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AUTHORITY

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VOLUME IVA

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

LEVEL III

FINAL REPORT OF BEARING STAKE TESTS

JANUARY THRU MARCH 1976

Volume IVA, Data Points 7, 8 and 9
Raw Data

9 JANUARY 1979

Distribution limited to U.S. Gov't. agencies
Proprietary Info.; 1 Feb 79. Other
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NAVAL AIR DEVELOPMENT CENTER

WARMINSTER, PENNSYLVANIA 18974

UNDER CONTRACTS

N62269-77-C-0139

N62269-78-M-6884

NATIONAL SECURITY INFORMATION
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SANDERS ASSOCIATES, INC.
OCEAN SYSTEMS DIVISION
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Classification Reviewed & Approved
By

R. L. Townsend 10 Jan 1979
R. L. Townsend Date

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Exemption Category 3
Declassify on 31 Dec 1989

SAI DOCUMENT CONTROL #
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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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- 3.0 Data Point 7 2-8-77 0202Z (16 Element Beamformed Data)
FRAZ Recording
Signal Level and SNR Calculations
Signal Gain Array Gain Calculations
Beamformed ALIU Plots

- 4.0 Data Point 7 2-8-77 0202Z (32 Element Beamformed Data)
Signal Level and SNR Calculations
Signal Gain and Array Gain Calculations
Beamformed ALIU Plots

- 5.0 Data Point 7 2-8-77 0202Z (52 Element Beamformed Data)
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- 6.0 Data Point 8 3-15-77 1501Z (Single Element Data)
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FRAZ Recording
Signal Level and SNR Calculations
Signal Gain and Array Gain Calculations
Beamformed ALIU Plots

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- 8.0 Data Point 8 3-15-77 1501Z (32 Element Beamformed Data)
 - Signal Level and SNR Calculations
 - Signal Gain and Array Gain Calculations
 - Beamformed ALIU Plots

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 - Signal Gain and Array Gain Calculations
 - Beamformed ALIU Plots

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 - Omni Signal Levels vs. Element Position Number Plots
 - Omni ALIU Plots

- 11.0 Data Point 9 3-15-77 2131Z (16 Element Beamformed Data)
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 - Signal Gain and Array Gain Calculations
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- 12.0 Data Point 9 3-15-77 2131Z (32 Element Beamformed Data)
 - Signal Level and SNR Calculations
 - Signal Gain and Array Gain Calculations
 - Beamformed ALIU Plots

- 13. Data Point 9 3-15-77 2131Z (51 Element Beamformed Data)
 - Signal Level and SNR Calculations
 - Signal Gain and Array Gain Calculations
 - Beamformer ALIU Plots

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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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SUMMARY OF DATA (CONTINUED)

• OMNI NOISE LEVELS

19 JANUARY 1977 DATA POINT 1

290 Hz +64.6 dBre μ Pa/1 Hz
295 Hz +64.2 dBre μ Pa/1 Hz

19 JANUARY 1977 DATA POINT 2

290 Hz +64.7 dBre μ Pa/1 Hz
295 Hz +65.4 dBre μ Pa/1 Hz

7 FEBRUARY 1977 DATA POINT 3

140 Hz +74.5 dBre μ Pa/1 Hz
290 Hz +67.5 dBre μ Pa/1 Hz

7 FEBRUARY 1977 DATA POINT 4

140 Hz +73.3 dBre μ Pa/1 Hz
290 Hz +65.6 dBre μ Pa/1 Hz

7 FEBRUARY 1977 DATA POINT 5

140 Hz +76.6 dBre μ Pa/1 Hz
290 Hz +68.4 dBre μ Pa/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

DATA POINT 12

+72.0 dBre μ Pa/1 Hz
+65.5 dBre μ Pa/1 Hz

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OPERATIONAL DATA

O M N I

DATE	RANGE	DEPTH	AVE. SIGNAL LEVEL (dB)	AVE. NOISE LEVEL (dB)	BANDWIDTH (kHz)	ARRAY CENTER ELEVATION (deg)	ARRAY CENTER AZIMUTH (deg)	SNR	LINEAR SCALE CORRECTION	CORRECTED SNR
1	DATE: 1-15-77 TIME: 1531Z RANGE: 910M 290HZ DEPTH: 1650FM 296HZ		-487 -513	-567 -571	-18 -18	+15 +15	+0 +0	70 78	-18 -50	+22 -20
2	DATE: 1-17-77 TIME: 1602Z RANGE: 910M 290HZ DEPTH: 1650FM 295HZ		-515 -512	-566 -569	-18 -18	+15 +15	+0 +0	50 47	-52 -54	-2 -7
3	DATE: 2-27-77 TIME: 0930Z RANGE: 1750M 140HZ DEPTH: 1900FM 260HZ		-325 -326	-467 -487	-18 -18	+10 +10	+12 +0	152 101	-42 -43	90 56
4	DATE: 2-27-77 TIME: 0118Z RANGE: 1570M 140HZ DEPTH: 1900FM 260HZ		-344 -396	-469 -506	-18 -18	+10 +10	+12 +0	125 110	-42 -42	83 69
5	DATE: 2-27-77 TIME: 1549Z RANGE: 1100M 140HZ DEPTH: 1900FM 260HZ		-300 -371	-435 -478	-18 -18	+10 +10	+12 +0	135 147	-42 -42	93 105
6	DATE: 2-27-77 TIME: 2032Z RANGE: 700M 140HZ DEPTH: 1900FM 260HZ		-247 -210	-492 -473	-18 -18	+10 +10	+12 +0	195 243	-46 -40	155 203

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PAGE	OPERATIONAL DATA	Avg SIGNAL LEVEL (dBV)	Avg. ROUTE LEVEL (dBV)	BAUD-RATE (KCP/S)	BAUD-WIDTH (KHZ)	CONV. LOSS (DB)	AREA SEUSITIVITY	AREA CONV. LOSS	SNR	CAMERA CORR. LOSS	CONCERT CD SNR
7	DATE: 2-15-77 TIME: 0102Z RANGE: 28 NM, 140 MZ DEPTH: 1800 FM, 280 MZ	-16.0 -17.5	-20.1 -24.0	-1.8 -1.8	+10 +10	+10 +10	+12 +8	+100 +100	34.1 36.5	-4.0 -4.0	70.1 72.5
8	DATE: 2-15-77 TIME: 1501Z RANGE: 28 NM, 140 MZ DEPTH: 2800 FM, 280 MZ	-19.4 -15.2	-32.9 -34.6	-1.8 -1.8	+10 +10	+10 +10	+12 +8	+100 +100	33.3 39.4	-4.0 -4.0	29.5 35.4
9	DATE: 2-15-77 TIME: 2131Z RANGE: 28 NM, 140 MZ DEPTH: 2800 FM, 280 MZ	-19.4 -12.5	-32.0 -31.0	-1.8 -1.8	+10 +10	+10 +10	+12 +8	+100 +100	36.6 38.5	-4.0 -4.0	72.6 74.5
10	DATE: 2-16-77 TIME: 0633Z RANGE: 122 NM, 140 MZ DEPTH: 2800 FM, 280 MZ	-23.3 -38.0	-44.0 -51.6	-1.8 -1.8	+10 +10	+10 +10	+12 +8	+100 +100	22.7 13.6	-4.0 -4.2	18.7 9.4
11	DATE: 2-16-77 TIME: 0935Z RANGE: 122 NM, 140 MZ DEPTH: 2800 FM, 280 MZ	-29.9 -41.5	-50.0 -54.0	-1.8 -1.8	+10 +10	+10 +10	+12 +8	+100 +100	24.2 12.5	-4.0 -4.2	16.2 8.3
12	DATE: 2-16-77 TIME: 1148Z RANGE: 122 NM, 140 MZ DEPTH: 2800 FM, 280 MZ	-24.8 -36.6	-48.2 -50.7	-1.8 -1.8	+10 +10	+10 +10	+12 +8	+100 +100	23.4 12.1	-4.0 -4.2	19.4 7.9

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16 ELEMENT ARRAY

OPERATIONAL DATA	ELEMENT												ARRAY								
	SIGMA LEVEL DBV	MCV-32 CAL. TIME	MCV-32 CORR. TIME	MCV-32 CORR. TIME	MCV-32 CORR. TIME	MCV-32 CORR. TIME	MCV-32 CORR. TIME	MCV-32 CORR. TIME	MCV-32 CORR. TIME	MCV-32 CORR. TIME	MCV-32 CORR. TIME	MCV-32 CORR. TIME	MCV-32 CORR. TIME	MCV-32 CORR. TIME	MCV-32 CORR. TIME	MCV-32 CORR. TIME	MCV-32 CORR. TIME	MCV-32 CORR. TIME	MCV-32 CORR. TIME		
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1 DATE: 1-1-77 TIME: 1500Z RANGE: 1000M 200MB DEPTH: 1000M 200MB	-304 -680	0 0	0 0	0 0	0 0	-324 -408	20 20	-501 -501	-301 -301	0 0	0 0	0 0	0 0	0 0	0 0	0 0	17.7 9.3	-9.1 -4.4	10.3 5.8	-33.1 -20.1	0 0
2 DATE: 1-1-77 TIME: 1500Z RANGE: 1000M 200MB DEPTH: 1000M 200MB	-371 -287	0 0	0 0	0 0	0 0	-371 -287	0 0	-446 -446	-446 -446	NA NA	0 0	0 0	0 0	0 0	0 0	0 0	7.5 5.9	-9.8 -9.0	7.6 7.8	-56.5 -58.5	0 0
3 DATE: 1-1-77 TIME: 0200Z RANGE: 1000M 100MB DEPTH: 1000M 200MB	-312 -416	0 0	0 0	0 0	0 0	-312 -416	20 20	-310 -310	-310 -310	0 0	0 0	0 0	0 0	0 0	0 0	0 0	23.6 23.3	-4.0 -4.0	19.8 20.1	35.5 35.5	23.8 24.1
4 DATE: 1-1-77 TIME: 1500Z RANGE: 1000M 100MB DEPTH: 1000M 200MB	-314 -462	0 0	0 0	0 0	0 0	-314 -462	20 20	-271 -271	-271 -271	0 0	0 0	0 0	0 0	0 0	0 0	0 0	15.7 20.0	-4.2 -4.0	11.7 17.2	38.5 38.5	15.9 21.2
5 DATE: 1-1-77 TIME: 1500Z RANGE: 1000M 100MB DEPTH: 1000M 200MB	-290 -374	0 0	0 0	0 0	0 0	-290 -374	20 20	-321 -321	-321 -321	0 0	0 0	0 0	0 0	0 0	0 0	0 0	31.1 31.4	-4.0 -4.0	27.3 27.3	46.0 46.0	31.3 31.3
6 DATE: 1-1-77 TIME: 2030Z RANGE: 1000M 100MB DEPTH: 1000M 200MB	-287 -253	0 0	0 0	0 0	0 0	-287 -253	20 20	-247 -247	-247 -247	0 0	0 0	0 0	0 0	0 0	0 0	0 0	38 26.9	-4.0 -4.0	24.2 33.5	17.0 17.0	28.2 37.5

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

DATA POINT 7 DATE 2-8-77 TIME 0202Z

FREQUENCY 140 HZ

INDICATED NOISE LEVEL $\frac{\text{dBV}}{\text{ABW}}$ 110

-50.1

SYSTEM SENSITIVITY $\text{dB}/\mu\text{B}$

-(-12) - -38.1

BANDWIDTH CONVERSION TO 1 HZ BAND

+8.2 - -29.9

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

+100 - +70.1

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

DATA POINT 7 DATE 2-8-77 TIME 0202Z

FREQUENCY 290 HZ

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

-54.0

SYSTEM SENSITIVITY $\text{dB}/\mu\text{B}$

-(-8) = -46.0

BANDWIDTH CONVERSION TO 1 HZ BAND

+8.2 = -37.8

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

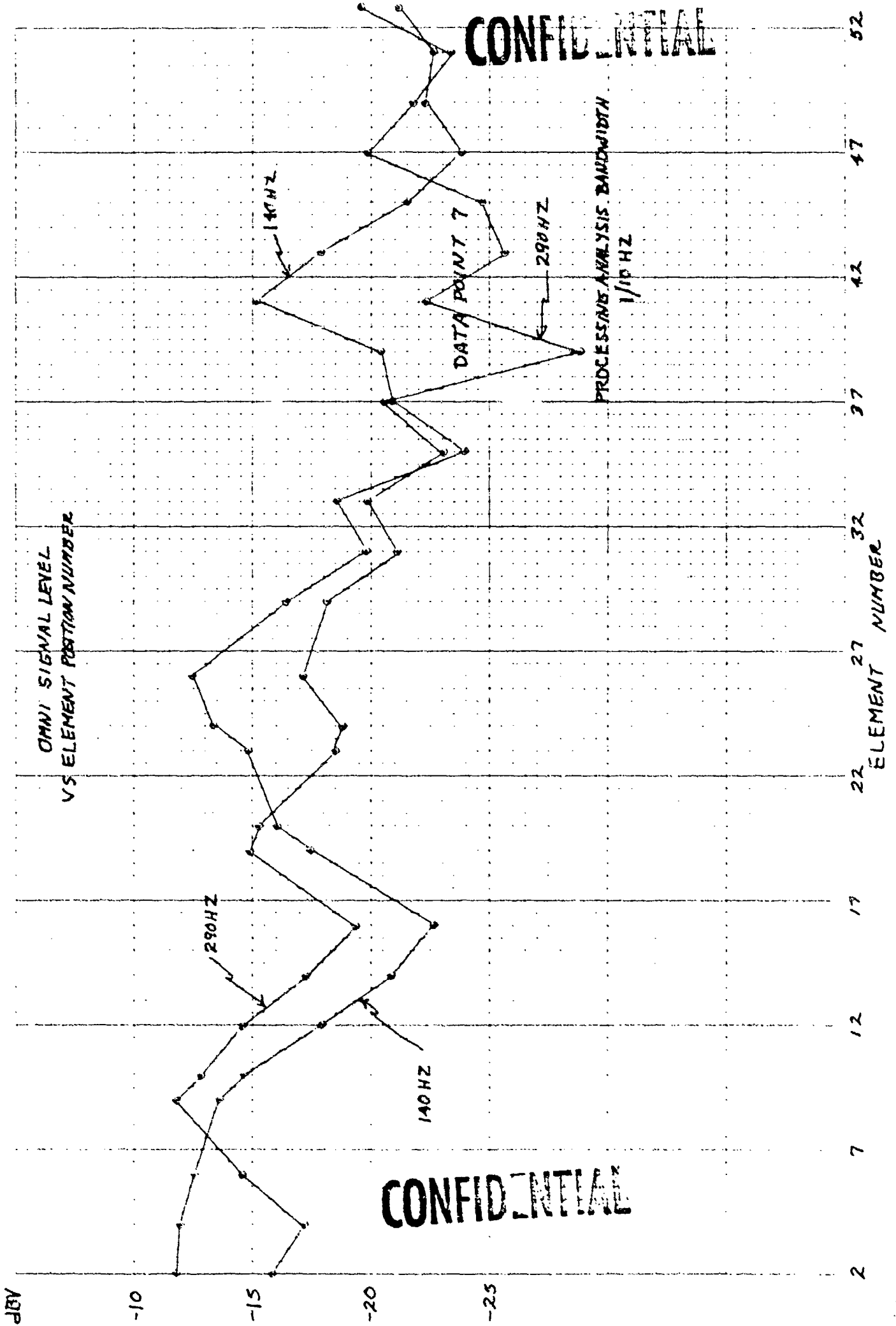
+100 = +62.2

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FIG. 2. SIGNAL LEVEL VS. ELEMENT POSITION



46 0703

REF: 2-8-77 09:00:00

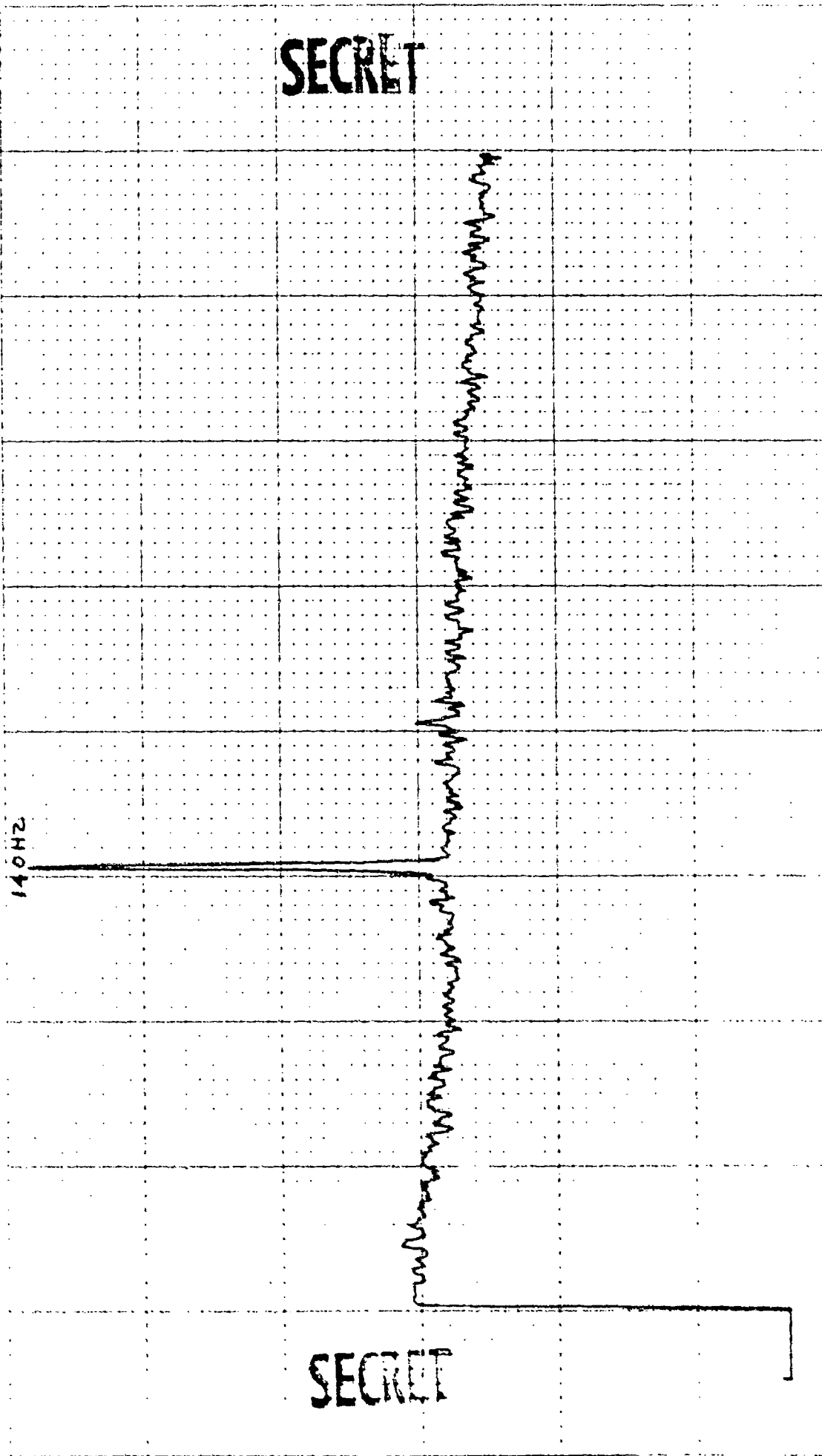
REEL: F29 INDEX: 1/45

DATE OF ANALYSIS:

CONTROL: 2-8-0202 (27)
OMNI SPECTRUM (ELEMENT 2)
EXERCISE: BEARING: STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE/TIME: 2-8-77 - 0202 Z
ANALYSIS BANDWIDTH: 1710 HZ
 DEG AZ STEERING

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING



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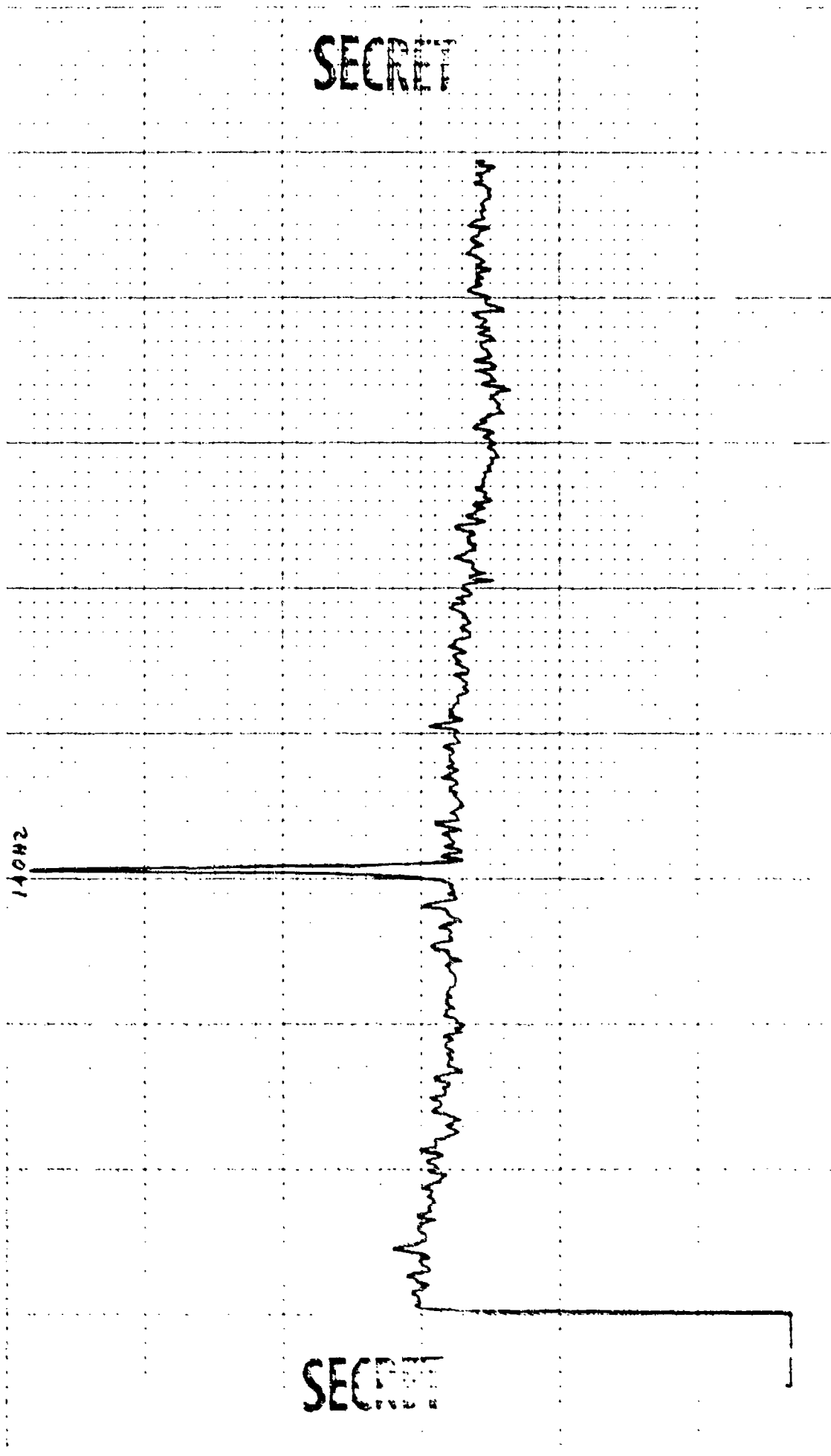
46 0703

REEL: F29 INDEX 1145

DATE OF ANALYSIS:
DATE/TIME: 2-8-77 -0202 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

CONTROL: 2-8 -0202 (28)
OMNI SPECTRUM (ELEMENT 4)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

INTEGRATION TIME 320 SECS ATTEN: DB
FILTER WIG: HANNING



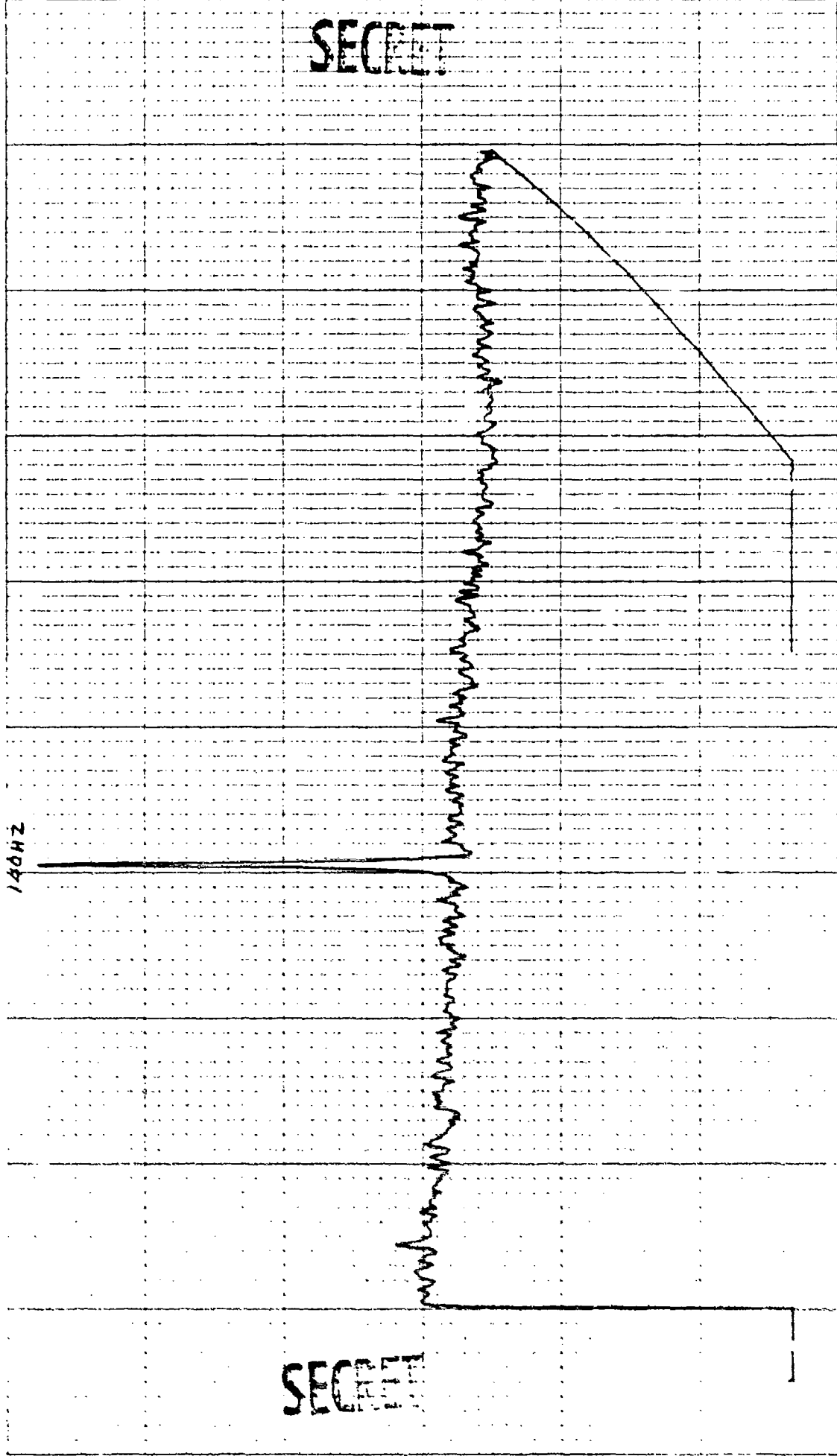
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(SEE SPECTRUM CENTER FREQUENCY)

CONTROL: Q202 - 5/ (DPT) DATE OF ANALYSIS: REEL: F29 INDEX: 145
 OMNI SPECTRUM (ELEMENT 6) DATE/TIME: 2-8-77 - 0202Z
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: - DB
 CENTER FREQ: 150 HZ - DEG AZ STEERING FILTER WTC: HANNING



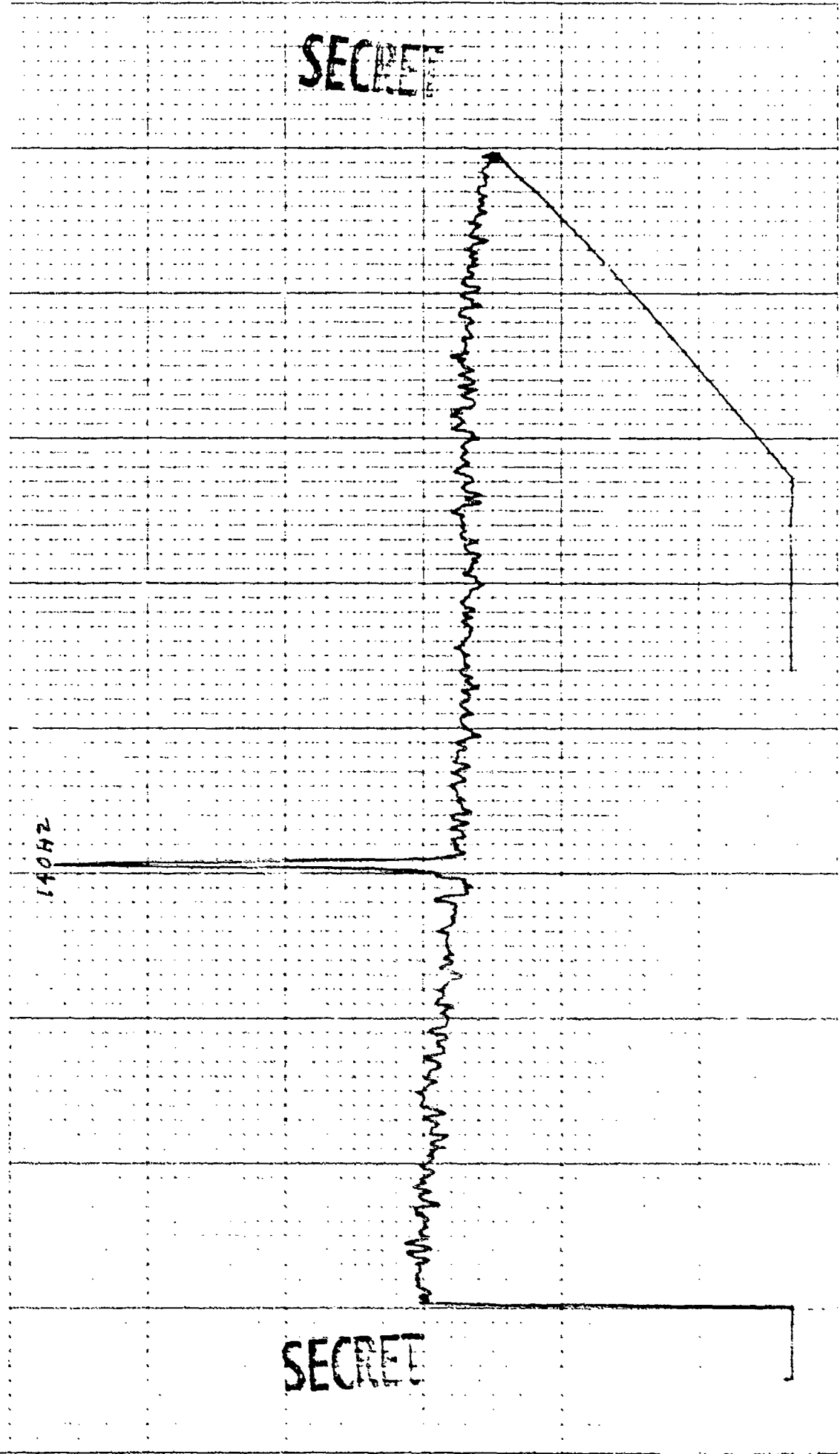
CONTROL: 2-B - 0202 (30)
OMNI SPECTRUM (ELEMENT 9)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 - 0202 Z
ANALYSIS BANDWIDTH: 1/10% Z
DEG AZ STEERING:

REEL: F29 INDEX 1145

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



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102 3 00 2 00 0 02

REEL: F29 INDEX 1145

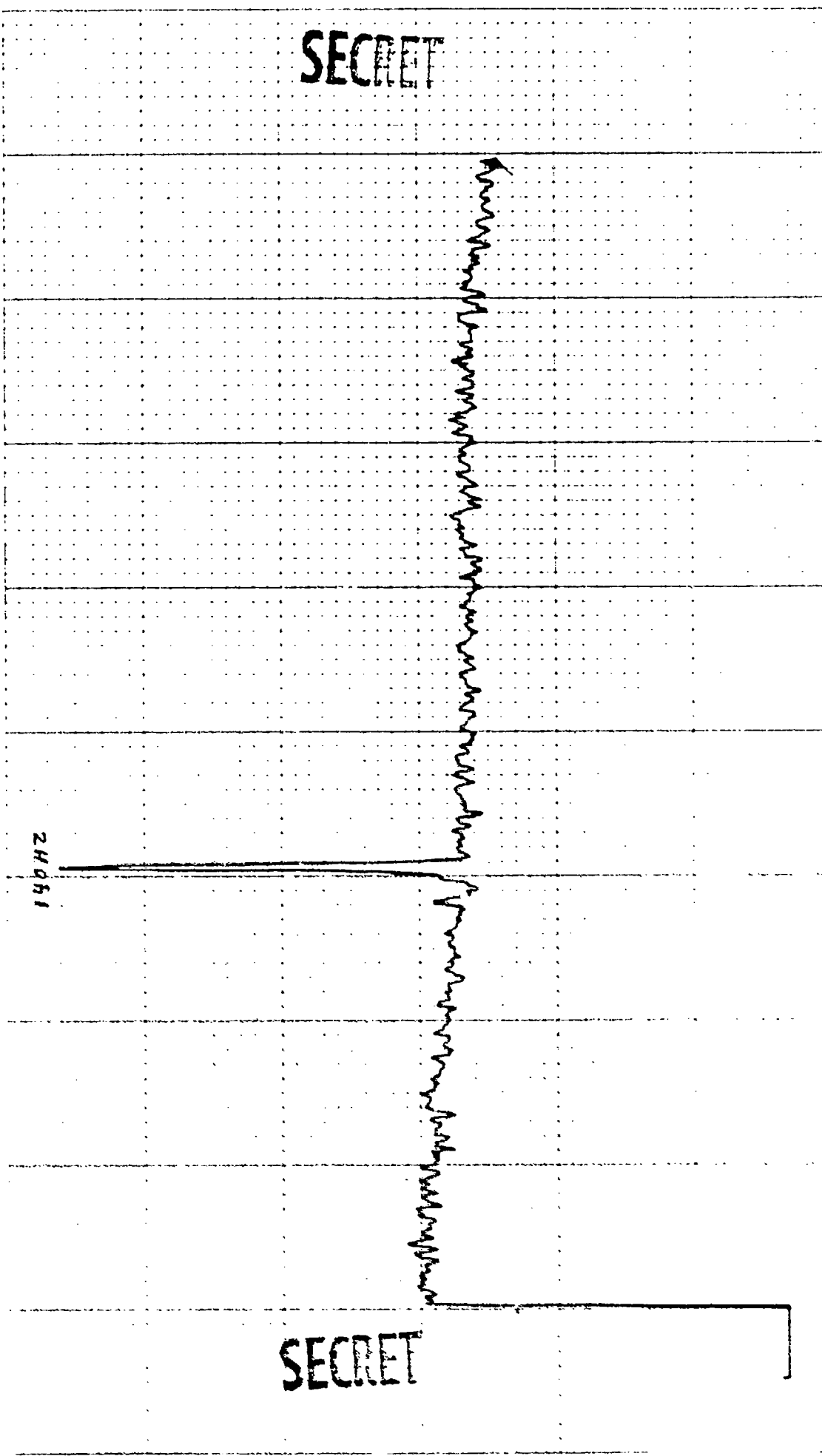
CONTROL: 2-8 - 0202 (J1)
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 - 0202 Z

ANALYSIS BANDWIDTH: 1/10 HZ
--- DEG AZ STEERING

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



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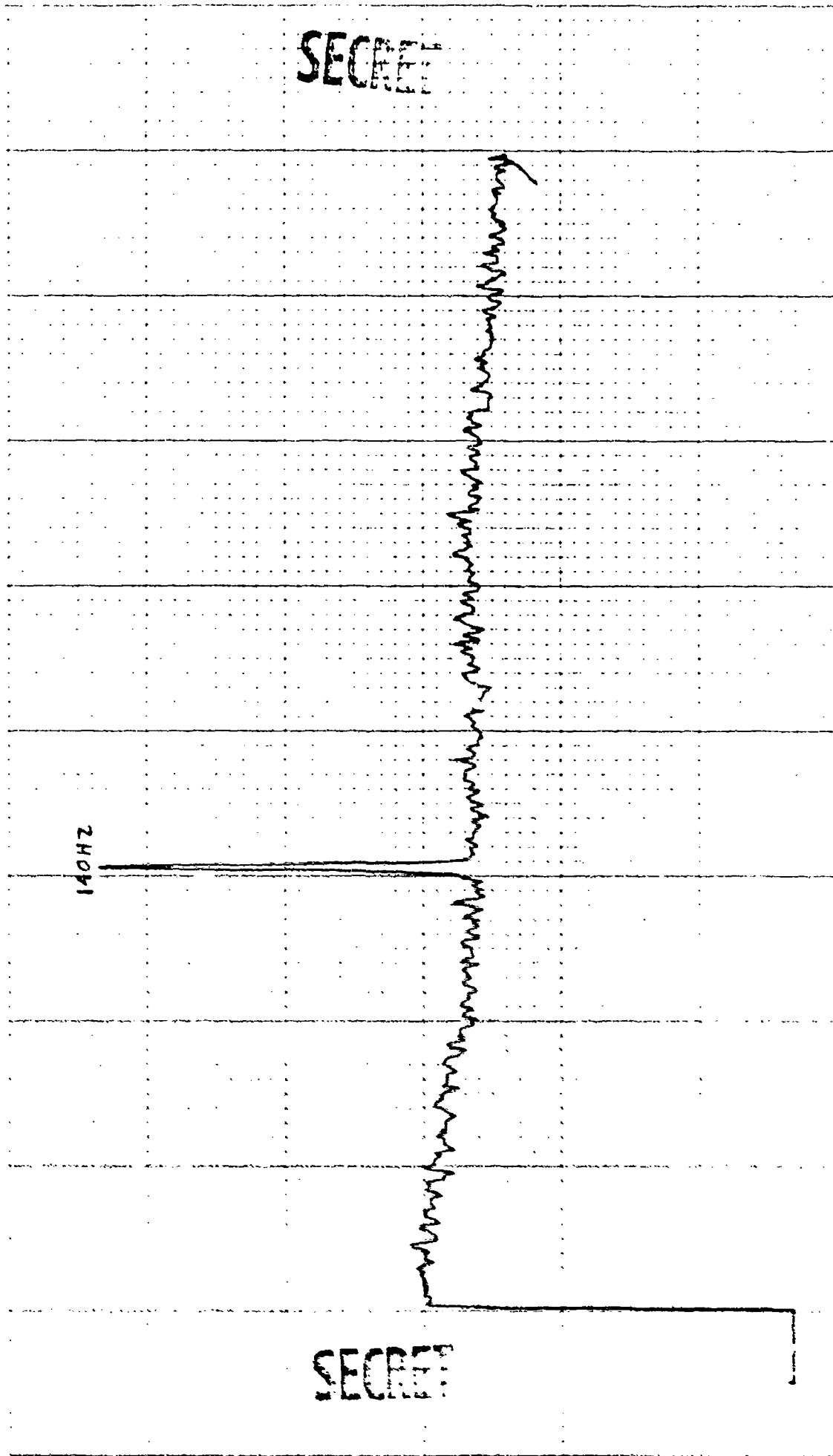
46 0703

REEL: F29 INDEX 1145

DATE OF ANALYSIS:
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
1 DEG AZ STEERING

CONTROL: 2-8 - 0202 (32)
OMNI SPECTRUM (ELEMENT 12)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

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



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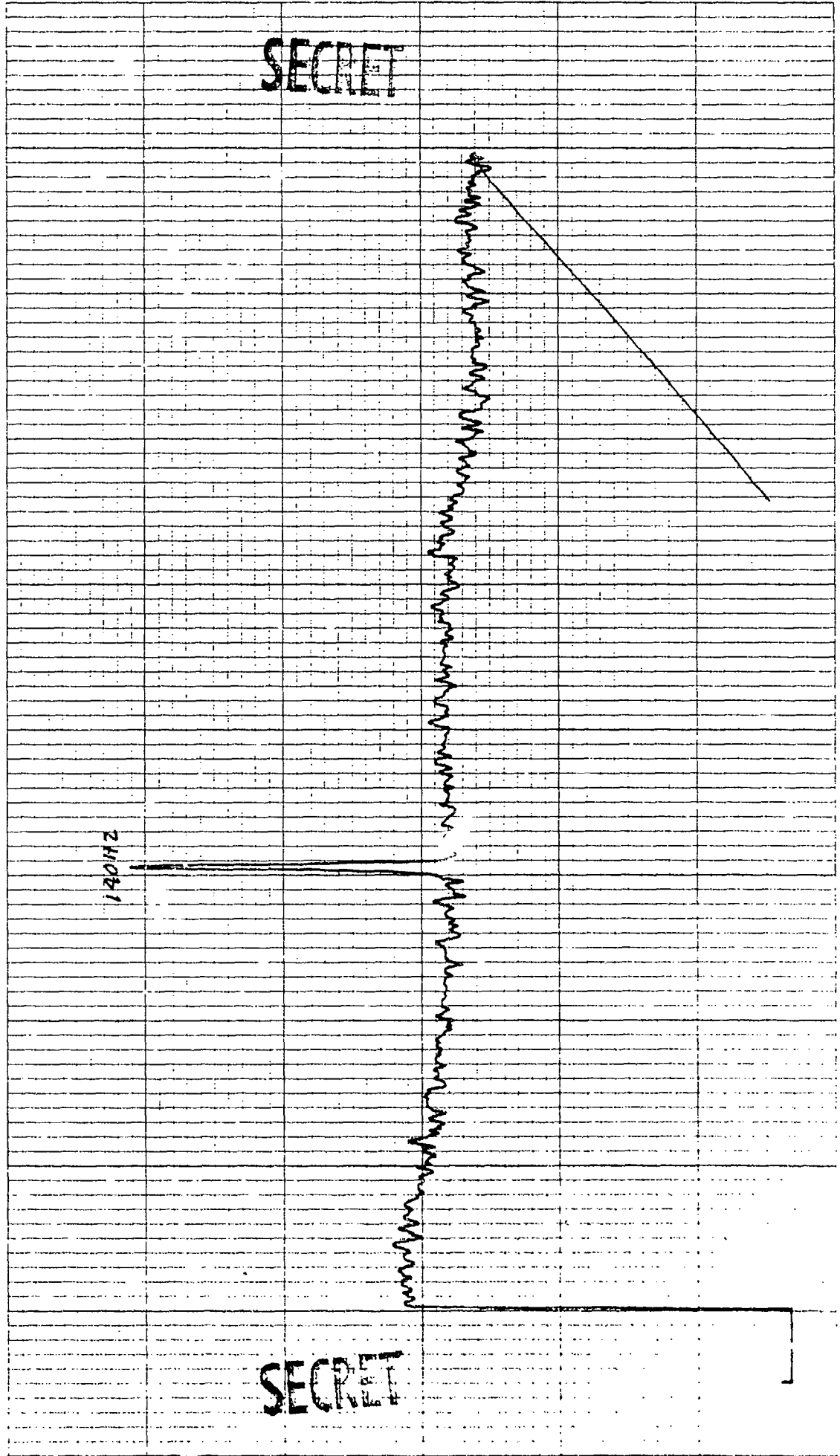
CONTROL: 2-8 -0202 (33)
OMNI SPECTRUM (ELEMENT 14)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 -0202 Z
ANALYSIS BANDWIDTH: 1/10HZ
 DEG AZ STEERING

REEL: F29 INDEX: 1145

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



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CONTROL: 2-8 -0202 (34)
QMI SPECTRUM/ELEMENT 16)
EXERCISE: BEARING STAVE
CENTER FREQ: 150 HZ
ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 -0202Z

ANALYSIS BANDWIDTH: 1/19HZ
DEC AZ STEERING

REEL: F29

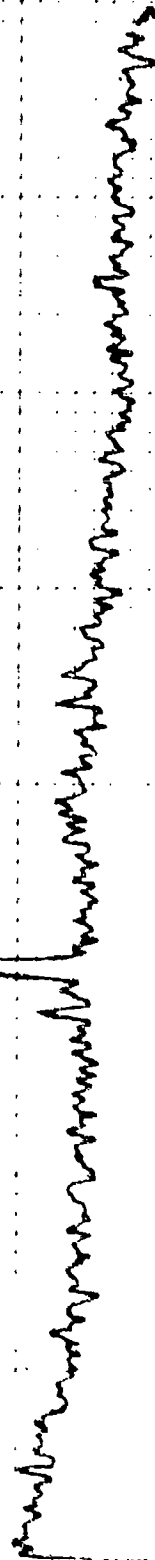
INDEX 1145

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

140HZ

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REF ID: A66666

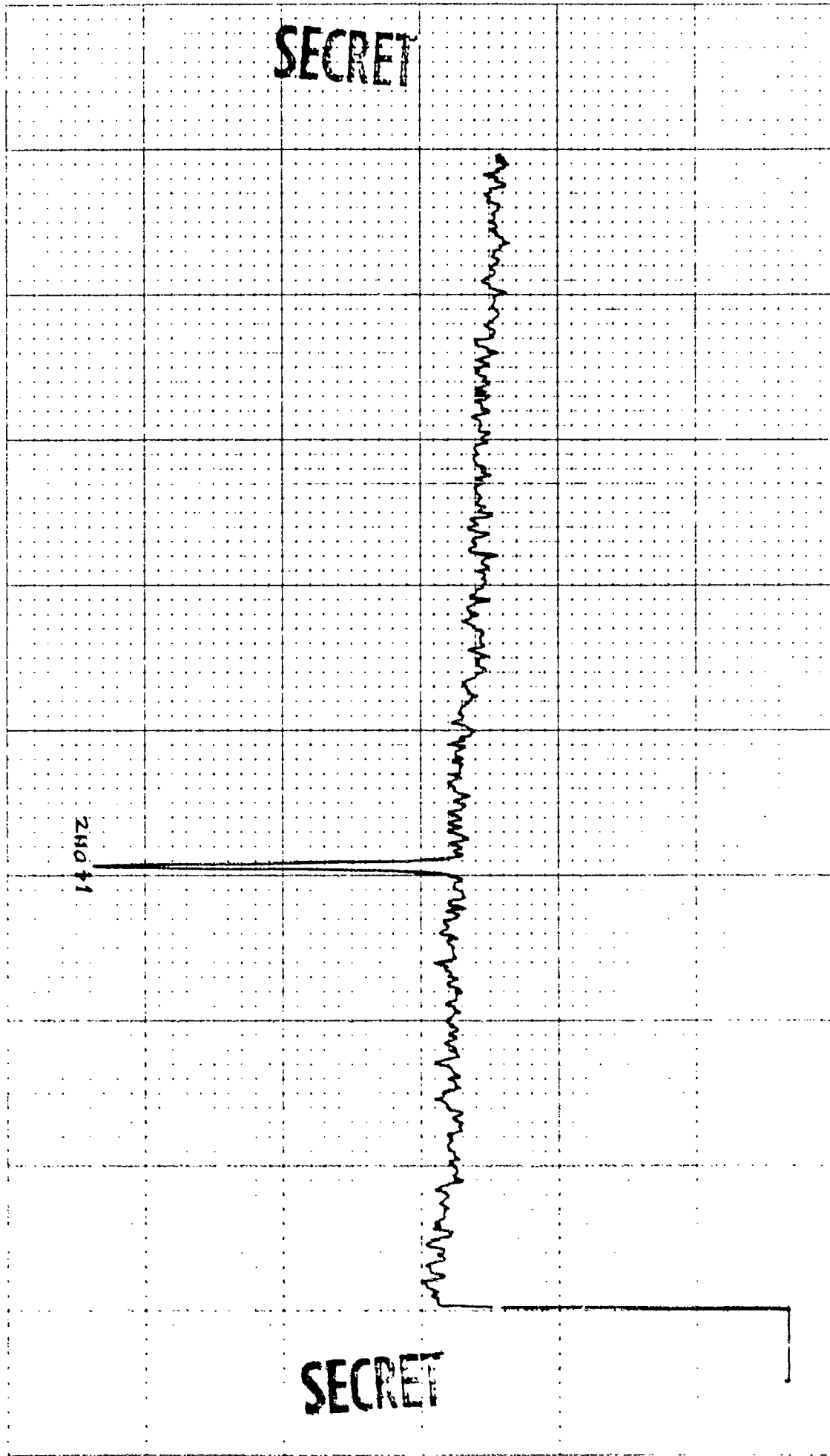
REEL: F29 INDEX 1145

DATE OF ANALYSIS:

CONTROL: 2-0 - 0202 (35)
OMNI SPECTRUM (ELEMENT 19)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE/TIME: 2-8-77 - 0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEC AZ STEERING

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



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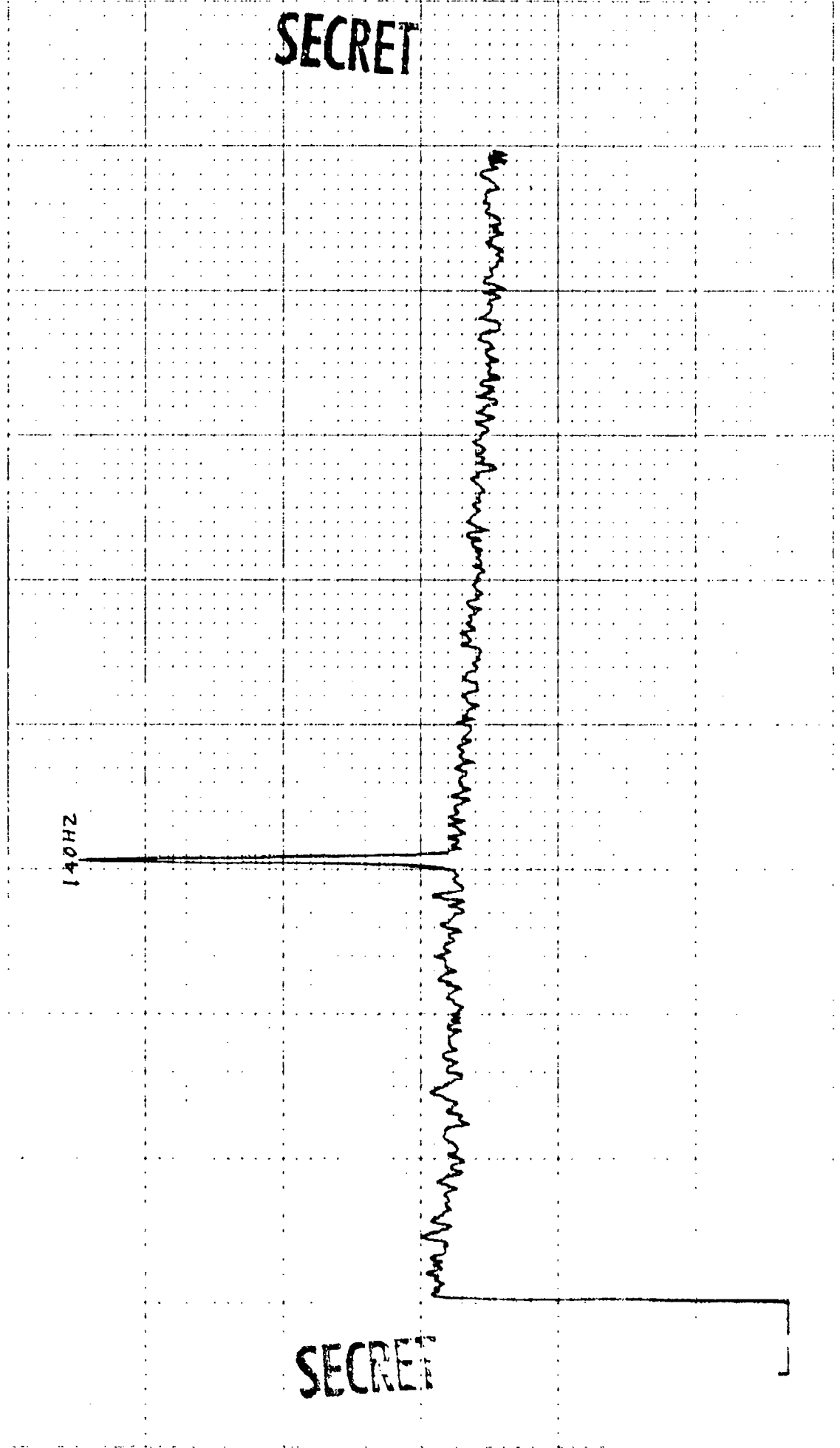
CONTROL: 2-8-0702 (36)
OMNI SPECTRUM (ELEMENT 20)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: F29 INDEX 1145

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WIG: HANNING



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CONTROL: 2-8-0202 (37)
OMNI SPECTRUM (ELEMENT 23)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

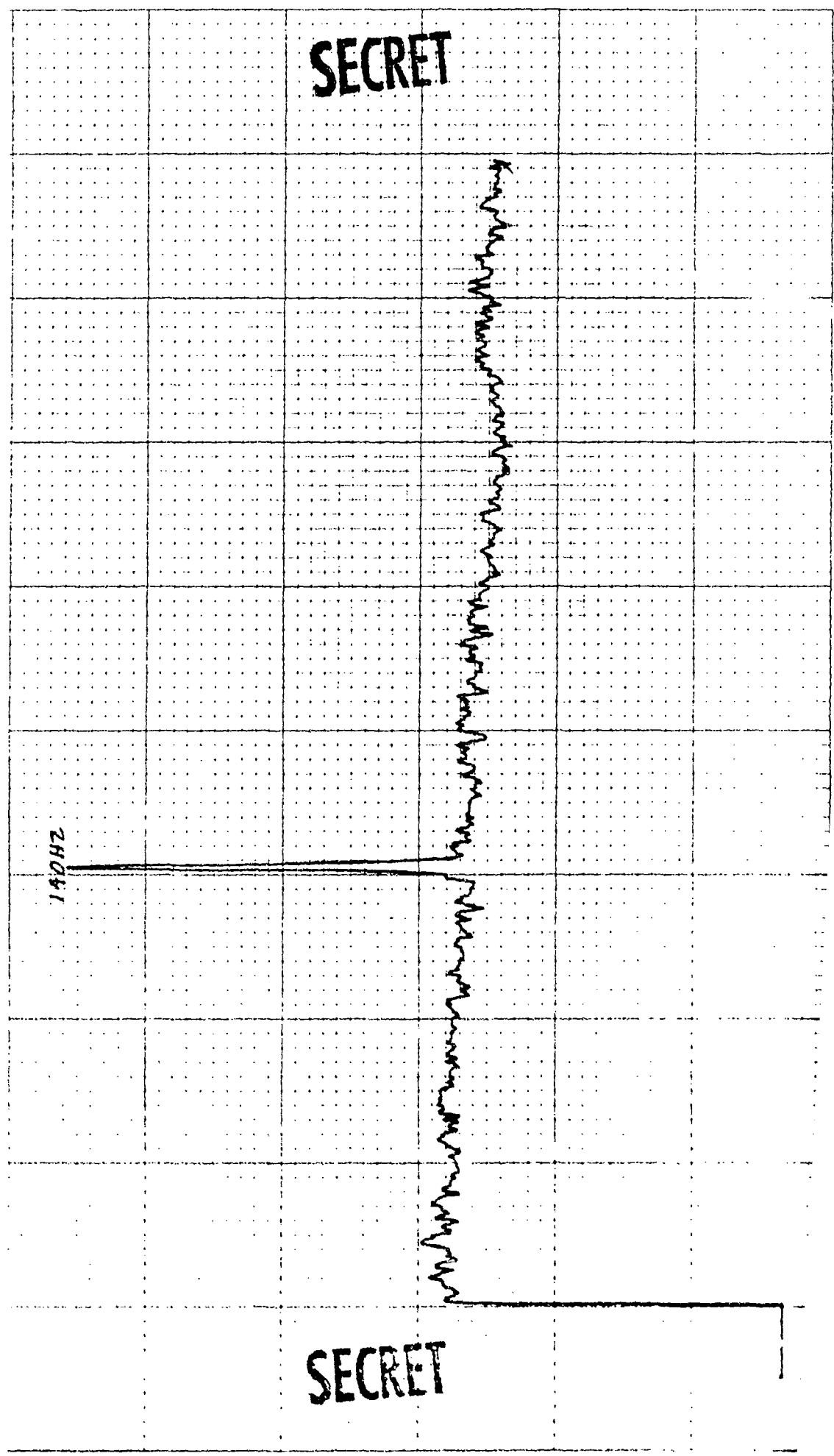
DATE OF ANALYSIS:

DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
_____ DEG AZ STEERING

REEL: F29

INDEX: 1145

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



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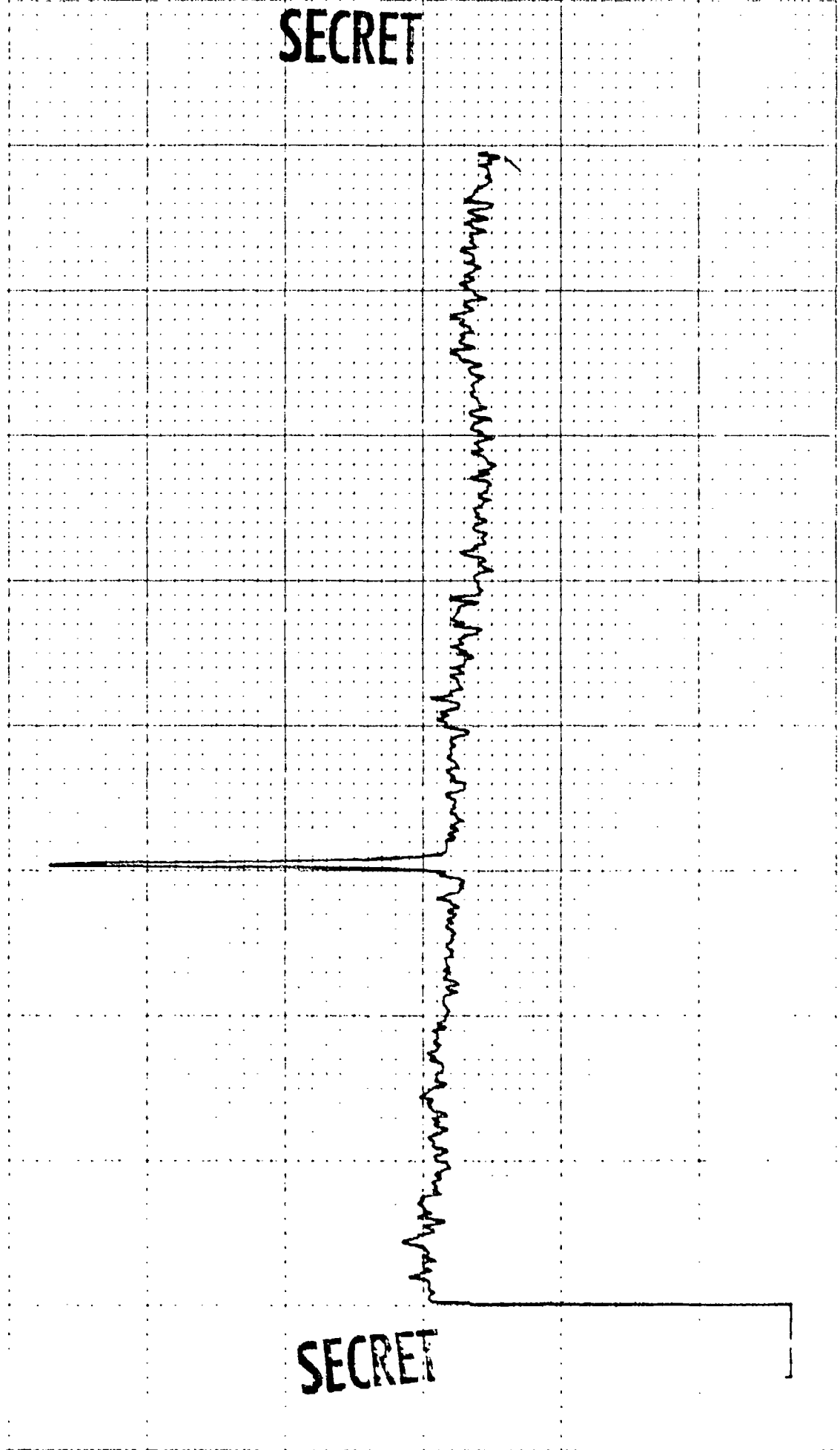
CONTROL: 2-0 -0202(38)
OMNI SPECTRUM(ELEMENT 24)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 -0202Z
ANALYSIS BANDWIDTH: 1/10HZ
 DEG AZ SIEERING

REEL: F29 INDEX 1145

INTEGRATION TIME 320 SECS ATTN: DB
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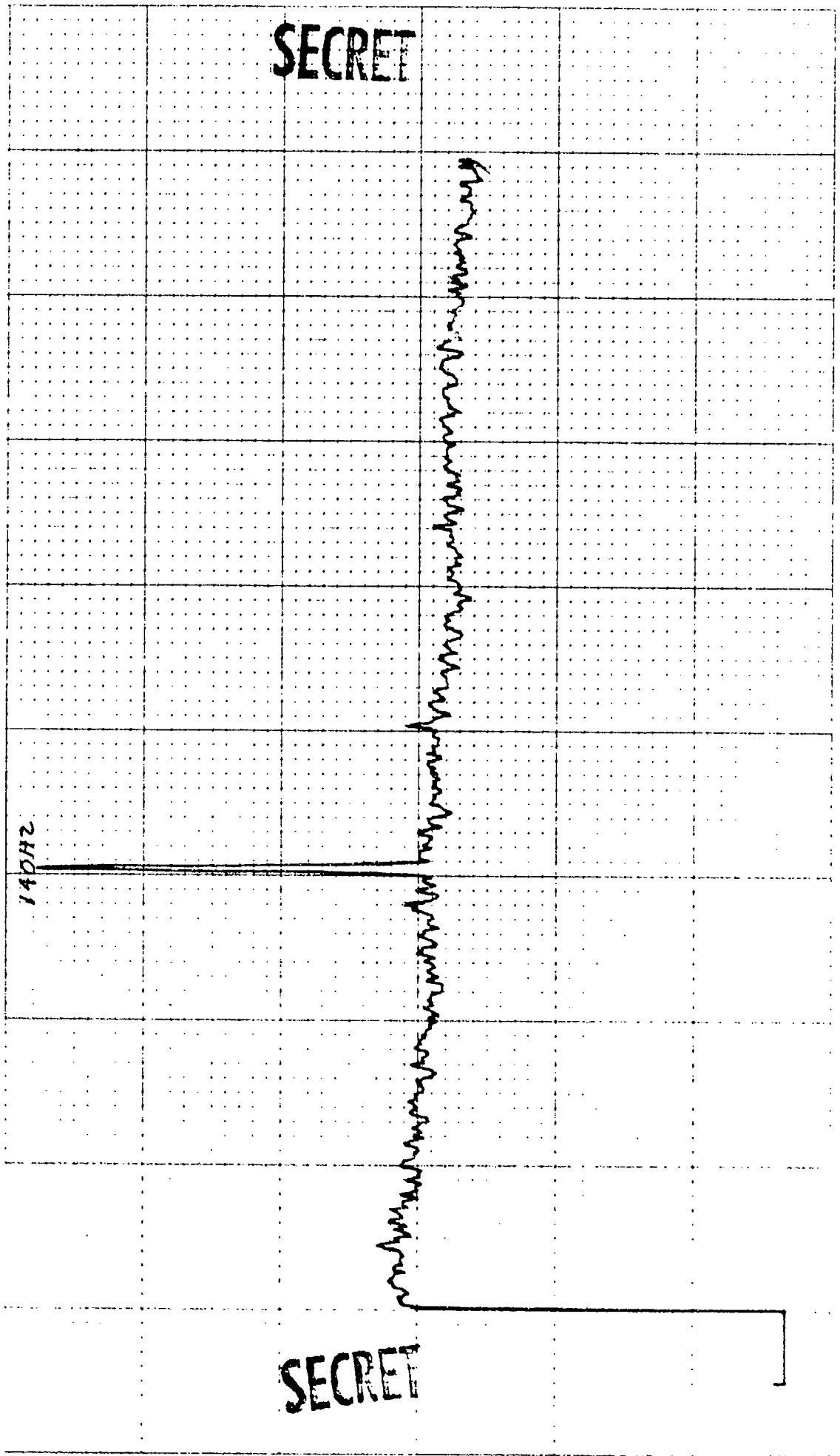
CONTROL: 28-0202(39)
OMNI SPECTRUM(ELEMENT 26)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 28-77-0202Z
ANALYSIS BANDWIDTH: 1/10HZ
 DEG AZ STEERING

REEL: F29 INDEX//45

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING



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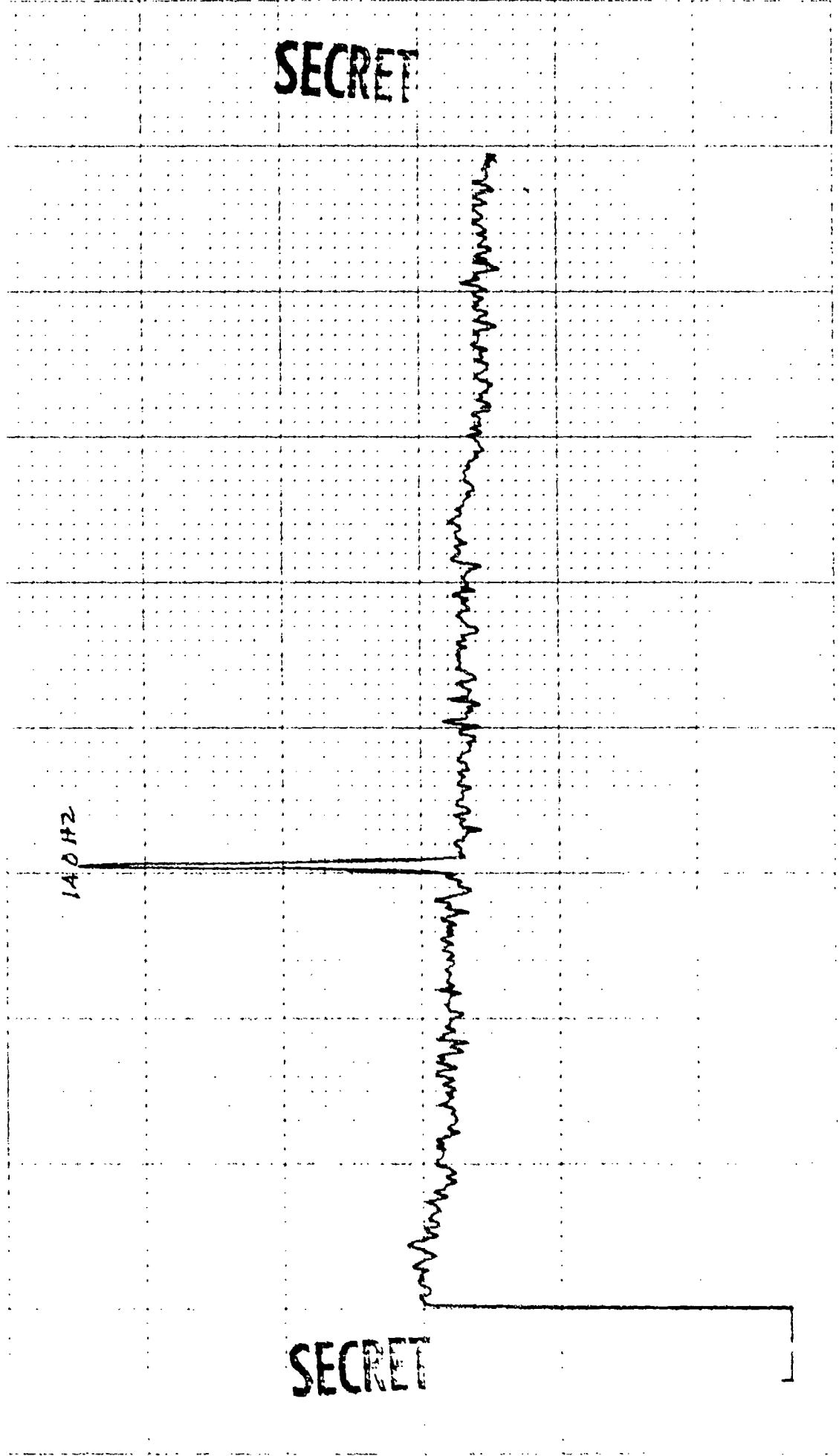
CONTROL: 2-8-0202 (10)
OMNI SPECTRUM (ELEMENT 29)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 -0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F29 INDEX 1145

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

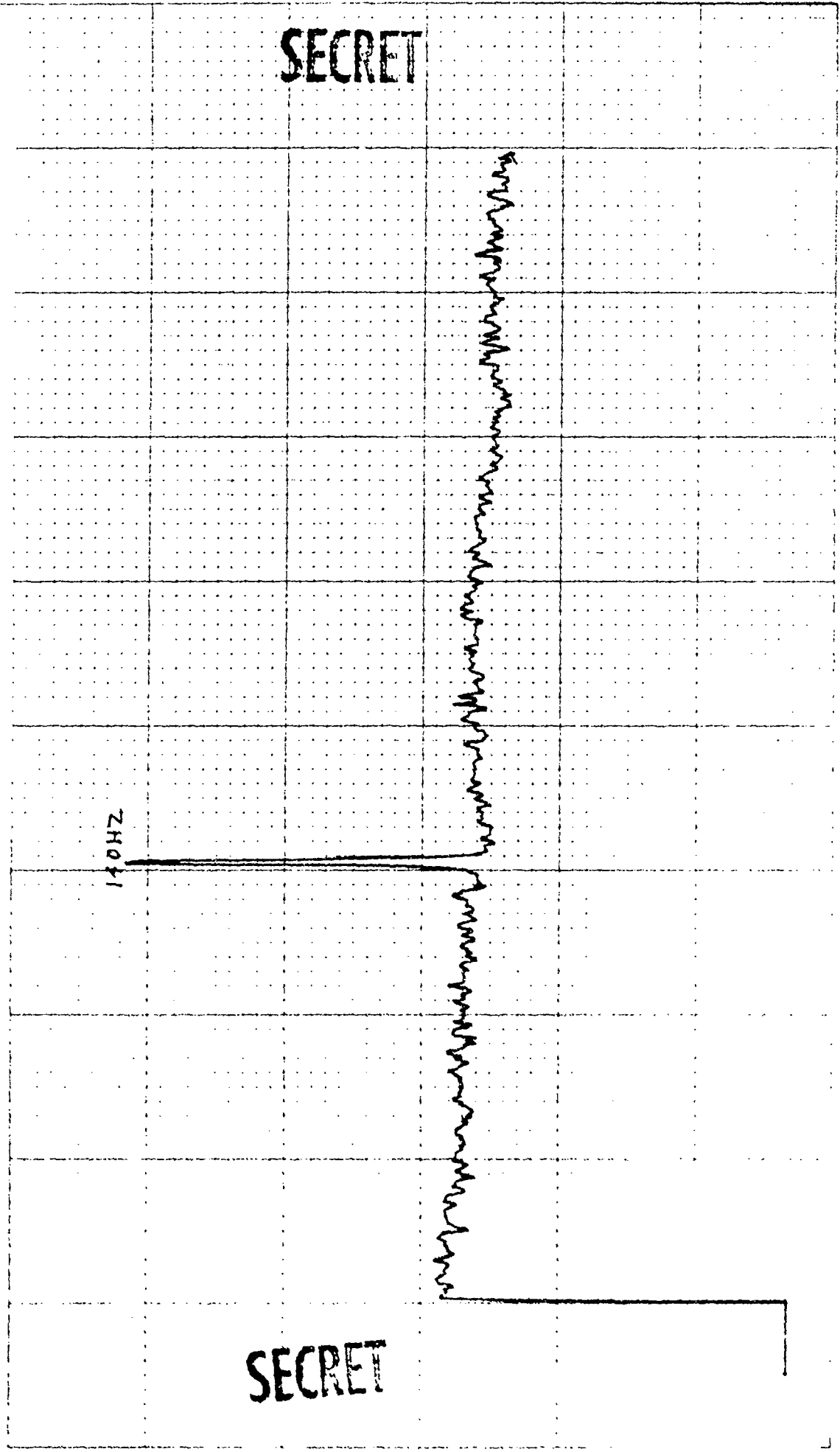


46 0703

CONTROL: 2-8-0202 (41)
OMNI SPECTRUM (ELEMENT 31)
EXERCISE: BEARING STAKE
CENTER FRQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:
DATE/TIME: 2-8-77 - 0202z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: F29 INDEX: 145
INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER WTG: HANNING



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46 0703

CONTROL: 2-8-0202 (42)
OMNI SPECTRUM (ELEMENT 33)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10 HZ
--- DEG AZ STEERING

REEL: F29 INDEX 145

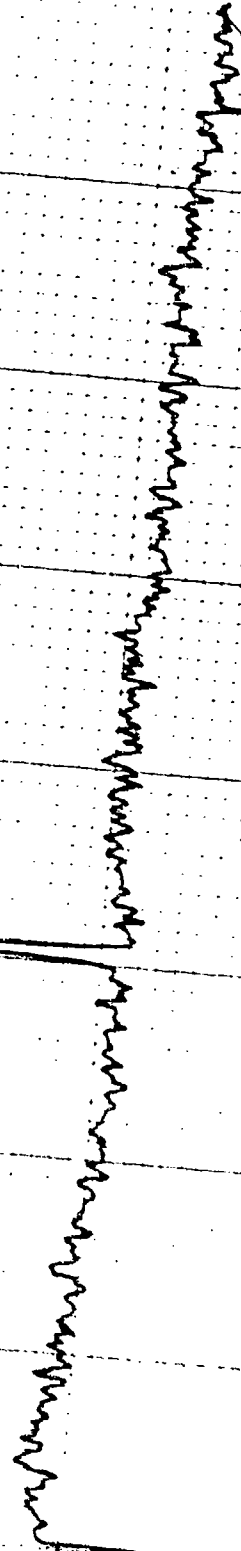
INTEGRATION TIME 320 SECS
FILTER

ATTEN: - DB
WTC: HANNING

140 HZ

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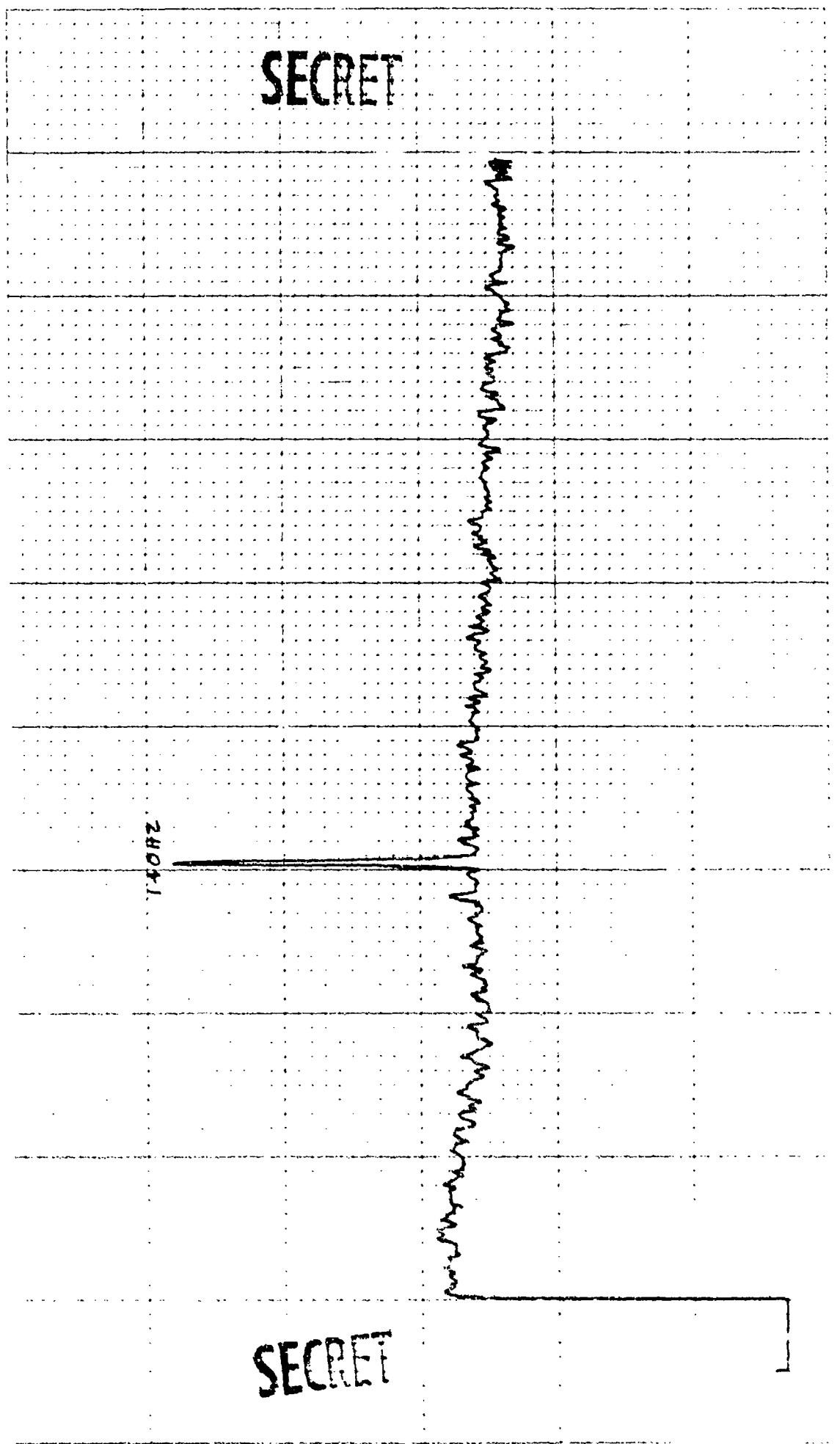
SECRET



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167 2-8-77 0202 (93)

CONTROL: 2-8-0202 (93) DATE OF ANALYSIS: REEL: F29 INDEX: 145
 OMNI SPECTRUM (ELEMENT 35)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 1 ELEMENT
 ANALYSIS BANDWIDTH: 1/10 HZ
 DEC / 1/2 STEERING
 INTEGRATION TIME 320 SECS ATTN: DB
 FILTER WTC: HANNING



46 0703

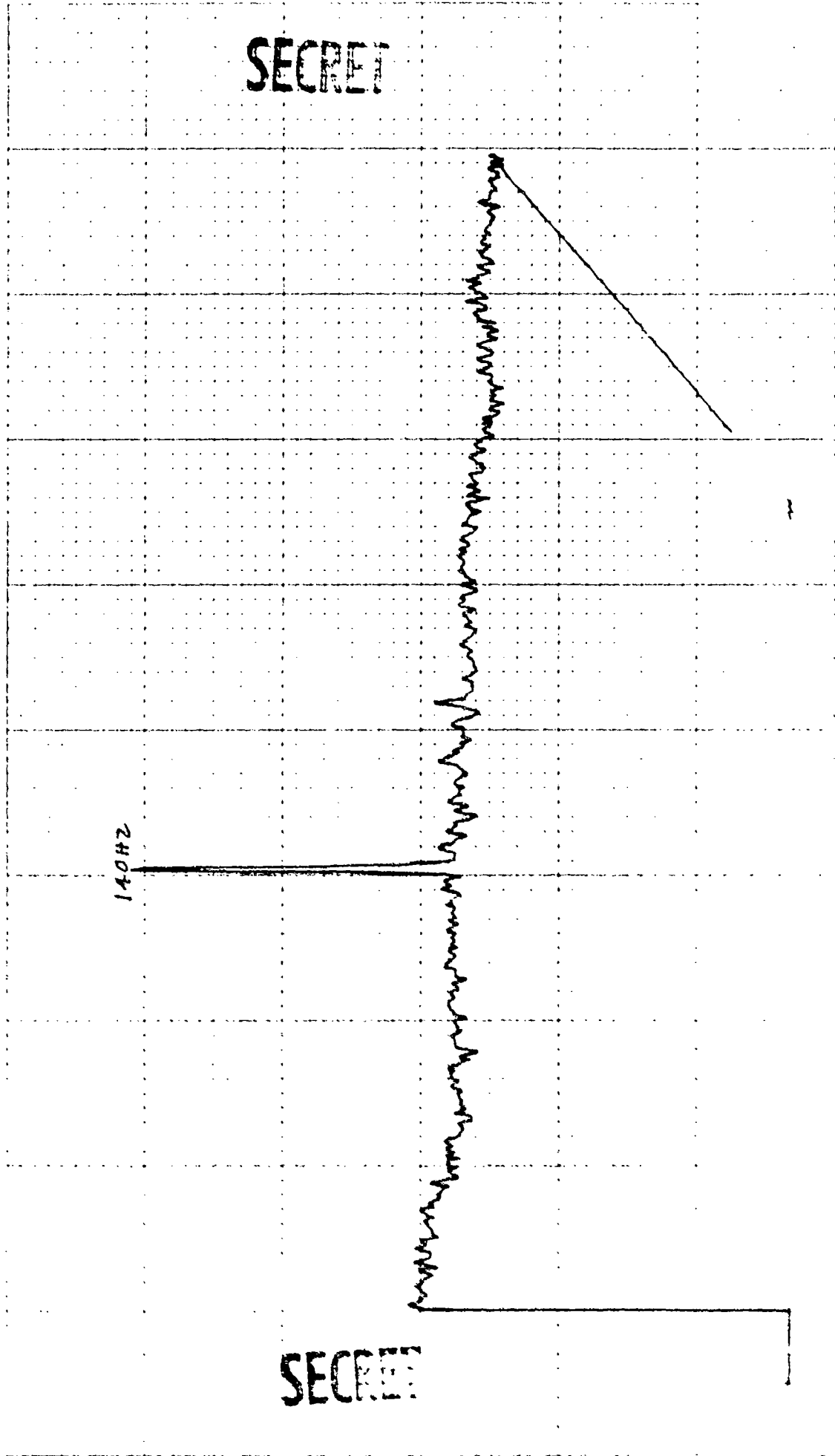
CONTROL: 2-8 -0202 (44)
OMNI SPECTRUM/ELEMENT 37
EXERCISE: BEARING STAKE
CENTER FREQ: 160 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 -0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEC AZ STEERING

REEL: F2-9 INDEX 1145

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



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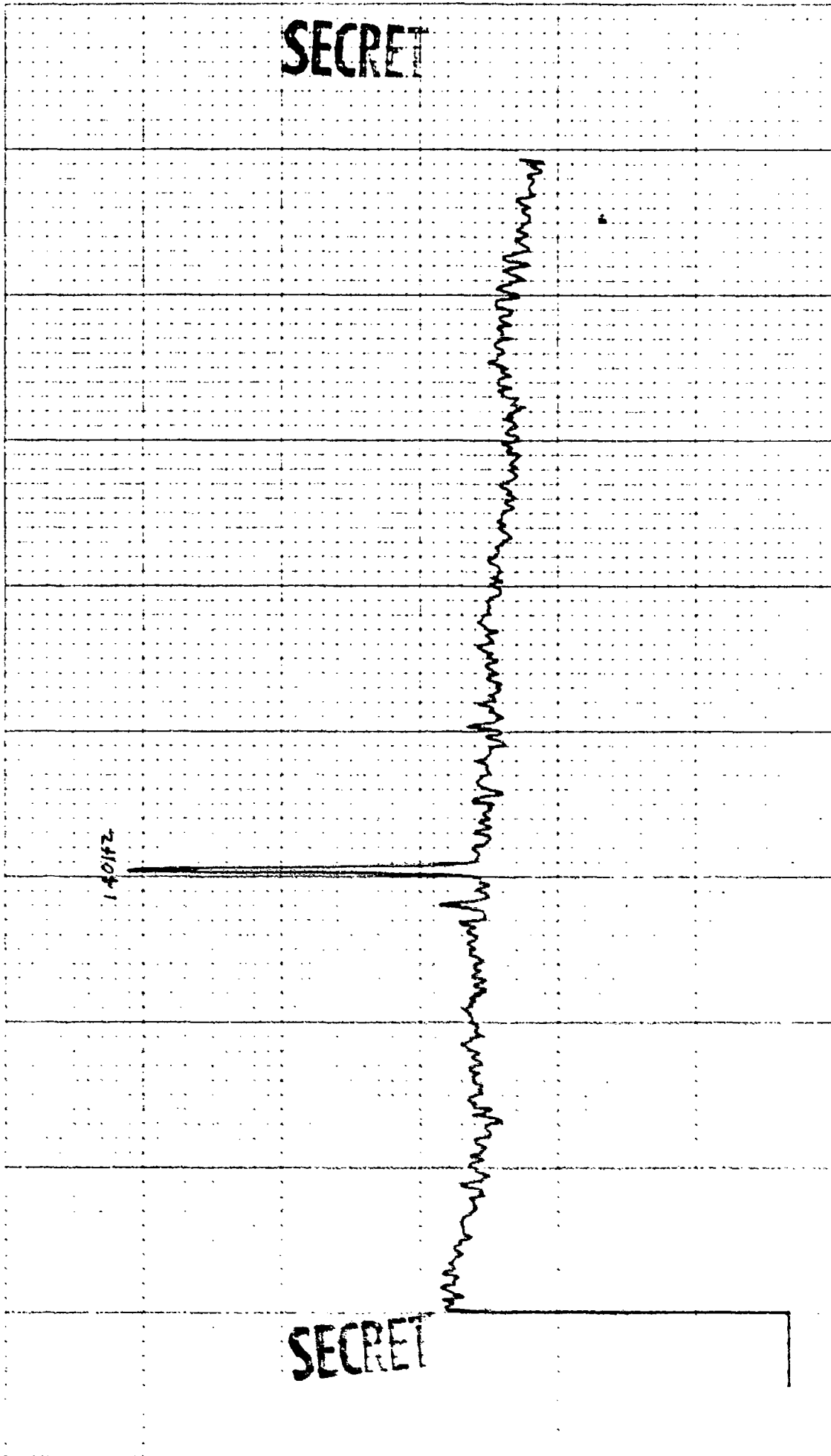
REEL: F-9 INDEX 1/45

DATE OF ANALYSIS:

CONTROL: 2-8-0202(45)
OMNI SPECTRUM (ELEMENT 39)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 MZ
1 ELEMENT

DATE/TIME: 2-8-77-0202Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



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REEL: F29 INDEX: 1145

DATE OF ANALYSIS:

CONTROL: 2-8 -0202 (41)
OMNI SPECTRUM (ELEMENT 41)

EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE/TIME: 2-8-77 -0202 Z

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

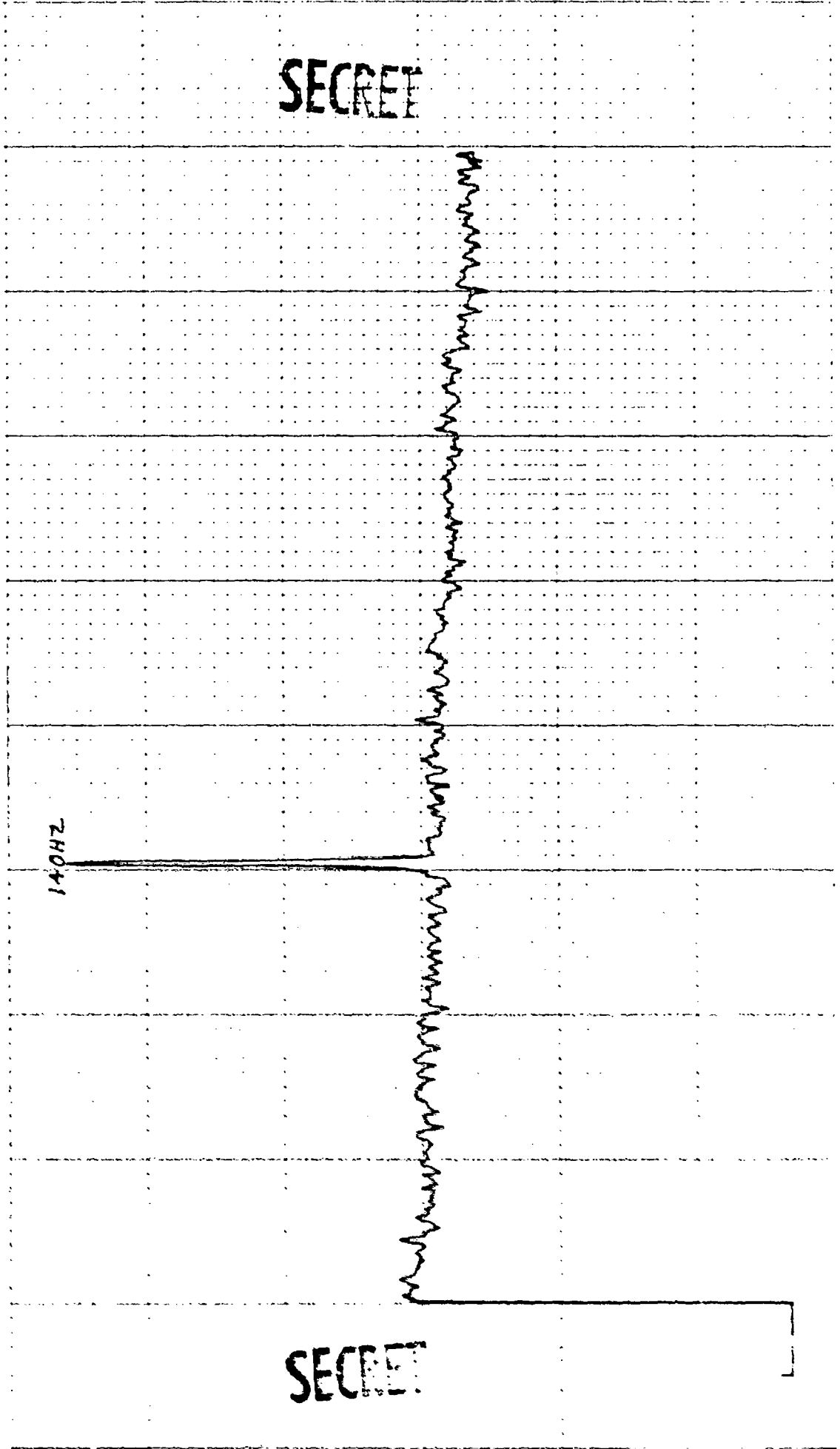
ANALYSIS BANDWIDTH: 1710 HZ

— DEC AZ STEERING

140HZ

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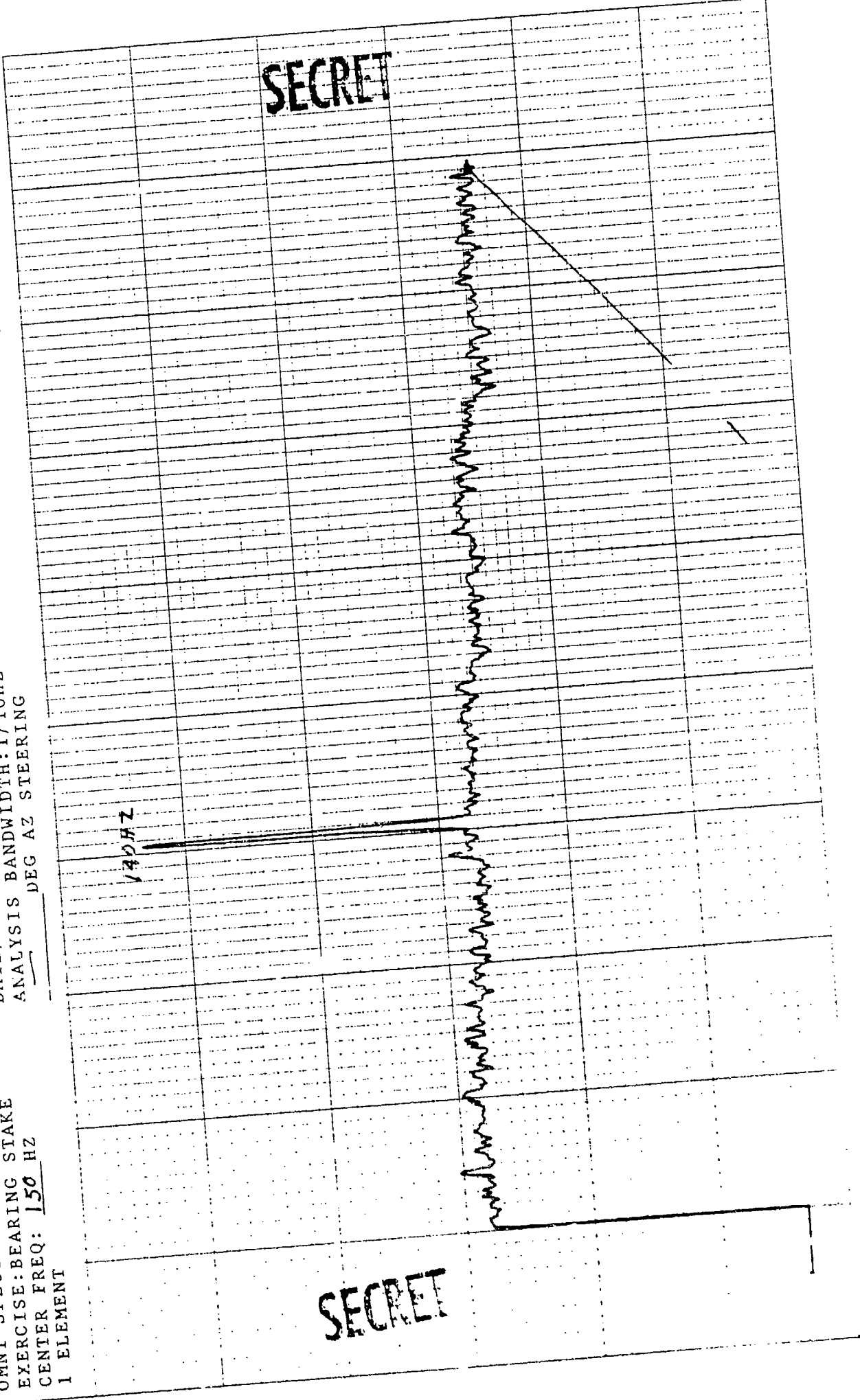
REEL: F29 INDEX: 1145

DATE OF ANALYSIS:

CONTROL: 2-8 - 0202 (47)
OMNI SPECTRUM (ELEMENT 43)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE/TIME: 2-8-77 - 0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEG AZ STEERING

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING



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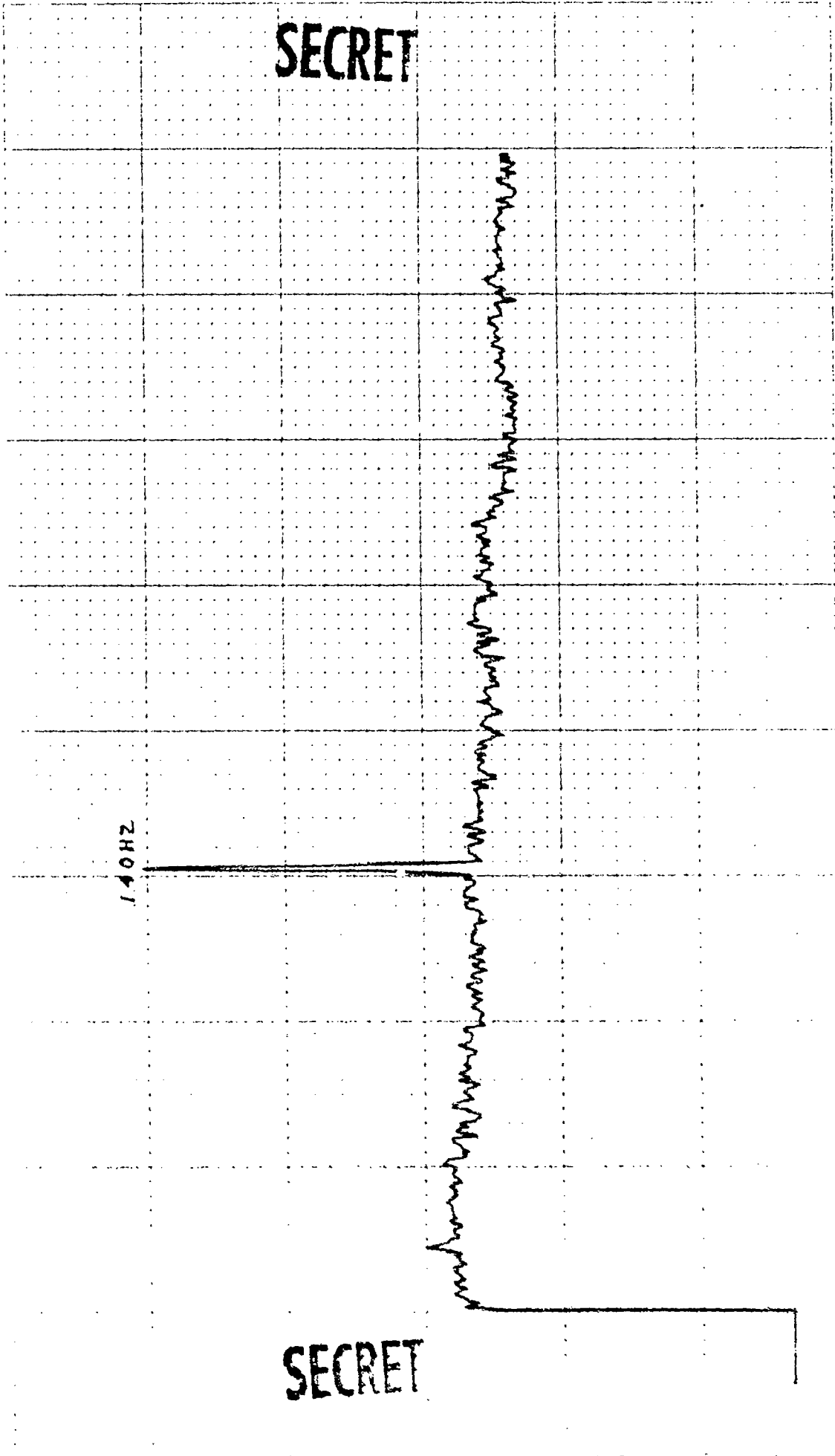
CONTROL: 2-8-0202(48)
OMNI SPECTRUM(ELEMENT 45)
EXERCISE: BEARING STAYE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77-0202.2
ANALYSIS BANDWIDTH: 1/10HZ
— DEC AZ STEERING

REEL: F29 INDEX 1145

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



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CONTROL: 2-8 -0202 (49)
OMNI SPECTRUM (ELEMENT 47)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 -0202Z

ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F29

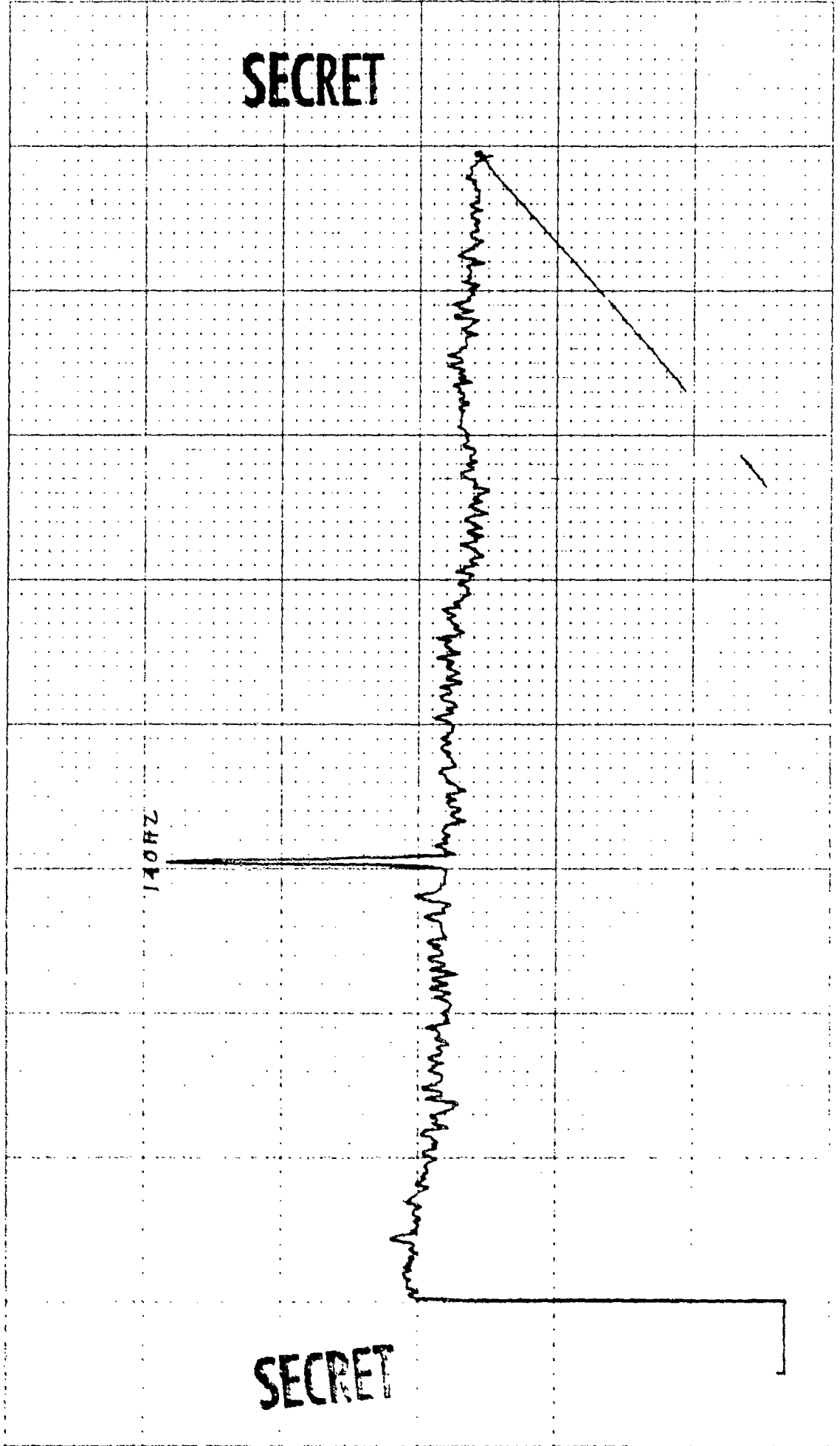
INDEX: 1145

INTEGRATION TIME 320 SECS

ATTEN: — DB

FILTER

WTG: HANNING



140 HZ

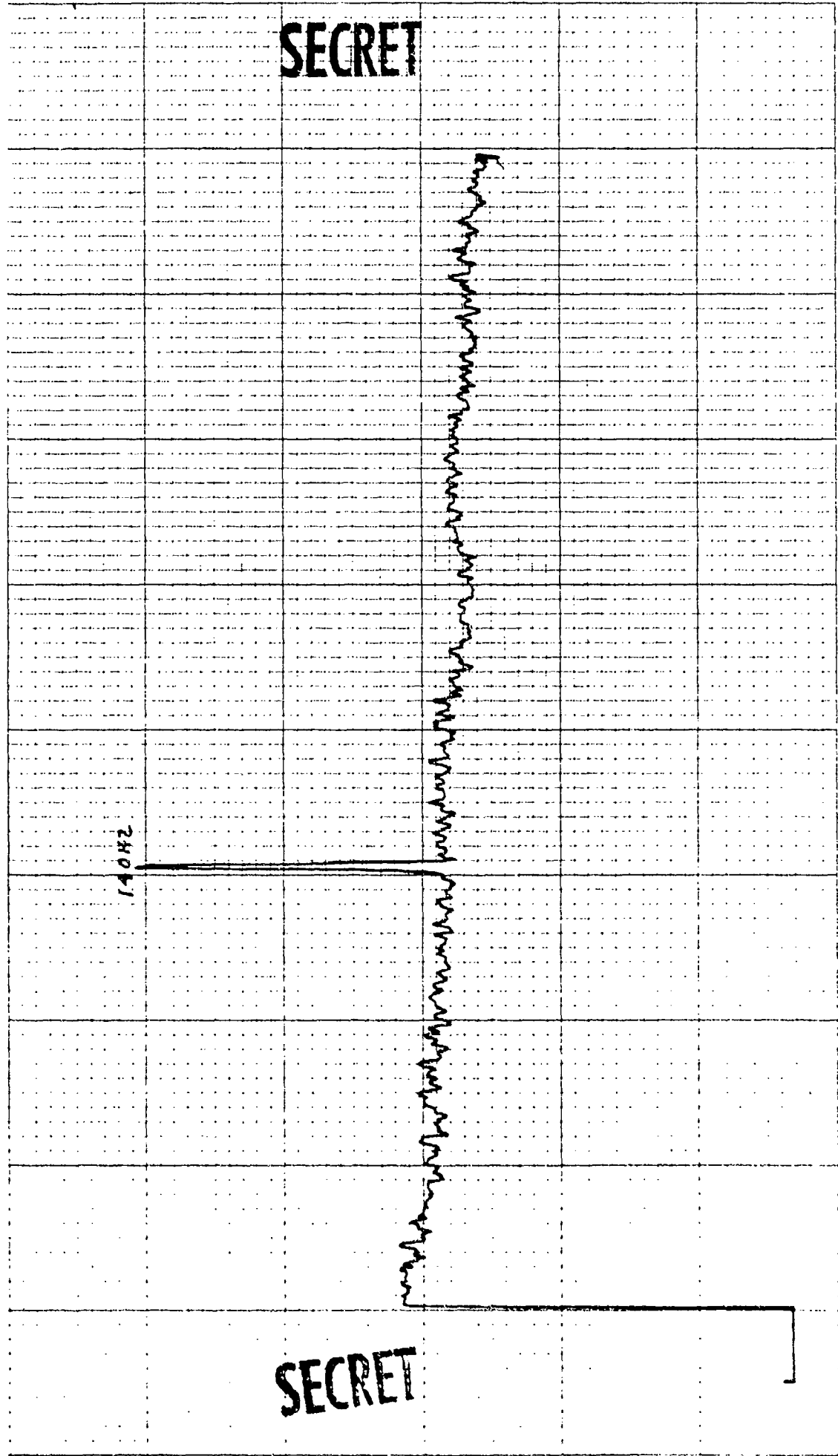
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Fig 2 SPECTRUM TO THE RIGHT OF THE PAGE

CONTROL: 2-8 -0202(50) DATE OF ANALYSIS: REEL: F29 INDEX 1145
 OMNI SPECTRUM(ELEMENT 49)
 EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: - DB
 CENTER FREQ: 150 HZ FILTER WTG: HANNING
 ANALYSIS BANDWIDTH: 1/10 HZ
 _____ DEG AZ STEERING



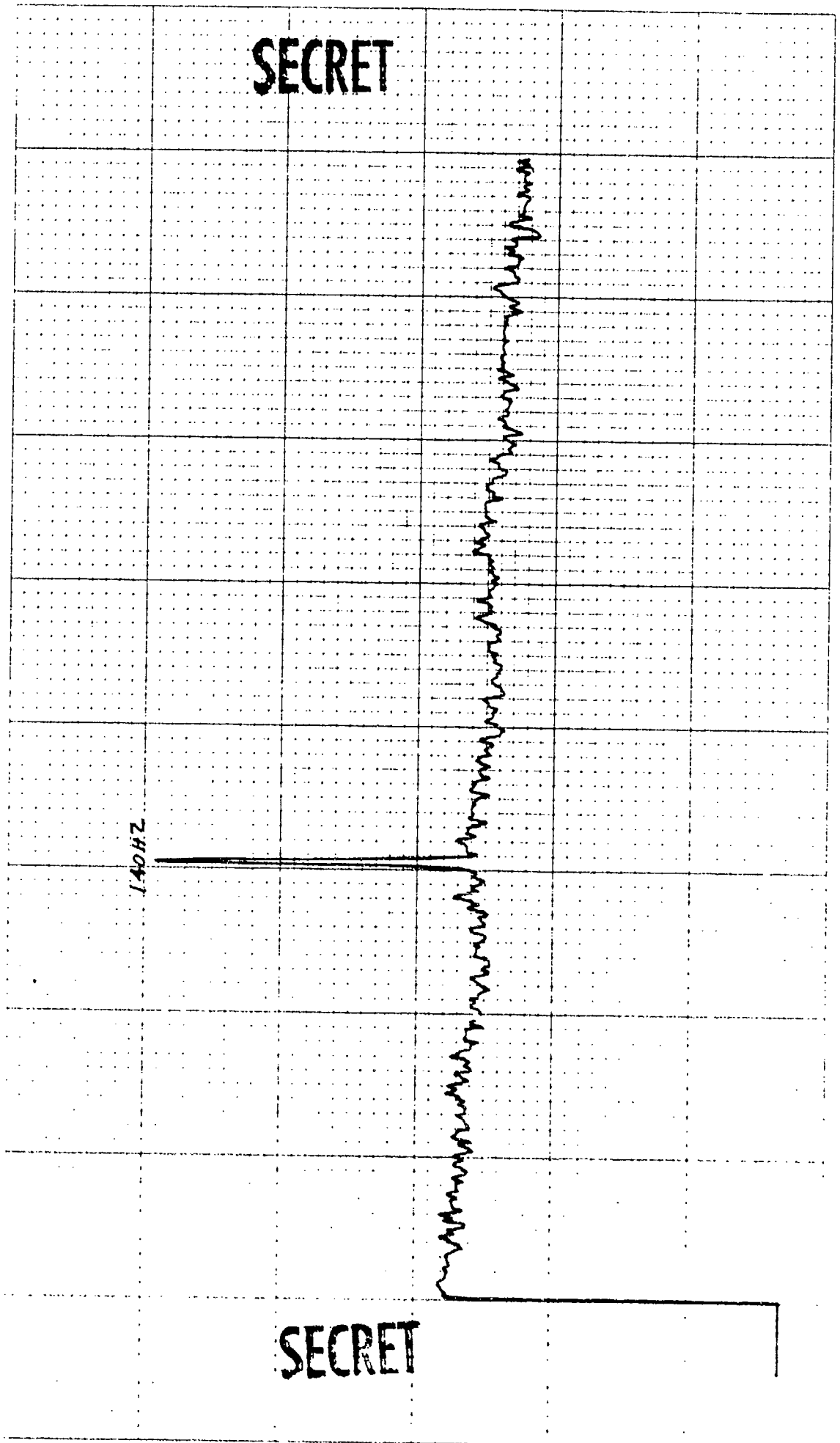
46 0703

DATE OF ANALYSIS: 2-8-77

CONTROL: 2-8-0202 (51) DATE OF ANALYSIS: REEL: F29 INDEX: 1149
 OMNI SPECTRUM (ELEMENT 51)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 I ELEMENT

INTEGRATION TIME 320 SECS ATTN: DB
 FILTER WIG: HANNING

DATE/TIME: 2-8-77 - 0202Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ. STEERING



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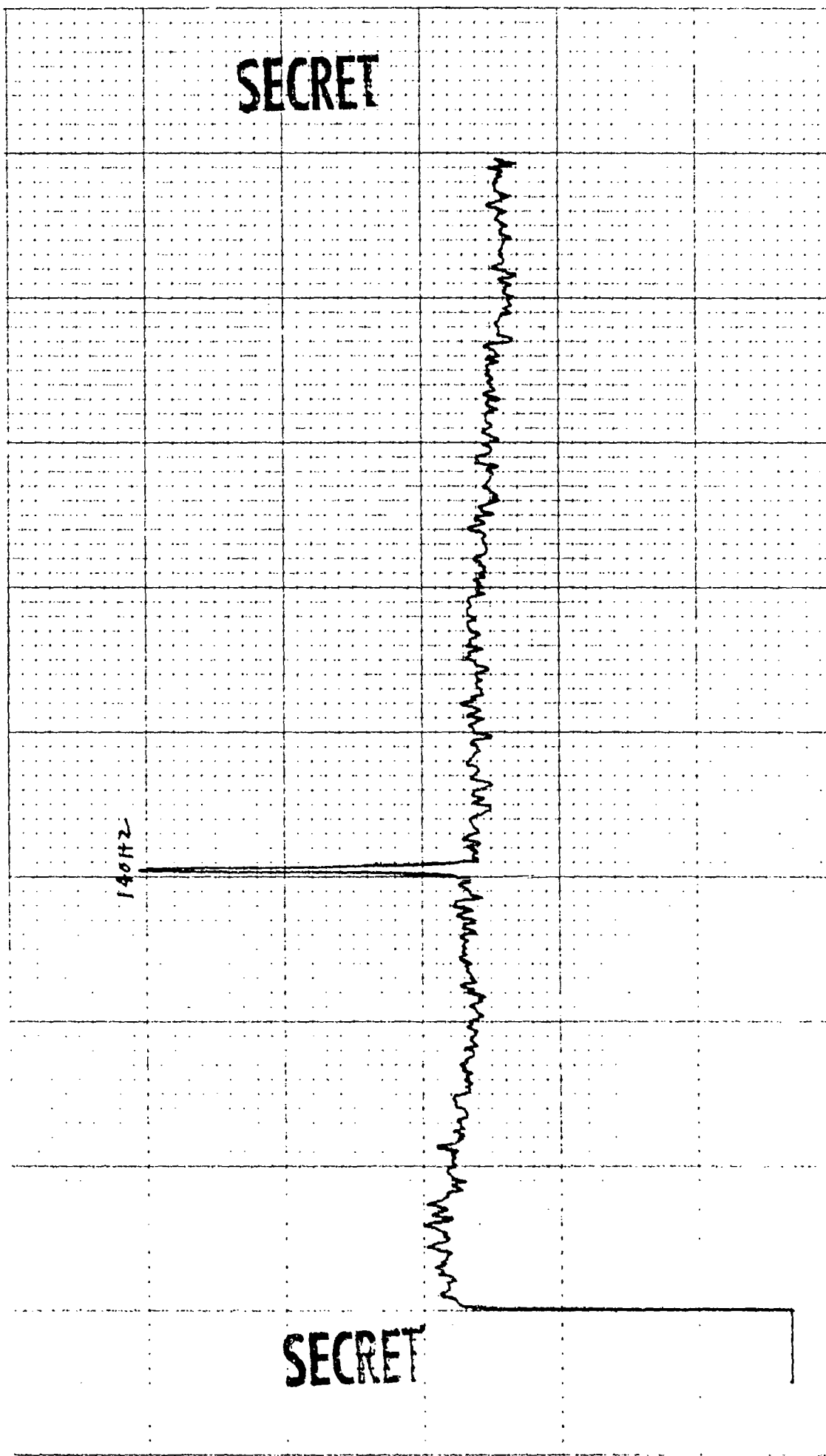
DATE OF ANALYSIS: 2-8-77

REEL: F29 INDEX: 1195

CONTROL: 2-8 - 0202 (52)
OMNI SPECTRUM (ELEMENT 53)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ STEERING

INTEGRATION TIME 320 SECS
FILTER
ATTEN: DB
WTG: HANNING



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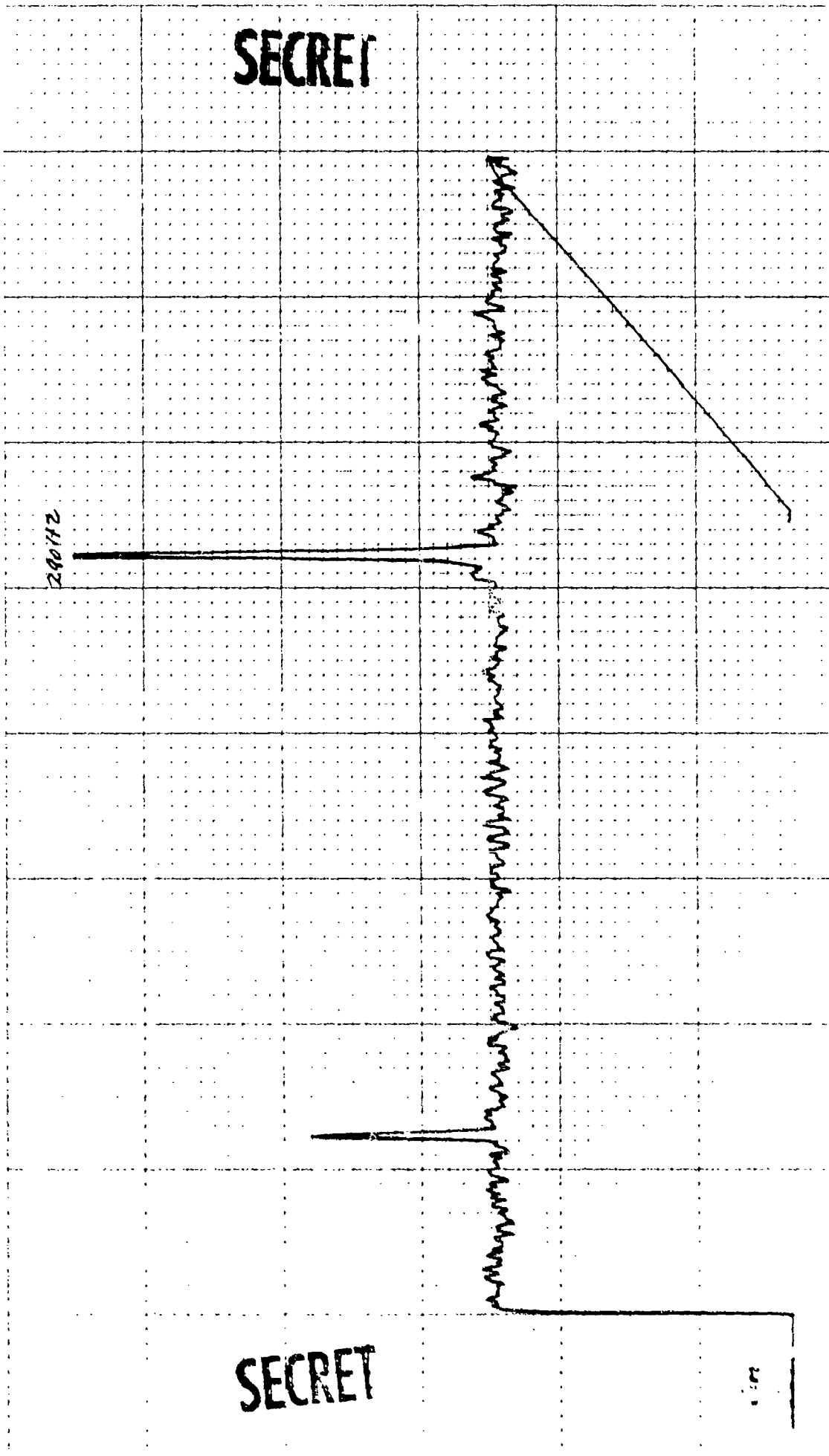
1492 1000 1000 1000 1000

CONTROL: 2-8 - 0202 (1)
 OMNI SPECTRUM (ELEMENT 2)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
 I ELEMENT

DATE OF ANALYSIS:
 DATE/TIME: 2-8-77 - 0202 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 DEG AZ STEERING

PEEL: F29 INDEX: 1/45

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



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INDEX 1145

REEL: F29

ATTEN: DB
WTG: HANNING

INTEGRATION TIME 320 SECS
FILTER

DATE OF ANALYSIS:

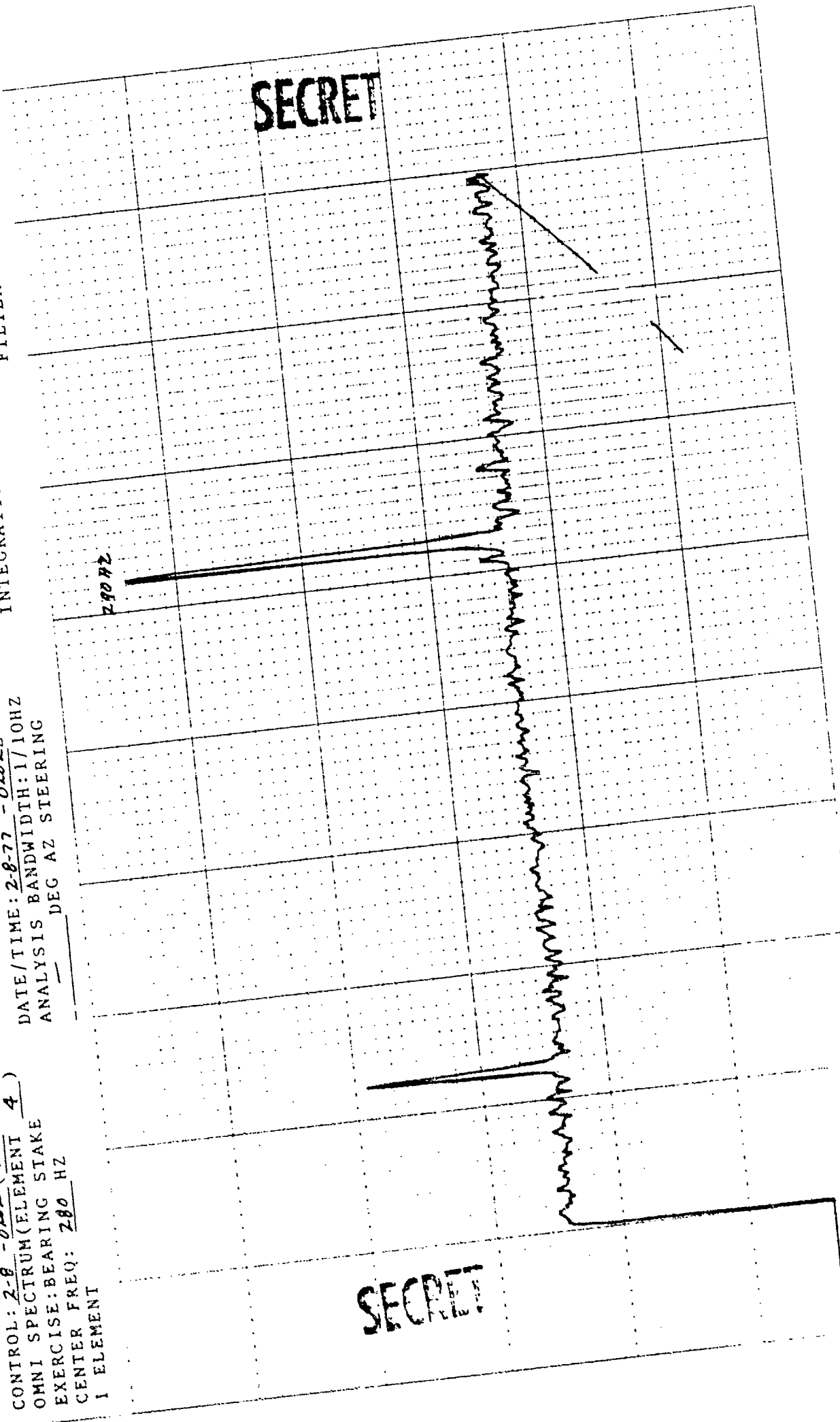
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

CONTROL: 2-8-0102 (2)
OMNI SPECTRUM (ELEMENT 4)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

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280 HZ

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1652 10.8.77 TO THE DEPT. OF DEFENSE

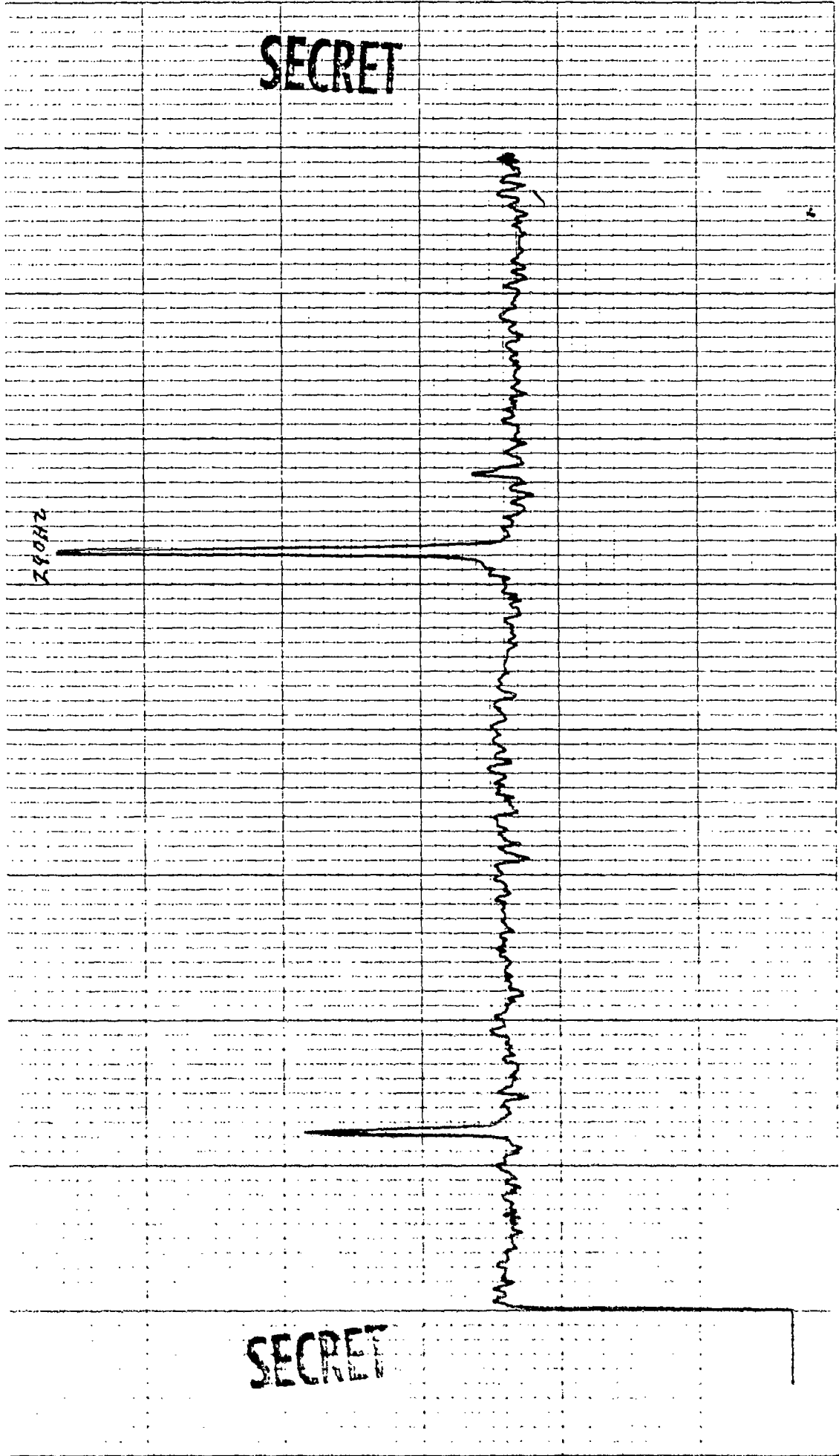
CONTROL: 2-8 - 0202 (3)
OMNI SPECTRUM (ELEMENT 6)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 - 0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: F29 INDEX: 145

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



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REF: 2-8-77 TO DB 1800: 2-8-77

CONTROL: 2-8 -0202 (4)
OMNI SPECTRUM(ELEMENT 9)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

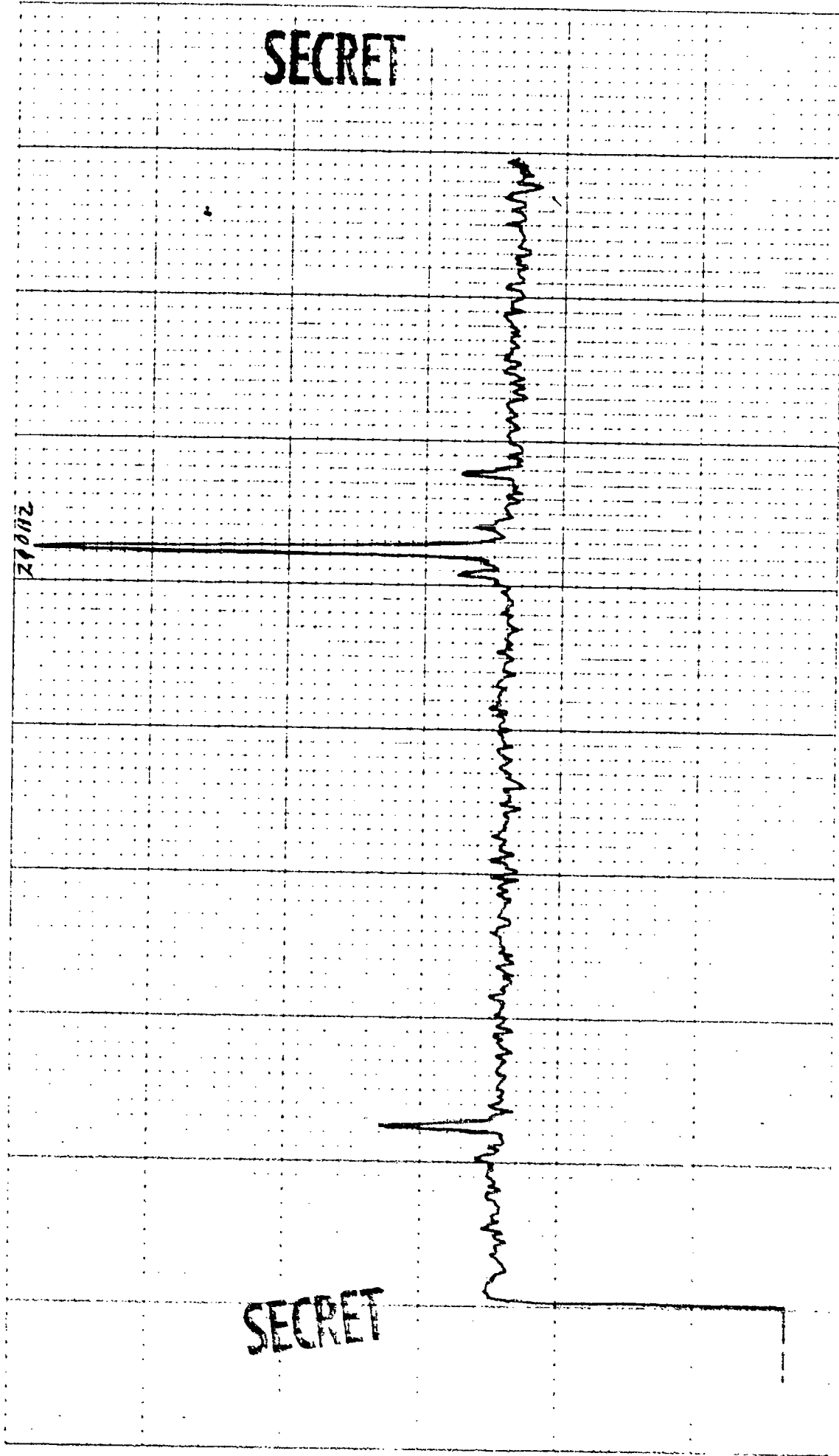
DATE OF ANALYSIS:

DATE/TIME: 2-8-77 -0202 Z

ANALYSIS BANDWIDTH: 1/10HZ
 DEG AZ STEERING

REEL: F29 INDEX: 145

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING



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CONT POL: 2.0 - 0.202 (5)
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

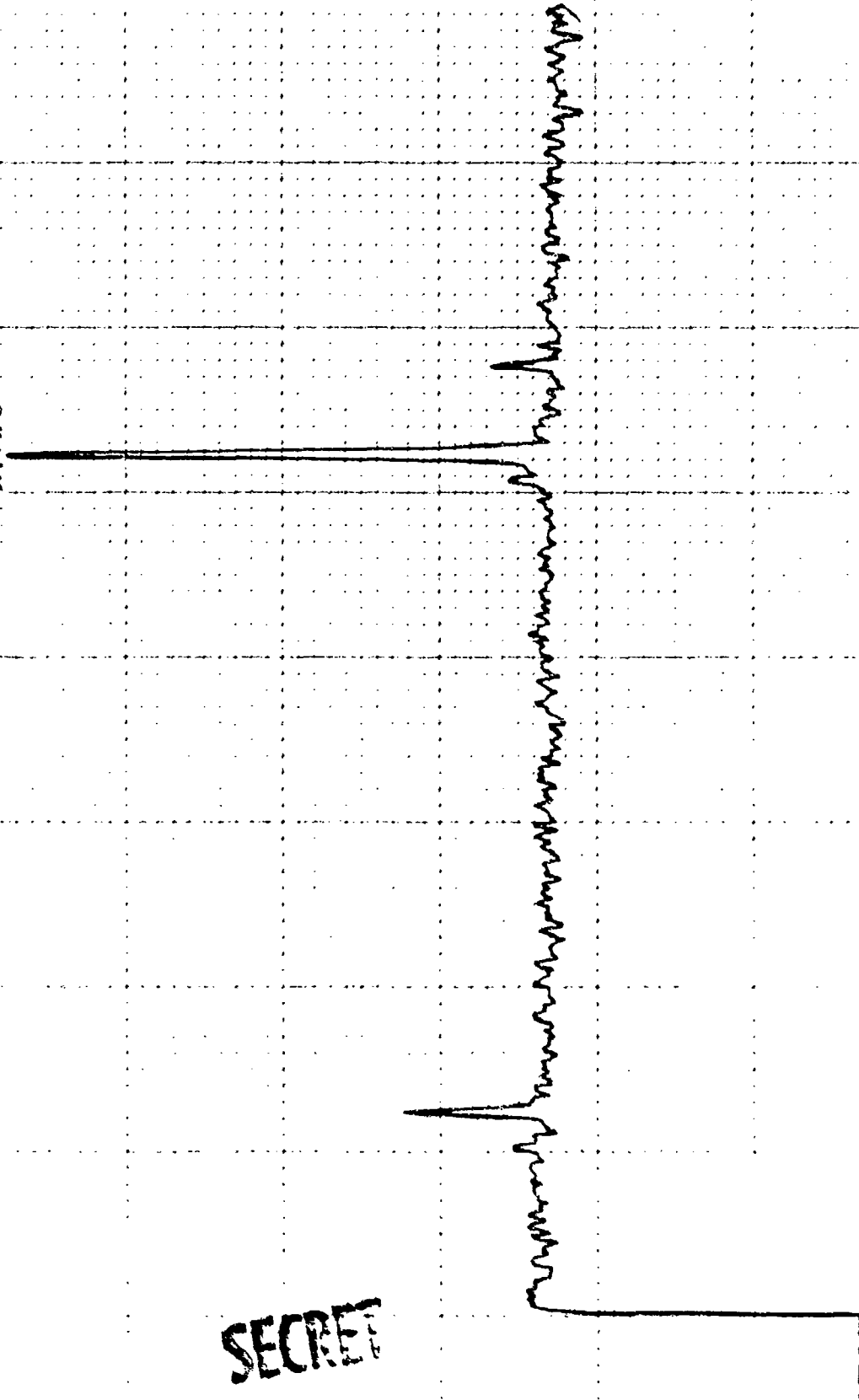
DATE/TIME: 2-8-77 - 0202 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

PEEL: F29

INDEX: 145

INTEGRATION TIME 320 SECS
FILTER WTC: HANNING

290HZ



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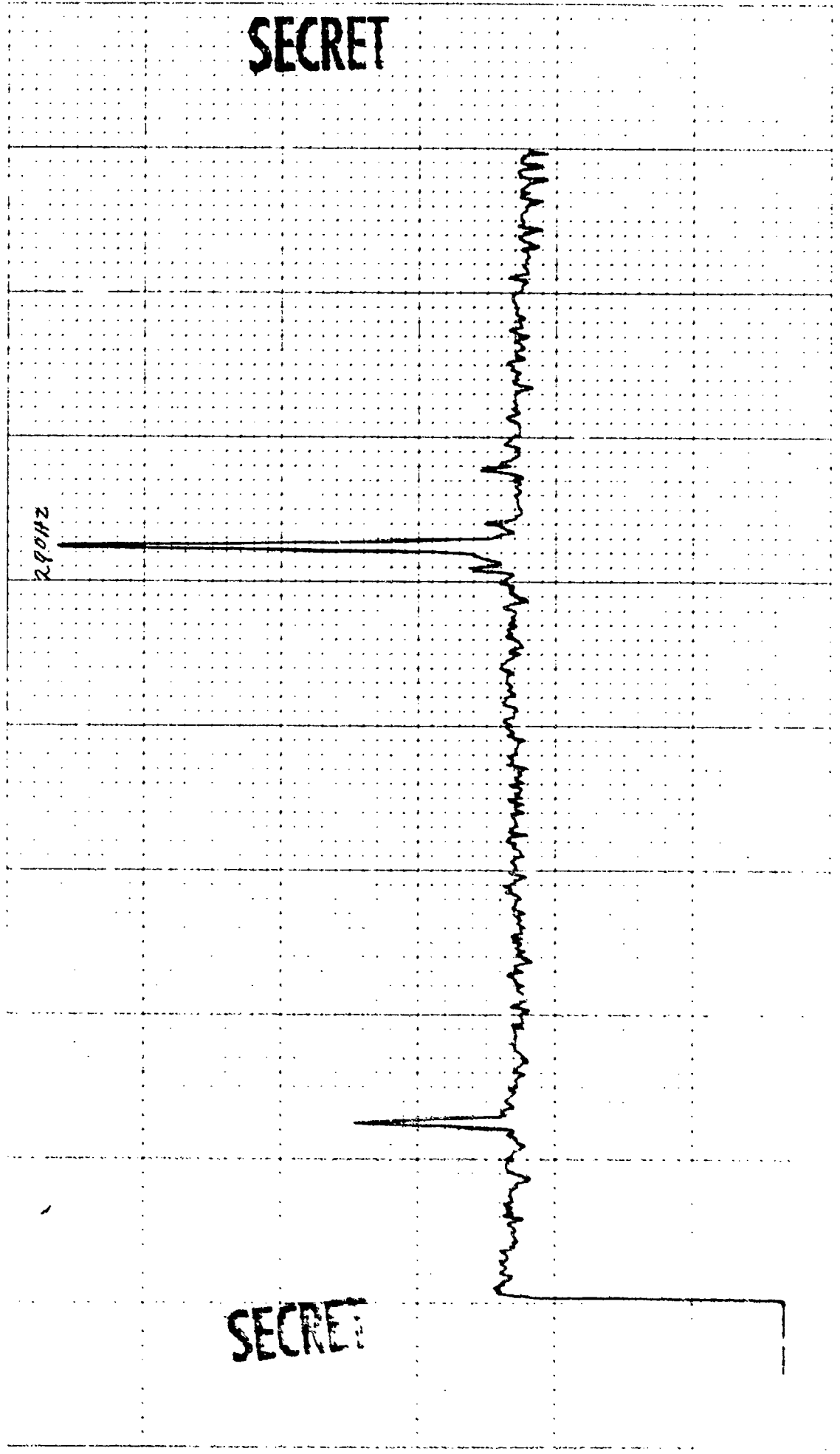
1/2 2-0-77 0202Z

REEL: F29 INDEX 1145

DATE OF ANALYSIS:

CONTROL: 2-0-0202 (6)
OMNI SPECTRUM (ELEMENT 12)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE/TIME: 2-0-77 - 0202Z
ANALYSIS BANDWIDTH: 1710 HZ
 DEG AZ STEERING
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING
ATTEN: — DB



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167. 2-8-77 0202Z

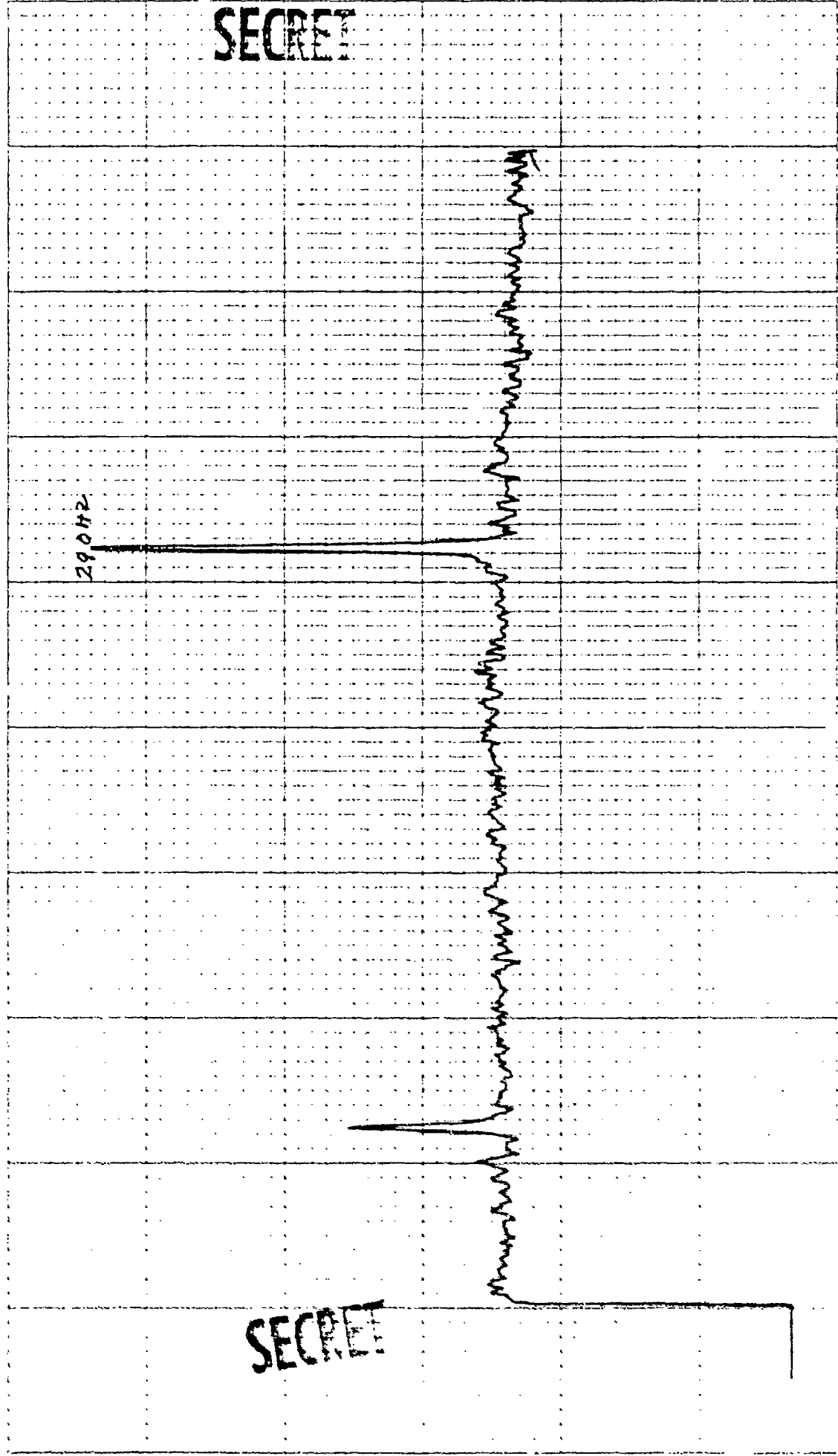
REEL: F21 INDEX: 1145

CONTROL: 2-8-0202 (7)
OMNI SPECTRUM (ELEMENT 14)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEG AZ STEERING

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



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REF ID: A660703

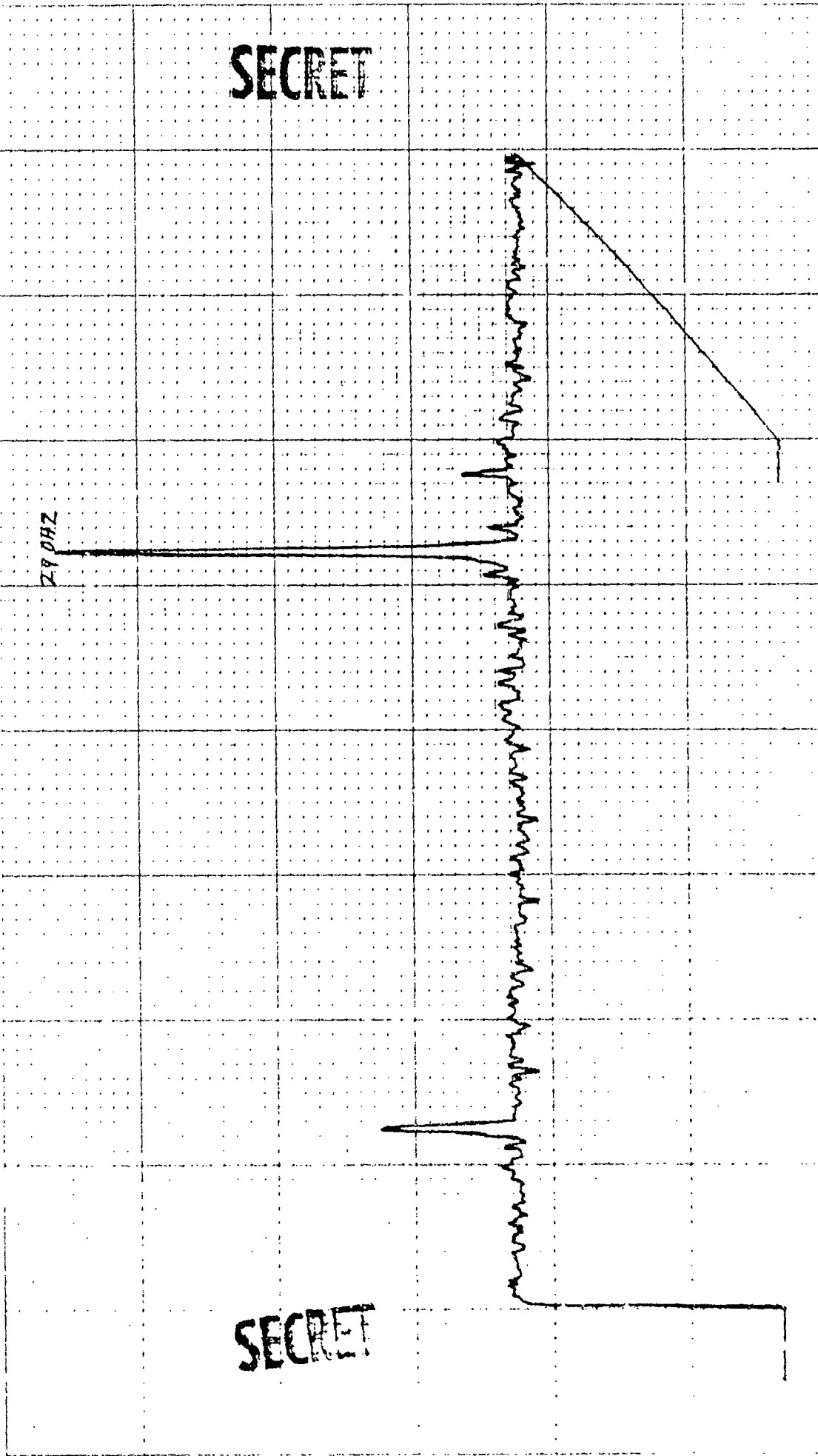
REEL: F29 INDEX: 1145

CONTROL: 2-8 -0202 (9)
OMNI SPECTRUM (ELEMENT 19)
EXERCISE: BEARING SIAKE
CENTER FREQ: 290 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 - 0242Z
ANALYSIS BANDWIDTH: 1/10 HZ
1 DEG AZ SLEERING

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER
WTC: HANNING

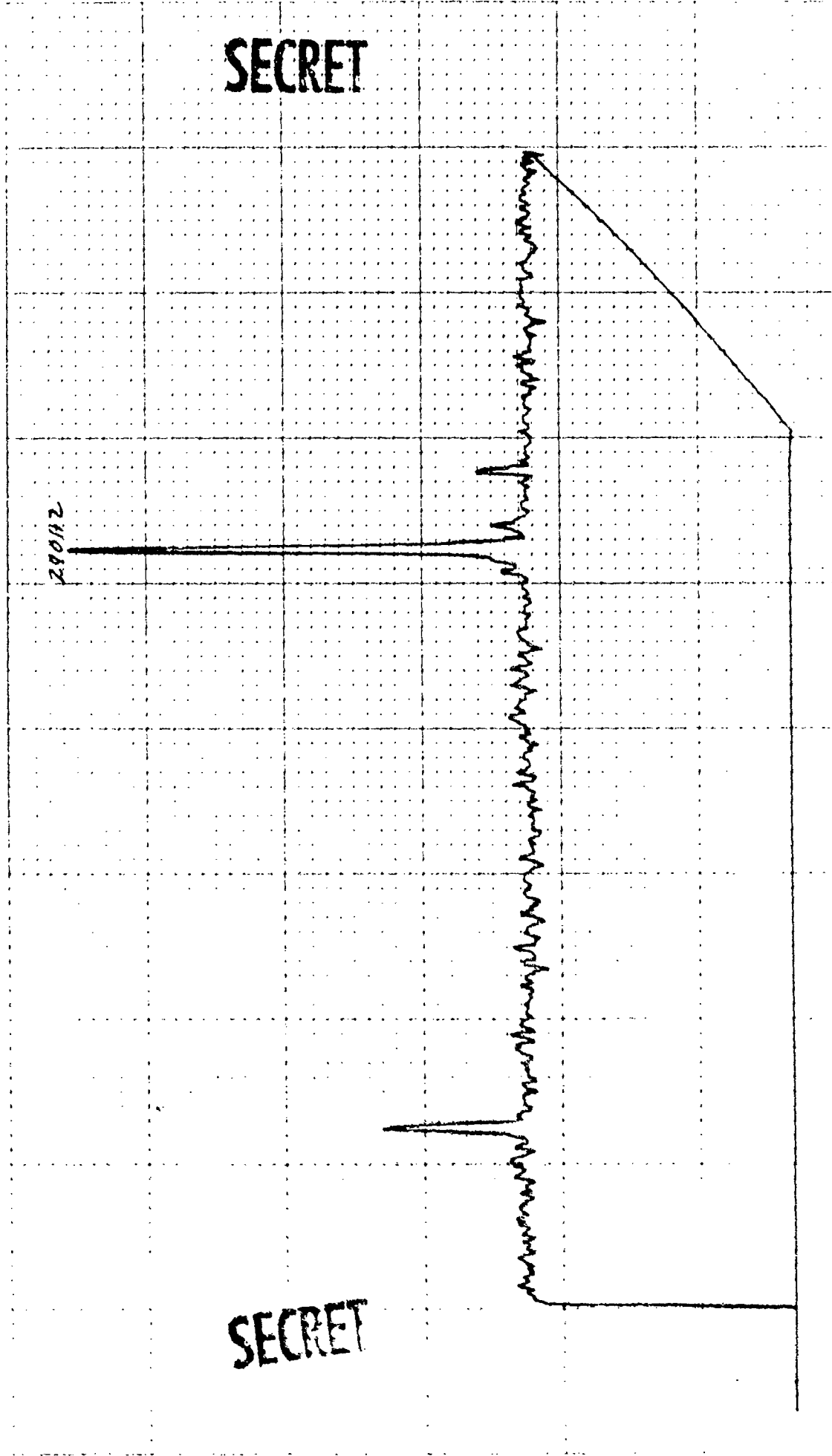


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CONTROL: 2.0 - 0202 (10)
 OMNI SPECTRUM (ELEMENT 20)
 EXERCISE: BEARING: STAKE
 CENTER FREQ: 280 HZ
 1 ELEMENT

DATE OF ANALYSIS:
 DATE/TIME: 2-8-77 - 0202 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 _____ DEG AZ STEERING

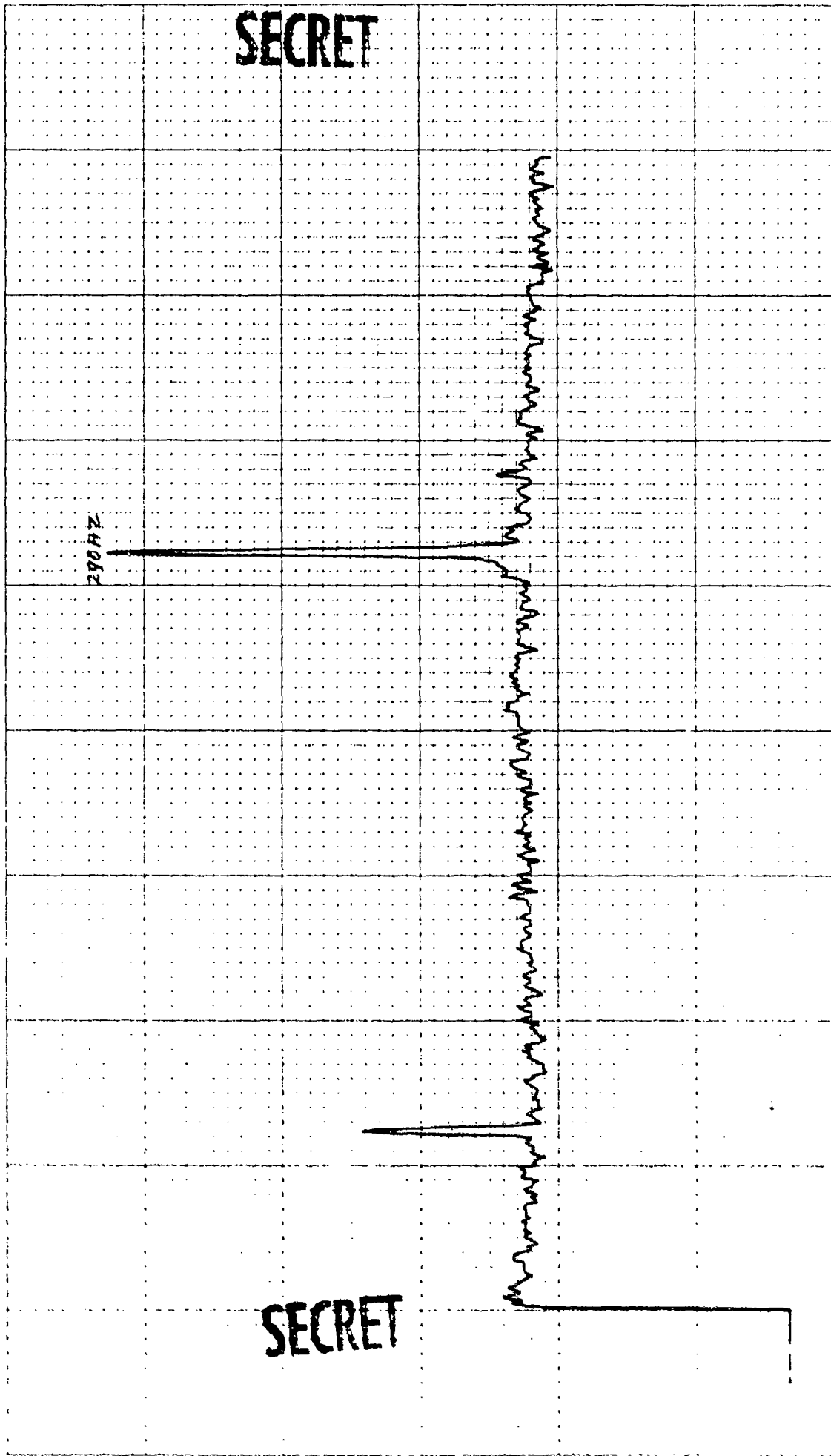
REEL: F29 INDEX: 145
 INTEGRATION TIME 320 SECS ATTEN: - DB
 FILTER WTG: HANNING



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CONTROL: 28 - 0202 (11) DATE OF ANALYSIS: REEL: F29 INDEX: 1145
 OMNI SPECTRUM (ELEMENT 23)
 EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTN: - DB
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
 1 ELEMENT DEC AZ STEERING



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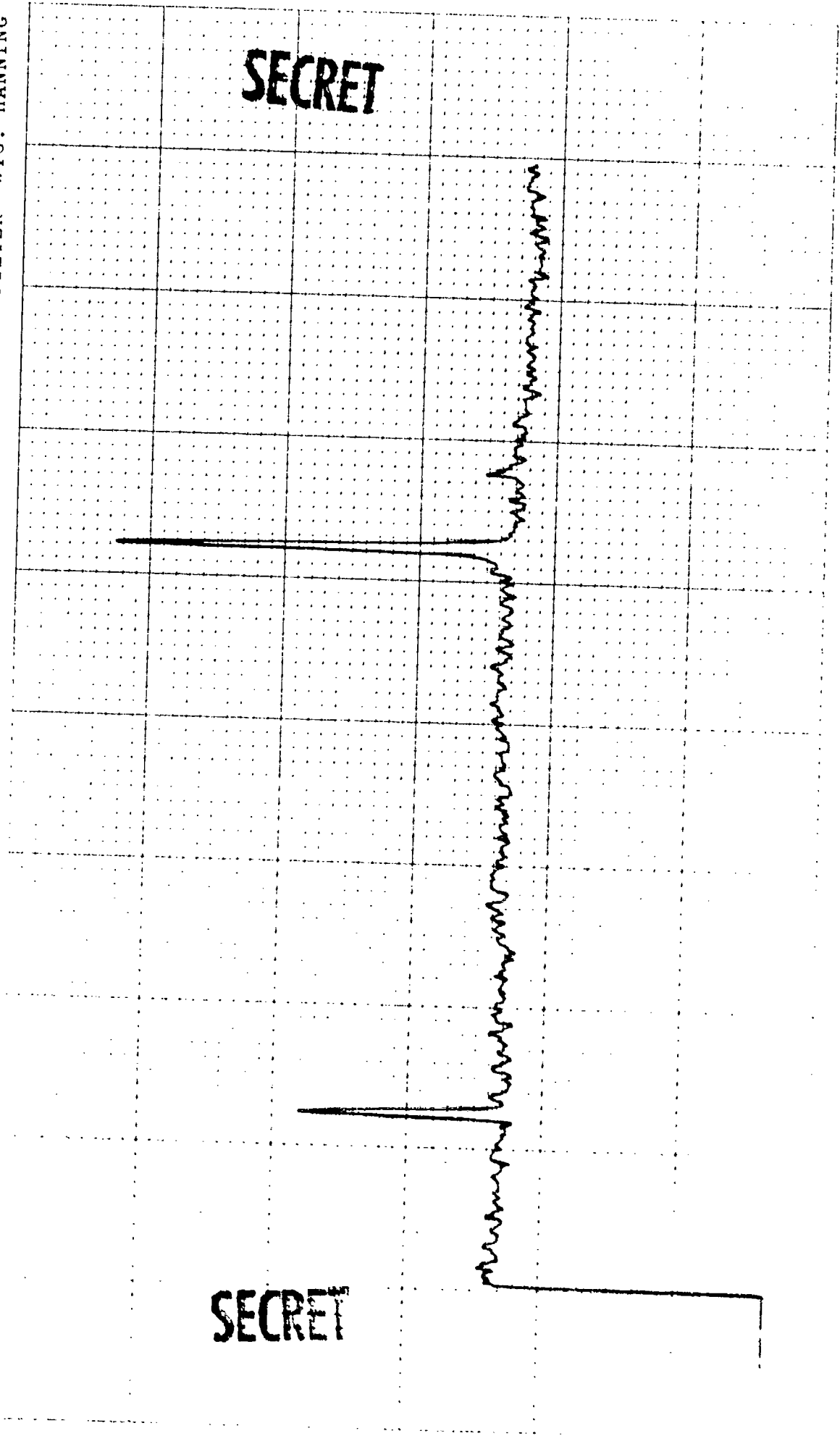
CONTROL: 2-8 - 0202 (12)
OMNI SPECTRUM (ELEMENT 24)
EXERCISE: BEAKING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 - 0202 Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ STEERING

REEL: F29 INDEX: 145

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



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INDEX 1/45

REEL: F29

DATE OF ANALYSIS:

CONTROL: 2-8 -0202 (13)

OMNI SPECTRUM (ELEMENT 26)

EXERCISE: BEARING STAKE

CENTER FREQ: 280 HZ

1 ELEMENT

DATE/TIME: 2-8-77 - 0202Z

ANALYSIS BANDWIDTH: 1/10HZ

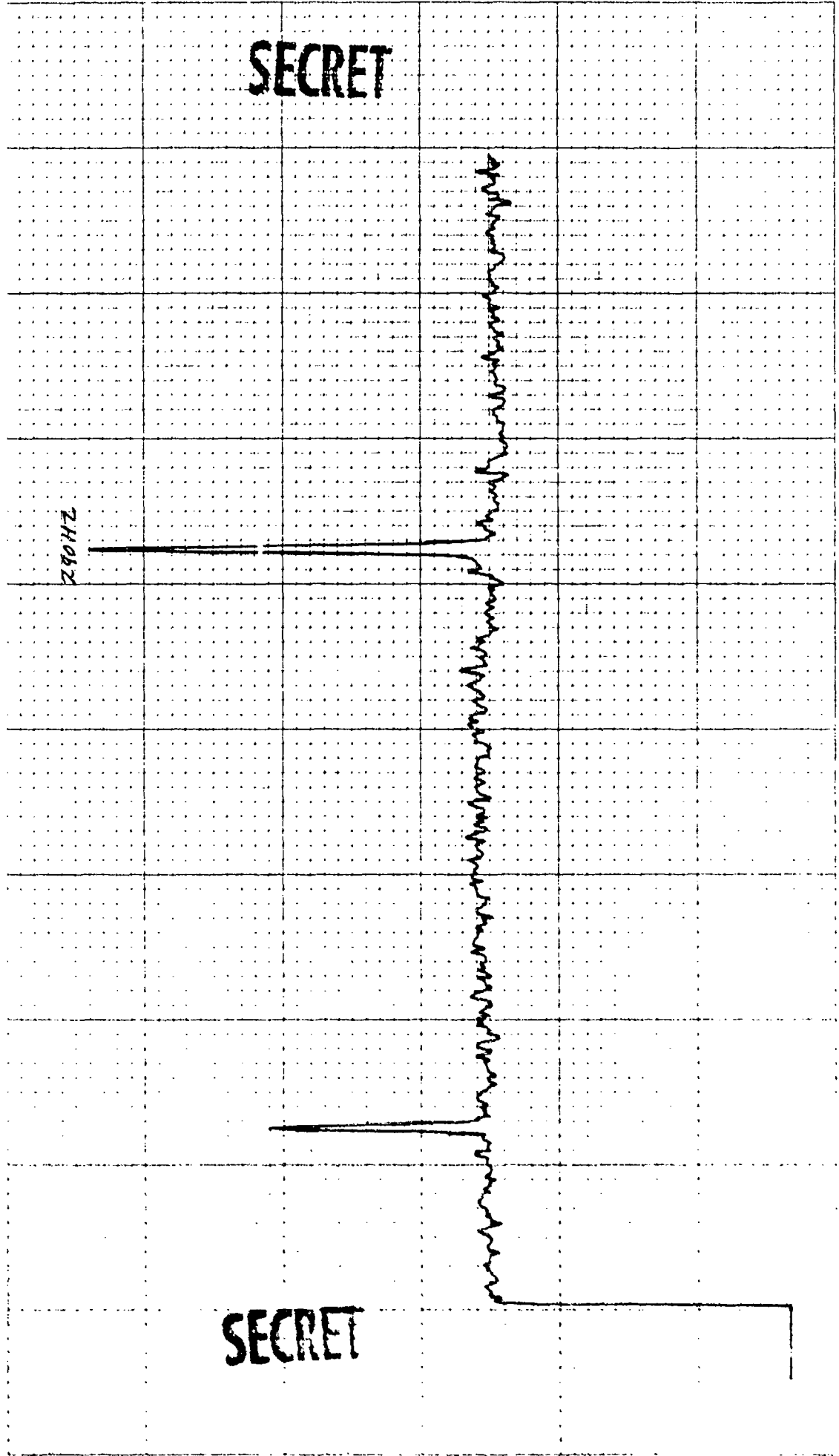
— DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

ATTEN: DB

WTC: HANNING



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REEL: F29 INDEX 1/45

DATE OF ANALYSIS: _____

CONTROL: 2-8-0202 (14)

OMNI SPECTRUM (ELEMENT 29)

EXERCISE: BEARING STAKE

CENTER FREQ: 280 HZ

1 ELEMENT

DATE/TIME: 2-8-77 - 0202Z

ANALYSIS BANDWIDTH: 1/10 HZ

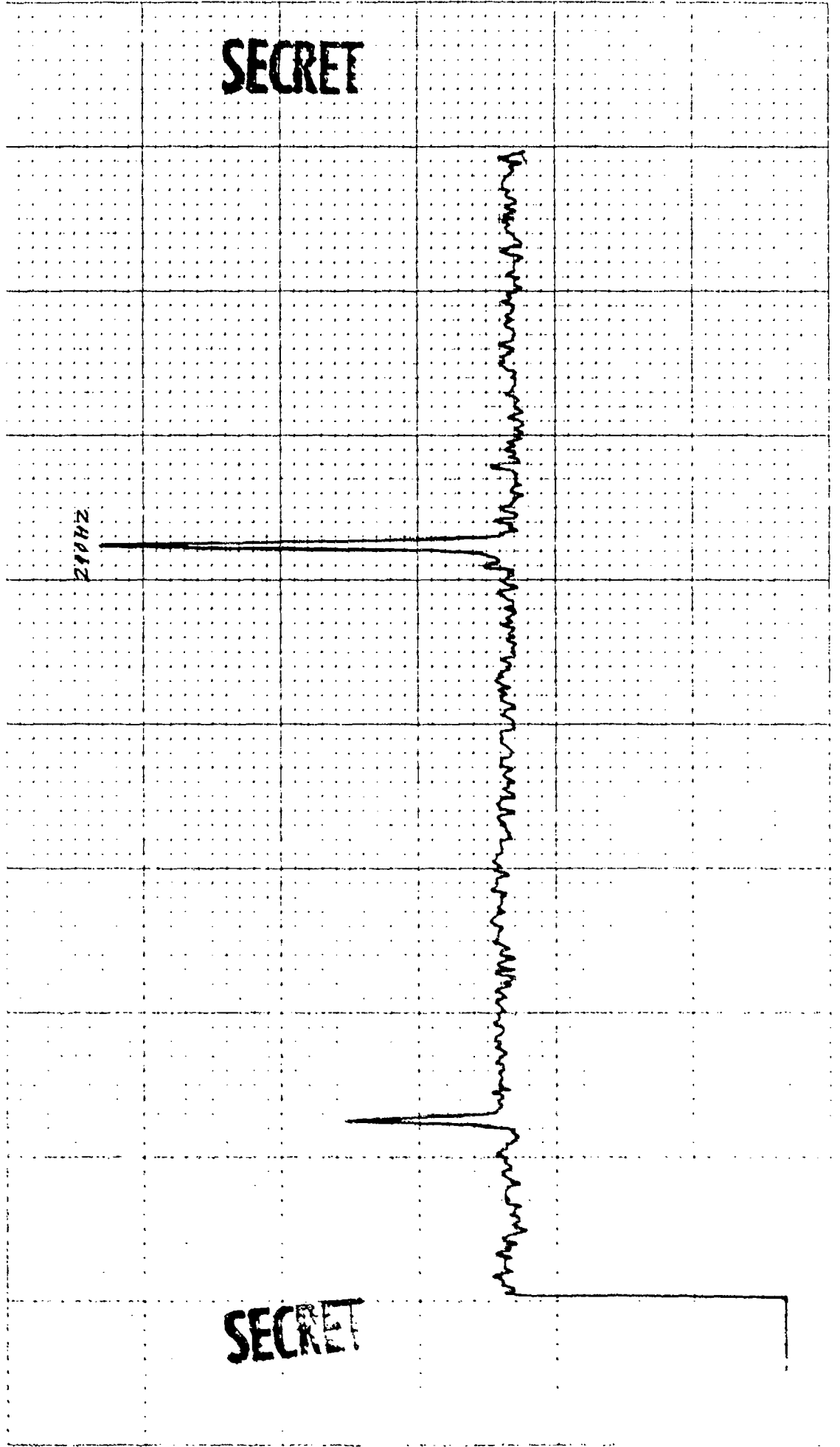
_____ DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER _____

ATTEN: - DB

WTC: HANNING



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INDEX 1145

REEL: F29

DATE OF ANALYSIS:

CONTROL: 0202 - 51 (D07)

OMNI SPECTRUM (ELEMENT 31)

DATE/TIME: 2-8-77 - 0202 Z

ANALYSIS BANDWIDTH: 1/10HZ

INTEGRATION TIME 320 SECS

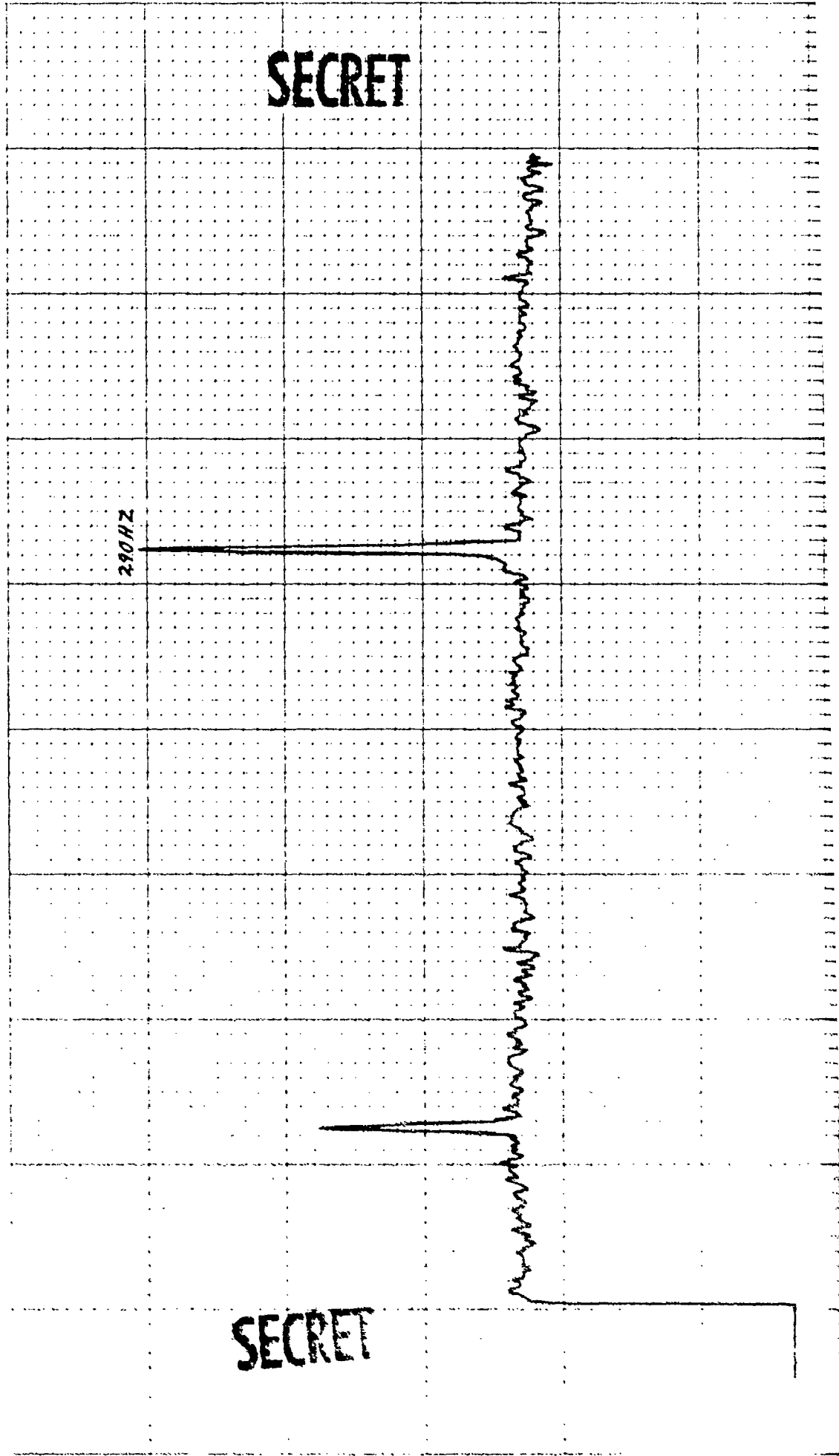
ATTEN: - DB

- DEG AZ STEERING

FILTER WTG: HANNING

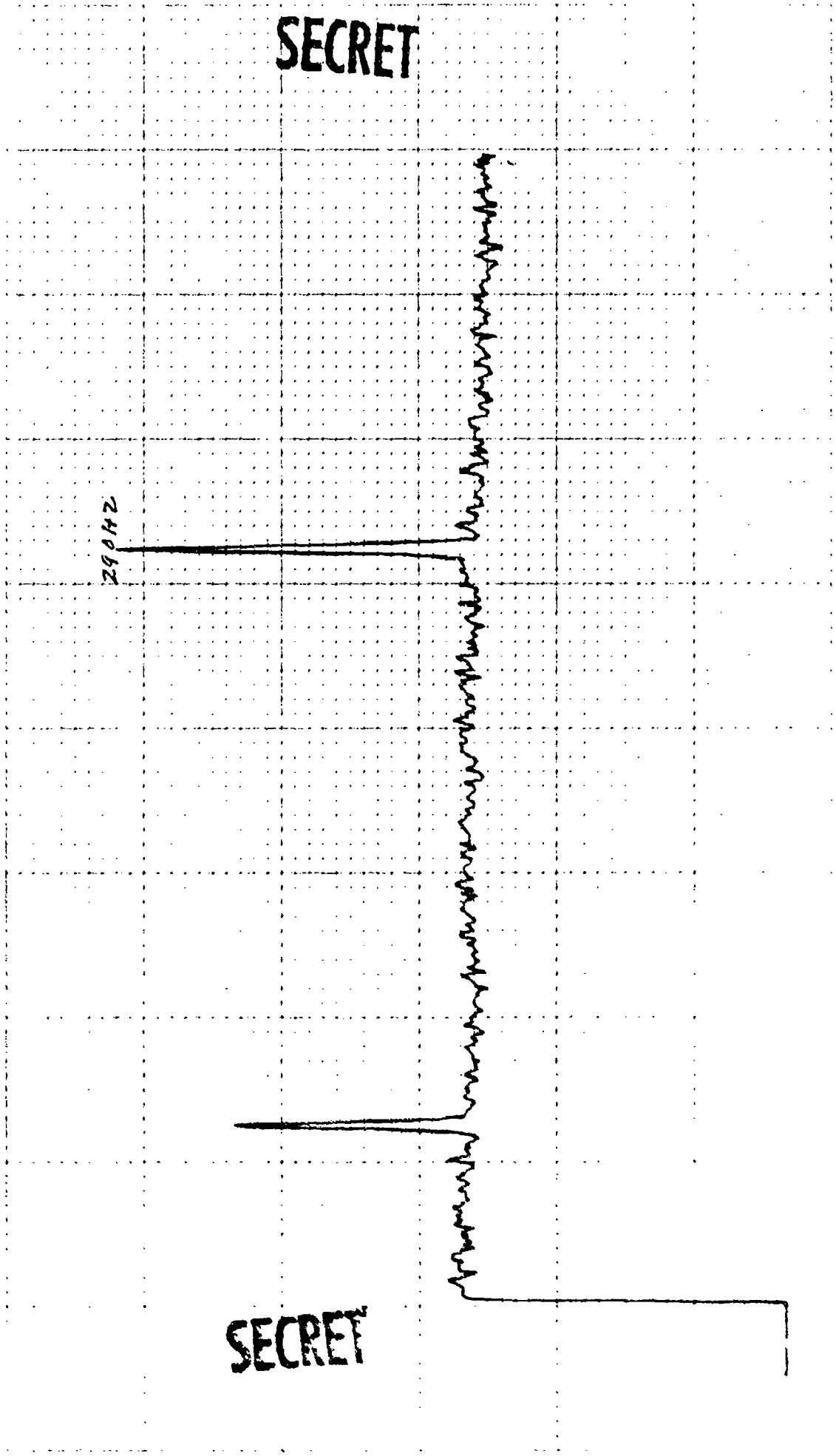
CENTER FREQ: 280 HZ

1 ELEMENT



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CONTROL: 2-8 -0202 (16) DATE OF ANALYSIS: PEEL: F29 INDEX: 1145
 OMNI SPECTRUM ELEMENT 23
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
 I ELEMENT
 DATE/TIME: 2-8-77 -0202Z
 ANALYSIS BANDWIDTH: 1/10HZ
 — DEC AZ STEERING
 INTEGRATION TIME 320 SECS ATTEN: DB
 FILTER WTG: HANNING



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REF ID: A66792

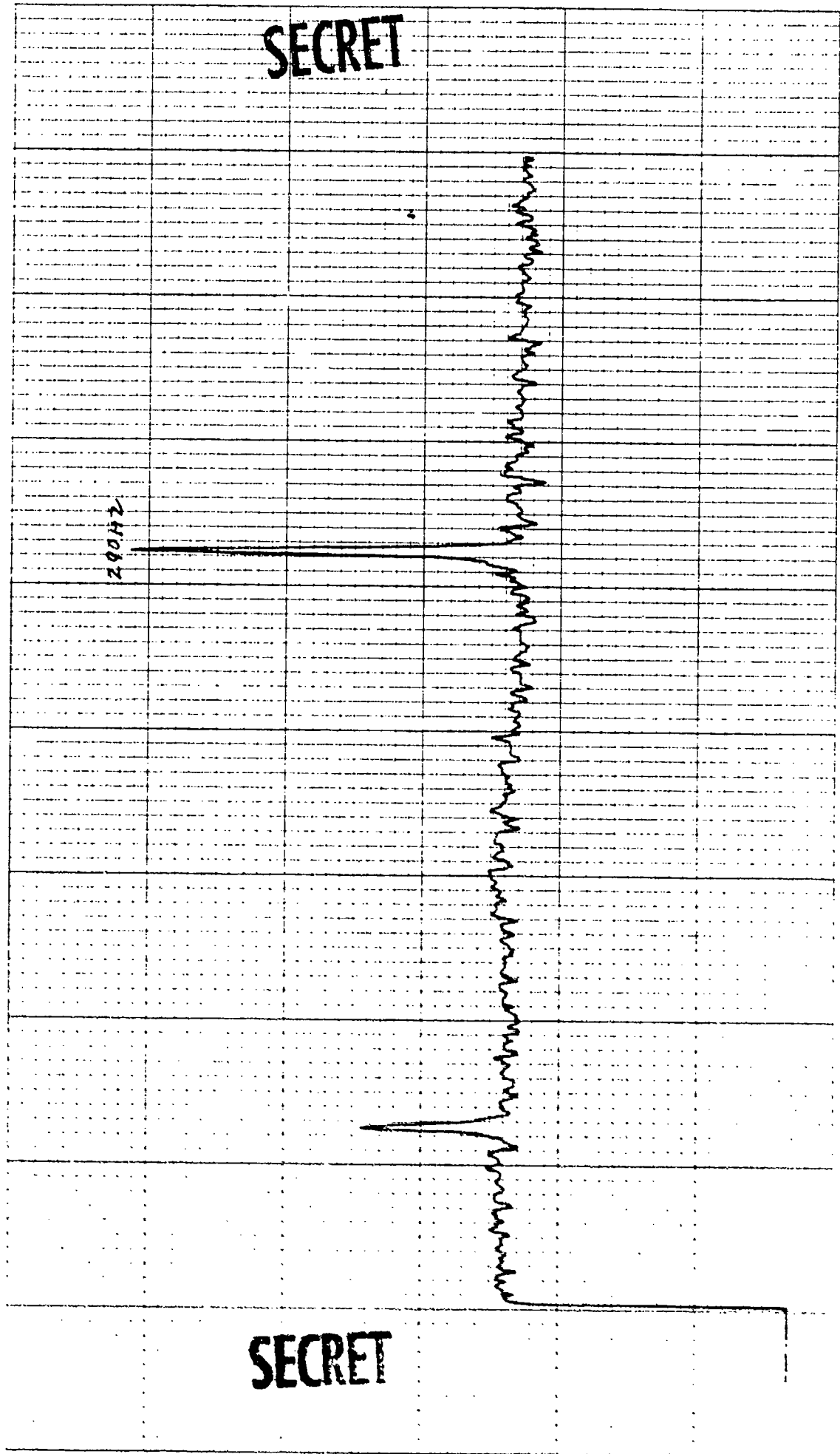
CONTROL: 2-8 - 0202 (18)
OMNI SPECTRUM (ELEMENT 37)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 - 0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F29 INDEX: 1145

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



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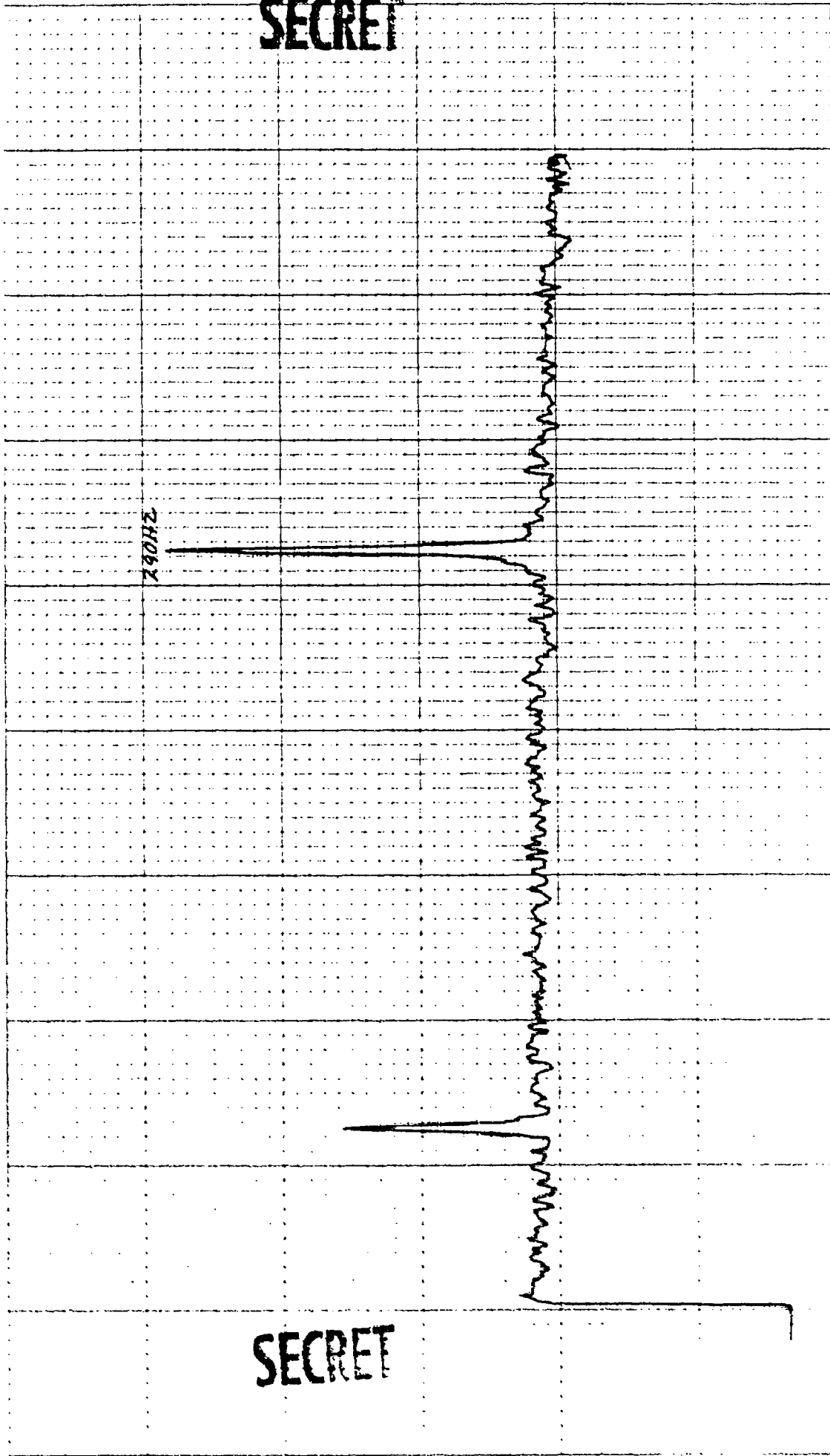
142 5000 12106 0010 0010 0010

REEL: F29 INDEX: 1145

INTEGRATION TIME 320 SECS
FILTER WTG: HANNING

DATE OF ANALYSIS:
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEC AZ STEERING

CONTROL: 2-8 - 0202 (19)
OMNI SPECTRUM (ELEMENT 39)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT



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INDEX/145

REEL: F29

DATE OF ANALYSIS:

CONTROL: 2-0 -0202 (2/)

OMNI SPECTRUM (ELEMENT 43)

EXERCISE: BEARING STAKE

CENTER FREQ: 280 HZ

1 ELEMENT

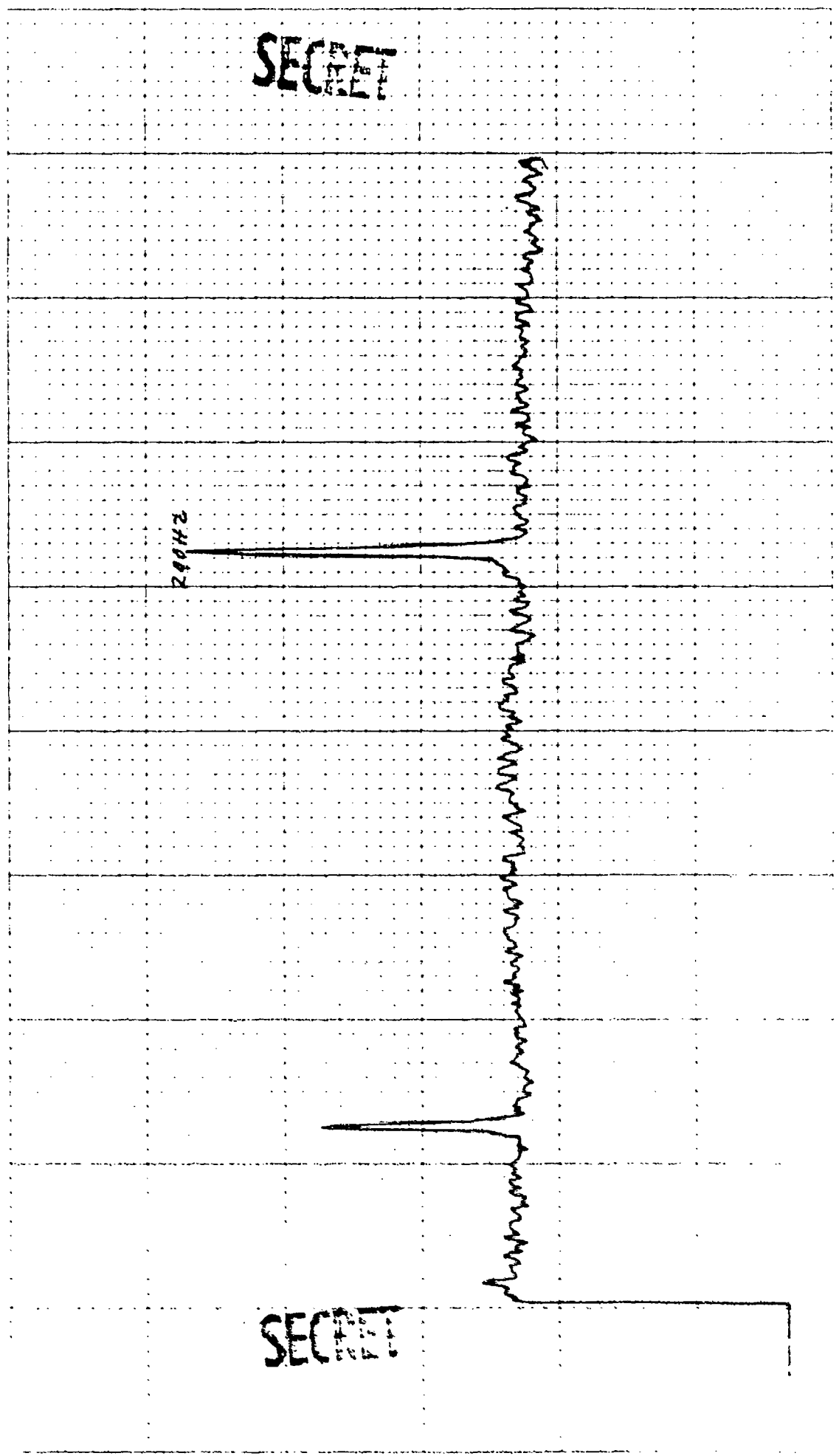
DATE/TIME: 2-8-77 - 0202 Z

ANALYSIS BANDWIDTH: 1/10HZ

DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER WTC: HANNING



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280HZ

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REF ID: A66843

REEL: F29 INDEX: 1145

DATE OF ANALYSIS:

CONTROL: 2-8 -0202 (22)

OMNI SPECTRUM (ELEMENT 45)

EXERCISE: BEARING STAKE

CENTER FREQ: 280 HZ

1 ELEMENT

DATE/TIME: 2-8-77 -0102 Z

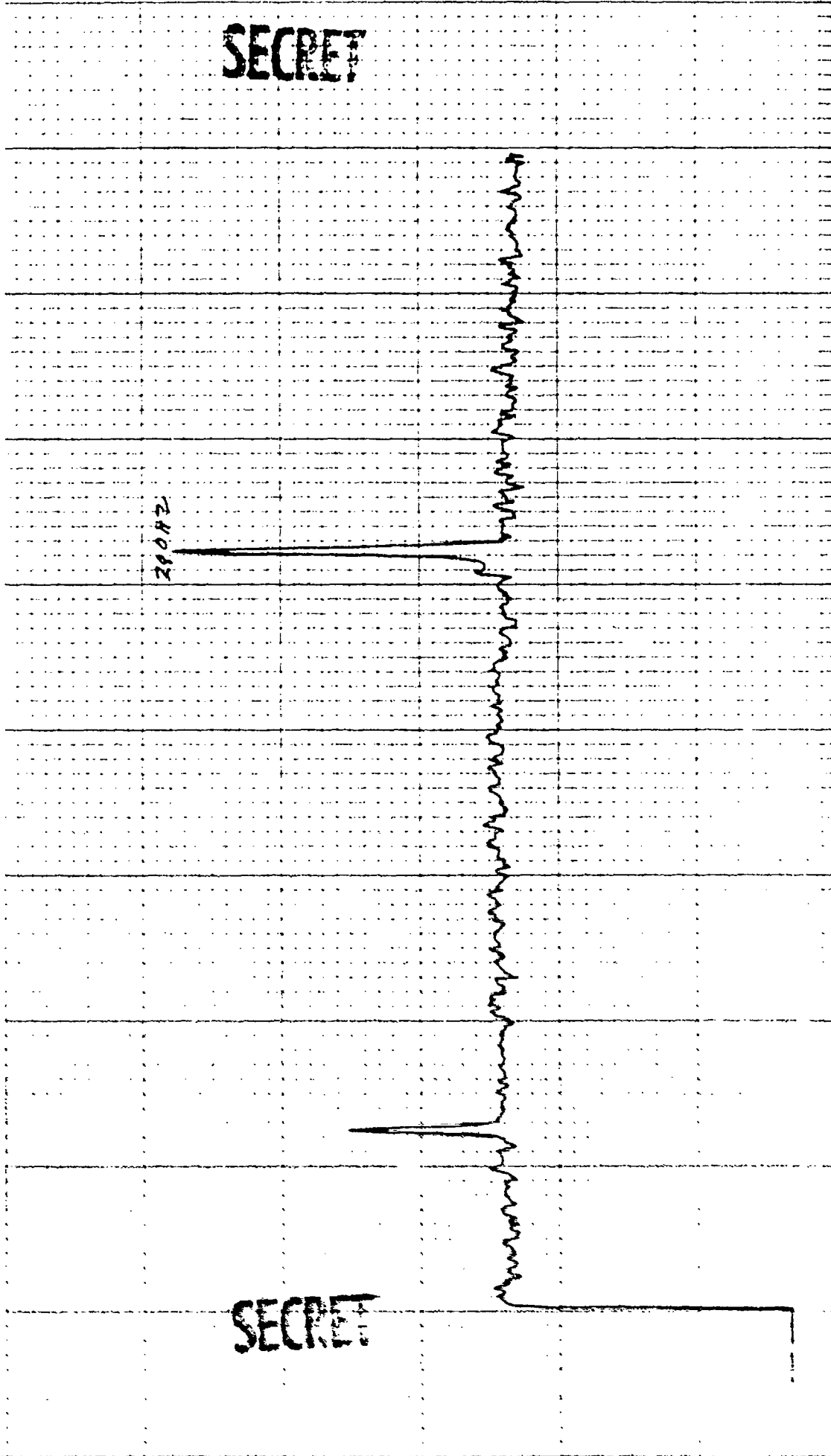
ANALYSIS BANDWIDTH: 1/10HZ

 DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER ATTEN: DB

WTC: HANNING

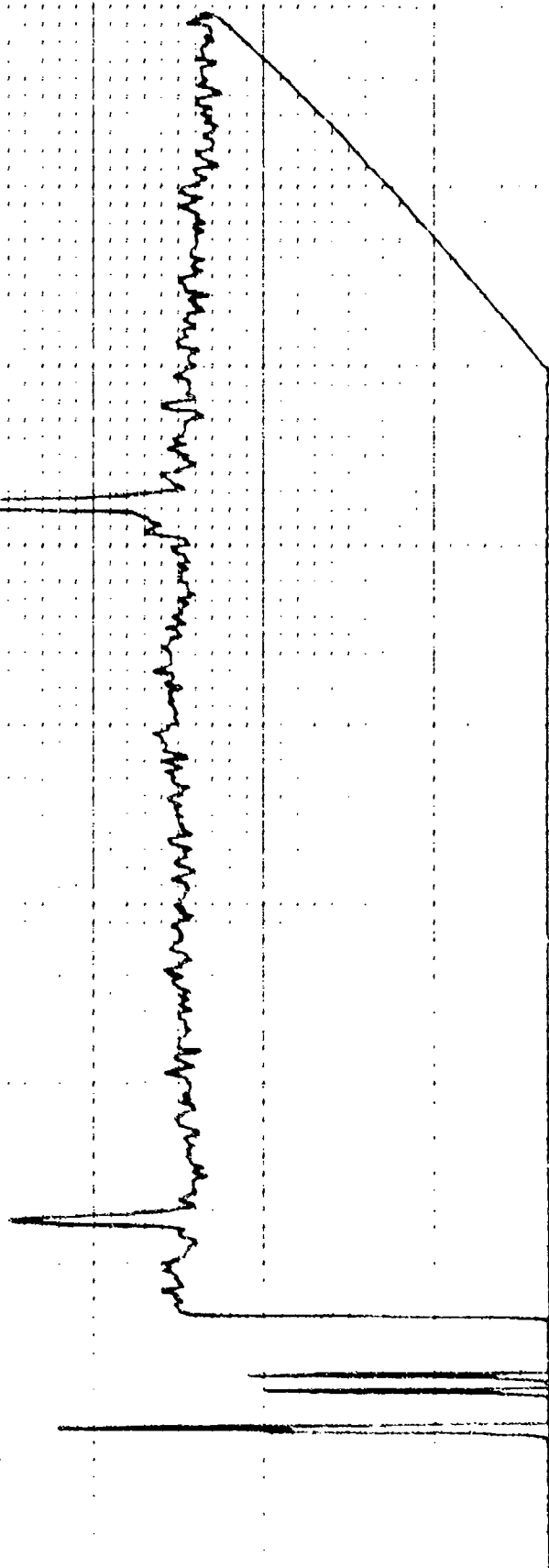


CONTROL: 2-8 - 0202 (23) DATE OF ANALYSIS: PEEL: F29 INDEX: 1145
 OMNI SPECTRUM (ELEMENT 47)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 2800 HZ
 1 ELEMENT
 DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTEN: DB
 ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING

290HZ

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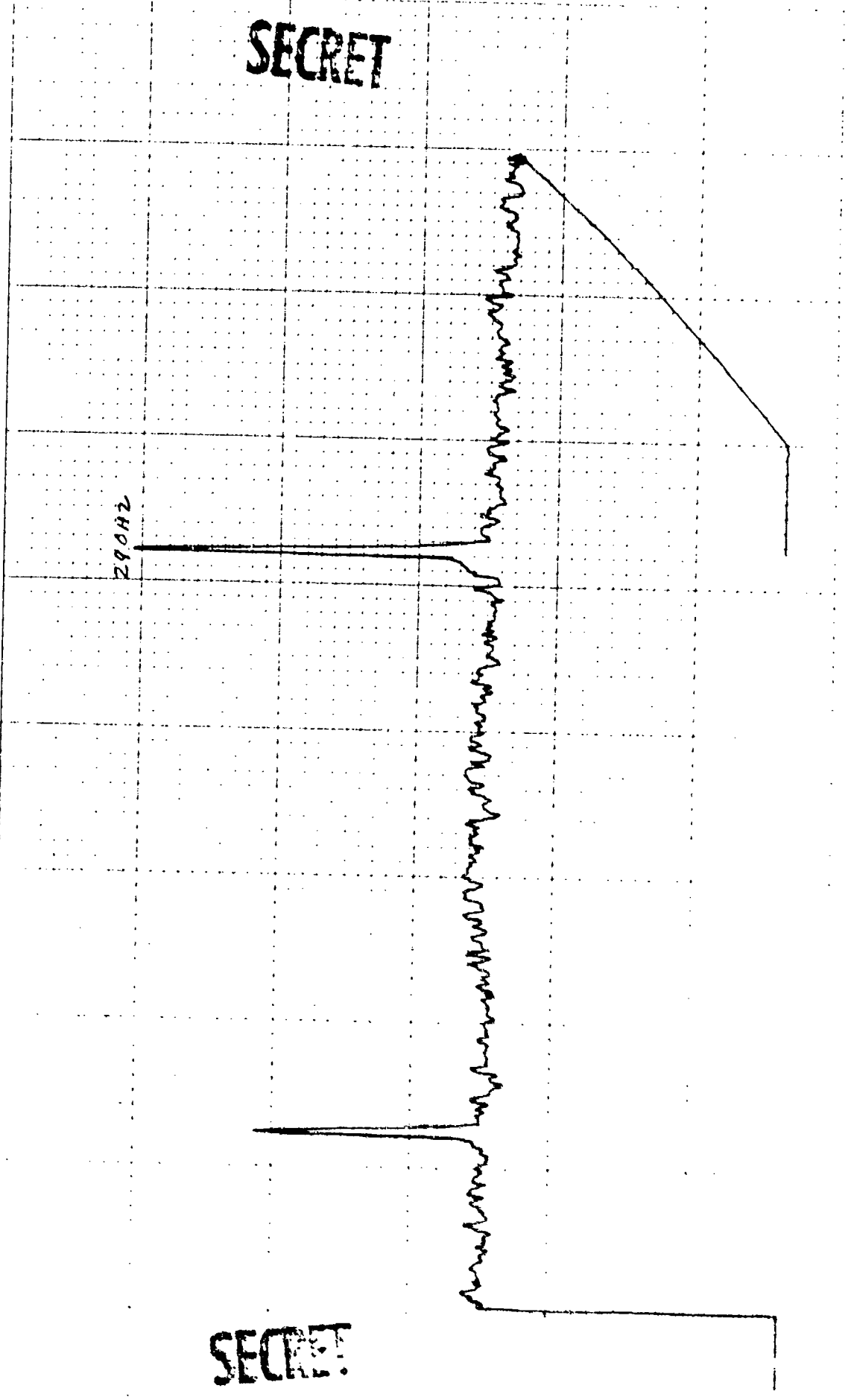
CONTROL: 2-0 - 0202 (24)
OMNI SPECTRUM (ELEMENT 49)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
I ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-0-77 - 0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F29 INDEX: 145

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



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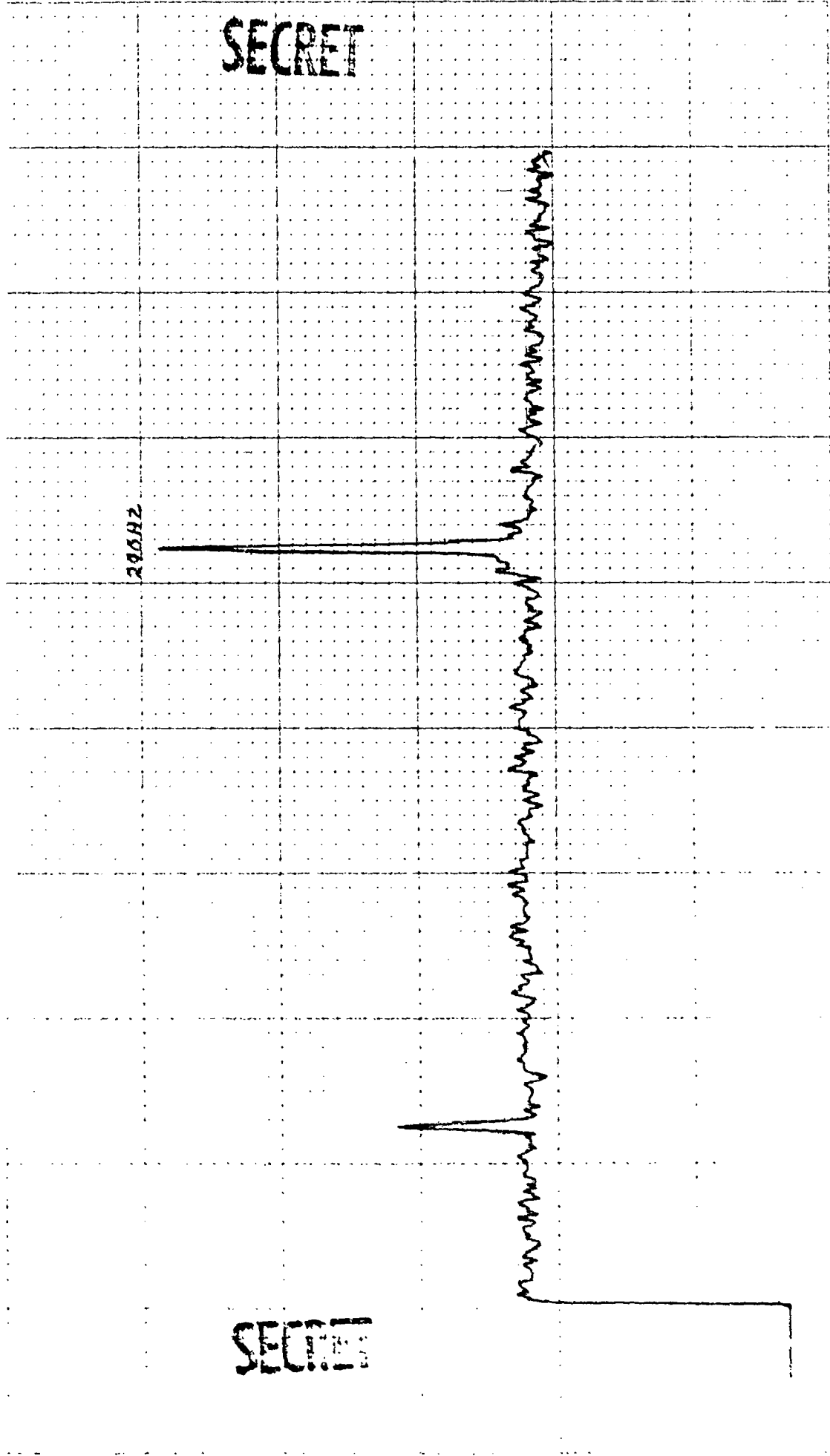
CONTROL: 2-8 -0202 (25)
OMNI SPECTRUM (ELEMENT 51)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-8-77 -0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F29 INDEX 145

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



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46 0702

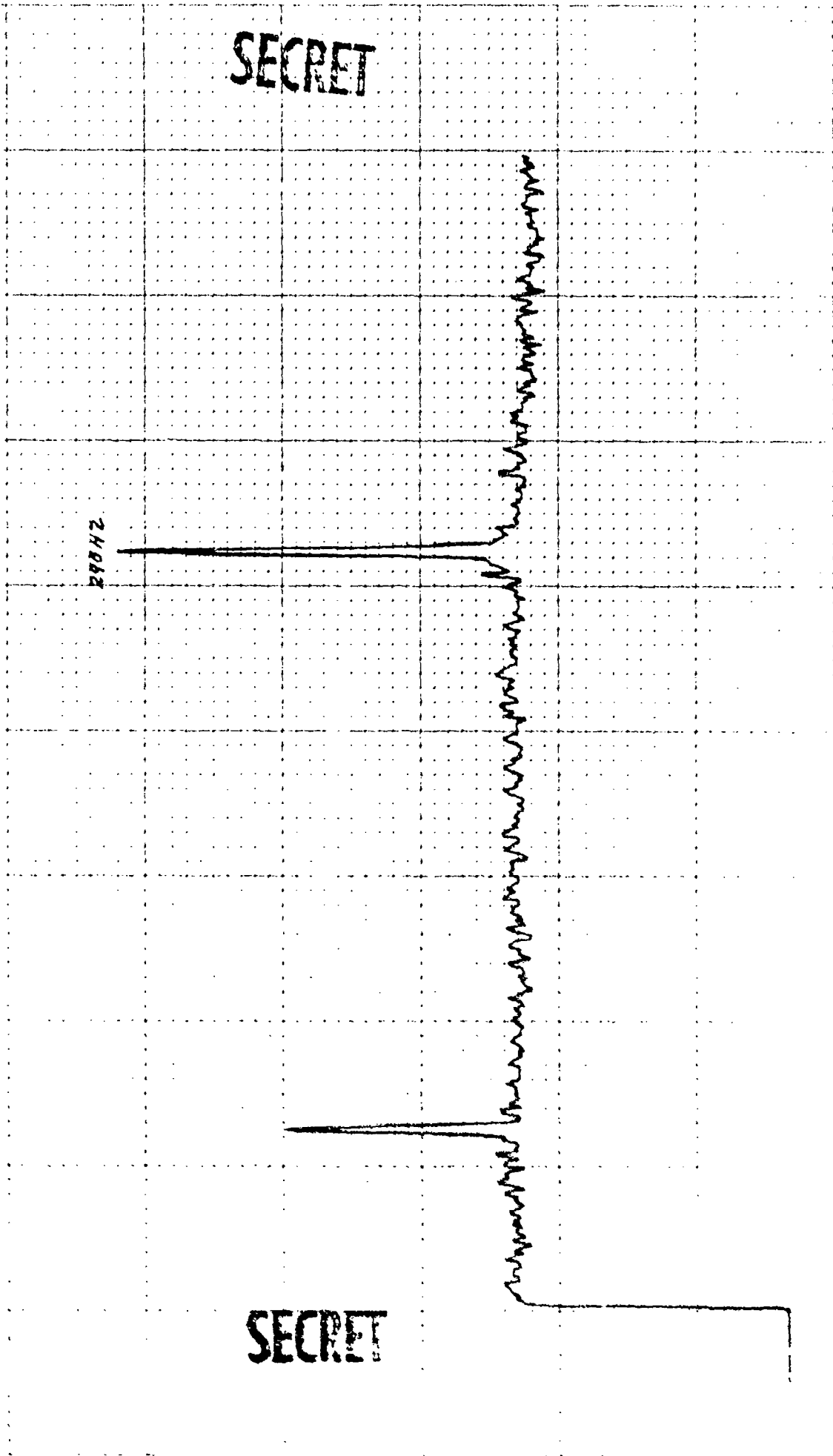
CONTROL: 2-0 - 0202 (26)
OMNI SPECTRUM (ELEMENT 53)
EXERCISE: BEARING, STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

DATE OF ANALYSIS:

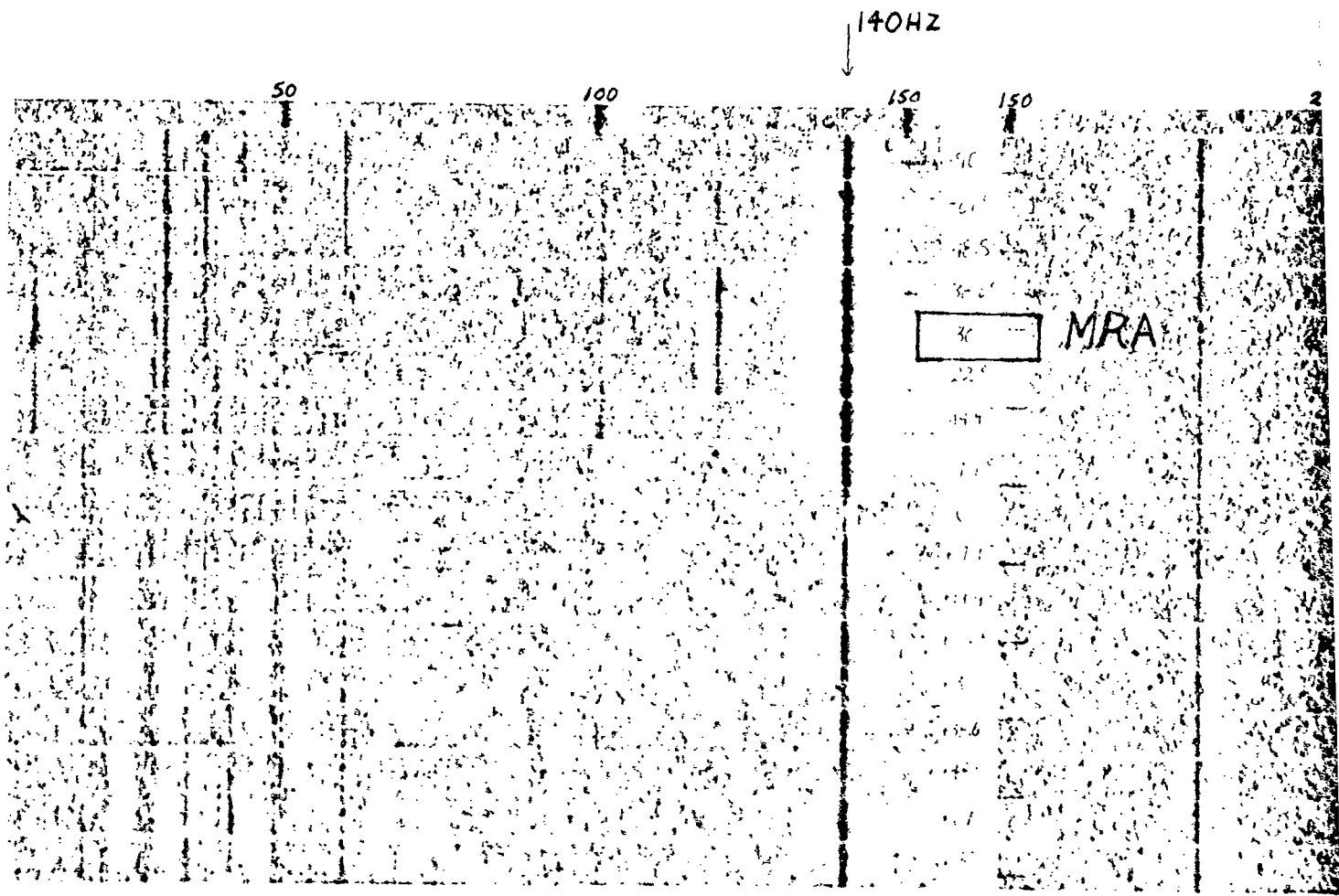
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F29 INDEX: 145

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



SECRET



CONTROL NUMBER _____
 NUMBER OF ELEMENTS _____
 FREQUENCY BAND _____ TO _____ HZ
 RANGE _____ N.M.

