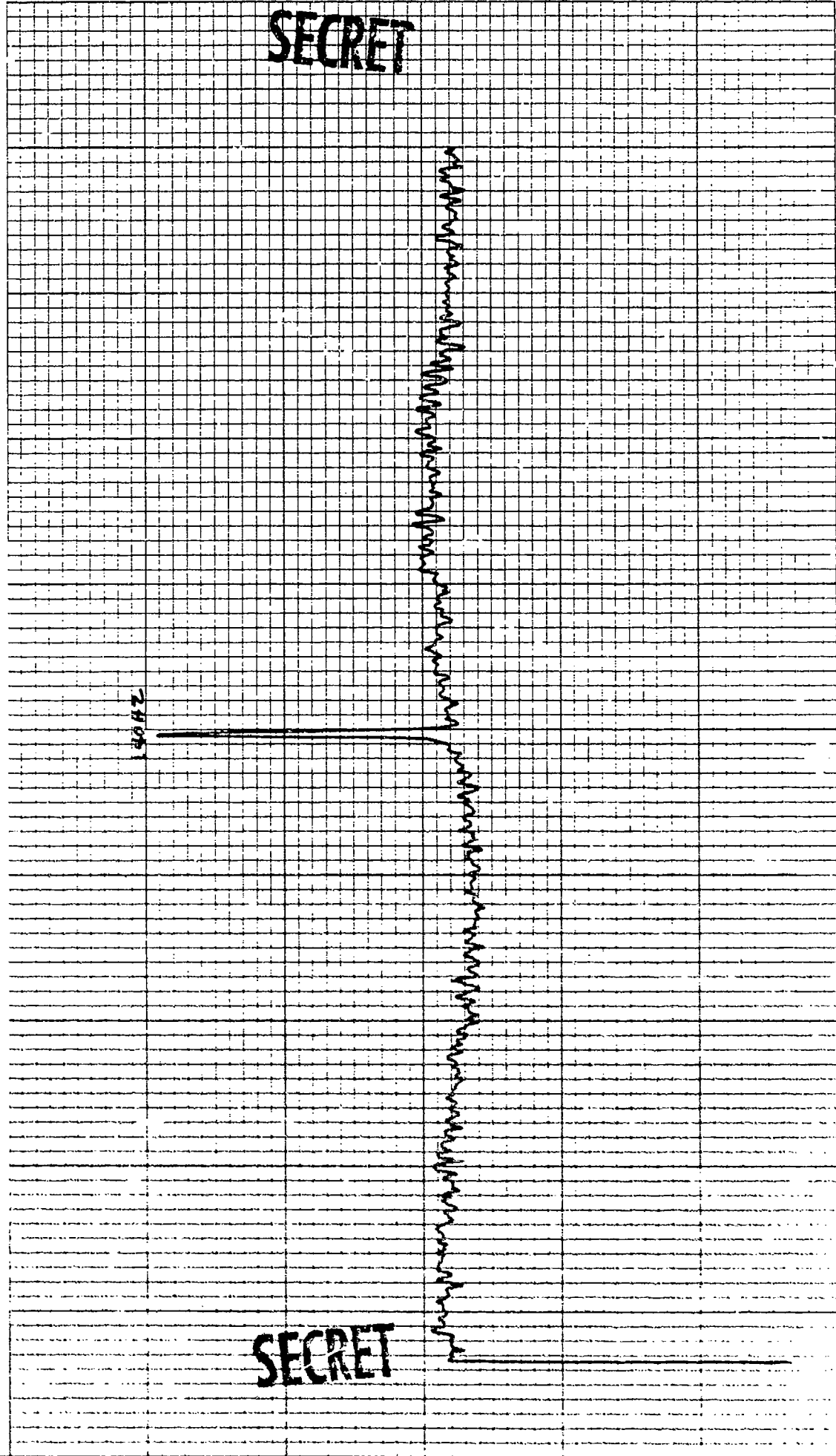
CONTROL: 1146 - 16 (DPIA) DATE OF ANALYSIS: 1 - 16 REEL: H24 INDE X: 1995
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-16-77 - 1146 Z INTEGRATION TIME 320 SECS ATTEN: -70 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 CENTER FREQ: 141 HZ 160 DEG. AZ STEERING



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SECRET

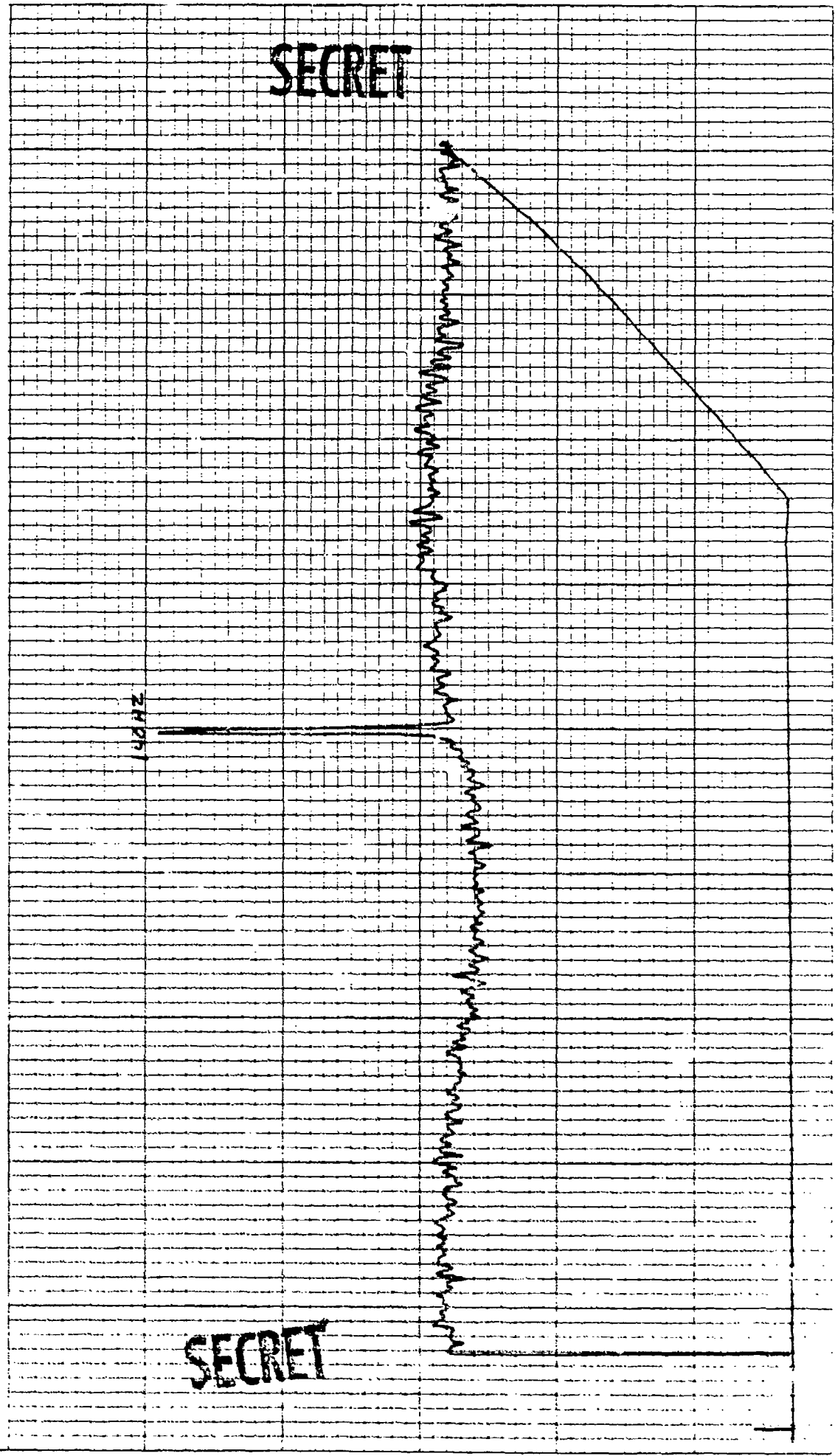
CONTROL: 1148 - 16 (DPR) REEL: 424 INDE X/885
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-16
EXERCISE: BEARING STAKE DATE/TIME: 3-6-77 - 1148 Z INTEGRATION TIME 320 SECS ATTN: -10 DB
CENTER FREQ: 140 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WIG: HANNING
16 ELEMENTS +70 DEG. AZ STEERING



K&E 10 X 10 TO THE INCHES
ALUMINUM & BRASS CO. MADE IN U.S.A.

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CONTROL: 1148 - 16 (DP12) DATE OF ANALYSIS: 1-16 REEL: M24 INDE X: 1995
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-16-77 - 11-2 Z INTEGRATION TIME: 320 SECS ATTN: -18 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
CENTER FREQ: 140 H7 + 72 DEG. AZ STEERING



SECRET

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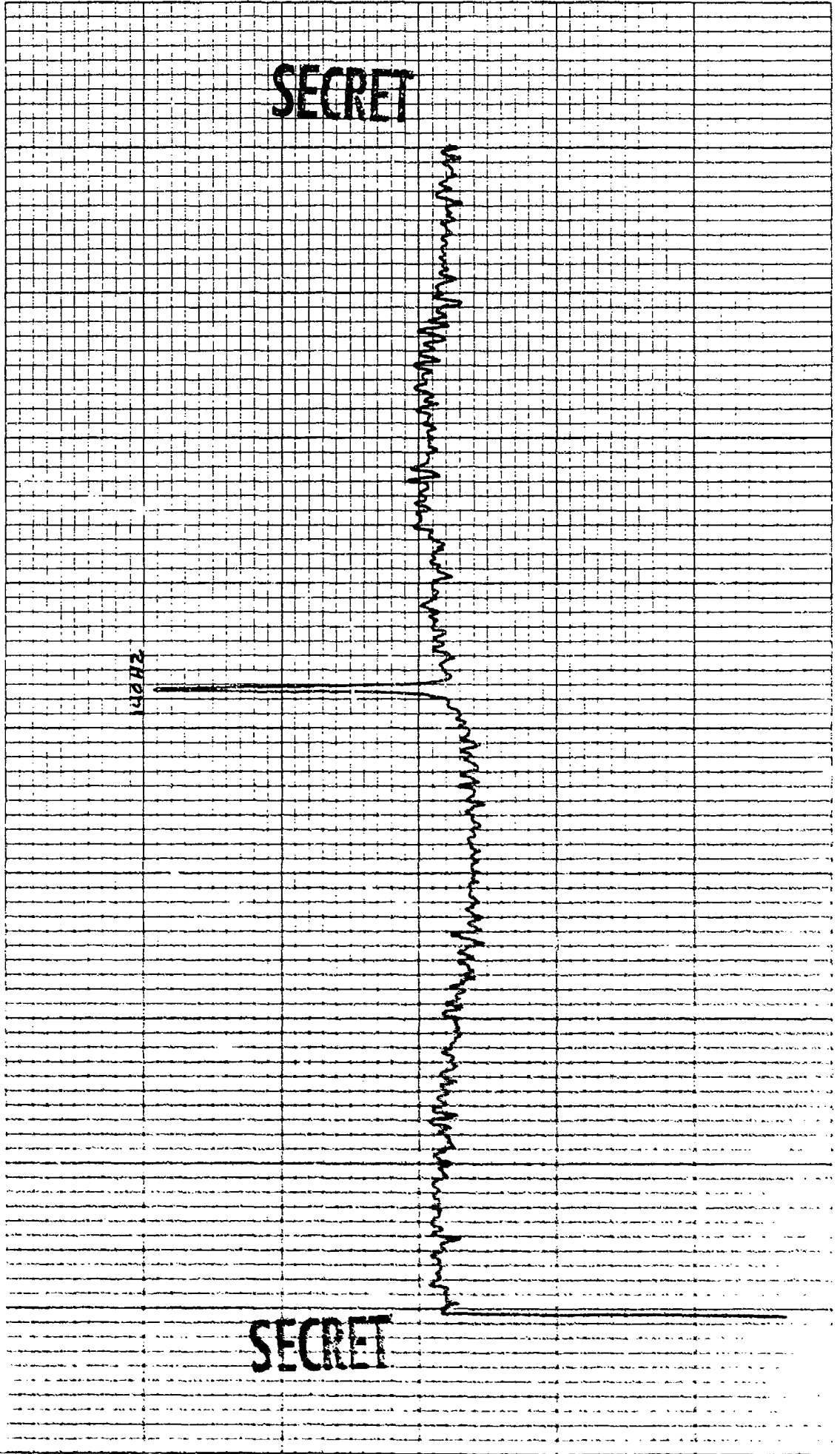
CONTROL: 1148 - 16 (DP/2) DATE OF ANALYSIS: - - REEL: May INDE X/1995

BEAMFORMED SPECTRUM (ELEMENTS) 1-16)

EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 1148 Z INTEGRATION TIME 320 SECS ATTN: -18 DB

CENTER FREQ: 140 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING

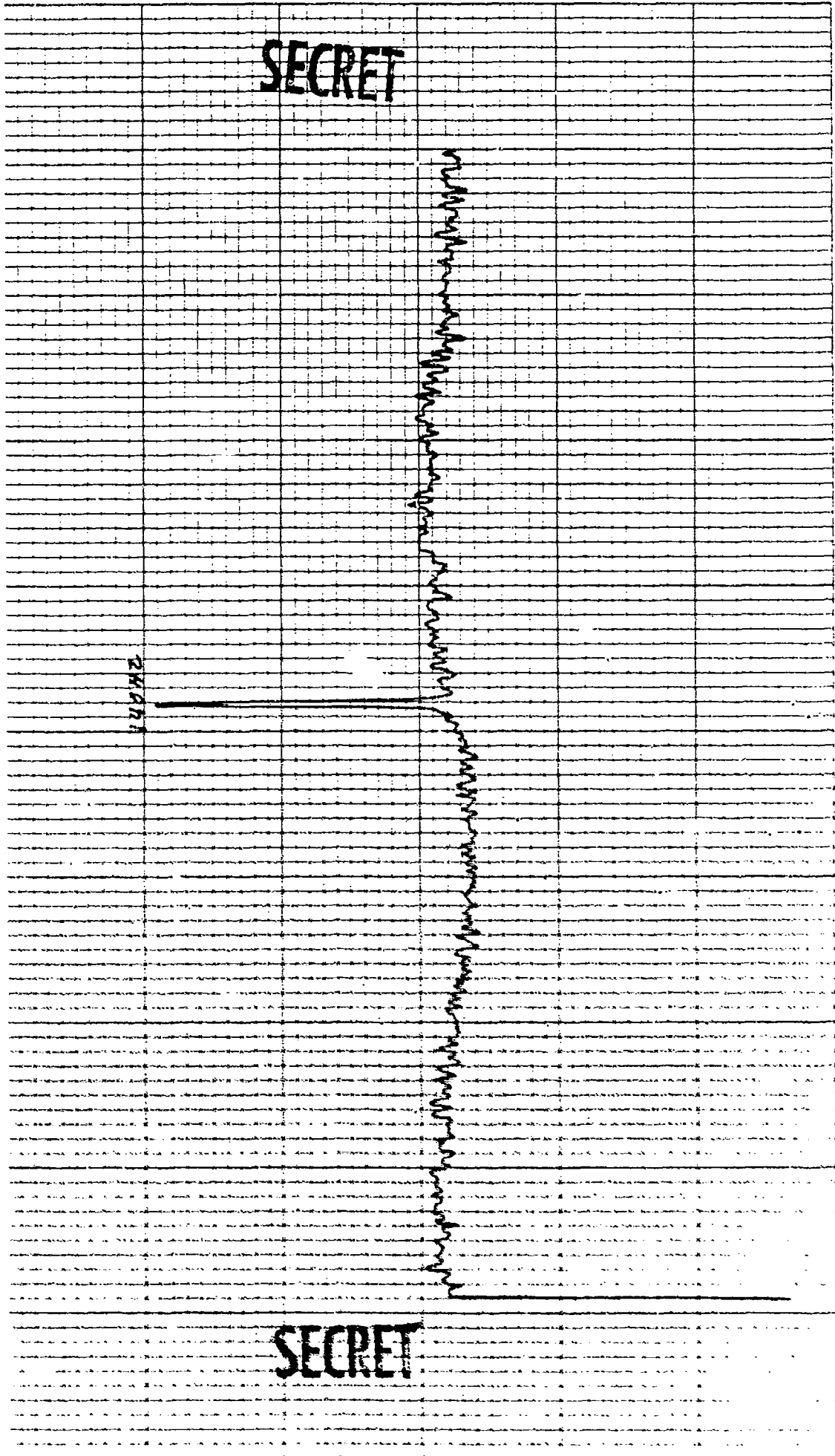
16 ELEMENTS +74 DEG. AZ STEERING



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10 X 10 TO THE INCHES 4 1/2 IN DIA.
REDFEL W. E. GREEN CO. MADE IN U.S.A.

CONTROL: 1140 - 16 (DPA) REEL: M34 INDE X1985
 BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-16
 EXERCISE: BEARING STAKE DATE/TIME: 3-26-77 - 1140 Z INTEGRATION TIME 320 SECS ATTN: 1/2 DB
 CENTER FREQ: 140 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTC WTC: HANNING
16 ELEMENTS + 76 DEG. AZ STEERI 3



SECRET

SECRET

7/1/20

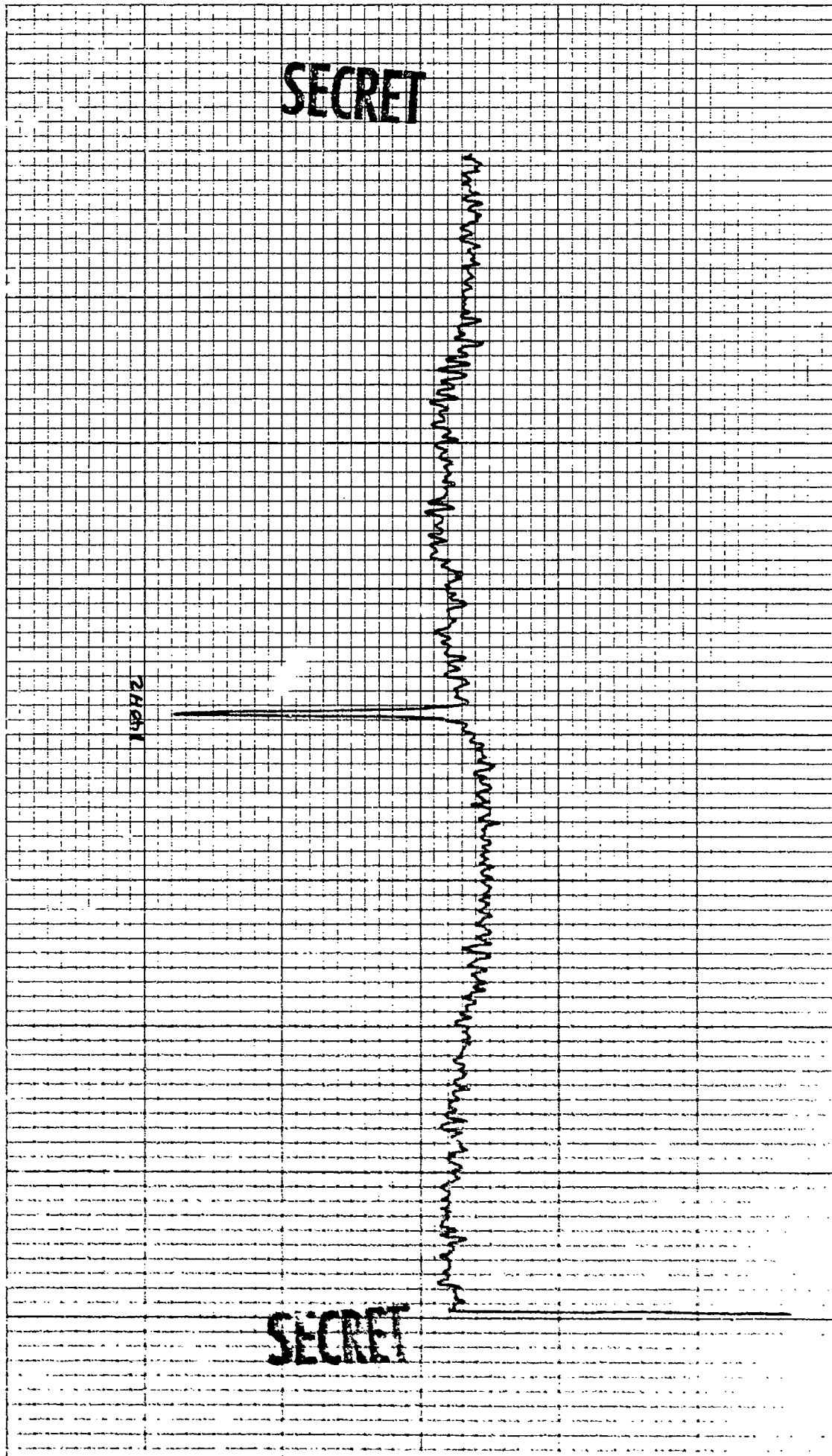
CONTROL: 1140 - 16 (DP12) DATE OF ANALYSIS: 1-16 REEL: M14 INDE X1995

BEAMFORMED SPECTRUM (ELEMENTS) INTEGRATION TIME 320 SECS ATTN: -10 DB

EXERCISE: BEARING STAKE FILTER WIG: HANNING

CENTER FREQ: 140 HZ ANALYSIS BANDWIDTH: 1140 Z

16 ELEMENTS + 70 DEG. AZ STEERING



SECRET

SECRET

NO. 10 X 10 TO THE INCH. 7 X 10 INCHES
KEUFEL & FOSER CO. MADE IN U.S.A.

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2/14/52

INDE X/195

REEL: M24

DATE OF ANALYSIS: 1-16

CONTROL: 1148 - 16 (QPI2)

BEAMFORMED SPECTRUM (ELEMENTS)

EXERCISE: BEARING STAKE

CENTER FREQ: 270 HZ

16 ELEMENTS

DATE/TIME: 3-16-77 - 1148 Z

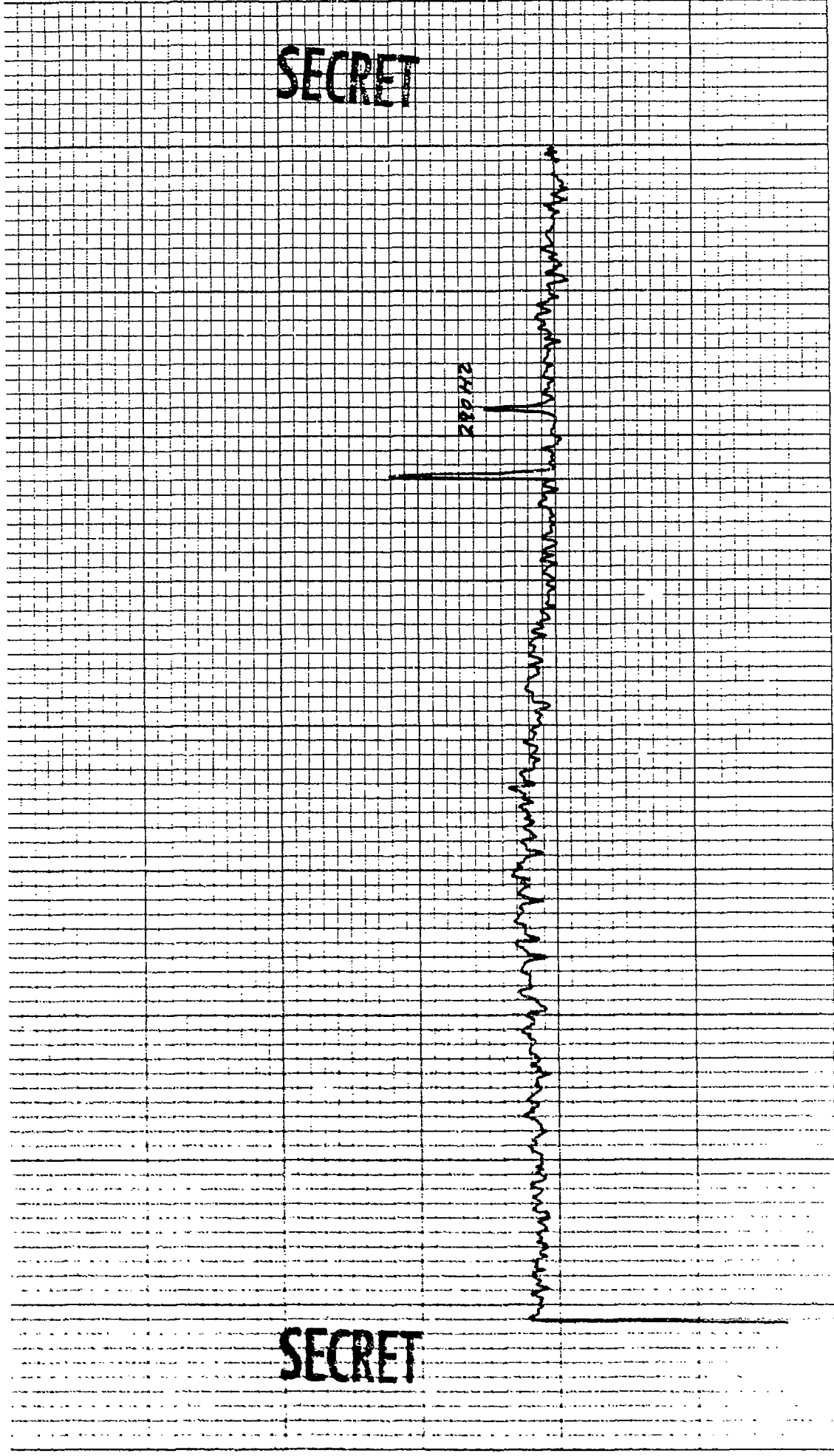
ANALYSIS BANDWIDTH: 1/10HZ

+48 DEG. AZ STEERING

INTEGRATION TIME 320 SECS

FILTER WTC: HANNING

ATTEN: -18 DB



SECRET

SECRET

K&E 10 X 10 TO THE INCH 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

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INDE X1996

REEL: M24

DATE OF ANALYSIS: - - - -

CONTROL: 1143 - 16 (DPIA)
BEAMFORMED SPECTRUM (ELEMENTS)

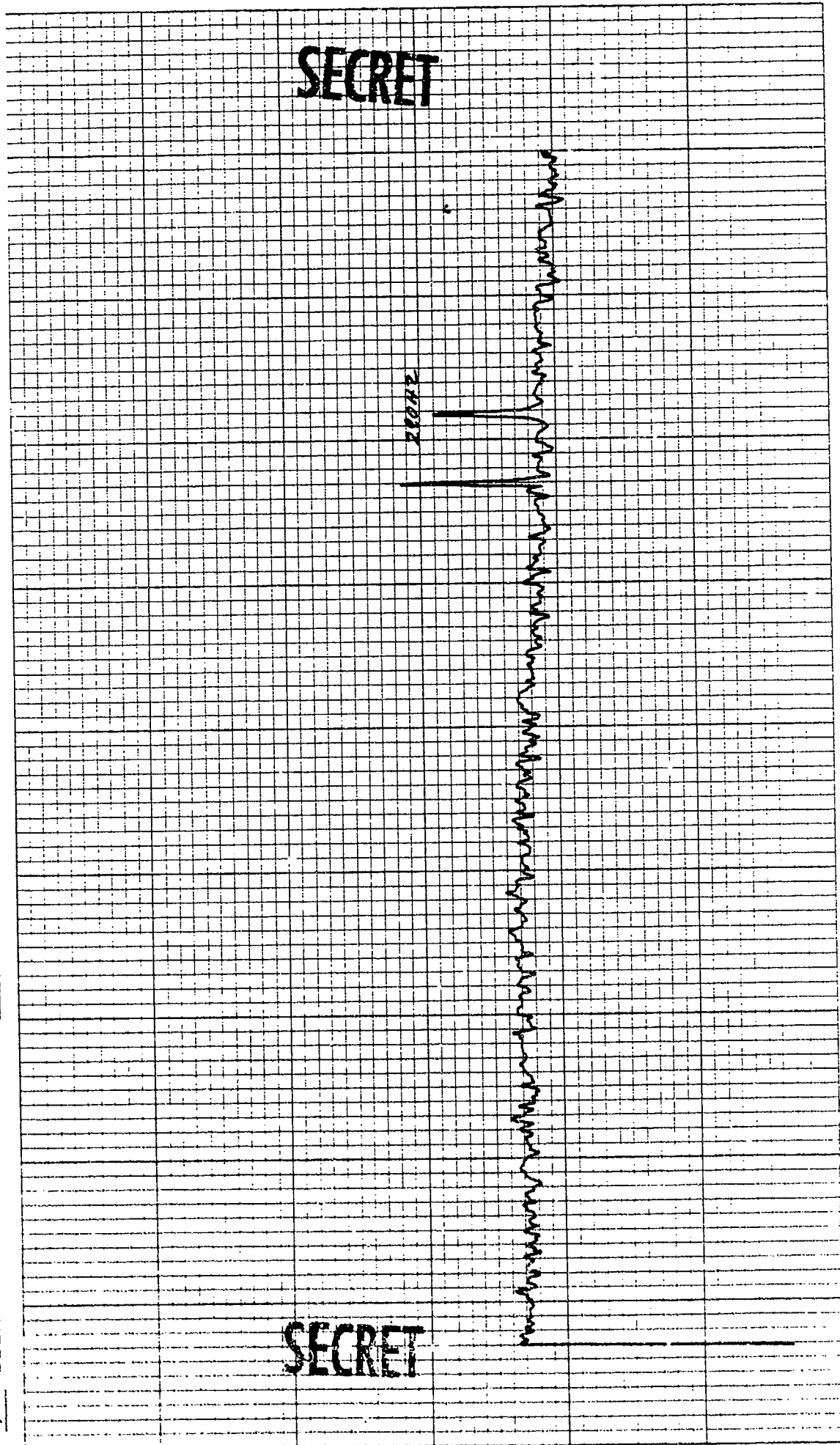
INTEGRATION TIME 320 SECS
ATTEN: -10 DB
FILTER WTG: HANNING

DATE/TIME: 3-16-77 - 1142 Z

ANALYSIS BANDWIDTH: 1/10HZ

+50 DEG. AZ STEERING

EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS



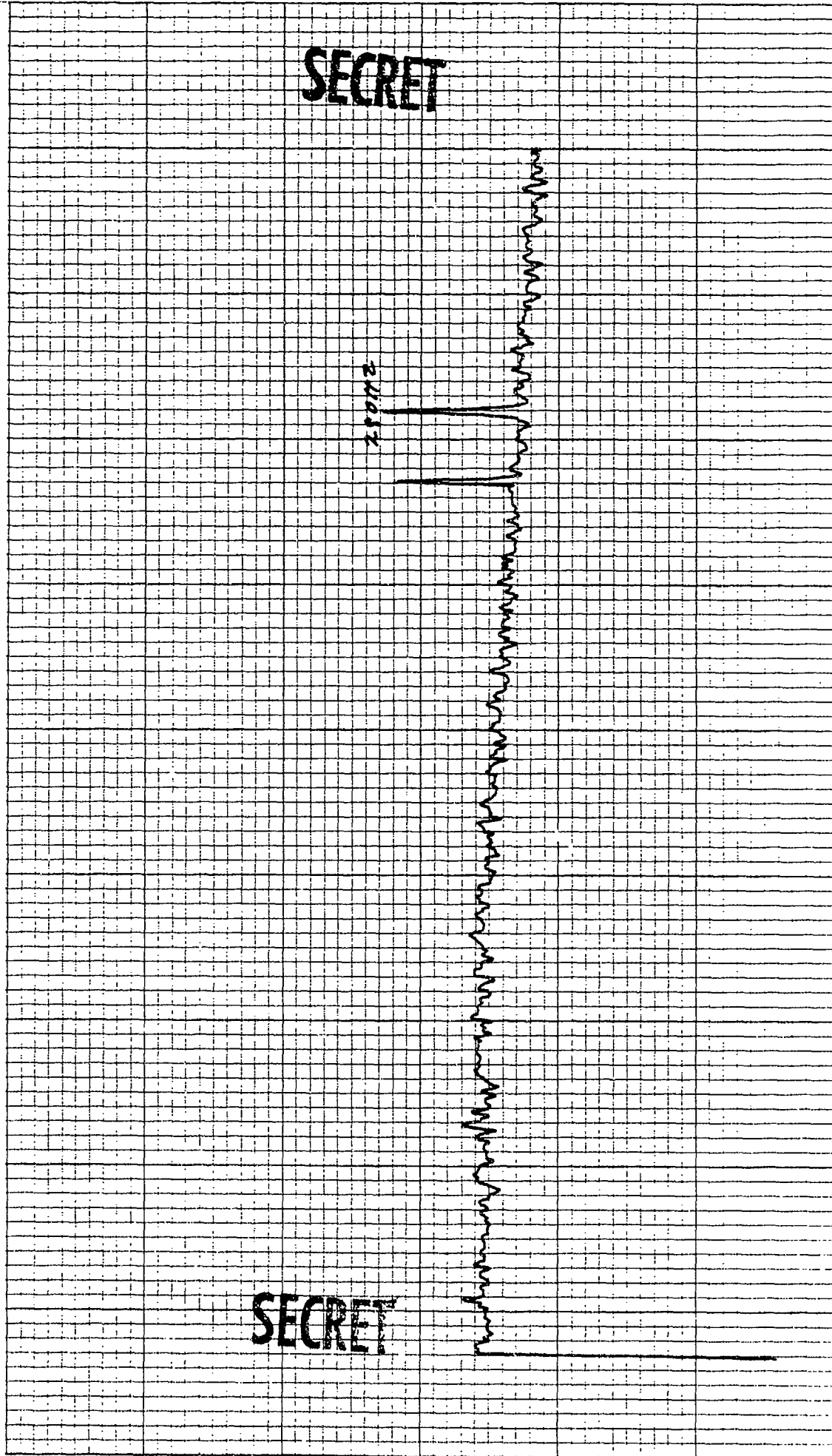
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KΣ 10 X 10 TO THE INCH • 7 X 10 INCHES
HEUFFEL & ESSER CO. MADE IN USA

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CONTROL: 1146 - 16 (DP12) DATE OF ANALYSIS: 1-16 REEL: M24 INDE X1995
BEAMFORMED SPECTRUM (ELEMENTS) INTEGRATION TIME 320 SECS ATTN: -70 DB
EXERCISE: BEARING STAKE FILTER WTG: HANNING
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ
16 ELEMENTS 452 DEG. AZ STEERING



CONTROL: 1148 16 (DP12) DATE OF ANALYSIS: 1-16 REEL: 124 INDE X/1925

BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-16-77 - 1148 Z INTEGRATION TIME 320 SECS ATTN: -10 DB

EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: PANNING

CENTER FREQ: 270 HZ 154 DEG. AZ STEERING

16 ELEMENTS

SECRET

SECRET

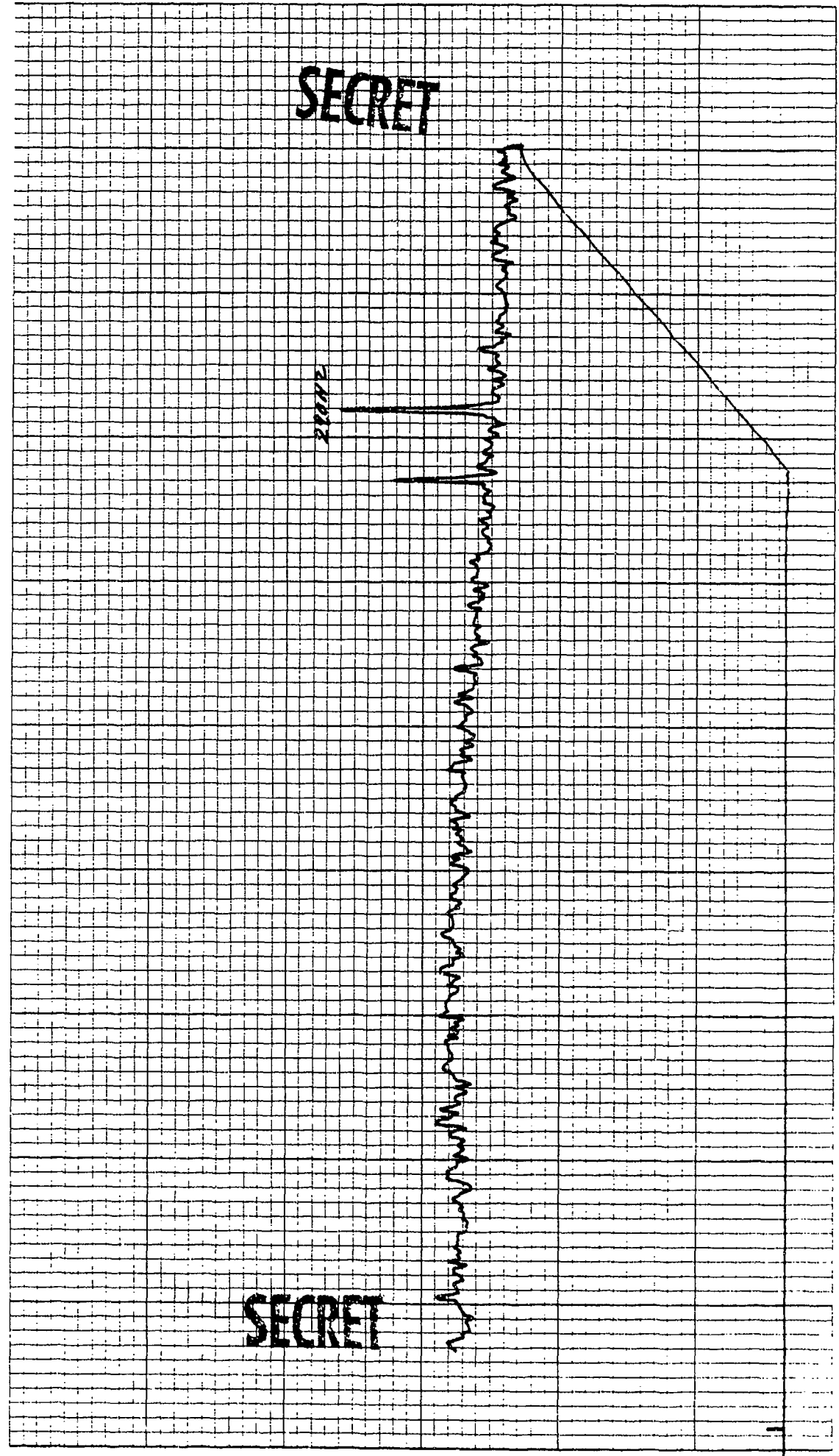
28000



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KEUFFEL & ESSER CO. MADE IN U.S.A.

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CONTROL: 1148 - 16 (DP12) DATE OF ANALYSIS: REEL: 124 INDE X 1995
BEAMFORMED SPECTRUM (ELEMENTS) /-16
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 1148 Z INTEGRATION TIME 320 SECS ATTN: -10 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
16 ELEMENTS +56 DEG. AZ STEERING

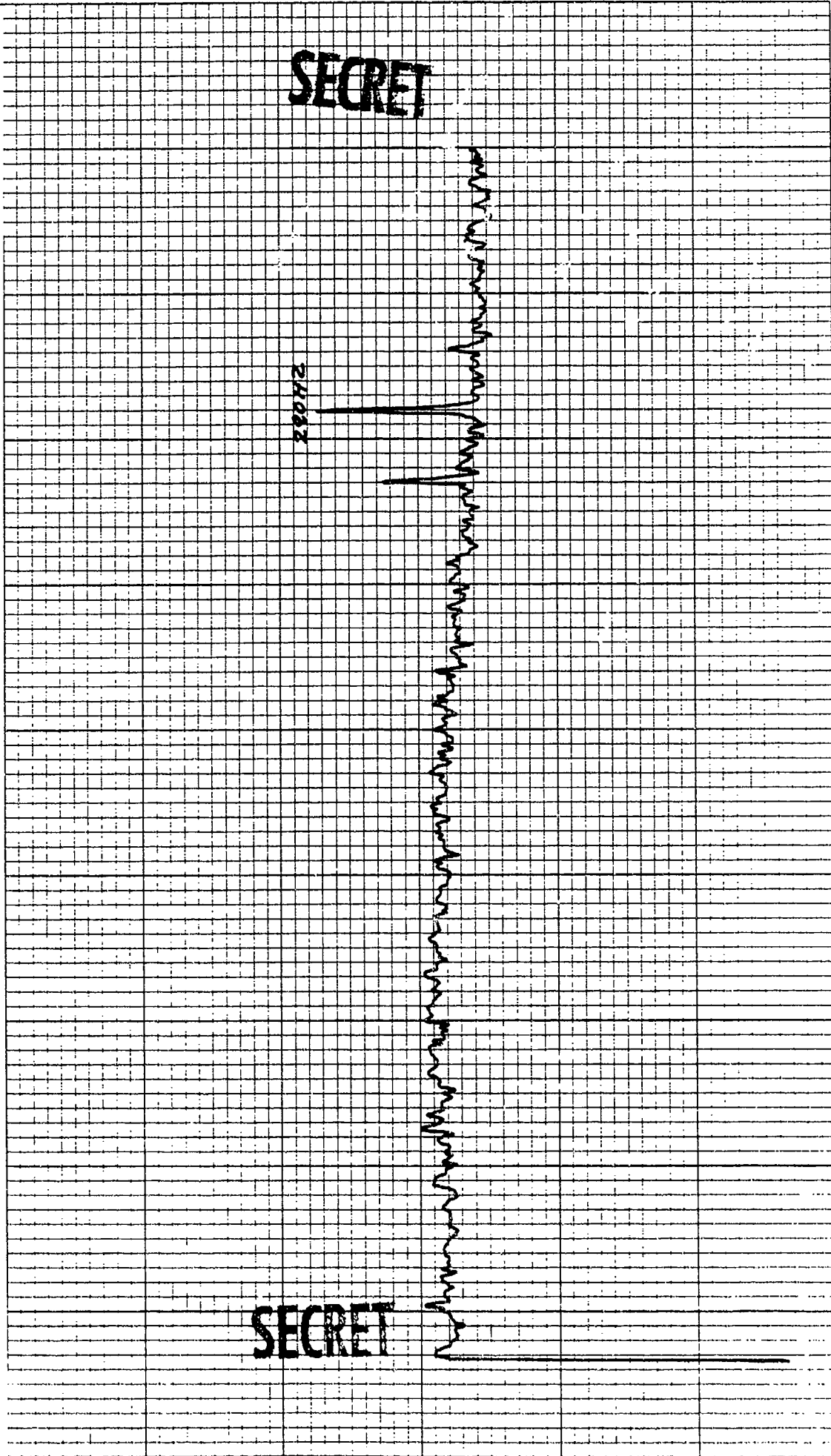


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CONTROL: 1140 - 16 (DP12) DATE OF ANALYSIS: 1-16
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 3-6-77 - 1148 Z
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ
16 ELEMENTS 150 DEG. AZ STEERING

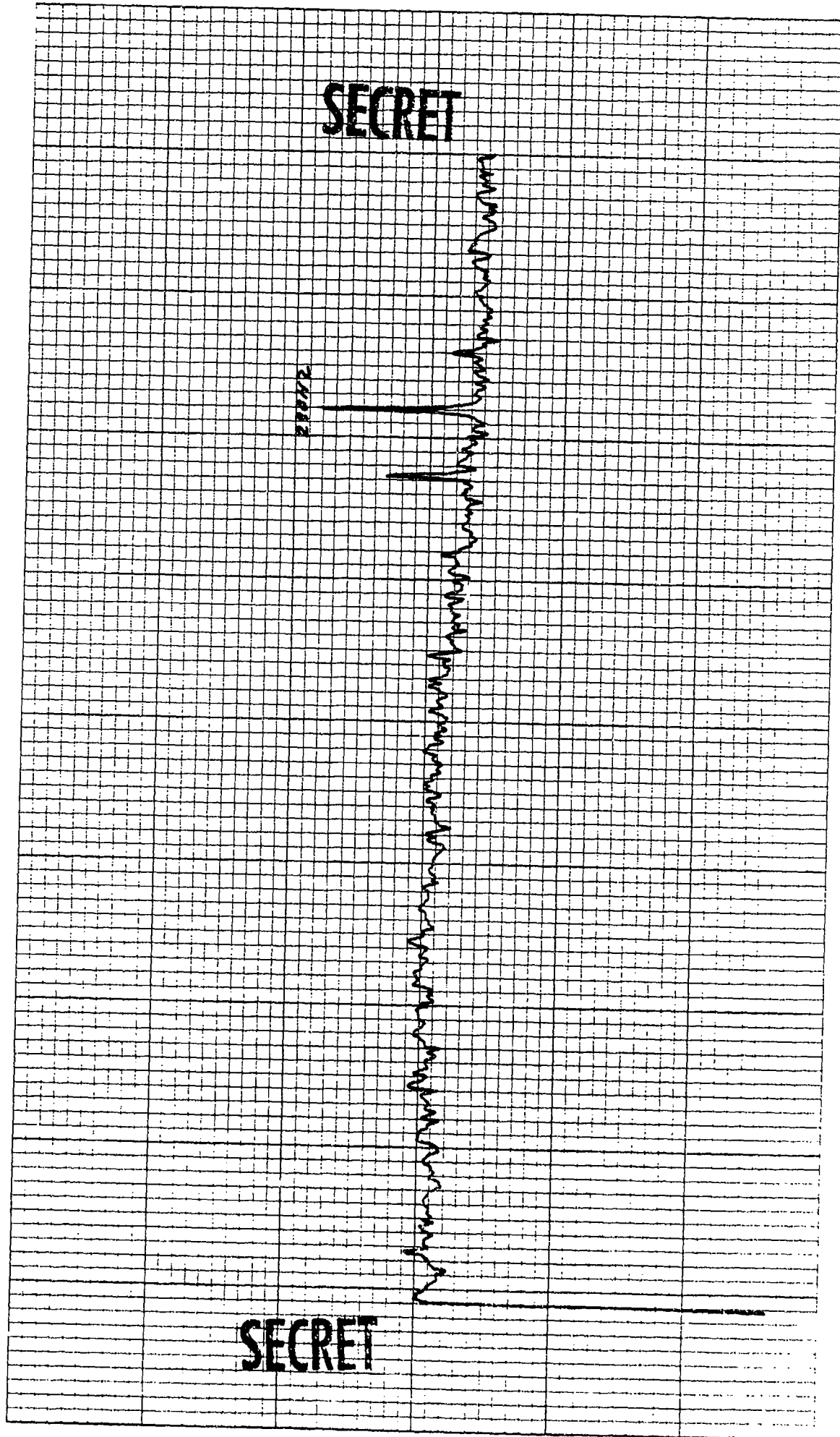
REEL: 1124 INDE X 1895
INTEGRATION TIME 320 SECS ATTN: -70 DB
FILTER WTG: HANNING



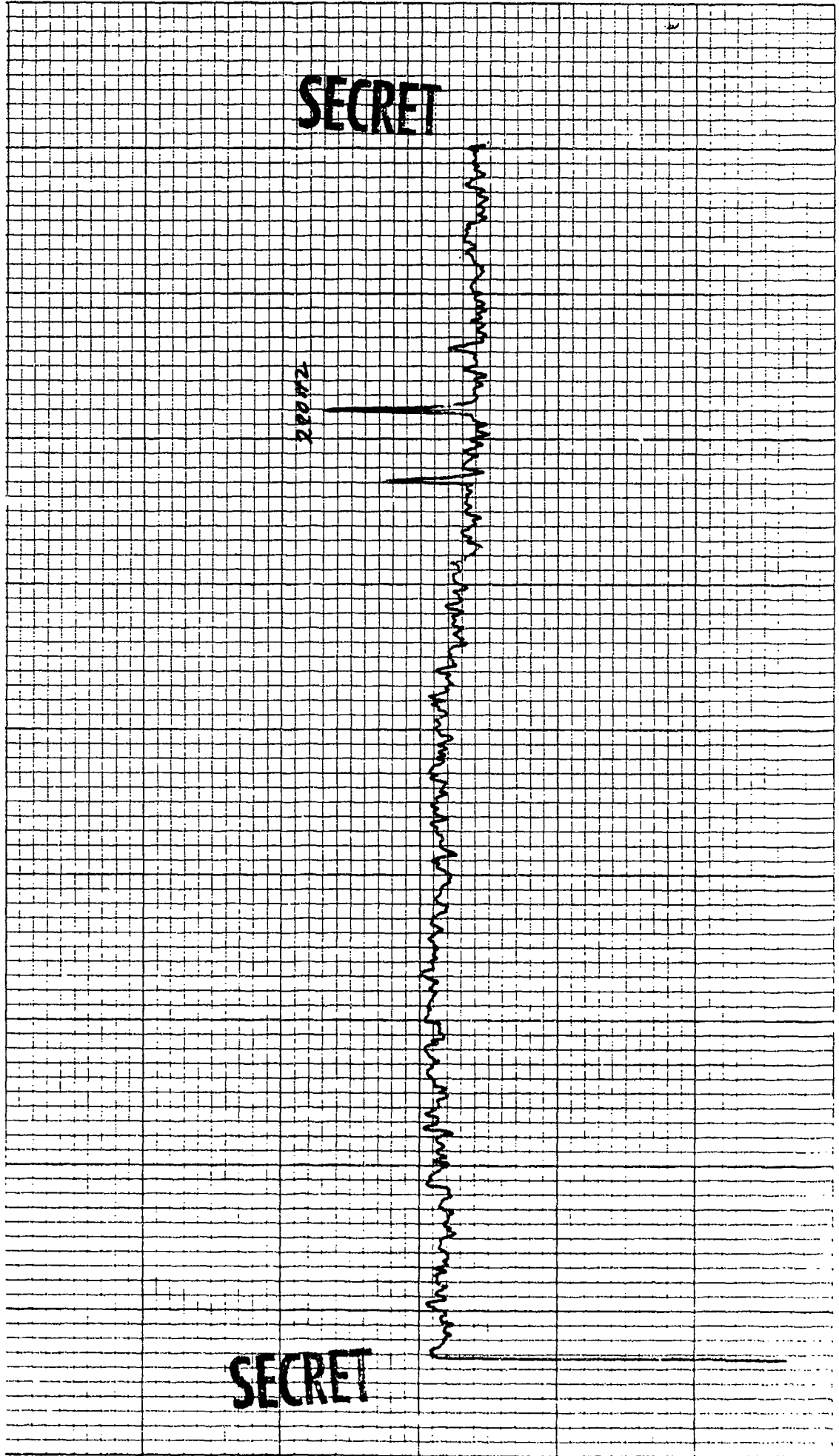
K-2 10 X 10 TO THE INCH 7 X 10 INCHES
NEUFEL & ESSER CO. MADE IN U.S.A.

