

UNCLASSIFIED

AD NUMBER

ADC017577

CLASSIFICATION CHANGES

TO: unclassified

FROM: secret

LIMITATION CHANGES

TO:
Approved for public release, distribution unlimited

FROM:
Distribution authorized to U.S. Gov't. agencies only; Test and Evaluation; Proprietary Information; 01 FEB 1979. Other requests shall be referred to Commander, Naval Air Development Center, Warminster, PA 18974.

AUTHORITY

31 Dec 1989, per document marking;
CNO/N772 ltr N772A/6U875630, 20 Jan 2006 &
ONR ltr 31 Jan 2006

THIS PAGE IS UNCLASSIFIED

L

AD CO I 7577

DDC FILE COPY

SECRET

2

LEVEL III

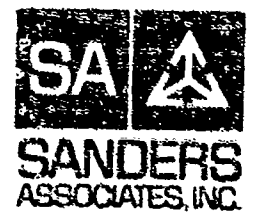
VOLUME IIIB
SELF-TENSIONING ACOUSTICAL
HORIZONTAL LINE ARRAY
(SPRAY)
DATA ANALYSIS (U)

FINAL REPORT OF BEARING STAKE TESTS
JANUARY THRU MARCH 1976

9 JANUARY 1979

PREPARED FOR
NAVAL AIR DEVELOPMENT CENTER
WARMINSTER, PENNSYLVANIA

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



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

DDC
RECEIVED
MAY 13 1979
REGISTRATION
D

79 04 04 514

SECRET

DTIC	White Section	<input type="checkbox"/>
DDO	Dark Section	<input checked="" type="checkbox"/>
UNANNOUNCED JUSTIFICATION		
BY		
DISTRIBUTION/AVAILABILITY CODES		
Dist.	AVAIL. CODE	SPECIAL
B		

SECRET

2

VOLUME IIIB

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

LEVEL III

FINAL REPORT OF BEARING STAKE TESTS

JANUARY THRU MARCH 1977

Volume IIIB, Data Points 4, 5 and
6 Raw Data

9 JANUARY 1979

5421

Distribution limited to U.S. Gov't. personnel
Proprietary Info.; / Feb '79 . Other
For this document must be referred to
NAVAL AIR DEVELOPMENT CENTER
WARMINSTER, PENNSYLVANIA 18974

UNDER CONTRACTS

N62269-77-C-0139

and

N62269-78-M-6884

NATIONAL SECURITY INFORMATION
UNAUTHORIZED DISCLOSURE SUBJECT TO CRIMINAL SANCTIONS

DDC
RECORDED
MAY 16 1979
REGISTRATION
D

PREPARED BY



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

Classification Reviewed & Approved
By

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

CLASSIFIED BY DD254 1 Dec 76
N62269-77-C-0139
Exempt from GDS of EO 11652
Exemption Category 3
Declassify on 31 Dec 1989

SECRET

SAI DOCUMENT CONTROL
1-10-607-0

**Best
Available
Copy**

UNCLASSIFIED

VOLUME

IA	Summary - Test Results
IE	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

89 02 01 014

UNCLASSIFIED

UNCLASSIFIED

TABLE OF CONTENTS

SECTION

- 1.0 Tabular Summary of Signal and SNR Measurements
Summary of Data Point Noise Plots
- 2.0 Data Point 4 2-7-77 1019Z (Single Element Data)
Noise Spectral Density Calculations
Omni Signal Levels vs. Element Position Number Plots
Omni ALIU Plots
- 3.0 Data Point 4 2-7-77 1019Z (16 Element Beamformed Data)
FRAZ Recording
Signal Level and SNR Calculations
Signal Gain and Array Gain Calculations
Beamformed ALIU Plots
- 4.0 Data Point 4 2-7-77 1019Z (32 Element Beamformed Data)
Signal Level and SNR Calculations
Signal Gain and Array Gain Calculations
Beamformed ALIU Plots
- 5.0 Data Point 4 2-7-77 1019Z (51 Element Beamformed Data)
Signal Level and SNR Calculations
Signal Gain and Array Gain Calculations
Beamformed ALIU Plots
- 6.0 Data Point 5 2-7-77 1549Z (Single Element Data)
Noise Spectral Density Calculations
Omni Signal Levels vs. Element Position Number Plots
Omni ALIU Plots
- 7.0 Data Point 5 2-7-77 1549Z (16 Element Beamformed Data)
FRAZ Recording
Signal Level and SNR Calculations
Signal Gain and Array Gain Calculations
Beamformed ALIU Plots
- 8.0 Data Point 5 2-7-77 1549Z (32 Element Beamformed Data)
Signal Level and SNR Calculations
Signal Gain and Array Gain Calculations
Beamformed ALIU Plots
- 9.0 Data Point 5 2-7-77 1549Z (51 Element Beamformed Data)
Signal Level and SNR Calculations
Signal Gain and Array Gain Calculations
Beamformed ALIU Data

UNCLASSIFIED

UNCLASSIFIED

- 10.0 Data Point 6 2-7-77 2033Z (Single Element Data)
 - Noise Spectral Density Calculations
 - Omni Signal Levels Element Position Number Plots
 - Omni ALIU Plots

- 11.0 Data Point 6 2-7-77 2033Z (16 Element Beamformed Data)
 - FRAZ Recording
 - Signal Level and SNR Calculations
 - Beamformed ALIU Plots

- 12.0 Data Point 6 2-7-77 2033Z (32 Element Beamformed Data)
 - Signal Level and SNR Calculations
 - Signal Gain and Array Gain Calculations
 - Beamformed ALIU Plots

- 13.0 Data Point 6 2-7-77 2033Z (51 Element Beamformed Data)
 - Signal Level and SNR Calculations
 - Signal Gain and Array Gain Calculations
 - Beamformed ALIU Plots

UNCLASSIFIED

UNCLASSIFIED

NOTE ALI Plot Scales for Beamformed and

Omni Data are NOT the same.

SNR comparisons cannot be taken directly
from plot comparisons.

UNCLASSIFIED

SECRET

SUMMARY OF DATA (CONTINUED)

• OMNI NOISE LEVELS

			DATA POINT 1
19 JANUARY 1977			
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	

SECRET

SECRET

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

SECRET

SECRET

• OMNI NOISE LEVELS

16 MARCH 1977

140 Hz
290 Hz

+72.0
+65.5

dBrePa/1 Hz
dBrePa/1 Hz

DATA POINT 12

SECRET

SECRET

O M N I

PO A T M	OPERATIONAL DATA	AVE. SIGNAL LEVEL DBV	AVE. NOISE LEVEL DBV	BAND- WIDTH CORREC- TION	BAND- WIDTH CONVER- SION	ARRAY SENSI- TIVITY	AP CORREC- TION	SNR	LINAR PROBILI- TY CORREC- TION	CORRECT- ED SNR
1	DATE: 1-17-77 TIME: 1551Z RANGE: 910M 280HZ DEPTH: 1600FM 280HZ	-487 -533	-567 -571	-10 -10	+15 +15	+0 +0	+100 +100	7.0 7.8	-4.6 -5.0	+2.2 -2.0
2	DATE: 1-17-77 TIME: 1600Z RANGE: 910M 280HZ DEPTH: 1600FM 280HZ	-515 -512	-566 -559	-10 -10	+15 +15	+0 +0	+100 +100	5.0 4.7	-5.2 -5.4	-1.2 -1.7
3	DATE: 2-7-77 TIME: 0319Z RANGE: 1750M 140HZ DEPTH: 1900FM 280HZ	-325 -316	-457 -487	-10 -10	+10 +10	+12 +0	+100 +100	13.2 10.1	-4.2 -4.3	9.0 5.6
4	DATE: 2-7-77 TIME: 0119Z RANGE: 1750M 140HZ DEPTH: 1900FM 280HZ	-344 -316	-469 -506	-10 -10	+10 +10	+12 +0	+100 +100	12.5 11.0	-4.2 -4.2	8.3 6.8
5	DATE: 2-7-77 TIME: 1549Z RANGE: 1100M 140HZ DEPTH: 1900FM 280HZ	-300 -331	-435 -478	-10 -10	+10 +10	+12 +0	+100 +100	13.5 14.7	-4.2 -4.2	9.3 10.5
6	DATE: 2-7-77 TIME: 2030Z RANGE: 700M 140HZ DEPTH: 1900FM 280HZ	-347 -230	-452 -473	-10 -10	+10 +10	+12 +0	+100 +100	18.5 24.3	-4.0 -4.0	13.5 20.3

SECRET

SECRET

O M N I

DATA	OPERATIONAL DATA	AVG SIGNAL LEVEL DBV	AVG NOISE LEVEL DBV	BANDWIDTH CONVERSION	BANDWIDTH CONVERSION	AREA SENSITIVITY	AP'S SENSITIVITY	SNR	LINEAR PRACTICAL SNR	CORRECTED SNR
7	DATE: 2-15-77 TIME: 0202Z RANGE: 28 NM 140 MZ DEPTH: 1800 FM 280 MZ	-16.0	-80.1	-1.8	+1.0	+1.2	+100	34.1	-4.0	30.1
8	DATE: 2-15-77 TIME: 1501Z RANGE: 28 NM 140 MZ DEPTH: 2800 FM 280 MZ	-19.4	-82.9	-1.8	+1.0	+1.2	+100	33.5	-4.0	29.5
9	DATE: 2-15-77 TIME: 2312Z RANGE: 72 NM 140 MZ DEPTH: 2800 FM 280 MZ	-13.5	-81.0	-1.8	+1.0	+1.2	+100	32.5	-4.0	28.5
10	DATE: 2-15-77 TIME: 0435Z RANGE: 128 NM 140 MZ DEPTH: 2800 FM 280 MZ	-23.3	-86.0	-1.8	+1.0	+1.2	+100	22.7	-4.0	18.7
11	DATE: 2-15-77 TIME: 0935Z RANGE: 128 NM 140 MZ DEPTH: 2800 FM 280 MZ	-29.8	-85.0	-1.8	+1.0	+1.2	+100	20.2	-4.0	16.2
12	DATE: 2-15-77 TIME: 1148Z RANGE: 128 NM 140 MZ DEPTH: 2800 FM 280 MZ	-38.6	-86.7	-1.8	+1.0	+1.2	+100	12.1	-4.2	7.9

SECRET

SECRET

16 ELEMENT ARRAY

OPERATIONAL DATA	SIGNAL LEVEL		CAL. CORR.		SIGNAL CORR.		SIGNAL CORR.		SIGNAL CORR.		SIGNAL CORR.		SIGNAL CORR.		SIGNAL CORR.		SIGNAL CORR.		SIGNAL CORR.		SIGNAL CORR.	
	LEVEL	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U		
1 DATE: 1-15-77 TIME 1810 RANGE: 1500 M DEPTH: 1500 M	100	110	110	20	-325	20	-501	-701	110	110	110	110	110	110	110	110	110	110	110	110	110	110
2 DATE: 1-15-77 TIME 1810 RANGE: 1500 M DEPTH: 1500 M	110	110	110	0	-371	0	-646	-911	110	110	110	110	110	110	110	110	110	110	110	110	110	110
3 DATE: 2-17-77 TIME 0910 RANGE: 1500 M DEPTH: 1500 M	110	110	110	20	-104	20	-310	-570	110	110	110	110	110	110	110	110	110	110	110	110	110	110
4 DATE: 2-17-77 TIME 1010 RANGE: 1500 M DEPTH: 1500 M	110	110	110	20	-172	20	-376	-636	110	110	110	110	110	110	110	110	110	110	110	110	110	110
5 DATE: 2-17-77 TIME 1010 RANGE: 1500 M DEPTH: 1500 M	110	110	110	20	-104	20	-310	-570	110	110	110	110	110	110	110	110	110	110	110	110	110	110
6 DATE: 2-17-77 TIME 2010 RANGE: 1500 M DEPTH: 1500 M	110	110	110	20	-104	20	-310	-570	110	110	110	110	110	110	110	110	110	110	110	110	110	110

SECRET

SECRET

ELEMENT

16

ARRAY

OPERATIONAL DATA	SIGNAL LEVEL DBV	ACQUISITION	BEAM CHANNEL ATTEN	BTC	A+E	J+K	I+5	MISS DBV	ACQUISITION	BEAM CHANNEL ATTEN	ISOM CHANNEL ATTEN	BEAM CHANNEL ATTEN	ARMY TIVITY	ARMY TIVITY	SMR H-F	LINEAR SCALE	CONDUCTED	STIEFR-ANGLE	QTL		
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	
7	DATE: 2-8-77 TIME: 0202Z RANGE: 28 NM DEPTH: 2800 FT	+10	+24	+2	24	+1.2	-41.4	-65.4	+10	+24	+24	+1.2	-1.8	+10	+12	+100	43.6	-4.0	39.8	-21.5	47.8
8	DATE: 3-5-77 TIME: 1501Z RANGE: 22 NM DEPTH: 2800 FT	+10	+18	+2	26	+5.9	-37.1	-61.6	+10	+18	+18	+1.7	-1.8	+10	+12	+100	31.5	-4.0	35.7	+30.0	39.7
9	DATE: 3-5-77 TIME: 212Z RANGE: 22 NM DEPTH: 2800 FT	+10	+12	+1	22	-0.5	-36.7	-62.2	+10	+12	+12	+1.1	-1.8	+10	+12	+100	36.2	-4.0	32.3	+51.5	36.3
10	DATE: 3-5-77 TIME: 0433Z RANGE: 28 NM DEPTH: 2800 FT	+10	+12	+0	22	+8.7	-43.2	-58.4	+10	+12	+12	+1.6	-1.8	+10	+8	+100	31.9	-4.0	48.5	+51.5	52.5
11	DATE: 3-5-77 TIME: 0933Z RANGE: 28 NM DEPTH: 2800 FT	+10	+12	+7	22	-38.9	-42.8	-64.8	+10	+12	+12	+1.7	-1.8	+10	+8	+100	12.9	-4.2	7	+81.5	4.9
12	DATE: 3-16-77 TIME: 1148Z RANGE: 22 NM DEPTH: 2800 FT	+10	+18	+2	22	+5.2	-23.6	-55.6	+10	+12	+12	+1.2	-1.8	+10	+12	+100	28.8	-4.0	35.0	+61.0	28.0
13	DATE: 3-16-77 TIME: 1148Z RANGE: 22 NM DEPTH: 2800 FT	+10	+18	+0	22	-13.8	-37.4	-58.4	+10	+12	+12	+1.8	-1.8	+10	+8	+100	23.6	-4.0	30.4	+61.0	24.4
14	DATE: 3-16-77 TIME: 0933Z RANGE: 28 NM DEPTH: 2800 FT	+10	+18	+2	28	-1	-28.2	-51.2	+10	+18	+18	+1.8	-1.8	+10	+12	+100	27.4	-4.0	23.6	+63.0	27.6
15	DATE: 3-16-77 TIME: 1148Z RANGE: 22 NM DEPTH: 2800 FT	+10	+18	+0	28	-11.4	-36.2	-54.2	+10	+18	+18	+1.8	-1.8	+10	+8	+100	18.8	-4.1	15.5	+62.0	18.6
16	DATE: 3-16-77 TIME: 1148Z RANGE: 22 NM DEPTH: 2800 FT	+10	+18	+2	28	+5.2	-27.1	-55.1	+10	+18	+18	+1.8	-1.8	+10	+12	+100	32.3	-4.0	28.5	+64.0	22.5
17	DATE: 3-16-77 TIME: 1148Z RANGE: 22 NM DEPTH: 2800 FT	+10	+18	+0	28	-11.4	-29.8	-57.8	+10	+18	+18	+1.8	-1.8	+10	+8	+100	17.9	-4.2	14.5	+64.0	18.7

SECRET

SECRET

32 ELEMENT ARRAY

P T #	OPERATIONAL DATA	SIGNAL LEVEL DB	INSTR. CAL. ERROR	BEAM ATTEN	B+C	A+E	J+K	I+G	SIGNAL LEVEL DB	CAL. ERROR	BEAM ATTEN	SEMI-CAL. CORRECT	Range		Beam width	Beam angle	SNR	M-F	Beam width	Beam angle	SIGNAL LEVEL DB		
													Beam width	Beam angle							Beam width	Beam angle	
1	DATE 1-13-57 TIME 1943 RANGE 1500M BEARING 280DE DEPTH 1500M 280DE	-57.5	+10	+10	2.0	-2.2	2.2	-3.4	-7.4	+1.0	+1.0	+1.8	+1.0	+1.0	+1.0	+1.0	17.7	+1.0	+1.0	+1.0	14.1	-5.7	10.6
																	9.0	+1.0	+1.0	+1.0	6.2	-5.7	10.6
2	DATE 1-13-57 TIME 1944 RANGE 1500M BEARING 280DE DEPTH 1500M 280DE	-55.0	+10	+10	1.1	-1.1	1.1	-1.1	-19.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	13.2	+1.0	+1.0	+1.0	9.0	-5.0	14.0
																	7.7	+1.0	+1.0	+1.0	7.0	-5.0	8.5
3	DATE 2-7-57 TIME 0113 RANGE 1500M BEARING 280DE DEPTH 1500M 280DE	-32.6	+10	+2.4	2.8	-2.4	2.4	-2.4	-1.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	24.3	+1.0	+1.0	+1.0	20.7	-2.6	24.7
																	23.4	+1.0	+1.0	+1.0	20.7	-2.6	24.7
4	DATE 2-7-57 TIME 0113 RANGE 1500M BEARING 280DE DEPTH 1500M 280DE	-32.2	+10	+2.4	2.8	-2.4	2.4	-2.4	-5.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	15.6	+1.0	+1.0	+1.0	15.8	-5.0	15.2
																	24.4	+1.0	+1.0	+1.0	24.2	-4.2	24.8
5	DATE 2-7-57 TIME 0113 RANGE 1500M BEARING 280DE DEPTH 1500M 280DE	-31.3	+10	+2.4	2.8	-2.4	2.4	-2.4	-6.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	24.4	+1.0	+1.0	+1.0	24.6	-4.0	24.6
																	24.4	+1.0	+1.0	+1.0	24.6	-4.0	24.6
6	DATE 2-7-57 TIME 0113 RANGE 1500M BEARING 280DE DEPTH 1500M 280DE	-29.0	+10	+2.4	2.8	-2.4	2.4	-2.4	-6.3	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	24.4	+1.0	+1.0	+1.0	24.6	-4.0	24.6
																	24.4	+1.0	+1.0	+1.0	24.6	-4.0	24.6

SECRET

SECRET

MAX.

ELEMENT

ARRAY

I T I T I T	OPERATIONAL DATA	SIGNAL LEVEL dBV	ACPR-33 CAL SIZES TLOW	BEAM- FRANCE ATTN. CORREC- TION	B+C	A+E	JTR	I+5	ADISE LEVEL dBV	ACPR-33 CAL SIZES TLOW	BEAM- FRANCE ATTN. CORREC- TION	BAND- WIDTH CORREC- TION	BAND- WIDTH CORREC- TION	ARRAY FRAN- CIS- TIVITY	APZ COVER- SION	SUR N-F	IMAGE FRAC- TION	CORRECT- ION dB	STRE- NGTH dB	Q+L	
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
7	DATE: 3-8-77 TIME: 0222Z RANGE: 220M 140M2 DEPTH: 2800 FM 285M2	-23.8 -22.8 -25.0	+10 +10 +10	+30 +30 +30	+2 +8 +4	+40 +40 +40	+40 +40 +40	-25.5 -31.6 -32.3	-25.5 -27.6 -22.3	+10 +10 +10	+30 +30 +30	+2 +8 +4	-1.8 -1.8 -1.8	+10 +10 +10	+10 +10 +10	+12 +8 +8	+100 +100 +100	-4.0 -4.0 -4.8	40.4 38.2 3.4	-21.5 -21.5 -21.5	44.4 43.2 8.2
8	DATE: 3-15-77 TIME: 1501Z RANGE: 220M 140M2 DEPTH: 2800 FM 285M2	-27.0 -24.0 -20.0	+10 +10 +10	+30 +30 +30	+2 +8 +8	+40 +40 +40	+40 +40 +40	-31.6 -33.4 -33.1	-27.6 -27.4 -23.1	+10 +10 +10	+30 +30 +30	+2 +8 +8	-1.8 -1.8 -1.8	+10 +10 +10	+10 +10 +10	+12 +8 +8	+100 +100 +100	-4.0 -4.0 -4.2	46.8 40.2 4.7	+20.0 +20.0 +20.0	42.8 50.2 12.9
9	DATE: 3-15-77 TIME: 2152Z RANGE: 220M 140M2 DEPTH: 2800 FM 285M2	-21.8 -18.2 -21.3	+10 +10 +10	+30 +30 +30	+2 +8 +8	+40 +40 +40	+40 +40 +40	-25.2 -21.4 -21.4	-25.2 -21.4 -21.4	+10 +10 +10	+30 +30 +30	+2 +8 +8	-1.8 -1.8 -1.8	+10 +10 +10	+10 +10 +10	+12 +8 +8	+100 +100 +100	-4.0 -4.0 -4.2	41.6 50.1 11.7	+51.5 +51.5 +51.5	46.6 50.1 15.9
10	DATE: 3-15-77 TIME: 0022Z RANGE: 220M 140M2 DEPTH: 2800 FM 285M2	-21.6 -21.6	+10 +10	+30 +30	+2 +8	+34 +34	+34 +34	-20.4 -20.8	-24.4 -24.8	+10 +10	+30 +30	+2 +8	-1.8 -1.8	+10 +10	+10 +10	+12 +8	+100 +100	-4.0 -4.0	28.0 22.1	+6.1 +6.1	31.0 30.1
11	DATE: 3-15-77 TIME: 0932Z RANGE: 220M 140M2 DEPTH: 2800 FM 285M2	-30.4 -27.4	+10 +10	+30 +30	+2 +8	+34 +34	+34 +34	-22.6 -22.1	-27.6 -22.1	+10 +10	+30 +30	+2 +8	-1.8 -1.8	+10 +10	+10 +10	+12 +8	+100 +100	-4.0 -4.0	26.2 20.5	+6.2 +6.2	30.2 34.5
12	DATE: 3-15-77 TIME: 1432Z RANGE: 220M 140M2 DEPTH: 2800 FM 285M2	-22.6 -22.2	+10 +10	+30 +30	+2 +8	+34 +34	+34 +34	-19.6 -23.2	-27.6 -22.2	+10 +10	+30 +30	+2 +8	-1.8 -1.8	+10 +10	+10 +10	+12 +8	+100 +100	-4.0 -4.1	26.2 24.7	+6.4 +6.4	30.2 30.1

SECRET

UNCLASSIFIED

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

DATA POINT 4 DATE 2-7-77 TIME 1019Z

FREQUENCY 140 HZ

INDICATED NOISE LEVEL $\frac{\text{dBV}}{\text{ABW}}$ -46.9

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

BANDWIDTH CONVERSION TO 1 HZ BAND +8.2

CONVERSION TO $\text{dBre}\mu\text{Pa}/\text{1HZ}$ +73.3

UNCLASSIFIED

UNCLASSIFIED

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

DATA POINT 4 DATE 2-7-77 TIME 1017Z

FREQUENCY 290 HZ

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

-50.6

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

-(6-8) -42.6

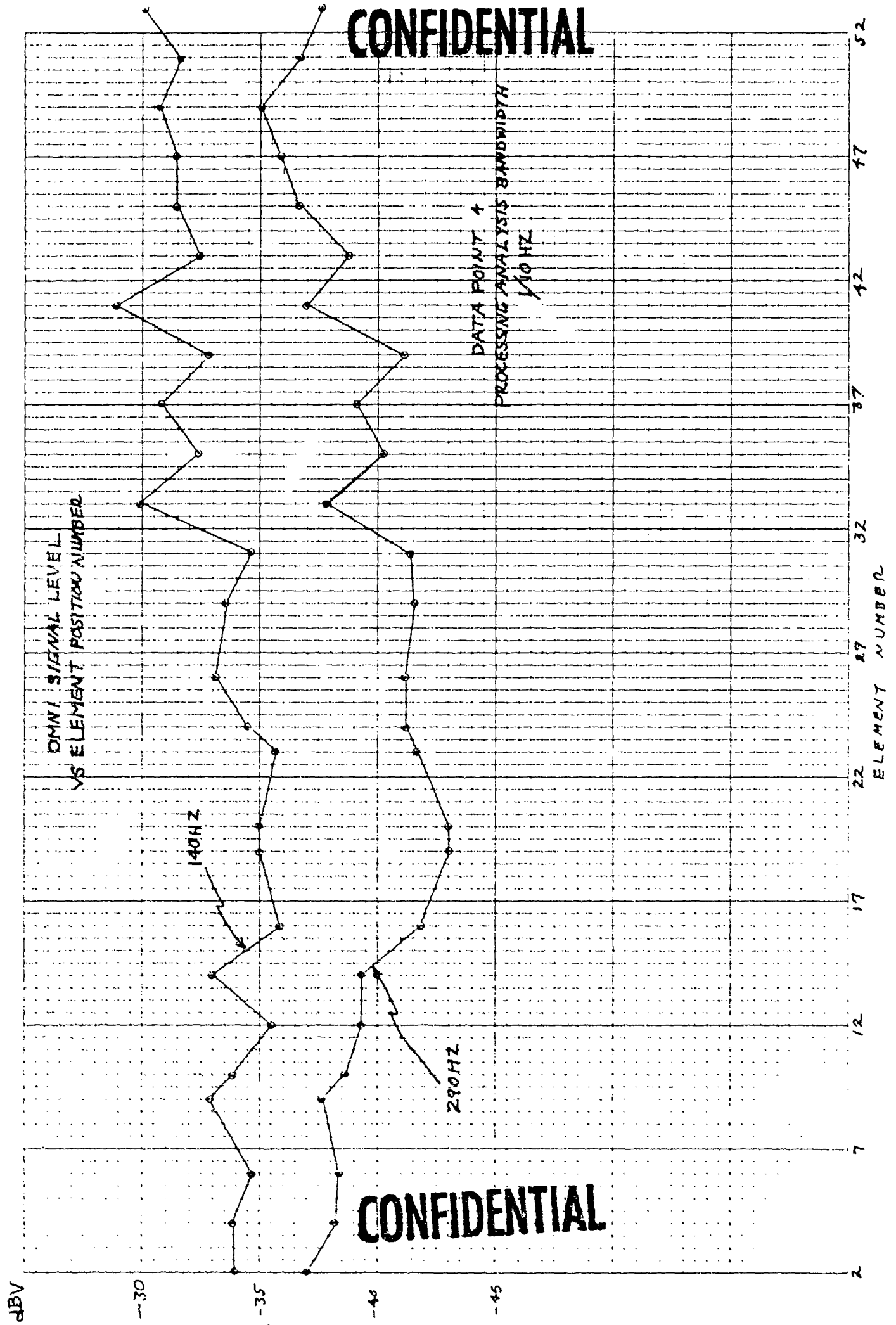
BANDWIDTH CONVERSION TO 1 HZ BAND

+8.2 -34.4

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

+100 +65.6

UNCLASSIFIED



CONFIDENTIAL

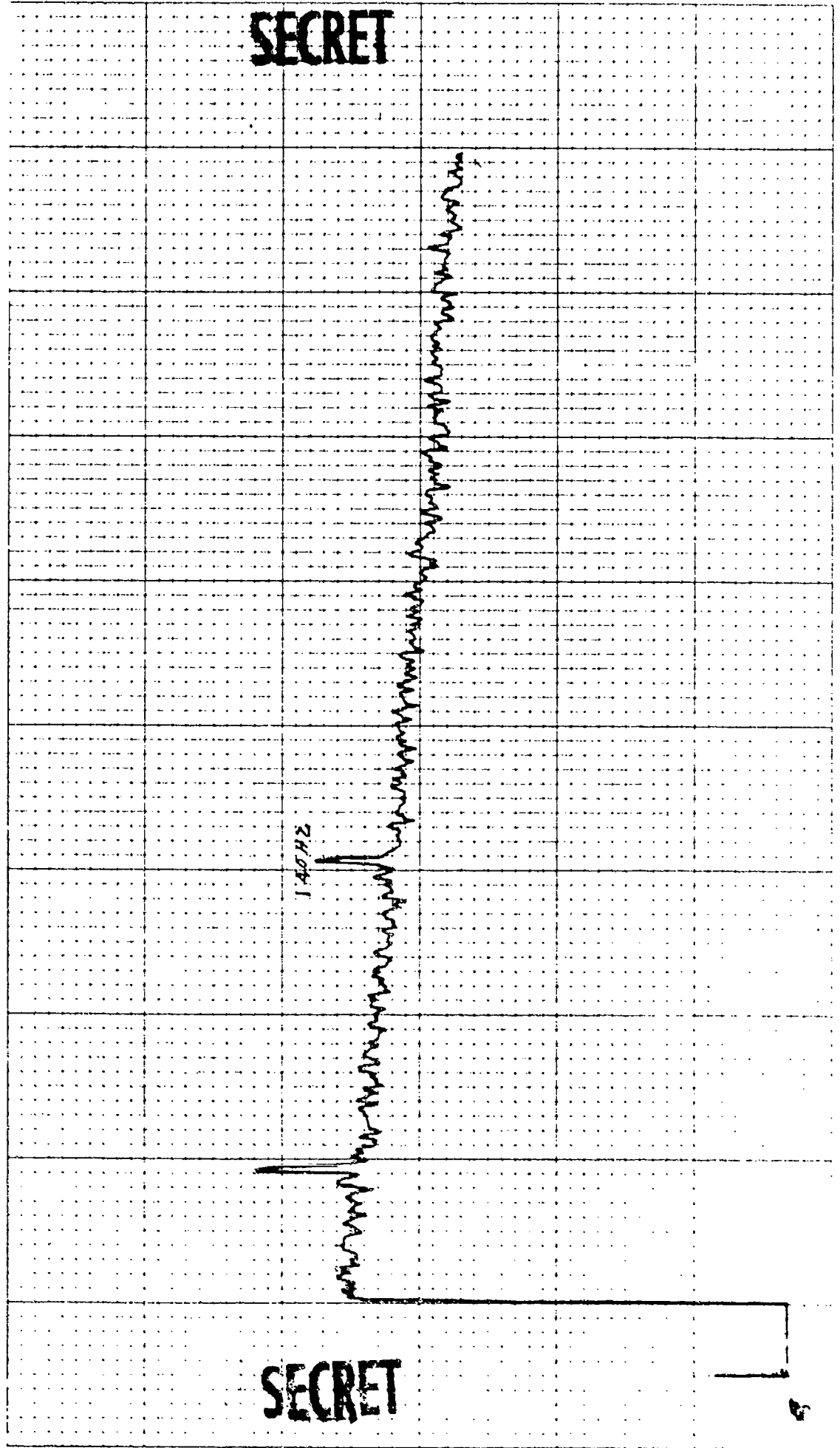
46 0703

H-02 10/19/77 TO THE BUREAU OF THE ARMY

CONTROL: 2-7-1019 (1) DATE OF ANALYSIS: REEL: F15 INDEX 1955
 OMNI SP. CTUM (ELEMENT 2)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 I ELEMENT

INTEGRATION TIME 320 SECS ATTEN: DB
 FILTER WTG: HANNING

DATE/TIME: 2-7-77 - 1019 Z
 ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING



46 0703

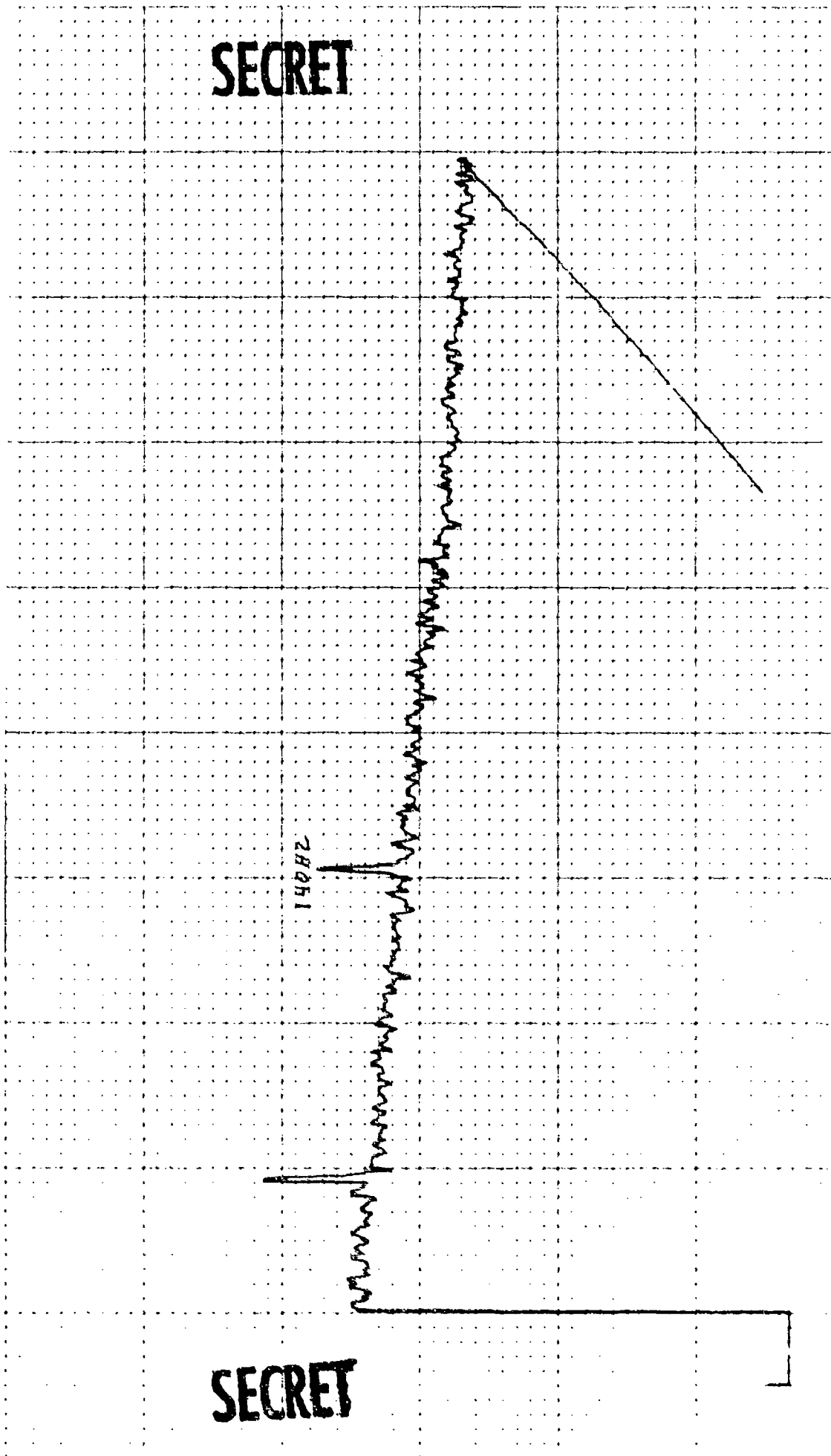
REF: 2-7-77-1019

CONTROL: 2-7-1019 (2)
 OMNI SPECTRUM (ELEMENT 4)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 1 ELEMENT

DATE OF ANALYSIS:
 DATE/TIME: 2-7-77 - 1019 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 DEG AZ STEERING

REEL: F15 INDEX: 1955

INTEGRATION TIME 320 SECS ATTEN: DB
 FILTER WTG: HANNING



SECRET

SECRET

46 0703

REF ID: A66100

CONTROL: 2-7 -1019 (3)
OMNI SPECTRUM (ELEMENT 6)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

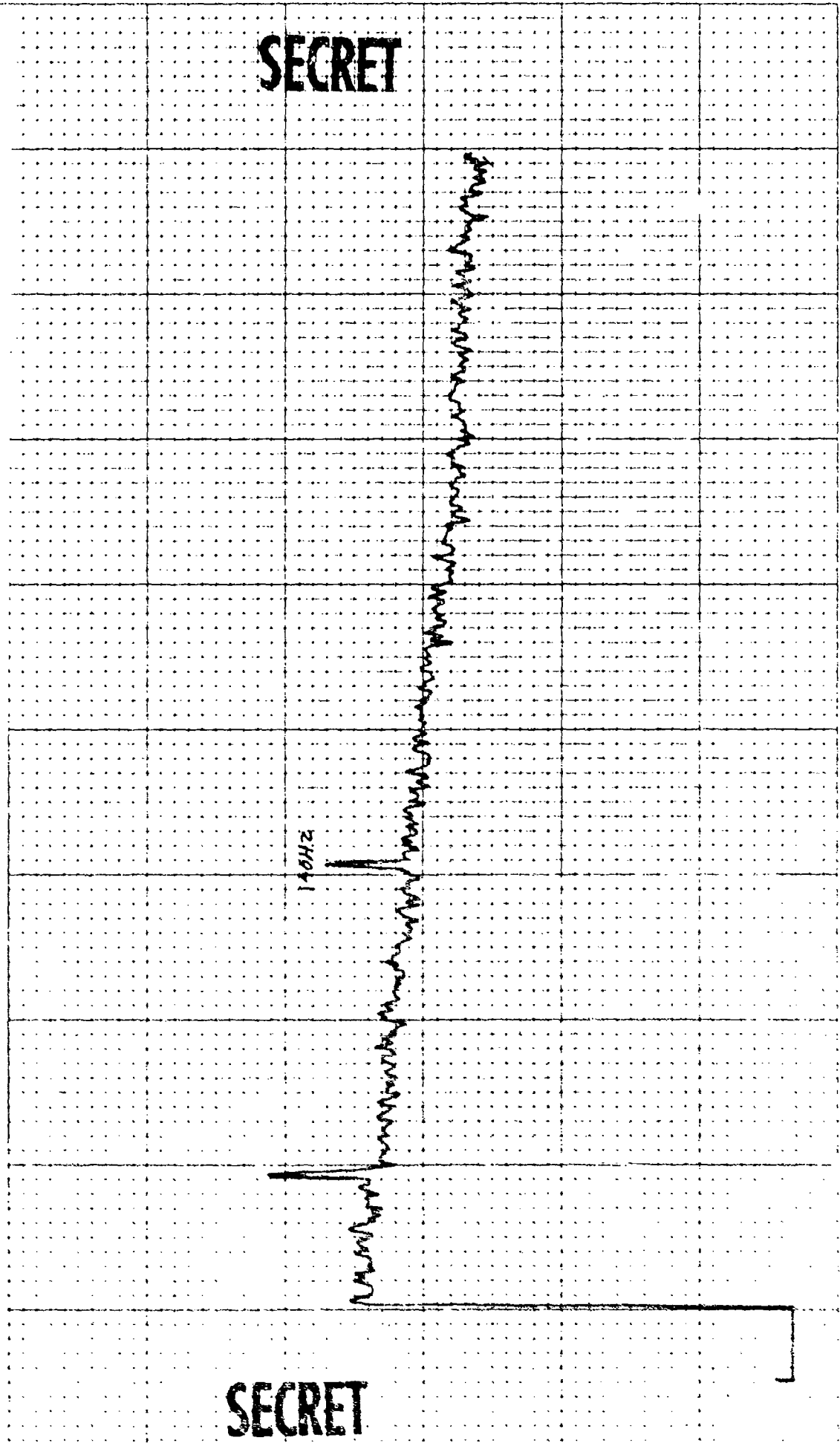
DATE/TIME: 2777 -1019 Z

ANALYSIS BANDWIDTH: 1/10 HZ

 DEC AZ STEERING

REEL: F15 INDEX/955

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



SECRET

SECRET

46 0703

CONTROL: 2-7 - 1019 (Y)
OMNI SPECTRUM/ELEMENT 9)
EXERCISE: BEARING STAVE
CENTER FREQ: 150 HZ
I ELEMENT

DATE OF ANALYSIS:

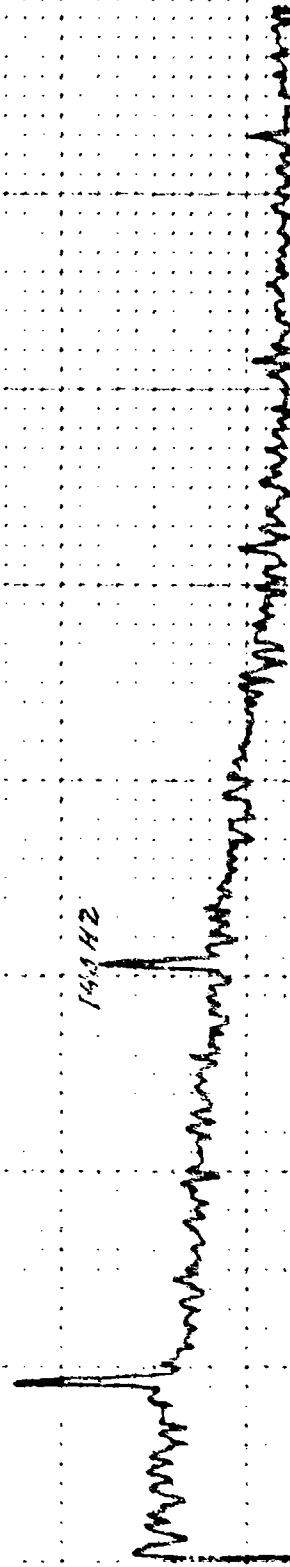
DATE/TIME: 2-7-77 - 1019 Z

ANALYSIS BANDWIDTH: F/10Hz
DEG. AZ STEERING

PEEL: F/S

INDEX/1955

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



SECRET

SECRET

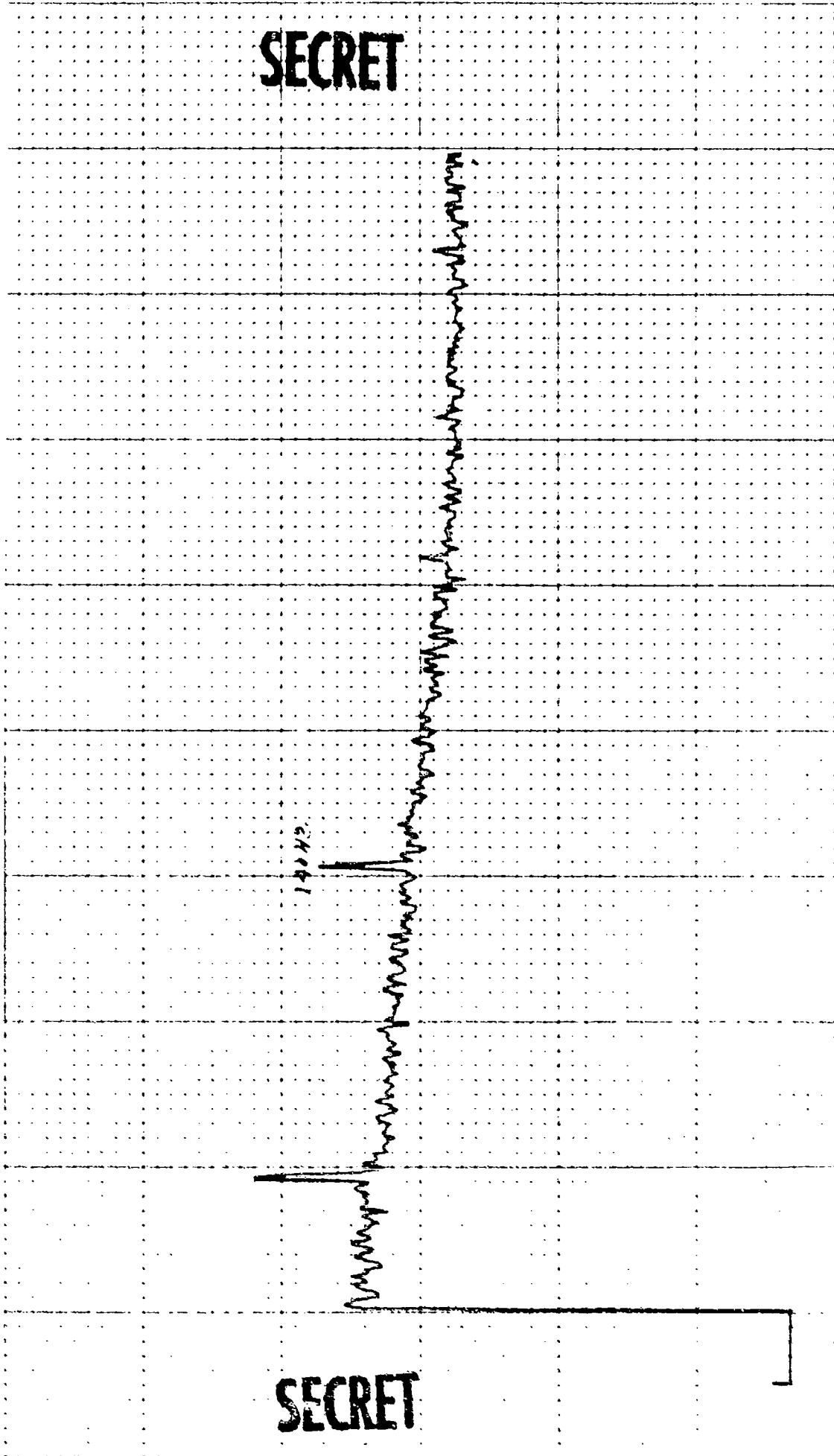
46 0703

KOE 2-7-77 1019 10

CONTROL: 2-7 - 1019 (5) DATE OF ANALYSIS: REEL: F/5 INDEX: 955
 OMNI SPECTRUM (ELEMENT 10)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 1 ELEMENT

INTEGRATION TIME 320 SECS ATTN: DB
 FILTER WTG: HANNING

DATE/TIME: 2-7-77 - 1019 Z
 ANALYSIS BANDWIDTH: 1 / 10 HZ
 _____ DEG AZ STEERING



SECRET

SECRET

46 0703

CONTROL: 2.7 - 1019 (6)
OMNI SPECTRUM (ELEMENT 12)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 MZ
1 ELEMENT

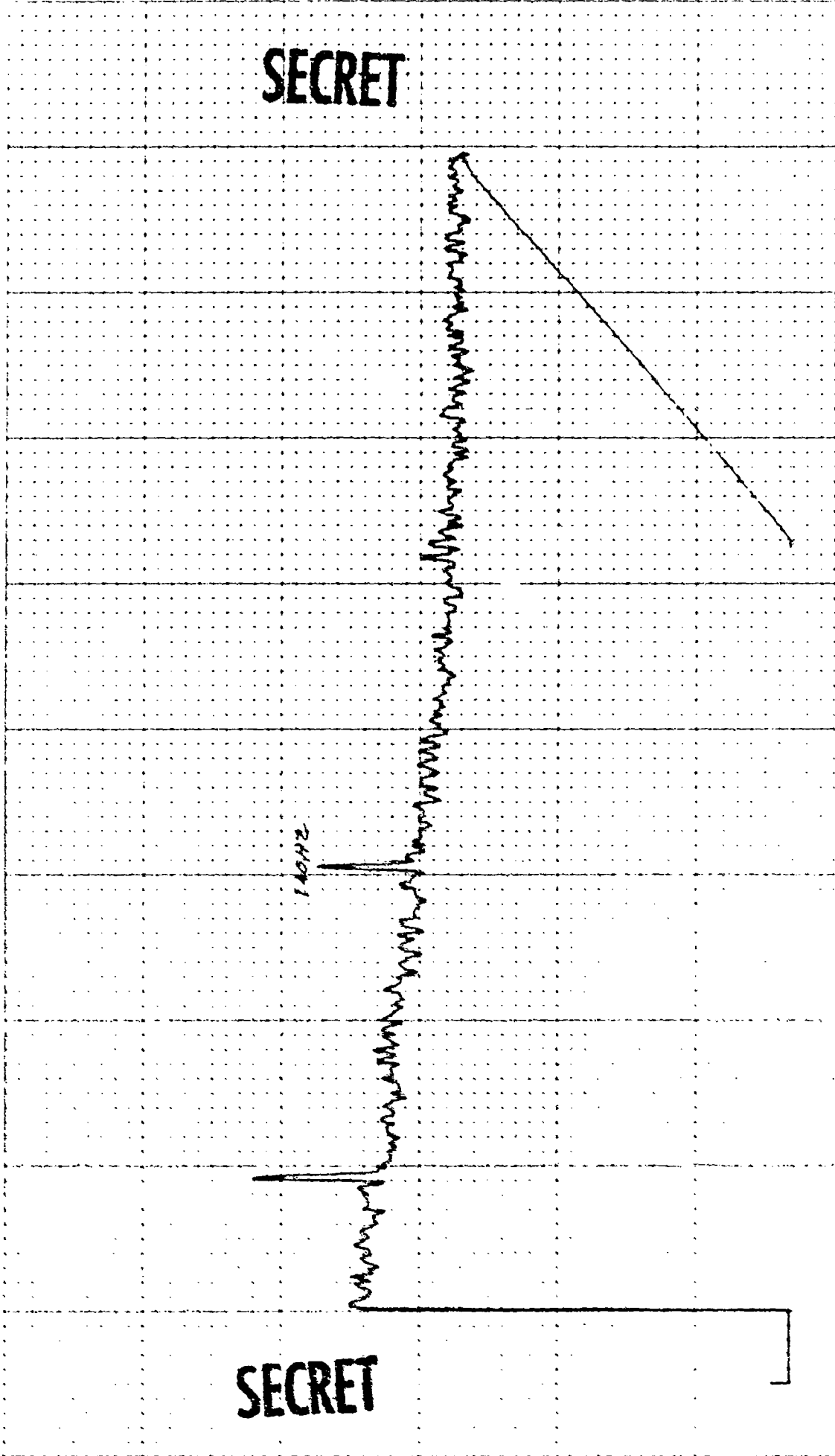
DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

REEL: F/5

INDEX/965

INTEGRATION TIME 320 SECS
FILTER ATTN: DB
WTC: HANNING



K&E 10 X 10 TO THE INCH 8.7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

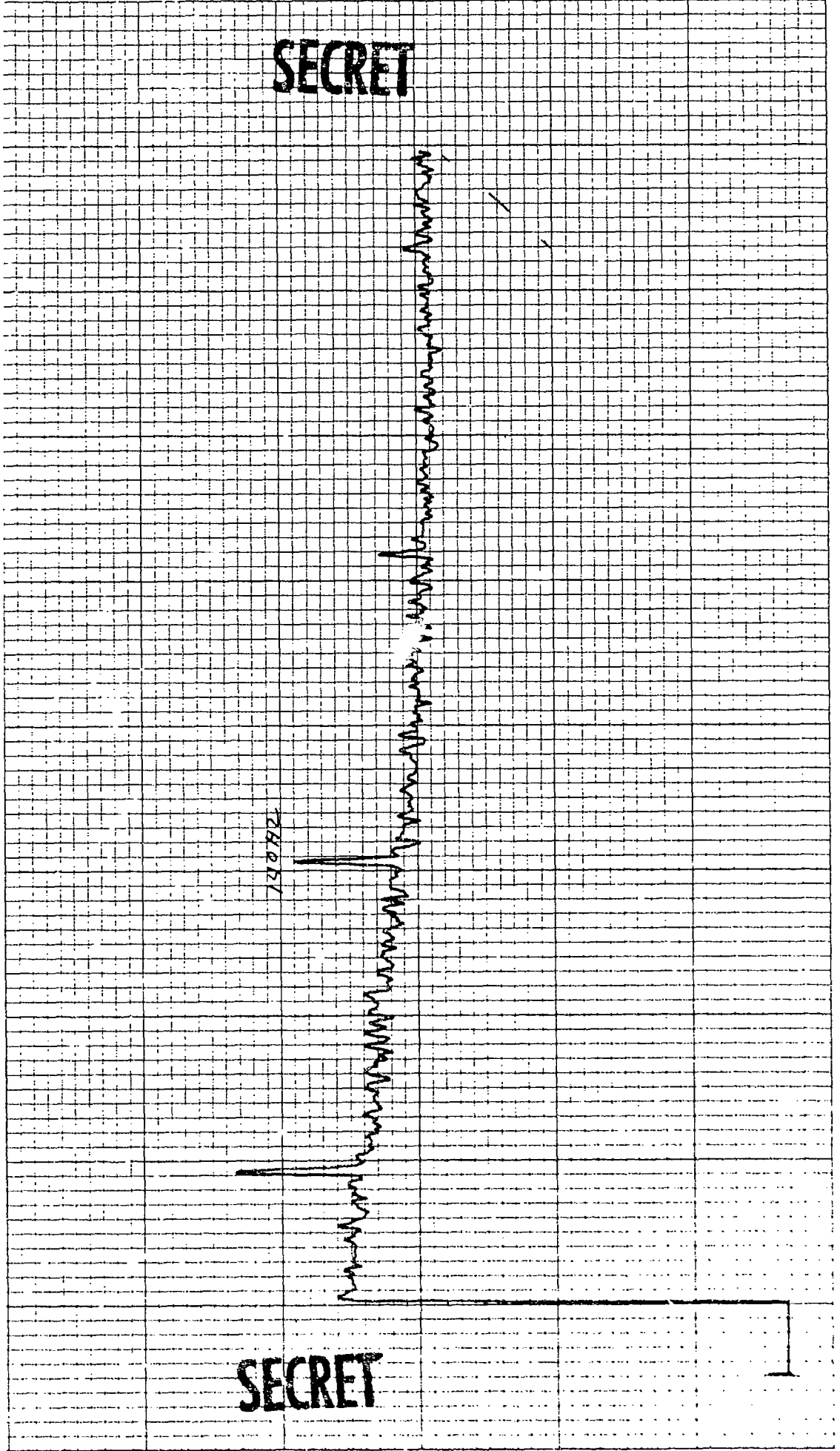
CONTROL: 2-7 - 1019 (7)
OMNI SPECTRUM (ELEMENT 14)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10 HZ
----- DEG AZ STEERING

REEL: F/S INDEX: 1955

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



SECRET

SECRET

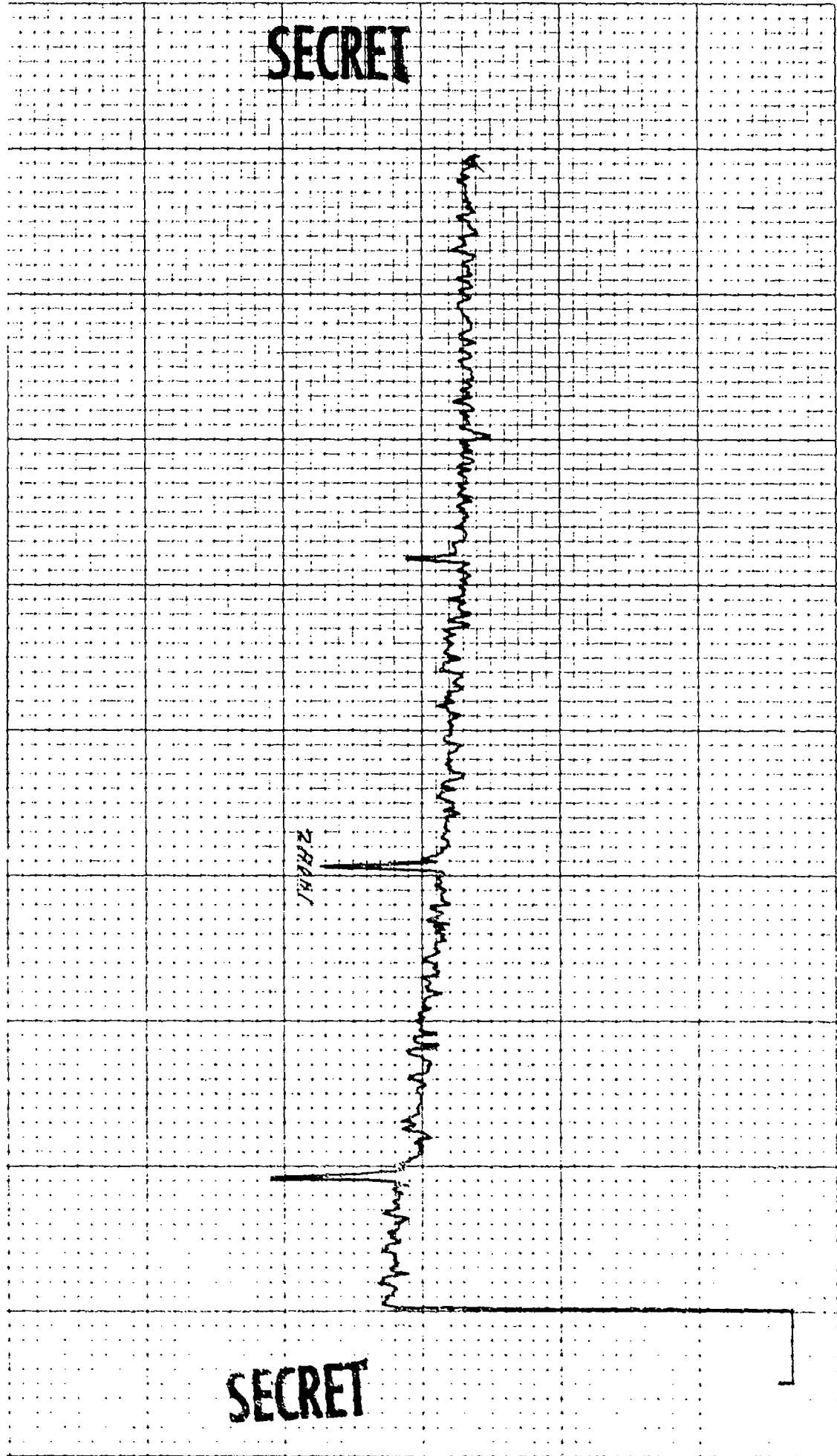
46 0703

REF TO THE INCH. ...

CONTROL: 2-7 - 1019 (0)
 OMNI SPECTRUM (ELEMENT 16)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 1 ELEMENT

DATE OF ANALYSIS:
 DATE/TIME: 2-7-77 - 1019 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 _____ DEC AZ STEERING

REEL: F/S INDEX: 953
 INTEGRATION TIME 320 SECS ATTN: DB
 FILTER WTG: HANNING



SECRET

SECRET

46 0703

REF ID: A66101

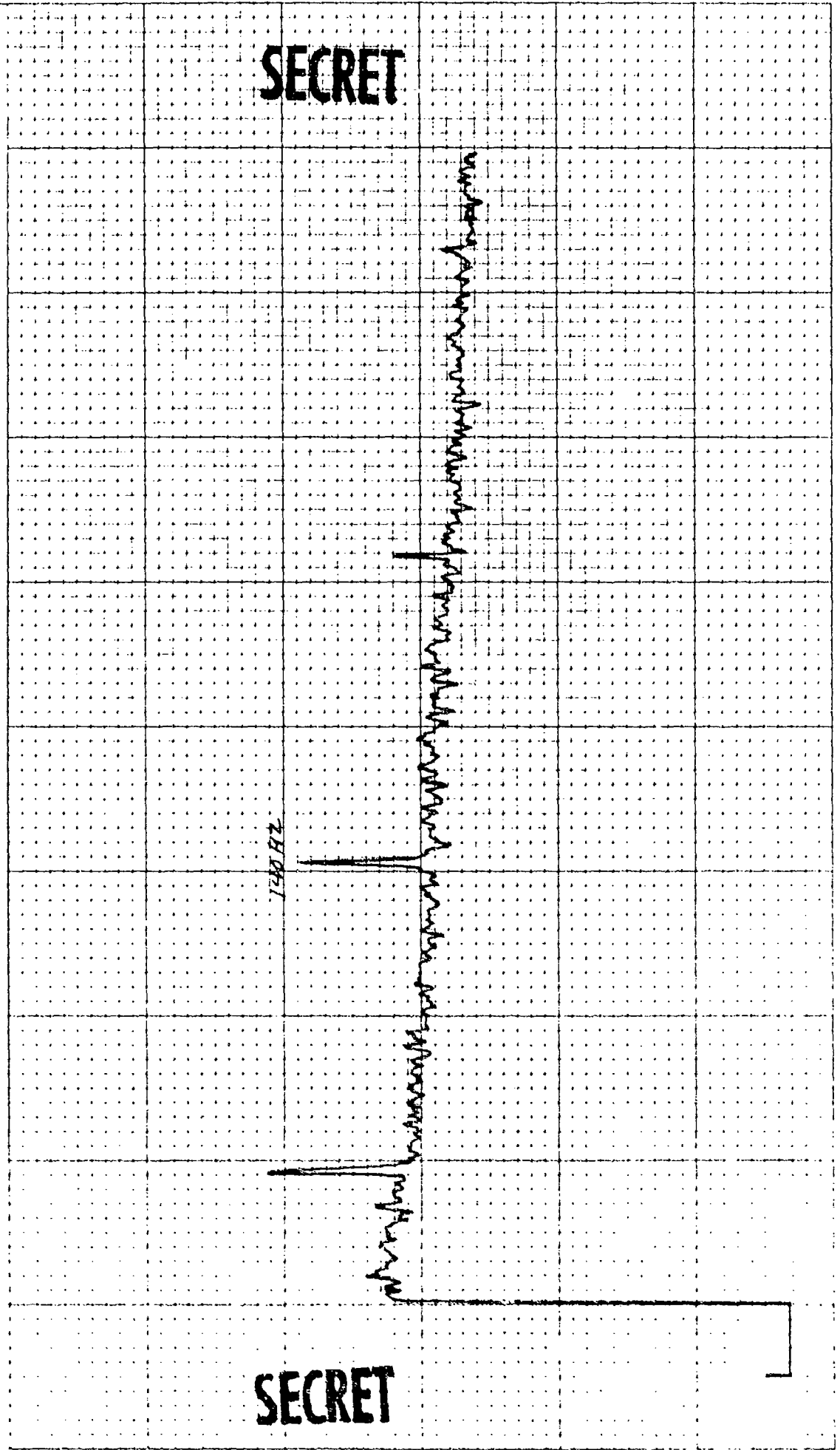
CONTROL: 2-7 -1019 (9)
OMNI SPECTRUM (ELEMENT 19)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
--- DEG AZ STEERING

REEL: F15 INDEX/1955

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



SECRET

SECRET

46 0703

KOE 10 X 10 TO TIME INCHES BY 1/10 HFS
WEIFFEL & ESSER CO. MADE IN U.S.A.

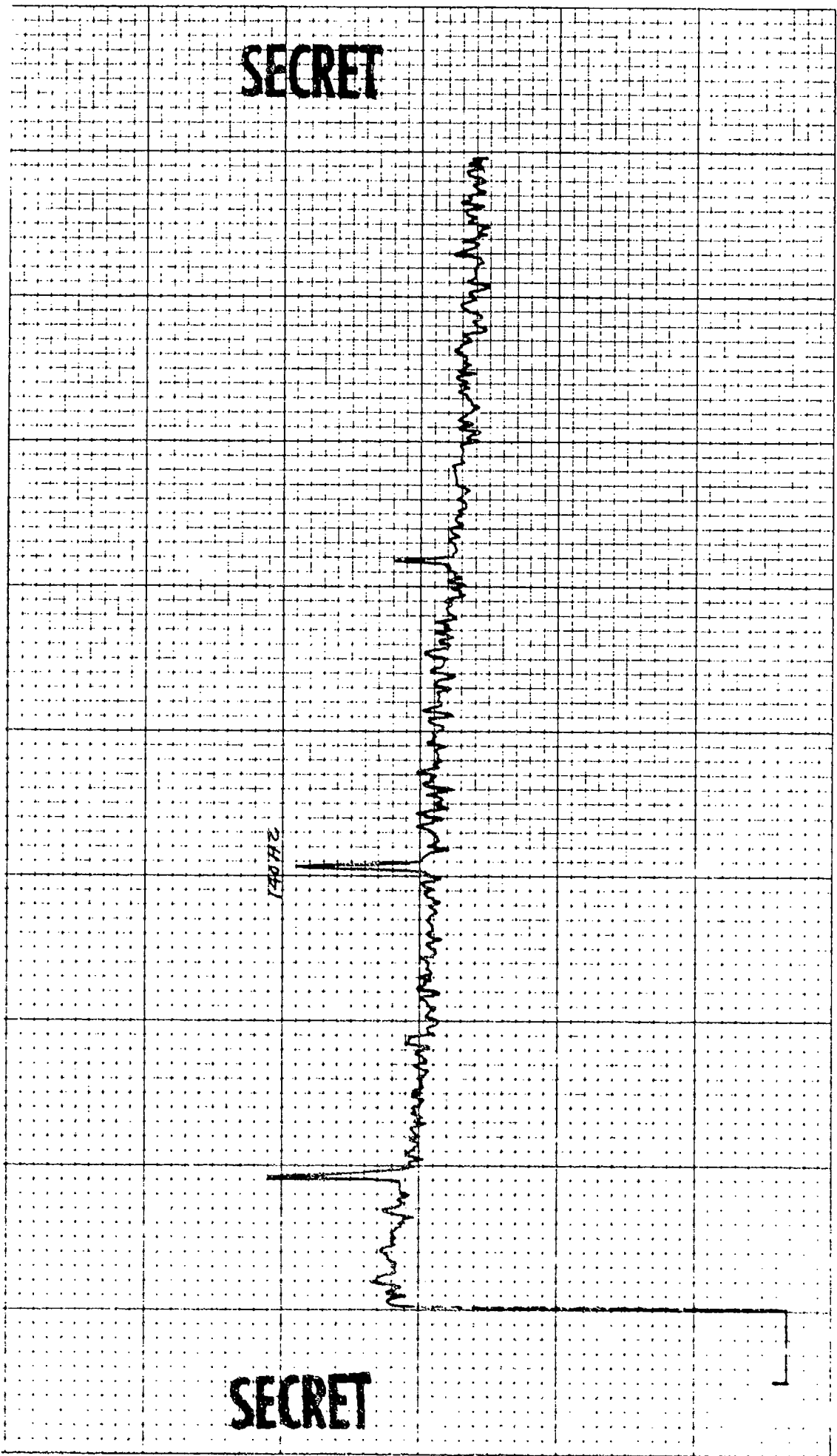
CONTROL: 2-7 - 1019 (10)
OMNI SPECTRUM (ELEMENT 20)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: F-5 INDEX: 1955

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



SECRET

SECRET

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

46 0703

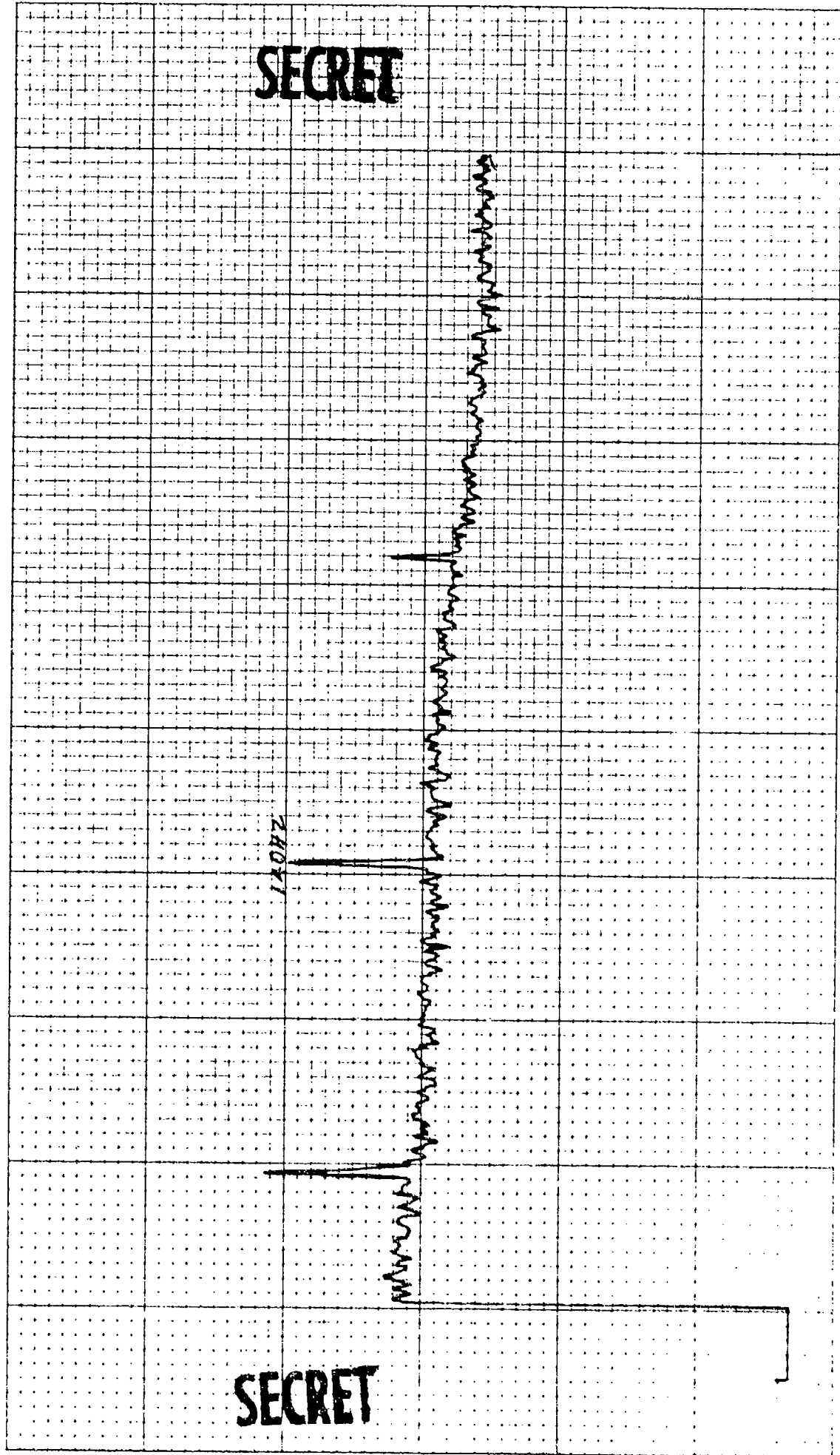
CONTROL: 2-7 - 1019 (11)
OMNI SPECTRUM (ELEMENT 23)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
_____ DEG AZ STEERING

REEL: F/S INDEX/955

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



46 0703

NOTE: REFERENCE TO THE INSTRUMENT IS IN THE INDEX

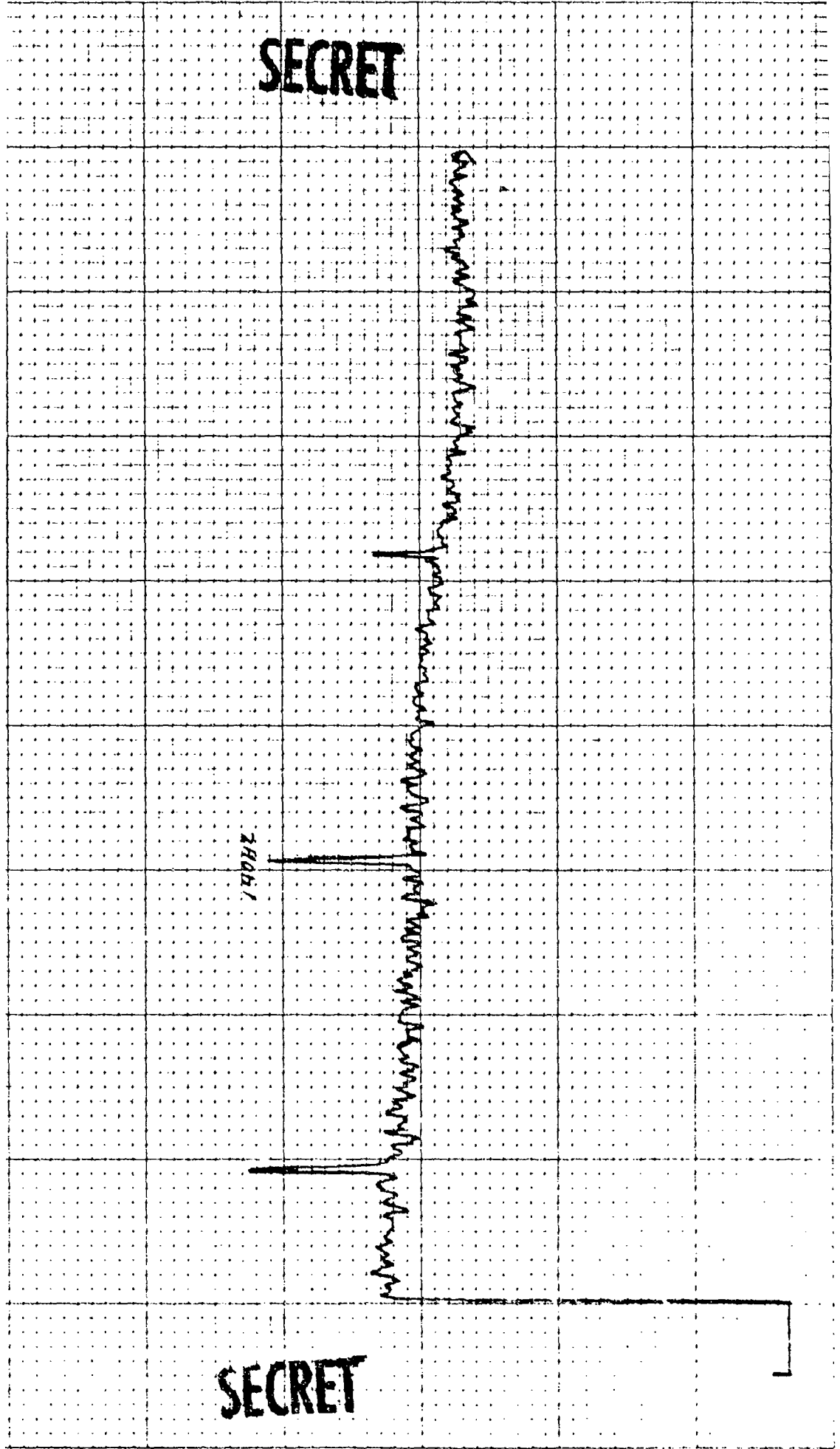
CONTROL: 2-7 -1019 (12)
OMNI SPECTRUM (ELEMENT 24)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -1019 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F15 INDEX: 1955

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING



SECRET

SECRET

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

46 0703

CONTROL: 2-7 -1019 (13)
OMNI SPECTRUM (ELEMENT 26)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -1019 Z

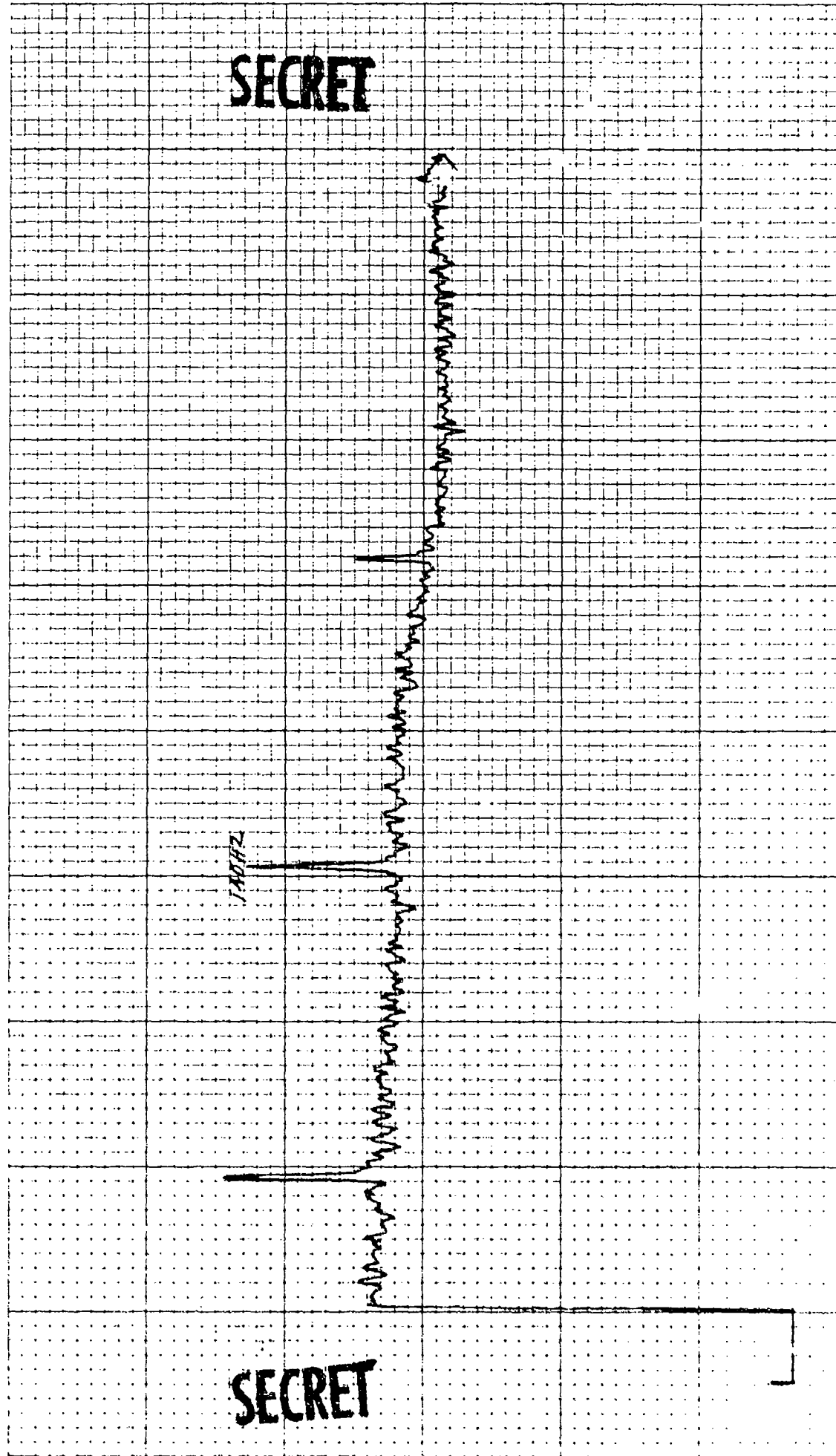
ANALYSIS BANDWIDTH: 1/10HZ
 DEG AZ STEERING

REEL: F/5

INDEX: 1955

INTEGRATION TIME 320 SECS
FILTER WTC: HANNING

ATTEN: DB



SECRET

SECRET

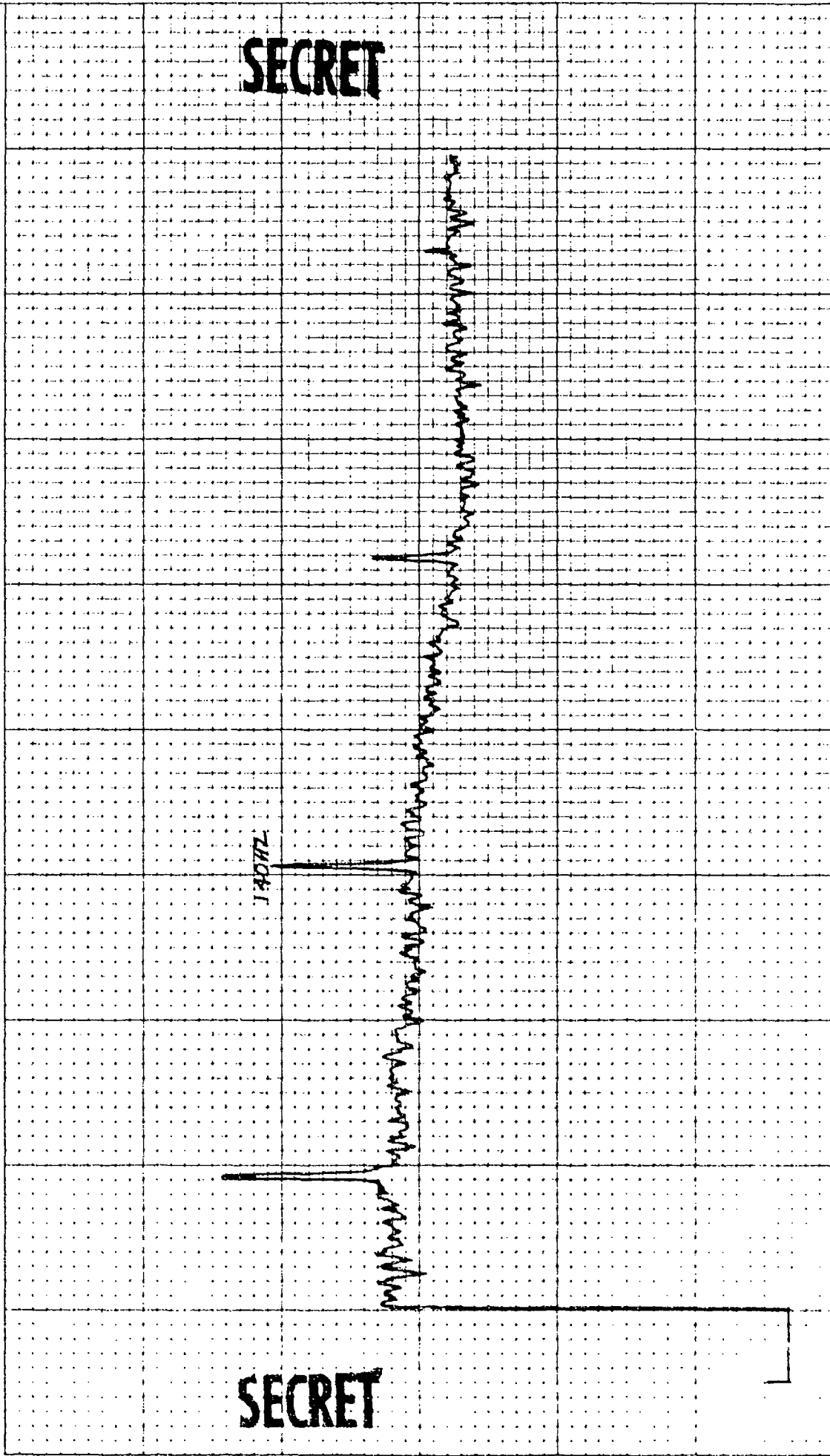
46 0703

KOE 1/2 INCH TO THE INCH
PAPER 4 PAPER 20

CONTROL: 2-7 -1019 (14)
OMNI SPECTRUM (ELEMENT 29)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
I ELEMENT

DATE OF ANALYSIS:
DATE/TIME: 2-7-77 -1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
 DEG AZ STEERING

REEL: F15 INDEX: 1955
INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC HANNING



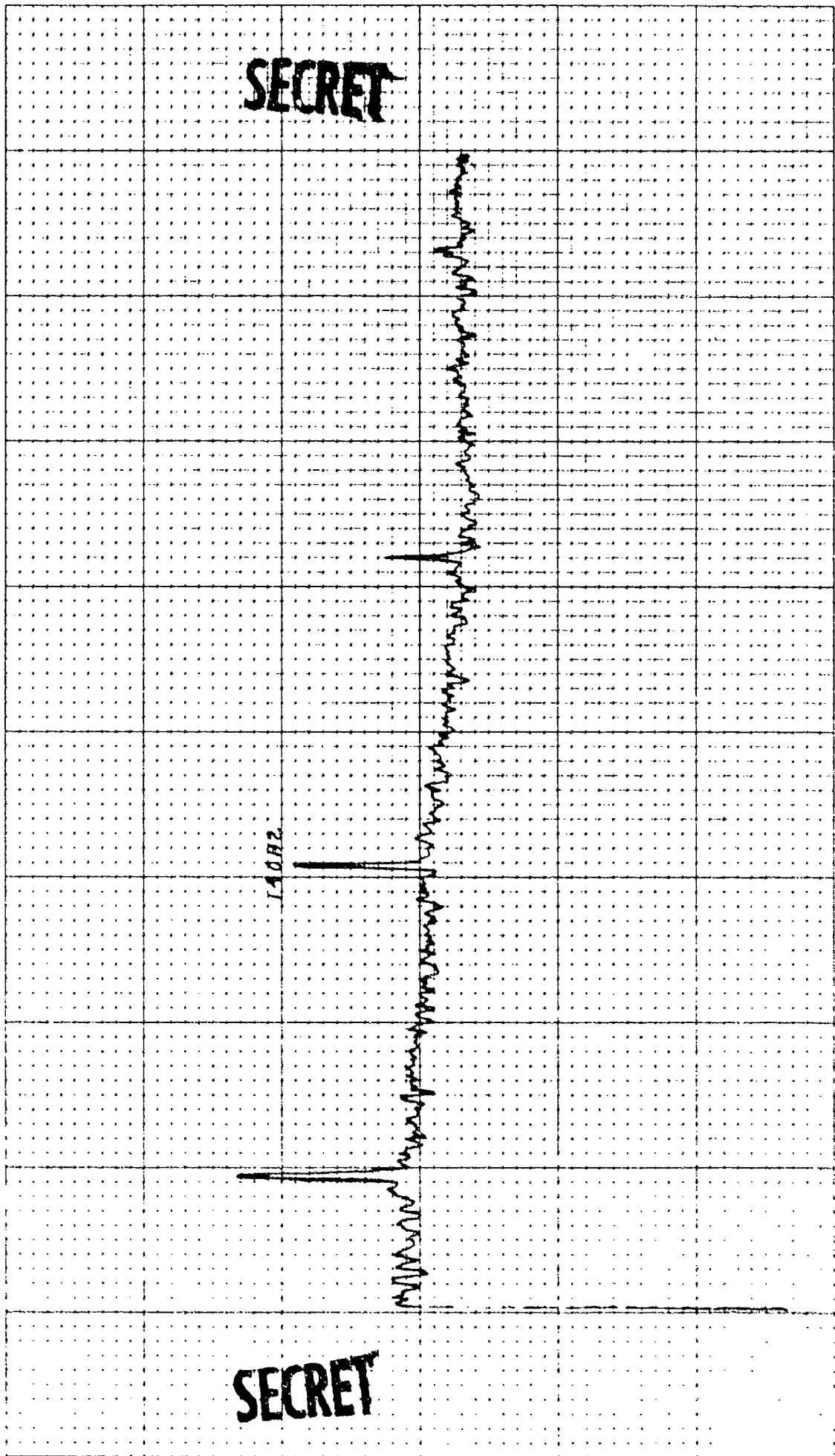
SECRET

SECRET

46 0703

REF ID: A66048

CONTROL: 2.7 - 1019 (15) DATE OF ANALYSIS: REEL: F15 INDEX: 1855
 OMNI SPECTRUM (ELEMENT 31)
 EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 I ELEMENT DEC AZ STEERING



KOE 10 X 10 TO THE INCH
PHILIP WESSER CO. MADE IN U.S.A.

46 0703

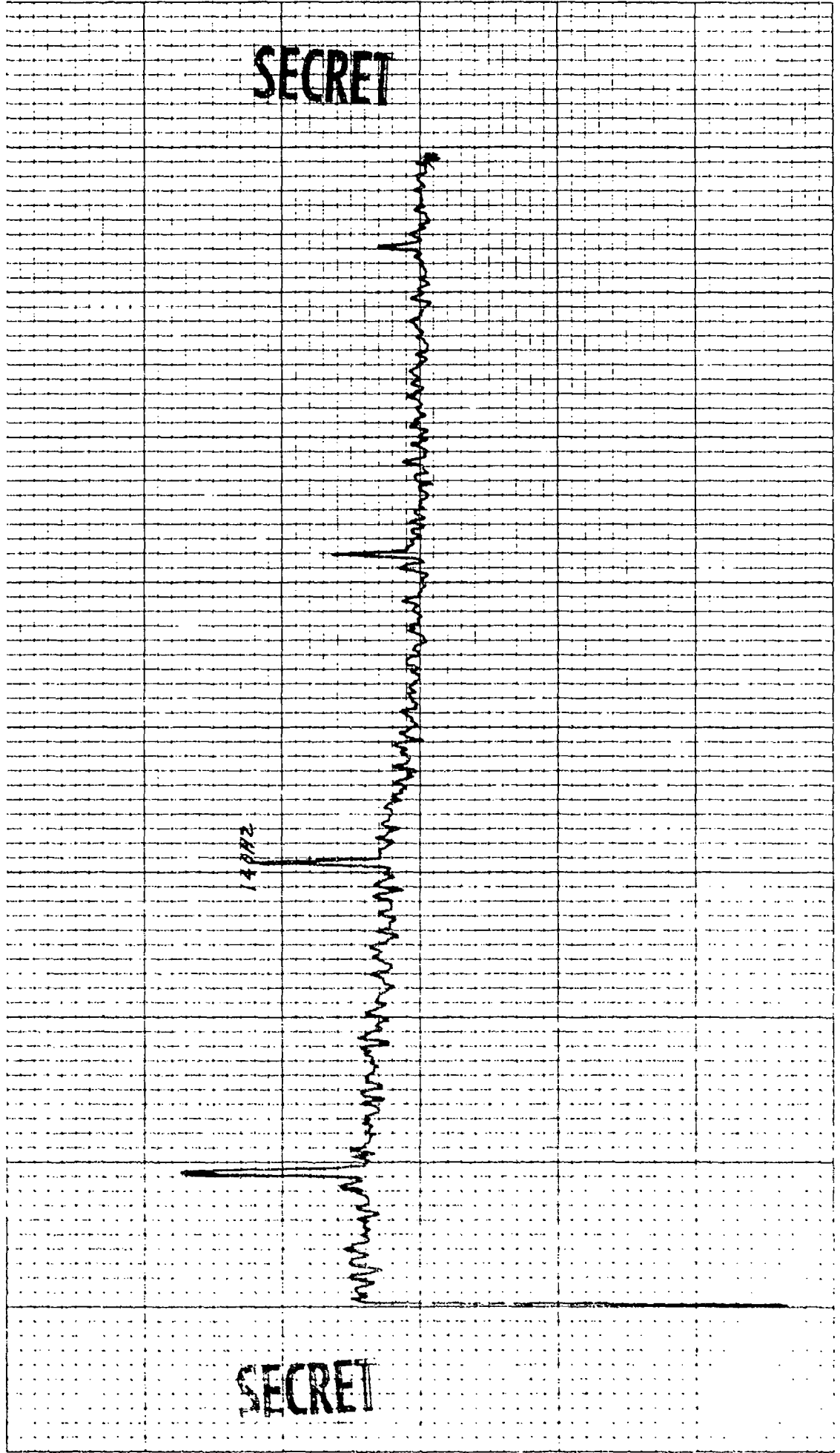
CONTROL: 2-7 - 1019 (16)
OMNI SPECTRUM (ELEMENT 33)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ STEERING

REEL: F/S INDEX 1015

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



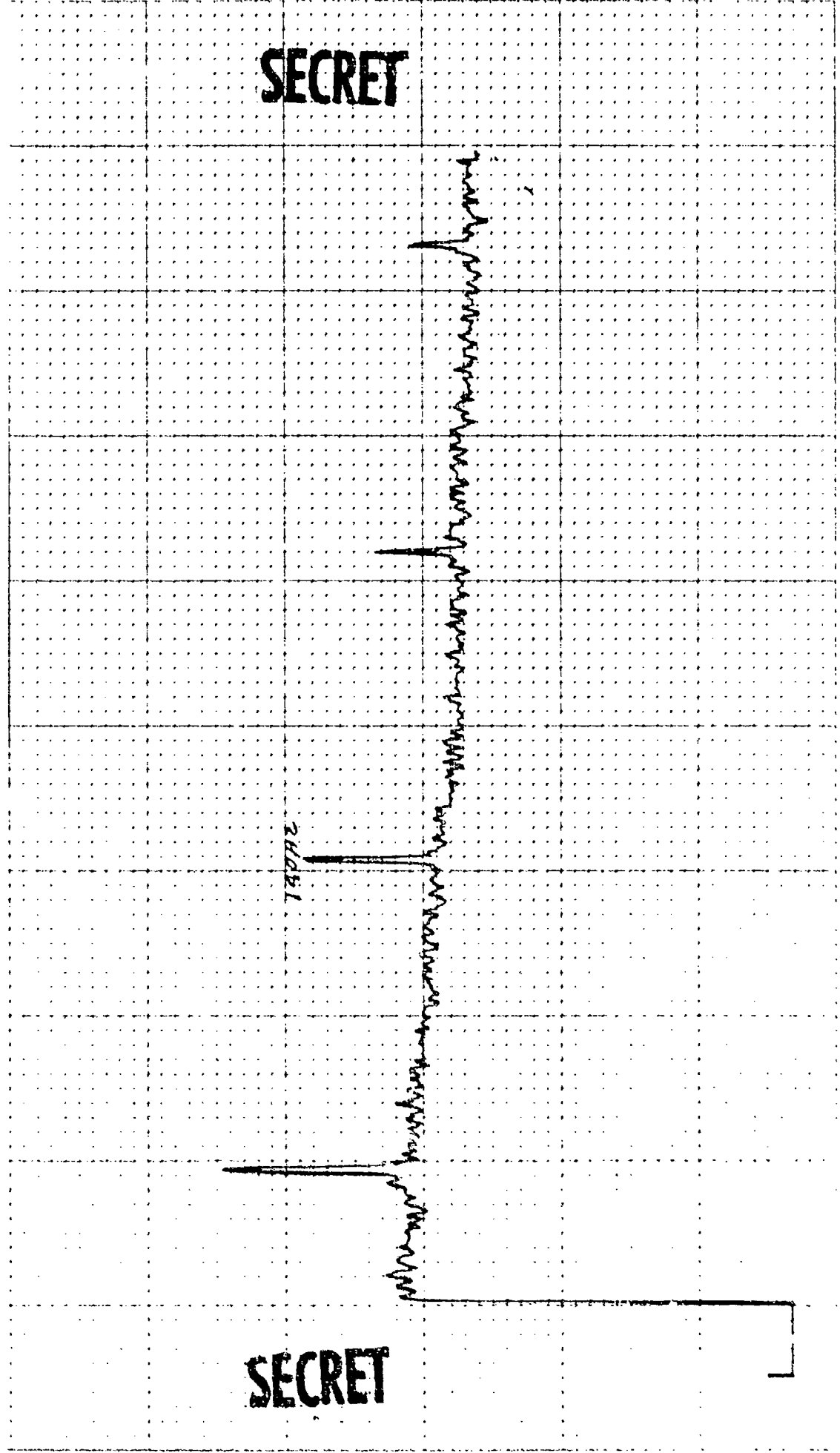
46 0703

McE 2400 2400 2400 2400

CONTROL: 2-7 - 1019 (17) DATE OF ANALYSIS: REEL: F/S INDEX: 955
 OMNI SPECTRUM (ELEMENT 35)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 I ELEMENT

INTEGRATION TIME 320 SECS ATTEN: DB
 FILTER WTC: HANNING

DATE/TIME: 2-7-77 - 1019 Z
 ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING



46 0703

REF: [Illegible]

INDEX 1953

REEL: F15

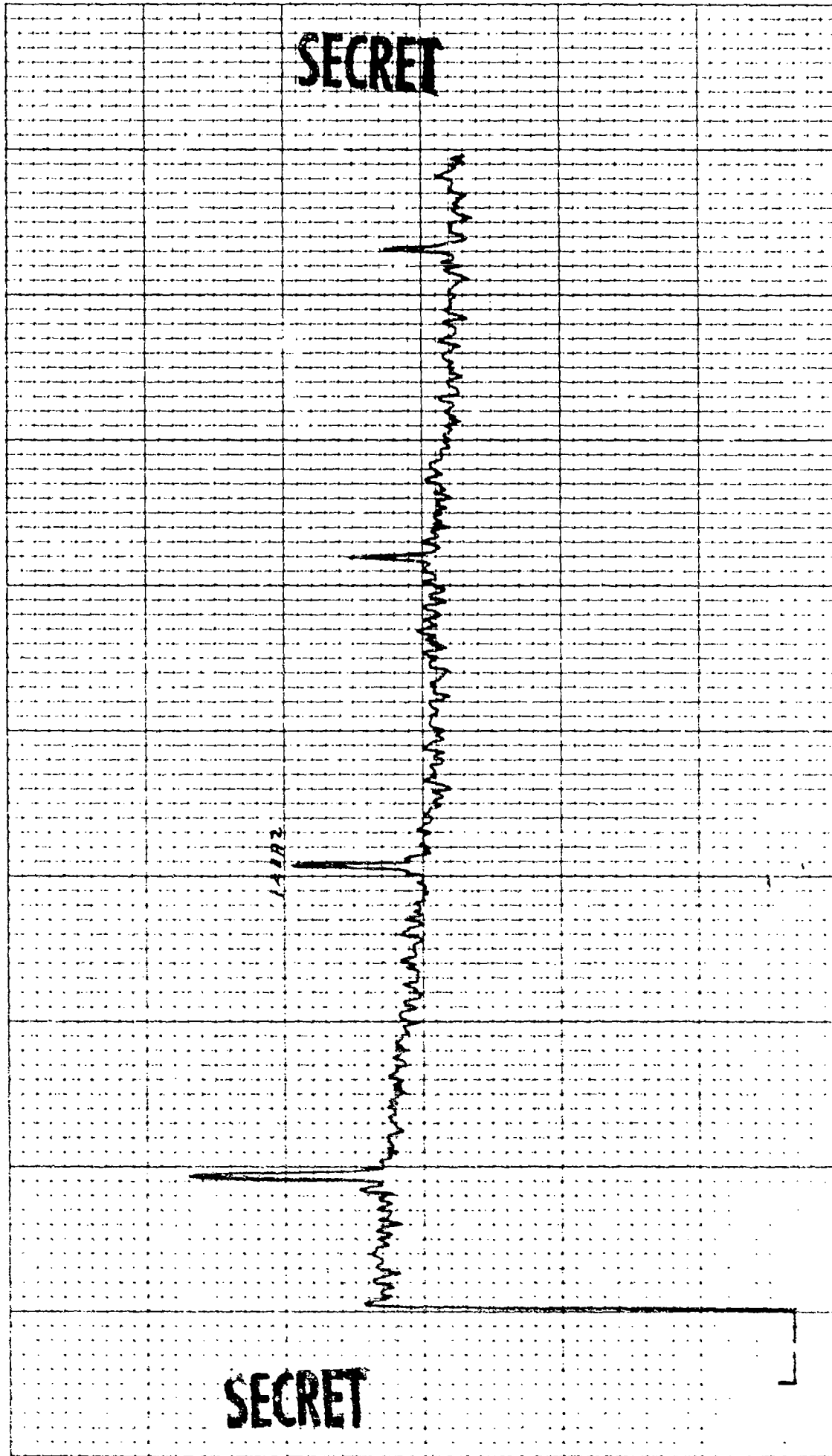
DATE OF ANALYSIS:

CONTROL: 2-7 -1019 (18)
OMNI SPECTRUM (ELEMENT 37)

INTEGRATION TIME 320 SECS ATTEN: DB
FILTER WTC: HANNING

DATE/TIME: 2-7-77 -1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT



46 0703

MOE W. G. ...

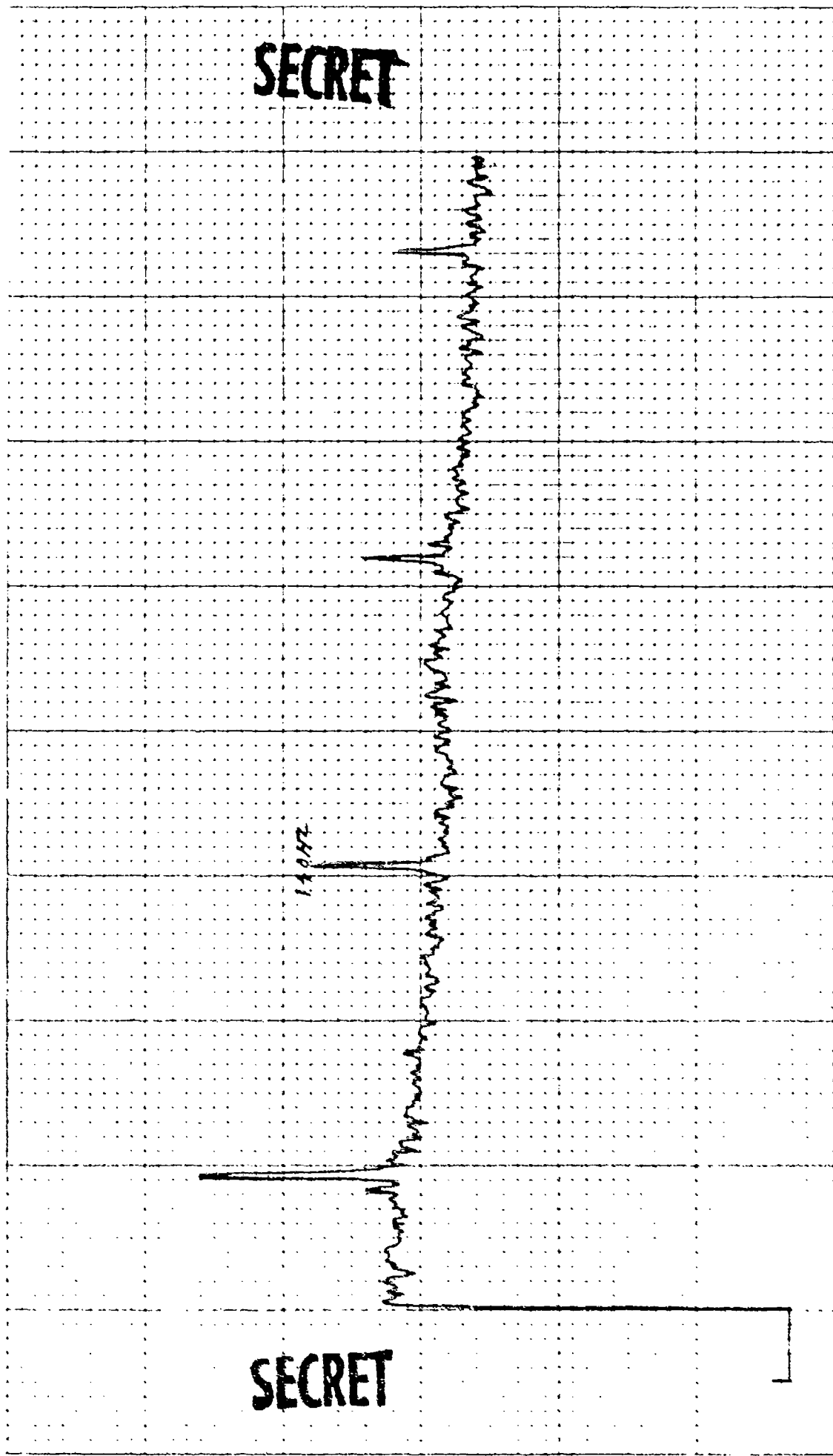
CONTROL: 2.7 - 1019 (19)
OMNI SPECTRUM (ELEMENT 39)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

REEL: F/5 INDEY 1355

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



SECRET

SECRET

46 0703

K-E 46 0703 0703 0703 0703

REEL: E/S INDEX: 855

DATE OF ANALYSIS:

CONTROL: 2-7-1019 (20)

OMNI SPECTRUM (ELEMENT 41)

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

I ELEMENT

DATE/TIME: 2-7-77 -1019 Z

ANALYSIS BANDWIDTH: 1/10 HZ

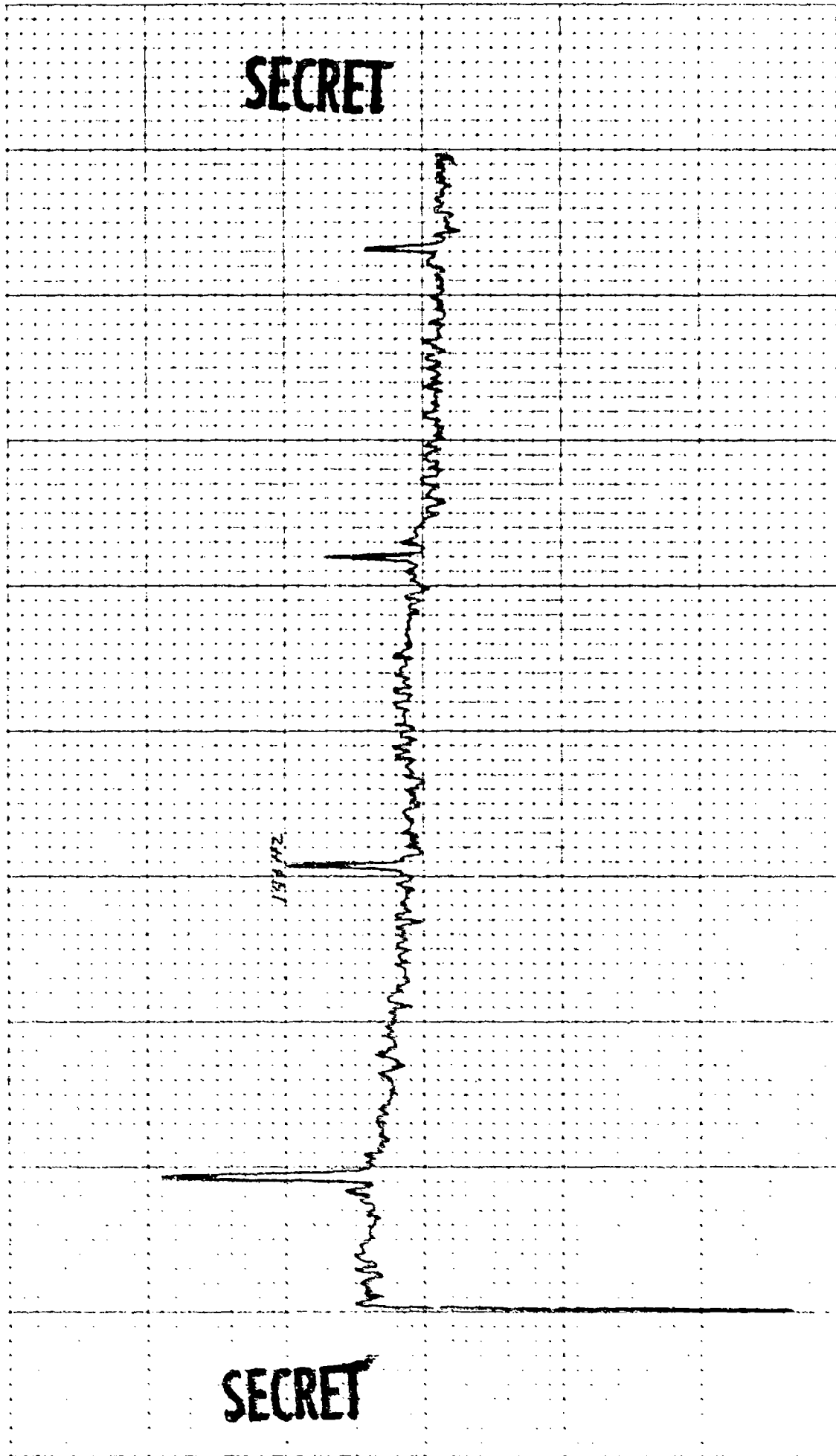
_____ DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

ATTEN: DB

WTC: HANNING



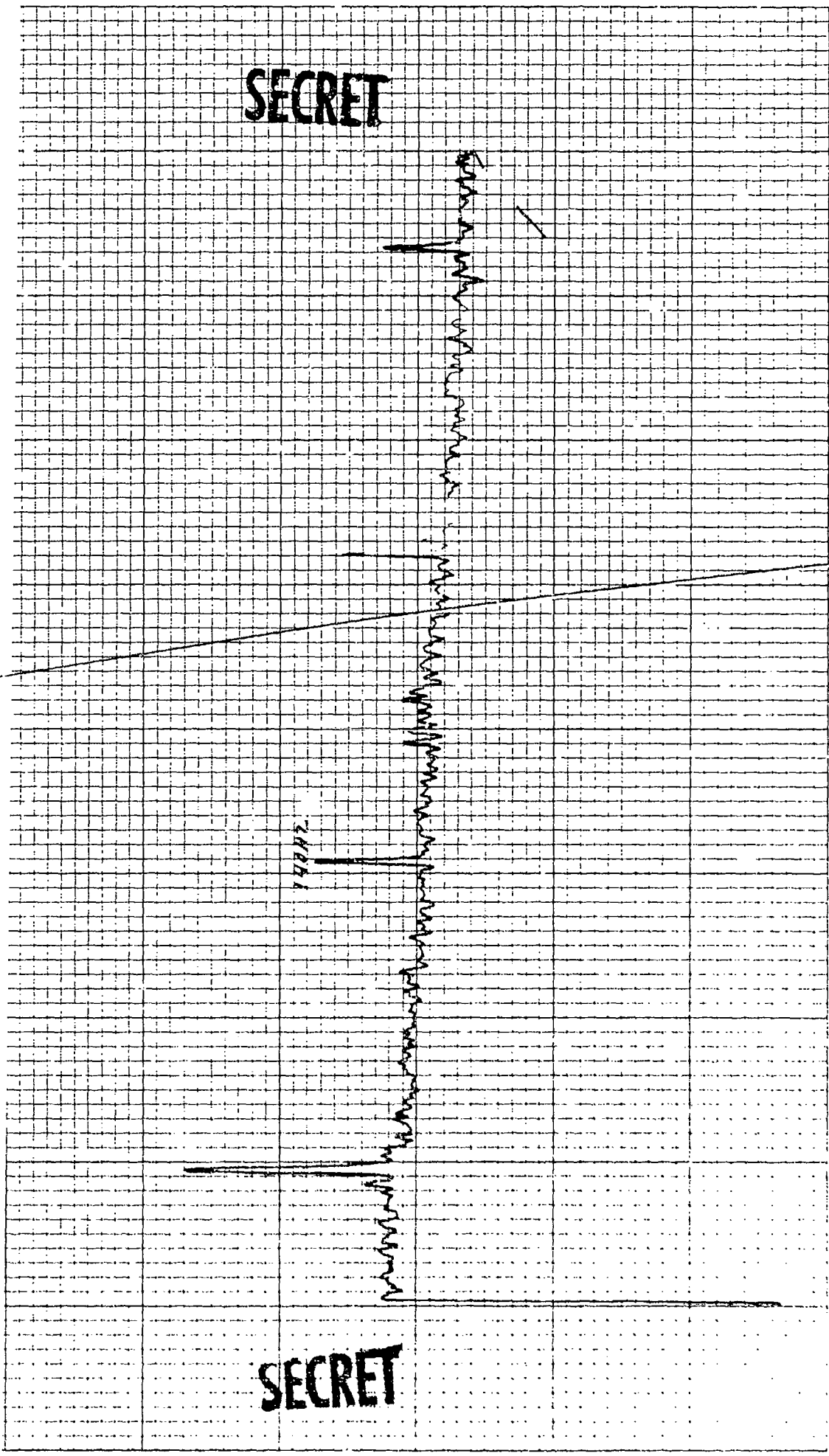
CONTROL: 2-9-1019 (24)
OMNI SPECTRUM (ELEMENT 43)
EXERCISE: BEARING STAKE
CENTER FREQ: 156 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -1019 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: F15 INDEX: 1955

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



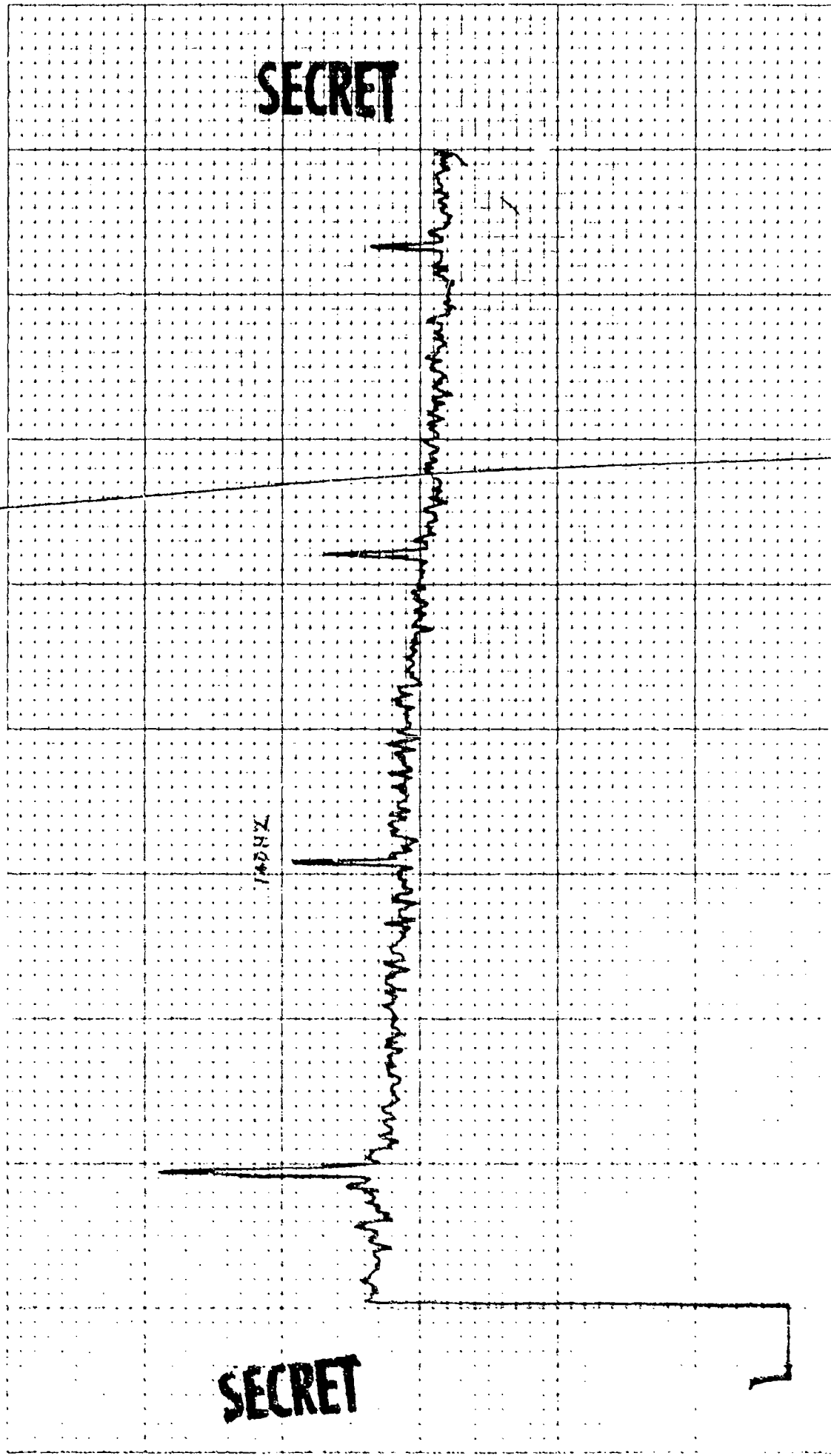
46 0703

CONTROL: 1019 - 51 (229)
 OMNI SPECTRUM (ELEMENT 45)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 1 ELEMENT

DATE OF ANALYSIS:
 DATE/TIME: 9-7-77 - 1019 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 - DEG AZ STEERING

REEL: F15
 INDEX 1955

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



45 0703

CONTROL: 2-7 - 1019 (23)
OMNI SPECTRUM (ELEMENT 47)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

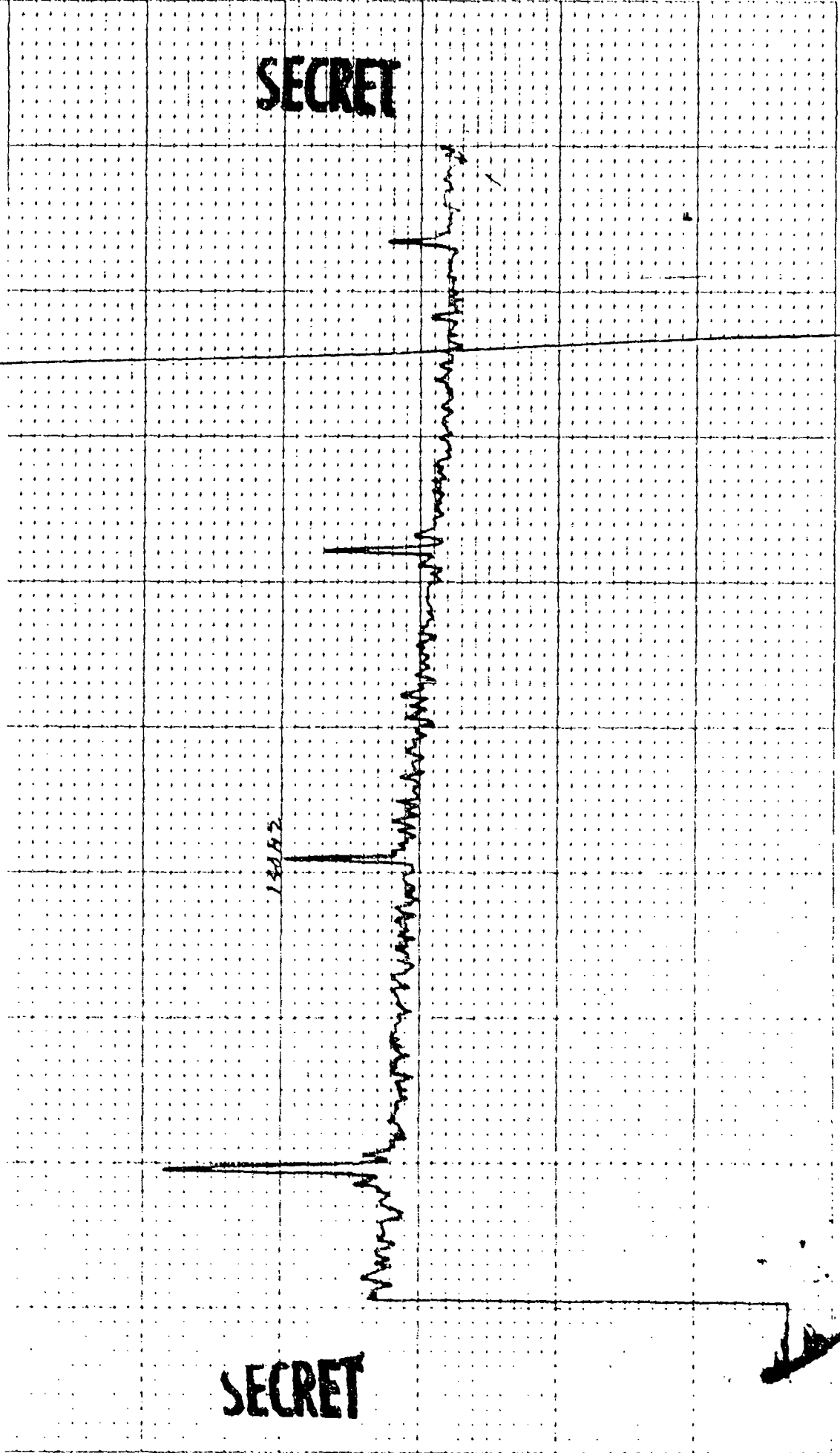
DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 1019 Z

ANALYSIS BANDWIDTH: 1/10HZ
— DEC AZ STEERING

REEL: F15 INDEX: 855

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



SECRET

SECRET

46 0703

46 0703

CONTROL: 2.7 - 1019 (24)
OMNI SPECTRUM (ELEMENT 19)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
I ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 1019 Z

ANALYSIS BANDWIDTH: 1/10 HZ
DEC AZ STEERING

REEL: F15

INDEX: 1955

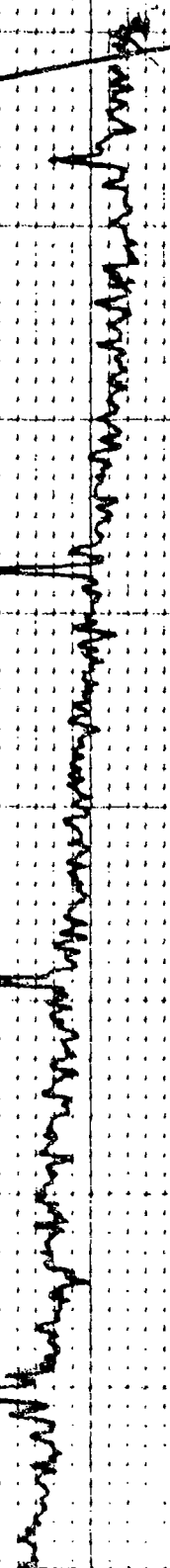
INTEGRATION TIME 320 SECS
FILTER WTC: HANNING

ATTEN: - DB

SECRET

SECRET

2001



46 0703

KOE # 100 TO THE ANCHOR # 100

CONTROL: 2-7 -1019 (25)
OMNI SPECTRUM (ELEMENT 51)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -1019 Z

ANALYSIS BANDWIDTH: 1/10HZ
_____ DEG AZ STEERING

REEL: F15

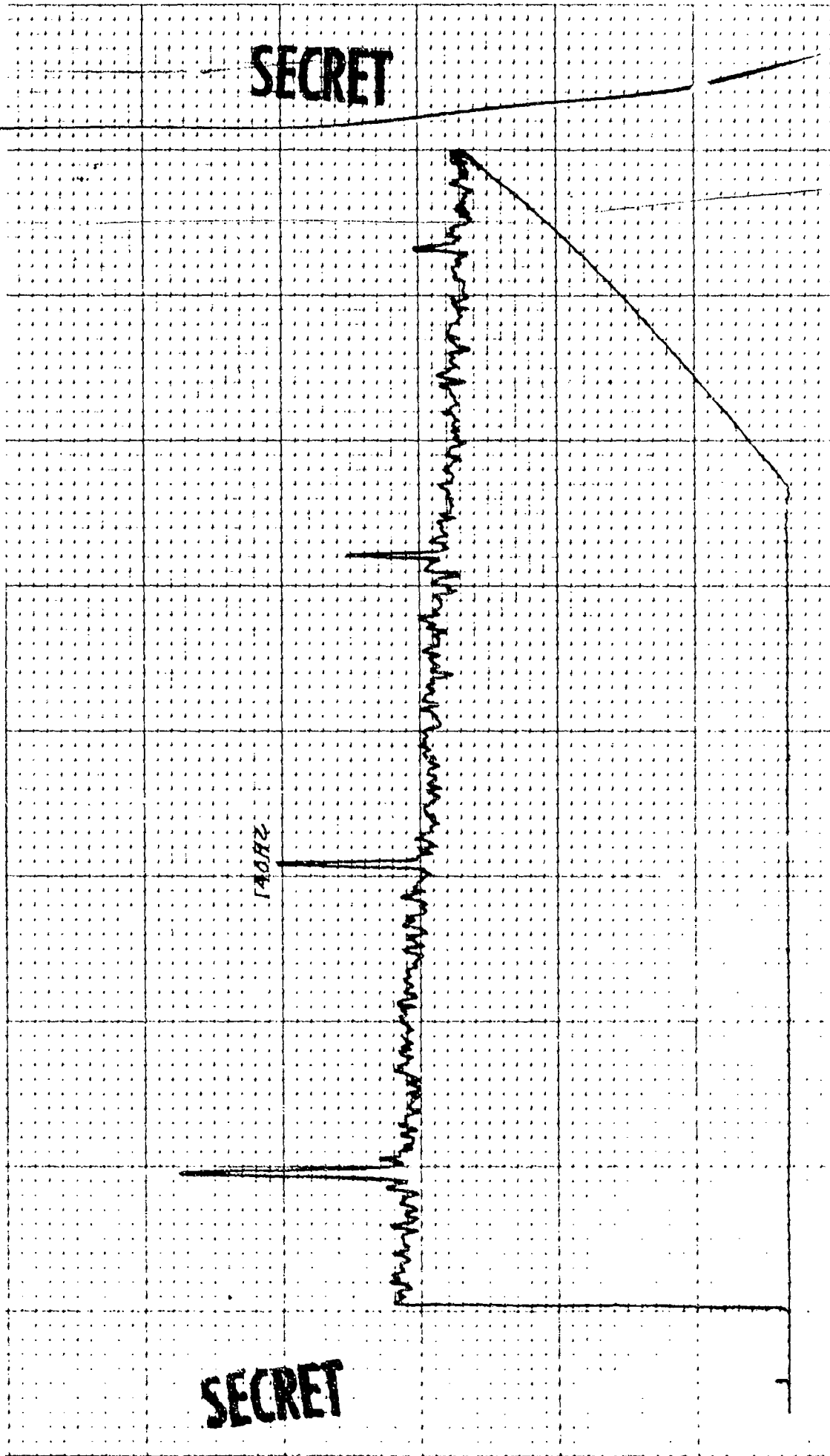
INDEX: 1955

INTEGRATION TIME 320 SECS
FILTER WTG: HANNING

100HZ

SECRET

SECRET



46 0703

REF ID: A66666

INDEX: 85

REEL: F/5

DATE OF ANALYSIS:

CONTROL: 2-7 - 1019 (26)

OMNI SPECTRUM (ELEMENT 53)

EXERCISE: BEARING STAKE

CENTER FREQ: 154 HZ

1 ELEMENT

DATE/TIME: 2-7-77 - 1019 Z

ANALYSIS BANDWIDTH: 1/10 HZ

— DEG AZ STEERING

INTEGRATION TIME 320 SECS

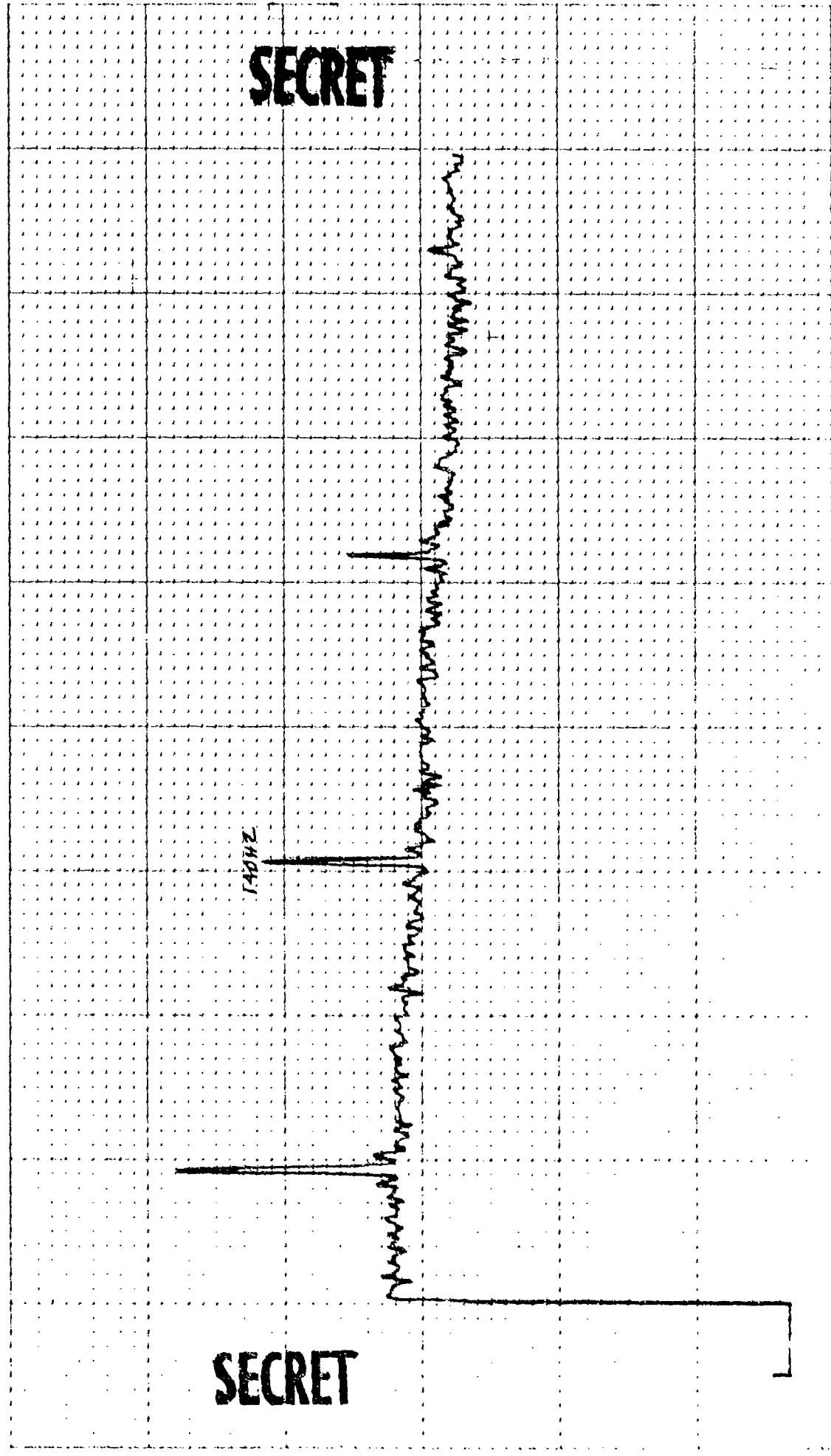
FILTER WTG: HANNING

ATTEN: — DB

SECRET

1400HZ

SECRET



KOE 10.4 TO THE INCH • 4 IN. HOURS
PEUFFEL & ESSER CO. NEW YORK, N.Y.

46 0703

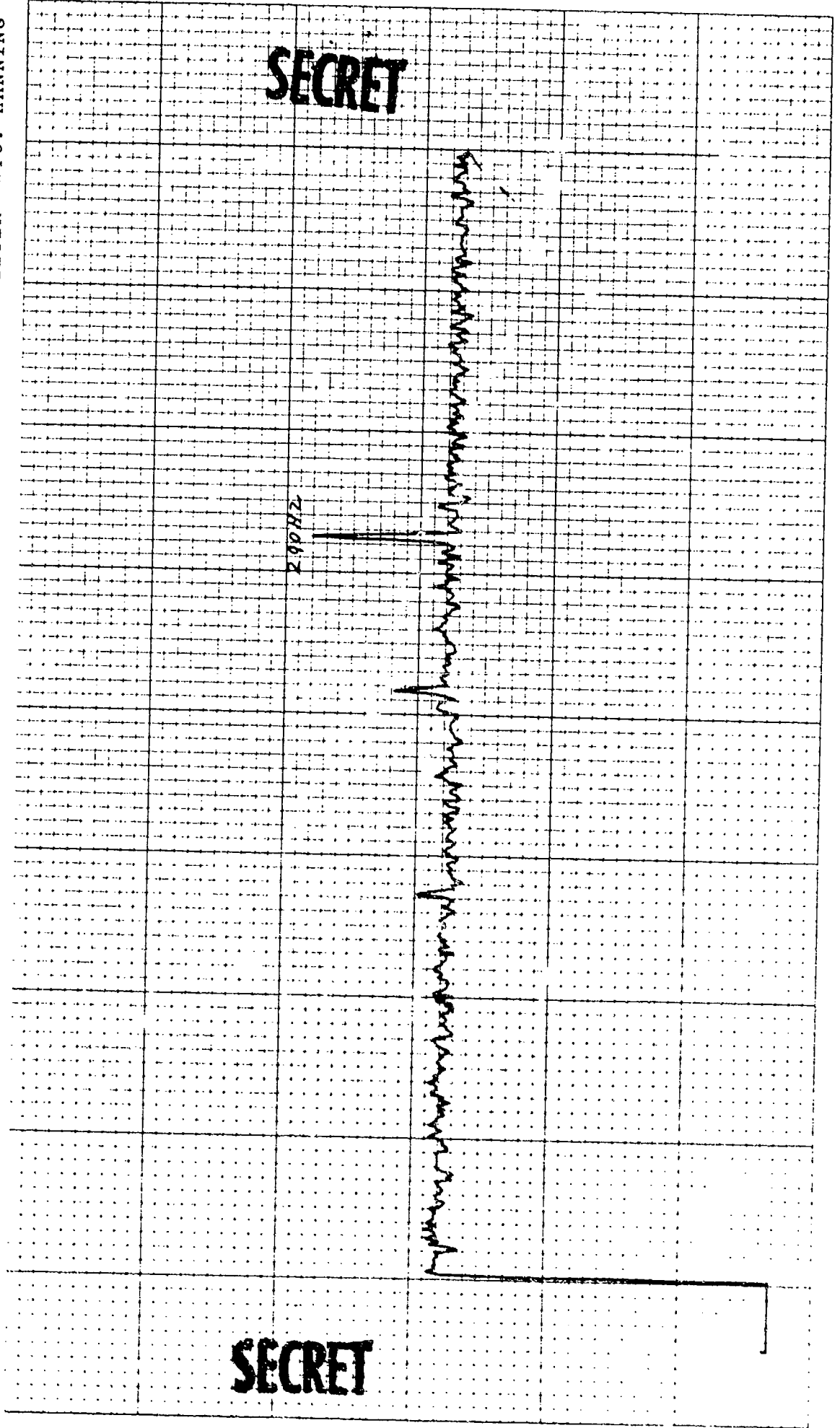
CONTROL: 2-7 - 1019 (27)
OMNI SPECTRUM (ELEMENT 2)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

REEL: F15 INDEX/1957

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



46 0703

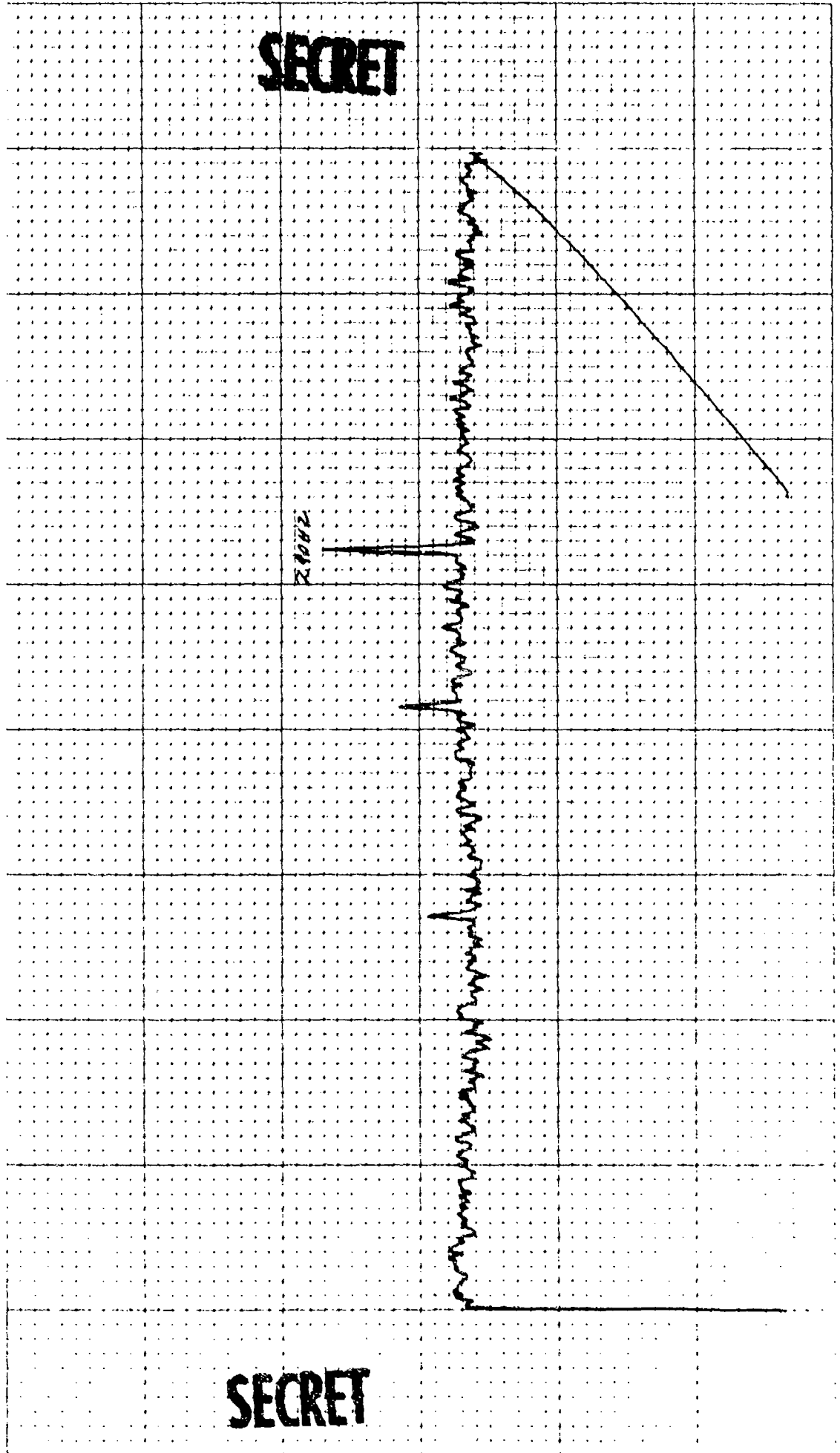
CONTROL: 2.7 - 1019 (20)
OMNI SPECTRUM (ELEMENT 4)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: F15 INDEX 1955

INTEGRATION TIME 320 SECS
FILTER
ATTEN: DB
WTG: HANNING



SECRET

SECRET

46 0703

KOE 27 APR 1955 8:24 AM

CONTROL: 2-7 - 1019 (29)
OMNI SPECTRUM (ELEMENT 6)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

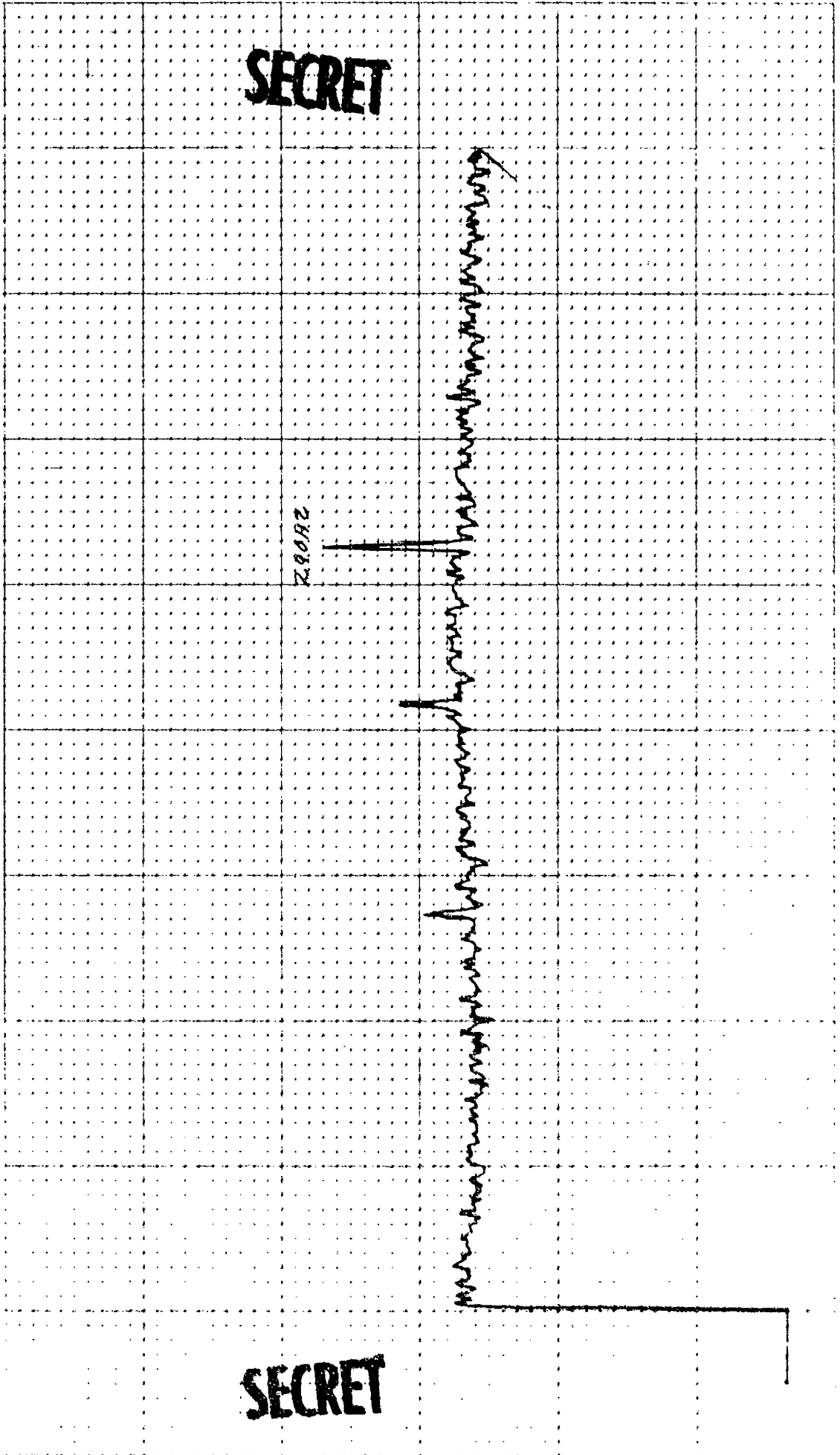
DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 1019 Z

ANALYSIS BANDWIDTH: 1/10 HZ
_____ DEG AZ STEERING

REEL: F/S INDEX: 1855

INTEGRATION TIME 320 SECS
FILTER WTC: HANNING



SECRET

SECRET

KOE 16 X 16 TO THE INCH • 1 X 10 INCHES
NEUFEL & FOSTER CO. MADE IN U.S.A.

46 0703

CONTROL: 2.7 - 1011 (30)
OMNI SPECTRUM (ELEMENT 9)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

DATE OF ANALYSIS:

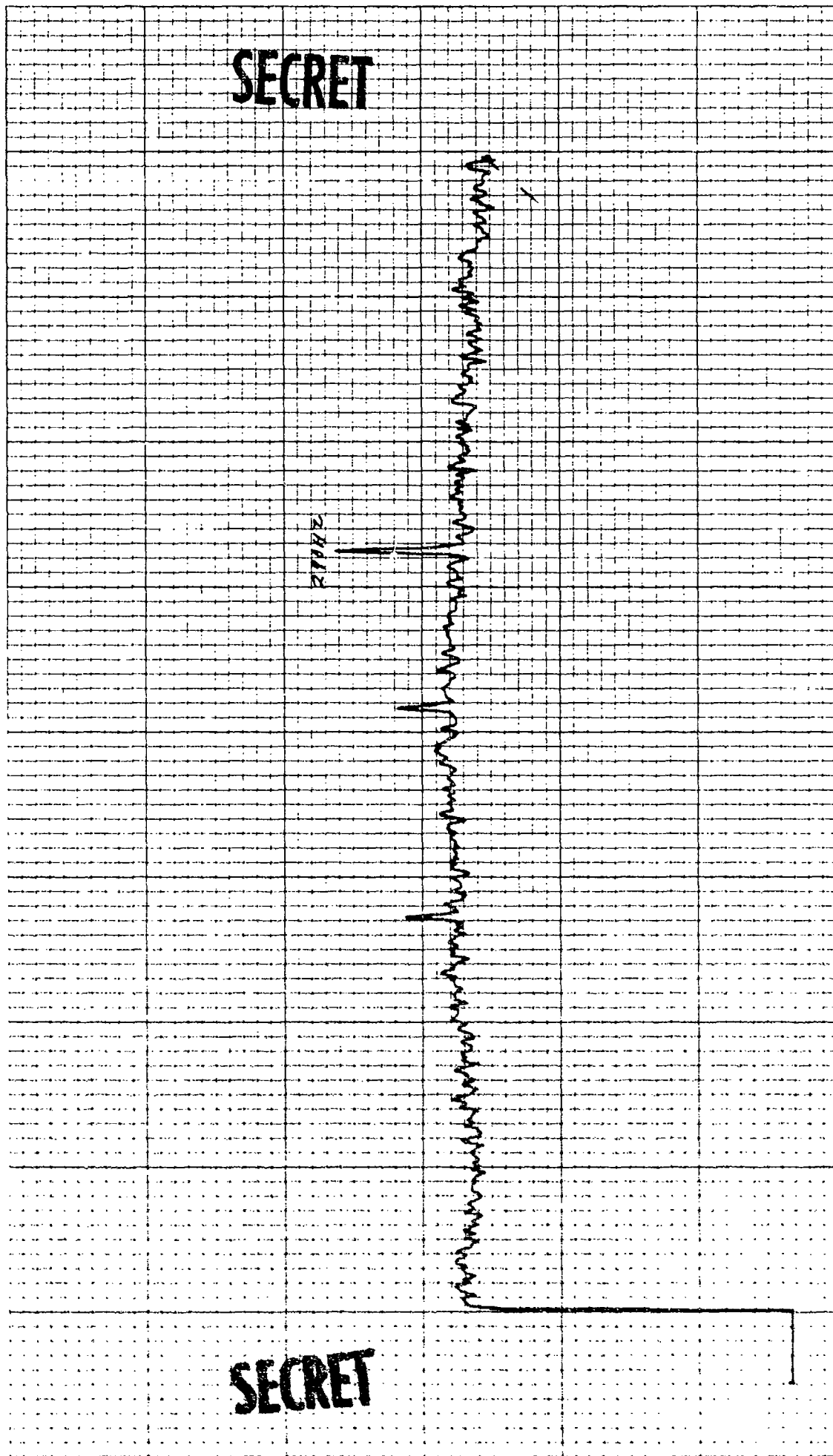
DATE/TIME: 2-7-77 - 1019 Z

ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F/5

INDEX: J437

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



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

46 0703

CONTROL: 2-7 -1019 (31)
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

DATE OF ANALYSIS:

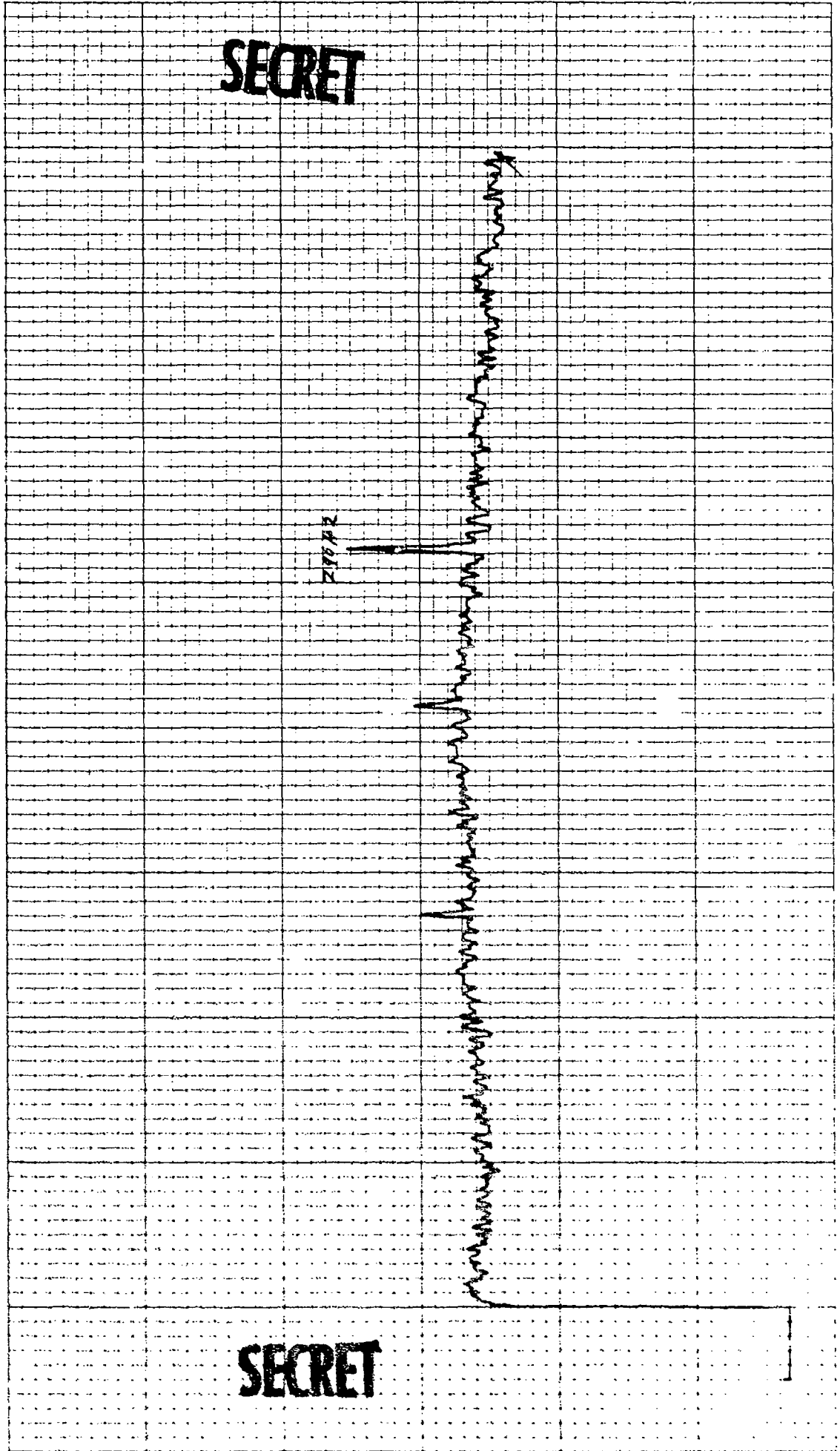
DATE/TIME: 2-7-77 -1019 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: F/S

INTEGRATION TIME 320 SECS
FILTER

ATTEN: DB
WTG: HANNING

INDEX 1955



46 0703

KOE 19 X 19 TO THE INCH • 2 1/2 INCHES
REDFIELD & LINDSEY CO. WASHINGTON, D.C.

8-17-72

CONTROL: 2-7 - 1019 (J2)
OMNI SPECTRUM (ELEMENT 12)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

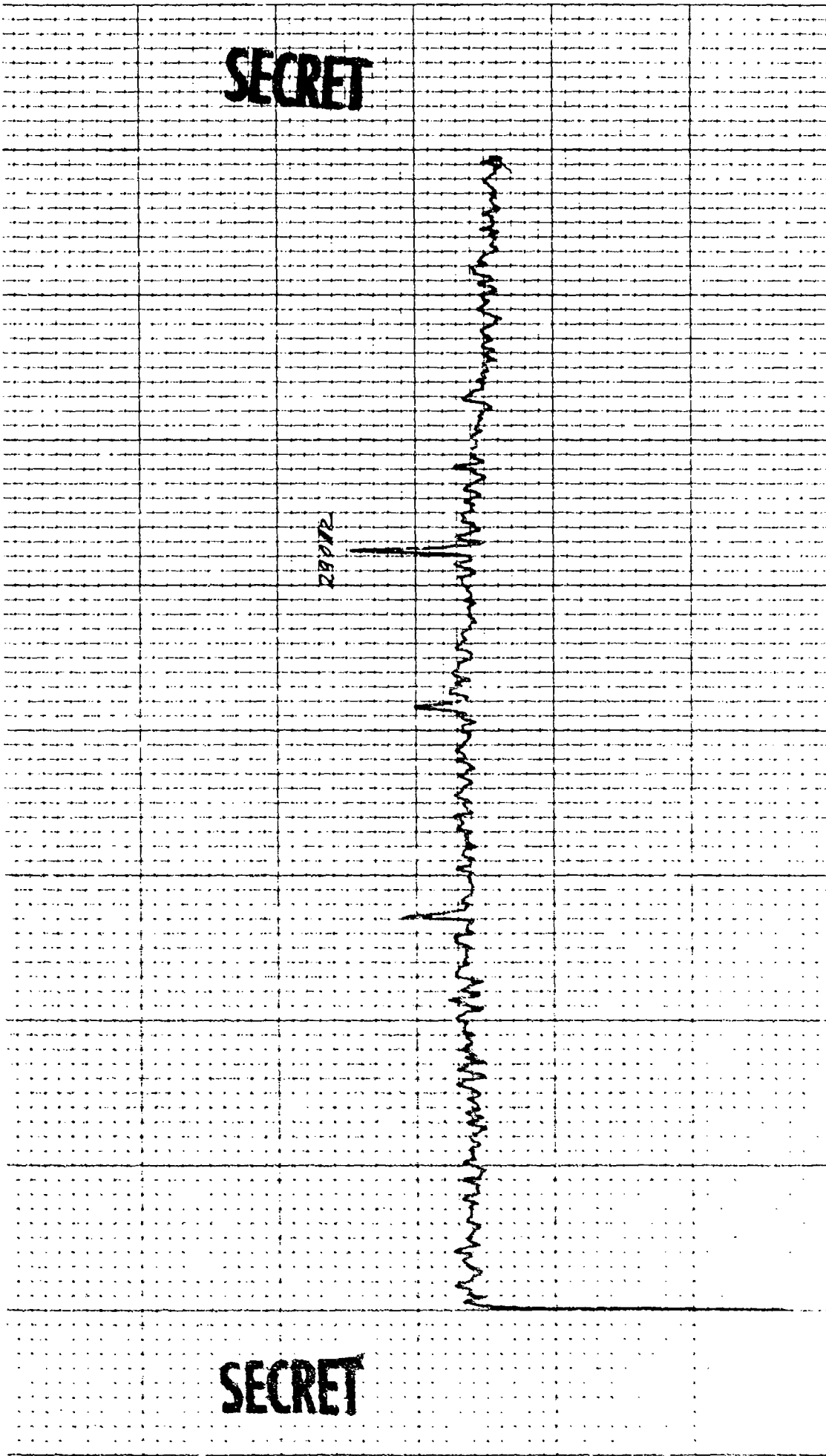
DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

REEL: F15

INDEX: 1955

INTEGRATION TIME 320 SECS
FILTER
ATTEN: DB
WTC: HANNING



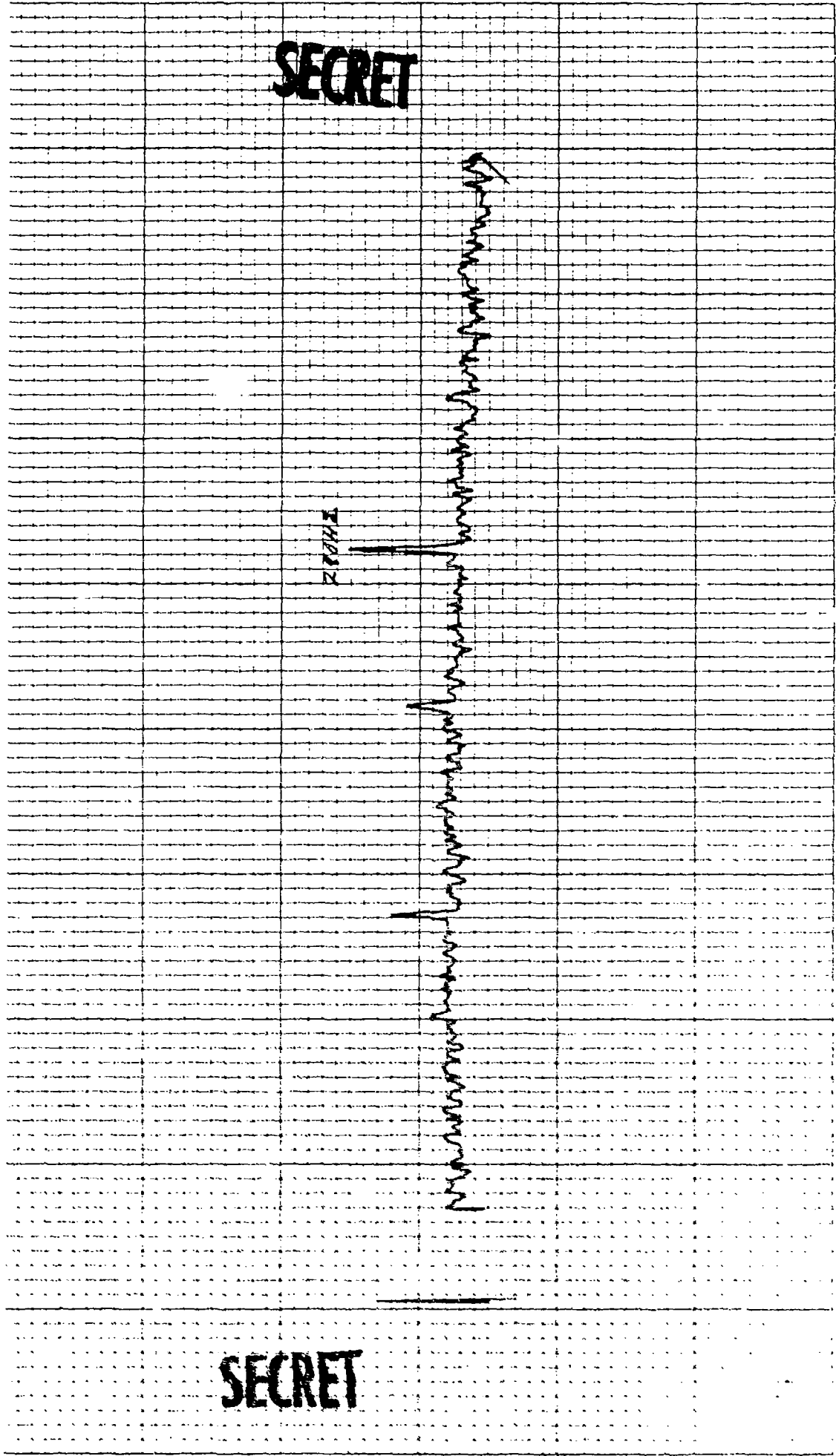
CONTROL: 2.7 - 1019 (33)
OMNI SPECTRUM (ELEMENT 14)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
- - - - - DEG AZ STEERING

REEL: FAS INDEX/955

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



SECRET

SECRET

46 0703

MOZ 5410 1019 (JY) 1019 (JY)

CONTROL: 2.7 - 1019 (JY)
OMNI SPECTRUM (ELEMENT 16)
EXERCISE: BEARING STAKE
CENTER FREQ: 250 HZ
1 ELEMENT

DATE OF ANALYSIS:

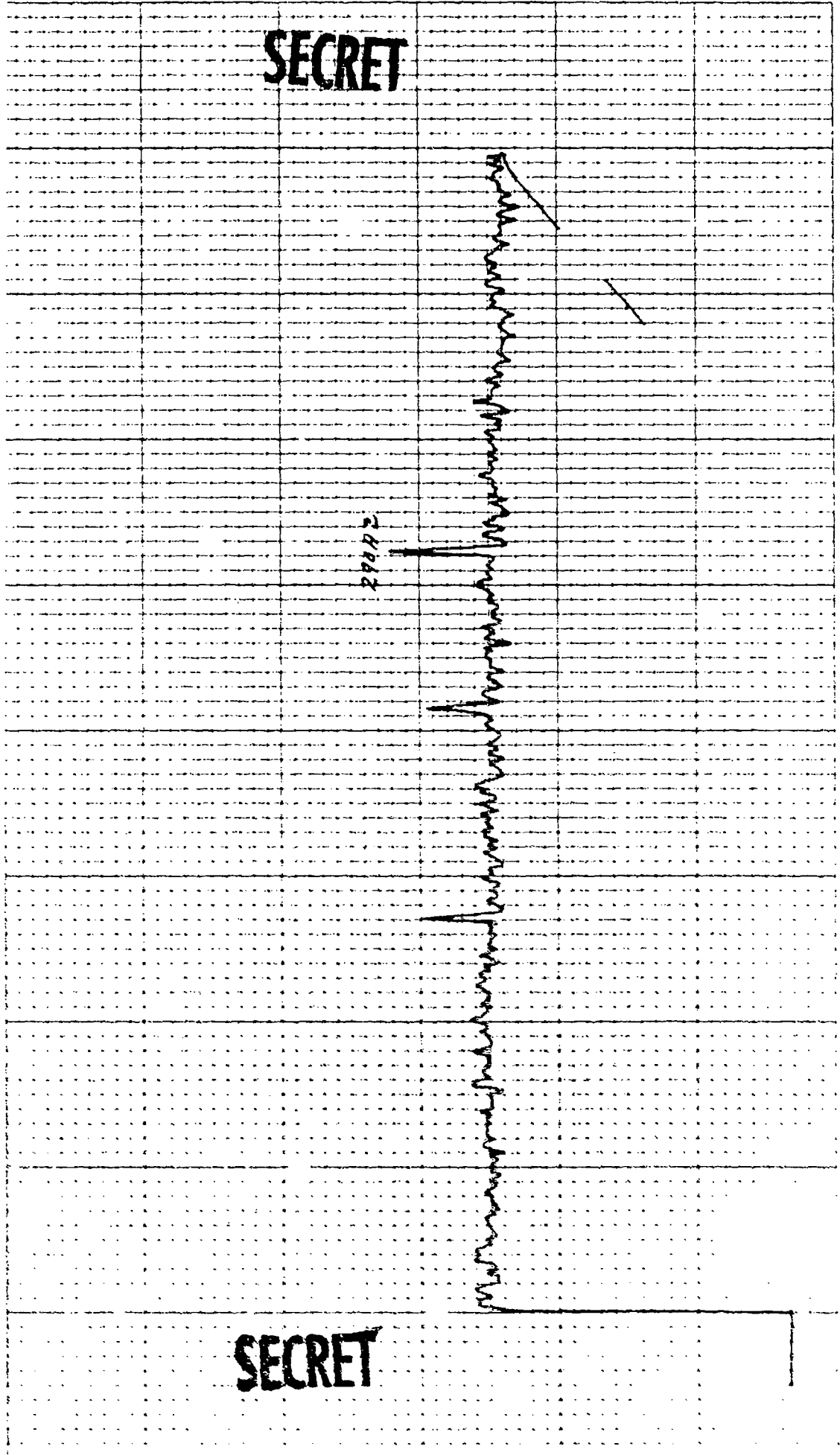
DATE/TIME: 2-7-77 - 1019 Z

ANALYSIS BANDWIDTH: 1/10 HZ
DEG AZ STEERING

REEL: F/S

INDEX: 955

INTEGRATION TIME 320 SECS
FILTER
ATTN: DB
WTG: HANNING



SECRET

SECRET

45 0703

REEL: F/5 INDEX: 955

DATE OF ANALYSIS:

CONTROL: 2-7 -1019 (35)

OMNI SPECTRUM/ELEMENT 19

EXERCISE: BEARING STAKE

CENTER FREQ: 280 HZ

1 ELEMENT

DATE/TIME: 2-7-77 - 1019 Z

ANALYSIS BANDWIDTH: 1/10 HZ

 DEC AZ SLEEPING

INTEGRATION TIME 320 SECS

FILTER WIG: HANNING

ATTEN: DB

SECRET

SECRET

28003

[Handwritten scribbles and illegible text]

45 0703

REF ID: A66888

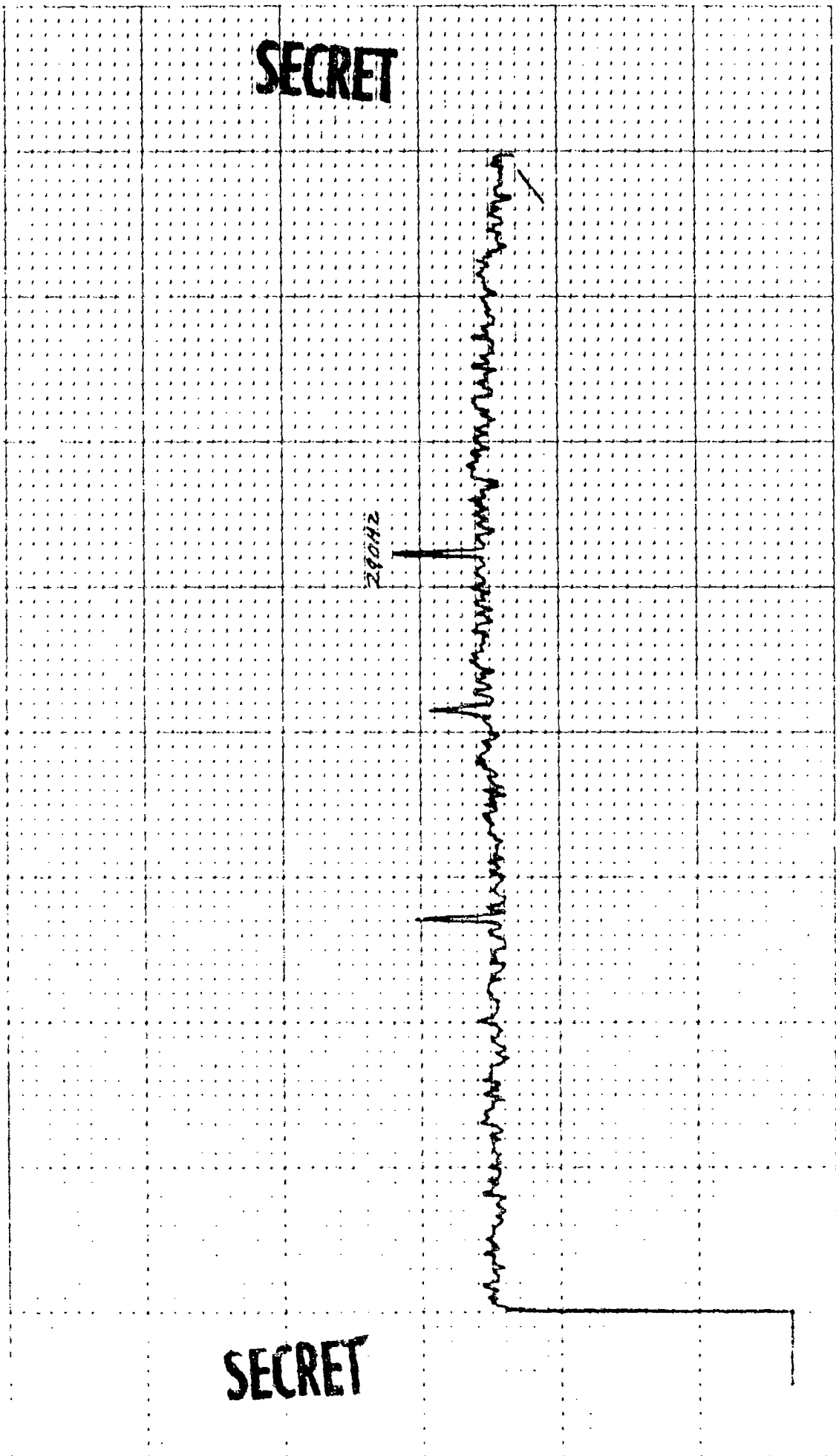
REEL: F-5 INDEX: 155

DATE OF ANALYSIS:

CONTROL: 27 - 1019 (76)
OMNI SPECTRUM (ELEMENT 20)
EXERCISE: BEARING STAKE
CENTER FREQ: 290 HZ
ELEMENT

DATE/TIME: 27-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEG AZ STEERING

INTEGRATION TIME 320 SECS
FILTER
ATTN: DB
WTG: HANNING



SECRET

SECRET

KOE 10 X 10 TO THE INCH. 4 1/2 INCHES
HEIFERUL & ESSER CO. MADE IN U.S.A.

46 0703

INDEX / 955

REEL: F/5

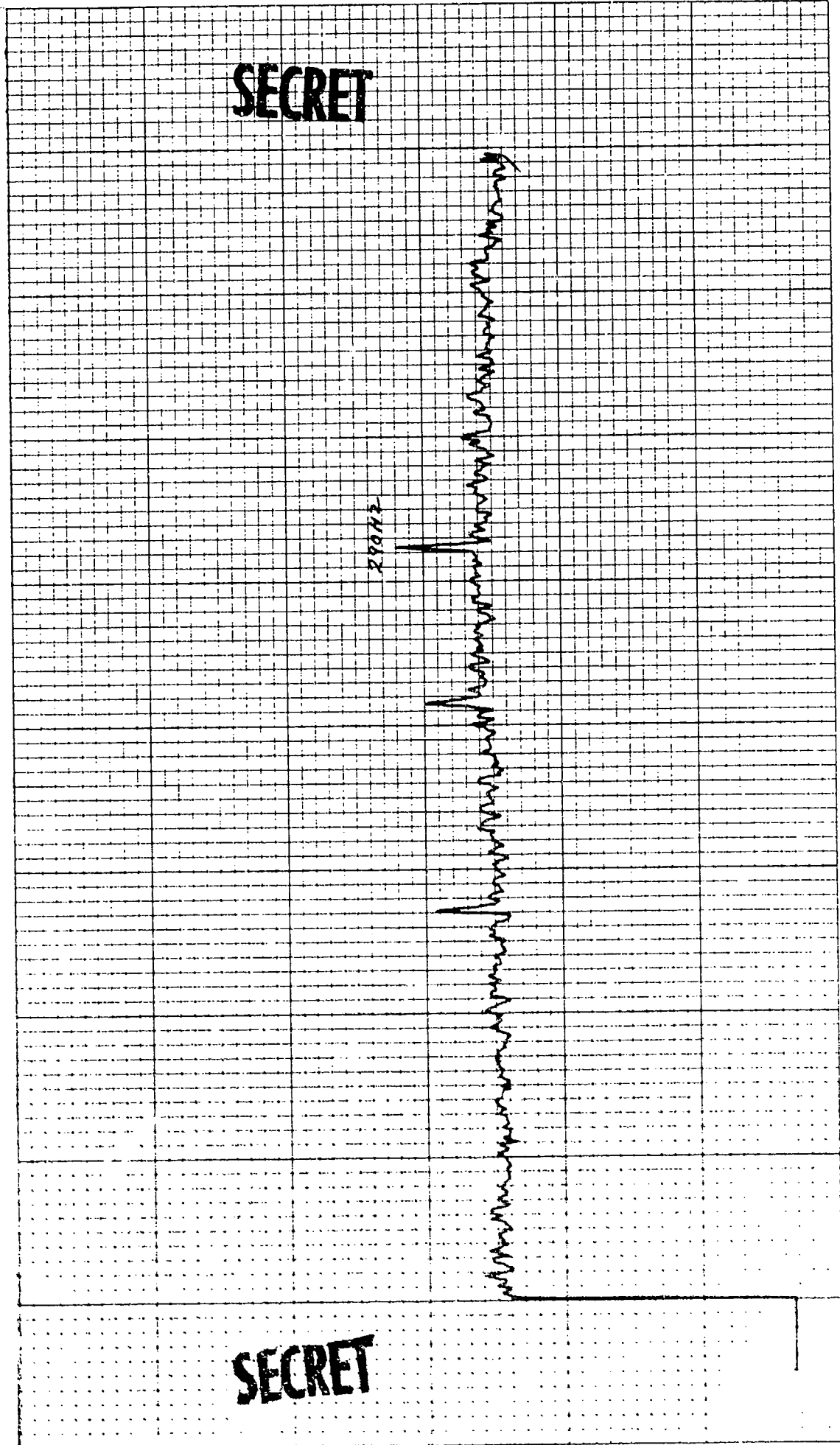
DATE OF ANALYSIS:

CONTROL: 2-7 - 1019 (37)
OMNI SPECTRUM (ELEMENT 23)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE/TIME: 2-7-77 - 1019 Z

ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER WTG: HANNING



KOE 10 X 10 TO THE INCH
WEIFFEL & PESSER CO. CHICAGO, ILL.

46 0703

CONTROL: 2-7 - 1019 (30)
OMNI SPECTRUM (ELEMENT 24)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

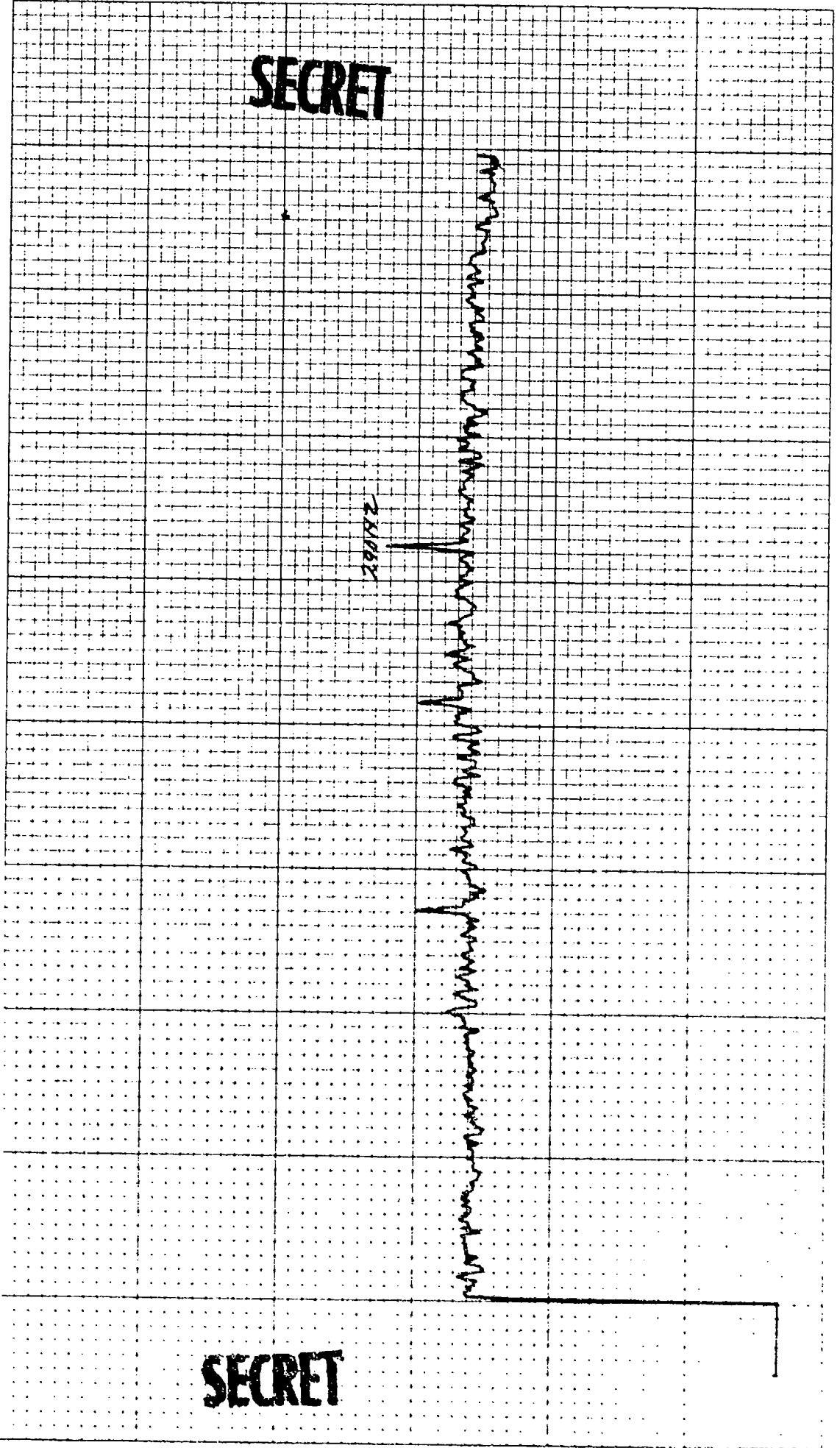
DATE/TIME: 2-7-77 - 1019 Z

ANALYSIS BANDWIDTH: 1/10 HZ
1 DEG AZ STEERING

REEL: F/5

INDEX: 1955

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



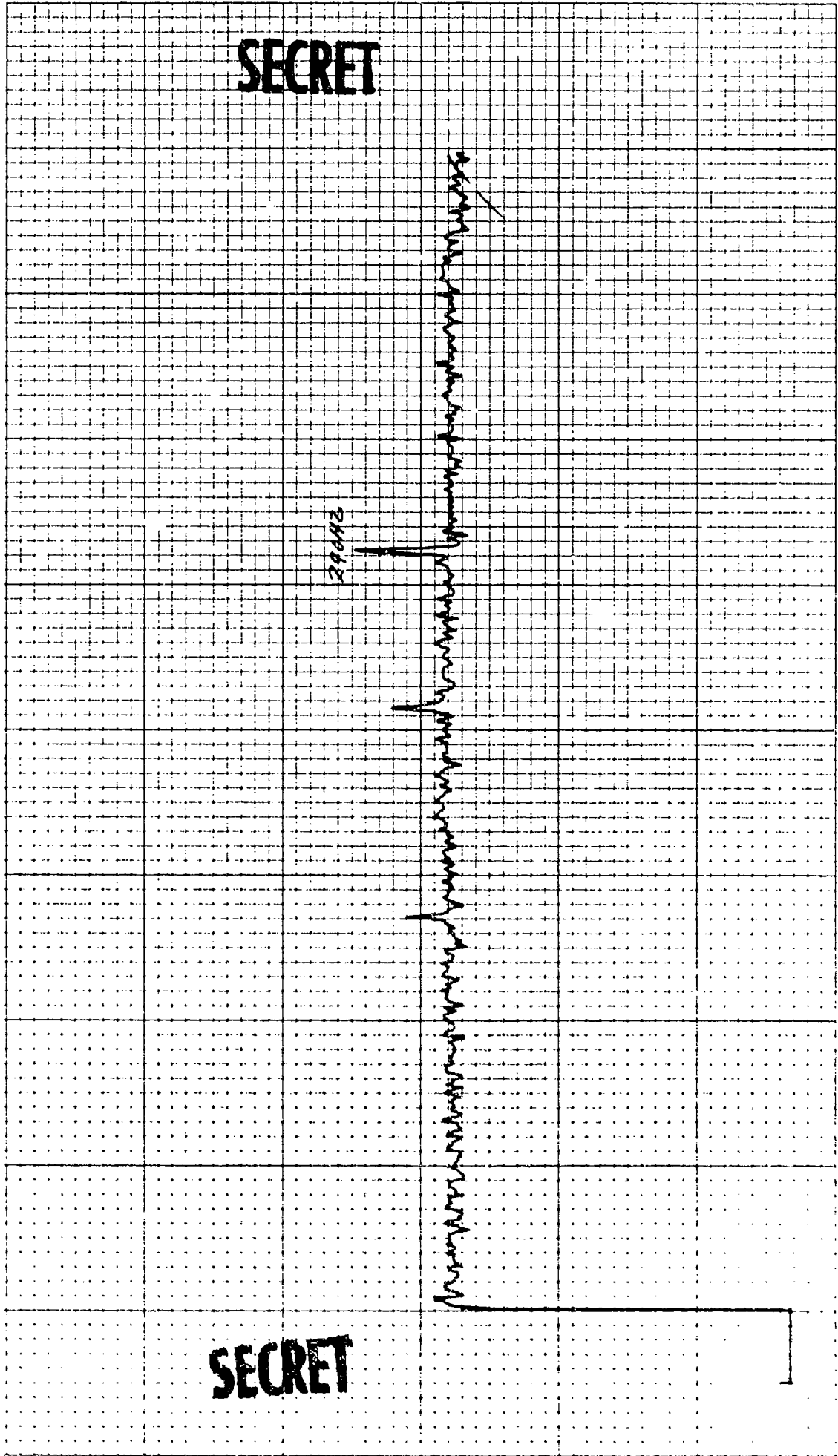
KOE 1/2 IN TO THE INCH
WEL-FEEL & ESKER CO. MADE IN U.S.A.

46 0703

CONTROL: 2-7 -1019 (39) DATE OF ANALYSIS: REEL: F/S INDEX 1955
OMNI SPECTRUM (ELEMENT 26)
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

SECRET

SECRET



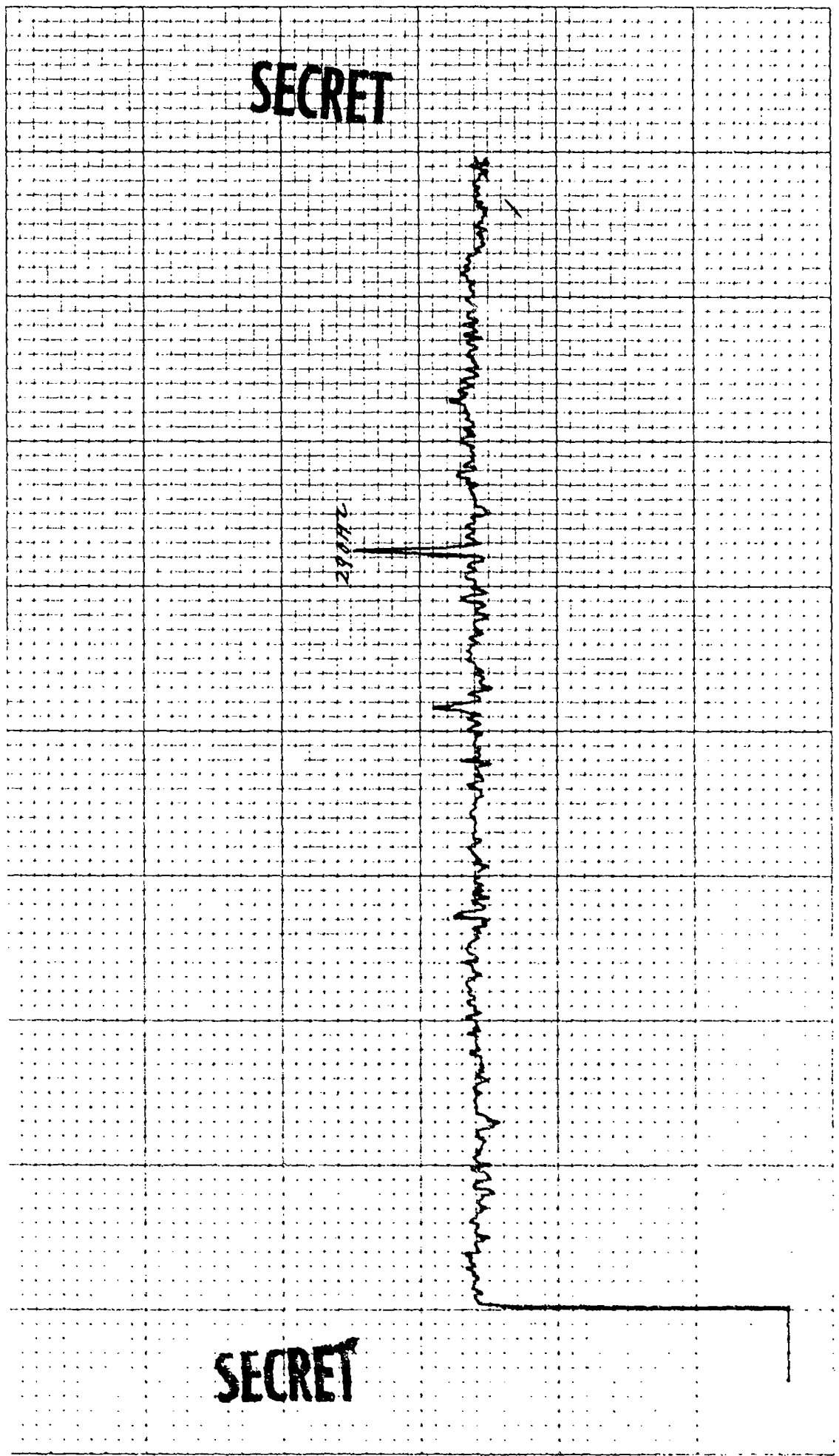
46 0703

K-Σ 12.16 TO TIME 12.16.00
REUTEL 085848 00 0000 0000

CONTROL: 2-7 -1019 (40)
OMNI SPECTRUM(ELEMENT 29)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

DATE OF ANALYSIS:
DATE/TIME: 2-7-77 -1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
 DEG AZ STEERING

REEL: F/5 INDEX: 1955
INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



NOE 30 X 10 TO THE INCH. A 10 DAY REF
WEIFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2-7 -1019 (41)
OMNI SPECTRUM (ELEMENT 31)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

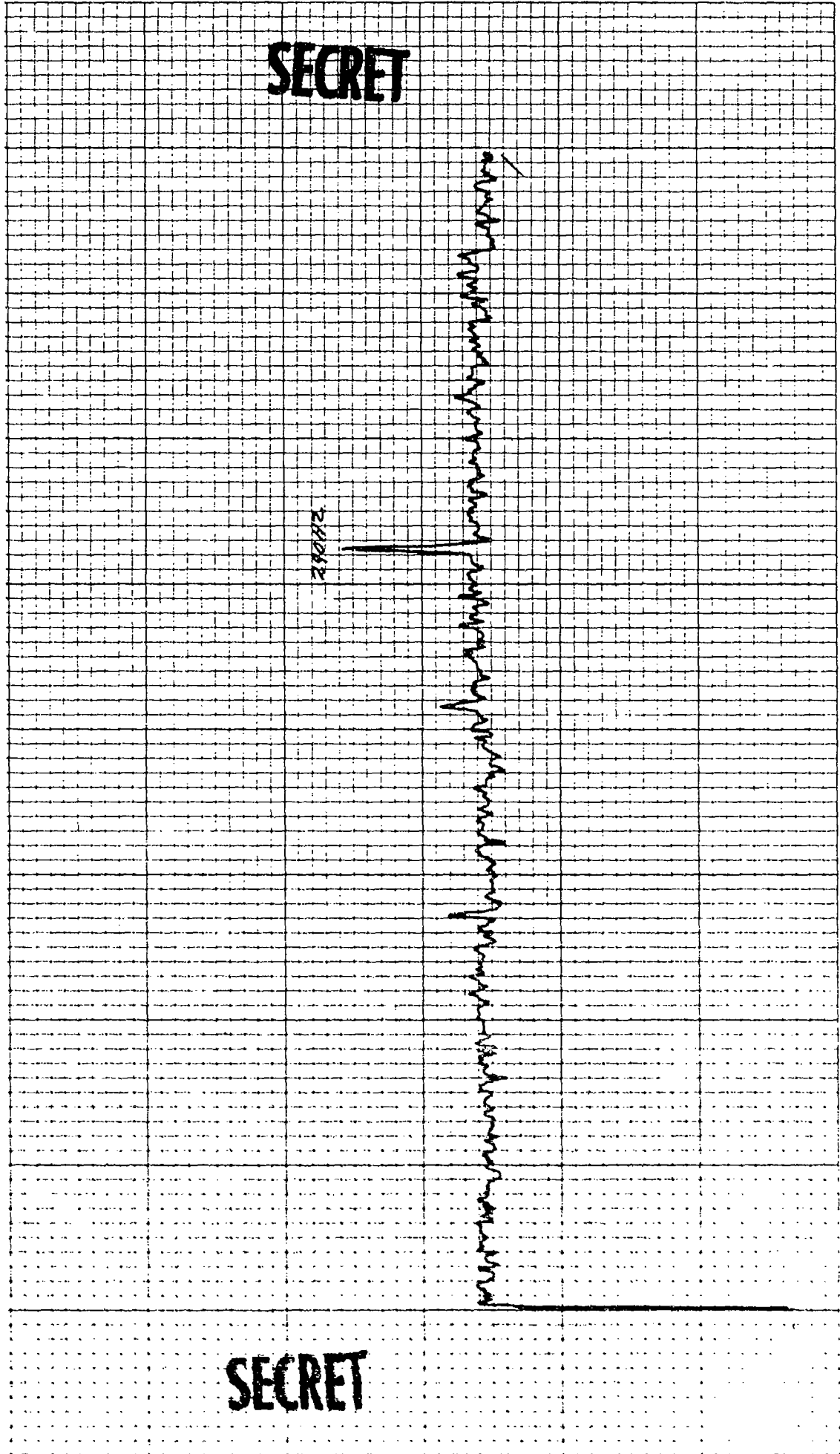
DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: F45

INDEX 1055

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER WTG: HANNING



KOE 10 X 10 TO THE INCH. / 10 INCHES
KFAUFEL & FESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2-7-1019 (42)
OMNI SPECTRUM (ELEMENT 33)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

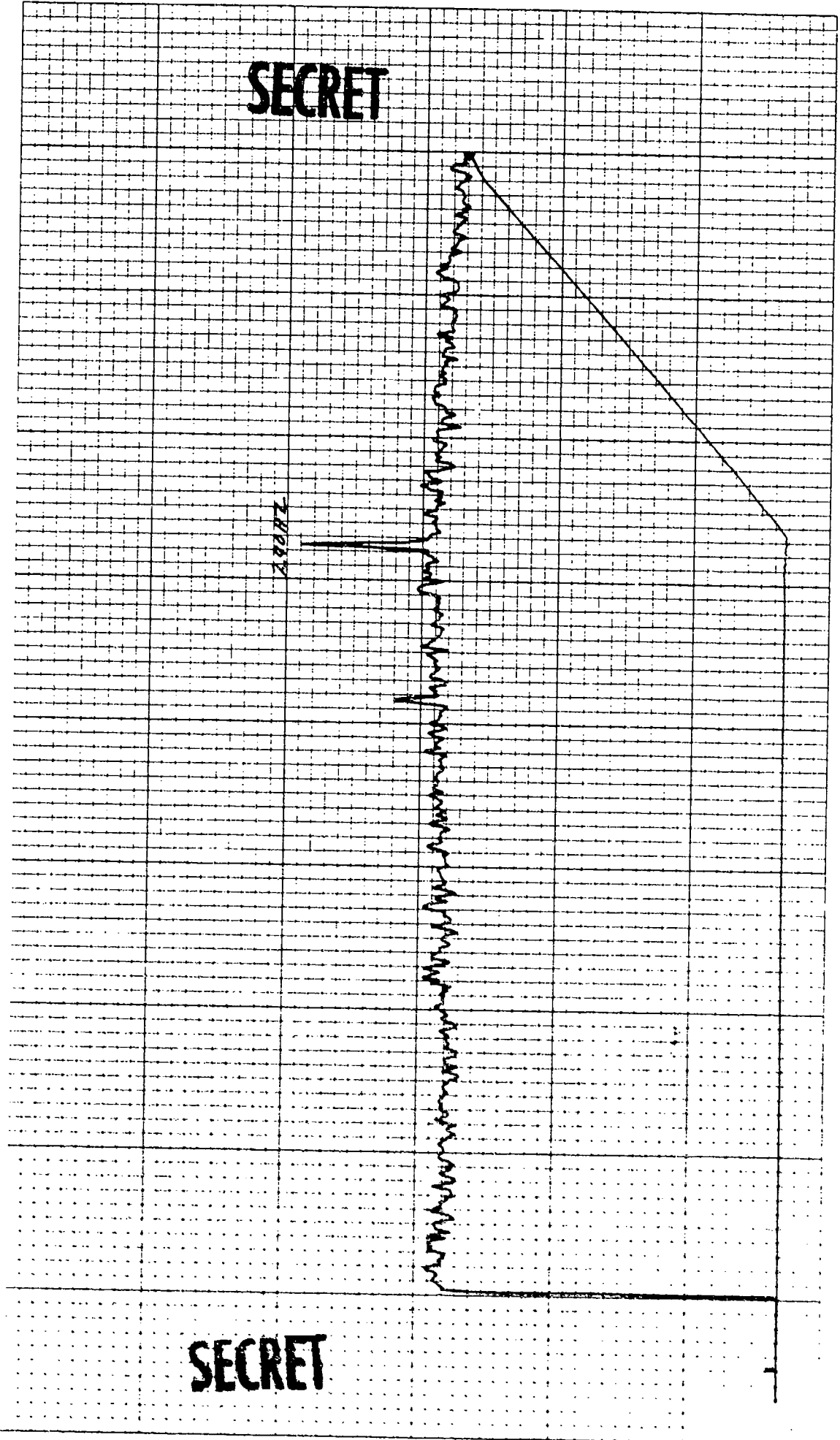
DATE/TIME: 2-7-77 - 1019Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: F/5

INDEX: 155

INTEGRATION TIME 320 SECS
FILTER

ATTEN: — DB
WTG: HANNING



SECRET

SECRET

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

46 0703

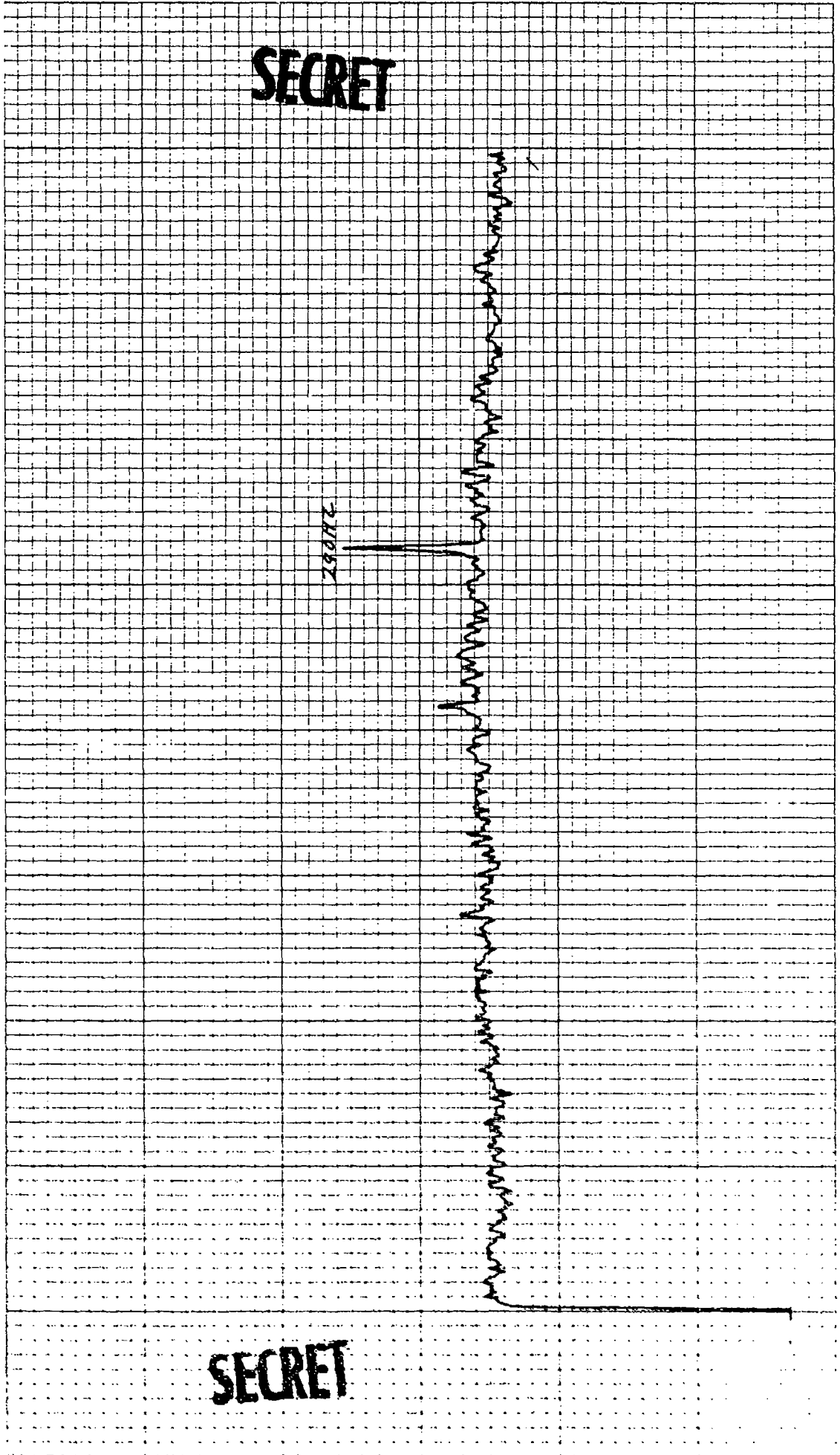
CONTROL: 2-7 -1019 (43)
OMNI SPECTRUM (ELEMENT 35)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

REEL: F15 INDEX 1955

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING



SECRET

SECRET

46 0703

REF ID: A61019 TO THE INCH. CO. 1019 Z

CONTROL: 2-7-1019 (44)
OMNI SPECTRUM (ELEMENT 32)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

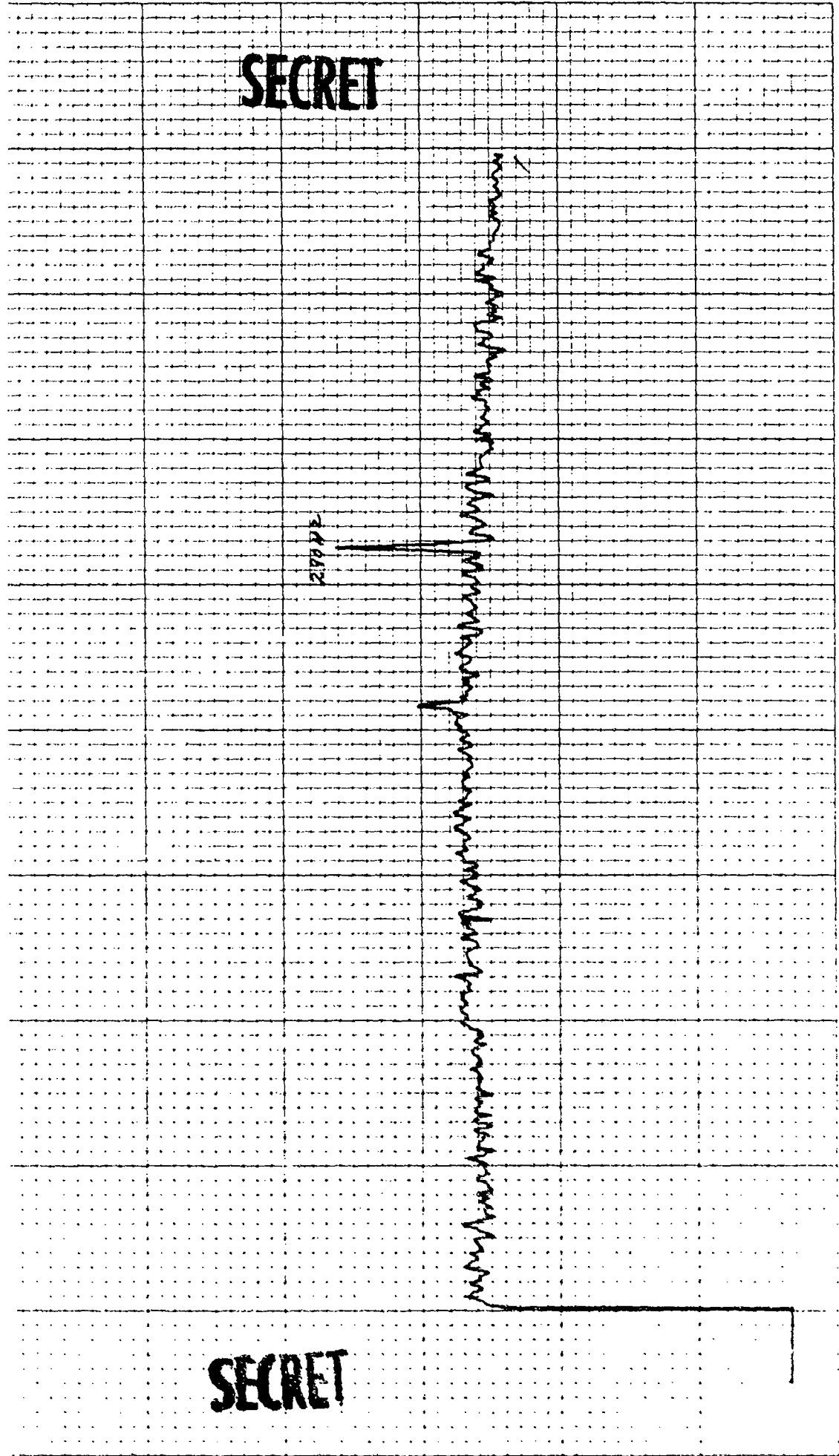
DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F/S

INDEX 1955

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



46 0703

KOE 10.8 IN TO THE INCH
NEUTRAL GRADE CO

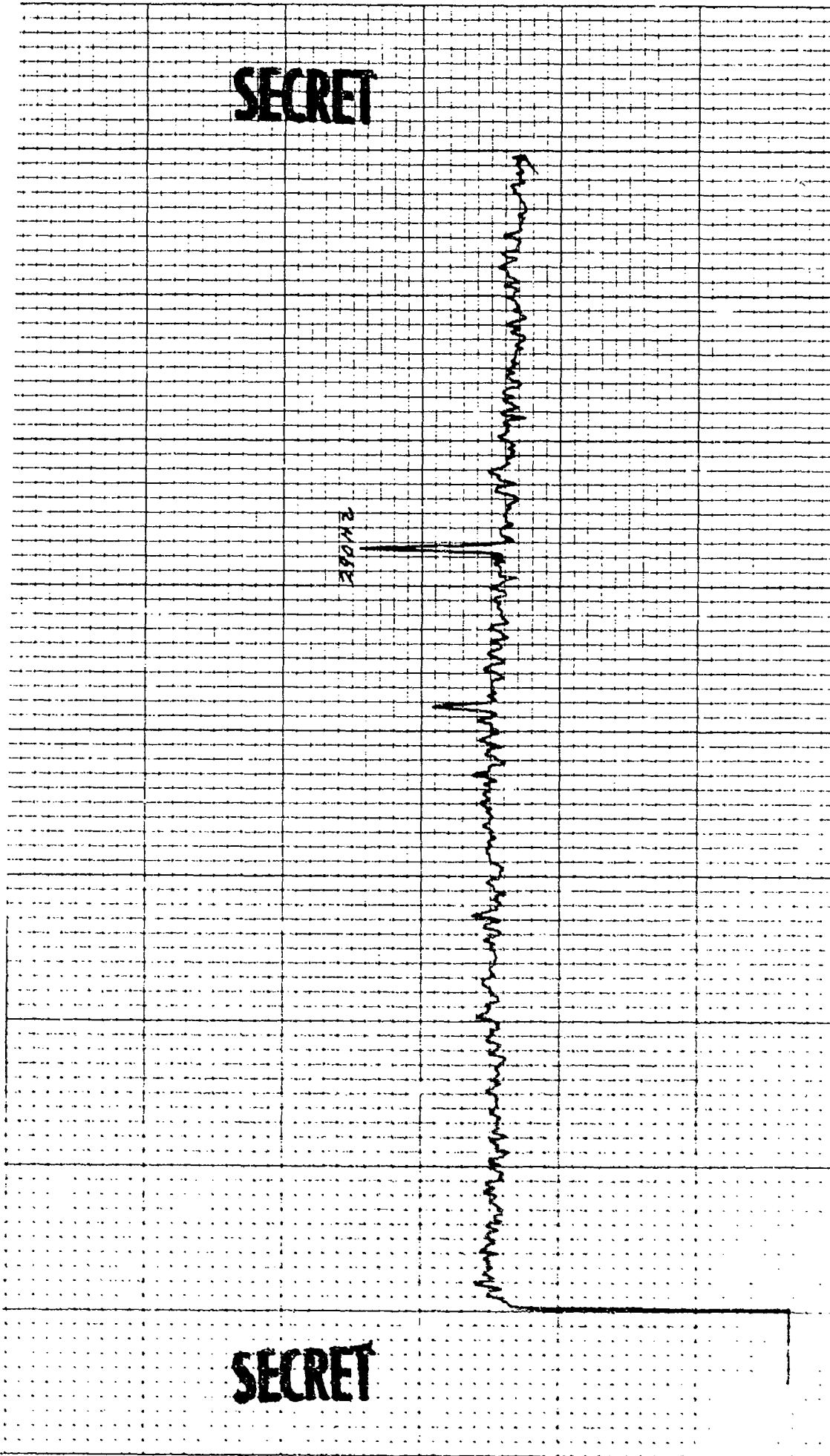
CONTROL: 2-7-1019 (45)
OMNI SPECTRUM (ELEMENT 39)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -1019 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: F/5 INDEX: 1955

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



SECRET

SECRET

REF ID: A61019 TO THE INCHES & POINTS
PHOTO & PAPER CO. WASHINGTON, D.C.