H I S T O R Y
 TAPE REEL NUMBER _____

ANALYSIS BAND WIDTH _____ HZ
 WATER DEPTH _____ FMS

FORM
 DATE
 ENR/C

1

140HZ

SECRET

290HZ

295HZ

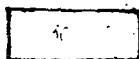
150

150

200

250

300



MRA

HISTORICAL

TAPE REEL NUMBER

TAPE COUNT

SECRET

ELEMENT NUMBERS

DATE

EXERCISE: BEARING STAKE

SAN-XXX-78-0135

ANALYSIS BAND WIDTH

Hz

WATER DEPTH

FMS

EMISS
TE
SIC

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 7

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-22.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-12.8	
BEAMFORMER GAIN	<u>+24</u>	+11.2	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	+11.4	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-65.4</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-55.4	
BEAMFORMER GAIN	<u>+24</u>	-31.4	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+11.2</u>	
SIGNAL LEVEL FOR SNR	<u>-31.4</u>	42.6	
PROCESSOR CORRECTION	<u>-4.0</u>	38.6	
MRA CORRECTION	<u>+ .2</u>	38.8	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	30.6	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 7

FREQUENCY 296 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-26.6</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-16.6	
BEAMFORMER GAIN	<u>+24</u>	+7.4	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	+8.2	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-71.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-61.8	
BEAMFORMER GAIN	<u>+24</u>	-37.8	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+8.2</u>	
SIGNAL LEVEL FOR SNR	<u>-37.8</u>	45	
PROCESSOR CORRECTION	<u>-4.0</u>	41	
MRA CORRECTION	<u>+ .8</u>	41.8	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	33.6	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 7

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-62.4</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-52.4	
BEAMFORMER GAIN	<u>+24</u>	-28.4	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	-27.6	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-71.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-61.8	
BEAMFORMER GAIN	<u>+24</u>	-37.8	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-27.6</u>	
SIGNAL LEVEL FOR SNR	<u>-37.8</u>	10.2	
PROCESSOR CORRECTION	<u>-5.6</u>	4.6	
MRA CORRECTION	<u>+ .8</u>	5.4	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-0.2</u>	-2.8	SNR 1 HZ BAND

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CONFIDENTIAL

DATA POINT 7

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-16.0</u>	<u>-17.5</u>	<u> </u>
MRA SIGNAL LEVEL	<u>+11.2</u>	<u>+ 8.2</u>	<u>-27.6</u>
ARRAY SIGNAL GAIN	<u>27.4</u>	<u>25.7</u>	<u> </u>
20 LOG <u>16</u>	<u>24</u>	<u>24</u>	<u> </u>
# of elements			
DIFFERENCE	<u>+3.4</u>	<u>+1.7</u>	<u> </u>

ARRAY GAIN

MRA SNR	<u>38.0</u>	<u>41.8</u>	<u>5.4</u>
MEAN OMNI SNR	<u>29.4</u>	<u>35.4</u>	<u> </u>
ARRAY GAIN	<u>9.4</u>	<u>6.4</u>	<u> </u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>10.0</u>	<u>12.0</u>	<u>11.7</u>
DIFFERENCE	<u>- .6</u>	<u>-5.6</u>	<u> </u>

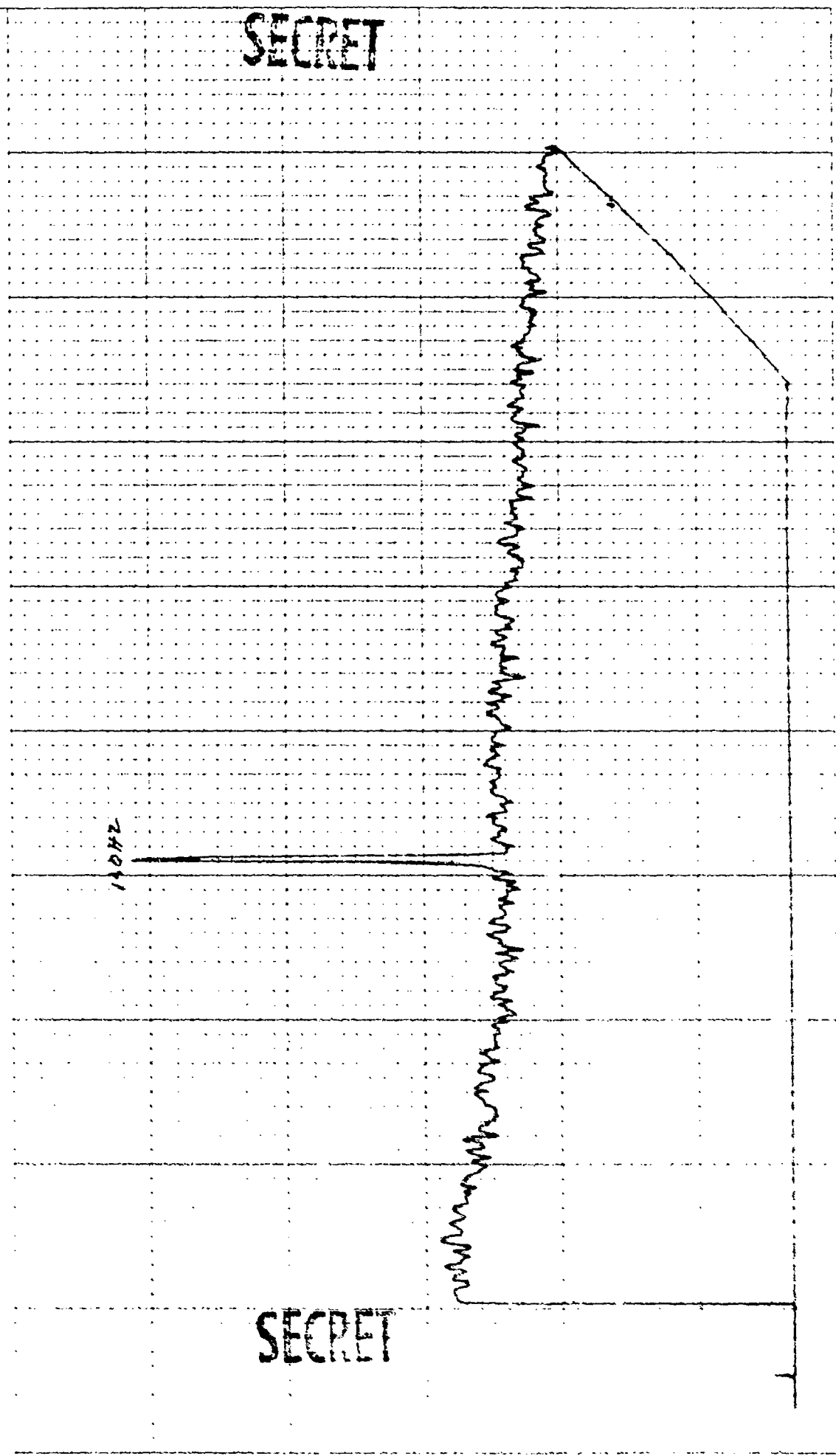
CONFIDENTIAL

46 0703

CONTROL: 0202 - 16 (DP7)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 MHz
16 ELEMENTS

DATE OF ANALYSIS: / - /
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-12 DEG. AZ STEERING

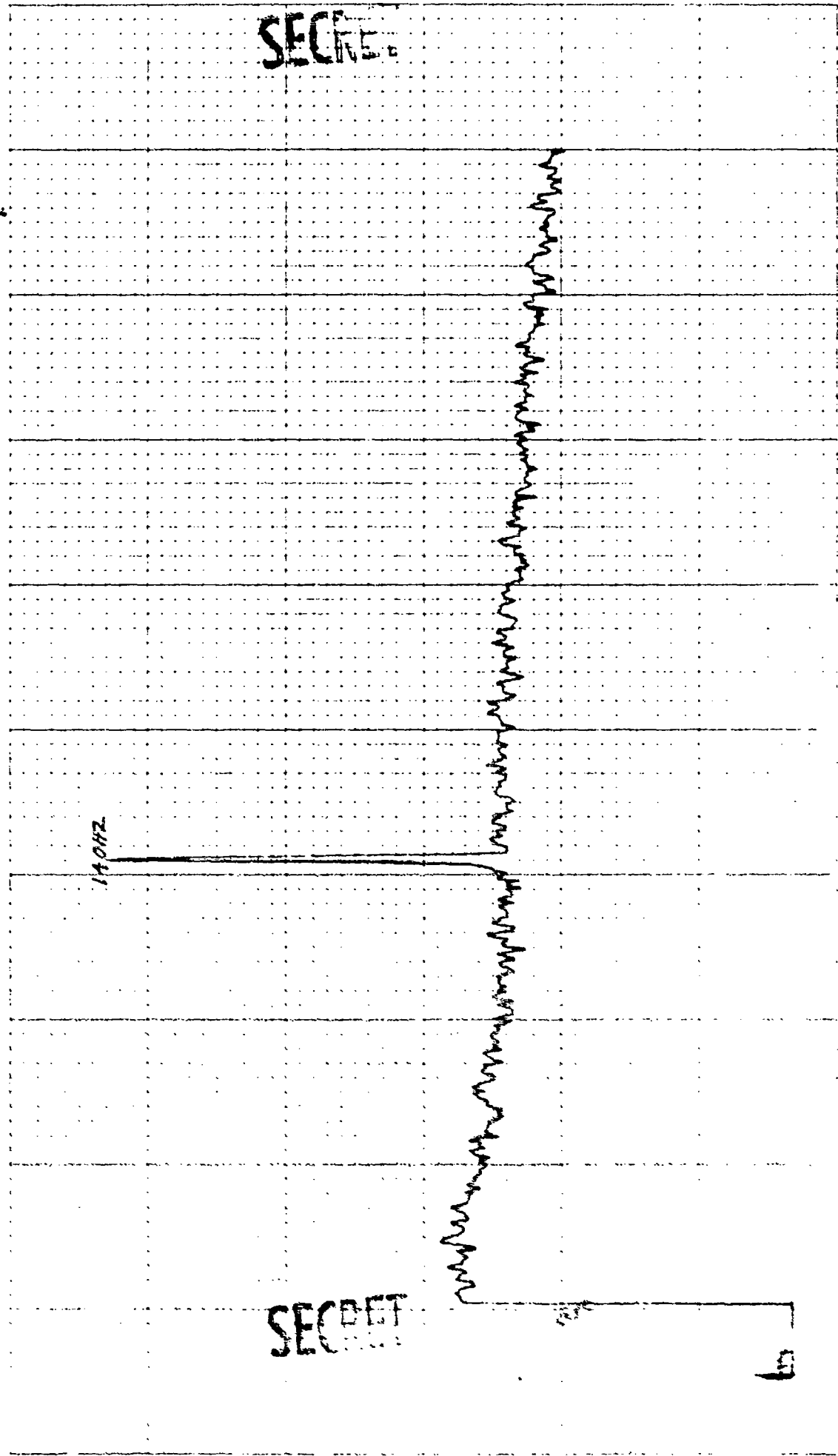
REEL: F29 INDE X1145
INTEGRATION TIME 320 SECS
ATTEN: -24 DB
FILTR: WTG: HANNING



46 0703

CONTROL: 0202 - 16 (DP7) DATE OF ANALYSIS: - - - -
 BEAMFORMED SPECTRUM (ELEMENTS) 1-16
 EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0201Z
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1710HZ
 16 ELEMENTS -14 DEG. AZ STEERING

REEL: F89 INDE X145
 INTEGRATION TIME 320 SECS ATTEN: -24 DB
 FILTER WTC: HANNING



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SECRET

67

45 0703

CONTROL: 0202 - 16 (007)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
15 ELEMENTS

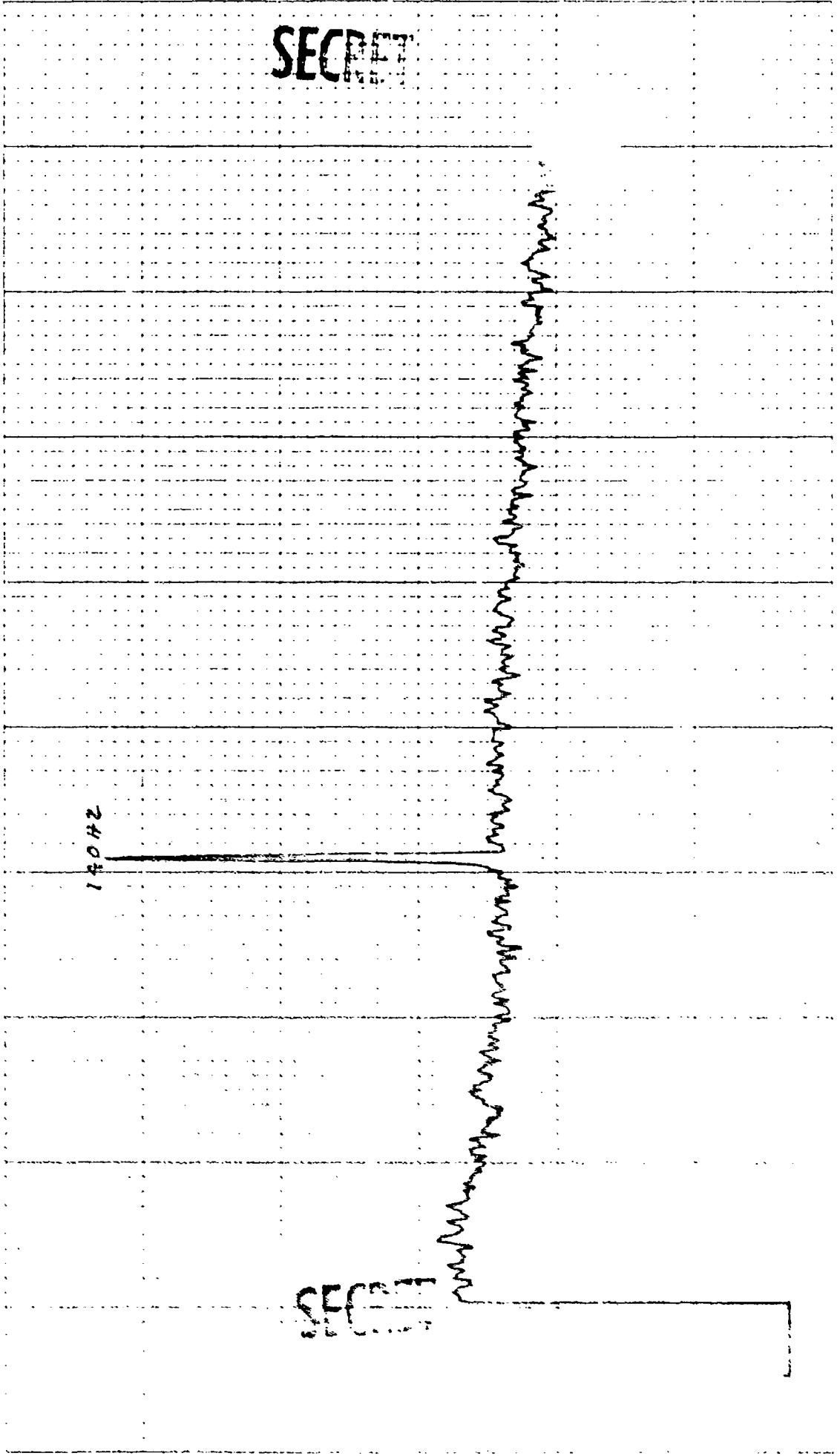
DATE OF ANALYSIS: 1-16
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-1/4 DEG. AZ STEERING

REEL: F29 INDE X/VS
INTEGRATION TIME 320 SECS ATTN: -24 DB
FILTER WTC: HANNING

140 HZ

SECRET

SECRET



46 0703

CONTROL: 0202 - 16 (DPT)
BEAMFORMED SPECTRUM ELEMENTS
EXERCISE: BEAPING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-8-77 - 0202 Z
ANALYSIS BANDWIDTH: 1/10HZ
-10 DEG. AZ STEERING

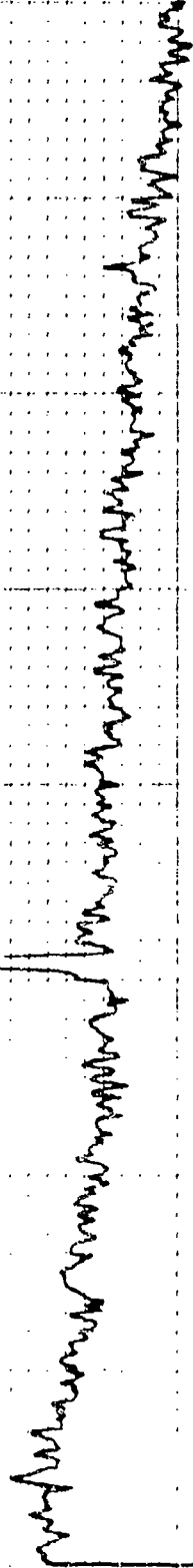
REEL: F29
INTEGRATION TIME 320 SECS
ATTEN: -2V DB
FILTER WTC: HANNING

INDE X 1195

130112

SECRET

SECRET

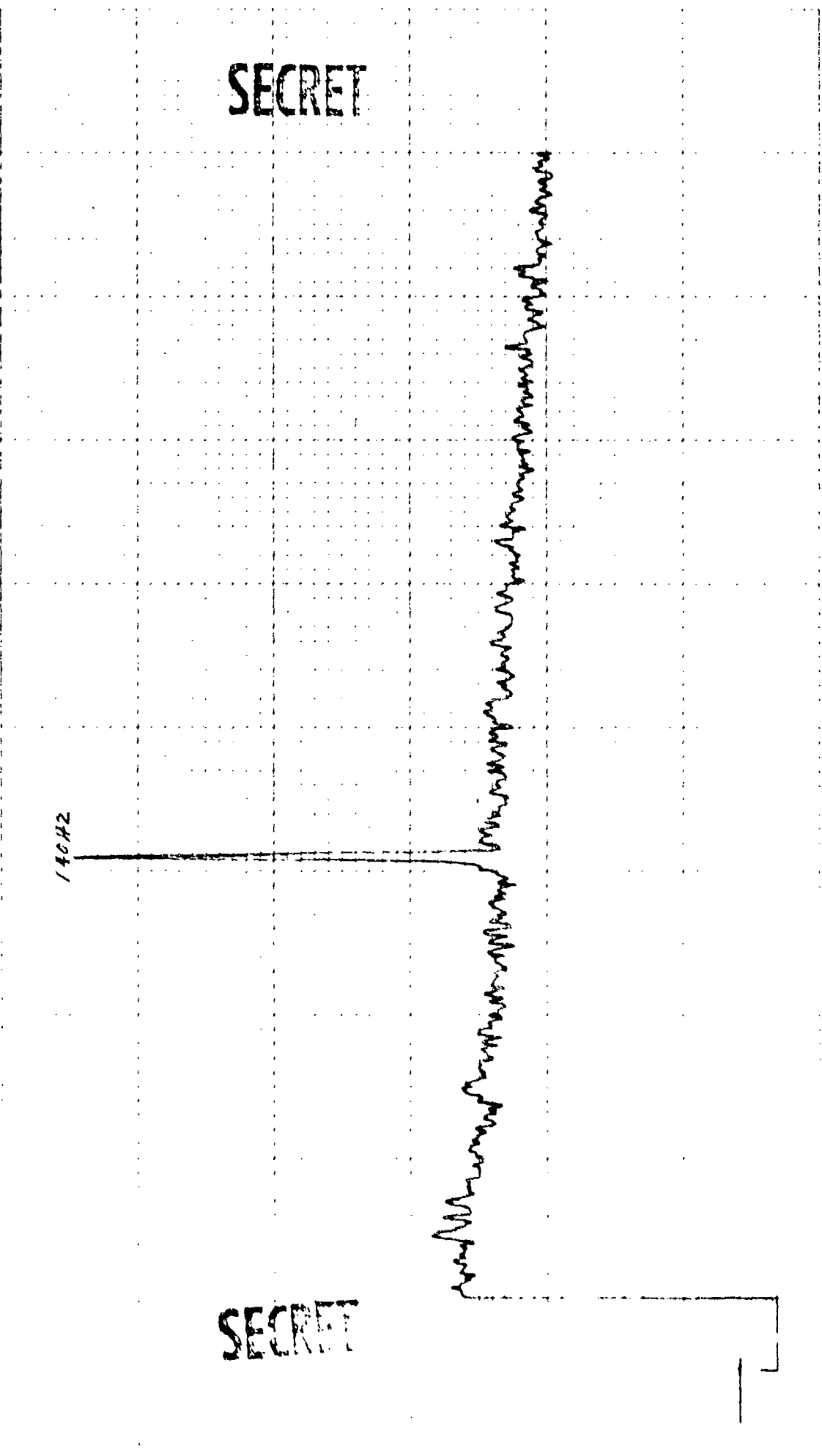


45 3793

CONTROL: 0202 - 16 (DPT)
 BEAMFORMED SPECTRUM ELEMENTS
 EXERCISE: BEARING STAYE
 CENTER FREQ: 150 HZ
 16 ELEMENTS

DATE OF ANALYSIS: - - -
 DATE/TIME: 2-8-77 - 0202 Z
 ANALYSIS BANDWIDTH: 1710HZ
 -19.5 DEG. AZ STEERING

REEL: F09
 INTEGRATION TIME 320 SECS
 FILTERED WTG: HANNING
 INDE X/195



SECRET

SECRET

45 0703

CONTROL: 0202 - 16 (007)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16

DATE/TIME: 2-8-77 - 0202Z

ANALYSIS BANDWIDTH: 1/10HZ
-22 DEG. AZ STEERING

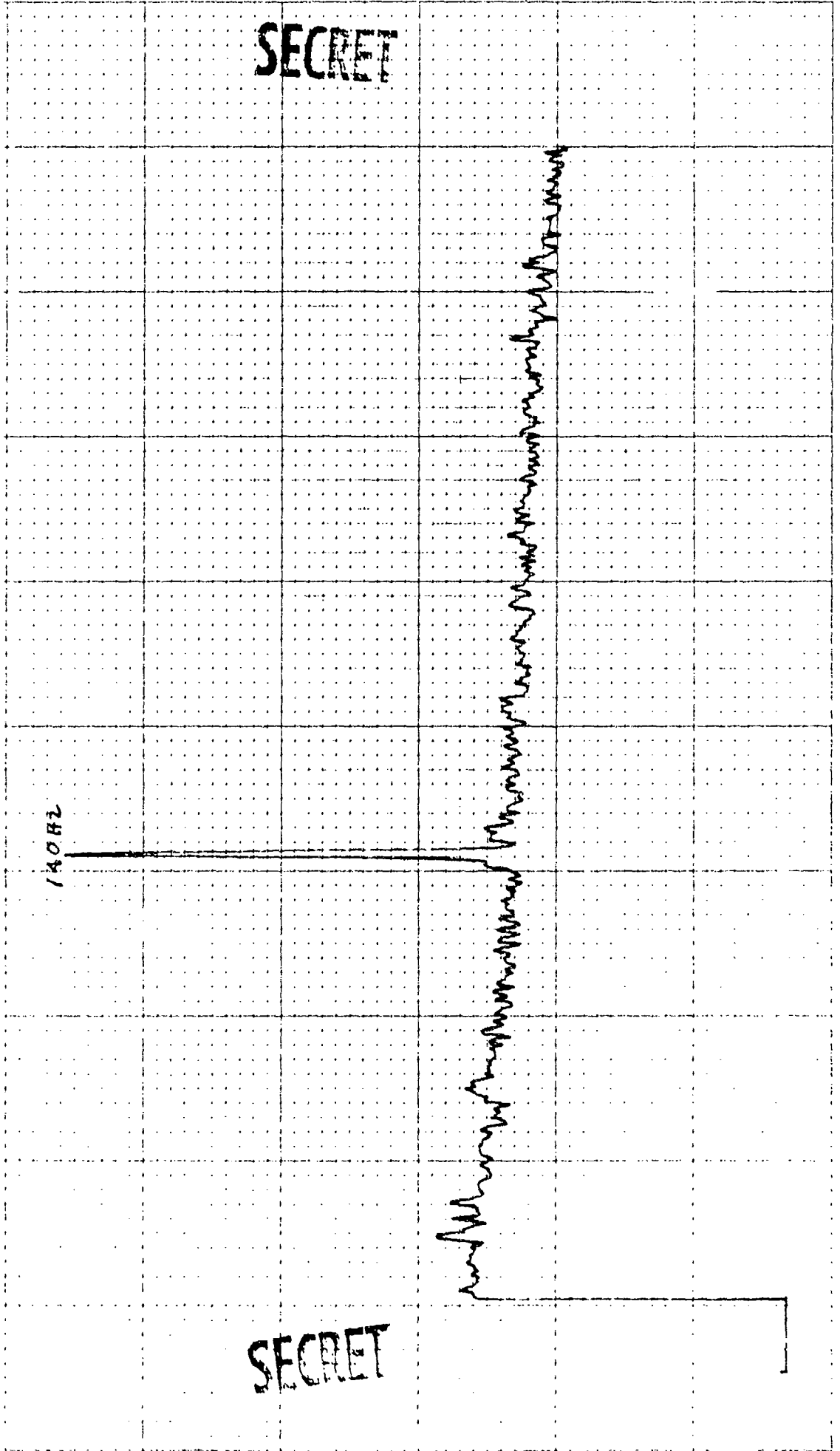
REEL: F29

INDE X 1/45

INTEGRATION TIME 320 SECS

ATTEN: -2Y DB

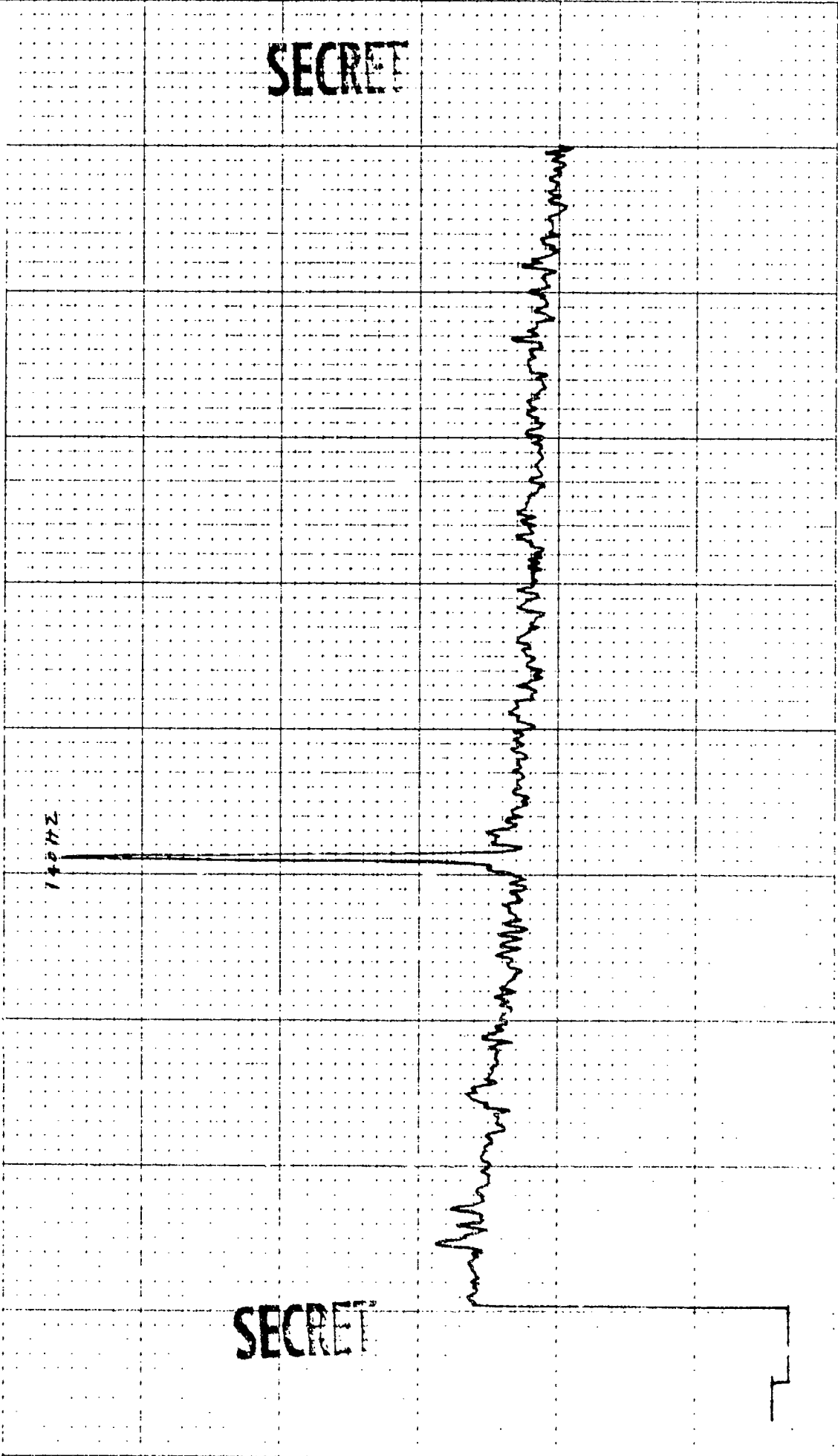
FIL.TFR WTG: HANNING



46 0703

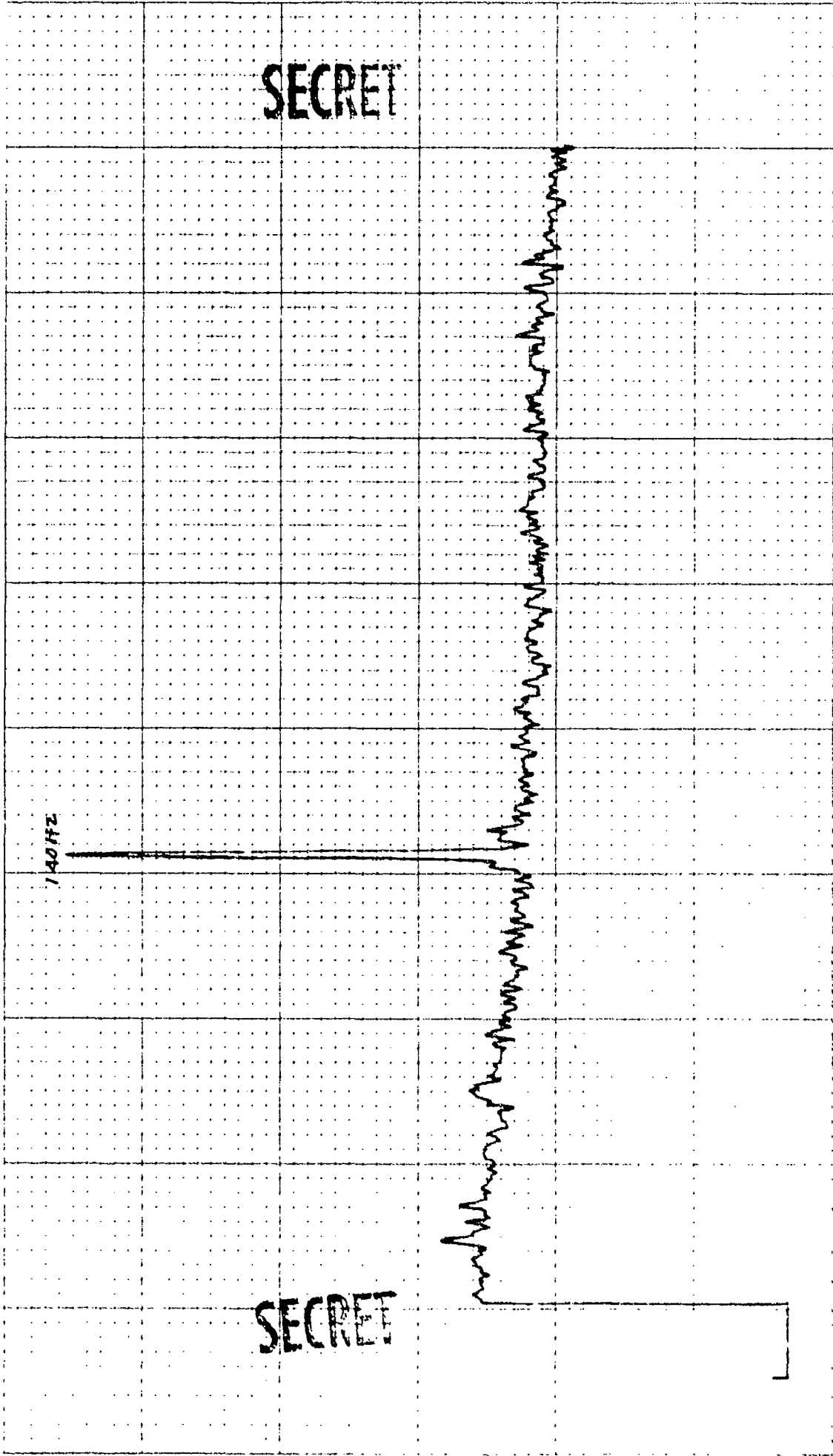
462 46201 TO THE DEPT OF DEFENSE

CONTROL: 0202-16 (DP7) DATE OF ANALYSIS: 1-16 REEL: F29 INDEX: X/145
 BEAMFORMED SPECTRUM(ELEMENTS))
 EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTN: 2YDB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1710HZ FILTER WTG: HANNING
16 ELEMENTS -24 DEG. AZ STEERING



46 0703

CONTROL: 0202-16 (097) DATE OF ANALYSIS: 1-16 REEL: F29 INDE X 1145
 BEAMFORMED SPECTRUM(ELEMENTS))
 EXERCISE: BEARING STAKE DATE/TIME: 2-0-77 - 0202Z INTEGRATION TIME 320 SECS ATTEN: -24 DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FIITFP WIG: HANNING
16 ELEMENTS -26 DEG. AZ STEERING



46 0703

REF ID: A6719 TO THE DEPT OF DEFENSE

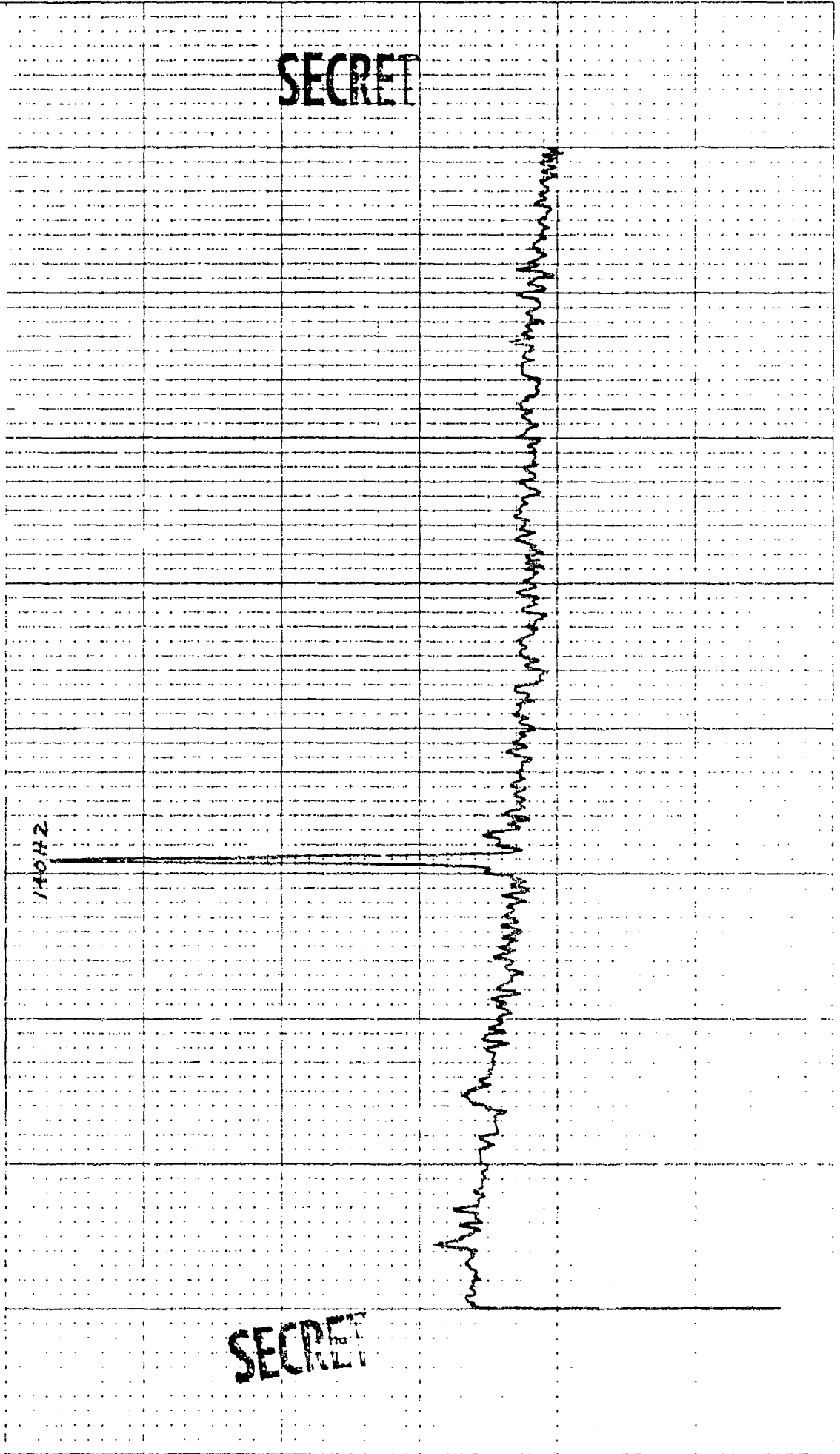
CONTROL: 0202-16 (DP7) DATE OF ANALYSIS: 1-16 REEL: F39 INDE X/145

BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-8-77 - 0202.Z INTEGRATION TIME 320 SECS ATTEN: 29 DB

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

CENTER FREQ: 150 HZ -27 DEG. AZ STEERING

16 ELEMENTS



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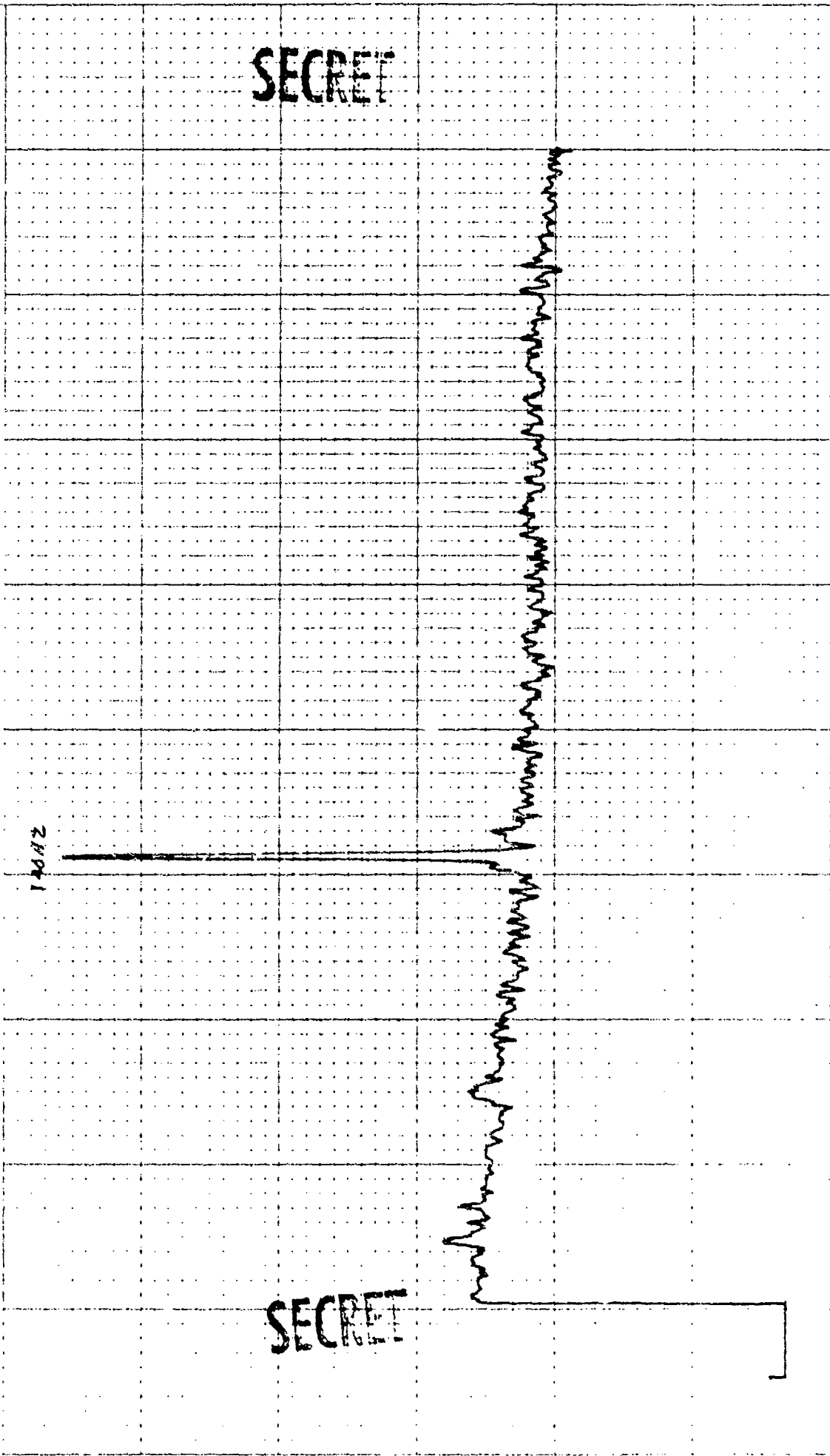
46 0703

CONTROL: 0202 - 5/ (DP7)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: _____
/ / - /

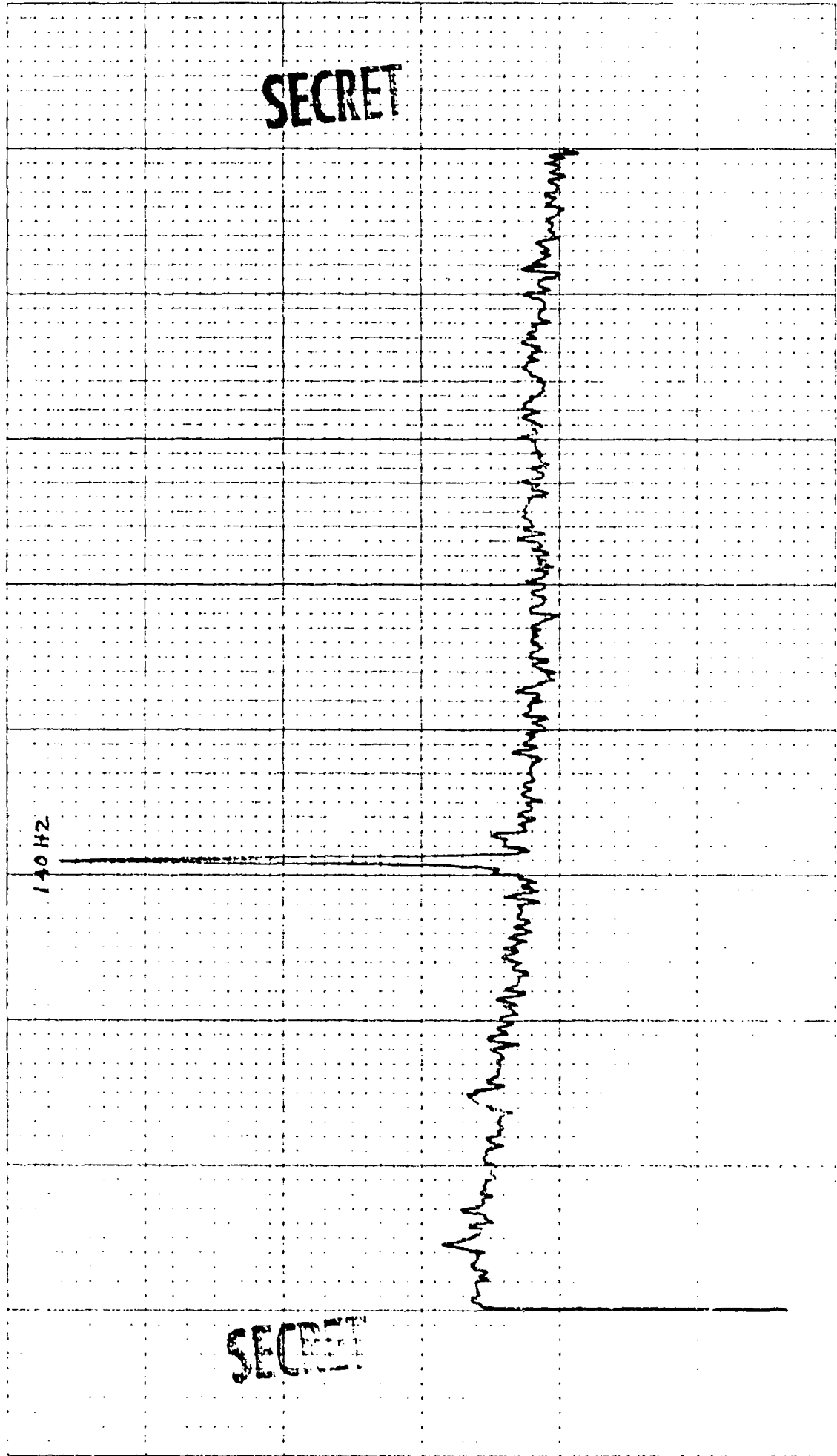
DATE/TIME: 2-8-77 - 0222Z
ANALYSIS BANDWIDTH: 1/10HZ
-28 DEG. AZ STEERING

REEL: F29 INDE X1/45
INTEGRATION TIME 320 SECS
ATTEN: 24 DB
FILTER WTG: HANNING



46 0703

CONTROL: 0202-16 (DP7) DATE OF ANALYSIS: - - REEL: F09 INDE X/195
 BEAMFORMED SPECTRUM(ELEMENTS) 1-16 INTEGRATION TIME 320 SECS ATTN: -24 DB
 EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0202Z FILTER WTC: HANNING
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
16 ELEMENTS -29 DEG. AZ STEERING

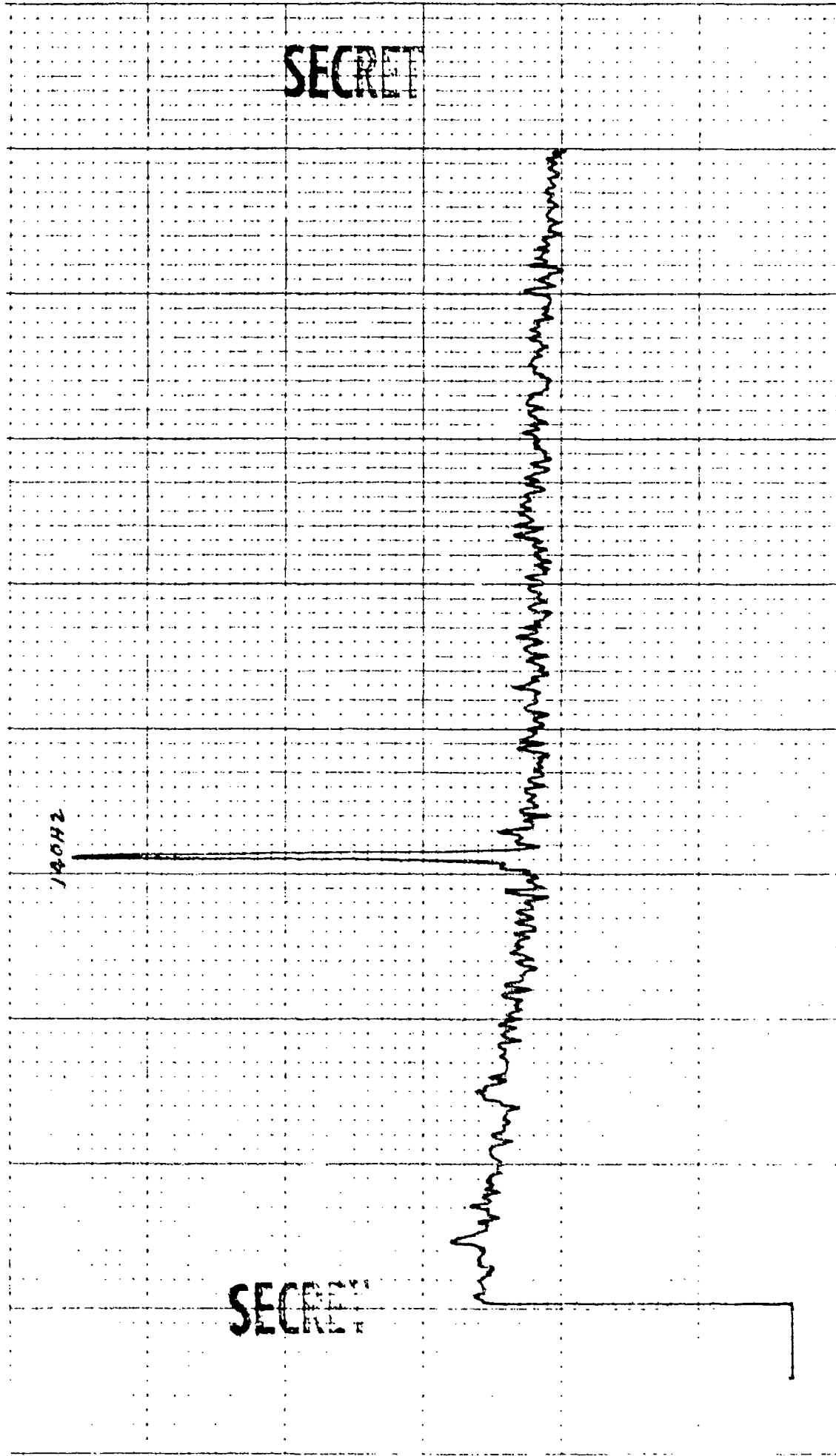


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46 0703

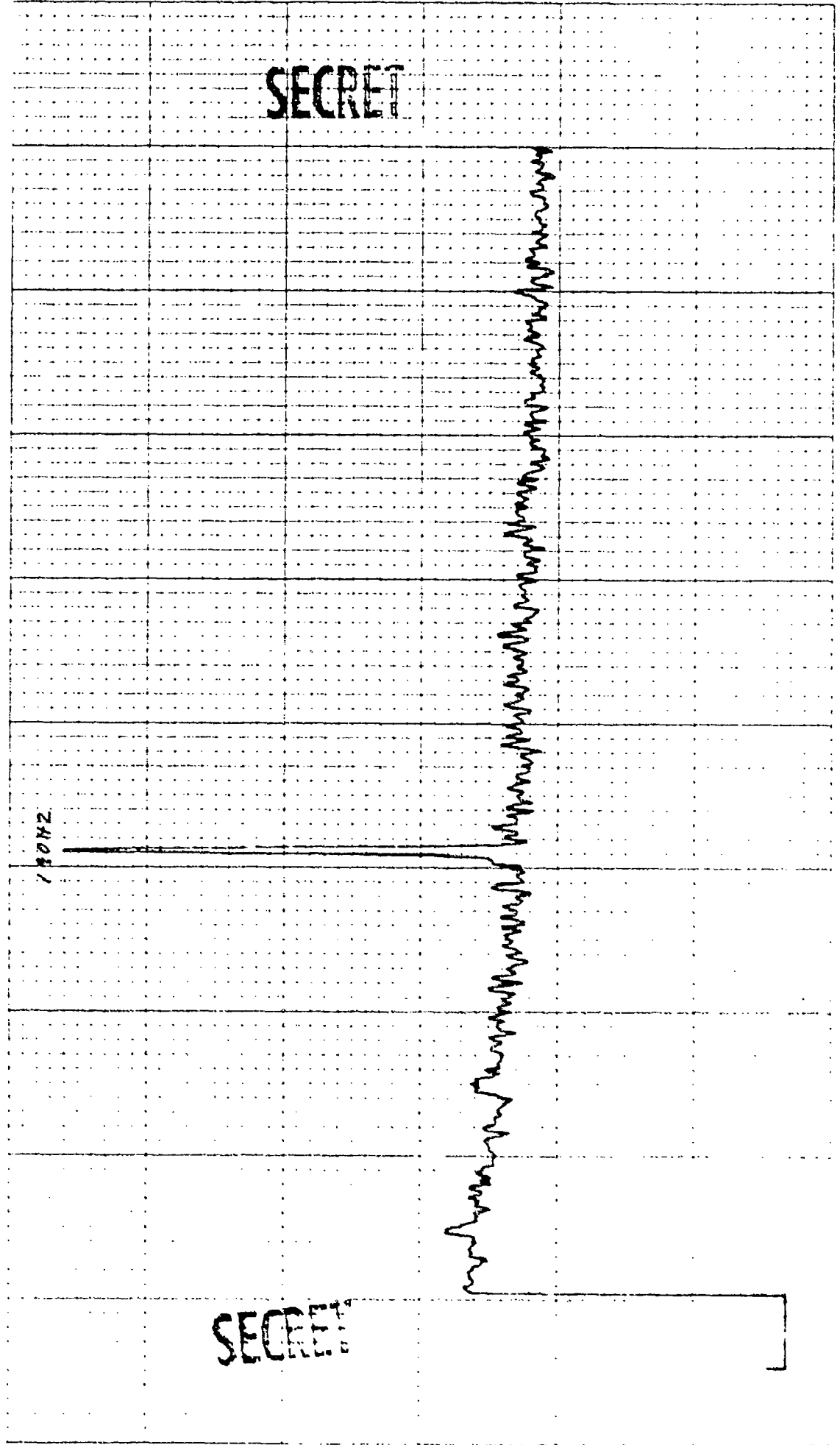
CONTROL: 0202-16 (DPT) DATE OF ANALYSIS: 1-16 REEL: F29 INDE X/145
BEAMFORMED SPECTRUM(ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTN: 2Y DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FII.TFR WTC: HANNING
16 ELEMENTS -30 DEG. AZ STEERING



46 0703

Page 3 of 4

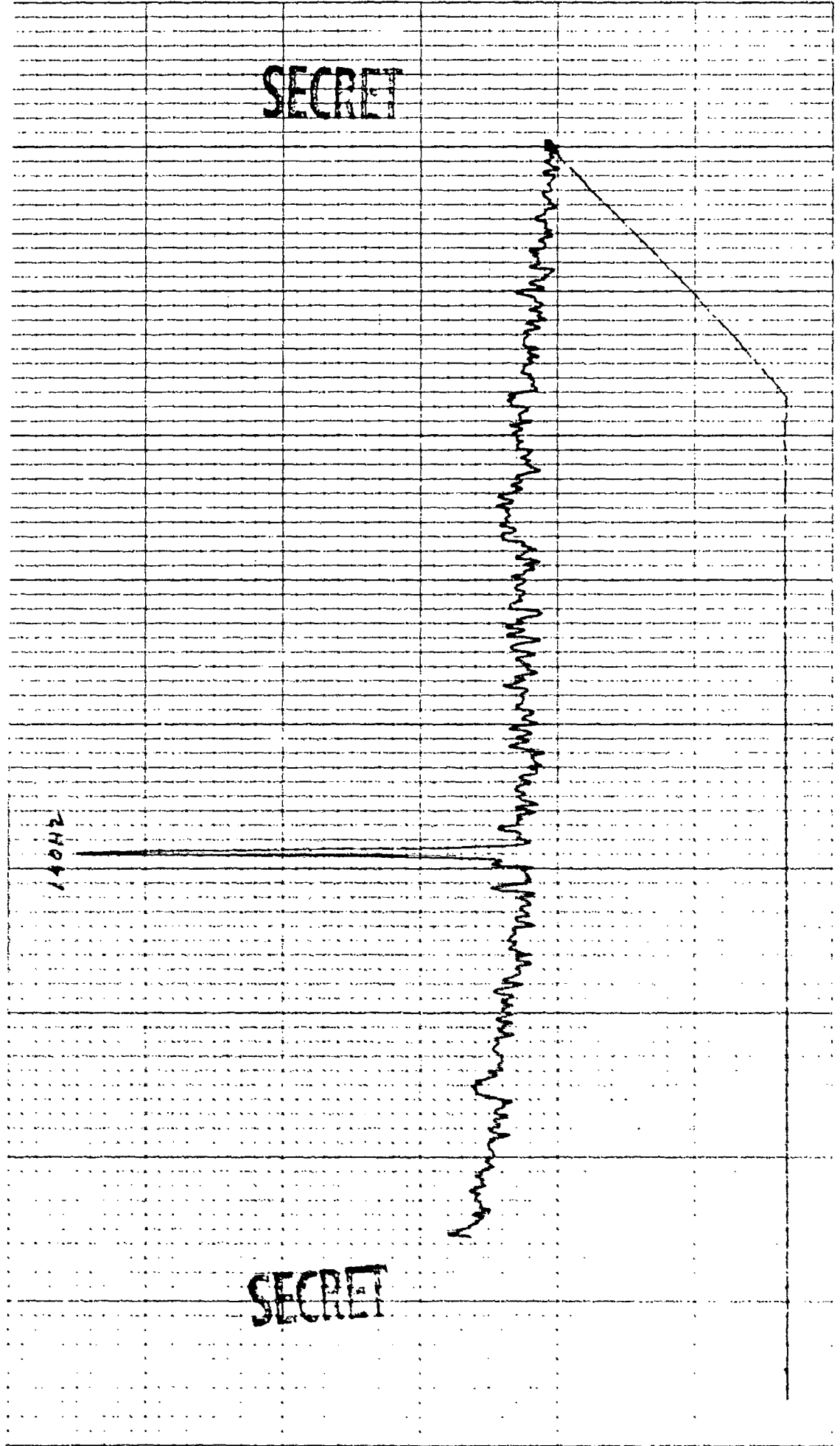
CONTROL: 0202-16 (DP7) DATE OF ANALYSIS: 1-1-6 REEL: F29 INDE X1145
 BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTN: -24 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1710HZ FILTFR WTC: HANNING
 CENTER FREQ: 150 HZ -32 DEG. AZ STEERING



46 0703

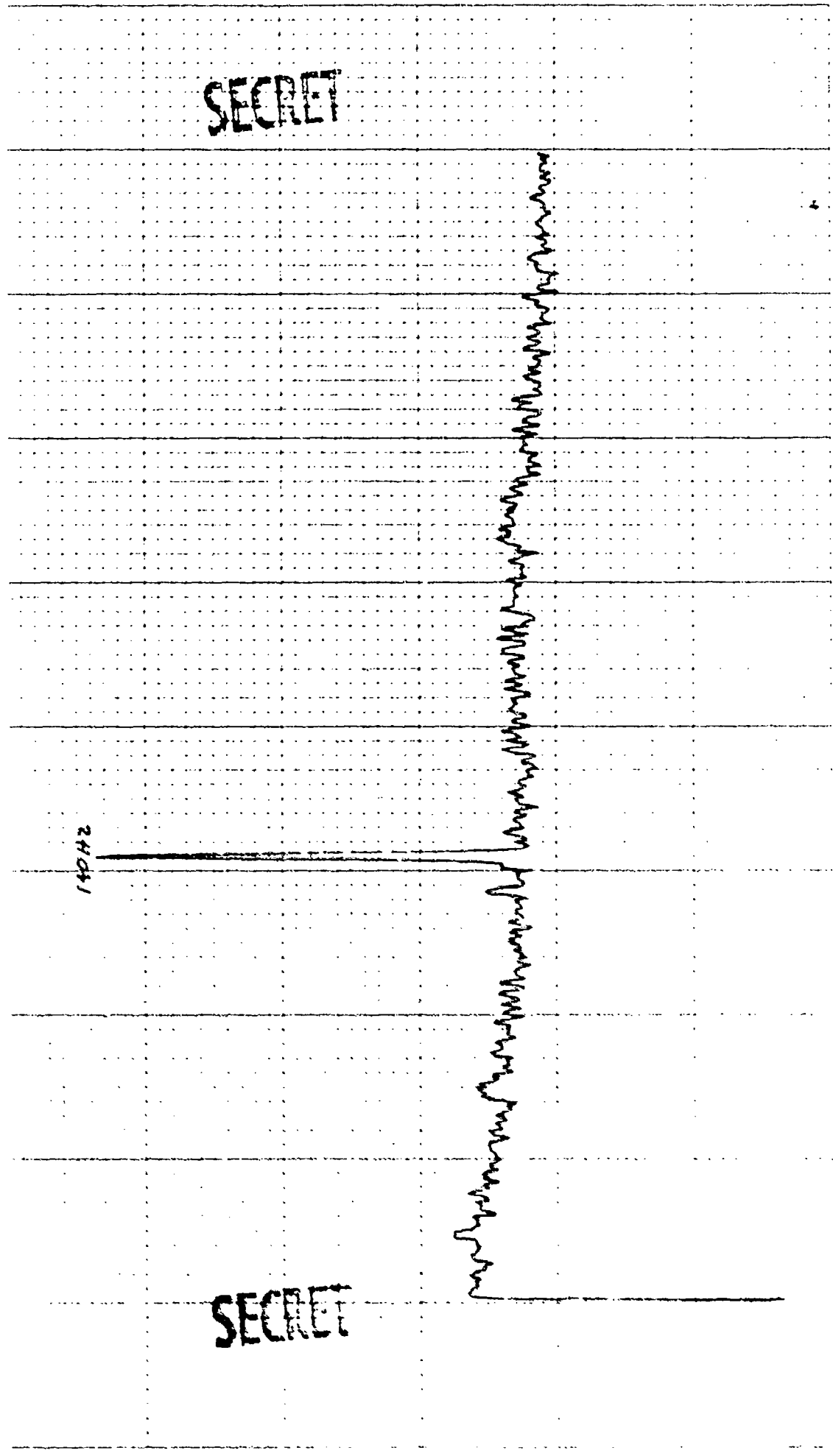
REF: 2-8-77

CONTROL: 0202-16 (DP7) DATE OF ANALYSIS: 1-16 REEL: F29 INDE X 1145
 BEAMFORMED SPECTRUM(ELEMENTS))
 EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTEN: -24 DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1710HZ FILTFR WTG: HANNING
16 ELEMENTS - 74 DEG. AZ STEERING



46 0703

CONTROL: 0202-16 (DP7) DATE OF ANALYSIS: 1-16 REEL: F09 INDE X1195
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTN: -24 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER: WTG HANNING
 CENTER FREQ: 150 HZ - 36 DEG. AZ STEERING



46 0703

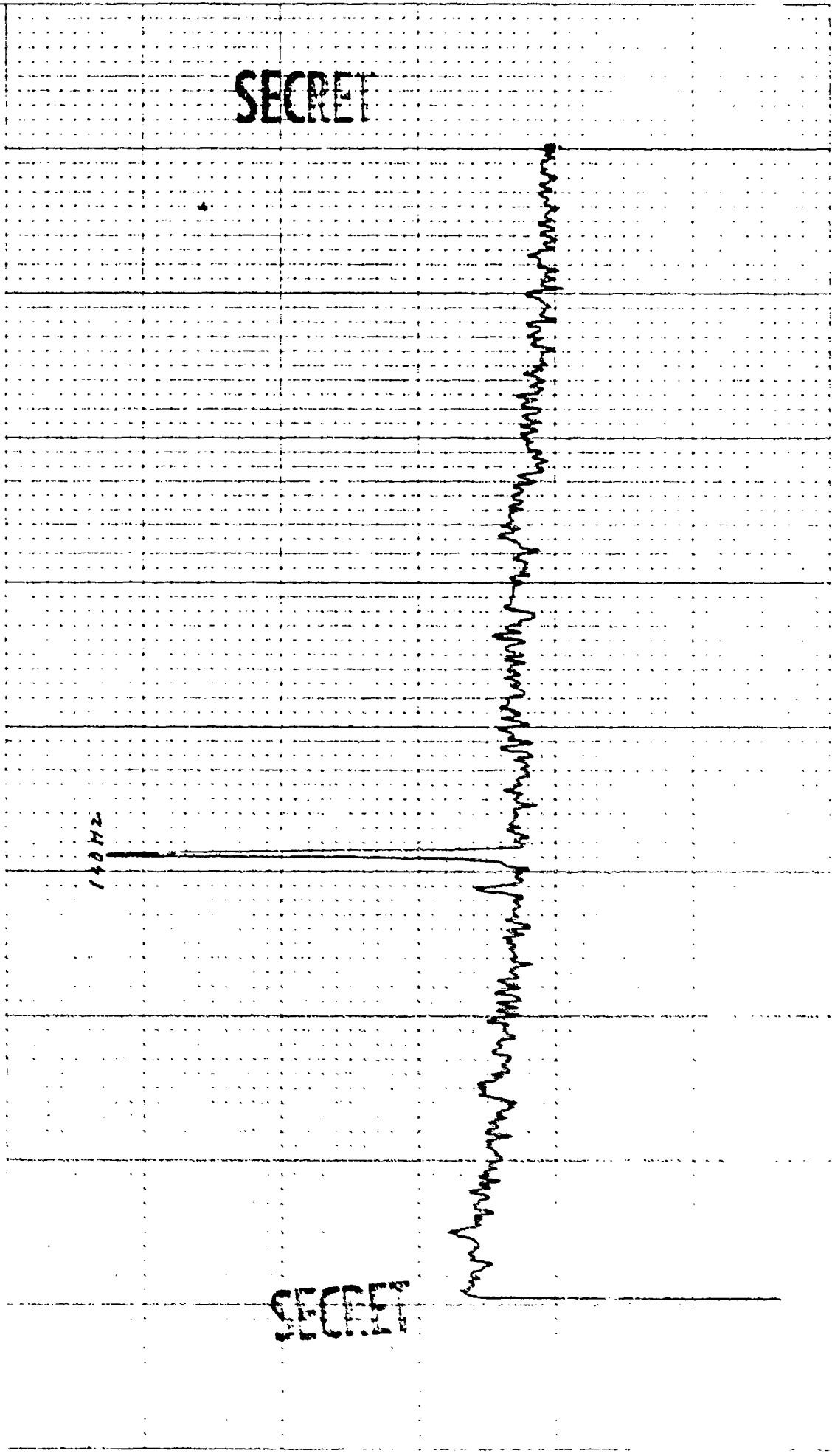
CONTROL: 0202 - 16 (DP7) DATE OF ANALYSIS: 1-12 REF: F29 INDE X1145

BEAMFORMED SPECTRUM(ELEMENTS) INTEGRATION TIME 320 SECS ATTEN: -24 DB

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

CENTER FREQ: 150 HZ - 30 DEG. AZ STEERING

16 ELEMENTS

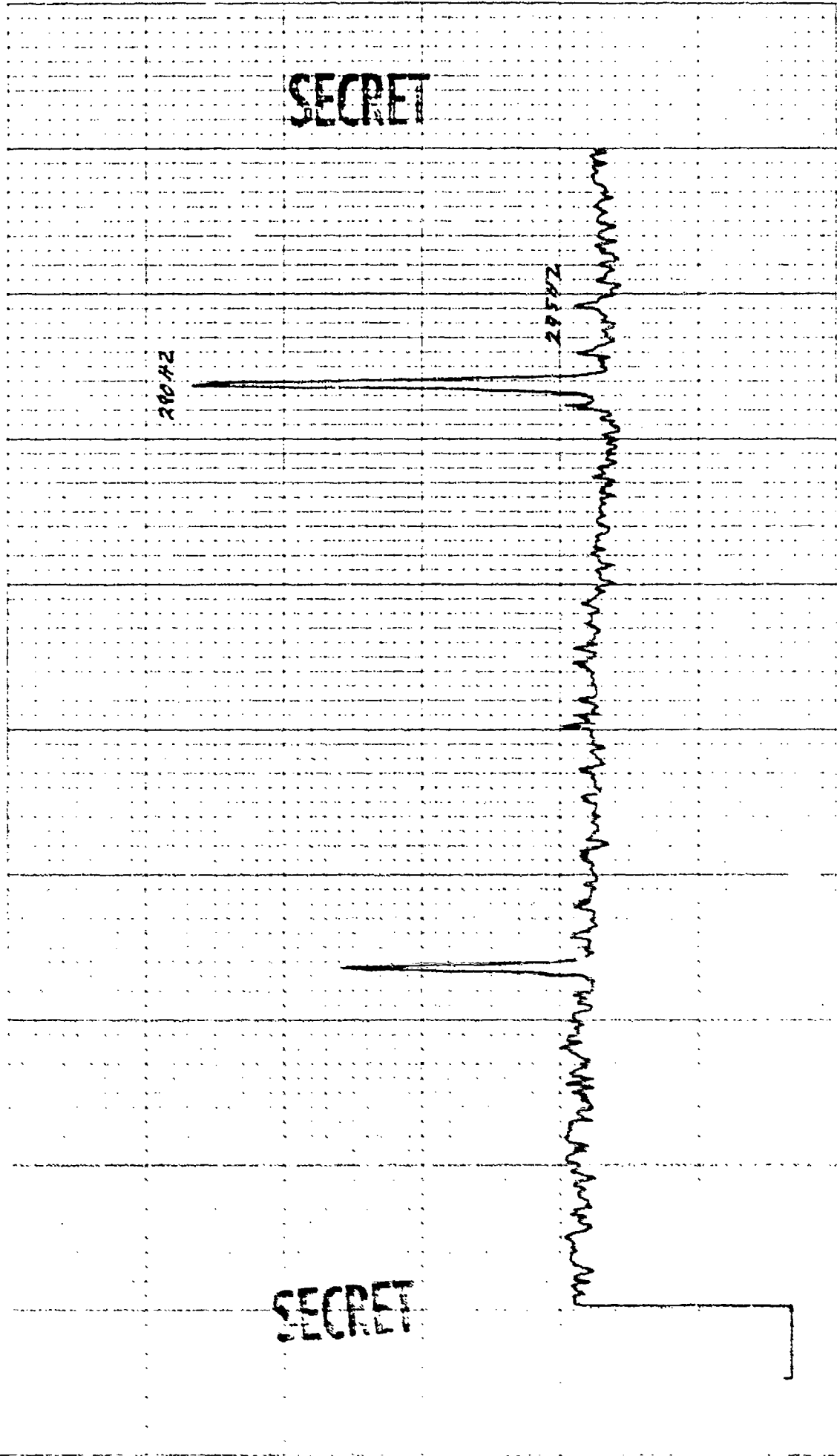


46 0703

CONTROL: 0202-16 (207)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-8-77 - 0102Z
ANALYSIS BANDWIDTH: 1/10 HZ
-12 DEG. AZ STEERING

REEL: F29 INDE X/145
INTEGRATION TIME 320 SECS
ATTN: 24 DB
FILTR: WTG: HANNING



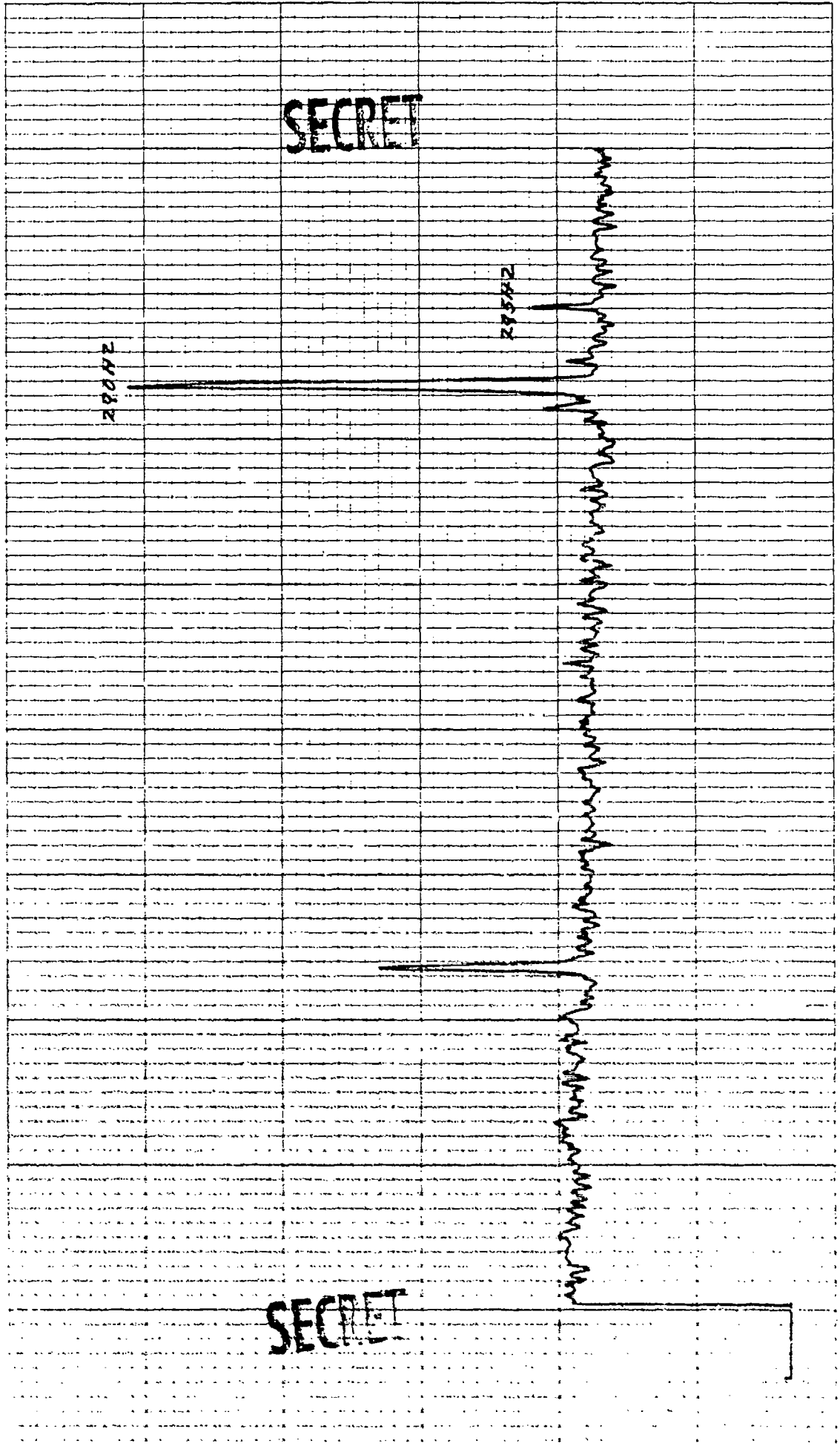
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REF ID: A6310 TO THE INFO. CENTER

46 0703

CONTROL: 0202-16 (D07) DATE OF ANALYSIS: 1-16 REEL: F29 INDE X1145
 BEAMFORMED SPECTRUM (ELEMENTS))
 EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTN: RY DB
 CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1710HZ FILTER WTG: HANNING
16 ELEMENTS -14 DEG. AZ STEERING

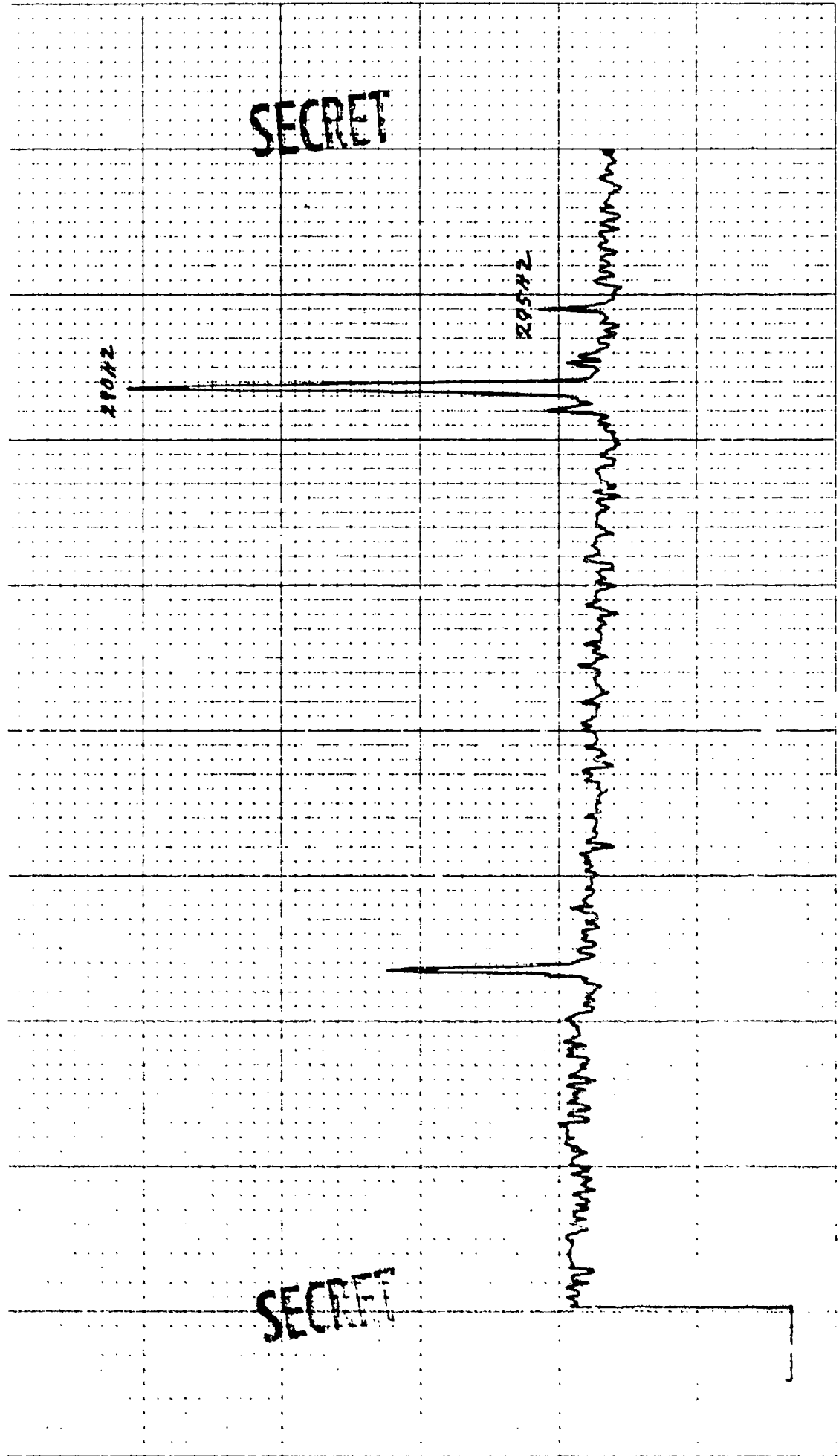


46 0703

CONTROL: 0202 - 16 (DP7)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 290 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-16 DEG. AZ STEERING

REEL: F09 INDE X/145
INTEGRATION TIME 320 SECS ATTN: -2Y DB
FILTFR WTC: HANNING

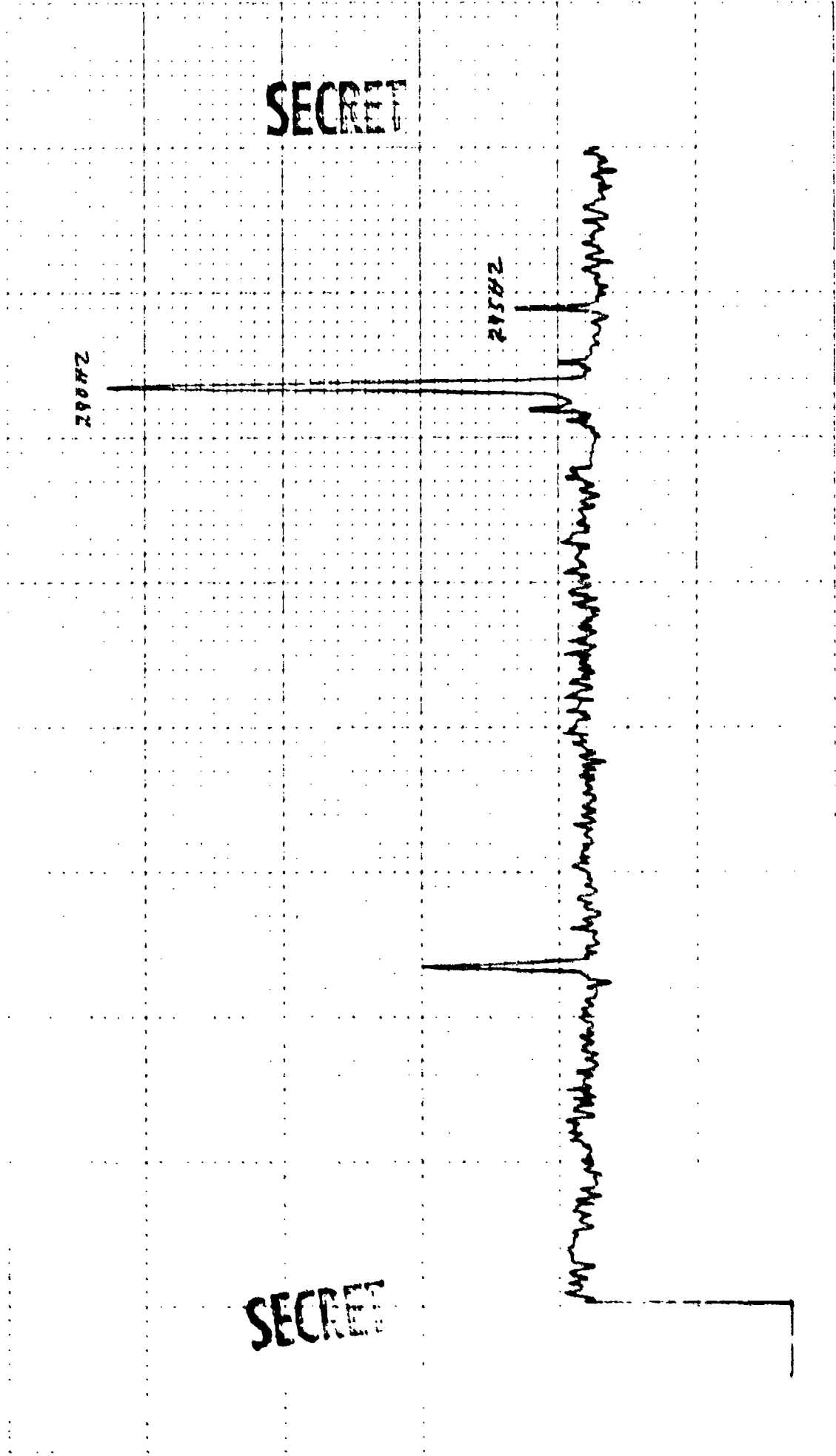


46 07 33

CONTROL: 0202-16 (DP2)
BEAMFORMED SPECTRUM/ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-10.5 DEG. AZ STEERING

REEL: F29 INDEX: 1/45
INTEGRATION TIME 320 SECS
ATTEN: -24 DB
FILTER WTC: HANNING

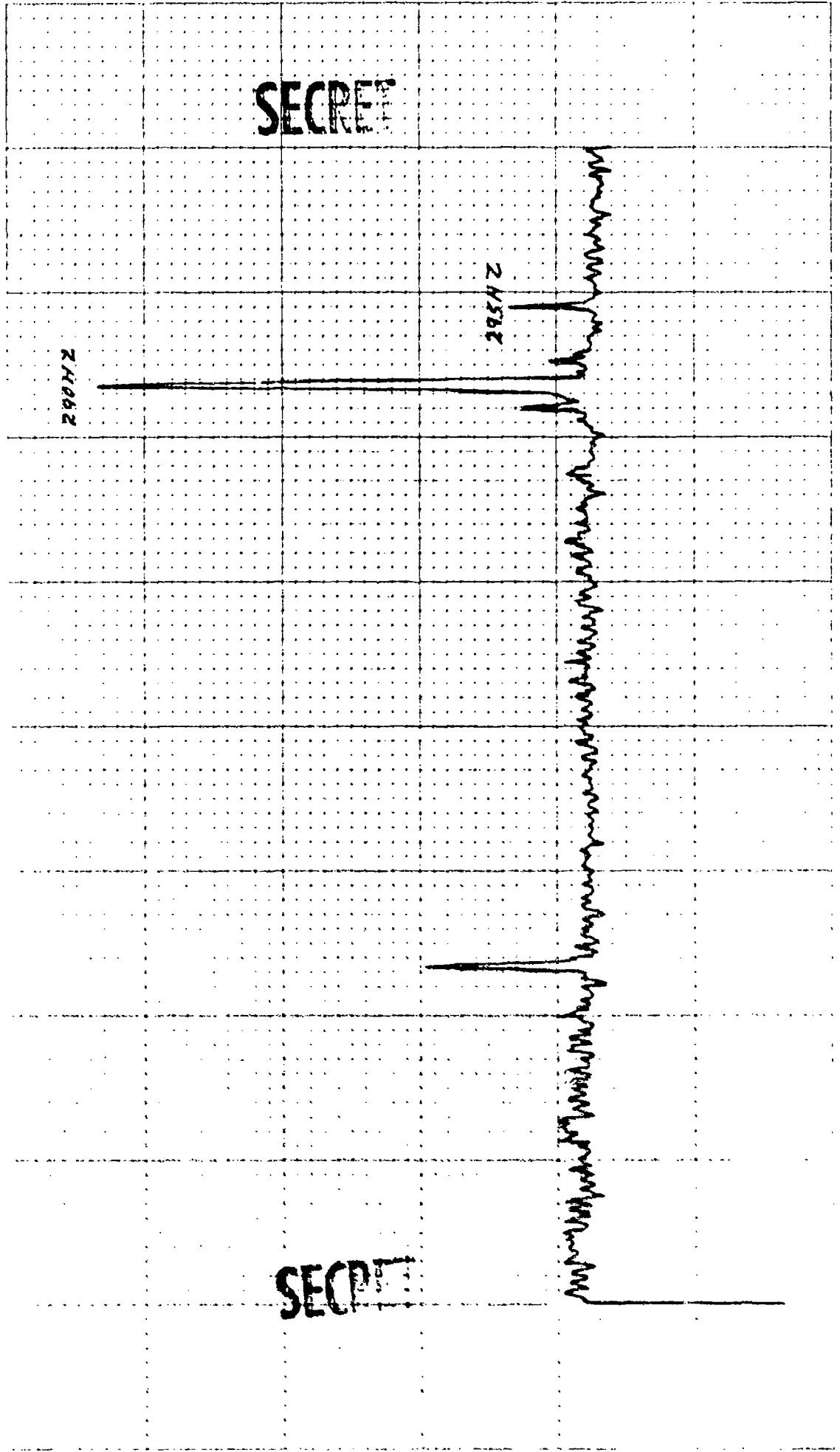


SECRET

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46 0703

CONTROL: 0202 - 5/ (D07) DATE OF ANALYSIS: _____ REEL: F29 INDE X 1105
 BEAMFORMED SPECTRUM(ELEMENTS) / - / 6
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: 24 DB
 CENTER FREQ: 270 HZ - 20 DEG. AZ STEERING FILTER WTC: HANNING

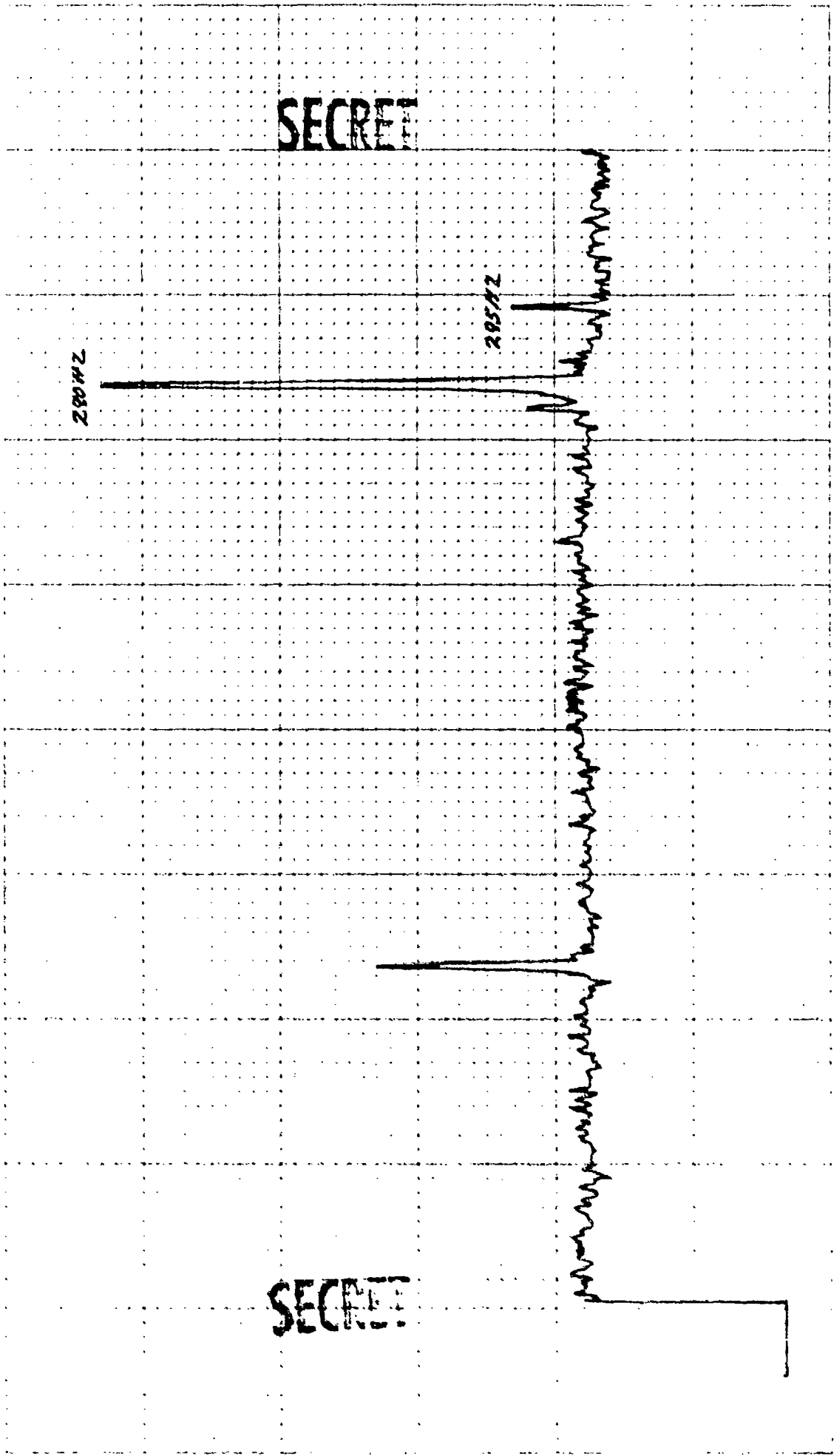


45 0793

CONTROL: 0202 - 16 (D87)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 2800 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
- 22 DEG. AZ STEERING

REEL: _____ INDEX _____
INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING



46 0703

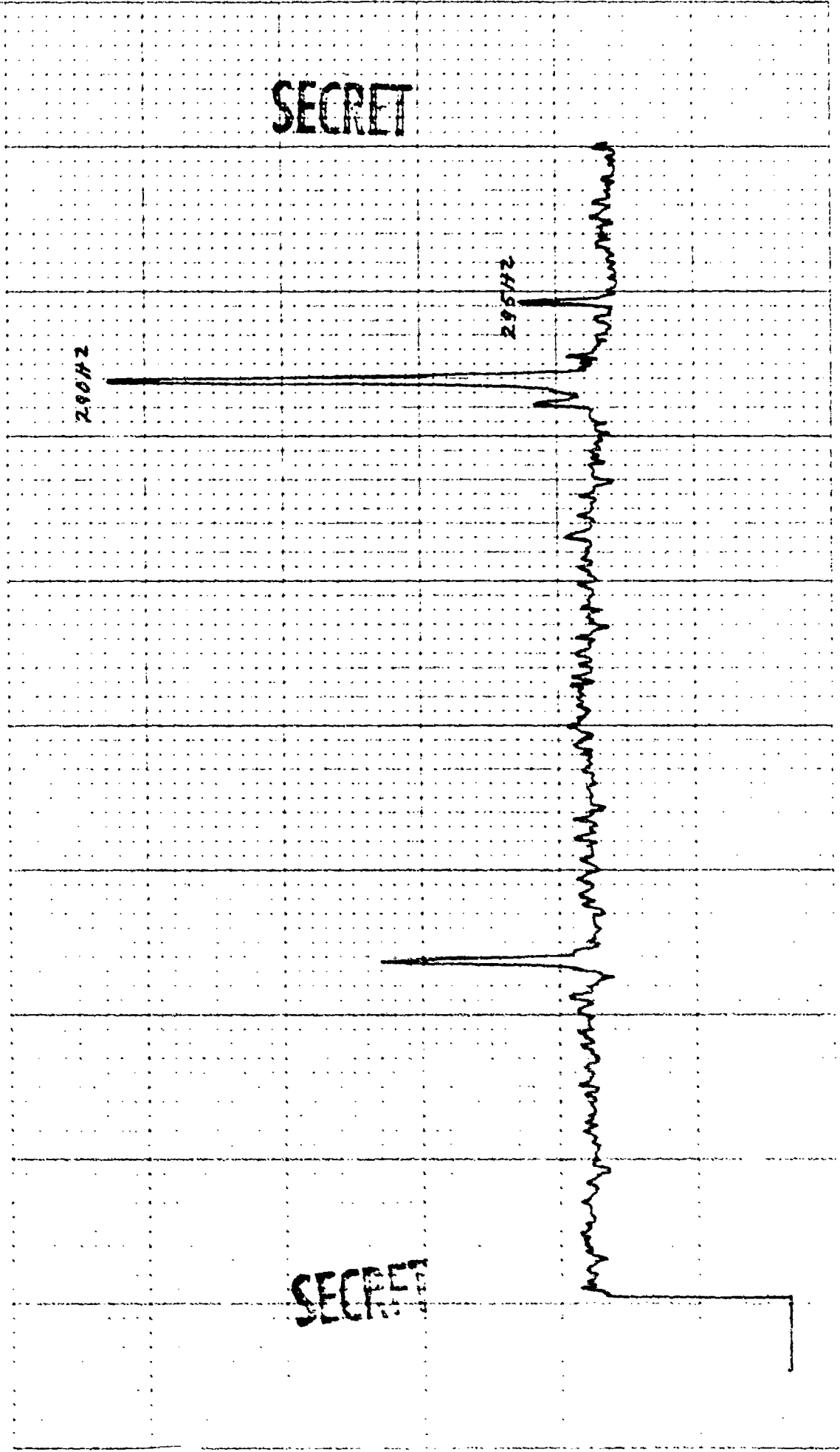
CONTROL: 0202-16 (207)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 MZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16

REEL: F09 INDE X 1145

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

DATE/TIME: 2-8-77-0202Z
 ANALYSIS BANDWIDTH: 1/10 HZ
-24 DEG. AZ STEERING

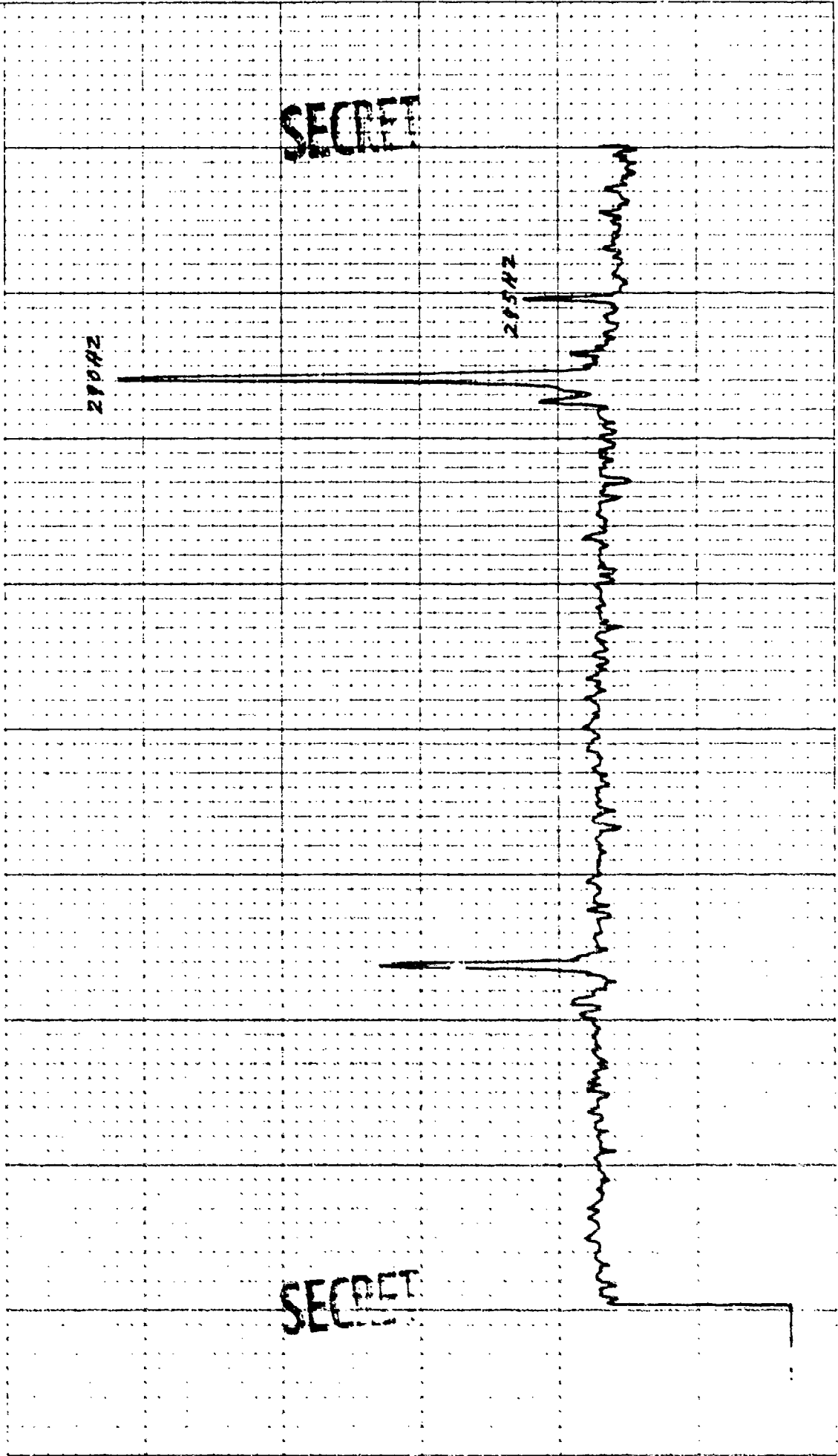


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46 0703

CONTROL: 0202 - 16 (D07) DATE OF ANALYSIS: - - REEL: F09 INDEX X1195
 BEAMFORMED SPECTRUM (ELEMENTS) / -16)
 EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0202 Z INTEGRATION TIME 320 SECS ATTEN: -24 DB
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ FTI: TFP WTG: HANNING
16 ELEMENTS - 26 DEG. AZ STEERING

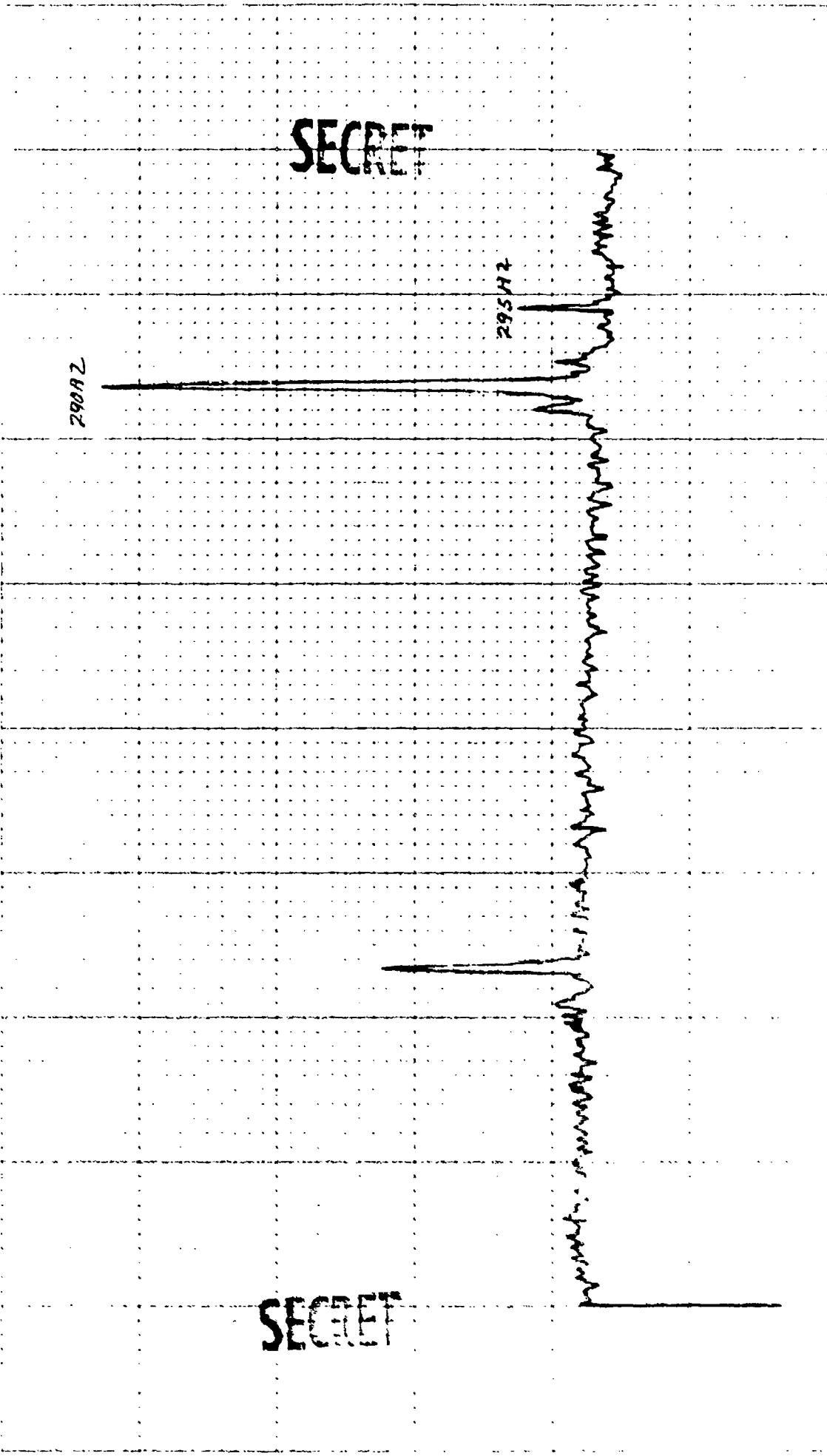


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46 0703

CONTROL: 0202-16 (207) DATE: ANALYSIS: -16 REEL: F29 INDE X/45
 BEAMFORMED SPECTRUM (ELEMENTS) DATE: TIME: 2-0-77 - 0202Z INTEGRATION TIME 320 SECS ATTN: -2Y DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1710HZ FILTER WTC: HANNING
 CENTER FREQ: 200 HZ -27 DEG. AZ STEERING

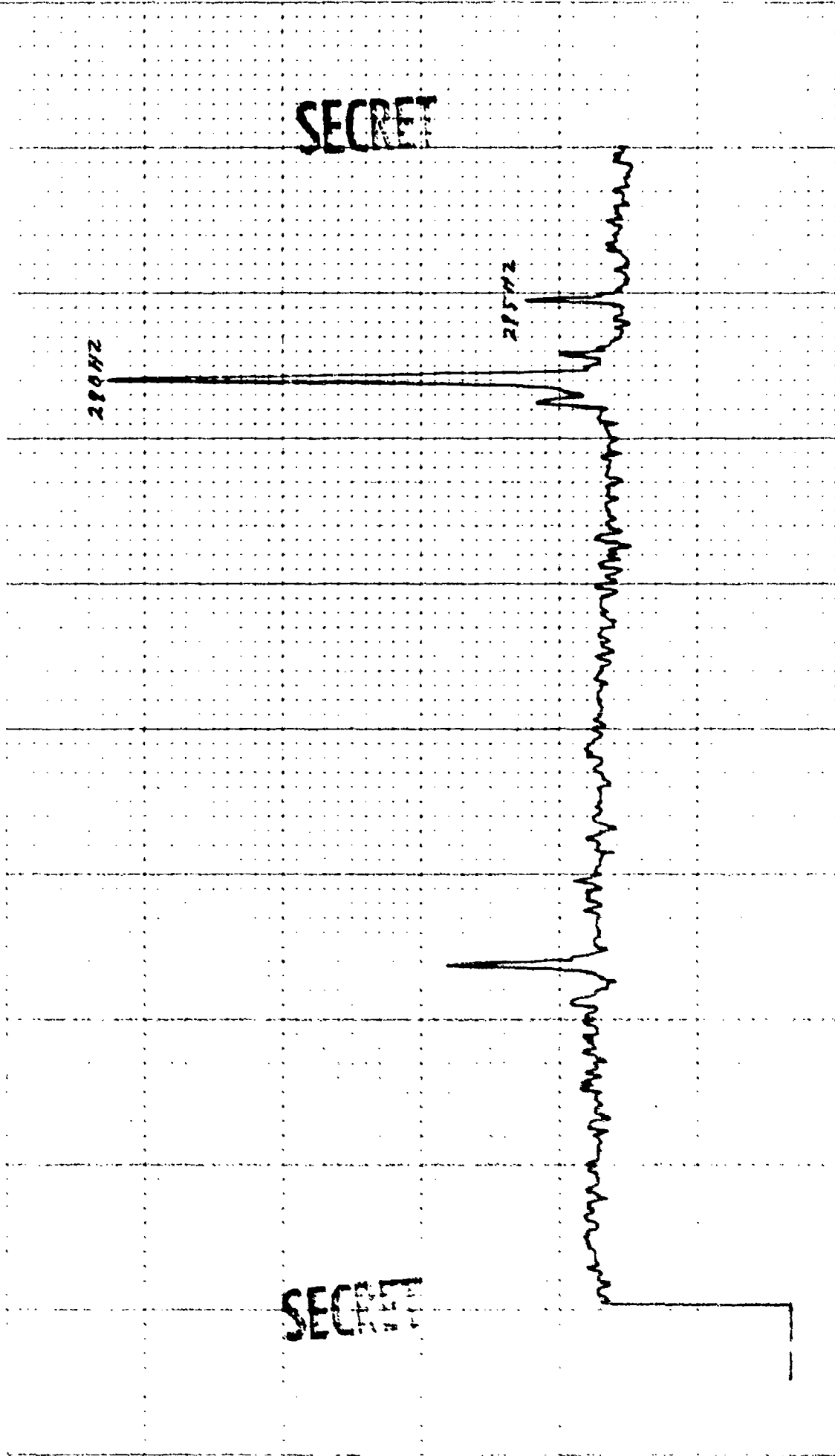


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SECRET

46 0703

CONTROL: 0202 - 16 (D07) DATE OF ANALYSIS: REEL: E23 INDE X 1195
 BEAMFORMED SPECTRUM (ELEMENTS) / - /
 EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTEN: -24 DB
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 /6 ELEMENTS -20 DEG. AZ STEERING



44 0703

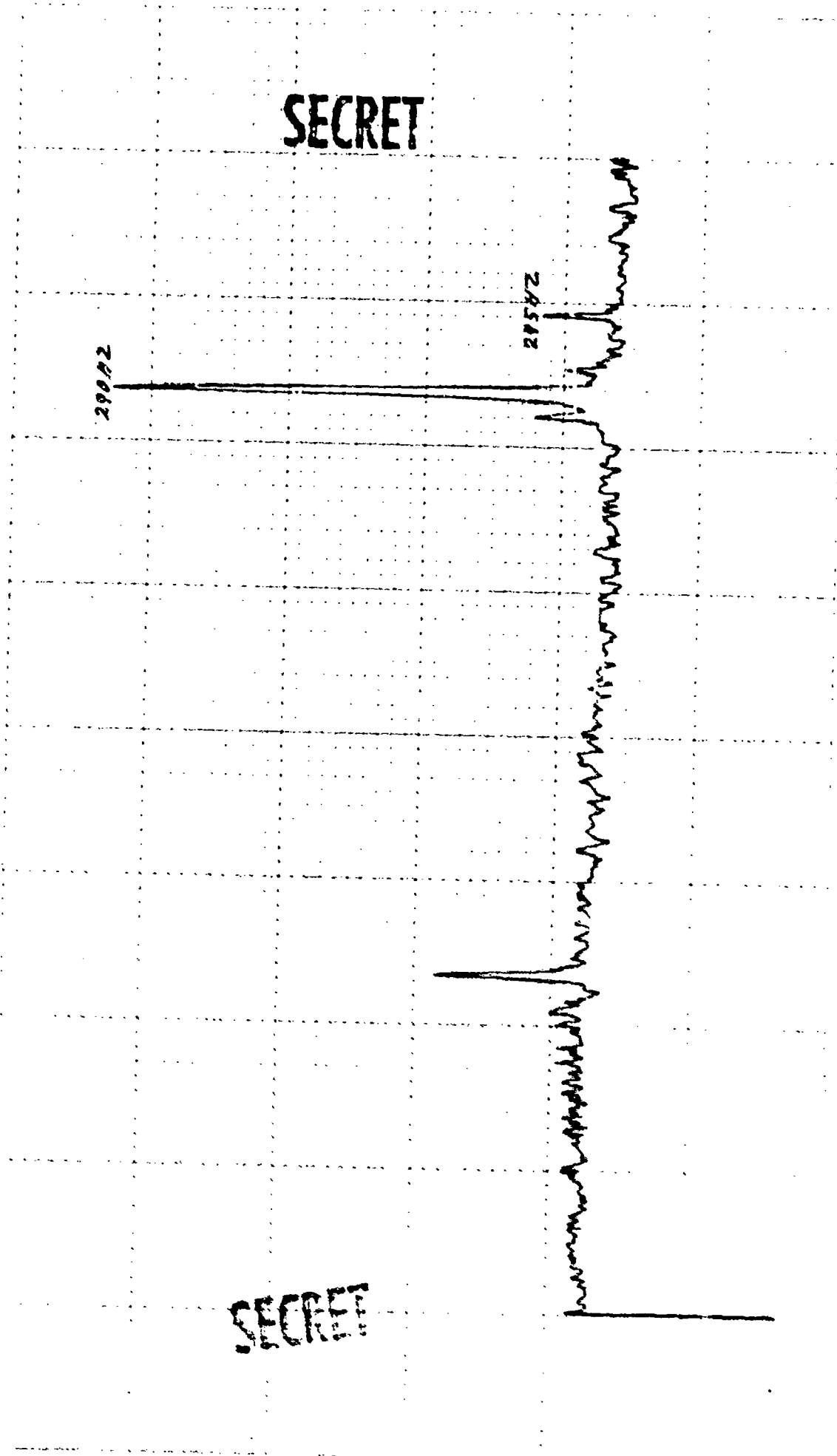
CONTROL: 0202 - 16 (007)
 BEAMFORMED SPECTRUM ELEMENTS
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
 16 ELEMENTS

DATE OF ANALYSIS: - - - - -
 / - / -

DATE/TIME: 2-8-77 0202Z
 ANALYSIS BANDWIDTH: 1/10HZ
 -29 DEG. AZ STEERING

REEL: F39
 INTEGRATION TIME 320 SECS
 FILTERED WTC: HANNING

INDEX: 1145
 ATTEN: 20 DB



SECRET

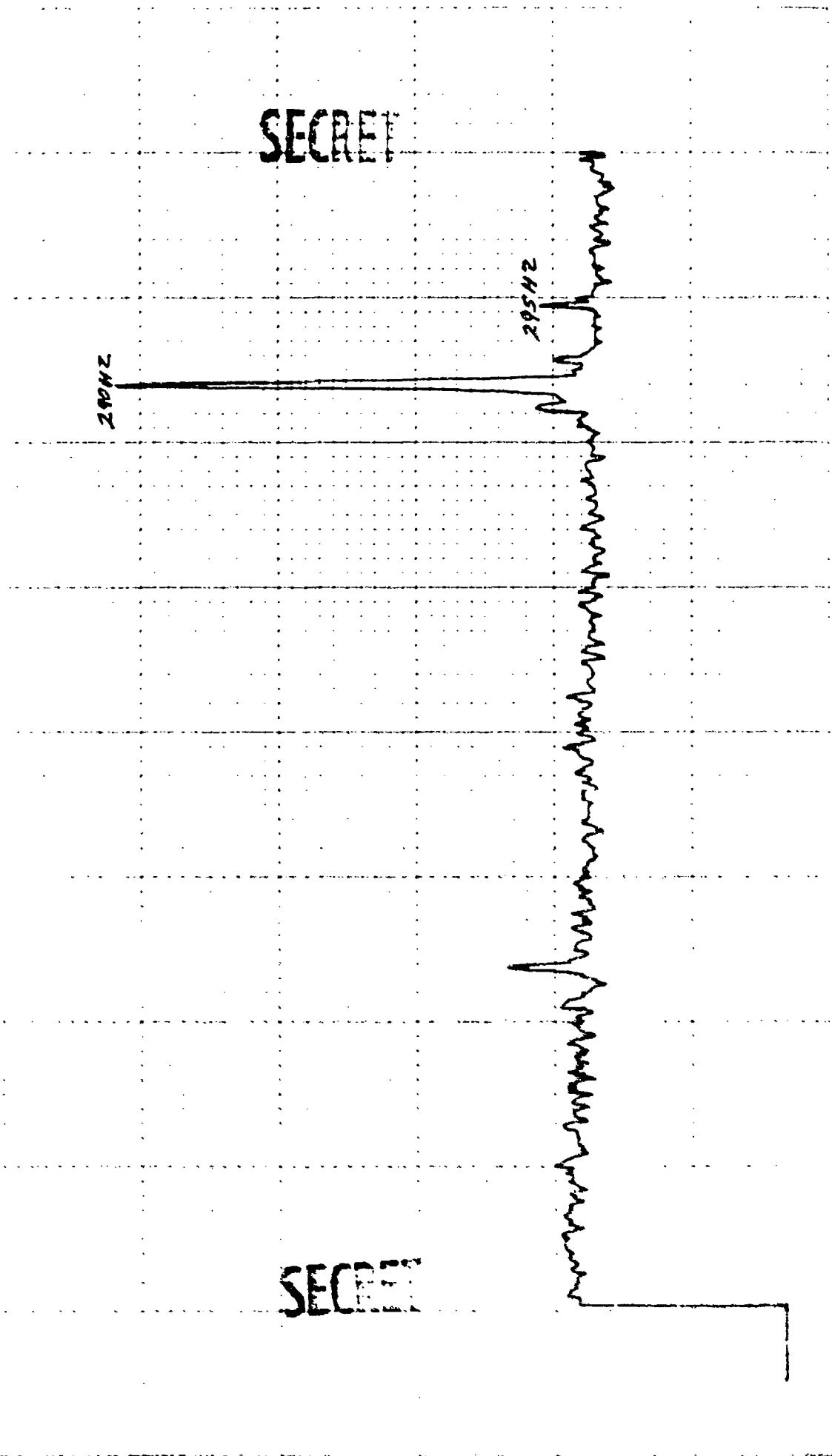
SECRET

46 070

CONTROL: 0202-16 (027)
 BEAMFORMED SPECTRUM/ELEMENTS
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
 16 ELEMENTS

DATE OF ANALYSIS: 1-16
 DATE/TIME: 2-8-77 - 0202 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 -30 DEG. AZ STEERING

REEL: F27
 INTEGRATION TIME 320 SECS
 FITTED WIG: HANNING
 ATTN: -24 DB
 WIG: HANNING



SECRET

SECRET

46 0/03

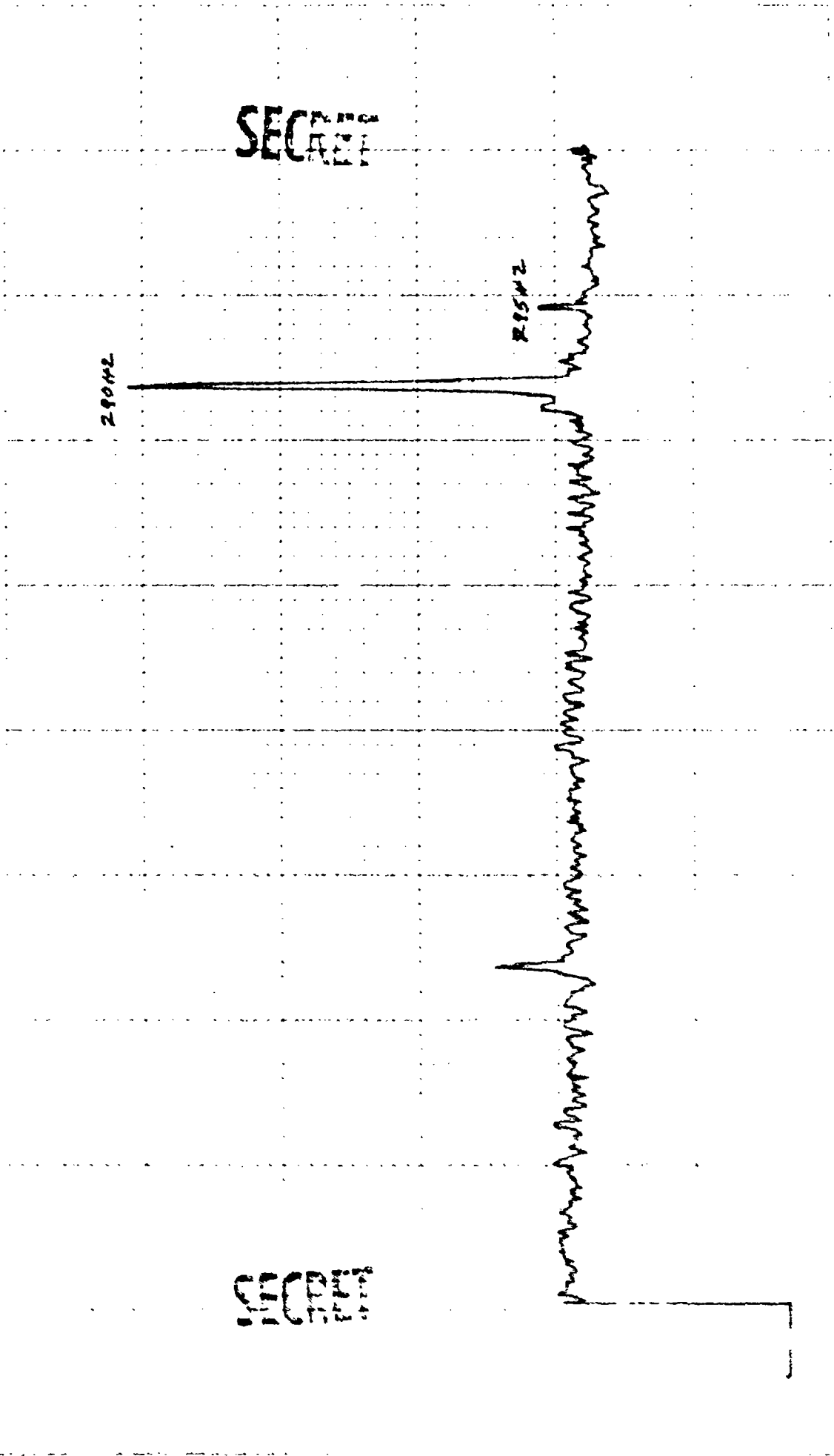
CONTROL: 0202 - /6 (007) DATE OF ANALYSIS: 7-76 REEL: F29 INDE X/VS

BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTER: -24 DB

EXERCISE: BEARING STAFF ANALYSIS BANDWIDTH: 1/10HZ FILTER WIG: HANNING

CENTER FREQ: 280 HZ -32 DEG. AZ STEERING

/6 ELEMENTS



SECRET

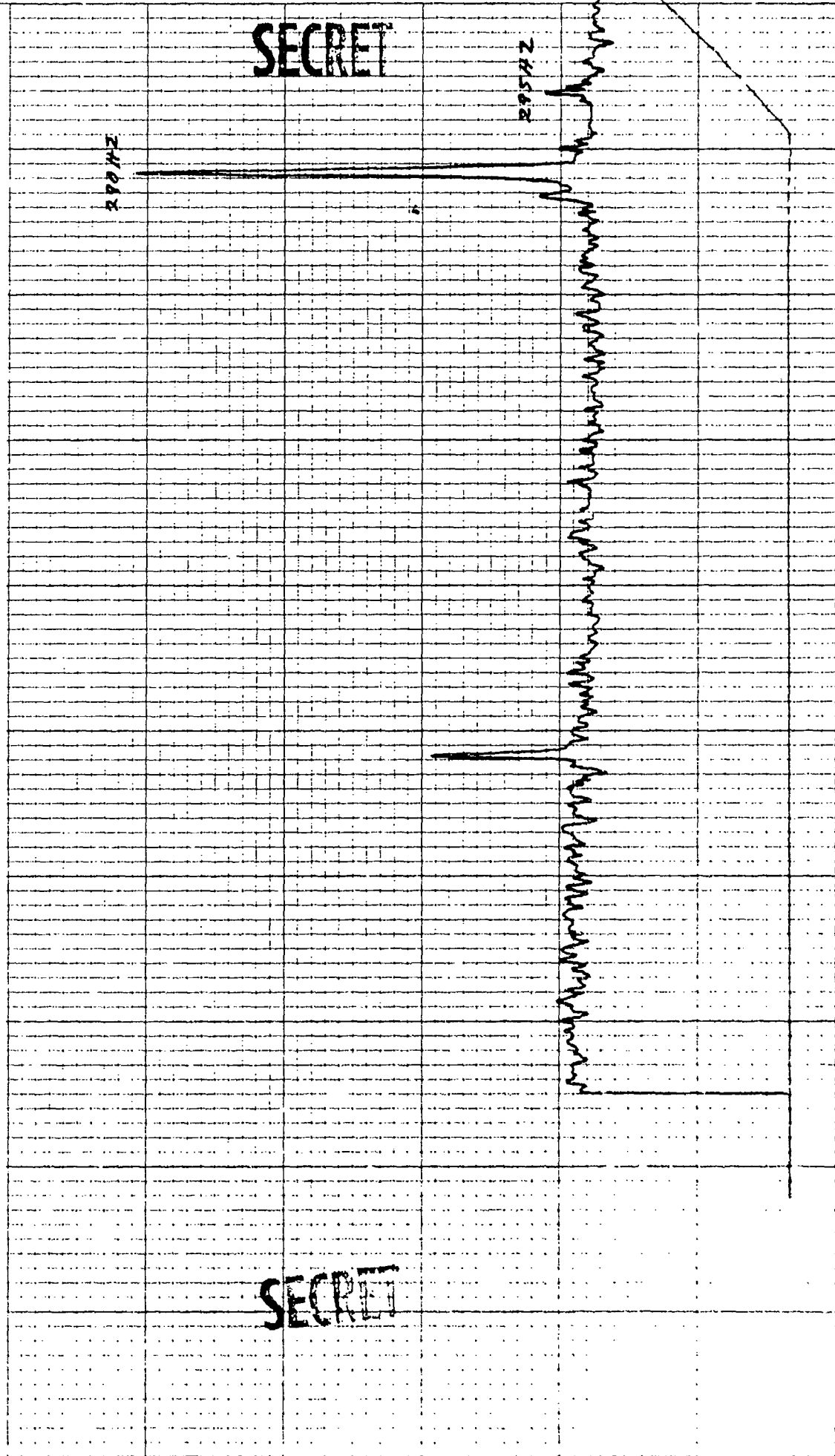
14-00000 10.0 TO THE INCHES IN THE HORIZONTAL
SCALE 1/2 INCH PER CYCLE

46 0703

CONTROL: 0202-16 (007)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
16 ELEMENTS

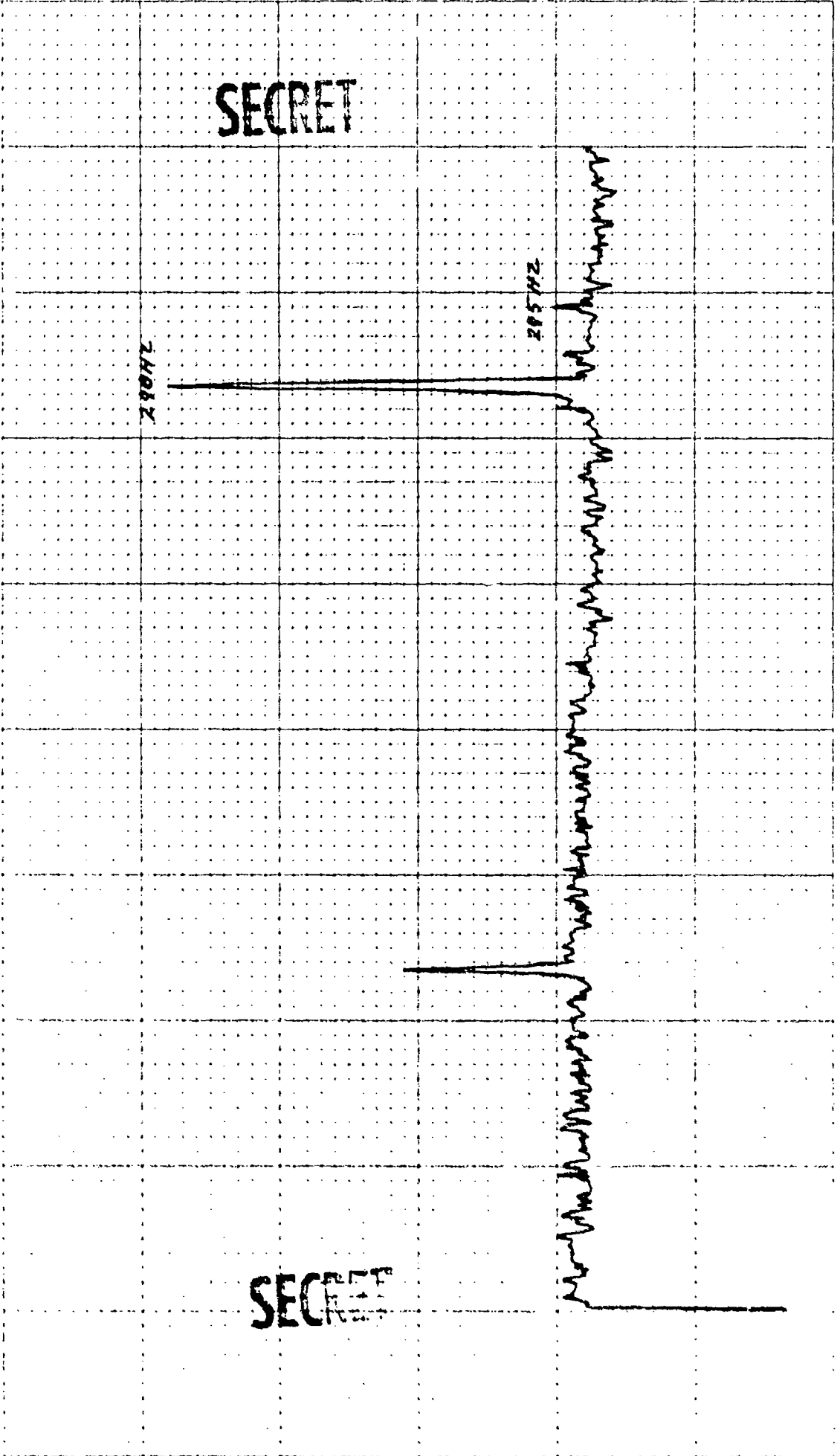
DATE OF ANALYSIS: 1-16
DATE/TIME: 2-8-77 - 0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
-34 DEG. AZ STEERING

REEL: F29 INDE X1145
INTEGRATION TIME 320 SECS ATTN: -24 DB
FII.TFR WTG: HANNING



46 0703

CONTROL: 0202-16 (DP7) DATE OF ANALYSIS: / / REEL: F09 INDE X1145
 BEAMFORMED SPECTRUM(ELEMENTS))
 EXERCISE: BEARING STAKE DATE/TIME: 2-9-77 - 0202Z INTEGRATION TIME 320 SECS ATTEN: -24 DB
 CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTC: HANNING
16 ELEMENTS - 36 DEG. AZ STEERING



46 5753

CONTROL: 2202 - 16 (207)
BEAMFORMED SPECTROSCOPIC ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
30 DEC. AZ STEERING

PEEL: F29
INTEGRATION TIME 320 SECS
FITTED WTS: HANNING
INDE X/145
ATTEN: -24 DB

SECRET

SECRET

290HZ

Handwritten scribbles and a vertical line on the graph grid.

295HZ

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 7

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-25.1</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-15.1	
BEAMFORMER GAIN	<u>+30</u>	+14.9	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	+15.1	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-67.3</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-57.3	
BEAMFORMER GAIN	<u>+30</u>	-27.3	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+14.9</u>	
SIGNAL LEVEL FOR SNR	<u>-27.3</u>	+2.2	
PROCESSOR CORRECTION	<u>-4.0</u>	-8.2	
MRA CORRECTION	<u>+ .2</u>	39.7	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	30	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL
SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 7

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-20.5</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-10.5</u>	
BEAMFORMER GAIN	<u>+30</u>	<u>+11.5</u>	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	<u>+12.3</u>	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-73.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-63.8</u>	
BEAMFORMER GAIN	<u>+30</u>	<u>-33.8</u>	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+11.5</u>	
SIGNAL LEVEL FOR SNR	<u>-33.8</u>	<u>45.3</u>	
PROCESSOR CORRECTION	<u>-4.0</u>	<u>40.3</u>	
MRA CORRECTION	<u>+ .8</u>	<u>41.1</u>	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	<u>32.9</u>	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 7

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-64.7</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-54.7</u>	
BEAMFORMER GAIN	<u>+30</u>	<u>-24.7</u>	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	<u>-23.9</u>	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-73.6</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-63.6</u>	
BEAMFORMER GAIN	<u>+30</u>	<u>-33.6</u>	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-24.7</u>	
SIGNAL LEVEL FOR SNR	<u>-33.6</u>	<u>8.9</u>	
PROCESSOR CORRECTION	<u>-4.2</u>	<u>4.7</u>	
MRA CORRECTION	<u>+ .8</u>	<u>5.5</u>	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-0.2</u>	<u>-2.7</u>	SNR 1 HZ BAND

CONFIDENTIAL

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-16.0</u>	<u>-17.5</u>	<u>_____</u>
MRA SIGNAL LEVEL	<u>+15.1</u>	<u>+12.3</u>	<u>- 23.9</u>
ARRAY SIGNAL GAIN	<u>31.1</u>	<u>29.8</u>	<u>_____</u>
20 LOG <u>32</u> # of elements	<u>30.1</u>	<u>30.1</u>	<u>_____</u>
DIFFERENCE	<u>+1.0</u>	<u>- .3</u>	<u>_____</u>

ARRAY GAIN

MRA SNR	<u>38.2</u>	<u>41.1</u>	<u>5.5</u>
MEAN OMNI SNR	<u>30.1</u>	<u>32.5</u>	<u>_____</u>
ARRAY GAIN	<u>8.3</u>	<u>8.6</u>	<u>_____</u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>12.5</u>	<u>14.7</u>	<u>15.1</u>
DIFFERENCE	<u>-4.2</u>	<u>-6.1</u>	<u>_____</u>

45 0703

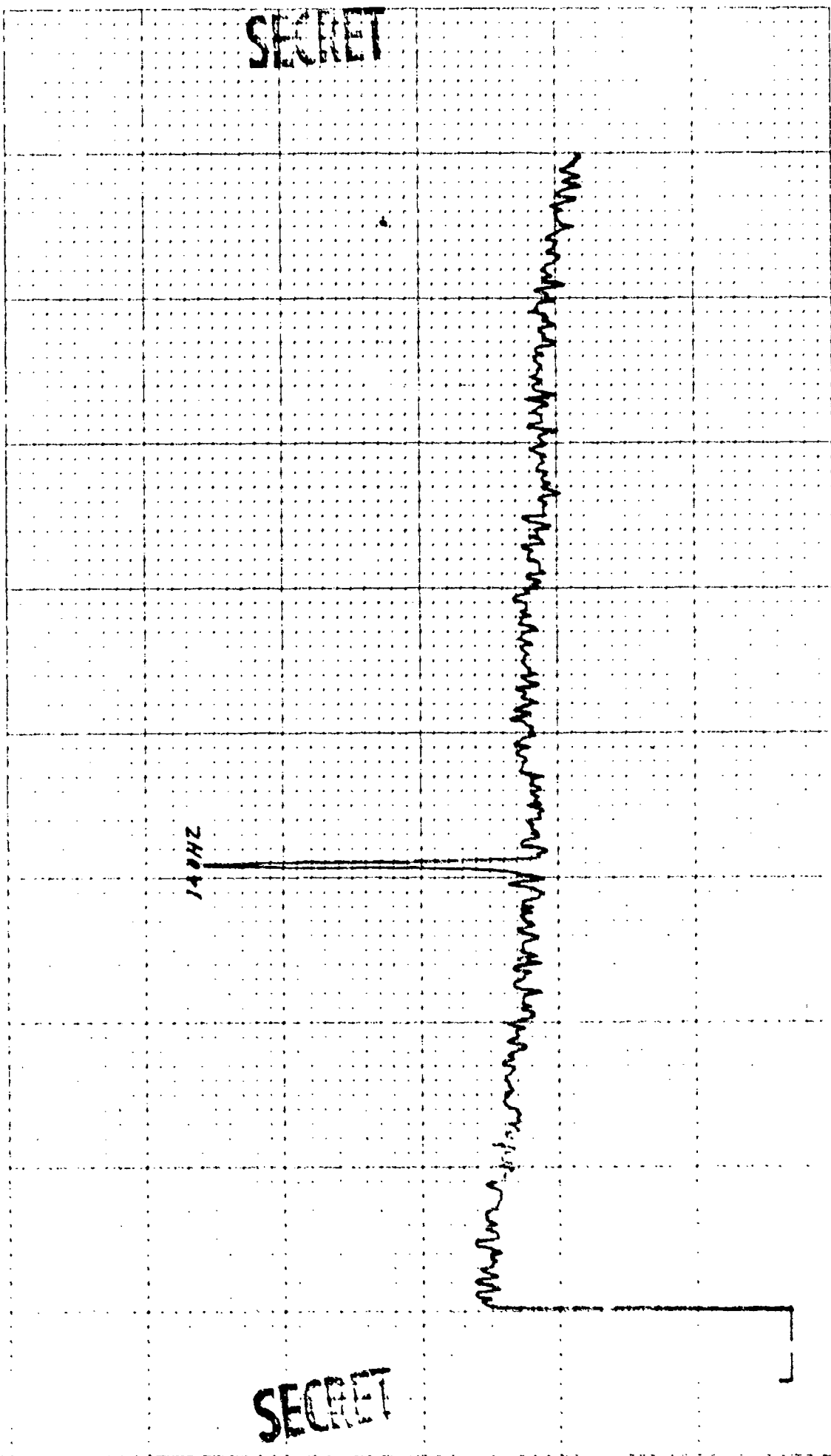
CONTROL: 0202 - J2 (DP7) DATE OF ANALYSIS: 1-26-82 REEL: F09 INDE X/195

BEAMFORMED SPECTRUM (ELEMENTS) 28-34 INTEGRATION TIME 320 SECS ATTEN: 30 DB

EXERCISE: BEARING STAKE DATE/TIME: 28-77 - 0202Z FILTFR WTG: HANNING

CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ AZ STEERING

32 ELEMENTS



SECRET

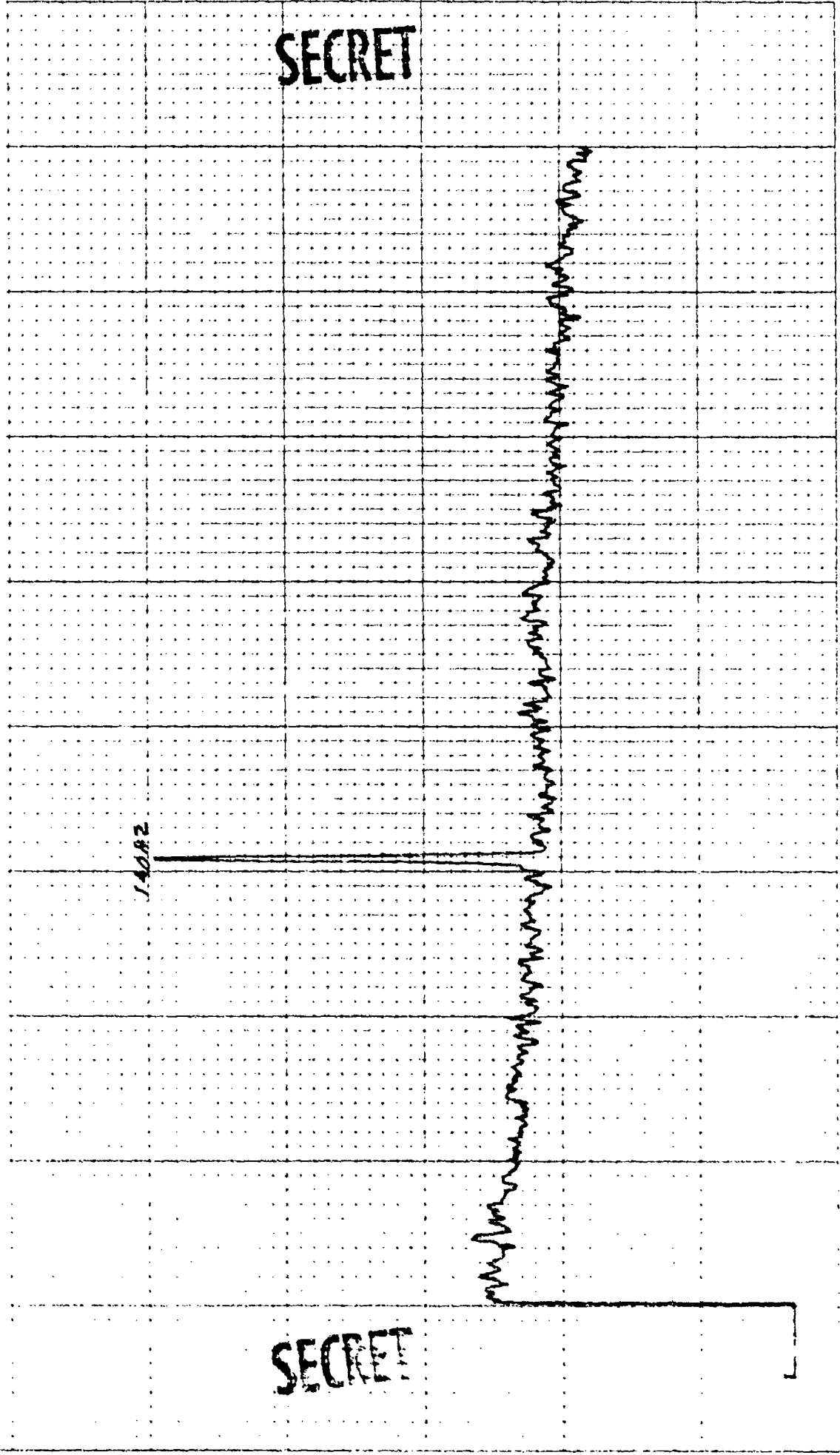
SECRET

46 0703

CONTROL: 0202-32 (D07)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-77
 DATE/TIME: 2-8-77 - 0202.2
 ANALYSIS BANDWIDTH: 1/10 HZ
-14 DEC. AZ STEERING

REEL: F39
 INTEGRATION TIME 320 SECS
 FILTER WTC: HANNING
 INDE X/195
 ATTEN: -20 DB



SECRET

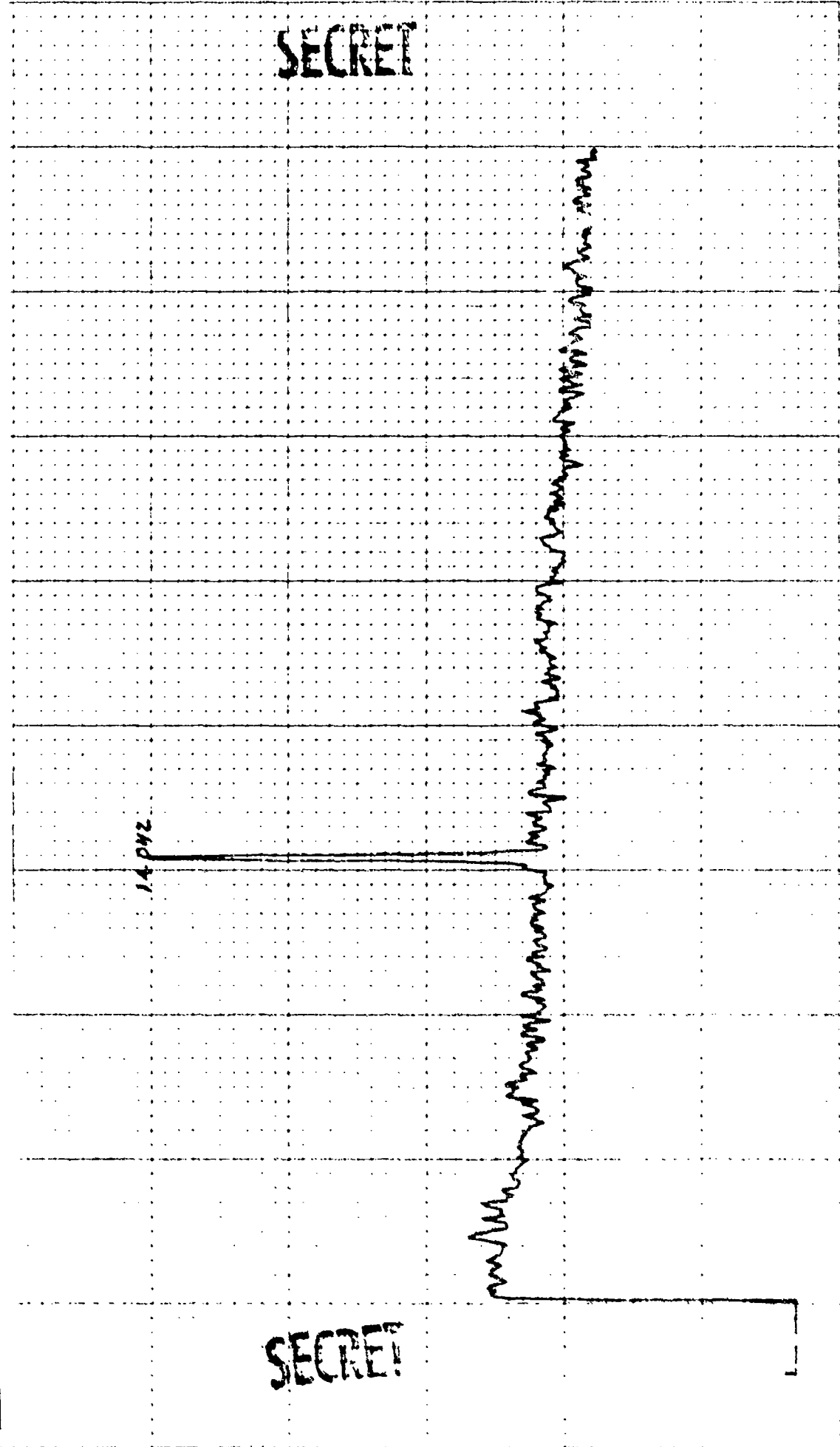
SECRET

46 0703

CONTROL: 0202-32 (DP7)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-25-82
DATE/TIME: 2077-0222Z
ANALYSIS BANDWIDTH: 1/10HZ
-16 DEG. AZ STEERING

REEL: F39 INDE X/145
INTEGRATION TIME 320 SECS ATTEN: -30 DB
FILTER WTC: HANNING



SECRET

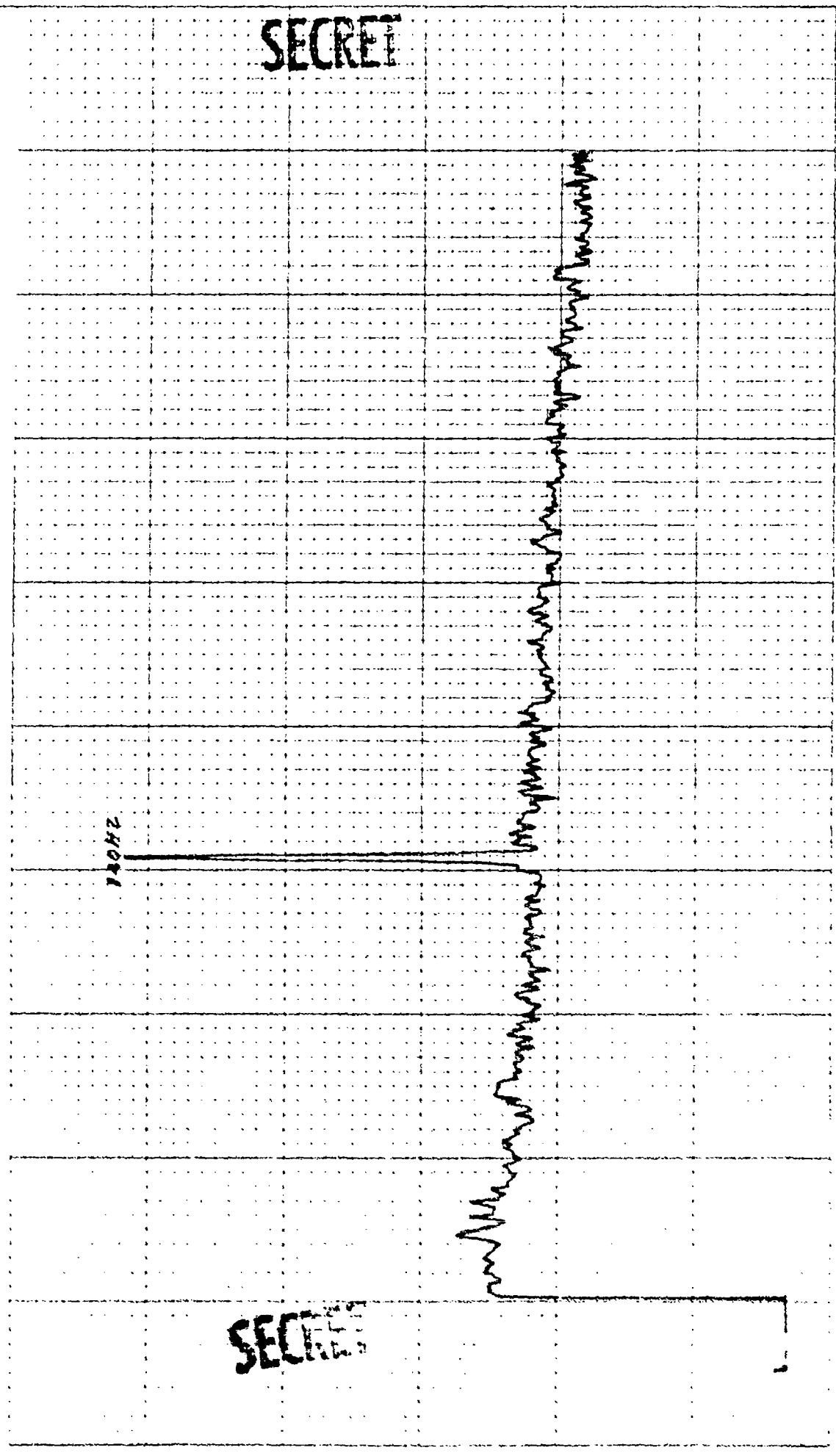
SECRET

46 0703

CONTROL: 0202-32 (DPT)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 KHZ
32 ELEMENTS

DATE OF ANALYSIS:
1-26-82 21-34
DATE/TIME: 2-8-77-0202Z
ANALYSIS BANDWIDTH: 1/10 HZ
-10 DEG. AZ STEERING

REEL: F29 INDE X/45
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTER WIG: HANNING

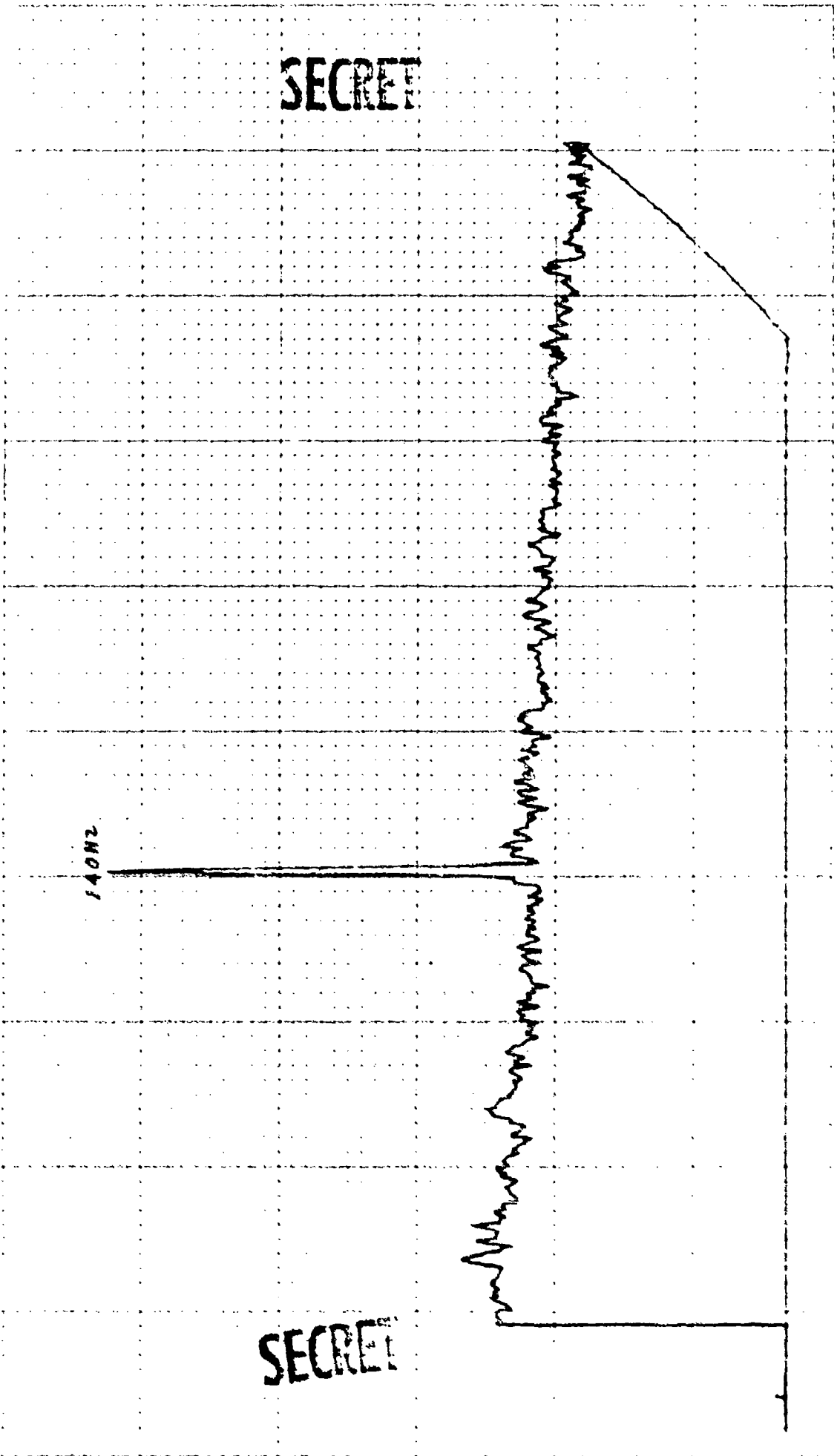


SECRET

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46 0703

CONTROL: 0202-30 (DP7) DATE OF ANALYSIS: 1-26-89-34 REEL: F29 INDE X/45
 BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-8-77 -02027 INTEGRATION TIME 320 SECS ATTEN: -30 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 CENTER FREQ: 150 HZ -20 DEG. AZ STEERING



SECRET

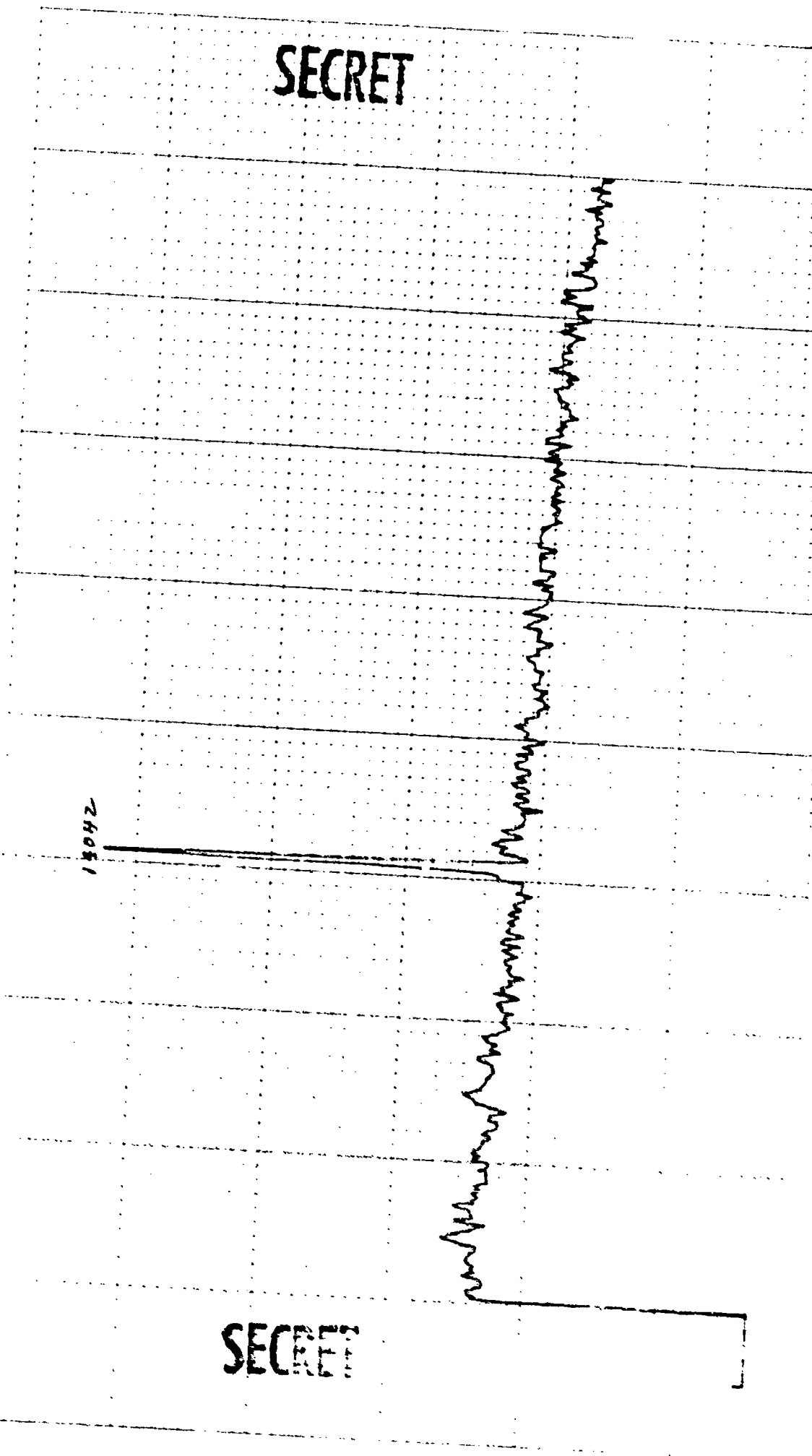
SECRET

66-0763

CONTROL: 0202-32 (DPT)
BEAMFORMED SPECTRUM/ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-59
DATE/TIME: 2-07-02Z
ANALYSIS BANDWIDTH: 1710HZ
-2/5 DEG. AZ STEERING

REEL: 529
INDE X/145
INTEGATION TIME 320 SECS
FILTERED
ATTEN: -70DB
WTG: HANNING



SECRET

SECRET

46 0703

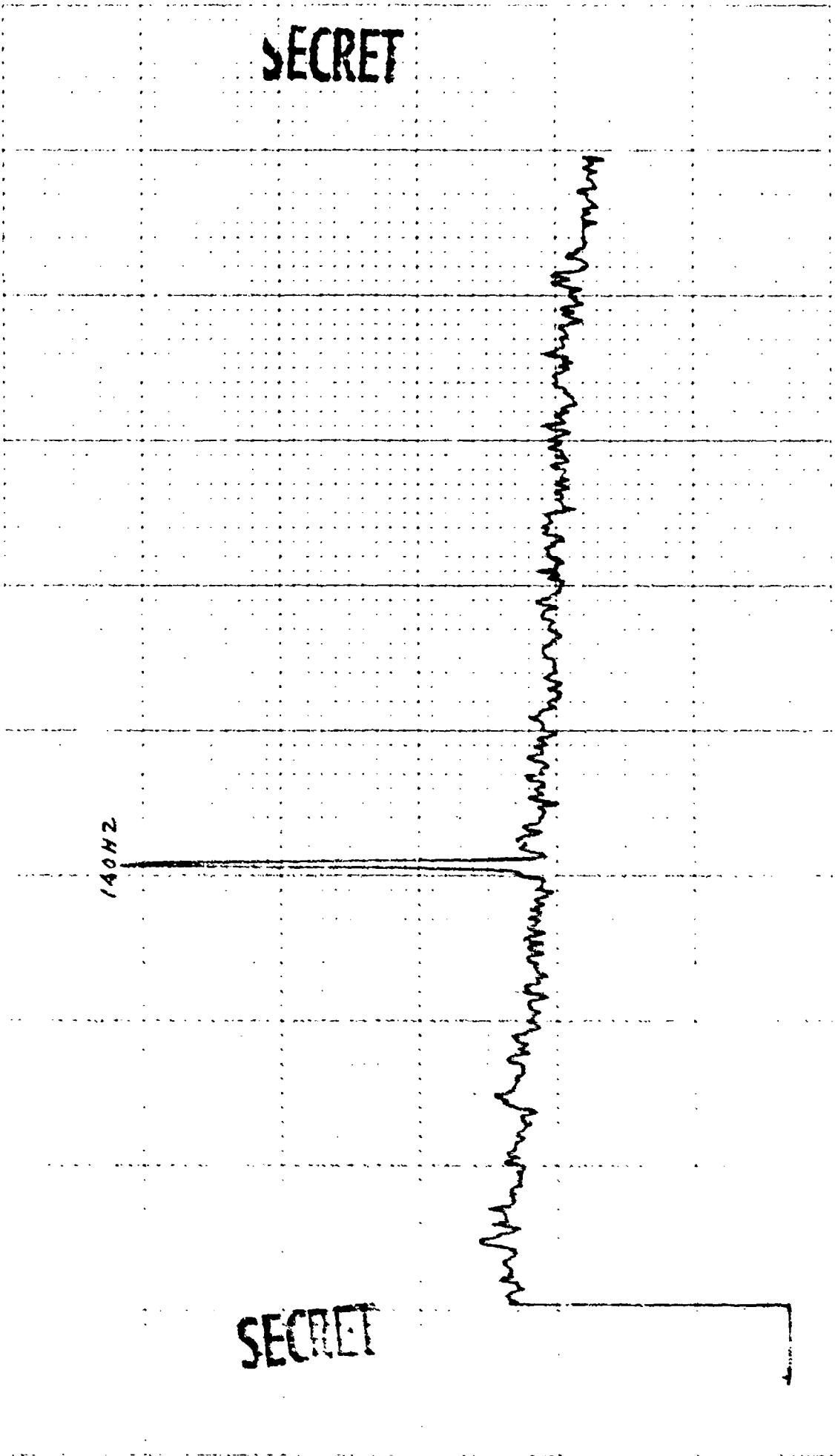
CONTROL: 0202 - 32 (DP7) DATE OF ANALYSIS: 1-26-89-37 REEL: F39 INDE X/145

BEAMFORMED SPECTRUM/ELEMENTS DATE/TIME: 2-8-77 - 0202 Z INTEGRATION TIME 320 SECS ATTEN: -30 DB

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

CENTER FREQ: 150 HZ - 22 DEG. AZ STEERING

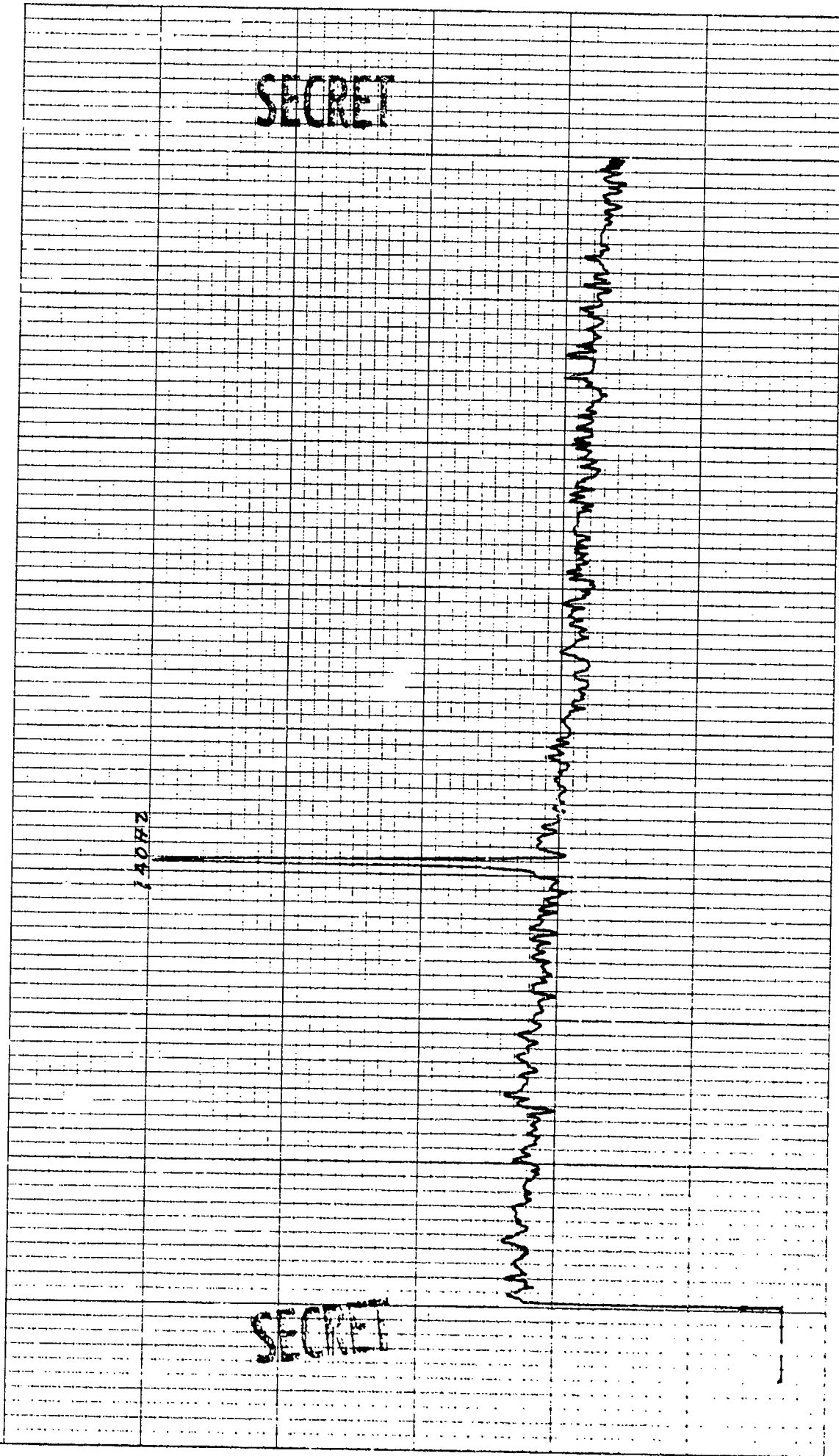
32 ELEMENTS



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CONTROL: 0202-32 (DP7) DATE OF ANALYSIS: 1-26-53 REEL: F29 INDE X/145
 BEAMFORMED SPECTRUM(ELEMENTS))
 EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0202Z
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: -30 DB
32 ELEMENTS -24 DEG. AZ STEERING FILTER WTG: HANNING



SECRET

SECRET

46 0753

CONTROL: 0202-72 (2P7) DATE OF ANALYSIS: REEL: F29 INDE X/45
 BEAMFORMED SPECTRUM/ELEMENTS: 1-264 29-53 INTEGRATION TIME 320 SECS ATTEN: -30 DB
 EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0202 Z FILTERED WTG: HANNING
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ
32 ELEMENTS -98 DEG. AZ STEERING

140HZ

SECRET

SECRET

Handwritten notes:
 140 Hz is the center frequency of the bearing stake exercise.
 The bearing stake exercise is a narrowband signal.
 The bearing stake exercise is a narrowband signal.
 The bearing stake exercise is a narrowband signal.