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CONTROL: 1140 - 16 (D/P12) REEL: M24 INDE X/PPS
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTEN: 70 DB
CENTER FREQ: 370 HZ FILTER WTG: HANNING
16 ELEMENTS DATE OF ANALYSIS: 1-16
DATE/TIME: 3-26-77 - 1140 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+59 DEG. AZ STEERING



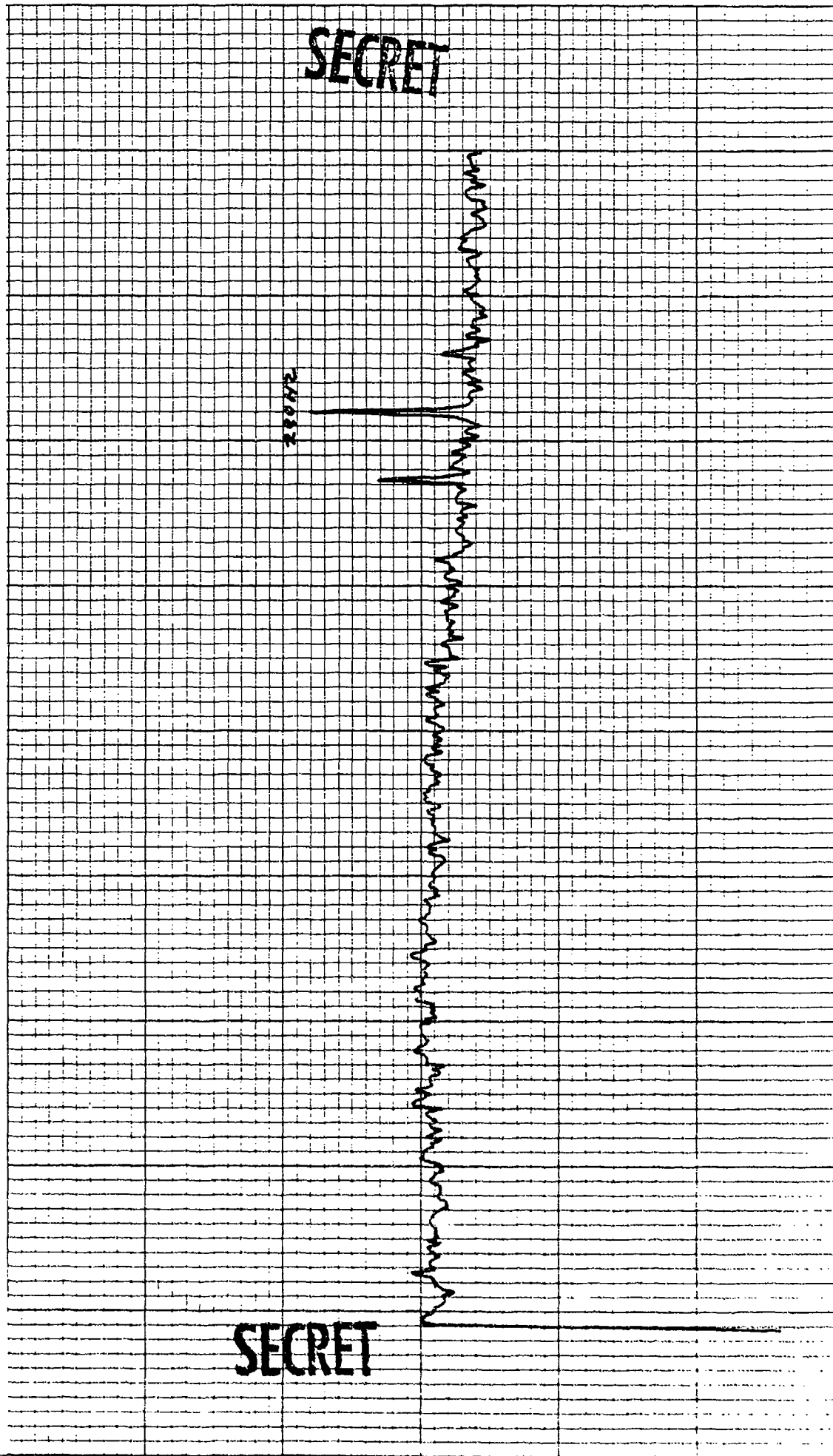
CONTROL: 1148 - 16 (DP12) DATE OF ANALYSIS: 1-16 REEL: M24 INDE X 1985
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 1148 Z INTEGRATION TIME 320 SECS ATTN: -18 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
16 ELEMENTS 160 DEG. AZ STEERING



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KEUFFEL & ESSER CO. MADE IN U.S.A.

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CONTROL: 1146 - 16 (DP12) REEL: M24 INDE X1995
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-16
EXERCISE: BEARING STAKE DATE/TIME: 376-77 -1146 Z INTEGRATION TIME 320 SECS ATTN: -/0 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
16 ELEMENTS +61 DEG. AZ STEERING



SECRET

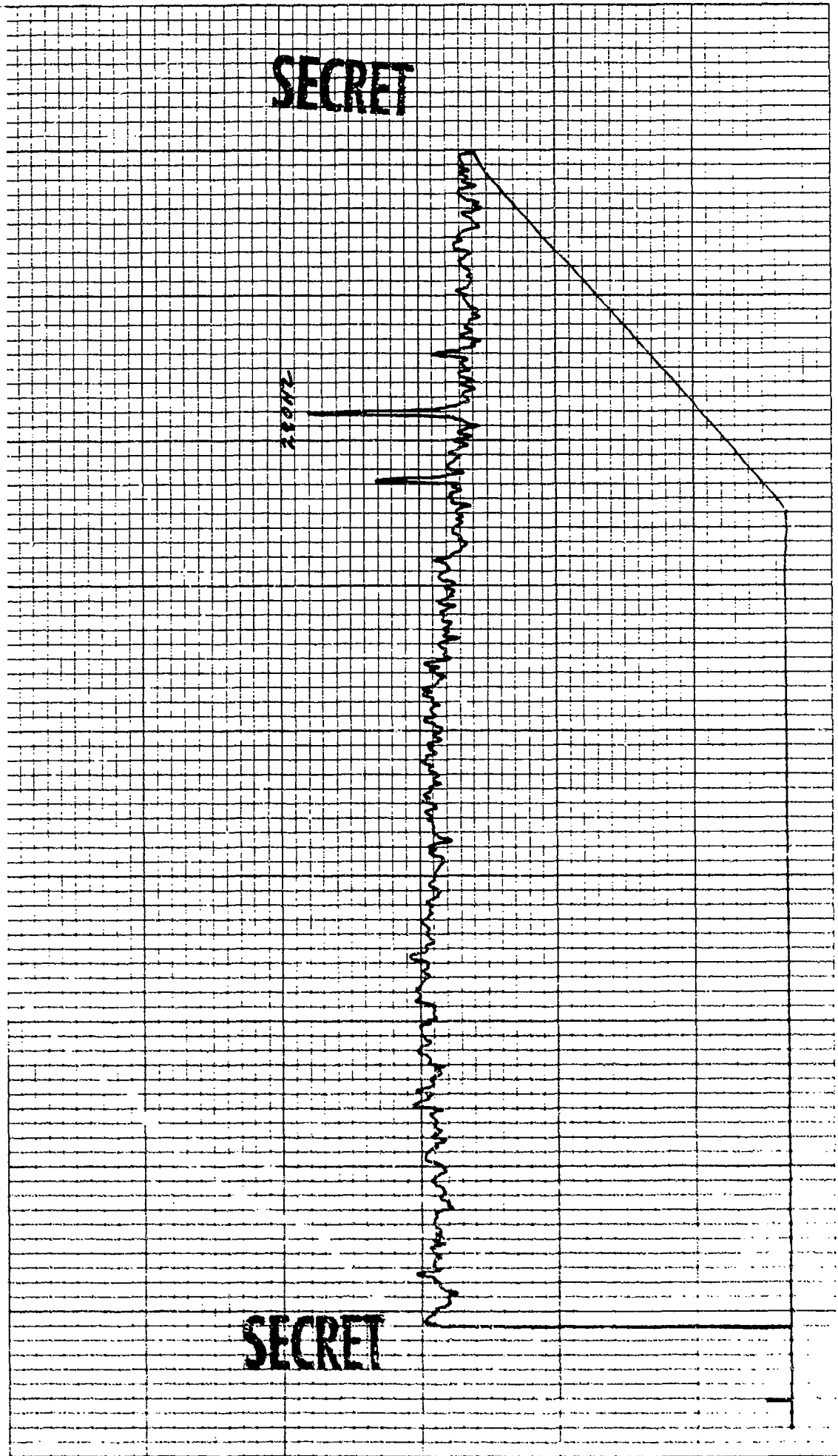
SECRET

10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

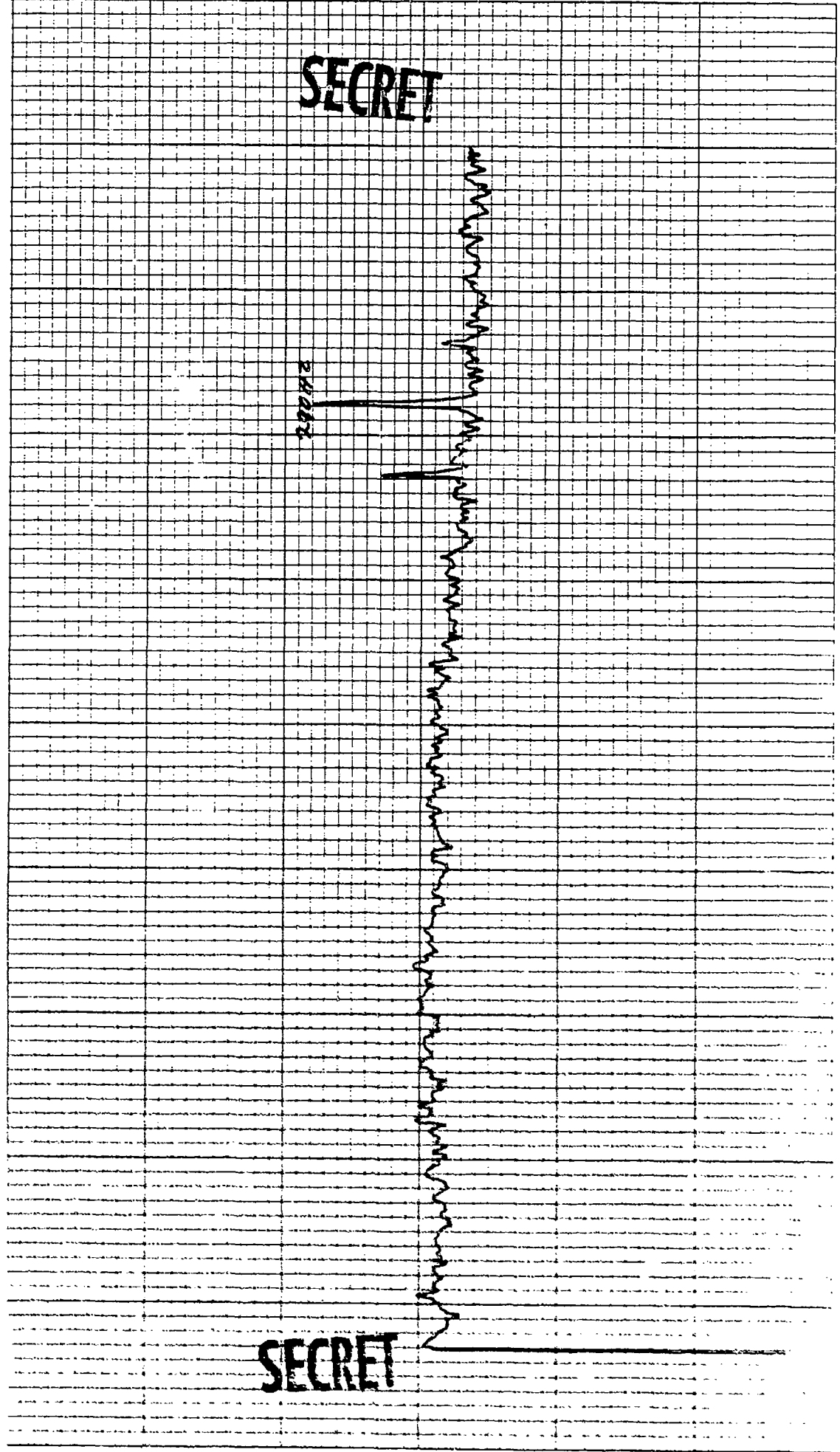
46 0703

1/16/55

CONTROL: 1146 - 16 (DP12) REEL: 1124 INDE X1995
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-16
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 1148 Z INTEGRATION TIME 320 SECS ATTN: DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
16 ELEMENTS +61.5 DEG. AZ STEERING



CONTROL: 1140 - 16 (0012) DATE OF ANALYSIS: 1-16 REEL: 404 INDE X 1005
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-16-77-1148 Z INTEGRATION TIME 320 SECS ATTEN: -10 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 270 HZ 402 DEG. AZ STEERING



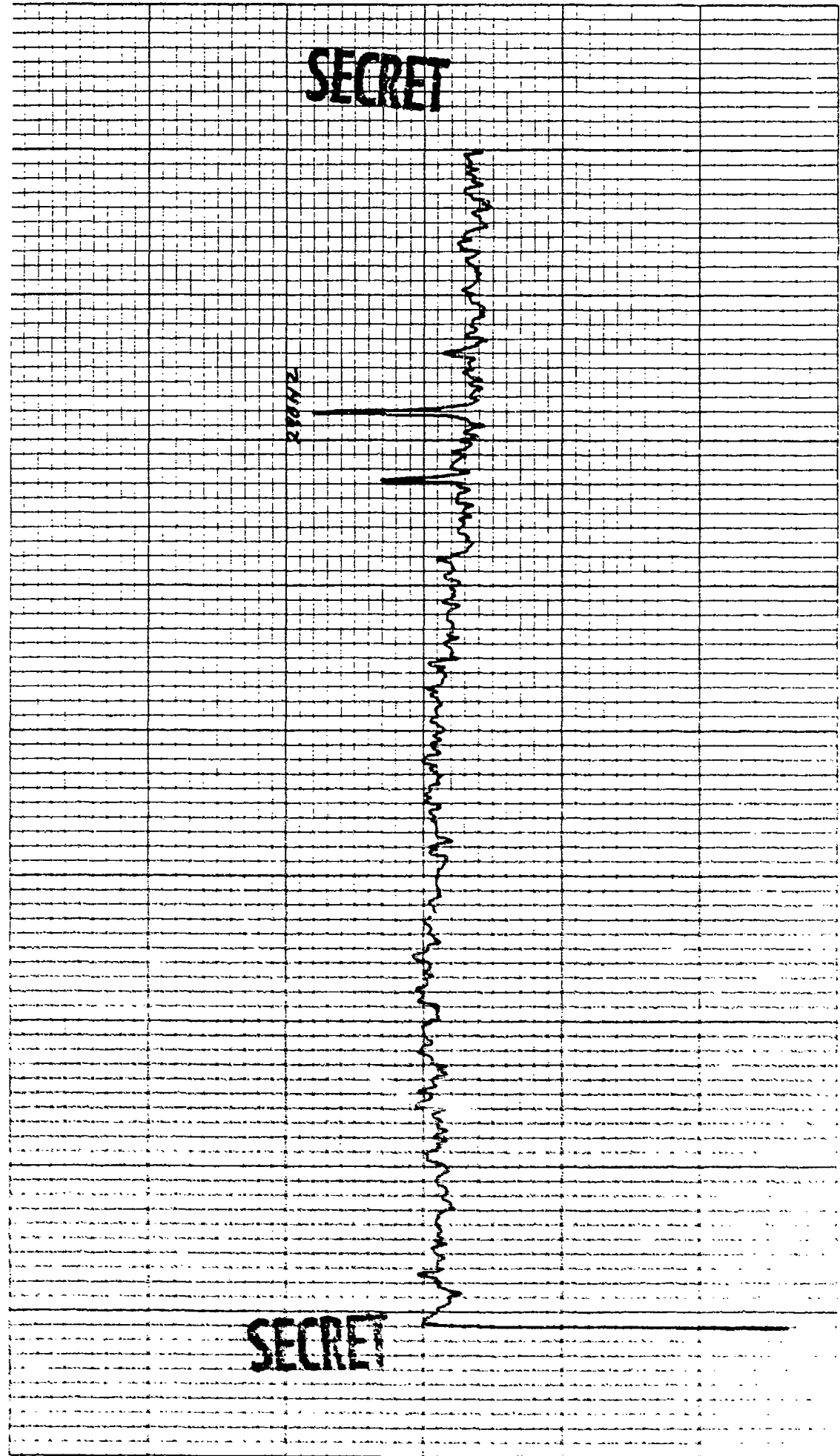
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10 X 10 TO THE INCH
HEUVEL & PAPER CO. MADE IN U.S.A.

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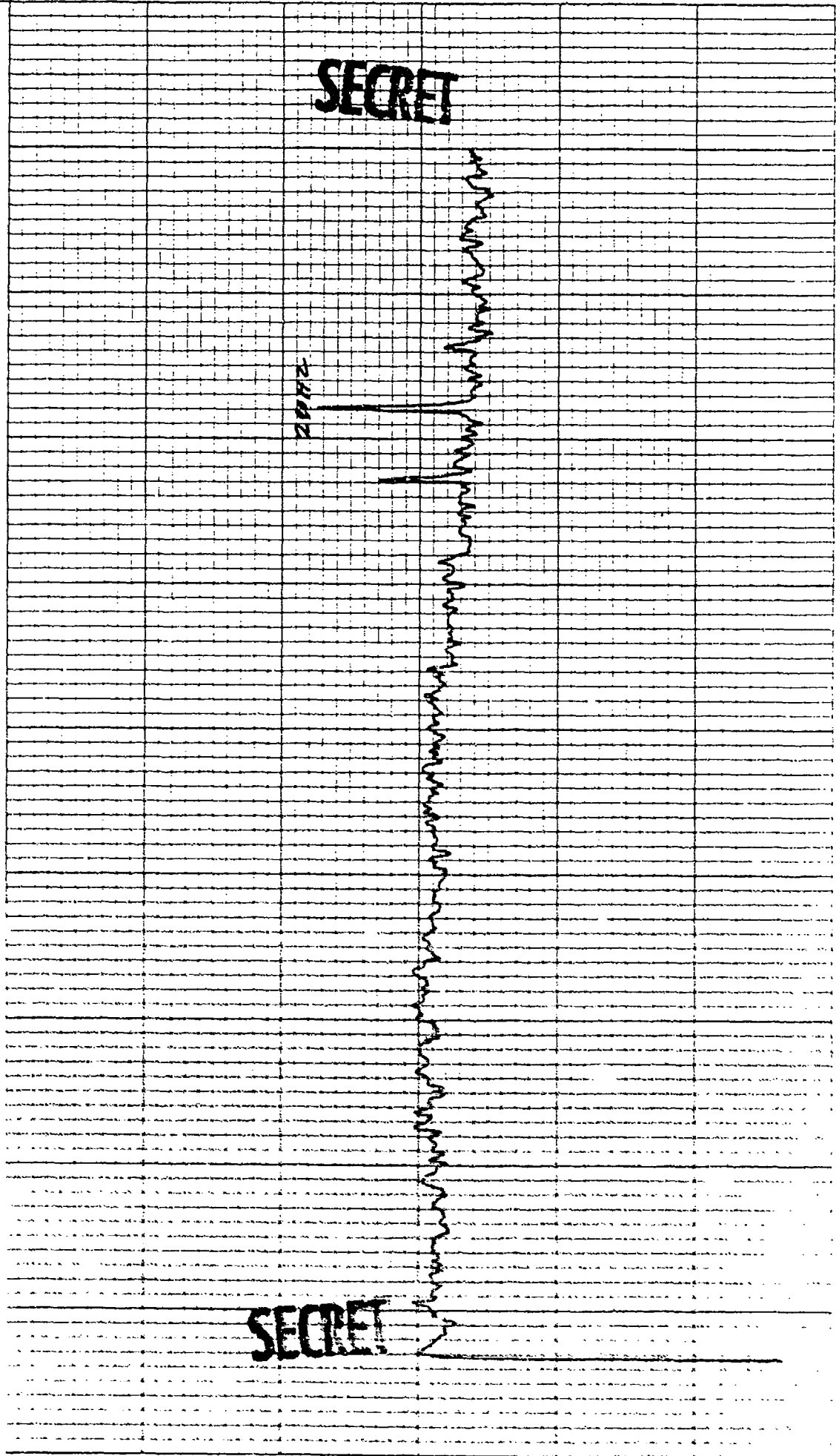
CONTROL: 140 - 16 (D12) DATE OF ANALYSIS: 1-16 REEL: M24 INDE X1965
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 7-6-77 - 1146 Z INTEGRATION TIME 320 SECS ATTN: -10 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
16 ELEMENTS 43 DEG. AZ STEERING



NOE 10 X 10 TO THE INCHES
NEUFEL & PAPER CO. MADE IN U.S.A.

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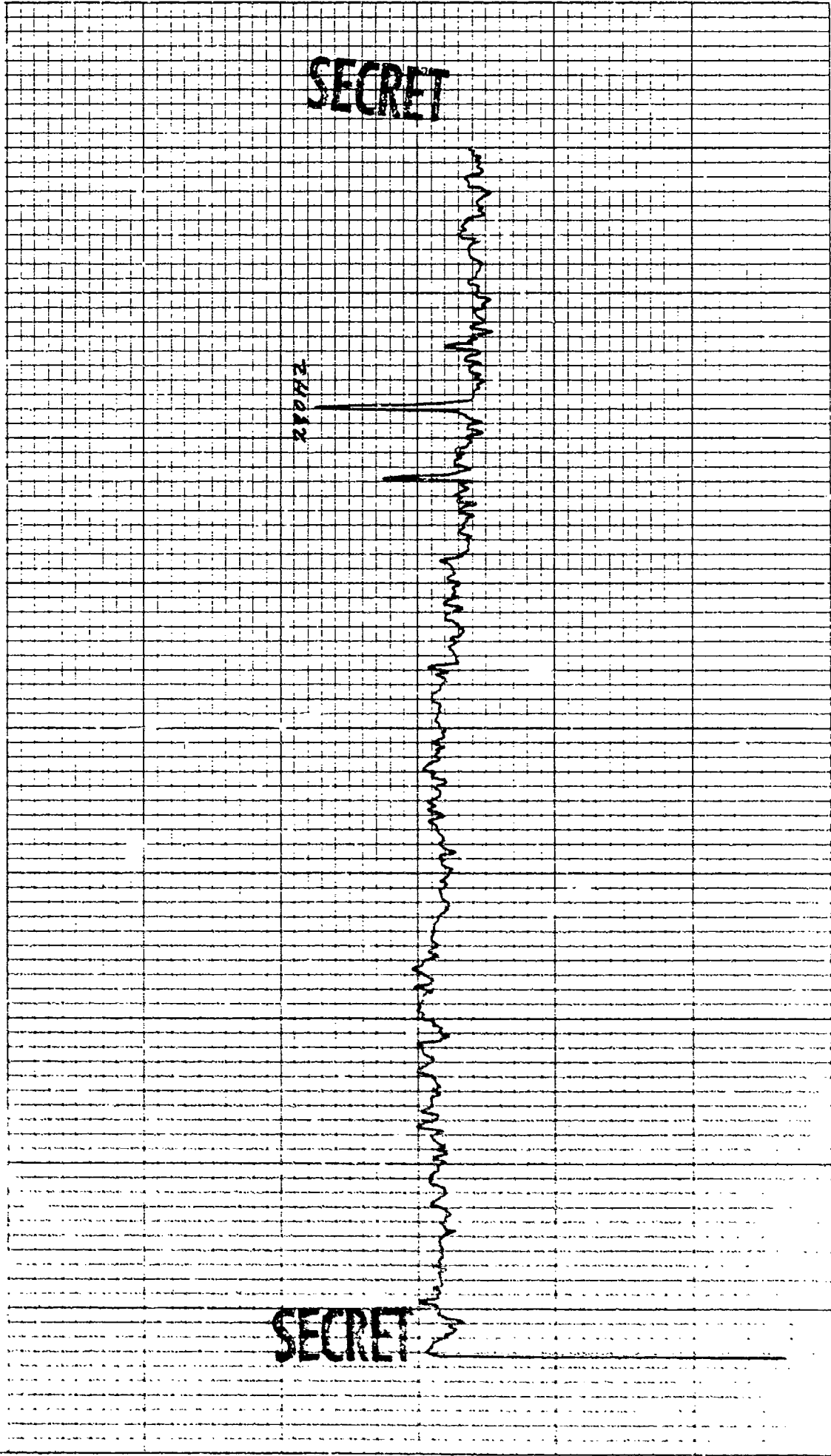
CONTROL: 1148 - 16 (8812) DATE OF ANALYSIS: 1-16 REEL: 424 INDE X/995
BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 3-6-77 - 1148 Z INTEGRATION TIME 320 SECS ATTEN: -10 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
CENTER FREQ: 270 HZ +64 DEG. AZ STEERING



SECRET

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CONTROL: 1190 - 16 (DP/2) REEL: 104 INDE X 1995
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: 78 DB
 CENTER FREQ: 270 HZ FILTER WTG: HANNING
 DATE OF ANALYSIS: 1-16
 DATE/TIME: 3-16-77 - 1148 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
16 DEG. AZ STEERING



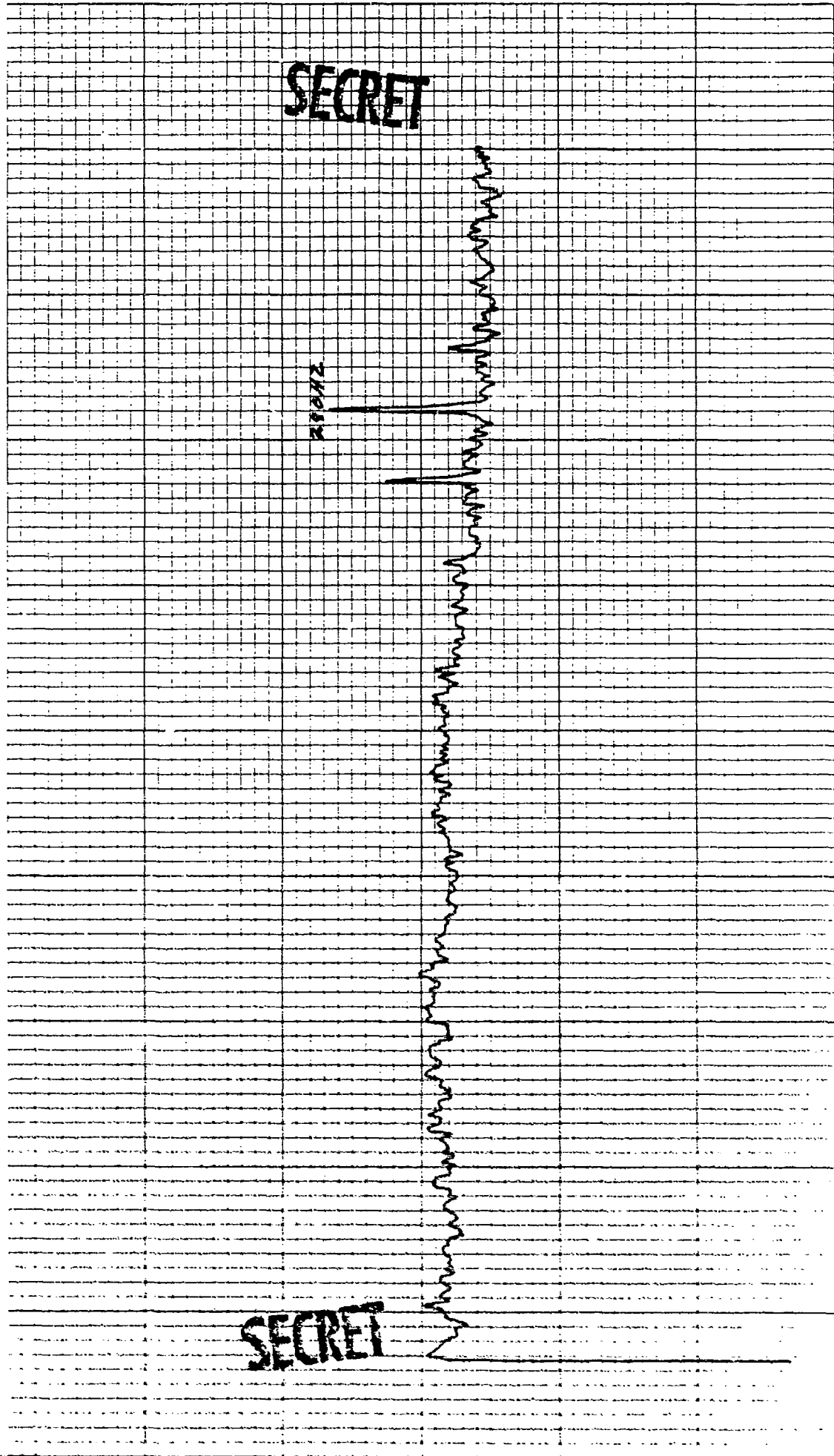
CONTROL: 1140 - 16 (DP12) DATE OF ANALYSIS: 1-16 REEL: M24 INDE X1995

BEAMFORMED SPECTRUM (ELEMENTS))

EXERCISE: BEARING STAKE DATE/TIME: 7-6-77 - 1140 Z INTEGRATION TIME 320 SECS ATTN: 79 DB

CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING

16 ELEMENTS + 60 DEG. AZ STEERING



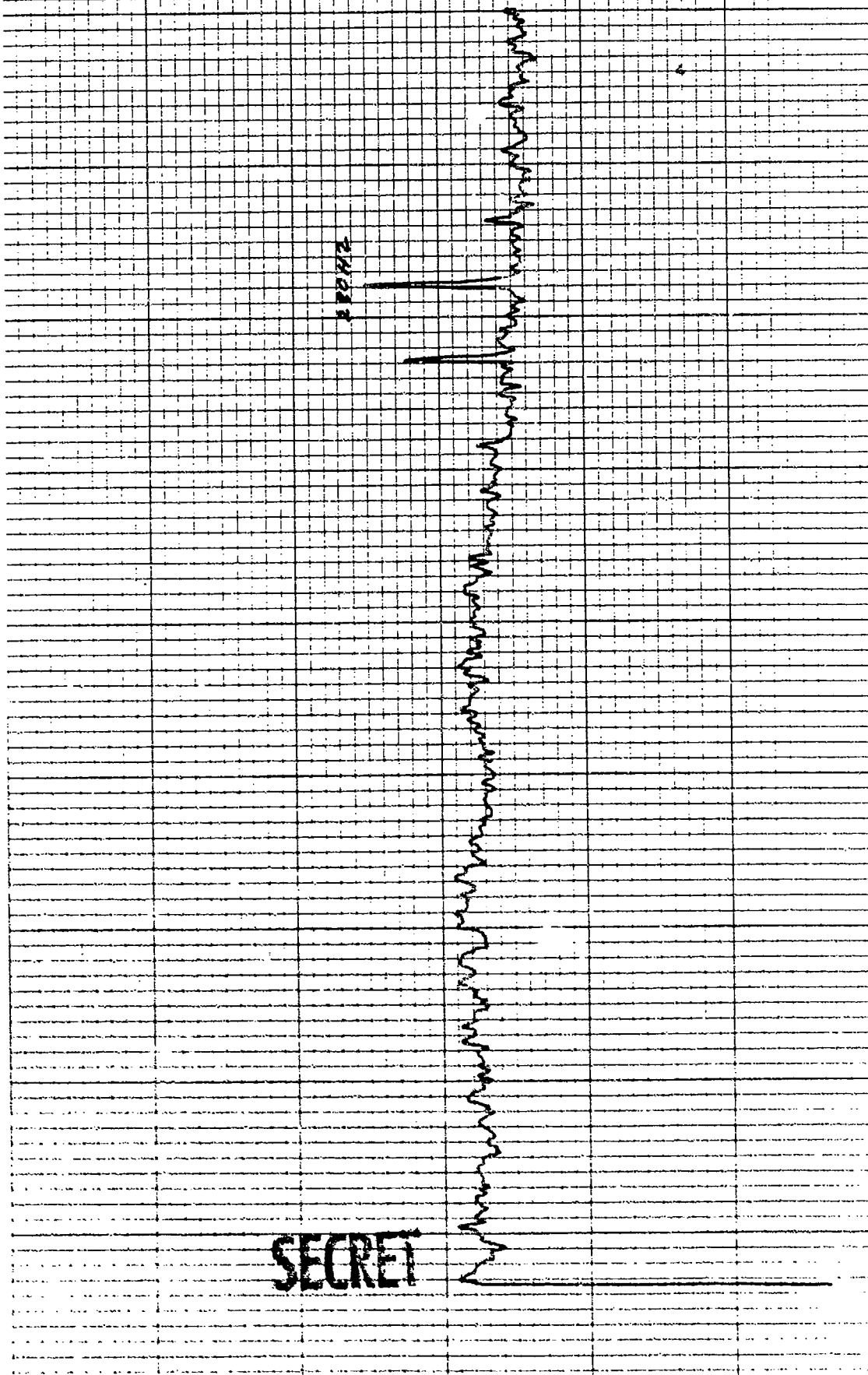
SECRET

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CONTROL: 1148 - 16 (DP12) DATE OF ANALYSIS: 1-16-66
 BEAMFORMED SPECTRUM (ELEMENTS) INTEGRATION TIME 320 SECS REEL: 104 INDE X 1985
 EXERCISE: BEARING STAKE FILTER WTG: HANNING ATTN: -10 DB
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ
 16 ELEMENTS 70 DEG. AZ STEERING

SECRET

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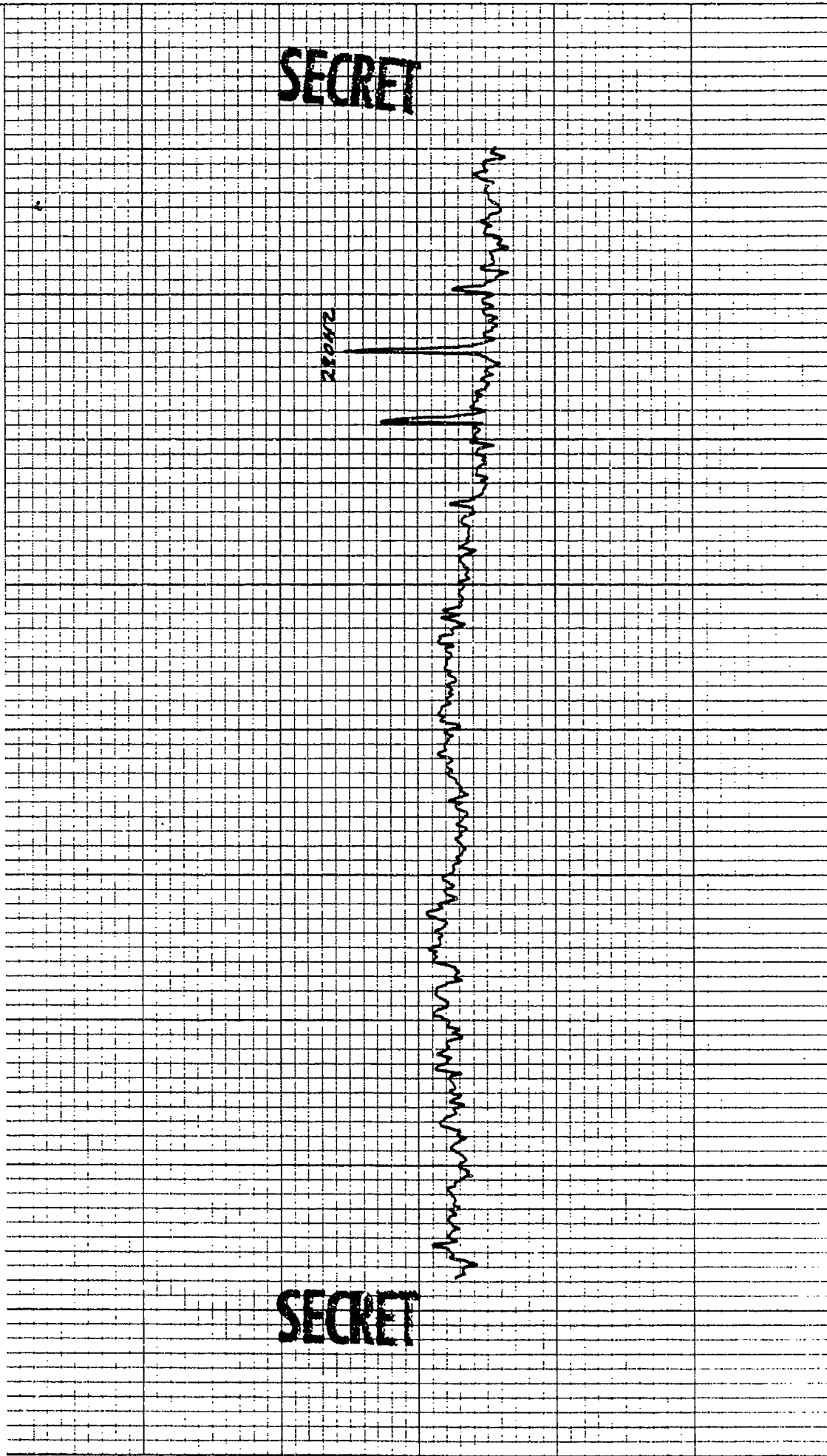


KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUPFEL & ESSER CO. MADE IN U.S.A.

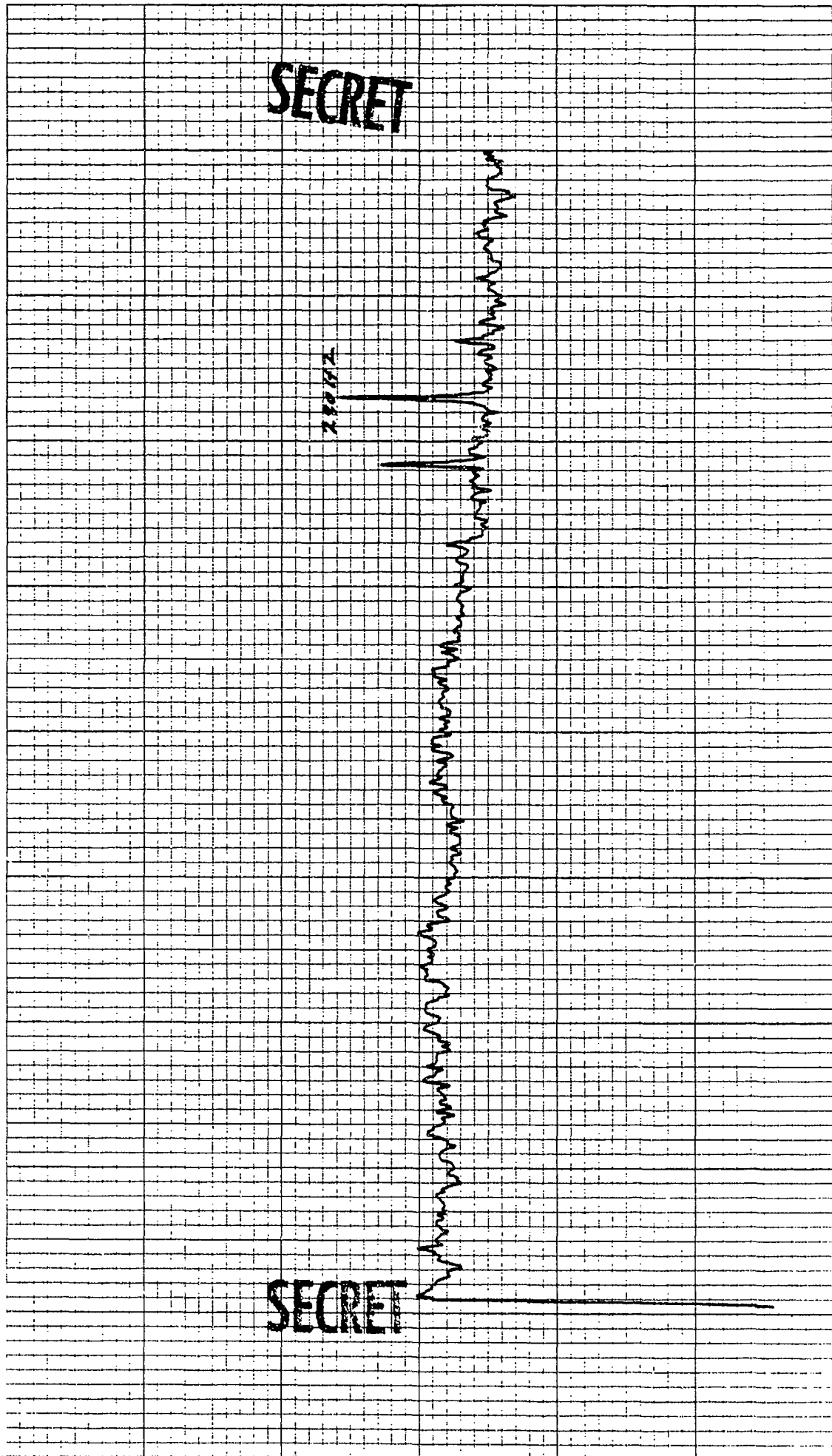
46 0703

11/16

CONTROL: 1148 - 16 (DP12) DATE OF ANALYSIS: 1-16 REEL: H24 INDE X/885
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 7-16-77-1148 Z INTEGRATION TIME 320 SECS ATTEN: -18 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 CENTER FREQ: 270 HZ +72 DEG. AZ STEERING



CONTROL: 1148 - 16 (DP12) DATE OF ANALYSIS: 1-16 REEL: 434 INDE X/105
BEAMFORMED SPECTRUM (ELEMENTS) INTEGRATION TIME 320 SECS ATTEN: 70 DB
EXERCISE: BEARING STAKE FILTER WTC: HANNING
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ
16 ELEMENTS +74 DEG. AZ STEERING

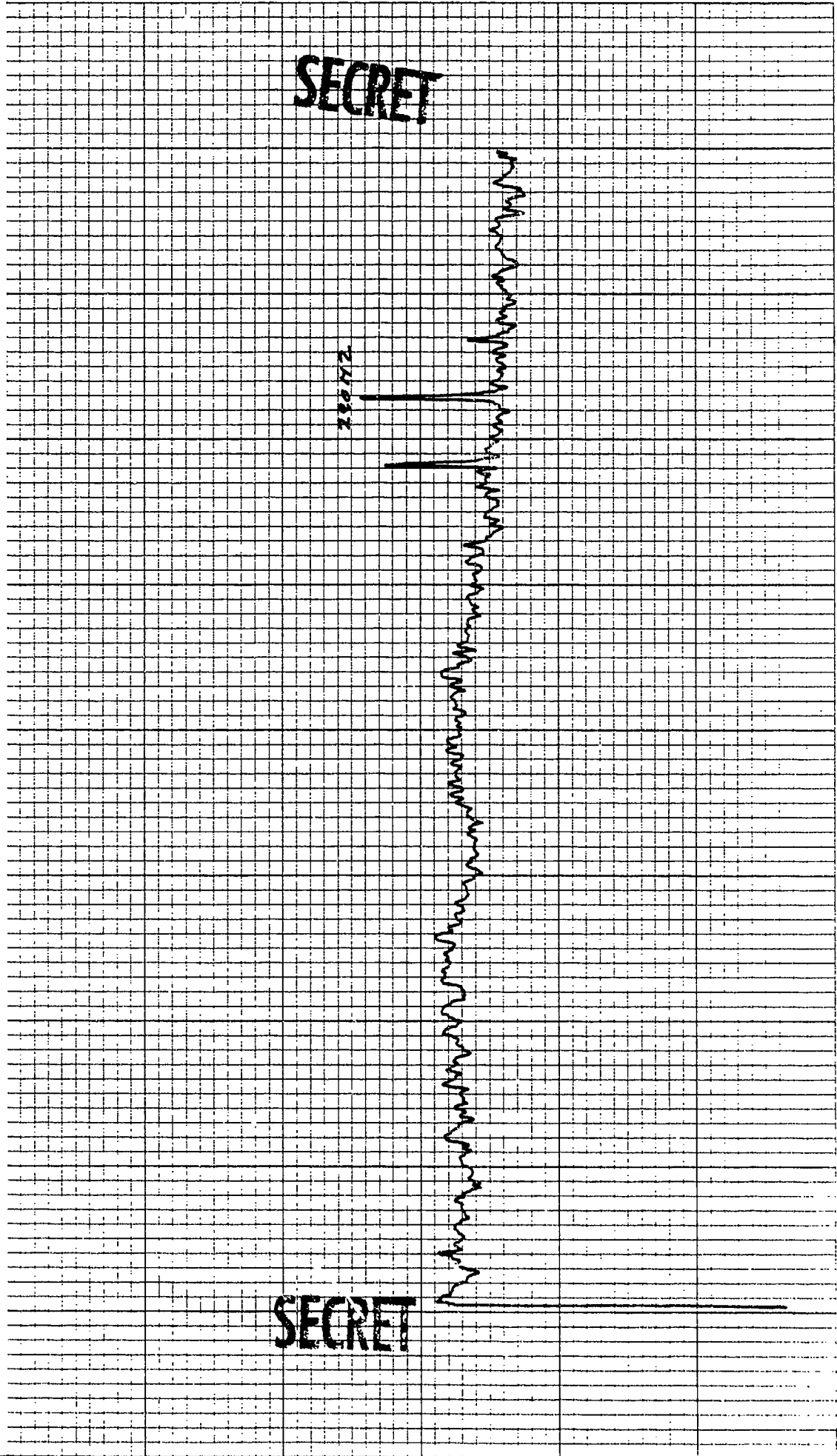


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216/28

CONTROL: 114A - 16 (DP12) REEL: M94 INDE X / 995
 BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-16
 EXERCISE: BEARING STAKE DATE/TIME: 3-6-77 - 1148 Z INTEGRATION TIME 320 SECS ATTEN: -10 DB
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
16 ELEMENTS +76 DEG. AZ STEERING



SECRET

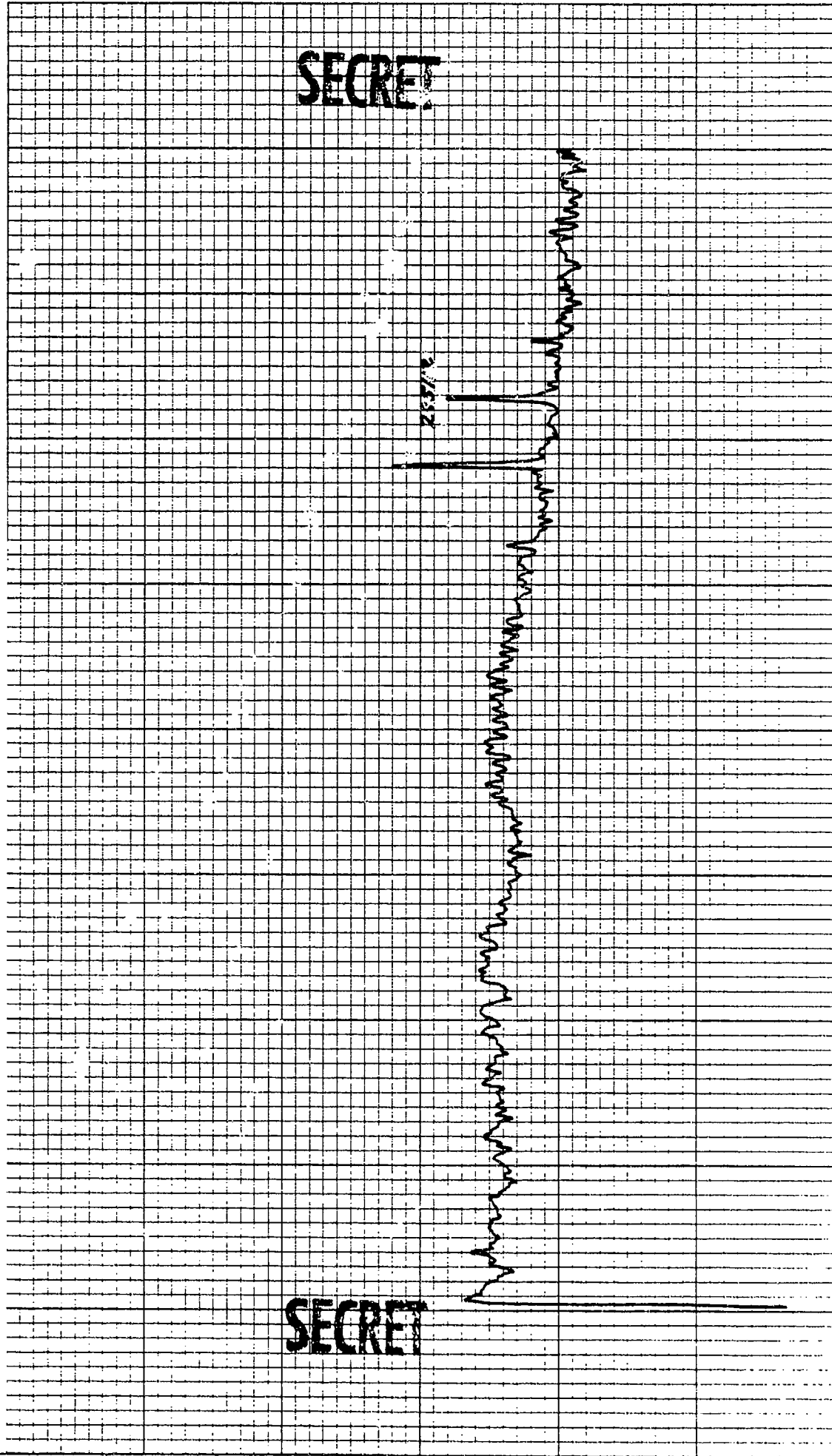
SECRET

KOE 10 X 10 TO THE INCH • 7 X 10, INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