46 0703

CONTROL: 2-7 -1019 (46)
OMNI SPECTRUM(ELEMENT 41)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

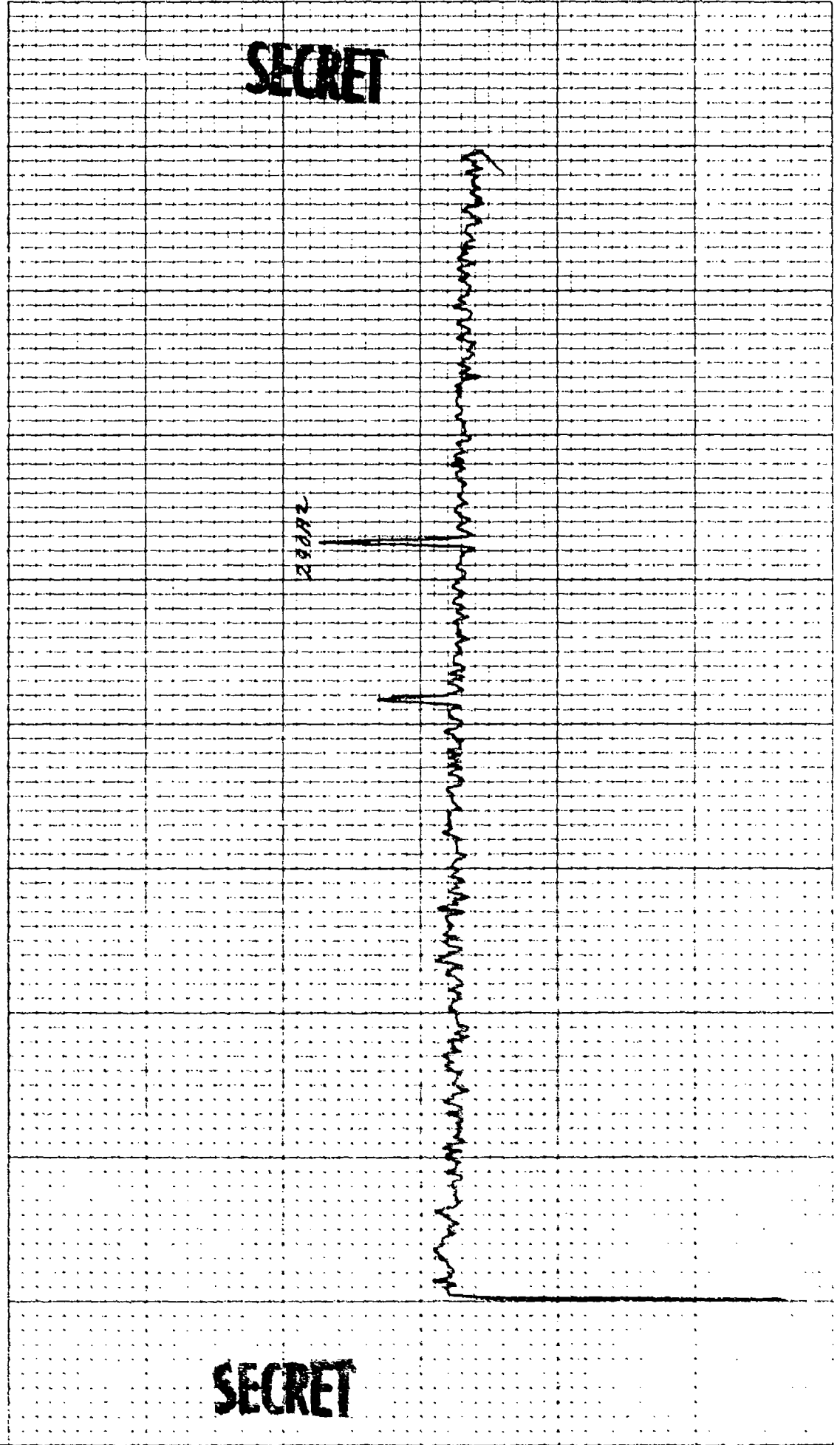
DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 1019 Z

ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: F/5 INDEX 1955

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



SECRET

SECRET

REF ID: A6 10 16 TO THE DIRECTOR, NSA, 2500 MICHIGAN AVENUE, WASHINGTON, D.C. 20535

46 0703

CONTROL: 2-7 -1019 (47)
OMNI SPECTRUM(ELEMENT 43)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

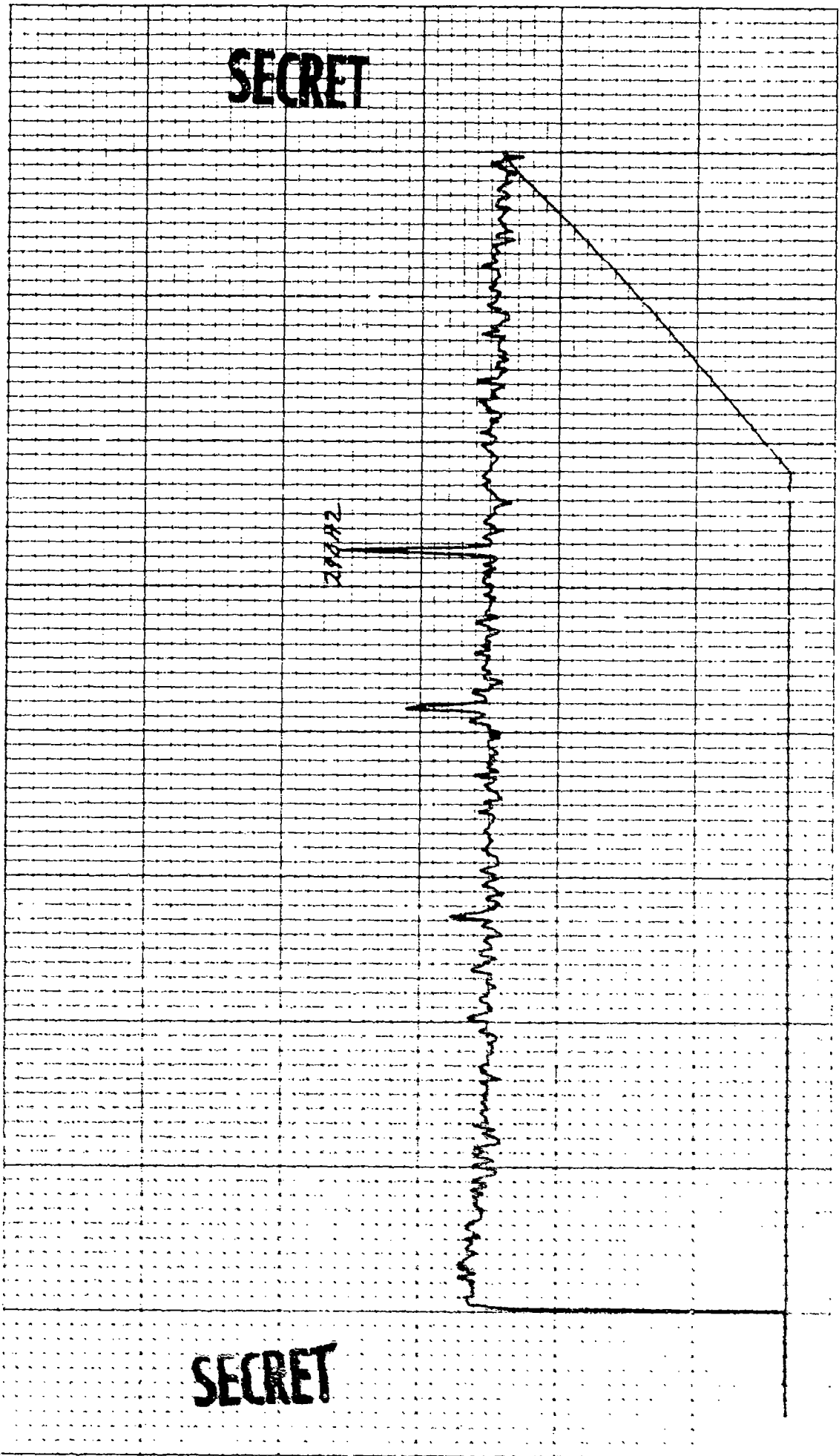
DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

REEL: F/5

INDEX 1955

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



SECRET

46 0703

REF ID: A66070

REEL: F/5 INDEX 1955

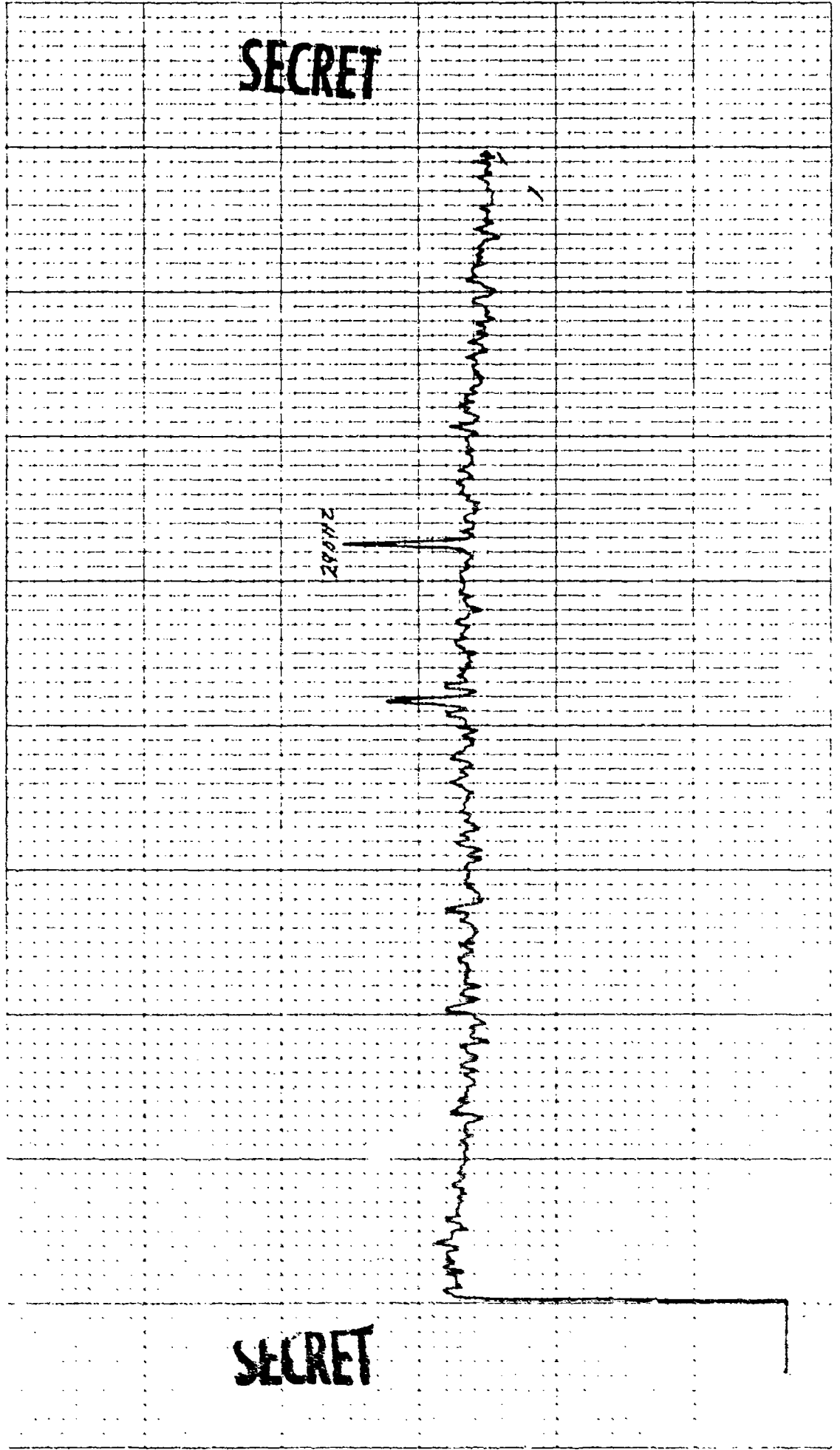
DATE OF ANALYSIS:

CONTROL: 2.7 - 1019 (40)
OMNI SPECTRUM (ELEMENT 45)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10 HZ

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

DEG AZ STEERING



SECRET

SECRET

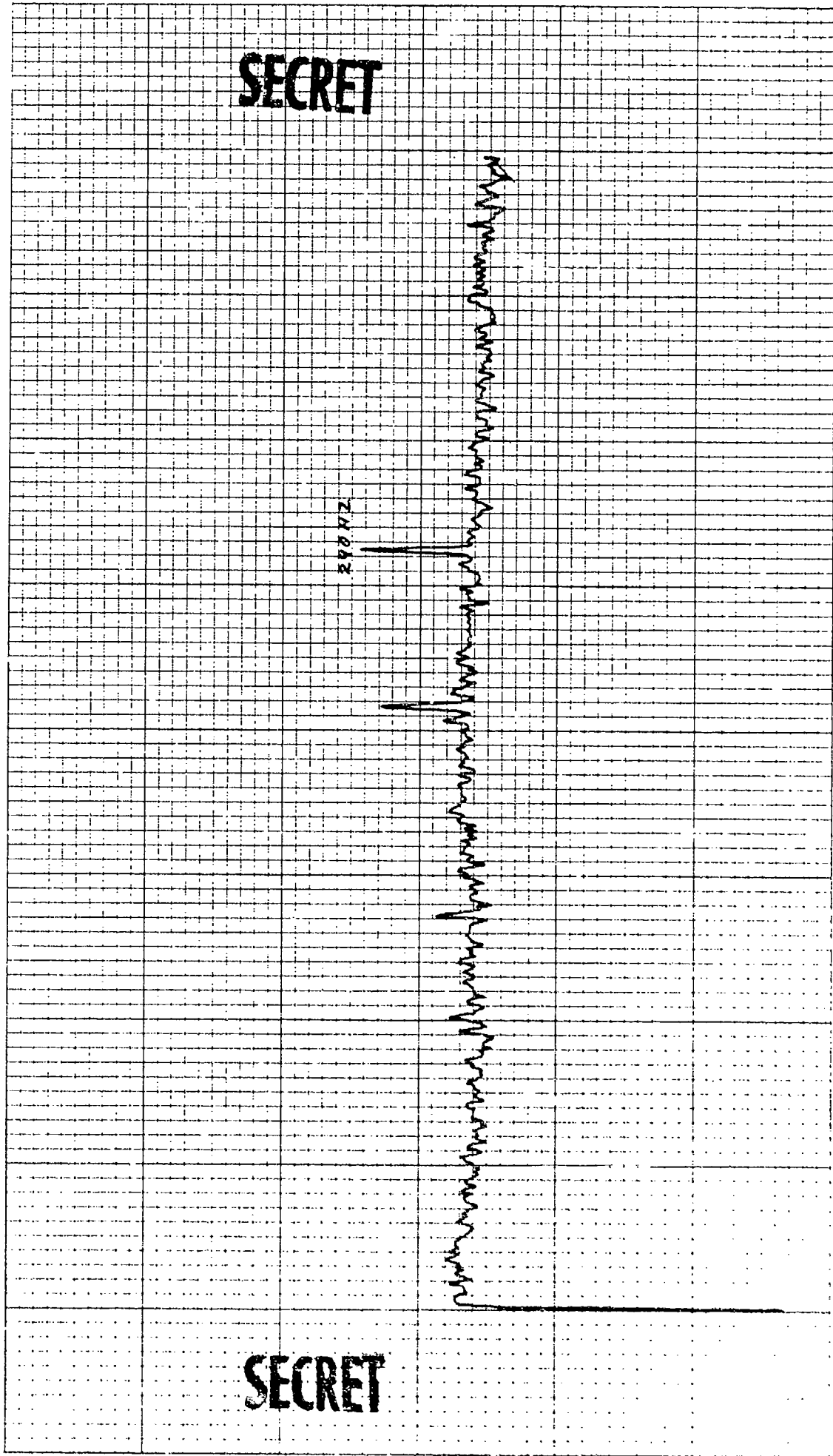
CONTROL: 1019 - 51 (DP4)
OMNI SPECTRUM (ELEMENT 47)
EXERCISE: BEARING STAKE
CENTER FREQ: 250 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
- DEG AZ STEERING

REEL: F/S INDEX 1955

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



SECRET

SECRET

46 0703

REF 2019 TO THE PAGES 2019

INDEX 1955

REEL: F/S

ATTEN: DB

FILTER

INTEGRATION TIME 320 SECS

WTC: HANNING

DATE OF ANALYSIS:

CONTROL: 2-7 - 1019 (50)

OMNI SPECTRUM (ELEMENT 49)

EXERCISE: BEARING STAKE

CENTER FREQ: 200 HZ

I ELEMENT

DATE/TIME: 2-7-77 - 1019 Z

ANALYSIS BANDWIDTH: 1/10HZ

DEG AZ STEERING

DATE/TIME: 2-7-77 - 1019 Z

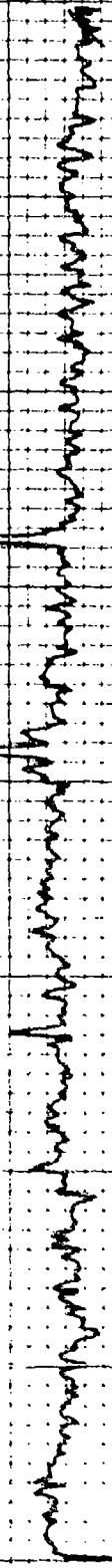
ANALYSIS BANDWIDTH: 1/10HZ

DEG AZ STEERING

SECRET

SECRET

2019Z



46 0703

K0Σ 100000 100000 100000

CONTROL: 2-7 - (5 /)
OMNI SPECTRUM (ELEMENT 5 /)
EXERCISE: BEARING STAKE
CENTER FREQ: 700 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

REEL: F15

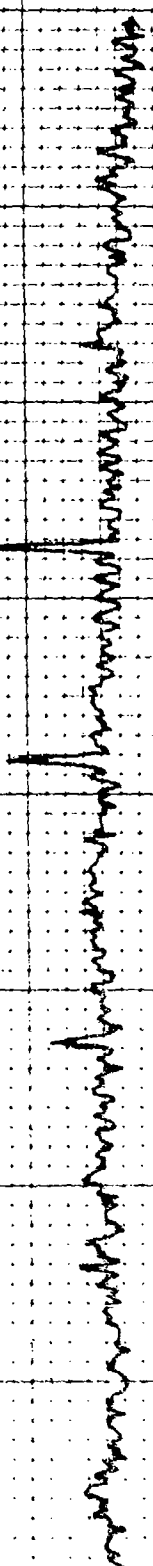
INDEX 1955

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER
WTG: HANNING

SECRET

SECRET

2000



46 0703

MSE 1000 1000 1000 1000

INDEX 1955

REEL: F/5

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -1919 Z

ANALYSIS BANDWIDTH: 1/10HZ

----- DEC AZ STEERING

INTEGRATION TIME 320 SECS

FILTER WTG: HANNING

CONTROL: 2-7 -1019 (52)

OMNI SPECTRUM/ELEMENT 53

EXERCISE: BEARING STAKE

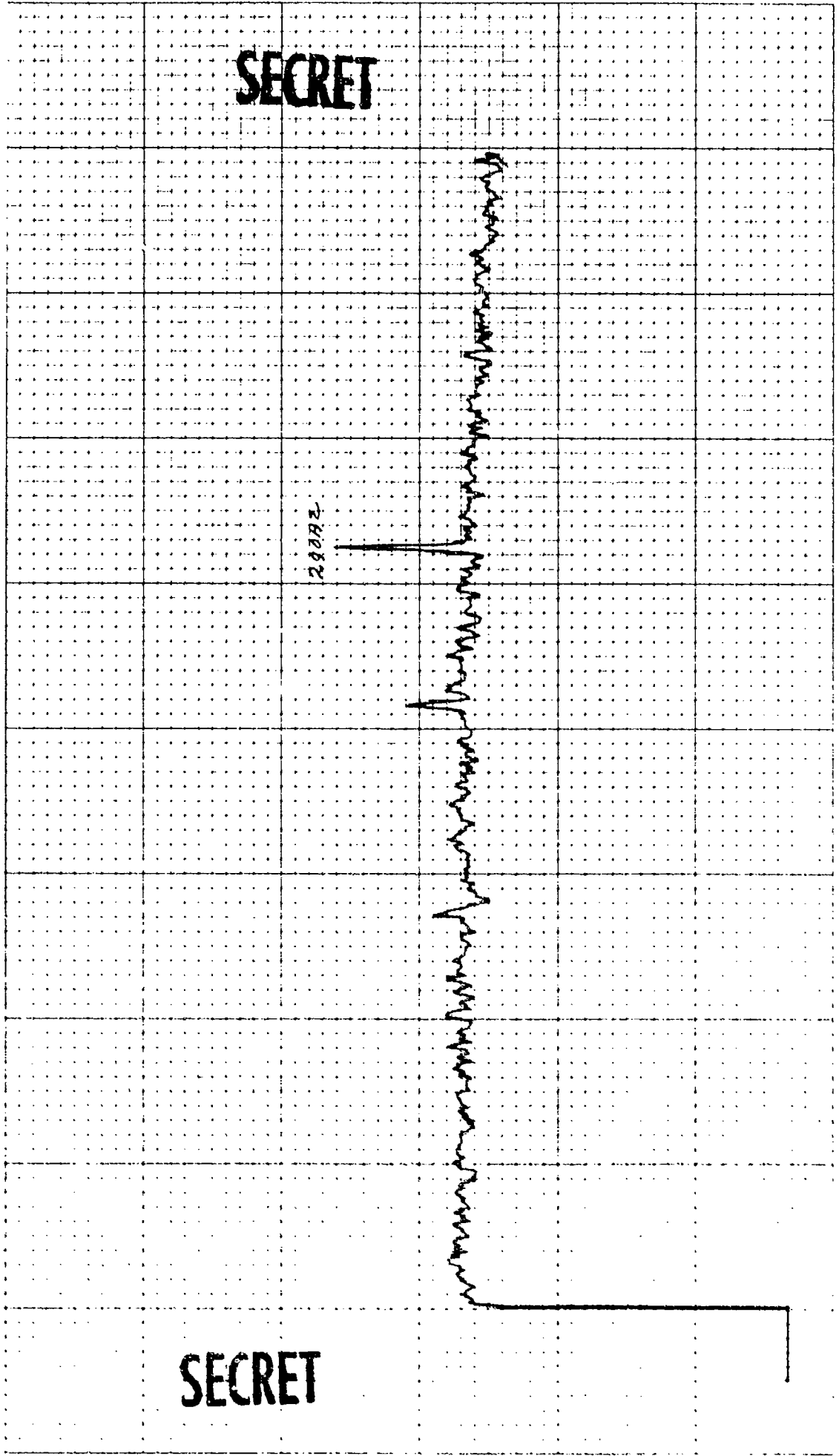
CENTER FREQ: 200 HZ

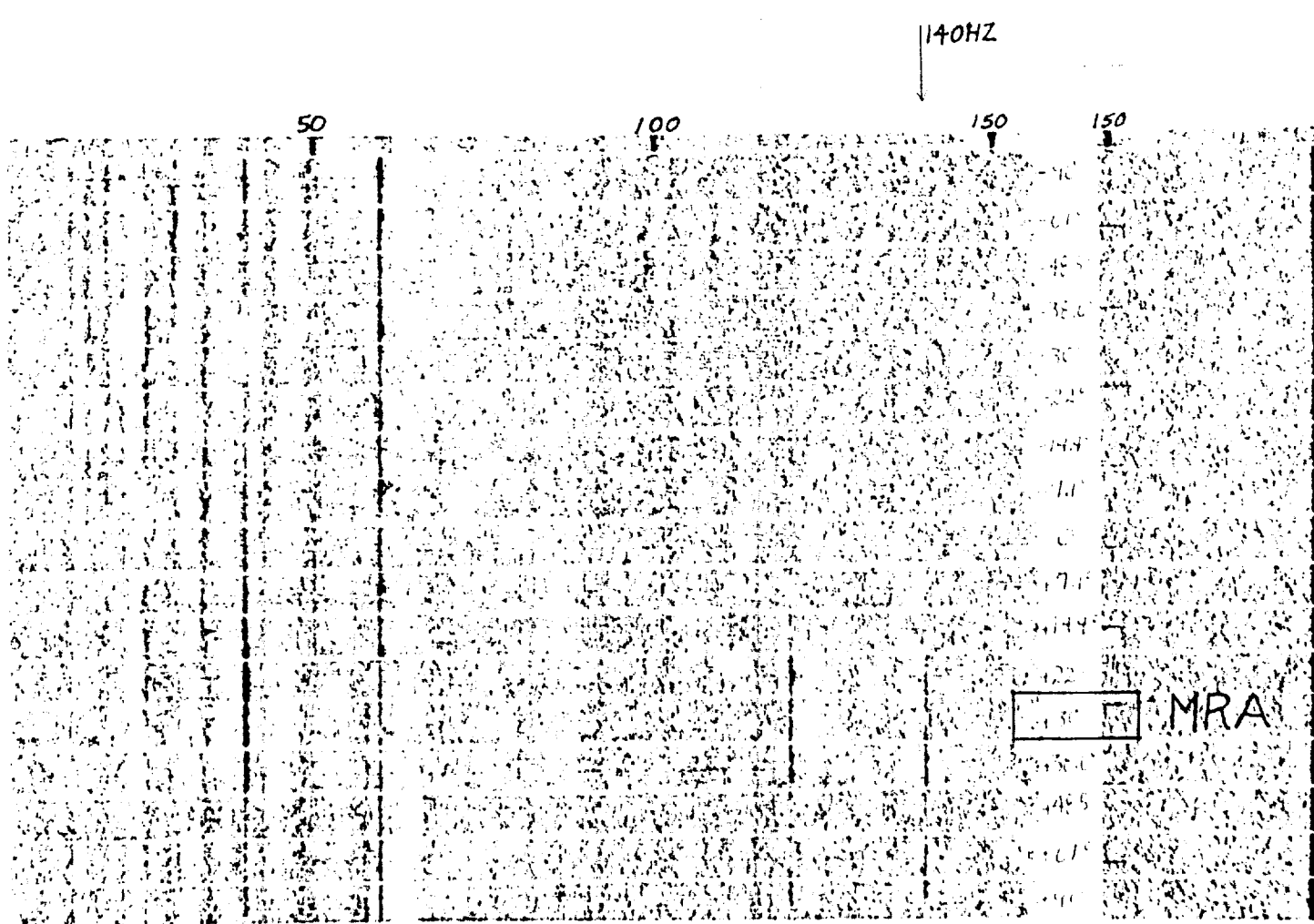
1 ELEMENT

SECRET

SECRET

20003





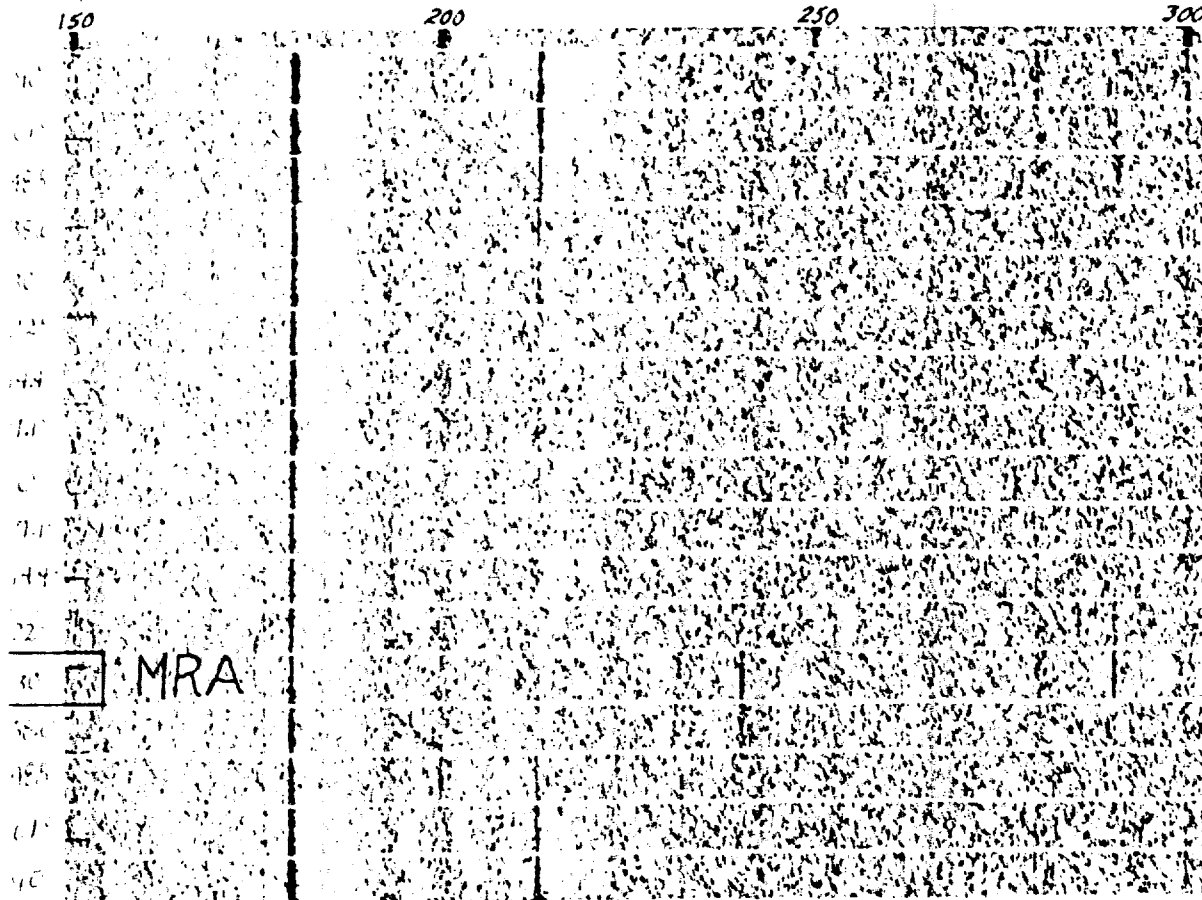
CONTROL NUMBER 10 92 44 DP4
 NUMBER OF ELEMENTS 16
 FREQUENCY BAND 10 TO 100 HZ
 RANGE 159 N.M.

HISTOGRAM
 TAPE REEL NUMBER F15
 ANALYSIS BAND WIDTH 2 HZ
 WATER DEPTH 2000 FMS

Best Available Copy

SECRET

290HZ
295HZ



OFRAZ
SER 175

TAPE COUNT 1955

SECRET

ELEMENT NUMBERS 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

DATE 1-1-77

SAN-XXX-78-0129

WIDTH 12
2000 FMS

EXERCISE: HEARING STATE

α

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 4

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-39.4</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-29.4	
BEAMFORMER GAIN	<u>+18</u>	-11.4	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	-11.2	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-55.1</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-45.1	
BEAMFORMER GAIN	<u>+18</u>	-27.1	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-11.4</u>	
SIGNAL LEVEL FOR SNR	<u>-27.1</u>	15.7	
PROCESSOR CORRECTION	<u>-4.2</u>	11.5	
MRA CORRECTION	<u>+ .2</u>	11.7	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	3.5	SNR 1 HZ BAND

Best Available Copy

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 4

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-44.4</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-34.4	
BEAMFORMER GAIN	<u>+18</u>	-16.4	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .7</u>	-15.7	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-66.4</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-56.4	
BEAMFORMER GAIN	<u>+18</u>	-38.4	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-16.4</u>	
SIGNAL LEVEL FOR SNR	<u>-38.4</u>	22.0	
PROCESSOR CORRECTION	<u>- 4.0</u>	18.0	
MRA CORRECTION	<u>+ .7</u>	18.7	SNR 1/2 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	10.5	SNR 1 HZ BAND

Best Available Copy

CONFIDENTIAL

CONFIDENTIAL

DATA POINT 4

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-34.4</u>	<u>-39.6</u>	<u> </u>
MRA SIGNAL LEVEL	<u>-11.2</u>	<u>-15.3</u>	<u> </u>
ARRAY SIGNAL GAIN	<u>23.2</u>	<u>24.3</u>	<u> </u>
20 LOG <u>16</u>	<u>24</u>	<u>24</u>	<u> </u>
# of elements			
DIFFERENCE	<u>- .8</u>	<u>+ .3</u>	<u> </u>

ARRAY GAIN

MRA SNR	<u>11.7</u>	<u>18.7</u>	<u> </u>
MEAN OMNI SNR	<u>8.3</u>	<u>6.5</u>	<u> </u>
ARRAY GAIN	<u>3.4</u>	<u>12.2</u>	<u> </u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>9.6</u>	<u>12.2</u>	<u> </u>
DIFFERENCE	<u>-6.2</u>	<u>0</u>	<u> </u>

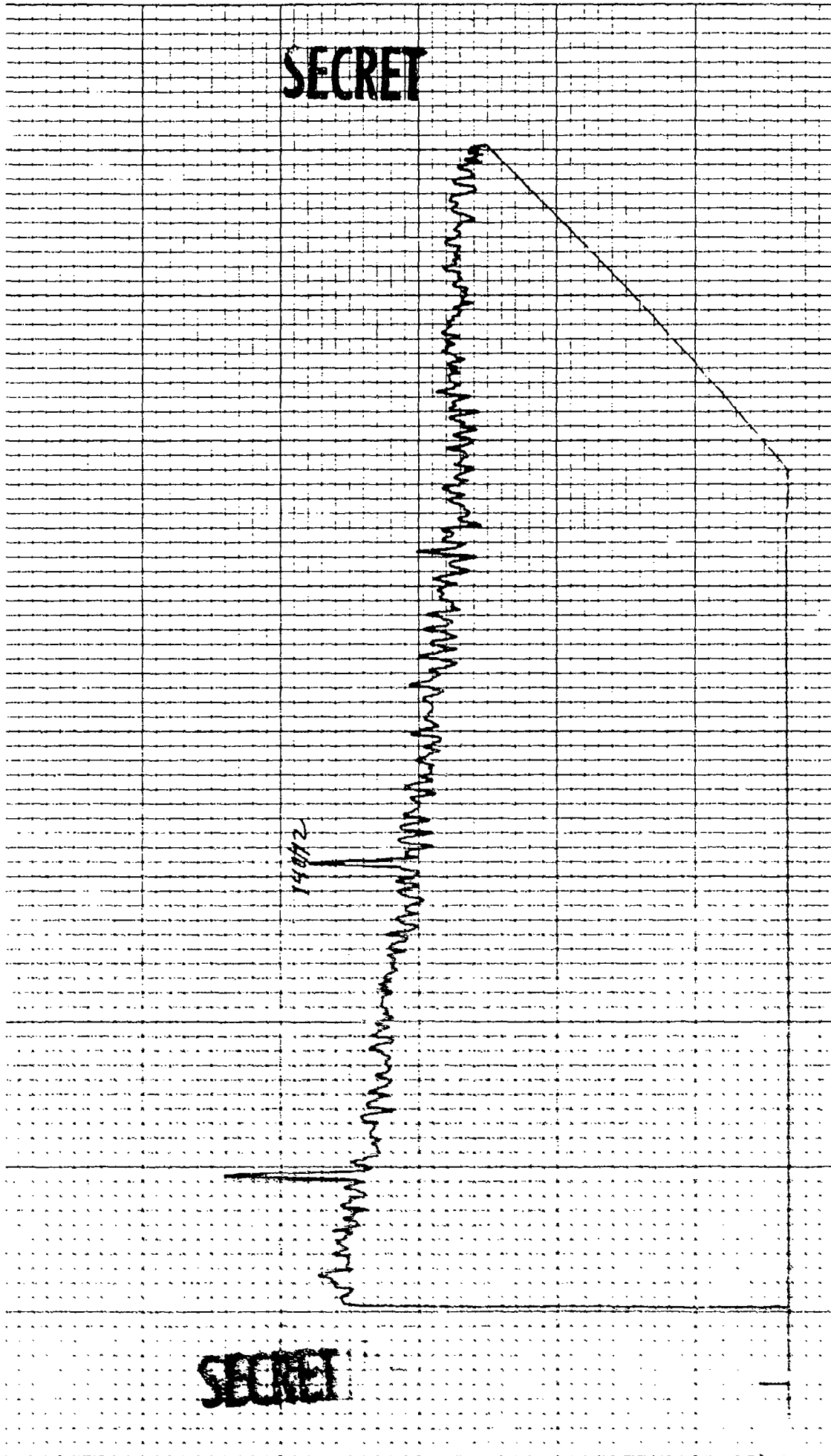
Best Available Copy

CONFIDENTIAL

CONTROL: 2-7-1019 (16)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERC E: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-1-6
DATE/TIME: Z77-1 / Z
ANALYSIS BANDWIDTH: 1/10HZ
AZC DEG. AZ STEERING

REEL: F15
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING
A.-EN: -18 DB
INDE X1955

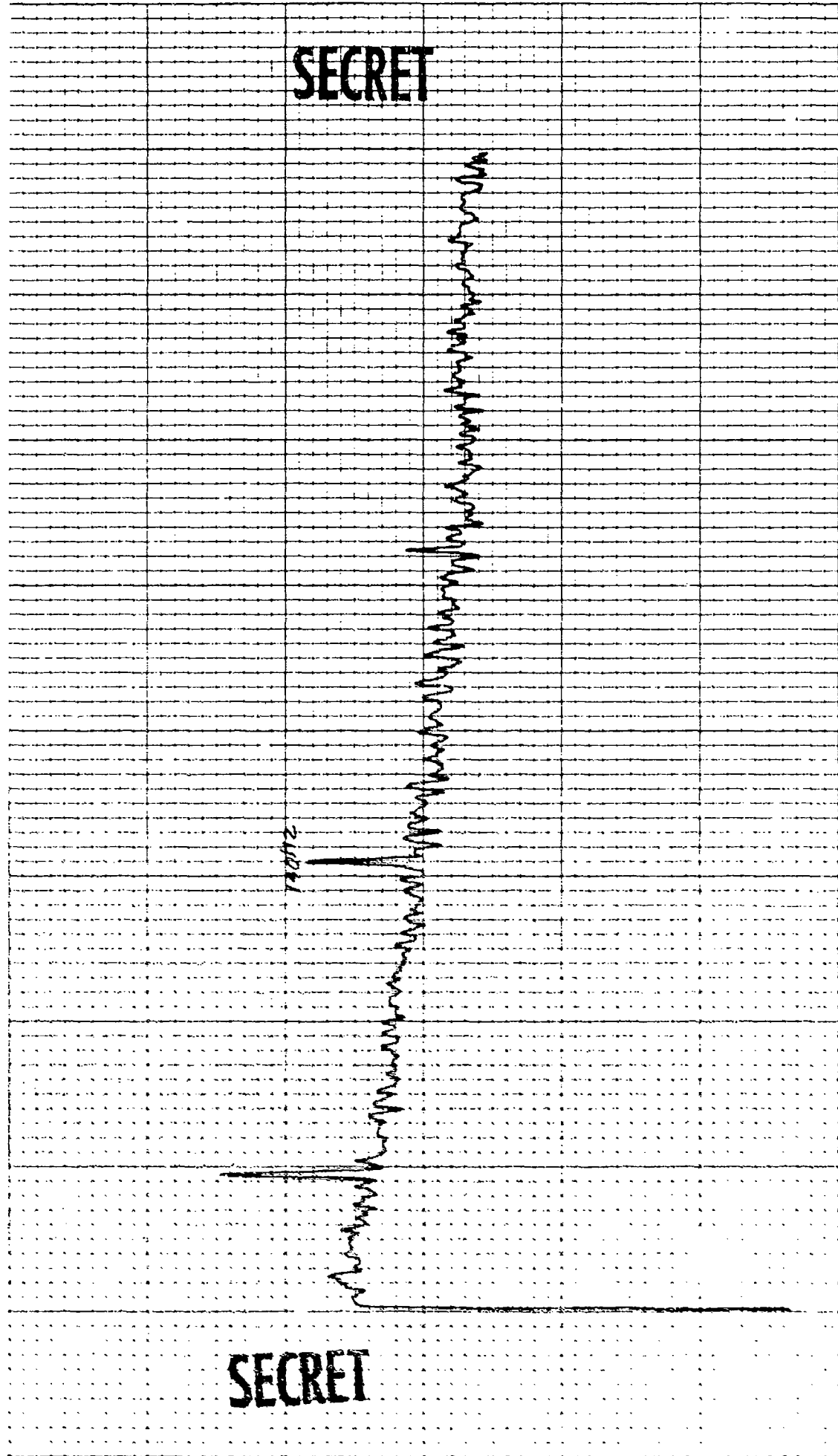


SECRET

46 0703

KOE

CONTROL: 2.7 - 1019 (16) DATE OF ANALYSIS: 1-16 REEL: F15 INDE X 1955
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 27-77 1019 Z INTEGRATION TIME 320 SECS ATTN: -18 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 CENTER FREQ: 150 HZ +22 DEC. AZ STEERING



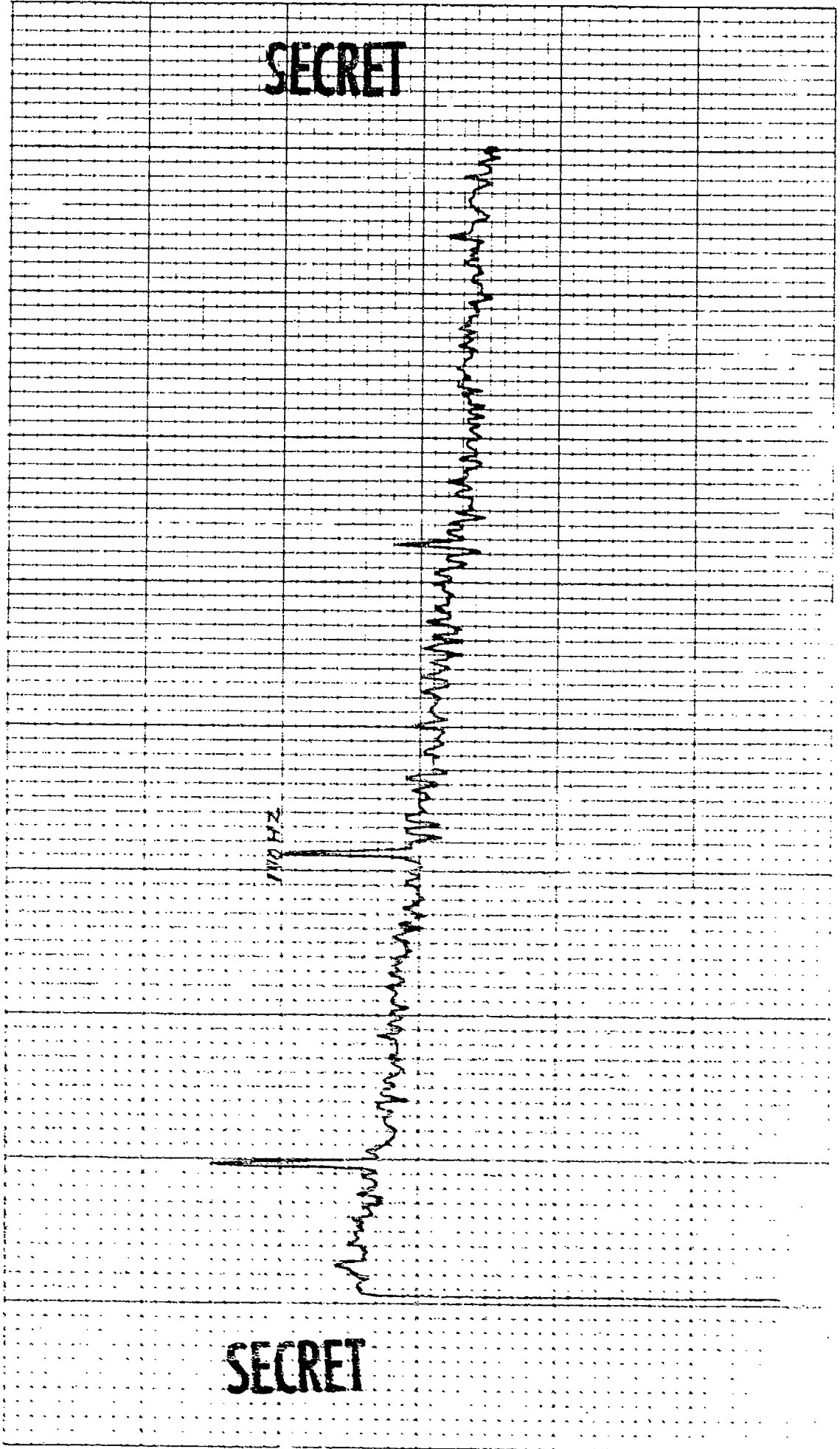
46 0703

10/2 10/19 10/19

CONTROL: 2-7 - 10/19 (16)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: - - - -
/ - 16)
DATE/TIME: 2-7-77 - 10/19 2
ANALYSIS BANDWIDTH: 1/10 HZ
+24 DEC. AZ STEERING

REEL: F/5 INDE X 1955
INTEGRATION TIME 320 SECS ATTN: -16 DB
FILTER WTC: HANNING



KOE 10 X 10 1/2 THE INCHES
REDFIELD & PERRY CO. MADE IN U.S.A.

46 0703

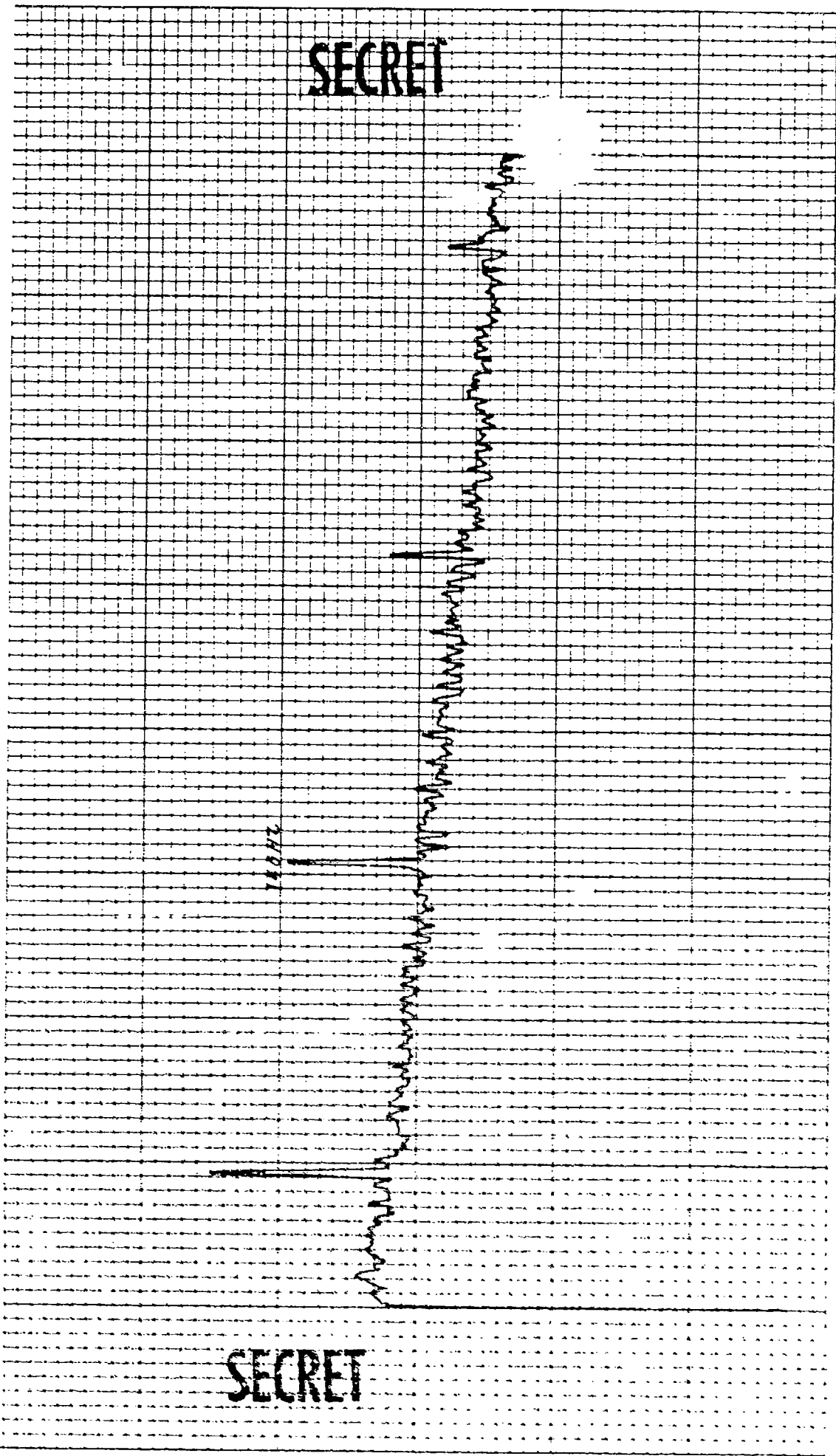
6 0703

CONTROL: 2.7 - 1019 (16)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10 HZ
F26 DEG. AZ STEERING

REEL: F15
INDE X 1955

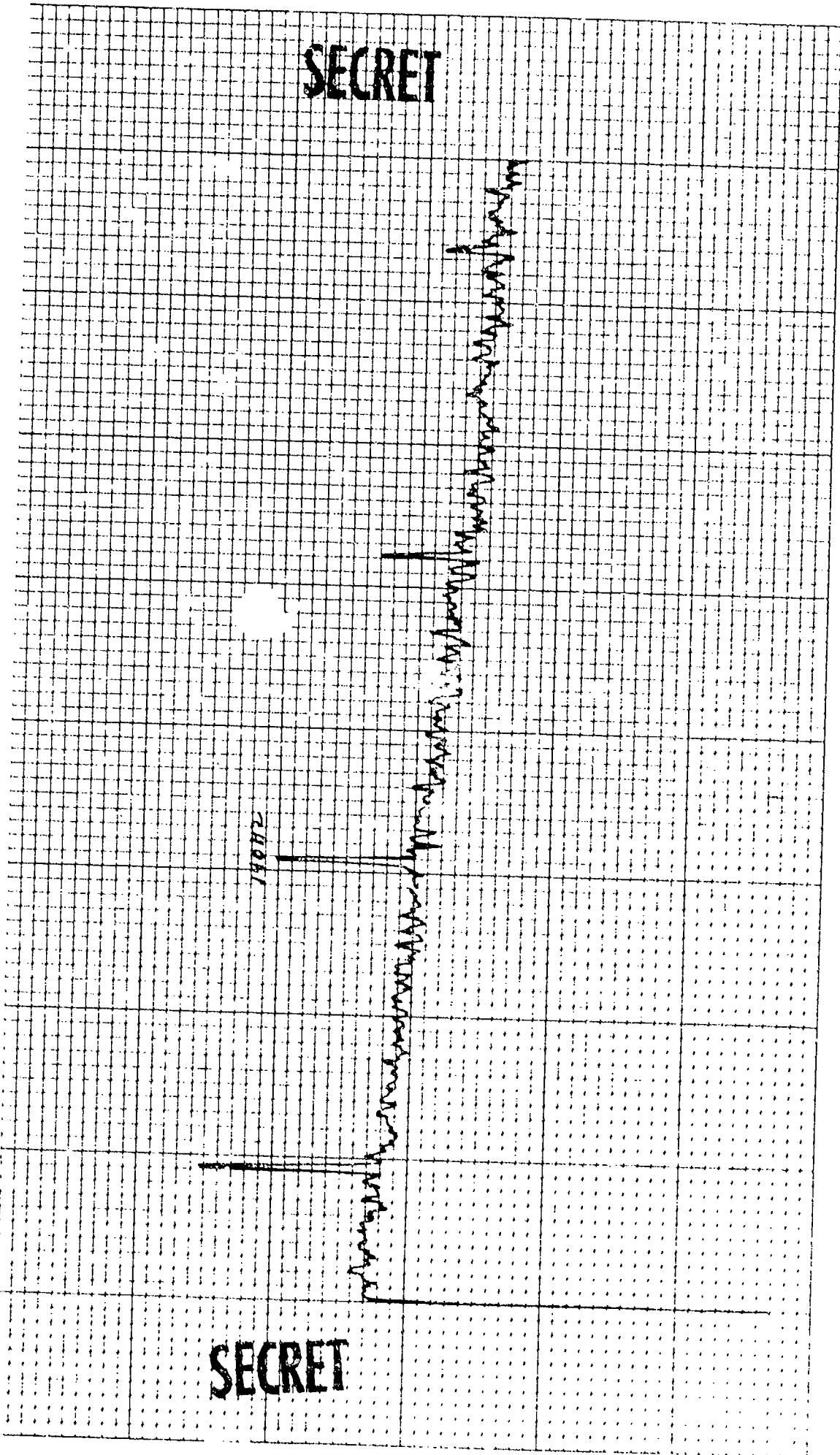
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING



CONTROL: 2-7 -1019 (16)
LEAMPFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-7-6
DATE/TIME: 2-7-77 -1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
±20 DEG. AZ STEERING

REEL: F/5
INDE X/955
INTEGRATION TIME 320 SECS
ATTEN: -10 DR
FILTIER WIG: HANNING



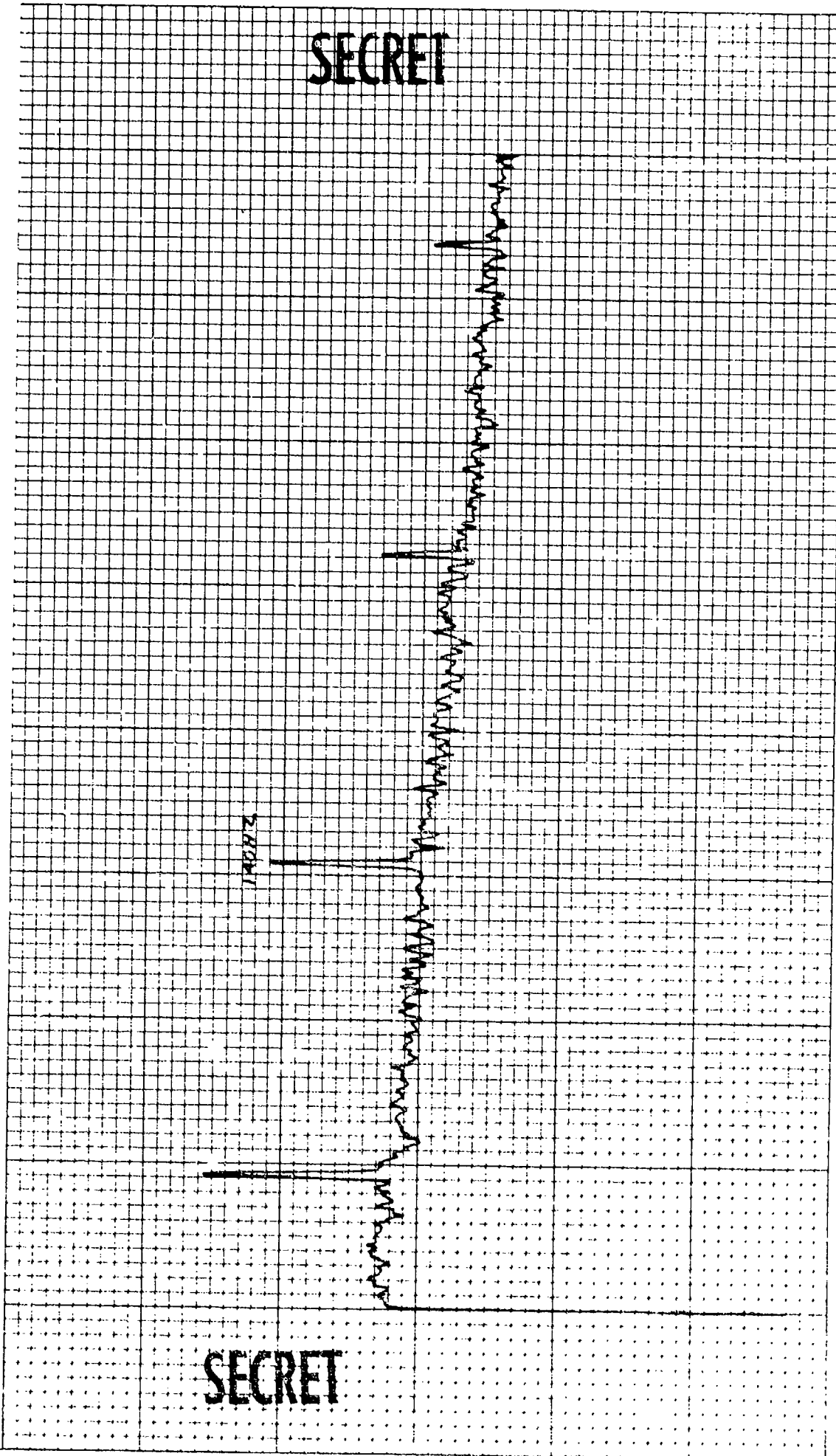
KOE 10 X 10 TO THE INCH * 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 1019 - 51 (DPY) DATE OF ANALYSIS: _____
BEAMFORMED SPECTRUM(ELEMENTS) / - /
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1019 Z
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
/C ELEMENTS +29 DEG. AZ STEERING

REEL: F/5 INDE X 1955

INTEGRATION TIME 320 SECS ATTN: 18 DB
FILTER WTC: HANNING



SECRET

SECRET

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

46 0703

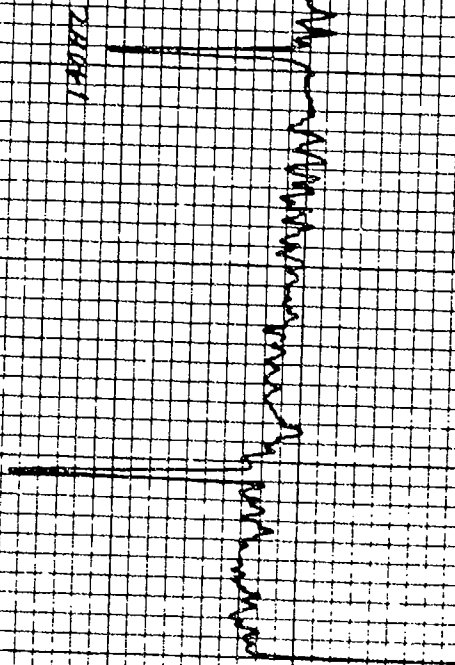
CONTROL: 2-7 -1019 (16)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-7-77 -1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
+29.5 DEG. AZ STEERING

REEL: F/5
INTEGRATION TIME 320 SECS
FILTER

INDE X/955

ATTEN: -10 DB
WTC: HANNING



SECRET

SECRET

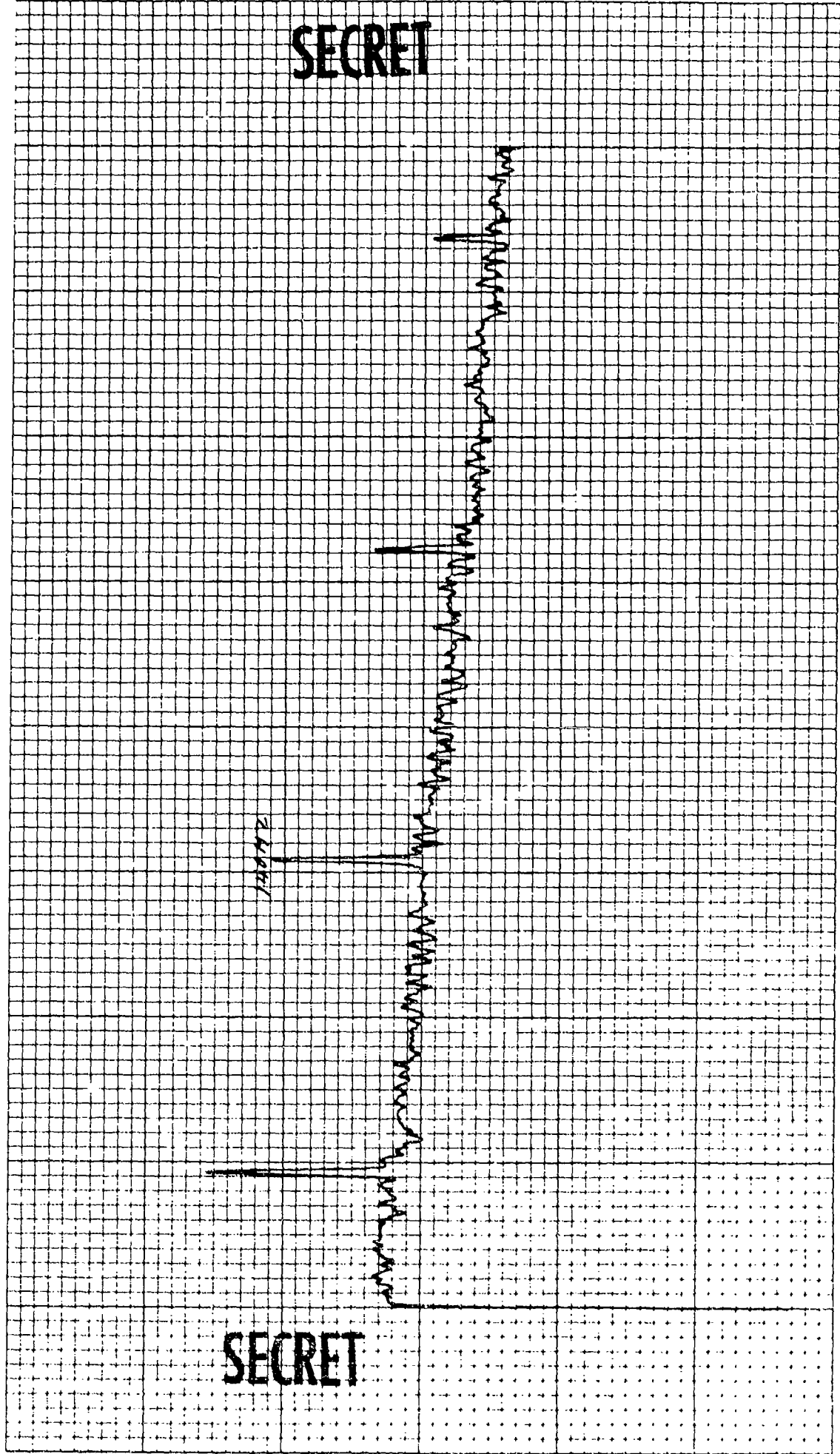
K•E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2-7 - 1019 (16)
BEAMFORMED SPECTRUM (ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS
DATE OF ANALYSIS: 1-16)
DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
+30 DEG. AZ STEERING

REEL: F15 INDE X1955

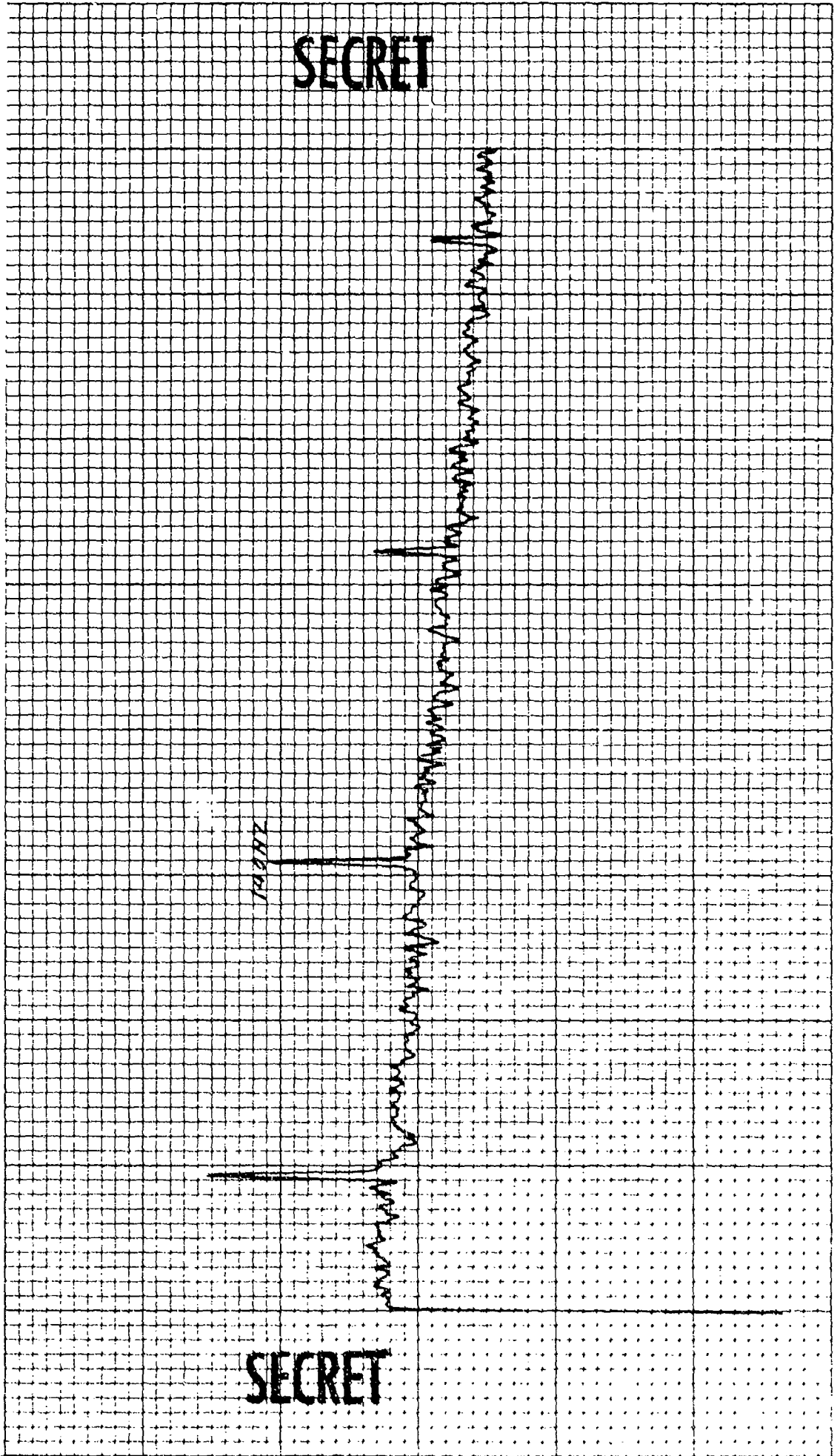
INTEGRATION TIME 320 SECS
ATTEN: -10 DB
FILTER WTG: HANNING



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

46 0703

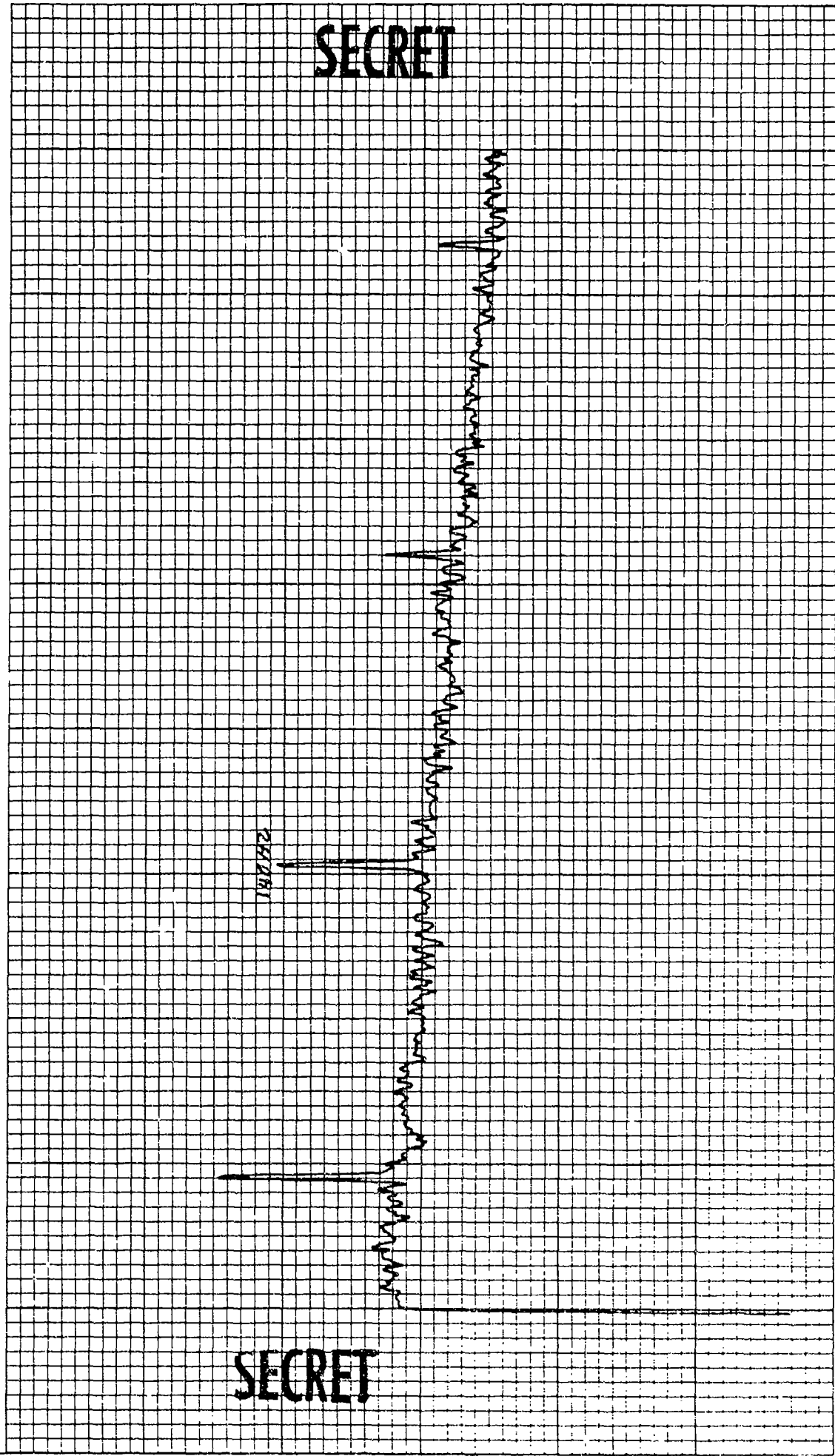
CONTROL: 2-7 -1019 (16) DATE OF ANALYSIS: 1-16 REEL: F15 INDEX X/855
BEAMFORMED SPECTRUM(ELEMENTS) INTEGRATION TIME 320 SECS ATTEN:-18 DB
EXERCISE: BEARING STAKE FILTER WTG: HANNING
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
16 ELEMENTS +32 DEG. AZ STEERING



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

46 0703

CONTROL: 27 - 1019 (16) DATE OF ANALYSIS: 1-16 REEL: F/5 INDEX: X/155
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-7-77 - 1019 Z INTEGRATION TIME 320 SECS ATTN: -10 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 150 HZ 474 DEC. AZ STEERING



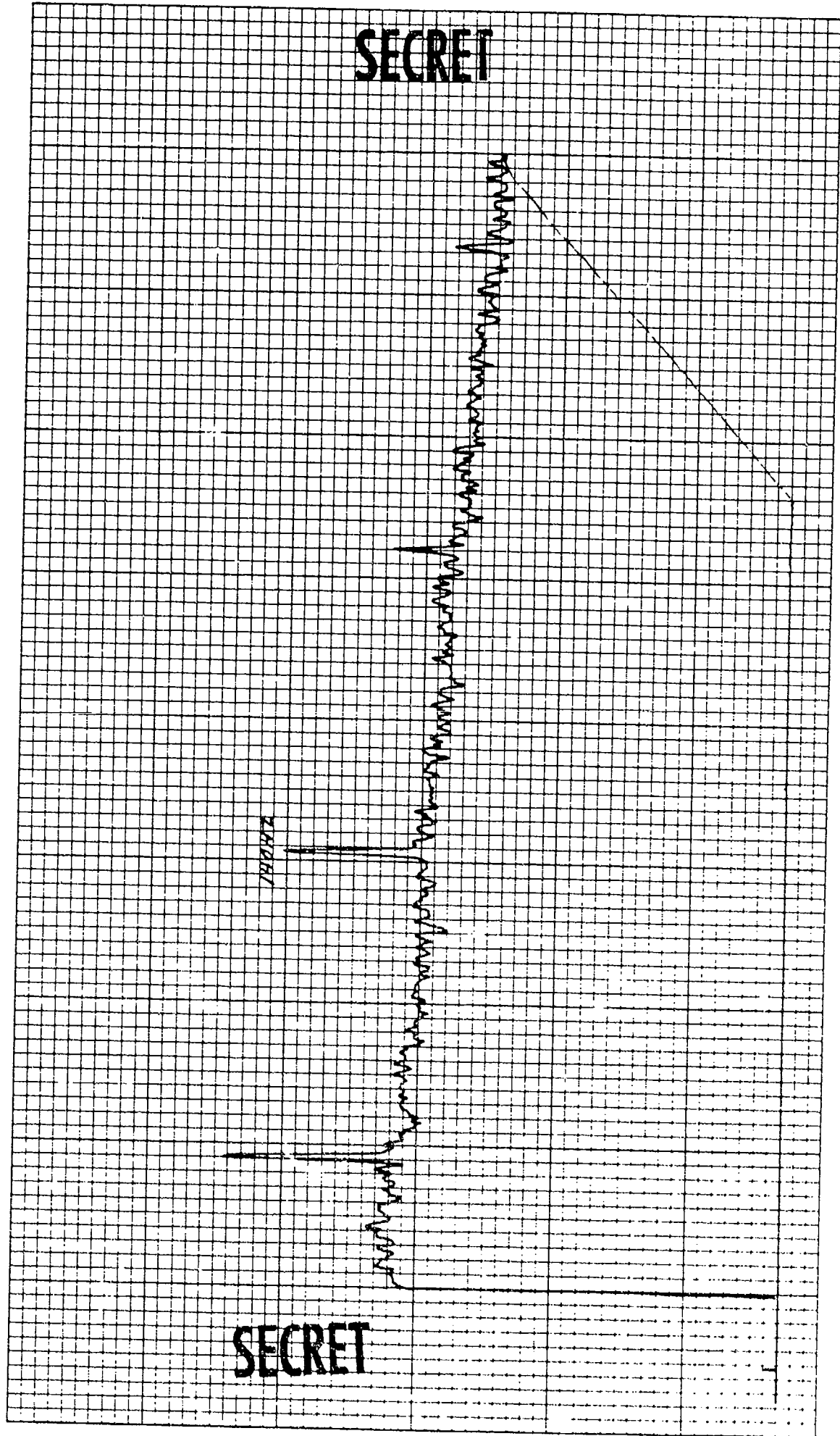
KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2-7 - 1019 (14)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16)
DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+36 DEG. AZ STEERING

REEL: F15 INDE X 1955
INTEGRATION TIME 320 SECS ATTN: 70 DB
FILTER WTC: HANNING



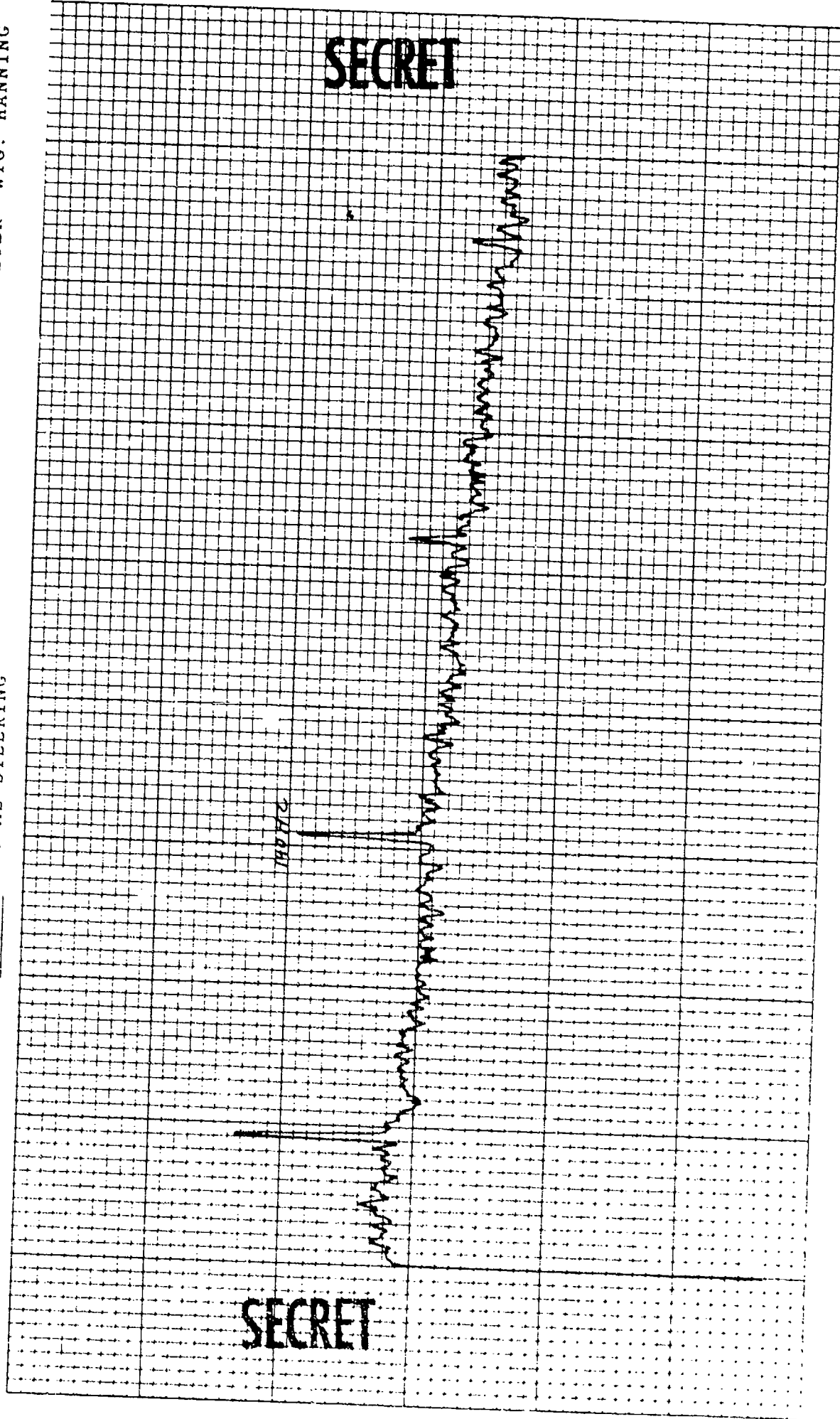
KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2-7 -1019 (16)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-7-77 -1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
+J8 DEG. AZ STEERING

REEL: F15 INDE X/1955
INTEGRATION TIME 320 SECS ATTEN: -10 DB
FILTER WTG: HANNING



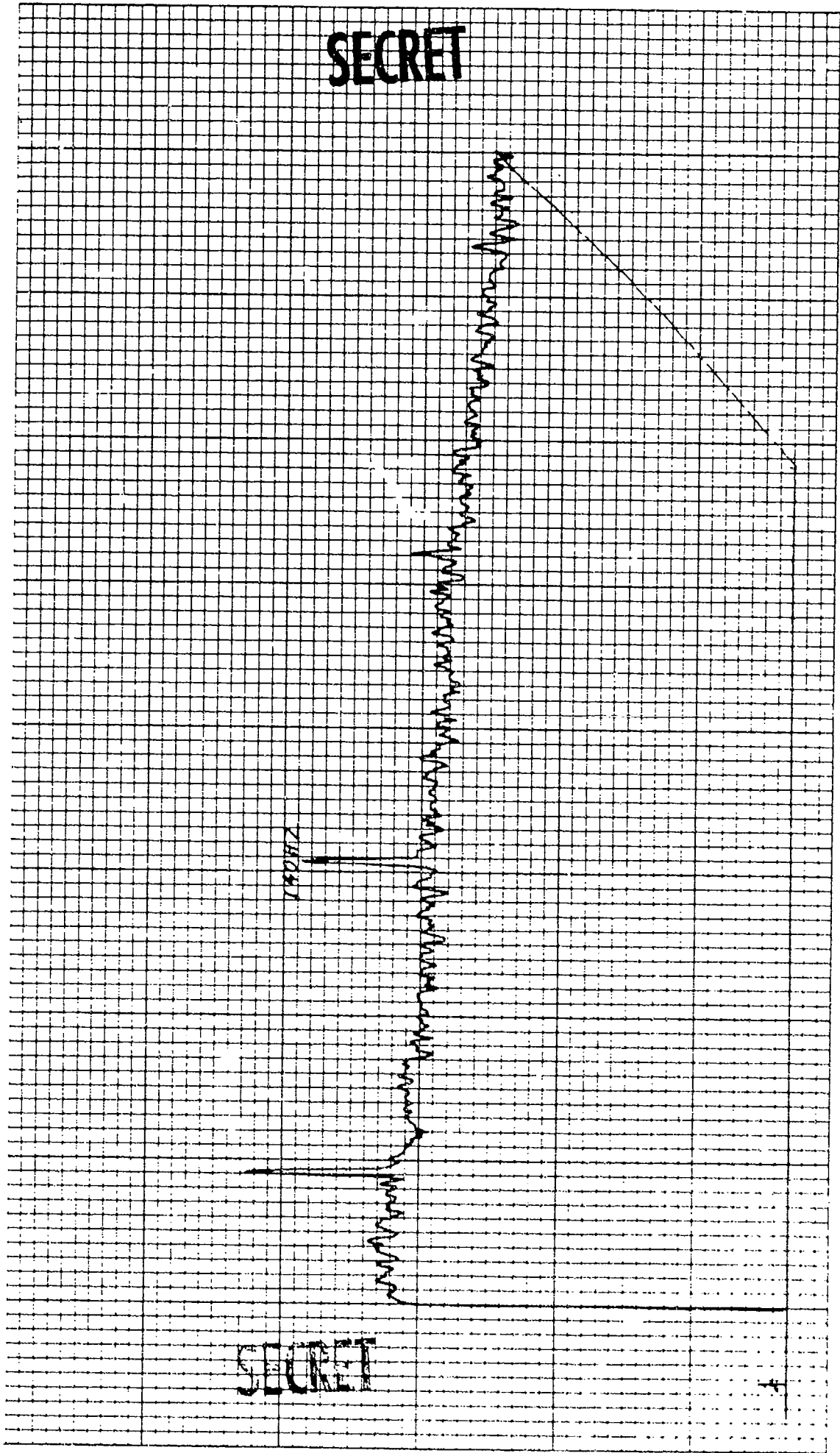
KOE 18 X 18 TO TIME (INCHES) X 18 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 27 -1019 (16)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1 -16
DATE/TIME: 2-7-77 -1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
+40 DEG. AZ STEERING

REEL: F/5
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING
ATTEN: -10 DB
INDE X/955

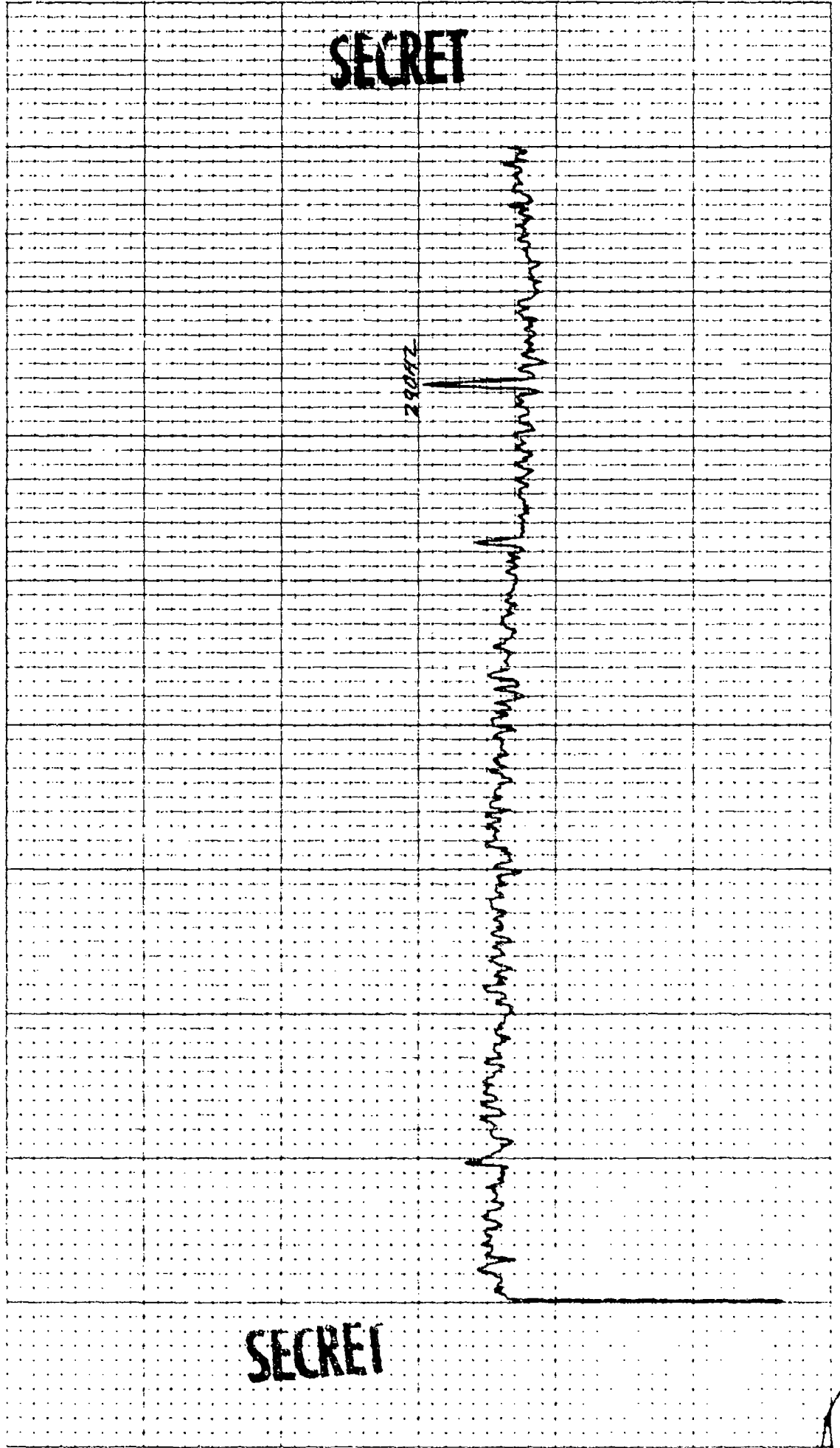


K0Σ 10 AUG 1955 10:00 AM
46 0703

CONTROL: 2-7 -1019 (16)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16)
DATE/TIME: 2-7-77 -1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
+20 DEG. AZ STEERING

REEL: F15
INTEGRATION TIME 320 SECS
ATTEN: -18 DB
FILTER WTC: HANNING
INDE X/1955



KOE 10.7.70 TO THE DIRECTOR, ...

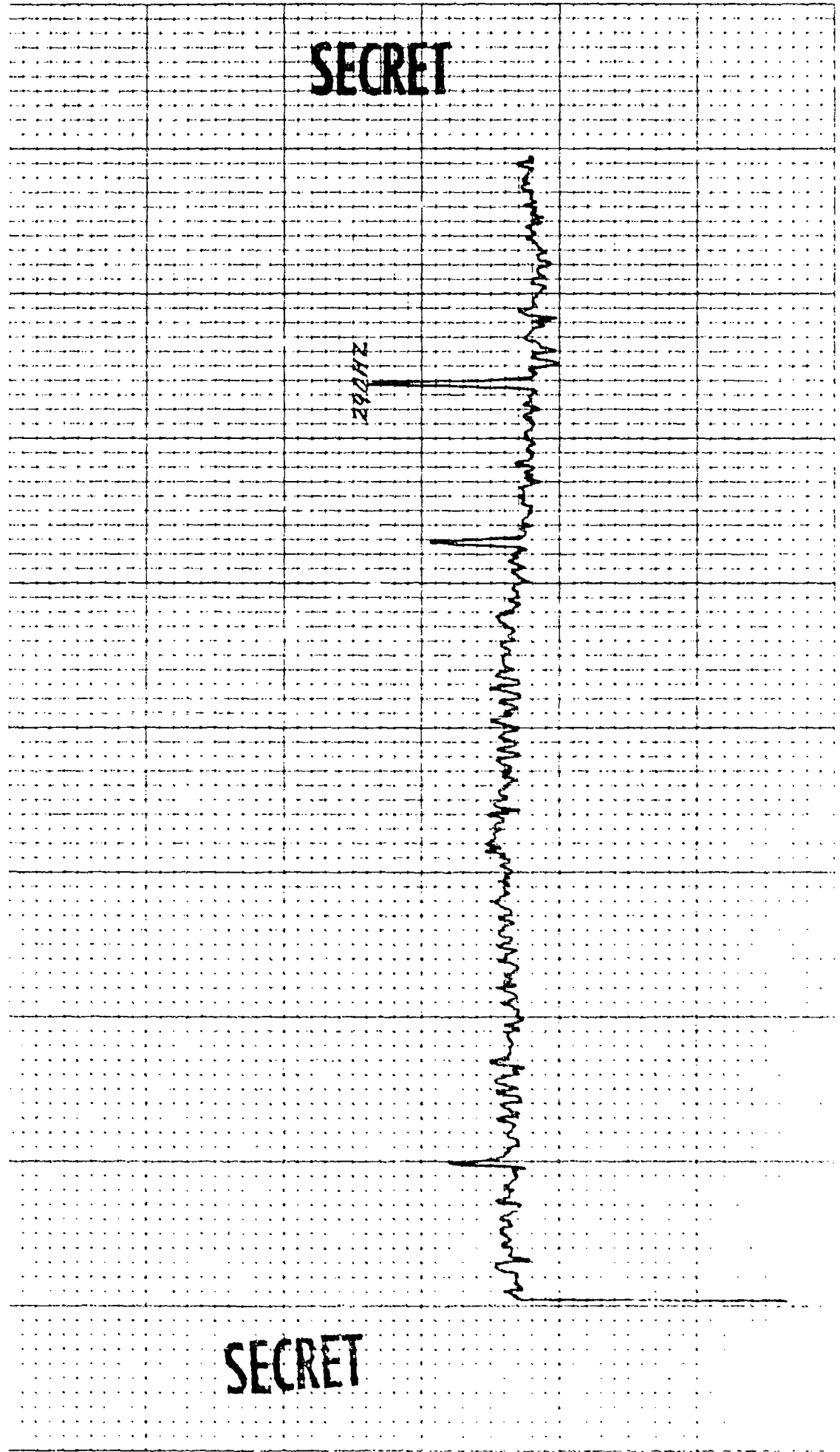
46 0703

16

CONTROL: 2-7 -1019 (16) DATE OF ANALYSIS: 1 - 16 REEL: F15 INDE X 1955
 BEAMFORMED SPECTRUM (ELEMENTS))
 EXERCISE: BEARING STAKE)
 CENTER FREQ: 270 HZ)
16 ELEMENTS)

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

DATE/TIME: 2-7-77 -1019 Z
 ANALYSIS BANDWIDTH: 1710HZ
+22 DEG. AZ STEERING



46 0703

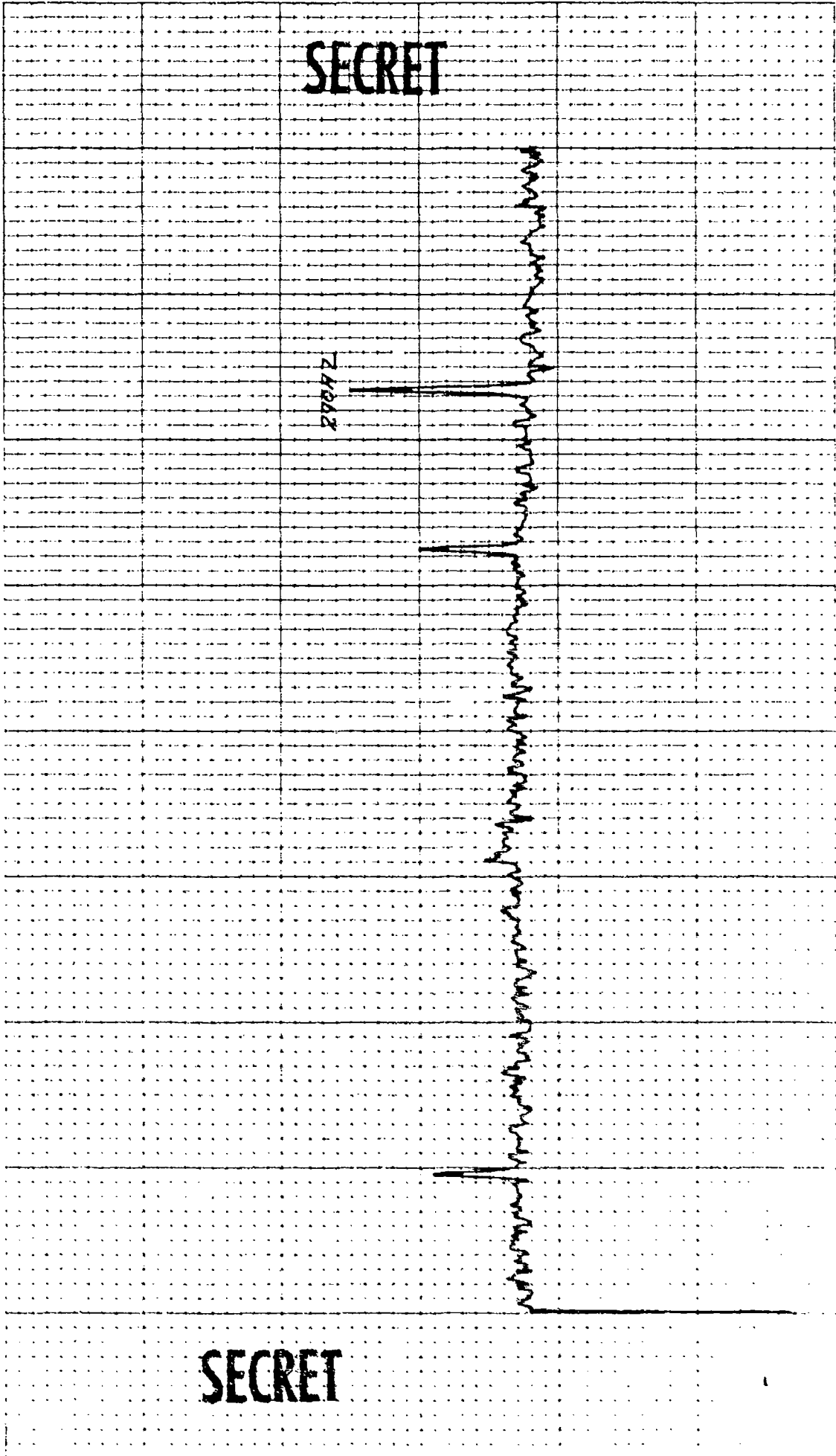
KGE 270110Z FEB 77

CONTROL: 27 - 1019 (1/6)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
 1/6 ELEMENTS

DATE OF ANALYSIS: 1-16
 DATE/TIME: 27-77 - 1019 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 + 24 DEG. AZ STEERING

REEL: F/5
 INTEGRATION TIME 320 SECS
 FILTER WTC: HANNING

INDE X 1955
 ATTN: -10 DB



SECRET

SECRET

46 0703

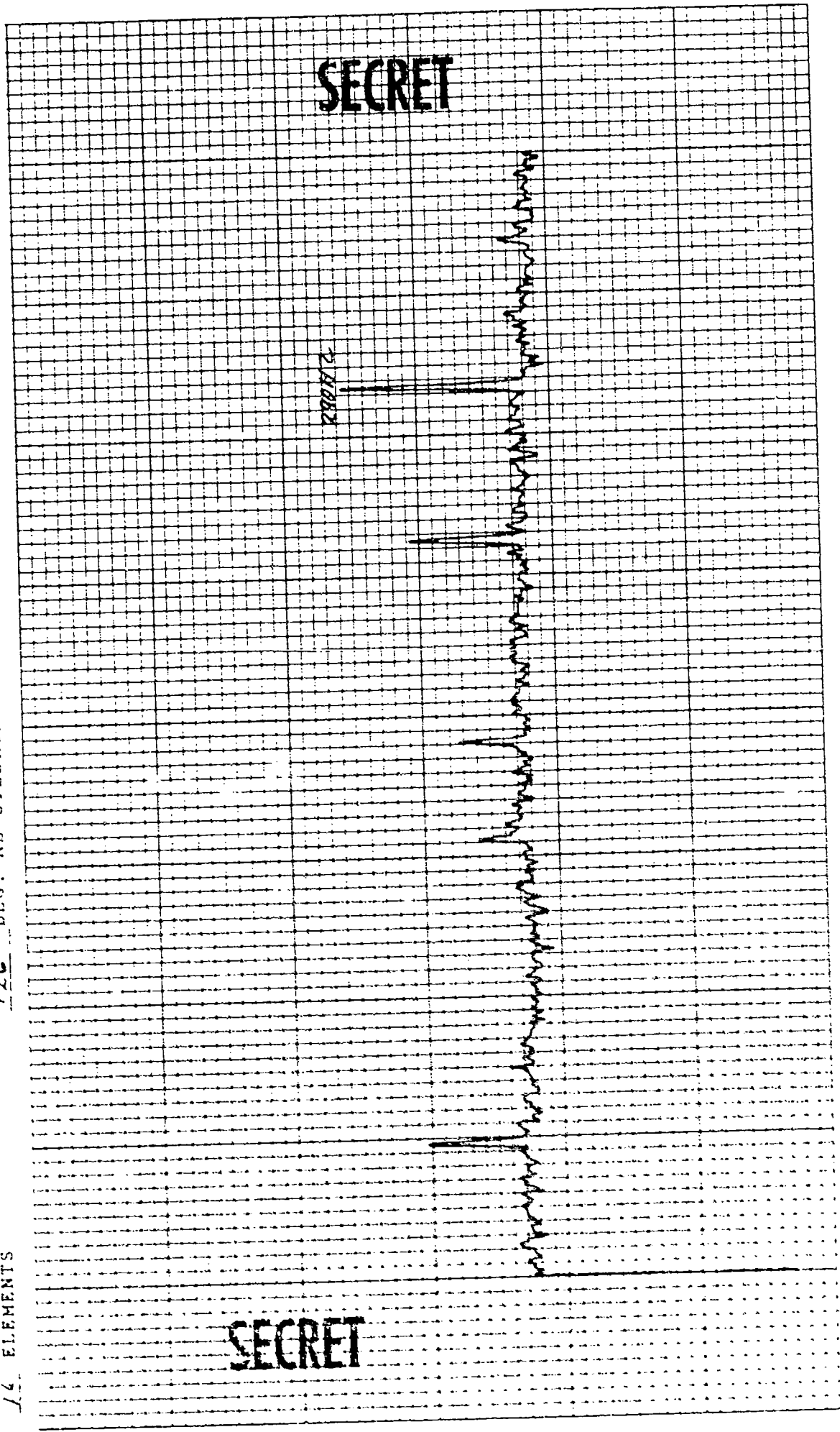
KOE 10 X 10 TO THE INCHES
WEINER & PAGER CO. MADE IN U.S.A.

REEL: F15 INDE X/1955

CONTROL: 2.7 -1019 (16)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
/4 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 22-77 -1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
+26 DEG. AZ STEERING

INTEGRATION TIME 320 SECS
ATTEN: 18 DB
FILTER WTG: HANNING



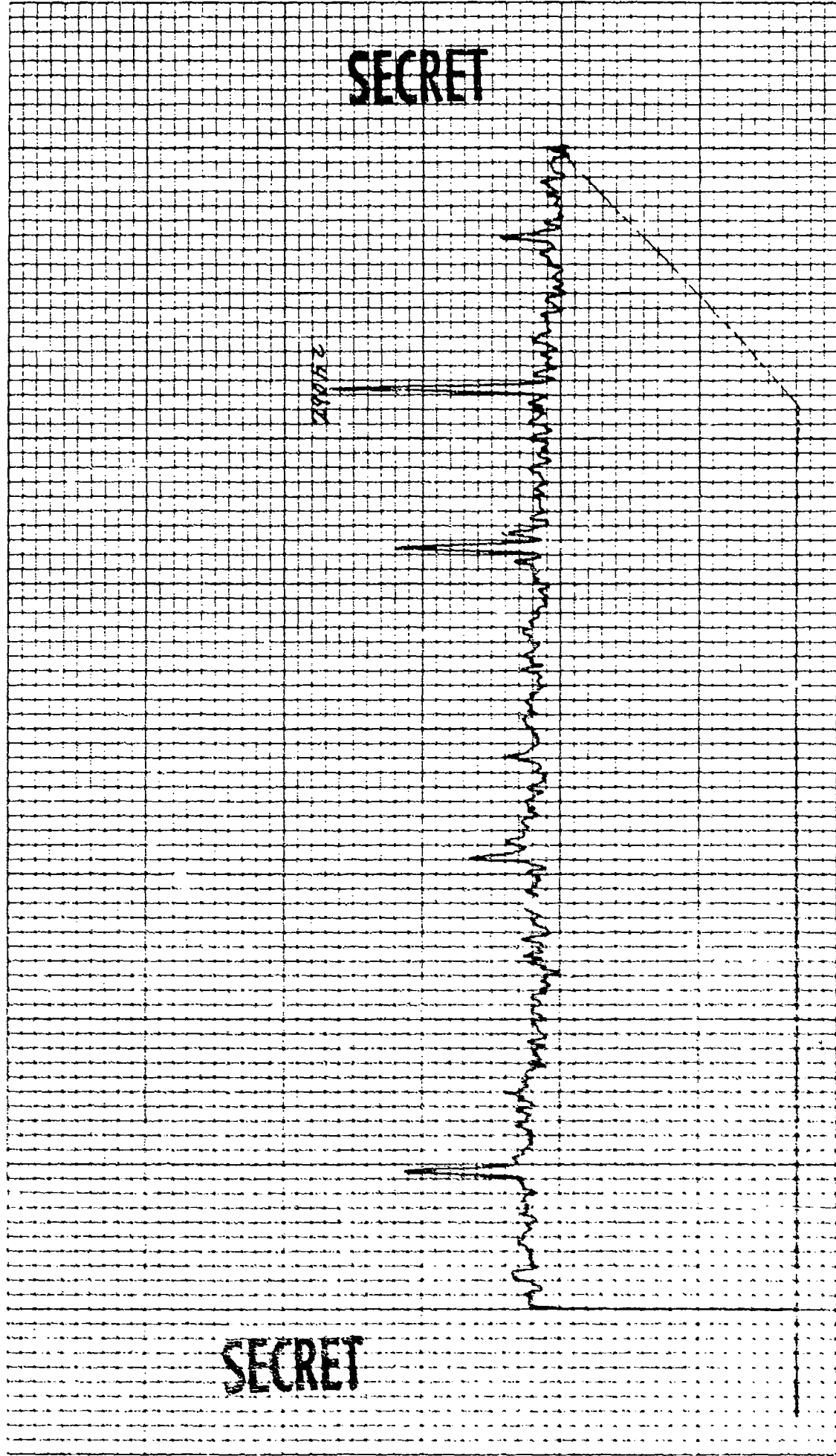
SECRET

SECRET

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

46 0703

CONTROL: 2.7 - 1019 (1/6) DATE OF ANALYSIS: 1-16 REEL: F/5 INDEX: 1955
BEAMFORMED SPECTRUM (ELEMENTS) INTEGRATION TIME 320 SECS ATTEN: -18 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
CENTER FREQ: 270 HZ 428 DEG. AZ STEERING



SECRET

CONTROL: 2-7 - 1019 (16)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
 16 ELEMENTS

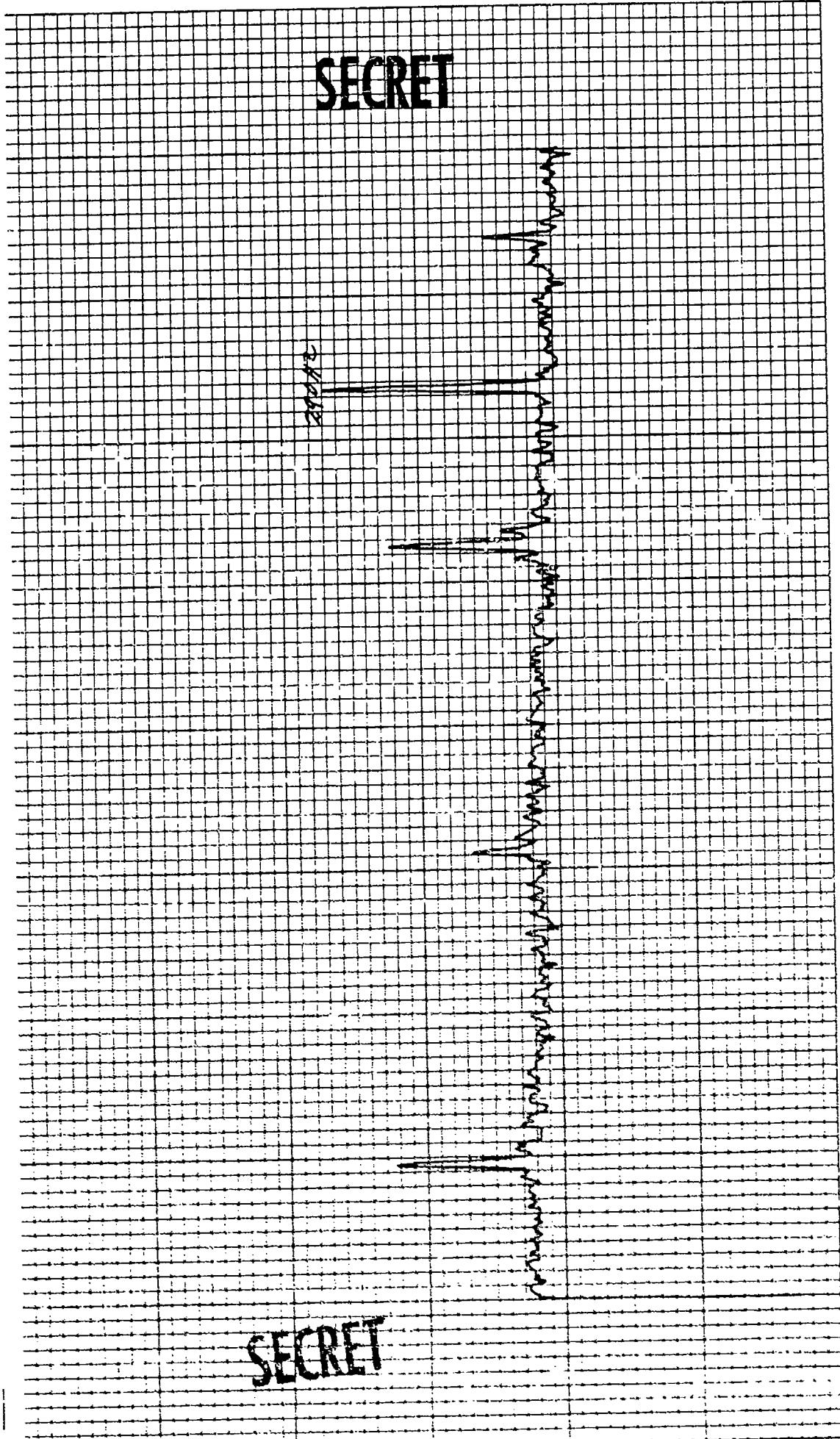
DATE OF ANALYSIS: 1-16

INTEGRATION TIME 320 SECS
 FILTER WIG: HANNING

REEL: F15 INDE X 1955

ATTEN: -10 DB

ANALYSIS BANDWIDTH: 1/10 HZ
 +29 DEG. AZ STEERING



H. E. 10 X 10 TO THE INCHES : X 10 INCHES
MELFEL & ESSER, CO. MADE IN U.S.A.

46 0703

CONTROL: 1019 - 51 (004)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
% ELEMENTS

DATE OF ANALYSIS: 1-16-77

DATE/TIME: 2:7-77 - 1019 Z

ANALYSIS BANDWIDTH: 1/10HZ
+29.5 DEG. AZ STEERING

REEL: F/5

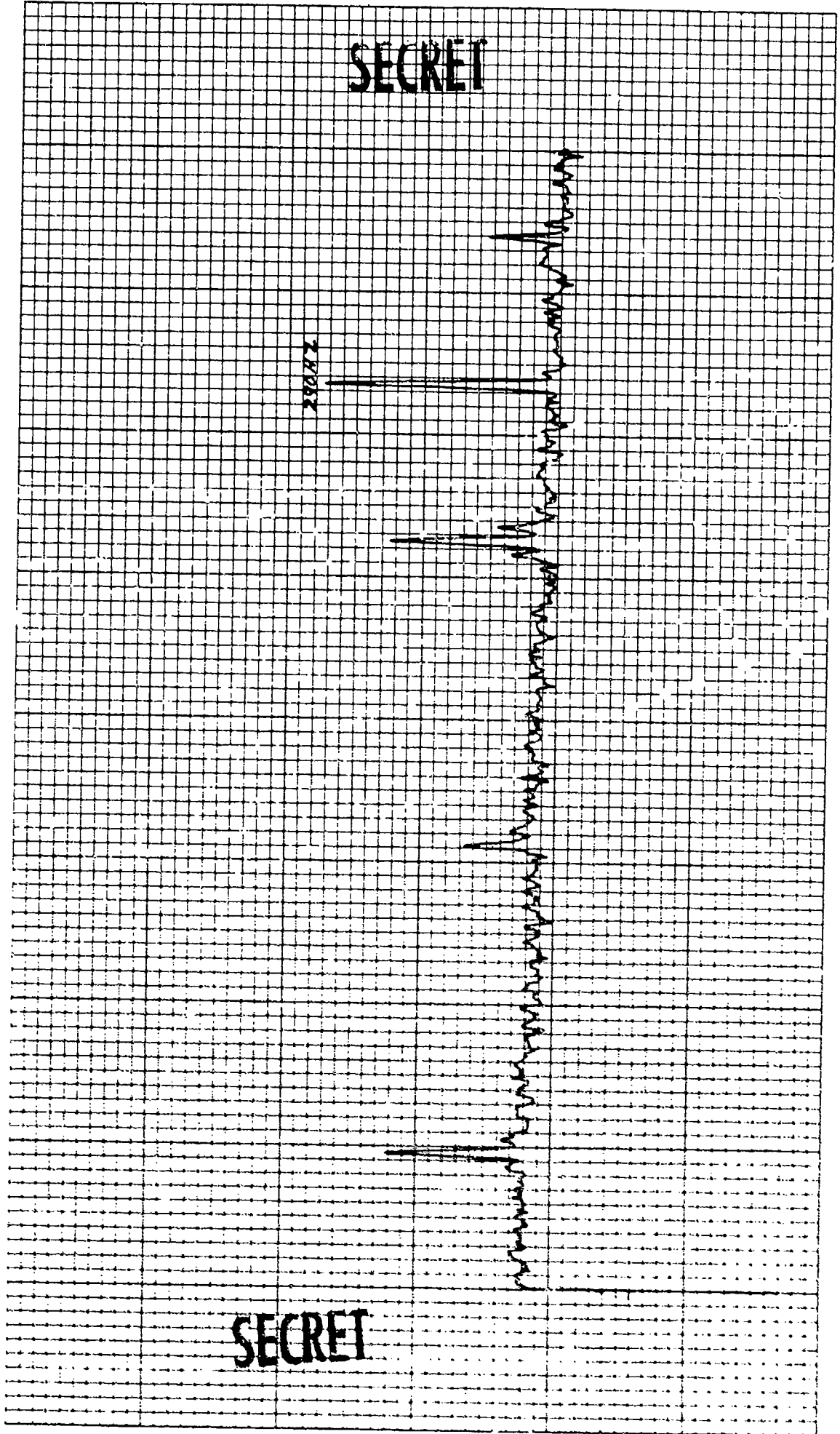
INDEX 1955

INTEGRATION TIME 320 SECS

ATTEN: 18 DB

FILTER

WTG: HANNING



KOE 16.4 IS TO THE INCH. 2 IS INCHES
REDFIELD WESSEX CO. 4040 2111

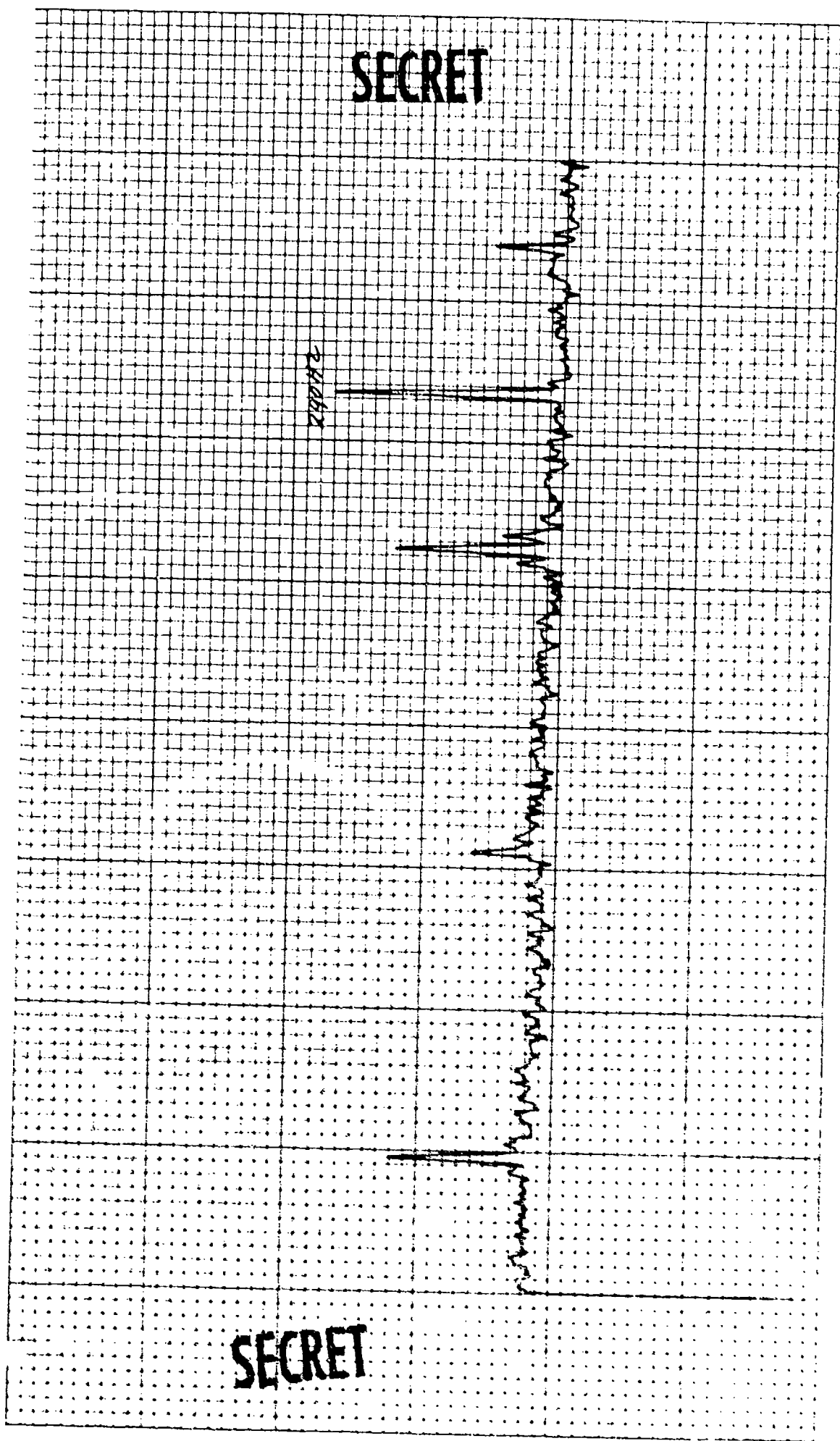
46 0703

CONTROL: 2-7 - 1019 (16)
BEAMFORMED SPECTRUM (ELEMENTS)
EXPOSE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16)
DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
+30 DEG. AZ STEERING

REEL: F15
INTEGRATION TIME 320 SECS
ATTEN: -10 DB
FILTER WTC: HANNING

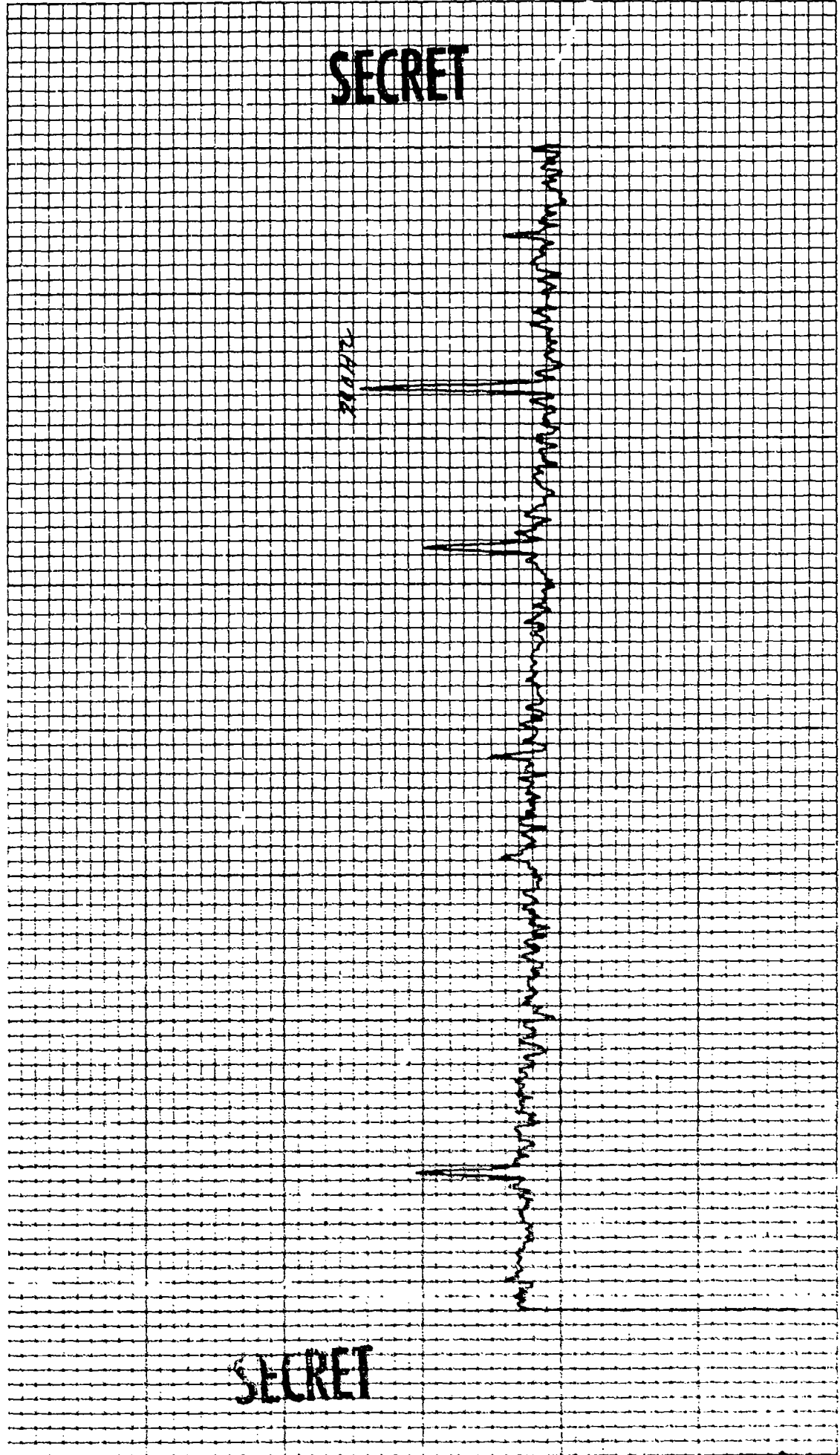
INDEX 1955



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

46 0703

CONTROL: 2-7 - 1019 (16) DATE OF ANALYSIS: 1-16) REEL: F15 INDE X 1955
BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-7-77 - 1019 Z INTEGRATION TIME 320 SECS ATTEN: -10 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
CENTER FREQ: 270 HZ +32 DEG. AZ STEERING



46 0703

KOE 2312 THE MEMPHIS

REEL: F/5 INDE X/1955

INTEGATION TIME 320 SECS

ATTEN: -/0 DB
FILTER WIG: HANNING

DATE OF ANALYSIS: 1-76

DATE/TIME: 2-7-77 -1019 Z

ANALYSIS BANDWIDTH: 1/10HZ

+34 DEG. AZ STEERING

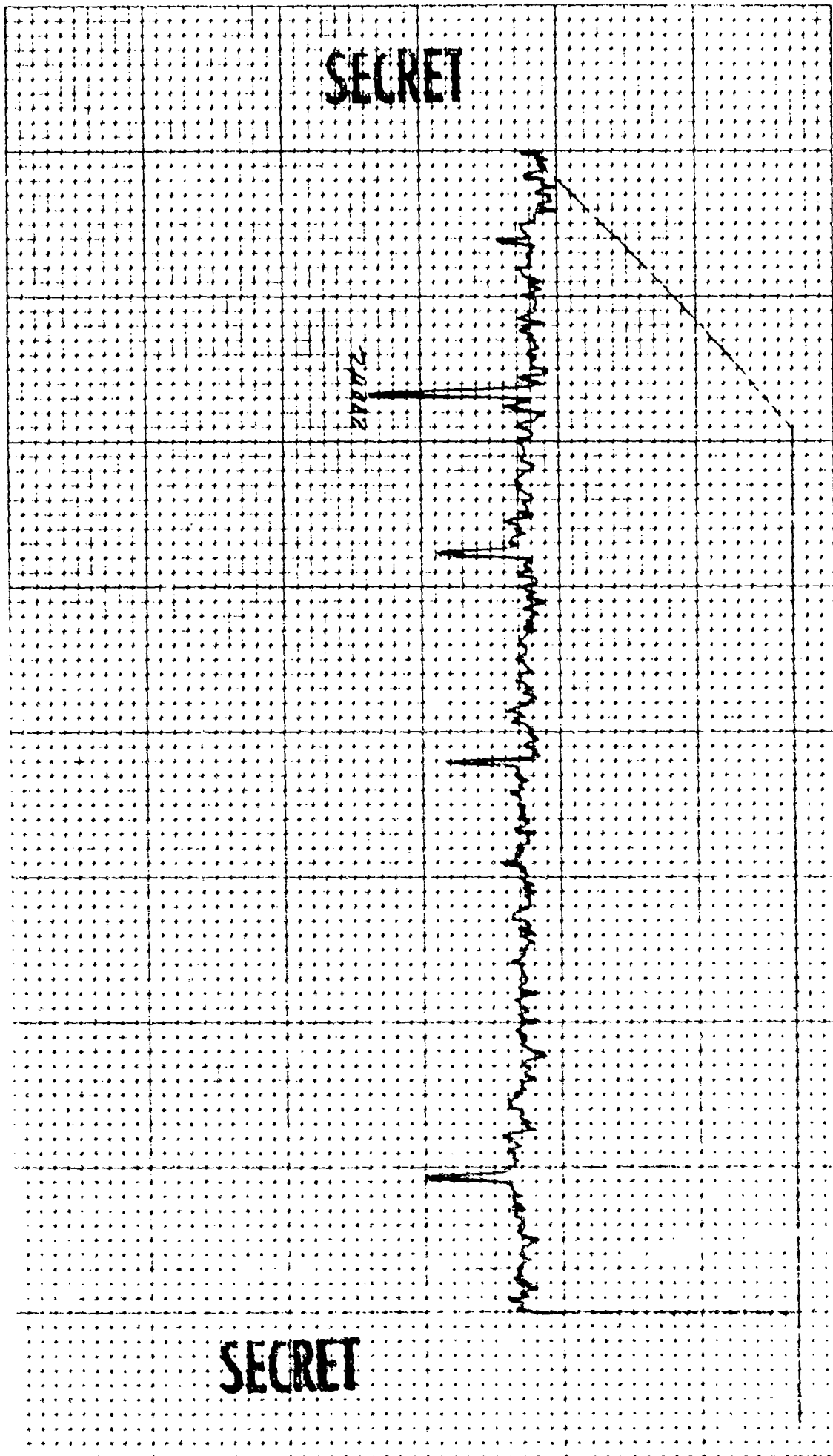
CONTROL: 27 -1019 (16)

BEAMFORMED SPECTRUM/ELEMENTS

EXERCISE: BEARING STAKE

CENTREP FREQ: 270 HZ

ELEMENTS



SECRET

SECRET

KOE 10 X 10 TO THE 1/1000000 7 X 10 INCHES
PERFECT PAPER CO. MADE IN U.S.A.

46 0703

INDEX 1955

REEL: F/5

DATE OF ANALYSIS: - - - - -

CONTROL: 2-7 -1019 (16)

INTEGRATION TIME 320 SECS

DATE/TIME: 2-7-57 -1019 Z

BEAMFORMED SPECTRUM (ELEMENTS)

ATTEN: -16 DB

ANALYSIS BANDWIDTH: 1710 HZ

EXERCISE: BEARING STAKE

FILTER

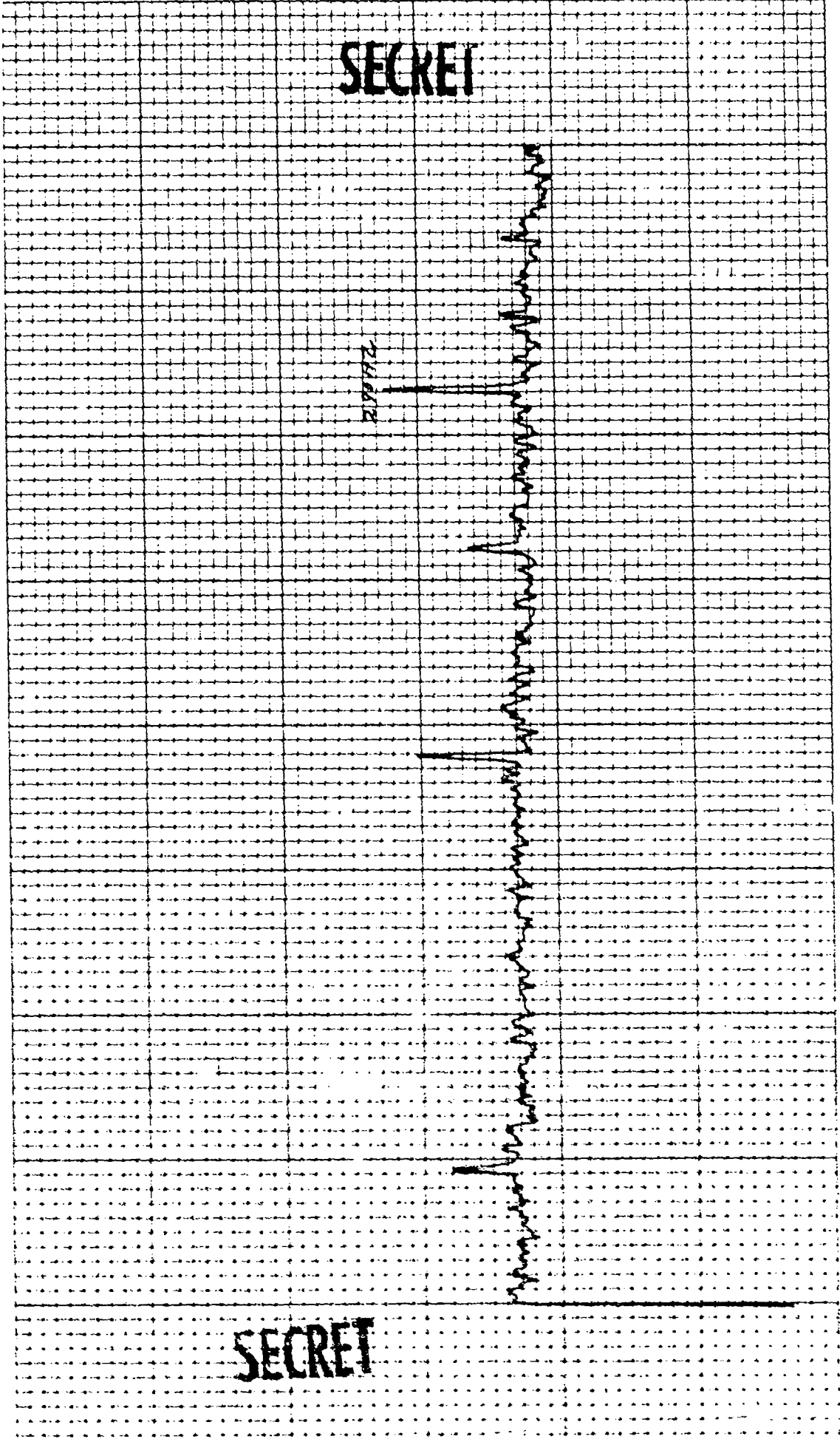
+36 DEC. AZ STEERING

CENTER FREQ: 270 HZ

WTC: HANNING

16 ELEMENTS

LC



SECRET

SECRET

KOE 10.15 TO TIME INDCM... 15 INCHES
REPTAL & PAGES 10 2000 0011

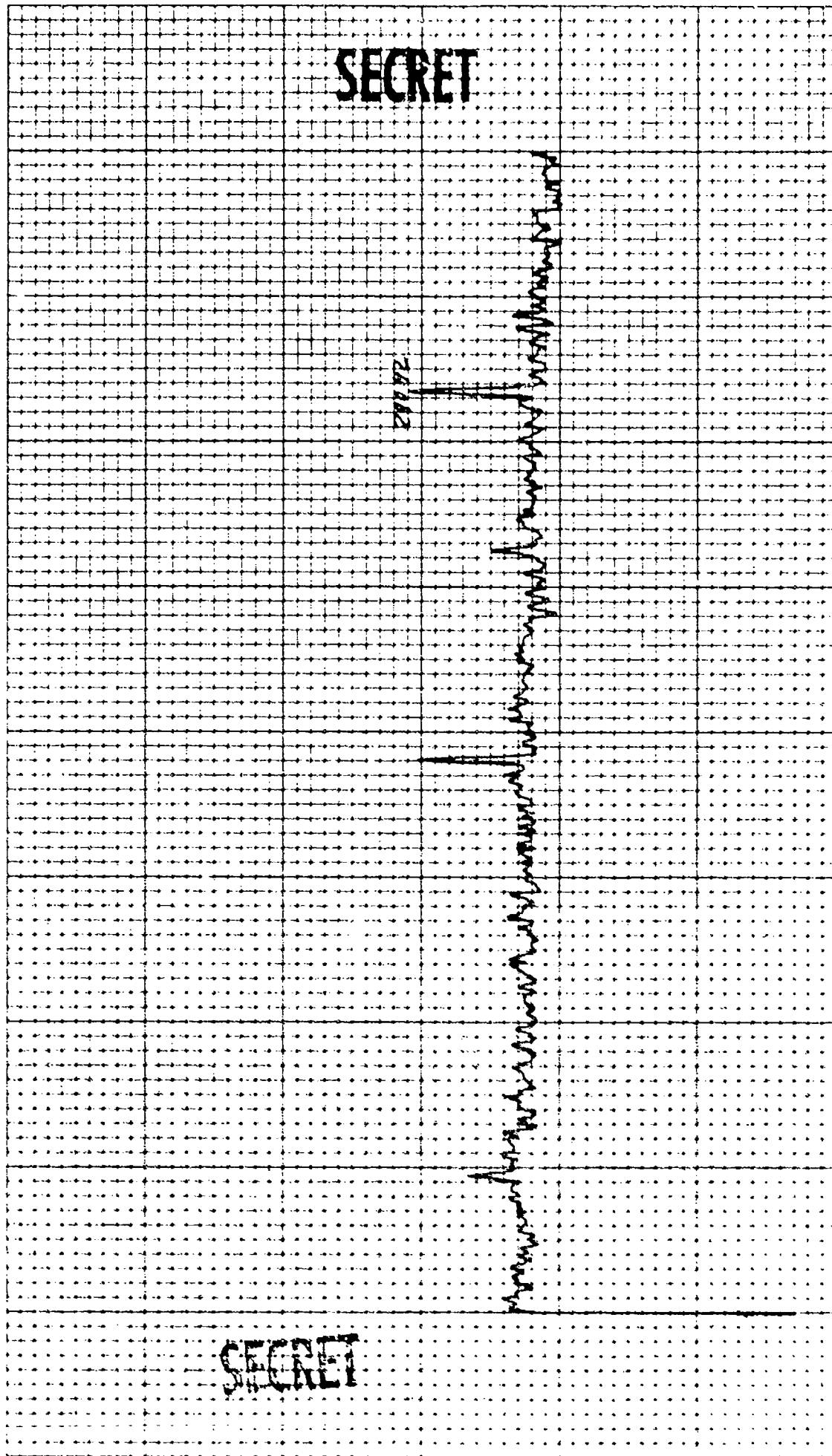
46 0703

CONTROL: 2-7 -1019 (16)
PERFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS

DATE OF ANALYSIS: - / - / -
/ - / -)
DATE/TIME: 2-7-77 -1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
+38 DEG. AZ STEERING

REEL: F/5
INDE X/955

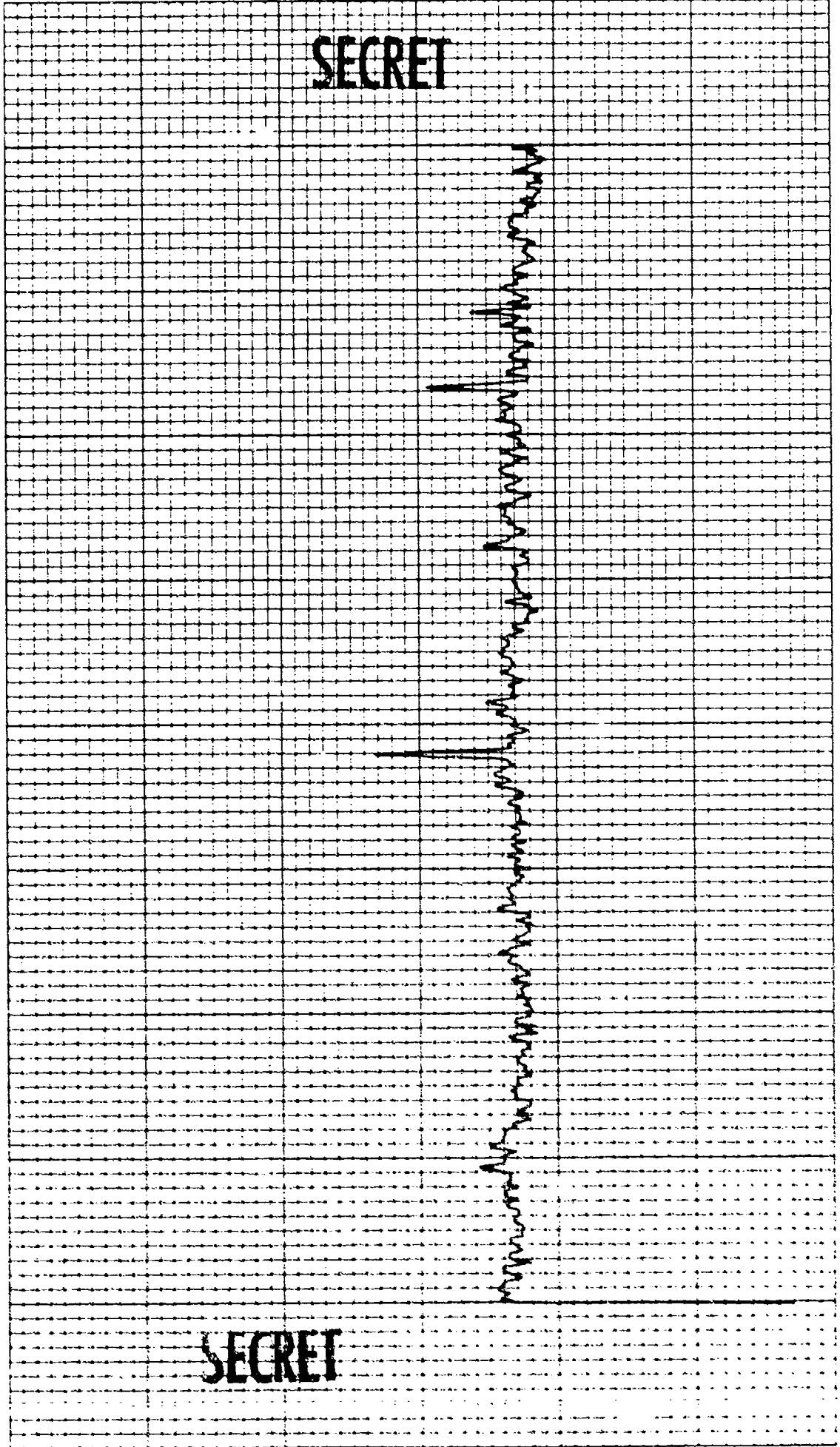
INTEGRATION TIME 320 SECS
ATTEN: -10 DB
FILTER WTC: HANNING



SECRET

SECRET

CONTROL: 2-7 - 1019 (16) REEL: F15 INDE X / 1955
 BEAMFORMED SPECTRUM (ELEMENTS) / - / C
 EXERCISE: BEAKING STAKE DATE / TIME: 2-7-77 - 1019 Z INTEGRATION TIME 320 SECS ATTEN: -10 DB
 CENTER FREQ: 270 KHZ ANALYSIS BANDWIDTH: 17 10HZ FILTIER WTG: HANNING
16 ELEMENTS + 40 DEC. AZ STEERING



CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 4

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-39.0</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-29.0	
BEAMFORMER GAIN	<u>+24</u>	-5.0	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	-4.8	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-50.9</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-40.9	
BEAMFORMER GAIN	<u>+24</u>	-24.9	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-5.0</u>	
SIGNAL LEVEL FOR SNR	<u>-24.9</u>	19.9	
PROCESSOR CORRECTION	<u>-4.0</u>	15.9	
MRA CORRECTION	<u>+ .2</u>	16.1	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	7.9	SNR 1 HZ BAND

Best Available Copy

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

ATA POINT 4

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-47.4</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-37.4	
BEAMFORMER GAIN	<u>+24</u>	-13.4	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .9</u>	-12.5	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-68.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-58.8	
BEAMFORMER GAIN	<u>+24</u>	-34.8	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-13.4</u>	
SIGNAL LEVEL FOR SNR	<u>-34.8</u>	21.4	
PROCESSOR CORRECTION	<u>-4.0</u>	17.4	
MRA CORRECTION	<u>+ .9</u>	18.3	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	10.1	SNR 1 HZ BAND

Best Available Copy

CONFIDENTIAL

CONFIDENTIAL

DATA POINT 4

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-34.4</u>	<u>-39.6</u>	<u> </u>
MRA SIGNAL LEVEL	<u>- 5.2</u>	<u>-12.5</u>	<u> </u>
ARRAY SIGNAL GAIN	<u>29.2</u>	<u>27.1</u>	<u> </u>
20 LOG <u>32</u>	<u>30.1</u>	<u>30.1</u>	<u> </u>
# of elements			
DIFFERENCE	<u>- .9</u>	<u>-3.0</u>	<u> </u>

ARRAY GAIN

MRA SNR	<u>16.1</u>	<u>18.3</u>	<u> </u>
MEAN OMNI SNR	<u>8.3</u>	<u>6.5</u>	<u> </u>
ARRAY GAIN	<u>7.8</u>	<u>11.8</u>	<u> </u>
THEORETICAL AEMUTH GAIN (at MRA)	<u>12.6</u>	<u>15.0</u>	<u> </u>
DIFFERENCE	<u>-4.8</u>	<u>-3.2</u>	<u> </u>

Best Available Copy

CONFIDENTIAL

KOE IS 2.5 IN TO THE PERIODICALLY REPEATING SIGNALS

46 0703

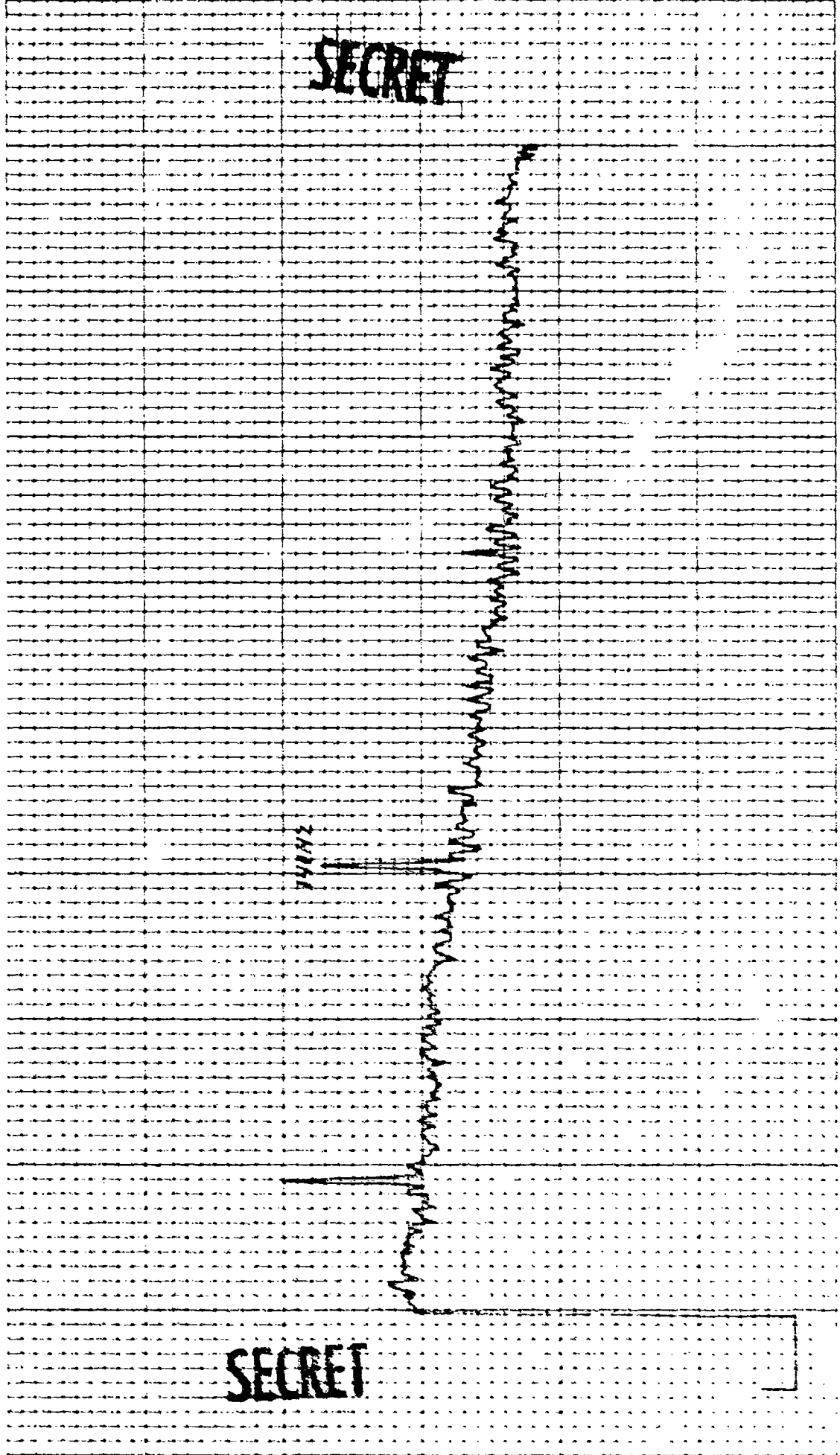
CONTROL: 2-7 - 1019 (J2)
 BEAMFORMED SPECTRUM/ELEMENTS
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 72 ELEMENTS

DATE OF ANALYSIS: _____
 1-26 4 29-JV)

DATE/TIME: 2-7-77 - 1019 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 +24 DEG. AZ STEERING

REEL: F75 INDE X/955

INTEGRATION TIME 320 SECS ATTN: -24 DB
 FILTER WTC: HANNING

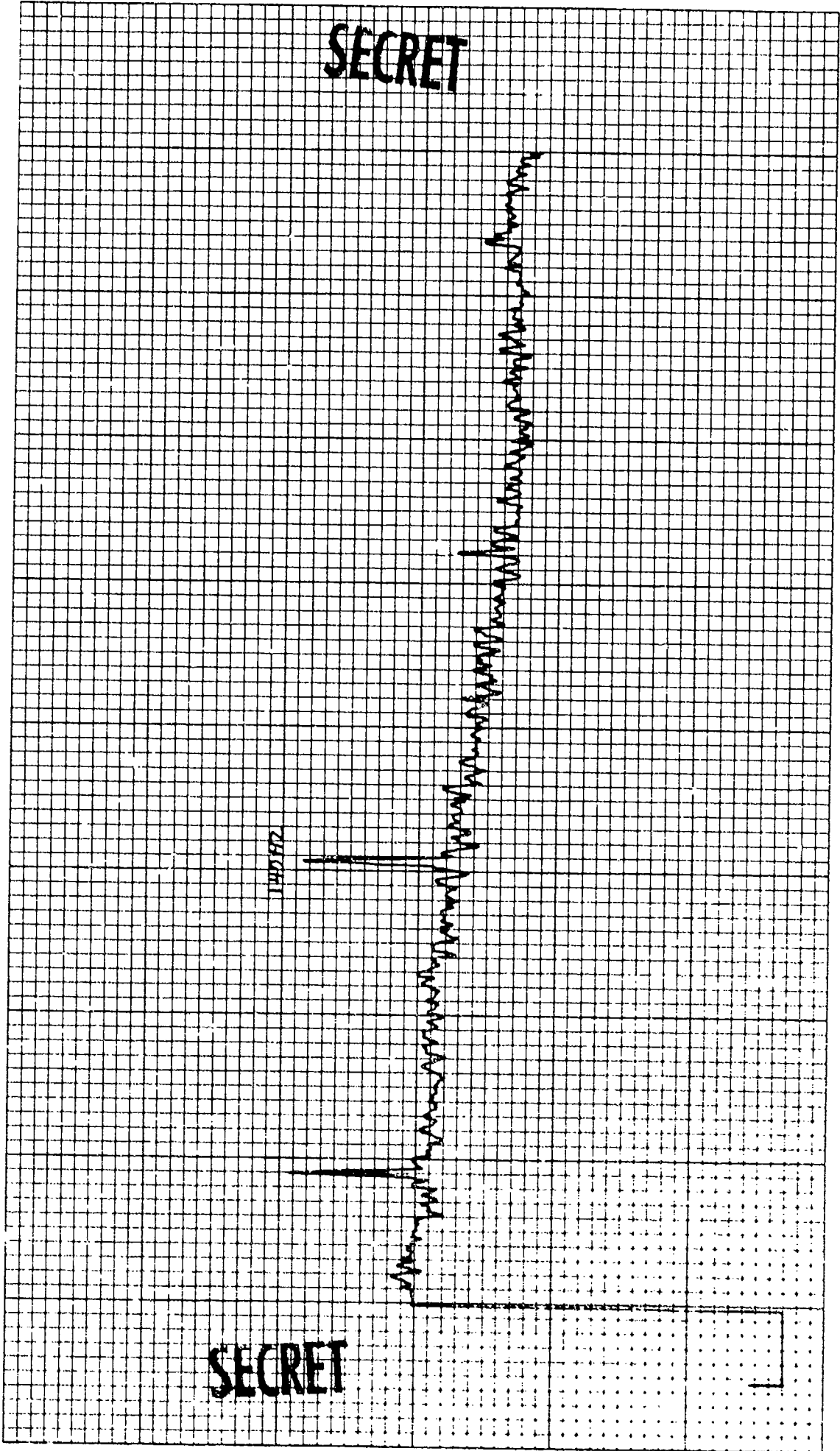


CONTROL: 2-7 -1019 (32)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 32 ELEMENTS

DATE OF ANALYSIS: 1-26-77
 DATE/TIME: 2-7-77 -1019 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 +36 DEG. AZ STEERING

REEL: F15
 INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

INDEX 1955



SECRET

SECRET

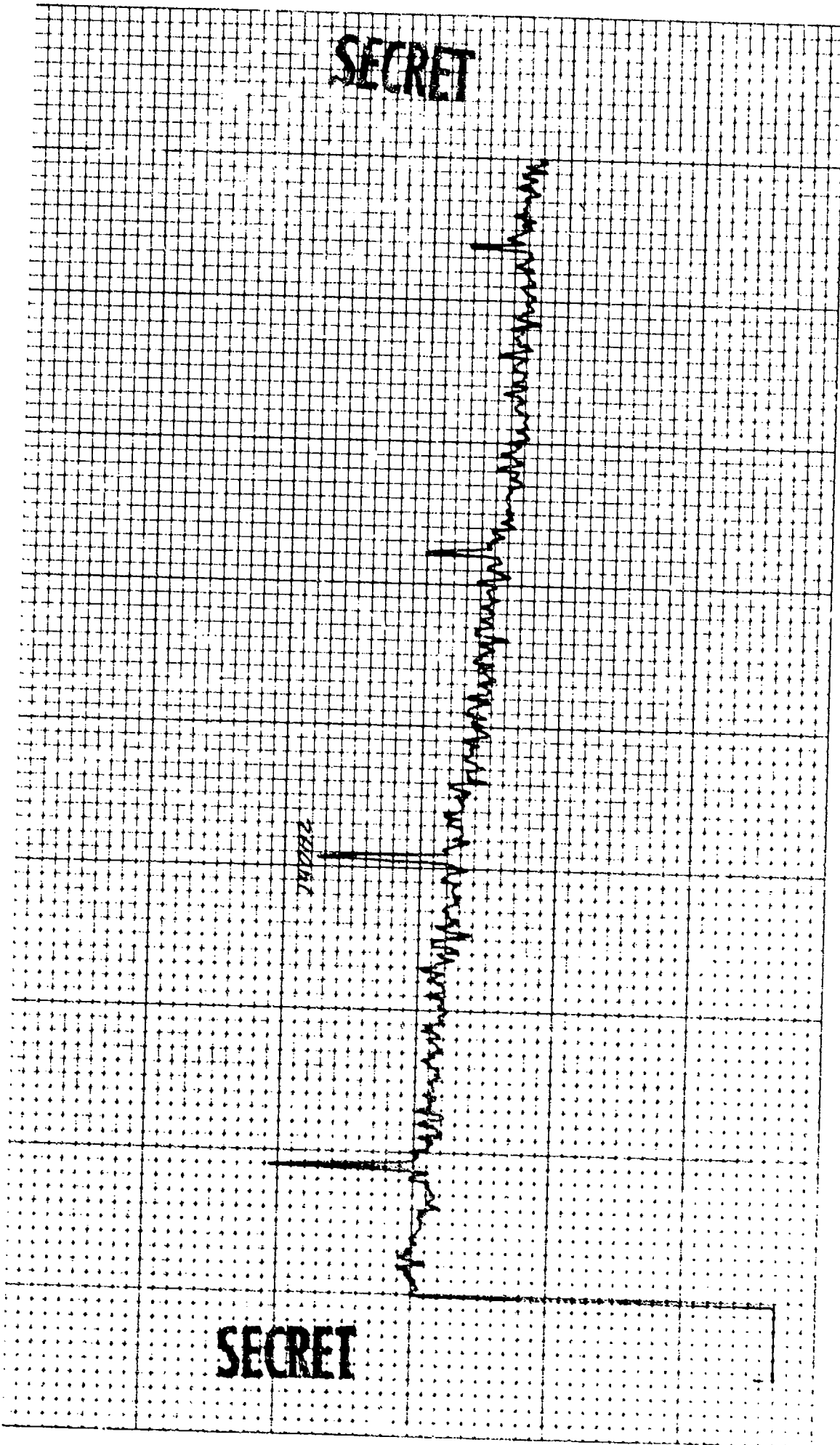
K-E 10.16 10 THE INCHES 7 10 INCHES
PREFLEX & ESSER CO MADE IN U.S.A.

46 0703

CONTROL: 27-1019 (32)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-77
DATE/TIME: 2-7-77 10:15
ANALYSIS BANDWIDTH: 1/10 HZ
+20 DEG. AZ STEERING

REEL: F15 INDE X/198
INTEGRATION TIME 320 SECS
ATTEN: -24 DB
FILTER WIG: HANNING



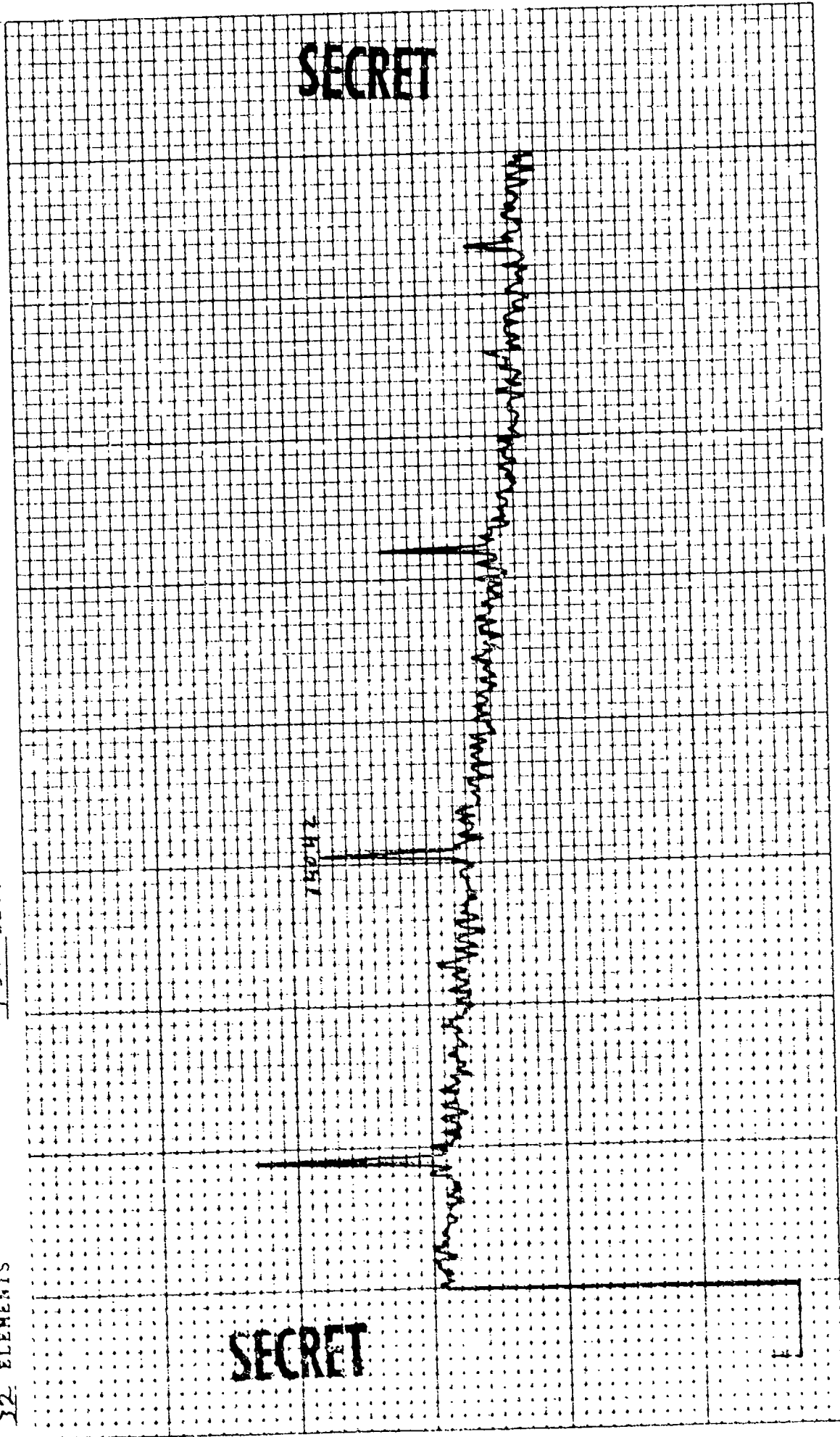
46 0703

K-E 10 X 10 TO THE INCHES
PEUFFEL & ESCHER CO. MADE IN U.S.A.

REEL: F15 INDEX X/1955

CONTROL: 2.7 - 1019 (J2) DATE OF ANALYSIS: 1-26-77
BEAMFORMED SPECTRUM (ELEMENTS) 28-34
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1019 Z
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ
12 ELEMENTS +30 DEG. AZ STEERING

INTEGRATION TIME 320 SECS ATTEN: -2Y DB
FILIER WTG: HANNING



46 0705

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

REEL: F/S INDE X/1955

REEL: F/S

DATE OF ANALYSIS: 1-26-77

CONTROL: 2-7-1019 (32)

BEAMFORMED SPECTRUM (ELEMENTS)

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

32 ELEMENTS

DATE/TIME: 2-7-77 -1019 Z

ANALYSIS BANDWIDTH: 1,10 HZ

121 DEG. AZ STEERING

INTEGRATION TIME 320 SECS

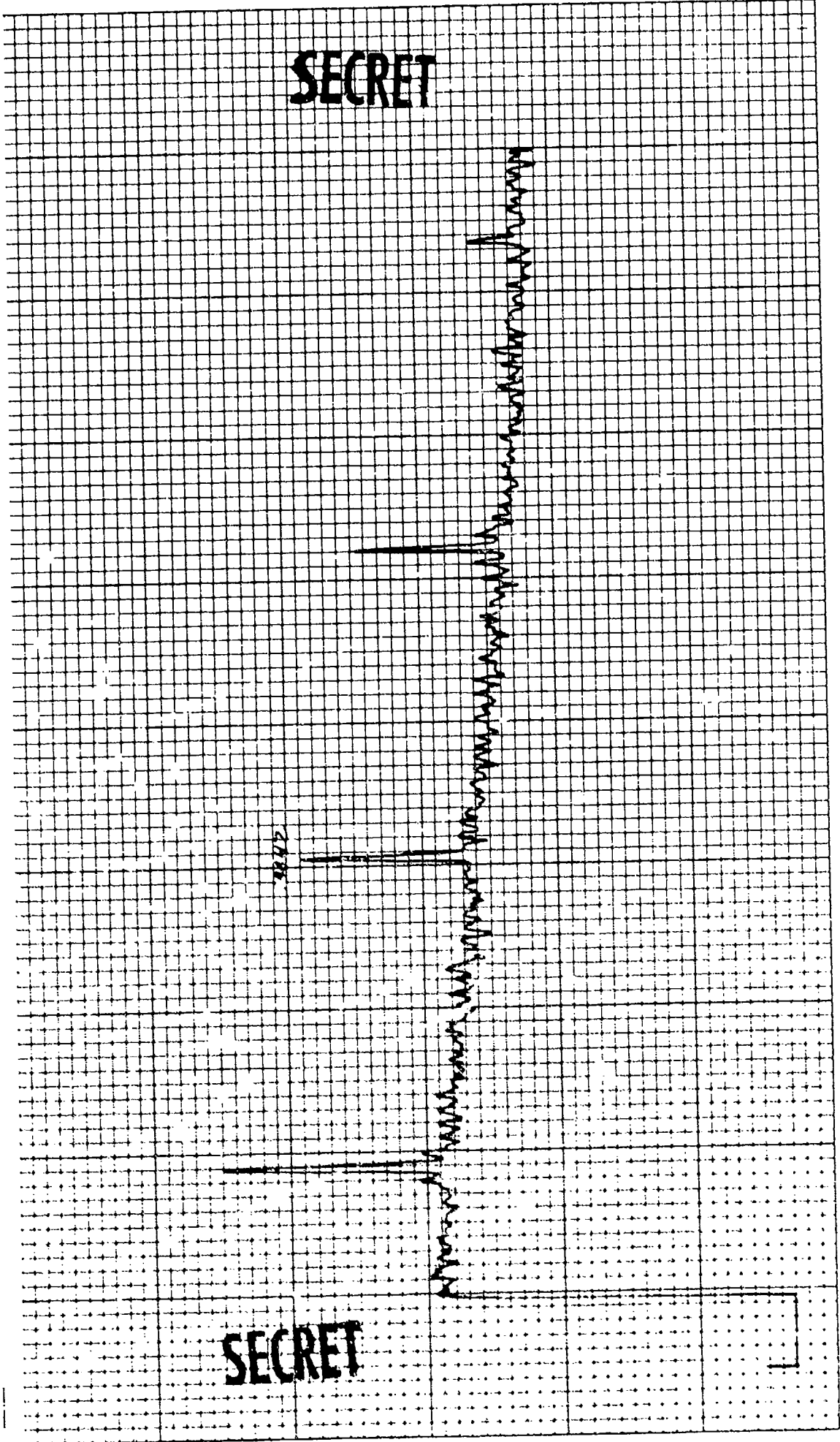
FILTER

ATTEN: -34 DB

WTC: HANNING

SECRET

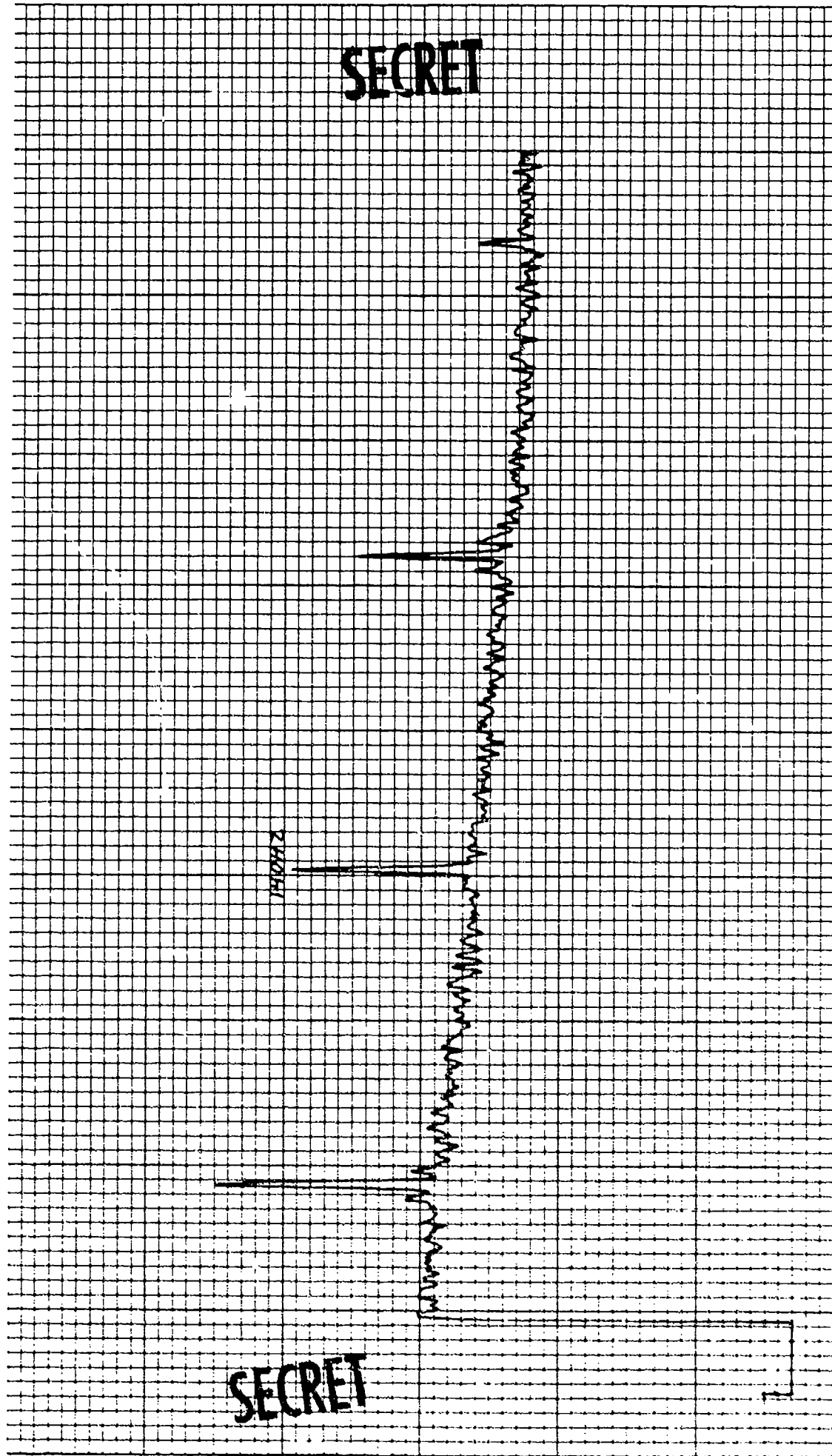
SECRET



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

46 0703

CONTROL: 27 -1019 (32)
BEAMFORMED SPECTRUM(ELEMENTS 1-26 & 29-34)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS
DATE OF ANALYSIS: - - -
REEL: F15 INDE X/1955
INTEGRATION TIME 320 SECS ATTEN: -24 DB
FILTER WTG: HANNING
DATE/TIME: 2-7-77 -1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
+31.5 DEG. AZ STEERING



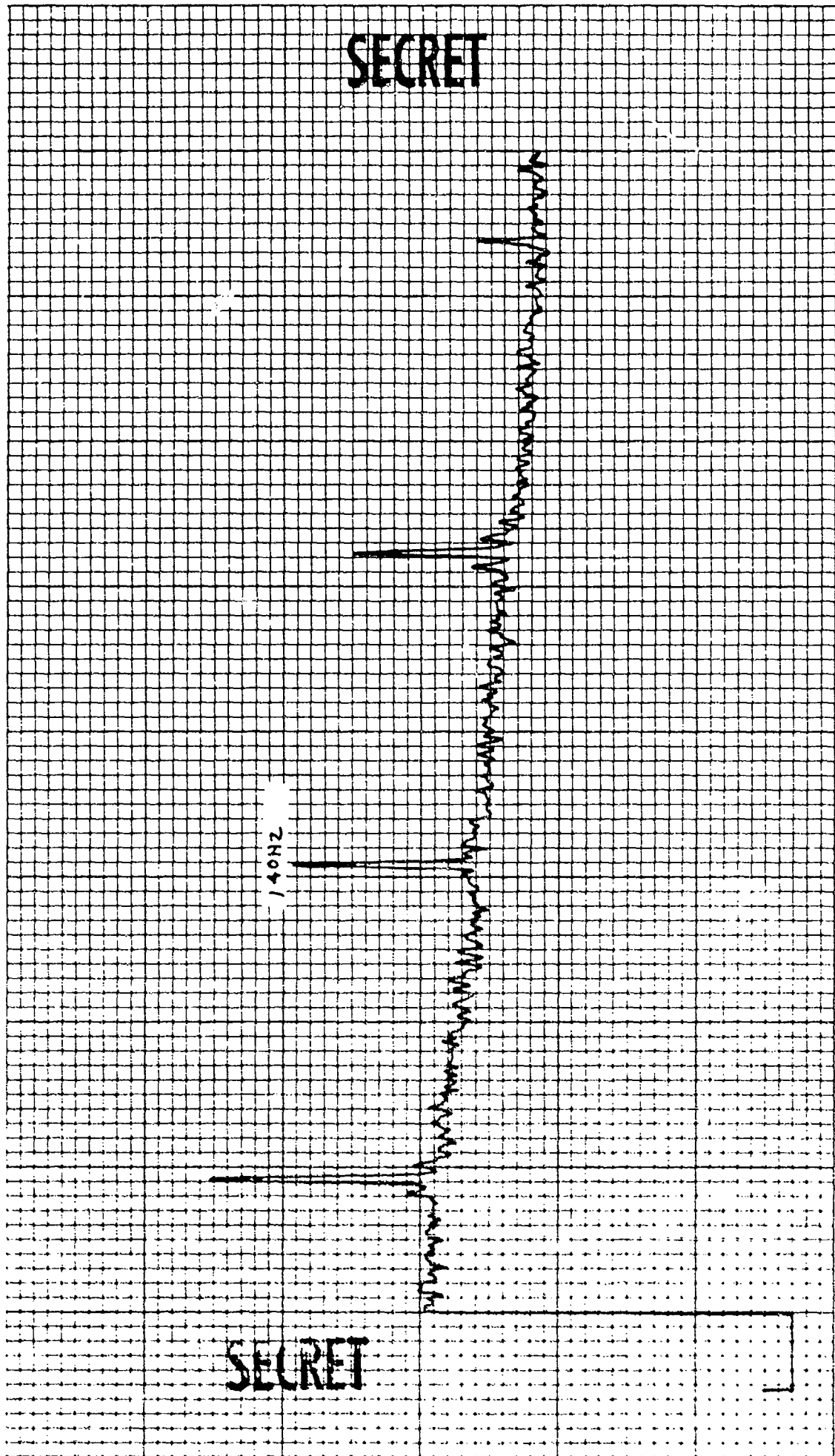
MSE 10 X 10 TO THE INCH 2 X 10 INCHES
NEUPPEL & ESSER CO. MADE IN U.S.A.

46 0703

3-326

CONTROL: 2-7 - 1019 (32) DATE OF ANALYSIS: - - - -
 BEAMFORMED SPECTRUM(ELEMENTS) 1-26 - 28-34
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1019 Z
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
 22 ELEMENTS +32 DEG. AZ STEERING

REEL: F/5 INDE X/1955
 INTEGRATION TIME 320 SECS ATTEN: -2YDB
 FILTER WTG: HANNING



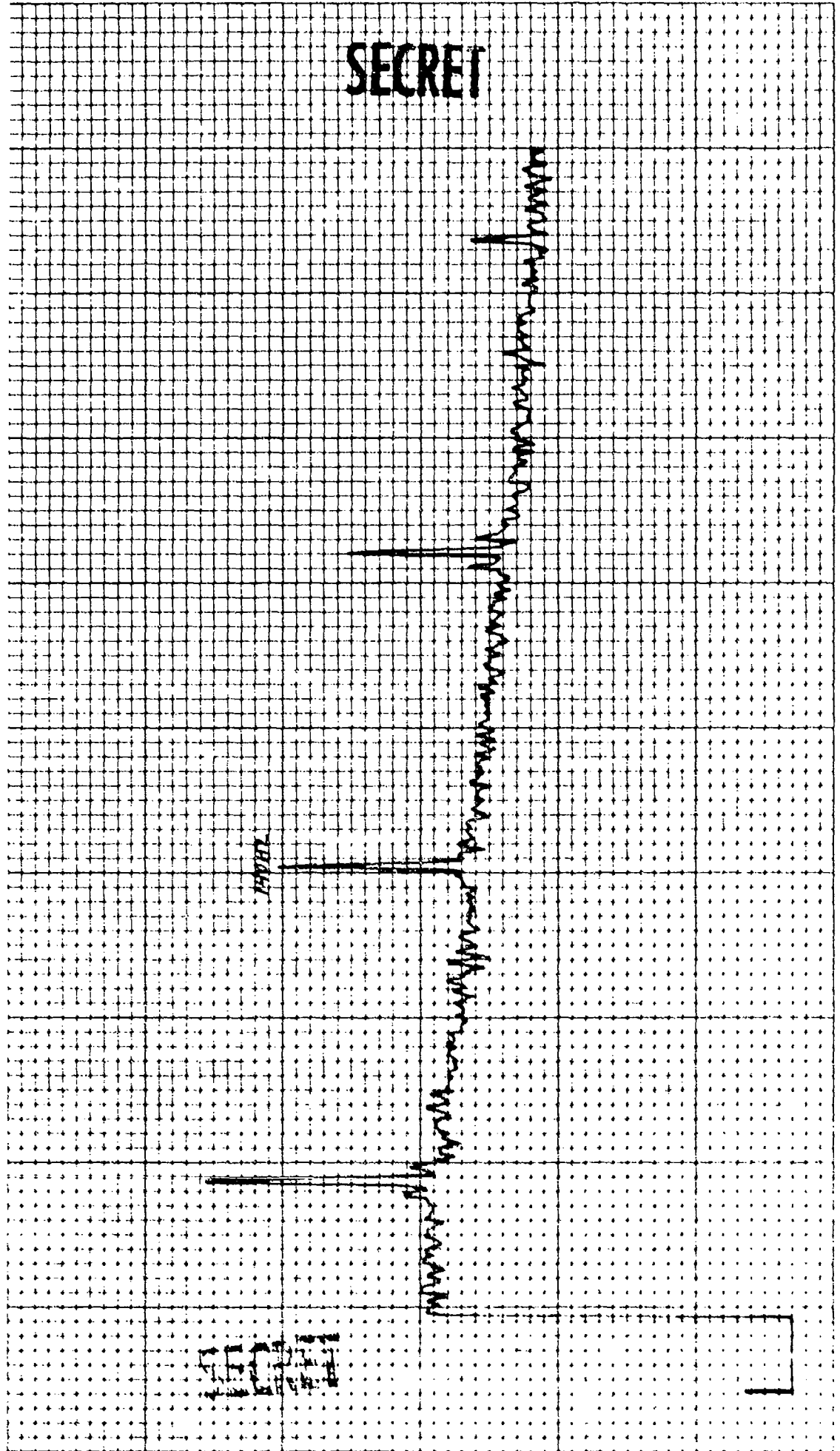
46 0703

KOE 10 X 10 TO THE INCHES 4 1/2 INCHES
PEPPER & ESSER CO. MADE IN U.S.A.

CONTROL: 2-7 - 1019 (32)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-54
 DATE/TIME: 2-7-77 - 1019 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
+32.5 DEG. AZ STEERING

REEL: F/5 INDE X/1955
 INTEGRATION TIME 320 SECS FILTER WTG: HANNING
 ATTN: -24 DB



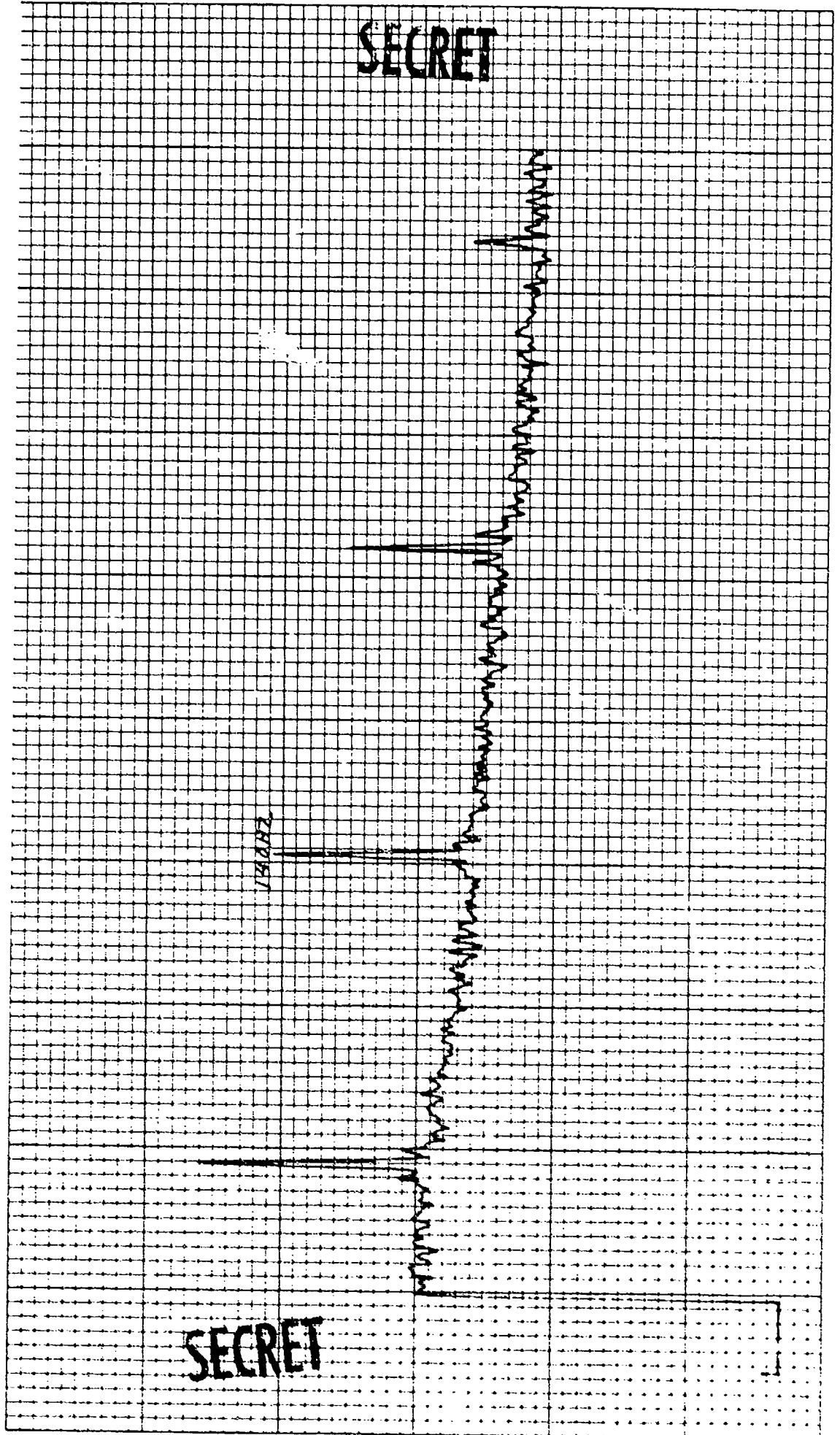
KOE 10 X 10 TO THE INCH .7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2-7 -1019 (J2)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS

DATE OF ANALYSIS: -- -- --
1-26-77 29-34)
DATE/TIME: 2-7-77 -1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
+33 DEG. AZ STEERING

REEL: F15 INDE X1955
INTEGRATION TIME 320 SECS ATTN: -24DB
FILTER WTG: HANNING

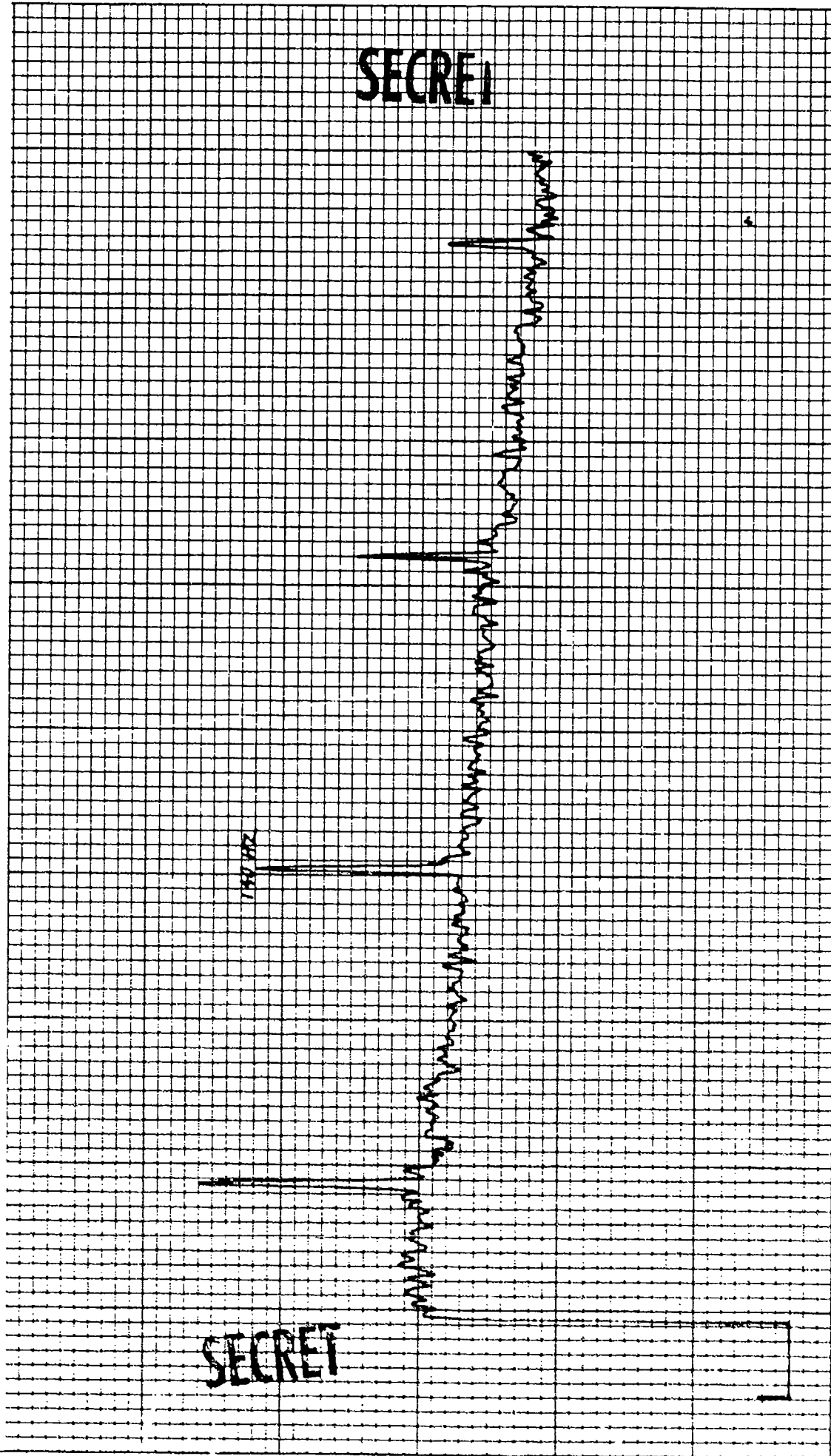


KOE 10 X 10 TO THE INCH .7 X .10 INCHES
KLUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2-7-1019 (J2) DATE OF ANALYSIS: 1-26-64 29-J4) INDE X 1955
BEAMFORMED SPECTRUM(ELEMENTS))
EXERCISE: BEARING STAKE)
CENTER FREQ: 150 HZ)
32 ELEMENTS)
INTEGRATION TIME 320 SECS)
FILTER WTG: HANNING)
ATTEN: -24 DB)

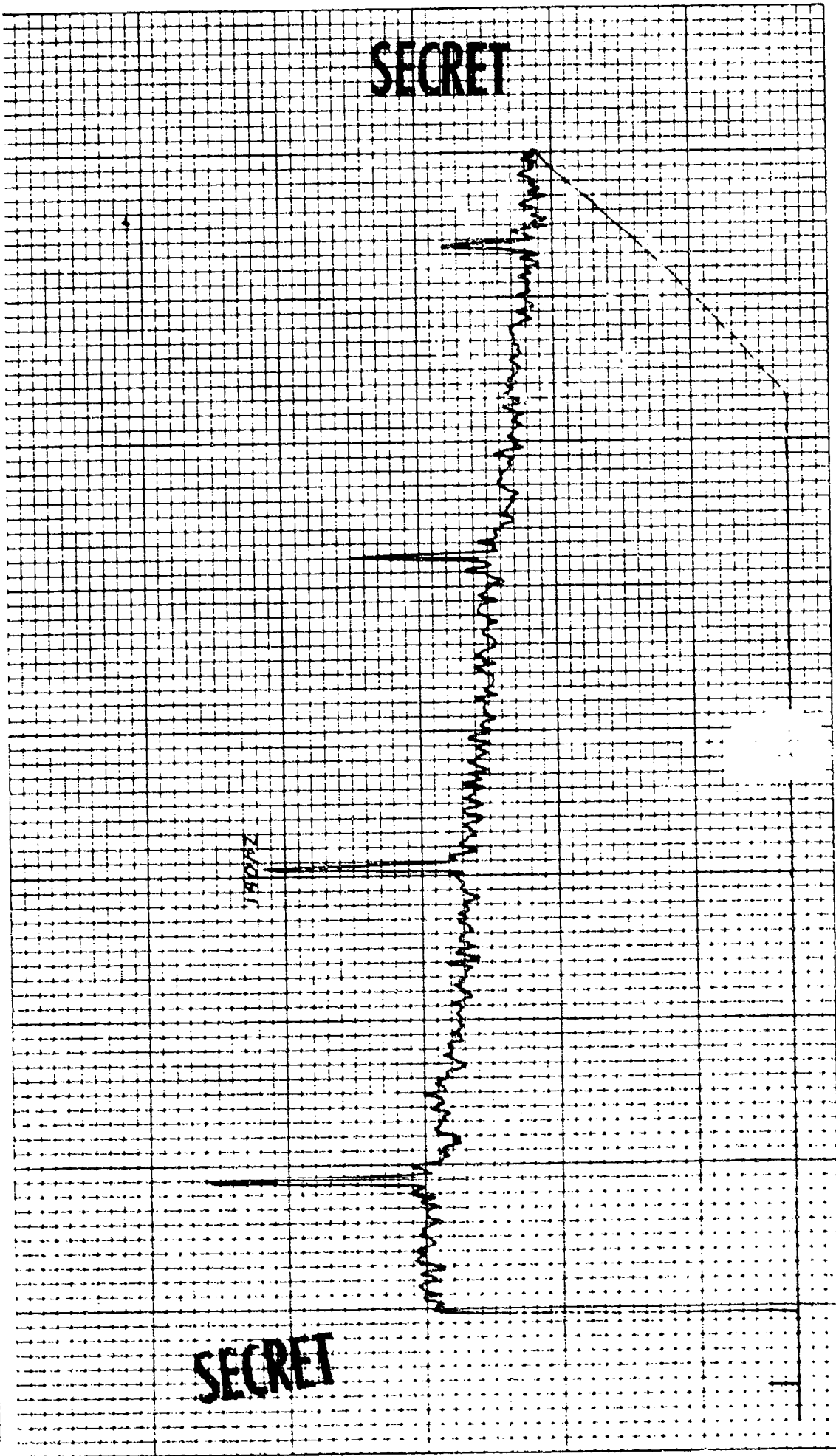
DATE/TIME: 2-7-77 -1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
+35.5 DEG. AZ STEERING



CONTROL: 2-7 -1019 (32) DATE OF ANALYSIS: -- -- --
 BEAMFORMED SPECTRUM (ELEMENTS) 1-26 39-34
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 -1019 Z
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
 32 ELEMENTS +JS DEG. AZ STEERING

REEL: E15 INTEGRATION TIME 320 SECS ATTEN: -2YDB
 FILTER WTG: HANNING

INTEGRATION TIME 320 SECS ATTEN: -2YDB
 FILTER WTG: HANNING



SECRET

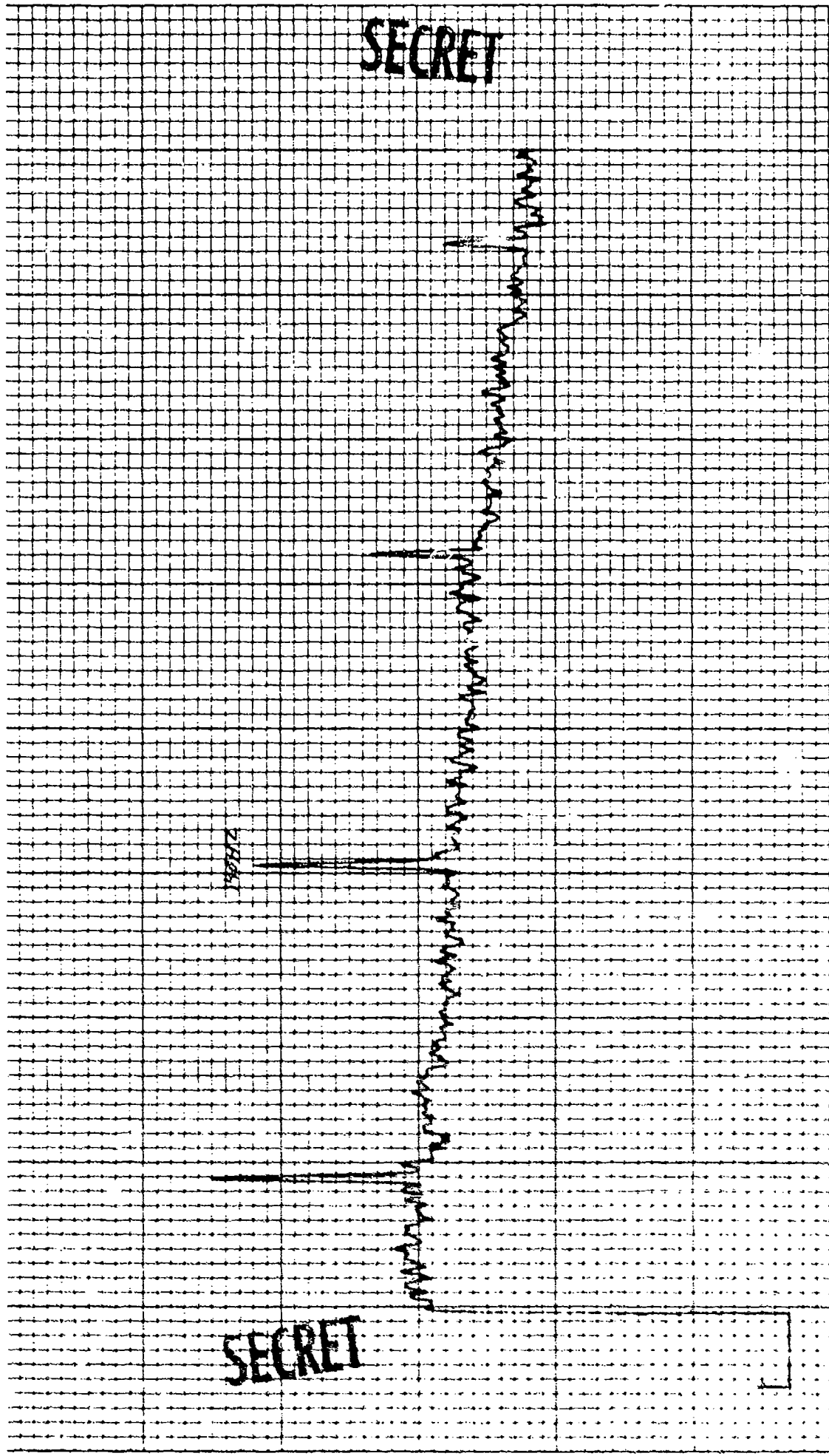
SECRET

K-E 10 X 10 TO THE INCHES
HEUFFEL & LEGER CO. MADE IN U.S.A.