46 0703

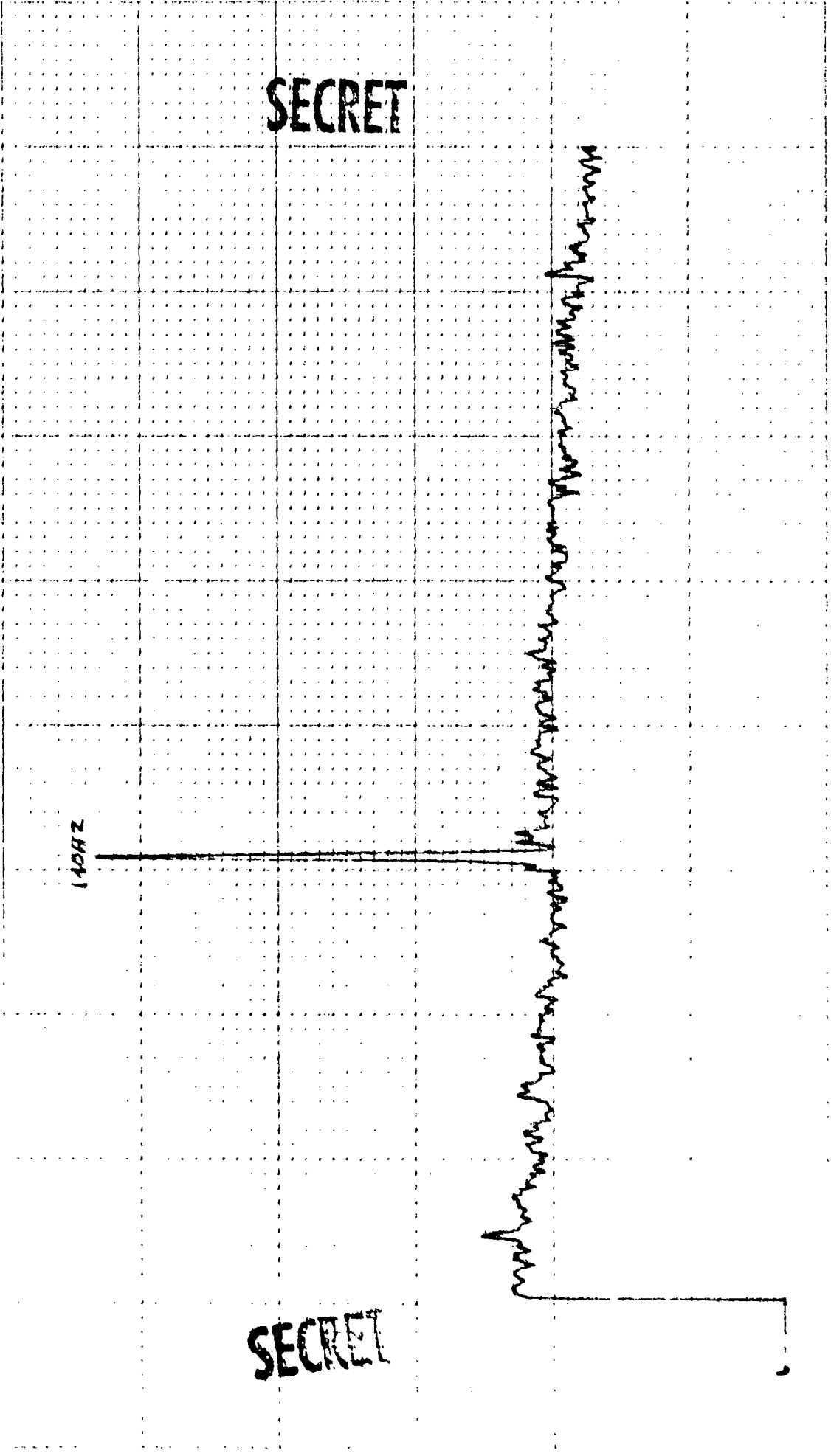
CONTROL: 0202 - 32 (DP7) DATE OF ANALYSIS: REEL: F29 INDE X / 145

BEAMFORMED SPECTRUM/ELEMENTS 1-26 / 29-34 INTEGRATION TIME 320 SECS ATTEN: -3 DB

EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0202Z FILTER WIG: HANNING

CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ

32 ELEMENTS -30 DEG. AZ STEERING



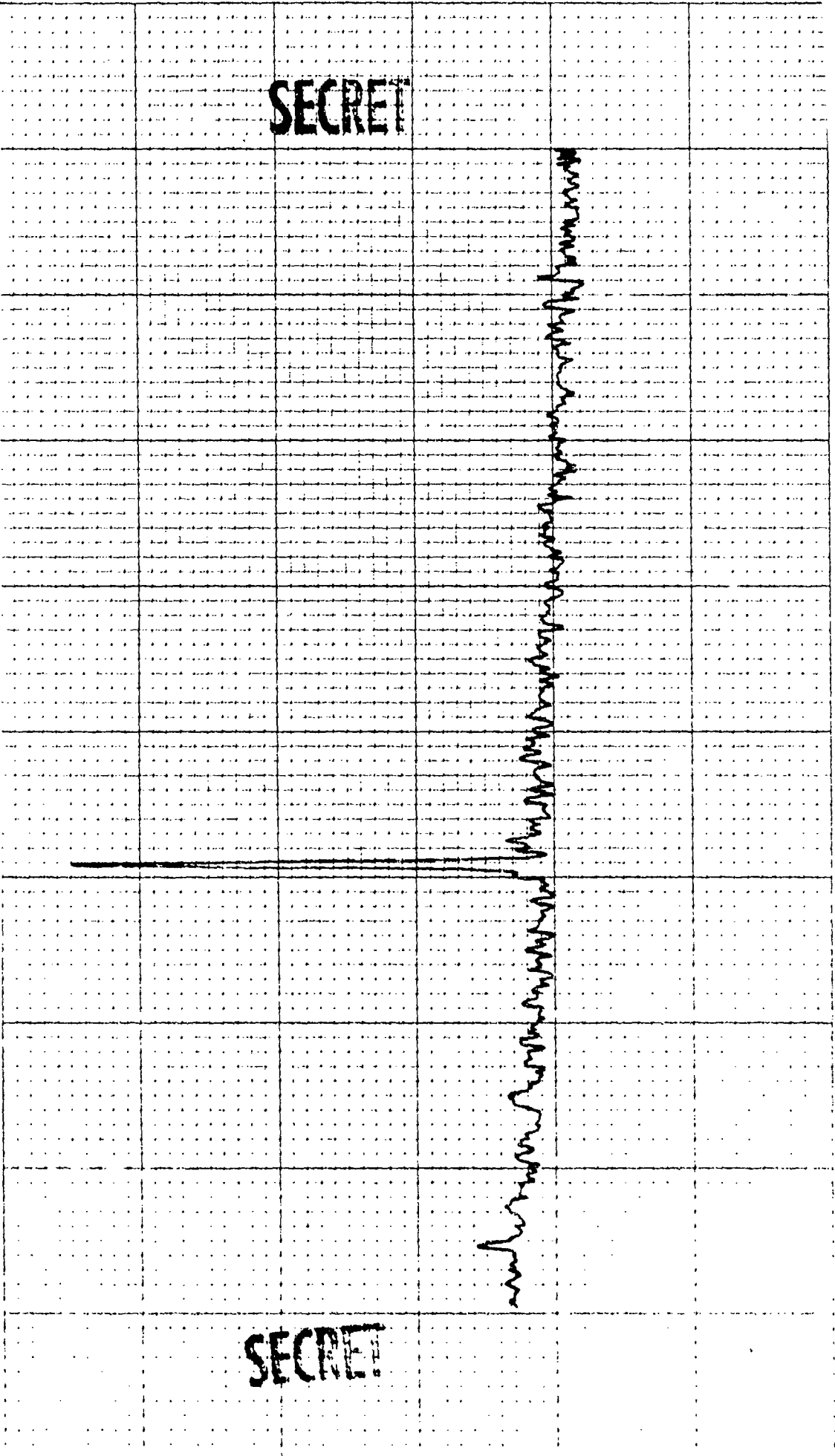
SECRET

SECRET

46 0703

DATE: 1-26-77 TO: 1-26-77 BY: [unclear]

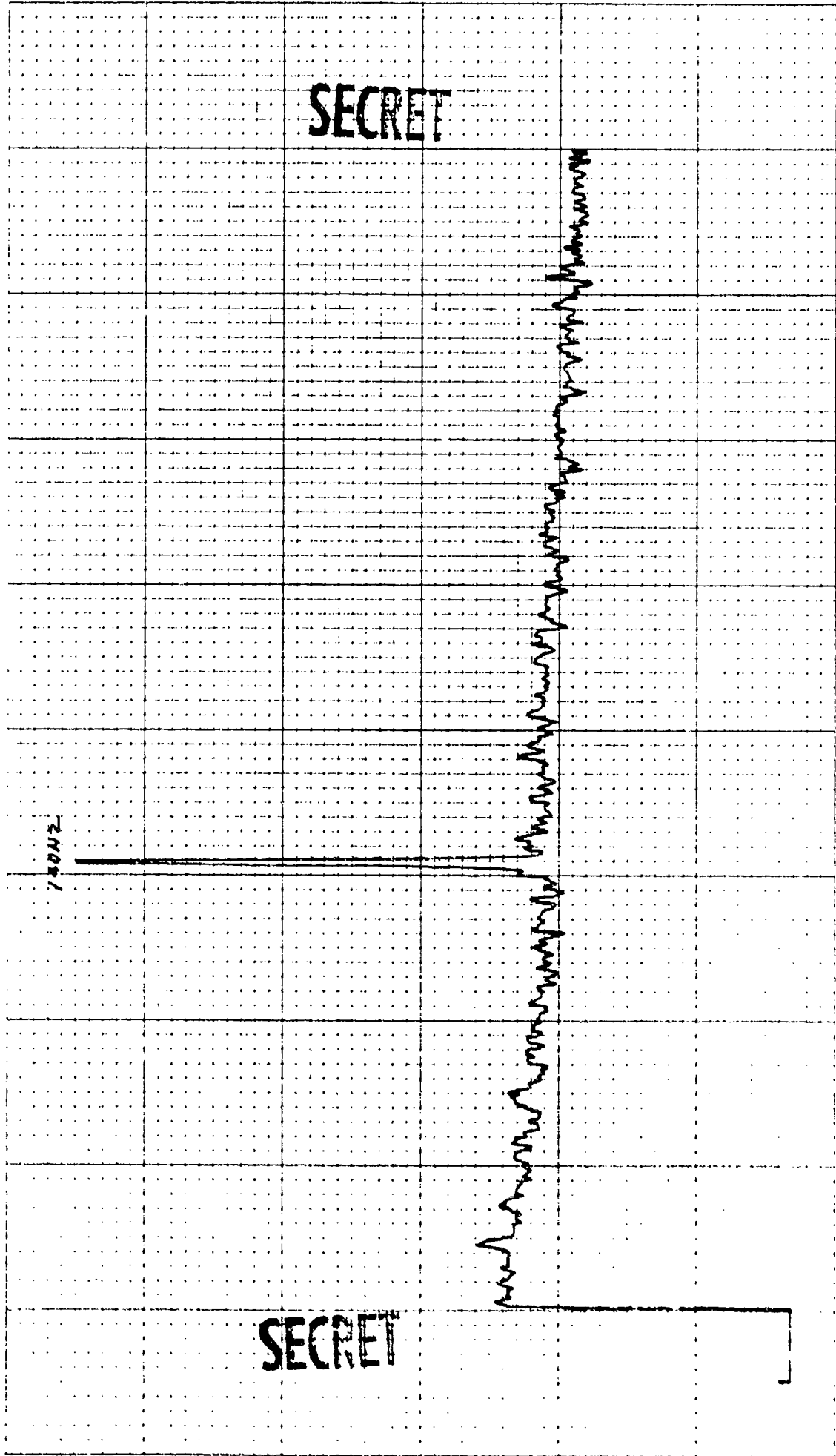
CONTROL: 0202-32 (DPT) DATE OF ANALYSIS: 1-26-77 REEL: F29 INDE X/145
 BEAMFORMED SPECTRUM(ELEMENTS) 09-34
 EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTEN: -30 DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTFR WTG: HANNING
32 ELEMENTS -32 DEG. AZ STEERING



46 0703

REF ID: A66666

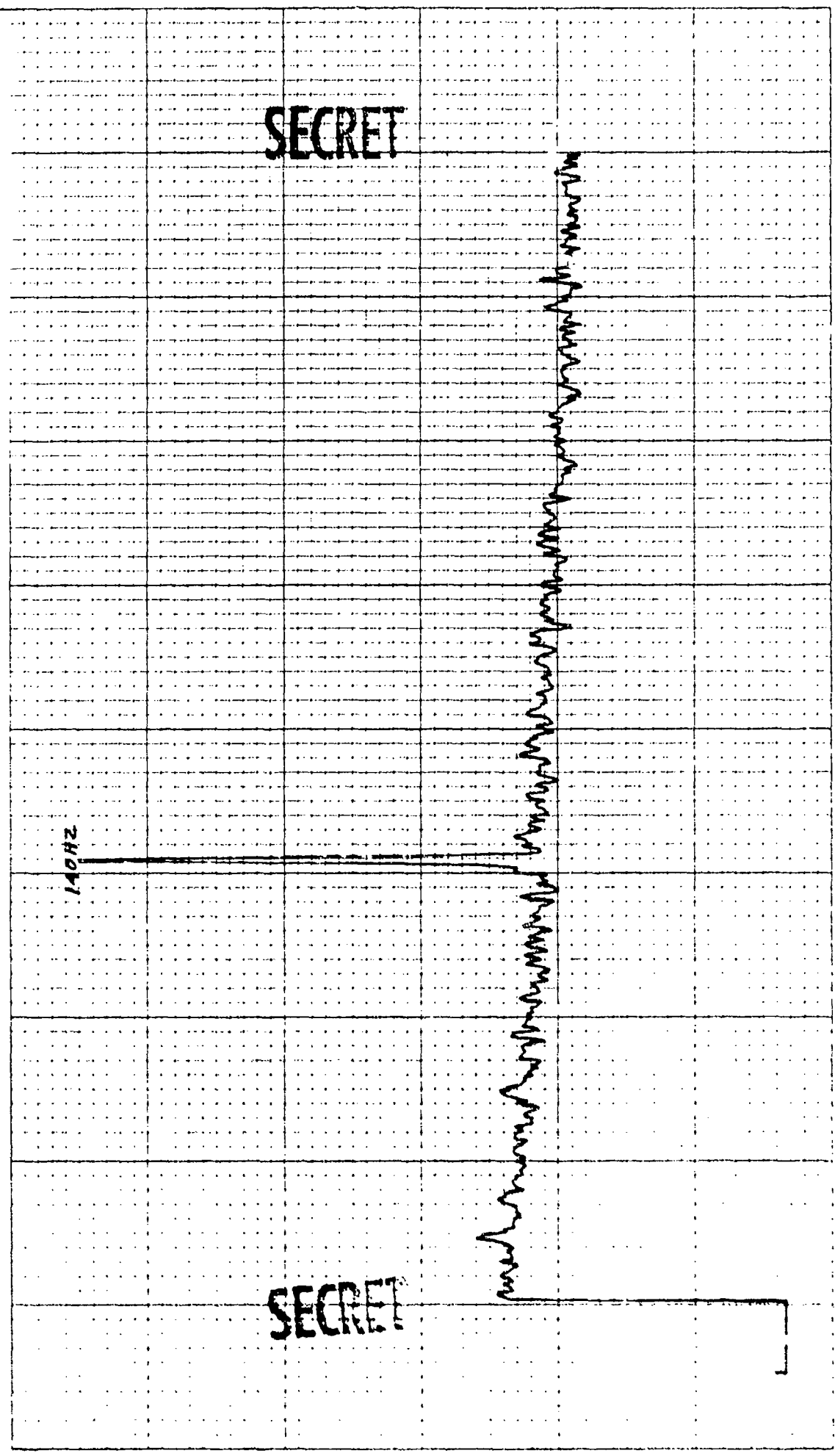
CONTROL: 0202 - 51 (007) DATE OF ANALYSIS: _____ REEL: F29 INDE X 1145
 BEAMFORMED SPECTRUM(ELEMENTS) 1-26 29-34
 EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0202.2 INTEGRATION TIME 320 SECS ATTEN: 30 DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
32 ELEMENTS -33 DEG. AZ STEERING



46 0703

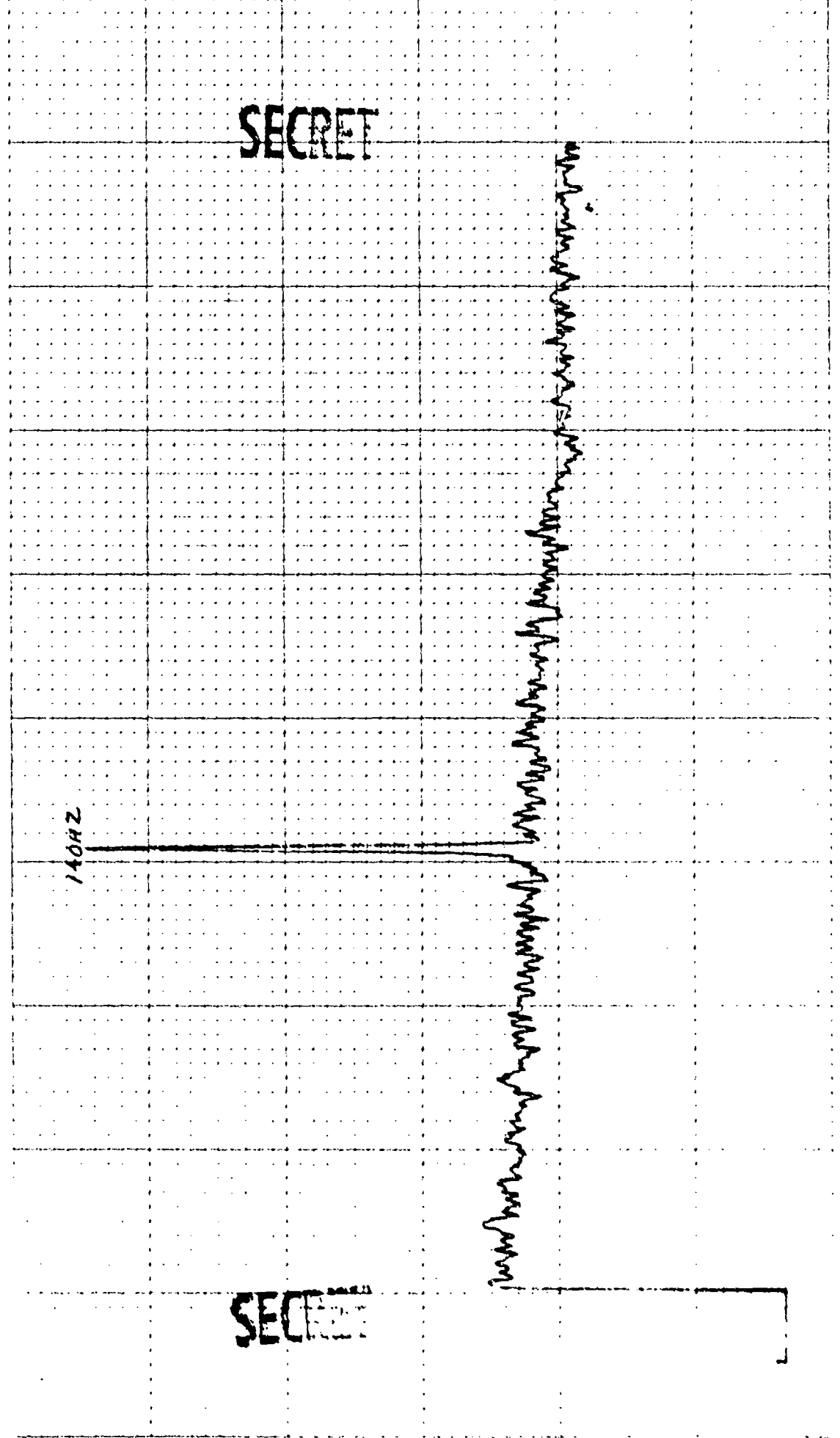
REF: 1-26-89-34

CONTROL: 0202-32 (DP7) DATE OF ANALYSIS: 1-26-89-34 REEL: F29 INDE X 1145
 BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-8-77 -0202-Z INTEGRATION TIME 320 SECS ATTEN: -30 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTFR WTG: HANNING
 CENTER FREQ: 150 HZ - 34 DEG. AZ STEERING



46 0703

CONTROL: 0202-32 (DP7) DATE OF ANALYSIS: 1-26-87 REEL: F29 INDEX: 1/45
 BEAMFORMED SPECTRUM(ELEMENTS) 28-34 INTEGRATION TIME 320 SECS ATTEN: -30 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER: WTG: HANNING
 CENTER FREQ: 150 HZ -36 DEG. AZ STEERING



Handwritten note: 140HZ

46 0703

1-26-77 08-34

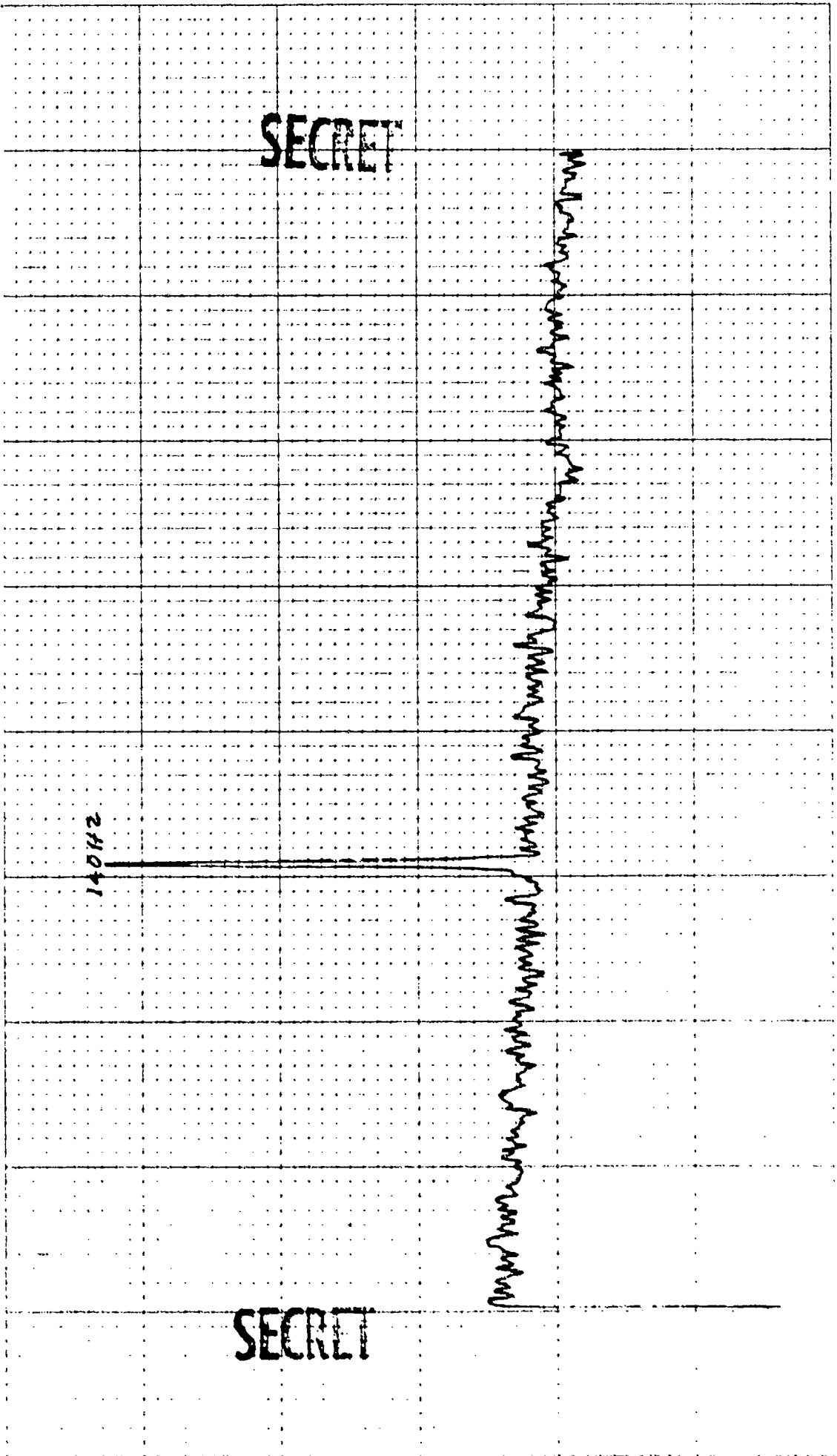
CONTROL: 0202 - 32 (DP7) DATE OF ANALYSIS: 1-26-77 08-34 REEL: F29 INDE X/145

BEAMFORMED SPECTRUM (ELEMENTS) INTEGRATION TIME 320 SECS ATTEN: -30 DB

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

CENTER FREQ: 150 HZ - 38 DEG. AZ STEERING

32 ELEMENTS



46 0703

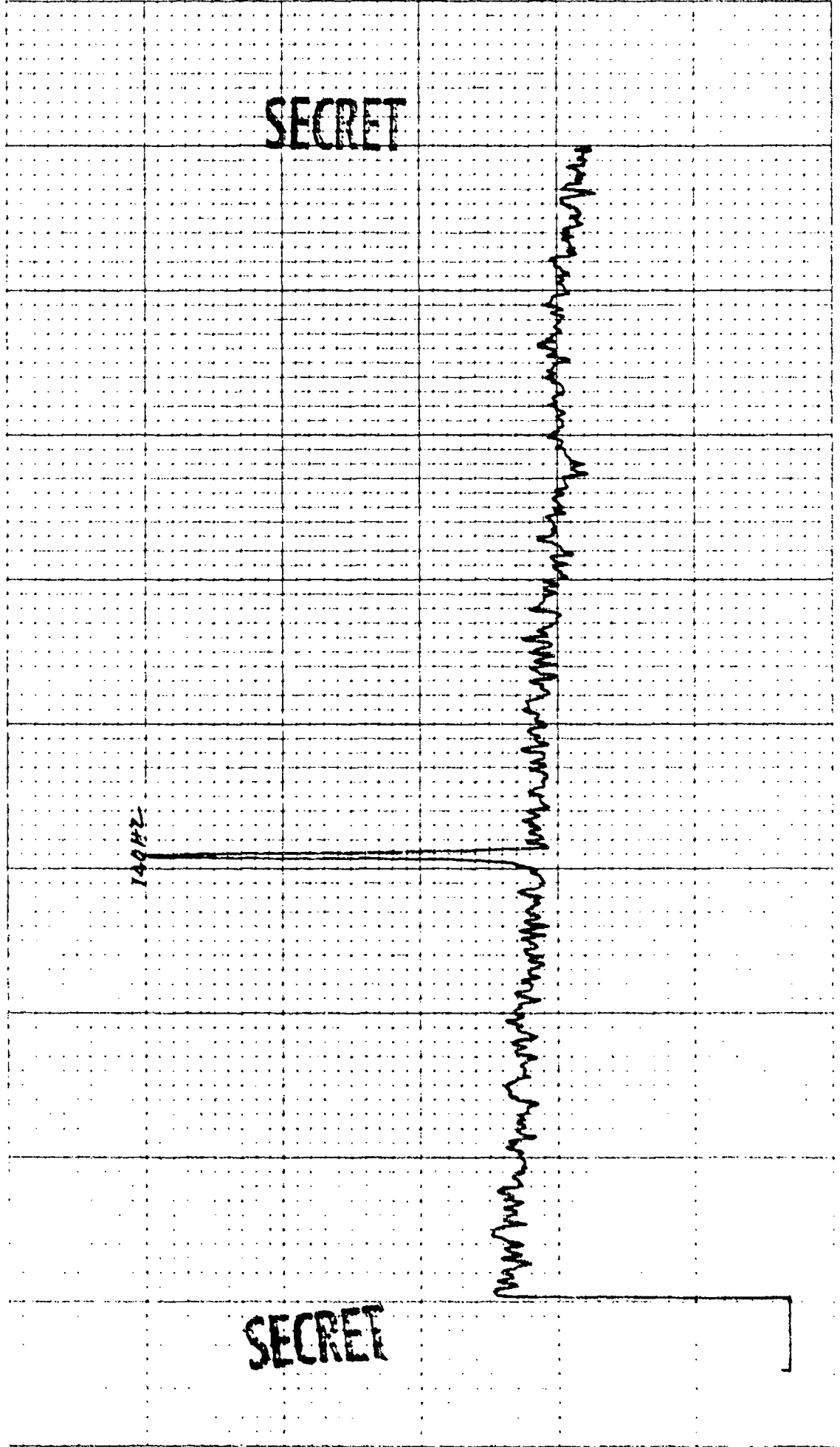
CONTROL: 0202 - 32 (DP7) DATE OF ANALYSIS: REEL: F29 INDE X1145

BEAMFORMED SPECTRUM (ELEMENTS) 1-26 & 28-34) INTEGRATION TIME 320 SECS ATTEN: -30 DB

EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0202Z FILTER WTG: HANNING

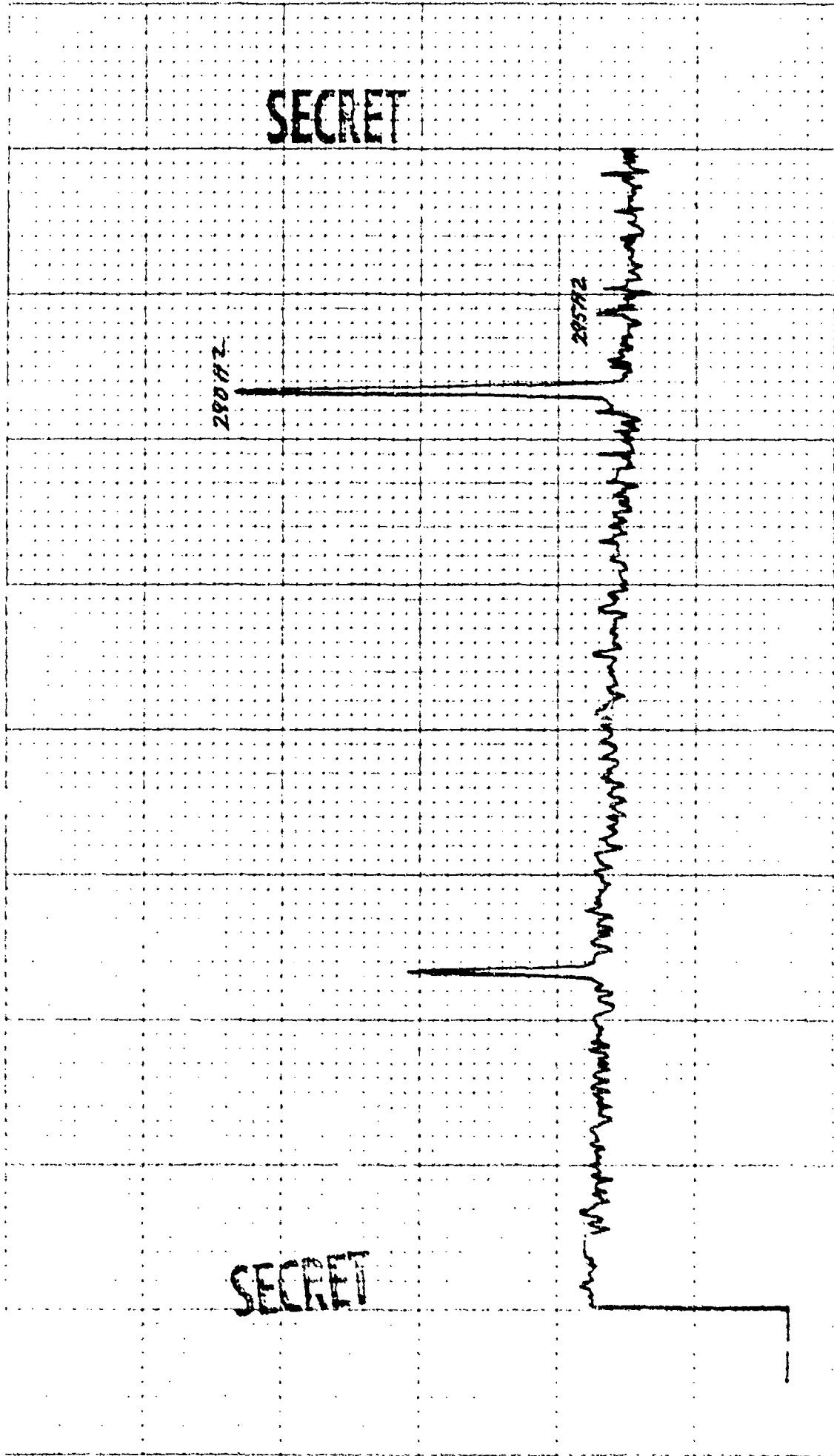
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ -40 DEG. AZ STEERING

32 ELEMENTS



46 0703

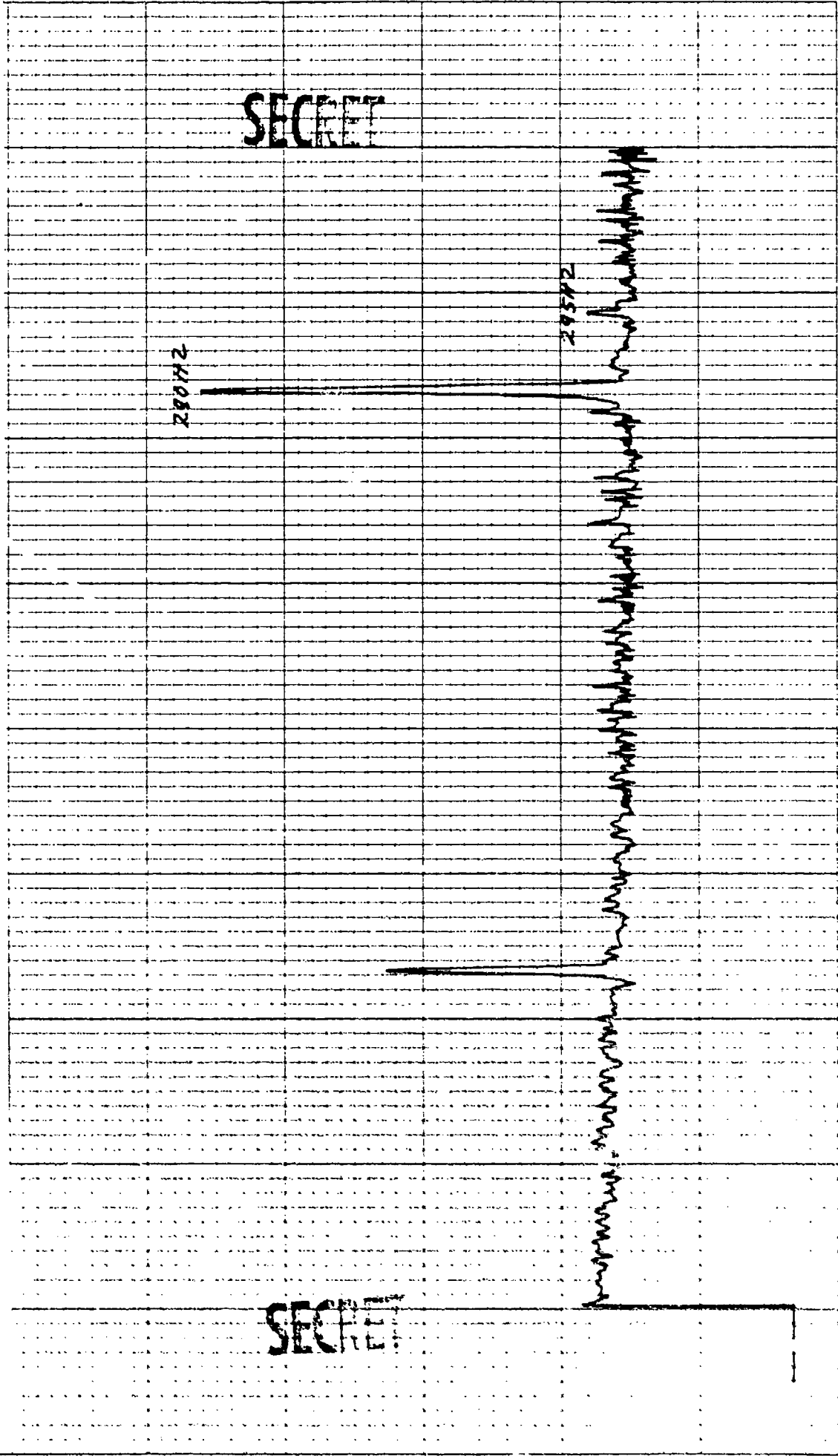
CONTROL: 0202-72 (DP7)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
72 ELEMENTS
 DATE OF ANALYSIS: 1-26-89-34
 DATE/TIME: 28-77-0202Z
 ANALYSIS BANDWIDTH: 171017
-12 DEC. AZ STEERING
 REEL: F29 INDE X 1145
 INTEGRATION TIME 320 SECS ATTEN: -30 DB
 FILTER WTC: HANNING



46 0703

(EX) 10419 TO 10418 US 10419

CONTROL: 0202-72 (207) DATE OF ANALYSIS: 1-26-89 REEL: F29 INDE X/145
 BEAMFORMED SPECTRUM(ELEMENTS) 29-34 INTEGRATION TIME 320 SECS ATTN: -30 DB
 EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 FIJ.TFR WTG: HANNING
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ
32 ELEMENTS -14 DEG. AZ STEERING

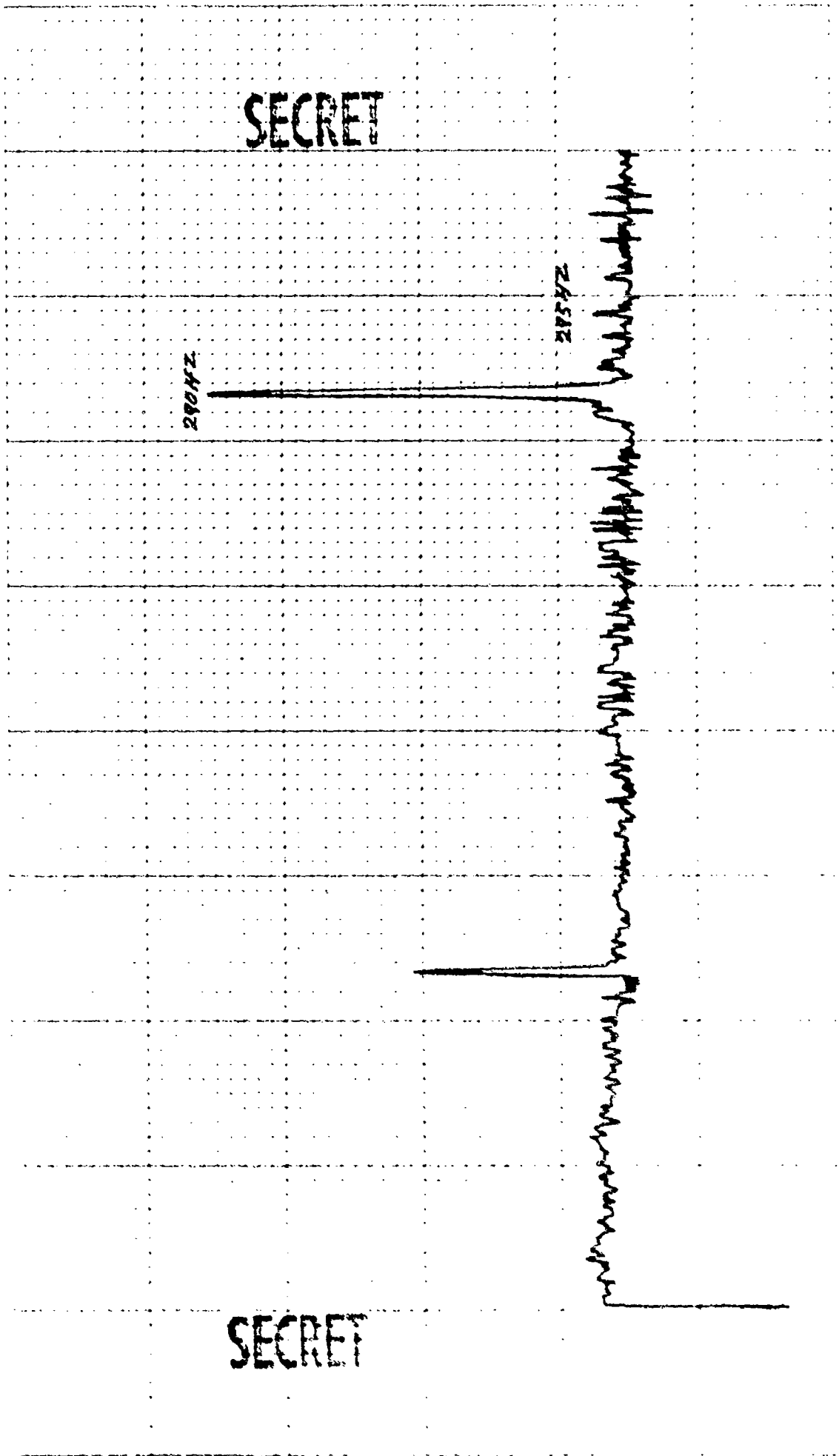


46 0763

CONTROL: 0202 - 32 (OP7)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 2800 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-54
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10 HZ
-16 DEG. AZ STEERING

REEL: F29 INDE X/145
INTEGRATION TIME 320 SECS ATTEN: 30 DB
FILTER WTG: HANNING



SECRET

SECRET

46 0703

CONTROL: 0201-32 (P07) DATE OF ANALYSIS: 1-26-80 (P-34)

BEAMFORMED SPECTRUM (ELEMENTS) ANALYSIS BANDWIDTH: 1/10HZ

EXERCISE: BEARING STAKE -10 DEG. A2 STEERING

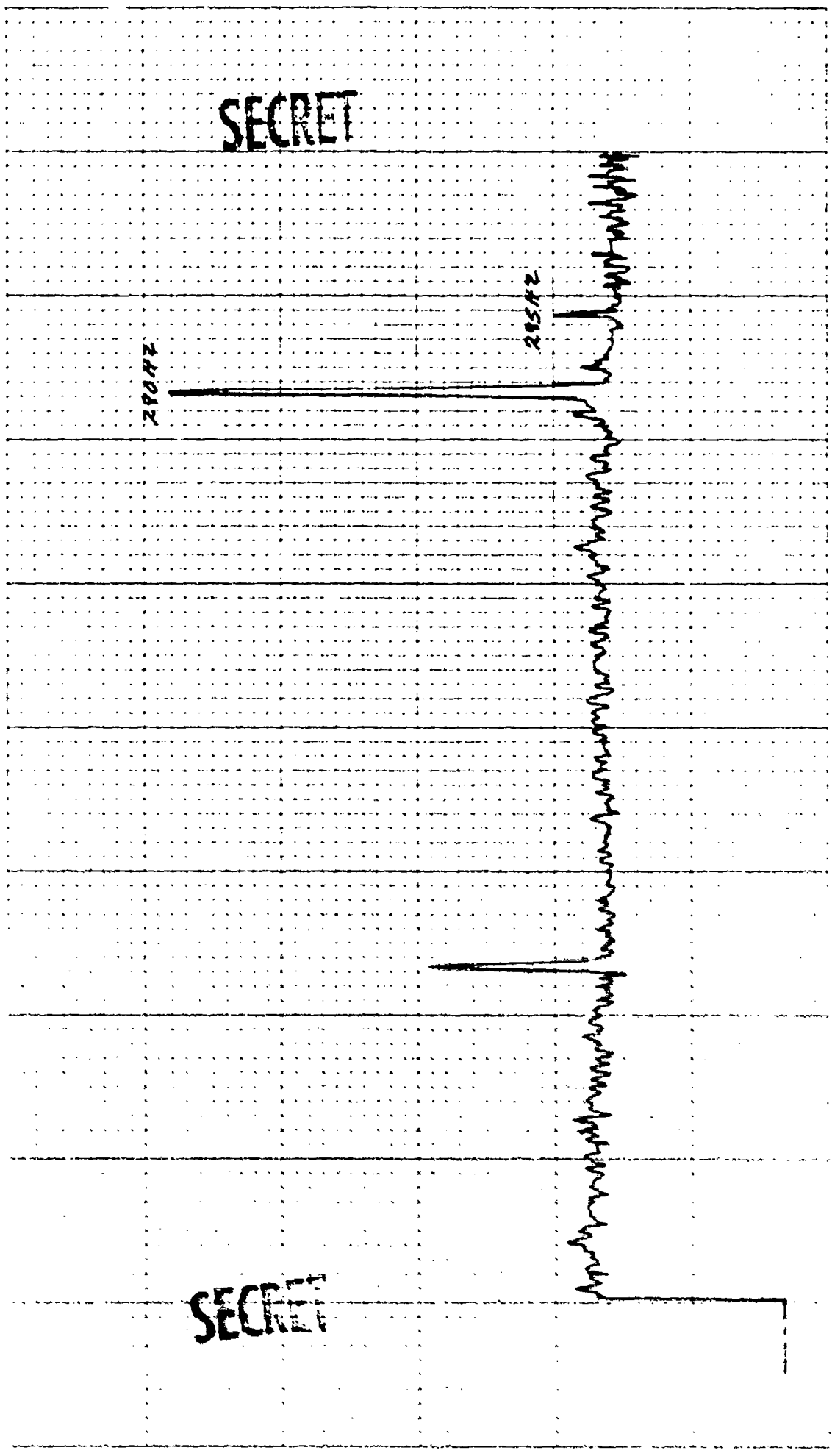
CENTER FREQ: 280 HZ

32 ELEMENTS

REEL: F29 INDE X/145

INTEGRATION TIME 320 SECS ATTN: -20DB

FILTR: HANNING



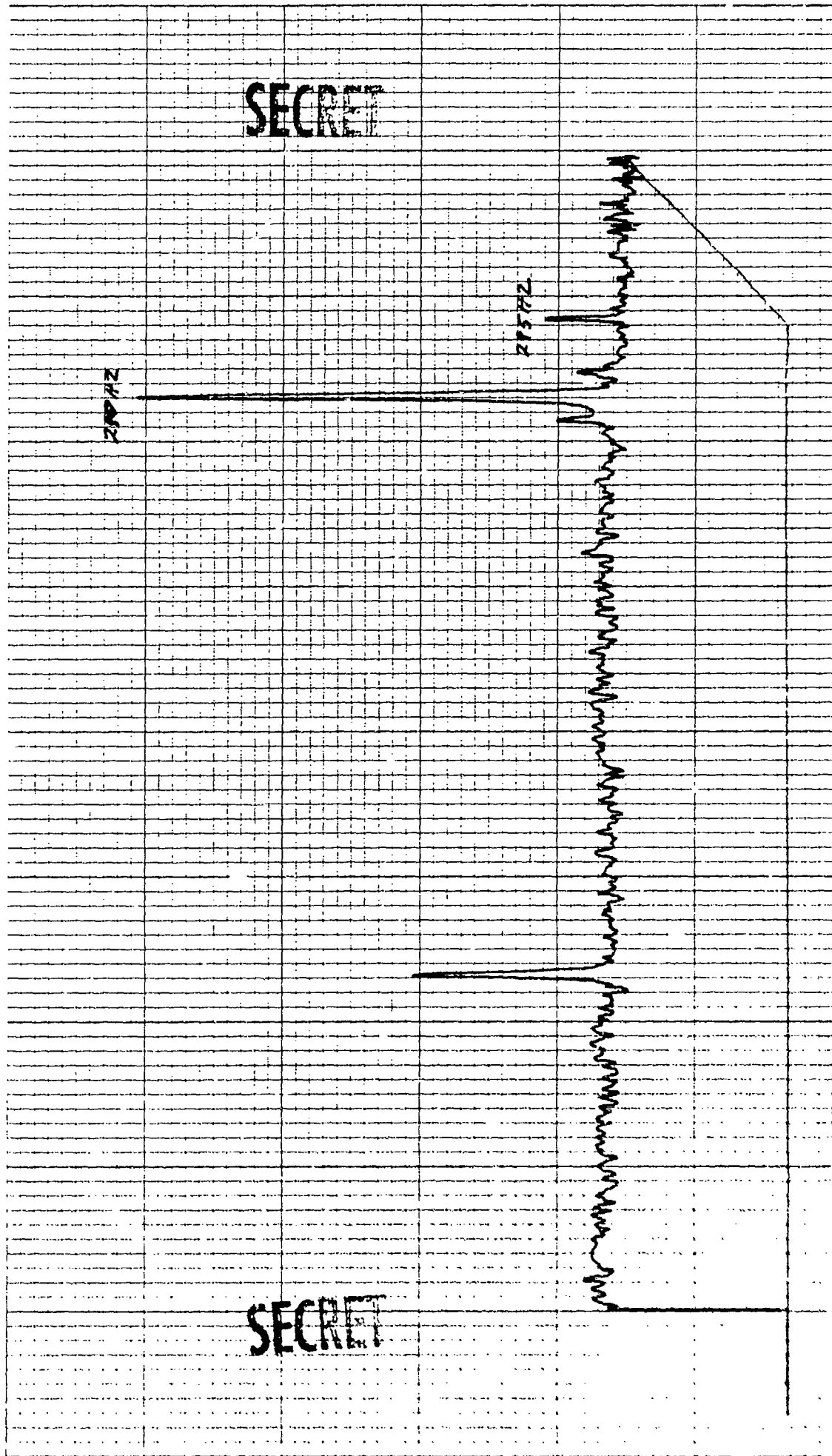
SECRET

SECRET

CONTROL: 0202-32 (DPT)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-88 28-34
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10 HZ
-20 DEG. AZ STEERING

REEL: F09 INDE X/135
INTEGRATION TIME 320 SECS ATTN: -30 DB
FILTER WTG: HANNING



46 0703

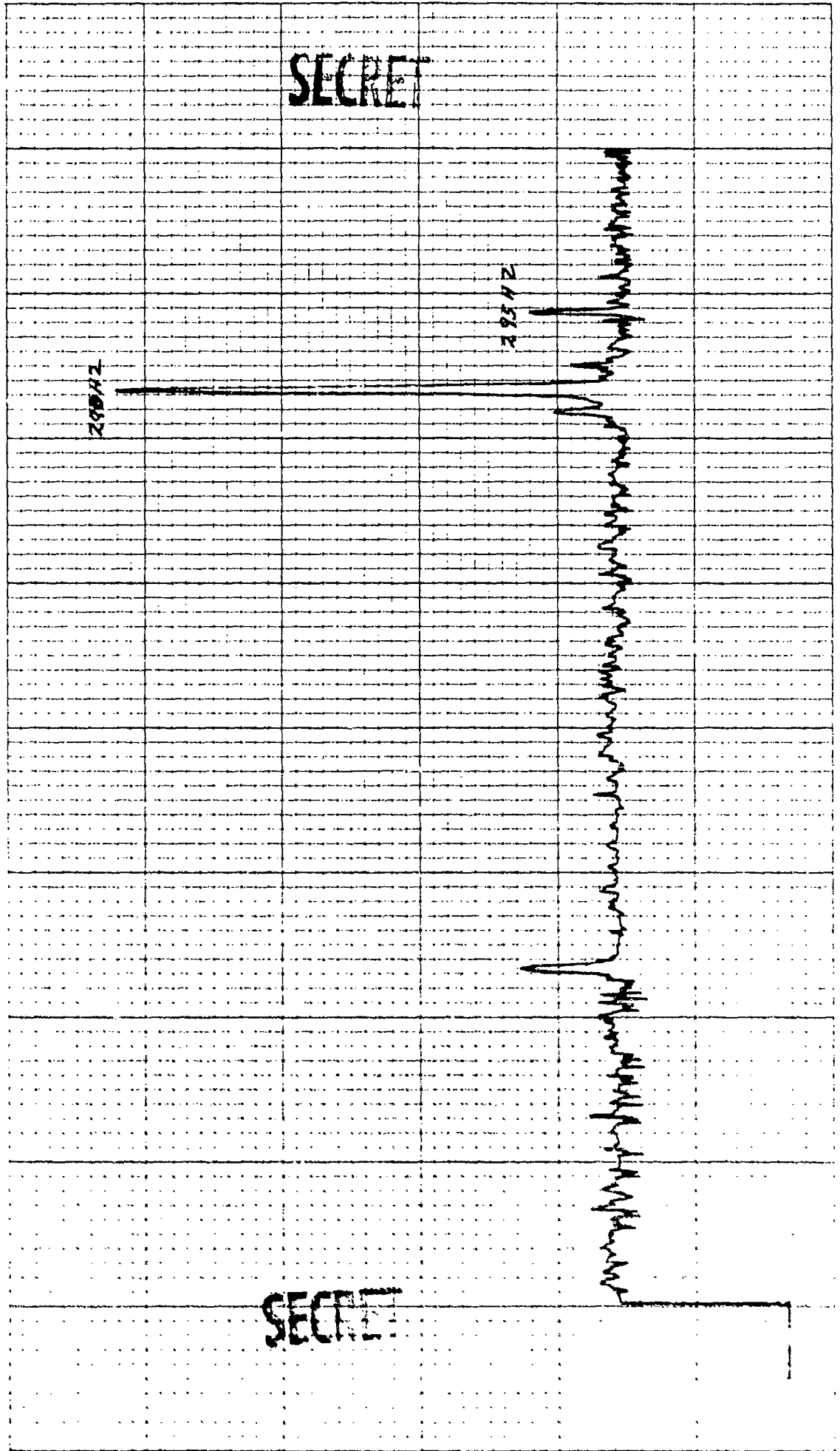
CONTROL: 0202 - 51 (DP7)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
32 ELEMENTS

DATE OF ANALYSIS: _____
1 - 26 @ 29-34

REEL: F24 INDE X 1/43

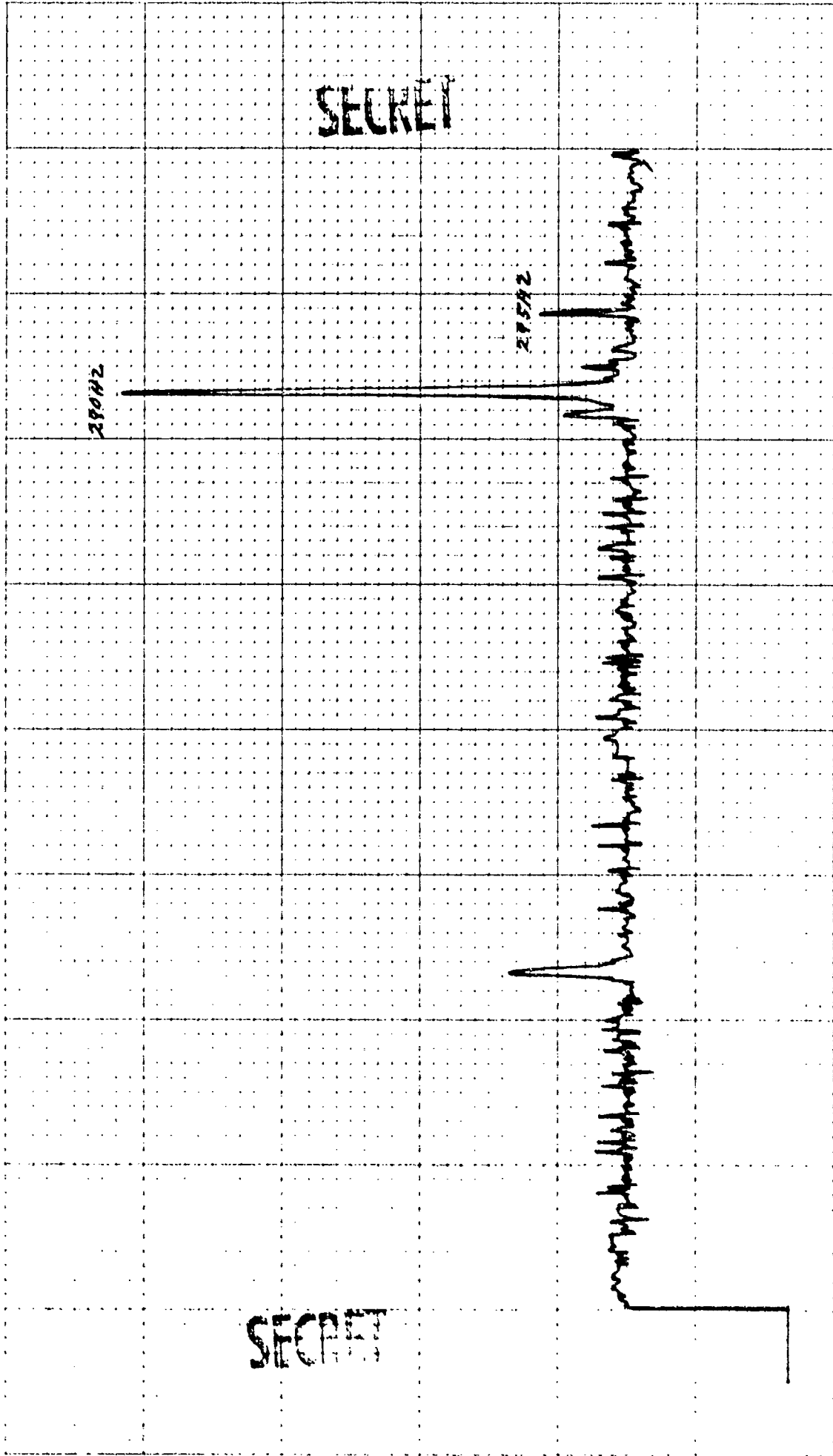
INTEGRATION TIME 320 SECS ATTN: 30 DB
 FILTER WTG: HANNING

DATE/TIME: 2-8-77 - 0202Z
 ANALYSIS BANDWIDTH: 1/10HZ
-2/5 DEG. AZ STEERING



46 0703

CONTROL: 0202 - 32 (DPT) DATE OF ANALYSIS: 1-26-58 09-34 REEL: F39 INDE X 1145
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-8-77 - 0202 Z INTEGRATION TIME 320 SECS ATTN: -30 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 CENTER FREQ: 280 HZ -32 DEG. AZ STEERING



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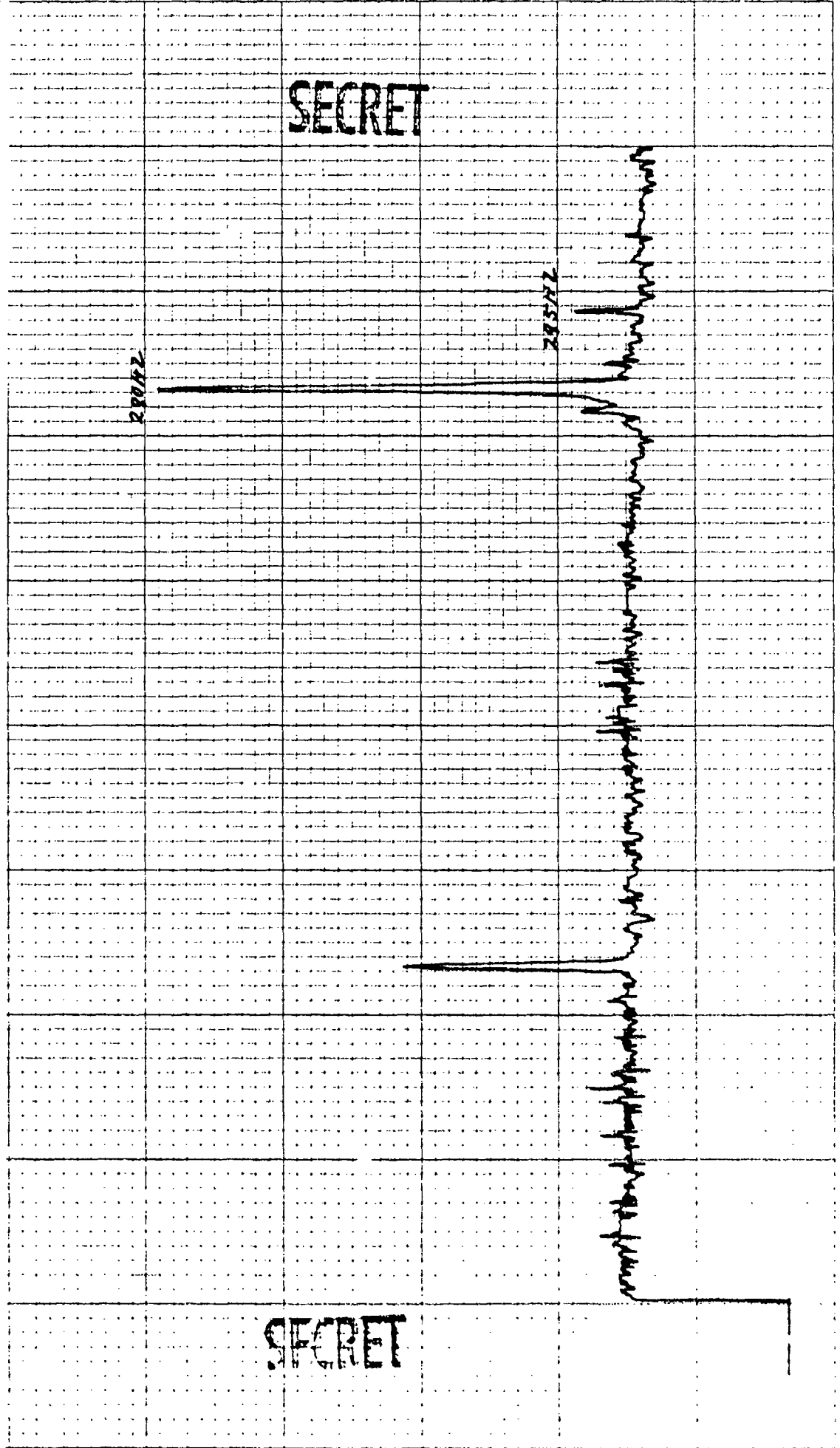
1-26-77 TO THE INCHES

CONTROL: 0202-32 (DP7)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 250 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-77
 DATE/TIME: 2-8-77-0202Z
 ANALYSIS BANDWIDTH: 1/10 HZ
24 DEG. AZ STEERING

REEL: F39
 INTEGRATION TIME 320 SECS
 FILTER
 WTG: HANNING

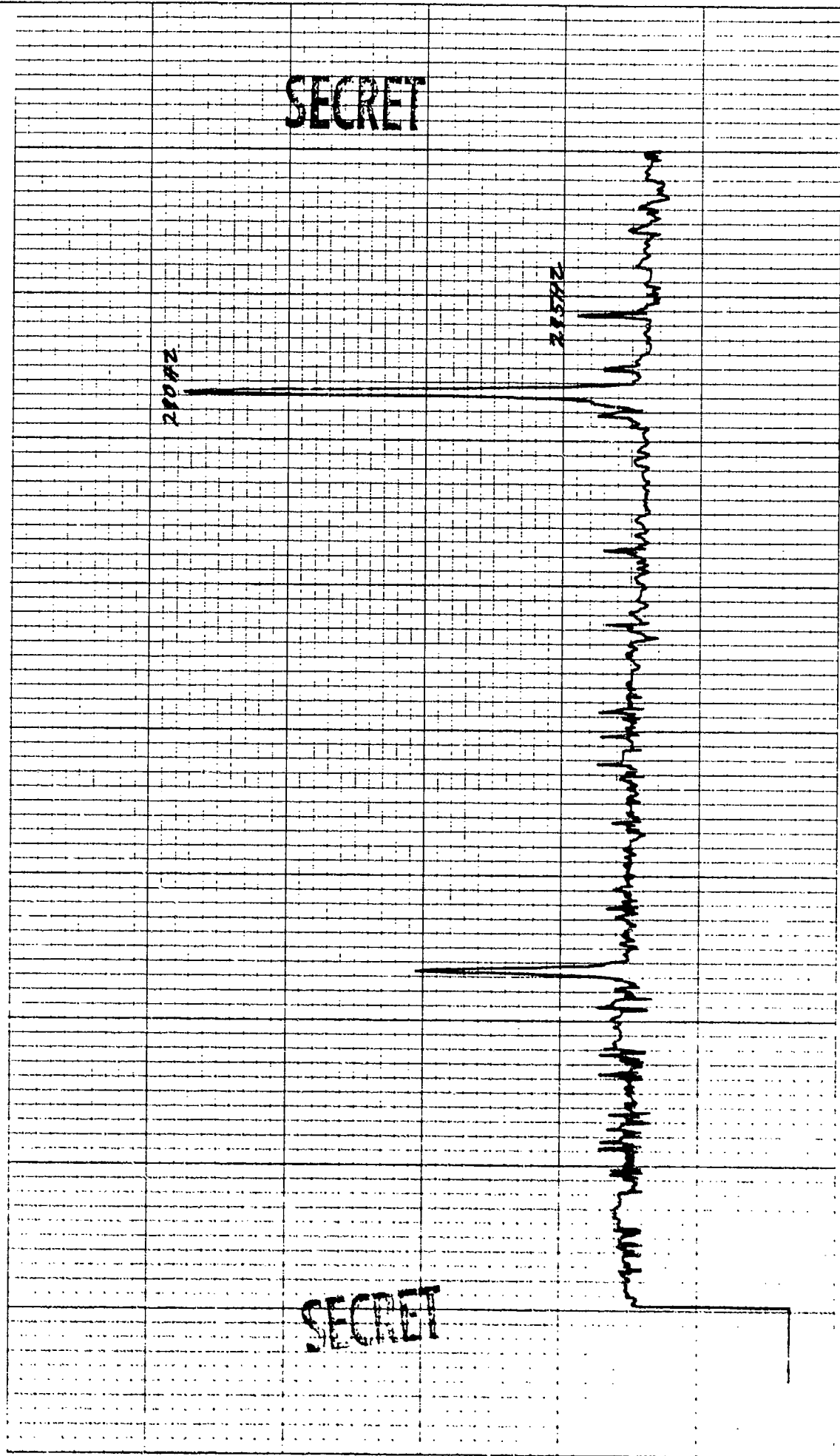
INDE X/145



10 X 10 TO THE INC. INC. BY THE INC.
KODAK SAFETY FILM CO. MADE IN U.S.A.

46 0703

CONTROL: 0202-32 (D07) DATE OF ANALYSIS: 1-26-77 REEL: F09 INDE X: 1145
BEAMFORMED SPECTRUM (ELEMENTS) 1-26-77 INTEGRATION TIME 320 SECS ATTN: -30 DB
EXERCISE: BEARING STAKE DATE/TIME: 2-8-77-0202 Z FILTER WTG: HANNING
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1770 HZ
32 ELEMENTS -26 DEG. AZ STEERING



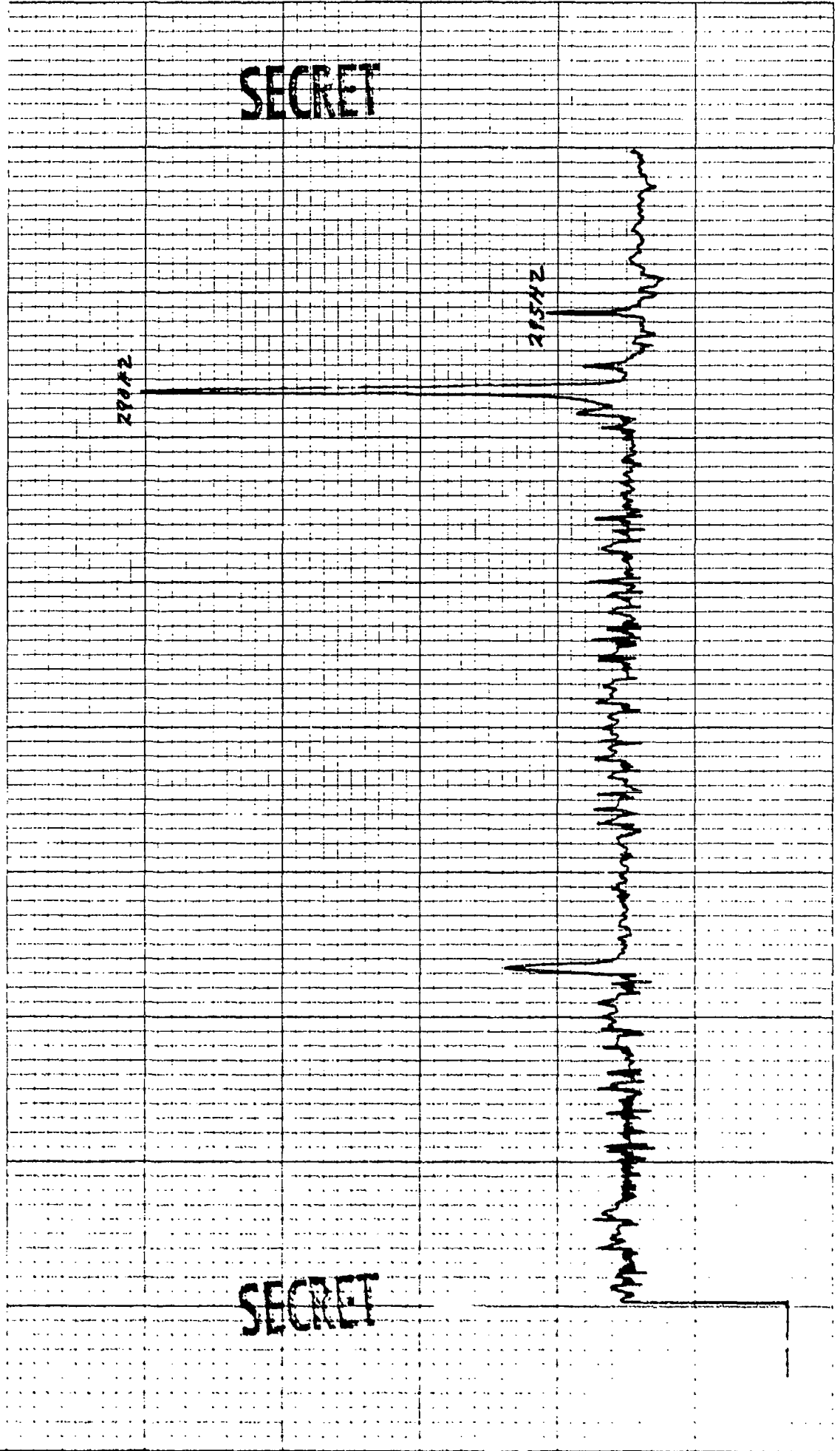
FORM 10-64 10 TO THE INCHES
PERFECT A ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 0202 - 32 (D07)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
32 ELEMENTS

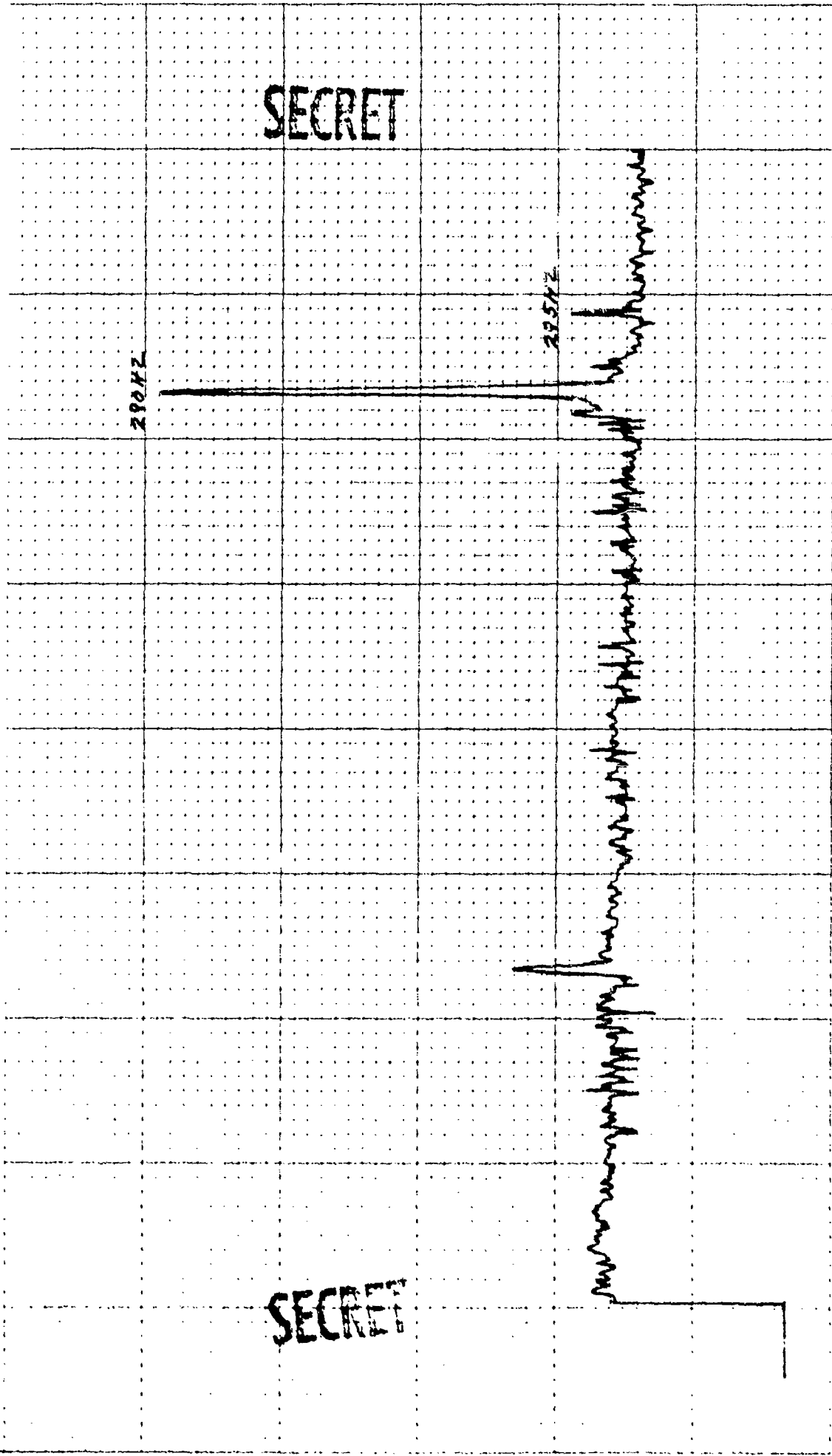
DATE OF ANALYSIS: -- -- --
1-26-77
DATE/TIME: 20-77 -0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-28 DEG. AZ STEERING

REEL: F09 INDE X 1195
INTEGRATION TIME 320 SECS ATTEN: -30 DB
FILTR WTG: HANNING



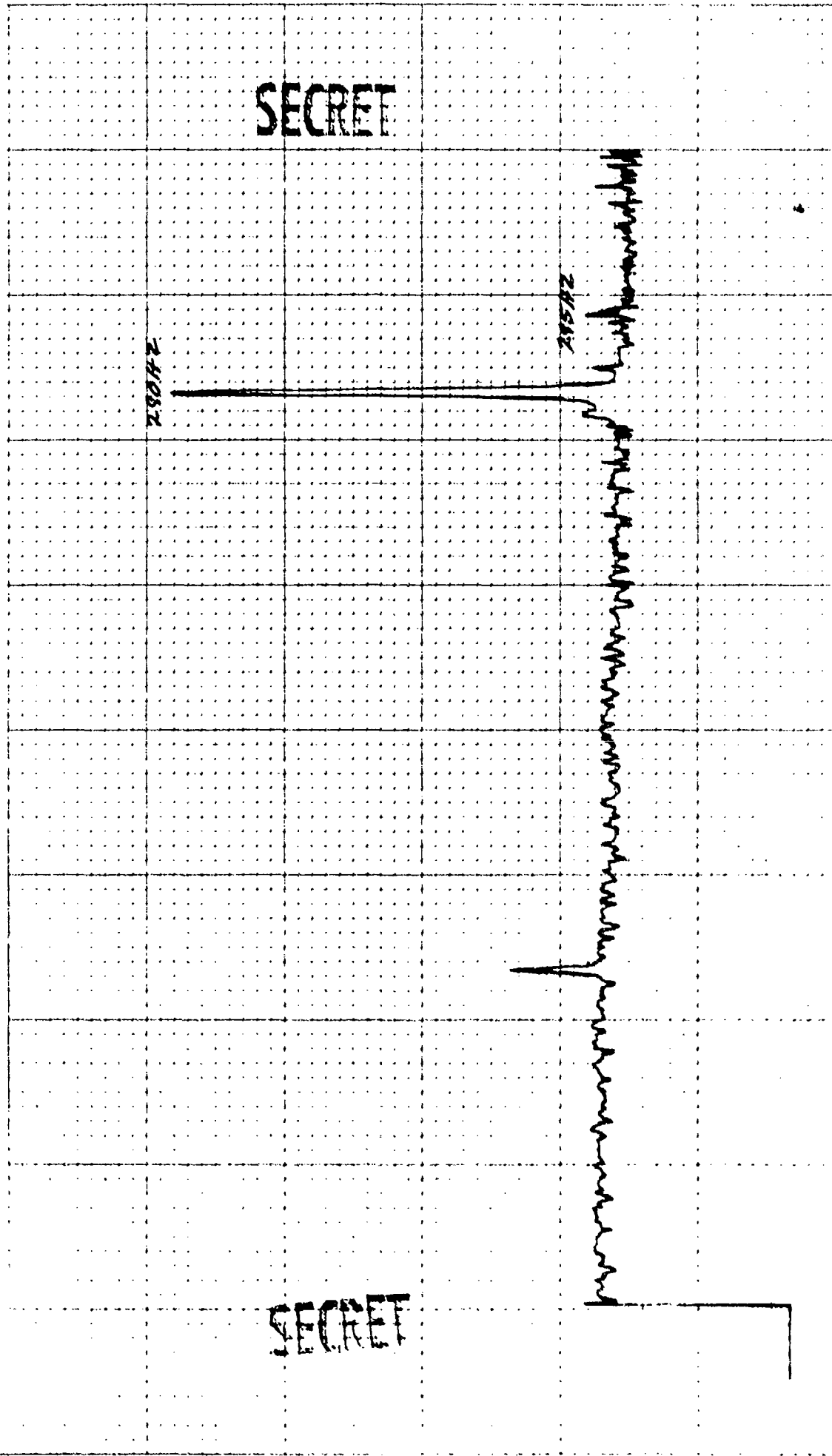
46 0703

CONTROL: 0202-32 (DP7) DATE OF ANALYSIS: 1-26-77 REEL: F99 INDE X1195
 BEAMPORMED SPECTRUM(ELEMENTS) 1-26-77-34 INTEGRATION TIME 320 SECS ATTEN: -30 DB
 EXERCISE: BEARING STAKE DATE/TIME: 2-8-77-0202Z FILTFR WTC: HANNING
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ
32 ELEMENTS +30 DEG. AZ STEERING



46 0703

CONTROL: 0202-32 (D07) DATE OF ANALYSIS: REEL: F39 INDE X 1145
 BEAMFORMED SPECTRUM (ELEMENTS) 1-269 08-34)
 EXERCISE: BEARING STAKE DATE/TIME: 2-8-77-0202Z INTEGRATION TIME 320 SECS ATTN: -30DB
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
32 ELEMENTS -32 DEG. AZ STEERING



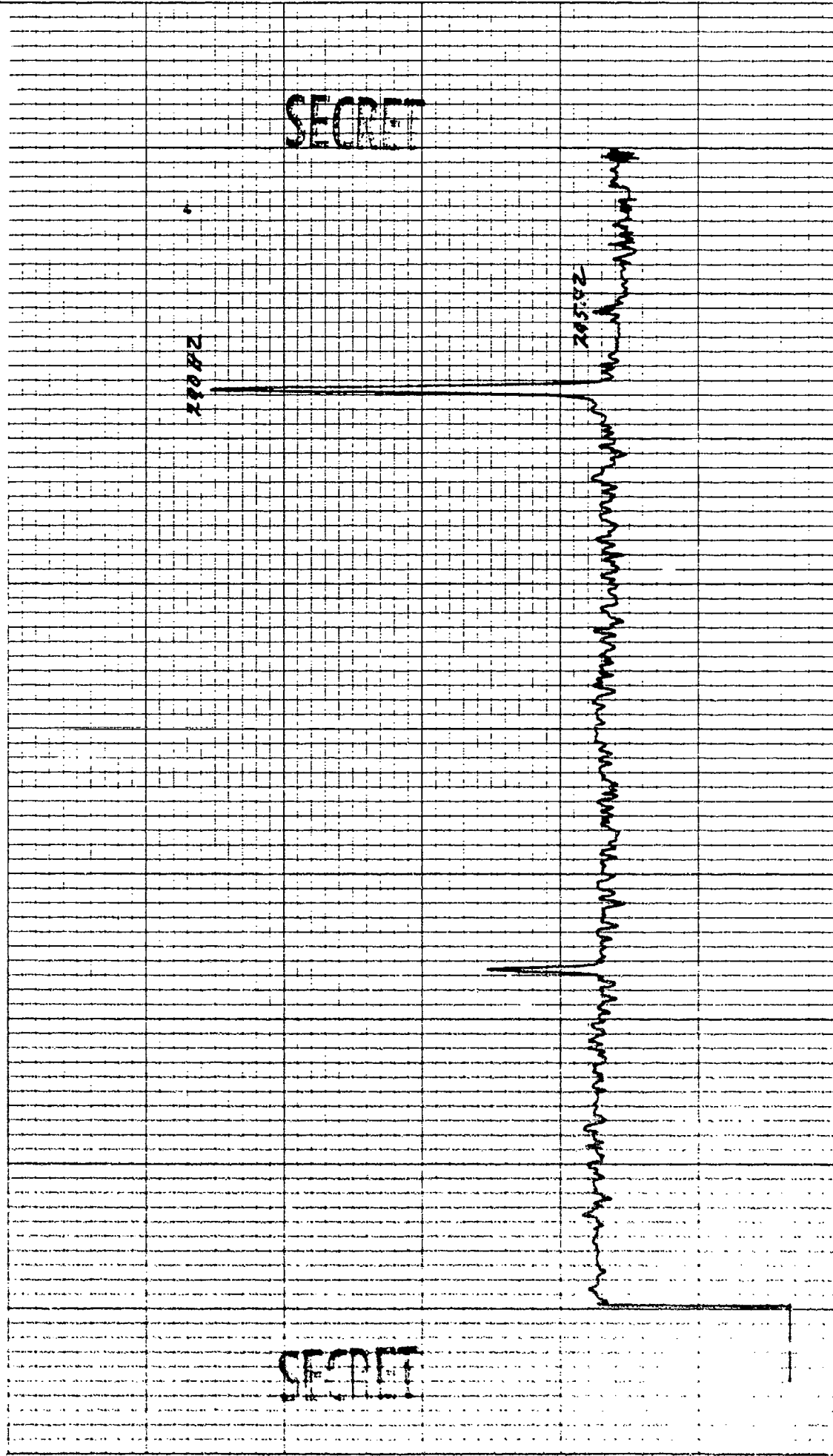
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CONTROL: 0202 - 32 (DP7)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-77
DATE/TIME: 2-8-77 - 0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
-33 DEG. AZ STEERING

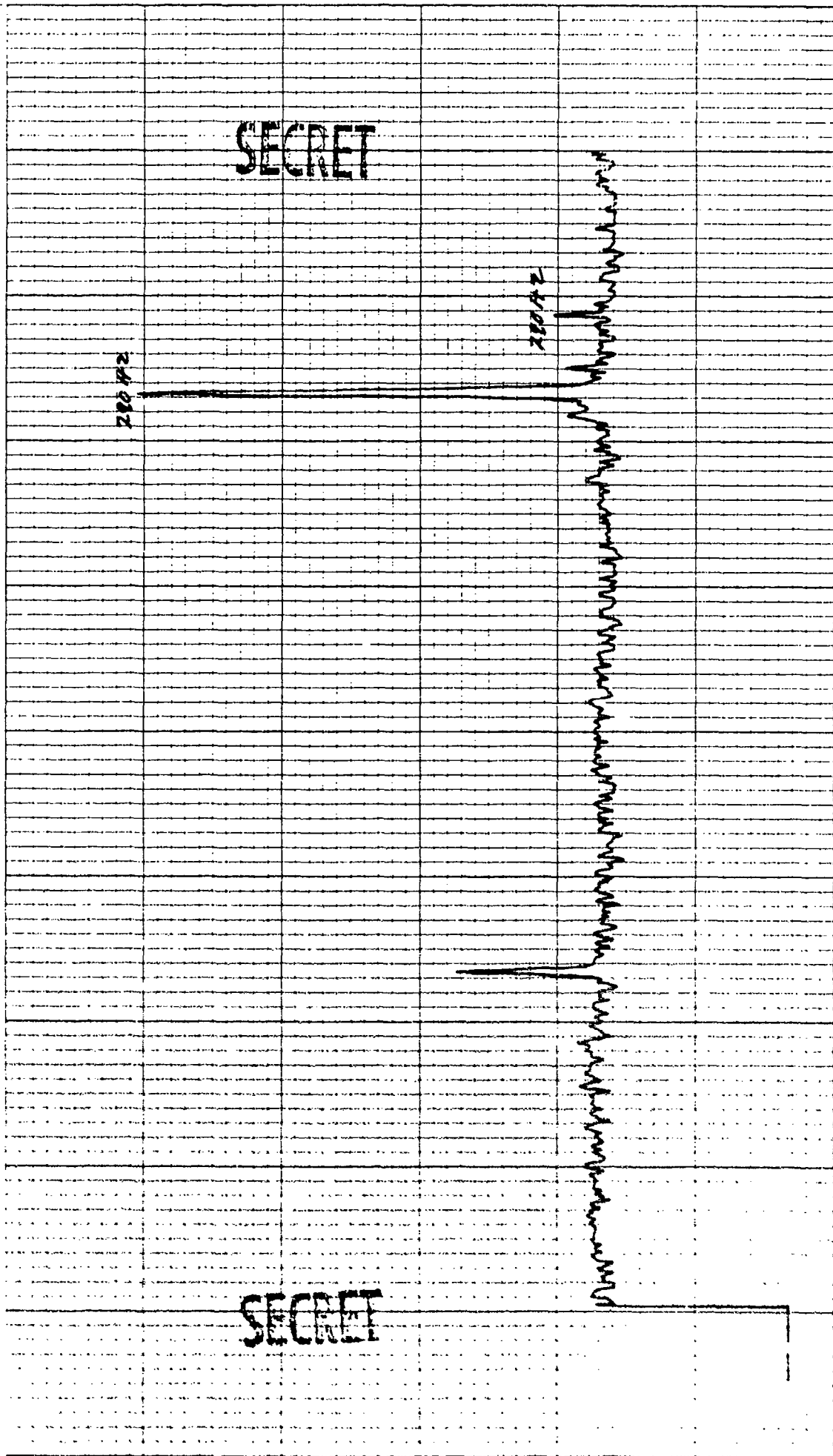
REEL: F29
INDE X 1145
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTER
WTG: HANNING



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CONTROL: 0202 - 32 (2007) DATE OF ANALYSIS: - - - - - INDEX 1145
 BEAMFORMED SPECTRUM (ELEMENTS) 1-268 08-34
 EXERCISE: BEARING STAKE DATE/TIME: 28-77 - 0202Z INTEGRATION TIME 320 SECS ATTN: -30 DB
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTFR WTG: HANNING
 32 ELEMENTS -34 DEG. AZ STEERING



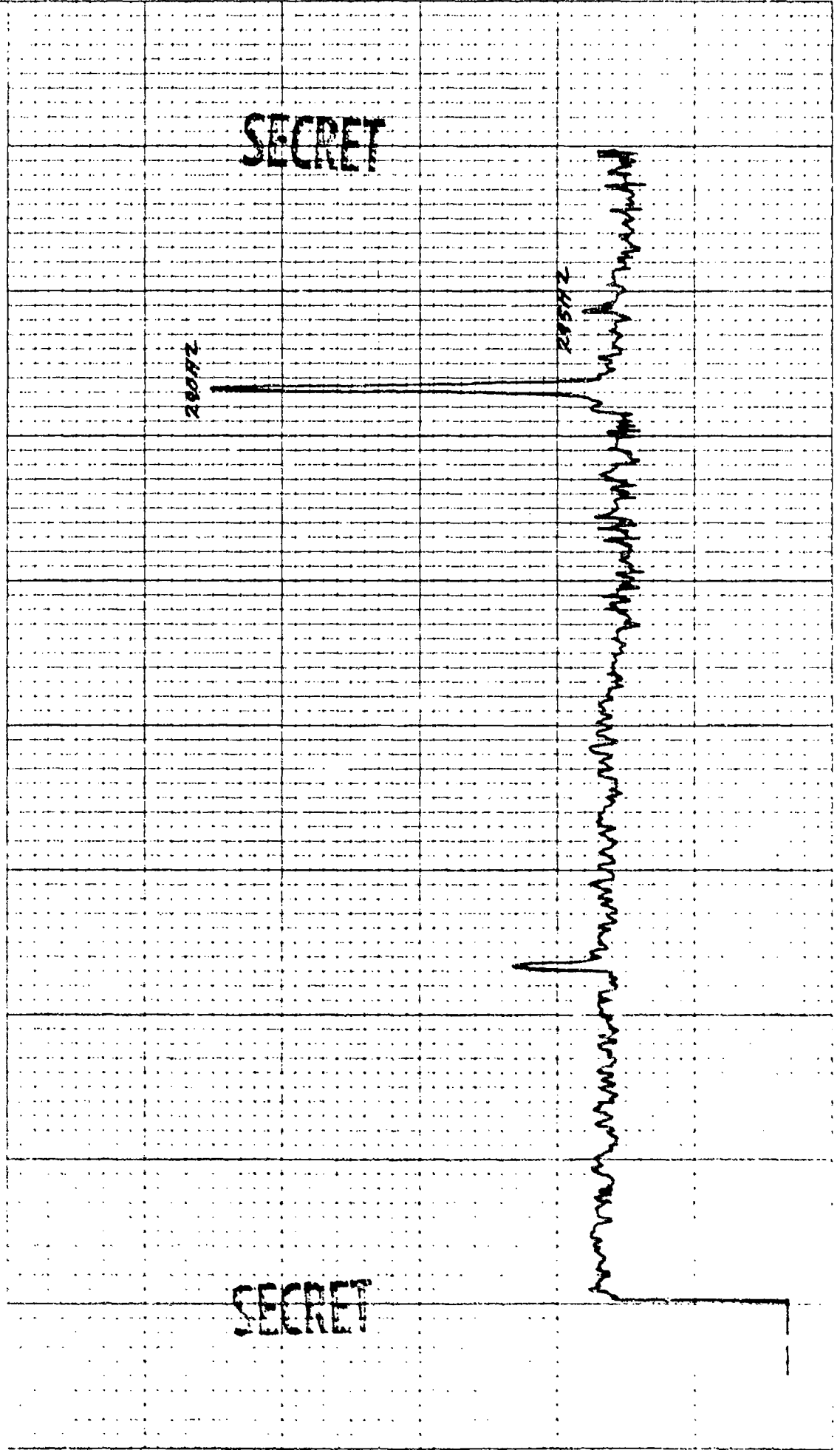
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REF: 2000 2000 2000 2000 2000

CONTROL: 0202-32 (DPT) DATE OF ANALYSIS: 1-26-77 REEL: F29 INDE X/145
 BEAMFORMED SPECTRUM(ELEMENTS) 29-34 INTEGRATION TIME 320 SECS ATTN:-30 DB
 EXERCISE: BEARING STAKE DATE/TIME: 2-077-0202Z FII.TPR WIG: HANNING
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ
 72 ELEMENTS -36 DEC. AZ STEERING

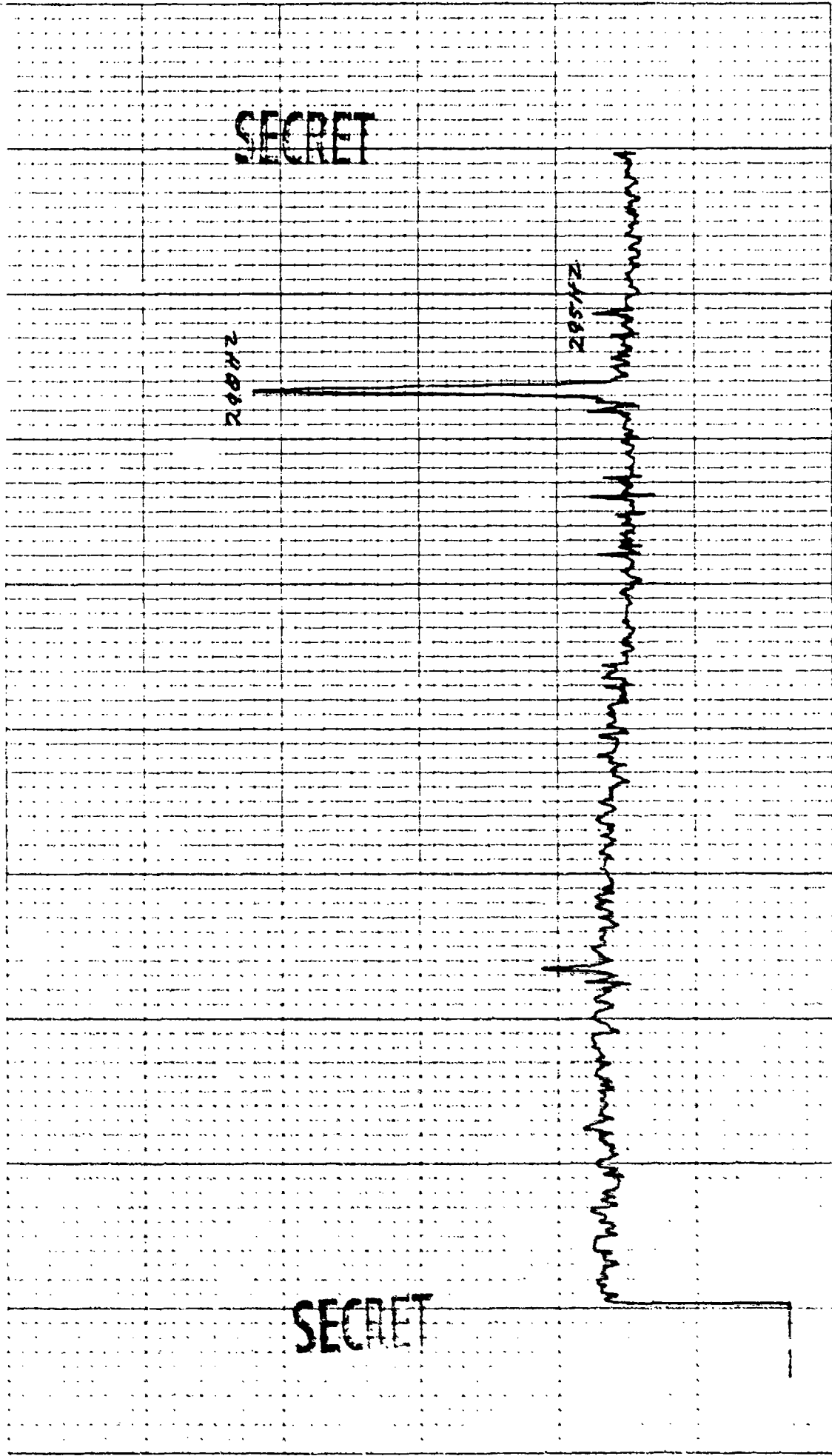


46 0703

CONTROL: 0202 - 32 (007)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-88-34
DATE/TIME: 2-177-0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-40 DEG. AZ STEERING

REEL: F07
INTEGRATION TIME 320 SECS
FI.I.TFR
ATTEN: 20DB
WTG: HANNING



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	<u>-16.2</u>	
	<u>-25.5</u>	41.7
	<u>-4.1</u>	37.7
	<u>+ .2</u>	37.9
	<u>-8.2</u>	29.7
		SNR 1/10 HZ BAND
		SNR 1 HZ BAND

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 SIGNAL LEVEL AND SNR
 CALCULATIONS
 FREQUENCY 290 HZ

NUMBER OF ELEMENTS 51

DATA POINT 7

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED
 MCPS-32 CAL. CORRECTION
 BEAMFORMER GAIN
 MRA CORRECTION

	<u>-28.8</u>
	-18.8
<u>+10</u>	
<u>+30</u>	+11.2
<u>+ .8</u>	+2.0

SIG. LEVEL FOR SNR CALCULATION
 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED
 MCPS-32 CAL. CORRECTION
 BEAMFORMER GAIN

	<u>-71.6</u>
	-61.6
<u>+10</u>	
<u>+30</u>	-31.6

NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR
 SIGNAL LEVEL FOR SNR
 PROCESSOR CORRECTION
 MRA CORRECTION
 BANDWIDTH CONVERSION

	<u>+11.2</u>
	+2.8
<u>-31.6</u>	
<u>-4.0</u>	38.8
<u>+ .8</u>	39.6
<u>-8.2</u>	31.4

SNR 1/10 HZ BAND
 SNR 1 HZ BAND

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SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 7

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 51

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-65.0</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-55.0	
BEAMFORMER GAIN	<u>-30</u>	-25.0	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	-24.2	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-72.3</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-62.3	
BEAMFORMER GAIN	<u>+30</u>	-32.3	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-25.0</u>	
SIGNAL LEVEL FOR SNR	<u>-32.3</u>	<u>7.3</u>	
PROCESSOR CORRECTION	<u>-4.8</u>	2.5	
MRA CORRECTION	<u>+ .8</u>	3.3	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	-4.9	SNR 1 HZ BAND

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SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-16.0</u>	<u>-17.5</u>	<u>_____</u>
MRA SIGNAL LEVEL	<u>+16.4</u>	<u>+12.0</u>	<u>-24.2</u>
ARRAY SIGNAL GAIN	<u>32.4</u>	<u>29.5</u>	<u>_____</u>
20 LOG <u>51</u> # of elements	<u>34.1</u>	<u>34.1</u>	<u>_____</u>
DIFFERENCE	<u>-1.7</u>	<u>-4.6</u>	<u>_____</u>

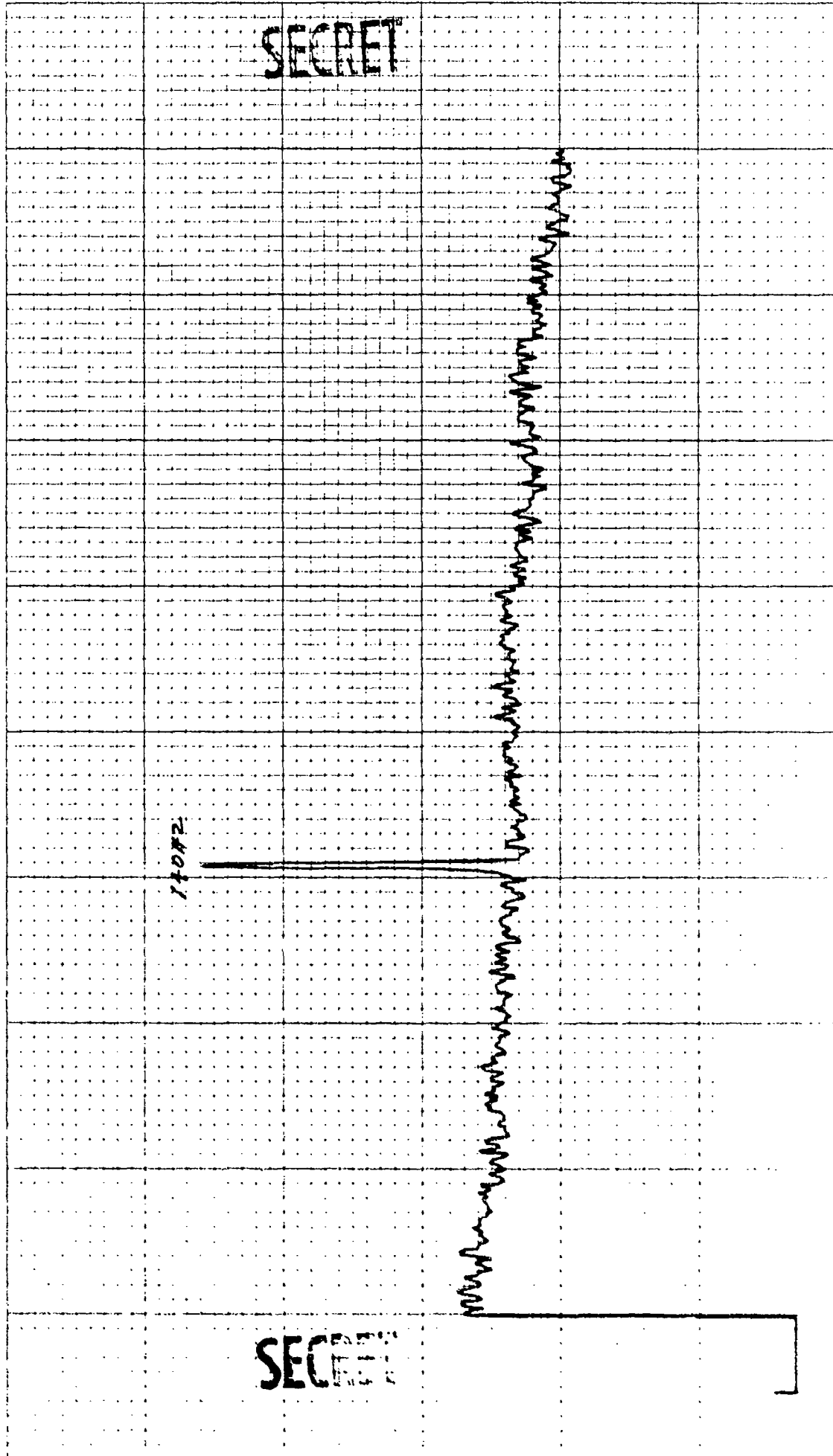
ARRAY GAIN

MRA SNR	<u>37.9</u>	<u>39.6</u>	<u>3.3</u>
MEAN OMNI SNR	<u>29.4</u>	<u>32.5</u>	<u>_____</u>
ARRAY GAIN	<u>8.5</u>	<u>7.1</u>	<u>_____</u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>14.7</u>	<u>17.1</u>	<u>17.2</u>
DIFFERENCE	<u>-6.2</u>	<u>-10.0</u>	<u>_____</u>

46 0703

NOTE: PLUG TO THE RIGHT OF THE STEREO PAIR

CONTROL: 0202-51 (DP7) DATE OF ANALYSIS: 1-26-88-53 REEL: F09 INDE X 1145
 BEAMFORMED SPECTRUM(ELEMENTS) ANALYSIS BANDWIDTH: 1710HZ INTEGRATION TIME 320 SECS ATTEN: -30 DB
 EXERCISE: BEARING STAKE -12 DEG. AZ STEERING F.I.T.F.R. WTG: HANNING
 CENTER FREQ: 150 HZ 51 ELEMENTS

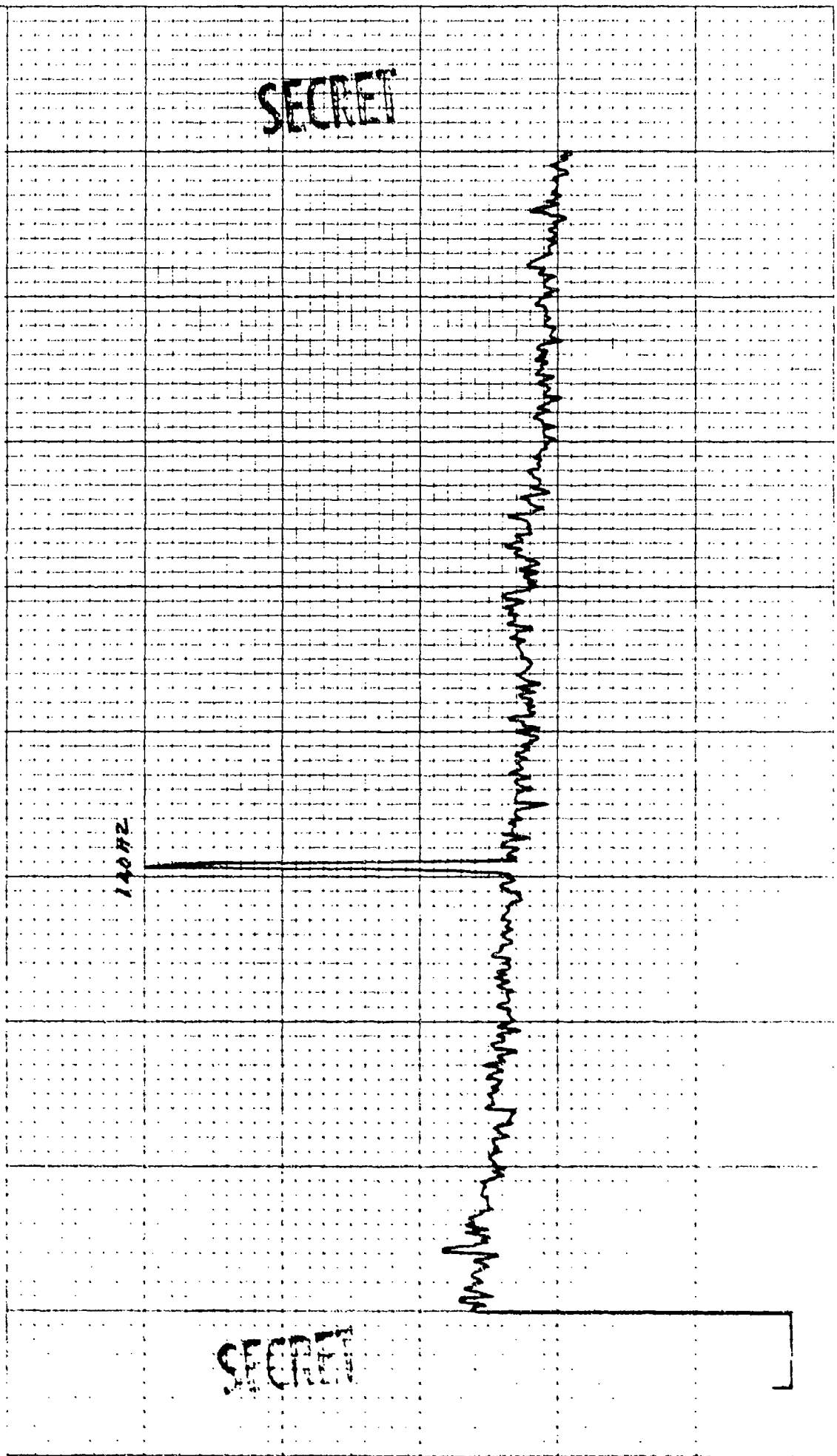


46 0703

1-22 14 100 200000 0000

CONTROL: 0202-51 (DP7) DATE OF ANALYSIS: -- -- --
 BEAMFORMED SPECTRUM (ELEMENTS) 1-26 8 89-53)
 EXERCISE: BEARING STAKE DATE/TIME: 2-8-77-0202Z
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
 51 ELEMENTS -14 DEG. AZ STEERING

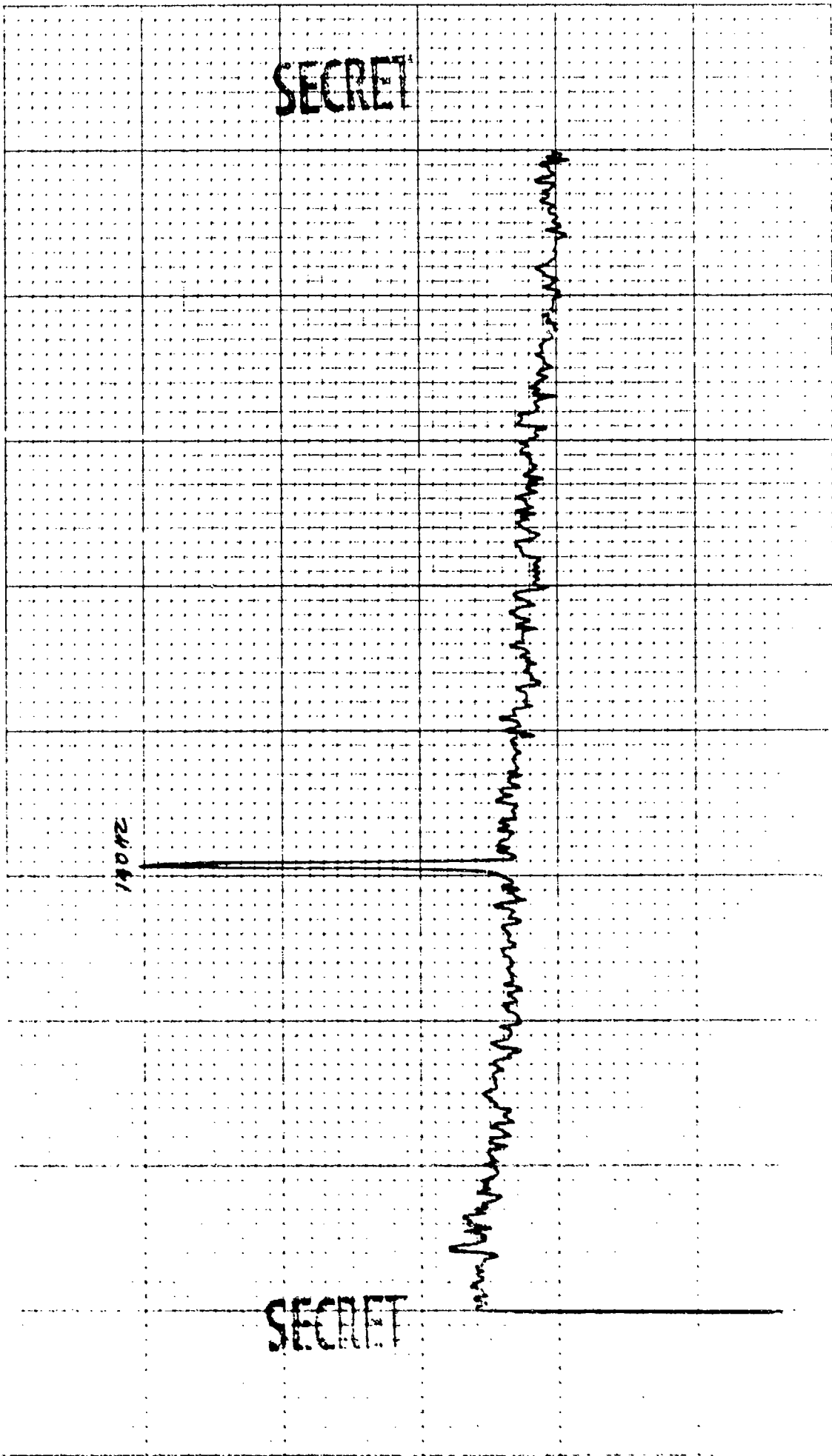
REEL: F29 INDE X/145
 INTEGRATION TIME 320 SECS ATTN: 30 DB
 FILTFR WTG: HANNING



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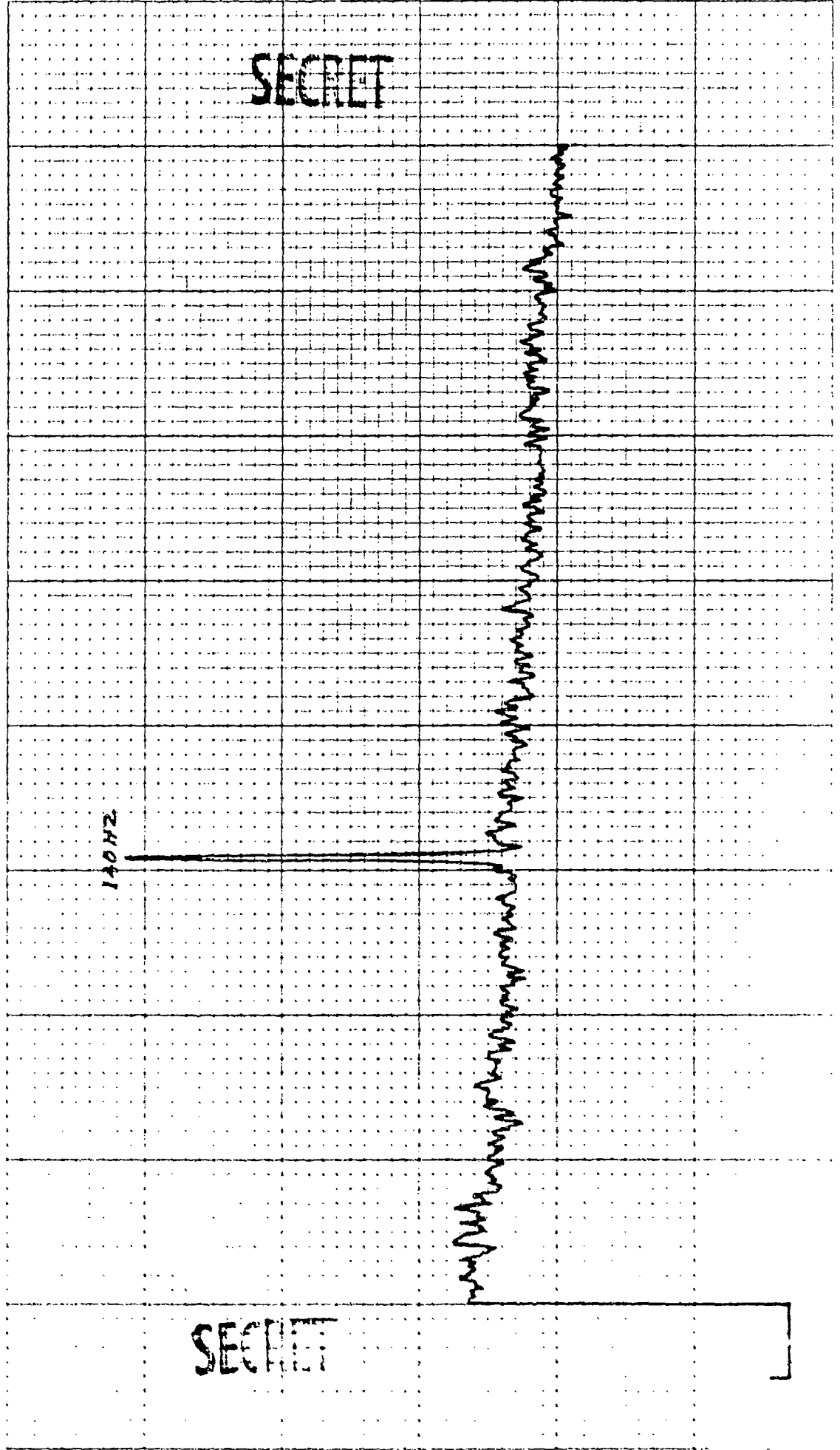
CONTROL: 0202-51 (D07) DATE OF ANALYSIS: 1-26-53 REEL: F99 INDE X 1145
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-077-0202Z INTEGRATION TIME 320 SECS ATTEN: -20 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1710HZ FILTER WTC: HANNING
 CENTER FREQ: 150 HZ -16 DEG. AZ STEERING



REF ID: A66878

46 0703

CONTROL: 0202-51 (DP1) DATE OF ANALYSIS: - - REEL: F29 INDE X 1145
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 1-26-78 09-53 INTEGRATION TIME 320 SECS ATTEN: 30 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FIITFR WTG: HANNING
CENTER FREQ: 150 HZ -10 DEC. AZ STEERING



46 0703

CONTROL: 0202 - 51 (097)

BEAMFORMED SPECTRUM (ELEMENTS)

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

51 ELEMENTS

DATE OF ANALYSIS: 1-26-77

28-77

DATE/TIME: 28-77 - 0202 Z

ANALYSIS BANDWIDTH: 1/10 HZ

-20 DEG. AZ STEERING

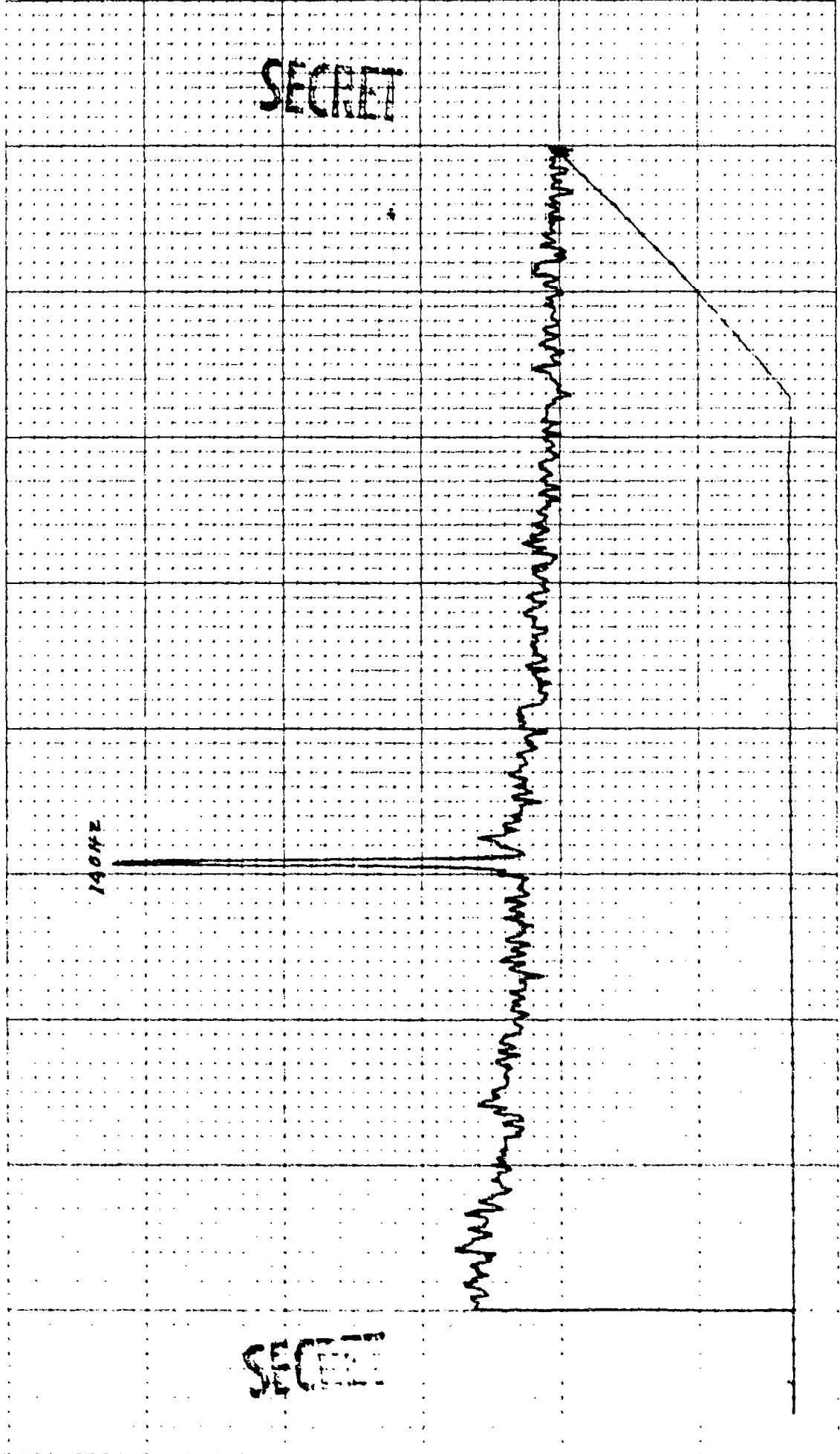
REEL: F29

INDE X 1/45

INTEGRATION TIME 320 SECS

ATTEN: -30 DB

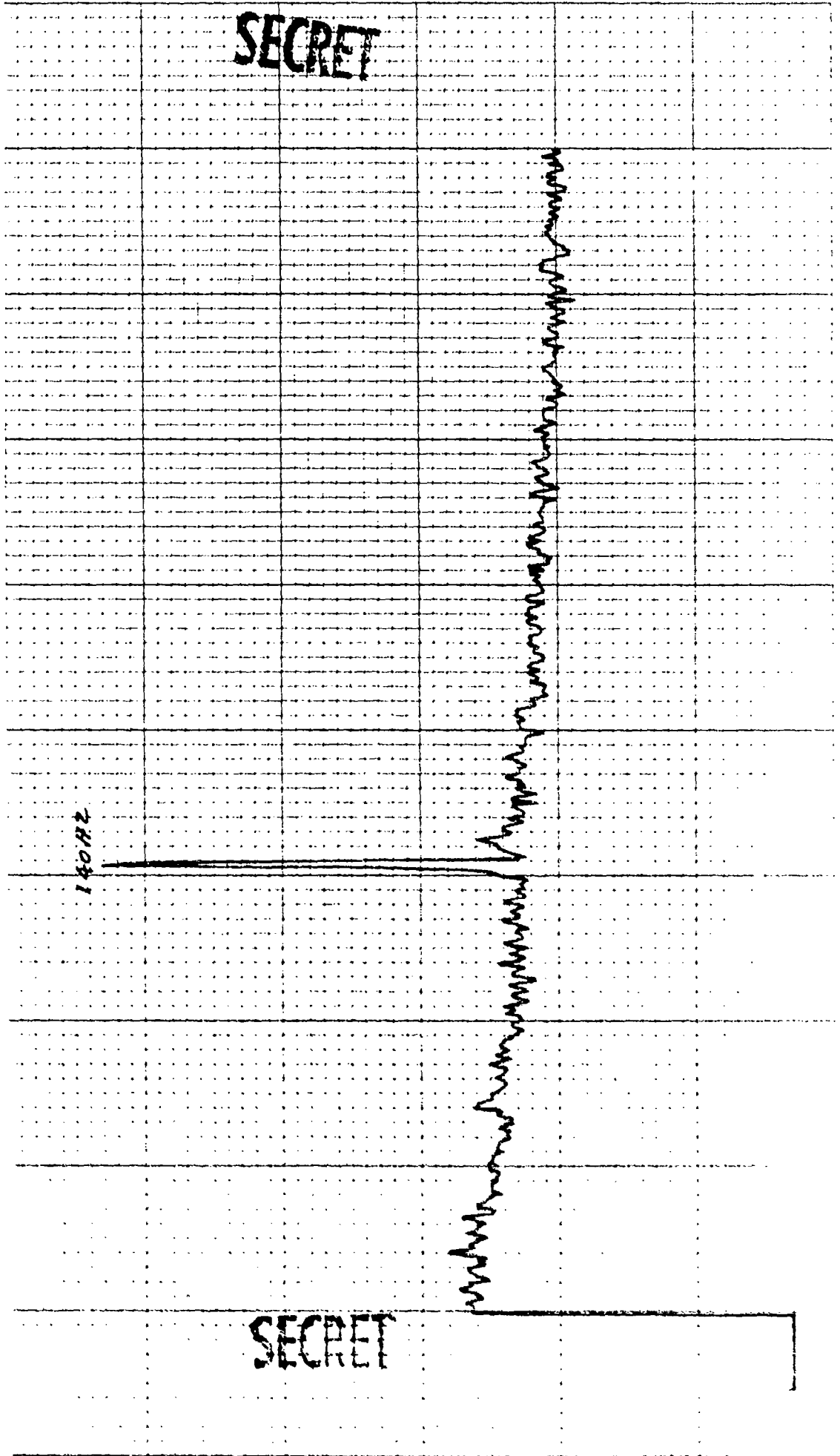
FILTER WIG: HANNING



46 0703

14-E WAVE NUMBER 1000

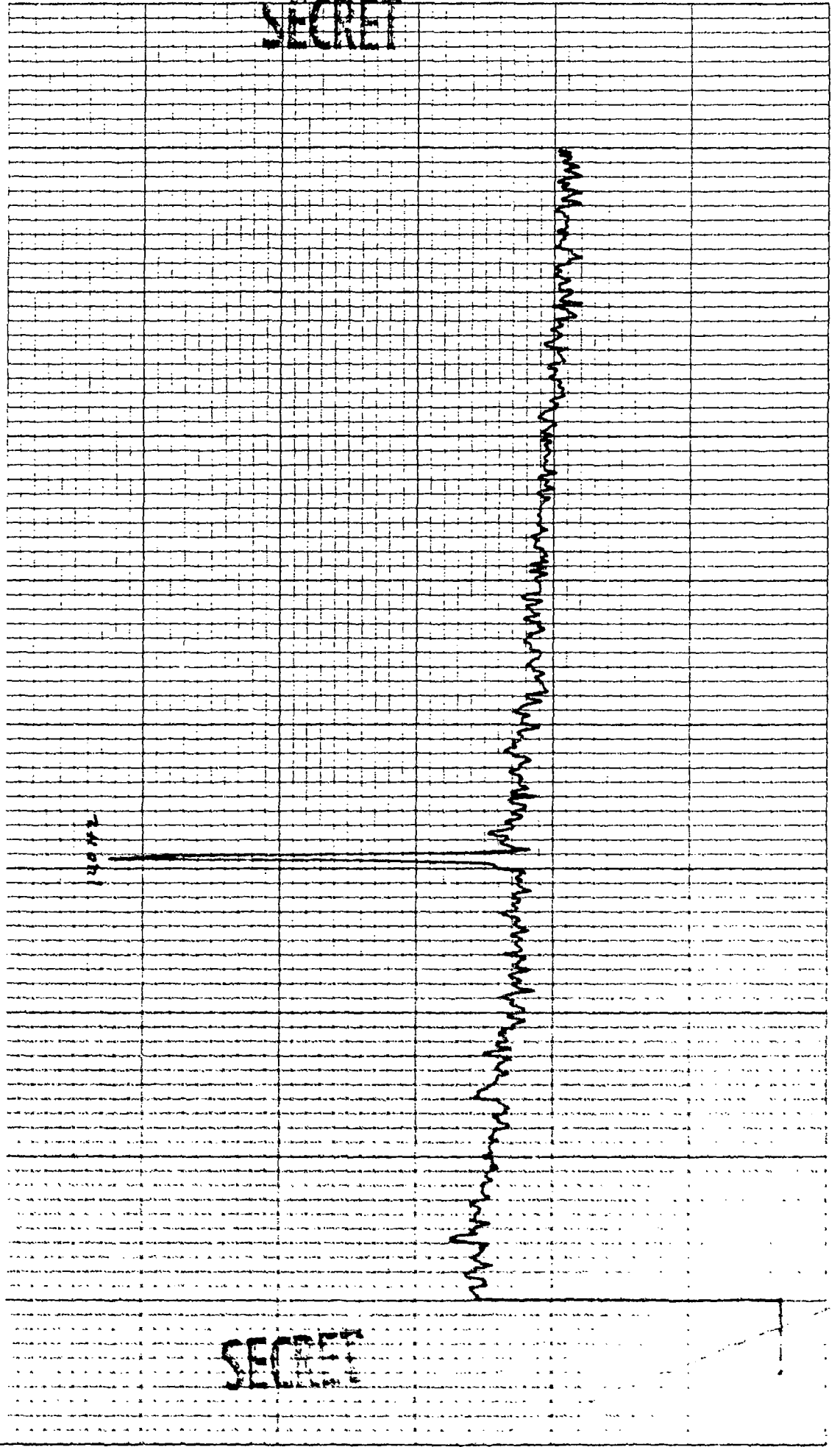
CONTROL: 0202-5/ (DPT) DATE OF ANALYSIS: 1-26-53 REEL: 529 INDEX: X1145
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 08-77-0002Z INTEGRATION TIME: 320 SECS ATTN: -30DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER: WTG: HANNING
 CENTER FREQ: 150 HZ 0/ DEC. AZ STEERING



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REPAIR A PAPER CO. MADE IN U.S.A.

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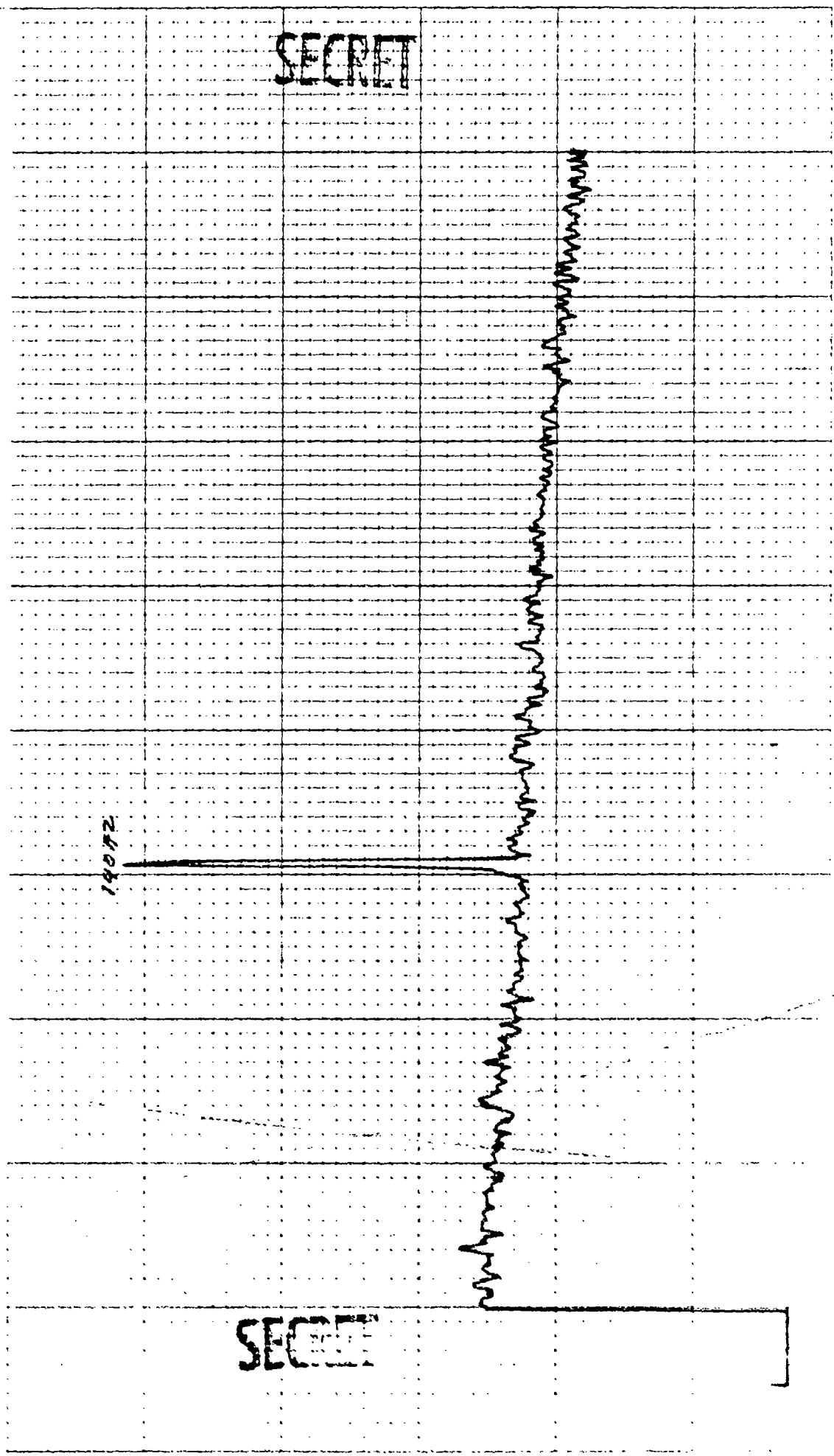
CONTROL: 0202 - 51 (DP7) DATE OF ANALYSIS: 1-26-77 REEL: F29 INDE X//45
BEAMFORMED SPECTRUM(ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTN: -30 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
51 ELEMENTS - 22 DEG. AZ STEERING



46 0703

1-26-53

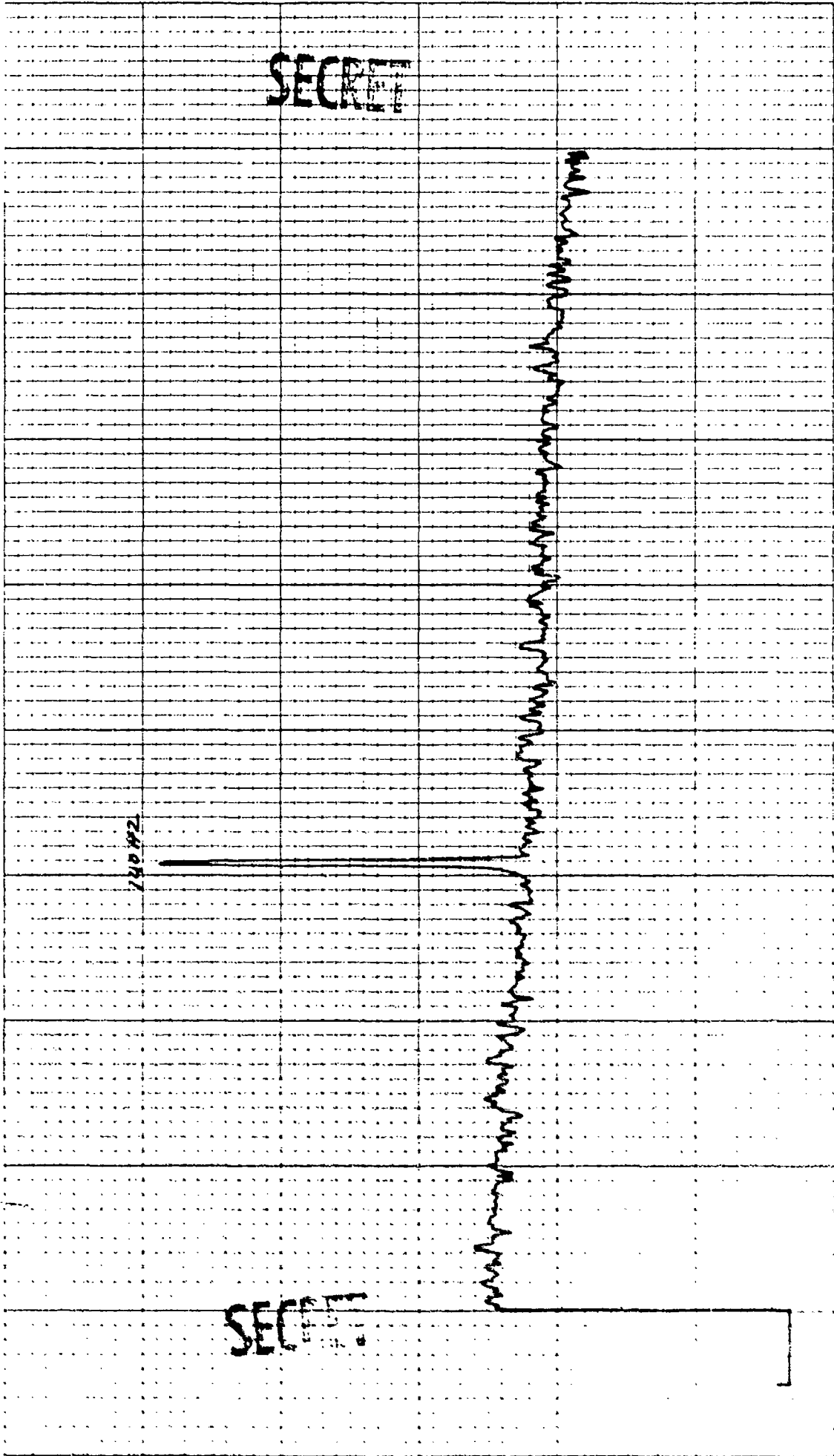
CONTROL: 0202-51 (007) DATE OF ANALYSIS: 1-26-53 REEL: F29 INDE X11VS
 BEAMFORMED SPECTRUM(ELEMENTS) 2-8-72-0202Z INTEGRATION TIME 320 SECS ATTN: 30 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 CENTER FREQ: 150 HZ 23 DEG. AZ STEERING



46 0703

REF: 460703

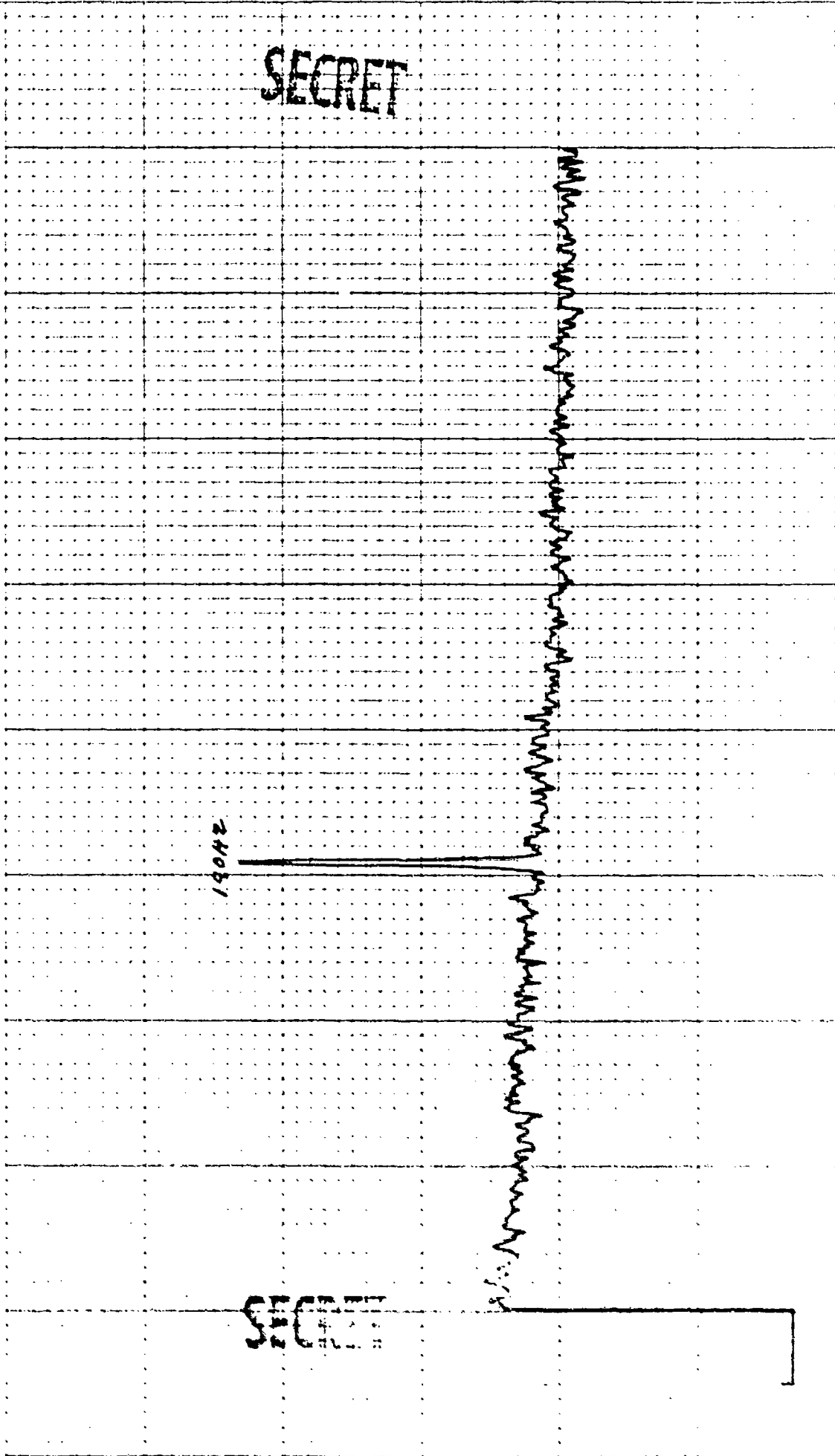
CONTROL: 0201 - 51 (P07) DATE OF ANALYSIS: REEL: F29 INDE X 1/45
 BEAMFORMED SPECTRUM(ELEMENTS) 1-26 6 29-53
 EXERCISE: BEARING STAKE DATE/TIME: 0-0-77 - 0201 Z INTEGRATION TIME 320 SECS ATTEN: -30DB
 CENTER FREQ: 150 MHz ANALYSIS BANDWIDTH: 1/10HZ FILT.FP WTG: HANNING
S/ ELEMENTS -24 DEG. AZ STEERING



46 0703

REF ID: A66000

CONTROL: 020 - 51 (007) DATE OF ANALYSIS: 1-26-53 REEL: F29 INDE X/145
 BEAMFORMED SPECTRUM (ELEMENTS))
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1710HZ INTEGRATION TIME 320 SECS ATTEN: -30DB
 CENTER FREQ: 150 HZ 26 DEC. AZ STEERING FILTER WTC: HANNING

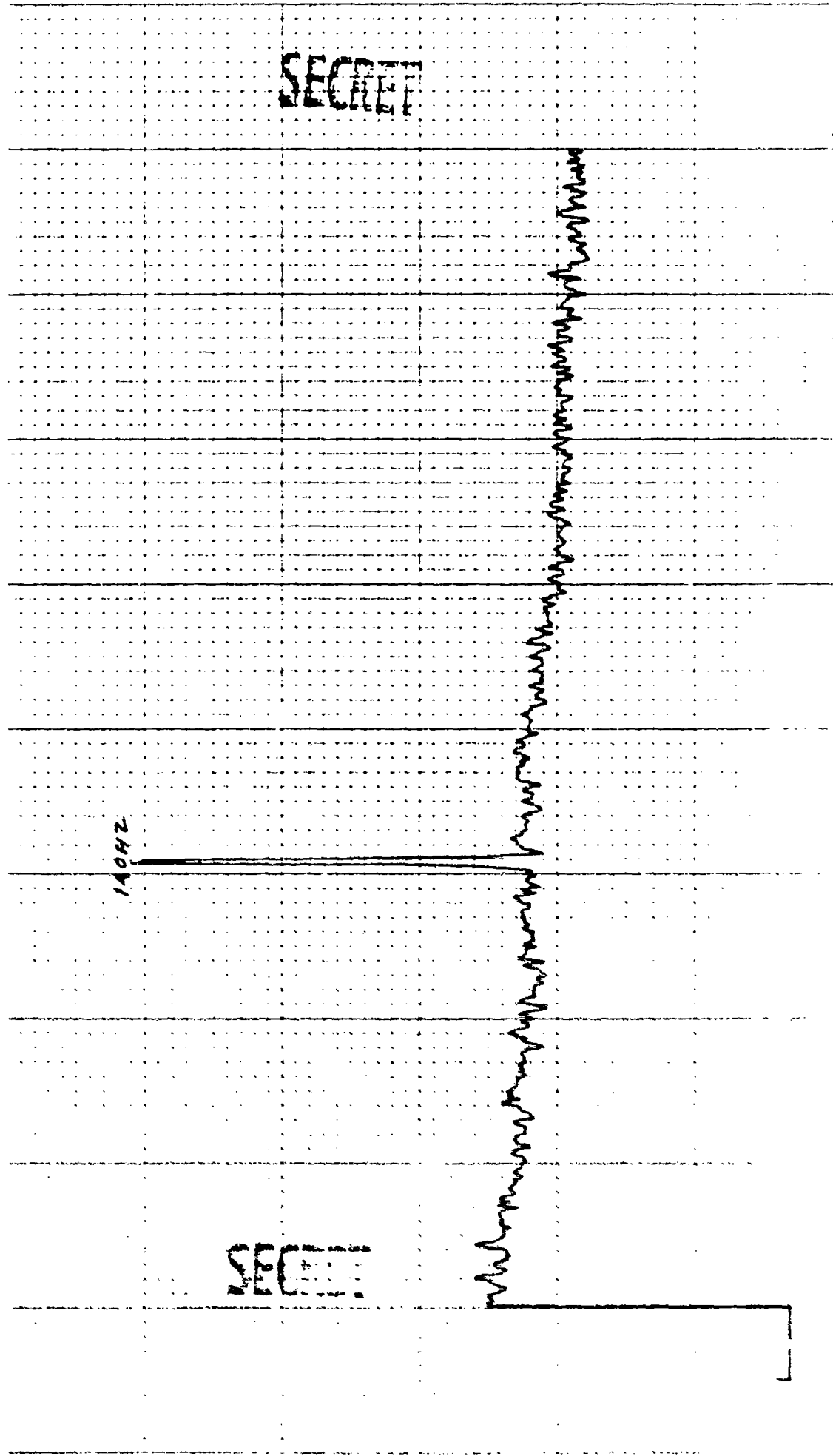


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CONTROL: 0202-51 (007) DATE OF ANALYSIS: 1-26-77 REEL: F-9 INDE X / 145
 BEAMFORMED SPECTRUM (ELEMENTS) 1-26-77-0022 INTEGRATION TIME 320 SECS ATTEN: -30 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1710HZ FILTER WTC: HANNING
 CENTER FREQ: 150 HZ 26 DEG. AZ STEERING

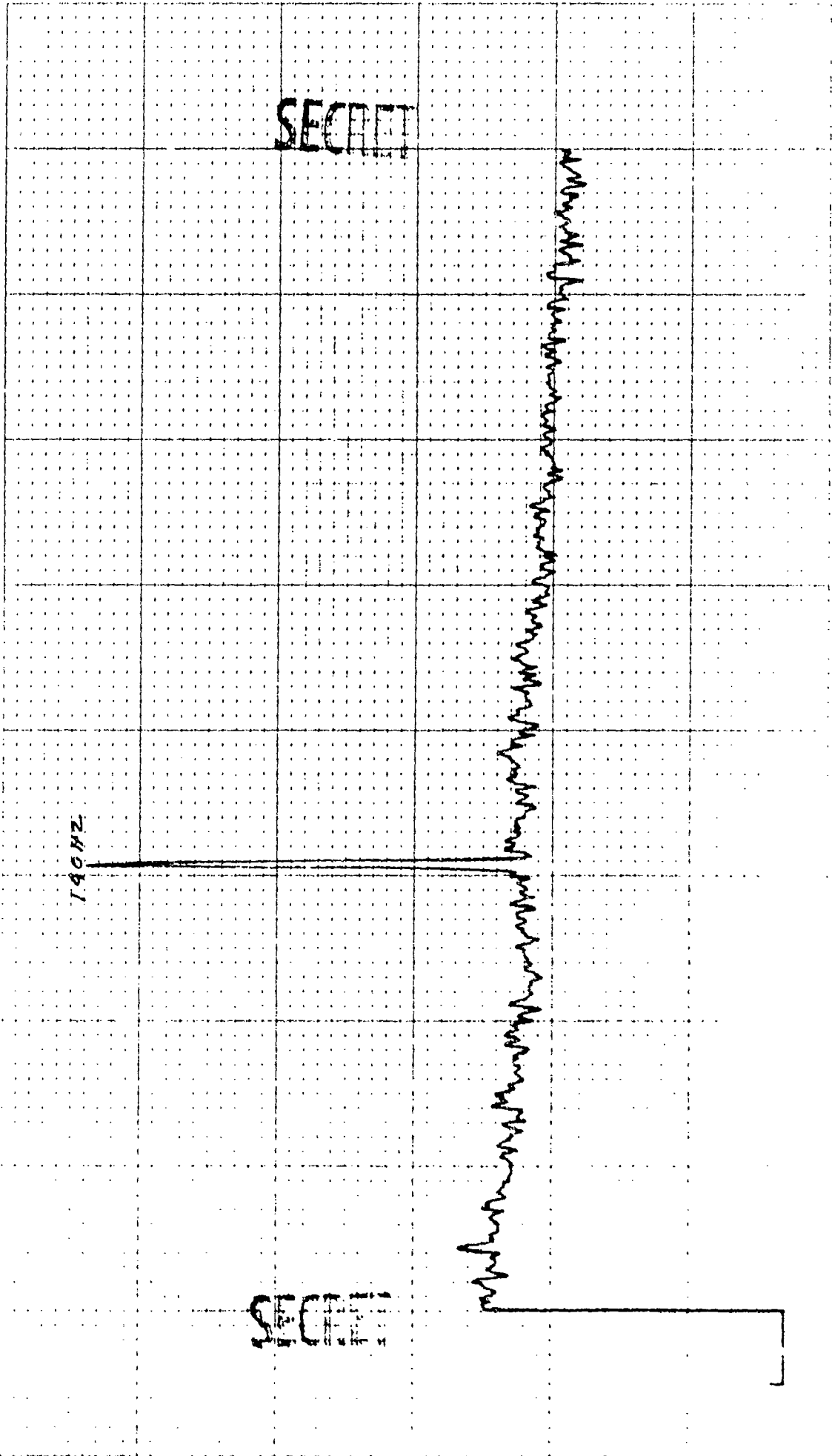


46 0703

CONTROL: 0202-51 (001)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
51 ELEMENTS

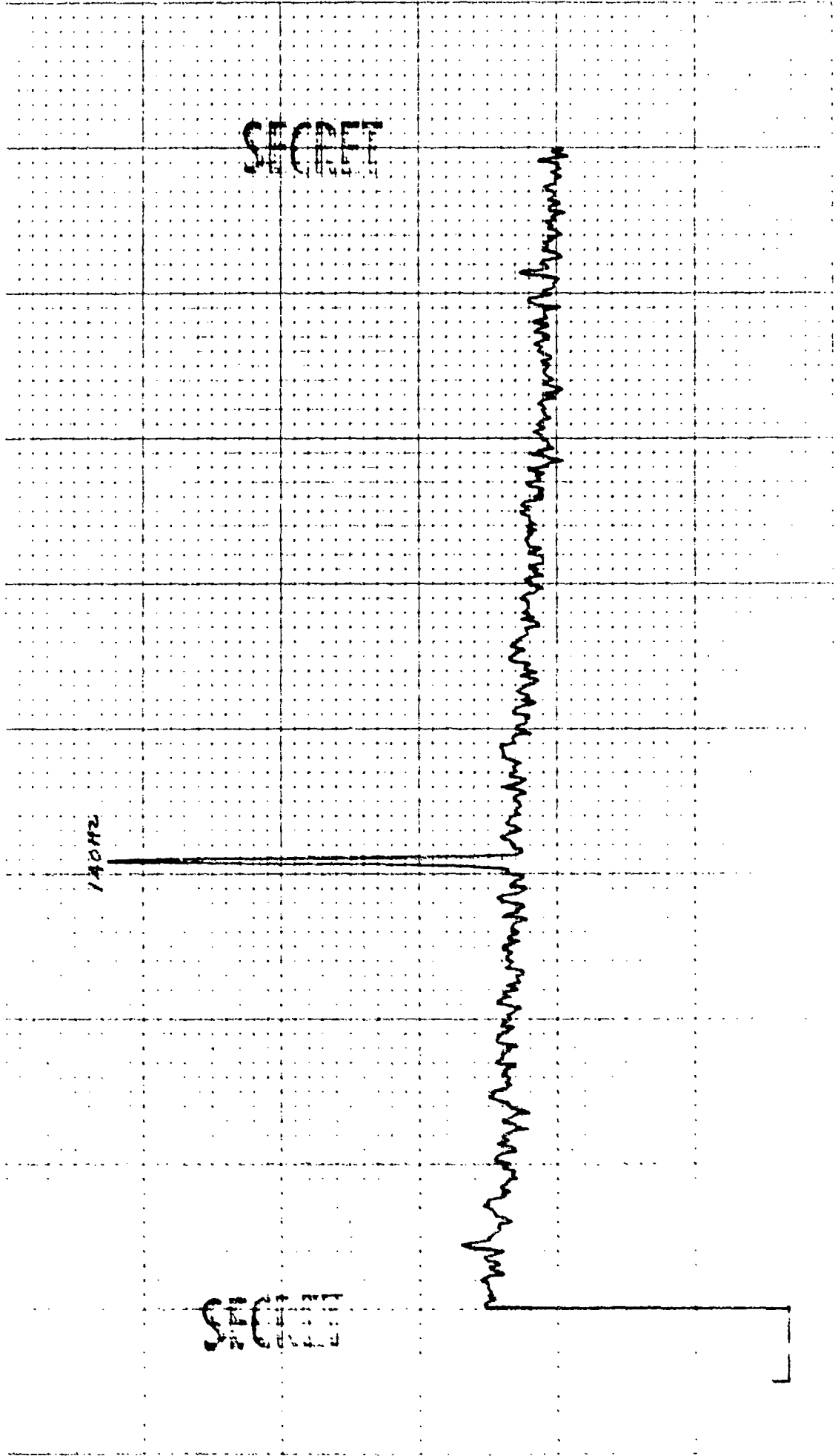
DATE OF ANALYSIS: 1-26-89-53
DATE/TIME: 0-0-77-0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-30 DEG. AZ STEERING

REEL: F29
INDE X 1145
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTFF WTG: HANNING



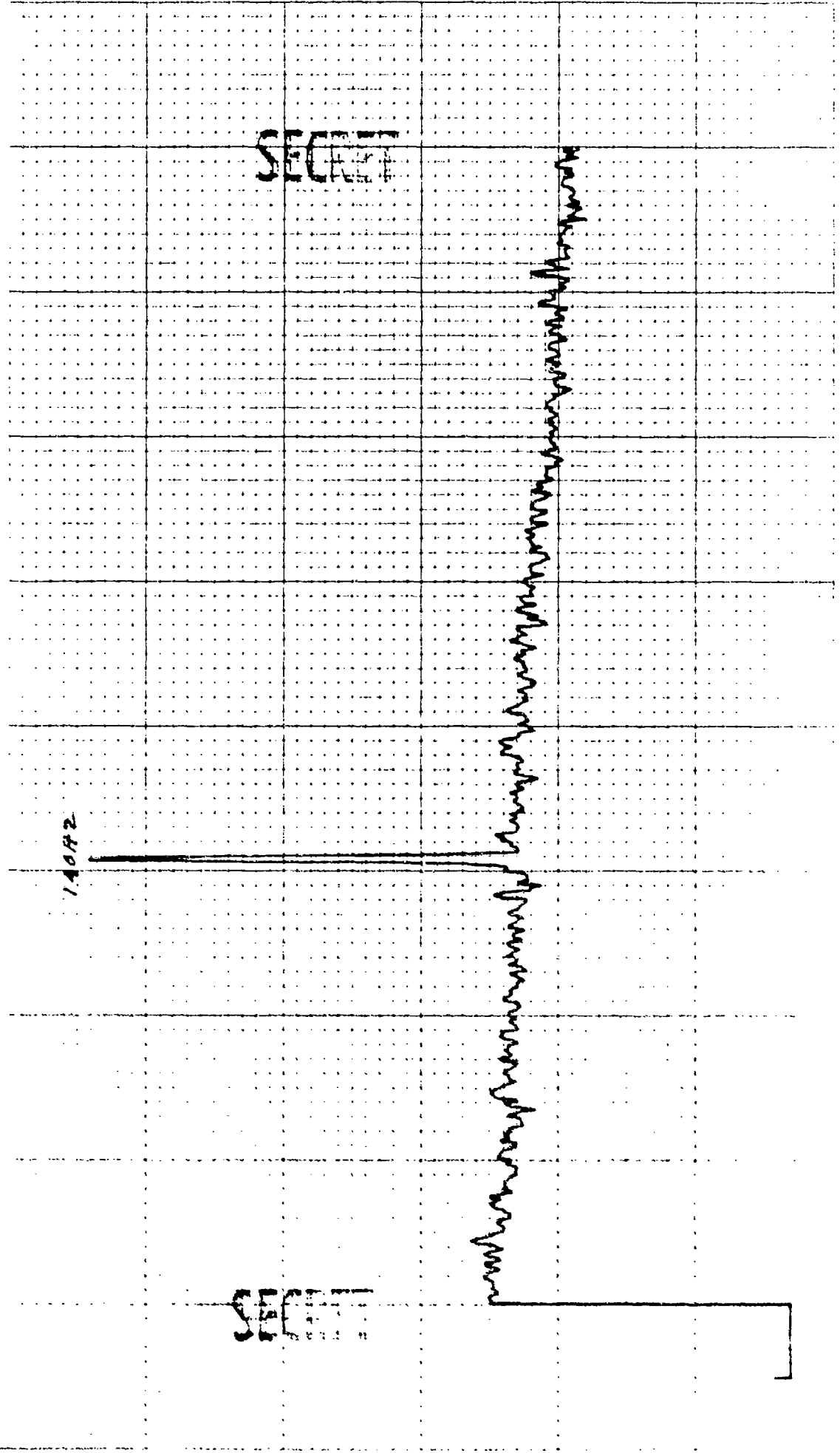
46 0703

CONTROL: 0202 - 51 (207) DATE OF ANALYSIS: - - REEL: F29 INDE X/145
 BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 1-26-77 09-53 INTEGRATION TIME 320 SECS ATTLN: -30DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1710HZ FILTFR WIG: HANNING
 CENTER FREQ: 150 HZ - 32 DEG. AZ STEERING



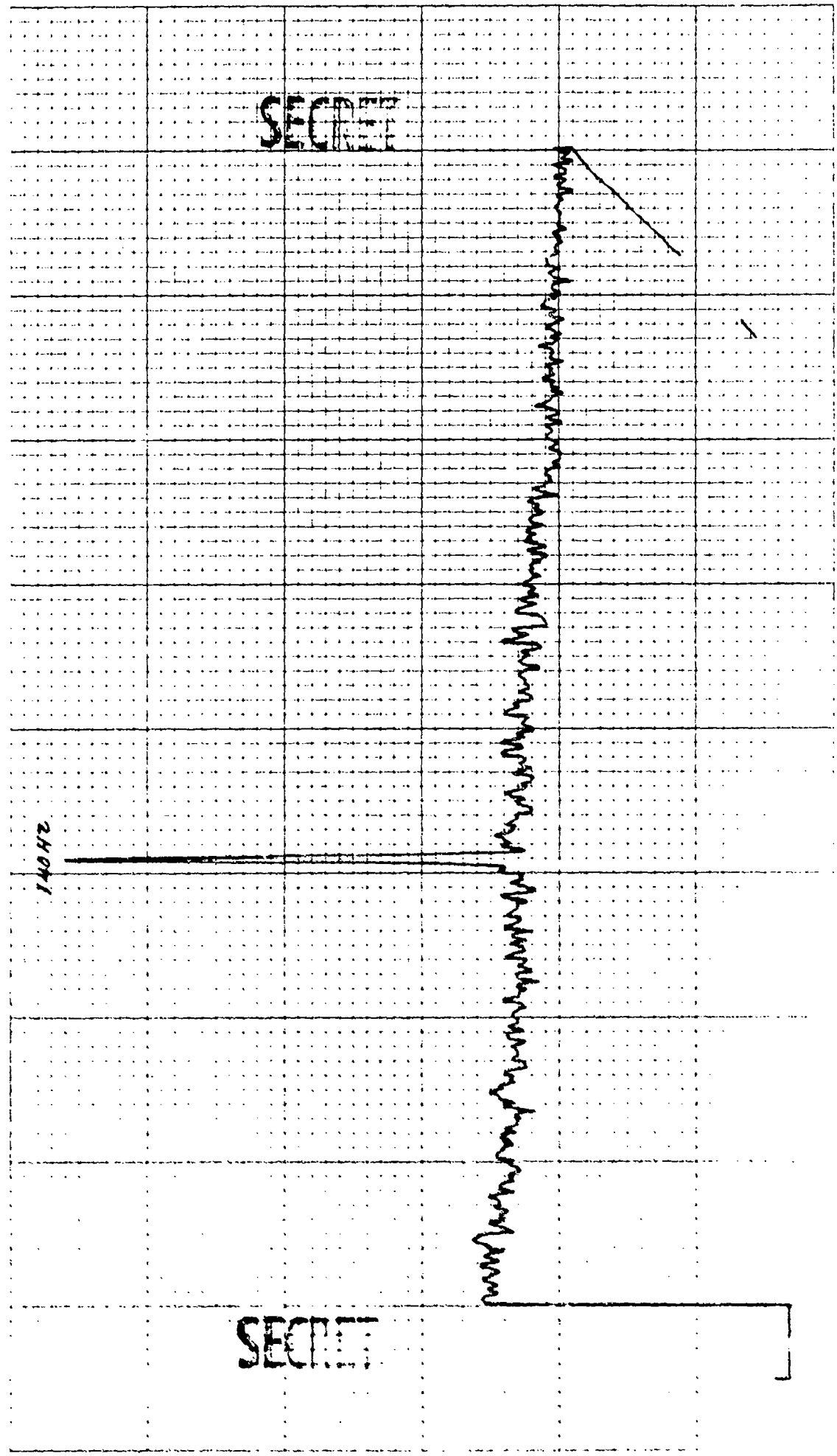
46 0703

CONTROL: 0202 - 51 (DP7) DATE OF ANALYSIS: 1-26-53 REEL: F29 INDE X/145
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0202 Z INTEGRATION TIME 320 SECS ATTEN: -30 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WIG: HANNING
5/ ELEMENTS -74 DEG. AZ STEERING



46 0703

CONTROL: 0222 - 51 (D11) DATE OF ANALYSIS: _____ INDE X 1145
 BEAMFORMED SPECTRUM(ELEMENTS) 1-26 & 29-53 REEL: F29
 EXERCISE: BEARING STAKE DATE/TIME: 2077 - 0202Z INTEGRATION TIME 320 SECS ATTEN: 30 DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
51 ELEMENTS - 36 DEG. AZ STEERING



46 0703

INDE X 1145

REEL: F27

ATTEN: -70 DB
WTG: HANNING

INTEGRATION TIME 320 SECS
FILTER

DATE OF ANALYSIS: 1-26-53

DATE/TIME: 2-8-77 -0802 Z

ANALYSIS BANDWIDTH: 1/10HZ

-30 DEG. AZ STEERING

CONTROL: Q202 - 51 (LPT)

BEAMFORMED SPECTRUM (ELEMENTS)

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

51 ELEMENTS

140HZ

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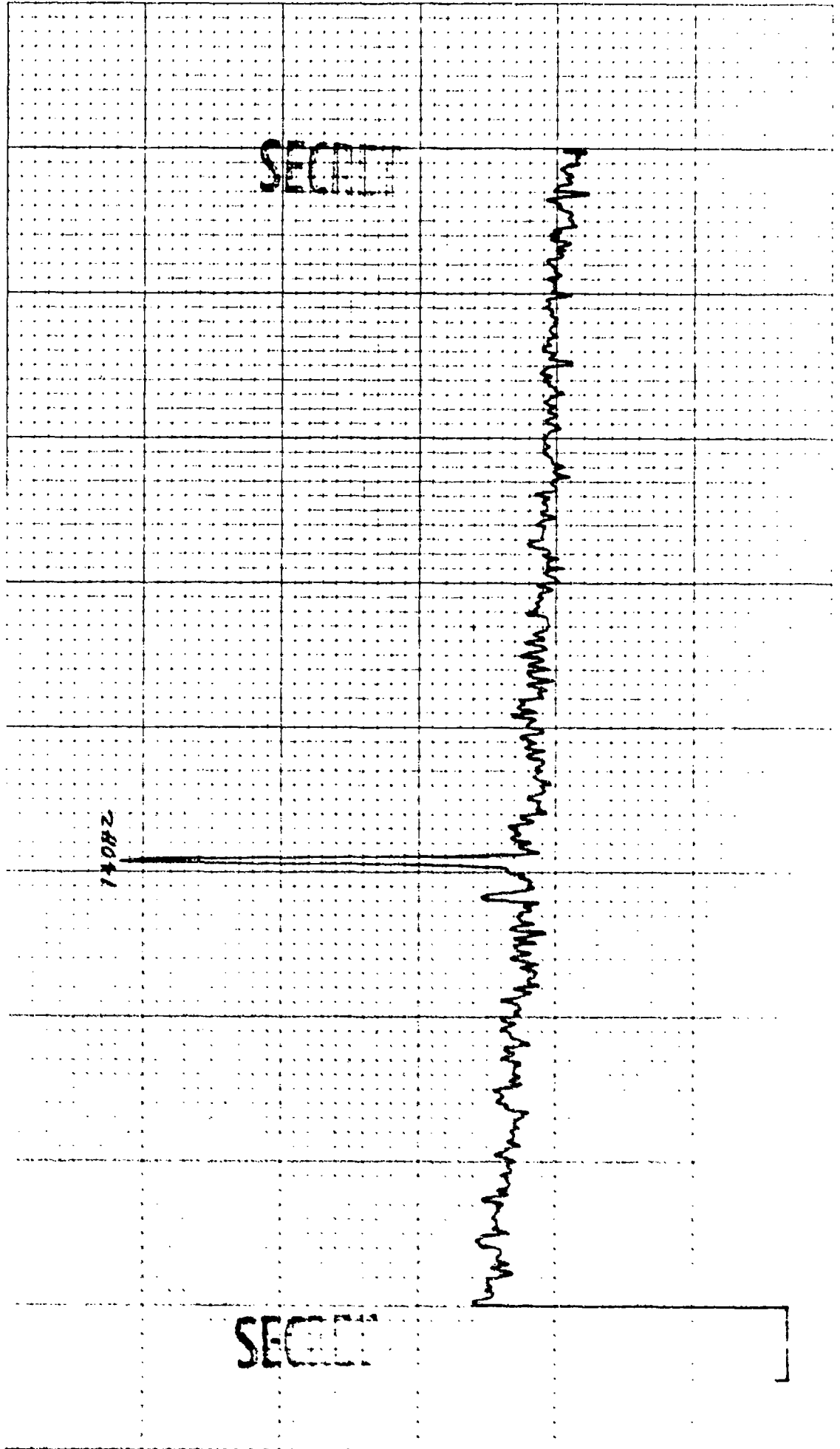
[Handwritten scribbles and markings across the grid]

46 0703

CONTROL: 0202-51 (D07)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
51 ELEMENTS

DATE OF ANALYSIS: 1-26-89 09-53
 DATE/TIME: 2-8-77 -0002Z
 ANALYSIS BANDWIDTH: 1/10HZ
40 DEG. AZ STEERING

REEL: F29 INDE X/145
 INTEGRATION TIME 320 SECS ATTEN: -30 DB
 FILTFR WTG: HANNING



46 0703

1-26 9 09-53

CONTROL: 0202-51 (DP7) DATE OF ANALYSIS: - -
 BEAMFORMED SPECTRUM(ELEMENTS) 1-26 9 09-53
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ
 CENTER FREQ: 150 HZ -42 DEG. AZ STEERING
51 ELEMENTS

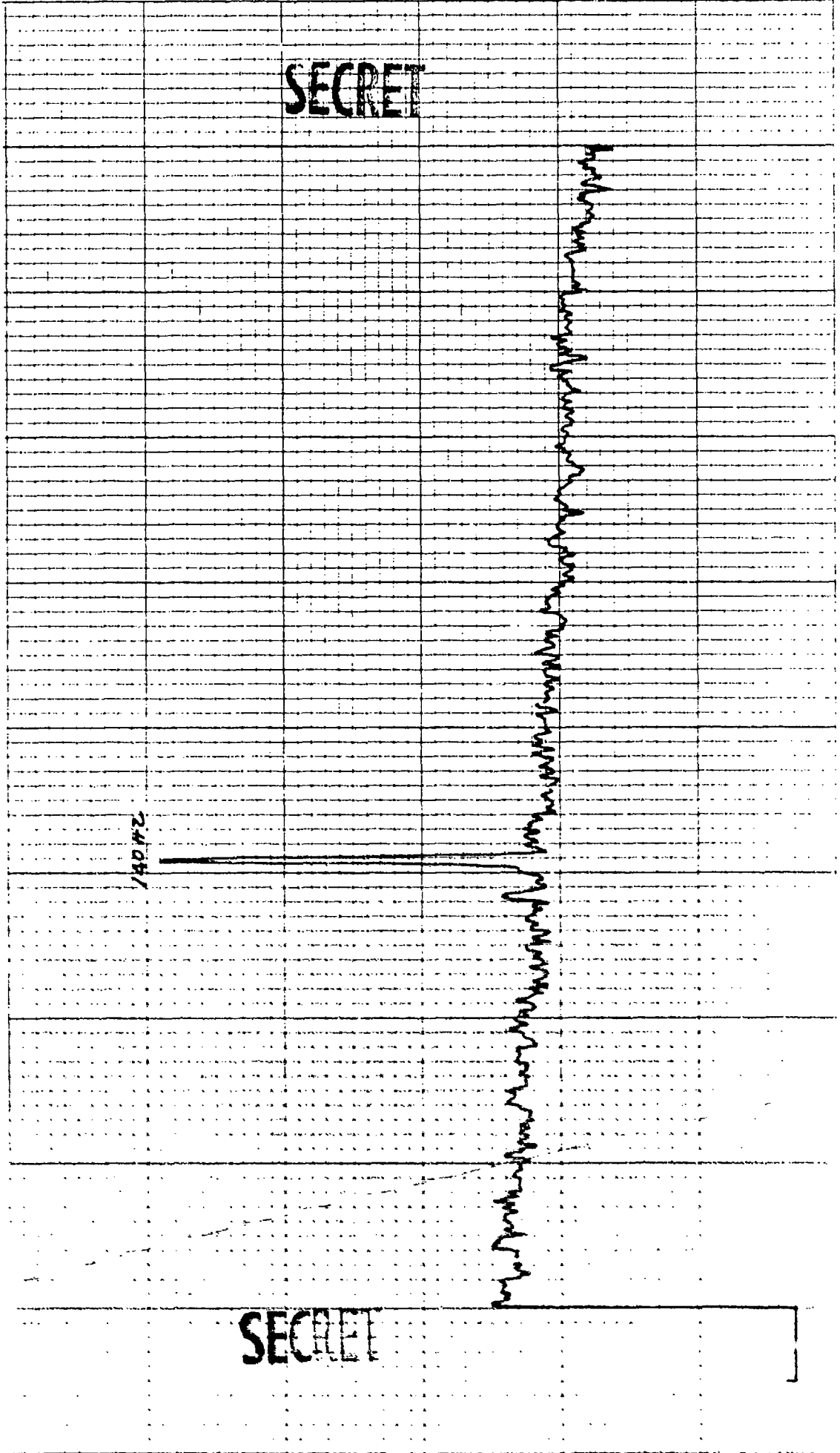
REEL: F29

INDE X/145

INTEGRATION TIME 320 SECS

ATTEN: -30 DB

FILTER WTG: HANNING

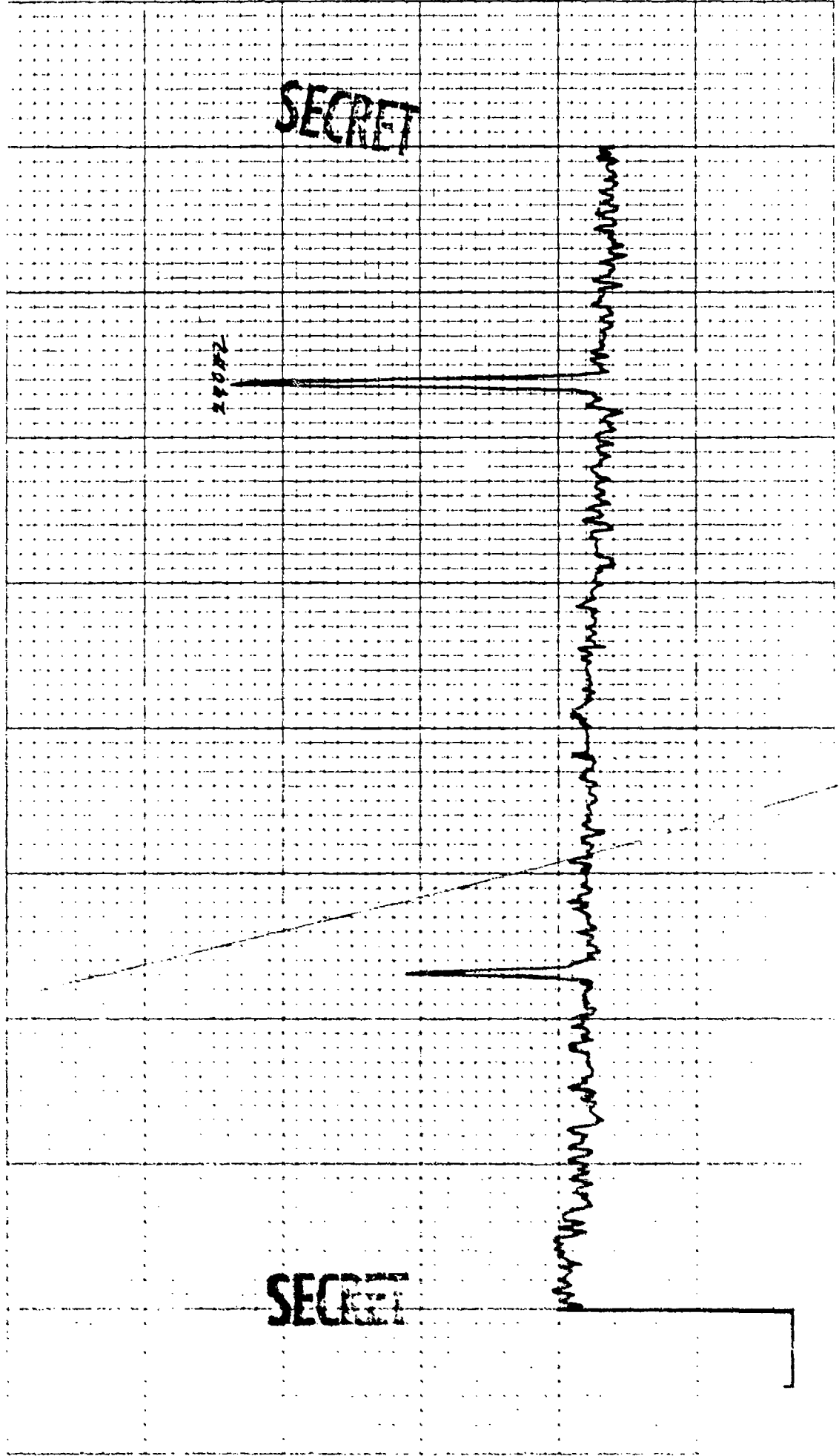


46 0703

CONTROL: 0202 - 5/ 097)
BEAMFORMED SPECTRUM (ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
5/ ELEMENTS

DATE OF ANALYSIS: - - - -
1-26-89-53
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
- 12 DEG. AZ STEERING

REEL: F29
INDE X/145
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTFR WTG: HANNING



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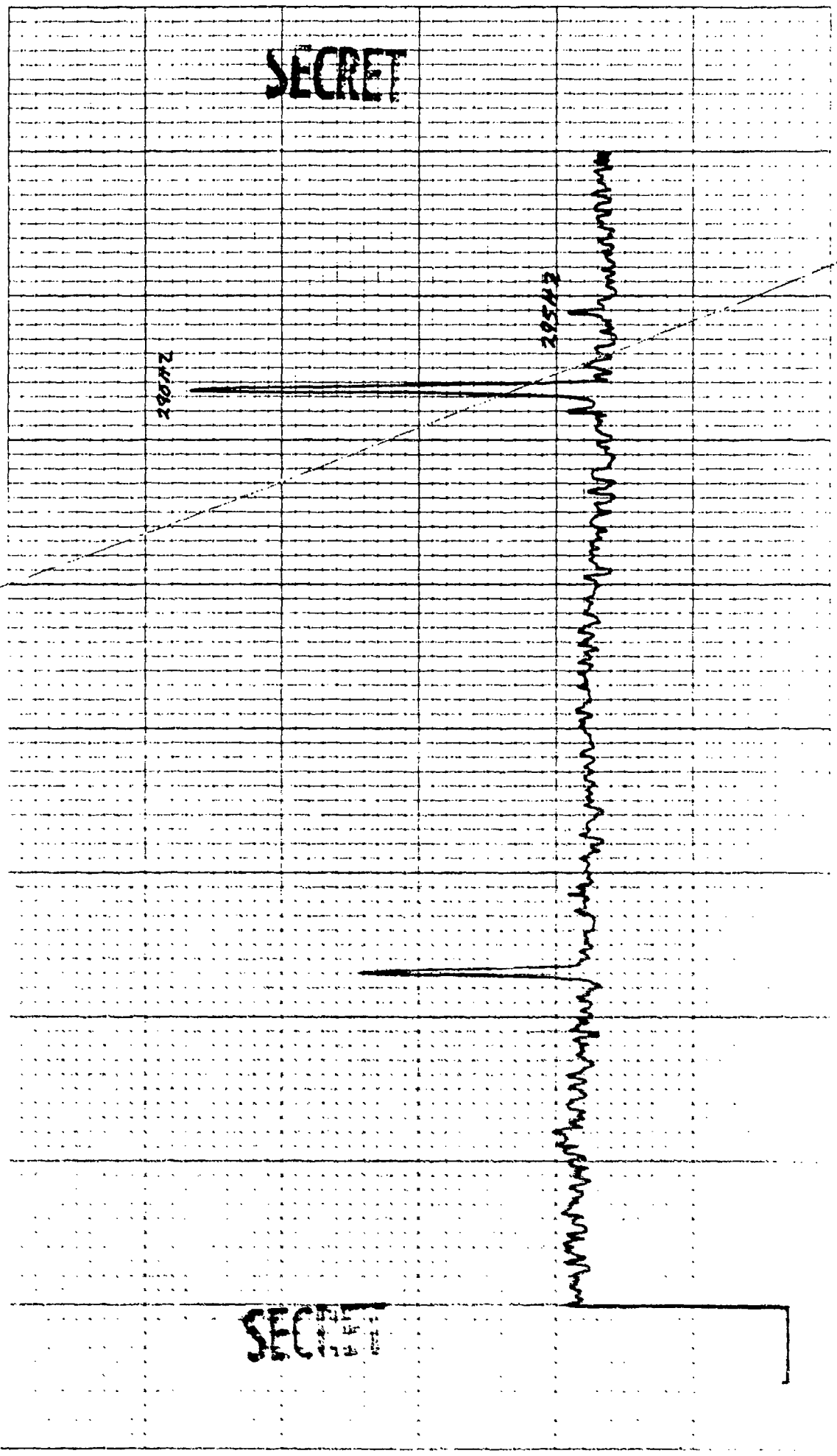
1-2-51 10:45 TO THE DIRECTOR, NSA

46 0703

CONTROL: 0202 - 51 (007)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
51 ELEMENTS

DATE OF ANALYSIS: 1-26-53
DATE/TIME: 0800Z
ANALYSIS BANDWIDTH: 1/10HZ
-14 DEG. AZ STEERING

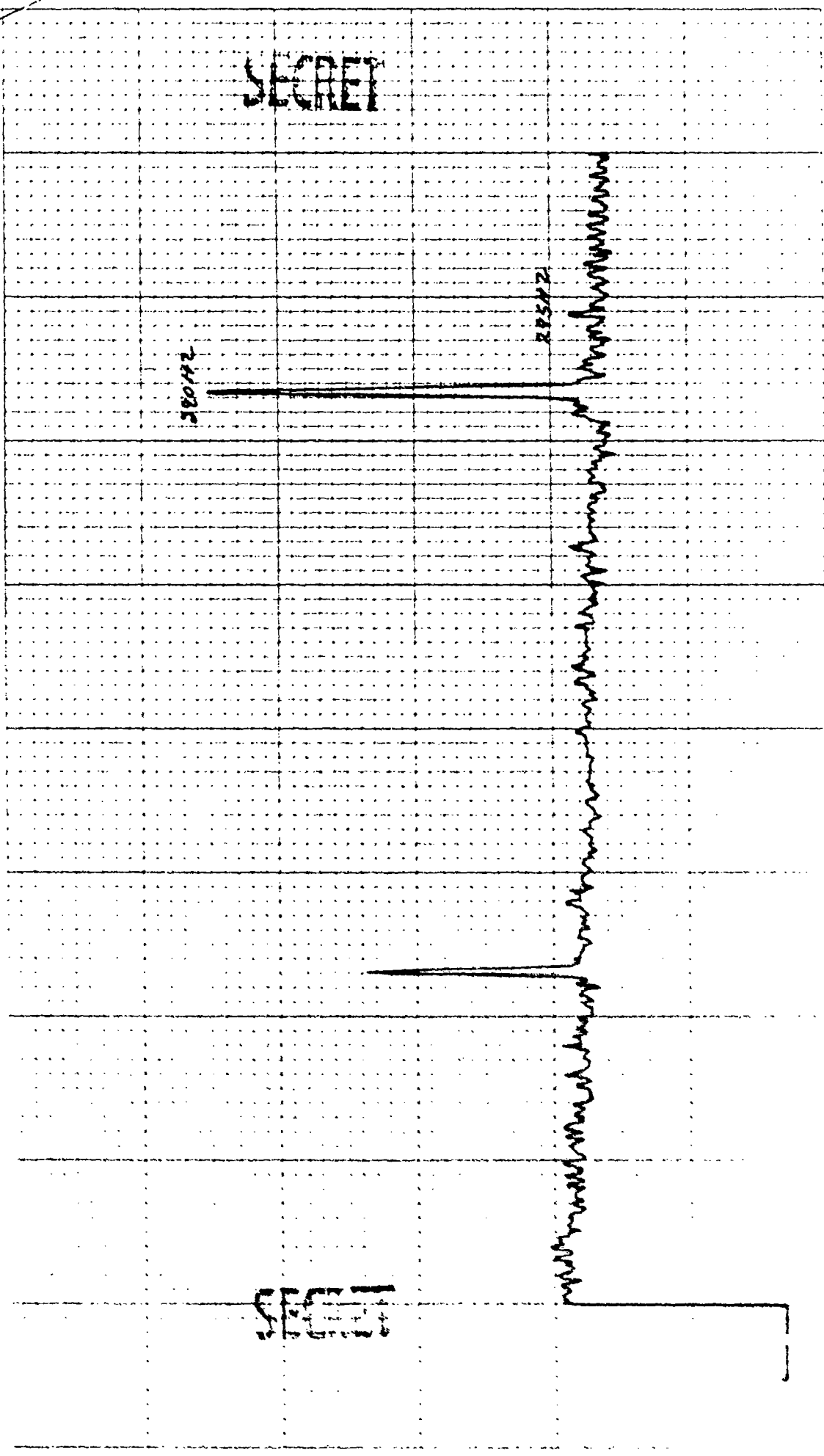
REEL: F39
INDE X/145
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTER WTG: HANNING



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46 0703

CONTROL: 0302-51 (207) DATE OF ANALYSIS: _____ REEL: F09 INDE: X145
 BEAMFORMED SPECTRUM (ELEMENTS) 1-268 89-53 INTEGRATION TIME 320 SECS ATTEN: -20 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER: _____ WTC: HANNING
 CENTER FREQ: 200 HZ -1/6 DEG. AZ STEERING



45 0703

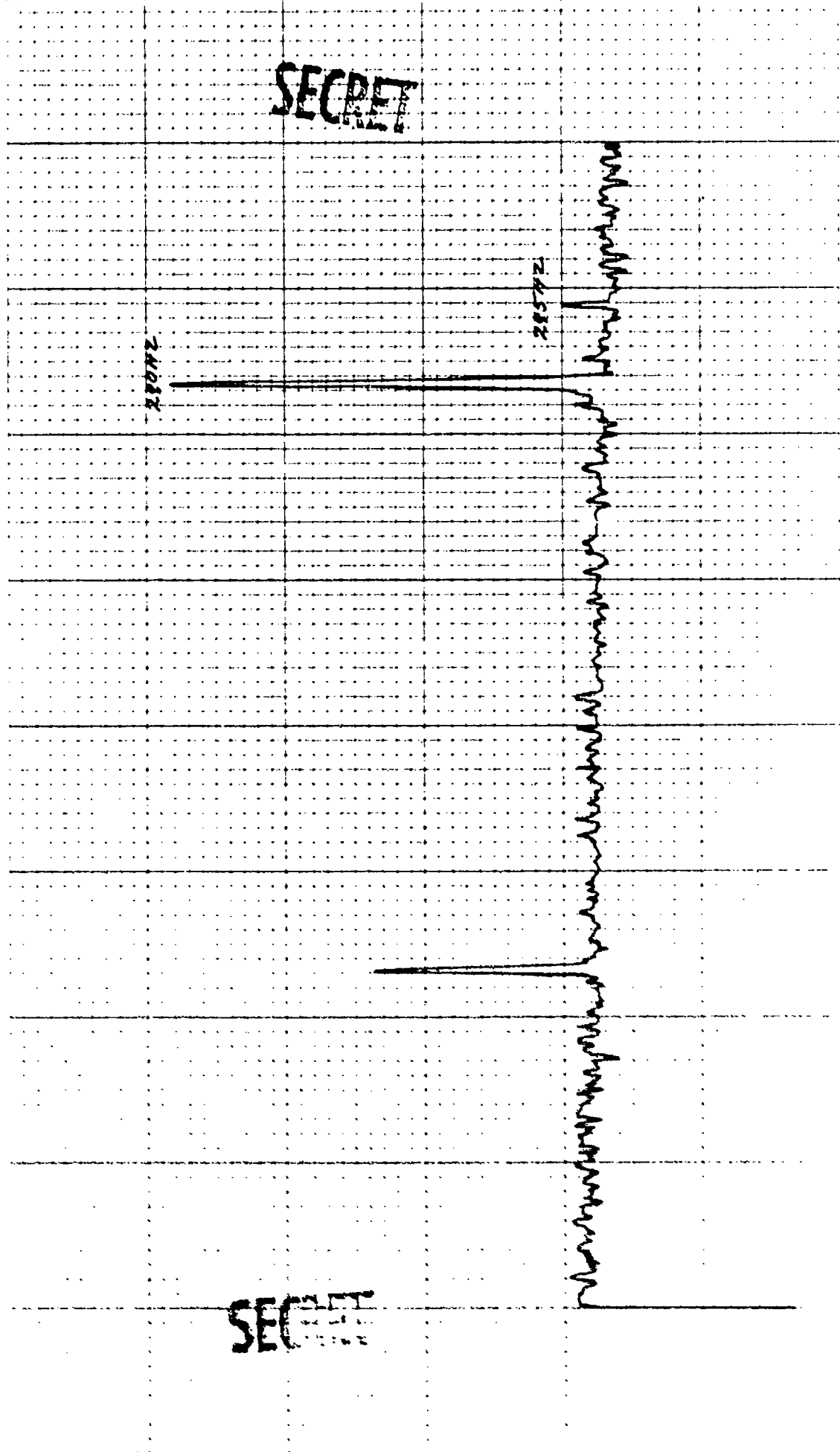
REF ID: A66666

CONTROL: 0202-5/ (D07)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 MZ
5/ ELEMENTS

DATE OF ANALYSIS: - - -
1-26-89-53
DATE/TIME: 20-77-0202Z
ANALYSIS BANDWIDTH: 1/10HZ
-10 DEG. AZ STEERING

REEL: F29
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTFR WTG: HANNING

INDE X//45



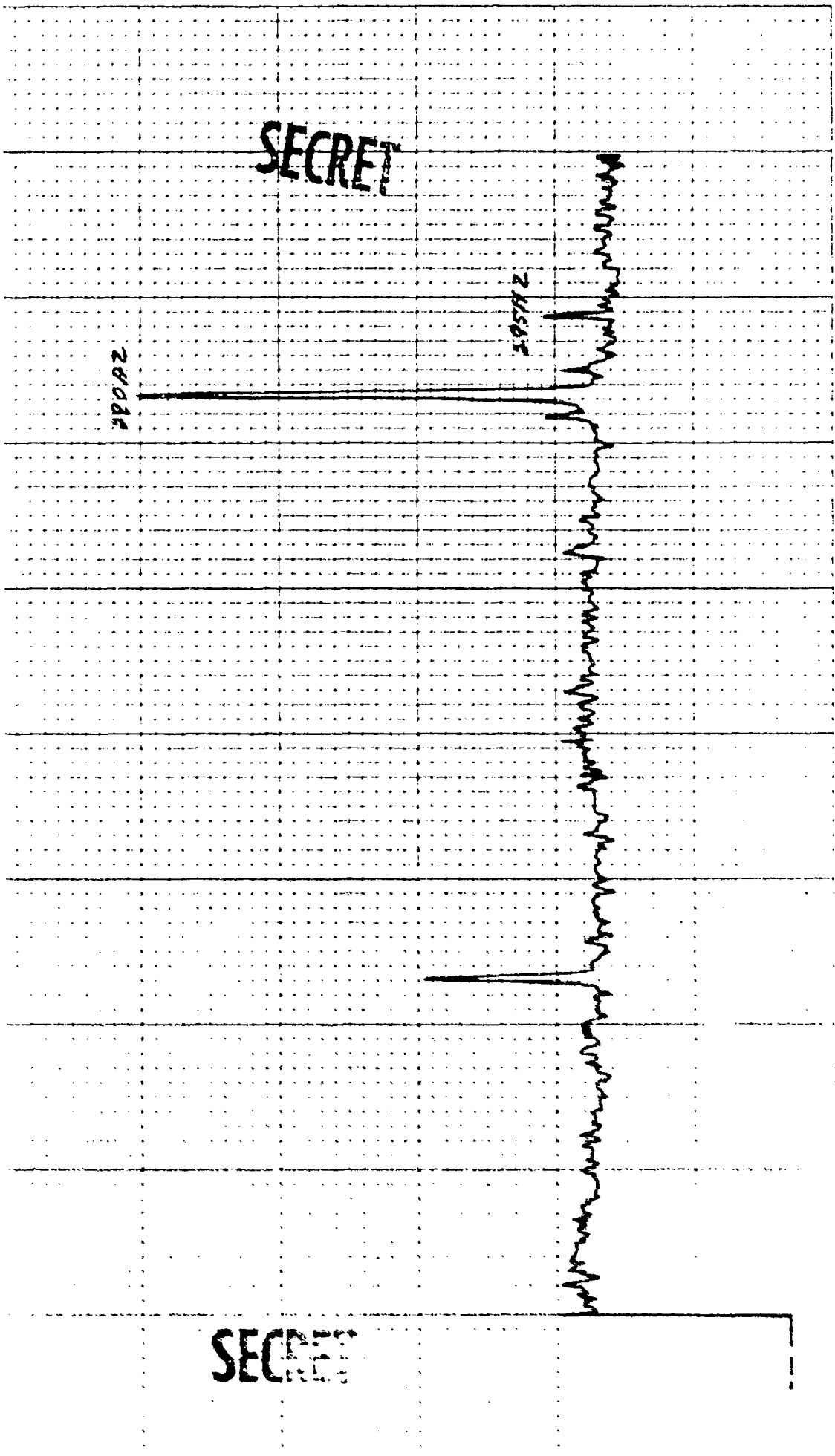
SECRET

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46 0703

CONTROL: 0302 - 51 (007) DATE OF ANALYSIS: - - - - -
 BEAMFORMED SPECTRUM (ELEMENTS) 1-26-77 21-53
 EXERCISE: BEARING STAKE DATE/TIME: 2-6-77 - 0302 Z
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ
 51 ELEMENTS - 20 DEG. AZ STEERING

REEL: F29 INDE X 1195
 INTEGRATION TIME 320 SECS ATTEN: 30 DB
 FILTER WTC: HANNING



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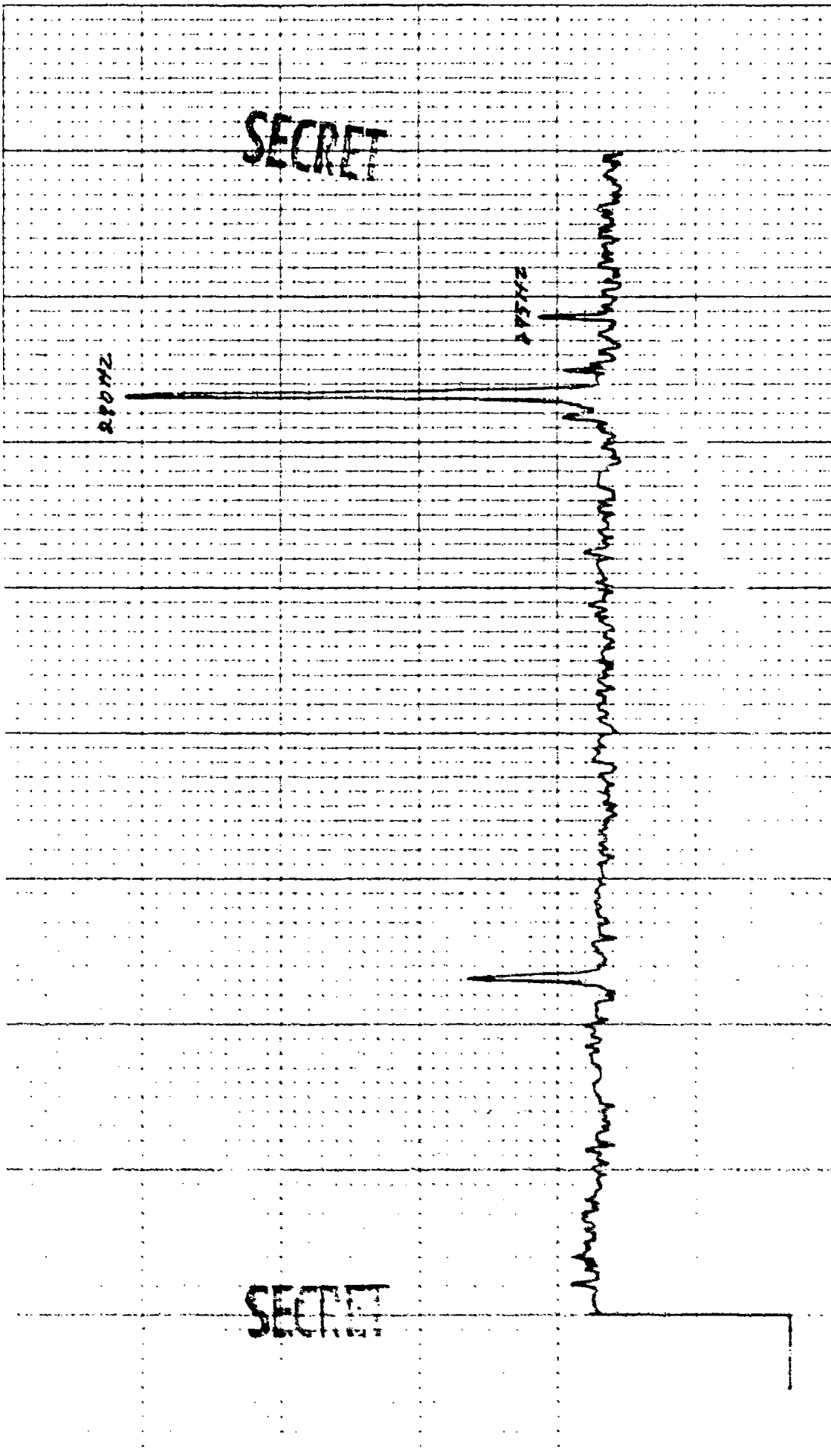
CONTROL: 0202-5/ (207) DATE OF ANALYSIS: REEL: F39 INDE X/145

BEAMFORMED SPECTRUM (ELEMENTS) 1-26-77 21-53

EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 -0002Z INTEGRATION TIME 320 SECS ATTN: -30 DB

CENTER FREQ: 290 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING

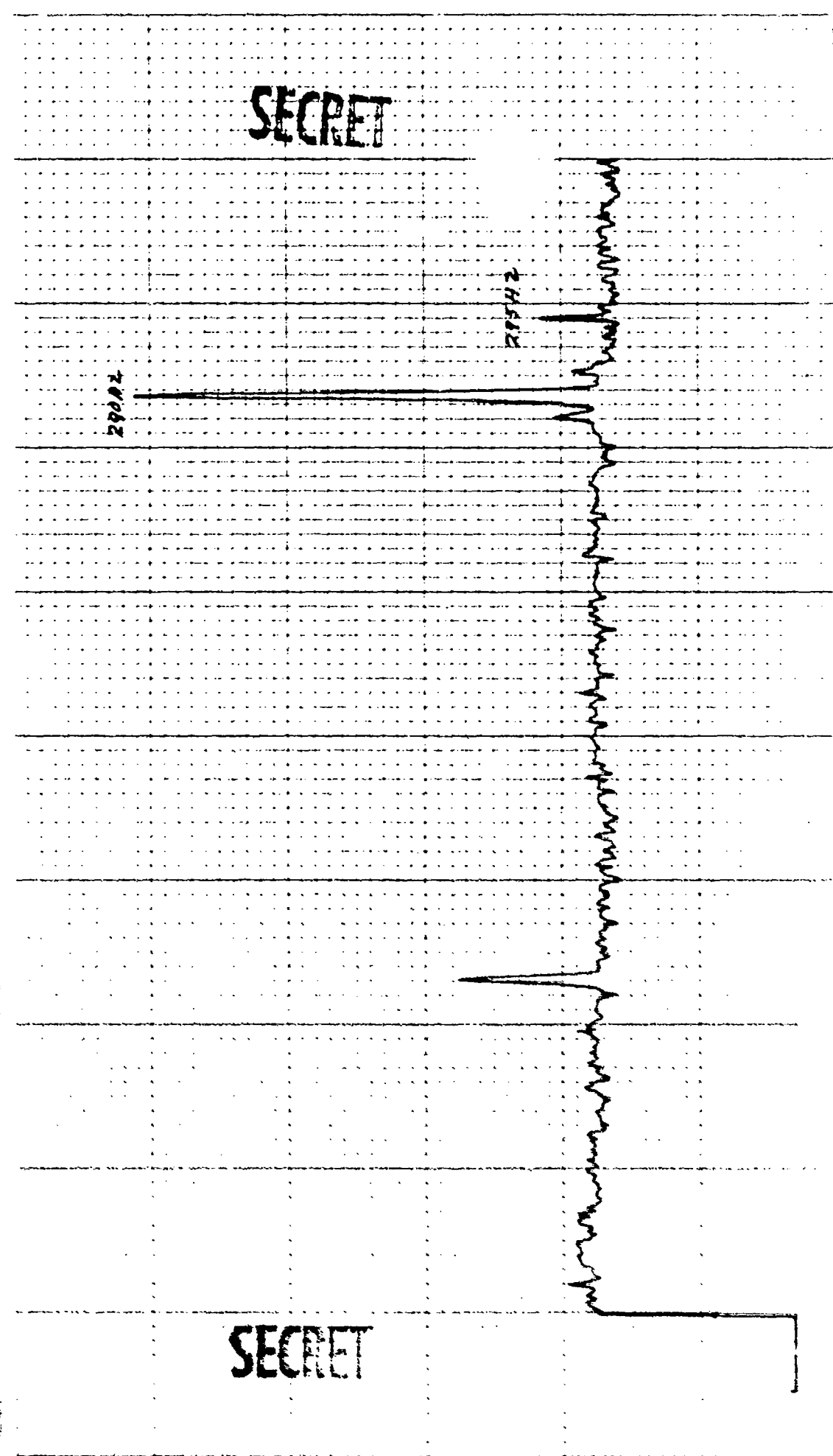
5/ ELEMENTS 22 DEG. AZ STEERING



46 0703

CONTROL: 0202 - 5/ (007) DATE OF ANALYSIS: _____
 BEAMFORMED SPECTRUM(ELEMENTS) 1-20 29-53)
 EXERCISE: BEARING STAKE DATE/TIME: 2877 - 0202Z
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ
 5/ ELEMENTS -2/ DEG. AZ STEERING

REEL: F29 INDE X 11045
 INTEGRATION TIME 320 SECS ATTEN: 30 DB
 FILTER WTC: HANNING



45 0703

REF ID: A66888

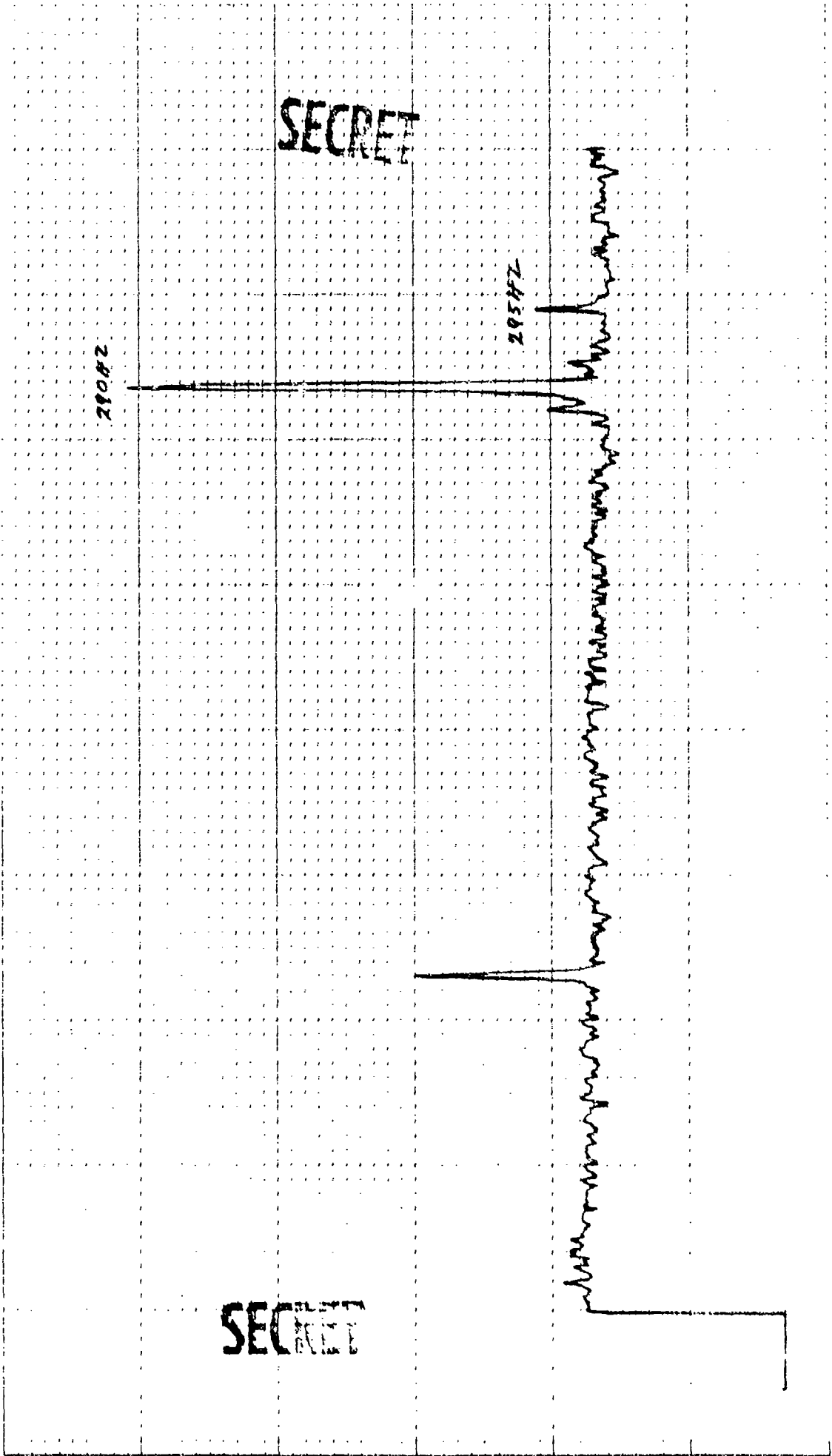
CONTROL: 0202-51 (DP7) DATE OF ANALYSIS: 1-26-53 REEL: F29 INDE X1145

BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTN: -30 DB

EXERCISE: BEAPING STAKE ANALYSIS BANDWIDTH: 1/19HZ FIL: FP WIG: HANNING

CENTER FREQ: 000 HZ - 03 DEG. AZ STEERING

51 ELEMENTS



SECRET

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46 0703

CONTROL: 0202 - 51 (207)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: 3EARING STAKE
CENTER FREQ: 280 HZ
5/ ELEMENTS

DATE OF ANALYSIS: -- -- --

1-26 198-53

DATE/TIME: 2-8-77 - 0202Z

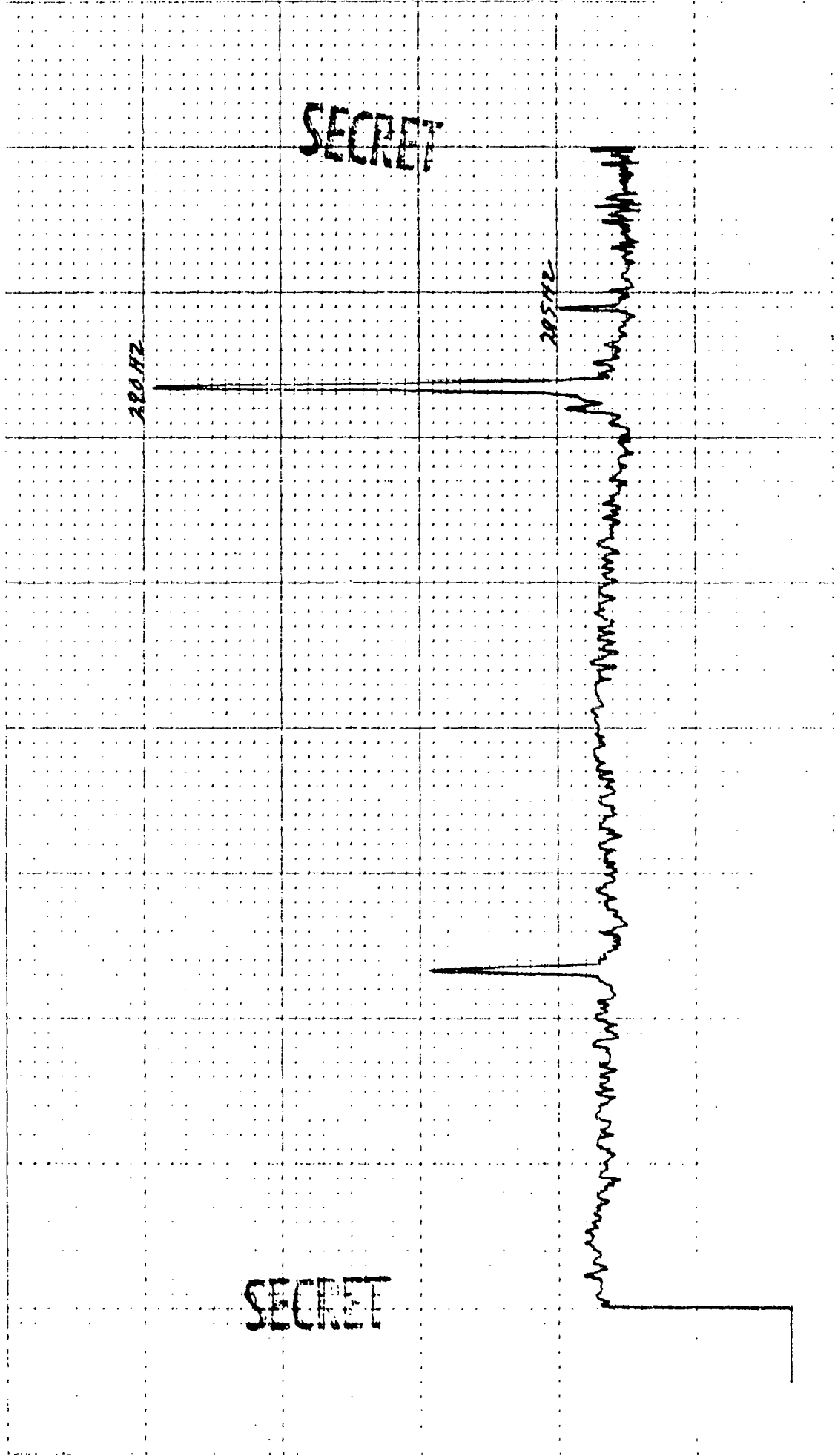
ANALYSIS BANDWIDTH: 1/10HZ

-04 DEG. AZ STEERING

REEL: F39 INDE X1145

INTEGRATION TIME 320 SECS

FILTER WIG: HANNING



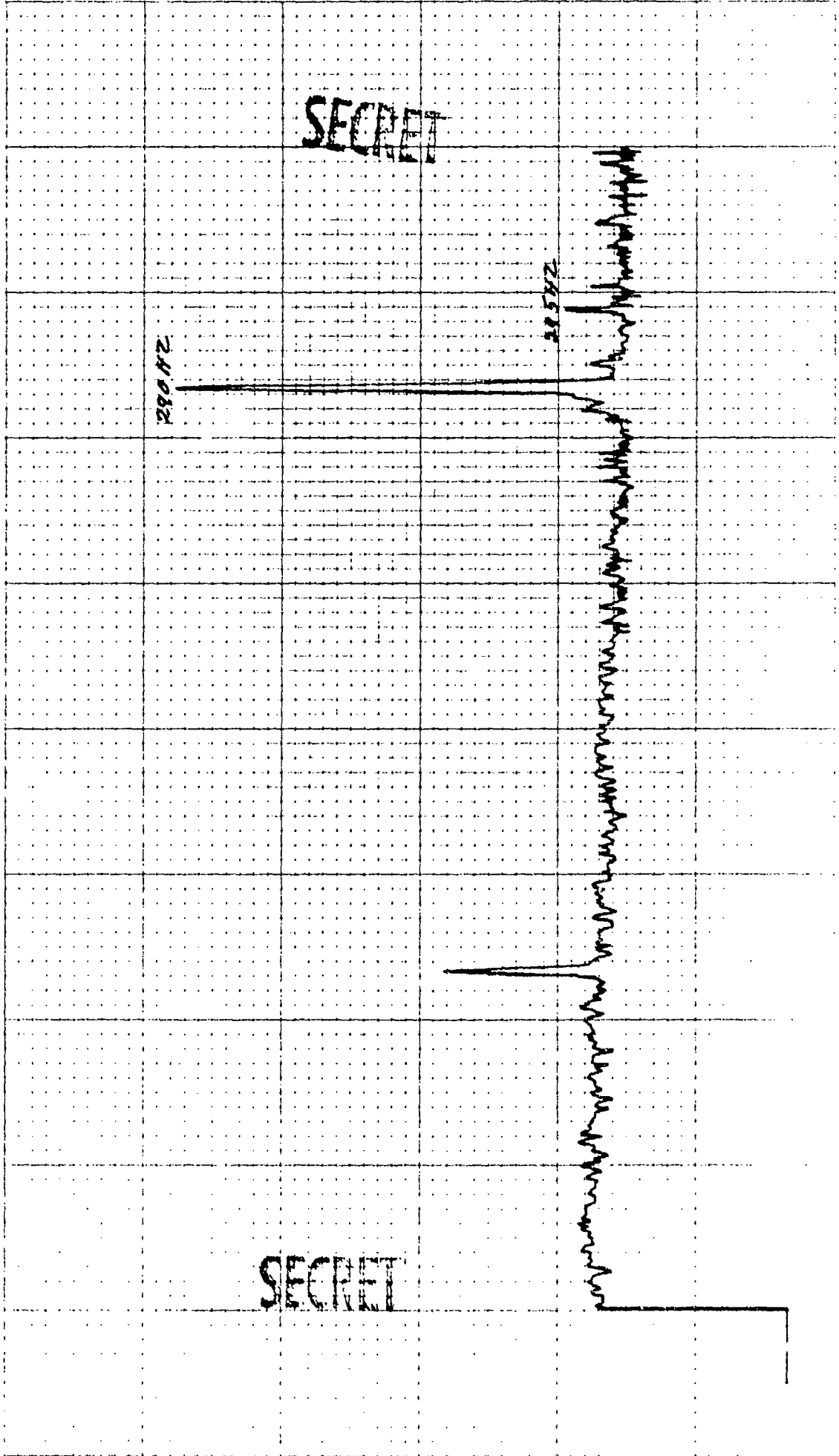
SECRET

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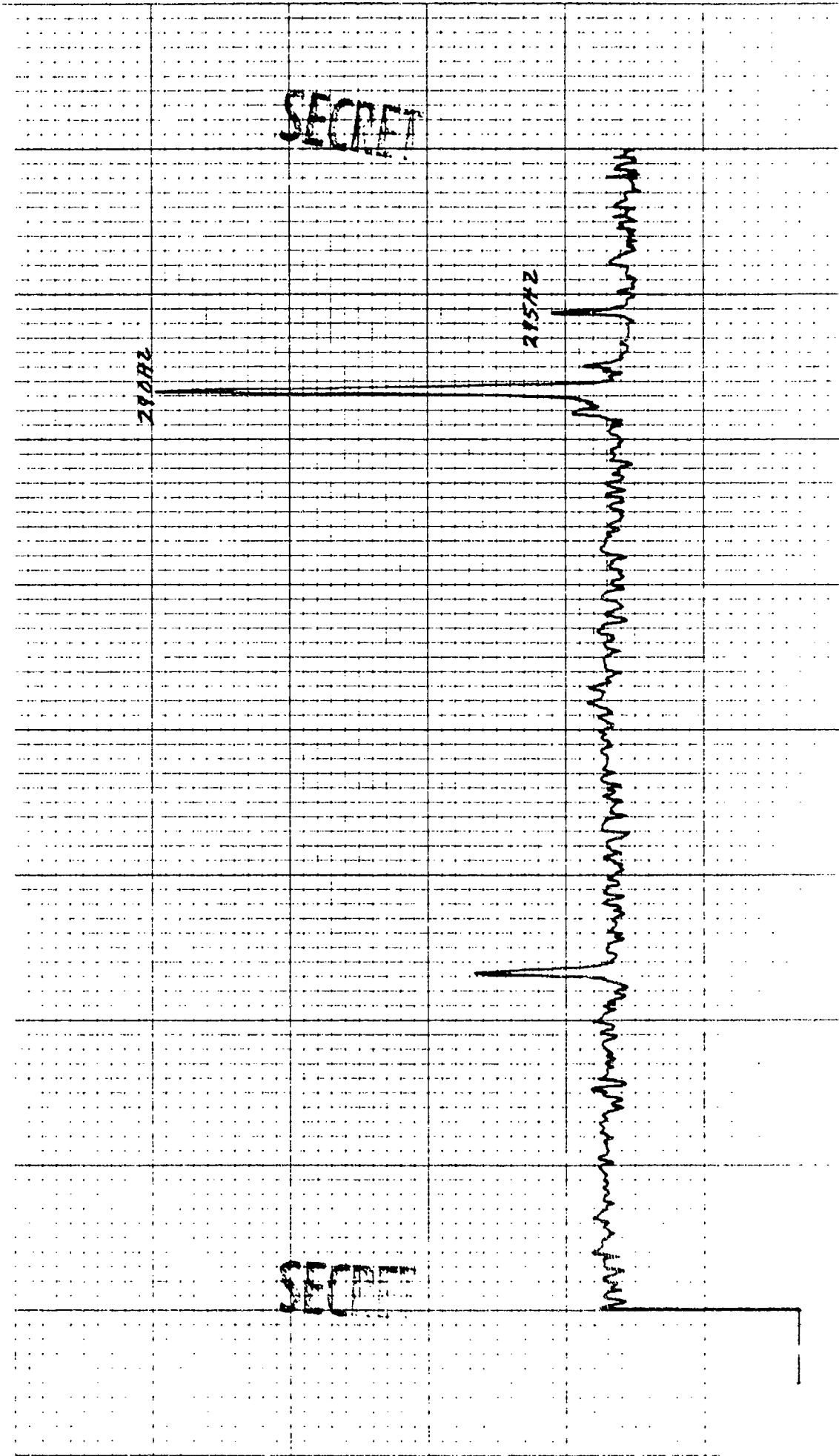
46 0703

46 0703

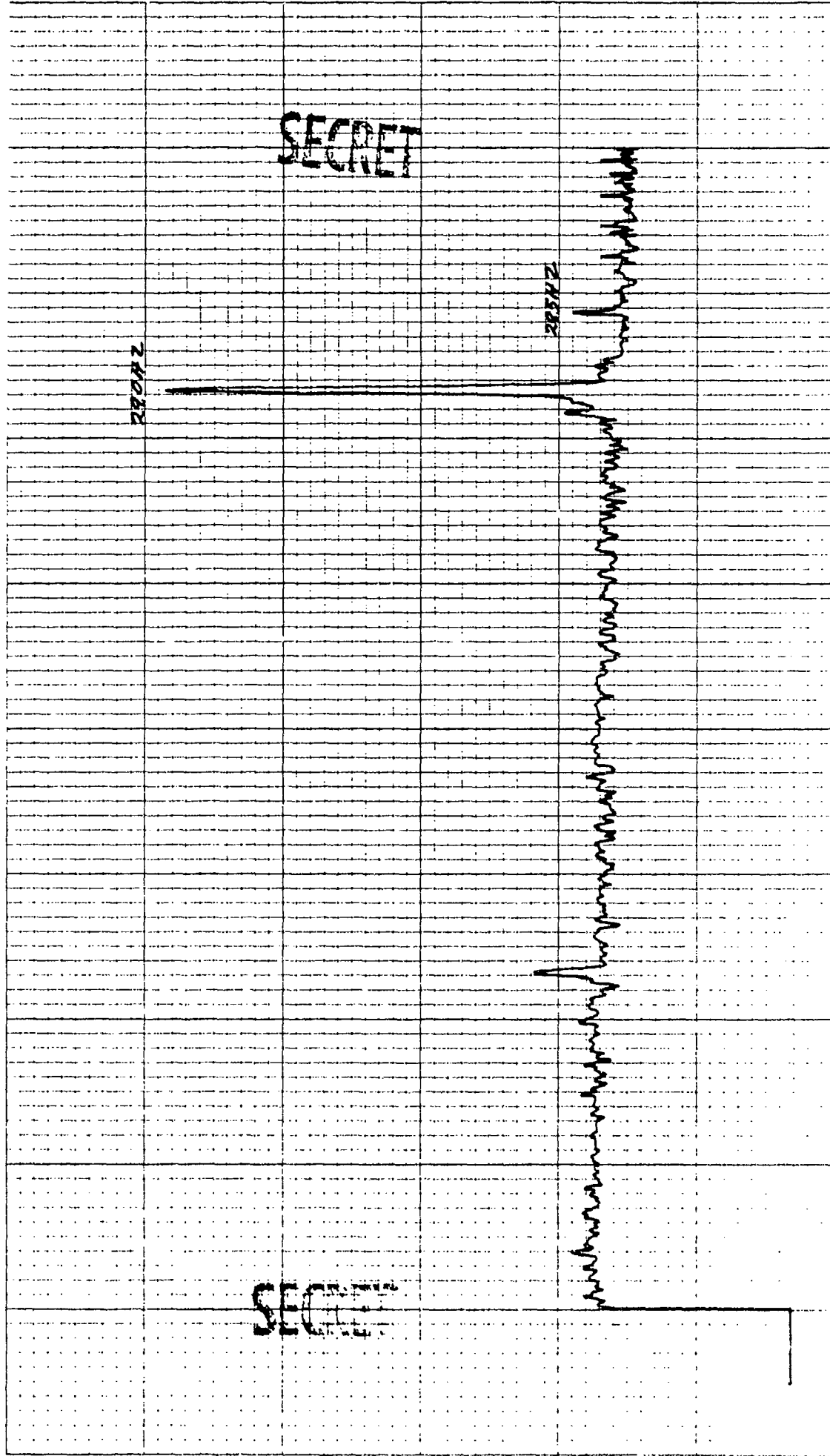
CONTROL: 0202-51 (DP7) DATE OF ANALYSIS: 1-26-53 REEL: F39 INDE X: 145
 BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-8-77-0202Z INTEGRATION TIME 320 SECS ATTN: -30 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER: WTG: HANNING
 CENTER FREQ: 280 HZ -26 DEG. AZ STEERING



CONTROL: 0202 - 51 (207) DATE OF ANALYSIS: 1-26-53 REEL: F21 INDE X//45
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-8-77 - 0202 Z INTEGRATION TIME 320 SECS ATTEN: 30 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FTI: TFR WTG: HANNING
CENTER FREQ: 280 HZ -20 DEG. AZ STEERING



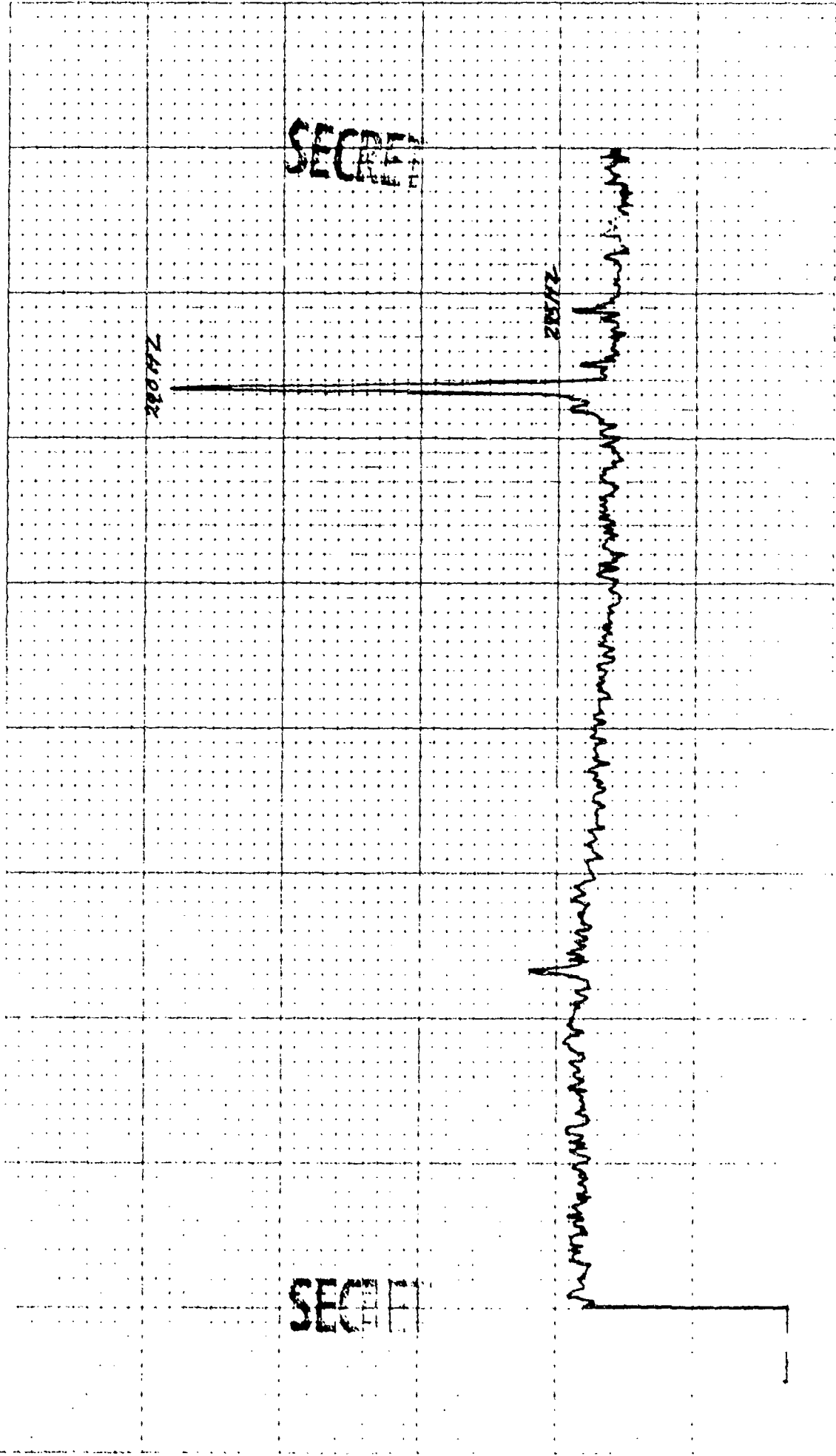
CONTROL: 0202-51 (DPT) DATE OF ANALYSIS: 1-26-53 REEL: F29 INDE X 1195
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTEN: -70 DB
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTFR WTG: HANNING
51 ELEMENTS -30 DEG. AZ STEERING



Page 2 of 2

46 0703

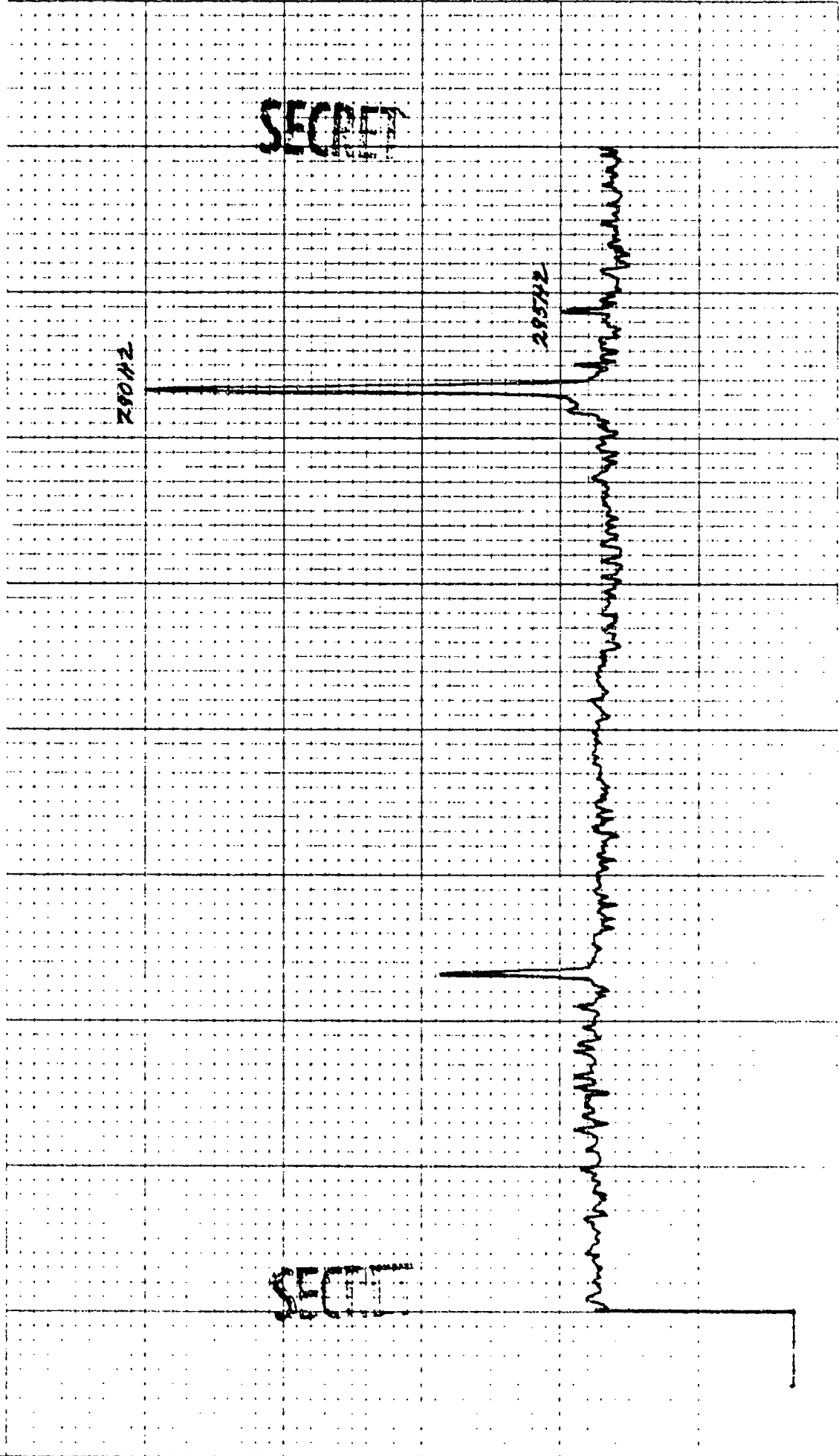
CONTROL: 0202-51 (DP7) DATE OF ANALYSIS: 1-26-53 REEL: E21 INDEX: X/145
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 2-8-77-0202Z INTEGRATION TIME 320 SECS ATTEN: -76 DB
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTFR WTG: HANNING
51 ELEMENTS -32 DEG. AZ STEERING



46 0703

FILE 10210 TO THE HIGH...