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CONTROL: 1140 - 16 (DP12) DATE OF ANALYSIS: 1-16 REEL: M24 INDE X 1985
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-16-77 - 1140 Z INTEGRATION TIME 320 SECS ATTEN: 70 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 270 HZ +70 DEG. AZ STEERING

16 ELEMENTS



SECRET

SECRET

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 12

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-18.9</u> dBV
MCPS-32 CAL. CORRECTION	<u>+10</u> -8.9
BEAMFORMER GAIN	<u>+18</u> +9.1 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u> +9.3 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-50.6</u> dBV
MCPS-32 CAL. CORRECTION	<u>+10</u> -40.6
BEAMFORMER GAIN	<u>+18</u> -22.6 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR	<u>+9.1</u>
NOISE LEVEL FOR SNR	<u>-22.6</u> 31.7
PROCESSOR CORRECTION	<u>- 4</u> 27.7
MRA CORRECTION	<u>+ .2</u> 27.9 SNR .013 HZ BAND
BANDWIDTH CONVERSION	<u> </u> SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL
SIGNAL LEVEL AND SNR
CALCULATIONS

DATA POINT 12

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -35.8 dBV
MCPS-32 CAL. CORRECTION +10 -25.8
BEAMFORMER GAIN +18 - 7.8 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION + .9 - 6.9 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -54.6 dBV
MCPS-32 CAL. CORRECTION +10 -44.6
BEAMFORMER GAIN +18 -26.6 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR -7.8
NOISE LEVEL FOR SNR -26.6 18.8
PROCESSOR CORRECTION -4.2 14.6
MRA CORRECTION + .9 15.5 SNR .013 HZ BAND
BANDWIDTH CONVERSION _____ SNR 1 HZ BAND

CONFIDENTIAL

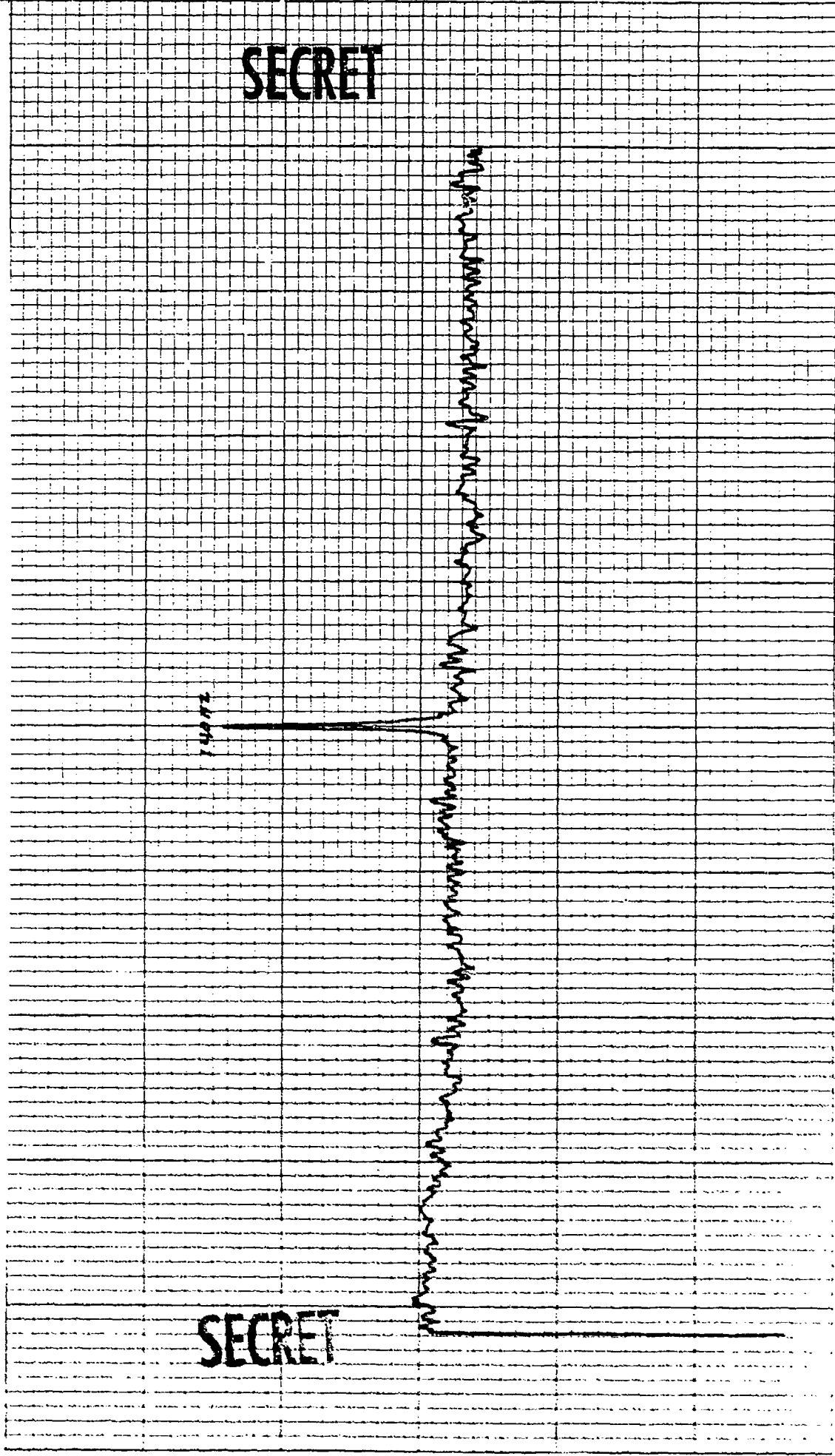
SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-24.8</u>	<u>-38.6</u>	<u> </u>
MRA SIGNAL LEVEL	<u>+9.3</u>	<u>-6.9</u>	<u> </u>
ARRAY SIGNAL GAIN	<u>34.1</u>	<u>31.7</u>	<u> </u>
20 LDG <u>32</u>	<u>30.1</u>	<u>30.1</u>	<u> </u>
# of elements			
DIFFERENCE	<u>+4.0</u>	<u>+1.6</u>	<u> </u>

ARRAY GAIN

MRA SNR	<u>27.9</u>	<u>15.5</u>	<u> </u>
MEAN OMNI SNR	<u>19.4</u>	<u>7.9</u>	<u> </u>
ARRAY GAIN	<u>8.5</u>	<u>7.6</u>	<u> </u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>10.6</u>	<u>13.4</u>	<u> </u>
DIFFERENCE	<u>-2.1</u>	<u>-5.8</u>	<u> </u>

CONTROL: 1140 - 32 (D112) REEL: 424 INDE X1095
 BEAMFORMED SPECTRUM (ELEMENTS) 1-26-77 21-34)
 EXERCISE: BEARING STAKE DATE/TIME: 3-26-77 - 1140 Z INTEGRATION TIME 320 SECS ATTN: -10 DB
 CENTER FREQ: 140 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 32 ELEMENTS +48 DEG. AZ STEERING



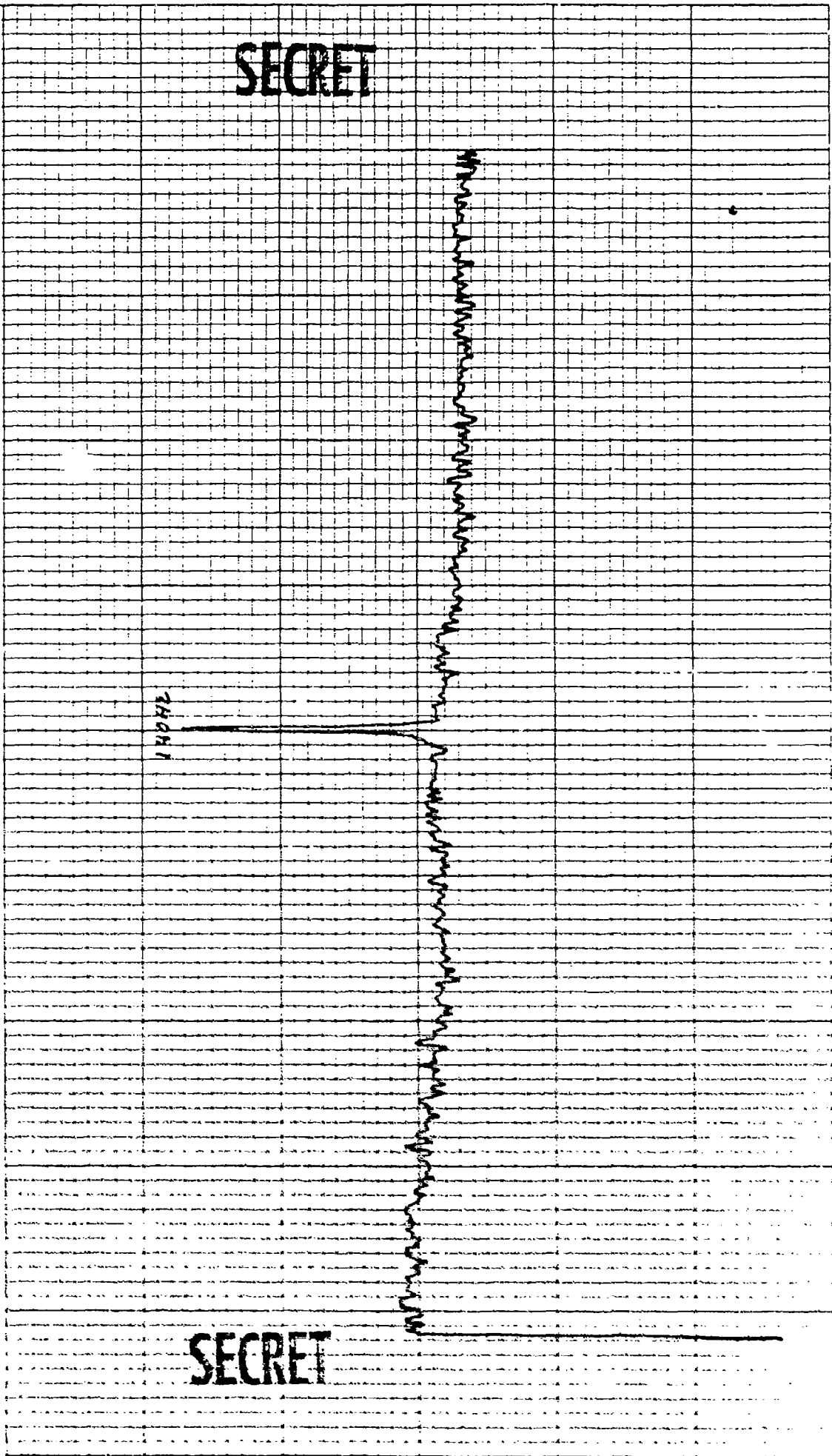
SECRET

SECRET

KOE 10 X 10 TO THE INCH • X 10 INCHES
REUP/1 A PAPER CO. 4010 M.D.A.

46 0703

CONTROL: 1140 - 32 (DP12) DATE OF ANALYSIS: 1-26-77 REEL: M24 INDE X1995
 BEAMFORMED SPECTRUM (ELEMENTS))
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: 1/ DB
 CENTER FREQ: 140 HZ 450 DEG. AZ STEERING FILTER WTG: HANNING
32 ELEMENTS



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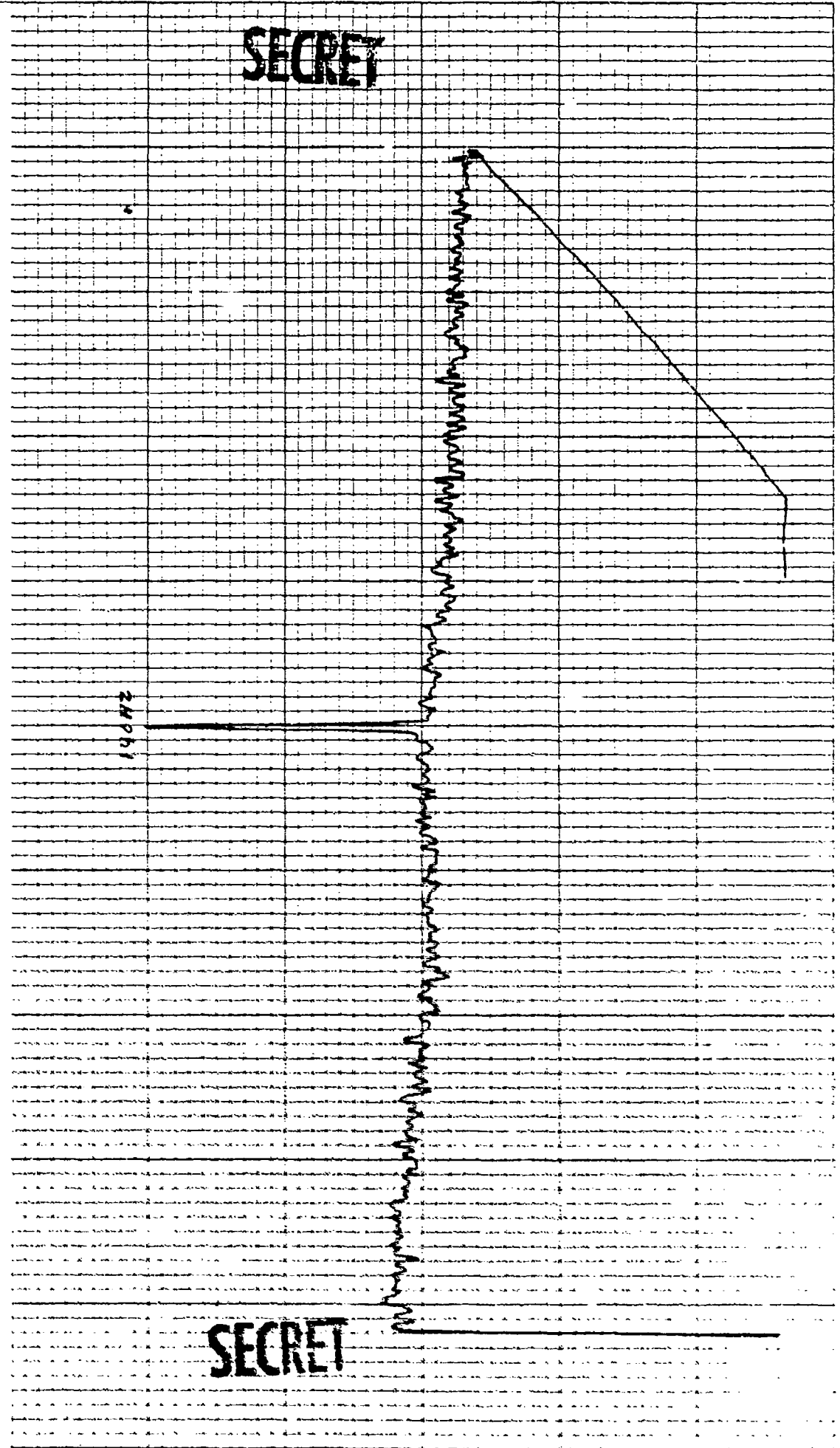
SECRET

10 X 10 TO THE INCHES
NEUVEL & PAPER CO. MADE IN U.S.A.

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CONTROL: 1140 - 72 (DP12) DATE OF ANALYSIS: -- -- --
BEAMFORMED SPECTRUM(ELEMENTS) 1-26 488-34
EXERCISE: BEARING STAKE DATE/TIME: 3-26-77 - 1140 Z
CENTER FREQ: 140 HZ ANALYSIS BANDWIDTH: 1/10HZ
32 ELEMENTS +52 DEG. AZ STEERING

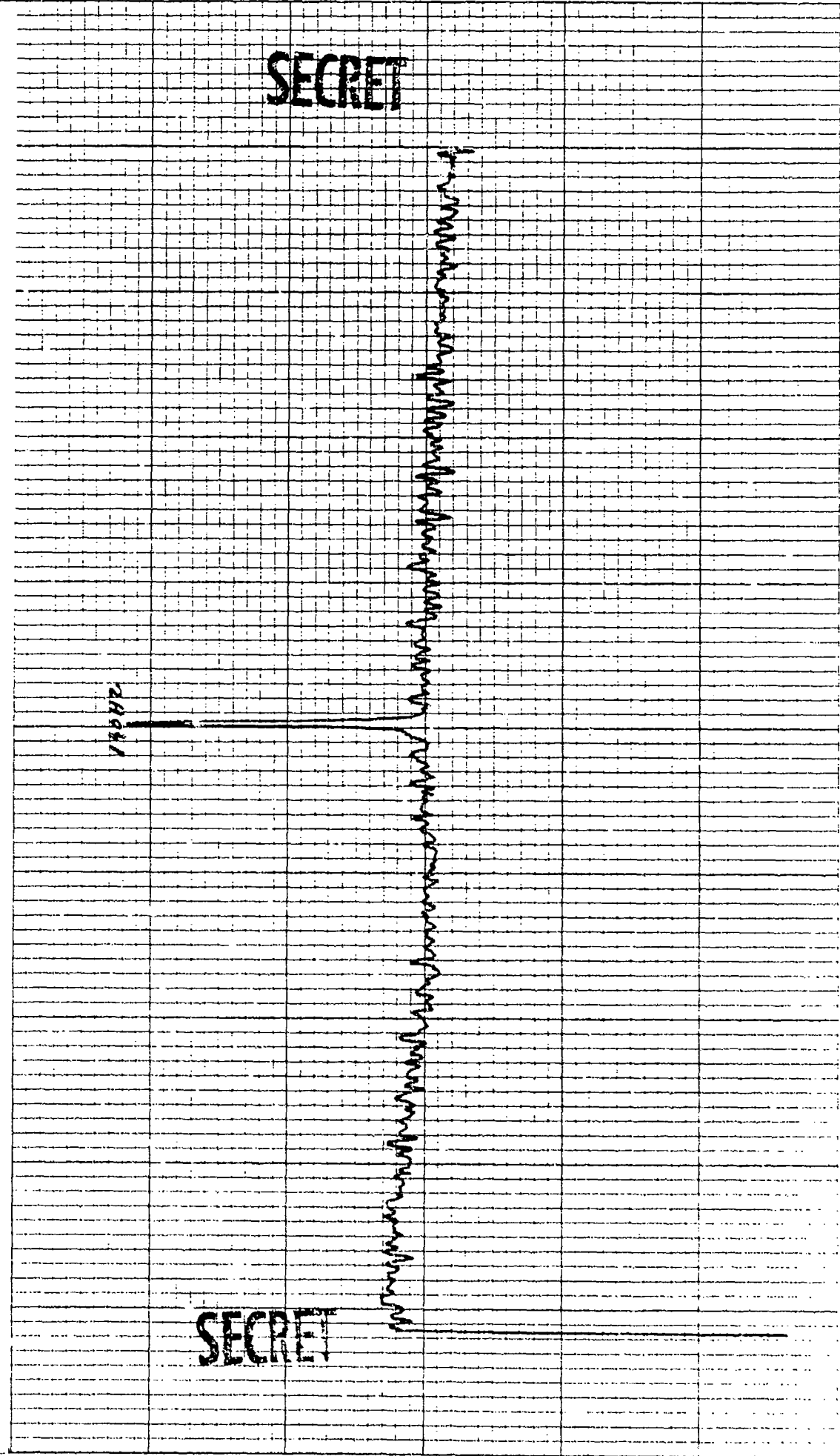
REEL: H23 INDE X 1983
INTEGRATION TIME 320 SECS ATTN: -10 DB
FILTER WTG: HANNING



CONTROL: 1140 - 32 (D912)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE BEARING STAKE
CENTER FREQ: 140 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-20-77
DATE/TIME: 3-26-77 - 1149 Z
ANALYSIS BANDWIDTH: 1/10HZ
454 DEG. AZ STEERING

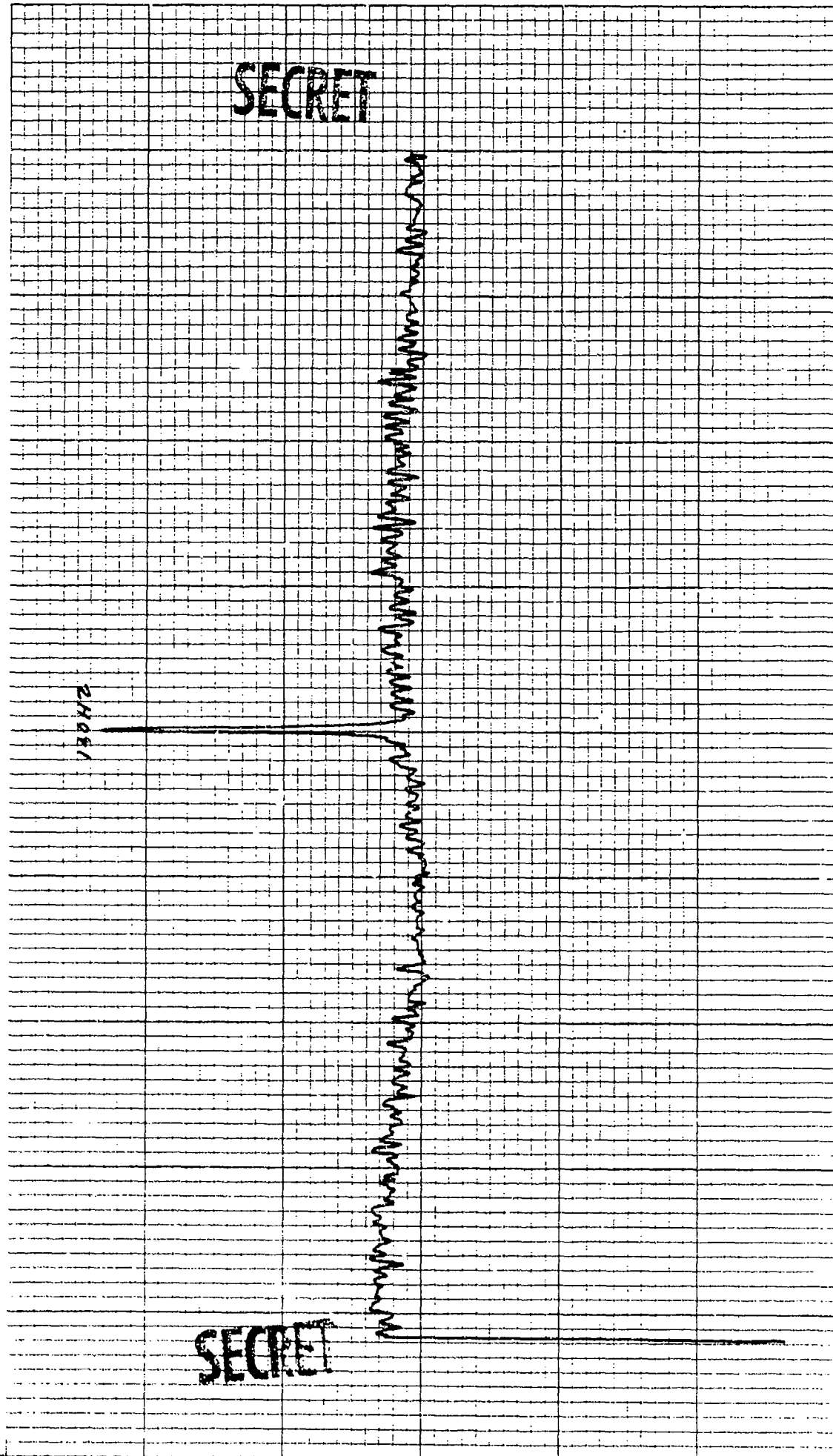
REEL: 124 INDE X/995
INTEGRATION TIME 320 SECS ATTN: -10 DB
FILTER WTC: HANNING



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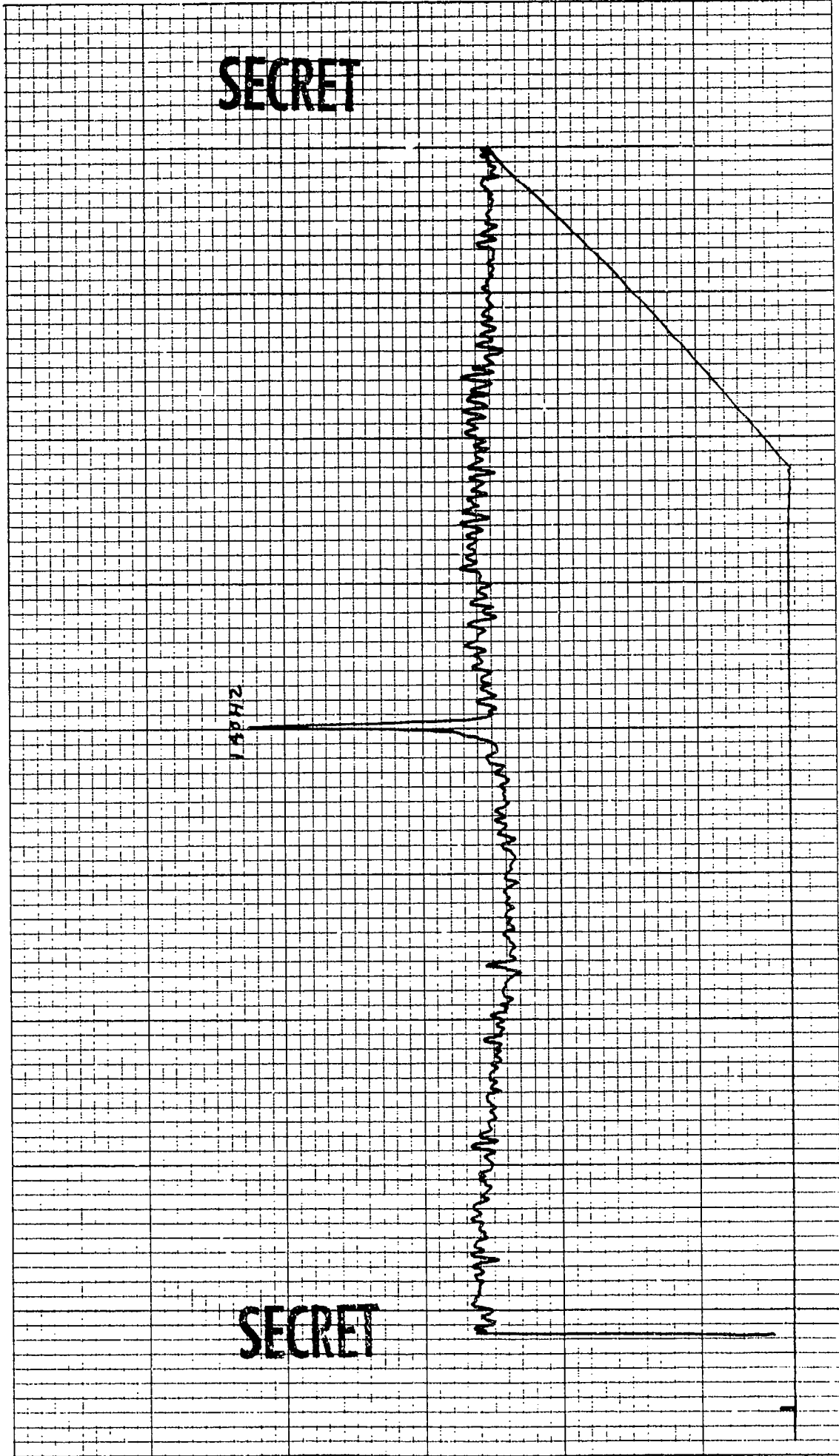
SECRET

CONTROL: 1140 - 32 (DP12) DATE OF ANALYSIS: - - - -
BEAMFORMED SPECTRUM (ELEMENTS) 1-26-9 08-34)
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: -/8 DB
CENTER FREQ: 140 HZ FILTER WTG: HANNING
32 ELEMENTS +56 DEG. AZ STEERING



CONTROL: 1148 - 32 (DP12) DATE OF ANALYSIS: 1-26-58
BEAMFORMED SPECTRUM (ELEMENTS) FILTER WTG: HANNING
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: -10 DB
CENTER FREQ: 140 HZ ANALYSIS BANDWIDTH: 1/10HZ
32 ELEMENTS 4.58 DEG. AZ STEERING

REEL: M24 INDE X/825



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CONTROL: 1140 - 32 (D812)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 140 HZ
32 ELEMENTS

DATE OF ANALYSIS: - - - -
1-26-77 29-53)
DATE/TIME: 3-16-77 - 1148 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+ 59 DEG. AZ STEERING

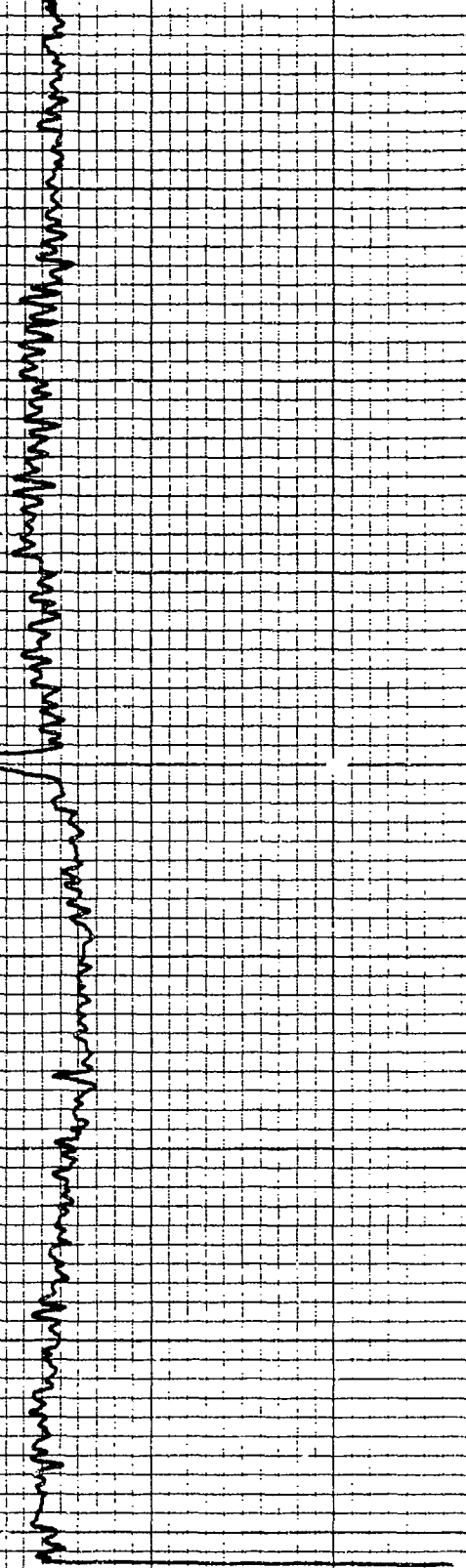
REEL: 124
INTEGRATION TIME 320 SECS
FILTER

INDE X 1985
ATTEN: -18 DB
WTG: HANNING

SECRET

140 HZ

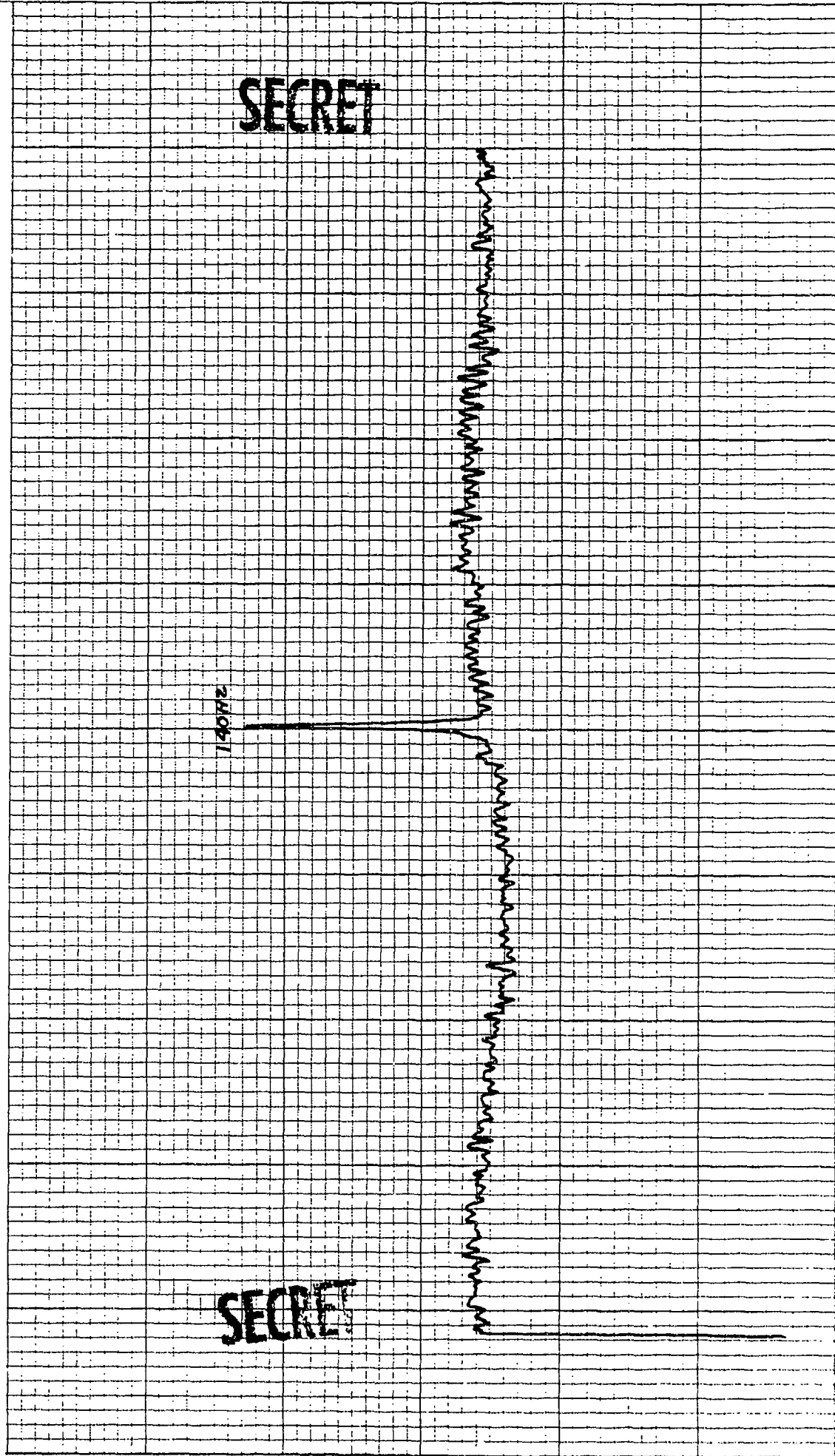
SECRET



K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

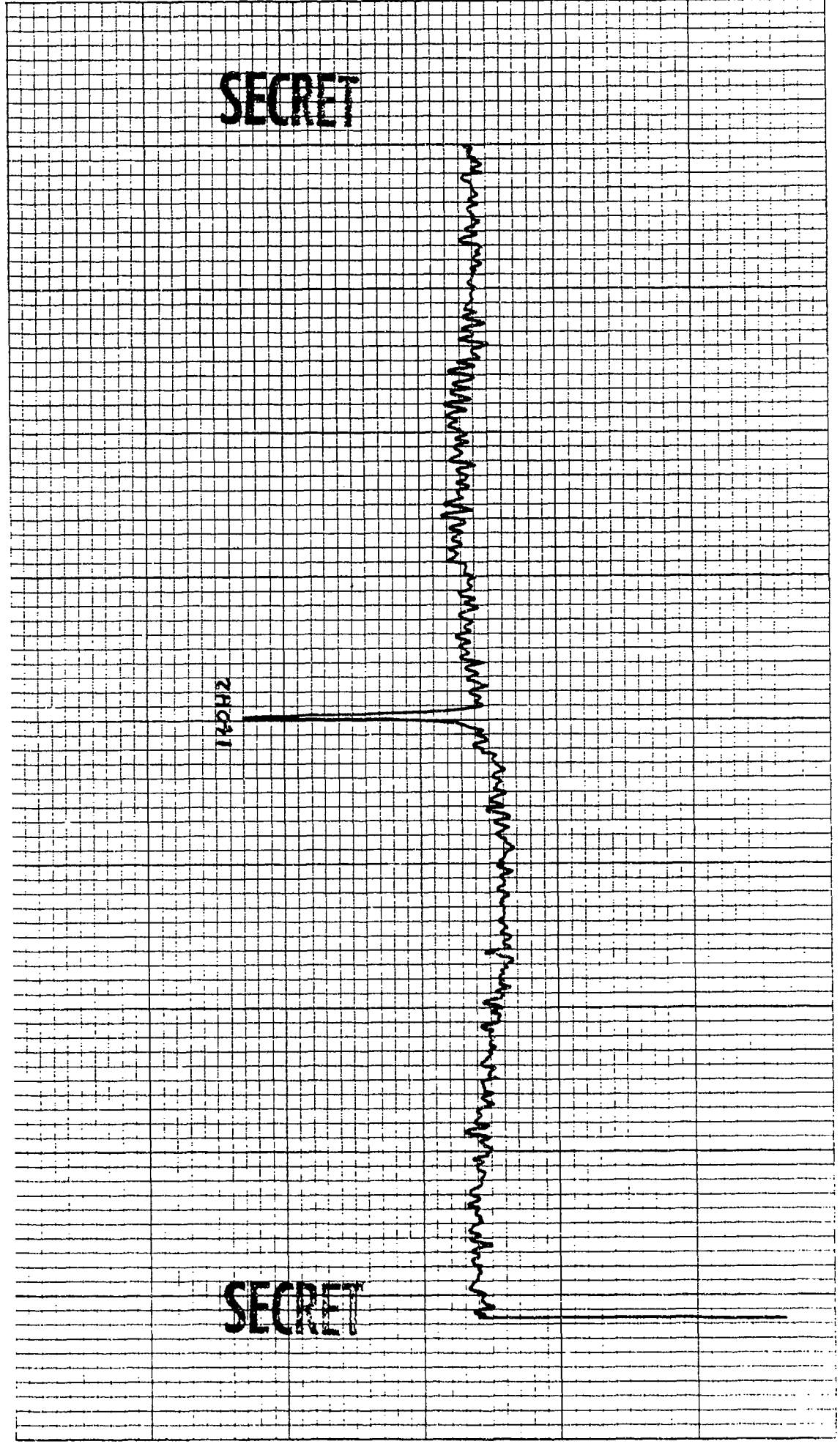
CONTROL: 1148 - 32 (DP12) DATE OF ANALYSIS: 1-26-77 REEL: M24 INDE X1995
BEAMFORMED SPECTRUM(ELEMENTS) 1-26-77-1148 Z INTEGRATION TIME 320 SECS ATTN: -1 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 140 HZ +60 DEG. AZ STEERING



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CONTROL: 1148 - 32 (DP12) DATE OF ANALYSIS: 1-26-77 REEL: M24 INDE X/985
BEAMFORMED SPECTRUM(ELEMENTS) 28-34)
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 1148 Z INTEGRATION TIME 320 SECS ATTEN: -18 DB
CENTER FREQ: 140 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
32 ELEMENTS +61 DEG. AZ STEERING



B774

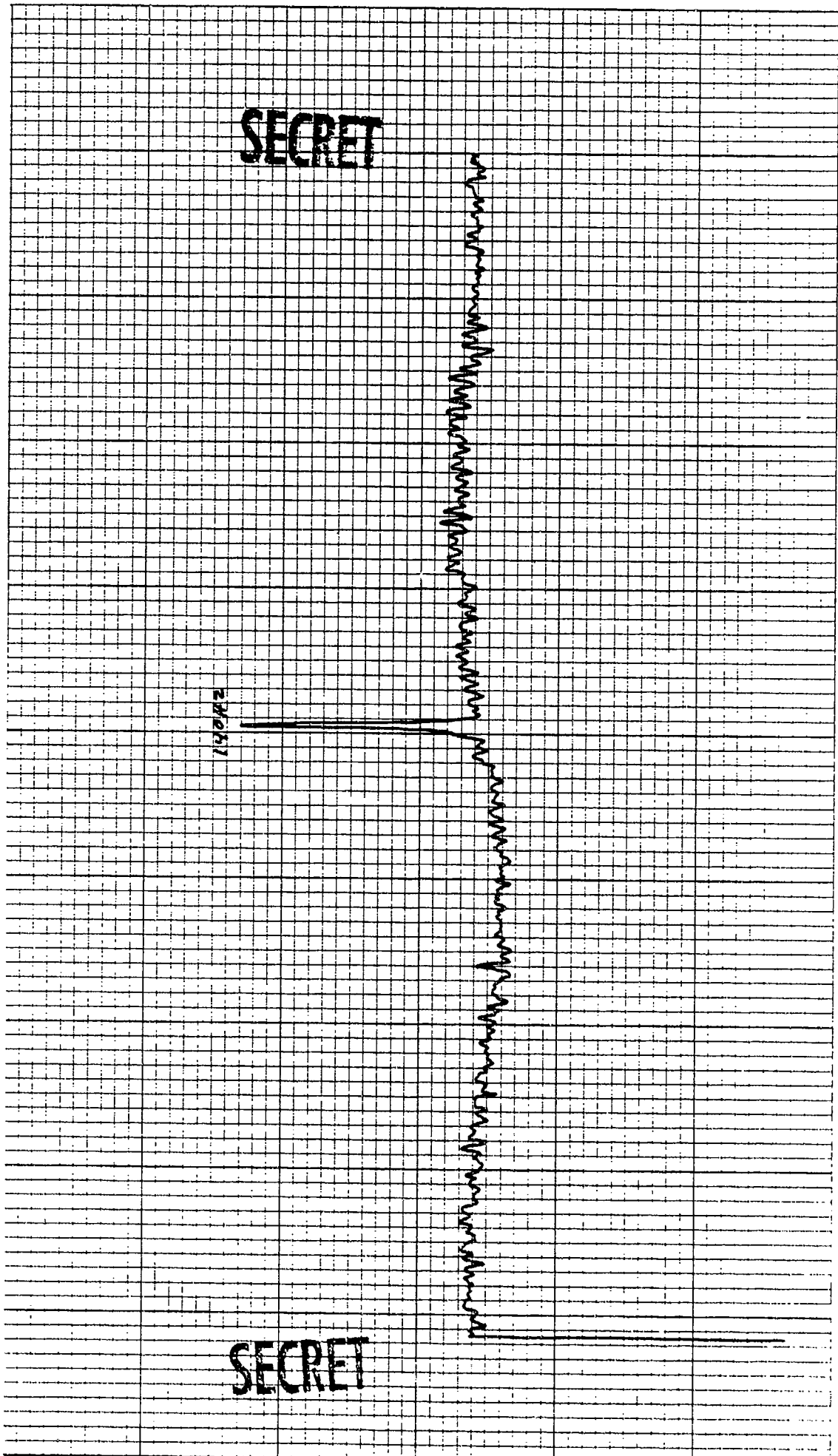
CONTROL: 1140 - 32 (0P12) REEL: N24 INDE X/985

BEAMFORMED SP: CTM(ELEMENTS) DATE OF ANALYSIS: 1-26 208-34

EXERCISE: BEARING STAKE DATE/TIME: 346-77 - 1148 Z INTEGRATION TIME 320 SECS ATTN: -18 DB

CENTER FREQ: 146 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING

32 ELEMENTS +61.5 DEG. AZ STEERING



1140/1

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INDE X/1986

REEL: H24

INTEGRATION TIME 320 SECS
ATTEN: 78 DB
FILTER WTG: HANNING

DATE OF ANALYSIS: -- -- --

1-26-77 2034

DATE/TIME: 3-6-77 - 1146 Z

ANALYSIS BANDWIDTH: 1/10HZ

+62 DEG. AZ STEERING

CONTROL: 1148 - 32 (D12)

BEAMFORMED SPECTRUM (ELEMENTS)

EXERCISE: BEARING STAKE

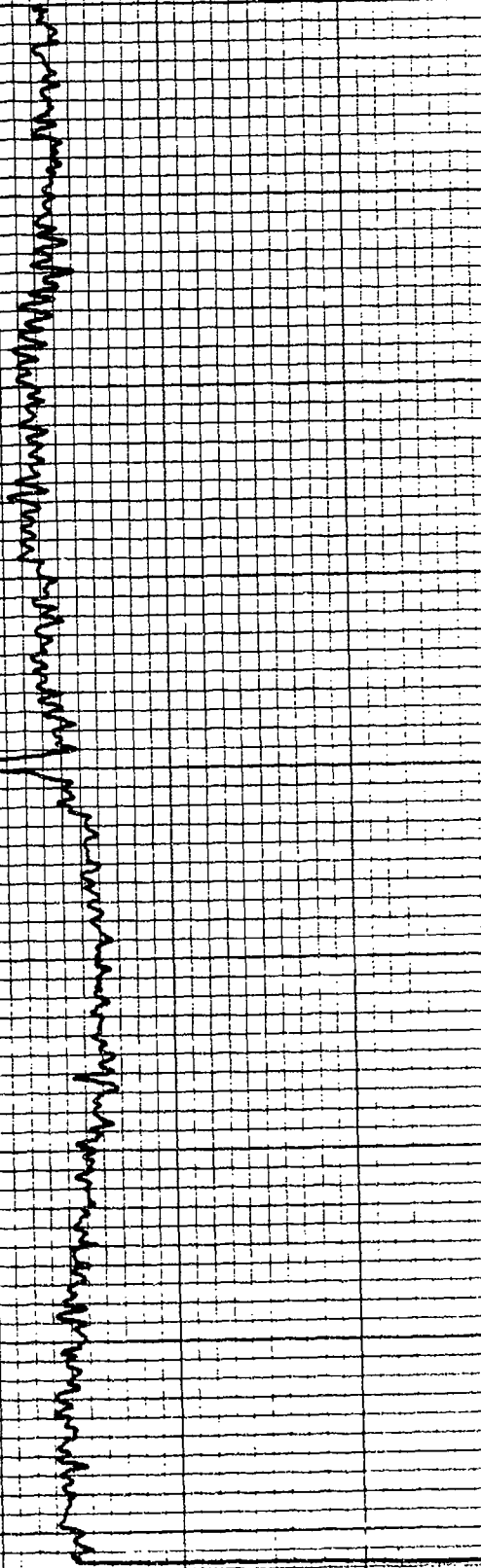
CENTER FREQ: 140 HZ

32 ELEMENTS

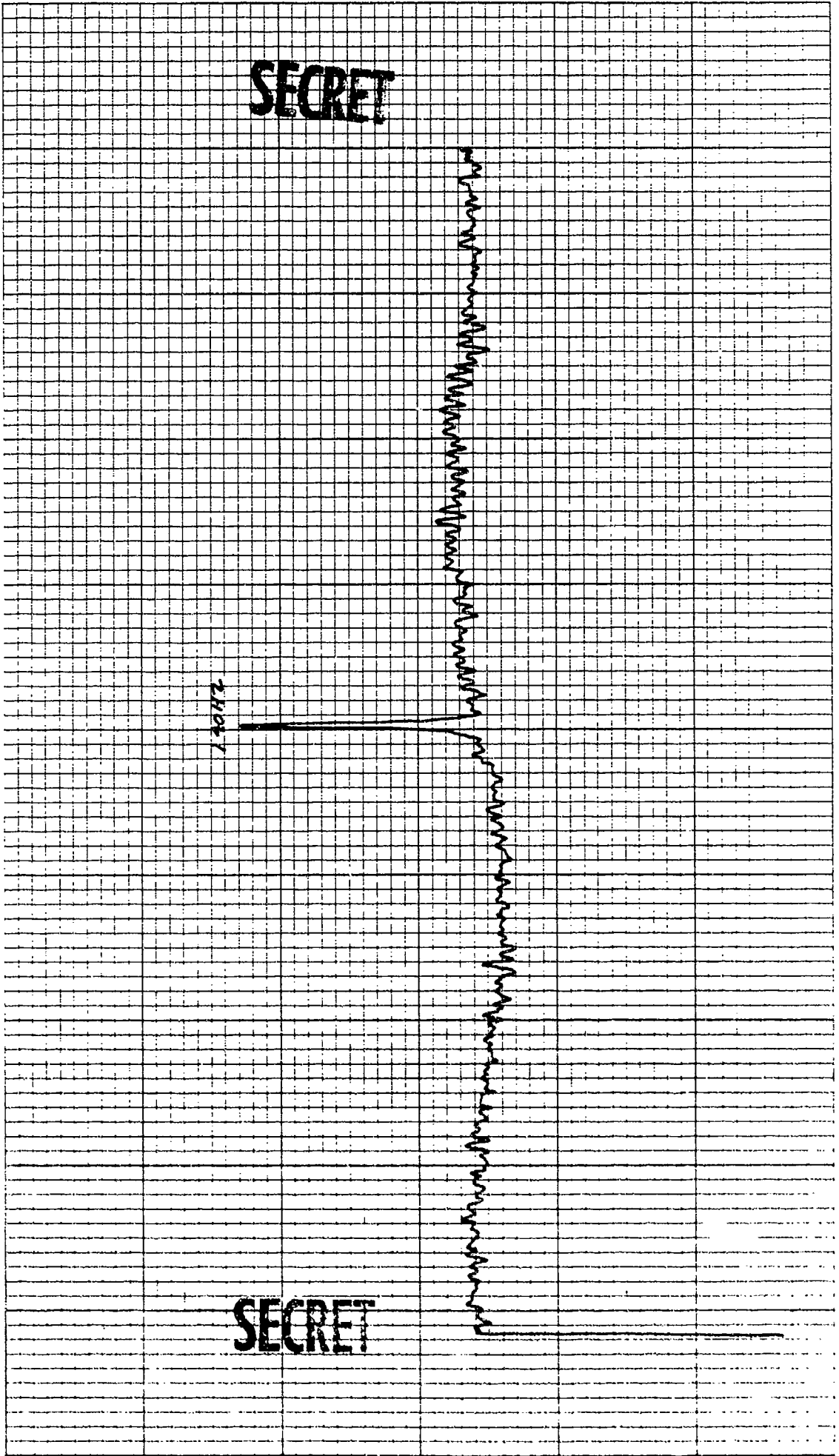
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CONTROL: 1148 - 32 (QPI2) DATE OF ANALYSIS: 1-26-77 REEL: M24 INDE X/996
 BEAMFORMED SPECTRUM (ELEMENTS) 21-34)
 EXERCISE: BEARING STAKE DATE/TIME: 7-16-77 - 1148 Z INTEGRATION TIME 320 SECS ATTEN: 70 DB
 CENTER FREQ: 140 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
32 ELEMENTS +63 DEG. AZ STEERING