46 0703

CONTROL: 27 - 1019 (32) DATE OF ANALYSIS: - -
BEAMFORMED SPECTRUM (ELEMENTS) 1 - 26 * 89 - 34)
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1019 Z
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ
32 ELEMENTS +37 DEG. AZ STEERING

REEL: F/5 INDE X/ 855
INTEGRATION TIME 320 SECS ATTEN: -24 DB
FILTER WTG: HANNING



SECRET

SECRET

KOE 10 X 10 TO THE INCHES
KLEINER & FESSER CO. MADE IN U.S.A.

46 0703

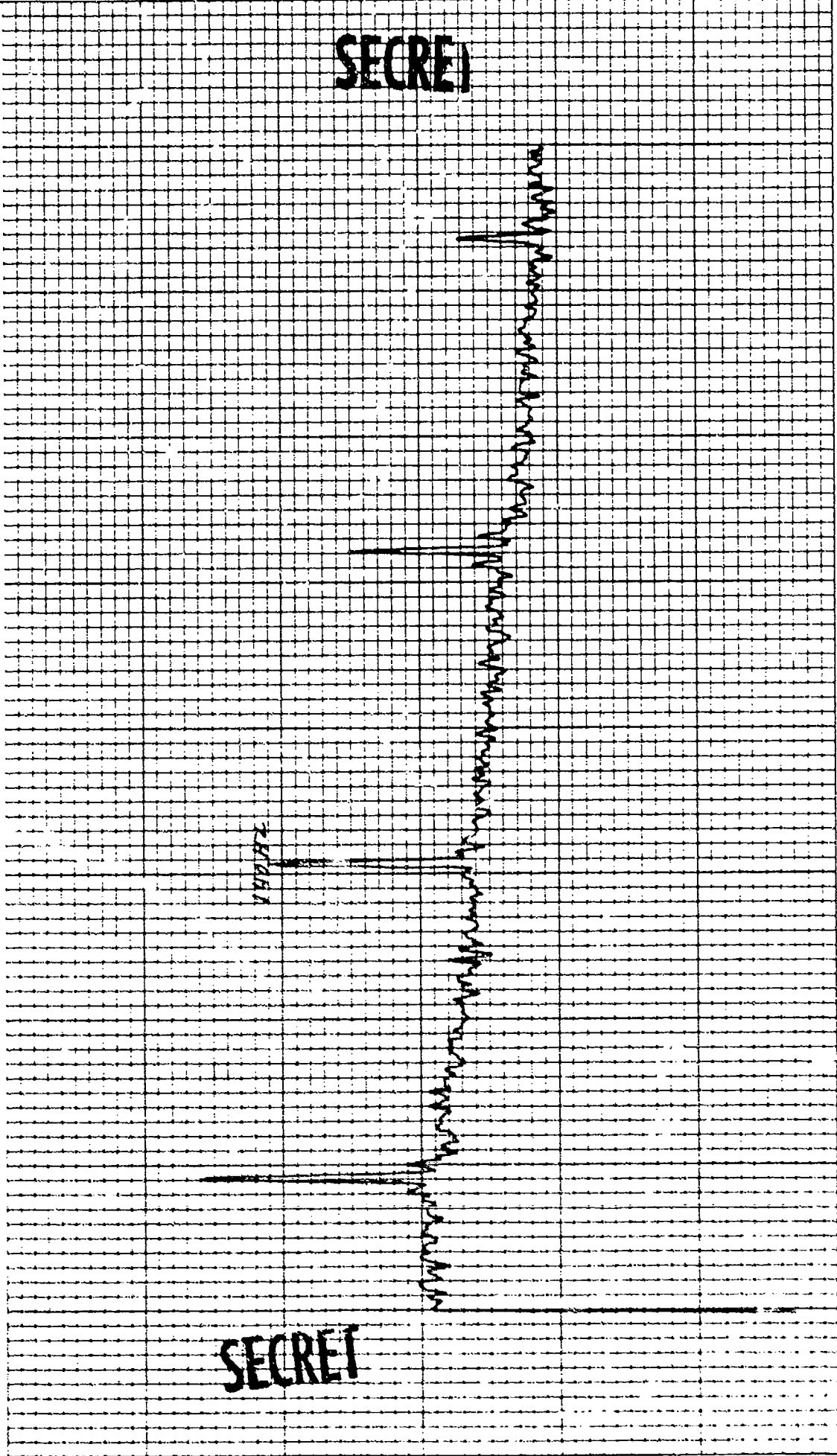
5-270

CONTROL: 2.7 - 1019 (F2)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 32 ELEMENTS

DATE OF ANALYSIS: 1-26 + 29-34
 DATE/TIME: 2-7-77 - 1519 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 +34 DEG. AZ STEERING

REEL: F15
 INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

INDE X 1955



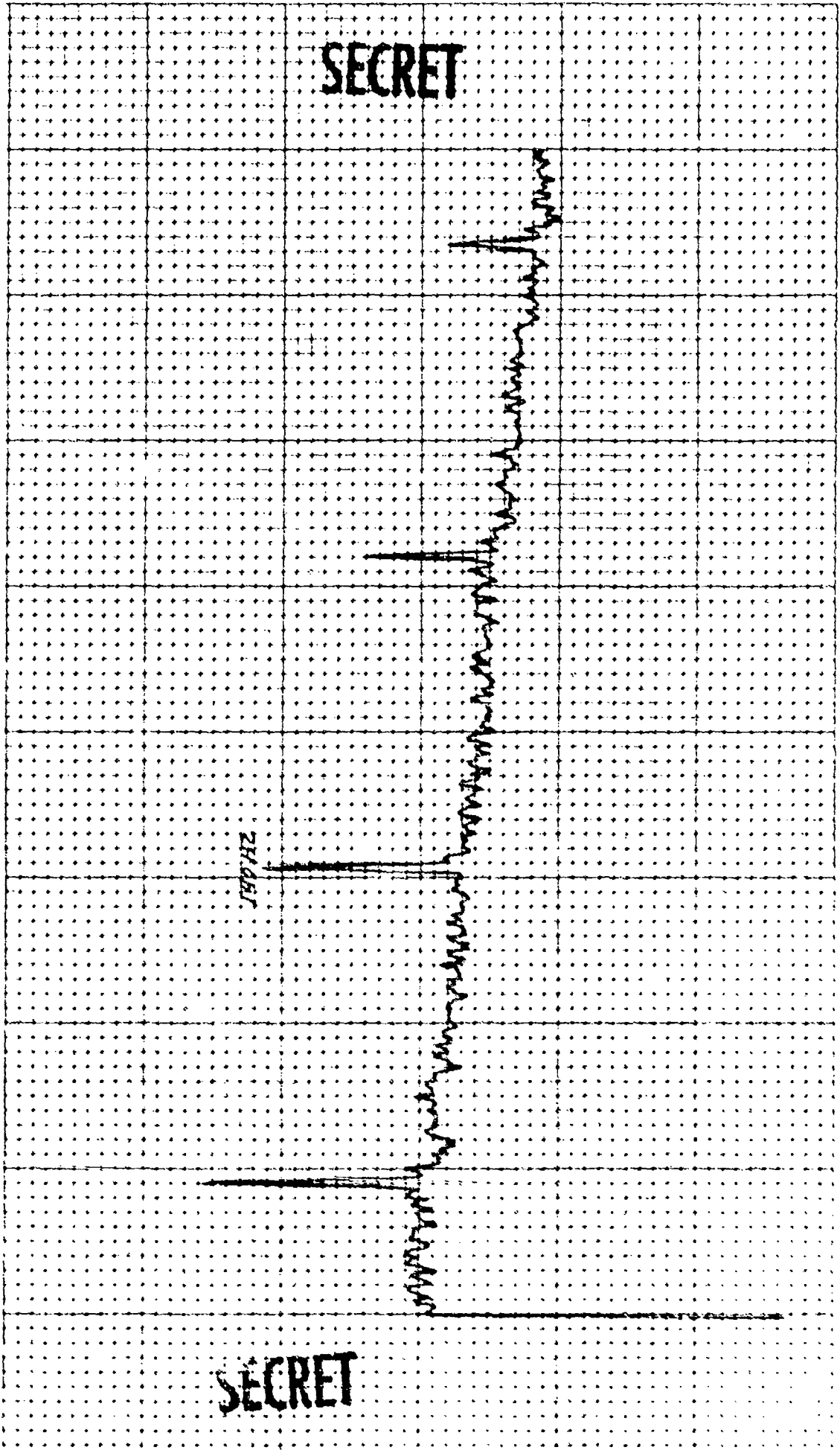
45 0703

MSE 10/19/72 TIME 08:00:00

CONTROL: 27 -1019 (72)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAGE
 CENTER FREQ: 150 HZ
 72 ELEMENTS

DATE OF ANALYSIS: 1-26-79
 DATE/TIME: 07-77 -1019 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 +7C DEG. AZ STEERING

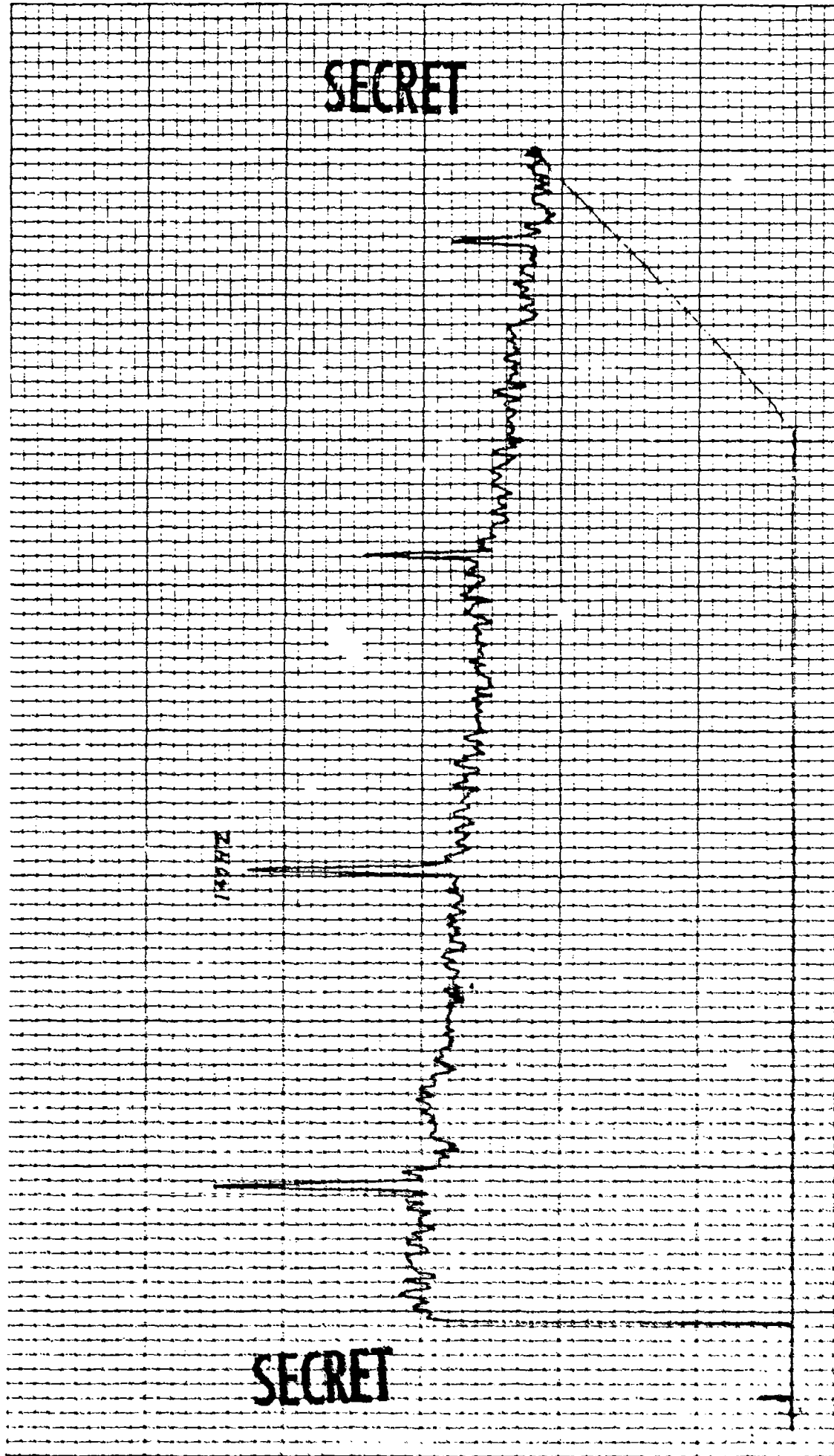
PEEL: F/S
 INTEGRATION TIME 320 SECS
 FILTER WTC: HANNING
 ATTN: -24DB
 INDE X 1955



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

46 0703

CONTROL: 1019 - S/ (DPV) DATE OF ANALYSIS: REEL: F15 INDE X 1955
BEAMFORMED SPECTRUM (ELEMENTS) 1-16 ✓ 29-3Y)
EXERCISE: BEARING STAKE DATE/TIME: 2:27 - 1019 Z INTEGRATION TIME 320 SECS ATTN: 2 1/2 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
32 ELEMENTS 32.5 DEG. AZ STEERING

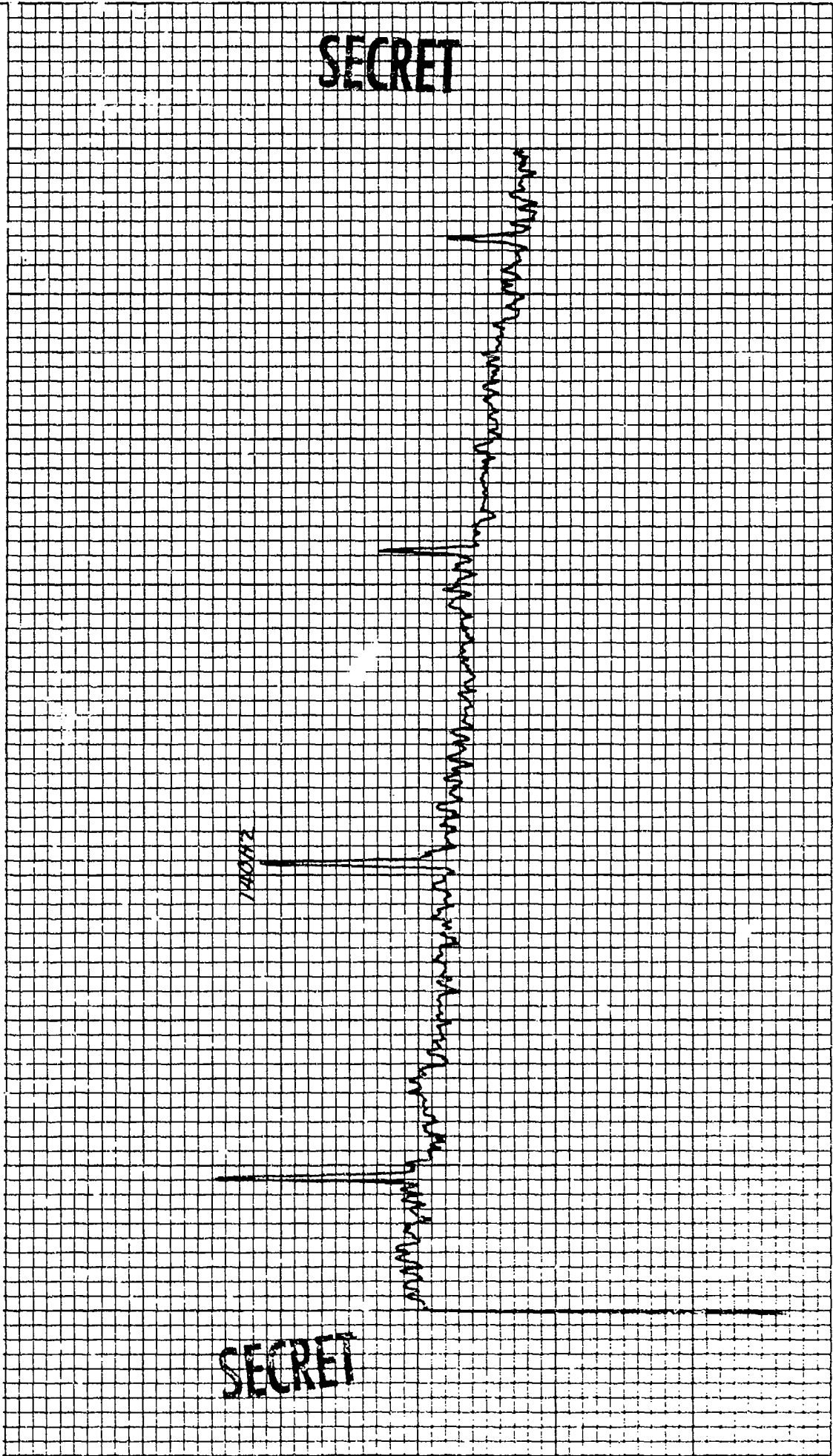


CONTROL: 2-7 -1019 (32)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26 & 29-34
DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
438 DEG. AZ STEERING

REEL: F15
INTEGRATION TIME 320 SECS
FILTER
ATTEN: -24 DB
WTG: HANNING

INDE X 1955



SECRET

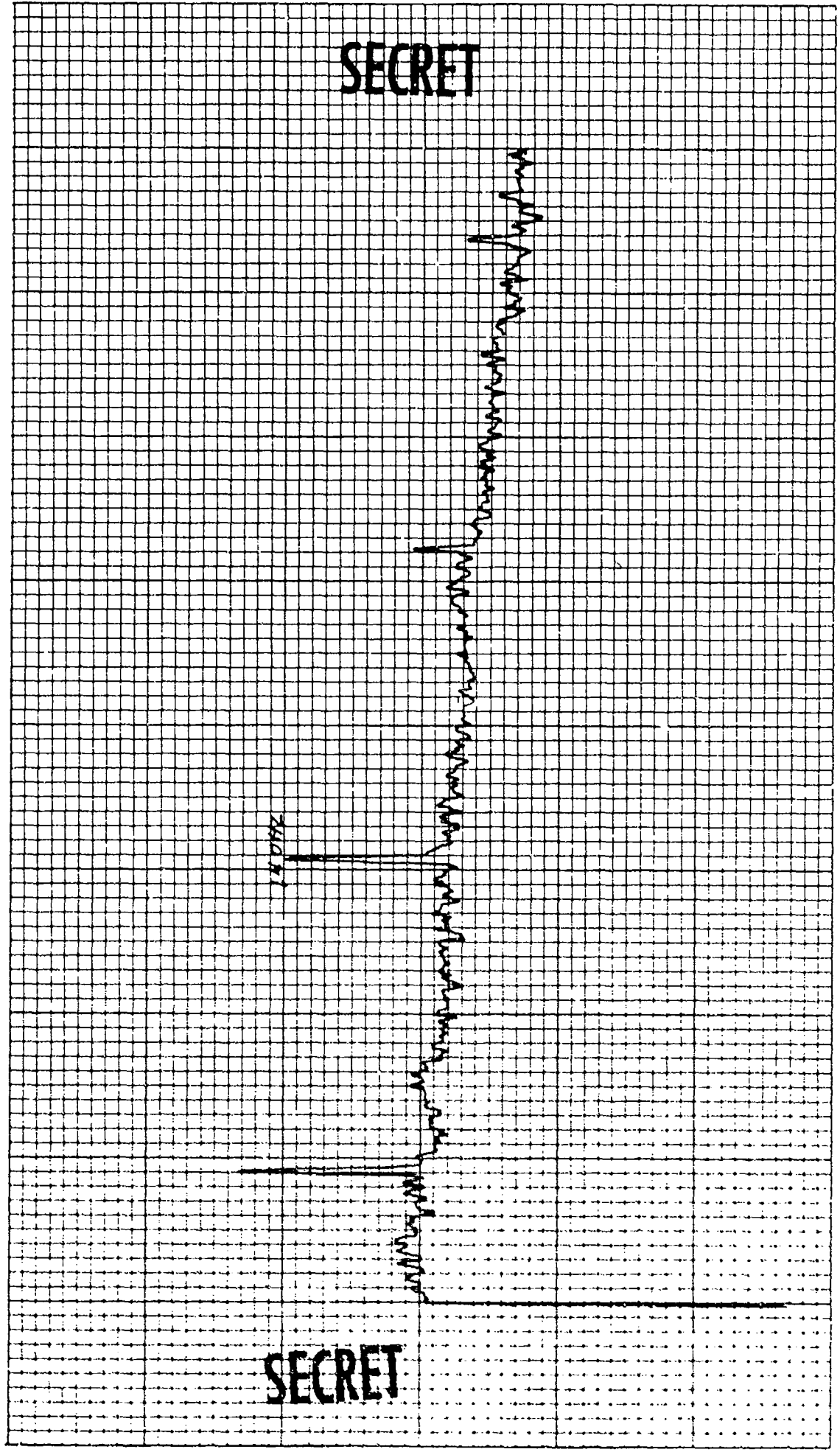
SECRET

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

46 0703

11-37b

CONTROL: 2.7 - 1019 (J2) DATE OF ANALYSIS: --- REEL: F15 INDE X 1955
 BEAMFORMED SPECTRUM (ELEMENTS) 1-26 4 29-34 INTEGRATION TIME 320 SECS ATTN: -24 DB
 EXERCISE: BEARING STAKE FILTER --- WTG: HANNING
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ
32 ELEMENTS 400 DEG. AZ STEERING



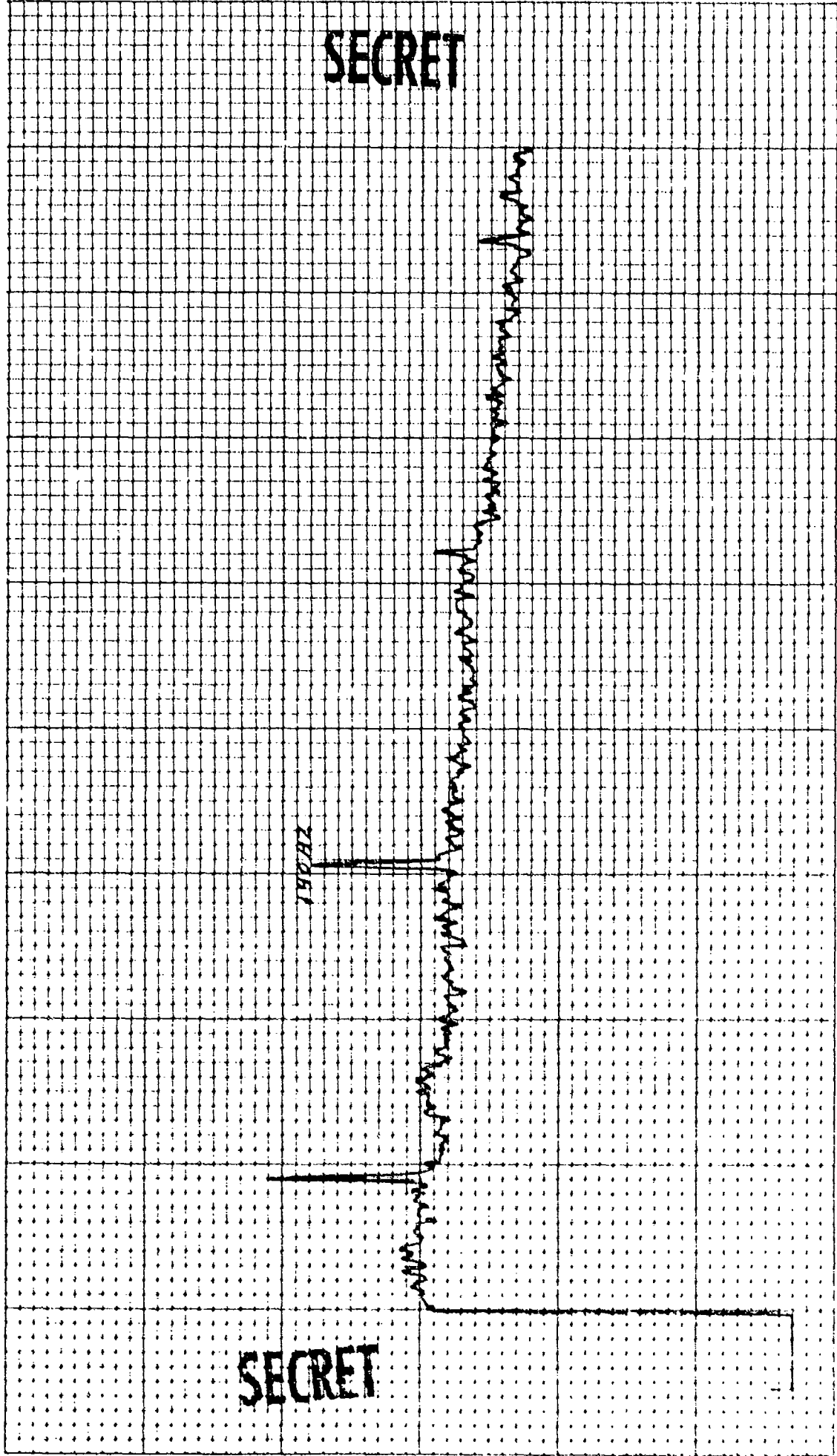
SECRET

SECRET

CONTROL: 2-7 -1019 (J2)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEAR: 1G STAKE
CENTER FREQ: 150 HZ
J2 ELEMENTS

DATE OF ANALYSIS: -- -- --
1-26 29-34
DATE/TIME: 2-7-77 -1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
142 DEG. AZ STEERING

REEL: F15 INDE X 1955
INTEGRATION TIME 320 SECS
ATTEN: -24 DB
FILTER WIG: HANNING



SECRET

SECRET

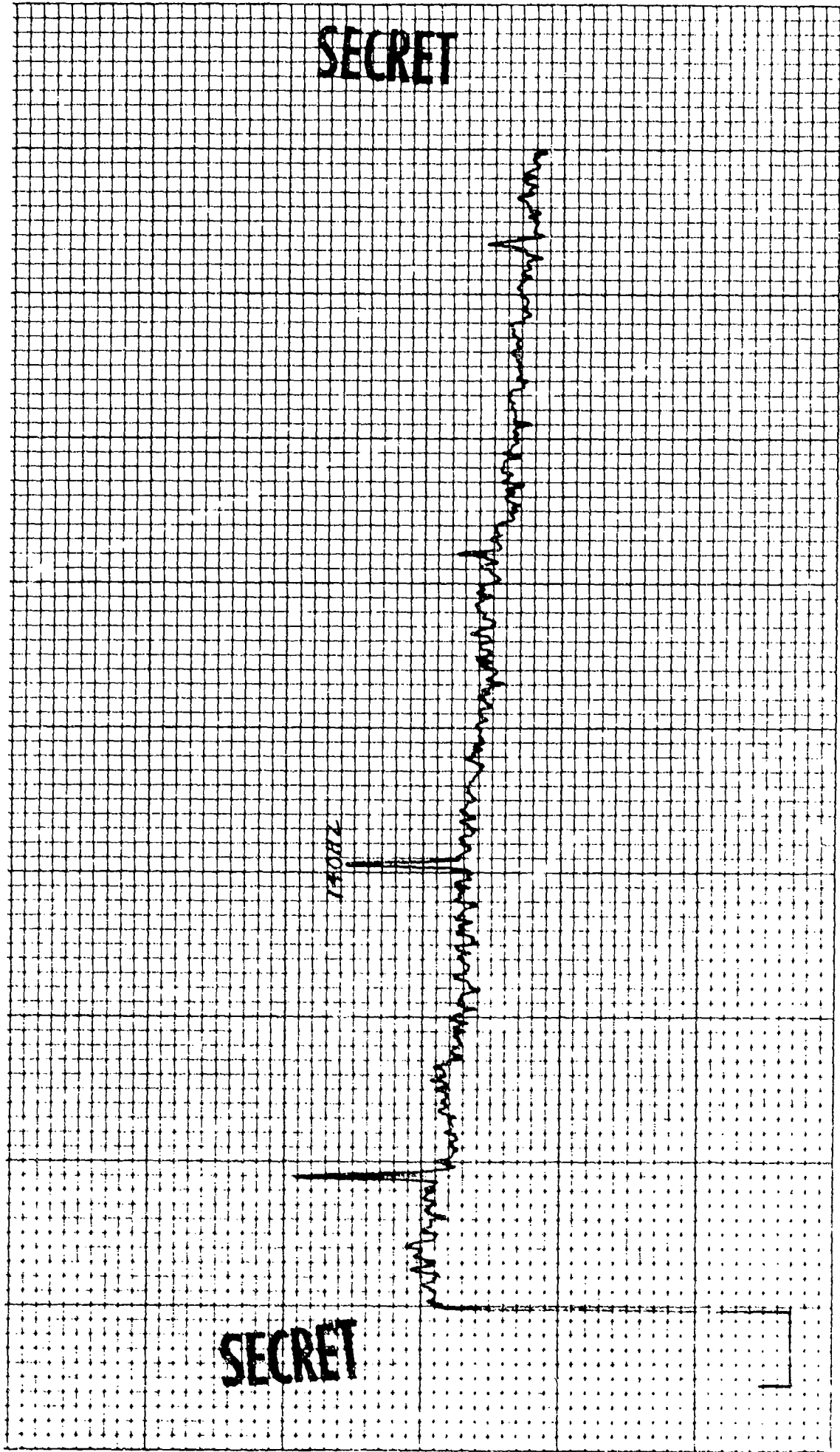
KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
REUPPEL & ESSER CO. MADE IN U.S.A.

46 0703

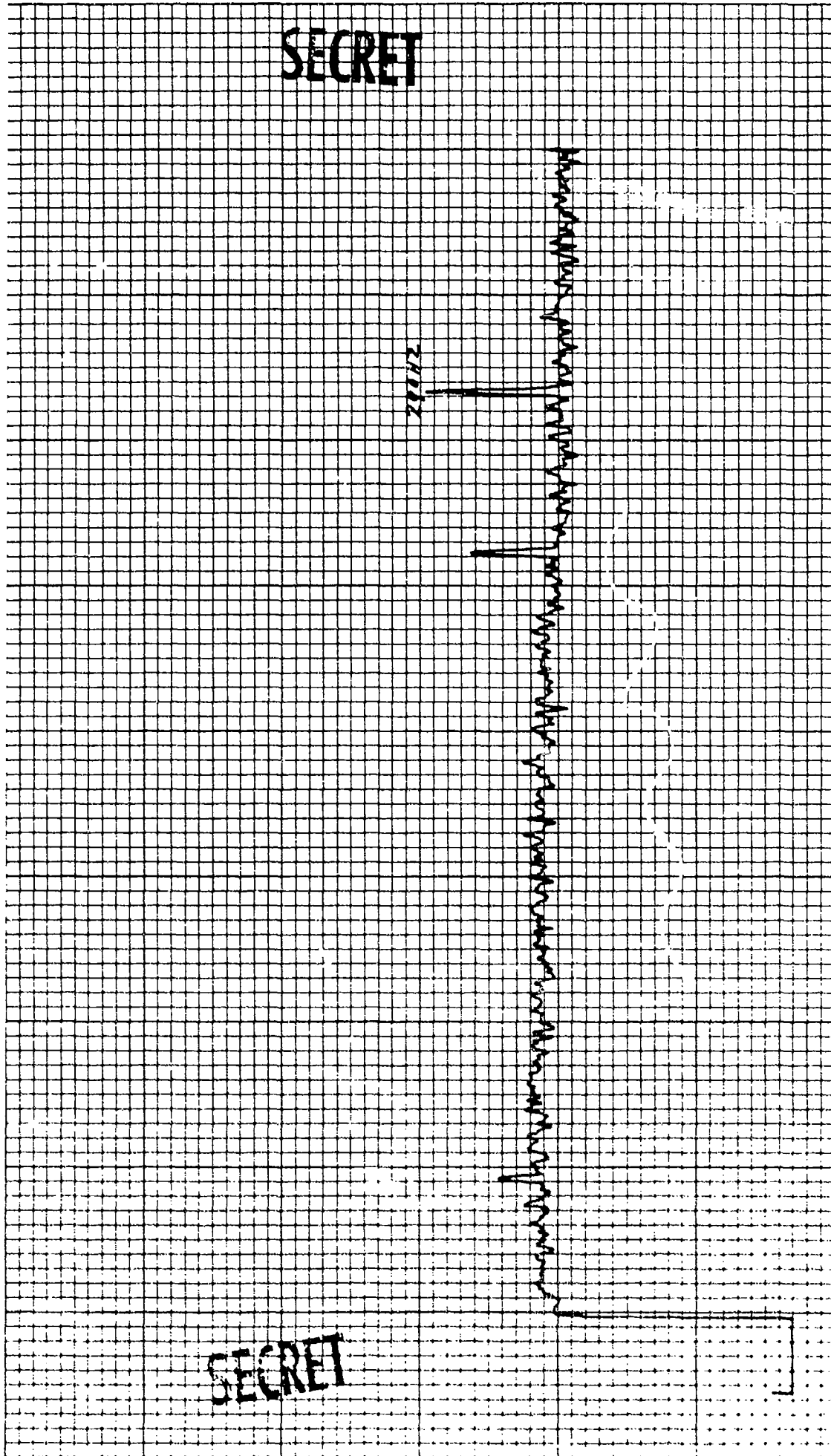
CONTROL: 2-7 - 1019 (32)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS

DATE OF ANALYSIS: -- -- --
1- 26 & 29-34)
DATE/TIME: 3-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 44 DEG. AZ STEERING

REEL: F15 INDE X 1955
INTEGRATION TIME 320 SECS ATTEN: 24 DB
FILTER WTG: HANNING



CONTROL: 27 - 10.9 (32) DATE OF ANALYSIS: 1-26-77 REEL: F/5 INDE X/855
 BEAMFORMED SPECTRUM (ELEMENTS))
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1019 Z INTEGRATION TIME 320 SECS ATTN: -2Y DB
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTC: HANNING
32 ELEMENTS 42Y DEG. AZ STEERING



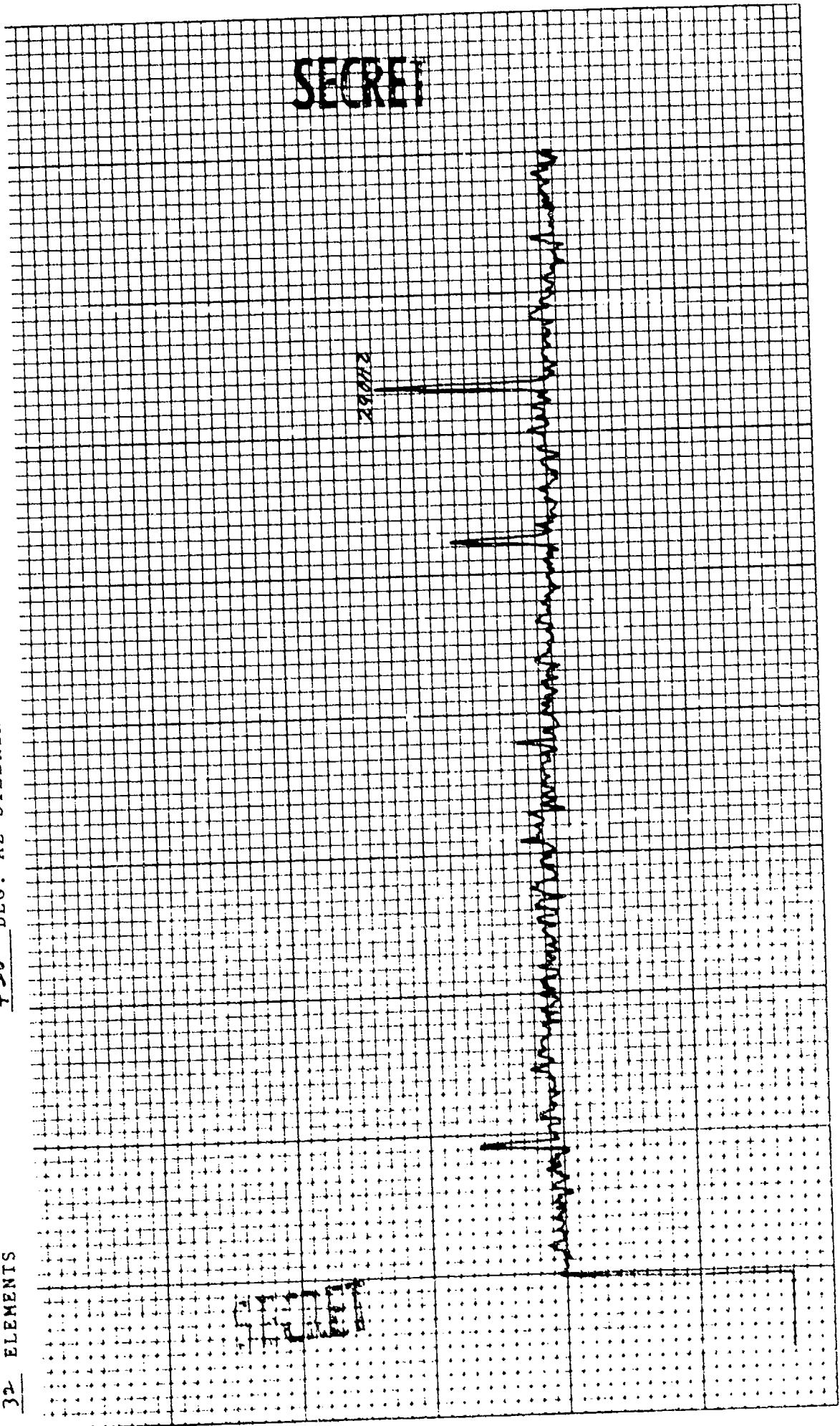
K-E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

REEL: F15 INDE X1P53

CONTROL: 2-7 -1019 (32) DATE OF ANALYSIS: 1-26 8 21-34
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-7-77 -1019 Z
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ
CENTER FREQ: 270 HZ +26 DEG. AZ STEERING
32 ELEMENTS

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

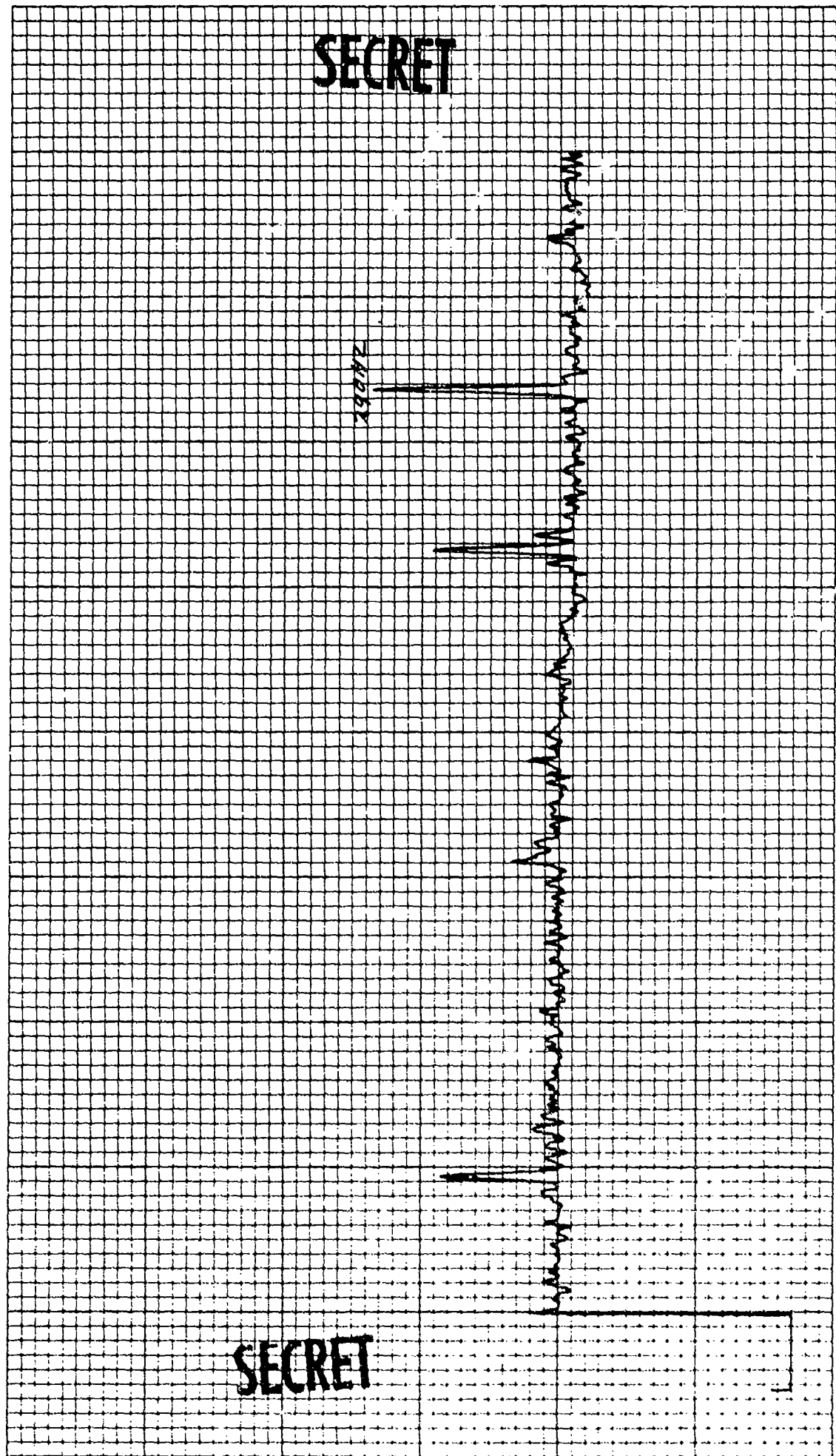


KOE 10 X 10 TO THE INCH .7 X 10 INCHES
KEUPPEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2-7 - 1019 (32) DATE OF ANALYSIS: 1-26 1977
BEAMFORMED SPECTRUM (ELEMENTS) 1-26 1977
EXERCISE: BEARING STAKE DATE/TIME: 9-7-77 - 1019 Z
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ
32 ELEMENTS +20 DEG. AZ STEERING

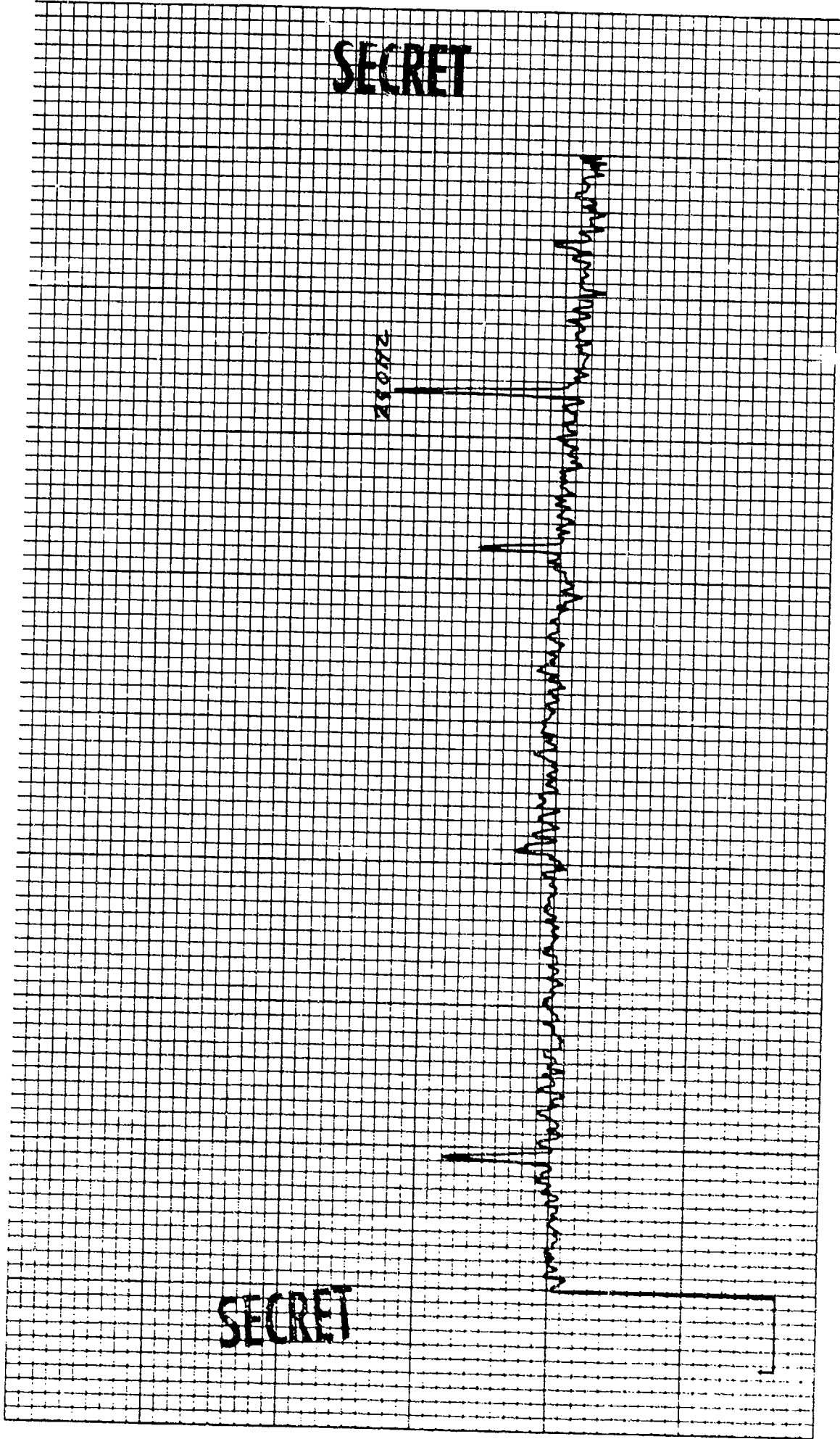
REEL: F15 INTEGRATION TIME 320 SECS ATTEN: -24DB
INDE X/1955 FILTER WTG: HANNING



K•E 10 X 10 TO THE INCH, 5.7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN USA

46 0703

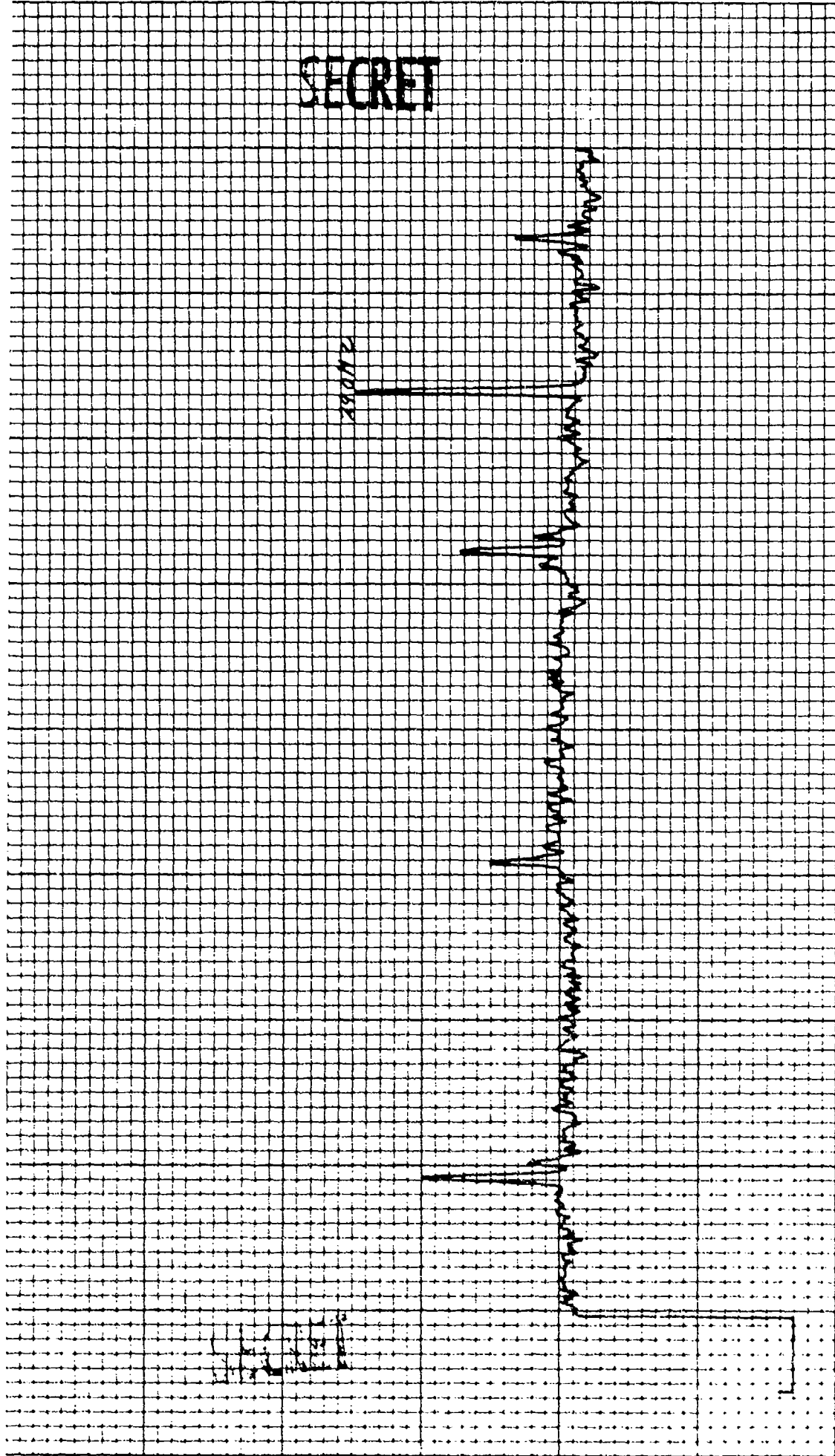
CONTROL: 2-7 - 1019 (32) DATE OF ANALYSIS: 1-26-77 REEL: F15 INDE X/055
 BEAMFORMED SPECTRUM (ELEMENTS) 2-7-77 - 1019 Z
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: -24DB
 CENTER FREQ: 270HZ +30 DEG. AZ STEERING FILTER WTC: HANNING
32 ELEMENTS



KOE 10 X 10 TO THE INCH .7 X .9 INCHES
HEUPFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2.7 - 1019 (32) DATE OF ANALYSIS: 1-26-77 REEL: F15 INDEX: 1953
BEAMFORMED SPECTRUM (ELEMENTS) EXERCISE: BEARING STAKE INTEGRATION TIME: 320 SECS ATTEN: -2VDB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER: WTC: HANNING
32 ELEMENTS 431 DEG. AZ STEERING

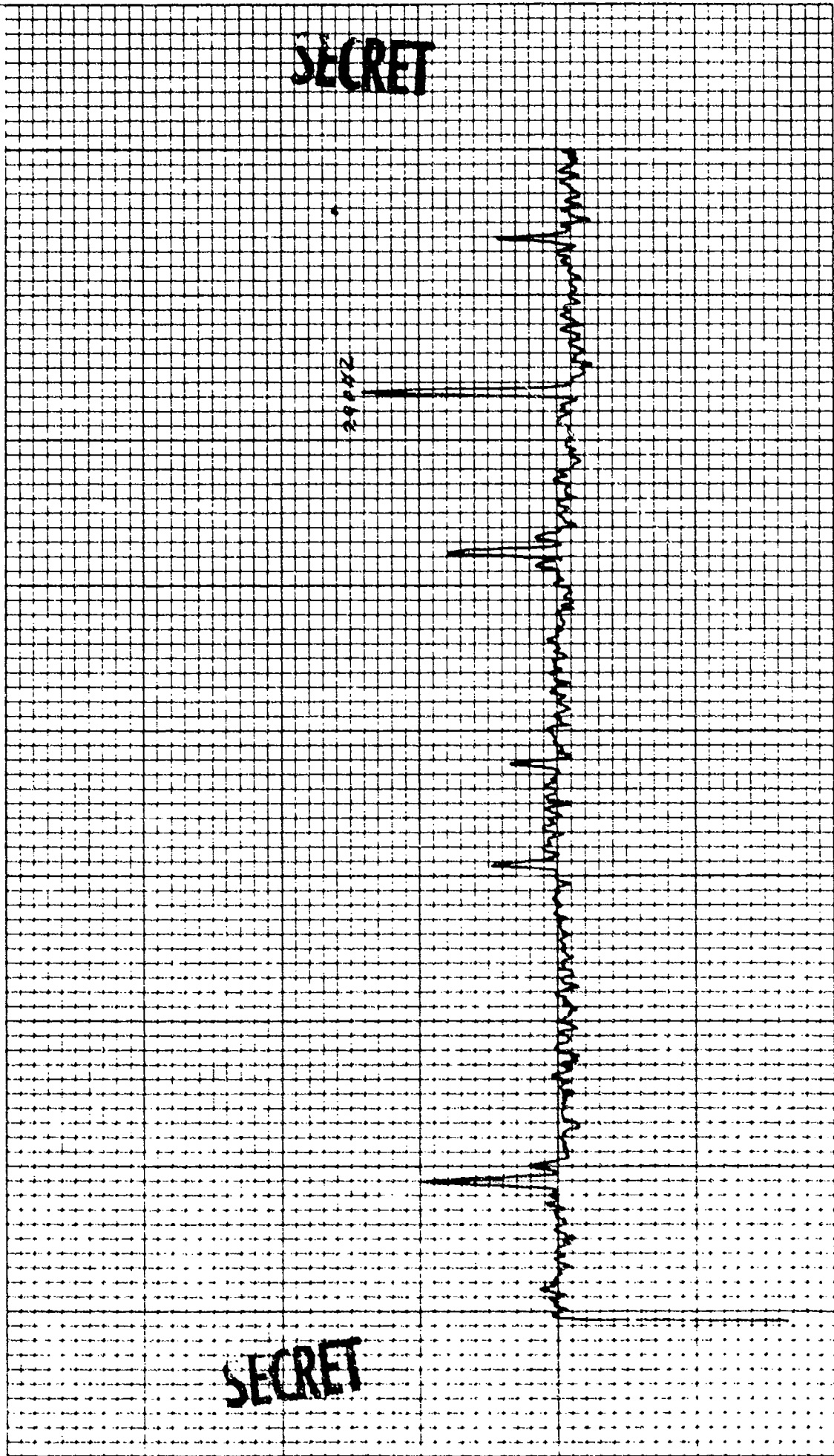


KOE 20 X 10 TO THE INCH 0.7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 27 - 1019 (32) DATE OF ANALYSIS: - - - - -
BEAMFORMED SPECTRUM(ELEMENTS) 1-264 29-34
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1019 Z
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ
32 ELEMENTS +31.5 DEG. AZ STEERING

REEL: F15 INDE X 1955
INTEGRATION TIME 320 SECS ATTN: -24 DB
FILTER WTG: HANNING

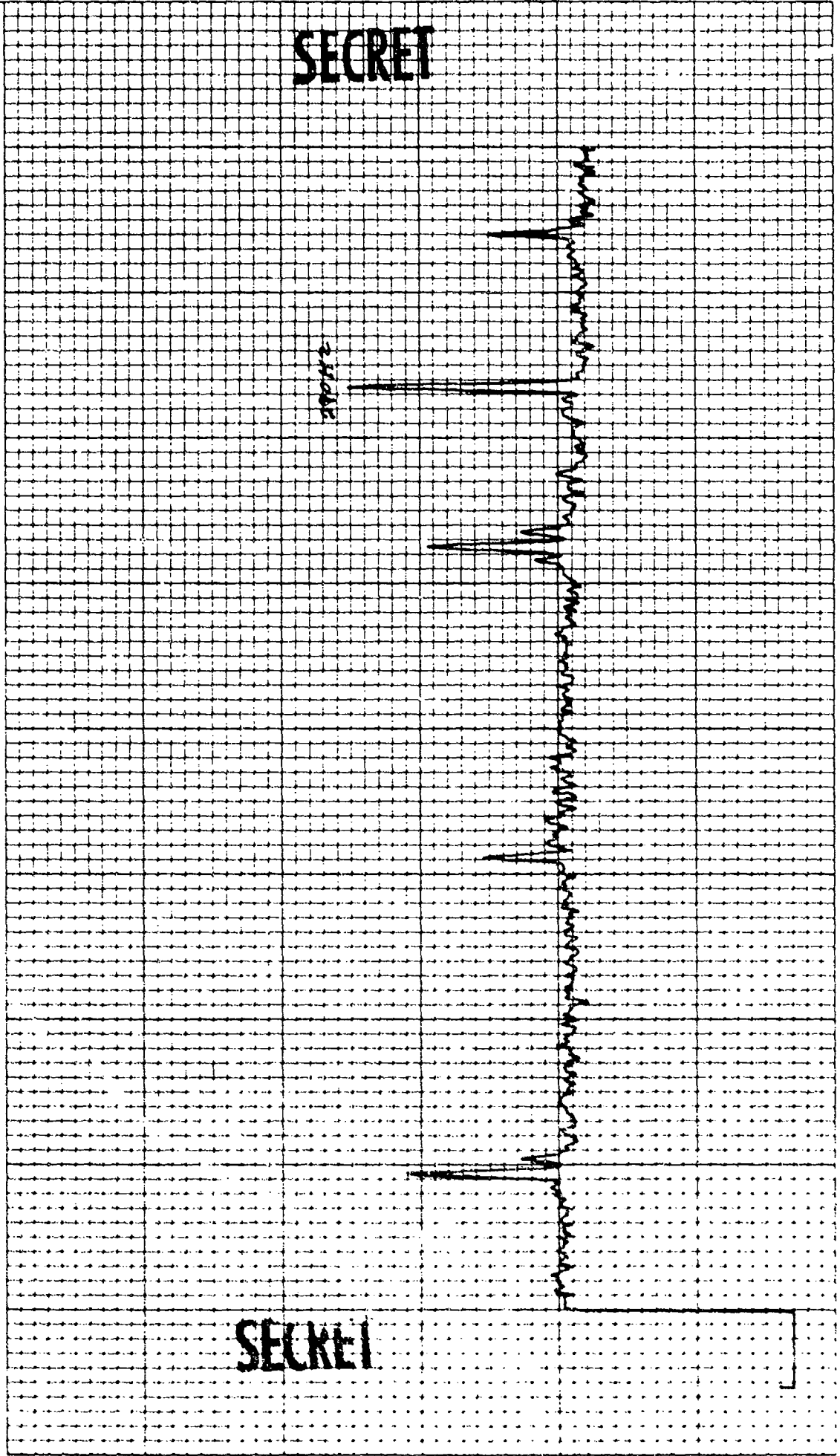


K-E 10 X 10 TO THE INCHES
FELSPER & PAPER CO. MADE IN U.S.A.

46 0703

CONTROL: 2-7 -1019 (22) DATE OF ANALYSIS: - - - -
BEAMFORMED SPECTRUM(ELEMENTS) 1-264 2-1-24)
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 -1019 Z INTEGRATION TIME 320 SECS ATTN: -24 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
32 ELEMENTS +32 DEC. AZ STEERING

REEL: F15 INDE X/955



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

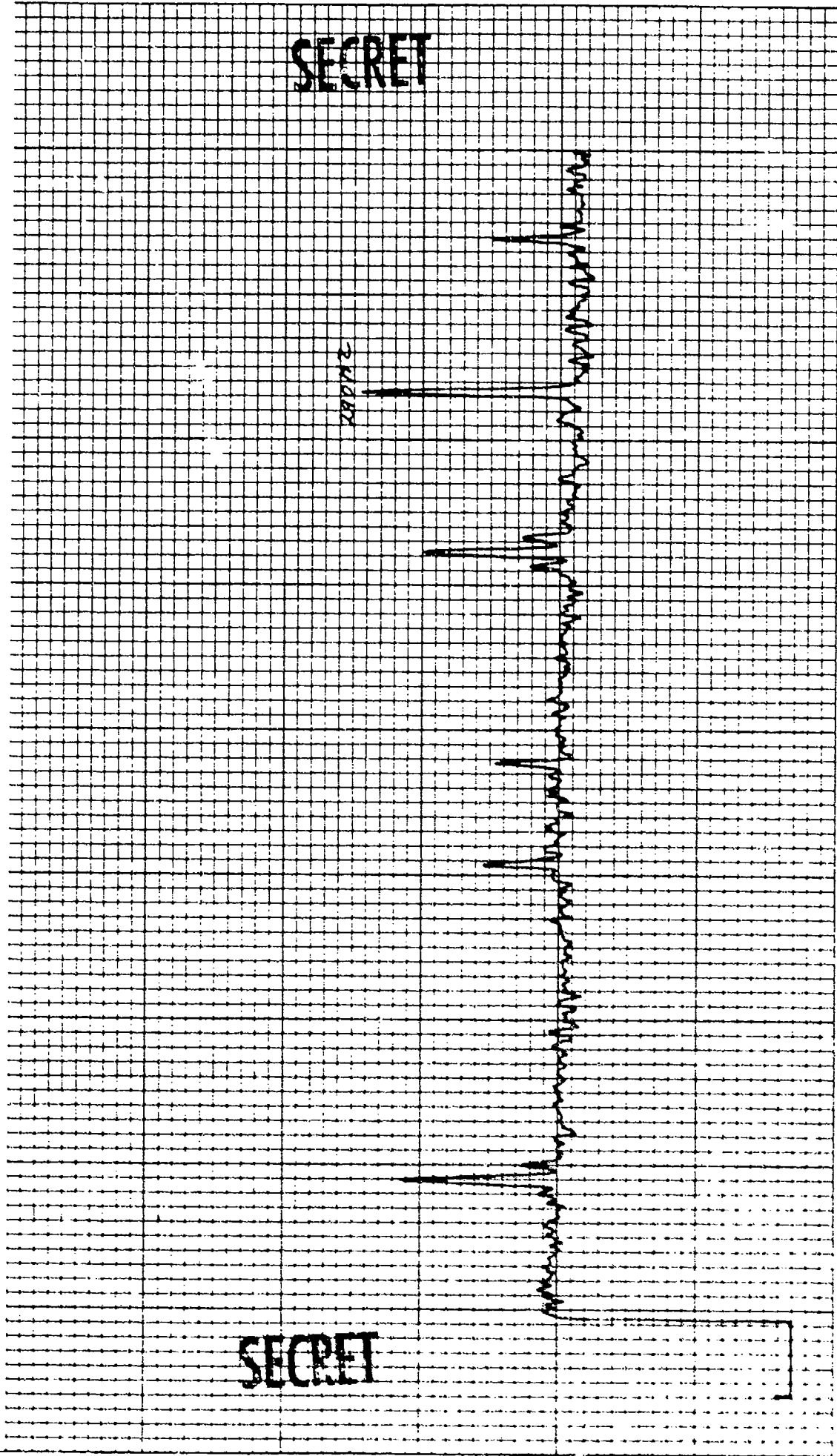
46 0703

CONTROL: 27 - 1019 (32)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 275 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-59-34
DATE/TIME: 2-7-72 - 1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
+37.5 DEC. AZ STEERING

REEL: F/5
INDE X/255

INTEGRATION TIME 320 SECS
FILTER WTG: HANNING



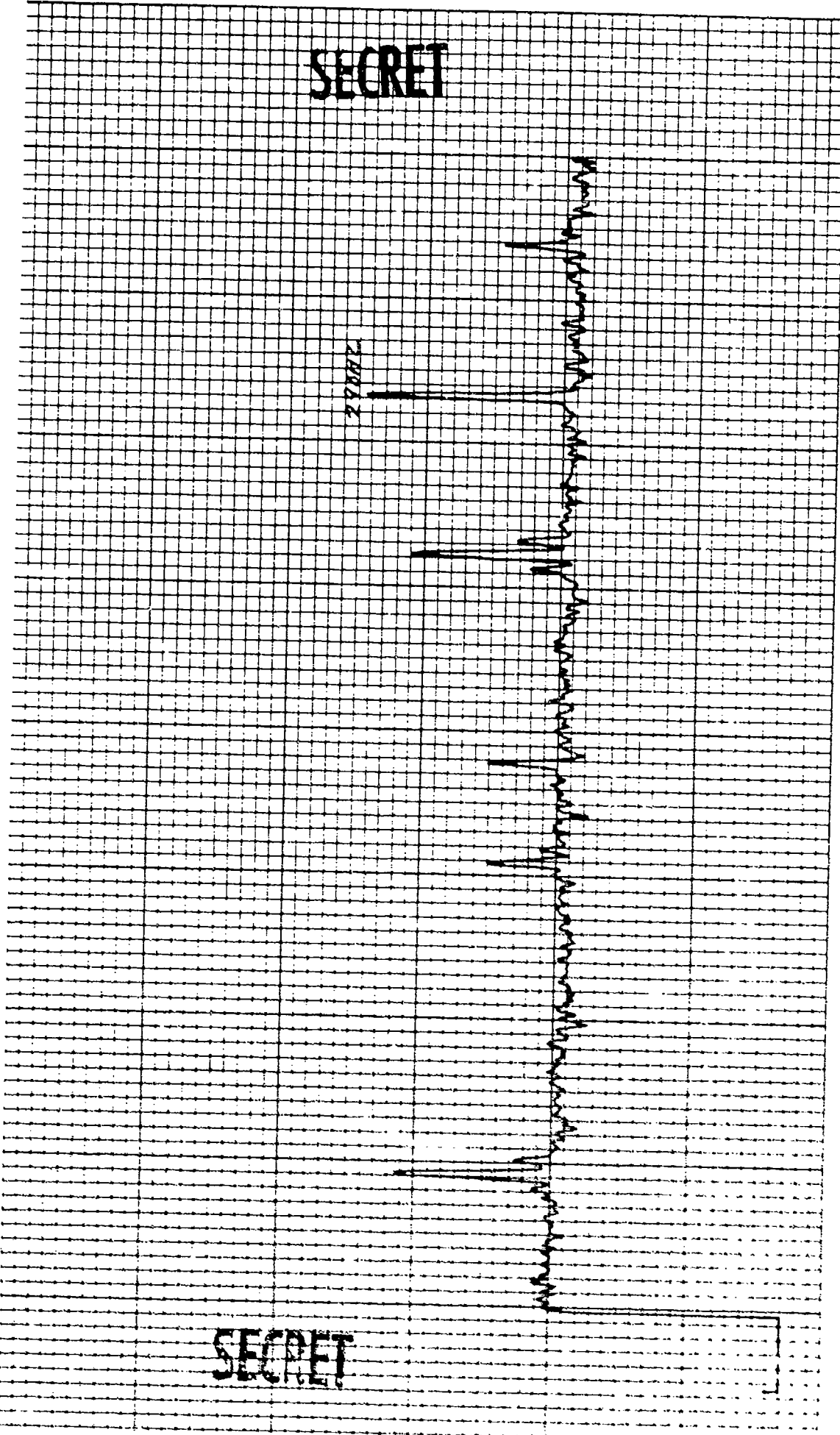
KOE 10 X 10 TO THE INCH .7 X 10 INCHES
HEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2-7 -1019 (32)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-77 09-24
DATE/TIME: 2-7-77 -1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
433 DEG. AZ STEERING

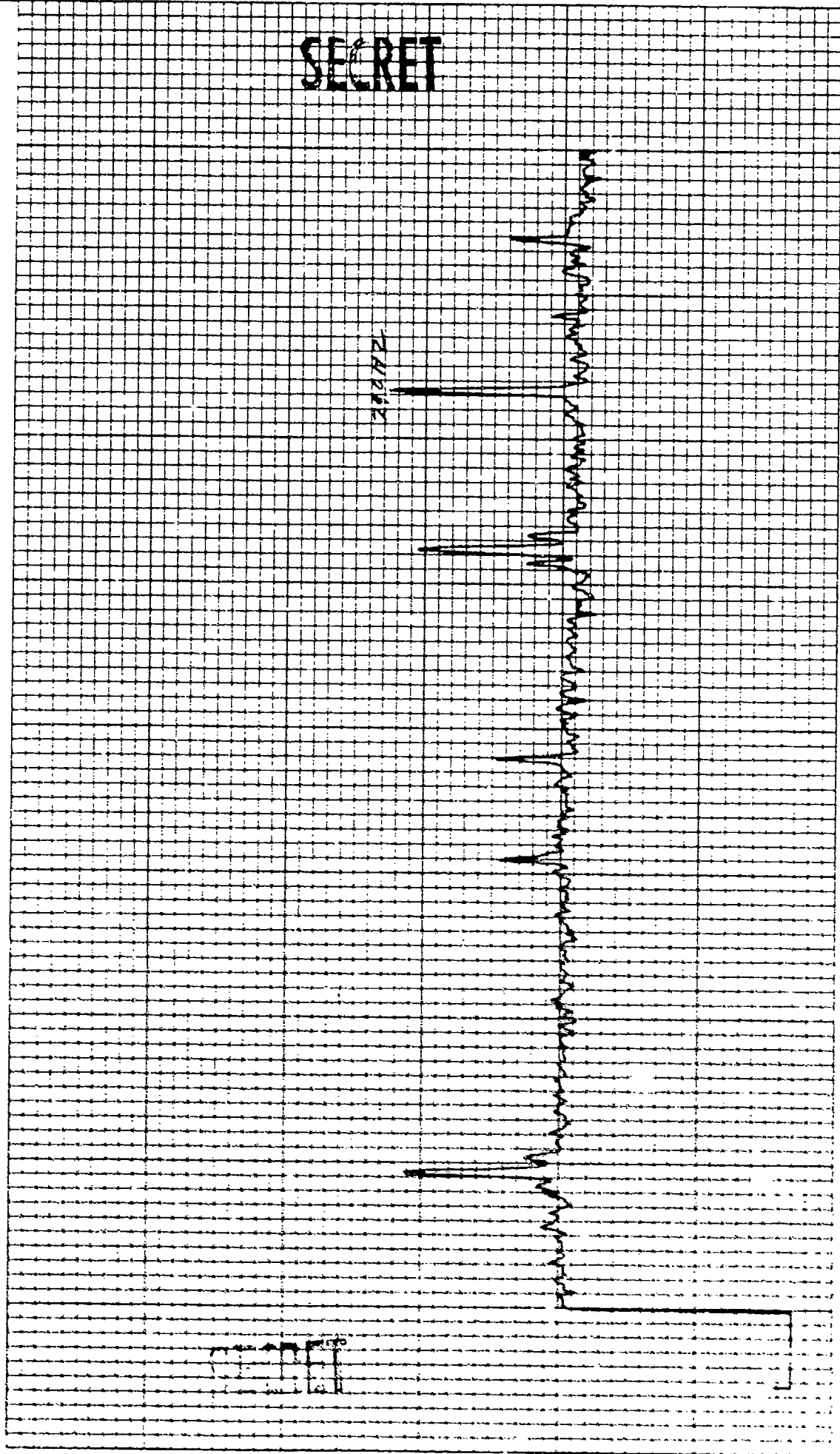
REEL: F15 INDE X/1955
INTEGRATION TIME 320 SECS
ATTEN: -2YDB
FILTER WTC: HANNING



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

46 0703

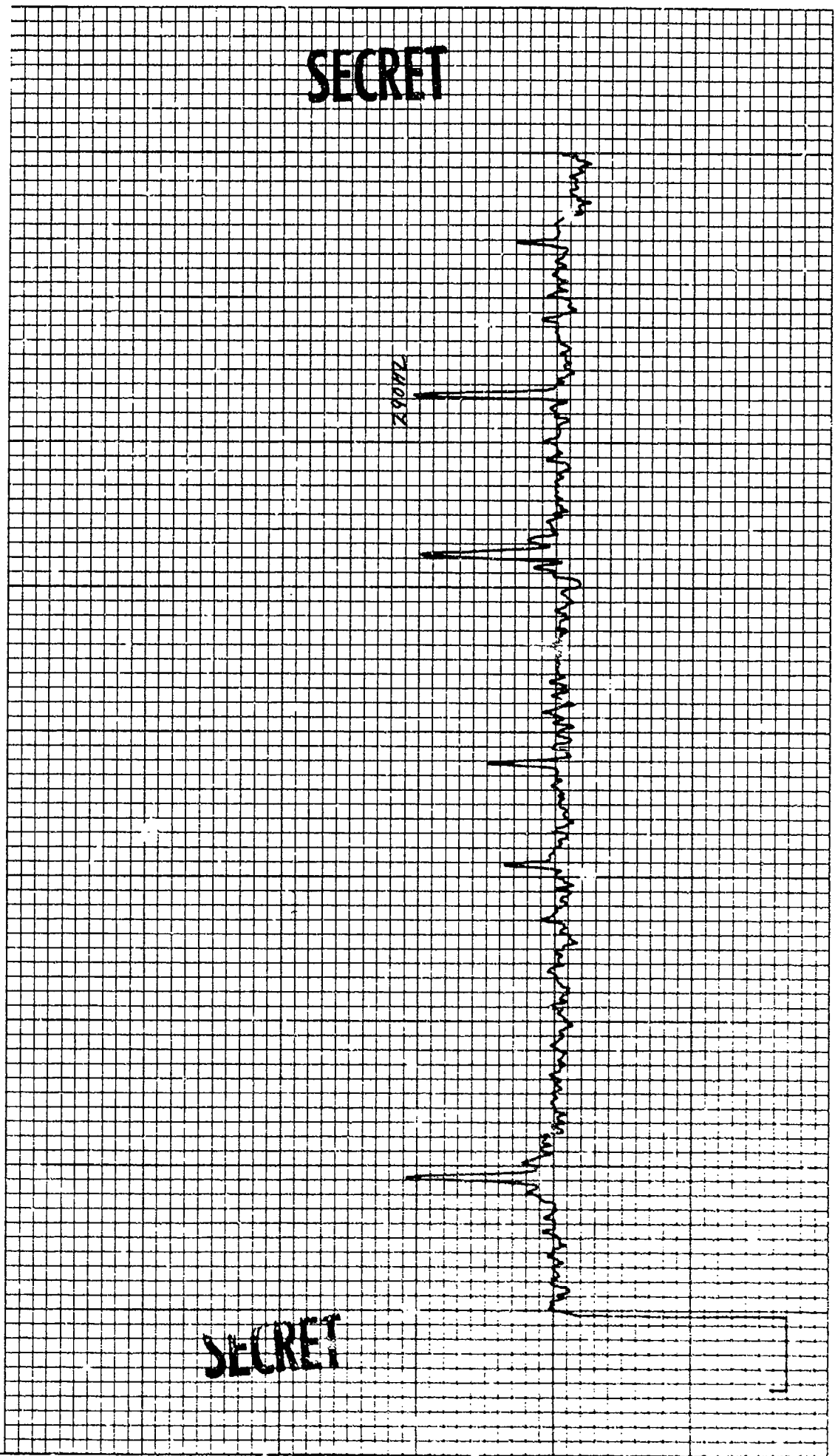
CONTROL: 2-7 - 1019 (J2) DATE OF ANALYSIS: 1-26 & 29-34 REEL: F15 INDEX X 1055
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-7-77 - 1019 Z INTEGRATION TIME 320 SECS ATTN: -24 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 370 HZ YJY DEG. AZ STEERING



CONTROL: 2-7 -1019 (32)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32- ELEMENTS

DATE OF ANALYSIS: -- -- --
DATE/TIME: 2-7-77 -1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
+35 DEG. AZ STEERING

REEL: F-5
INDE X 1953
INTEGRATION TIME 320 SECS
ATTEN: -24 DB
FILTER WTG: HANNING



K&E 10 X 10 TO THE INCH 1.7 X 10 INCHES
REUTHER & LESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2-7 - 1019 (32)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-77

DATE/TIME: 2-7-77 - 1019 Z

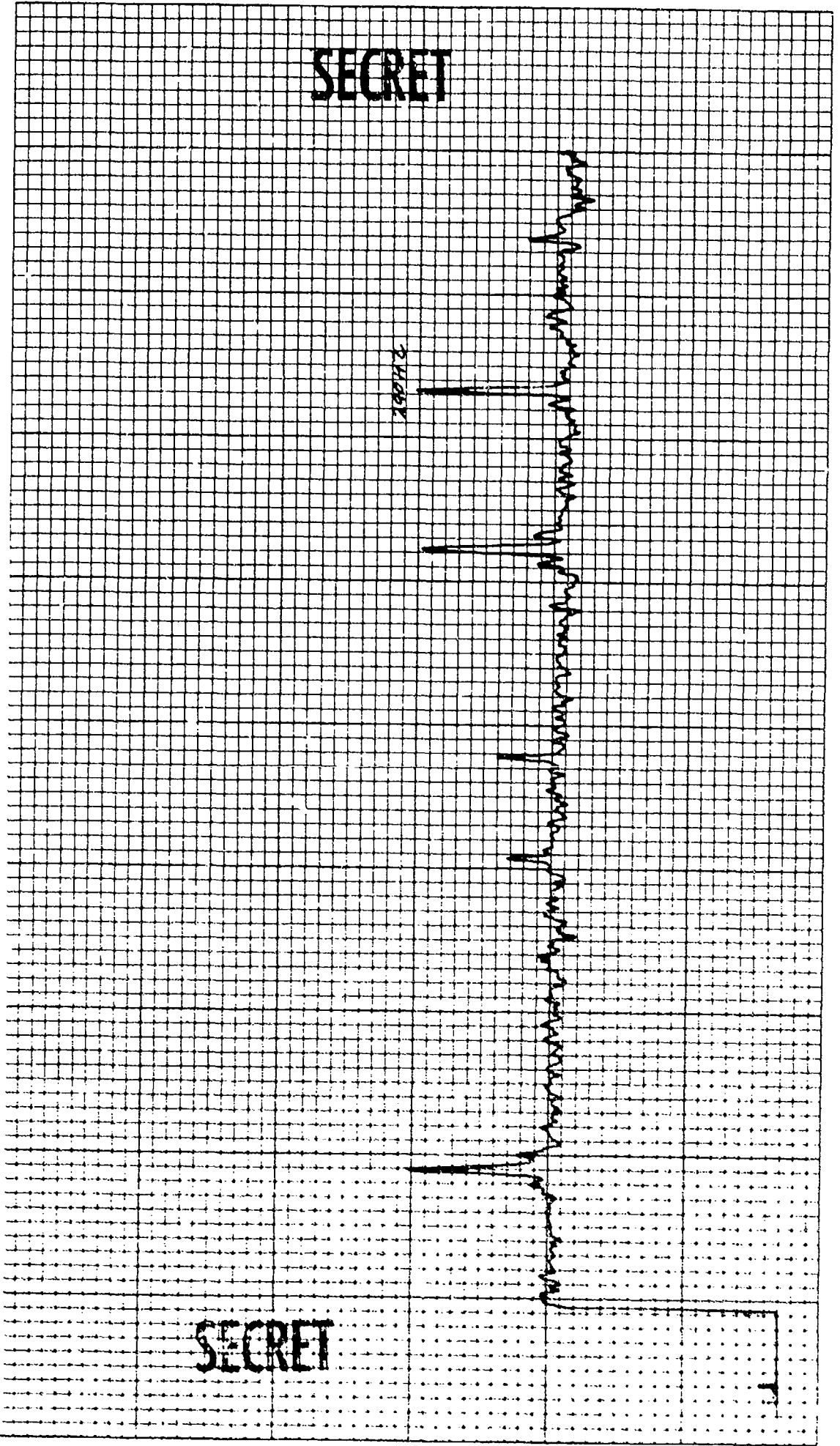
ANALYSIS BANDWIDTH: 1/10HZ
+35.5 DEG. AZ STEERING

REEL: F15 INDE X 1953

INTEGRATION TIME 320 SECS

FILTER

ATTEN: -24 DB
WTC: HANNING



SECRET

SECRET

46 0703

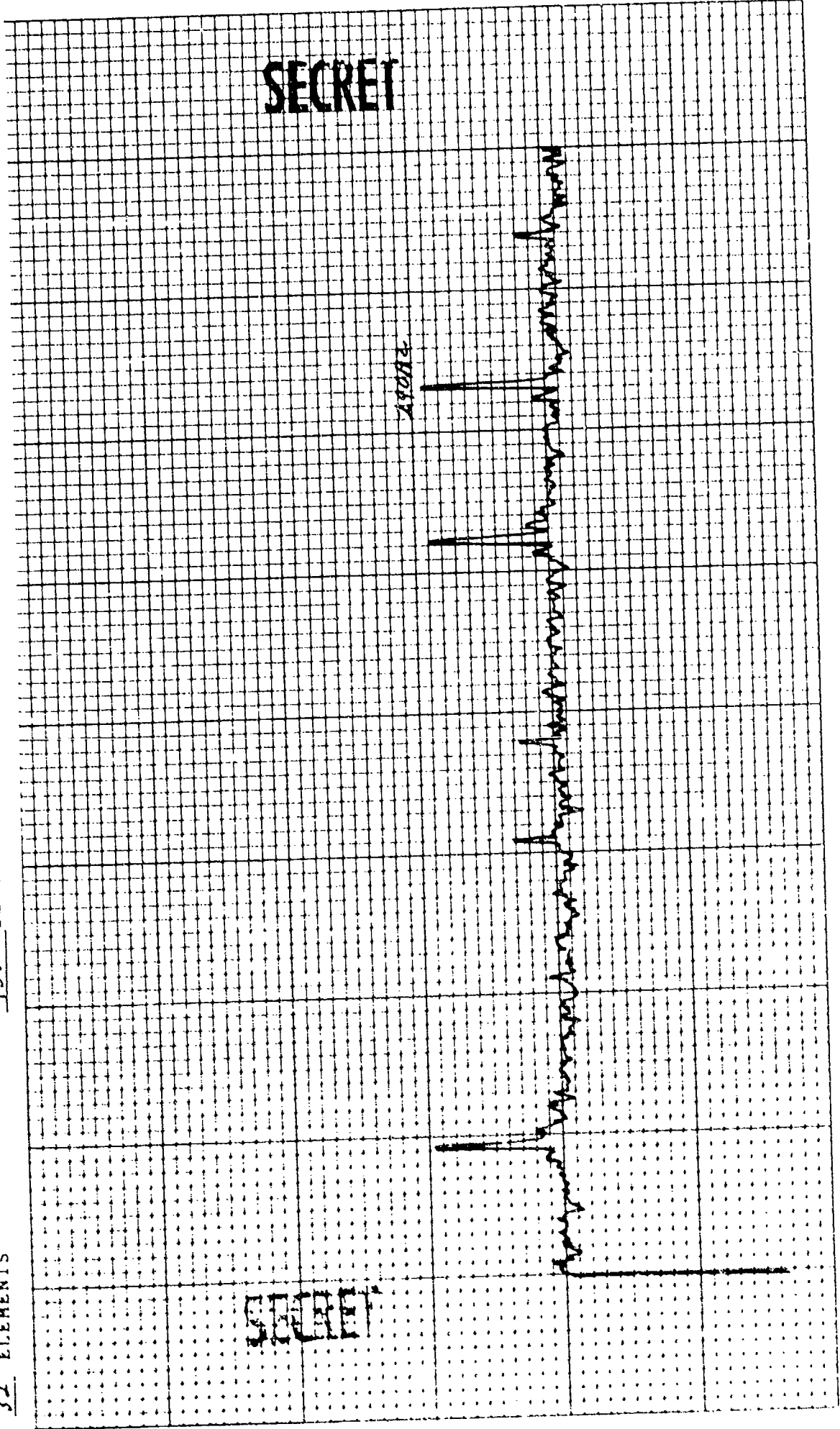
K-E 10 X 10 TO THE INCHES
HETPIL & ESSER CO. MADE IN U.S.A.

REEL: F15 INDE X 1855
INTEGRATION TIME 320 SECS ATTEN: -28 DB
FILIER WIG: HANNING

CONTROL: 2.7 - 1019 (32) DATE OF ANALYSIS: ---
BEAMFORMED SPECTRUM (ELEMENTS 1-26 & 29-34)
EXERCISE: BEARING STAKE DATE/TIME: 9-7-77 - 1019 Z
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ
32 ELEMENTS 136 DEG. AZ STEERING

SECRET

SECRET

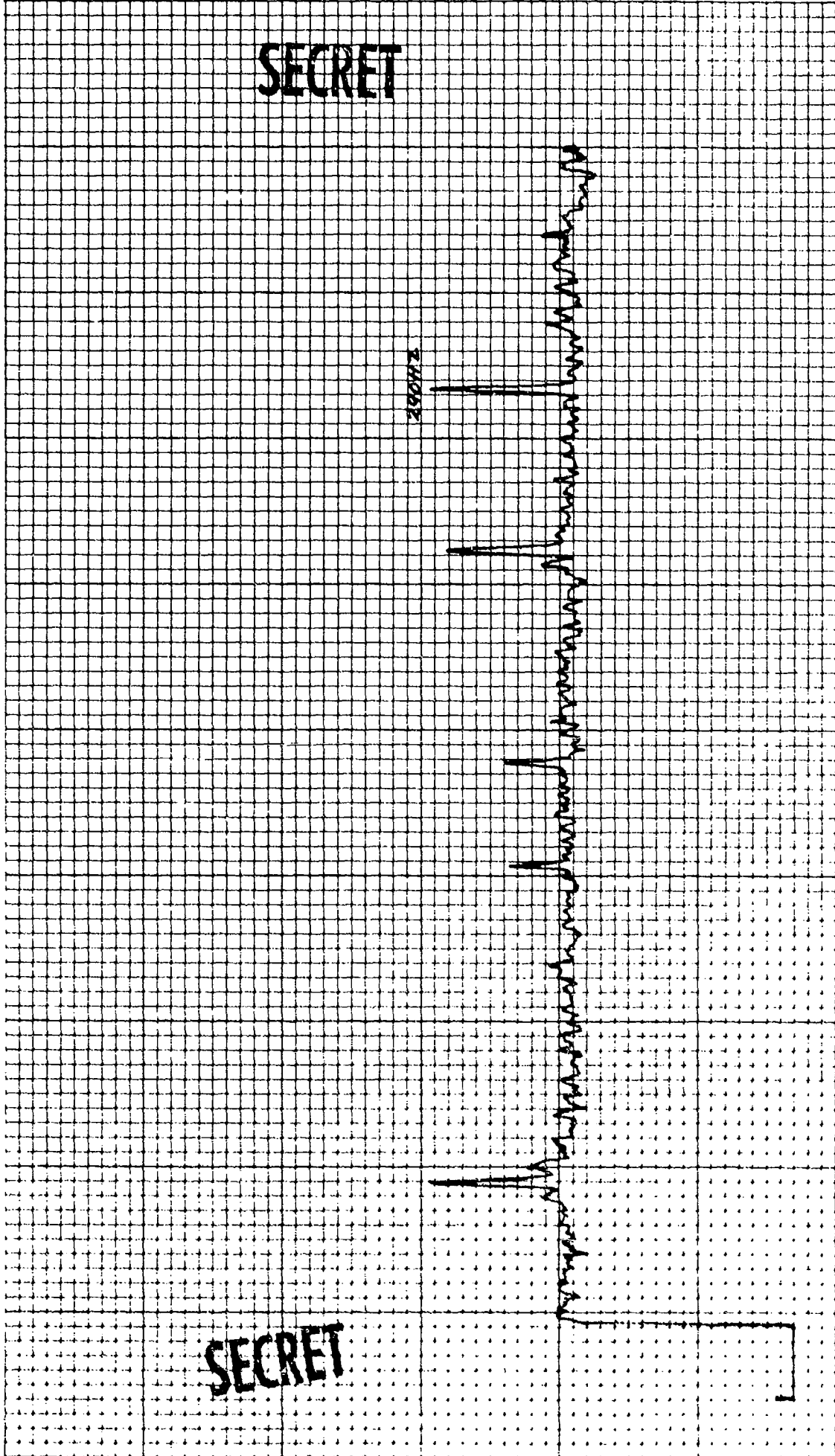


KOE 10 X 10 TO THE INCH 0.7 X 0.9 INCHES
RELAYED & ESSER CD 3404 4 1954

46 0703

CONTROL: 1019 - 51 (DP4) DATE OF ANALYSIS: _____
BEAMFORMED SPECTRUM (ELEMENTS 1-26 & 29-34)
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1819 Z
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ
32 ELEMENTS +36.5 DEG. AZ STEERING

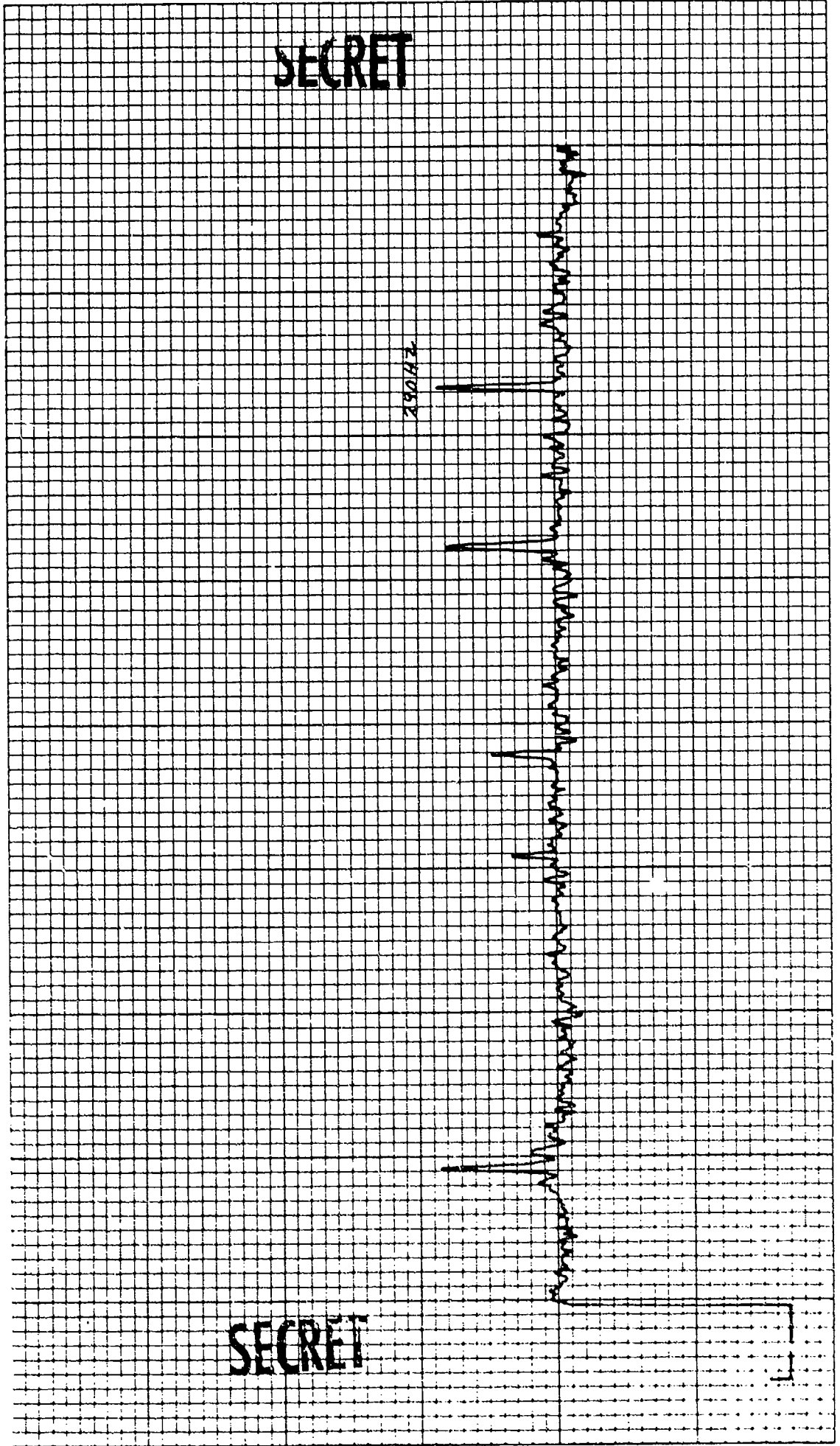
REEL: F15 INDE X 455
INTEGRATION TIME 320 SECS ATTEN: 24 DB
FILTER WTG: HANNING



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

46 0703

CONTROL: 2-7 -1019 (32) DATE OF ANALYSIS: 1-26-77 20-34
BEAMFORMED SPECTRUM (ELEMENTS) REEL: F15 INDE X 1955
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: -24 DB
CENTER FREQ: 270 HZ FILTER WTG: HANNING
32 ELEMENTS +37 DEG. AZ STEERING ANALYSIS BANDWIDTH: 1/10HZ



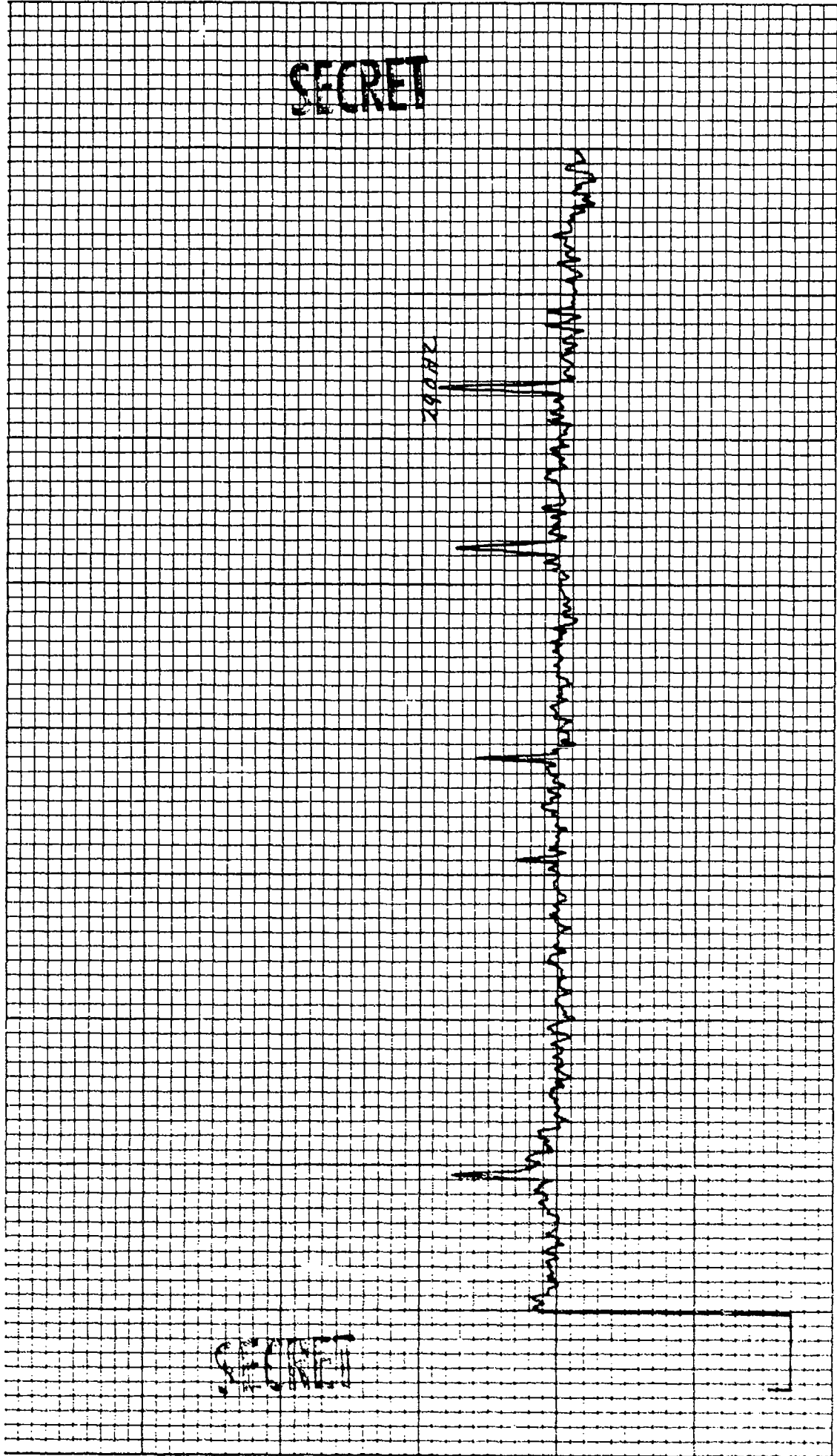
H₀Σ 10 X 10 TO THE INCH: 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2.7 - 1019 (J2) DATE OF ANALYSIS: -- -- --
 BEAMFORMED SPECTRUM(ELEMENTS) 1-26 & 29-34)
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1019 Z
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ
 32 ELEMENTS +38 DEG. AZ STEERING

REEL: F15 INDE X 1955
 INTEGRATION TIME 320 SECS ATTEN: -24 DB
 FILTER WTG: HANNING

17-11



46 0703

KOE 10.7 10 TO TIME INCHES 1/16 INCHES
PER INCH 1/8 SECS 1/2 INCHES 1/16

REEL: F/S INDE X 1955

INTEGRATION TIME 320 SECS

FILTER WIG: HANNING

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -1019Z

ANALYSIS BANDWIDTH: 1/10HZ

+40 DEG. AZ STEERING

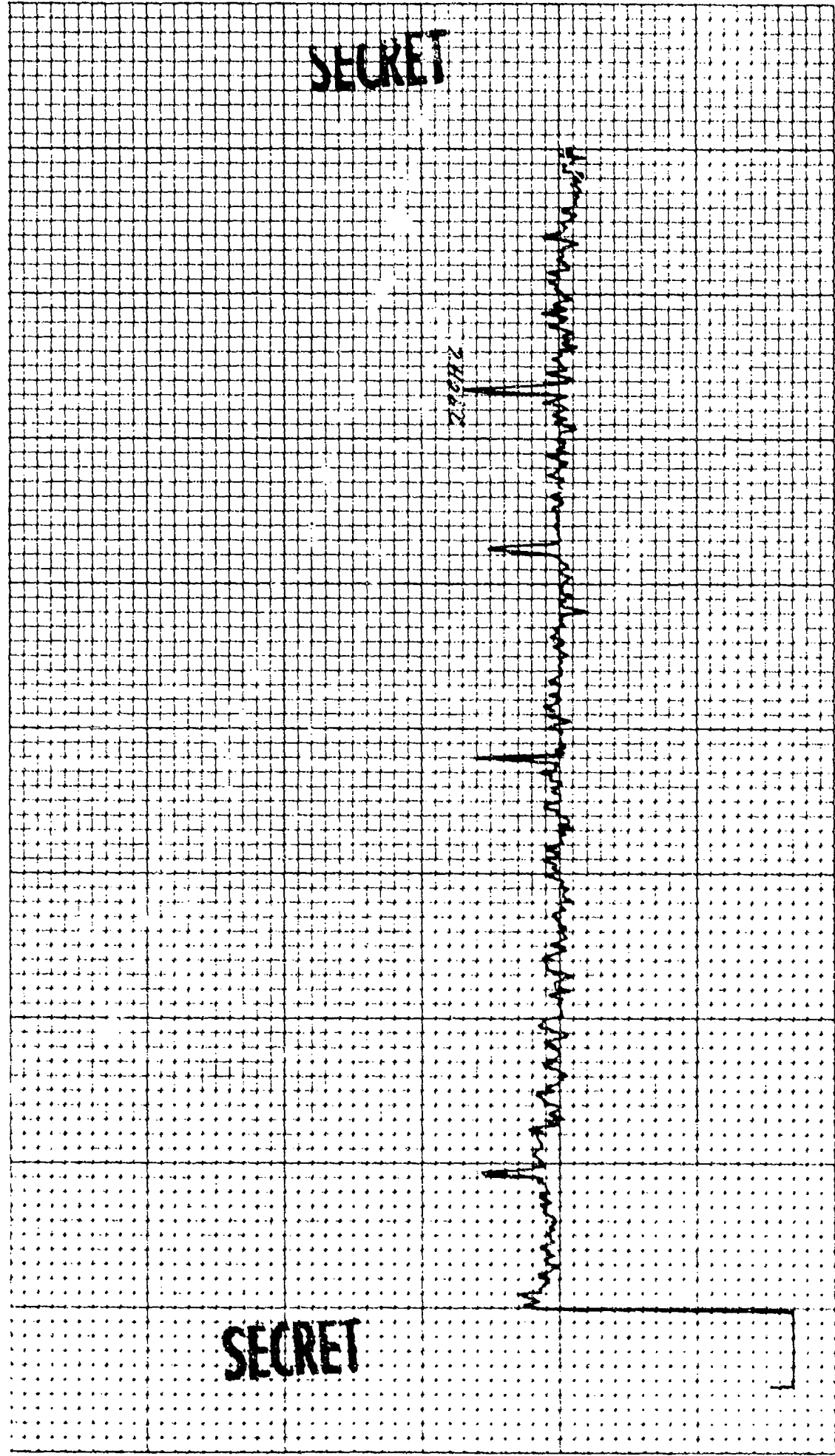
CONTROL: 2-7 -1019 (JD)

BEAMFORMED SPECTRUM (ELEMENTS)

EXERCISE: BEARING STAYE

CENTER FREQ: 270 HZ

JD ELEMENTS

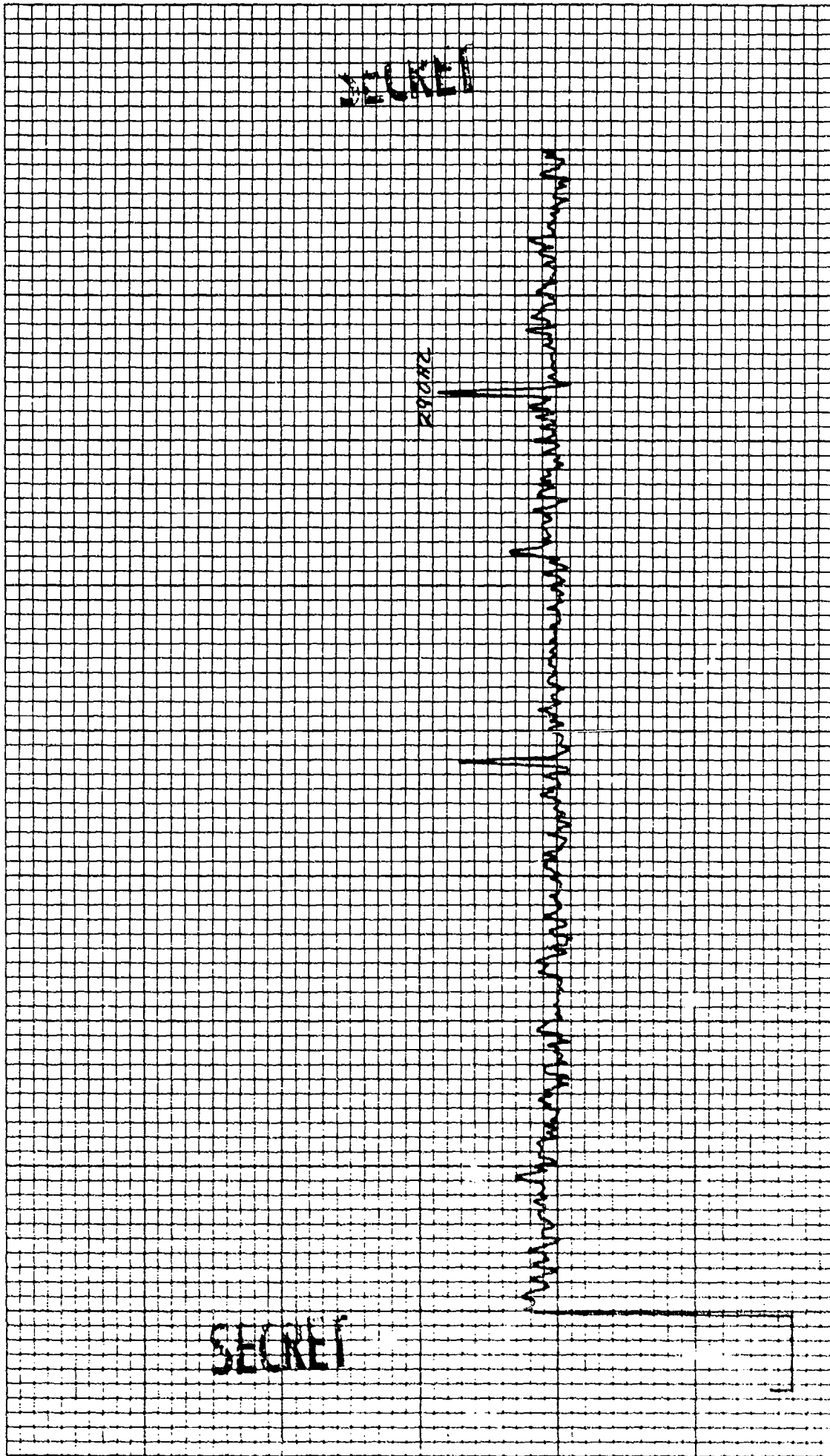


KSE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2.7 - 1019 (32) DATE OF ANALYSIS: 1-26-77 1019 Z
BEAMFORMED SPECTRUM (ELEMENTS) 4 28-34
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ
CENTER FREQ: 270 HZ +42 DEG. AZ STEERING

REEL: F/S INDE X 1955
INTEGRATION TIME 320 SECS ATTN: -2YDB
FILTER HANNING WTG: HANNING



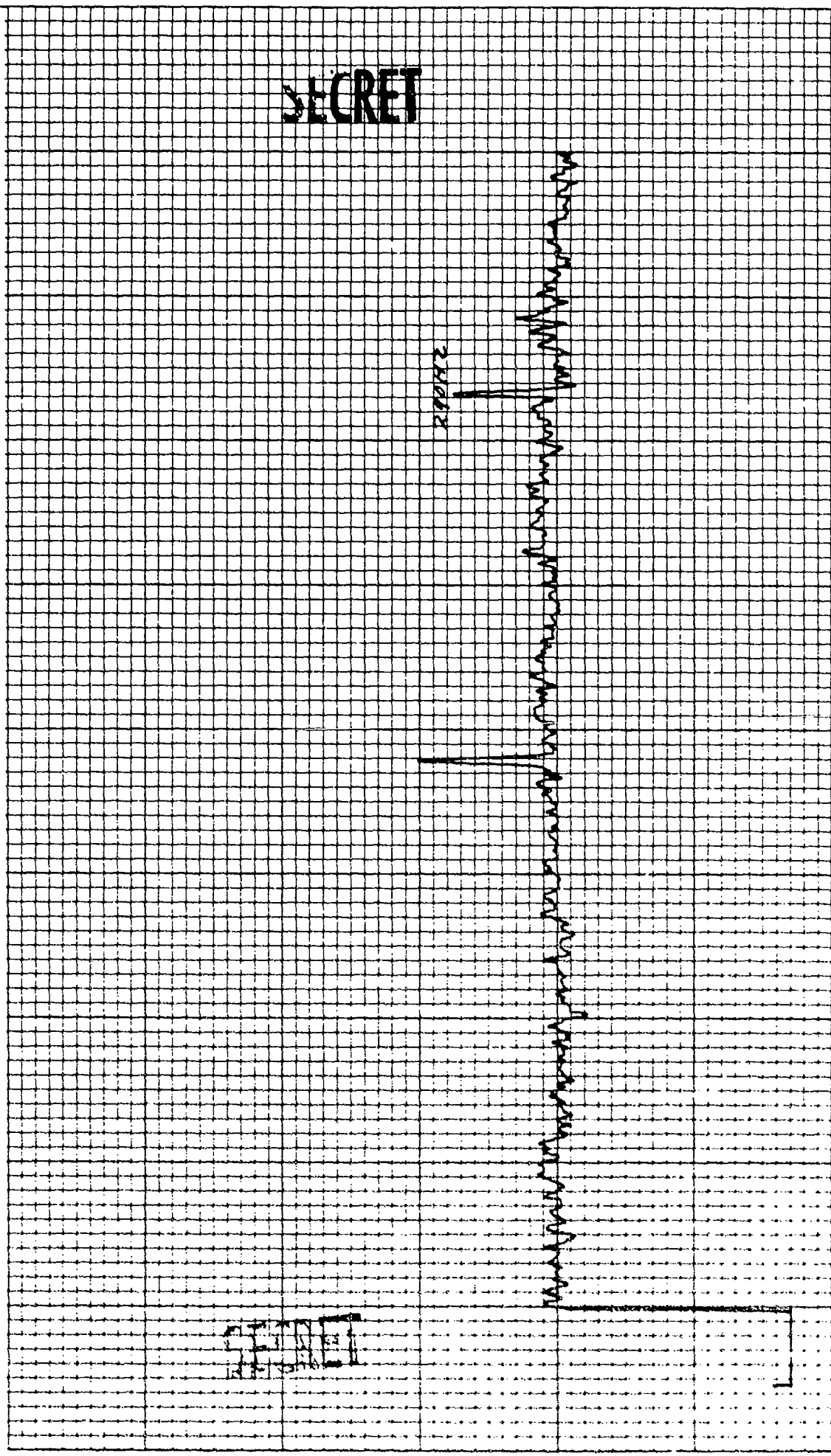
K.E. 10 X 10 TO THE INCH .7 X 10 INCHES
HEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2-7 - 1019 (32)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-77
DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1710HZ
+44 DEG. AZ STEERING

REEL: F15 INDE X1955
INTEGRATION TIME 320 SECS
ATTEN: -24 DB
FILTER WTG: HANNING



CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 4

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 51

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-42.4</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-32.4</u>	
BEAMFORMER GAIN	<u>+30</u>	<u>-2.4</u>	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	<u>-2.2</u>	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-63.6</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-53.6</u>	
BEAMFORMER GAIN	<u>+30</u>	<u>-23.6</u>	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-2.4</u>	
SIGNAL LEVEL FOR SNR	<u>-23.6</u>	<u>21.2</u>	
PROCESSOR CORRECTION	<u>-4.0</u>	<u>17.2</u>	
MRA CORRECTION	<u>+ .2</u>	<u>17.4</u>	SNR 70 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	<u>9.2</u>	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 4

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 51

SIGNAL LEVEL

MOPS-32 SIGNAL LEVEL INDICATED		<u>-51.9</u>	
MOPS-32 CAL. CORRECTION	<u>+10</u>	-41.9	
BEMFORMER GAIN	<u>+30</u>	-11.9	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	-11.1	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MOPS-32 SIGNAL LEVEL INDICATED		<u>-71.4</u>	
MOPS-32 CAL. CORRECTION	<u>+10</u>	-61.4	
BEMFORMER GAIN	<u>+30</u>	-31.4	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-11.9</u>	
SIGNAL LEVEL FOR SNR	<u>-31.4</u>	19.5	
PROCESSOR CORRECTION	<u>-4.0</u>	15.5	
MRA CORRECTION	<u>+ .8</u>	16.3	SNR 1/2 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	8.1	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

DATA POINT 4

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-34.4</u>	<u>-39.6</u>	<u> </u>
MRA SIGNAL LEVEL	<u>- 2.2</u>	<u>-11.1</u>	<u> </u>
ARRAY SIGNAL GAIN	<u>32.2</u>	<u>28.5</u>	<u> </u>
20 LOG <u>51</u>	<u>34.1</u>	<u>34.1</u>	<u> </u>
# of elements			
DIFFERENCE	<u>-1.9</u>	<u>-5.6</u>	<u> </u>

ARRAY GAIN

MRA SNR	<u>17.6</u>	<u>16.3</u>	<u> </u>
MEAN OMNI SNR	<u>8.3</u>	<u>6.5</u>	<u> </u>
ARRAY GAIN	<u>9.3</u>	<u>9.8</u>	<u> </u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>14.8</u>	<u>17.1</u>	<u> </u>
DIFFERENCE	<u>- 5.5</u>	<u>- 7.3</u>	<u> </u>

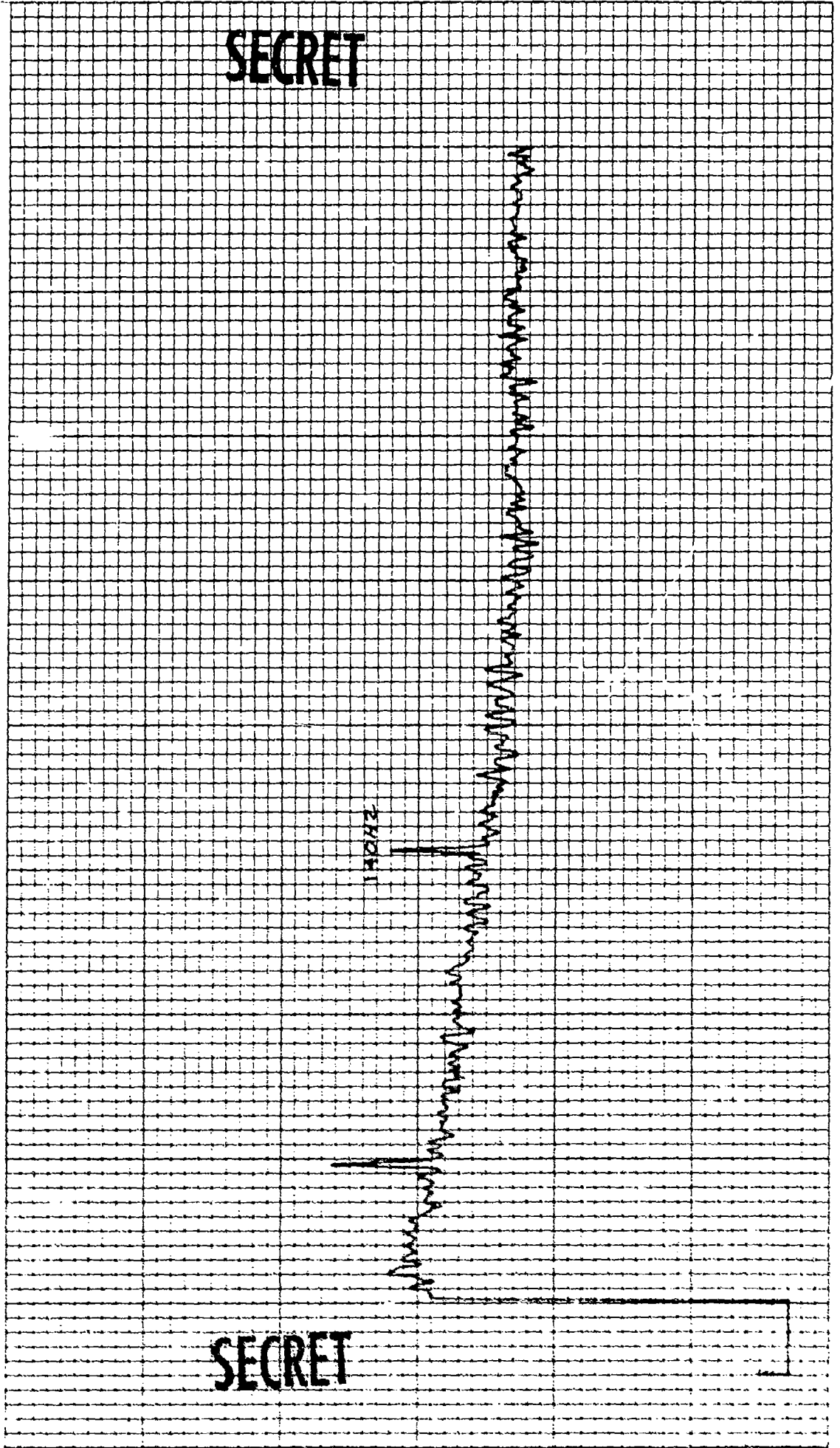
CONFIDENTIAL

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

46 0703

CONTROL: Z-7 - 1017 (S1) DATE OF ANALYSIS: ---
BEAMFORMED SPECTRUM(ELEMENTS) 1-26889-34
EXERCISE: BEARING STAKE DATE/TIME: 3-7-77 - 1019 Z
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
S1 ELEMENTS 122 DEG. AZ STEERING

REEL: F15 INDE X 1955
INTEGRATION TIME 320 SECS ATTN: -30DB
FILTER WTC: HANNING

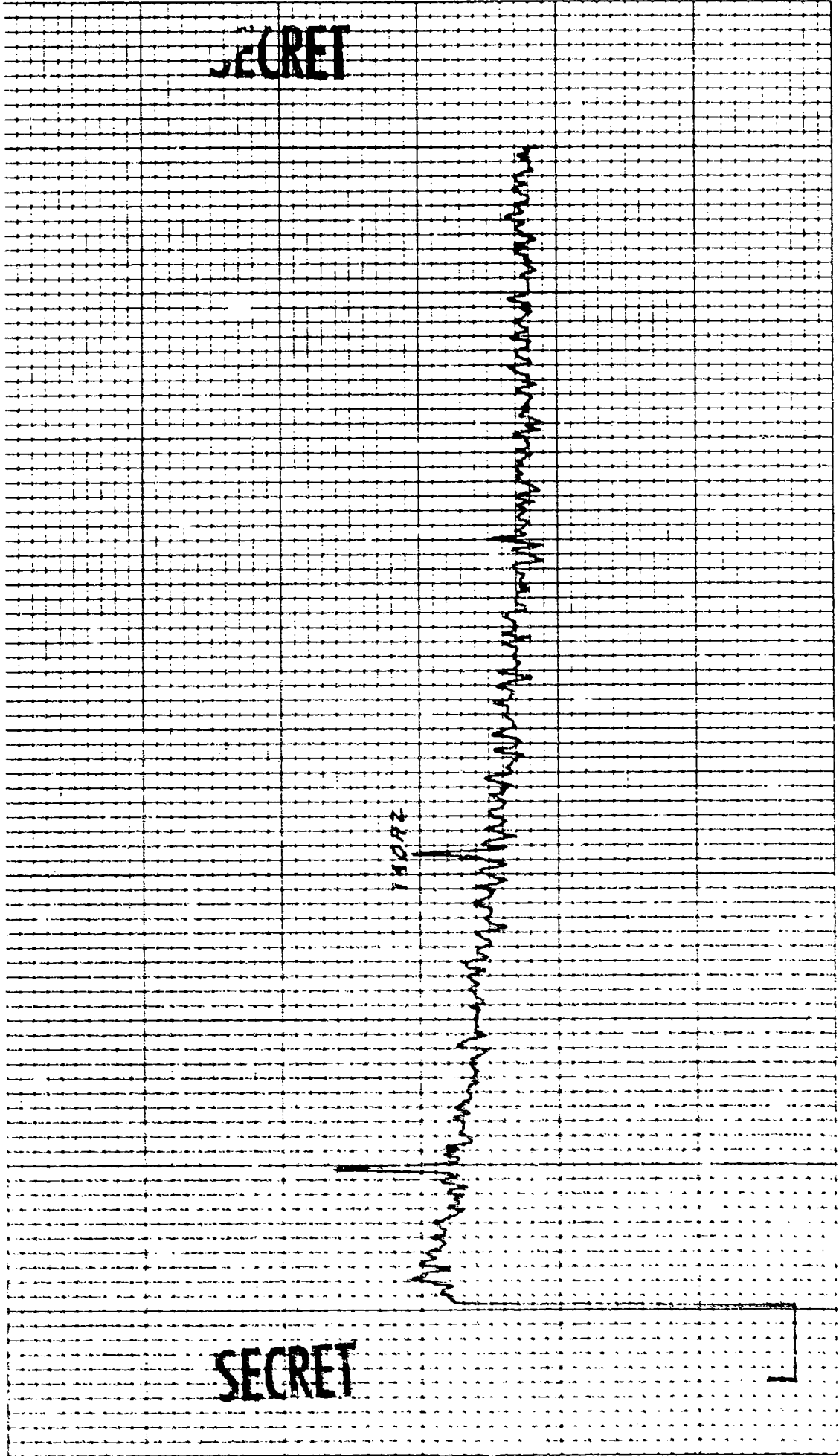


46 0703

K/E 10 X 10 TO THE INCHES X 10 INCHES
REUFEL & ESSER CO. WASHINGTON

CONTROL: 2-7 -1019 (51) DATE OF ANALYSIS: ---
 BEAMFORMED SPECTRUM(ELEMENTS) 1-26-89-53
 EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTEN: -30DB
 CENTER FREQ: 150 HZ FILTER WTC: HANNING
 51 ELEMENTS +24 DEG. AZ STEERING
 ANALYSIS BANDWIDTH: 1/10HZ

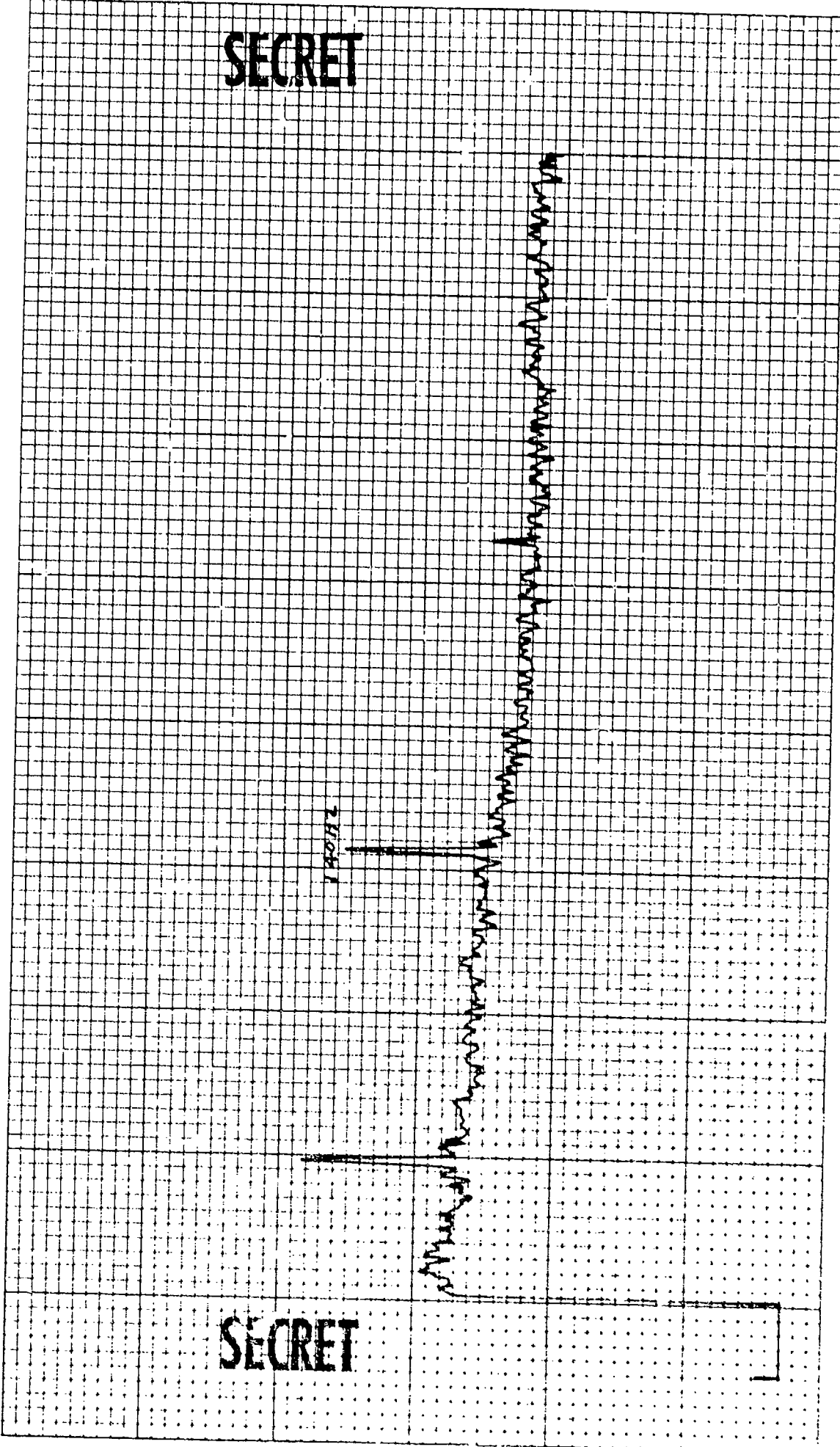
REEL: F15 INDE X1855



CONTROL: 2-7 - 1019 (51)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
51 ELEMENTS

DATE OF ANALYSIS: 1-26 8 29-83
DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
206 DEG. AZ STEERING

REEL: F15 INDE X1855
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING



SECRET

SECRET

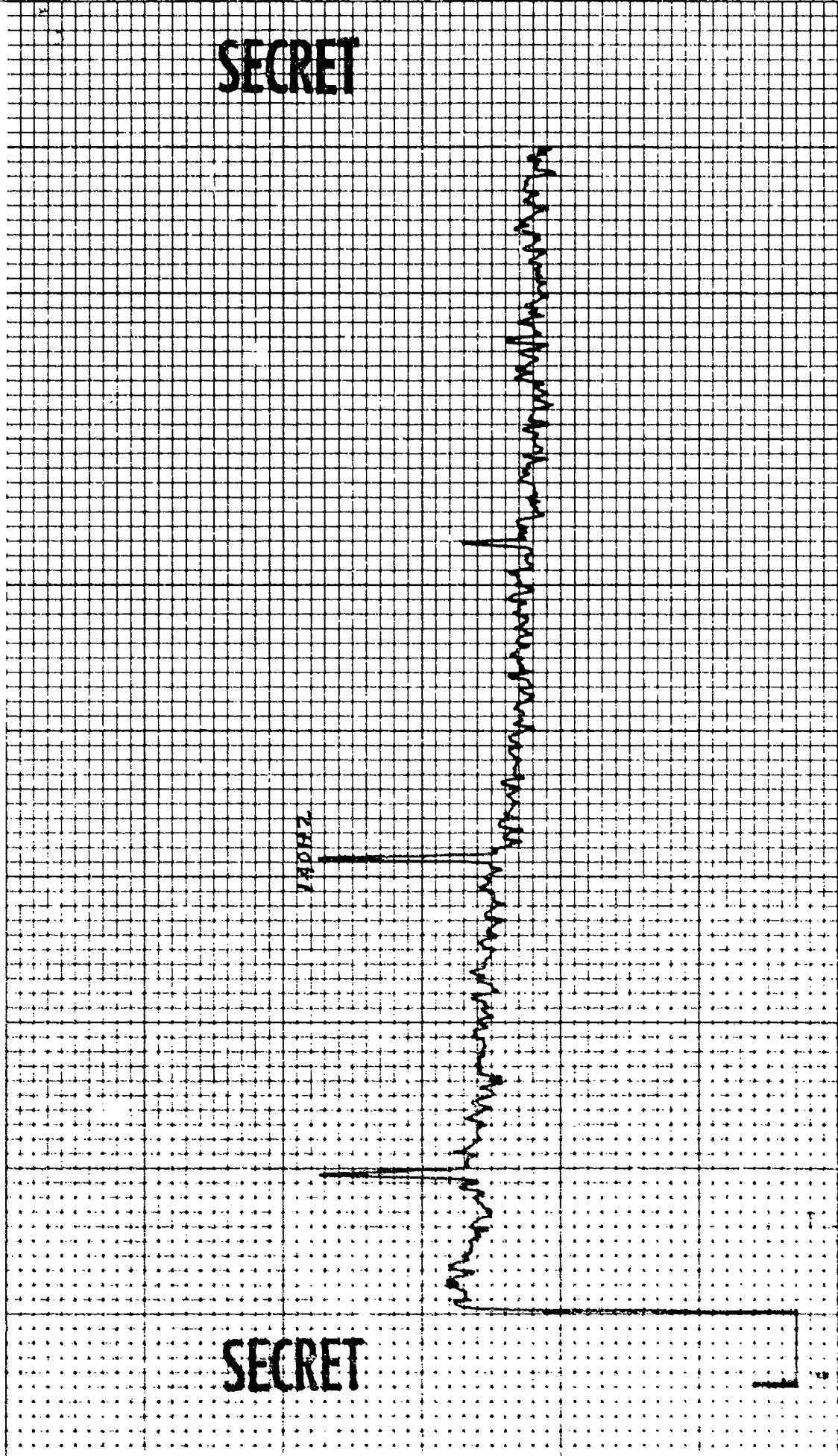
KOE 10 X 10 TO THE INCH 0.7 X 10 INCHES
MELFFEL & KESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2.7 - 1019 (51)
BEAMFORMED SPECTRUM (ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
51 ELEMENTS

DATE OF ANALYSIS: 1-26-53
DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1710 HZ
+20 DEG. AZ STEERING

REEL: F15 INDE X/1955
INTEGRATION TIME 320 SECS ATTN: -70DB
FILTER WTG: HANNING



SECRET

SECRET

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

46 0703

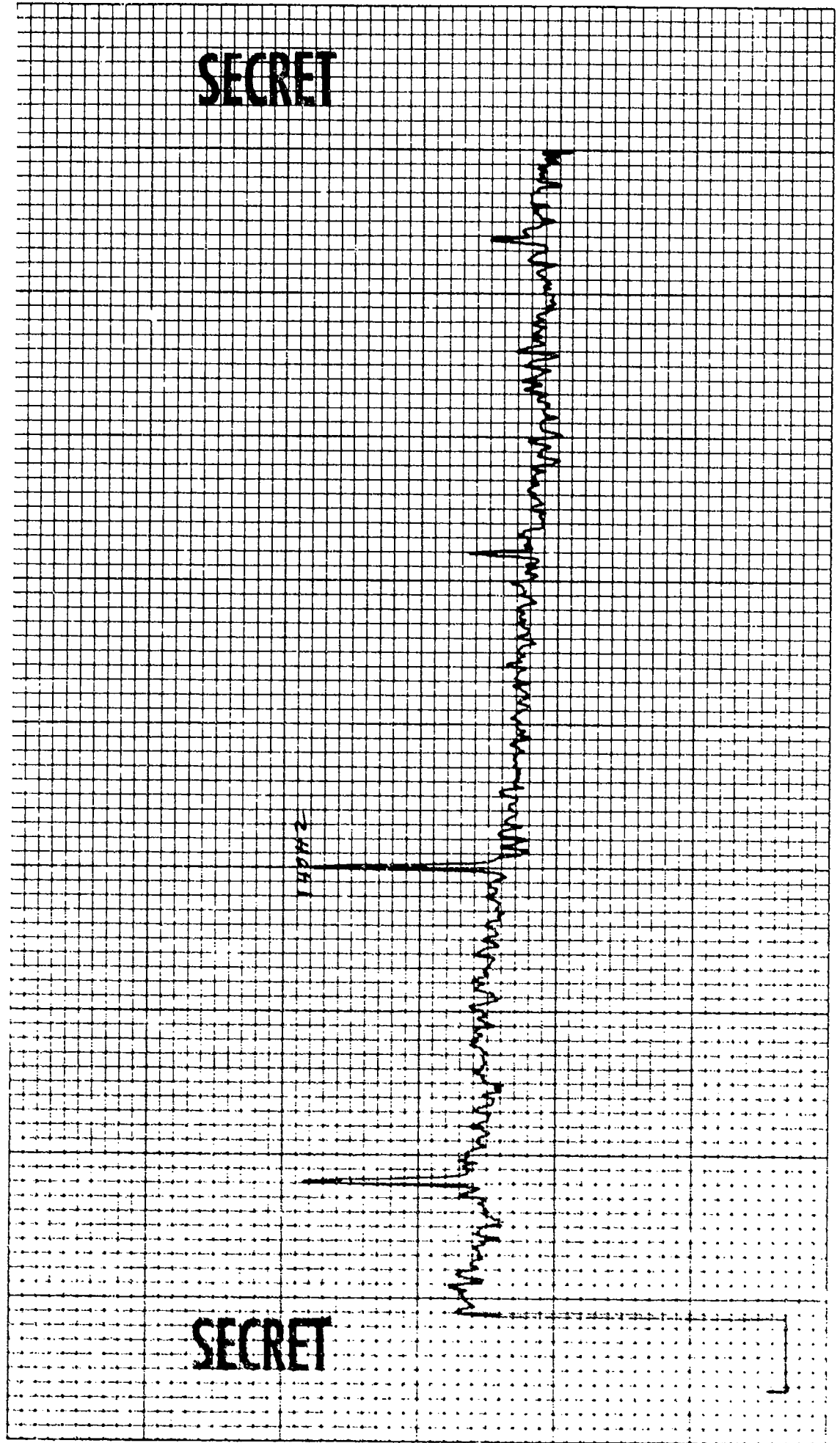
CONTROL: 2-7 - 1019 (51)
BEAMFORMED SPECTRUM ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
51 ELEMENTS

DATE OF ANALYSIS: 1-26-53
DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
+29 DEG. AZ STEERING

REEL: F15 INDE X/955
INTEGRATION TIME 320 SECS ATTEN: -30 DB
FILTER WTC: HANNING

SECRET

SECRET

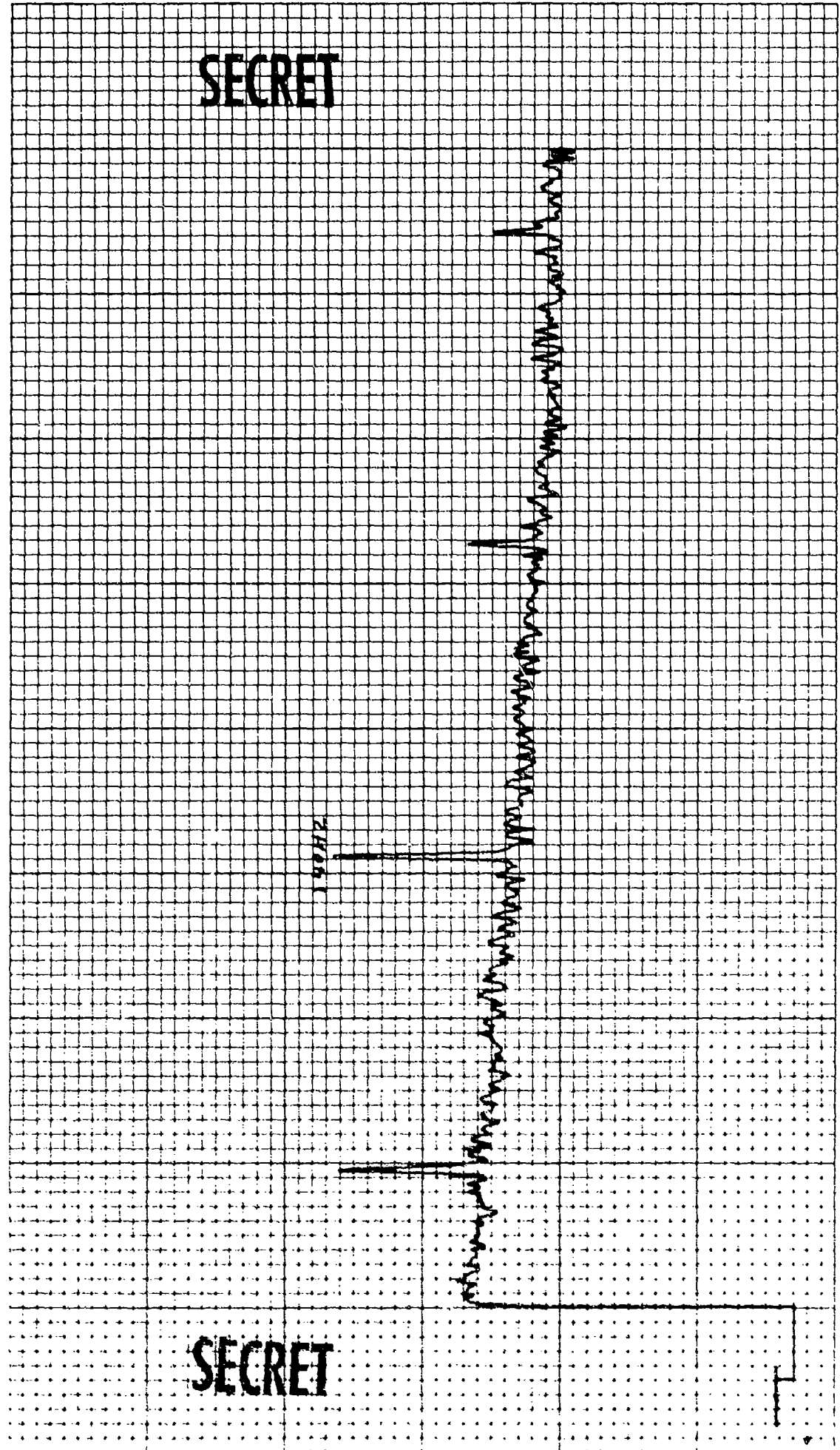


015-51

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

46 0703

CONTROL: 2-7 -1019 (51)
BEAMFORMED SPECTRUM(ELEMENTS) 1-26 4 29-53
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
51 ELEMENTS
DATE OF ANALYSIS: - - - -
DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10 HZ
130 DEG. AZ STEERING
REEL: F15
INDE X/955
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTER WTG: HANNING



SECRET

SECRET

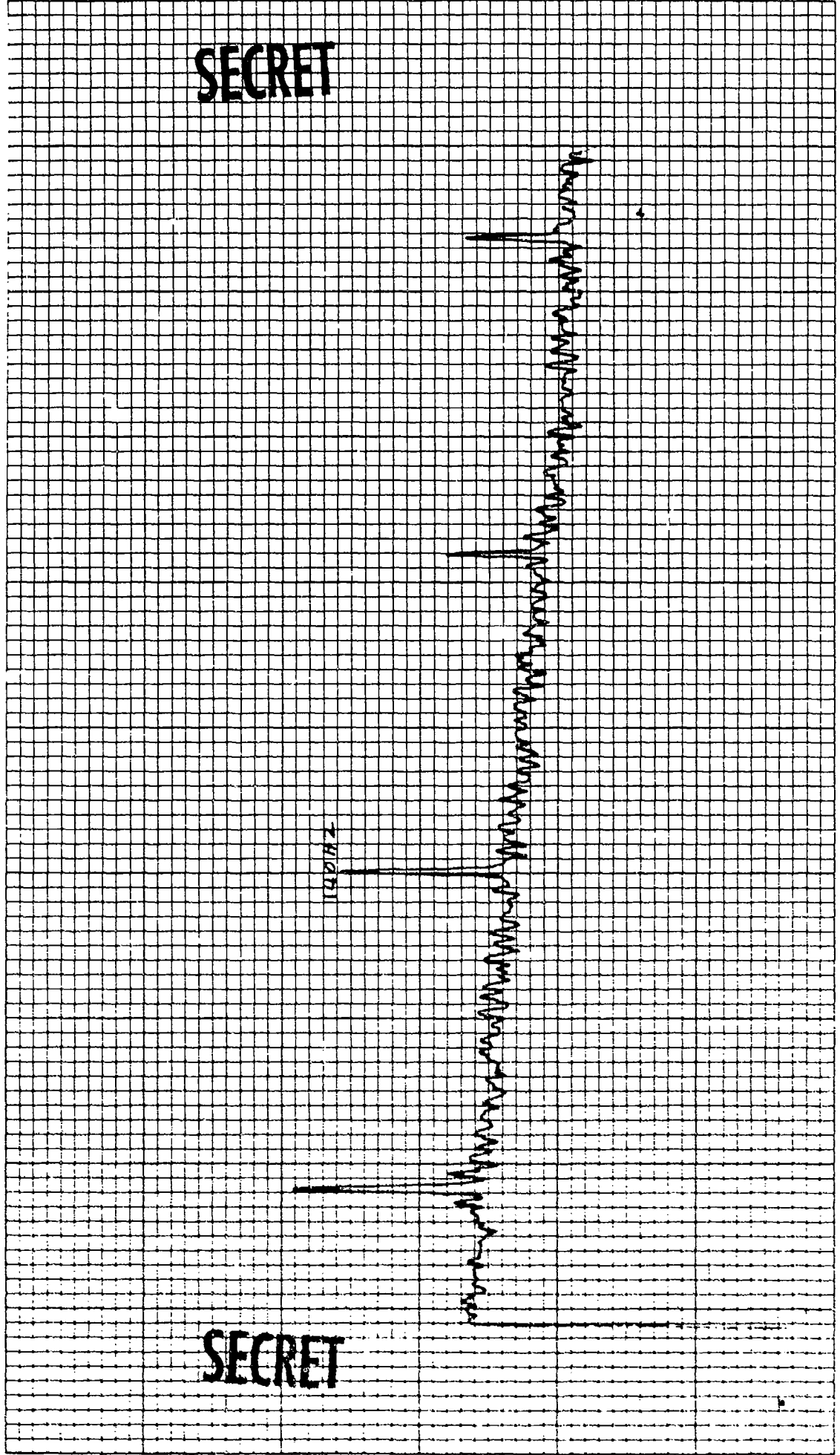
KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

4 27
518 100 111

CONTROL: 2-7 - 1019 (S1) DATE OF ANALYSIS: - - - -
BEAMFORMED SPECTRUM (ELEMENTS) 1-26 & 28-53
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: -30DB
CENTER FREQ: 150 HZ FILTER WTG: HANNING
5/ ELEMENTS +31 DEG. AZ STEERING

REEL: F15 INDE X 1955

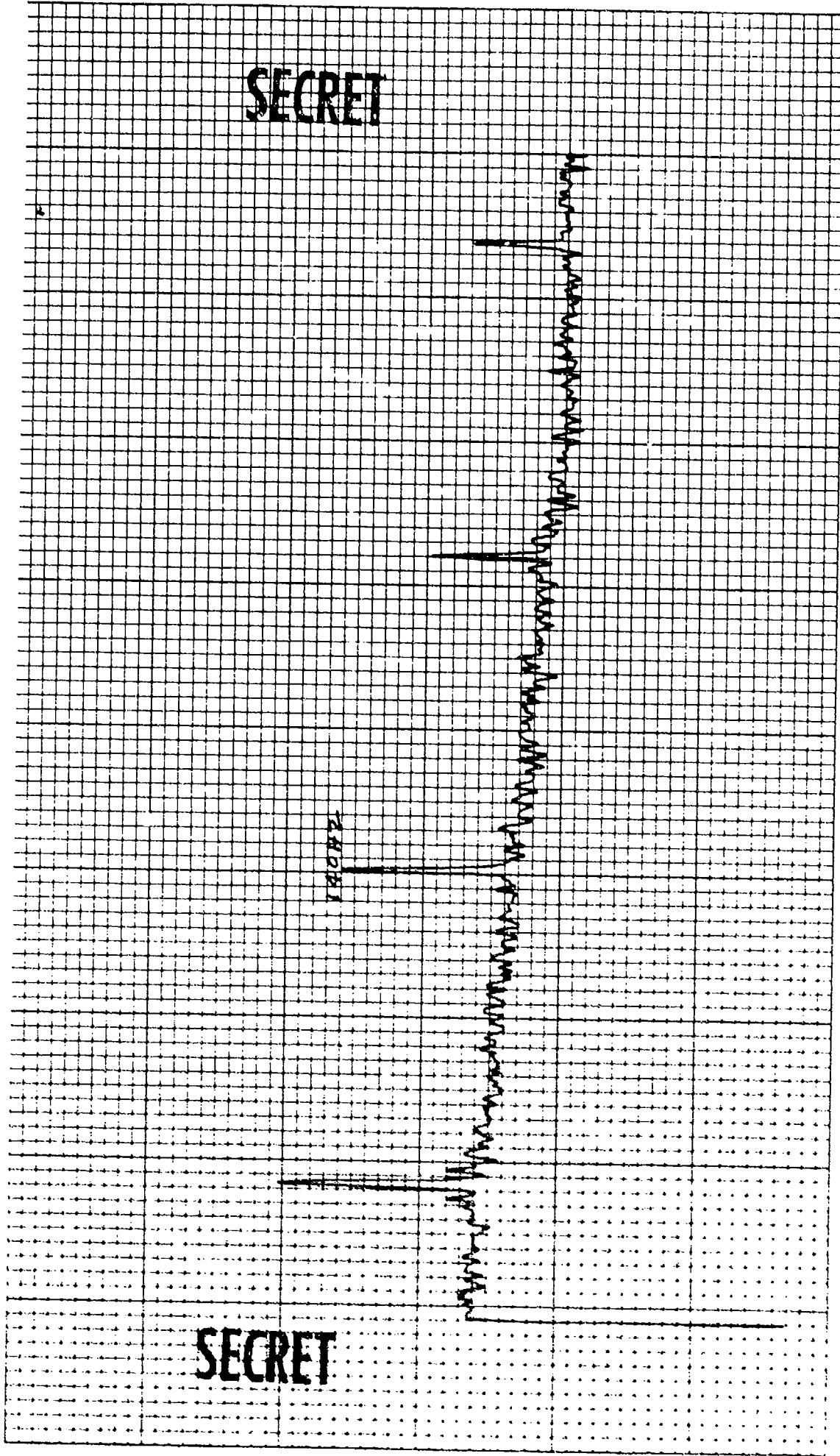


K+E 10 X 10 TO THE INCH 0.7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

DPV → 31
146
SIE

CONTROL: 2-7 -1019 (51)
BEAMFORMED SPECTRUM(ELEMENTS) 1-26428-53
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
61 ELEMENTS
DATE OF ANALYSIS: ---
DATE/TIME: 2-7-77 -1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
+31.5 DEG. AZ STEERING
REEL: F/S
INDE X/955
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING



SECRET

SECRET

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

46 0703

CONTROL: 2-7 - 1019 (51)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
51 ELEMENTS

DATE OF ANALYSIS: - - - - -

1-26-79-53

DATE/TIME: 2-7-77 - 1019 Z

ANALYSIS BANDWIDTH: 1/10HZ

732 DEG. AZ STEERING

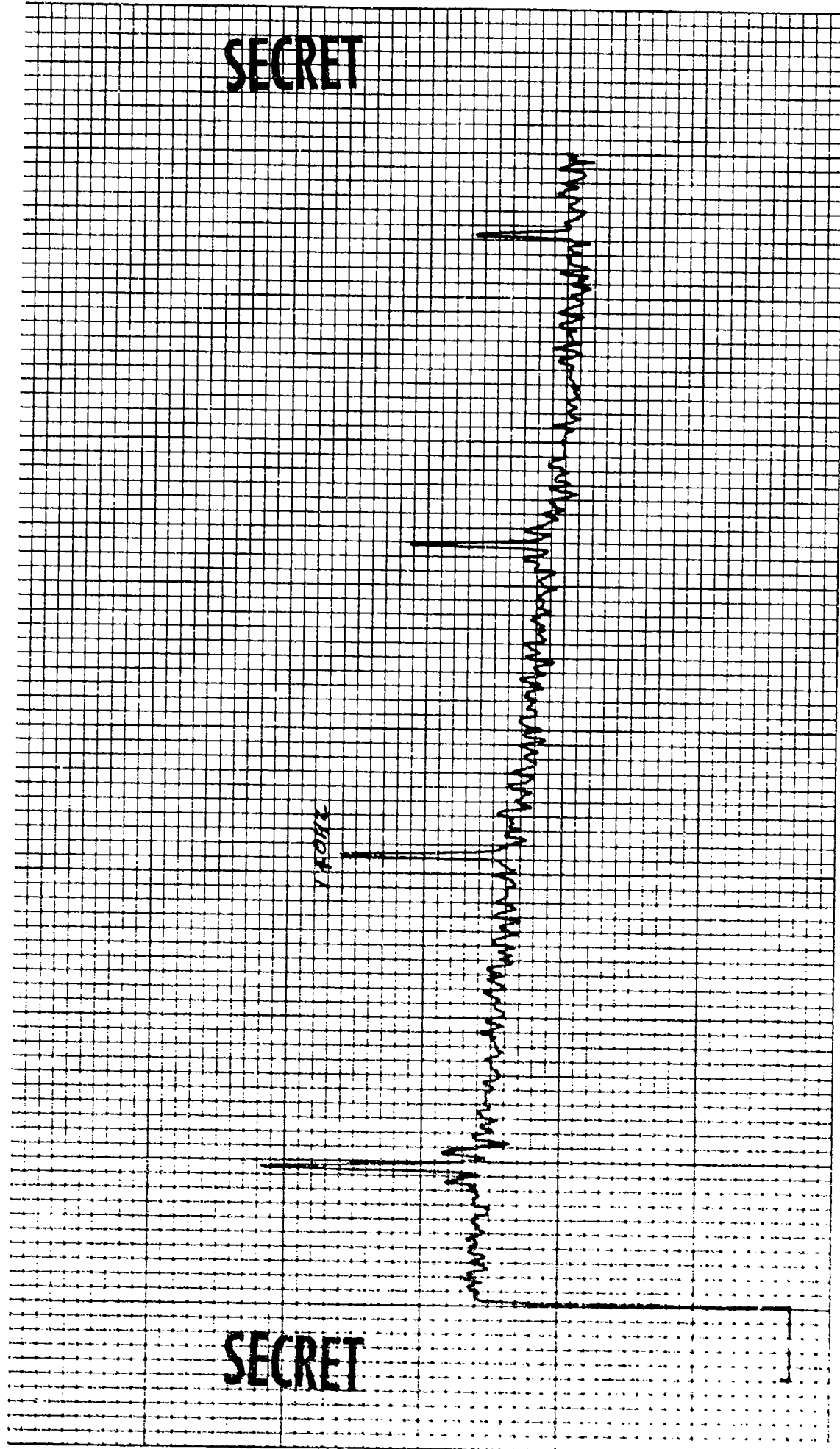
REEL: F15

INDE X1955

INTEGRATION TIME 320 SECS

FILTER

ATTEN: -30 DB
WTG: HANNING

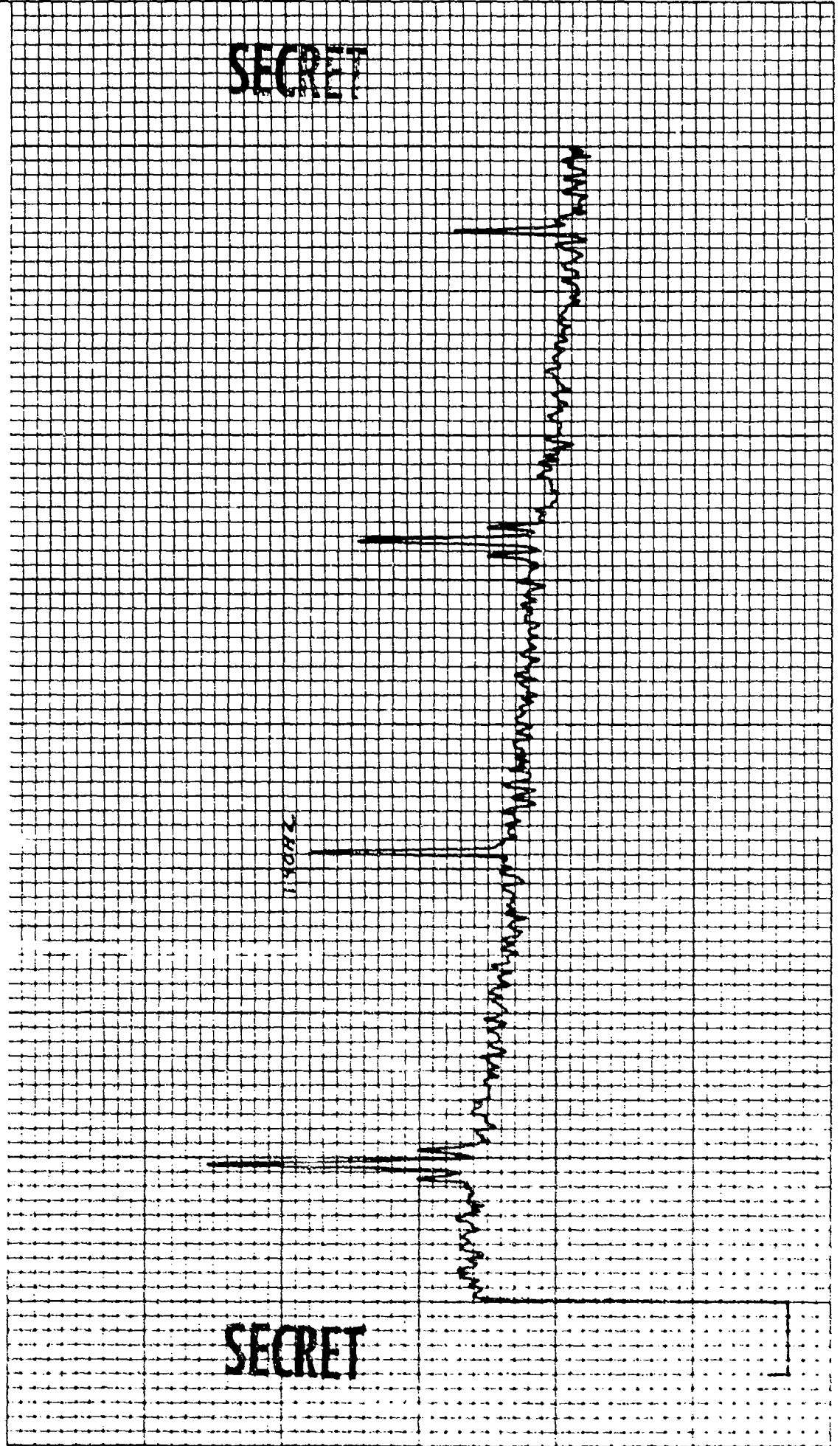


K-E 18 X 10 TO THE INCH .7 X 10 INCHES
KUPTEL & LESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2-7 - 1019 (51) DATE OF ANALYSIS: - - - -
BEAMFORMED SPECTRUM (ELEMENTS 1 - 26 & 28-53)
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1019 Z
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ
5/ ELEMENTS +3V DEG. AZ STEERING

REEL: F15 INDE X1955
INTEGRATION TIME 320 SECS ATTN: -30 DB
FILTER WTG: HANNING

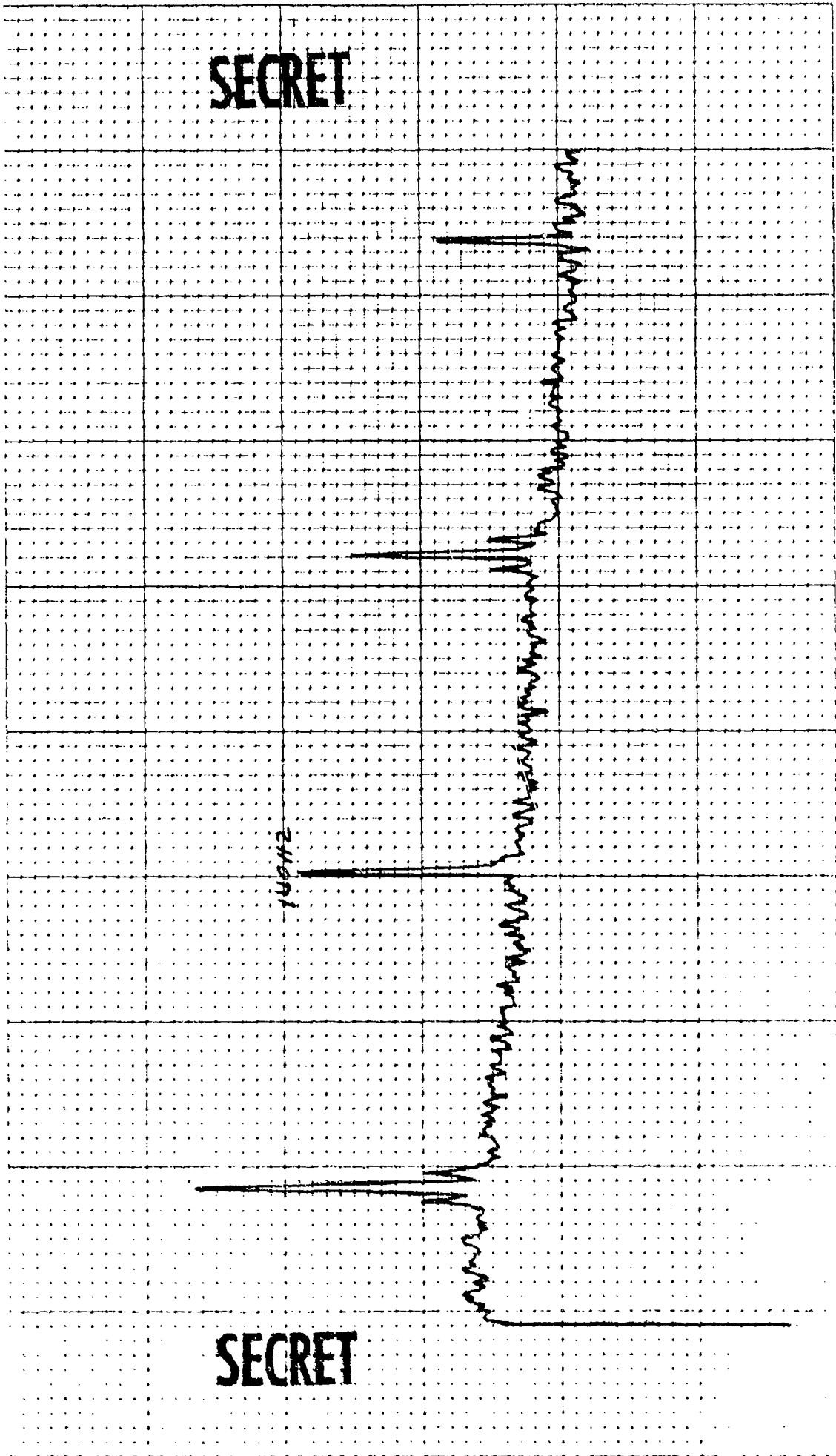


KOE BEARING TO THE INCH. 46 0703

46 0703

149
1.5 = 23

CONTROL: 2.7 - 1019 (51) DATE OF ANALYSIS: REEL: F/5 INDE X/955
 BEAMFORMED SPECTRUM (ELEMENTS) 1-26 & 29-53 INTEGRATION TIME 320 SECS ATTEN: 30 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WIG: HANNING
 CENTER FREQ: 150 HZ ±35 DEG. AZ STEERING



MSE 10 X 10 TO THE INCHES 100 INCHES

46 0703

3 P 4

146 E
S 1 E # 75

CONTROL: 2-7 -1019 (51) DATE OF ANALYSIS: - - - -

BEAMFORMED SPECTRUM(ELEMENTS 1-26 & 28-53)

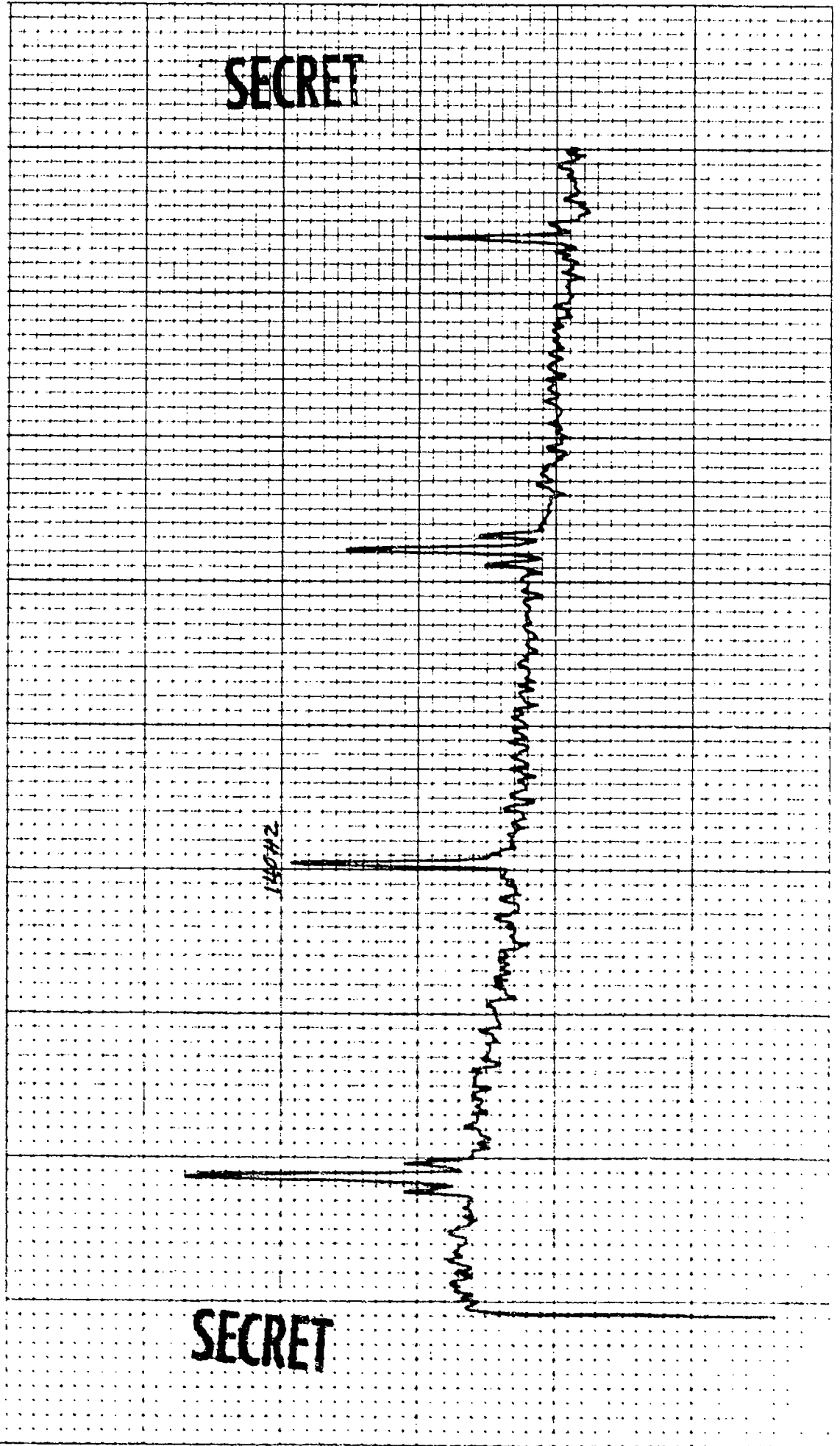
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 -1019 Z

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

51 ELEMENTS 435.5 DEG. AZ STEERING

REEL: F5/ INTEGRATION TIME 320 SECS ATEN: ~20DB

INDE X1955 FILTER WTG: HANNING



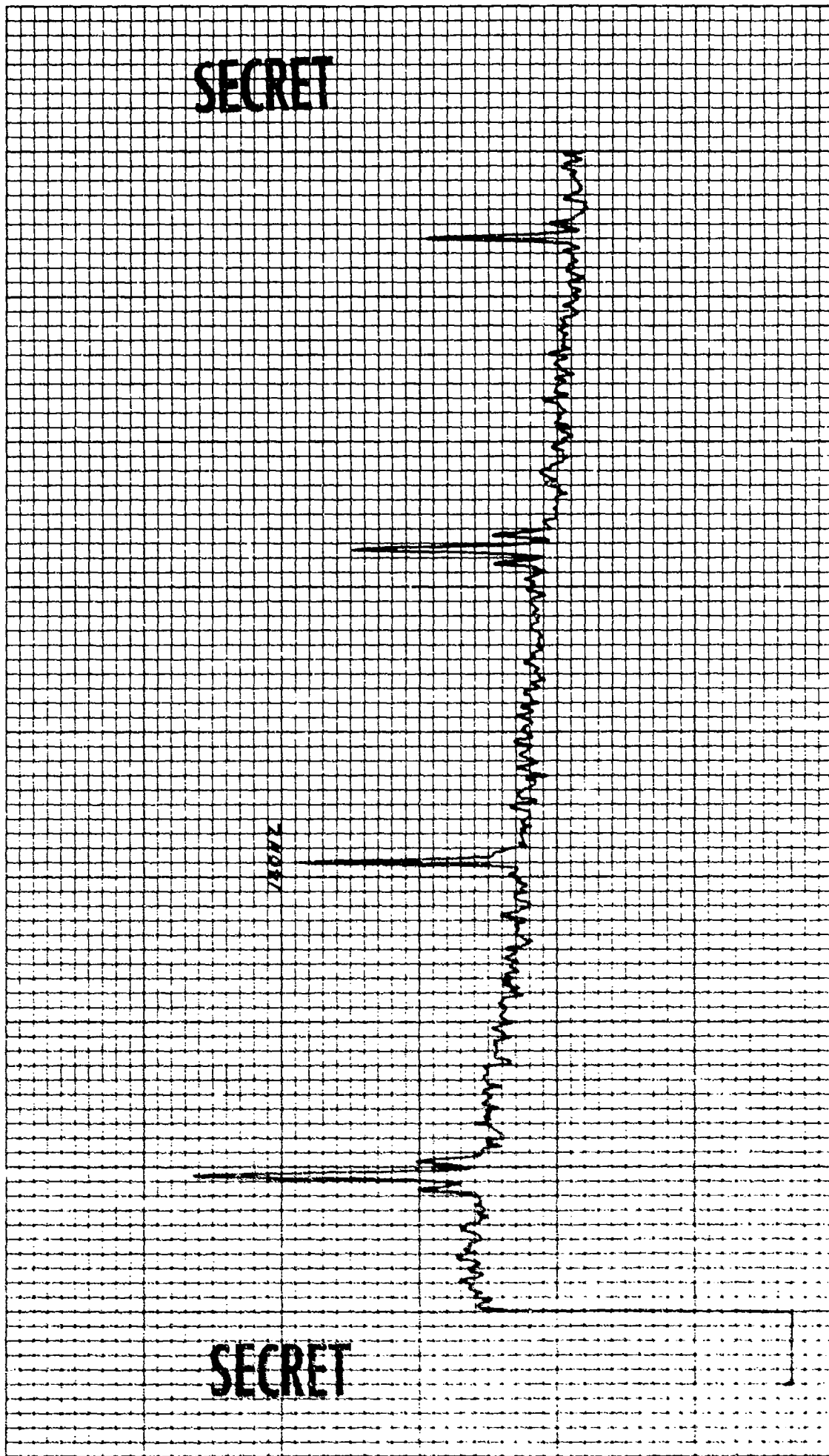
SECRET

SECRET

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

46 0703

CONTROL: 1019 - 51 (DPY) DATE OF ANALYSIS: _____ REEL: F/5 INDE X/955
BEAMFORMED SPECTRUM (ELEMENTS) / - 26 & 29-53)
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1019 Z INTEGRATION TIME 320 SECS ATTEN: 30 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
51 ELEMENTS +36 DEG. AZ STEERING

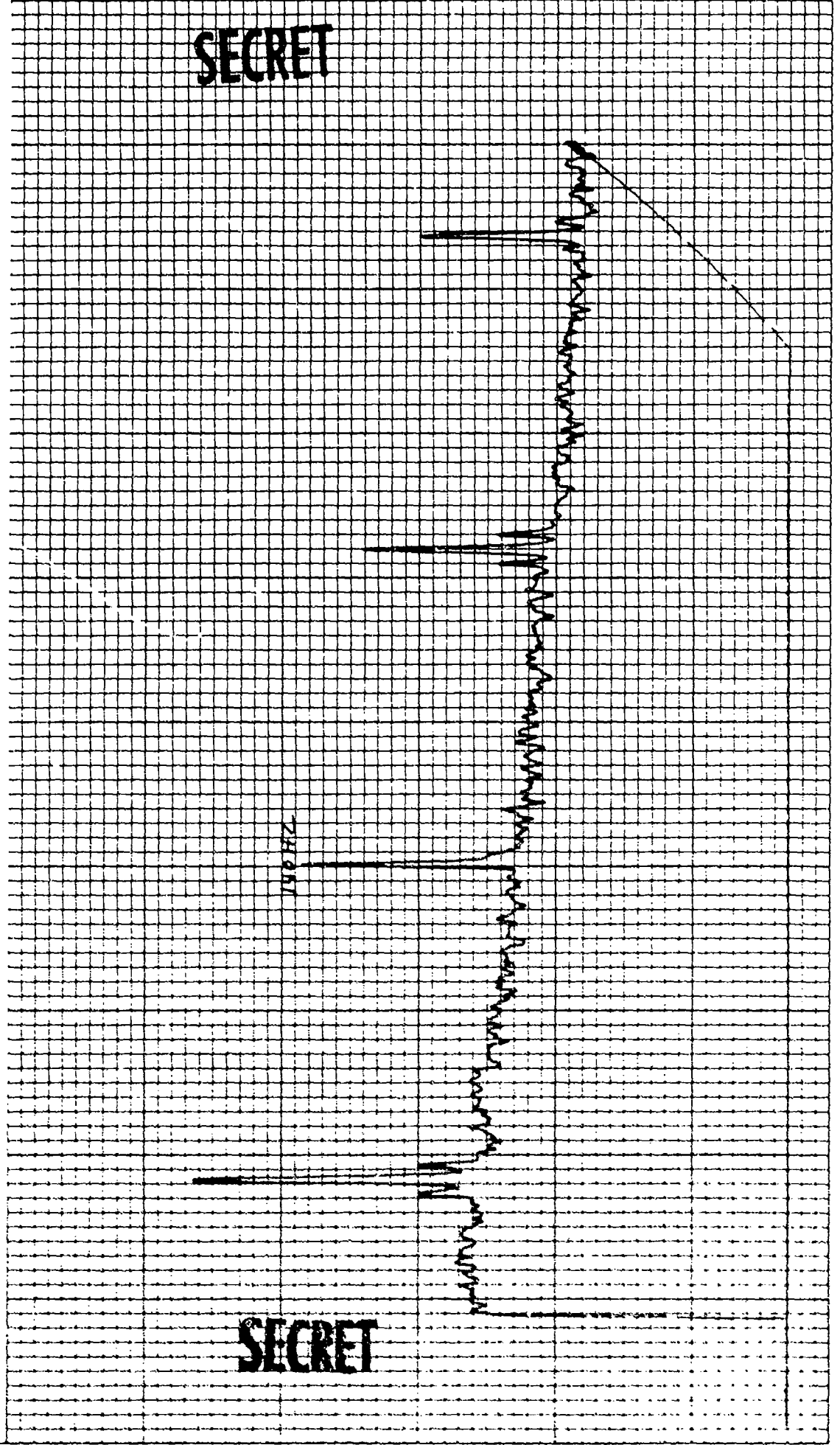


KSE 10 X 10 TO THE INCH .7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

24
4
148 51E

CONTROL: 2-7 - 1019 (S1) DATE OF ANALYSIS: REEL: F15 INDE X1955
BEAMFORMED SPECTRUM(ELEMENTS) 1-26 & 28-53 INTEGRATION TIME 320 SECS ATTEN: -20 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 150 HZ +37 DEG. AZ STEERING



KOE 10 X 10 TO THE INCH 2 X 10 INCHES
NEUFEL & ESSER CO. WASHINGTON, D.C.

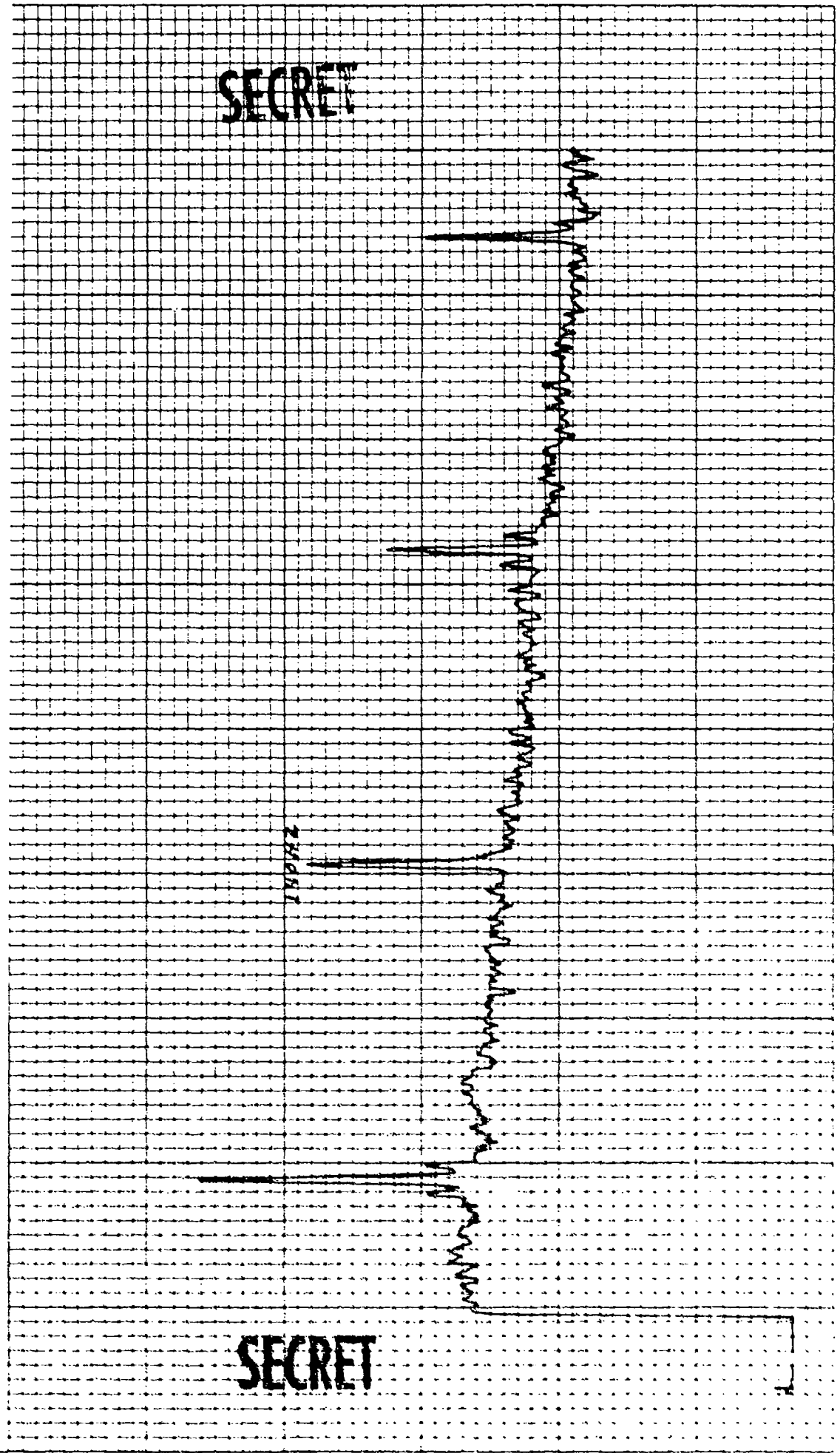
46 0703

CONTROL: 2.7 - 1019 (51)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
51 ELEMENTS

DATE OF ANALYSIS: 1-26-77
DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10 HZ
730 DEG. AZ STEERING

REEL: F/S
INDE X/1955

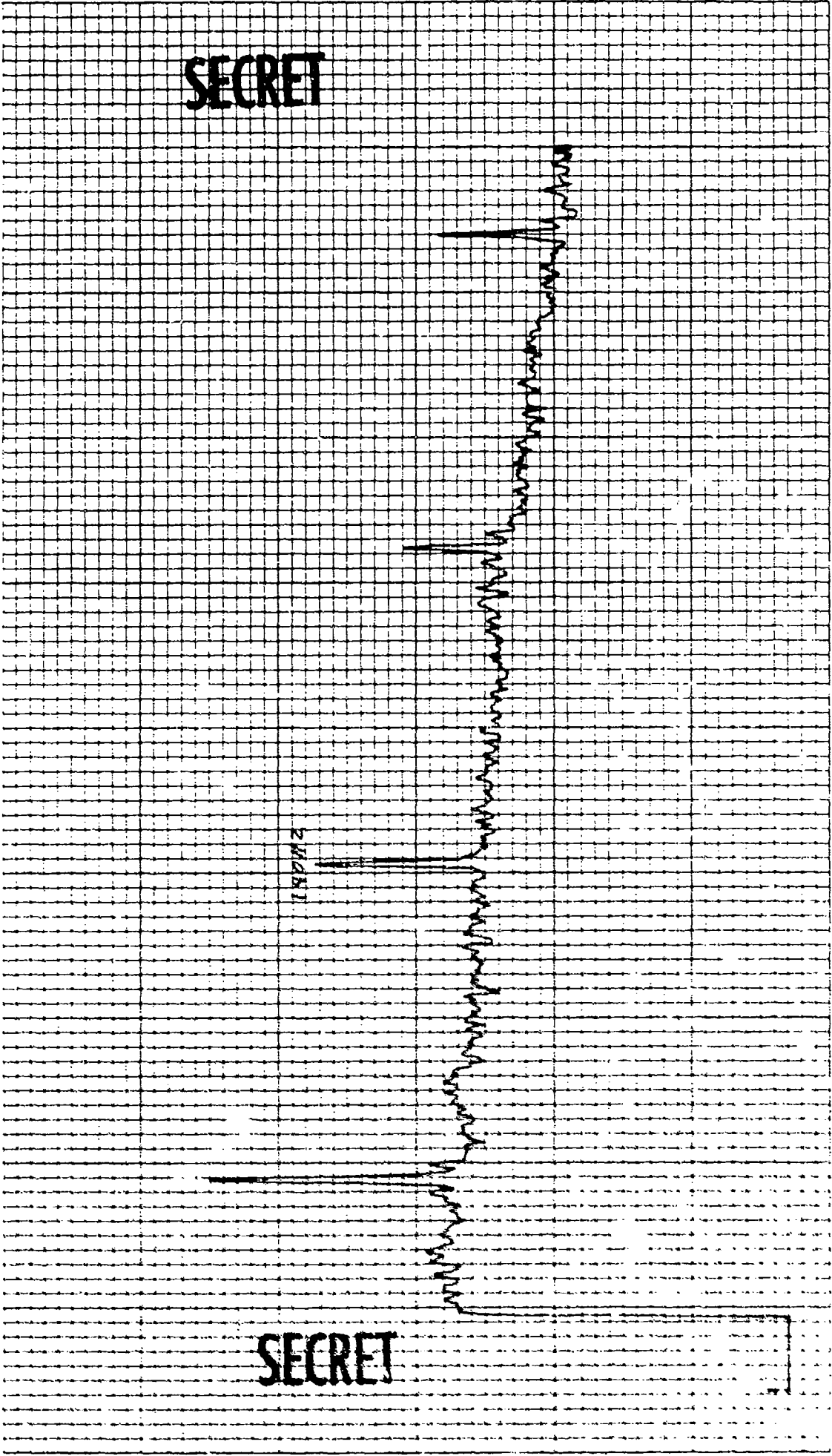
INTEGRATION TIME 320 SECS
ATTEN: -50 DB
FILTER WTG: HANNING



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

46 0703

CONTROL: 2-7 - 1019 (S1)
BEAMFORMED SPECTRUM (ELEMENTS) 1-26 4 29-53)
EXERCISE: BEARING STAKE
CENTFR FREQ: 160 HZ
S1... ELEMENTS
DATE OF ANALYSIS: - - - -
DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
440 DEG. AZ STEERING
REEL: F/5 INDE X 1955
INTEGRATION TIME 320 SECS ATTN:-30DB
FILTER WTG: HANNING



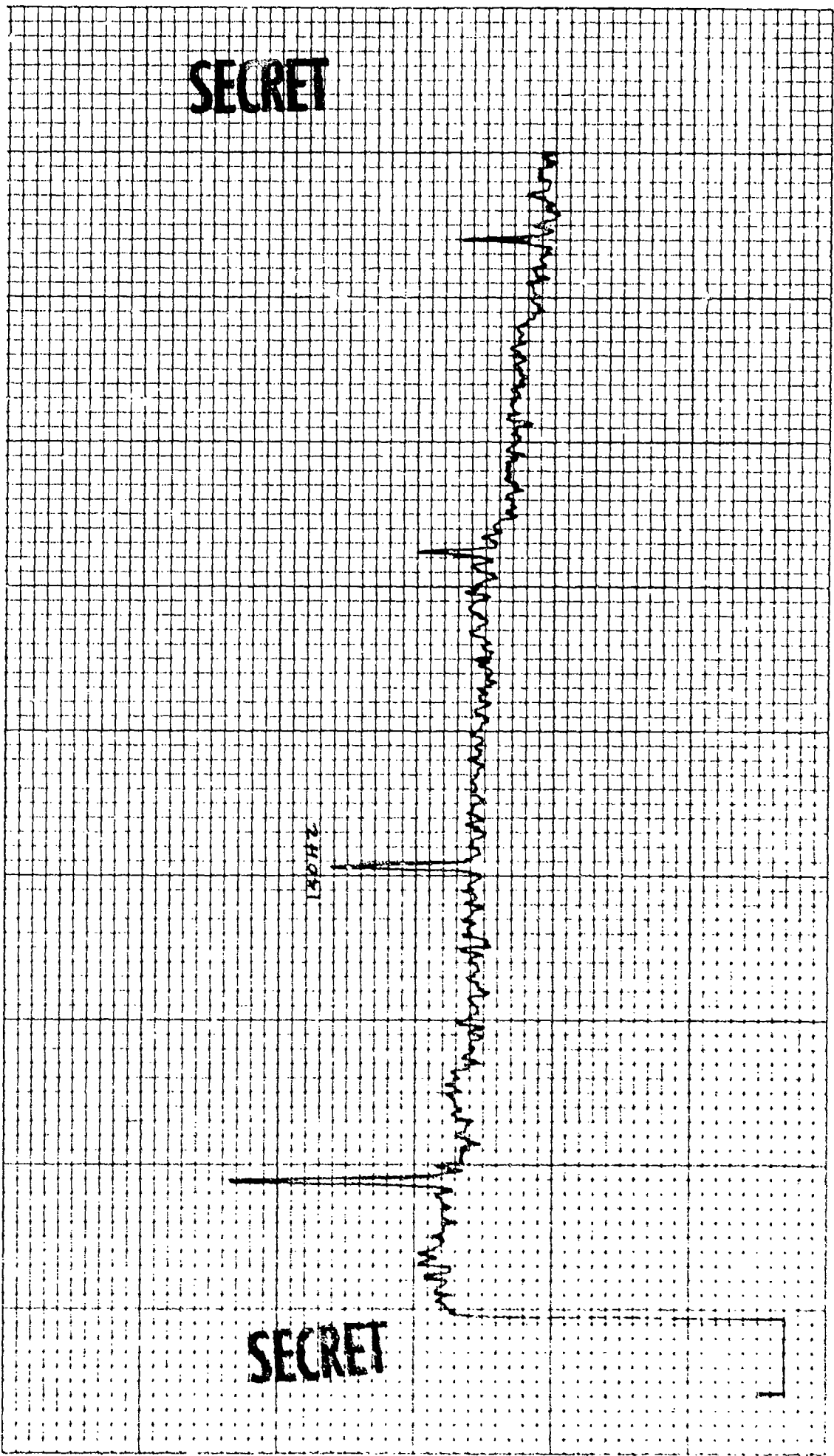
CONTROL: 2-7 -1019 (51) DATE OF ANALYSIS: 1-26 4 29-53 REEL: F/S INDE X/255

BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-7-77 - 1019 Z INTEGRATION TIME 320 SECS ATTEN: -30 DB

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

CENTER FREQ: 150 HZ 442 DEG. AZ STEERING

5/ ELEMENTS



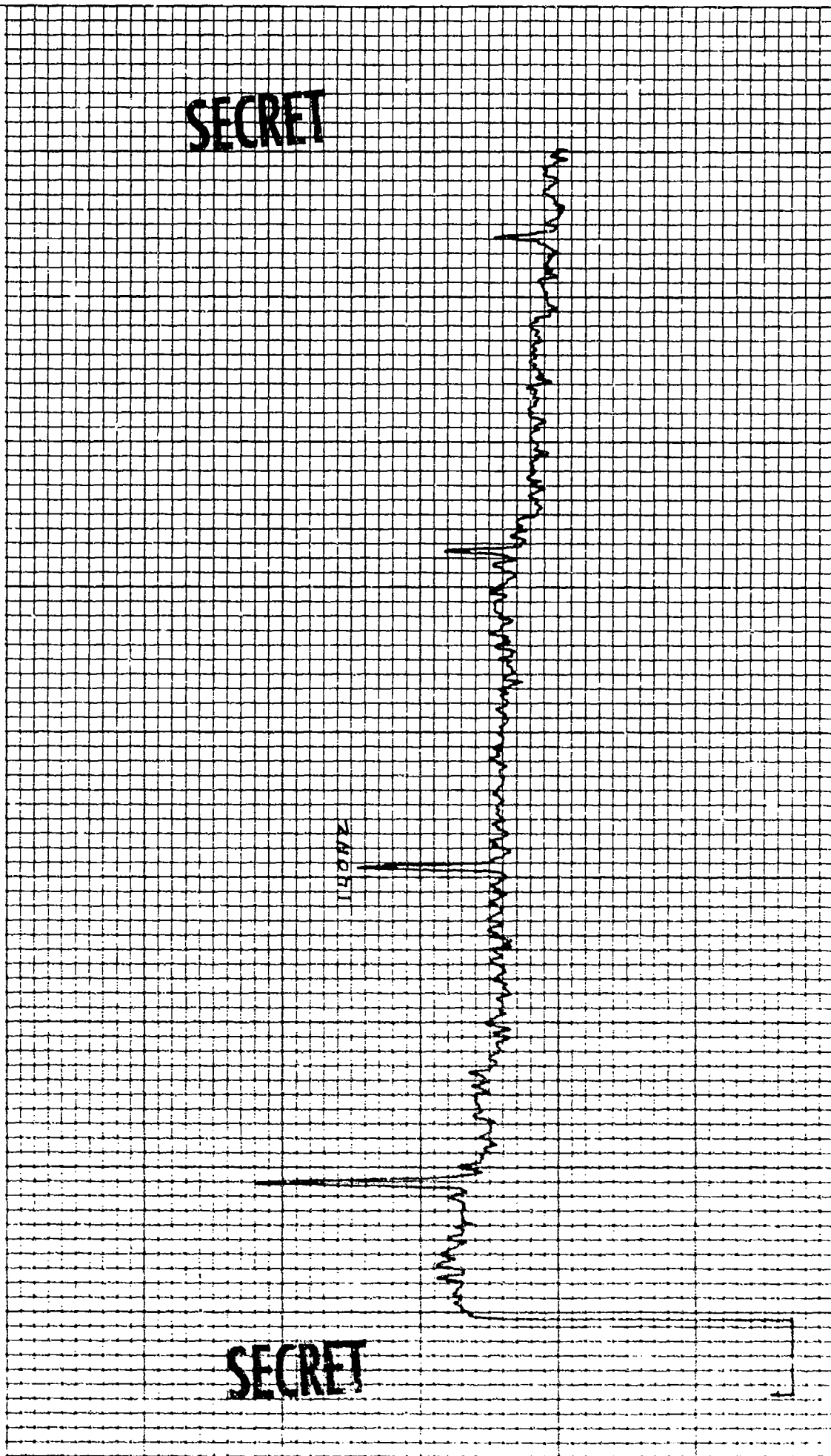
SECRET

SECRET

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

46 0703

CONTROL: 2-7 - 1019 (51) DATE OF ANALYSIS: 1-26-53 REEL: F15 INDE X/1955
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-7-77 - 1019 Z INTEGRATION TIME 320 SECS ATTN: -30 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTFR FREQ: 150 HZ +44 DEG. AZ STEERING



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

46 0703

CONTROL: 2-7 -1019 (5/) REEL: F15 INDE X1955
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-26-77 28-53
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 -1019 Z INTEGRATION TIME 320 SECS ATTN: -30 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
5/ ELEMENTS + 22 DEG. AZ STEERING

SECRET

SECRET

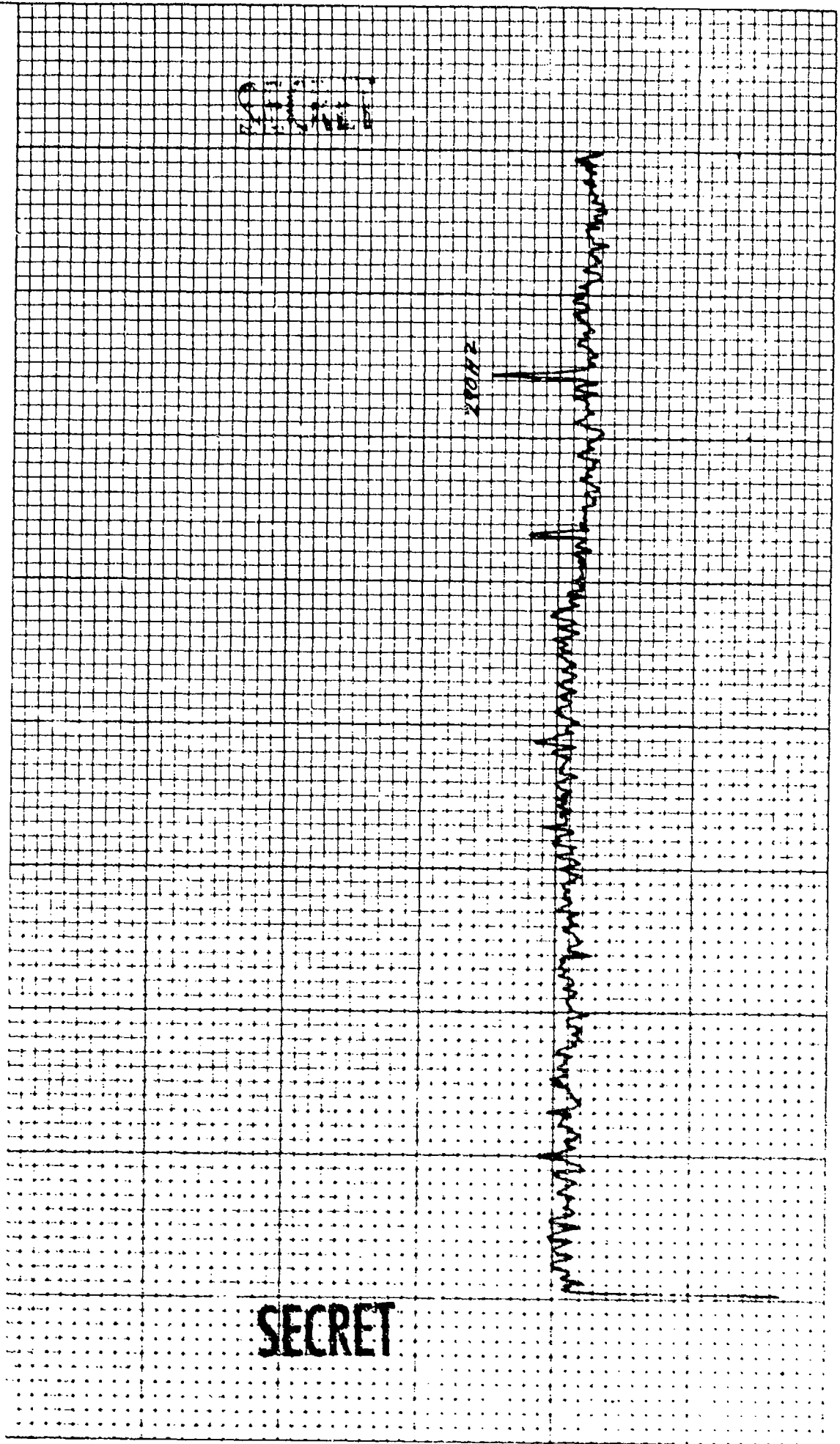
2800 Hz



H·Σ 10 X 10 TO THE INCHES: 7 10 INCHES
REUFEL & ESSER CO. MADE IN U.S.A.

46 0703

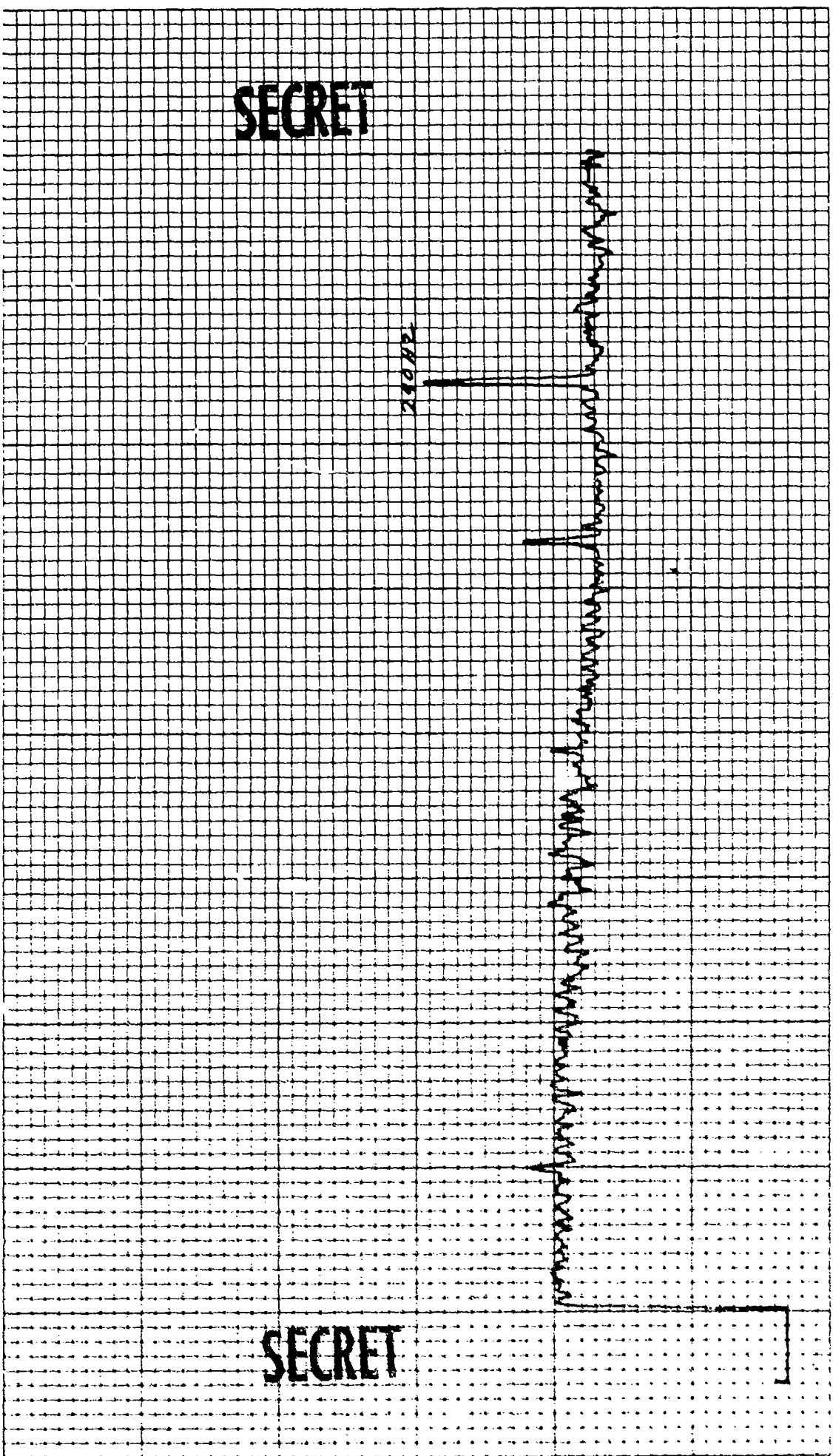
CONTROL: 2.7 - 1019 (51) DATE OF ANALYSIS: 1-26-53 REEL: F15 INDE X1958
BEAMFORMED SPECTRUM (ELEMENTS) 1-26-53 INTEGRATION TIME 320 SECS ATTEN: -30 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 270 HZ 24 DEG. AZ STEERING



KOE 12 X 10 TO THE INCH .7 X 10 INCHES
KUPPEL & FESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2-7 - 1019 (51) DATE OF ANALYSIS: 1-26-78 REEL: F15 INDE X 1055
BEAMFORMED SPECTRUM (ELEMENTS) 28-53
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTEN: -30 DB
81 ELEMENTS 236 DEG. AZ STEERING FILTER WTG: HANNING



SECRET

SECRET

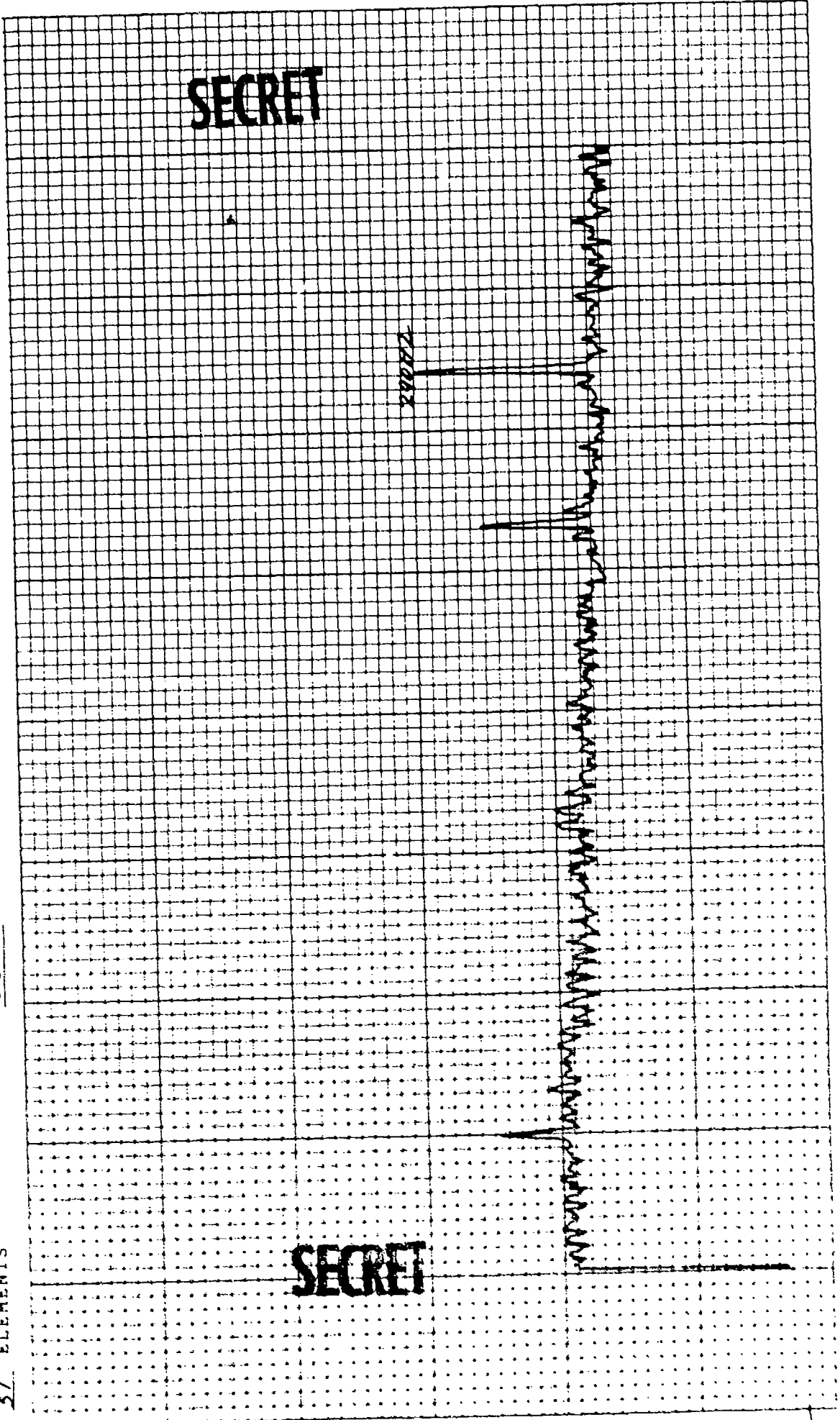
KOE 10 X 10 TO THE INCH - 7 X 10 INCHES
MULTIPLE OF FEASER CO. MADE IN U.S.A.