CONTROL: 0002-51 (007) DATE OF ANALYSIS: 1-26-88-53 REEL: F-89 INDE X 1195
BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-8-77 -0002Z INTEGRATION TIME 320 SECS ATTEN: -30 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTFR WTG: HANNING
CENTER FREQ: 280 HZ -34 DEG. AZ STEERING



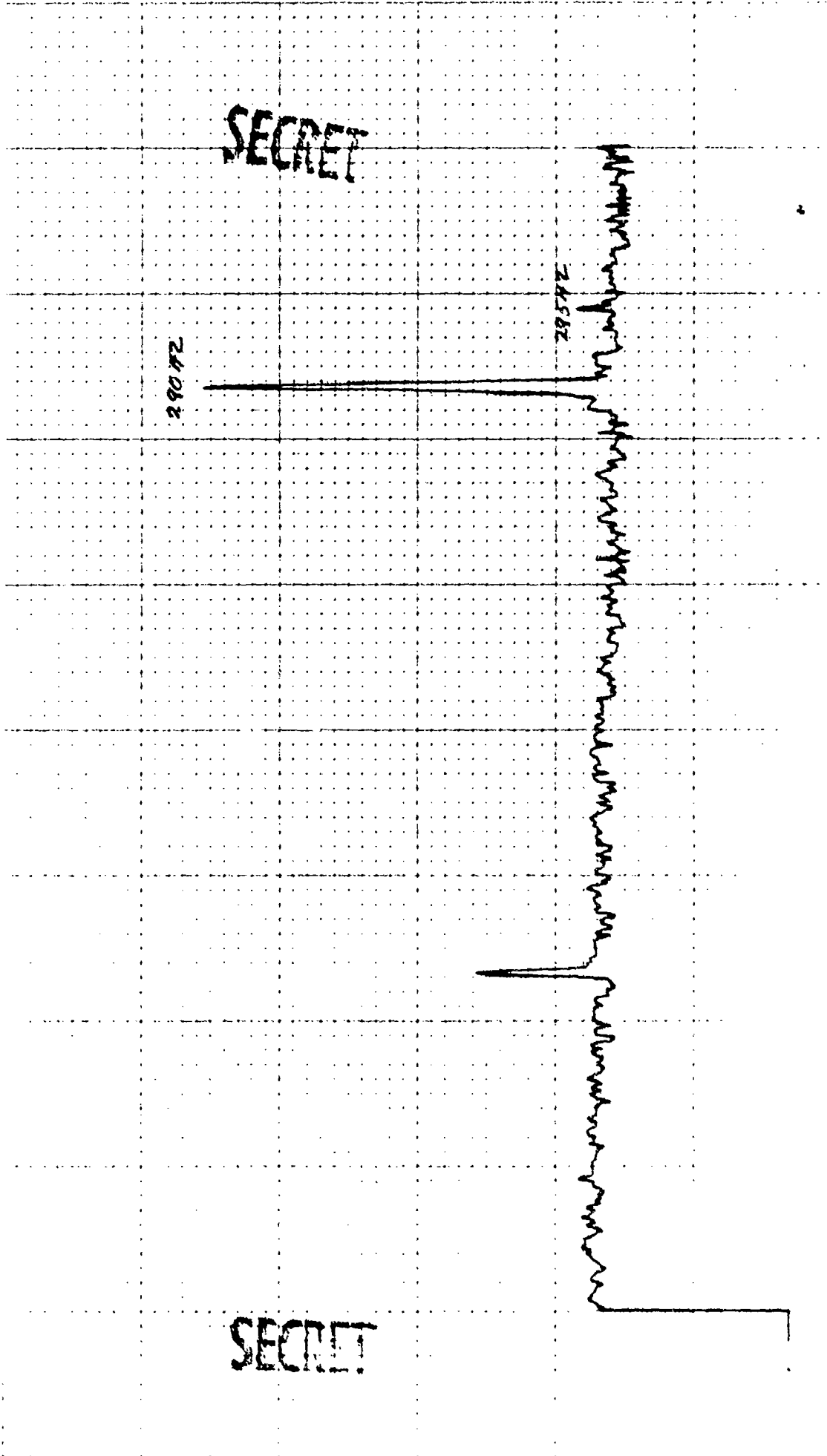
46 0703

CONTROL: 0202 - 51 (DPT)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
51 ELEMENTS

DATE OF ANALYSIS: 1-26-82 08-53

ANALYSIS BANDWIDTH: 1710HZ
-36 DEG. AZ STEERING

REEL: F01 INDEX 1140
INTEGRATION TIME 320 SECS ATTN: -20 DB
FILTER WTG: HANNING



46 0703

REF: [illegible]

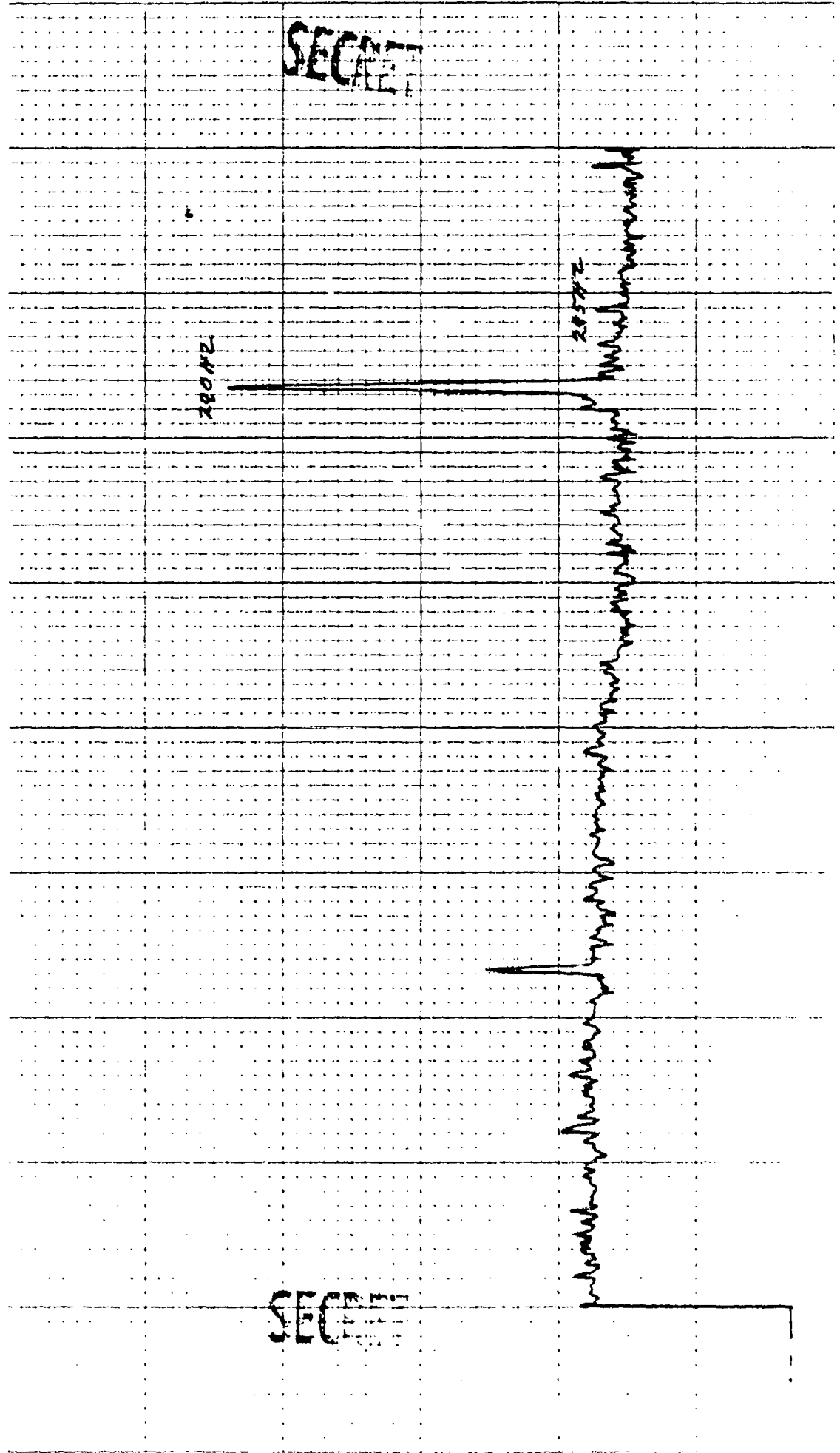
CONTROL: 0202 - 51 (207) DATE OF ANALYSIS: 1-26-88-53 REEL: F29 INDE X/145

BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTEN: -30 DB

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

CENTER FREQ: 280 HZ -38 DEG. AZ STEERING

51 ELEMENTS



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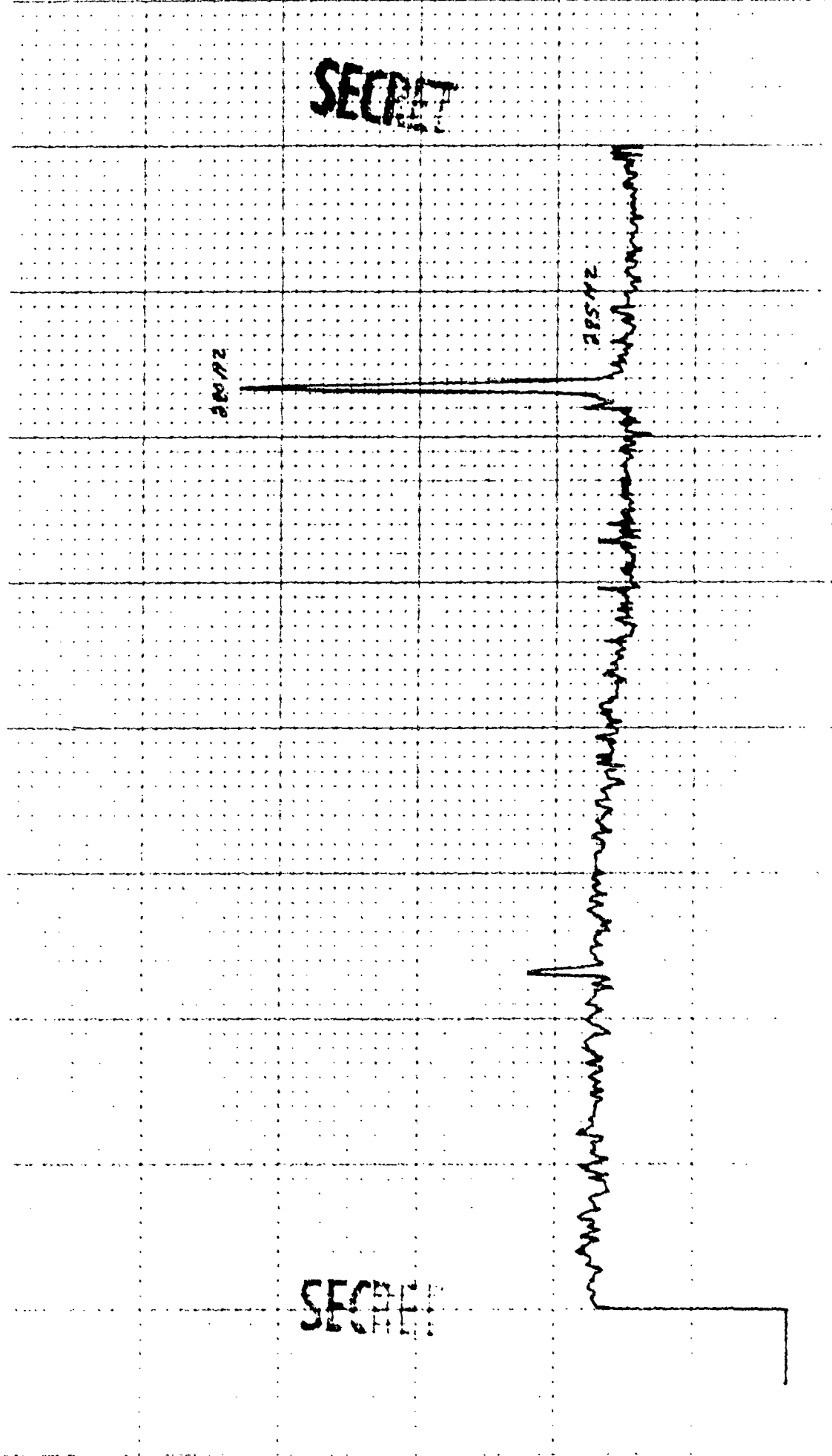
46 0703

CONTROL: 0902-51 (DP1)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 2800 HZ
51 ELEMENTS

DATE OF ANALYSIS: 1-26-89-53
DATE/TIME: 08:37-0902Z
ANALYSIS BANDWIDTH: 1/10 HZ
-40 DEG. AZ STEERING

REEL: F29
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILT.FP
WTG: HANNING

INDE X1/45



SECRET

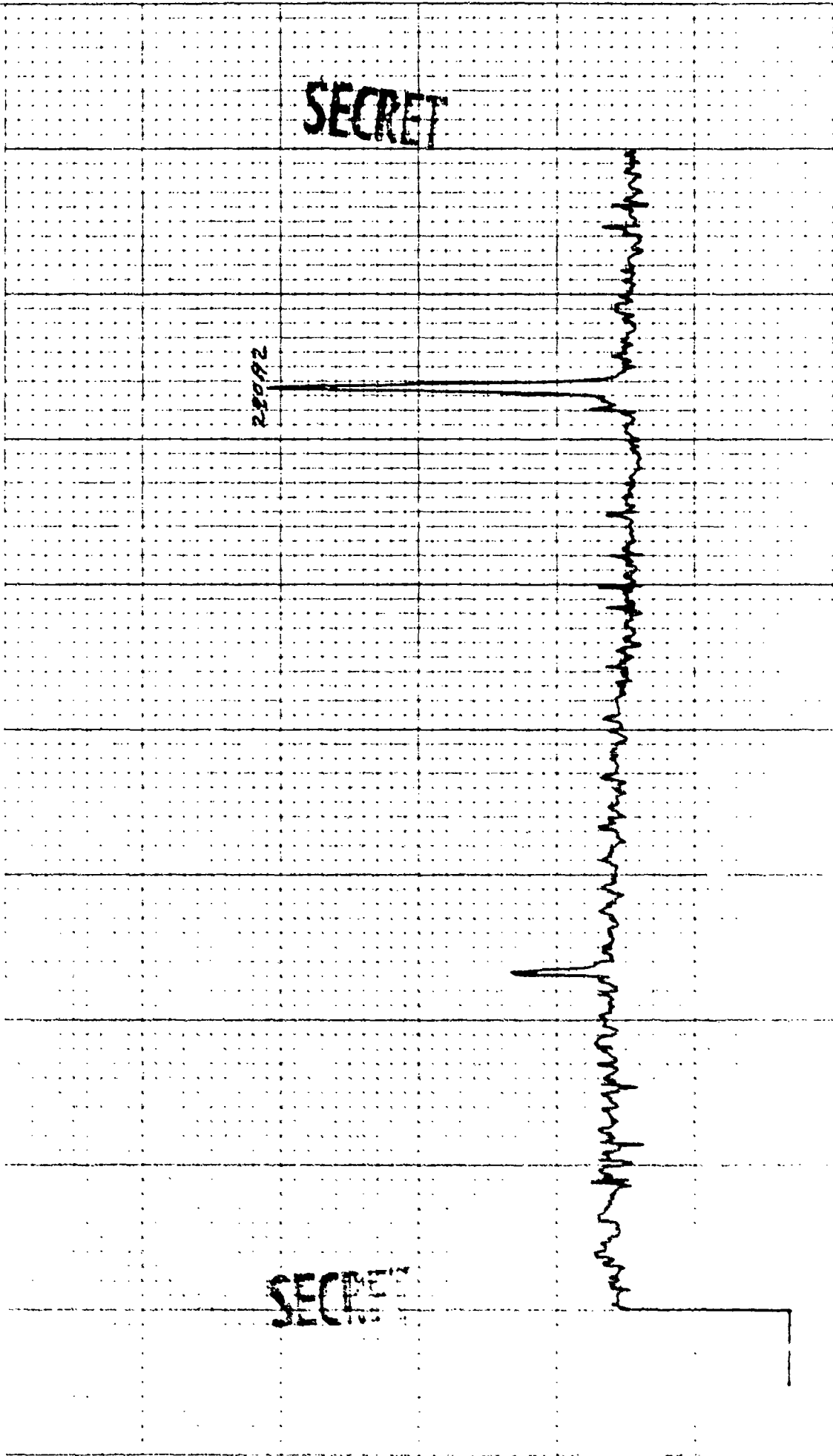
SECRET

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CONTROL: 0202 - 51 (007)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
5/ ELEMENTS

DATE OF ANALYSIS: -- -- --
1-26-89-53
DATE/TIME: 2-0-77 - 0207Z
ANALYSIS BANDWIDTH: 1/10HZ
- 42 DEG. AZ STEERING

REEL: F29 INDE X 1145
INTEGRATION TIME 320 SECS ATTEN: -30DB
FII.TFP WTG: HANNING



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

TIME 150/Z

DATA POINT 8 DATE 3-15-77

FREQUENCY 140 HZ

INDICATED NOISE LEVEL $\text{dBV} \frac{1}{\mu\text{V}}$ -52.9

-(-12)

SYSTEM SENSITIVITY $\text{dB}/\mu\text{B}$ -40.9

+8.2

BANDWIDTH CONVERSION TO 1 HZ BAND -32.7

+100

CONVERSION TO $\text{dBre}\mu\text{Pa}/1\text{HZ}$ +17.3

UNCLASSIFIED

UNCLASSIFIED

UNCLASSIFIED

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

DATA POINT 8 DATE 3-15-77 TIME 1501Z

FREQUENCY 290 HZ

INDICATED NOISE LEVEL $\frac{1}{\mu V}$ ABW -54.6

SYSTEM SENSITIVITY $\mu B/\mu B$ -(-0) -46.6

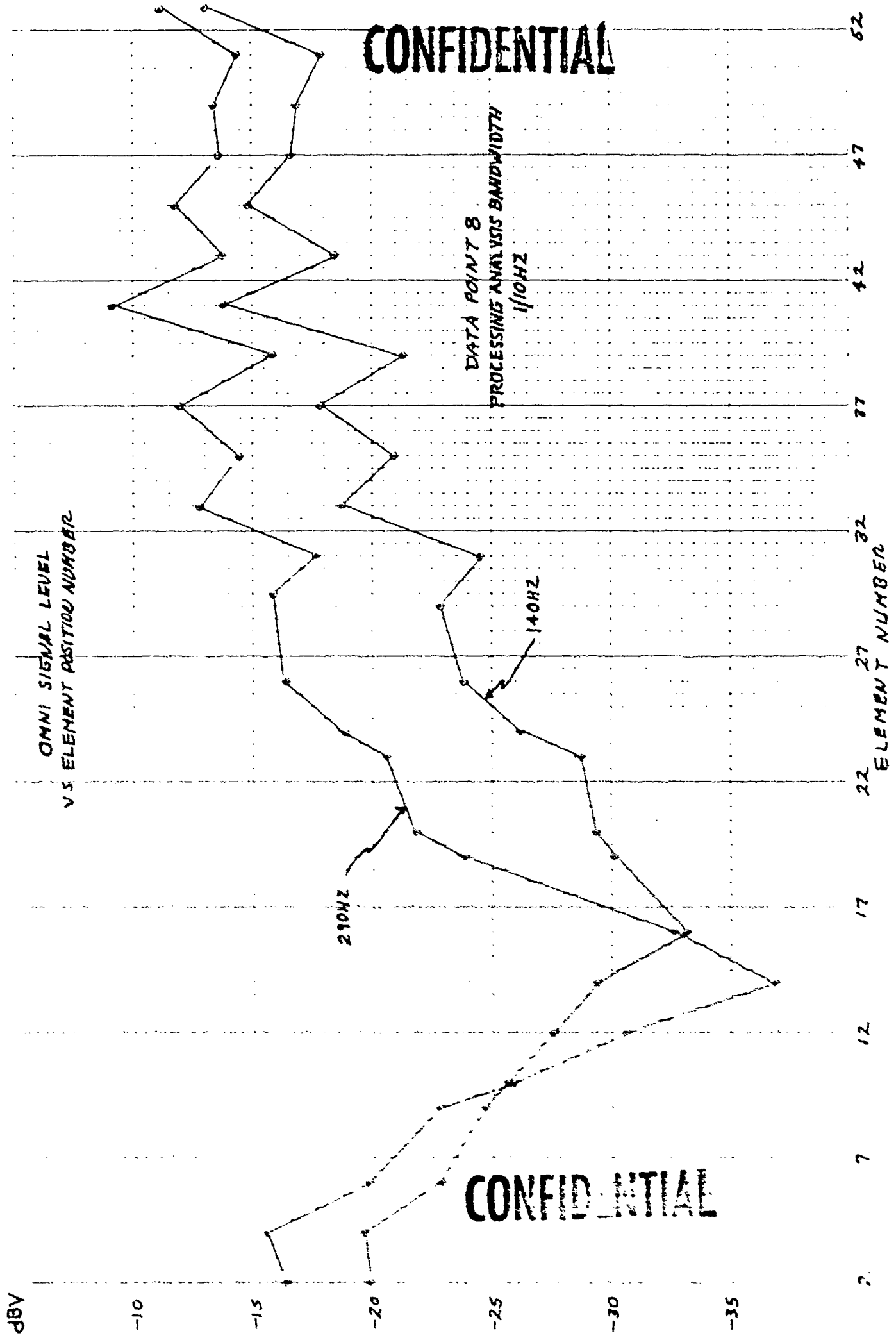
BANDWIDTH CONVERSION TO 1 HZ BAND +8.2 -38.4

CONVERSION TO $\mu B_{rePa}/1HZ$ +100 +61.6

UNCLASSIFIED

46 0703

Fig. 4-10-1 (1000 Hz)



CONFIDENTIAL

CONFIDENTIAL

46 0703

REF ID: A66000

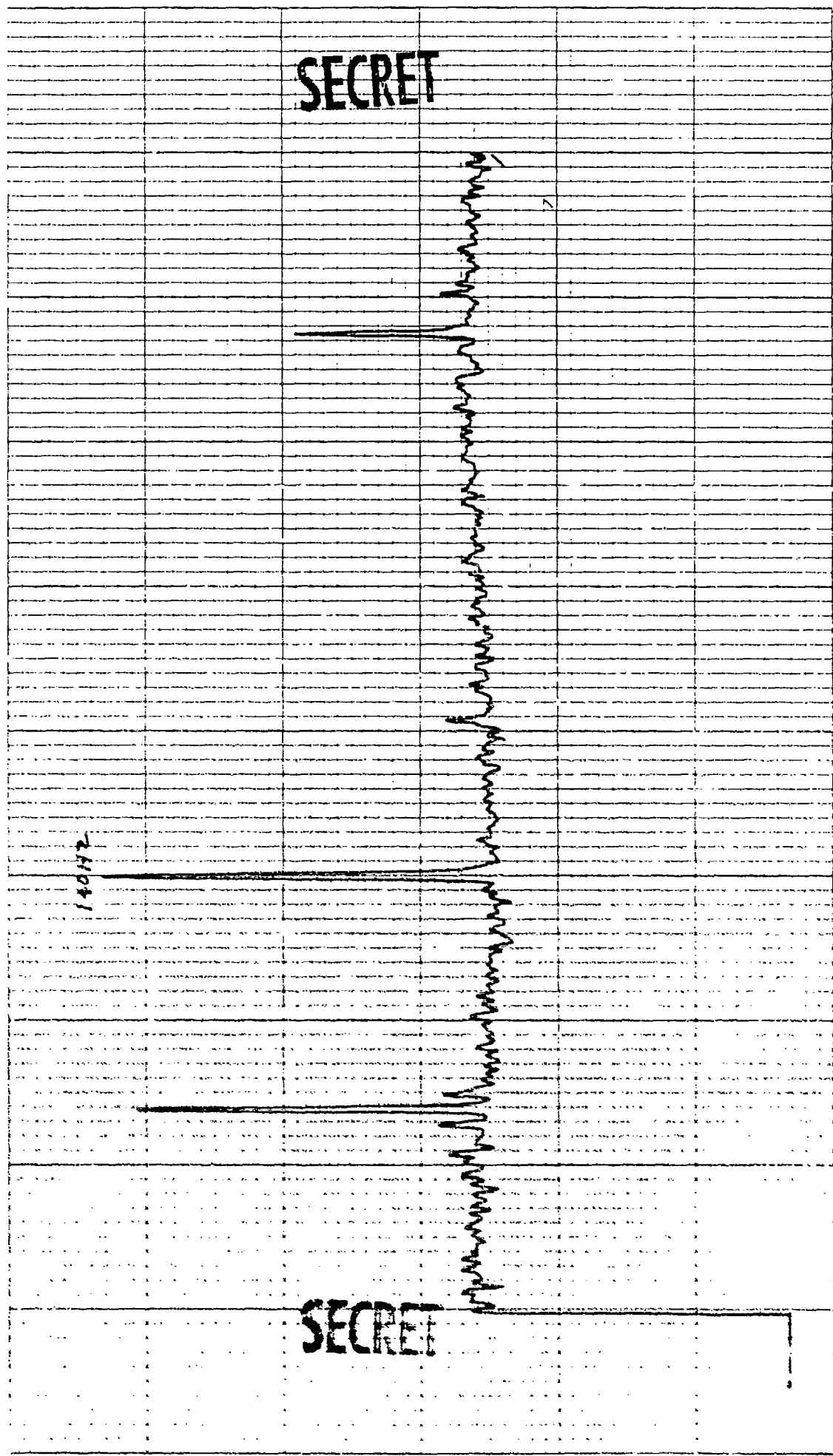
CONTROL: 3-45 - 1501 (2.7) DATE OF ANALYSIS: REEL: 114 INDEX 3340

OMNI SPECTRUM (ELEMENT 2) DATE/TIME: 3-7-57 - 1501 Z

EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/1CHZ INTEGRATION TIME 320 SECS ATTN: DB

CENTER FREQ: 150 HZ DEG AZ SIEERING FILTER WTG: HANNING

1 ELEMENT



46 6763

INDEX 3360

REEL: 14

DATE OF ANALYSIS:

CONTROL: 3-5 - 1501 (10)

OMNI SPECTRUM ELEMENT 4

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

1 ELEMENT

DATE/TIME: 3-5-77 - 1501 Z

ANALYSIS BANDWIDTH: 1/10 HZ

DEC AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

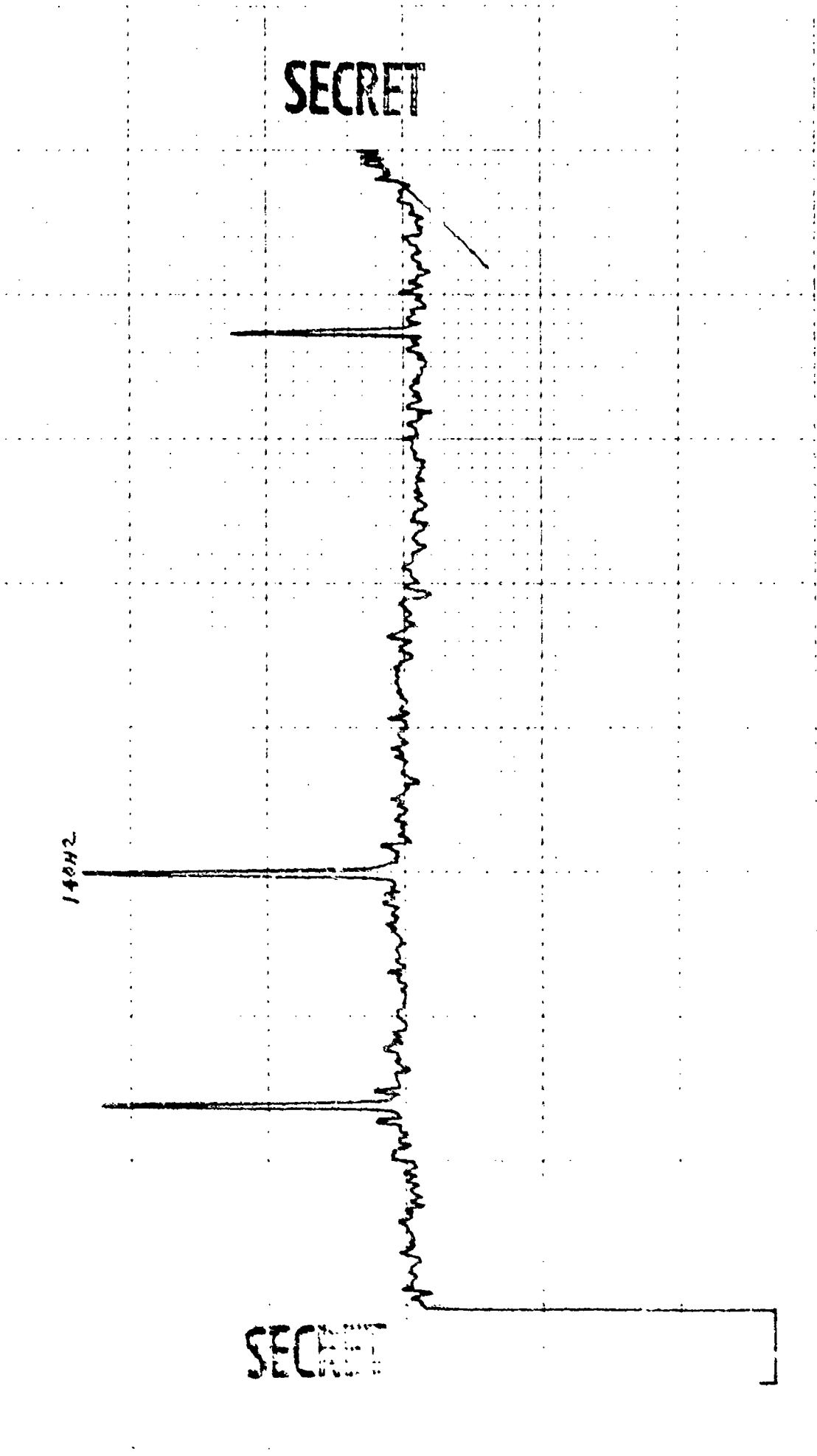
ATTEN: DB

WTG: HANNING

140HZ

SECRET

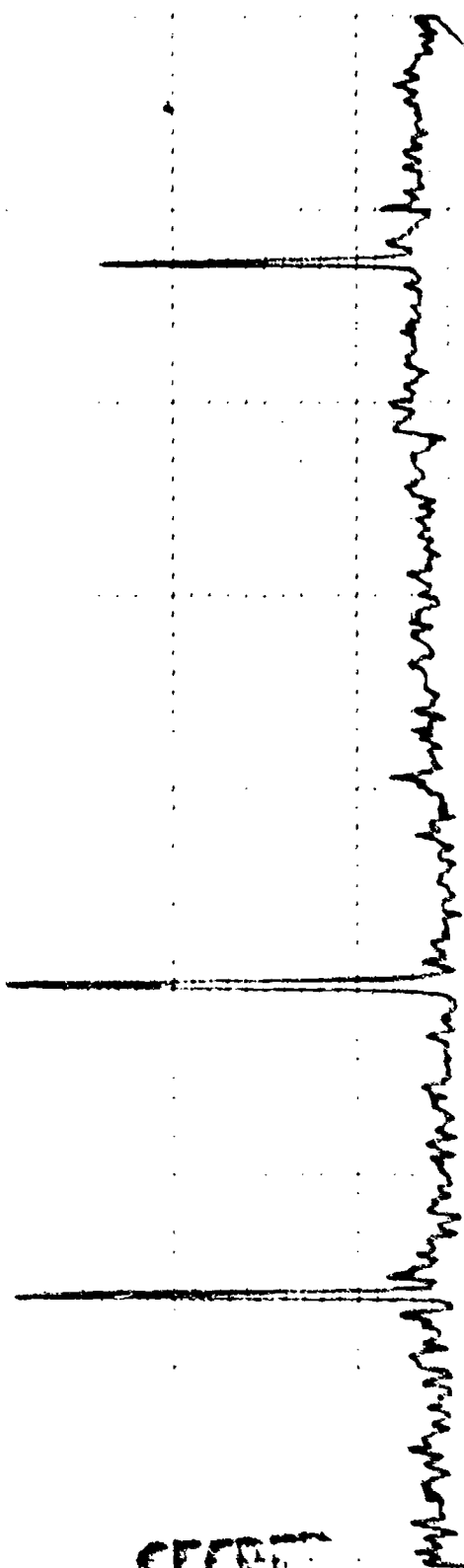
SECRET



45 5753

CONTROL: 745-1501-130 / DATE OF ANALYSIS: PERL: M4 INDEX 3340
 OMNI SPECTRUM ELEMENT: 9.3 / DATE TIME: 24577-1501 Z
 SPECTROGRAPHING STAGE: ANALYSIS BANDWIDTH: 10HZ INTEGRATION TIME 320 SECS ATTN: DB
 CENTER FREQ: 150 HZ / AZ: STEEPING FILTER WIG: HANNING
 ELEMENT

140HZ



SECRET

SECRET

66 0703

REEL: NY INDEX 3000

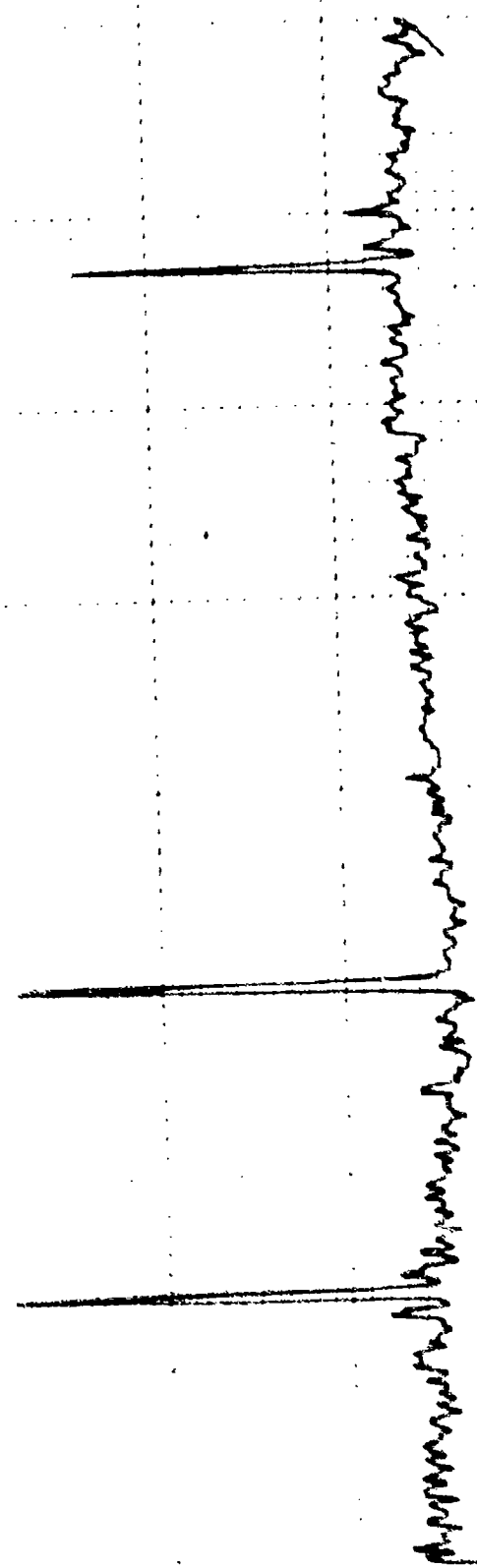
DATE OF ANALYSIS:

DATE/TIME: 2-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

CONTROL: 1501 - 40 (208)
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAVE
CENTER FREQ: 150 HZ
1 ELEMENT

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

140HZ



SECRET

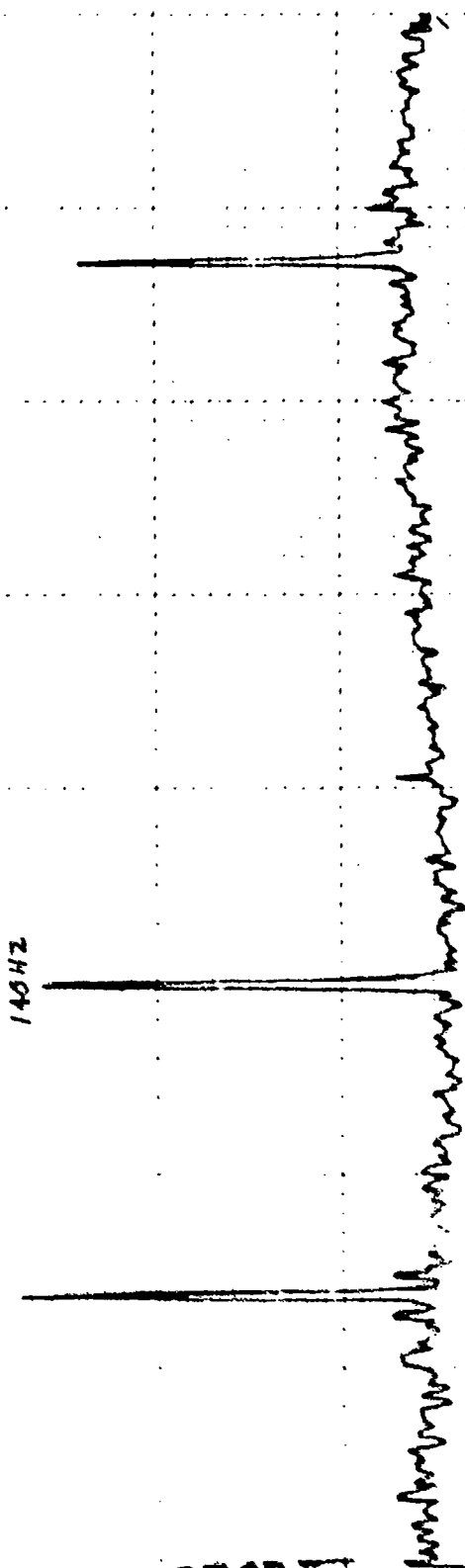
SECRET

46 6763

PEEL: NY INDEX 3340
INTEGRATION TIME 320 SECS ATTEM: DB
FILTER WIG HANNING

DATE OF ANALYSIS:
DATE/TIME: 275-72-1501 Z
ANALYSIS BANDWIDTH: 10HZ
DEC AZ STEERING

CONTROL: 375-1501 (72)
OMNI SPECTRUM/ELEMENT 12
EXERCISE: BEARING STAFF
CENTER FREQ: 150 HZ
1 ELEMENT



SECRET

46 0703

INDEX 3340

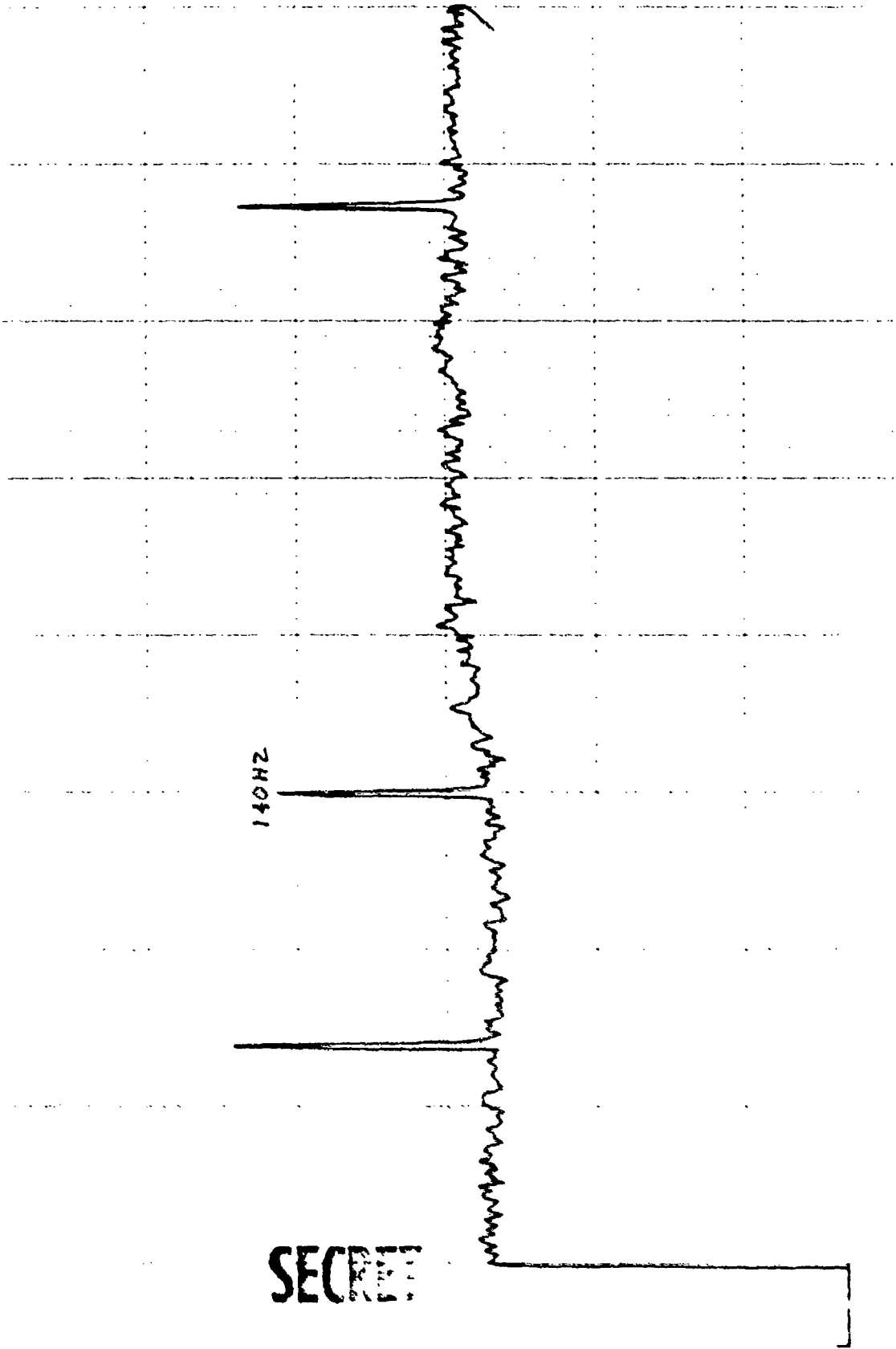
REEL: M4

DATE OF ANALYSIS:

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

DATE/TIME: 3-5-77 - 1501 Z
ANALYSIS: BANDWIDTH: 1/10HZ
DEG AZ STEERING

CONTROL: 3-15 - 1501 (J4)
OMNI SPECTRUM (ELEMENT 16)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT



SECRET

SECRET

40 9793

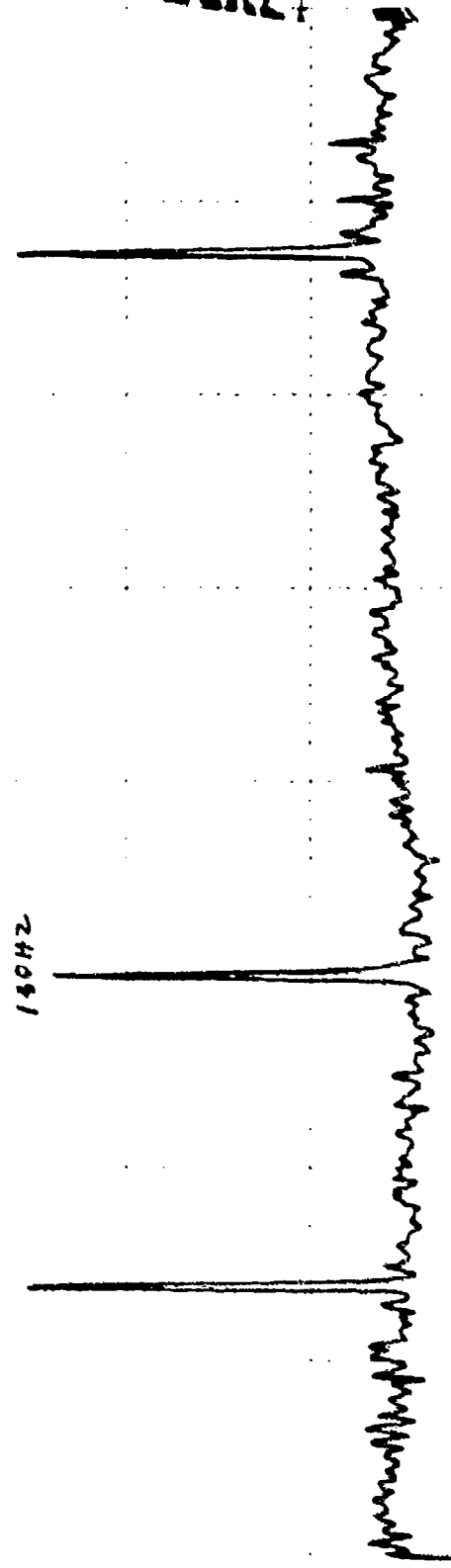
CONTROL: 3-15 -1501 (35)
OMNI SPECTRUM(ELEMENT 19)
EXERCISE: BEARING STAFF
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 7-5-72 -1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

PEEL: NY INDEX 3340

INTEGRATION TIME 320 SECS ATTN: DB
FILTYP WTG: HANNING



SECRET

SECRET

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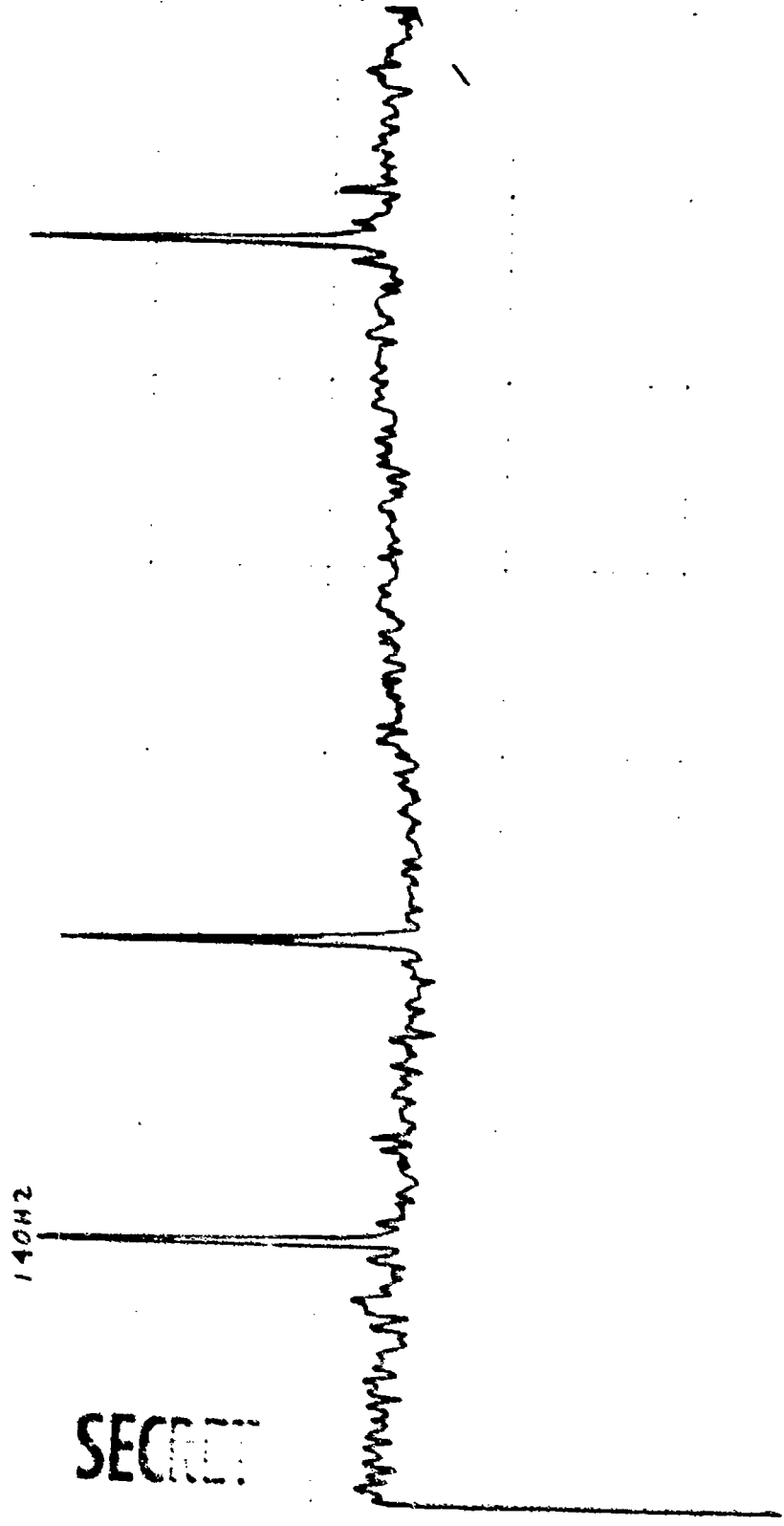
CONTROL: 375-1501 (26)
 GMMI SPECTRUM(ELEMENT 20.)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150.000 MHz
 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 1501 Z
 ANALYSIS BANDWIDTH: 1/100HZ
 DEG AZ: SLEEPING

PEEL: 1/4 INDEX 334C

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

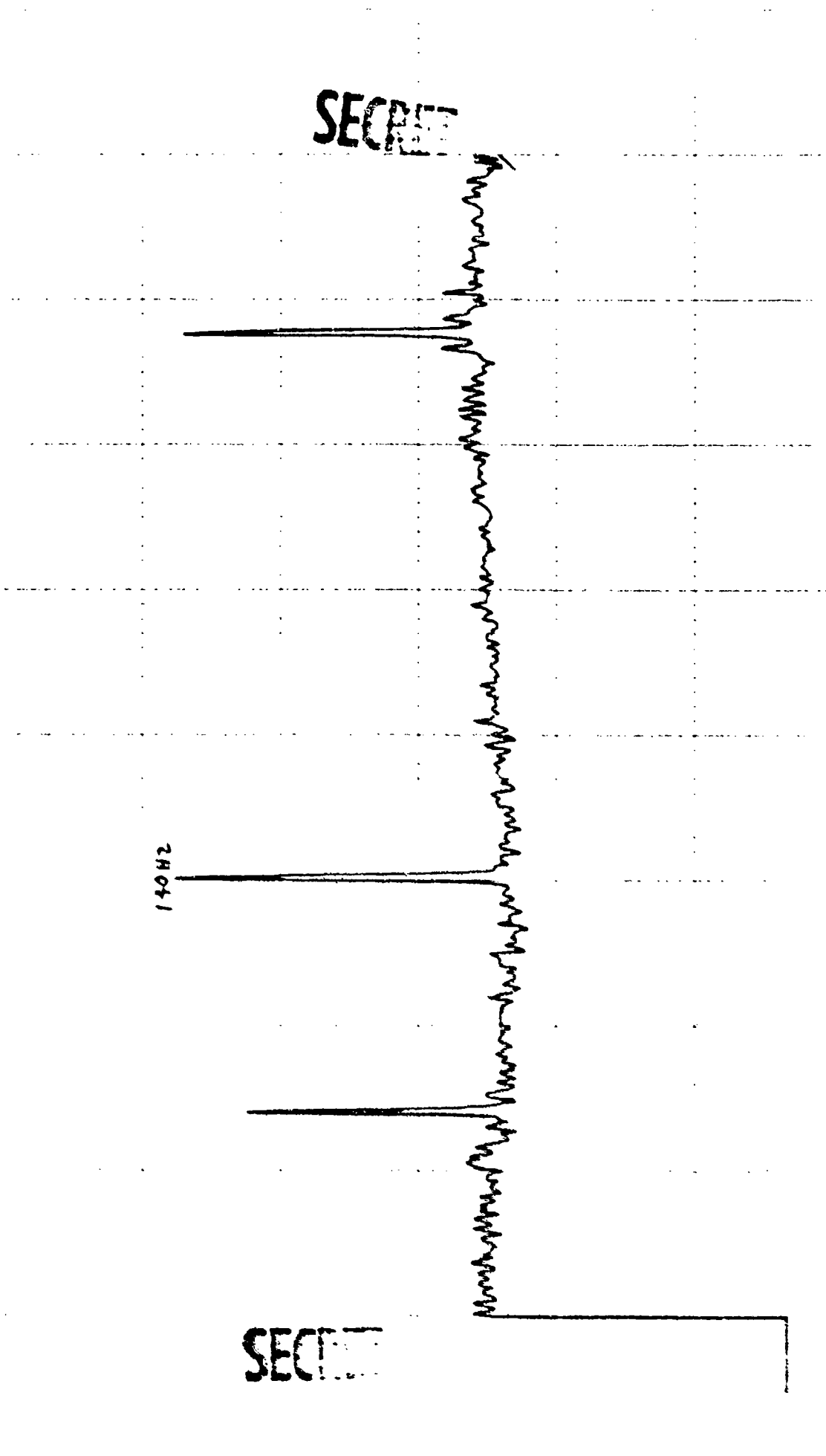


46, 0/03

CONTROL: 3-15 - 1501 (78)
 OMNI SPECTRUM (ELEMENT 24)
 EXERCISE: BEARING STAB
 CENTER FREQ: 1500 HZ
 1 ELEMENT

DATE OF ANALYSIS:
 DATE/TIME: 3-15-77 - 1501 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 DEC AZ STEERING

REEL: 44 INDEX 3346
 INTEGRATION TIME 320 SECS ATTN: - DB
 FILTER WTC: HANNING



SECRET

SECRET

46 0703

46 0703

INDEX 3340

REEL: M4

DATE OF ANALYSIS:

CONTROL: 3-15 - 1501 (39)

OMNI SPECTRUM (ELEMENT 26)

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

1 ELEMENT

DATE/TIME: 3-15-77 - 1501 Z

ANALYSIS BANDWIDTH: 1/10 HZ

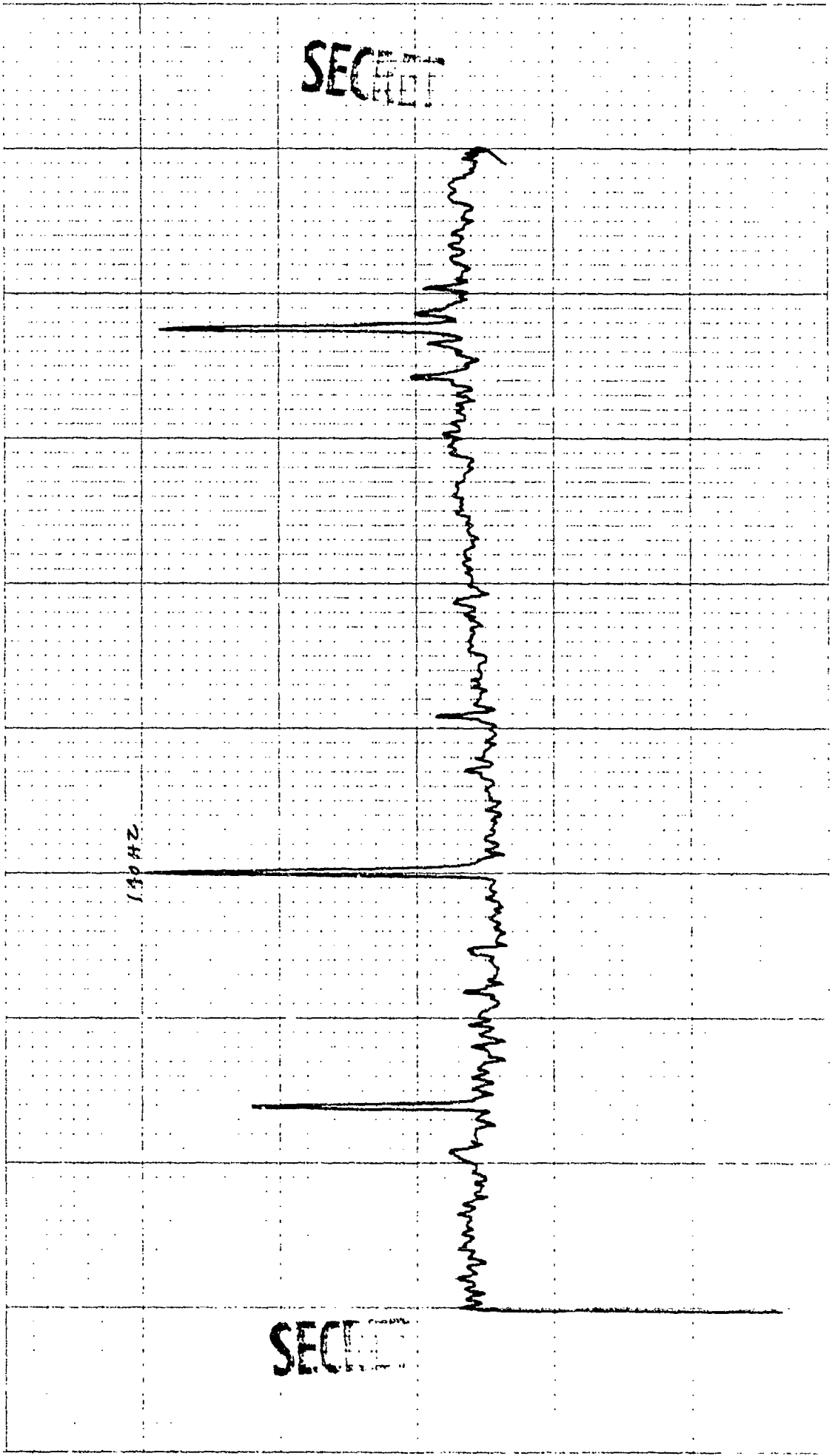
1 DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

ATTEN: DB

WTG: HANNING



SECRET

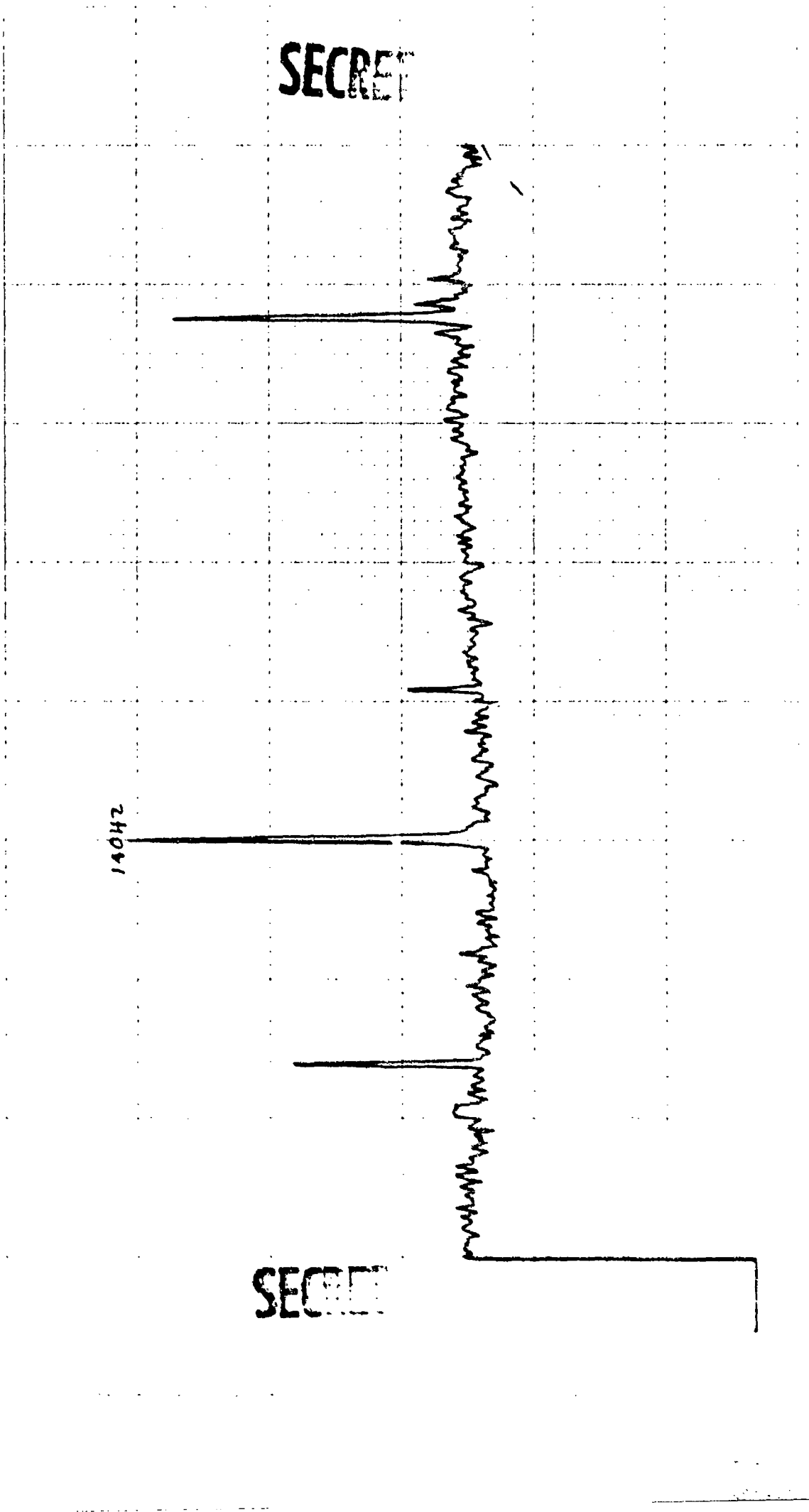
SECRET

46 0703

CONTROL: 3-5 - 1501 (40) DATE OF ANALYSIS: REEL: MY INDEX 3340
 OMNI SPECTRUM (ELEMENT 29)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 1 ELEMENT

DATE OF ANALYSIS:
 DATE/TIME: 3-15-77 - 1501 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

INTEGRATION TIME 320 SECS ATTEN: DB
 FILTER WTG: HANNING



SECRET

SECRET

46 0763

CONTROL: 345 - 1501 (41)
OMNI SPECTRUM/ELEMENT 31
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

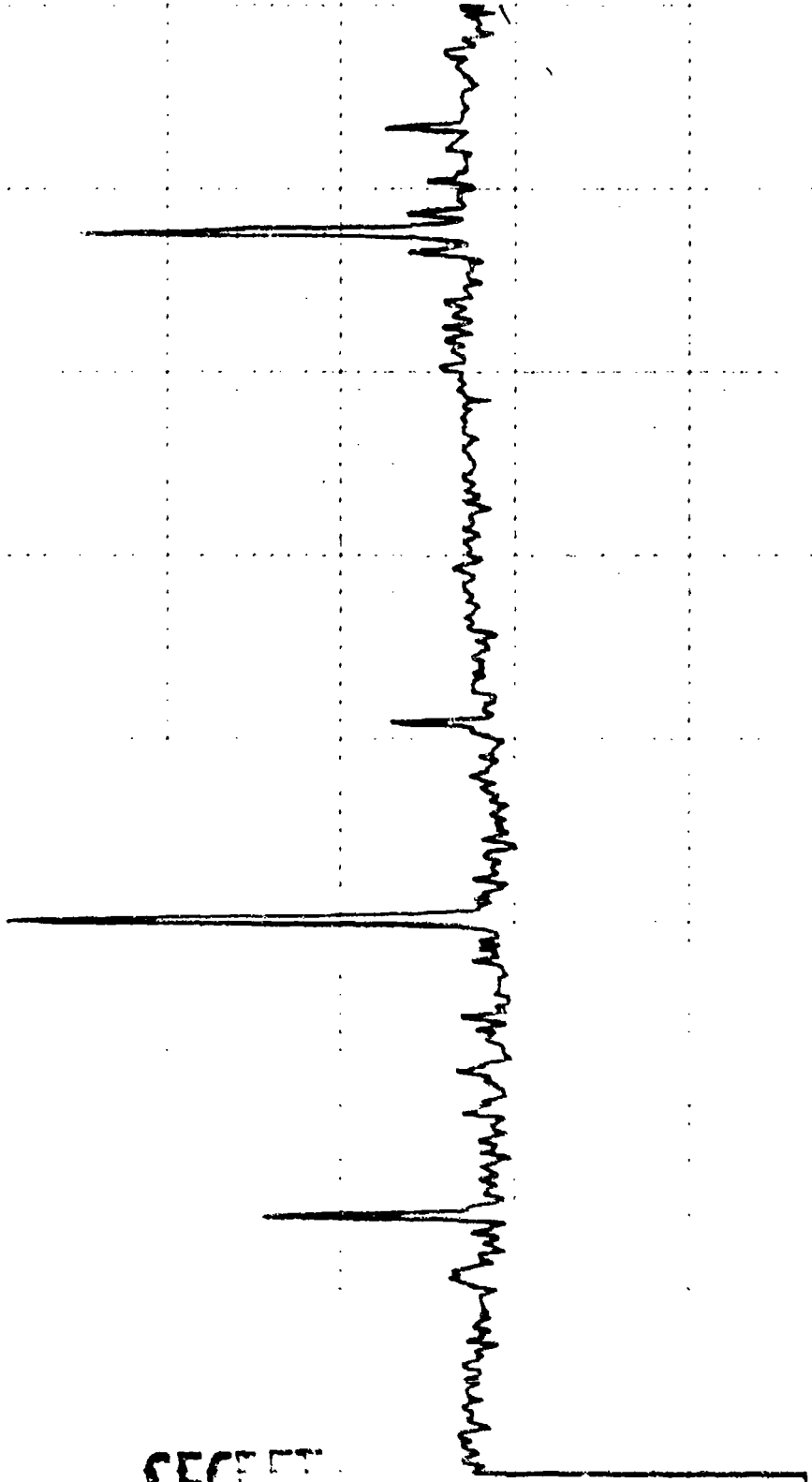
DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1710HZ
— DEG AZ STEERING

REEL: 144 INDEX 3340

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

140 HZ



SECRET

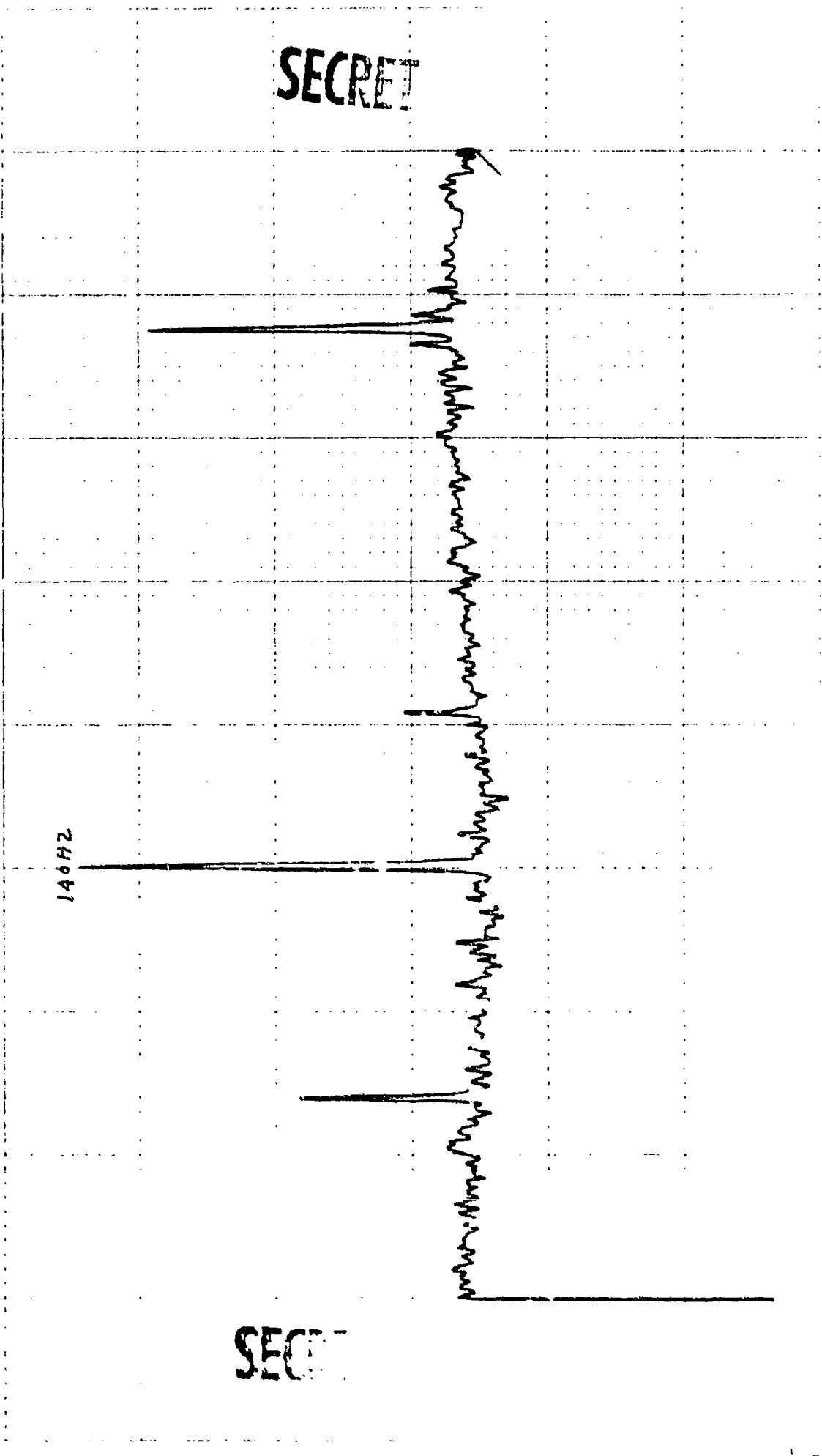
SECRET

46 0703

CONTROL: 3-15 -1501 (42)
 OMNI SPECTRUM (ELEMENT 33)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 1 ELEMENT

DATE OF ANALYSIS:
 DATE/TIME: 3-15-77 - 1501 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 — DEG AZ STEERING

REEL: MY INDEX 3340
 INTEGRATION TIME 320 SECS ATTEN: DB
 FILTER: WTG: HANNING



SECRET

SECRET

46 0703

INDEX 3346

REEL: M4

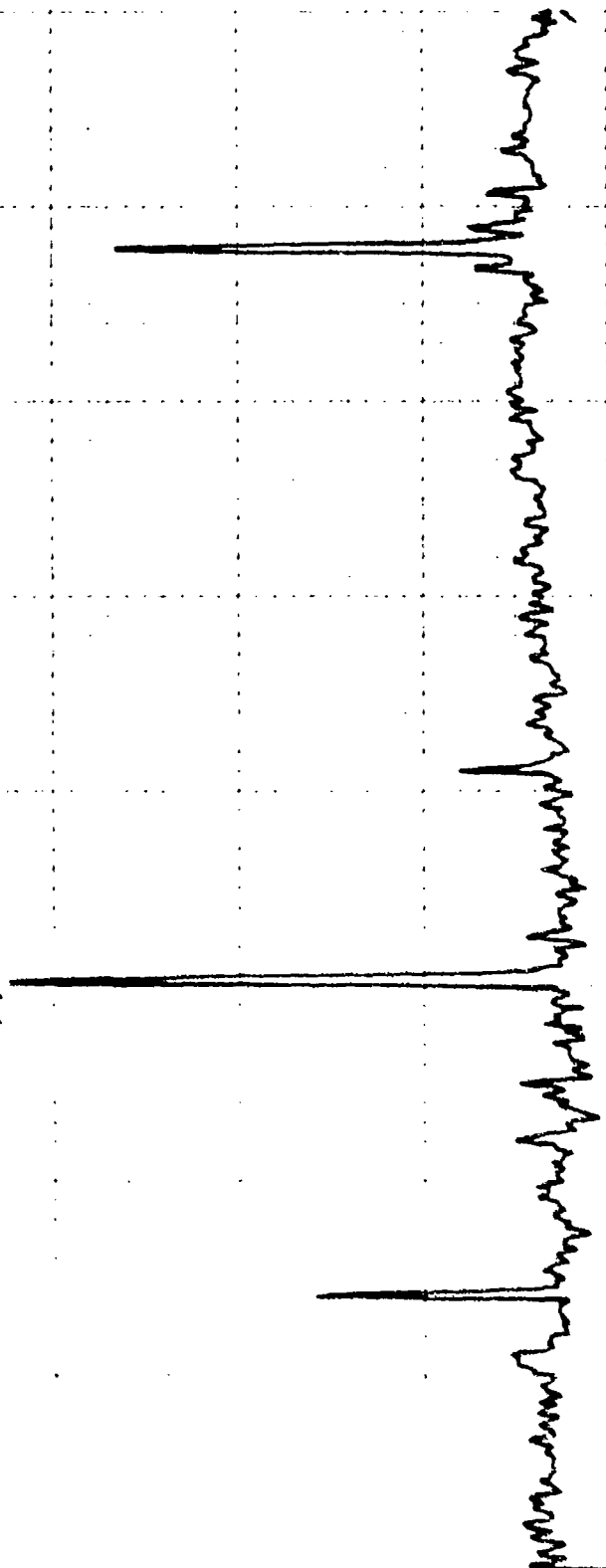
DATE OF ANALYSIS:

CONTROL: 3-15 - 1501 (43)
OMNI SPECTRUM (ELEMENT 35)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEC AZ STEERING

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING

140 HZ



SECRET

SECRET

46 0703

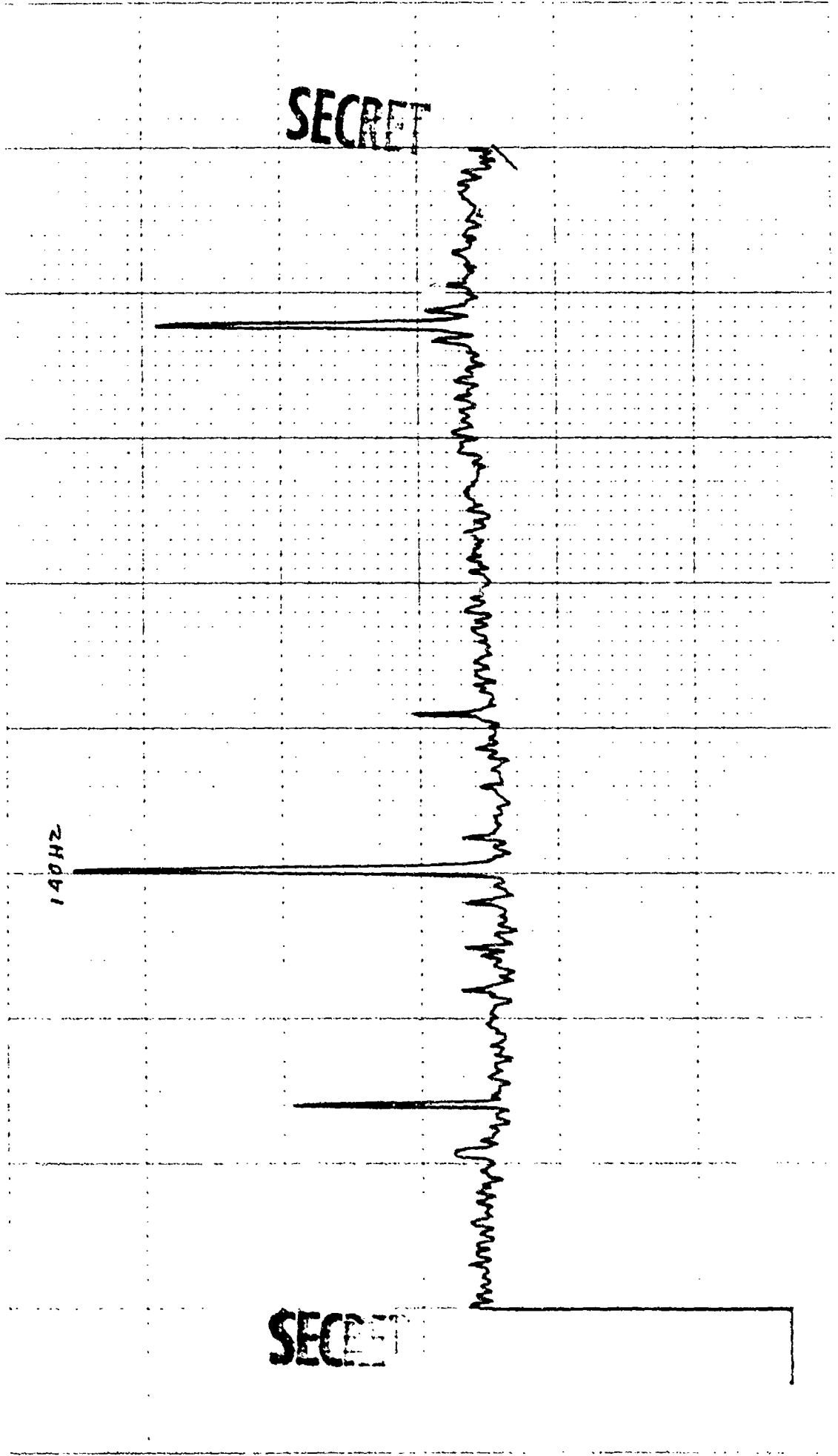
CONTROL: 3-15 - 1501 (44)
OMNI SPECTRUM (ELEMENT 37)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEC AZ STEERING

REEL: M4 INDEX 3340

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



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CONTROL: 3-15 - 1501 (45)
OMNI SPECTRUM/ELEMENT 38)
EXERCISE: BEARING STAKE
CENTER FRE. 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

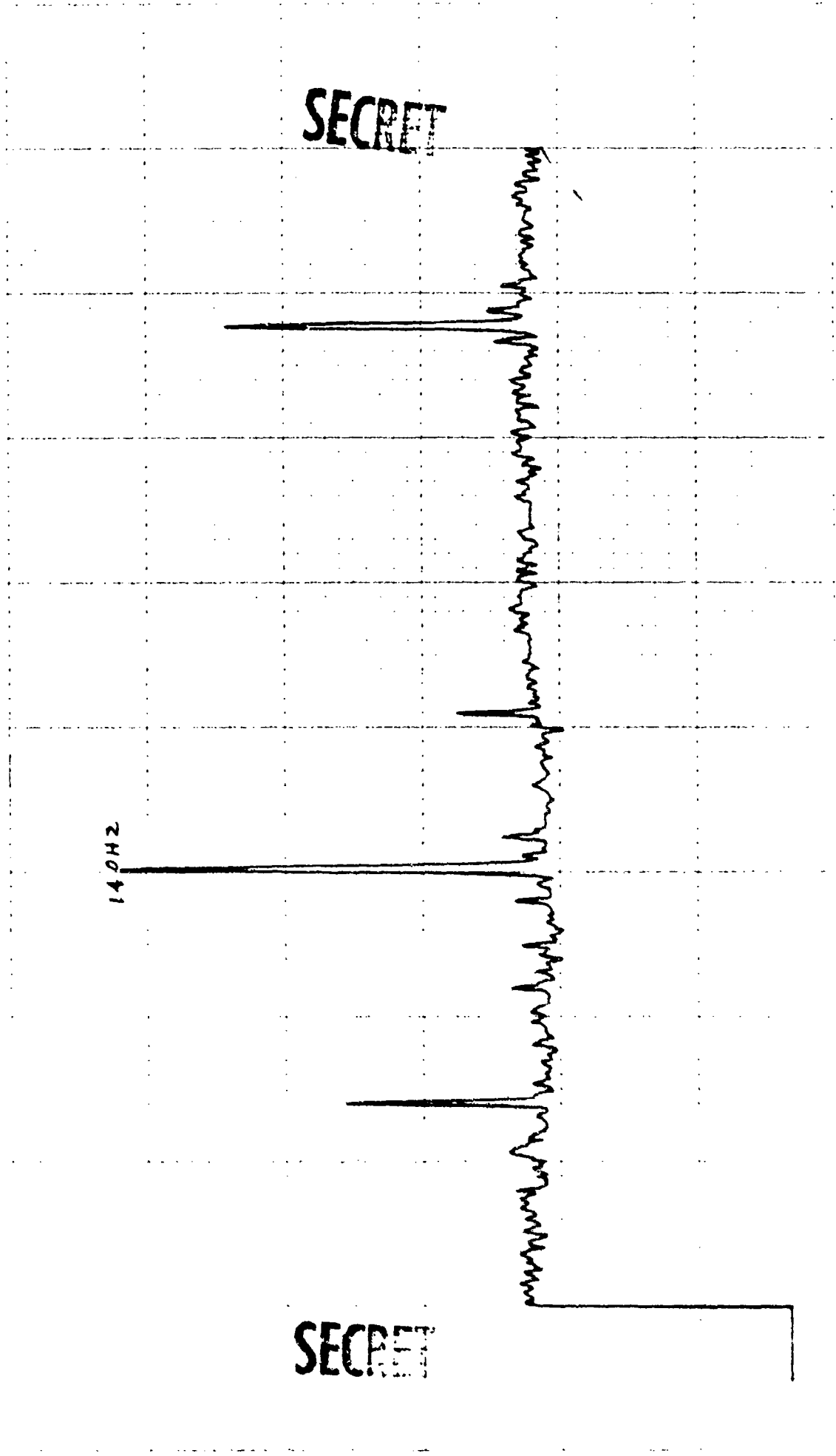
REEL: 44 INDEX 3340

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING

140HZ

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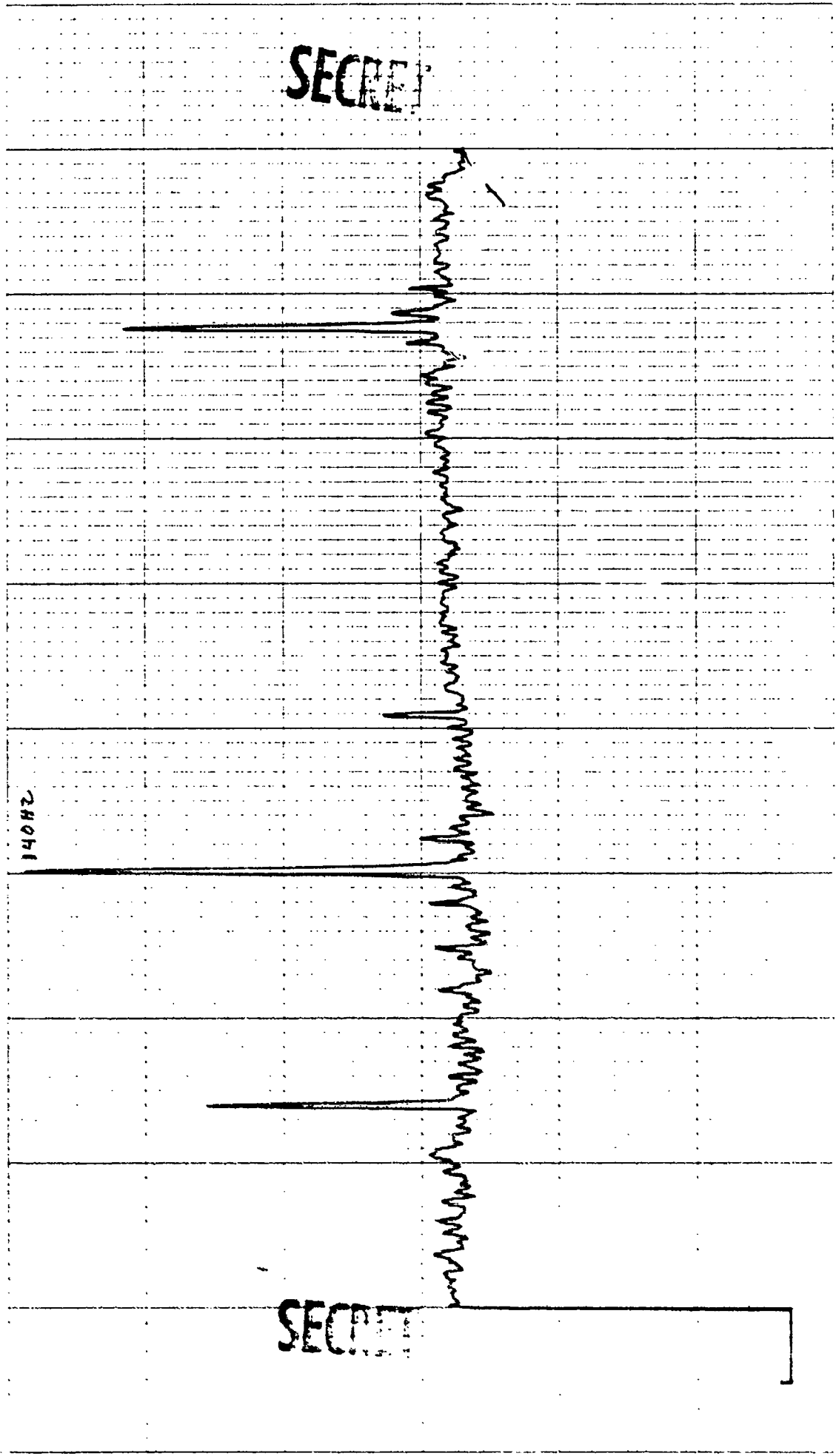
CONTROL: 3-15 - 1501 (46) DATE OF ANALYSIS: REEL: 114 INDEX 3340

OMNI SPECTRUM (ELEMENT 41) DATE/TIME: 3-15-77 - 1501 Z

EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: DB

CENTER FREQ: 150 HZ _____ DEG AZ STEERING FILTER WTG: HANNING

1 ELEMENT



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REF: 46 0703 0703 0703 0703

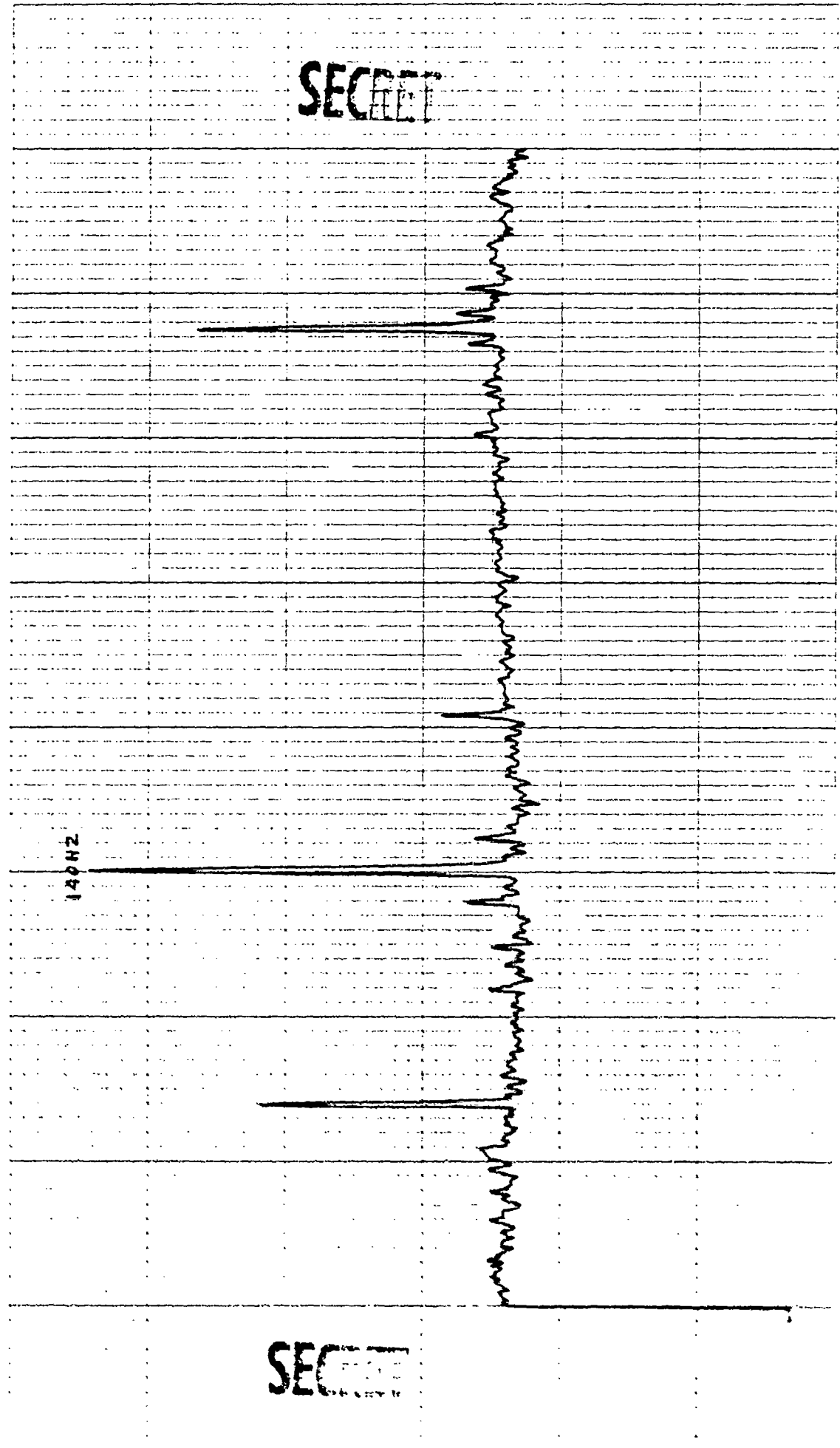
CONTROL: 3-15 - 1501 (47)
OMNI SPECTRUM (ELEMENT 43)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ STEERING

REEL: MY INDEX 3390

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



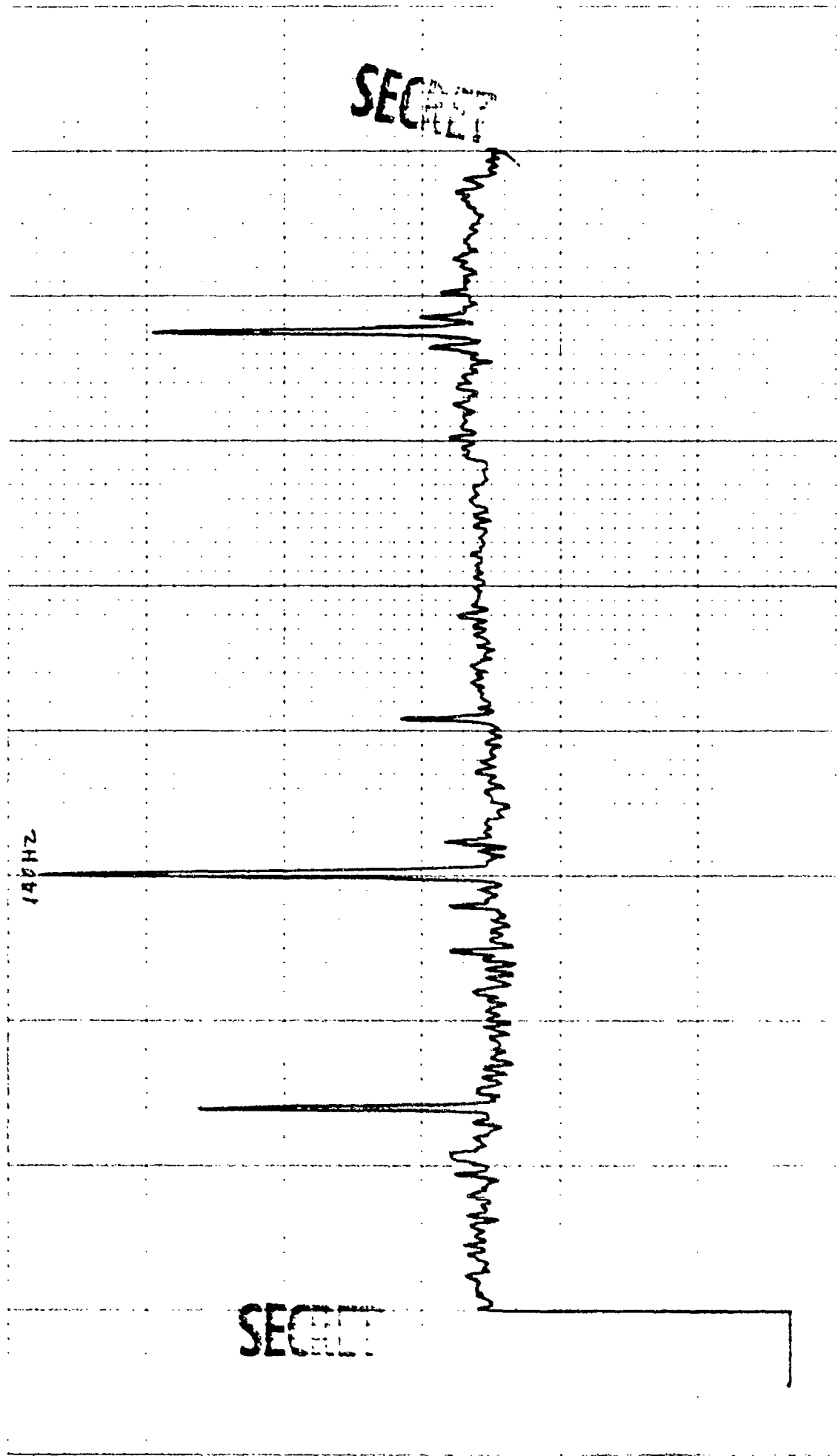
46 0703

CONTROL: 3-15 - 1501 (48)
 OMNI SPECTRUM (ELEMENT 45)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 MHz
 1 ELEMENT

DATE OF ANALYSIS:
 DATE/TIME: 3-15-77 - 1501 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 DEG AZ STEERING

REEL: M4
 INDEX 3380

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



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REEL: M4 INDEX 3390

DATE OF ANALYSIS

DATE/TIME: 3-5-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEC AZ STEERING

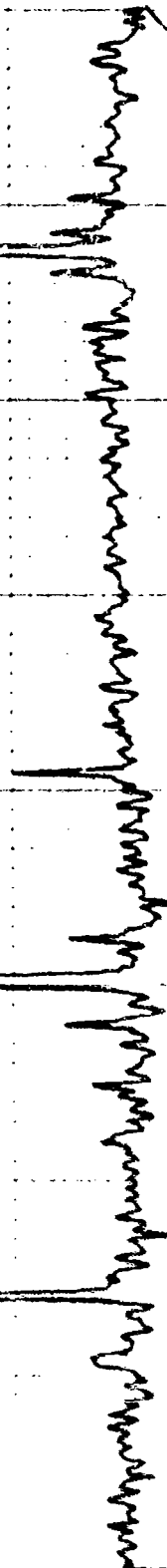
CONTROL: 3-15 - 1501 (49)
OMNI SPECTRUM (ELEMENT 47)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

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

140 HZ

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CONTROL: 3-15 - 1501 (50)
OMNI SPECTRUM (ELEMENT 49)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC. AZ STEERING

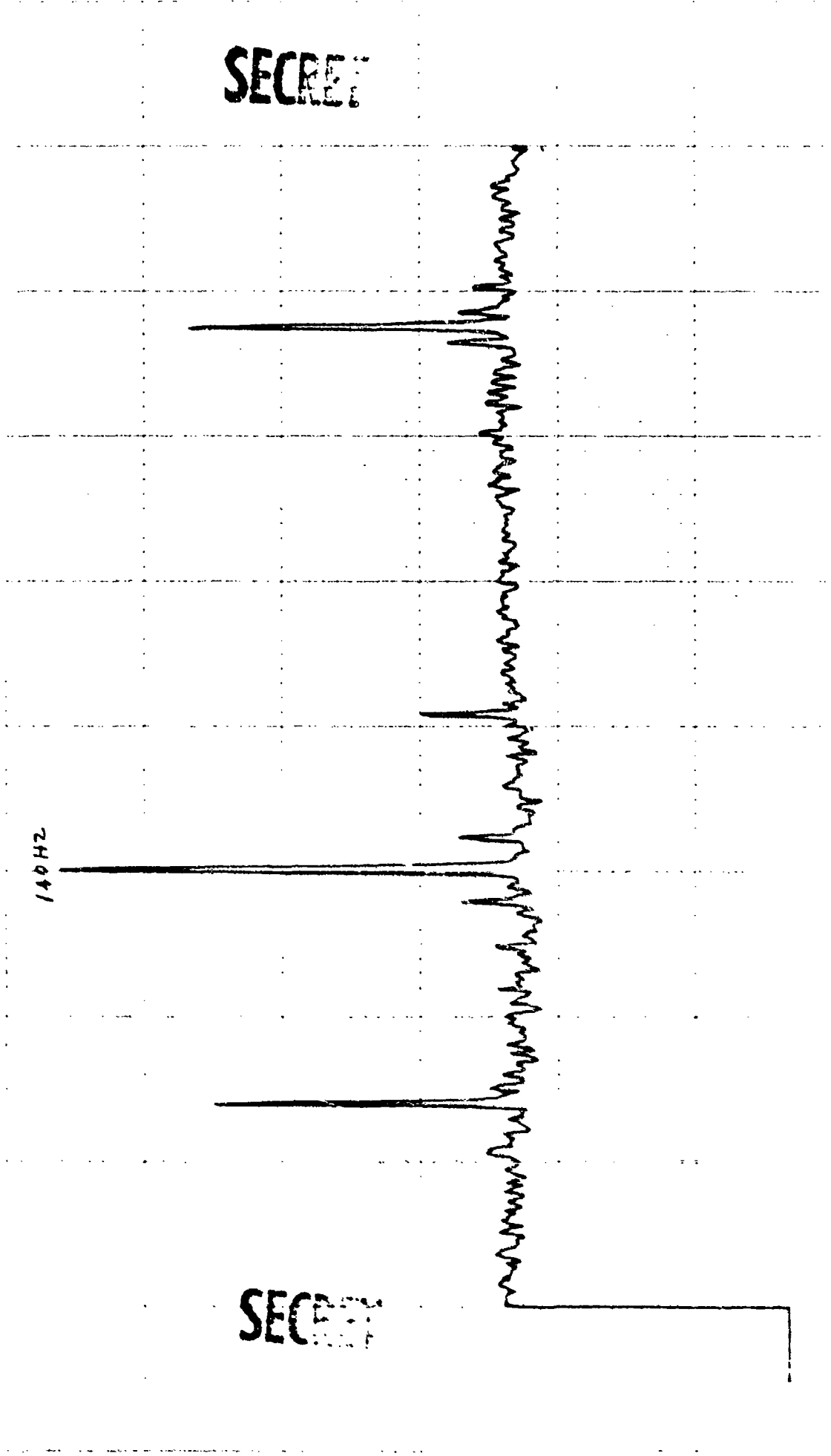
REEL: 44 INDEX 3240

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING

140 HZ

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REEL: 44 INDEX 3340

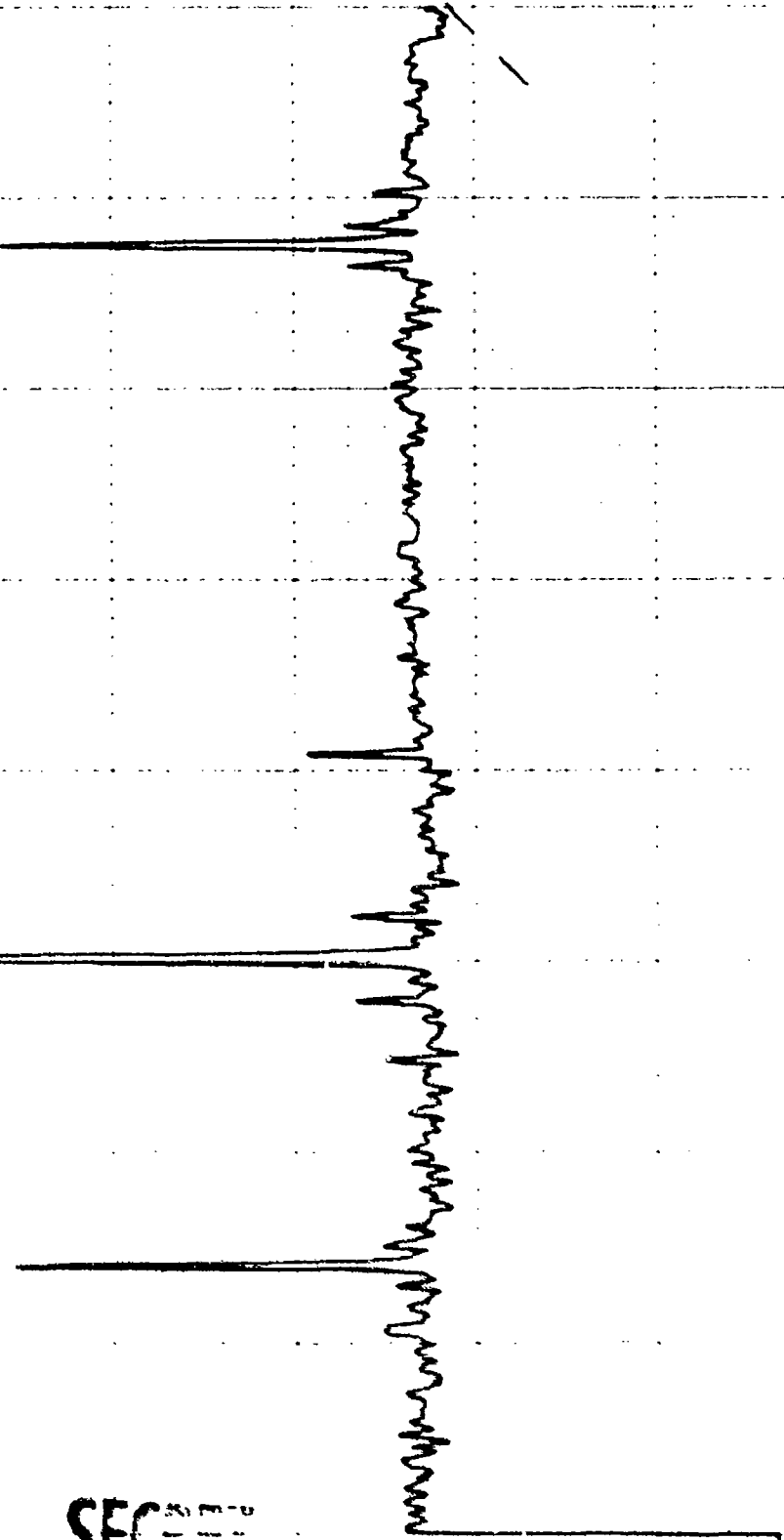
DATE OF ANALYSIS:

CONTROL: 3-15 - 1501 (S1)
OMNI SPECTRUM(ELEMENT 51)
EXERCISE: BEARING STAVE
CENTER FREQ: 150 HZ
ELEMENT

DATE/TIME: 3-15-72 - 1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ STEERING

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING

140 HZ



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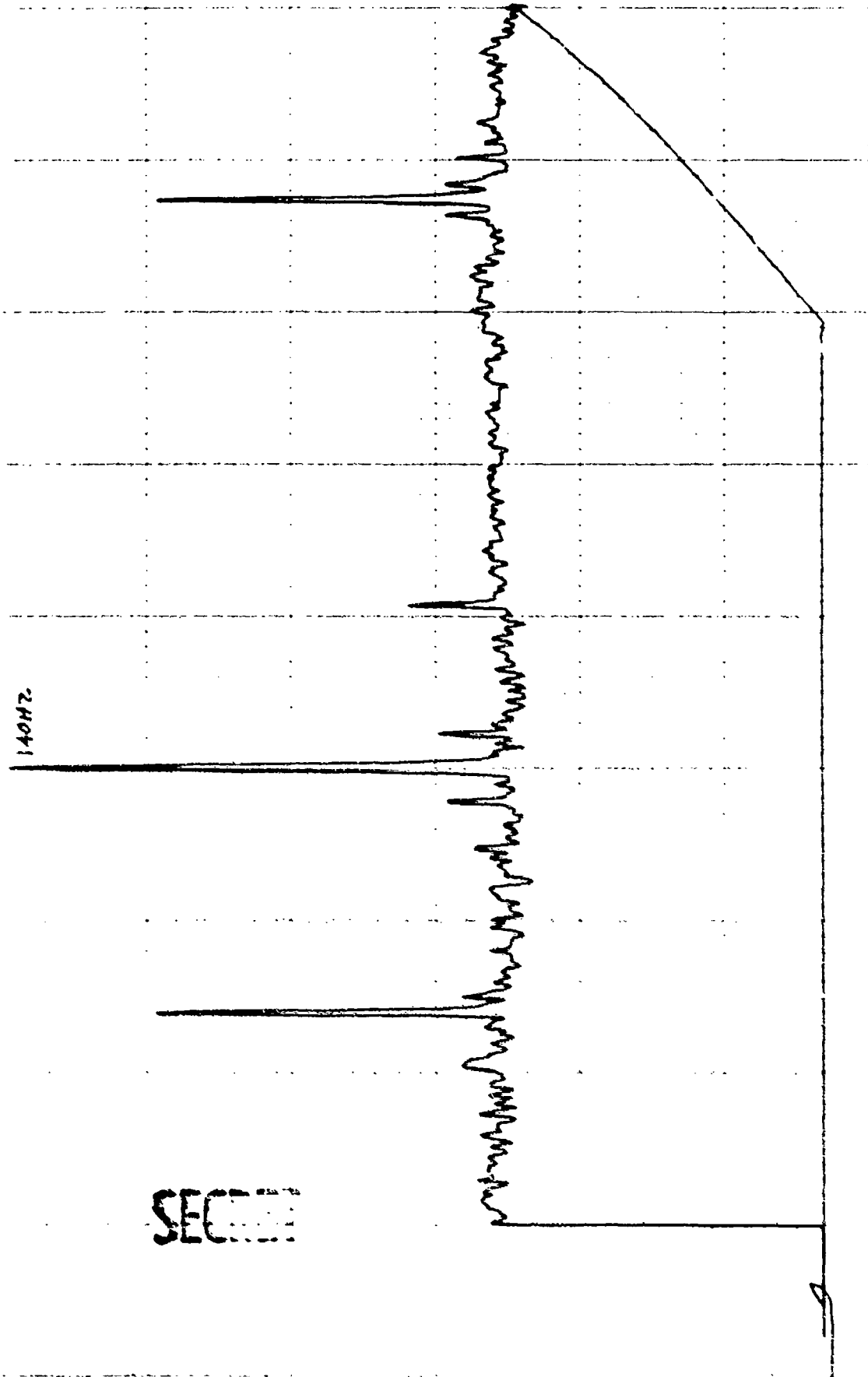
CONTROL: 3-15 - 1501 (52)
OMNI SPECTRUM (ELEMENT 53)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEG AZ STEERING

REEL: M4 INDEX 334

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



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

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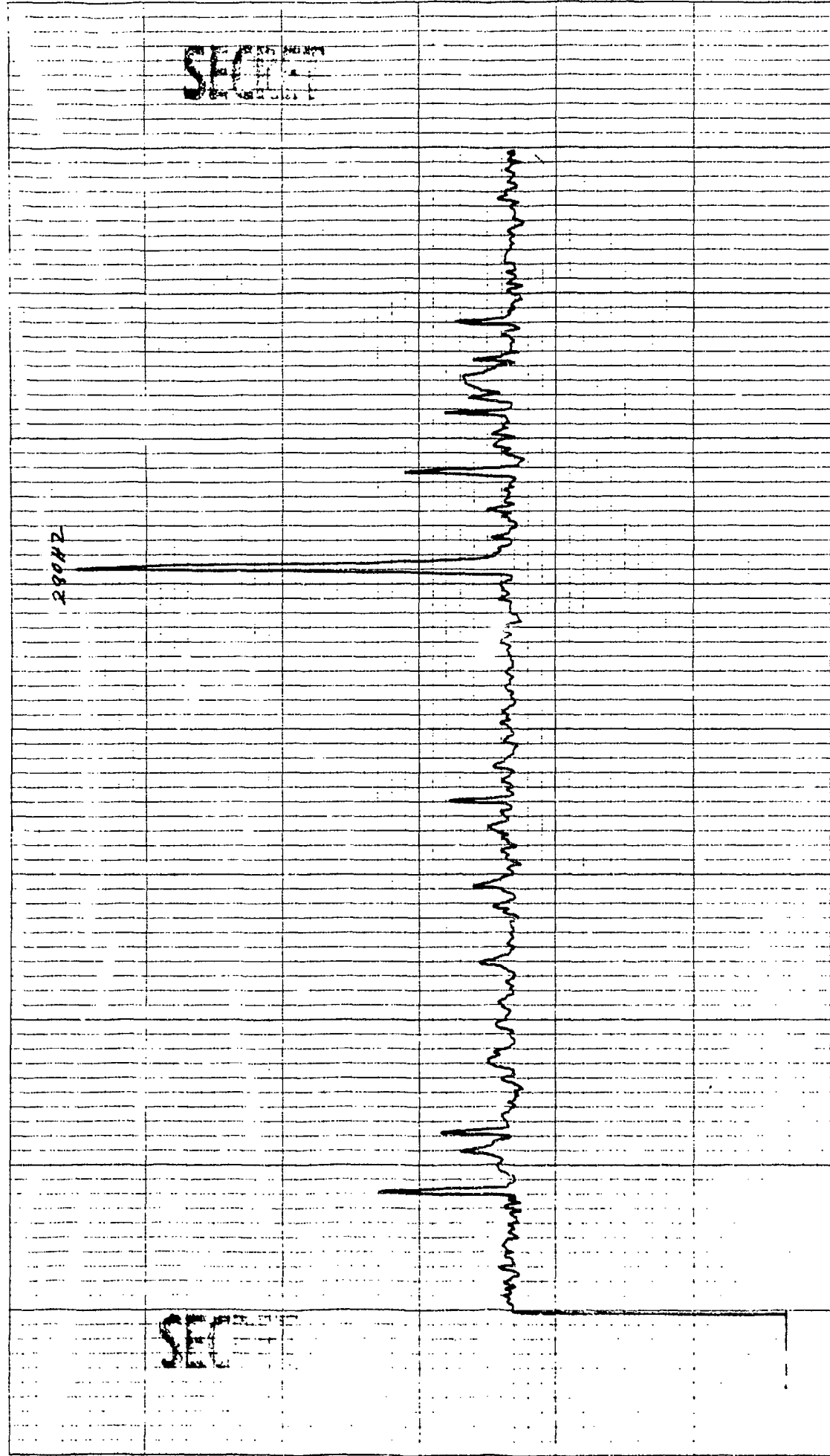
CONTROL: 3-15-1501 (1)
OMNI SPECTRUM (ELEMENT 2)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
1 DEG AZ STEERING

REEL: 114 INDEX 3340

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

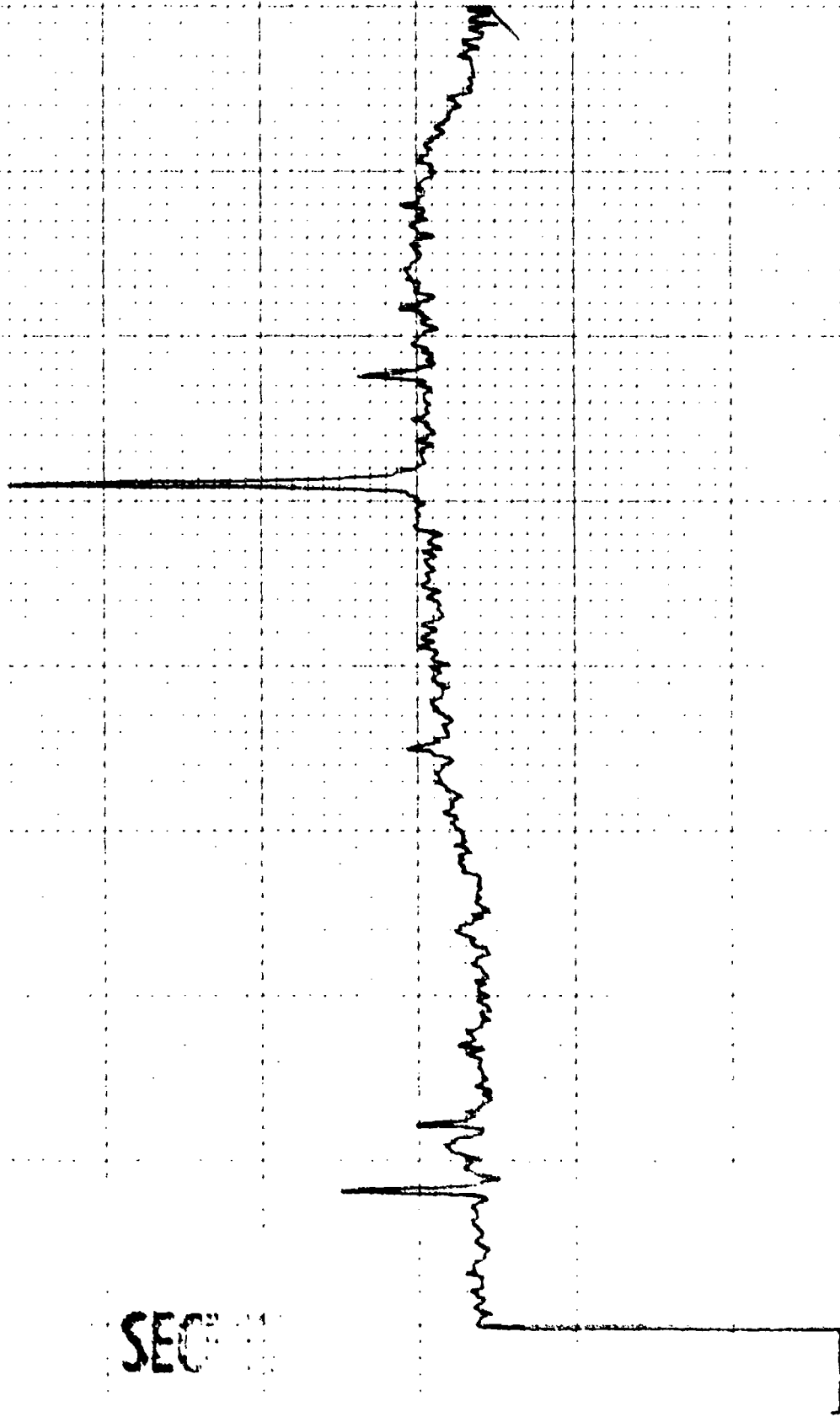


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MoZ 116 2055207 1111

CONTROL: 375-1501 (2) DATE OF ANALYSIS: REEL: MY INDEX 3740
 OMNI SPECTRUM (ELEMENT 4)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 HZ INTEGRATION TIME 320 SECS ATTEN: - DB
 1 ELEMENT - DEG AZ STEERING FILTER WIG: HANNING

210 HZ



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REEL: M4 INDEX 3340

DATE OF ANALYSIS:

CONTROL: 3-15-1501 (3)

OMNI SPECTRUM (ELEMENT 6)

EXERCISE: BEARING STAKE

CENTER FREQ: 280 HZ

1 ELEMENT

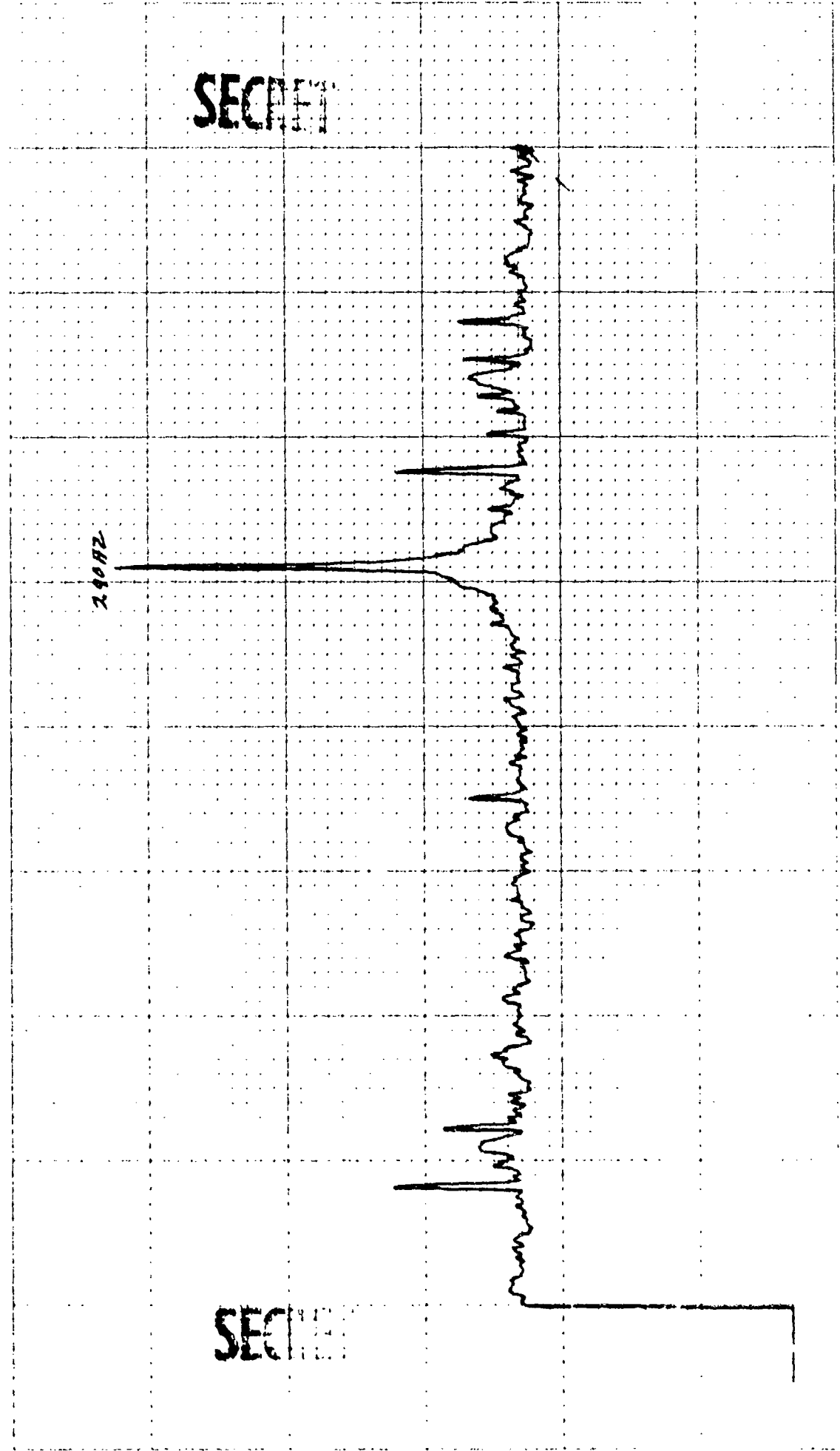
DATE/TIME: 3-15-77 - 1501 Z

ANALYSIS BANDWIDTH: 1/10 HZ

— DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER WIG: HANNING



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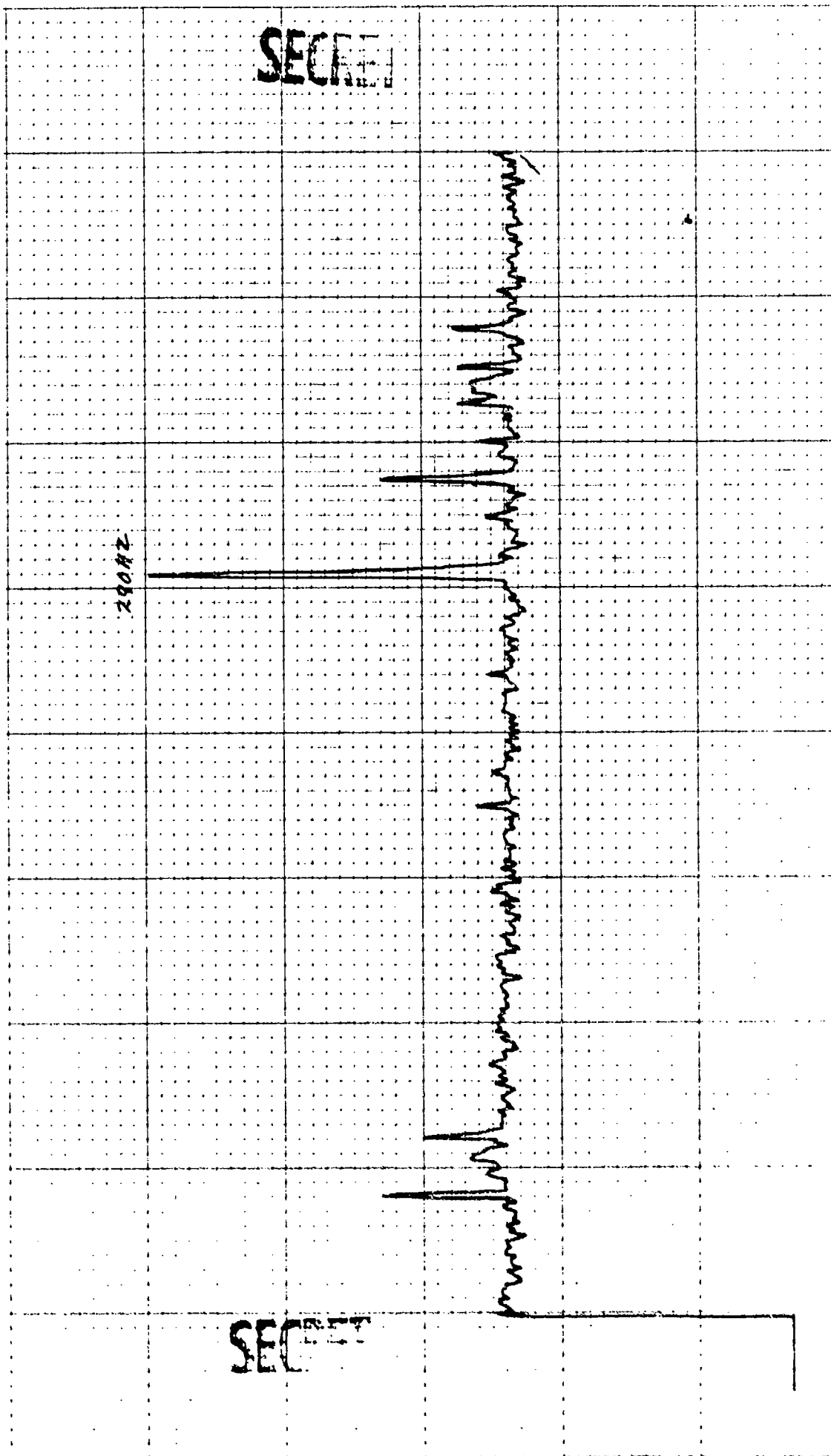
REEL: 14 INDEX 3390

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
 DEG AZ STEERING

CONTROL: 3-15 - 1501 (4)
OMNI SPECTRUM (ELEMENT 9)
EXERCISE: BEARING STAKE
CENTER FREQ: 230 HZ
1 ELEMENT

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WIG: HANNING



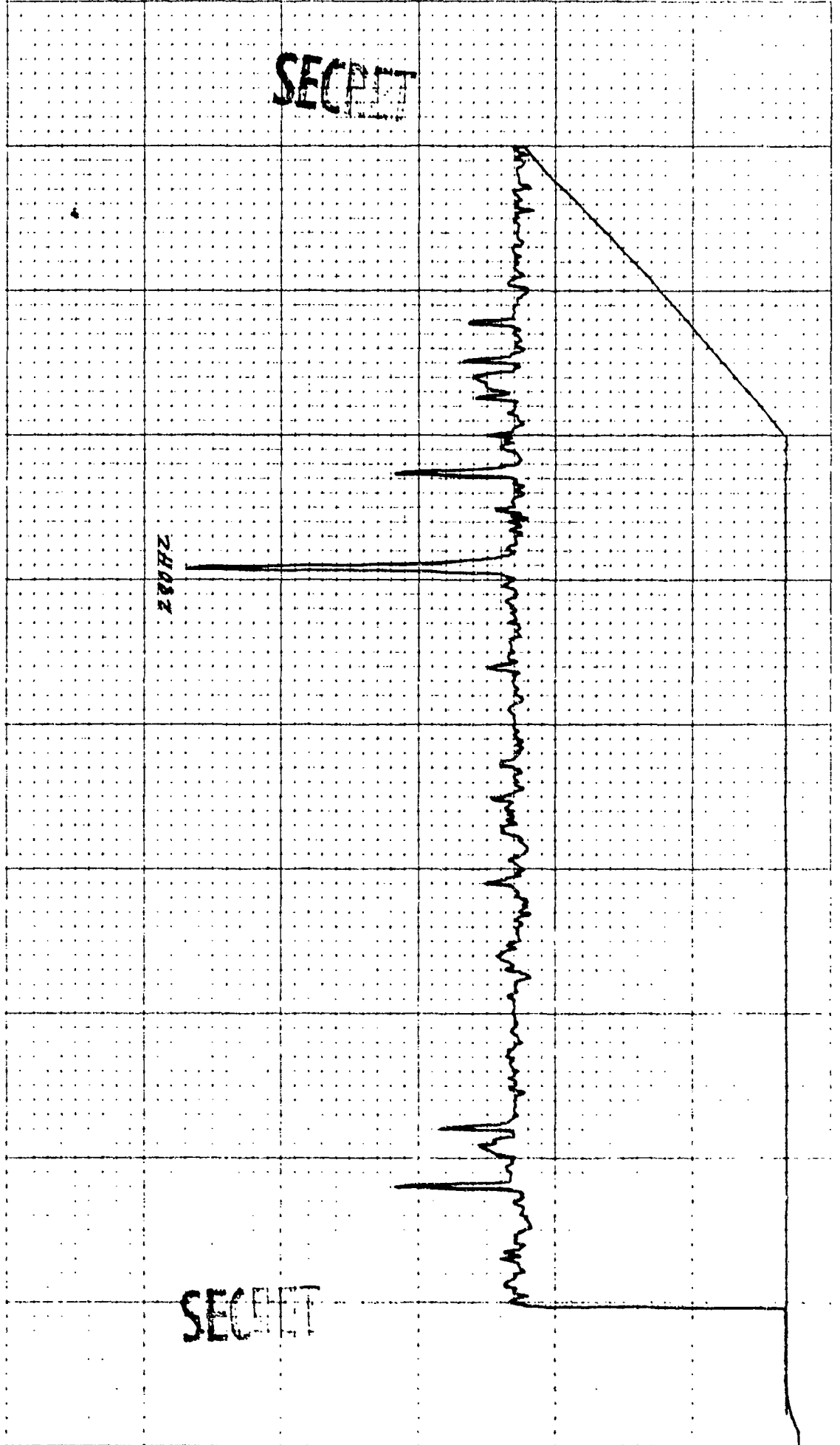
46 0703

REF ID: A66000

CONTROL: 3-15-1501 (5) DATE OF ANALYSIS: REEL: M4 INDEX 3340
 OMNI SPECTRUM (ELEMENT 10)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 HZ
 1 ELEMENT

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

DATE/TIME: 3-15-77 - 1501 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
- DEG AZ STEERING



REF: 1416 TO THE INCH: 1/4" (100)

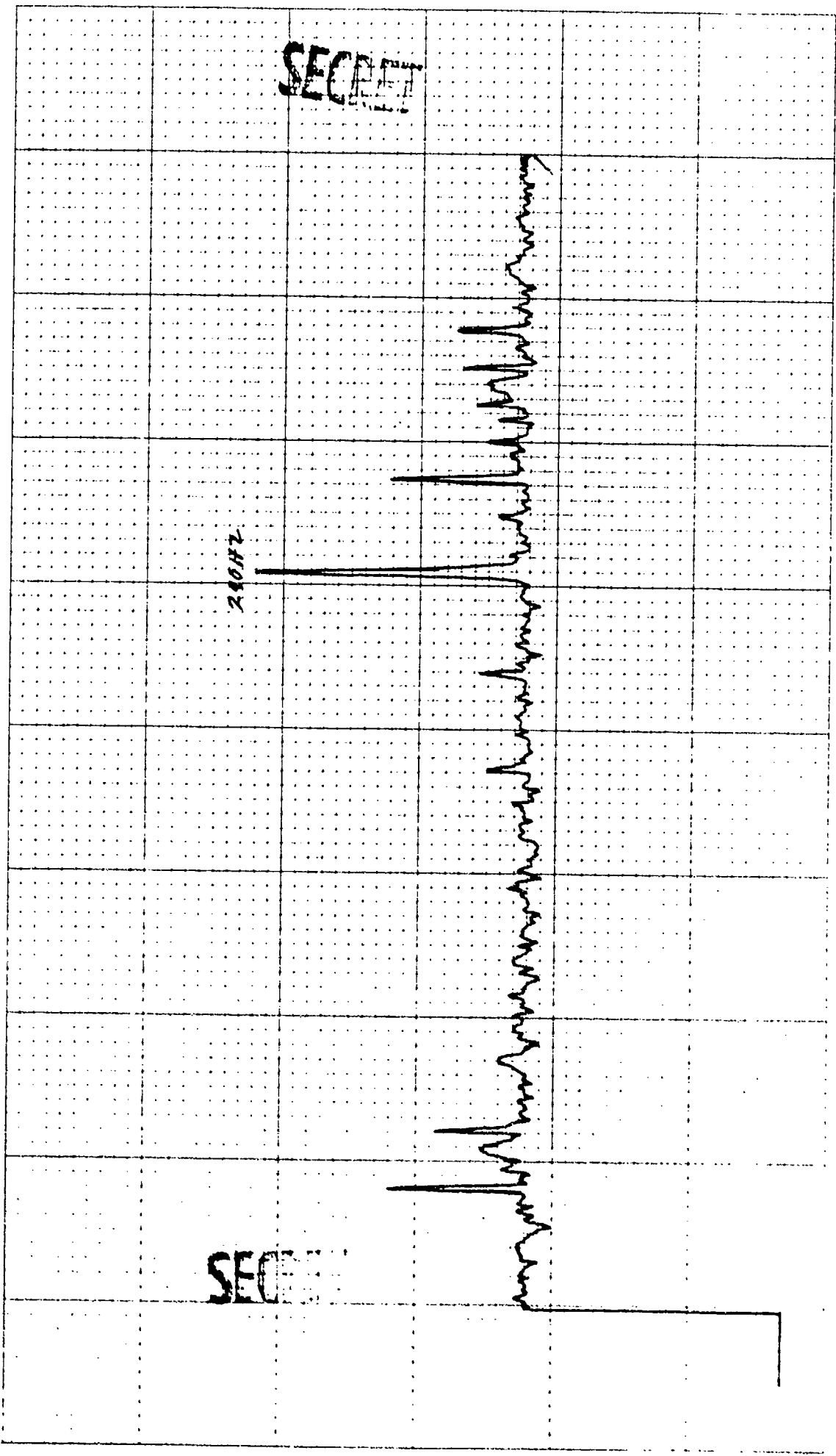
46 0703

CONTROL: 3-15 - 1501 (6)
 OMNI SPECTRUM (ELEMENT 12)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
 I ELEMENT

DATE OF ANALYSIS:
 DATE/TIME: 3-15-77 - 1501 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 _____ DEG AZ STEERING

REEL: NY INDEX: 3340

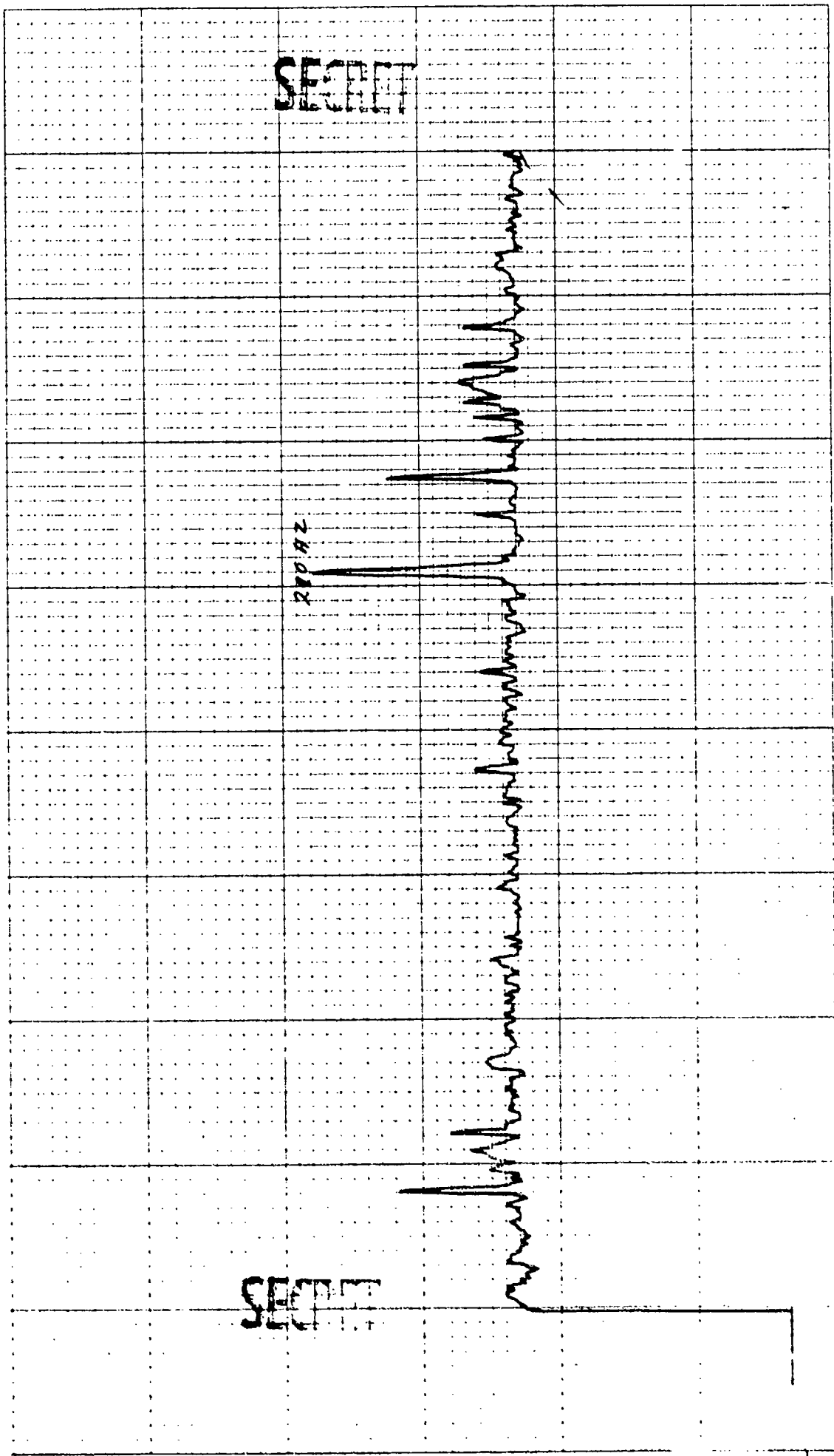
INTEGRATION TIME 320 SECS ATTEN: - DB
 FILTER WTG: HANNING



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CONTROL: 7-15 -1501 (7) DATE OF ANALYSIS: REEL: M4 INDEX 3340
 OMNI SPECTRUM(ELEMENT 14)
 EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 -1501 Z
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: - DB
 1 ELEMENT DEG AZ STEERING FILTER WTG: HANNING



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REF ID: A66082

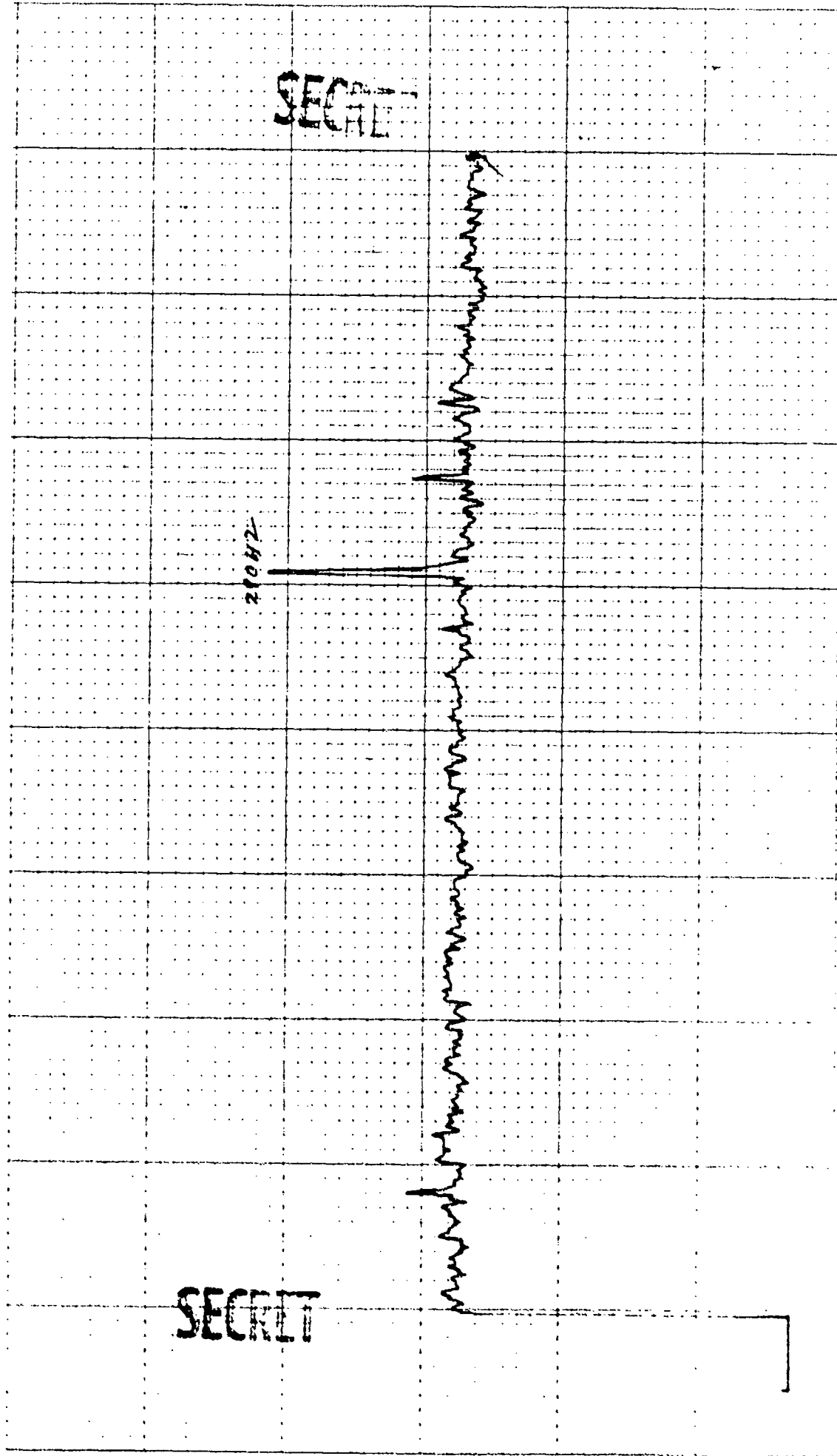
CONTROL: 375-1501 (8)
OMNI SPECTRUM (ELEMENT 16)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: 144 INDEX: 3340

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

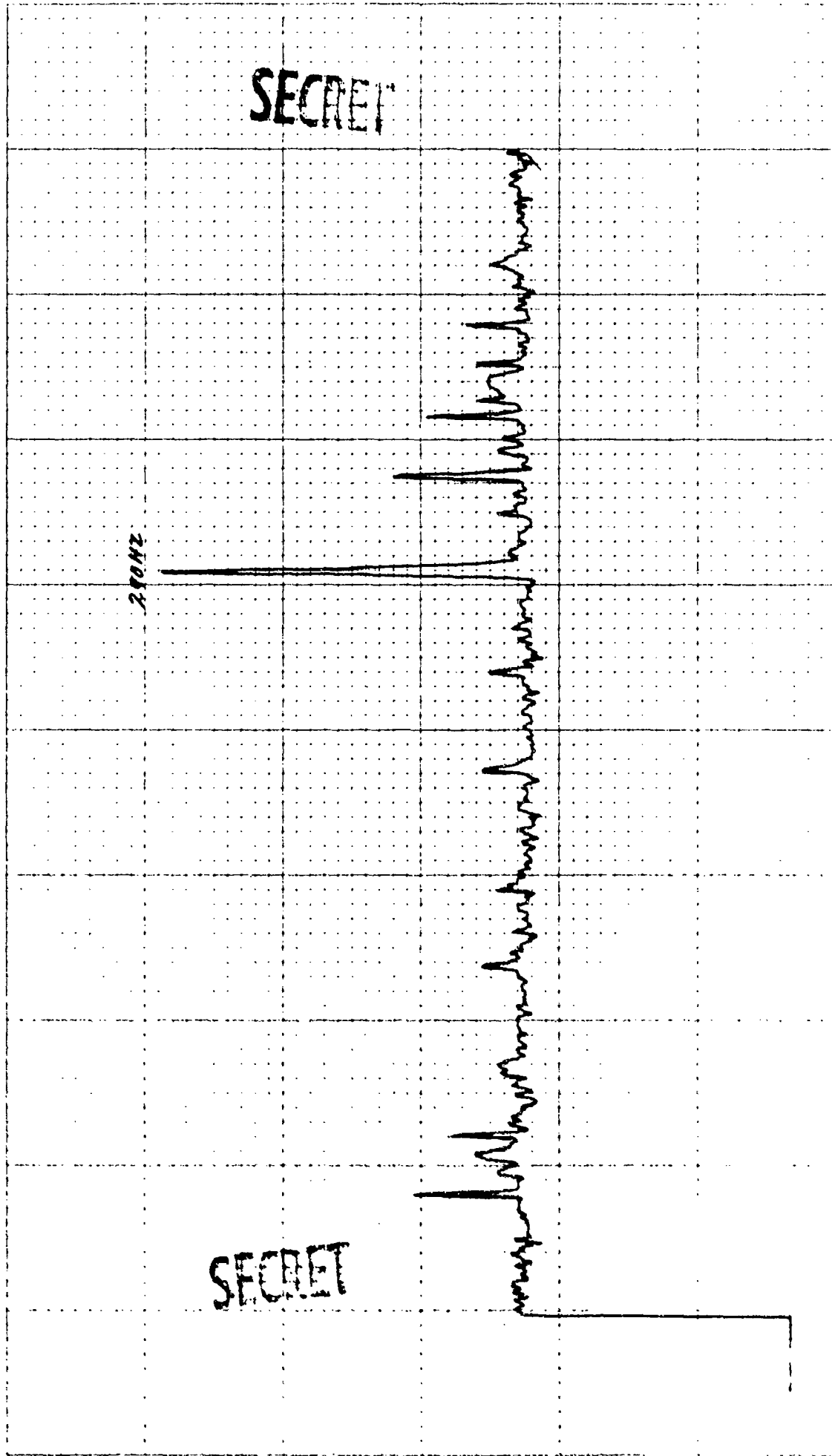


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FILE NAME: 3-15-1501 (9)

CONTROL: 3-15-1501 (9) DATE OF ANALYSIS: REEL: 144 INDEX 3340
 OMNI SPECTRUM (ELEMENT 19)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 17 JOHZ INTEGRATION TIME 320 SECS ATTN: — DB
 1 ELEMENT — DEG AZ STEERING FILTER WTC: HANNING



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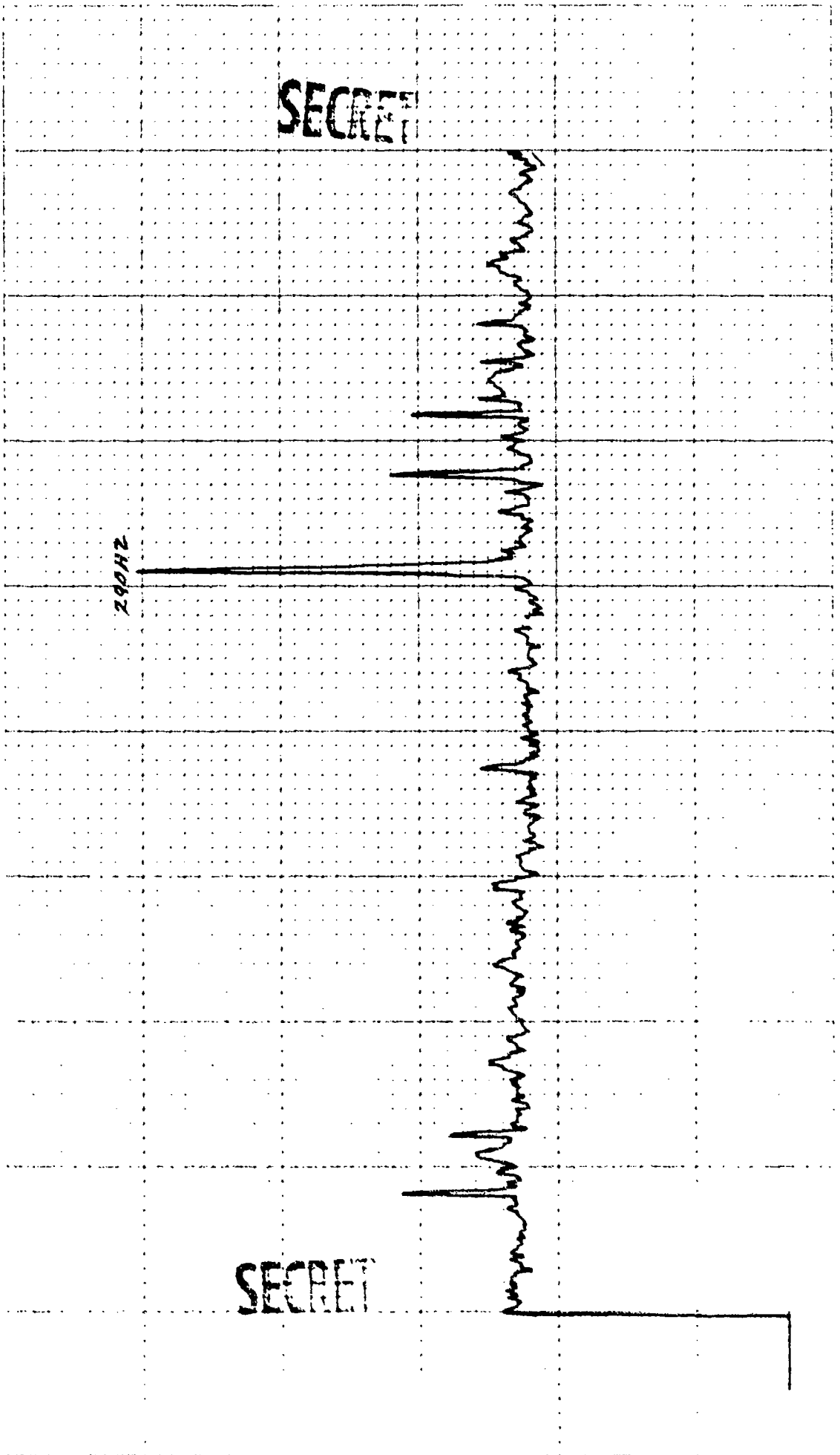
REEL: M4 INDEX J740

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ STEERING

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

CONTROL: 3-15 - 1501 (10)
OMNI SPECTRUM (ELEMENT 20)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT



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USE OF THIS INFORMATION IS RESTRICTED

CONTROL: 375 - 1501 (11)
OMNI SPECTRUM (ELEMENT 23)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

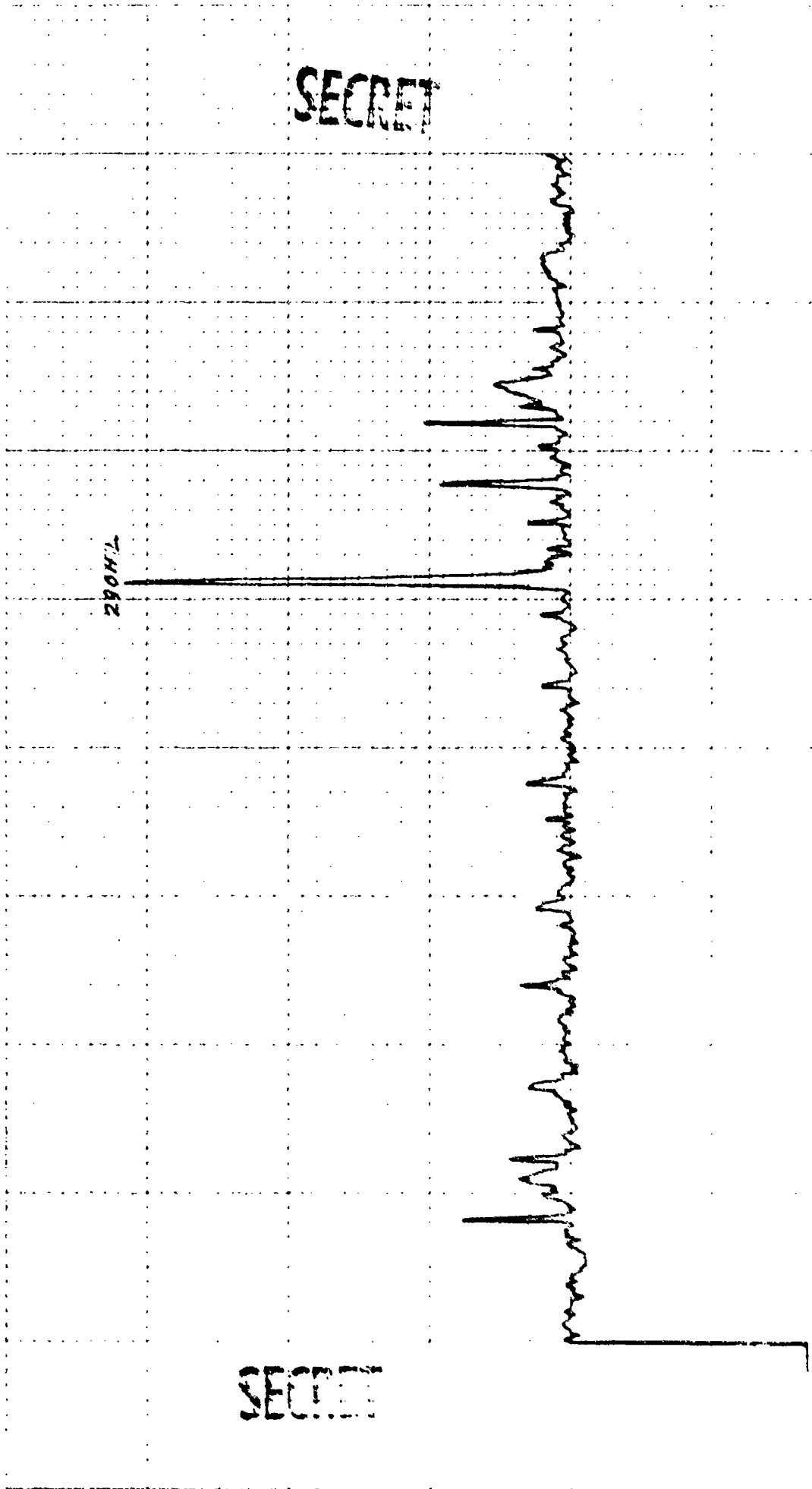
DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 1501Z

ANALYSIS BANDWIDTH: 11/10 HZ
 DEG AZ STEERING

REEL: M4 INDEX J340

INTEGRATION TIME 320 SECS
FILTER WTG: HANNING



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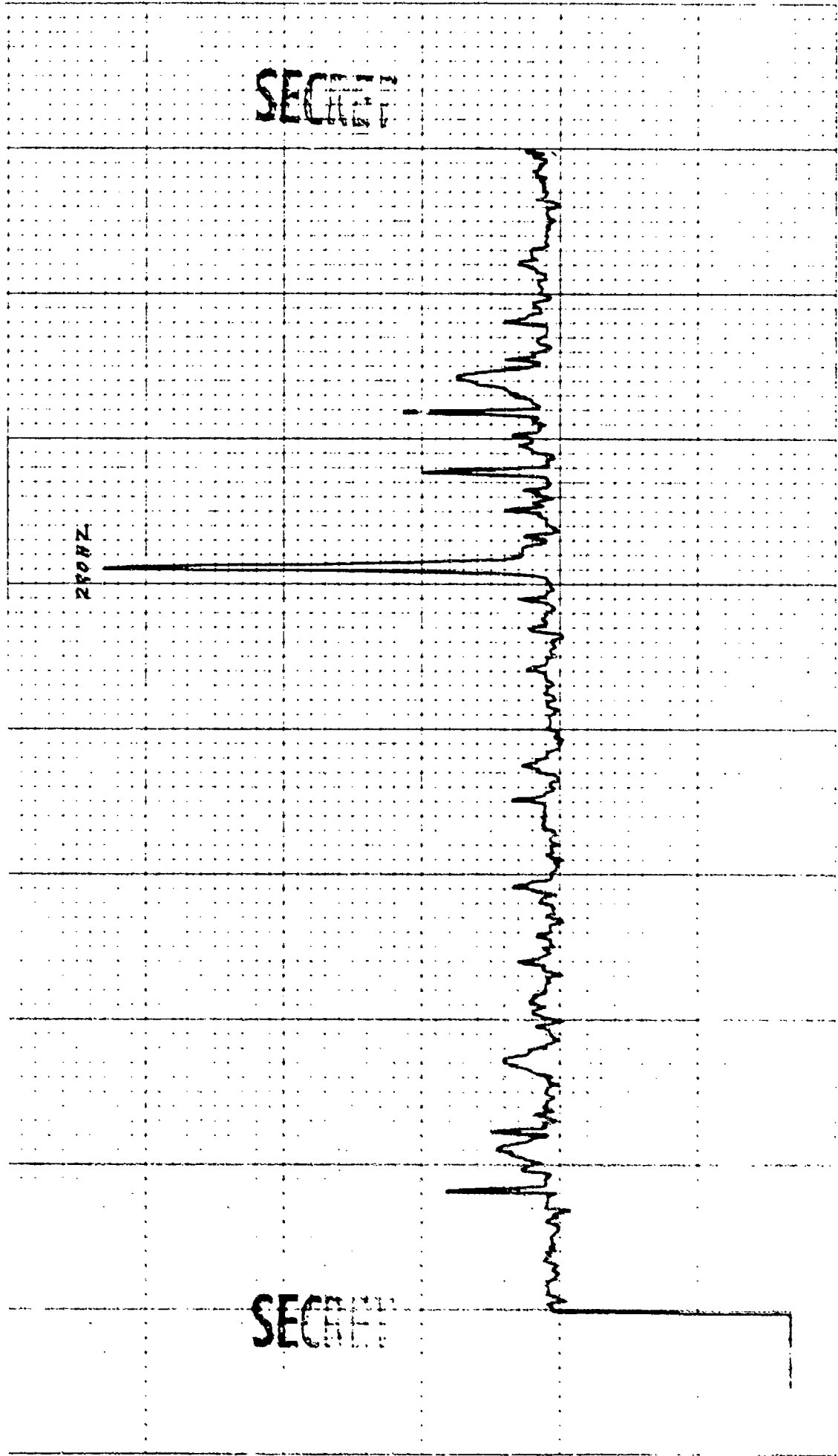
CONTROL: 3-15-1501 (12)
OMNI SPECTRUM (ELEMENT 24)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: M4 INDEX 3340

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



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REEL: M4 INDEX 3740

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 1501 Z

ANALYSIS BANDWIDTH: 1/10HZ

DEC AZ STEERING

INTEGRATION TIME 320 SECS

FILTER WTG: HANNING

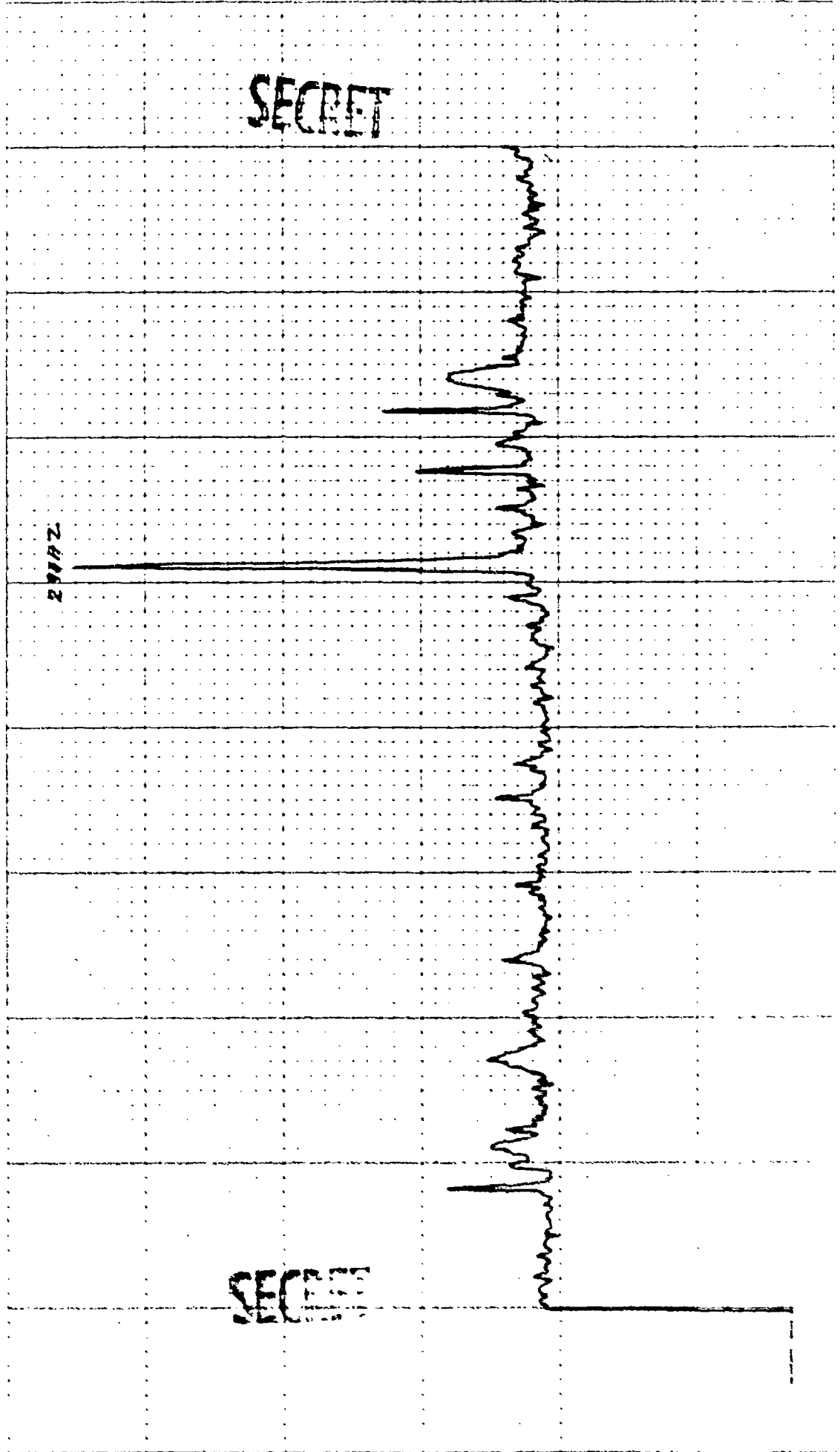
CONTROL: 375-150/ (13)

OMNI SPECTRUM (ELEMENT 26)

EXERCISE: BEARING STAKE

CENTER FREQ: 280 HZ

1 ELEMENT



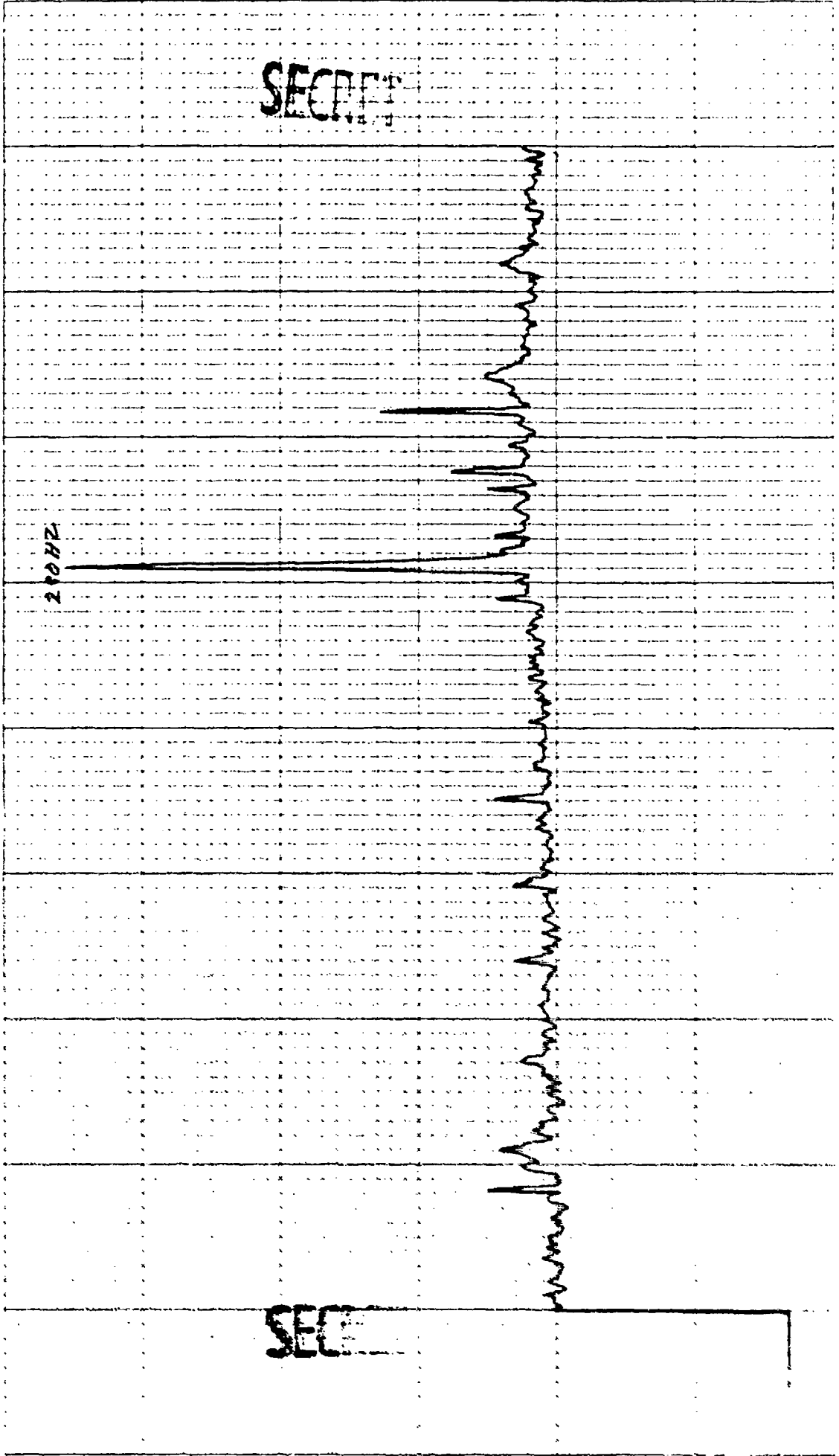
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CONTROL: 3-75 - 1501 (14) DATE OF ANALYSIS: REEL: M4 INDEX 3740
 OMNI SPECTRUM (ELEMENT 29)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: - DB
 1 ELEMENT DEC AZ STEERING FILTER WTG: HANNING



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CONTROL: 3-15-1501 (15)
OMNI SPECTRUM (ELEMENT 31)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

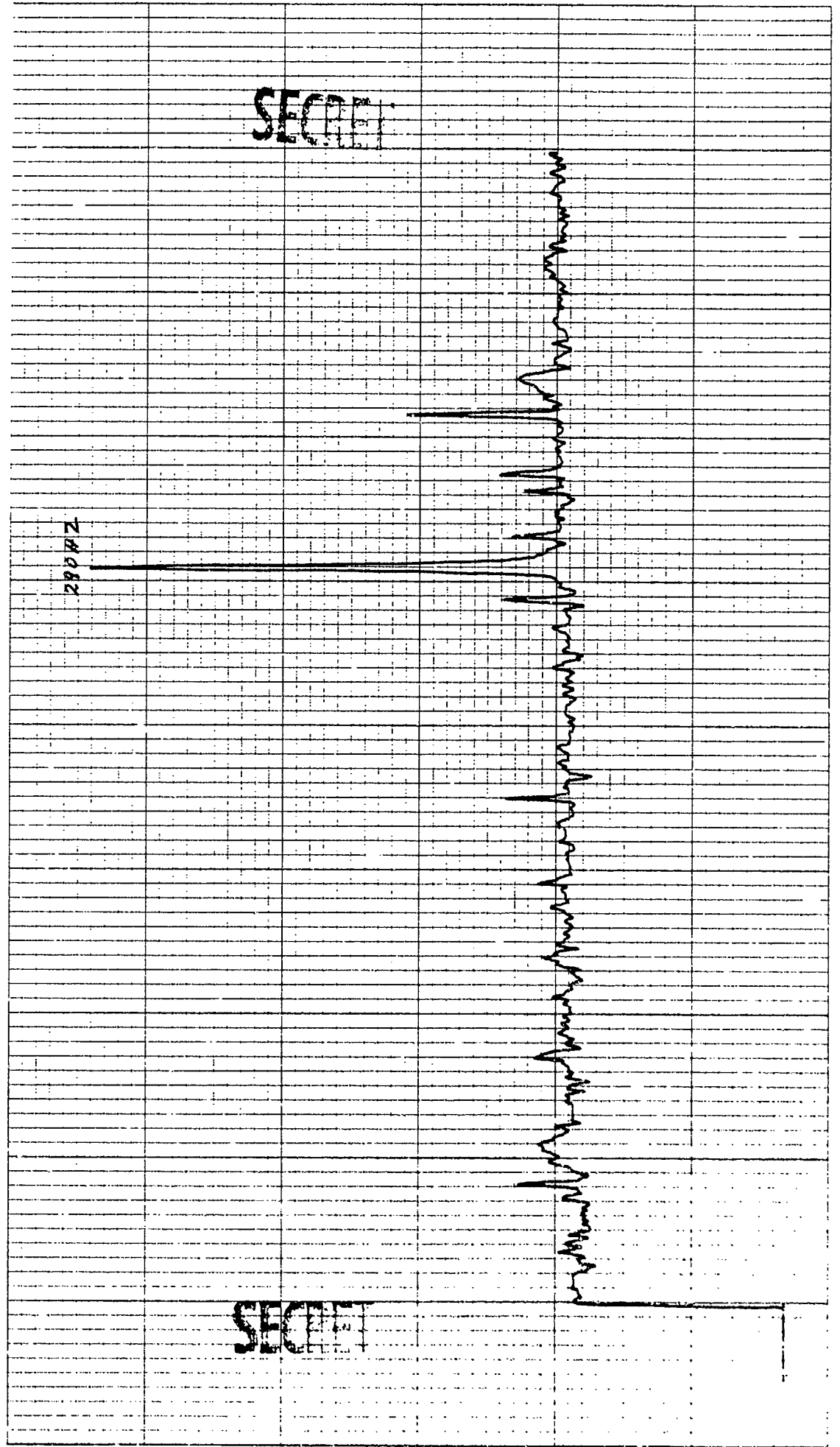
DATE OF ANALYSIS:

DATE/TIME: 3-5-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: M4

INDEX 3340

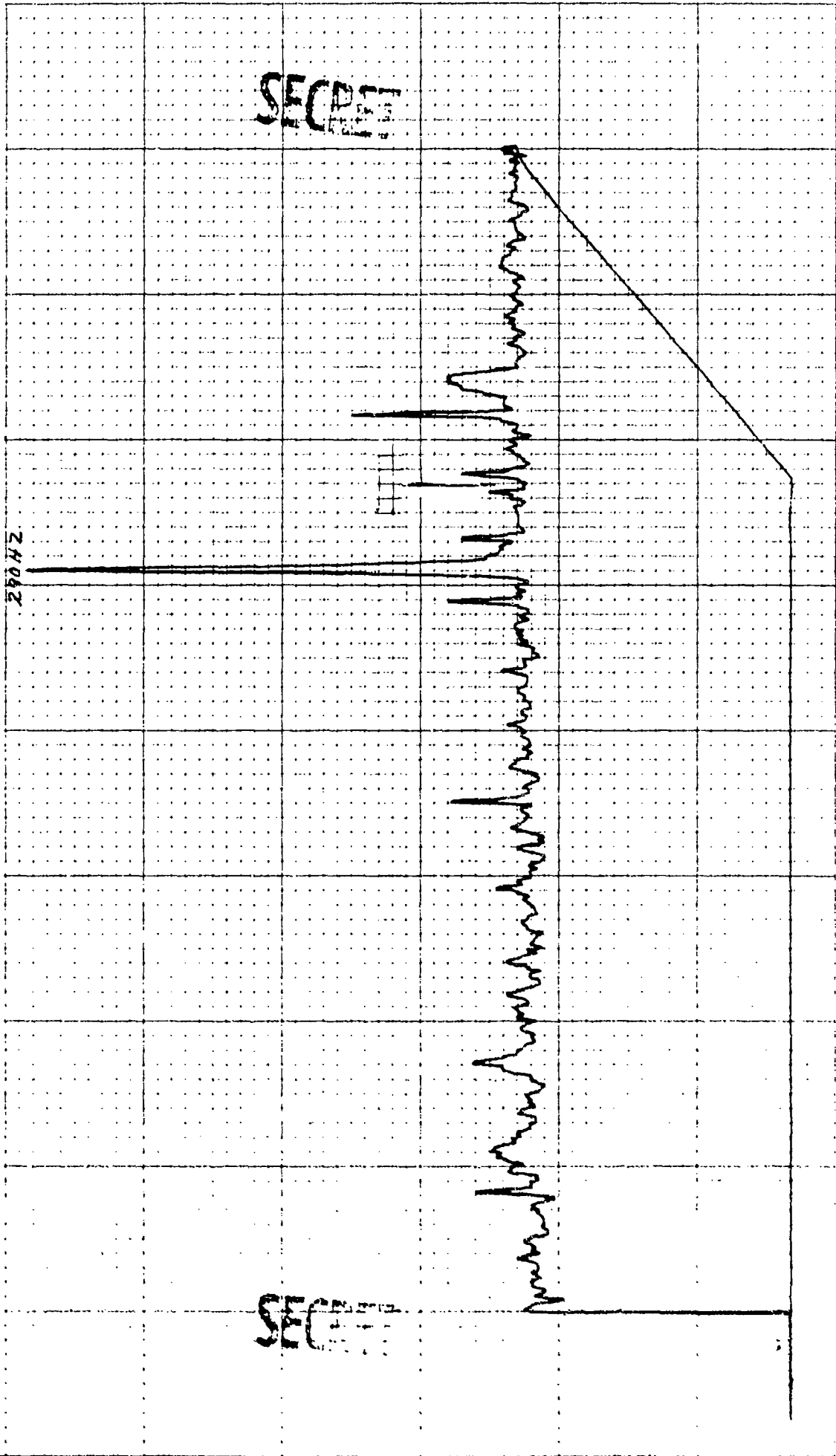
INTEGRATION TIME 320 SECS
FILTER
ATTEN: - DB
WTG: HANNING



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MODE 1501 TO THE USCHS 20 01 1501 Z

CONTROL: 1501 - 40 (DPB) DATE OF ANALYSIS: REEL: MY INDEX 3000
 OMNI SPECTRUM (ELEMENT 33)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 HZ
 1 ELEMENT
 INTEGRATION TIME 320 SECS ATTN: - DB
 FILTER WTG: HANNING



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CONTROL: 3-15 -150/ (17) REEL: 44 INDEX 3340

OMNI SPECTRUM(ELEMENT 35)

EXERCISE: BEARING STAKE

CENTER FREQ: 200 HZ

1 ELEMENT

DATE OF ANALYSIS:

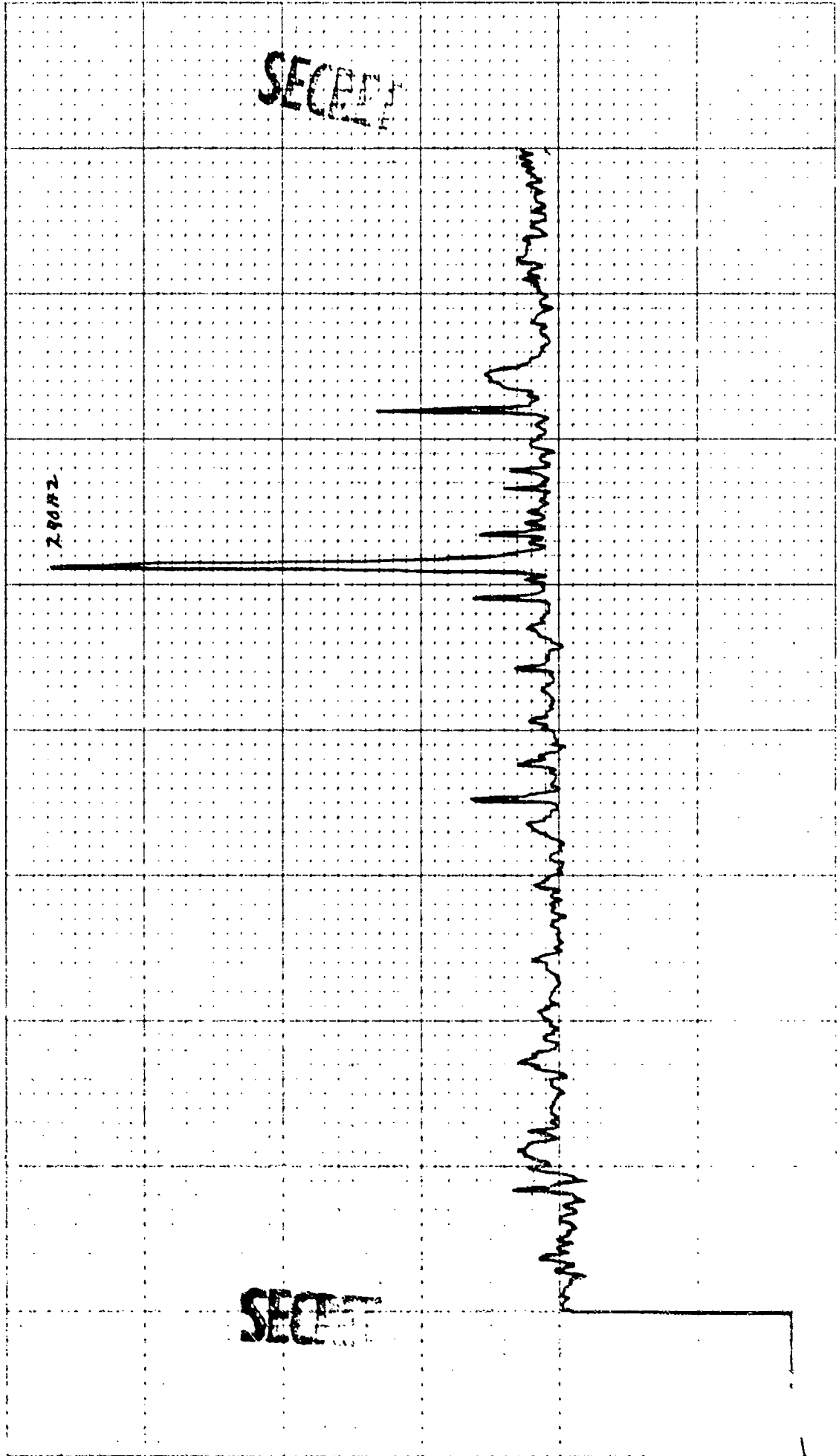
DATE/TIME: 3-15-77 -150/ 2

ANALYSIS BANDWIDTH: 1/10HZ

INTEGRATION TIME 320 SECS ATTEN: DB

FILTER WTC: HANNING

DEG AZ STEERING



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REDFIELD & ESSER CO. ...

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CONTROL: 3-15 - 1501 (18)
OMNI SPECTRUM(ELEMENT 37)
EXERCISE: BEARING STAKE
CENTER FREQ: 180 HZ
1 ELEMENT

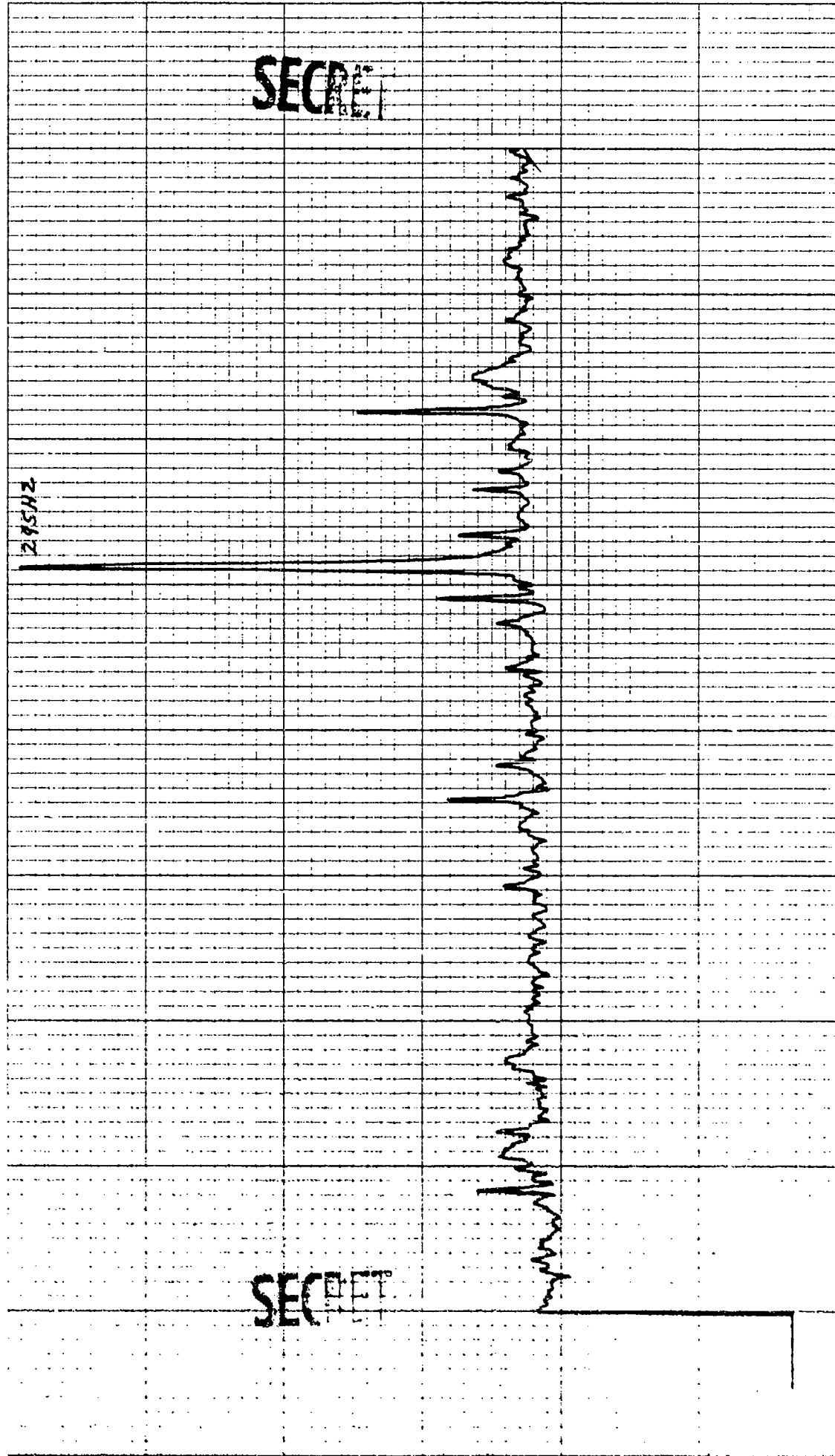
DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: M4

INDEX 3346

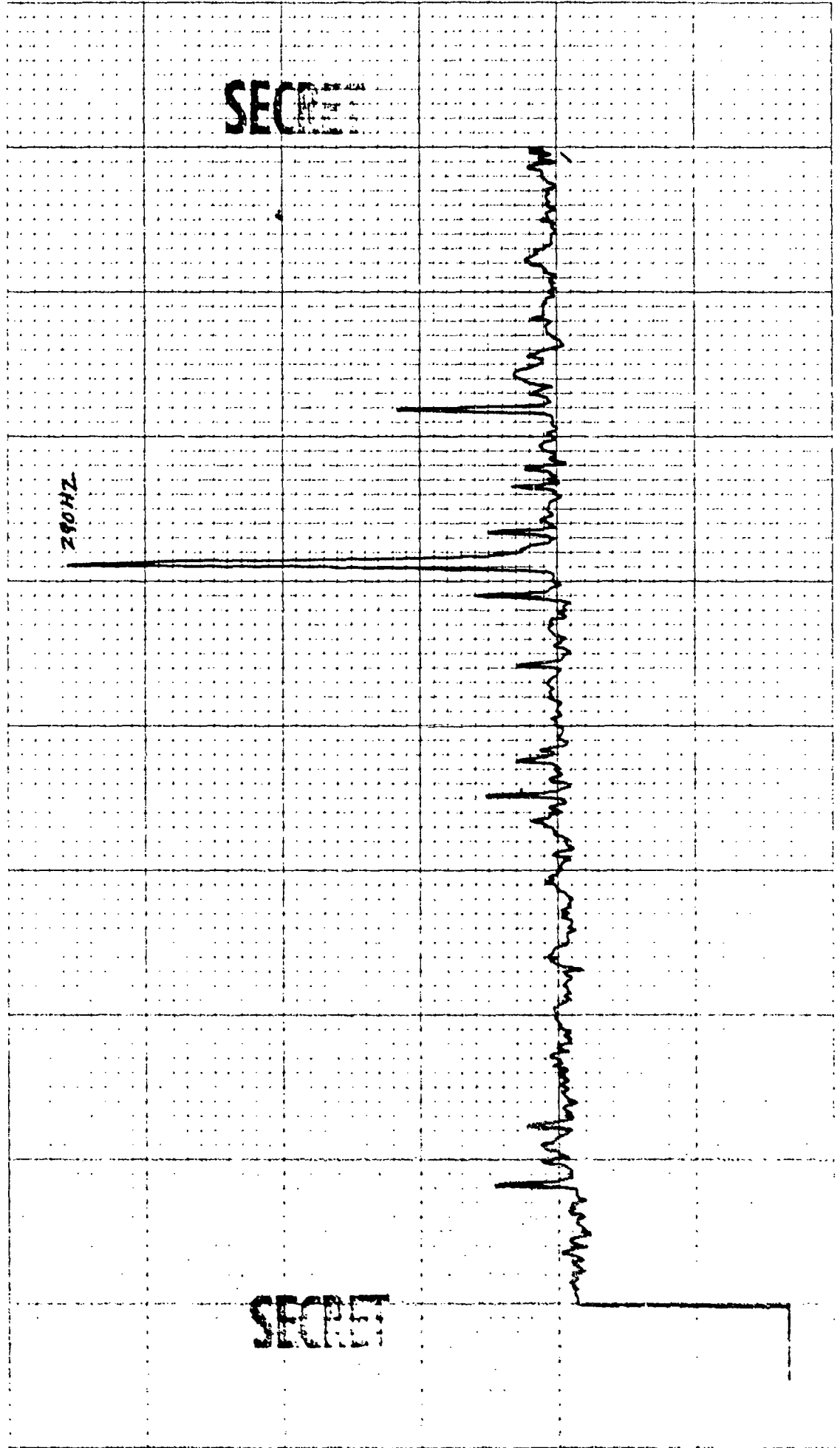
INTEGRATION TIME 320 SECS
ATTEN: - DB
FILTER
WTG: HANNING



46 0703

460703 3-15-77 TO THE DIRECTOR, NSA

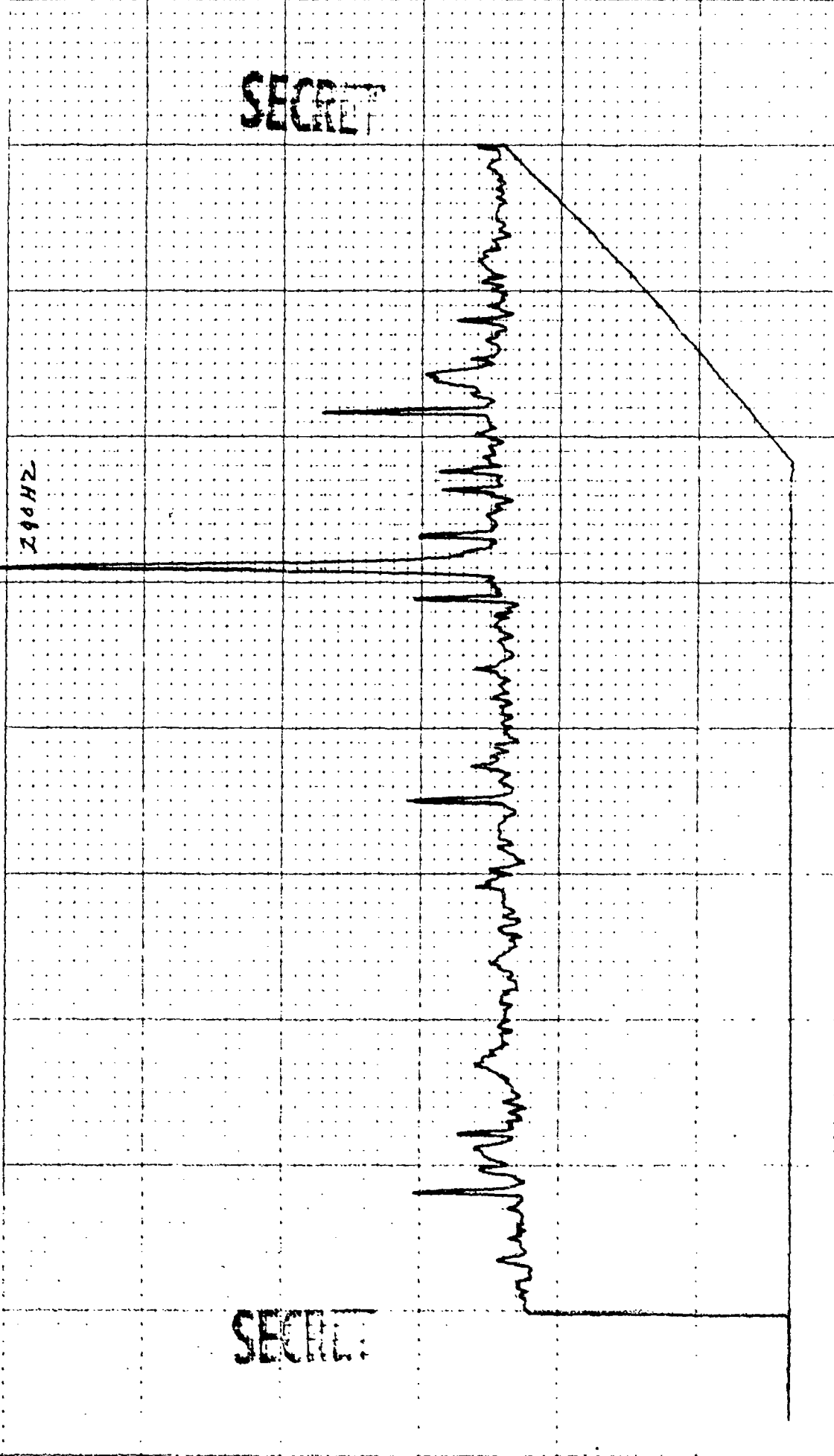
CONTROL: 3-15-1501 (19) DATE OF ANALYSIS: REEL: M4 INDEX 3340
 OMNI SPECTRUM (ELEMENT 39)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: - DB
 1 ELEMENT DEG AZ STEERING FILTER WIG: HANNING



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REF: 46 0703 TO THE HIGH...

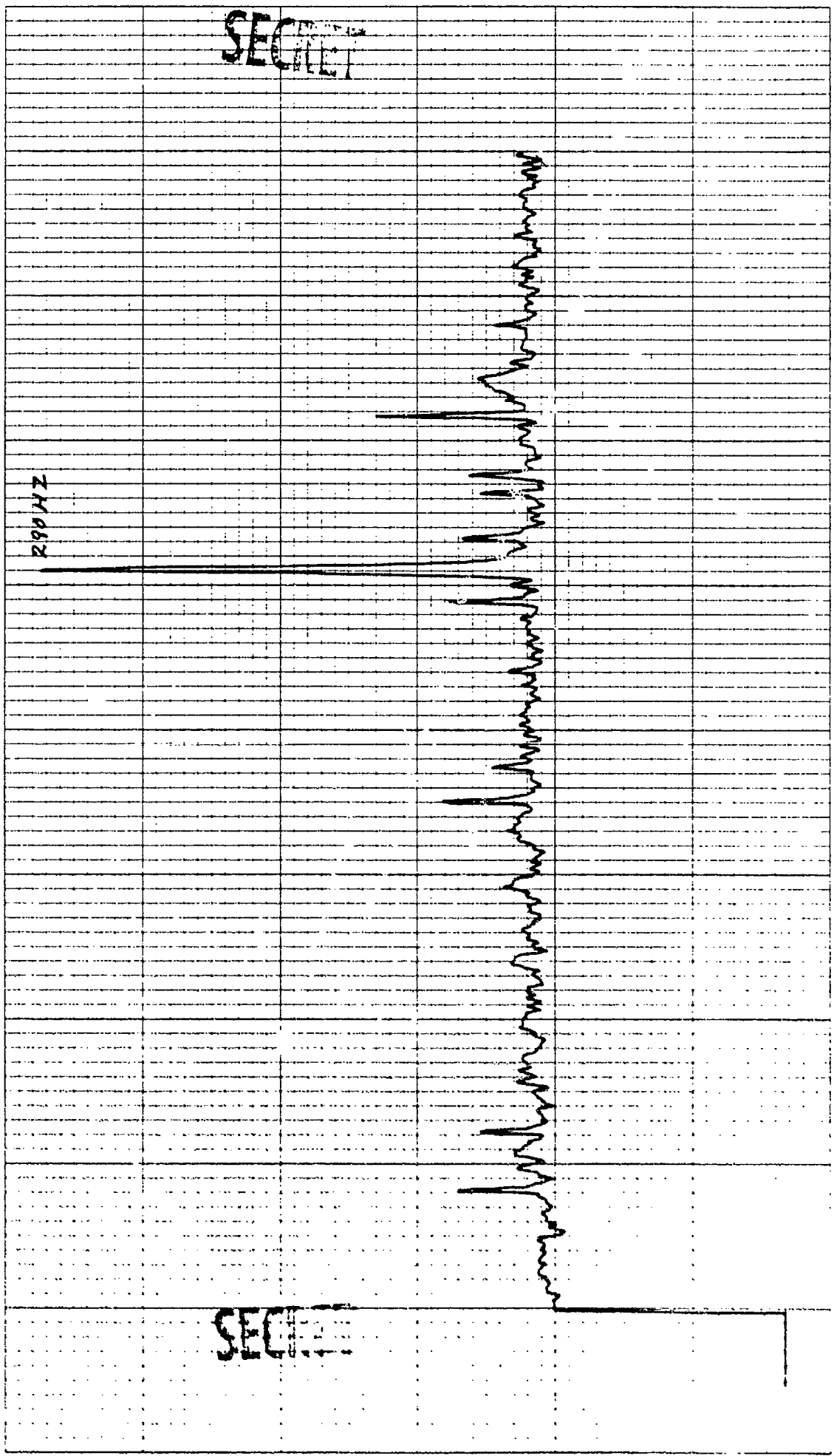
CONTROL: 3-15 -1501 (20) DATE OF ANALYSIS: REEL: M4 INDEX 3340
 OMNI SPECTRUM (ELEMENT 41)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: - DB
 ELEMENT _____ DEG AZ STEERING FILTER WTG: HANNING



16 X 10 TO THE INCH + 7 X 10 11/16 HFS
KEUFFEL & ESSER CO. MADE IN U.S.A.

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CONTROL: 3-15 -1501 (21) DATE OF ANALYSIS: REEL: M4 INDEX 3340
OMNI SPECTRUM (ELEMENT 43)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: - DB
1 ELEMENT DEG AZ STEERING FILTER WTC: HANNING



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REF: 3-15-77 1501 (23)

REEL: MY INDEX 3390

DATE OF ANALYSIS:

CONTROL: 3-15 -1501 (23)

OMNI SPECTRUM (ELEMENT 47)

EXERCISE: BEARING STAKE

CENTER FREQ: 290 HZ

1 ELEMENT

DATE/TIME: 3-15-77 -1501 Z

ANALYSIS BANDWIDTH: 1/10 HZ

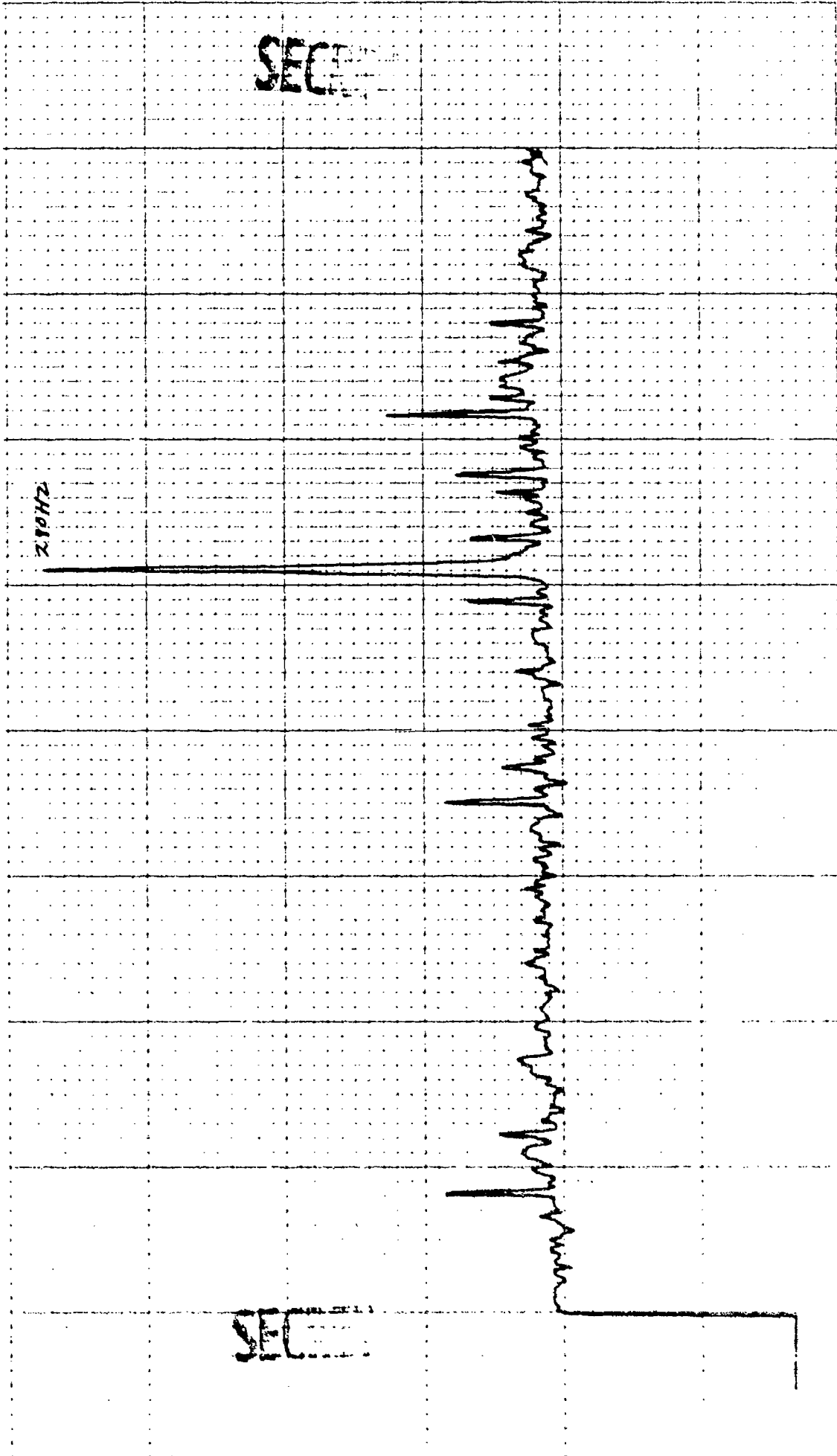
 DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

ATTEN: DB

WIG: HANNING



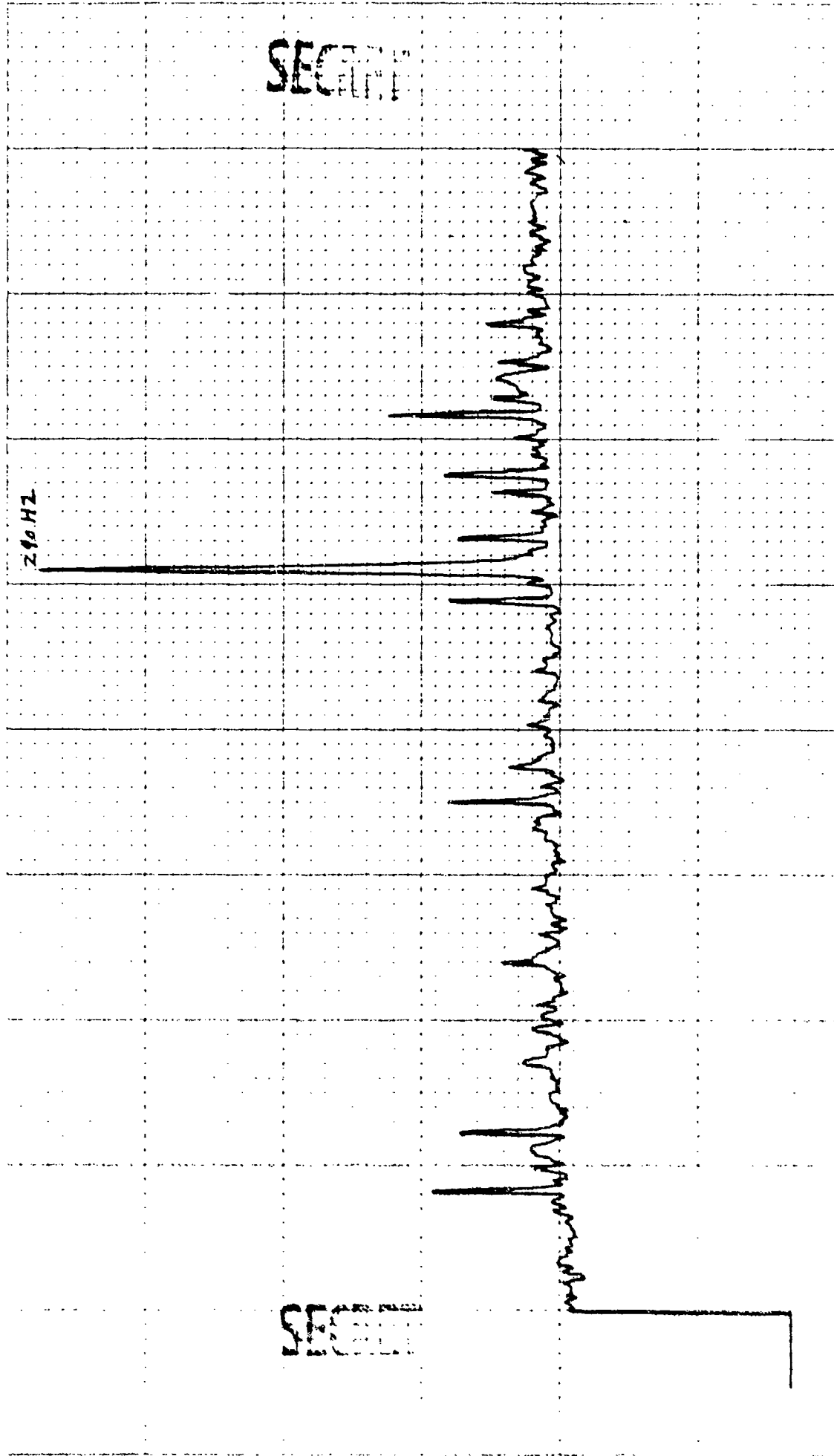
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142 2100 2000000 0000

CONTROL: 315 - 1501 (24) DATE OF ANALYSIS: REEL: M4 INDEX 374e
 OMNI SPECTRUM (ELEMENT 49)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
 1 ELEMENT

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

DATE/TIME: 3-15-77 - 1501 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING



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DATE: 21 JUN 70 DE: 0800 Z

REEL: M4 INDEX 3340

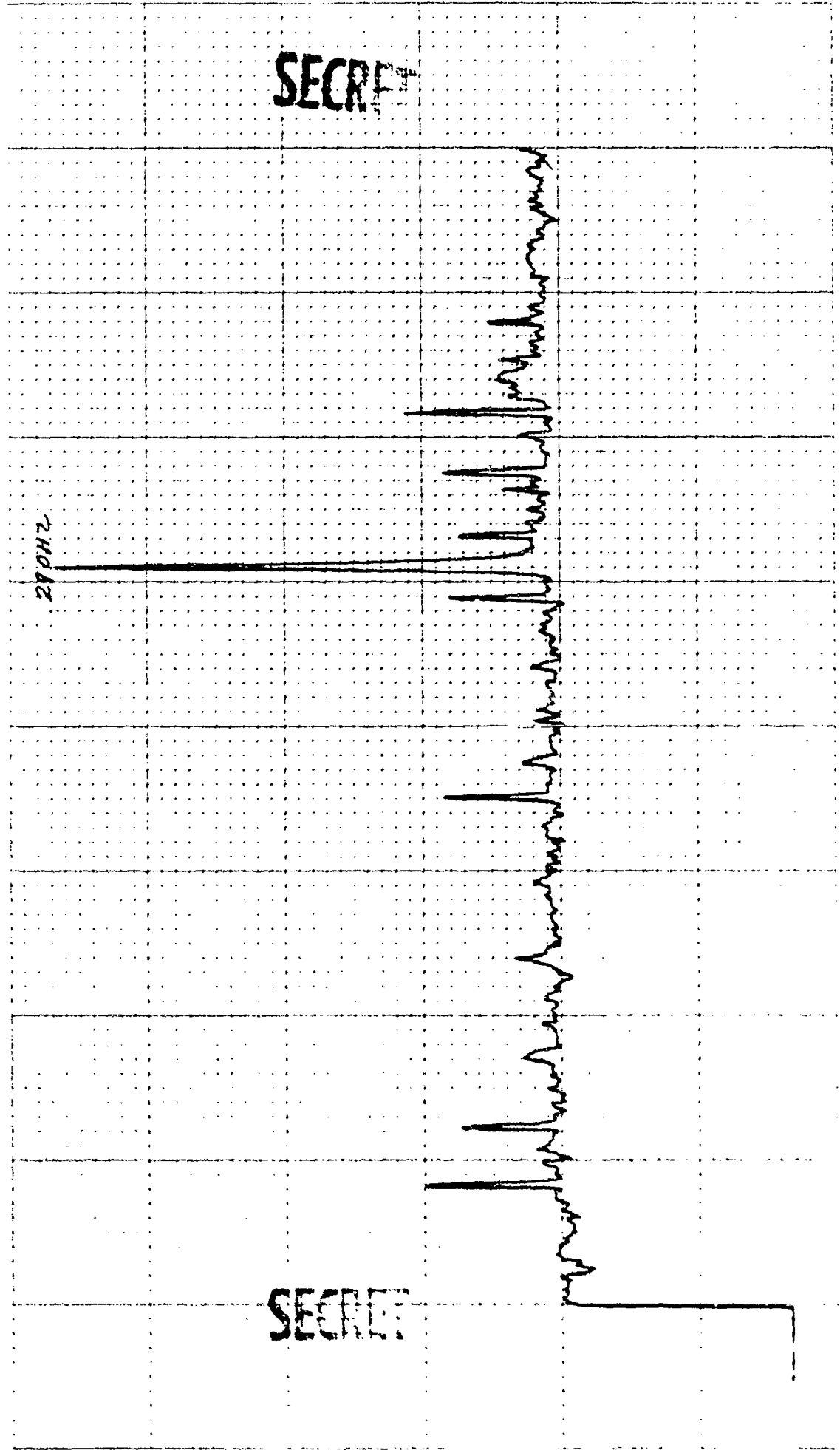
DATE OF ANALYSIS:

CONTROL: 3-15 - 1501 (25)
OMNI SPECTRUM (ELEMENT 51)

EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING

DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING



46 0703

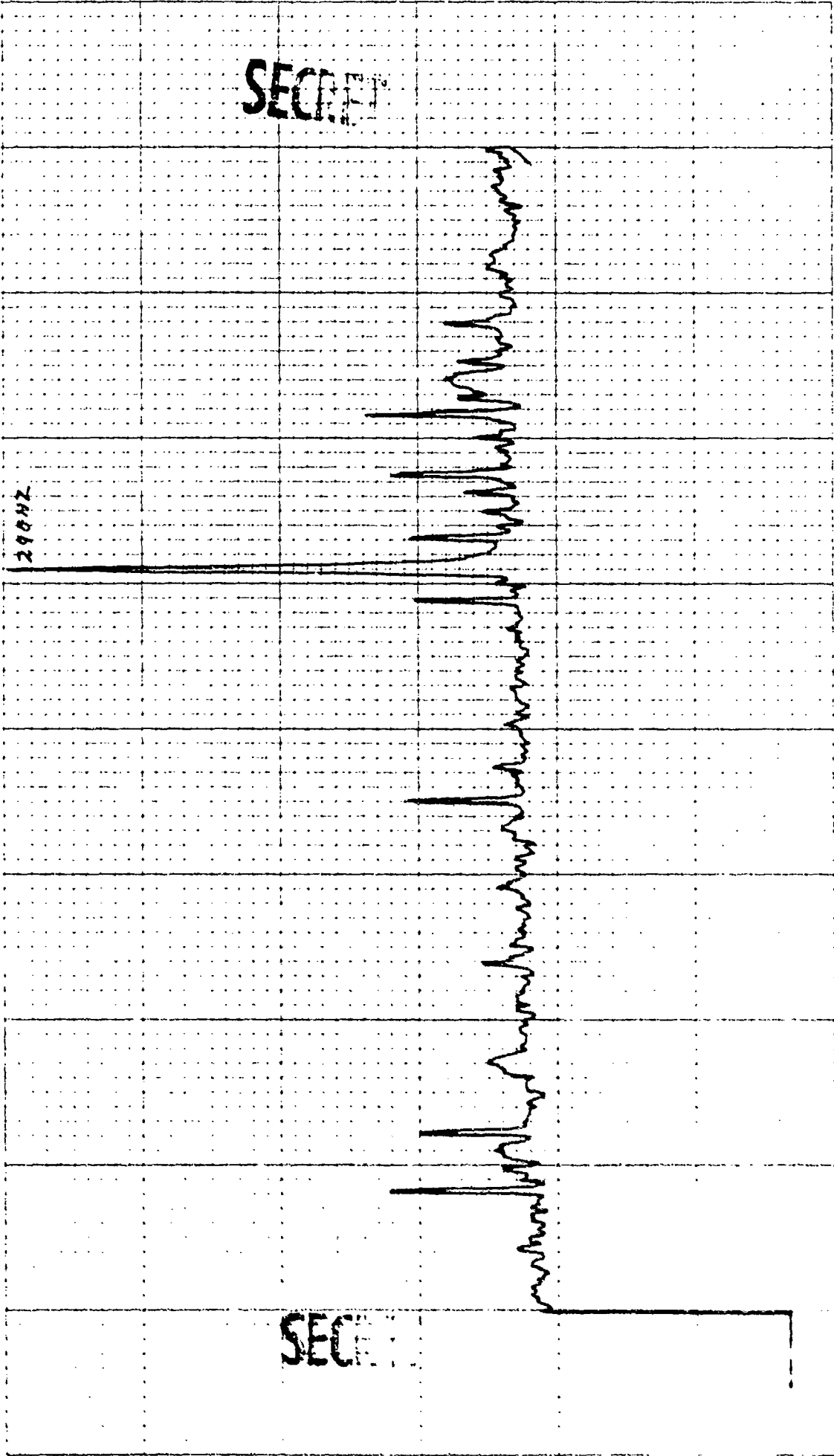
CONTROL: 3-15 - 1501 (2C)
OMNI SPECTRUM (ELEMENT 53)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

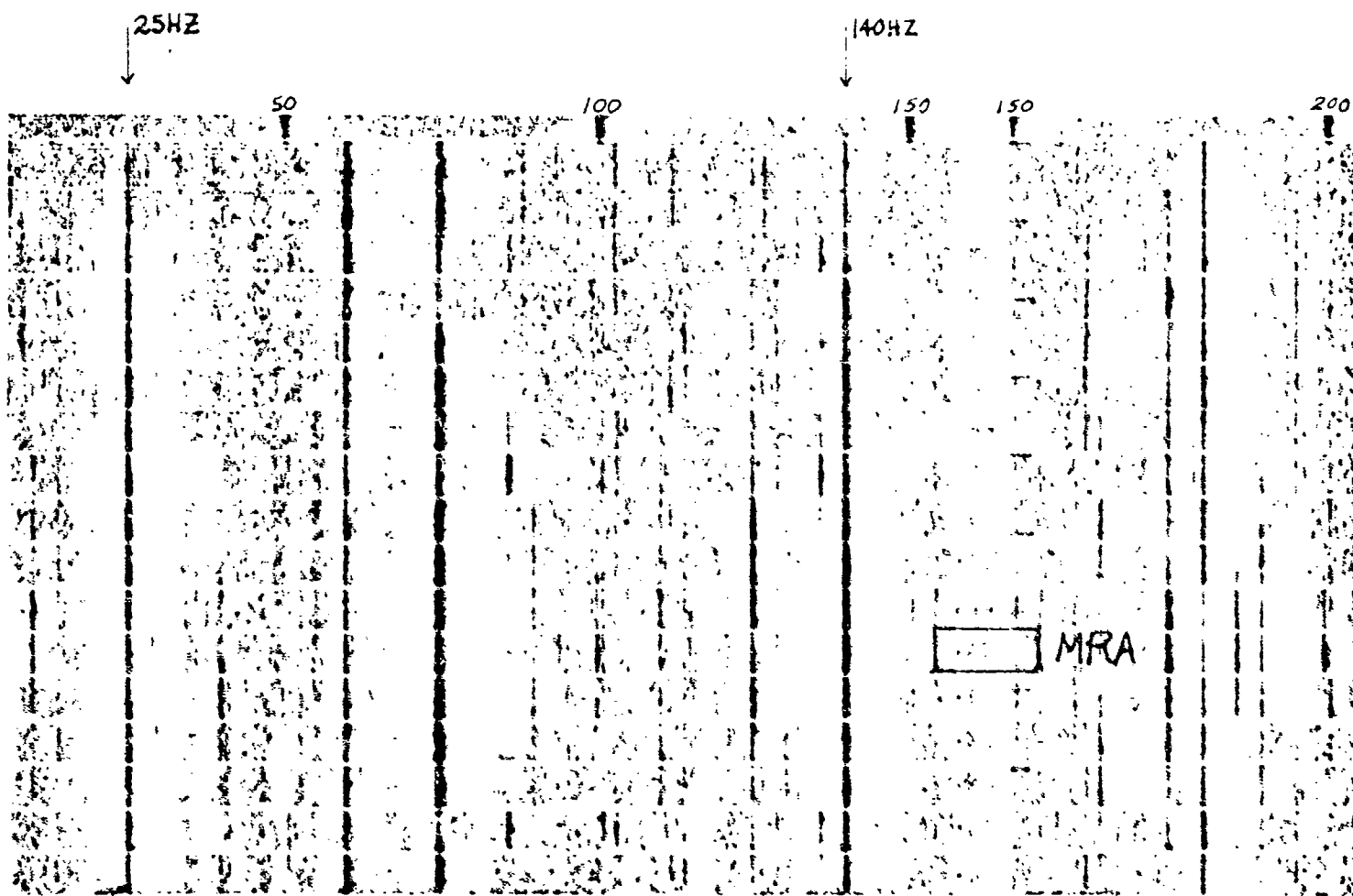
DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: 114 INDEX 3740

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





CONTROL NUMBER 100-2-4-172
 NUMBER OF ELEMENTS 7
 FREQUENCY BAND TO HZ
 RANGE 25 N.M.