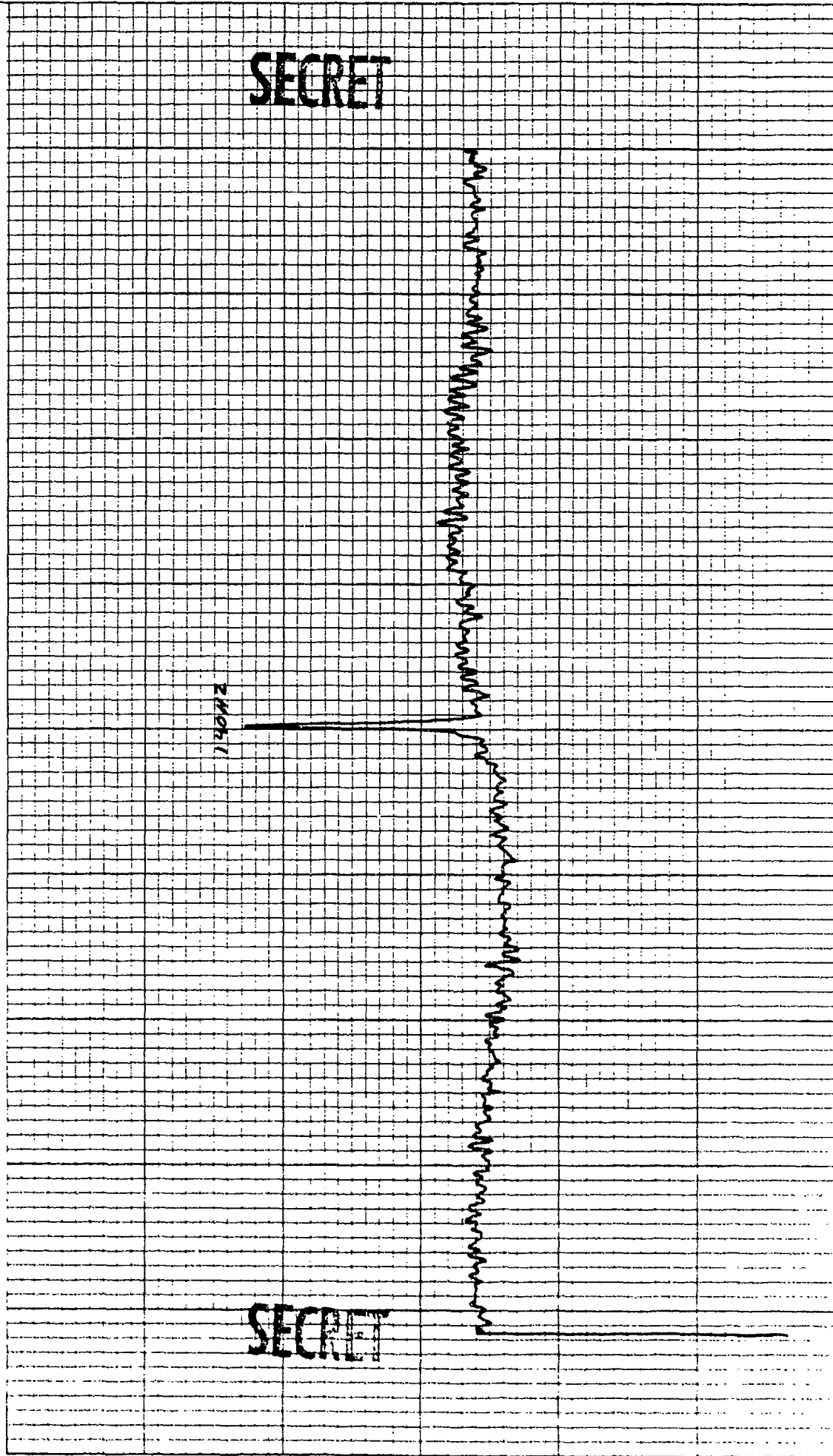


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46 0703

1008105

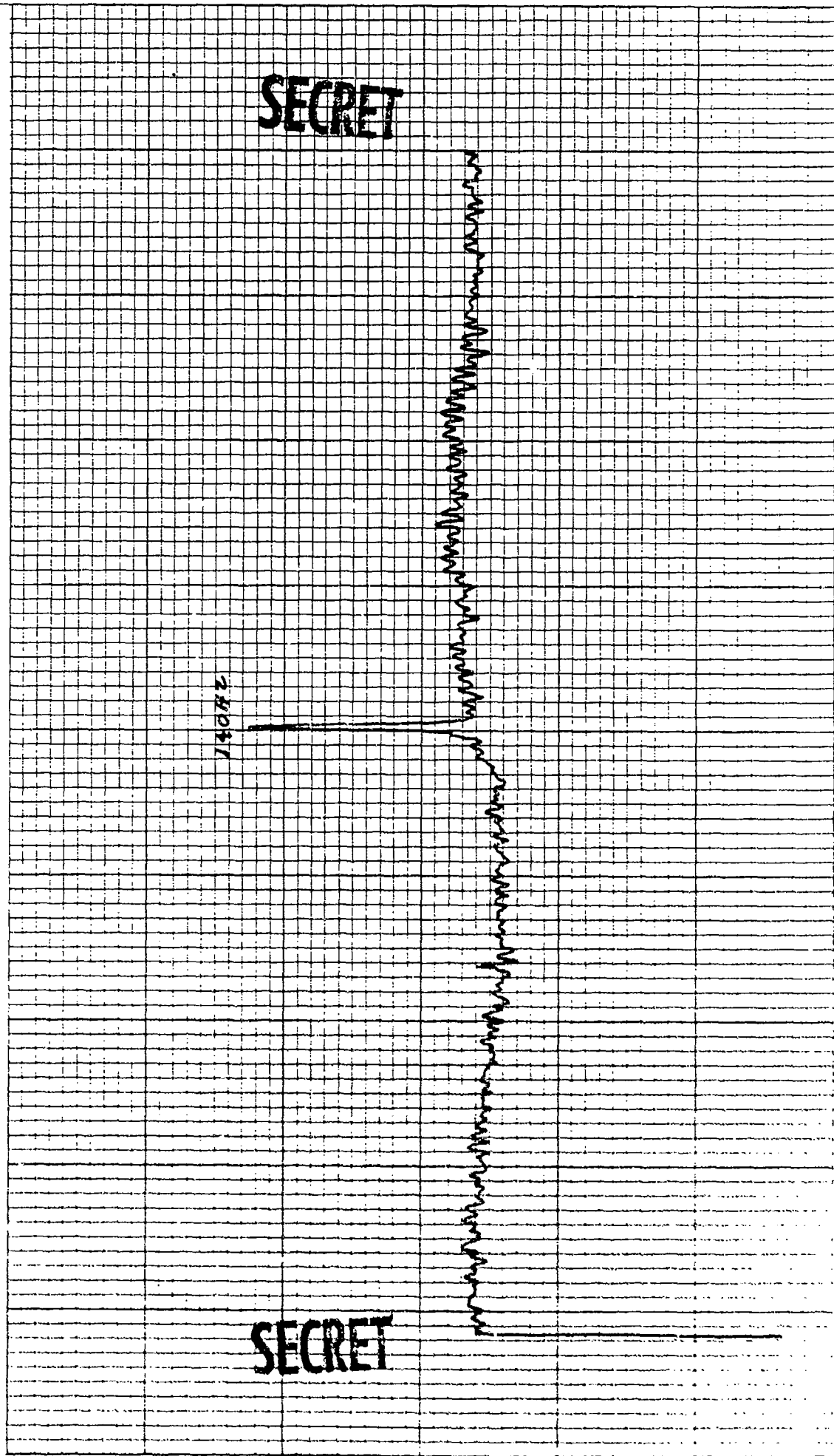
CONTROL: 1148 - 32 (DP12) DATE OF ANALYSIS: 1-26-77
BEAMFORMED SPECTRUM (ELEMENTS) REEL: M24 INDE X/995
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTEN: 78 DB
CENTER FREQ: 140 HZ FILTER WTG: HANNING
32 ELEMENTS +64 DEG. AZ STEERING



CONTROL: 1140 - 32 (DP/2) DATE OF ANALYSIS: - - - -
 BEAMFORMED SPECTRUM (ELEMENTS) 1-26-77 (28-34)
 EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 1140 Z
 CENTER FREQ: 140 HZ ANALYSIS BANDWIDTH: 1/10 HZ
 32 ELEMENTS 466 DEG. AZ STEERING

REEL: N24 INDE X/993

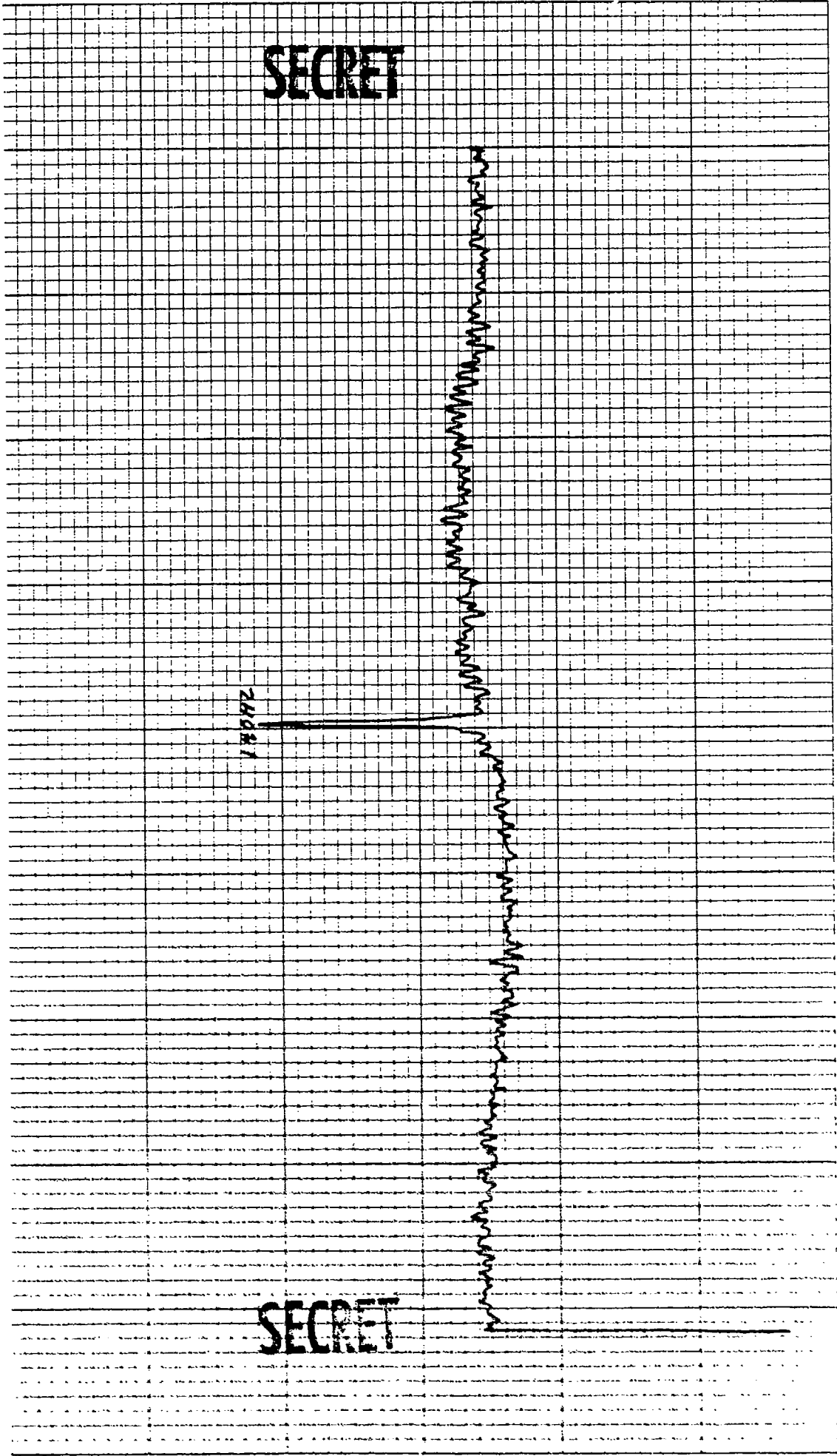
INTEGRATION TIME 320 SECS ATTN: -10 DB
 FILTER WTC: HANNING



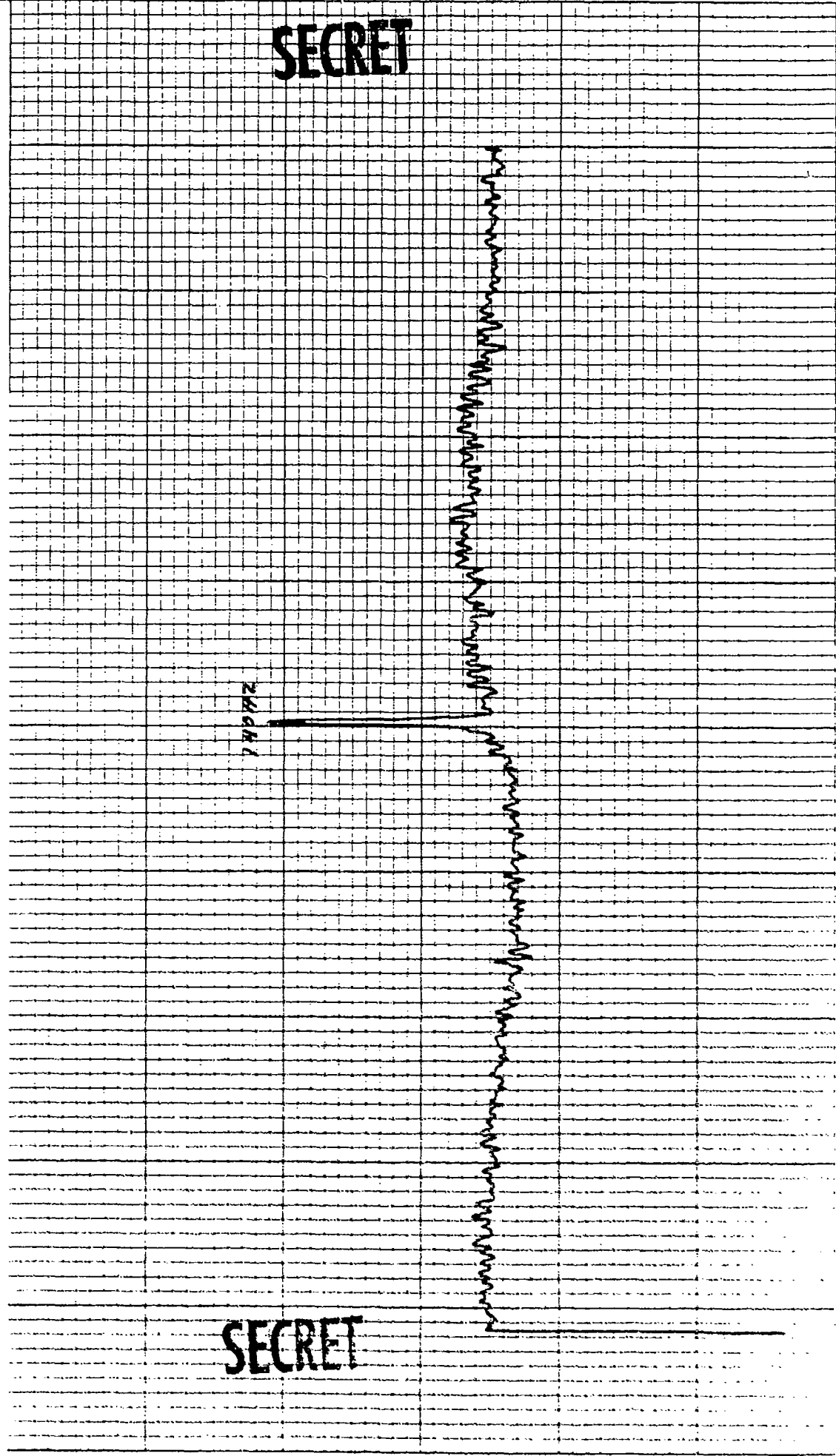
KOE 10 X 10 TO THE INCH : X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

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CONTROL: 1148 - 72 (D112) REEL: M24 INDE X1995
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-26-77 ATTEN: -18 DB
EXERCISE: BEARING STAKE 28-34 INTEGRATION TIME 320 SECS FILTER WTG: HANNING
CENTER FREQ: 140 HZ ANALYSIS BANDWIDTH: 1/10 HZ
72 ELEMENTS +68 DEG. AZ STEERING



CONTROL: 1148 - 72 (DP12) REEL: M24 INDE X/1985
 BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: /-26 28-34
 EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 1148 Z INTEGRATION TIME 320 SECS ATTN: -/0 DB
 CENTER FREQ: 140 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 72 ELEMENTS 70 DEG. AZ STEERING



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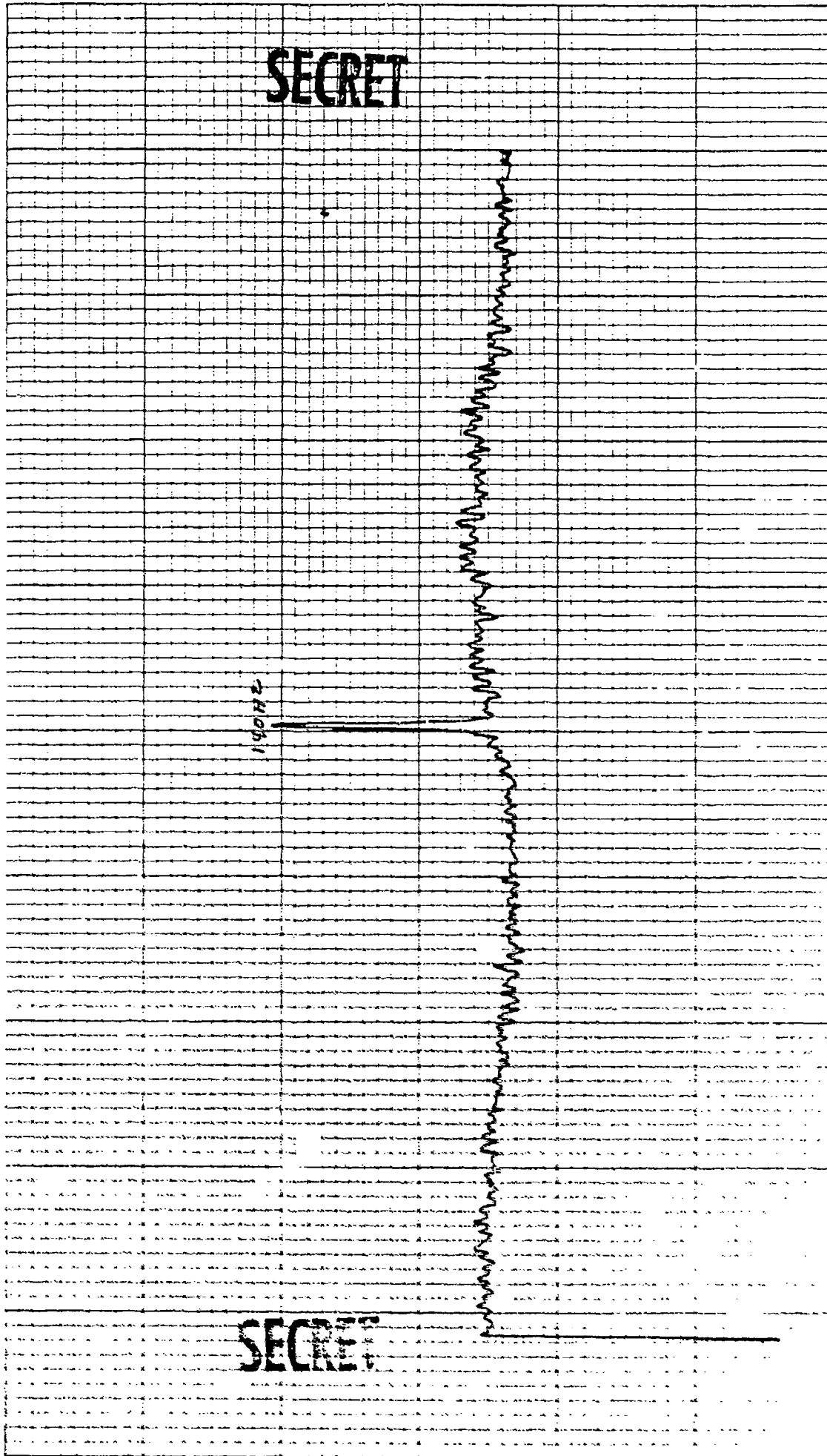
CONTROL: 1148 - 32 (DP/2) DATE OF ANALYSIS: 1-26-77 28-34 REEL: Y24 INDE X/1995

BEAMFORMED SPECTRUM (ELEMENTS) INTEGRATION TIME 320 SECS ATTEN: -10 DB

EXERCISE: BEARING STAKE FILTER WTG: HANNING

CENTER FREQ: 140 HZ ANALYSIS BANDWIDTH: 1/10HZ

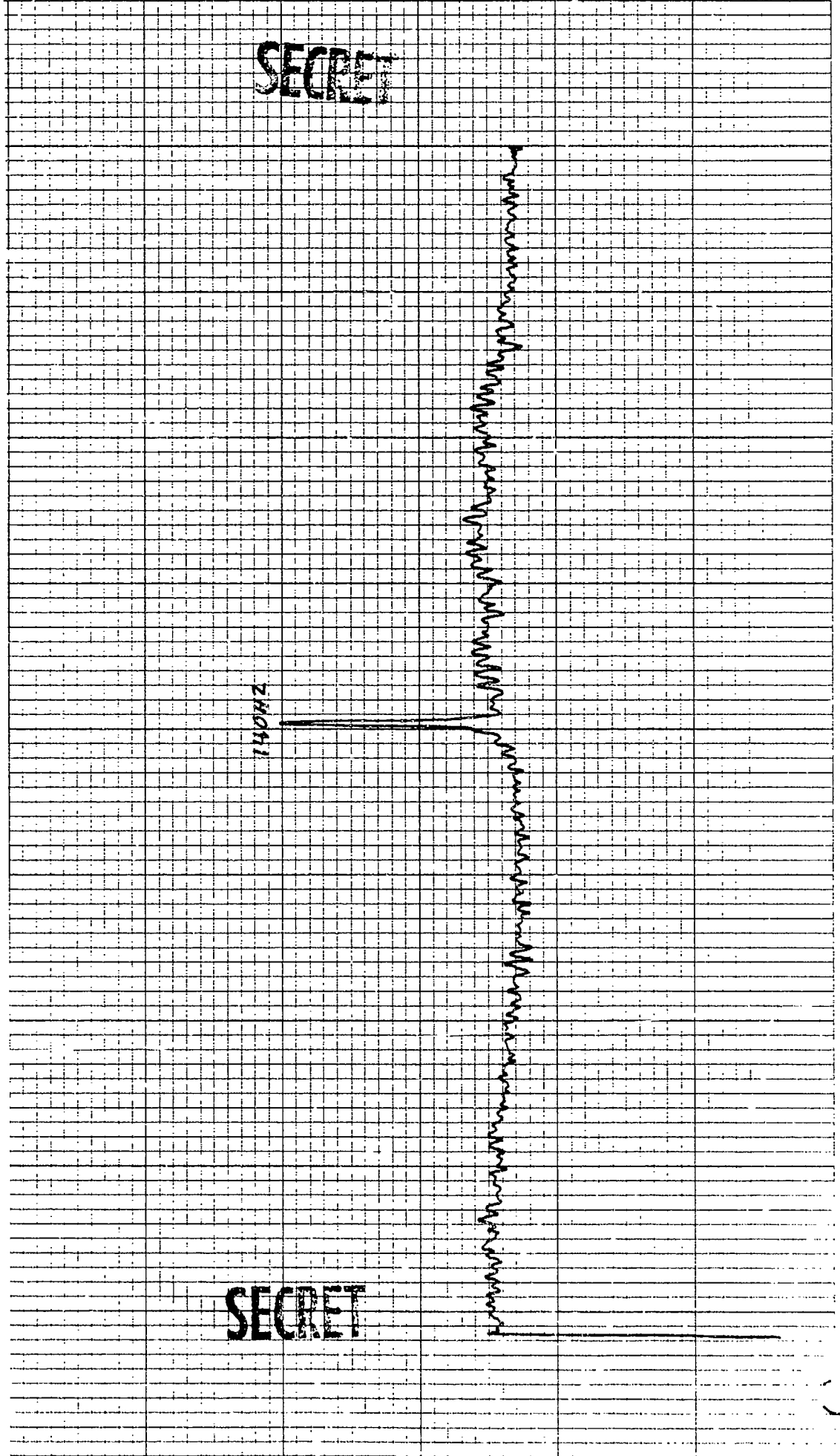
32 ELEMENTS +7.1 DEG. AZ STEERING



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CONTROL: 148 - 32 (DP12) DATE OF ANALYSIS: 1-26-77 REEL: 124 INDE X: 198
 BEAMFORMED SPECTRUM (ELEMENTS) 29-34
 EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 1148 Z INTEGRATION TIME 320 SECS ATTEN: -18 DB
 CENTER FREQ: 140 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
32 ELEMENTS +74 DEG. AZ STEERING

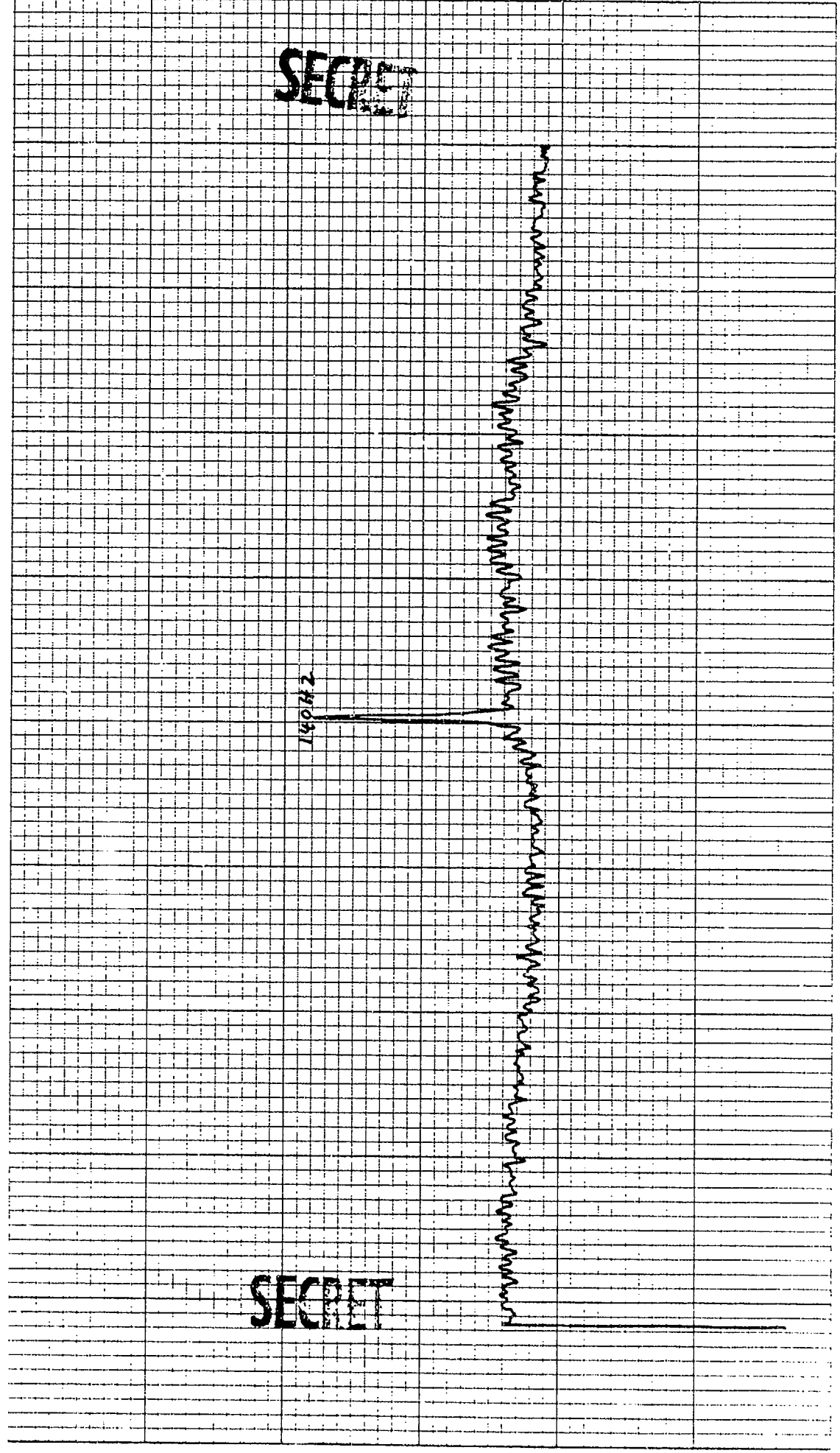


10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

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35

CONTROL: 1148 - 32 (Data) DATE OF ANALYSIS:
 BEAMFORMED SPECTRUM (ELEMENTS) 1-26-77 29-34
 EXERCISE: BEARING STAKE
 CENTER FREQ: 140 HZ
32 ELEMENTS
 REEL: 1124 INDE X 1995
 INTEGRATION TIME 320 SECS ATTN: -18 DB
 FILTER WTG: HANNING
 ANALYSIS BANDWIDTH: 1/10HZ
+7C DEG. AZ STEERING



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CONTROL: 1148 - 32 (DP12)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 140 HZ
32 ELEMENTS

DATE OF ANALYSIS: -- -- --
1-26-77 29-34)
DATE/TIME: 3-16-77-1148Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 78 DEG. AZ STEERING

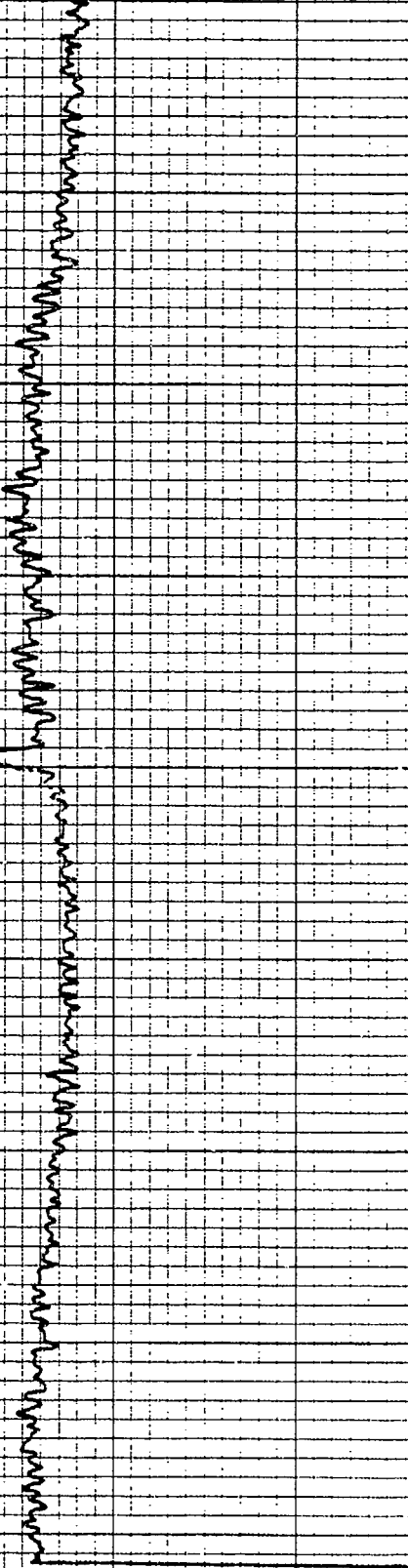
REEL: 124
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING

INDE X/995
ATTN: -10 DB
WTG: HANNING

SECRET

140 HZ

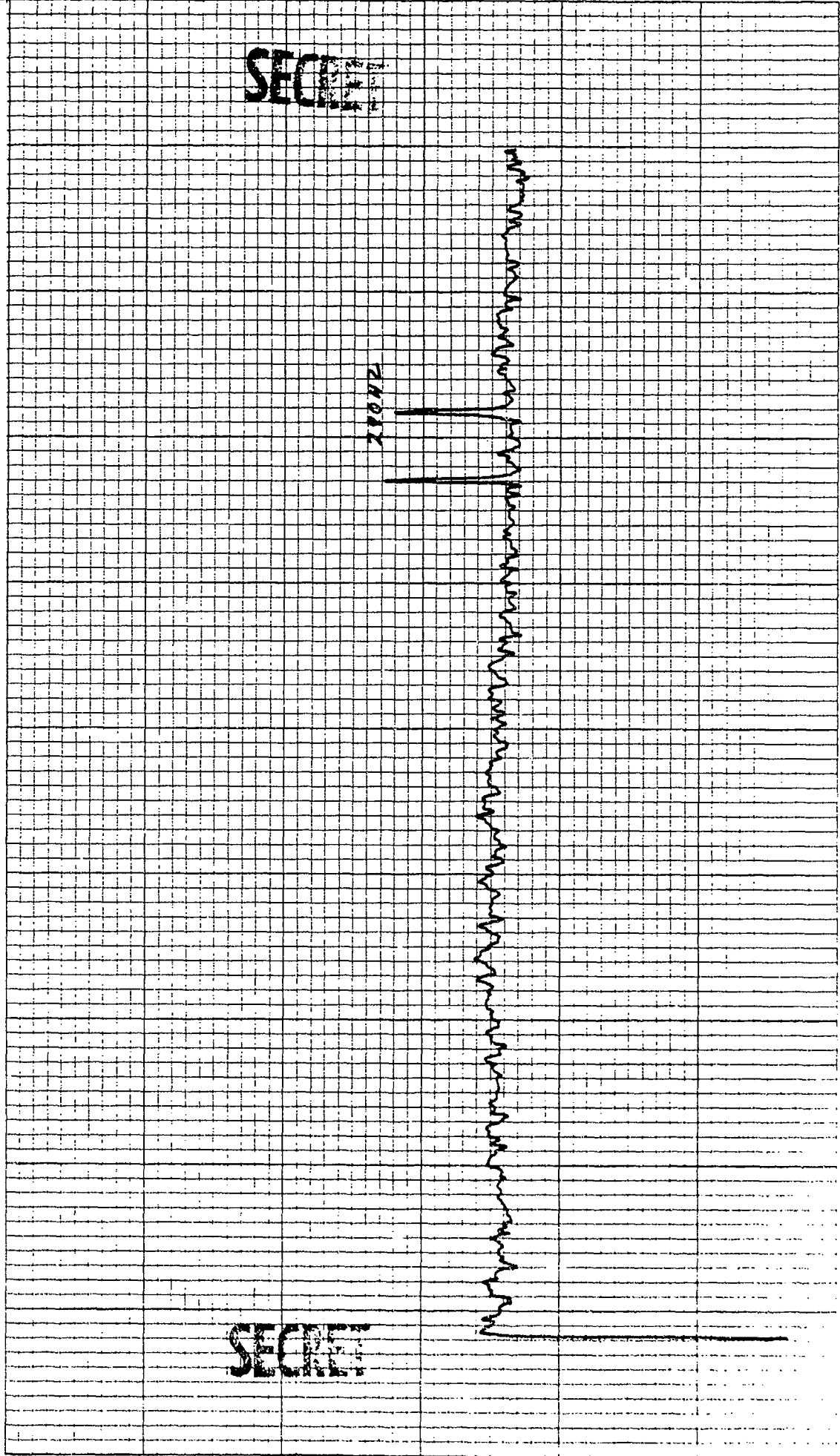
SECRET



CONTROL: 1148 - 32 (0012)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 970 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1 - 26 28-34)
DATE/TIME: 3-16-77 - 1148 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+48 DEG. AZ STEERING

REEL: M34 INDE X/995
INTEGRATION TIME 320 SECS ATTN: -10 DB
FILTER WTG: HANNING



SECRET

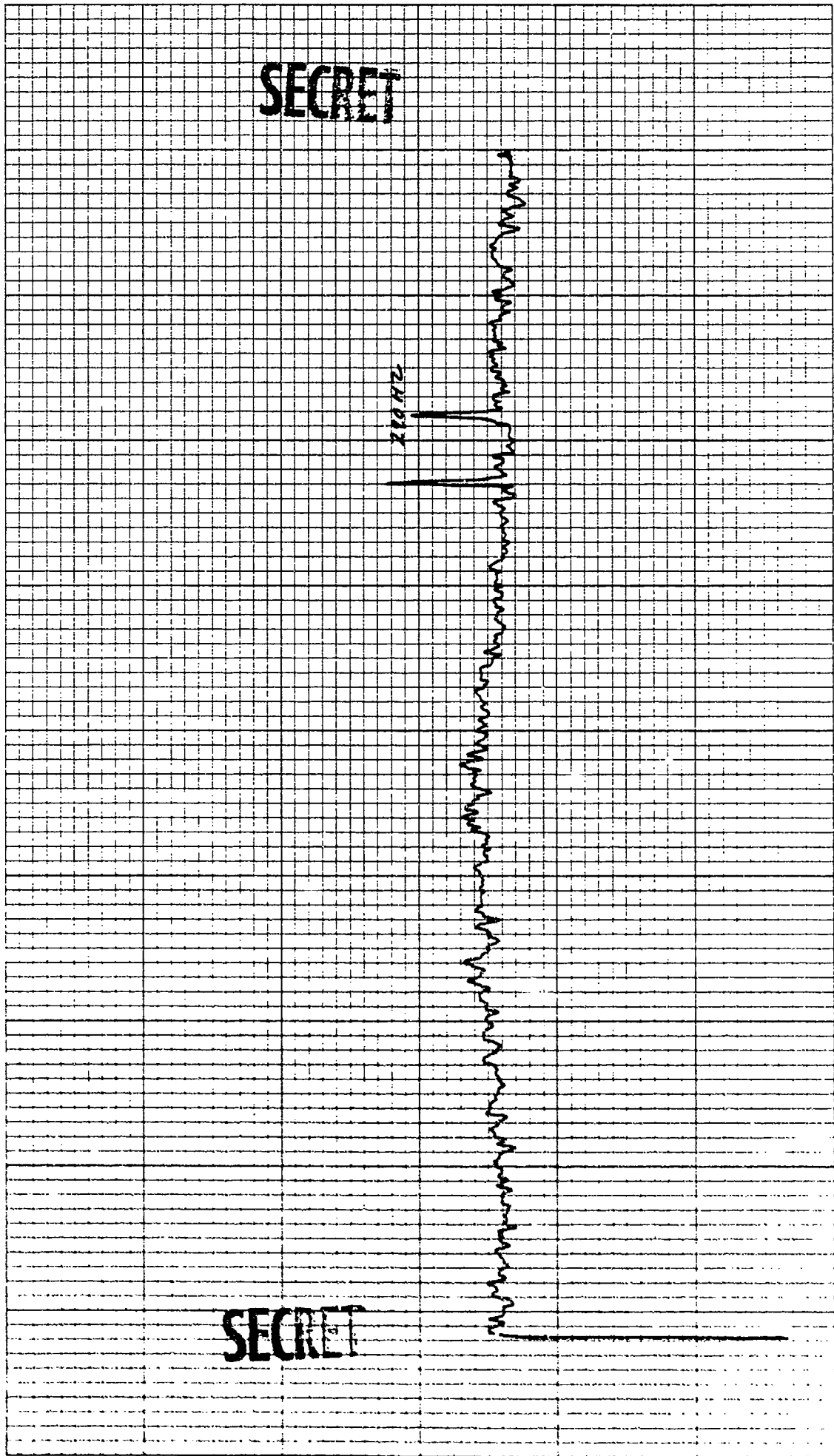
SECRET

KOE 10 X 10 TO THE INCH .7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

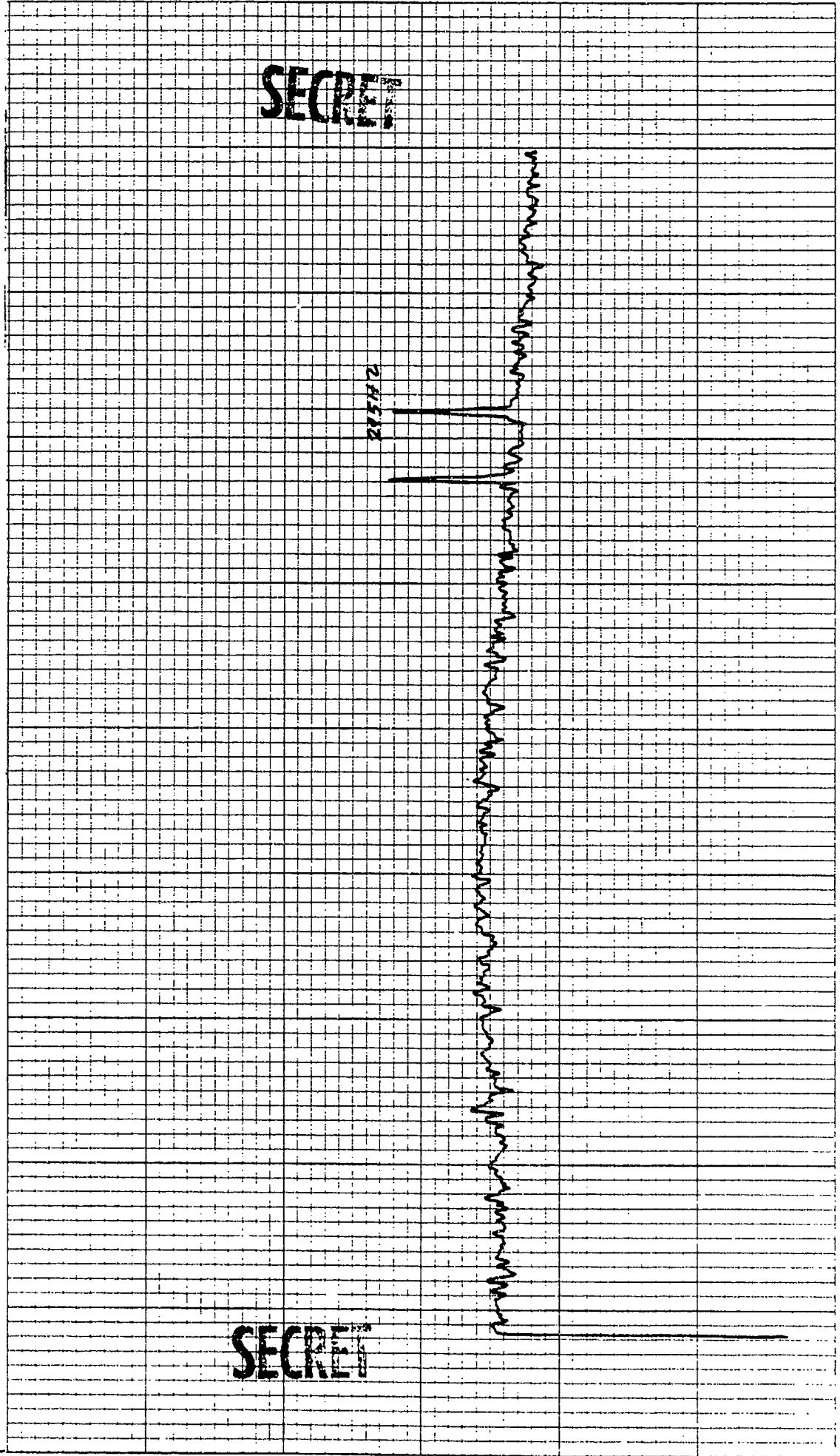
46 0703

CONTROL: 1148 - 22 (DPIA) DATE OF ANALYSIS: -- -- --
BEAMFORMED SPECTRUM (ELEMENTS) 1-26 4 29-34)
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 1140 Z
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ
92 ELEMENTS +50 DEG. AZ STEERING

REEL: 124 INDE X 1995
INTEGRATION TIME 320 SECS ATTEN: -18DB
FILTER WTG: HANNING



CONTROL: 1148 - 32 (D012) DATE OF ANALYSIS: 1-26-59 REEL: 124 INDE X: 1995
BEAMFORMED SPECTRUM (ELEMENTS) 3-16-77 - 1148 Z INTEGRATION TIME 320 SECS ATTN: -10 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 270 HZ +5.2 DEG. AZ STEERING



K_{SE} 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

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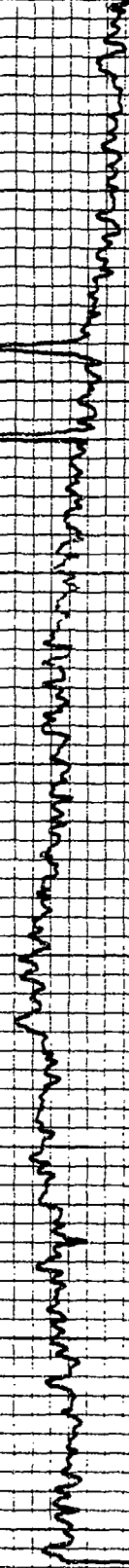
CONTROL: 1148 - 32 (2012) DATE OF ANALYSIS: 1-26-77
BEAMFORMED SPECTRUM(ELEMENTS) 1-26-77-34
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 1148 Z
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ
32 ELEMENTS +54 DEG. AZ STEERING

REEL: HAY INDE X/965
INTEGRATION TIME 320 SECS ATTEN: -18 DB
FILTER WTC: HANNING

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200412



CONTROL: 1148 - 32 (DP12)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

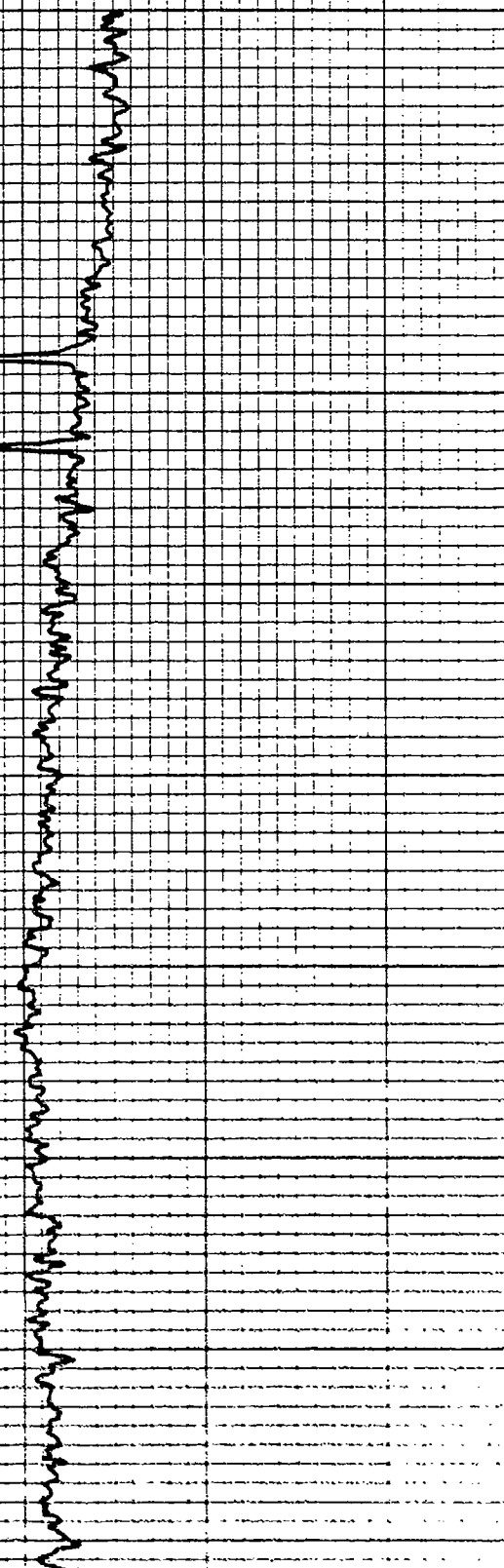
DATE OF ANALYSIS: - - - -
1-26-77-34
DATE/TIME: 3-16-77 -1148 Z
ANALYSIS BANDWIDTH: 1/10 HZ
-56 DEG. AZ STEERING

REEL: M24 INDE X 1985
INTEGRATION TIME 320 SECS ATTN: -10 DB
FILTER WTG: HANNING

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32000



10 X 10 TO THE INCHES
GROUP 1 & LOWER CO. MARK 1055

46 0703

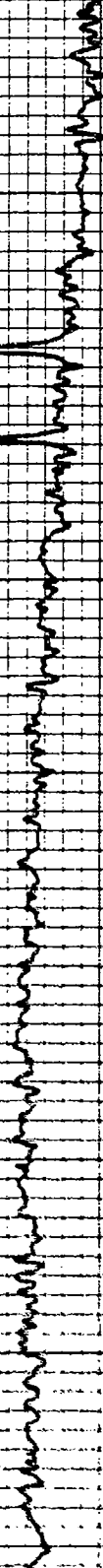
CONTROL: 1148 - 32 (201A) DATE OF ANALYSIS: 1-26-54
BEAMFORMED SPECTRUM(ELEMENTS) 1-26-54
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS
REEL: M24 INDE X1985
INTEGRATION TIME 320 SECS ATTN: -10 DB
FILTER WTG: HANNING