46 0703

REEL: F/5 INDE X/955

CONTROL: 27 - 1019 (51) DATE OF ANALYSIS: ---
BEAMFORMED SPECTRUM (ELEMENTS) 1-26 & 29-53
EXERCISE: BEARING STAKE DATE/TIME: 27-77 - 1019 Z
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ
51 ELEMENTS +28 DEC. AZ STEERING

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



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

46 0703

CONTROL: 2-7 - 1019 (51)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
51 ELEMENTS

DATE OF ANALYSIS: 1-26-77

DATE/TIME: 9-7-77 - 1019Z

ANALYSIS BANDWIDTH: 1/10HZ

109 DEG. AZ STEERING

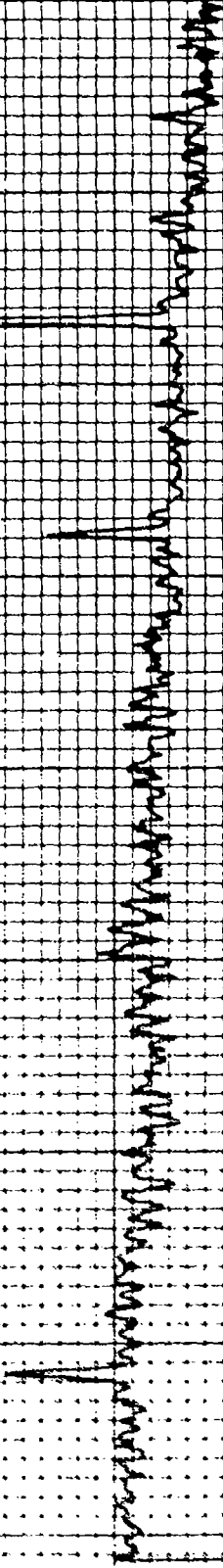
REEL: F15 INDE X1955

INTEGRATION TIME 320 SECS
FILTER WTG: HANNING

SECRET

SECRET

210912



KOE 10 X 10 TO THE INCHES
PERFEL & EDWARDS CO. MADE IN U.S.A.

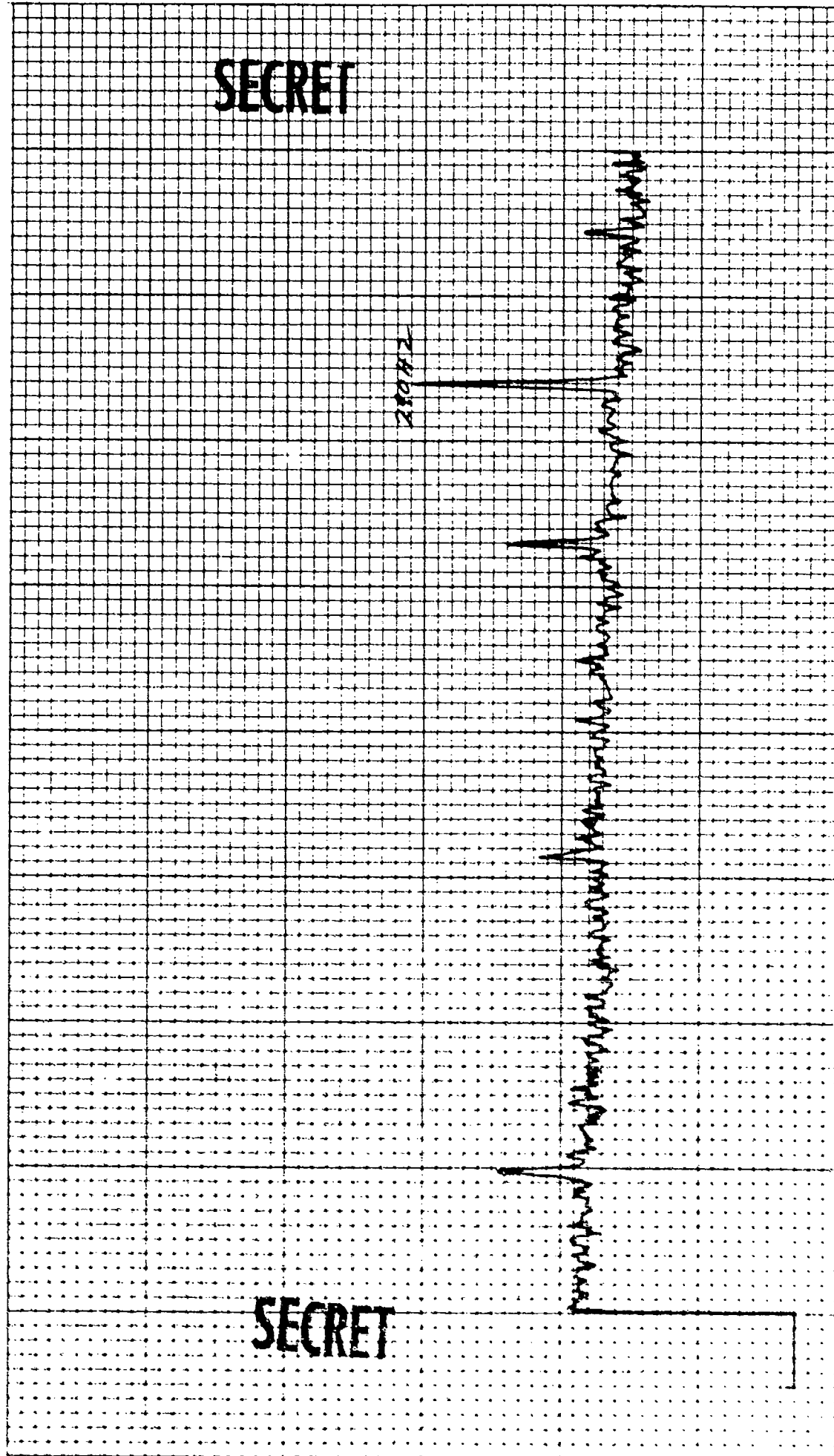
46 0703

CONTROL: 2-7 - 1019 (51)
BEAMFORMED SPECTRUM (ELEMENTS) 1-26 * 29-53)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 MHz
51 ELEMENTS

DATE OF ANALYSIS: - - - -
DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
±30 DEG. AZ STEERING

REPL: FVS
INDE X/1955

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



SECRET

SECRET

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

46 0703

D 24
230 516 284

CONTROL: 2-7 - 1019 (51)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
51 ELEMENTS

DATE OF ANALYSIS: -- -- --
1-26 & 29-53)
DATE/TIME: 7-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+31 DEG. AZ STEERING

REEL: 45

INTEGRATION TIME 320 SECS
FILTER WTG: HANNING

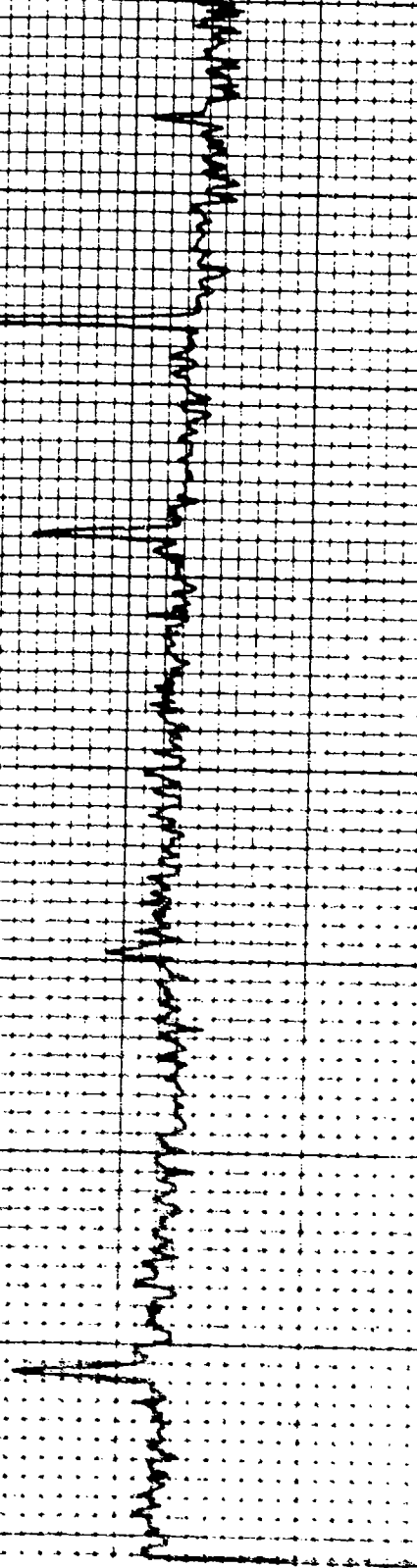
INDE X 1855

ATTEN: -70 DB
WTG: HANNING

SECRET

SECRET

28072



KOE 12 1/2 TO THE INCREMENT

46 0703

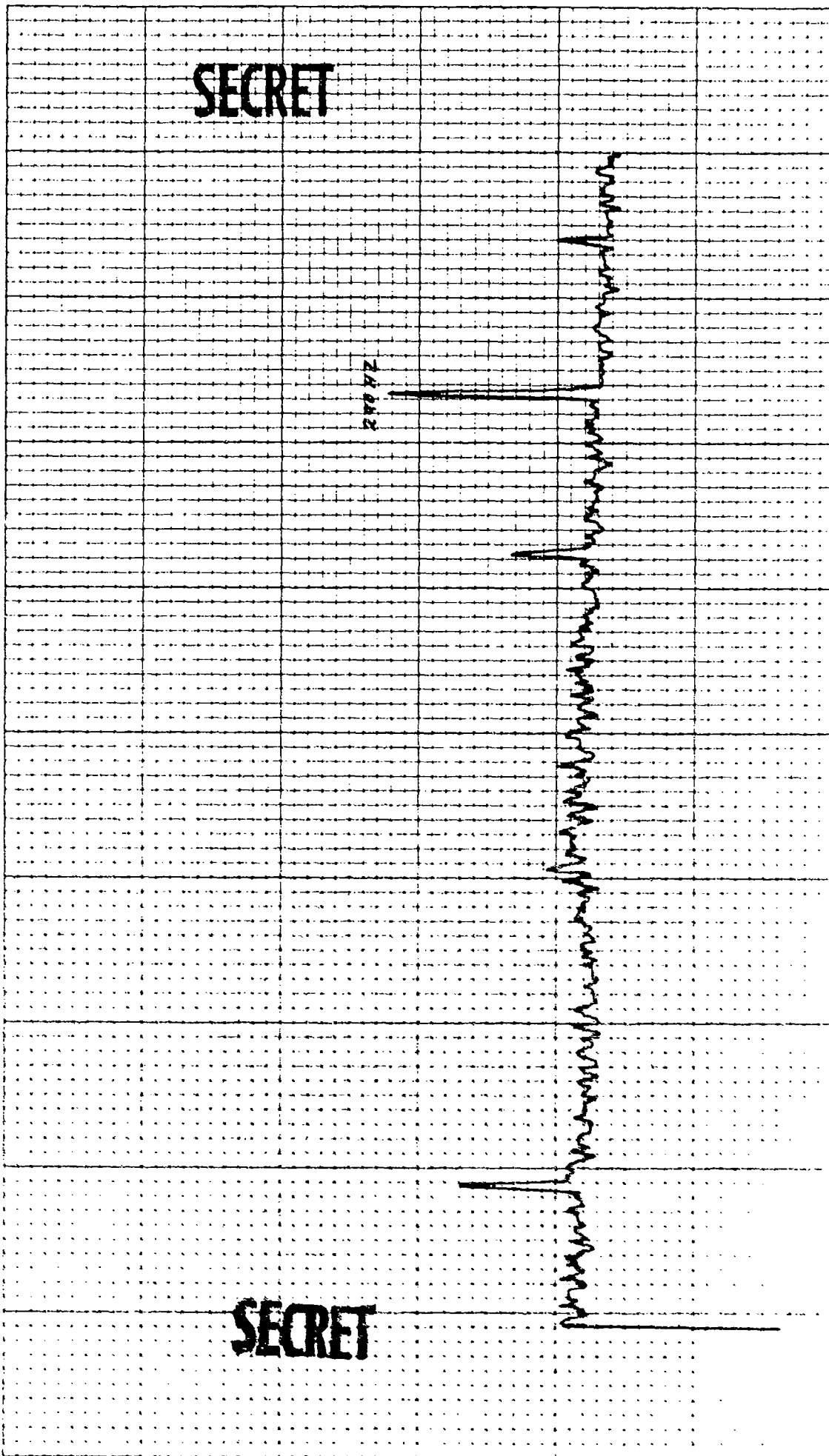
CONTROL: 1019 - 51 (DPV)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
 51 ELEMENTS

DATE OF ANALYSIS: _____
 1-26-53

INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

REEL: F15 INDE X 1955

ANALYSIS BANDWIDTH: 1/10HZ
 +31.5 DEG. AZ STEERING



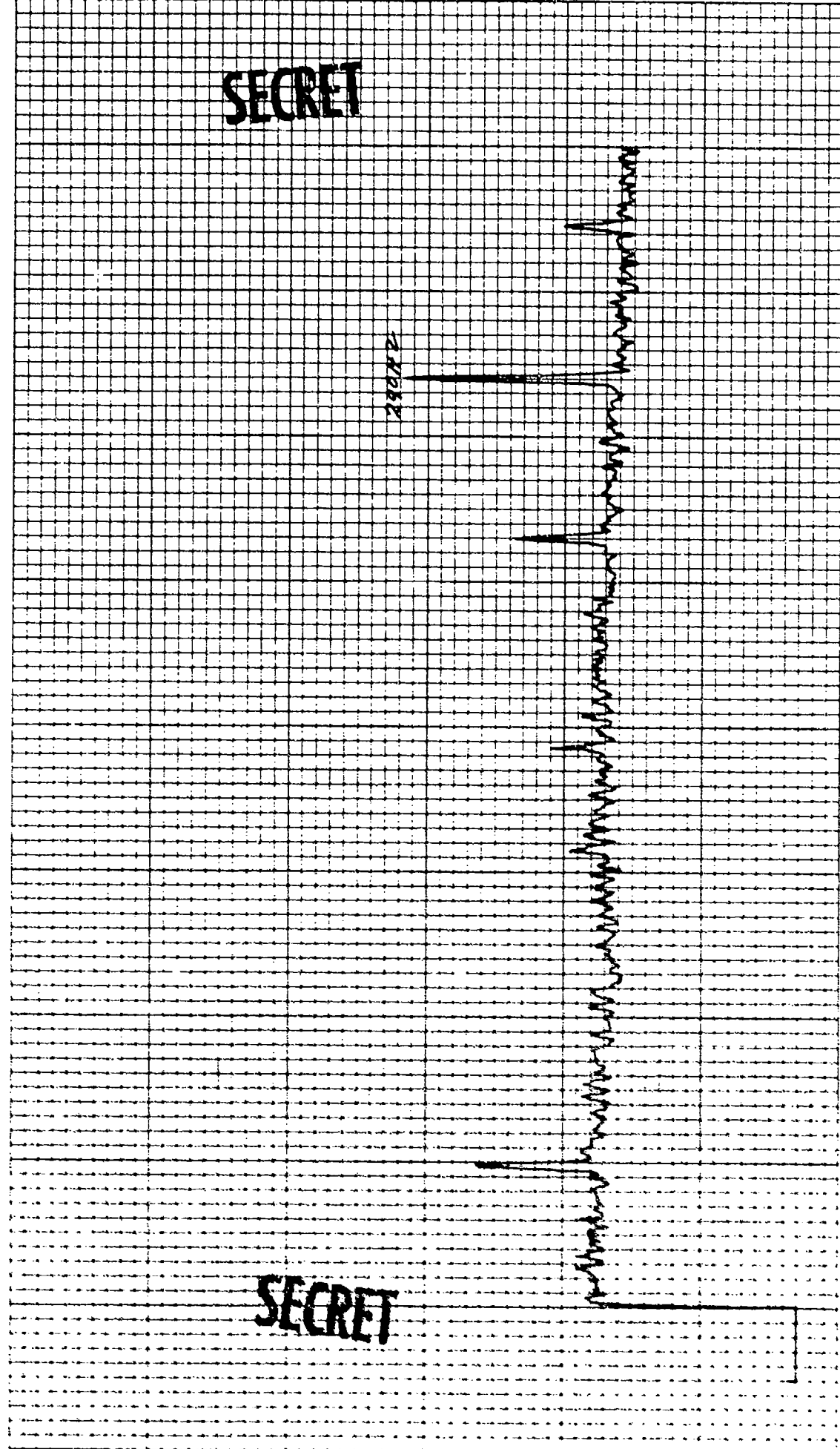
KOE 10 X 10 TO THE INC. 14.7 X 10 DIMENES
KELVIN P. & ENGINEER CO. 8144 44 11.1

46 0703

CONTROL: 2-7 - 1019 (51)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
51 ELEMENTS

DATE OF ANALYSIS: - - -
1 - 26 09-53
DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
+32 DEG. AZ STEERING

REEL: F15
INDE X1955
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTER WTC: HANNING



SECRET

SECRET

KOE IR X 10 TO TALK INCH-0.7 X 10 INCHES
REUPPEL & EGGER CO MADE IN U.S.A.

46 0703

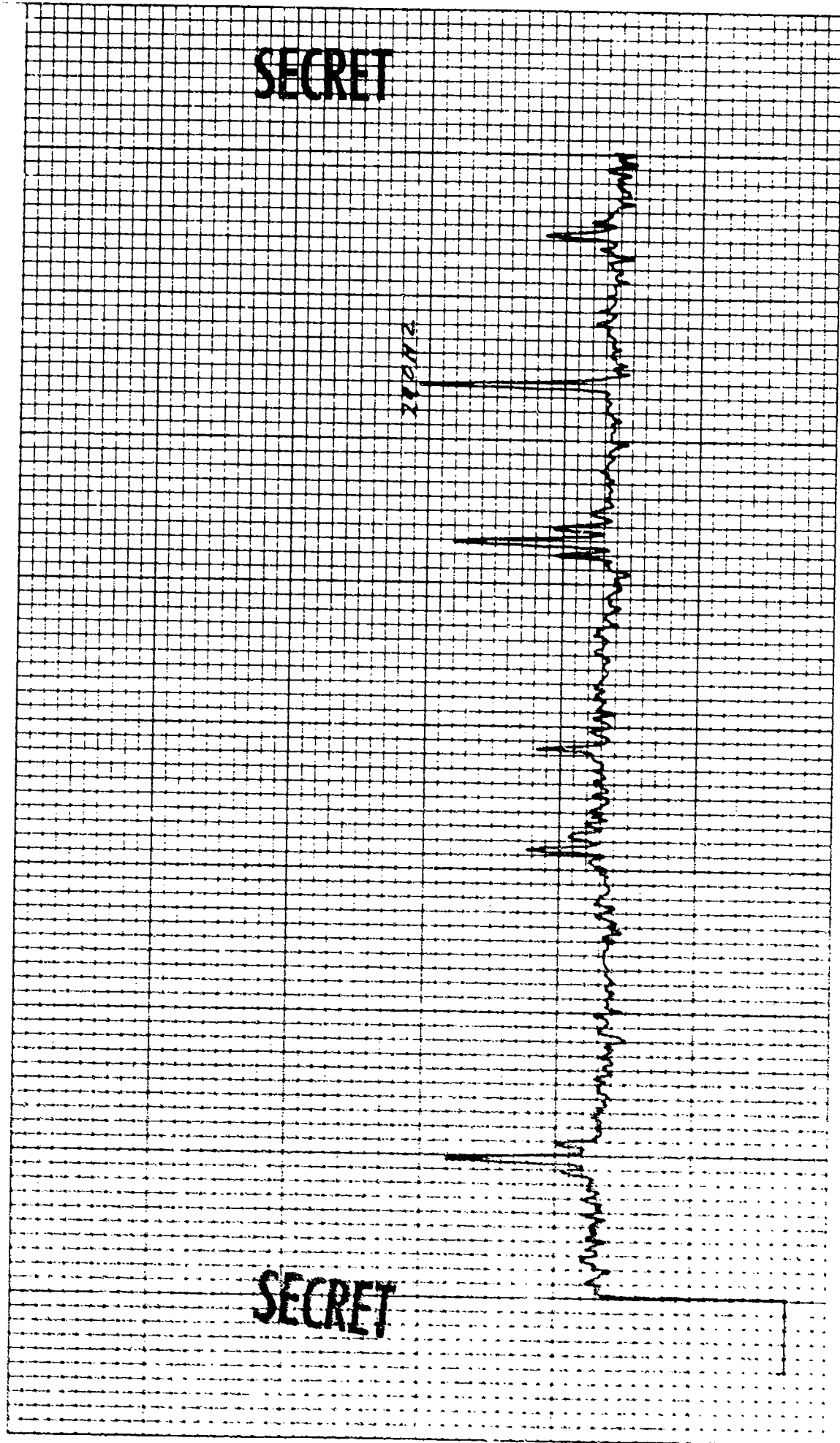
CONTROL: 2-7 -1019 (51)
BEAMFORMED SPECTRUM (ELEMENTS) 1-26 29-53)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
5/ ELEMENTS

DATE OF ANALYSIS: -- -- --
DATE/TIME: 2-7-77 -1019 2
ANALYSIS BANDWIDTH: 1/10HZ
Y34 DEG. AZ STEERING

REEL: F15 INDE X 1255
INTEGRATION TIME 320 SECS ATTN: -30 DB
FILTER WTC: HANNING

SECRET

SECRET

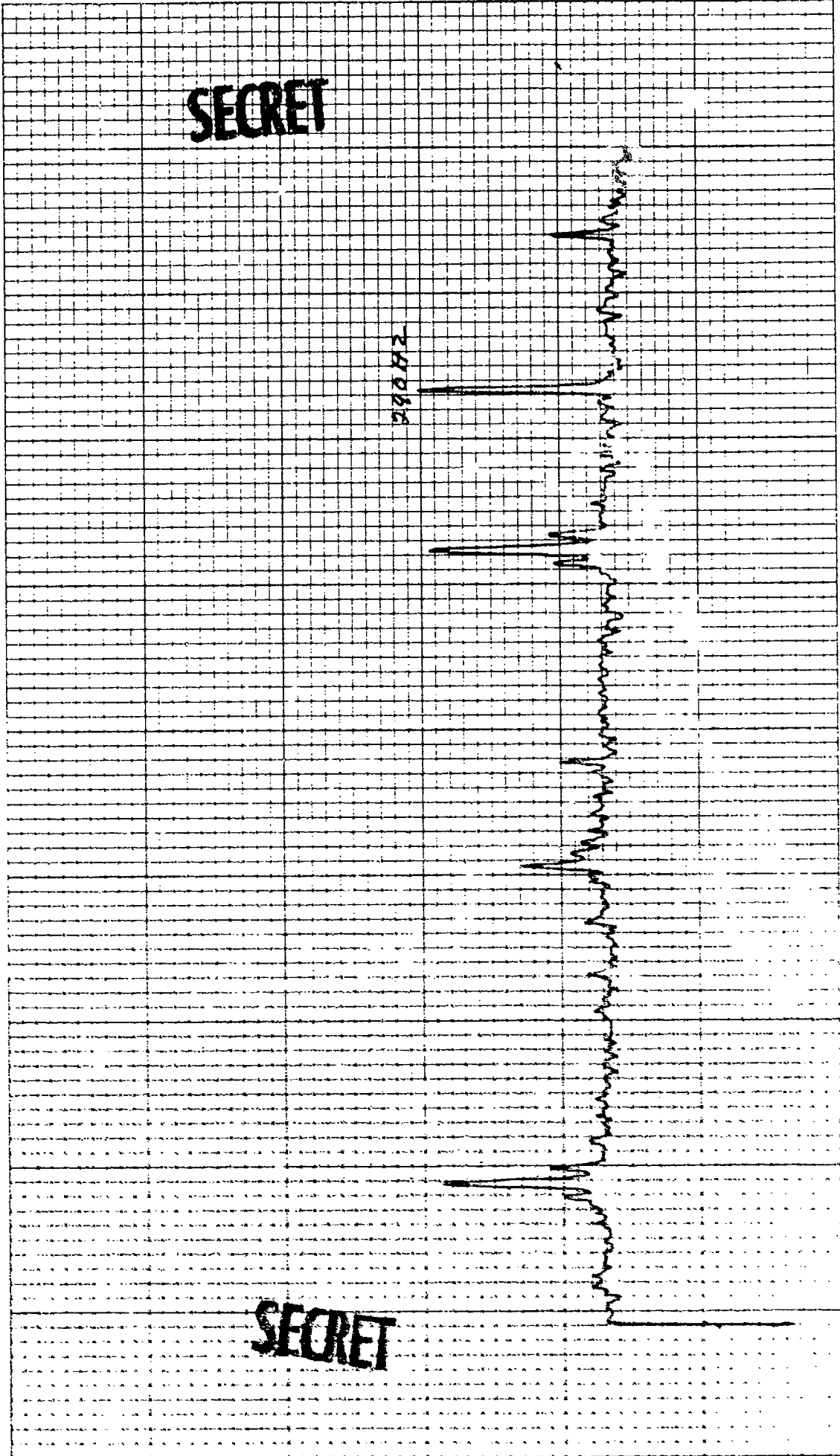


MSE 10 X 10 TO THE INCHES : 1 TO 10 IN DB
KELSFEL & FERRER CO. MADE IN U.S.A.

46 0703

DP 11
S 1 2
1 1 2 3 4

CONTROL: 2-7 - 1019 (51) DATE OF ANALYSIS: REEL: F15 INDE X1955
 BEAMFORMED SPECTRUM(ELEMENTS) 1-26 & 29-53 INTEGRATION TIME 320 SECS ATTN: -30 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 CENTER FREQ: 270 HZ 135 DEG. AZ STEERING



K-2 10 X 10 TO THE INCHES 2.10 INCHES

46 0703

2PM

10
51F # 36

CONTROL: 2.7 - 10.9 (5.1) DATE OF ANALYSIS: REEL: F/5 INDE X/955

BEAMFORMED SPECTRUM (ELEMENTS) 1-26-63 29-63 INTEGRATION TIME 320 SECS ATTEN: -30 DB

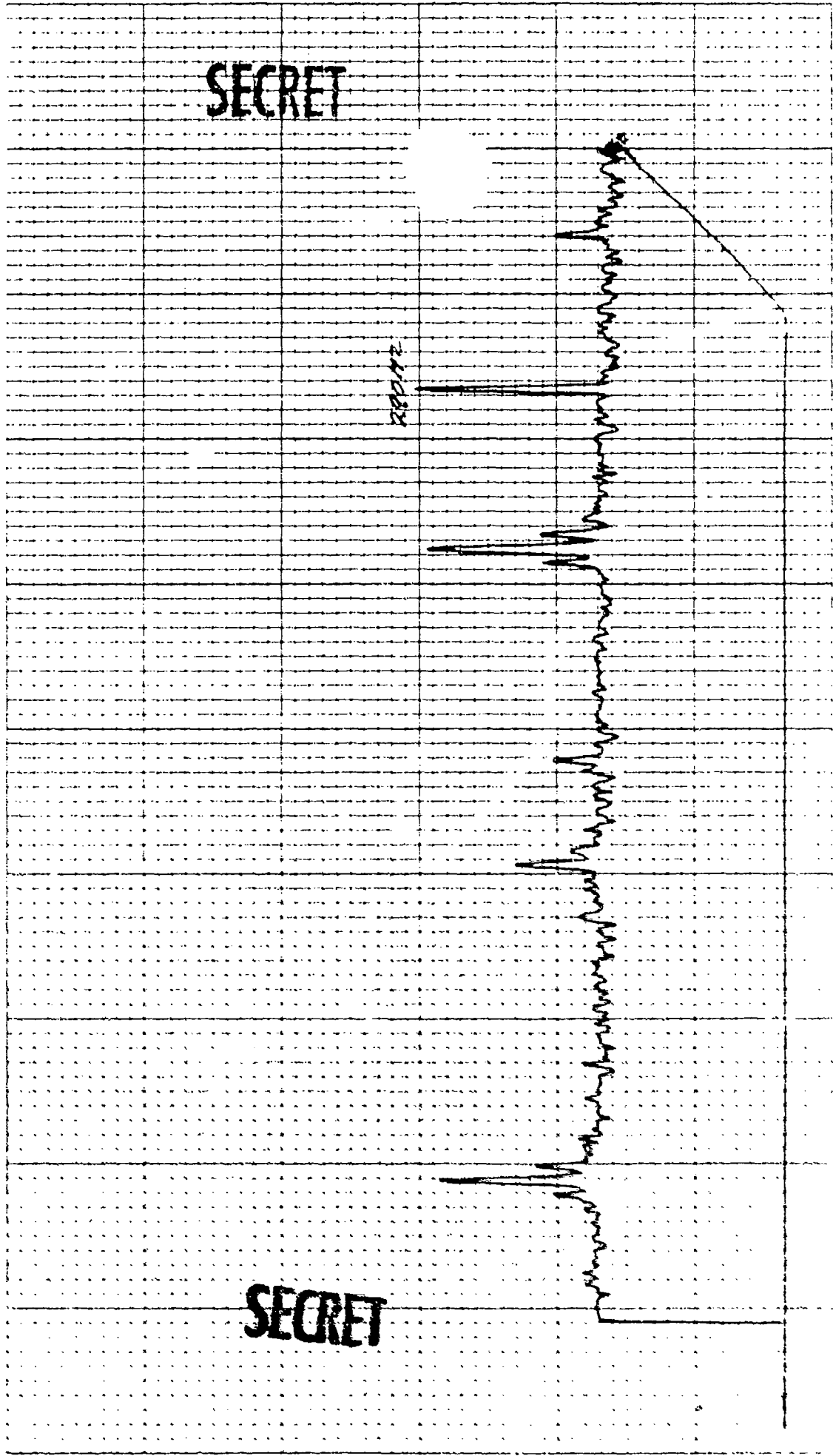
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1019 Z FILTER WTC: HANNING

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

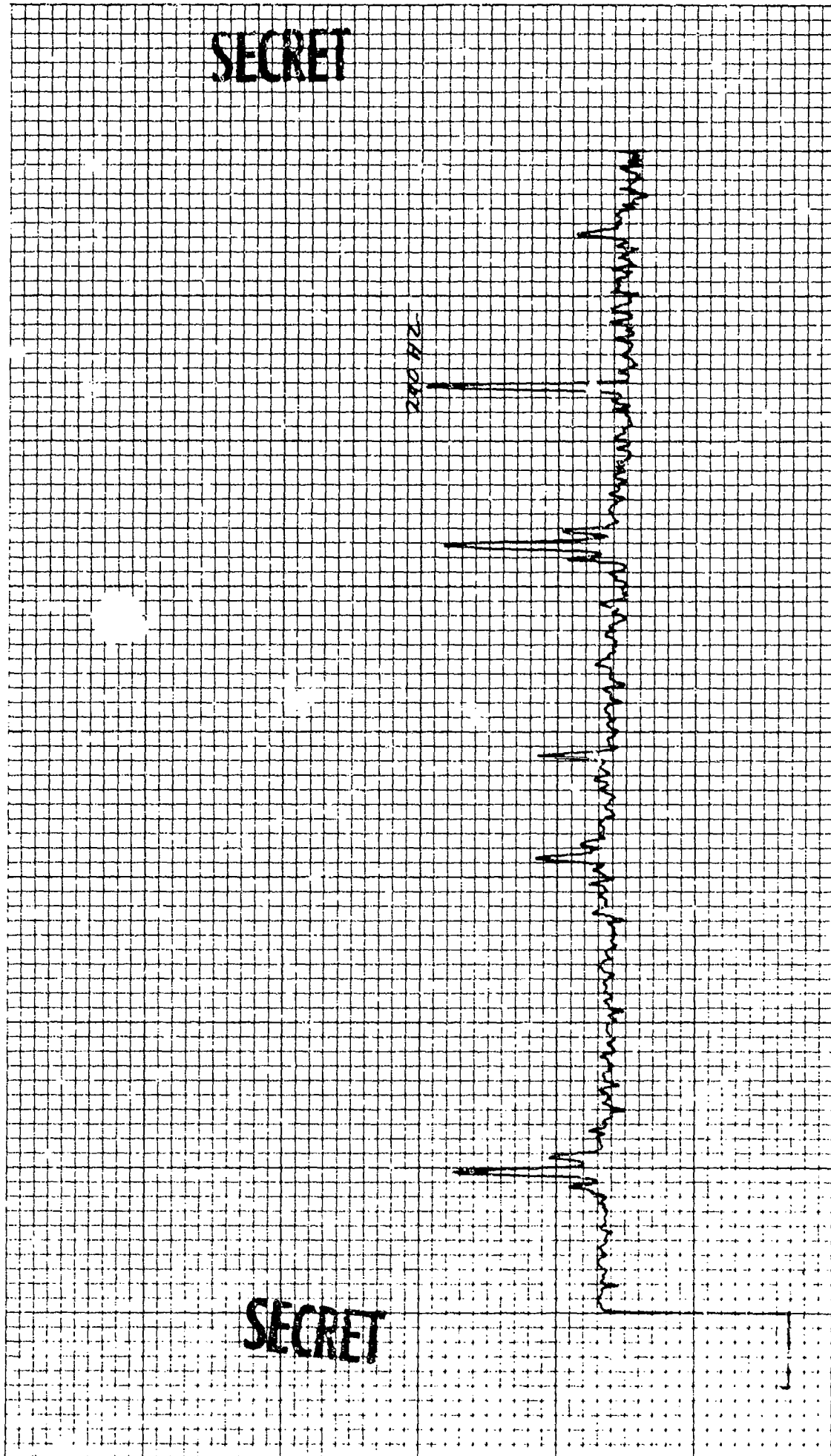
6/ ELEMENTS #35.5 DEG. AZ STEERING

SECRET

SECRET



CONTROL: 2.7 - 1019 (51) DATE OF ANALYSIS: 1-26-53 REEL: F15 INDE X1955
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-7-77 - 1019 Z
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTEN: 30 DB
 CENTER FREQ: 270 HZ 436 DEG. AZ STEERING FILTER WTG: HANNING
51 ELEMENTS



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

46 0703

DP 4

LE 70

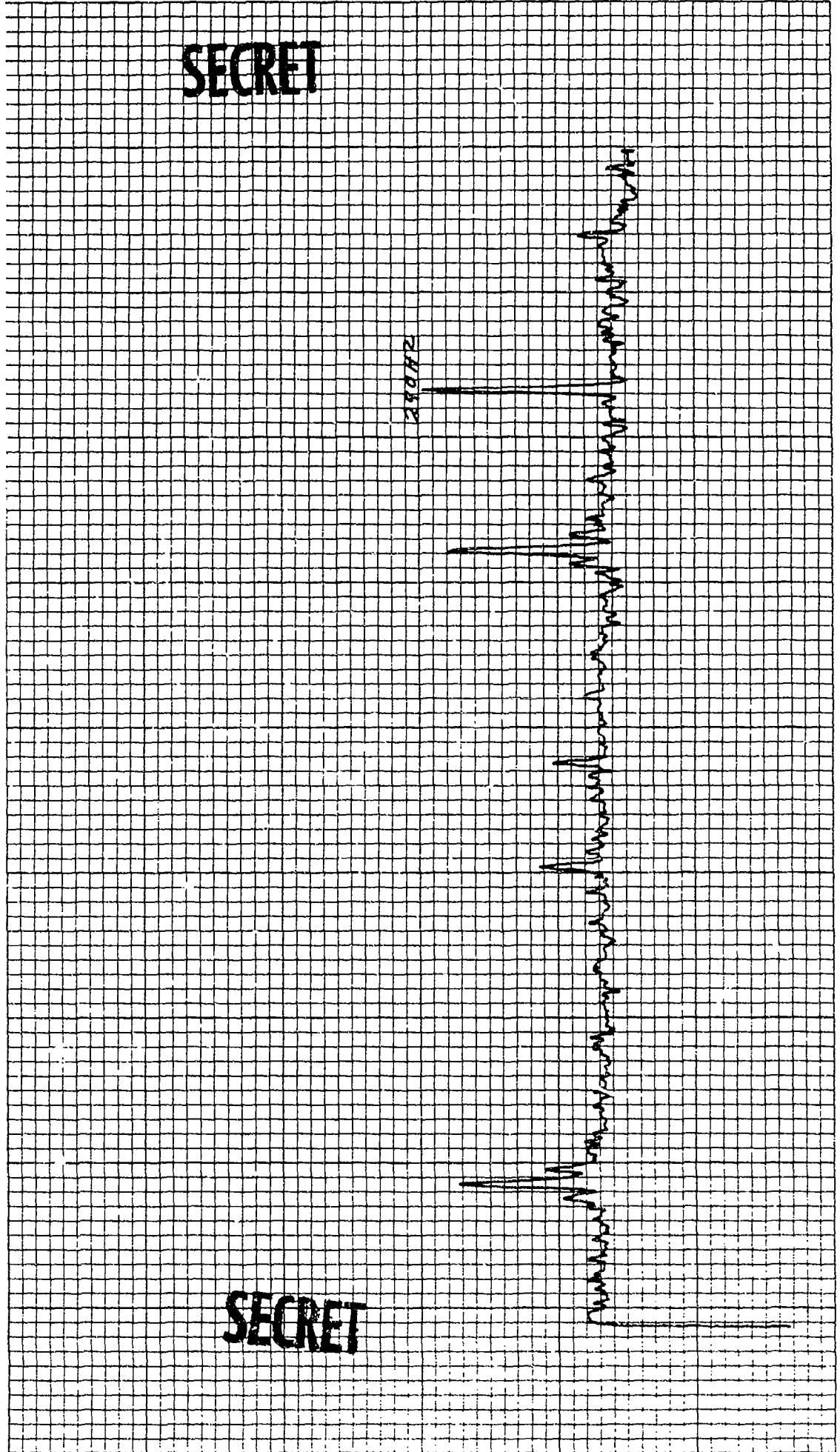
201 51E

CONTROL: 2.7 - 1019 (51) DATE OF ANALYSIS: - - - -
BEAMFORMED SPECTRUM (ELEMENTS) 1-264 08-53)
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1019 Z
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ
51 ELEMENTS +37 DEG. AZ STEERING

REEL: F15 INDE K1955
INTEGRATION TIME 320 SECS ATTN: -30 DB
FILTER WTG: HANNING

SECRET

SECRET



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

46 0703

CONTROL: 2-7 -1019 (51)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
51 ELEMENTS

DATE OF ANALYSIS: 1-26 29-53
DATE/TIME: 2-7-77, -1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
+30 DEG. AZ STEERING

REEL: F15 INDE X 1955
INTEGRATION TIME 320 SECS ATTN: -30DB
FILTER WTG: HANNING

SECRET

SECRET

270HZ



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

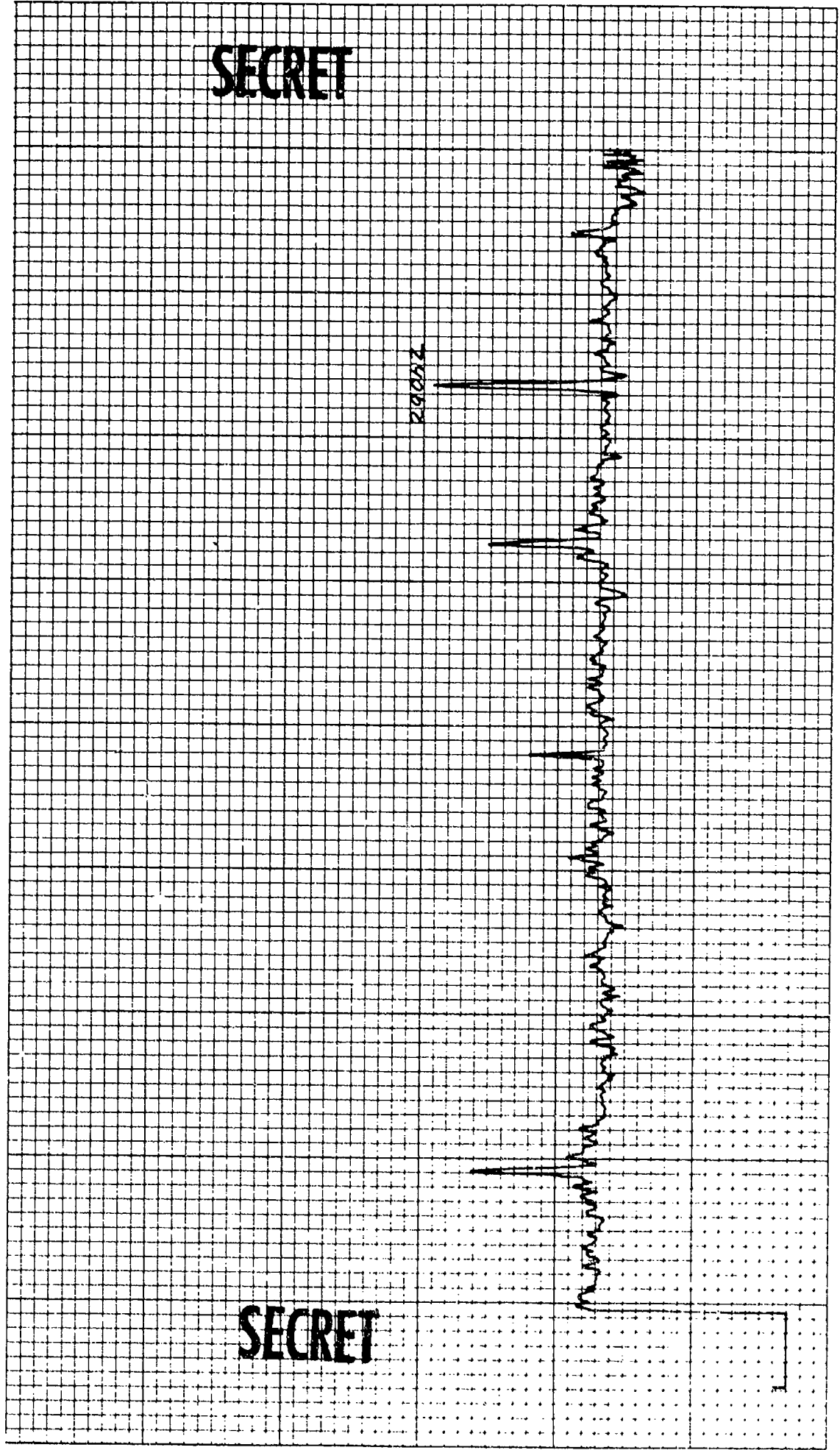
46 0703

CONTROL: 2-7 -1019 (51)
BEAMFORMED SPECTRUM(ELEMENTS 1-26 & 29-55)
EXERCISE: BEARING STAKE
CENTER FREQ: 170 HZ
81 ELEMENTS

DATE OF ANALYSIS: - - - - -
DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
+40 DEG. AZ STEERING

REEL: F15
INDE X1255

INTEGRATION TIME 320 SECS
FILTER WTG: HANNING
ATTEN: -20 DB



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

46 0703

REEL: F15 INDE X1955

CONTROL: 2.7 -1019 (51)
BEAMFORMED SPECTRUM (ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
51 ELEMENTS

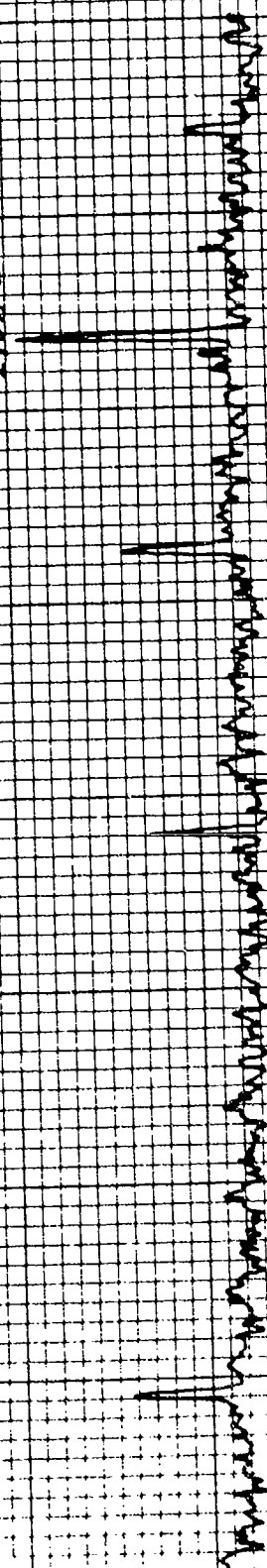
DATE OF ANALYSIS: 1-26-53
DATE/TIME: 2-7-77 -1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
+42 DEG. AZ STEERING

INTEGRATION TIME 320 SECS
FILTER WTG: HANNING

SECRET

SECRET

270 HZ



KOE 10 X 10 TO THE INCH 4.7 X 10 INCHES
KEUFFEL & ESSER CO MADE IN USA

46 0703

CONTROL: 2-7 - 1019 (51)
BEAMFORMED SPECTRUM(ELEMENTS 1-26 & 28-53)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
51 ELEMENTS

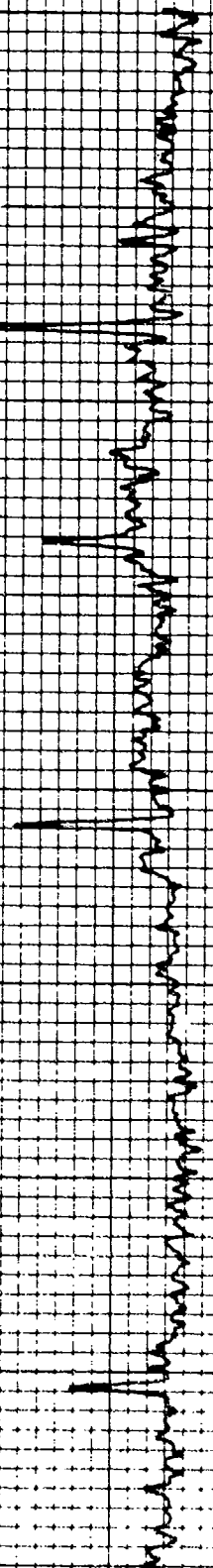
DATE OF ANALYSIS: - - -
DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 44 DEG. AZ STEERING

REEL: F15 INDE X/955
INTEGRATION TIME 320 SECS ATTN: -30 DB
FILTER WTG: HANNING

SECRET

SECRET

200012



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

DATA POINT 5

DATE 2-7-77

TIME 1549Z

FREQUENCY 140 HZ

UNCLASSIFIED

INDICATED NOISE LEVEL $\frac{\text{dBV}}{\sqrt{\text{Hz}}}$ -43.6

SYSTEM SENSITIVITY $\text{dB}/\mu\text{B}$ -31.6

BANDWIDTH CONVERSION TO 1 HZ BAND +82

CONVERSION TO $\text{dBre}\mu\text{Pa}/\text{1HZ}$ +76.6

UNCLASSIFIED

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

DATA POINT 5 DATE 2-7-77 TIME 1549Z

FREQUENCY 290 HZ

INDICATED NOISE LEVEL $\frac{dBV}{\mu V}$ -47.8

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

BANDWIDTH CONVERSION TO 1 HZ BAND +8.2

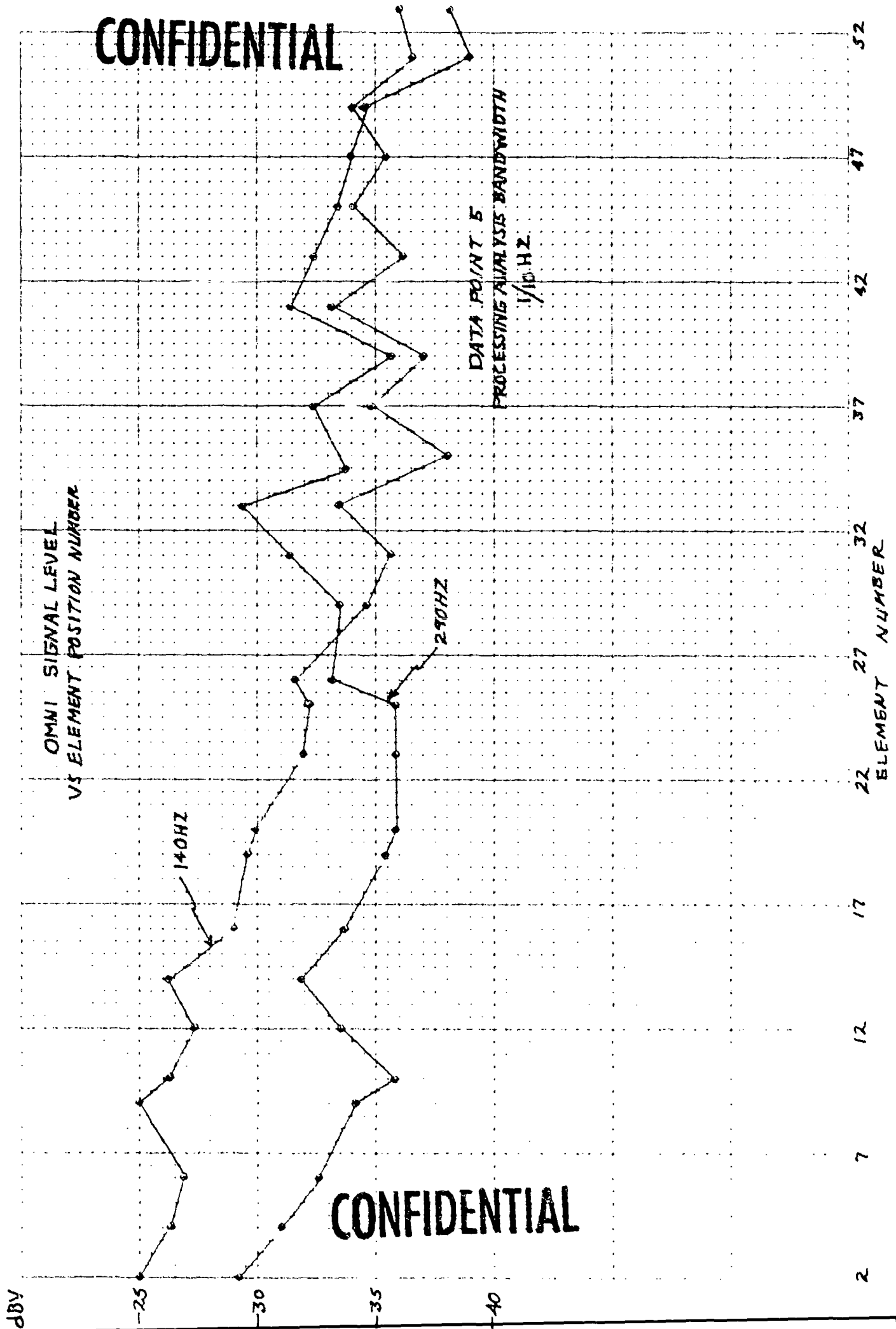
CONVERSION TO $\frac{dBre\mu Pa}{1HZ}$ +100

UNCLASSIFIED

UNCLASSIFIED

46 0703

MOE 2540 2000 2000 2000



46 0703

REF ID: A66666

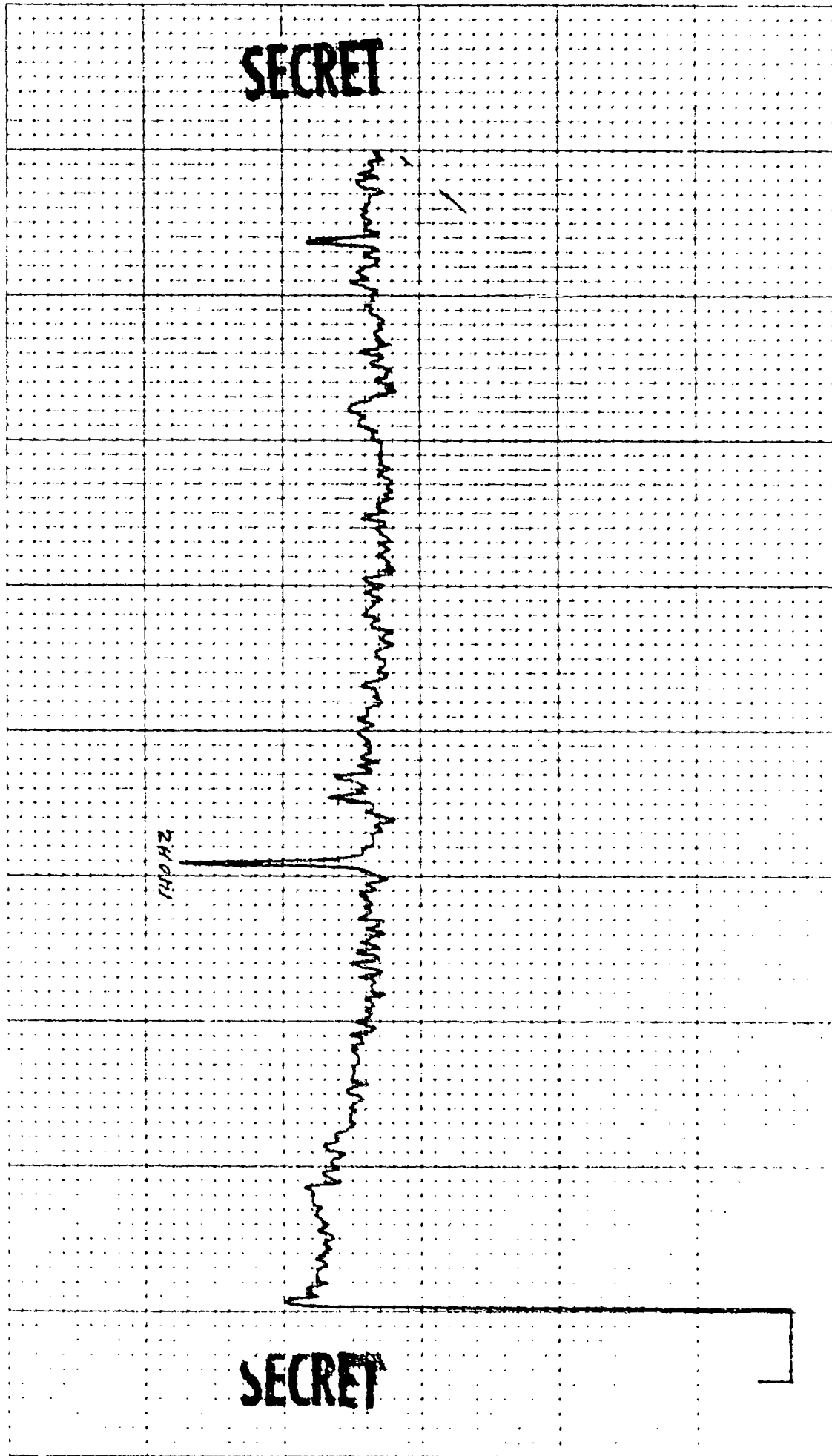
REEL: F/1 INDEX 3050

CONTROL: 2-7 -1549 (1)
OMNI SPECTRUM (ELEMENT 2)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
I ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -1549 Z
ANALYSIS BANDWIDTH: 1/10HZ
 DEG AZ STEERING

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



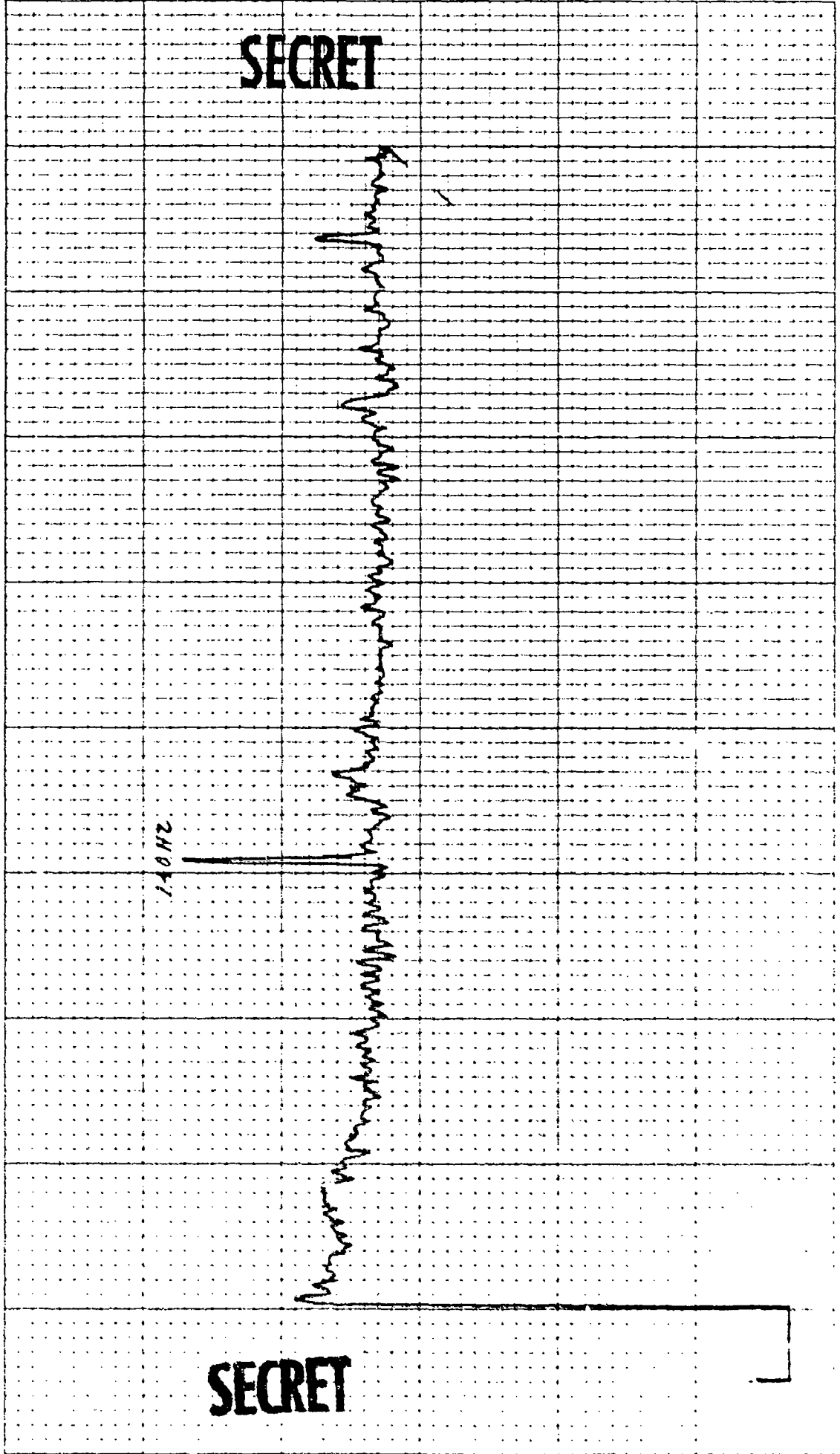
SECRET

SECRET

46 0703

REF 101 TO THE DIRECTOR, NSA

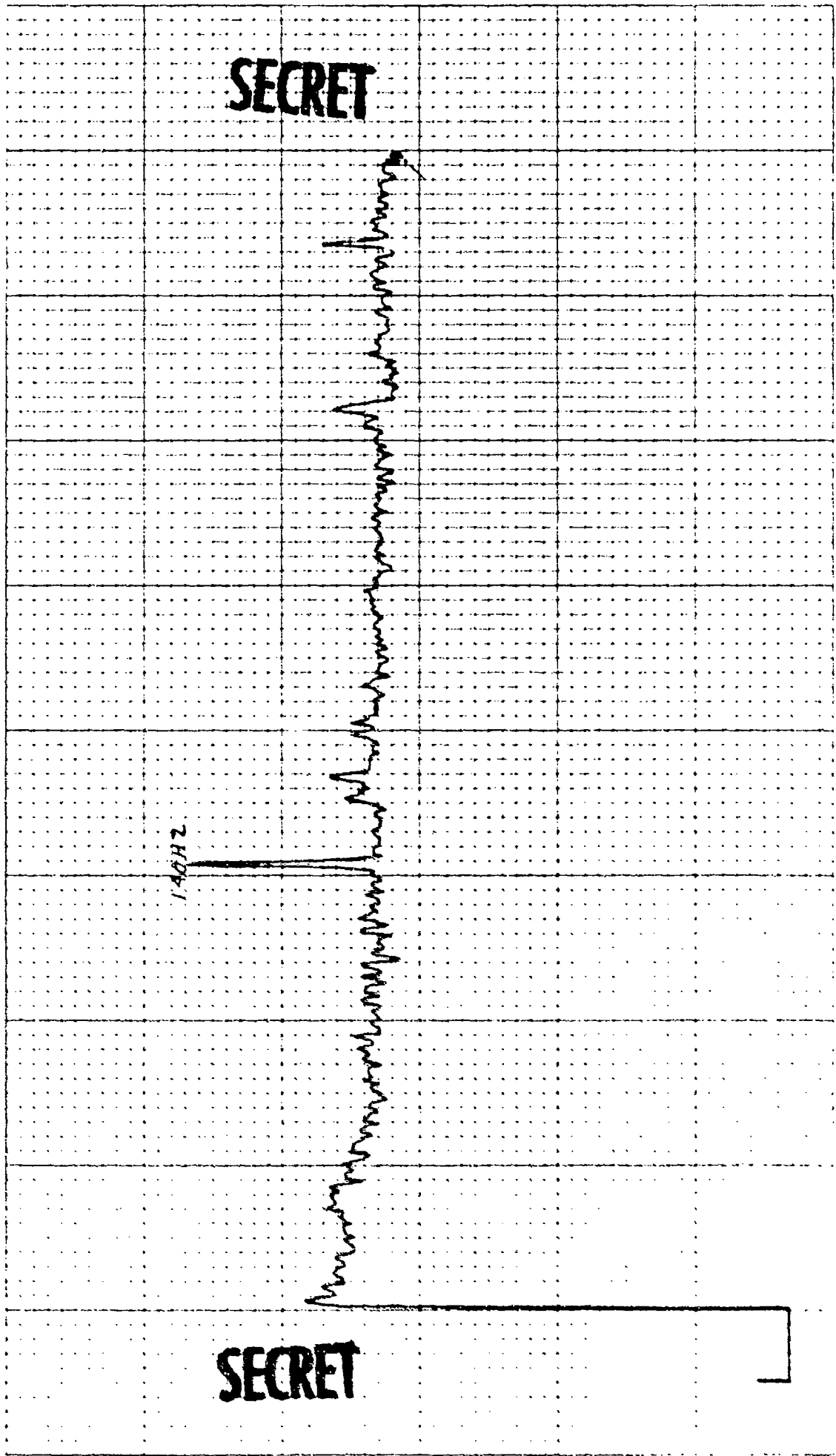
CONTROL: 2-7 -1549 (2) DATE OF ANALYSIS: REEL: F19 INDEX 3050
OMNI SPECTRUM (ELEMENT 4)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT
INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING
DATE/TIME: 2-7-77 -1549 Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ STEERING



46 0703

NOE 2-7-77 1549Z

CONTROL: 2-7 -1549 (3) DATE OF ANALYSIS: REEL: F19 INDEX 3050
OMNI SPECTRUM (ELEMENT 6)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT
DATE/TIME: 2-7-77 -1549 Z INTEGRATION TIME 320 SECS ATTN: - DB
ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
DEC AZ STEERING



46 0703

REF ID: A66666

CONTROL: 2.7 - 15.9 (4)
OMNI SPECTRUM (ELEMENT 9)
EXERCISE: BEARING STAKE
CENTER FREQ: 750 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 15.9 Z

ANALYSIS BANDWIDTH: 1/16.0 Z

— DEG AZ STEERING

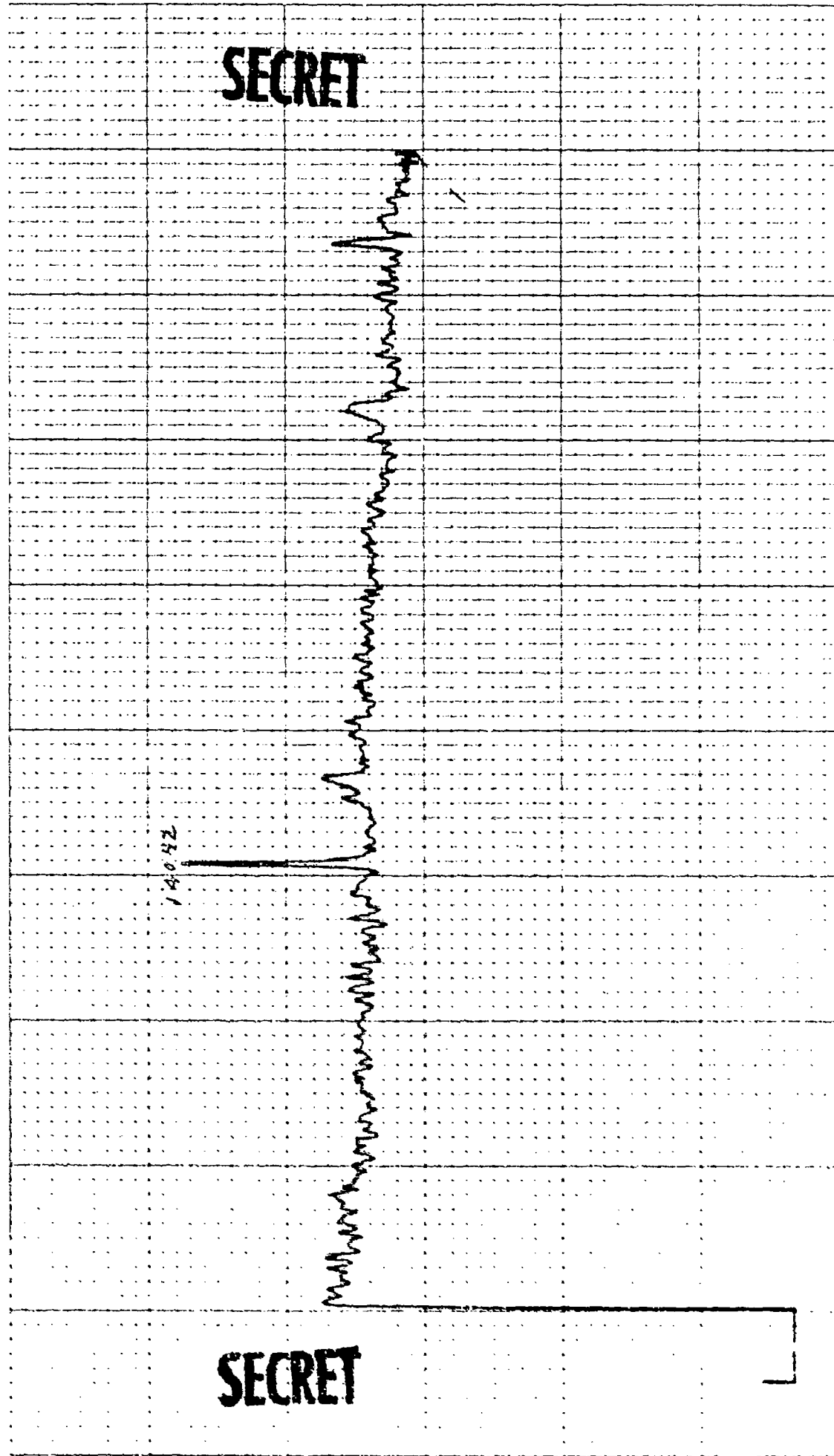
REEL: F19

INDEX: J.0

INTEGRATION TIME 320 SECS

ATTEN: — DB

FILTER WTC: HANNING



46 0703

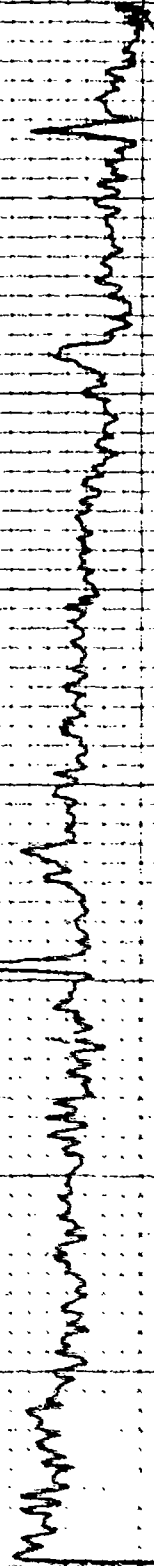
KOE 5448 10/11/77 05:11:00

CONTROL: 2-7 -1549 (5) DATE OF ANALYSIS: REEL: F19 INDEX 3050
OMNI SPECTRUM/ELEMENT 10)
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: - DB
1 ELEMENT _____ DEG AZ STEERING FILTER WTC: HANNING

14092

SECRET

SECRET



CONTROL: 2-7 -1549 (6)
OMNI SPECTRUM (ELEMENT 12)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
ELEMENT

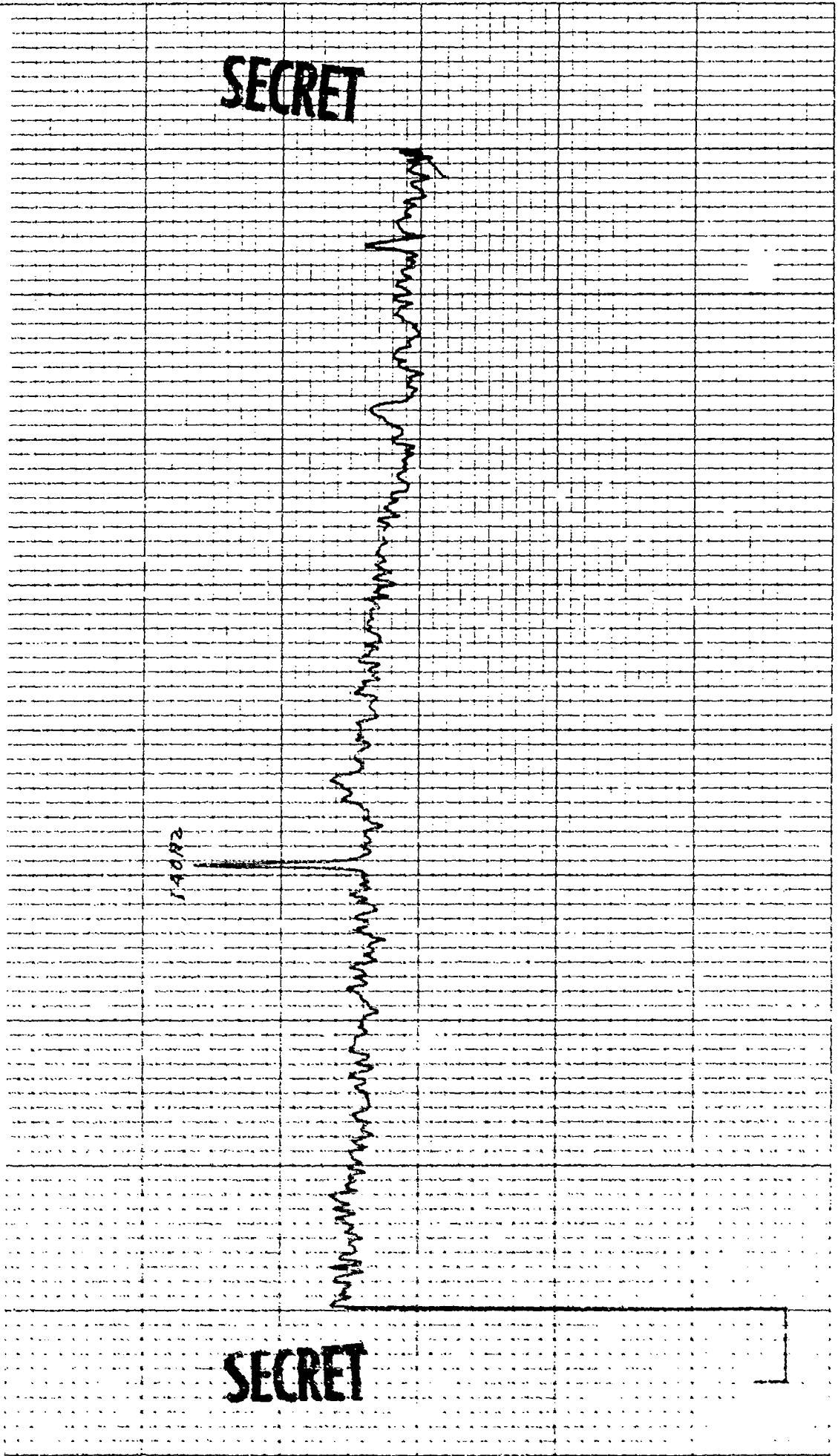
DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 1549Z

ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

REEL: F19 INDEX: 3050

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



SECRET

SECRET

46 0703

REF: 2-7-77

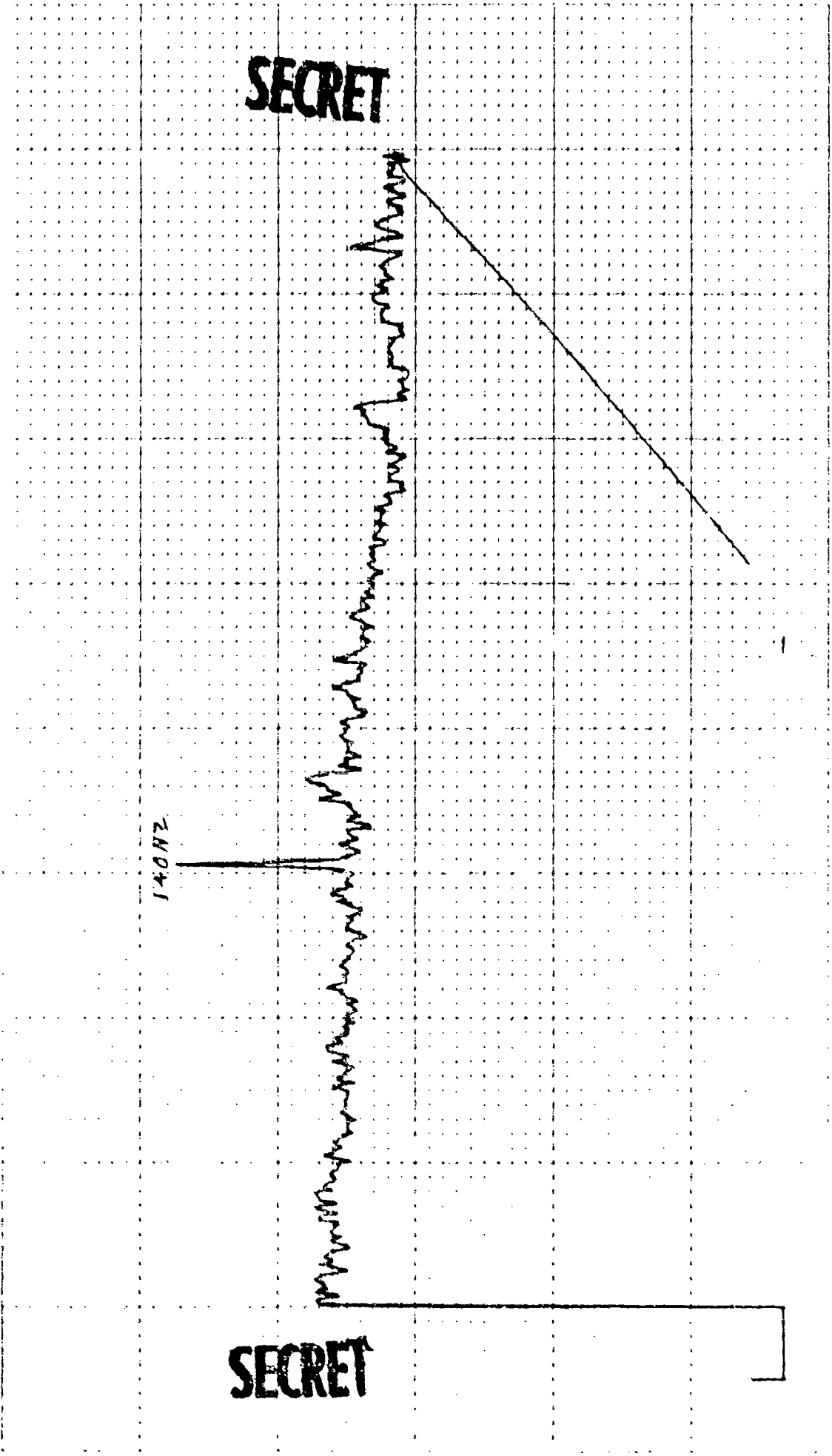
CONTROL: 2-7 -1544 (7) DATE OF ANALYSIS: REEL: F/9 INDEX: J-5

OMNI SPECTRUM (ELEMENT 14) DATE/TIME: 2-7-77 -1549 Z

EXERCISE: BEARING STAKE ANALYTIC BANDWIDTH: 1/10HZ

CENTER FREQ: 150 HZ DEC 17 SIEKING INTEGRATION TIME 320 SECS ATTN: DB

1 ELEMENT FILTER WIG: HANNING



SECRET

SECRET

46 9703

REF: 14-00000 TO THE INCH: 14-00000

CONTROL: 27 - 1549 (8) DATE OF ANALYSIS: REEL: F19 INDEX: 357

OMNI SPECTRUM (ELEMENT 16)

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

I ELEMENT

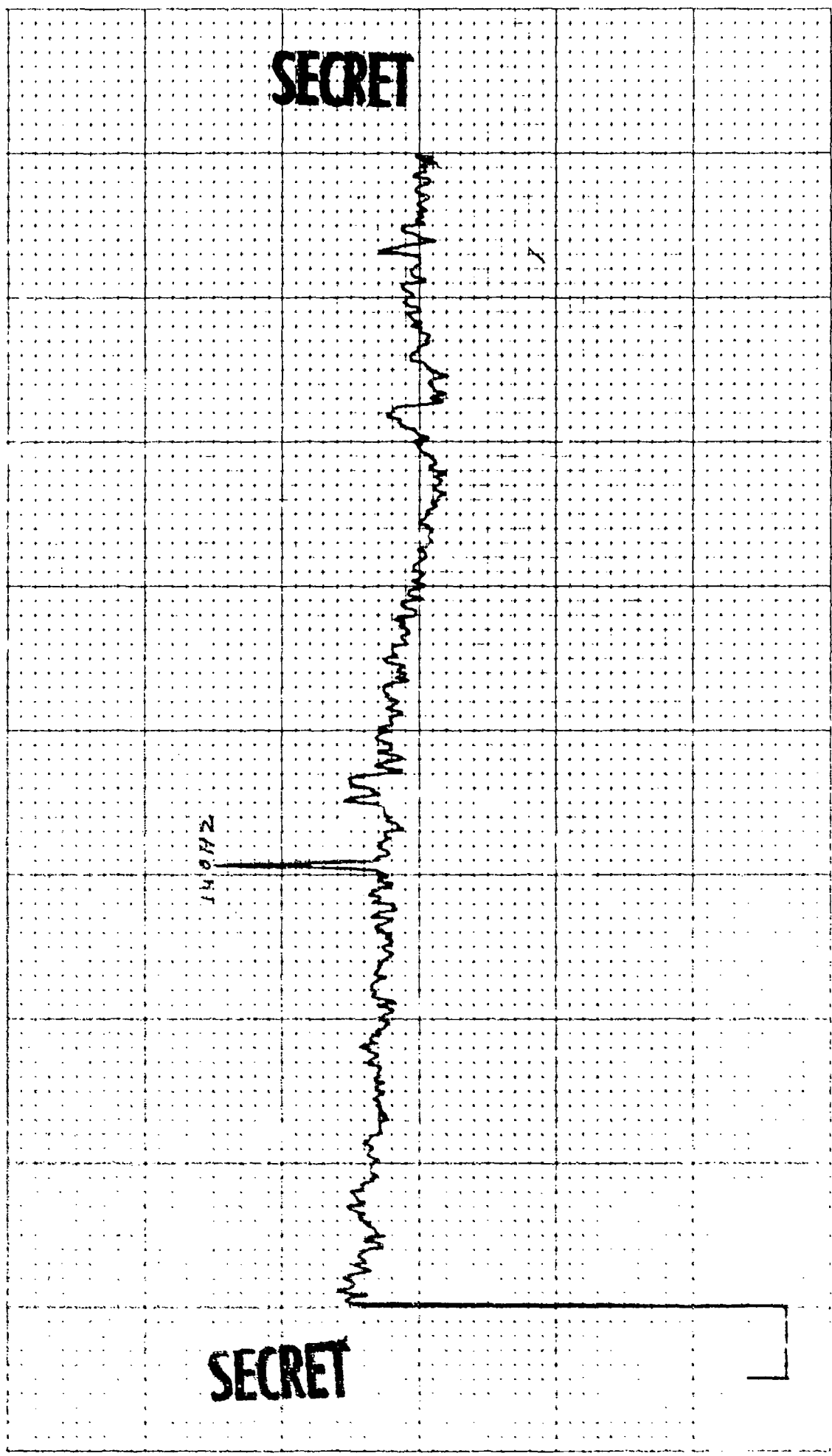
INTEGRA ION TIME 320 SECS ATTEN: - DB

FILTER WIG: HANNING

DATE/TIME: 2-2-77 - 1549 Z

ANALYSIS BANDWIDTH: 1/10HZ

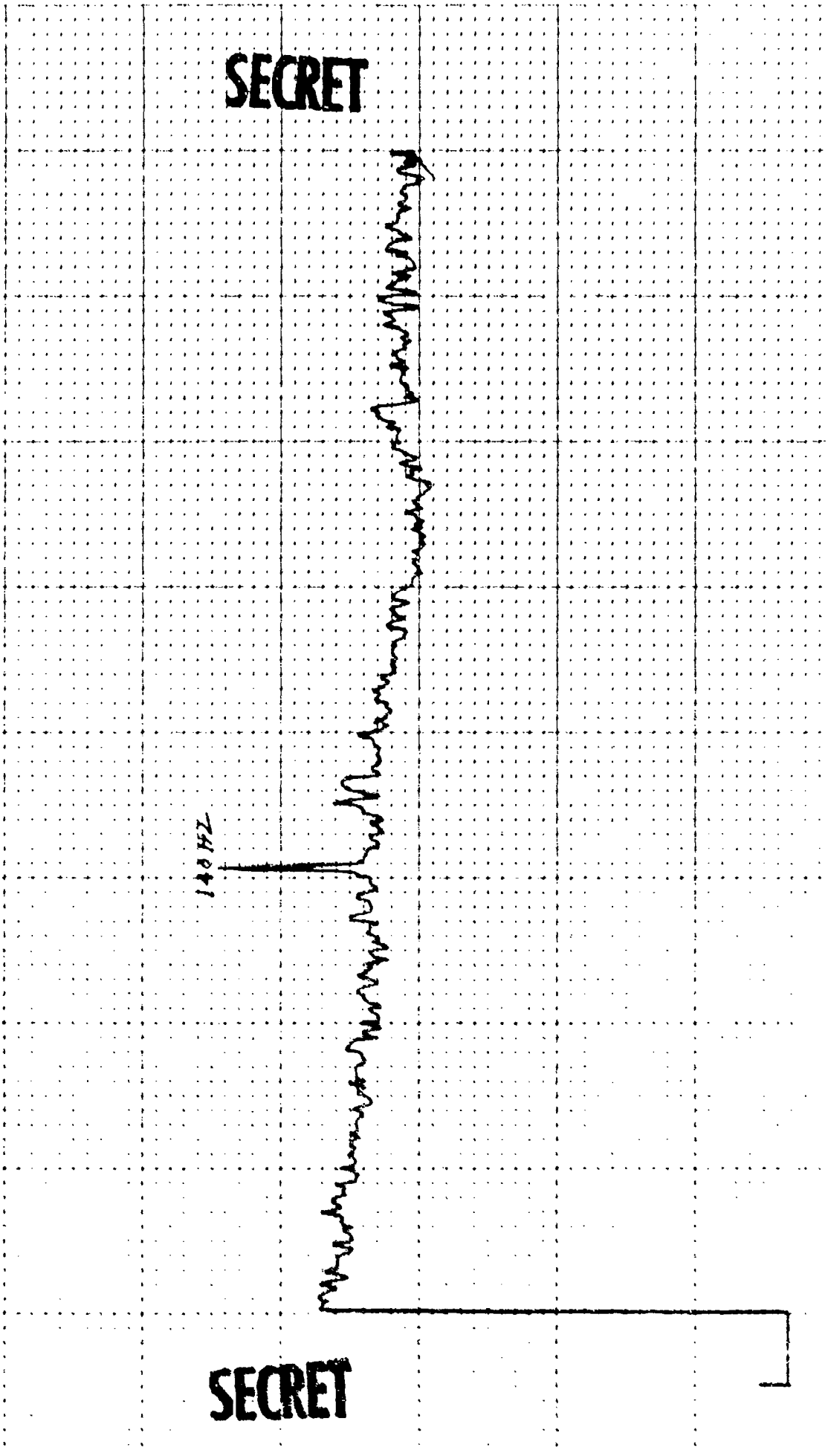
DEG AZ STEERING



45 0703

K-E 27-1549 (9)

CONTROL: 27-1549 (9) DATE OF ANALYSIS: REEL: F/9 INDEX 3050
 OMNI SPECTRUM (ELEMENT 19) DATE/TIME: 2-7-77 - 1549Z INTEGRATION TIME 320 SECS ATTN: DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 CENTER FREQ: 150 KZ DEG AZ STEERING



SECRET

SECRET

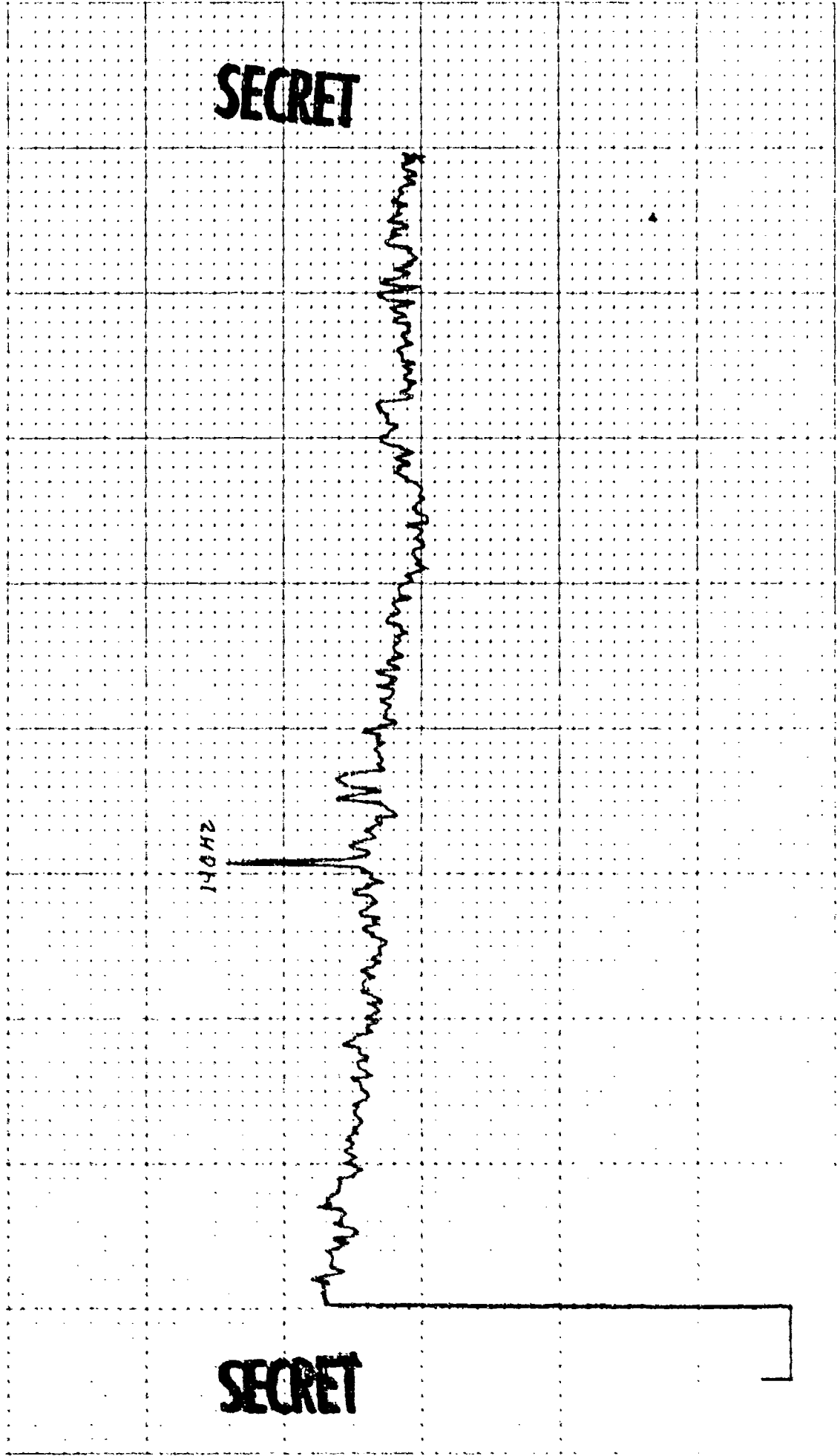
46 0703

KOE 2-7-77 1549Z

CONTROL: 2-7-1549 (10) DATE OF ANALYSIS: REEL: F19 INDEX 3050
 OMNI SPECTRUM (ELEMENT 20)
 EXERCISE: BZARING STAKE
 CENTER FREQ: 150 HZ
 1 ELEMENT

INTEGRATION TIME 320 SECS ATTN: DB
 FILTER WTG: HANNING

DATE/TIME: 2-7-77 -1549Z
 ANALYSIS BANDWIDTH: 1/10HZ
 ———— DEG AZ STEERING



46 0703

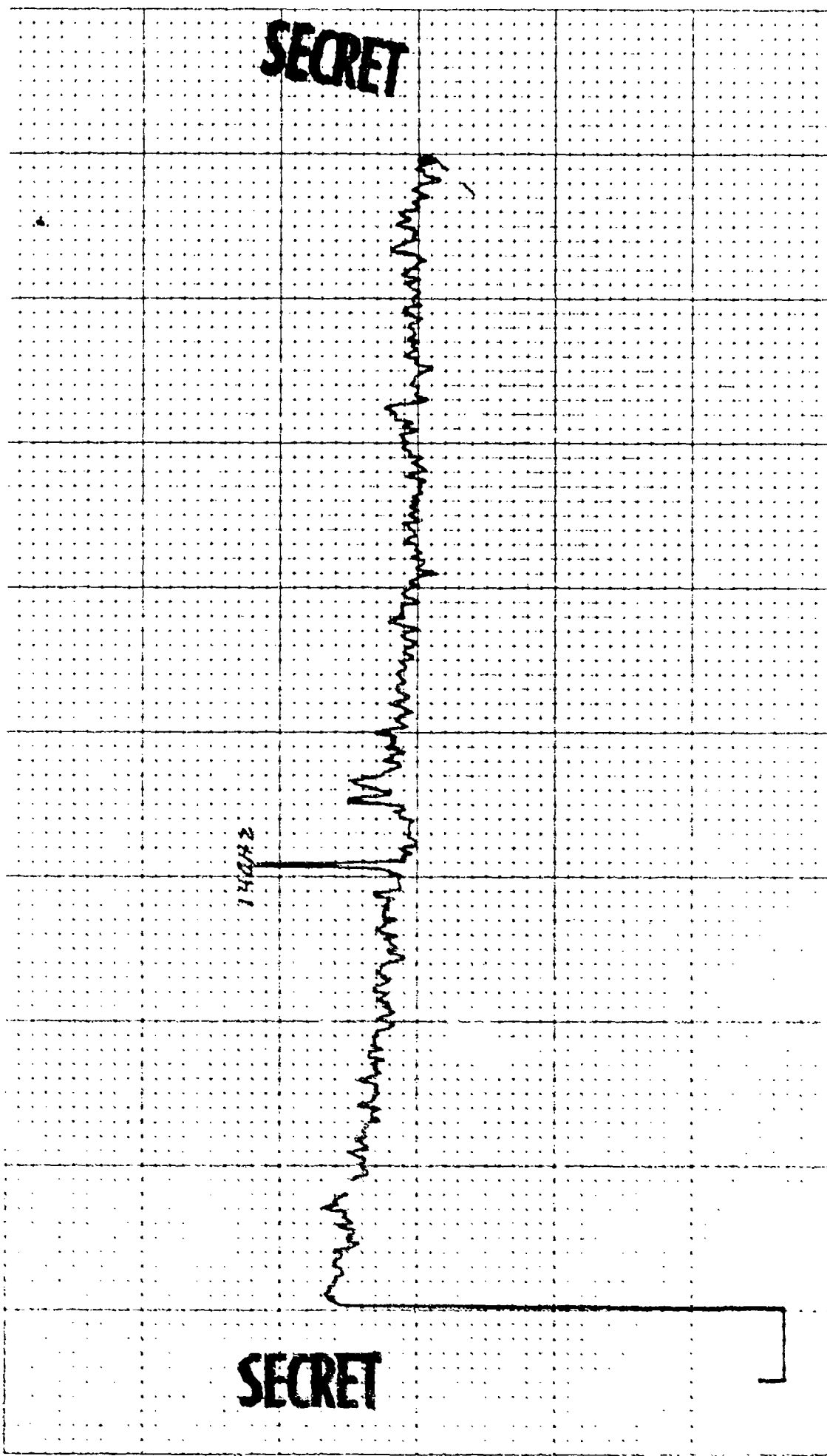
CONTROL: 2.7 - 1544 (11)
OMNI SPECTRUM (ELEMENT 23)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 041 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

REEL: F11 INDEX 305

INTEGRATION TIME 320 SECS ATTEN: DB
FILTER WTG: HANNING

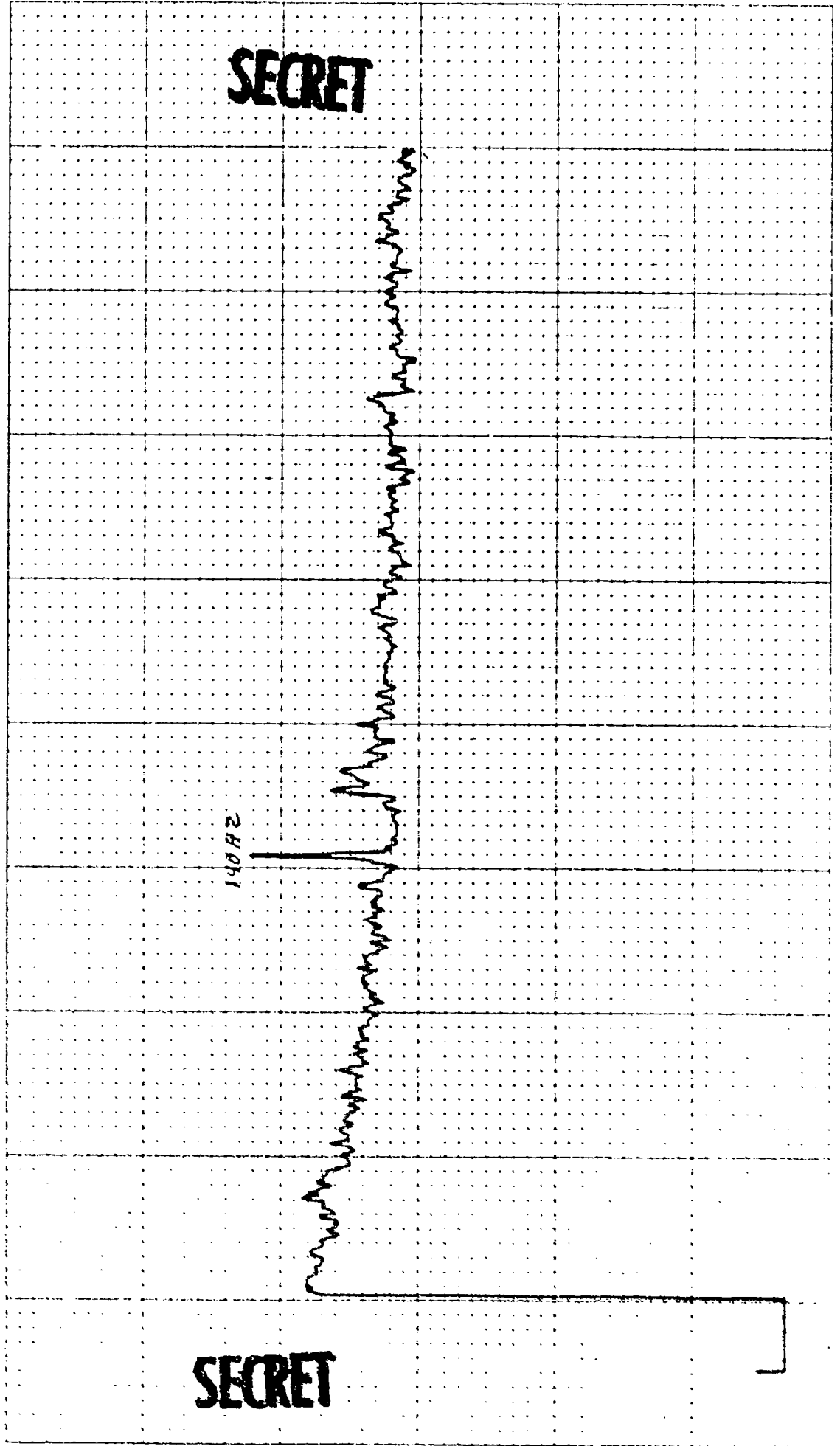


46 0703

REF ID: A66887

CONTROL: 2-7 -1549 (12) DATE OF ANALYSIS: REEL: F19 INDEX J050
 OMNI SPECTRUM (ELEMENT 24)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 I ELEMENT

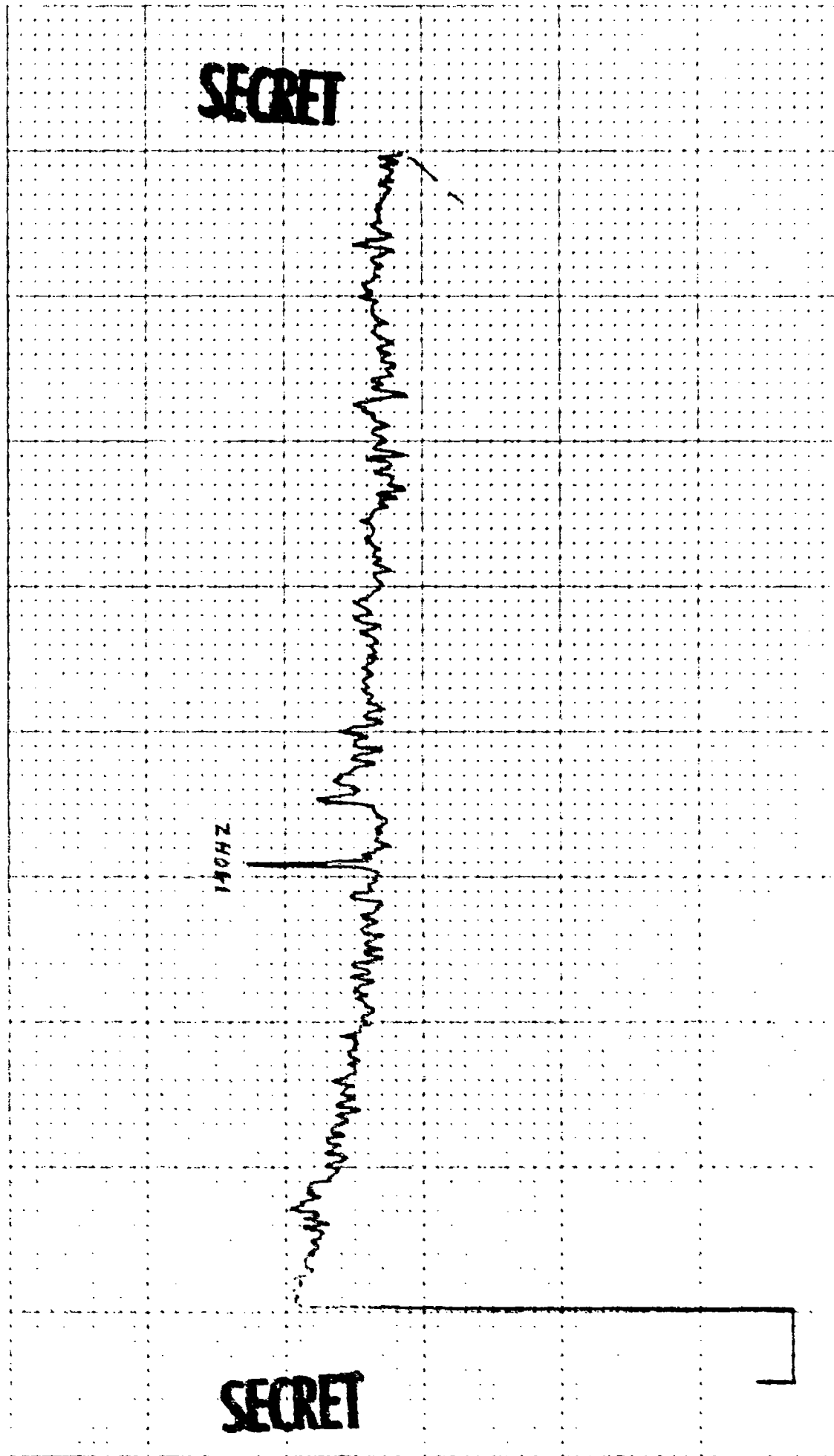
DATE/TIME: 2-7-77 -1549Z INTEGRATION TIME 320 SECS ATTN: DB
 ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 ———— DEG AZ STEERING



46 0703

REF ID: A66888

CONTROL: 1549 - 5/ (DPS)
 OMNI SPECTRUM (ELEMENT 26)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 DATE OF ANALYSIS:
 DATE/TIME: 2-7-77 - 1549 Z
 ANALYSIS: BANDWIDTH: 1/10HZ
 — DEC AZ STEERING
 REEL: F19 INDEX 3050
 INTEGRATION TIME 320 SECS ATTEN: - DB
 FILTER WTC: HANNING



46 0703

REF ID: A66703

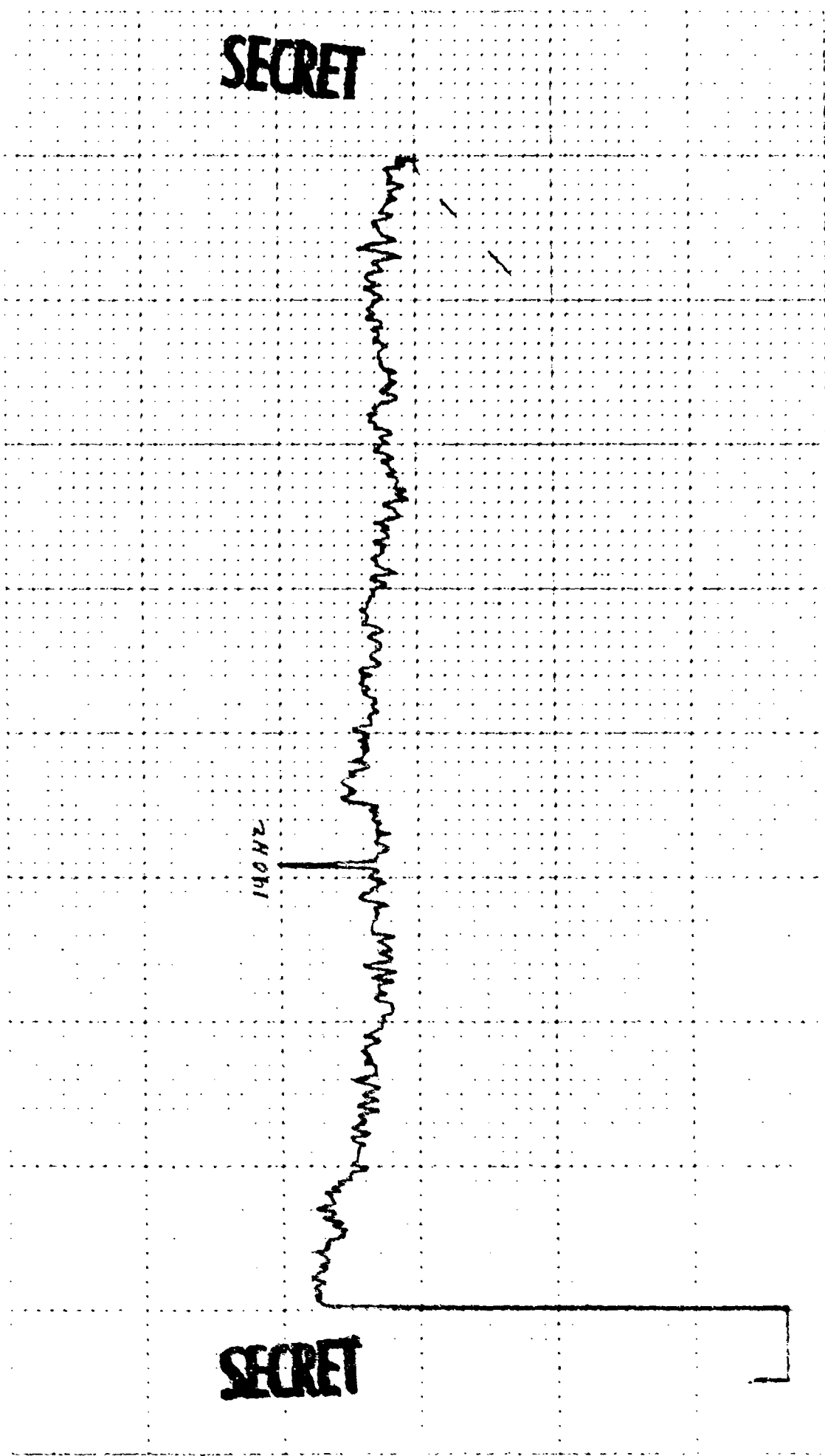
CONTROL: 2-7 - 15M (IV)
OMNI SPECTRUM (ELEMENT 29)
EXERCISE: BEARING STAVE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-77 - 15 49 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG. AZ. SCEEPING

PEEL: F/1 INDEX 305

INTEGRATION TIME 320 SECS ATTEN: DB
FILTER WIG: HANNING



SECRET

SECRET

46 0703

10-E 27-72 2000-2000-2000

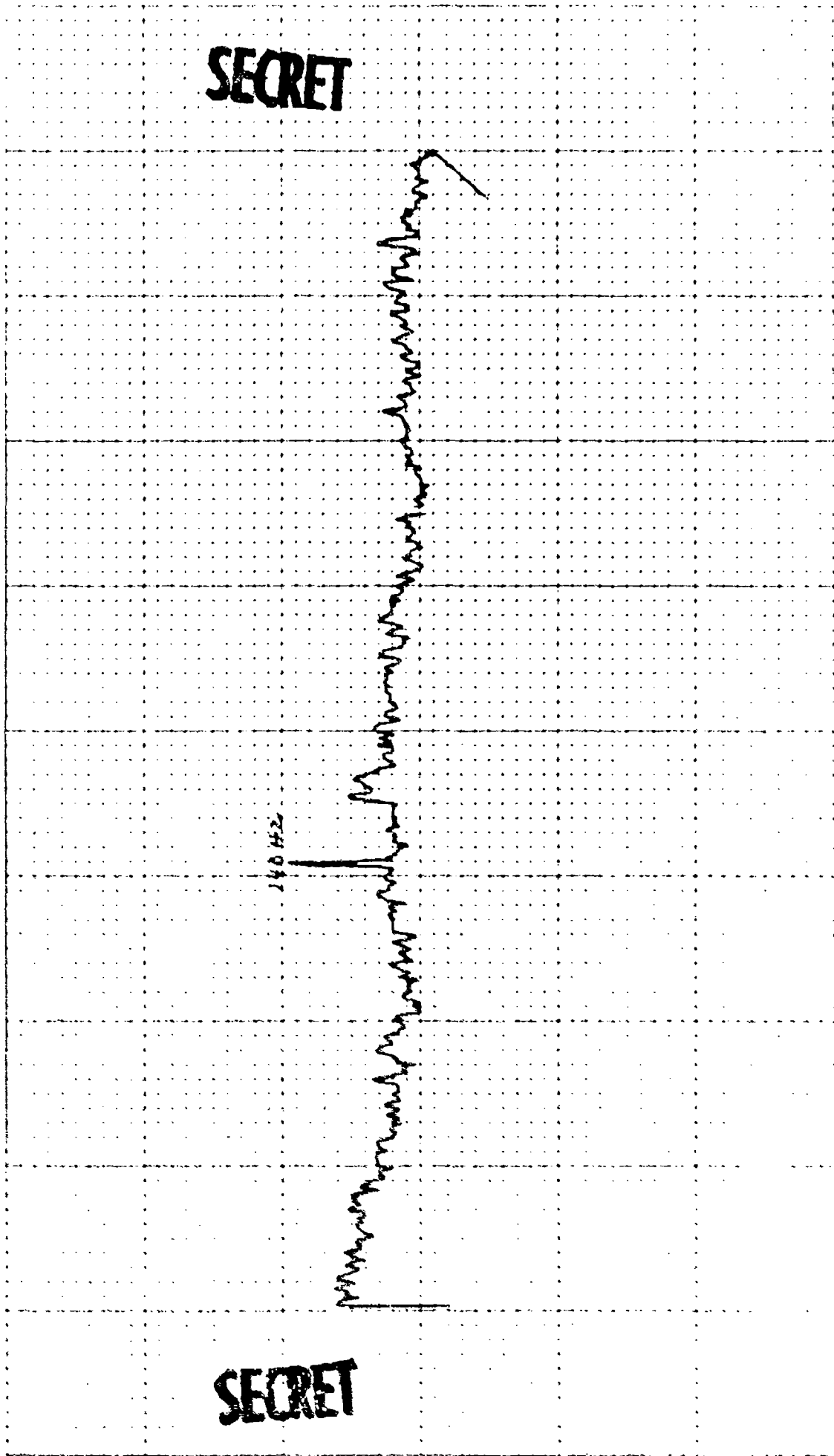
CONTROL: 27 - 1549 (15) DATE OF ANALYSIS: REEL: F19 INDEX: J050

OMNI SPECTRUM (ELEMENT 31) DATE/TIME: 27-72 - 1549 Z

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

CENTER FREQ: 150 HZ DEG AZ STEERING FILTER WTC: HANNING

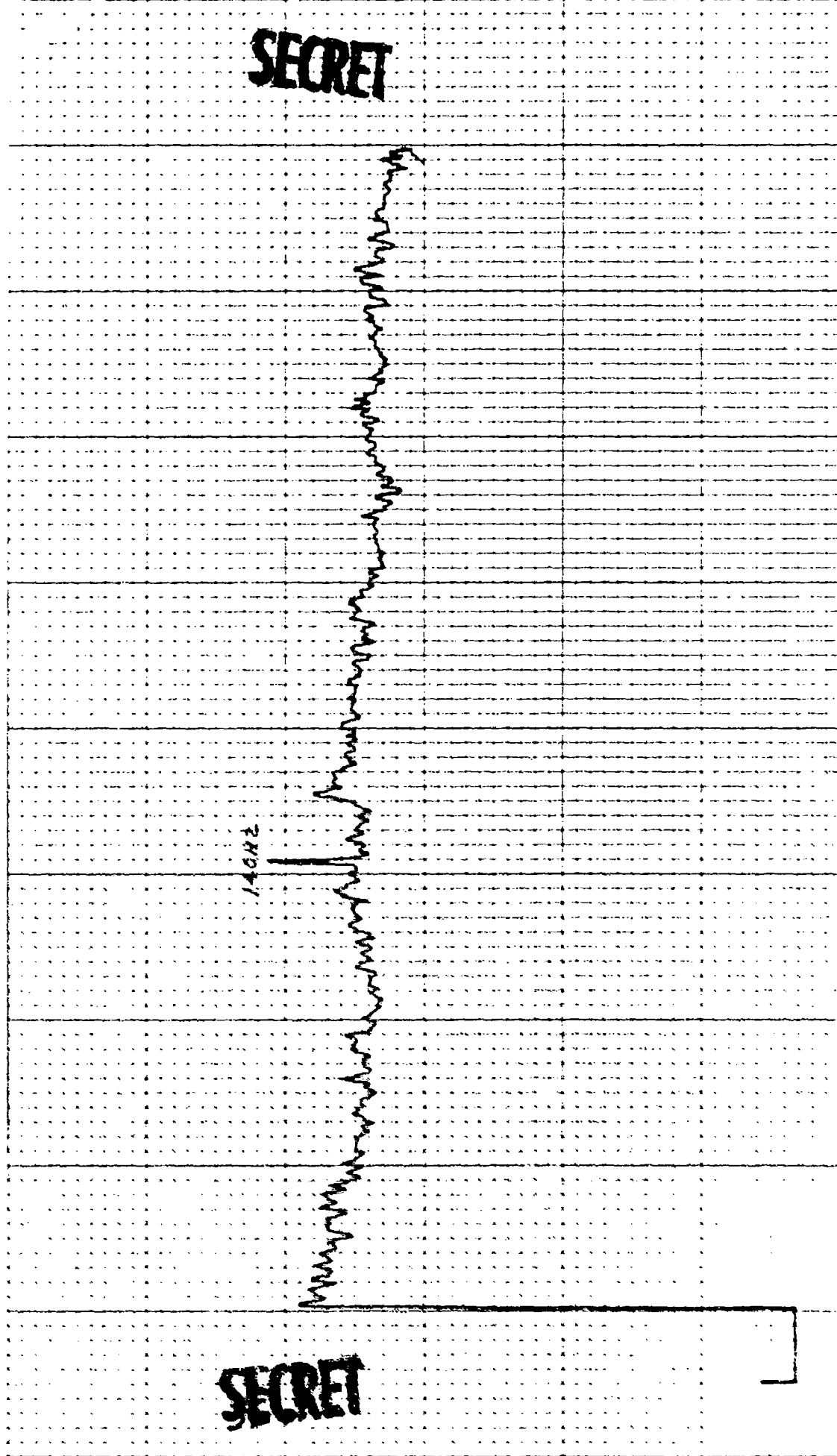
1 ELEMENT



46 0703

10E 12000 TO 100 000 120 000 130 000

CONTROL: 2-7 -1549 (16) DATE OF ANALYSIS: REEL: F19 INDEX 305C
OMNI SPECTRUM (ELEMENT 7J)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
INTEGRATION TIME 320 SECS ATTEN: - DB
FILTER WTG: HANNING
DATE/TIME: 2-7-77 -1549 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING



46 0703

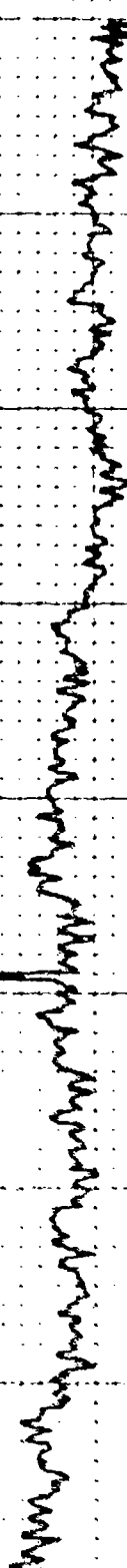
16-E 2700 50703 2700 50703

CONTROL: 2-7 -1549 (17) DATE OF ANALYSIS: REEL: F19 INDEX: 3050
OMNI SPECTRUM(ELEMENT 35)
EXERCISE: BEARING STAKE DATE/TIME: 2-7-27 -1549 Z
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTEN: DB
1 ELEMENT DEG AZ STEERING FILTER WTC: HANNING

SECRET

SECRET

170HZ



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

46 0703

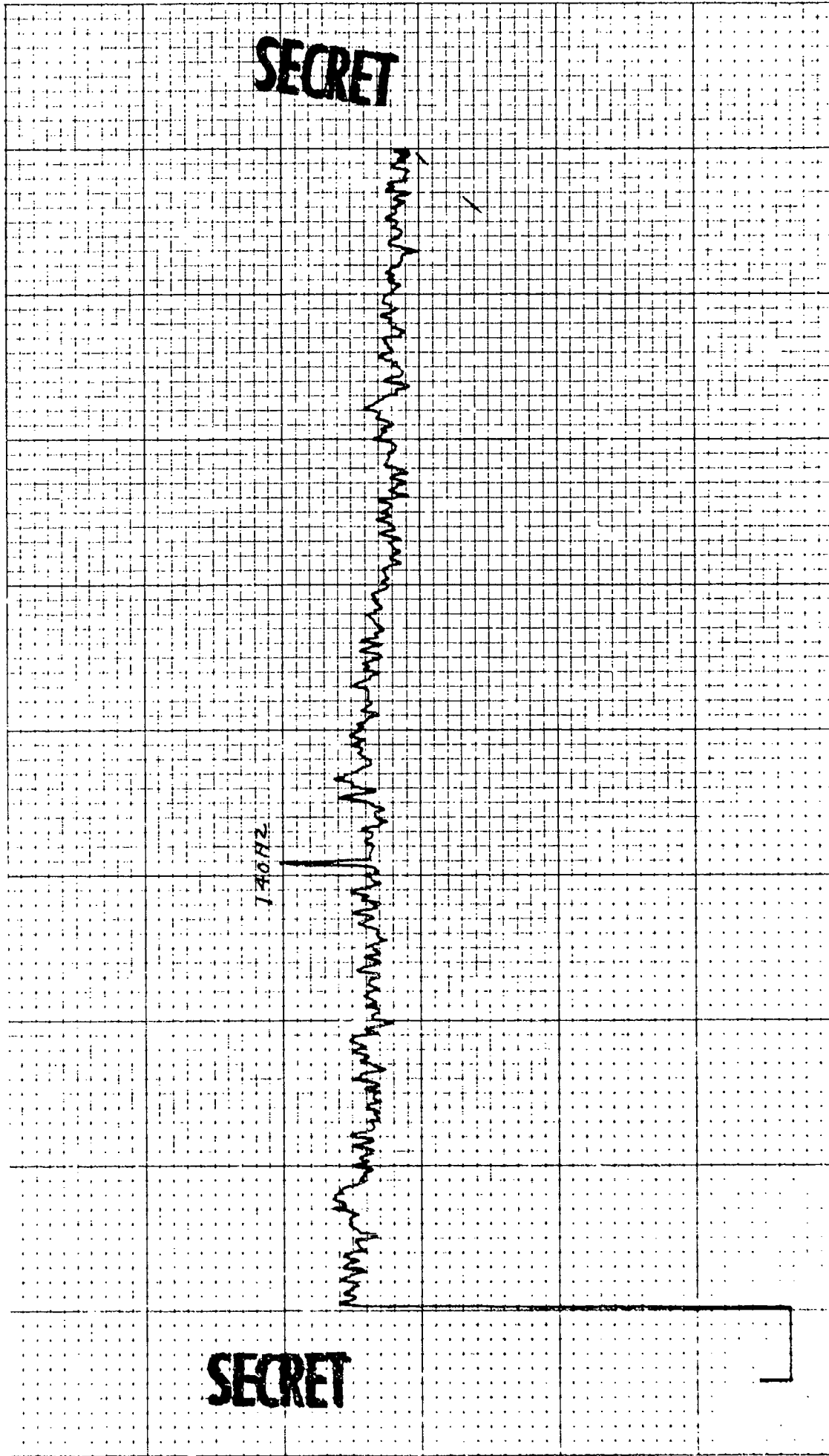
REEL: F19 INDEX 3050

DATE OF ANALYSIS:

CONTROL: 2-7 -1544 (16)
OMNI SPECTRUM (ELEMENT 37)
EXERCISE: BEARING SLAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE/TIME: 2-7-77 -1549Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

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



46 0703

KOE 11/10/54

CONTROL: 2-7 -1544 (19)
 OMNI SPECTRUM(ELEMENT 39)
 EXERCISE: BEARING STAVE
 CENTER FREQ: 150 HZ
 I ELEMENT

DATE OF ANALYSIS:
 DATE/TIME: 2-2-77 -1549 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 _____ DEG AZ STEERING

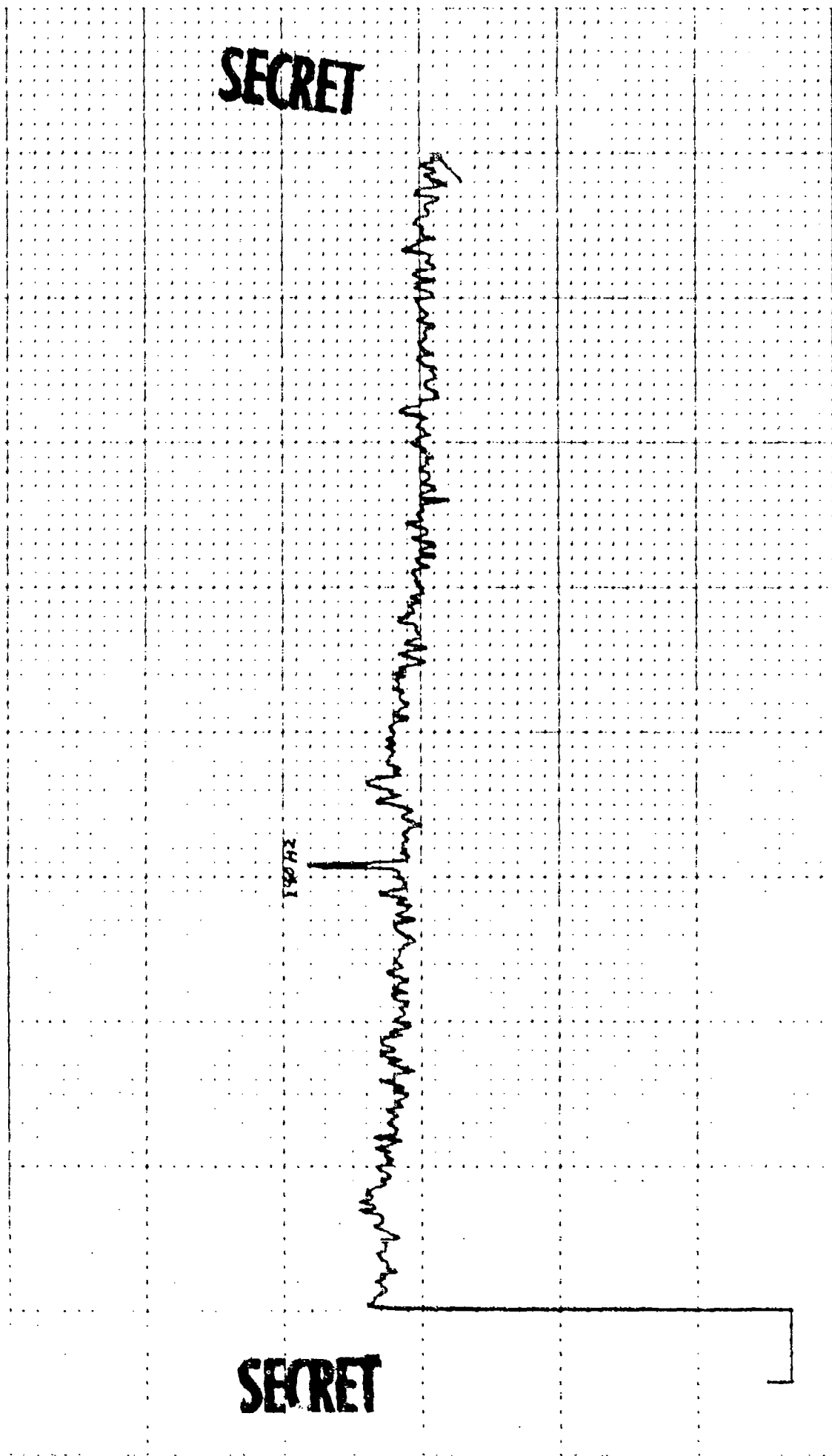
REEL: F19 INDEX 3050

INTEGPAATION TIME 320 SECS
 FILIER WIG: HANNING

AITEN: DB

SECRET

SECRET



46 0703

MSE of the State of...

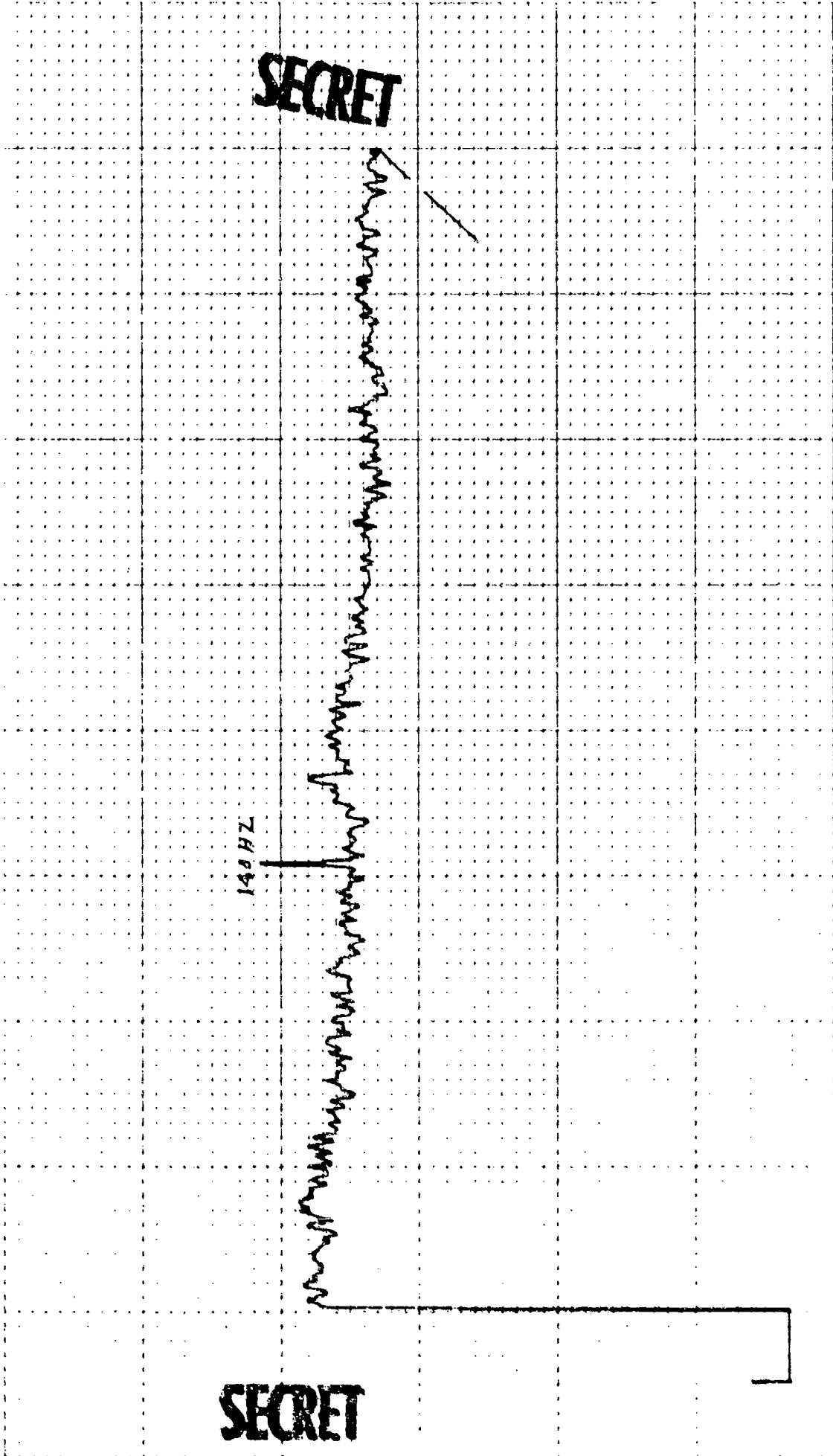
CONTROL: 2.7 - 1549 (20)
 OMNI SPECTRUM (ELEMENT 41)
 EXERCISE: BEARING, STAKE
 CENTER FREQ: 150 HZ
 I ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 1549 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: F19 INDEX 3050

INTEGRATION TIME 320 SECS ATTEN: DB
 FILTER WIG: HANNING



SECRET

140 HZ

SECRET

45 0703

McE 5.4.71 TO THE ROOMS...

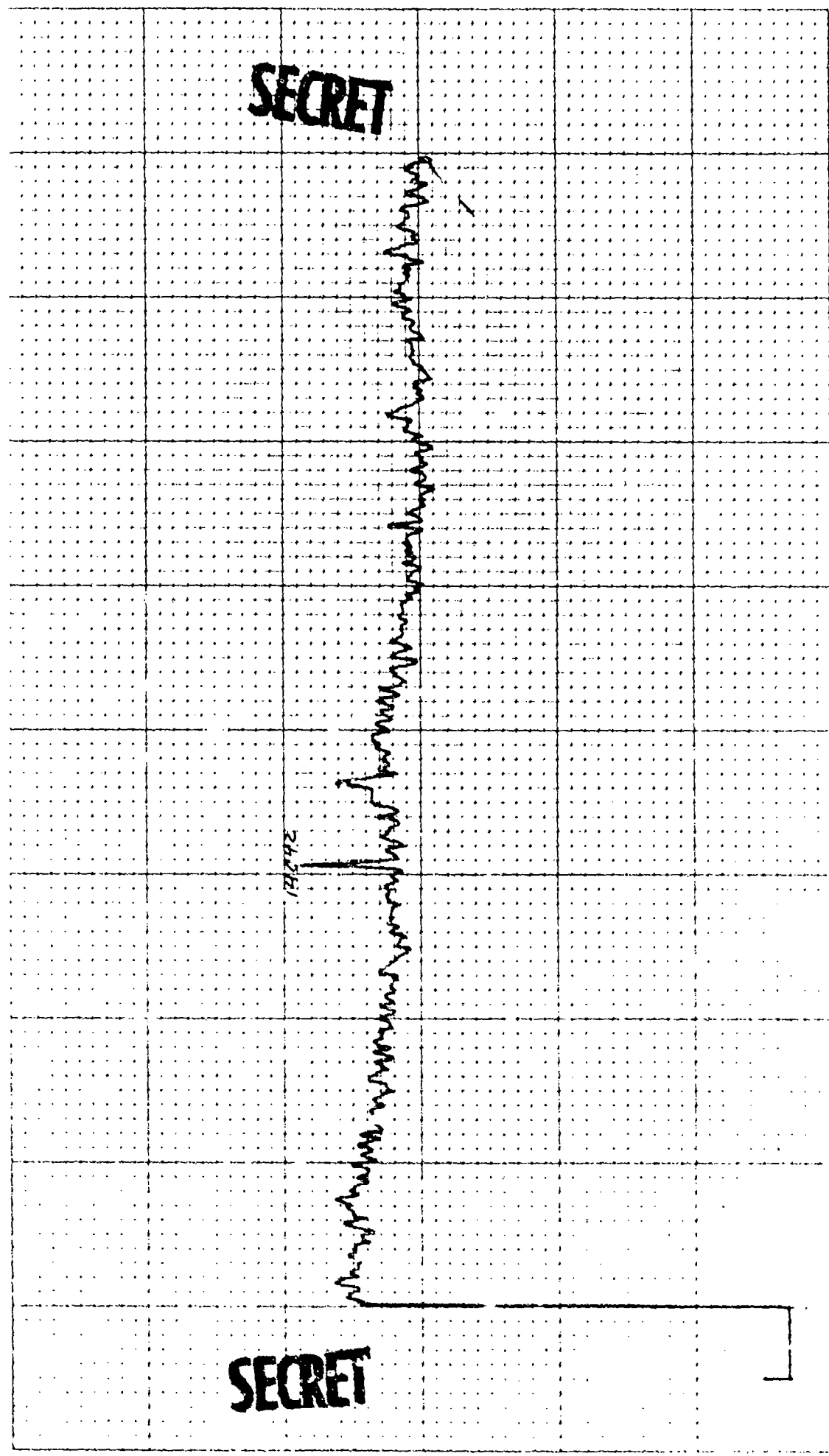
CONTROL: 2.7 - 1500 (21)
OMNI SPECTRUM (ELEMENT 47)
EXERCISE: BEARING STAGE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 1544 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEC AZ STEERING

REEL: F/9 INDEX 3050

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING



46 0703

KOE REF TO THE INCHES OF THE

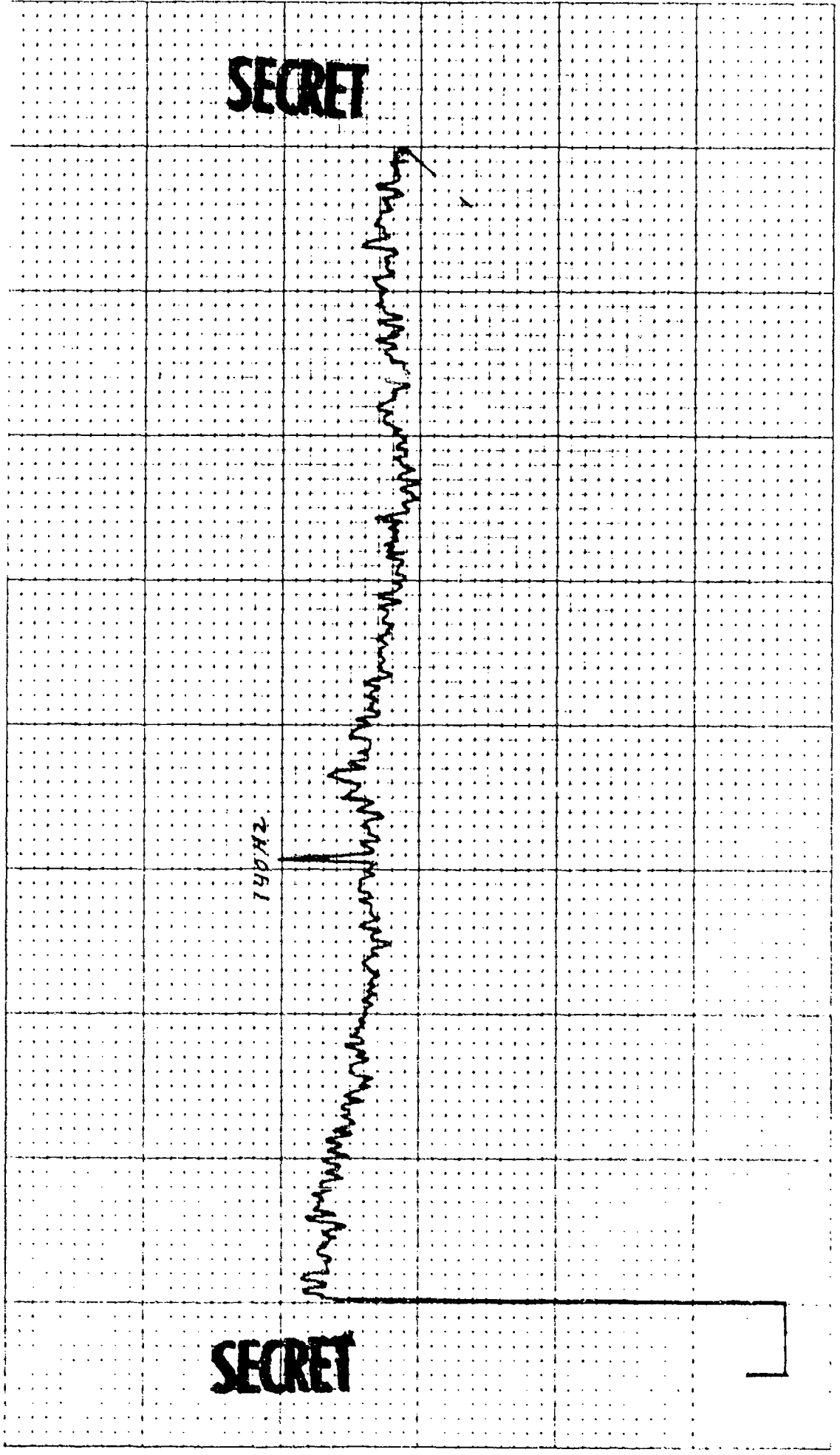
CONTROL: 27 -1549 (22)
OMNI SPECTRUM (ELEMENT 45)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
I ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -1549 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

REEL: F19 INDEX J050

INTEGRATION TIME 320 SECS
FILTER WTG: HANNING



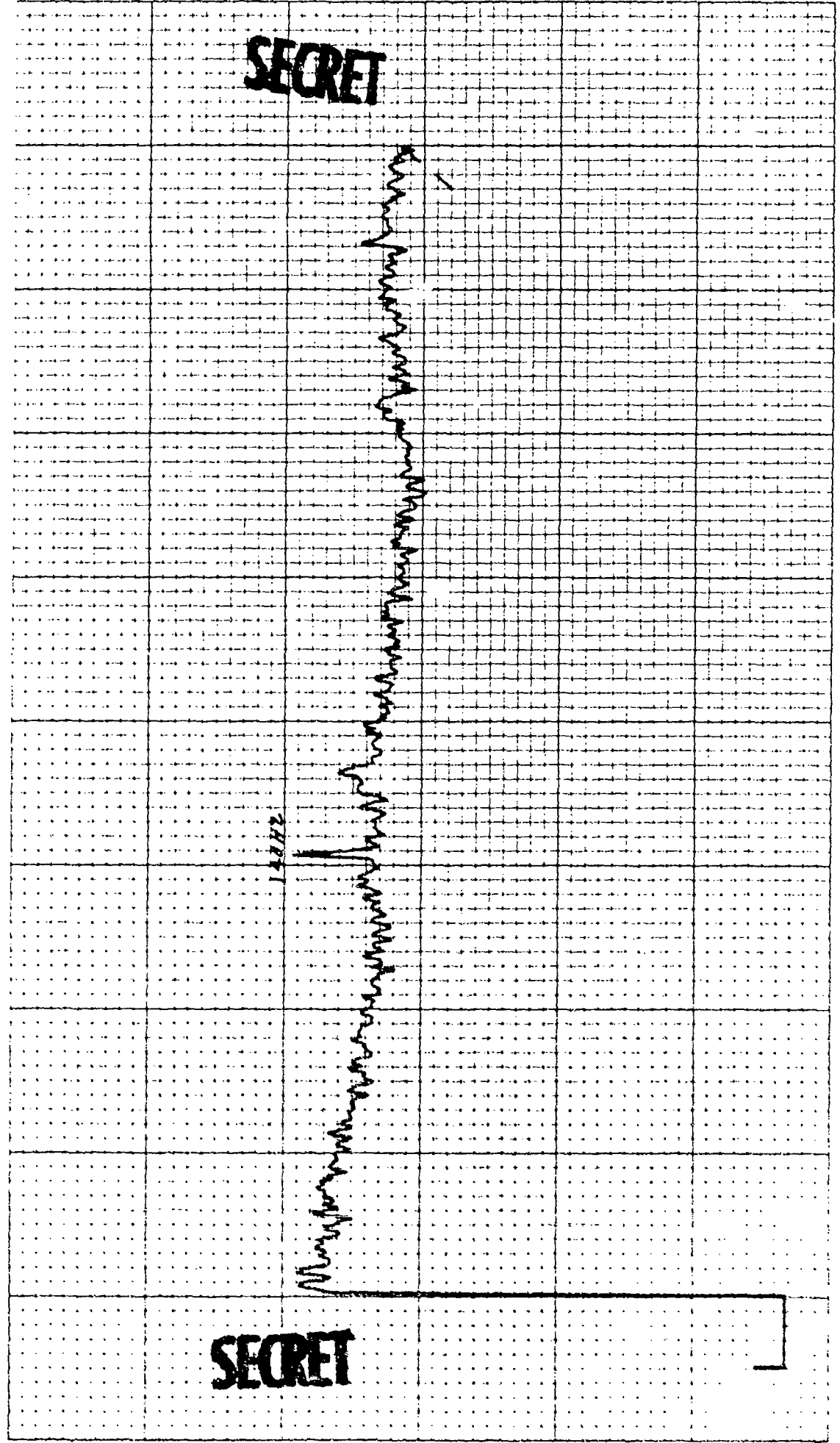
SECRET

SECRET

KOE 1/2 INCH TO THE INCH
PERFEL SYSTEM CO. 444 4th St. N.W.

46 0703

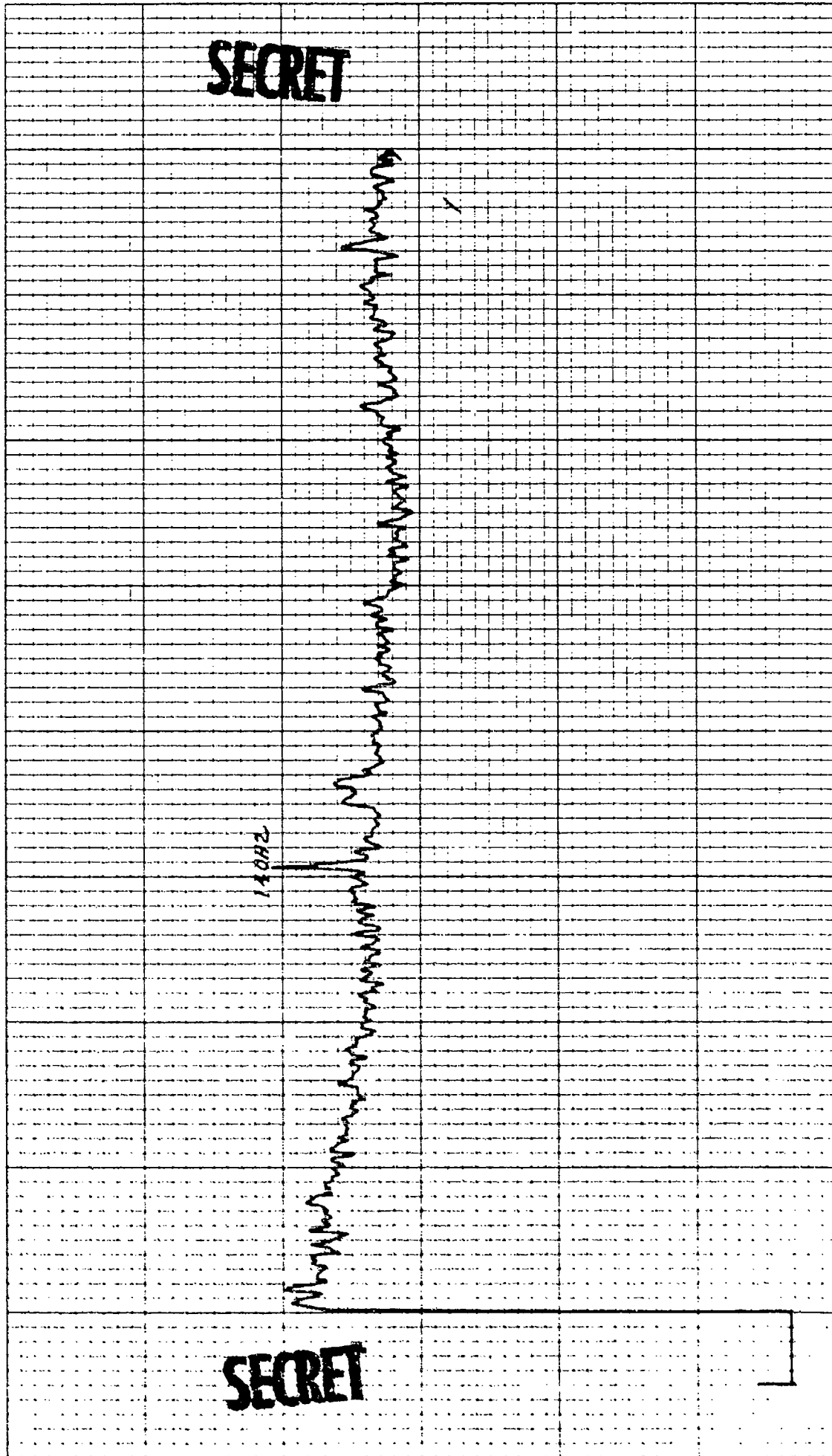
CONTROL: 2-7 -1549 (23) DATE OF ANALYSIS: REEL: F19 INDEX J050
OMNI SPECTRUM (ELEMENT 47)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: DB
1 ELEMENT — DEG AZ STEERING FILTER WTG: HANNING



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

46 0703

CONTROL: 2-7 -1549 (24) DATE OF ANALYSIS: REEL: F19 INDEX 3050
OMNI SPECTRUM (ELEMENT 49)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
INTEGRATION TIME 320 SECS ATTN: DB
ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTC: HANNING
1 ELEMENT DEC AZ STEERING



46 0703

REF ID: A66828

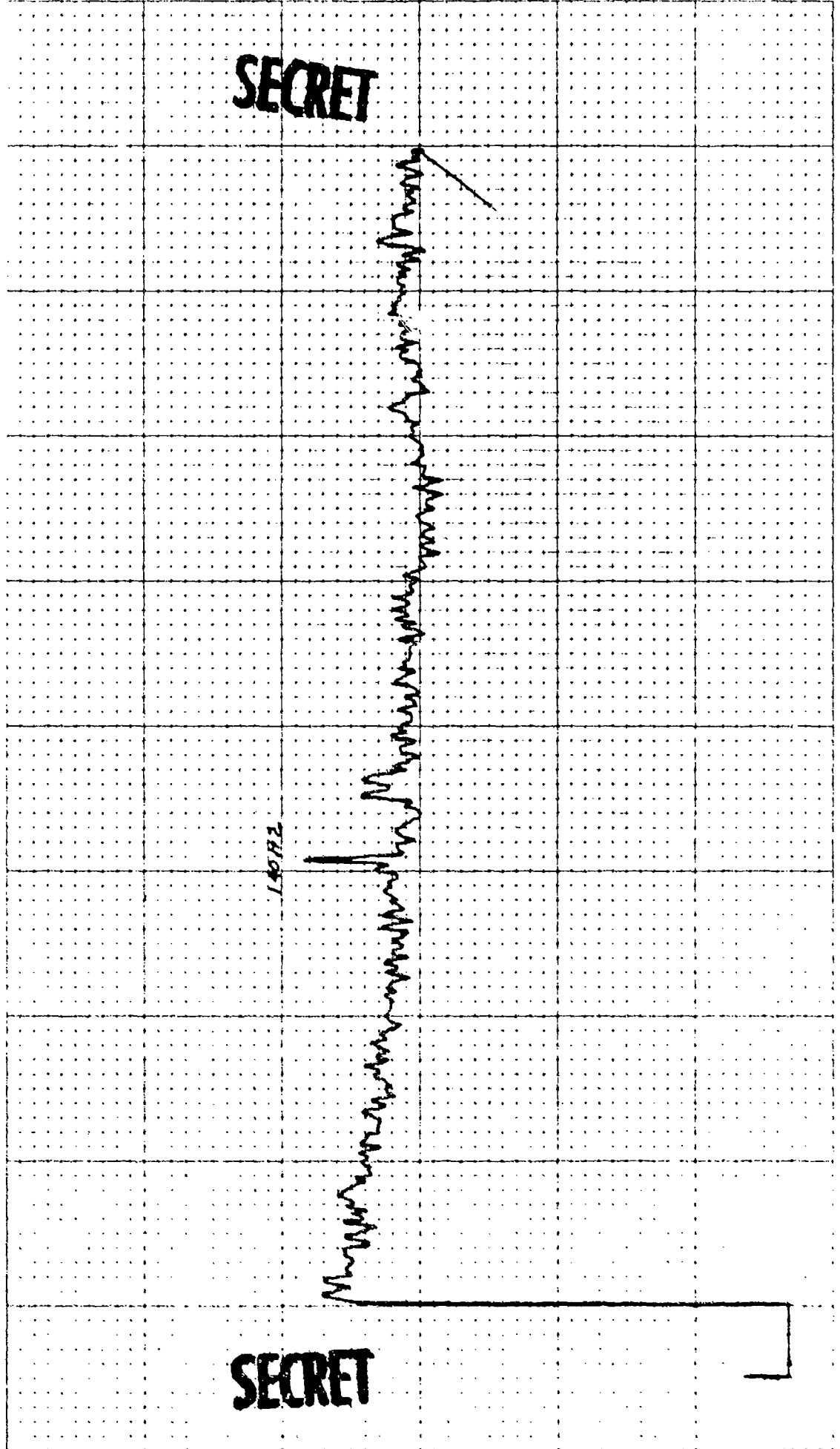
CONTROL: 2.7 - 1549 (25)
OMNI SPECTRUM (ELEMENT 51)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10HZ
_____ DEG AZ STEERING

REEL: Fig INDEX: 3050

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING



46 0703

REF ID: A66000

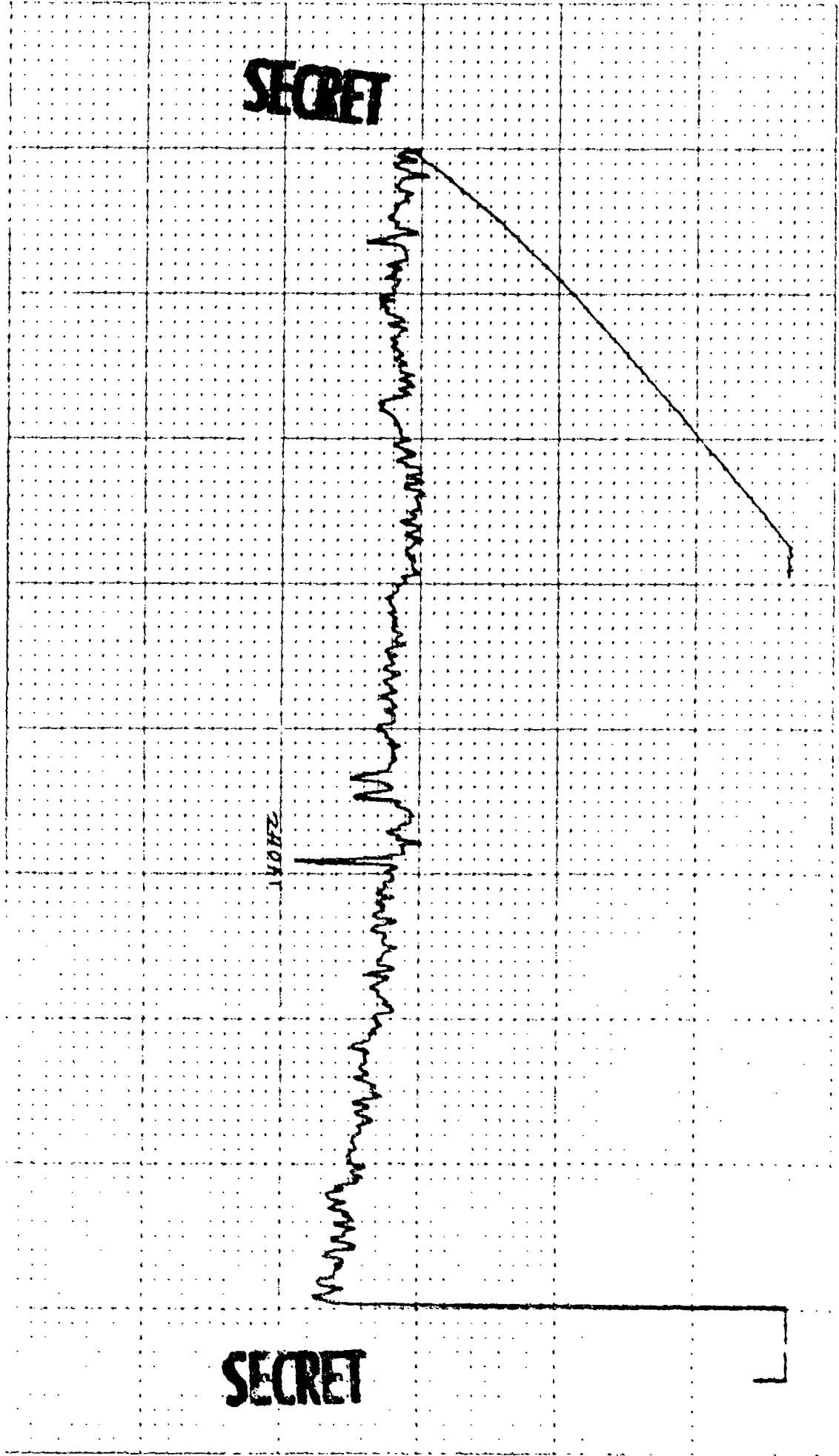
CONTROL: 2.7 - 1549 (26)
OMNI SPECTRUM (ELEMENT 53)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEC AZ STEERING

REEL: F/1 INDEX J-5

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



SECRET

SECRET

46 0703

CONTROL: 2-7 -1500 (27)
OMNI SPECTRUM(ELEMENT 2)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

DATE OF ANALYSIS:

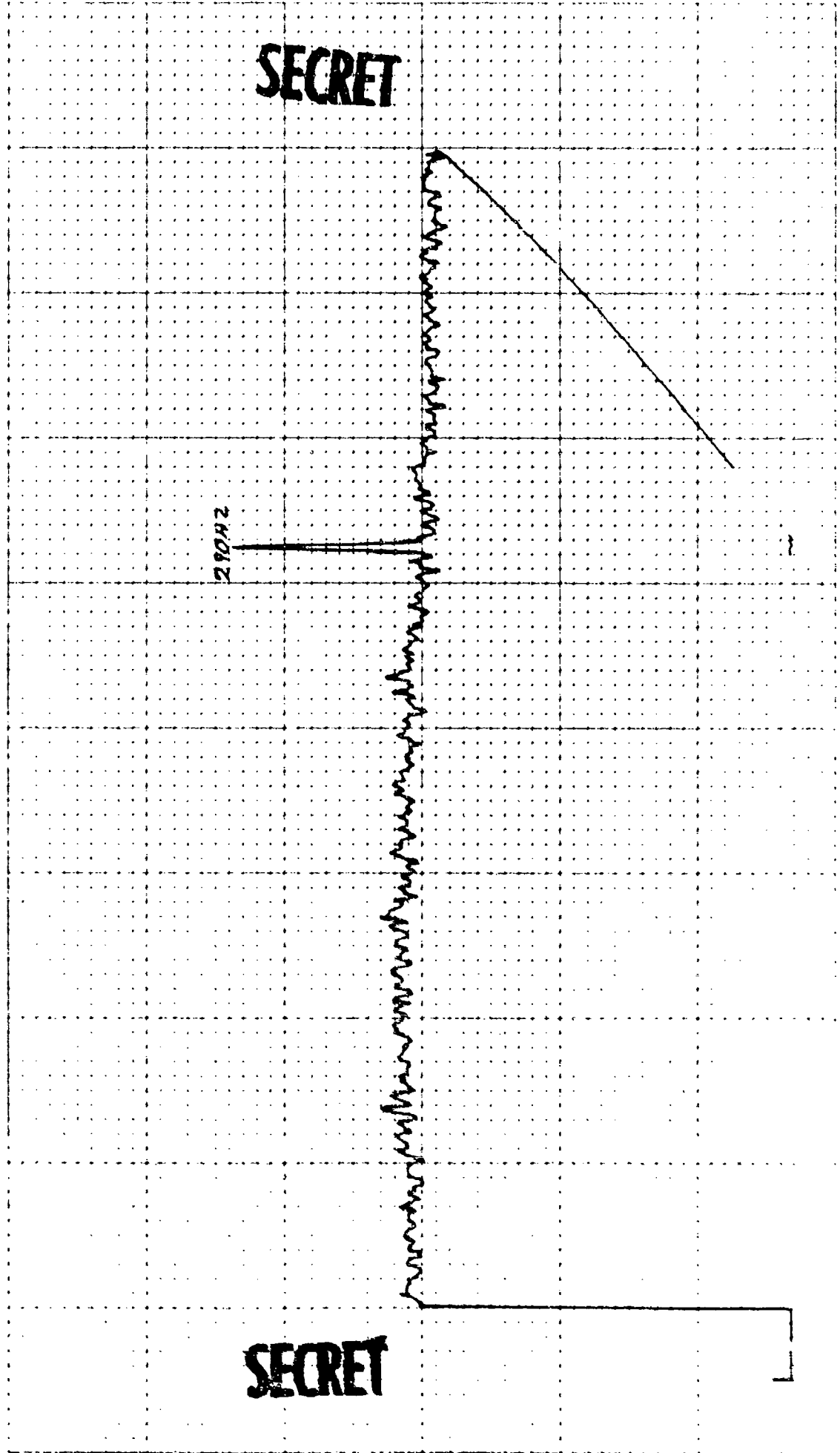
DATE/TIME: 2-7-77 -1549 Z

ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

REEL: F19

INDEX 3050

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER WTG: HANNING



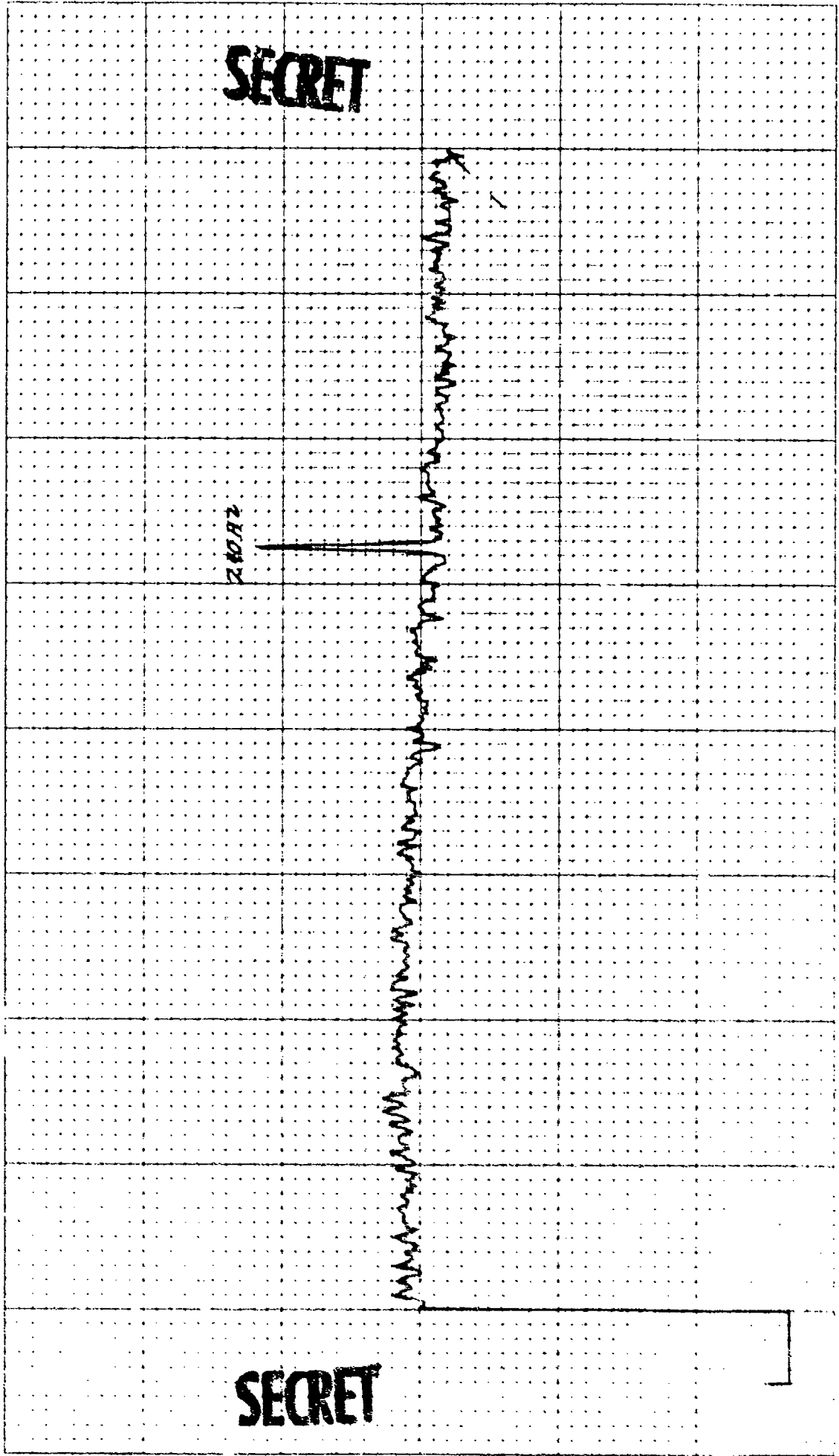
SECRET

SECRET

46 0703

KOE

CONTROL: 2-7 -1549 (20) DATE OF ANALYSIS: REEL: F.9 INDEX 3050
 OMNI SPECTRUM (ELEMENT 4)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ INTEGRATION TIME 320 SECS ATTN: DB
 I ELEMENT _____ FILTER WIG: HANNING
 ANALYSIS BANDWIDTH: 1/10HZ _____ DEG AZ STEERING



280HZ

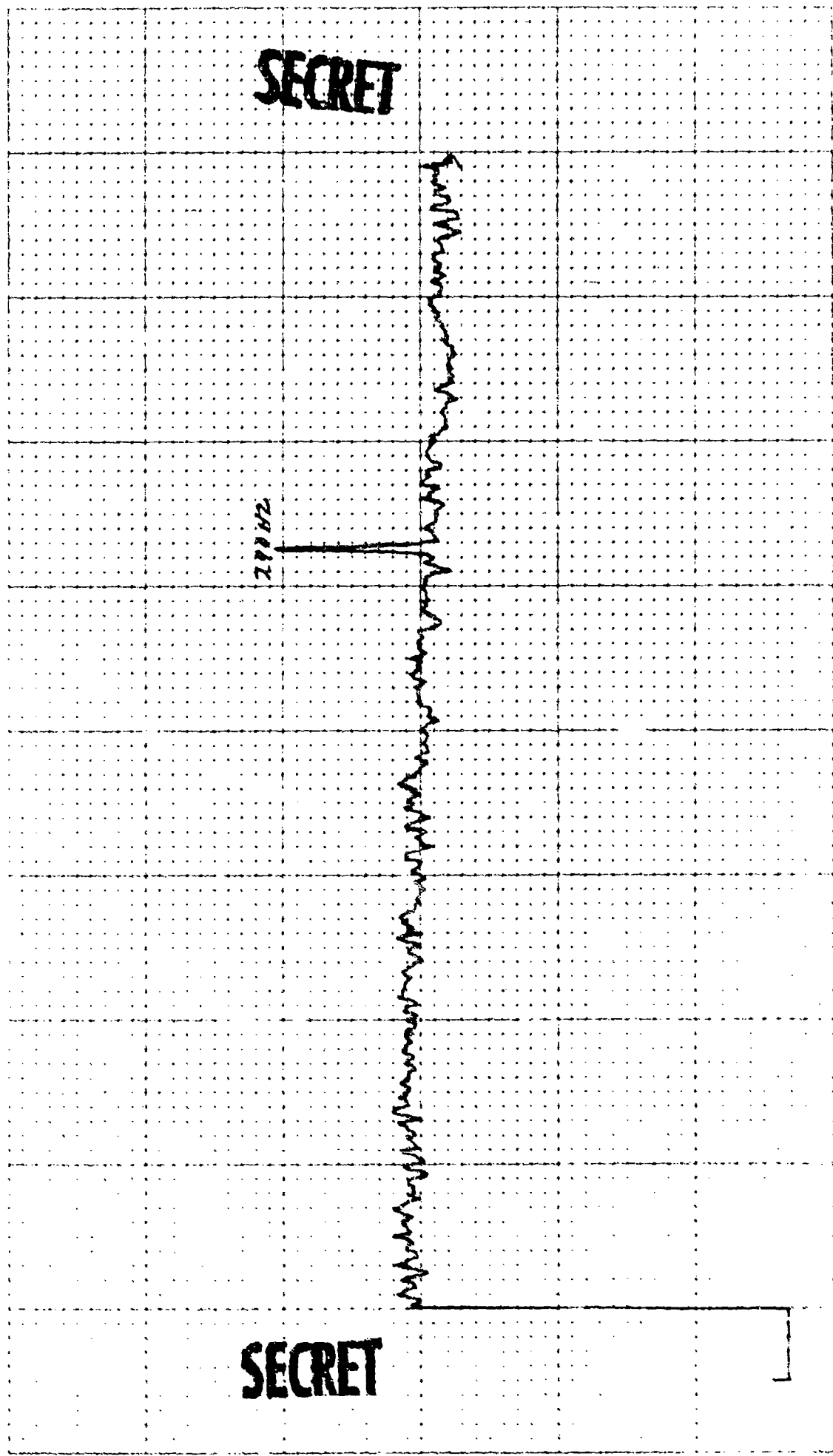
SECRET

SECRET

46 0703

ME 2-7-77 1548 (20)

CONTROL: 2-7 -1548 (20) REEL: F19 INDEX 3050
 OMNI SPECTRUM(ELEMENT 6)
 EXERCISE: BEARING STAKE ATEN: DB
 CENTER FREQ: 280 HZ FILTER WTC: HANNING
 1 ELEMENT
 DATE OF ANALYSIS: INTEGRATION TIME 320 SECS
 DATE/TIME: 2-7-77 -1548 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
DEC AZ STEERING



SECRET

SECRET

46 0703

K-E 1-1-68 10:00 AM

CONTROL: 2-7 -1544 (30)
OMNI SPECTRUM (ELEMENT 9)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

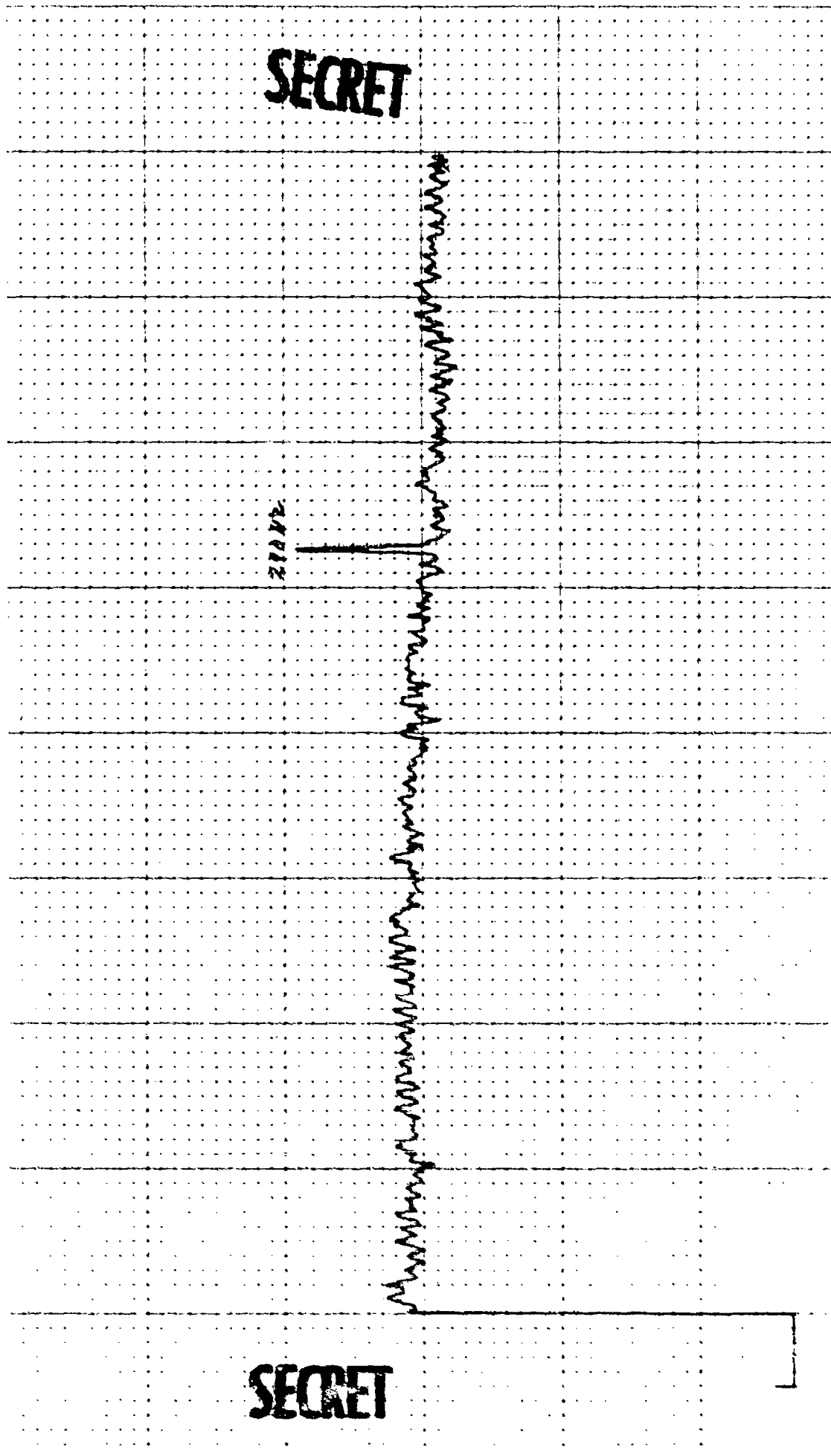
DATE OF ANALYSIS:

DATE/TIME: 2-277 -1549 Z

ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

REEL: F19 INDEX 3050

INTEGRATION TIME 320 SECS ATTN: DB
FILTER MTG: HANNING



SECRET

SECRET

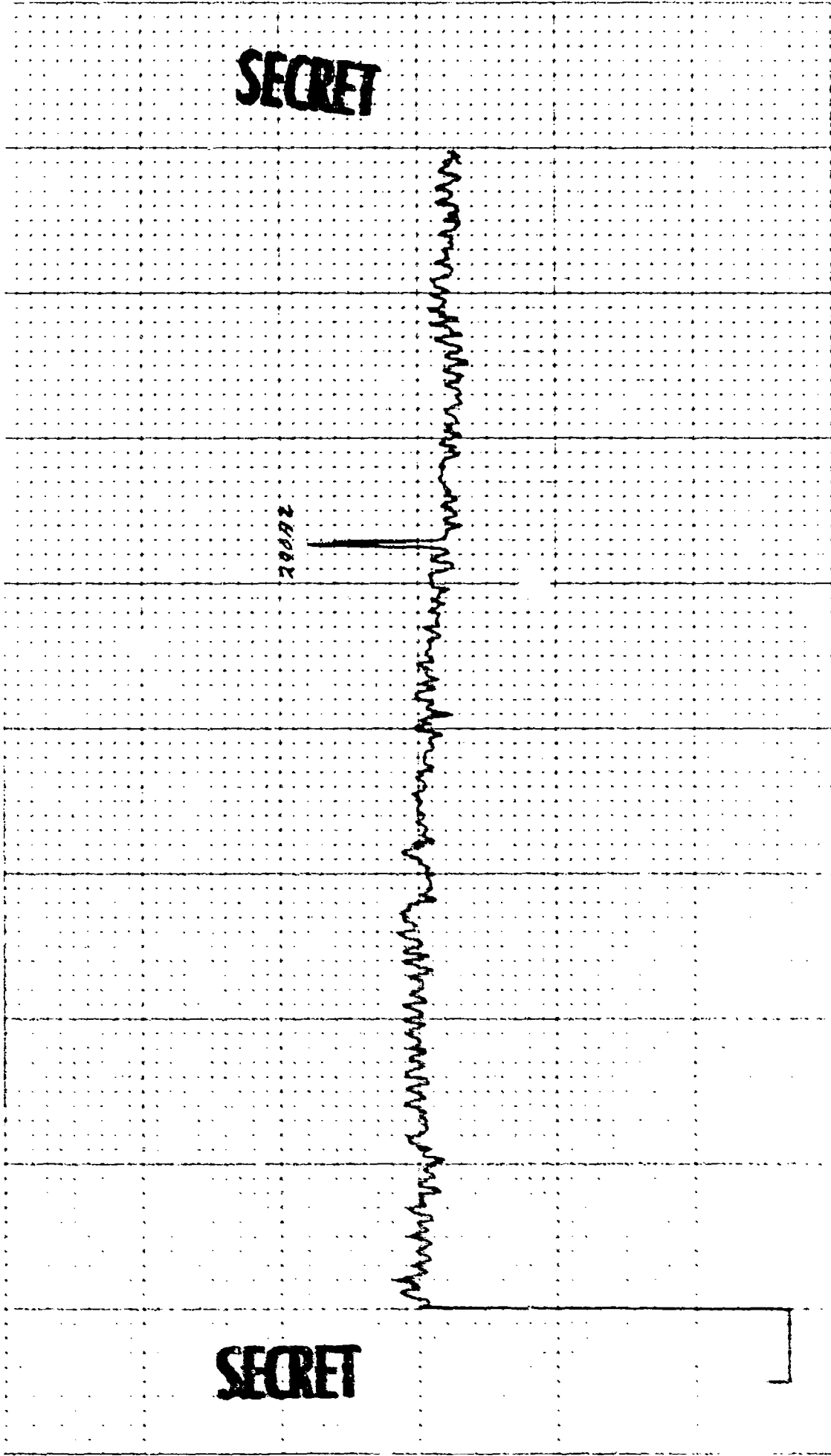
46 0703

CONTROL: 2-7-1597 (2/)
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 1549Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

REEL: F19 INDEX 3050
INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING

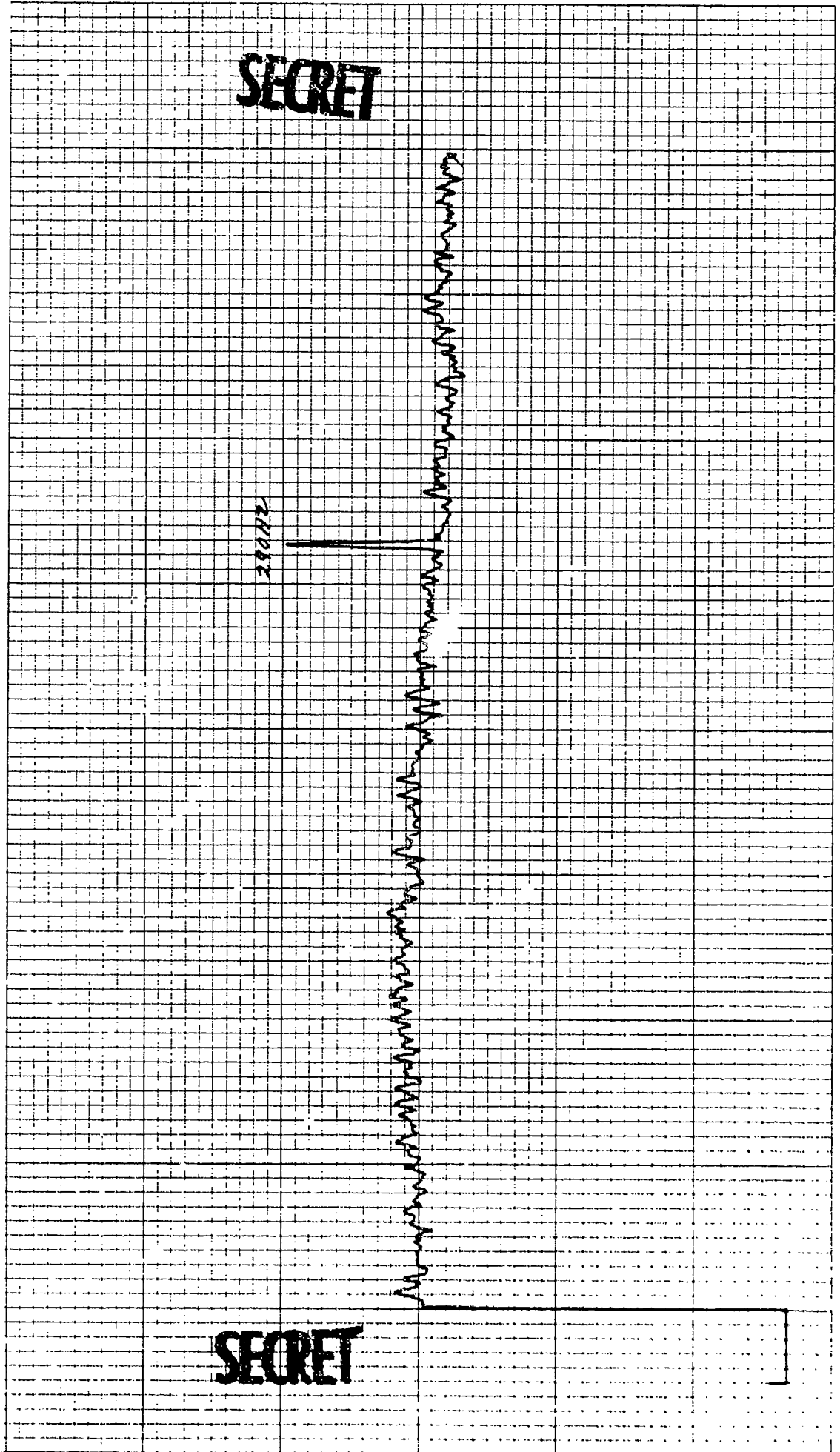


CONTROL: 2-7 -1549 (32)
OMNI SPECTRUM (ELEMENT 12)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -1549Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

REEL: F19 INDEX: 3050
INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING



46 0703

MSE 2-7-77 1549 (33)

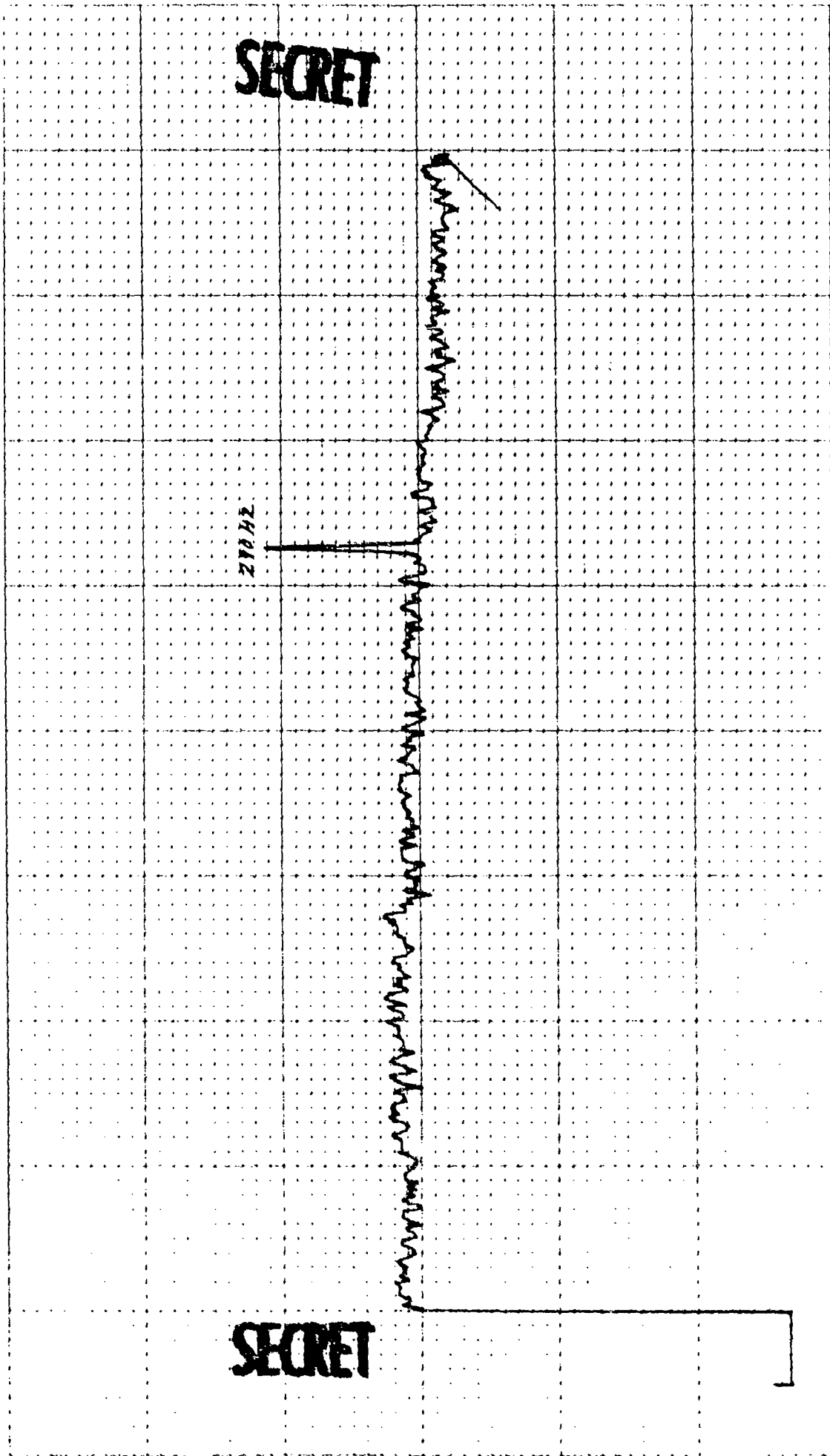
REEL: 519 INDEX 2050

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 1549Z
ANALYSIS BANDWIDTH: 1/10HZ
 DEG AZ STEERING

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

CONTROL: 2-7 -1549 (33)
OMNI SPECTRUM (ELEMENT 14)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT



SECRET

200 HZ

SECRET

46 0703

K02 1/2 IN TO TIME INCH: 1/2 IN PER INCH

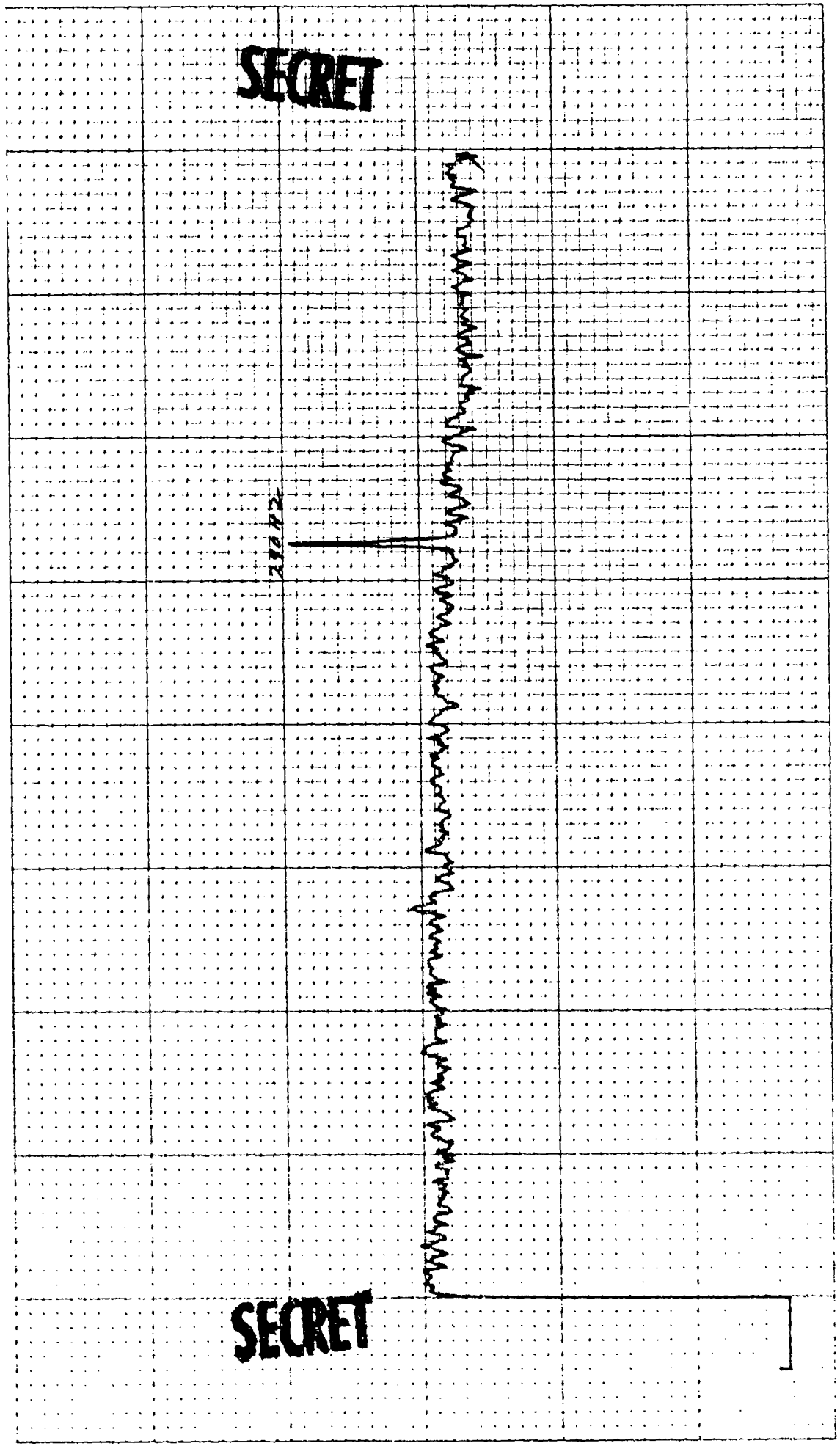
REEL: Flg INDEX 3050

DATE OF ANALYSIS:

CONTROL: 2.7 - 1509 (34)
OMNI SPECTRUM (ELEMENT 16)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE/TIME: 2-7-77 - 1542
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

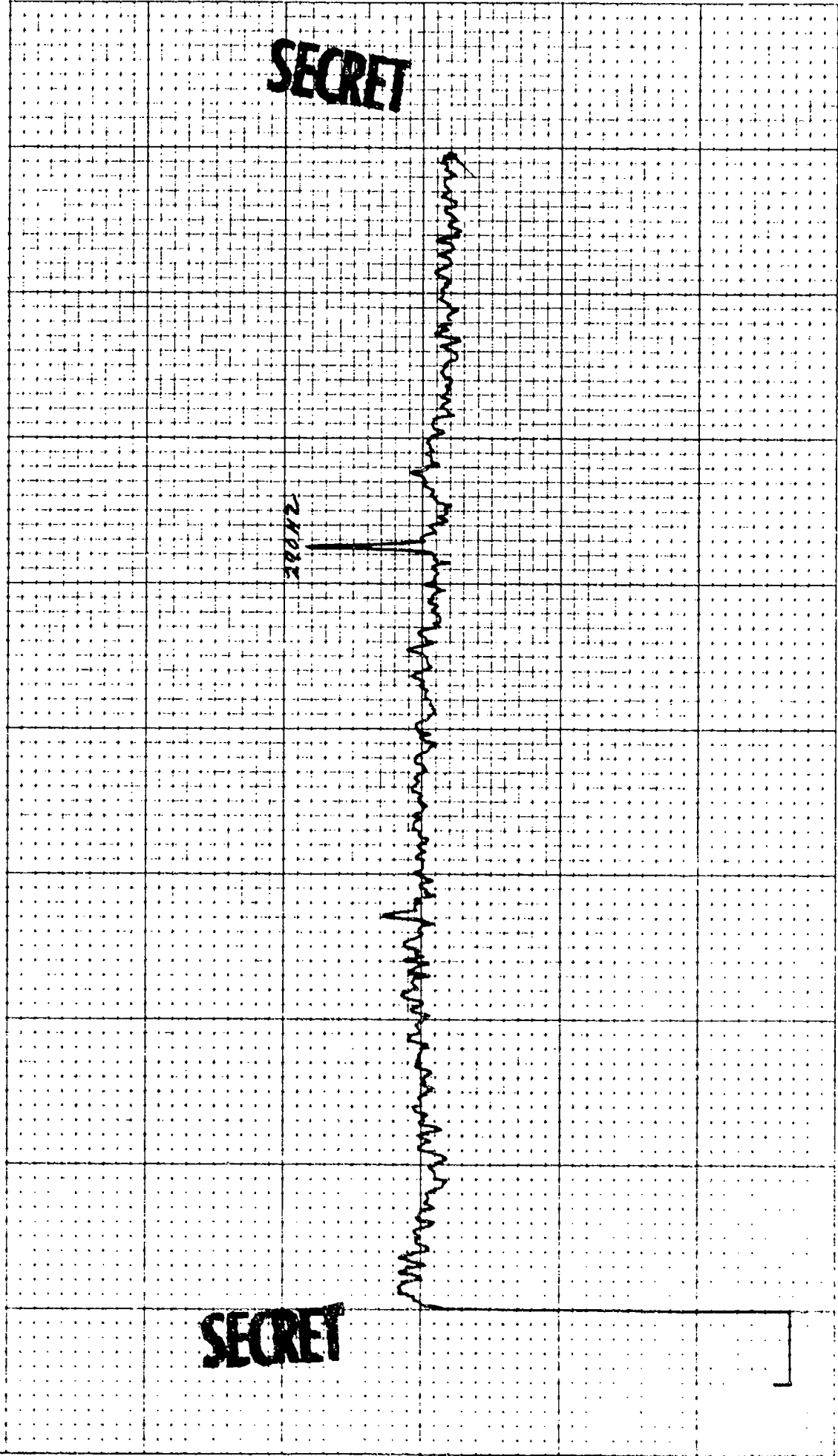
INTEGRATION TIME 320 SECS
FILTER ATTN: DB
WTG: HANNING



46 0703

KOE 12.4 IN TO THE INCH
PENFEL & ESSER CO

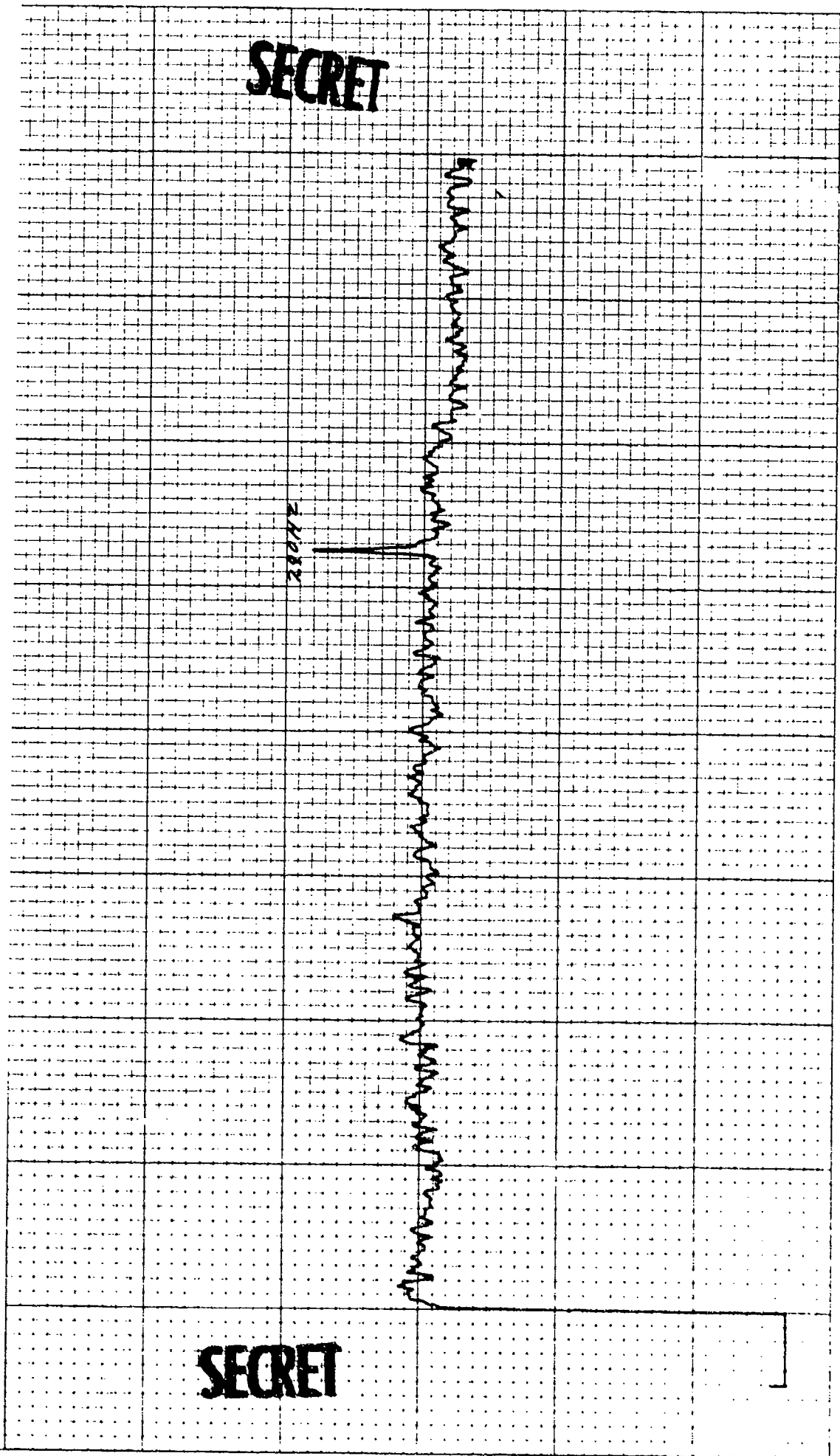
CONTROL: 2-7 -1549 (35) DATE OF ANALYSIS: REEL: F19 INDEX 3050
 OMNI SPECTRUM (ELEMENT 19)
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 -1549 Z INTEGRATION TIME 320 SECS ATTN: DB
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
 I ELEMENT — DEG AZ STEERING



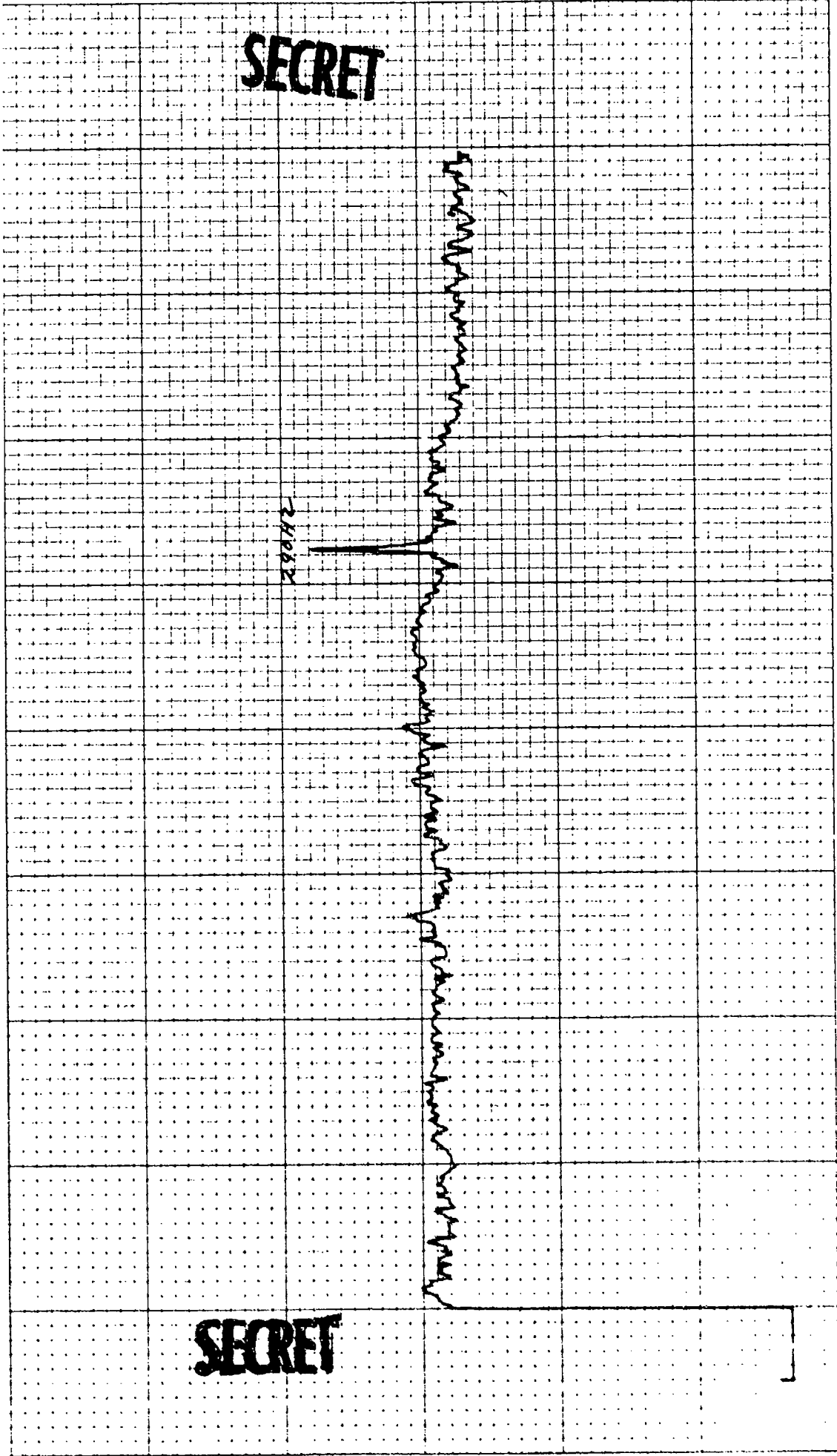
KOE 10 X 10 TO THE INCH • 2 1/2 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2-7 -1549 (26) DATE OF ANALYSIS: REEL: F-9 INDEX 3050
 OMNI SPECTRUM (ELEMENT 20)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: DR
 1 ELEMENT _____ DEG AZ STEERING FILTER WTG: HANNING



CONTROL: 2-7 -1548 (37) DATE OF ANALYSIS: REEL: F19 INDEX: 3050
 OMNI SPECTRUM (ELEMENT 13)
 EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: DB
 CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
1 ELEMENT DEG AZ STEERING



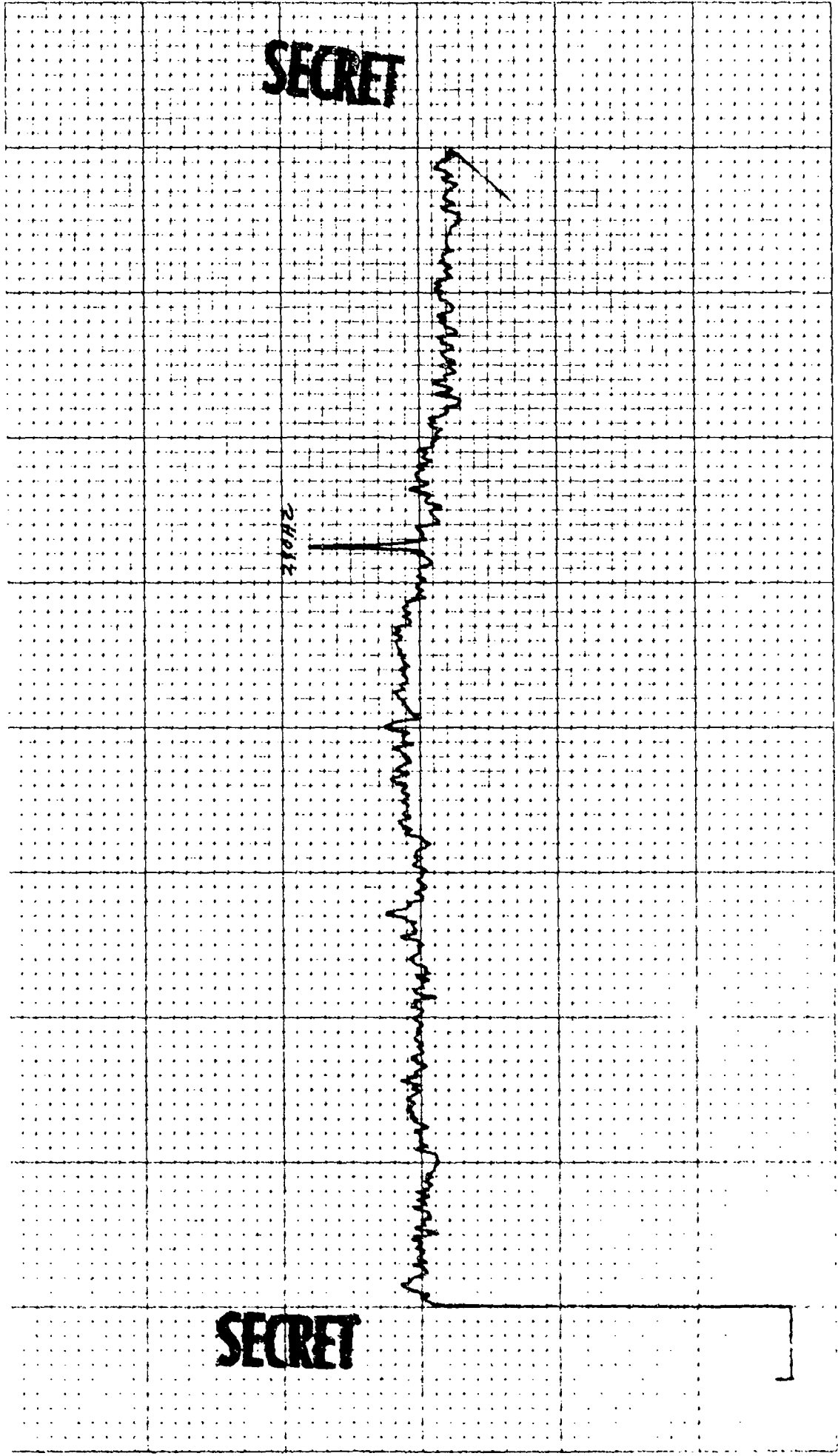
KOE 3054 TO THE INCHES, 2 1/2 INCHES.
PEUFFER & ESSER CO. 1949 S. 1000

46 0703

CONTROL: 2-7 -1549 (30) DATE OF ANALYSIS: REEL: F/9 INDEX 3050
OMNI SPECTRUM (ELEMENT 24)
EXERCISE: BEARING STAKE
CENTER FREQ: 290 HZ
1 ELEMENT

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

DATE/TIME: 2-7-77 -1549 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING



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

46 0703

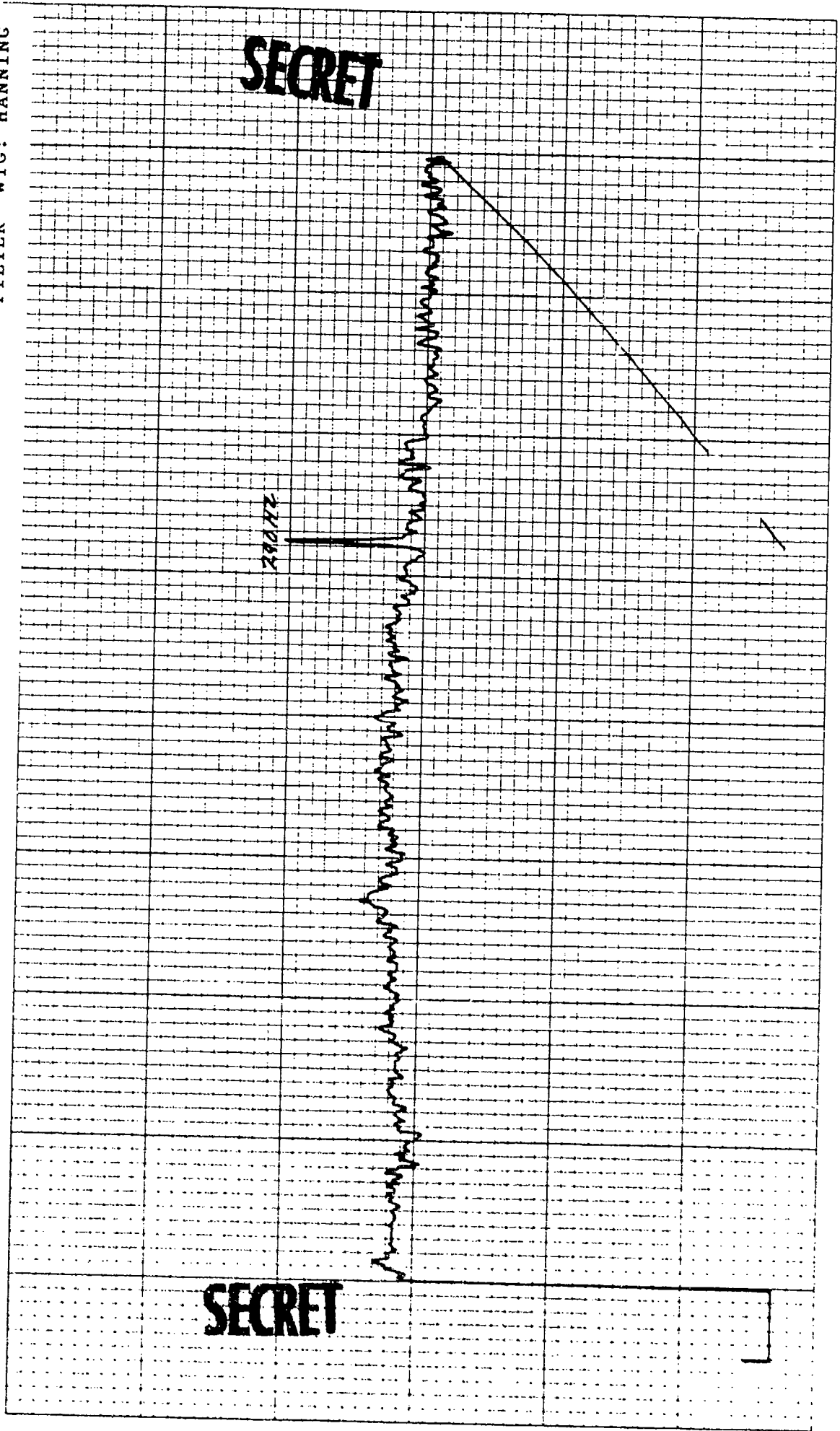
CONTROL: 2-7 -1549 (39)
OMNI SPECTRUM (ELEMENT 26)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -1549 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEG AZ STEERING

REEL: F19 INDEX 3050

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



KOE 19.5 IN TO THE INCH. 2 1/2 INCHES
PERFECT & ESSER CO. MADE IN U.S.A.