H I S T O R Y
 TAPE REEL NUMBER

ANALYSIS BAND WIDTH HZ
 WATER DEPTH FMS

REF
 DATE
 ENG

140HZ

290HZ 295HZ

SECRET

150

150

200

250

300

MRA

LIST OF FRAMES
TAPE REEL NUMBER _____

ANALYSIS BAND WIDTH _____ Hz
WATER DEPTH _____ FMS

TAPE COUNT _____

ELEMENT NUMBERS _____
DATE _____ SAN-XXX-78-0138
EXERCISE BEARING STYLE _____

SECRET

TIME
DATE
SOURCE

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 8

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-22.1</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-12.1	
BEAMFORMER GAIN	<u>+18</u>	+ 5.9	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	+6.1	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-61.6</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-51.6	
BEAMFORMER GAIN	<u>+18</u>	-33.6	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+5.9</u>	
SIGNAL LEVEL FOR SNR	<u>-33.6</u>	39.5	
PROCESSOR CORRECTION	<u>-4.0</u>	35.5	
MRA CORRECTION	<u>+ .2</u>	35.7	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	27.5	SNR 1 HZ BAND

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SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 8

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-21.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-11.8	
BEAMFORMER GAIN	<u>+18</u>	+6.2	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	+7.0	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-73.6</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-63.6	
BEAMFORMER GAIN	<u>+18</u>	-45.6	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+6.2</u>	
SIGNAL LEVEL FOR SNR	<u>-45.6</u>	51.8	
PROCESSOR CORRECTION	<u>-4.0</u>	47.8	
MRA CORRECTION	<u>+ .8</u>	48.6	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	40.4	SNR 1 HZ BAND

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SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 8

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-58.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-48.8</u>	
BEAMFORMER GAIN	<u>+18</u>	<u>-30.8</u>	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	<u>-30</u>	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-67.7</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-57.7</u>	
BEAMFORMER GAIN	<u>+18</u>	<u>-39.7</u>	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-30.8</u>	
SIGNAL LEVEL FOR SNR	<u>-39.7</u>	<u>8.9</u>	
PROCESSOR CORRECTION	<u>-4.4</u>	<u>4.5</u>	
MRA CORRECTION	<u>+ .8</u>	<u>5.3</u>	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	<u>-2.9</u>	SNR 1 HZ BAND

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DATA POINT 8

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-19.4</u>	<u>-15.2</u>	<u> </u>
MRA SIGNAL LEVEL	<u>+6.1</u>	<u>+7.0</u>	<u>-30.0</u>
ARRAY SIGNAL GAIN	<u>25.5</u>	<u>22.2</u>	<u> </u>
20 LOG <u>16</u>	<u>24</u>	<u>24</u>	<u> </u>
# of elements			
DIFFERENCE	<u>+1.5</u>	<u>-1.8</u>	<u> </u>

ARRAY GAIN

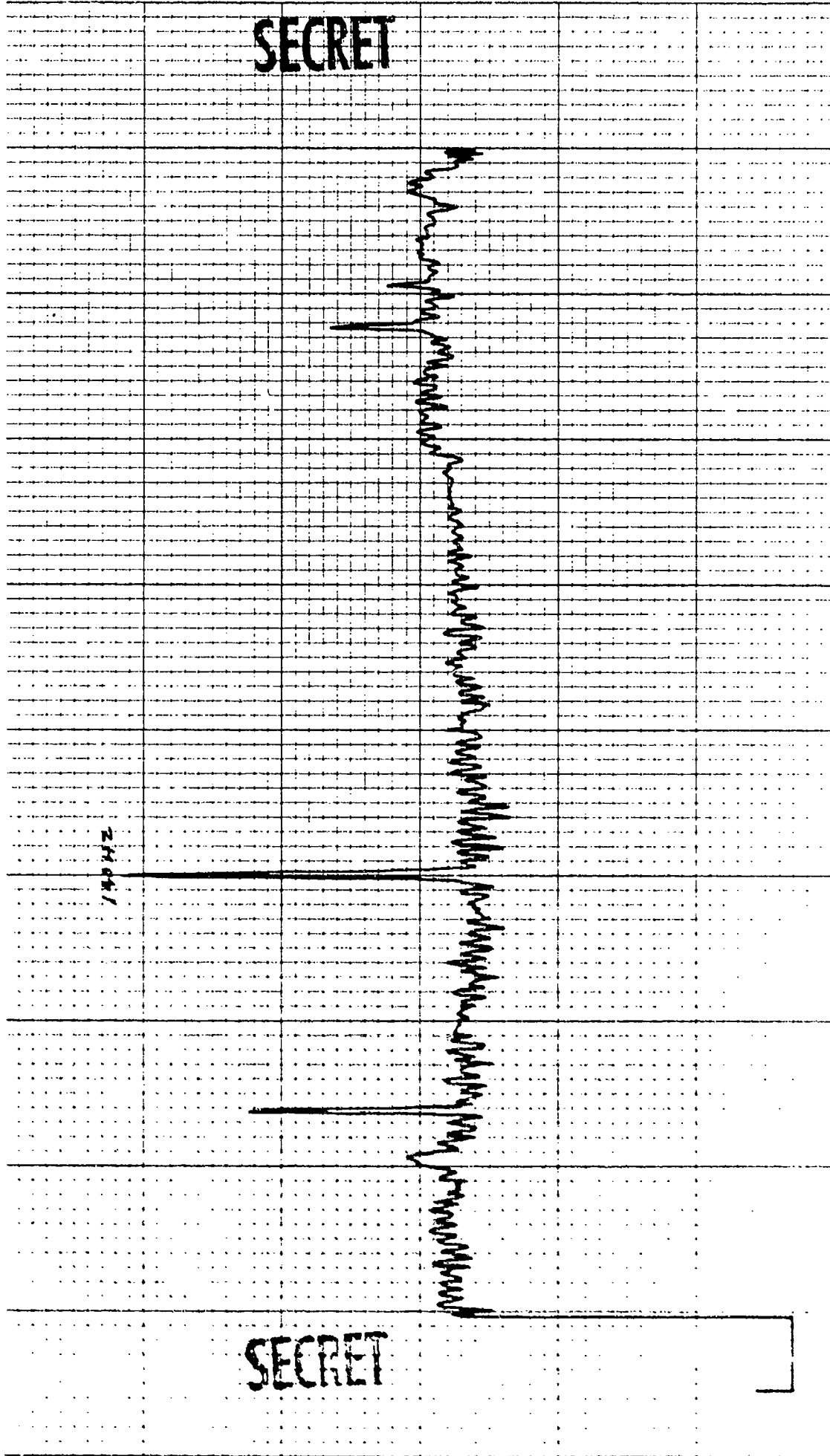
MRA SNR	<u>35.7</u>	<u>48.6</u>	<u>5.3</u>
MEAN OMNI SNR	<u>29.4</u>	<u>35.4</u>	<u> </u>
ARRAY GAIN	<u>6.3</u>	<u>13.2</u>	<u> </u>
THEORETICAL VERTICAL GAIN	<u>10.4</u>	<u>12.1</u>	<u>12.3</u>
(at MRA)			
DIFFERENCE	<u>-4.1</u>	<u>+1.1</u>	<u> </u>

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PLS RETURN TO THE 100th ...

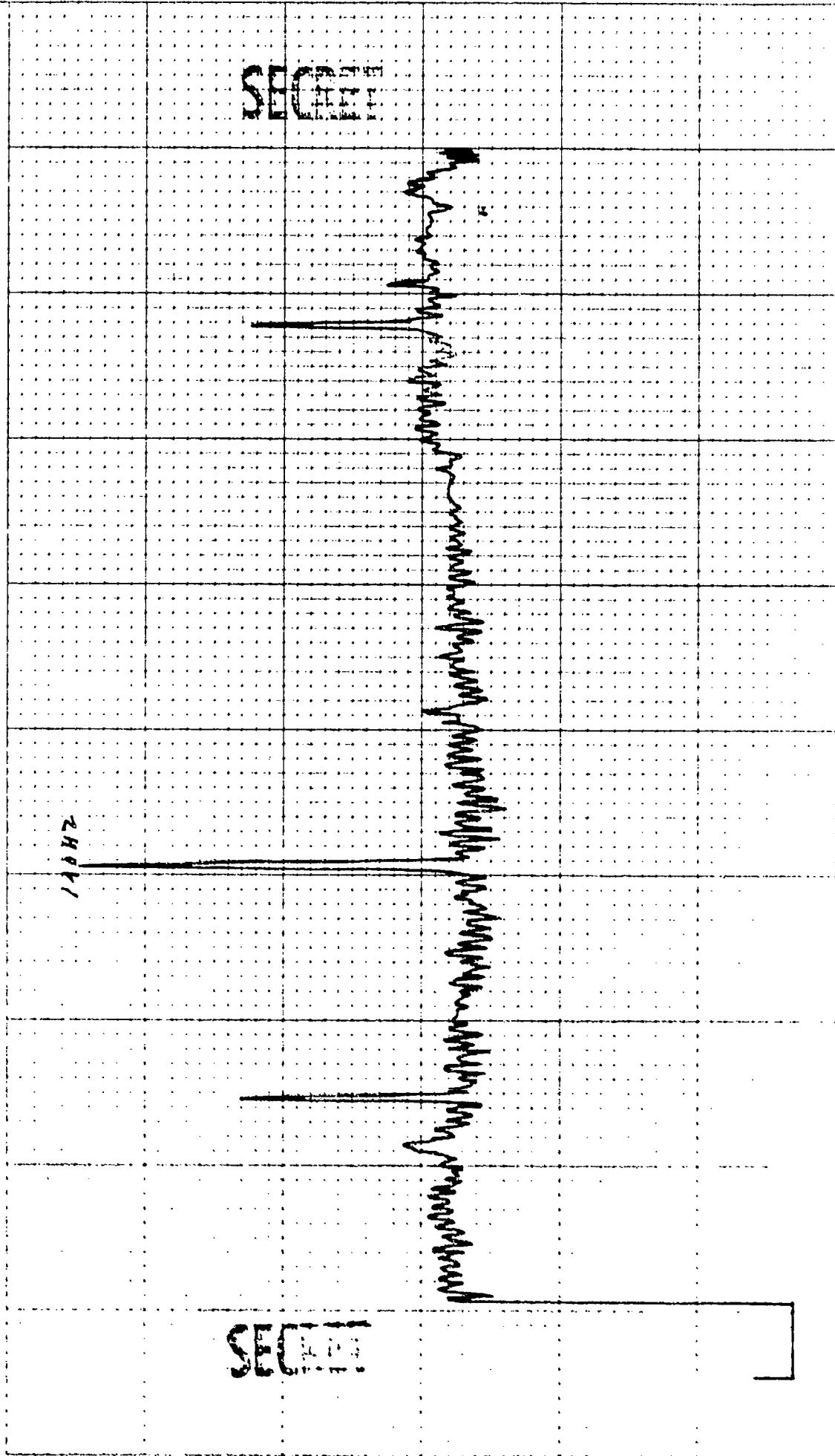
CONTROL: 1501 - 16 (DPR) DATE OF ANALYSIS: 28-44 REEL: M4 INDE X 3000
 BEAMFORMED SPECTRUM (ELEMENTS))
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: -10 DB
 CENTER FREQ: 150 HZ +7 DEG. AZ STEERING FILTER WTG: HANNING
16 ELEMENTS



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46 0703

CONTROL: 1501 - 16 (DPO) DATE OF ANALYSIS: 29-04 REEL: 144 INDE X 3000
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3:15:77 - 1501 Z INTEGRATION TIME 320 SECS ATTN: -10 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10 HZ FILTFR WTG: HANNING
 CENTER FREQ: 150 HZ +9 DEG. AZ STEERING



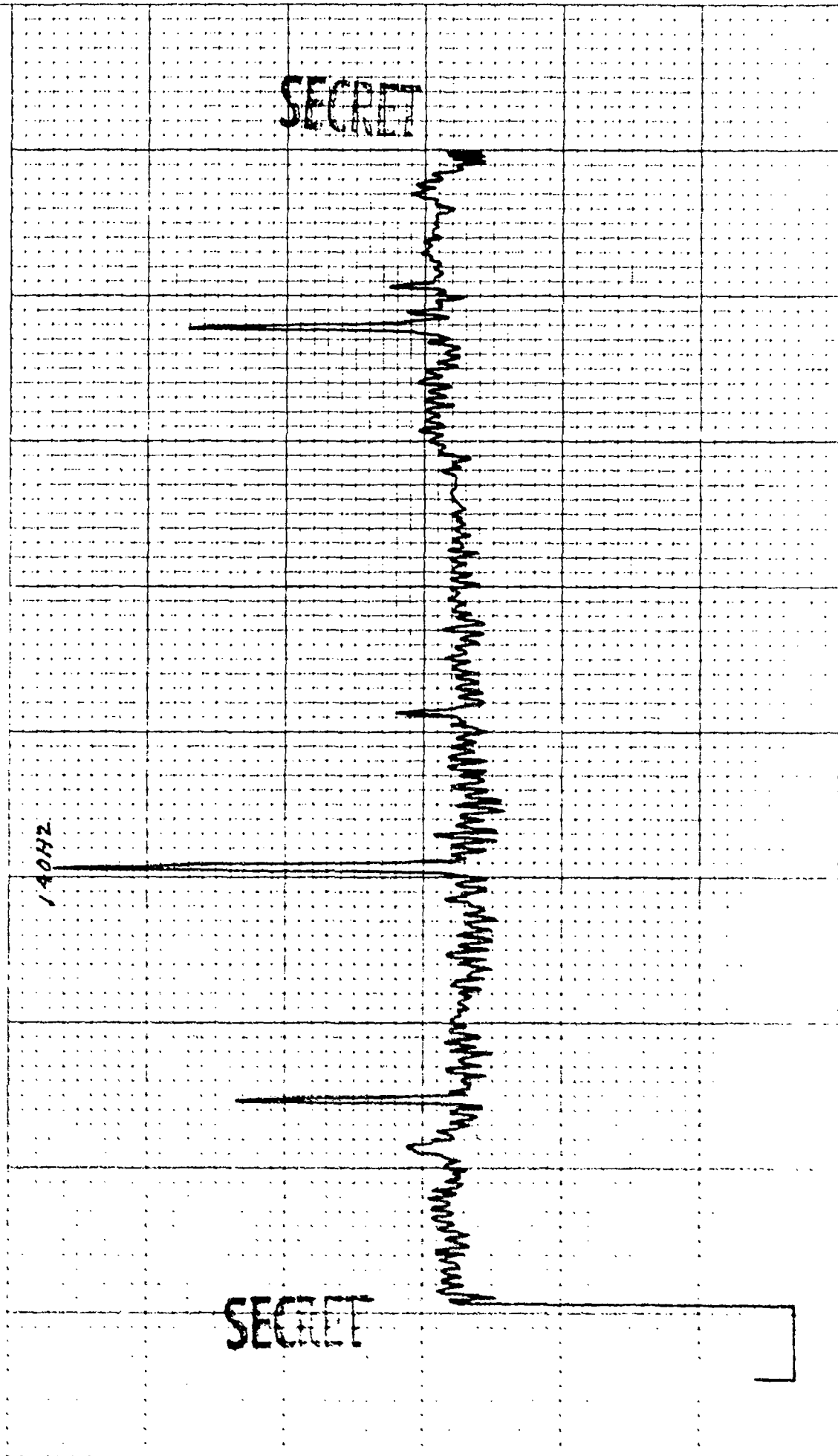
46 0703

REF ID: A66096

CONTROL: 1501 - 16 (DPB)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 29-44
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
4/1 DEG. AZ STEERING

REEL: 14
INTEGRATION TIME 320 SECS
ATTEN: -18 DB
FILTFR WTG: HANNING
INDE X 3000



46 0703

REF: 3-15-77

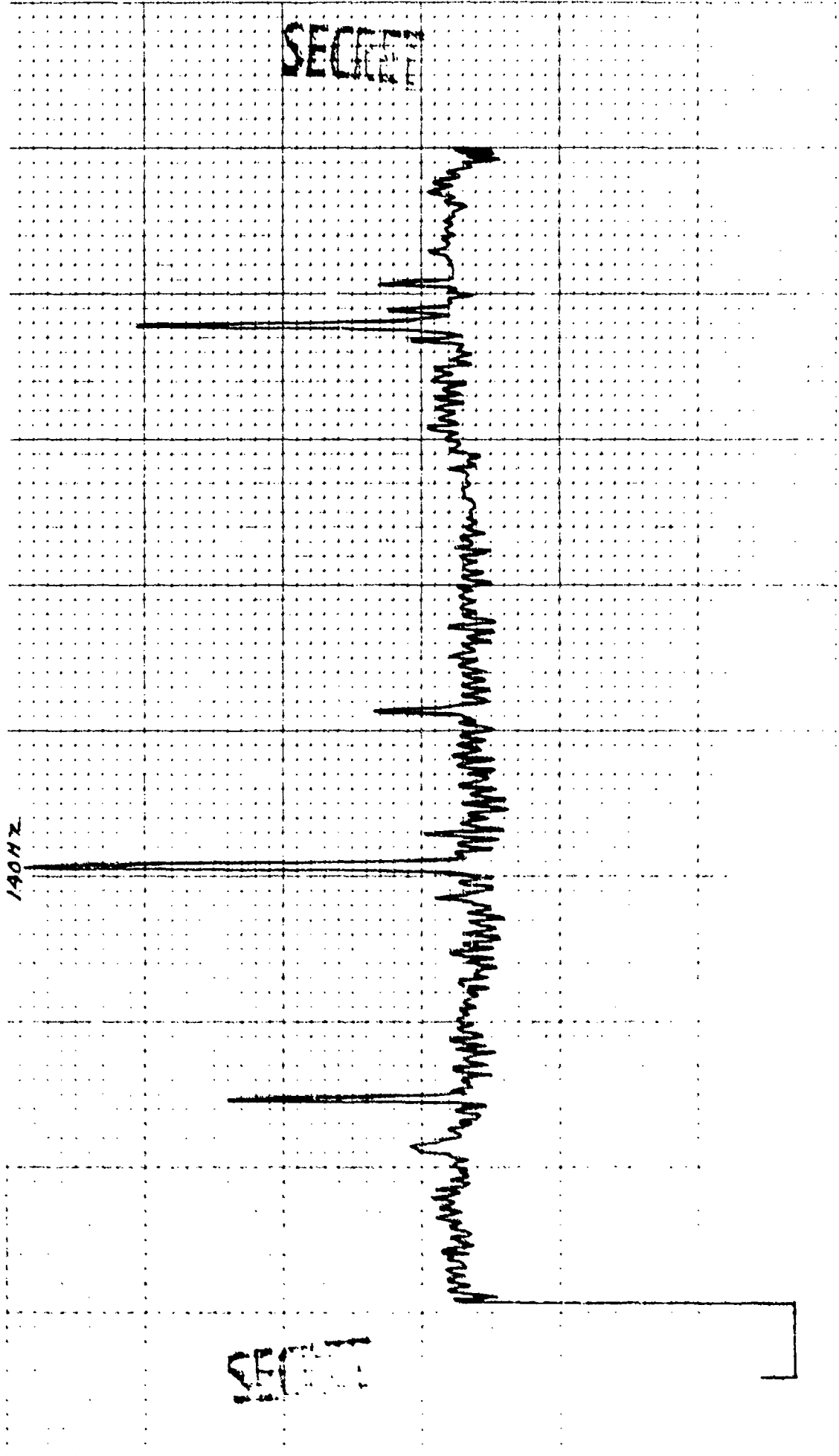
CONTROL: 1501 - 40 (DB) DATE OF ANALYSIS: _____ INDE X 3000

BEAMFORMED SPECTRUM (ELEMENTS) 29-44

EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 1501 Z INTEGRATION TIME 320 SECS ATTEN: 18 DB

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

16 ELEMENTS +13 DEG. AZ STEERING



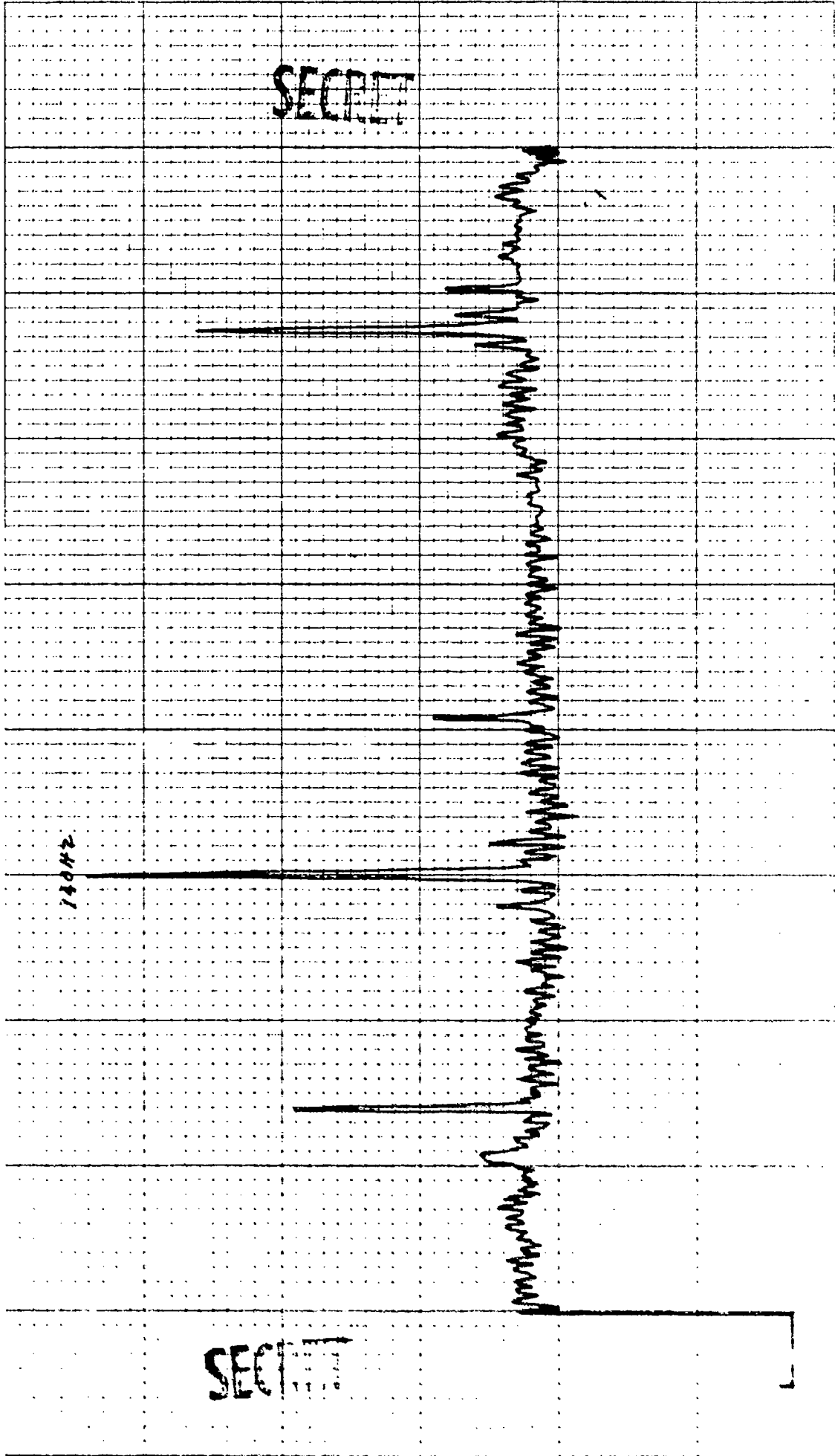
SECRET

SECRET

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NOE BY THE OPERATOR

CONTROL: 1501 - 16 (DPG) REEL: 114 INDE X 3000
 BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 29-44
 EXERCISE: BEARING STAKE DATE/TIME: 3-5-77 - 1501 Z INTEGRATION TIME 320 SECS ATTEN: 78 DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
16 ELEMENTS 4/5 DEG. AZ STEERING



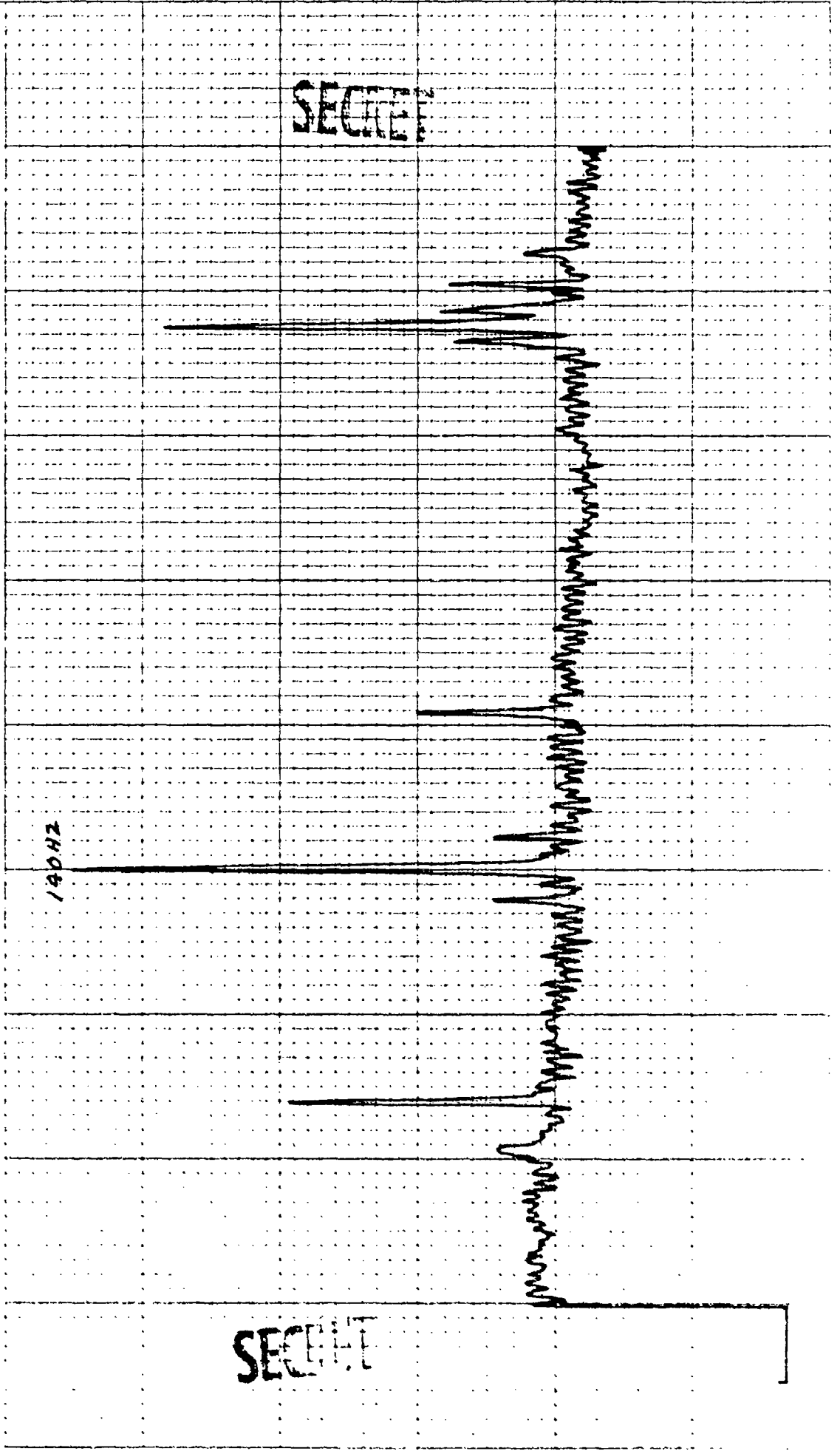
46 0703

REF: 1501 - 16 (DDB)

CONTROL: 1501 - 16 (DDB)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

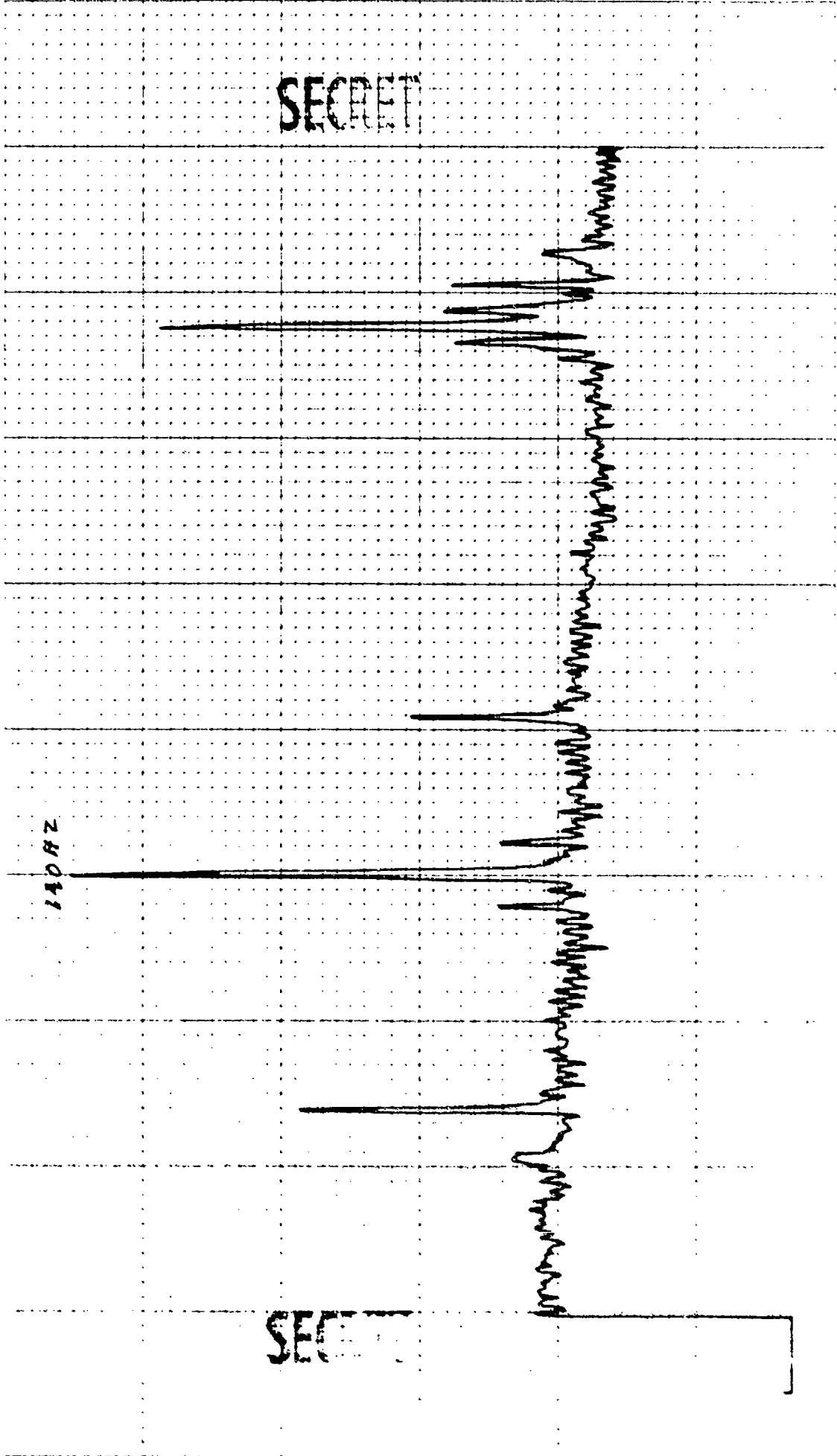
DATE OF ANALYSIS: 29-44
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 19 DEG. AZ STEERING

REEL: 44
INTEGRATION TIME 320 SECS
FII.TPR
ATTEN: 70 DB
WTG: HANNING
INDE X 3000



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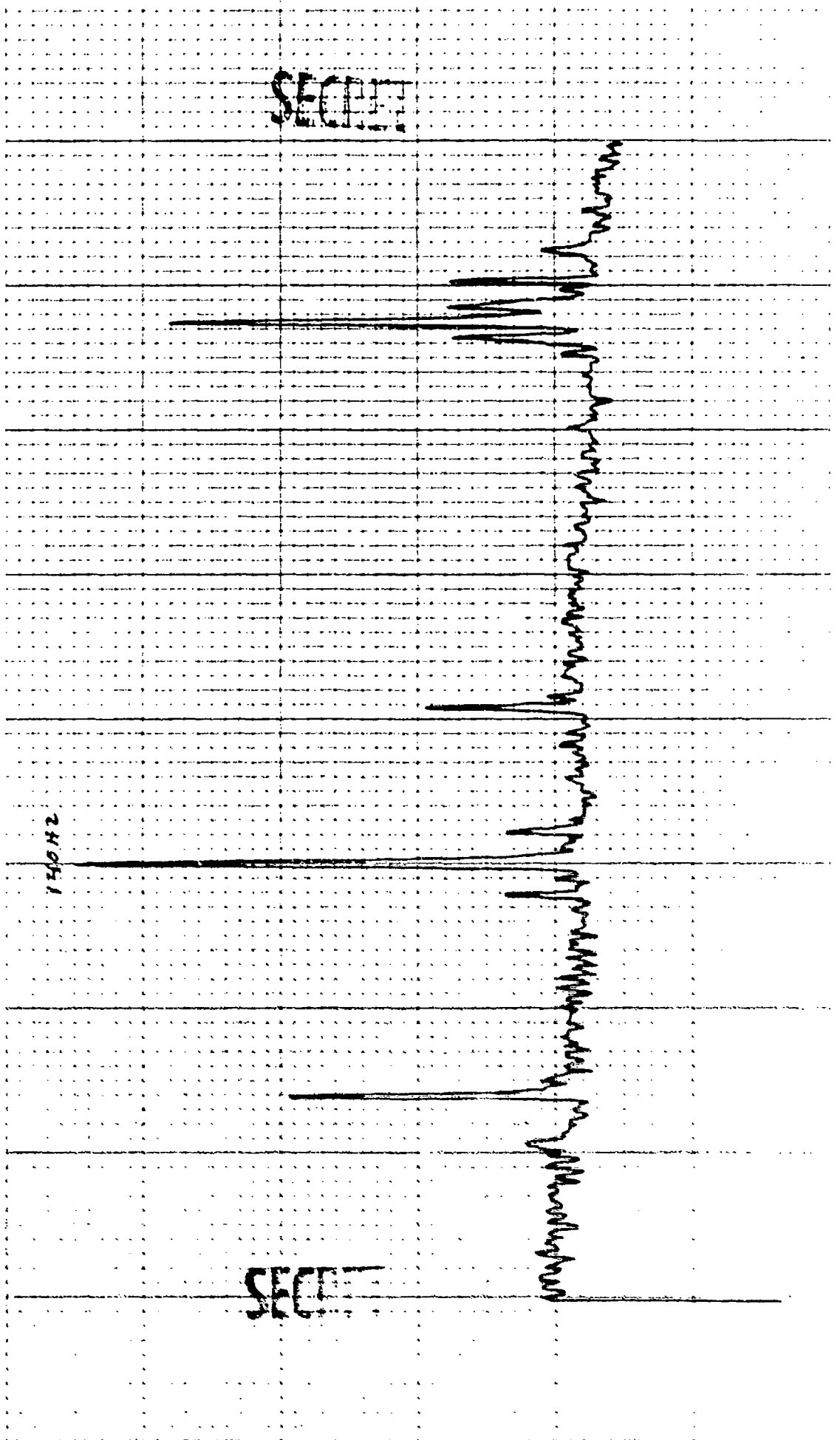
CONTROL: 1501 - 16 (000) DATE OF ANALYSIS: 28-44 REEL: M4 INDE X3000
 BEAMFORMED SPECTRUM (ELEMENTS))
 EXERCISE: BEARING STAKE)
 CENTER FREQ: 150 HZ)
16 ELEMENTS)
 ANALYSIS BANDWIDTH: 1/10HZ
 INTEGRATION TIME 320 SECS FILTER WTC: HANNING
120 DEG. AZ STEERING



46 0703

145 20.000 20.000 20.000 20.000

CONTROL: 1501 - 16 (DPS) REEL: M4 INDE X3000
 BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: - - -
 EXERCISE: BEARING STAKE 29-44 INTEGRATION TIME 320 SECS ATTN: -10 DB
 CENTER FREQ: 150 MZ ANALYSIS BANDWIDTH: 1/10HZ FILTFR WTG: HANNING
16 ELEMENTS 23 DEG. AZ STEERING



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CONTROL: 1501 - 16 (DPR) DATE OF ANALYSIS: -- -- --
 BEAMFORMED SPECTRUM (ELEMENTS) 29-44
 EXERCISE: BEARING STAKE DATE/TIME: 37577-1501 2
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
 16 ELEMENTS 725 DEG. AZ STEERING

REEL: 144

INDE X 3000

INTEGRATION TIME 320 SECS

ATTEN: -18 DB

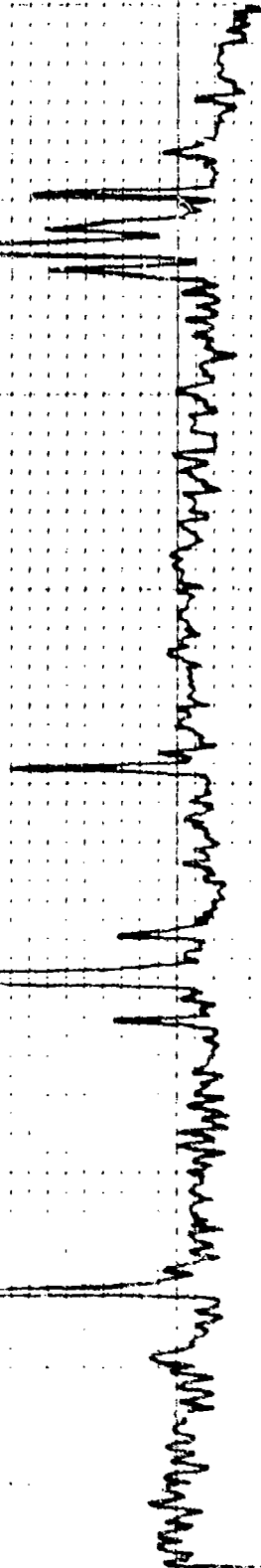
FILT: FB

WTG: HANNING

140HZ

SECRET

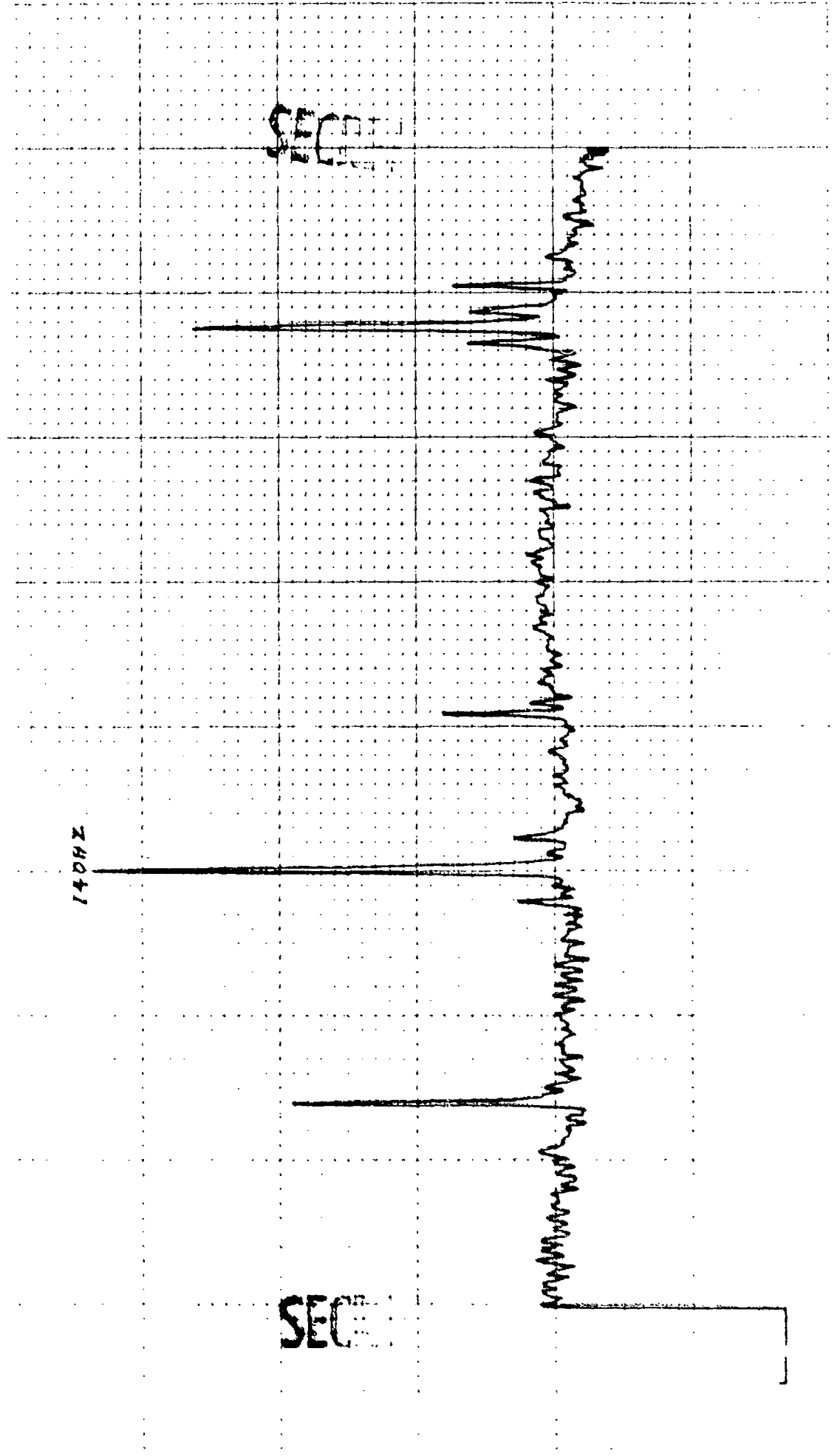
SECRET



140HZ
 1501-16
 29-44
 37577-1501 2
 1/10HZ
 725 DEG. AZ STEERING

46 0703

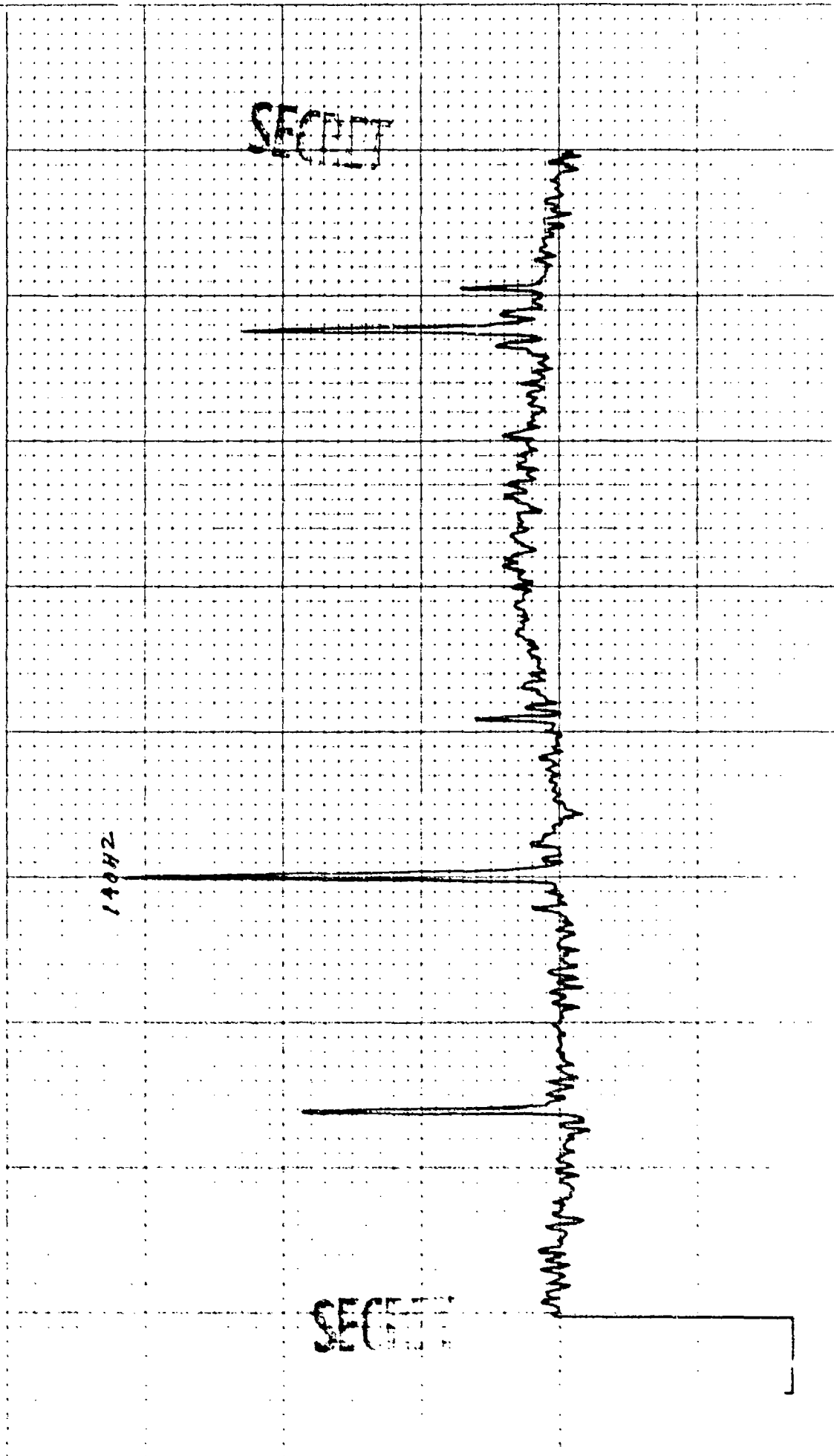
CONTROL: 1501 - 16 (DPB) DATE OF ANALYSIS: 29-44 REEL: 44 INDE X 3000
 BEAMFORMED SPECTRUM(ELEMENTS) 29-44
 EXERCISE: BEARING STAKE DATE/TIME: 7-15-77 - 1501 Z INTEGRATION TIME 320 SECS ATTN: -10 DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1710HZ FILTER WIG: HANNING
16 ELEMENTS +27 DEG. AZ STEERING



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DATE OF ANALYSIS: 29-54

CONTROL: 1501 - 16 (DPR) DATE OF ANALYSIS: 29-54 REEL: 144 INDE X3000
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 3-25-77 - 1501 Z INTEGRATION TIME 320 SECS ATTN: -18 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTC: HANNING
16 ELEMENTS +29 DEG. AZ STEERING



REF: 28000000000000000000

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CONTROL: 150/ - 16 (D08)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 170 HZ
16 ELEMENTS

DATE OF ANALYSIS: - - - - -
29-44
DATE/TIME: 3-5-77 - 150/ Z
ANALYSIS BANDWIDTH: 1/10HZ
+9 DEG. AZ STEERING

REEL: M4

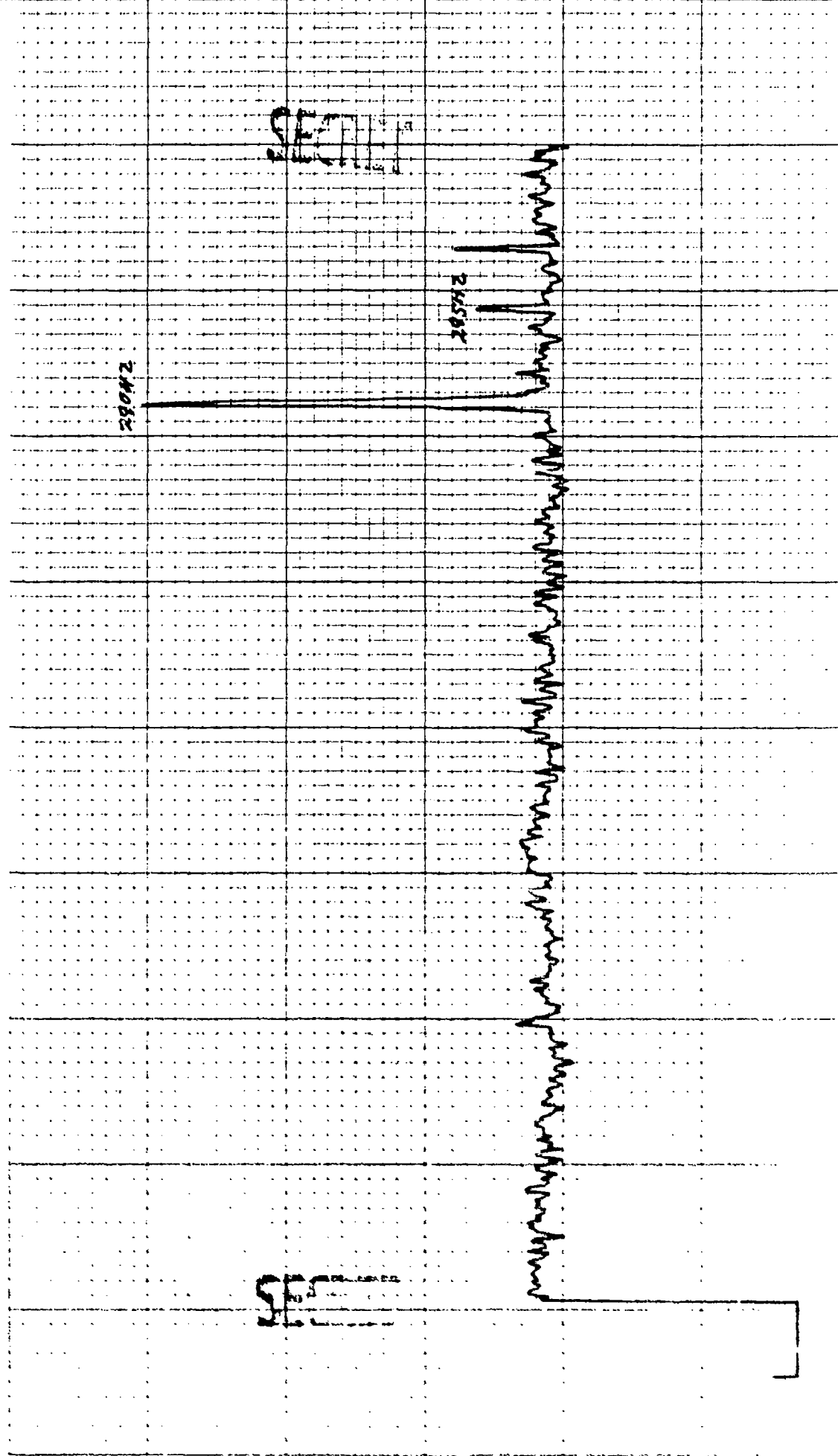
INDE X 3000

INTEGRATION TIME 320 SECS

ATTEN: 70 DB

FILTER

WTG: HANNING



45 0703

DATE: 29-44

INDE XC 2000

REEL: M4

DATE OF ANALYSIS: 29-44

CONTROL: 1501 - 48 (0P8)

INTEGRATION TIME 320 SECS

DATE/TIME: 3-15-77-1501 Z

REFORMED SPECTRUM (ELEMENTS)

ATTEN: 18 DB

ANALYSIS BANDWIDTH: 1/10HZ

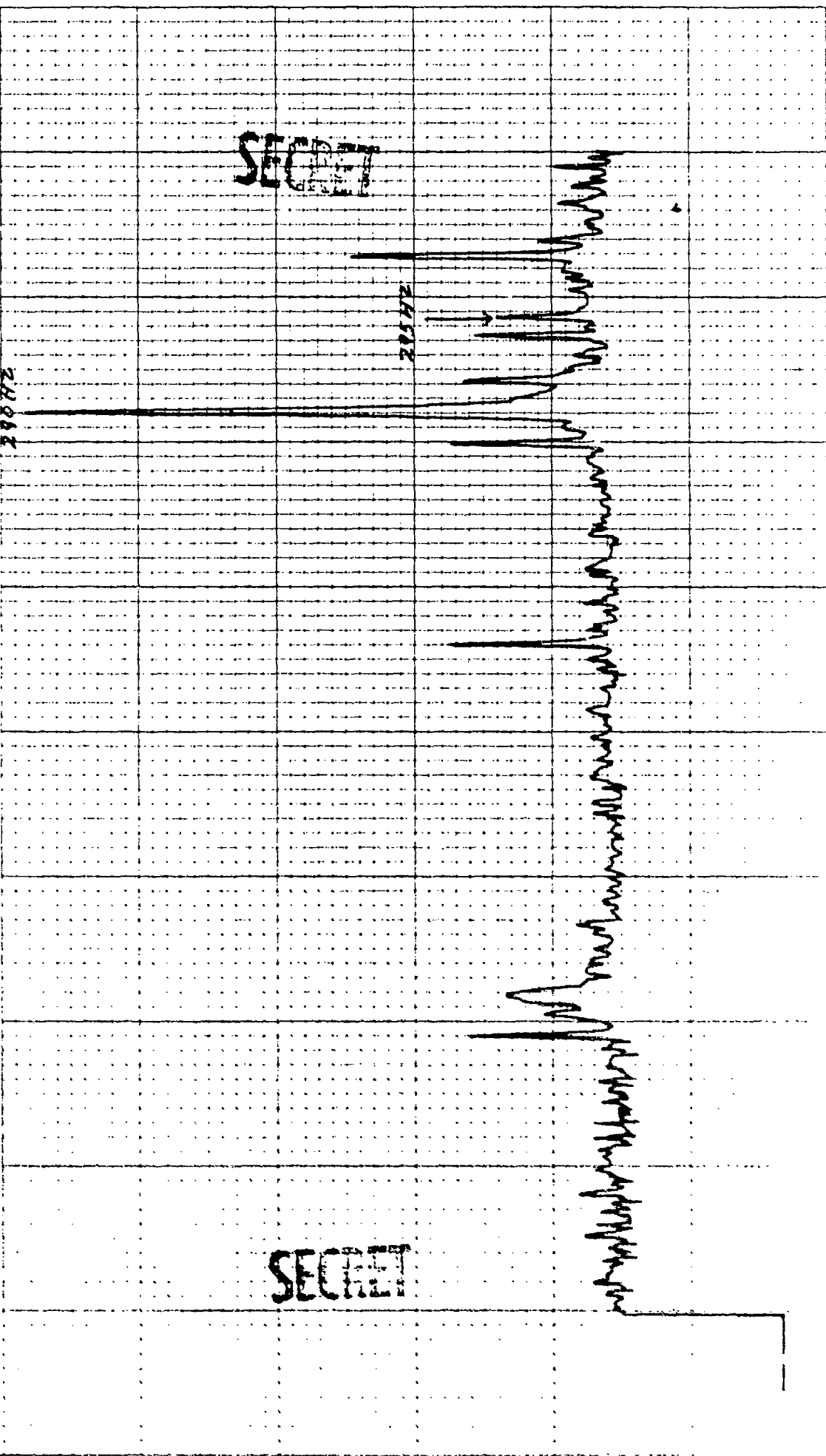
EXERCISE: BEARING STAKE

FILTER: HANNING

+ 11 DEG. AZ STEERING

CENTER FREQ: 270 HZ

1/6 ELEMENTS



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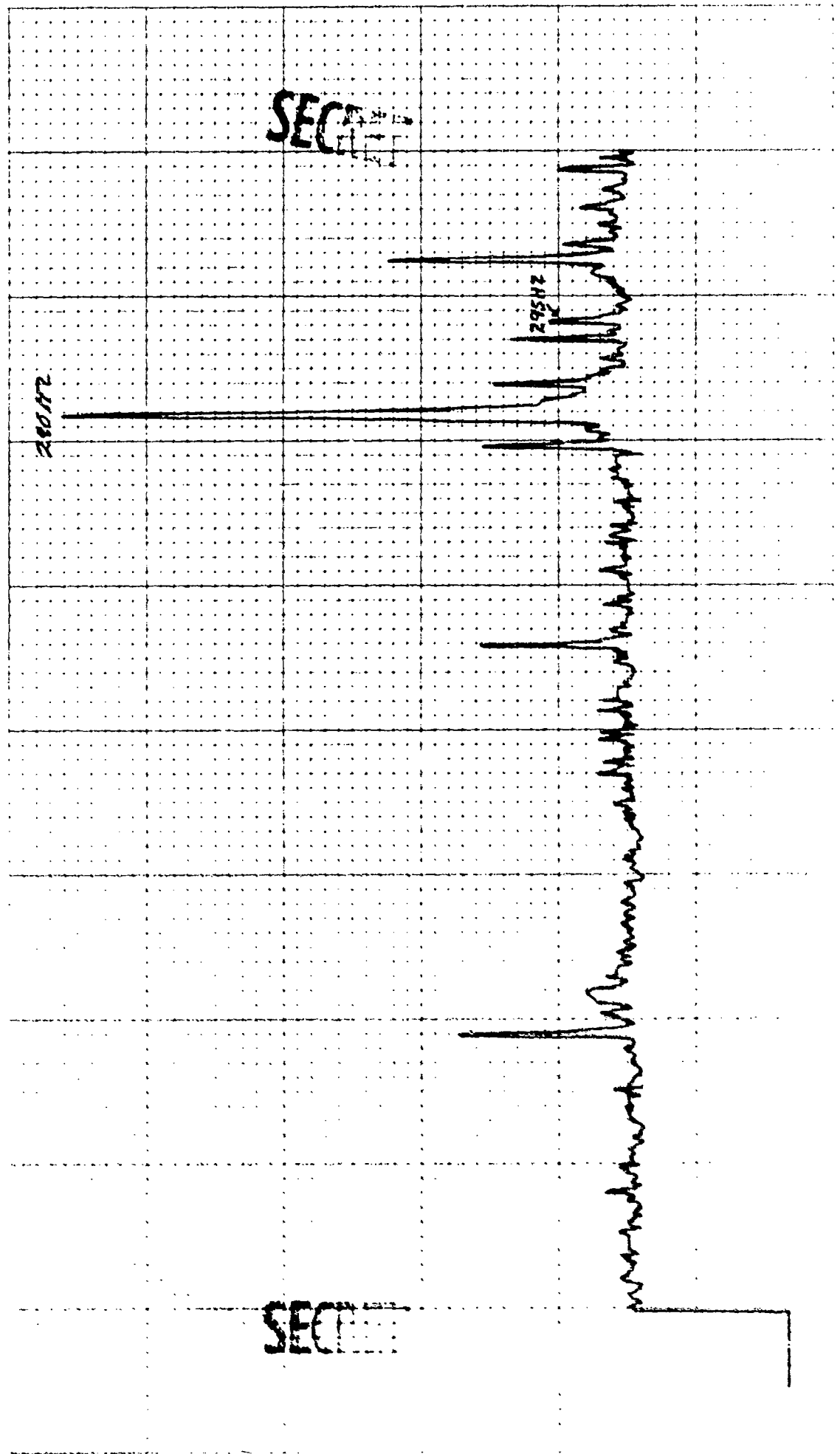
CONTROL: 1501 - 16 (008) REEL: 14 INDE X3000

BEAMFORMED SPECTRUM/ELEMENTS DATE OF ANALYSIS: 09-44

EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: -18 DB

CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FII.TFR WTC: HANNING

16 ELEMENTS + 17 DEG. AZ STEERING



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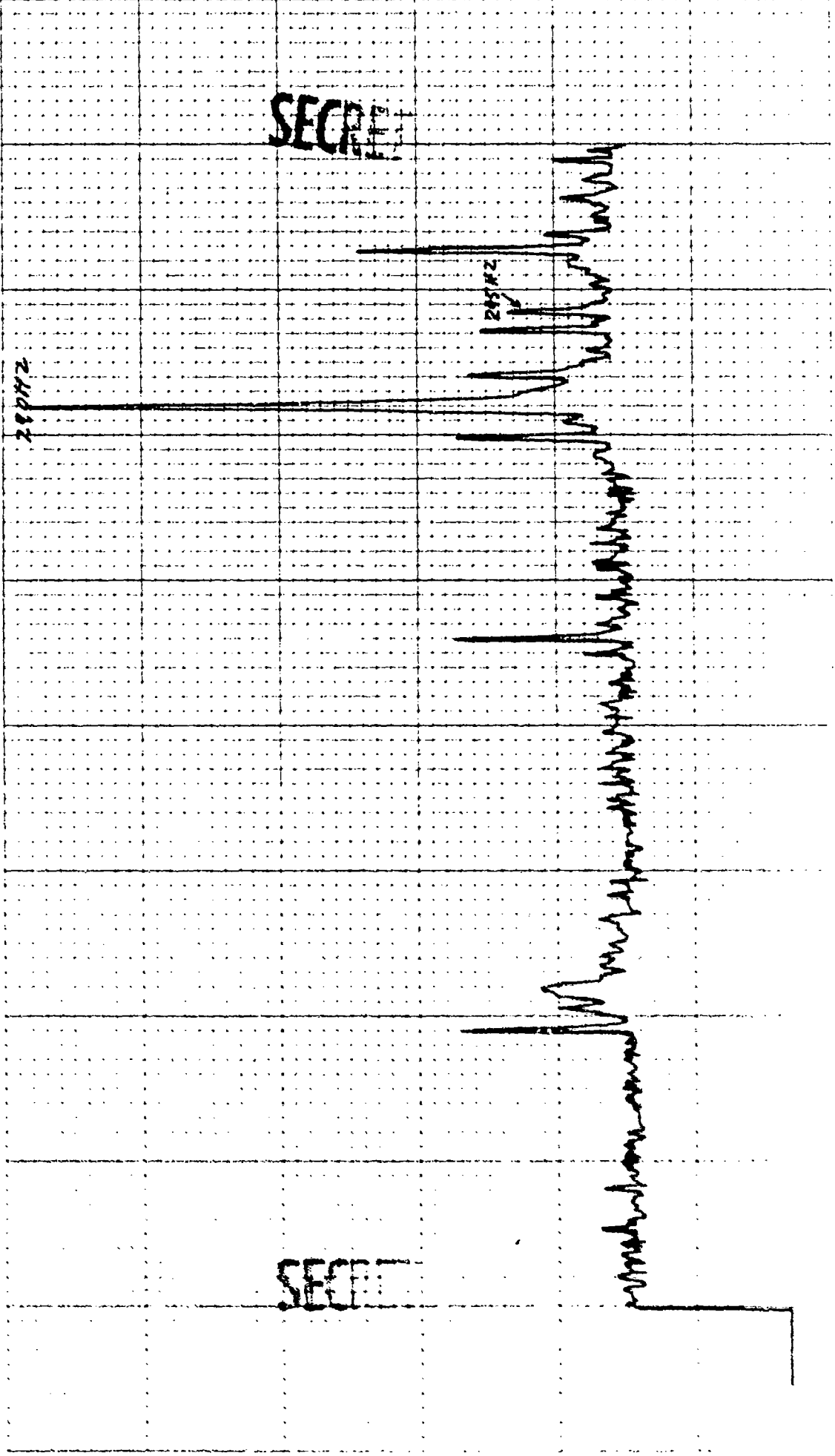
CONTROL: 1501 - 16 (2PB) DATE OF ANALYSIS: REEL: M4 INDE X3000

BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 29-44 INTEGRATION TIME 320 SECS ATTEN: 10 DB

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

CENTER FREQ: 270 HZ +19 DEG. AZ STEERING

16 ELEMENTS



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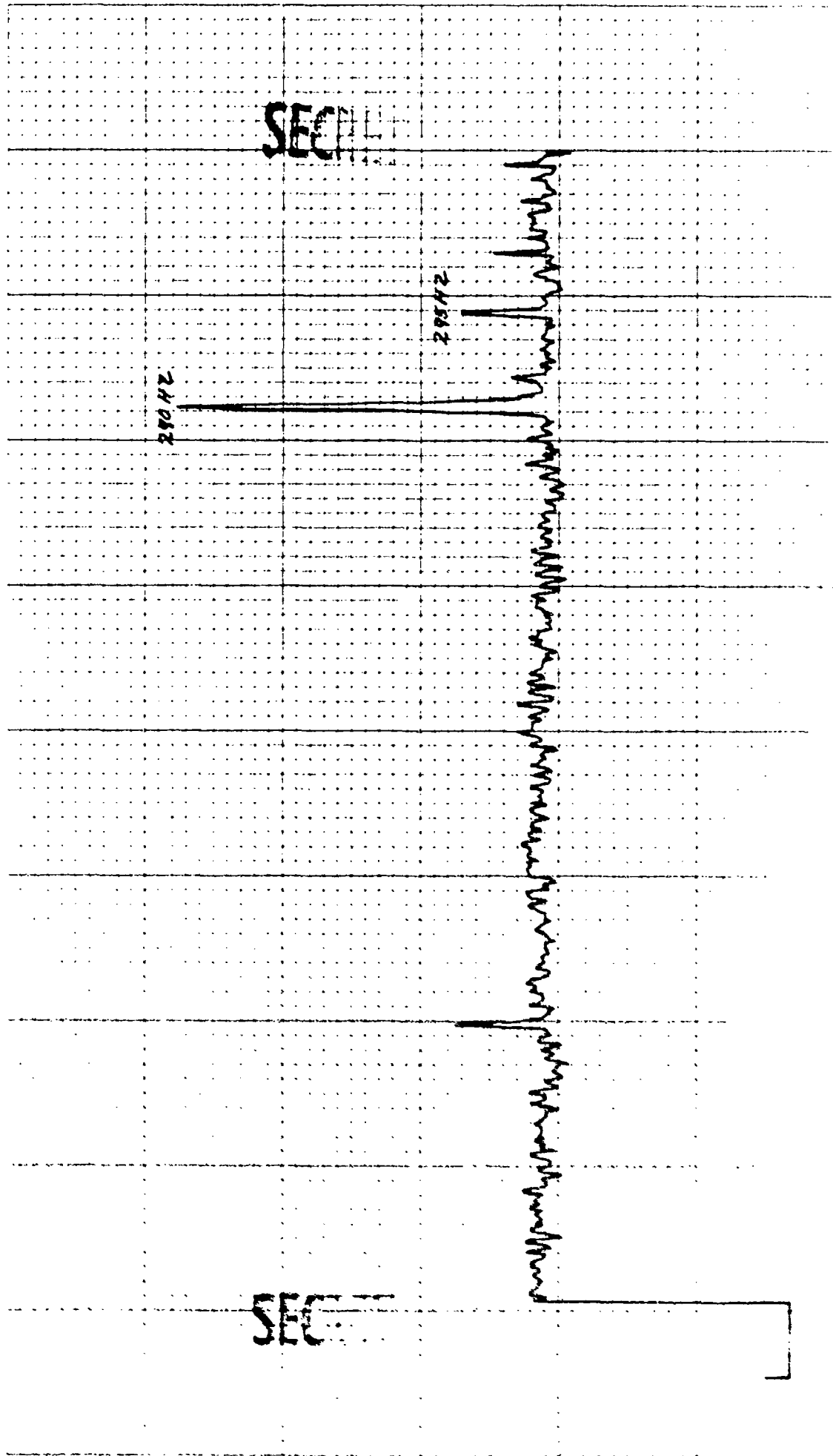
CONTROL: 1501 - 48 (DP8)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
/6 ELEMENTS

DATE OF ANALYSIS: _____
29-44

ANALYSIS BANDWIDTH: 1/10HZ
+20 DEG. AZ STEERING

REEL: _____ INDEX _____

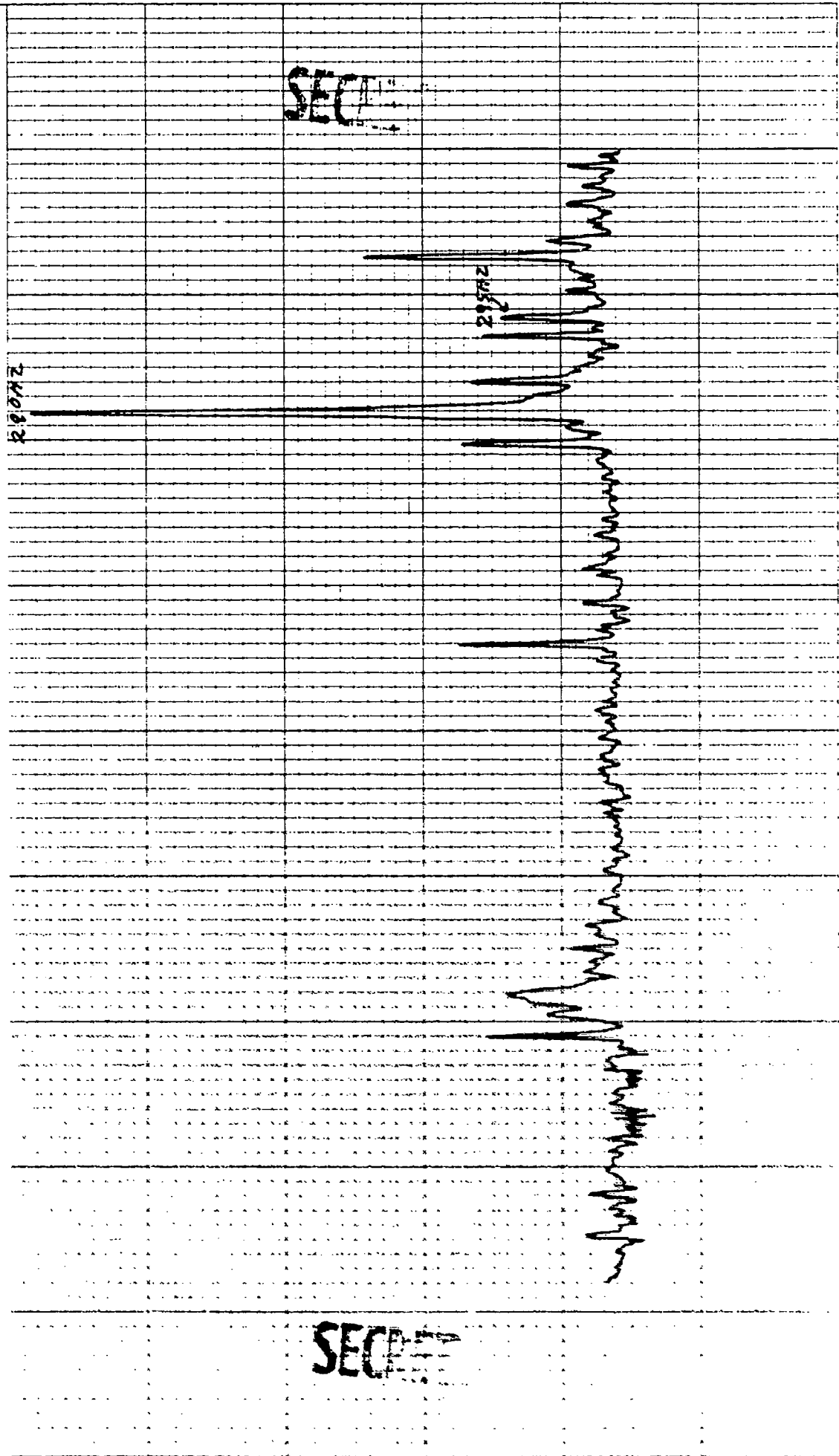
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING DB



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10.2.10 THE TIME INDICATED IS IN UTC

CONTROL: 1501 - 16 (DP8) REEL: M4 INDE X 3000
 BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: 29-44
 EXERCISE: BEARING STAKE DATE/TIME: 1-15-77 - 1501 Z INTEGRATION TIME 320 SECS ATTN: -18 DB
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FI.TFR WTG: HANNING
16 ELEMENTS + 2/ DEG. AZ STEERING



46 0703

102 2040 0000 0000 0000

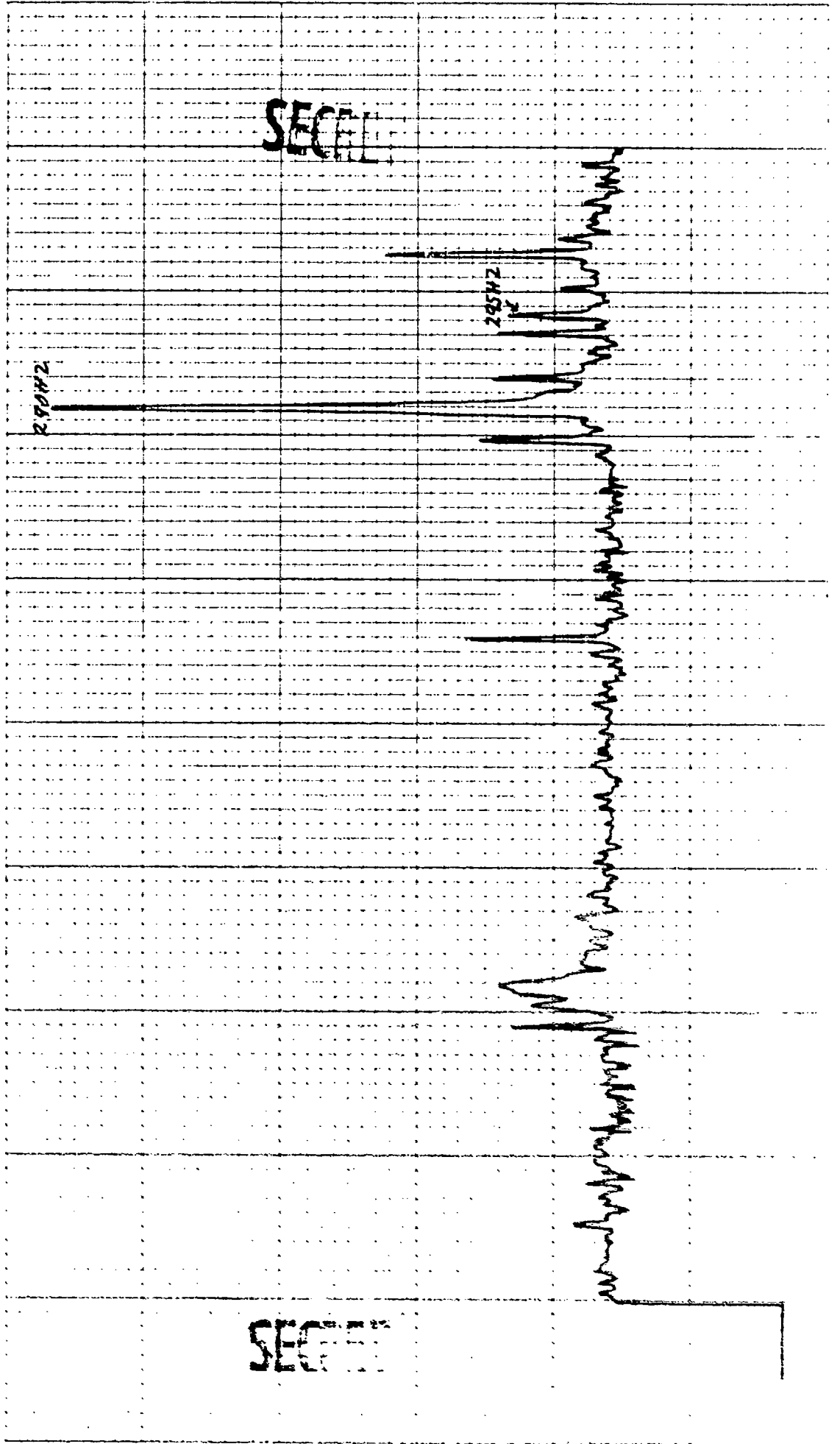
CONTROL: 1501 - 16 (DPO)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
16 ELEMENTS

DATE OF ANALYSIS: - - - -
29-44

INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

REEL: M4
 INDE X 300c

ANALYSIS BANDWIDTH: 1/10 HZ
+33 DEC. AZ STEERING

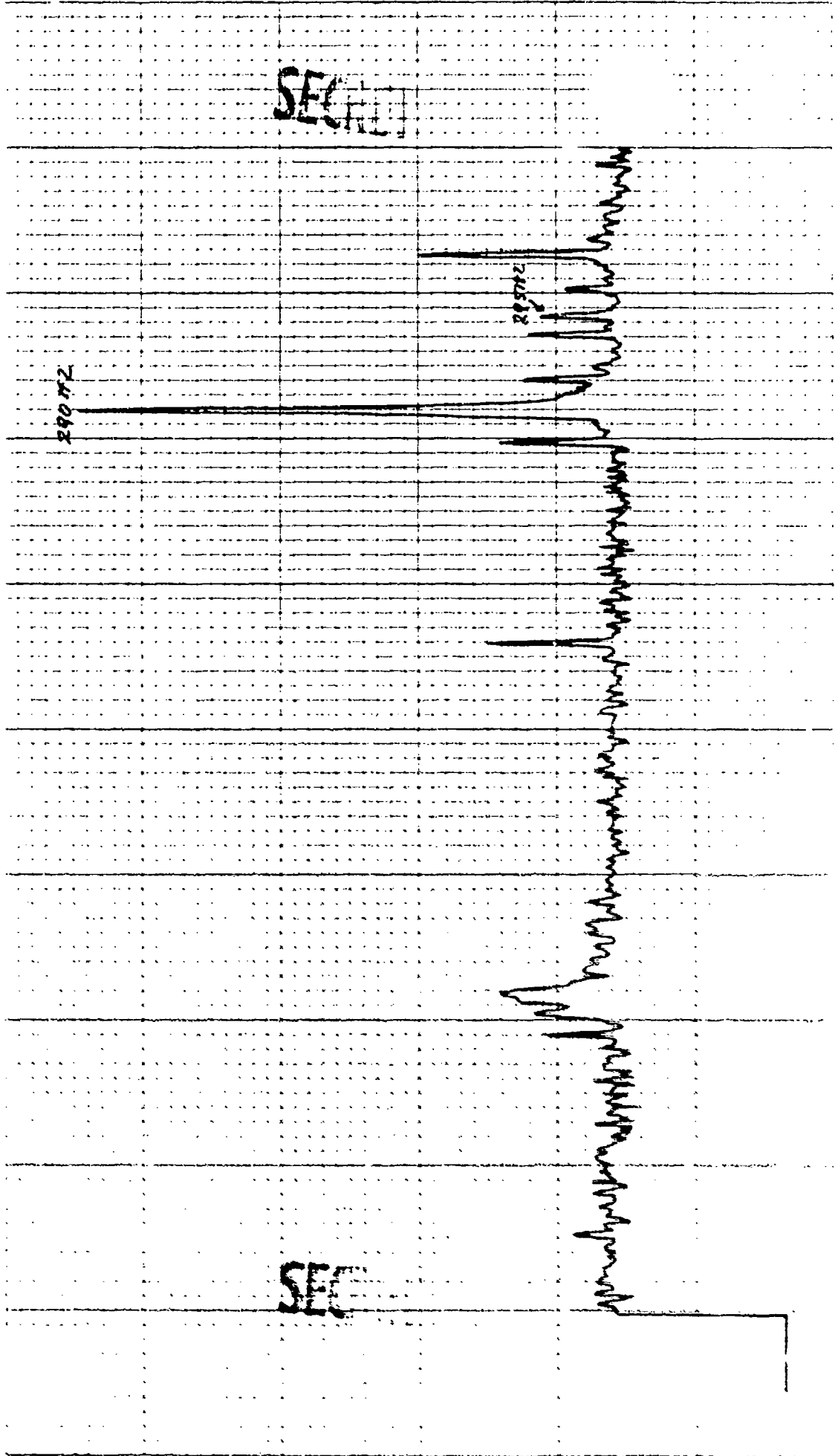


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CONTROL: 1501 - 16 (DPO)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS

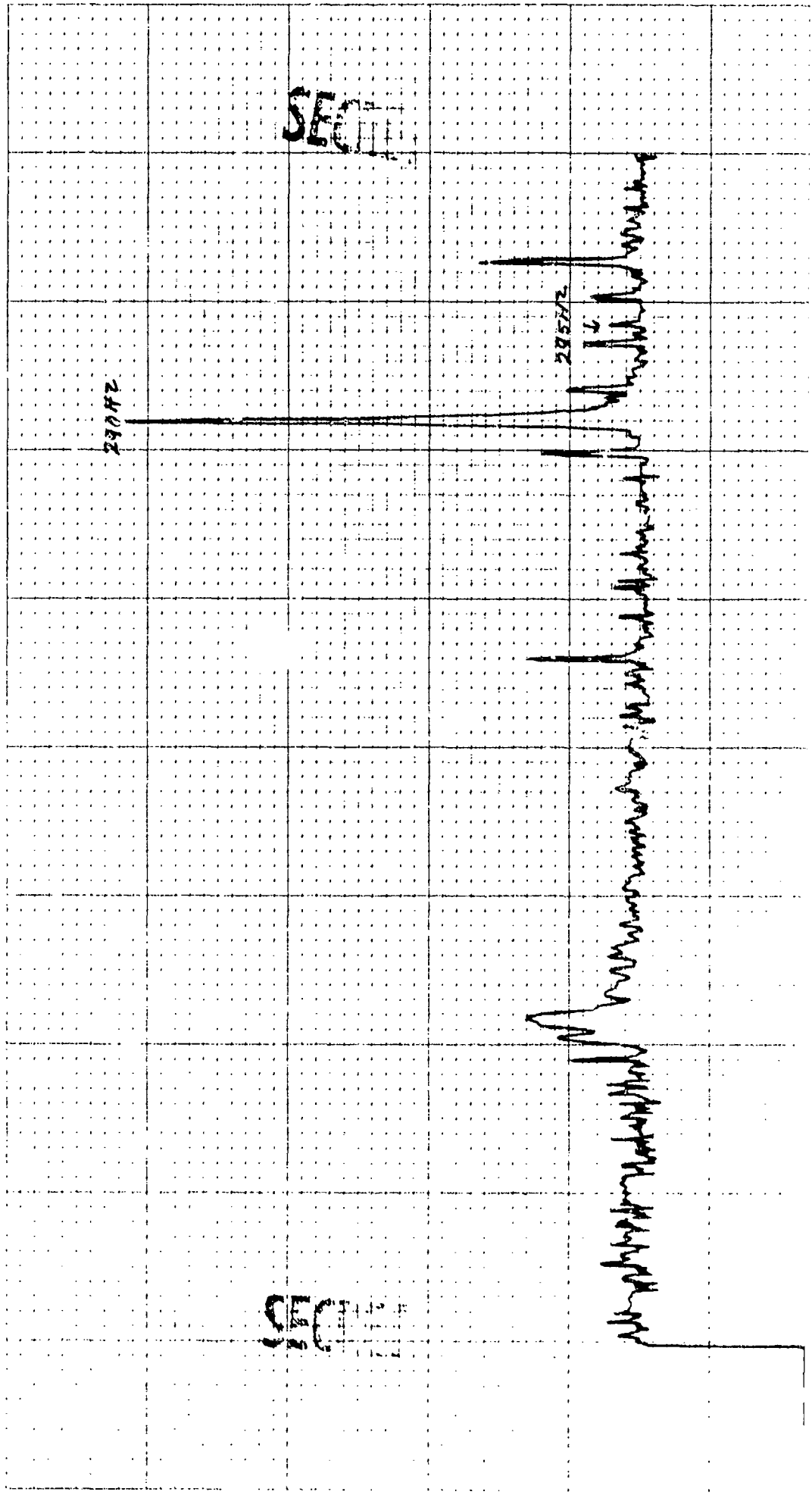
DATE OF ANALYSIS: - - -
29-44
DATE/TIME: 17577 - 150/Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 25 DEG. AZ STEERING

REEL: M4 INDE X3000
INTEGRATION TIME 320 SECS ATTN: 78 DB
FILT.FP WTG: HANNING



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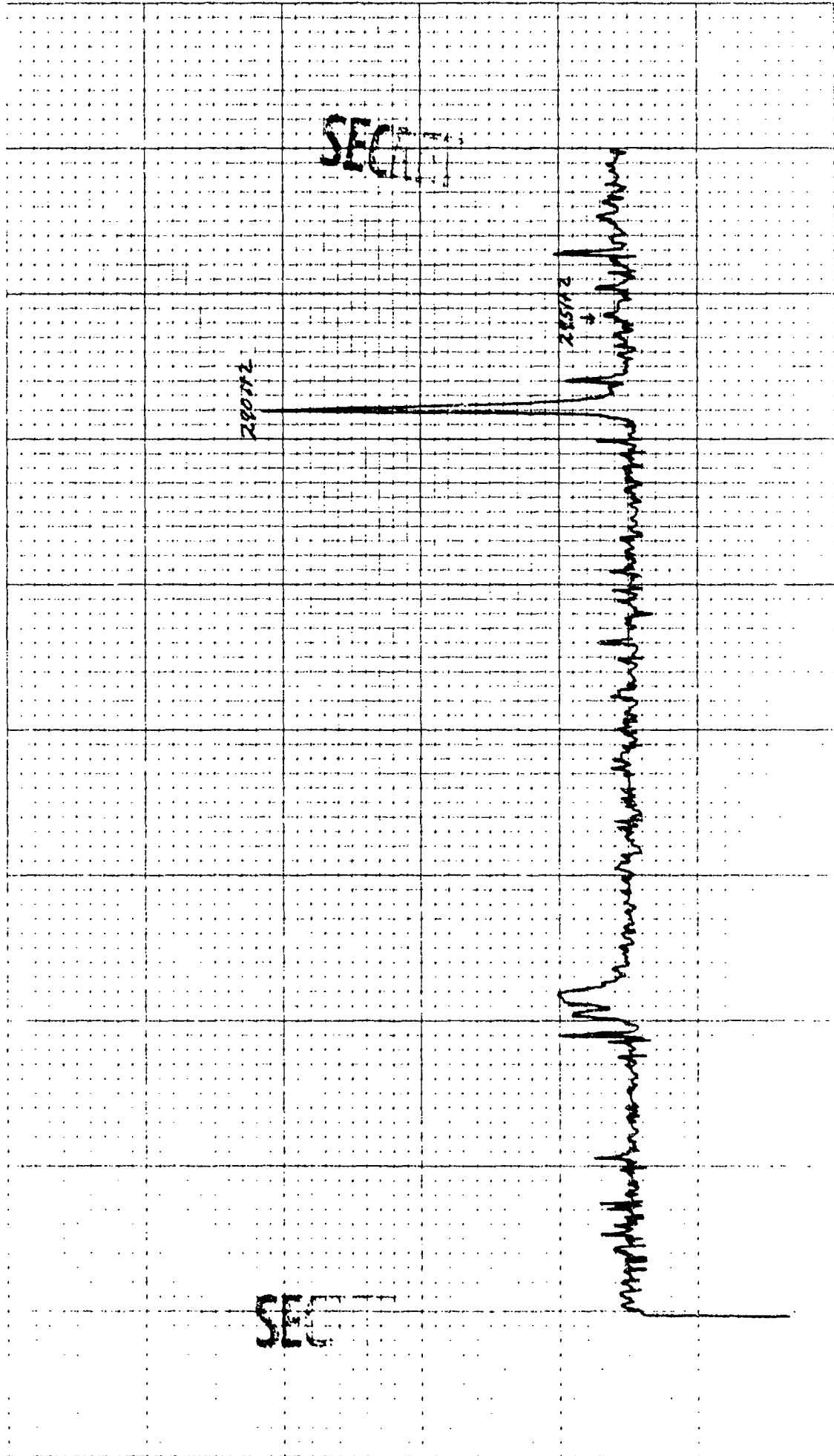
CONTROL: 1501-16 (DP8) DATE OF ANALYSIS: 29-44 REEL: 114 INDE X 3000
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-15-77 -1501Z INTEGRATION TIME 320 SECS ATTEN: -18 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 CENTER FREQ: 270 HZ +27 DEG. AZ STEERING



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NOTE: REFER TO THE INSTRUMENT MANUAL

CONTROL: 1501 - 16 (DP8) DATE OF ANALYSIS: 29-44 REEL: M4 INDEX: X1501
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-15-77 - 1501 Z INTEGRATION TIME 320 SECS ATTEN: -18 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER: WTG: HANNING
CENTER FREQ: 270 HZ +29 DEG. AZ STEERING



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SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 8

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-27.2</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-17.2	
BEAMFORMER GAIN	<u>+30</u>	+12.8	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	+13	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-75.1</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-65.1	
BEAMFORMER GAIN	<u>+30</u>	-35.1	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+12.8</u>	
SIGNAL LEVEL FOR SNR	<u>-35.1</u>	47.9	
PROCESSOR CORRECTION	<u>-4.0</u>	43.9	
MRA CORRECTION	<u>+ .2</u>	44.1	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	35.9	SNR 1 HZ BAND

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SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 8

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-23.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-13.8	
BEAMFORMER GAIN	<u>+30</u>	+16.2	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	+17	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-75.2</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-65.2	
BEAMFORMER GAIN	<u>+30</u>	-35.2	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+16.2</u>	
SIGNAL LEVEL FOR SNR	<u>-35.2</u>	51.4	
PROCESSOR CORRECTION	<u>-4.0</u>	47.4	
MRA CORRECTION	<u>+ .8</u>	48.2	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	40.0	SNR 1 HZ BAND

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SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 8

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-60.4</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-50.4	
BEAMFORMER GAIN	<u>+30</u>	-20.4	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	-19.6	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-74.4</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-64.4	
BEAMFORMER GAIN	<u>+30</u>	-34.4	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-20.4</u>	
SIGNAL LEVEL FOR SNR	<u>-34.4</u>	14	
PROCESSOR CORRECTION	<u>-1.2</u>	9.8	
MRA CORRECTION	<u>+ .8</u>	10.6	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	2.4	SNR 1 HZ BAND

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DATA POINT 8

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-19.4</u>	<u>-15.2</u>	<u>_____</u>
MRA SIGNAL LEVEL	<u>+13.0</u>	<u>+17.0</u>	<u>-19.6</u>
ARRAY SIGNAL GAIN	<u>32.4</u>	<u>32.3</u>	<u>_____</u>
20 LOG <u>32</u> # of elements	<u>30.1</u>	<u>30.1</u>	<u>_____</u>
DIFFERENCE	<u>+ 2.3</u>	<u>+2.2</u>	<u>_____</u>

ARRAY GAIN

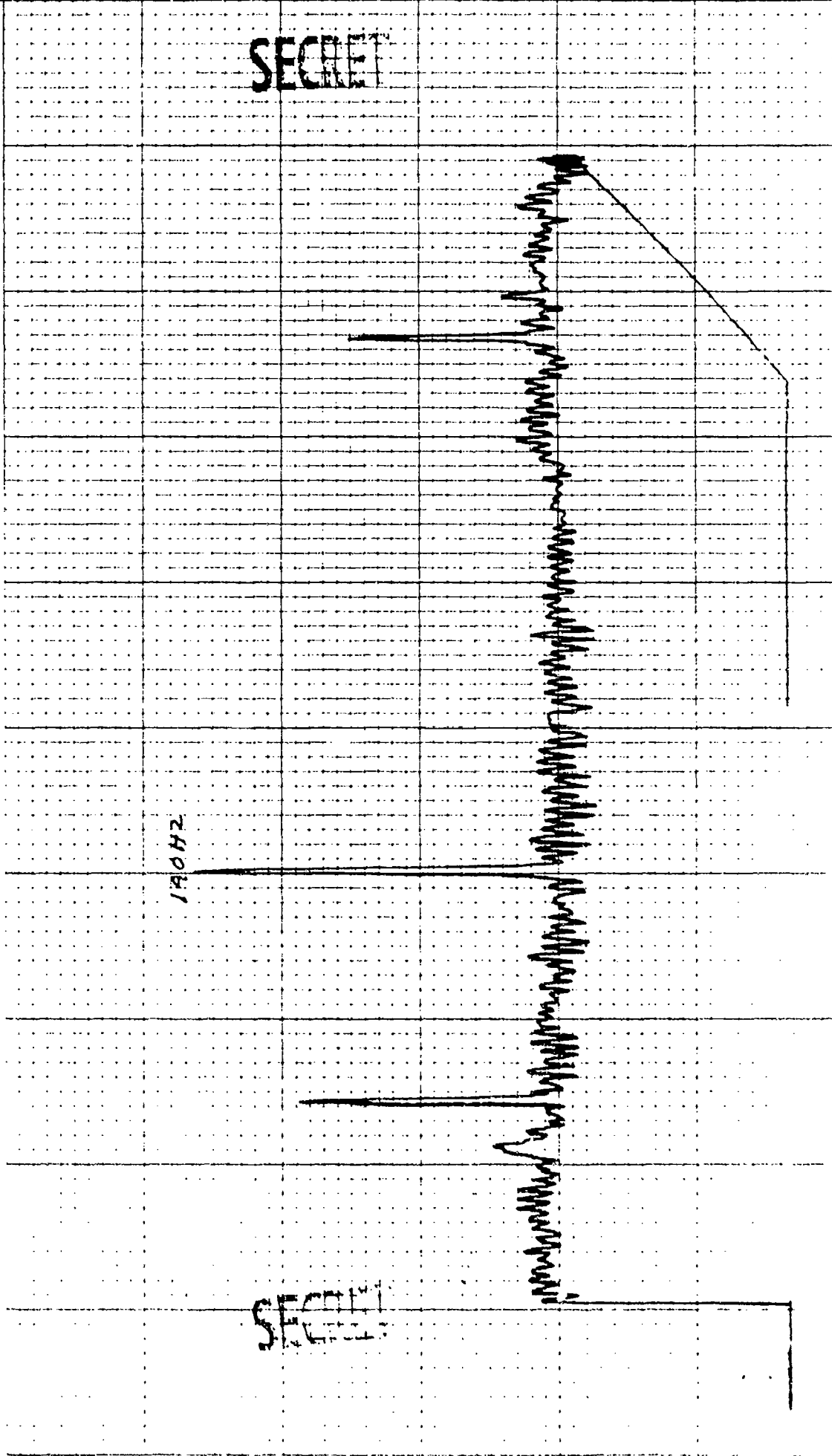
MRA SNR	<u>44.1</u>	<u>48.2</u>	<u>10.6</u>
MEAN OMNI SNR	<u>29.4</u>	<u>35.4</u>	<u>_____</u>
ARRAY GAIN	<u>14.7</u>	<u>12.8</u>	<u>_____</u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>13.4</u>	<u>15.2</u>	<u>14.7</u>
DIFFERENCE	<u>+ 1.3</u>	<u>- 2.4</u>	<u>_____</u>

CONFIDENTIAL

REF ID: A66703

46 0703

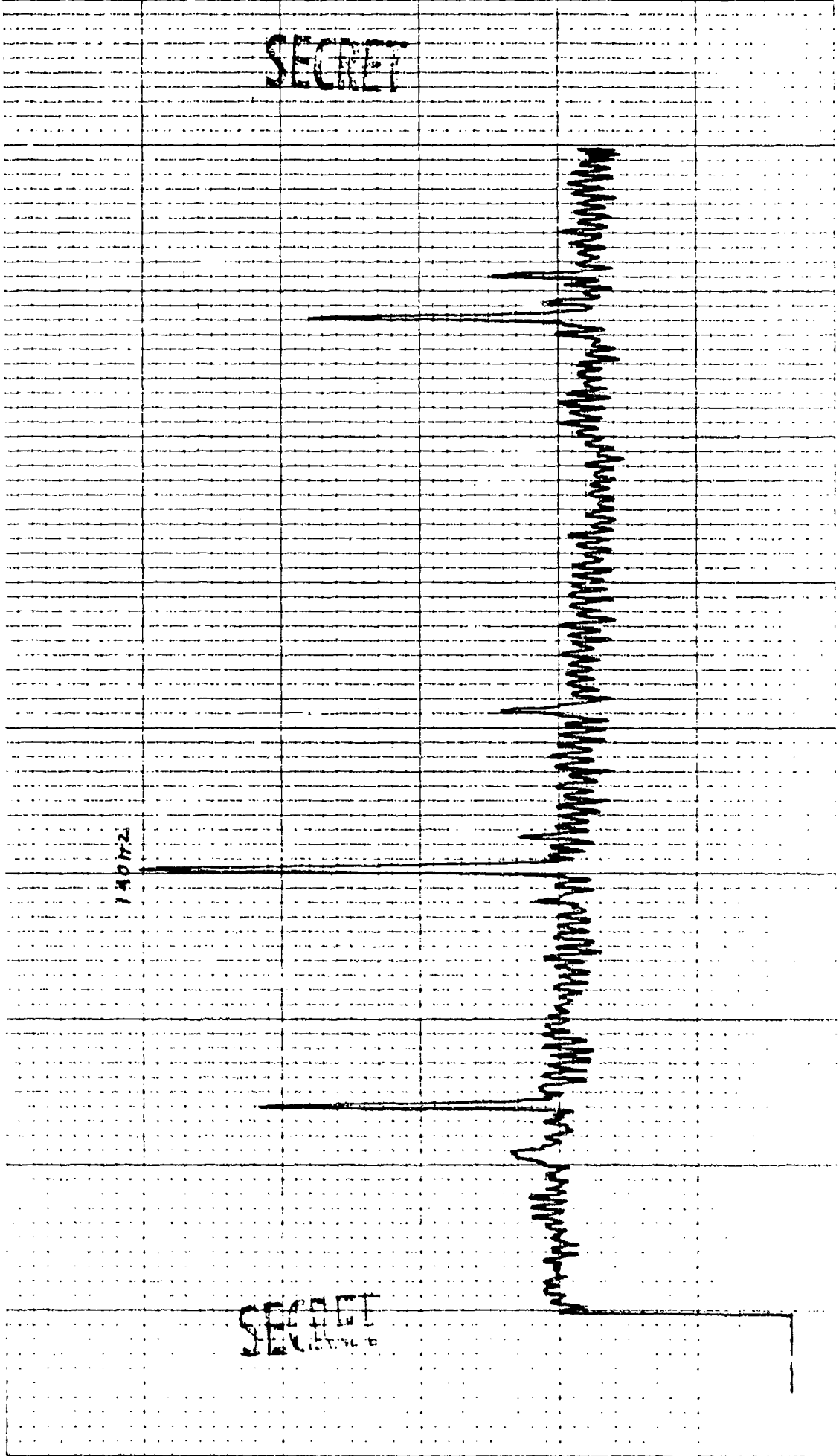
CONTROL: 1501 - 32 (DP8) REEL: M4 INDE X3000
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 30-269 28-53
EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 1501 Z INTEGRATION TIME 320 SECS ATTN: 30 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1710 HZ FILTER WTG: HANNING
32 ELEMENTS 412 DEG. AZ STEERING



10 X 10 TO THE INCH. 2.5 CM GRID.
REF. 10-10-70

46 0703

CONTROL: 1501 - 32 (DPE) REEL: 14 INDE X3000
BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: 20-26-09-53
EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 1501Z INTEGRATION TIME 320 SECS ATTN: -30 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FTI.TFR WTG: HANNING
32 ELEMENTS +14 DEG. AZ STEERING



10 X 10 TO THE RIGHT OF THE CENTER OF THE BEARING STAKE

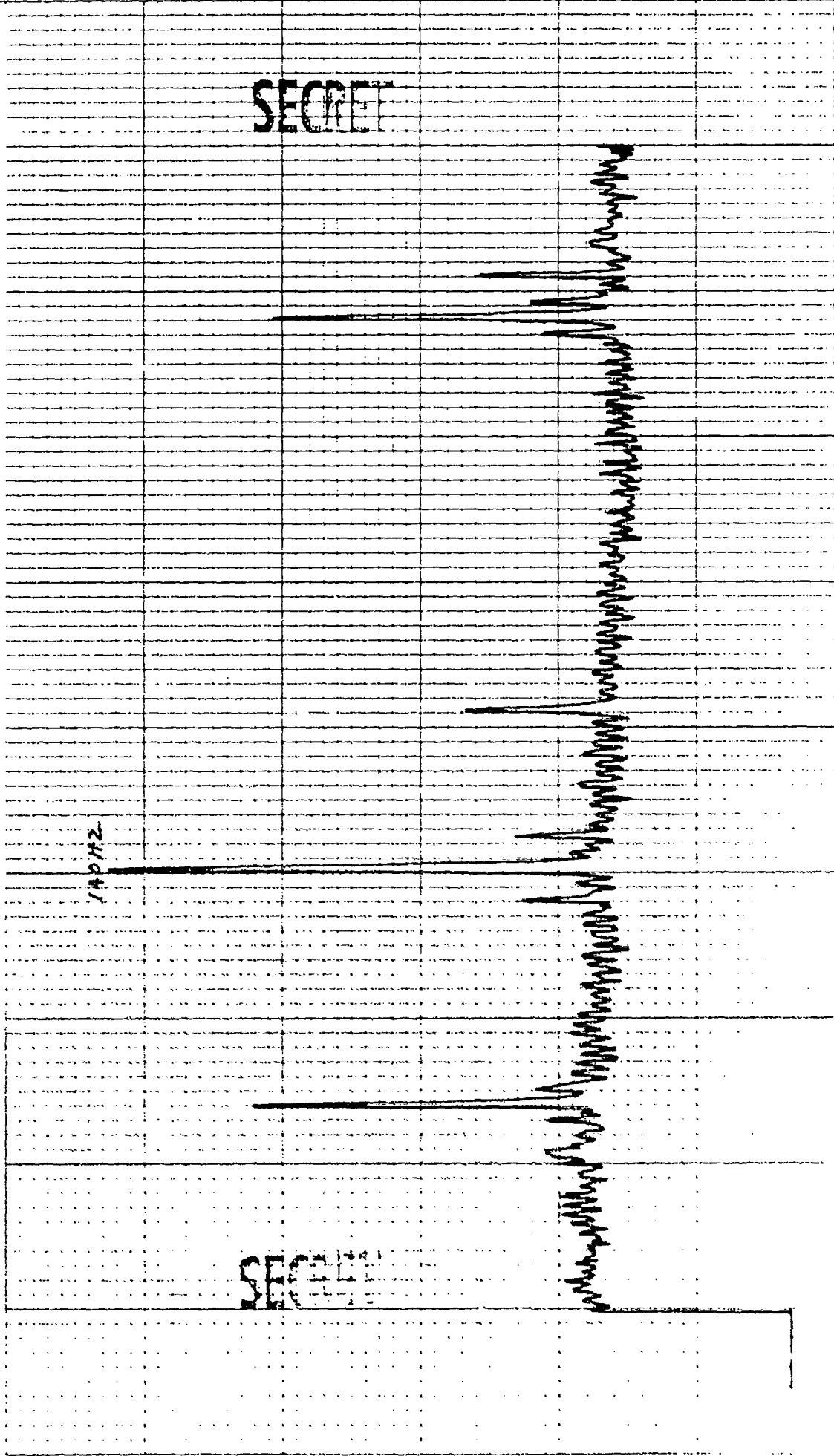
46 0703

CONTROL: 1501 - 32 (DP8) DATE OF ANALYSIS: -- -- --
BEAMFORMED SPECTRUM (ELEMENTS) 20-26429-53
EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 1507 Z
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ
32 ELEMENTS +1/6 DEC. AZ STEERING

REEL: 144

INDE X 3000

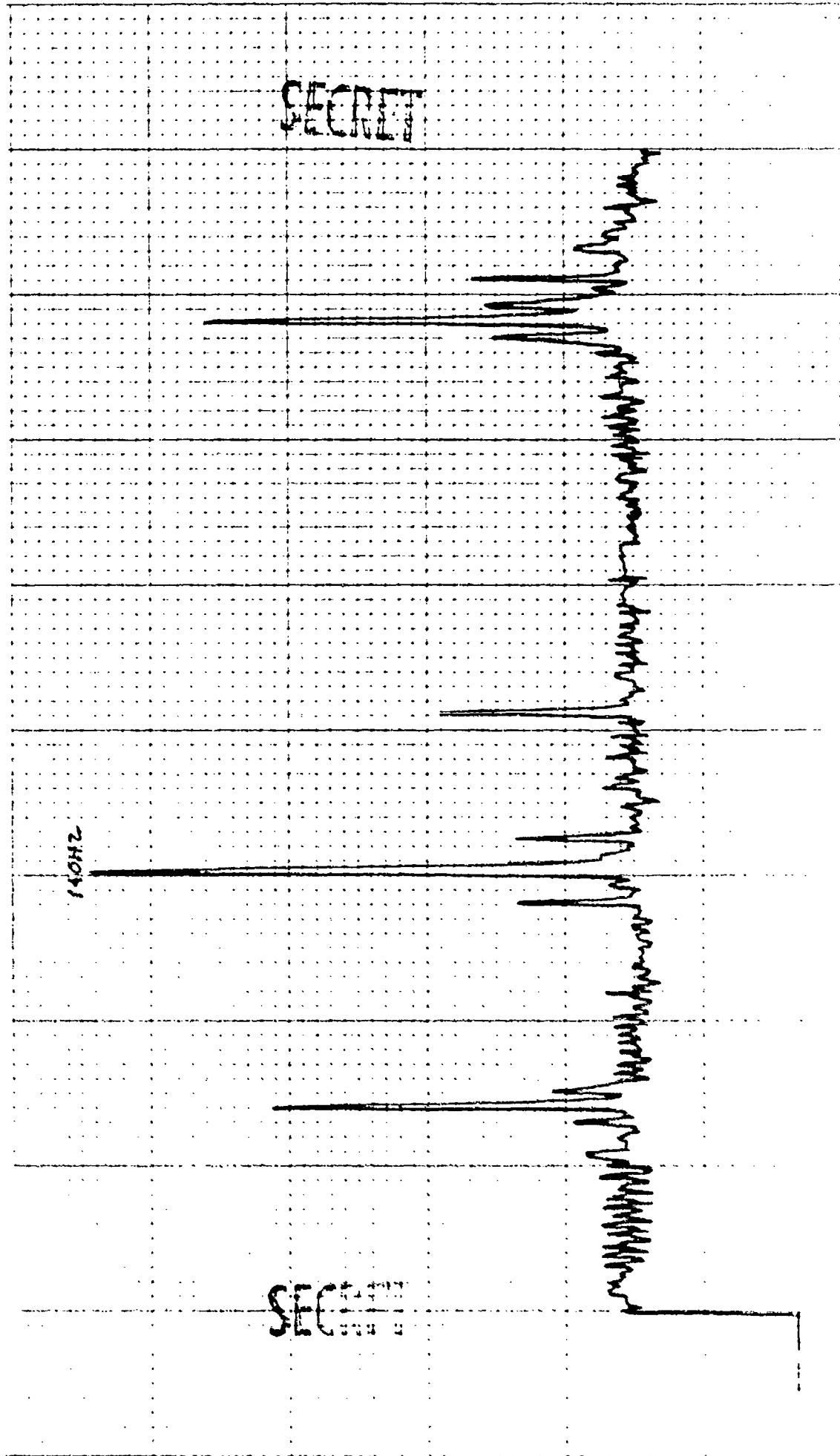
INTEGRATION TIME 320 SECS
FIT.FP WTG: HANNING



46 0703

1/4 X 2 1/2 INCHES

CONTROL: 1501 - 32 (DPO) REEL: 44 INDE X 300c
BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: 20-268/29-53
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ
CENTER FREQ: 150 HZ +18 DEG. AZ STEERING
32 ELEMENTS INTEGRATION TIME 320 SECS ATTN: -30 DB
FILTER WIG: HANNING

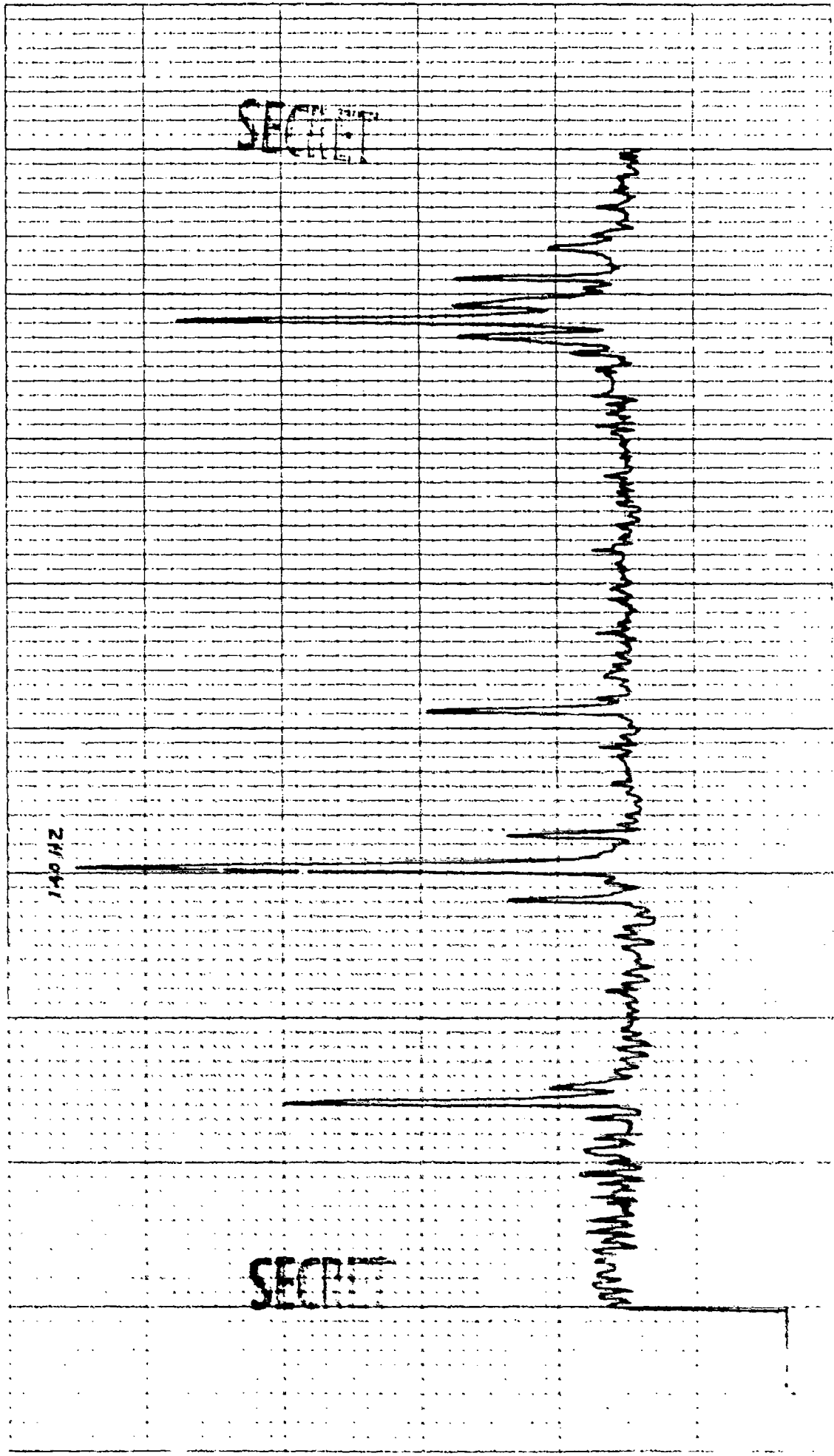


46 0703

PLATE TO THE DEPT. OF DEFENSE

CONTROL: 1501 - 48 (DP8) DATE OF ANALYSIS: _____
BEAMFORMED SPECTRUM(ELEMENTS 20-26 & 29-53)
EXERCISE: BEARING STAKE DATE/TIME: 7-15-77 - 1501 Z
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ
32 ELEMENTS +20 DEG. AZ STEERING

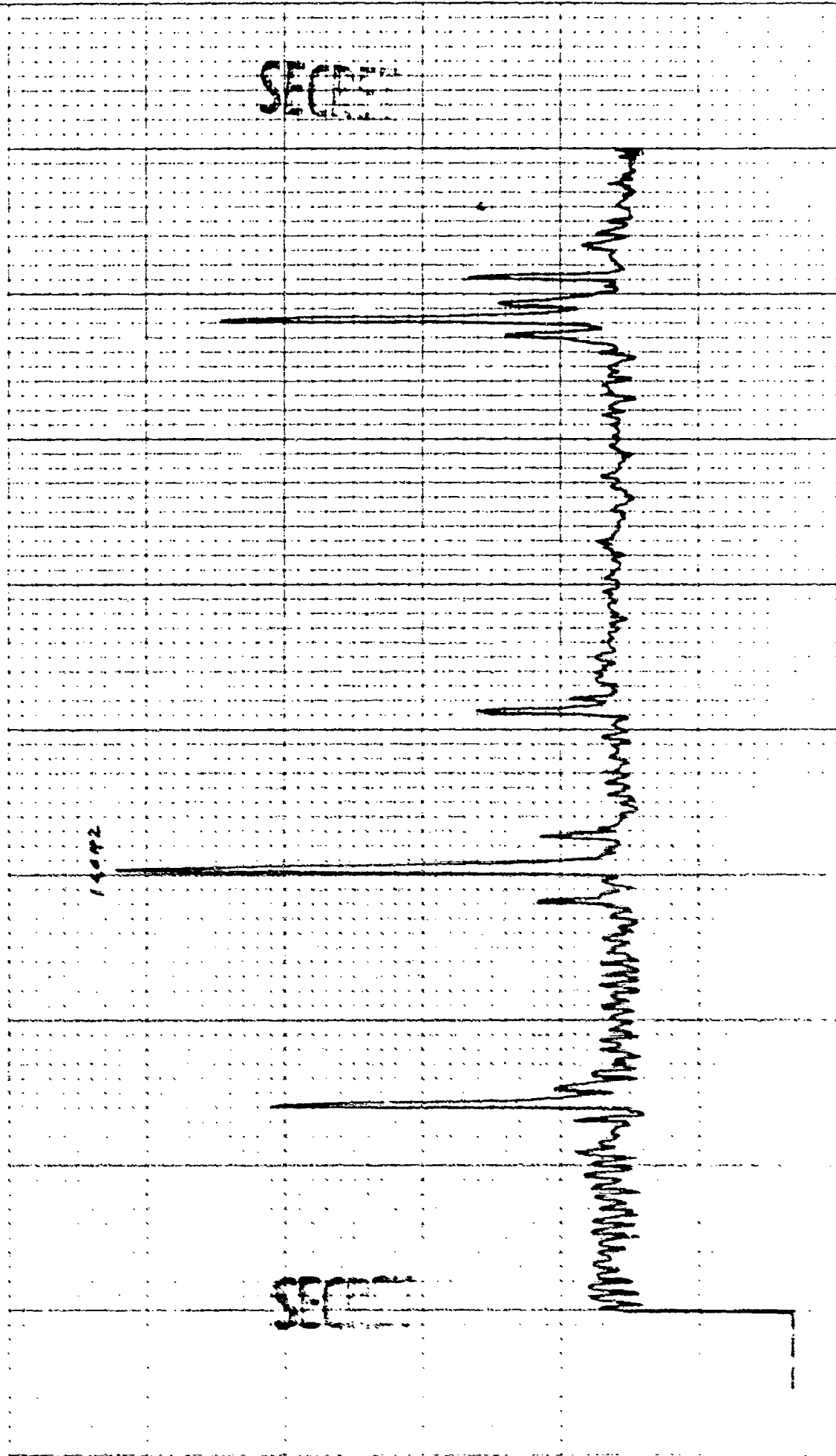
REEL: M4 INDE X 3100
INTEGRATION TIME 320 SECS ATTN: 30 DB
FILTER WTG: HANNING



46 0703

REF: 20-268 29-53

CONTROL: 1501 - 32 (200) DATE OF ANALYSIS: 20-268 29-53 REEL: M4 INDE X 3000
BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 7-5-77 - 1501 Z INTEGRATION TIME 320 SECS ATTN: -30DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 150 HZ +24 DEG. AZ STEERING



46 0703

10-20-77 TO THE DIRECTOR, NSA

CONTROL: 1501 - 32 (DPB) REEL: 14 INDE X3000

BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 20-26-77 29-53

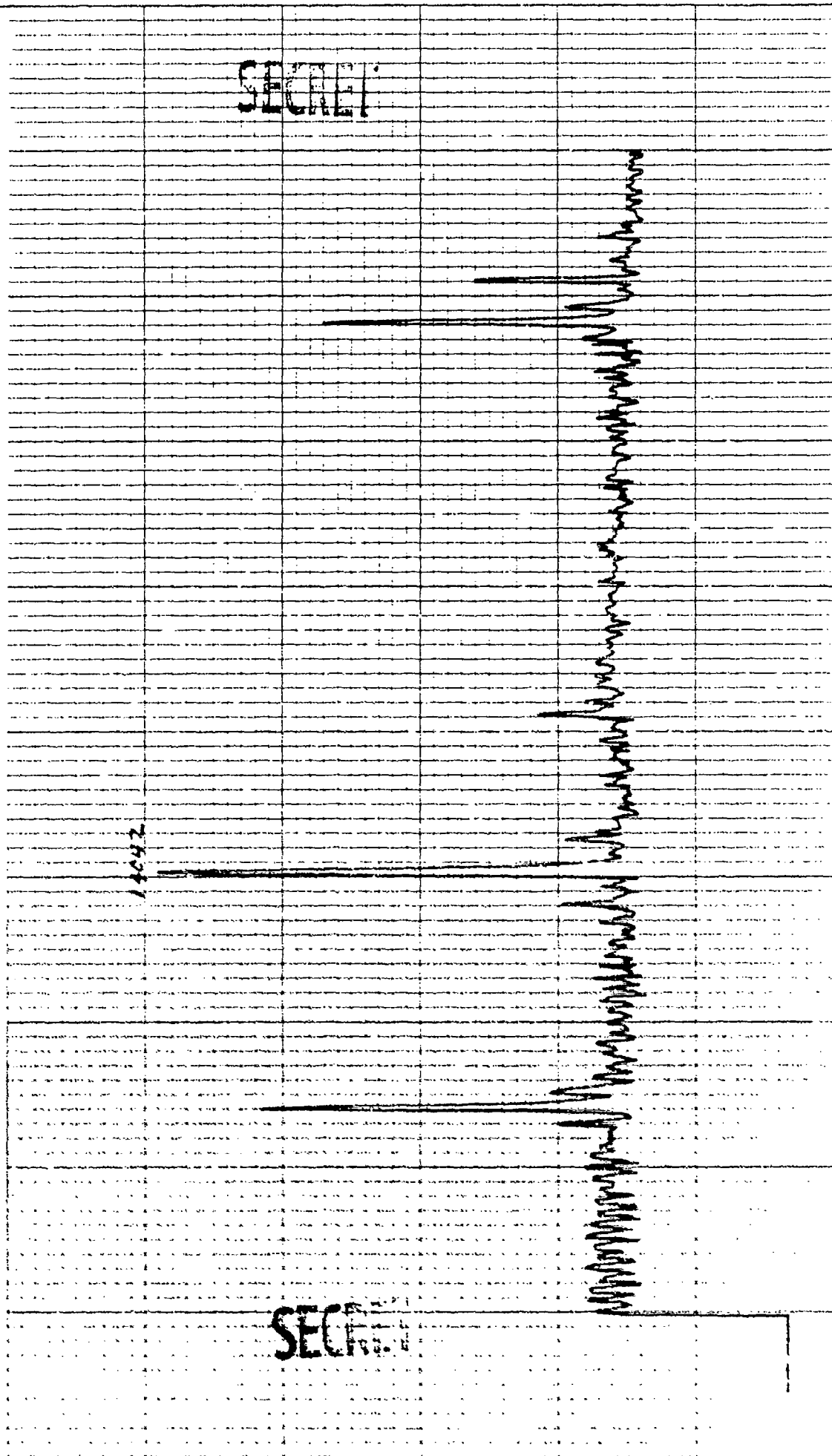
EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 1501 Z

CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ

32 ELEMENTS + 26 DEG. AZ STEERING

INTEGRATION TIME 320 SECS ATTEN: -30 DB

FII.TFR WTG: HANNING



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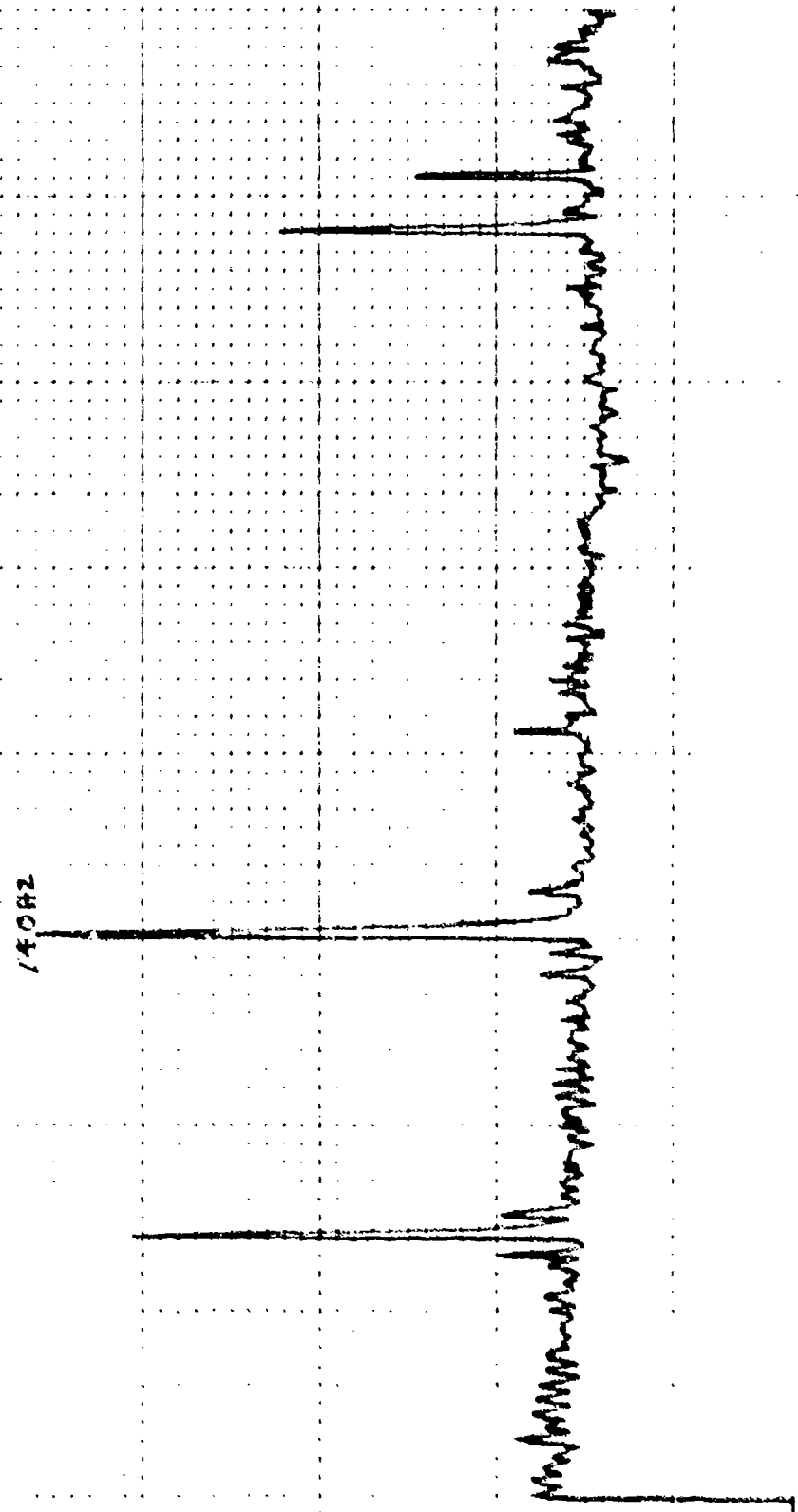
CONTROL: 1501 - 70 (200) DATE OF ANALYSIS: 20-06-89-53 REEL: 44 INDE X300

BEAMFORMED SPECTRUM/ELEMENTS DATE TIME: 2-15 77 - 1501 Z INTEGRATION TIME 320 SECS ATTEN: 30 DB

EXERCISE: BEARING STAVE ANALYSIS BANDWIDTH: 1/10HZ FILTER WIG: HANNING

CENTER FREQ: 150 HZ + 20 DEG. AZ STEERING

32 ELEMENTS



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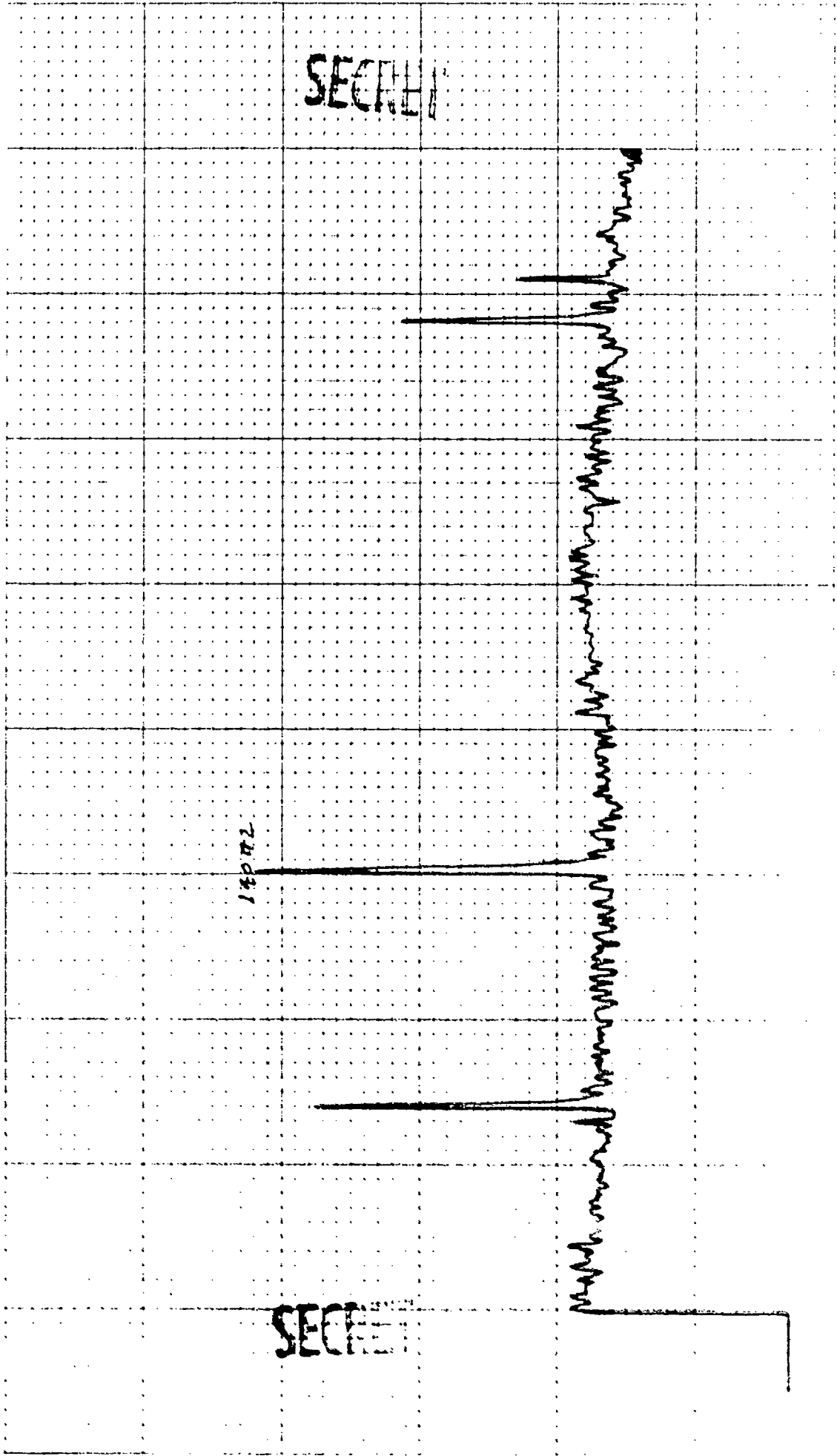
SECRET

46 0703

CONTROL: 1501 - 32 (DPE)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS

DATE OF ANALYSIS: 20-26-77
DATE/TIME: 15-77-1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
+70 DEG. AZ STEERING

REEL: 144 INDE X3000
INTEGRATION TIME 320 SECS ATTEN: -30 DB
FILTFR WTG: HANNING



SECRET

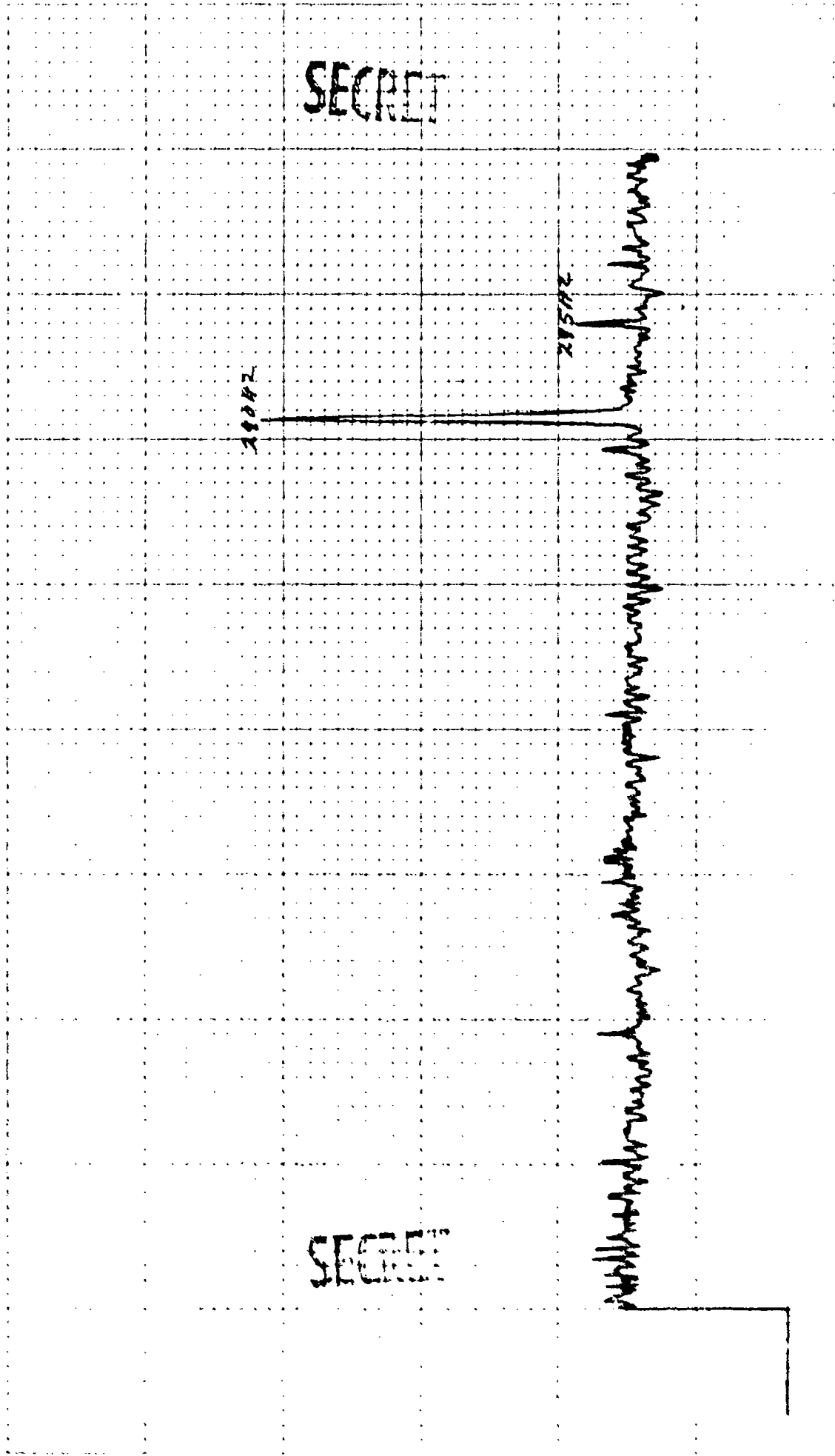
SECRET

46 0703

CONTROL: 1501 - 33 (DPO)
BEAMFORMED SPECTRUM/ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

DATE OF ANALYSIS: - - -
20-26-77
DATE/TIME: 3:45-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+ 10 DEG. AZ STEERING

REEL: M4 INDE X3006
INTEGRATION TIME 320 SECS ATTEN: -30 DB
FITTED WIG: HANNING



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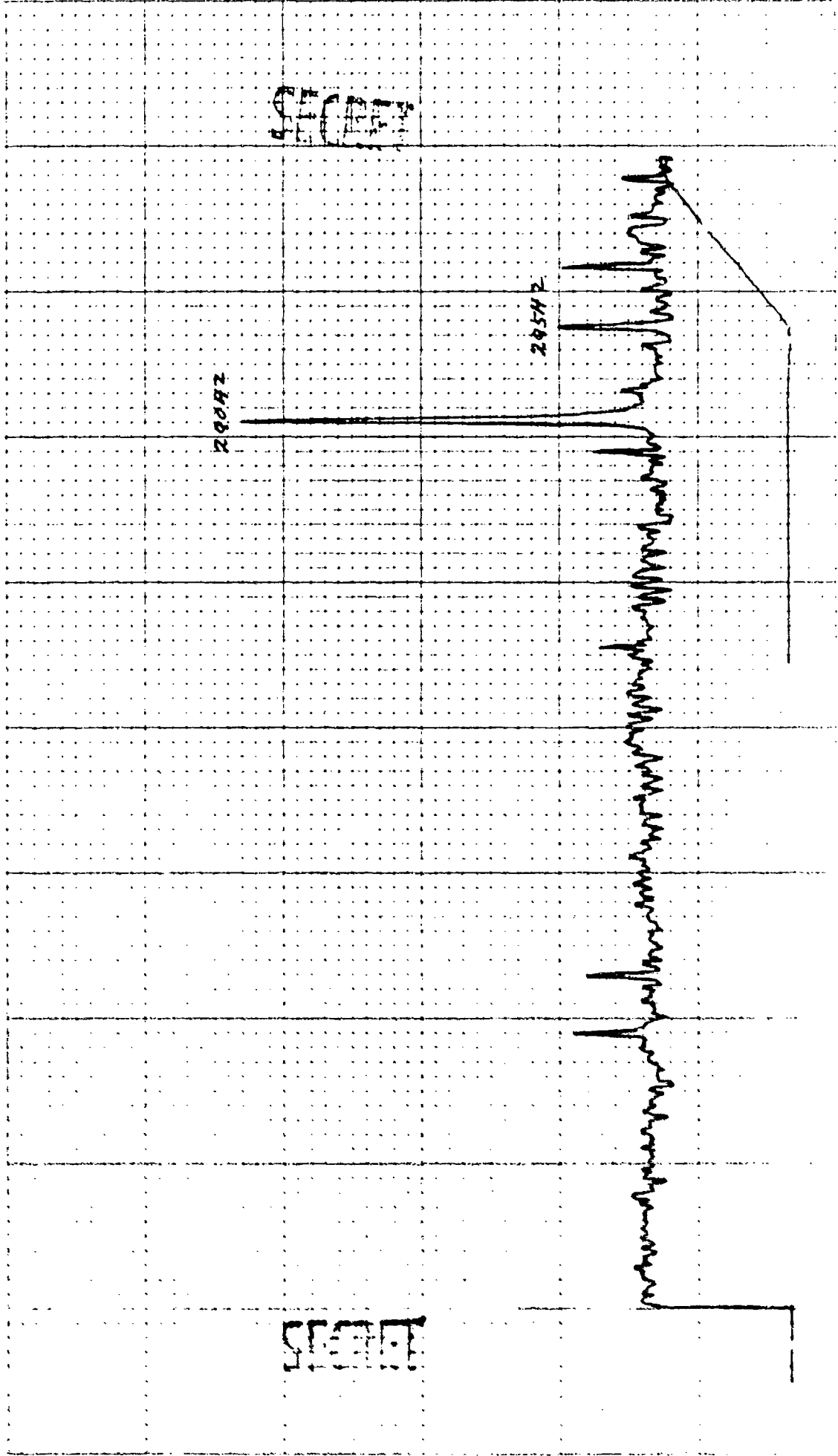
46 0703

CONTROL: 1501 - 72 (200)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

DATE OF ANALYSIS: 20-26-77 19-53
DATE/TIME: 3-15-77 -1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
+12 DEG. AZ STEERING

REEL: MY
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTFR WTC: HANNING

INDE X 3000

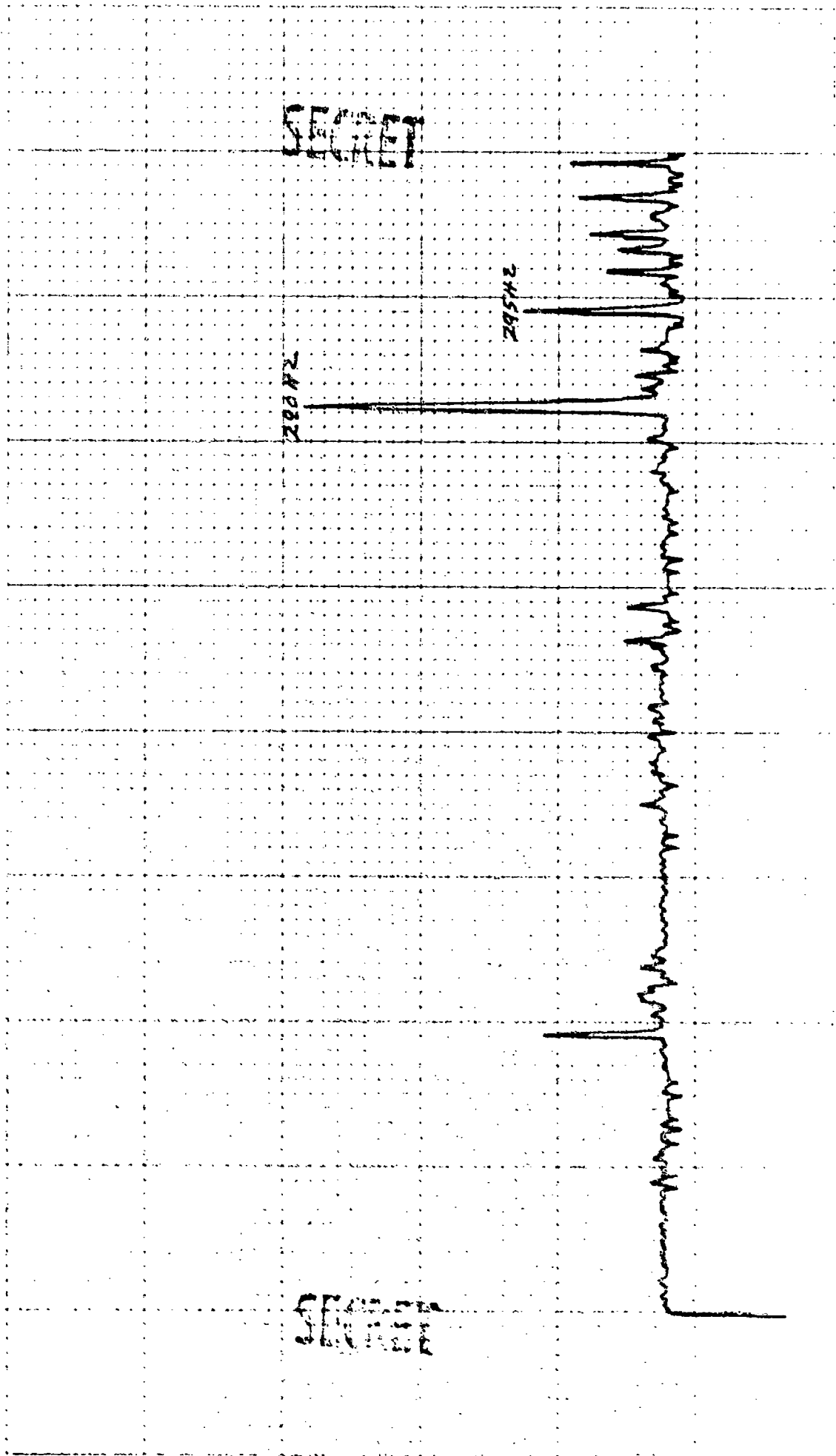


46 0703

CONTROL: 1501 - 12 (200)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
 22 ELEMENTS

DATE OF ANALYSIS: 20-26-77 2153
 DATE/TIME: 1-15-77 -150/ Z
 ANALYSIS BANDWIDTH: 1/10HZ
 104 DEG. AZ STEERING

REEL: 114 INDE X3000
 INTEGRATION TIME 320 SECS ATTN:-70 DB
 FILTER WTG: HANNING

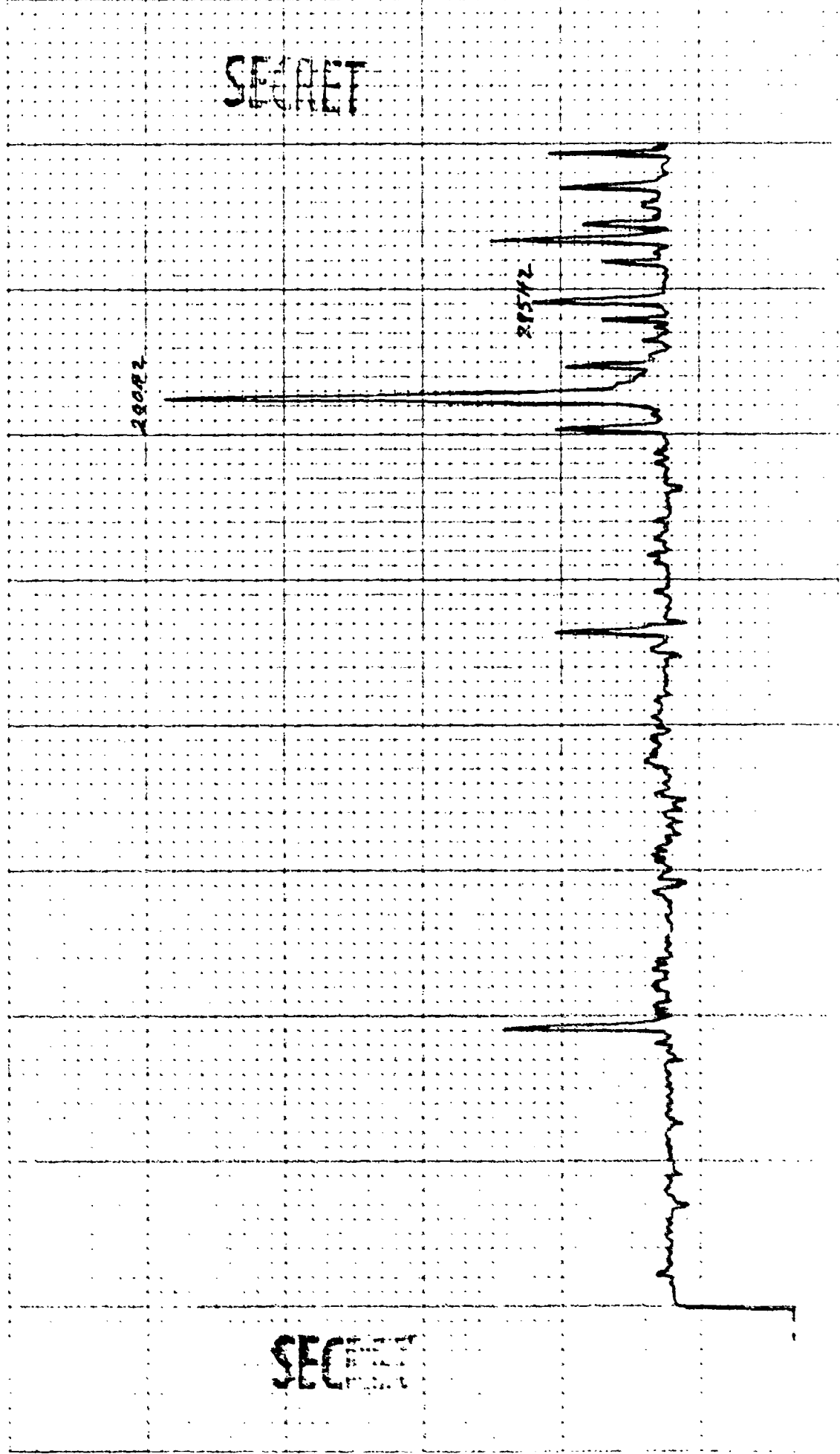


46 0703

CONTROL: 1501 - 32 (DPS)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

DATE OF ANALYSIS: 20-20-53
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
+1/2 DEG. AZ STEERING

REEL: NY INDE X 3000
INTEGRATION TIME 320 SECS ATTEN: -30 DB
FILTER WTG: HANNING



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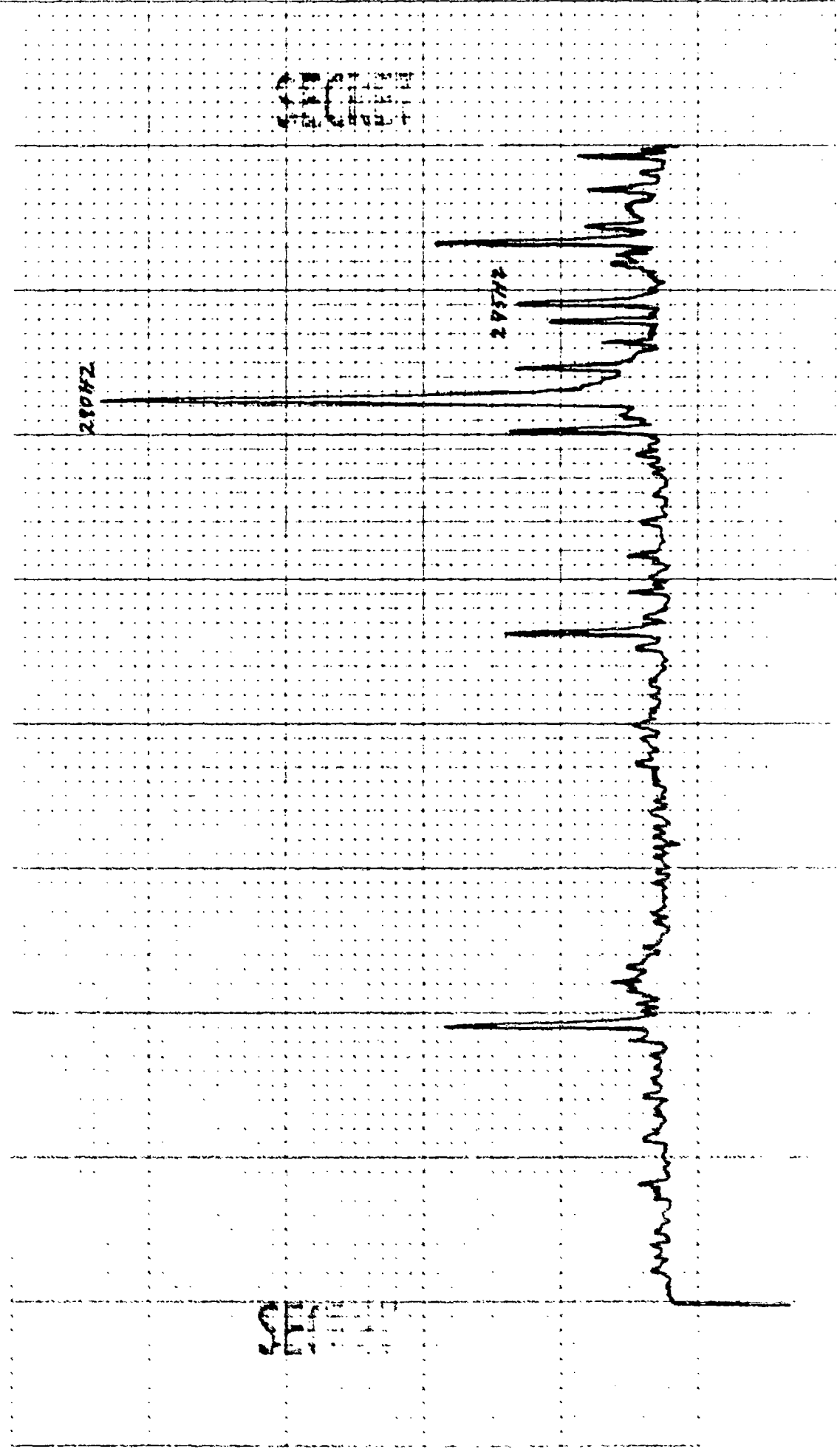
SECRET

46 0703

CONTROL: 1501 - 32 (D18)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

DATE OF ANALYSIS: 20-26-78-53
DATE: TIME: 17:55:17 - 190/2
ANALYSIS BANDWIDTH: 1/10HZ
+18 DEG. AZ STEERING

REEL: M4 INDE X3000
INTEGRATION TIME 320 SECS ATTEN: -70 DB
FILTER WTC: HANNING



46 0703

CONTROL: 1501 - 48 (DP2) DATE OF ANALYSIS: _____

BEAMFORMED SPECTRUM(ELEMENTS) 20 26 29-53)

EXERCISE: BEARING STAKE DATE/TIME: 3/5-77 - 1501 Z

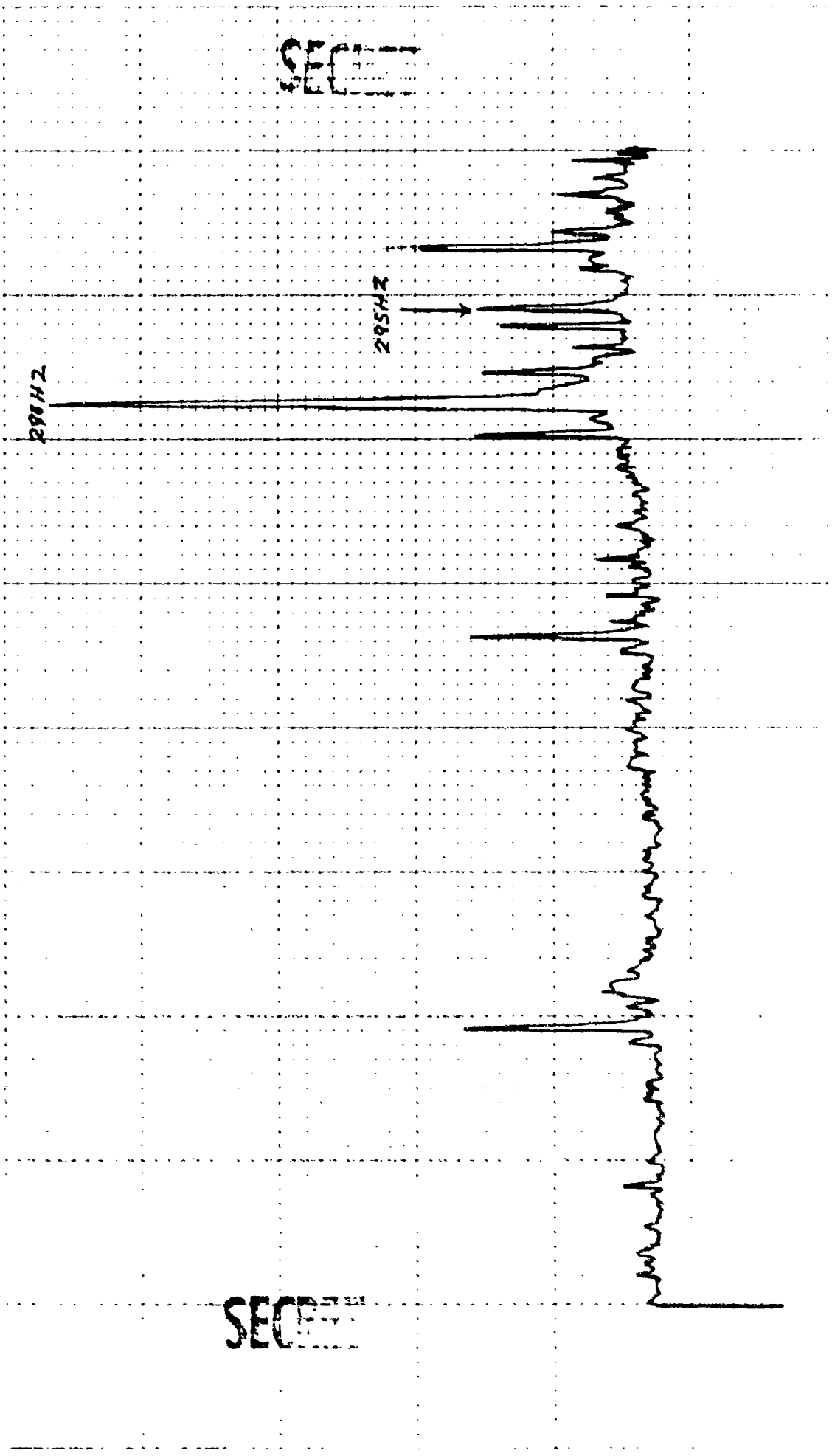
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ

22 ELEMENTS + 20 DEG. AZ STEERING

REEL: M4 INDE X 3000

INTEGRATION TIME 320 SECS FILTER WTC: HANNING

ATTEN: 30 DB



46 0707

CONTROL: 1501 - 32 (000)
BEAMFORMED SPECTRUM ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 220 HZ
32 ELEMENTS

DATE OF ANALYSIS: ---

20-26-89-53

DATE/TIME: 3-15-77 - 1501 Z

ANALYSIS BANDWIDTH: 1/10HZ

12.2 DEG. AZ STEERING

REEL: M4 INDE X3000

INTEGRATION TIME 320 SECS

FILTER

ATTEN: -30 DB

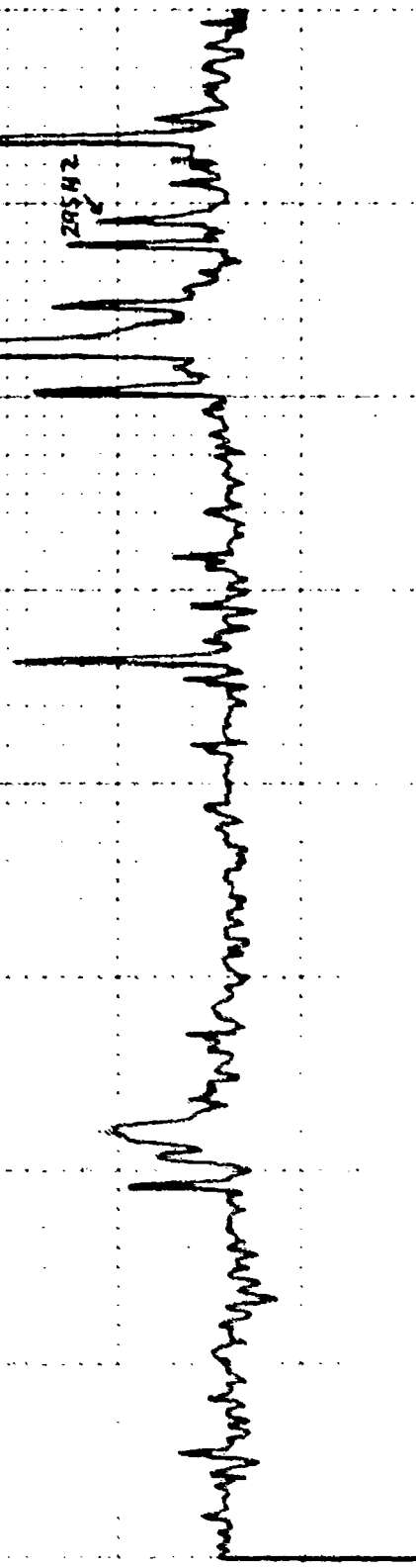
WTC: HANNING

21002

20542

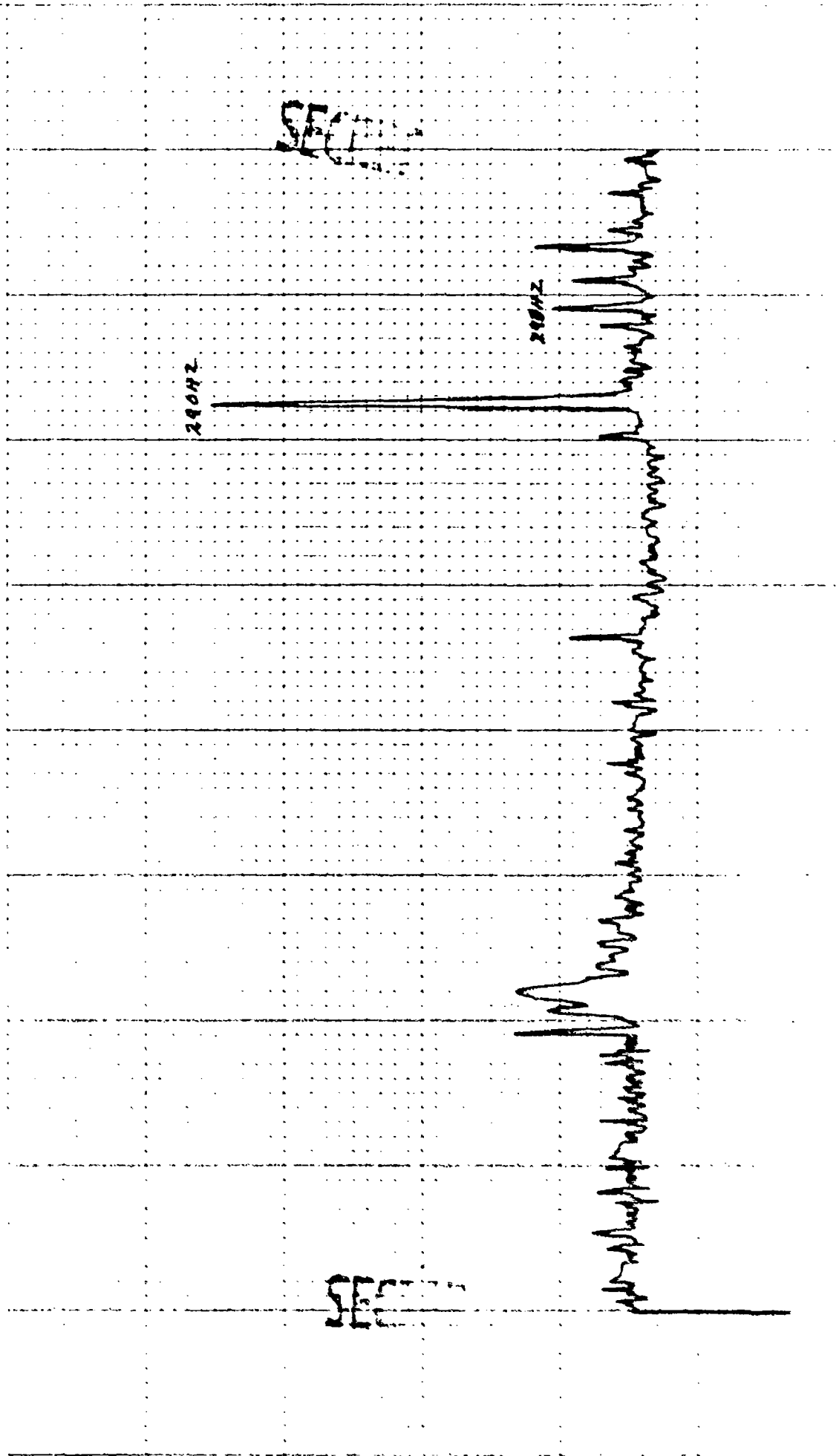
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CONTROL: 1501 - 32 (DP8) DATE OF ANALYSIS: REEL: M4 INDE X3000
BEAMFORMED SPECTRUM (ELEMENTS) 20-26 & 09-53
EXERCISE: BEARING STAKE DATE/TIME: 5-15-77 - 1501 Z INTEGRATION TIME 320 SECS ATTN: -30 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTERED WTC: HANNING
32 ELEMENTS 4 24 DEG. AZ STEERING



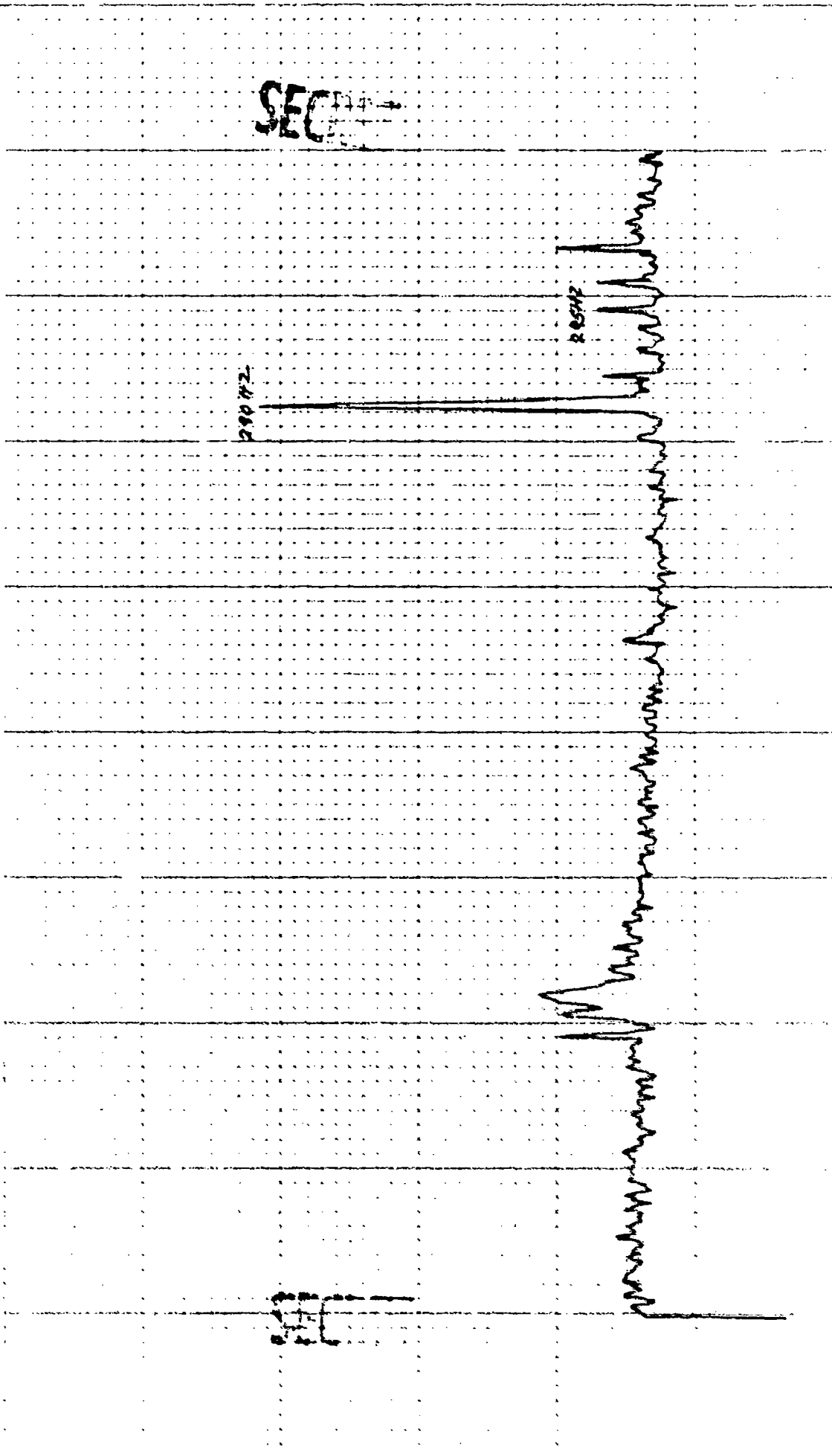
45 0703

CONTROL: 1501 - 72 (200) DATE OF ANALYSIS: REEL: M4 INDE X 300c

BEAMFORMED SPECTRUM(ELEMENTS) 20.208 38-53 INTEGRATION TIME 320 SECS ATTEN: -30 DB

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

CENTER FREQ: 270 HZ 72 DEG. AZ STEERING

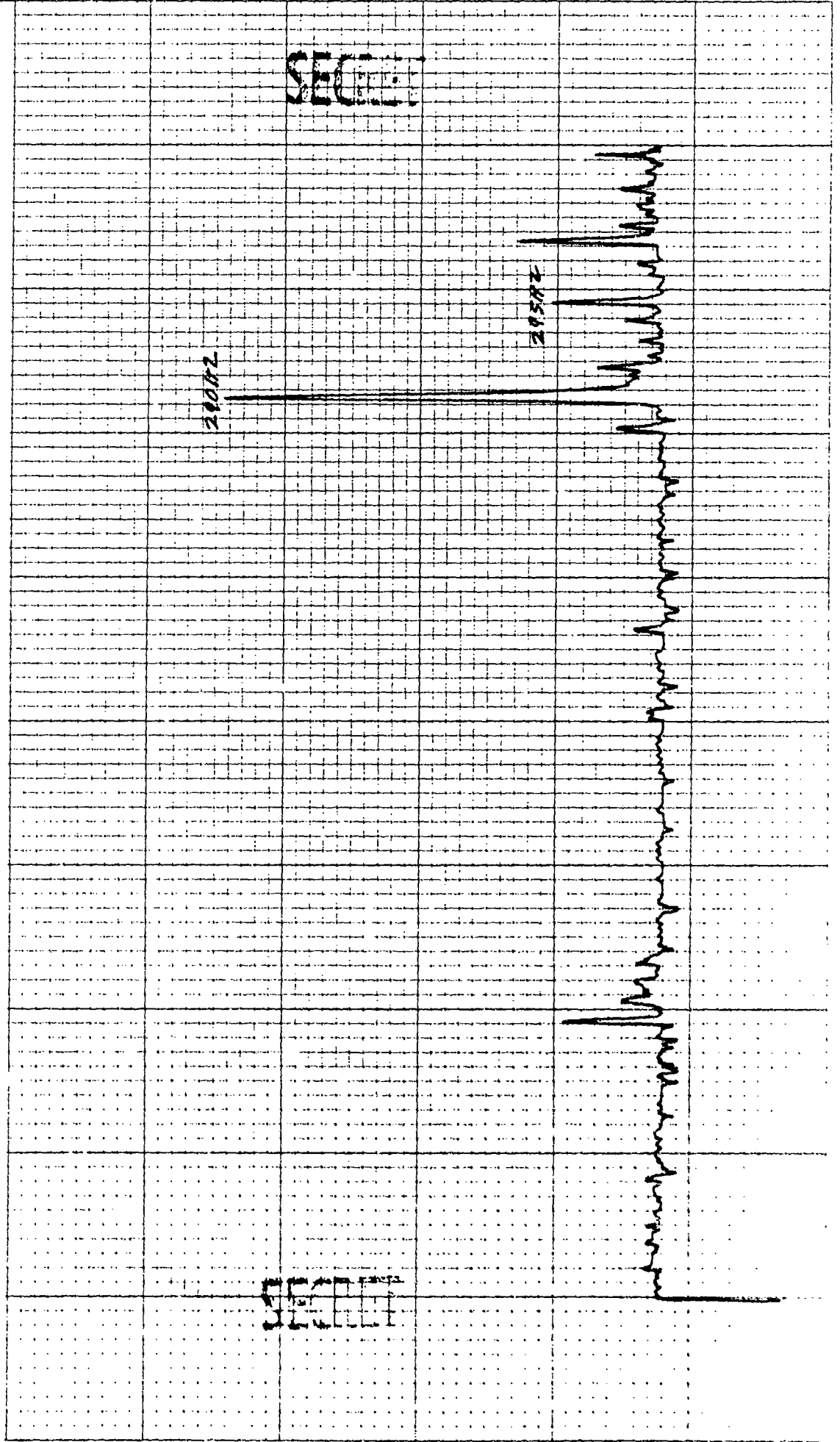


K-Σ 1/2 X 10 TO THE INCH * X 10 DIVIDES
KEUPPEL & ESS * CO * MADE IN U.S.A.