DATE/TIME: 3-7-77 - 1148 Z
ANALYSIS BANDWIDTH: 1/10HZ
+50 DEC. AZ STEERING

SECRET

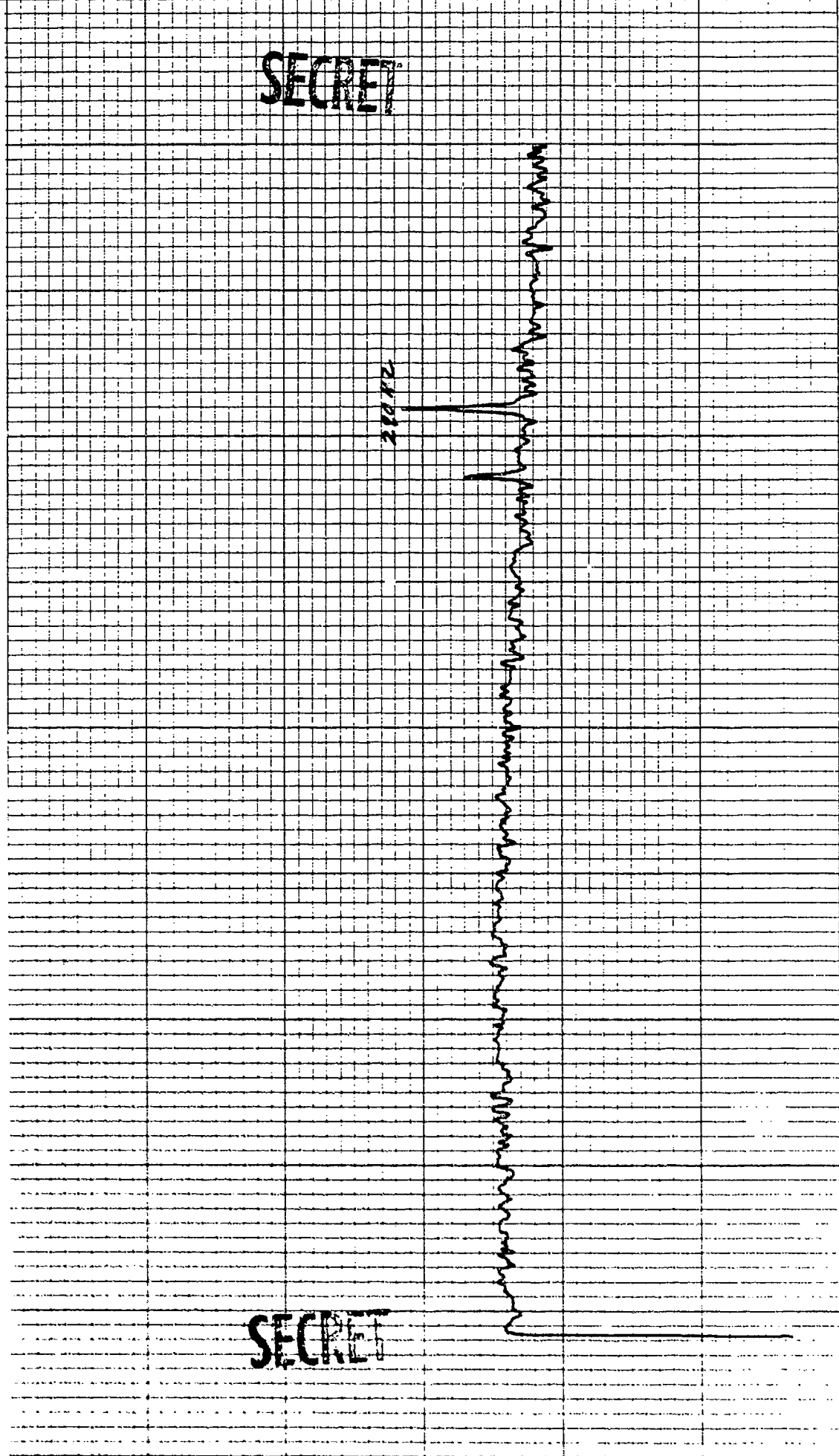
SECRET

2000



CONTROL: 1140 - 72 (DP1A) DATE OF ANALYSIS: -- -- --
 BEAMFORMED SPECTRUM (ELEMENTS) 1-26-77 20-34
 EXERCISE: BEARING STAKE DATE/TIME: 3-6-77 - 1:40 Z
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ
 32 ELEMENTS +59 DEG. AZ STEERING

REEL: M94 INDE X 1905
 INTEGRATION TIME 320 SECS ATTN: -10 DB
 FILTER WIG: HANNING



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SECRET

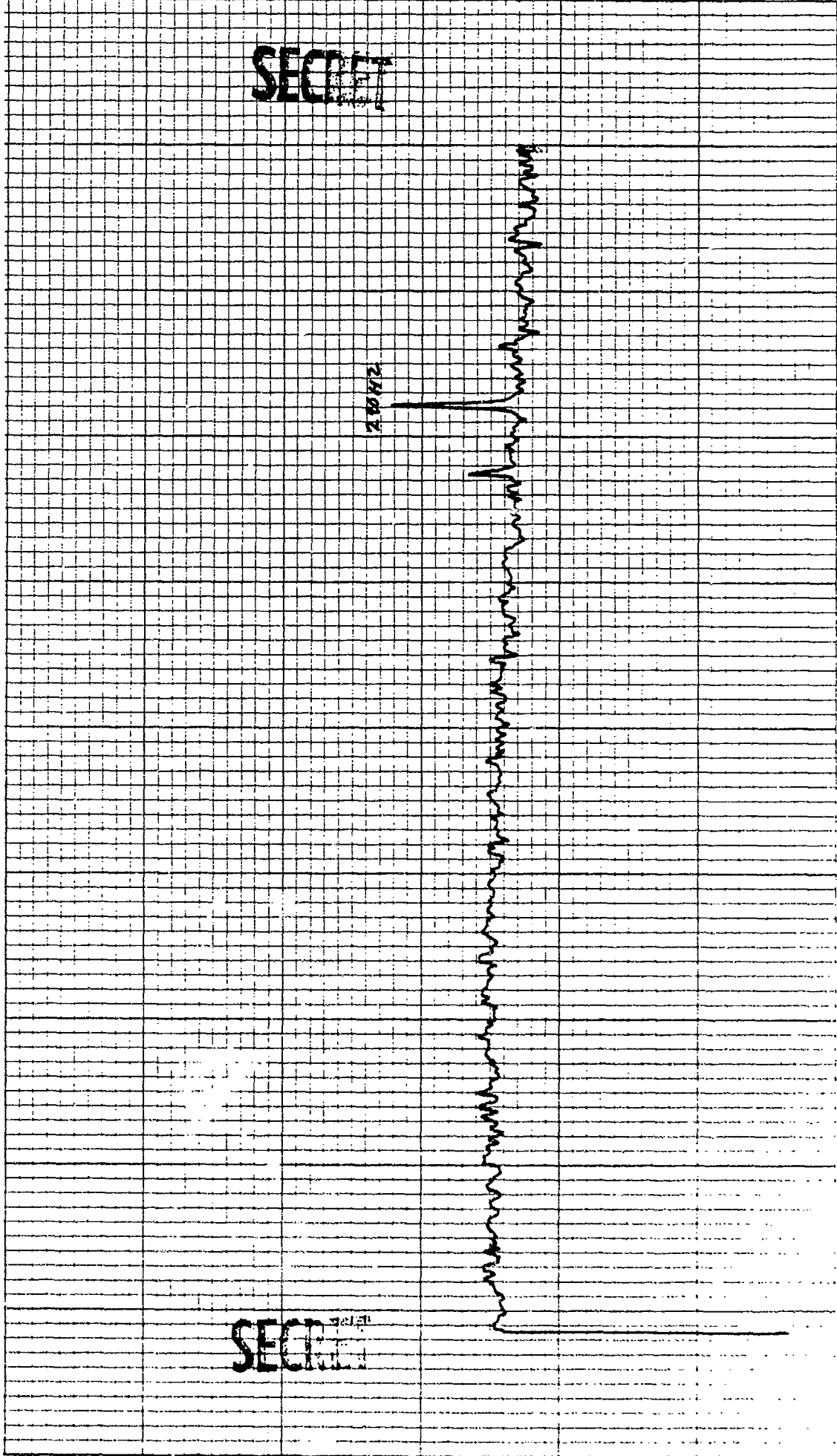
KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 1148 - 32 (D912)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-54
DATE/TIME: 3-6-77 - 1148 Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 60 DEG. AZ STEERING

REEL: 12V INDE X/195
INTEGRATION TIME 320 SECS ATTN: -10 DB
FILTER WTG: HANNING



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10 X 10 TO THE INCHES
PRINTED & PAPER CO. DIVISION

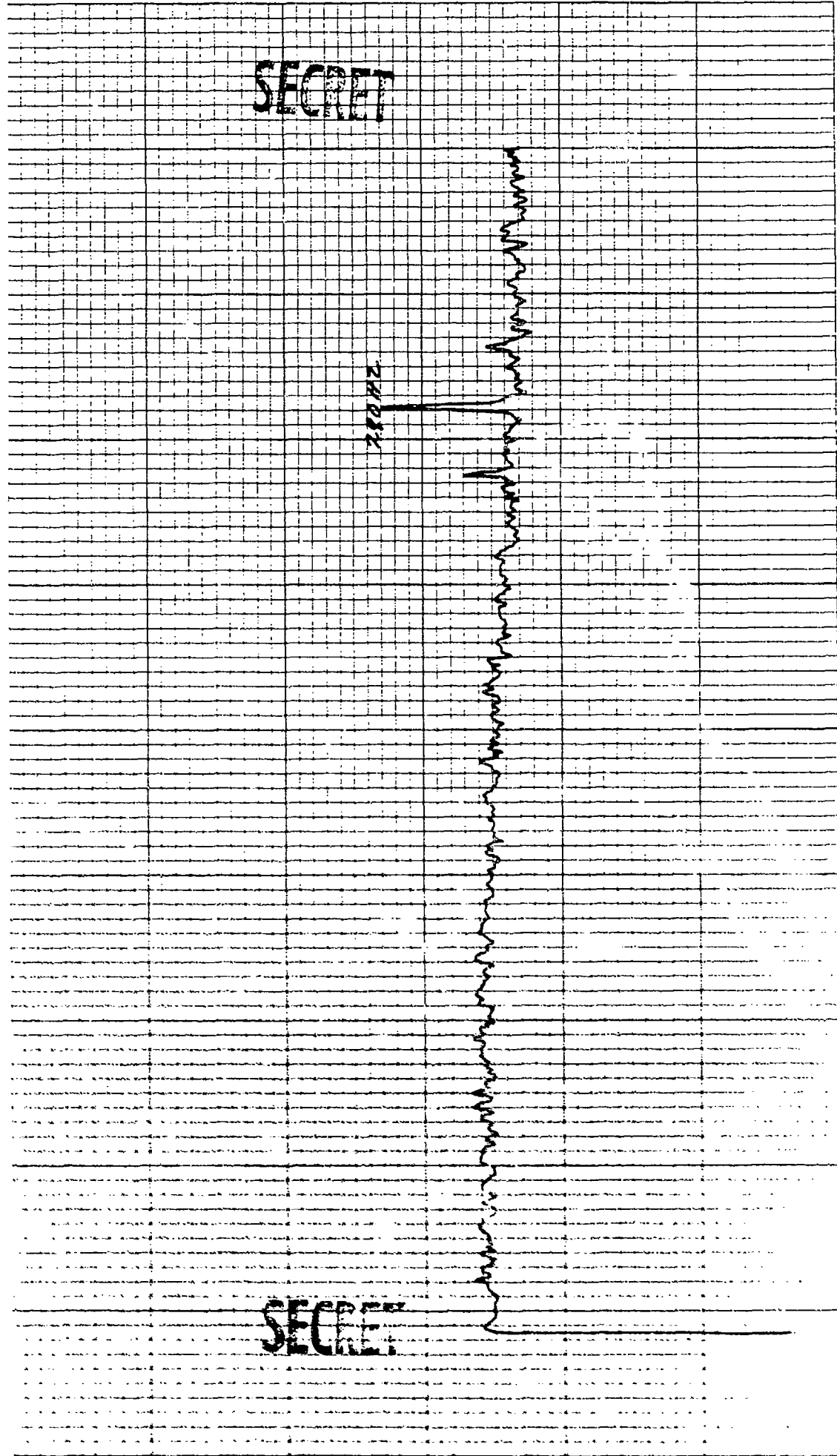
46 0703

Page 2

CONTROL: 1140 - 32 (0012)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

DATE OF ANALYSIS: - - - -
1 - 26 09 - 34)
DATE/TIME: 7-6-77 - 1148 Z
ANALYSIS BANDWIDTH: 1/10 HZ
46.5 DEG. AZ STEERING

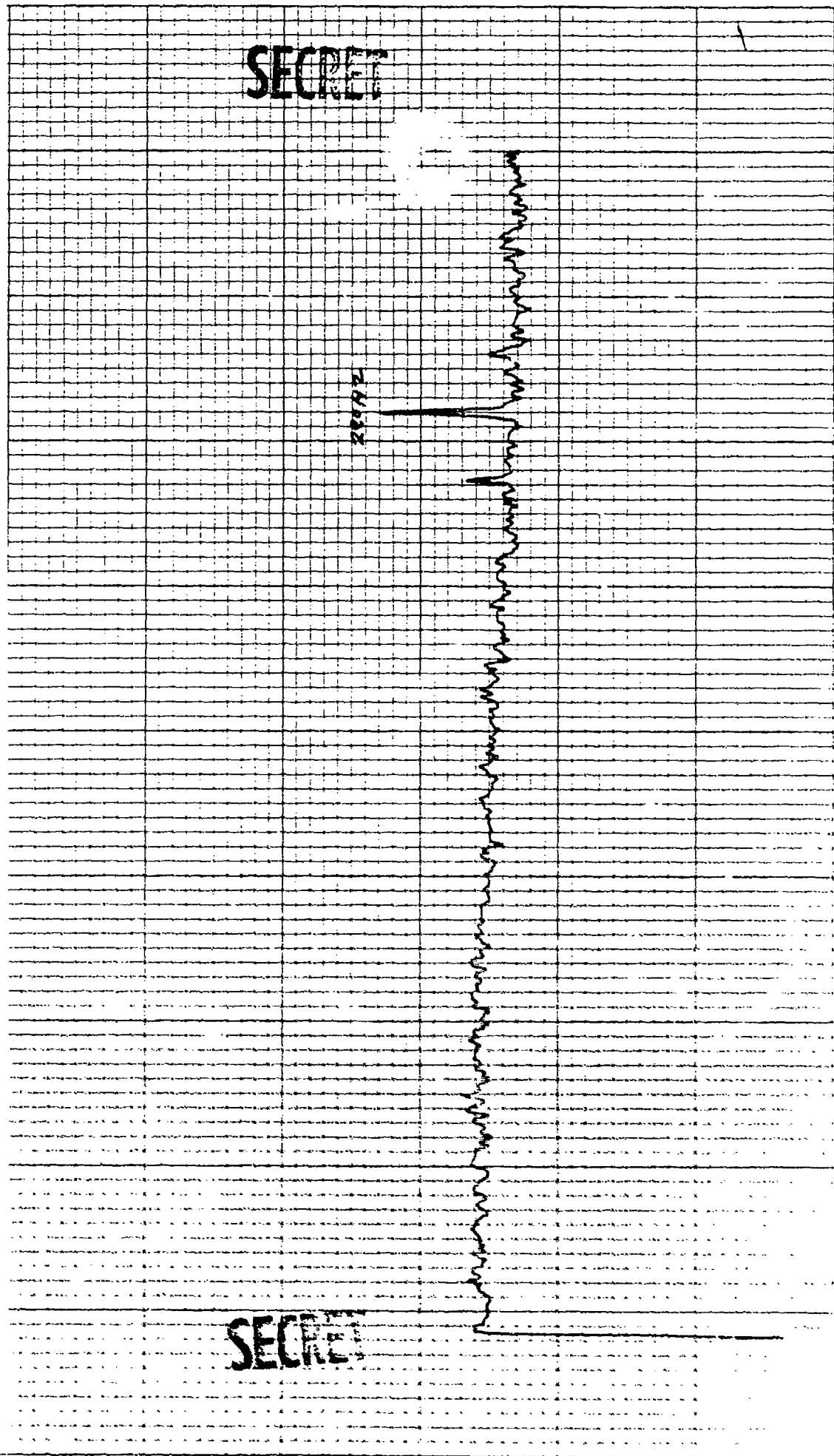
REEL: MAY INDE X/198
INTEGRATION TIME 320 SECS ATTN: 70 DB
FILTER WTG: HANNING



10 X 10 TO THE INCH 7 X 10 INCHES
REDFIELD & PETER CO. MADE IN U.S.A.

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CONTROL: 1140 - 32 (D12) DATE OF ANALYSIS: 1-26-77 REEL: M20 INDE X/995
BEAMFORMED SPECTRUM(ELEMENTS) 29-34
EXERCISE: BEARING STAKE DATE/TIME: 7-16-77 - 1140 Z INTEGRATION TIME 320 SECS ATTN: -18 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
32 ELEMENTS 462 DEG. AZ STEERING



INDE X1995

REEL: M24

DATE OF ANALYSIS: 1-26-64

CONTROL: 1140 - 32 (DP12)

INTEGRATION TIME 320 SECS

DATE/TIME: 3-12-67 - 1124 Z

BEAMFORMED SPECTRUM (ELEMENTS)

FILTER

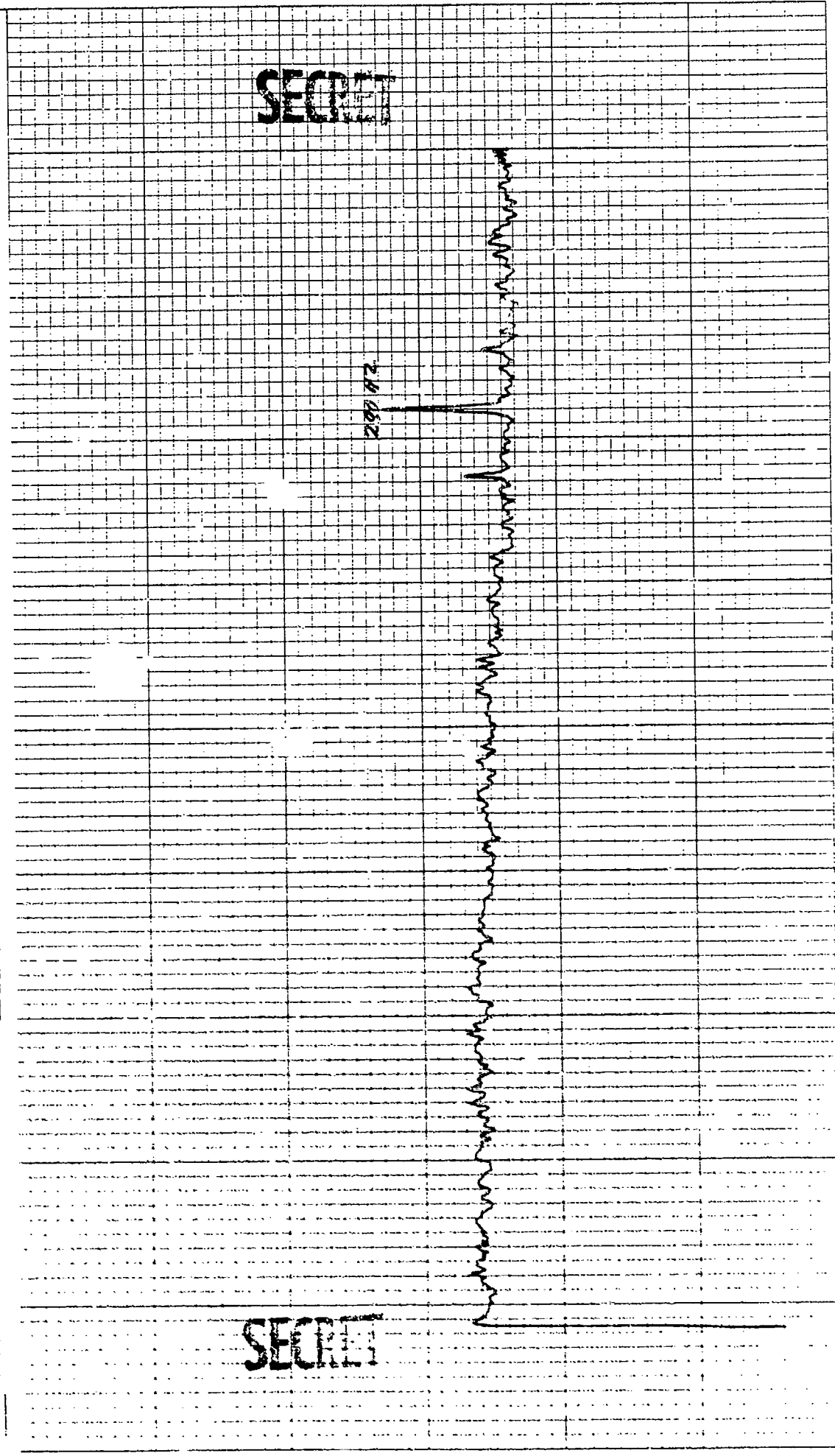
ANALYSIS BANDWIDTH: 1/10HZ

EXERCISE: BEARING STAKE

WTG: HANNING

463 DEG. AZ STEERING

CENTER FREQ: 270 HZ
32 ELEMENTS



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10 X 10 TO THE INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

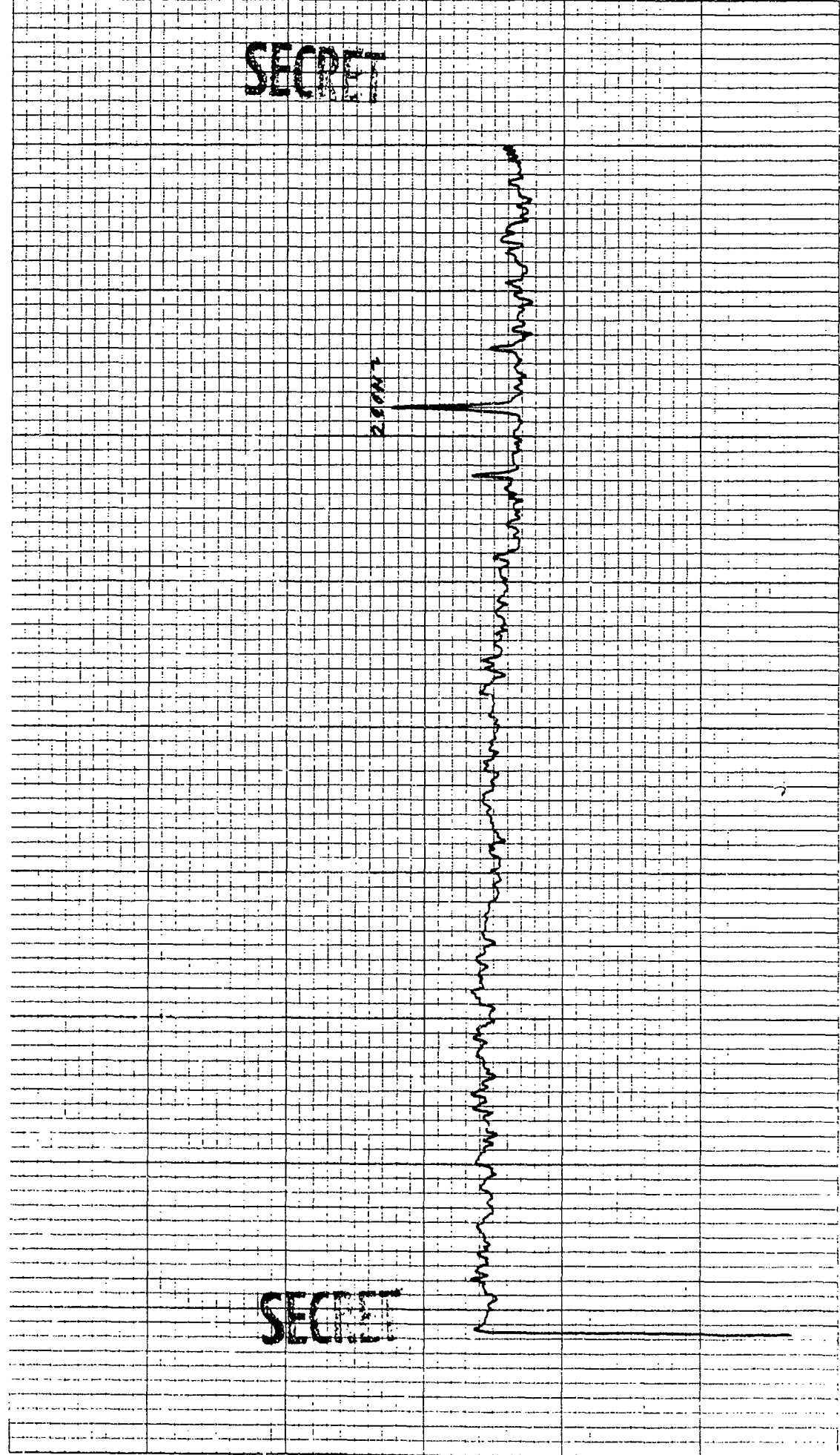
46 0703

CONTROL: 1148 - 32 (DP12)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

DATE OF ANALYSIS: -- -- --
1-25-89-34
DATE/TIME: 3-26-77 - 1148 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+64 DEG. AZ STEERING

REEL: M24
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING

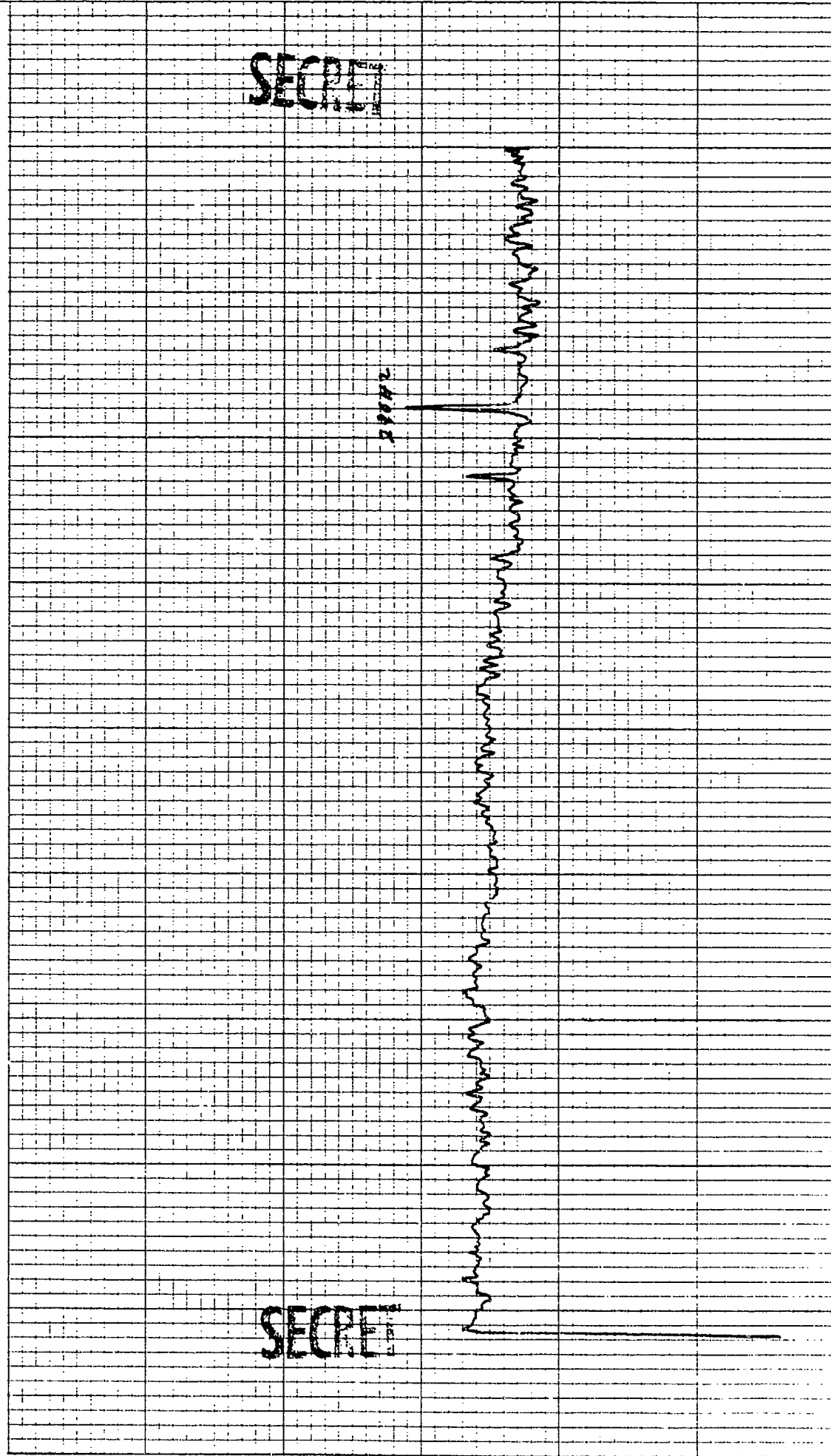
INDE X/1995



SECRET

SECRET

CONTROL: 1140 - 32 (0912) REEL: 124 INDE X/985
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-26 121-34
EXERCISE: BEARING STAKE DATE/TIME: 3/6-77-1140 Z INTEGRATION TIME 320 SECS ATTEN: -10 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
32 ELEMENTS +66 DEG. AZ STEERING



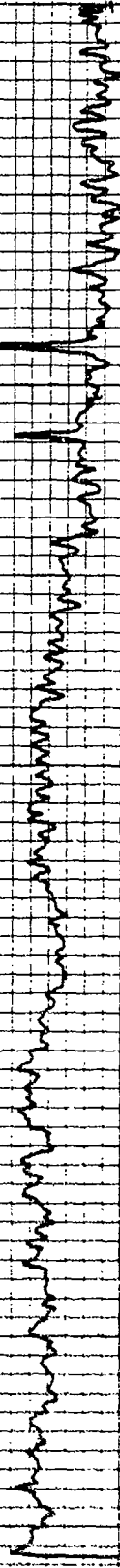
10 X 10 TO THE INCH 5.7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 140 - 32 (DP12) DATE OF ANALYSIS: REEL: K24 INDE X1115
BEAMFORMED SPECTRUM (ELEMENTS) 1-26 8 99-34)
EXERCISE: BEARING STAKE DATE/TIME: 3-6-77 - 1148 Z INTEGRATION TIME 320 SECS ATTEN: -18 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
32 ELEMENTS +68 DEG. AZ STEERING

SECRET

28072

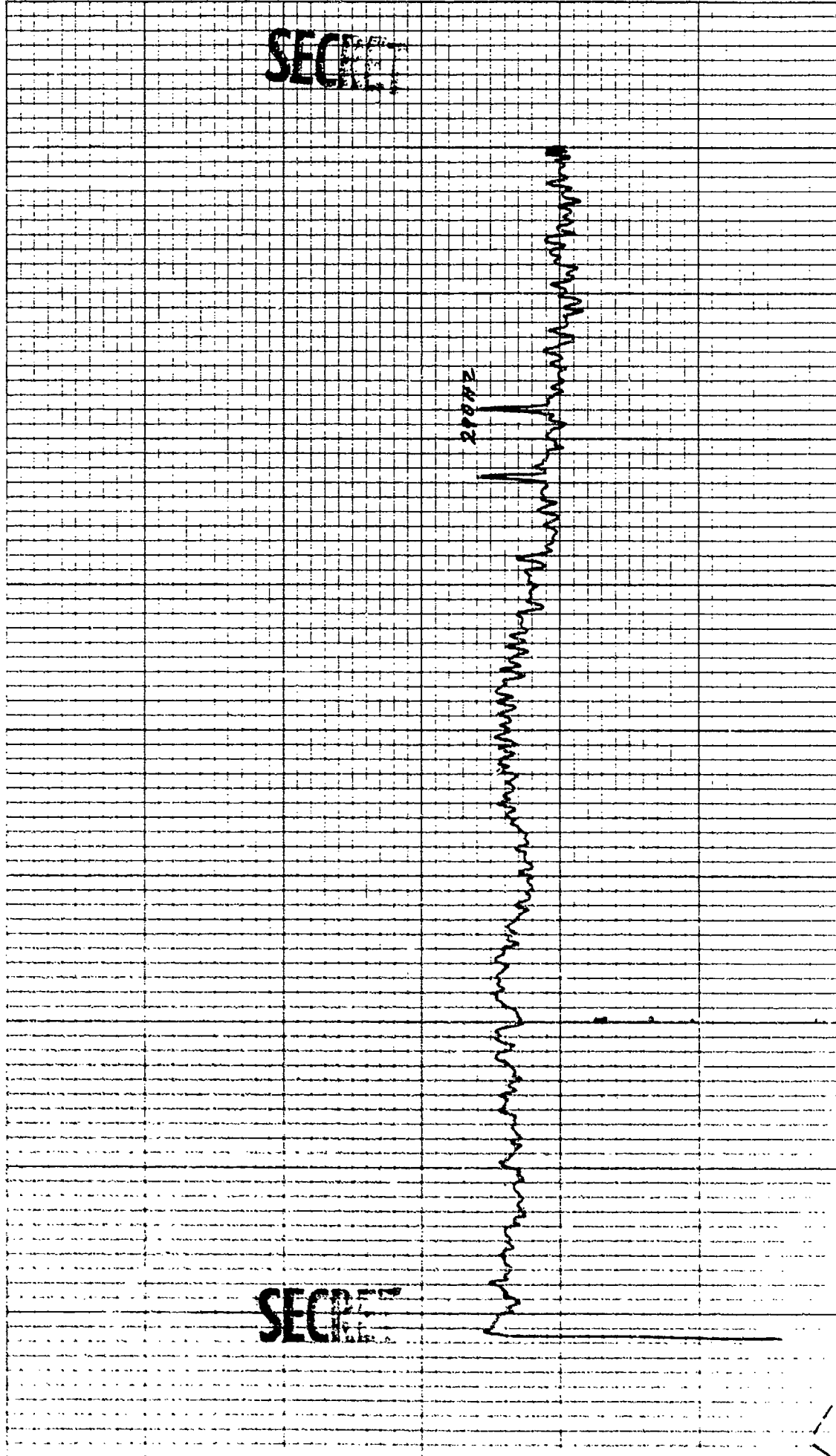


10 X 10 TO THE INCH • 1 X 10 INCHES
KODAK SAFETY FILM CO. MADE IN U.S.A.

46 0703

CONTROL: 1140 - J2 (D012) DATE OF ANALYSIS: -- -- --
BEAMFORMED SPECTRUM(ELEMENTS) 1-26-77-34)
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ
CENTER FREQ: 270 HZ +70 DEG. AZ. STEERING
32 ELEMENTS

REEL: M24 INDE X/1925
INTEGRATION TIME 320 SECS ATTN: 70 DB
FILTER WTG: HANNING



SECRET

SECRET

K. O. S. 10 X 10 TO THE INCH • 7 X 10 INCHFS
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

INDE X/1905

REEL: 429

ATTEN: -18 DB
WTG: HANNING

INTEGRATION TIME 320 SECS
FILTER

DATE OF ANALYSIS: - - - - -

1-26-77

DATE/TIME: 3-16-77 - 1148 Z

ANALYSIS BANDWIDTH: 1/10HZ

472 DEG. AZ STEERING

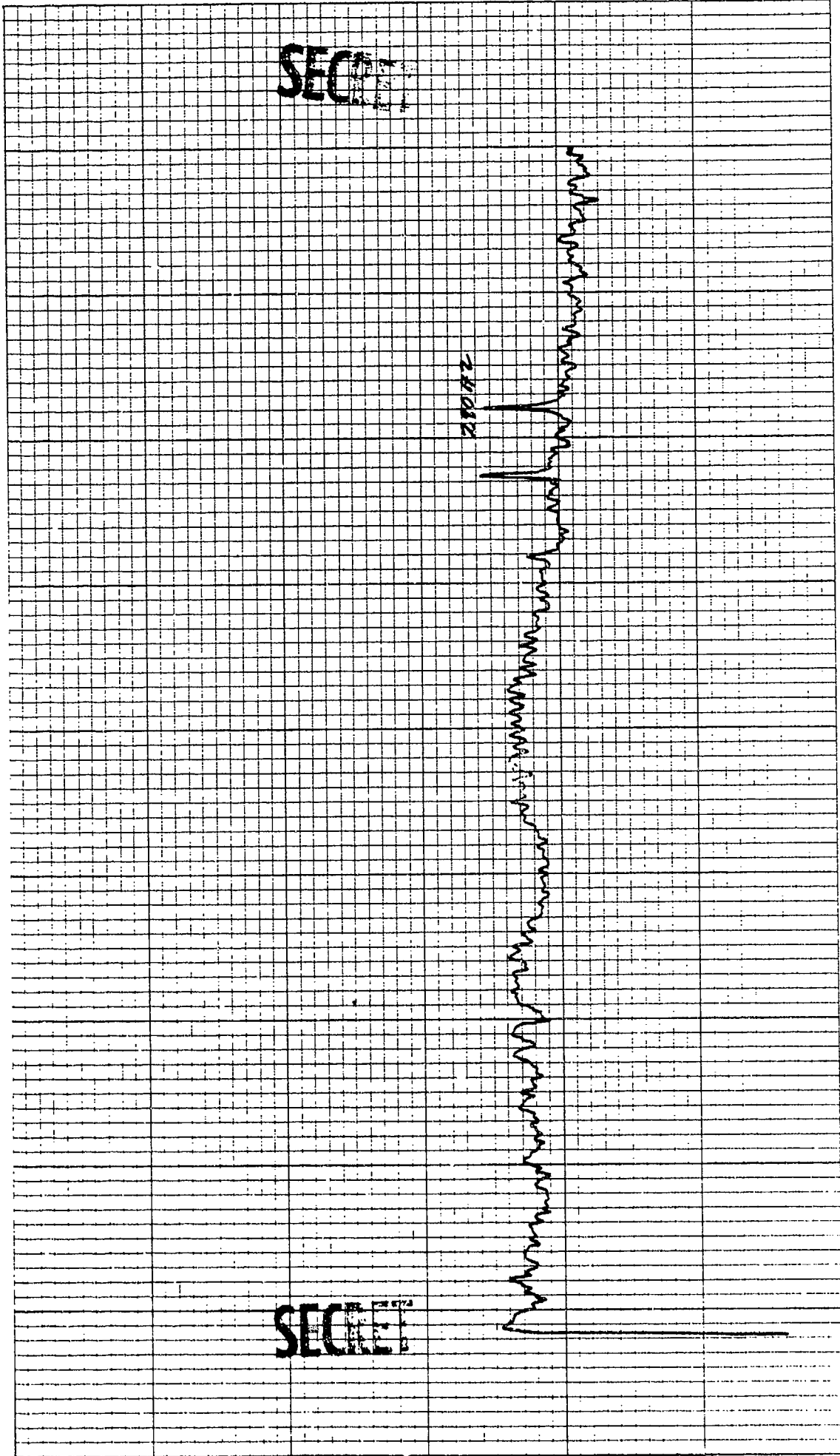
CONTROL: 1148 - 32 (DP12)

BEAMFORMED SPECTRUM (ELEMENTS)

EXERCISE: BEAPING STAKE

CENTER FREQ: 270 HZ

32 ELEMENTS



KREUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

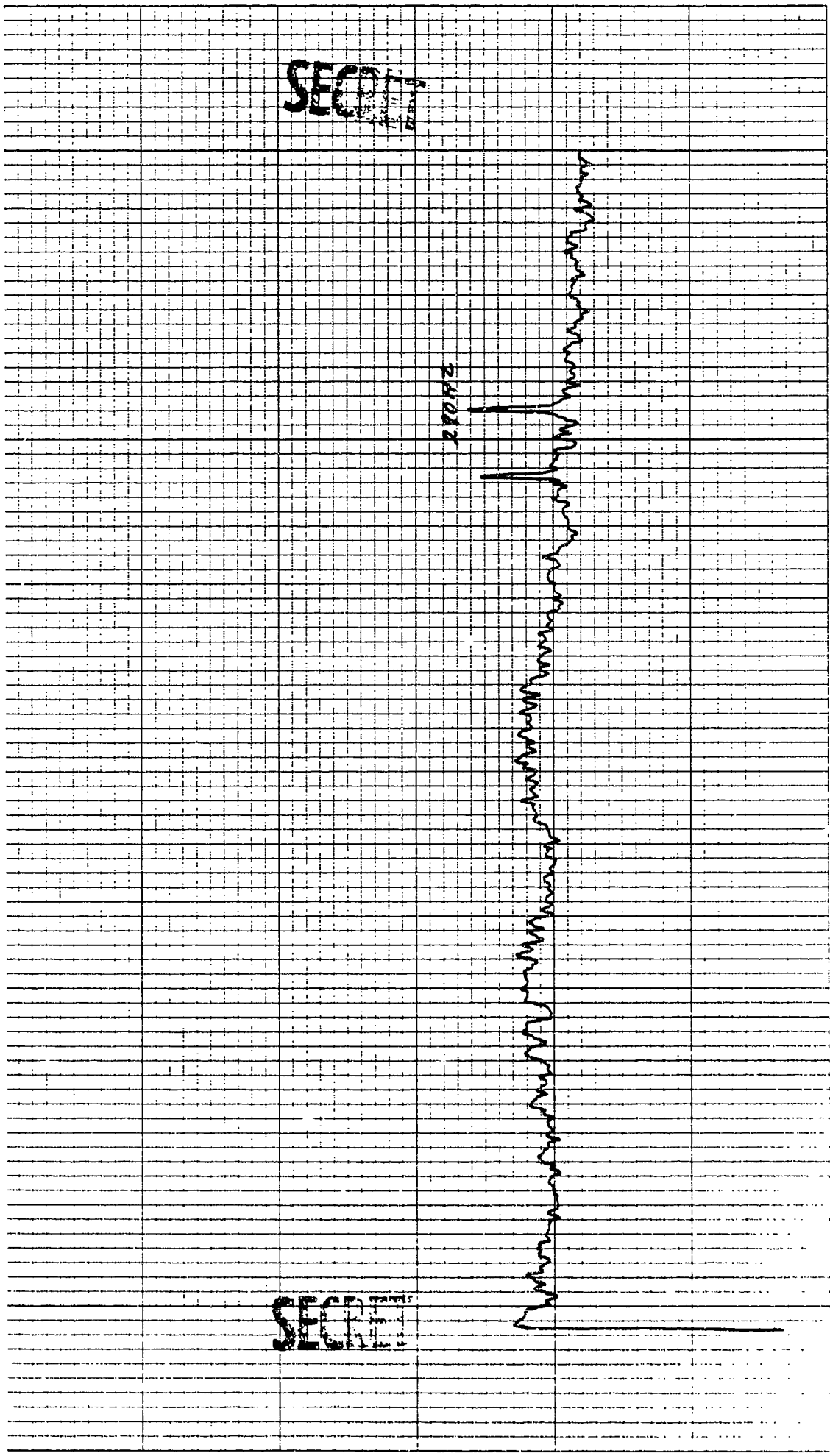
CONTROL: 1148 - 32 (D0-12) DATE OF ANALYSIS: 1-26-77 REEL: 424 INDE X/1995

BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 3-6-77-1148 Z INTEGRATION TIME 320 SECS ATTEN: 70 DB

EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING

CENTER FREQ: 270 HZ + 74 DEG. AZ STEERING

32 ELEMENTS



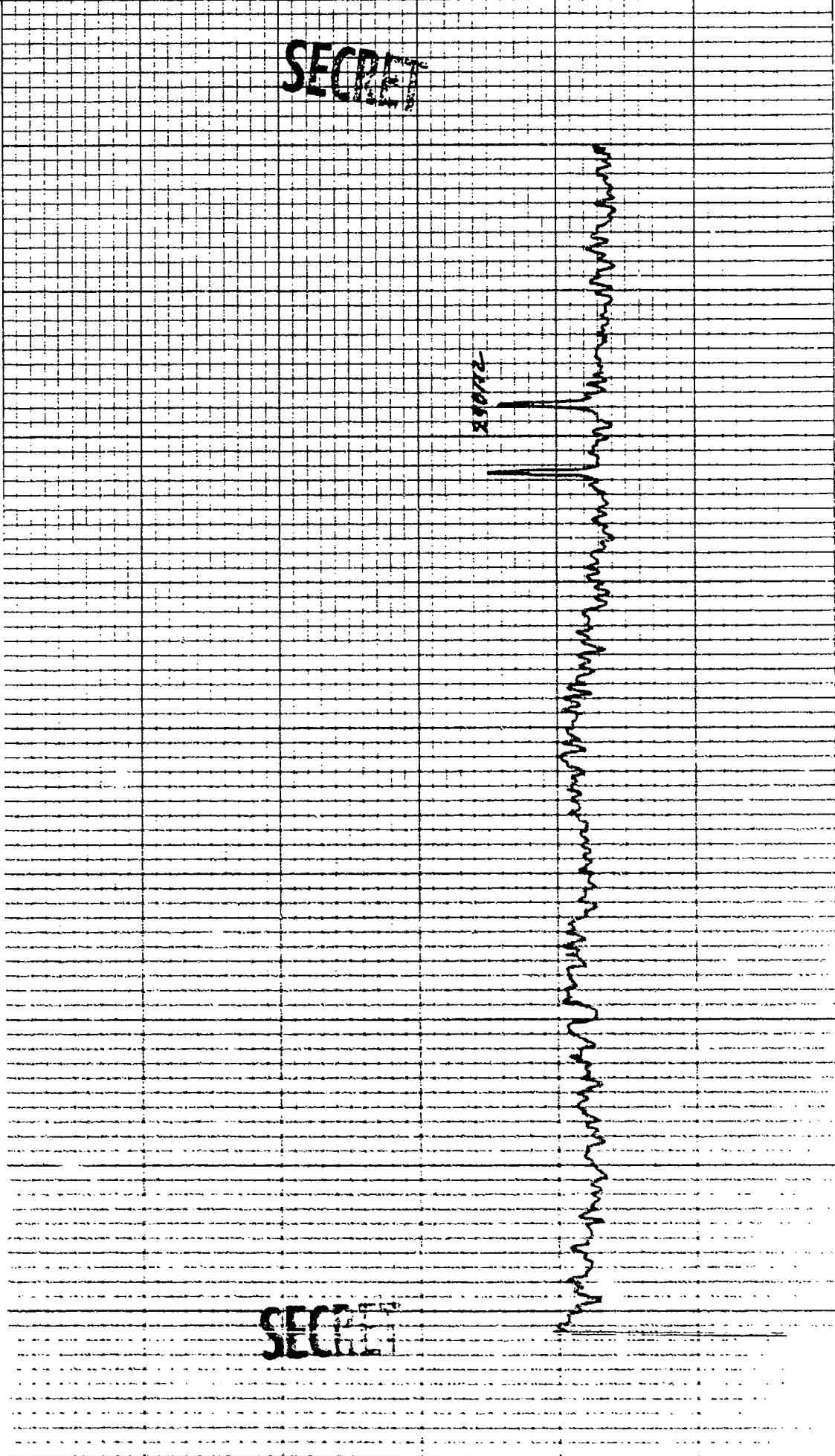
KOE 10 X 10 TO THE INCH • / X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

11.6

CONTROL: 1140 - 72 (DP12) DATE OF ANALYSIS: -- -- --
BEAMFORMED SPECTRUM (ELEMENTS) 1-26 8 28-34)
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: 10 DB
CENTER FREQ: 270 HZ FILTER WIG: HANNING
72 ELEMENTS +76 DEG. AZ STEERING

REEL: 1124 INDE X1005



14E 10 X 10 TO THE INCHES
NEUFEL & ENGER CO. MADE IN U.S.A.