46 0703

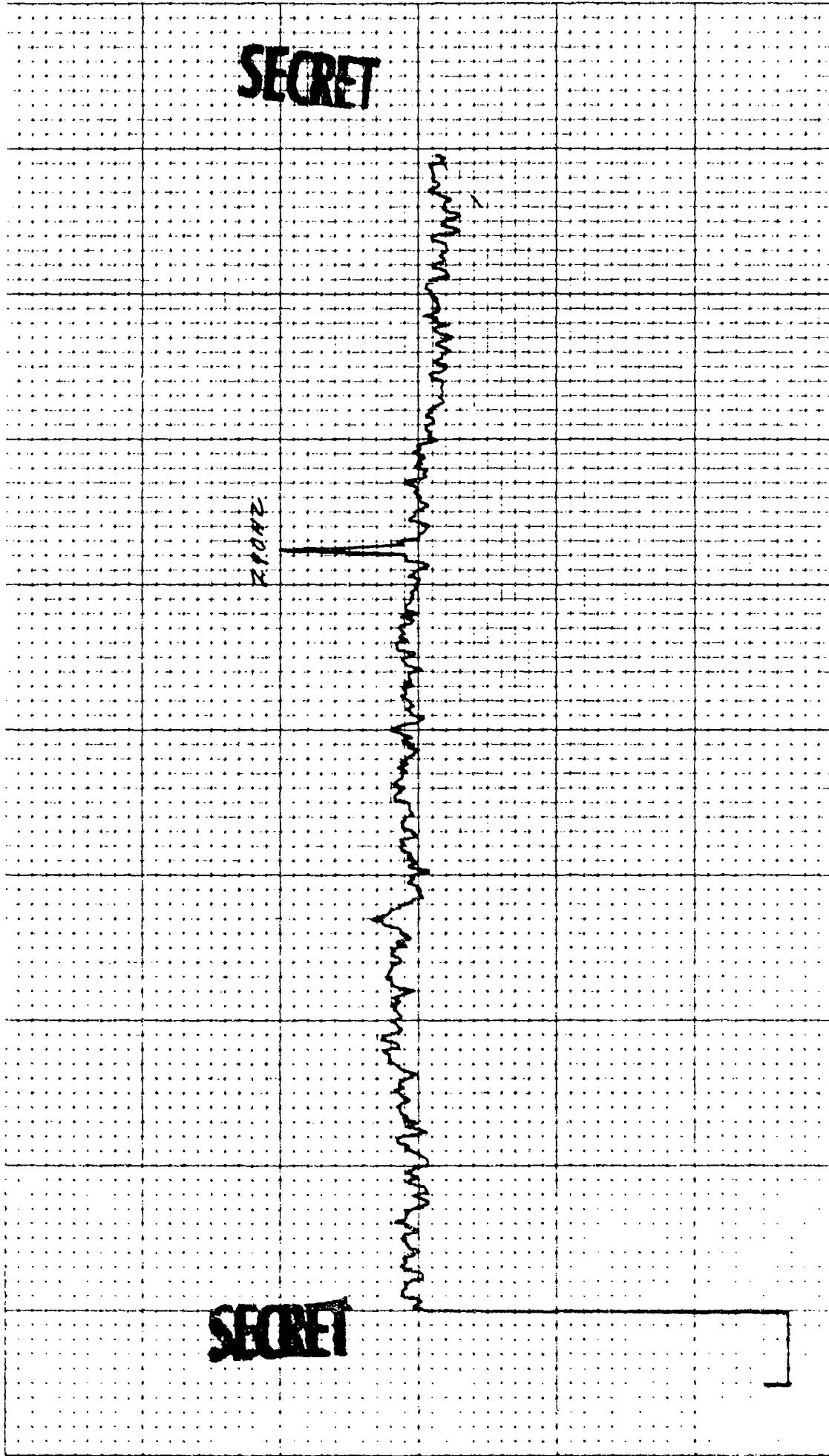
CONTROL: 2.7 -1549 (40)
OMNI SPECTRUM(ELEMENT 29)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -1549 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

REEL: F19 INDEX 3050

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



46 0703

K-E 10 X 10 TO THE INCHS. 2 1/2 INCHES
REDFIELD & SINGER CO. CHICAGO, ILL.

INDEX 3050

REEL: F/9

DATE OF ANALYSIS:

CONTROL: 2-7 -1549 (4/)
OMNI SPECTRUM (ELEMENT 3/)

EXERCISE: BEARING STAKE

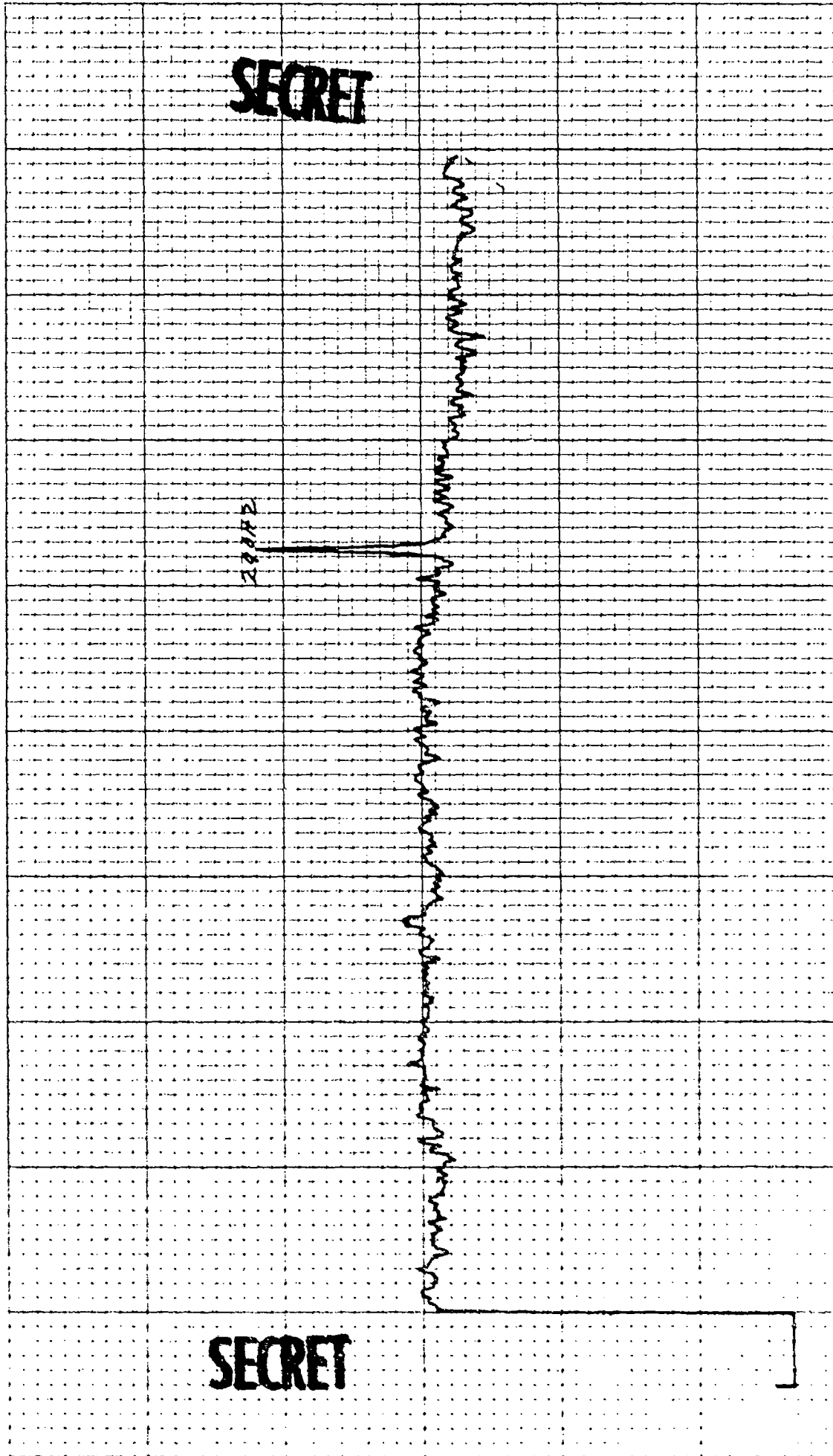
CENTER FREQ: 280 HZ

1 ELEMENT

DATE/TIME: 2-7-77 -1549 Z
ANALYSIS BANDWIDTH: 1/10 HZ

_____ DEG AZ STEERING

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER
WTG: HANNING



46 0703

DATE OF ANALYSIS:

REEL: F19 INDEX 3050

CONTROL: 2-7 -1549 (42)

OMNI SPECTRUM (ELEMENT 33)

EXERCISE: BEARING STAKE

CENTER FREQ: 280 HZ

1 ELEMENT

DATE/TIME: 2-7-77 -1549 Z

ANALYSIS BANDWIDTH: 1/10 HZ

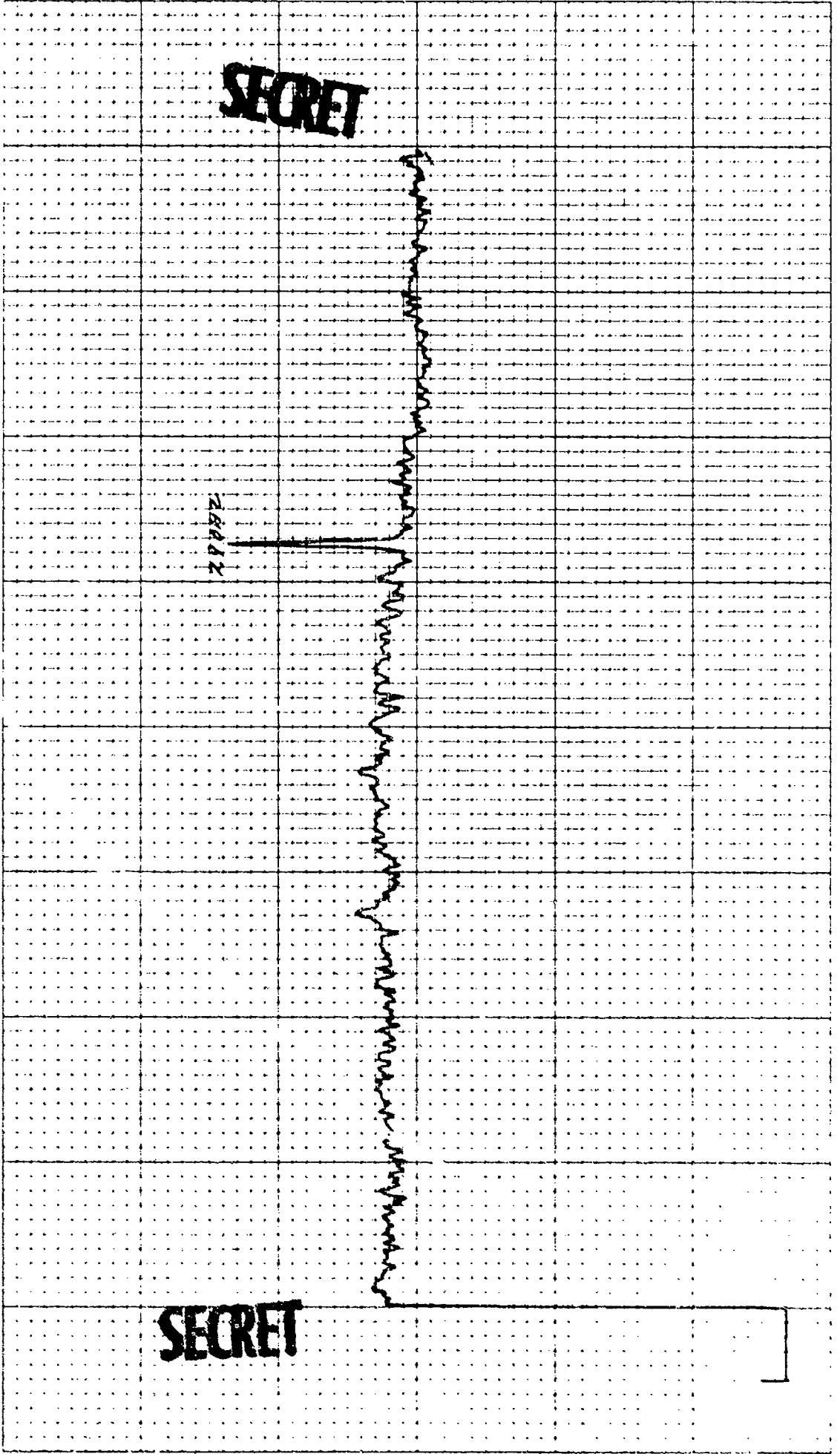
DEC AZ STEERING

INTEGRATION TIME 320 SECS

FILTER DB

ATTN: HANNING

WTG: HANNING



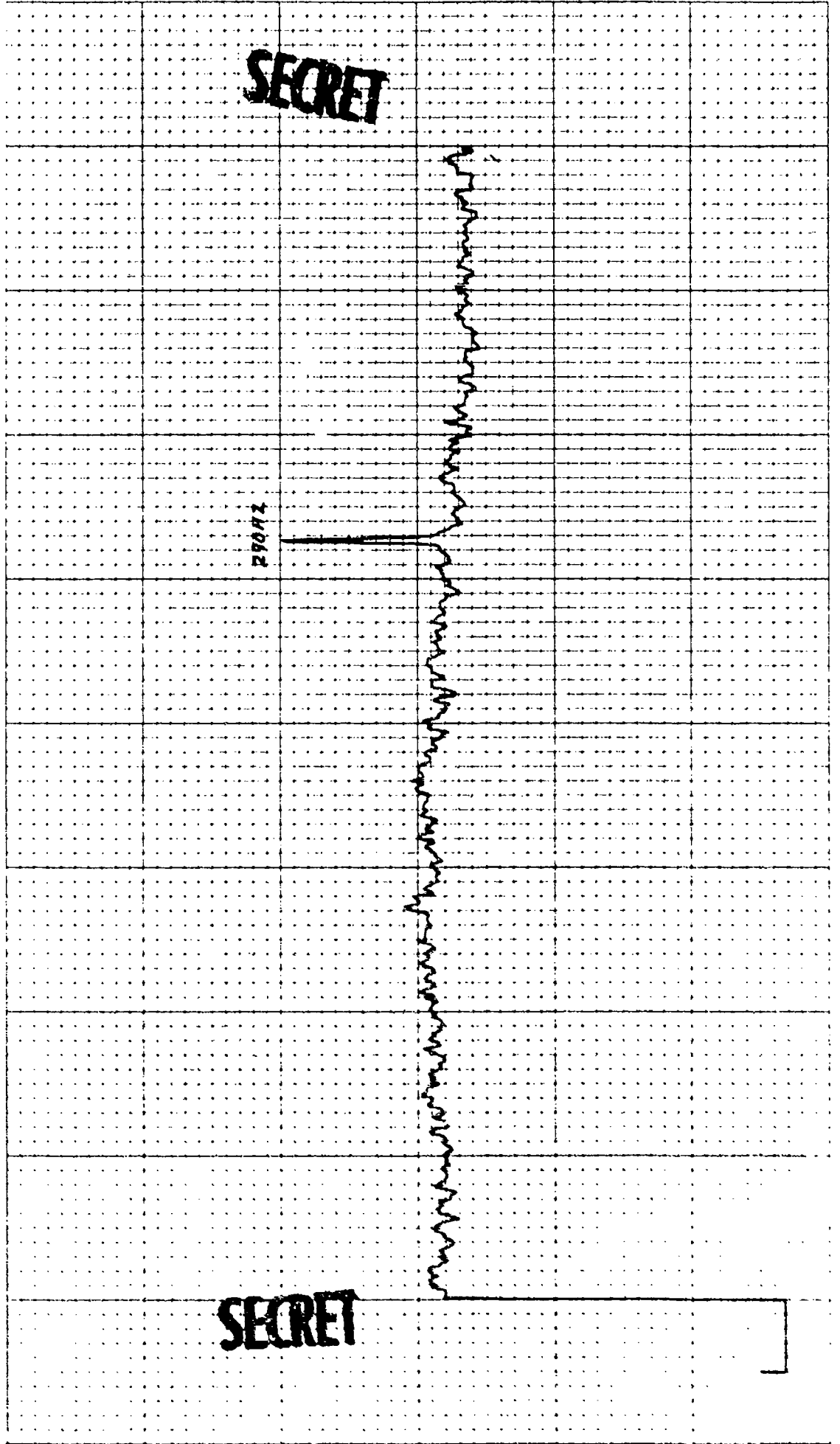
SECRET

SECRET

46 C703

REF: 27 APR 1972 TO THE DIRECTOR, NSA, WASH DC

CONTROL: 1549 - 51 (DPS) DATE OF ANALYSIS: REEL: F19 INDEX 3050
 OMNI SPECTRUM (ELEMENT 35) DATE/TIME: 2-7-72 - 1549 Z INTEGRATION TIME 320 SECS ATTN: - DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 CENTER FREQ: 150 HZ — DEG AZ STEERING



46 0703

KOE USE IN TO THE INCOM. 2 10 00 00 00
PROB. 2 10 00 00 00 00

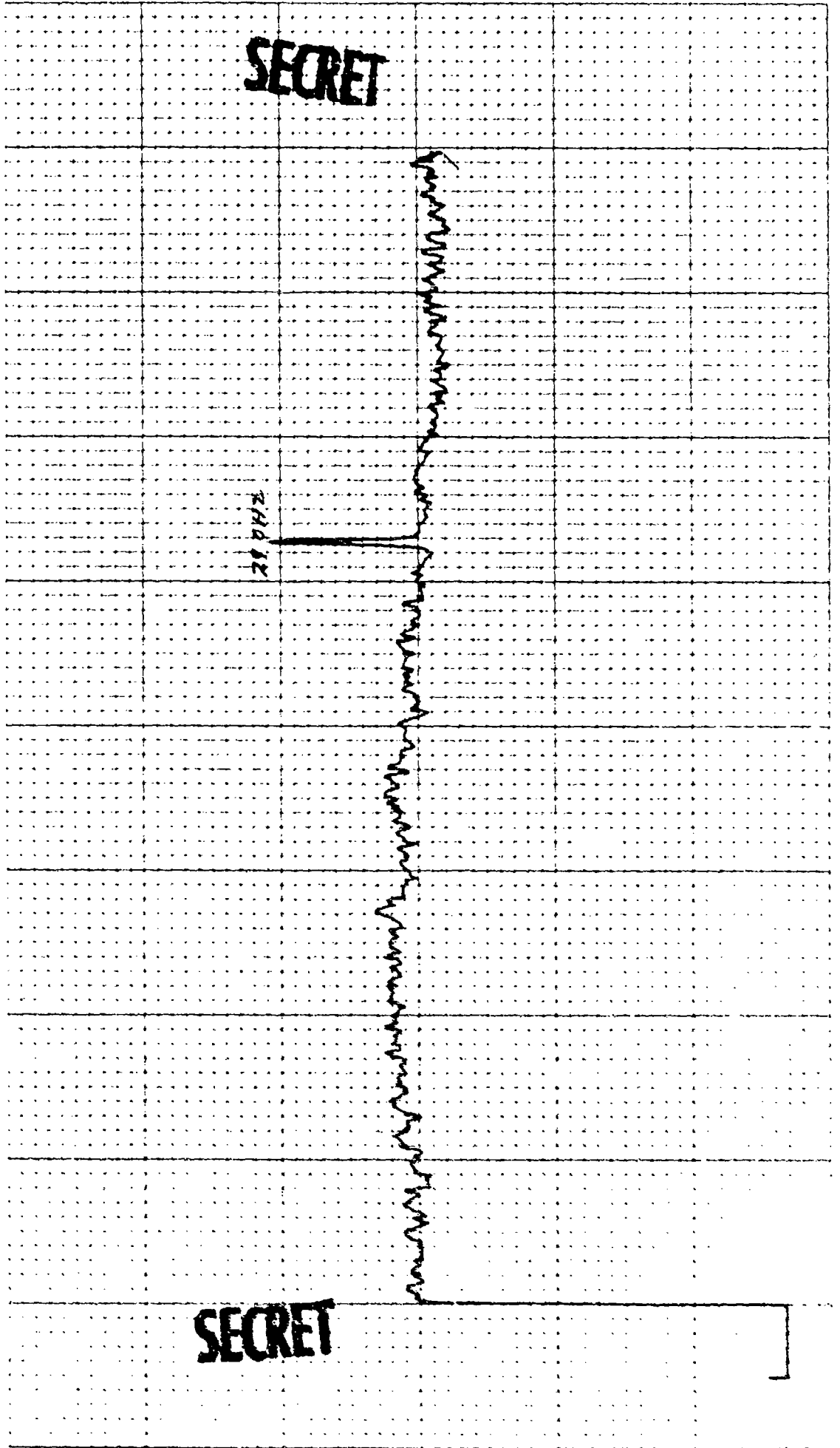
REEL: F11 INDEX J650

CONTROL: 2-7 -1549 (44)
OMNI SPECTRUM (ELEMENT 37)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -1549 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



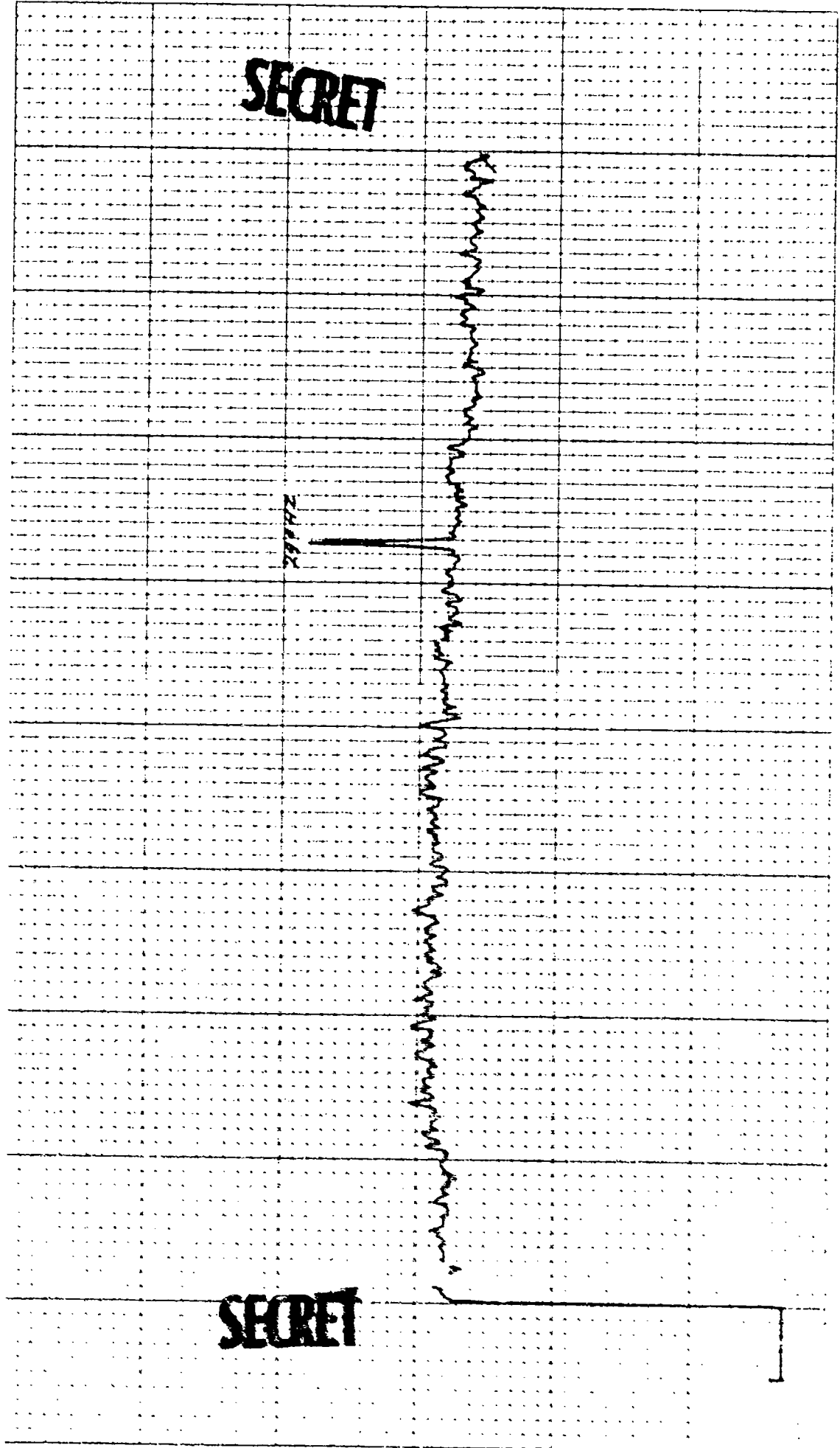
46 0703

REF ID: A66000

CONTROL: 2-7 -1549 (45) DATE OF ANALYSIS: REEL: F/9 INDEX: 3050
 OMNI SPECTRUM (ELEMENT 39)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
 1 ELEMENT

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

DATE/TIME: 2-7-77 -1549 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 _____ DEC AZ STEERING



CONTROL: 2-7 -1549 (46)
OMNI SPECTRUM (ELEMENT 41)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

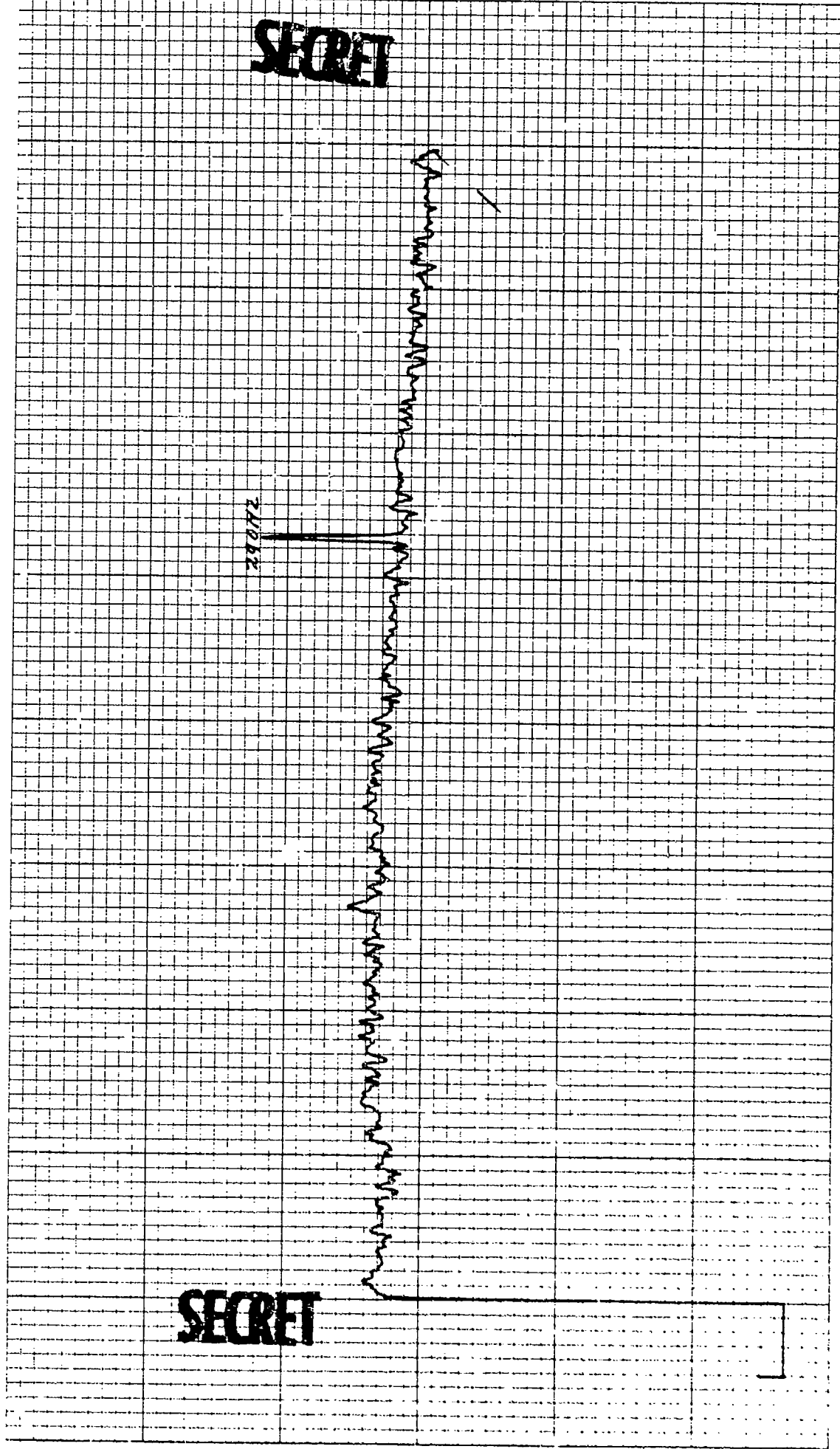
DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -1549 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEG AZ STEERING

REEL: F19

INDEX 3052

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



SECRET

280 HZ

SECRET

K&E 1 1/2" IS TO THE INCH
KUPFFEL & BESSER CO. NEW YORK, N.Y.

46 0703

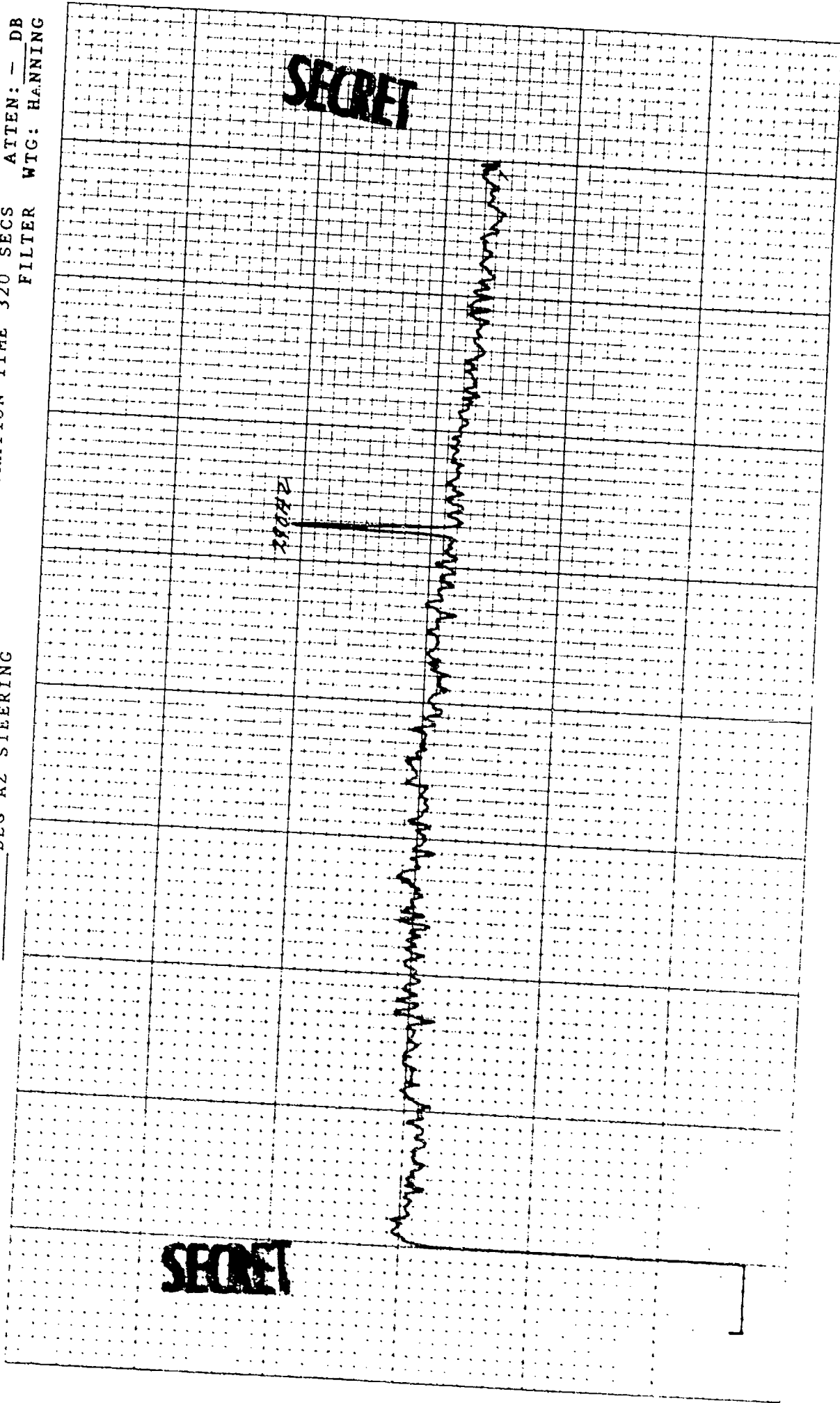
CONTROL: 2-7-1649 (47)
OMNI SPECTRUM (ELEMENT 43)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10HZ
_____ DEG AZ STEERING

REEL: F19
INDEX 3050

INTEGRATION TIME 320 SECS
FILTER WTG: HANNING
ATTEN: DB



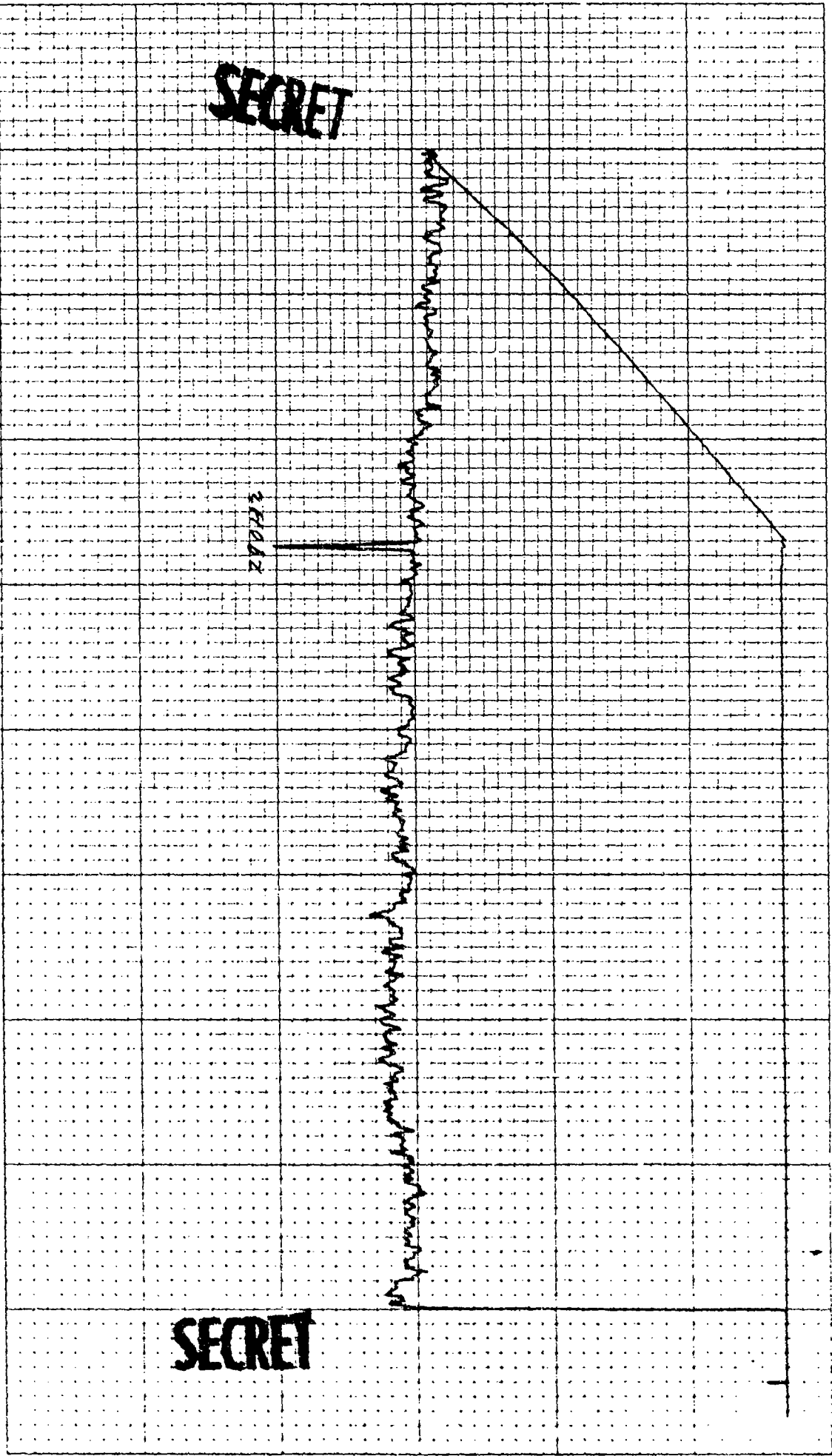
SECRET

SECRET

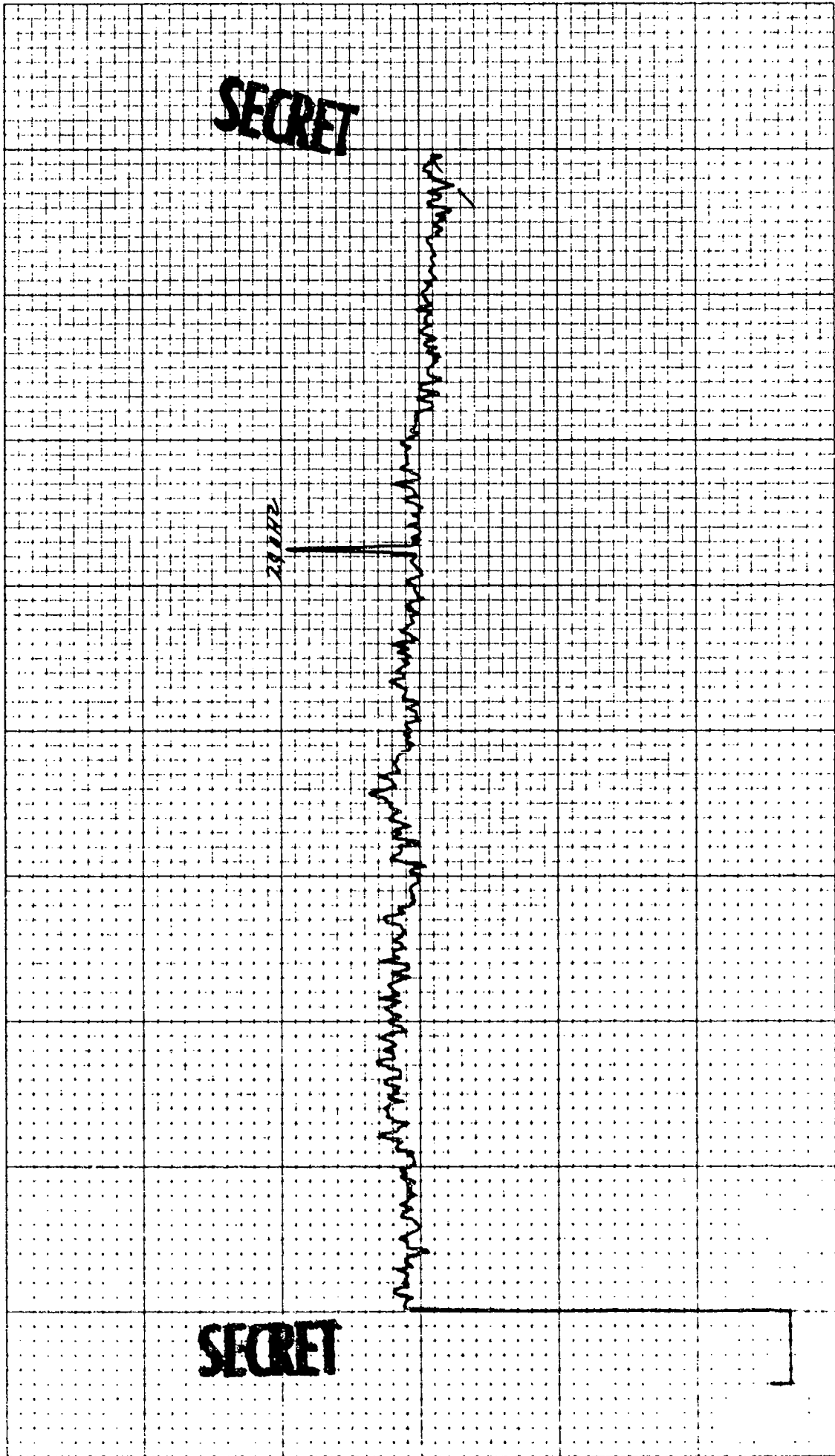
HOE 10.4 V. TO THE INCH. 7.5 IN. 10.4 V. HOE
PERFECT & BERRY CO. MADE IN U.S.A.

46 0703

CONTROL: 2-7 -1549 (48) DATE OF ANALYSIS: REEL: F19 INDEX 3050
OMNI SPECTRUM (ELEMENT 45)
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 -1549 Z
CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: DB
1 ELEMENT DEG AZ STEERING FILTER WTG: HANNING



CONTROL: 2-7 -1549 (49) DATE OF ANALYSIS: REEL: F19 INDEX: 3050
 OMNI SPECTRUM (ELEMENT 47)
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 -1549 Z
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: DB
 1 ELEMENT 1 DEG AZ STEERING FILTER WTG: HANNING



SECRET

KOE 12/11/77 TO THE INCH. 2. 1/10 HZ

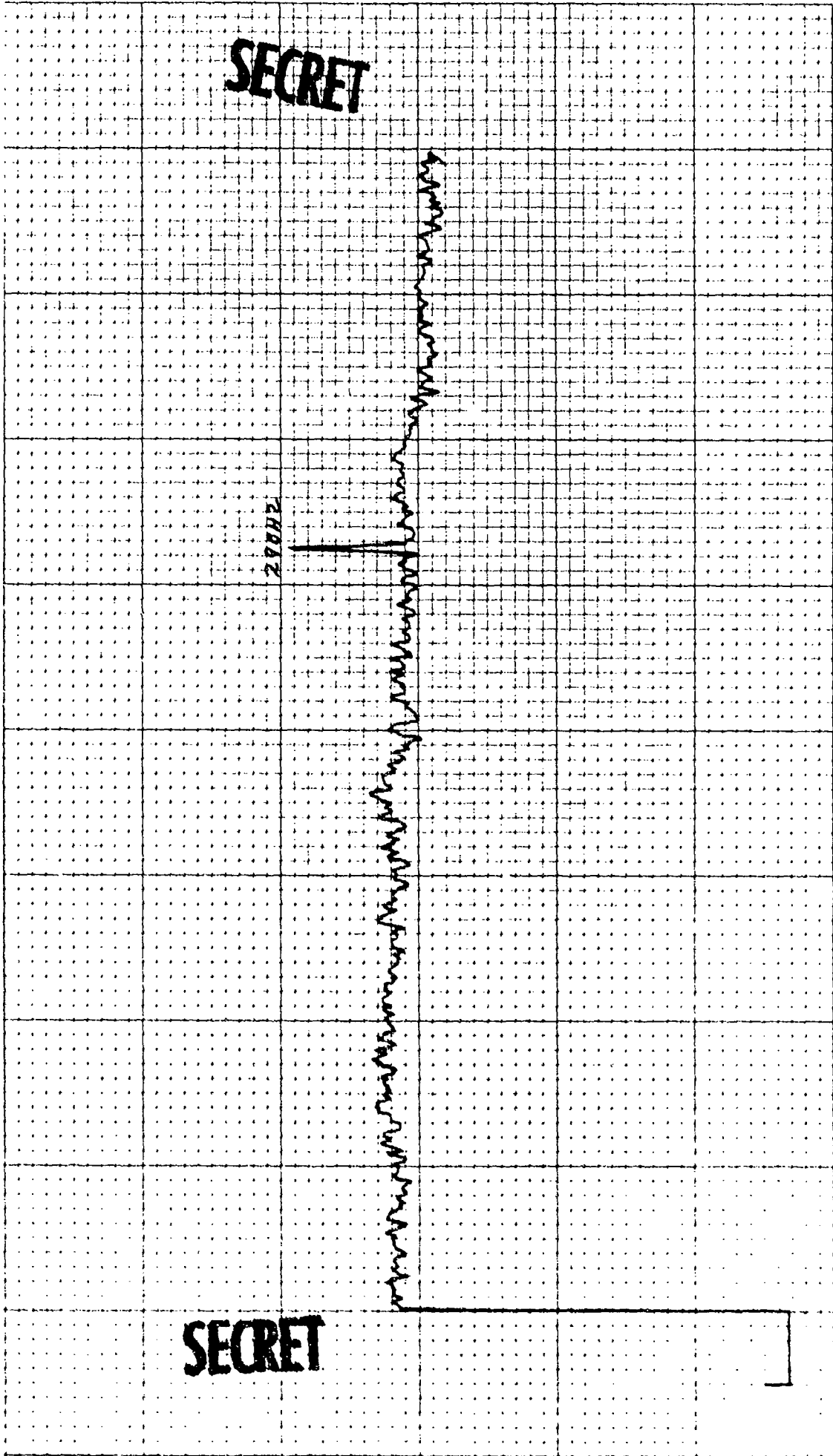
46 0703

CONTROL: 2-7 -1549 (50)
 OMNI SPECTRUM(ELEMENT 49)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
 1 ELEMENT

DATE OF ANALYSIS:
 DATE/TIME: 2-7-77 -1549 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 ——— DEG AZ STEERING

REEL: Fig INDEX: 3050

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



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

46 0793

CONTROL: 2.7 - 1599 (51)
OMNI SPECTRUM (ELEMENT 51)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

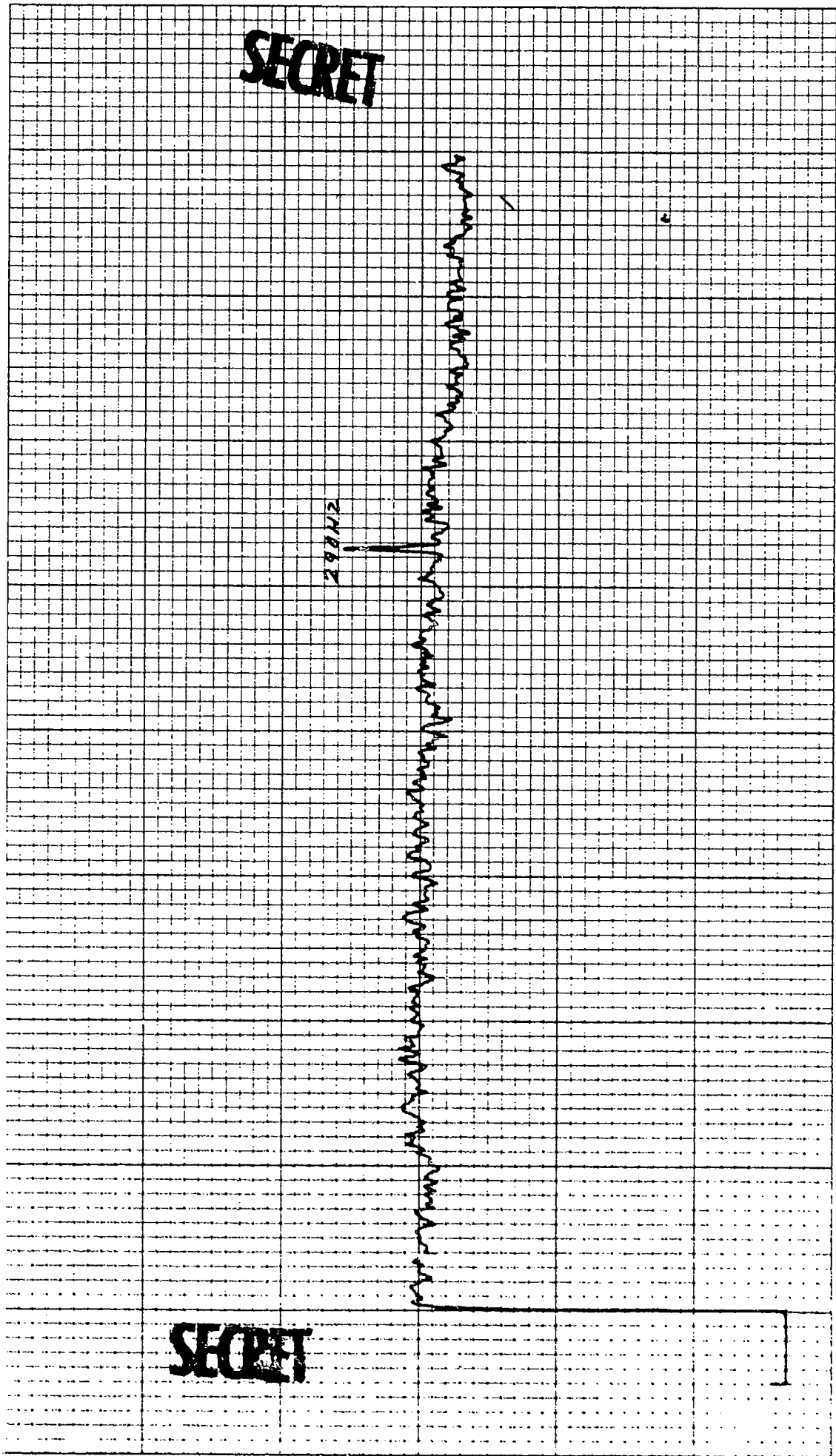
DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F19 INDEX: J550

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

SECRET

SECRET



46 0703

WE HAVE TO THE SERVICE OF THE
NAVY & AIR FORCE

REEL: F19 INDEX 3060

DATE OF ANALYSIS:

CONTROL: 2-7-1549 (52)

OMNI SPECTRUM (ELEMENT 53)

EXERCISE: BEARING STAKE

CENTER FREQ: 280 HZ

1 ELEMENT

DATE/TIME: 2-7-77 -1549 Z

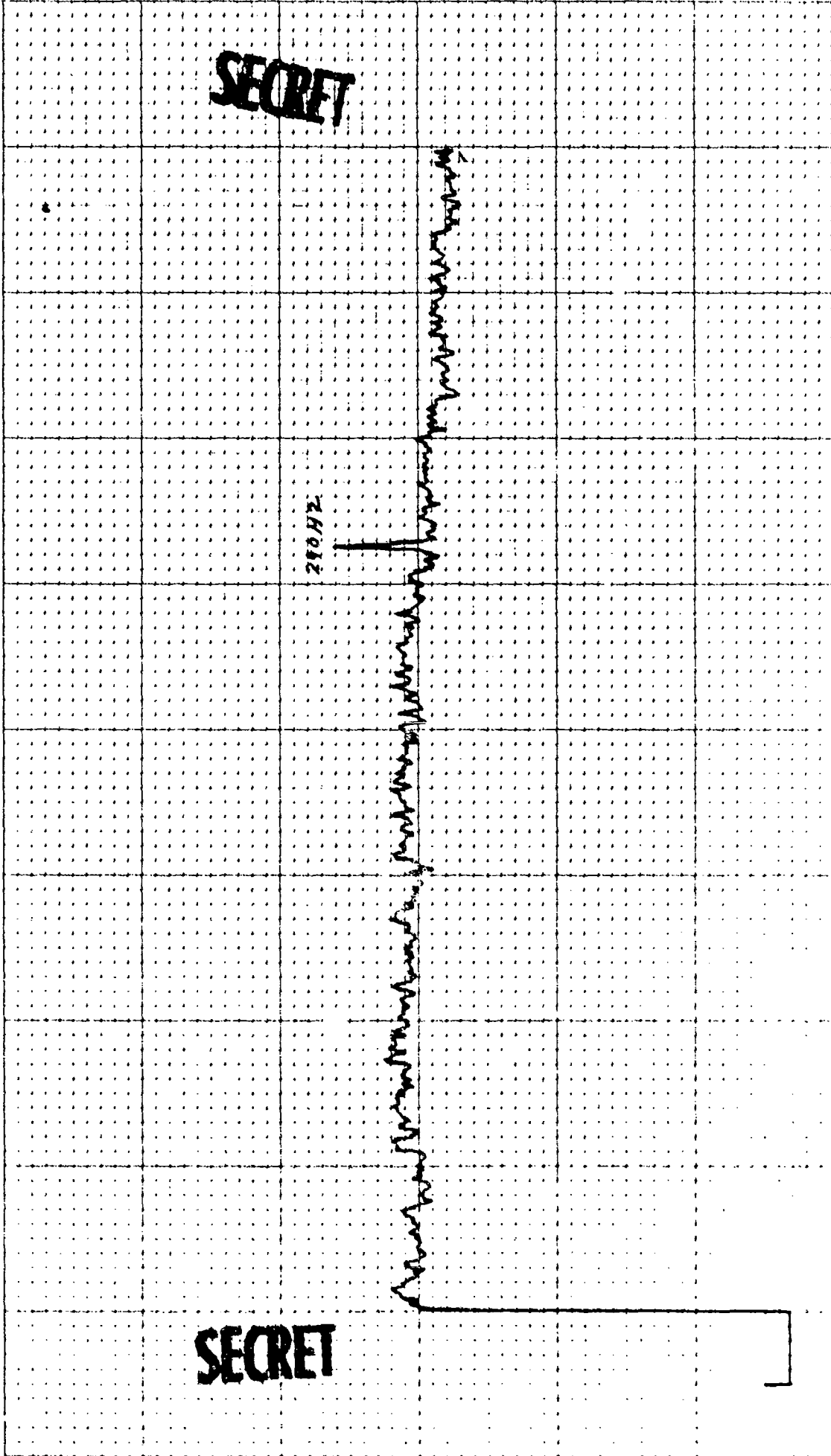
ANALYSIS BANDWIDTH: 1/10 HZ

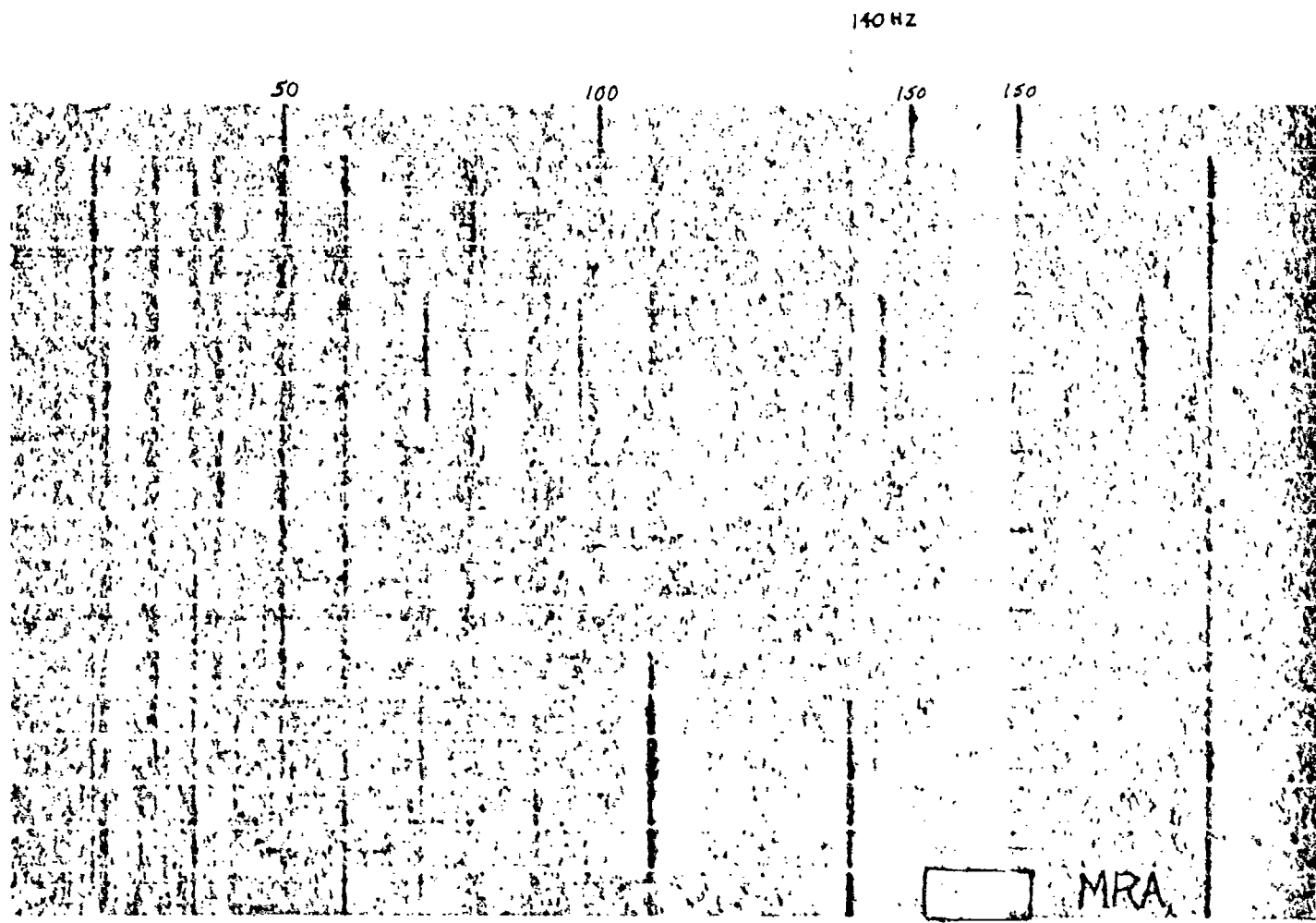
— DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER WTG: HANNING

ATTEN: — DB





CONTROL NUMBER 474-233
 NUMBER OF ELEMENTS 2
 FREQUENCY BAND 12 TO 150 HZ
 RANGE CA N.M.

H I S T O R Y
 TAPE REEL NUMBER 1
 ANALYSIS BAND WIDTH 2 HZ
 WATER DEPTH 100 FMS

1

140 HZ

SECRET

290 HZ 295 HZ

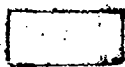
150

150

200

250

300



MRA

HISTOGRAM
TAPE REEL NUMBER

TAPE COUNT

SECRET

ANALYSIS BAND WIDTH HZ
WATER DEPTH FMS

ELEMENT NUMBERS

DATE SAN-XXX-78-0132

EXERCISE: BEARING STAKE

13
D
E

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 5

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-29.0</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-19.0	
BEAMFORMER GAIN	<u>+18</u>	-1.0	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	- .8	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 ^{noise} SIGNAL LEVEL INDICATED		<u>-60.3</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-50.3	
BEAMFORMER GAIN	<u>+18</u>	-32.3	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-1.0</u>	
SIGNAL LEVEL FOR SNR	<u>-32.3</u>	+31.3	
PROCESSOR CORRECTION	<u>-4.0</u>	+27.3	
MRA CORRECTION	<u>+ .2</u>	+27.5	SNR 1/16 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	19.3	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 5

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-38.4</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-28.4</u>	
BEAMFORMER GAIN	<u>+18</u>	<u>-10.4</u>	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .9</u>	<u>-9.5</u>	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-64.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-54.8</u>	
BEAMFORMER GAIN	<u>+18</u>	<u>-36.8</u>	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-10.4</u>	
SIGNAL LEVEL FOR SNR	<u>-36.8</u>	<u>26.4</u>	
PROCESSOR CORRECTION	<u>-4.0</u>	<u>22.4</u>	
MRA CORRECTION	<u>+ .9</u>	<u>23.3</u>	SNR $\frac{1}{10}$ HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	<u>15.1</u>	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

DATA POINT 5

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-30.0</u>	<u>-33.1</u>	_____
MRA SIGNAL LEVEL	<u>- .8</u>	<u>- 9.5</u>	_____
ARRAY SIGNAL GAIN	<u>29.2</u>	<u>23.6</u>	_____
20 LOG <u>16</u>	<u>24</u>	<u>24</u>	_____
# of elements			_____
DIFFERENCE	<u>+5.2</u>	<u>- .4</u>	_____

ARRAY GAIN

MRA SNR	<u>27.5</u>	<u>23.3</u>	_____
MEAN OMNI SNR	<u>9.3</u>	<u>10.5</u>	_____
ARRAY GAIN	<u>18.2</u>	<u>12.8</u>	_____
THEORETICAL AZMUTH GAIN (at MRA)	<u>9.2</u>	<u>13.3</u>	_____
DIFFERENCE	<u>+9.0</u>	<u>- .5</u>	_____

CONFIDENTIAL

46 0703

REF ID: A66776

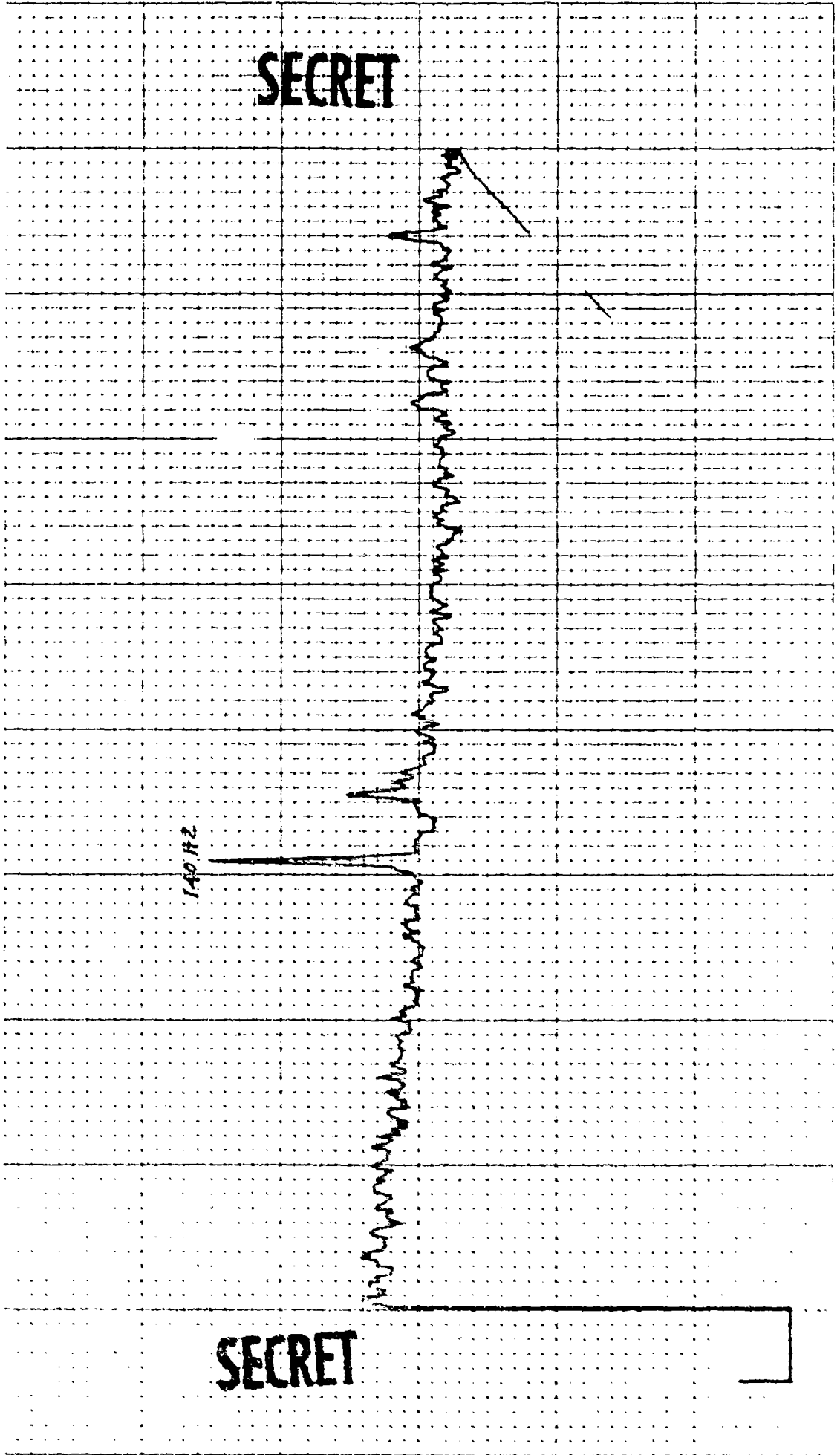
CONTROL: 1549 - 16 (DP5)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16

REEL: F19 INDE X 3650

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

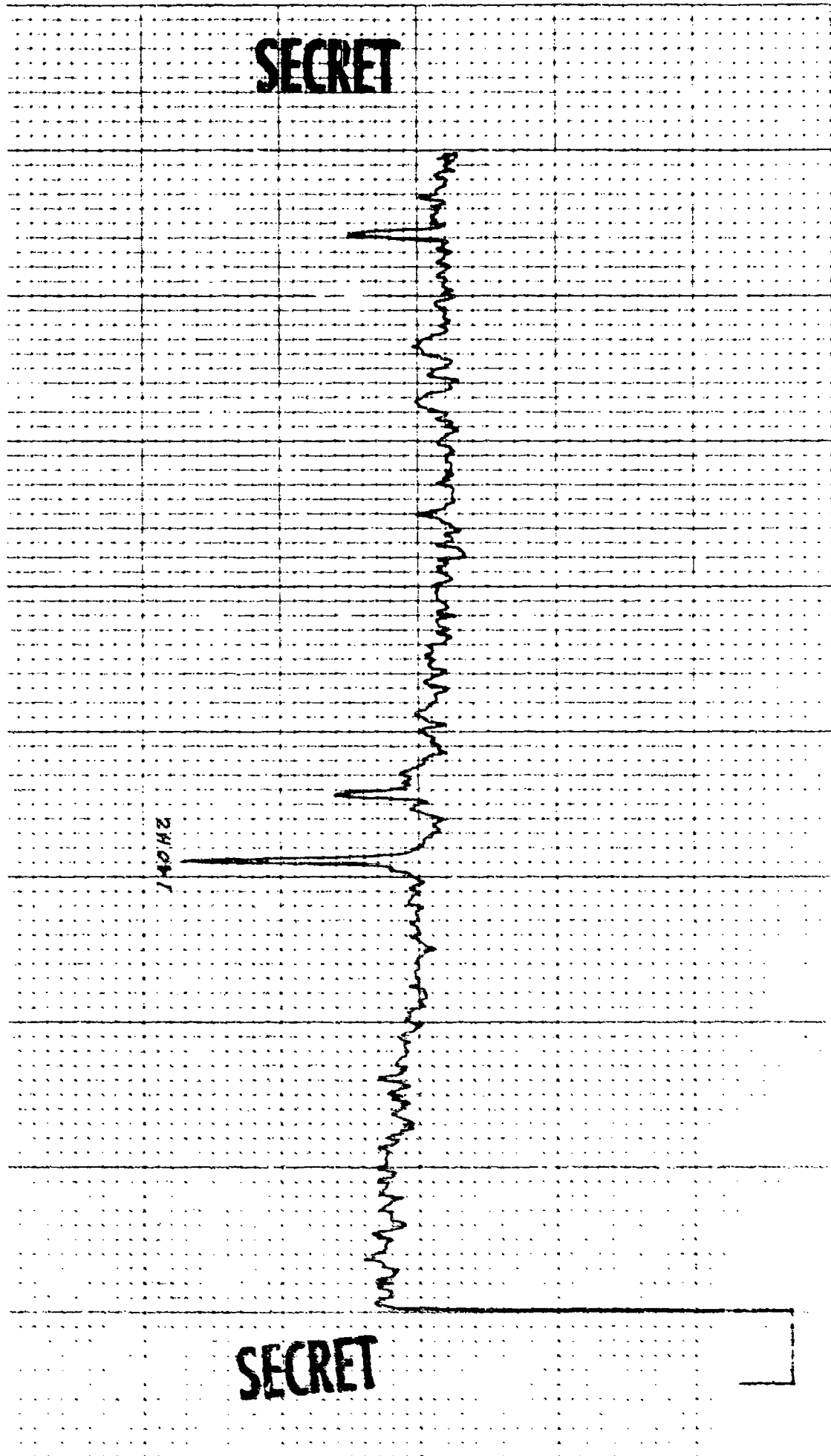
DATE/TIME: 2-7-77 - 1549 Z
 ANALYSIS BANDWIDTH: 1710HZ
+ 20 DEG. AZ STEERING



46 0703

KSE 1549 TO THE 16 (D05)

CONTROL: 1549 - 16 (D05) REEL: F19 INDE X3050
 BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: - - -
 EXERCISE: BEAKING STAKE / - / C INTEGRATION TIME 320 SECS ATTEN: 70 DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 16 ELEMENTS + 30 DEC. AZ STEERING



SECRET

45 0702

CONTROL: 1549 - 16 (DP5) DATE OF ANALYSIS: - - - -
 BEAMFORMED SPECTRUM/ELEMENTS 1-16
 EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTEN: 1/8 DB
 CENTER FREQ: 150 HZ FILTER WTG: HANNING
 16 ELEMENTS + 32 DEG. AZ STEERING ANALYSIS BANDWIDTH: 1/10HZ

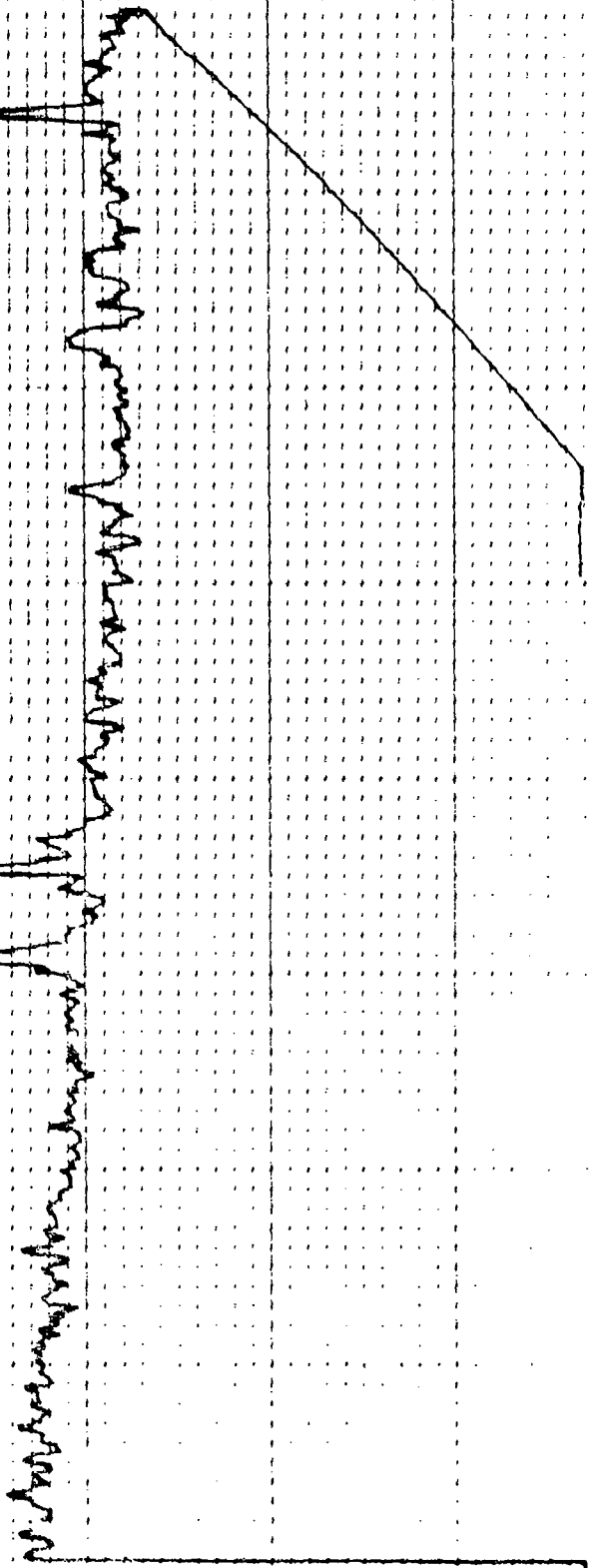
REEL: F/9

INDEX: 13050

150HZ

SECRET

SECRET

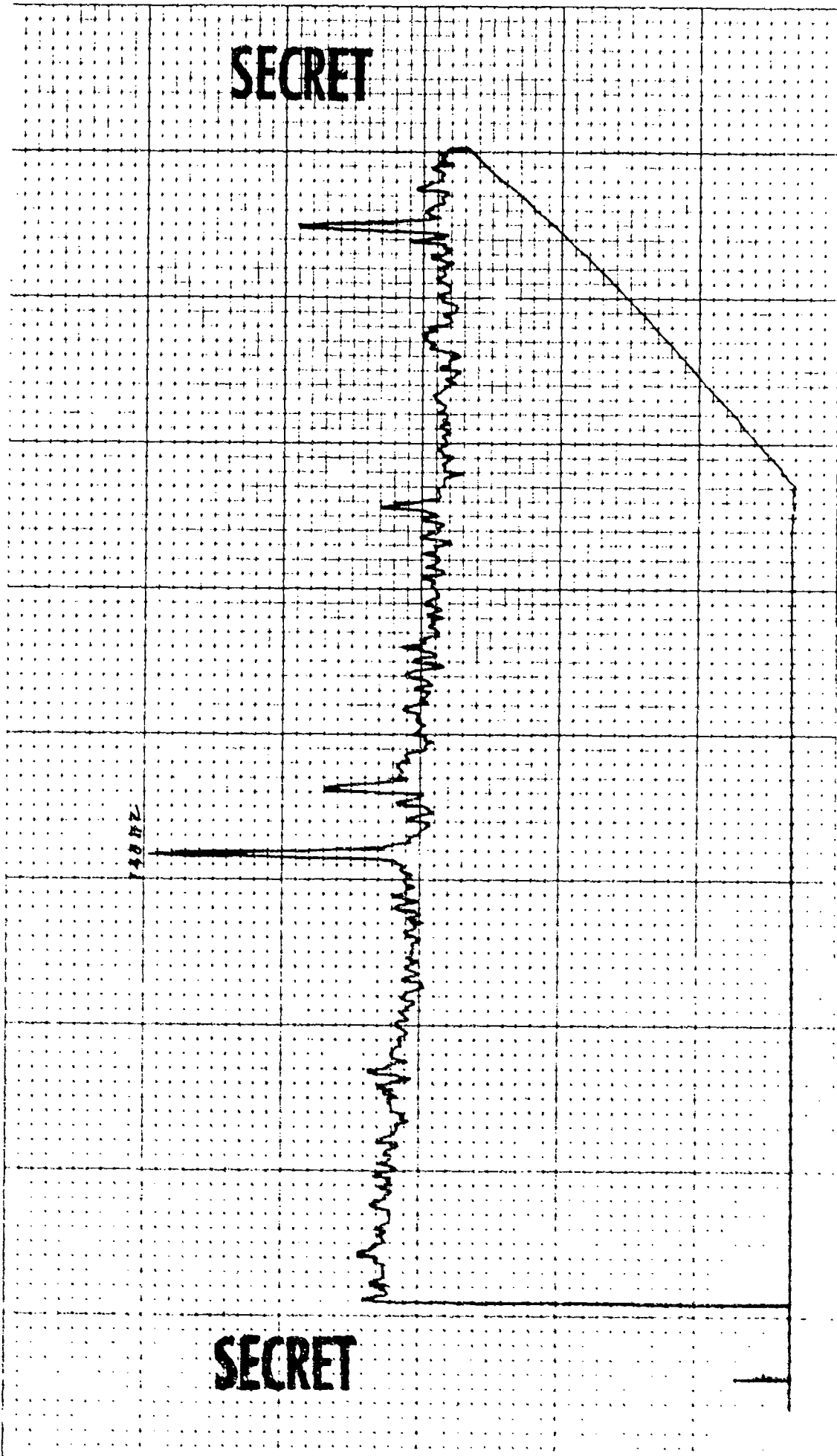


+

CONTROL: 1549 - 16 (DP5)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1710 HZ
+34 DEG. AZ STEERING

REEL: F19 INDEX X 2057
INTEGRATION TIME 320 SECS ATTEN: -8 DB
FILTER WTG: HANNING



SECRET

SECRET

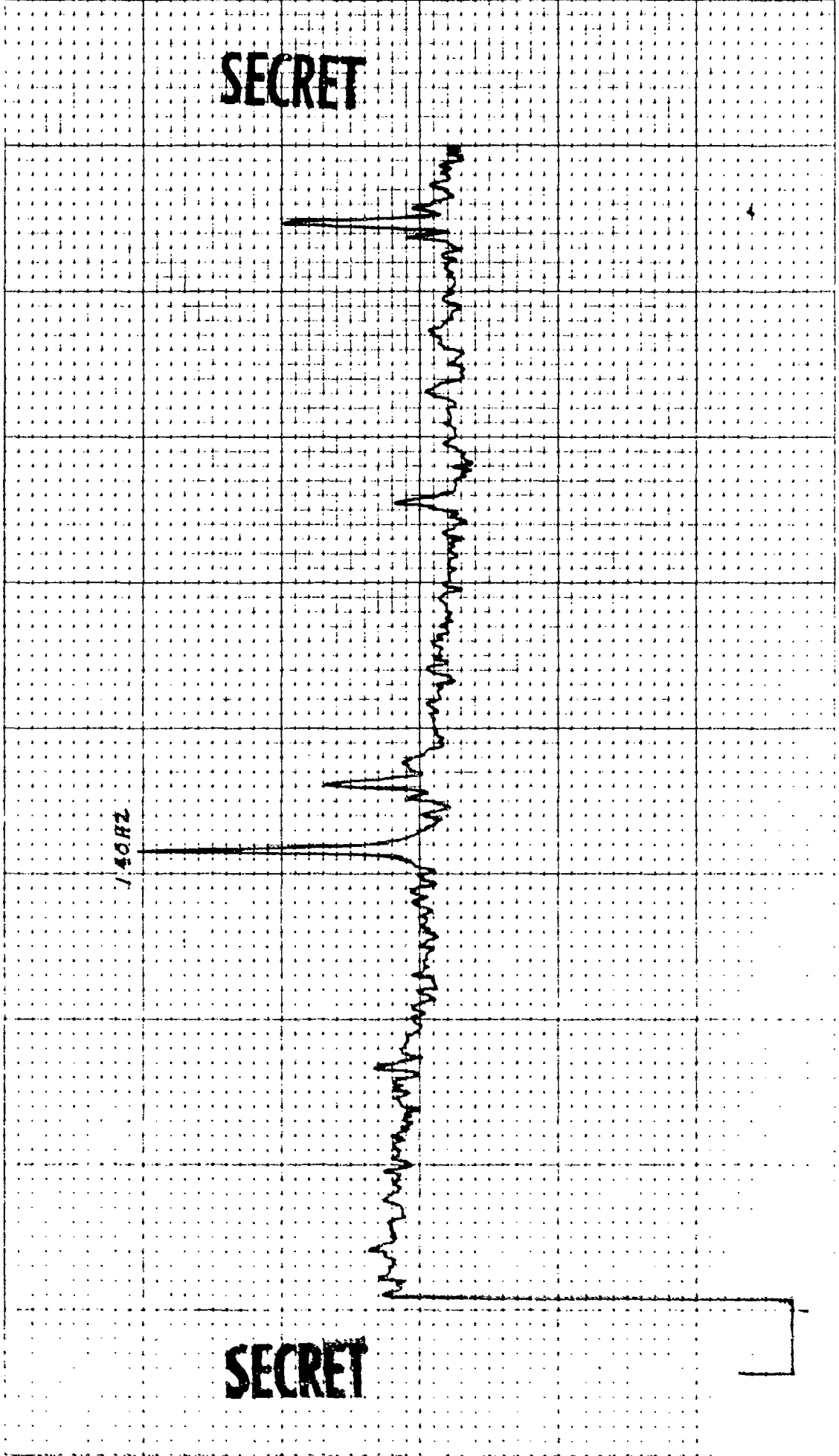
46 0703

CONTROL: 1549 - 16 (DBS)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 16 ELEMENTS

DATE OF ANALYSIS: - - -
 / - / -

DATE/TIME: 2-7-77 - 1549 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 +36 DEG. AZ STEERING

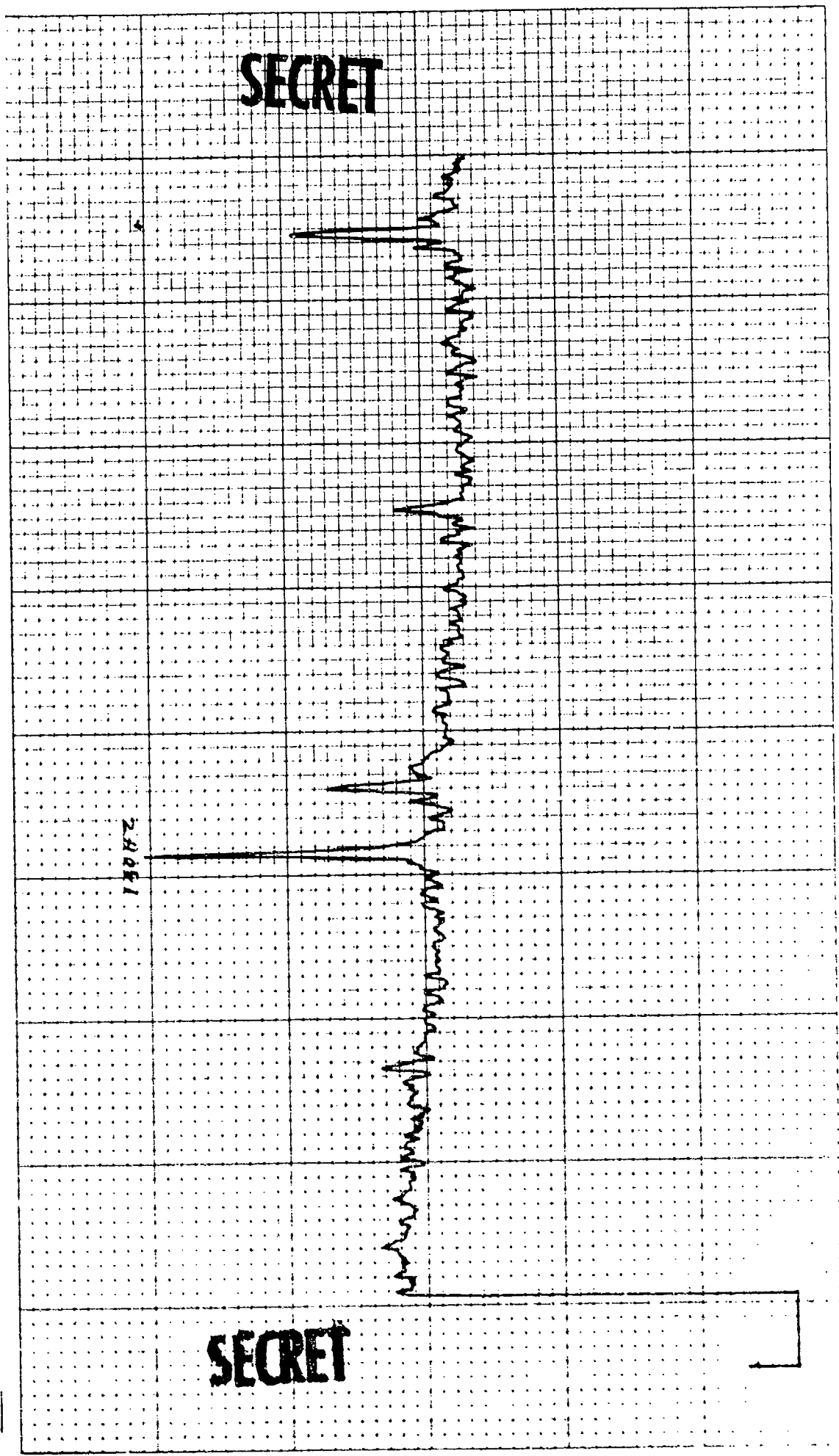
REEL: F19 INDE X3050
 INTEGRATION TIME 320 SECS ATTN: -18 DB
 FILTER WTC: HANNING



H.O.E. IS A 10 TO THE INCHES
PER INCH. 5 EIGHTS OF AN INCH.

46 0703

CONTROL: 1549 - 16 (DP5) DATE OF ANALYSIS: - - REEL: F/9 INDE X 3650
 BEAMFORMED SPECTRUM (ELEMENTS) / -16 INTEGRATION TIME 320 SECS ATTEN: -18 DB
 EXERCISE: BEARING STAKE DATE/TIME: 27-77 - 1549 Z FILTER WTG: HANNING
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ
16 ELEMENTS +38 DEG. AZ STEERING



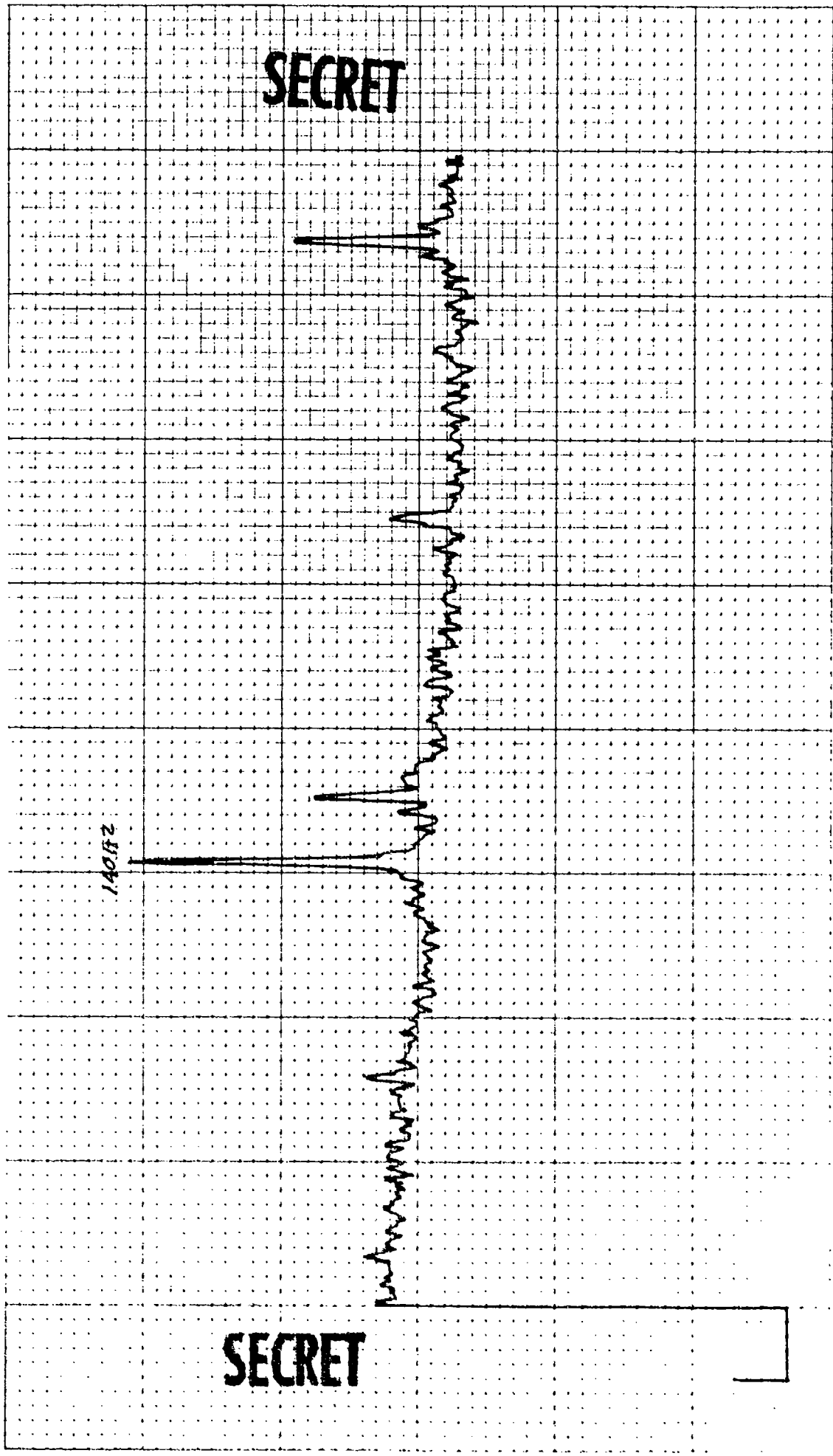
SECRET

SECRET

KOE 19.7.15 TO THE INCHES 2.3 INCHES
SP-1111 & SP-1112

46 0703

CONTROL: 1549 - 16 (DPS) REEL: F-19 INDE X3050
 BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: - - - - -
 EXERCISE: BEARING STAKE /-16 INTEGRATION TIME 320 SECS ATTN: -10 DB
 CENTER FREQ: 150 HZ FILTER WTG: HANNING
16 ELEMENTS +39 DEG. AZ STEERING



KOE 10 X 10 TO THE INCH
HEIDELBERGER CO. MADE U.S.A.

46 0703

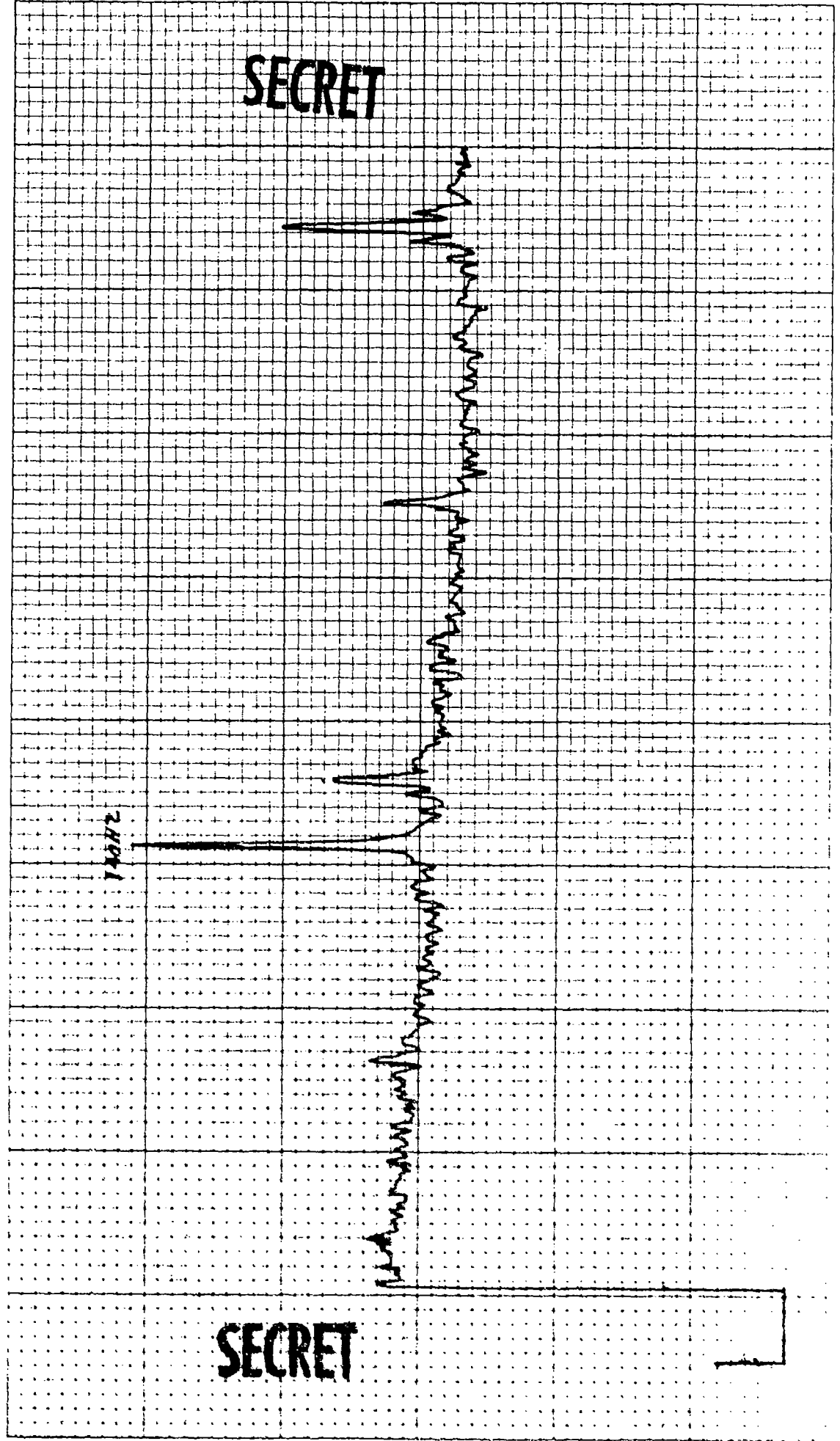
CONTROL: 1549 - 51 (PP5)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
/C ELEMENTS

DATE OF ANALYSIS: 1 - 16

DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10HZ
+40 DEG. AZ STEERING

REEL: F19
INDE X3050

INTEGRATION TIME 320 SECS
ATTEN: 18 DB
FILTER WTG: HANNING



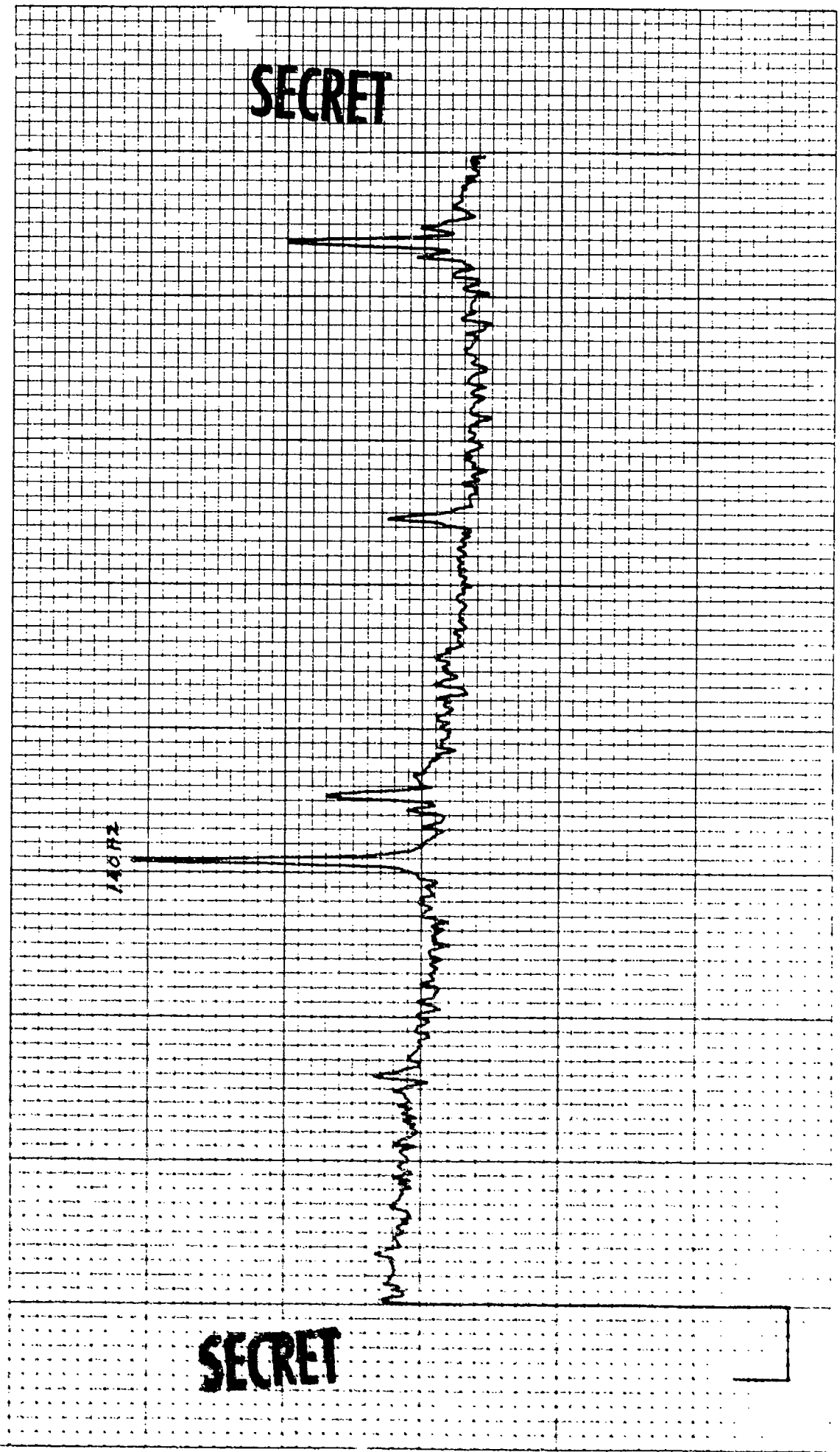
KOE 10 X 10 TO THE INCH 7.4 10 INCHES
NEUFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 1549 - 16 (DPS)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+ 41 DEG. AZ STEERING

REEL: F19 INDE X3052
INTEGRATION TIME 320 SECS
ATTEN: -10 DB
FILTER WTG: HANNING

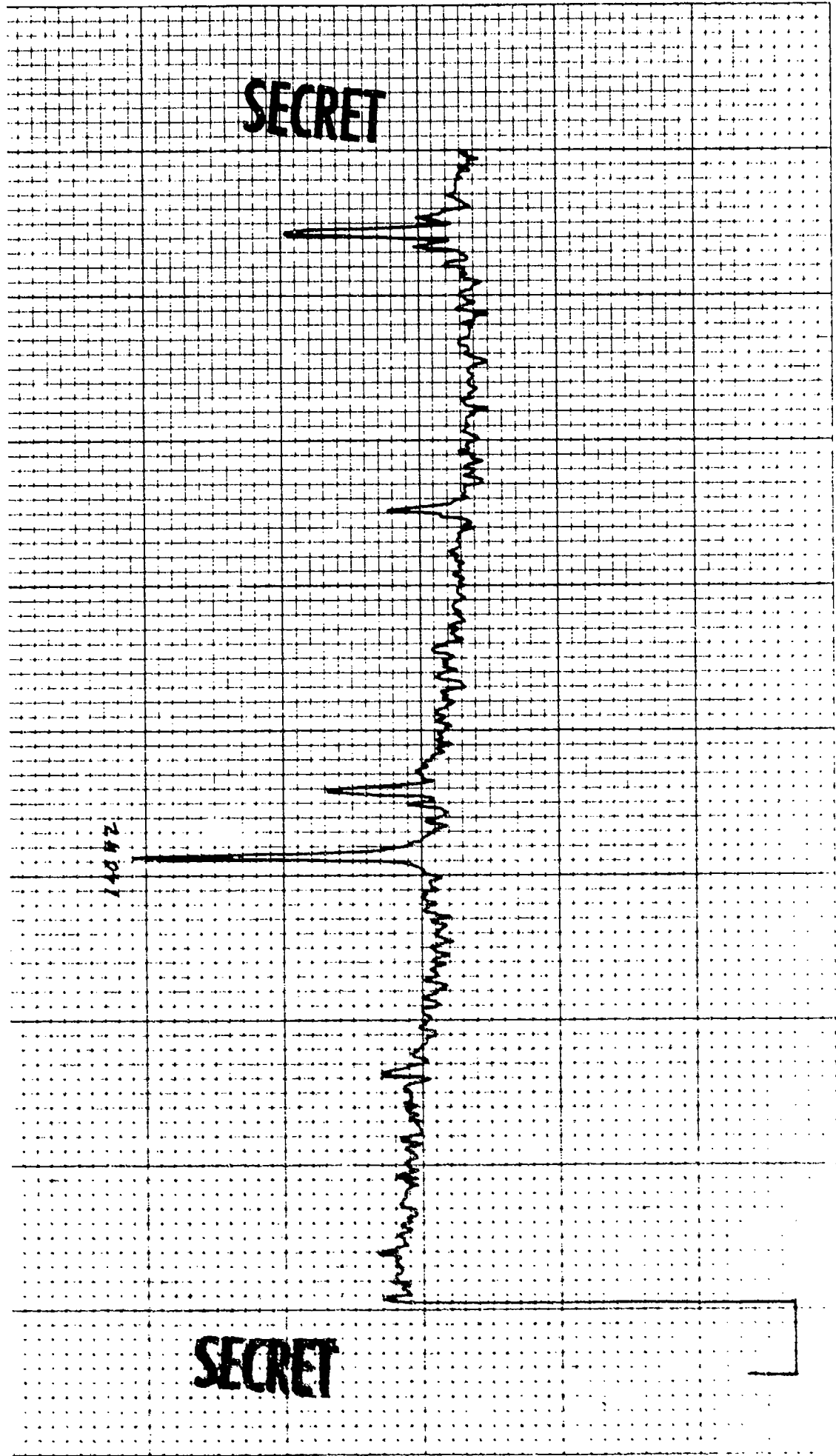


SECRET

46 0703

KOE 12.4 IN TO THE INCH: 2.0 INCHES
SCALING: 1.0000000000000000

CONTROL: 1549 - 16 (DP5) DATE OF ANALYSIS: 1 - 16 REEL: F19 INDE X3050
 BEAMPFORMED SPECTRUM(ELEMENTS) 16
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTN: -18 DB
16 ELEMENTS ANALYSIS BANDWIDTH: 1710HZ FILTER WTG: HANNING



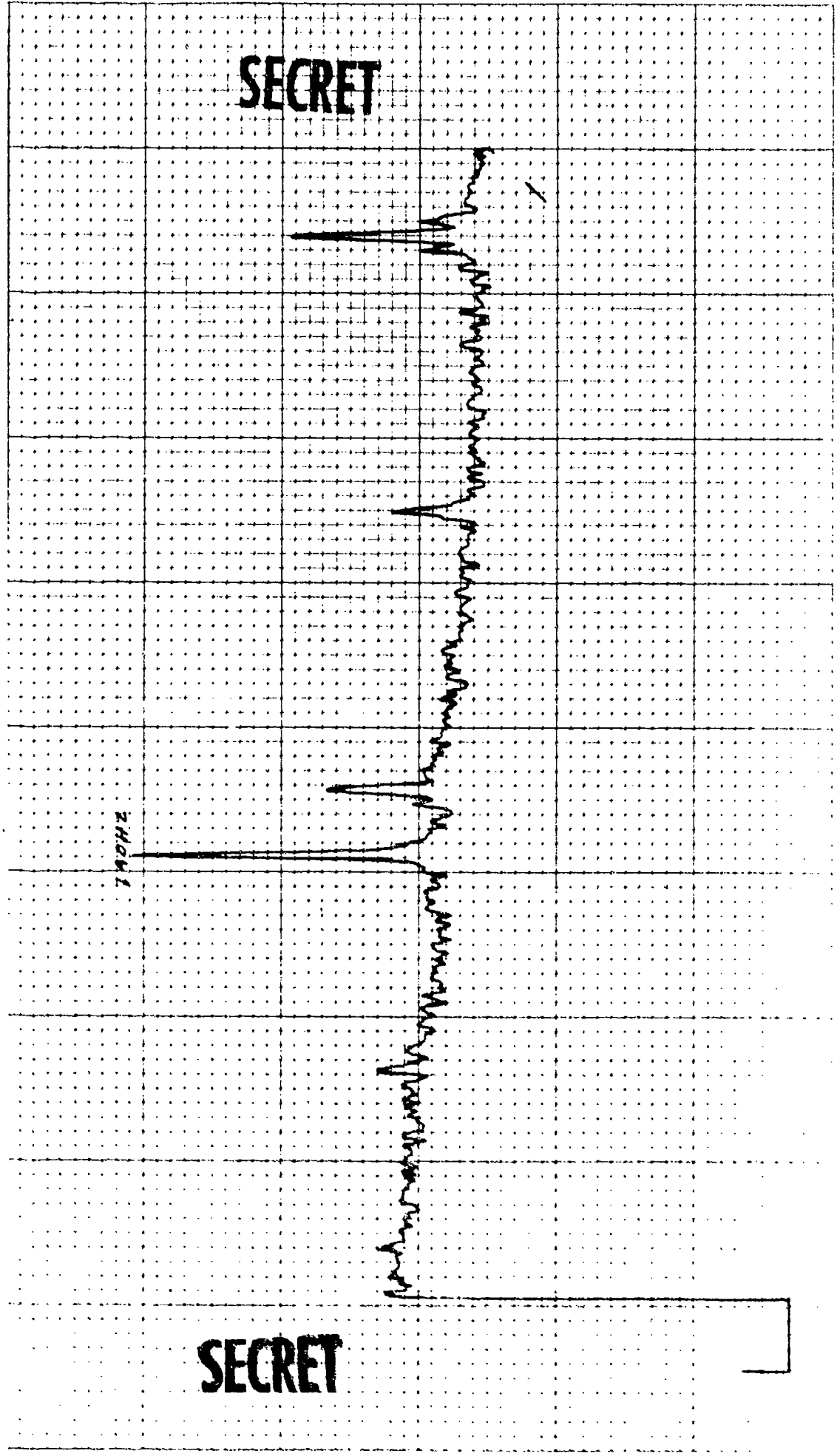
K-E 12.400 TO THE INCH. 200. 0.00. 0.00.

46 0703

CONTROL: 1549 - 16 (DB5)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10 HZ
44 DEG. AZ STEERING

REEL: F19 INDE X3050
INTEGRATION TIME 320 SECS ATTN: 10 DB
FILTER WTG: HANNING



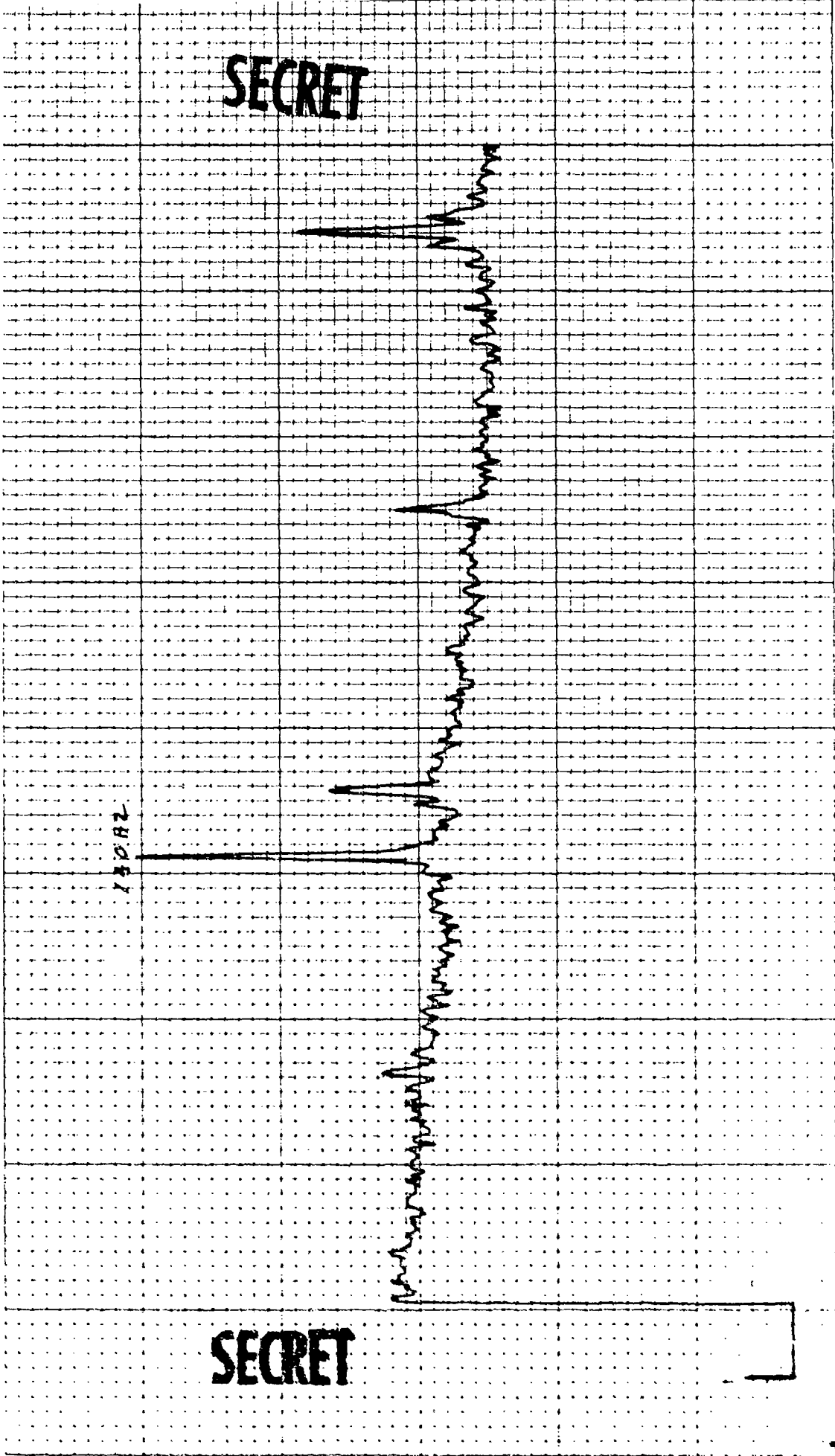
K-E 10.4 TO THE INCHES 7.10 INCHES
PEPPER & BASSER CO. MADE IN U.S.A.

46 0703

CONTROL: 1549 - 16 (D15)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: - - - -
/ - /
DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+46 DEG. AZ STEERING

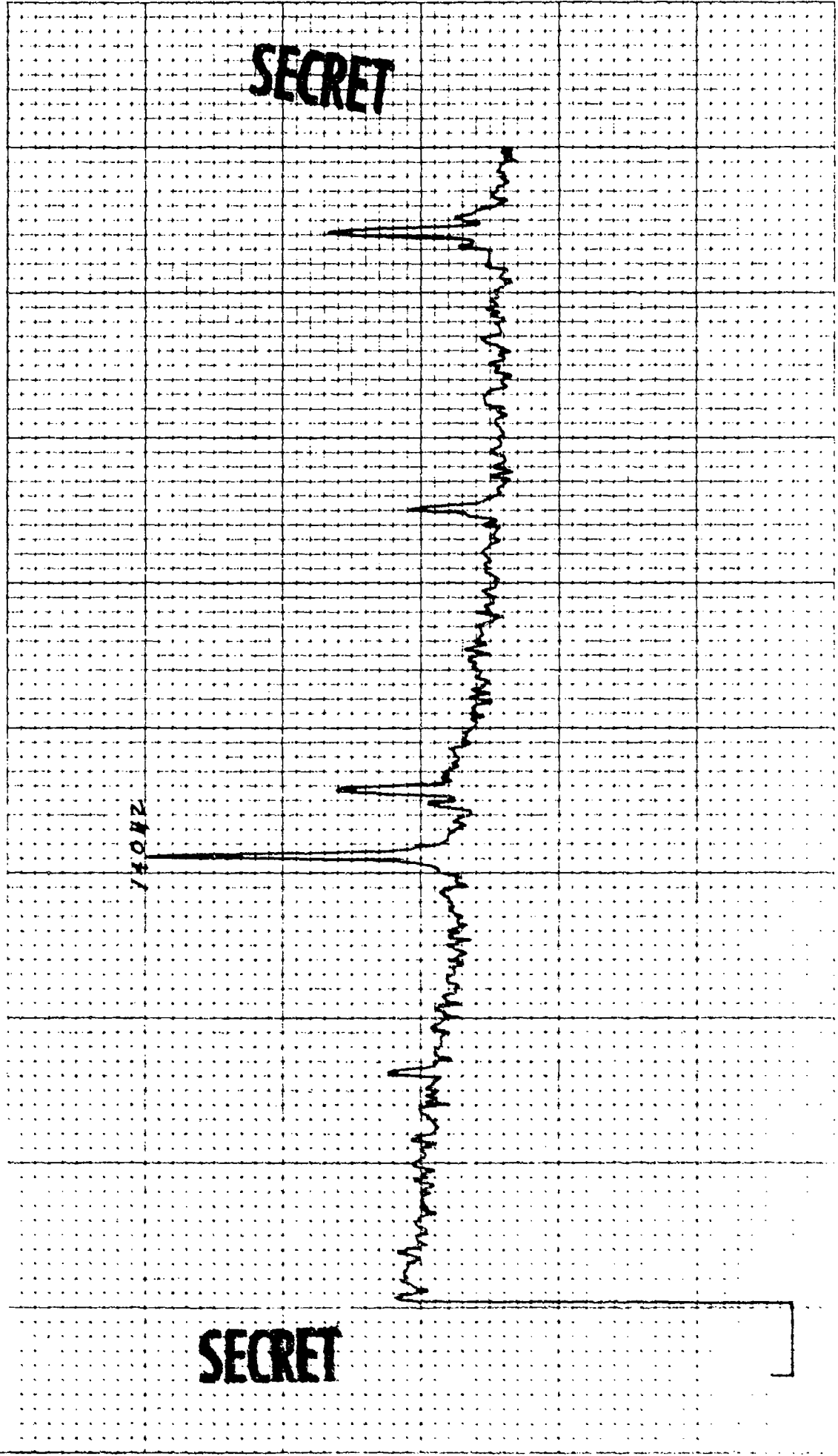
REEL: F19 INDE X3052
INTEGRATION TIME 320 SECS ATTN: -18 DB
FILTER WTC: HANNING



NOE 10.5.16 TO THE BOMBERS 2.1.1968

46 0703

CONTROL: 1549 - 16 (DP5) REEL: F19 INDE X3050
 BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: 1-16
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTN: -18 DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
16 ELEMENTS + 48 DEG. AZ STEERING



SECRET

46 0703

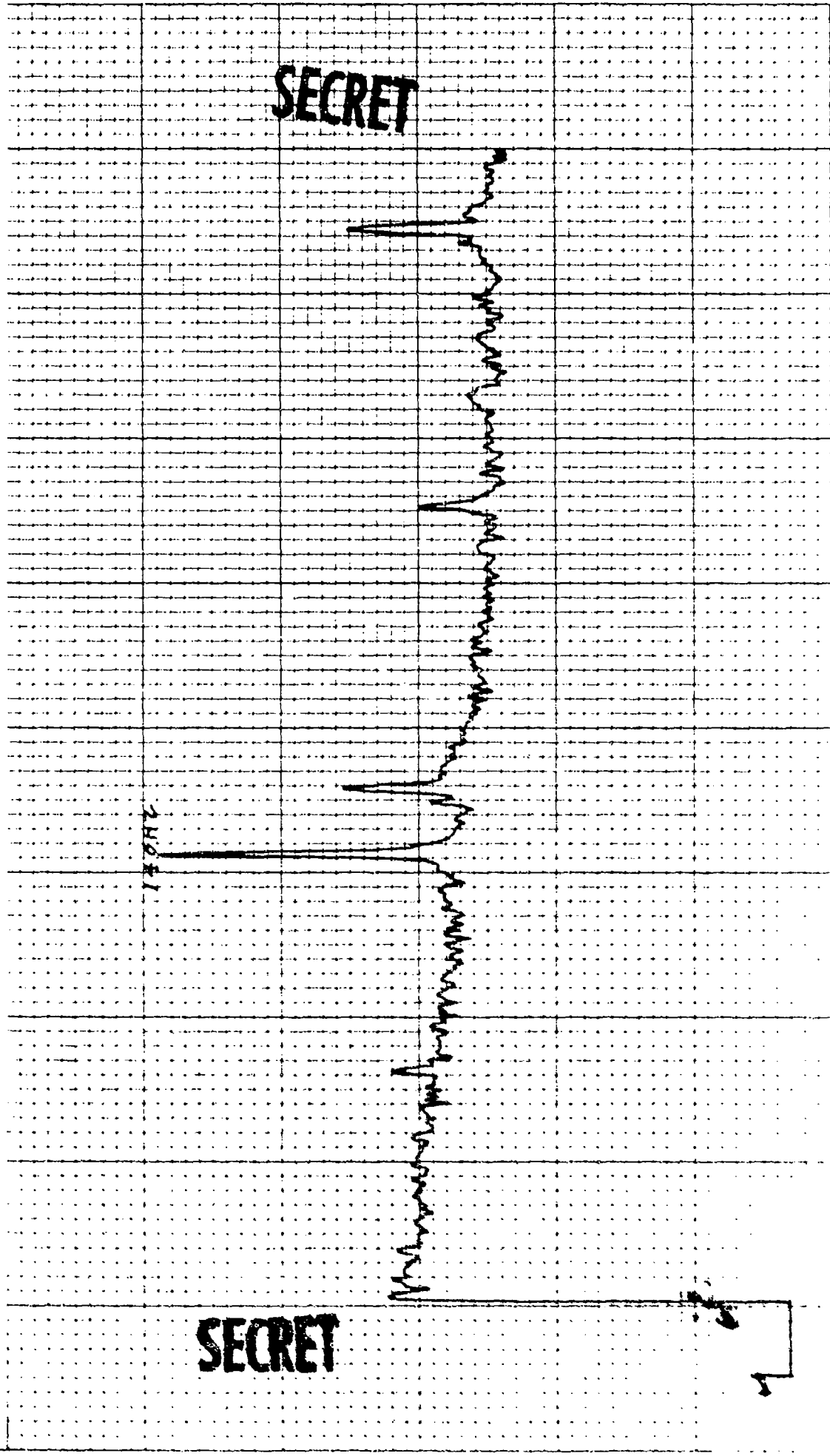
KOE 10/11/16 TO THE DEPT. OF DEFENSE

CONTROL: 1549 - 16 (DPS)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 50 DEG. AZ STEERING

REEL: F/9
INTEGRATION TIME 320 SECS
FILTER
WTG: HANNING

INDE X 3050
ATTEN: -16 DB



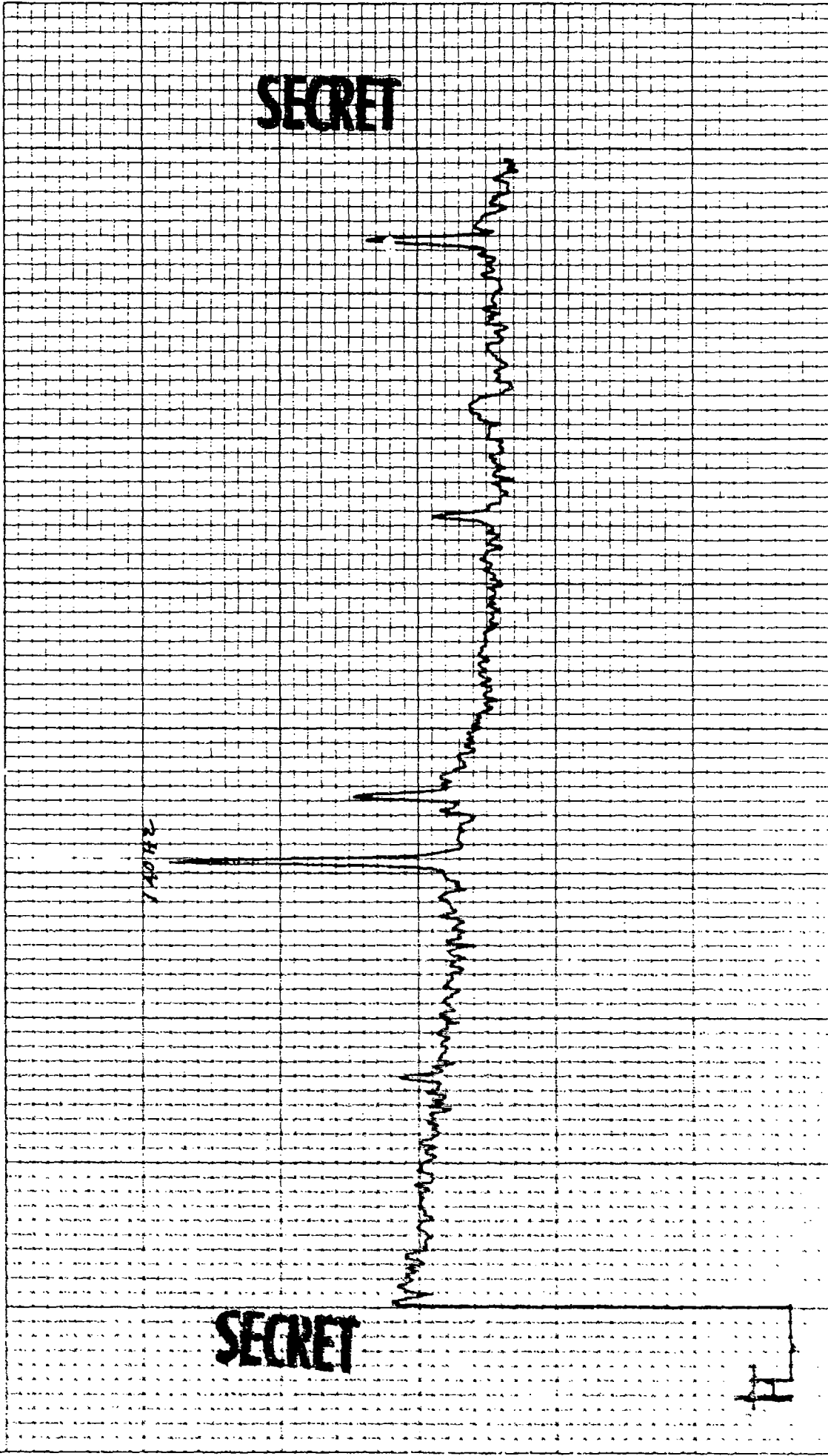
SECRET

SECRET

CONTROL: 1549 - 16 (DPS)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+52 DEG. AZ STEERING

REEL: Fig
INDE X 7050
INTEGRATION TIME 320 SECS
ATTEN: -10 DB
FILTER WTG: HANNING



SECRET

SECRET

11

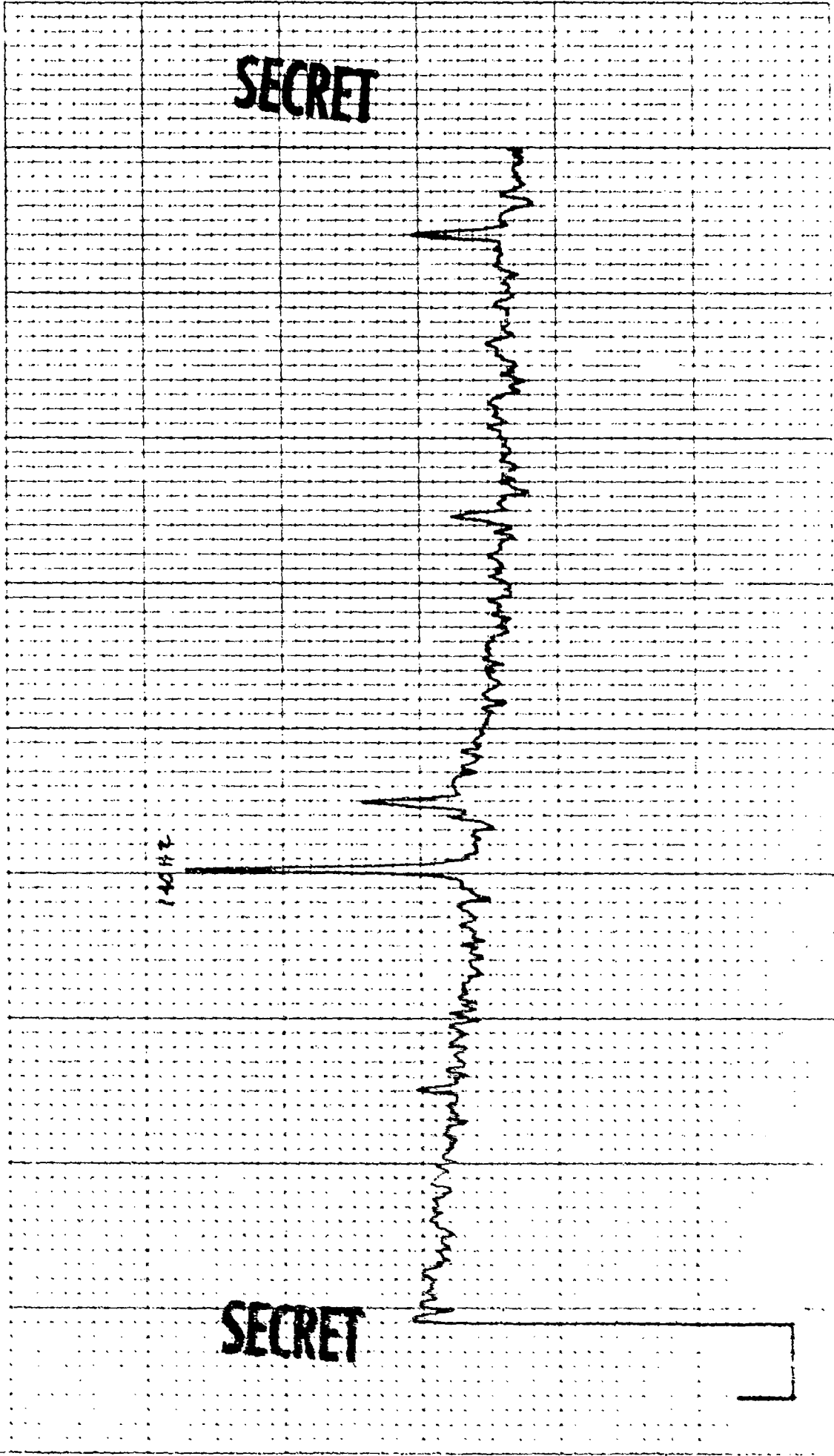
REF ID: A6610 TO THE DIRECTOR, NSA

46 0713

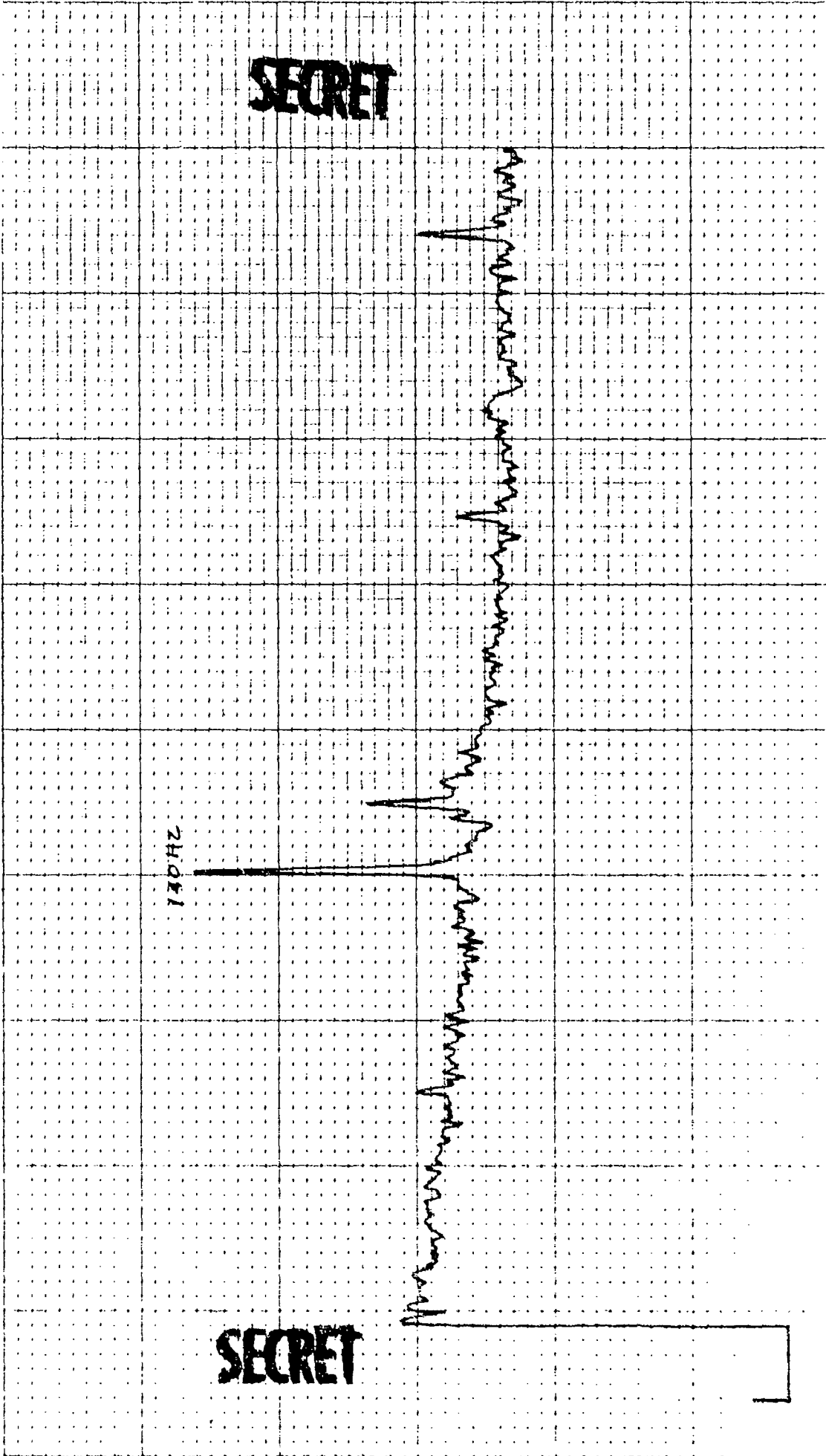
CONTROL: 1549-16 (DP5)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 7-16
DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10 HZ
±54 DEG. AZ STEERING

REEL: F19 INDE X3250
INTEGRATION TIME 320 SECS ATTN: -10 DB
FILTER WIG: HANNING



CONTROL: 1549-16 (0P5) DATE OF ANALYSIS: 1-16 REEL: F19 INDE X 3050
 BEAMFORMED SPECTRUM (ELEMENTS) 16 ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: -18 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 CENTER FREQ: 150 HZ 1549 Z 156 DEG. AZ STEERING



SECRET

SECRET

46 0703

KOE 10 X 10 TO THE INCH
REAR VIEW OF THE INCH

33-100

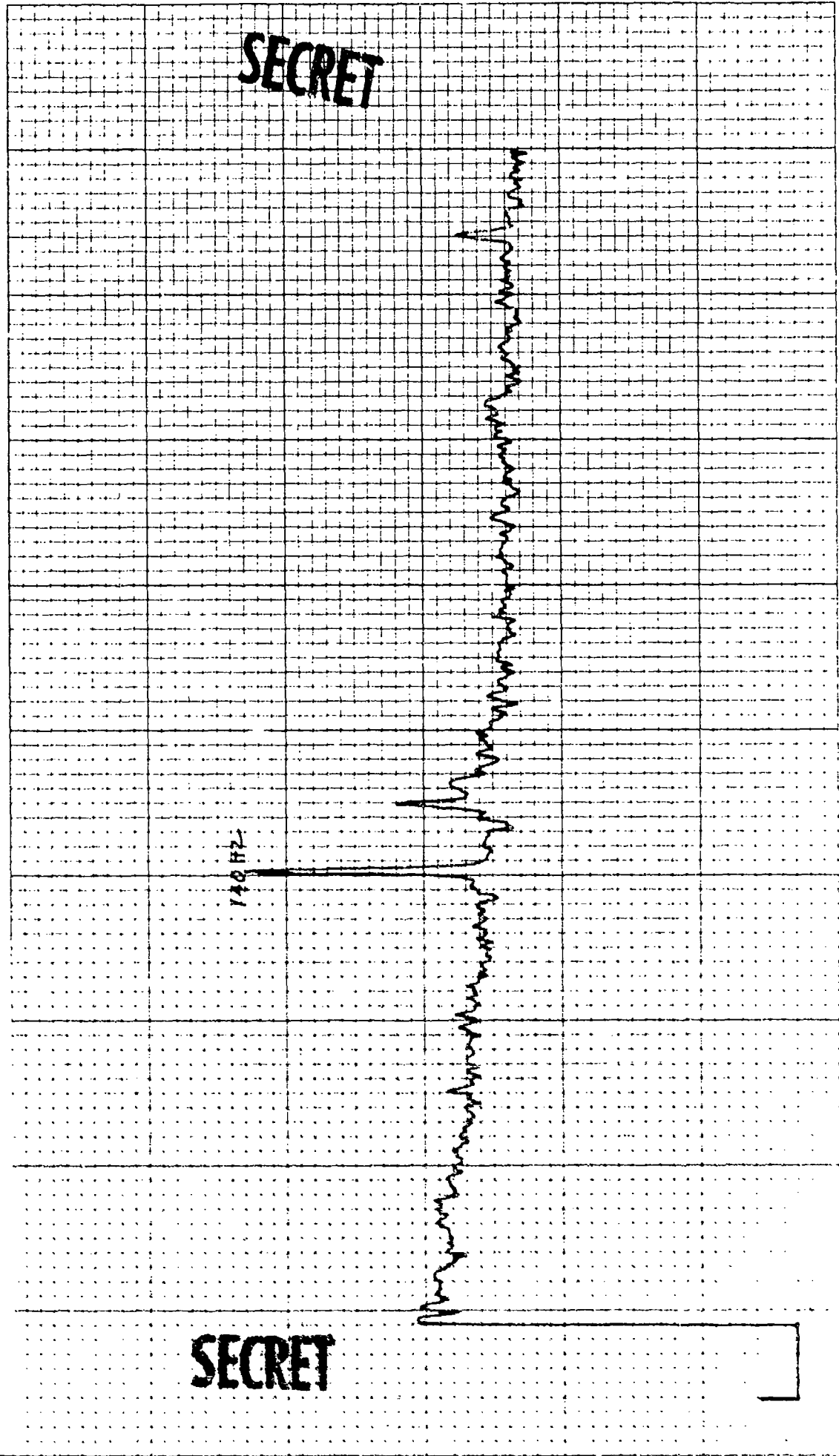
CONTROL: 1549 - 16 (DPS)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16

DATE/TIME: 2-7-77 - 1549 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
+58 DEG. AZ STEERING

REEL: F/9 INDE X 250

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



46 0703

K0Σ 10 X 10 TO THE INCHES 2 10 INCHES
KAPPA EL A-5550 CO 1000-1000

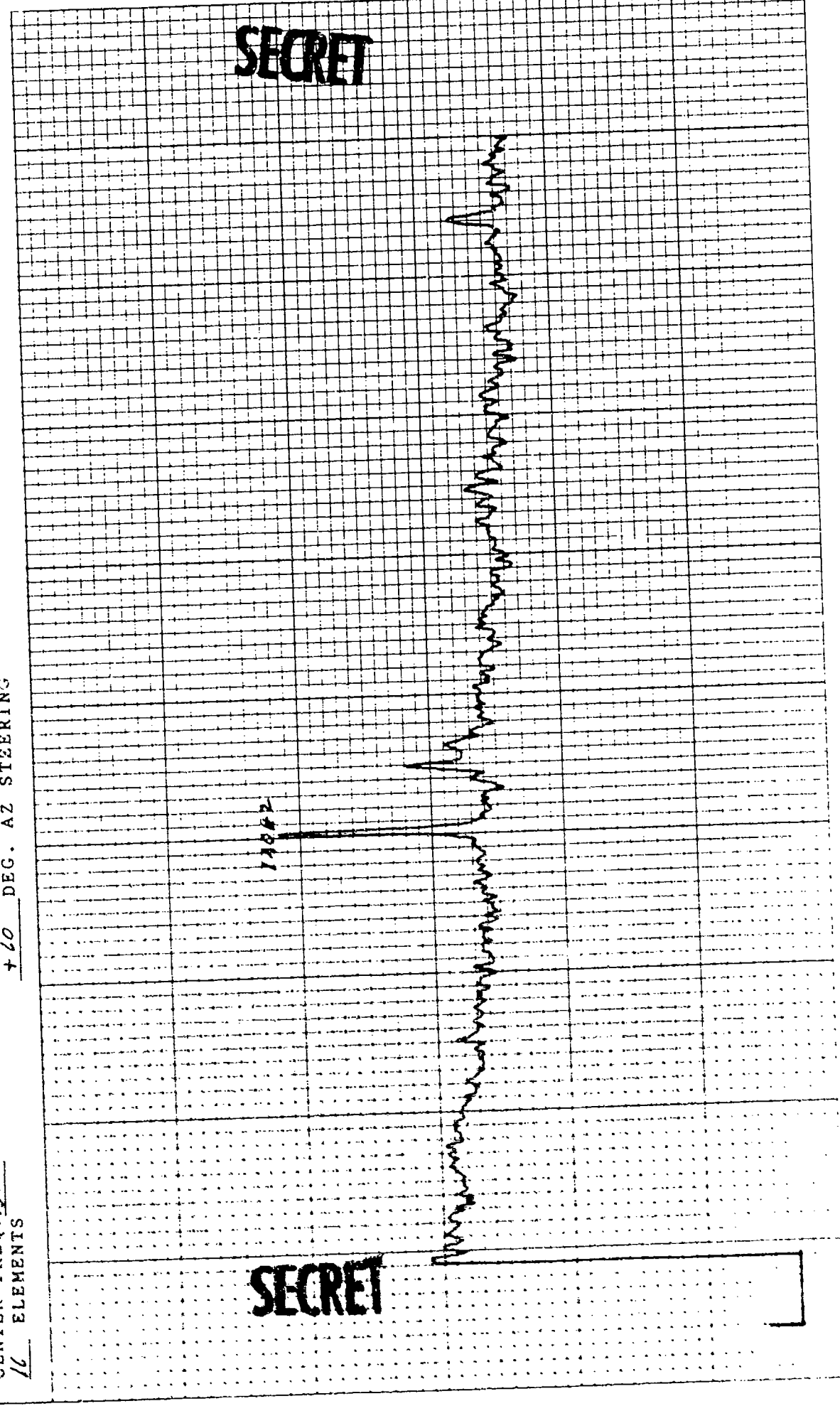
INDE X 205P
REEL: Fig
ATTEN: -18 DB
WTG: HANNING

INTEGRATION TIME 320 SECS
FILTER

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 1549Z
ANALYSIS BANDWIDTH: 1/10 HZ
+60 DEG. AZ STEERING

CONTROL: 1549-16 (015)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS



SECRET

SECRET

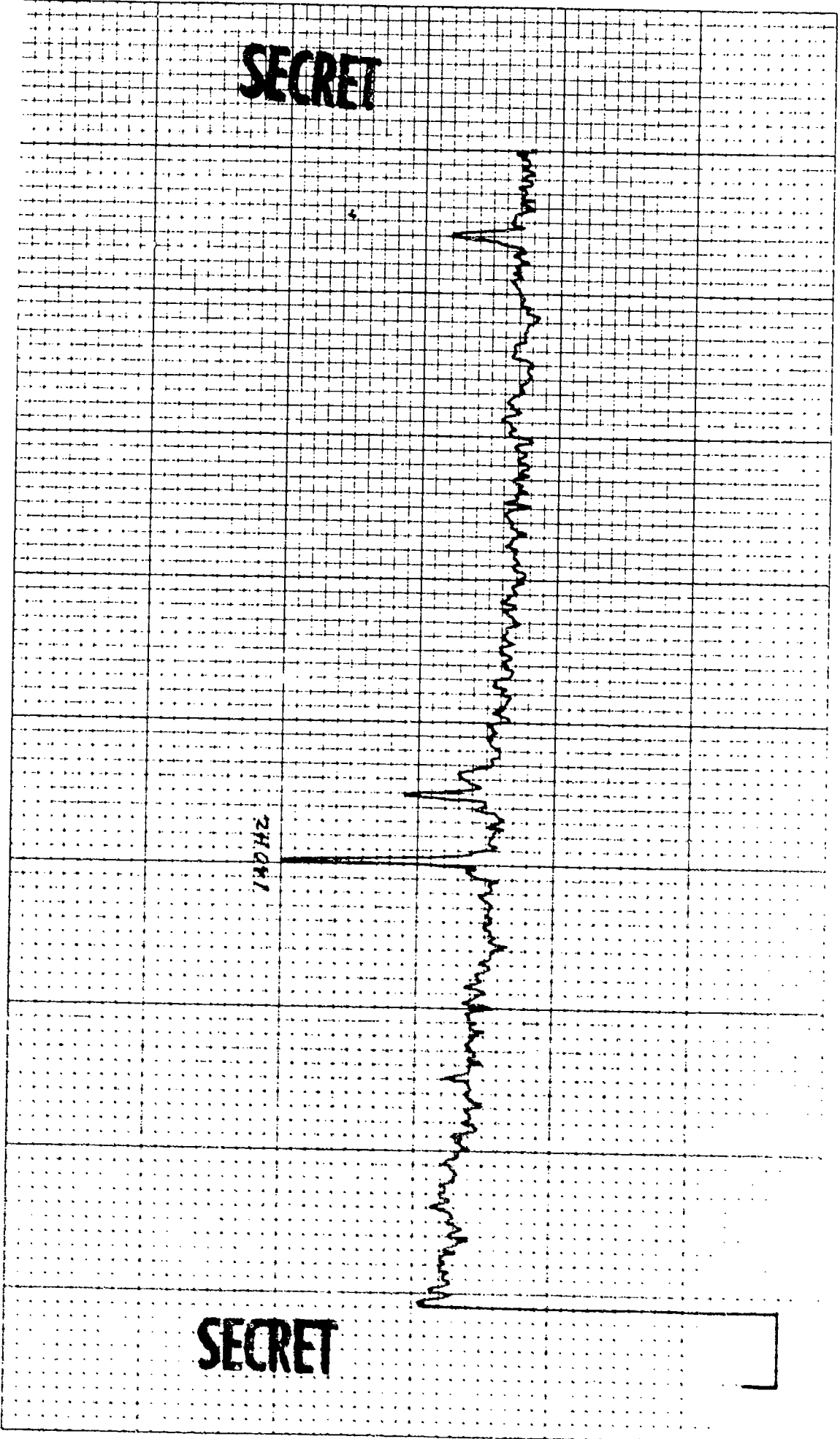
46 0703

KOE 1549 TO THE BY H...
1549-168

CONTROL: 1549 - 16 (DPF) DATE OF ANALYSIS: _____
 BEAMFORMED SPECTRUM (ELEMENTS) 1 - 16
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
16 ELEMENTS

INTEGRATION TIME 320 SECS REEL: F19 INDE X 3050
 FILTER WTG: HANNING ATTN: -10 DB

DATE/TIME: 2-7-77 - 1549Z
 ANALYSIS BANDWIDTH: 1/10HZ
+12 DEG. AZ STEERING



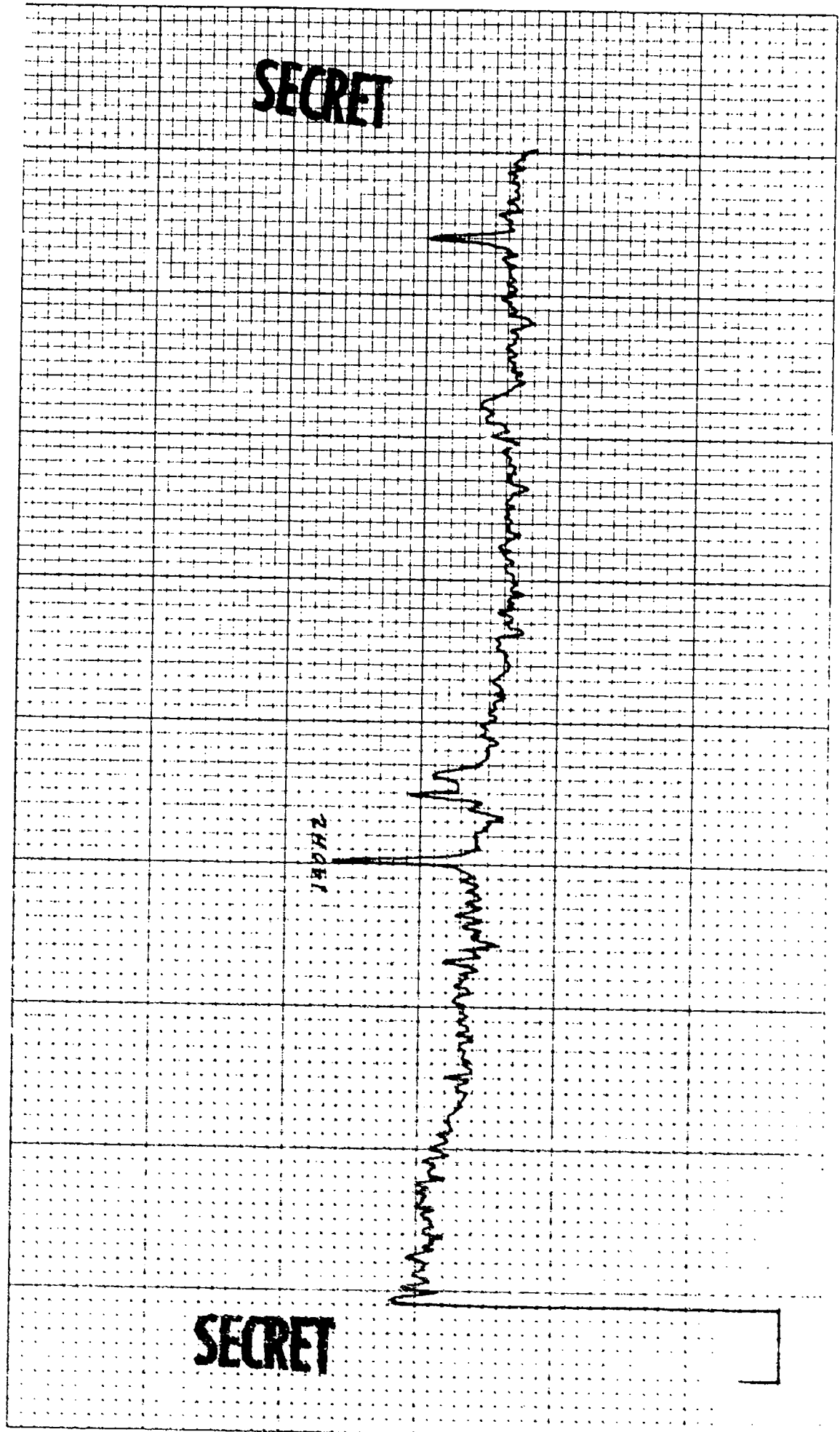
10-E 15 X 16 TO THE INCH - 2 1/2 INCHES
PAPER WEIGHT CO. 500 2 1/2

46 0703

CONTROL: 1544 - 16 (DPF)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+64 DEG. AZ STEERING

REEL: F19 INDE X 3050
INTEGRATION TIME 320 SECS ATTN: -18 DB
FILTER WTG: HANNING



SECRET

SECRET

46 0703

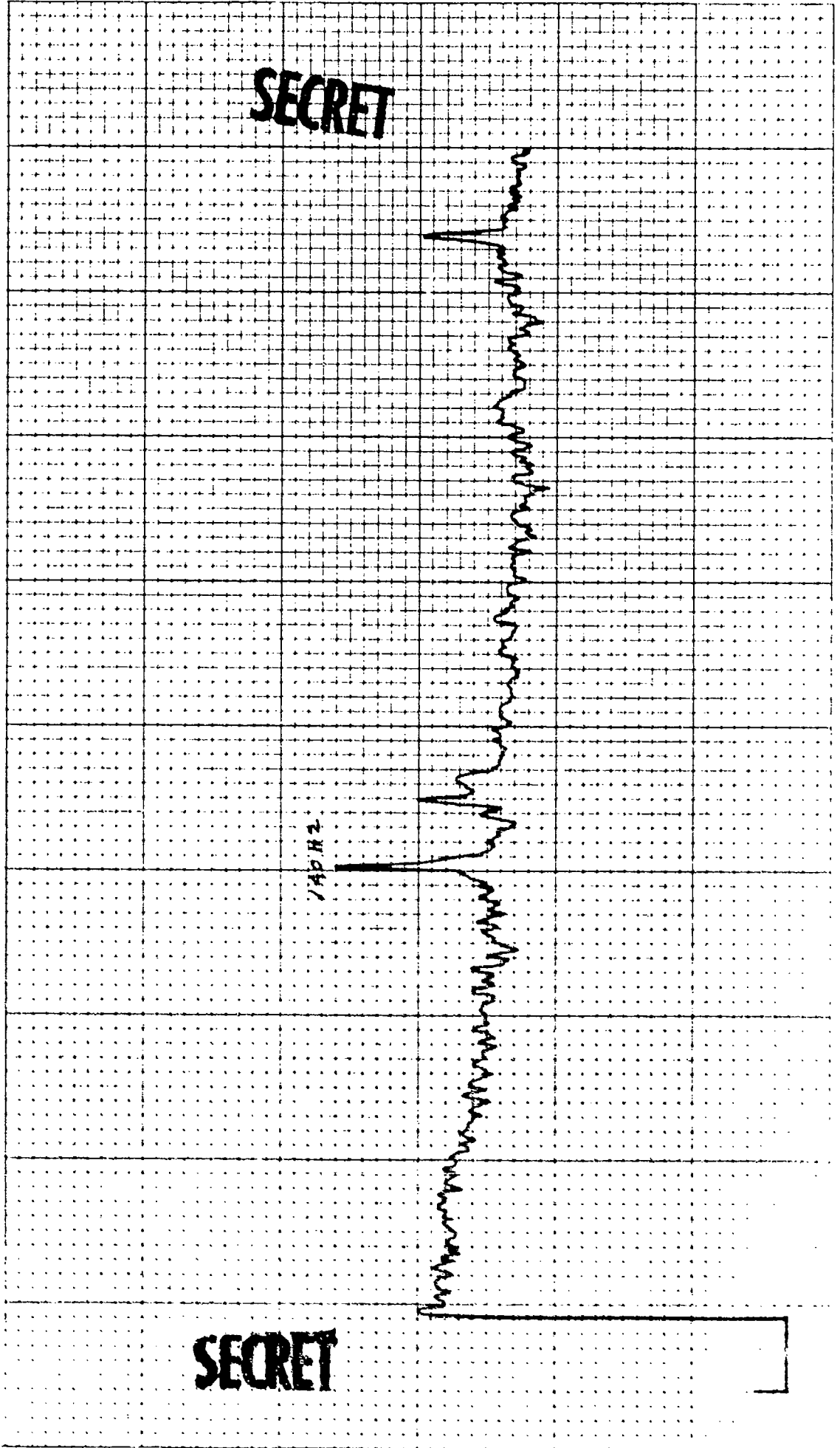
KOE 1549 TO THE DEGREE OF 16

CONTROL: 1549 - 16 (DP5) DATE OF ANALYSIS: - - - - -
 BEAMFORMED SPECTRUM(ELEMENTS) / - / 6
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
 16 ELEMENTS 166 DEG. AZ STEERING

REEL: F19

INDE X 305P

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



SECRET

SECRET

KOE 10 X 10 TO THE INCH 1 1/2 INCHES
WEISSER & FISHER CO. MADE IN U.S.A.

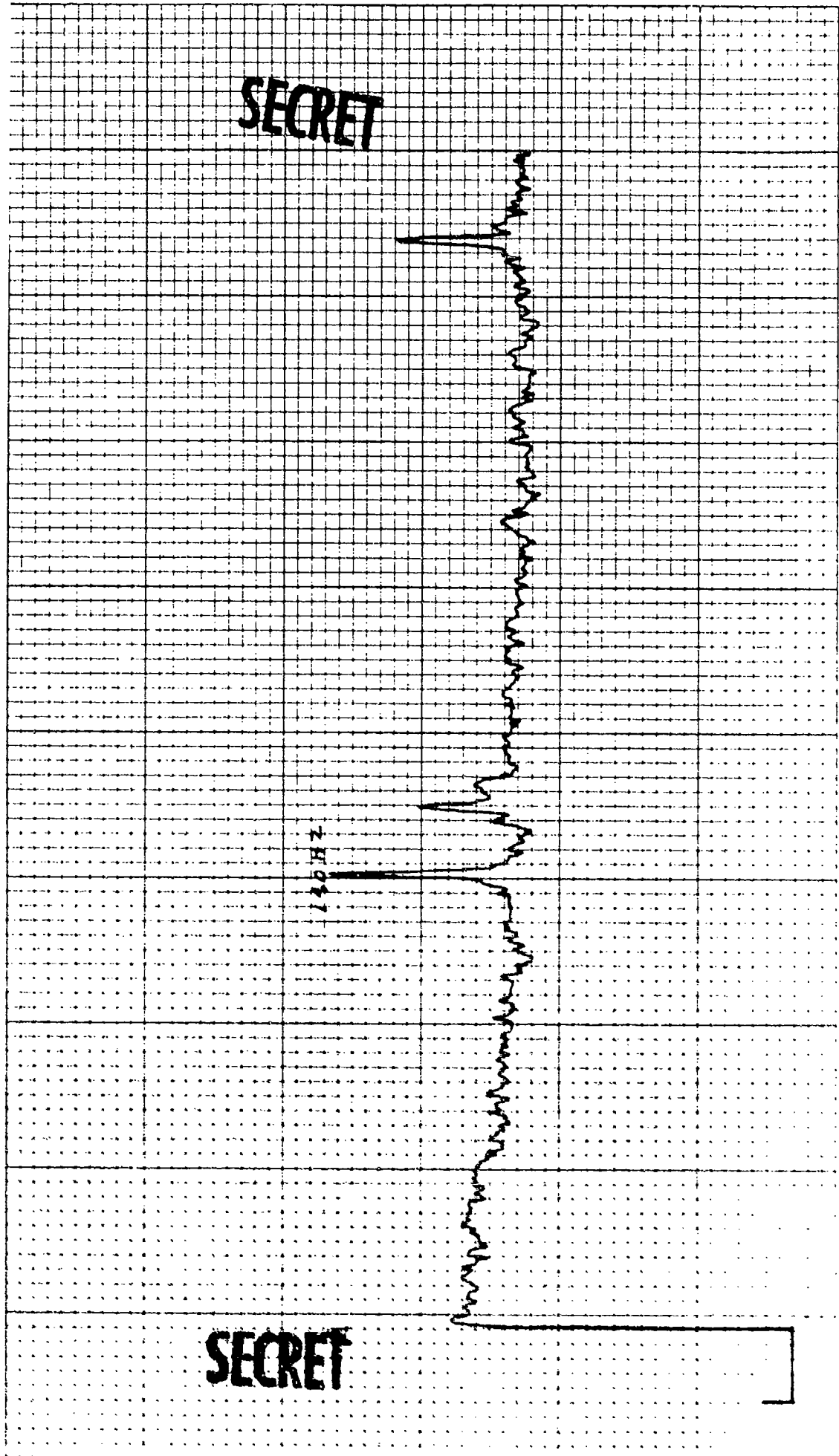
46 0703

CONTROL: 1549 - 16 (DPS)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: - - - - -
/ - - /
DATE/TIME: 2-7-77 - 1549Z
ANALYSIS BANDWIDTH: 1/10HZ
+68 DEG. AZ STEERING

REEL: F19
INTEGRATION TIME 320 SECS
ATTEN: -18 DB
FILTER WTG: HANNING

INDE X 2050



SECRET

SECRET

KOE 10 X 10 TO THE INCHES 5 10 15 20 HFS
WEISSER & SWEENEY CO. NEW YORK, N.Y.

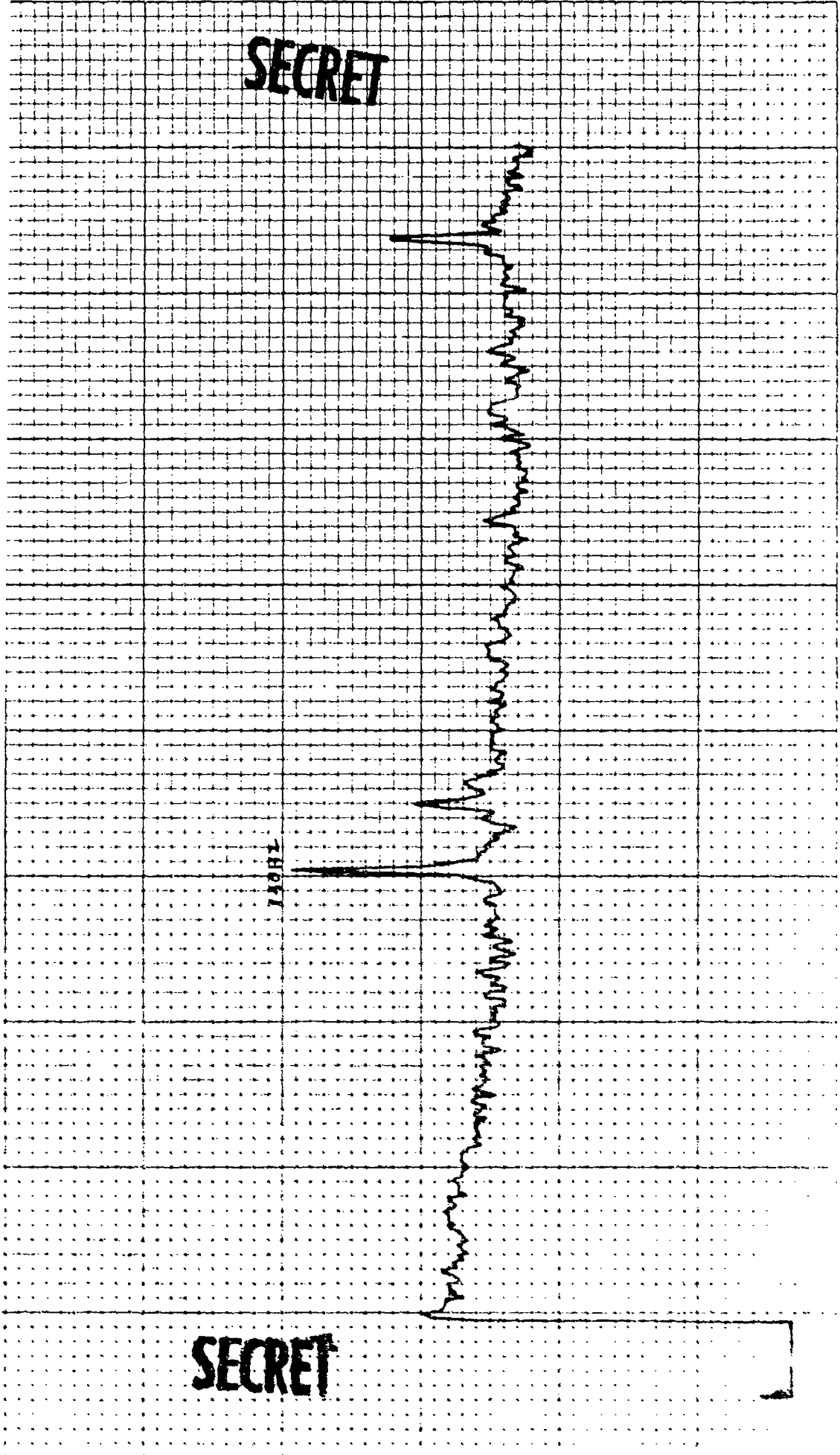
46 0703

CONTROL: 1549 - 16 (DPS)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16

DATE/TIME: 2-7-77 -1549 Z
ANALYSIS BANDWIDTH: 1/10HZ
+70 DEG. AZ STEERING

REEL: F19 INDE X 3050
INTEGRATION TIME 320 SECS ATTN: -10 DB
FILTER WTG: HANNING



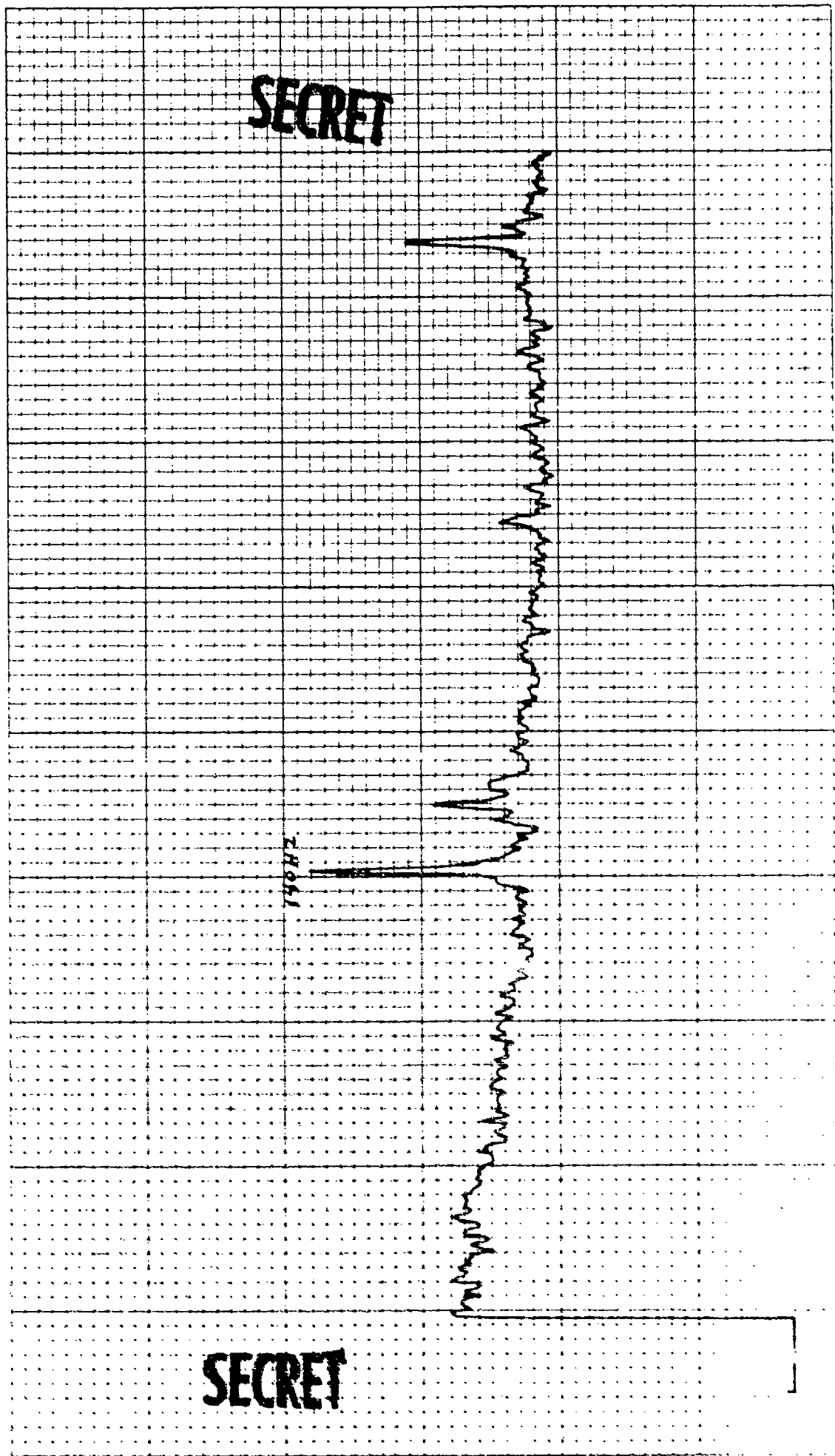
KOE 1549 TO THE BUREAU OF AERONAUTICS

46 0703

CONTROL: 1549 - 16 (DPI)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
/6 ELEMENTS

DATE OF ANALYSIS: - - -
/ - / C
DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+72 DEG. AZ STEERING

RFEL: F19 INDE X3050
INTEGRATION TIME 320 SECS
ATTEN: -18 DB
FILTER WTC: HANNING



46 0703

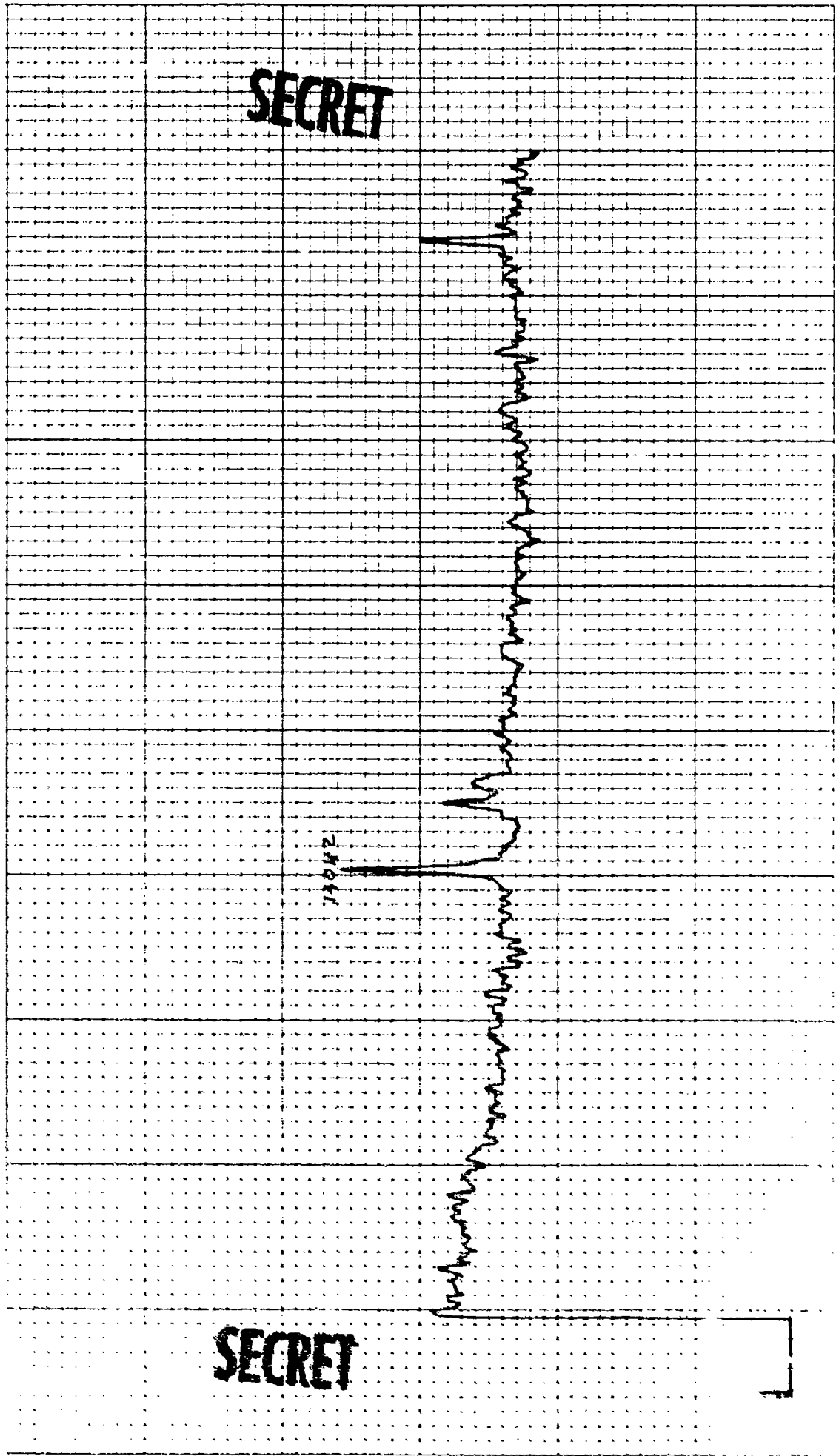
K0E 1549-16 (196)

CONTROL: 1549 - 16 (196)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
/C ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10HZ
+74 DEG. AZ STEERING

REEL: F19
INTEGRATION TIME 320 SECS
FILTER

INDE X 305
ATTEN: -6 DB
WTG: HANNING



46 0703

KOE 1544 - 16 (DPS)

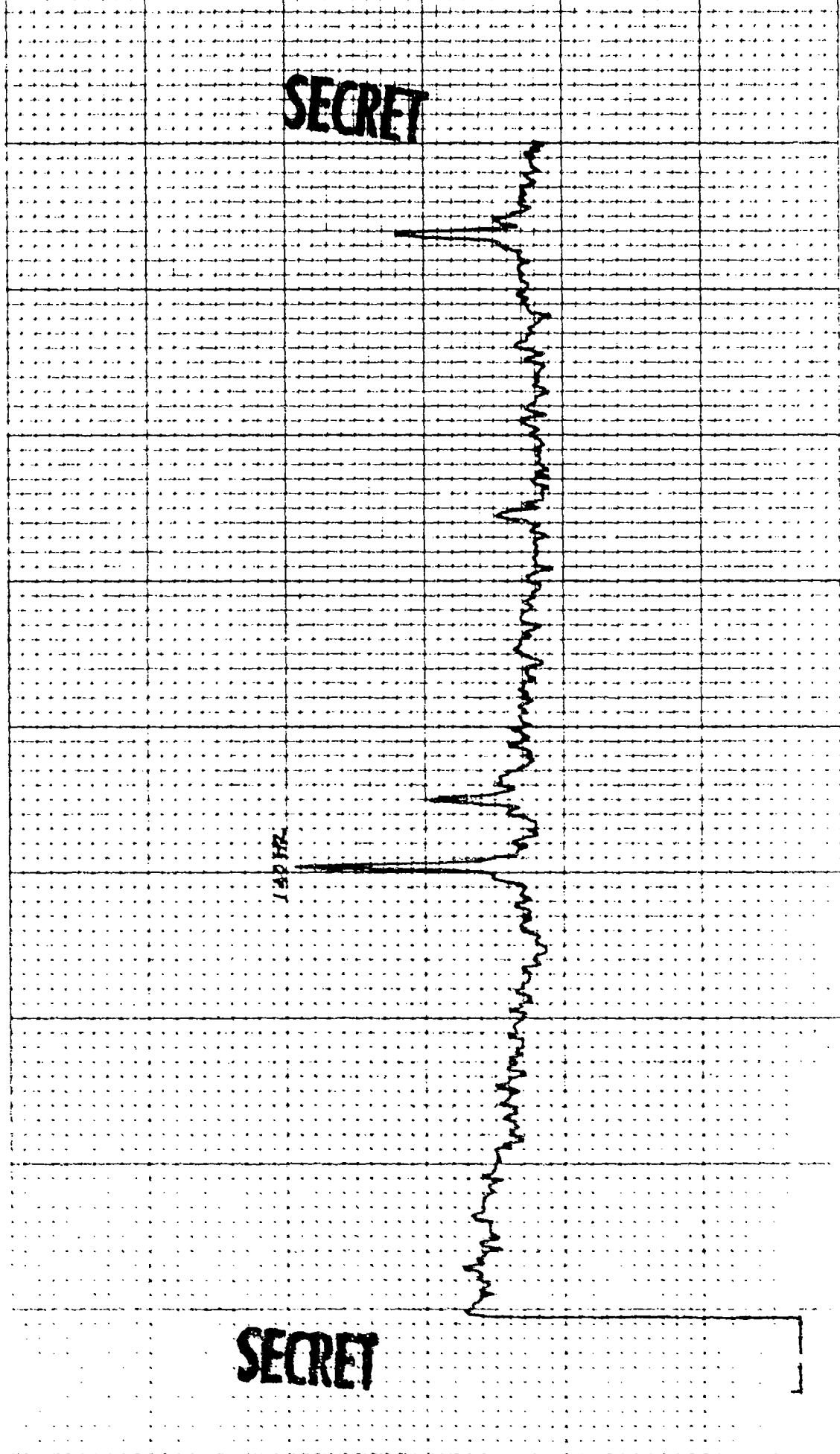
CONTROL: 1544 - 16 (DPS) DATE OF ANALYSIS: 1-16 REEL: F19 INDE X 3050

BEAMFORMED SPECTRUM (ELEMENTS) 1-16 INTEGRATION TIME 320 SECS ATTEN: -10 DB

EXERCISE: BEARING STAKE DATE/TIME: 27-77 - 1509 Z FILTER WTG: HANNING

CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ + 76 DEG. AZ STEERING

16 ELEMENTS

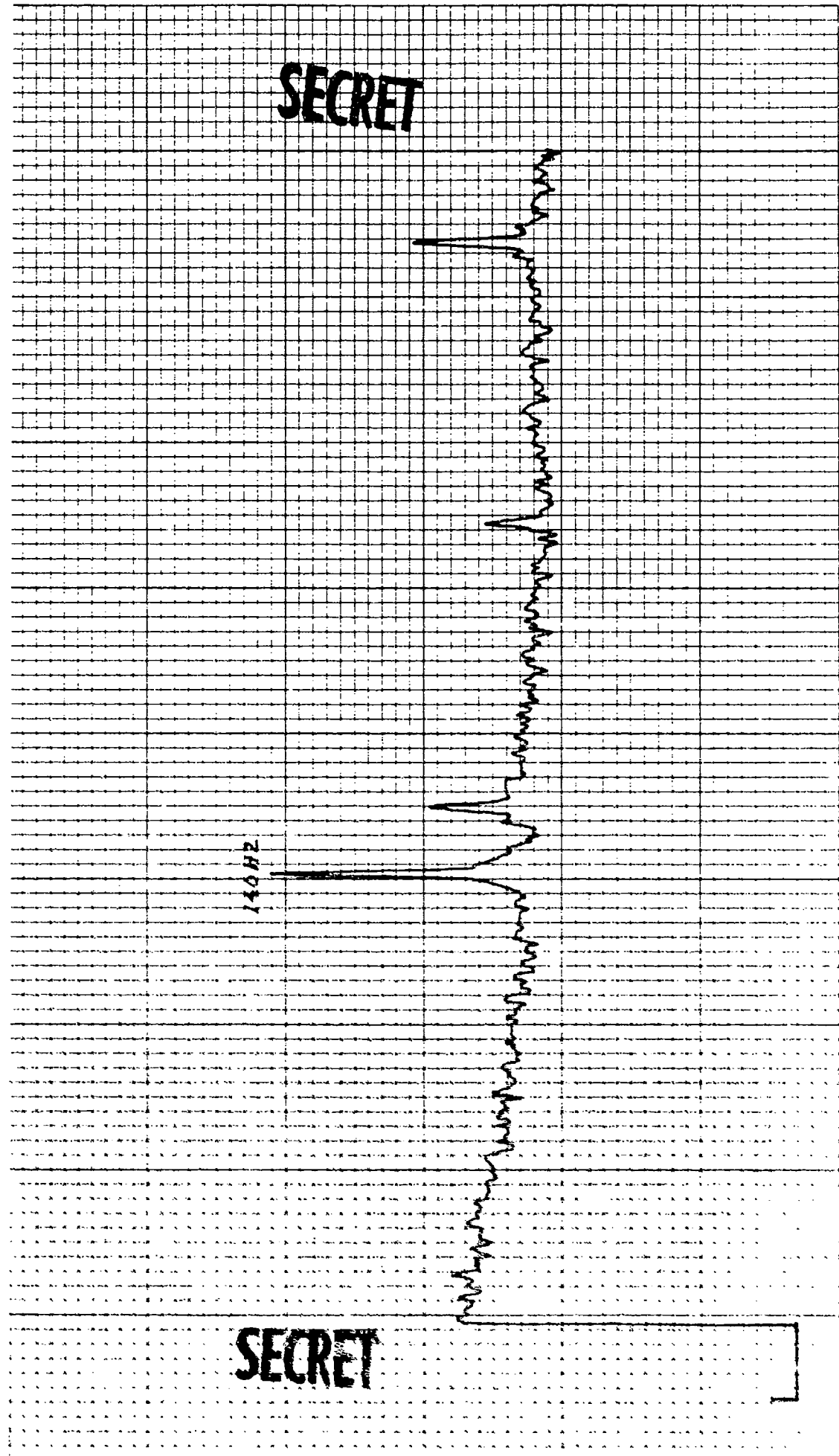


KSE 10 X 10 TO THE INCH 7 X 10 IMP KES
NEUPHEL BASSER CO. MADE IN U.S.A.