46 0703

CONTROL: 1501 - 32 (PP8)
BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: -- -- --
EXERCISE: BEARING STAKE 20-26 9' 28-53)
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ
32 ELEMENTS +38 DEG. AZ STEERING

REEL: 44 INDE X 3000
INTEGRATION TIME 320 SECS ATTN: ~30DB
FILT.FFR WTG: HANNING

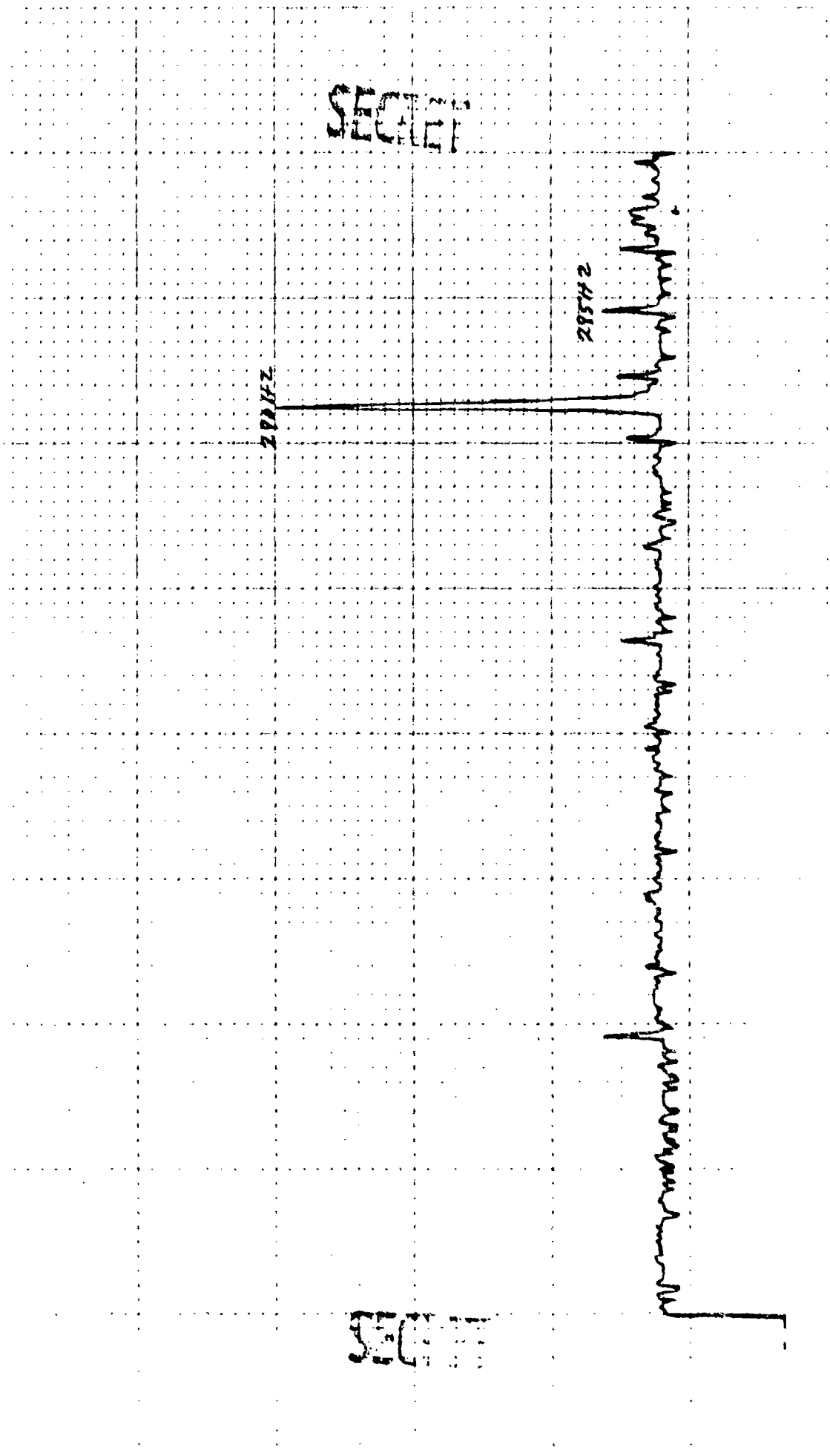


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CONTROL: 1501 - 32 (010)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
 32 ELEMENTS

DATE OF ANALYSIS: 20-2-68 29-53
 DATE/TIME: 3-15-77 - 1501 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 +30 DEG. AZ STEERING

REEL: 44 INDE X 3000
 INTEGRATION TIME 320 SECS ATTEN: 30 DB
 FILTER WIG: HANNING



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SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 8

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 48

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-27</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-17</u>	
BEAMFORMER GAIN	<u>+30</u>	<u>+13</u>	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	<u>+13.2</u>	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-71.6</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-61.6</u>	
BEAMFORMER GAIN	<u>+30</u>	<u>-31.6</u>	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+13</u>	
SIGNAL LEVEL FOR SNR	<u>-31.6</u>	<u>44.6</u>	
PROCESSOR CORRECTION	<u>-4.0</u>	<u>40.6</u>	
MRA CORRECTION	<u>+ .2</u>	<u>40.8</u>	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	<u>32.6</u>	SNR 1 HZ BAND

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SIGNAL LEVEL AND SNR
CALCULATIONS

DATA POINT 8

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 48

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-29.0</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-14.0	
BEAMFORMER GAIN	<u>+30</u>	+16.0	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	+16.8	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-73.4</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-63.4	
BEAMFORMER GAIN	<u>+30</u>	-33.4	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+16.0</u>	
SIGNAL LEVEL FOR SNR	<u>-33.4</u>	49.4	
PROCESSOR CORRECTION	<u>-2.2</u>	45.4	
MRA CORRECTION	<u>+ .8</u>	46.2	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	38.0	SNR 1 HZ BAND

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SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 8

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 40

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-60.0</u>
MCPS-32 CAL. CORRECTION	<u>+10</u>	-50.0
BEAMFORMER GAIN	<u>+30</u>	-20.0 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	-19.2 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-73.1</u>
MCPS-32 CAL. CORRECTION	<u>+10</u>	-63.1
BEAMFORMER GAIN	<u>+30</u>	-33.1 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-20.0</u>
SIGNAL LEVEL FOR SNR	<u>-33.1</u>	13.1
PROCESSOR CORRECTION	<u>-4.2</u>	8.9
MRA CORRECTION	<u>+ .8</u>	9.7 SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-0.2</u>	1.5 SNR 1 HZ BAND

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DATA POINT 8

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-19.4</u>	<u>-15.2</u>	<u>_____</u>
MRA SIGNAL LEVEL	<u>+13.2</u>	<u>+16.8</u>	<u>-19.2</u>
ARRAY SIGNAL GAIN	<u>33.6</u>	<u>32.0</u>	<u>_____</u>
20 LOG <u>40</u>	<u>33.6</u>	<u>33.6</u>	<u>_____</u>
# of elements			
DIFFERENCE	<u>-1.0</u>	<u>-1.6</u>	<u>_____</u>

ARRAY GAIN

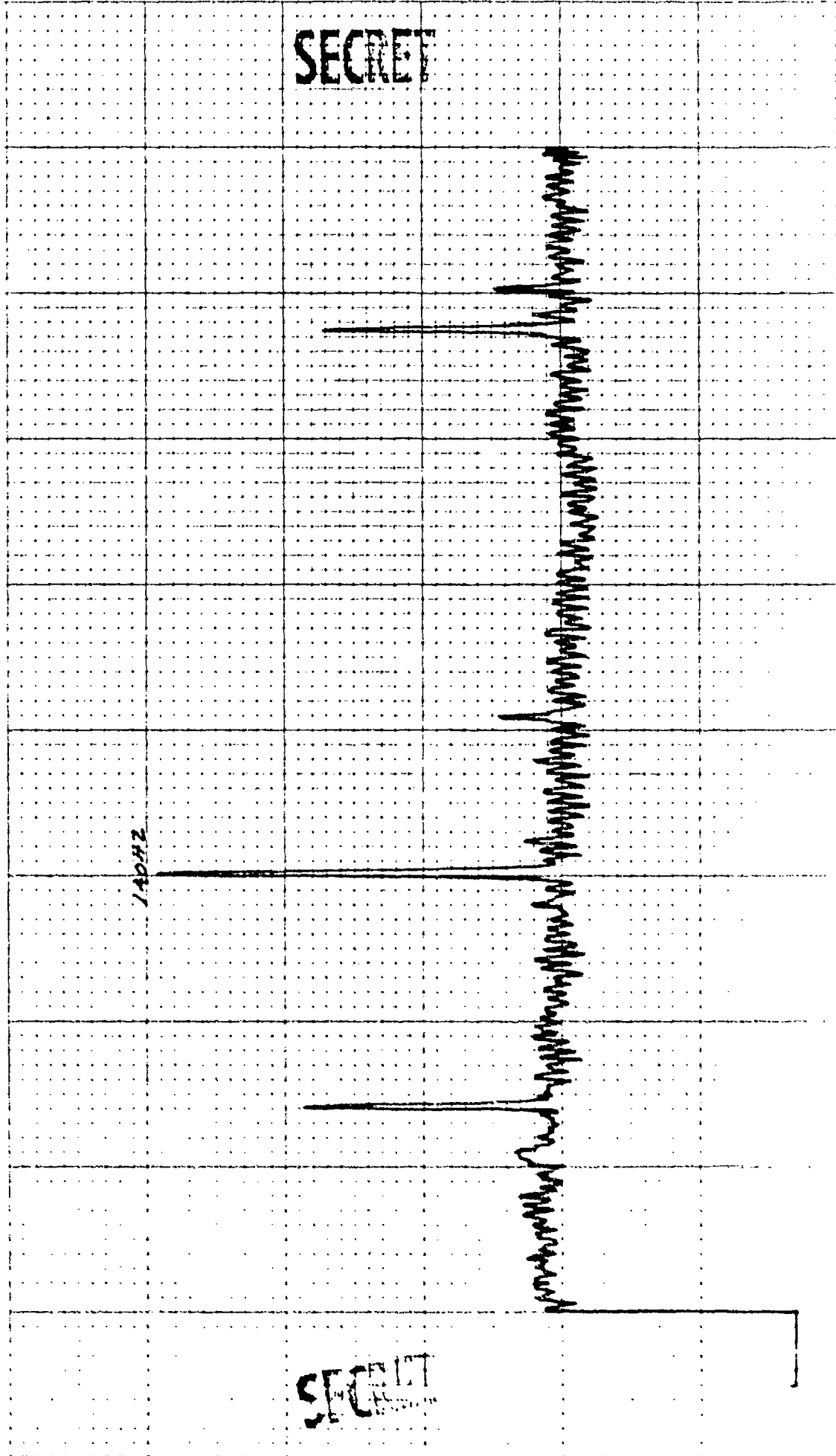
MRA SNR	<u>40.8</u>	<u>46.2</u>	<u>9.7</u>
MEAN OMNI SNR	<u>29.4</u>	<u>35.4</u>	<u>_____</u>
ARRAY GAIN	<u>11.4</u>	<u>10.8</u>	<u>_____</u>
THEORETICAL AZIMUTH GAIN (at MRA)	<u>15.3</u>	<u>16.9</u>	<u>17.0</u>
DIFFERENCE	<u>-3.9</u>	<u>-6.1</u>	<u>_____</u>

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1072 1060 1060 1060 1060

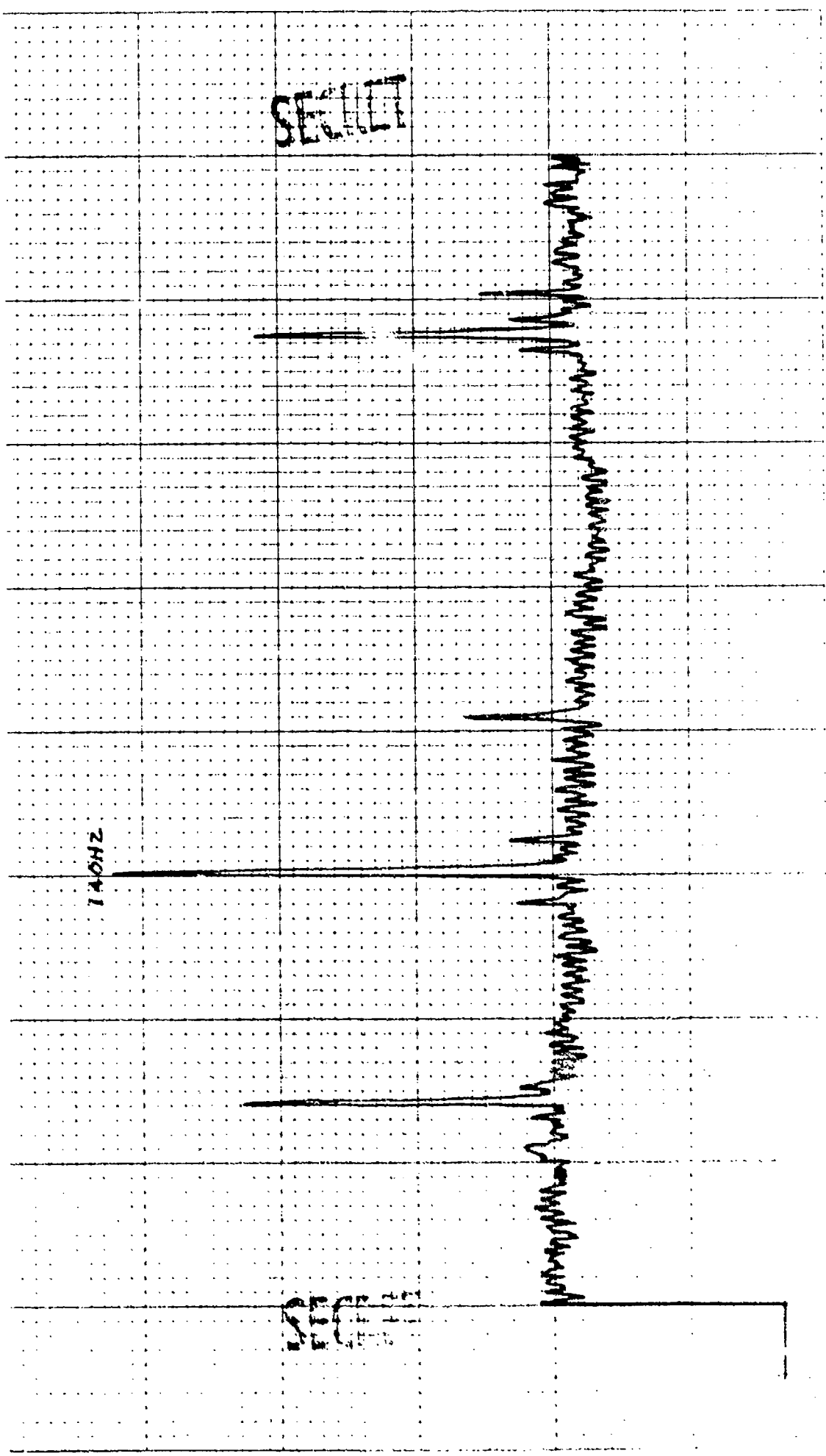
CONTROL: 1501 - 48 (208) DATE OF ANALYSIS: - - - -
 BEAMFORMED SPECTRUM (ELEMENTS 1-689-14916-26 & 28-53) REEL: 44 INDE X3000
 EXERCISE: BEARING STAKE DATE/TIME: 3-5-77 - 1501 Z INTEGRATION TIME 320 SECS ATTN: - 20 DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILT.FP WTC: HANNING
 48 ELEMENTS +14 DEG. AZ STEERING



46 0703

102 5400 1000 1000 1000

CONTROL: 1501 -40 (DPO) DATE OF ANALYSIS: REEL: 44 INDE X 3000
 BEAMFORMED SPECTRUM (ELEMENTS 1-249-14716-26402-53)
 EXERCISE: BEARING STAKE DATE/TIME: 3-5-77 -1501 Z INTEGRATION TIME 320 SECS ATTN: 30 DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTFR WTG: HANNING
40 ELEMENTS +16 DEG. AZ STEERING



46 0703

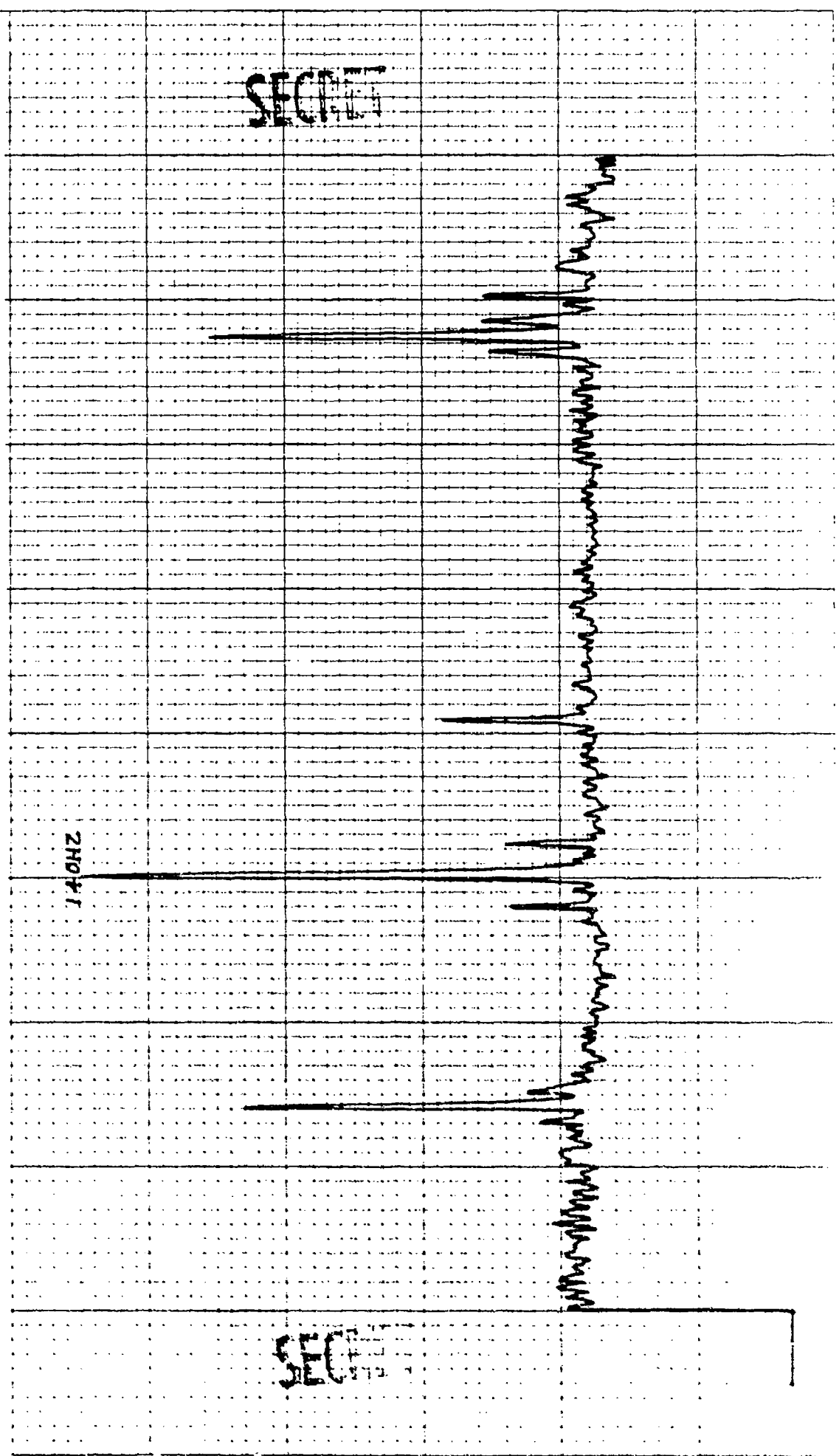
102 10 100 100 100 100 100 100

CONTROL: 1501 - 48 (298)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
48 ELEMENTS

DATE OF ANALYSIS: - - - -
1-6-49-14 (16-257-29-53)
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+10 DEG. AZ STEERING

REEL: 114
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTFR WTG: HANNING

INDE X 3000



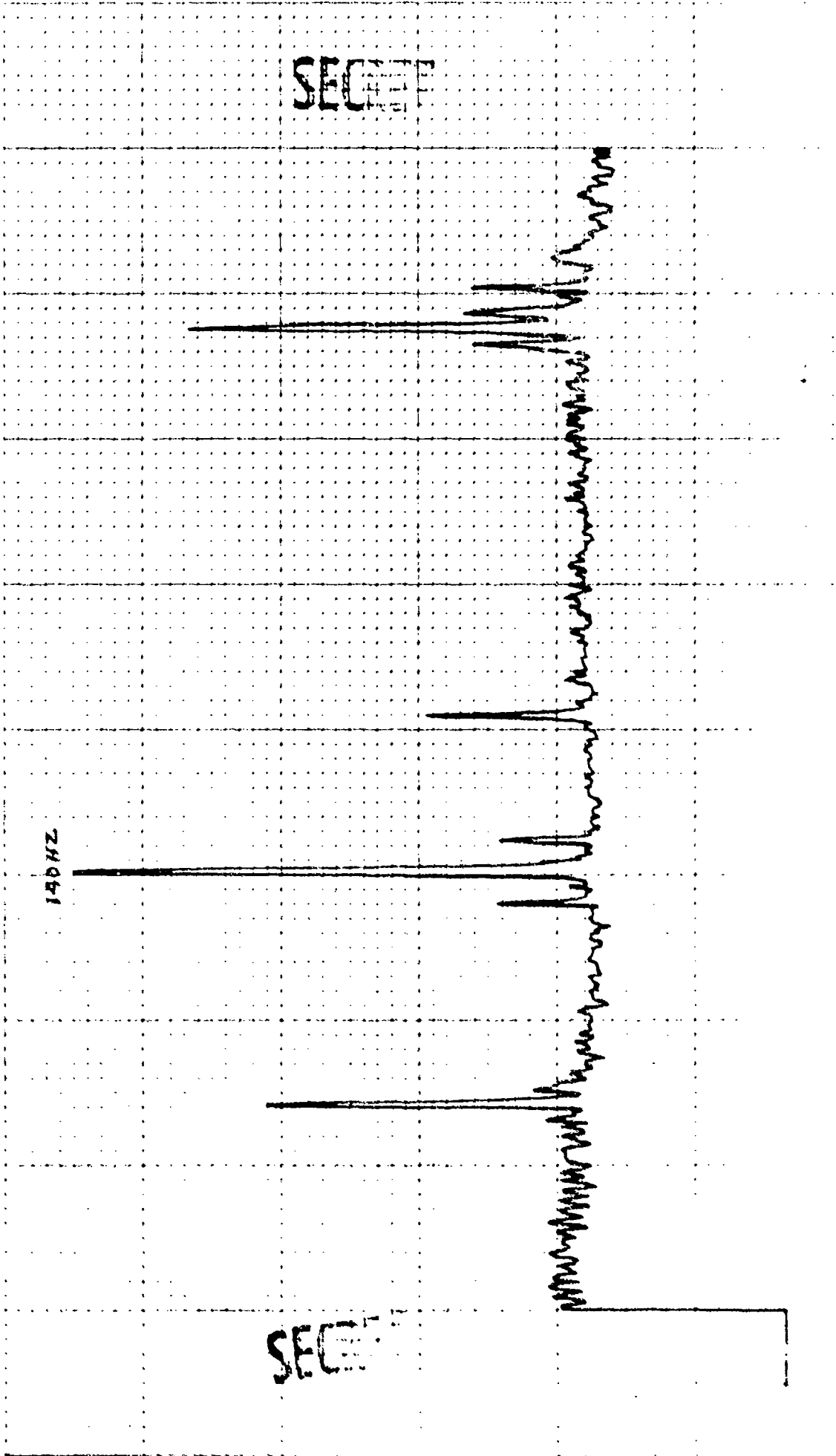
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46 0703

CONTROL: 1501 - 10 (DP8) DATE OF ANALYSIS: _____
 BEAMFORMED SPECTRUM(ELEMENTS) 1-649-14416-26(29-53)
 EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 -1501 Z
 CENTER FREQ: 150 MHZ ANALYSIS BANDWIDTH: 1/10HZ
 40 ELEMENTS 119 DEG. AZ STEERING

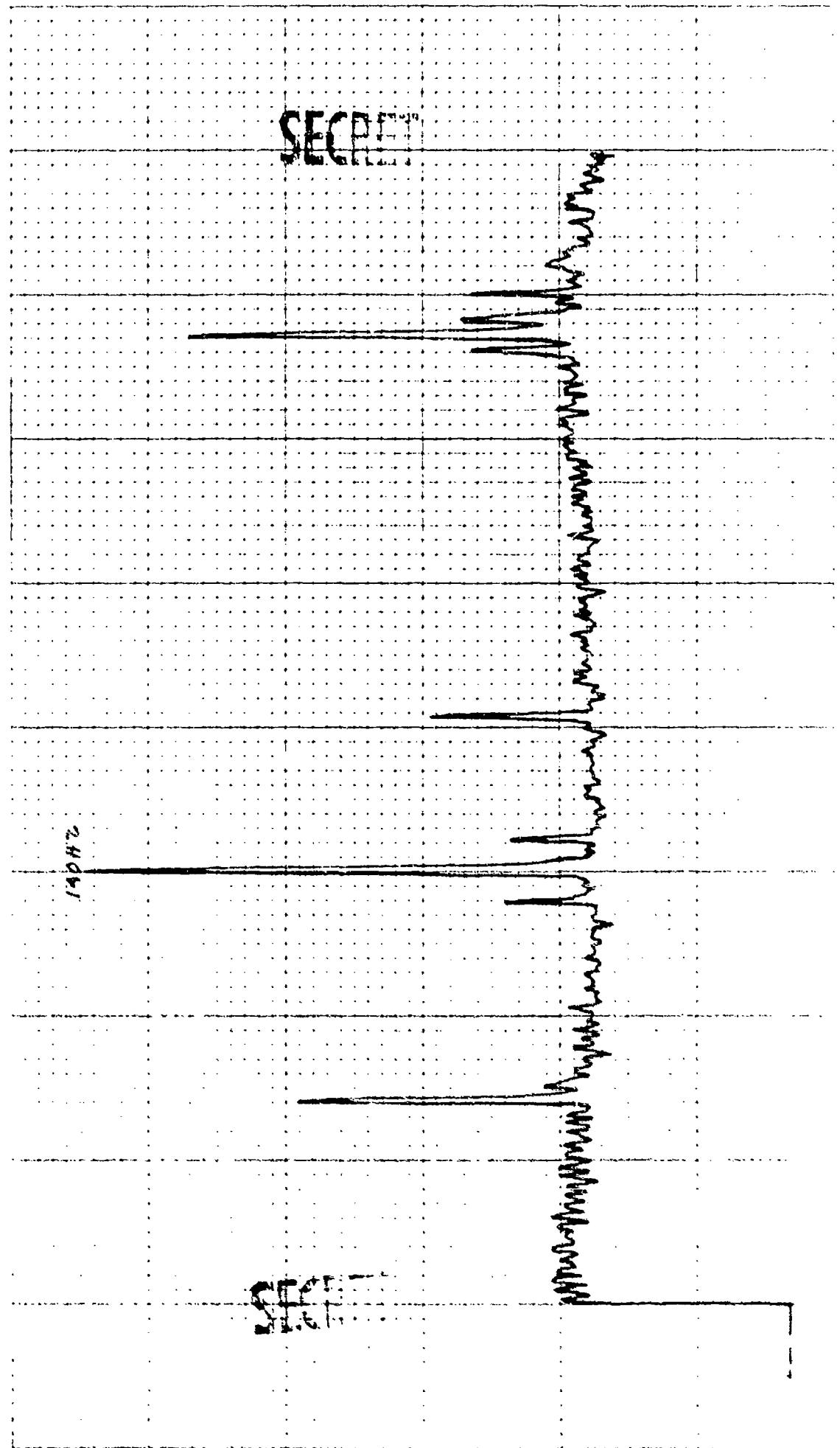
REEL: M4 INDE X3000
 INTEGRATION TIME 320 SECS ATTEN: 30 DB
 FILTER WIG: HANNING



46 0703

CONTROL: 1501 - 40 (DDB) DATE OF ANALYSIS: - - - - -
 BEAMFORMED SPECTRUM (ELEMENTS) 1-6 4 9 -14 4 16-36 4 20-53)
 EXERCISE: BEARING STAKE DATE/TIME: 3-15-70 - 150 / 2
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1 / 10 HZ
 40 ELEMENTS + 20 DEG. AZ STEERING

REEL: 44 INDE X 3000
 INTEGRATION TIME 320 SECS ATTEN: -30 DB
 FILTER WIG: HANNING

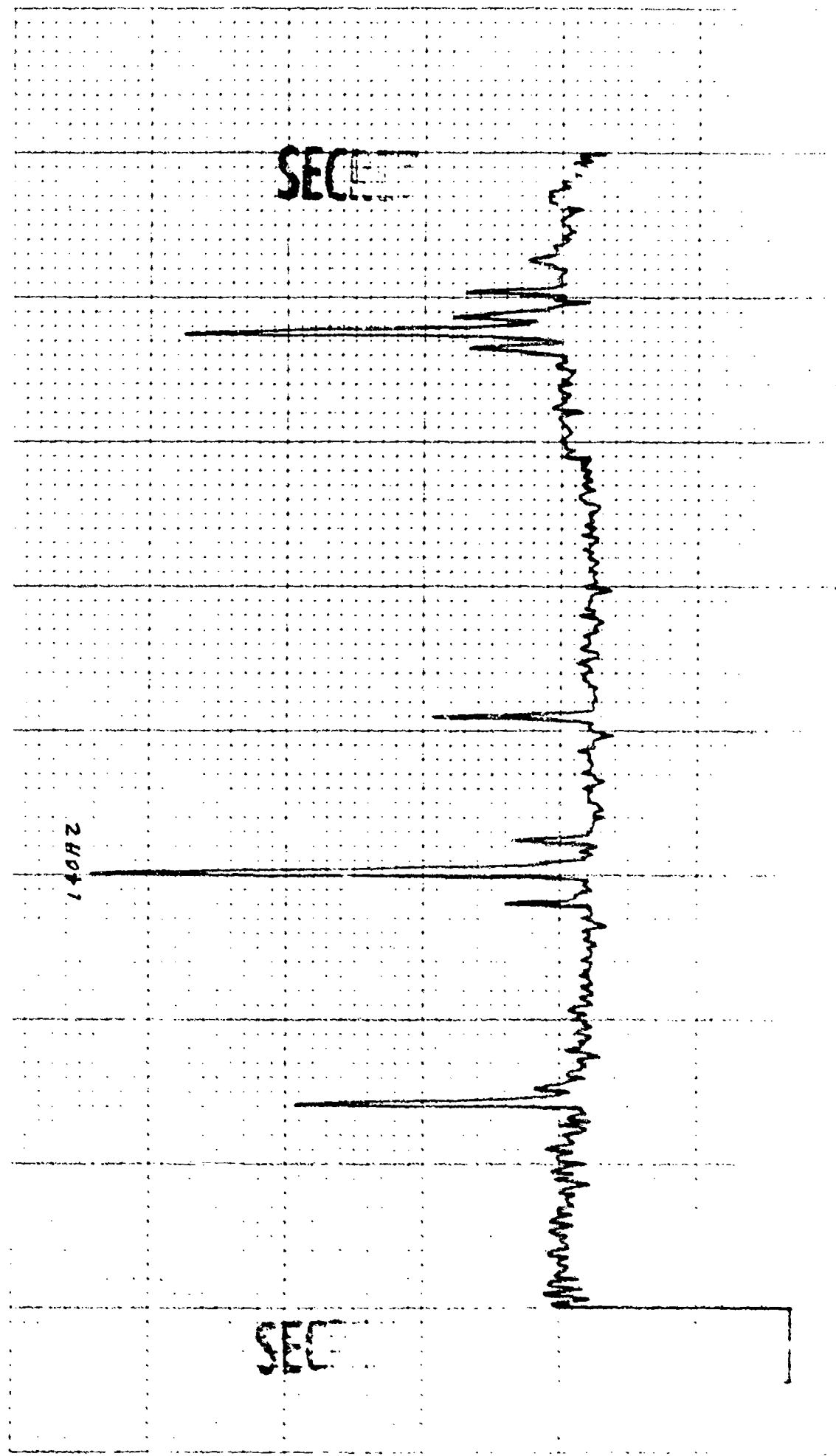


46 0703

CONTROL: 1501 - 48 (DPB)
 BEAMFORMED SPECTRUM (ELEMENTS 1-6 18-14 16-26 28-53)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 48 ELEMENTS

DATE OF ANALYSIS: - - - -
 DATE/TIME: 3-75-77 -150/ Z
 ANALYSIS BANDWIDTH: 1/10HZ
 + 2/ DEG. AZ STEERING

REEL: 44 INDE X3000
 INTEGRATION TIME 320 SECS ATTEN: -70 DB
 FILTER WTC: HANNING

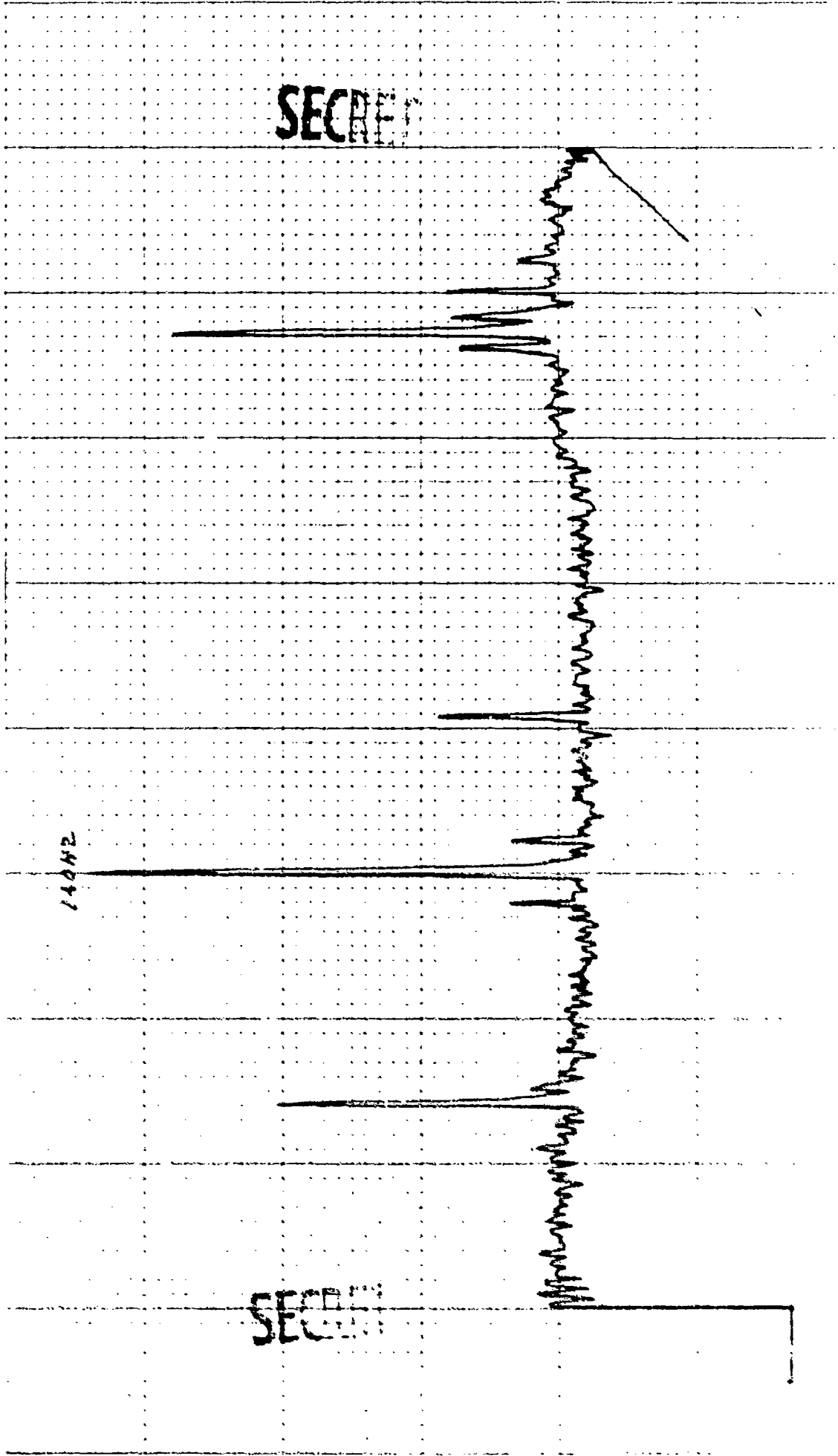


46 0703

CONTROL: 1501 - 48 (200)
 BEAMFORMED SPECTRUM (ELEMENTS 1-64)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 MHz
 48 ELEMENTS

DATE OF ANALYSIS: 1-6-8-14816-2642053
 DATE/TIME: 3-15-77 - 1507 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 122 DEG. AZ STEERING

REEL: 44 INDE X 3000
 INTEGRATION TIME 320 SECS ATTN: -30 DB
 FILTER WTG: HANNING



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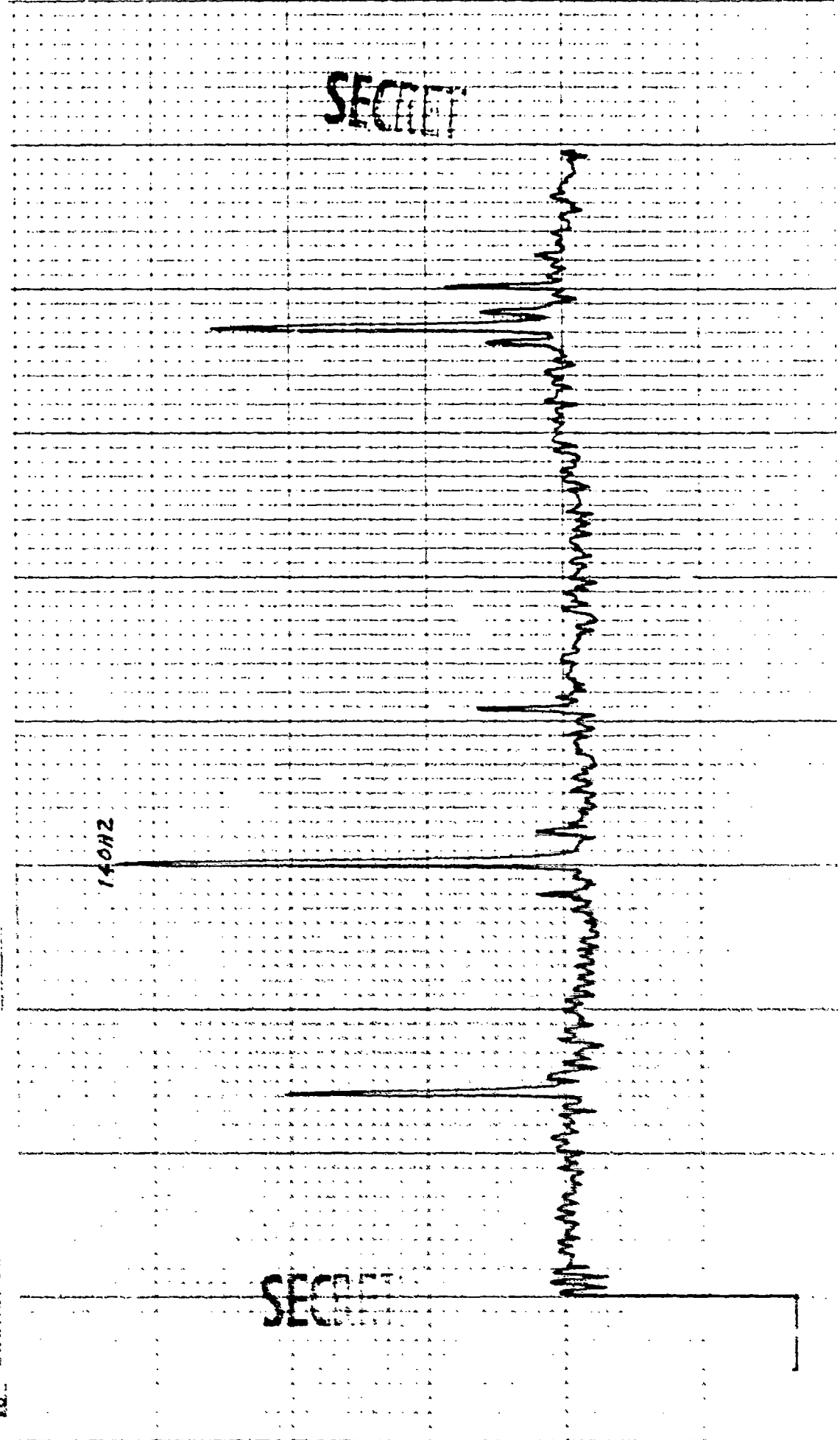
INDE X3000

REEL: 44

INTEGRATION TIME 320 SECS ATTEN: -30 DB
FILTER WTG: HANNING

DATE OF ANALYSIS: _____
DATE/TIME: 1-24 9-194 16-264 20-53)
ANALYSIS BANDWIDTH: 1/10HZ
+24 DEG. AZ STEERING

CONTROL: 1501 - 48 (DPO)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
48 ELEMENTS



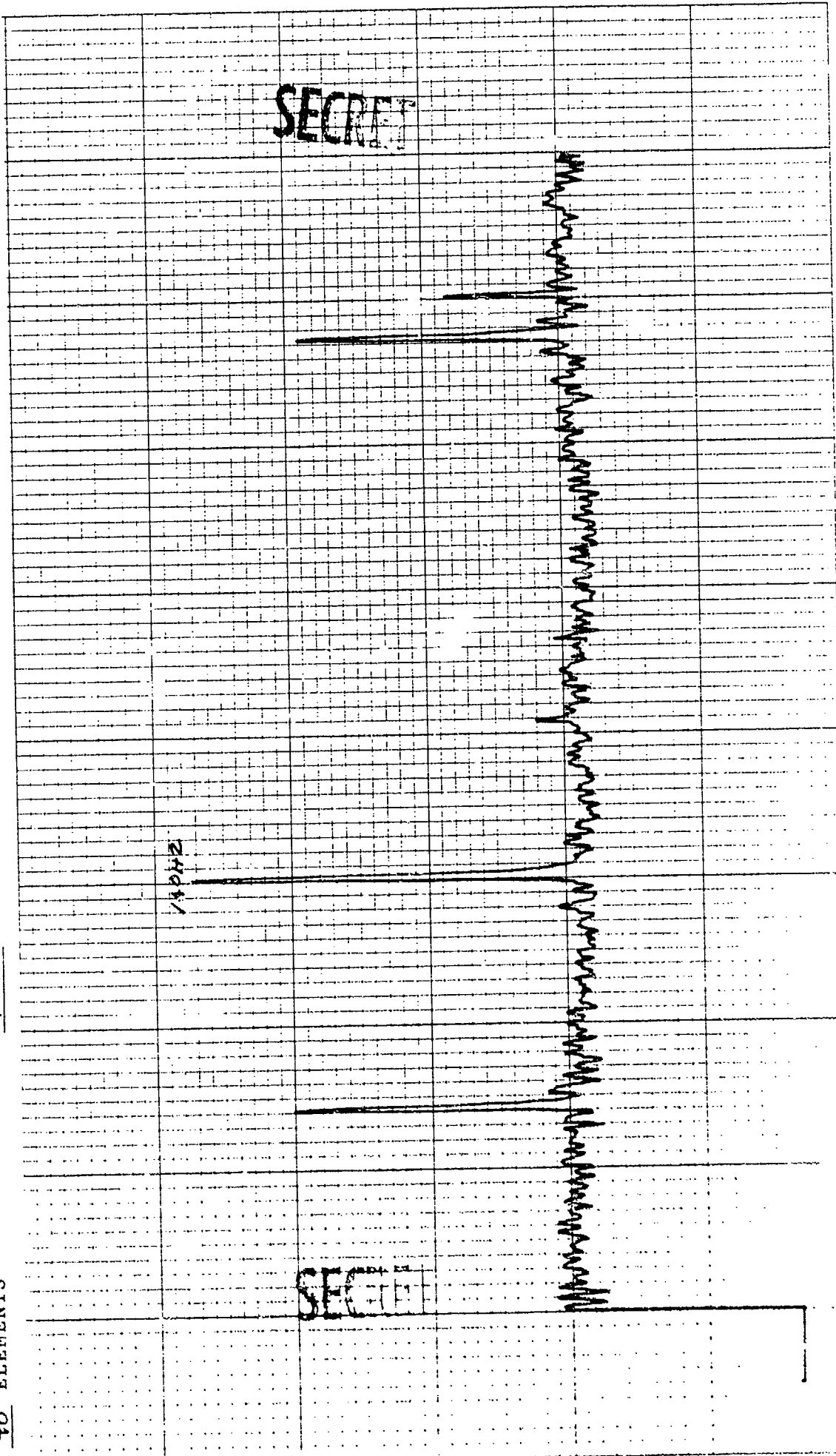
46 0703

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

CONTROL: 150/ - 40 (DPE) DATE OF ANALYSIS: - -
 BEAMFORMED SPECTRUM (ELEMENTS 1-6 29-14 16-26 29-53)
 EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: -30 DB
 CENTER FREQ: 150 HZ FILTER WTG: HANNING
40 ELEMENTS + 20 DEG. AZ STEERING

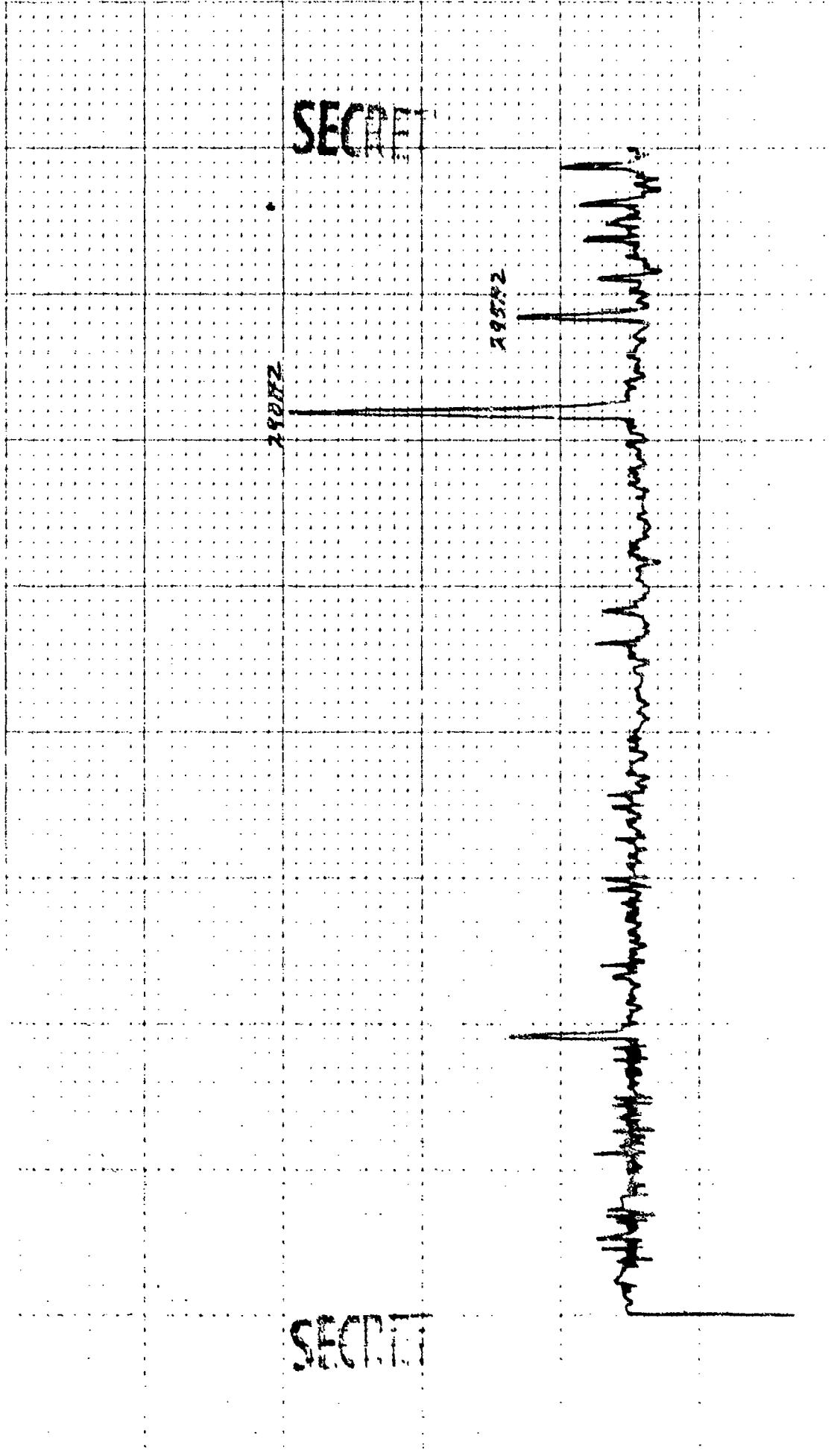
REEL: 44

INDE X3000



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CONTROL: 1501 - 40 (DPB) DATE OF ANALYSIS: REEL: 14 INDE X3000
 BEANFORMED SPECTRUM(ELEMENTS) 1-6-8-14-20-28-35
 EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 1501Z INTEGRATION TIME 320 SECS ATTEN: -30 DB
 CENTER FREQ: 270 MZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WIG: HANNING
40 ELEMENTS +14 DEG. AZ STEERING

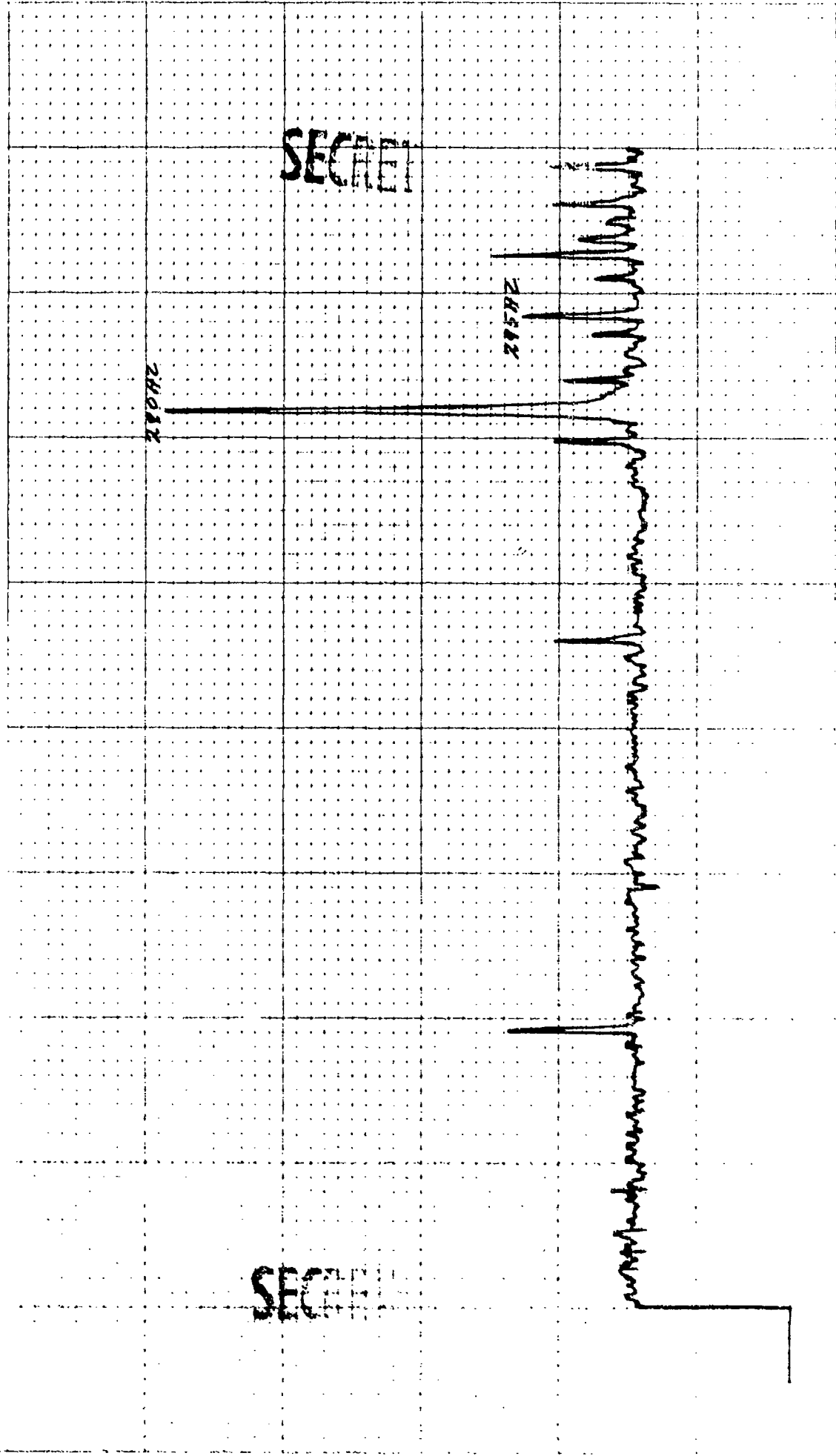


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CONTROL: 150/ -40 (DPO) DATE OF ANALYSIS: REEL: 44 INDE X7000
 BEAMFORMED SPECTRUM(ELEMENTS) 1-6 49-14 4 16-26 4 28-33
 EXERCISE: BEARING STAKE DATE/TIME: 3-5-77 -150/ 2 INTEGRATION TIME 320 SECS ATTEN: -30 DB
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WIG: HANNING
40 ELEMENTS +16 DEG. AZ STEERING

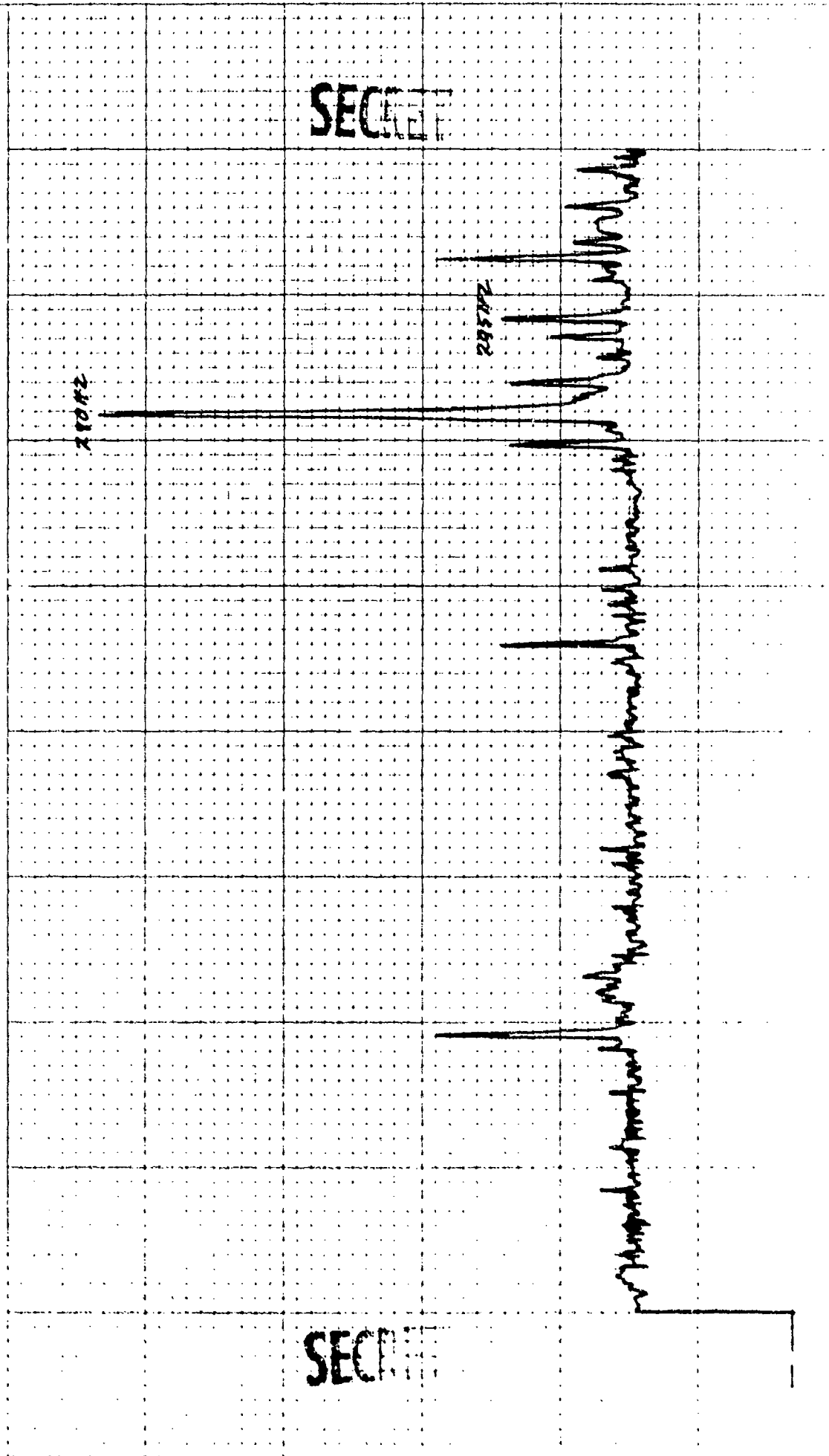


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CONTROL: 1501 - 40 (D86)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
48 ELEMENTS

DATE OF ANALYSIS: - - - -
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 10 DEC. AZ STEERING

INTEGRATION TIME 320 SECS
REEL: 144
ATTEN: -30 DB
WTG: HANNING

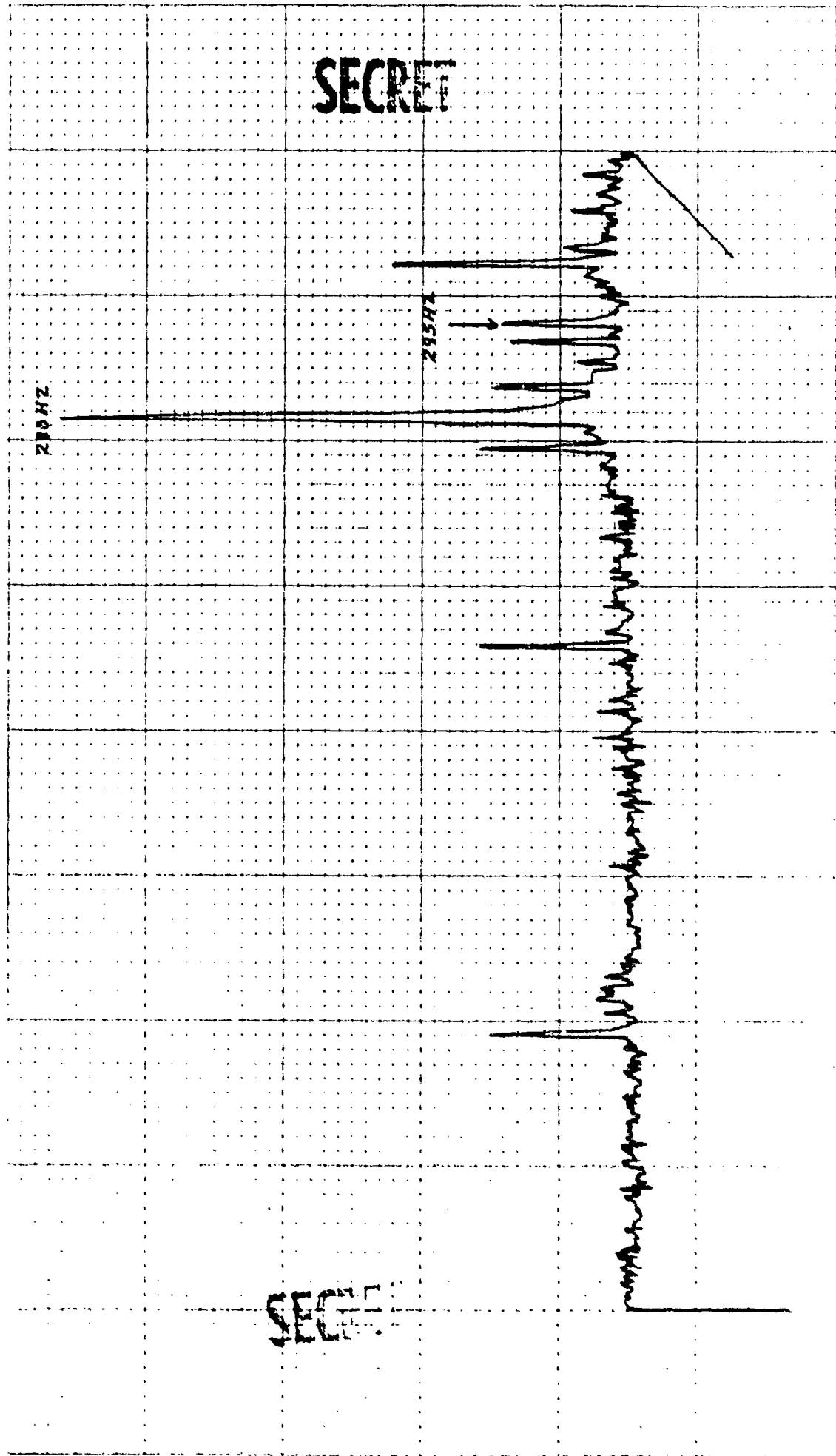


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CONTROL: 1501 - 48 (DOB) DATE OF ANALYSIS: _____ REEL: MY INDE X 3000
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 1-28-77 16-20 29-53
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ
 CENTER FREQ: 270 HZ +20 DEG. AZ STEERING INTEGRATION TIME 320 SECS ATTEN: 30 DB
 48 ELEMENTS FILTER WTG: HANNING



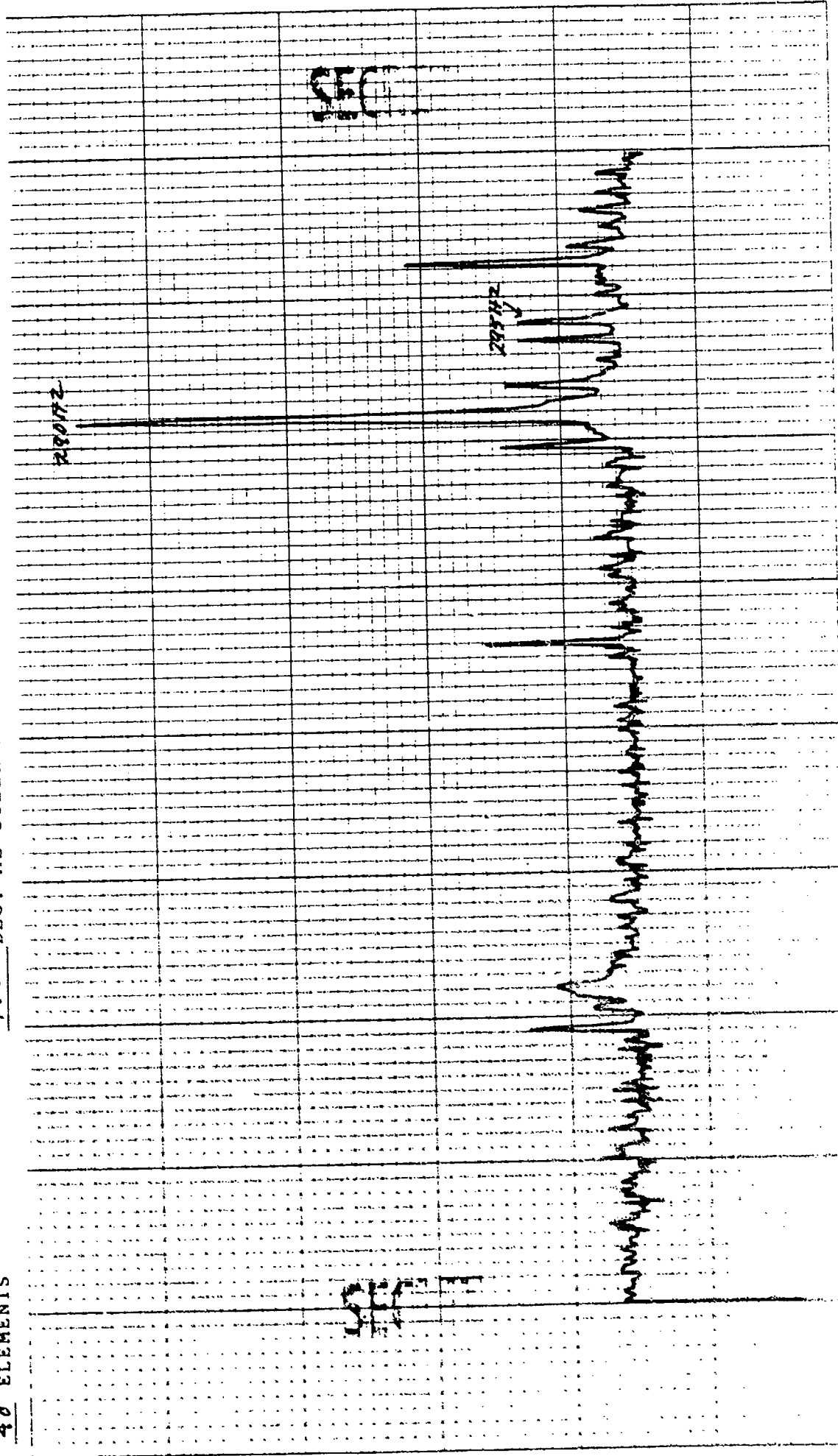
46 0703

10 X 10 TO THE INCHES
PER INCH

REEL: 14 INDE X 3000

CONTROL: 1501 - 40 (DPE) DATE OF ANALYSIS: ---
BEAMFORMED SPECTRUM (ELEMENTS 1-688-148/16-20488-53)
EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 1501 Z
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ
48 ELEMENTS +22 DEG. AZ STEERING

INTEGRATION TIME 320 SECS ATTN: -30 DB
FILTER WIG: HANNING

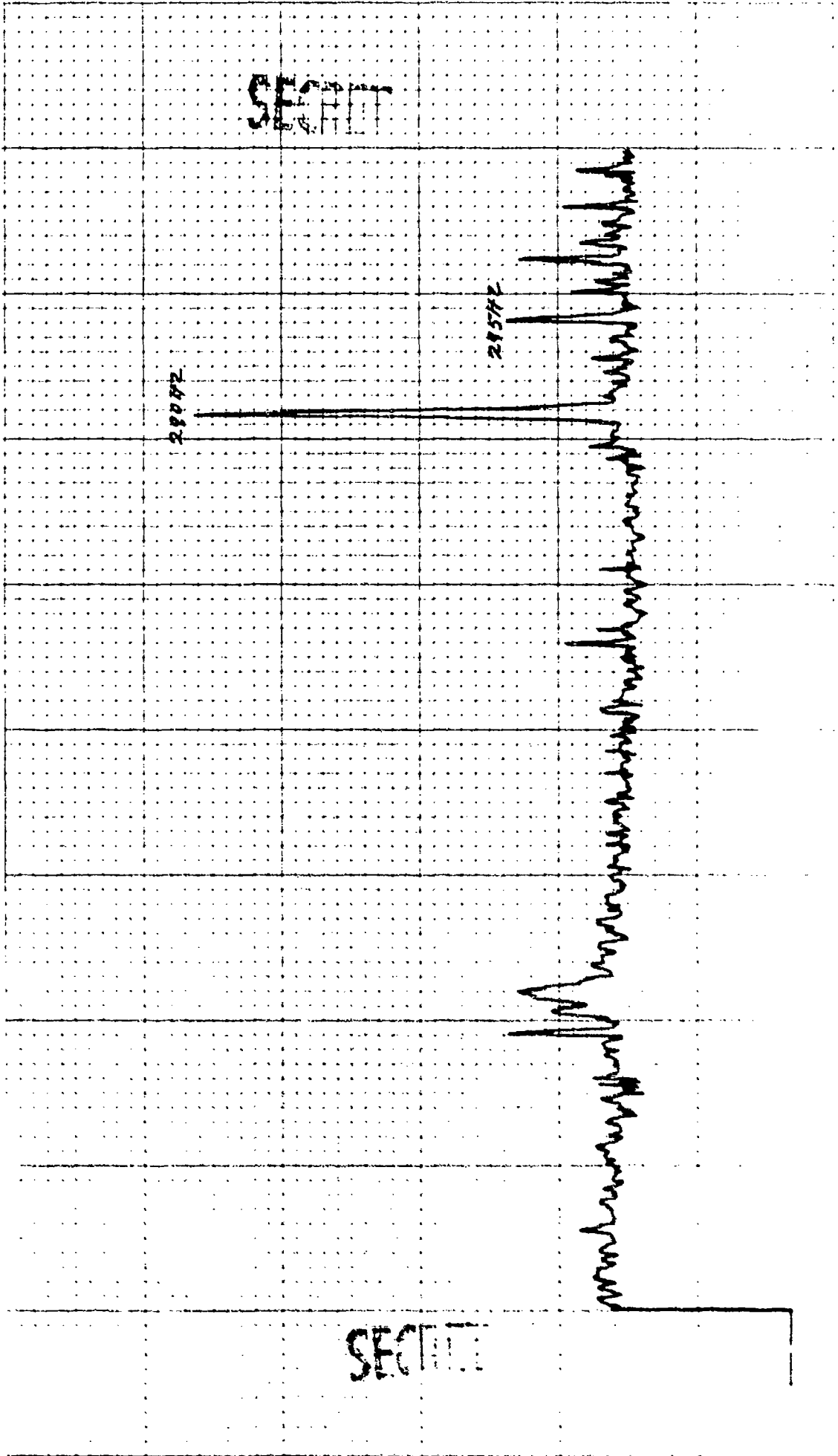


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CONTROL: 150% - 40 (DPO)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
40 ELEMENTS

DATE OF ANALYSIS: ---
DATE/TIME: 1-6-77 14:16-26 270-53
ANALYSIS BANDWIDTH: 1/10HZ
+24 DEG. AZ STEERING

REEL: 144 INDE X3000
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTER WIG: HANNING



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1-2-58 10:10:00 AM

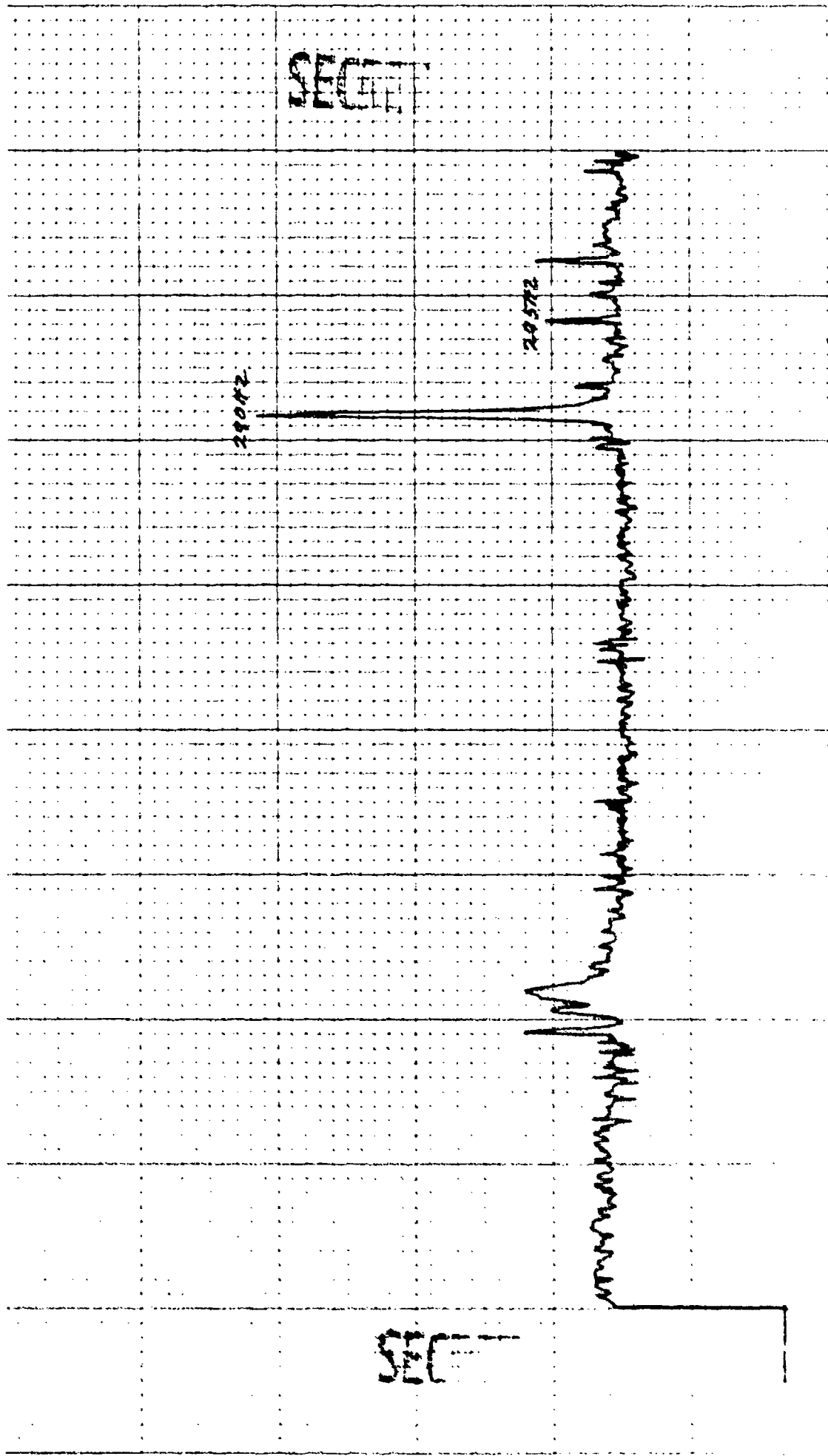
CONTROL: 1501 - 40 (D00) REEL: 44 INDE XJ000

BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-2-58 10:10:00 AM

EXERCISE: BEARING STAKE DATE/TIME: 3-25-77 - 1501 Z INTEGRATION TIME 320 SECS ATTN: -30 DB

CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FI.L.FPR WTG: HANNING

46 ELEMENTS + 26 DEC. AZ STEERING



UNCLASSIFIED

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

DATA POINT 9 DATE 3-15-77 TIME 2:31Z

FREQUENCY 140 HZ

INDICATED NOISE LEVEL $\frac{\text{dB}}{\text{ABW}}$ -52.0

SYSTEM SENSITIVITY $\text{dB}/\mu\text{B}$ -(-12) -40.0

BANDWIDTH CONVERSION TO 1 HZ BAND +8.2 -31.8

CONVERSION TO $\text{dBrePa}/\text{1HZ}$ +106 +68.2

UNCLASSIFIED

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

DATA POINT 9 DATE 3-15-77 TIME 2131Z

FREQUENCY 290 HZ

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

-51.0

SYSTEM SENSITIVITY dB/ μ B

-(-9) -43.0

BANDWIDTH CONVERSION TO 1 HZ BAND

+8.2 -34.8

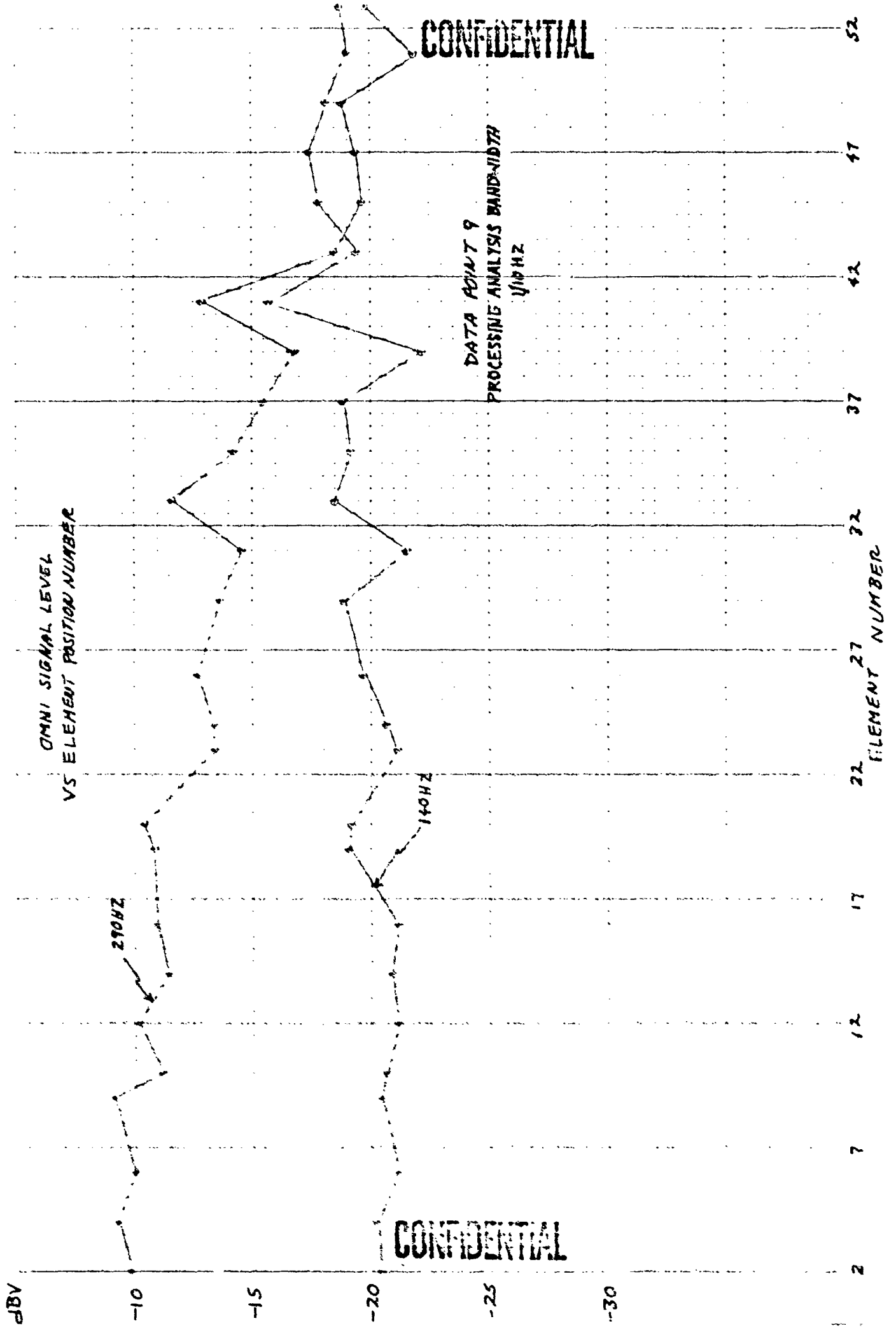
CONVERSION TO dBrePa/1HZ

+160 +65.2

UNCLASSIFIED

UNCLASSIFIED

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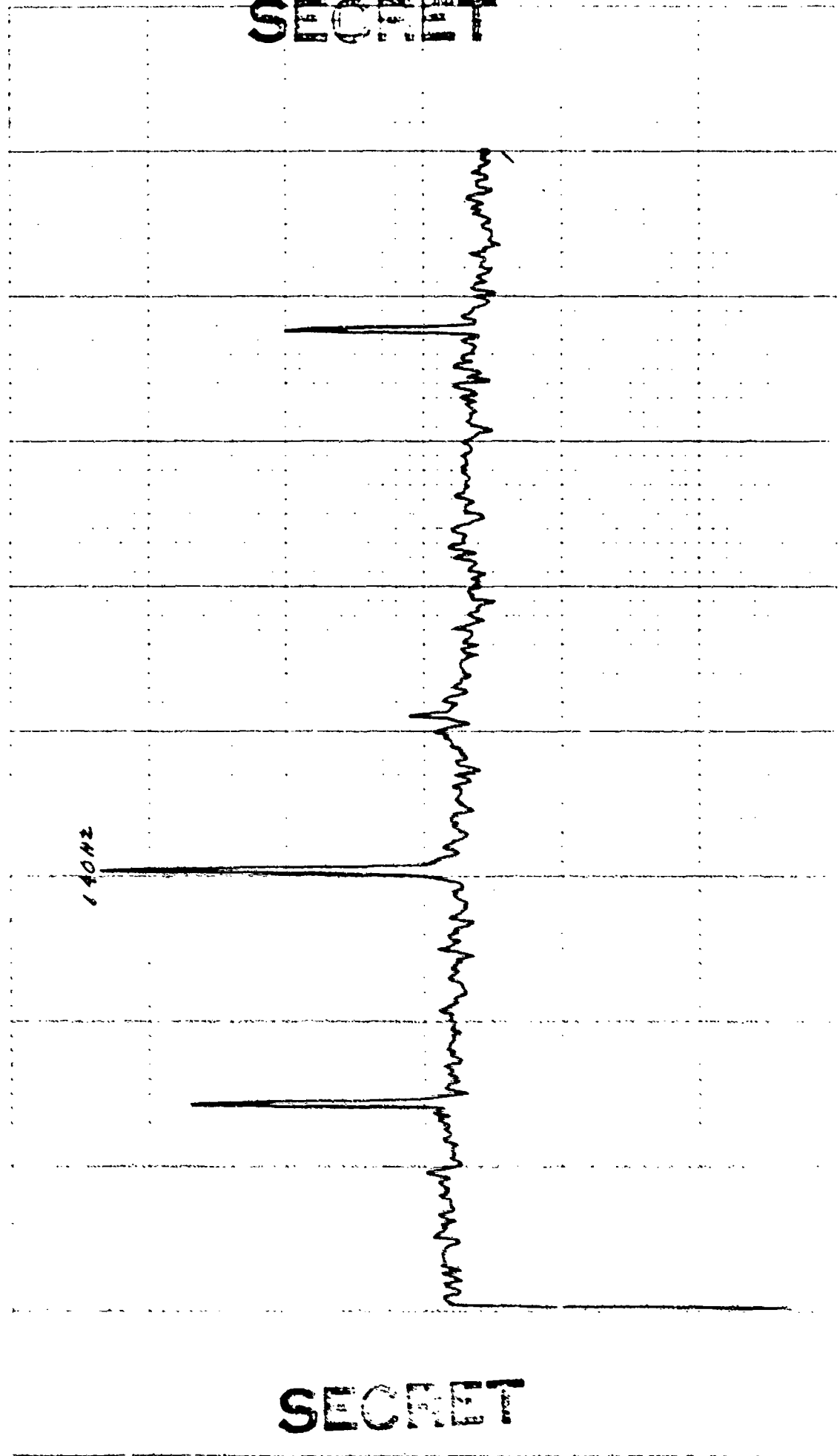


CONFIDENTIAL

CONFIDENTIAL

45 0703

CONTROL: 3-15-2171 (27) (27) DATE OF ANALYSIS: REEL: N10 INDEX 3620
 OMNI SPECTRUM (ELEMENT 2)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 1 ELEMENT
 DATE/TIME: 3-15-77 - 2131 Z INTEGRATION TIME 320 SECS ATTN: - DB
 ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTC: HANNING
 - DEG AZ STEERING



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X/A

CONTROL: 3-15 - 2131 (28)
OMNI SPECTRUM (ELEMENT 4)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

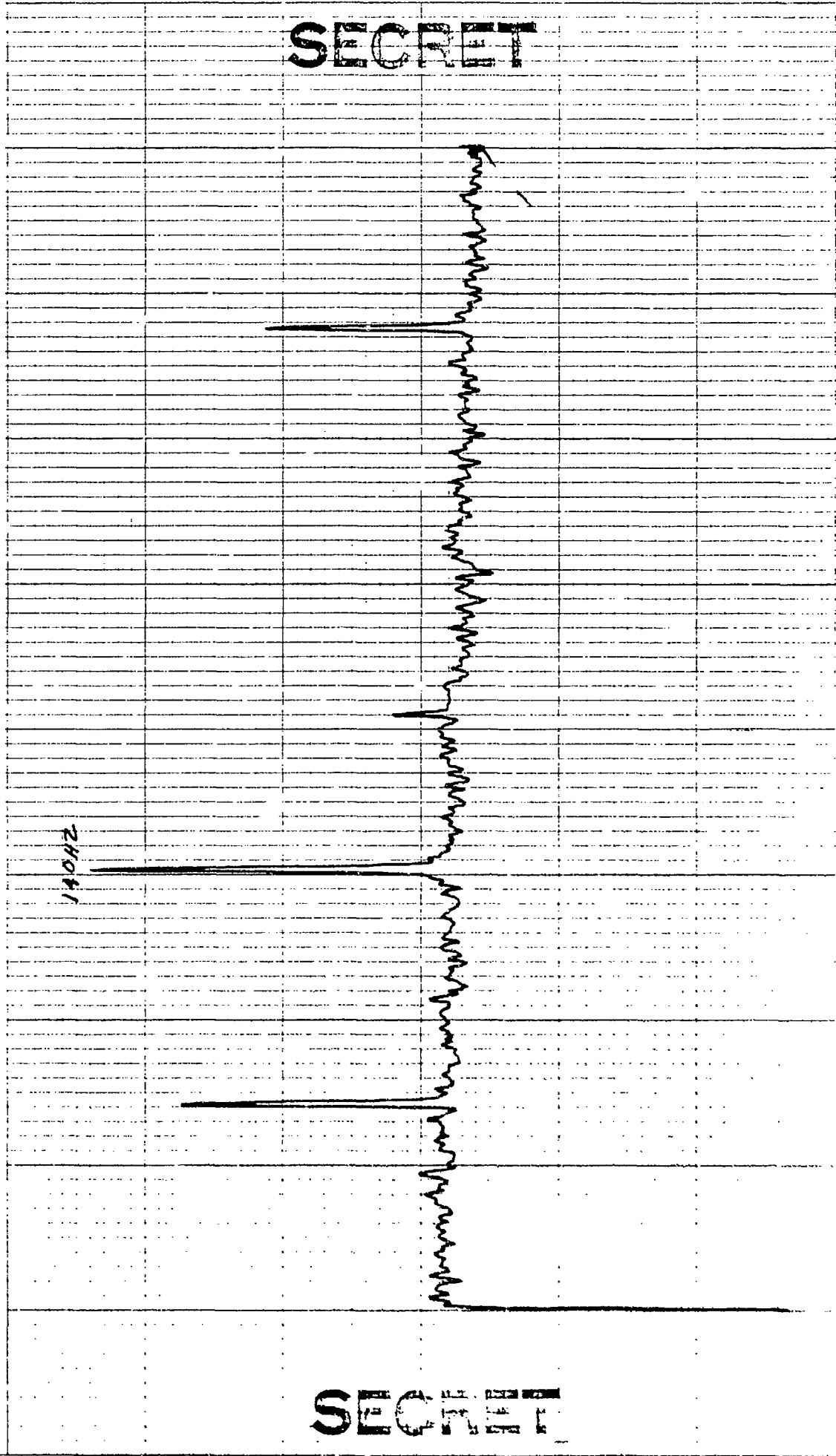
DATE OF ANALYSIS:

DATE/TIME: 2-15-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10 HZ
1 DEC AZ STEERING

REEL: M10

INDEX 3620

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER WT: HANNING



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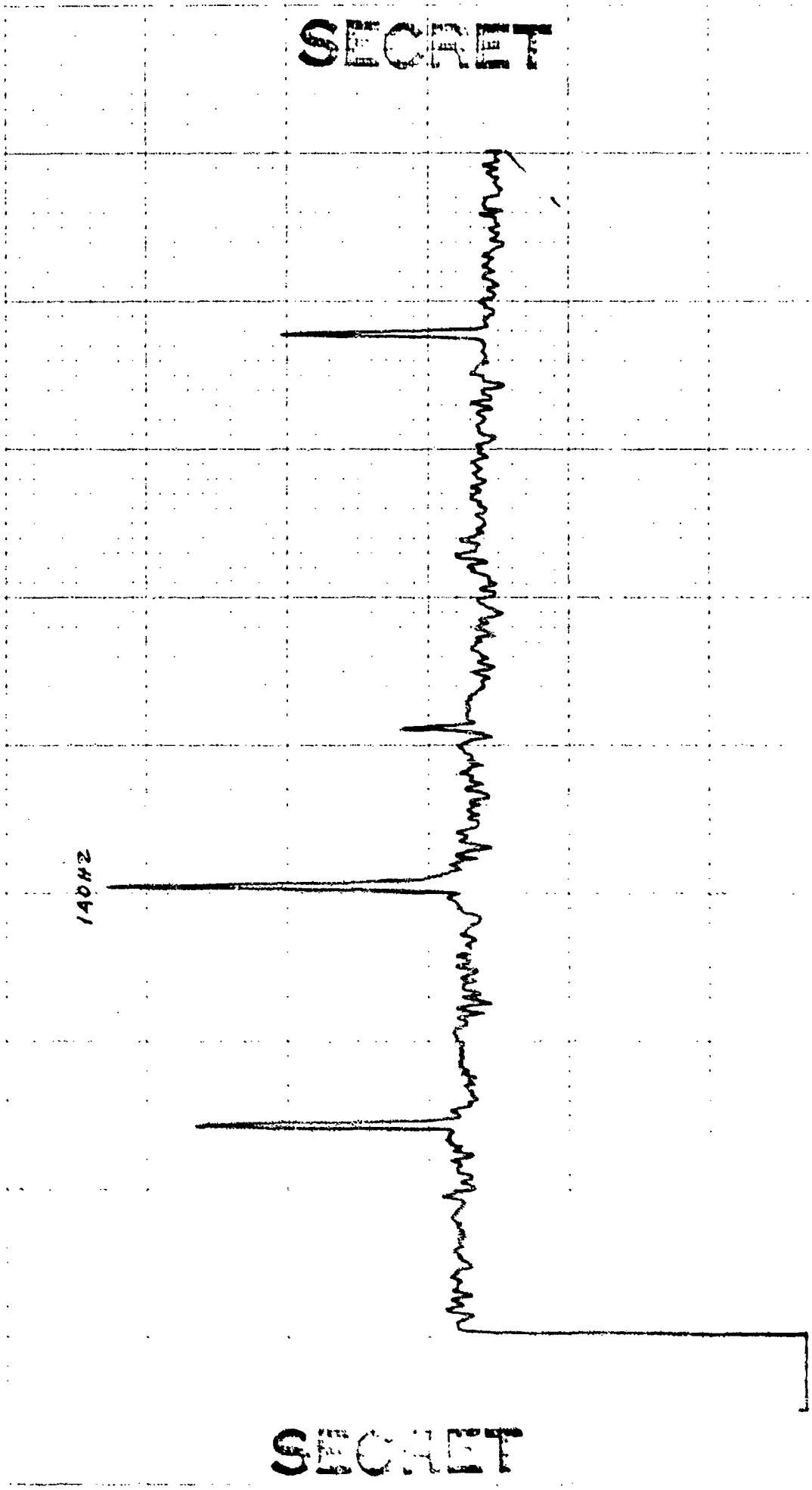
46 0703

1427 2400 2400 2400 2400

CONTROL: 345 - 2131 (29) DATE OF ANALYSIS: REEL: M10 INDEX 3620
 OMNI SPECTRUM (ELEMENT 6)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 1 ELEMENT

DATE/TIME: 37577 - 2431
 ANALYSIS BANDWIDTH: 1/10HZ
 DEG AZ STEERING

INTEGRATION TIME 320 SECS ATTN: DB
 FILTER WTG: HANNING



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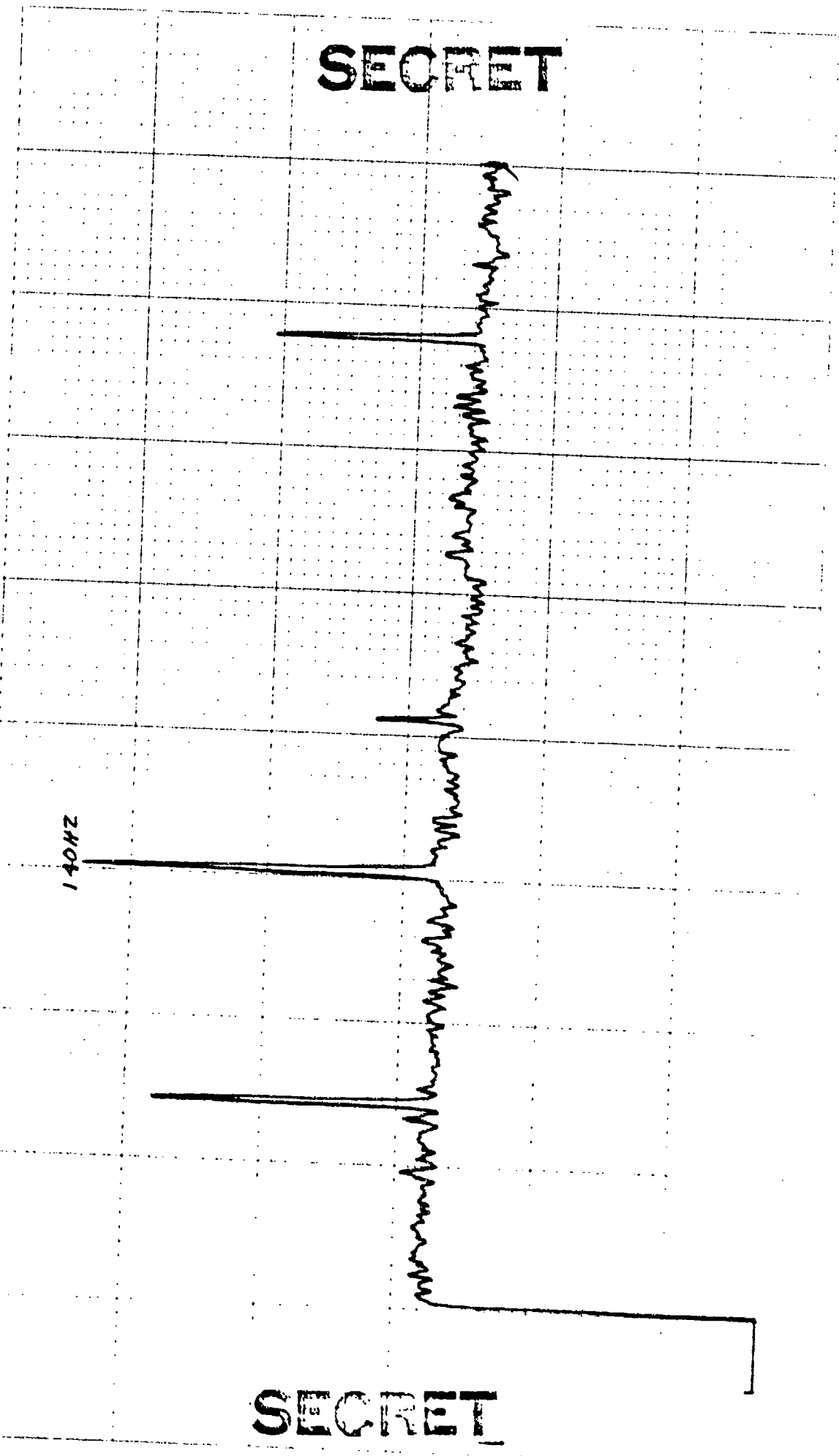
CONTROL: 375-2131 (31)
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: M10 INDEX 3620

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



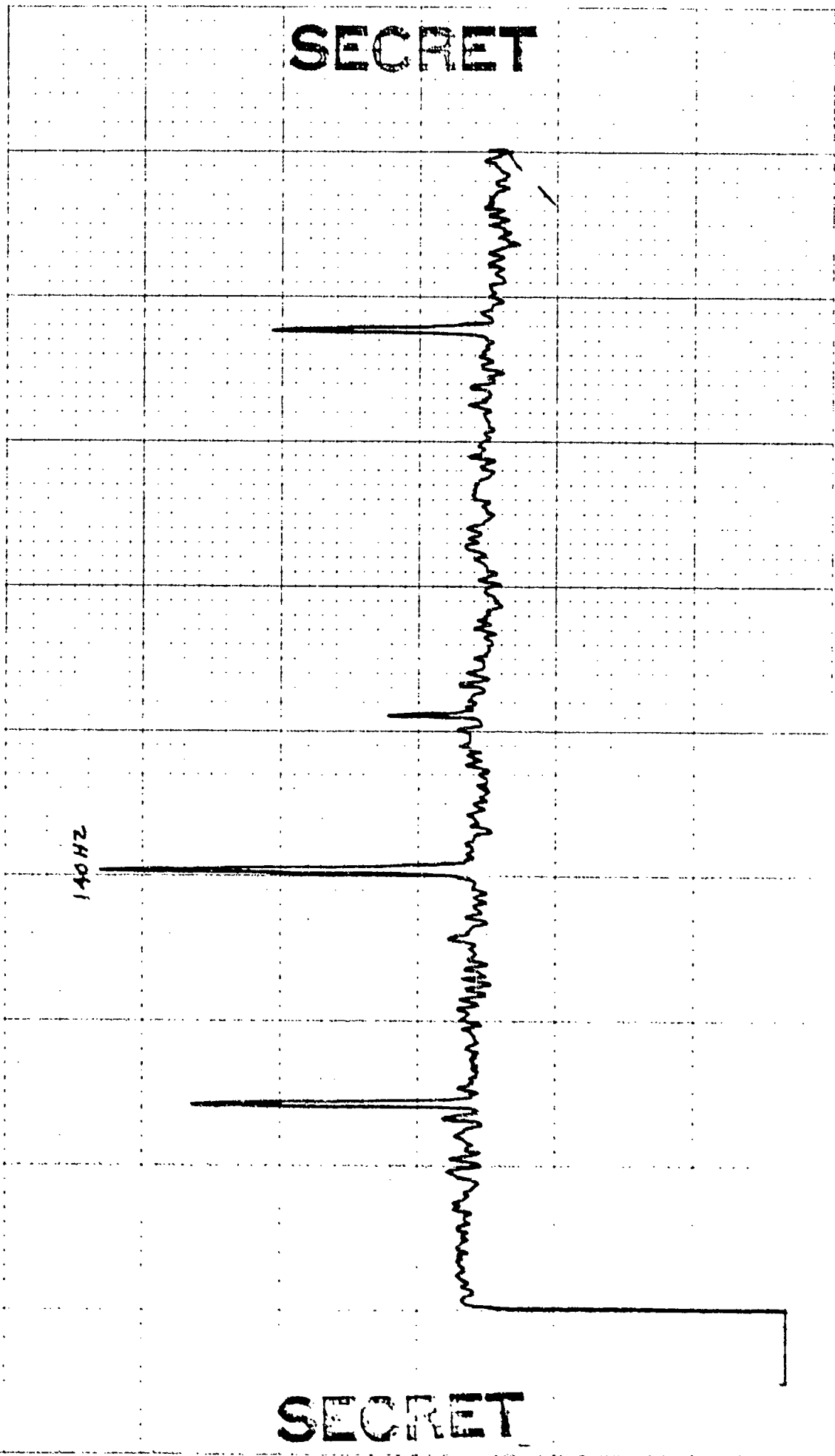
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Page 2 of 2

CONTROL: 345-2/31 (12) DATE OF ANALYSIS: REEL: A10 INDEX 3620
 OMNI SPECTRUM (ELEMENT 12)
 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



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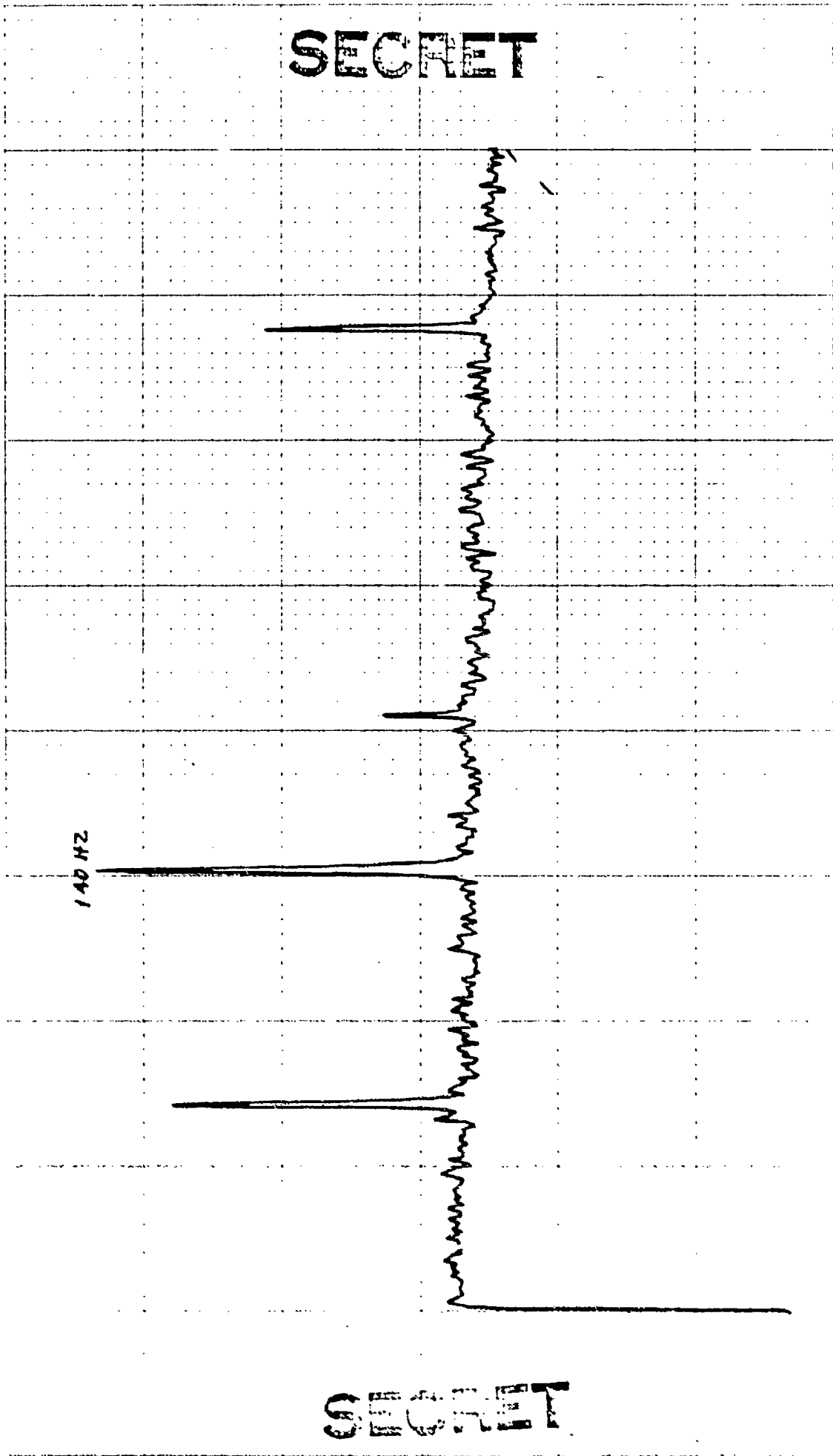
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142 25 00 30.15 00.00 00.00

CONTROL: 3-15 - 2131 (33) REEL: K10 INDEX: 3620
 OMNI SPECTRUM (ELEMENT 14)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 1 ELEMENT

DATE OF ANALYSIS:
 DATE/TIME: 3-15-77 - 2131 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 _____ DEG AZ STEERING

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



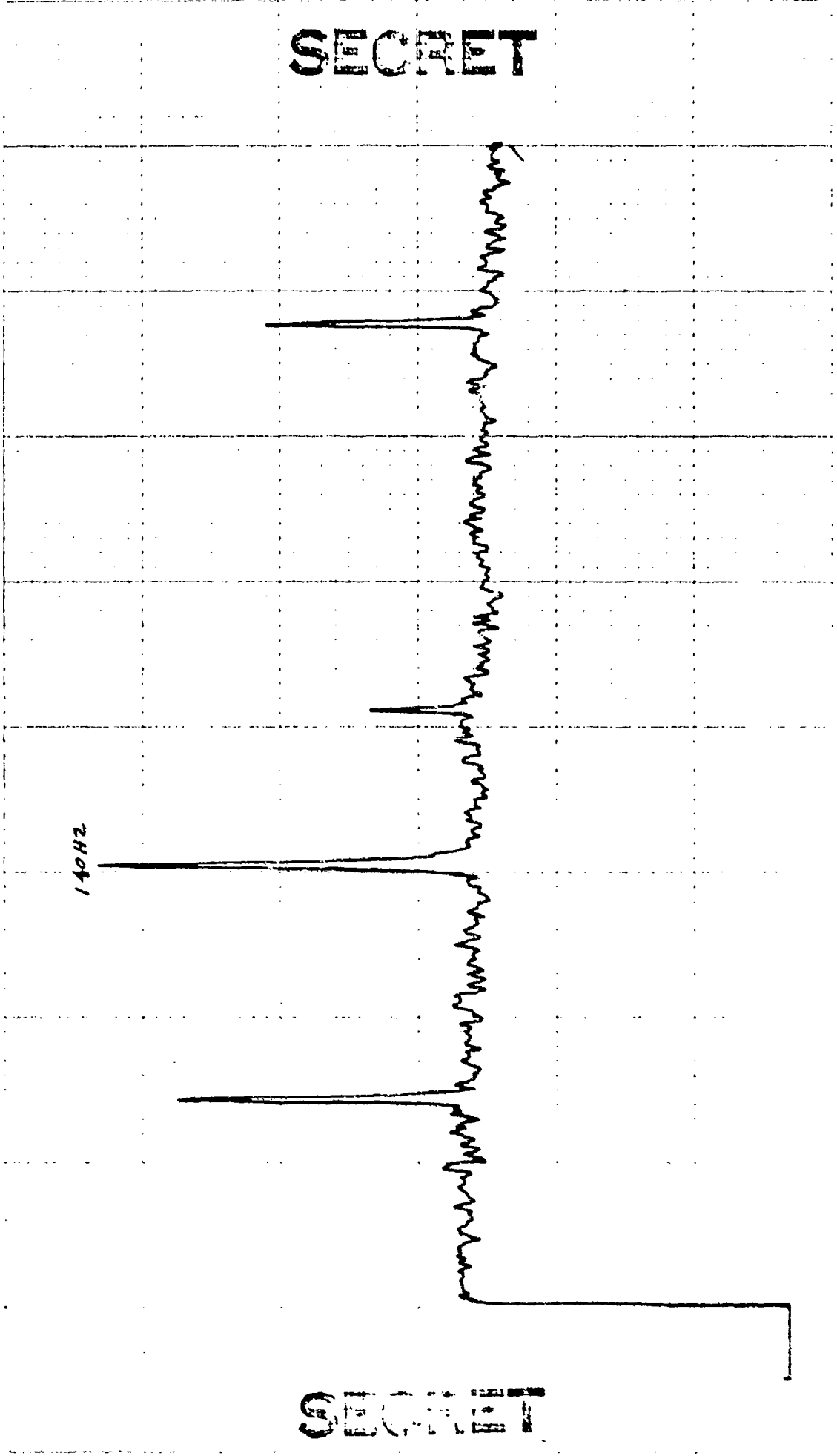
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1657 24 0000 0000 0000 0000

CONTROL: 3-15 - 2131 (34) DATE OF ANALYSIS: REEL: 110 INDEX 3620
 GMNI SPECTRUM (ELEMENT 16)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTEN: - DB
 1 ELEMENT _____ DEC AZ STEERING FILTER WIG: HANNING



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REF ID: A66000

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CONTROL: 3-15 - 2431 (35)
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

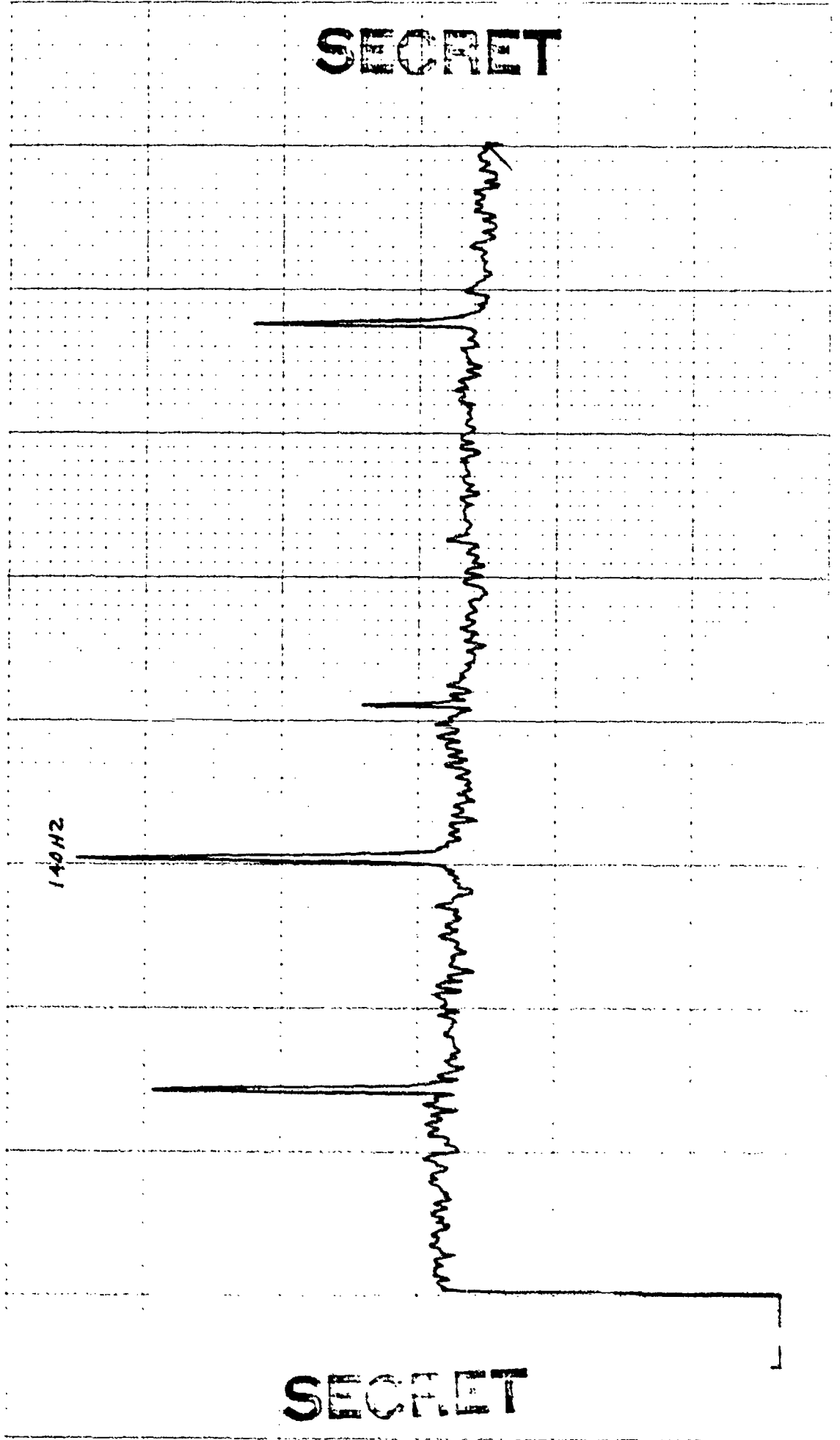
DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 2431 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: M10

INDEX 3620

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



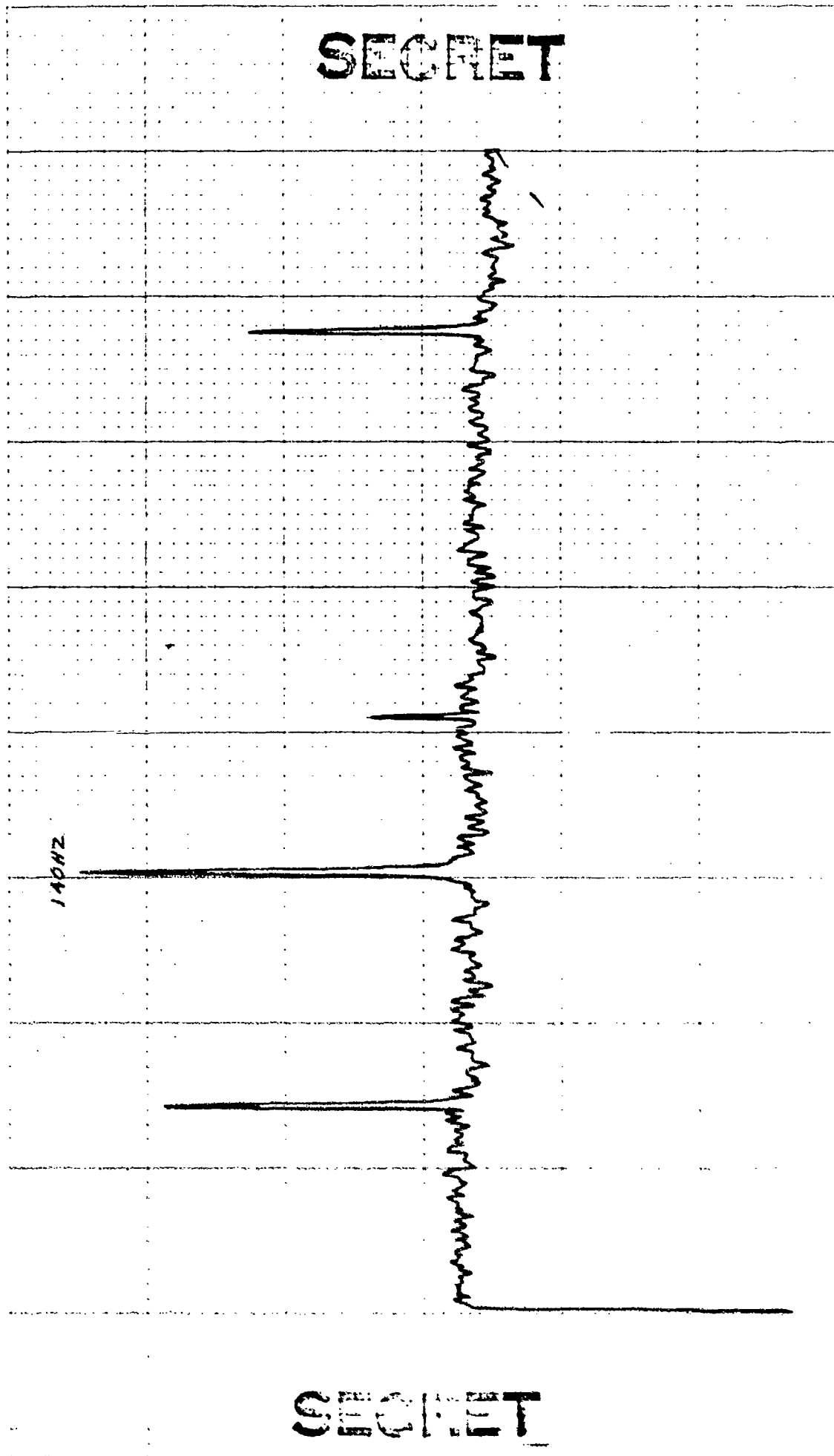
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REF: 3-15-77 TO THE DIRECTOR, NSA

CONTROL: 3-15-77 (36) DATE OF ANALYSIS: REEL: M10 INDEX 3620
 OMNI SPECTRUM (ELEMENT 20)
 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



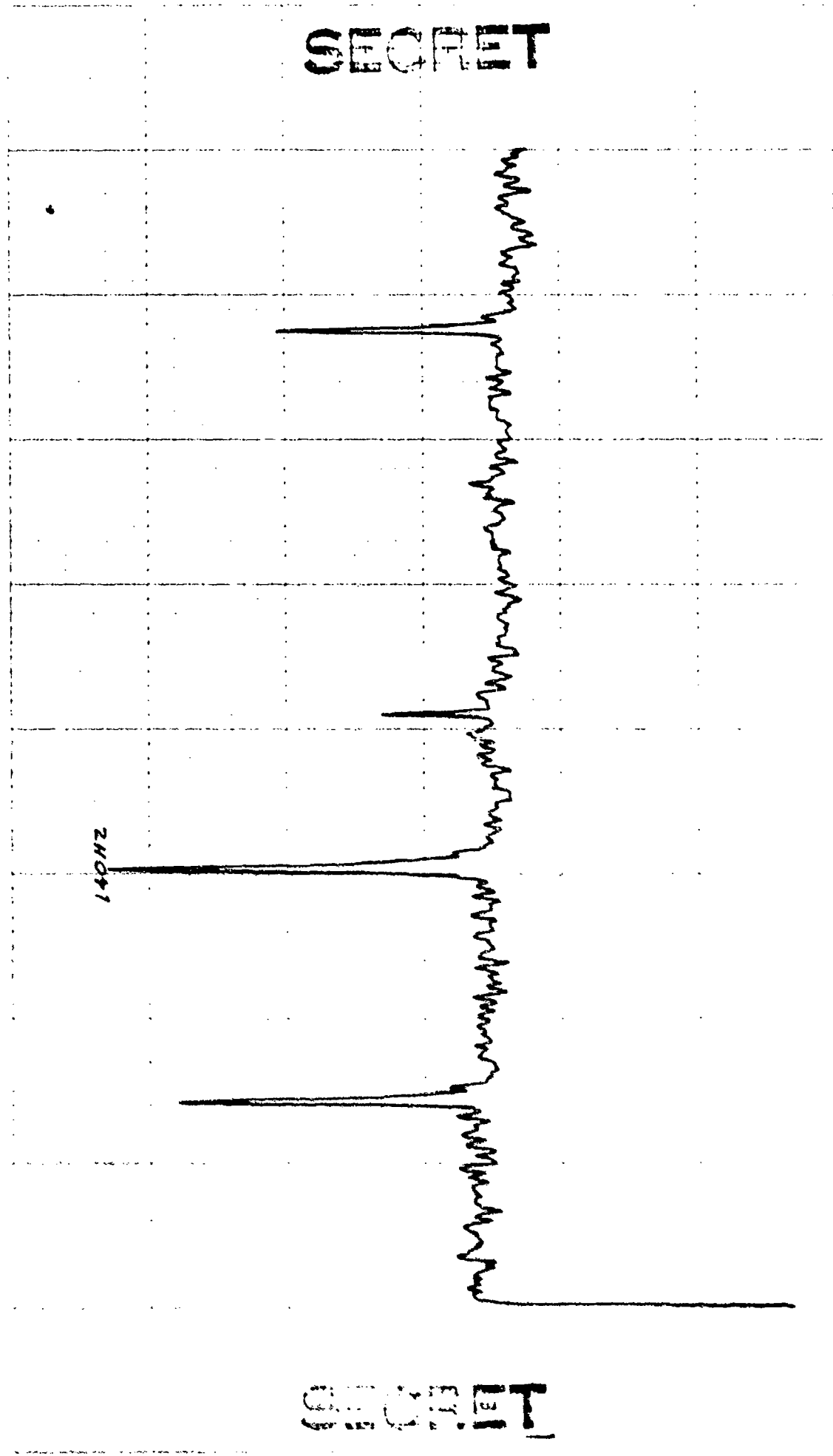
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143 50 50 20 10 00 00

CONTROL: 3-15 - 2/31 (17) DATE OF ANALYSIS: REEL: 110 INDEX 362
 OMNI SPECTRUM (ELEMENT 23)
 EXERCISE: BEARING STAKE DATE/TIME: 3-5-77 - 20/1 Z INTEGRATION TIME 320 SECS ATTN: DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTC: HANNING
 1 ELEMENT DEG AZ STEERING



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CONTROL: 3-15 - 2187 (J8)
OMNI SPECTRUM (ELEMENT 24)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 2131 Z

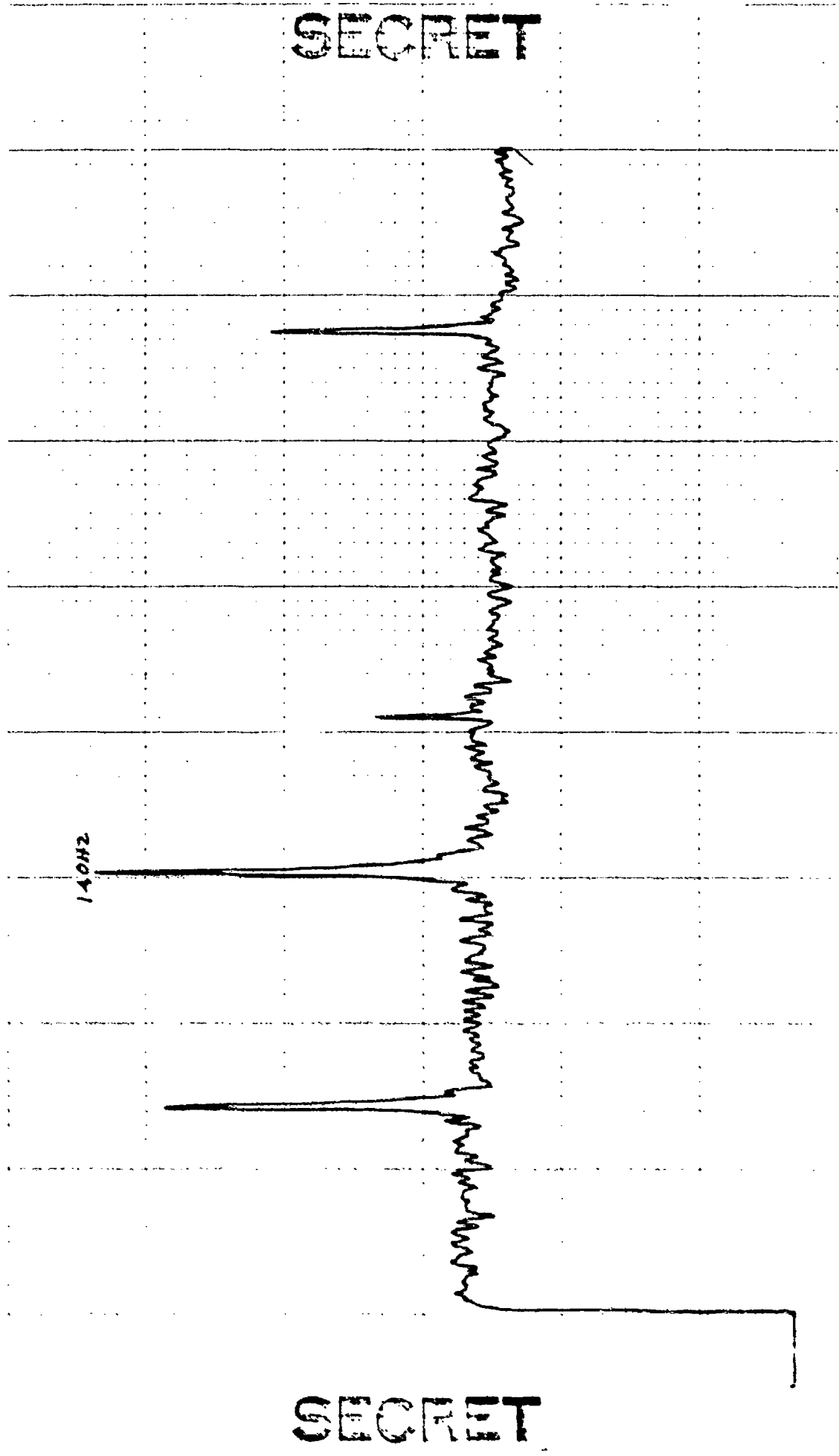
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: M10

INTEGRATION TIME 320 SECS
FILTER

INDEX 3620

ATTEN: - DB
WTG: HANNING



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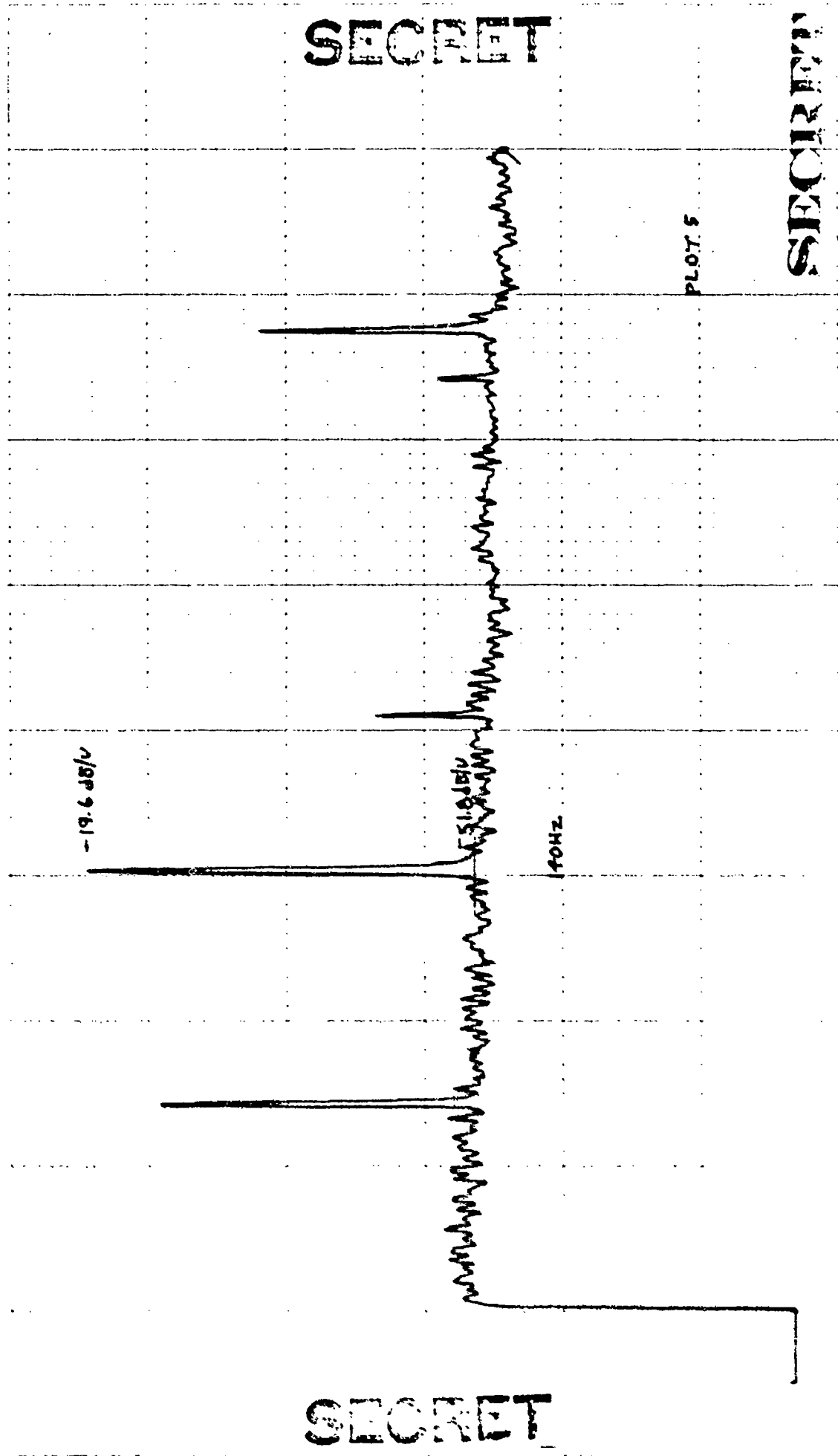
CONTROL: 2/J - 5/ (DPY)
OMNI SPECTRUM (ELEMENT 26)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 2/3/ Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ STEERING

REEL: MIO INDEX 3620

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



100 HZ

150 HZ

188 HZ

PLOT 5

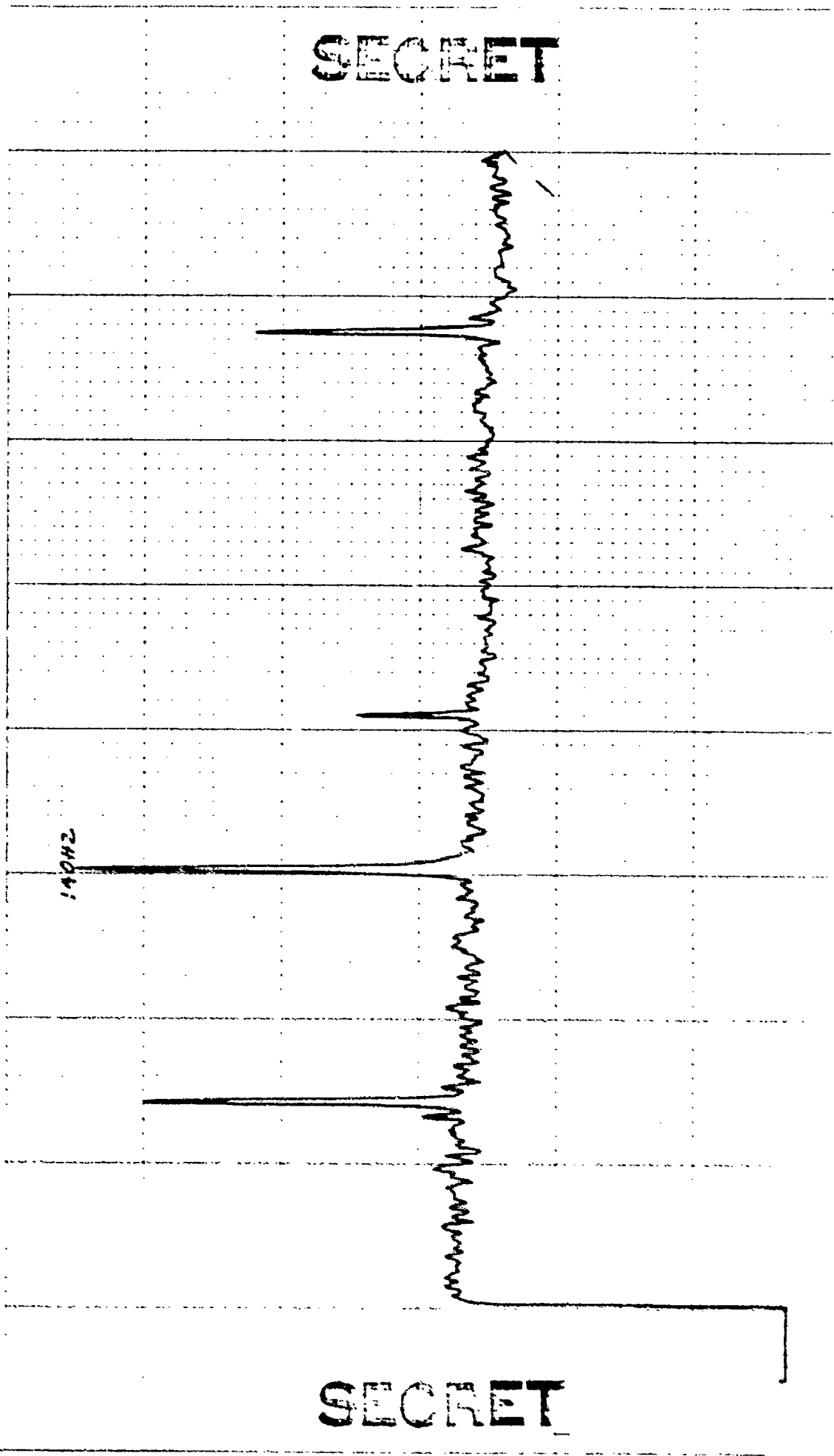
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CONTROL: 3-15 - 213/ (10) DATE OF ANALYSIS: REEL: 110 INDEX 3620
 OMNI SPECTRUM (ELEMENT 29)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 1 ELEMENT

DATE/TIME: 3-5-77 - 2131 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 INTEGRATION TIME 320 SECS ATTN: - DB
 FILTER WTG: HANNING
 DEC AZ STEERING



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MAY 20 1977 08:00:00

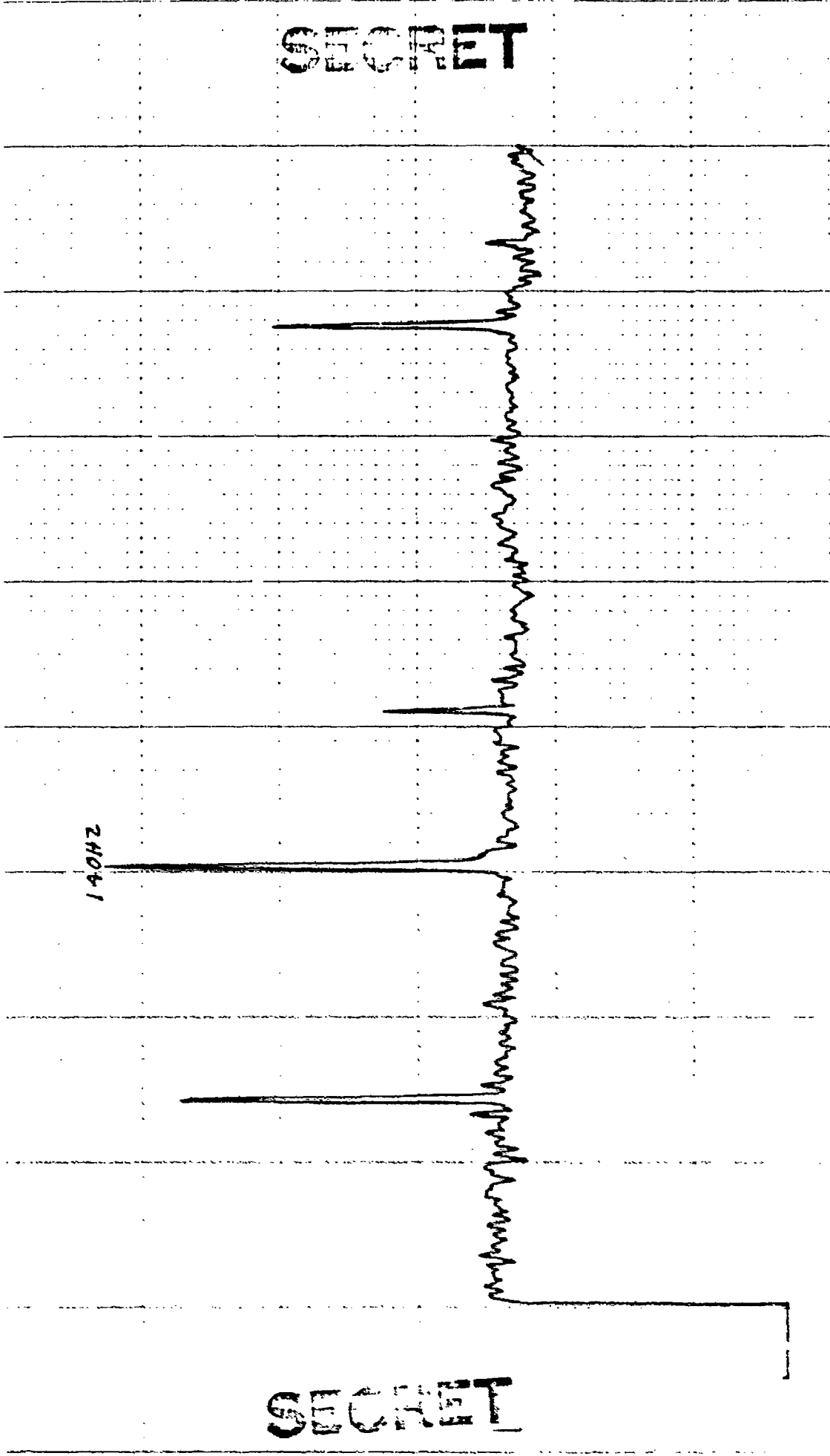
CONTROL: 7-45 - 2/77 (41)
OMNI SPECTRUM (ELEMENT 31)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-5-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ STEERING

REEL: 410 INDEX: 3620

INTEGRATION TIME 320 SECS
FILTER WTG: HANNING



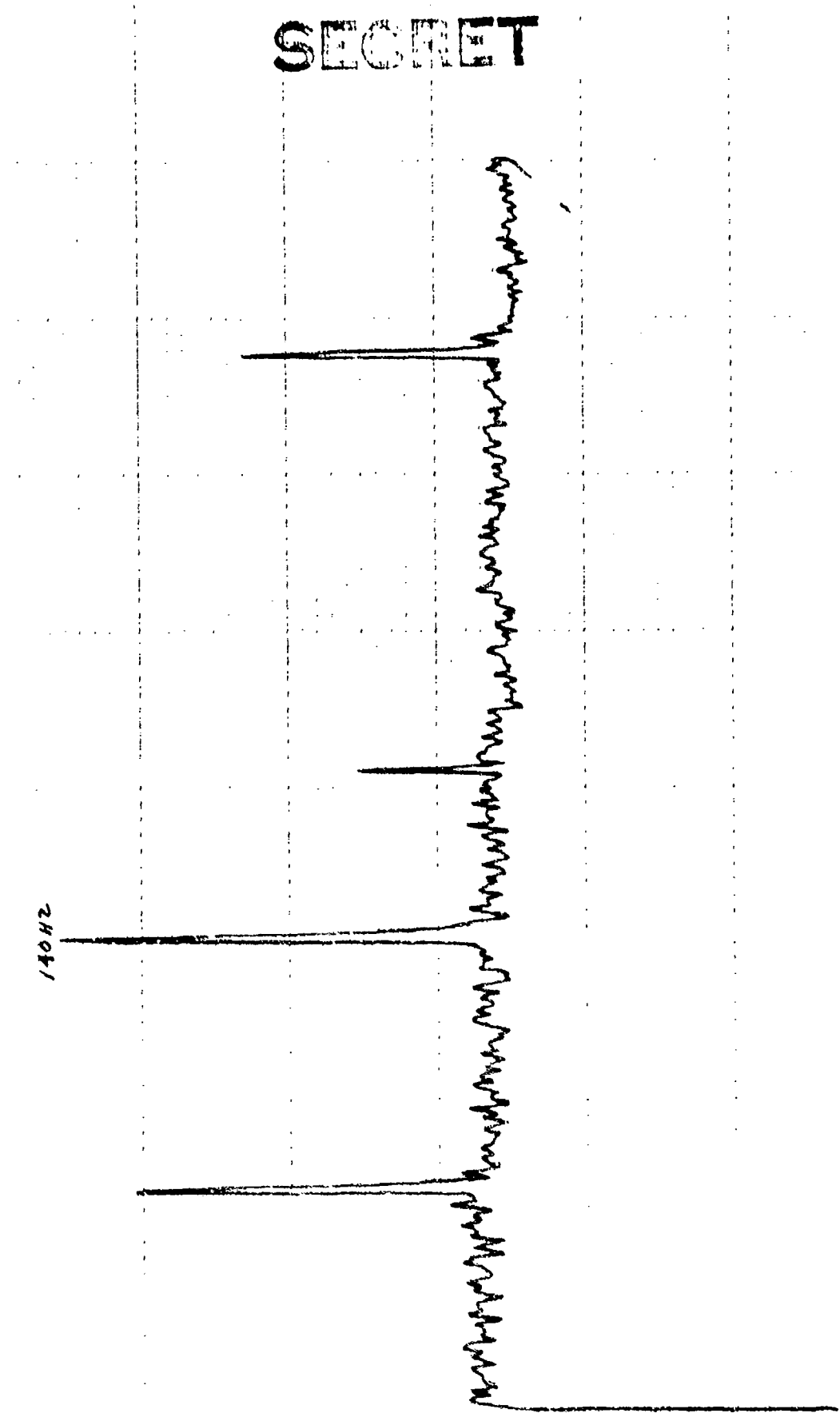
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CONTROL: 345-202 (42)
OMNI SPECTRUM (ELEMENT 33)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:
DATE/TIME: 3-45-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEG AZ SLEEPING

REEL: M19
INDEX: 7620
INTEGRATION TIME 320 SECS
FILTER
ATTN: — DB
WTC: HANNING



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REEL: M10 INDEX 3620

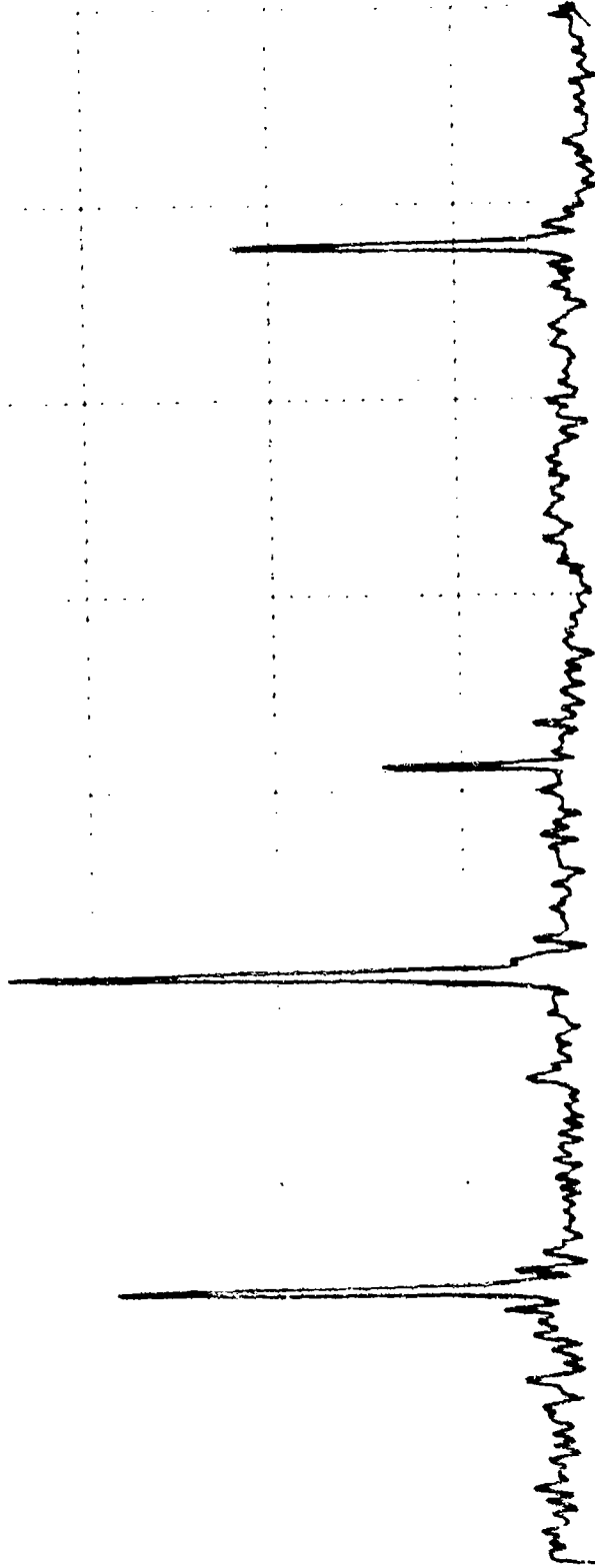
DATE OF ANALYSIS:

DATE/TIME: 3-16-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10HZ
- DEG AZ STEERING

COMIPOL: 2131 - 51 (889)
OMNI SPECIPUM (ELEMENT 35)
EXERCISE: BEARING STAKE
CENTER FREQ: 152 HZ
1 ELEMENT

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

170HZ



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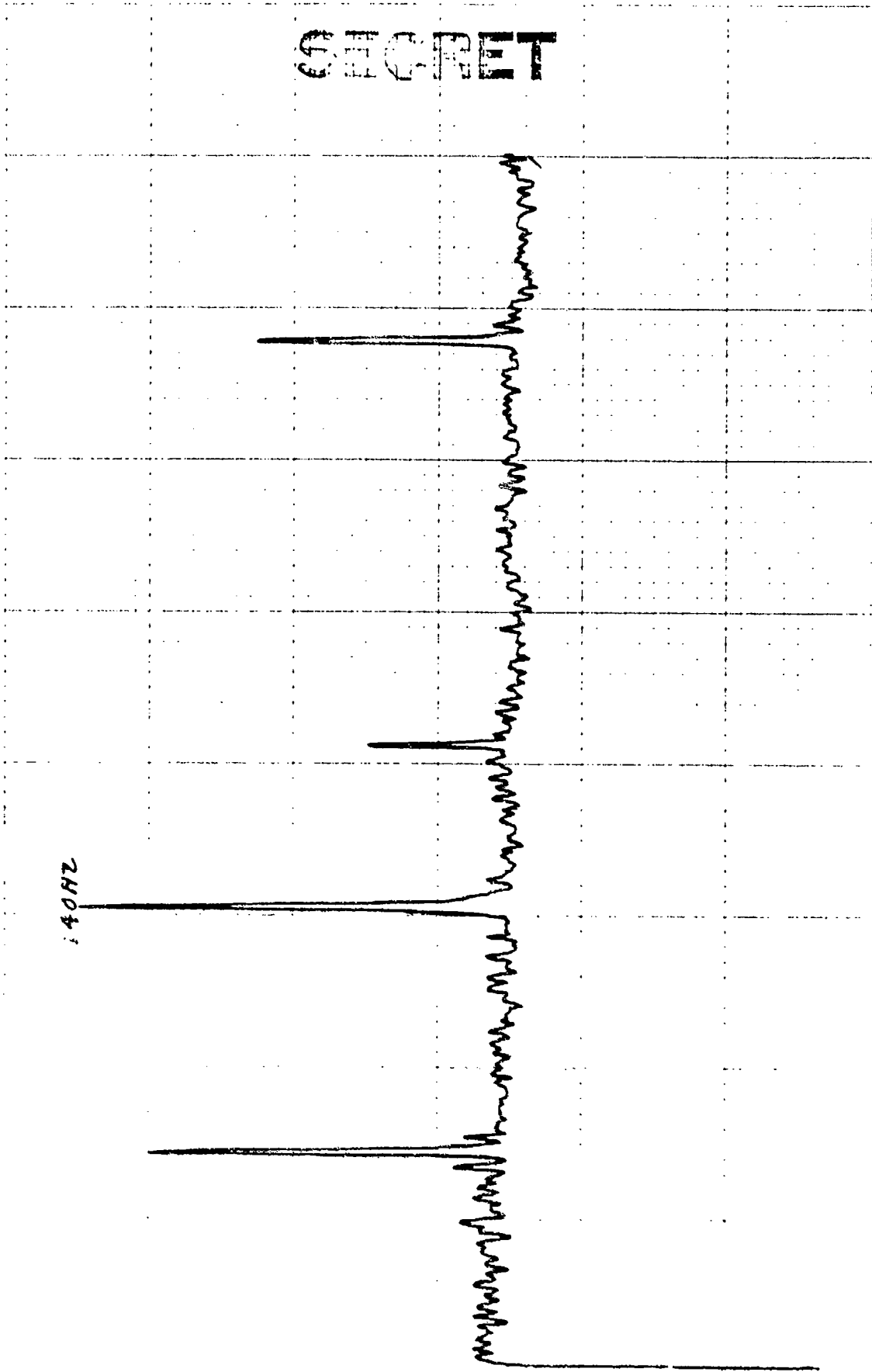
CONTROL: 3-15 - 2131 (44)
OMNI SPECTRUM (ELEMENT 37)
EXEPCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10HZ
_____ DEG AZ STEERING

REEL: M10 INDEX 3620

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



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CONTROL: 3-5 - 2/31 (45)
OMNI SPECTRUM (ELEMENT 39)
EXERCISE: BEARING STAYE
CENTER FREQ: 150 HZ
1 ELEMENT

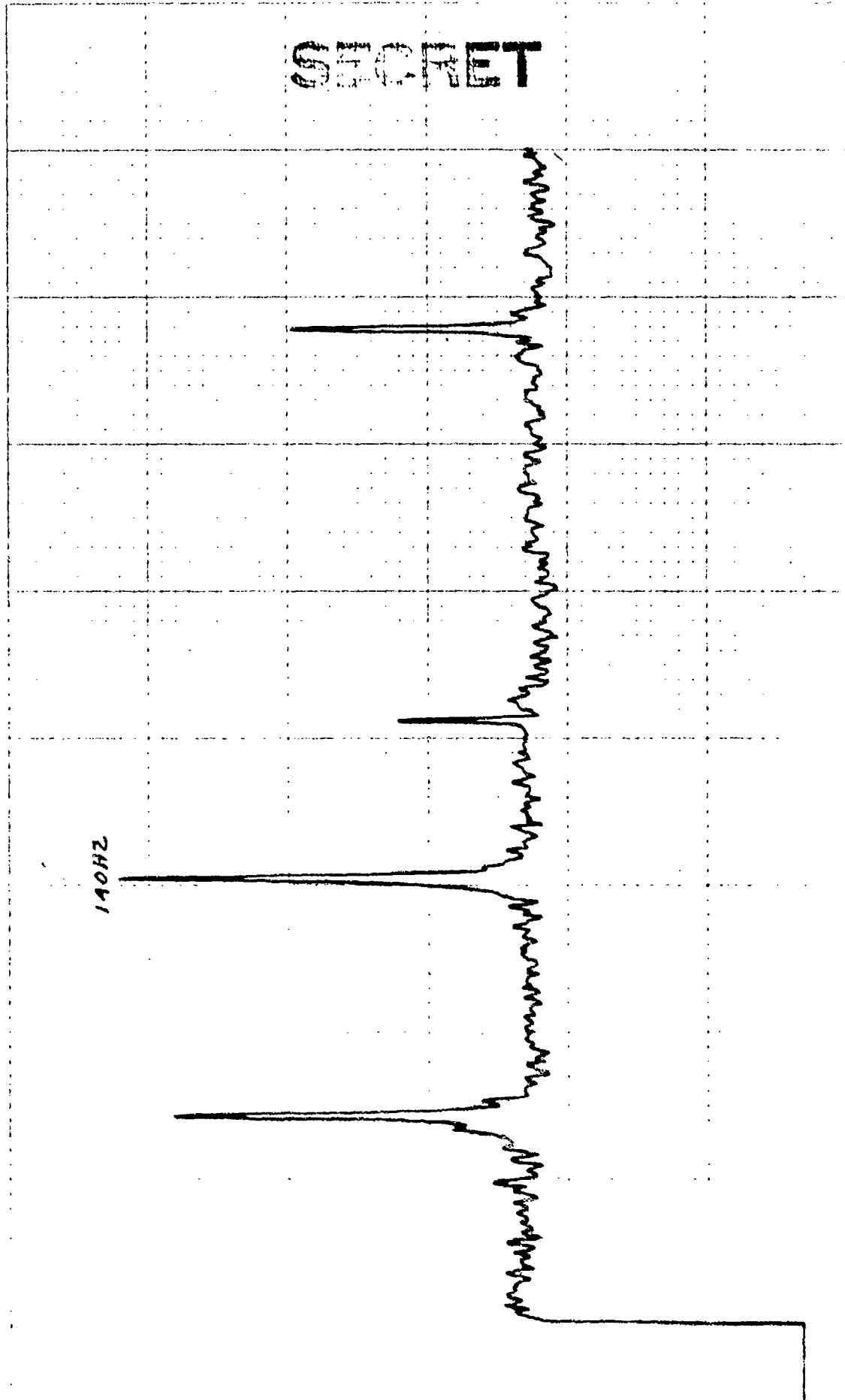
DATE OF ANALYSIS:

DATE/TIME: 3-5-77 - 2/31 Z

ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ STEERING

REEL: 110 INDEX 3020

INTEGRATION TIME 320 SECS
FILTER WTC: HANNING



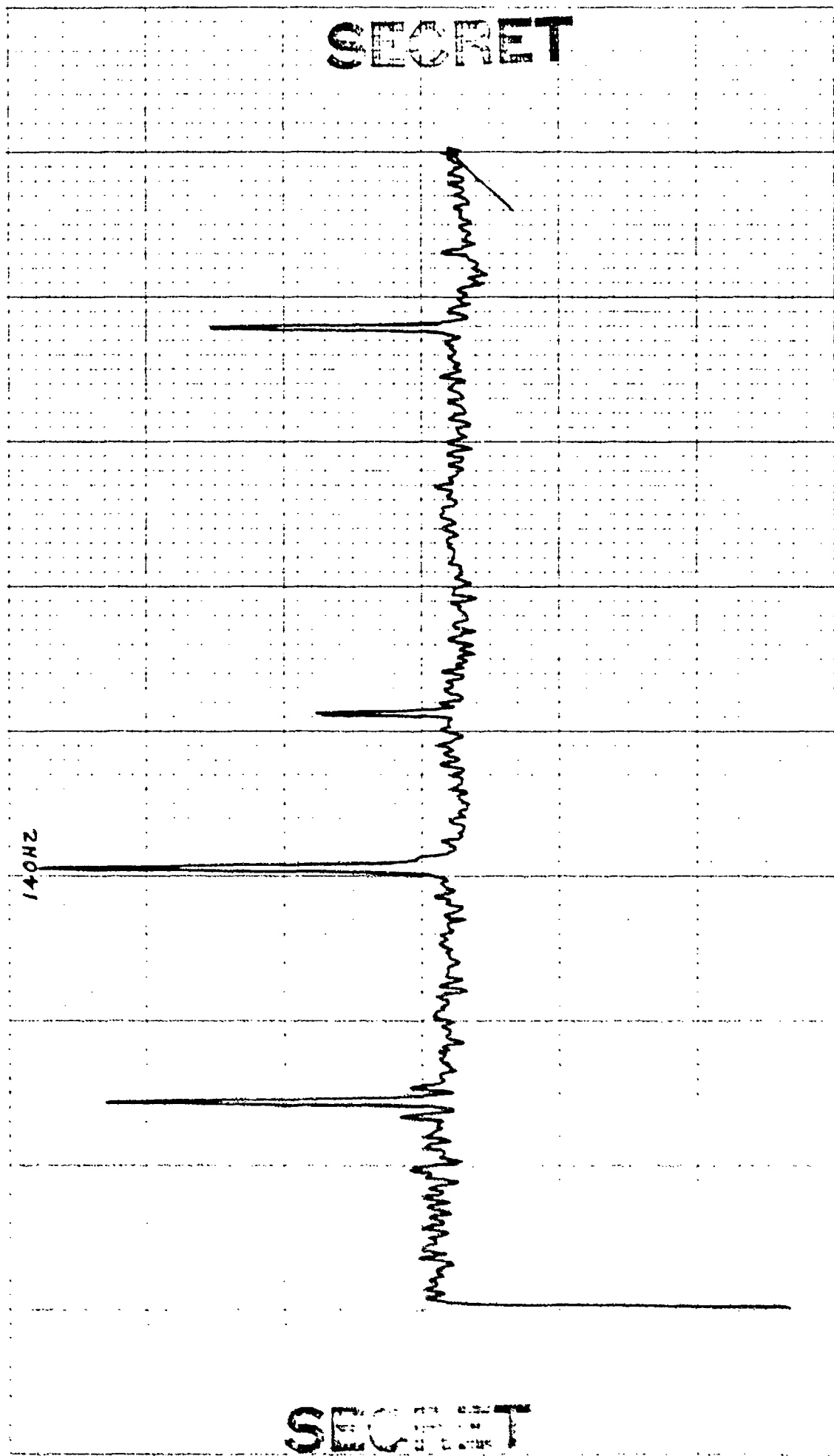
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1622 46000 46000 46000 46000 46000

CONTROL: 3-15 -2131 (41) DATE OF ANALYSIS: REEL: M10 INDEX 3620
OMNI SPECTRUM (ELEMENT 41)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
INTEGRATION TIME 320 SECS ATTEN: DB
FILTER WTG: HANNING
DATE/TIME: 3-15-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEC AZ STEERING



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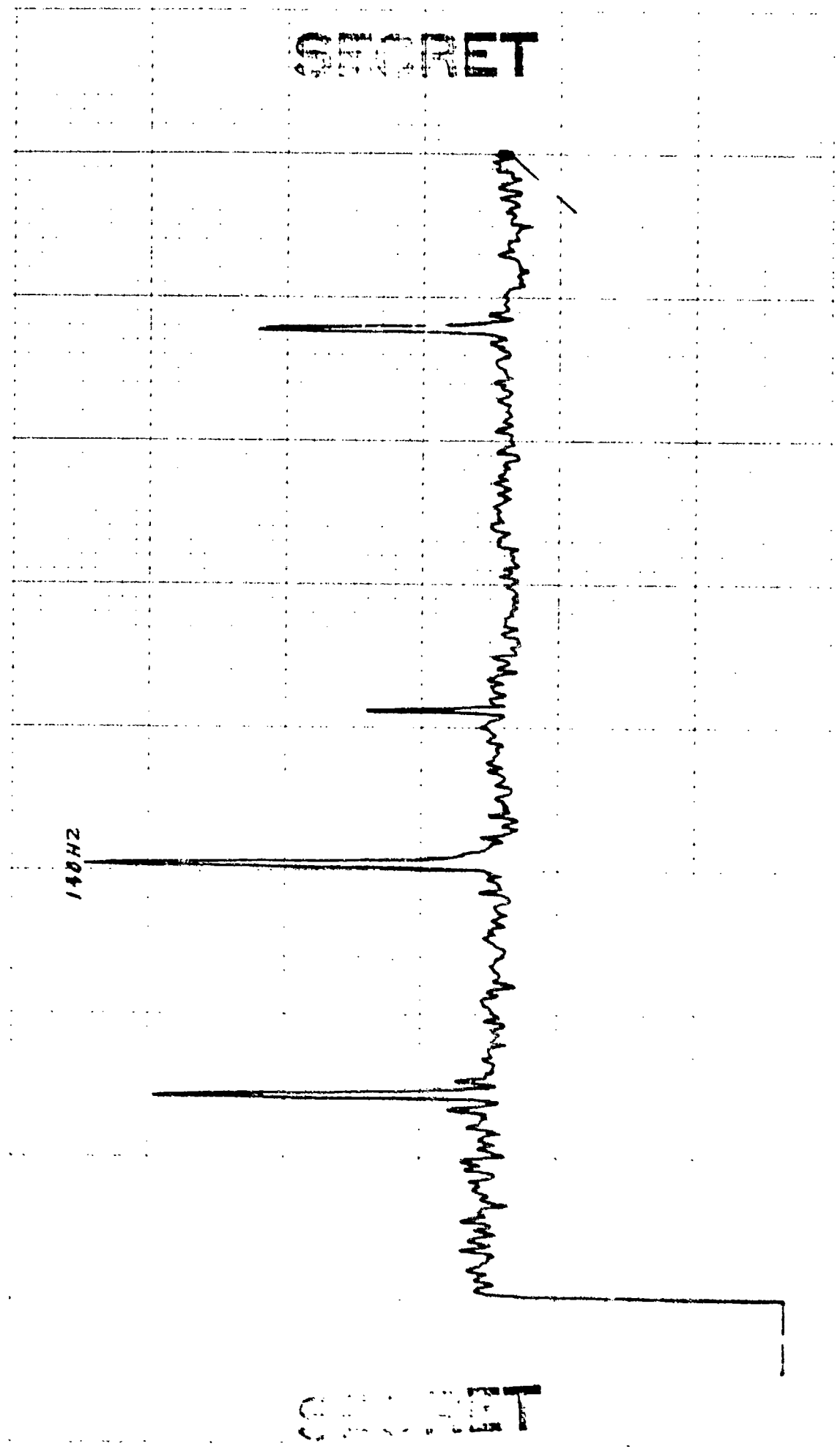
CONTROL: 3-15 - 2/31 (47)
OMNI SPECTRUM(ELEMENT 43)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 2/31 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEC AZ STEERING

REEL: 1910 INDEX J620

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



SECRET

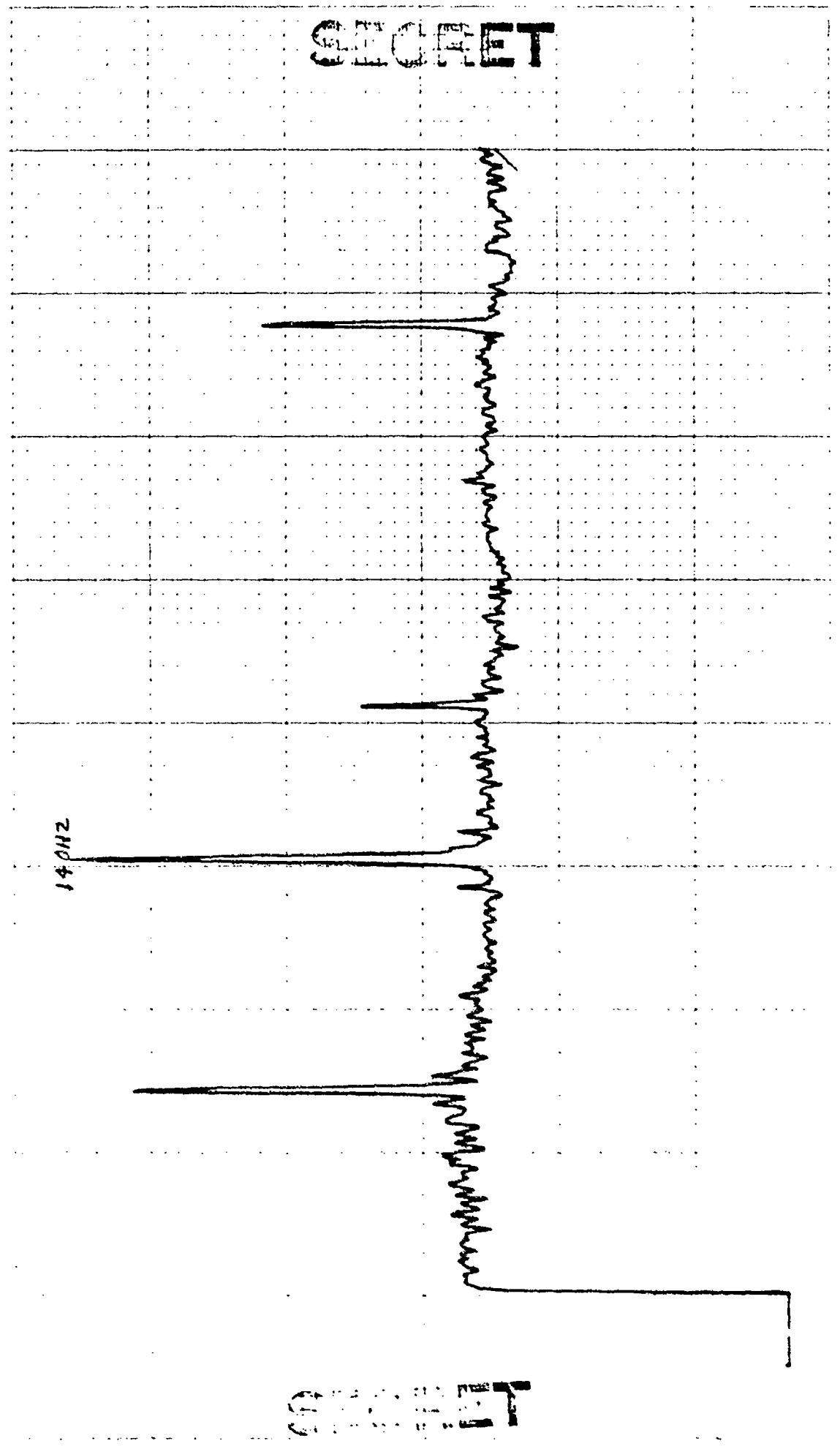
SECRET

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CONTROL: 3-15 - 212/ (40) REEL: M10 INDEX 3/20
 OMNI SPECTRUM (ELEMENT 45)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ INTEGRATION TIME 320 SECS ATTN: - DB
 1 ELEMENT FILTER WIG: HANNING

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 212/ Z
 ANALYSIS BANDWIDTH: 1/10HZ
 DEG AZ STEERING



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1487 16500 20000 25000 30000

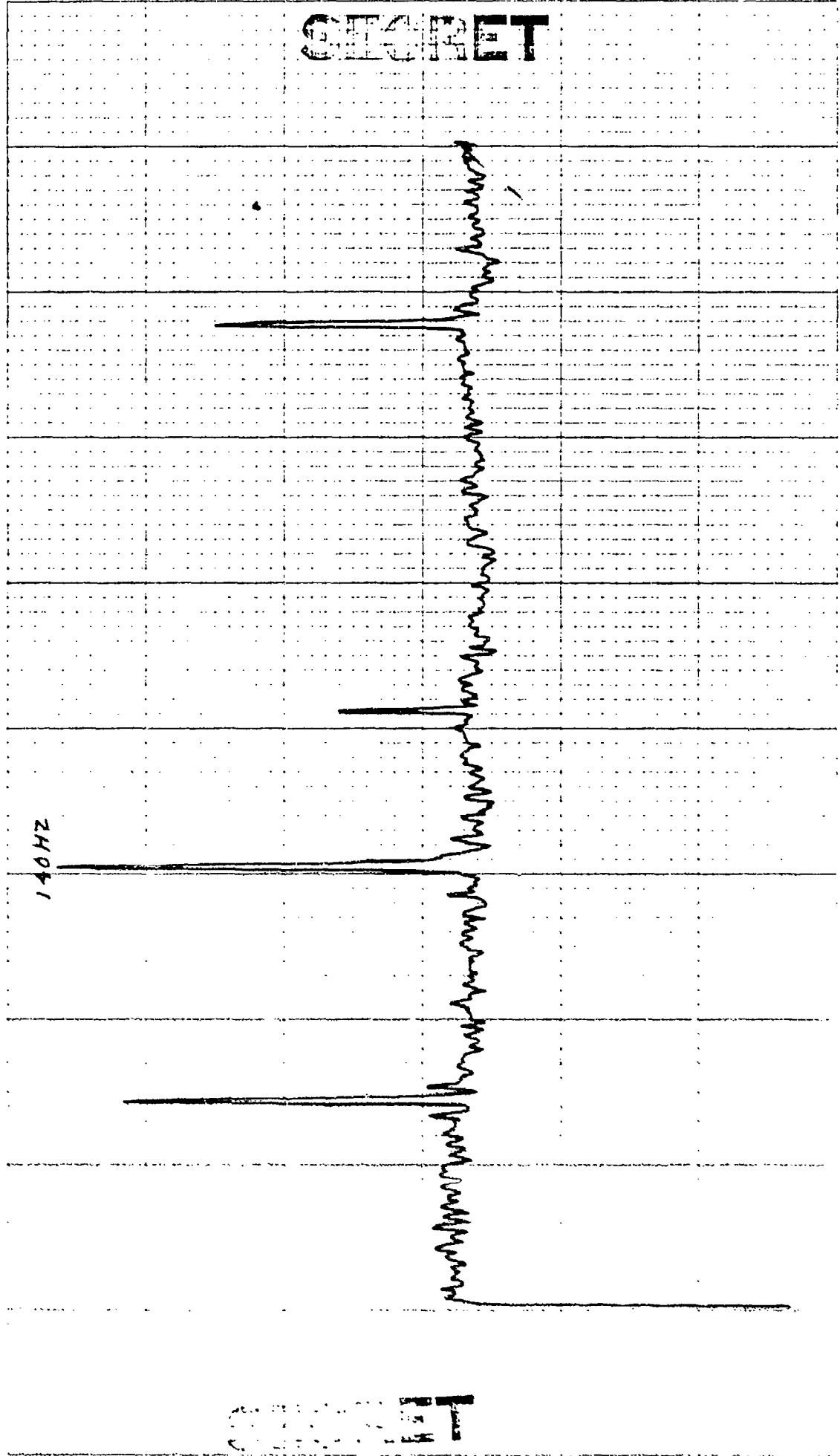
CONTROL: 3-15 - 2131 (49)
OMNI SPECTRUM (ELEMENT 47)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 7-5-77 - 2131 Z
ANALYSIS BANDWIDTH: 1710 HZ
--- DEG AZ STEERING

REEL: M10 INDEX 3620

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



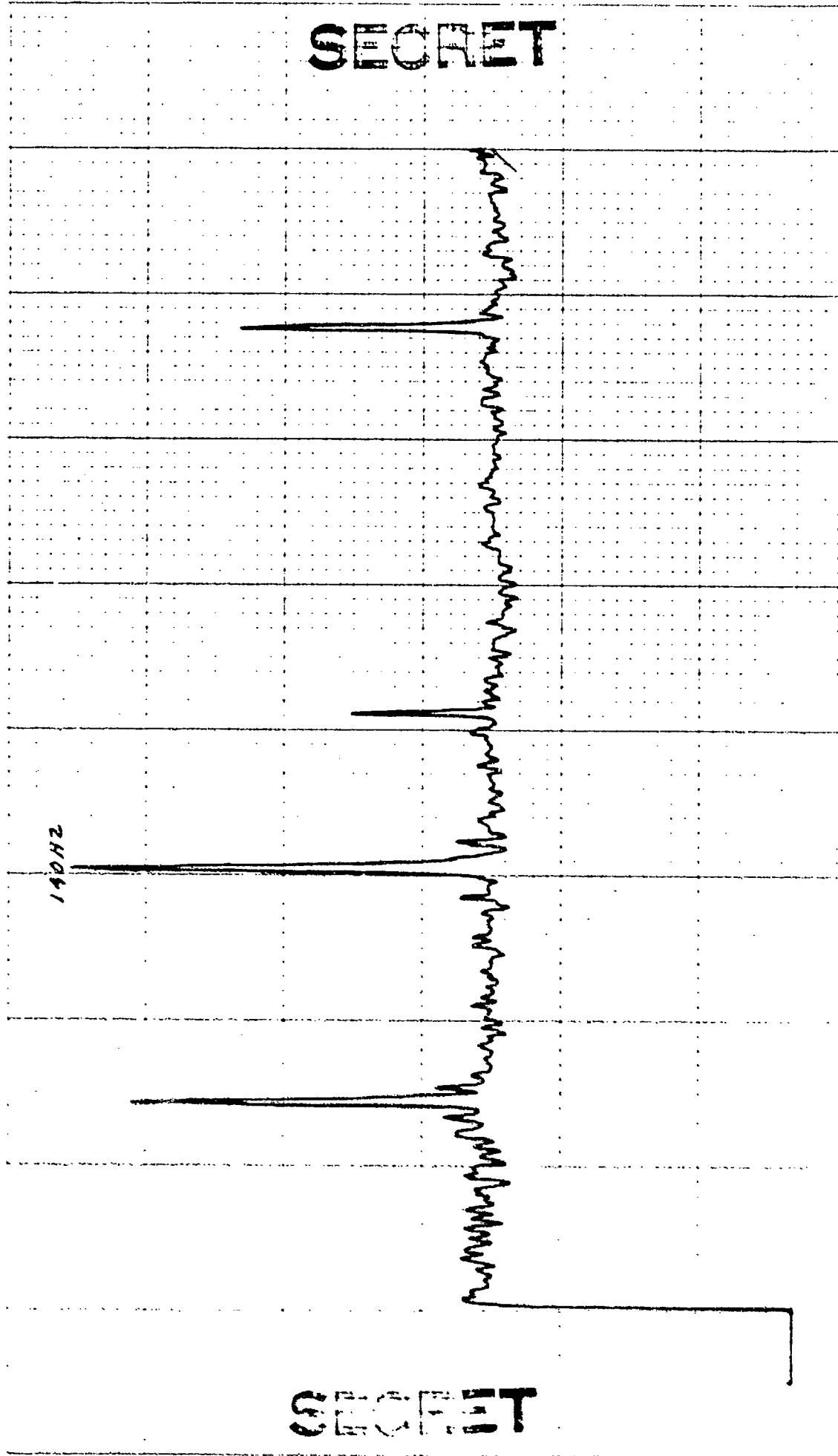
46 0703

REF: 3-15-77 2-231 2

CONTROL: 3-15 - 231 (50) DATE OF ANALYSIS: REEL: M10 INDEX: 7620
 OMNI SPECTRUM (ELEMENT 49)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 1 ELEMENT

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

DATE/TIME: 3-15-77 - 231 2
 ANALYSIS BANDWIDTH: 1/10HZ
 DEG AZ STEERING



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1637 2548 2549 2550 2551 2552 2553 2554 2555 2556 2557 2558 2559 2560 2561 2562 2563 2564 2565 2566 2567 2568 2569 2570 2571 2572 2573 2574 2575 2576 2577 2578 2579 2580 2581 2582 2583 2584 2585 2586 2587 2588 2589 2590 2591 2592 2593 2594 2595 2596 2597 2598 2599 2600

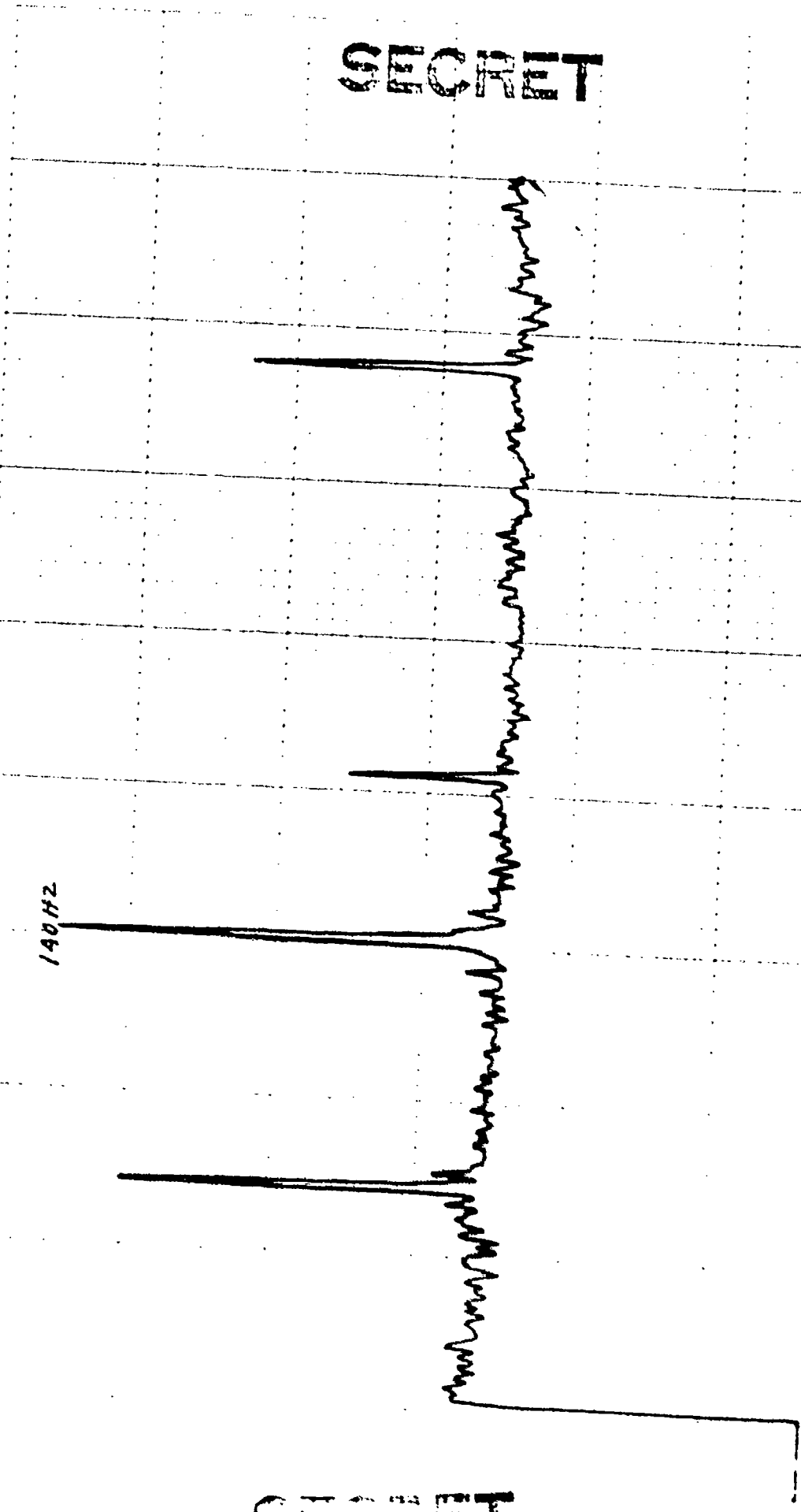
CONTROL: 3-15 - 213 (51)
OMNI SPECTRUM (ELEMENT 51)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-5-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: A10 INDEX 3620

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER WTG: HANNING



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REF: 30401 10100 0000 0000 0000

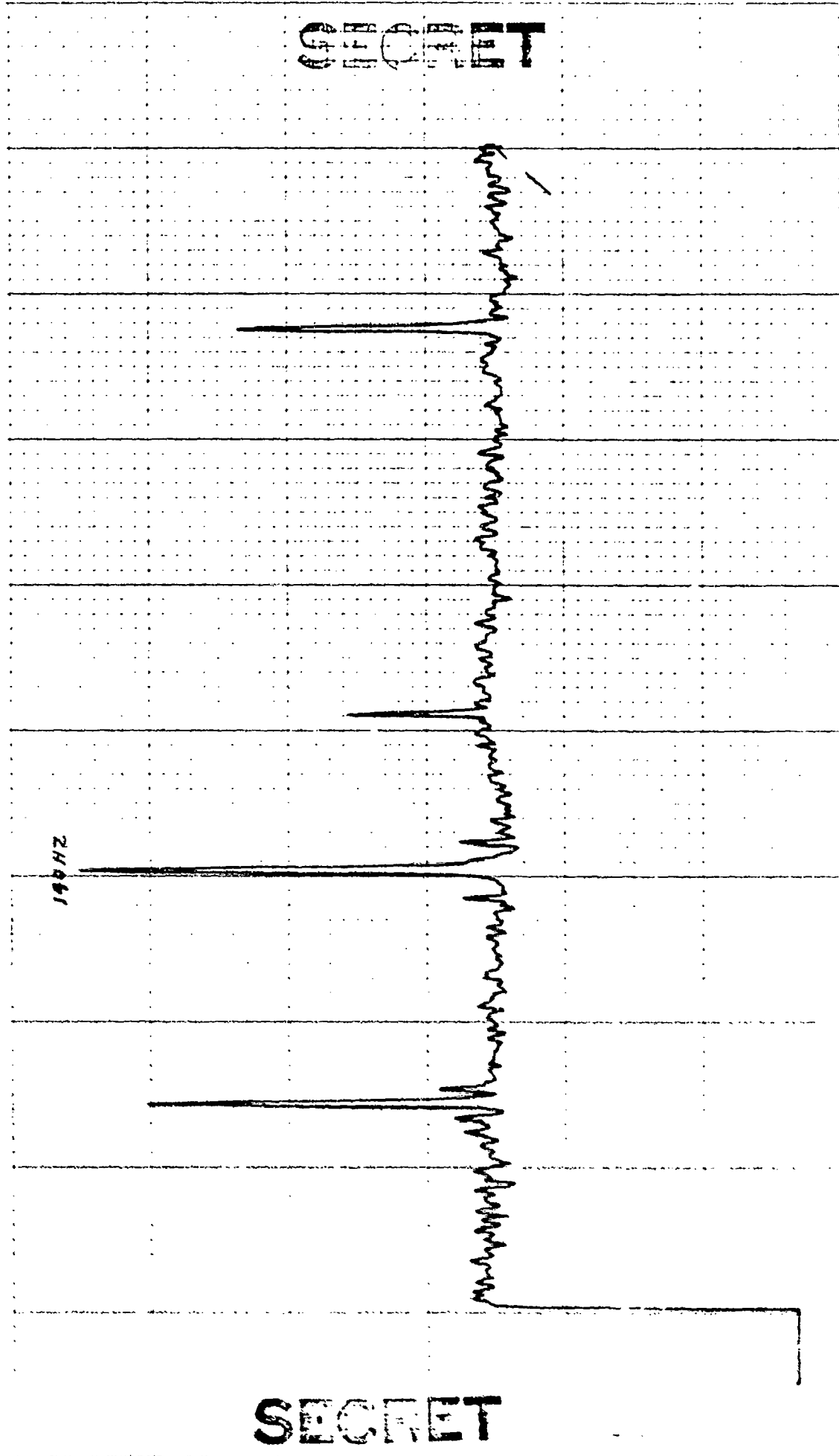
CONTROL: 3-75 - 2131 (52)
OMNI SPECTRUM (ELEMENT 53)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-5-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ STEERING

REEL: 1910 INDEX 3620

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

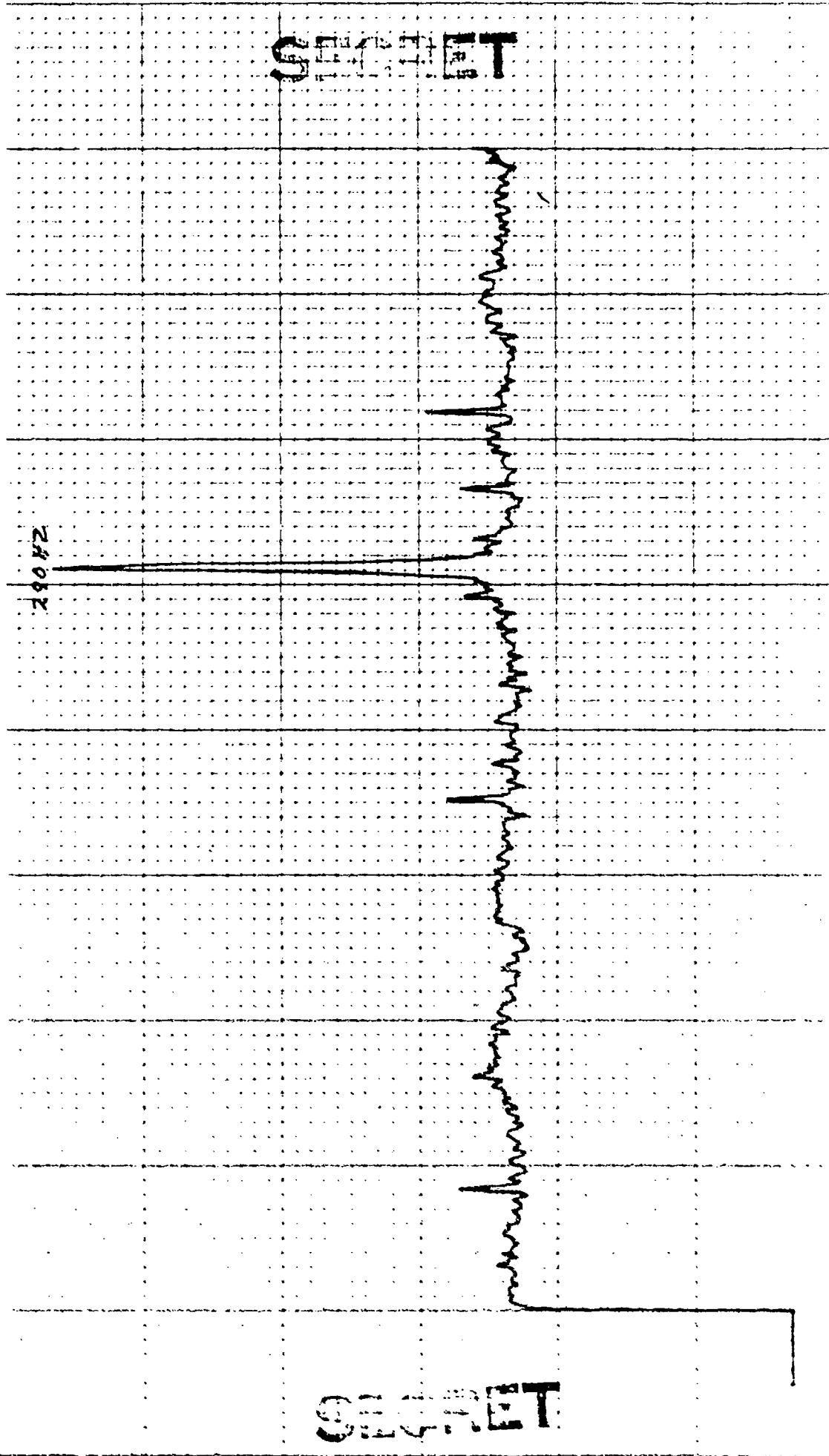


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CONTROL: 3-15 - 2131 (53)) REEL: M10 INDEX 3620
OMNI SPECTRUM (ELEMENT 2)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
DATE OF ANALYSIS:
DATE/TIME: 3-15-77 - 2131 Z INTEGRATION TIME 320 SECS ATTN: — DB
ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTC: HANNING
— DEG AZ STEERING



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INDEX 3600

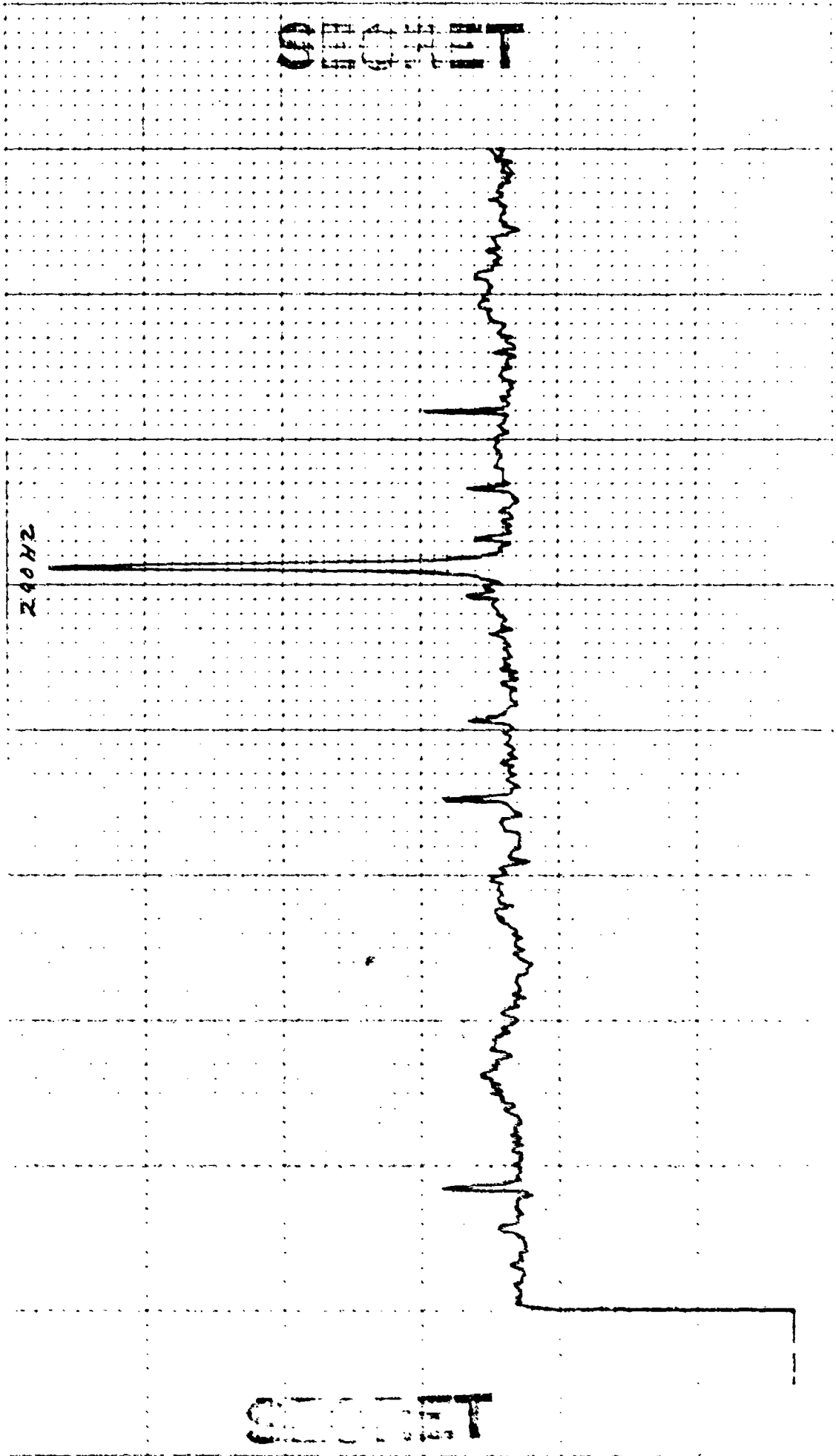
REEL: M10

DATE OF ANALYSIS:

CONTROL: 3-75-2171 (54)
OMNI SPECTRUM (ELEMENT 4)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

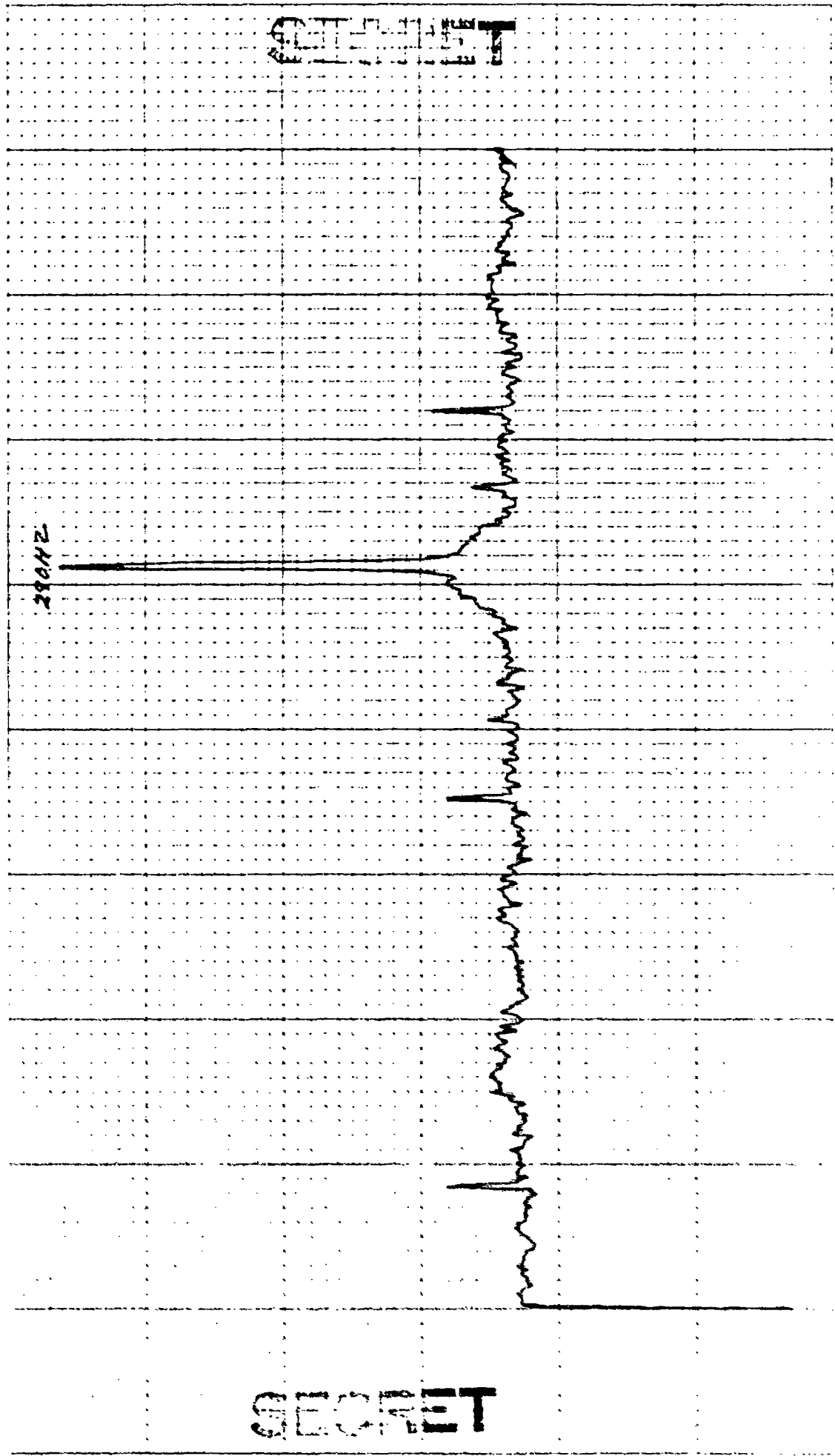
DATE/TIME: 2-5-77 - 2131 Z
ANALYSIS BANDWIDTH: 11 / 10 HZ
— DEC AZ STEERING

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

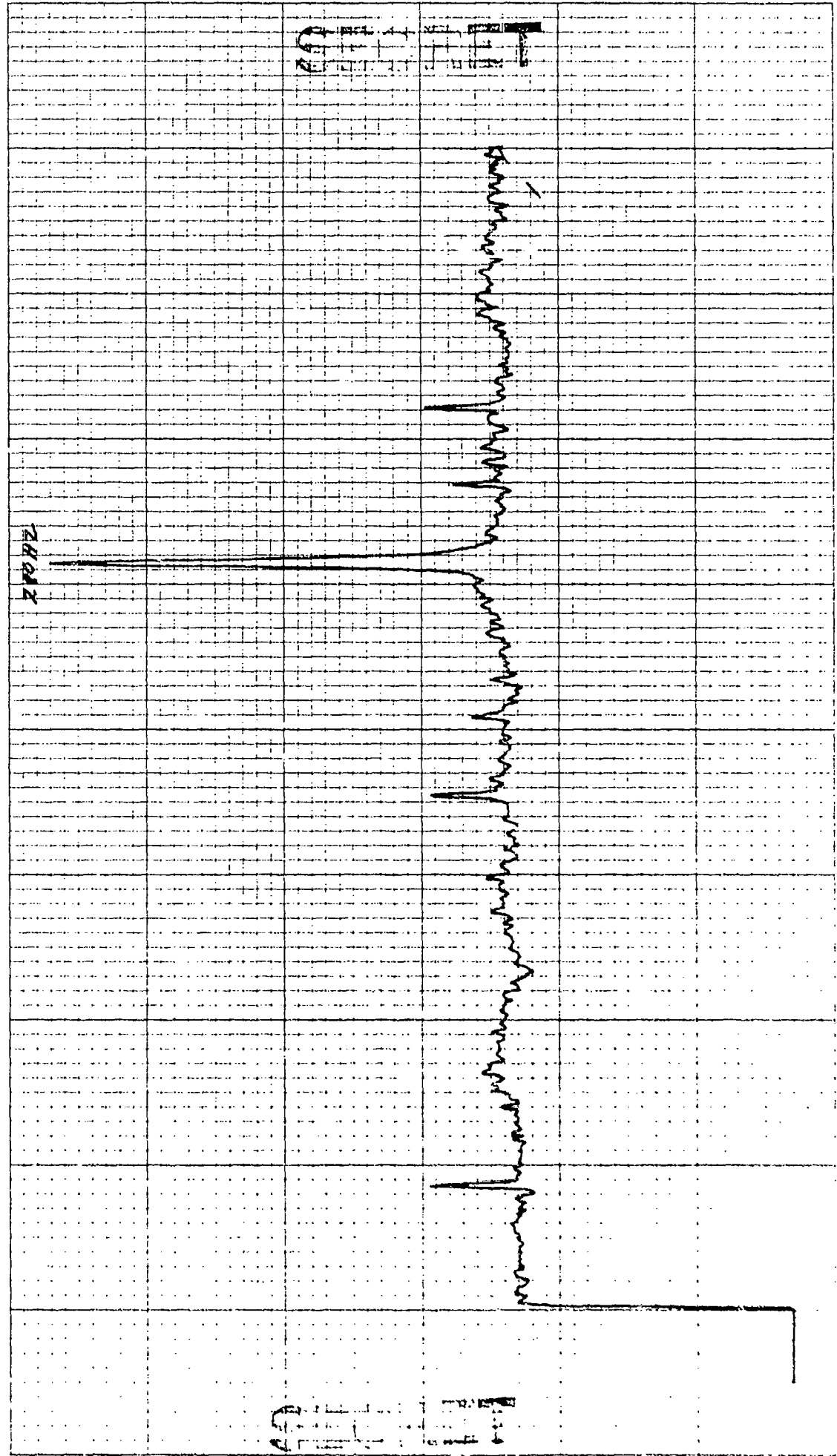


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CONTROL: 3-15 - 201 (55) DATE OF ANALYSIS: REEL: A10 INDEX 312
 OMNI SPECTRUM (ELEMENT 6) DATE/TIME: 3-15-77 - 2:31 Z INTEGRATION TIME 320 SECS ATTN: ~ DB
 EXERCISE: BEARING: STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 CENTER FREQ: 280 HZ --- DEG AZ STEERING



CONTROL: 3-15-2131 (56) DATE OF ANALYSIS: REEL: M10 INDEX: J620
 OMNI SPECTRUM (ELEMENT 9)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTEN: - DB
 1 ELEMENT — DEG AZ STEERING FILTER HANNING WTG: HANNING



CONTROL: 3-15 - 2/31 (57)
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

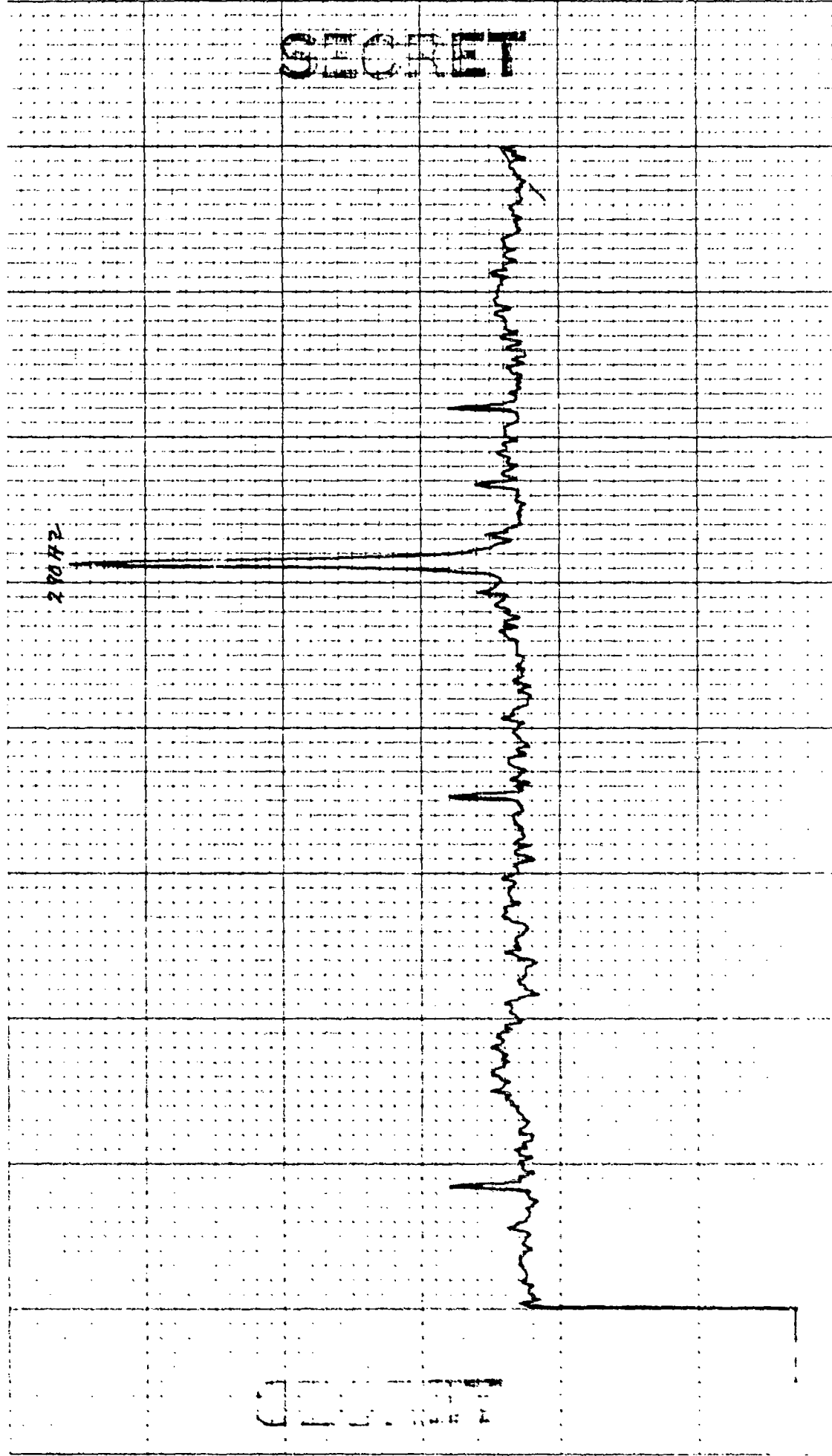
DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: N10

INDEX 3620

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



46 0703

INDEX 3690

REEL: N10

DATE OF ANALYSIS:

CONTROL: 375-2131 (58)

OMNI SPECTRUM (ELEMENT 12)

EXERCISE: BEARING STAKE

CENTER FREQ: 200 HZ

I ELEMENT

DATE/TIME: 3-15-77 - 2131 Z

ANALYSIS BANDWIDTH: 1710 HZ

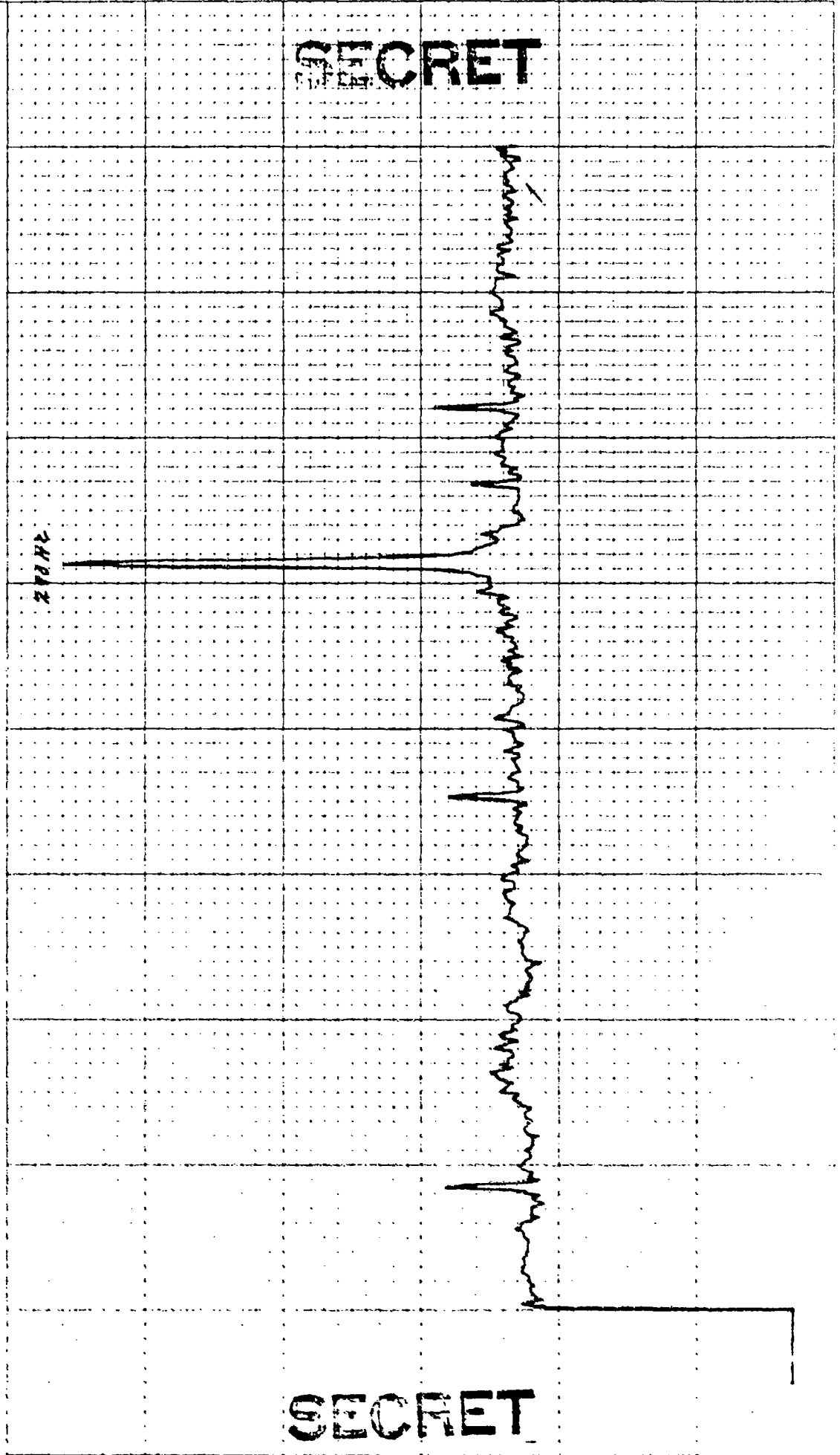
 DEG AZ STEERING

INTEGRATION TIME 320 SECS

ATTEN: - DB

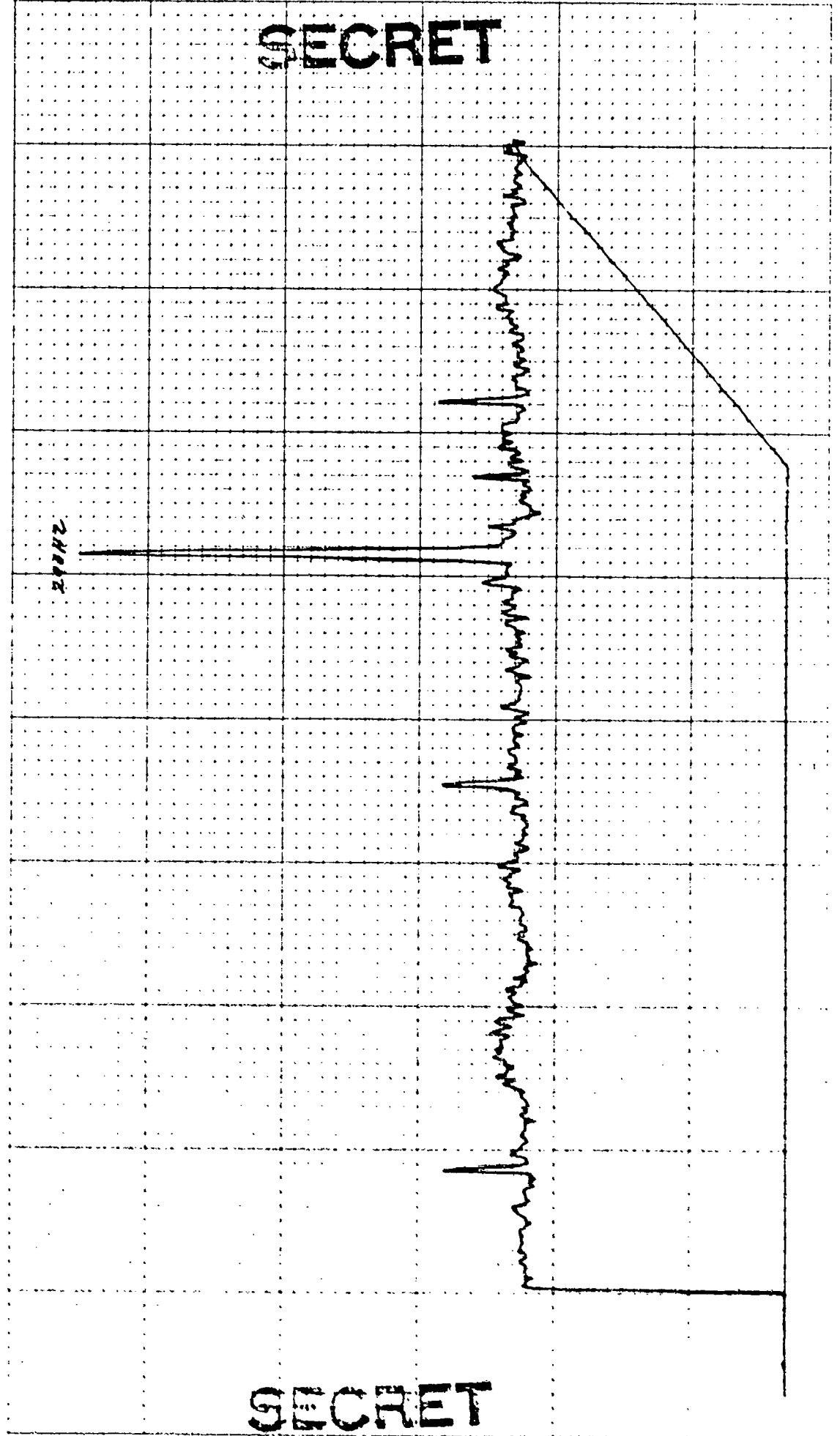
FILTER

WTG: HANNING



46 0703

CONTROL: 3-15-2131 (59) DATE OF ANALYSIS: REEL: H10 INDEX 3620
 OMNI SPECTRUM/ELEMENT 14 DATE/TIME: 3-15-77 - 2131 Z INTEGRATION TIME 320 SECS ATTN: - DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WIG: HANNING
 CENTER FREQ: 200 HZ DEG AZ STEERING



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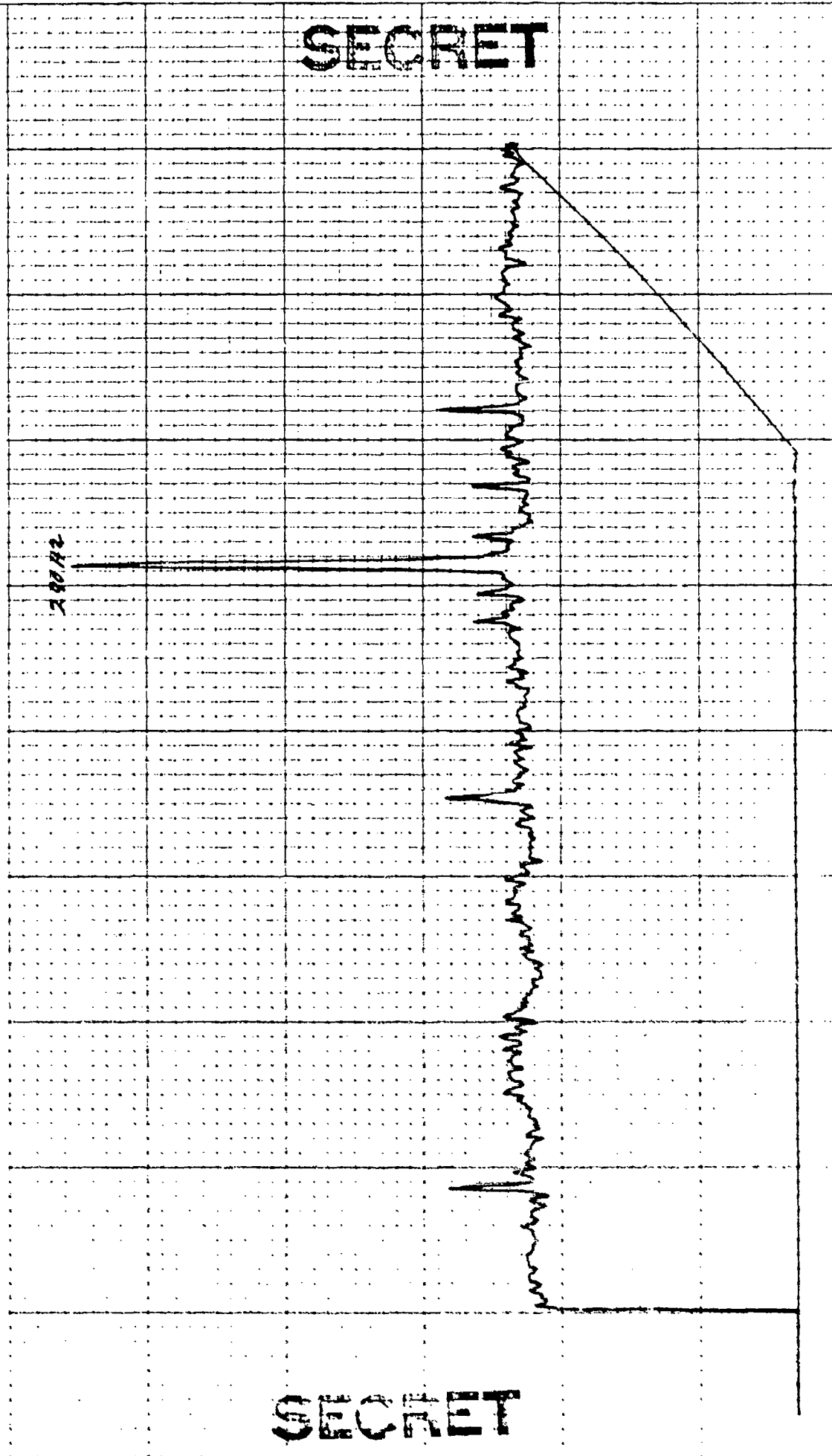
CONTROL: 3-15-2131 (60)
OMNI SPECTRUM (ELEMENT 16)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEC AZ STEERING

REEL: 110 INDEX 3620

INTEGRATION TIME 320 SECS
FILTER WIG: HANNING



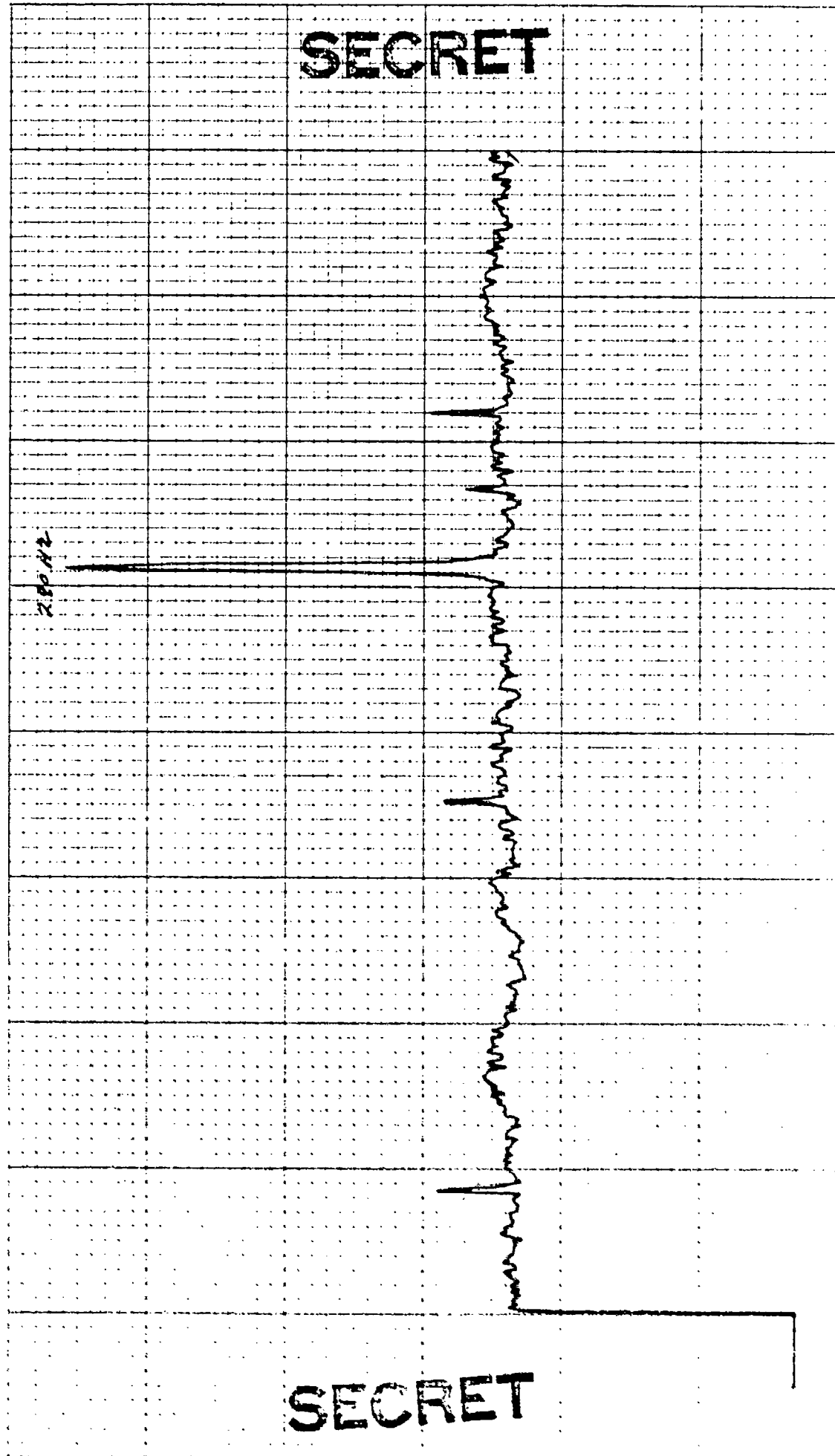
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(Z) 460703 0703 0703 0703

CONTROL: 3-45-2171 (67) DATE OF ANALYSIS: REEL: M10 INDEX 3620
 OMNI SPECTRUM (ELEMENT 19)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ INTEGRATION TIME 320 SECS ATTN: DB
 1 ELEMENT FILTER WTG: HANNING
 ANALYSIS BANDWIDTH: 1/10 HZ
DEG AZ STEERING

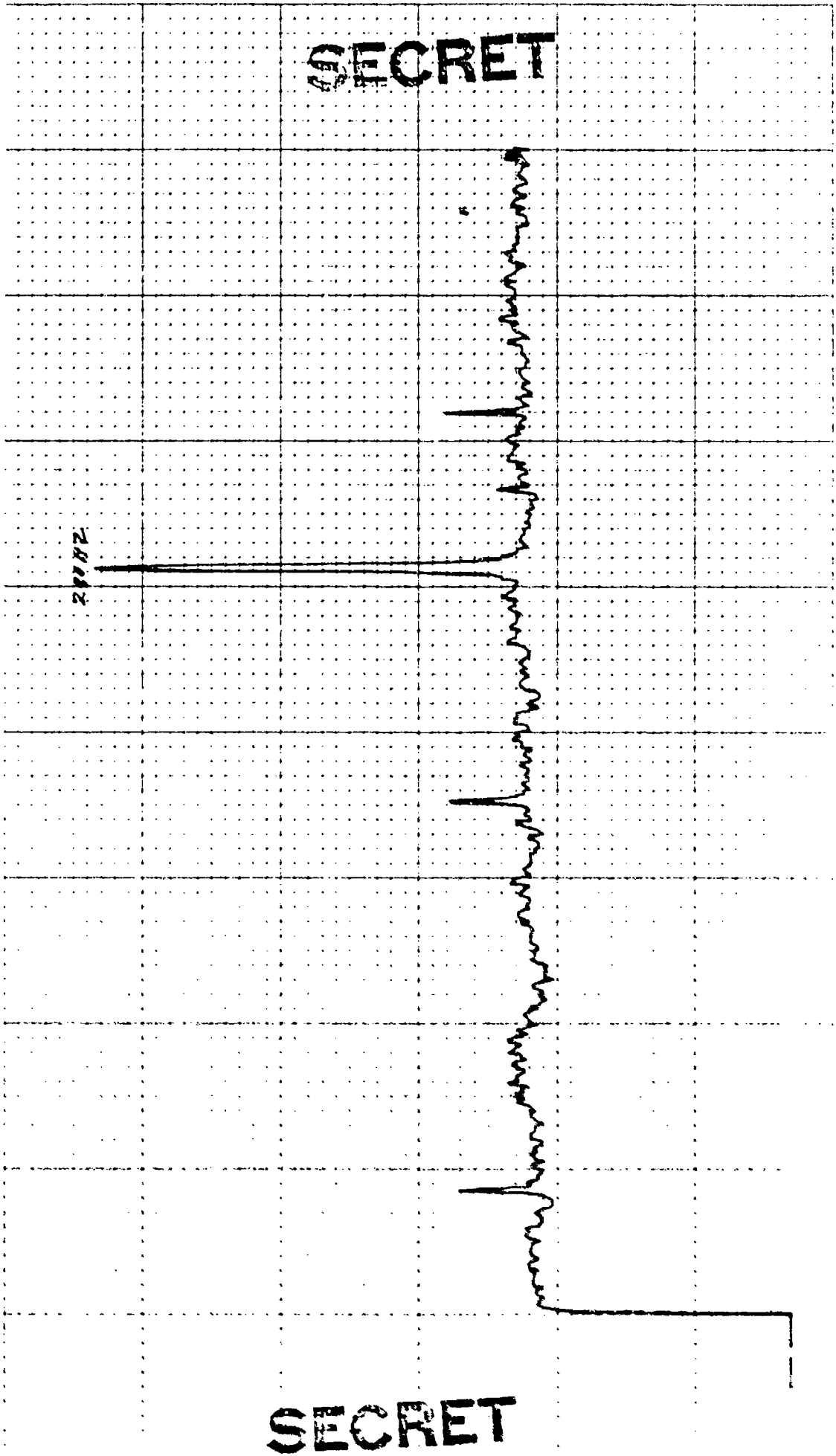


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CONTROL: 3-15 - 2071 (63) DATE OF ANALYSIS: REEL: M10 INDEX 3620
 OMNI SPECTRUM (ELEMENT 23) DATE/TIME: 3-15-77 - 2031 Z
 EXERCISE: BEARING STAFF ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: DB
 CENTER FREQ: 200 HZ _____ DEG AZ STEERING FILTIER WTC: HANNING



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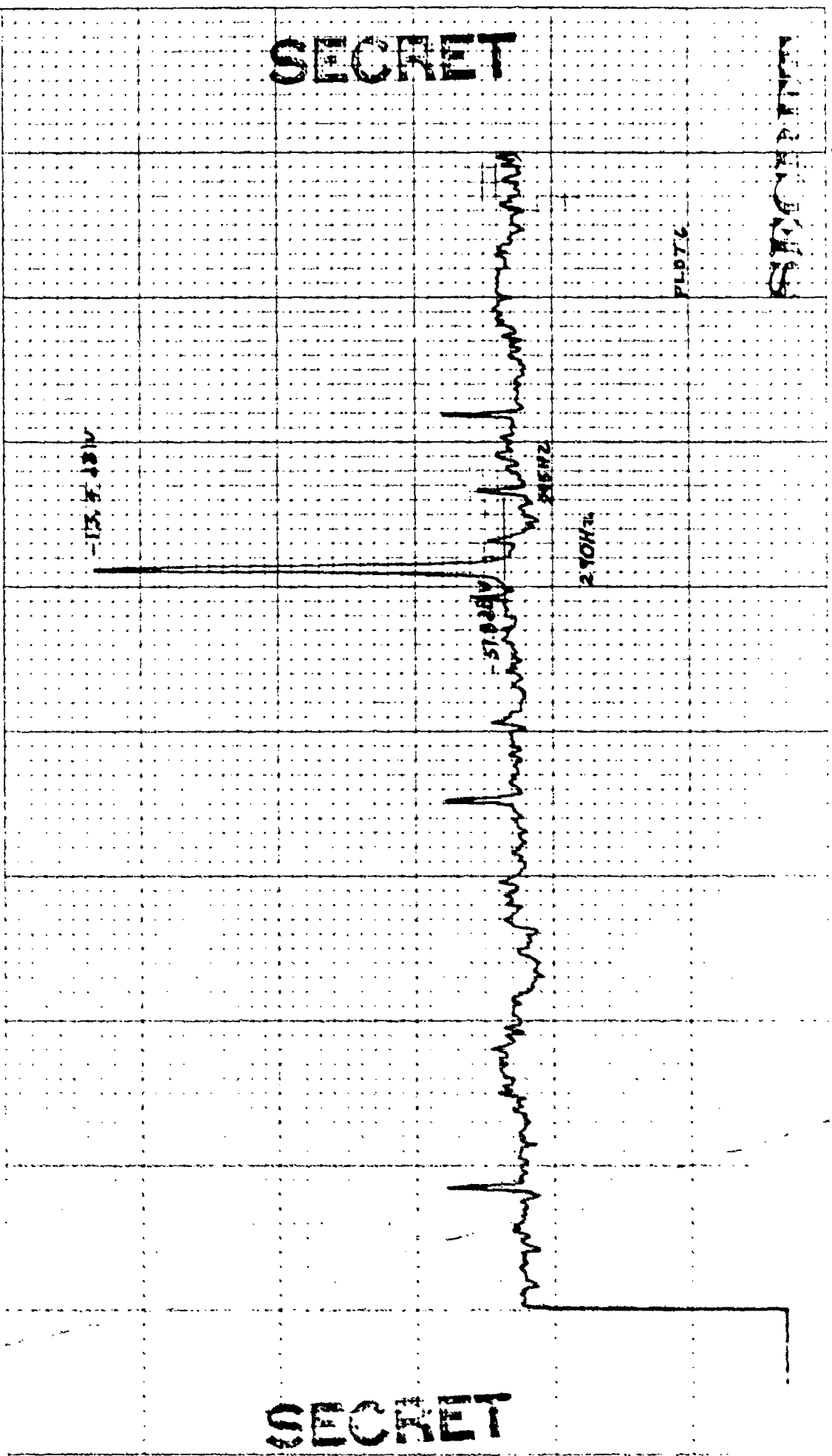
CONTROL: 2/3/ - 5/ (DP7) DATE OF ANALYSIS: REEL: M10 INDEX: 3620