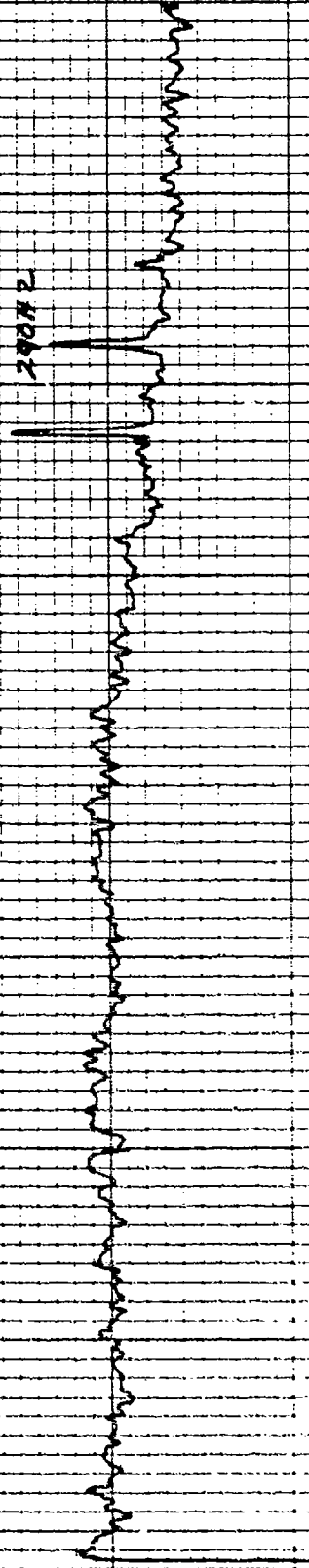
46 0703

CONTROL: 1140 - 32 (DP12) DATE OF ANALYSIS: -- -- --
BEAMFORMED SPECTRUM (ELEMENTS) 1-26-77 22-74)
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 1140 Z
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ
32 ELEMENTS +70 DEG. AZ STEERING

REEL: M2V INDE X 1985
INTEGRATION TIME 320 SECS ATTN: -16 DB
FILTER WTC: HANNING

SECRET

SECRET



CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 12

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 51

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -23.6 dBV

MCPS-32 CAL. CORRECTION +10 -13.6

BEAMFORMER GAIN +24 +10.4 SIG. LEVEL FOR SNR CALCULATION

MRA CORRECTION + .2 +10.6 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -53.6 dBV

MCPS-32 CAL. CORRECTION +10 -43.6

BEAMFORMER GAIN +24 -19.6 NOISE LEVEL FOR SNR CALCULATION
TI

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR +10.4

NOISE LEVEL FOR SNR -19.6 30.0

PROCESSOR CORRECTION -4 26.0

MRA CORRECTION + .2 26.2 SNR .013 HZ BAND

BANDWIDTH CONVERSION _____ SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 12

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 51

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-39.2</u> dBV	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-29.2
BEAMFORMER GAIN	<u>+24</u>	-5.2 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .81</u>	-4.4 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-57.2</u> dBV	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-47.2
BEAMFORMER GAIN	<u>+24</u>	-23.2 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR	<u>-5.2</u>	
NOISE LEVEL FOR SNR	<u>-23.2</u>	18 0
PROCESSOR CORRECTION	<u>-4.2</u>	13.8
MRA CORRECTION	<u>+ .8</u>	14.6 SNR .013 HZ BAND
BANDWIDTH CONVERSION	<u> </u>	SNR 1 HZ BAND

CONFIDENTIAL

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-24.8</u>	<u>-38.6</u>	<u> </u>
MRA SIGNAL LEVEL	<u>+10.6</u>	<u>-4.4</u>	<u> </u>
ARRAY SIGNAL GAIN	<u>35.4</u>	<u>34.2</u>	<u> </u>
20 LOG <u>51</u>	<u>34.1</u>	<u>34.1</u>	<u> </u>
# of elements			
DIFFERENCE	<u>+1.3</u>	<u>+ .1</u>	<u> </u>

ARRAY GAIN

MRA SNR	<u>26.2</u>	<u>14.6</u>	<u> </u>
MEAN OMNI SNR	<u>19.4</u>	<u>7.9</u>	<u> </u>
ARRAY GAIN	<u>6.8</u>	<u>6.7</u>	<u> </u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>12.6</u>	<u>15.1</u>	<u> </u>
DIFFERENCE	<u>-5.8</u>	<u>-8.4</u>	<u> </u>

REF ID: A60703

46 0703

CONTROL: 1146 - 57 (PP12) DATE OF ANALYSIS: - - - -

BEAMFORMED SPECTRUM (ELEMENTS) 1-26-53

EXERCISE: BEARING STAKE DATE/TIME: 3-20-77 - 1148 Z

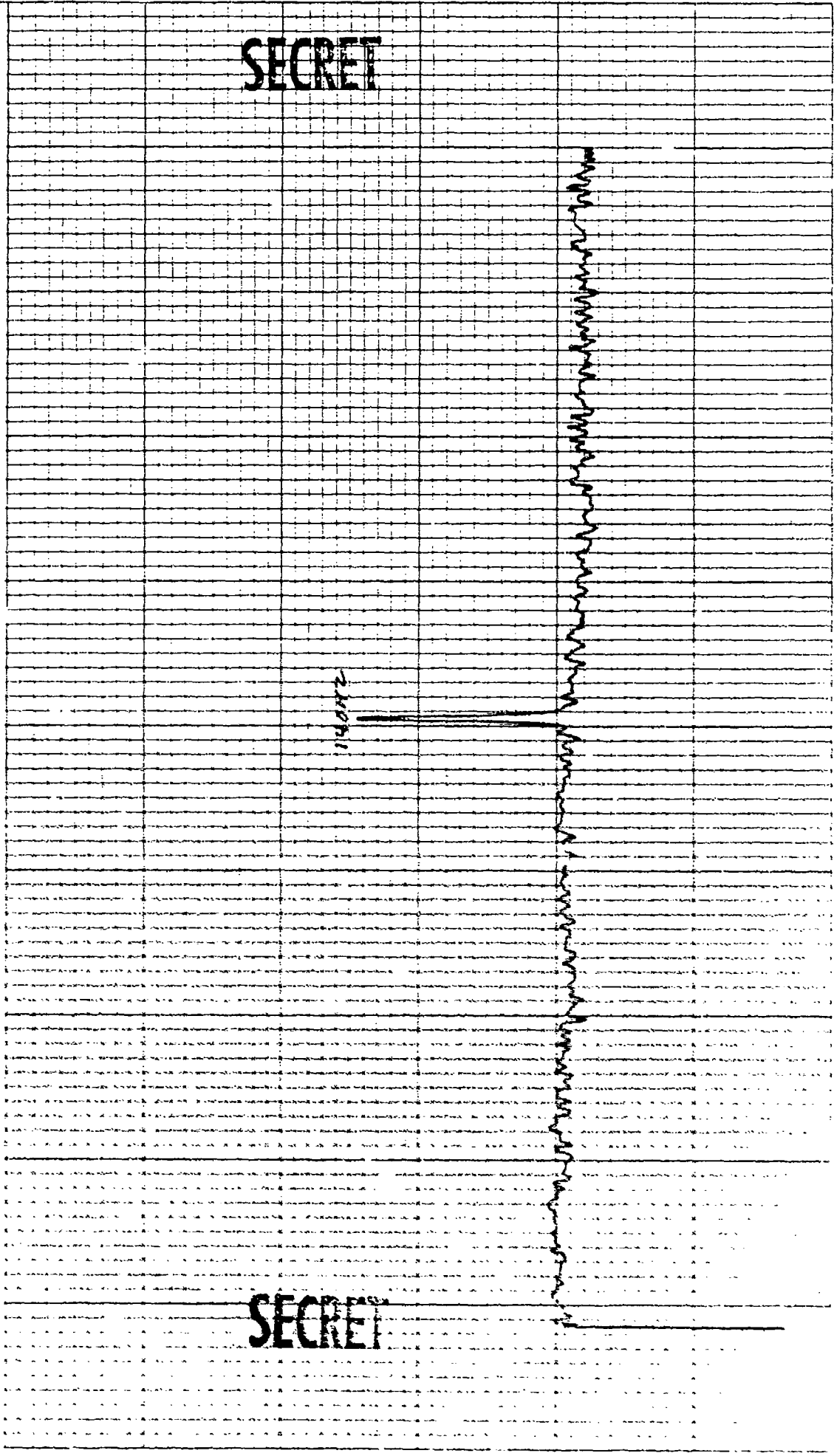
CENTER FREQ: 140 HZ ANALYSIS BANDWIDTH: 1/10HZ

57 ELEMENTS 490 DEG. AZ STEERING

REEL: N84 INDE X 1805

INTEGRATION TIME 320 SECS ATTN: -24 DB

FILTER WTG: HANNING



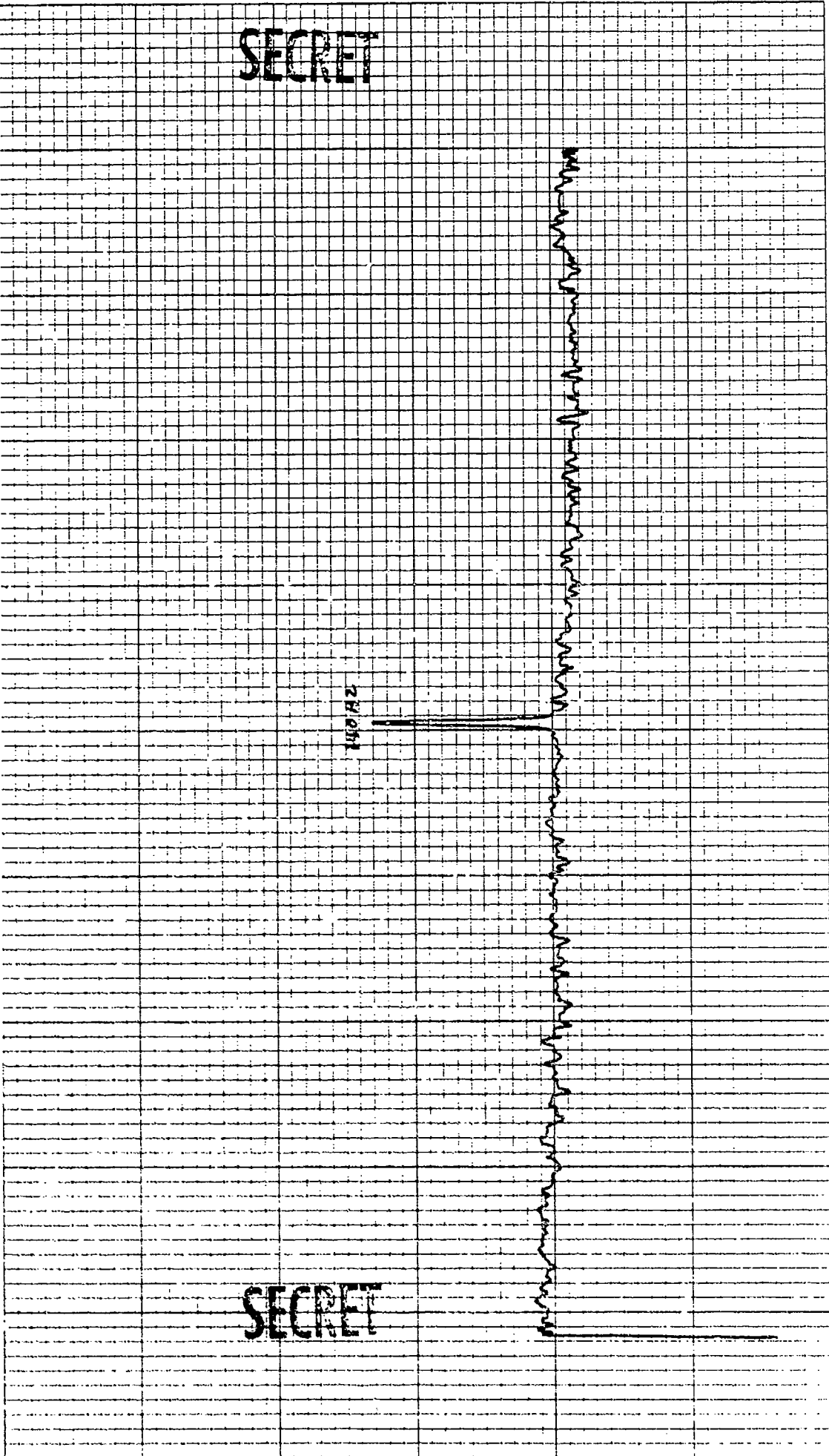
CONTROL: 1140 - 51 (0812) DATE OF ANALYSIS: 1-26-53 REEL: 124 INDE X/225

BEAMFORMED SPECTRUM (ELEMENTS) ANALYSIS BANDWIDTH: 1/1000 Z INTEGRATION TIME 320 SECS ATEN: -81 DB

EXERCISE: BEAKING STAKE ANALYSIS BANDWIDTH: 1/1000 Z FILTER WTG: HANNING

CENTER FREQ: 140 HZ + 50 DEG. AZ STEERING

51 ELEMENTS



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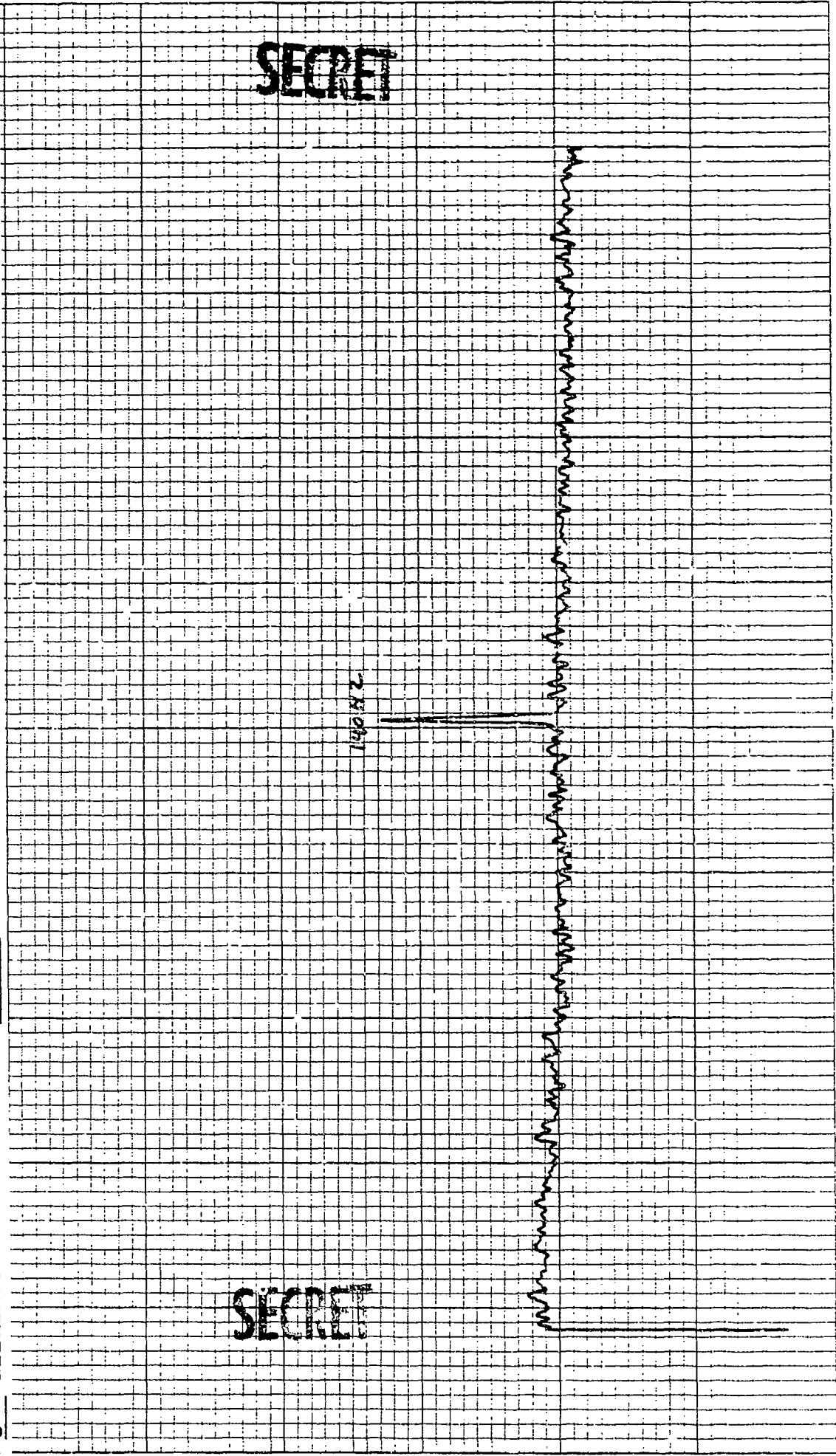
SECRET

2/21/5

CONTROL: 1148 - 51 (QPI2) DATE OF ANALYSIS: -- -- --
 BEAMFORMED SPECTRUM (ELEMENTS) REEL: 424 INDE X/996
 EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: -24DB
 CENTER FREQ: 146 HZ FILTER WFG: HANNING
 51 ELEMENTS 452 DEG. AZ STEERING ANALYSIS BANDWIDTH: 1/10HZ
 DATE/TIME: 2-26-53

SECRET

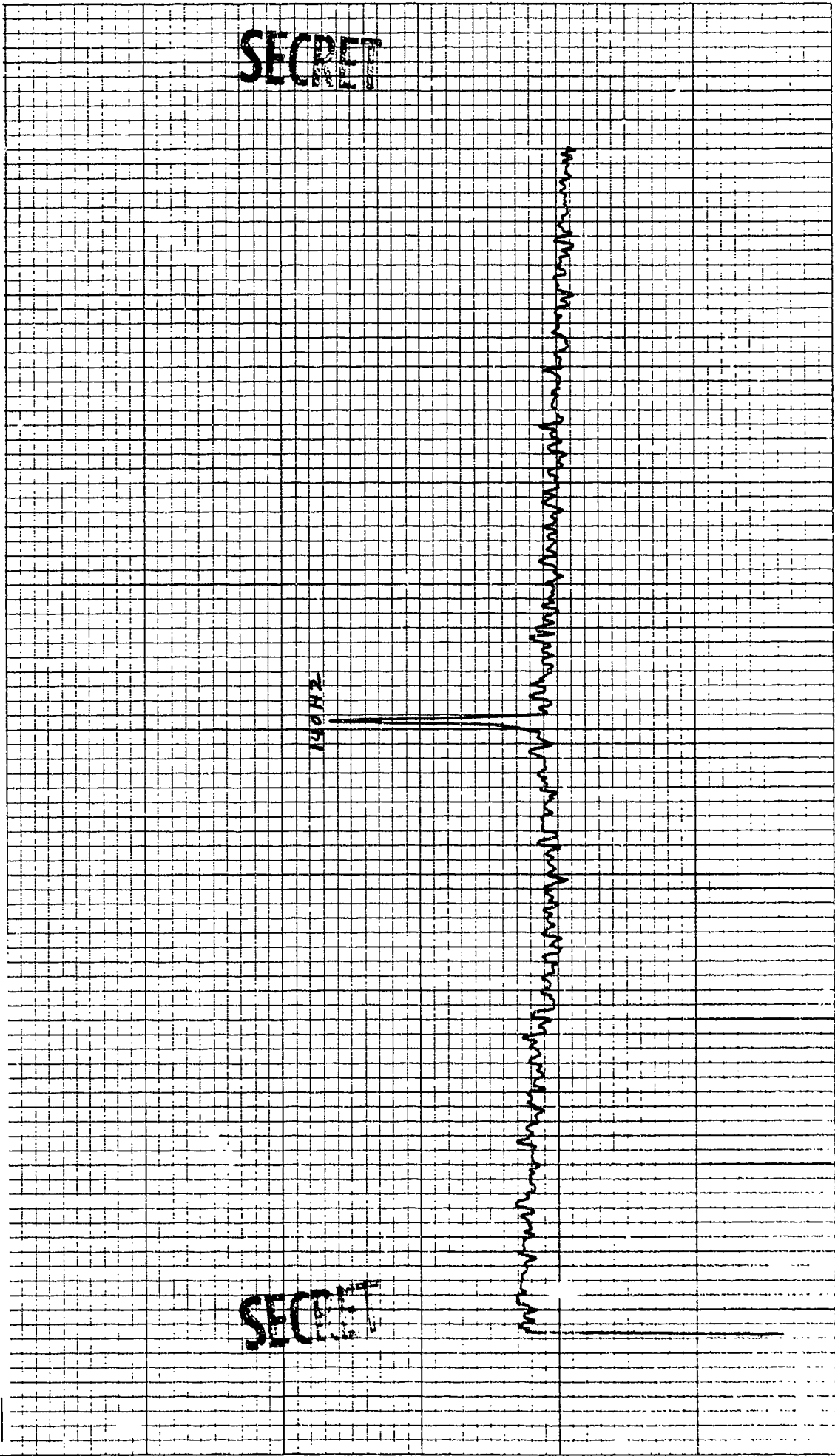
SECRET



CONTROL: 1140 - 51 (DP12)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 140 HZ
51 ELEMENTS

DATE OF ANALYSIS: 1-26-77
DATE/TIME: 3-16-77 - 1140 Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 54 DEG. AZ STEERING

REEL: M24 INDE X/995
INTEGRATION TIME 320 SECS ATTN: -24DB
FILTER WTG: HANNING



SECRET

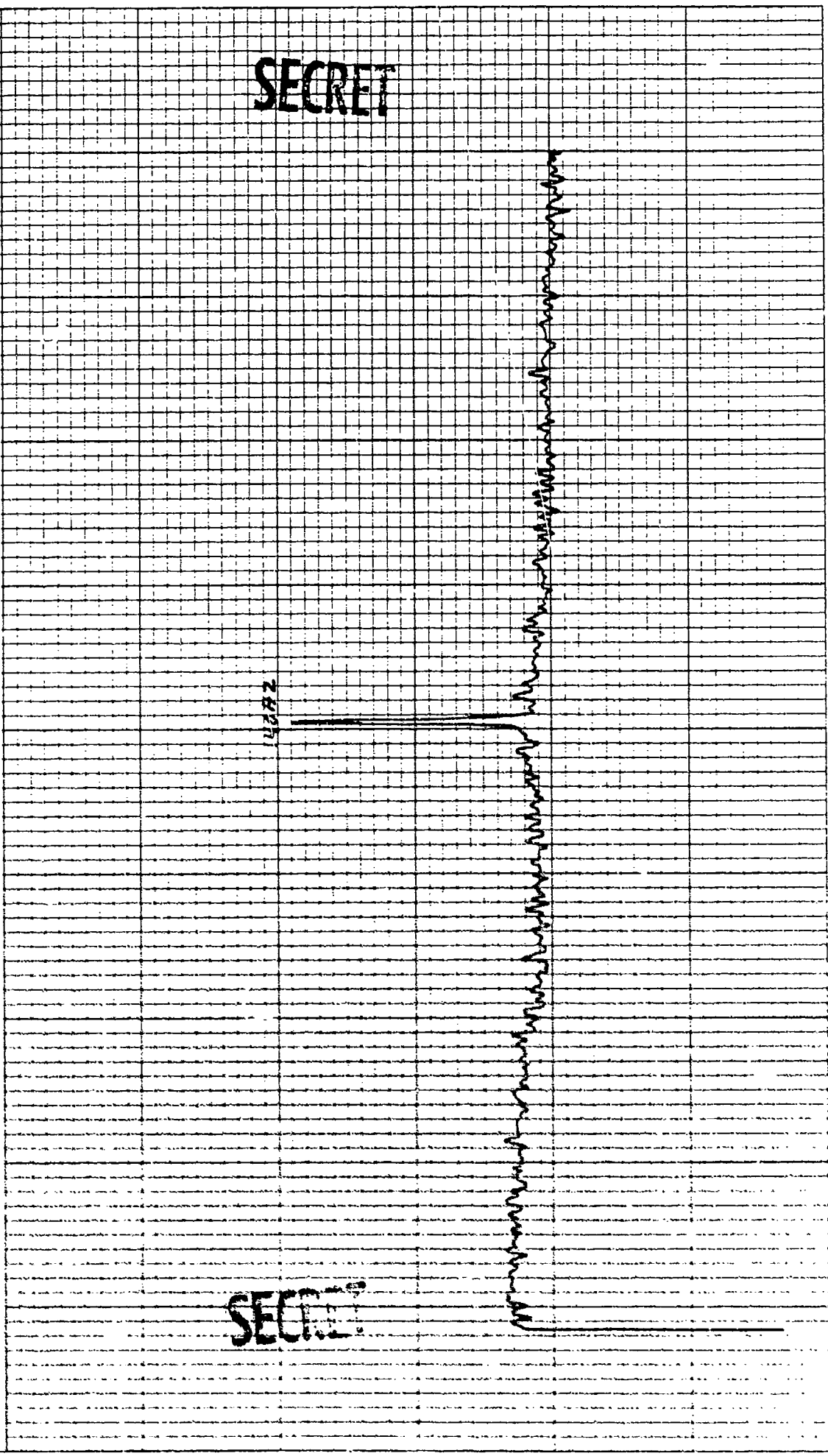
SECRET

CONTROL: 1148 - 51 (0012) DATE OF ANALYSIS: -- -- --
 BEAMFORMED SPECTRUM (ELEMENTS) 1-26-77-1140 Z
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ
 CENTER FREQ: 140 HZ 4-56 DEG. AZ STEERING
 5) ELEMENTS

REEL: M24

INDE X1996

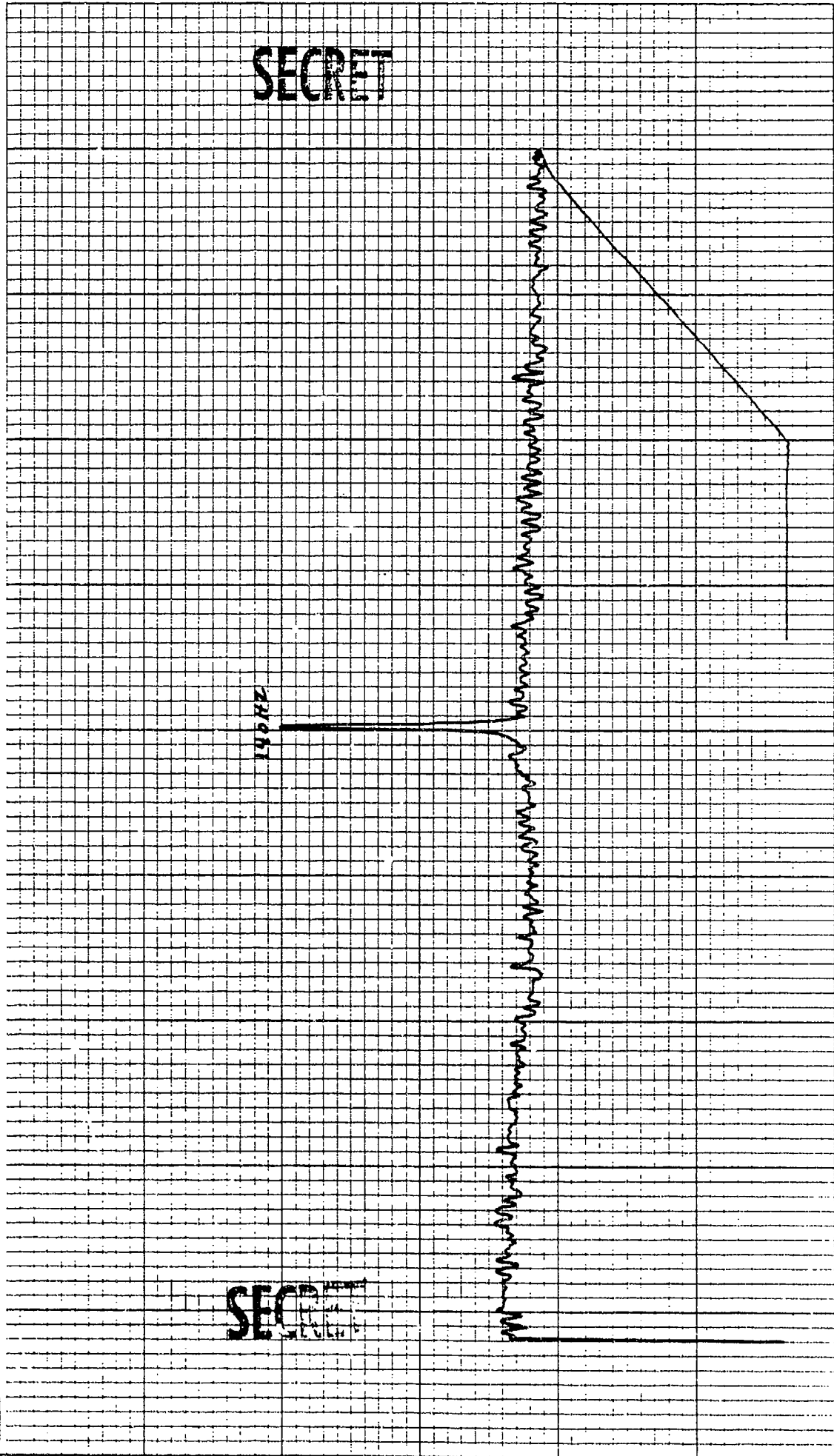
INTEGRATION TIME 320 SECS
 FILTER
 ATTN: -24 DB
 WTG: HANNING



SECRET

SECRET

CONTROL: 1149 - 51 (D012) DATE OF ANALYSIS: 1-26-53 REEL: 1124 INDEX: X 1985
BEAMFORMED SPECTRUM (ELEMENTS) ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTEN: -24 DB
EXERCISE: BEARING STAKE +50 DEG. AZ STEERING FILTER WTG: HANNING
CENTER FREQ: 140 HZ



SECRET

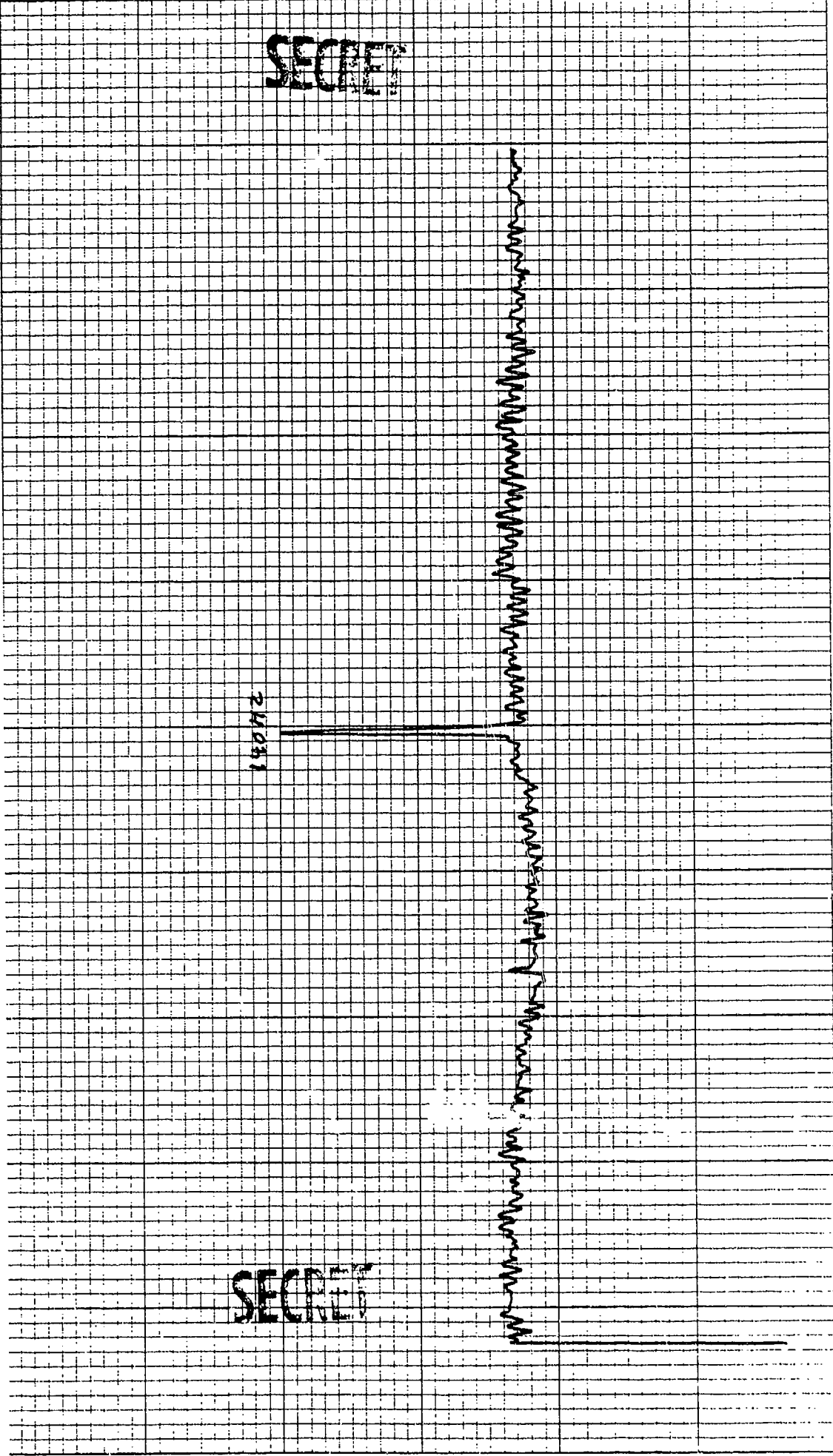
SECRET

1-26-77

CONTROL: 1140 - 51 (DPI2) DATE OF ANALYSIS: ---
 BEAMFORMED SPECTRUM(ELEMENTS) 1-26-77-53
 EXERCISE: BEARING STAKE DATE/TIME: 3-26-77 - 1148 Z
 CENTER FREQ: 140 HZ ANALYSIS BANDWIDTH: 1/10HZ
 51 ELEMENTS 757.5 DEG. AZ STEERING

REEL: M24 INTEGRATION TIME 320 SECS ATTEN: -24DB
 FILTER WTG: HANNING

INDE X1985



SECRET

SECRET

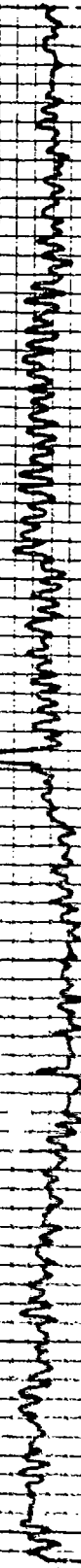
R.A. 12

CONTROL: 1140 - 51 (2012) DATE OF ANALYSIS: -- -- --
 BEAMFORMED SPECTRUM (ELEMENTS 1-26 of 28-53)
 EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: -2Y/DB
 CENTER FREQ: 140 HZ FILTER WTG: HANNING
 51 ELEMENTS +60 DEG. AZ STEERING

SECRET

140 HZ

SECRET



46 0703

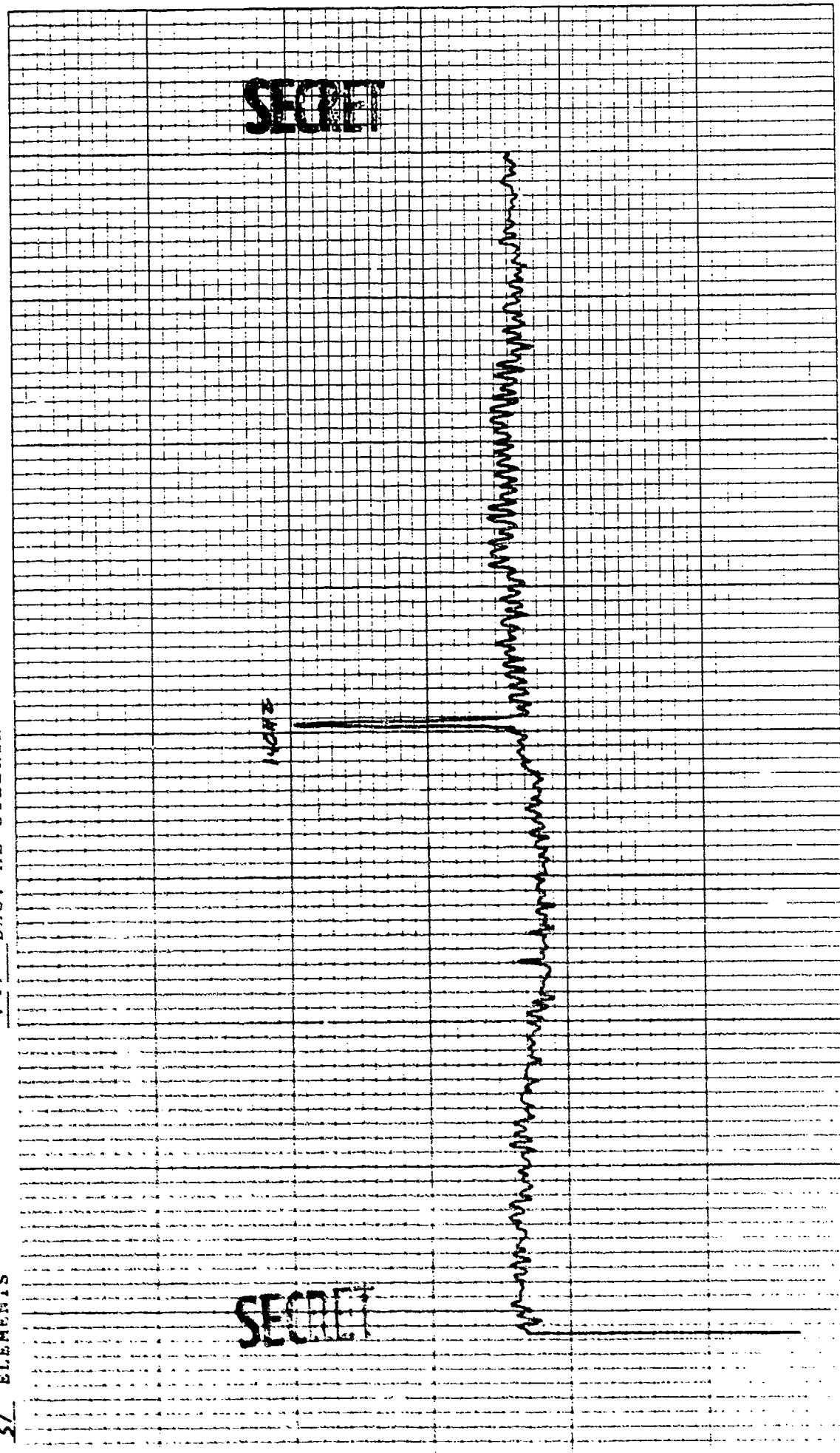
KOE 10 X 10 TO THE INCHES
REDFIELD B. E. & S. CO. MADE IN U.S.A.

REEL: A24 INDE X 1995

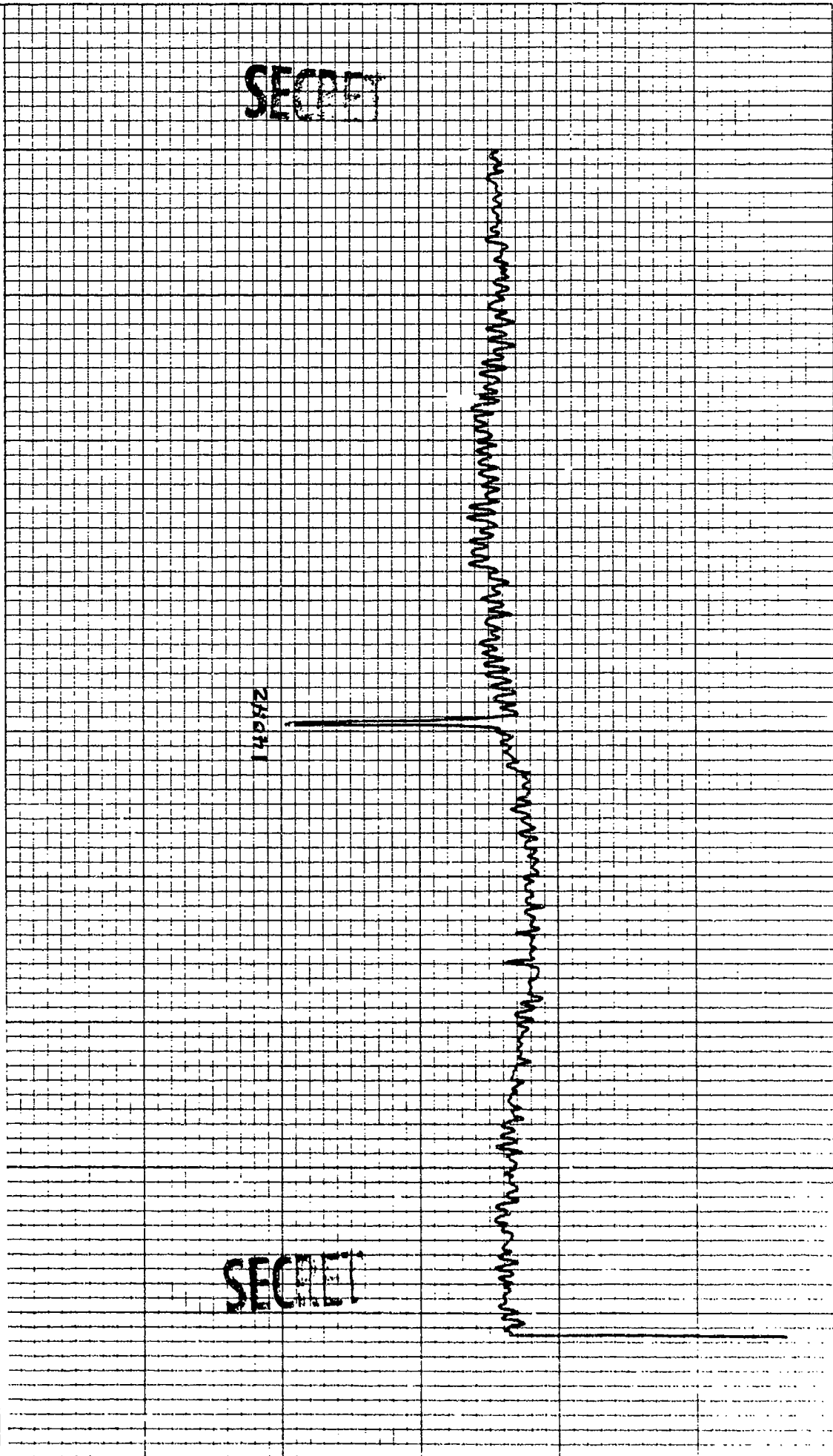
INTEGRATION TIME 320 SECS
FILTER WTC: HANNING

DATE OF ANALYSIS: 1-26-53
DATE/TIME: 370-77-1148 Z
ANALYSIS BANDWIDTH: 1/10HZ
451 DEG. AZ STEERING

CONTROL: 1148 - 51 (0012)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
51 ELEMENTS

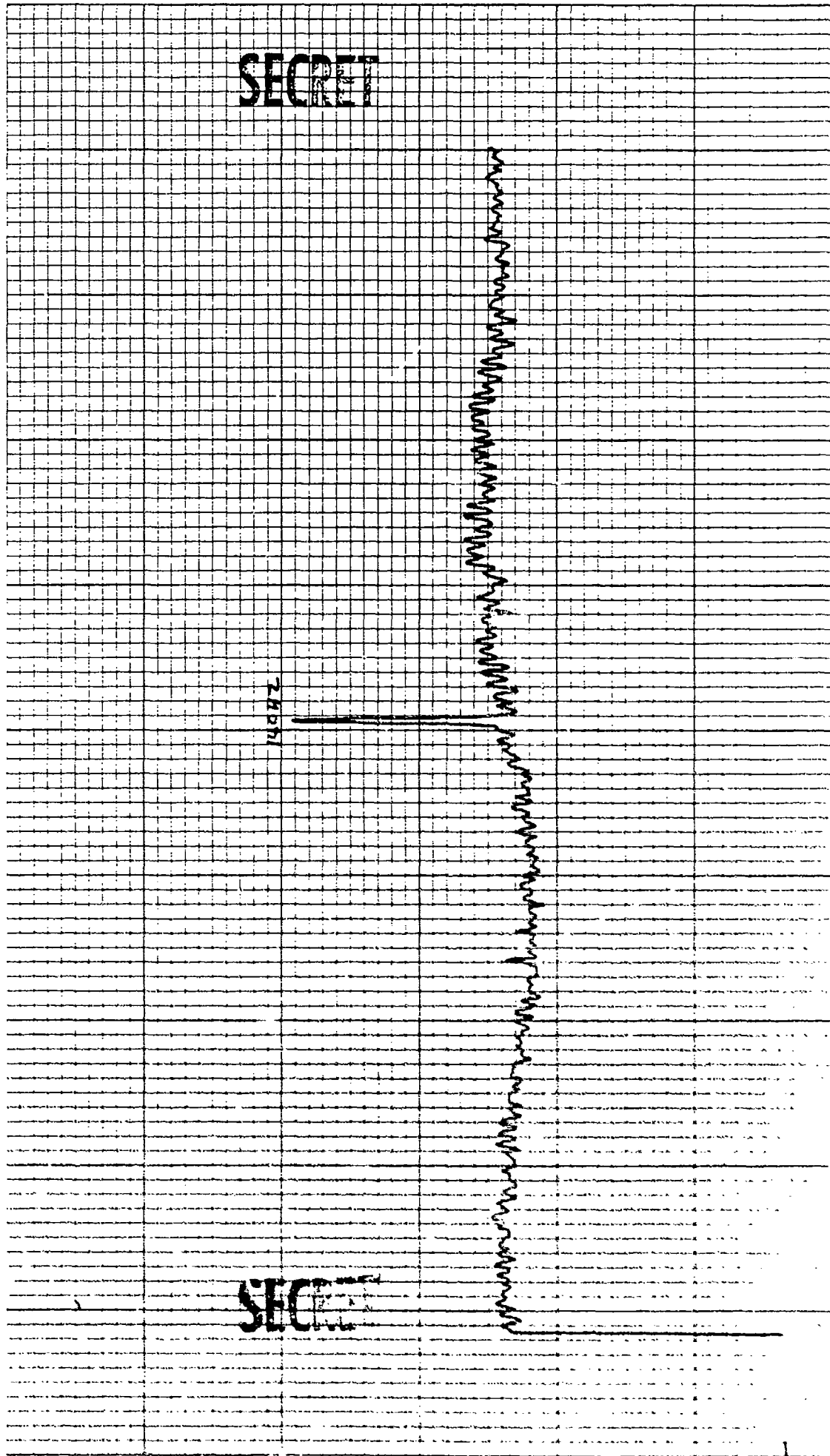


CONTROL: 1148 - 51 (DP12) REEL: M24 INDE X/885
 BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-26-77 28-53
 EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 1148 Z INTEGRATION TIME 320 SECS ATTN: 24 DB
 CENTER FREQ: 140 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
51 ELEMENTS 7.62 DEG. AZ STEERING



CONTROL: 1140 - 51 (0012) DATE OF ANALYSIS: 1-26-77
BEAMFORMED SPECTRUM (ELEMENTS) ANALYSIS BANDWIDTH: 1/10HZ
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ
CENTER FREQ: 140 HZ
67 ELEMENTS

REEL: 104 INDE X/005
INTEGRATION TIME 320 SECS ATTN: 0.4 DB
FILTER WTG: HANNING



CONTROL: 1148 - 2/ (2012) REEL: A 24 INDE X/1995

BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-26-88 28-53

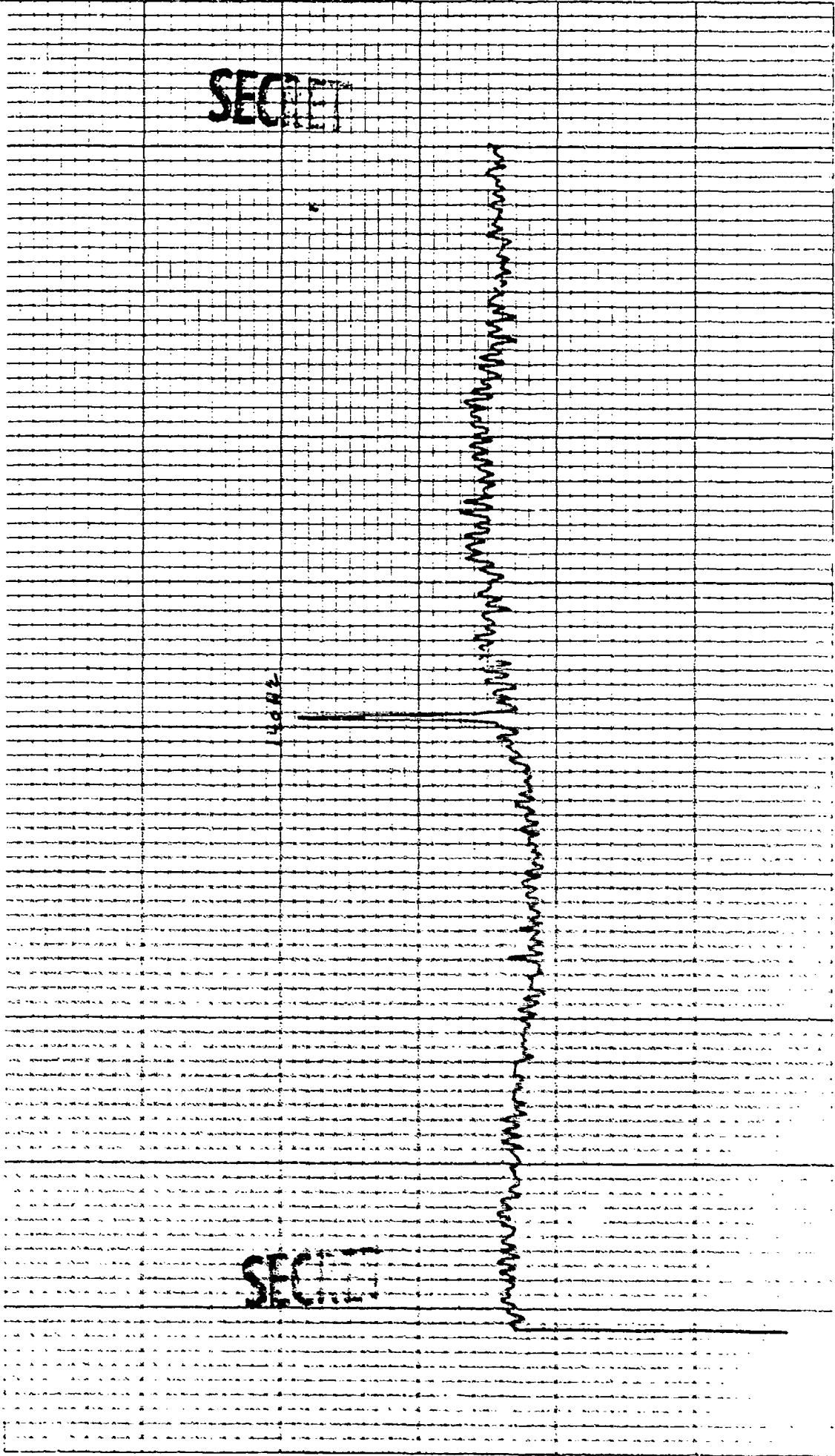
EXERCISE: BEARING STAKE DATE/TIME: 3-26-77 - 1140 Z INTEGRATION TIME 320 SECS ATTN: -2V DB