46 0703

CONTROL: 1549 - 16 (D15)
 BEAMFORMED SPECTRUM (ELEMENTS) / - / C REEL: F19 INDE X3050
 EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: -18 DB
 CENTER FREQ: 150 HZ FILTER WTG: HANNING
 16 ELEMENTS + 78 DEG. AZ STEERING

DATE OF ANALYSIS: - - - -
 / - / C
 DATE/TIME: 2-7-77 - 1549 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 + 78 DEG. AZ STEERING



SECRET

46 0703

REF ID: A610 TO THE DIRECTOR, NSA

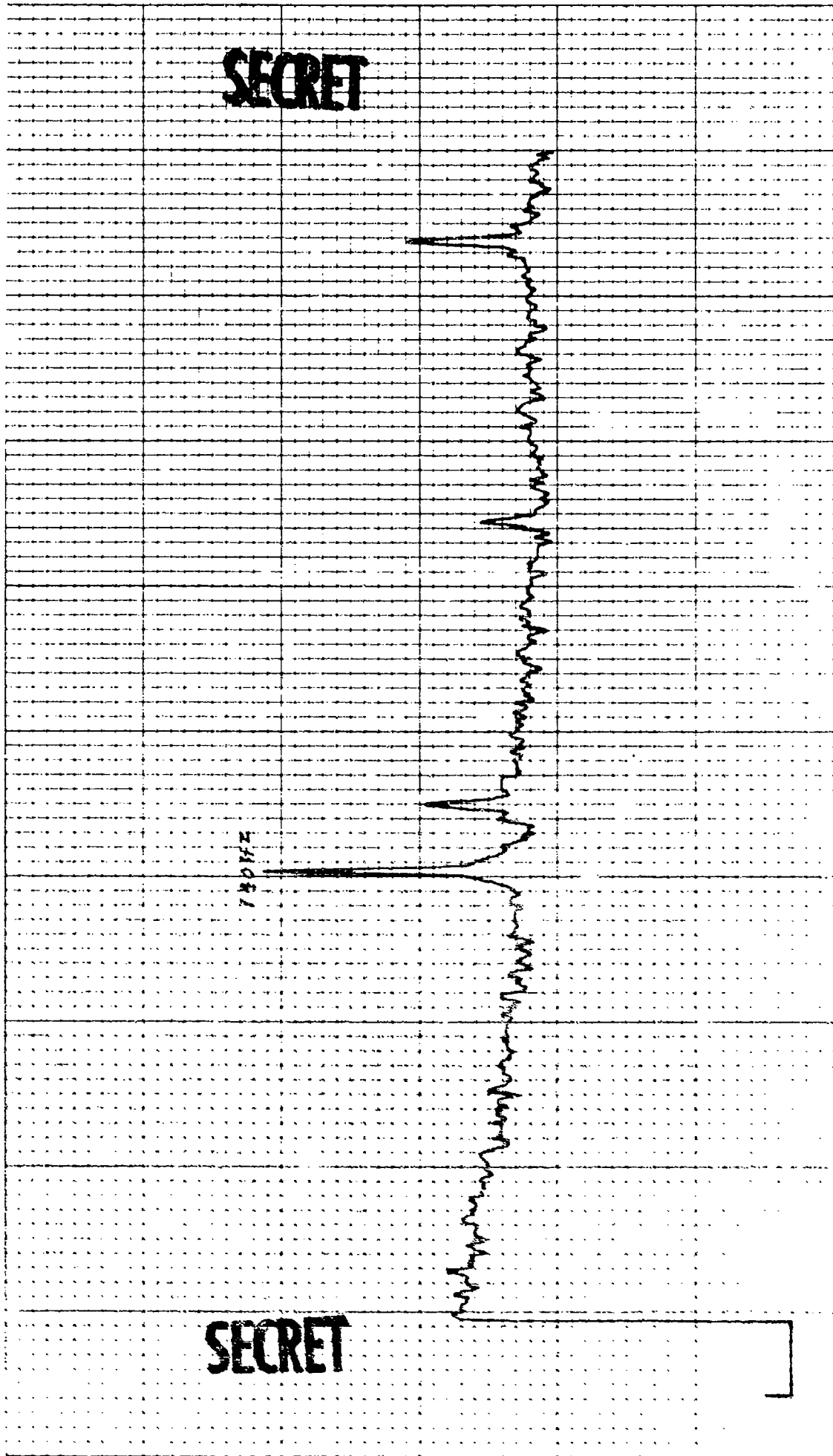
CONTROL: 1549 - 16 (DPS) DATE OF ANALYSIS: 1-16 REEL: F19 INDE X 352

BEAMFORMED SPECTRUM (ELEMENTS) 1-16

EXERCISE: BEARING STAKE DATE/TIME: 27-77 - 1549Z INTEGRATION TIME 320 SECS ATTN: -18 DB

CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1710HZ FILTER WTG: HANNING

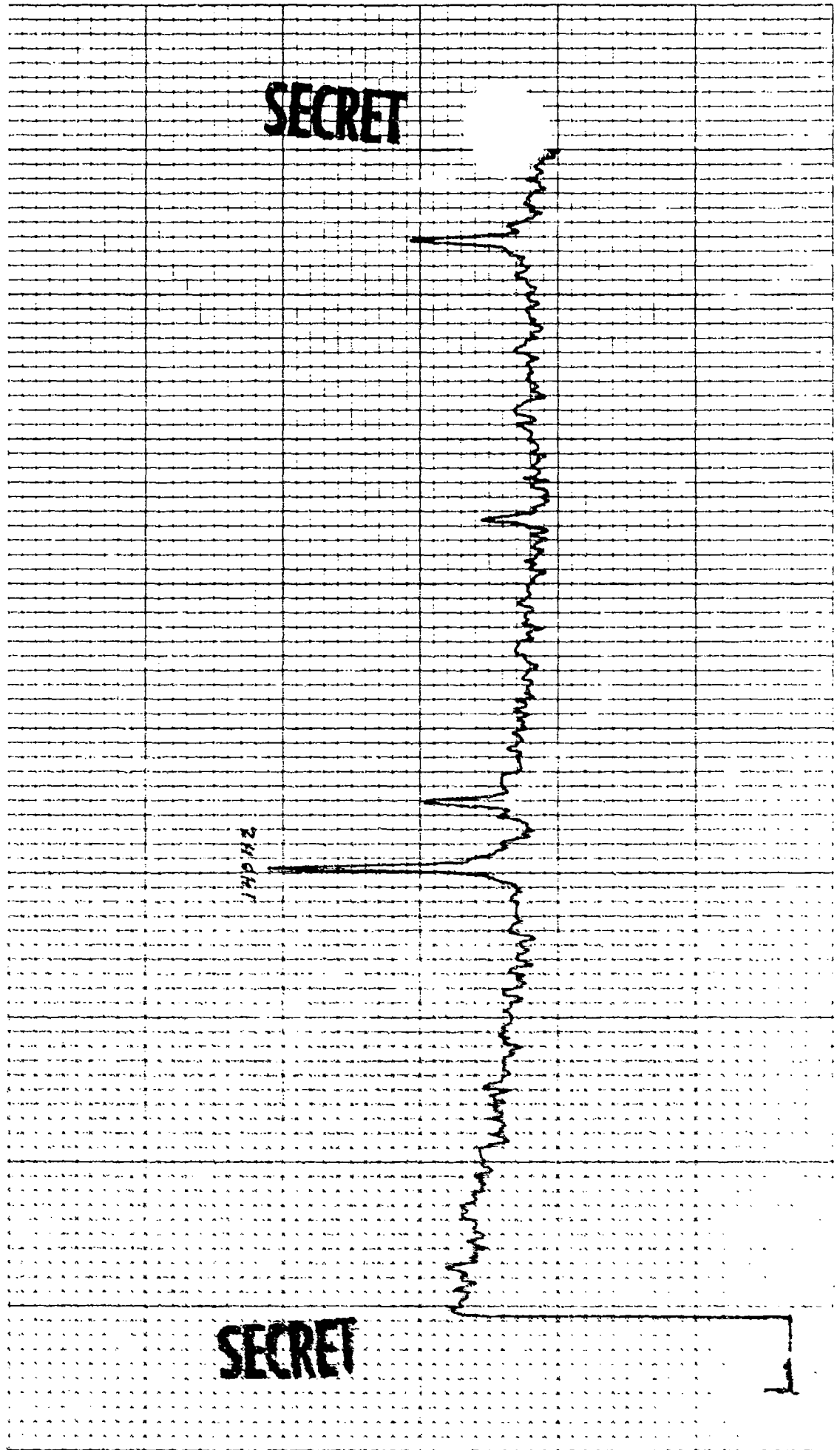
16 ELEMENTS +80 DEG. AZ STEERING



REF ID: A66000

46 0703

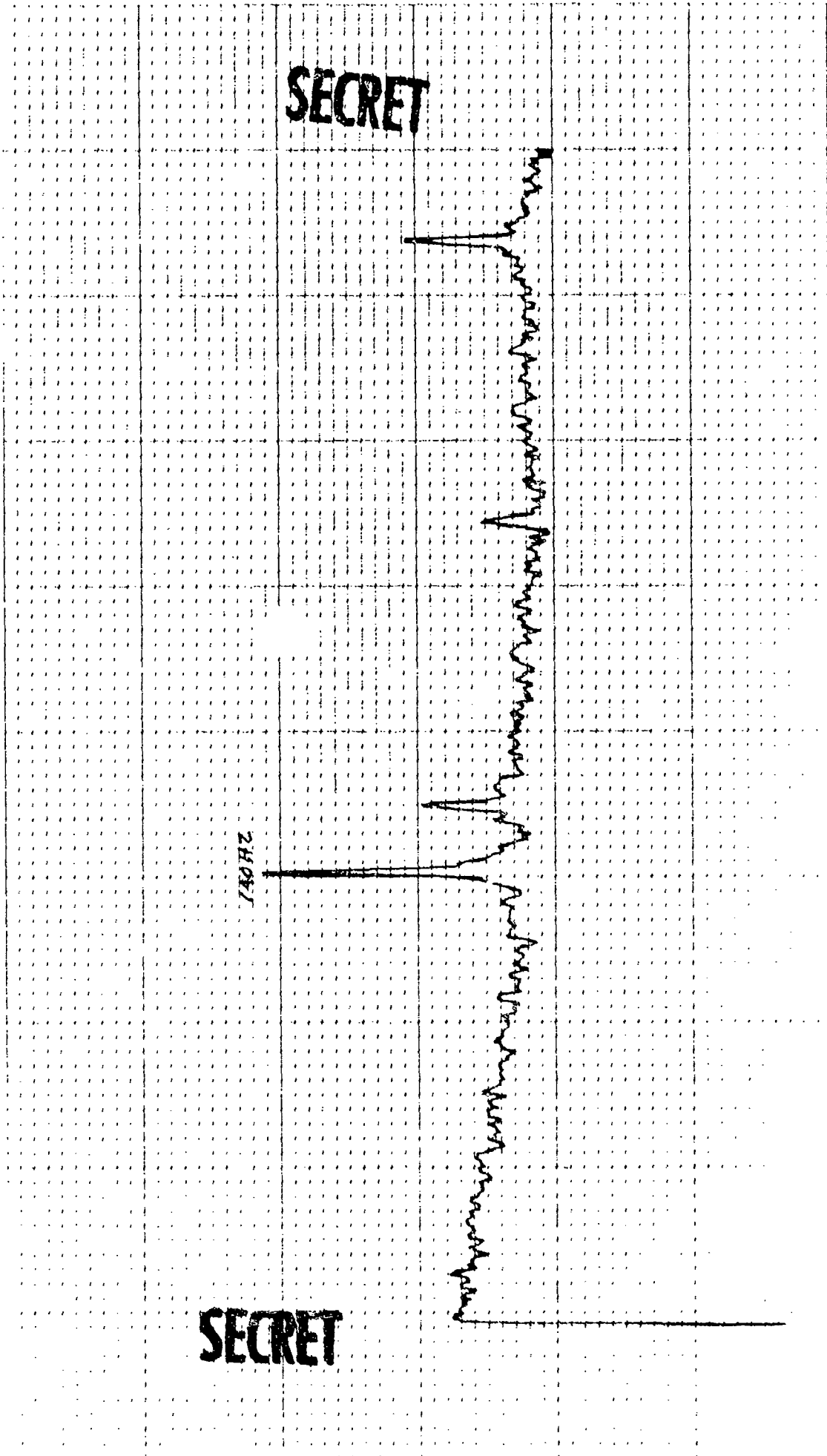
CONTROL: 1549 - 16 (DPS) DATE OF ANALYSIS: 1 - 16 REEL: F19 INDE X3050
 BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-7-77 - 1549Z INTEGRATION TIME 320 SECS ATTEN: -18 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 CENTER FREQ: 150 HZ +82 DEC. AZ STEERING



SECRET

SECRET

CONTROL: 1549 - 16 (DPS) DATE OF ANALYSIS: 1 - 16 REEL: F19 INDE X 3050
 BEAMFORMED SPECTRUM(ELEMENTS))
 EXERCISE: BEARING STAKE DATE/TIME: 27-77 - 1549 Z INTEGRATION TIME 320 SECS ATTEN: -10 DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 17/10HZ FILTER WTC: HANNING
16 ELEMENTS 404 DEG. AZ STEERING

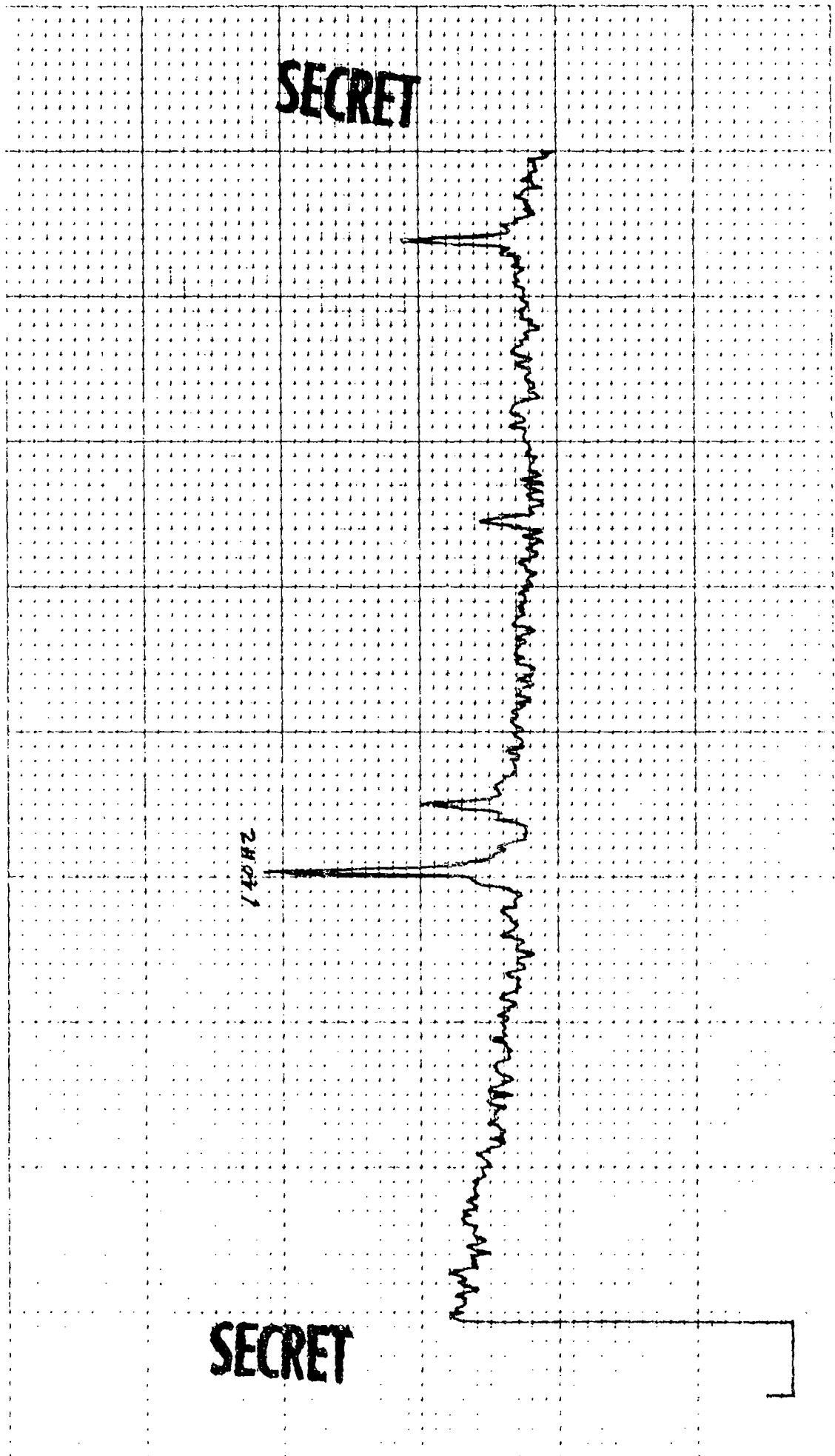


SECRET

SECRET

45 0703

CONTROL: 1549 - 16 (DPS) DATE OF ANALYSIS: 1 - 16 REEL: F/9 INDE X 3050
BEAMFORMED SPECTRUM (ELEMENTS) 1 - 16 INTEGRATION TIME 320 SECS ATTEN: -19 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 150 HZ +86 DEG. AZ STEERING



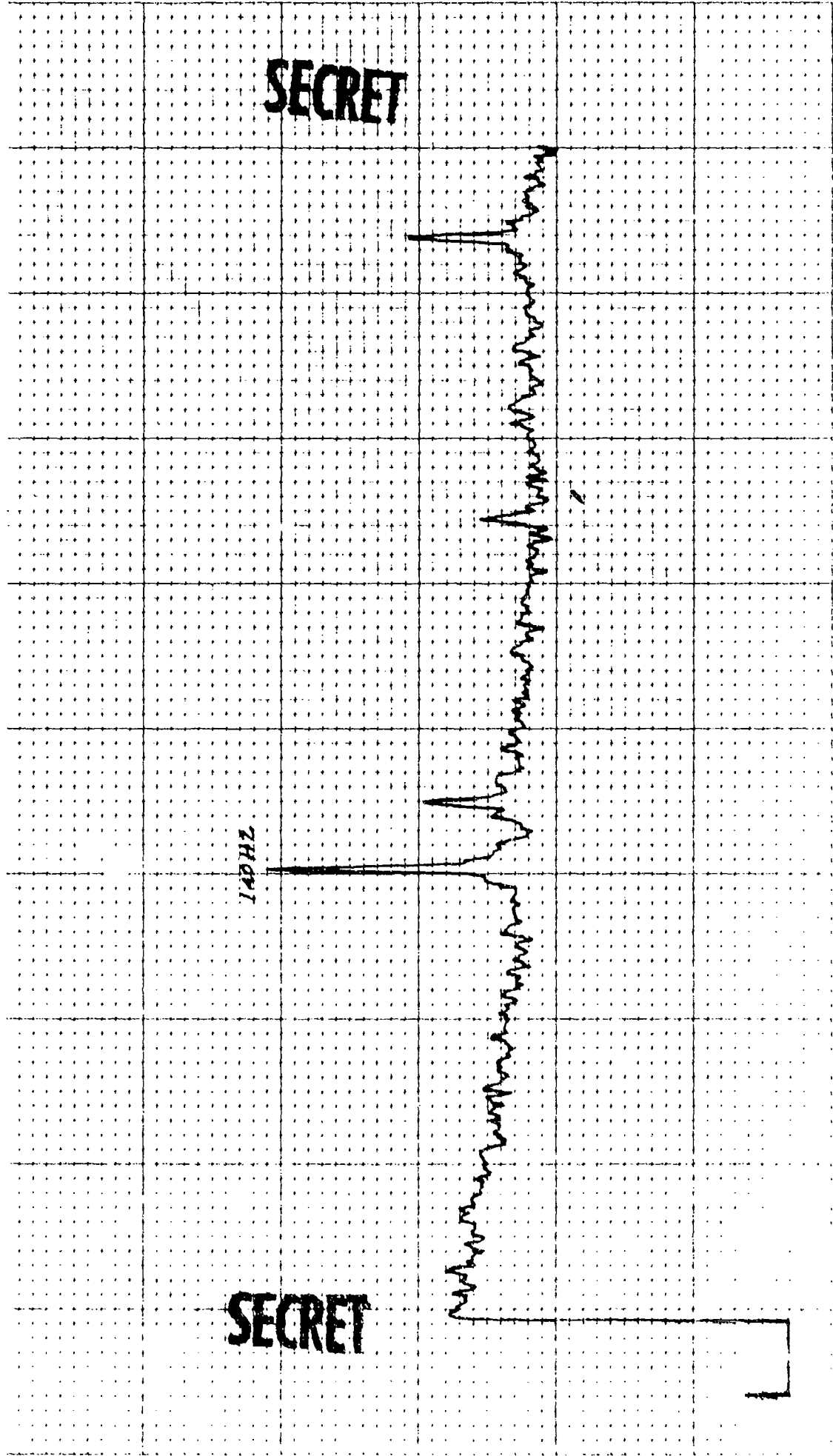
MOE WE 100 TO THE INCHES OF THE

46 0703

CONTROL: 1549 - 16 (DP5)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: - - - -
1 - 16
DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+08 DEG. AZ STEERING

REEL: F19 REEL: X305
INTEGRATION TIME 320 SECS ATTEN: -18 DB
FILTER WTG: HANNING



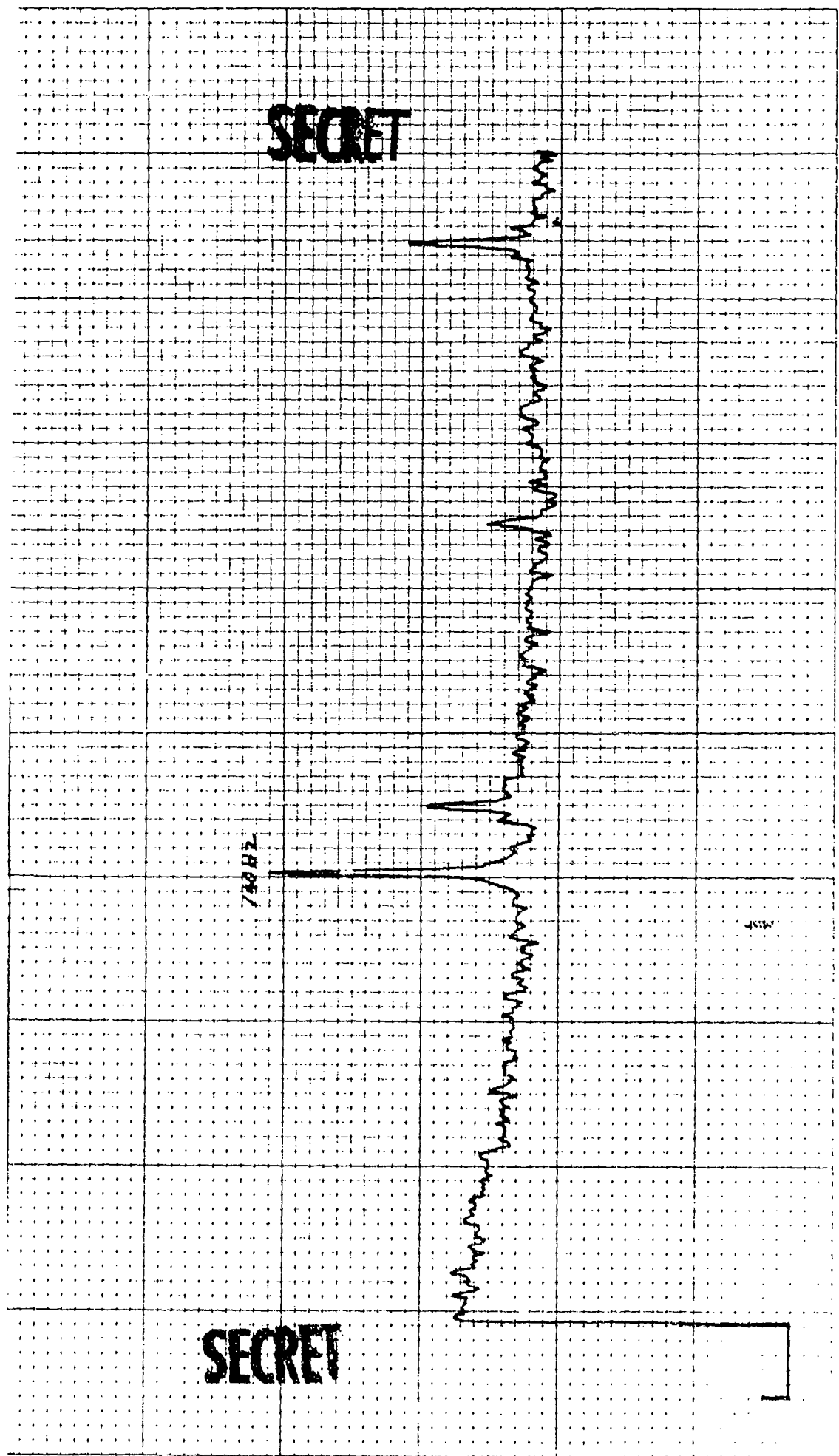
KOE 10/19/76 TO THE INCH. BY THE
DEUFFER & FESSER CO. MANHATTAN, N.Y.

46 0703

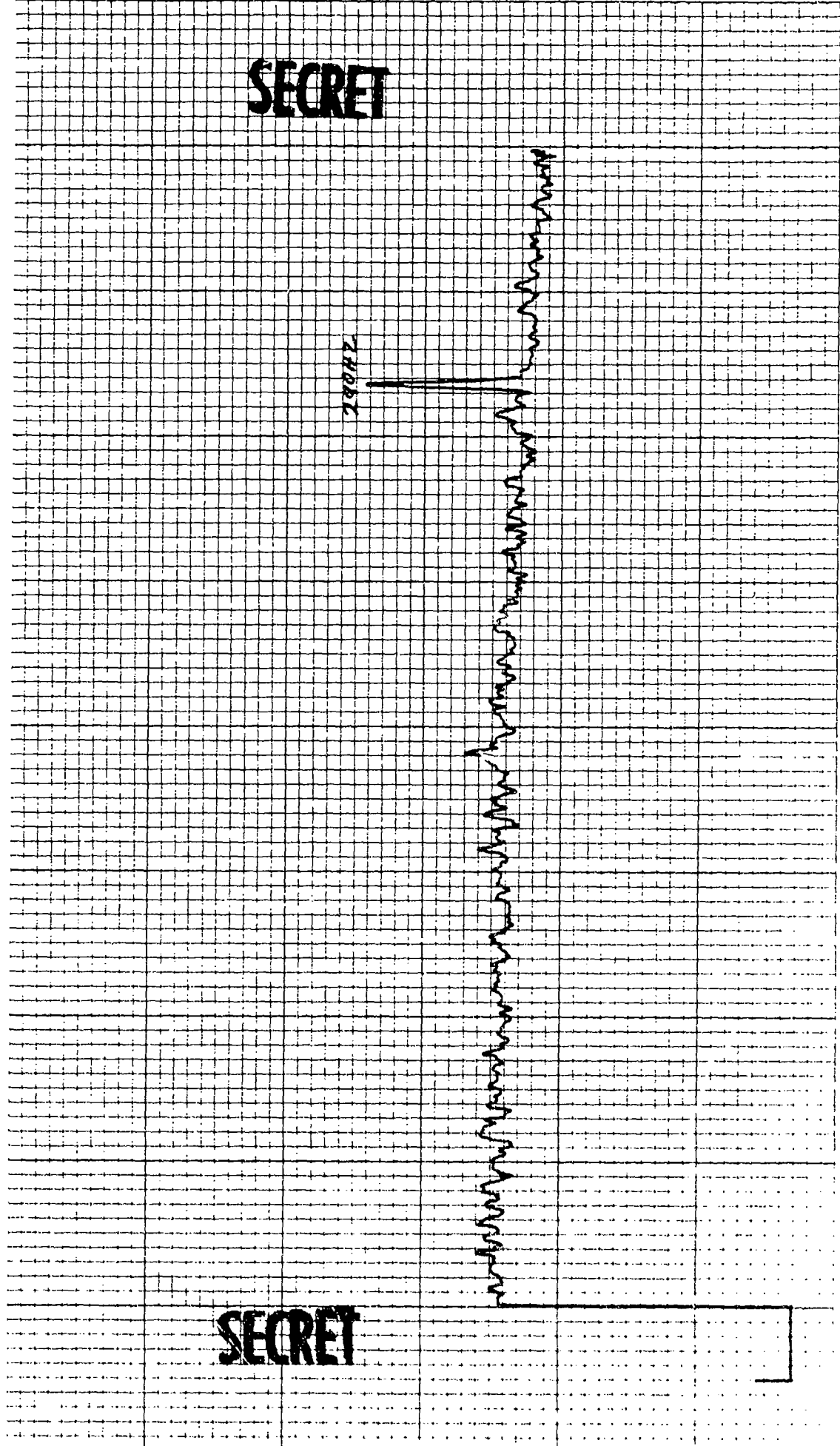
CONTROL: 1549-16 (DPS)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS. 1-16
DATE/TIME: 2-7-77 - 1549.2
ANALYSIS BANDWIDTH: 1/10 HZ
+90 DEG. AZ STEERING

REEL: F19 INDE X 2050
INTEGRATION TIME 320 SECS
ATTEN: -70 DB
FILTER WTG: HANNING



CONTROL: 1549 - 16 (DPS) DATE OF ANALYSIS: 1-16
 BEAMFORMED SPECTRUM (ELEMENTS) REEL: F19 INDE X3050
 EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS. ATTN: -18 DB
 CENTER FREQ: 280 HZ FILTER WTG: HANNING
 16 ELEMENTS + 28 DEG. AZ STEERING



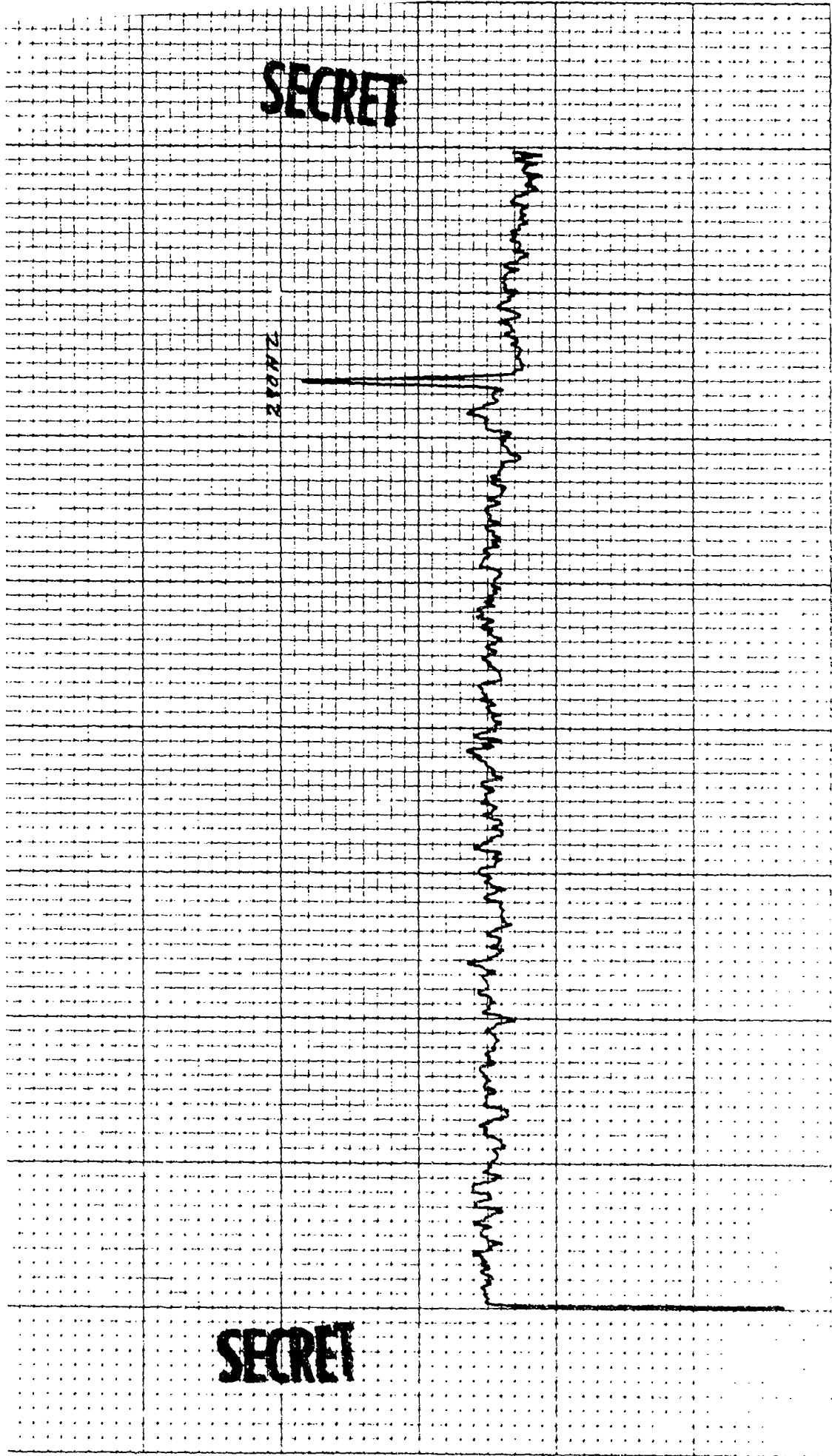
KOE 10 X 10 TO THE INCH • 1/10 INCHES
PEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 1549 - 16 (DP5)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+ 30 DEG. AZ STEERING

REEL: F19 REEL X 30
INTEGRATION TIME 320 SECS ATTEN: 181
FILTER WTC: HANNING



KOE 19 X 10 TO THE INCH
PEUSFEL & ESSER CO. MADE IN U.S.A.

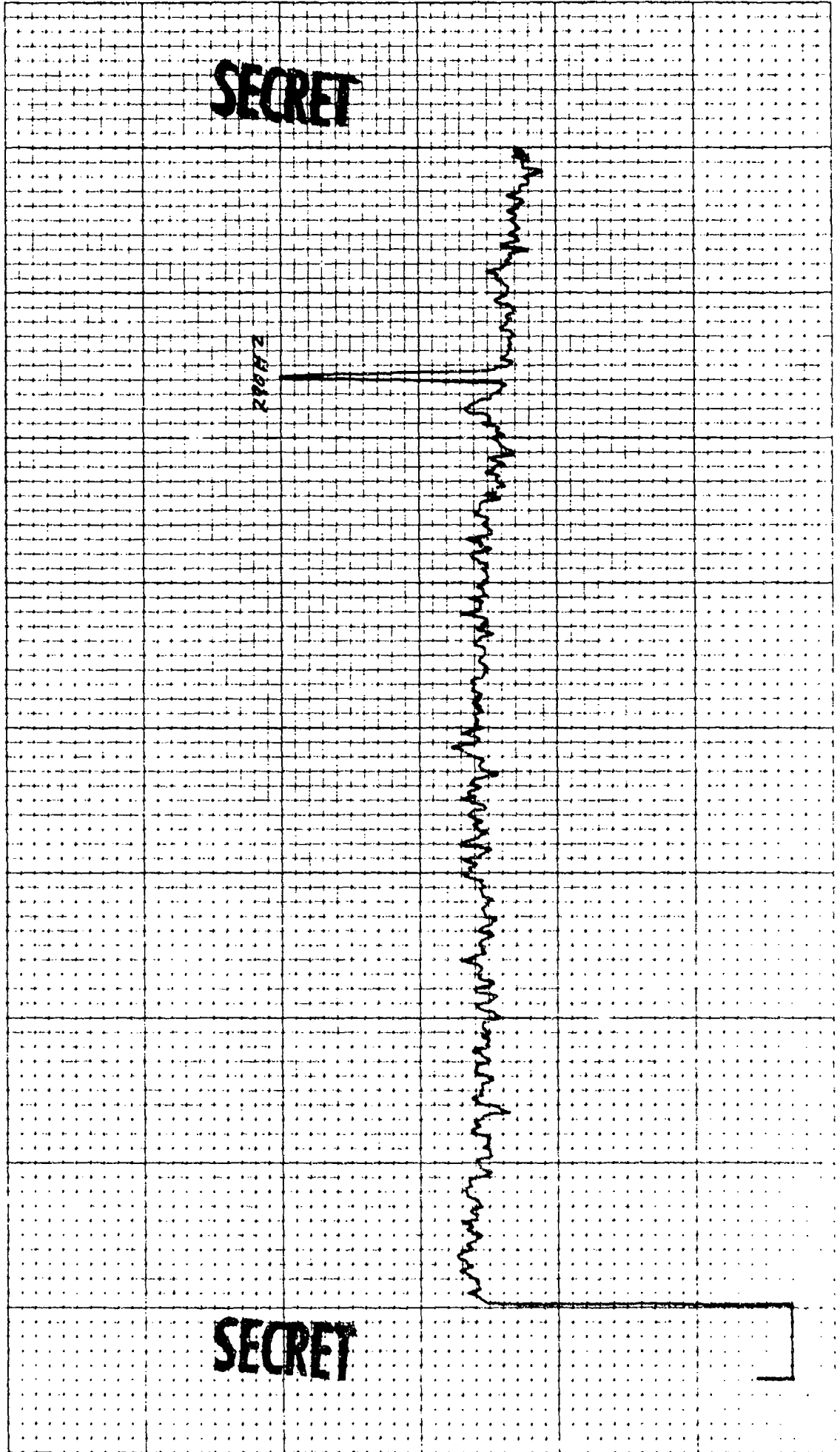
46 0703

CONTROL: 1549 - 16 (DPS)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 290 HZ
16 ELEMENTS

DATE OF ANALYSIS: -- / -- / --
DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+ 32 DEG. AZ STEERING

REEL: F/9
INTEGRATION TIME 320 SECS
ATTEN: -18 DB
FILTER
WTG: HANNING

INDE X 3065



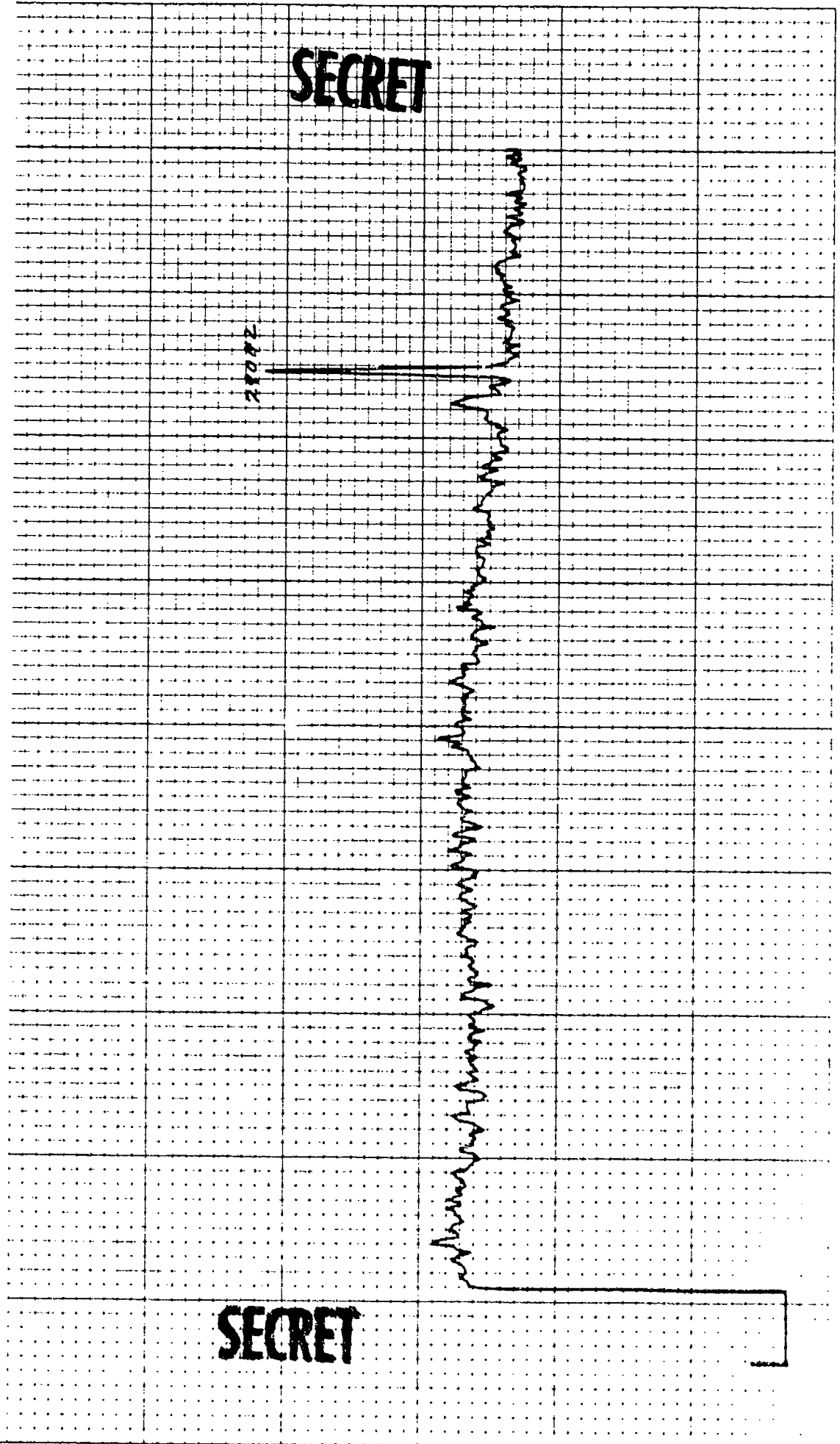
KOE 10 X 10 TO THE INCH • 1 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 1549 - 16 (DPS)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+34 DEG. AZ STEERING

REEL: F19 INDE X 3050
INTEGRATION TIME 320 SECS ATTN: -70 DB
FILTER WTG: HANNING



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

46 0703

CONTROL: 1549 - 16 (DPS)
BEAMFORMED SPECTRUM (ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+ 36 DEG. AZ STEERING

REEL: F19 INDE X 3050
INTEGRATION TIME 320 SECS ATTN: -18 DB
FILTER WTG: HANNING

SECRET

2800HZ

SECRET



MSE 10 X 10 TO TIME INCHES 1 X 10 INCHES
KEU/PFL & PSENER CO MADE IN U.S.A.

46 0703

CONTROL: 1549 - 16 (DPS) DATE OF ANALYSIS: - -
BEAMFORMED SPECTRUM (ELEMENTS) / 16
EXERCISE: BEARING STAKE
CENTER FREQ: 260 HZ
16 ELEMENTS

REEL: F/9 INDE X3050
INTEGRATION TIME 320 SECS ATTEN: -10 DB
FILTER WTG: HANNING

DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+30 DEG. AZ STEERING

SECRET

200HZ

SECRET



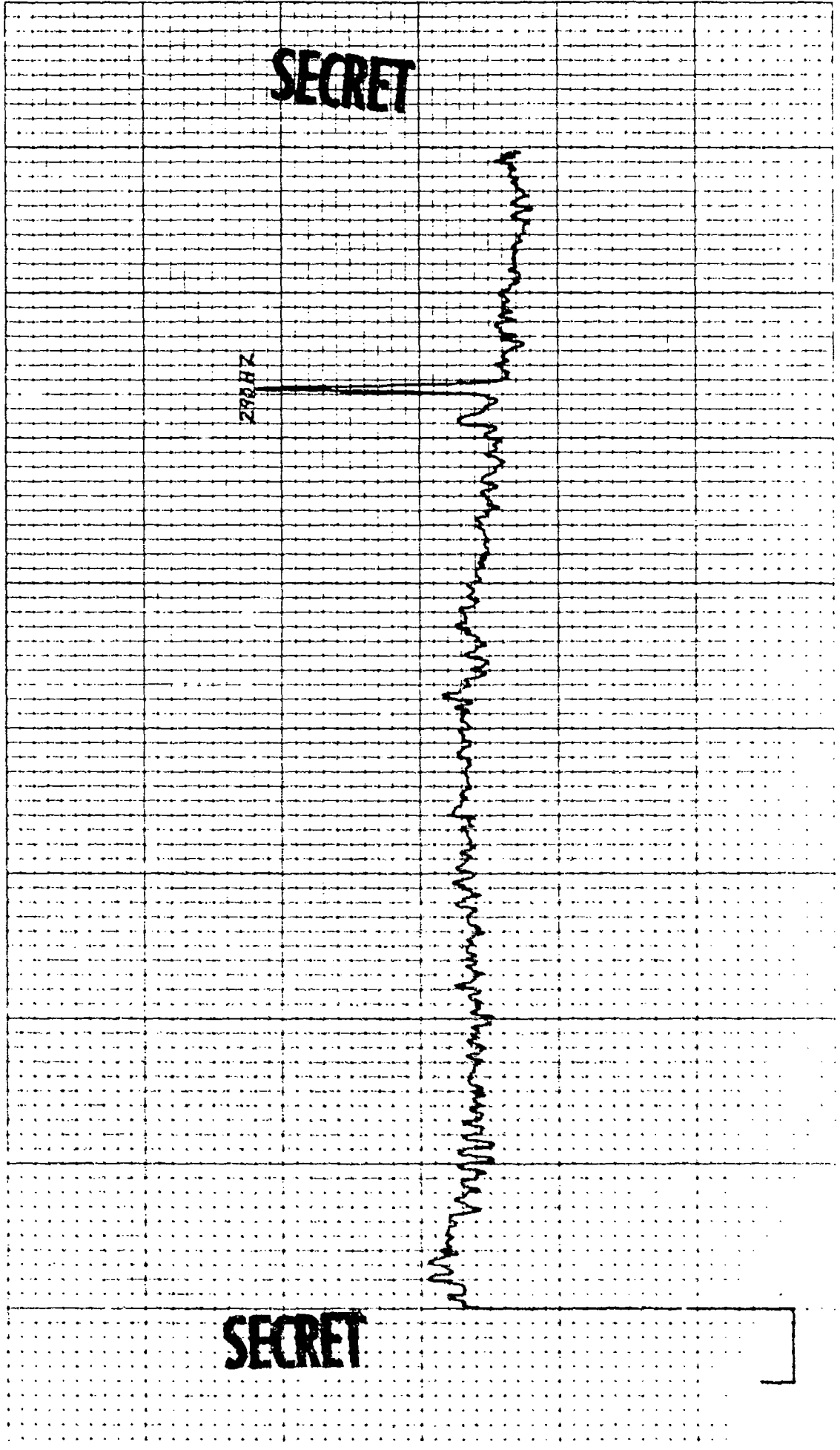
102 10.7 Hz TO THE INCHES 200 HZ PER INCH

46 0703

CONTROL: 1549 - 1/6 (DP5)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
1/6 ELEMENTS

DATE OF ANALYSIS: 1 - 1/6
DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+39 DEG. AZ STEERING

REEL: F19 INDE XJ050
INTEGRATION TIME 320 SECS ATTN: -18 DB
FILTER WTG: HANNING



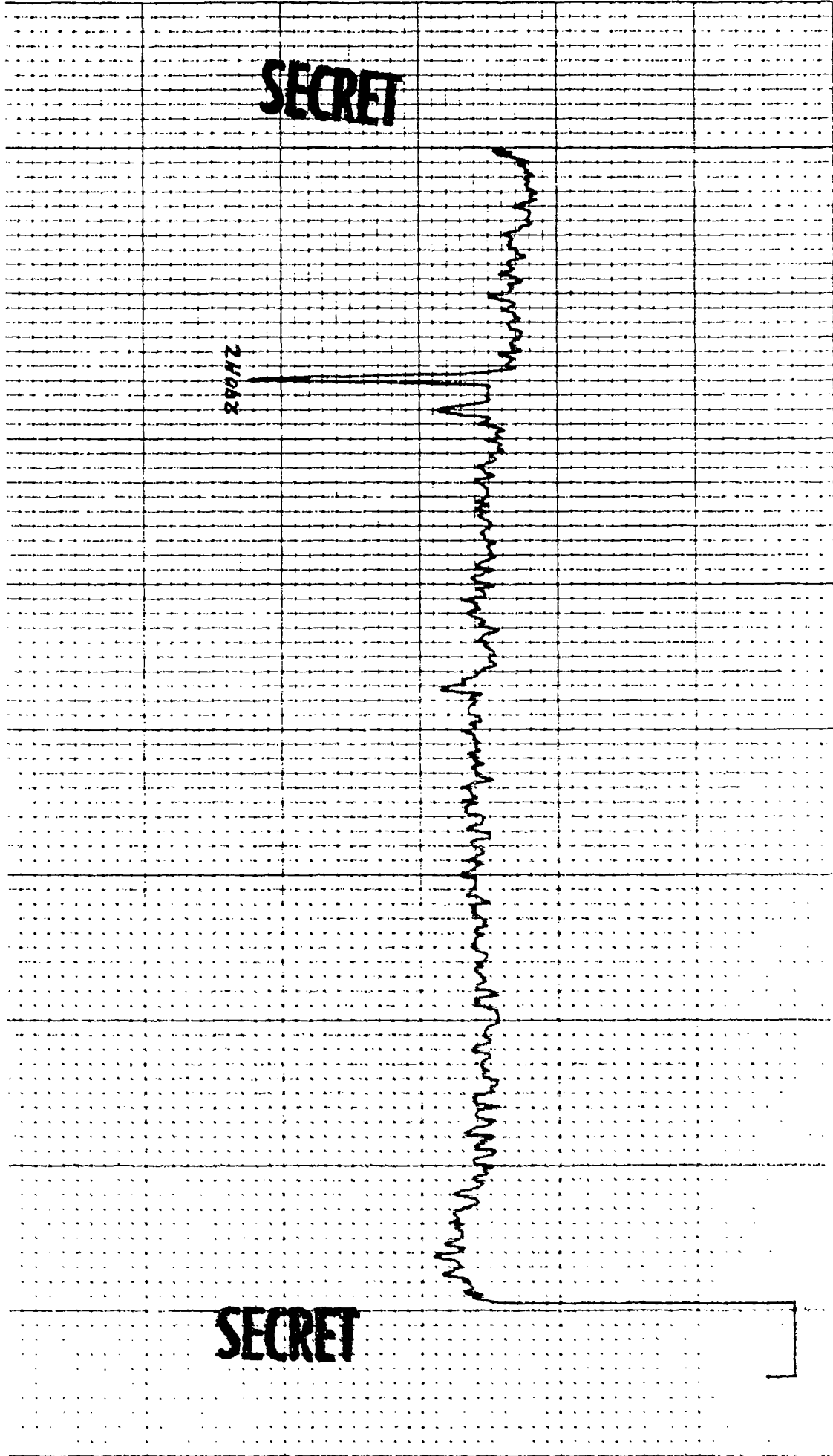
SECRET

SECRET

KOE BEARING TO THE ENEMY'S AIRCRAFT

46 0703

CONTROL: 1544 - 51 (DPS) DATE OF ANALYSIS: _____ REEL: F19 INDE X 3060
BEAMFORMED SPECTRUM (ELEMENTS) 1 - 16 INTEGRATION TIME 320 SECS ATTEN: /P DB
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549Z FILTER WTG: HANNING
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ
/6 ELEMENTS + 40 DEG. AZ STEERING

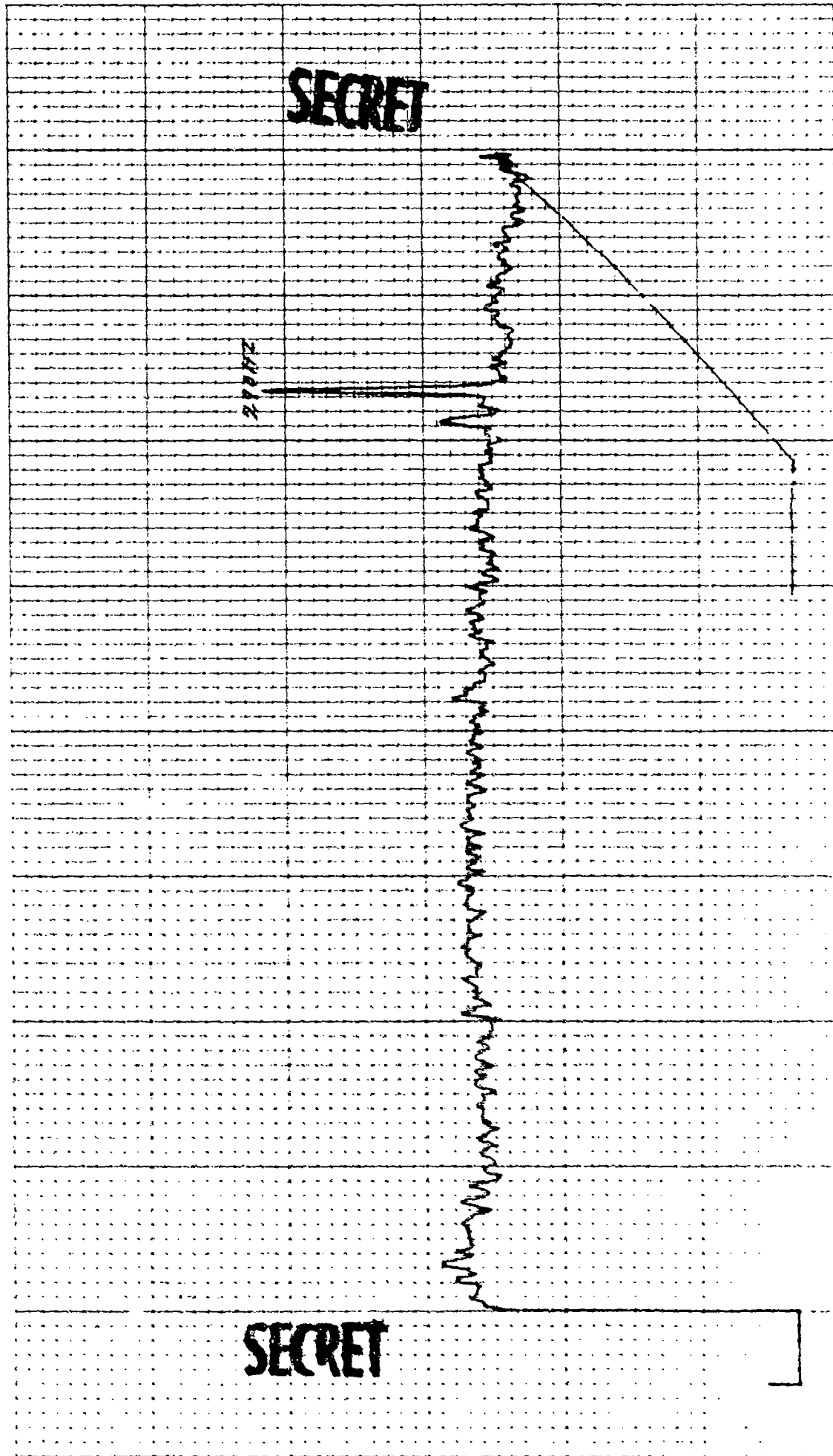


46 0703

K-5 1549 TO THE DEPT. OF DEFENSE

CONTROL: 1549 - 16 (DP5) DATE OF ANALYSIS: 1-16 REEL: F19 INDE X3050
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTN: -18 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
CENTER FREQ: 200 HZ +41 DEG. AZ STEERING

16 ELEMENTS



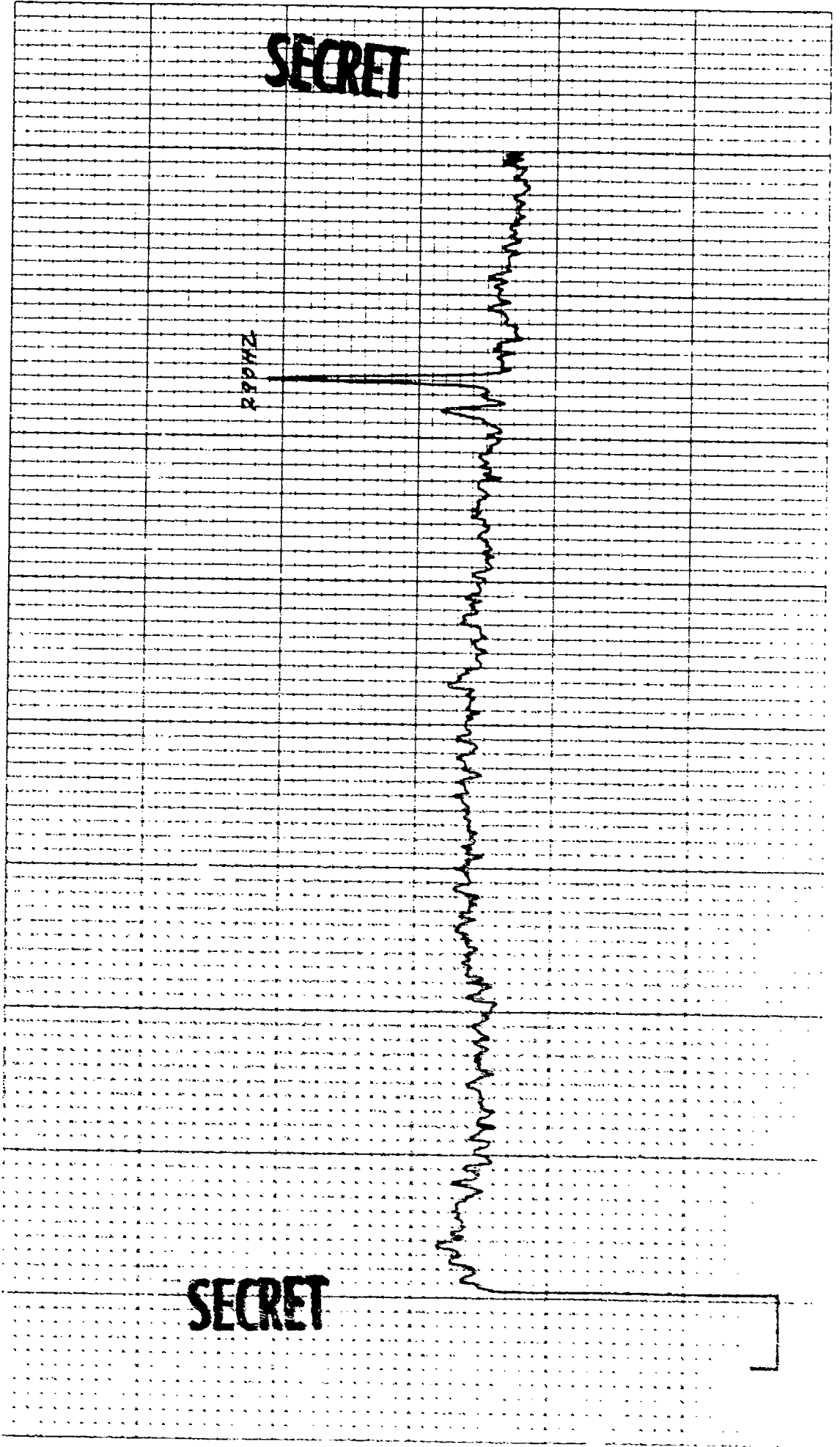
CONTROL: 1549 - 16 (DP5)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-76

REEL: F19 INDEX X 3050

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

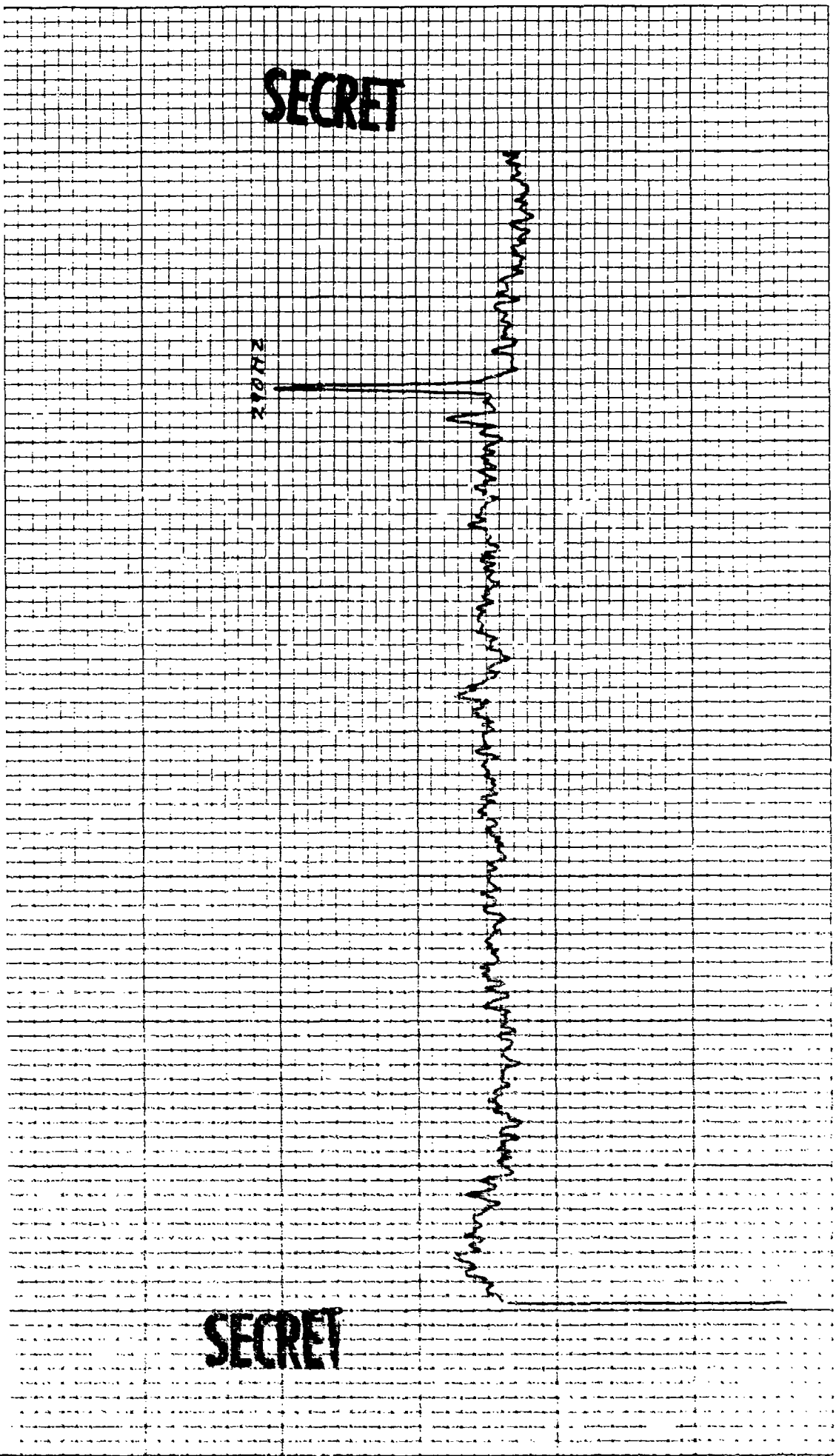
DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+42 DEG. AZ STEERING



CONTROL: 1549 - 16 (DPS)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
 DATE/TIME: 2-7-77 - 1549 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
-44 DEG. AZ STEERING

REEL: F19 INDE X3050
 INTEGRATION TIME 320 SECS ATTN: -18 DB
 FILTER WTG: HANNING



SECRET

SECRET

46 0703

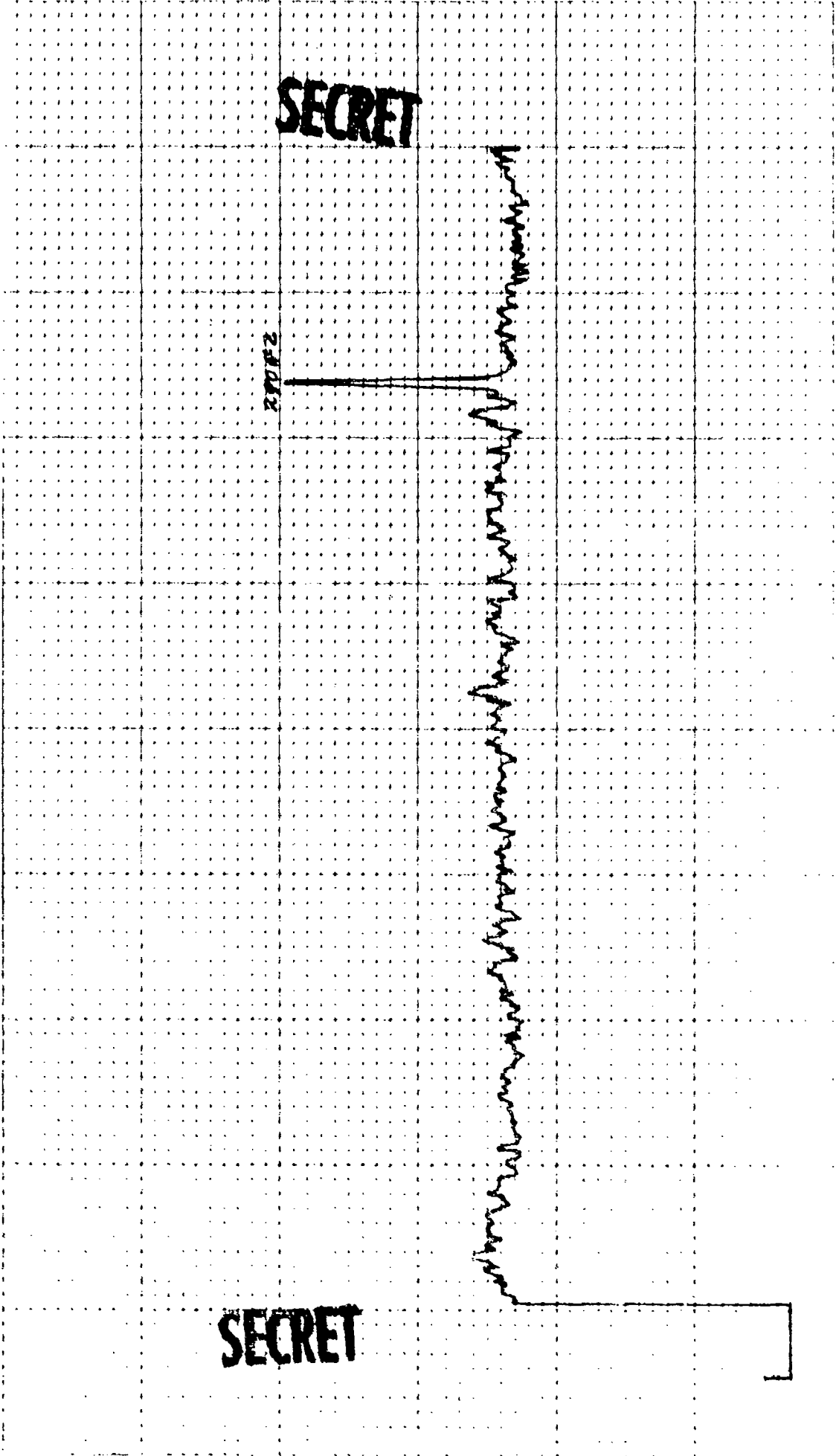
CONTROL: 1599 - 16 (205)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 HZ
10 ELEMENTS

DATE OF ANALYSIS: 1 - 10

REEL: F19 INDE X3050

INTEGRATION TIME 320 SECS ATTEN: -16 DB
 FILTER WIG: HANNING

ANALYSIS BANDWIDTH: 1/10 HZ
+ 46 DEG. AZ STEERING



SECRET

SECRET

45 0703

K-E 2700 2000 1000 0000

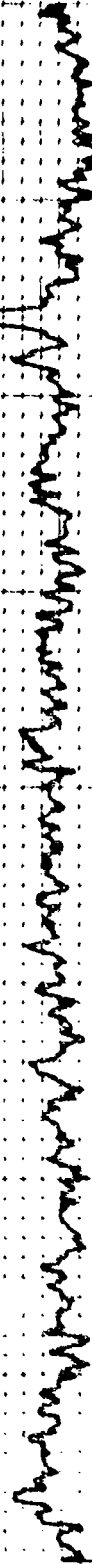
CONTROL: 1549 - 16 (DPS) DATE OF ANALYSIS: - - - -
 BEAMFORMED SPECTRUM (ELEMENTS) / - - / 6
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z
 CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1/10 HZ
 16 ELEMENTS + 48 DEG. AZ STEERING

REEL: F19 INDEX X 3050
 INTEGRATION TIME 320 SECS ATTEN: -10 DB
 FILTER WIG: HANNING

SECRET

SECRET

290 HZ



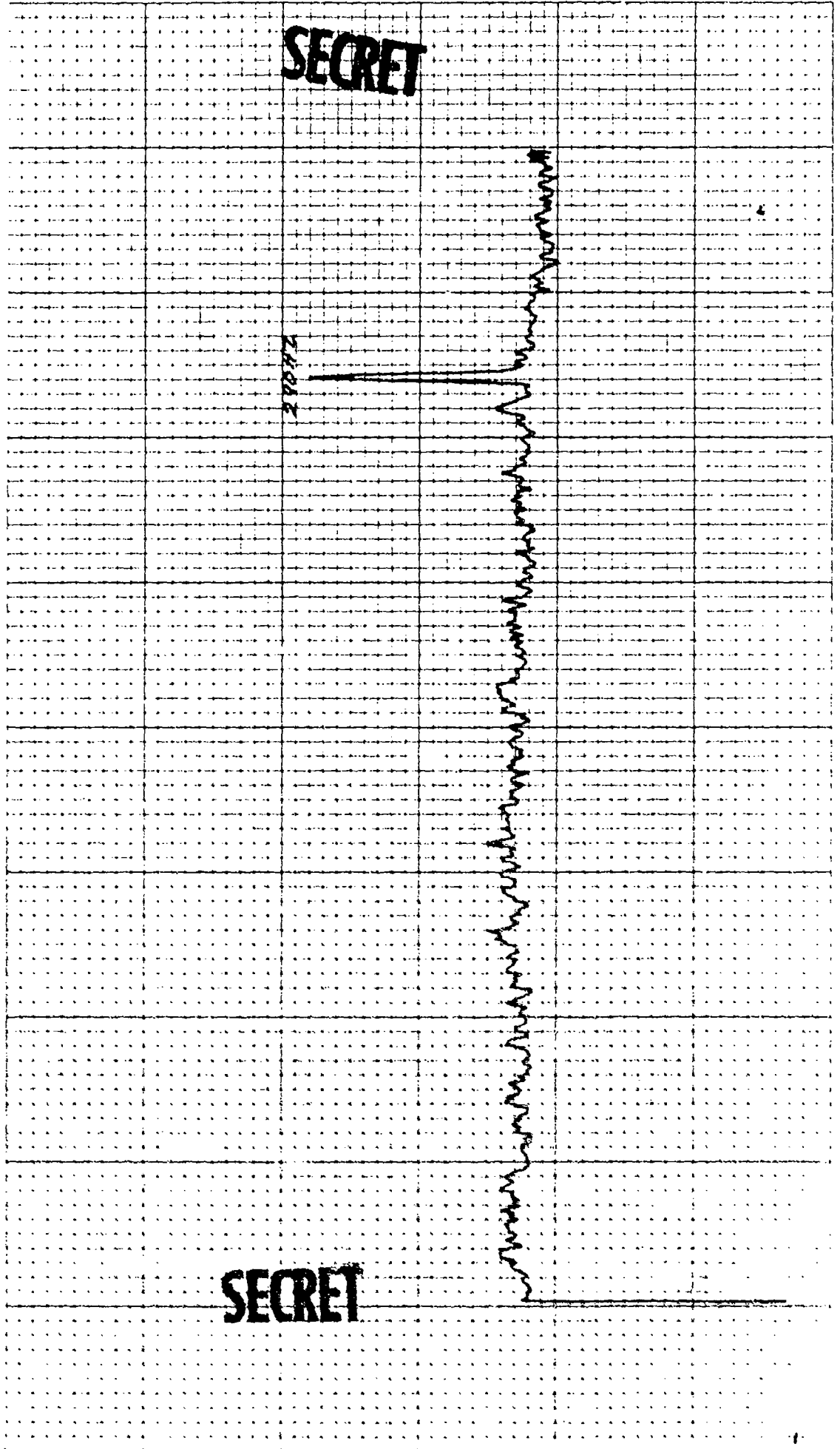
K&E 10.5 IS TO THE DIG...
20/10/77

46 0703

CONTROL: 1549 - 16 (D15)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
16 ELEMENTS

DATE OF ANALYSIS: -- -- --
/ -- /
DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 50 DEG. AZ STEERING

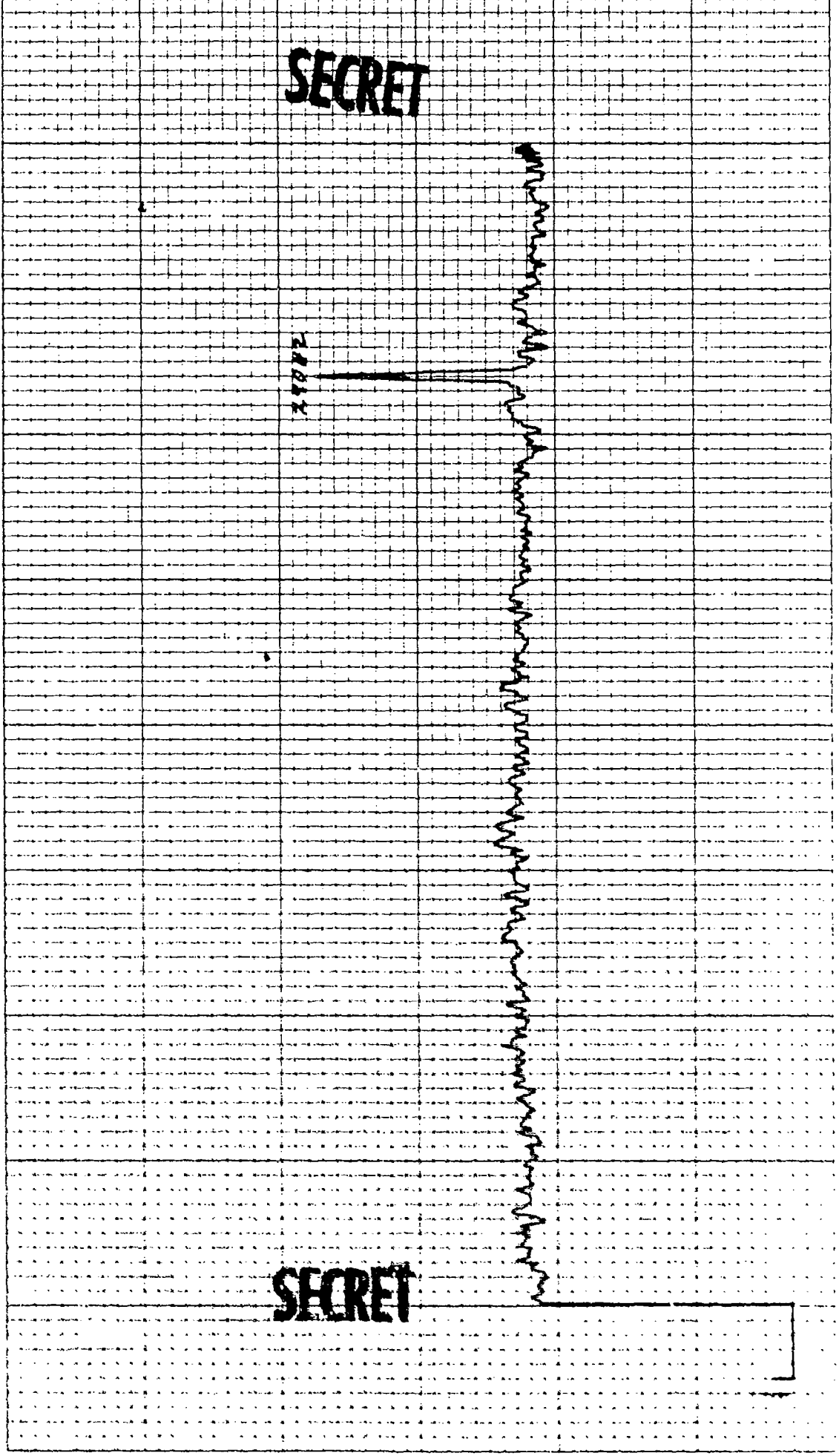
REEL: F19 INDE X 3050
INTEGRATION TIME 320 SECS ATTN: -10 DB
FILTER WTC: HANNING



46 0703

KOE 10 X 10 TO THE INCH. 1 IN 100 HZ

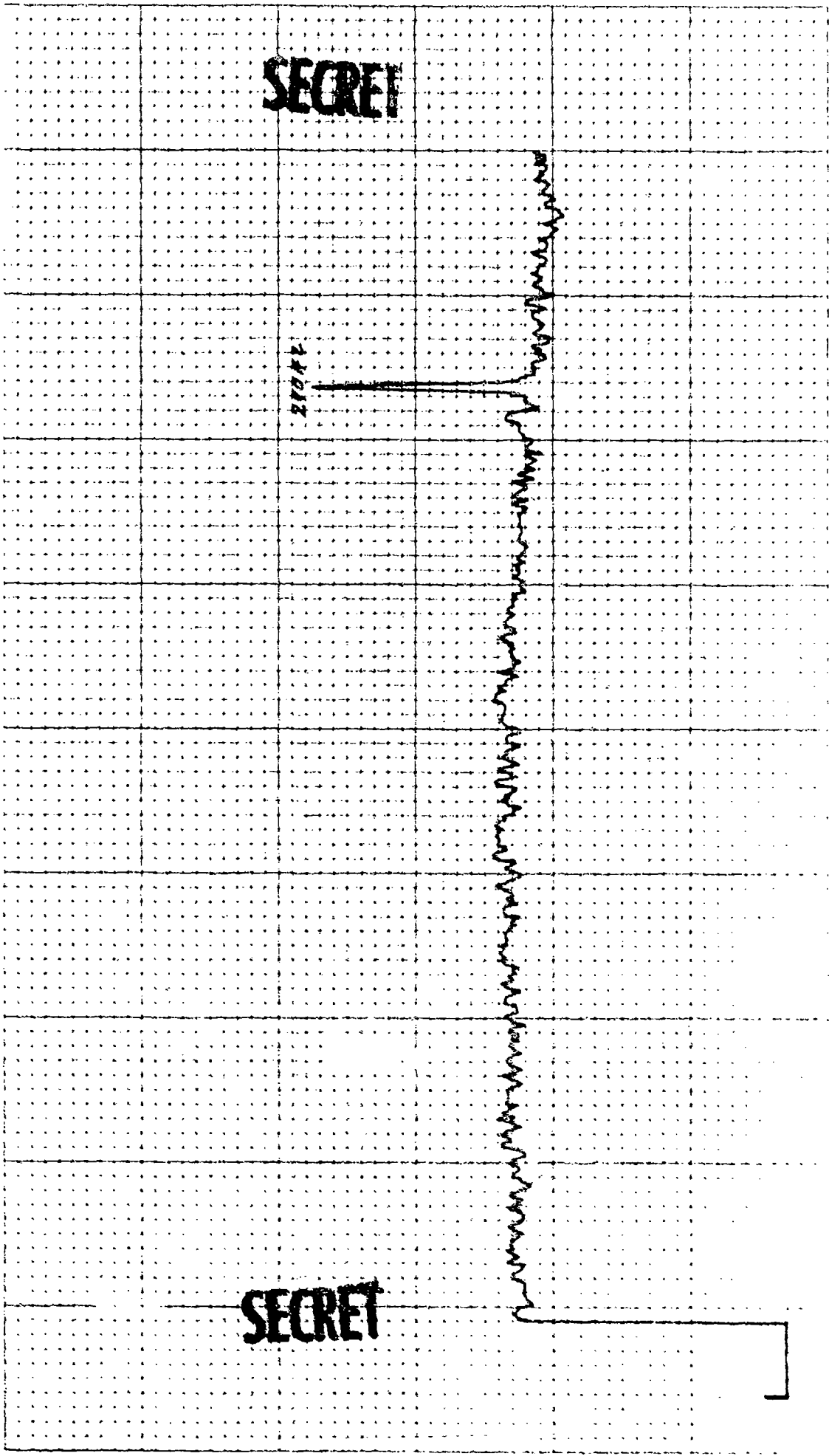
CONTROL: 1549 - 16 (206) DATE OF ANALYSIS: 1-16 REEL: F19 INDE X 3050
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTN: -18 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
 CENTER FREQ: 280 HZ + 52 DEG. AZ STEERING



46 0703

K-E 54 DEG. AZ STEERING

CONTROL: 1549-16 (DP3) DATE OF ANALYSIS: 1-16 REEL: F19 INDE X 3050
 BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-7-77 - 1549Z INTEGRATION TIME 320 SECS ATTEN: -18 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WIG: HANNING
 CENTER FREQ: 280 HZ * 54 DEG. AZ STEERING

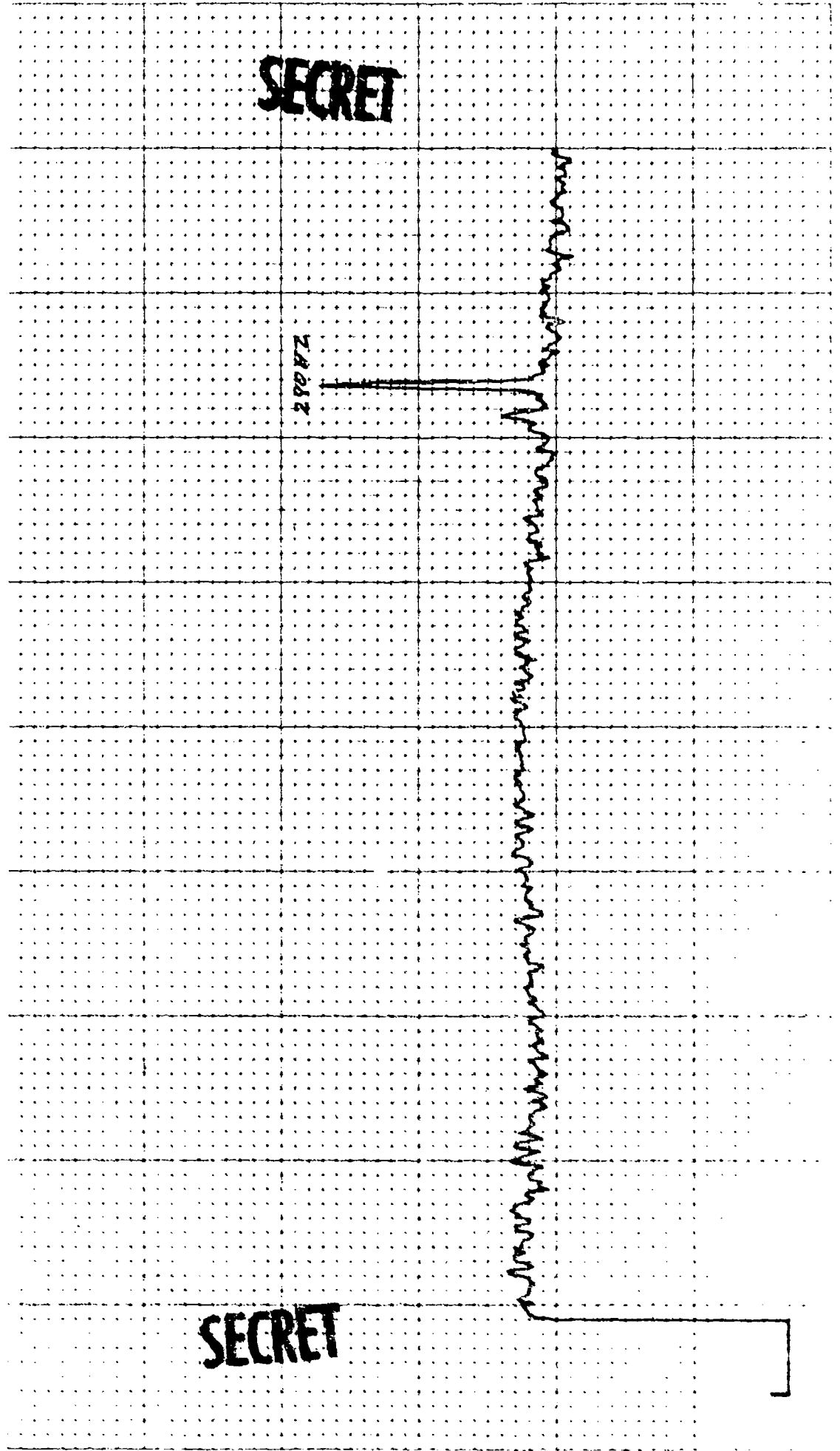


SECRET

SECRET

46 0703

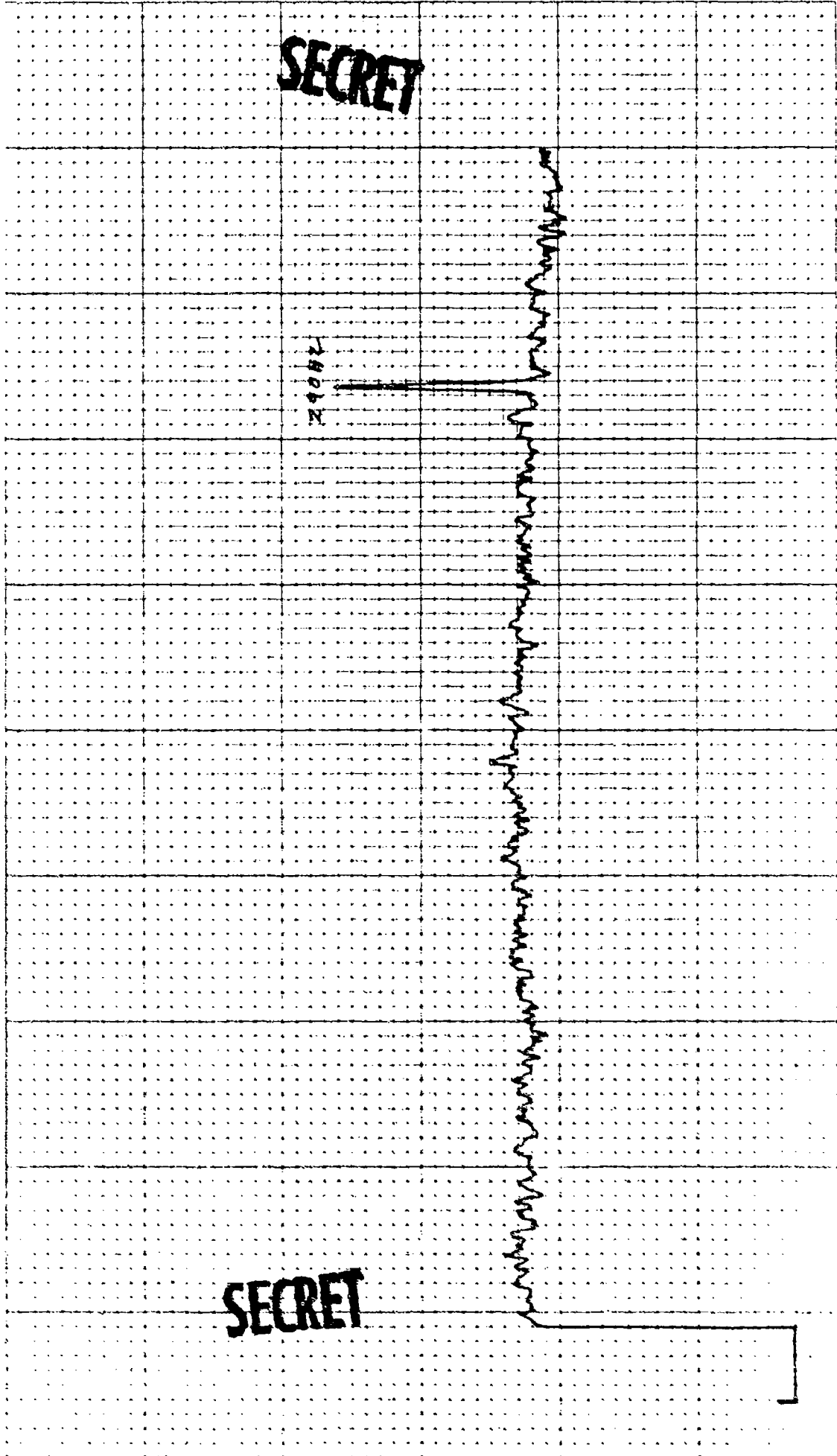
CONTROL: 1549 - 16 (DP5)
 BEAMPORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 HZ
16 ELEMENTS
 DATE OF ANALYSIS: 1-16
 DATE/TIME: 27-77 - 1549Z
 ANALYSIS BANDWIDTH: 1710 HZ
456 DEC. AZ STEERING
 REEL: F19 INDE X 3050
 INTEGRATION TIME 320 SECS ATTN: -18 DB
 FILTER WTC: HANNING



46 0703

REF TO THE ...

CONTROL: 1549 - 16 (DPF) DATE OF ANALYSIS: 1-16 REEL: F11 INDE X 3050
 BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-7-77 - 1549Z INTEGRATION TIME 320 SECS ATTEM: -10 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 CENTER FREQ: 200 HZ +50 DEG. AZ STEERING



46 0703

MOE 1549-16 (DPS)

CONTROL: 1549-16 (DPS) DATE OF ANALYSIS: 1-16 REEL: F19 INDE X 3050

BEAMFORMED SPECTRUM (ELEMENTS) INTEGRATION TIME 320 SECS ATTEM: 18 DB

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

CENTER FREQ: 200 HZ +10 DEG. AZ STEERING

16 ELEMENTS

SECRET

SECRET

290 Hz



46 0703

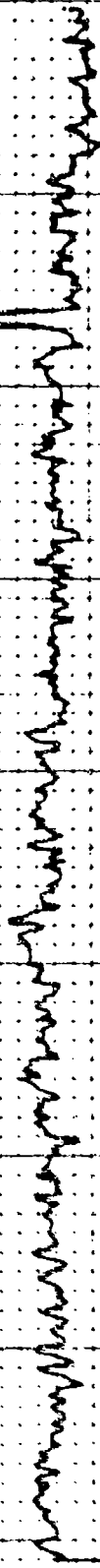
KOE 2549-16 (DPS)

CONTROL: 1549-16 (DPS) REEL: F19 INDE X3050
BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: 1-16
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549Z INTEGRATION TIME 320 SECS ATTN: -/S DB
CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1710HZ FILTER WTC: HANNING
16 ELEMENTS *22 DEG. AZ STEERING

SECRET

SECRET

2100Z



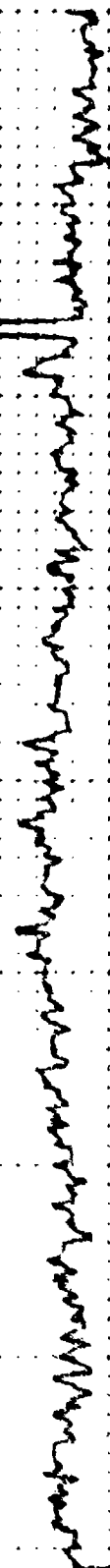
45 0703

CONTROL: 1549 - 16 (DP5) DATE OF ANALYSIS: 1-76 REEL: F19 INDEX: X7050
 BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTEN: -18 DB
 EXERCISE: BEARING, STAVE ANALYSIS BANDWIDTH: 1/10HZ FILTER WIG: HANNING
 CENTER FREQ: 280 HZ + 64 DEG AZ STEERING

SECRET

SECRET

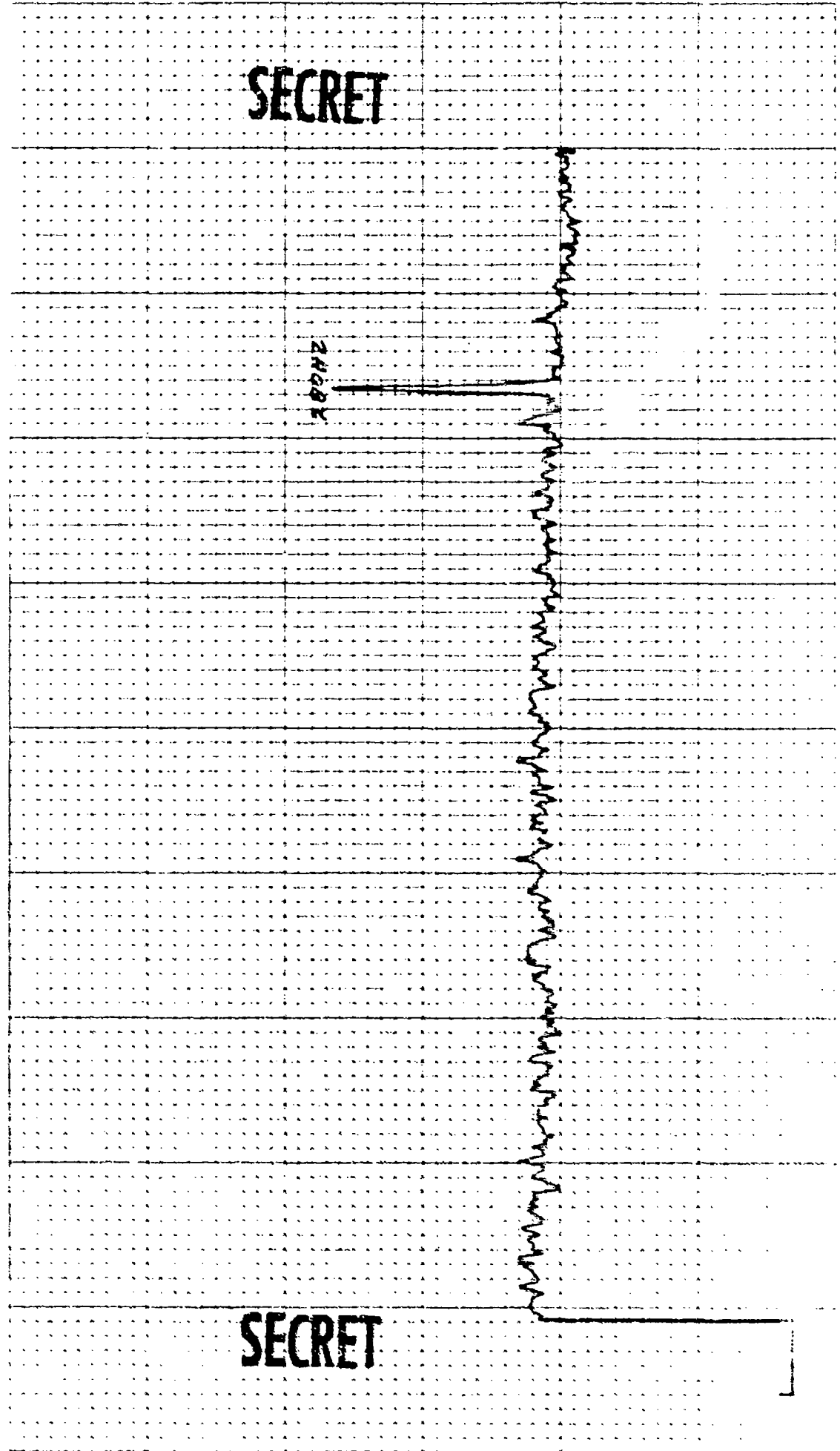
280HZ



46 0703

KOE

CONTROL: 1549 - 16 (DP5) DATE OF ANALYSIS: 1-16 REEL: F19 INDE X3050
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-2-77 - 1549 Z INTEGRATION TIME 320 SECS ATTN: 78 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1710HZ FILTER WTC: HANNING
 CENTER FREQ: 280 HZ 16 DEC. AZ STEERING



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

46 0703

CONTROL: 1549 - 16 (DPS)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
16 ELEMENTS

DATE OF ANALYSIS: - - - -
/ - /
DATE/TIME: 2-7-77 - 1549Z
ANALYSIS BANDWIDTH: 1/10HZ
+60 DEG. AZ STEERING

REEL: F/9 INDE X 305A
INTEGRATION TIME 320 SECS ATTN: -18 DB
FILTER WTG: HANNING

SECRET

SECRET

100%



24-16-77

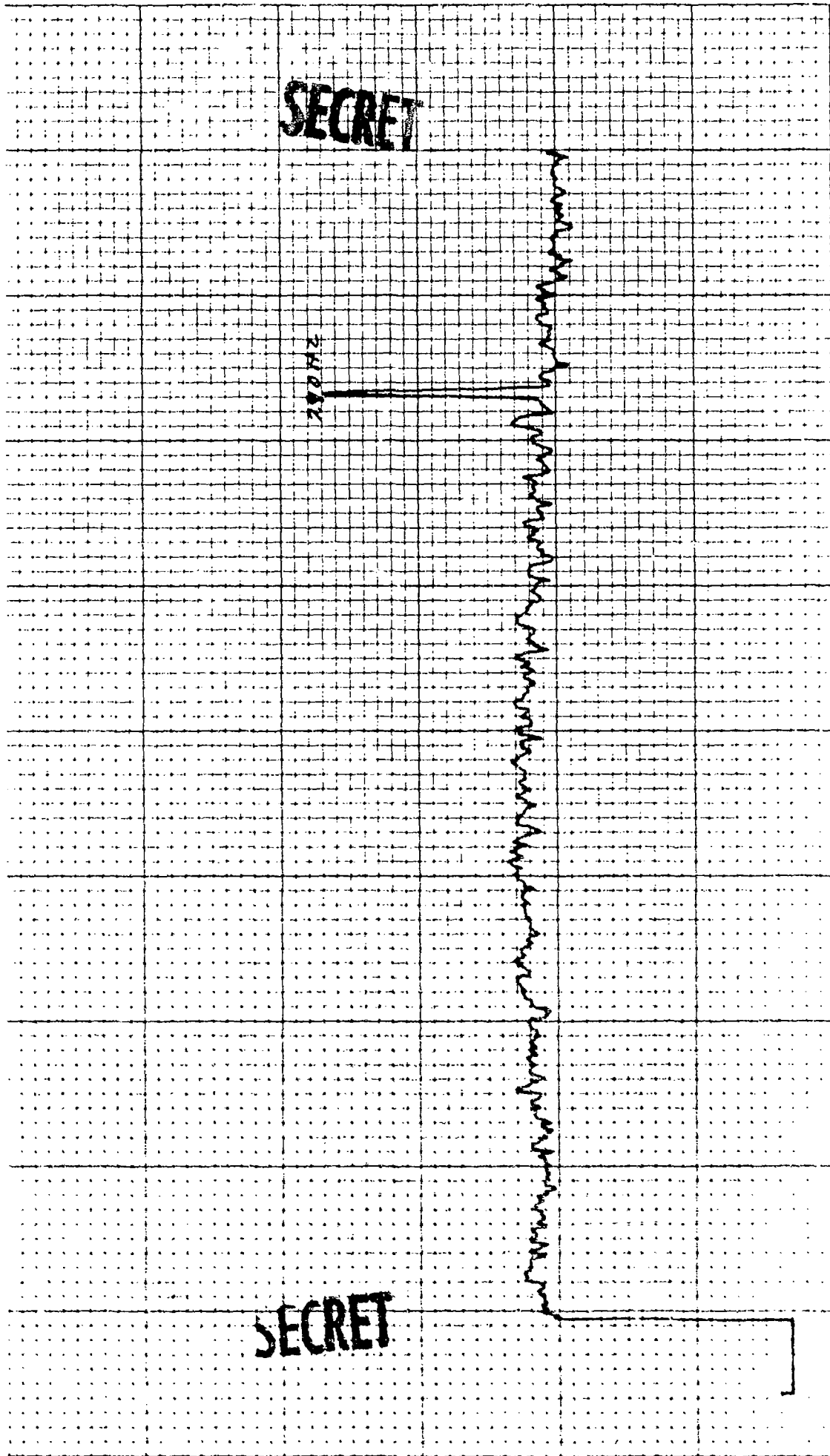
KOE 10.7.10 TO THE DIRECTOR, NSA
PERFORMED SPECTRUM ELEMENTS

46 0703

CONTROL: 1549 - 16 (205)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/16
470 DEG. AZ STEERING

REEL: F11 INDE X 3050
INTEGRATION TIME 320 SECS ATTN: -18 DB
FILTER WIG: HANNING



46 0703

K-Σ 1/16 (0.0625) TO THE INCHES

CONTROL: 1549 - 16 (0.0625) DATE OF ANALYSIS: 1-1-77

BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-7-77 - 1549 Z

EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10 HZ

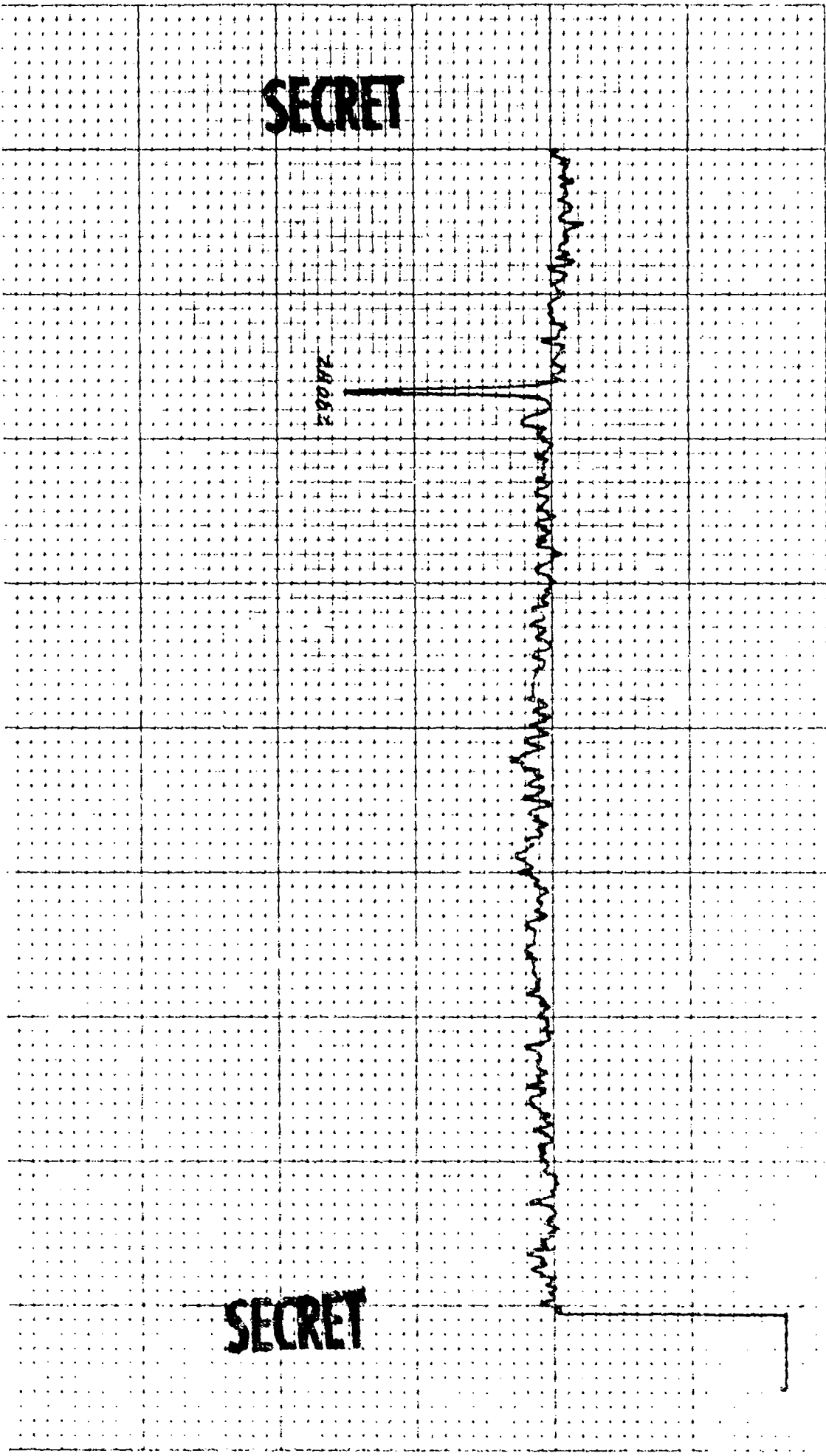
CENTER FREQ: 280 HZ + 72 DEG. AZ STEERING

16 ELEMENTS

REEL: F/1 INDE X 3050

INTEGRATION TIME 320 SECS ATTN: -10 DB

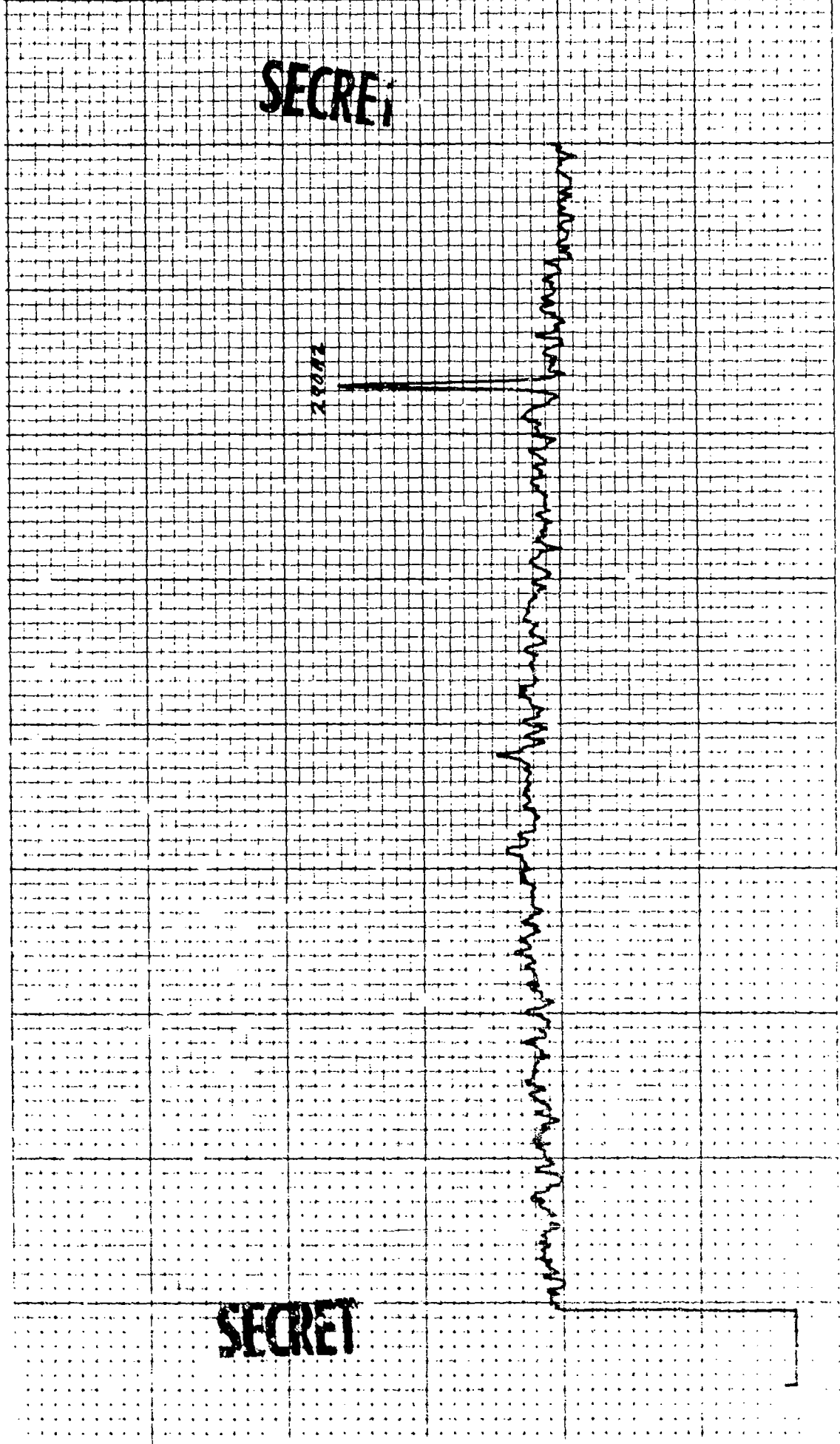
FILTER WIG: HANNING



K-2 IS A 10 TO THE INCH...
PERMIT & PAPER CO. 1941 & 1942

46 0703

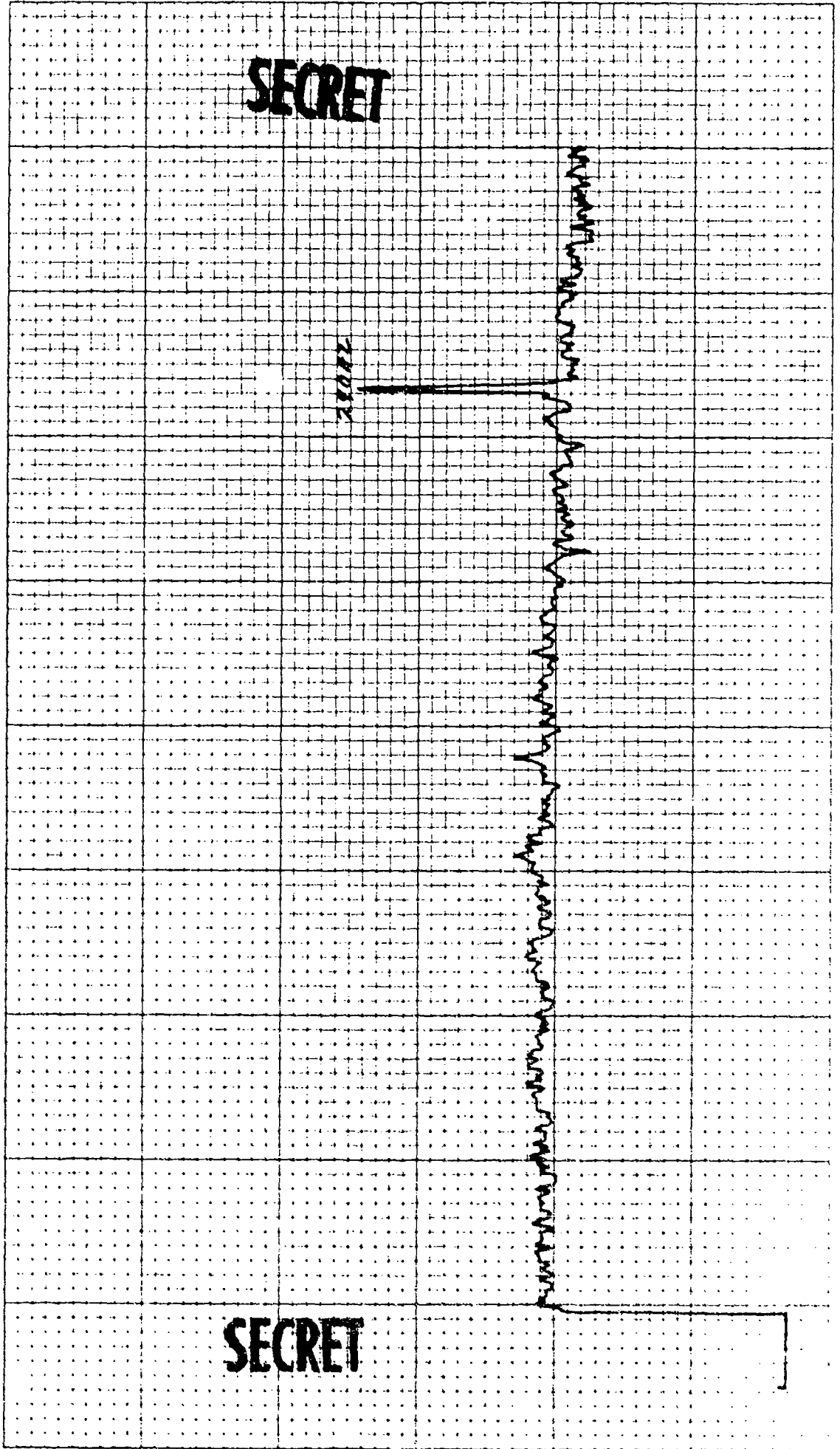
CONTROL: 1549 - 16 (DP5) DATE OF ANALYSIS: 1-16 REEL: 7/6 INDE X 3050
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-7-77 - 1547 INTEGRATION TIME 320 SECS ATTN: -10 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 CENTER FREQ: 200 HZ +74 DEG. AZ STEERING



K-Σ 30 X 60 TO THE INCHES
PENTON PRESS CO. MADE IN U.S.A.

46 0703

CONTROL: 1549 - 16 (DPS) DATE OF ANALYSIS: REEL: F19 INDE X 3050
BEAMFORMED SPECTRUM (ELEMENTS) / -16
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549Z INTEGRATION TIME 320 SECS ATTN: -10 DB
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
16 ELEMENTS +70 DEG. AZ STEERING

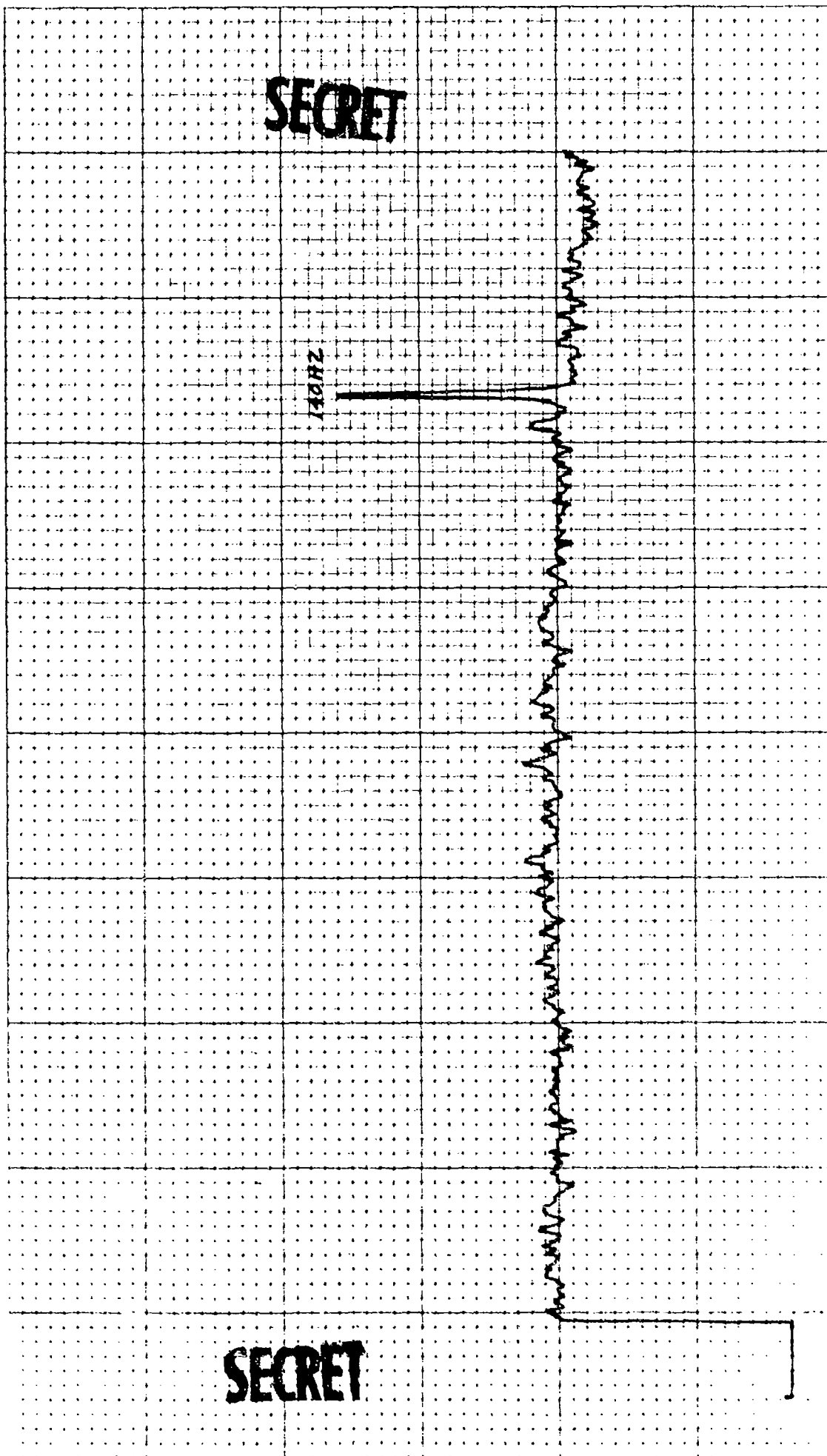


KOE 10.4 IN TO THE INCHES
REEL NUMBER 46 0703

46 0703

CONTROL: 1549 - 16 (DPS) DATE OF ANALYSIS: - - -
BEAMFORMED SPECTRUM (ELEMENTS) / - / C
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ
16 ELEMENTS 778 DEG. AZ STEERING

REEL: F19 INDE X 3060
INTEGRATION TIME 320 SECS ATTN: -10 DB
FILTER WTC: HANNING



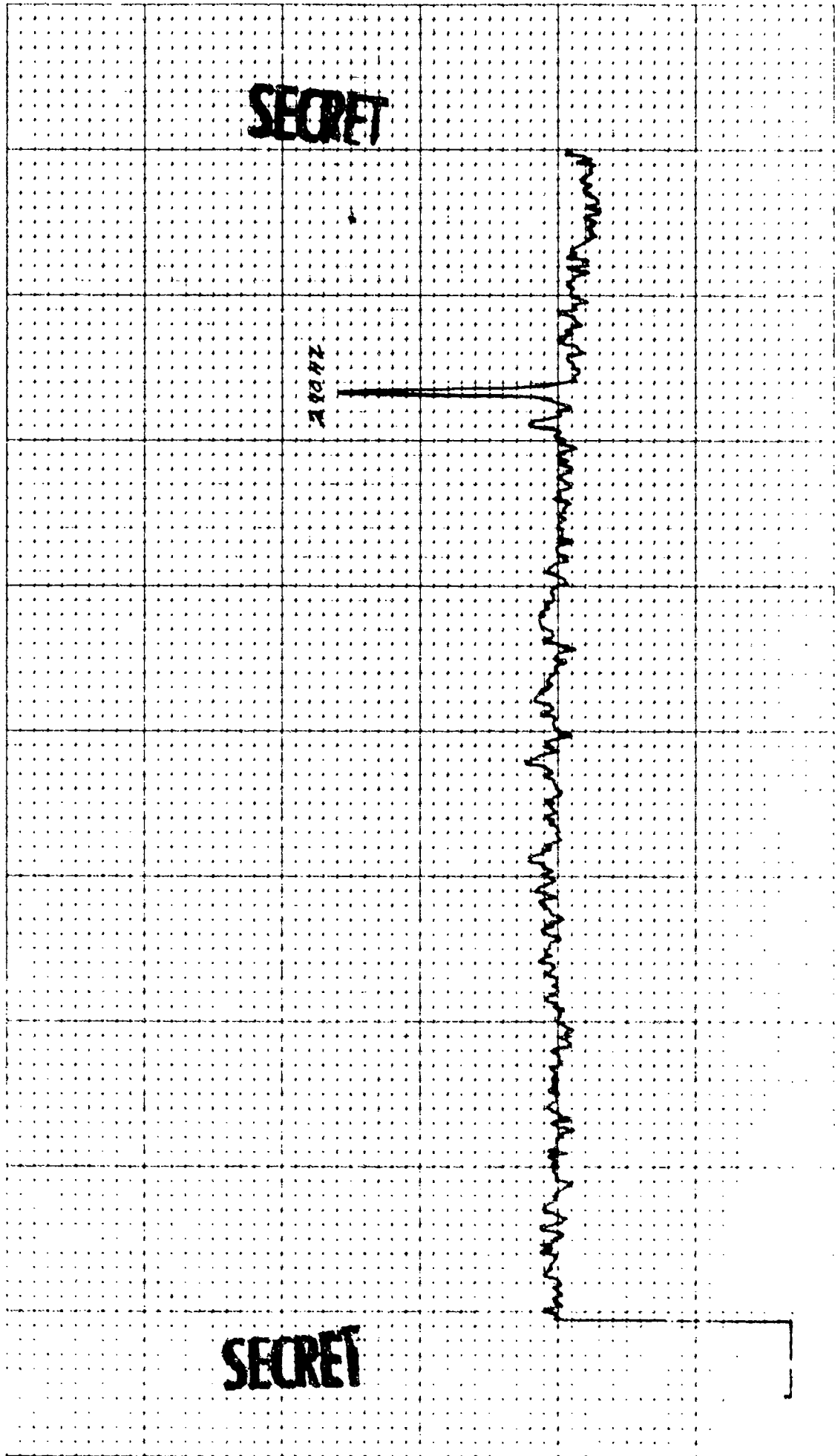
45 0703

NOE 3160 10 THE 1000 2 1000

CONTROL: 1599 - 16 (DPS)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1 - 16
DATE/TIME: 2-7-77 - 1549Z
ANALYSIS BANDWIDTH: 1/10 HZ
180 DEG. AZ STEERING

REEL: F19 INDE X 2852
INTEGRATION TIME 320 SECS ATTEN: 78 DB
FILTER WTG: HANNING



SECRET

SECRET

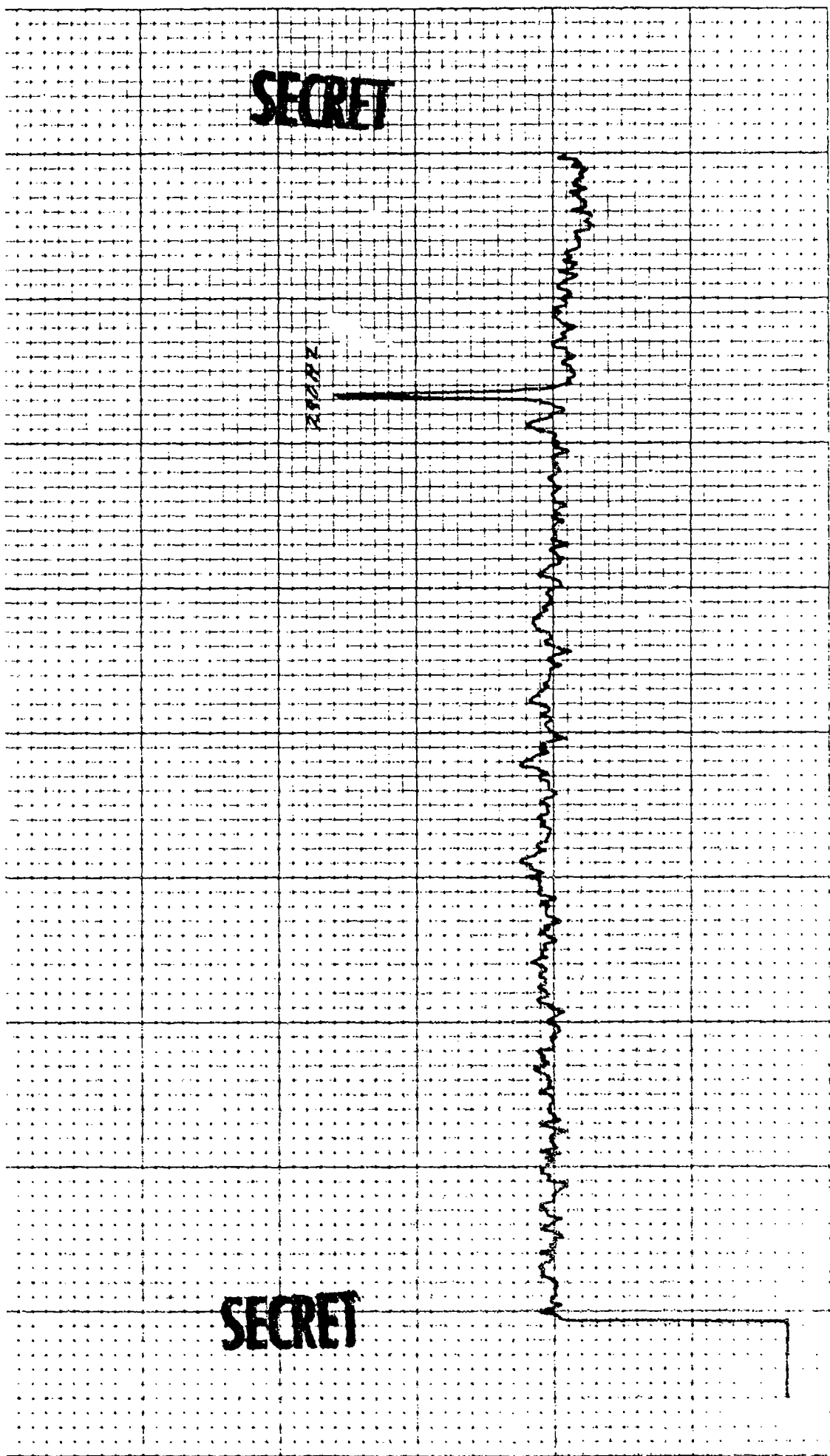
KOE 10 X 10 TO THE (PACMAN) 10 INCHES
PERFECT & FASTER CO. MADE IN U.S.A.

46 0703

CONTROL: 1549 - 16 (DPS)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+82 DEG. AZ STEERING

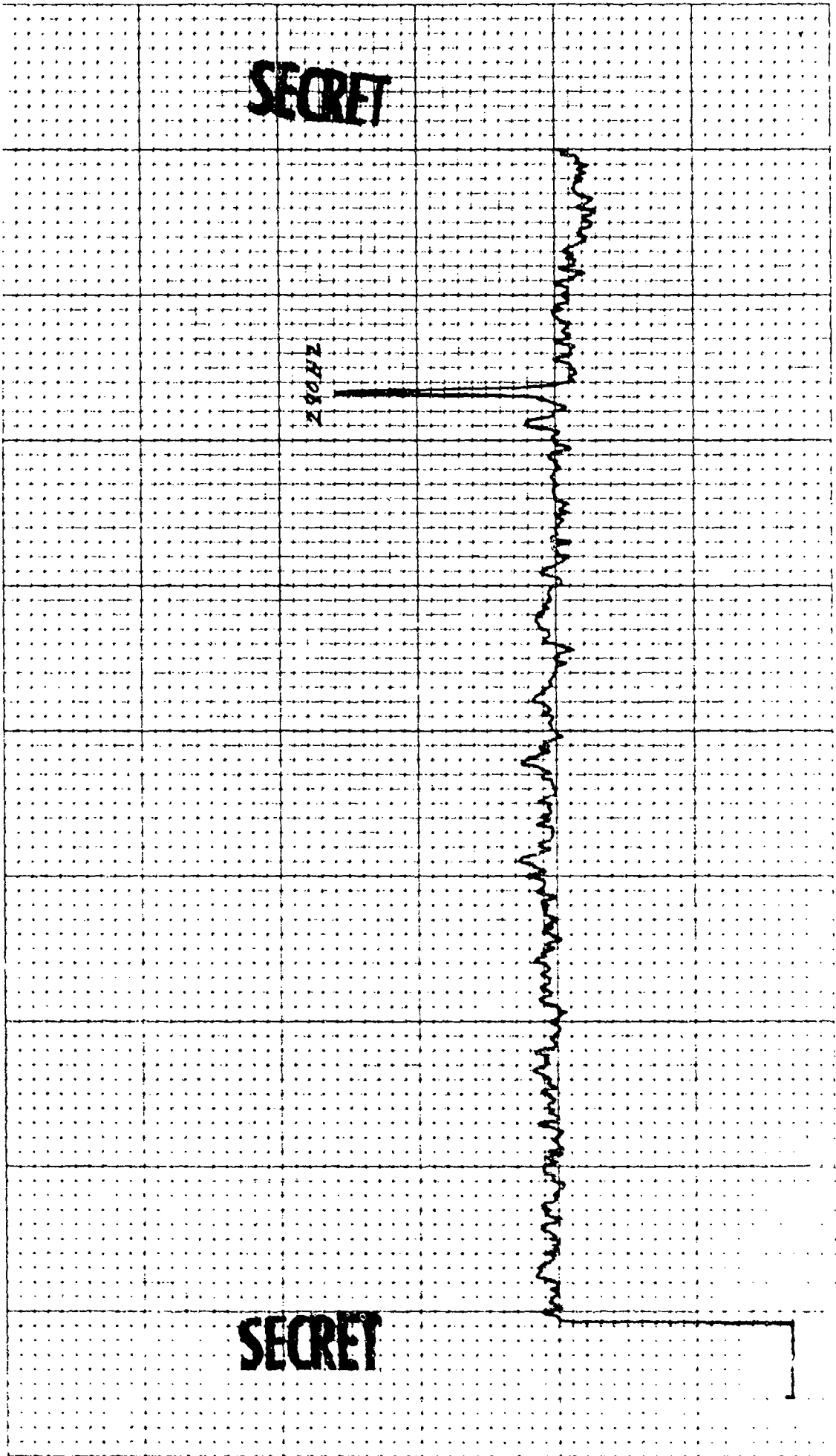
REEL: F19 INDE X 3050
INTEGRATION TIME 320 SECS ATTN: -10 DB
FILTER WTC: HANNING



46 0703

K-E 1549 - 16 (DP5)

CONTROL: 1549 - 16 (DP5) DATE OF ANALYSIS: REEL: F19 INDE X 3050
 BEAMFORMED SPECTRUM (ELEMENTS) / - /
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTN: 10DB
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
16 ELEMENTS +84 DEG. AZ STEERING



KOE 10 X 10 TO THE INCHES 1/250000

46 0703

CONTROL: 1549 - 16 (DP5) DATE OF ANALYSIS: - - - -

BEAMFORMED SPECTRUM (ELEMENTS) / - / 6

EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z

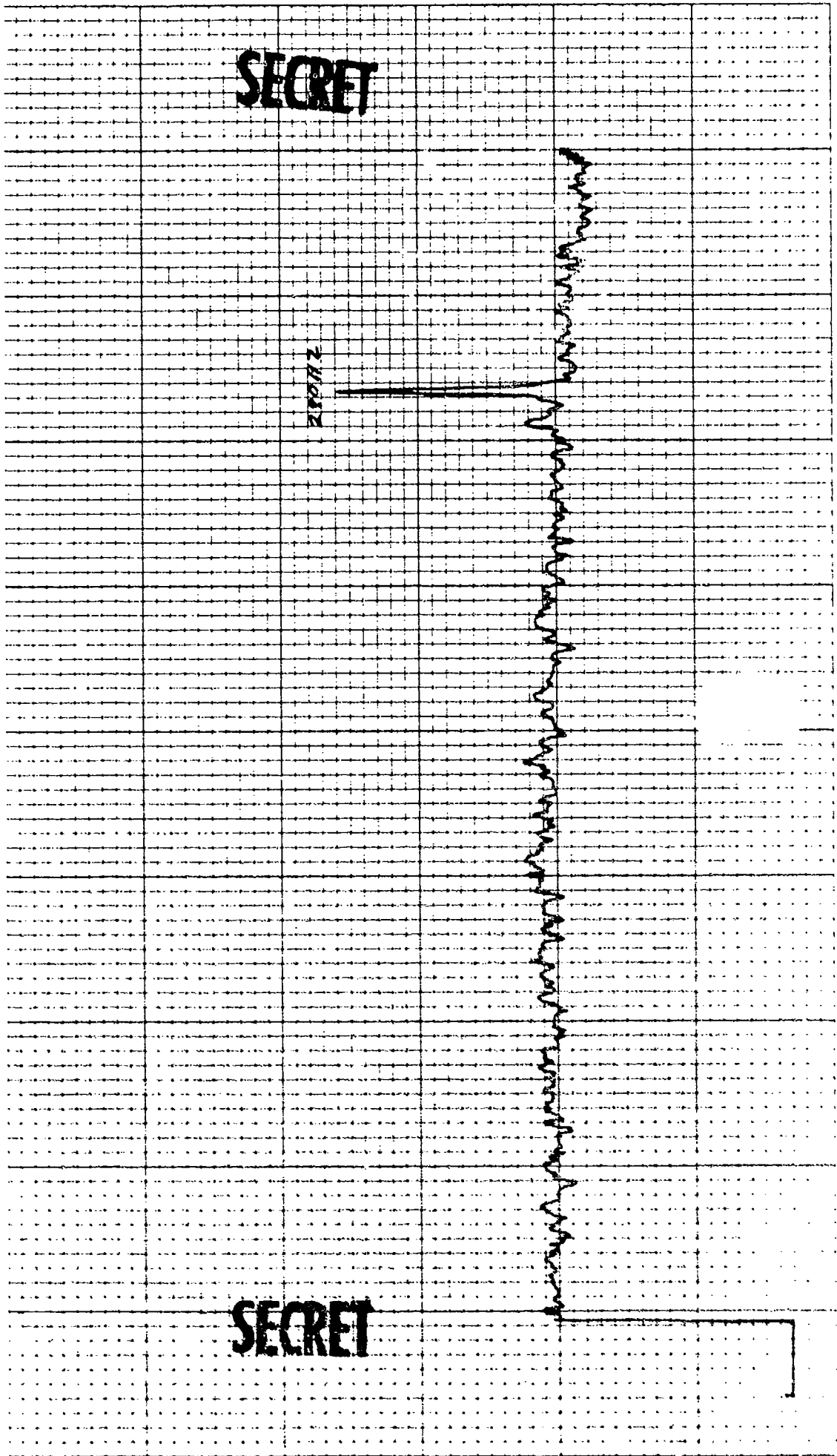
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ

16 ELEMENTS +86 DEG. AZ STEERING

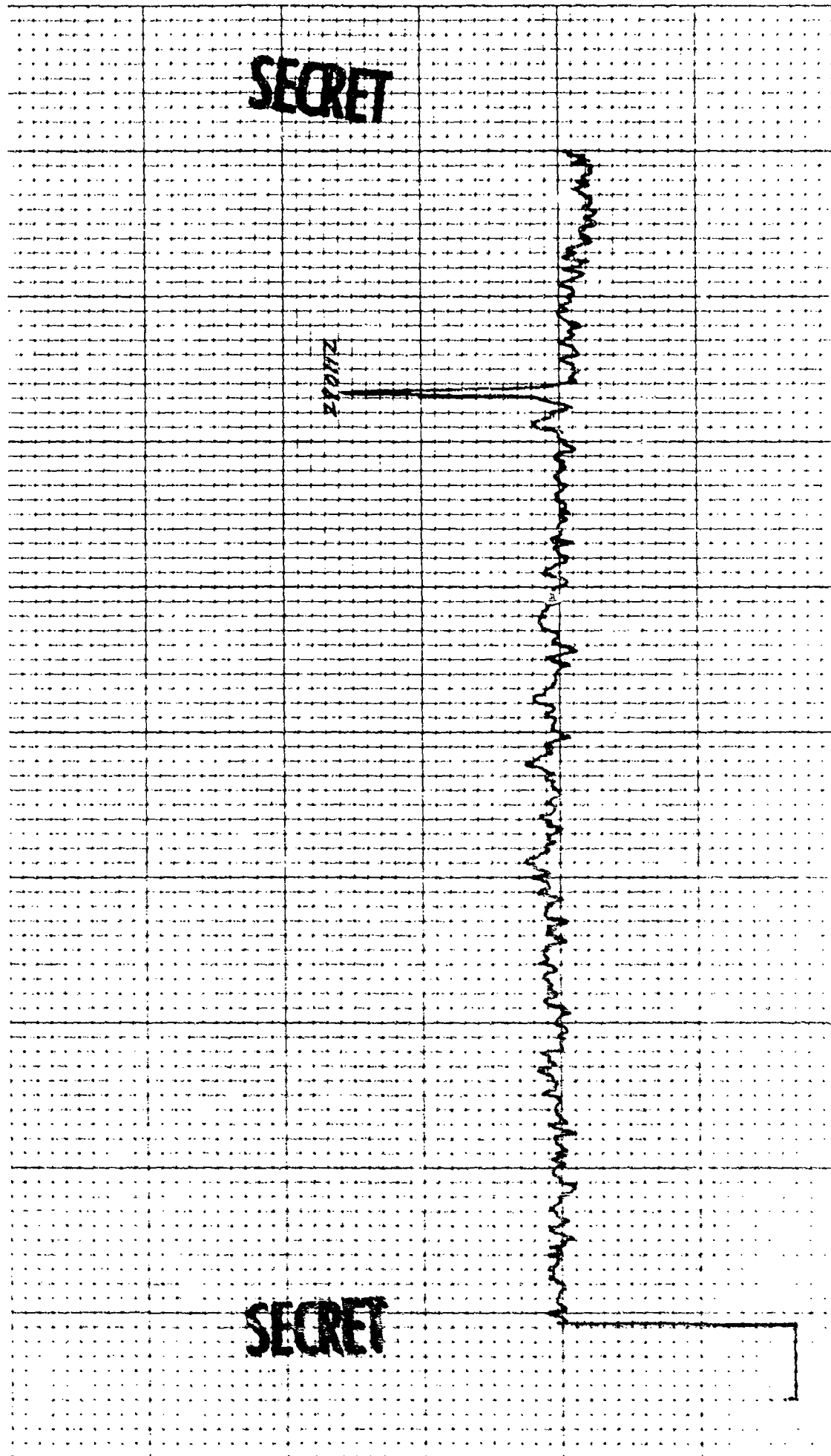
REEL: F/9 INDE X 3050

INTEGRATION TIME 320 SECS ATTN: -18 DB

FILTER WTG: HANNING



CONTROL: 1549 - 16 (SP5) DATE OF ANALYSIS: - - REEL: F19 INDE X 3050
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTEN: 70 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
CENTER FREQ: 200 HZ + 00 DEG. AZ STEERING

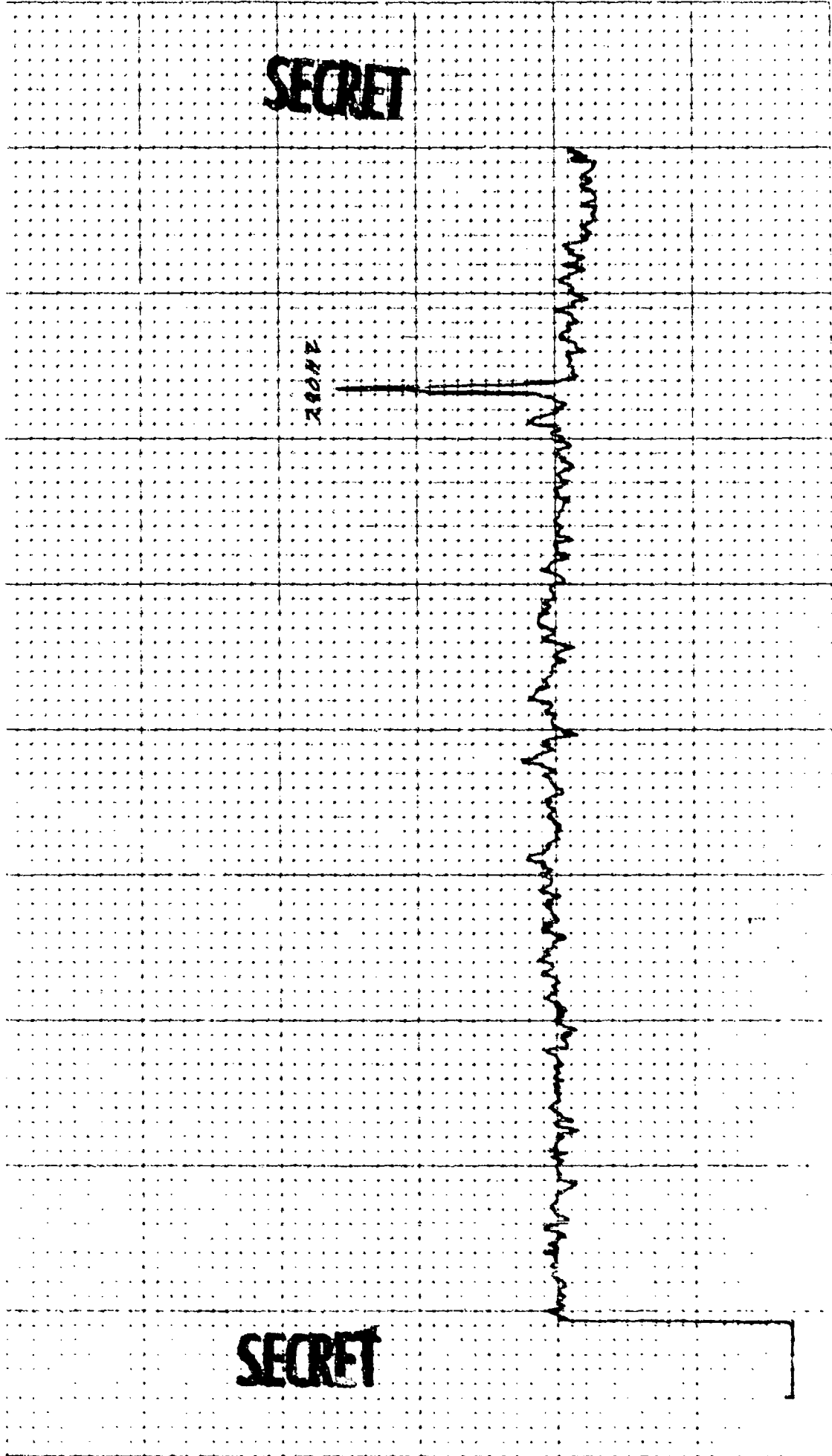


KOE WAVE TO THE DEPT OF DEFENSE

46 0703

CONTROL: 1544 - 16 (D05) DATE OF ANALYSIS: -- -- --
 BEAMPORMED SPECTRUM(ELEMENTS) / - / 6
 EXERCISE: BPARING STAKE DATE/TIME: 2-7-77 - 1549Z
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: / 10HZ
 16 ELEMENTS +90 DEG. AZ STEERING

REEL: F19 INDE X 3050
 INTEGRATION TIME 320 SECS ATTEN: -18 DB
 FILTER WTC: HANNING



SECRET

SECRET

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 5

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-31.3</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-21.3</u>	
BEAMFORMER GAIN	<u>+24</u>	<u>+2.7</u>	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	<u>+2.9</u>	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-60.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-50.8</u>	
BEAMFORMER GAIN	<u>+24</u>	<u>-36.8</u>	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+2.7</u>	
SIGNAL LEVEL FOR SNR	<u>-31.8</u>	<u>39.5</u>	
PROCESSOR CORRECTION	<u>-4.0</u>	<u>35.5</u>	
MRA CORRECTION	<u>+ .2</u>	<u>35.7</u>	SNR $\frac{1}{10}$ HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	<u>27.5</u>	SNR 1 HZ BAND

CONFIDENTIAL

Most Available Copy

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 5

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-41.2</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-31.2	
BEAMFORMER GAIN	<u>+24</u>	-7.2	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	-6.4	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-65.9</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-55.9	
BEAMFORMER GAIN	<u>+24</u>	-31.9	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-7.2</u>	
SIGNAL LEVEL FOR SNR	<u>-31.9</u>	24.7	
PROCESSOR CORRECTION	<u>-4.0</u>	20.7	
MRA CORRECTION	<u>+ .8</u>	21.5	SNR 1/2 HZ BAND
BANDWIDTH CORRECTION	<u>-8.2</u>	13.3	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

DATA POINT 5

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-30.0</u>	<u>-33.1</u>	<u> </u>
MRA SIGNAL LEVEL	<u>+ 2.9</u>	<u>- 6.4</u>	<u> </u>
ARRAY SIGNAL GAIN	<u>+32.9</u>	<u>+26.7</u>	<u> </u>
20 LOG <u>32</u>	<u>30.1</u>	<u>30.1</u>	<u> </u>
# of elements			
DIFFERENCE	<u>+ 2.8</u>	<u>- 3.4</u>	<u> </u>

ARRAY GAIN

MRA SNR	<u>25.7</u>	<u>25.5</u>	<u> </u>
MEAN OMNI SNR	<u>9.3</u>	<u>10.5</u>	<u> </u>
ARRAY GAIN	<u>16.4</u>	<u>15.0</u>	<u> </u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>12.2</u>	<u>14.6</u>	<u> </u>
DIFFERENCE	<u>+ 4.2</u>	<u>+ .4</u>	<u> </u>

CONFIDENTIAL

46 0703

KOE DE PIRE TO THE INCHES

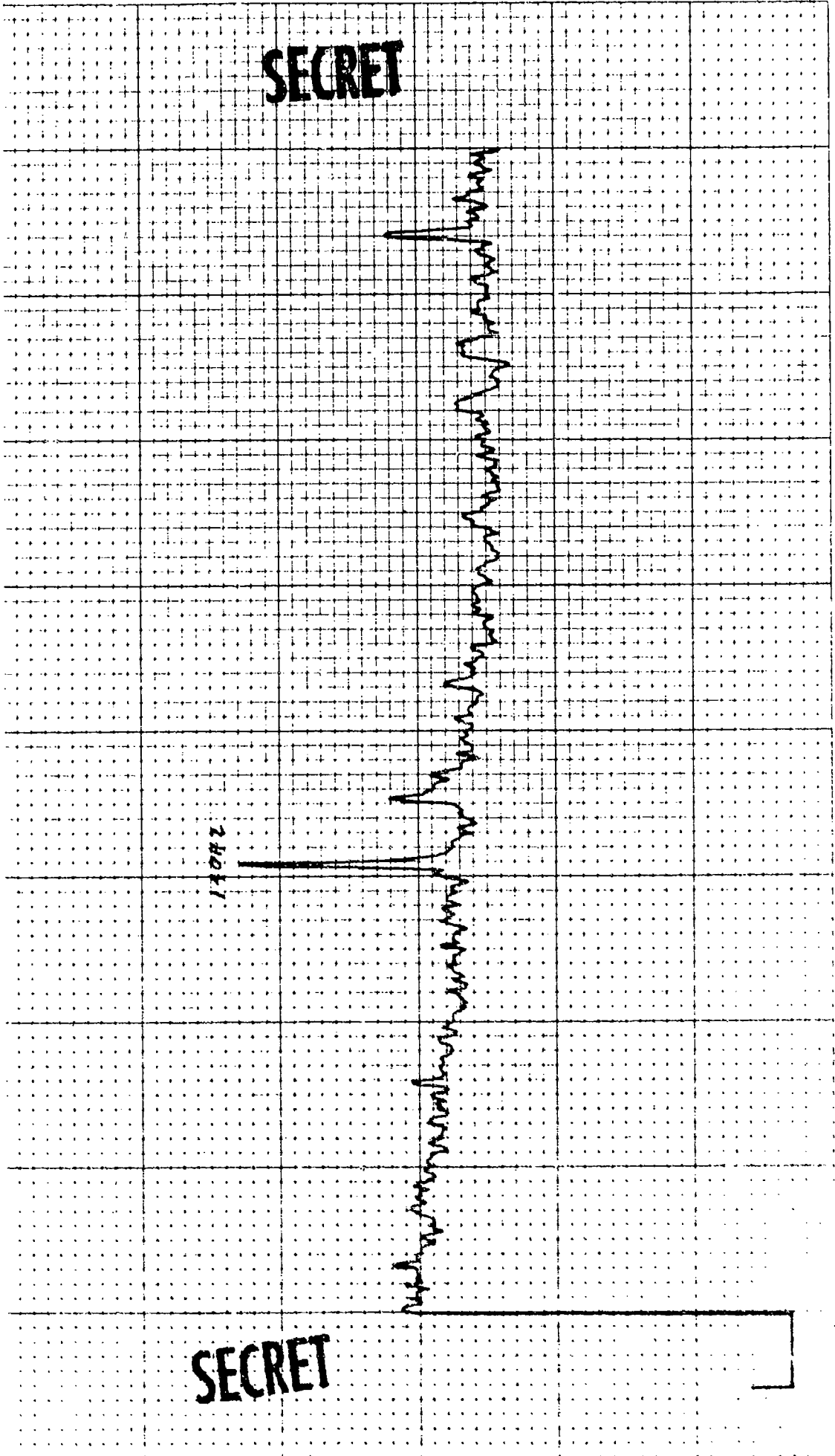
CONTROL: 1549 - J2 (2P5)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 32 ELEMENTS

DATE OF ANALYSIS: 1-26-77 (29-34)

INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

REEL: F19 INDE X 3050

DATE/TIME: 2-7-77 -1549 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 + 34 DEG. AZ STEERING



SECRET

SECRET

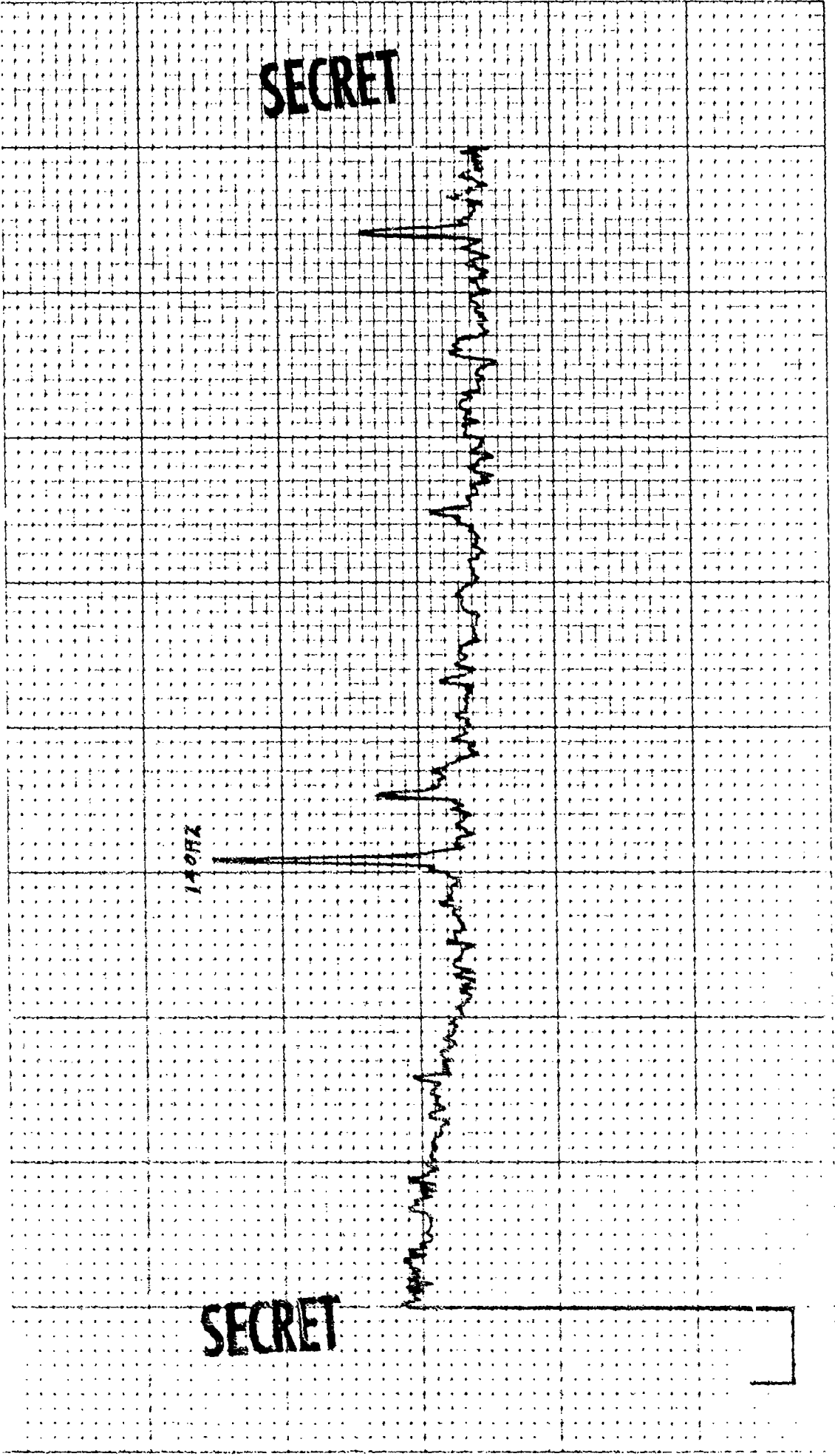
46 0703

REF ID: A66158

CONTROL: 1549 - 32 (DPS) DATE OF ANALYSIS: -- -- --
 BEAMFORMEL SPECTRUM(ELEMENTS) 1-26 @ 29-34)
 EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTEN: -24DB
 CENTER FREQ: 150 HZ FILTER WTG: HANNING
 32 ELEMENTS +36 DEG. AZ STEERING ANALYSIS BANDWIDTH: 1/10HZ

REEL: F19

INDE X 3050



SECRET

SECRET

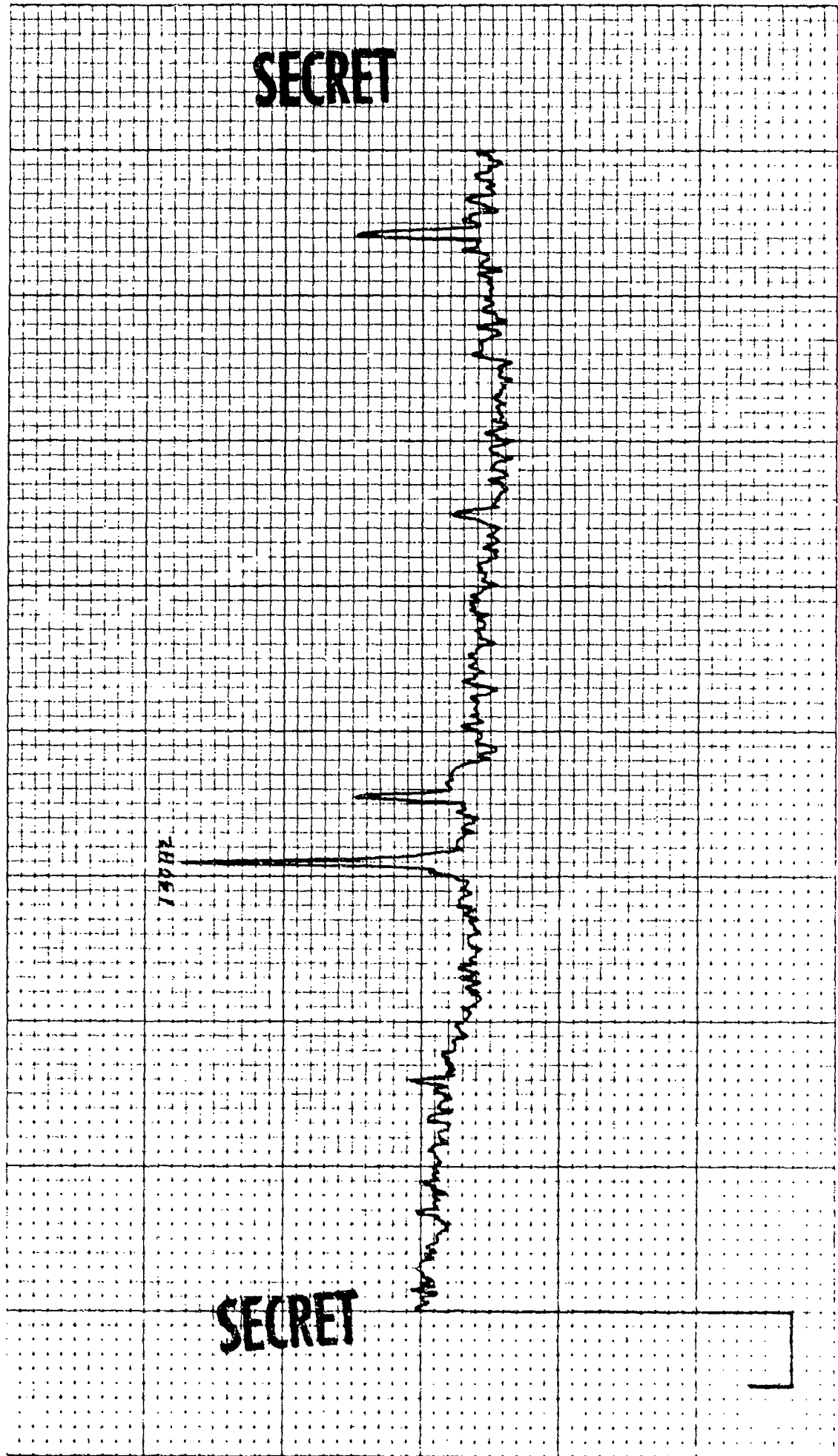
46 0703

K+E 10 X 10 TO THE INCH
REUFFEL & ESSER CO. MADE IN U.S.A.

CONTROL: 1549 - 32 (205)
 BEAMFORMED SPECTRUM (ELEMENTS) 1-26 4 29-34)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 32 ELEMENTS

DATE OF ANALYSIS: - - - -
 DATE/TIME: 2-7-77 - 1549 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 + 30 DEG. AZ STEERING

REEL: F19
 INTEGRATION TIME 320 SECS
 FILTER WTC: HANNING
 INDE X3050
 ATTN: -2YDB



SECRET

SECRET

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

46 0703

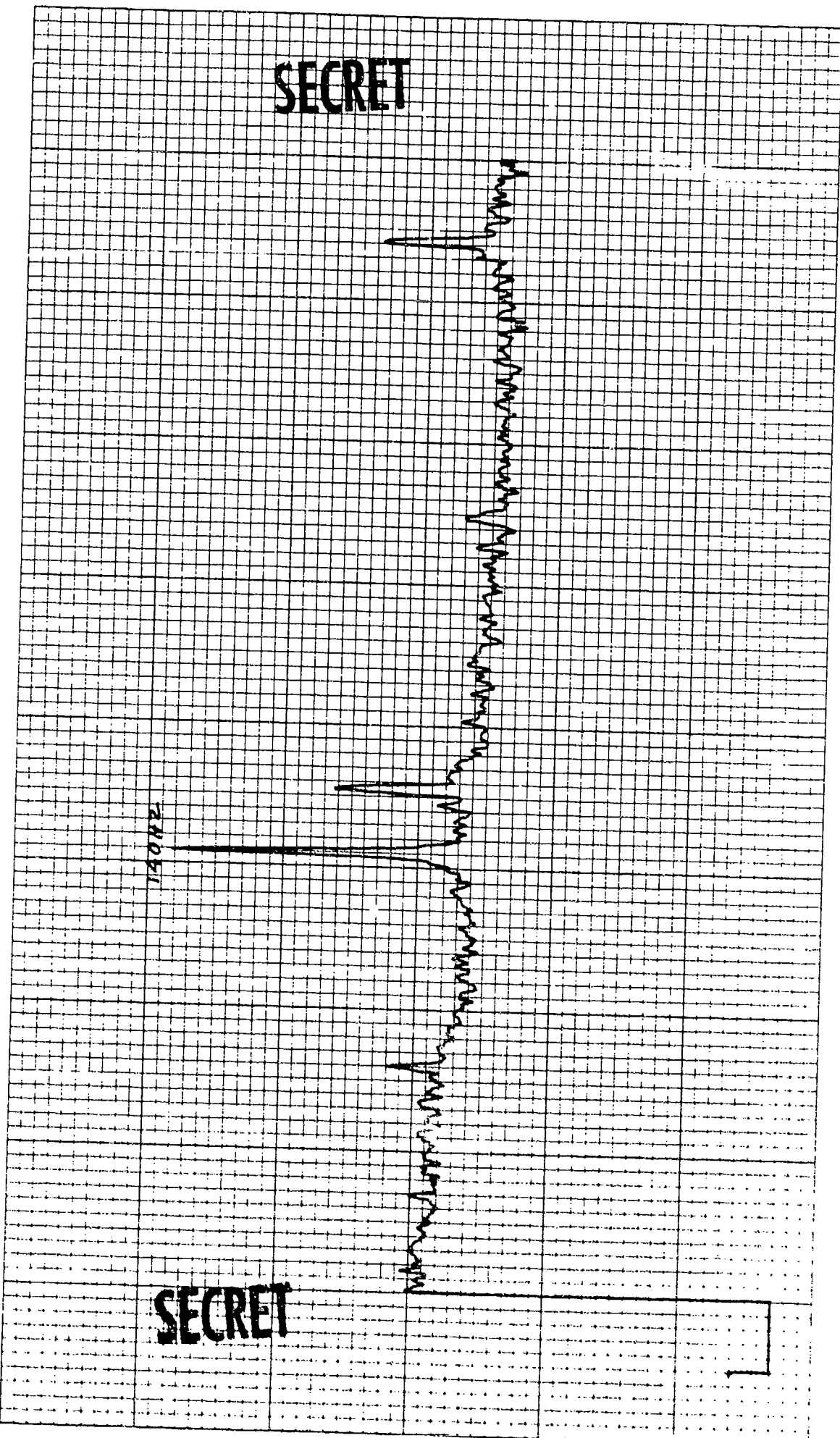
CONTROL: 1549 - 3λ (DP5)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
3λ ELEMENTS

DATE OF ANALYSIS: 1-26-77
DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 40 DEG. AZ STEERING

REEL: F19
INDE X3050
INTEGRATION TIME 320 SECS
ATTEN: -24 DB
FILTER WTG: HANNING

SECRET

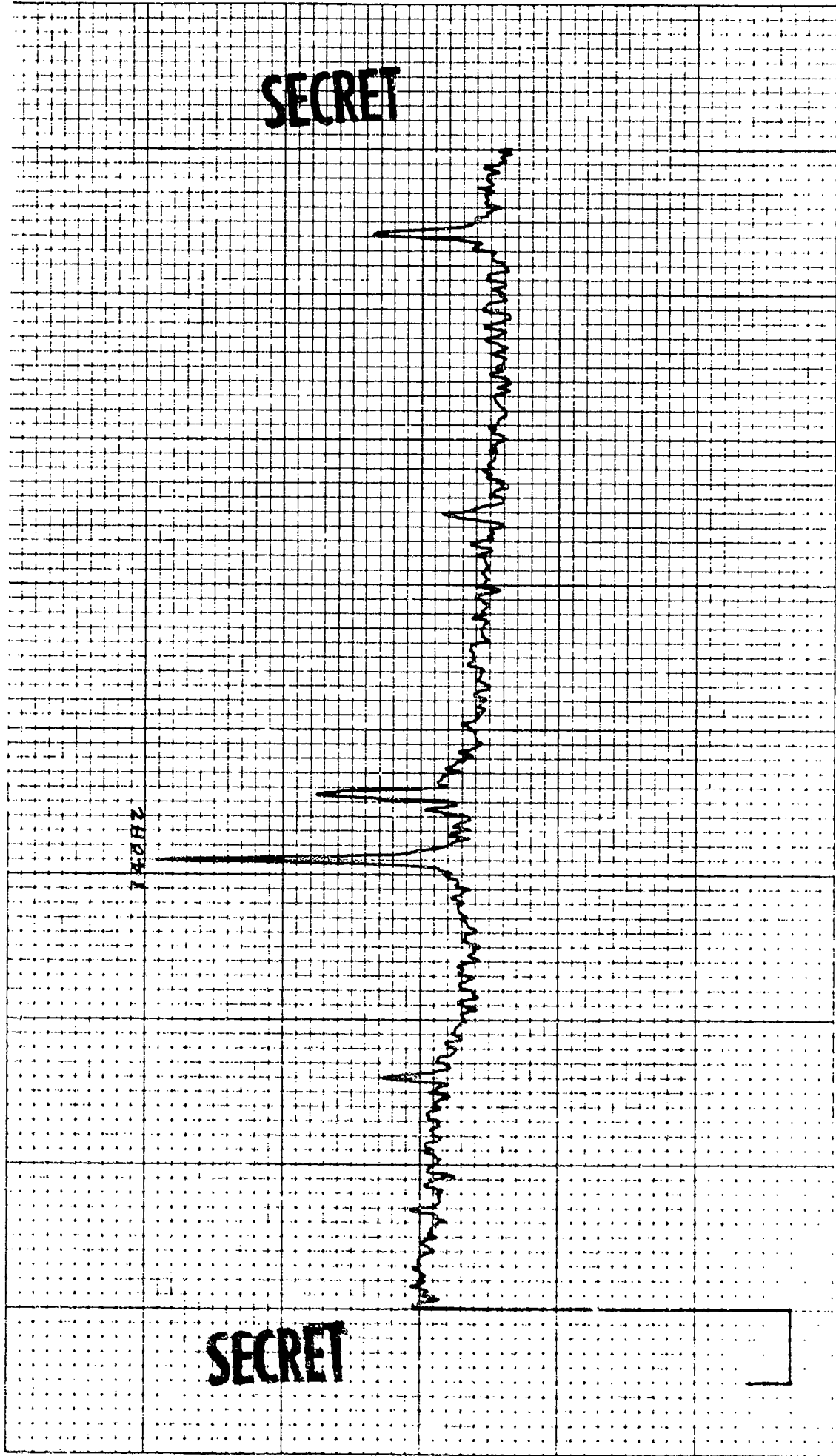
SECRET



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

46 0703

CONTROL: 1549 - 32 (205) DATE OF ANALYSIS: 1-26-77 REEL: F19 INDE X 3050
 BEAMFORMED SPECTRUM (ELEMENTS) 29-34 INTEGRATION TIME 320 SECS ATTN: -24 DB
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z FILTER WTC: HANNING
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
32 ELEMENTS +42 DEG. AZ STEERING



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

46 0703

CONTROL: 1549 - 51 (DP5)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS

DATE OF ANALYSIS: _____

1-26-77

DATE/TIME: 2-7-77 - 1549 Z

ANALYSIS BANDWIDTH: 1/10 HZ

+43 DEG. AZ STEERING

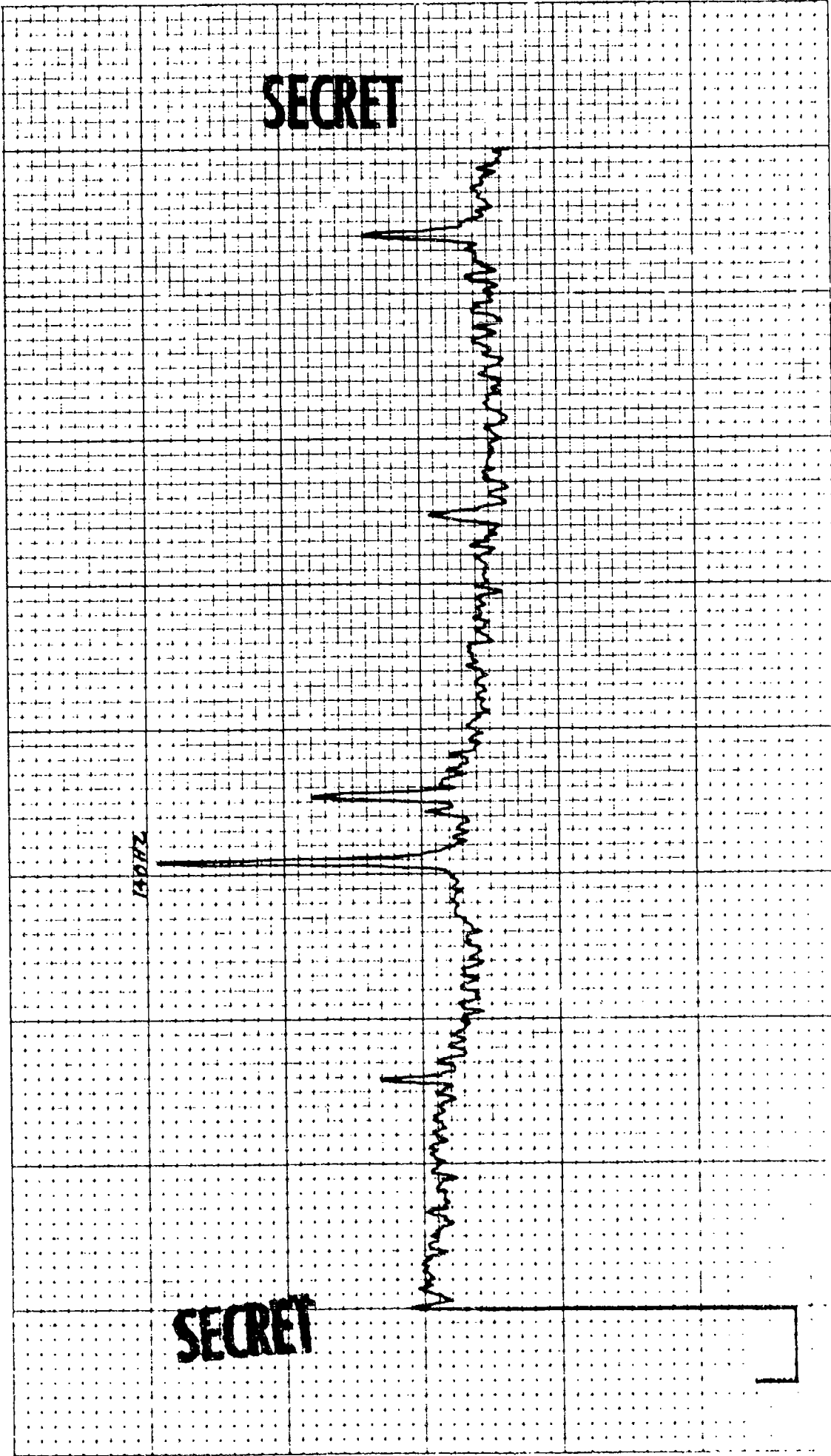
REEL: F19

INDE X3060

INTEGRATION TIME 320 SECS

ATTEN: 24 DB

FILTER WIG: HANNING

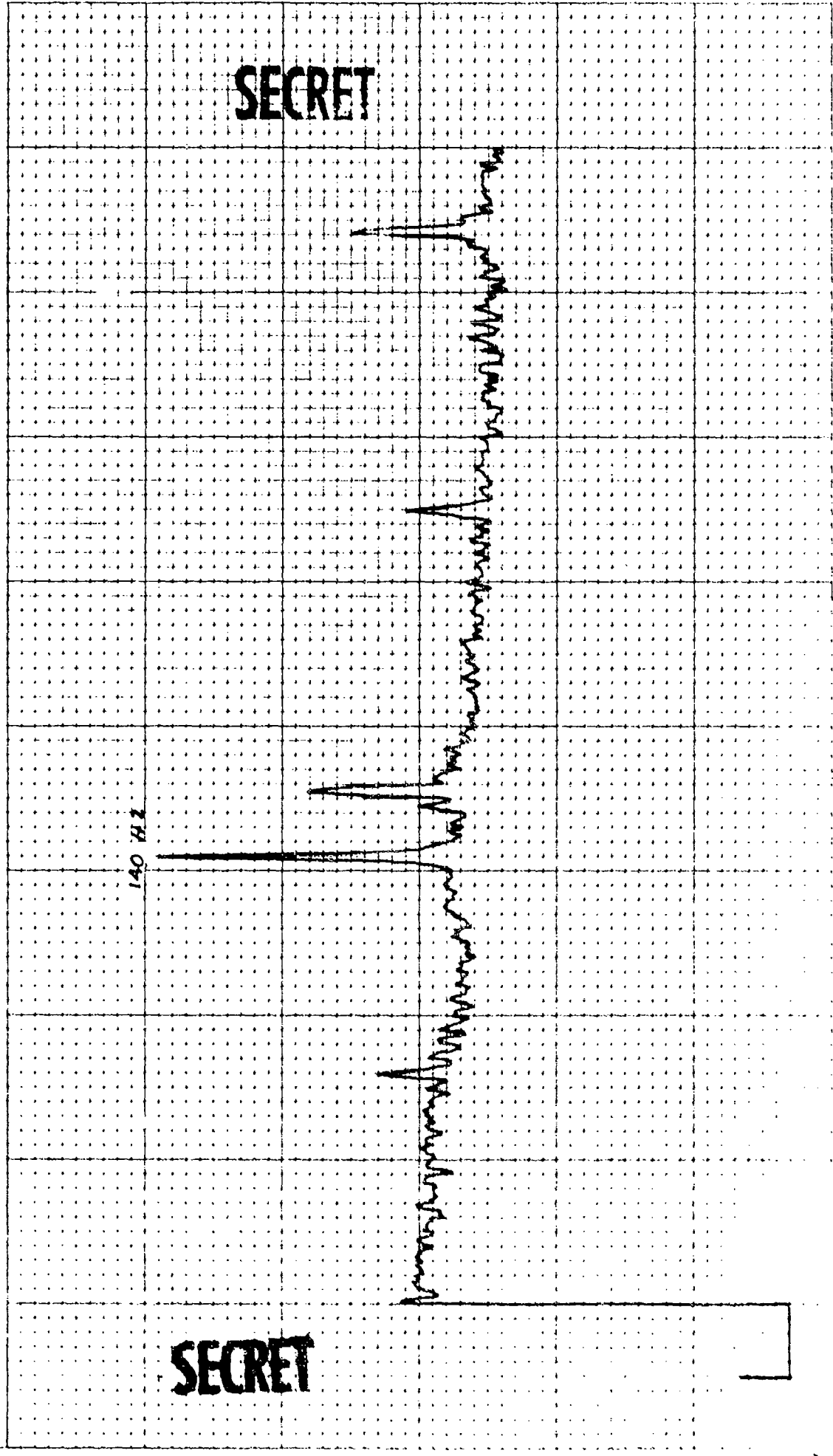


46 0703

KOE 20.416 TO THE INCHES 20.416 INCHES

CONTROL: 1549 - 32 (DPS) DATE OF ANALYSIS: - - - -
 BEAMFORMED SPECTRUM (ELEMENTS) 1-26 29-34
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
 32 ELEMENTS + 44 DEG. AZ STEERING

REEL: F19 INDE X 3050
 INTEGRATION TIME 320 SECS ATTEN: -2V DB
 FILTER WTG: HANNING



15

46 0703

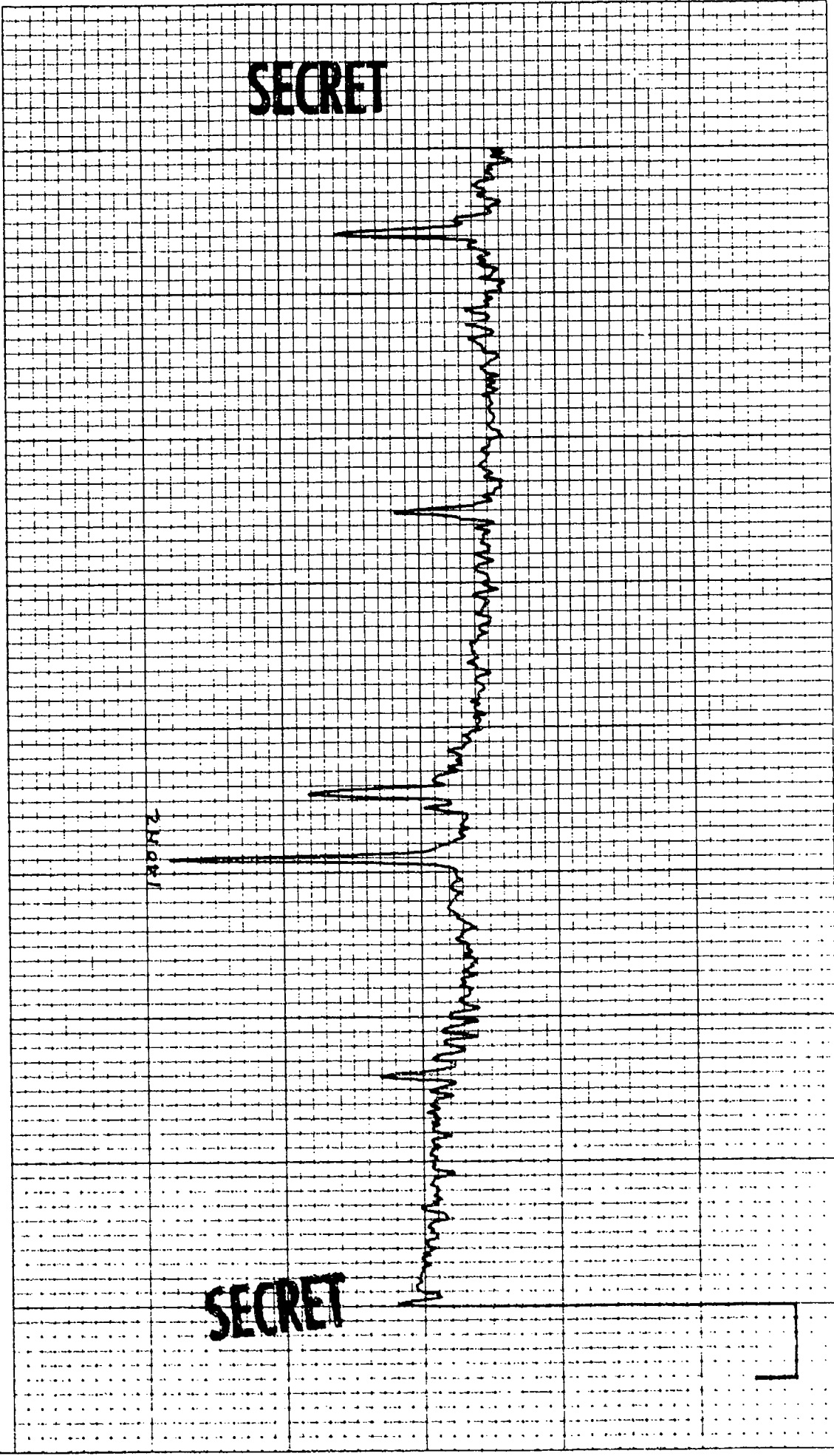
KOE 10 X 10 TO THE INCH
KEUFEL & ESSER CO. MADE IN U.S.A.

7-306

CONTROL: 1549 - 32 (DPS) DATE OF ANALYSIS: -- -- --
 BEAMFORMED SPECTRUM(ELEMENTS) 1-26 & 29-34
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
 32 ELEMENTS + 42 DEG. AZ STEERING

REEL: F19 INDE X 3050

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



SECRET

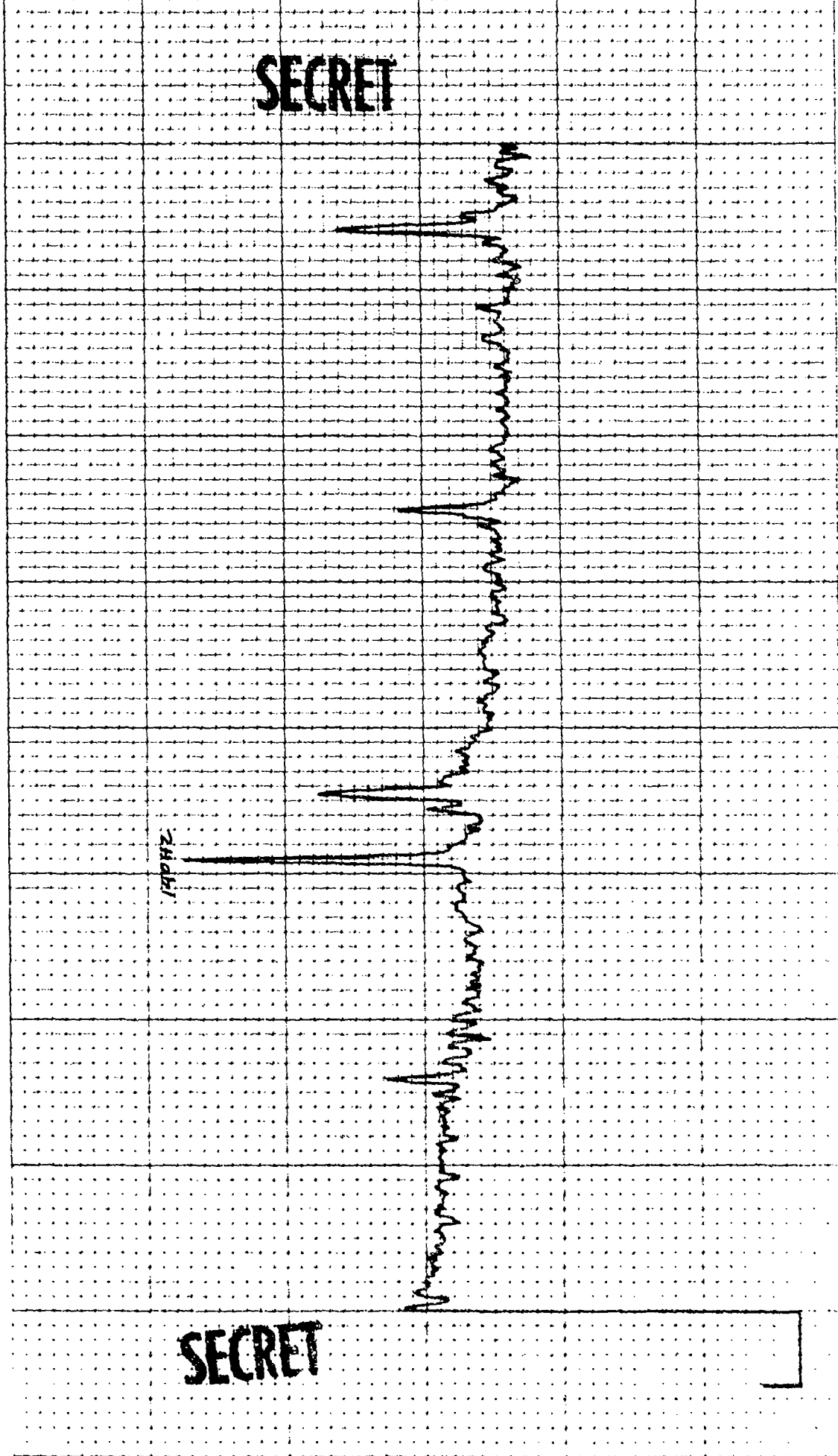
SECRET

46 0703

KSE 15.4 MG TO THE INCH (0.25 INCHES)
WEIGHT WASSER CO. MADE IN U.S.A.