OMNI SPECTRUM (ELEMENT 24) INTEGRATION TIME 320 SECS ATTN: - DB

EXERCISE: BEARING STAKE FILTER WTG: HANNING

CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ

1 ELEMENT - DEG AZ STEERING



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241HZ

280HZ

318HZ

46 0703

REF ID: A66666

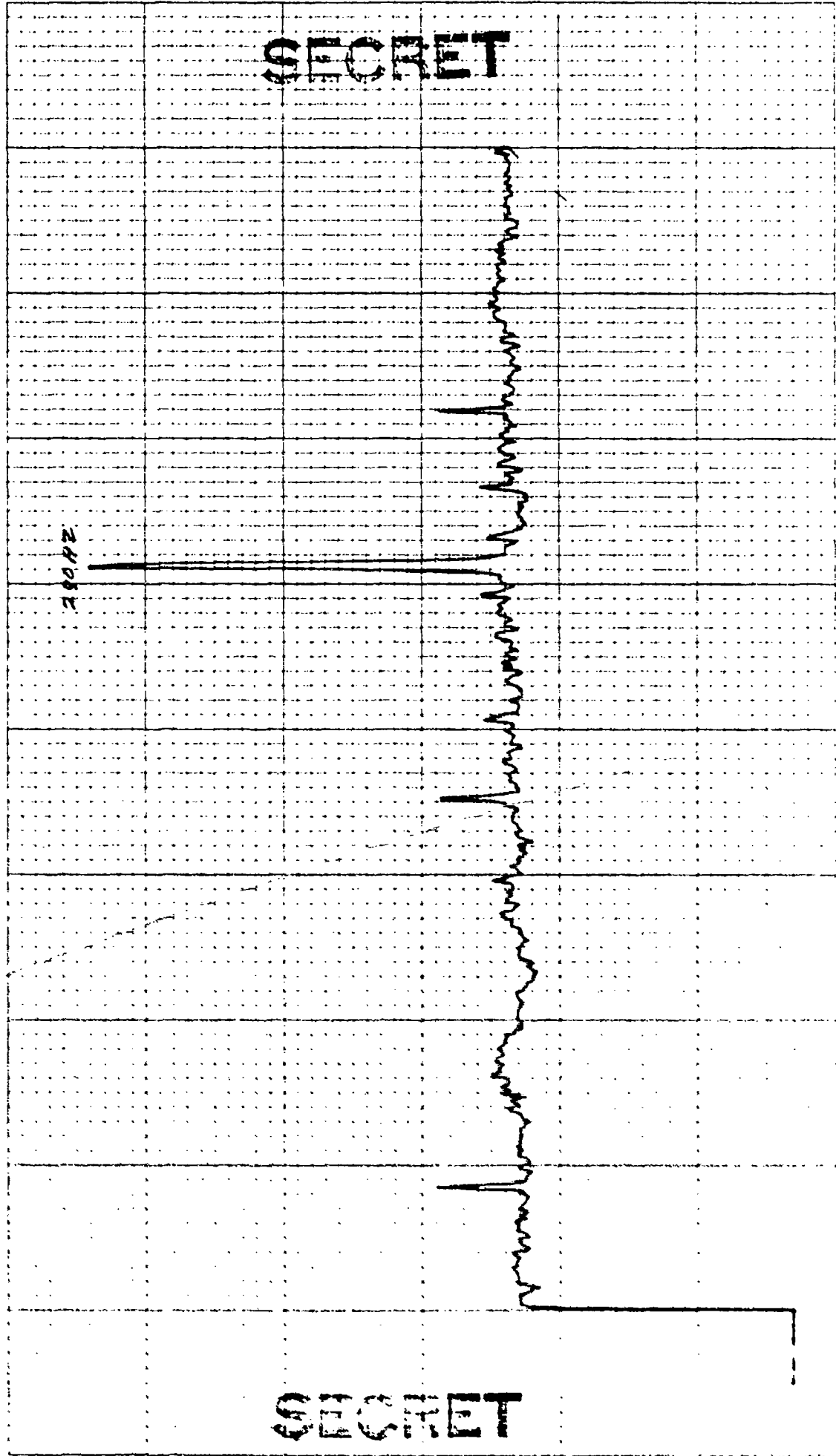
CONTROL: 3-15 - 2171 (65)
OMNI SPECTRUM (ELEMENT 26)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10HZ
--- DEC AZ STEERING

REEL: M10 INDEX 3620

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING



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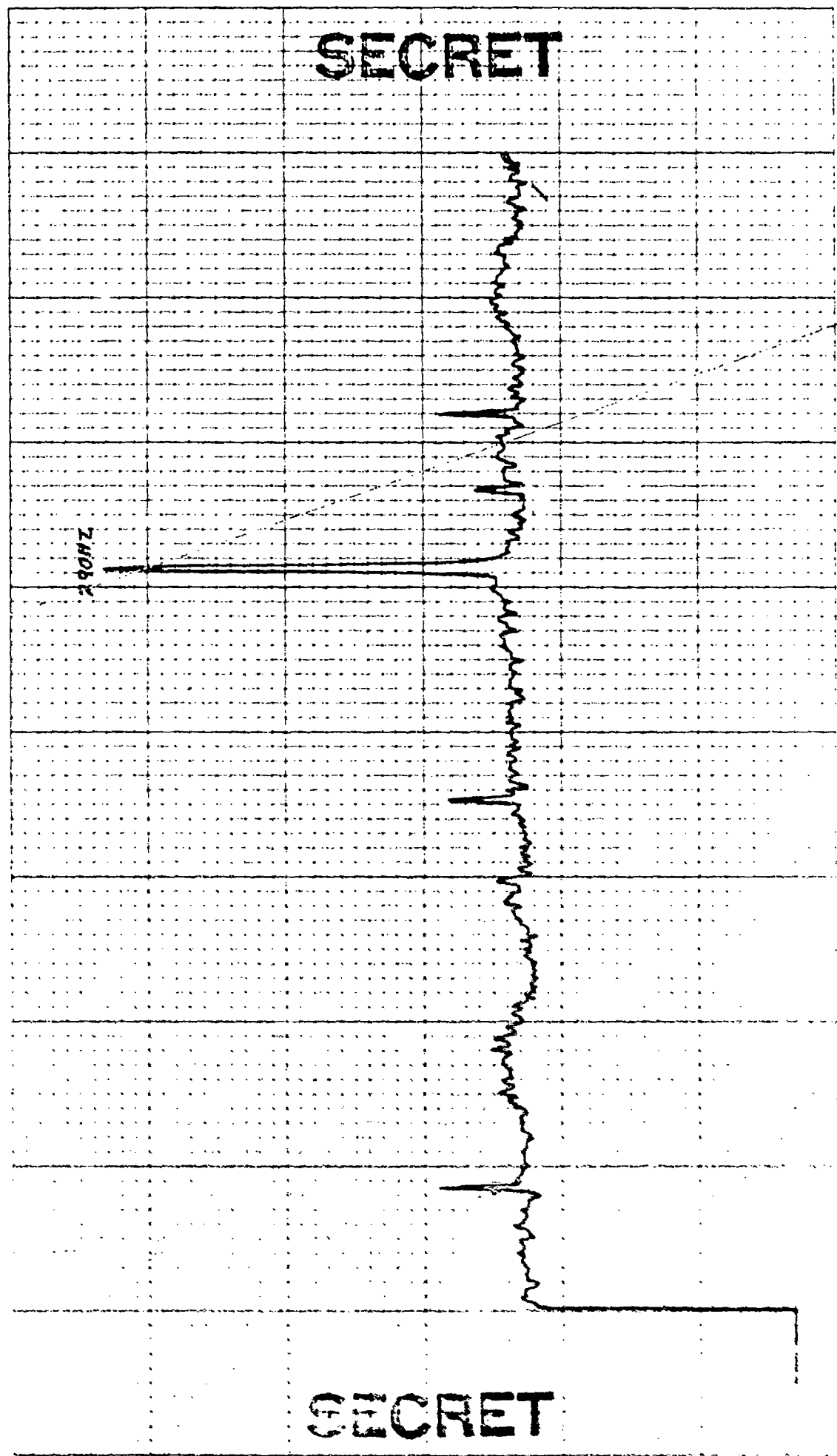
REEL: M10 INDEX 3620

DATE OF ANALYSIS:

DATE/TIME: 3-6-77 - 2/31 Z
ANALYSIS BANDWIDTH: 1/10HZ
- DEC AZ STEERING

CONTROL: 2/31 - 5/ (DP3)
OMNI SPECTRUM (ELEMENT 29)
EXERCISE: BEARING: STAKE
CENTER FREQ: 280 KHZ
1 ELEMENT

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

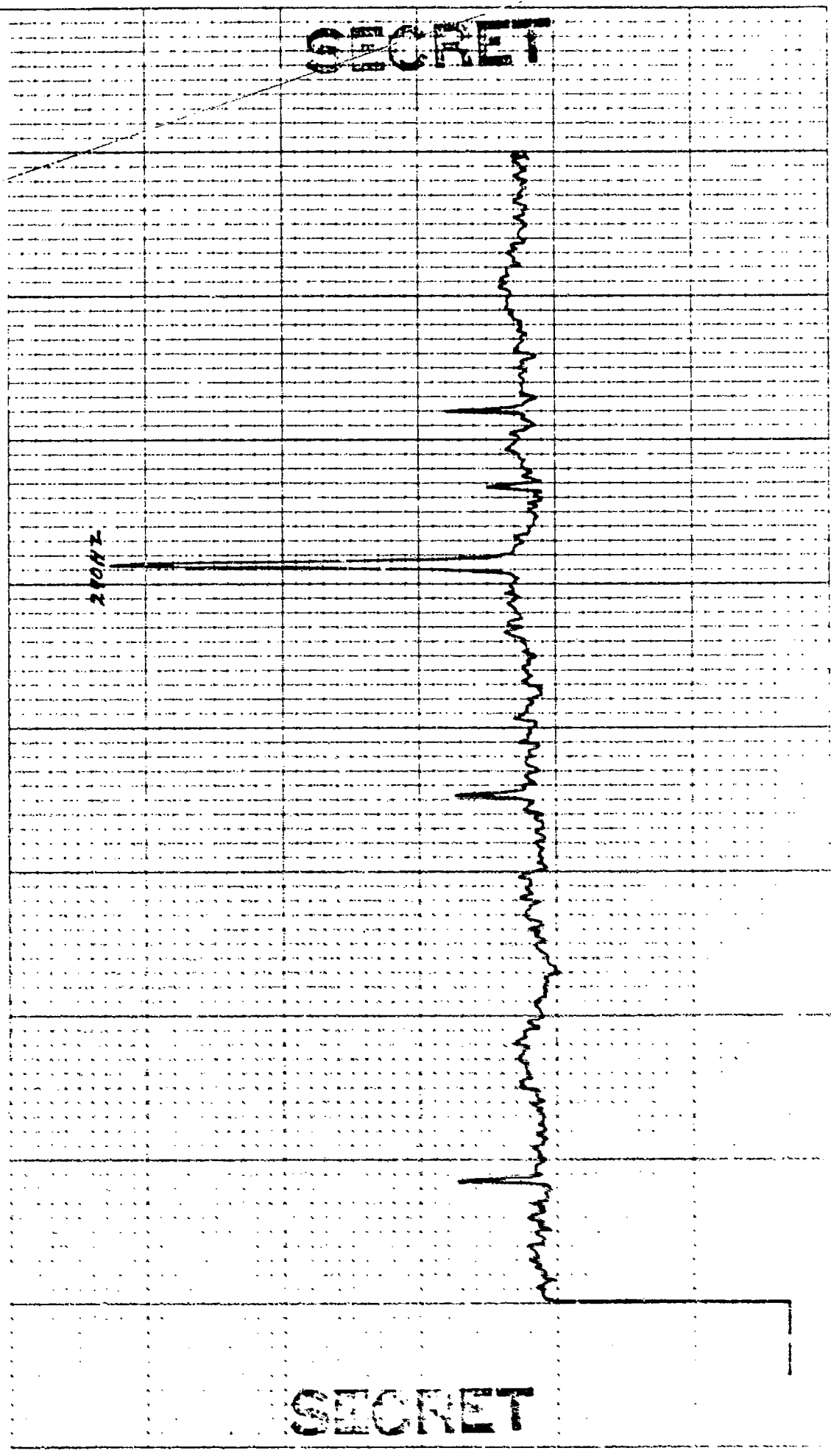


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CONTROL: 3-15 - 2131 (67) DATE OF ANALYSIS: REEL: M10 INDEX 3620
 OMNI SPECTRUM(ELEMENT 31)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: - DB
 1 ELEMENT DEG AZ STEERING FILTER WTC: HANNING



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CONTROL: 3-15 - 2131 (68)
OMNI SPECTRUM (ELEMENT 33)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-5-77 - 2131 Z

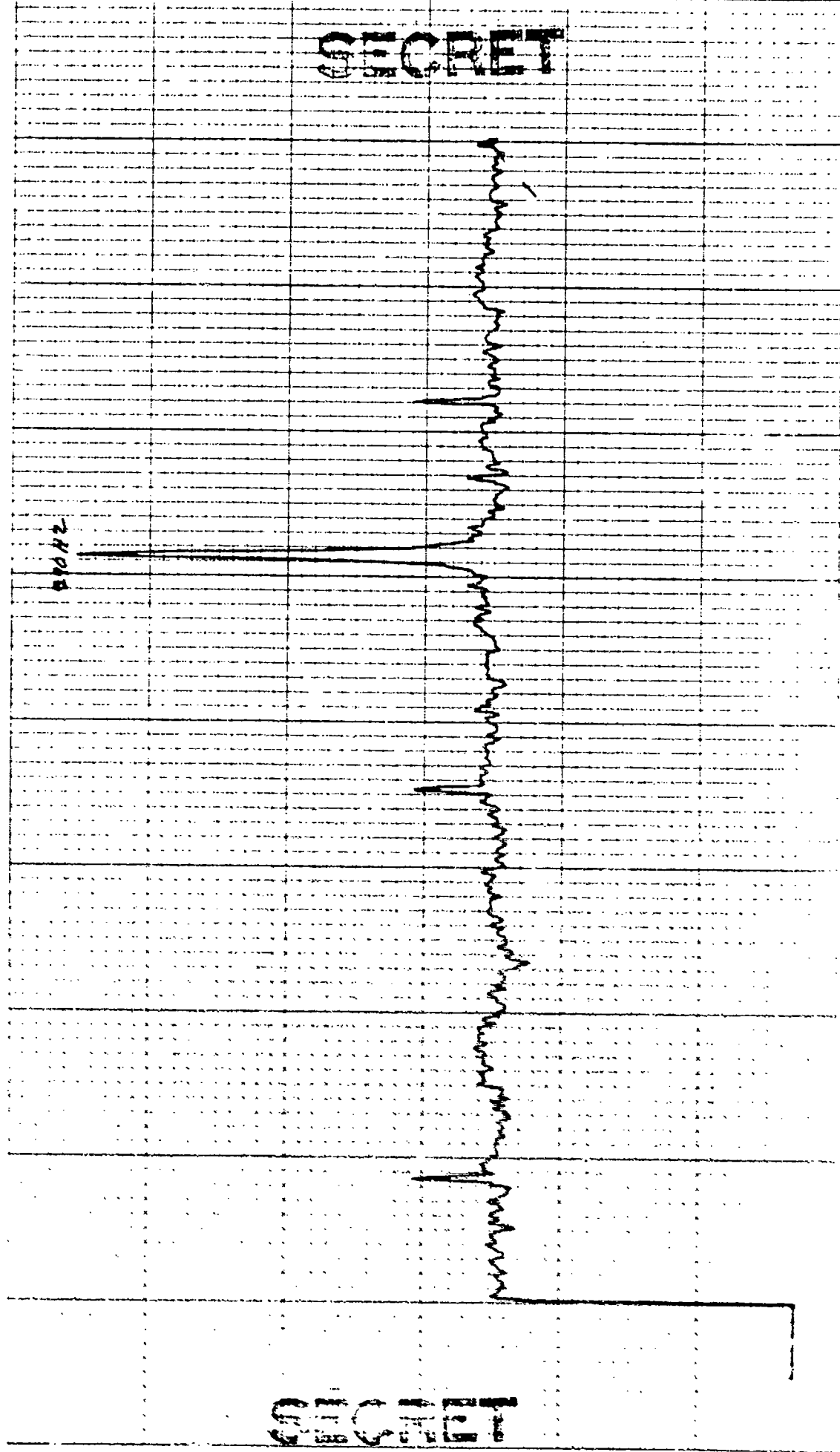
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

REEL: M10

INTEGRATION TIME 320 SECS
FILTER

INDEX 362c

ATTEN: - DB
WTG: HANNING



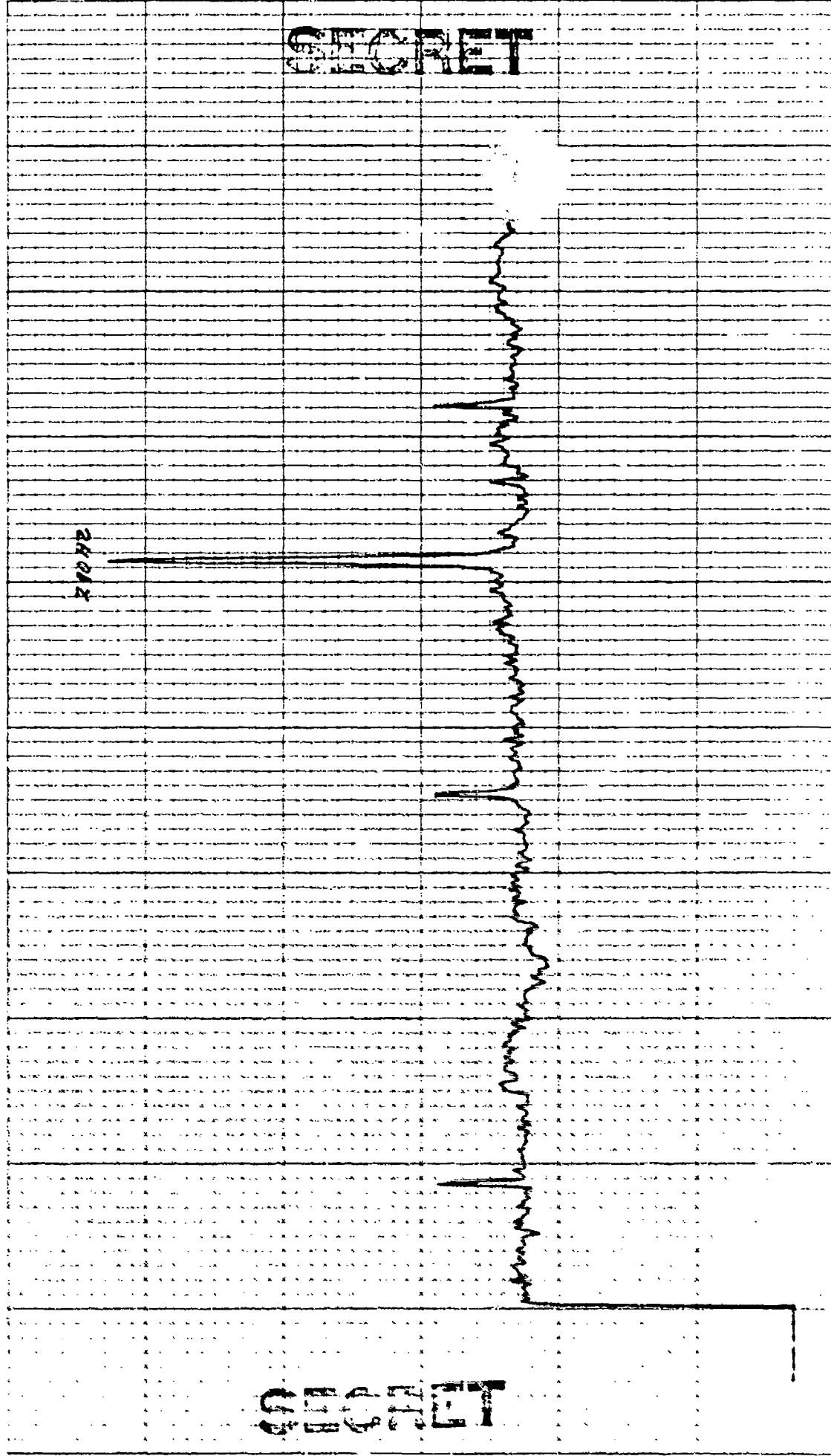
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(S) 2000 2100 2200 2300 2400 2500 2600 2700 2800 2900 3000 3100 3200 3300 3400 3500 3600 3700 3800 3900 4000 4100 4200 4300 4400 4500 4600 4700 4800 4900 5000 5100 5200 5300 5400 5500 5600 5700 5800 5900 6000 6100 6200 6300 6400 6500 6600 6700 6800 6900 7000 7100 7200 7300 7400 7500 7600 7700 7800 7900 8000 8100 8200 8300 8400 8500 8600 8700 8800 8900 9000 9100 9200 9300 9400 9500 9600 9700 9800 9900 10000

CONTROL: 3-15-2131(69) DATE OF ANALYSIS: REEL: N/O INDEX J620
 OMNI SPECTRUM (ELEMENT 15)
 EXERCISE: BEARING: STAKE DATE/TIME: 3-15-77-2131 Z INTEGRATION TIME 320 SECS ATTN: - DB
 CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
 1 ELEMENT — DEG AZ STEERING



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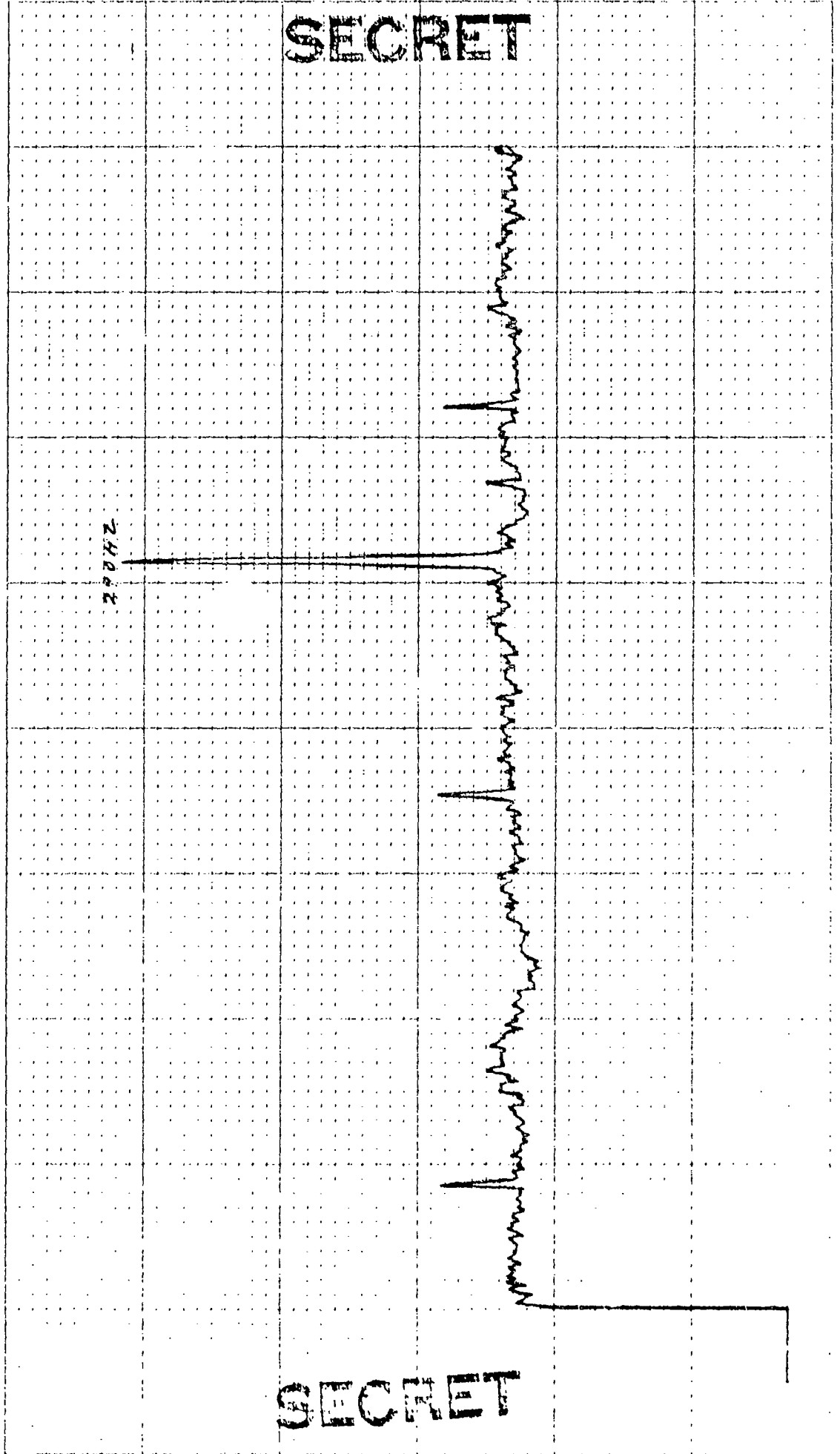
REEL: M10 INDEX 3690

DATE OF ANALYSIS:

DATE/TIME: 3-1577 - 2131Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

INTEGRATION TIME 320 SECS ATTEN: DB
FILTER WTG: HANNING

CONTROL: 3-45-2131 (70)
OMNI SPECTRUM(ELEMENT 37)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT



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CONTROL: 3-15-2/31 (71)
OMNI SPECTRUM (ELEMENT 39)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

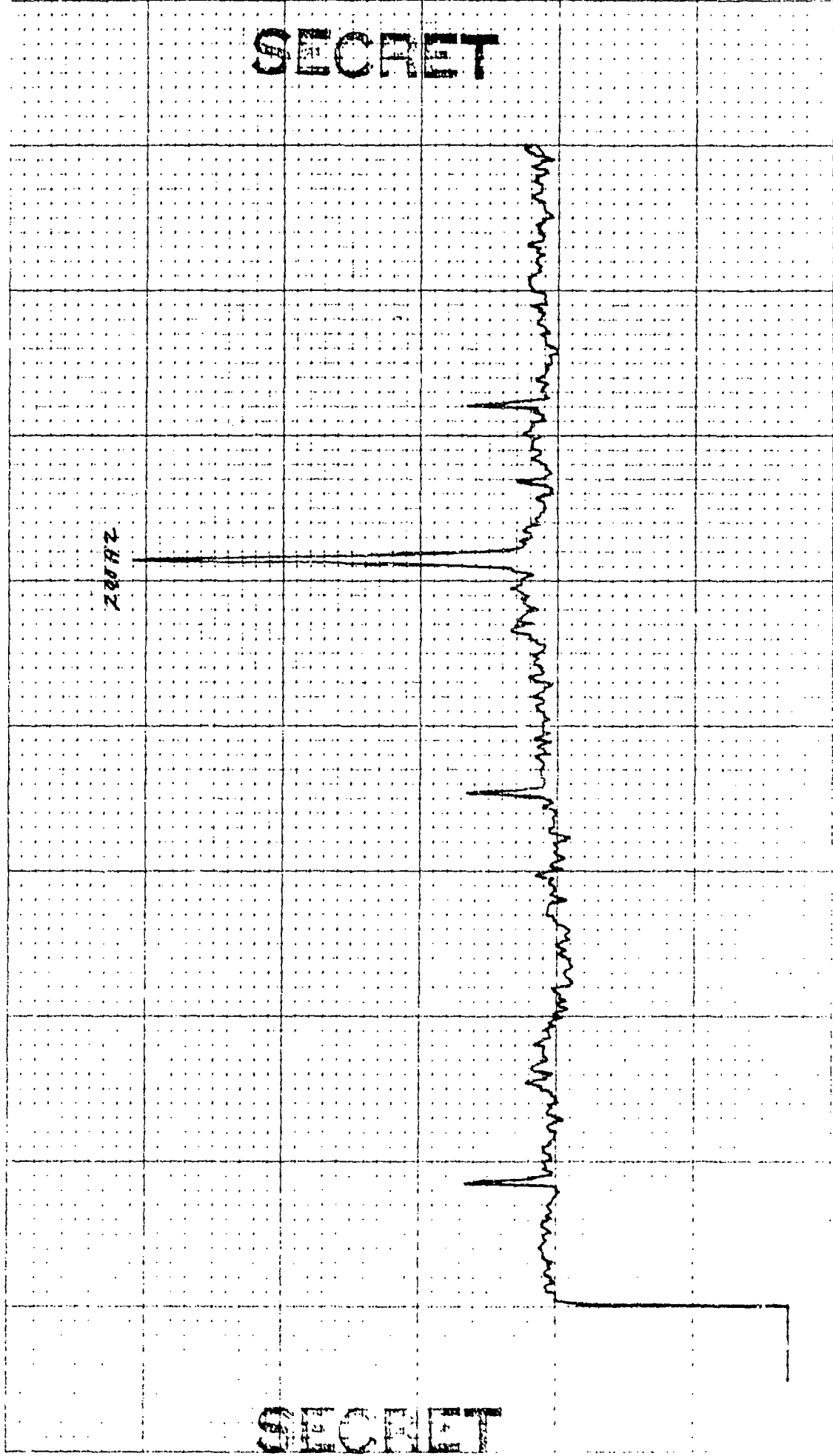
DATE/TIME: 3-15-77 -2/31 Z

ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: M10

INDEX 3120

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



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Ms: 10/10/77 10:00:00

CONTROL: 3-15 - 2/31 (72)
OMNI SPECTRUM(ELEMENT 41)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

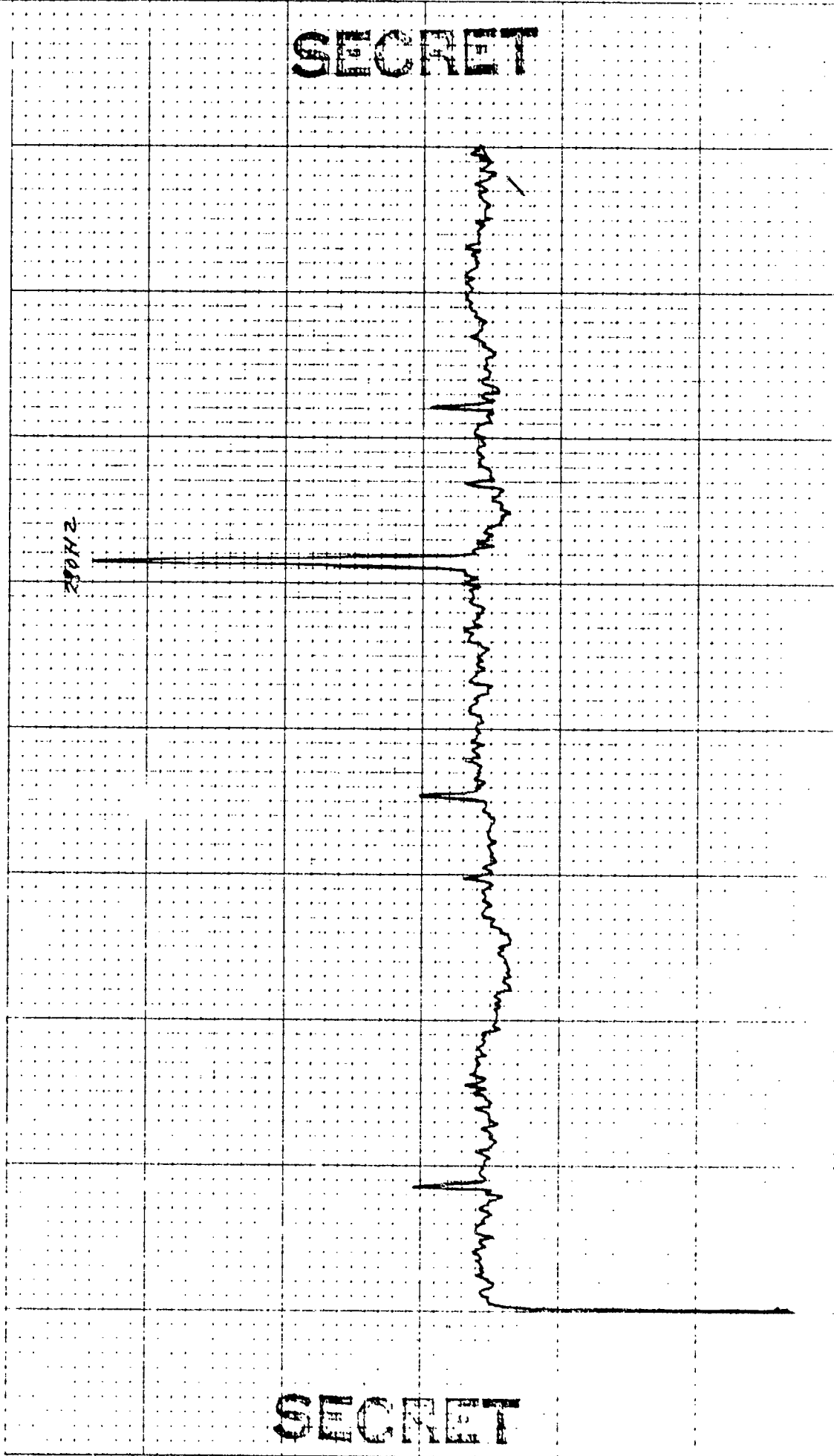
DATE/TIME: 3-15-77 - 2131 Z

ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: A10

INDEX 362c

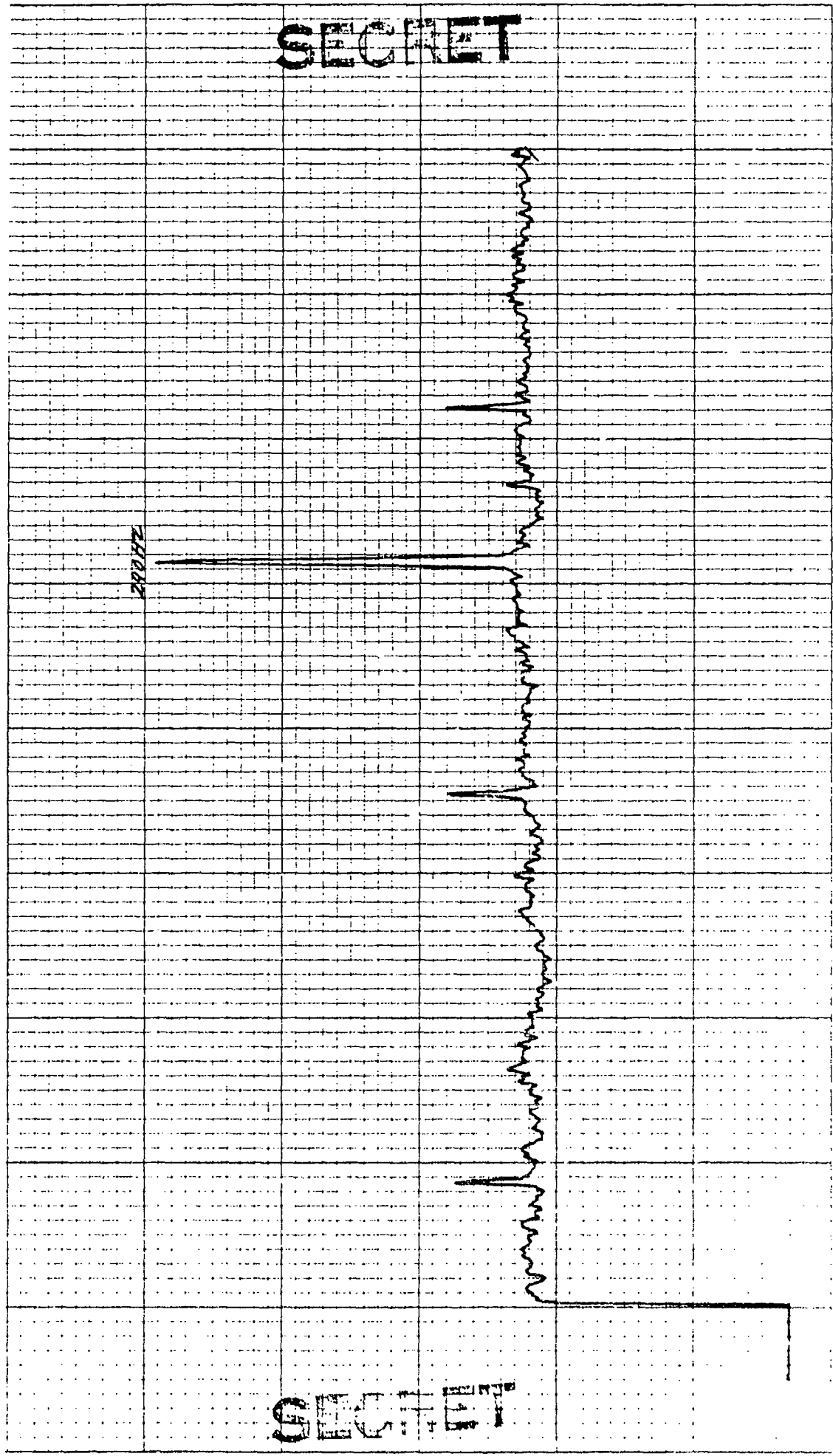
INTEGRATION TIME 320 SECS
FILTER ATTN: DB
WTC: HANNING



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CONTROL: 3-15-2131 (73) DATE OF ANALYSIS: REEL: A10 INDEX 3620
 OMNI SPECTRUM (ELEMENT 43)
 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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REEL 410 INDEX 3020

814

CONTROL: 3-15 - 2131 (74)
OMNI SPECTRUM (ELEMENT 45)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

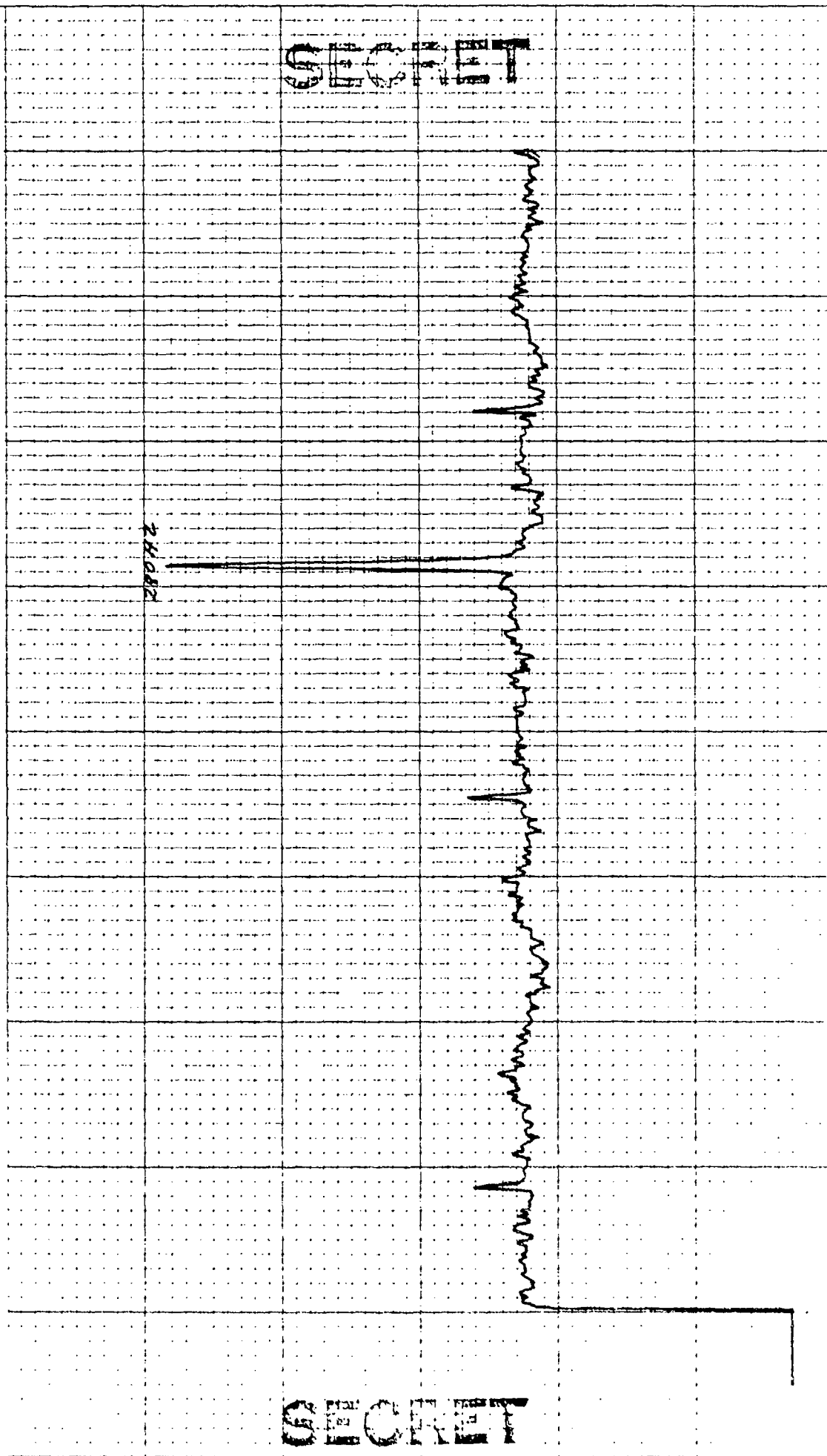
DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEC AZ STEERING

REEL: 410

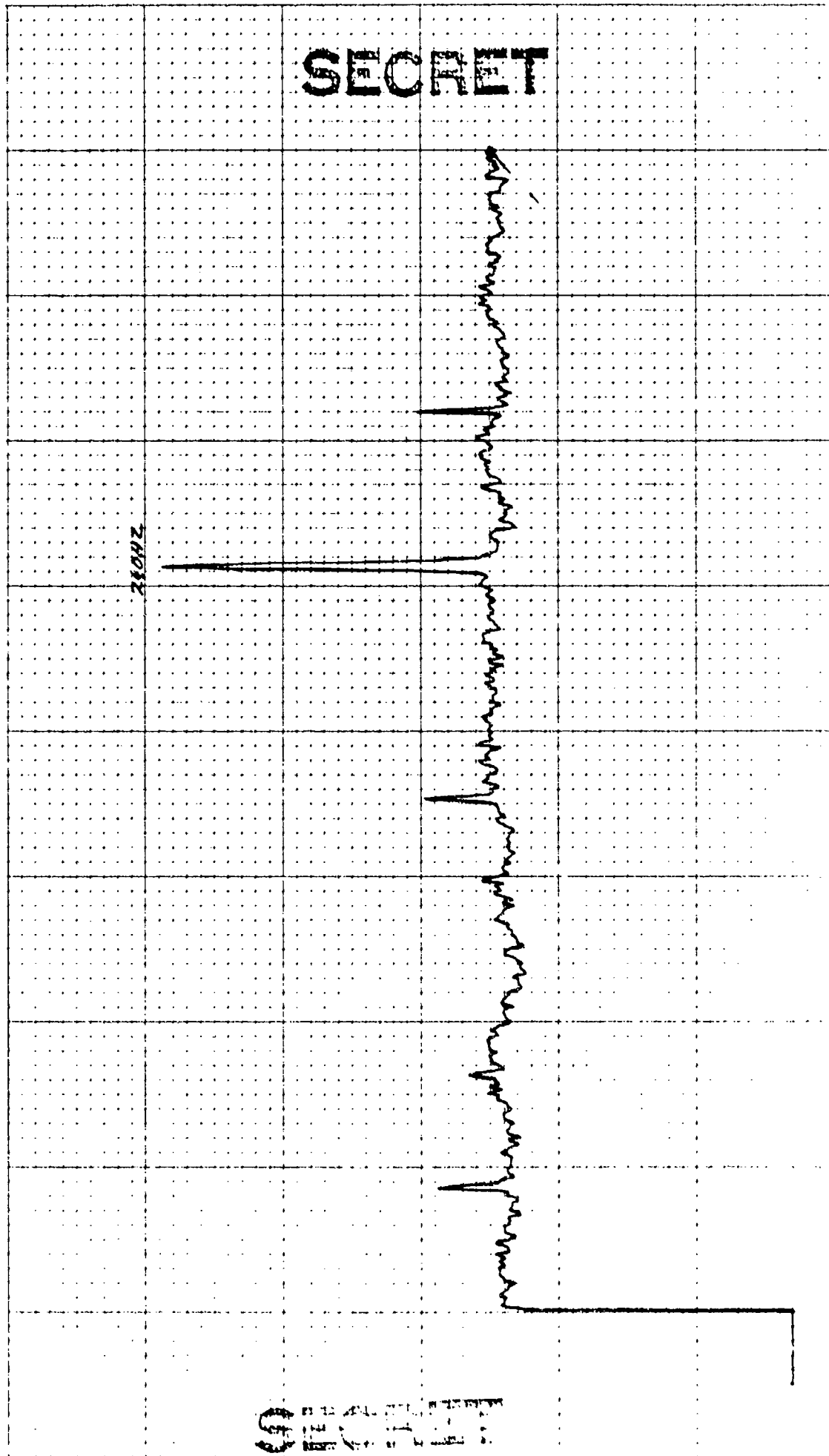
INDEX 3020

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER
WIG: HANNING



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CONTROL: 375 - 2131 (75) DATE OF ANALYSIS: REEL: M10 INDEX 3620
OMNI SPECTRUM (ELEMENT 47)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: J/10 HZ INTEGRATION TIME 320 SECS ATTN: - DB
1 ELEMENT DEG AZ STEERING FILTER WTG: HANNING



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WZL 10/15/77 10:15 AM

INDEX 3020

REEL: M10

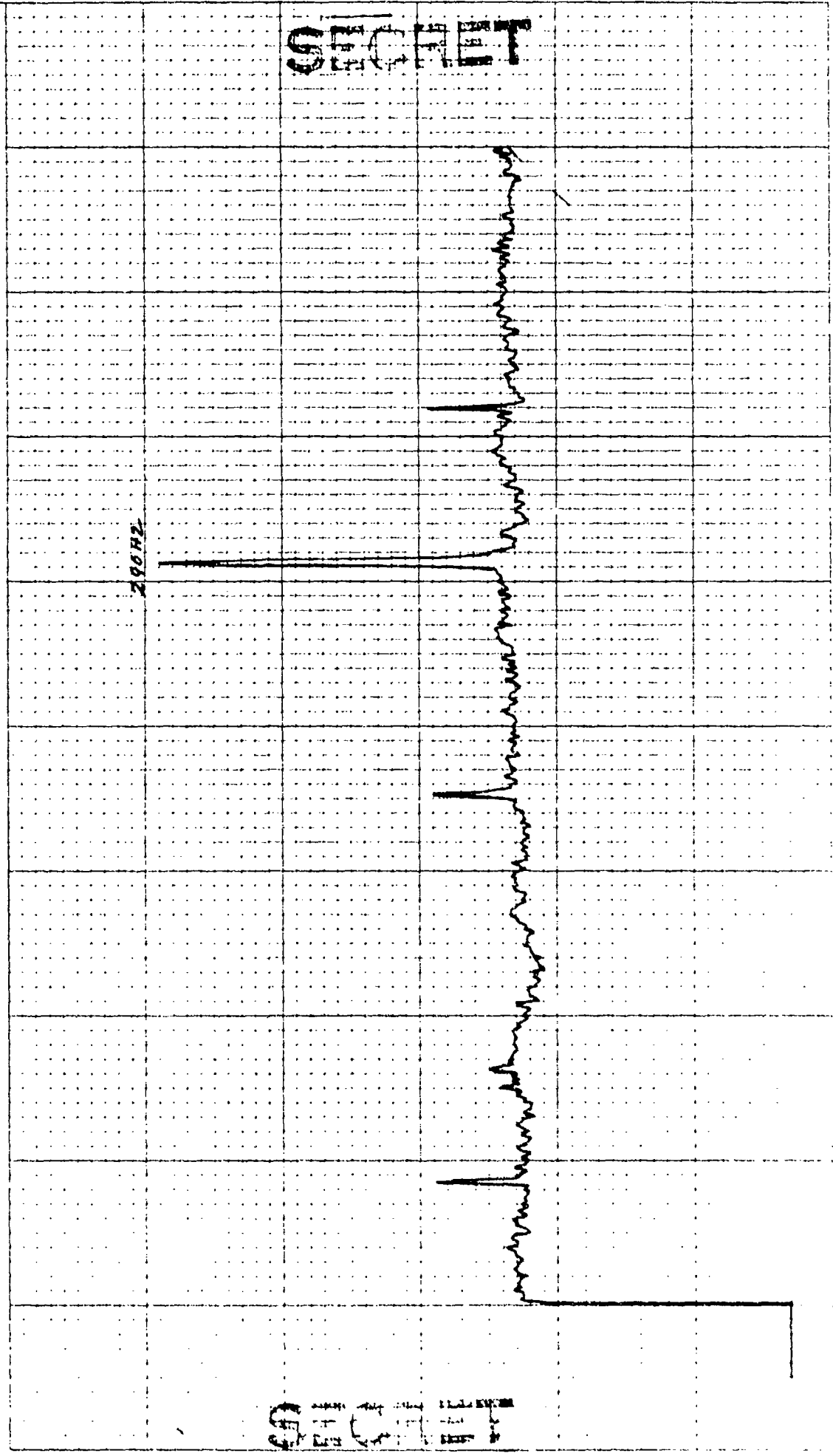
DATE OF ANALYSIS:

CONTROL: 3-15 - 2131 (76)

INTEGRATION TIME 320 SECS ATTEN: DB
FILTER HANNING

DATE/TIME: 3-15-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10HZ
1 DEG AZ STEERING

OMNI SPECTRUM(ELEMENT 49)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT



45 0793

REEL: N10 INDEX J62c

DATE OF ANALYSIS:

CONTROL: 3-15-77 (77)

OMNI SPECTRUM (ELEMENT 51)

EXERCISE: BEARING STAKE

CENTER FREQ: 280 HZ

1 ELEMENT

DATE/TIME: 3-15-77 - 2131 Z

ANALYSIS BANDWIDTH: 1/10 HZ

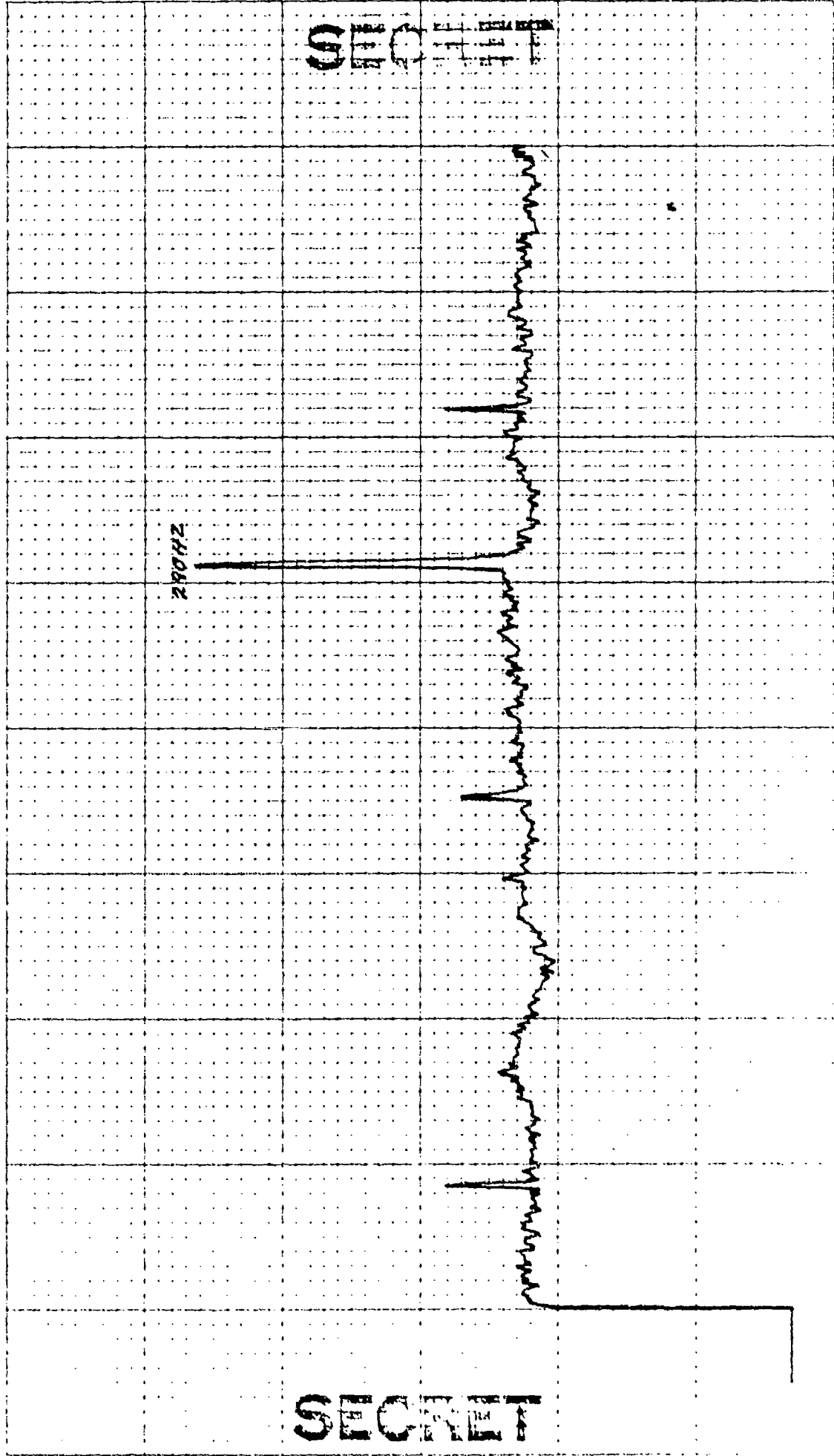
— DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

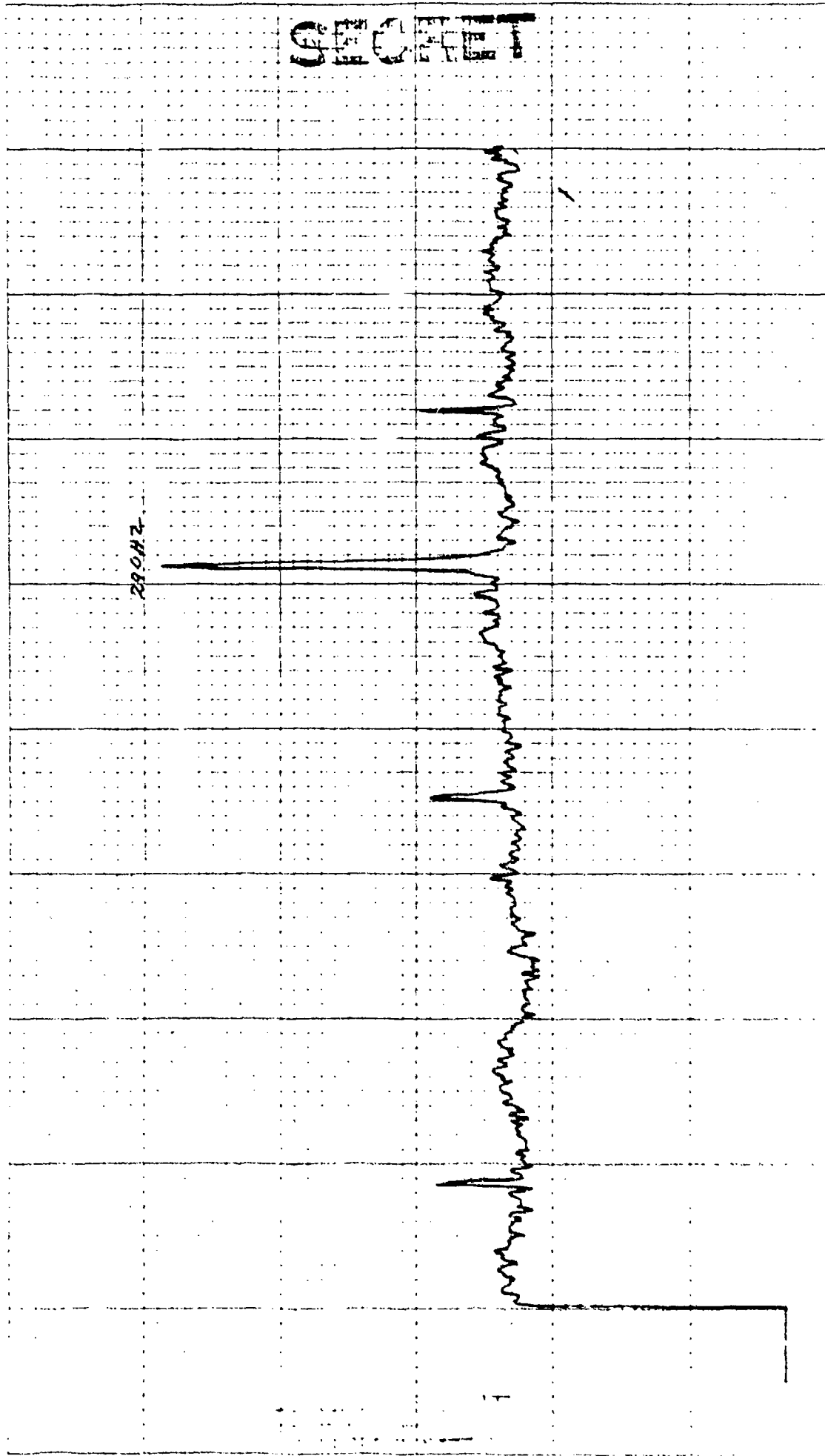
ATTEN: — DB

WTC: HANNING



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CONTROL: 3-15 - 2131 (76) DATE OF ANALYSIS: REEL: M10 INDEX J120
OMNI SPECTRUM (ELEMENT 53)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: - DB
I ELEMENT - DEG AZ STEERING FILTER WTC: HANNING



25HZ

140HZ

50

100

150

150

MRA

CONTROL NUMBER 107-207
NUMBER OF ELEMENTS 2
FREQUENCY BAND 25 TO 140 HZ
RANGE S.W.

HISTORICAL
TAPE REEL NUMBER A7

ANALYSIS BAND WIDTH 11
WATER DEPTH 100

REF
DATE
EXPI

CONFIDENTIAL

SIGNAL LEVEL AND SNR
CALCULATIONS

DATA POINT 9

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -22.5

MCPS-32 CAL. CORRECTION +10 -12.5

BEAMFORMER GAIN +12 -.5 SIG. LEVEL FOR SNR CALCULATION

MRA CORRECTION + .2 -.3 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -58.7

MCPS-32 CAL. CORRECTION +10 -48.7

BEAMFORMER GAIN +12 -36.7 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR -.5

SIGNAL LEVEL FOR SNR -36.7 31.2

PROCESSOR CORRECTION -4.0 32.2

MRA CORRECTION + .2 32.4 SNR 1/10 HZ BAND

BANDWIDTH CONVERSION -8.2 24.2 SNR 1 HZ BAND

CONFIDENTIAL

SIGNAL LEVEL AND SNR
CALCULATIONS

DATA POINT 9

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-13.3</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-3.3
BEAMFORMER GAIN	<u>+12</u>	+8.7 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .6</u>	+9.3 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-65.2</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-55.2
BEAMFORMER GAIN	<u>+12</u>	-43.2 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR	<u>+8.7</u>	
SIGNAL LEVEL FOR SNR	<u>-43.2</u>	51.9
PROCESSOR CORRECTION	<u>-4.0</u>	47.9
MRA CORRECTION	<u>+ .6</u>	48.5 SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-0.2</u>	48.3 SNR 1 HZ BAND

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 9

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-51.9</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-41.9
BEAMFORMER GAIN	<u>+12</u>	-29.9 SIG. LEVEL FOR SNR CALCULAT
MRA CORRECTION	<u>+ .8</u>	-29.1 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-64.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-54.8
BEAMFORMER GAIN	<u>+12</u>	-42.8 NOISE LEVEL FOR SNR CALCULA TI

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR	<u>-29.9</u>	
SIGNAL LEVEL FOR SNR	<u>-42.8</u>	26.9
PROCESSOR CORRECTION	<u>-4.0</u>	22.9
MRA CORRECTION	<u>+ .8</u>	23.7 SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	15.5 SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

DATA POINT 9

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-19.4</u>	<u>-12.5</u>	<u> </u>
MRA SIGNAL LEVEL	<u>- .34</u>	<u>+ 9.3</u>	<u>-29.1</u>
ARRAY SIGNAL GAIN	<u>19.0</u>	<u>21.8</u>	<u> </u>
20 LOG <u>16</u>	<u>24.0</u>	<u>24.0</u>	<u>24.8</u>
# of elements	<u> </u>	<u> </u>	<u> </u>
DIFFERENCE	<u>- 5.0</u>	<u>-2.2</u>	<u> </u>

ARRAY GAIN

MRA SNR	<u>32.4</u>	<u>48.5</u>	<u>9.7</u>
MEAN OMNI SNR	<u>28.6</u>	<u>34.5</u>	<u>N.D.</u>
ARRAY GAIN	<u>3.8</u>	<u>14.0</u>	<u> </u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>8.5</u>	<u>11.1</u>	<u>11.0</u>
DIFFERENCE	<u>-4.7</u>	<u>+ 2.9</u>	<u> </u>

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INDE X3620

REEL: 110

DATE OF ANALYSIS: 1-16

CONTROL: 2131 - 16 (D01)

INTEGRATION TIME 320 SECS

DATE/TIME: 3-15-77 - 2131 Z

BEAMFORMED SPECTRUM (ELEMENTS)

ATTEN: 12 DB

ANALYSIS BANDWIDTH: 1/10HZ

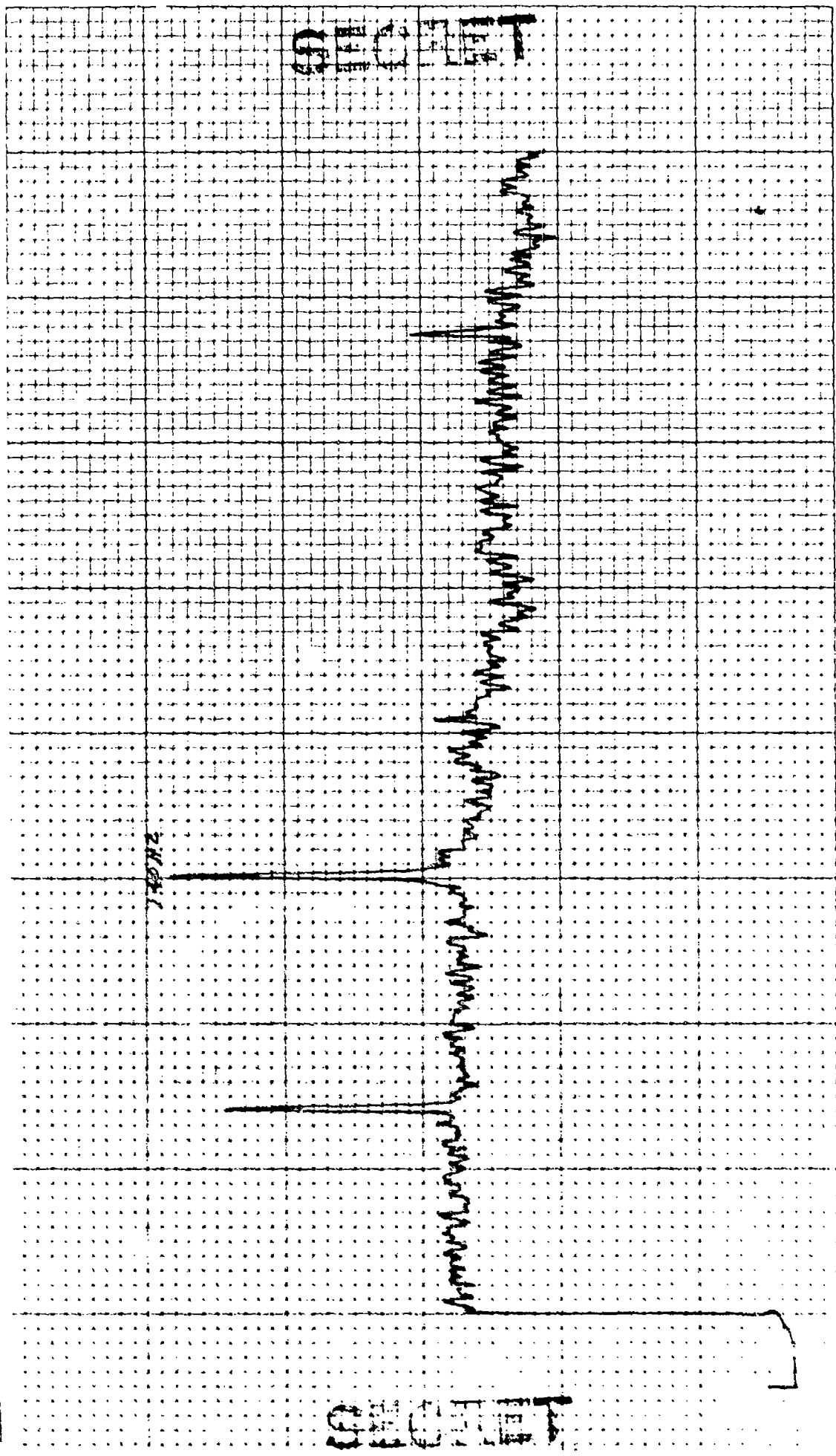
EXERCISE: BEARING STAKE

FILTER WTC: HANNING

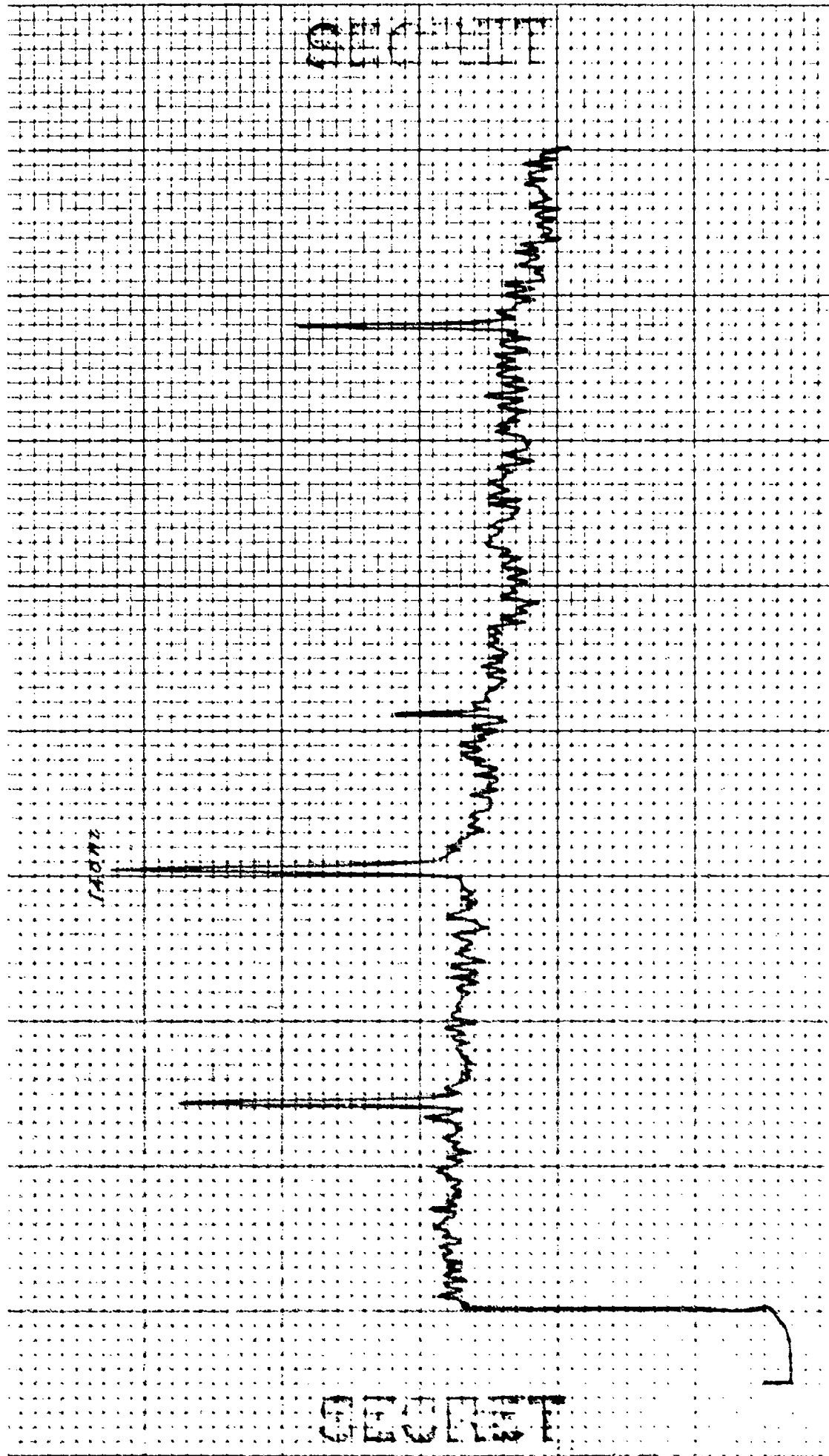
+ 30 DEG. AZ STEERING

CENTER FREQ: 150 HZ

16 ELEMENTS



CONTROL: 213 - 16 (DPI) DATE OF ANALYSIS: - - REEL: 110 INDE XJ720
 BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 3-25-77 - 213/2 INTEGRATION TIME 320 SECS ATTEN: -12 DB
 EXERCISE: BEARING STAKE ANALYSIC BANDWIDTH: 1/10HZ FILTER WIG: HANNING
 CENTER FREQ: 150 HZ + 42 DEG. AZ STEERING

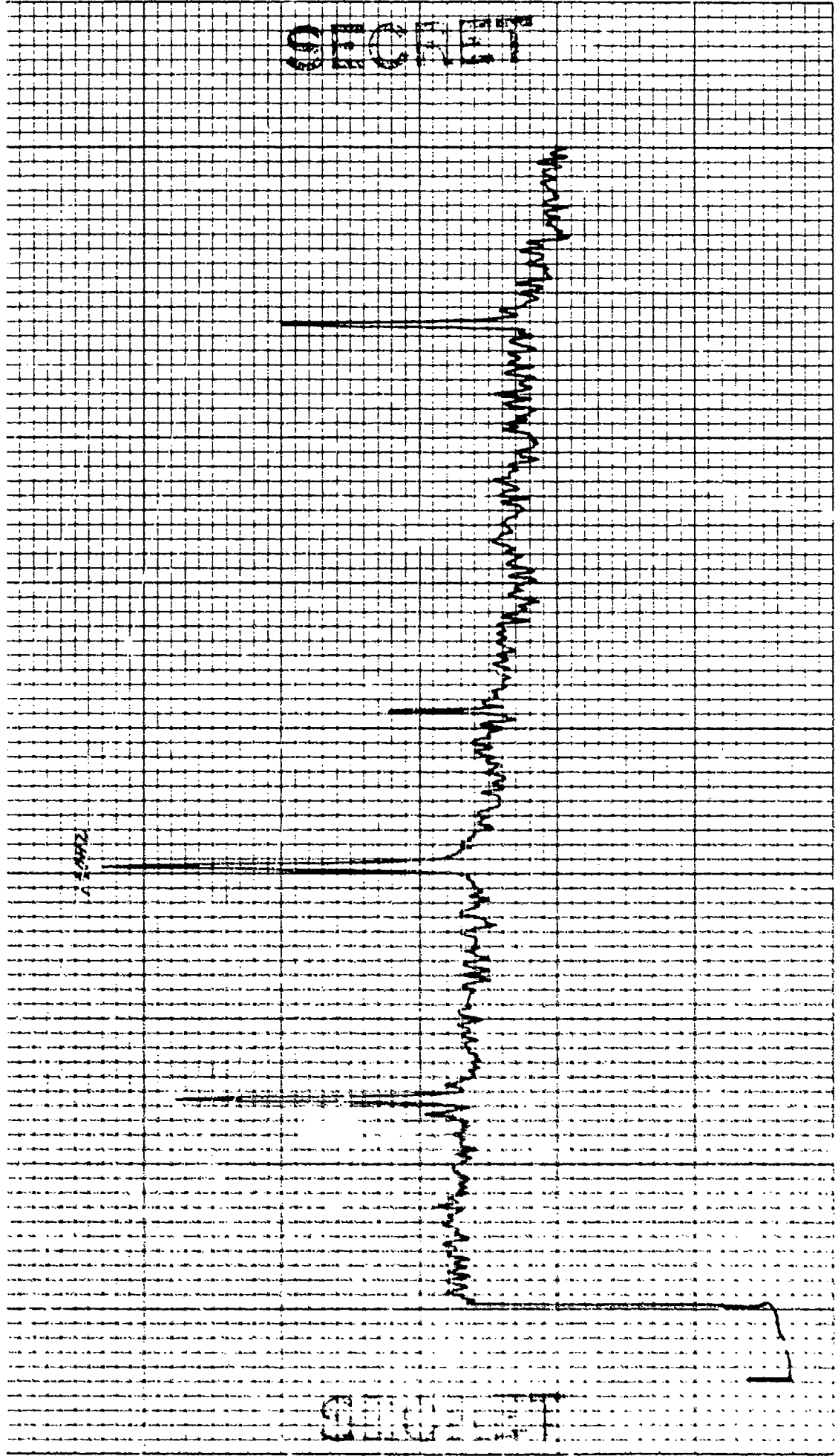


CONTROL: 2171 - 16 (20)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-76
DATE/TIME: 3-5-77 - 2171Z
ANALYSIS BANDWIDTH: 1/10HZ
+44 DEG. AZ STEERING

REEL: A10
INTEGRATION TIME 320 SECS
ATTEN: -12 DB
FILTER WTG: HANNING

INDE X 3620



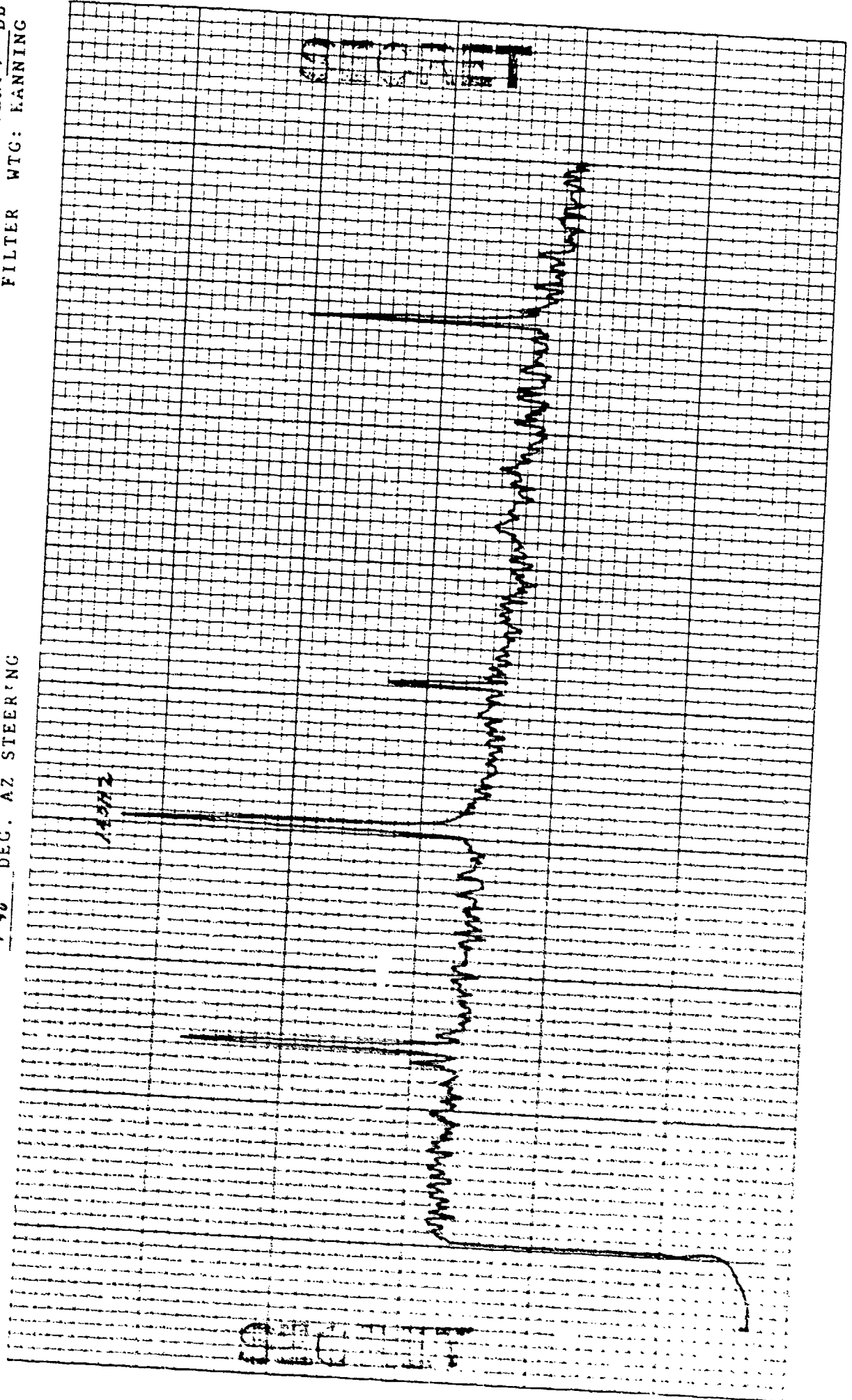
K&E IS UP TO THE INCHES 1/16 INCHES
REUFELL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2231 - 16 (DP9)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: REARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 3-5-77 - 2131Z
ANALYSIS BANDWIDTH: 1/10 HZ
46 DEC. AZ STEERING

REEL: M10
INDE X3610
INTEGRATION TIME 320 SECS
ATTEN: 72 DB
FILTER
WTG: HANNING



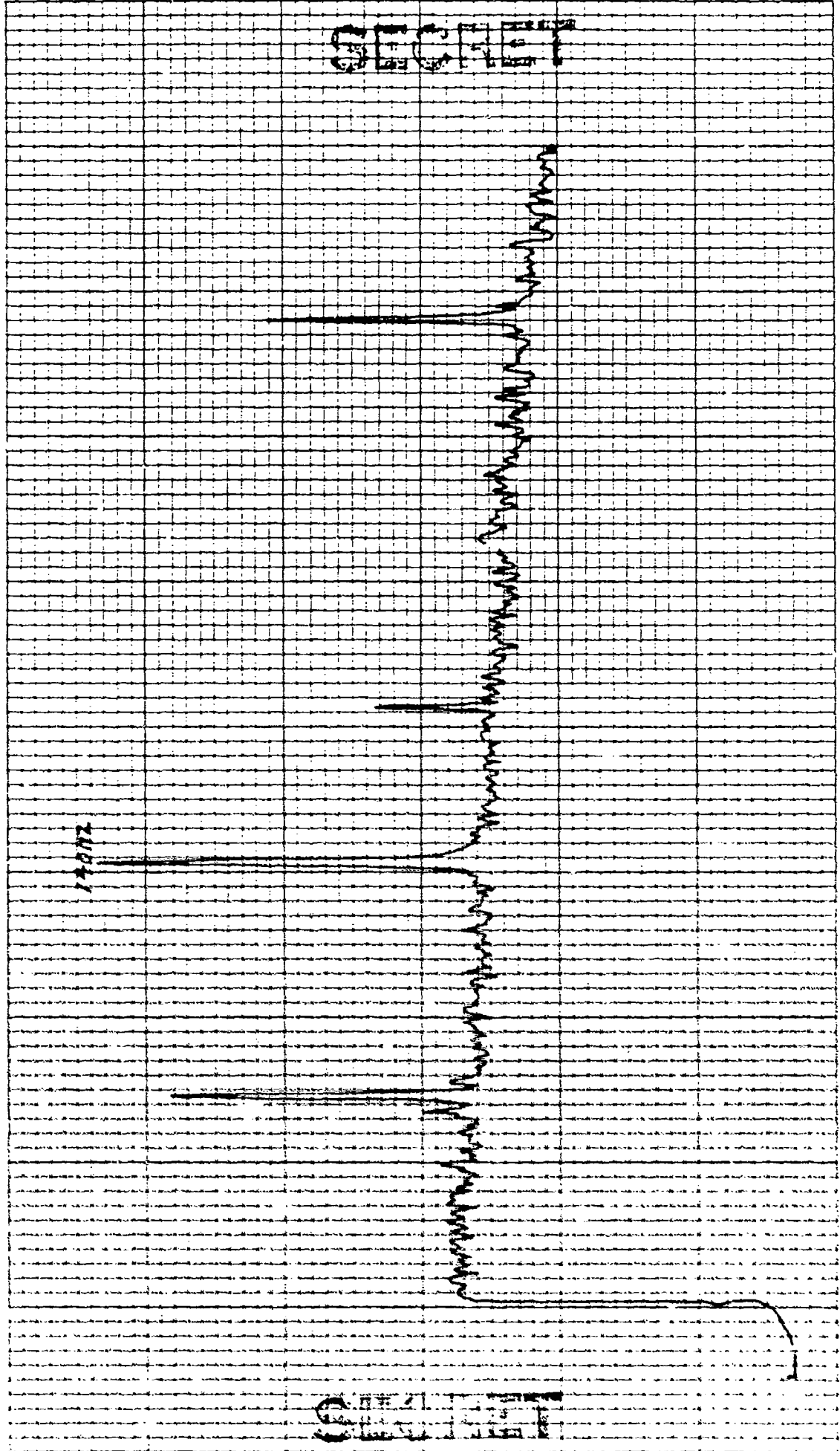
100E 10 X 10 TO THE ...
GENERAL ELECTRIC CO. MADE IN U.S.A.

46 0703

CONTROL: 2/31 - 16 (21)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 7-5-77 - 2:01 Z
ANALYS S BANDWIDTH: 1/10 HZ
+ 40 DEG. AZ STEERING

REEL: 410 INDE X360
INTEGRATION TIME 320 SECS ATTN: 7.2 DB
FILTER WTG: HANNING



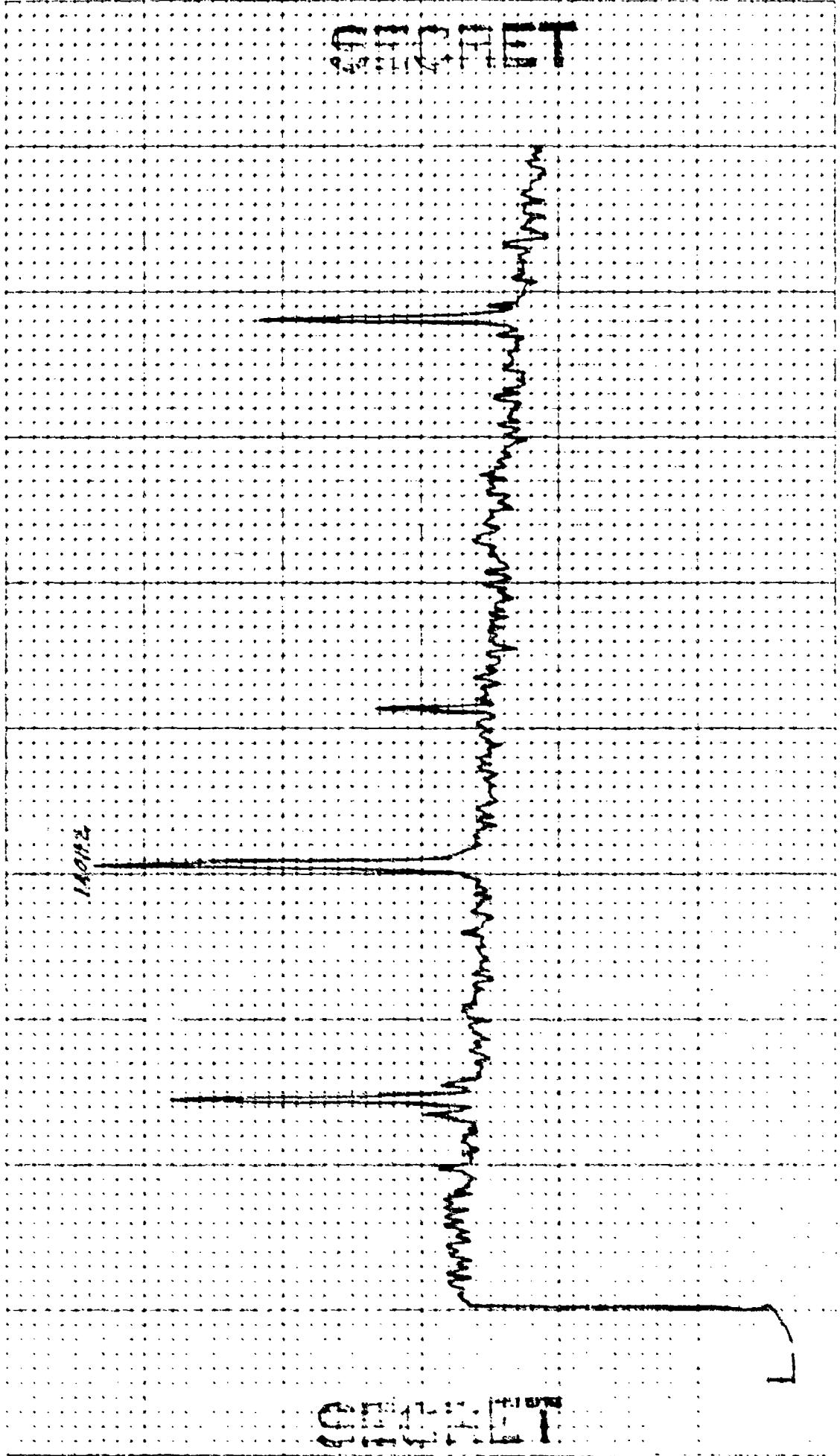
SECRET

SECRET

NOE 1530 1200 1000 800 600 400 200

46 0703

CONTROL: 2131 - 16 (DB9) DATE OF ANALYSIS: PEEL: A10 INDE X3220
 BEAMFORMED SPECTRUM/ELEMENTS DATE/TIME: 3-15-77 - 2131 Z INTEGRATION TIME 320 SECS ATTEN: -2-DB
 EXERCISE: BEARING STAFF ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 CENTER FREQ: 150 HZ 4-50 DEG. AZ STEERING



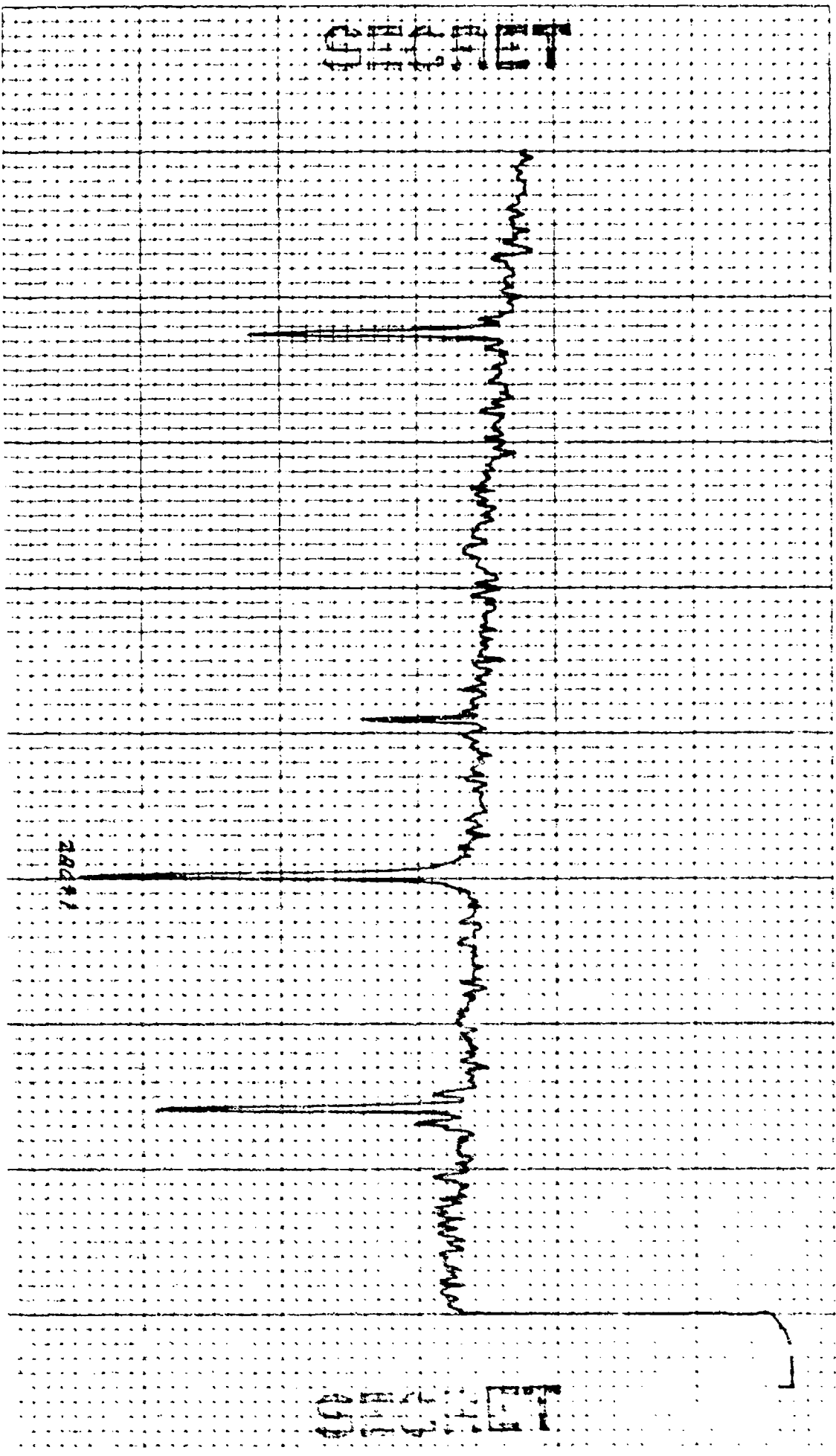
14012

14012

KOE 18 JUL 50 THE DEPT. OF THE ARMY
REPT. # 100-100-100-100-100-100

46 0703

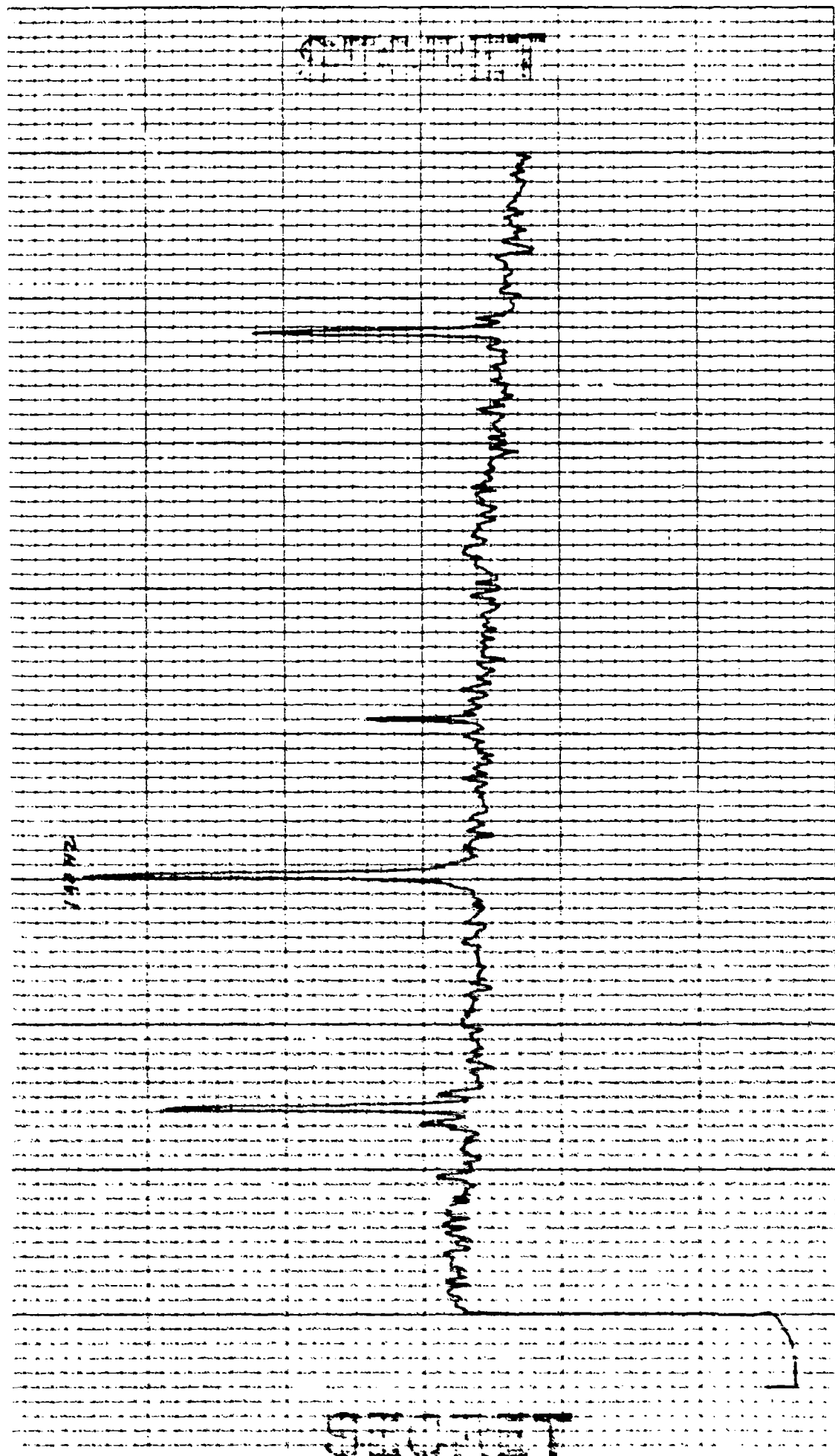
CONTROL: 2001 - 16 (DPP) DATE OF ANALYSIS: 1-16 REEL: M10 INDE X3626
BEAMFORMED SPECTRUM (ELEMENTS) 1-16
EXERCISE: BEARING: STAKE DATE/TIME: 373.77 - 2101 Z INTEGRATION TIME 320 SECS ATTEN: -12 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
16 ELEMENTS +505 DEG. AZ STEERING



KOE 10 X 10 TO THE 10th 100 HZ TO 100 MHz
ROPER & POWER CO. MADE IN U.S.A.

46 0703

CONTROL: 2131 - 16 (DPF) REEL: 400 INDE X 200
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-76
EXERCISE: BEARING STAKE DATE/TIME: 7-15-77 - 2131 Z INTEGRATION TIME 320 SECS ATTN: 2 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTC: HANNING
16 ELEMENTS + 5/ DEG. AZ STEERING



KOE REPORT TO THE DIRECTOR, 4-10-68

46 0703

EXERCISE

CONTROL: 211 - 51 (DP9)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BFAIRING STAKE
CENTER FREQ: 150 HZ
76 ELEMENTS

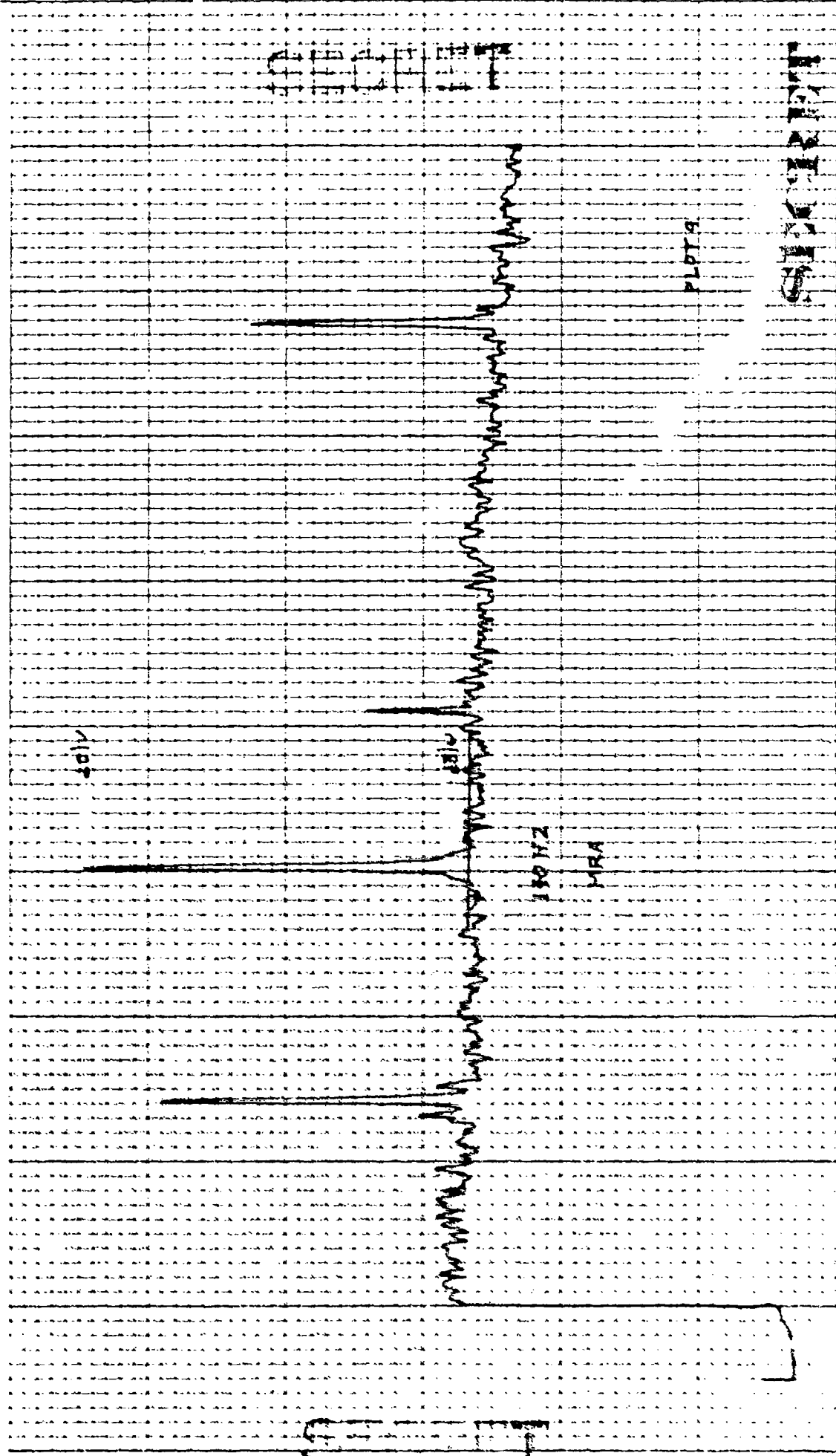
DATE OF ANALYSIS: _____

DATE/TIME: 7-15-77 - 211/7
ANALYSIS BANDWIDTH: 1/10 HZ
45.5 DEG. AZ STEERING

REEL: M10

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

INDE X7620



110 HZ

150 HZ

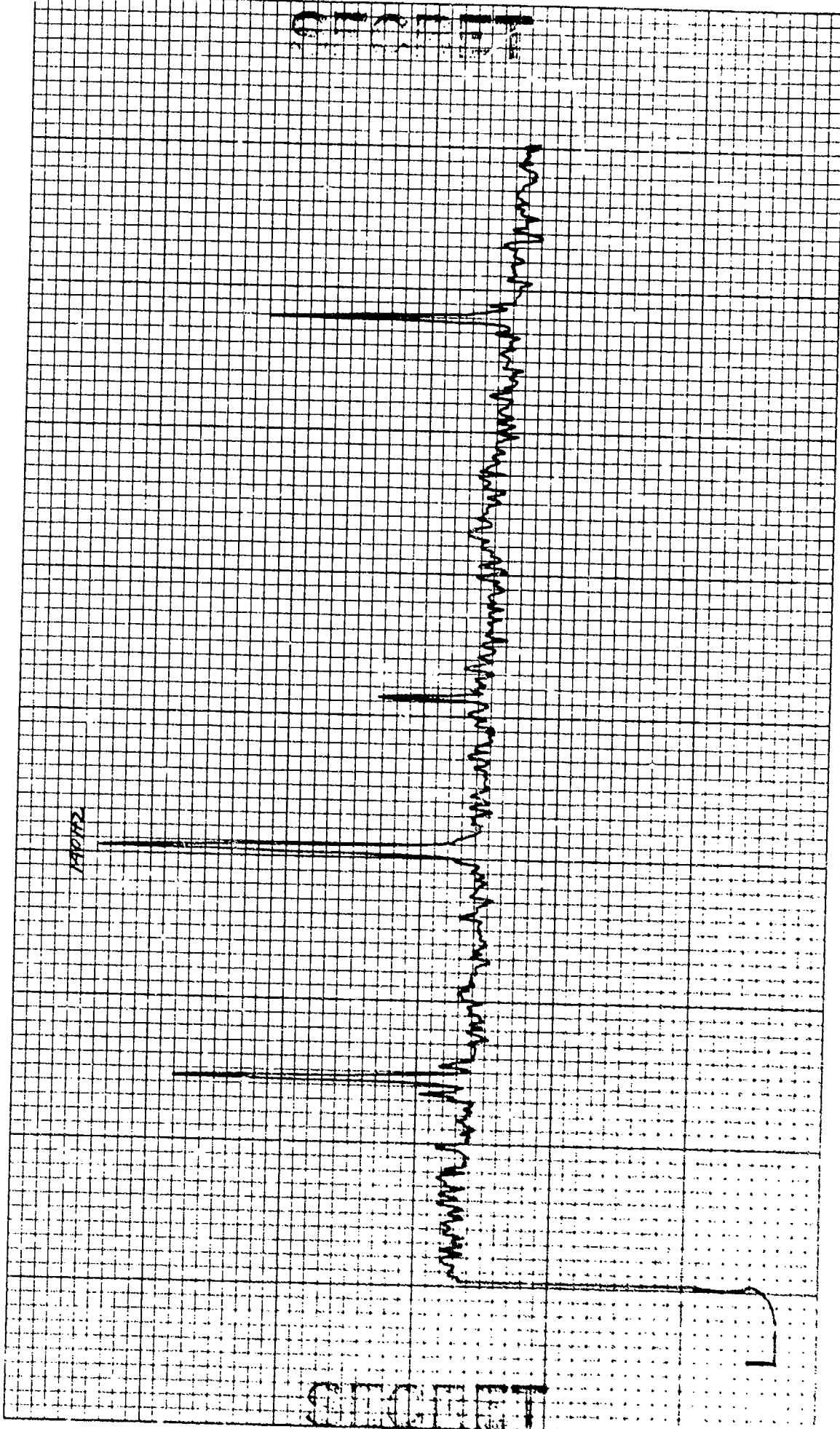
180 HZ

PLT9

CONTROL: 2/31 - 16 (DP9)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 3-15-77 - 2/31 Z
ANALYSIS BANDWIDTH: 1/10 HZ
152 DEG. AZ STEERING

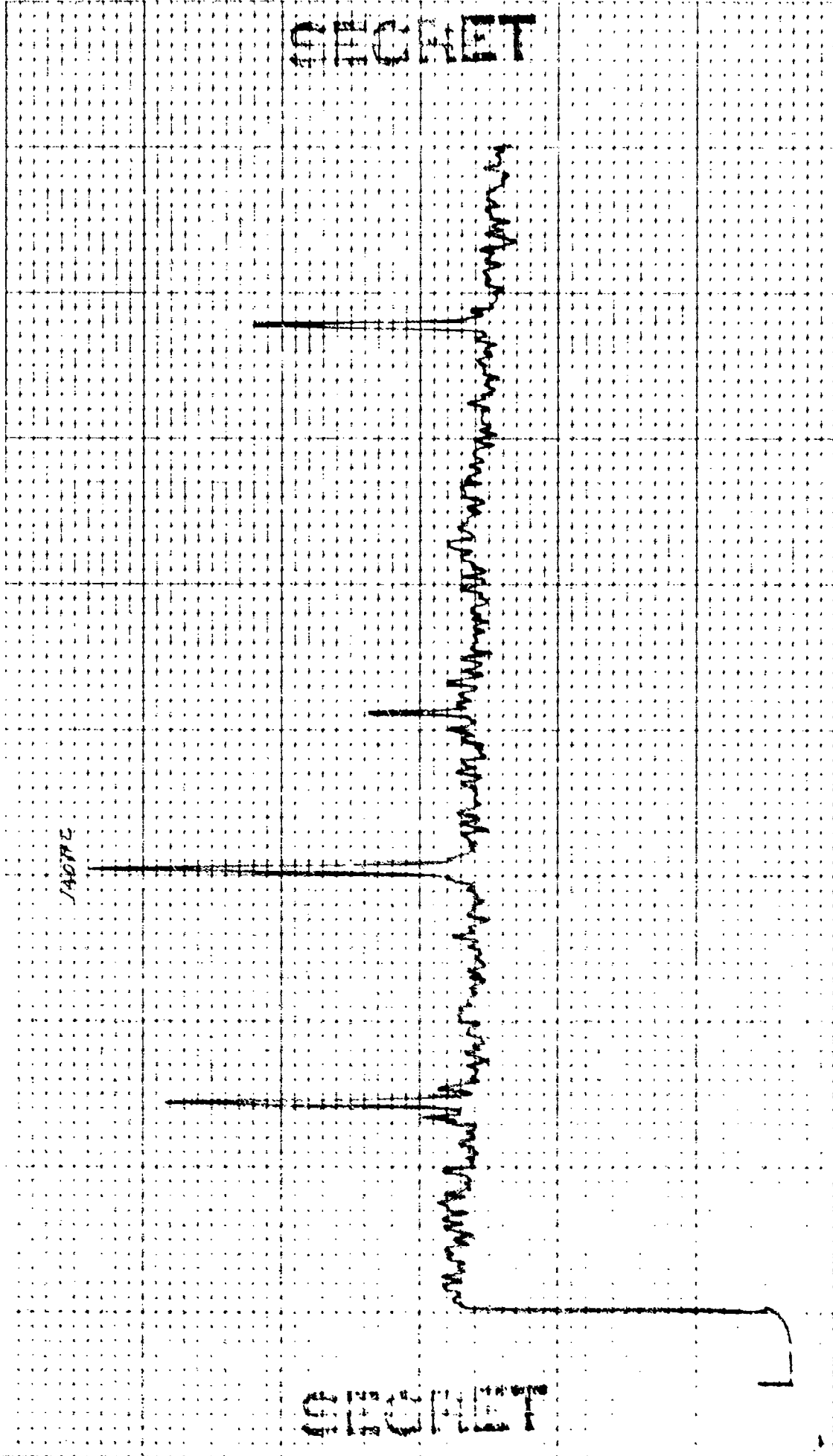
REEL: A10 INDE X3620
INTEGRATION TIME 320 SECS ATTEN: 72 DB
FILTER WTC: HANNING



KOE 2/27/77 TO TIME NORMAL 6.12.0000000000

46 0703

CONTROL: 2/27 - 16 (489) DATE OF ANALYSIS: - - - REEL: M10 INDE X320
 BEAMFORMED SPECTRUM/ELEMENTS DATE/TIME: 77-2/3/Z INTEGRATION TIME 320 SECS ATTEN: 7A DB
 EXERCISE: BEARING STAKE ANALYSIS BA WIDTH: 1710HZ FILTER WTC: HANNING
 CENTER FREQ: 150 HZ +54 DEG. 07 STEERING

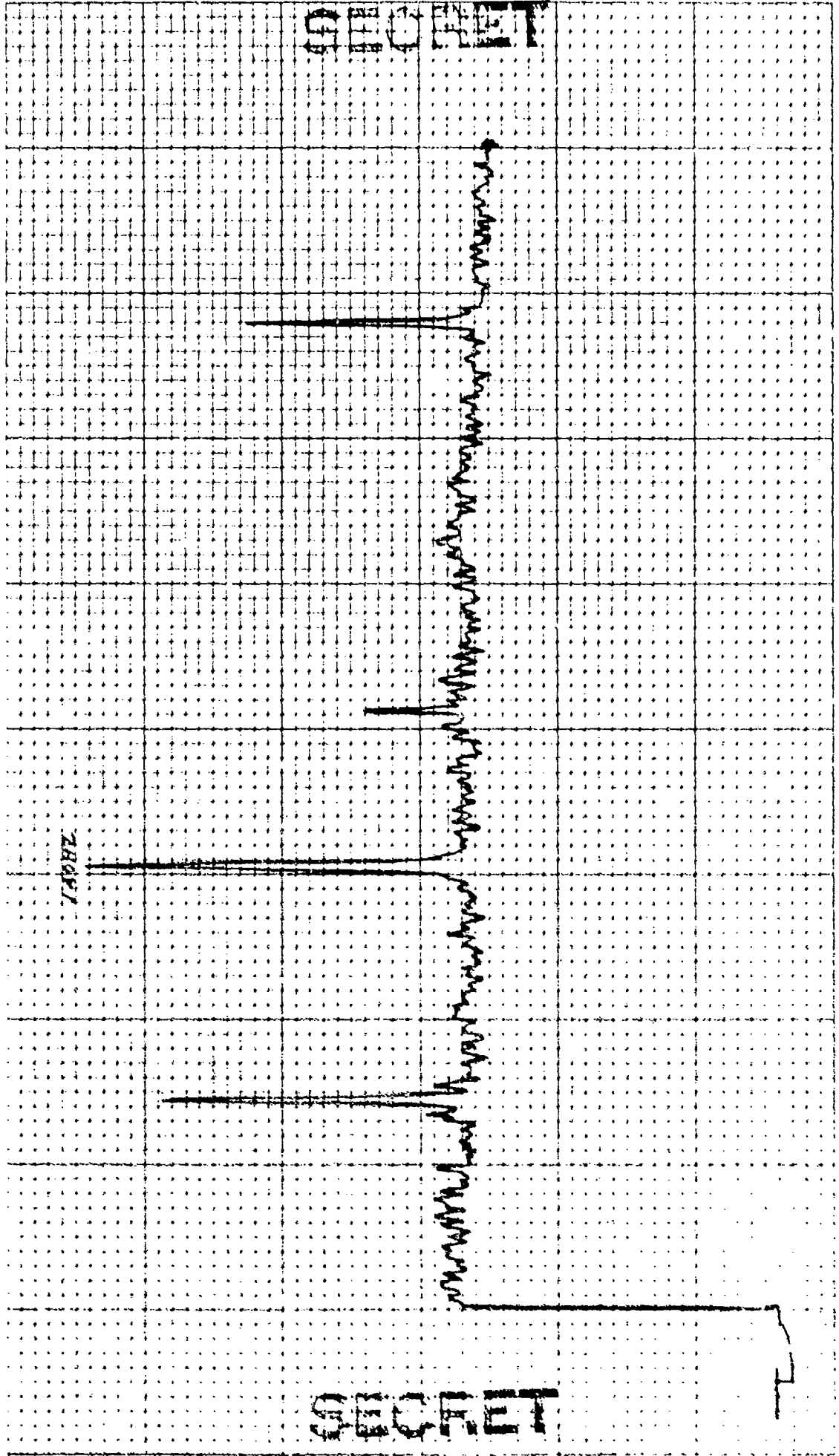


46 0703

CONTROL: 2131 - 16 (PPT)
BEAMFORMED SPECTRUM/ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: - - -
1 - 16
DATE/TIME: 7-75-77 - 2131 Z
ANALYSIS BANDWIDTH: 11/10HZ
+56 DEG. AZ STEERING

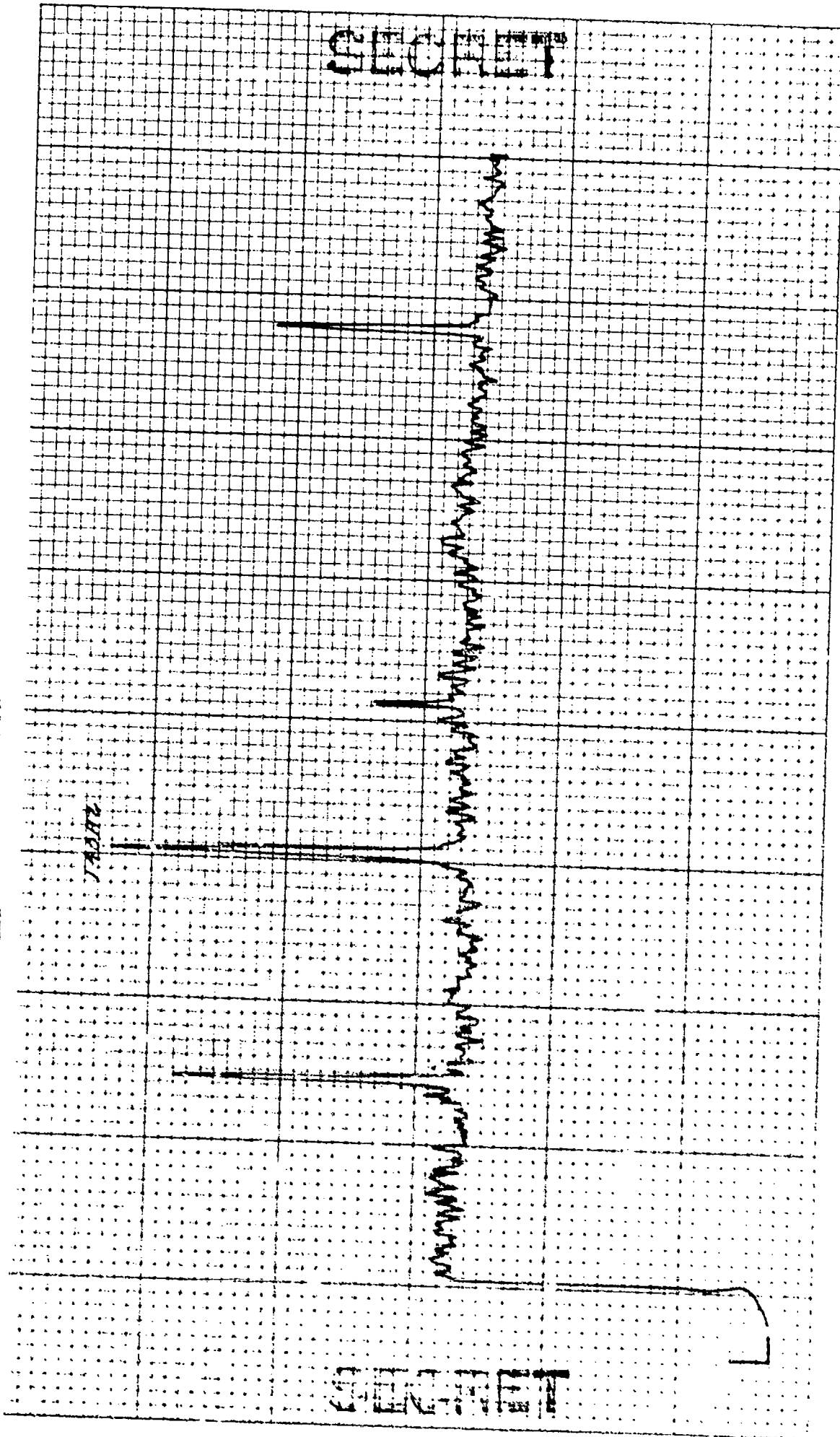
REEL: M10 INDE X 2620
INTEGRATION TIME 320 SECS ATTEN: 72 DB
FILTER MTG: HANNING



CONTROL: 2131 - 16 (DP9)
BEAMFORMED SPECTRUM ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 150 MHz
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 3-15-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/1 MHz
+50 DEG. A. STEERING

REEL: 110 INDE X3626
INTEGRATION TIME 320 SECS
ATTEN: 2 DB
FILTER WTG: HANNING



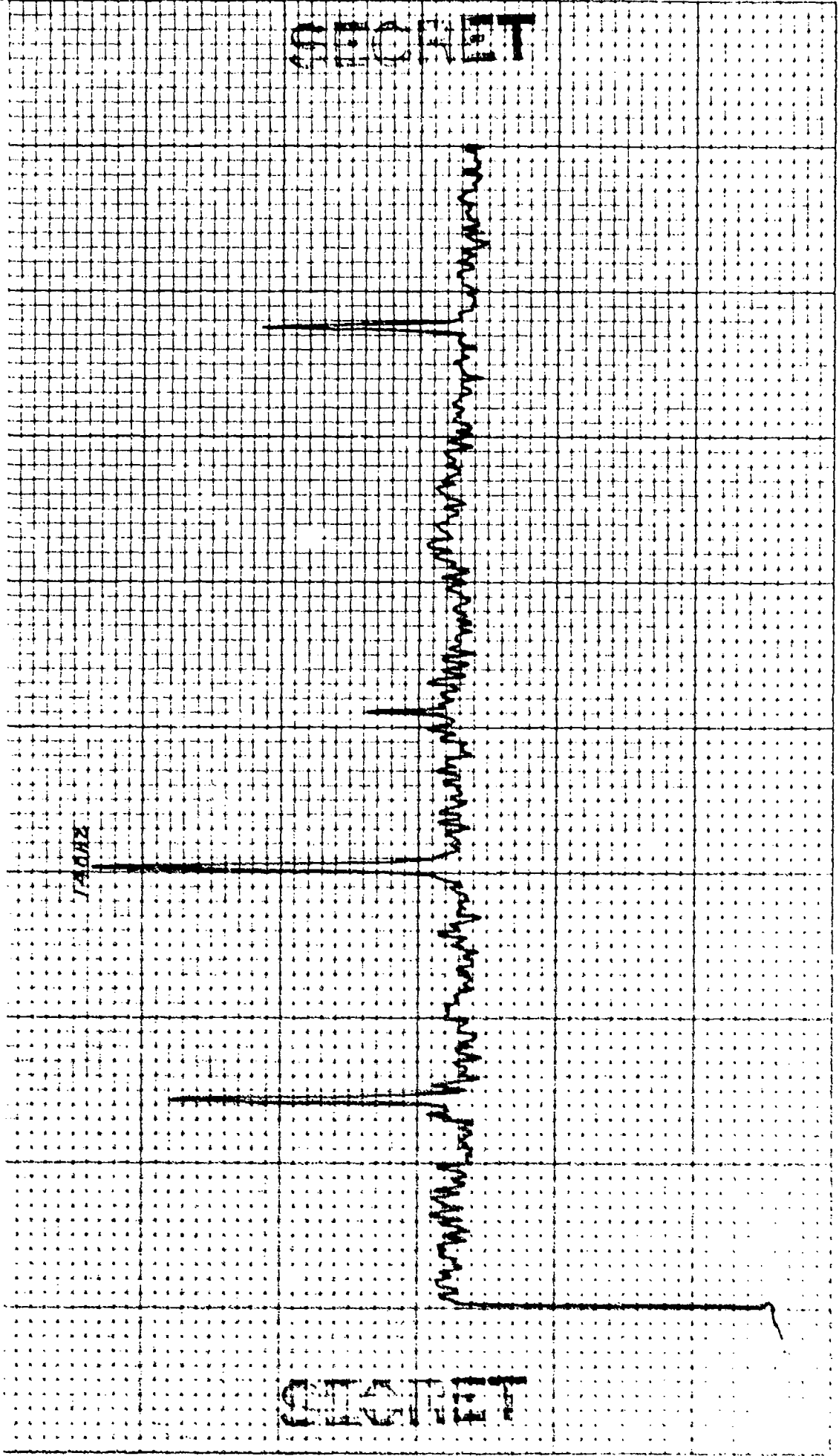
KOE 12.7 16 TO THE INCH... 1 1/2 INCHES
PULP & ESSENCE CO. MADE IN U.S.A.

46 0703

CONTROL: 2131 - 16 (209)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: - - -
1-16
DATE/TIME: 3-5-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+60 DEG. AZ STEERING

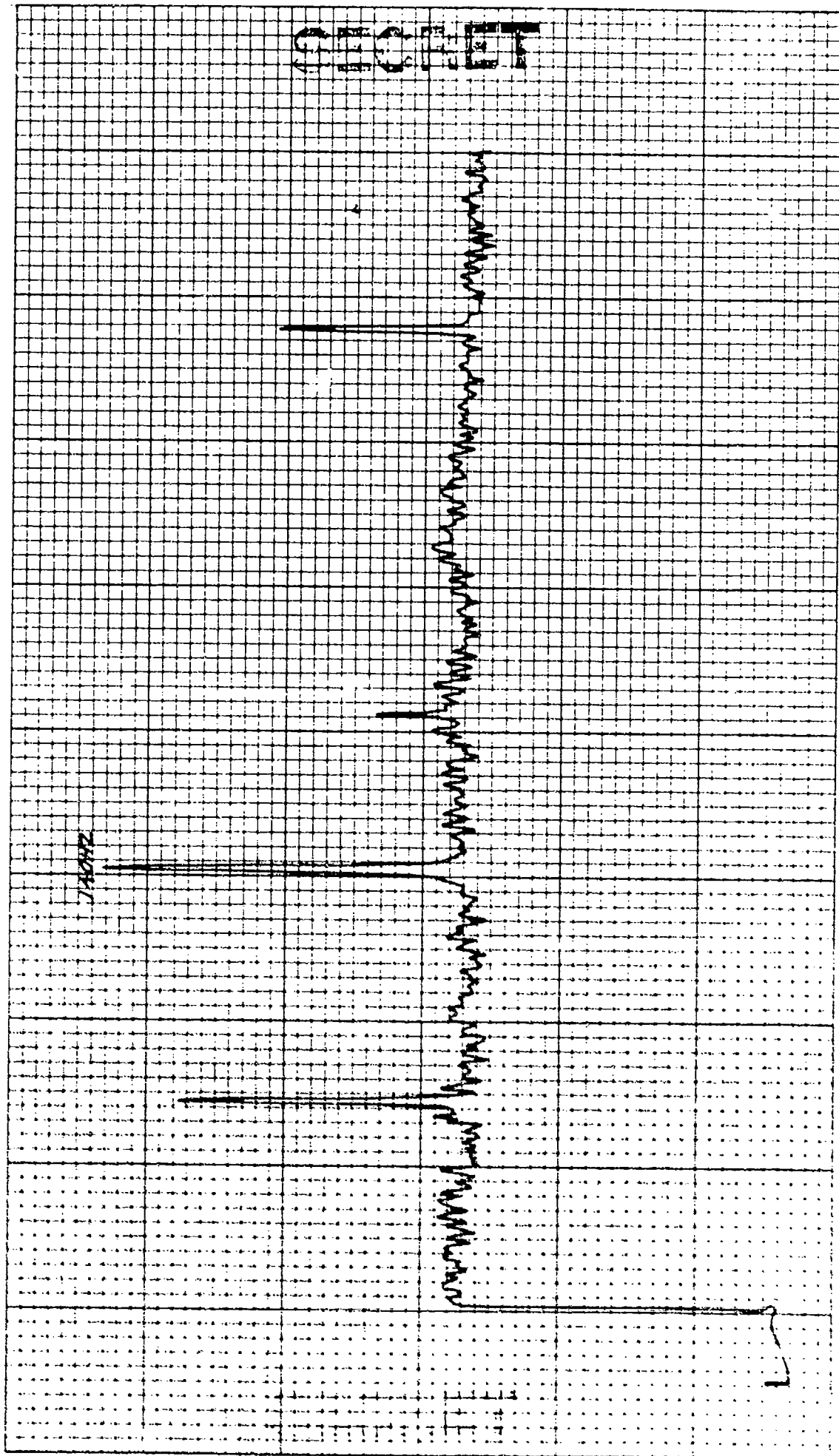
REEL: 410 INDE X3620
INTEGRATION TIME 320 SECS ATTEN: 72 DB
FILTER WIG: HANNING



CONTROL: 2131 - 16 (2001)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 3-15-77 - 2:31 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+62 DEG. AZ STEERING

REEL: 1910 INDE X3626
INTEGRATION TIME 320 SECS ATTN: -12 DB
FILTER WTG: HANNING



INDE X 7620

REEL: 110

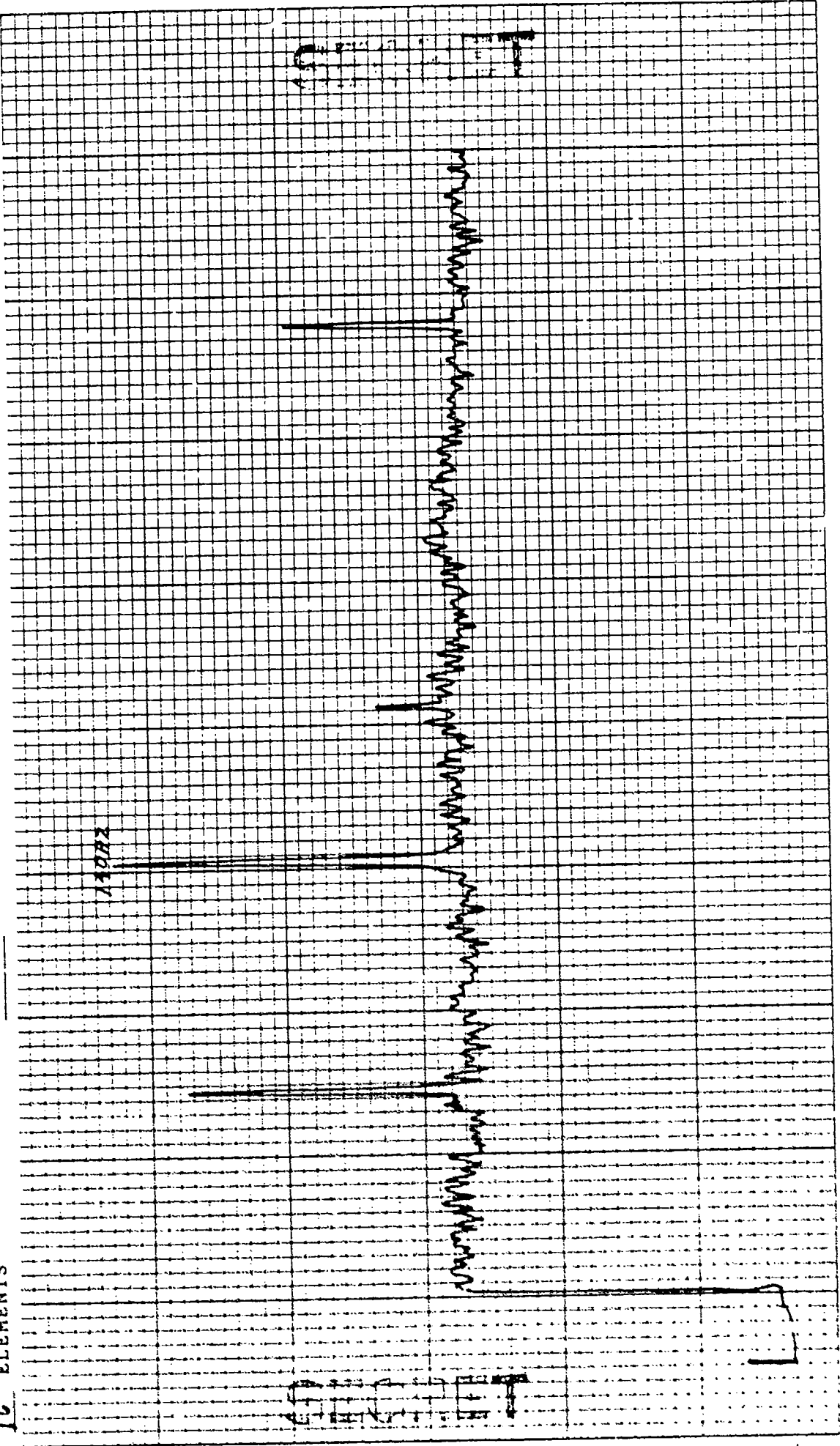
DATE OF ANALYSIS: 1-16

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

DATE/TIME: 3-13-77-2131 Z

CONTROL: 2131 - 16 (DP9)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

ANALYSIS BANDWIDTH: 1710 HZ
+24 DEG. AZ STEERING



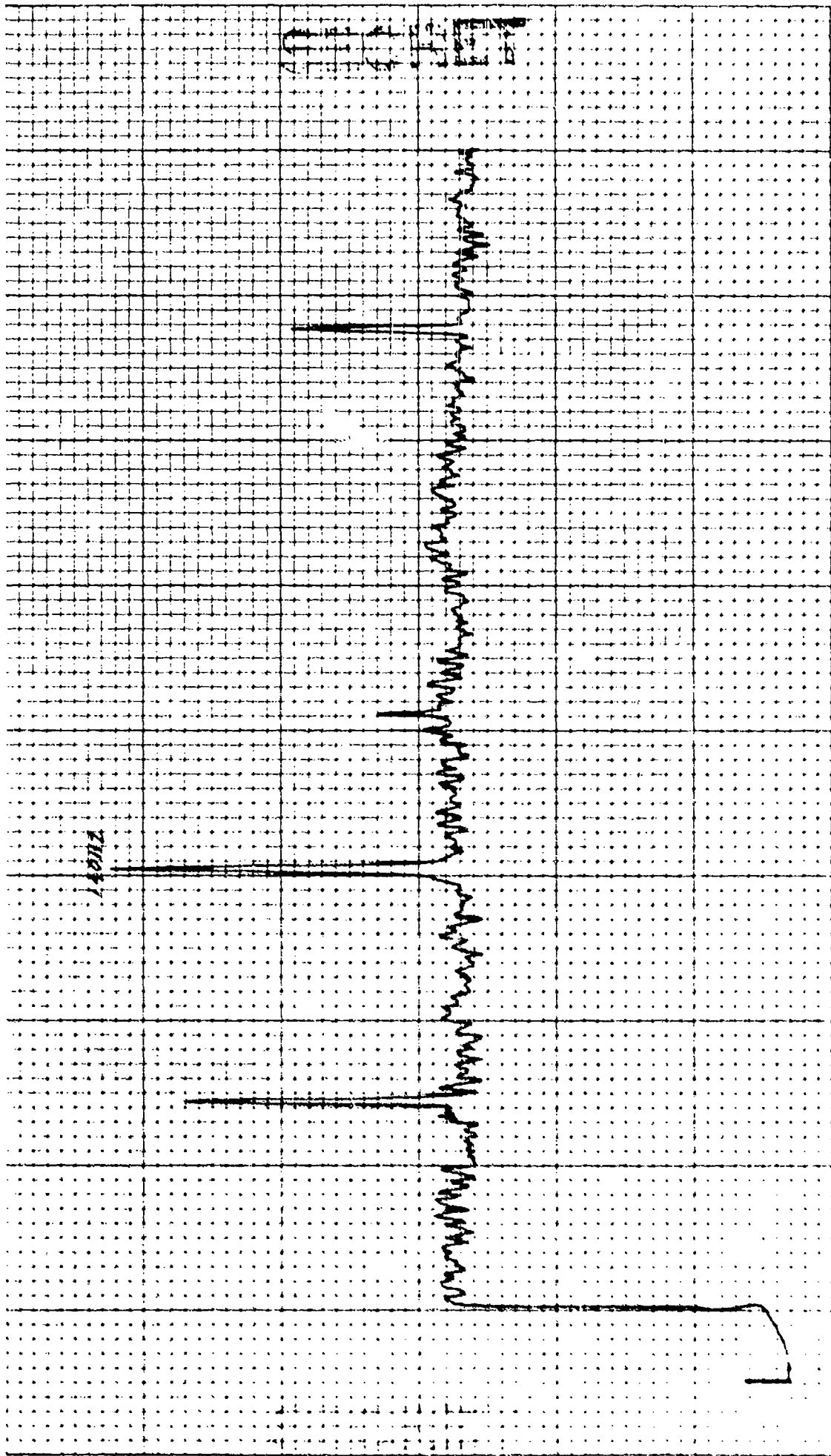
KOE 16 X 16 TO THE INCH...
PAPER & LESSER CO. (MILITARY)

46 0703

CONTROL: 2131 - 16 (DP1)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 3-25-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 66 DEG. AZ STEERING

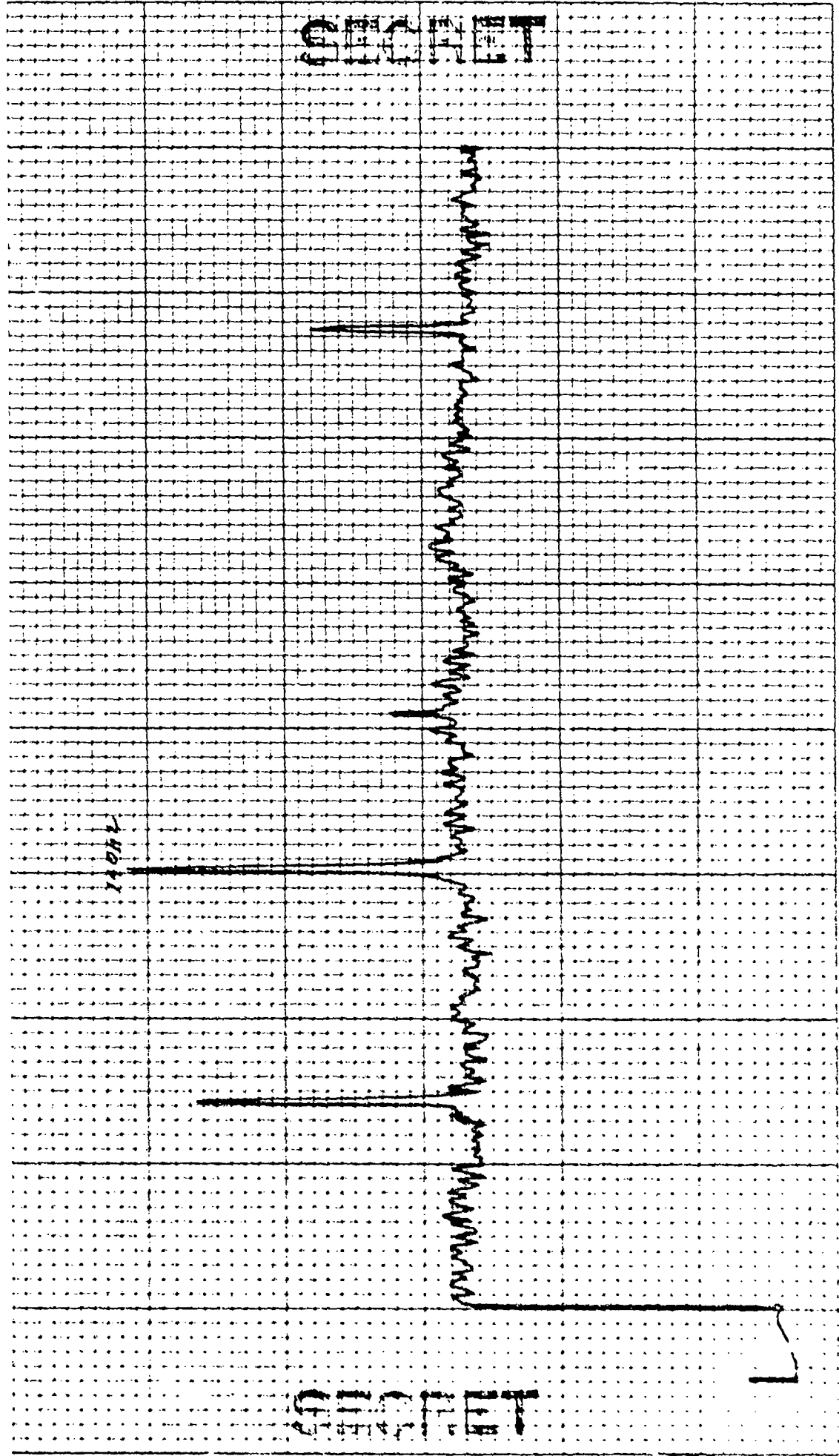
REEL: 413 INDE X 221
INTEGRATION TIME 320 SECS ATTN: -12DB
FILTER WTC: HANNING



KOE 10 X 10 TO THE INCHES
PAPER COVER CO. MADE IN U.S.A.

46 0703

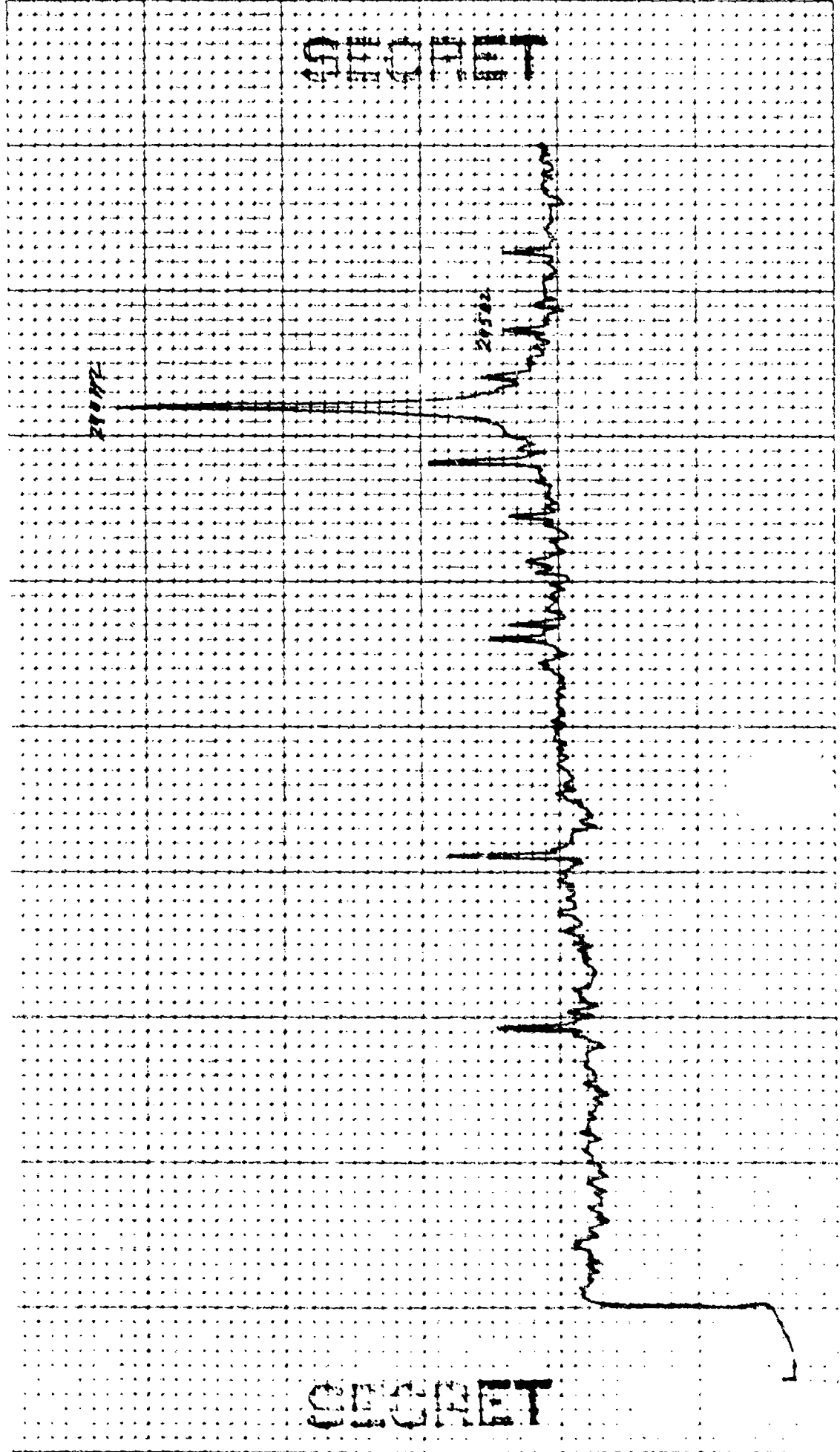
CONTROL: 2131 - 16 (DAP) DATE OF ANALYSIS: 1-16 REEL: A10 INDE X360
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-15-77 - 2131Z INTEGRATION TIME 320 SECS ATTEN: 4 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WIG: HANNING
CENTER FREQ: 150 HZ 60 DEG. AZ STEERING



46 0703

REF: [Illegible]

CONTROL: 2031 - 16 (DPP) DATE OF ANALYSIS: 1-16
 BEAMFORMED SPECTRUM(ELEMENT) INTEGRATION TIME 320 SECS ATTEN: -14 DB
 EXCEPT: BEARING STAYE FILTER WIG: HANNING
 CENTER FREQ: 070 HZ +36 DEG. AZ STEERING
 16 ELEMENT



PEEL: M10

INDE X3620

KOE 12412 TO THE DEPT. OF THE ARMY

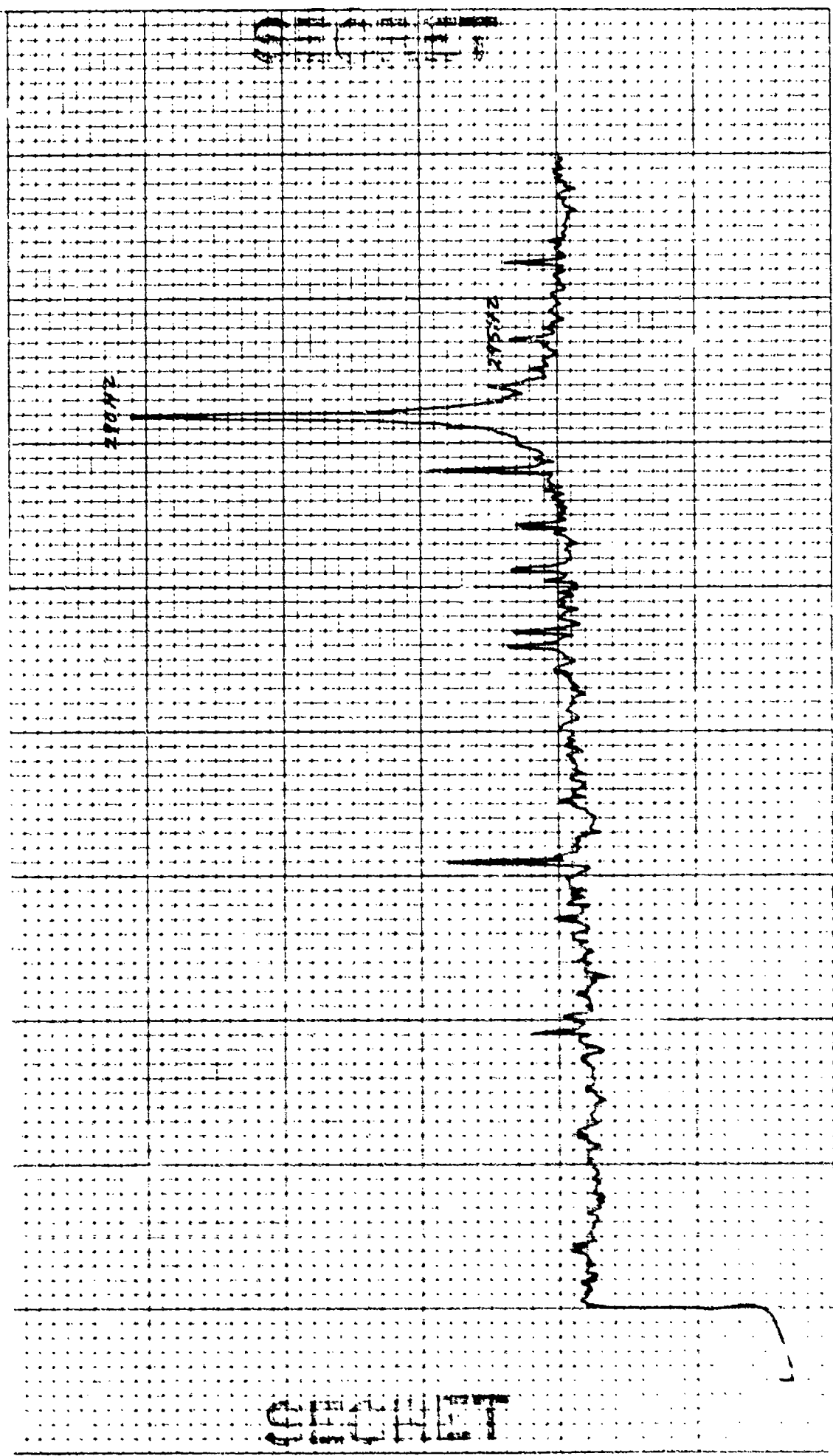
46 0703

CONTROL: 2071 - 16 (2071)
 BEAMFORMED SPECTRUM ELEMENTS
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
 16 ELEMENTS

DATE OF ANALYSIS: 1-16
 DATE/TIME: 7-15-77 - 2031 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 + 30 DEG. AZ STEERING

REEL: 410
 INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

INDE X362c



46 0703

KOE PLANS TO THE HIGHER FREQUENCIES

CONTROL: 2031 - 16 (DM)
 BEAMFORMED SPECTRUM/ELEMENTS
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
 16 ELEMENTS

DATE OF ANALYSIS: 1-76

REEL: 410

INTEGRATION TIME 320 SECS

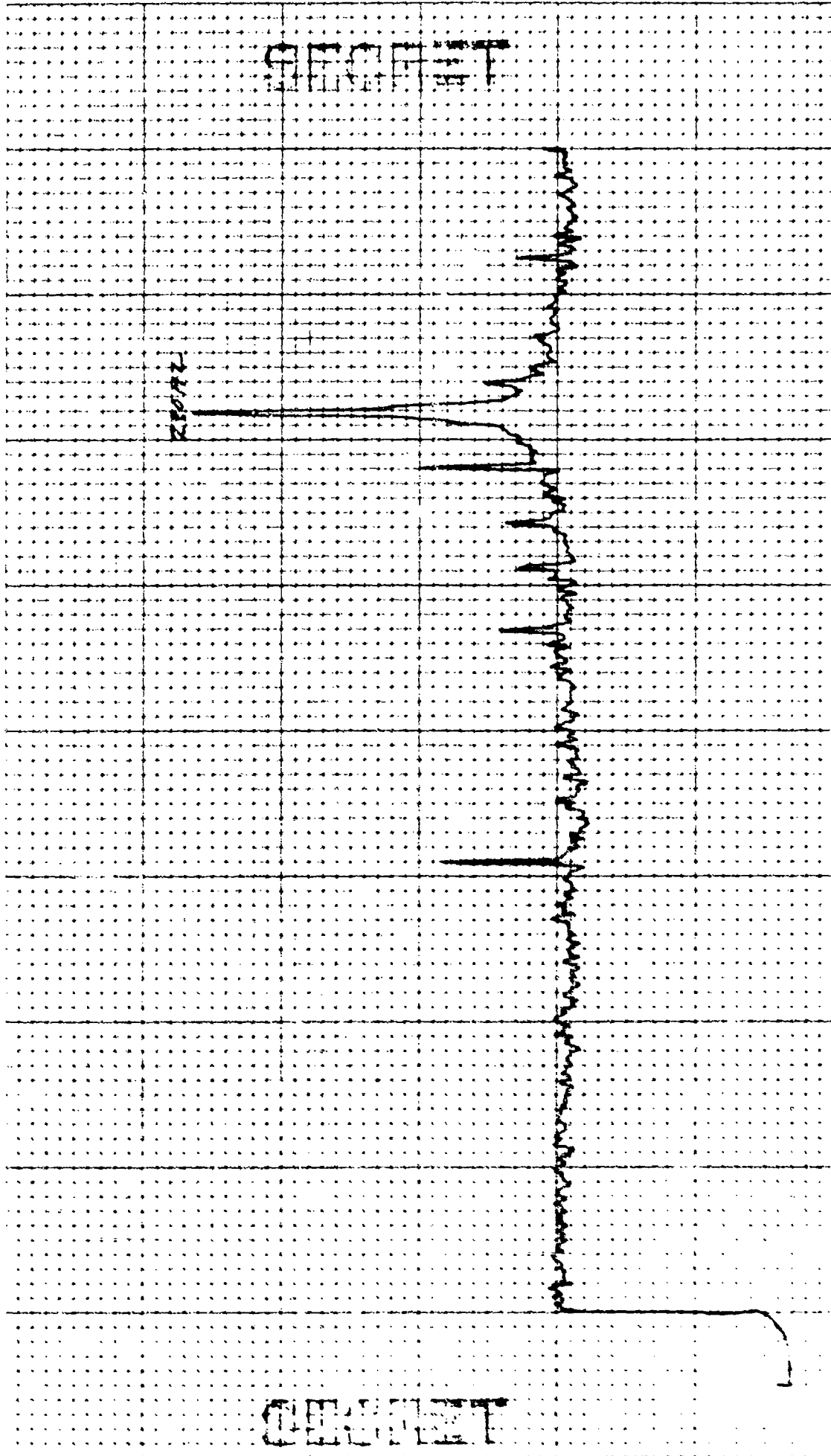
ATTEN: 72 DB

FILTER WTG: HANNING

ANALYSIS BANDWIDTH: 1/10HZ

+40 DEG. AZ. STEERING

INDE K3620



K-2 19.7 IS TO THE INCHES 1.5 CM PER

46 0703

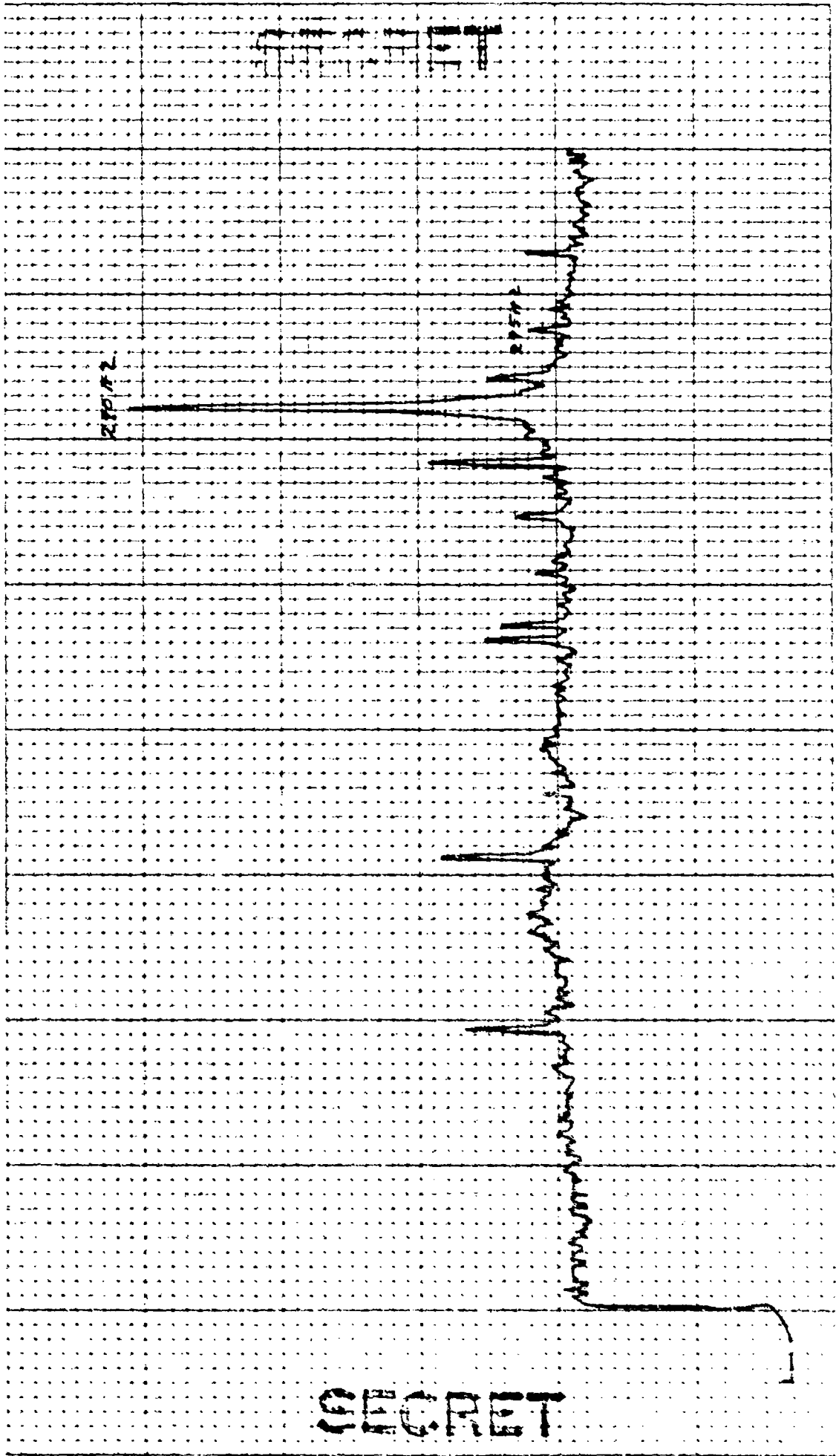
CONTROL: 2131 - 16 (DPI) DATE OF ANALYSIS: 1-16 REEL: M10 INDE X3680

BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-15-77 - 2131 Z INTEGRATION TIME 320 SECS ATTEN: -12 DB

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

CENTER FREQ: 270 HZ +42 DEG. AZ STEERING

16 ELEMENTS

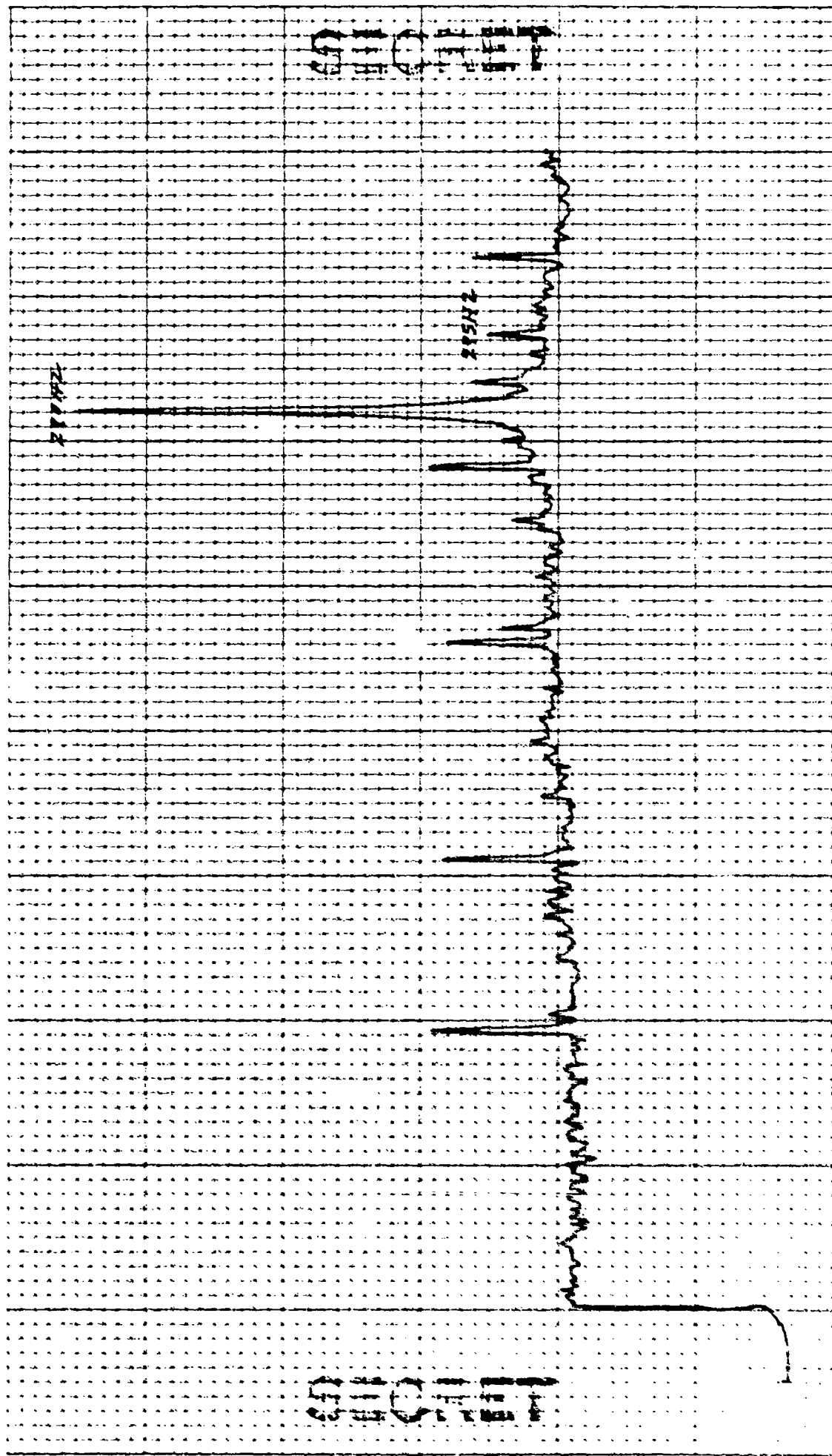


SECRET

K-E 15.418 TO 15.416 (15.417) 15.418

46 0703

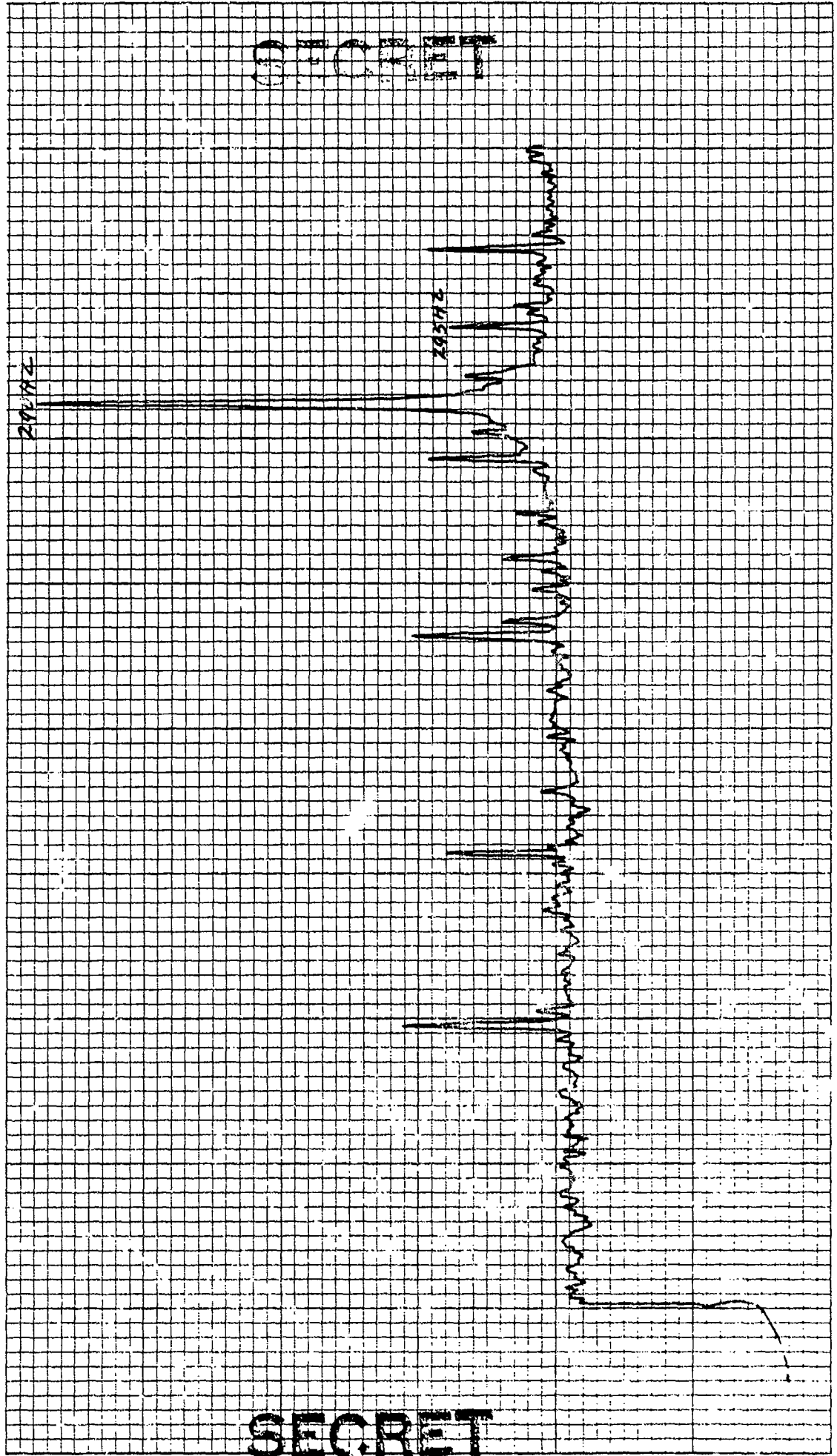
CONTROL: 2071 - 16 (DPF) DATE OF ANALYSIS: REEL: A10 INDE X 360
 BEAMFORMED SPECTRUM(ELEMENTS) 1-16
 EXERCISE: BEARING STAFF DATE/TIME: 7-25-77 - 203/2 INTEGRATION TIME 320 SECS ATTEN: 72 DB
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 /6 ELEMENTS 4-44 DEG. AZ STEERING



CONTROL: 2131 - 16 (DPP)
BEAMFORMED SPECTRUM (ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS

DATE OF ANALYSIS: -- -- --
1-16)
DATE/TIME: 3-5-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10HZ
746 DEG. AZ STEERING

REFL: 410 INDE X 3620
INTEGRATION TIME 320 SECS ATTN: -72.DB
FILTER WTG: HANNING

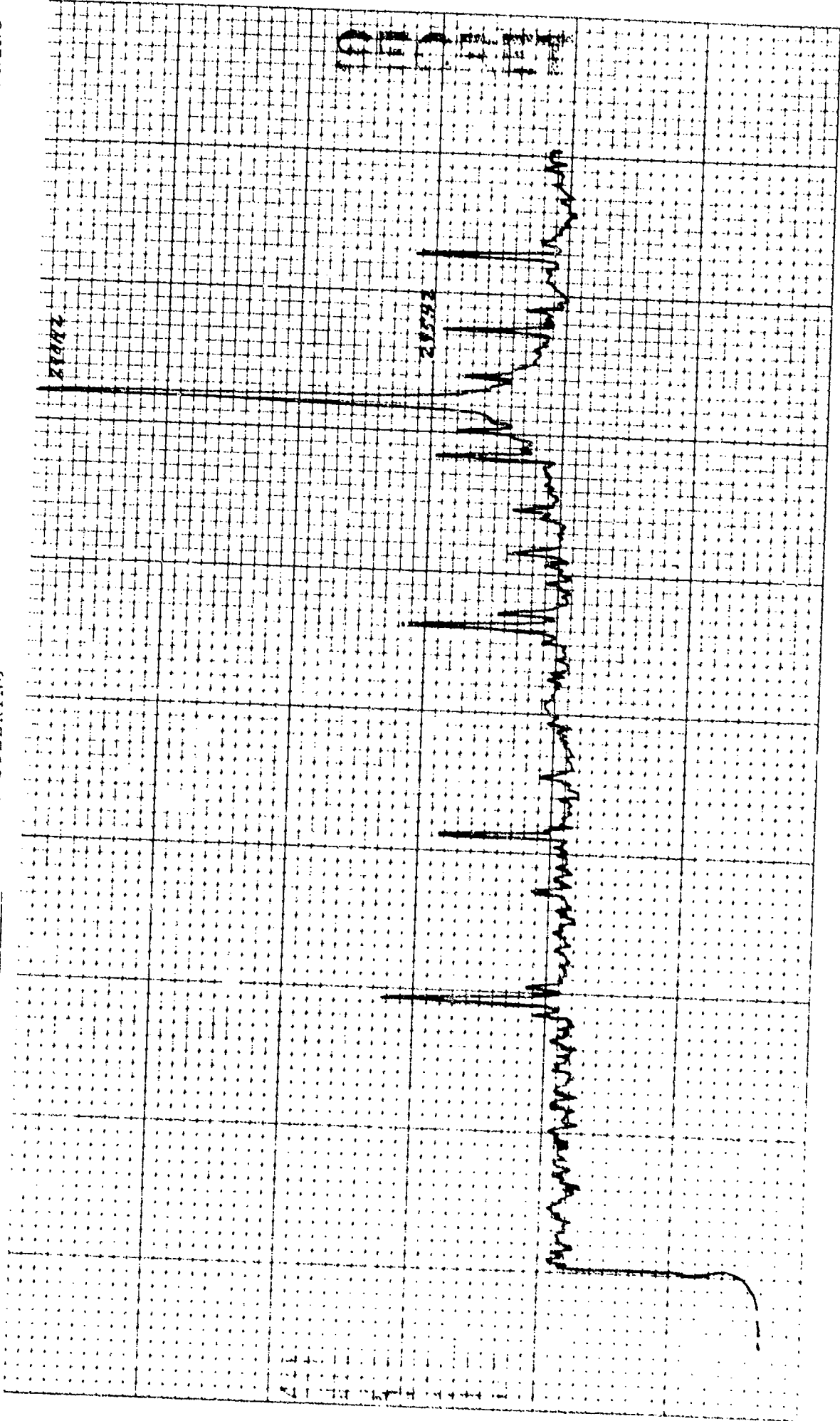


SECRET

NOE REFERENCE TO THE DOCUMENT INCHES

46 0703

CONTROL: 2031 - 16 (DPL) DATE OF ANALYSIS: 1-16 REEL: 415 INDE X3620
 BEAMFORMED SPECTRUM/ELEMENTS
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTEN: -12 DB
16 ELEMENTS 440 DEG. AZ STEERING FILTER WTC: HANNING



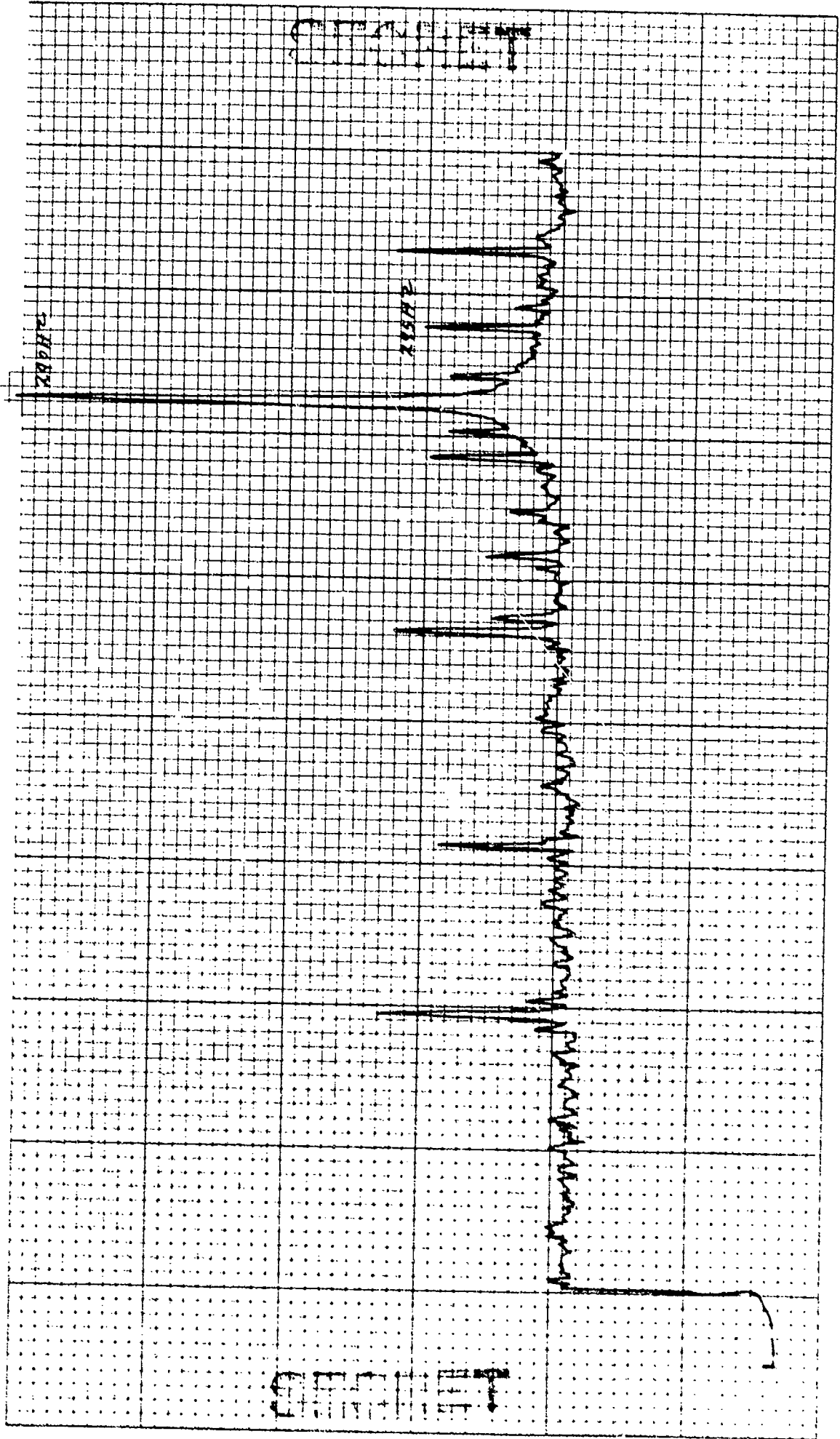
K₀E 10 X 10 TO THE INCH • X 10 INCHES
PEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

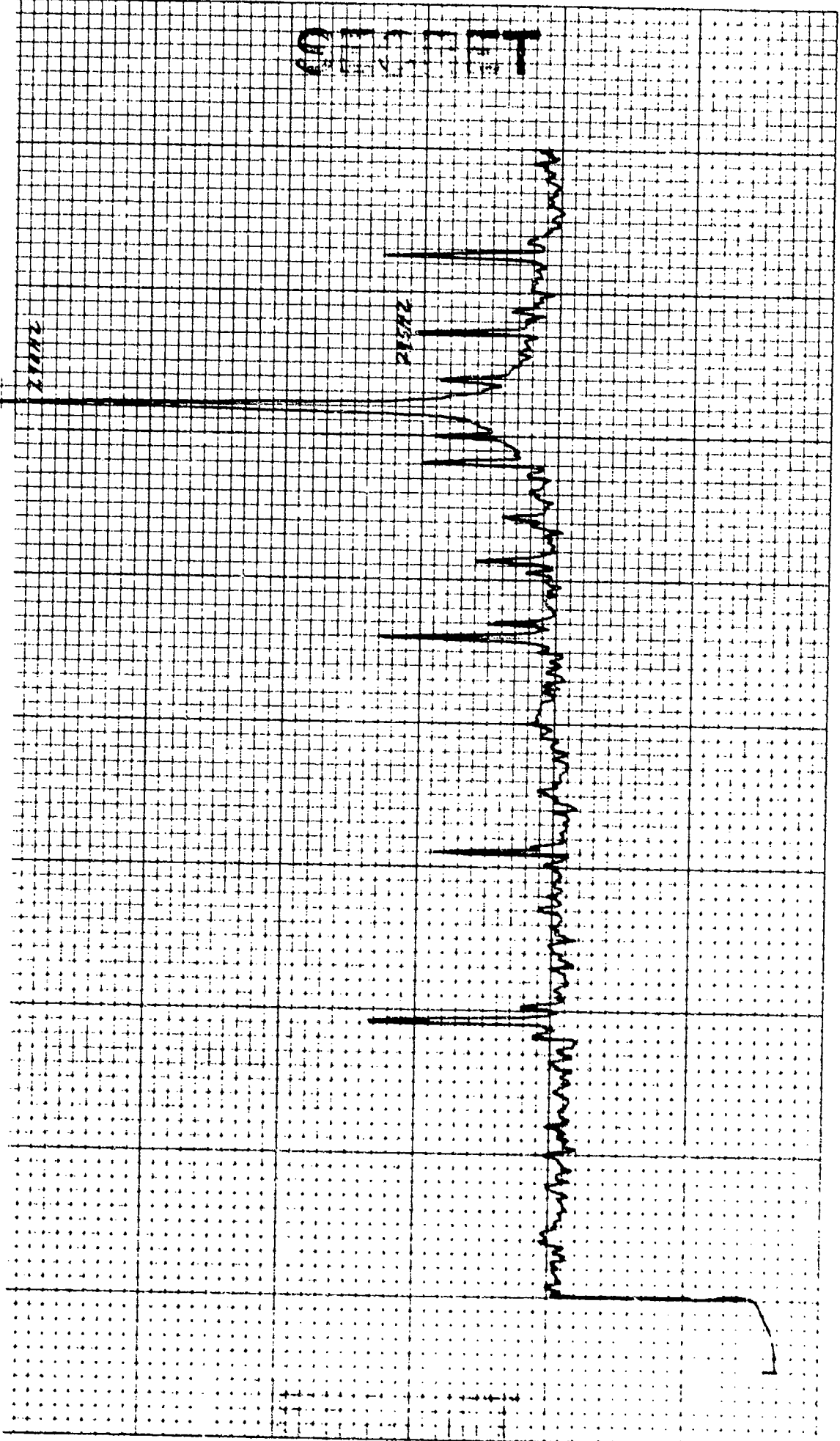
CONTROL: 2131 - 16 (DP9)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16)
DATE/TIME: 3-25-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 50 DEG. AZ STEERING

REEL: A10 INDE XJ620
INTEGRATION TIME 320 SECS ATTEN: 72 DB
FILTER WTC: HANNING



CONTROL: 2131 - 16 (DP9) DATE OF ANALYSIS: 1-16 REEL: 410 INDE XJ620
BEAMFORMED SPECTRUM (ELEMENTS) 1-16
EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 2131Z INTEGRATION TIME 320 SECS ATTEN: -12 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WIG: HANNING
16 ELEMENTS + 50.5 DEG. AZ STEERING

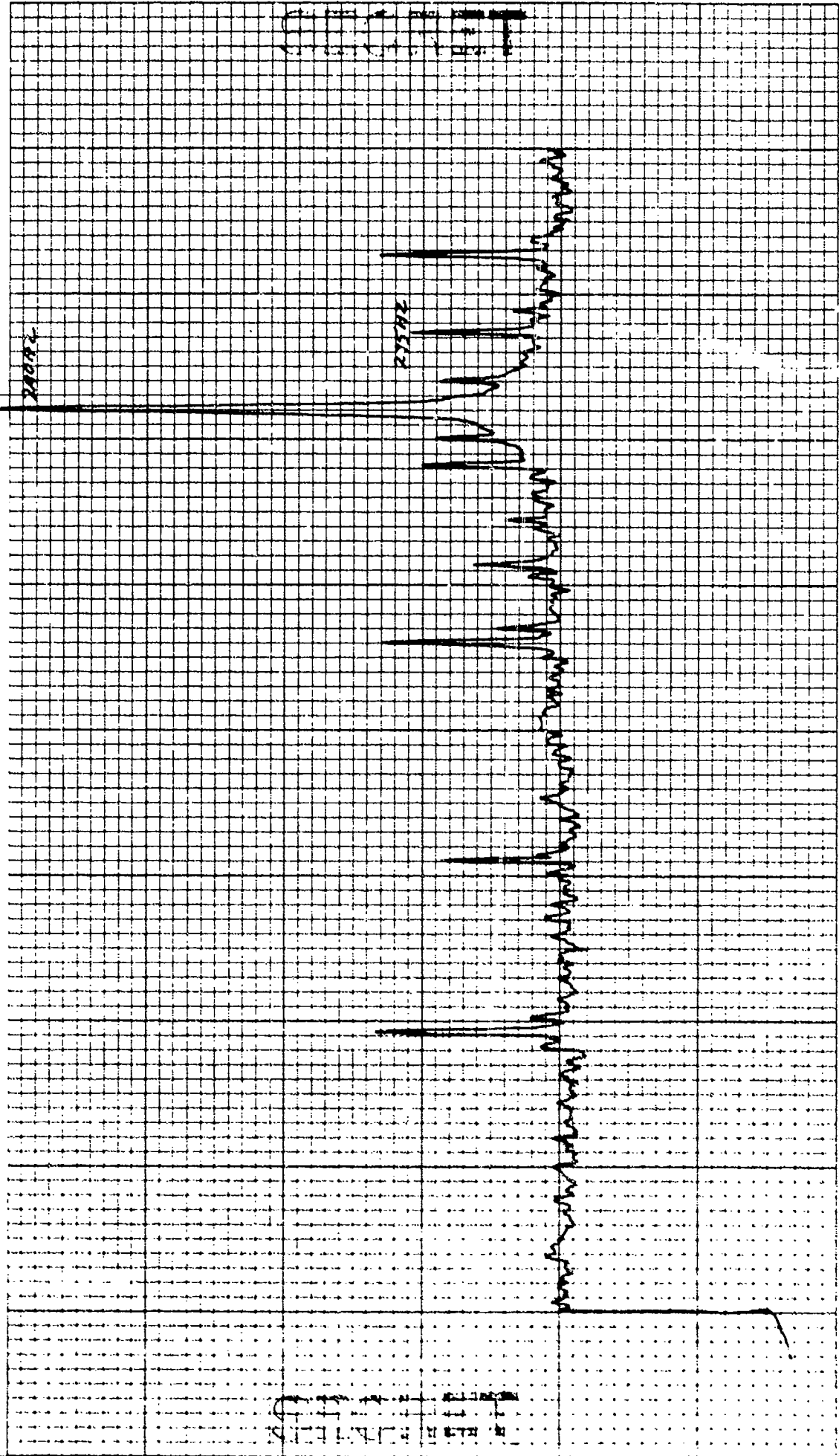


LEADER

KOE 10 X 10 TO THE INCH .7 X .3 INCHES
KEUTTEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2131 - 16 (DP9) DATE OF ANALYSIS: 1-16 REEL: 410 INDE X 3620
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 201 Z INTEGRATION TIME 320 SECS ATTEN: -7.2 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
16 ELEMENTS + 51 DEG. AZ STEERING



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

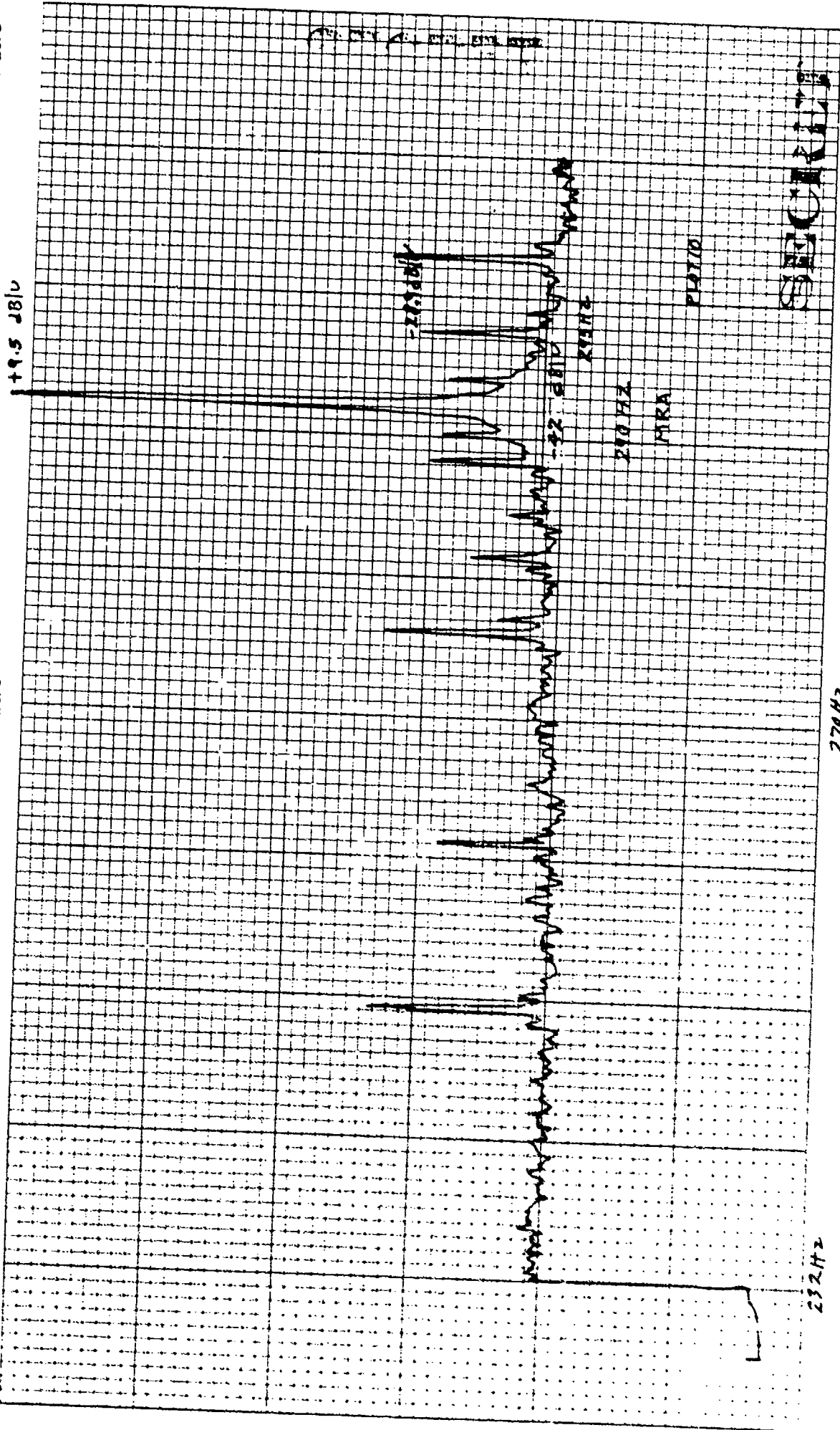
46 0703

SECRET

CONTROL: 2131 - 51 (2131)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS

DATE OF ANALYSIS: _____
/ 10 / 60
DATE/TIME: 3-15-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+51.5 DEG. AZ STEERING

REEL: M10 INDE X3670
INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTC: HANNING

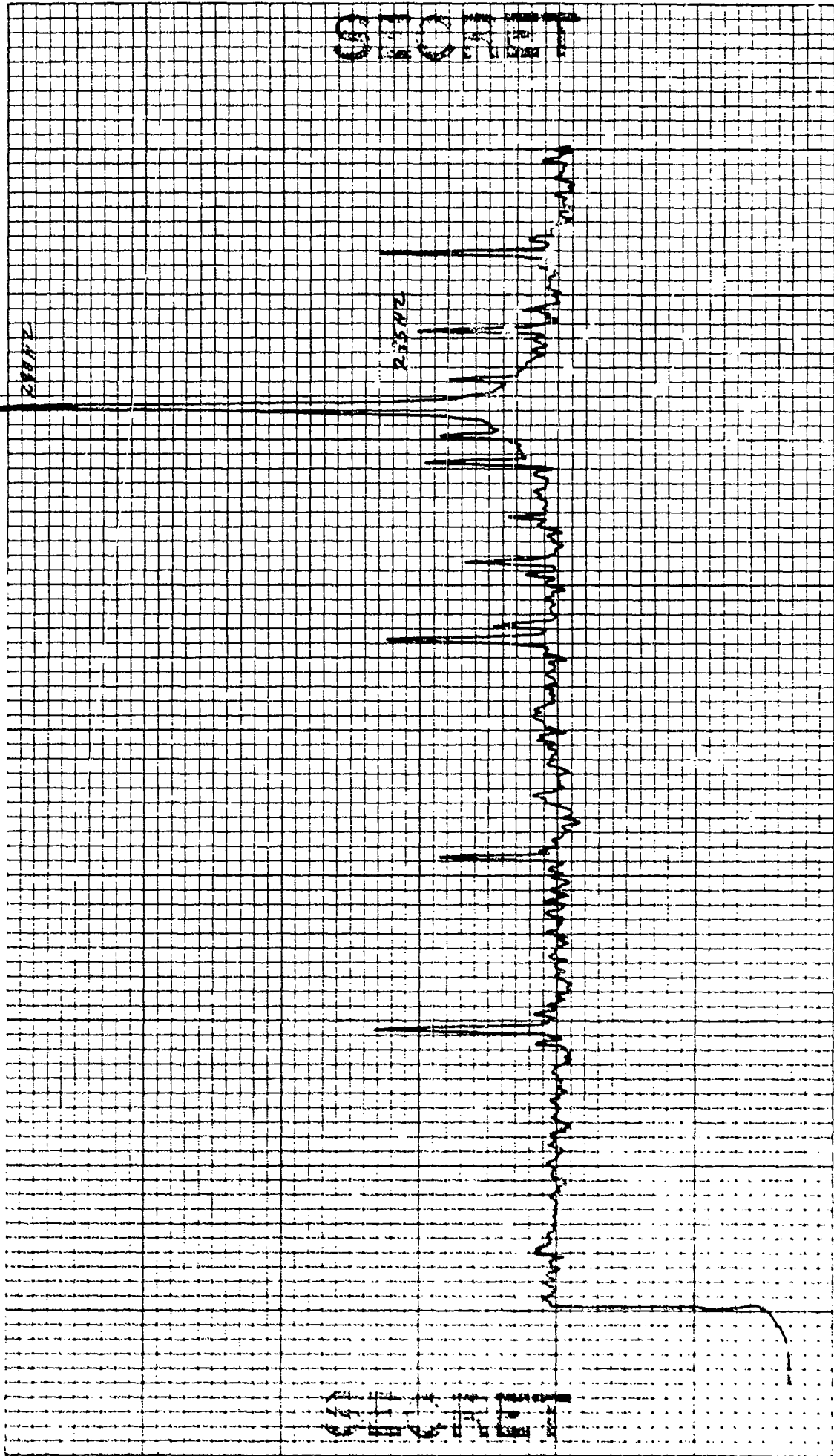


SECRET

JOHN

270 HZ

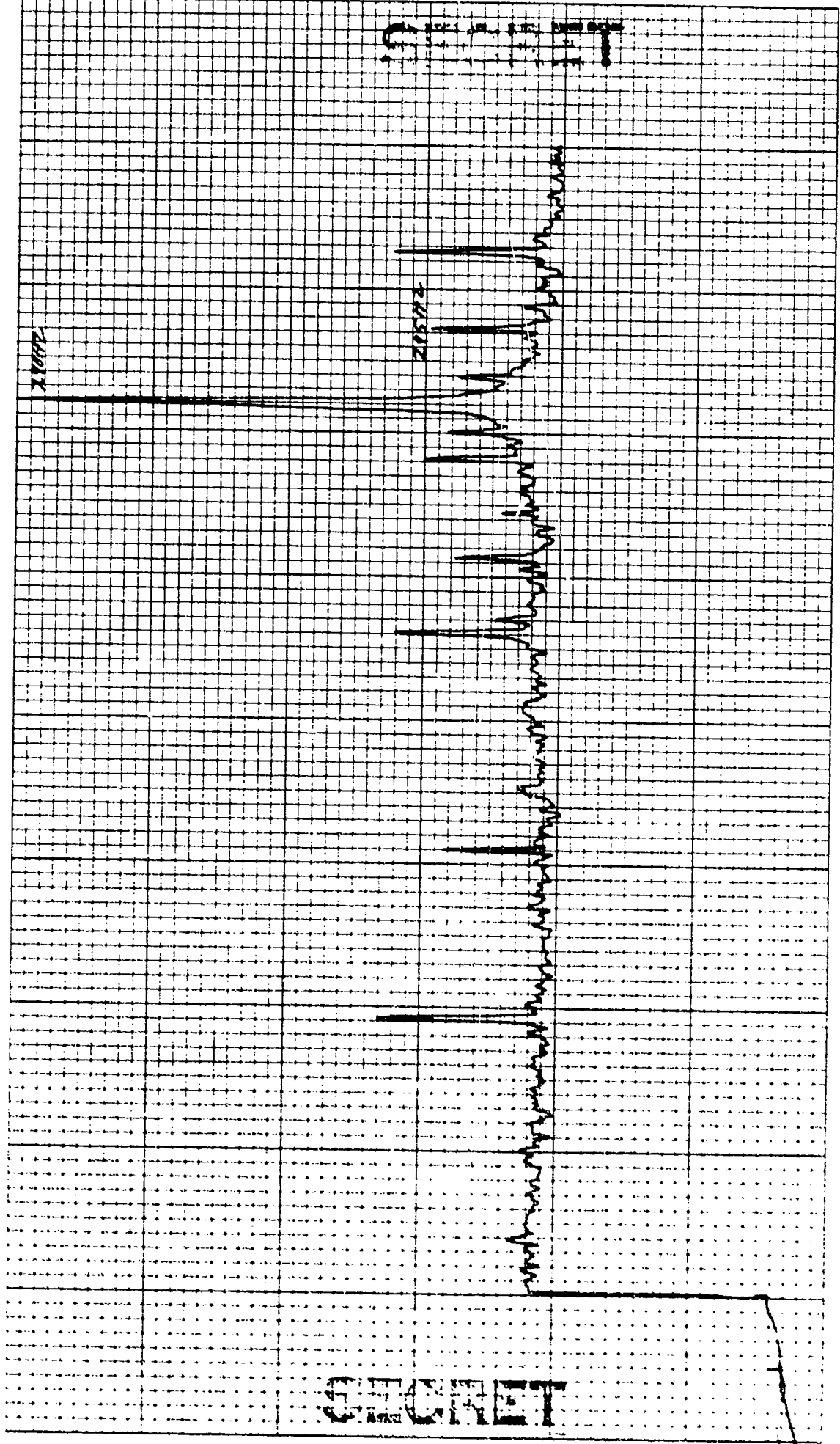
CONTROL: 2131 - 16 (DPI) DATE OF ANALYSIS: 1-16 REEL: A10 INDE X 3620
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 2131 Z INTEGRATION TIME 320 SECS ATTEN: -12 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
16 ELEMENTS +52 DEG. AZ STEERING



CONTROL: 2/31 - 16 (289)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
 16 ELEMENTS

DATE OF ANALYSIS: 1-16)
 DATE/TIME: 345-77 - 2/3/ Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 454 DEG. AZ STEERING

REEL: 110 INDE X 3620
 INTEGRATION TIME 320 SECS ATTN: -12 DB
 FILTER WTG: HANNING



SECRET

SECRET

KOE REPORT TO THE DIRECTOR, 15 JAN 68

46 0703

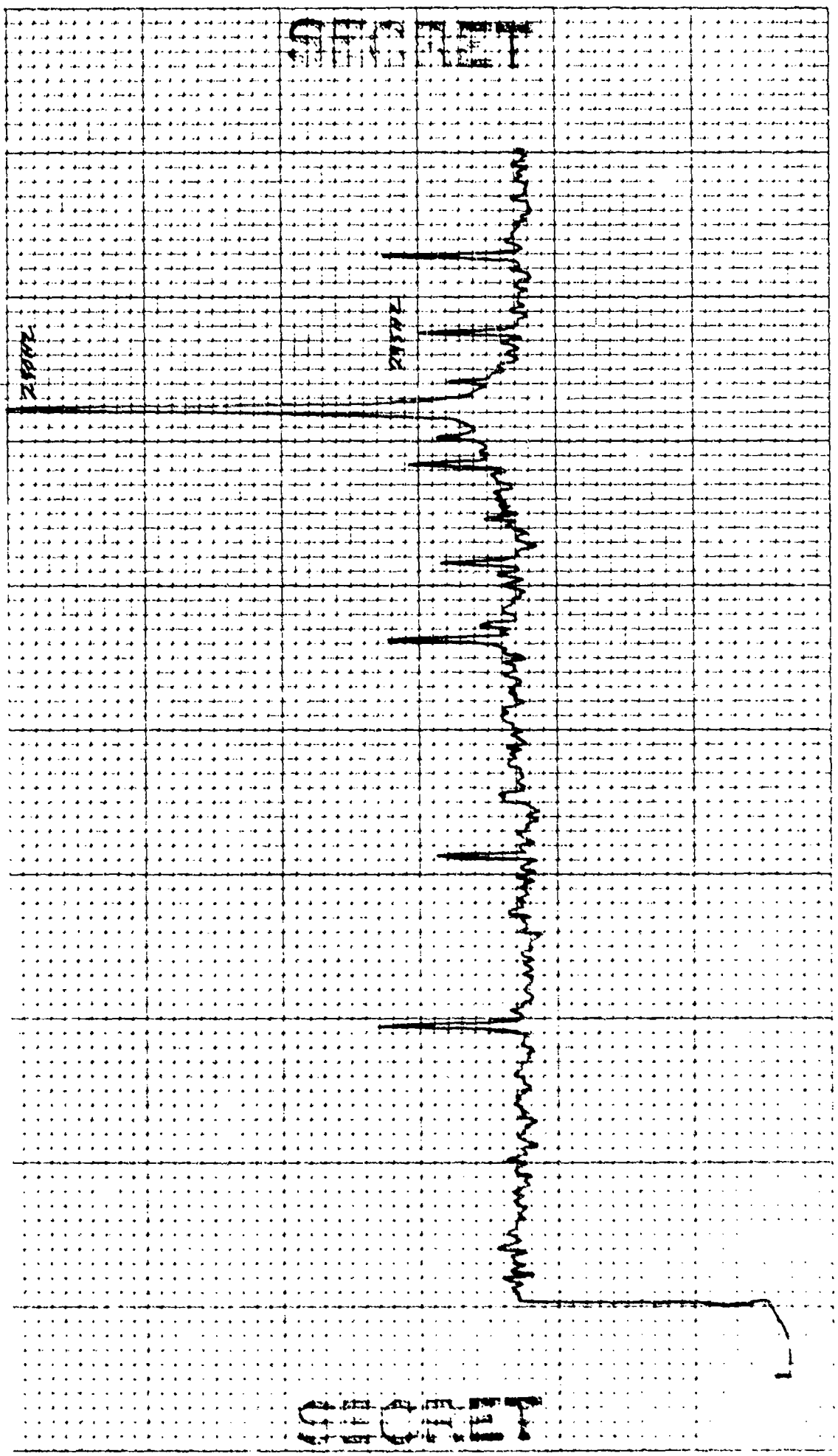
CONTROL: 0131 - 16 (001) DATE OF ANALYSIS: 1-16 REEL: 410 INDE X3620

BEAMFORMED SPECTRUM (ELEMENTS))

EXERCISE: BEARING STAFF DATE/TIME: 346-77-0131Z INTEGRATION TIME 320 SECS ATTEN: -12 DB

CENTER FREQ: 070 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING

16 ELEMENTS +56 DEG. AZ STEERING



KOE 10.2 IS TO THE INCHES 2.5 INCHES
16 APRIL 1964 00 00000000

46 0703

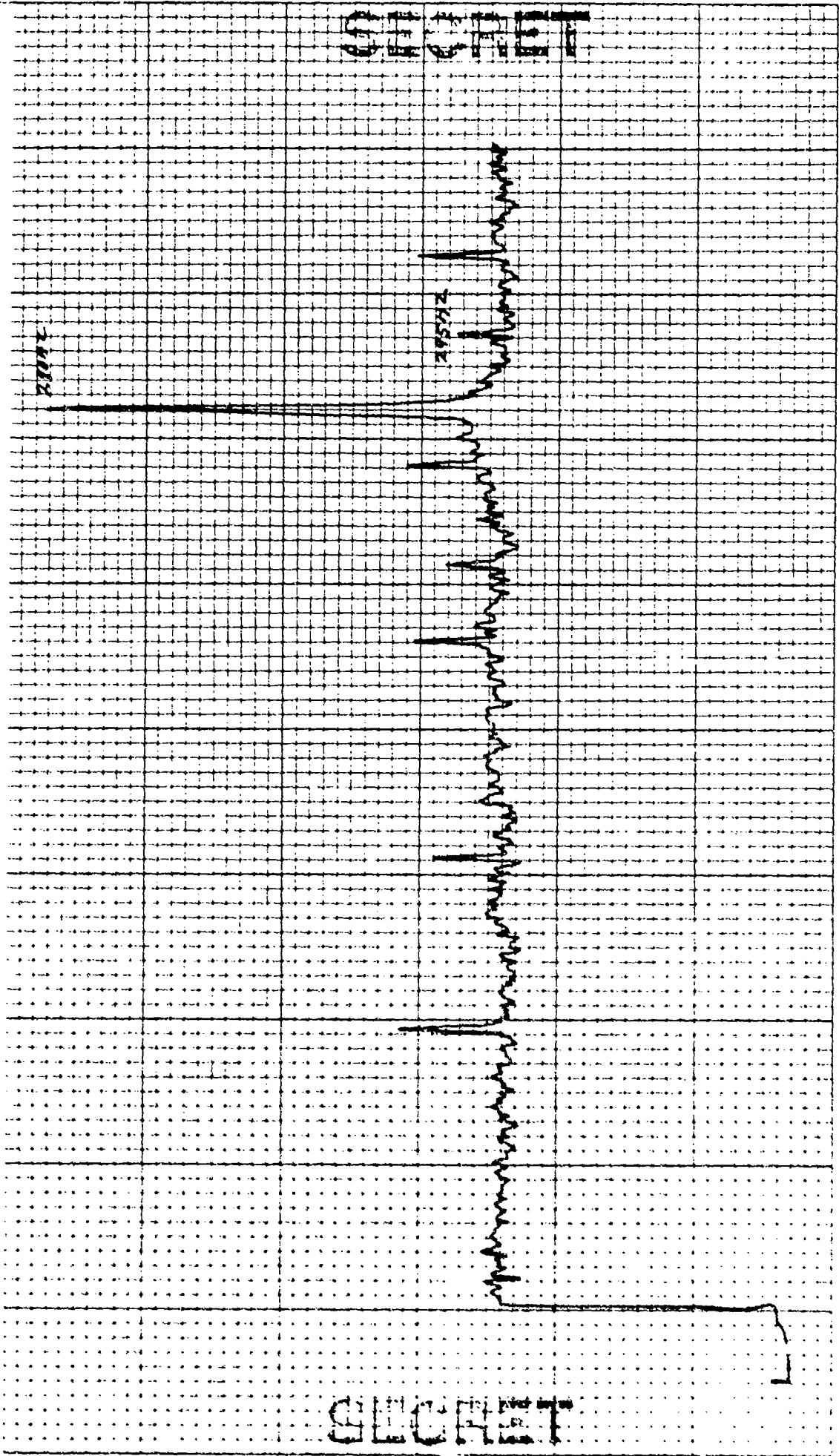
CONTROL: 2031 - 16 (DPF) DATE OF ANALYSIS: 1-16 REEL: M10 INDE X3120

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

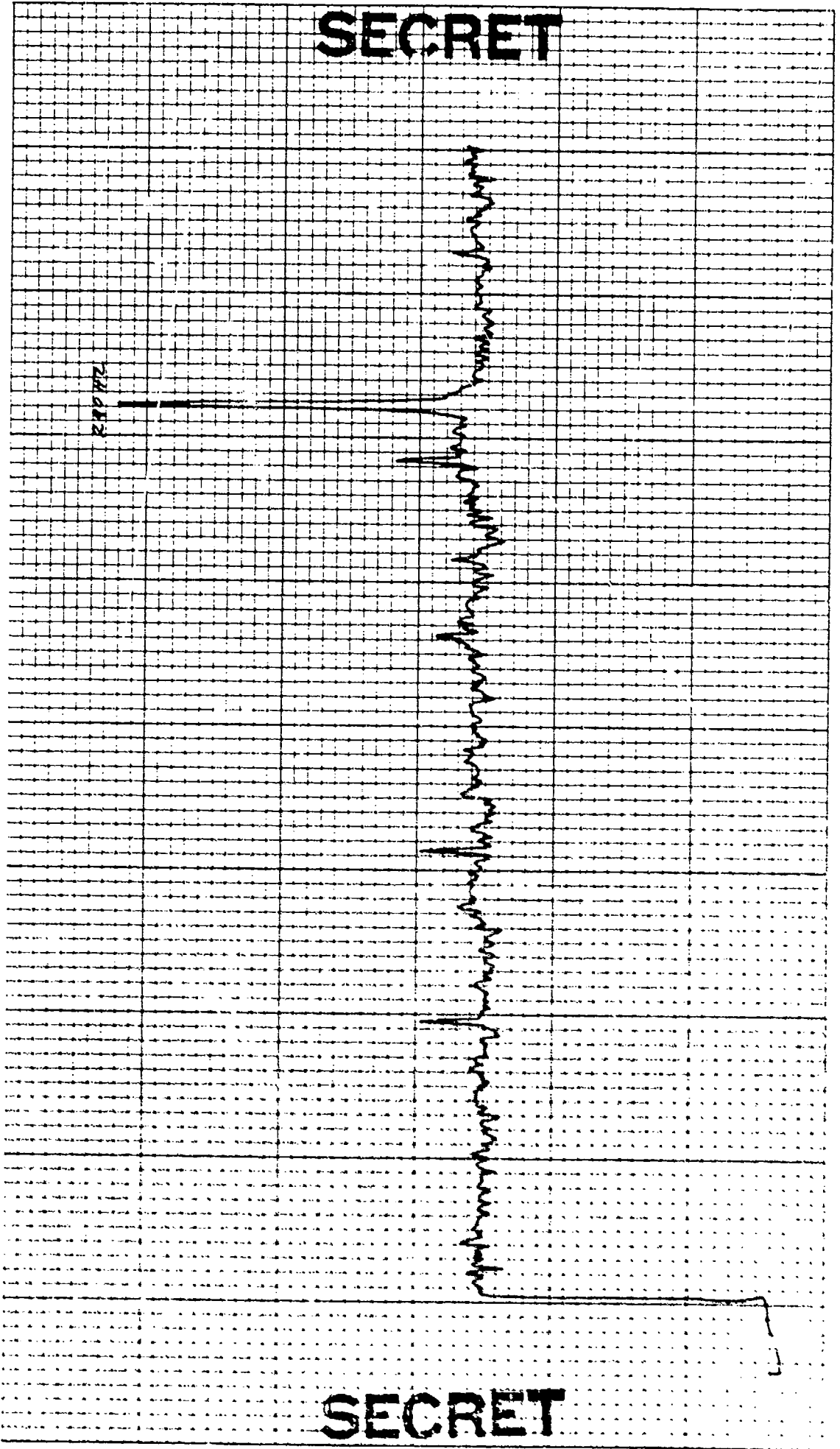
EXERCISE: BEARING STAKE FILTER WTC: HANNING

CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ

16 ELEMENTS +50 DEG. AZ STEERING



CONTROL: 2231 - 16 (DPT) DATE OF ANALYSIS: 1-16 REEL: A10 INDE X3620
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: 72 DB
16 ELEMENTS +62 DEG. AZ STEERING FILTER WTG: HANNING



SECRET

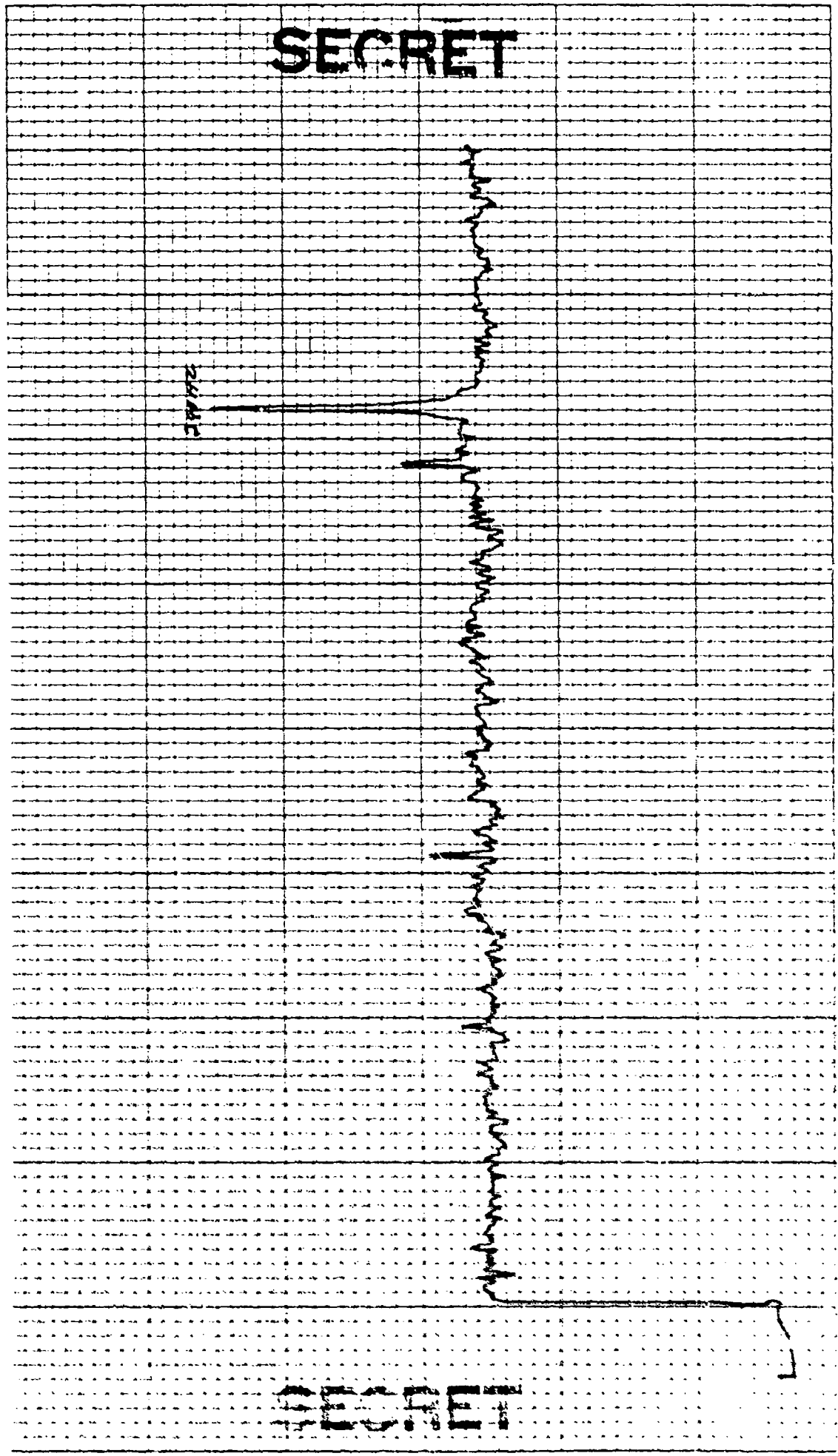
KOE 10.8 IS TO THE INCHES
REEL AT THE CO. MADE IN U.S.A.