CENTER FREQ: 140 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING

S/ ELEMENTS +6V DEG. AZ STEERING

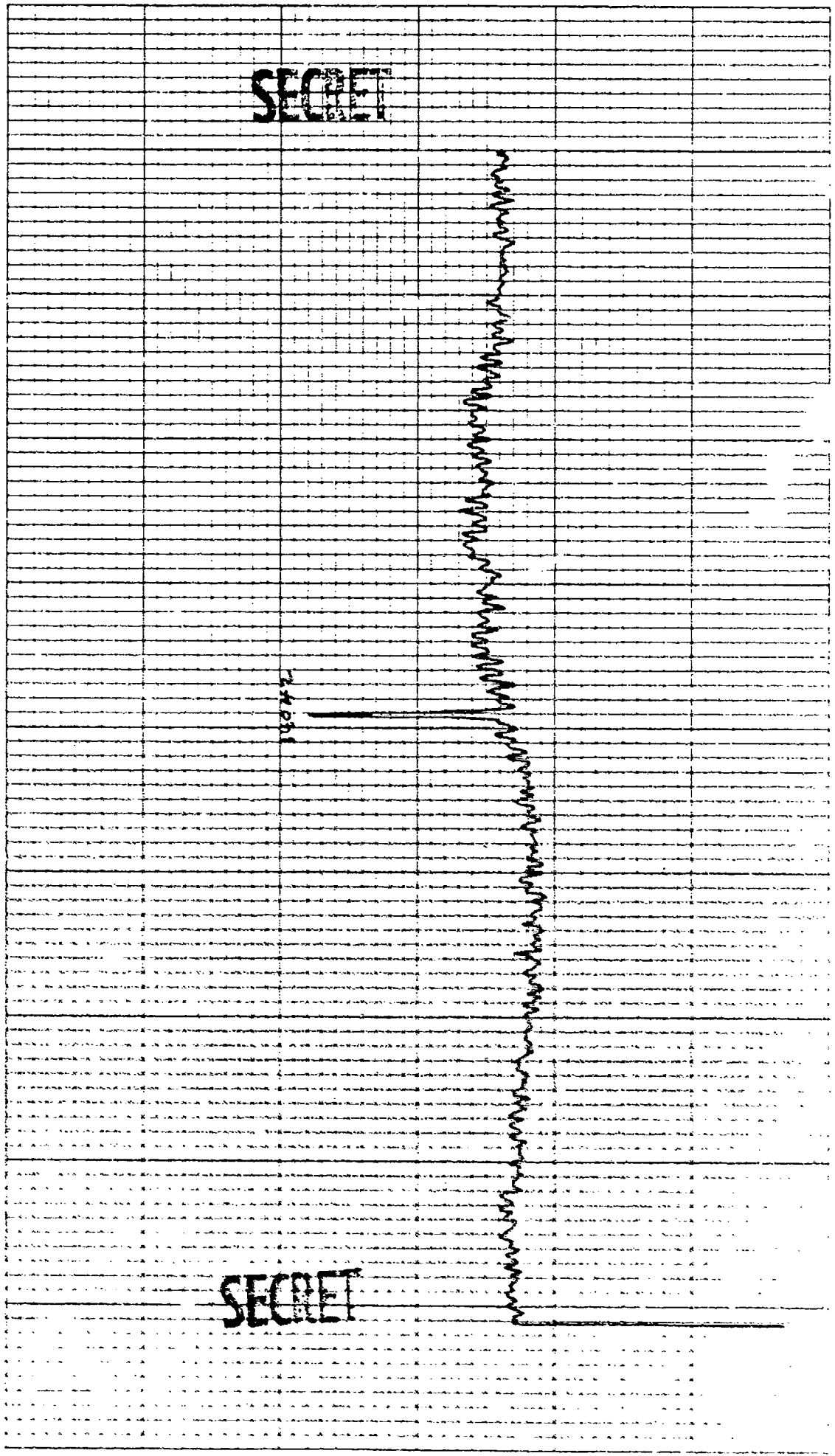
SECRET

SECRET



3.9.1.23

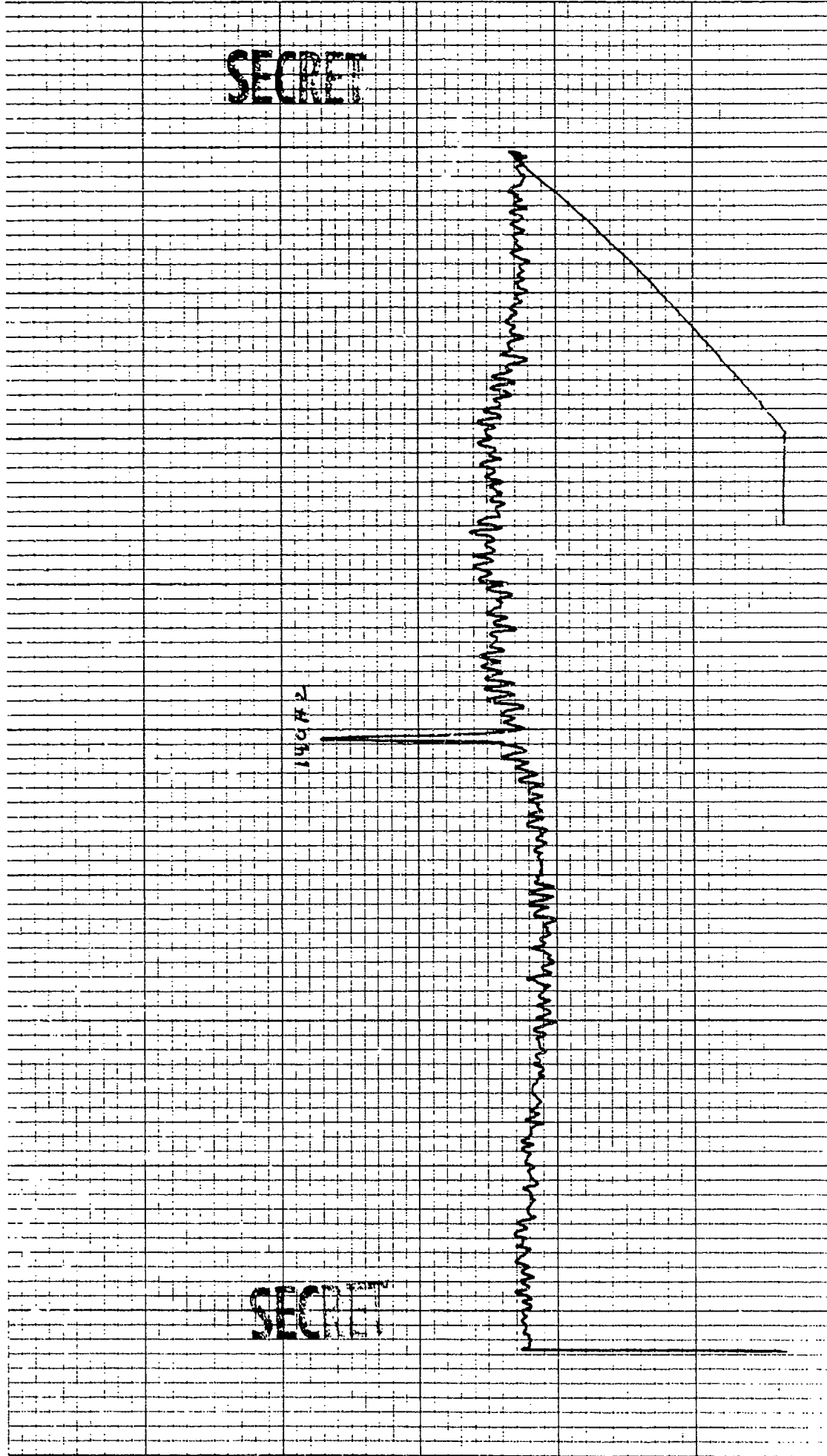
CONTROL: 1140 - 5/ (OP/A) DATE OF ANALYSIS: - - - - - INDE X1995
 BEAMFORMED SPECTRUM (ELEMENTS) 1-96 K 92-53 REEL: N24
 EXERCISE: BEARING STAKE DATE/TIME: 3-76-77 - 1402 Z INTEGRATION TIME 320 SECS ATTN: -24 DB
 CENTER FREQ: 140 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 5/ ELEMENTS +66 DEG. AZ STEERING



CONTROL: 1140 - 5/ (0012)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 140 HC
5/ ELEMENTS

DATE OF ANALYSIS: -- -- --
1-22-68 09-53
DATE/TIME: 3-76-77 - 1140 Z
ANALYSIS BANDWIDTH: 1/10HZ
+68 DEG. AZ STEERING

REEL: 1144 INDE X/125
INTEGRATION TIME 320 SECS ATTN: -2V DB
FILTER WTG: HANNING

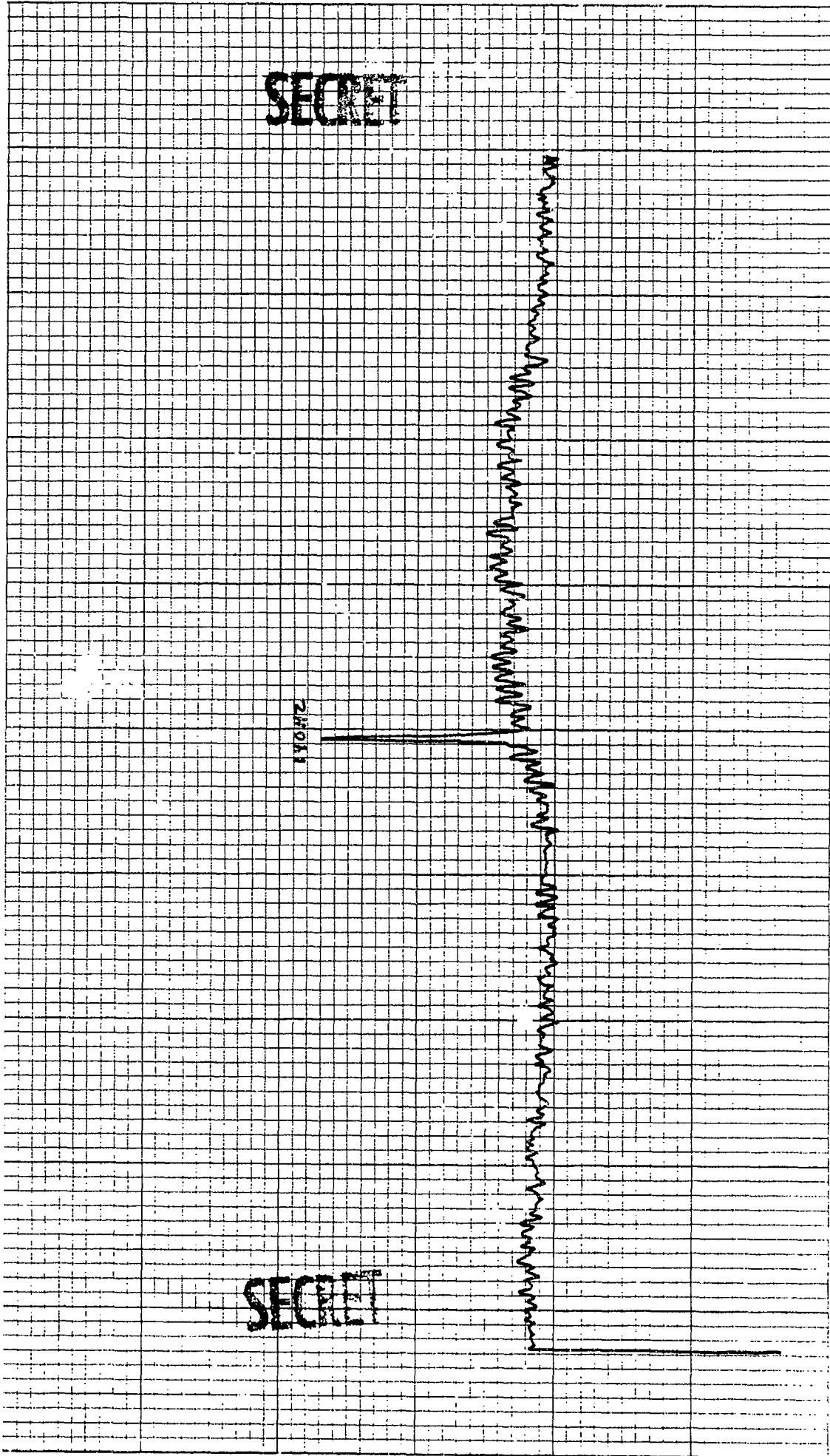


175/27

CONTROL: 1148 - 51 (0912)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 140 HZ
51 ELEMENTS

DATE OF ANALYSIS: 1-26-53
DATE/TIME: 3-16-77 - 1148 Z
ANALYSIS BANDWIDTH: 1/10HZ
170 DEG. AZ STEERING

REEL: 424 INDE X 1985
INTEGRATION TIME 320 SECS
ATTEN: -2V DB
FILTER WTG: HANNING



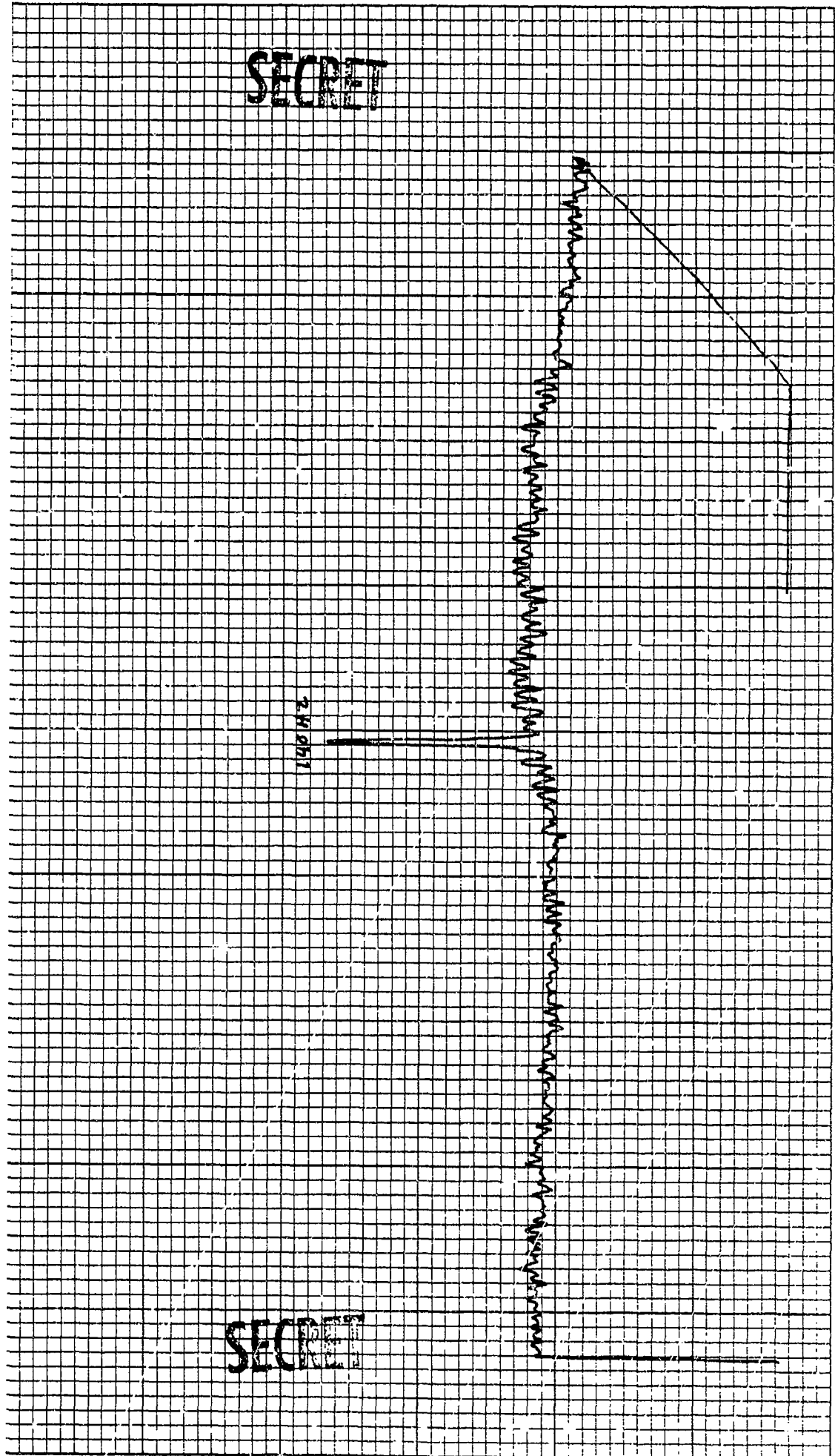
SECRET

SECRET

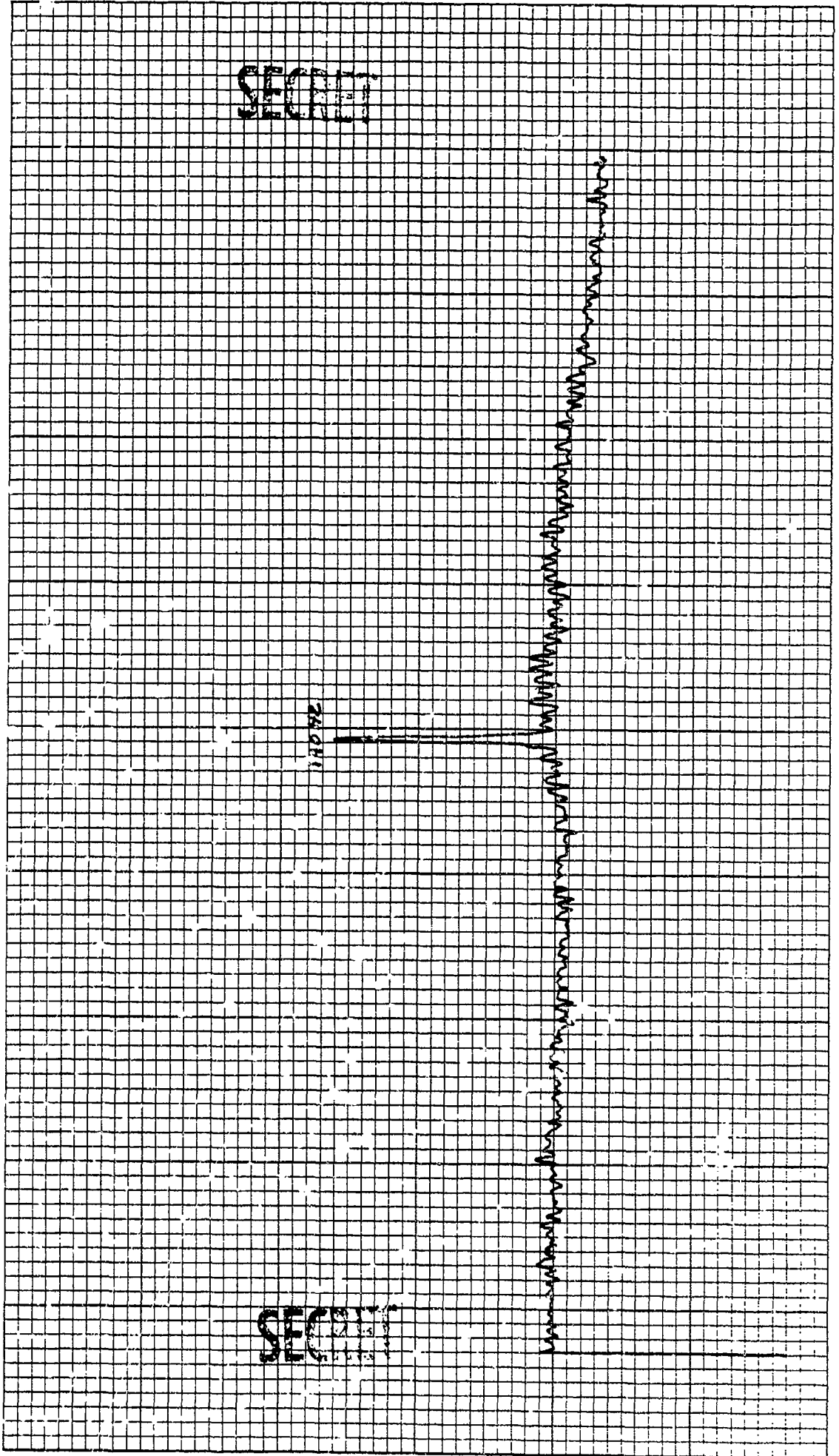
K-E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 1140 - 51 (DP12) DATE OF ANALYSIS: 1-26-88-53 REEL: K24 INDE X1005
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-12-77 - 1140 Z INTEGRATION TIME 320 SECS ATTN: -24 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 140 HZ + 72 DEG. AZ STEERING



CONTROL: 1148 - 51 (DFIR) DATE OF ANALYSIS: 1-26-53 INDE X 1915
 BEAMFORMED SPECTRUM (ELEMENTS) EXERCISE: BEAKING STAKE REEL: NAY
 CENTER FREQ: 145 HZ ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: -2Y DB
 51 ELEMENTS F74 DEG. AZ STEERING FILTER WTC: HANNING



10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

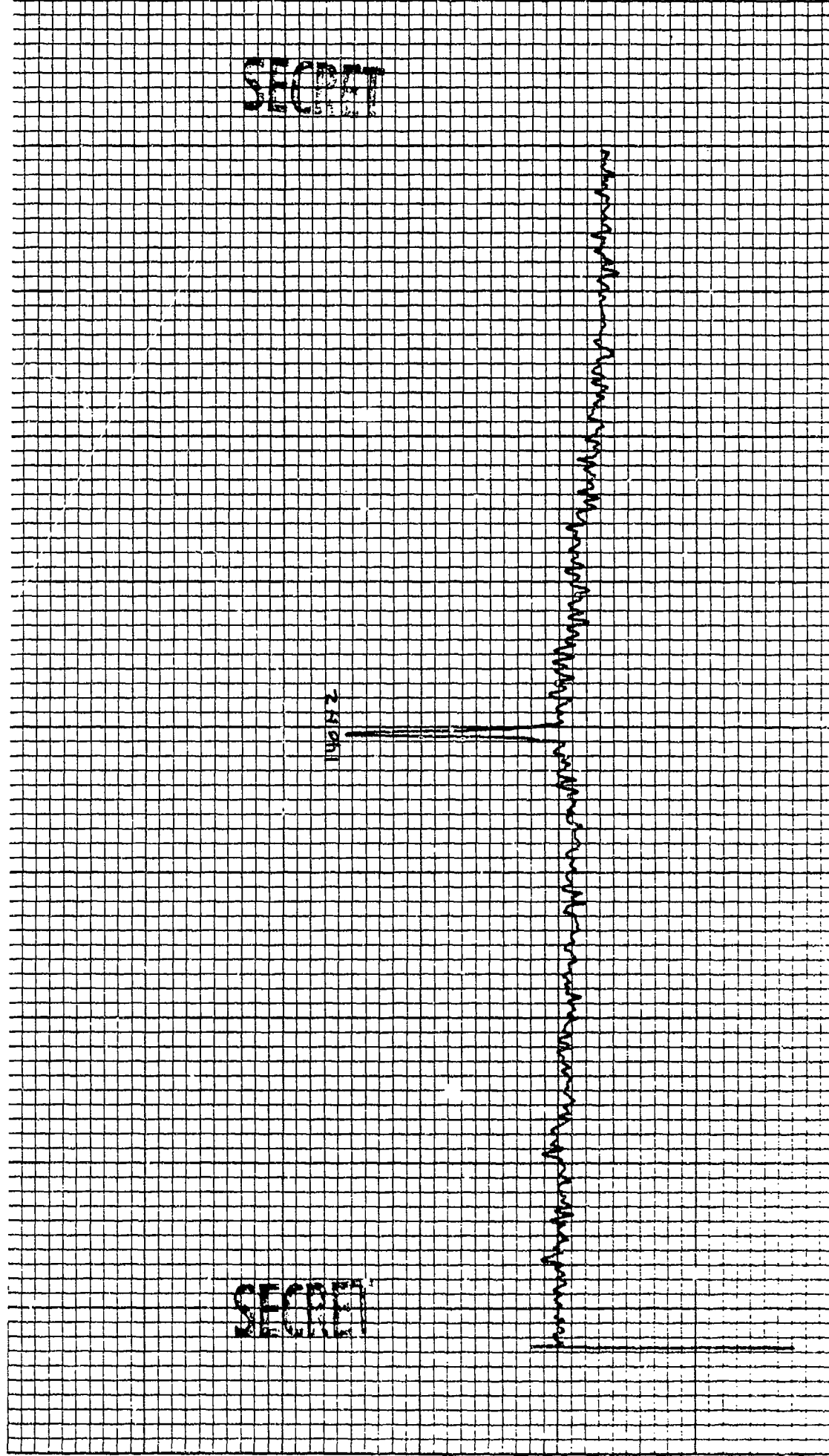
CONTROL: 1148 - 51 (DPIA)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 140 HZ
51 ELEMENTS

DATE OF ANALYSIS: 1-26-53

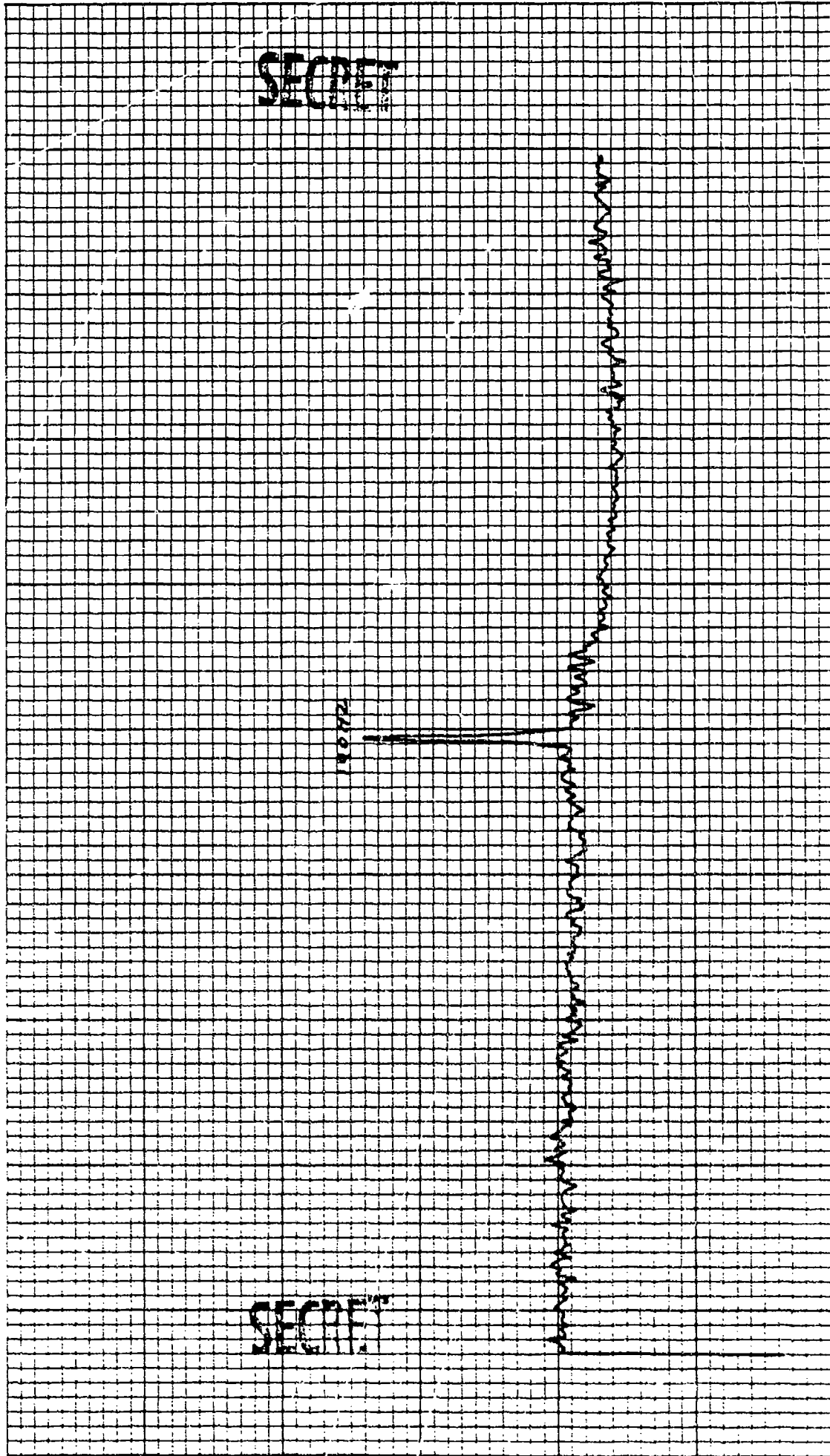
DATE/TIME: 3-16-77 - 140 Z
ANALYSIS BANDWIDTH: 1710HZ
+76 DEG. AZ STEERING

REEL: 1124 INDE X 1995

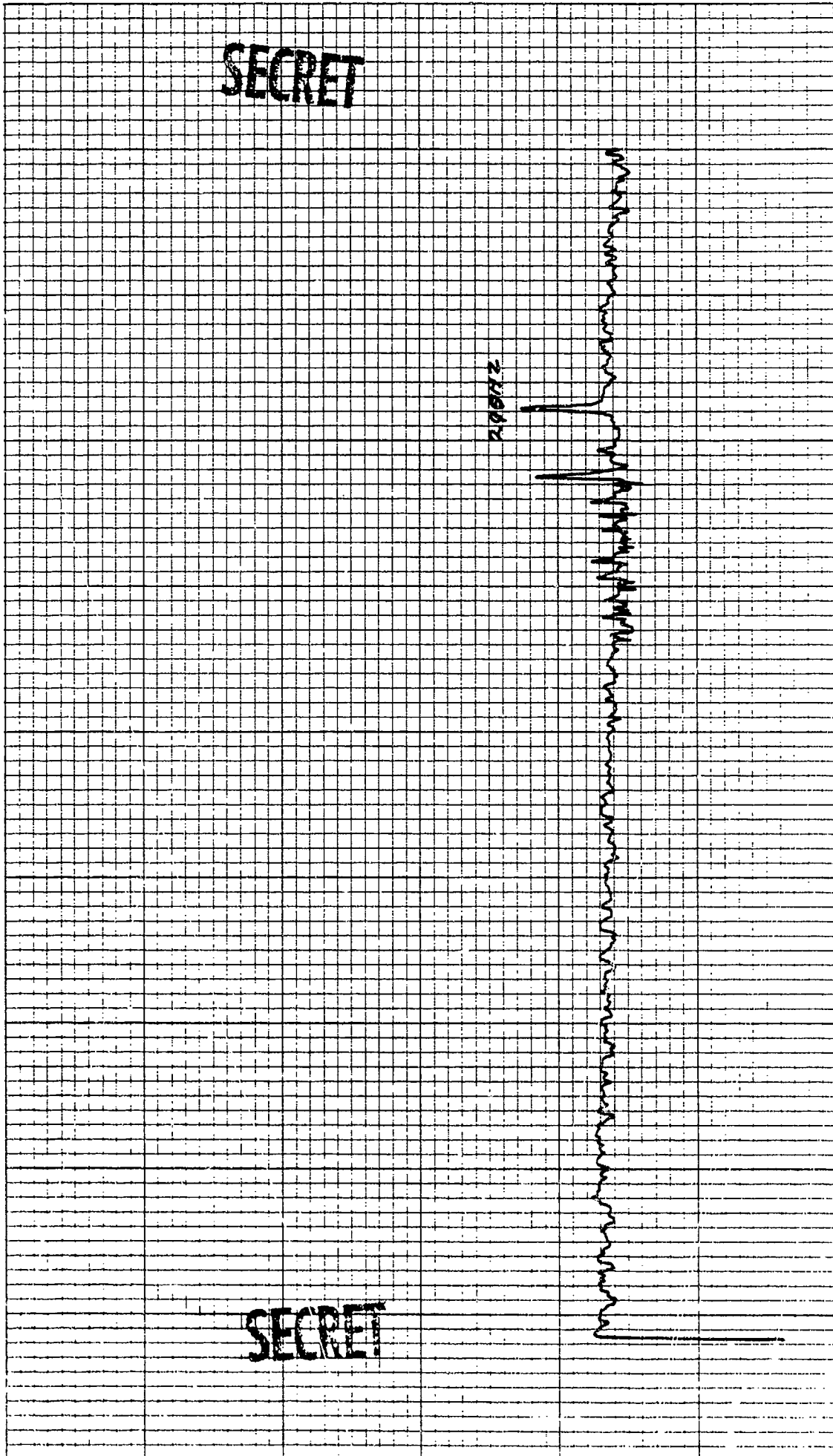
INTEGRATION TIME 320 SECS
ATTEN: -24 DB
FILTER WTG: HANNING



CONTROL: 1146 - 51 (D012) REEL: M-2V INDE X 1105
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-26-77 29-53
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 1148 Z INTEGRATION TIME 320 SECS ATTN: -24DB
CENTER FRQ: 14.0 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
51 ELEMENTS +70 DEG. AZ STEERING



CONTROL: 1140 - 51 (D912) DATE OF ANALYSIS: - - REEL: 1124 INDE X 1986
BEAMFORMED SPECTRUM (ELEMENTS) 1-26 88-53 INTEGRATION TIME 320 SECS ATTEN: 24 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
CENTER FREQ: 270 HZ 4-40 DEG. AZ STEERING

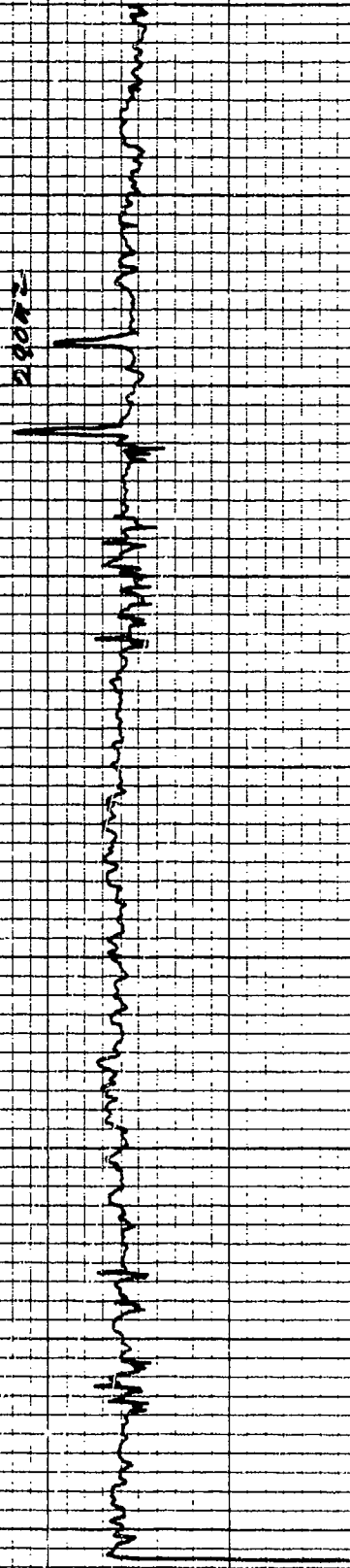


CONTROL: 1148 - 51 (DP12) DATE OF ANALYSIS: -- -- --
BEAMFORMED SPECTRUM (ELEMENTS) 1-26-77 28-53)
EXERCISE: BEARING STAKE DATE/TIME: 3-76-77 - 1148 Z
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ
S/ ELEMENTS +50 DEG. AZ STEERING

REEL: 424 INDE X/REF
INTEGRATION TIME 320 SECS ATTN: -24DB
FILTER WTG: HANNING

SECRET

SECRET

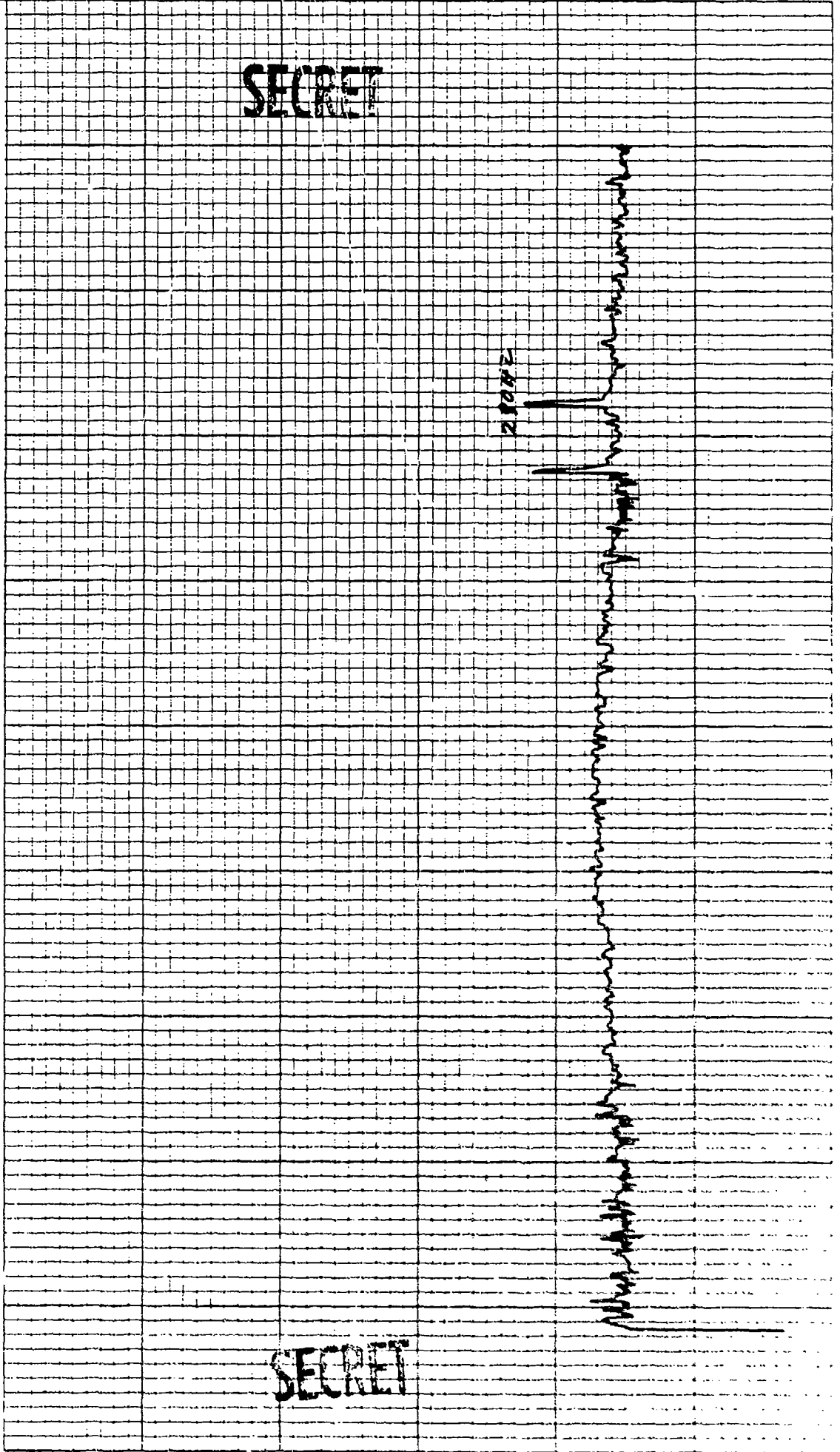


CONTROL: 1146 - 51 (DP12) DATE OF ANALYSIS: - - - -
BEAMFORMED SPECTRUM (ELEMENTS) 1-26-53
EXERCISE: BEARING STAKE DATE/TIME: 3-6-77 - 1148 Z
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ
51 ELEMENTS 45.2 DEG. AZ STEERING

REEL: M24 INDE X1993
INTEGRATION TIME 320 SECS ATTN: -2YDB
FILTER WTG: HANNING

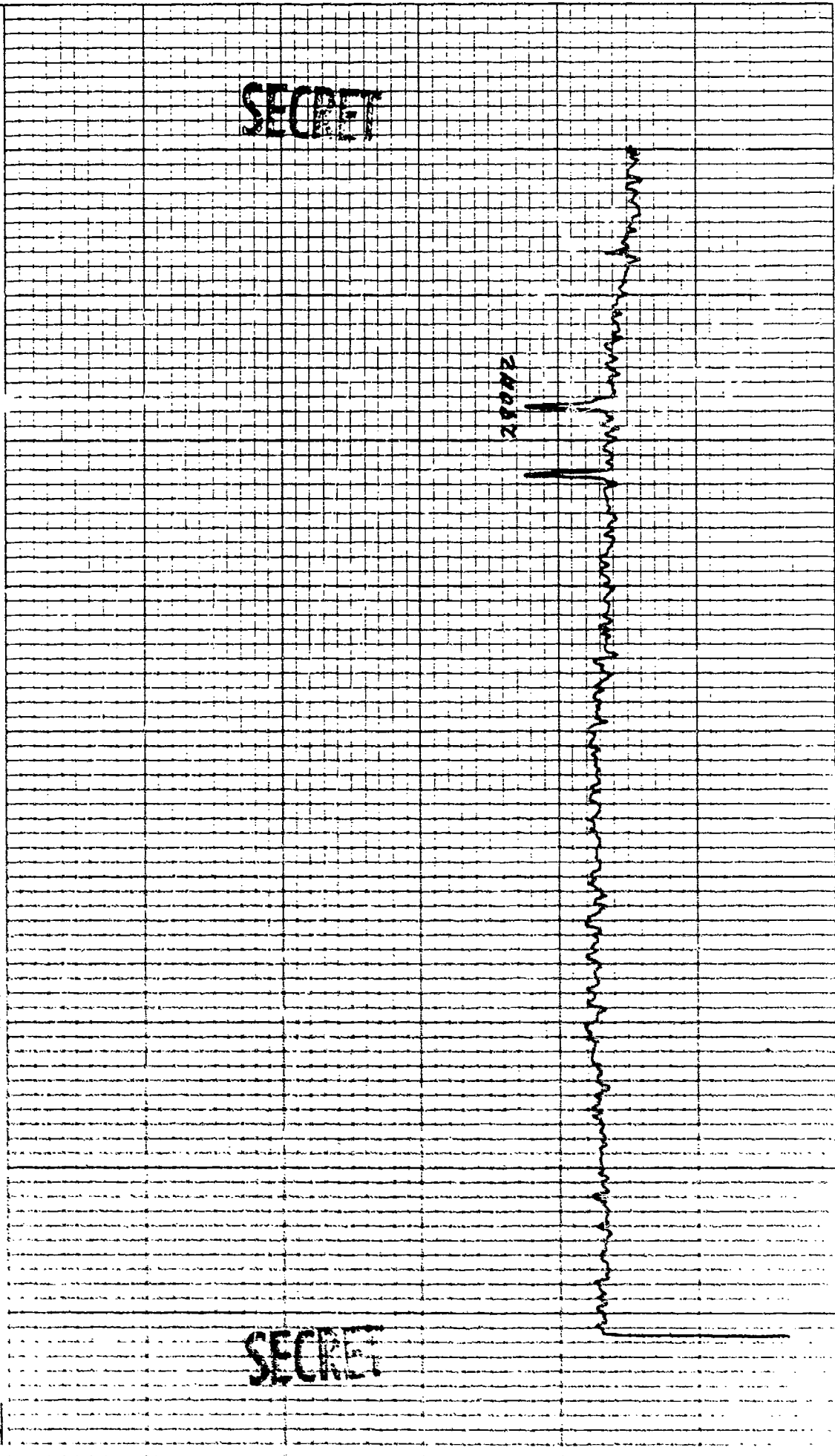
SECRET

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CONTROL: 1140 - 51 (0012) DATE OF ANALYSIS: -- -- --
 BEAMFORMED SPECTRUM(ELEMENTS) 1-264 29-53
 EXERCISE: BEARING STAKE DATE/TIME: 7-16-77 - 1140 Z
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ
 51 ELEMENTS +5V DEC. AZ STEERING

REEL: 1124 INDE X1965
 INTEGRATION TIME 320 SECS ATTN: -34DB
 FILTER WTG: HANNING



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INDE X/1985

REEL: 144

ATTEN: -2Y DB

WTC: HANNING

INTEGRATION TIME 320 SECS

FILTER

DATE OF ANALYSIS: - - - -

1-26-53

DATE/TIME: 3-16-77 - 1148 Z

ANALYSIS BANDWIDTH: 1/10HZ

+56 DEG. AZ STEERING

CONTROL: 1148 - 51 (0012)

BEAMFORMED SPECTRUM (ELEMENTS)

EXERCISE: BEARING STAKE

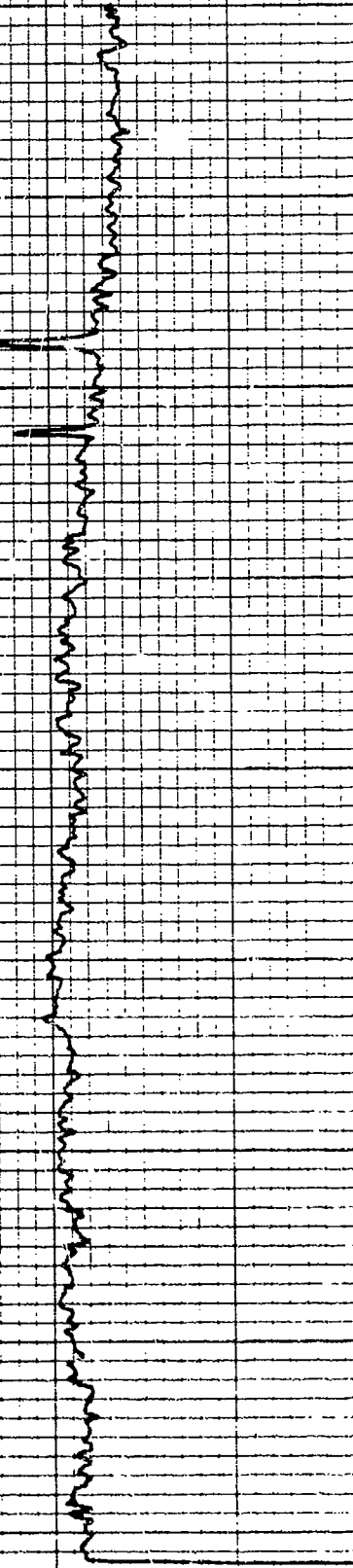
CENTER FREQ: 270 HZ

51 ELEMENTS

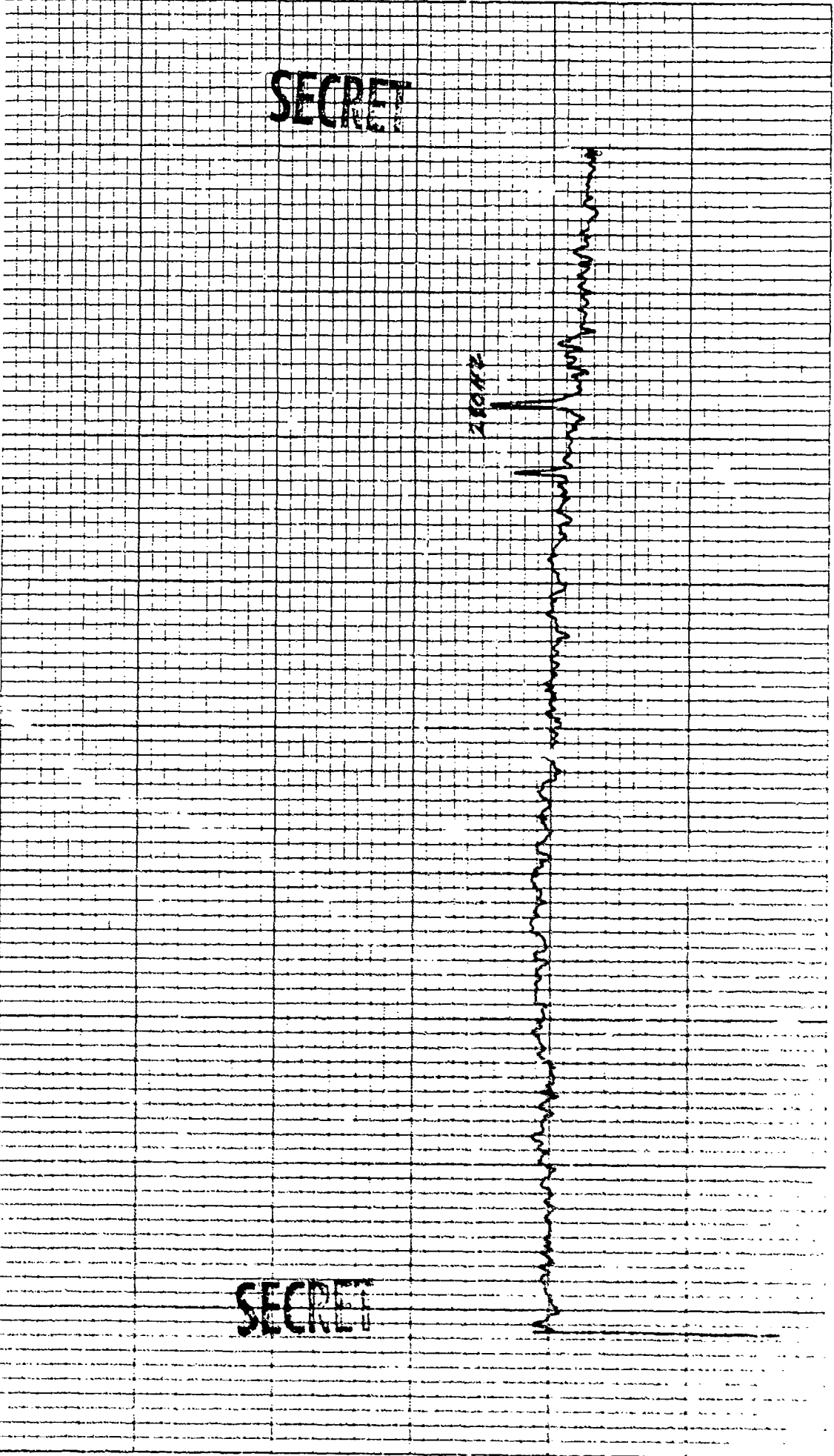
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20000



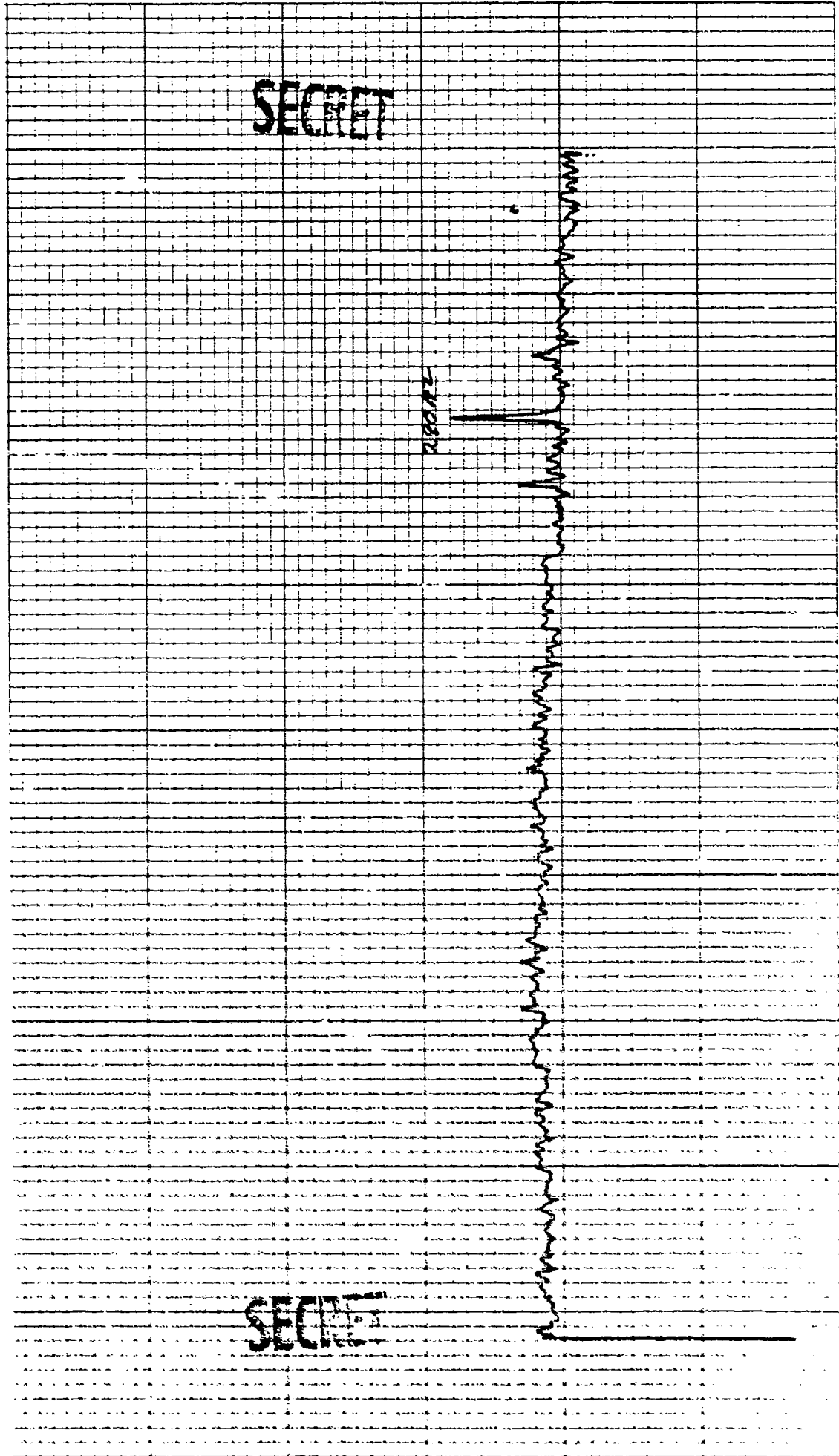
CONTROL: 1140 - 51 (DP12) DATE OF ANALYSIS: 1-26-53 REEL: 124 INDE X1985
BEAMFORMED SPECTRUM (ELEMENTS) 51 EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: -24 DB
51 ELEMENTS +38 DEG. AZ STEERING FILTER WTG: HANNING