CONTROL: 1549 - 32 (DP5) DATE OF ANALYSIS: 1-26-77
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-7-77 - 1549 Z
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ
 CENTER FREQ: 150 HZ 440 DEG. AZ STEERING

REEL: F19 INDE X 3050
 INTEGRATION TIME 320 SECS FILTER WTG: HANNING



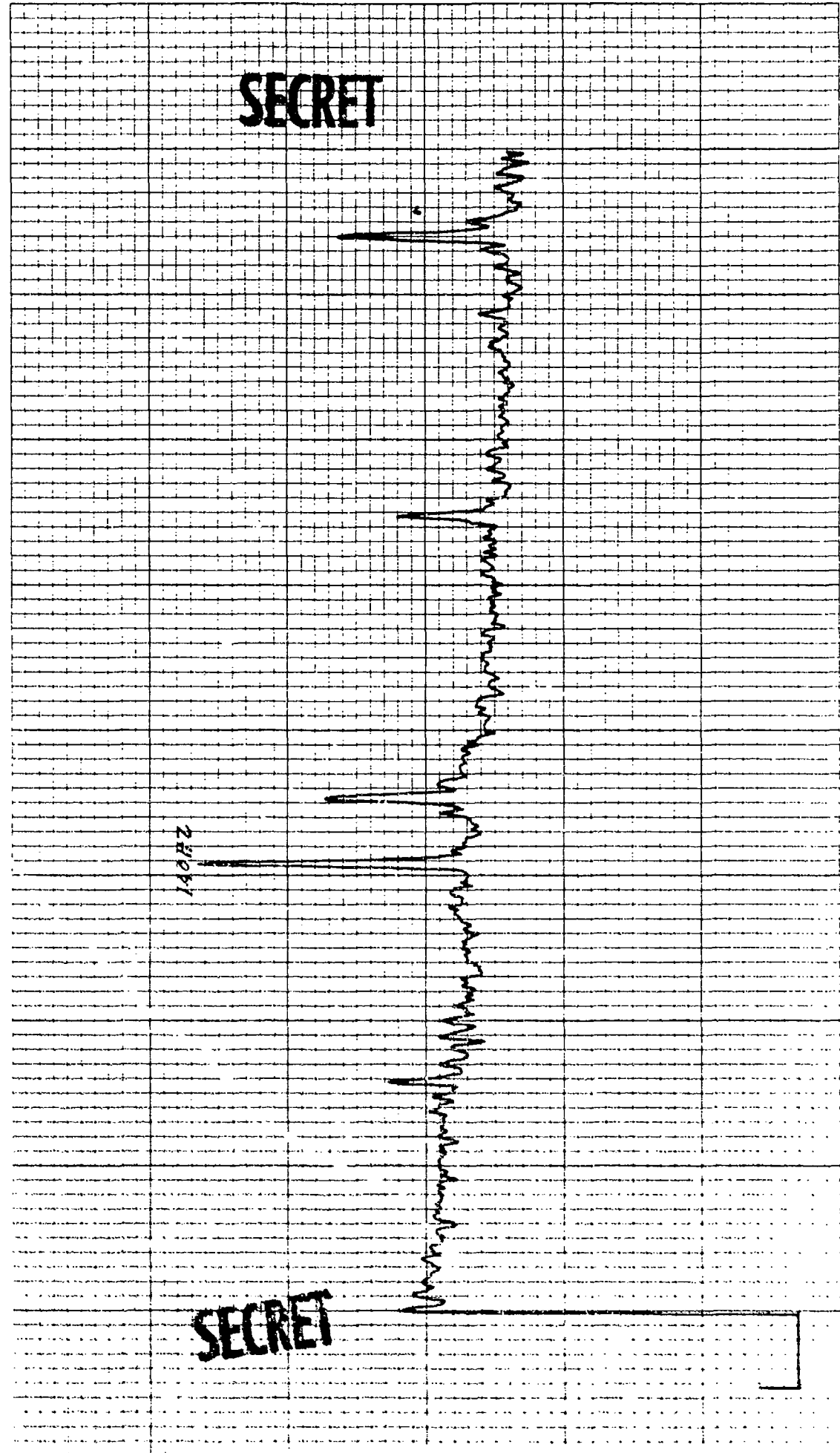
CONTROL: 1549 - 32 (DP5) DATE OF ANALYSIS: 1-26-77 28-34 REEL: F11 INDE X3050

BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 27-77 1549 Z INTEGRATION TIME 320 SECS ATTEN: -24 DB

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

CENTER FREQ: 150 HZ +49 DEG. 1.4 STEERING

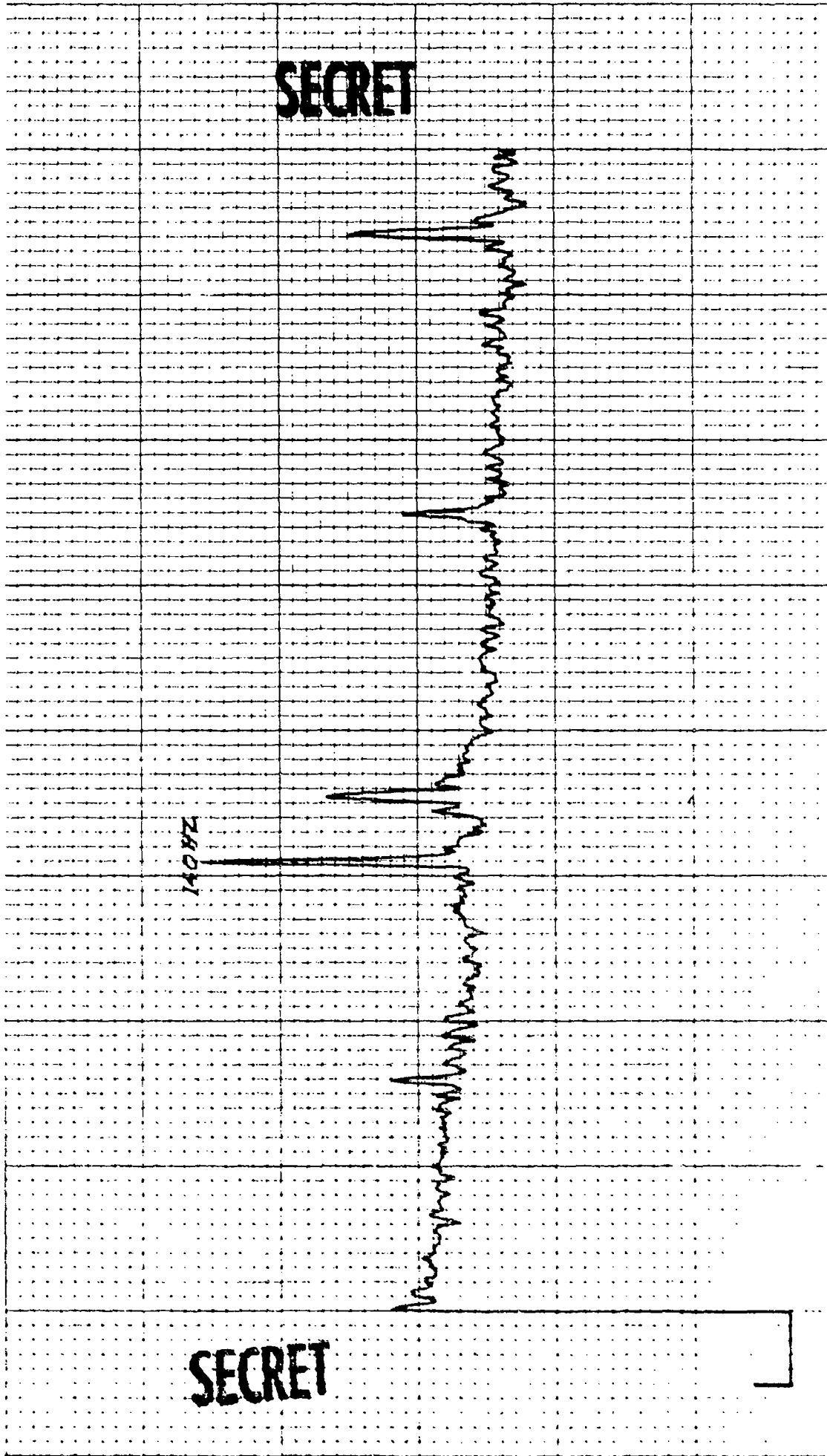
32 ELEMENTS



WSE 107 TO THE WCHS. 107-107-107
MERRILL & ASSOC. CO. 107-107-107

46 0703

CONTROL: 1549 - 32 (MPS) DATE OF ANALYSIS: 1-20-77 REEL: F19 INDE X 3050
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTN: -24 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
CENTR FREQ: 150 HZ + 50 DEG. AZ STEERING



SECRET

SECRET

46 0703

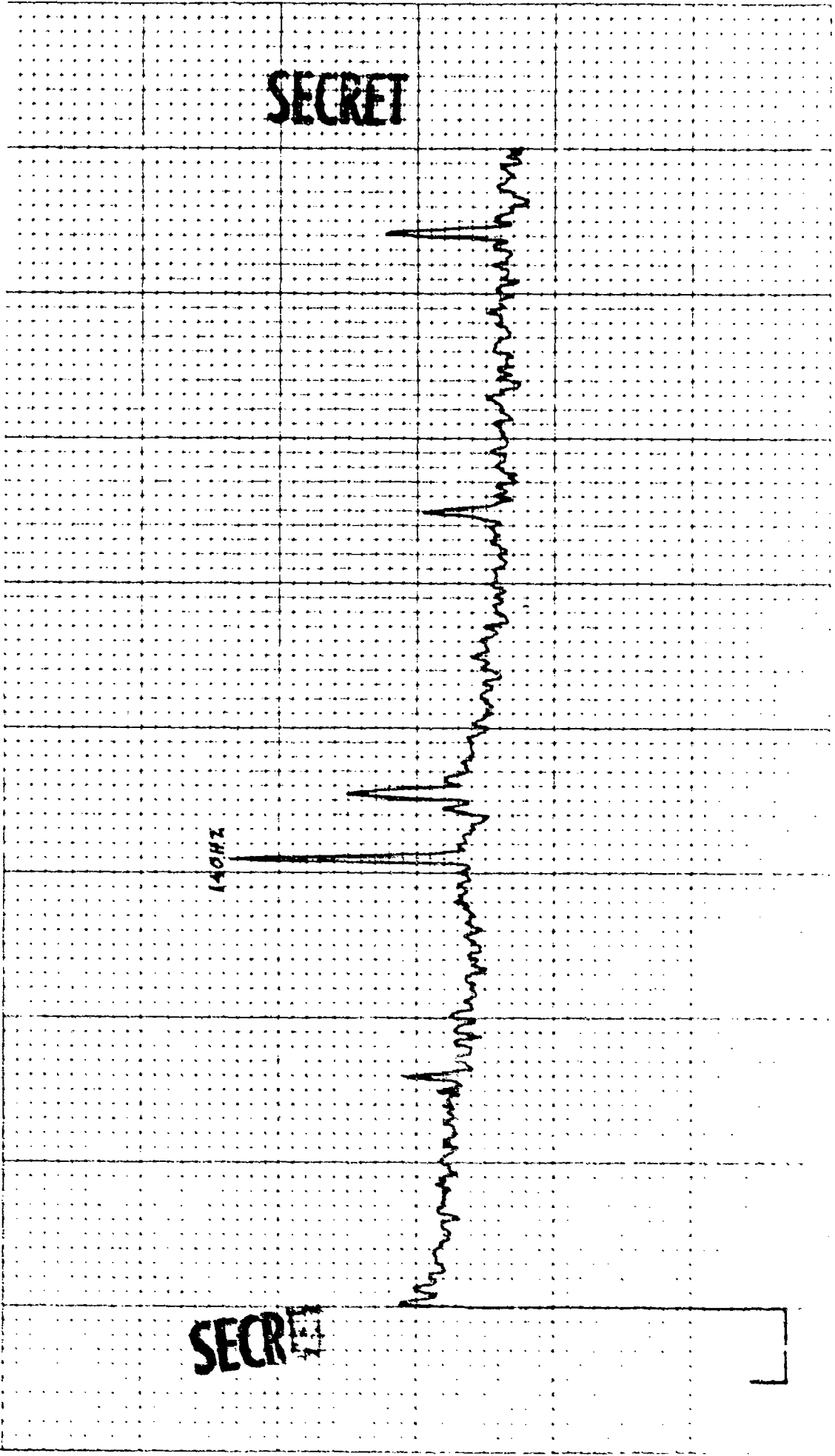
CONTROL: 1549 - 32 (D05)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 32 ELEMENTS

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

REEL: F19
 INTEGRATION TIME 320 SECS
 FILTER WTC: HANNING

DATE/TIME: 2-7-77 - 1540 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 +52 DEG. AZ STEERING

INDE X 3050



SECRET

46 0703

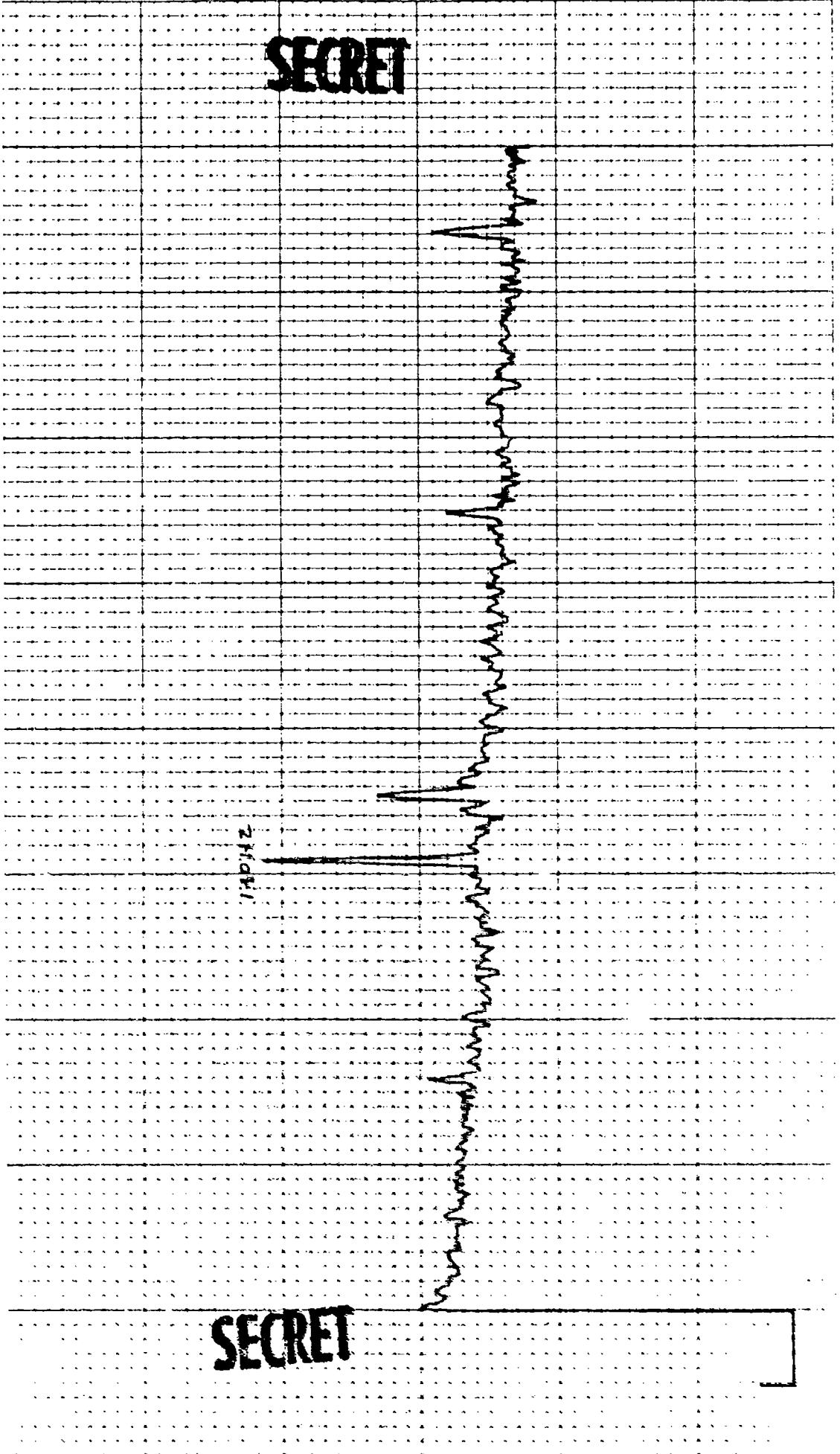
KSE 1549 TO THE DEPT OF DEFENSE

CONTROL: 1549 - 32 (DP5)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 154 HZ
 32 ELEMENTS

DATE OF ANALYSIS: 1 - 26 & 28-34
 DATE/TIME: 2-7-77 - 1549 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 154 DEG. AZ STEERING

REEL: F/9
 INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

INDE X 3050



17-248

CONTROL: 1549 - 32 (DPS) DATE OF ANALYSIS: ---

BEAMFORMED SPECTRUM (ELEMENTS) 1-26 & 28-34

EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z

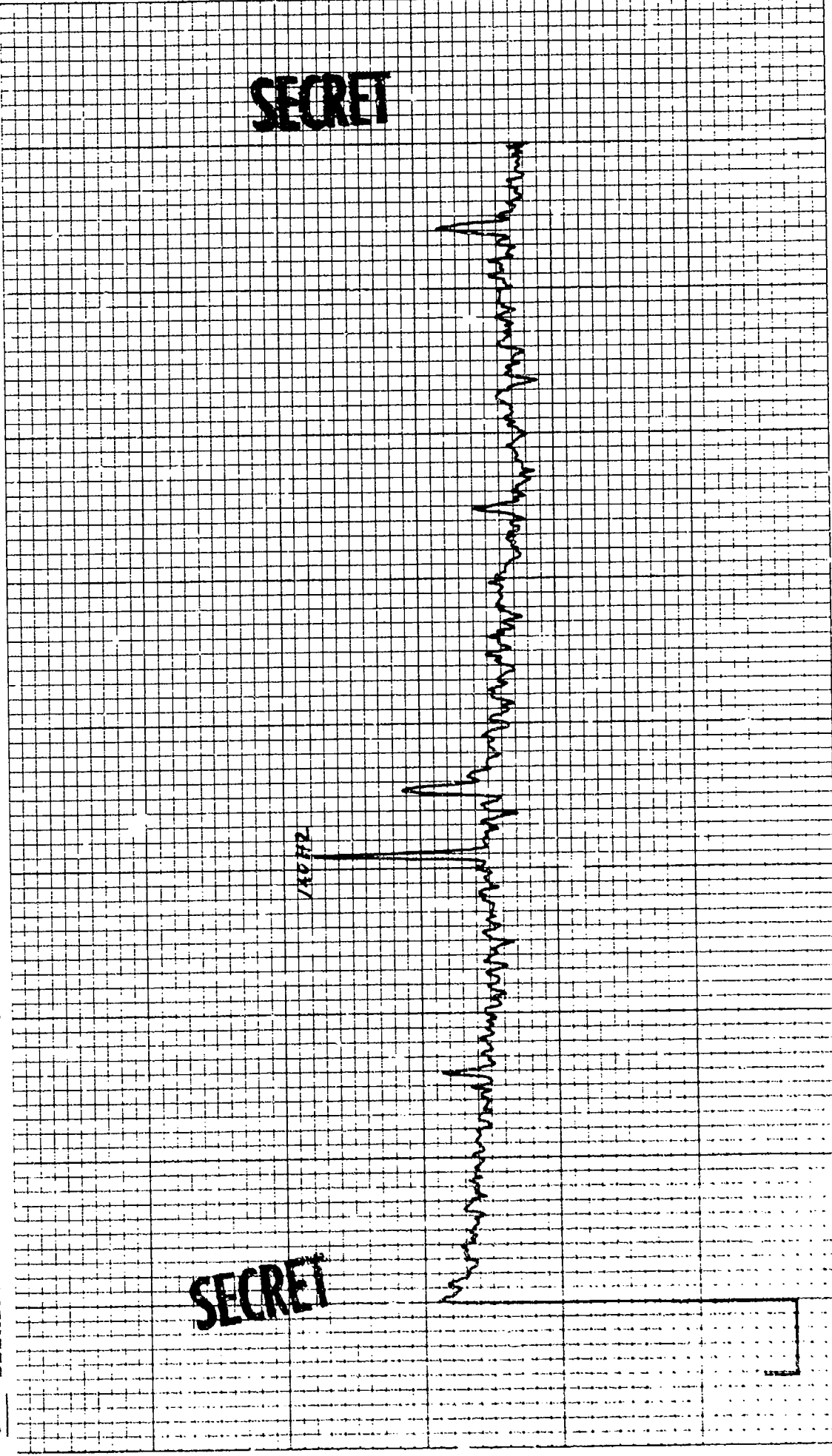
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ

32 ELEMENTS +56 DEG. AZ STEERING

PEEL: F19 INDE X3050

INTEGRATION TIME 320 SECS ATTEN: -2f DB

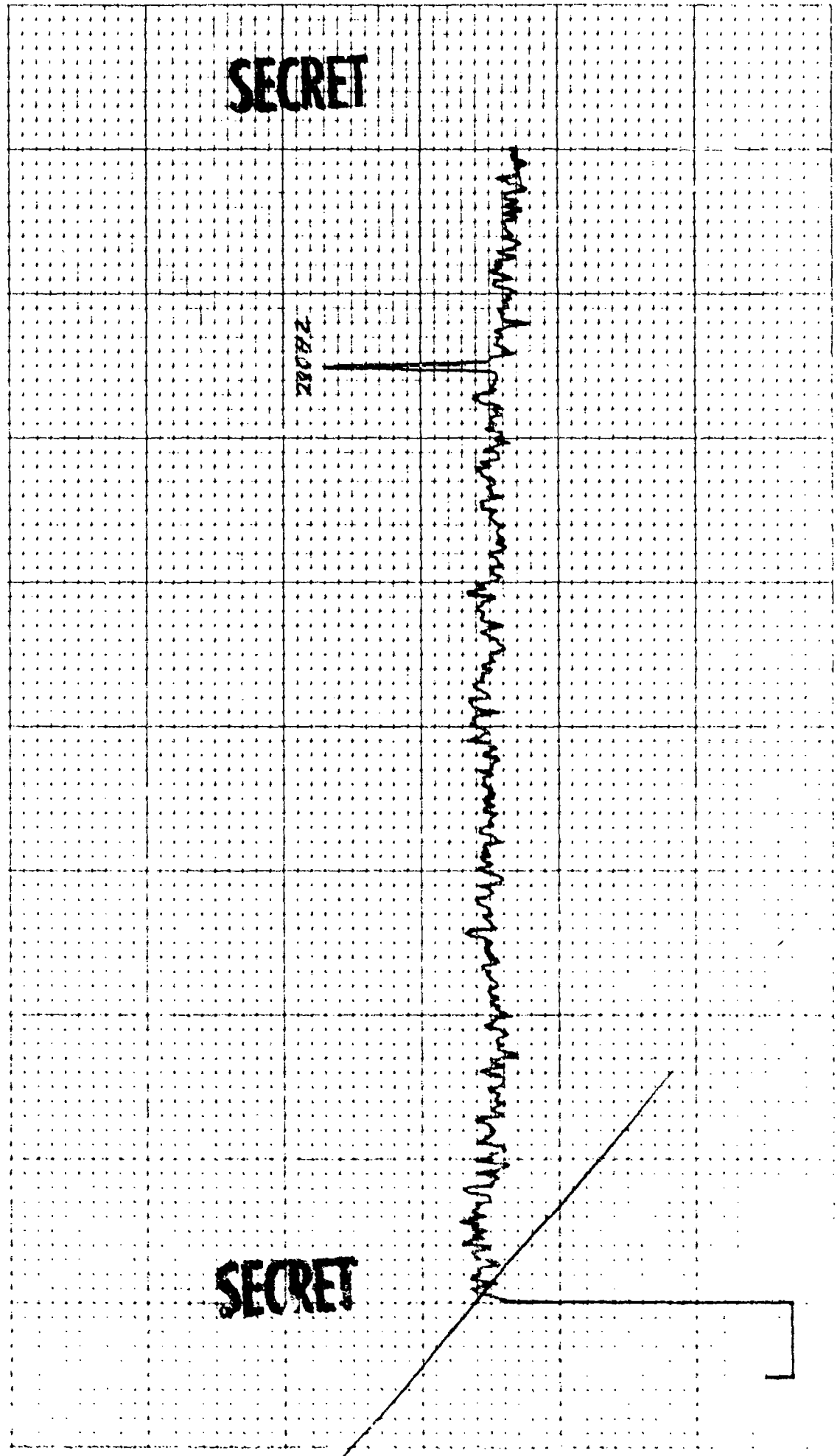
FILTER WTG: HANNING



46 0703

CONTROL: 1549 - 32 (DP5) DATE OF ANALYSIS: - - - -
 BEAMPFORMED SPECTRUM (ELEMENTS) 1-26-82 29-34)
 EXERCISE: BEARING STAKE DATE/TIME: 27-77 - 1549 Z
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ
 32 ELEMENTS +34 DEG. AZ STEERING

REEL: F19 INDE X 3050
 INTEGRATION TIME 320 SECS ATTEN: -24 DB
 FILTER WTG: HANNING



SECRET

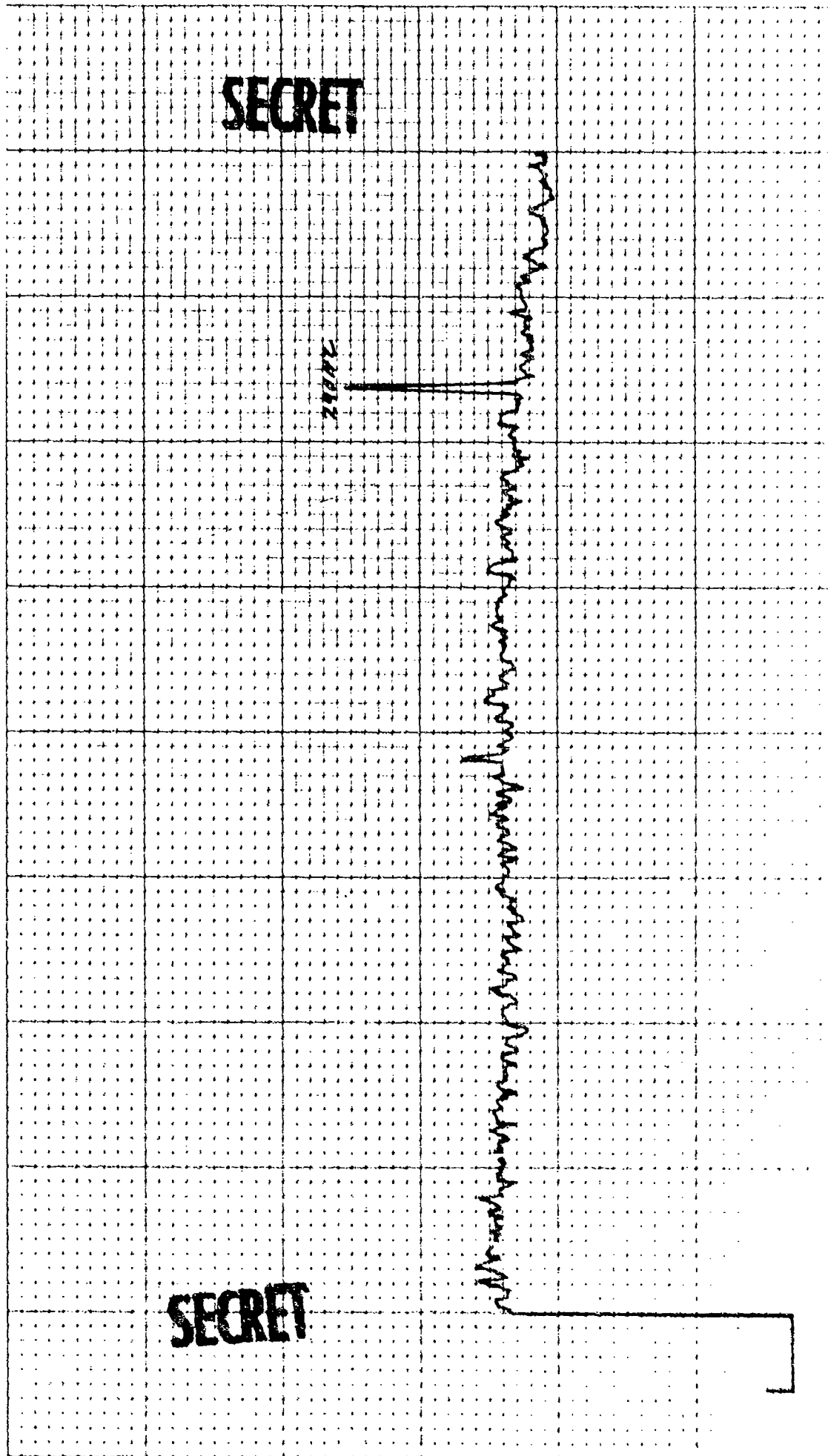
SECRET

46 0703

KOE 12 11 1977

CONTROL: 1549 - 32 (DPS) DATE OF ANALYSIS: -- -- --
 BEAMFORMED SPECTRUM (ELEMENTS) 1-26-77 29-34
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ
 32 ELEMENTS 436 DEG. AZ STEERING

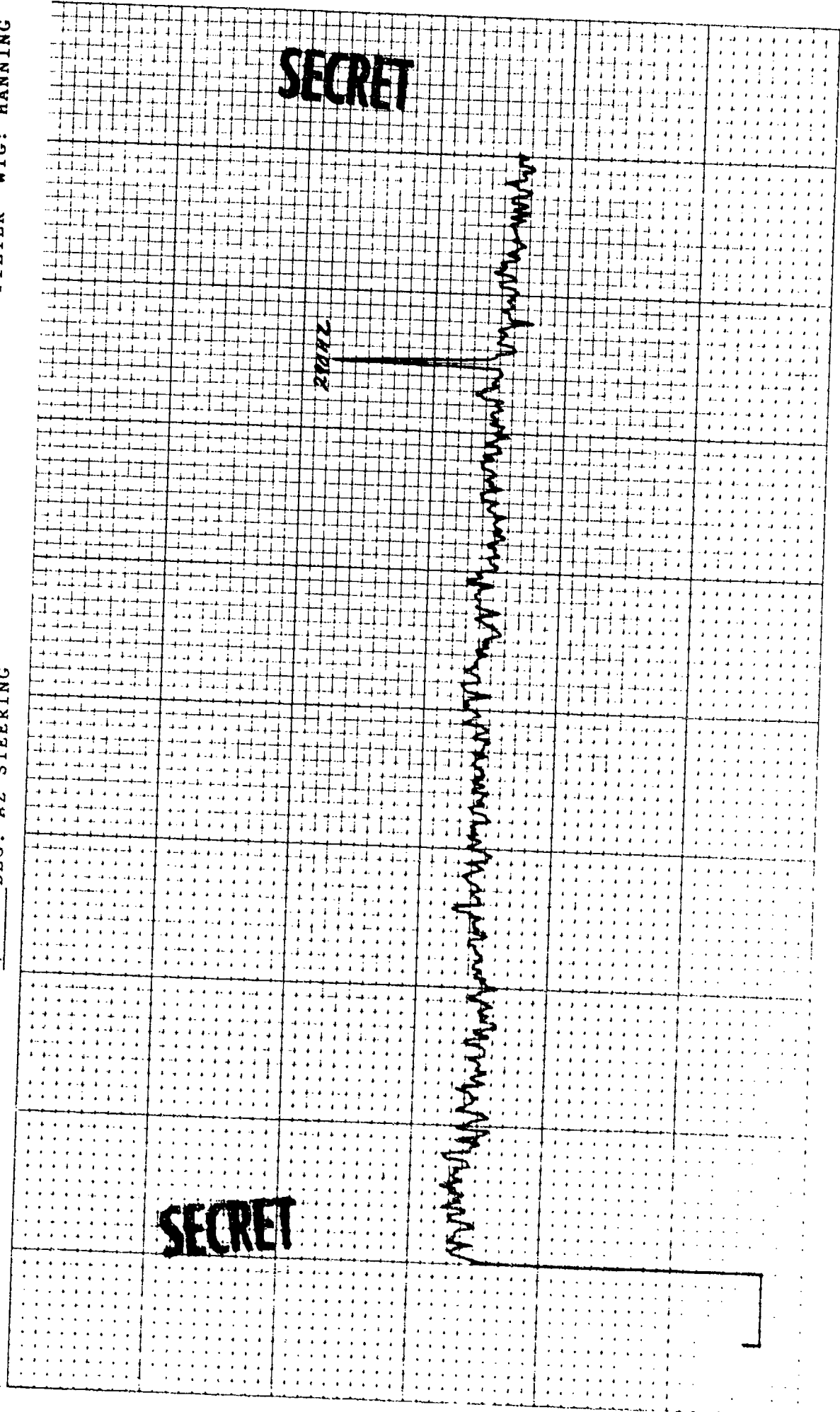
REEL: F/9 INDE X 3050
 INTEGRATION TIME 320 SECS ATTEN: 24 DB
 FILTER WTG: HANNING



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

46 0703

CONTROL: 1549-32 (185) DATE OF ANALYSIS: 1-26-77 REEL: F19 INDE: XJ050
 BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTN: -34 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 CENTER FREQ: 200 HZ 138 DEG. AZ STEERING



SECRET

SECRET

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

46 0703

CONTROL: 1549 - 32 (DP5)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
32 ELEMENTS

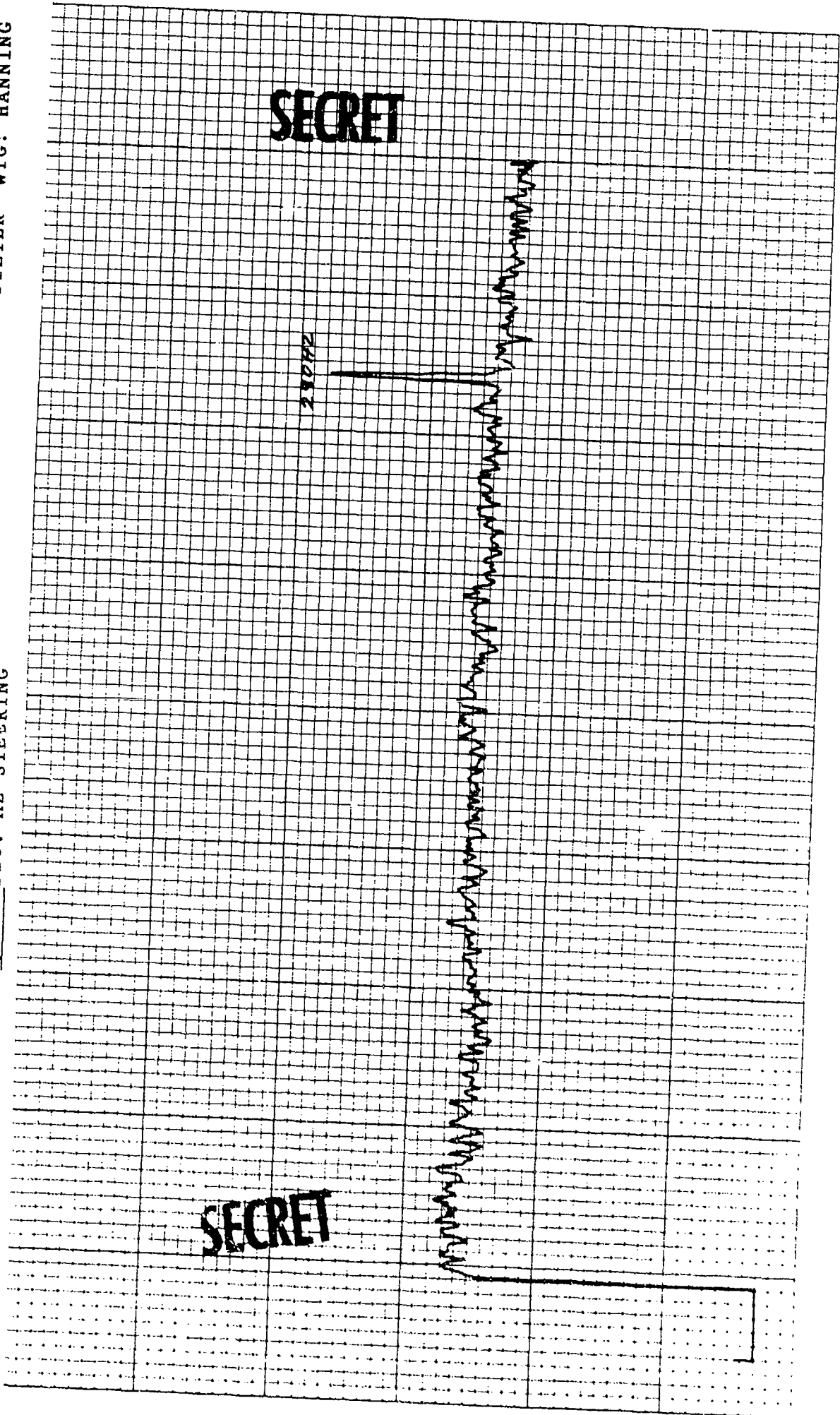
DATE OF ANALYSIS: 1-26-77 29-34

REEL: F19 INDE X308

INTEGRATION TIME 320 SECS FILTER WTG: HANNING

ANALYSIS BANDWIDTH: 1/10HZ
40 DEG. AZ STEERING

ATTEN: -24DB



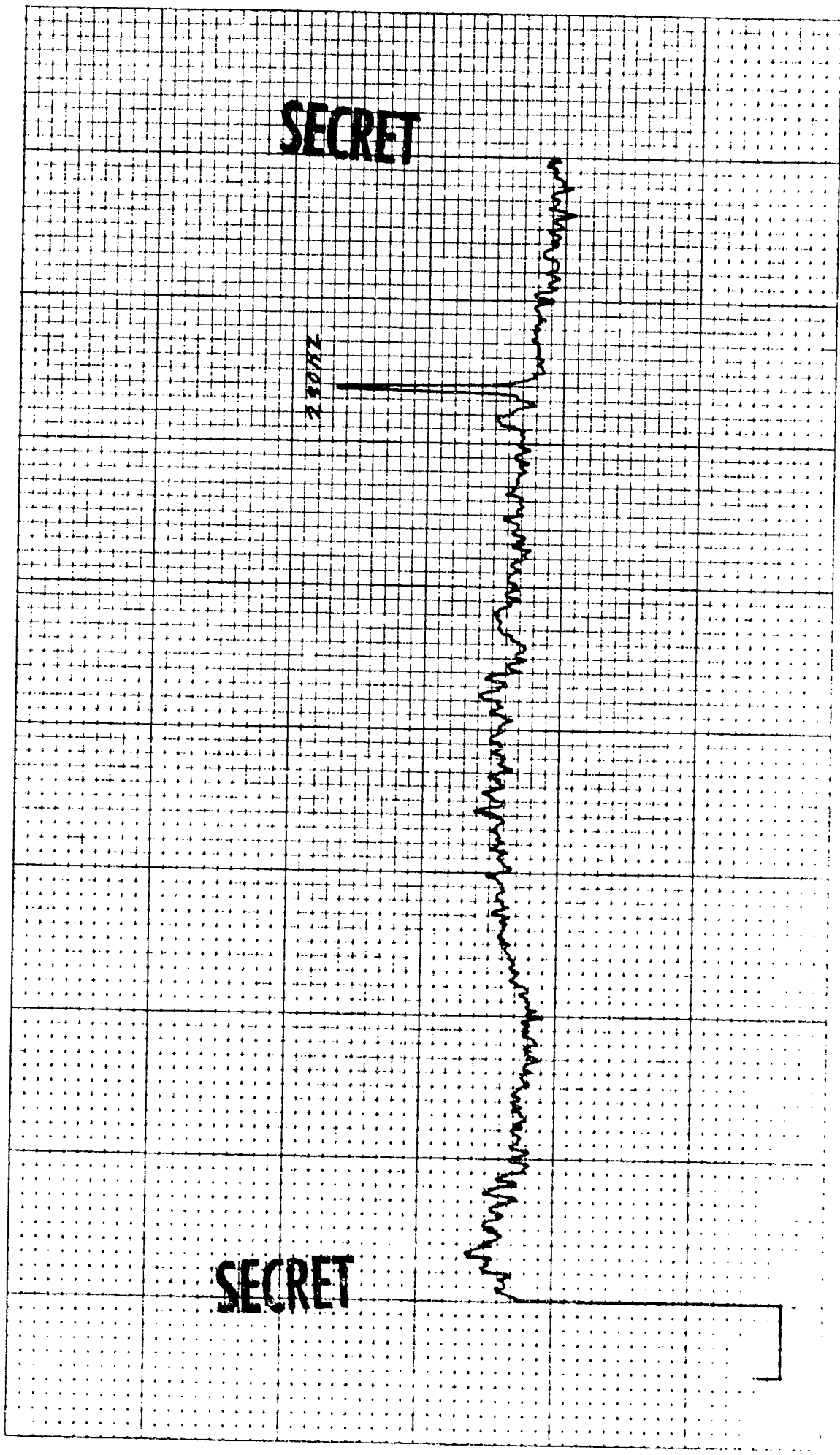
SECRET

SECRET

KOE 12.5 TO THE INCHES
REUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 1549-32 (DP5) DATE OF ANALYSIS: 1-26-77 REEL: F19 INDE X 3050
 BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTN: -24 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 CENTER FREQ: 280 HZ +42 DEG. AZ STEERING



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

46 0703

CONTROL: 1549 - 32 (DPS)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
32 ELEMENTS

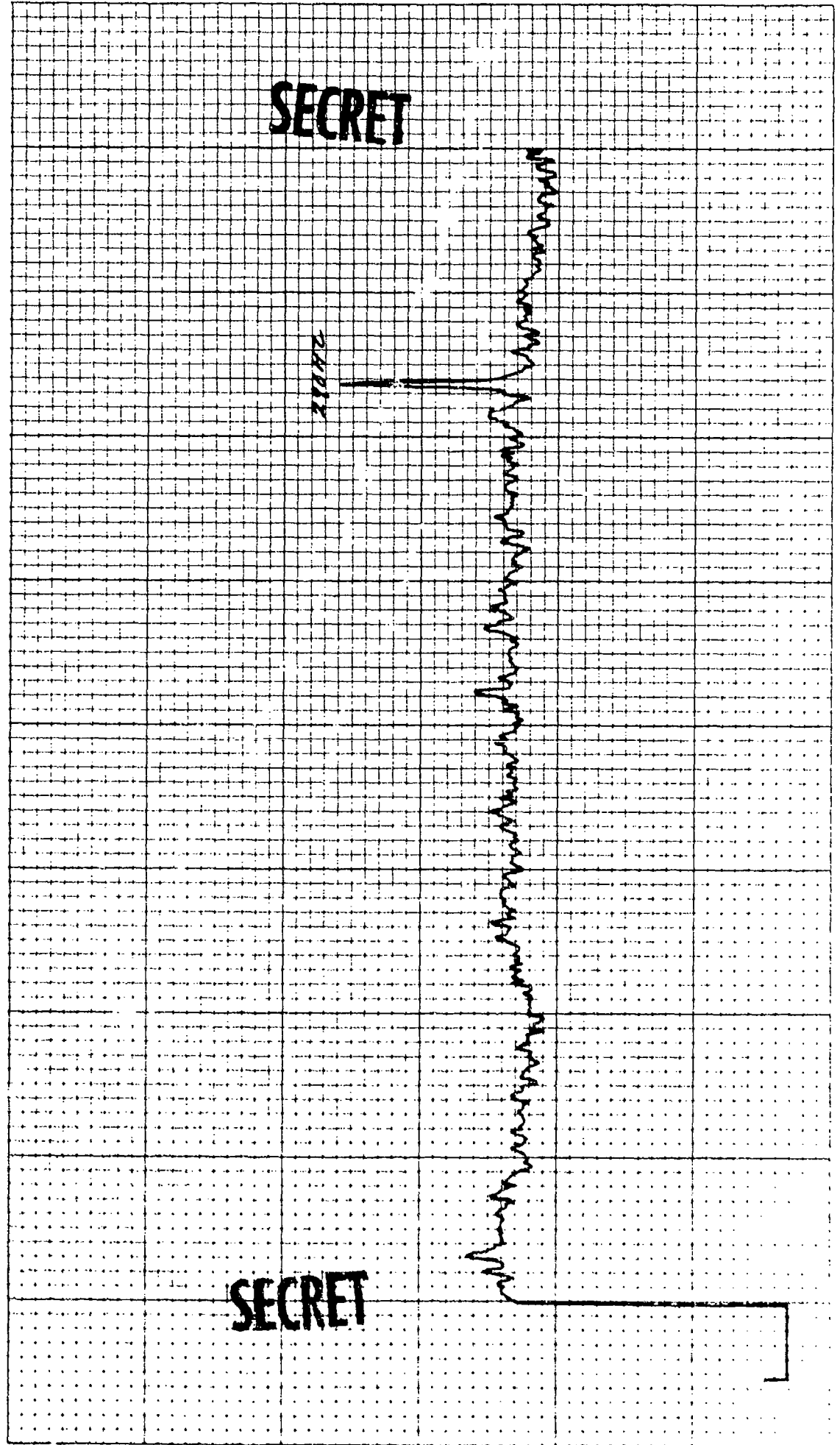
DATE OF ANALYSIS: 1-26-77

DATE/TIME: 2-7-77 - 1549 Z

ANALYSIS BANDWIDTH: 1/10HZ
+ 43 DEG. AZ STEERING

REEL: F19 INDE X3050

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



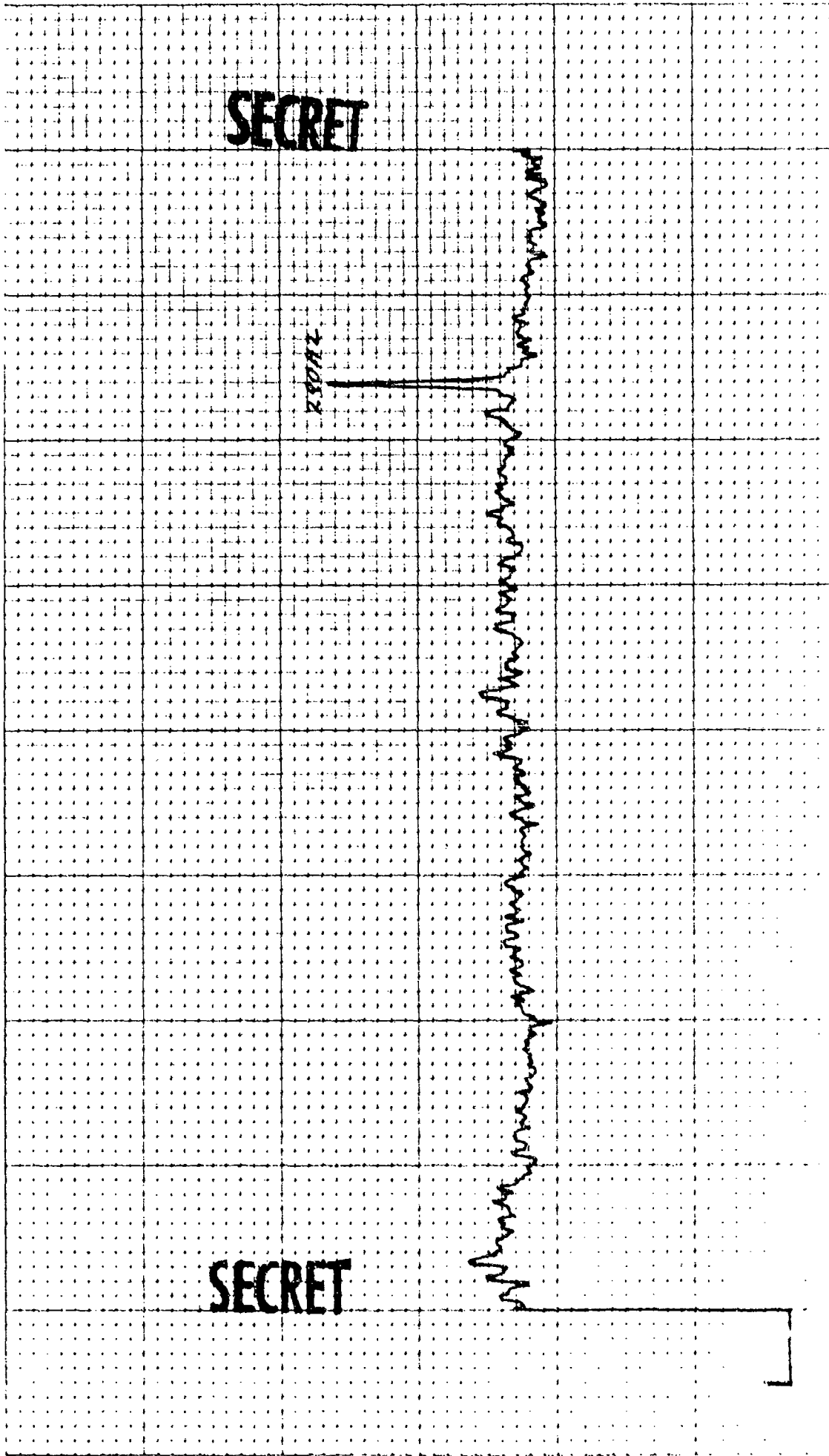
CONTROL: 1549 - 32 (DPS) DATE OF ANALYSIS: 1-26-28-34 REEL: F19 INDEX: Jsp

BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTN: -2Y DB

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

CENTER FREQ: 280 HZ 444 DEG. AZ STEERING

32 ELEMENTS



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

46 0703

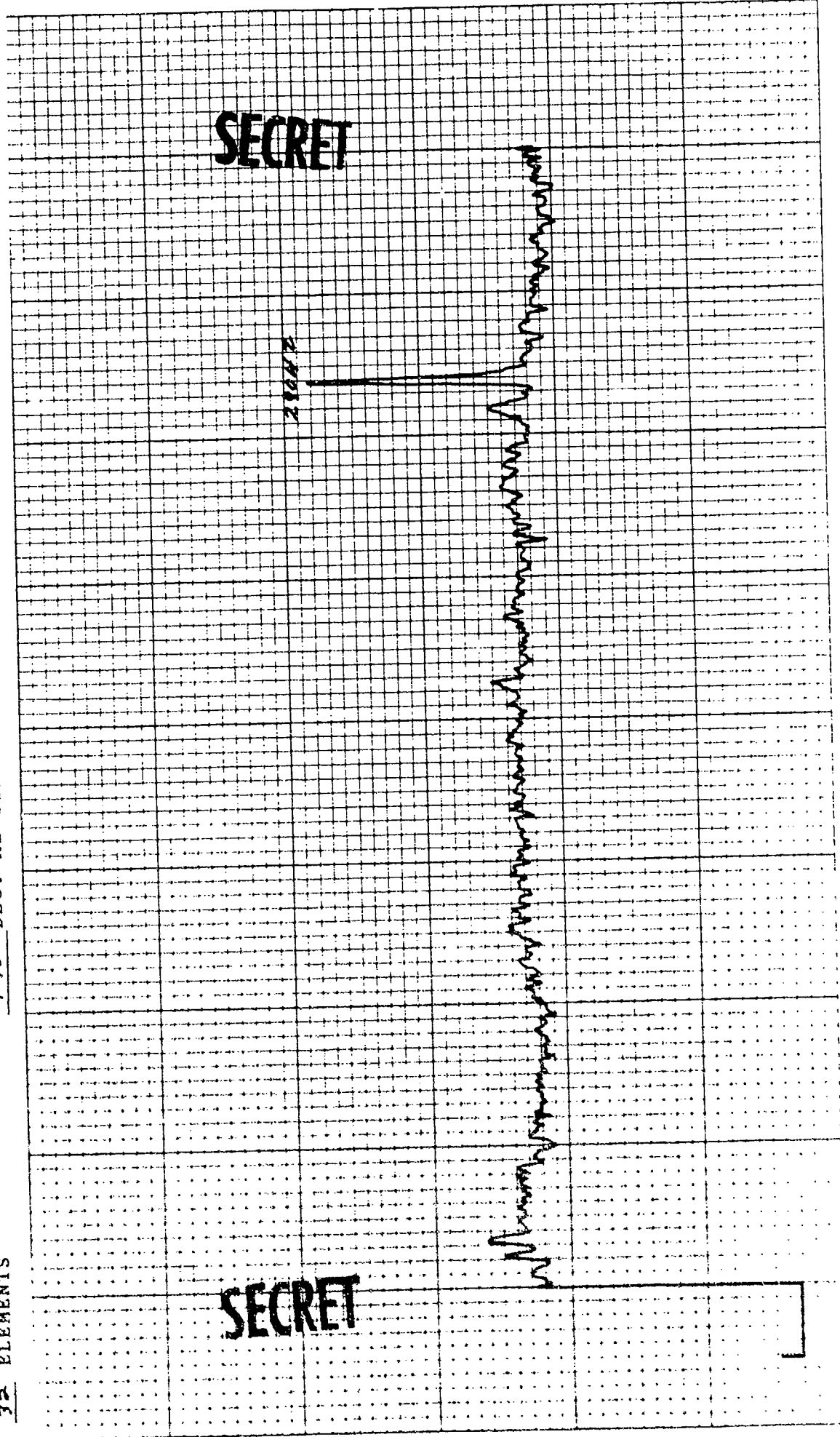
INDE X3050

REEL: F19

DATE OF ANALYSIS: 1-26-82
DATE/TIME: 2-7-77 - 1549Z
ANALYSIS BANDWIDTH: 1/10HZ
+46 DEG. AZ STEERING

CONTROL: 1549 - 32 (DPS)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
32 ELEMENTS

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



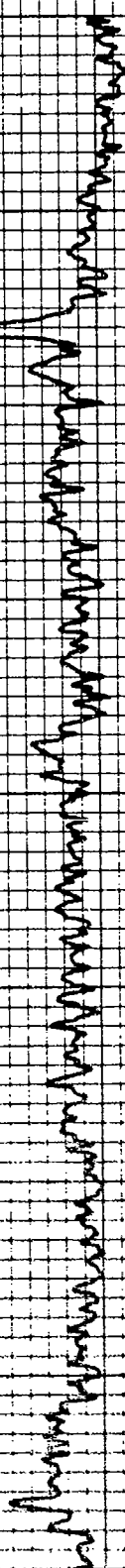
10 X 10 TO THE INCH, 1 X 10 INCHES
REUPPEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 1541 - J2 (DPS) DATE OF ANALYSIS: 1-26-77 REEL: F19 INDE X305
 BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTN: -2YDB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 CENTER FREQ: 200 HZ + 40 DEG. AZ STEERING

SECRET

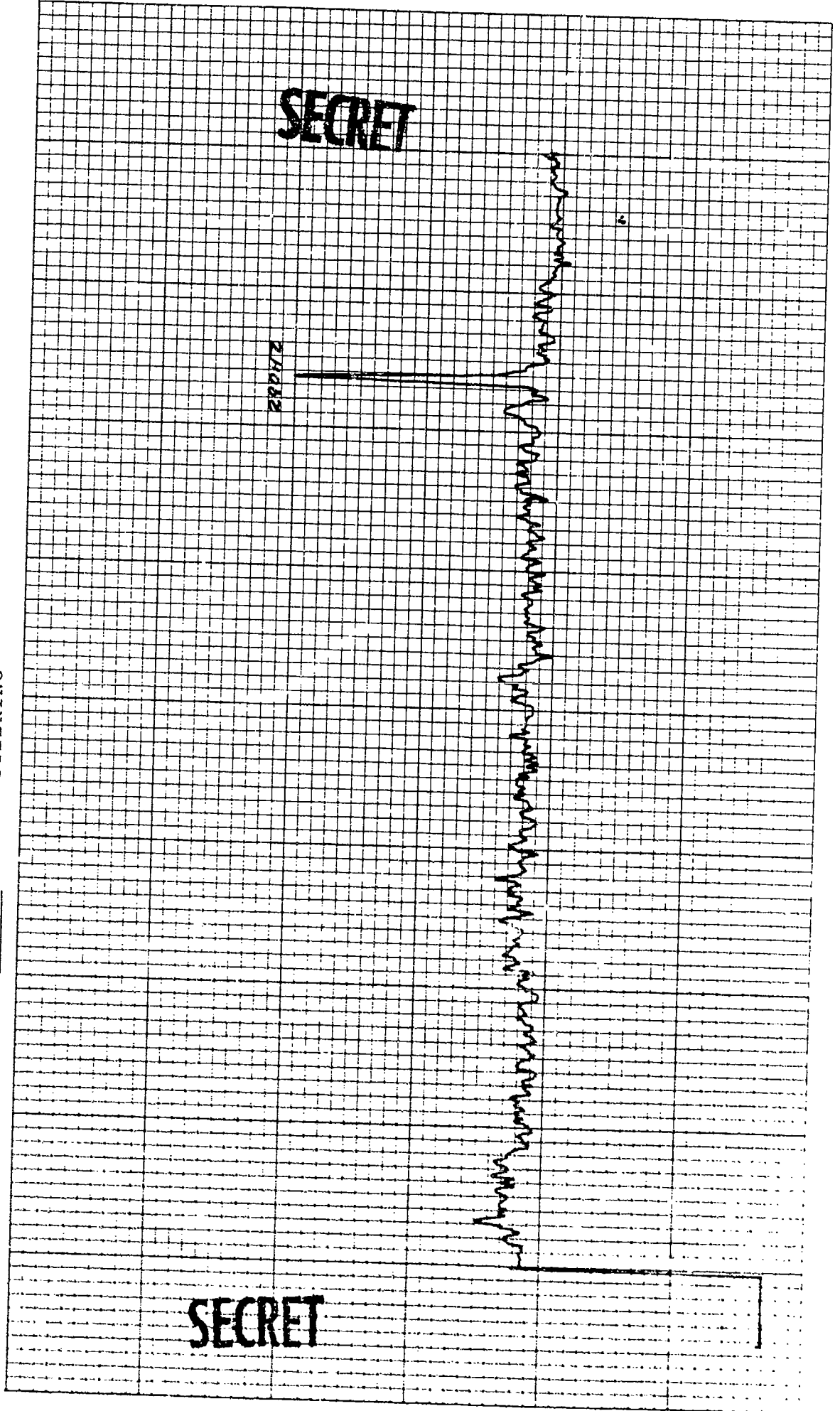
SECRET



46 0703

CONTROL: 1549 - 51 (005) DATE OF ANALYSIS: _____
BEAMFORMED SPECTRUM (ELEMENTS) 1-26 # 29-53
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ
32 ELEMENTS +49 DEG. AZ STEERING

REEL: F19 INDE X3050
INTEGRATION TIME 320 SECS ATTN: 24 DB
FILTER WTG: HANNING



SECRET

SECRET

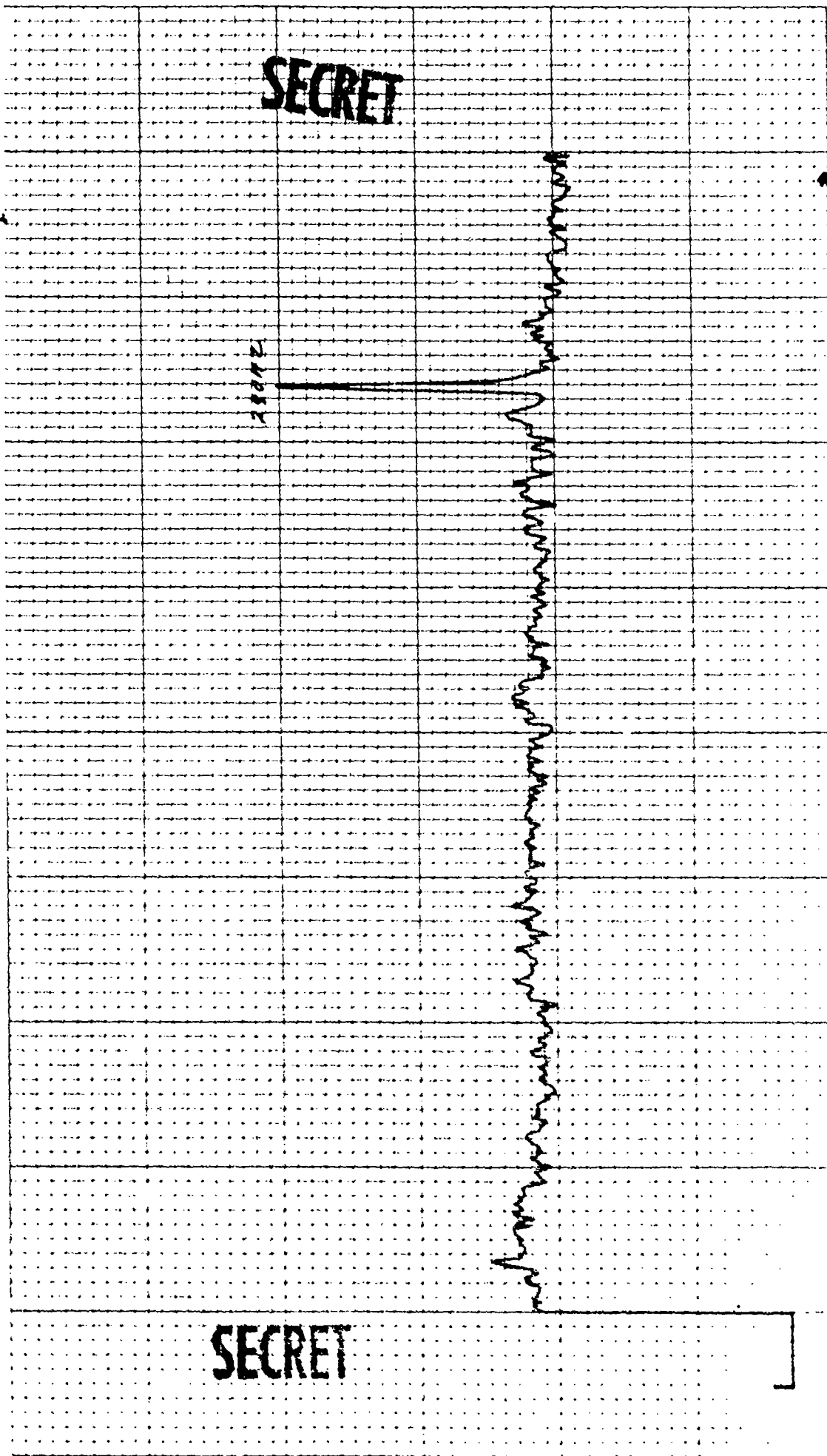
KOE 10 X 10 TO THE INCHES
REFLECTOR BEARING STAKE

46 0703

CONTROL: 1549 - 32 (DPS)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
32 ELEMENTS

DATE OF ANALYSIS: - - - -
1-26-77
DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+50 DEG. AZ STEERING

REEL: F19 INDE X 3050
INTEGRATION TIME 320 SECS ATTN: -24DB
FILTER WTC: HANNING



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

46 0703

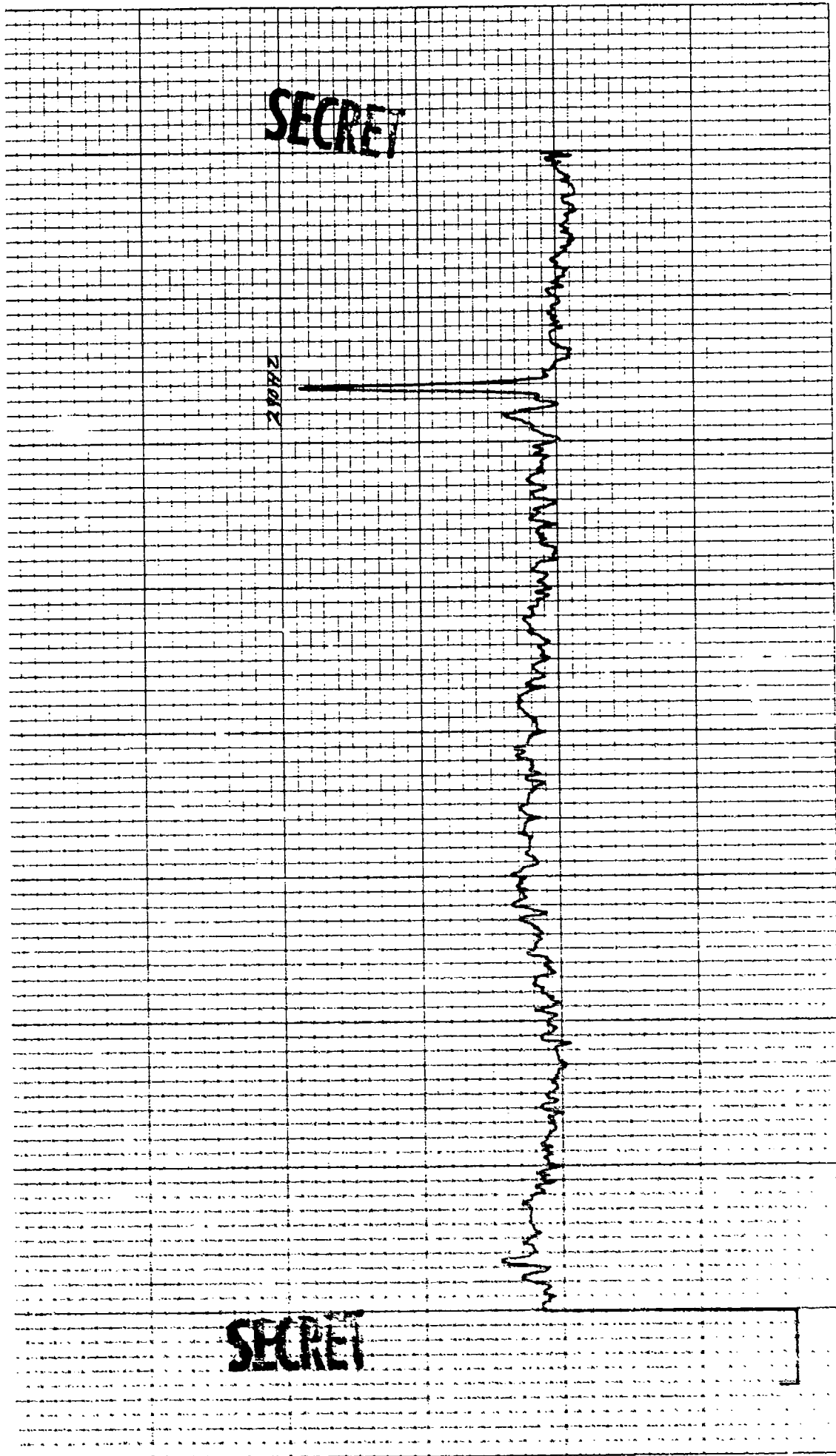
CONTROL: 1549 - 72 (DP5)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-77 29-37

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

REEL: F19 INDE X3050

ANALYSIS BANDWIDTH: 1/10HZ
+52 DEG. AZ STEERING



46 0703

KOE 15.415 TO THE DEPT. OF DEFENSE

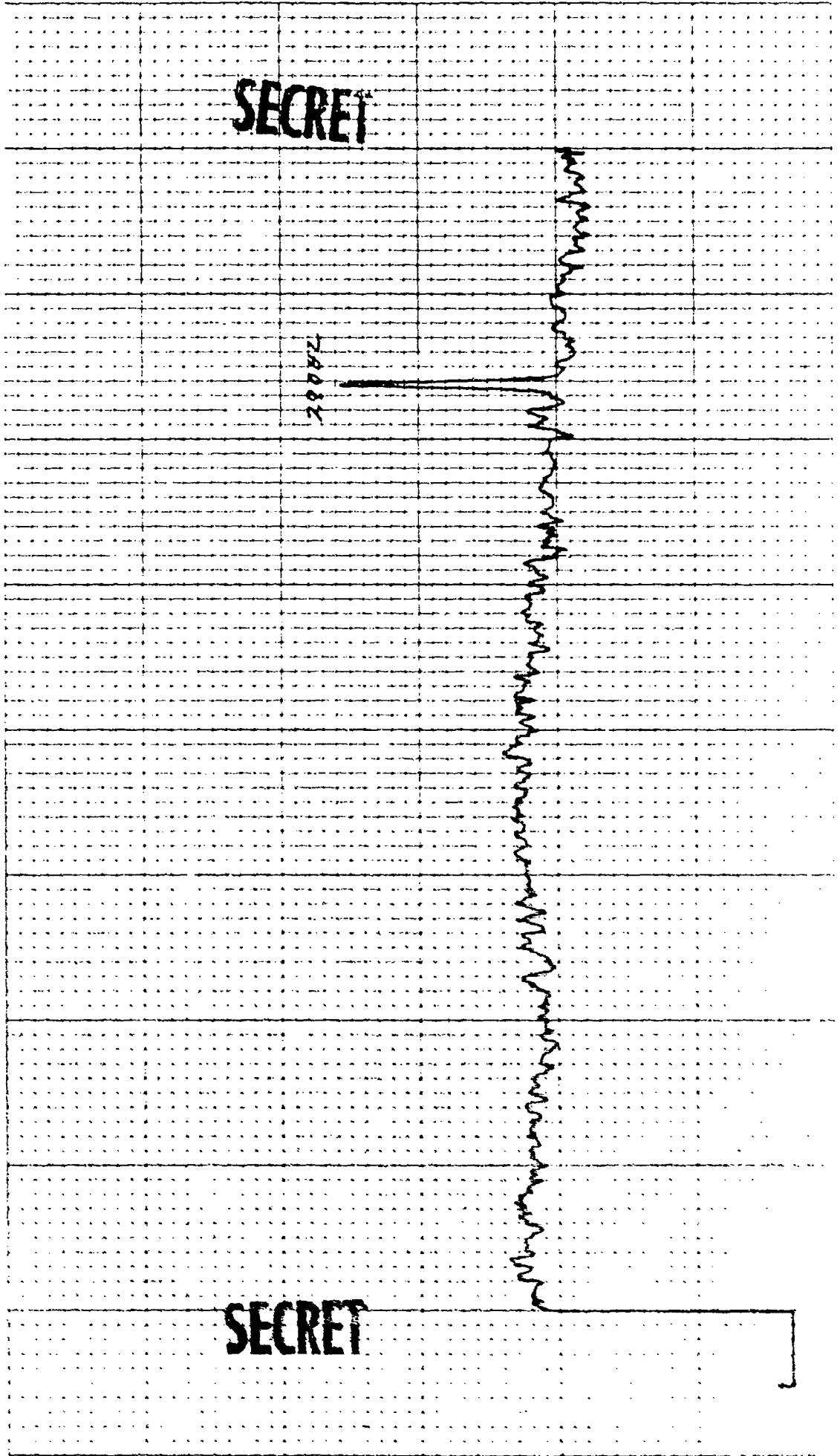
CONTROL: 1549 - 32 (DPS) DATE OF ANALYSIS: 1-26-77 (21-34) REEL: F19 INDE X 3050

BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-7-77 - 1649 Z INTEGRATION TIME 3.0 SECS ATTN: -2V DB

EXERCISE: B' ARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING

CENTER FREQ: 200 HZ +5V DEG. AZ STEERING

32 ELEMENTS



KOE VEHICLE TO TIME INCHES

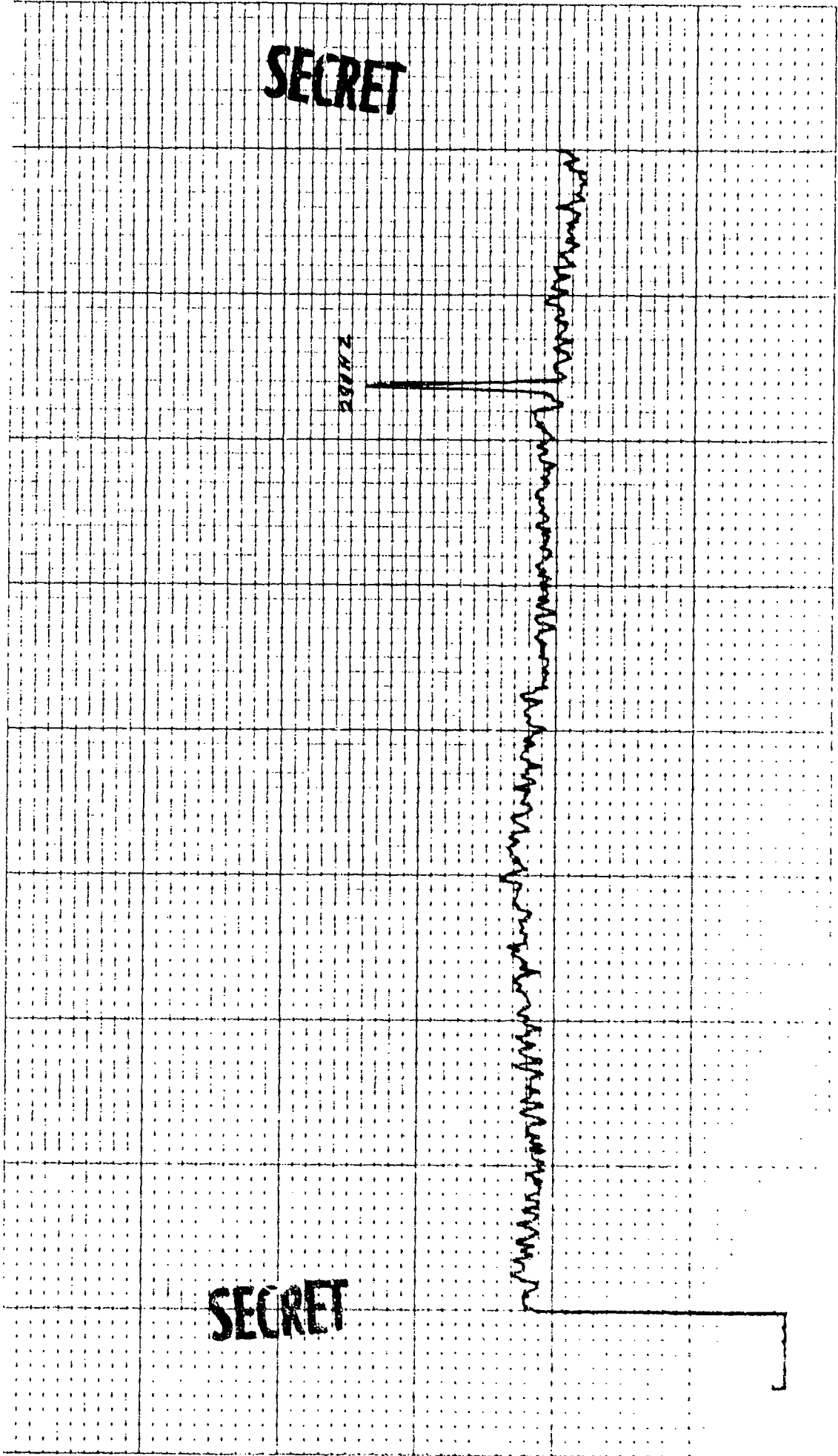
46 0703

CONTROL: 1549 - 32 (DPS)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
 32 ELEMENTS

DATE OF ANALYSIS: 1-16-77
 DATE/TIME: 2-7-77 -1549 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 156 DEG. AZ STEERING

REEL: F19
 INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

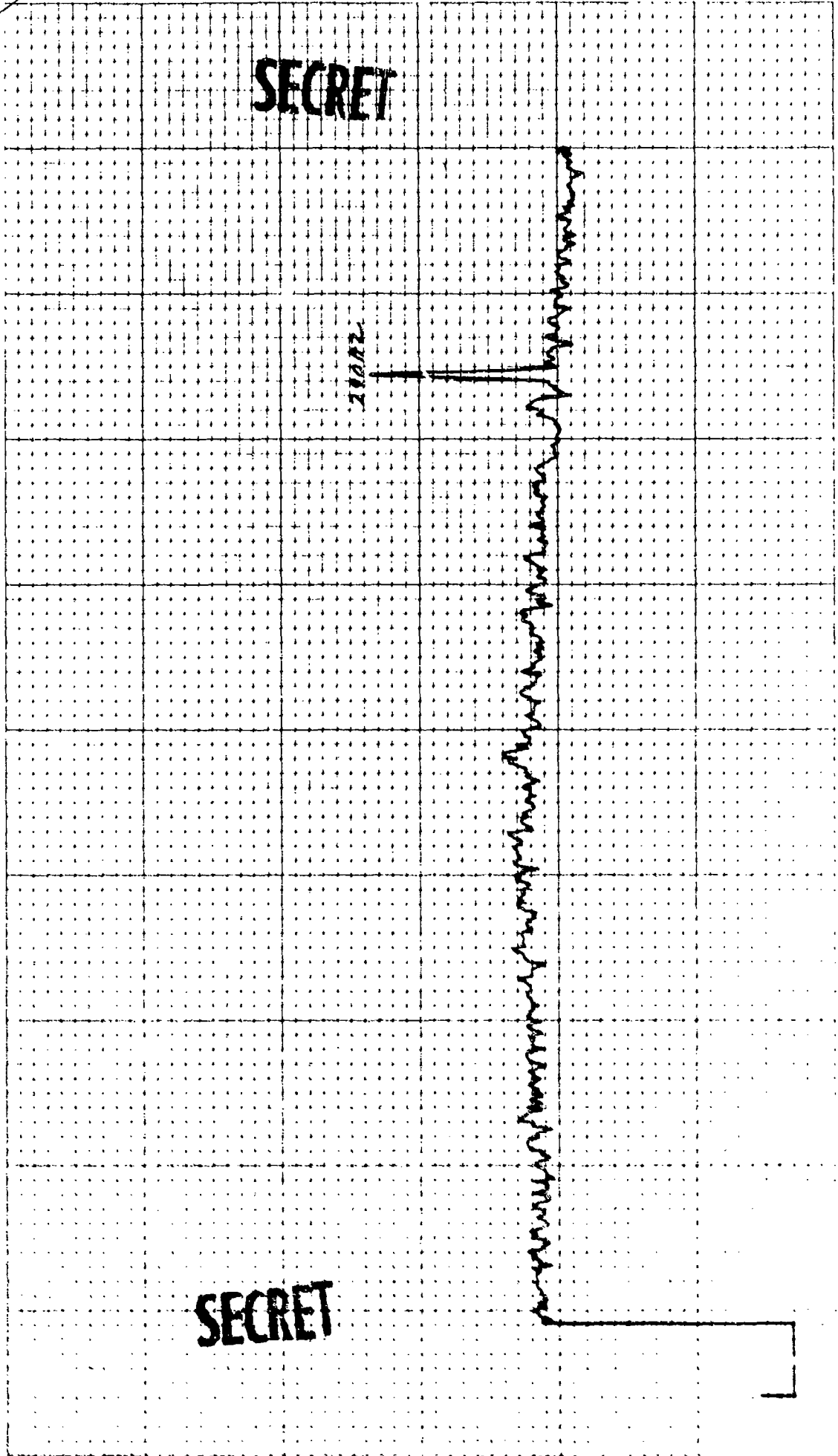
INDE X3050
 ATTEN: -24 DB



46 0703

NOE 19 21 1971 TO THE DIRECTOR, COMSEC

CONTROL: 1549 - 32 (DPS) DATE OF ANALYSIS: REEL: F/9 INDE X3650
BEAMFORMED SPECTRUM(ELEMENTS) 1-26 9 29 -34
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTN: 24 DB
CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
32 ELEMENTS +58 DEG. AZ STEERING



SECRET

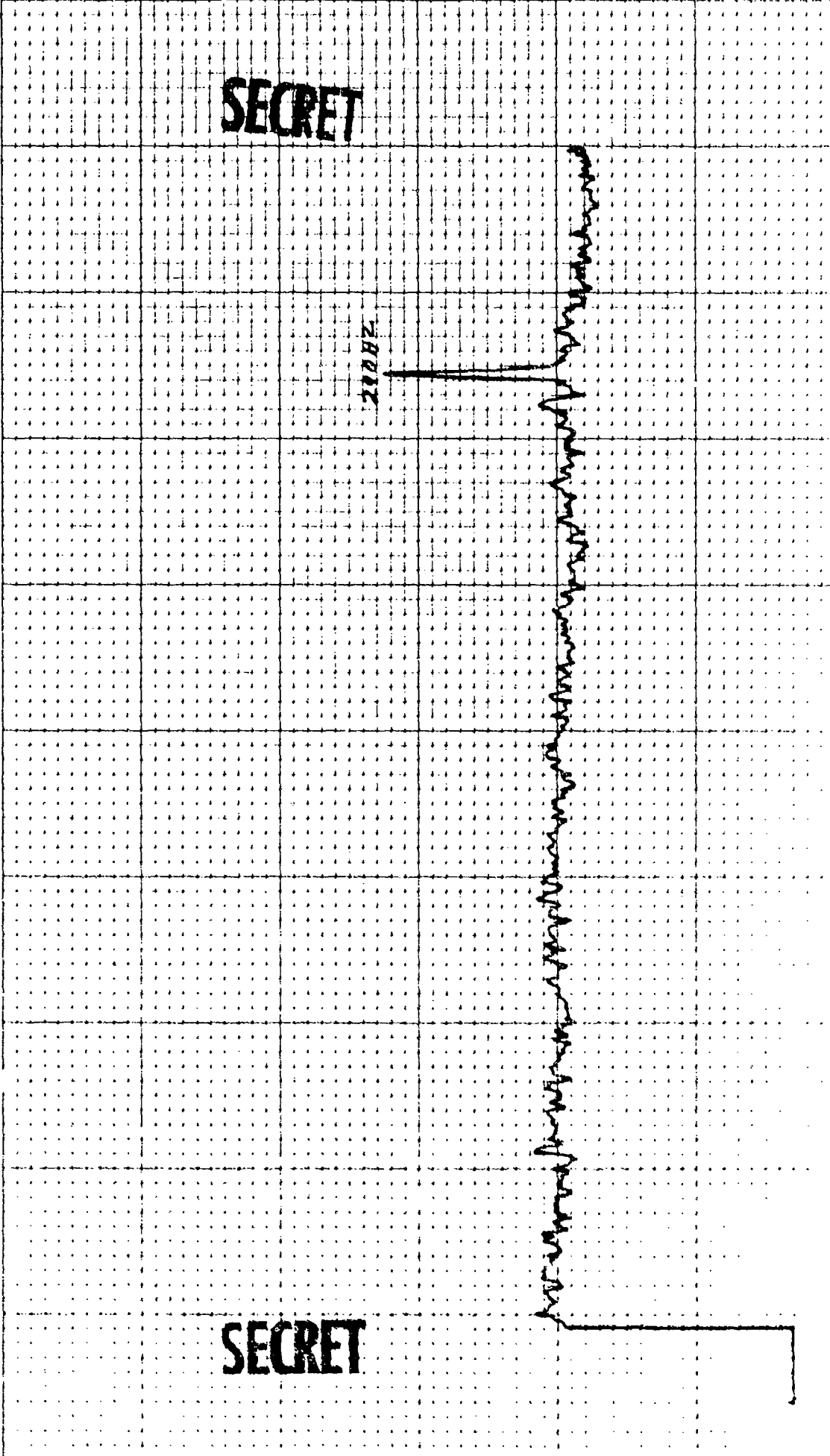
SECRET

46 0703

REF ID: A66000

CONTROL: 1549 - 32 (DBS) DATE OF ANALYSIS: - - - - -
 BEAMPFORMED SPECTRUM (ELEMENTS) 1-26 & 29-34
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ
 32 ELEMENTS +60 DEG. AZ STEERING

REEL: F19 INDE X3050
 INTEGRATION TIME 320 SECS ATTEN: -24 DB
 FILTER WTC: HANNING



SECRET

SECRET

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 5

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 51

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-36.2</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-26.2	
BEAMFORMER GAIN	<u>+30</u>	+3.8	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	+4.0	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-64.2</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-54.2	
BEAMFORMER GAIN	<u>+30</u>	-24.2	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+3.8</u>	
SIGNAL LEVEL FOR SNR	<u>-24.2</u>	28.0	
PROCESSOR CORRECTION	<u>-4.0</u>	24.0	
MRA CORRECTION	<u>+ .2</u>	24.2	SNR 1/2 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	16.0	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 5

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 51

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-43.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-33.8</u>	
BEAMFORMER GAIN	<u>+20</u>	<u>-3.8</u>	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	<u>-3.0</u>	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-69.2</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-59.2</u>	
BEAMFORMER GAIN	<u>+30</u>	<u>-29.2</u>	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-3.8</u>	
SIGNAL LEVEL FOR SNR	<u>-29.2</u>	<u>25.4</u>	
PROCESSOR CORRECTION	<u>-4.0</u>	<u>21.4</u>	
MRA CORRECTION	<u>+ .8</u>	<u>22.2</u>	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	<u>16.0</u>	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

DATA POINT 5

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-30.0</u>	<u>-33.1</u>	_____
MRA SIGNAL LEVEL	<u>+4.0</u>	<u>-3.0</u>	_____
ARRAY SIGNAL GAIN	<u>34.0</u>	<u>30.1</u>	_____
20 LOG <u>51</u> # of elements	<u>34.0</u>	<u>34.1</u>	_____
DIFFERENCE	<u>0</u>	<u>-4.0</u>	_____

ARRAY GAIN

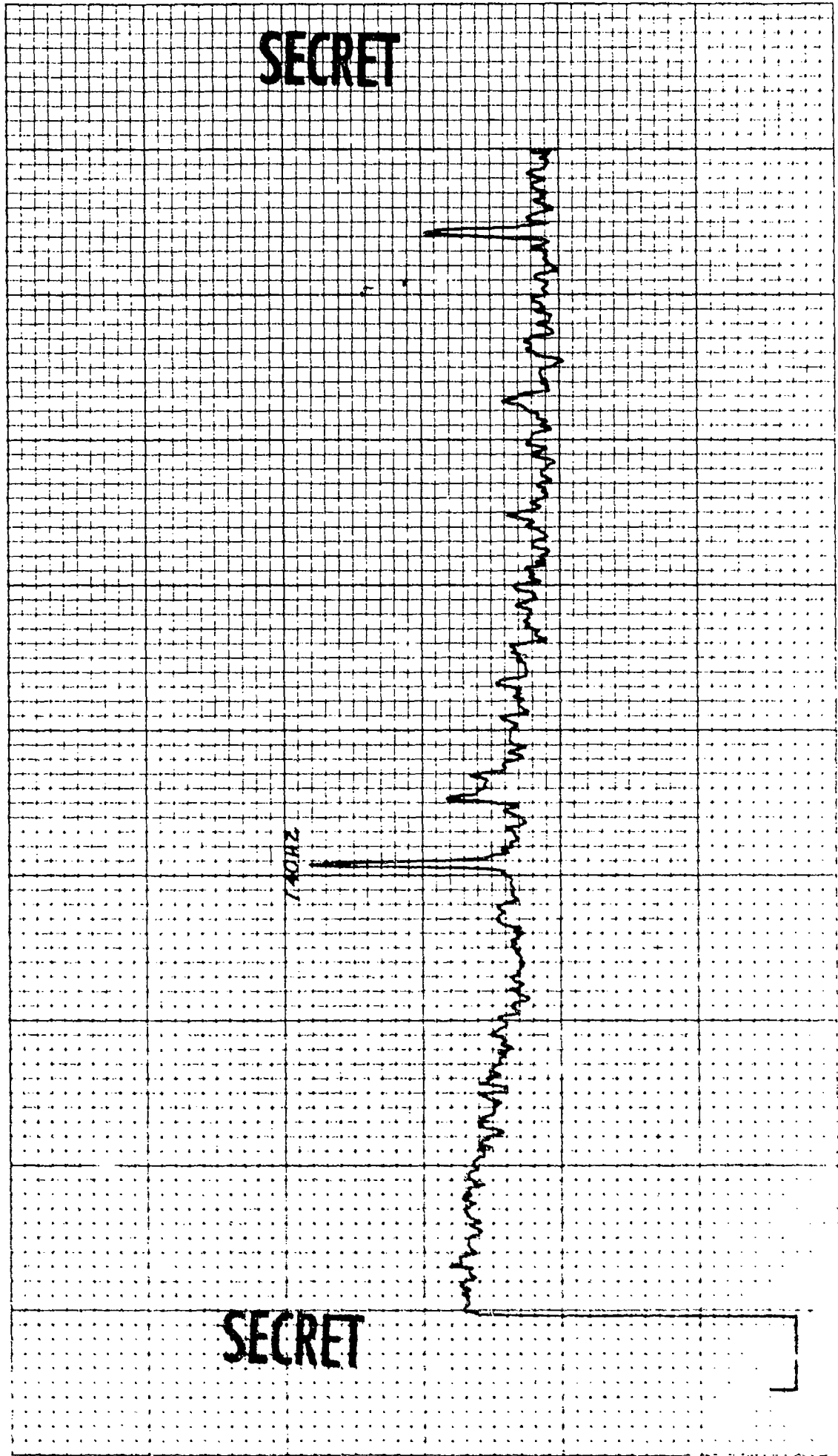
MRA SNR	<u>24.2</u>	<u>22.2</u>	_____
MEAN OMNI SNR	<u>9.3</u>	<u>10.5</u>	_____
ARRAY GAIN	<u>14.9</u>	<u>11.7</u>	_____
THEORETICAL AZMUTH GAIN (at MRA)	<u>14.2</u>	<u>16.3</u>	_____
DIFFERENCE	<u>+ .7</u>	<u>- 4.6</u>	_____

CONFIDENTIAL

H•E 16 X 10 TO THE INCHES
PUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 1549-51 (DPS) DATE OF ANALYSIS: 1-26-53 REEL: F11 INDE X3650
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2:7-77 - 1549Z INTEGRATION TIME 320 SECS ATTN: -30 DB
EXERCISE: BEARING 'TAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 150.1Z +32 DEG. AZ STEERING



KOE 10 X 10 TO THE INCHES
PUFFEL & TOWER CO. MADE IN U.S.A.

46 0703

CONTROL: 1549 - 5/ (DPS)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
5/ ELEMENTS

DATE OF ANALYSIS: 1-26-53

DATE/TIME: 2-7-77 - 1549 Z

ANALYSIS BANDWIDTH: 1/10HZ
+ 34 DEG. AZ STEERING

REEL: F19

INTEGRATION TIME 320 SECS
FILTER

INDE X 050

ATTEN: -30 DB
WTG: HANNING

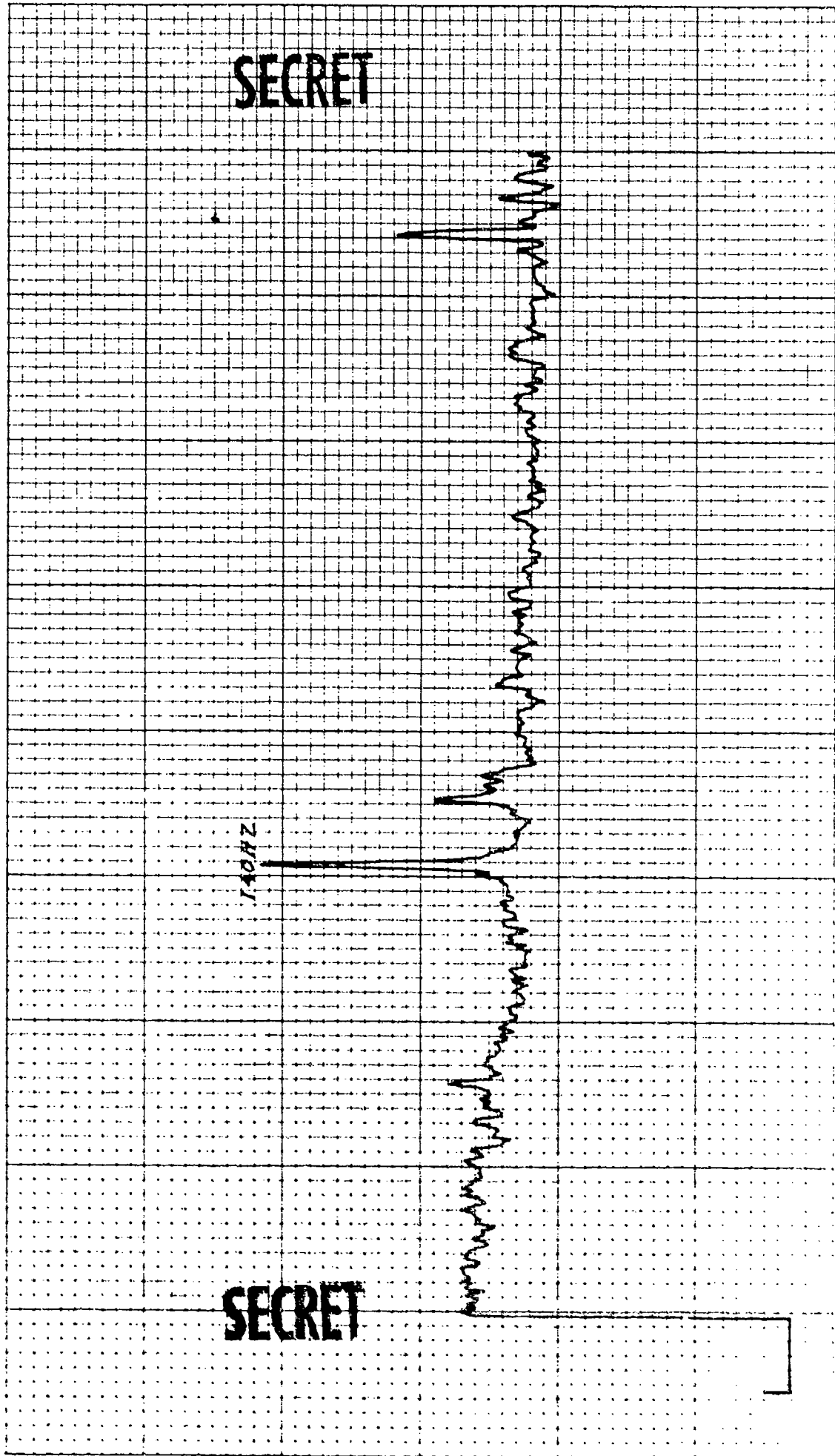
SECRET

1.40HZ

SECRET



CONTROL: 1549 - 51 (205) DATE OF ANALYSIS: INDE X350
 BEAMFORMED SPECTRUM (ELEMENTS) 1-26-82 29-53
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: -30 DB
 51 ELEMENTS 736 DEG. AZ STEERING FILTER WTG: HANNING



46 0703

REF ID: A66000

INDE X350

REEL: F/1

ATTEN: -30 DB
WTC: HANNING

INTEGRATION TIME 320 SECS
FILTER

DATE OF ANALYSIS: - - - - -

1-26 4 29-53

DATE/TIME: 27-77 -1549 Z

ANALYSIS BANDWIDTH: 1/10HZ

+ 30 DEG. AZ STEERING

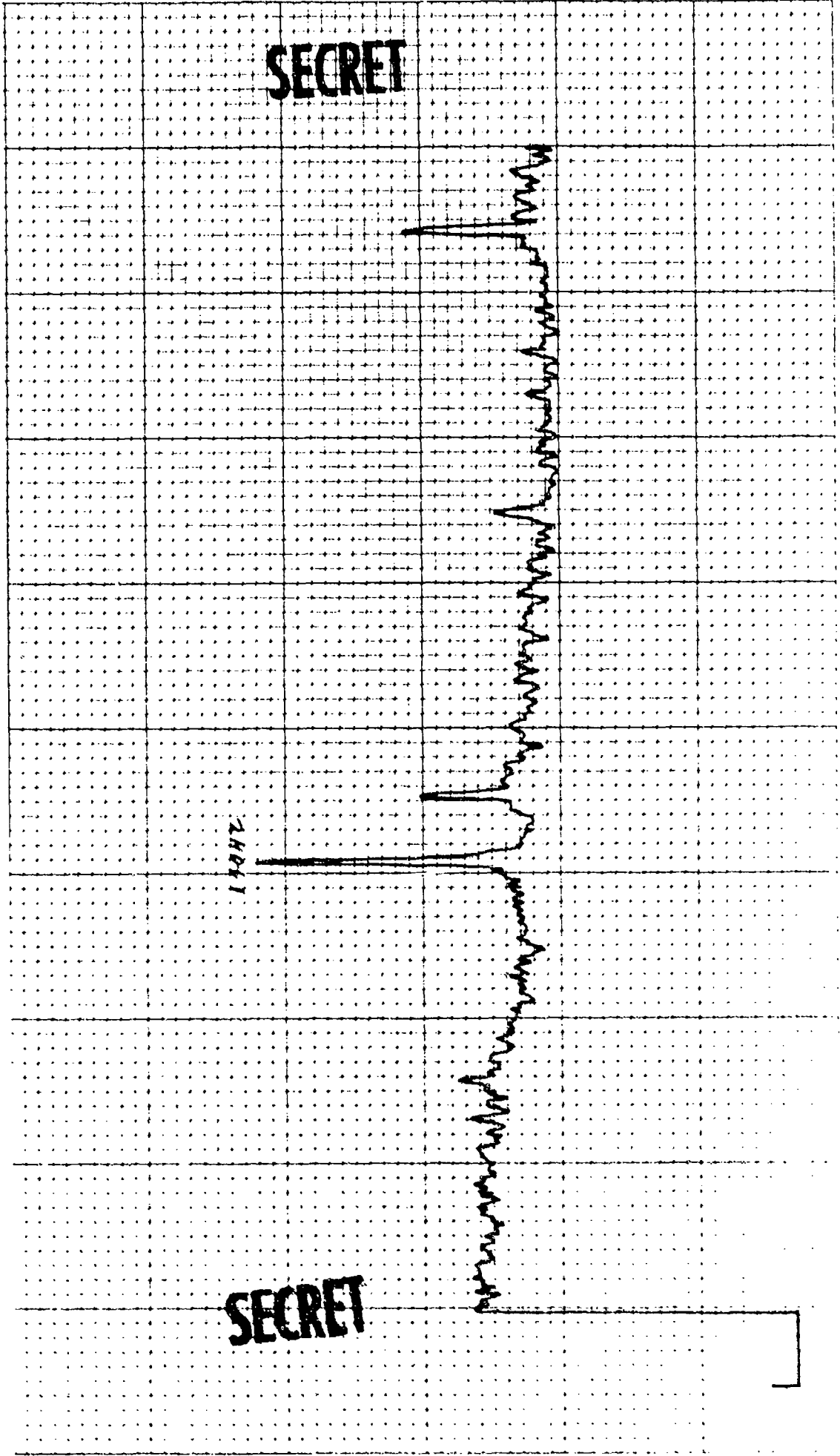
CONTROL: 1549 - 5/ (DPS)

BEAMFORMED SPECTRUM (ELEMENTS)

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

5/ ELEMENTS



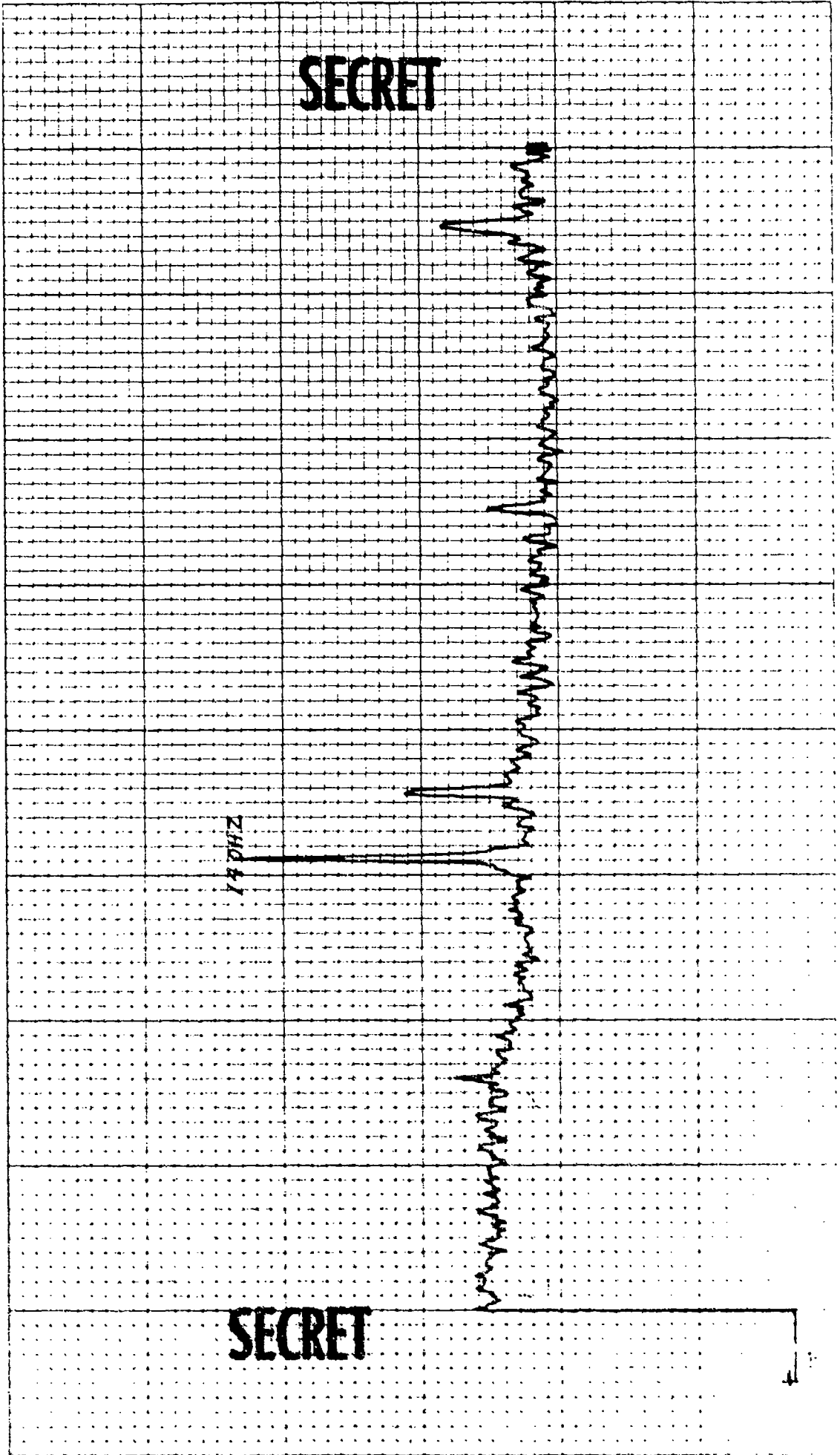
SECRET

SECRET

KOE JO. 8.10 TO THE INCH. 1.10 INCHES
PIPERL & PAPER TO 2004 8.10.1

46 0703

CONTROL: 1549 - 51 (DP5) DATE OF ANALYSIS: 1-26-77 - 1549Z REEL: F19 INDE X3050
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-7-77 - 1549Z INTEGRATION TIME 320 SECS ATTN: 30 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTC: HANNING
 CENTER FREQ: 150 HZ 140 DEG. AZ STEERING



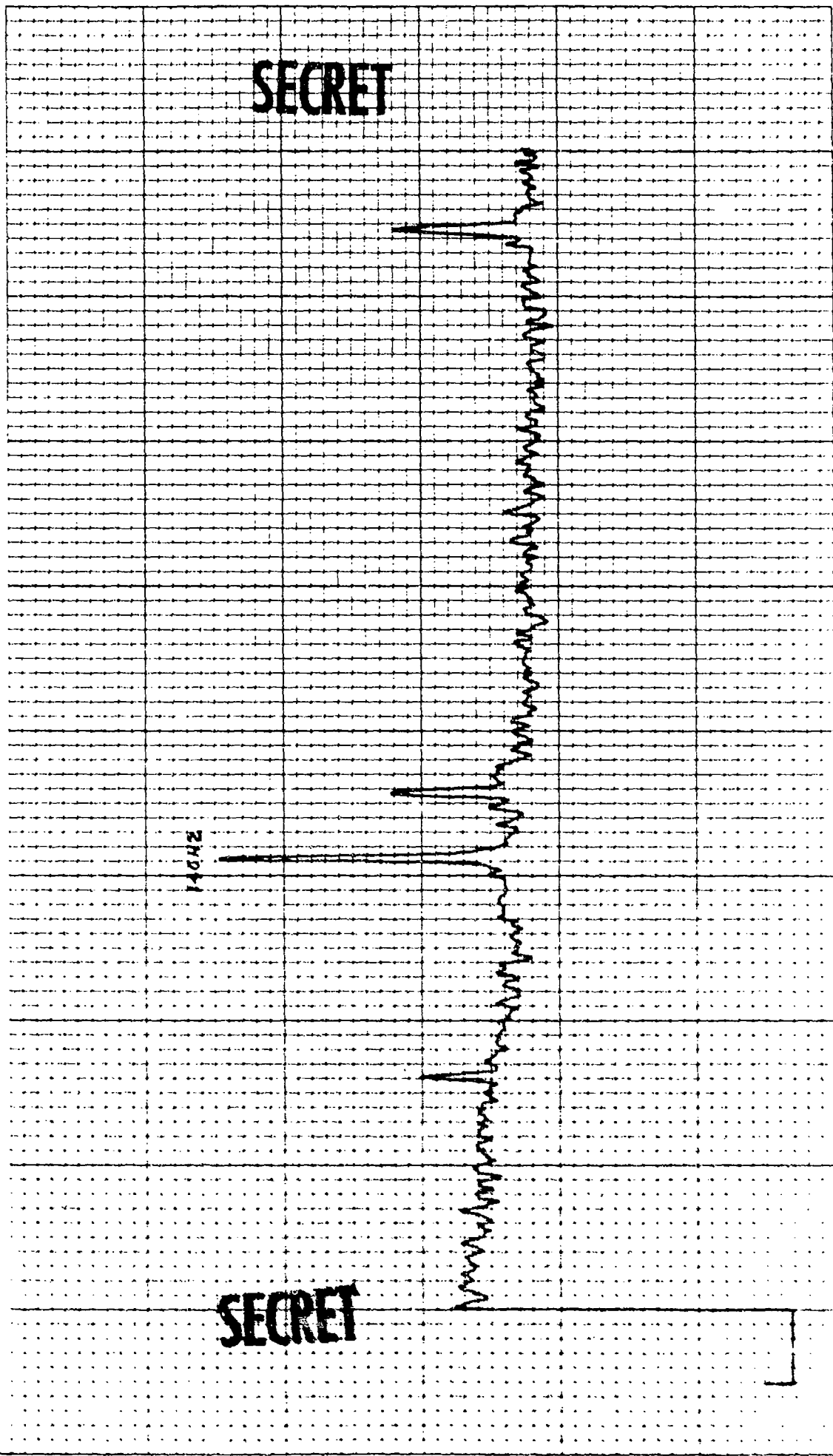
K-E 10 X 10 TO THE INCH 1/2 10 100 MHz
REAR PANEL & FRONT PANEL

46 0703

CONTROL: 1549 - 51 (DPS)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
51 ELEMENTS

DATE OF ANALYSIS: _____
DATE/TIME: 1-26 12 29-53
ANALYSIS BANDWIDTH: 1/10 HZ
4.42 DEG. AZ STEERING

REEL: F19 INDE X 2050
INTEGRATION TIME 320 SECS ATTN: 30 DB
FILTER WTC: HANNING



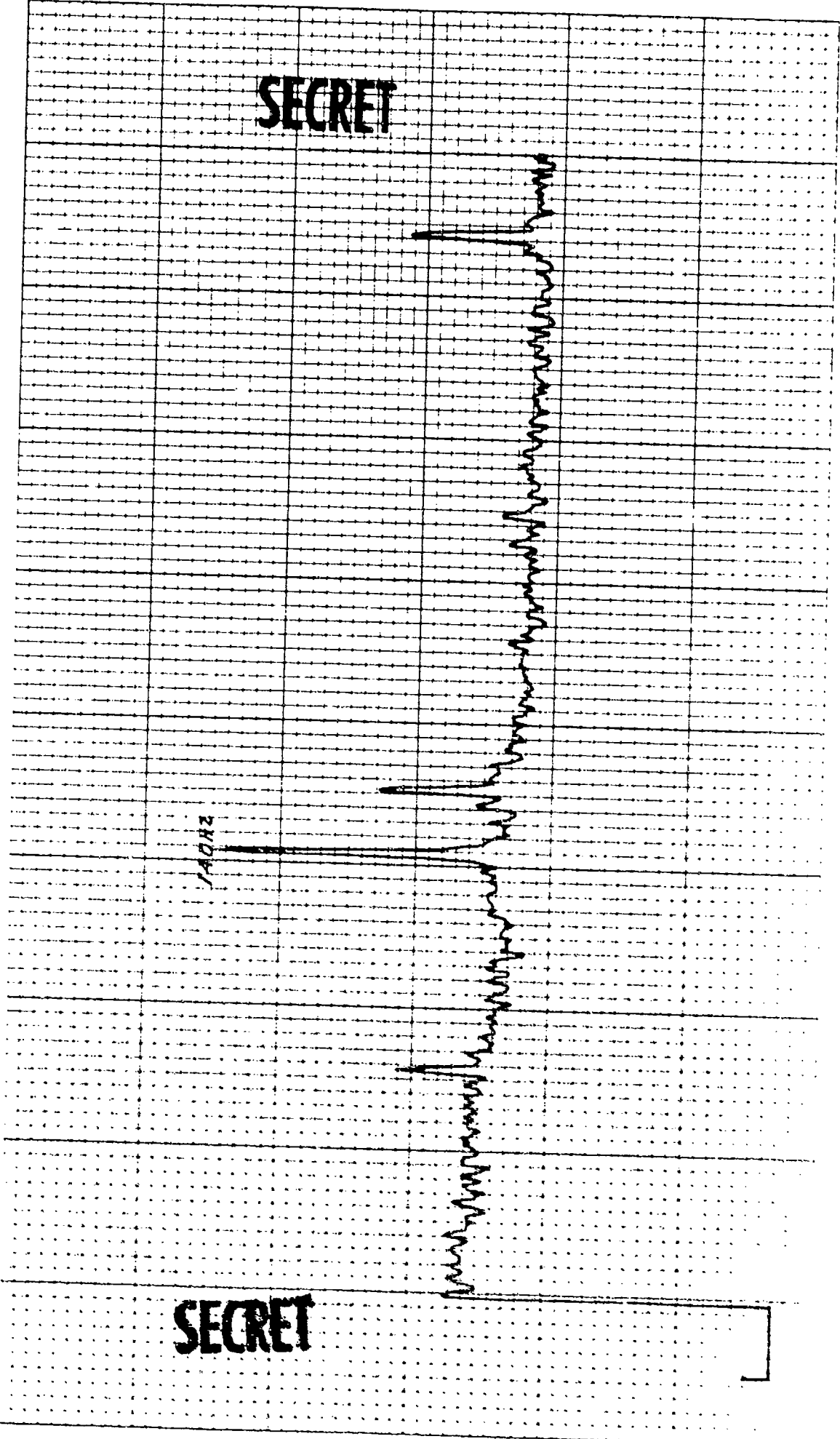
KOE 10.4 TO THE INCHES 2 TO INCHES
REUSEL & PAPER 10 1/2 INCHES

46 0703

CONTROL: 1549 - 51 (DPS)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
51 ELEMENTS

DATE OF ANALYSIS: -- -- --
1-26-29-53
DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10HZ
+43 DEG. AZ STEERING

REEL: F19 INDE X3059
INTEGRATION TIME 320 SECS ATTN:-30 DB
FILTER WTG: HANNING



SECRET

SECRET

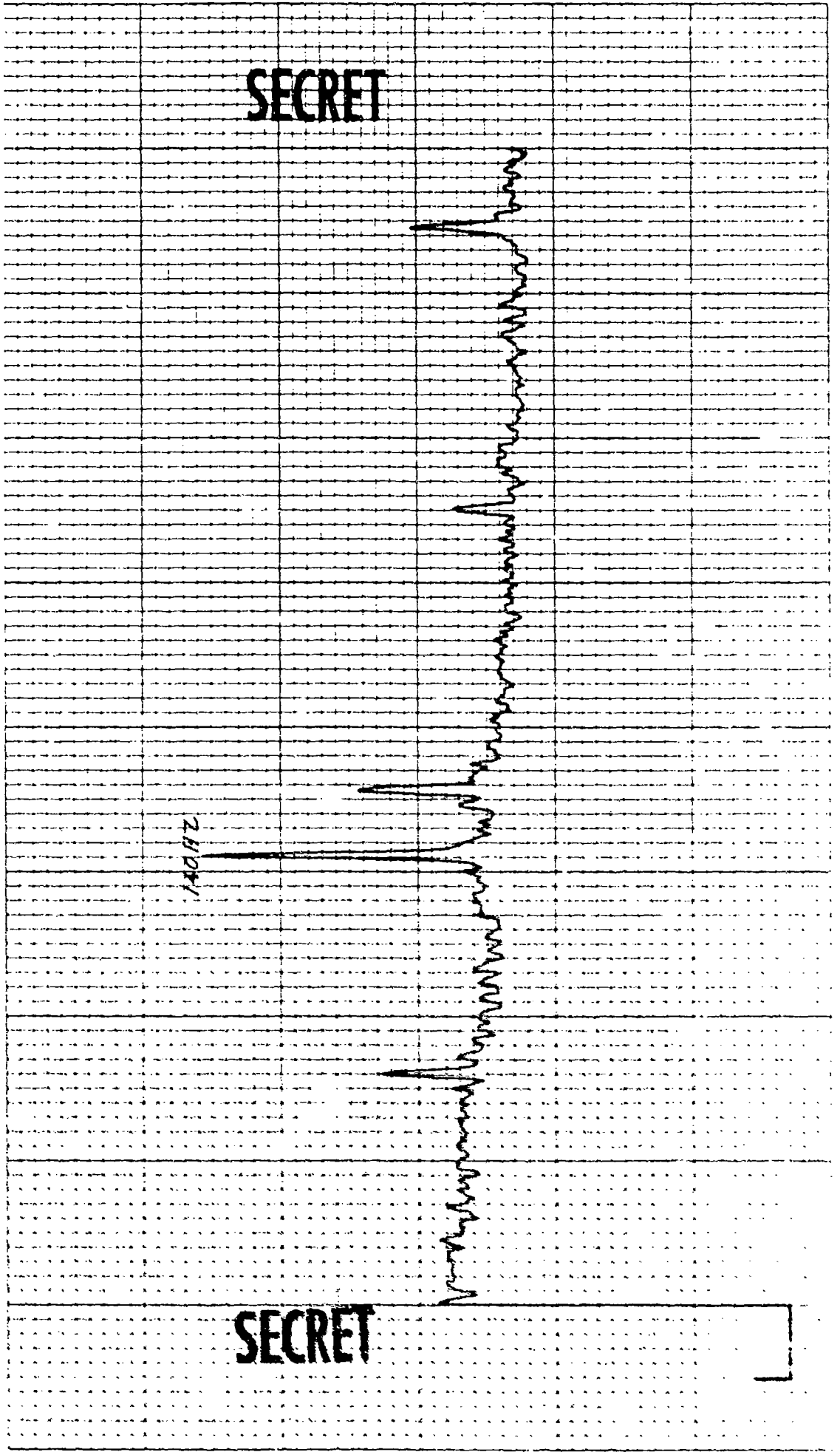
KOE 10 X 10 TO THE INCHES
NEUFEL & PASTER CO. MADE IN U.S.A.

46 0703

CONTROL: 1509 - 51 (D95) DATE OF ANALYSIS:
 BEAMFORMED SPECTRUM (ELEMENTS) 1-26-29-53
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
51 ELEMENTS

REEL: F19 INDE X 300
 INTEGRATION TIME 320 SECS ATTEN: 30 DB
 FILTER WTC: HANNING

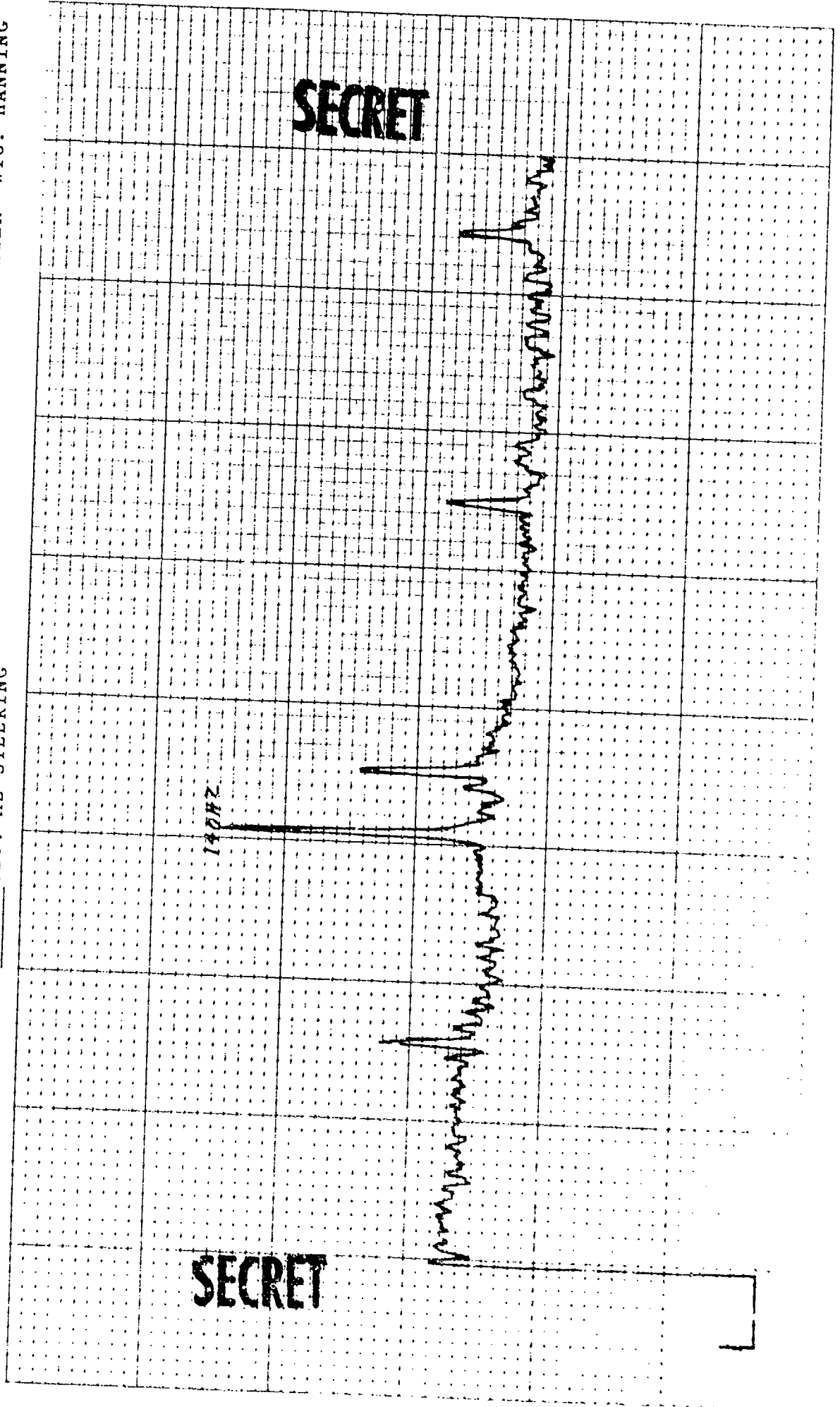
ANALYSIS BANDWIDTH: 1/10 HZ
+44 DEG. AZ STEERING



REF ID: A66888

46 0703

CONTROL: 1549-51 (DPS) DATE OF ANALYSIS: 1-26-77 REEL: F19 INDE X350
 BEAMFORMED SPECTRUM (ELEMENTS) 21-53 INTEGRATION TIME 320 SECS ATTN: 30 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1710HZ FILTER WTG: HANNING
 CENTER FREQ: 150 HZ 45 DEG. AZ STEERING



SECRET

SECRET

14-E 20 4110 TO THE INSTRUMENTS

46 0703

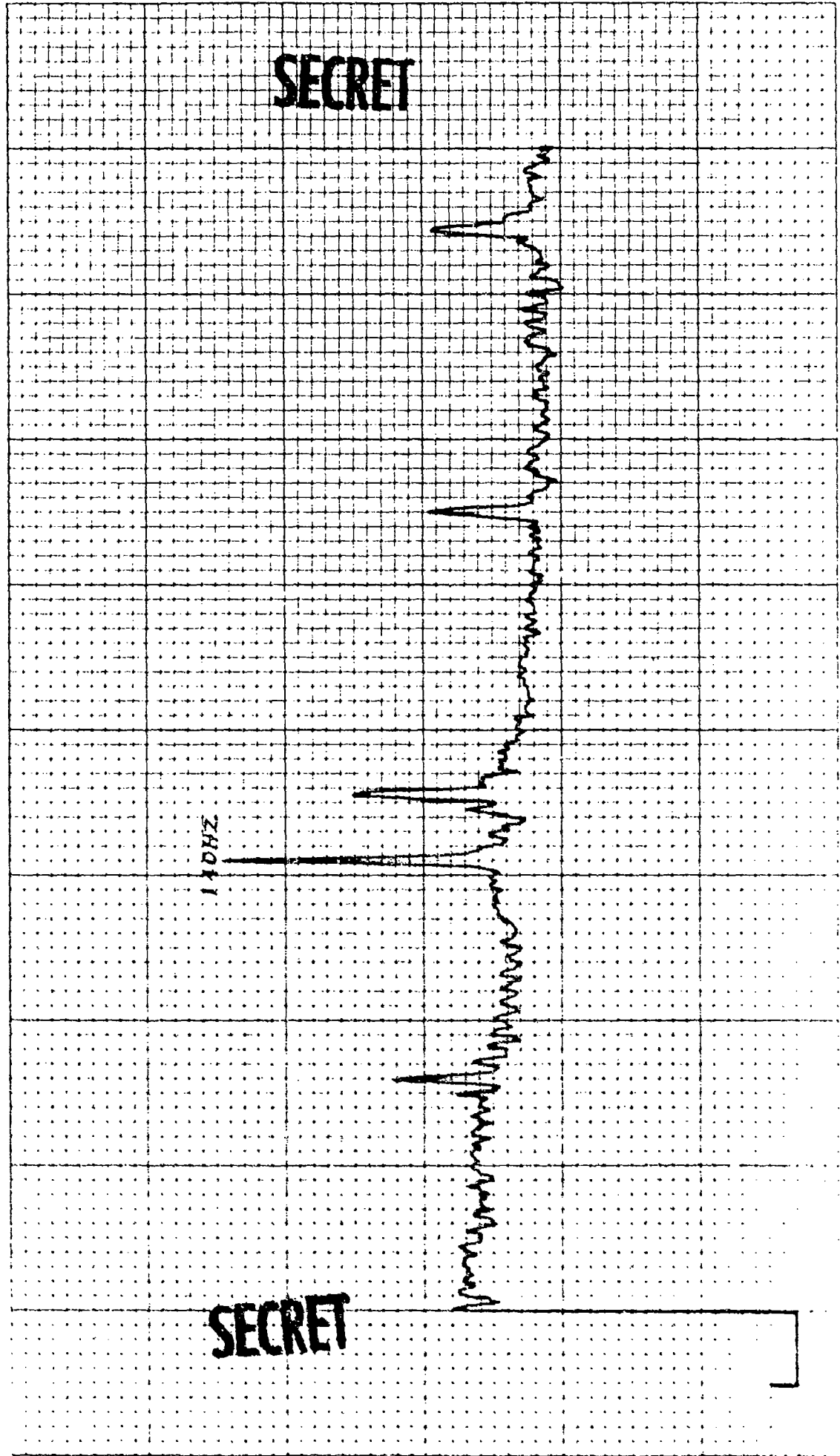
CONTROL: 1549 - 5/ (DPS)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 5/ ELEMENTS

DATE OF ANALYSIS: ~ - -
 1-268 28-53

INTEGRATION TIME 320 SECS
 FILTER
 WTC: HANNING

REEL: F19
 INDE X3050

ANALYSIS BANDWIDTH: 1/10HZ
 446 DEG. AZ STEERING

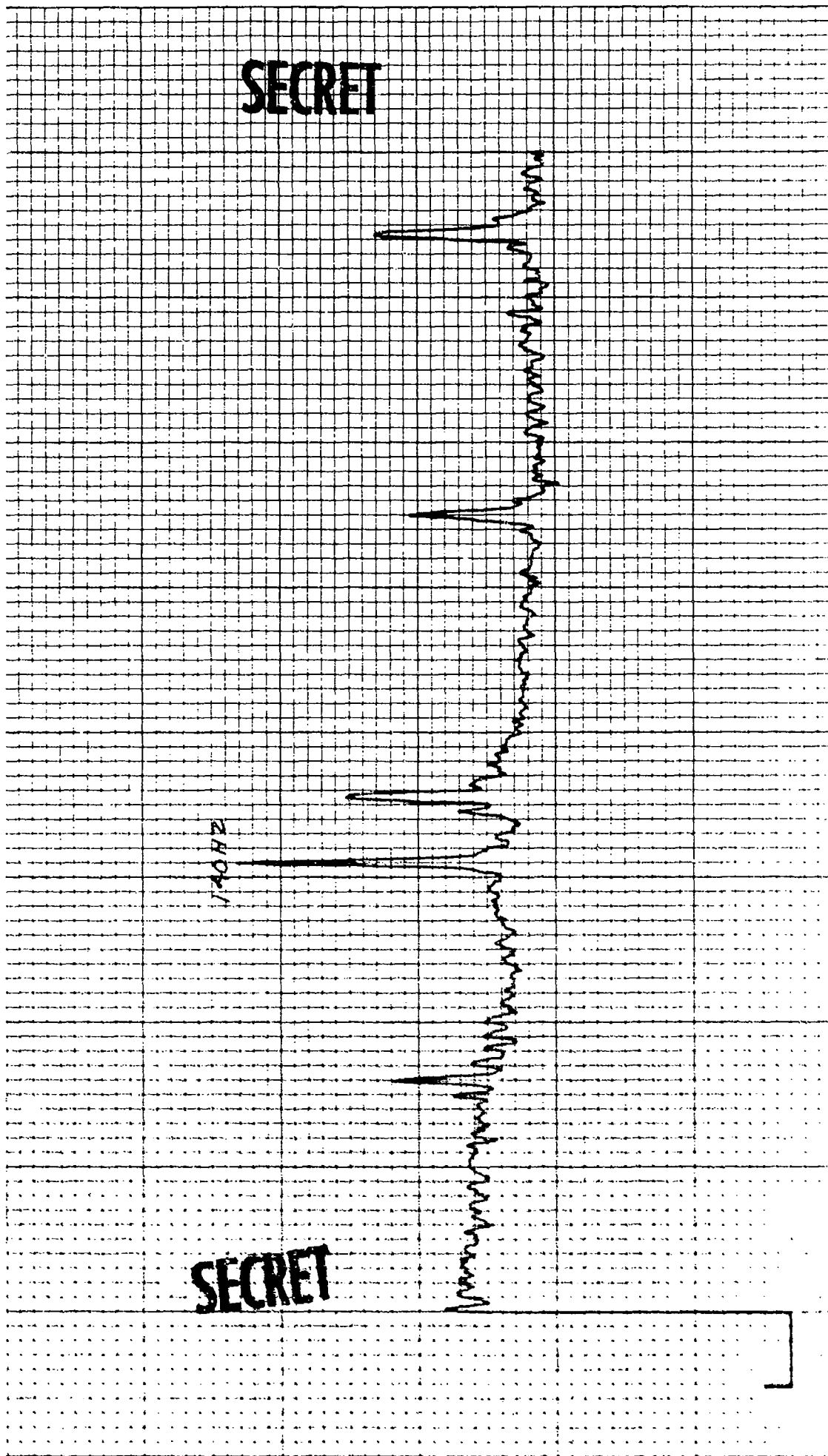


SECRET

46 0703

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

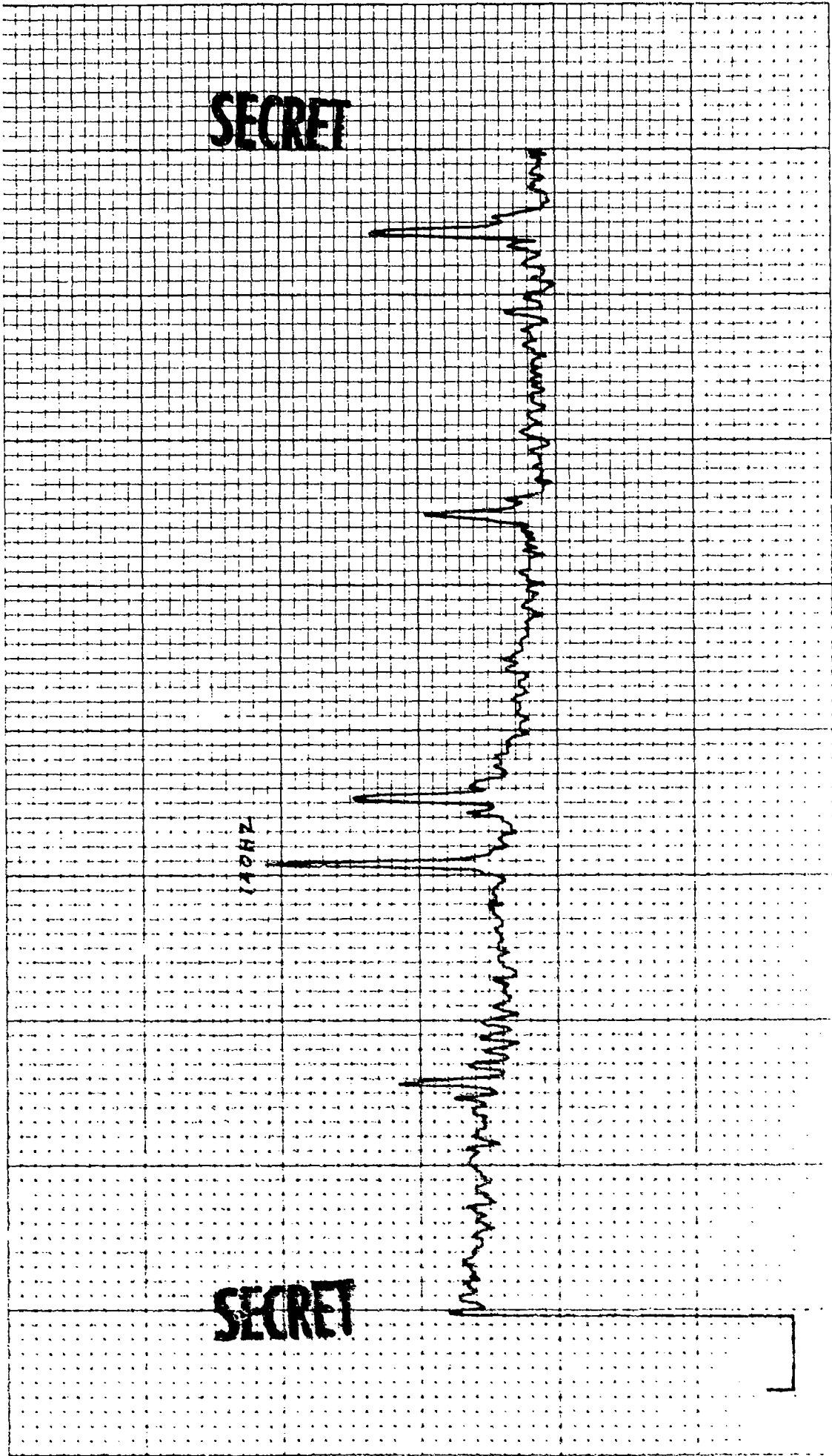
CONTROL: 1549 - 51 (DPS) REEL: F19 INDE X3650
 BEAMFORMED SPECTRUM (ELEMENTS) 1-26 & 29-53
 EXERCISE: BEARING STAKE DATE OF ANALYSIS: - - -
 CENTER FREQ: 150 HZ DATE/TIME: 2-7-77 - 1549 Z
 51 ELEMENTS ANALYSIS BANDWIDTH: 1/10HZ
 INTEGRATION TIME 320 SECS FILTER WTG: HANNING
 +48 DEG. AZ STEERING



CONTROL: 1549 - 51 (DPS)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
51 ELEMENTS

DATE OF ANALYSIS: - - - - -
1-26-53
DATE/TIME: 2777-1549 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+49 DEG. AZ STEERING

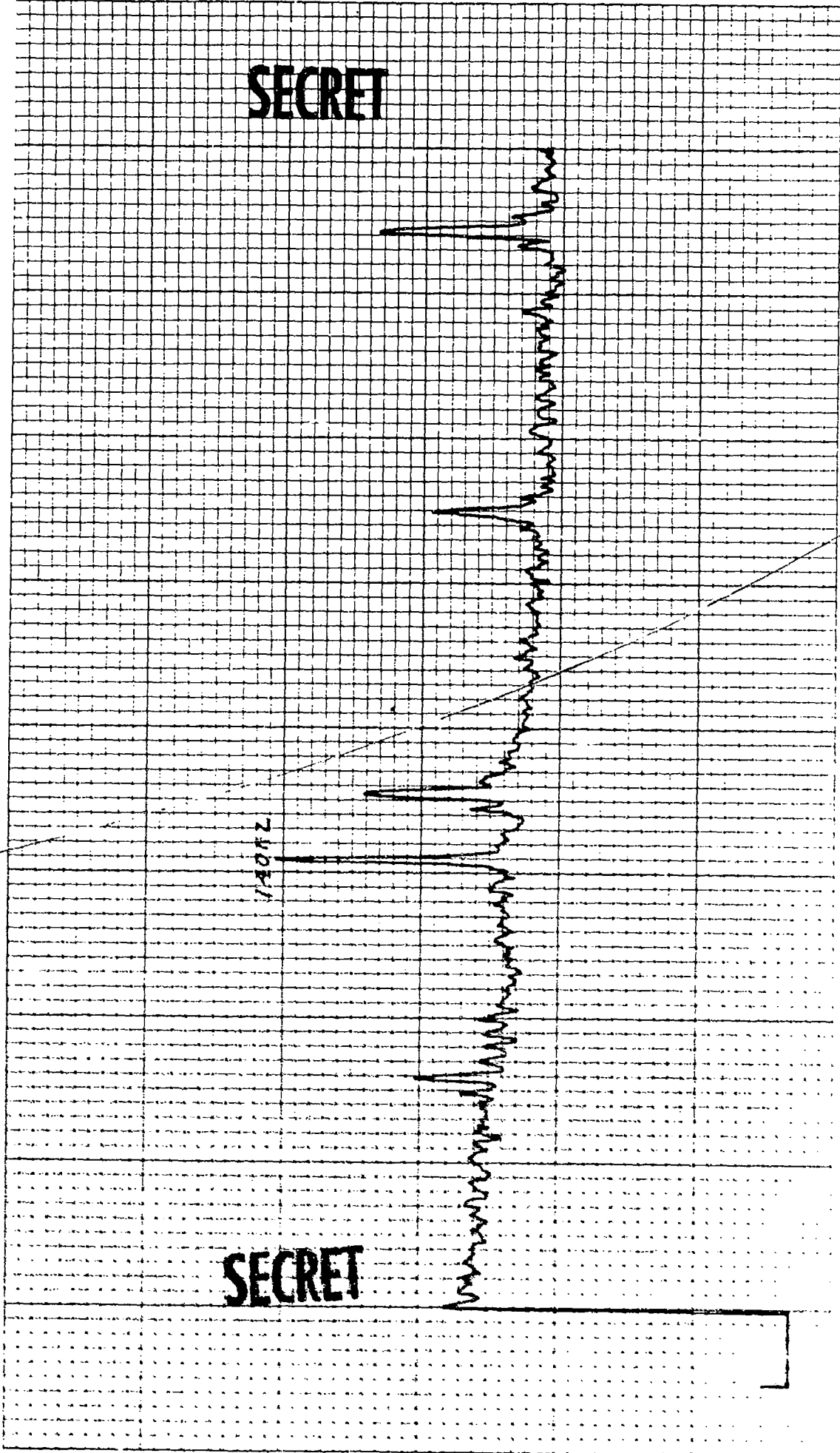
REEL: F19 INDE X165
INTEGRATION TIME 320 SECS ATTEN: -30 DB
FILTER WTG: HANNING



KOE 10 X 16 TO THE INCHES
SECUREL & PAPER CO. MADE IN U.S.A.

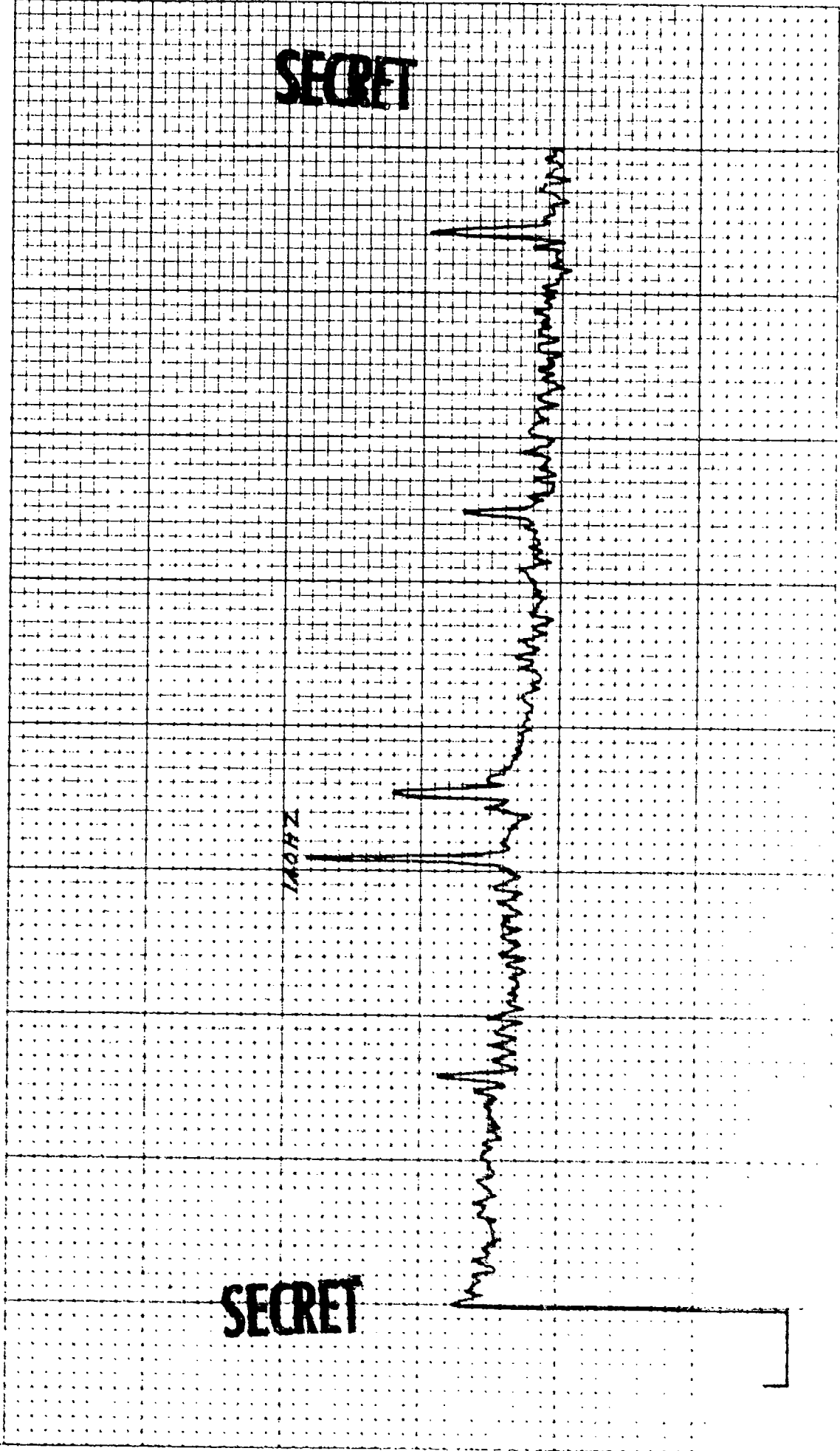
46 0703

CONTROL: 1549 - 51 (DRS) DATE OF ANALYSIS: REEL: F19 INDE X3050
 BEAMFORMED SPECTRUM(ELEMENTS) 1-26 @ 29-53
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTEN: 30 DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTC: HANNING
51 ELEMENTS +50 DEG. AZ STEERING



H*E SERIAL & TRACK NO. 46 0703

CONTROL: 1549 - 51 (DP5) DATE OF ANALYSIS: 1-26-53 REEL: F19 INDE X3658
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTN: -30 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 CENTER FREQ: 150 HZ +52 DEG. AZ STEERING

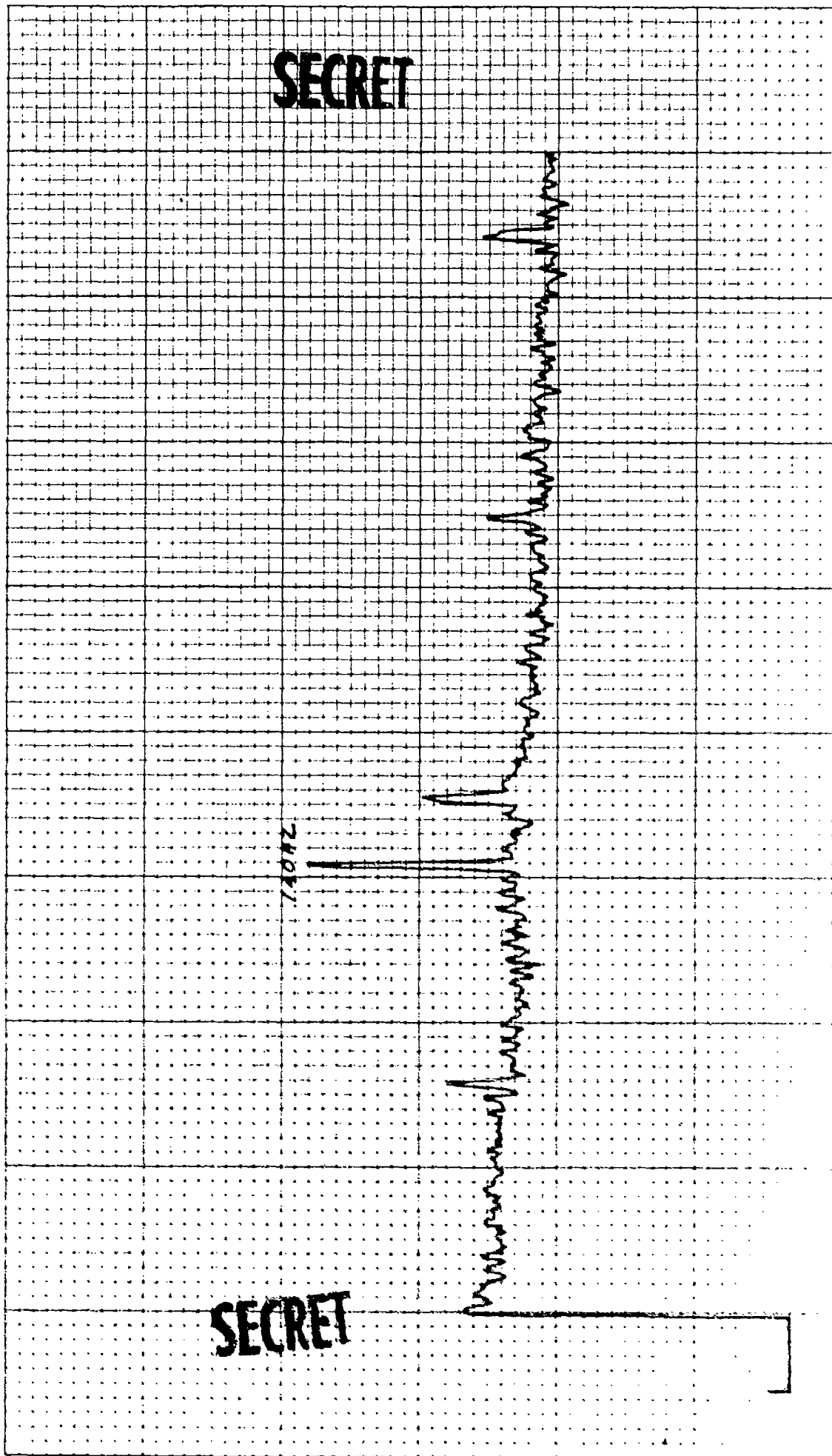


SECRET

KOE IS X 16 TO THE INCH. 1/2 INCHES
REPRODUCED FROM 70 4000 401

46 0703

CONTROL: 1549 - 5/ (DPS) DATE OF ANALYSIS: ---
BEAMFORMED SPECTRUM (ELEMENTS) 1-208 29-53
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS REEL: F19 INDE X3050
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING ATTN: -30 DB
5/ ELEMENTS +54 DEG. AZ STEERING



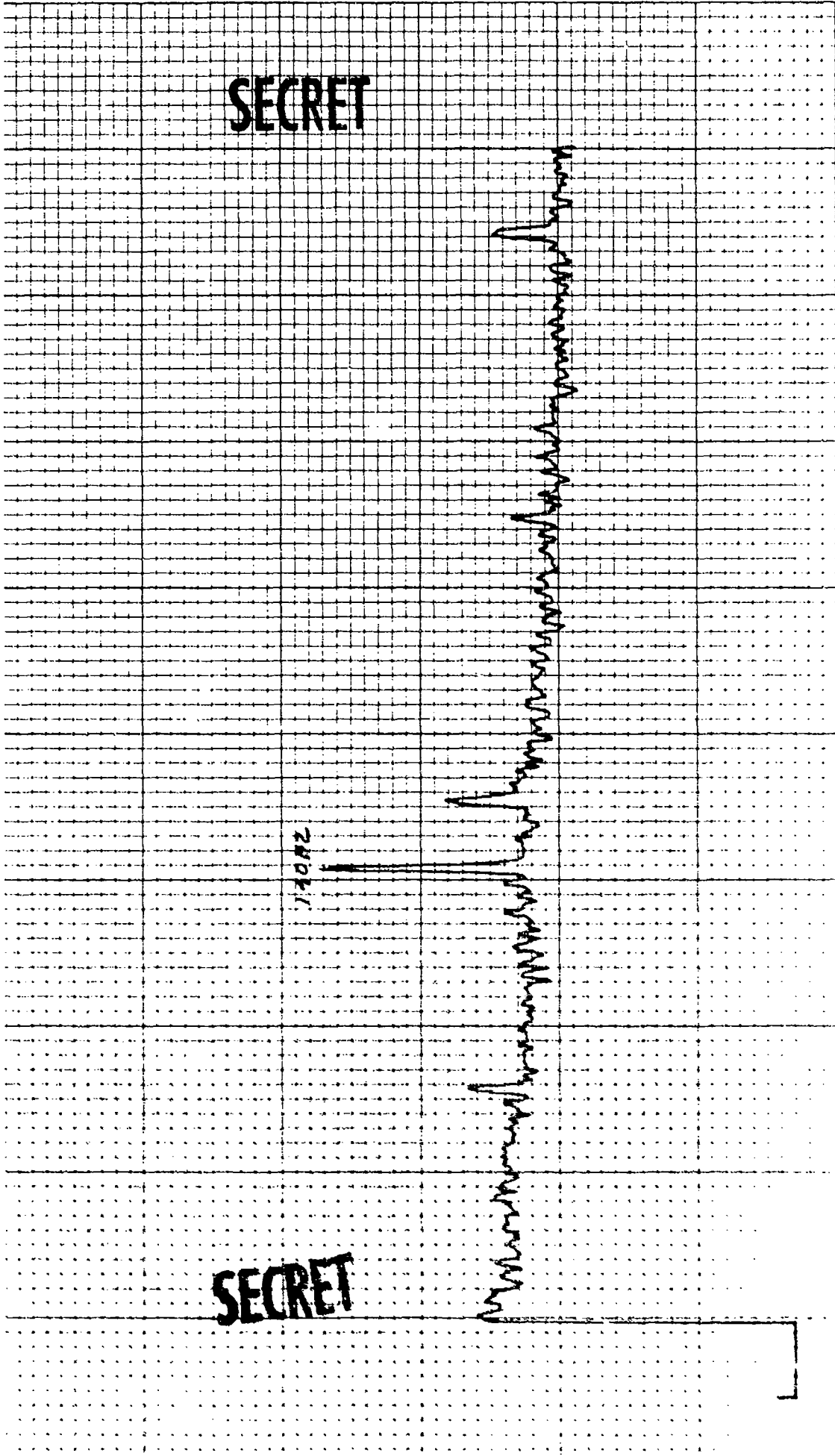
10 X 10 TO THE INCHES
PER INCH & CENTER FOR 4000 & 8000

46 0703

CONTROL: 1599 - 5/ (DPS)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
5/ ELEMENTS

DATE OF ANALYSIS: -- -- --
1-26-53
DATE/TIME: 27-27 -1541 Z
ANALYSIS BANDWIDTH: 1/10HZ
+56 DEG. AZ STEERING

REEL: F/9 INDE X 3450
INTEGRATION TIME 320 SECS ATTN: -30 DB
FILTER WTC: HANNING



SECRET

SECRET

46 0703

K-E 10.1 TO THE INCHES / 10.1 INCHES

CONTROL: 1549 - 51 (DPS) DATE OF ANALYSIS: - - - -

BEAMFORMED SPECTRUM (ELEMENTS) 1-26 & 29-53

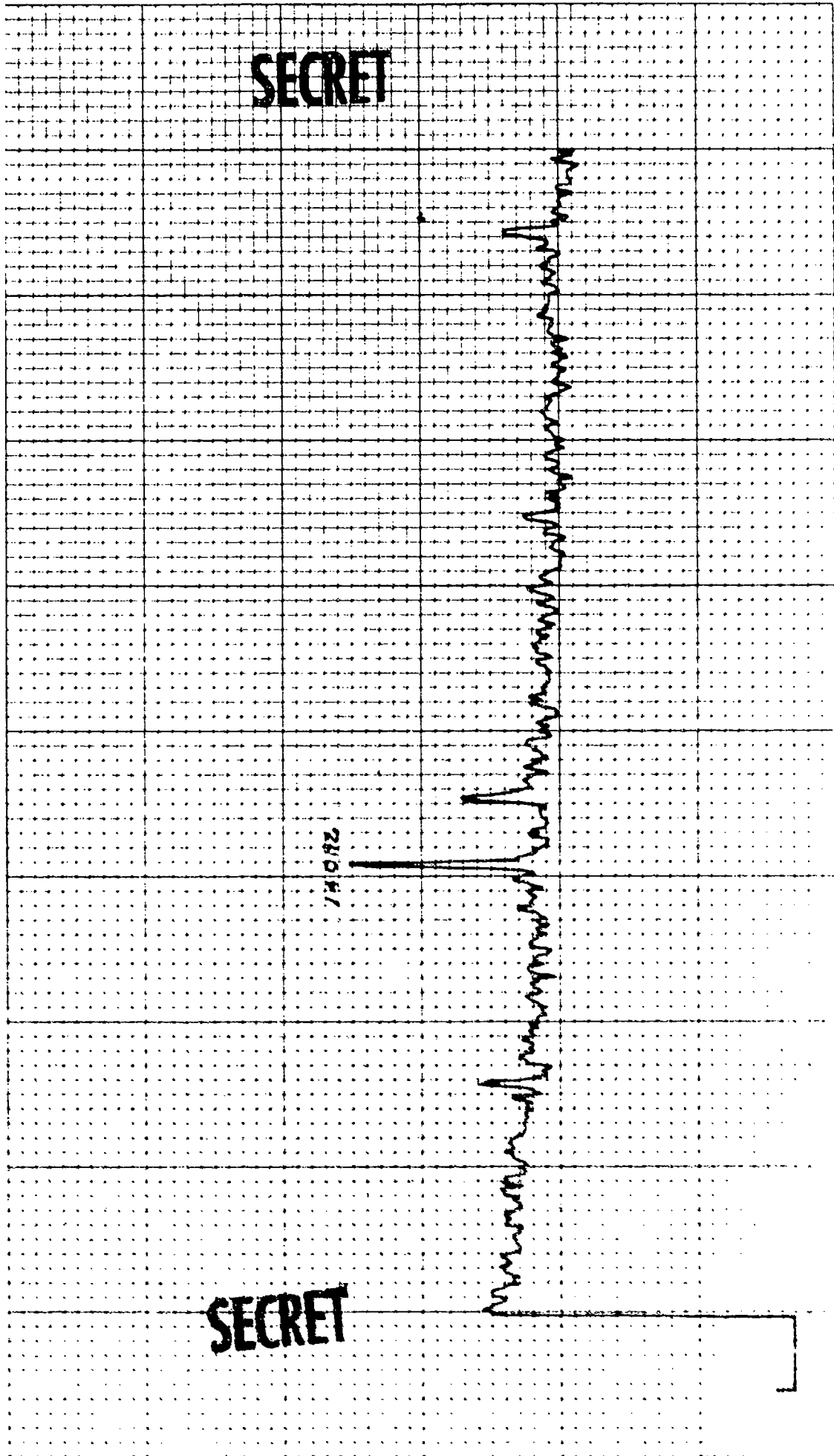
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z

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

51 ELEMENTS +50 DEG. AZ STEERING

REEL: F/1 INTEGRATION TIME 320 SECS FILTER WTC: HANNING

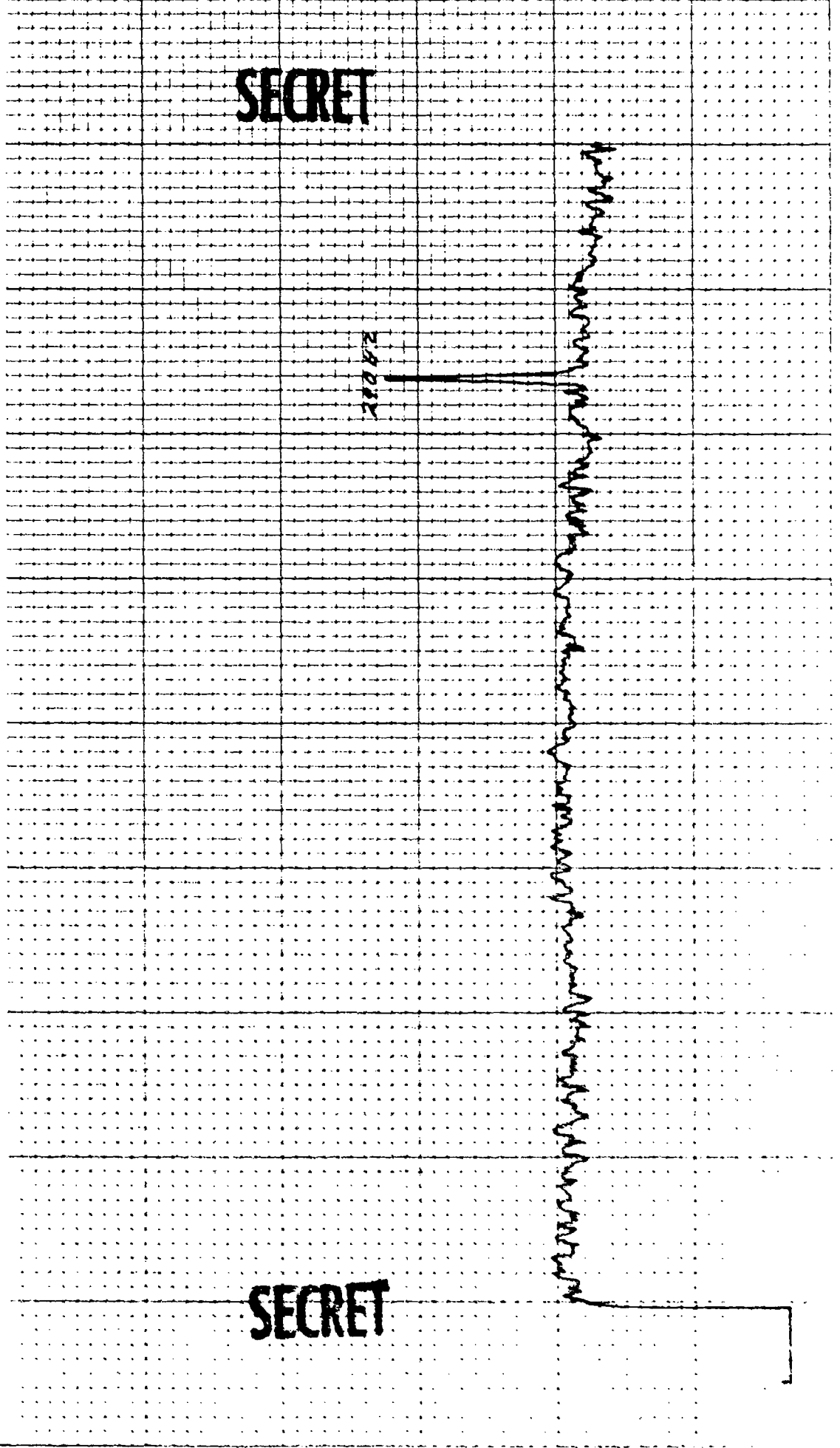
INDE X300 ATTEN: 30 DB



46 0703

K-2 19 511 10 1156 10 1156 10 1156

CONTROL: 1549 - 51 (DPS) DATE OF ANALYSIS: REEL: F19 INDE X3062
 BEAMFORMED SPECTRUM (ELEMENTS) 1-26 8 29-53 INTEGRATION TIME 320 SECS ATTEN: -30 DB
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z FILTER WTG: HANNING
 CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1/10HZ +32 DEG. AZ STEERING



K-E 15X16 TO THE DIRECTOR, NSA, WASH, DC

46 0703

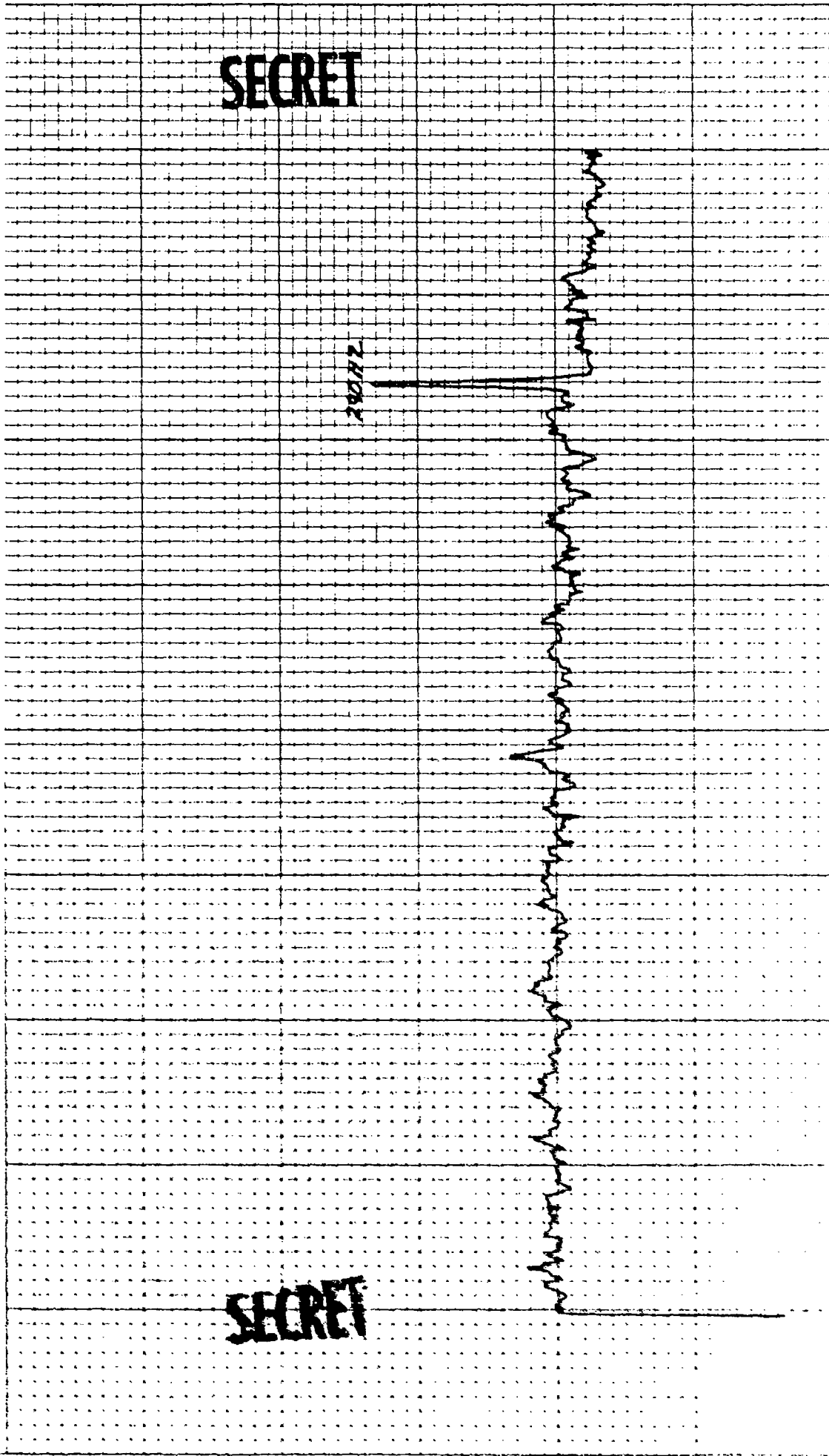
CONTROL: 1549 - 5/ (DPS) DATE OF ANALYSIS: 1-26-53 REEL: F19 INDE X3050

BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-7-77 - /549Z INTEGRATION TIME 320 SECS ATTN: -30 DB

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

CENTER FREQ: 2500 HZ +34 DEG. AZ STEERING

5/ ELEMENTS



SECRET

SECRET

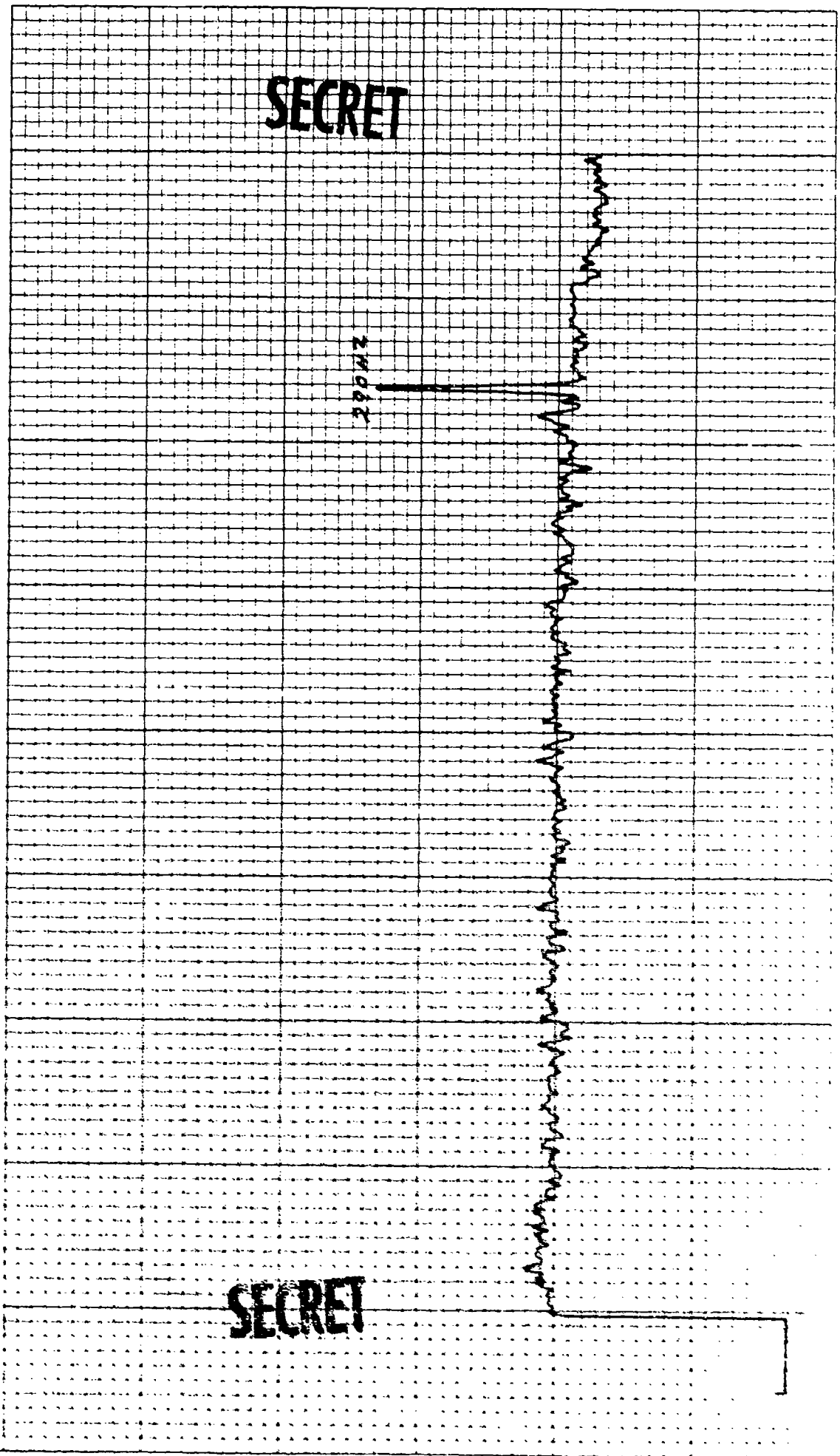
46 0703

K-E 10.4 10 TO THE IMP... 2.15 10.4 MFS
REEL # 29-53

CONTROL: 1549 - 51 (DP5)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
 51 ELEMENTS

DATE OF ANALYSIS: -- -- --
 1-26-84 29-53)
 DATE/TIME: 2-7-77 - 1549 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 + 36 DEG. AZ STEERING

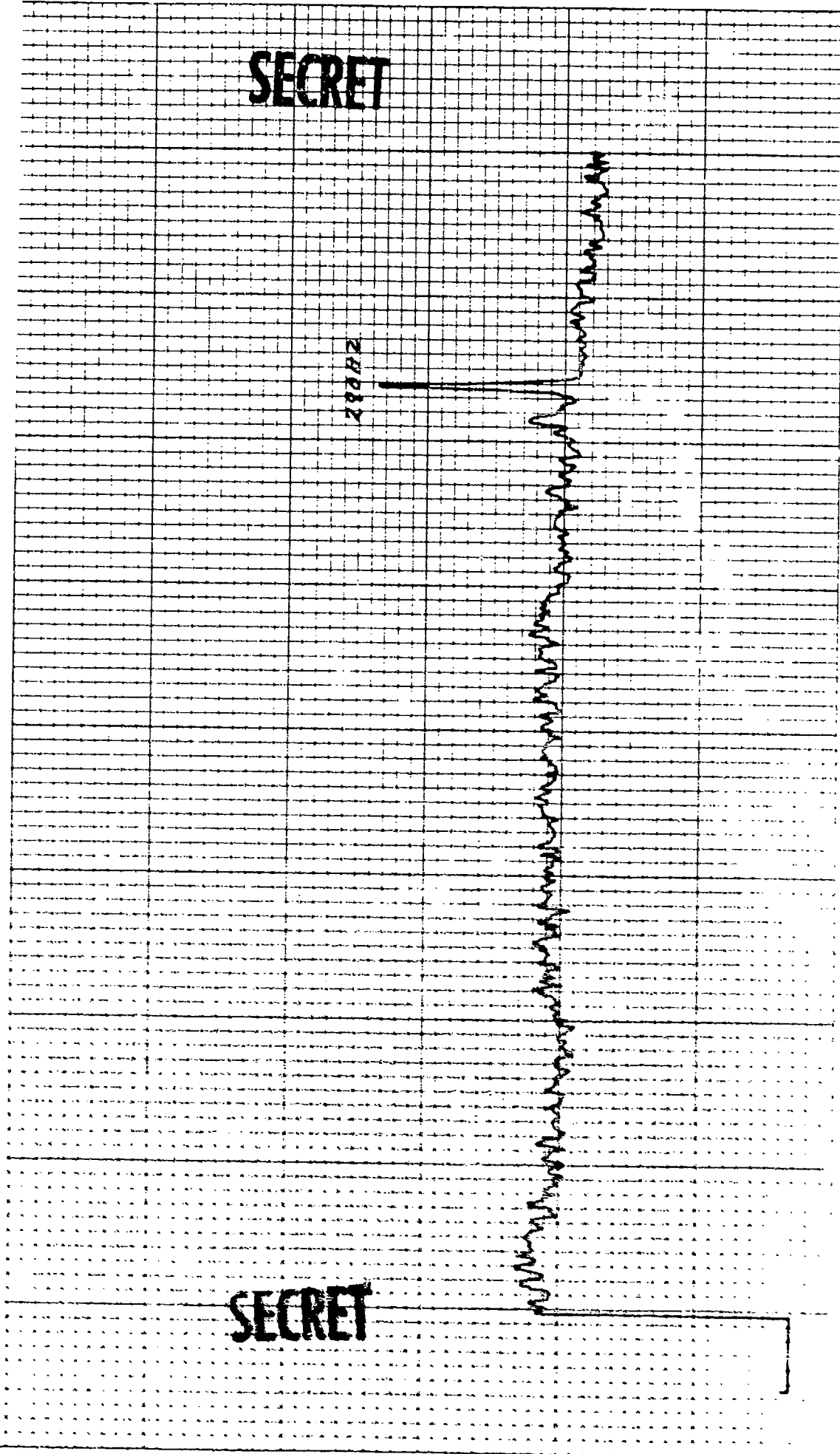
REEL: Fig INDE X3050
 INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING



SECRET

SECRET

CONTROL: 1549 - 5/ (285) REEL: F19 INDE X3050
 BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-26-53
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATEN: -30 DB
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
5/ ELEMENTS 430 DEG. AZ STEERING



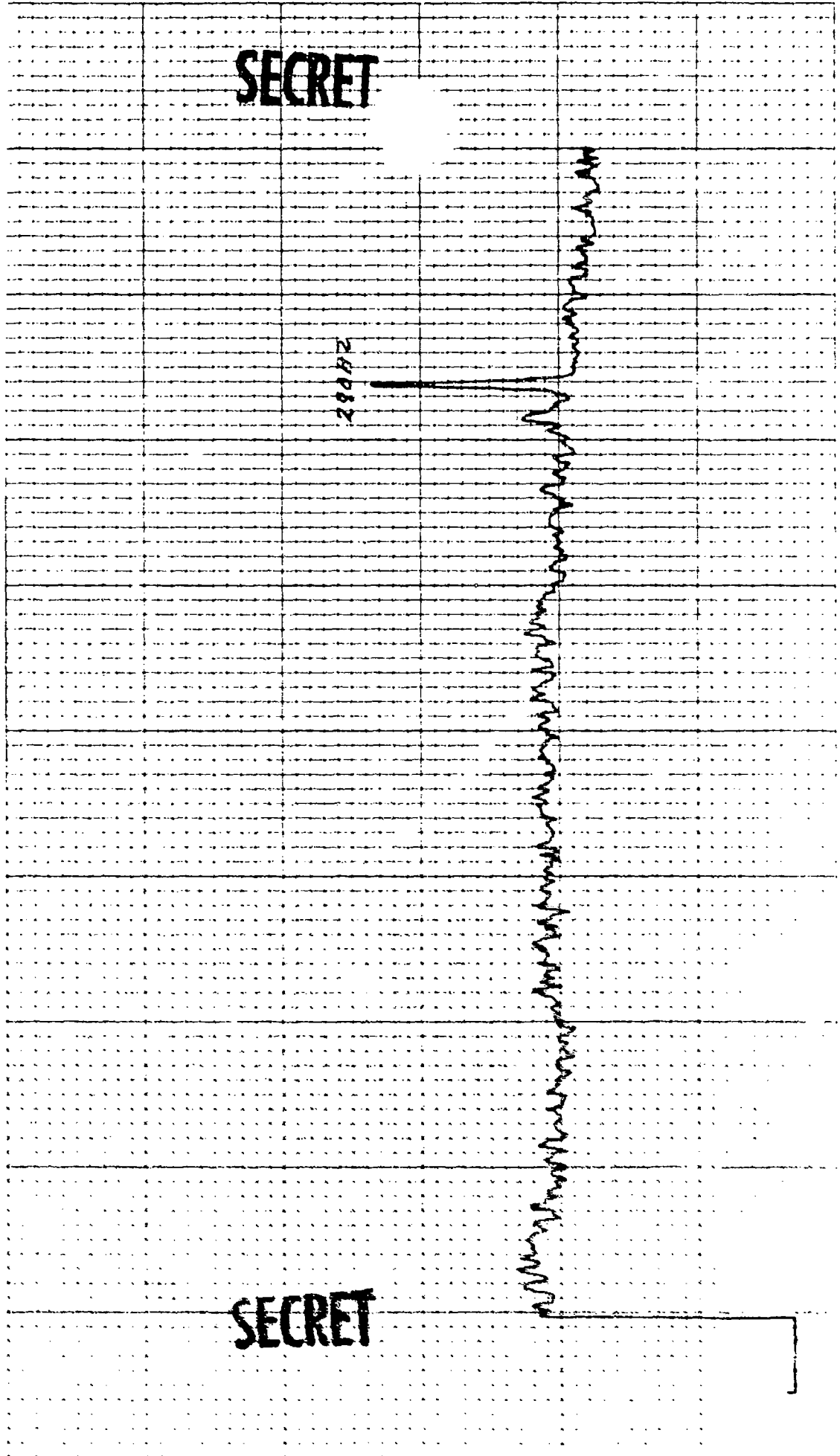
SECRET

SECRET

46 0703

I(Σ 2000 Hz) 4600 Hz

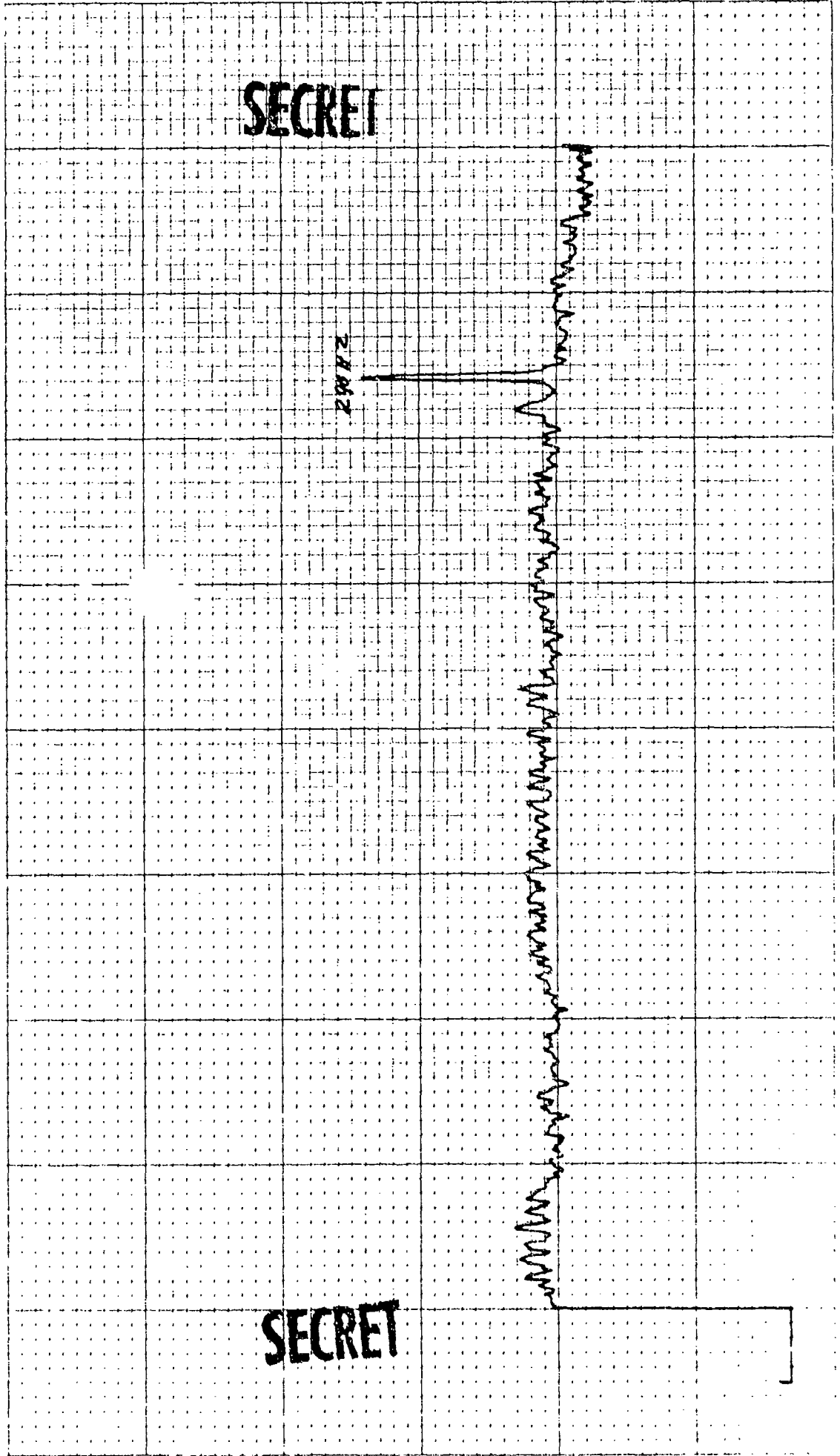
CONTROL: 1549 - 5/ (DPS) DATE OF ANALYSIS: REEL: E19 INDE X 2050
 BEAMFORMED SPECTRUM (ELEMENTS) /-268 29-53 INTEGRATION TIME 320 SECS ATJEN: -30 DB
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z FILTER WTG: HANNING
 CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1/10 HZ
5/ ELEMENTS + 30 DEG. AZ STEERING



KOE 12/15 TO THE INCH. 1/15, 1977
PEPPER & ESSER CO. JULY 1977

46 0703

CONTROL: 1549 - 51 (DPS) DATE OF ANALYSIS: REF: F19 INDE X3050
BEAMFORMED SPECTRUM (ELEMENTS) 1-26-77 21-50)
EXERCISE: BEAKING STAKE DATE/TIME: 2-7-77 -1549 Z INTEGRATION TIME 320 SECS ATTN: -30 DB
CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
51 ELEMENTS +42 DEG. AZ STEERING



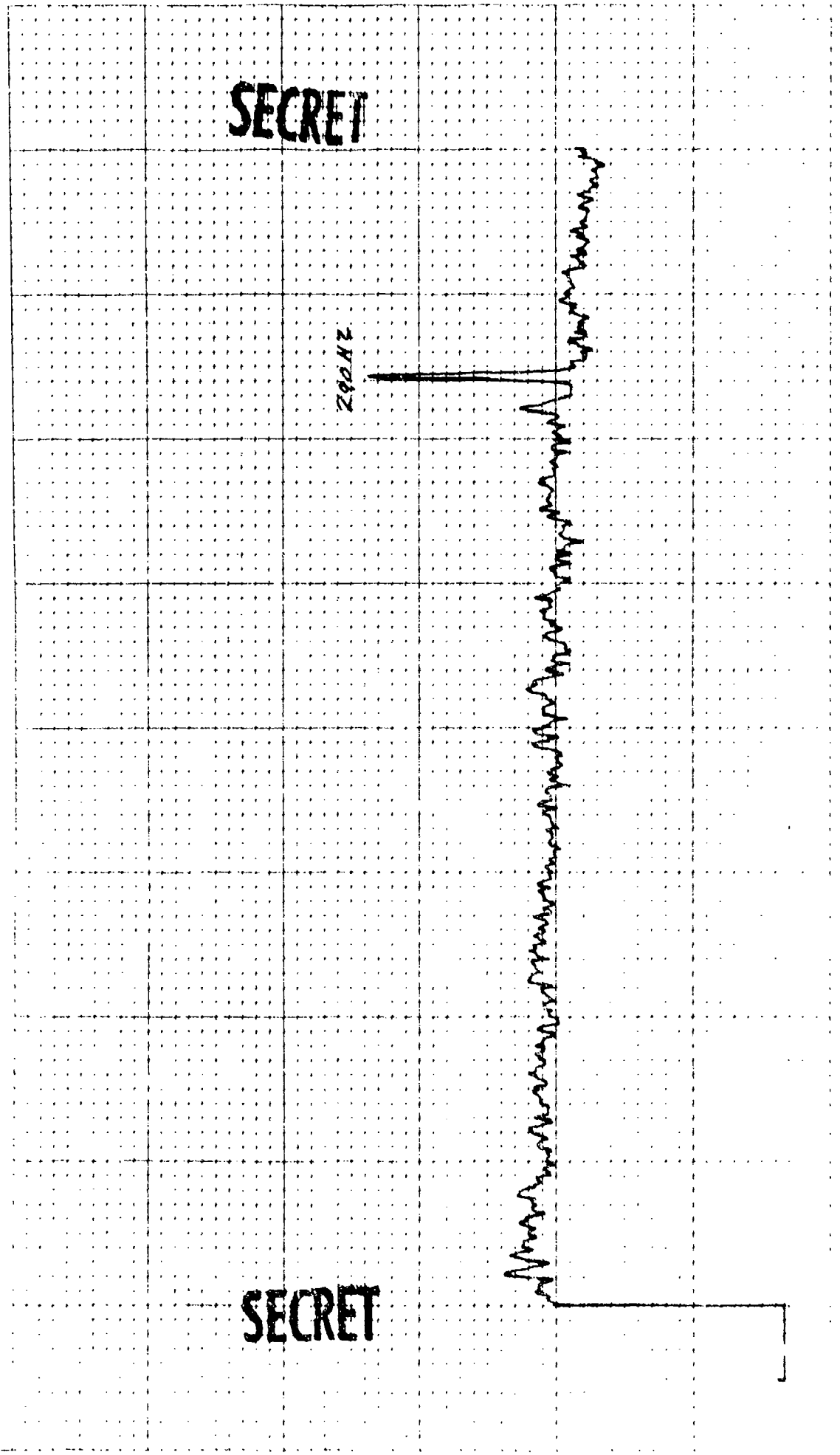
46 0703

CONTROL: 1549 - 51 (285)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
 51 ELEMENTS

DATE OF ANALYSIS: 1-26-53
 DATE/TIME: 2-7-77 -1549 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 +40 DEG. AZ STEERING

REEL: F19
 INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

INDE X3650



SECRET

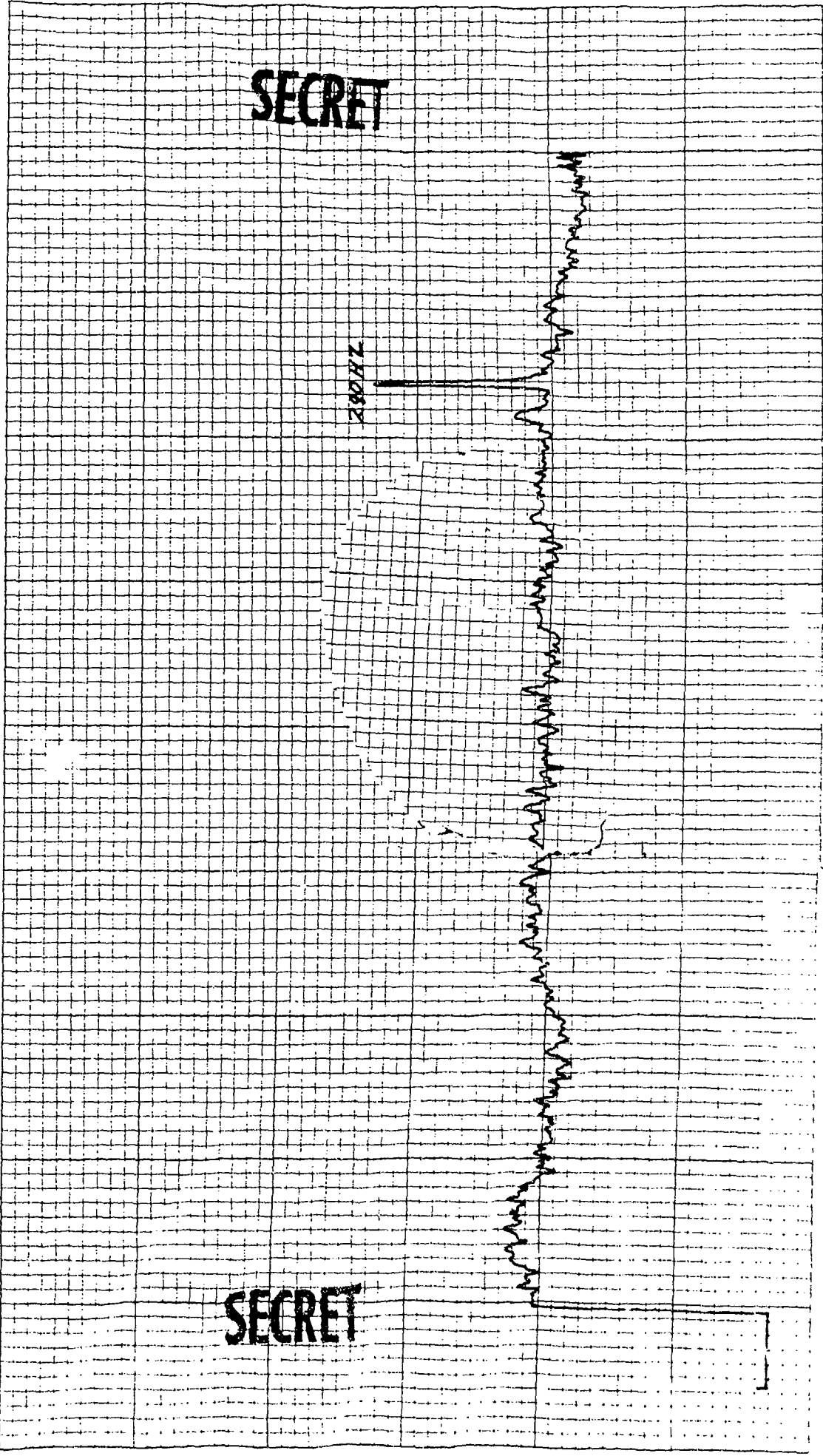
SECRET

280 HZ

CONTROL: 1549 - 51 (295)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 260 HZ
51 ELEMENTS

DATE OF ANALYSIS: ---
1-26-77 29-53
DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+42 DEG. AZ STEPPING

REEL: F79 INDE X348
INTEGRATION TIME 320 SECS ATTN: -30 DB
FILTER WTG: HANNING



SECRET

SECRET

K-Σ 16 X 16 TO THE INCHS. A 16 INCHES
REIFFEL & LESSER CO. MADE IN U.S.A.

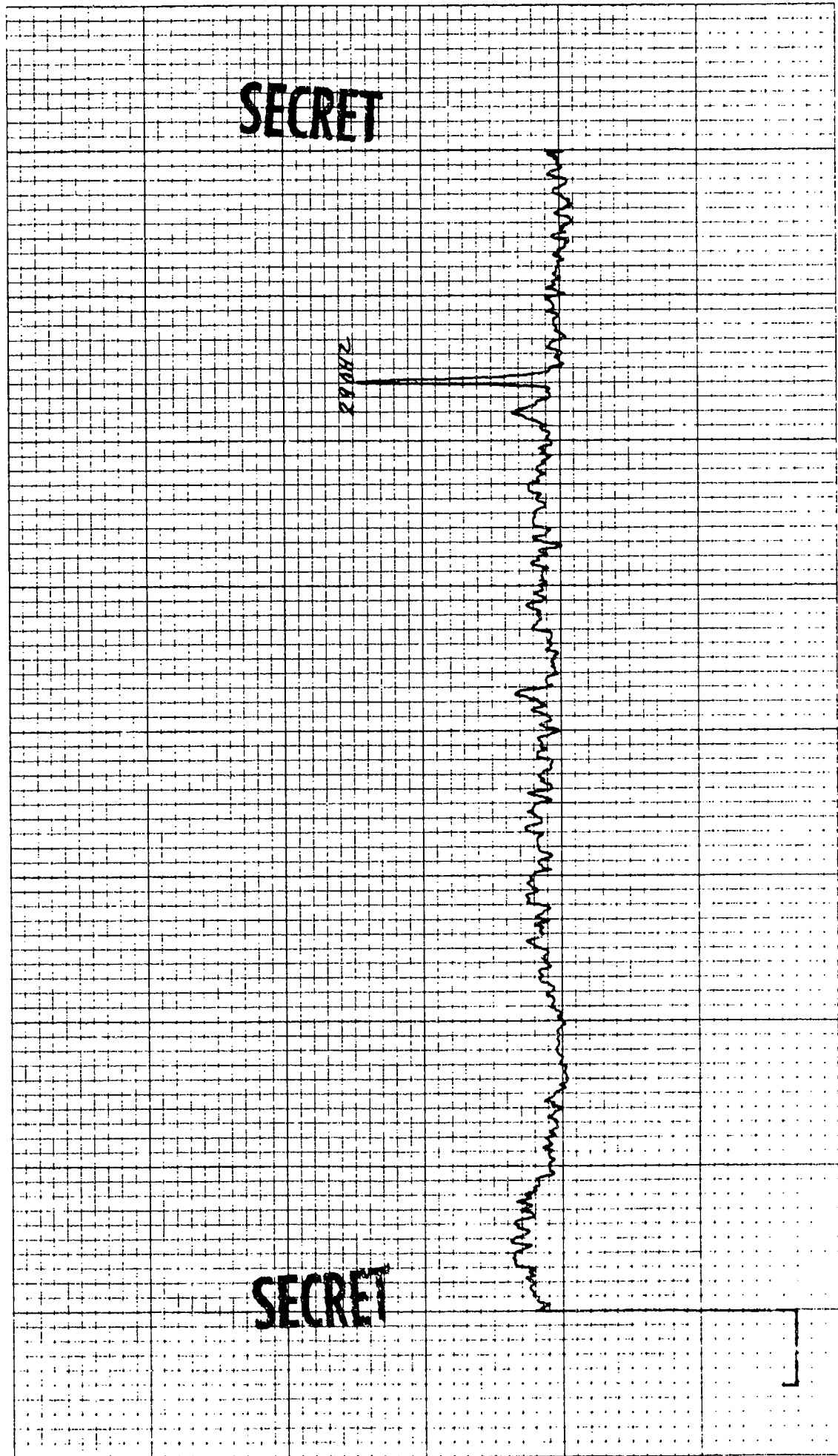
46 0703

CONTROL: 1549 - 51 (DP5)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
51 ELEMENTS

DATE OF ANALYSIS: -- -- --
1-268 29-53

DATE/TIME: 2-7-72 - 1549 Z
ANALYSIS BANDWIDTH: 1/10HZ
+44 DEG. AZ STEERING

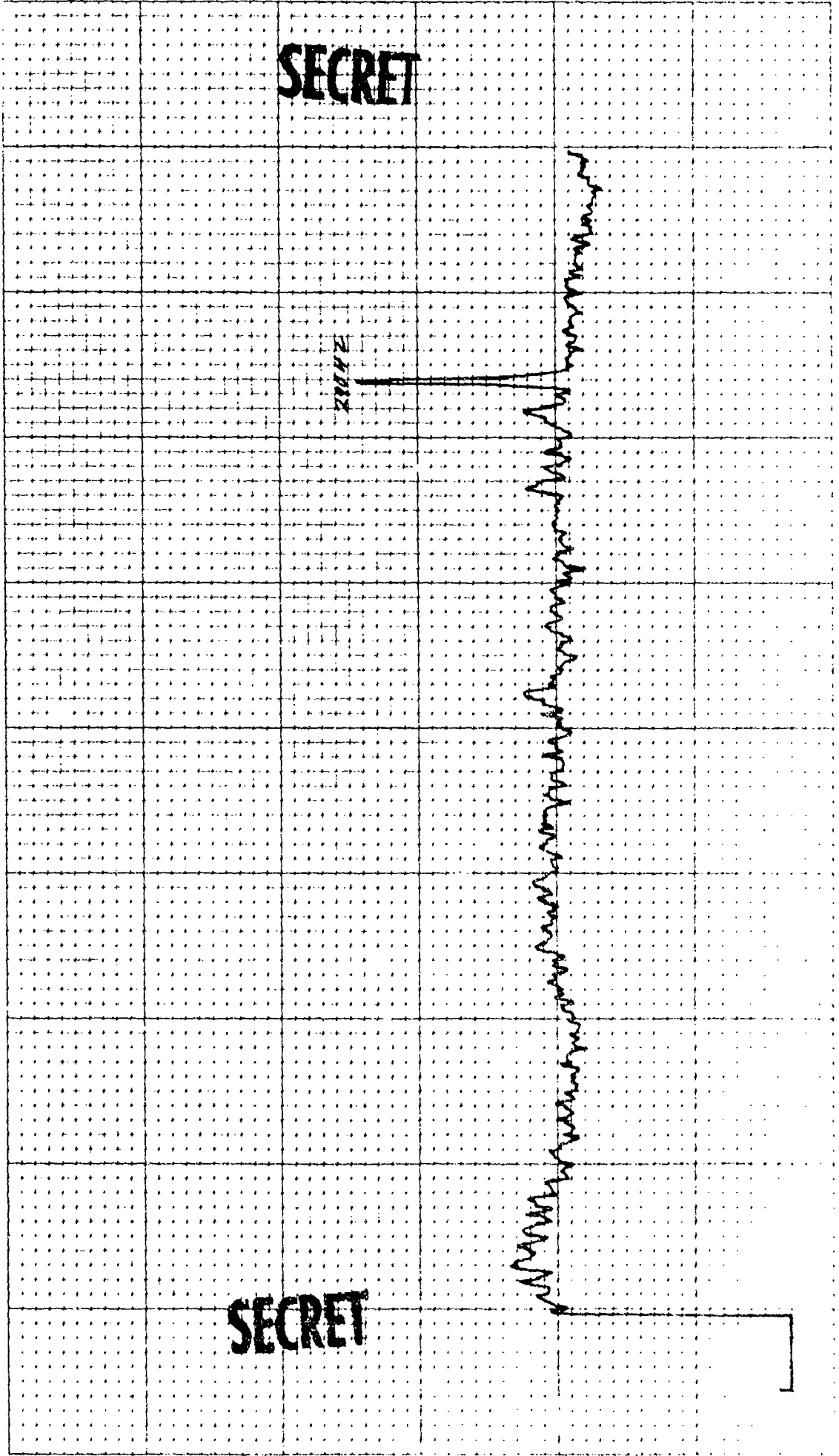
REEL: FI1 INDE X 3050
INTEGRATION TIME 320 SECS ATTEN: -30 DB
FILTER WTG: HANNING



K02 12.1 TO THE INCHES
PEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 1549 - 51 (DPS) DATE OF ANALYSIS: 1-26-53 REEL: 519 INDE X305
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549Z INTEGRATION TIME 320 SECS ATTN: -30 DB
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
51 ELEMENTS +45 DEG. AZ STEERING

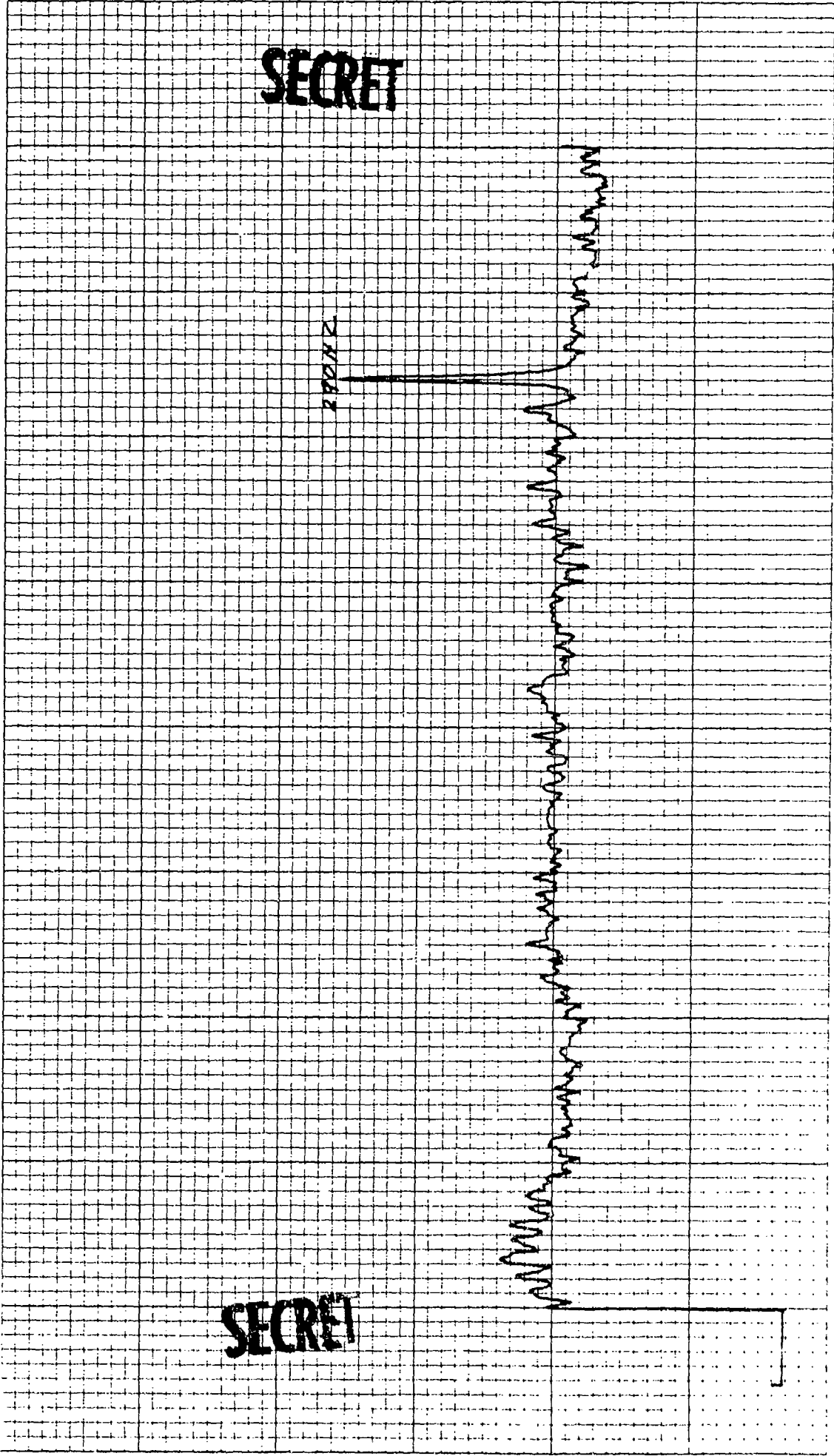


K₀Σ 10 X 10 TO THE INCH • 7 X 10 IN LINES
KEUFFEL & ESSER CO. MADE IN U.S.A.

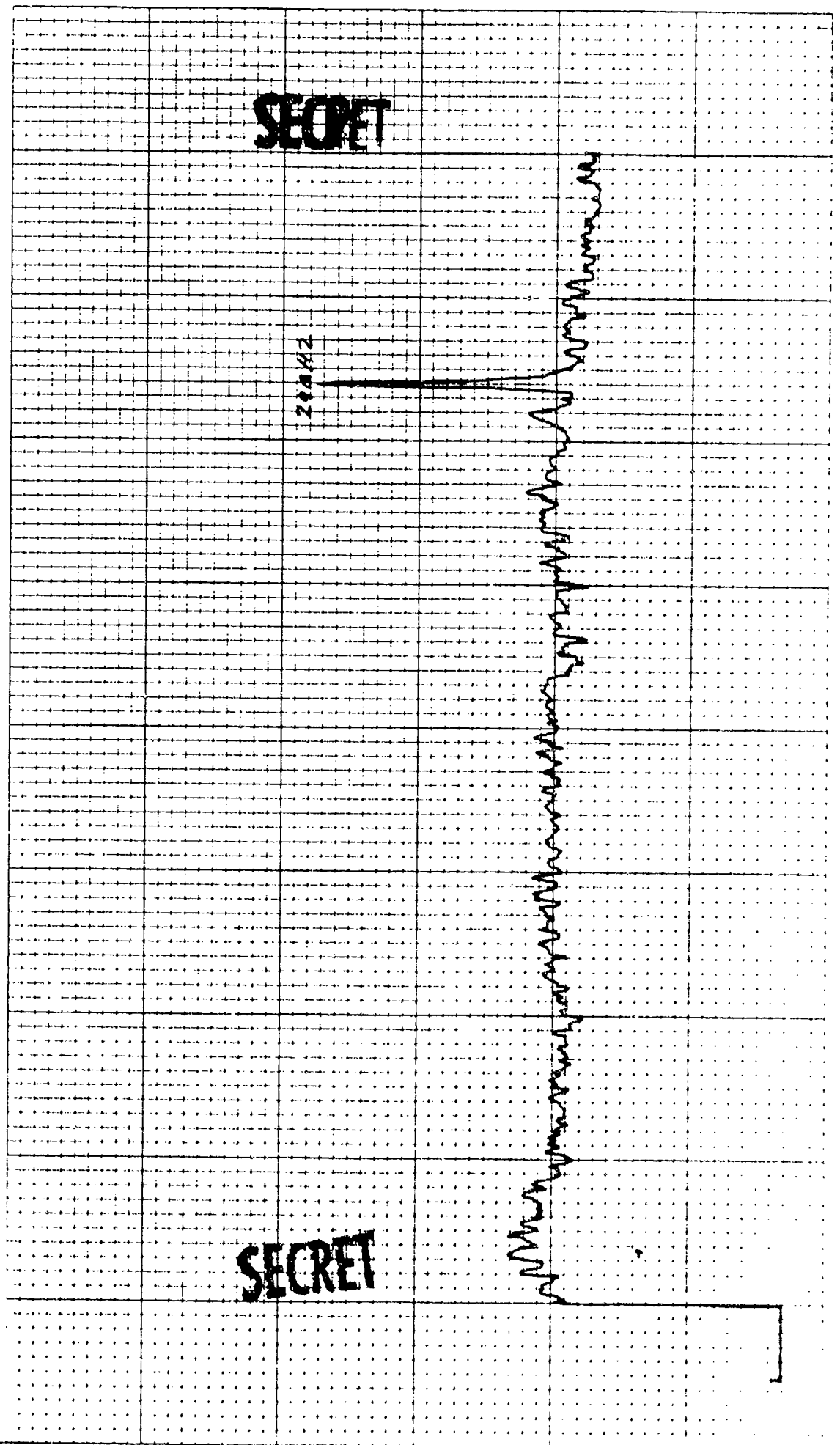
46 0703

CONTROL: 1549 - 5/ (DPS) DATE OF ANALYSIS: ---
BEAMFORMED SPECTRUM (ELEMENTS) 1-36829-53
EXERCISE: BEARING STAKE
CENTER FREQ: 250 HZ
5/ ELEMENTS
INTEGRATION TIME 320 SECS ATTEN: -30 DB
REEL: F19 FILTER WTC: HANNING
INDE XJ050

DATE/TIME: Z-7-77 - 1549Z
ANALYSIS BANDWIDTH: 1/10HZ
+46 DEG. AZ STEERING



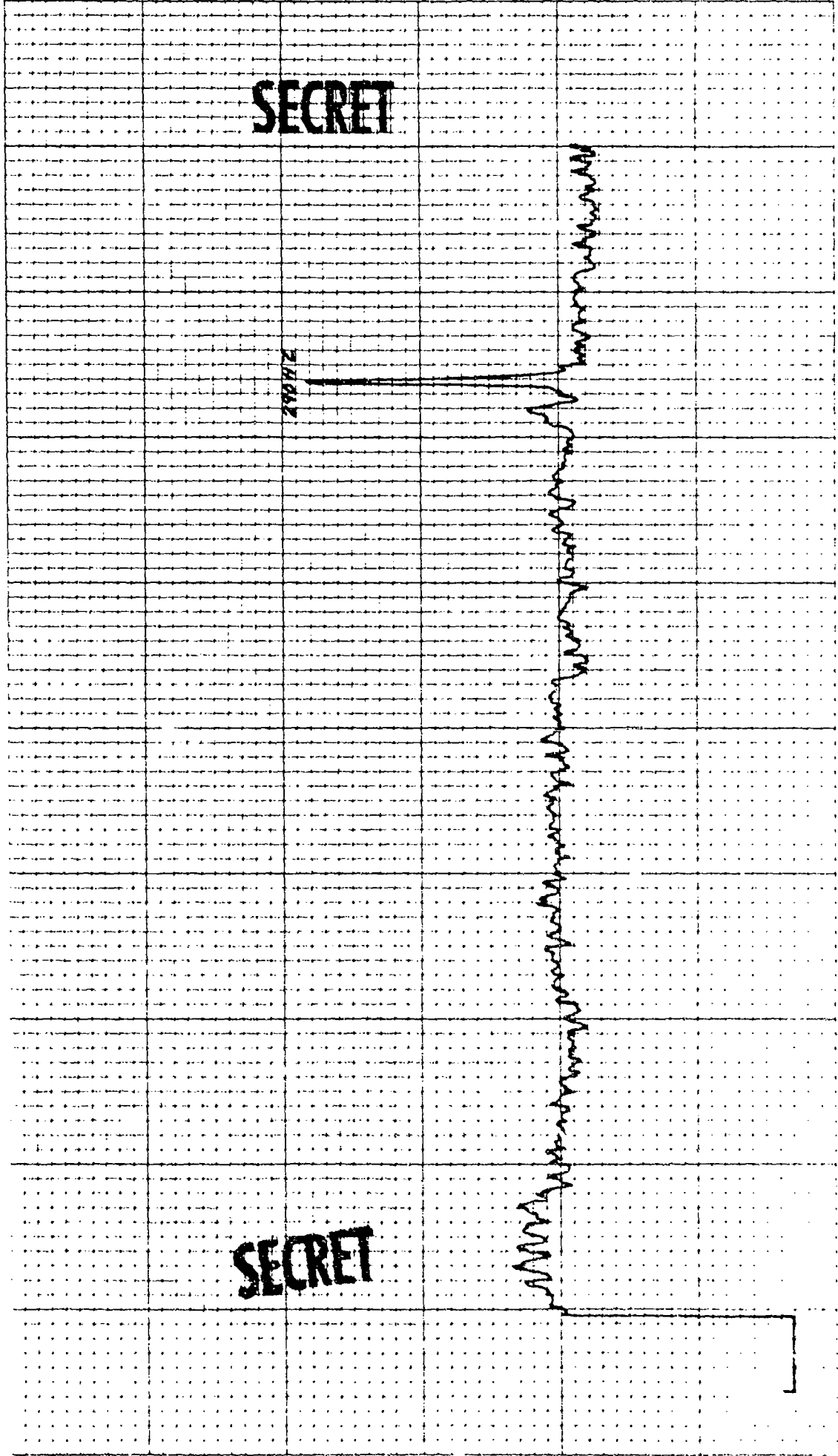
CONTROL: 1549 - 51 (DPS) REEL: F19 INDE X3050
 BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-26-29-53
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTN: -30 DB
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTC WTC: HANNING
51 ELEMENTS 148 DEG. AZ STEERING



KOE 16.4 IN TO THE INCH. 2.5 POINTS.
REUPPEL & ESSER CO. MILWAUKEE, WIS.

46 0703

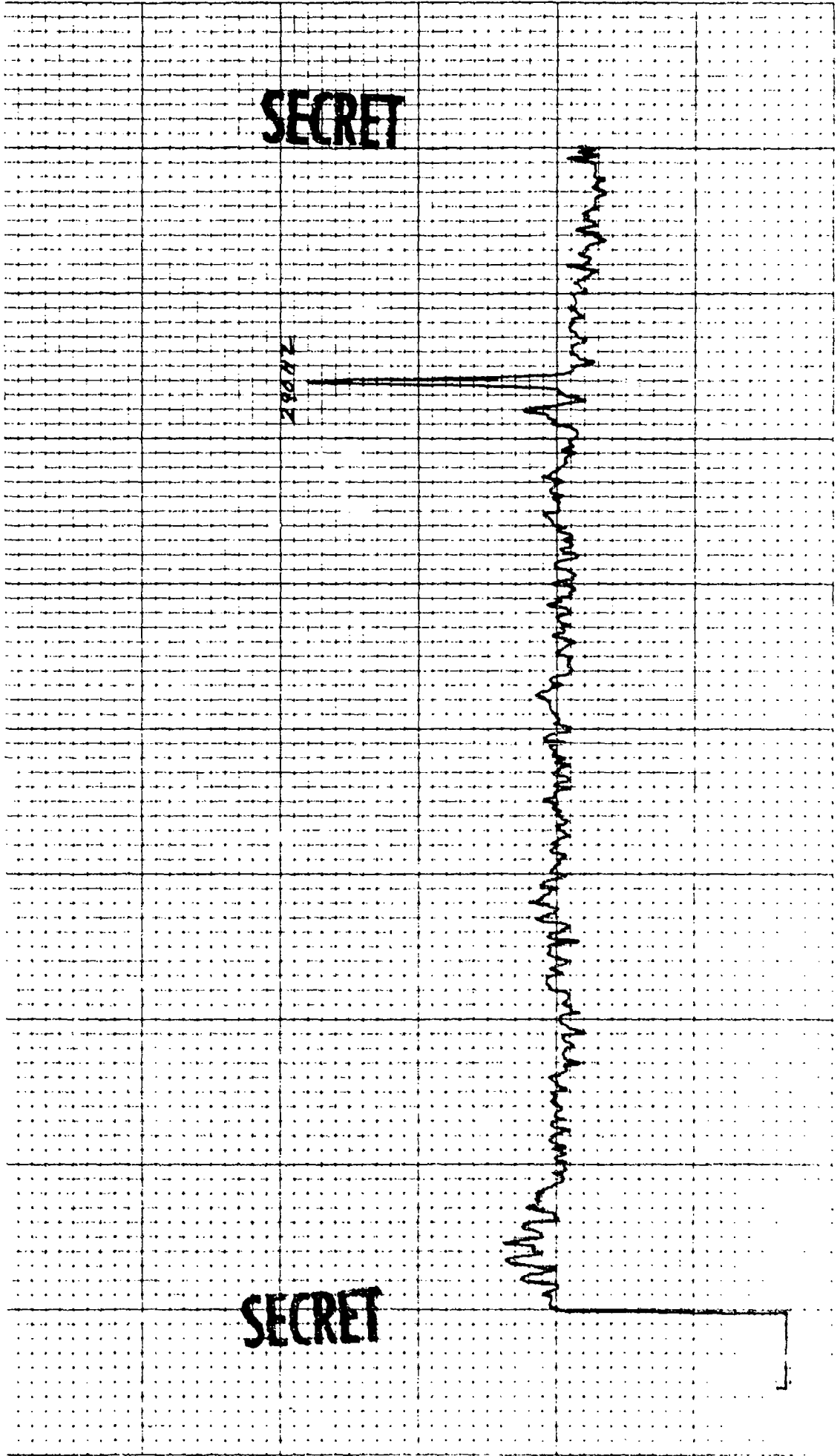
CONTROL: 1549 - 51 (DPS) DATE OF ANALYSIS: _____ INDE X 3060
BEAMFORMED SPECTRUM(ELEMENTS) 1 - 26 @ 20 - 53 INTEGRATION TIME 320 SECS ATTEN: 30 DB
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z FILTER WTG: HANNING
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ
5/ ELEMENTS +49 DEG. AZ STEERING



KOE 10.4 TO THE INCH
PENFELL & LESSER CO. MADE IN U.S.A.