46 0703

CONTROL: 2431 - 16 (DP1)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
/6 ELEMENTS

DATE OF ANALYSIS: - - - - -
(-/6)
DATE/TIME: 7-15-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10 HZ
464 DEG. AZ STEERING

REEL: M10 INDE X362c
INTEGRATION TIME 320 SECS
ATTEN: -12 DB
FILTER WTG: HANNING



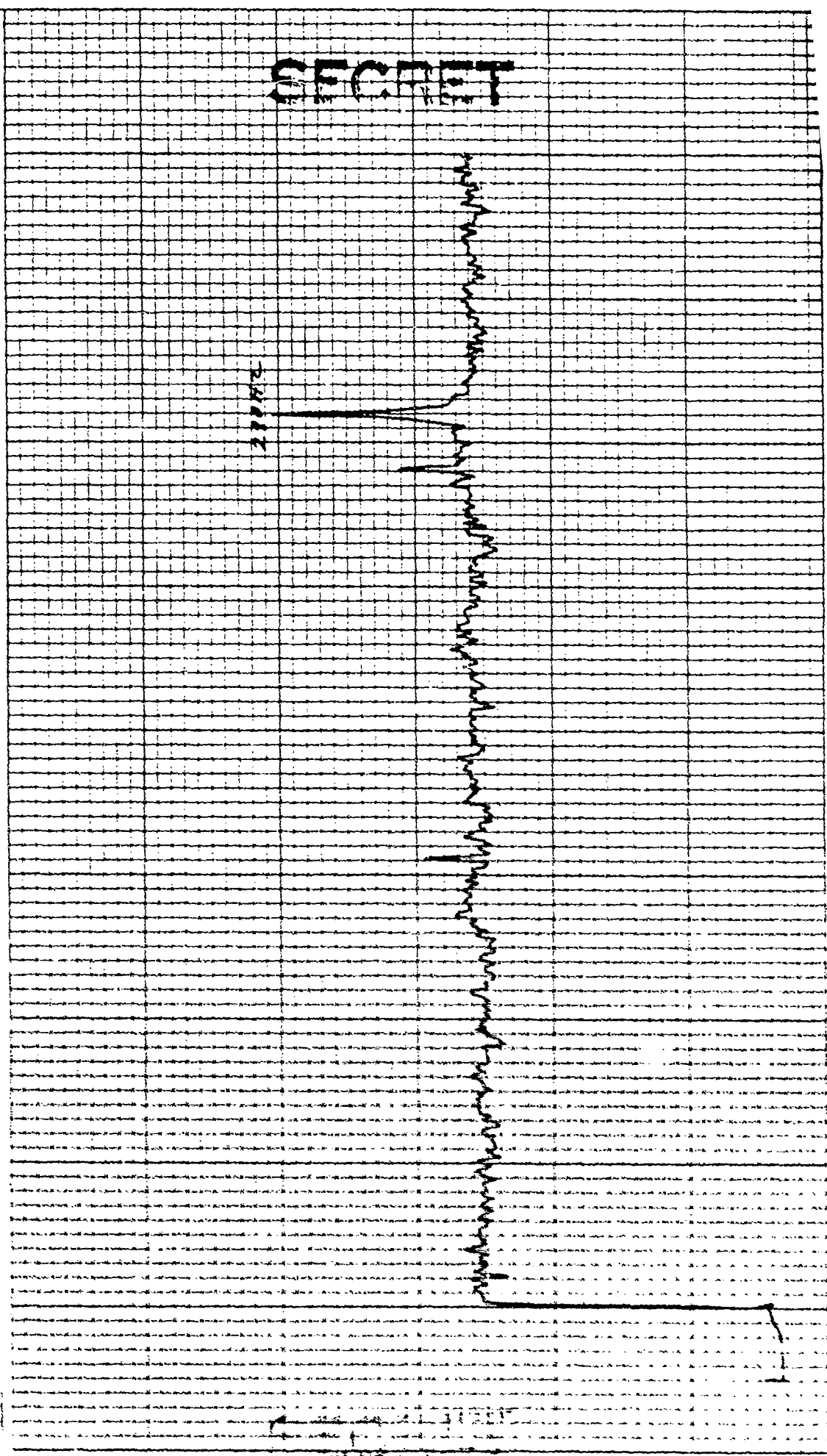
16E 10 X 10 TO 100 INCHES X 10 CMES
MELFORD W. EGAN CO. MADE IN U.S.A.

46 0703

CONTROL: 2031 - 16 (200)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 245-277 - 2031 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+ 22 DEG. AZ STEERING

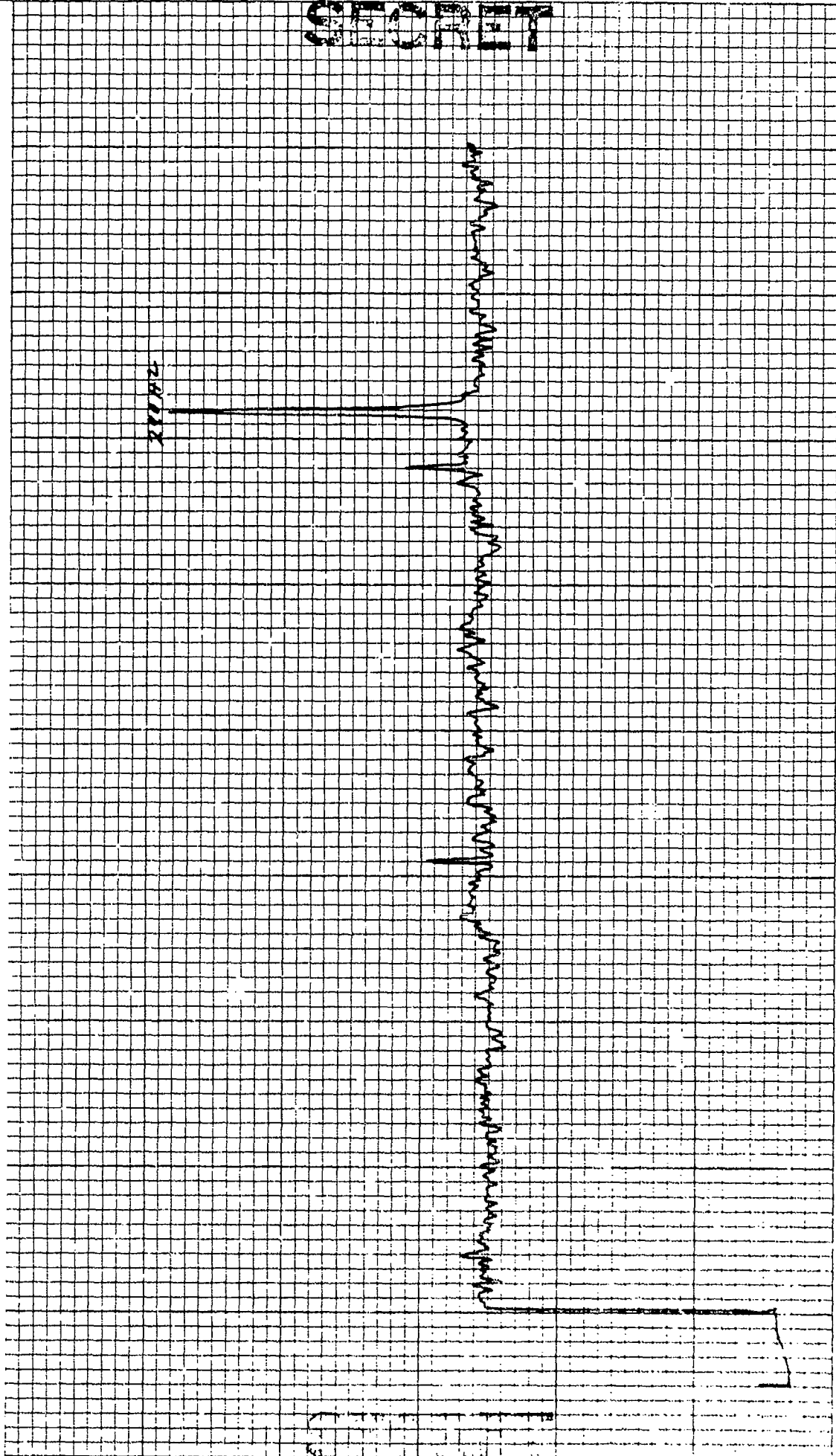
REEL: M10 INDE XJG90
INTEGRATION TIME 320 SECS ATTN: 72 DB
FILTER WTC: HANNING



CONTROL: 2/31-16 (DP9)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 3-15-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+68 DEG. AZ STEERING

REEL: M10 INDE X 3670
INTEGRATION TIME 320 SECS ATTN: -12 DB
FILTER WTG: HANNING



SECRET

CONFIDENTIAL

SIGNAL LEVEL AND SNR CALCULATIONS

DATA POINT 9

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-21.9</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-11.9
BEAMFORMER GAIN	<u>+24</u>	+12.1 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	+12.3 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-64.5</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-54.5
BEAMFORMER GAIN	<u>+24</u>	-30.5 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR	<u>+12.1</u>	
SIGNAL LEVEL FOR SNR	<u>-30.5</u>	+2.6
PROCESSOR CORRECTION	<u>-4.0</u>	38.6
MRA CORRECTION	<u>+ .2</u>	38.8 SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	30.6 SNR 1 HZ BAND

SECTION 12

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 9

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-14.2</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	- 4.2
BEAMFORMER GAIN	<u>+24</u>	+19.9 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .6</u>	+20.5 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-67.1</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-57.1
BEAMFORMER GAIN	<u>+24</u>	-33.1 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR	<u>+19.9</u>	
SIGNAL LEVEL FOR SNR	<u>-33.1</u>	53.0
PROCESSOR CORRECTION	<u>-4.0</u>	+9.0
MRA CORRECTION	<u>+ .6</u>	+9.6 SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	+1.4 SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR CALCULATIONS

DATA POINT 9

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-52.7</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-42.7
BEAMFORMER GAIN	<u>+24</u>	-18.7 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .9</u>	-17.8 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-67.2</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-57.2
BEAMFORMER GAIN	<u>+24</u>	-33.2 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR	<u>-18.7</u>	
SIGNAL LEVEL FOR SNR	<u>-33.2</u>	14.5
PROCESSOR CORRECTION	<u>-4.0</u>	10.5
MRA CORRECTION	<u>+ .9</u>	11.4 SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	3.2 SNR 1 HZ BAND

CONFIDENTIAL

DATA POINT 9

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-19.4</u>	<u>-17.5</u>	<u>N.D.</u>
MRA SIGNAL LEVEL	<u>+12.3</u>	<u>+20.4</u>	<u>-17.8</u>
ARRAY SIGNAL GAIN	<u>31.7</u>	<u>30.9</u>	
20 LOG <u>32</u> # of elements	<u>30.1</u>	<u>30.1</u>	<u>30.1</u>
DIFFERENCE	<u>+1.6</u>	<u>+2.8</u>	

ARRAY GAIN

MRA SNR	<u>38.8</u>	<u>49.6</u>	<u>11.4</u>
MEAN OMNI SNR	<u>28.6</u>	<u>34.5</u>	<u>N.D.</u>
ARRAY GAIN	<u>10.2</u>	<u>15.1</u>	
THEORETICAL BEAMWIDTH GAIN (at MRA)	<u>11.7</u>	<u>14.2</u>	<u>14.0</u>
DIFFERENCE	<u>-1.5</u>	<u>+ .9</u>	

46 0703

REF: 1000 1000 1000 1000

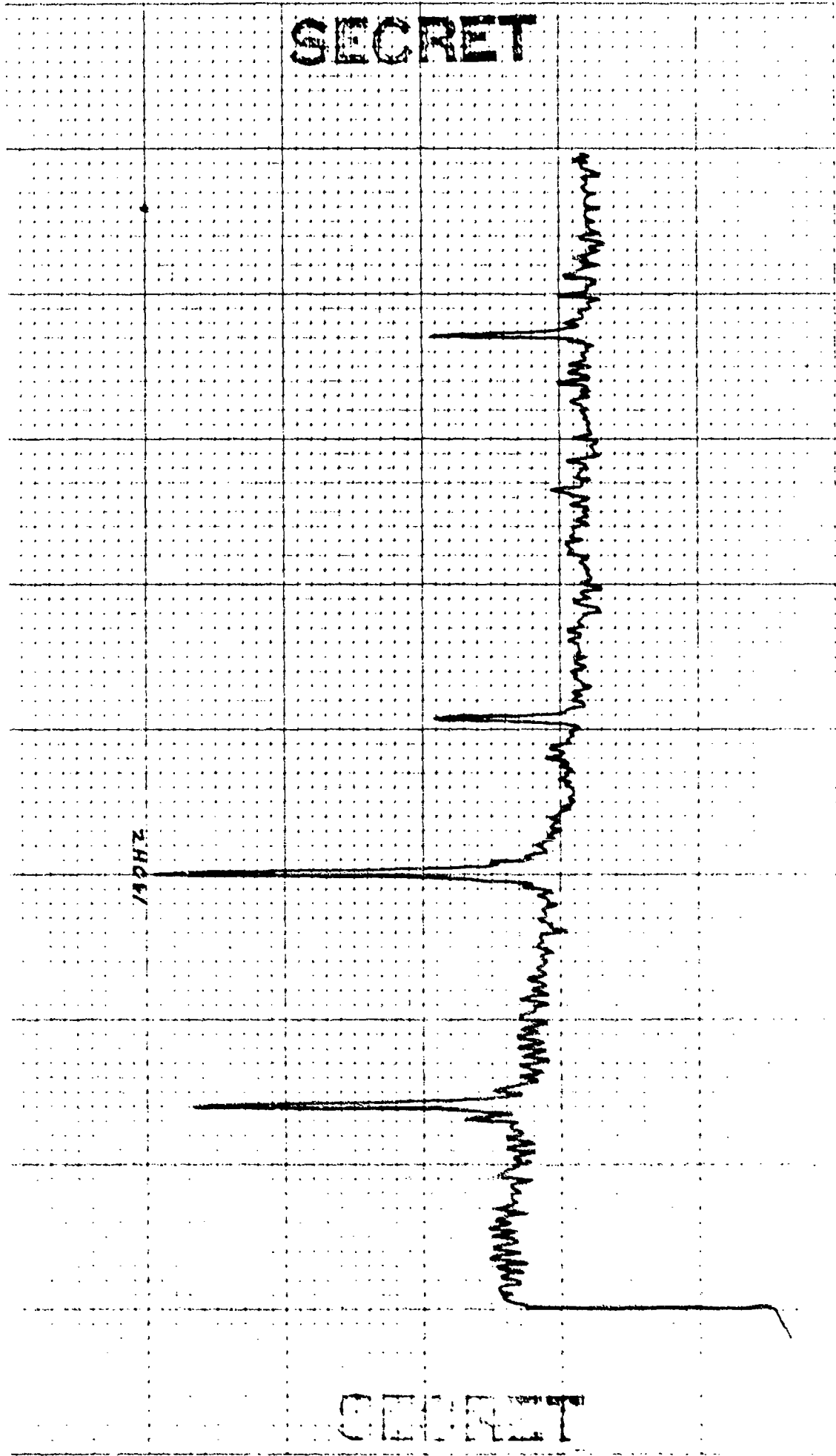
1

CONTROL: 231 - 22 (DP)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 32 ELEMENTS

DATE OF ANALYSIS: - - -
 1-26 29-34
 DATE/TIME: 3-75-77 - 2/31 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 +44 DEG. AZ STEERING

REEL: M10
 INTEGRATION TIME 320 SECS
 FILTER
 ATEN: -24 DB
 WTG: HANNING

INDE X3620



SECRET

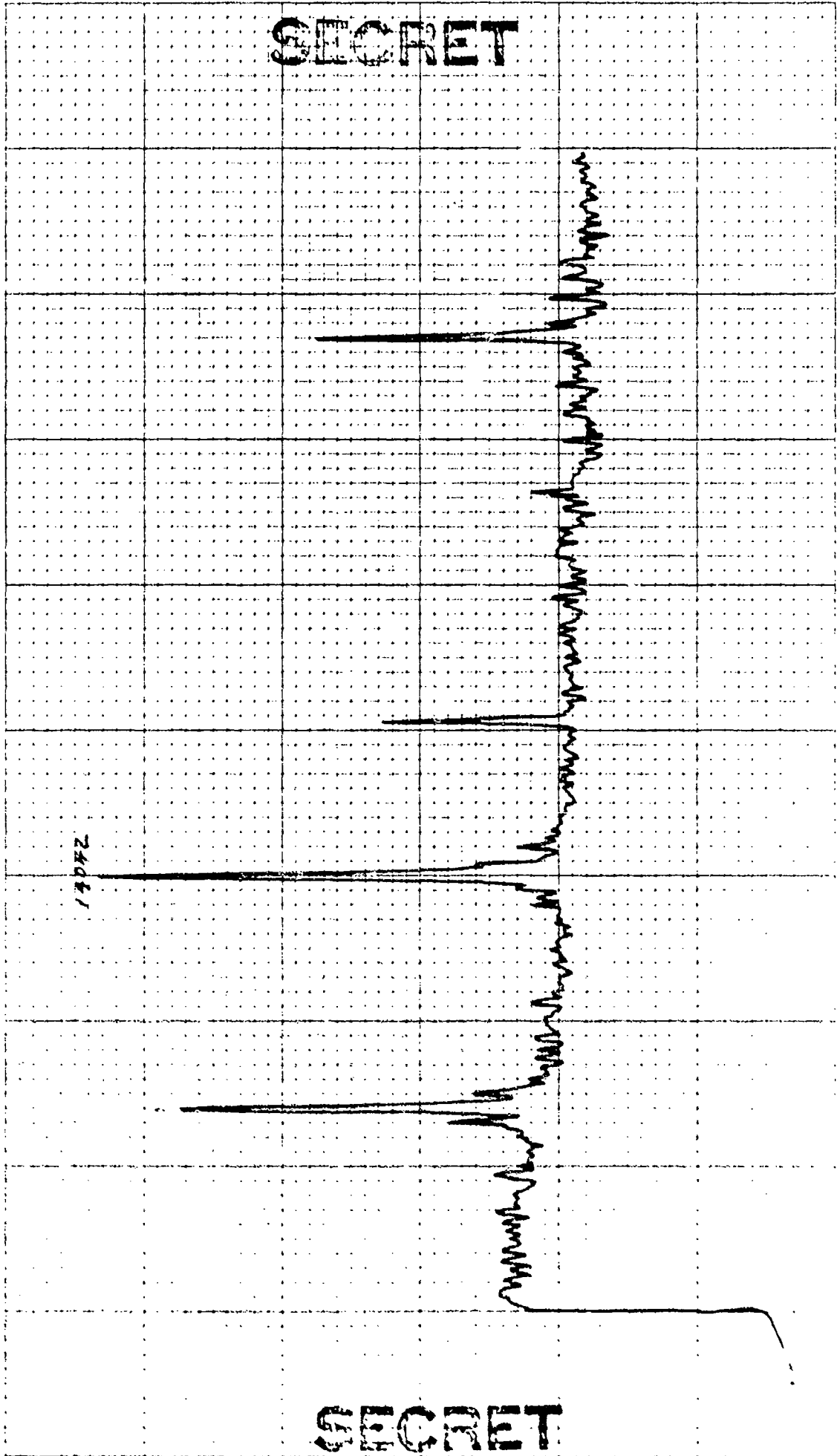
SECRET

46 0703

REF ID: A66000

CONTROL: 2131 - 32 (DP9) DATE OF ANALYSIS: - - - -
 BEAMFORMED SPECTRUM(ELEMENTS) 1-26-8 29-34
 EXERCISE: BEARING STAKE DATE/TIME: 3-5-77-2131Z
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
 32 ELEMENTS + 42 DEG. AZ STEERING

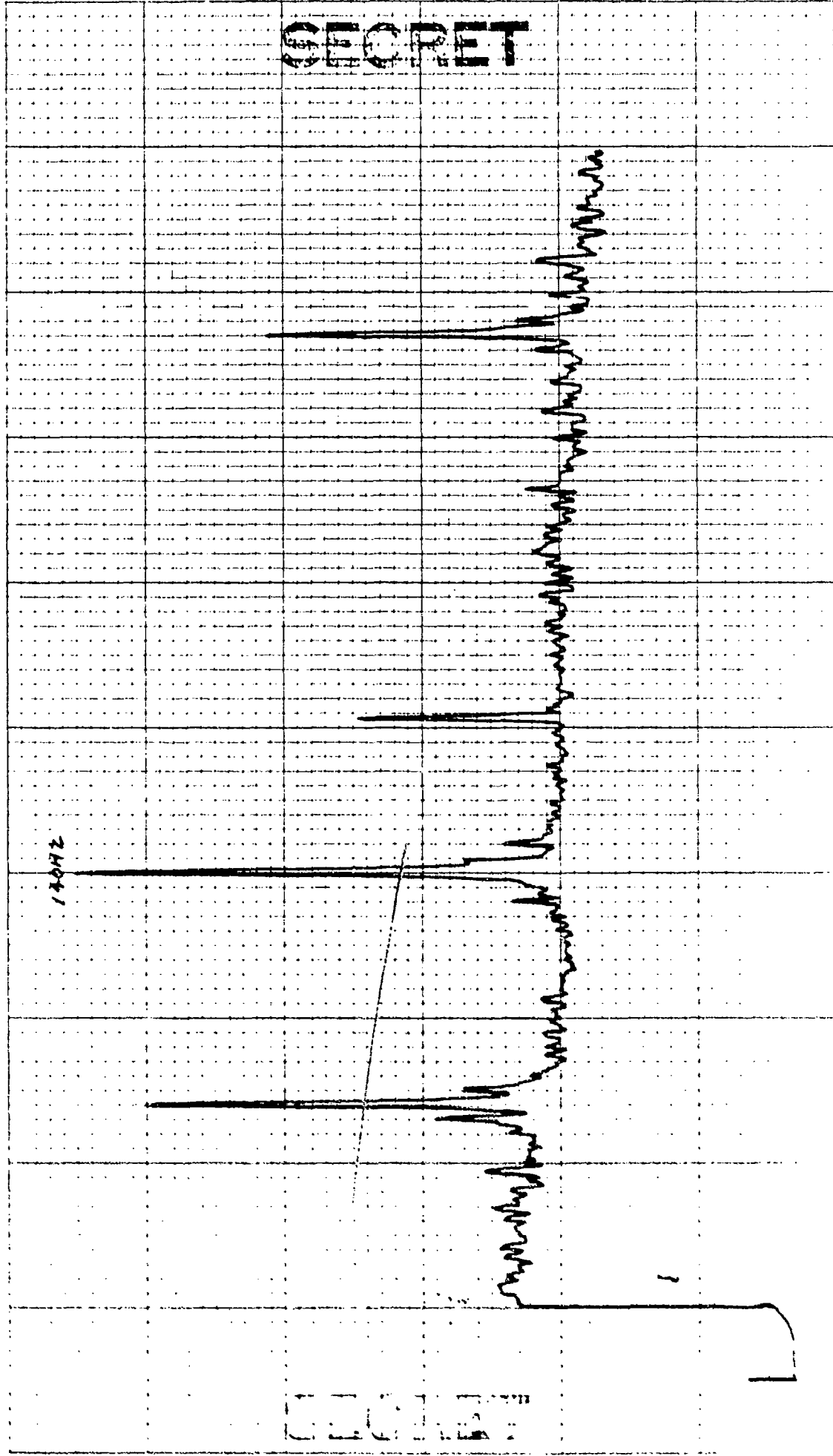
REEL: M10 INDE XJ62c
 INTEGRATION TIME 320 SECS ATTEN: -2YDB
 FILTER WTG: HANNING



46 0703

NOTE: DO NOT TO THE RIGHT OF THE GRAPH

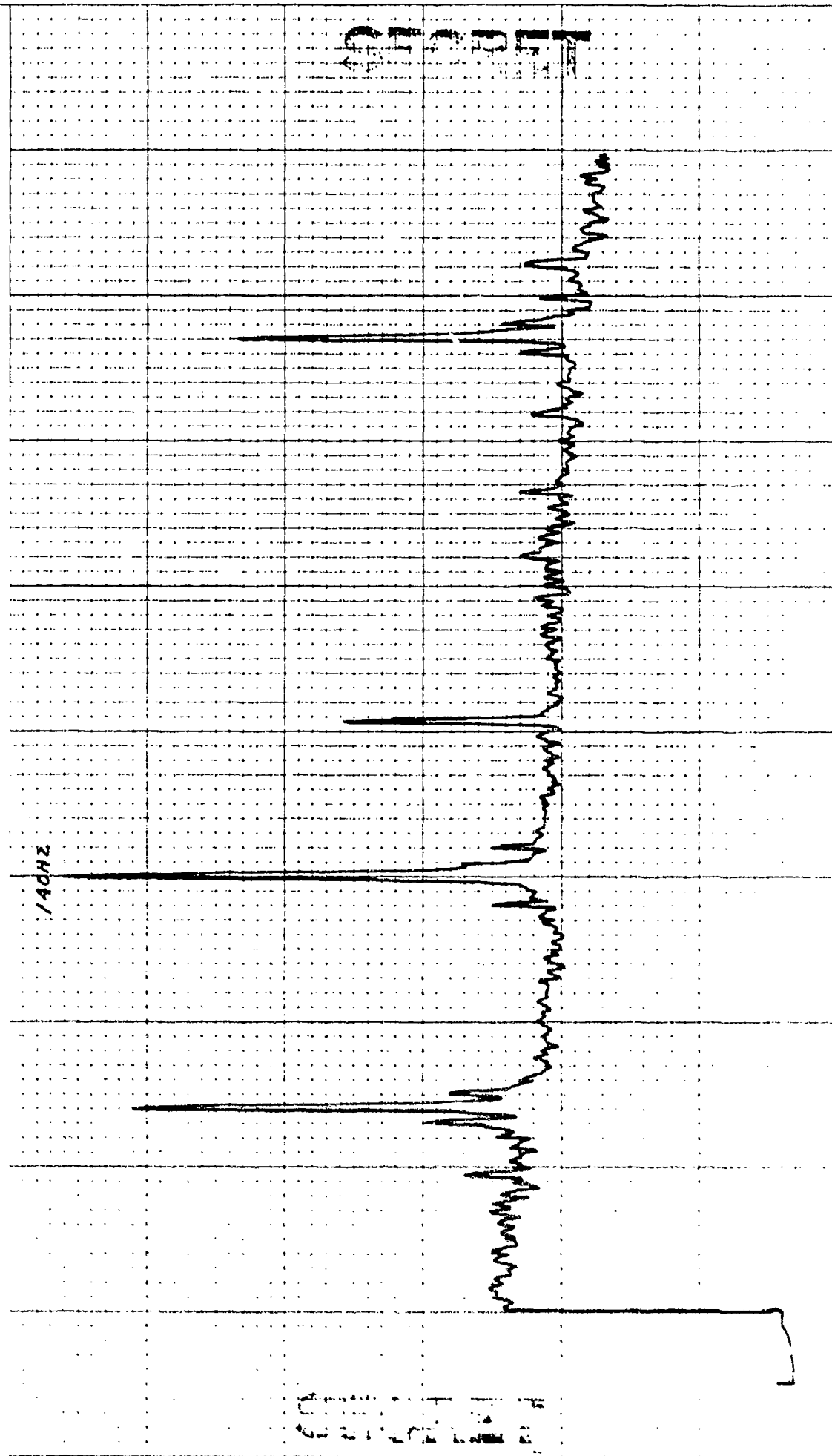
CONTROL: 2131 - 32 (089) DATE OF ANALYSIS: REE.: A10 INDE X2120
 BEAMFORMED SPECTRUM(ELEMENTS) 1-26 08 29-54 INTEGRATION TIME 320 SECS ATTN: -2Y DB
 EXERCISE: BEARING STAKE 2131 Z FILTER WTG: HANNING
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
32 ELEMENTS +48 DEG. AZ STEERING



46 0703

DATE OF ANALYSIS: 1-26-77

CONTROL: 2/31 - 32 (DPF) DATE OF ANALYSIS: 1-26-77
 BEAMFORMED SPECTRUM (ELEMENTS) REEL: 410 INDE X3620
 EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: -2Y DB
 CENTER FREQ: 150 HZ FILTER WTG: HANNING
 32 ELEMENTS +50 DEG. AZ STEERING ANALYSIS BANDWIDTH: 1/10HZ
 DATE/TIME: 2-15-77 - 2/13/78



46 0703

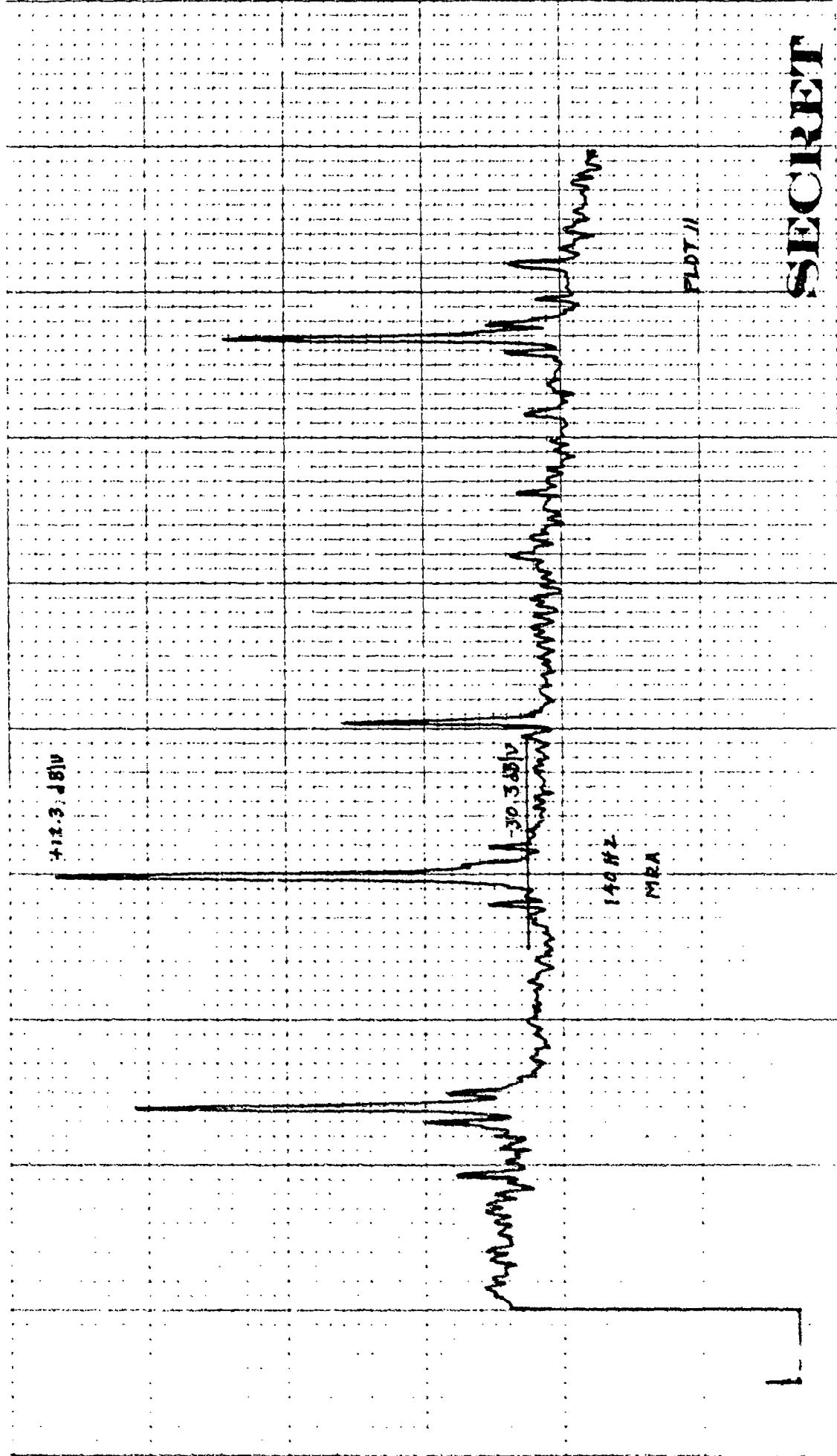
1/22 14 508 24 100 00 00 00 00 00 00

SECRET

CONTROL: 2/31 - 5/ (009) DATE OF ANALYSIS: _____
 BEAMFORMED SPECTRUM (ELEMENTS) 17.26 2970 34)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
32 ELEMENTS

REEL: 710 INDE XJ620
 INTEGRATION TIME 320 SECS ATTN: - DB
 FILTER WIC: HANNING

DATE/TIME: 3-15-77 - 2131 Z
 ANALYSIS BANDWIDTH: 1/10HZ
+51.6 DEG. AZ STEERING



SECRET

150HZ

100HZ

2/11

45 0703

INDE X3626

REEL: 210

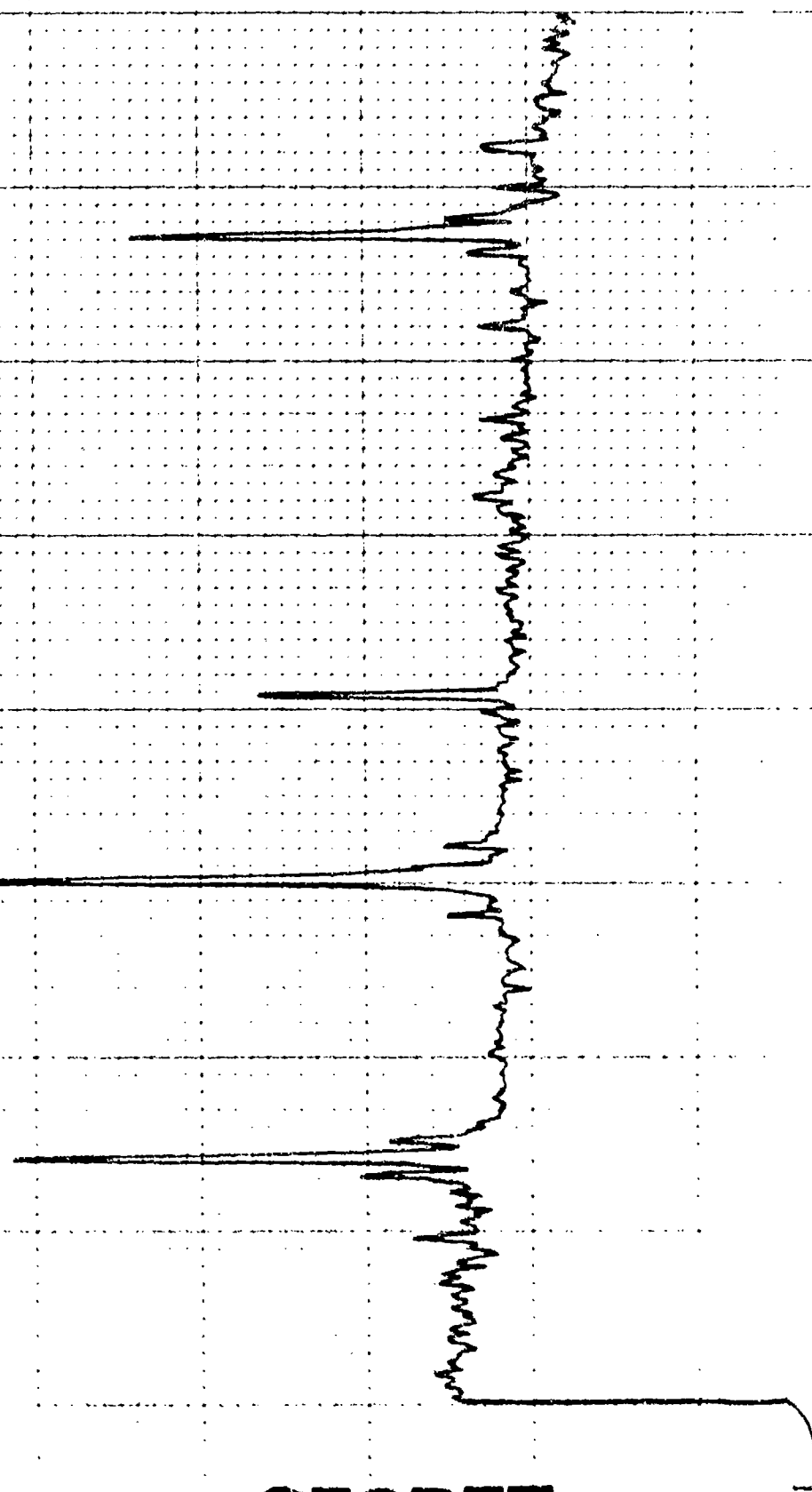
DATE OF ANALYSIS: - - - -

CONTROL: 2131 -32 (DP9)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS

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

1-26 8 08 34
DATE/TIME: 3-15-77 - 013/Z
ANALYSIS BANDWIDTH: 1/10HZ
+57 DEG. AZ STEERING

140 Hz



SECRET

SECRET

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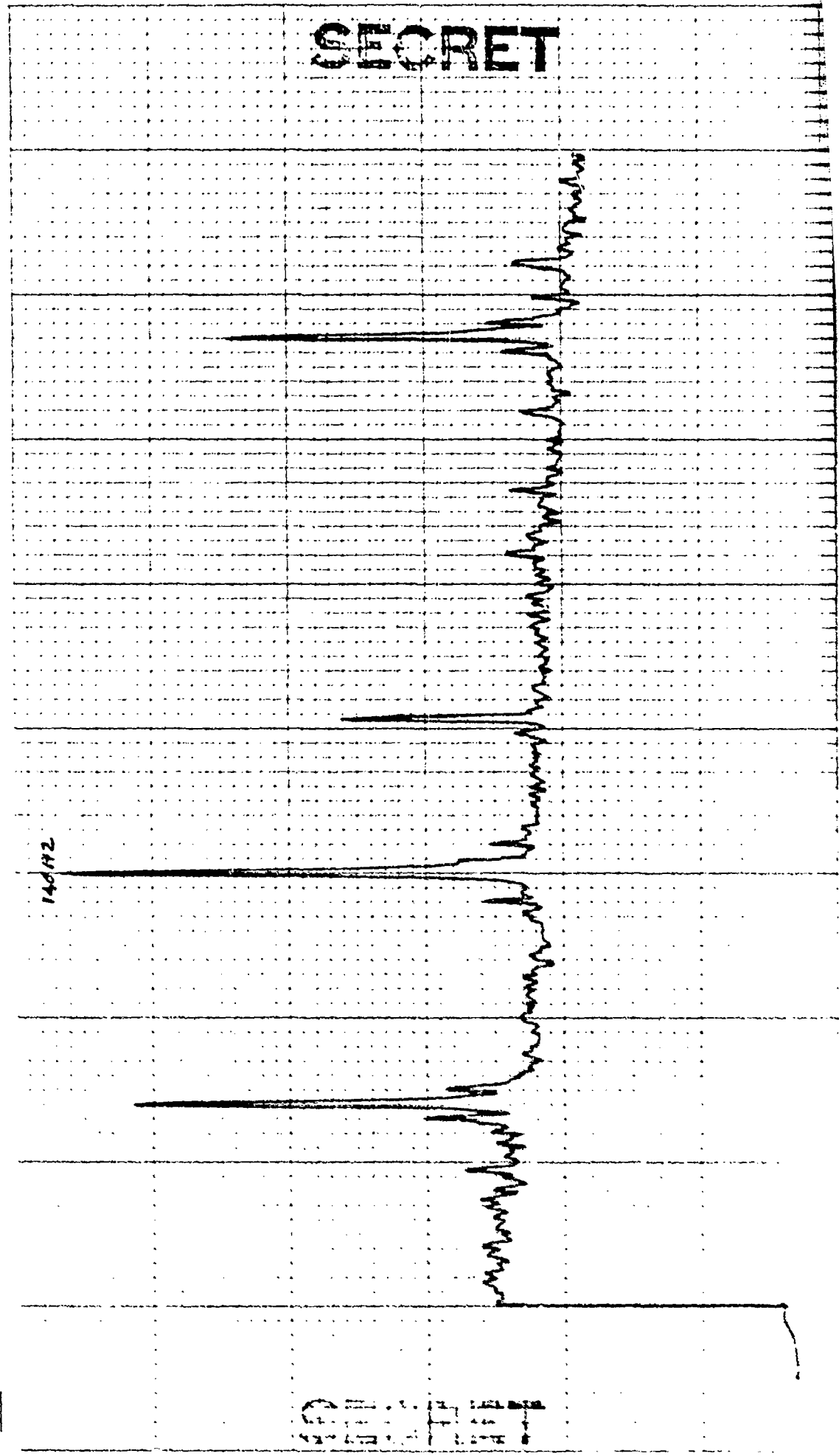
1603 240000 240000 240000 240000

11

CONTROL: 2131 - 72 (209)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
72 ELEMENTS

DATE OF ANALYSIS: - - - -
/ - 26 08 74)
DATE/TIME: 7-5-77 - 217 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+ 52 DEG. AZ STEERING

REEL: 410 INDE XJ620
INTEGRATION TIME 320 SECS ATTEN: -2V DB
FILTER WTG: HANNING



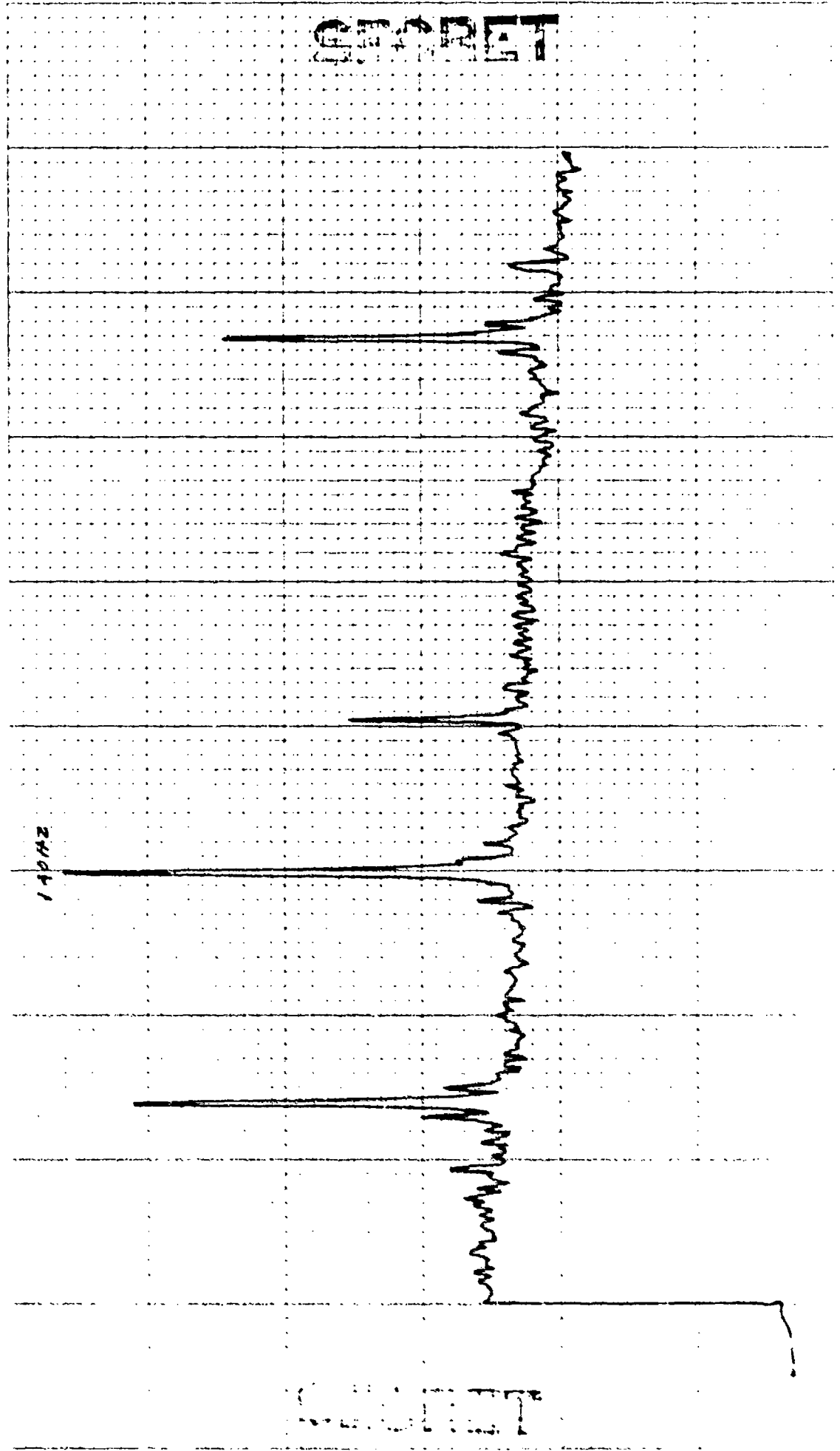
46 0703

CONTROL: 213/ - 72 (DP9)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 32 ELEMENTS

DATE OF ANALYSIS: 1-26 1989
 DATE/TIME: 3-5-77 - 213/ Z
 ANALYSIS BANDWIDTH: 1710HZ
 754 DEG. AZ STEERING

REEL: M10
 INTEGRATION TIME 320 SECS
 FILTER WTC: HANNING

INDE X3624



150 HZ

160 HZ

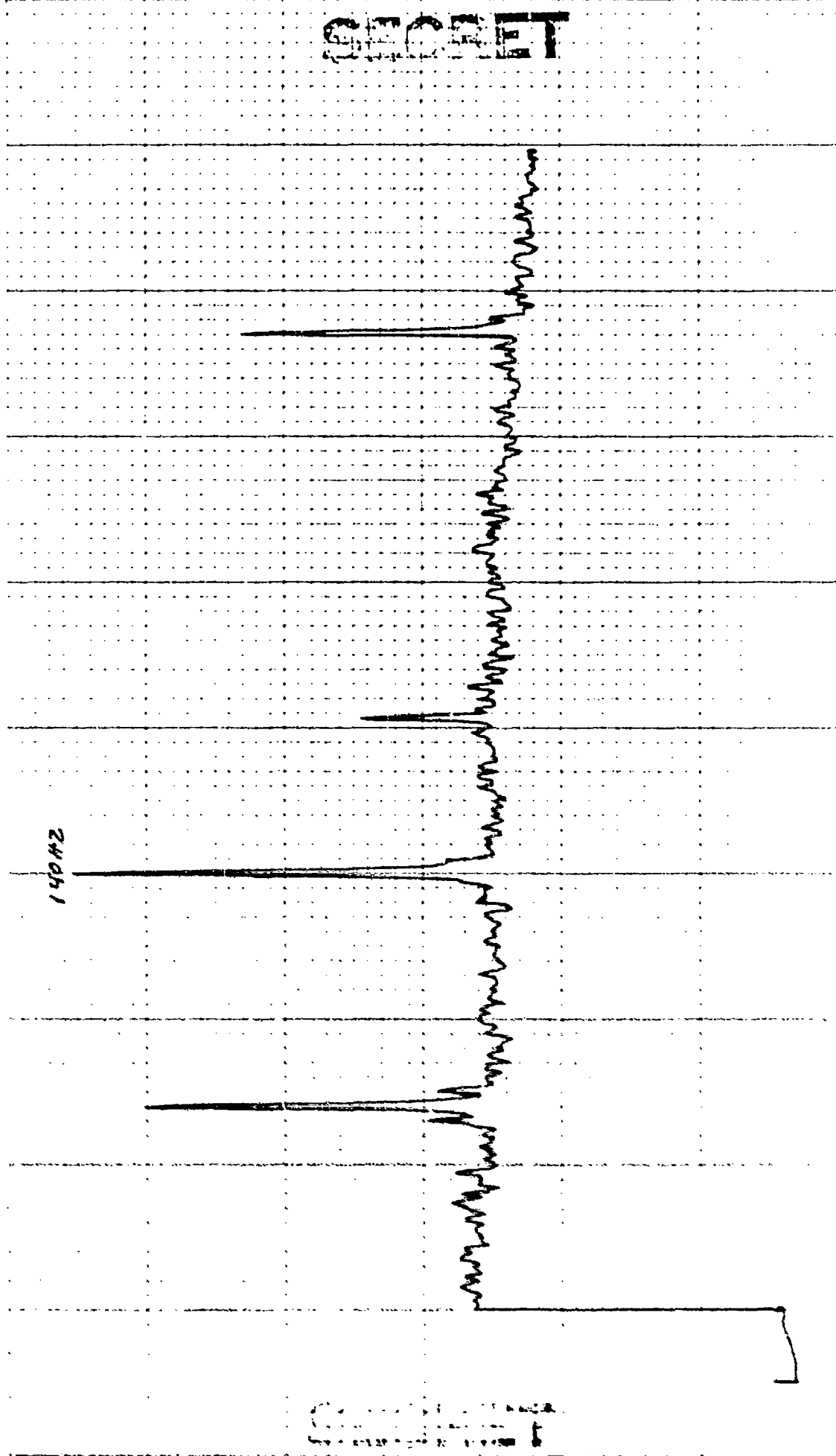
46 0703

REEL: A10 INDE X 3020

INTEGRATION TIME 320 SECS ATTEN: -2Y DB
FILTER WTG: HANNING

DATE OF ANALYSIS: 1-26-77
ANALYSIS BANDWIDTH: 1710HZ
+ 56 DEG. AZ STEERING

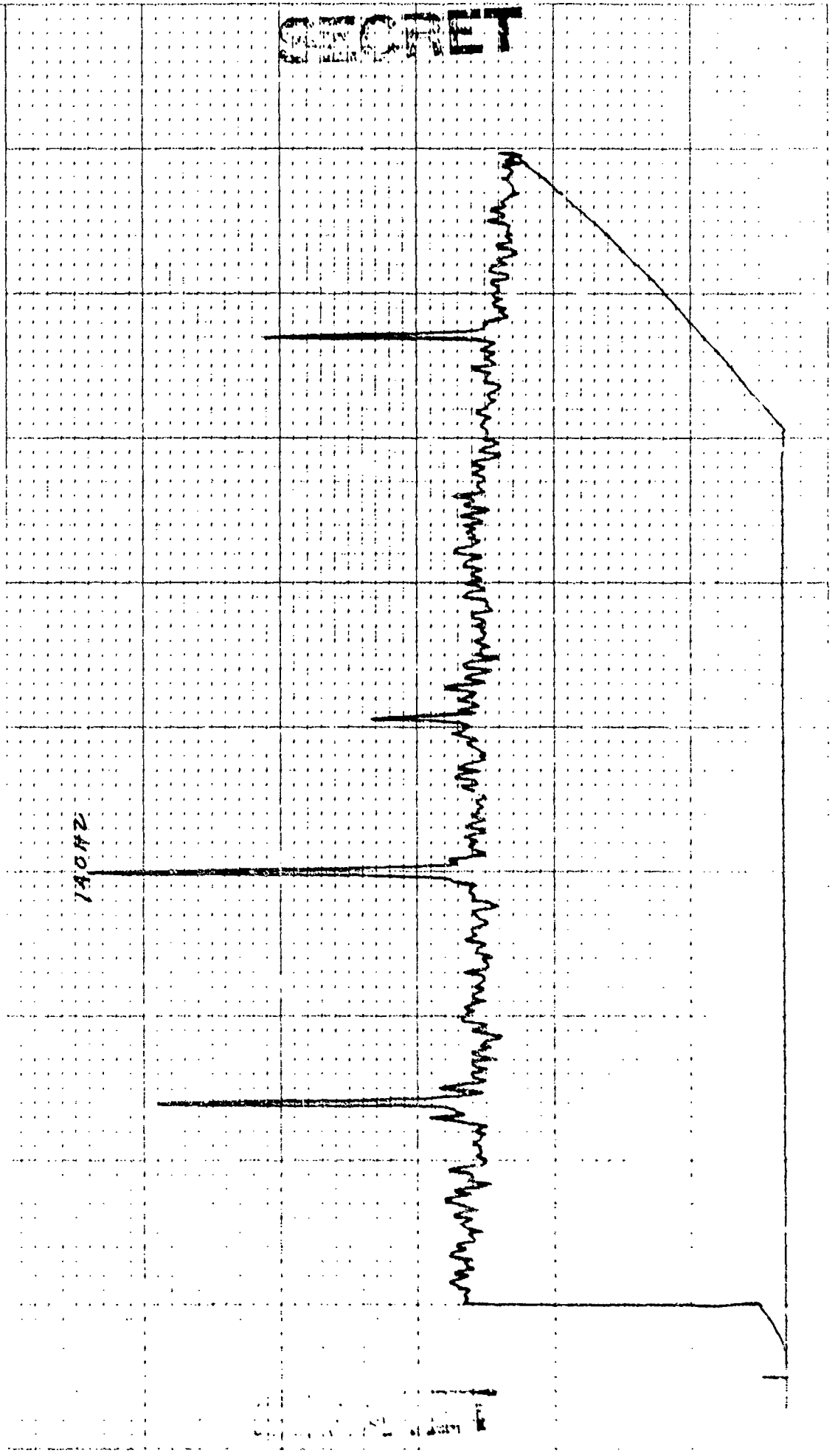
CONTROL: 2131-32 (DPY)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTF FREQ: 150 HZ
ELEMENTS 32



SECRET

SECRET

CONTROL: 2131 - 32 (349)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING TAKE
 CENTER FREQ: 250 HZ
 32 ELEMENTS
 DATE OF ANALYSIS: 1-26-89 (29-34)
 ANALYSIS BANDWIDTH: 1/10 HZ
 +50 DEG. AZ STEERING
 REEL: A10
 INDE XJ620
 ATTEN: -24 DB
 FILTER WIG: HANNING

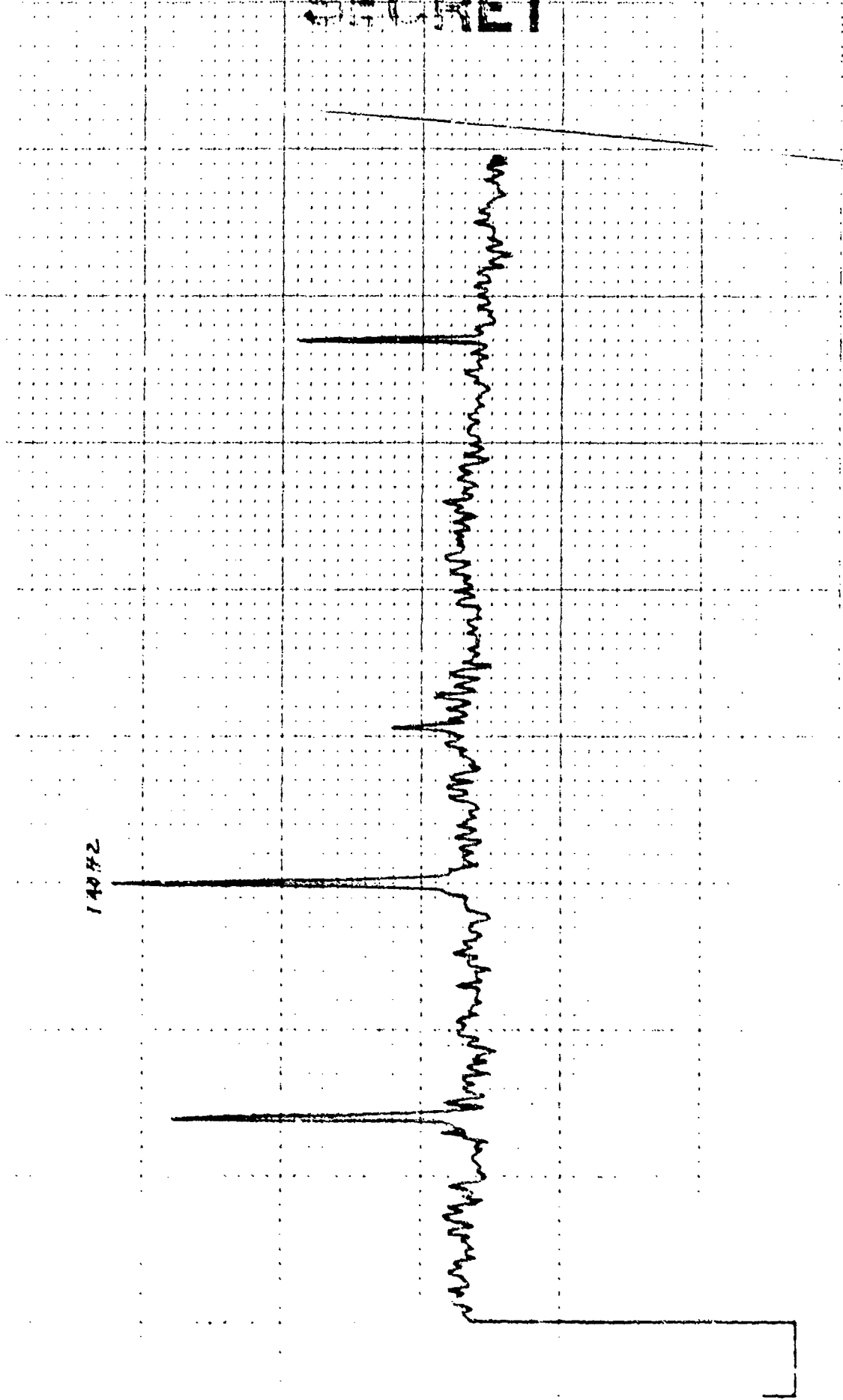


46 0703

CONTROL: 2131 - 72 (209)
BEAMFORMED SPECTRUM ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 150 KHZ
72 ELEMENTS

DATE OF ANALYSIS: 1-26-89-34
ANALYSIS BANDWIDTH: 1710HZ
+60 DEG. AZ STEERING

REEL: M10 INDE X3600
INTEGRATION TIME 320 SECS
ATTEN: -24DB
FILTER WIG: HANNING



SECRET

SECRET

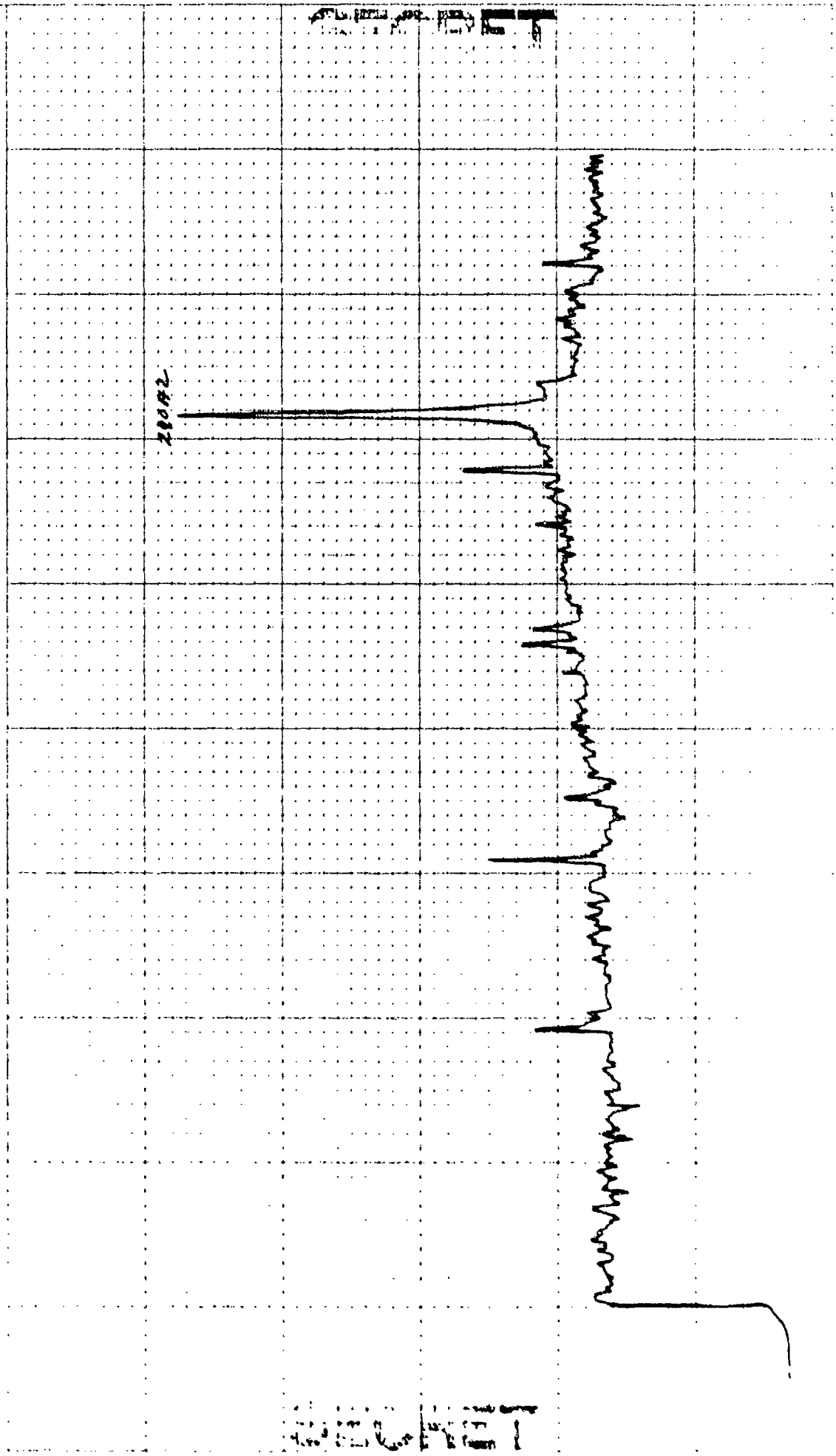
45 0703

CONTROL: 2131 - 22 (DPP) DATE OF ANALYSIS: 1-26-77
 REFORMED SPECTRUM(ELEMENTS) 1-26-77-34
 EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 2131Z
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ
 32 ELEMENTS + 44 DEG. AZ STEERING

REEL: H10

INDE X3626

INTEGRATION TIME 320 SECS ATEN: -24DB
 FILTER WIG: HANNING

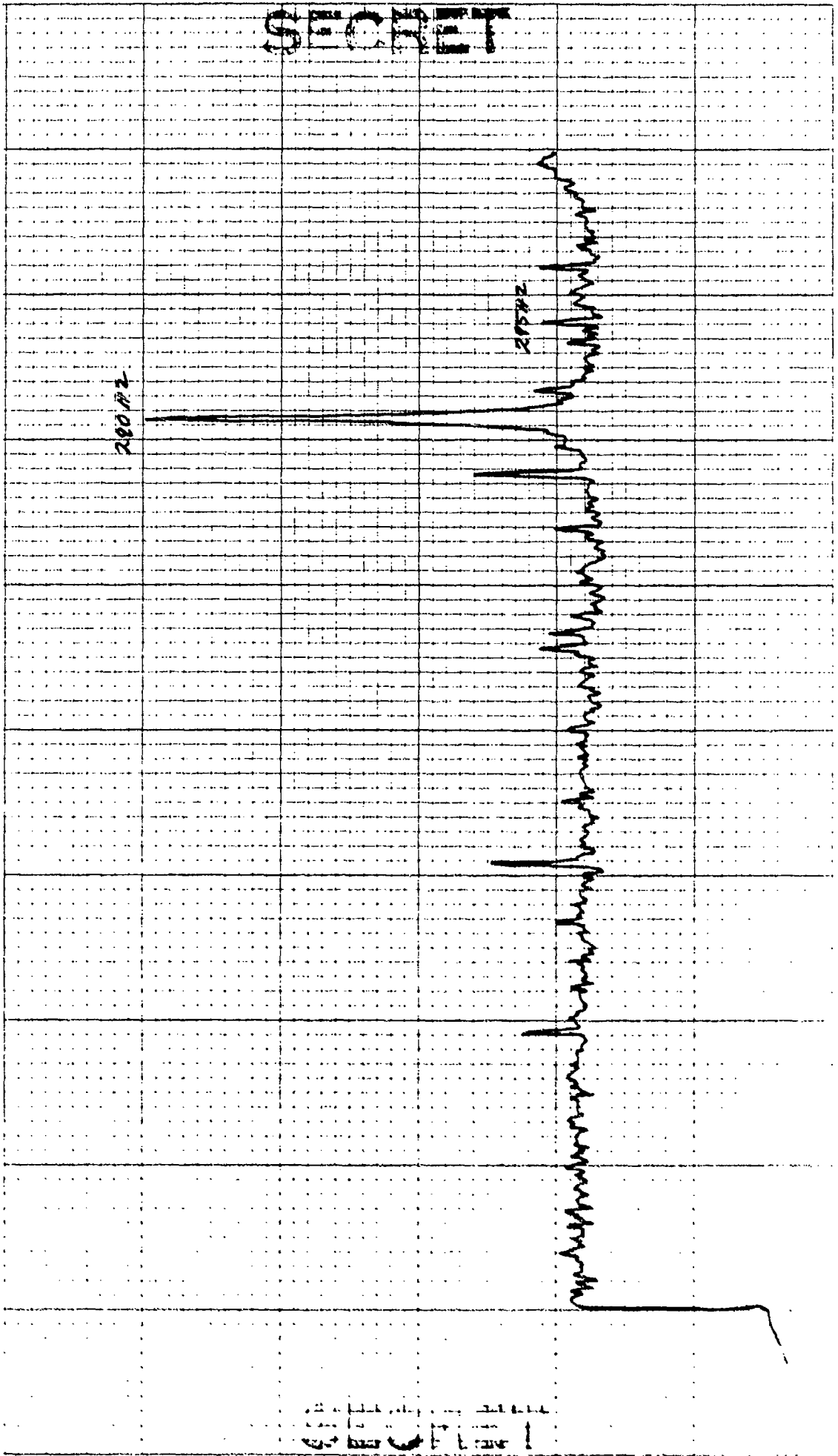


46 0703

REF ID: A66000

CONTROL: 2131 - 72 (DPT) REEL: M10 INDE X 3610
 BEAMFORMED SPECTRUM (ELEMENTS) INTEGRATION TIME 320 SECS ATTN: -24 DB
 EXERCISE: BEARING STAKE FILTER WTG: HANNING
 CENTER FREQ: 270 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-77
 DATE/TIME: 3-15-77 - 2131 Z
 ANALYSIS BANDWIDTH: 1/10HZ
46 DEG. AZ STEERING



SECRET

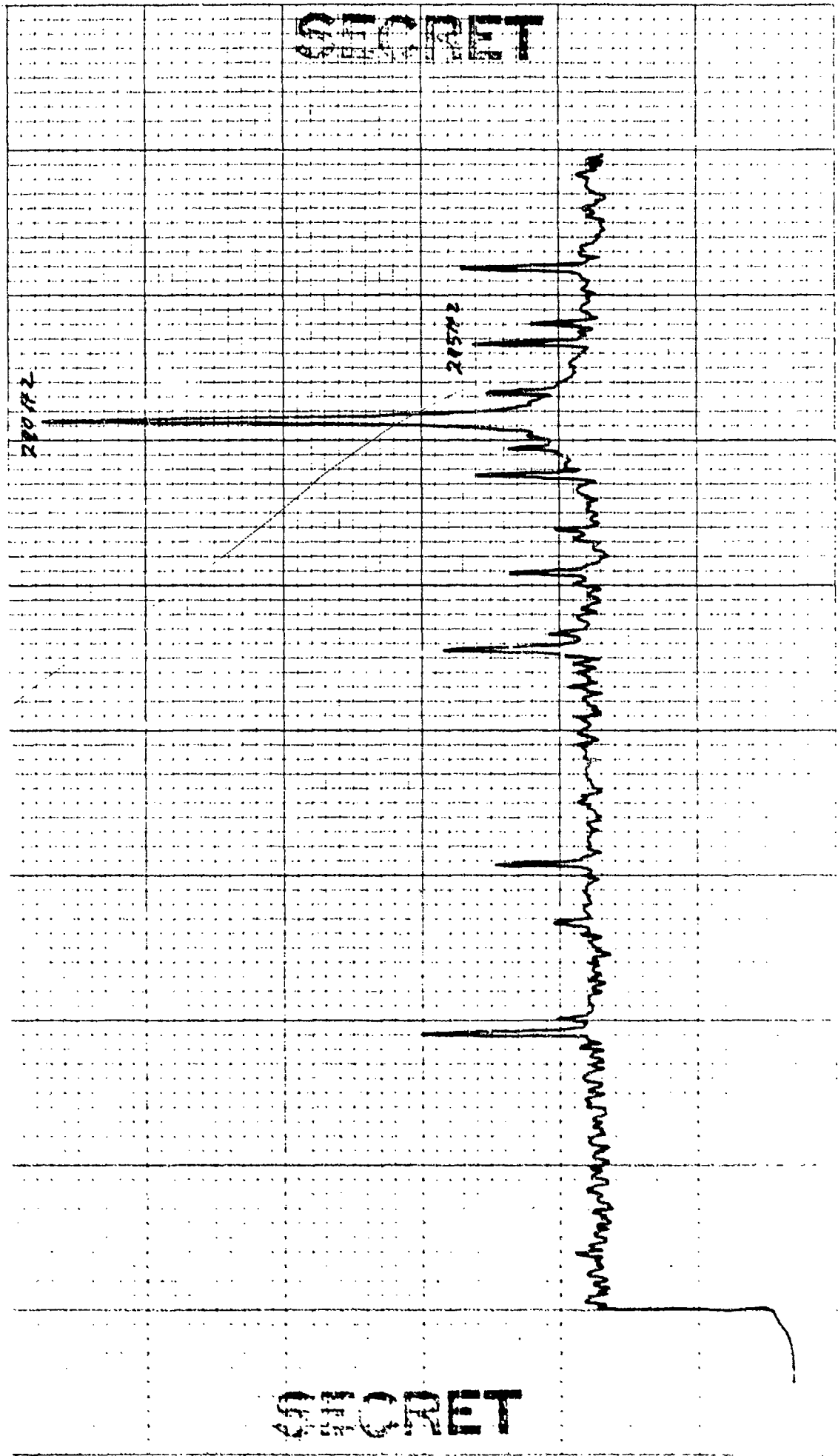
46 0703

1/22 15:48 TO THE DEPT. OF DEFENSE

CONTROL: 2131 - 32 (089)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
72 ELEMENTS

DATE OF ANALYSIS: 1-26-77
DATE/TIME: 3-5-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10 HZ
448 DEG. AZ STEERING

REEL: 110 INDE X 3620
INTEGRATION TIME 320 SECS
ATTEN: -34 DB
FILTER WTC: HANNING



SECRET

SECRET

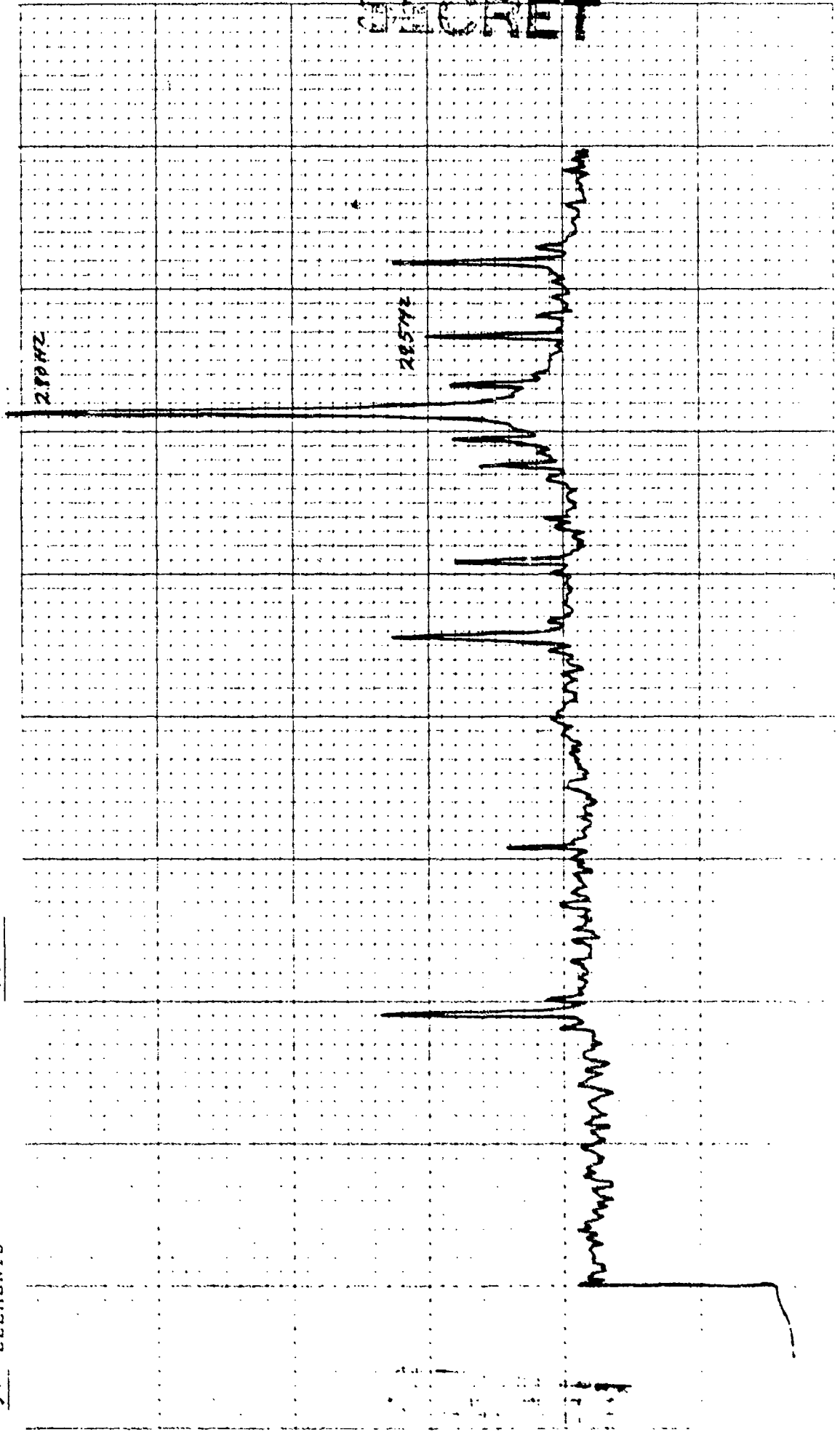
46 0703

REEL: M10 INDE XJ620

INTEGRATION TIME 320 SECS ATTN: -24 DB
FILTER WIG: HANNING

DATE OF ANALYSIS: 1-26-82 29-34
DATE/TIME: 3-15-77 2131 Z
ANALYSIS BANDWIDTH: 1710HZ
+50 DEG. AZ STEERING

CONTROL: 2171 - 32 (DP9)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS



46 0703

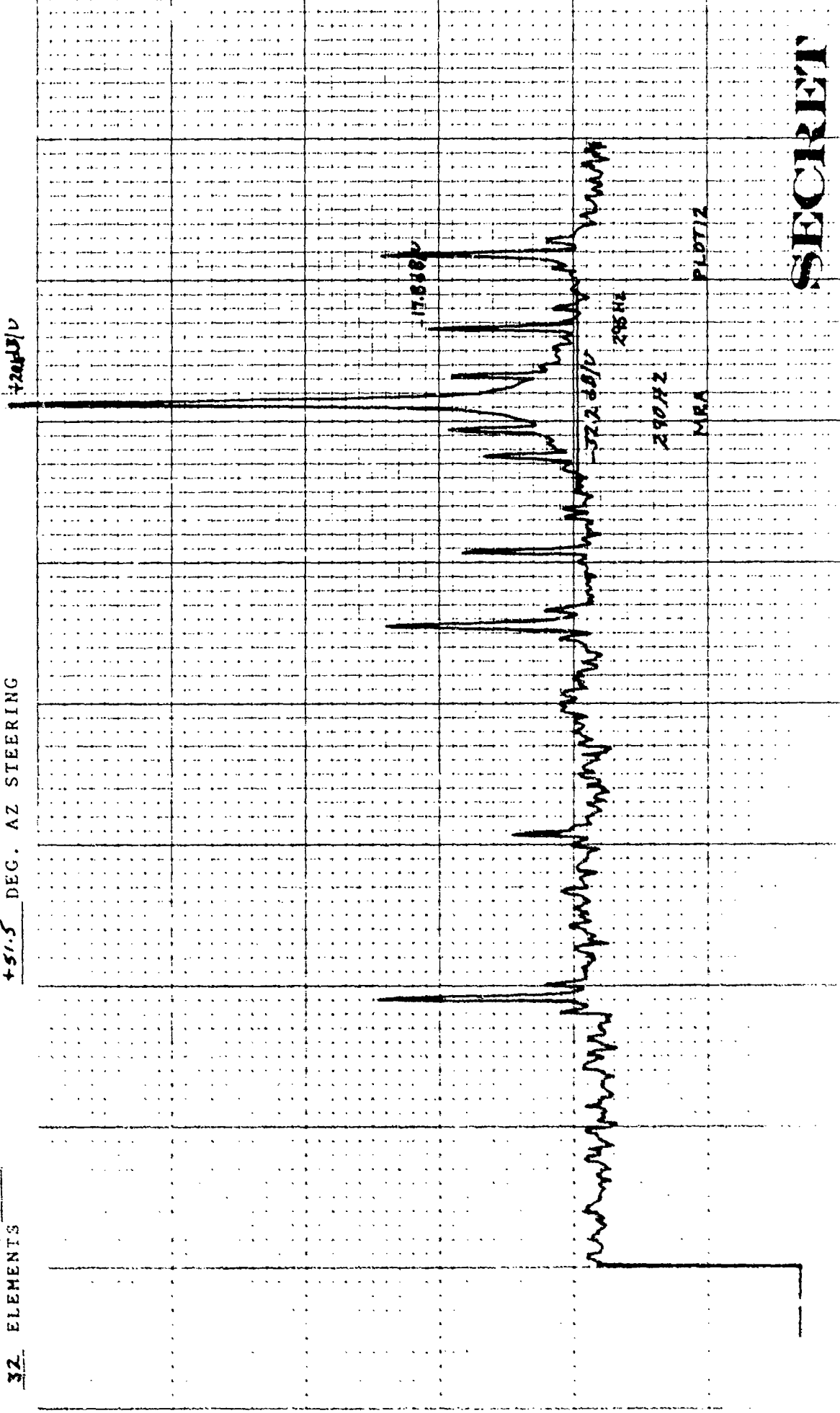
SECRET

102 124 TO THE USCGC 100000

CONTROL: 2131 - 51 (P19)
 BEAMFORMED SPECTRUM (ELEMENTS 17020 297034)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
32 ELEMENTS

DATE OF ANALYSIS: _____
 DATE/TIME: 3-15-77 - 2131 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
+51.5 DEG. AZ STEERING

REEL: M10
 INDE X3220
 INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING



222 HZ

270 HZ

SECRET

308 HZ

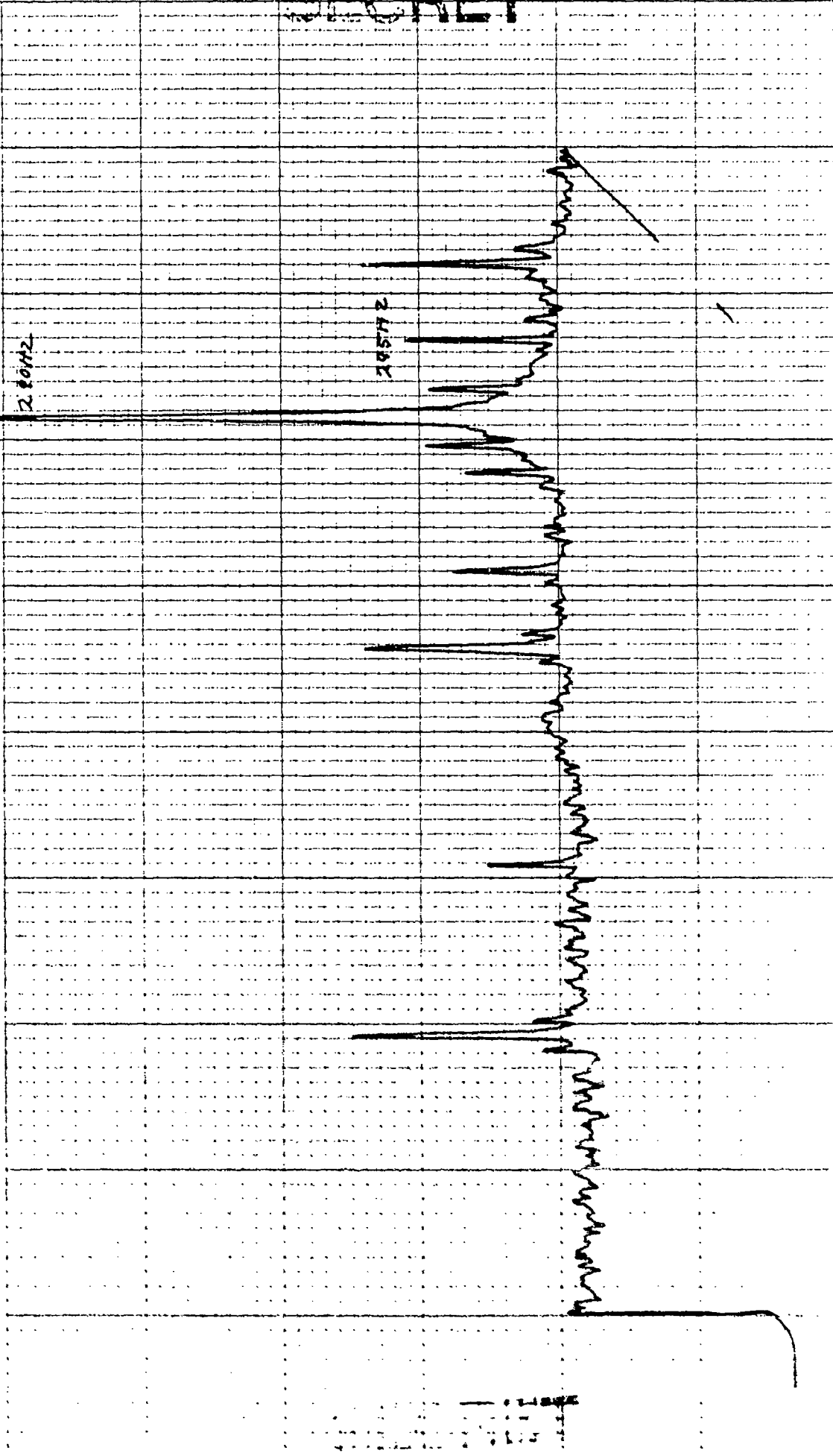
46 0703

10 X 10 TO THE INCHES

CONTROL: 231 - 22 (DPI)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
22 ELEMENTS

DATE OF ANALYSIS: _____
1-26-58-34)
 DATE/TIME: 3-75-57 - 213/2
 ANALYSIS BANDWIDTH: 1/10HZ
+5/ DEG. AZ STEERING

REEL: 410 INDE X3620
 INTEGRATION TIME 320 SECS ATTEN: 0Y DB
 FILTER WTG: HANNING

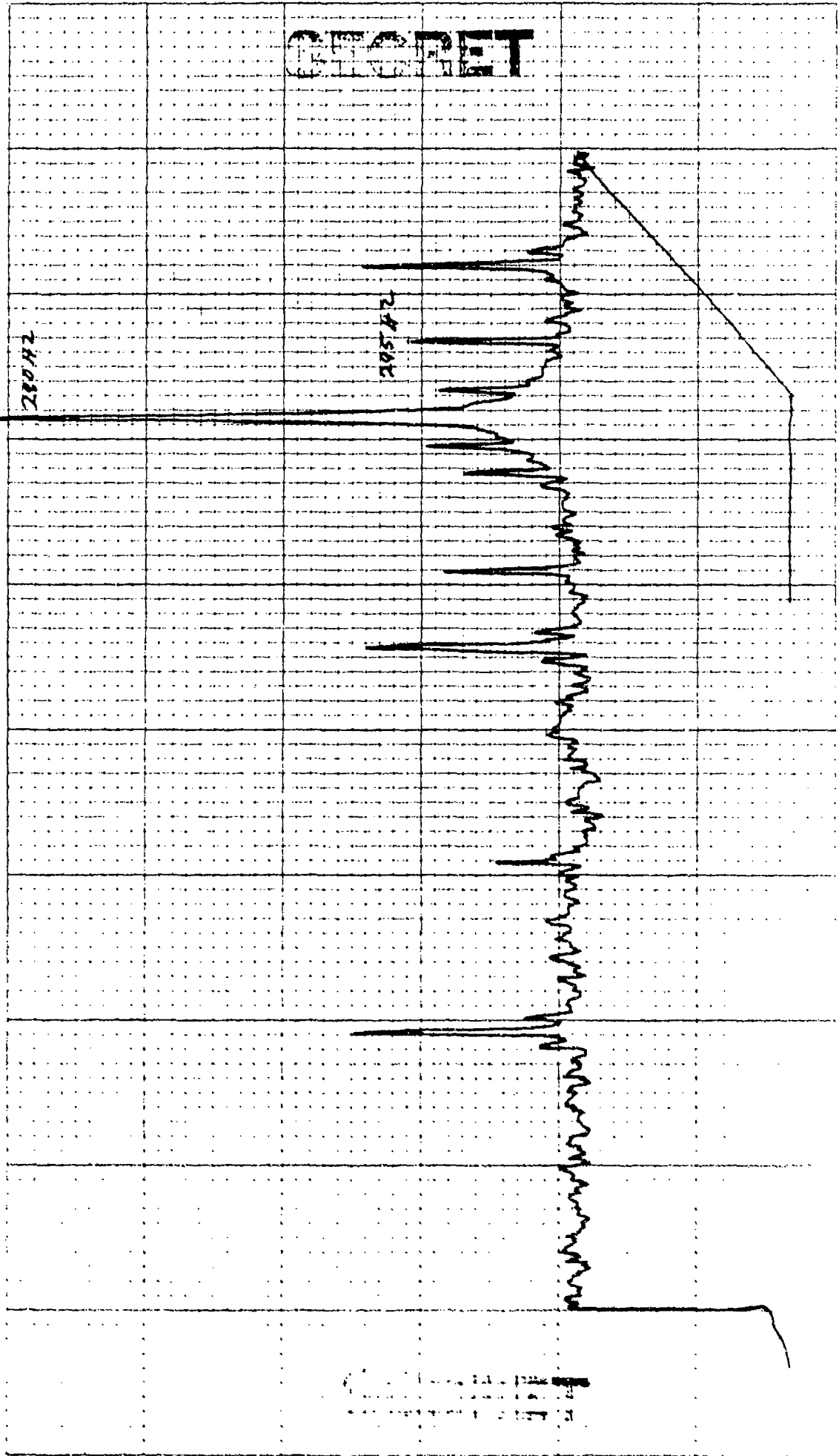


SECRET

46 0703

REF ID: A66000

CONTROL: 2131 - 32 (399) DATE OF ANALYSIS: 1-26-72 REEL: 410 INDE: X302c
 BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 7-15-77 - 217/Z INTEGRATION TIME 320 SECS ATTEN: -9Y DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 CENTER FREQ: 270 HZ 752 DEG. AZ STEERING



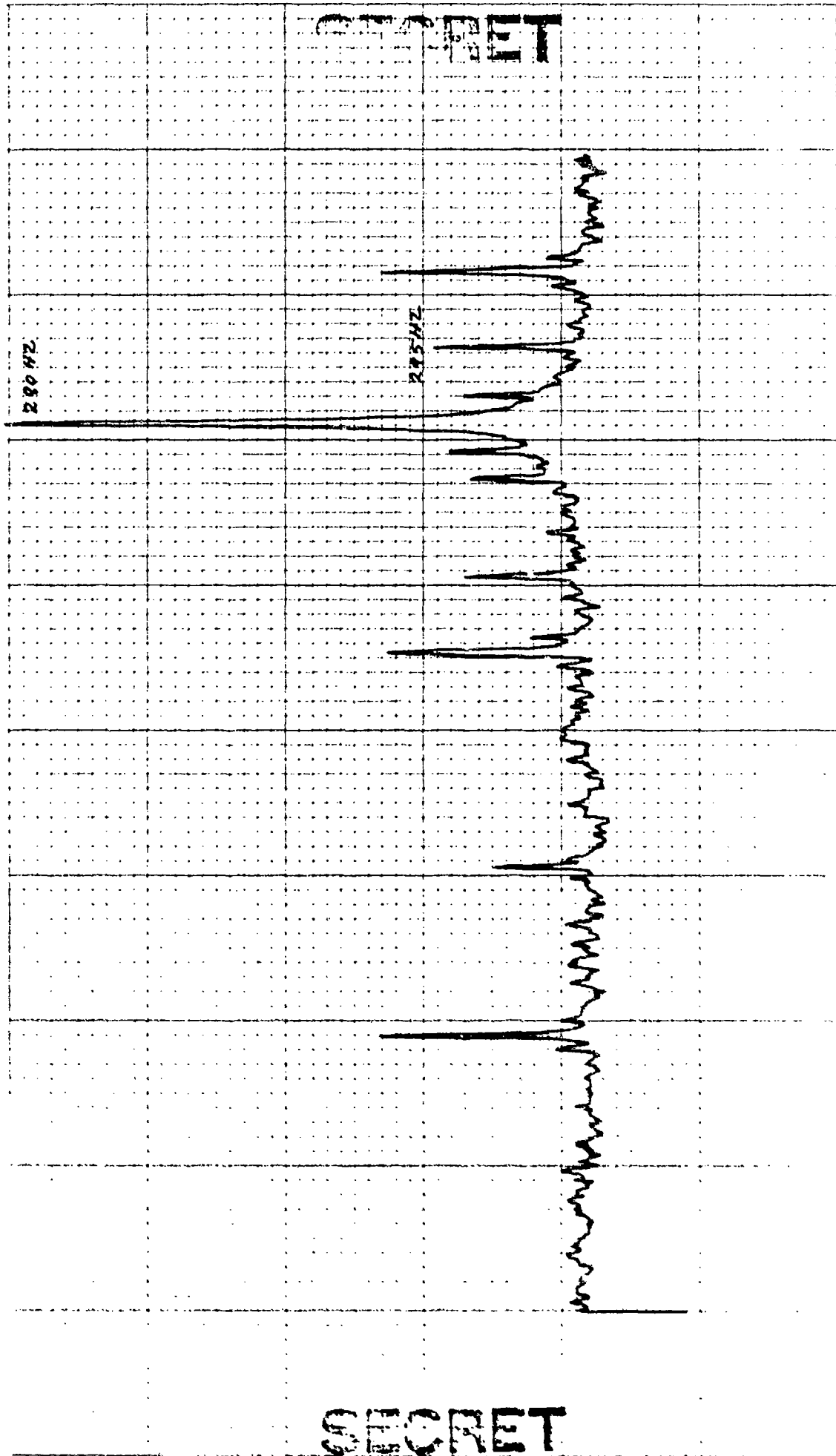
46 0703

CONTROL: 201 - 32 (209)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
 32 ELEMENTS

DATE OF ANALYSIS: 7-26-74
 DATE/TIME: 3:57 - 3:03 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 154 DEG. AZ STEERING

REEL: _____ INDEX _____

INTEGRATION TIME 320 SECS
 FILTER WTC: HANNING
 ATTN: DB



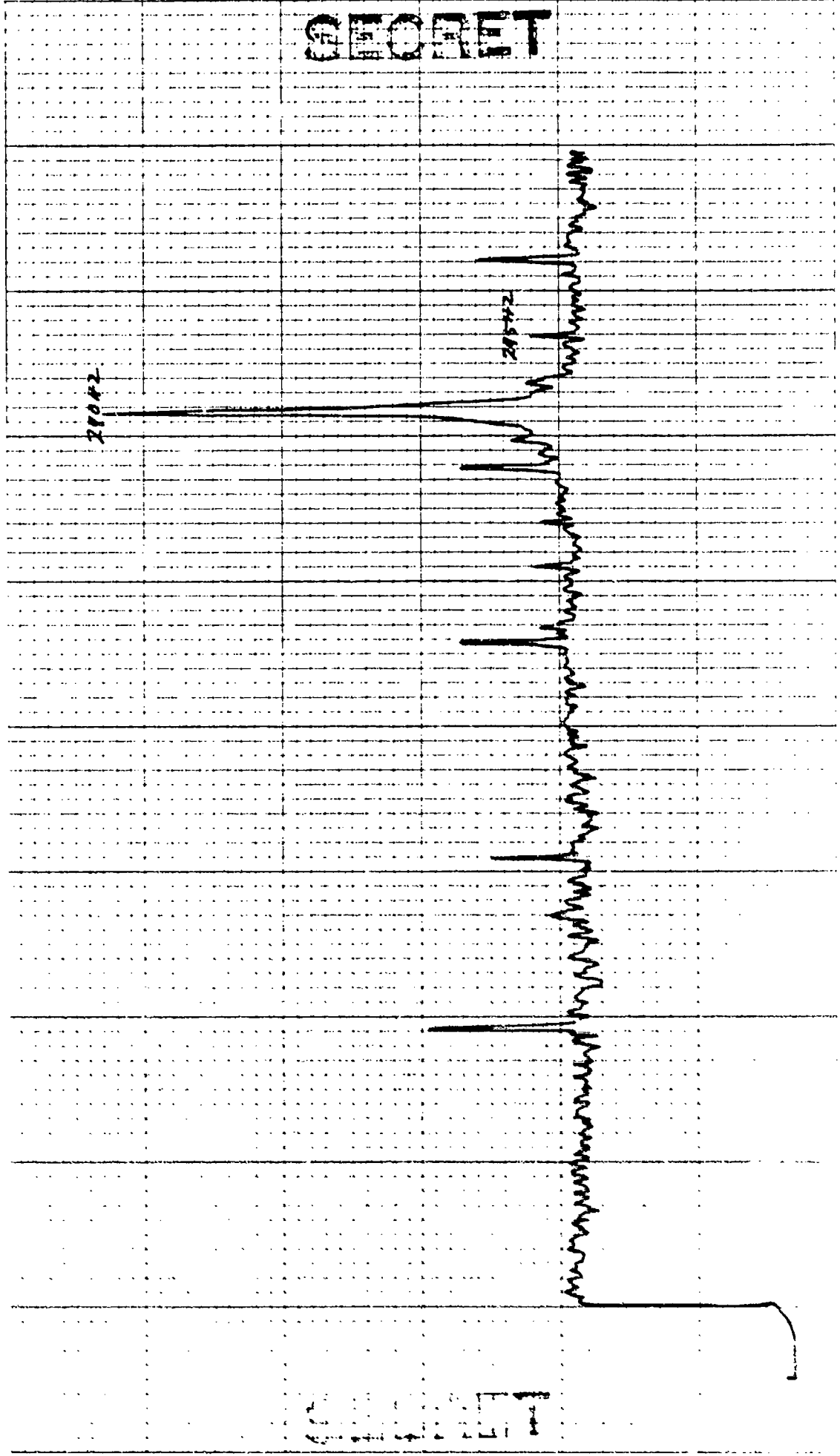
SECRET

46 0703

CONTROL: 2101 - 32 (DPP)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-89-34
DATE/TIME: 3-15-77 - 2137 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+56 DEG. AZ STEERING

KEEL: M10 INDE X360c
INTEGRATION TIME 320 SECS
ATTEN: 24 DB
FILTER WTG: HANNING



46 0703

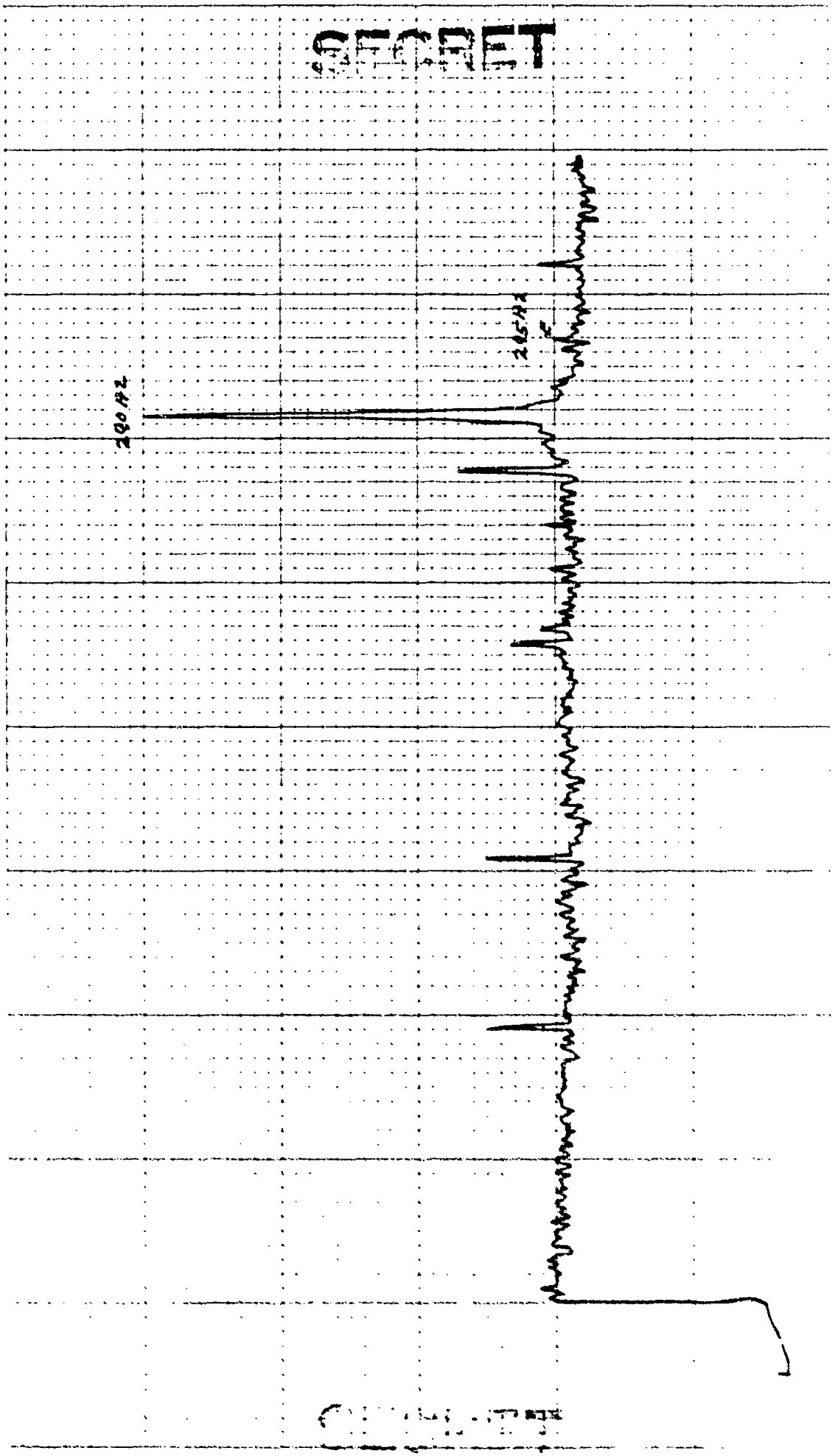
CONTROL: 2171 - 32 (209) REEL: 410 INDE X 3620

BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-26-8 29-34

EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTEN: -24 DB

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

72 ELEMENTS 450 DEG. AZ STEERING

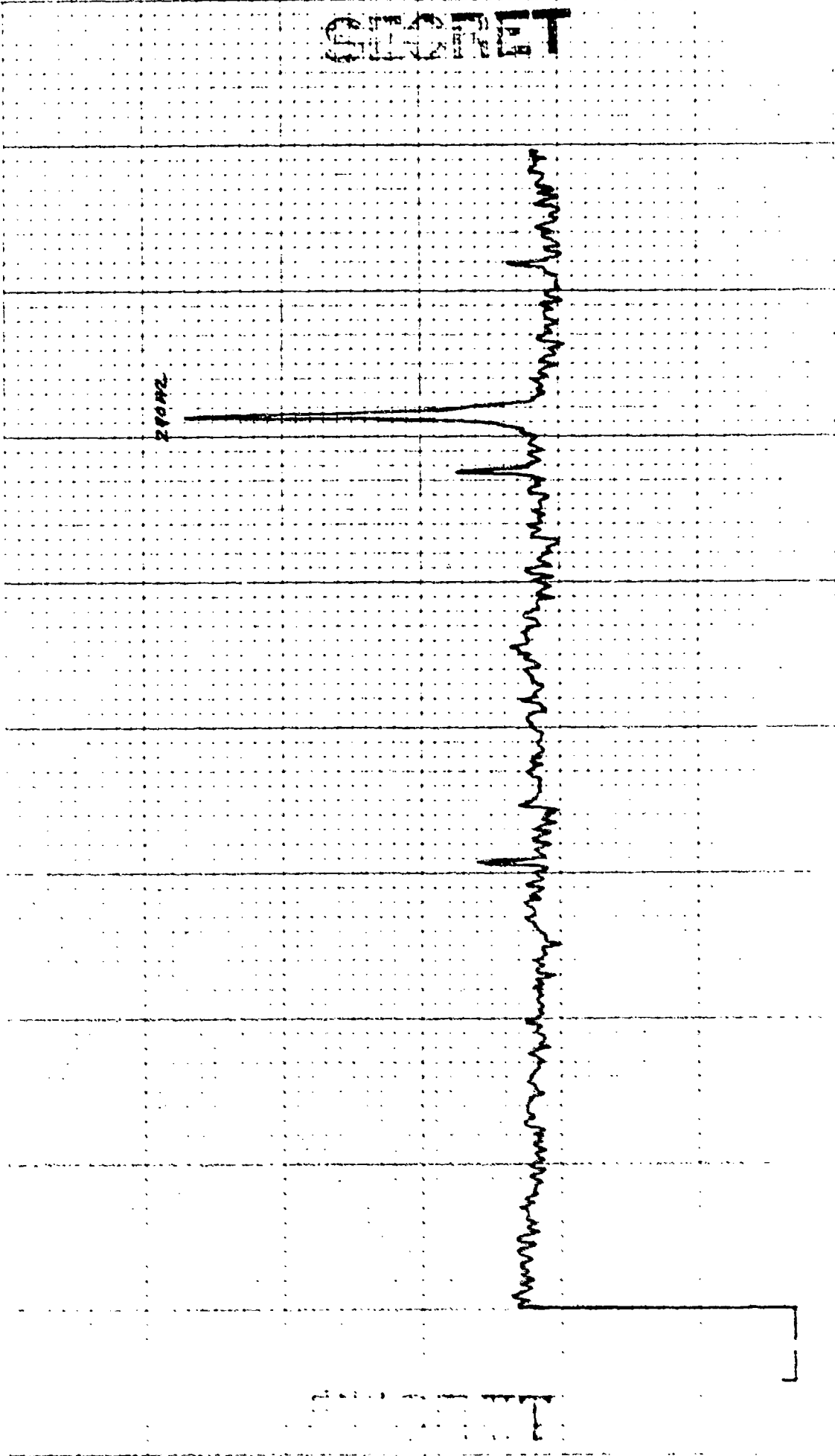


45 0703

CONTROL: 2031 - 22 (D07)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
72 ELEMENTS

DATE OF ANALYSIS: 1-26-77
DATE/TIME: 3-5-77 - 2031 Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 60 DEG. AZ STEERING

REEL: M10 INDE X3600
INTEGRATION TIME 320 SECS ATTEN: -3Y DB
FILTER WTG: HANNING



SECRET

CONFIDENTIAL

SIGNAL LEVEL AND SNR
CALCULATIONS

DATA POINT 9 FREQUENCY 140 HZ NUMBER OF ELEMENTS 51

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -23.6
MCPS-32 CAL. CORRECTION +10 -13.6
BEAMFORMER GAIN +30 +26.4 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION + .2 +11.6 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -69.2
MCPS-32 CAL. CORRECTION +10 -59.2
BEAMFORMER GAIN +30 -29.2 NOISE LEVEL FOR SNR CALCULATION

SECTION 13

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR +16.4
SIGNAL LEVEL FOR SNR -29.2 45.6
PROCESSOR CORRECTION -4.0 41.6
MRA CORRECTION + .2 41.8 SNR 1/10 HZ BAND
BANDWIDTH CONVERSION -0.2 53.6 SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR CALCULATIONS

DATA POINT 9

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 51

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-18.2</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-8.2
BEAMFORMER GAIN	<u>+30</u>	+21.8 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	+22.6 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-71.4</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-61.4
BEAMFORMER GAIN	<u>+30</u>	-31.4 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR	<u>+21.8</u>	
SIGNAL LEVEL FOR SNR	<u>-31.4</u>	53.2
PROCESSOR CORRECTION	<u>-4.0</u>	49.2
MRA CORRECTION	<u>+ .8</u>	50.0 SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	41.8 SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 9

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 51

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-56.3</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-46.3
BEAMFORMER GAIN	<u>+20</u>	-16.3 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	-15.5 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-71.4</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-61.4
BEAMFORMER GAIN	<u>+20</u>	-31.4 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR	<u>-16.3</u>	
SIGNAL LEVEL FOR SNR	<u>-31.4</u>	15.1
PROCESSOR CORRECTION	<u>-4.2</u>	10.9
MRA CORRECTION	<u>+ .8</u>	11.7 SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	3.5 SNR 1 HZ BAND

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CONFIDENTIAL

DATA POINT 9

SIGNAL GAIN

	<u>140 HZ</u>	<u>200HZ</u>	<u>205HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-19.4</u>	<u>-12.5</u>	<u>N.D</u>
MRA SIGNAL LEVEL	<u>+16.6</u>	<u>+22.6</u>	<u>-15.5</u>
ARRAY SIGNAL GAIN	<u>36.0</u>	<u>35.1</u>	
20 LOG <u>51</u>	<u>34.1</u>	<u>34.1</u>	<u>34.1</u>
# of elements			
DIFFERENCE	<u>+ 1.9</u>	<u>+ 1.0</u>	

ARRAY GAIN

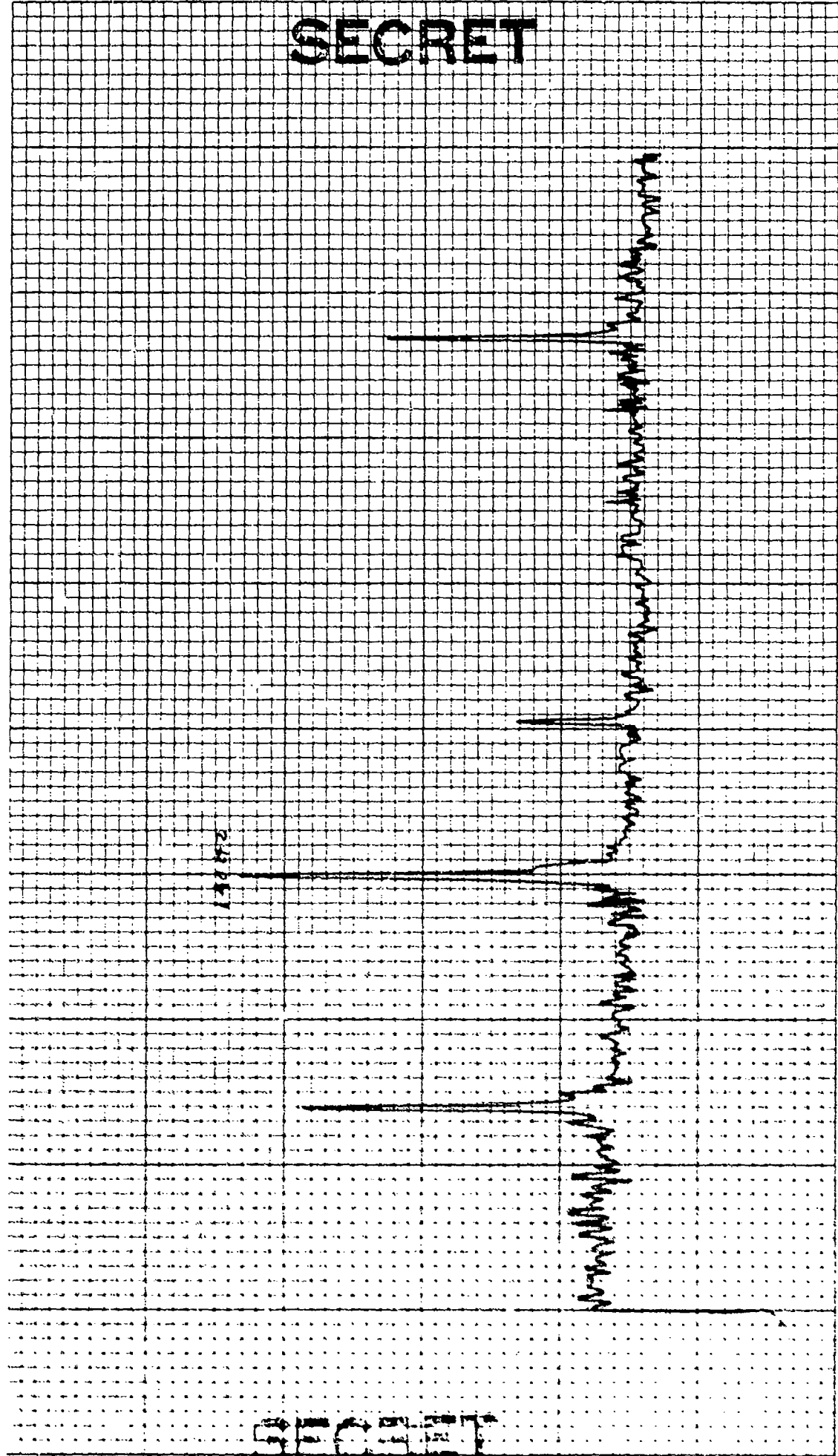
MRA SNR	<u>41.8</u>	<u>50.0</u>	<u>11.7</u>
MEAN OMNI SNR	<u>28.6</u>	<u>34.5</u>	<u>N.D.</u>
ARRAY GAIN	<u>13.2</u>	<u>15.5</u>	
THEORETICAL AZMUTH GAIN (at MRA)	<u>13.6</u>	<u>16.0</u>	<u>16.2</u>
DIFFERENCE	<u>- .4</u>	<u>- .5</u>	

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KOE 12 X 10 TO TIME INCHES
10 INCHES
EQUIP. & ESSER CO. MADE IN U.S.A.

46 0703

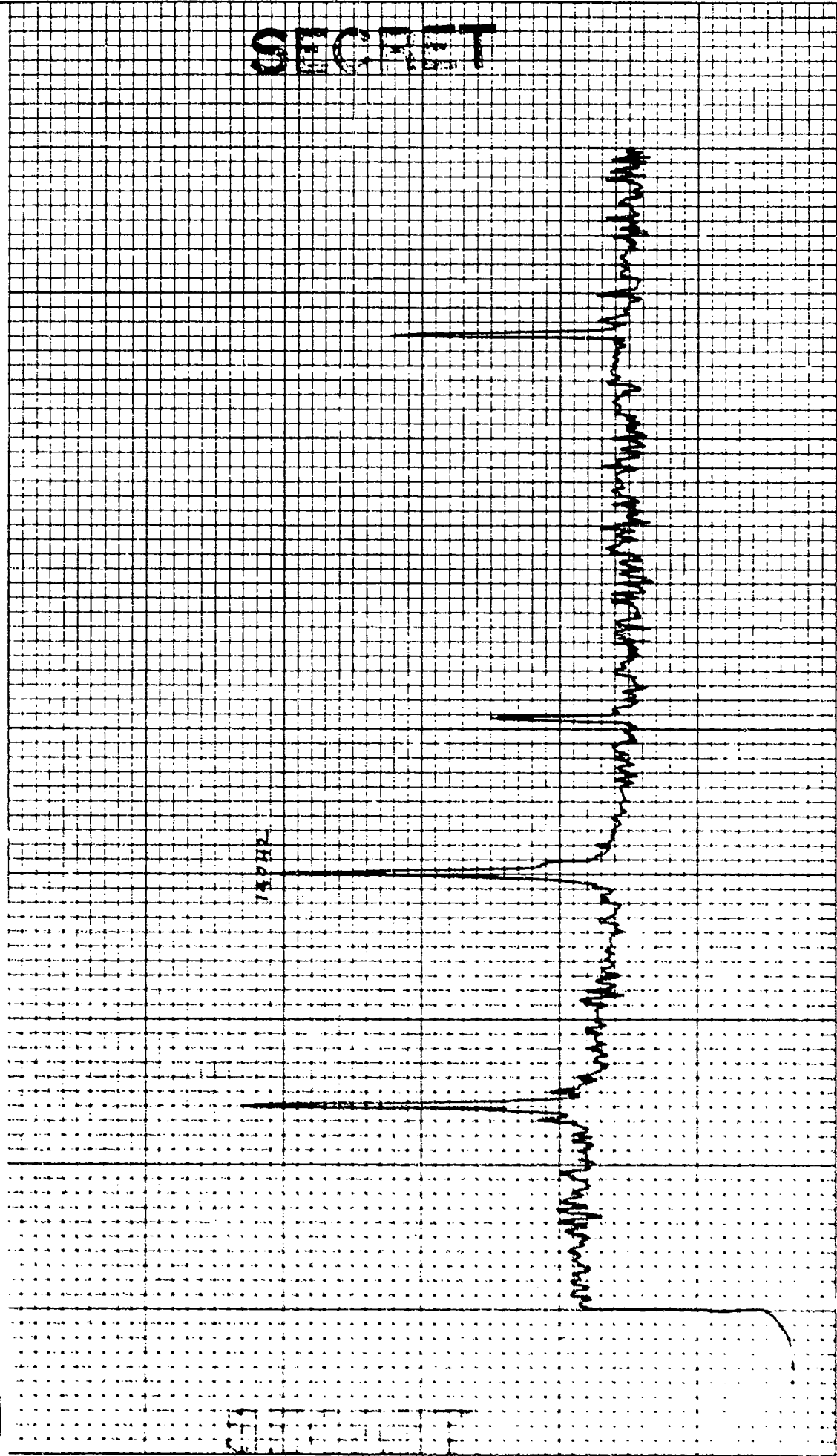
CONTROL: 2131-57 (208) DATE OF ANALYSIS: - - REEL: M10 INDE X 3620
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 1-26 12 28-53 INTEGRATION TIME 320 SECS ATEN: -30 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 150 HZ + 44 DEG. AZ STEERING



K&E FAX TO THE INCH. 7.4 IS INCHES
FLUOR. P. ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2/31 - 51 (DPP) DATE OF ANALYSIS: REEL: 410 INDE X3126
 BEAMFORMED SPECTRUM(ELEMENTS) 1-264 28-53) INTEGRATION TIME 320 SECS ATTN: -70 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 CENTER FREQ: 150 HZ +46 DEG. AZ STEERING

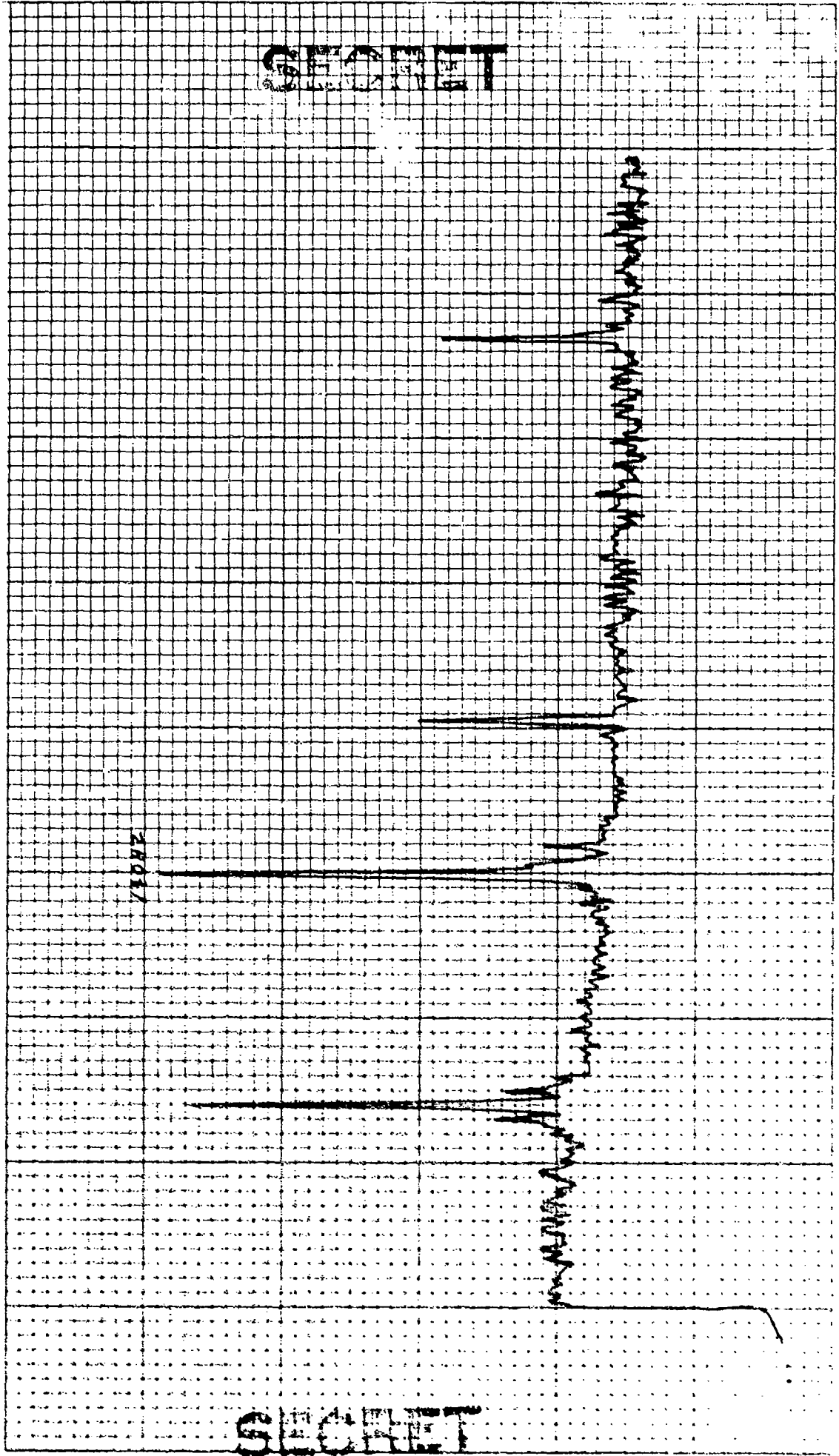


SECRET

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

46 0703

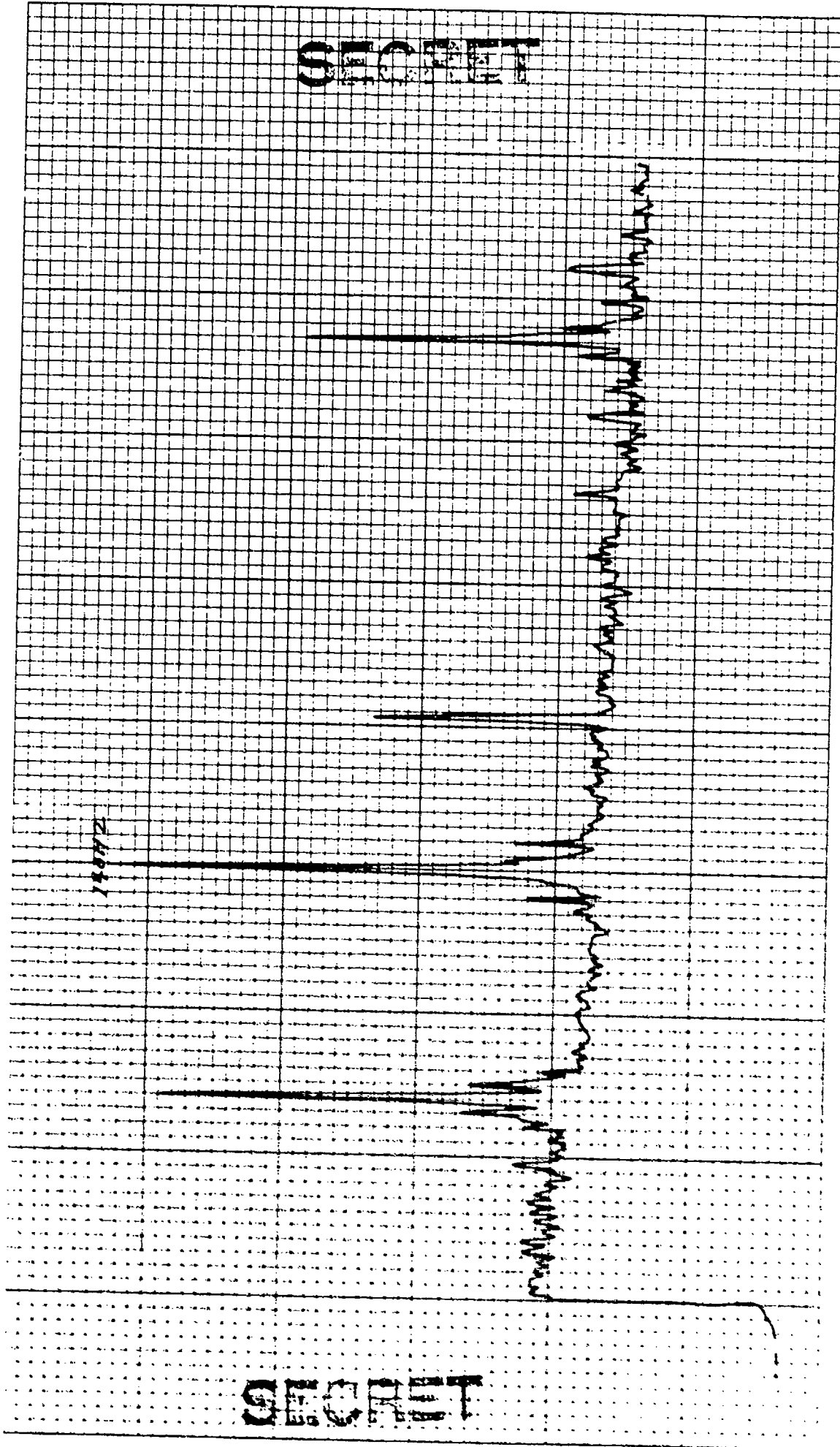
CONTROL: 2131 - 51 (DP9) DATE OF ANALYSIS: REEL: M10 INDE XJ62
BEAMFORMED SPECTRUM (ELEMENTS) 1-26 28-53)
EXERCISE: BEARING STAKE DATE/TIME: 3-5-77 - 2131/2 INTEGRATION TIME 320 SECS ATTEN: -30 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTC: HANNING
51 ELEMENTS 440 DEG. AZ STEERING



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

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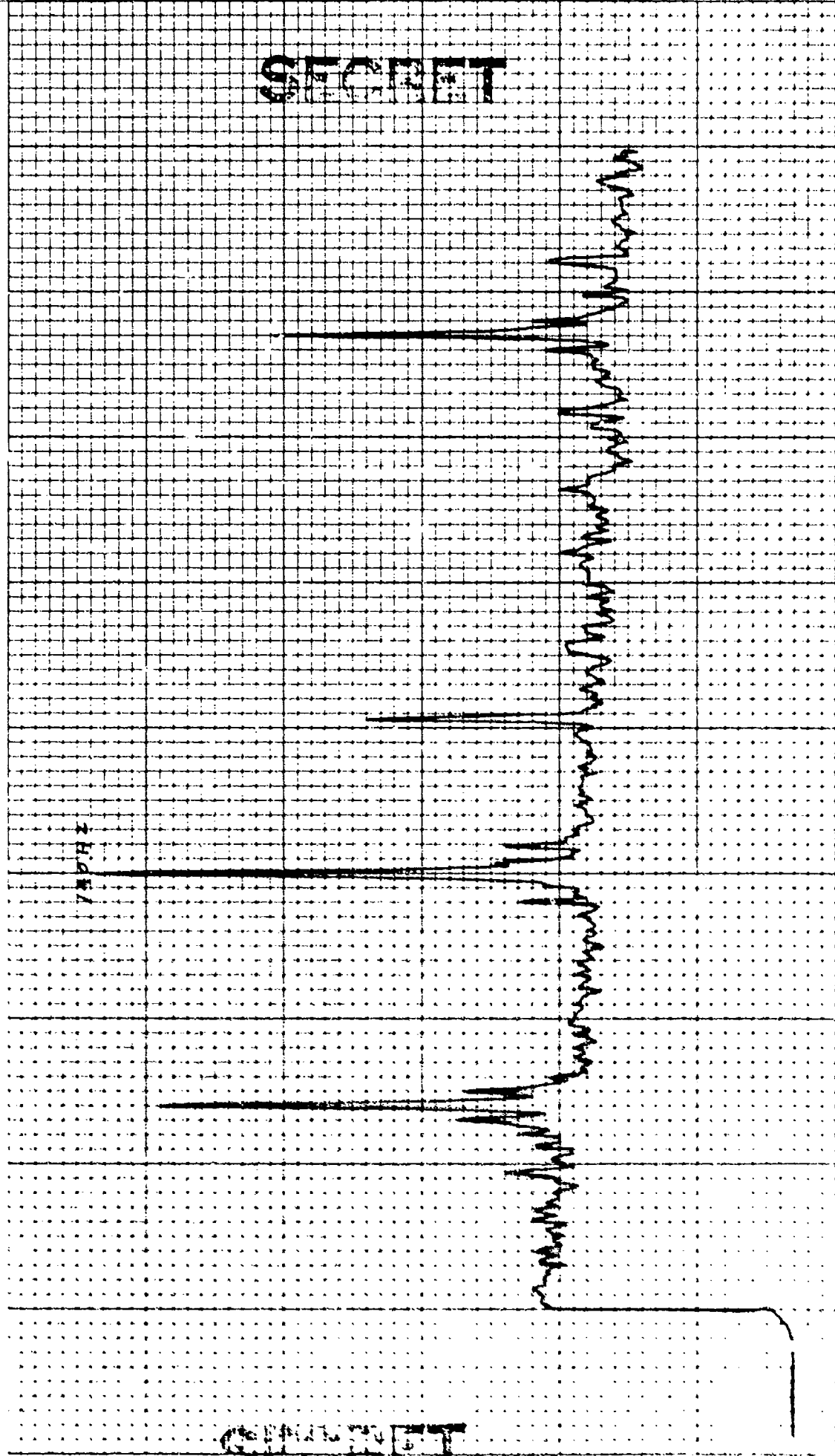
CONTROL: 2/31 - 5/ (D99) DATE OF ANALYSIS: 1-26-89-53 REEL: 110 INDE XJ620
BEAMFORMED SPECTRUM (ELEMENTS) EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTEN: -30DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
51 ELEMENTS +50 DEG. AZ STEERING



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

46 0703

CONTROL: 2131 - 51 (D91) DATE OF ANALYSIS: - - - -
BEAMFORMED SPECTRUM(ELEMENTS) 1-26 * 21-53
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATEN: -30 DB
CENT'R FREQ: 150 HZ FILTER WTG: HANNING
51 ELEMENTS + 51 DEG. AZ STEERING ANALYSIS BANDWIDTH: 1/10HZ



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USE PAPER TO THE RIGHT OF THIS PAGE

SECRET

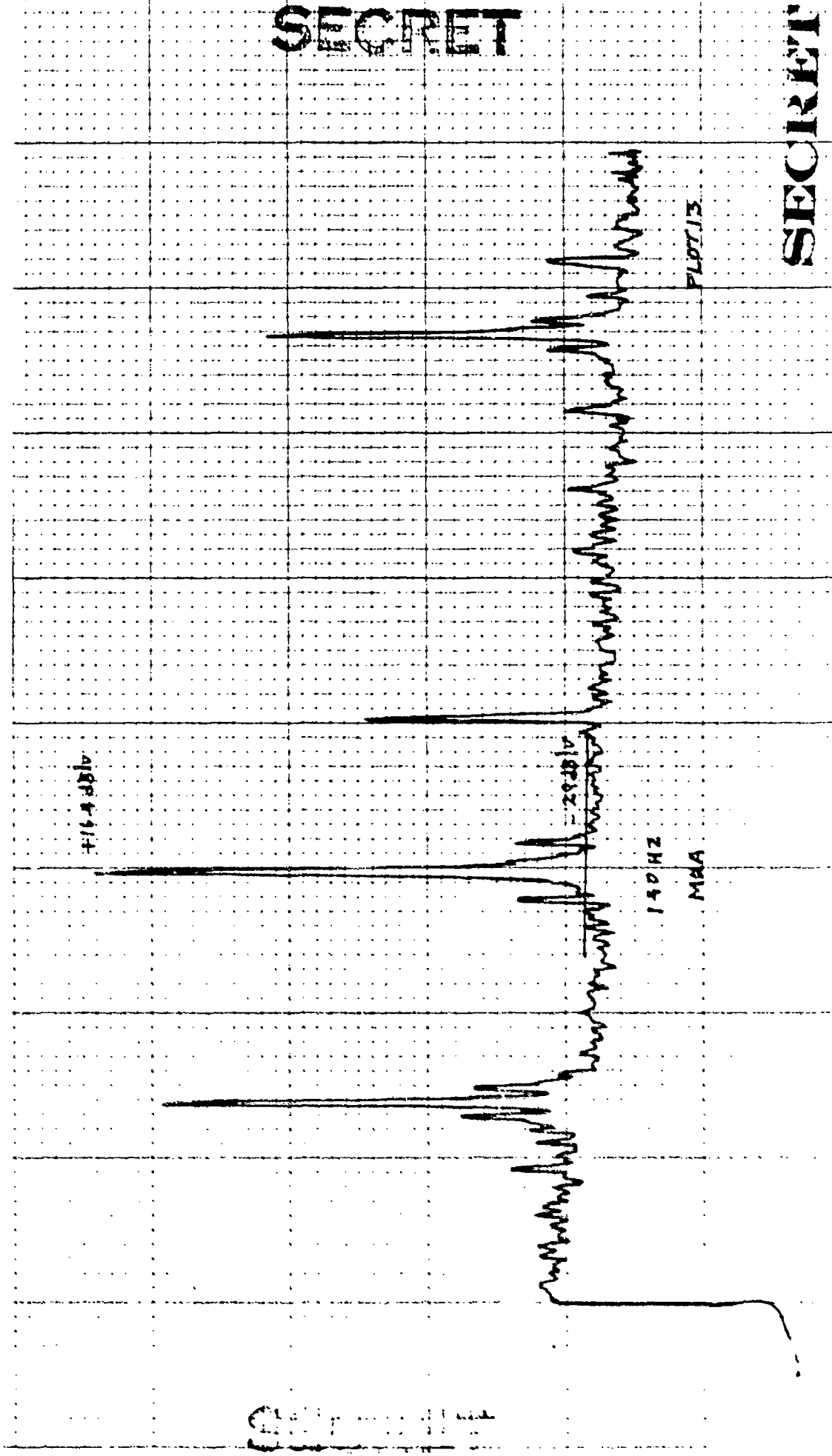
CONTROL: 2/3/ - 5/ (PP9)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
51 ELEMENTS

DATE OF ANALYSIS:
17.26 297.53

DATE/TIME: 3-9-77 - 2/3/ 2
ANALYSIS BANDWIDTH: 1/10HZ
157.5 DEG. AZ STEERING

REEL: MIC INDE X3624

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



180HZ

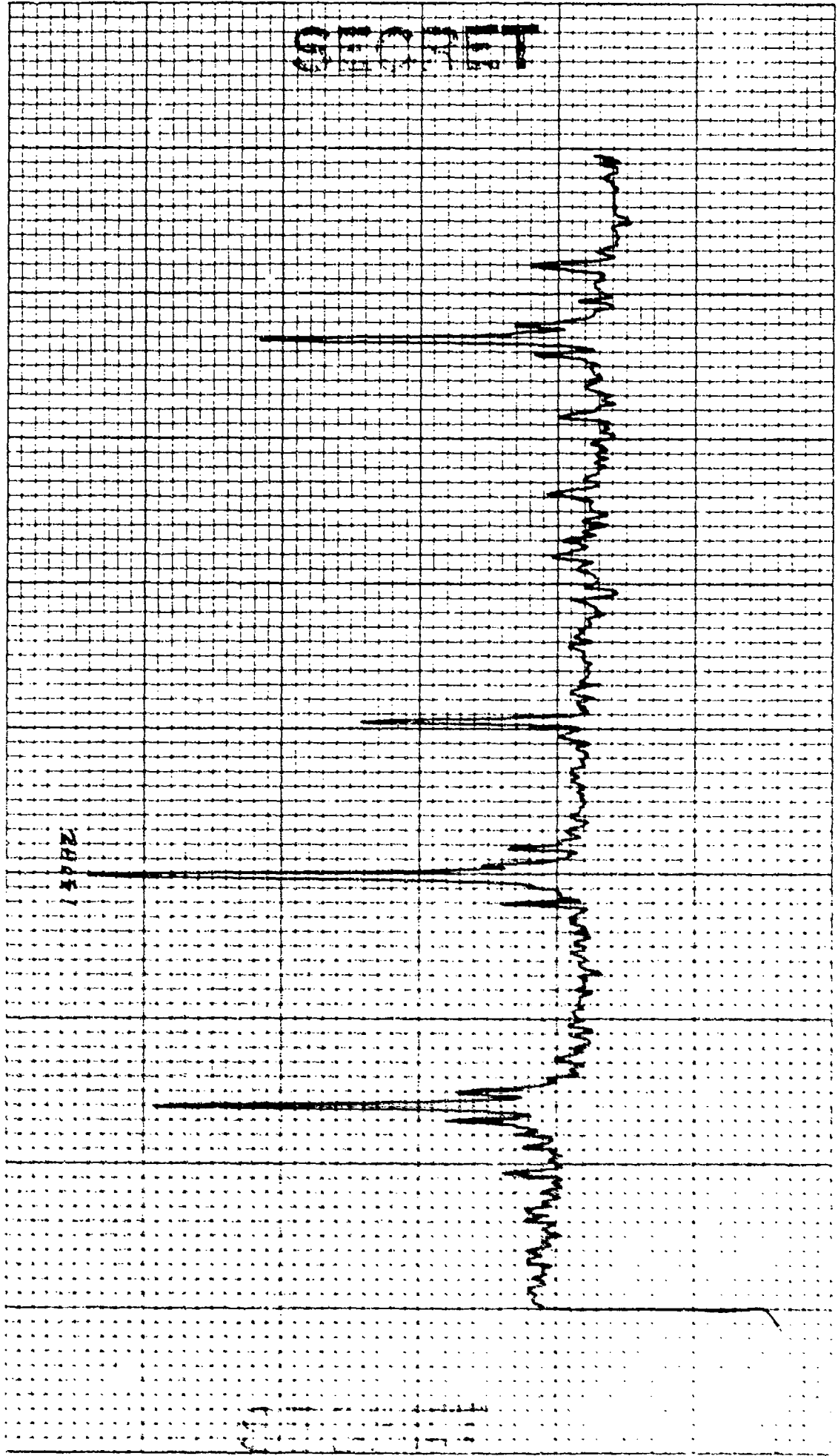
150 HZ

111HZ

KOE 15.3 IS TO THE INSTRUMENTS
PERDUELL & ROSSER CO. WASH. D.C.

46 0703

CONTROL: 2131 - 51 (DP9) DATE OF ANALYSIS: - - -
BEAMFORMED SPECTRUM (ELEMENTS) 1-26-57 08-53
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: -30 DB
CENTER FREQ: 150 MHz FILTER WTC: HANNING
51 ELEMENTS +52 DEG. AZ STEERING



KOE 15.4 IS TO THE DIRECTION OF THE ELEMENTS

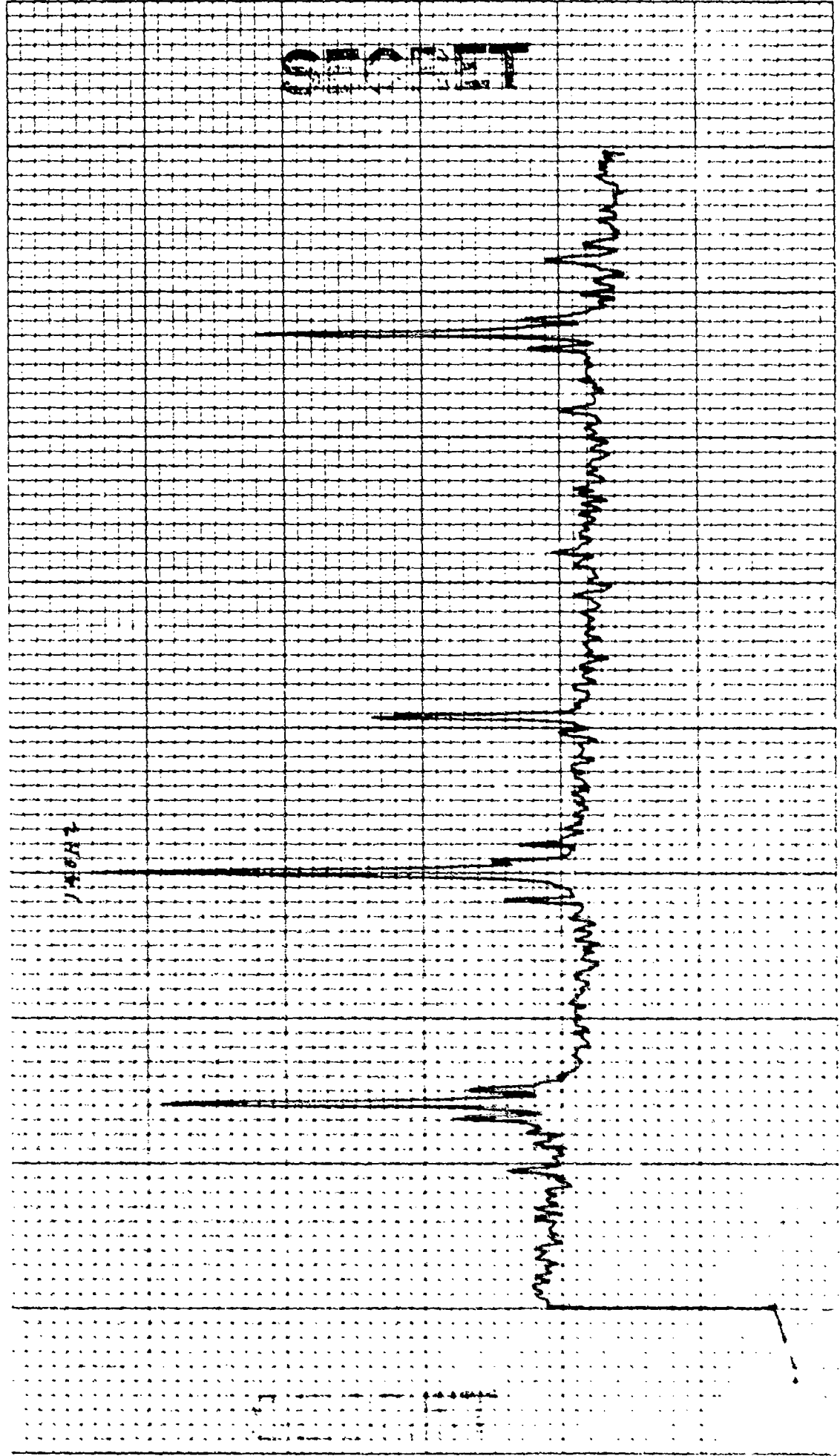
46 0703

CONTROL: 2131 - 51 (DP9)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
51 ELEMENTS

DATE OF ANALYSIS: 1-26-77
DATE/TIME: 7-15-77 - 2131Z
ANALYSIS BANDWIDTH: 1/10HZ
+54 DEG. AZ STEERING

REEL: 410
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING

INDE X 3620
ATTEN: -30 DB



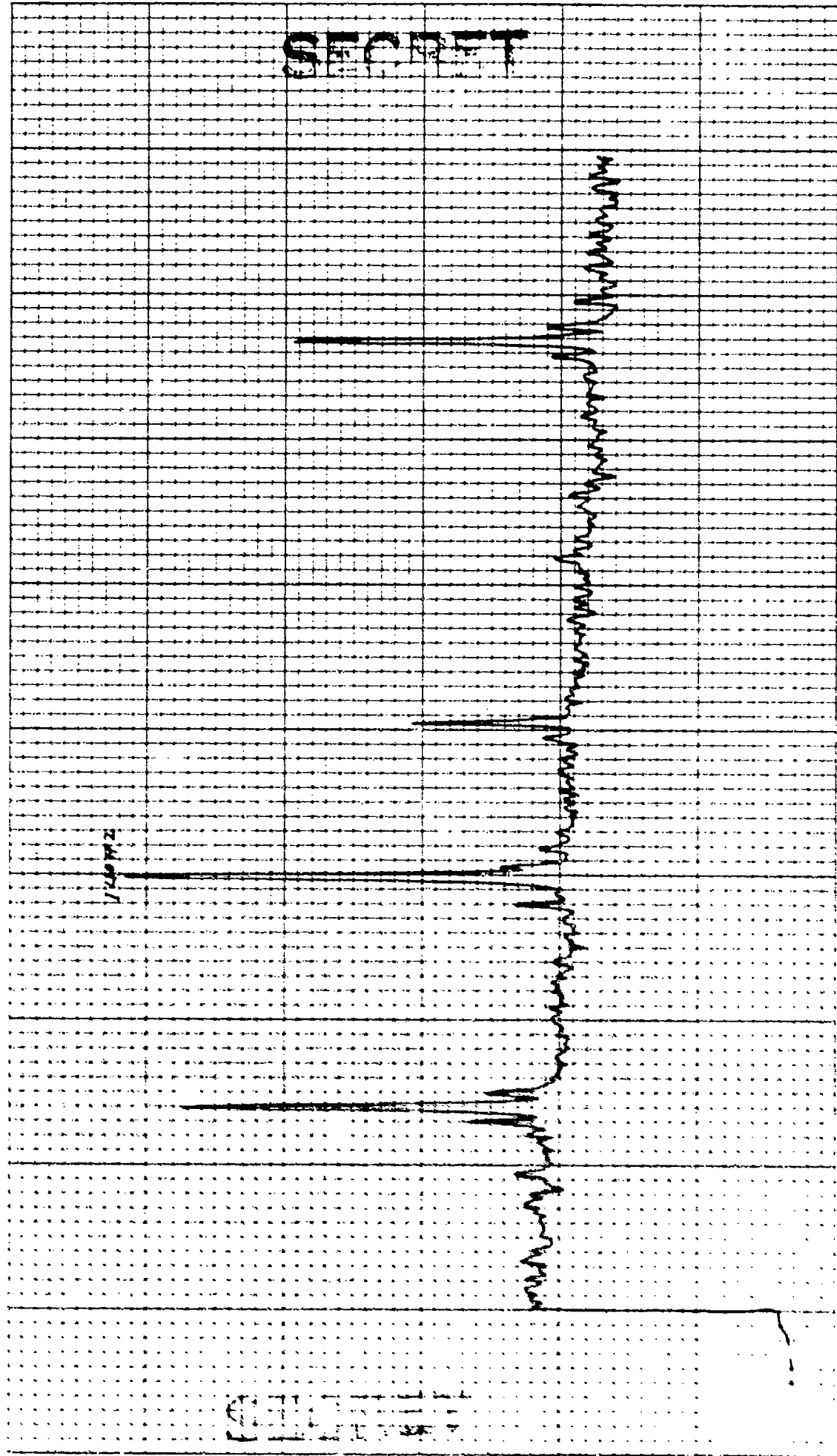
REF ID: A6 TO THE US...
PERFECT & POWER CO.

46 0703

CONTROL: 2131-57 (D09)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
57 ELEMENTS

DATE OF ANALYSIS: -- -- --
1-268 29-53)
DATE/TIME: 3-15-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+56 DEG. AZ STEERING

REEL: M10 INDE X3620
INTEGRATION TIME 320 SECS ATTN: -3.0 DB
FILTER WTC: HANNING



MOE 10 X 10 TO THE INCHES 1.4 TO INCHES
REDFIELD & PETER CO. MADE IN U.S.A.

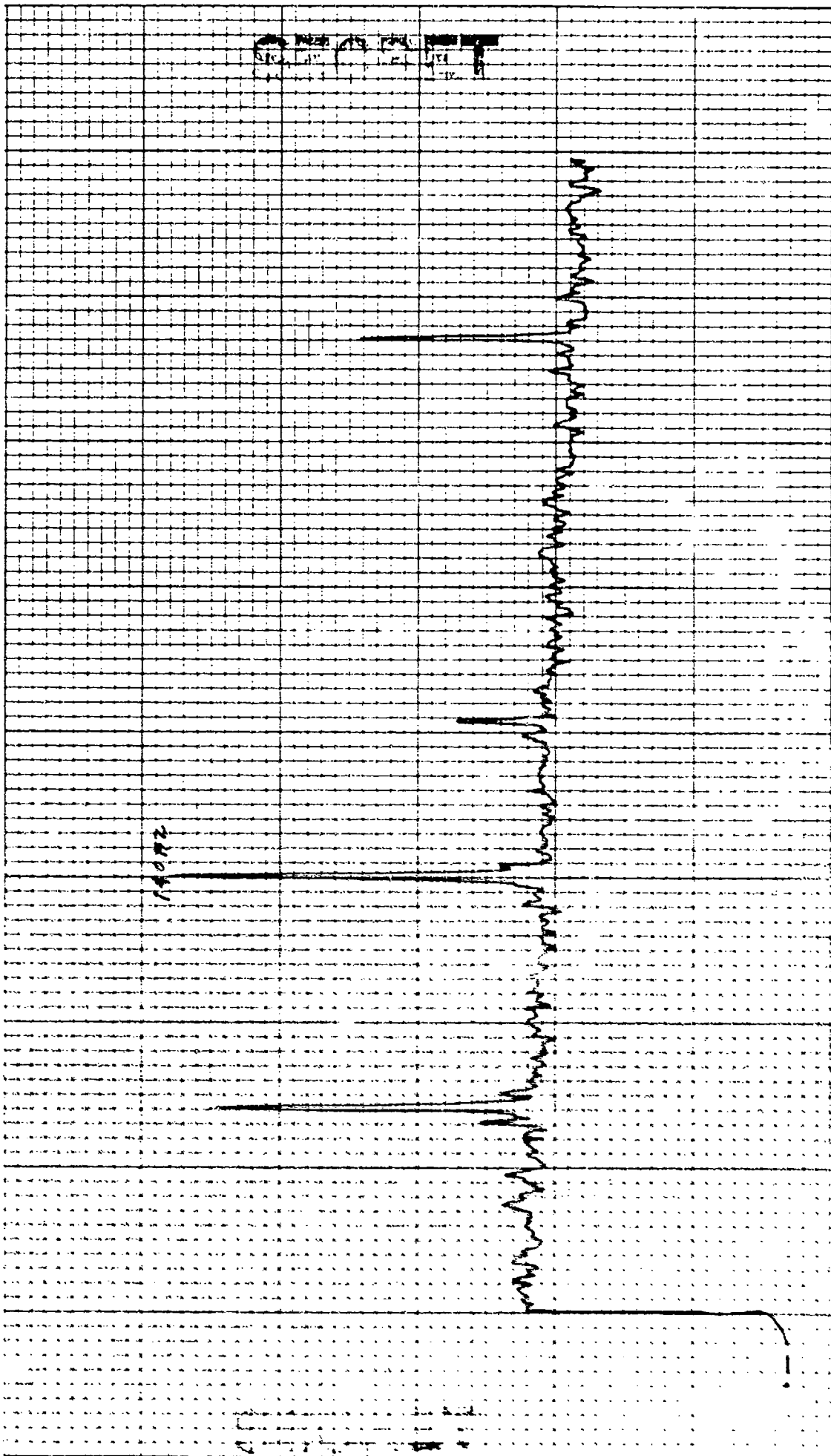
46 0703

CONTROL: 231 - 51 (DP9)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
51 ELEMENTS

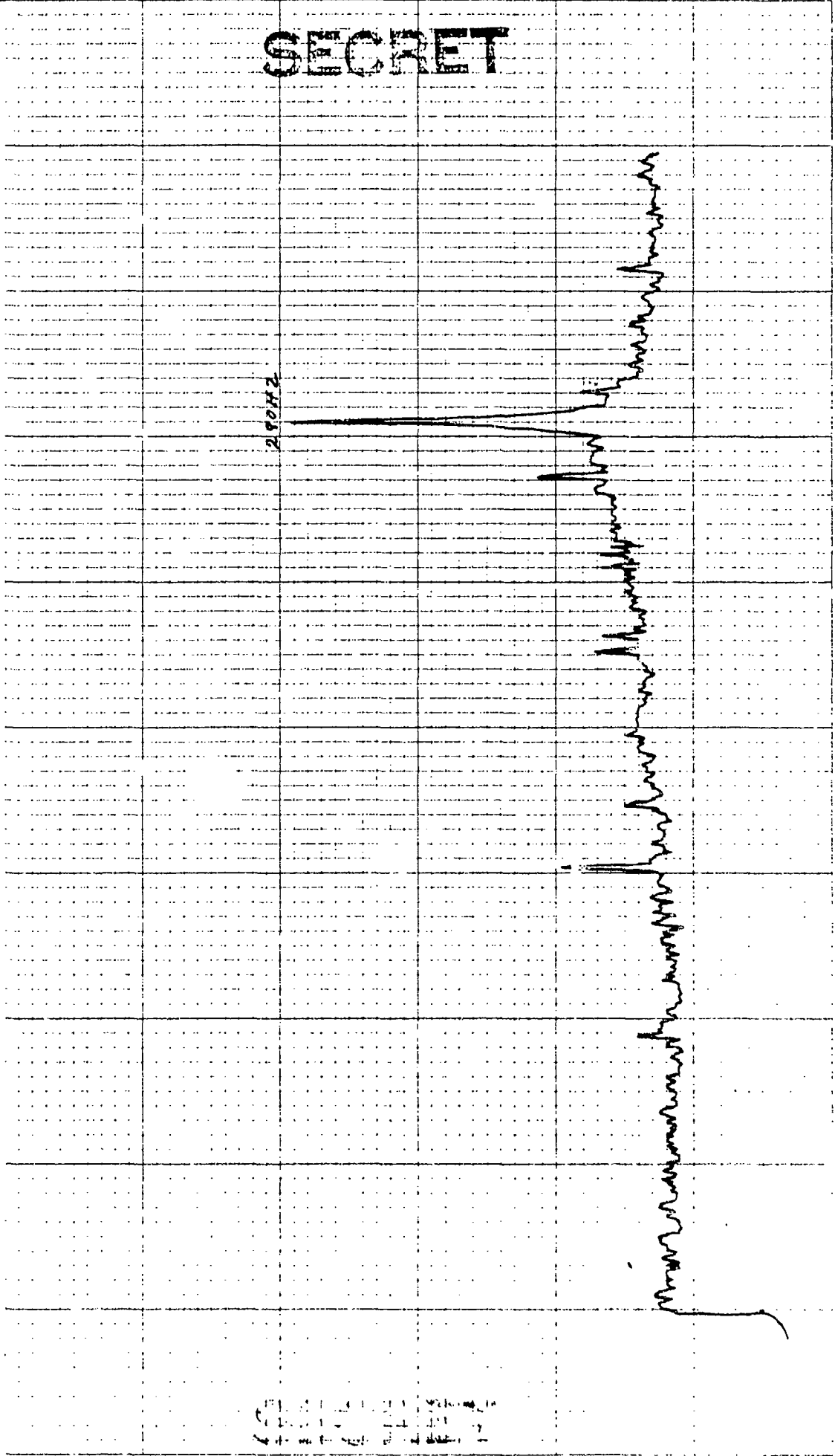
DATE OF ANALYSIS: 1-26-89-53)
DATE/TIME: 3-15-77 - 2:13 / Z
ANALYSIS BANDWIDTH: 1/10 HZ
+ 50 DEG. AZ STEERING

REEL: N10
INDE X 2620

INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTER WTC: HANNING



CONTROL: 2131 - 51 (D89) DATE OF ANALYSIS: 1-26-77 REEL: A10 INDE X 360
 BEAMFORMED SPECTRUM (ELEMENTS) 28-53
 EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 2:31Z INTEGRATION TIME 320 SECS ATTN: -30 DB
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
51 ELEMENTS + 44 DEG. AZ STEERING



NOE
1/2 INCH TO TIME INCHES
1/2 INCH TO BEER 00 1/2 INCHES

46 0703

INDE X 3620

REEL: 710

DATE OF ANALYSIS: - - -

CONTROL: 213(-5/ (DPT)

BEAMFORMED SPECTRUM(ELEMENTS)

EXERCISE: BLARING STAKE

CENTER FREQ: 270 HZ

5/ ELEMENTS

DATE/TIME: 1-26-82 29-53

ANALYSIS BANDWIDTH: 1/10HZ

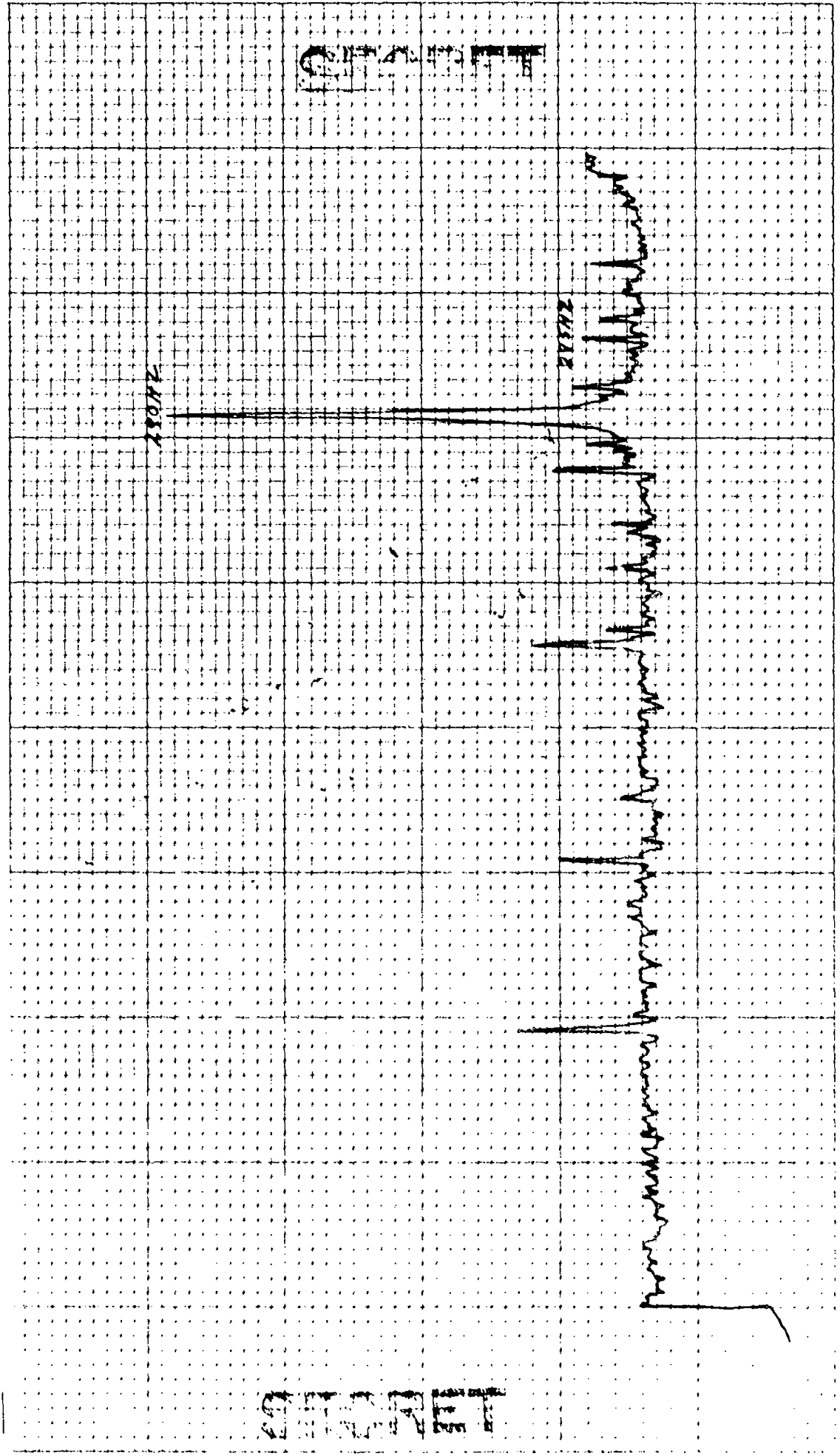
+46 DEG. AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

WTG: HANNING

ATTEN: -30 DB



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

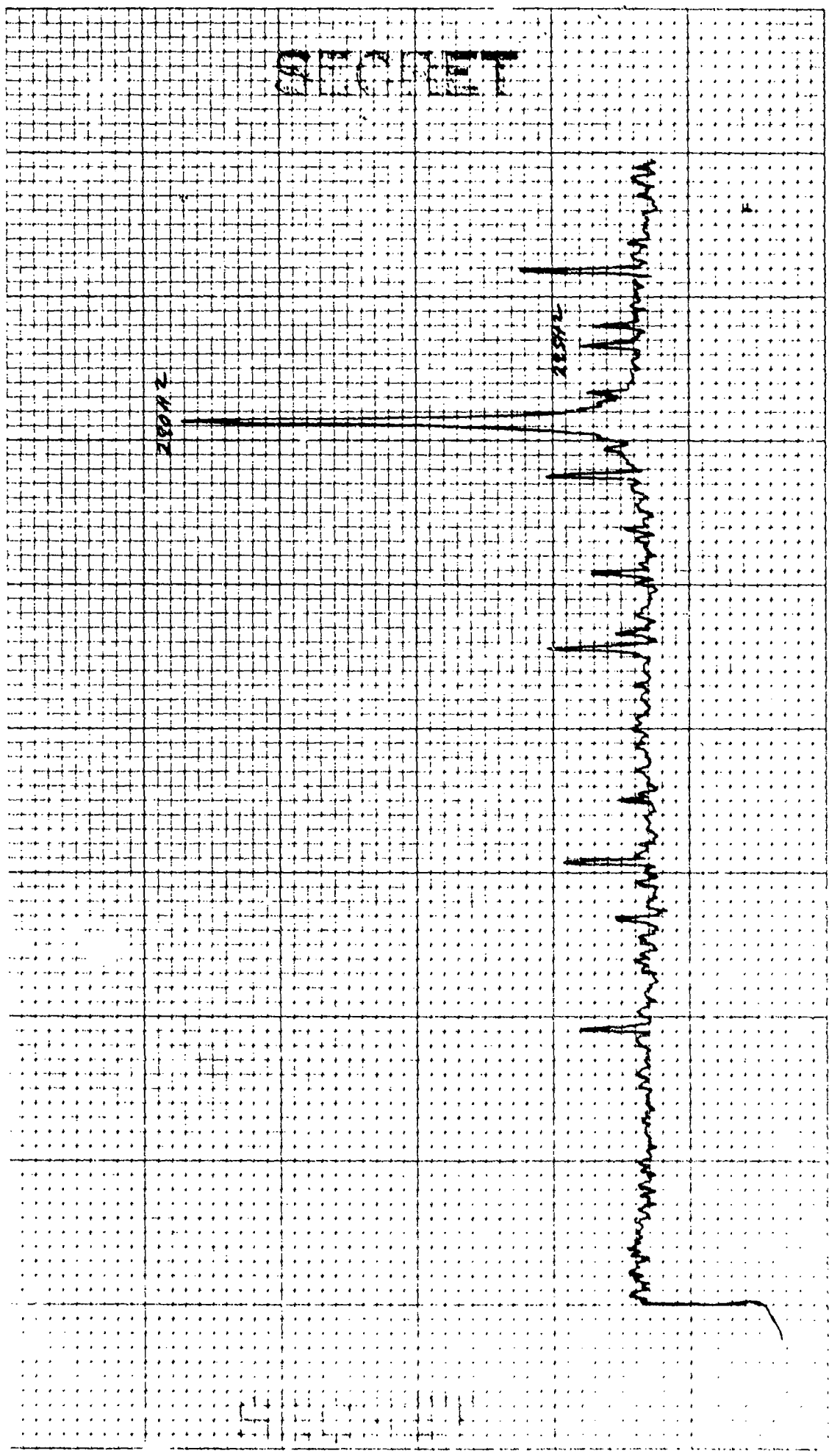
46 0703

CONTROL: 2131 - 51 (DP1)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
51 ELEMENTS

DATE OF ANALYSIS: 1-26-53
DATE/TIME: 3-15-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+ 48 DEG. AZ STEERING

REEL: N10
INDE X3620

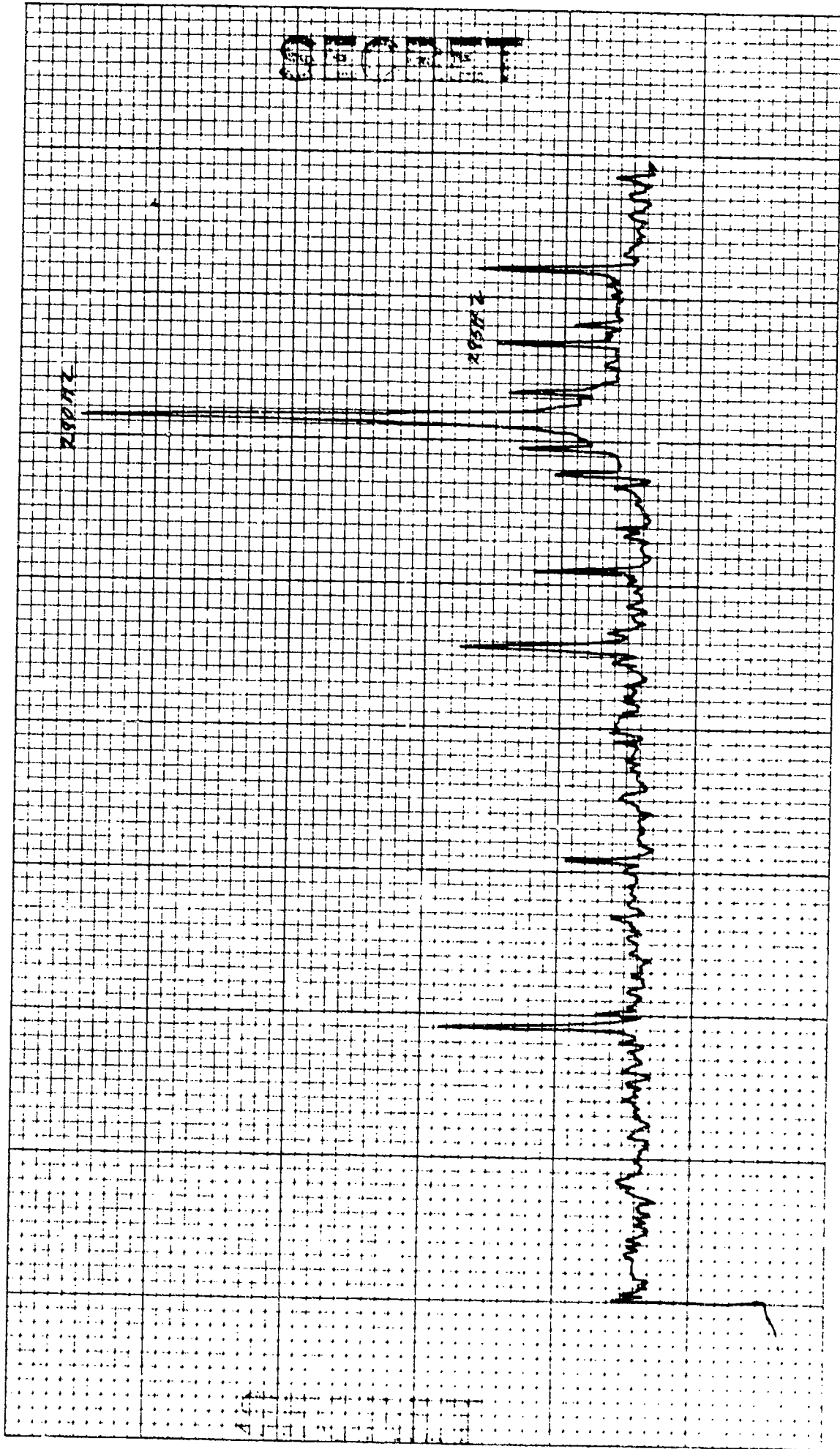
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTIER WTG: HANNING



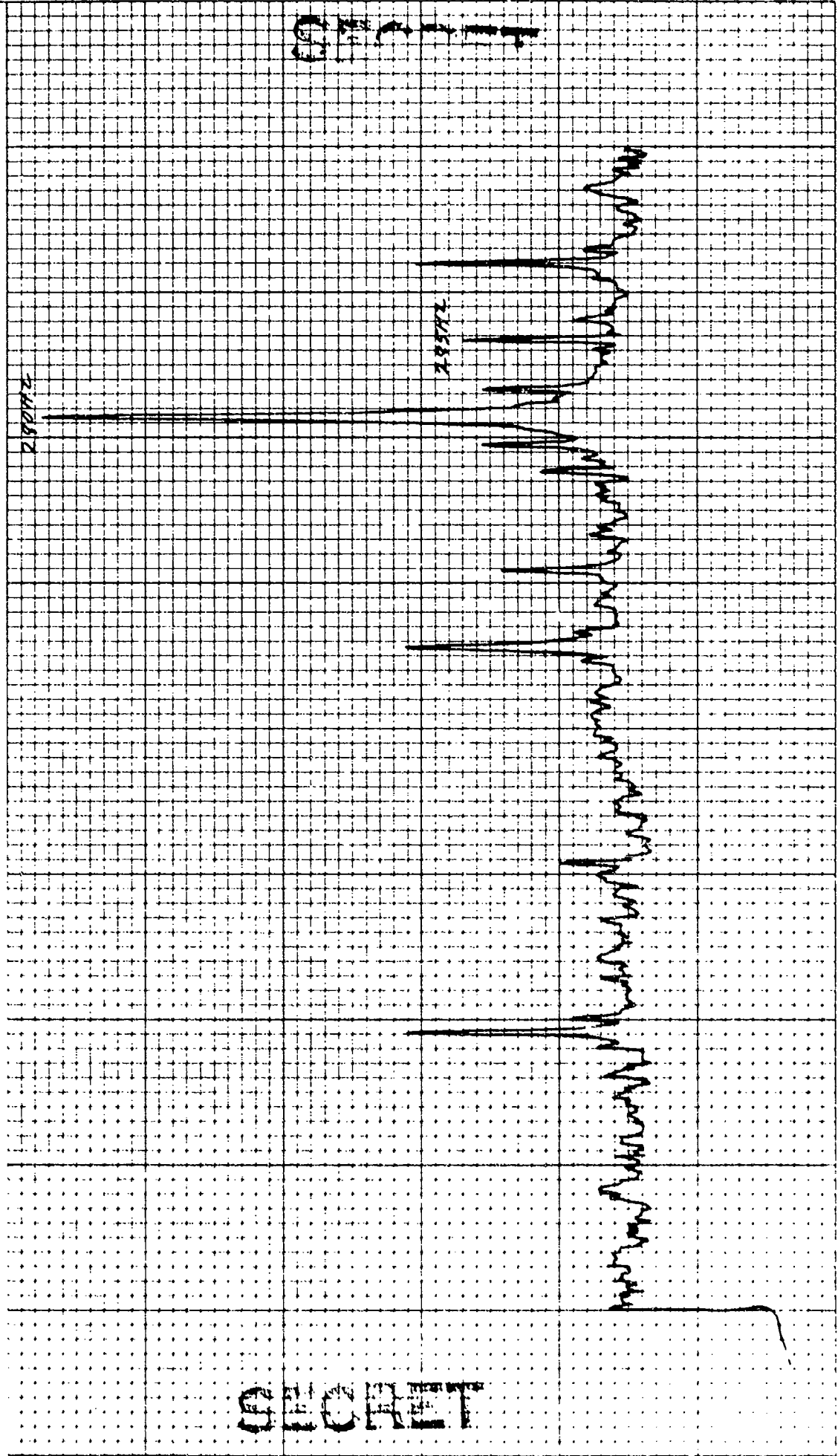
KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2121 - 51 (389) DATE OF ANALYSIS: 1-20-53 REEL: A10 INDE: X360
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 213 / Z INTEGRATION TIME 320 SECS ATTN: -30DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
51 ELEMENTS +50 DEG. AZ STEERING



CONTROL: 2131 - 51 (DP9) DATE OF ANALYSIS: - - REEL: 410 INDE X 3620
BEAMFORMED SPECTRUM (ELEMENTS) 1-26421-53
EXERCISE: BEARING STAKE DATE/TIME: 375-77 - 2151 Z INTEGRATION TIME 320 SECS ATEN: -30DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WIG: HANNING
51 ELEMENTS 457 DEG. AZ STEERING

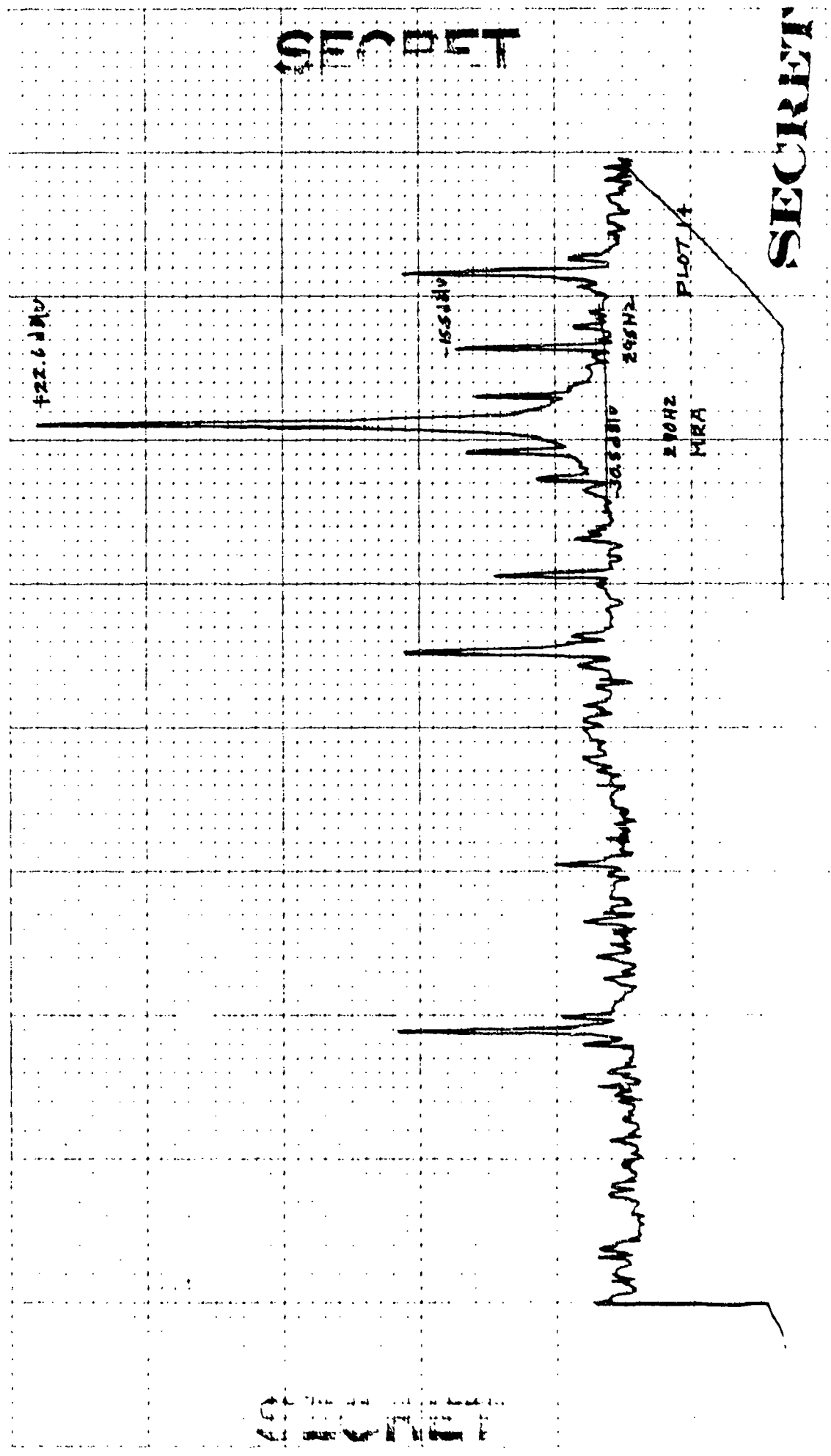


45 0703

1422 2131 2131 2131 2131

SECRET

CONTROL: 2131 - 51 (DP9) DATE OF ANALYSIS: _____ REEL: N10 INDE X 3620
 BEAMFORMED SPECTRUM(ELEMENTS) 1524 2970 53 INTEGRATION TIME 320 SECS ATTEN: - DB
 EXERCISE: BEARING STAKE DATE/TIME: 3/5-77 - 2131 Z FILTER WIG: HANNING
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ
51 ELEMENTS 151.5 DEG. AZ STEERING



270HZ

232Hz

300Hz

SECRET

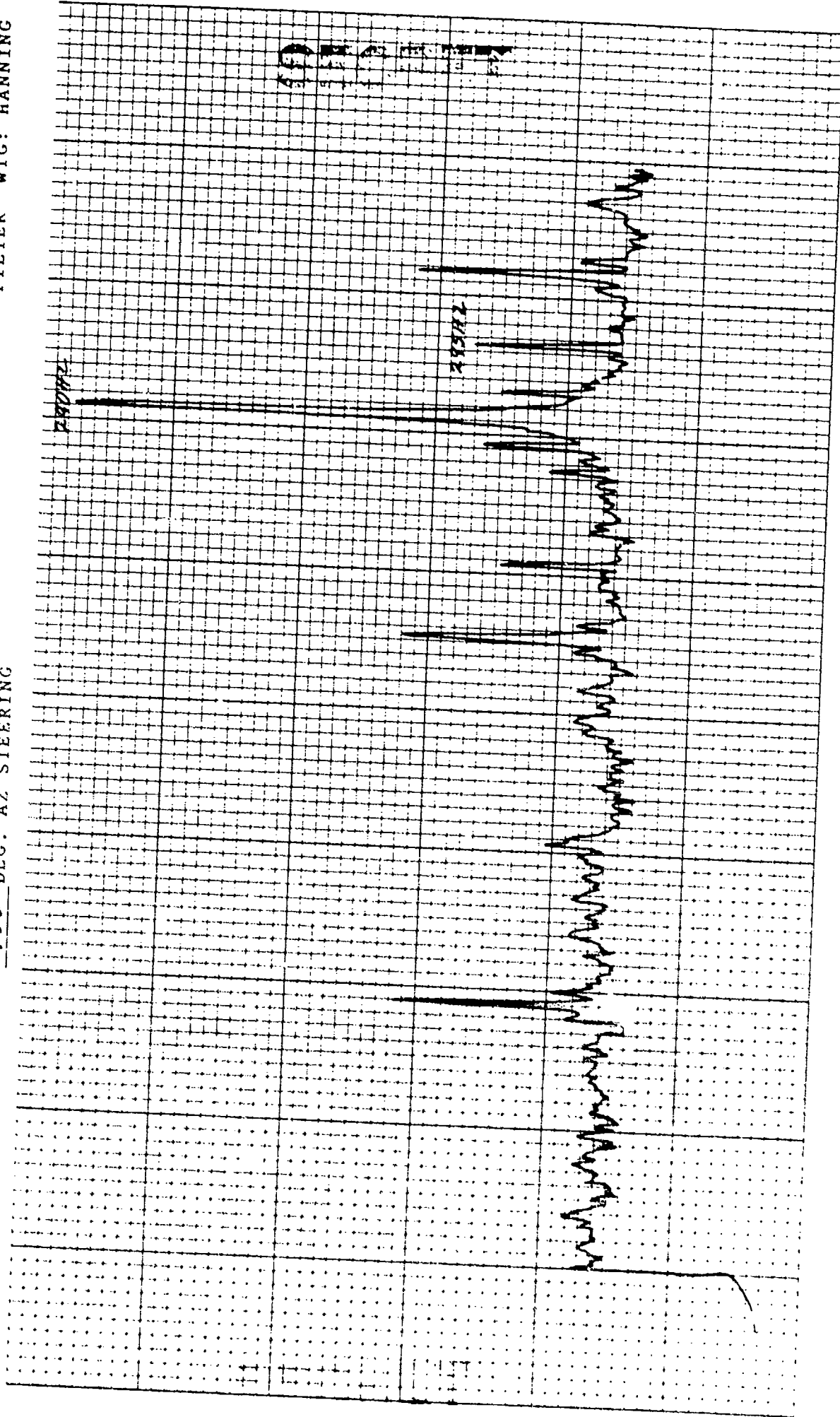
K^oE 10 X 10 TO TIME (INCHES) X 10 INCHES
PEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2131 - 51 (DPF)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
51 ELEMENTS

DATE OF ANALYSIS: 1-26-53
DATE/TIME: 3-15-77-013(Z)
ANALYSIS BANDWIDTH: 1/10 HZ
+52 DEG. AZ STEERING

REEL: 410 INDE X7600
INTEGRATION TIME 320 SECS ATTN: -30 DB
FILTER WIG: HANNING



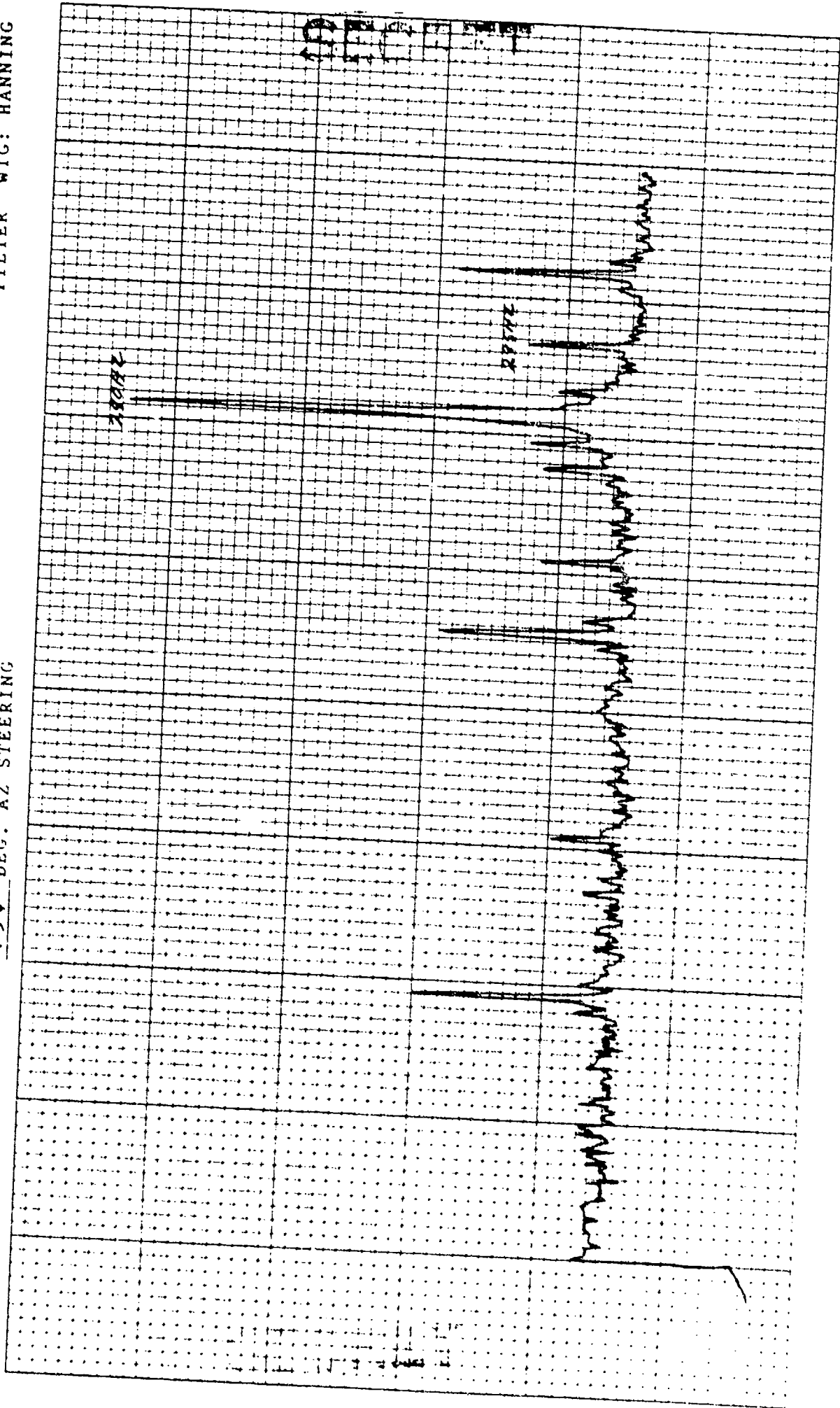
KOE 10 X 10 TO THE INCH • 7 / 10 INCHES
PEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2131 - 51 (DPP)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
51 ELEMENTS

DATE OF ANALYSIS: ---
1-26-53
DATE/TIME: 215-77 - 2121 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+ 54 DEG. AZ STEERING

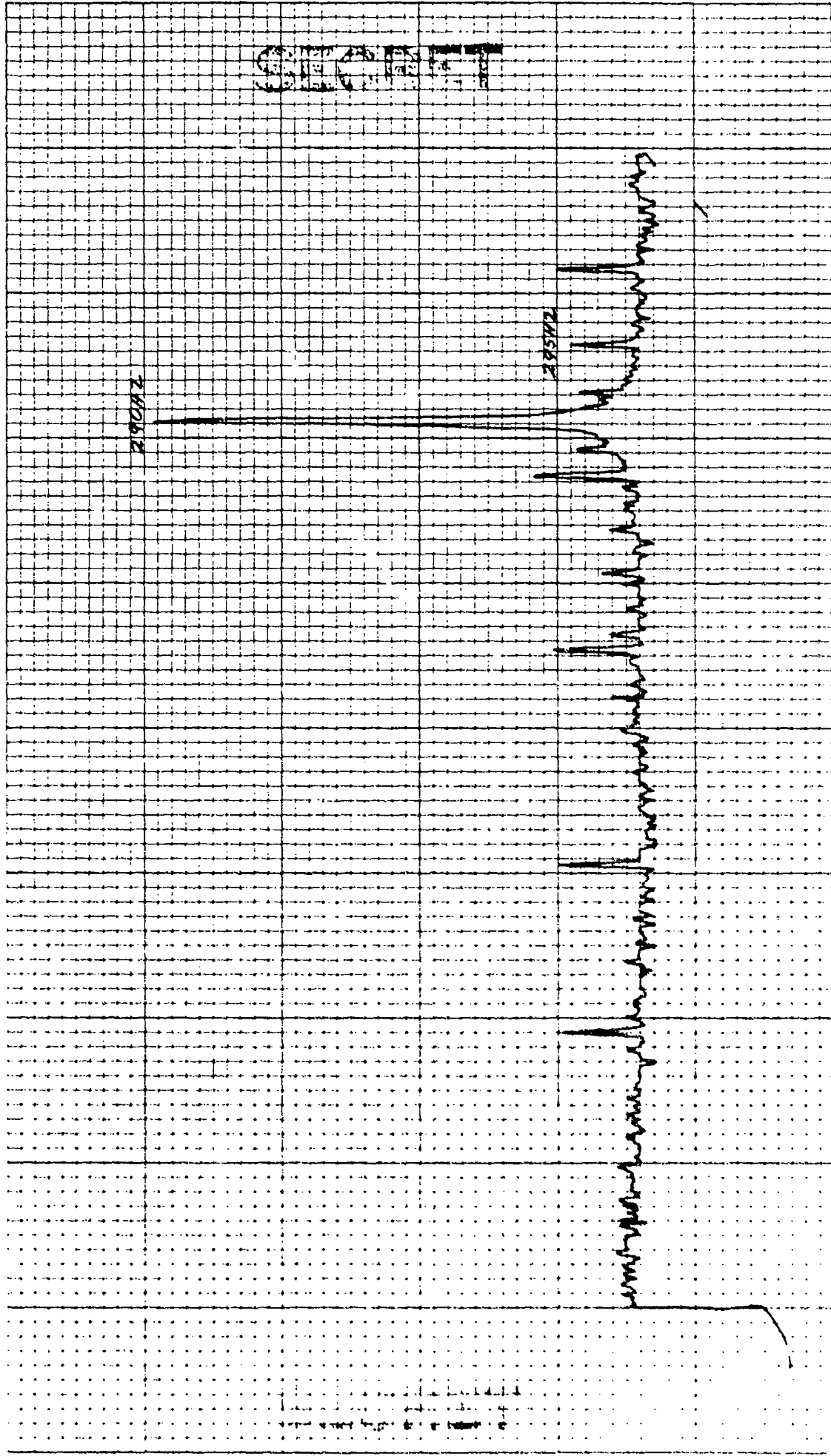
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING
REF: A10
INDE X3620
ATTEN: -30 DB



K·E 10 X 10 TO THE INCH = 2.5 CM. HCFHS
PERFEL & ESCHER CO. MADE IN U.S.A.

46 0703

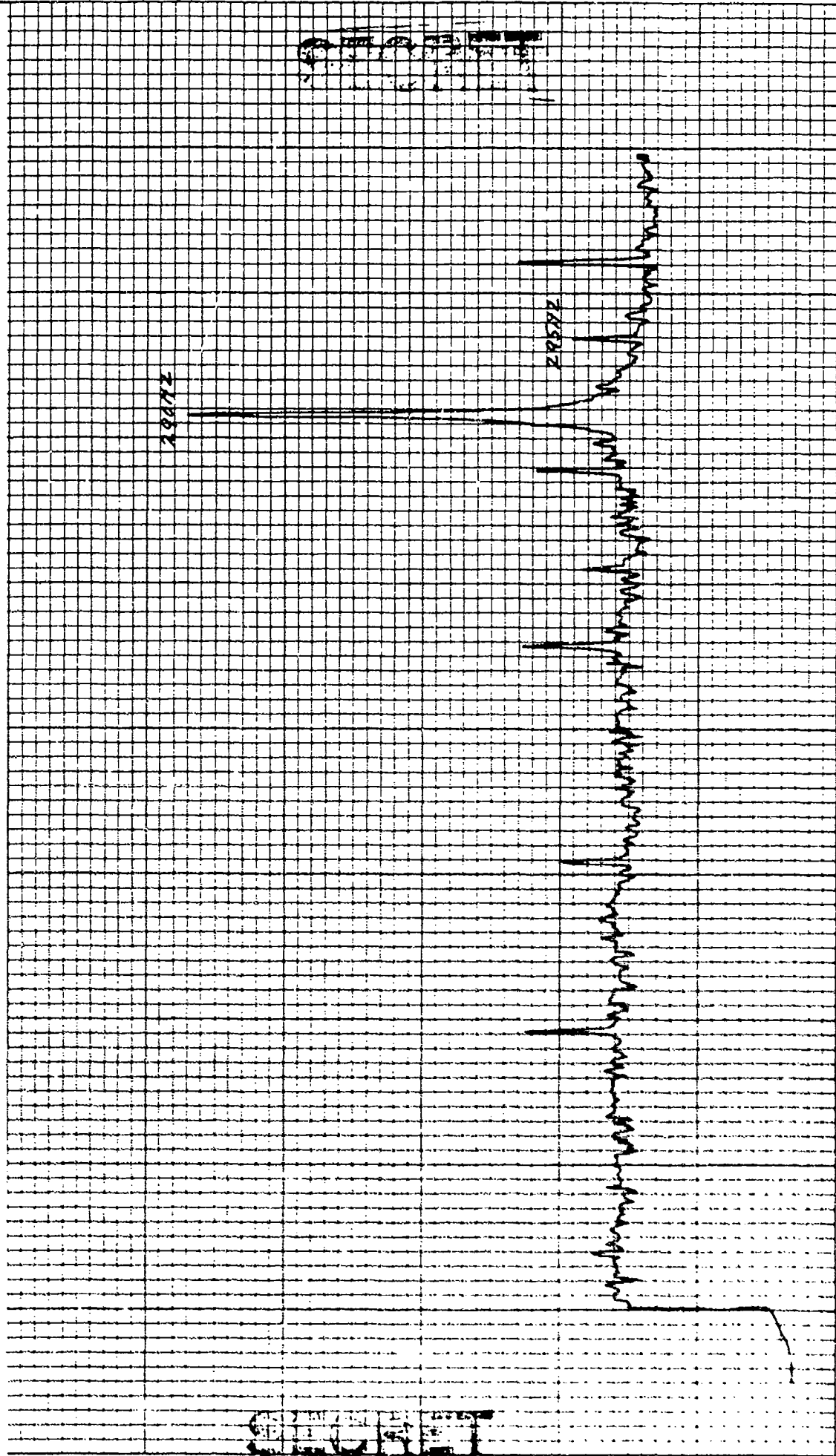
CONTROL: 2131-51 (DP9) DATE OF ANALYSIS: - - REEL: 110 UNDE X 36 20
BEAMFORMED SPECTRUM (ELEMENTS 1-26 & 28-53) INTEGRATION TIME 320 SECS ATTEN: -20 DB
EXERCISE: BEARING STAKE FILTER WTG: HANNING
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ
5/ ELEMENTS + 56 DEG. AZ STEERING



KOE 10 X 10 TO TIME INCH. 7 X 10 INCHES
REUPTEL BY ESCRER CO. MADE IN U.S.A.

46 0703

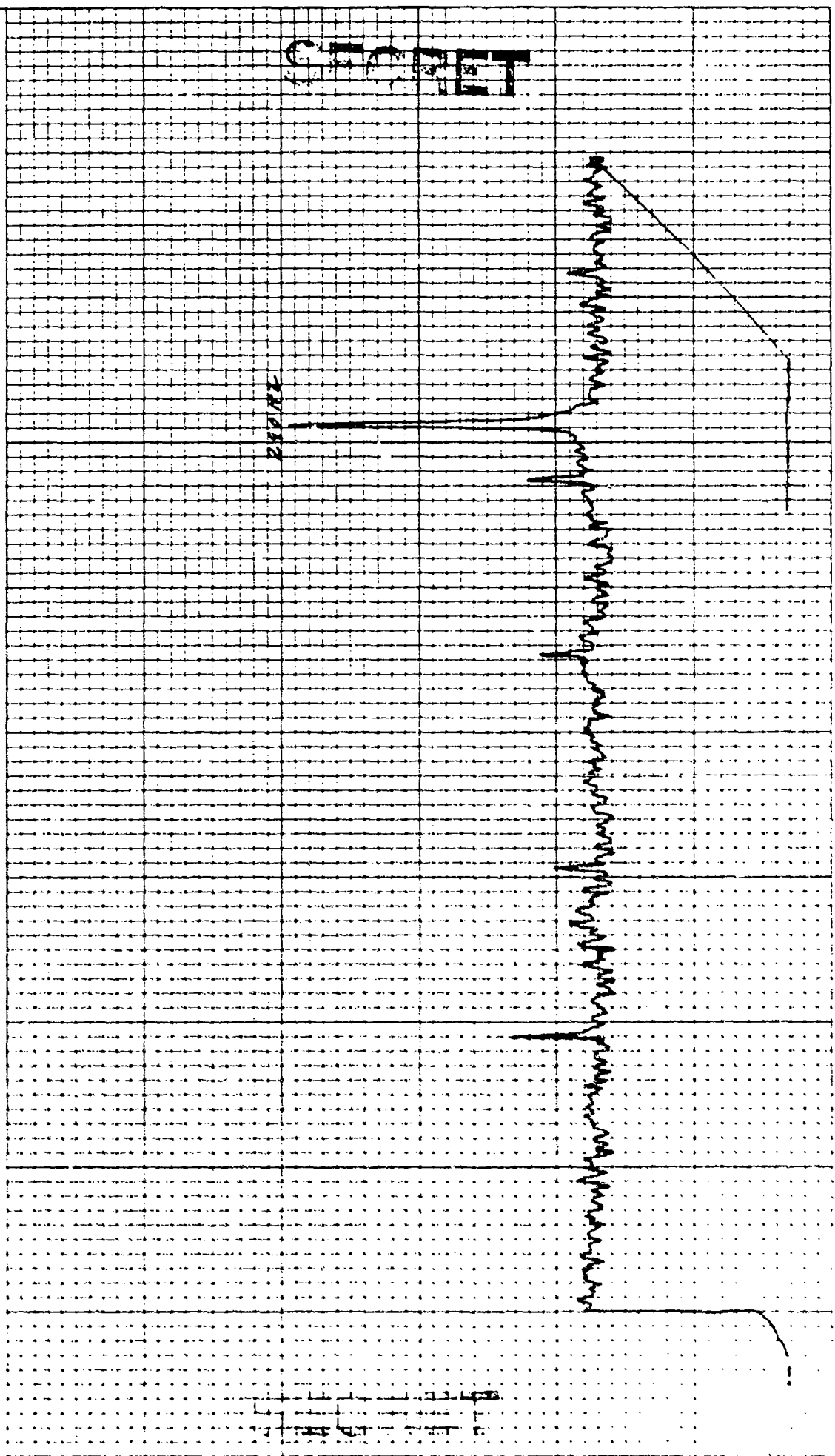
CONTROL: 2131 - 51 (DPF) DATE OF ANALYSIS: REEL: 410 INDE X3600
BEAMFORMED SPECTRUM (ELEMENTS) 1-26 ~~29~~ 53) INTEGRATION TIME 320 SECS ATTN: -30 DB
EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 2131 Z FILTER WTG: HANNING
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ
51 ELEMENTS +50 DEG. AZ STEERING



MOE 10.8 IN TO THE INCHES 2 1/2 INCHES
PULP & COVER CO. INC. N.Y.

46 0703

CONTROL: 2131 - 51 (DP9) REEL: 410 INDE X 3620
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-26-82
EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 2131 Z INTEGRATION TIME 320 SECS ATTN: -30 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTC: HANNING
51 ELEMENTS 460 DEC. AZ STEERING





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

MEMORANDUM FOR DISTRIBUTION LIST

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.

DISTRIBUTION STATEMENT A: Approved for Public Release; Distribution is unlimited.

3. Questions may be directed to the undersigned on (703) 696-4619, DSN 426-4619.

BRIAN LINK
By direction

Subj: DECLASSIFICATION OF LONG RANGE ACOUSTIC PROPAGATION PROJECT
(LRAPP) DOCUMENTS

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Declassified LRAPP Documents

Report Number	Personal Author	Title	Publication Source (Originator)	Pub. Date	Current Availability	Class.
Unavailable	Bossard, David C.	ACOUSTIC ANALYSIS/ASEPS	Wagner Associates	780726	ADA076268	U
NRLMR3832	Heitmeyer, R., et al.	PRELIMINARY RESULTS OF AN ANALYSIS OF BEAM NOISE IN THE MEDITERRANEAN (U)	Naval Research Laboratory	780901	ADC 616 220	U
Unavailable	Watrous, B. A.	PARKA I OCEANOGRAPHIC DATA COMPENDIUM	Naval Ocean R&D Activity	781101	ADB115967	U
Unavailable	Dunbar, B., et al.	LAMBDA PROCESSING LABORATORY AND ENGINEERING SUPPORT, FINAL REPORT 1 JANUARY 1977 - 31 OCTOBER 1978	Texas Instruments, Inc.	781129	ND	U
Unavailable	Blumen, L. S., et al.	ASTRAL MODEL. VOLUME 2: SOFTWARE IMPLEMENTATION	Science Applications, Inc.	790101	ADA956122	U
Unavailable	Spofford, C. W.	ASTRAL MODEL. VOLUME 1: TECHNICAL DESCRIPTION	Science Applications, Inc.	790101	ADA956124	U
Unavailable	Townsend, R., et al.	SELF-TENSIONING ACOUSTICAL HORIZONTAL LINE ARRAY (SPRAY) DATA ANALYSIS. FINAL REPORT OF BEARING STAKE TESTS JANUARY THRU MARCH 1977. VOLUME IA. OVERALL PROGRAM PERFORMANCE RESULTS WITH TEST RESULTS SUMMARY	Sanders Associates, Inc.	790101	ADC017573	U
Unavailable	Unavailable	SELF-TENSIONING ACOUSTICAL HORIZONTAL LINE ARRAY (SPRAY) DATA ANALYSIS. FINAL REPORT OF BEARING STAKE TESTS JANUARY THRU MARCH 1977. VOLUME IB. DETAILED DESCRIPTION, TEST RESULTS	Sanders Associates, Inc.	790101	ADC017574	U
Unavailable	Unavailable	SELF-TENSIONING ACOUSTICAL HORIZONTAL LINE ARRAY (SPRAY) DATA ANALYSIS. FINAL REPORT OF BEARING STAKE TESTS JANUARY THRU MARCH 1977. VOLUME II. DATA ANALYSIS FACILITY AND DATA REDUCTION METHODOLOGY	Sanders Associates, Inc.	790109	ADC017575	U
Unavailable	Unavailable	SELF-TENSIONING ACOUSTICAL HORIZONTAL LINE ARRAY (SPRAY) DATA ANALYSIS. FINAL REPORT OF BEARING STAKE TESTS JANUARY THRU MARCH 1977. VOLUME IIIA. DATA POINTS 1, 2 AND 3 RAW DATA	Sanders Associates, Inc.	790109	ADC017576	U
Unavailable	Unavailable	SELF-TENSIONING ACOUSTICAL HORIZONTAL LINE ARRAY (SPRAY) DATA ANALYSIS. FINAL REPORT OF BEARING STAKE TESTS JANUARY THRU MARCH 1977. VOLUME IIIB. DATA POINTS 4, 5 AND 6 RAW DATA	Sanders Associates, Inc.	790109	ADC017577	U
Unavailable	Unavailable	SELF-TENSIONING ACOUSTICAL HORIZONTAL LINE ARRAY (SPRAY) DATA ANALYSIS. FINAL REPORT OF BEARING STAKE TESTS JANUARY THRU MARCH 1977. VOLUME IVA. DATA POINTS 7, 8 AND 9 RAW DATA	Sanders Associates, Inc.	790109	ADC017578	U