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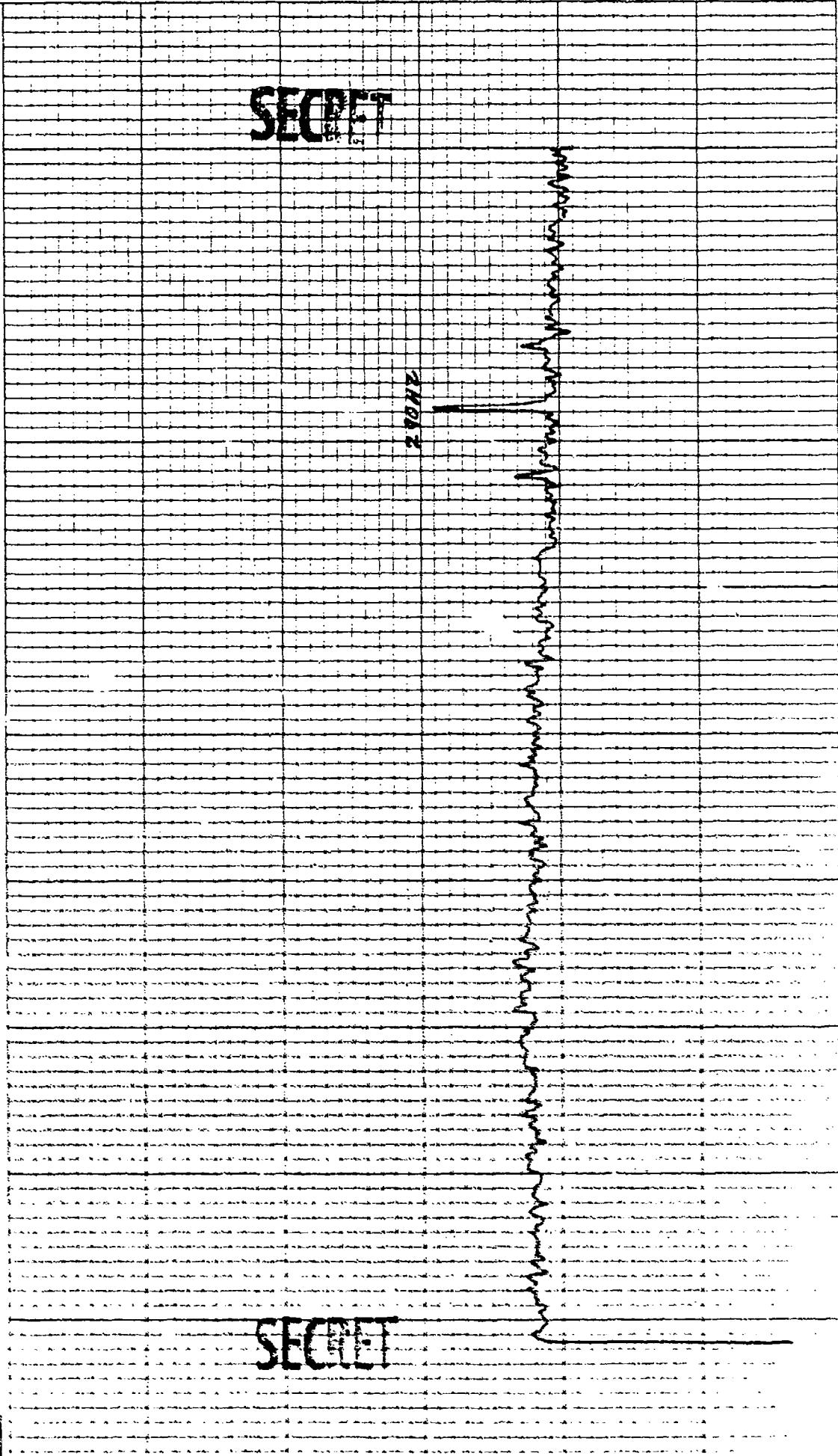
CONTROL: 1140 - 51 (D01A) REEL: A24 INDE X1905
 BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-26-53
 EXERCISE: BEARING STAKE DATE/TIME: 3-6-77-1148 Z INTEGRATION TIME 320 SECS ATTN: -24 DB
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
 5 ELEMENTS 1-59.5 DEG. AZ STEERING



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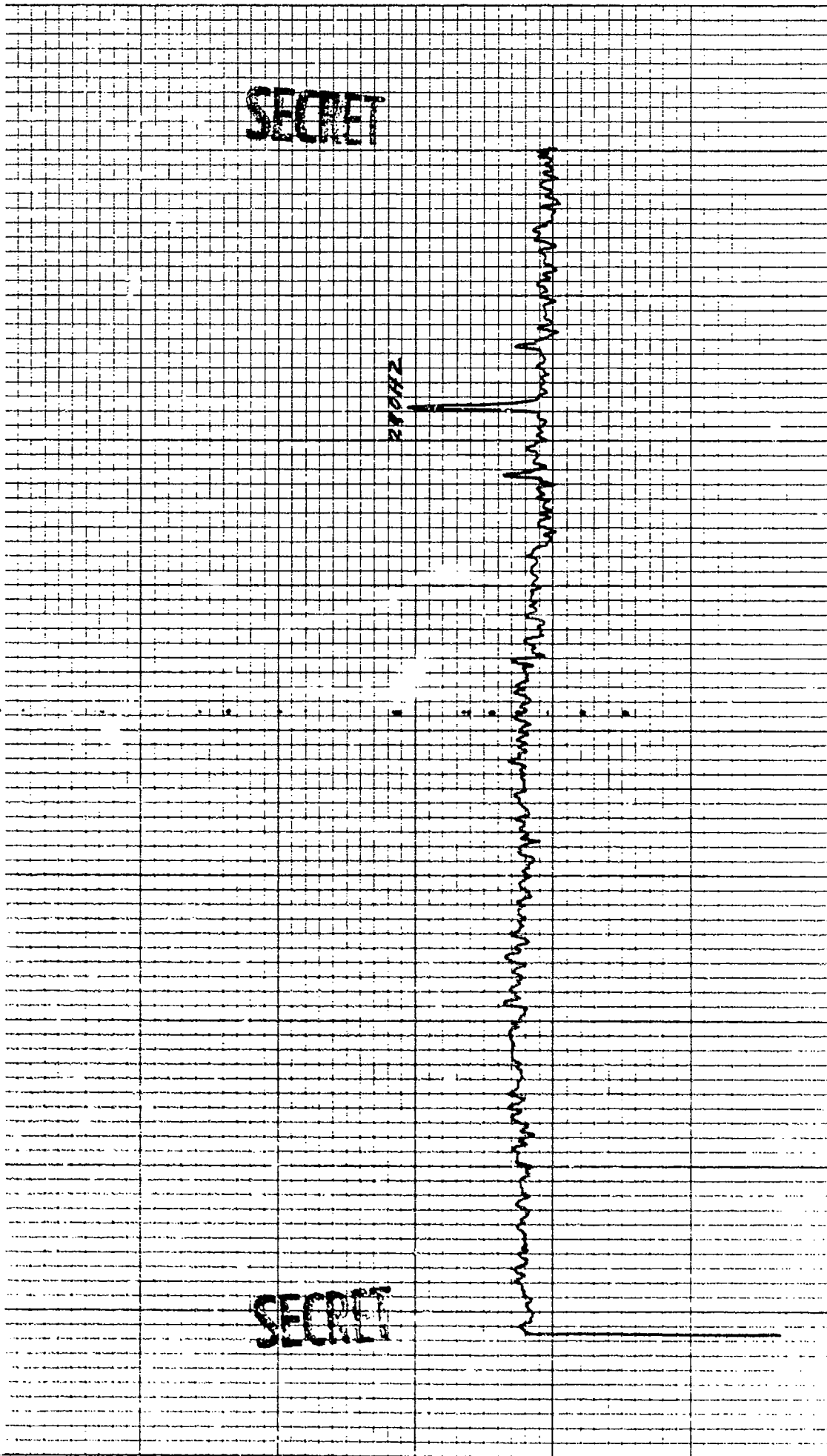
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CONTROL: 1148 - 51 (DP12) DATE OF ANALYSIS: 1-26-53
 BEAMFORMED SPECTRUM(ELEMENTS) REEL: 1824 INDE X1005
 EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTEN: -24 DB
 CENTER FREQ: 270 HZ FILTER WTG: HANNING
 51 ELEMENTS +60 DEG. AZ STEERING ANALYSIS BANDWIDTH: 1/10HZ



CONTROL: 1140 - 51 (DP12) DATE OF ANALYSIS: 1-26-53
BEAMFORMED SPECTRUM (ELEMENTS) ANALYSIS BANDWIDTH: 1/10 HZ
EXERCISE: BEARING STAKE 451 DEG. AZ STEERING
CENTER FREQ: 270 HZ

REEL: N 24 INDE X: 1995
INTEGRATION TIME 320 SECS ATTN: 24 DB
FILTER WTG: HANNING



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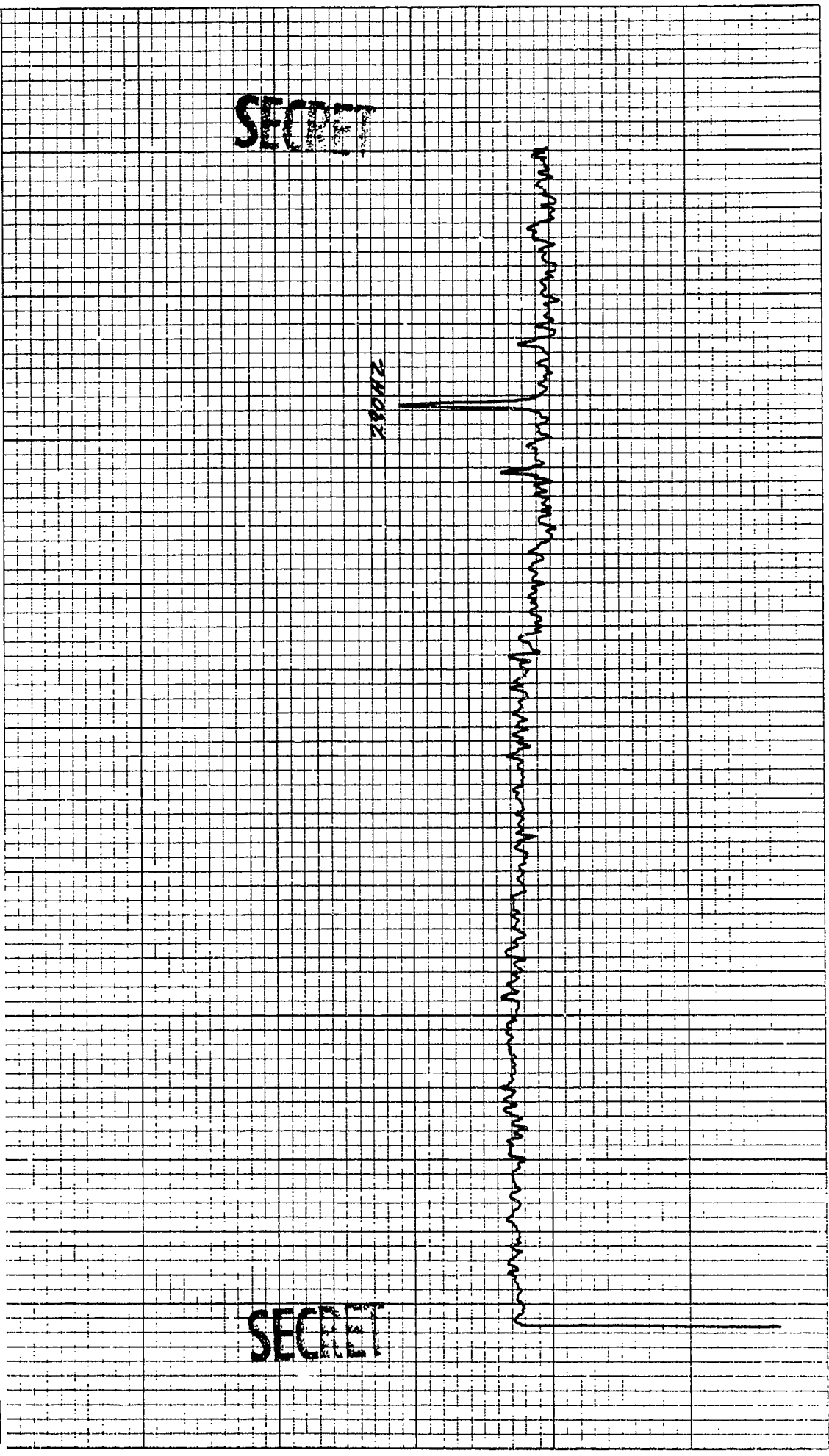
K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
REUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 1148 - 51 (DP12)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
51 ELEMENTS

DATE OF ANALYSIS: 1-26-53
RATE/TIME: 3-6-77 - 1148 Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 62 DEG. AZ STEERING

REEL: M24 INDE X/995
INTEGRATION TIME 320 SECS ATEN: -07 DB
FILTER WTG: HANNING



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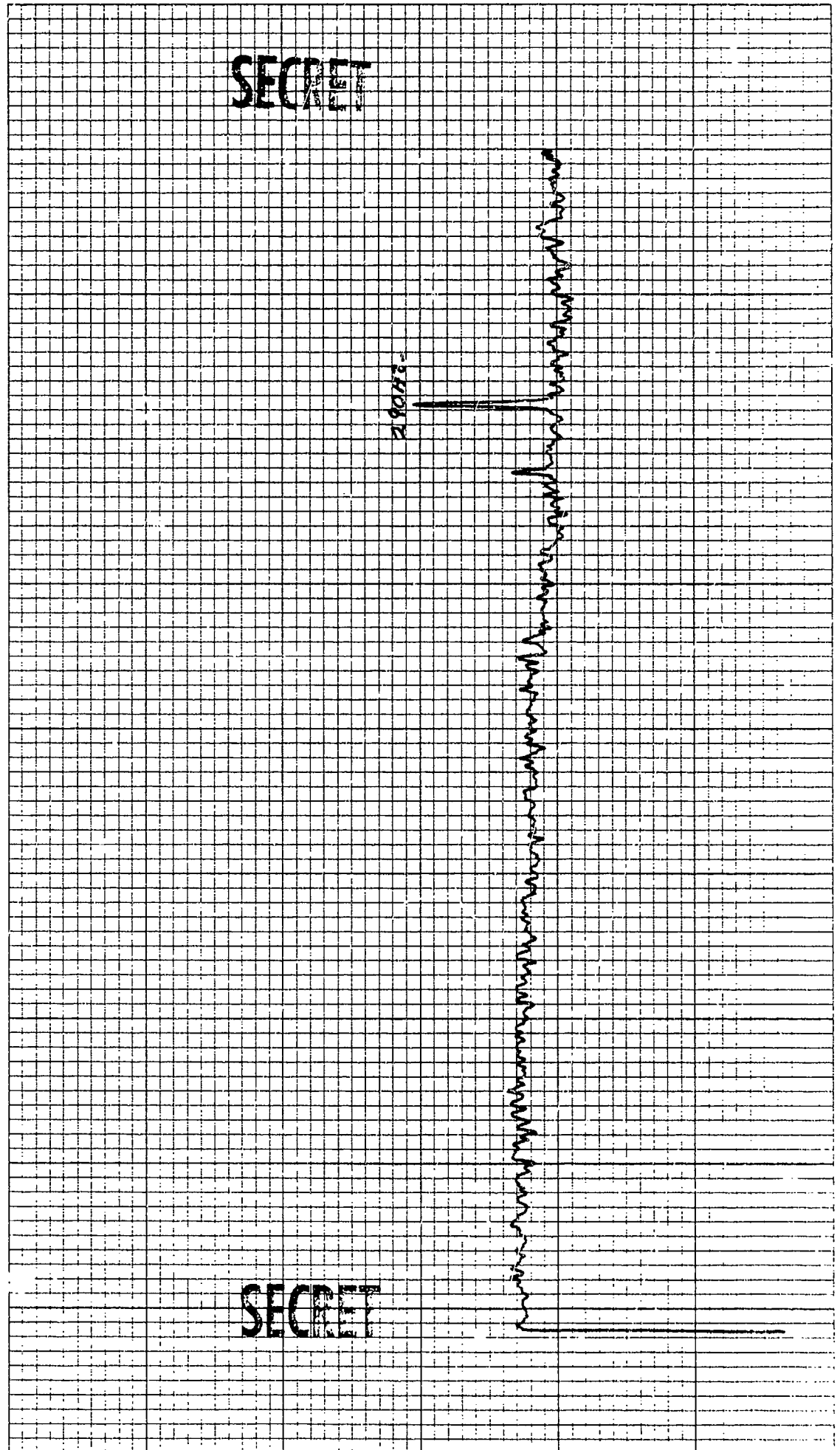
SECRET

P. 51 50

CONTROL: 1146 - 51 (DP12) DATE OF ANALYSIS: 1-26-77 REEL: K24 INDE X 1885
BEAMFORMED SPECTRUM(ELEMENTS 51)
EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 1148 Z INTEGRATION TIME 320 SECS ATTN: 24 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
51 ELEMENTS +63 DEG. AZ STEERING

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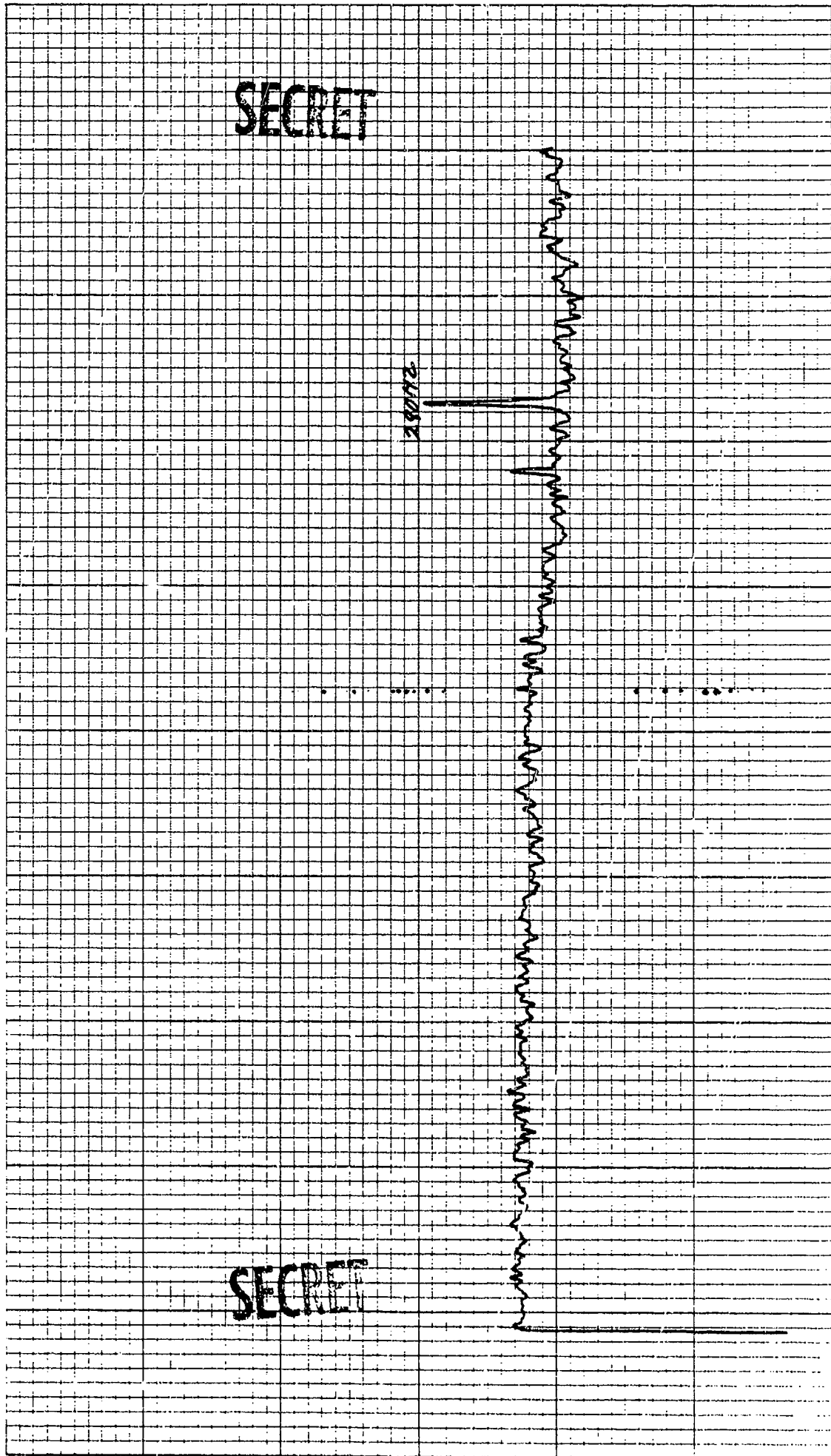


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46 0703

BS1122

CONTROL: 1140 - 51 (0012) DATE OF ANALYSIS: 1-26-88 REEL: H24 INDE X/1995
BEAMFORMED SPECTRUM (ELEMENTS) 88-53 INTEGRATION TIME 320 SECS ATTN: -2Y DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 270 HZ 46Y DEG. AZ STEERING

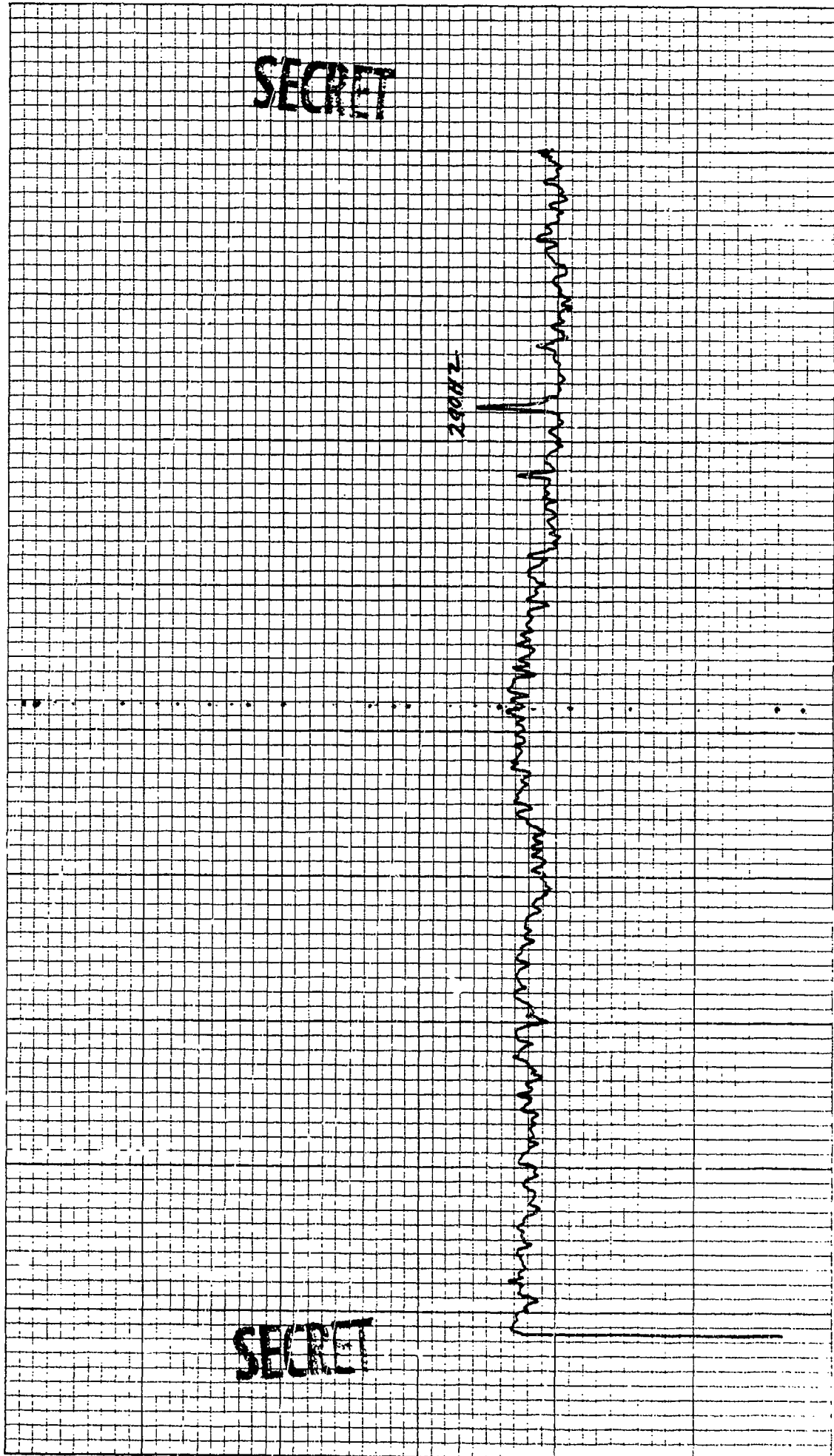


K-2 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

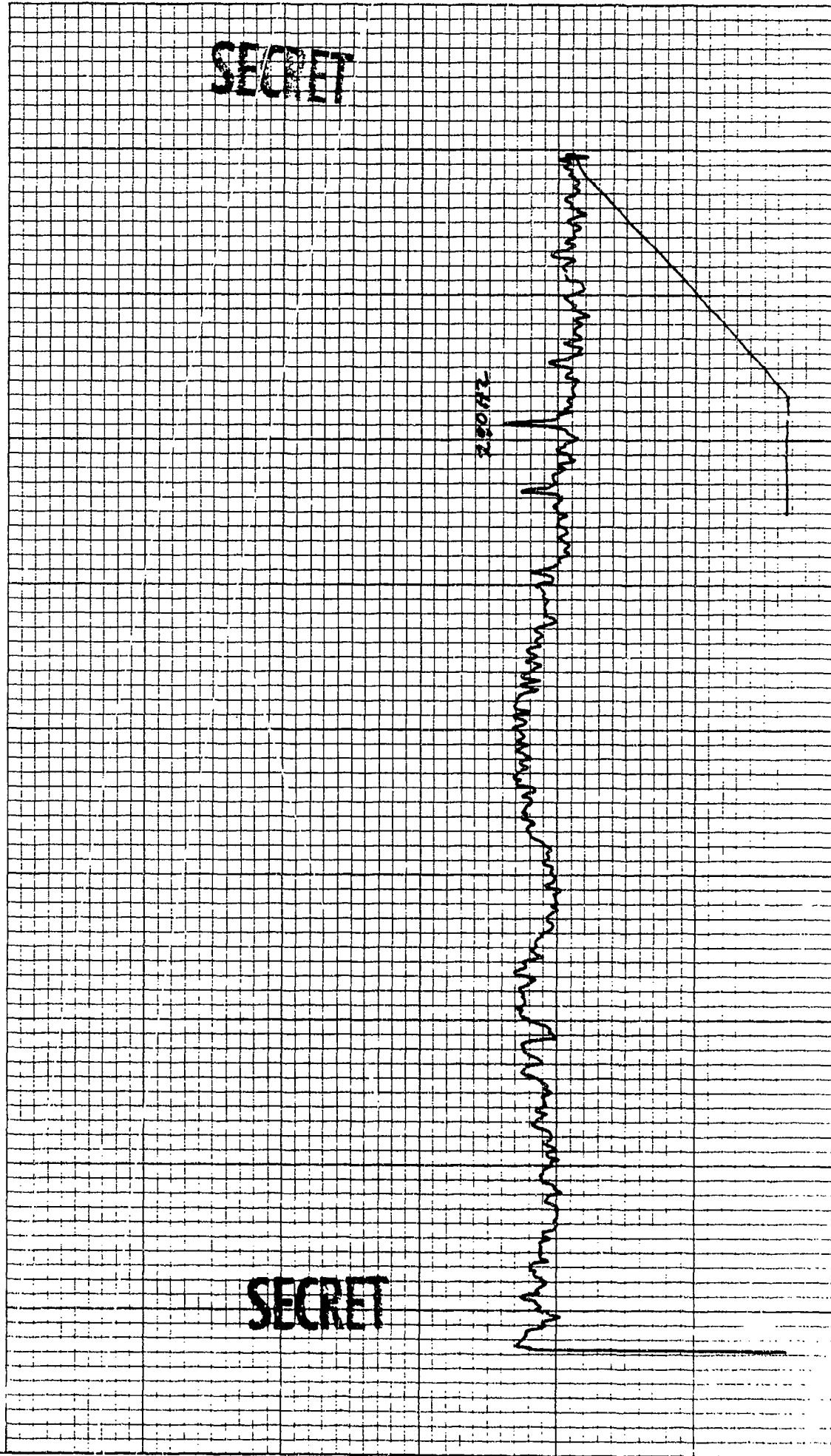
46 0703

1154 24

CONTROL: 1140 - 51 (DP12) DATE OF ANALYSIS: - - REEL: 124 INDE X1995
 BEAMFORMED SPECTRUM (ELEMENTS 1-26 & 28-53)
 EXERCISE: BEARING STAKE DATE/TIME: 3-16-77 - 1140 Z INTEGRATION TIME 320 SECS ATTN: -2Y/DB
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTC: HANNING
51 ELEMENTS 1-66 DEG. AZ STEERING



CONTROL: 1140 - 51 (DP12) DATE OF ANALYSIS: 1 - 26 - 68
BEAMFORMED SPECTRUM (ELEMENTS) REEL: K 24 INDE X 1965
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTEN: -24 DB
CENTER FREQ: 270 HZ FILTER WTG: HANNING
51 ELEMENTS + 68 DEG. AZ STEERING



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7.51123

CONTROL: 11148 - 51 (DPIA) DATE OF ANALYSIS: - - - REEL: M24 INDE X 1995

BEAMFORMED SPECTRUM (ELEMENTS) 1 - 264 88-53) INTEGRATION TIME 320 SECS ATTN: 24 DB

EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING

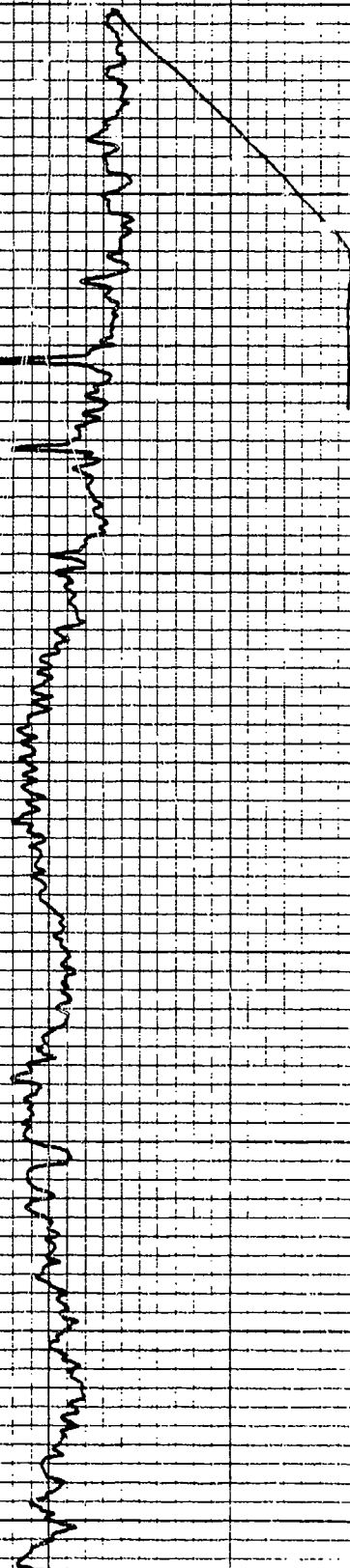
CENTER FREQ: 270 HZ + 70 DEG. AZ STEERING

51 ELEMENTS

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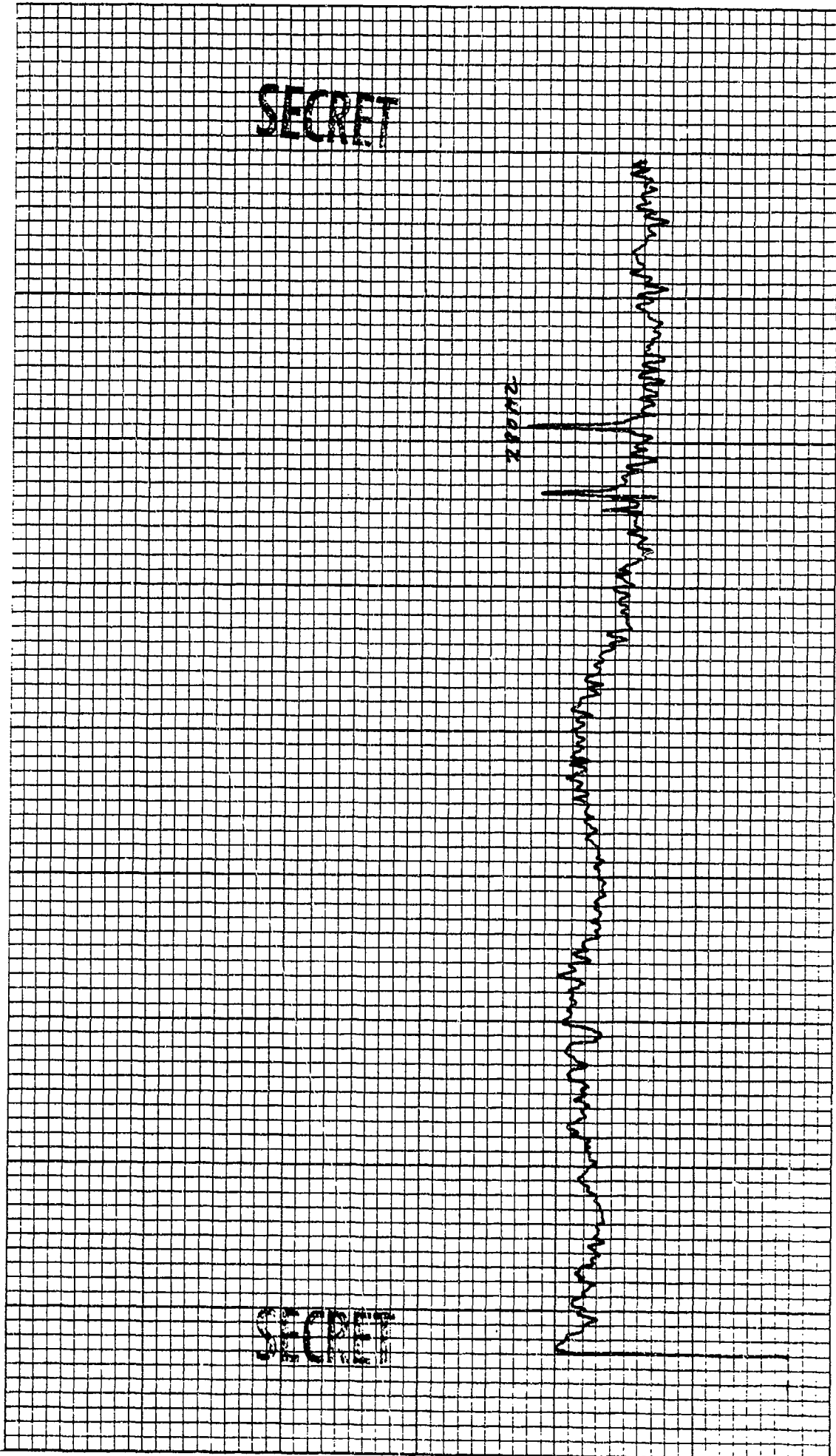
270 HZ



CONTROL: 1140 - 51 (DP12) DATE OF ANALYSIS: ---
BEAMFORMED SPECTRUM (ELEMENTS) 1 - 26 - 29 - 53)
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTEN: -24 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
51 ELEMENTS +72 DEG. AZ STEERING

REEL: 424

INDE X1009



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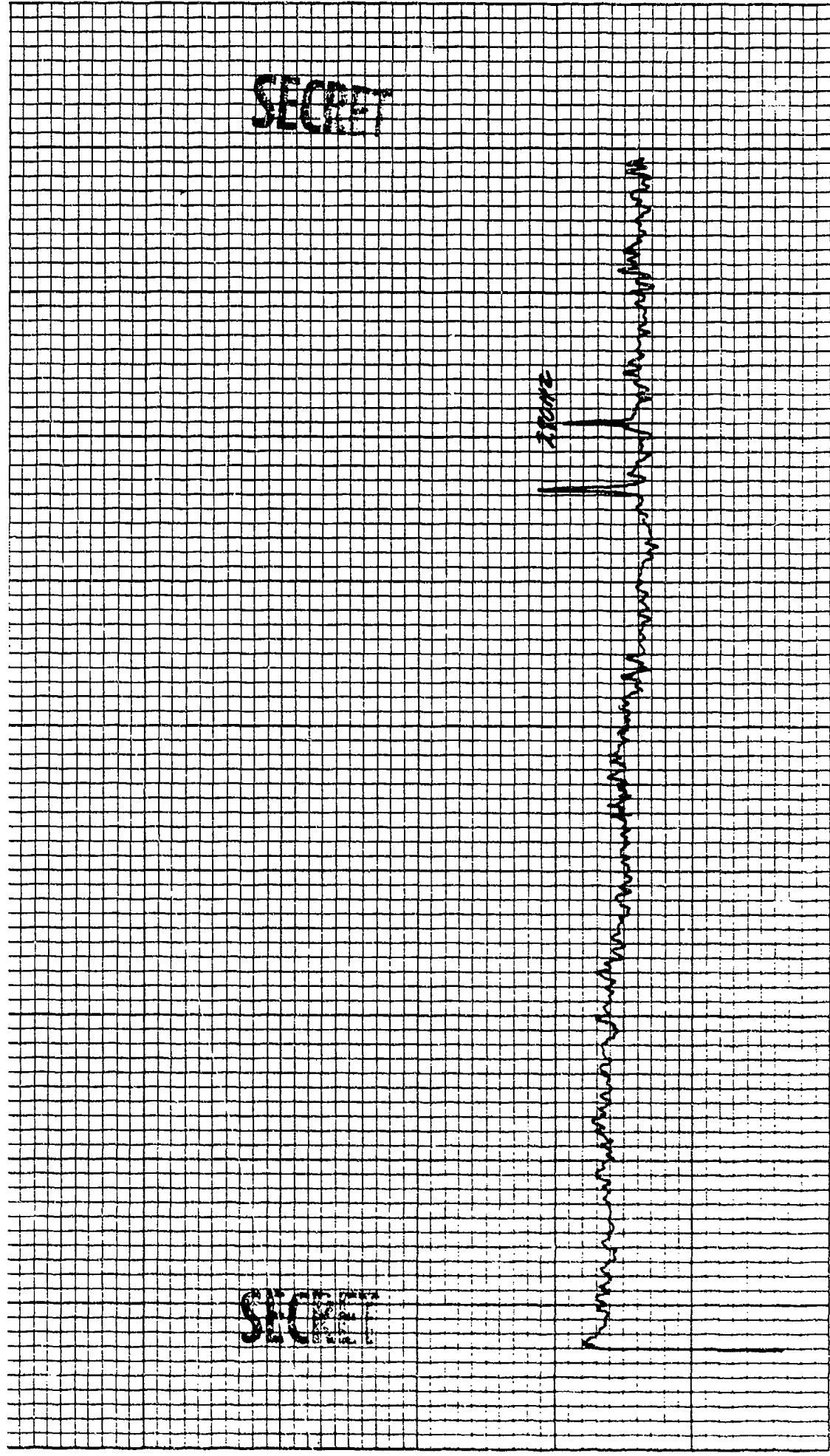
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6

5

CONTROL: 1140 - 51 (D012) DATE OF ANALYSIS: 1-26-53 REEL: M24 INDE X6995
BEAMFORMED SPECTRUM (ELEMENTS) ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: -24DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 270 HZ + 74 DEG. AZ STEERING



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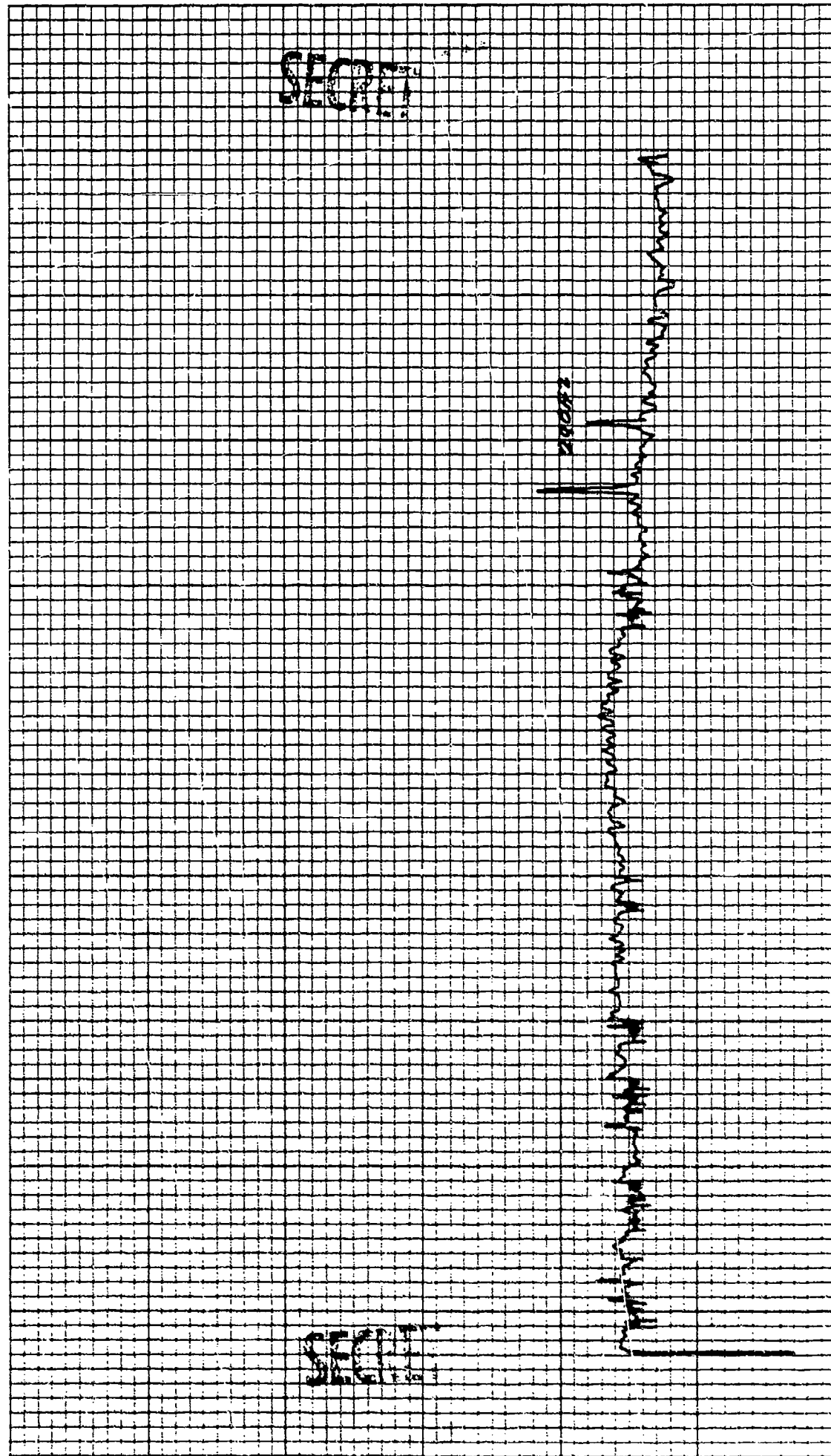
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46 0703

CONTROL: 1148 - 51 (D912) DATE OF ANALYSIS: - -
BEAMFORMED SPECTRUM (ELEMENTS 1-264 98-53)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ
51 ELEMENTS 470 DEG. AZ STEERING

REEL: K24 INDE X 1985
INTEGRATION TIME 320 SECS ATTEN: -34 DB
FILTER WTC: HANNING





DEPARTMENT OF THE NAVY

OFFICE OF NAVAL RESEARCH
875 NORTH RANDOLPH STREET
SUITE 1425
ARLINGTON VA 22203-1995

IN REPLY REFER TO:

5510/1
Ser 321OA/011/06
31 Jan 06

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Subj: DECLASSIFICATION OF LONG RANGE ACOUSTIC PROPAGATION PROJECT
(LRAPP) DOCUMENTS

Ref: (a) SECNAVINST 5510.36

Encl: (1) List of DECLASSIFIED LRAPP Documents

1. In accordance with reference (a), a declassification review has been conducted on a number of classified LRAPP documents.
2. The LRAPP documents listed in enclosure (1) have been downgraded to UNCLASSIFIED and have been approved for public release. These documents should be remarked as follows:

Classification changed to UNCLASSIFIED by authority of the Chief of Naval Operations (N772) letter N772A/6U875630, 20 January 2006.

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3. Questions may be directed to the undersigned on (703) 696-4619, DSN 426-4619.

A handwritten signature in black ink, appearing to read "B. F. Link".

BRIAN LINK
By direction

Subj: DECLASSIFICATION OF LONG RANGE ACOUSTIC PROPAGATION PROJECT
(LRAPP) DOCUMENTS

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Report Number	Personal Author	Title	Publication Source (Originator)	Pub. Date	Current Availability	Class.
Unavailable	Unavailable	SELF-TENSIONING ACOUSTICAL HORIZONTAL LINE ARRAY (SPRAY) DATA ANALYSIS. FINAL REPORT OF BEARING STAKE TESTS JANUARY THRU MARCH 1977. VOLUME IVB. DATA POINTS 10, 11 AND 12 RAW DATA	Sanders Associates, Inc.	790109	ADC017579	U
ARLTR7924	Mitchell, S. K., et al.	ANALYSIS OF ACOUSTIC BOTTOM INTERACTION IN BEARING STAKE (U)	University of Texas, Applied Research Laboratories	790223	ADE001369; NS; ND	U
TIU1886502F	Eichenberger, D.	REPORT FOR CHURCH STROKE II OCEANOGRAPHIC SERVICES	Texas Instruments, Inc.	790326	ADB036751; ND	U
Unavailable	Unavailable	FINAL REPORT, 1 NOVEMBER 1976-31 DECEMBER 1978	Xonics, Inc.	790430	ADB037987	U
Unavailable	Mitchell, T. M.	PREMOBILIZATION OF R/V INDIAN SEAL	Texas Instruments, Inc.	790531	ADB039703	U
Unavailable	Hays, E. E.	ACODAC AMBIENT NOISE PROGRAM	Woods Hole Oceanographic Institution	790601	ADB040404	U
LRAPPR79029	Unavailable	INTRODUCTION TO THE LRAPP ENVIRONMENTAL-ACOUSTIC DATA BANK (U)	Naval Ocean R&D Activity	790601	ADB041066; NS	U
USRD NO. 4807	Unavailable	MEASUREMENTS ON AQUADYNE MODEL AQ-1 ELEMENTS FOR THE UPGRADED LAMBDA ARRAY	Naval Research Laboratory	790802	ND	U
Unavailable	Ellis, G. E.	SUMMARY OF ENVIRONMENTAL ACOUSTIC DATA ANALYSIS	University of Texas, Applied Research Laboratories	790814	ADA073876	U
BR U0048-9C2	Unavailable	TAP III FINAL REPORT (U)	Bunker-Ramo Corp. Electronic Systems Division	790901	ND	U
ORITR1245	Moses, E. J.	OPTIONS, REQUIREMENTS, AND RECOMMENDATIONS FOR AN LRAPP ACOUSTIC ARRAY PERFORMANCE MODEL (U)	ORI, Inc.	790917	NS; ND	U
Unavailable	Colborn, J. G., et al.	EVALUATION OF STANDARD OCEAN CANDIDATES ENVIRONMENTAL ACOUSTIC SUPPORT FOR FLEET OPERATIONS AND NATO	Pacific-Sierra Research Corp.	800301	ADA087304	U
Unavailable	Kirby, W. D.	SUMMARY OF ENVIRONMENTAL ACOUSTIC MEASUREMENTS, MODELING AND ANALYSIS	Science Applications, Inc.	801112	ADB052623	U
Unavailable	Unavailable	SURFACE DUCT, ROUGH SURFACE SCATTERING, AND CUSPED CAUSTIC IMPROVEMENTS FOR FACT	University of Texas, Applied Research Laboratories	801215	ADB053770	U
Unavailable	Renner, W. W., et al.	WIND-GENERATED NOISE MODELING	Science Applications, Inc.	810301	ADA126250	U
Unavailable	Wilson, J. H.	TOWED ARRAY PERFORMANCE PREDICTION SYSTEM - VERSION 1.2	Science Applications, Inc.	810401	ADA190143	U
Unavailable	Goit, E. H.	FINAL REPORT	Science Applications, Inc.	810701	ADB059397	U
3	Unavailable	FINAL REPORT	University of Texas, Applied Research Laboratories	810721	ND	U