46 0703

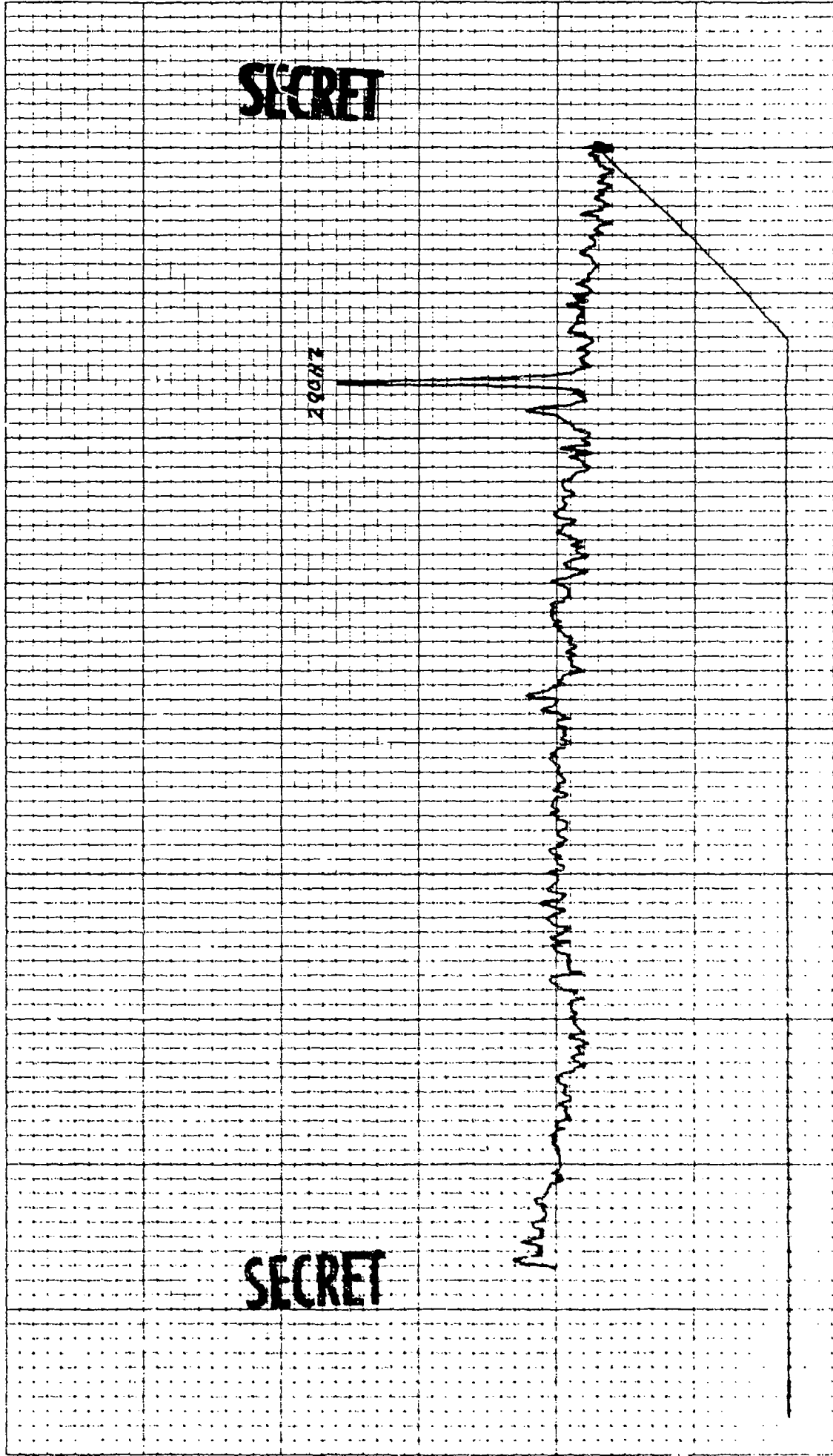
CONTROL: 1549 - 51 (DP5) DATE OF ANALYSIS: 1-26-53 REEL: 51 INDE XJ650
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTN: -30 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 CENTER FREQ: 200 HZ +50 DEG. AZ STEERING



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

46 0703

CONTROL: 1549 - 5/ (005) REEL: F19 INDE X350
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: - - -
EXERCISE: BEARING STAKE /- 26 & 29-53
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: -30 DB
5/ ELEMENTS + 52 DEG. AZ STEERING FILTER WTC: HANNING



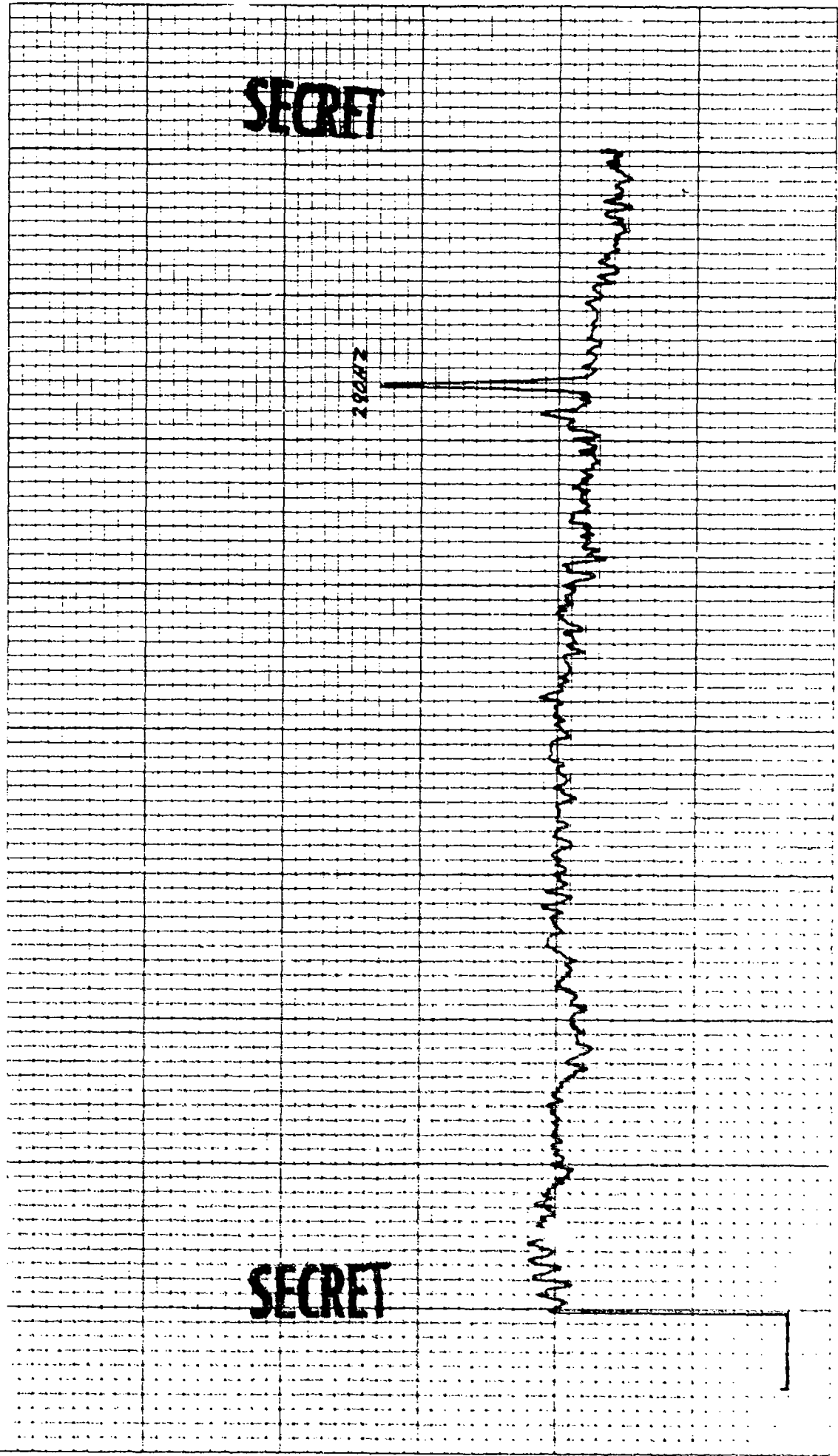
KOE 10 X 10 TO THE INCH. 1.5 INCHES.
REDFIELD BESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 1549 - 51 (DBS)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
51 ELEMENTS

DATE OF ANALYSIS: - - - - -
1-26 & 28-53)
DATE/TIME: 2-7-77 -1549 Z
ANALYSIS BANDWIDTH: 1/10HZ
+54 DEG. AZ STEERING

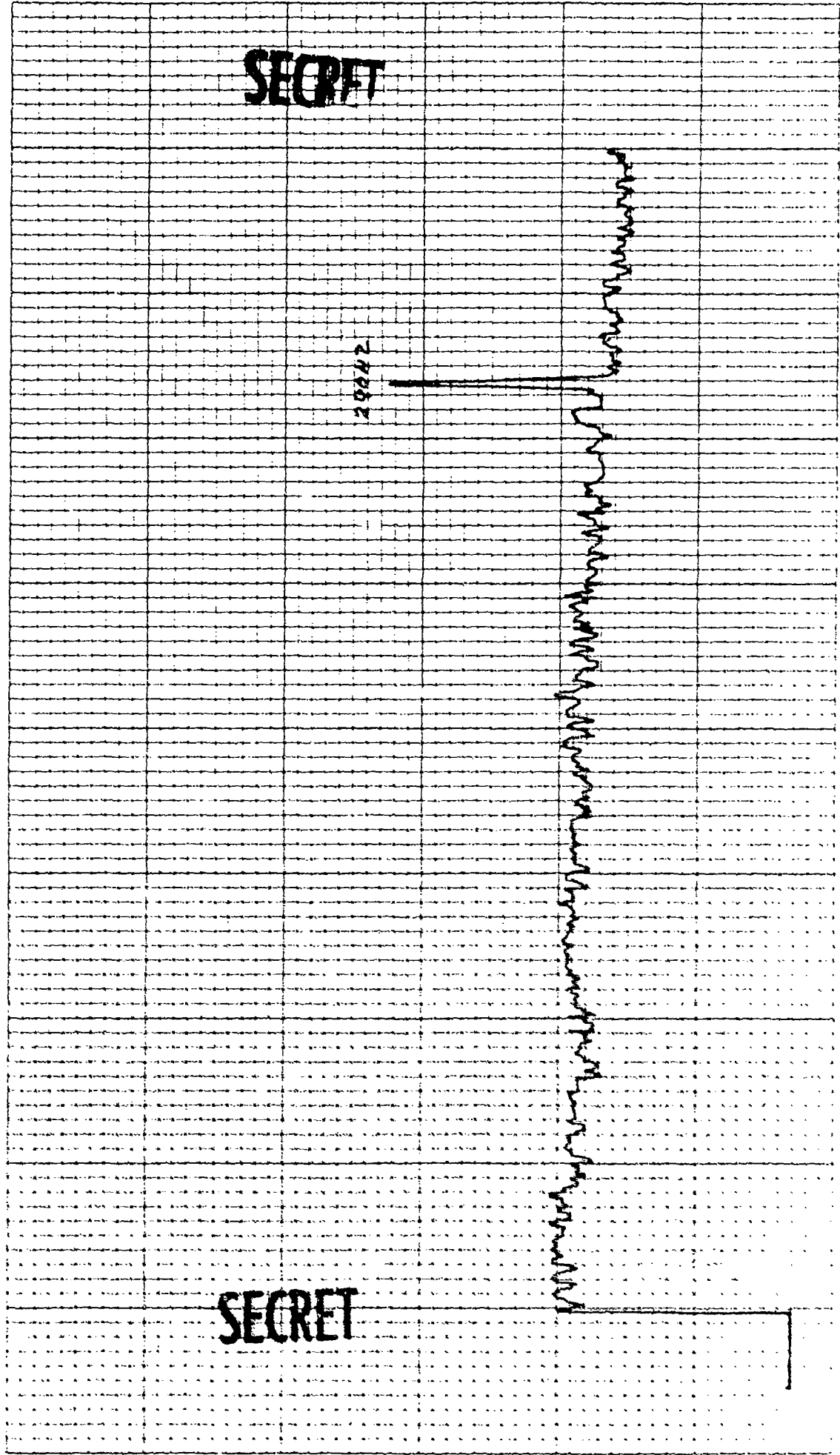
REEL: F19 INDE X 355
INTEGRATION TIME 320 SECS ATTEN:-30 DB
FILTER WTC: HANNING



10 X 10 TO THE INCHES 1 TO THE FEET
RECEIVED AT RESEARCH CO. WASH. D.C.

46 0703

CONTROL: 1549 - 51 (DPS) DATE OF ANALYSIS: 1-26-53 REEL: F19 INDE X 3051
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTN: -30 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 280 HZ 756 DEG. AZ STEERING



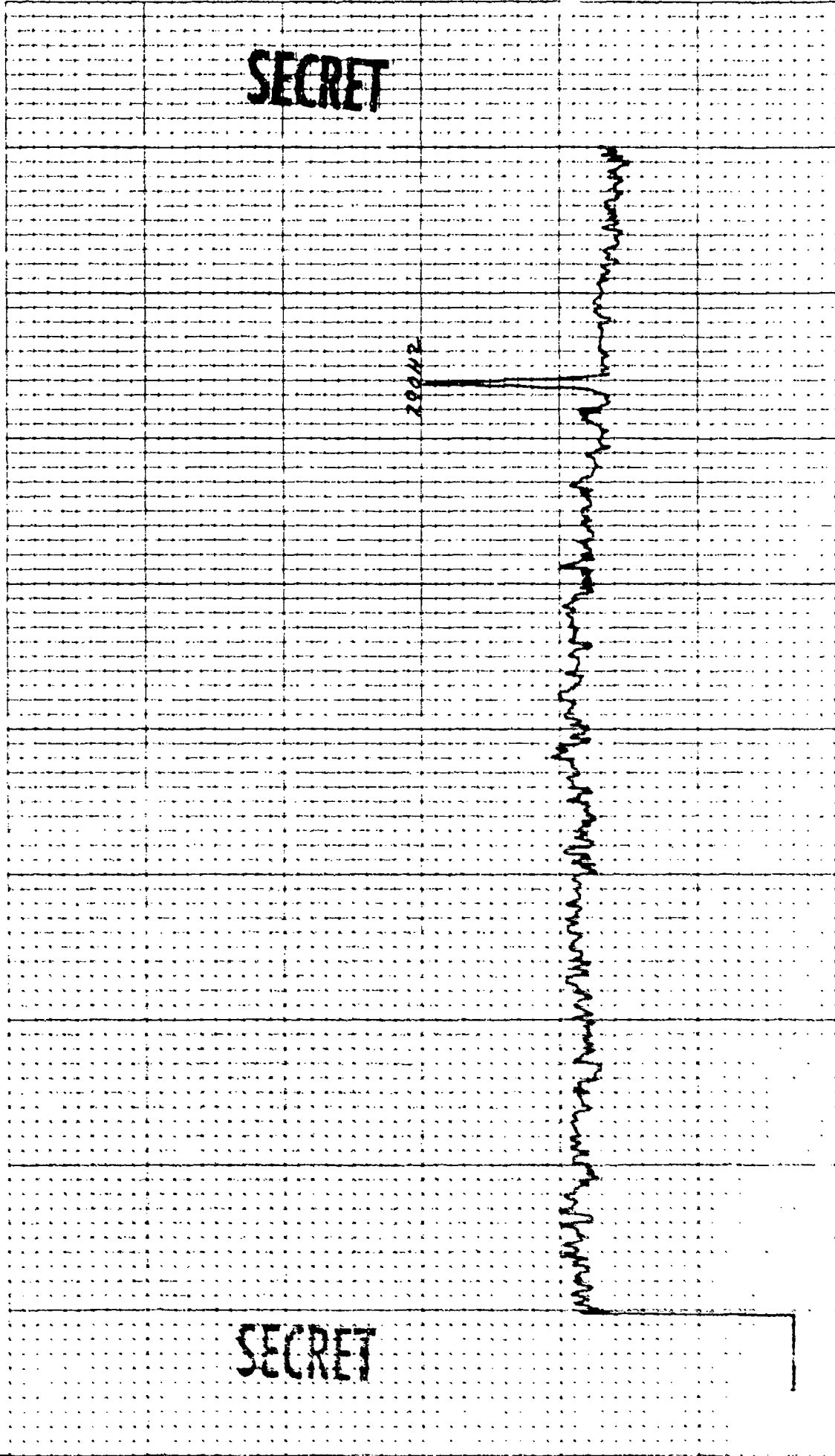
KOE 3210 TO THE OTHER 21000000

46 0703

CONTROL: 1549 - 5/ (DPS)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
5/ ELEMENTS

DATE OF ANALYSIS: - - - -
1-26 @ 29-53)
DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10HZ
+50 DEG. AZ STEERING

REEL: F19
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING
INDE XJ50
ATTEN: -30 DB



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

DATA POINT 6 DATE 2-7-77 TIME 2033Z

FREQUENCY 140 HZ

INDICATED NOISE LEVEL $\frac{\mu V}{ABW}$

-44.2

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

-(-12) = -32.2

BANDWIDTH CONVERSION TO 1 HZ BAND

+8.2 = 24.0

CONVERSION TO $\frac{dBre\mu Pa}{1HZ}$

+100 = +76

UNCLASSIFIED

UNCLASSIFIED

UNCLASSIFIED

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

TIME 2033Z

DATE 2-7-77

DATA POINT: 6

FREQUENCY 290 HZ

INDICATED NOISE LEVEL $\frac{\mu V}{ABW}$ -47.3

SYSTEM SENSITIVITY dB/ μB -(-8)

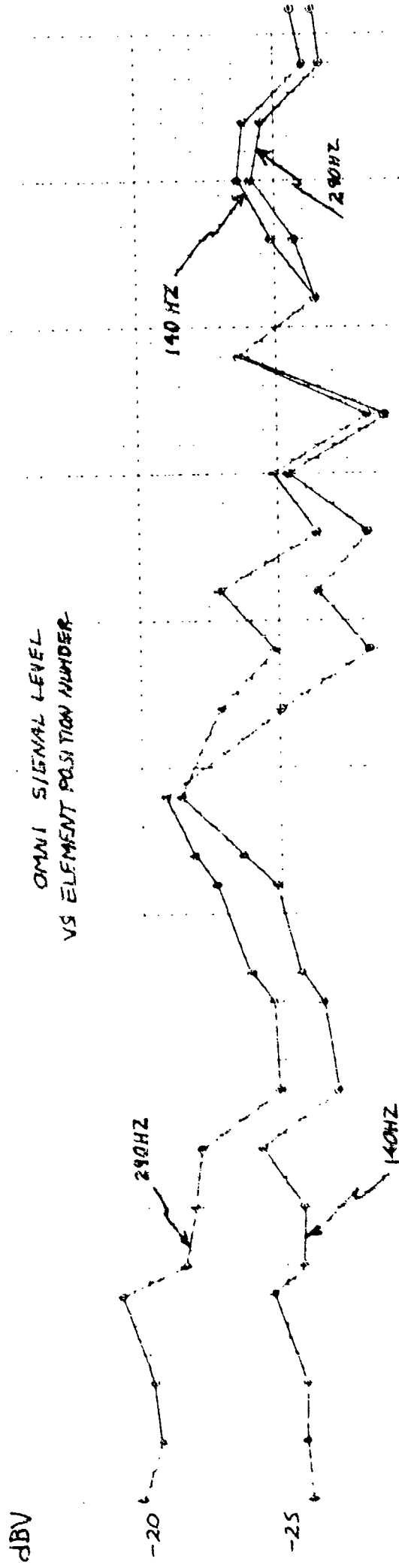
BANDWIDTH CONVERSION TO 1 HZ BAND +8.2

CONVERSION TO dBre $\mu Pa/1HZ$ -31.1

+100 +68.9

UNCLASSIFIED

46, 0703



CONFIDENTIAL

DATA POINT 6
PROCESSING ANALYSIS BANDWIDTH
1/10HZ

dBV

-20

-25

-30

-35

2/10HZ

1/10HZ

OMNI SIGNAL LEVEL
VS ELEMENT POSITION NUMBER

CONFIDENTIAL

2

7

12

17

22

27

32

37

42

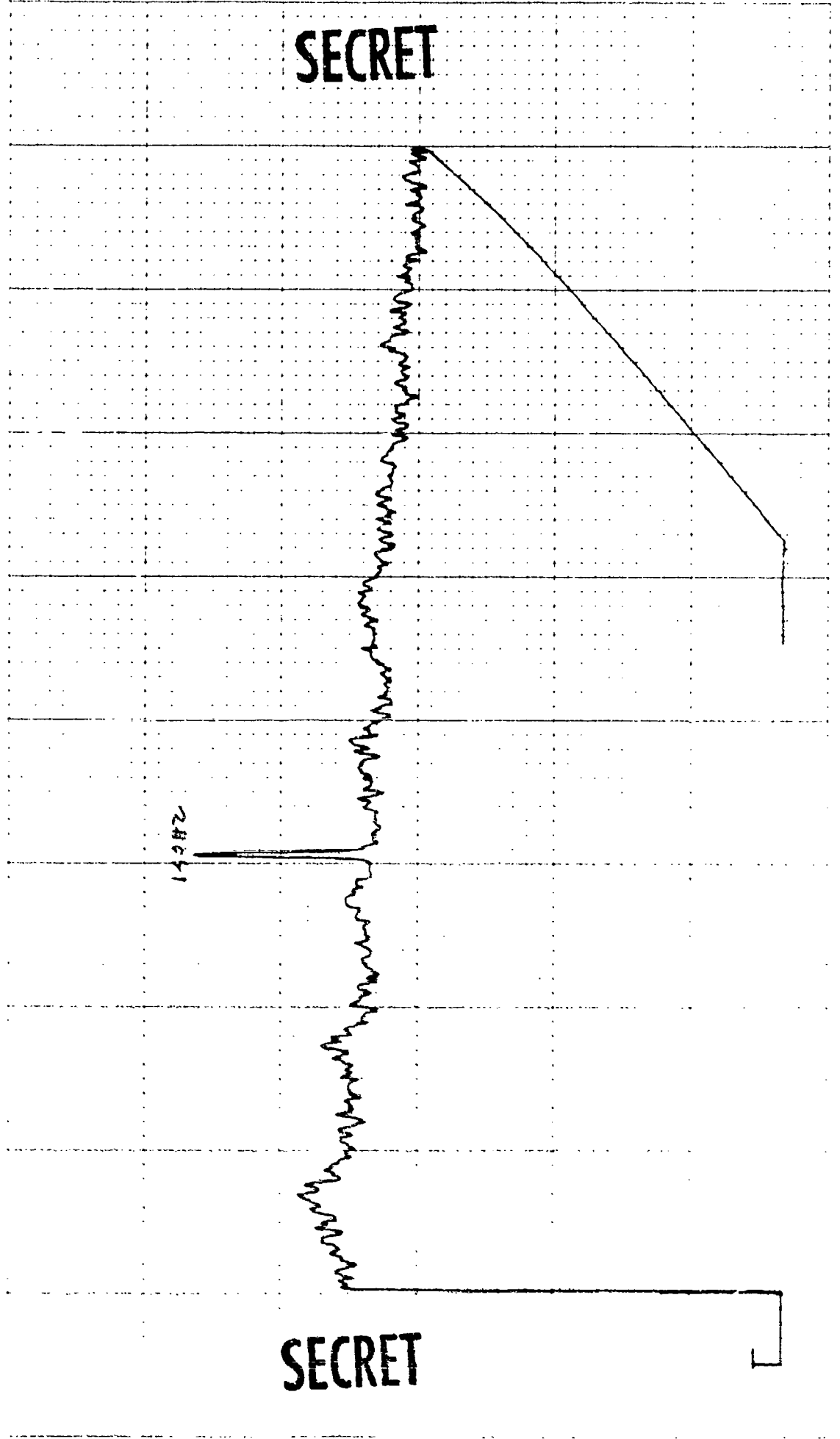
47

52

ELEMENT NUMBER

46 0703

CONTROL: 2-7 - 2033 (27) DATE OF ANALYSIS: RFEL: F23 INDEX 3320
 OMNI SPECTRUM (ELEMENT 2)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: DB
 I ELEMENT _____ DEG AZ STEERING FILTER WTC: HANNING



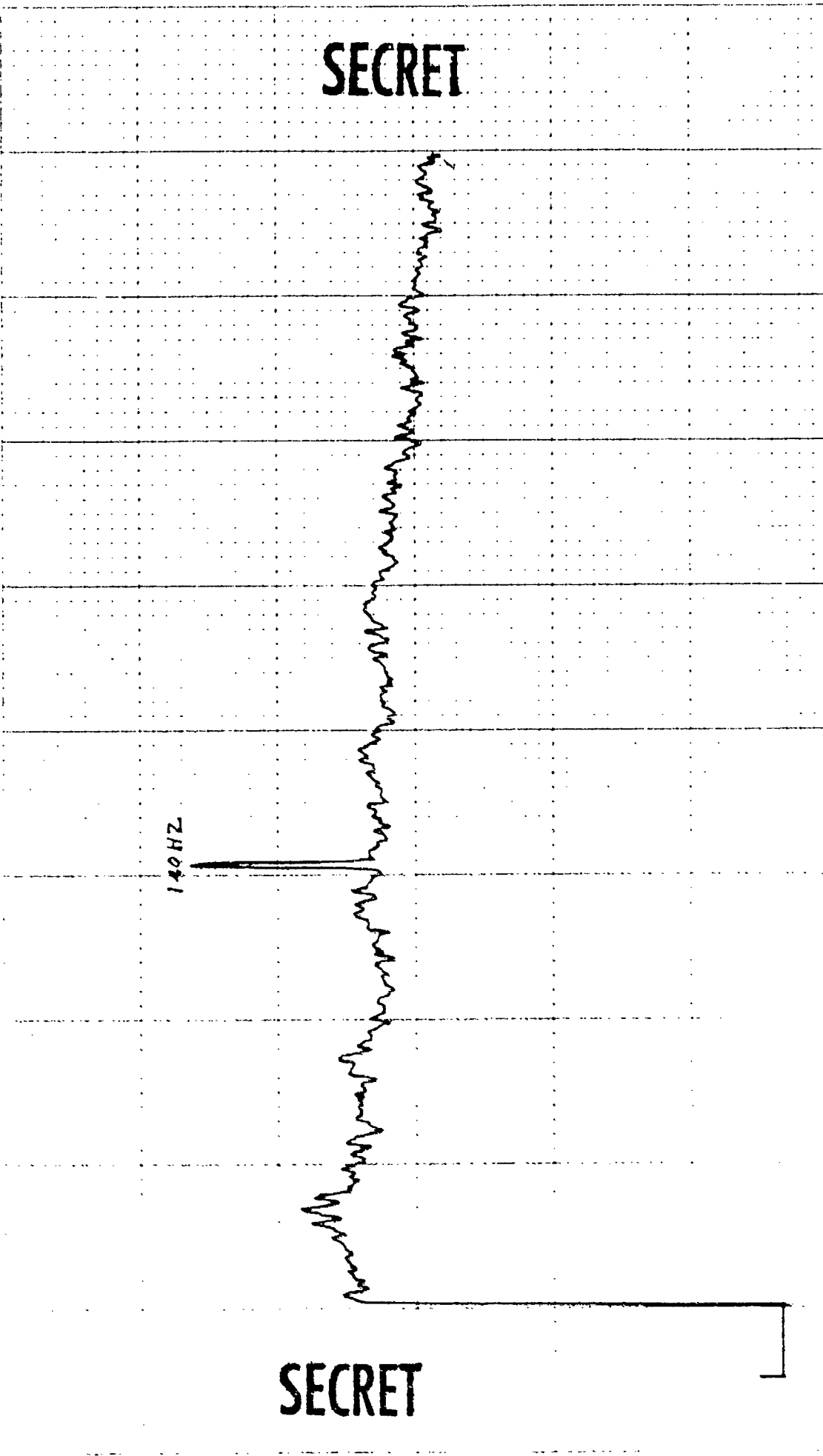
46 0/03

102 54 111 24 108 00

CONTROL: 2-7 -2033 (28)
 OMNI SPECTRUM (ELEMENT 4)
 EXERCISE: BEARING, STAFF
 CENTER FREQ: 150 HZ
 1 ELEMENT

DATE OF ANALYSIS:
 DATE/TIME: 2-7-77 - 2033 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 ——— DEG AZ STEERING

REEL: F23 INDEX 3320
 INTEGRATION TIME 320 SECS ATTEN: - DB
 FILTER WTC: HANNING



SECRET

SECRET

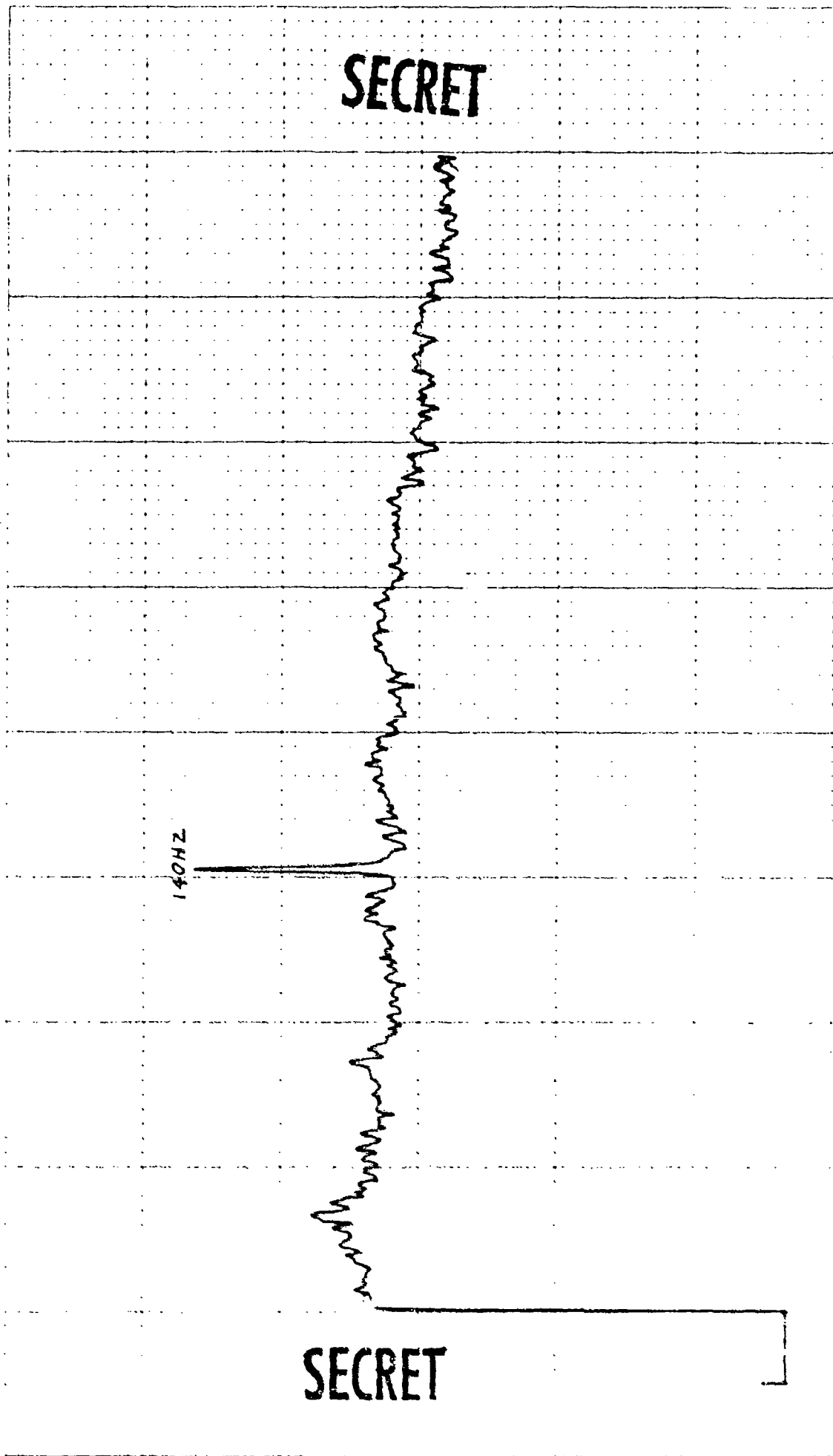
46 0703

CONTROL: 2033 - 51 (P06)
 OMNI SPECTRUM (ELEMENT 6)
 EXERCISE: BEAKING STAKE
 CENTER FREQ: 150 HZ
 1 ELEMENT

DATE OF ANALYSIS:
 DATE/TIME: 2-7-77 - 2033 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: F23 INDEX 3320

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



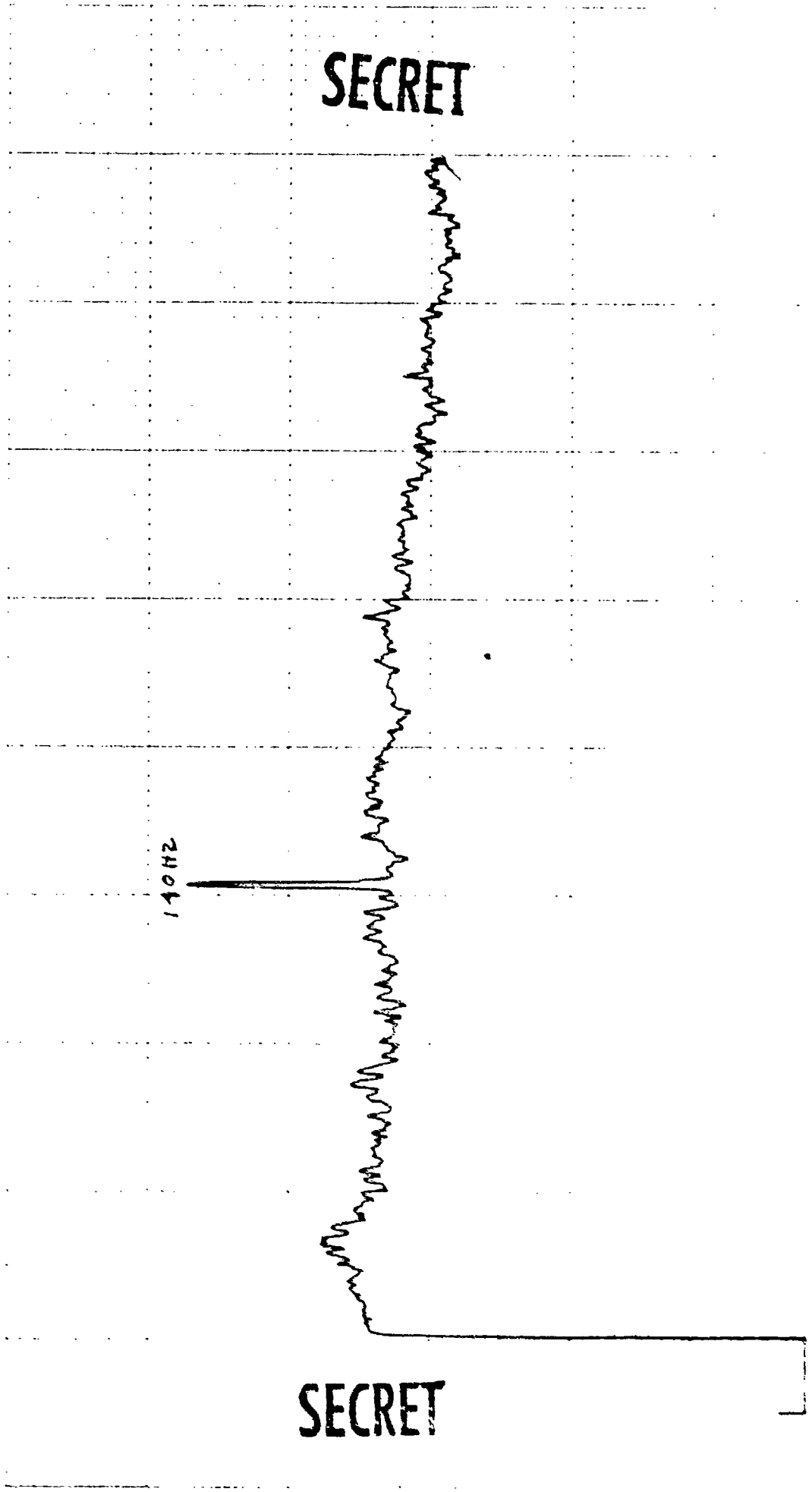
46 0703

CONTROL: 2-7 -2999 (30)
 OMNI SPECTRUM(ELEMENT 9)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 1 ELEMENT

DATE OF ANALYSIS:
 DATE/TIME: 2-7-77 -2033 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 DEG AZ STEERING

REEL: F23 INDEX 3320

INTEGRATION TIME 320 SECS ATTN: DB
 FILTER WTG: HANNING



SECRET

SECRET

46 0703

(02) 4600 0703 0000

CONTROL: 2-7 - 2033 (31)
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

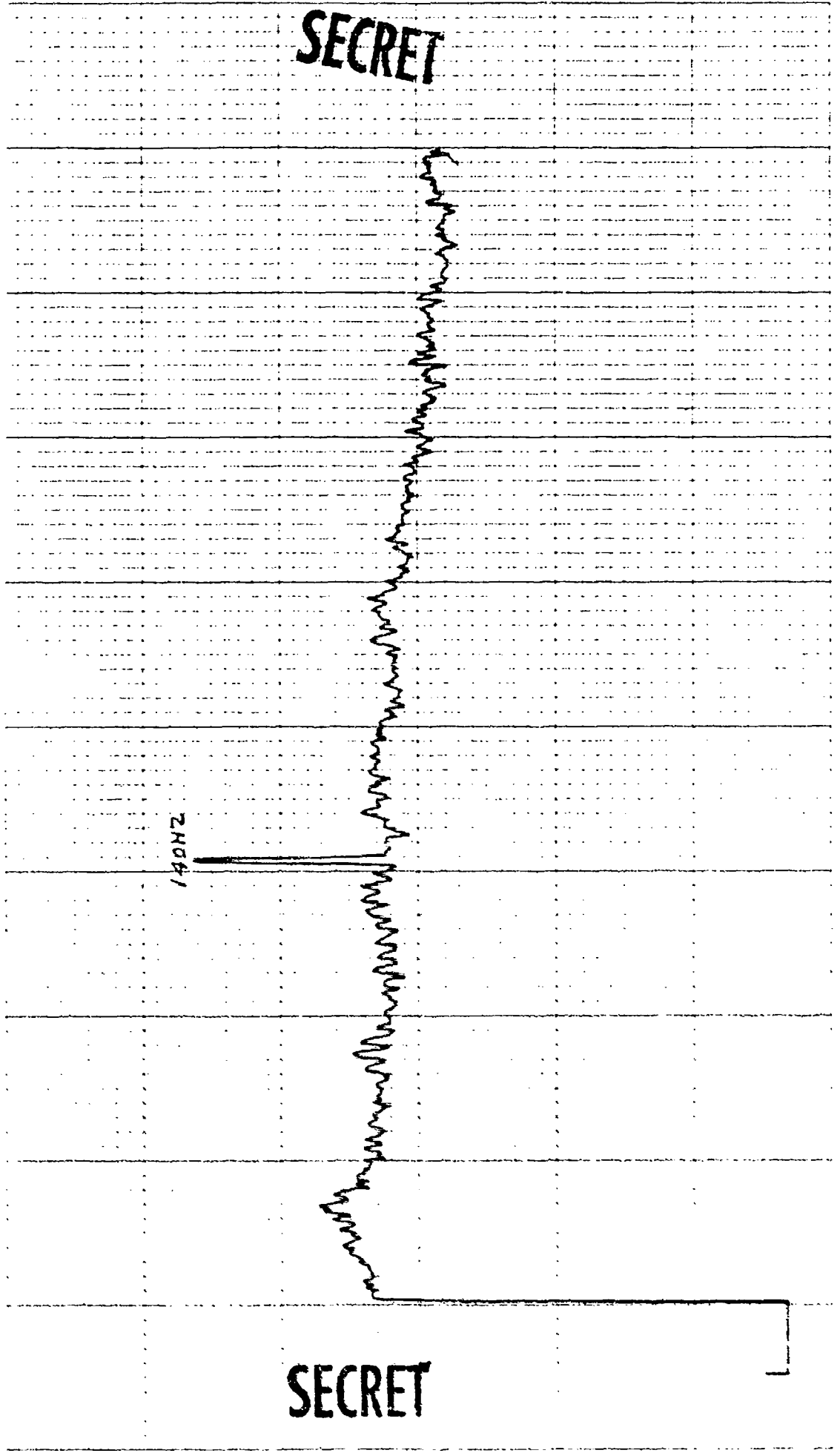
DATE/TIME: 2-7-77 - 2033 Z

ANALYSIS BANDWIDTH: 1/10HZ

_____ DEG AZ STEERING

REEL: F23 INDEX 3324

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



SECRET

SECRET

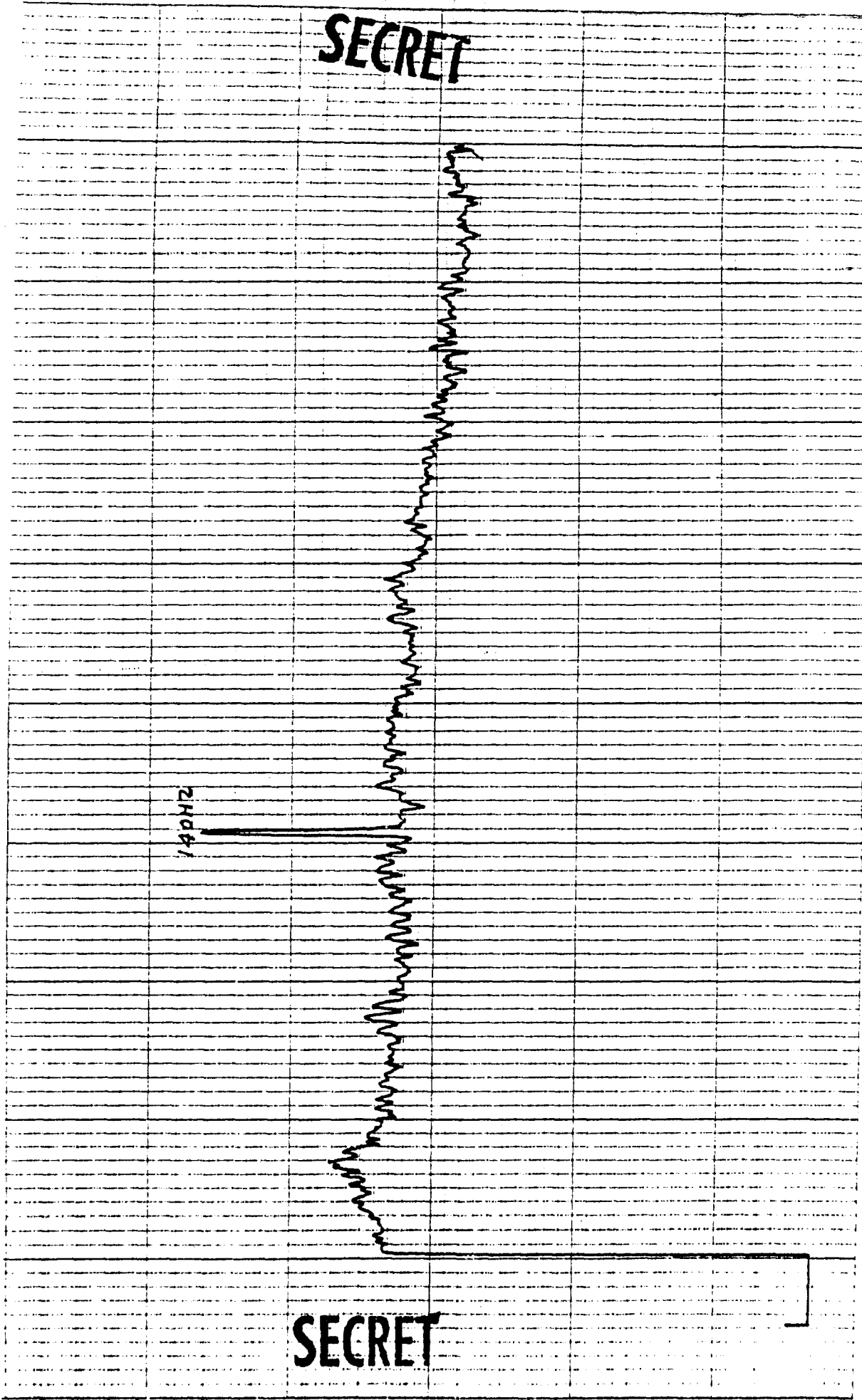
CONTROL: 2-7 - 2032 (31)
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

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

REEL: F23 INDEX 3324



SECRET

SECRET

CONTROL: 2-7-2033 (32)
OMNI SPECTRUM (ELEMENT 12)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

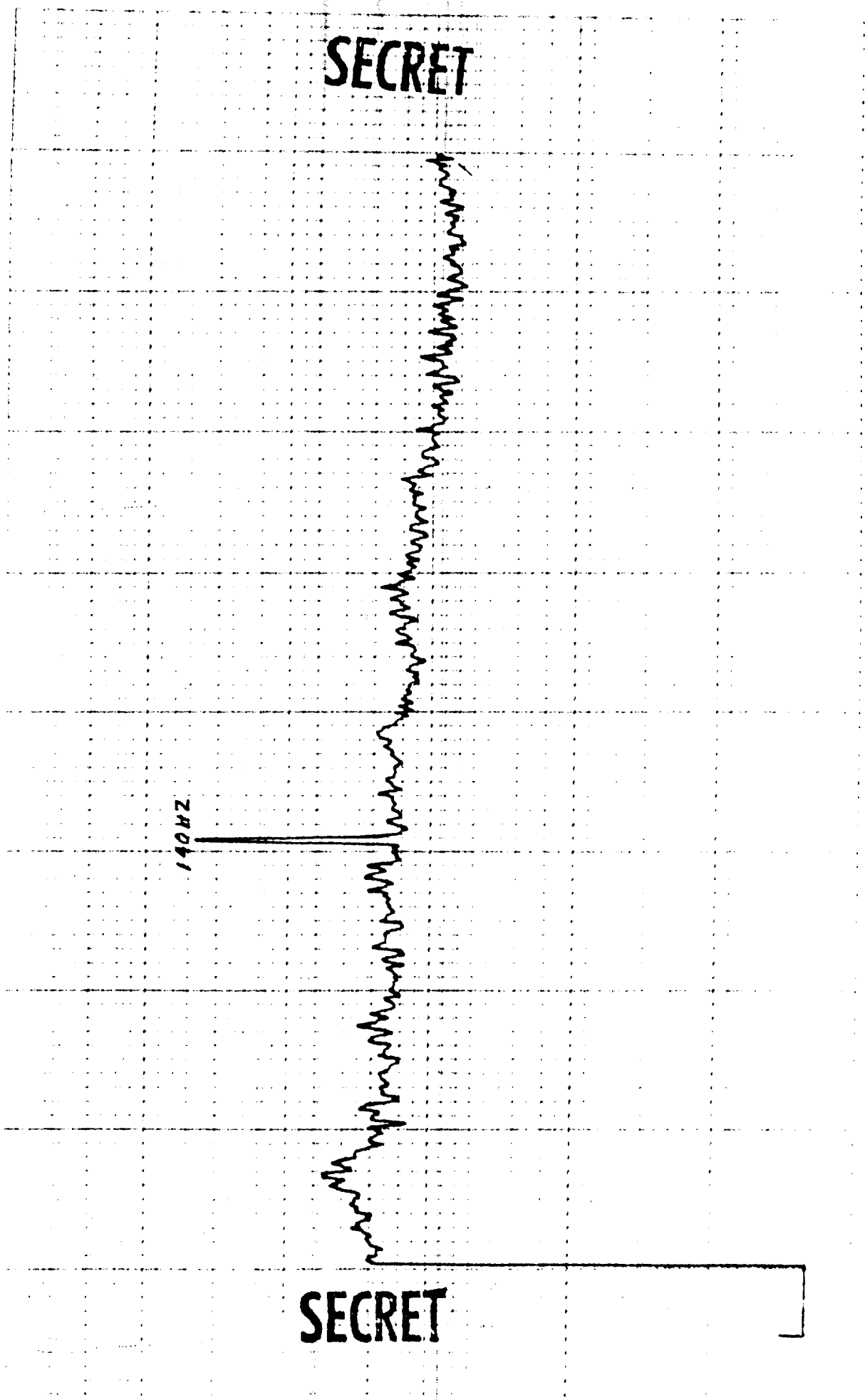
DATE/TIME: 2-7-77 - 2033 Z

ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F23

INDEX 3320

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



SECRET

SECRET

CONTROL: 2-7 -2033 (33)
OMNI SPECTRUM (ELEMENT 14)
EXERCISE: BEARING STAGE
CENTER FREQ: 150 MZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

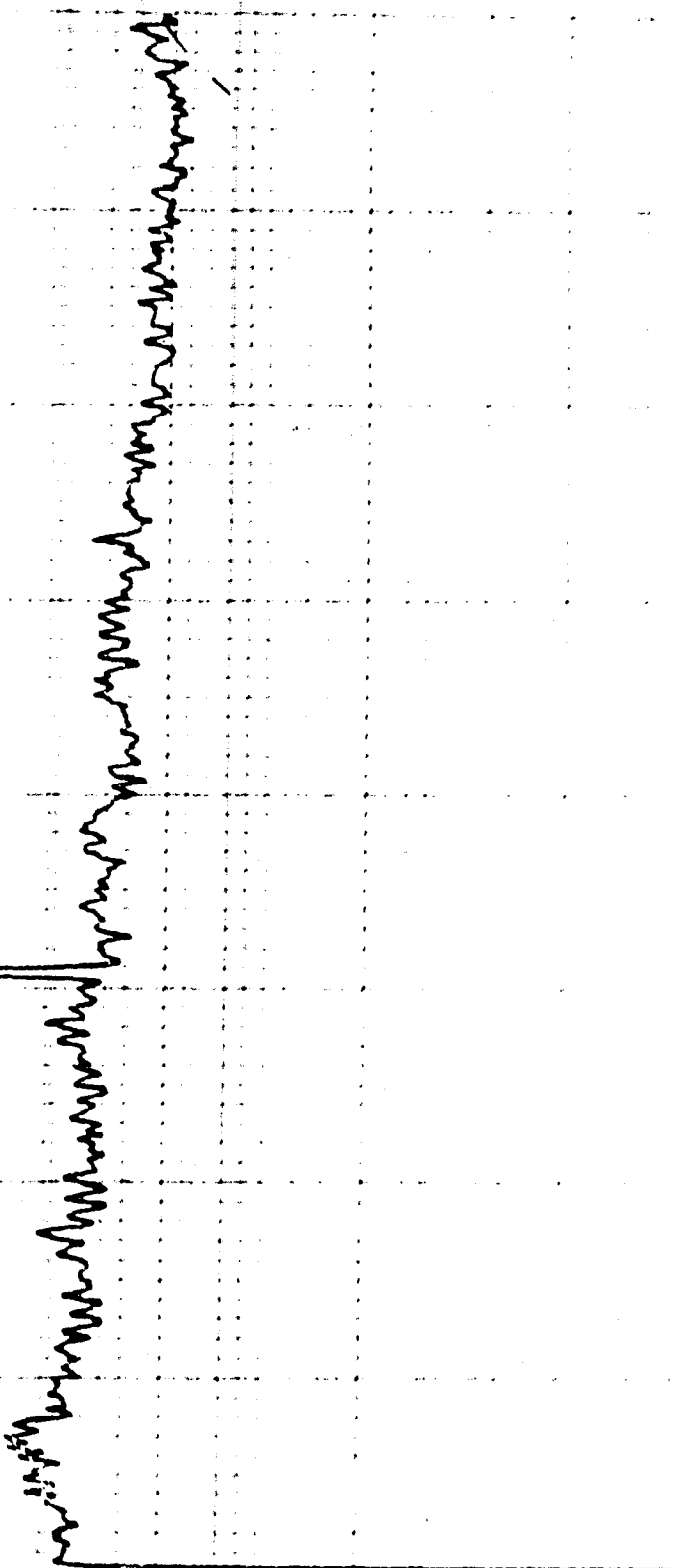
PEEL: F23 INDEX 3320

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

140MZ

SECRET

SECRET



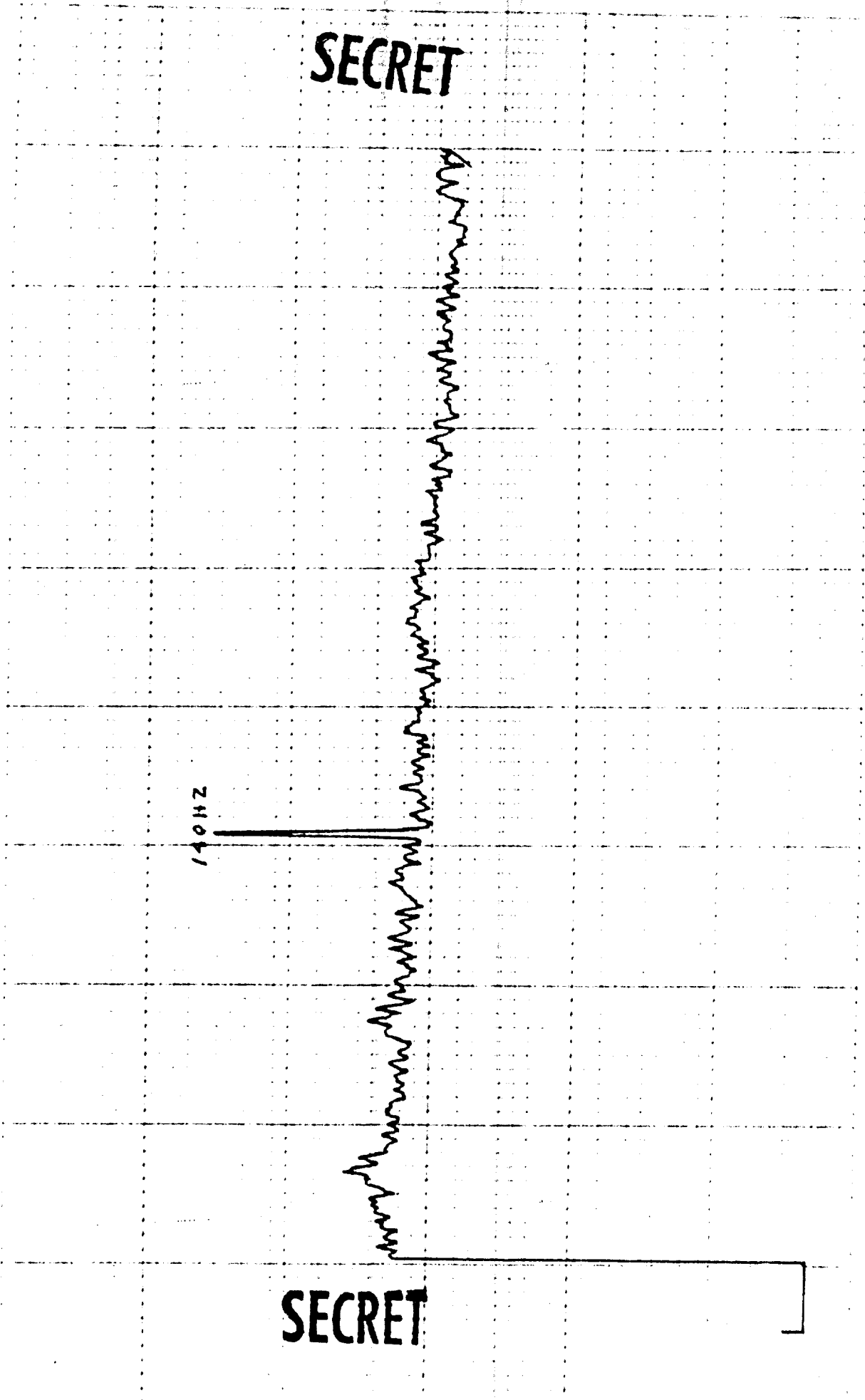
CONTROL: 2-7 - 2033 (34)
OMNI SPECTRUM (ELEMENT 16)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F23 INDEX J320

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



SECRET

SECRET

INDEX: 3326

REF: F23

DATE OF ANALYSIS:

CONTROL: 27-2037 (35)

OMNI SPECTRUM (ELEMENT 19)

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

1 ELEMENT

DATE/TIME: 2-7-77 - 2033 Z

ANALYSIS BANDWIDTH: 1/10 HZ

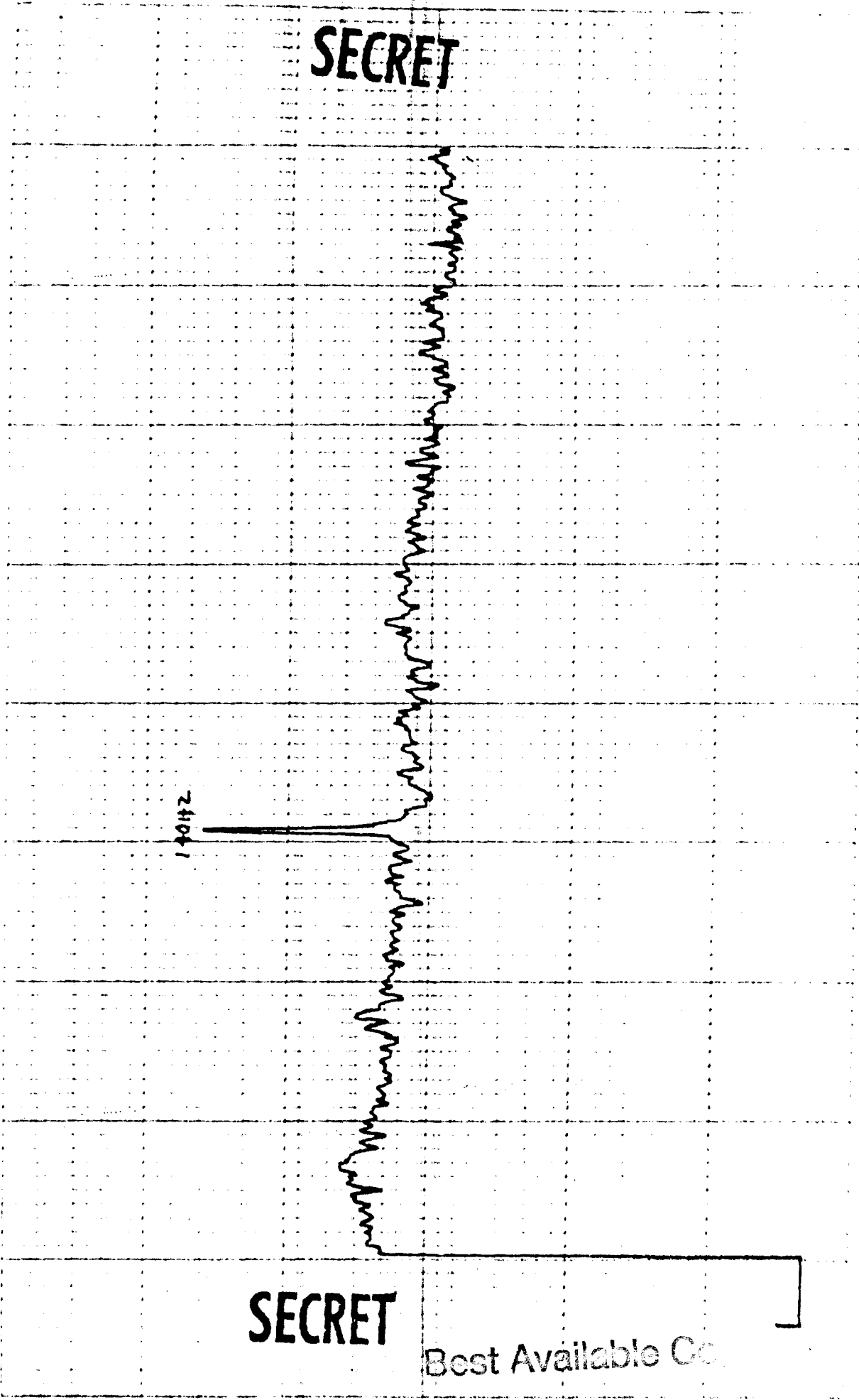
— DEG AZ STEERING

INTEGRATION TIME 320 SECS

ATTEN: — DB

FILTER

WTG: HANNING



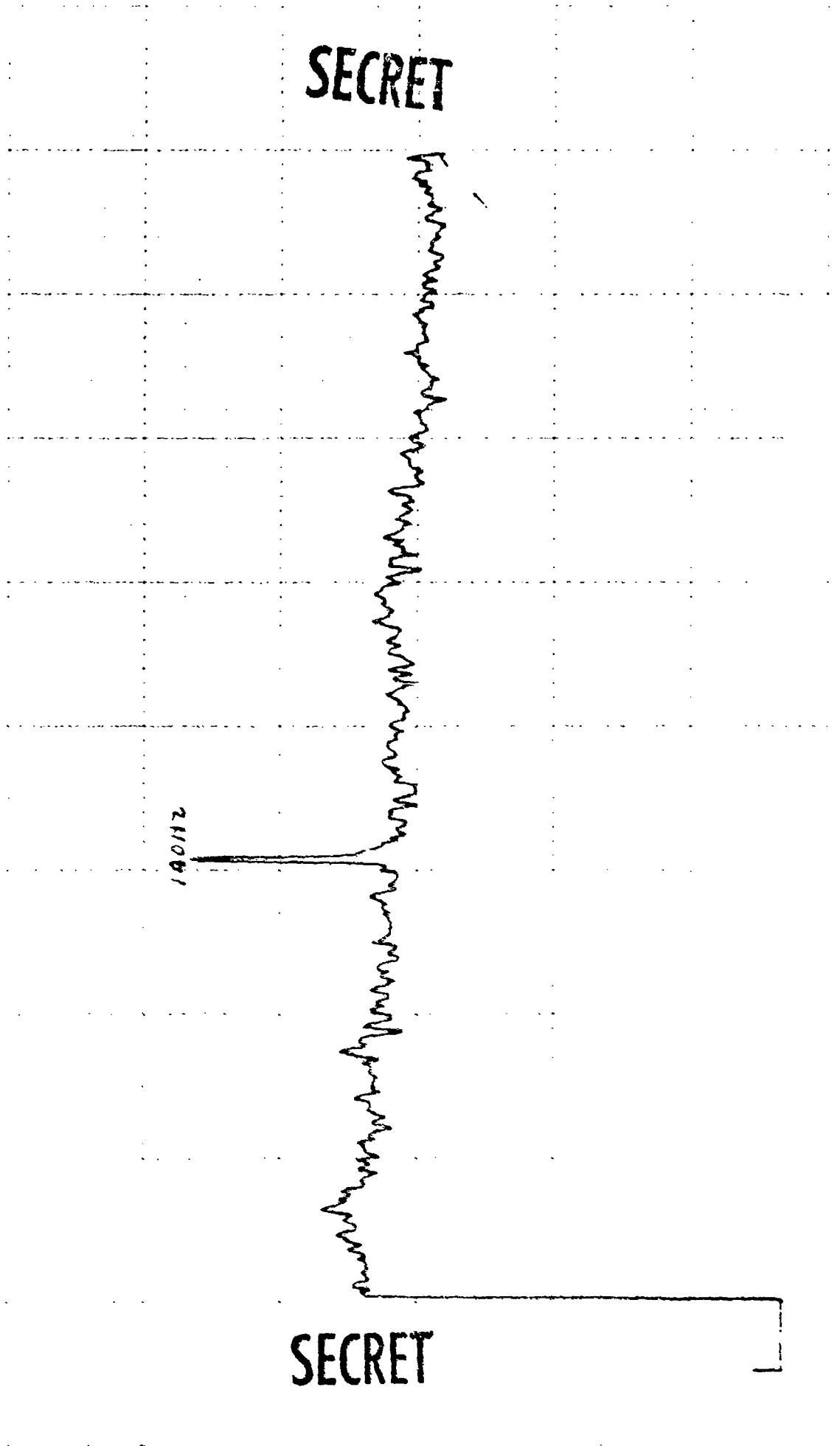
SECRET

Best Available Co

46 0703

152 0000 0000

CONTROL: 2-7 -2033 (36) DATE OF ANALYSIS: REEL: F23 INDEX J22
 OMNI SPECTRUM (ELEMENT 20) DATE/TIME: 2-7-77 -2033 Z
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/1007 INTEGRATION TIME 320 SECS ATTEN: - DB
 CENTER FREQ: 150.87 DEG AZ BEARING FILTER WIG: HANNING
 ELEMENT



SECRET

SECRET

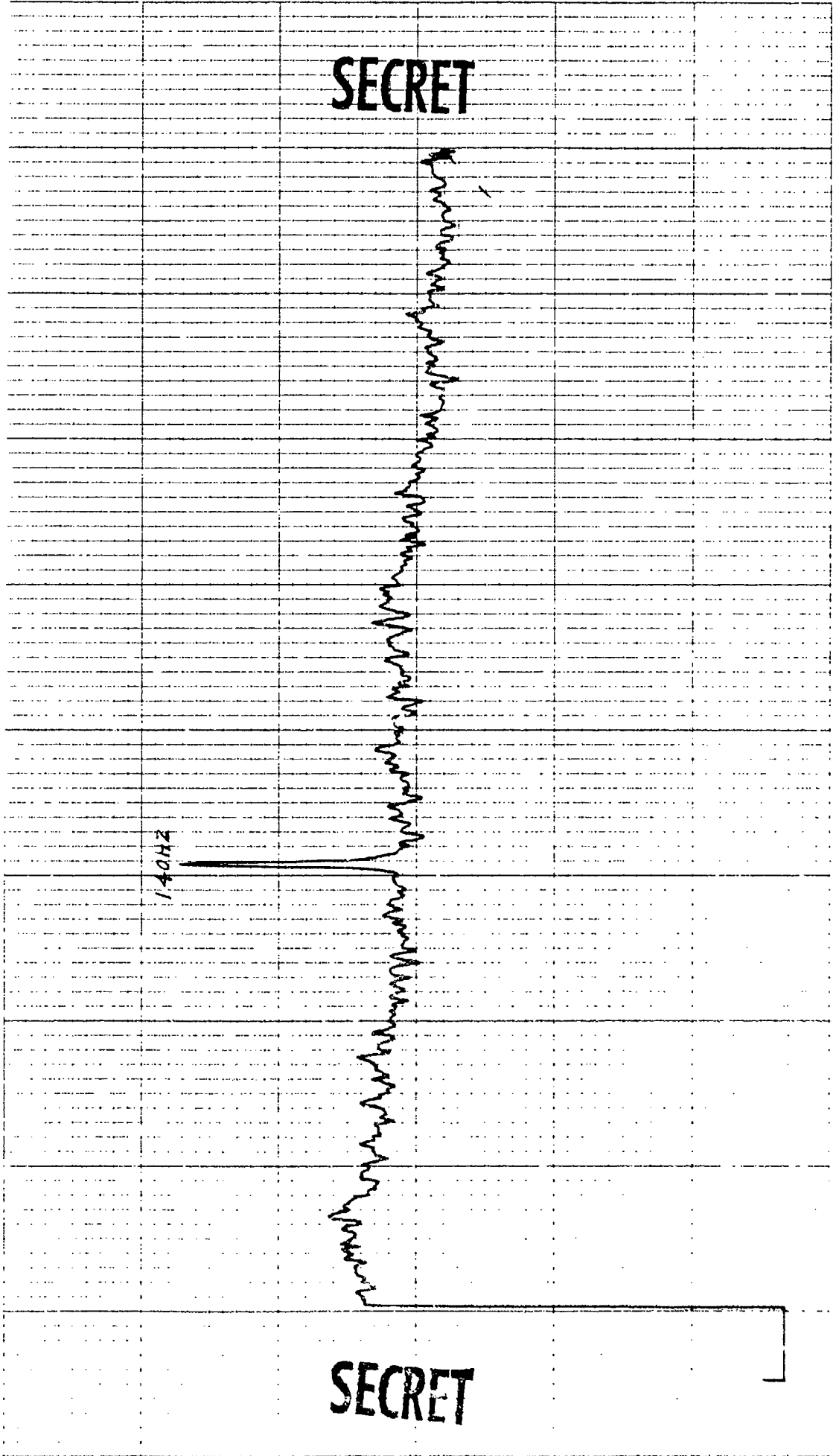
CONTROL: 2-7 -2033 (37)
OMNI SPECTRUM (ELEMENT 23)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ STEERING

REEL: F23 INDEX 3320

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



46 0703

10-2 1000 1000 1000 1000

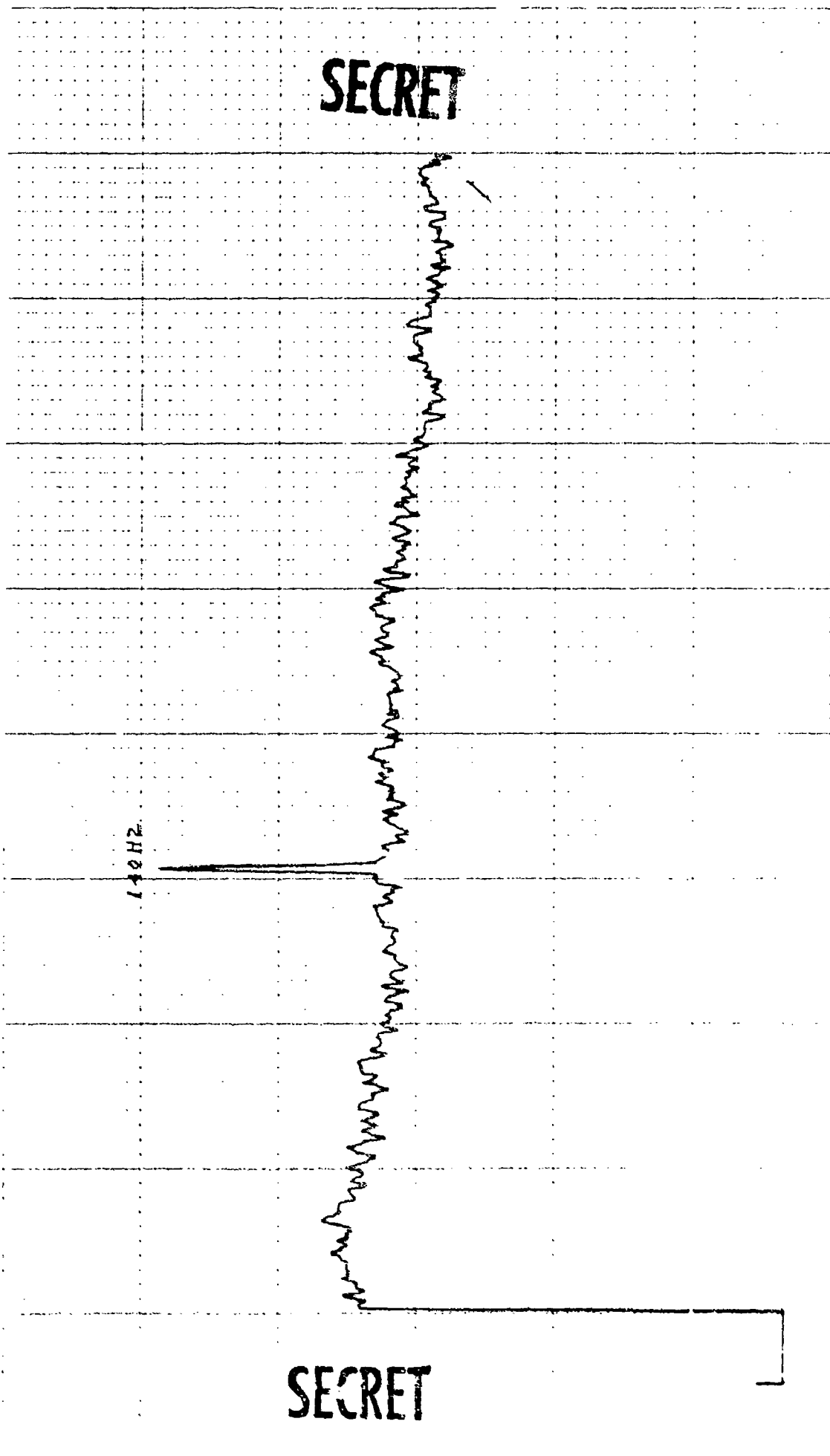
CONTROL: 2-7 - 2033 (38)
OMNI SPECTRUM (ELEMENT 24)
EXERCISE: BEAKING STAKE
CENTER FREQ: 150 HZ
: ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC A2 STEERING

REEL: F23 INDEX 3320

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



SECRET

SECRET

46 0700

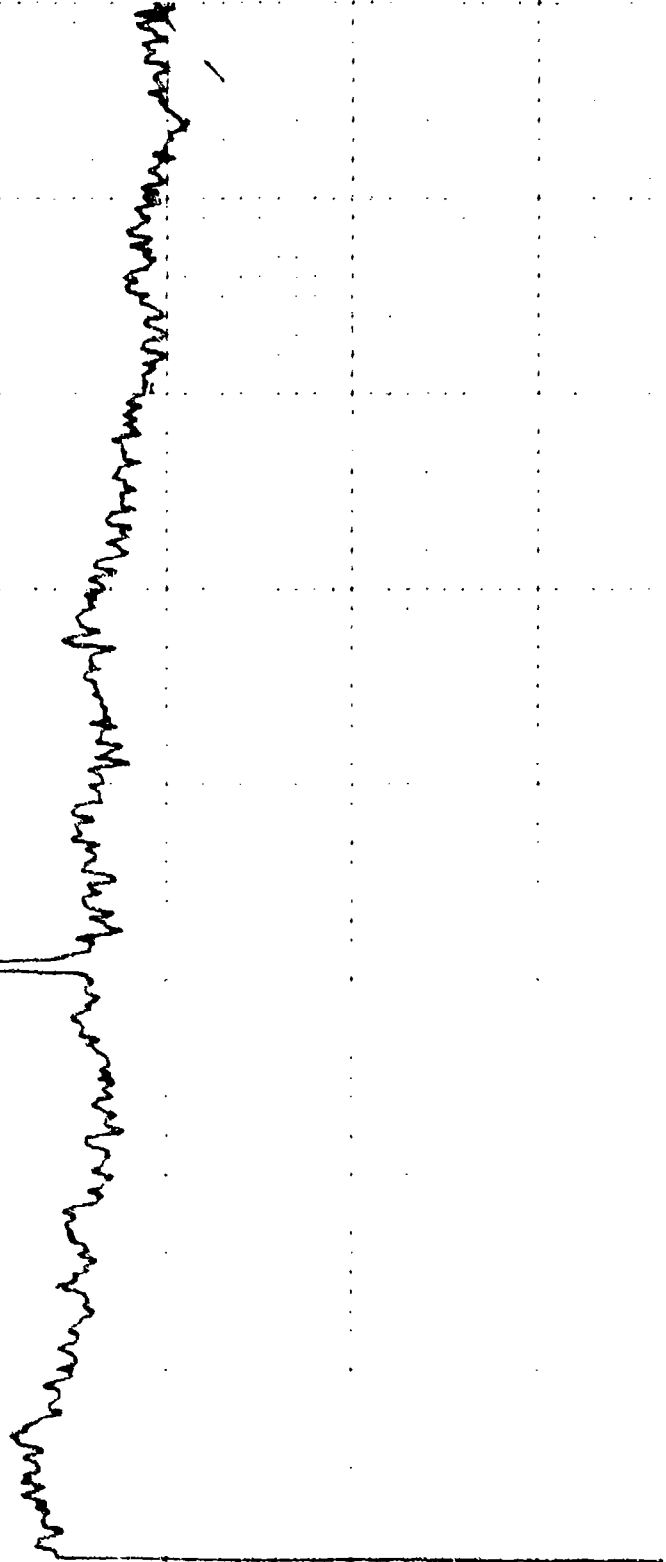
CONTROL: 2.7 - 2033 (39) REEL: F23 INDEX 3320
OMNI SPECTRUM ELEMENT 26
EXERCISE: BEARING STAFF
CENTER FREQ: 150 HZ
ELEMENT

DATE OF ANALYSIS:
DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS: BANDWIDTH: 1710HZ INTEGRATION TIME 320 SECS ATTEN: - DB
- - - - - DEC AZ STEERING FILTER WTG: HANNING

140HZ

SECRET

SECRET



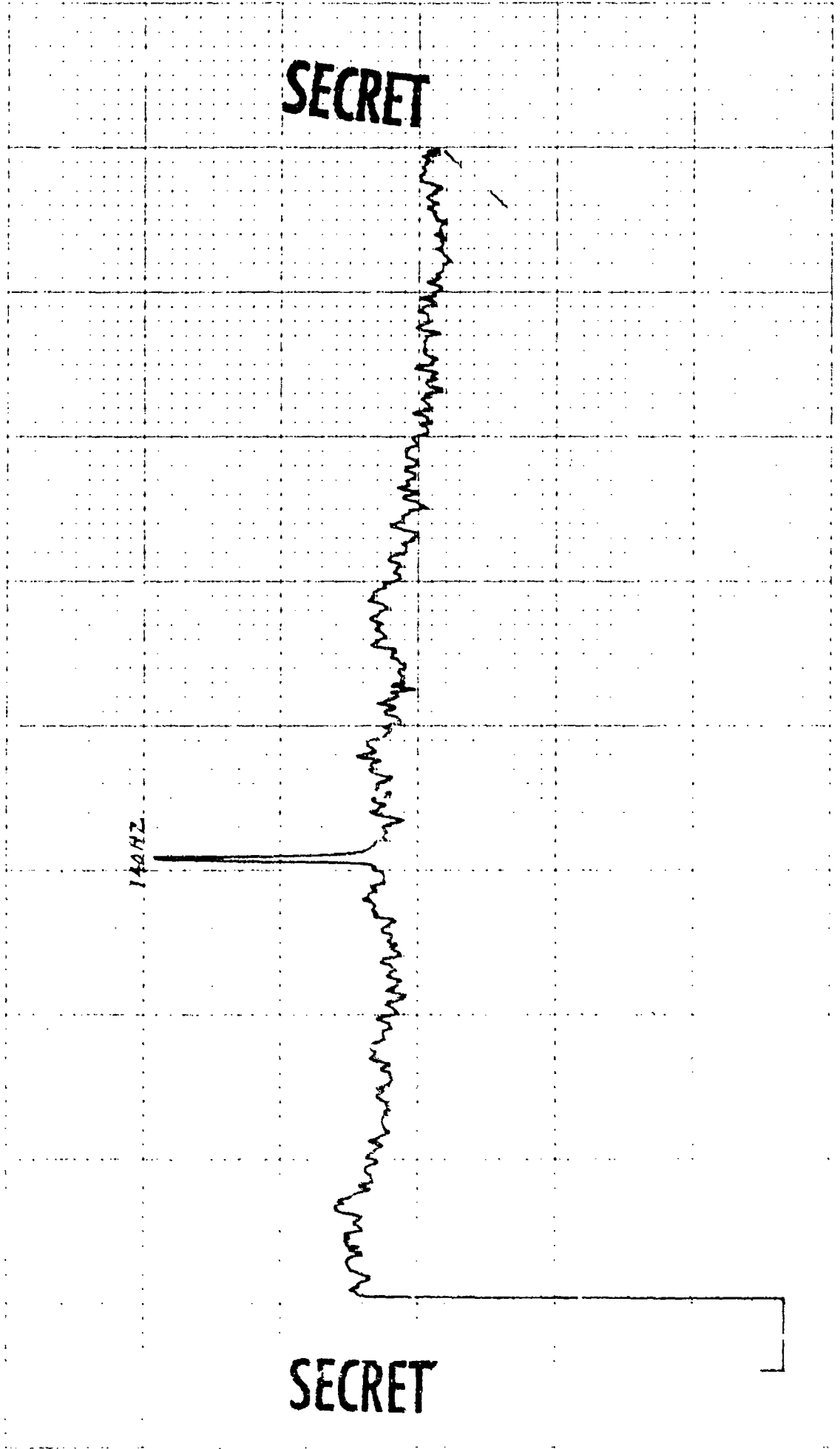
46 0703

REEL: F23 INDE.: 3320

DATE OF ANALYSIS:
DATE/TIME: 2-7-77 - 2033Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

CONTROL: 2-7-2033 (40)
OMNI SPECTRUM (ELEMENT 29)
EXERCISE: BEAKING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

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



4C 0703

192. 40 700 5000 Hz

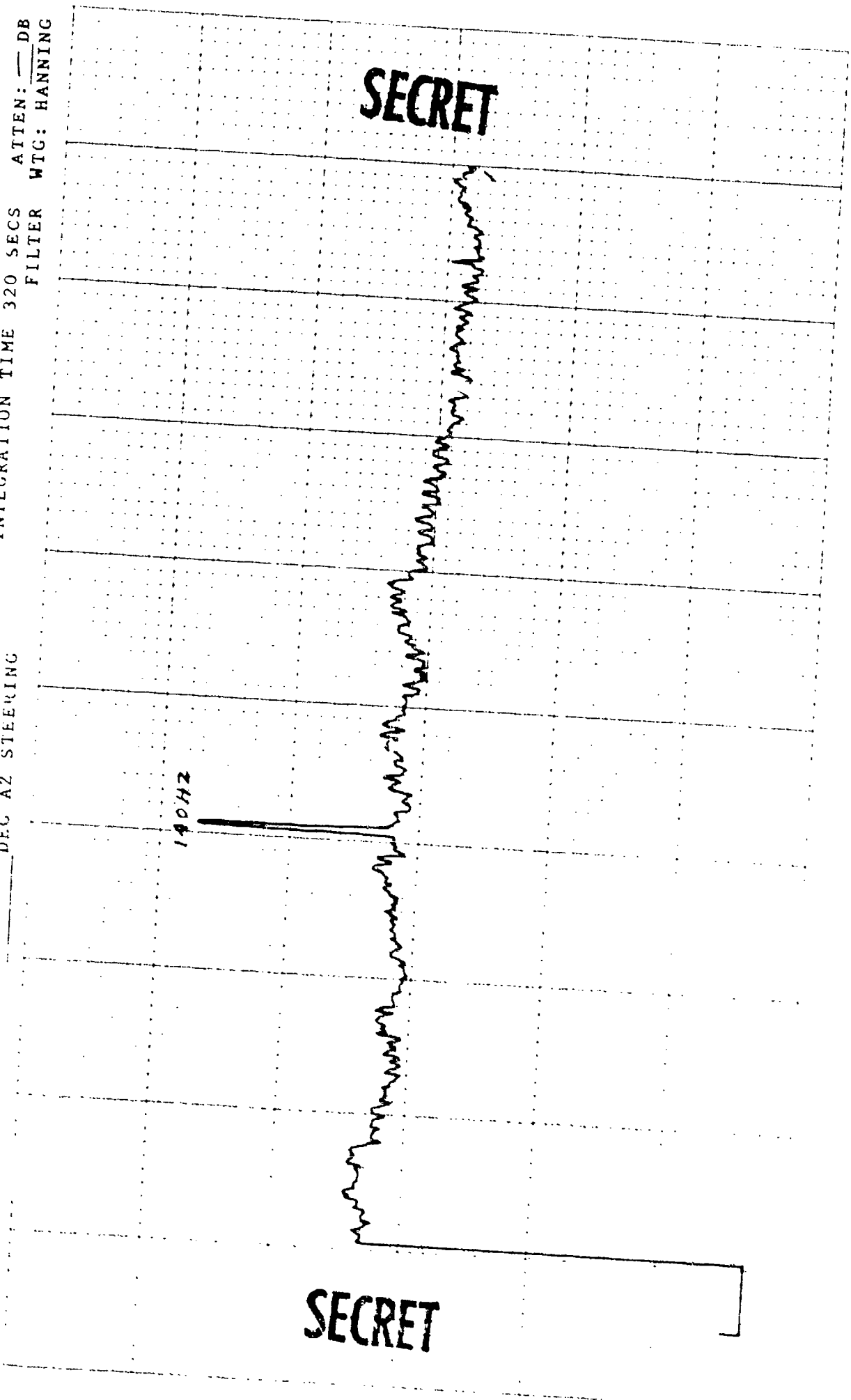
CONTROL: 2.7 - 2037 (41)
OMNI SPECTRUM (ELEMENT 31)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEC AZ STEERING

REEL: F23 INDEX J320

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



SECRET

SECRET

46 0703

CONTROL: 2.7 - 2033 (42)
OMNI SPECTRUM (ELEMENT 33)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEC AZ STEERING

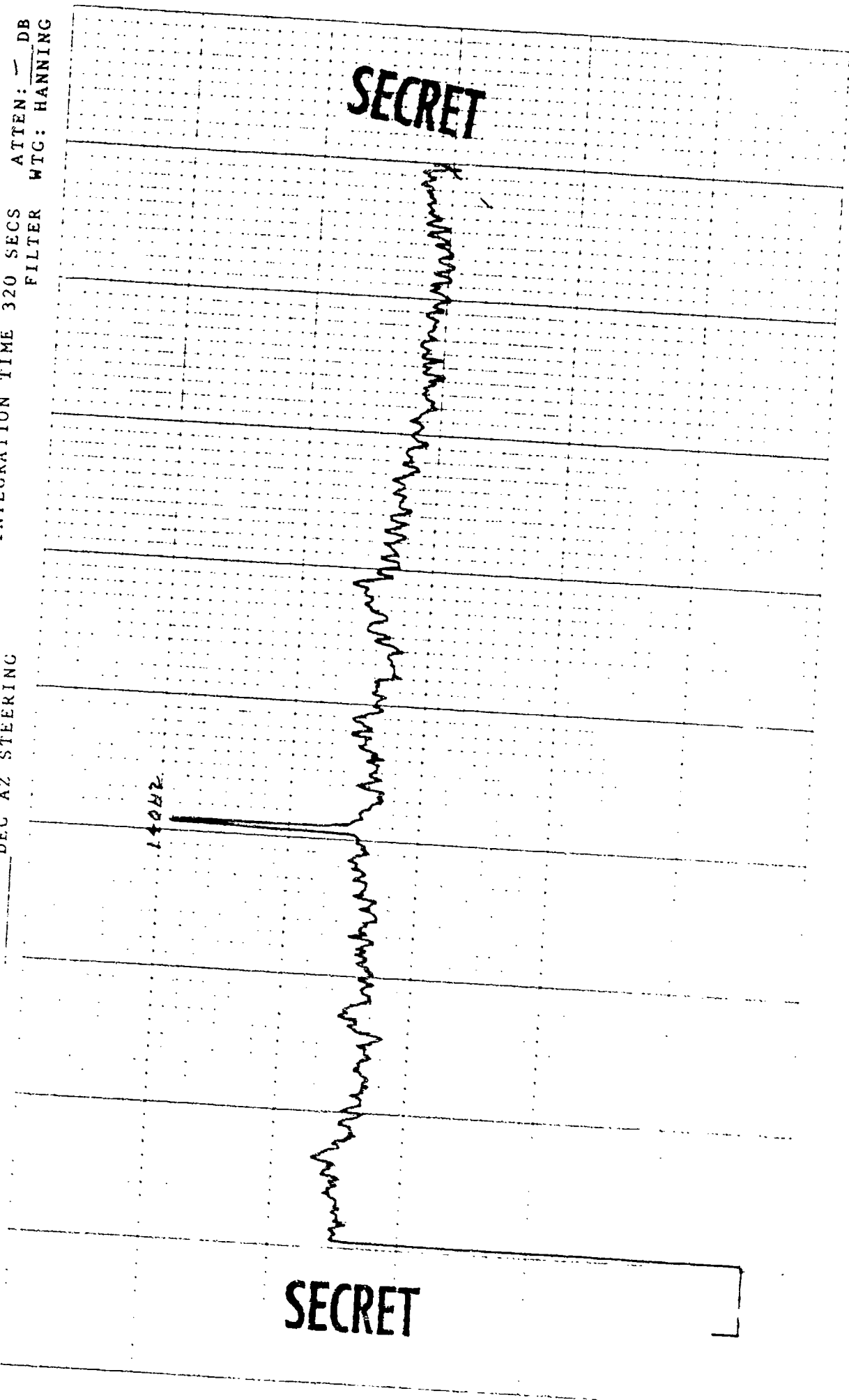
REEL: F23 INDEX 333

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

140HZ

SECRET

SECRET



46 0703

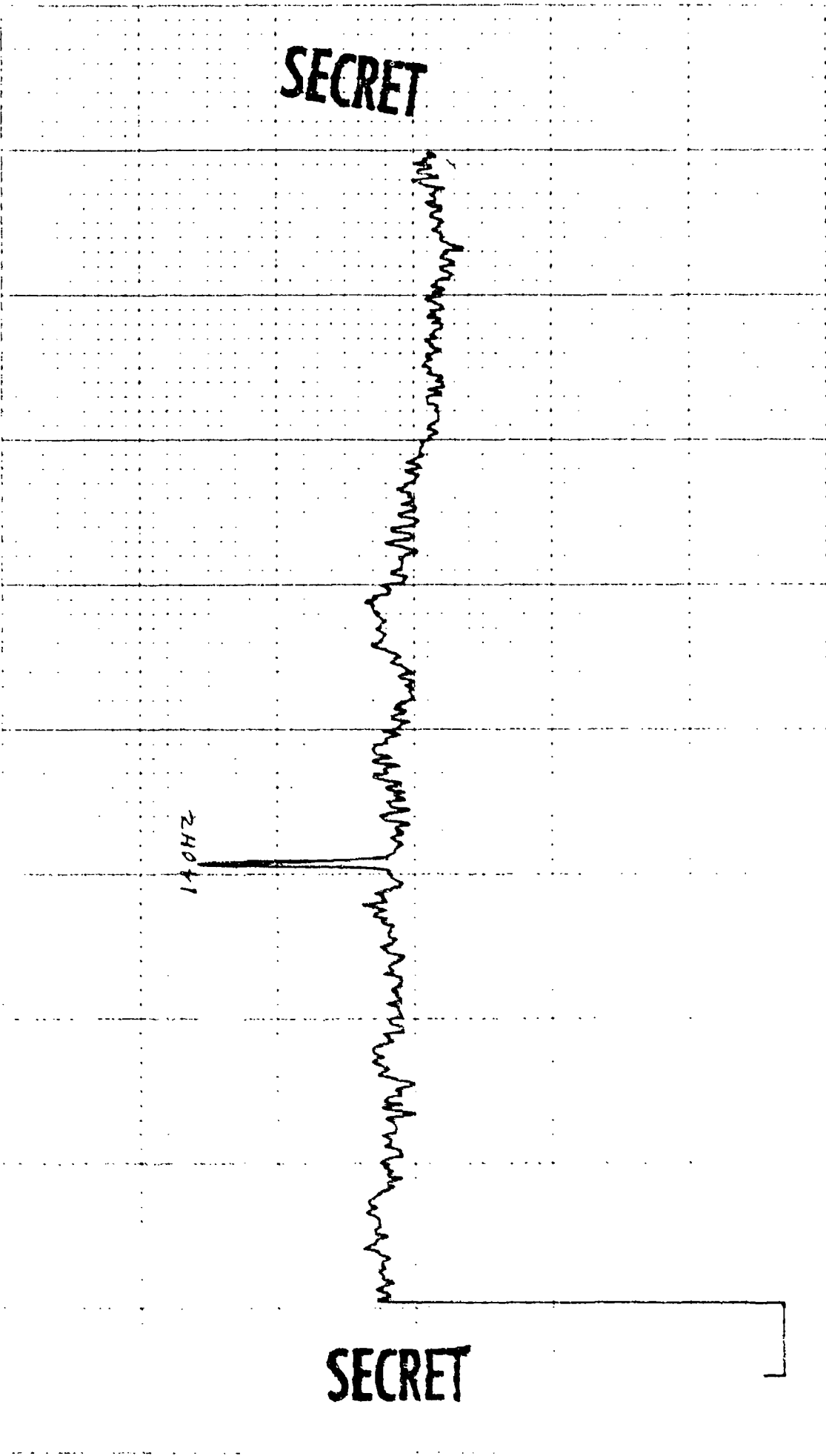
CONTROL: 2-7 - 2013 (47)
OMNI SPECTRUM (ELEMENT 35)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2037 Z
ANALYSIS BANDWIDTH: 1/10 HZ
1 DEG AZ STEERING

REEL: F23 INDEX 3320

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



46 0703

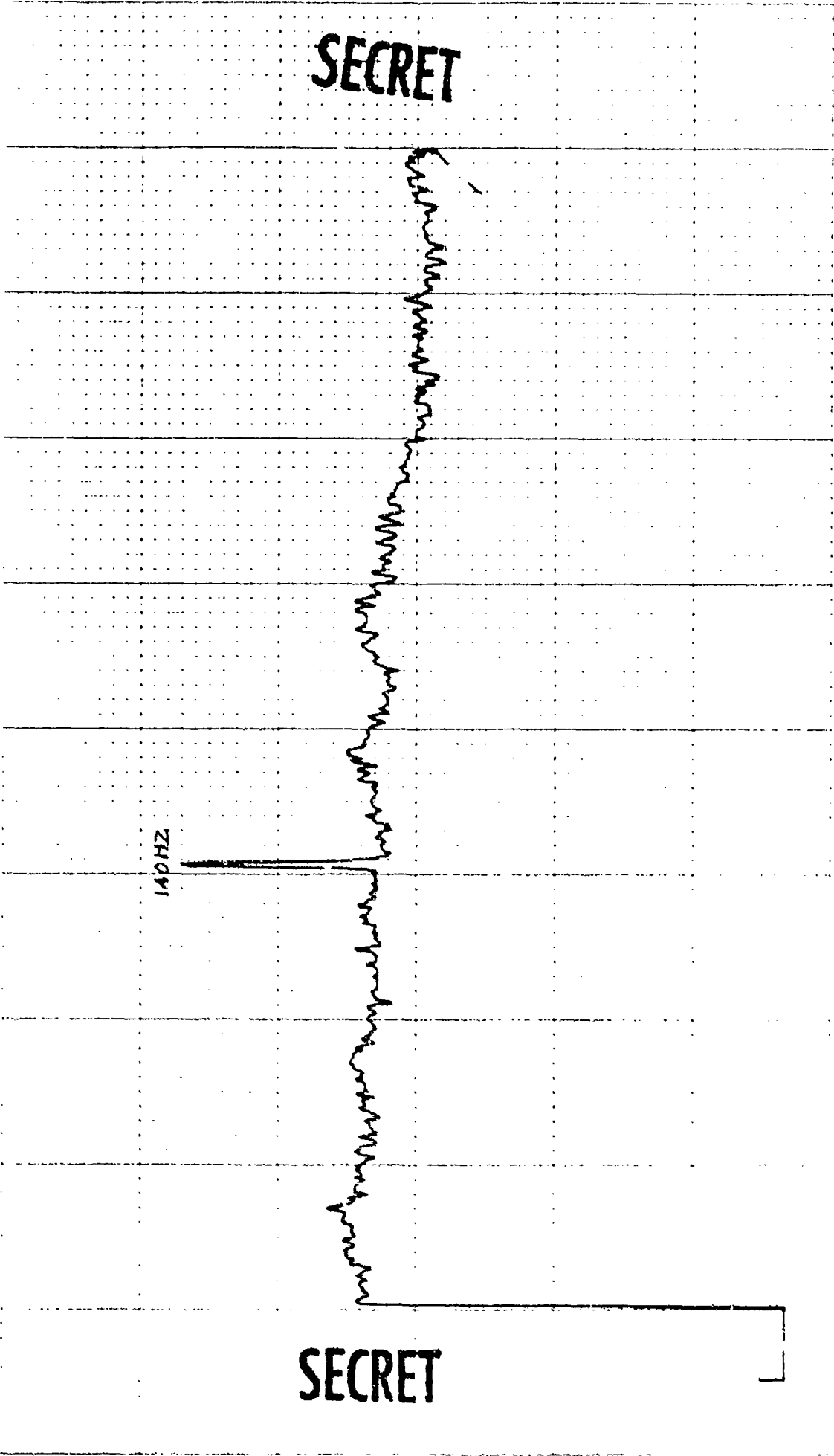
CONTROL: 2-7 - 2039 (44)
OMNI SPECTRUM (ELEMENT 37)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2039 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: F23 INDEX 332

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



SECRET

SECRET

46 0703

16-2 1400 101400 0000 0000

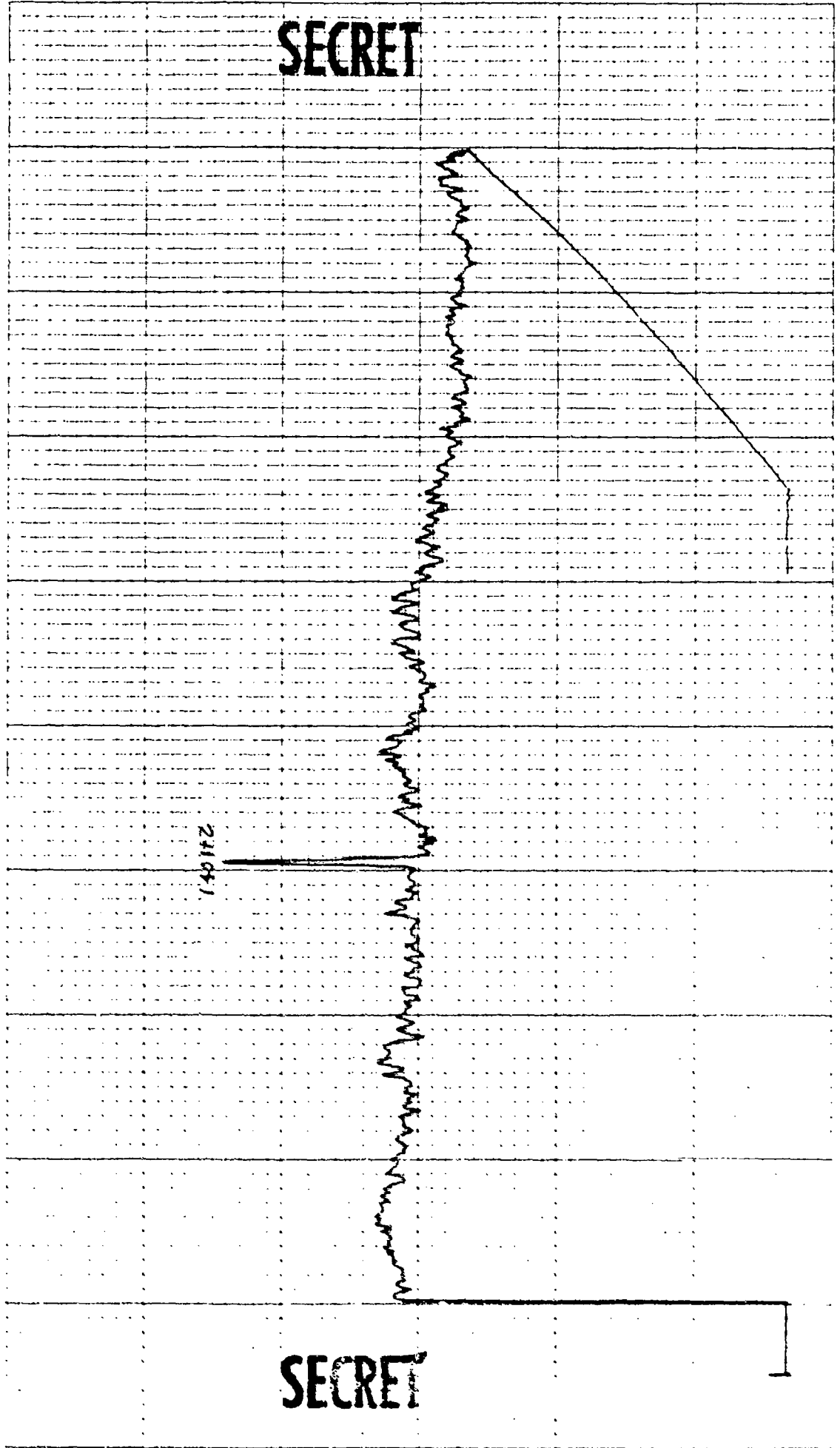
CONTROL: 2-7 - 2033 (45)
OMNI SPECTRUM (ELEMENT 39)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 KHZ
I ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
_____ DEG AZ STEERING

REEL: F23 INDEX 3320

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



46 0703

KOE 10/10/73 08:10:00

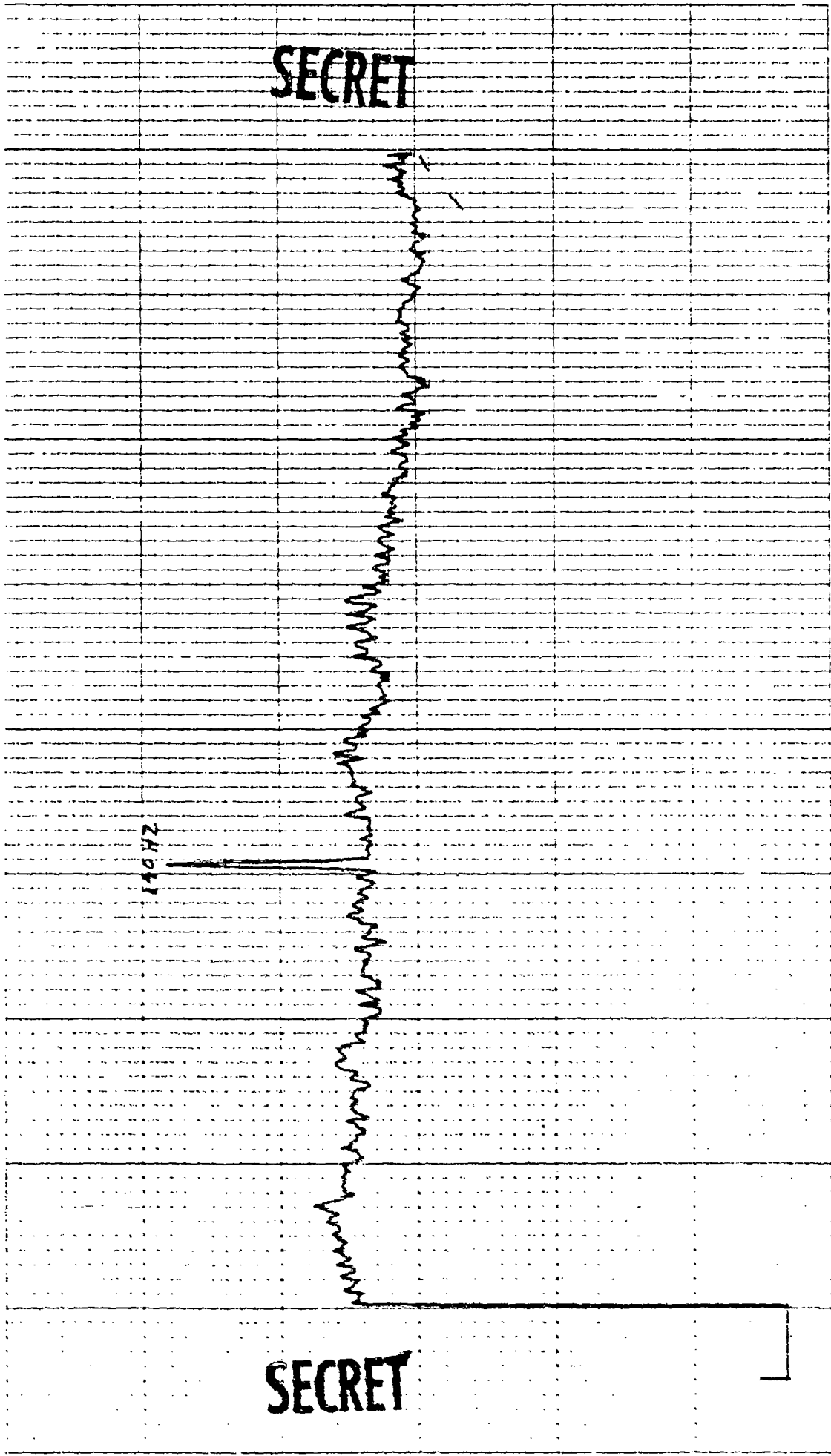
REEL: F23 INDEX 332

DATE OF ANALYSIS:

CONTROL: Z-7 - 2073 (46)
OMNI SPECTRUM (ELEMENT 41)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE/TIME: Z-7-73 - 2033 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEC AZ STEERING

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING

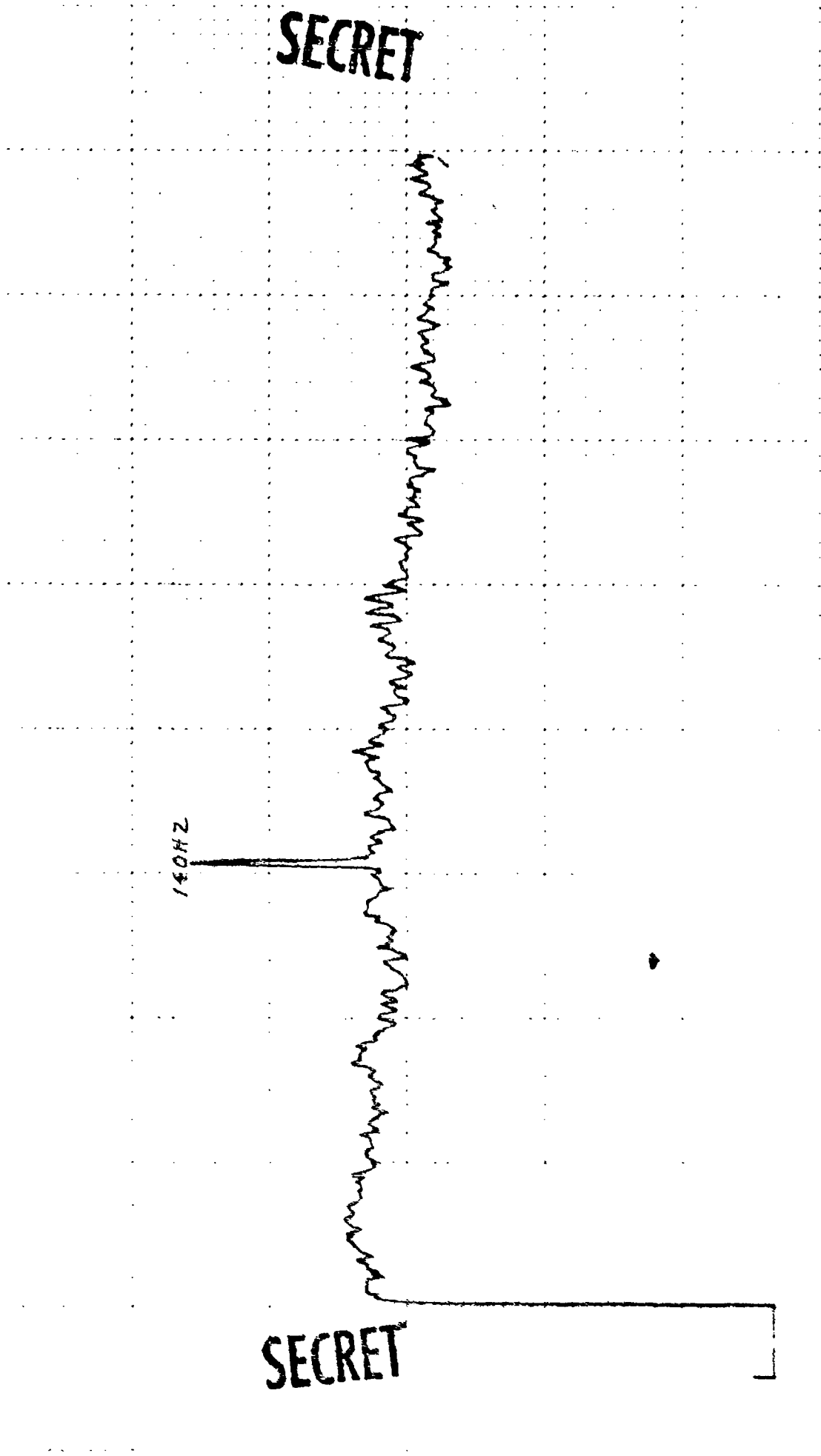


SECRET

SECRET

46 0703

CONTROL: 27-2023 (47) DATE OF ANALYSIS: PEEL: F23 INDEX 3720
 OMSI SPECTRUM/ELEMENT 93)
 EXERCISE: BEARING STAYE
 CENTER FREQ: 150 HZ
 BANDWIDTH: 1000Z
 FILTER WTG: HANNING
 INTEGRATION TIME 320 SECS
 ATTN: - DB
 DEC AT: SLEEPING



SECRET

SECRET

46 0703

CONTROL: 2-7 - 2073 (40)
OMNI SPECTRUM (ELEMENT 45)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

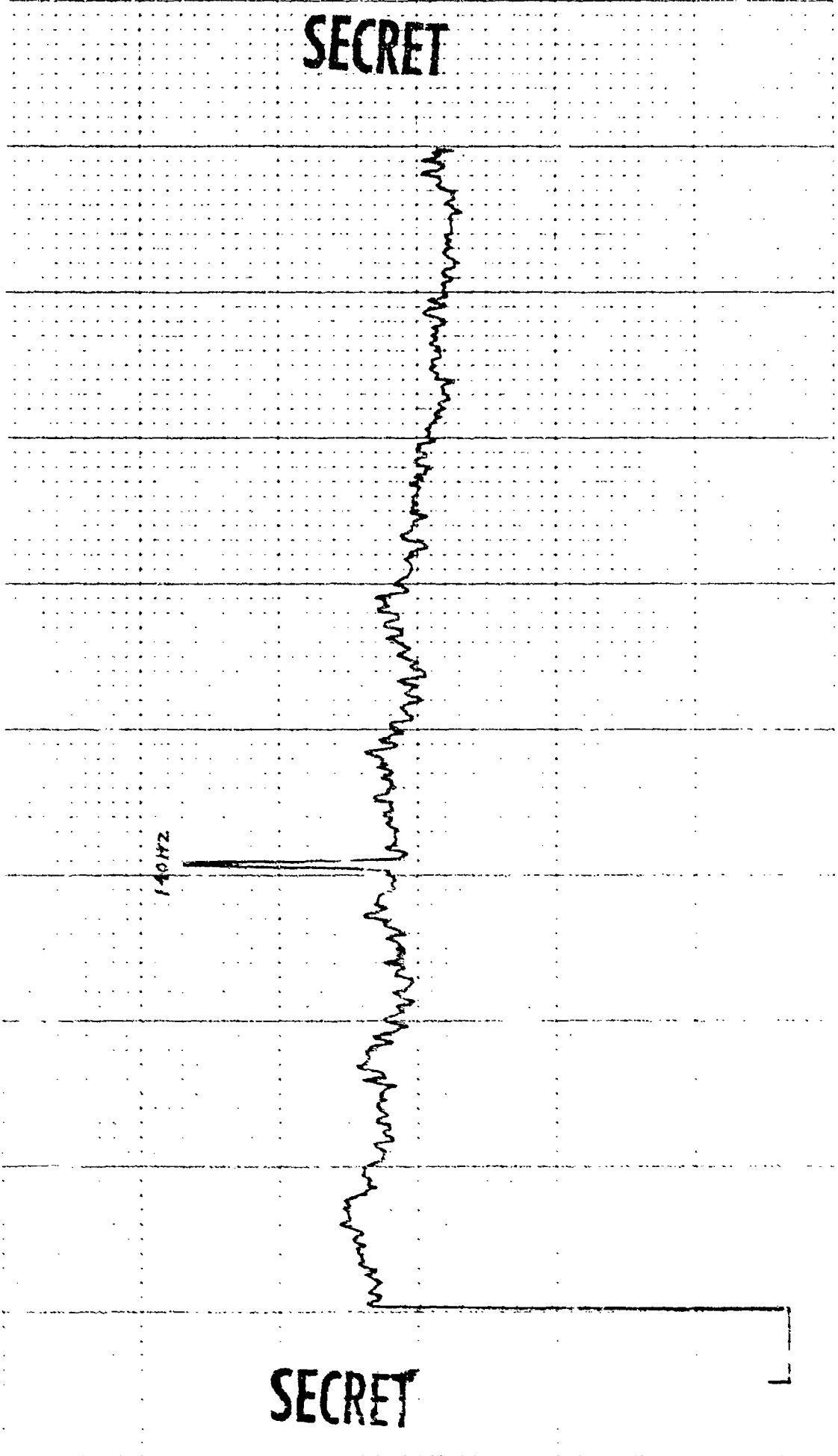
DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2073 Z
ANALYSIS BANDWIDTH: 1/10HZ
..... DEG AZ STEERING

REEL: F23

INDEX 3320

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING



SECRET

SECRET

46 0703

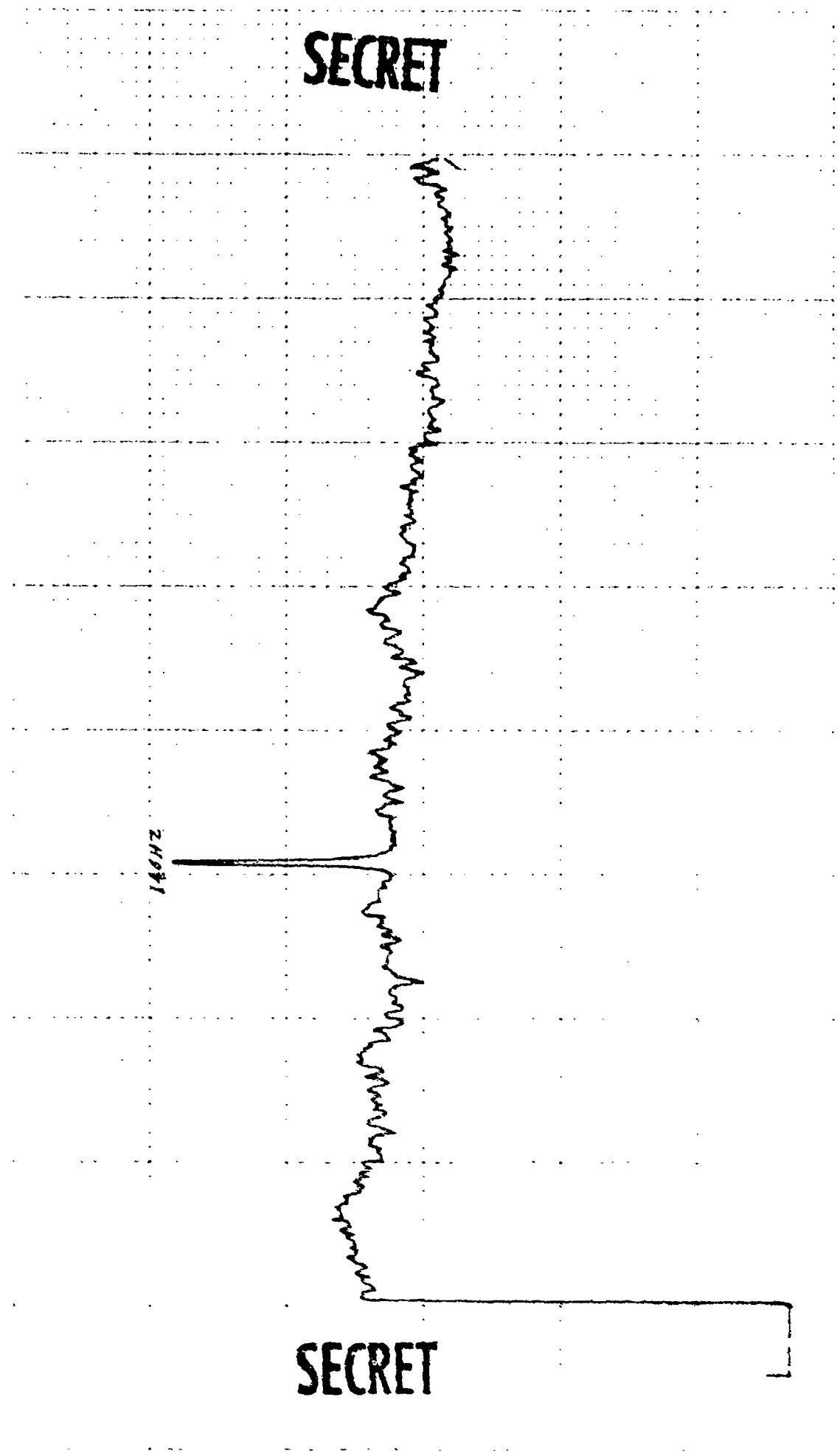
CONTROL: 2-7 - 2033 (49)
OMNI - SPECTRUM (ELEMENT 47)
PACIFIC SE: BEARING: 318 FT
CENTER FREQ: 150 MZ
ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 /
ANALYSIS BANDWIDTH: 1 / 10 HZ /
DEC. AZ: 318 DEGR.

REEL: F23 INDEX: 3720

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING



SECRET

SECRET

46 0703

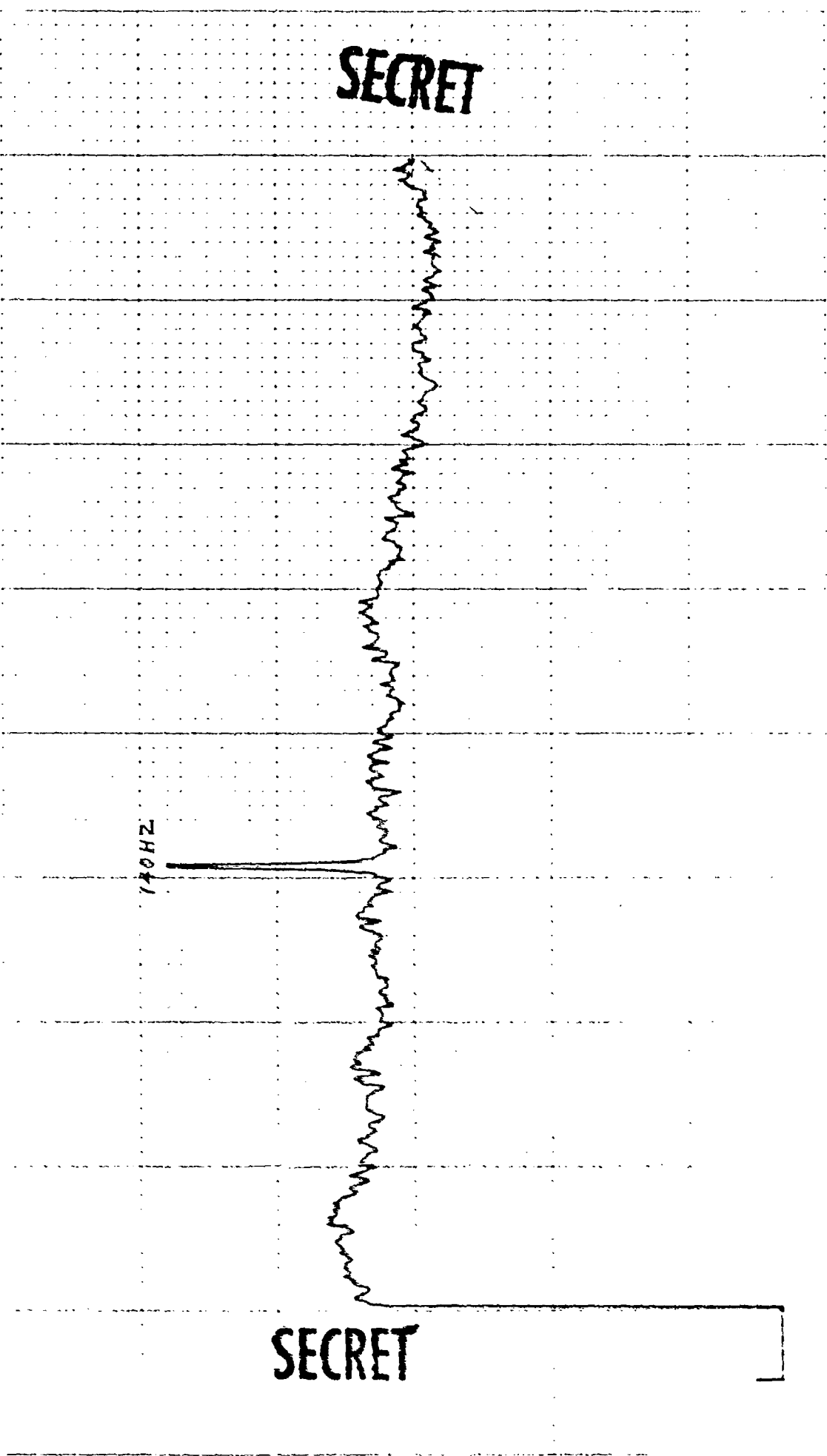
CONTROL: 2.7 - 2033 (50)
OMNI SPECTRUM (ELEMENT 49)
EXERCISE: BEARING STAB.
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: 523 INDEX: 3320

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



SECRET

SECRET

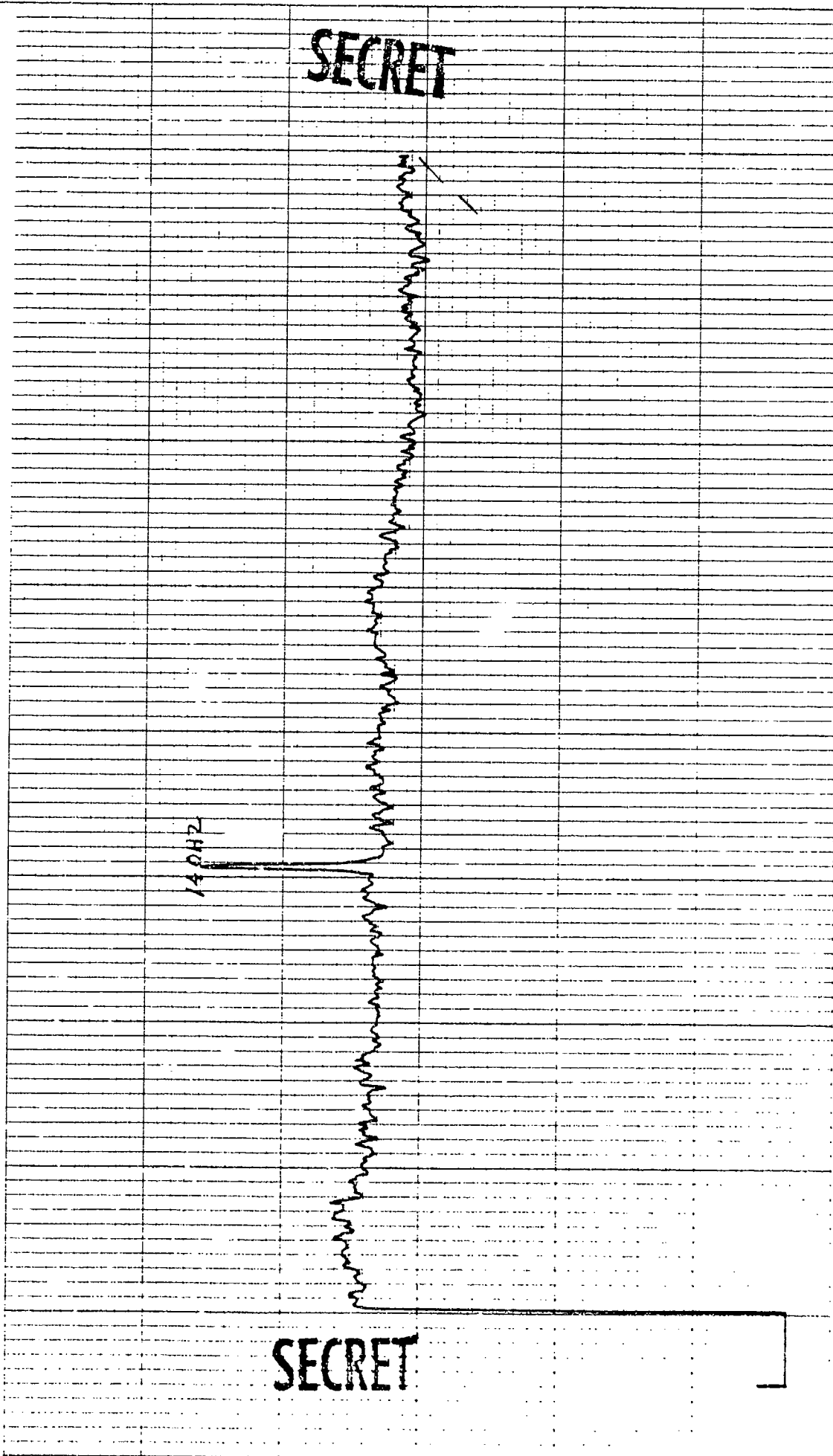
CONTROL: 2-7 - 2033 (51)
CMI SPECTRUM (ELEMENT 51)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
 DEC AZ STEERING

REEL: F23 INDEX 332g

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



46 0703

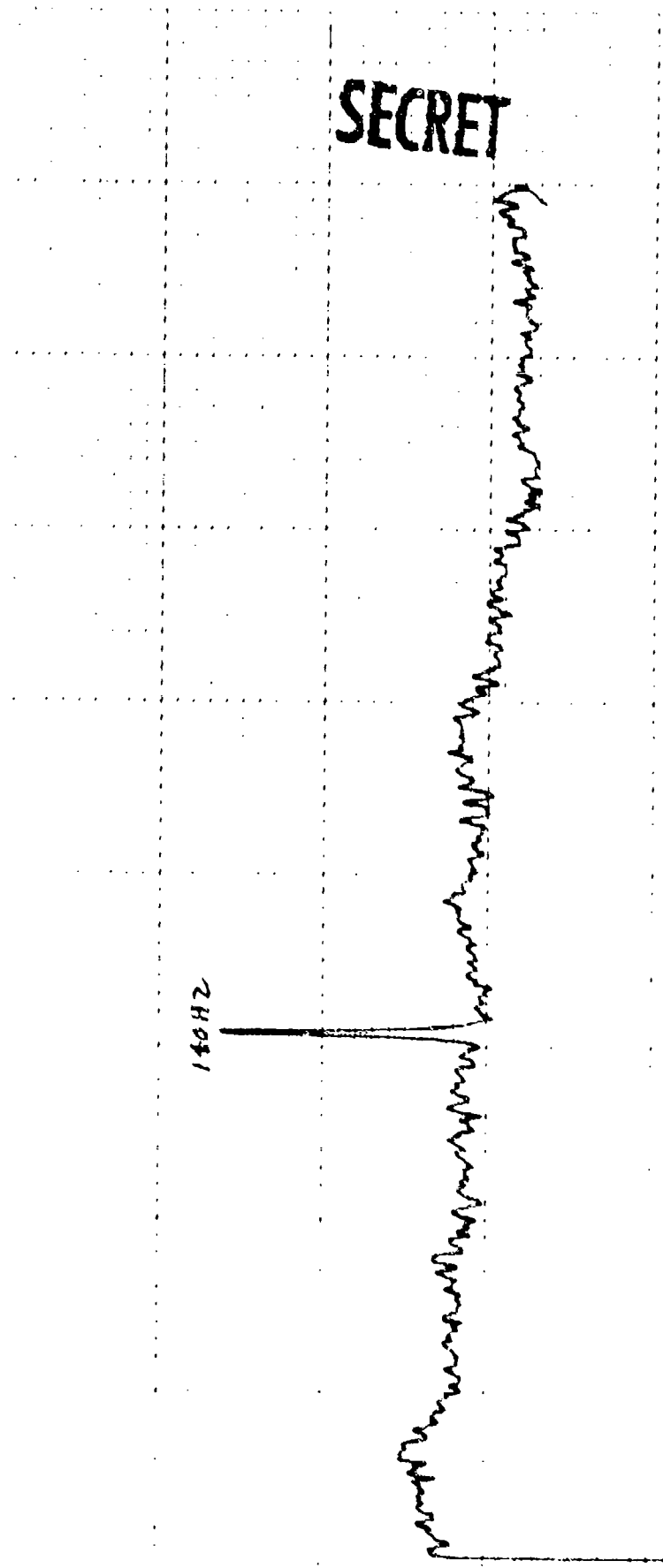
CONTROL: 2-7-2003 (52)
OMNI SPECTRUM (ELEMENT 53)
EXCEPT WRAPPING STATE
CENTER FREQ: 150 MHz
ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 100HZ
RES AZ STEERING

PEEL: F23 INDEX: 3300

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER MIG: HANNING



SECRET

SECRET

46 0703

CONTROL: 2-7-2033 (1)
OMNI SPECTRUM (ELEMENT 2)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
ELEMENT

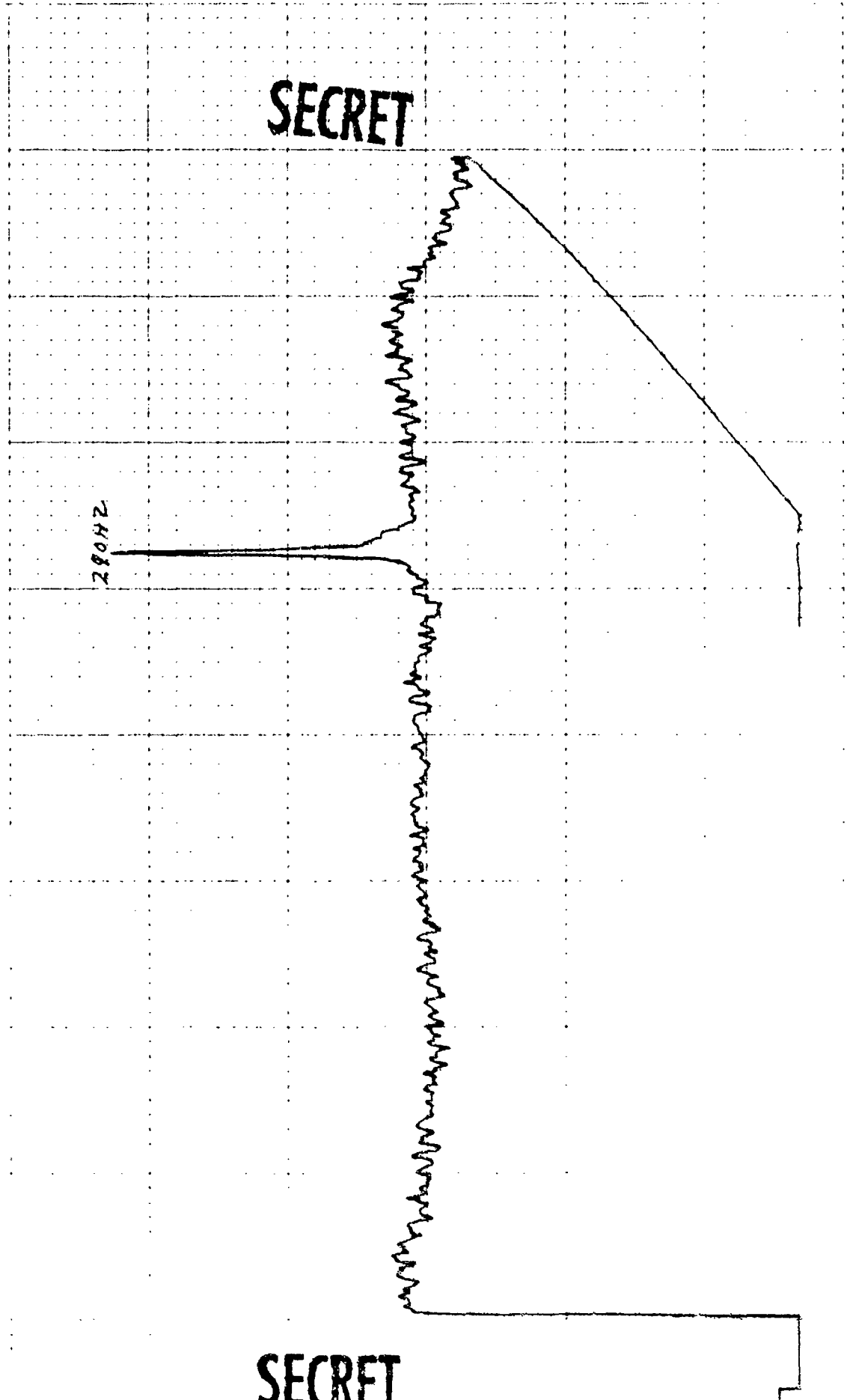
DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEC AZ STEERING

REEL: F23

INDEX: 332

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER
WTG: HANNING



SECRET

46 0703

INDEX 3320

REEL: F 23

DATE OF ANALYSIS:

CONTROL: 2-7-2033 (2)

OMNI SPECTRUM (ELEMENT 4)

EXERCISE: BEARING STAKE

CENTER FREQ: 280 HZ

1 ELEMENT

DATE/TIME: 2-7-77 - 2033 Z

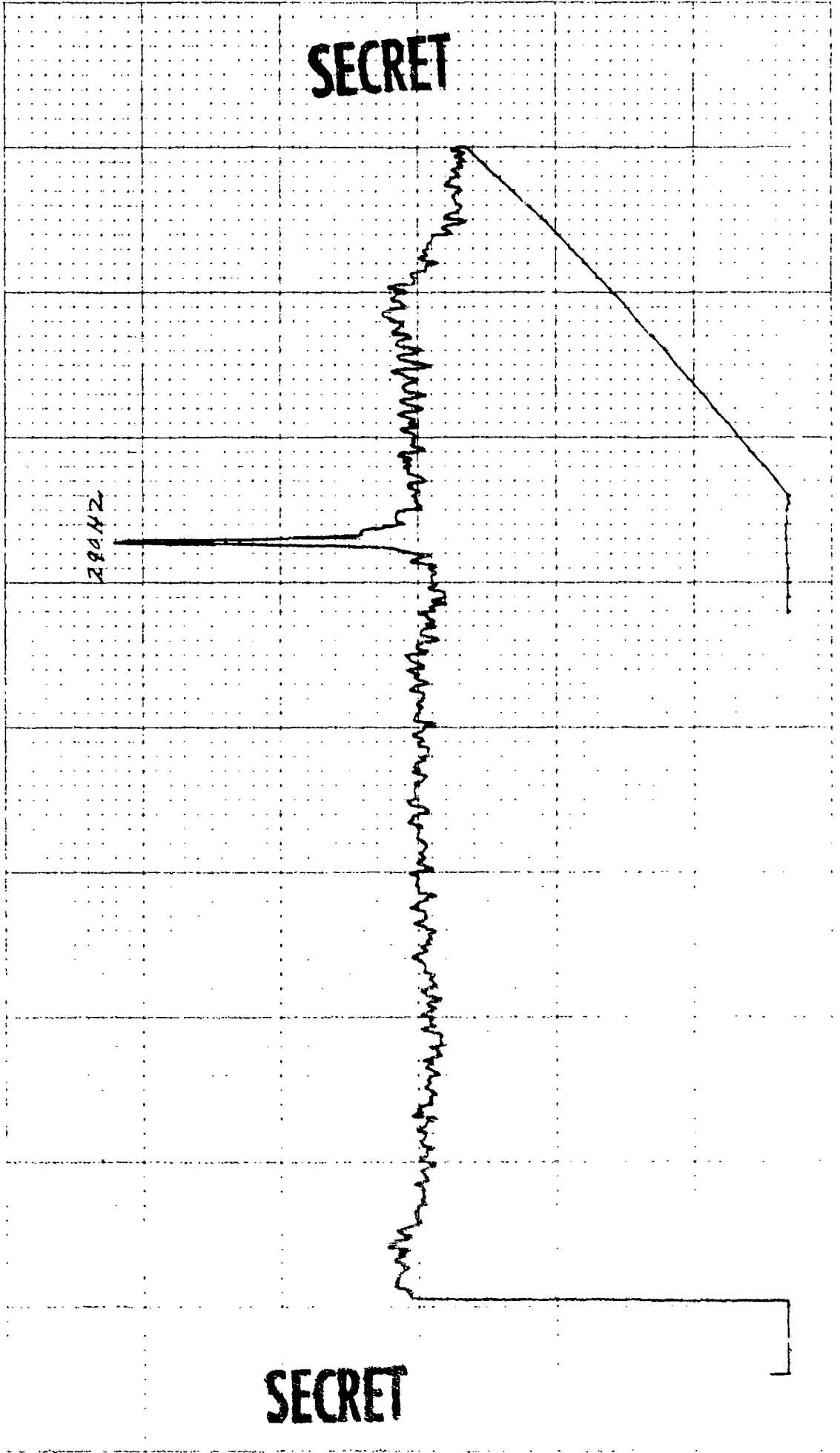
ANALYSIS BANDWIDTH: 1/10 HZ

 DEC AZ STEERING

INTEGRATION TIME 320 SECS

ATTEN: - DB

FILTER WTG: HANNING



SECRET

SECRET

46 0703

REF ID: A6292862

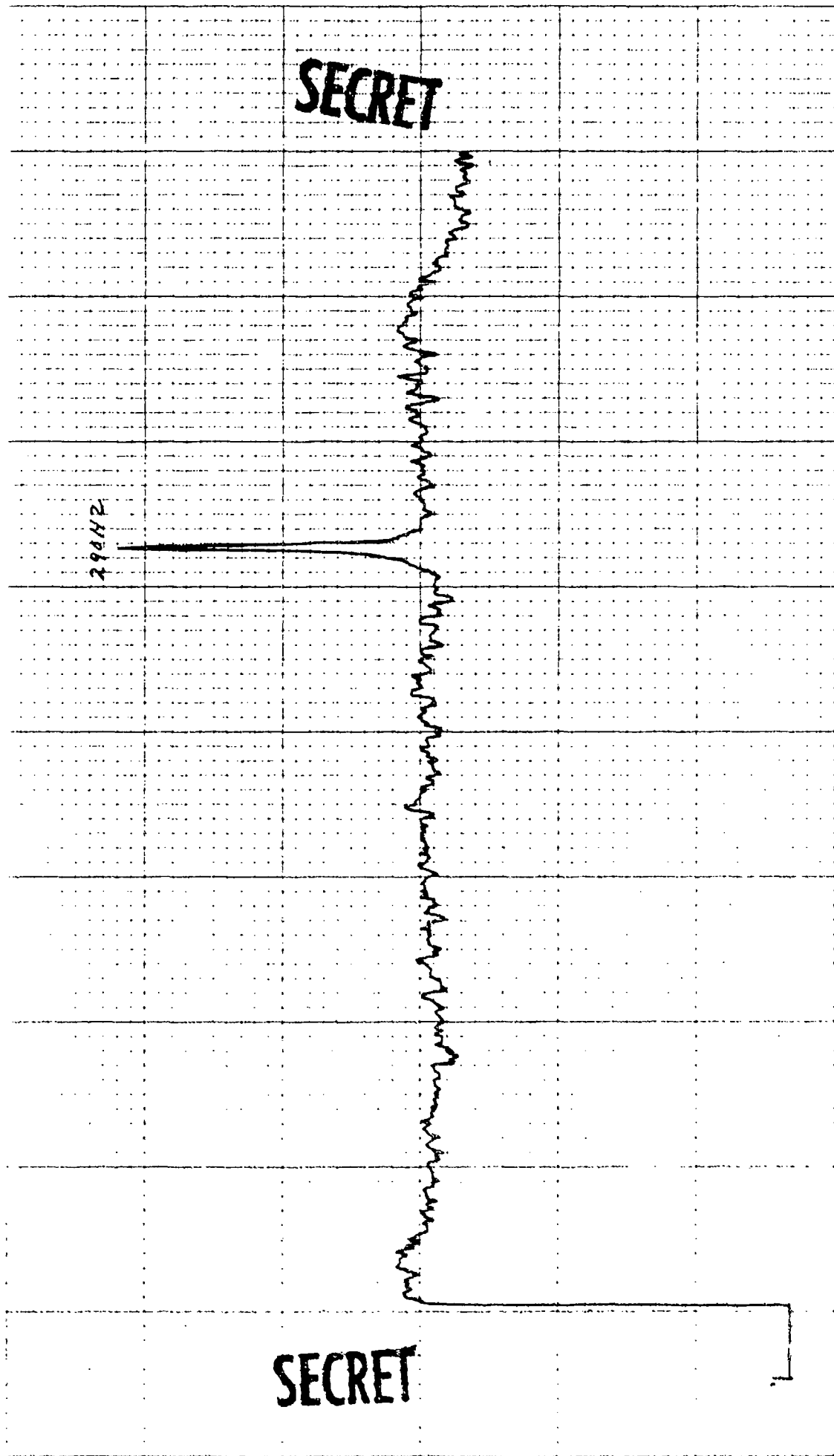
CONTROL: 2-7 - 2033 (3)
OMNI SPECTRUM (ELEMENT 6)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

REEL: F23 INDEX 332

INTEGRATION TIME 320 SECS
FILTER DB
ATTN: HANNING
WTG:



46 0703

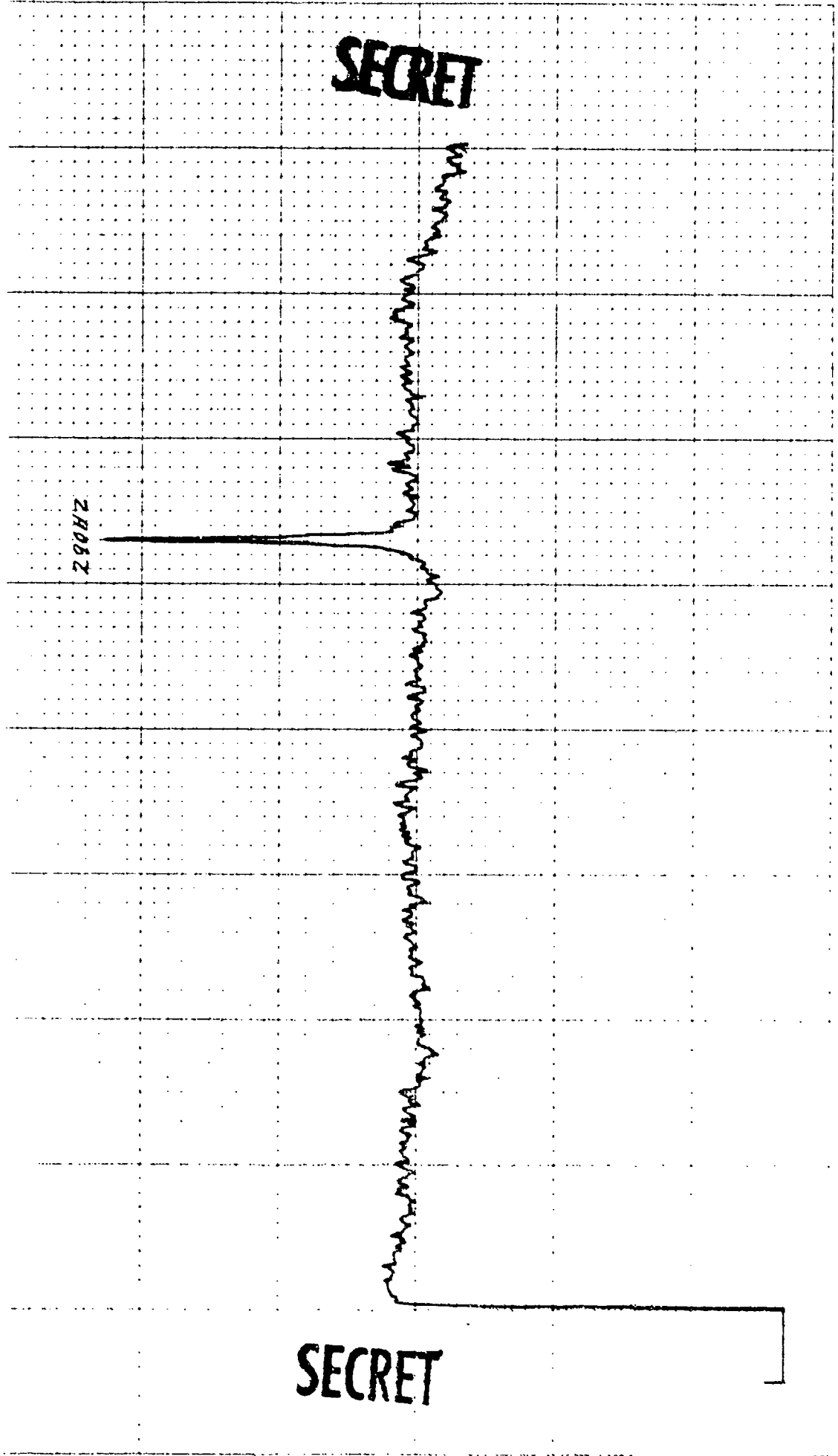
CONTROL: 2-7 - 2033 (4)
OMNI SPECTRUM (ELEMENT 9)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEC AZ STEERING

REEL: F23 INDEX 3320

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



SECRET

SECRET

46 0703

REF: 2007-2033 (S)

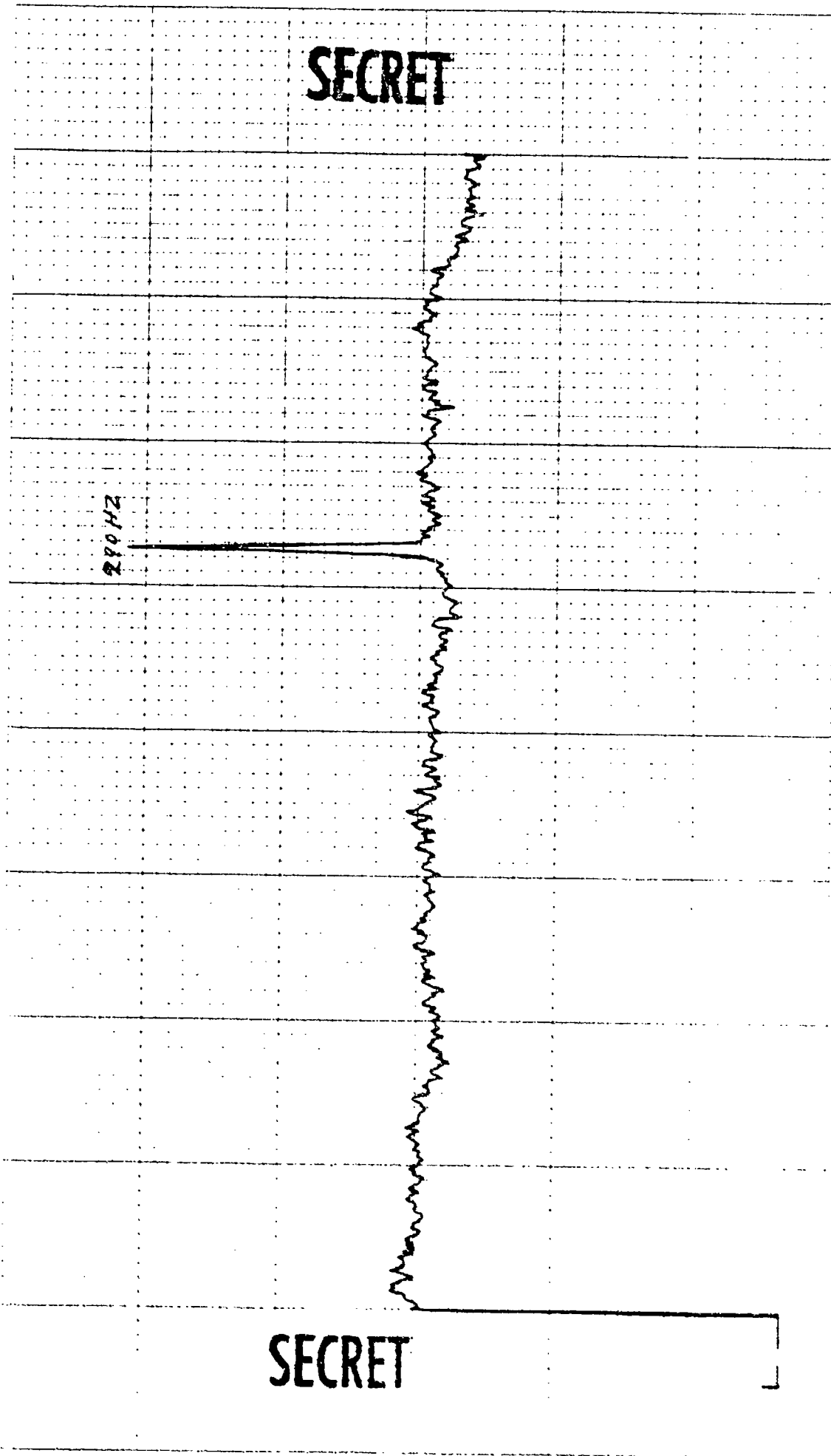
CONTROL: 27 - 2033 (S)
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 27-77 - 2033Z
ANALYSIS BANDWIDTH: 1710 HZ
_____ DEG AZ STEERING

REEL: F23 INDEX: 3326

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



46 0703

CONTROL: 2-7 - 2033 (6)
OMNI SPECTRUM (ELEMENT 12)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

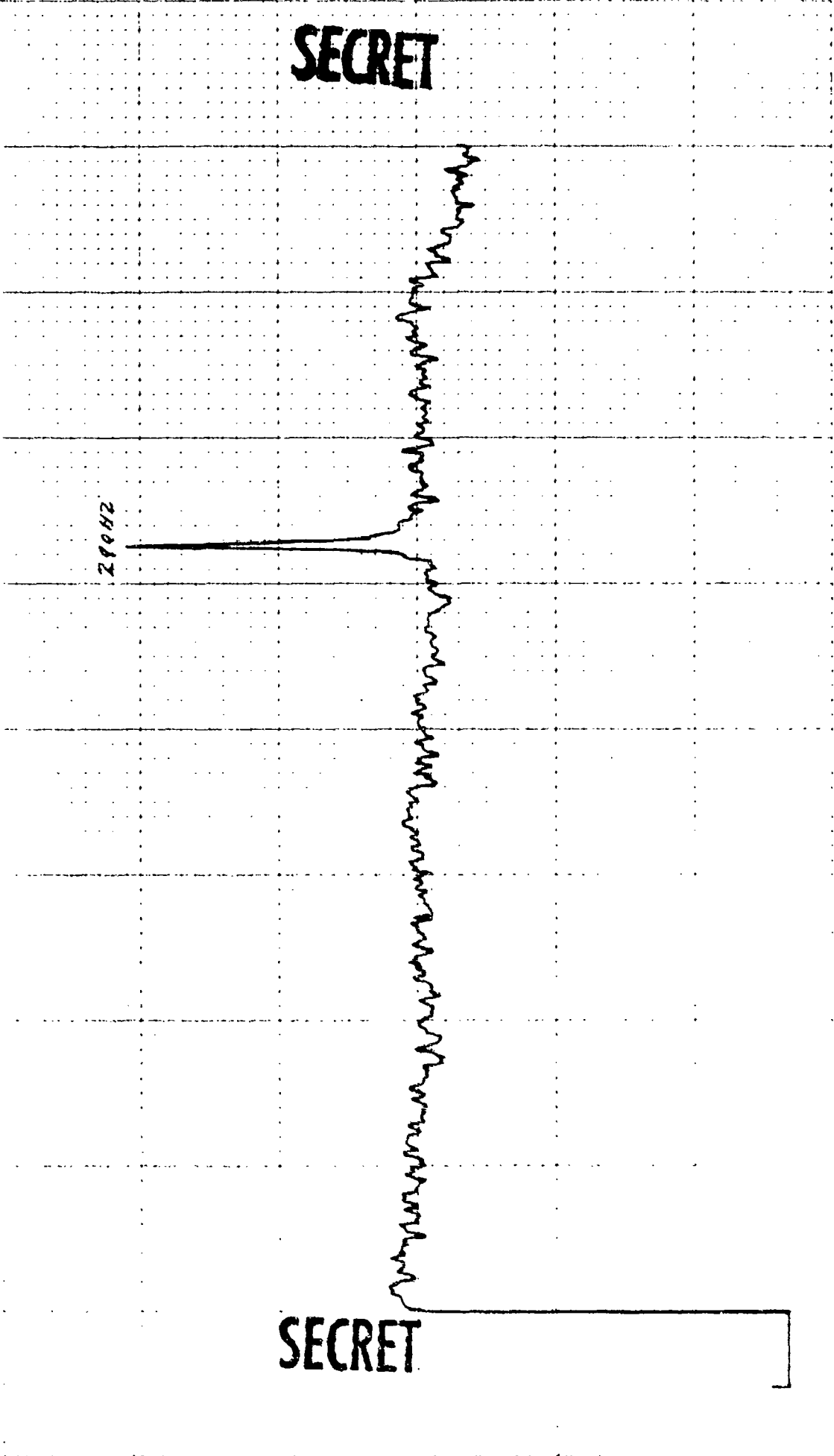
DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

REEL: F23

INDEX: J320

INTEGRATION TIME 320 SECS
FILTER WTG: HANNING
ATTEN: DB



SECRET

SECRET

46 0703

163 4603 51 00 00

CONTROL: 2033 - 51 (DPL)
OMNI SPECTRUM (ELEMENT 14)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

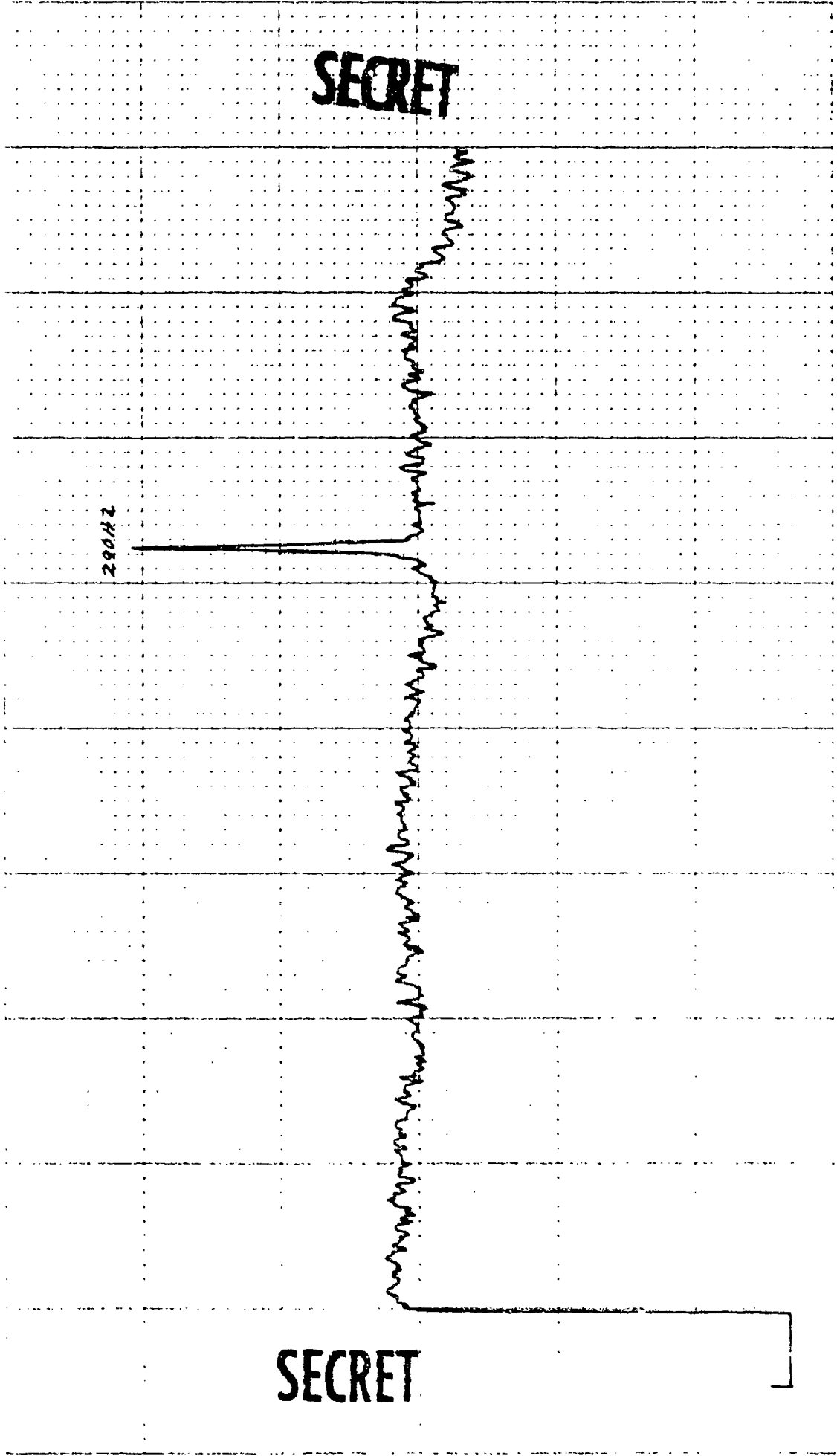
DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z

ANALYSIS BANDWIDTH: 1/10HZ
- DEC AZ STEERING

REEL: 723 INDEX 3320

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



SECRET

SECRET

16-2: PLATE TO THE INSTRUMENT

46 0703

176

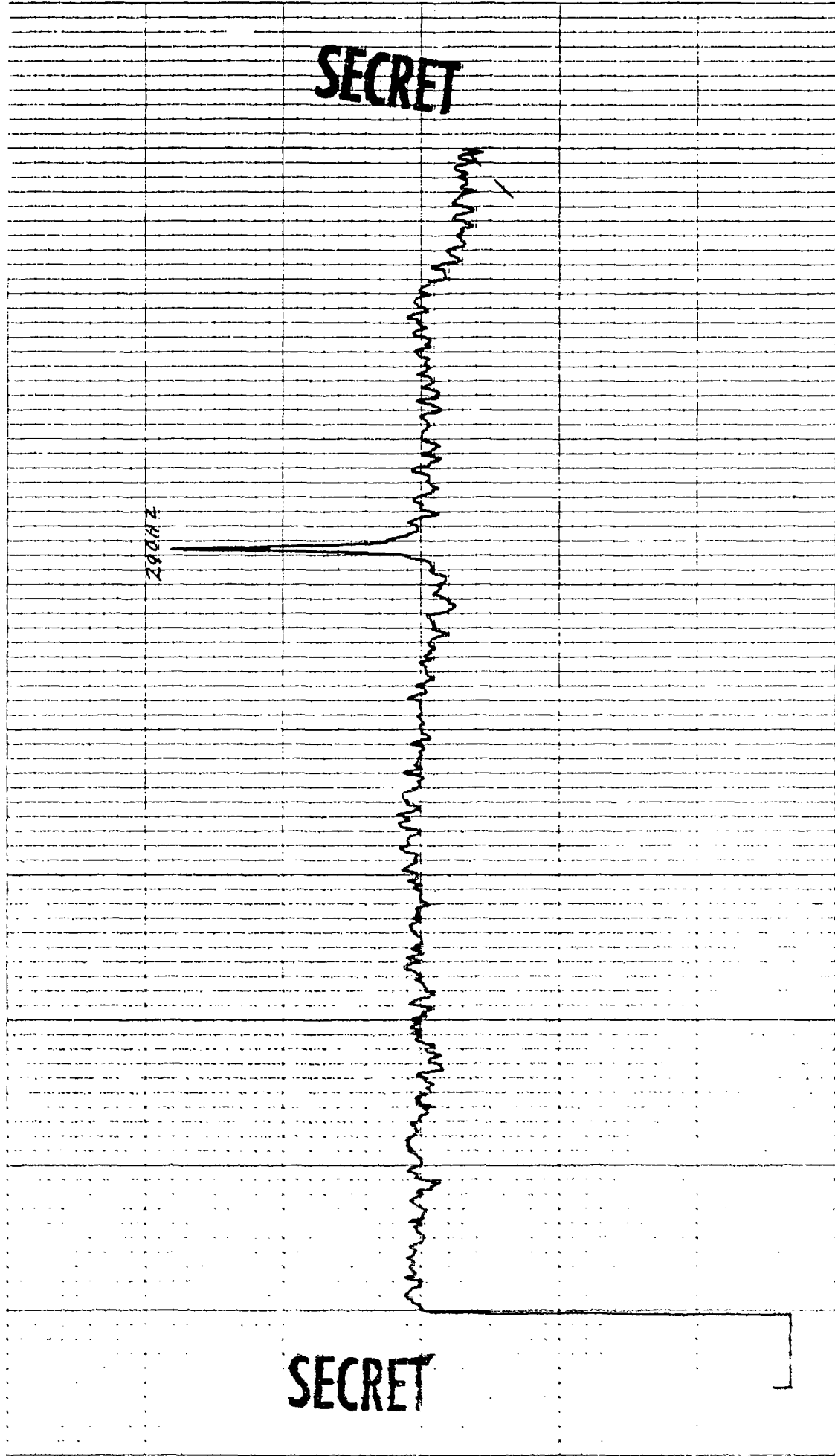
CONTROL: 27-2033 (8)
OMNI SPECTRUM (ELEMENT 16)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 27-77 -2033 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: F23 INDEX 3320

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER WTG: HANNING



16E 10 X 10 TO THE 100 MS

46 0703

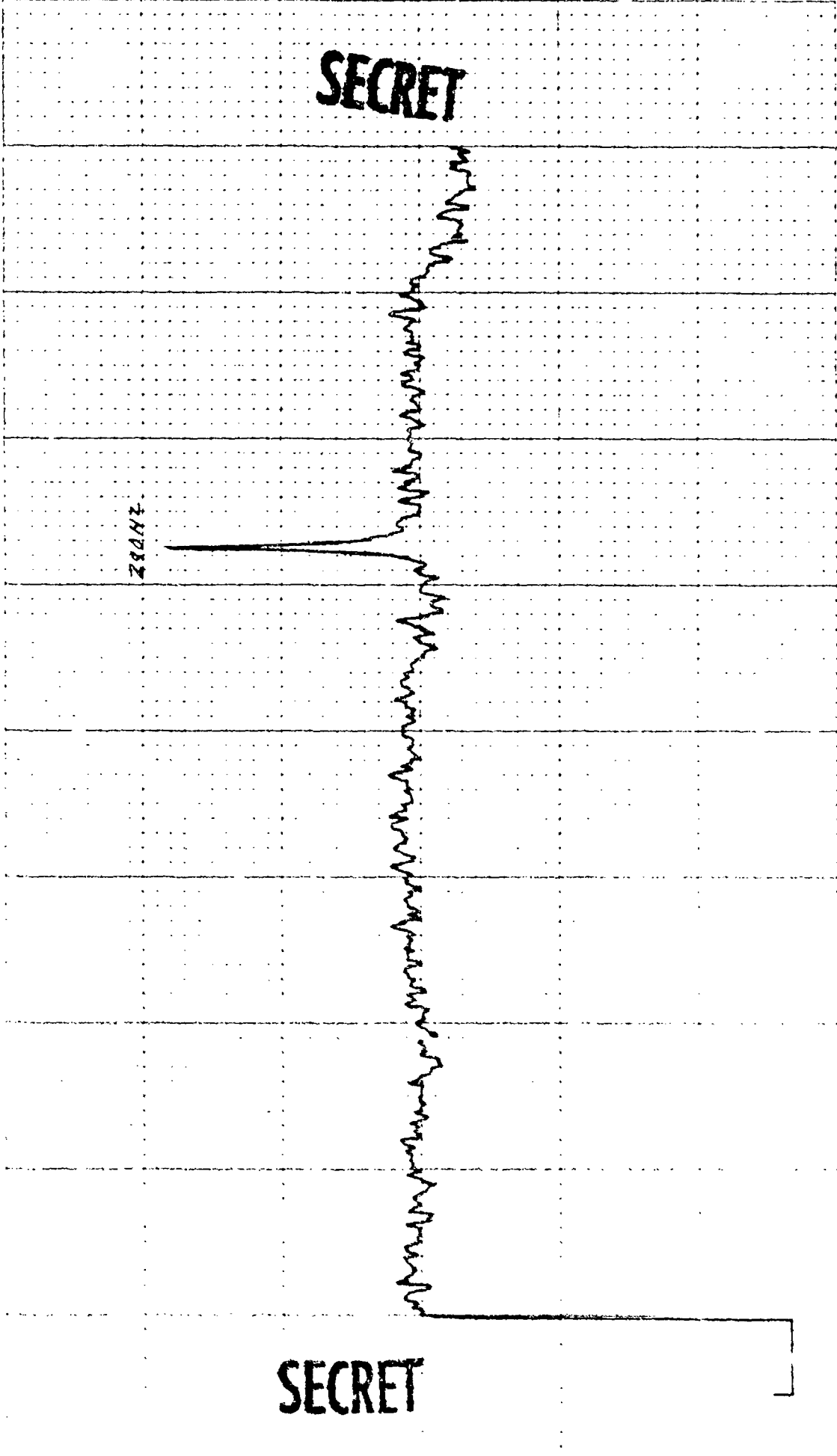
CONTROL: 2-7 - 2037 (9)
OMNI SPECTRUM (ELEMENT 19)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2037 Z
ANALYSIS BANDWIDTH: 1/10 HZ
_____ DEG AZ STEERING

REEL: F23 INDEX: 3320

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



SECRET

SECRET

46 0703

10-2-77 2033Z

INDEX 3324

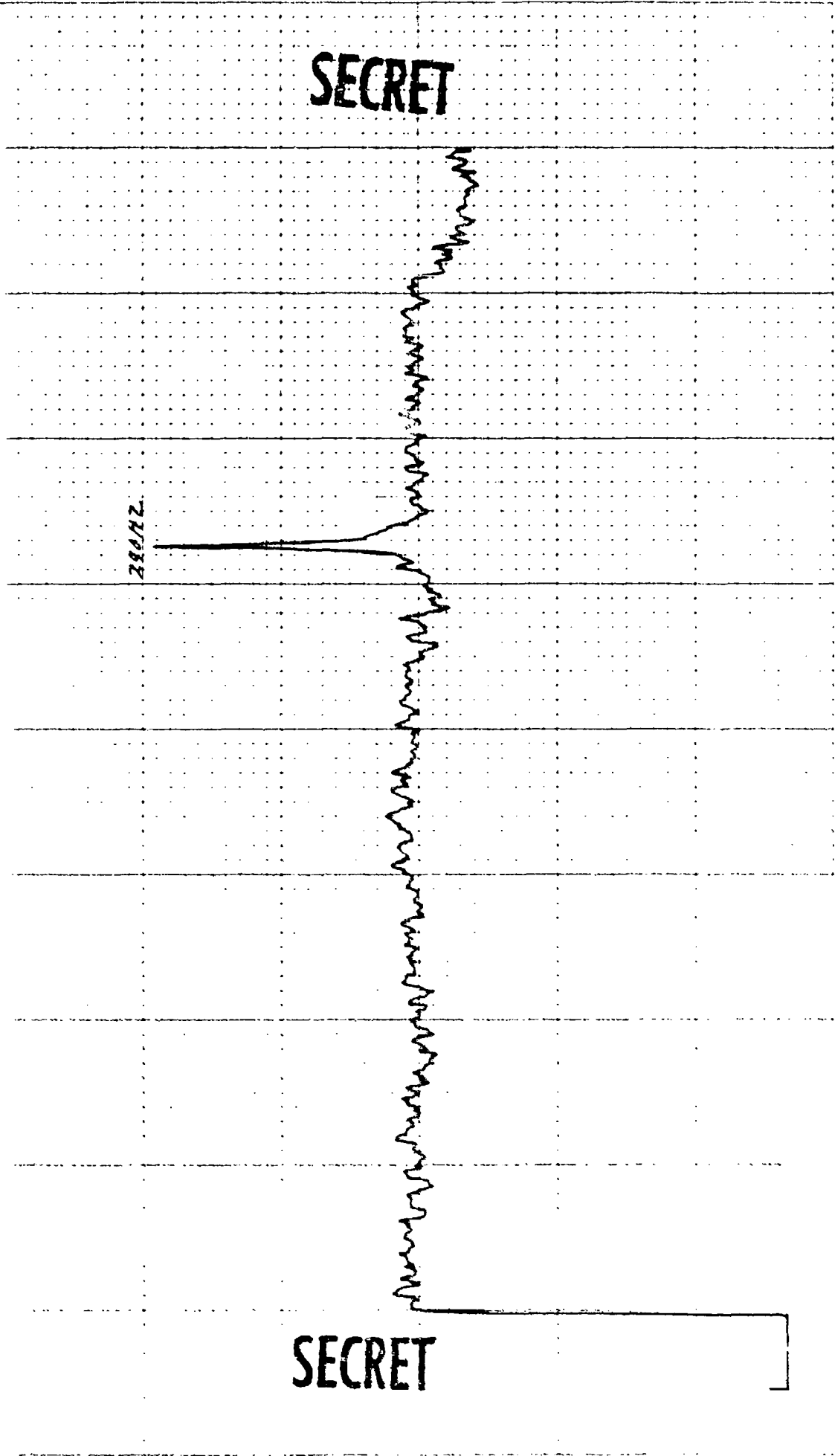
REEL: F23

DATE OF ANALYSIS:

CONTROL: 2.7 - 2033 (10)
OMNI SPECTRUM (ELEMENT 20)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEC AZ STEERING

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



SECRET

SECRET

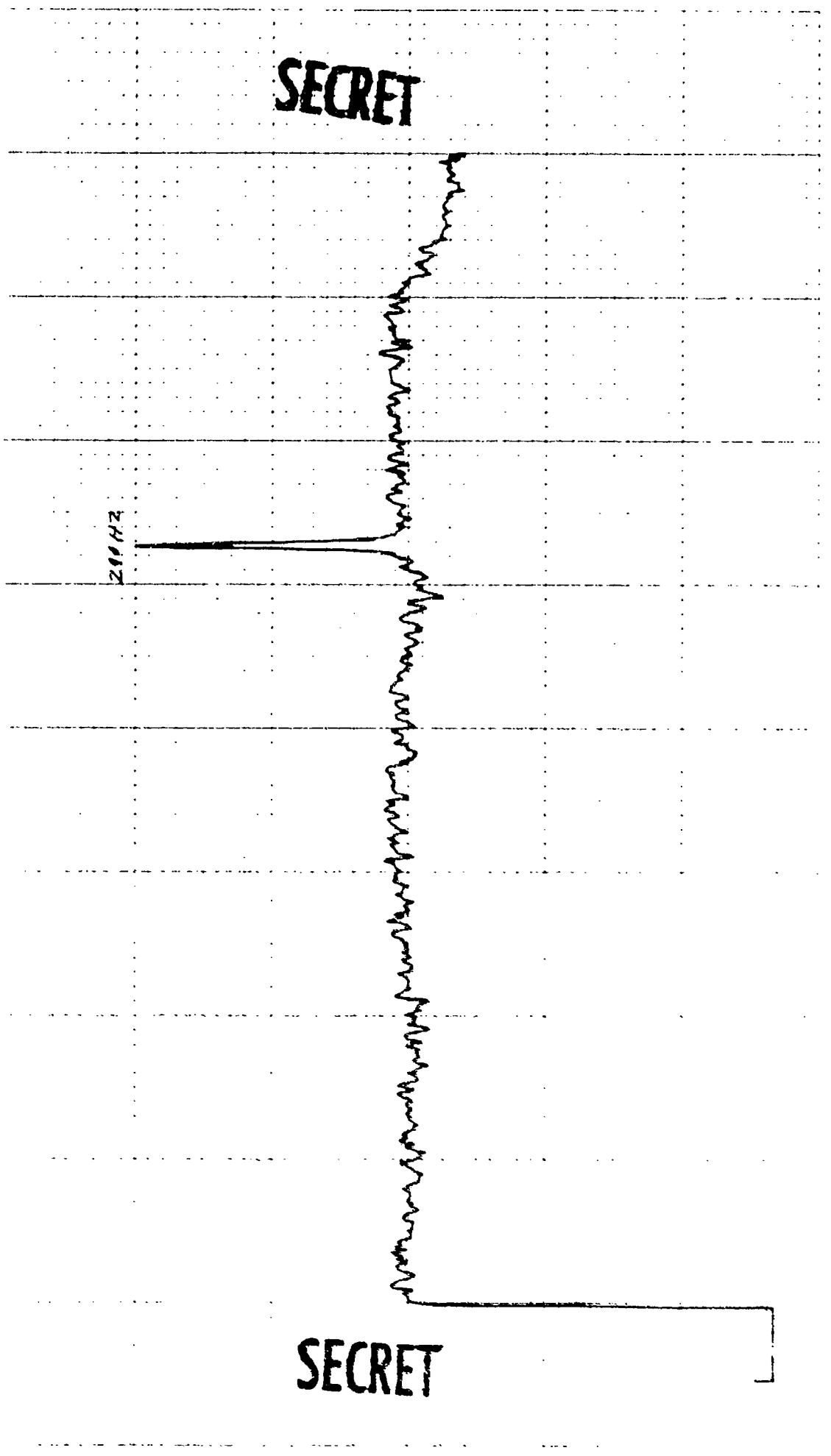
46 0703

REEL: F23 INDEX 3320

DATE OF ANALYSIS:
DATE/TIME: 2-7-77 -2033Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

CONTROL: 2-7-2033 (11)
OMNI SPECTRUM (ELEMENT 23)
EXERCISE: BEARING, STAFF
CENTER FREQ: 280 HZ
1 ELEMENT

INTEGRATION TIME 320 SECS
FILTER WTC: HANNING
ATTEN: DB



SECRET

SECRET

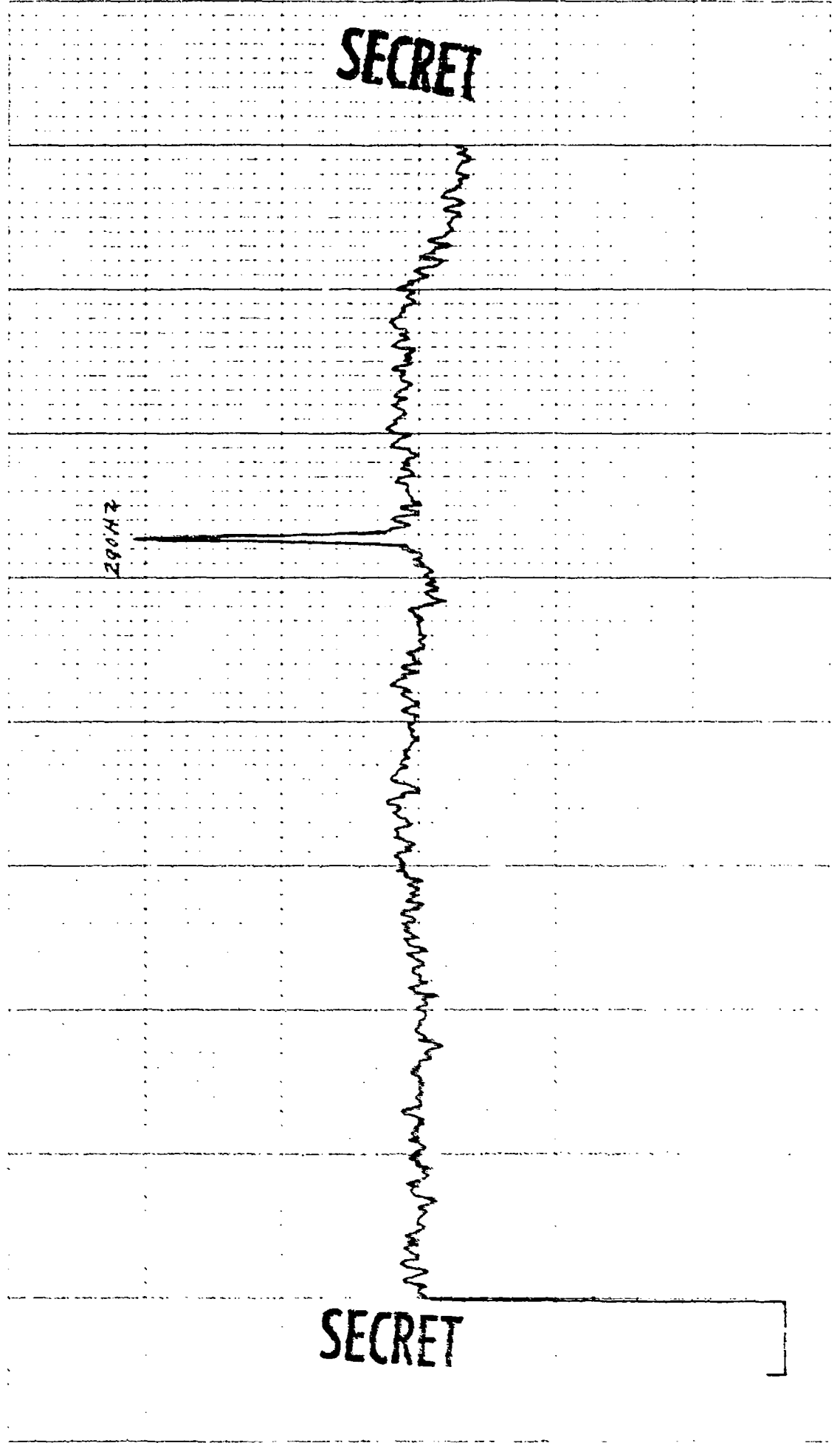
46 0703

CONTROL: 2-7 - 2033 (12)
 OMNI SPECTRUM (ELEMENT 24)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 HZ
 1 ELEMENT

DATE OF ANALYSIS:
 DATE/TIME: 2-7-77 - 2033 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 --- DEG AZ STEERING

REEL: F23 INDEX 3320

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



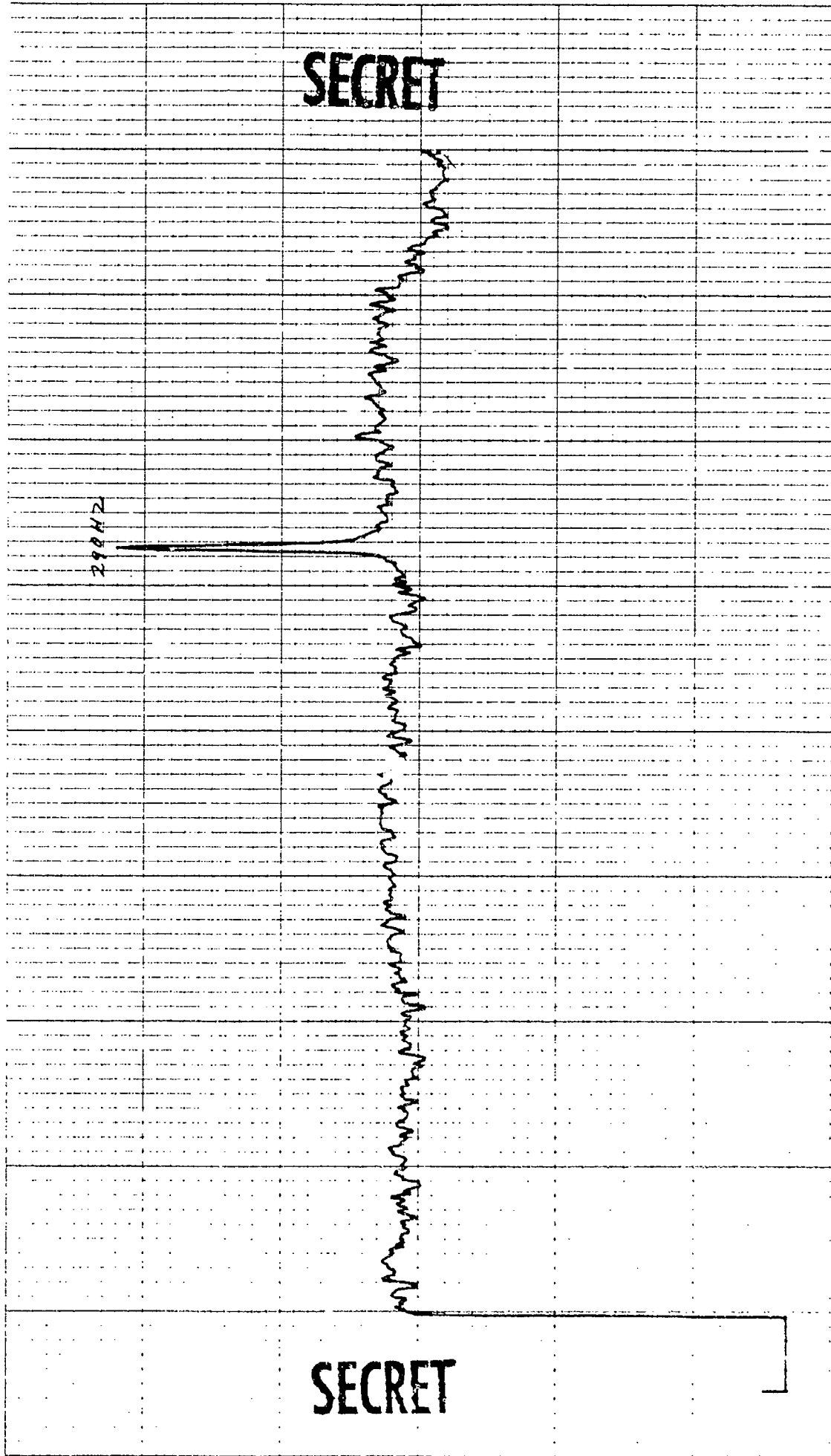
CONTROL: 2-7 -2032 (13)
OMNI SPECTRUM(ELEMENT 26)
EXERCISE: BCHARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

REEL: F23 INDEX 3320

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

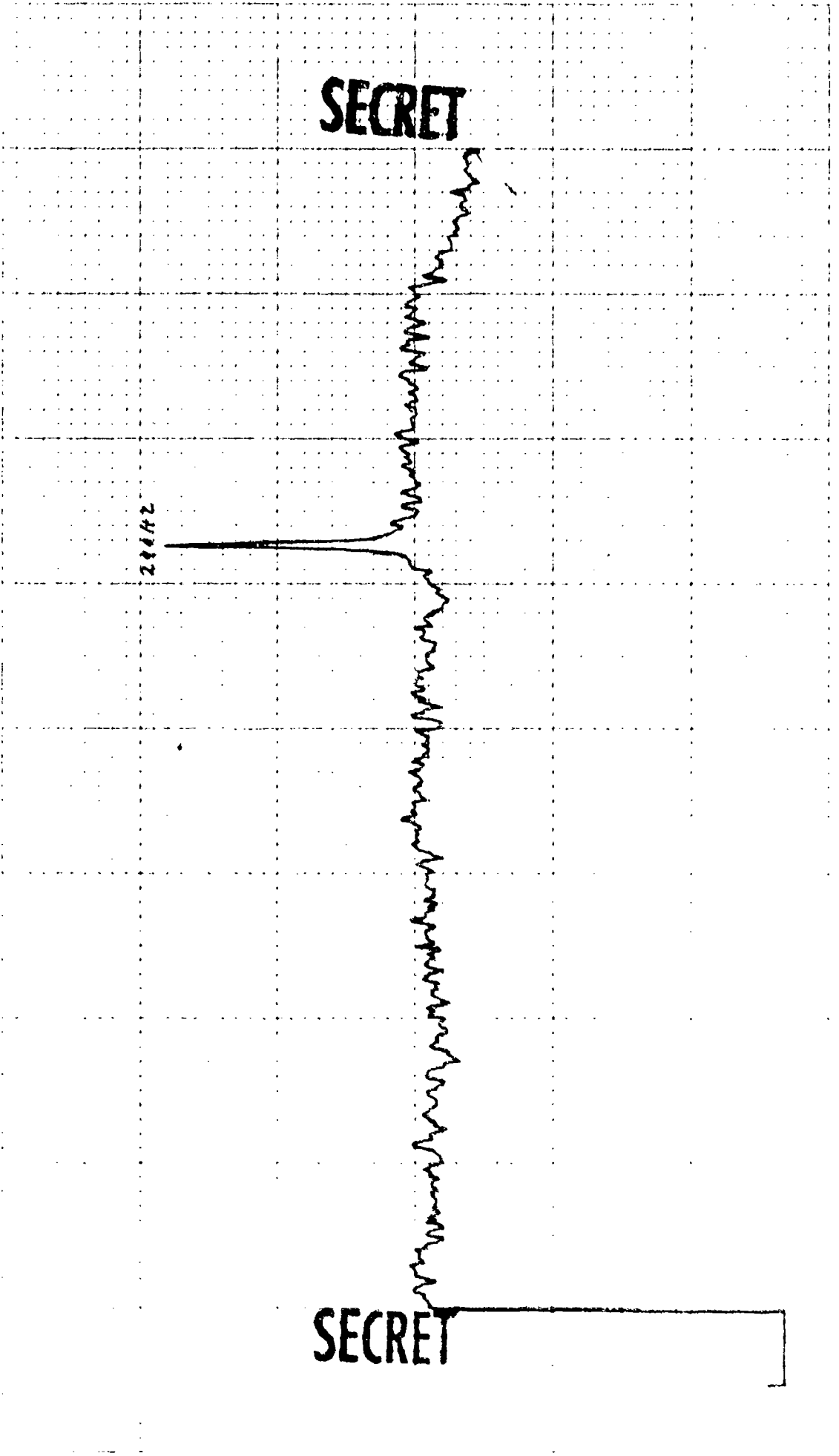


46 0703

CONTROL: 27-2033 (14) DATE OF ANALYSIS: REEL: F23 INDEX 3320
 OMNI SPECTRUM (ELEMENT 2Y)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
 I ELEMENT

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

DATE/TIME: 2-7-77 - 2033Z
 ANALYSIS BANDWIDTH: 1/10HZ
 -- DEC AZ STEERING



SECRET

SECRET

10-16-77 TO THE IPCHS...
REMIT MESSAGE...

46 0703

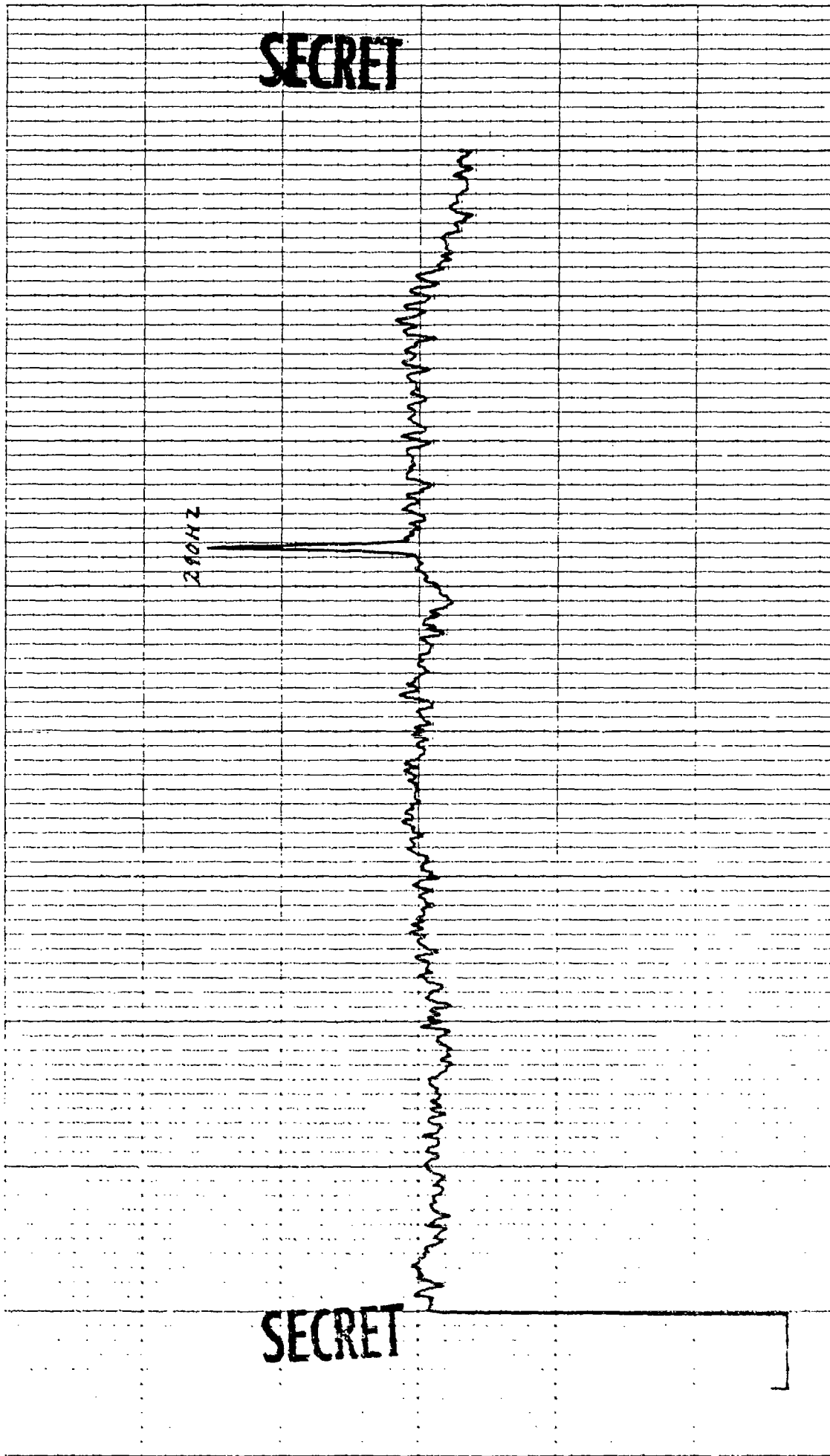
CONTROL: 2-7 - 2033 (15)
OMNI SPECTRUM (ELEMENT 3 /)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

REEL: F23 INDEX 3220

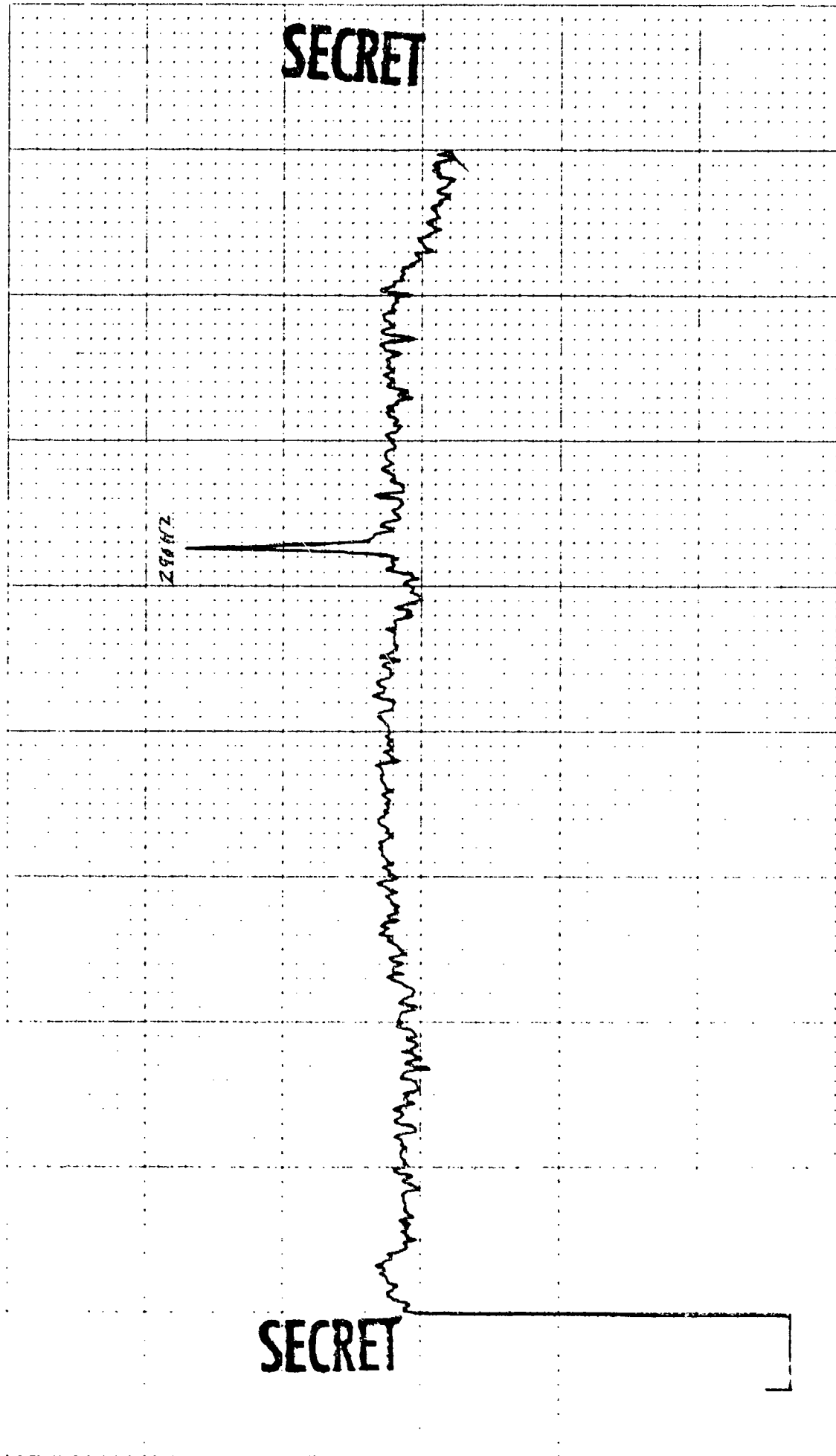
INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



46 0703

CONTROL: 2-7 -2073 (16) DATE OF ANALYSIS: REEL: F23 INDEX 332
 OMNI SPECTRUM (ELEMENT 23)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
 1 ELEMENT

DATE/TIME: 2-7-77 -2073 2 INTEGRATION TIME 320 SECS ATTN: - DB
 ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
- DEC AZ STEERING



46 0703

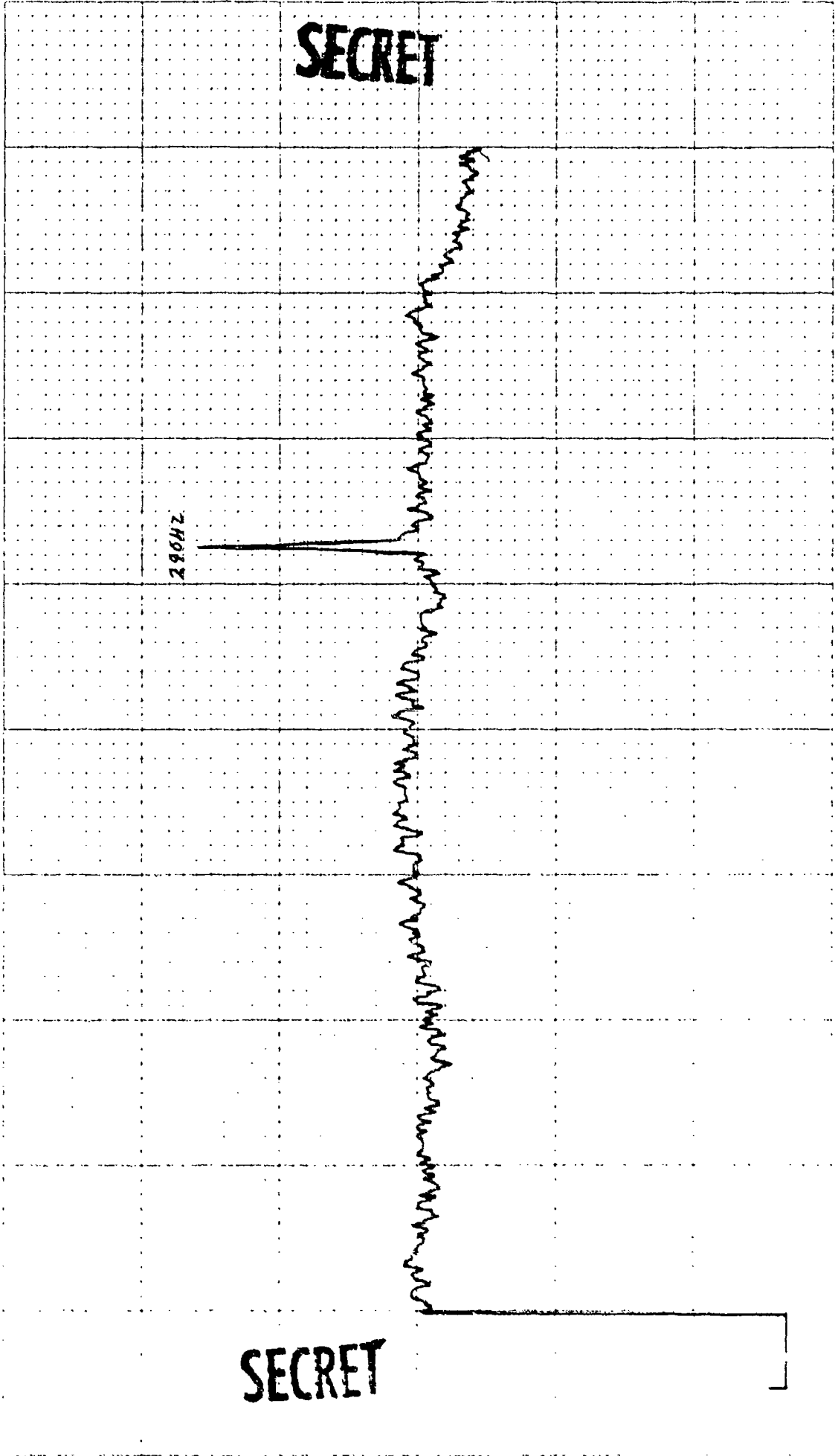
CONTROL: 2-7 - 2033 (17)
OMNI SPECTRUM (ELEMENT 35)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ STEERING

REEL: F23 INDEX 3320

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



SECRET

SECRET

46 0703

REF ID: A66549475

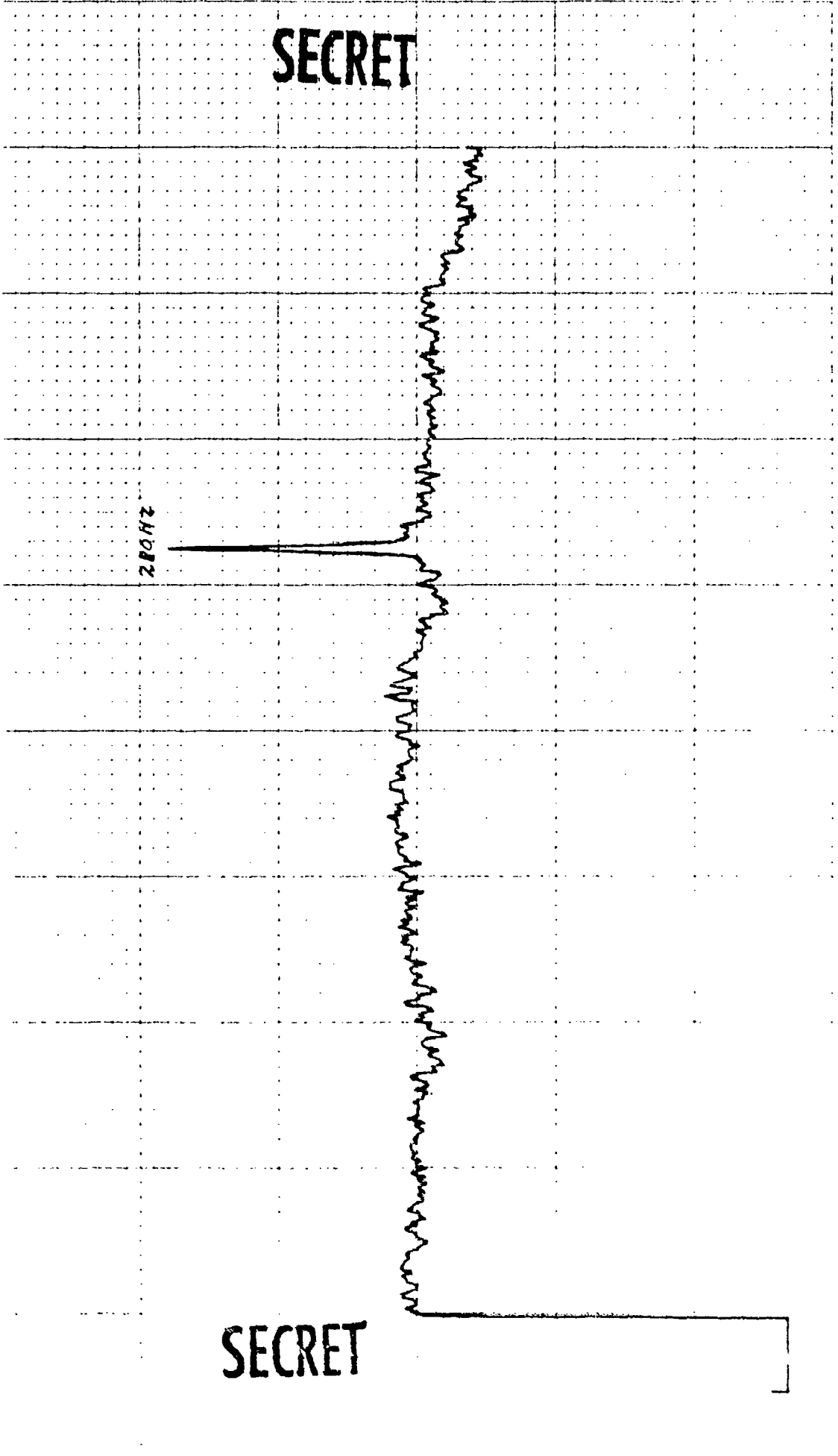
CONTROL: 2-7 -2037 (18)
OMNI SPECTRUM (ELEMENT 37)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

REEL: F23 INDEX 3324

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING



SECRET

SECRET

46 0703

CONTROL: 2.7 - 2073 (19)
OMNI SPECTRUM (ELEMENT 39)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z

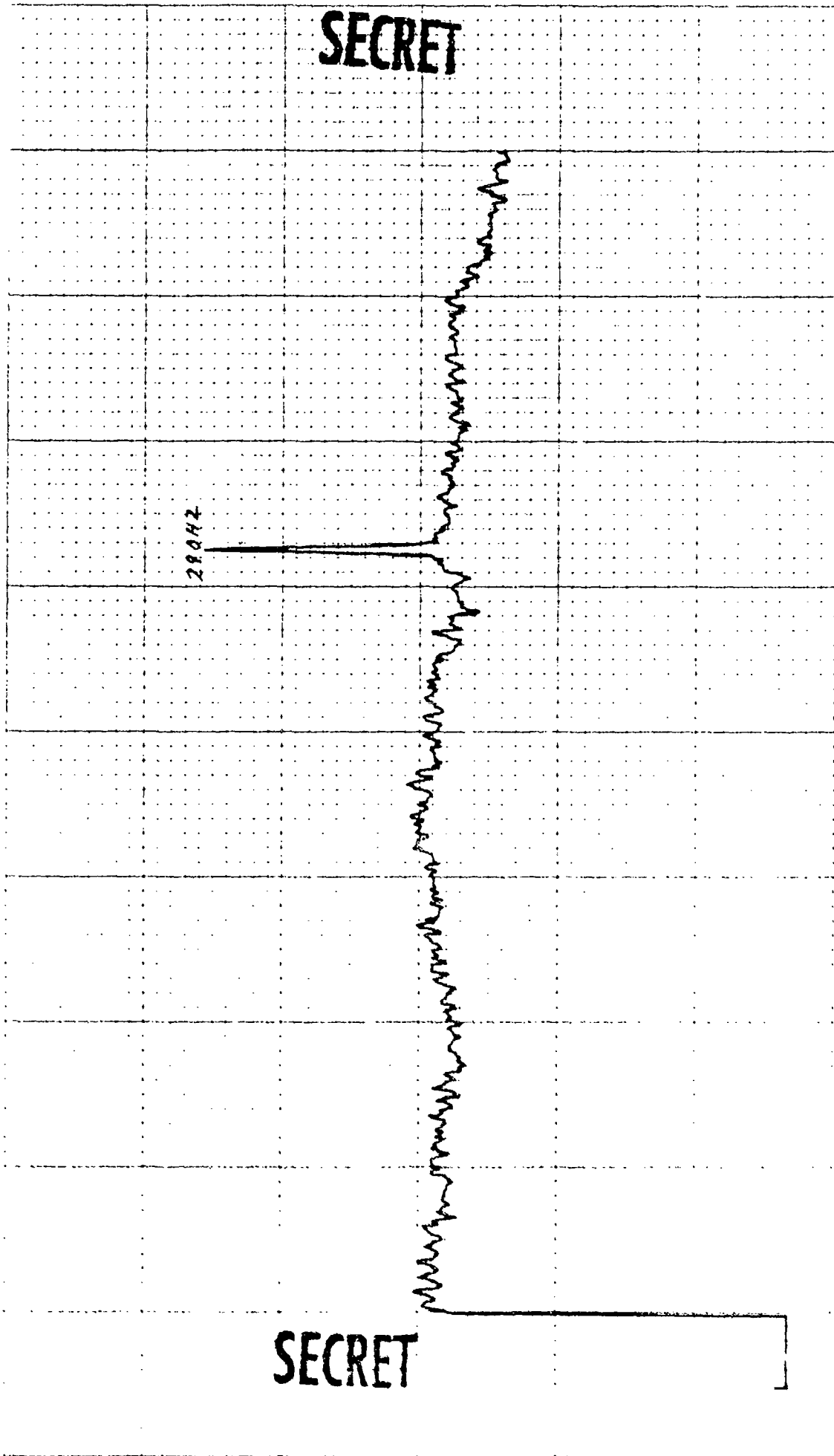
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: F23

INDEX: J320

INTEGRATION TIME 320 SECS
FILTER WTC: HANNING

ATTEN: - DB



46 0703

10-2 1000 541000 2-7-77

CONTROL: 2-7 -2033 (20)
OMNI SPECTRUM (ELEMENT 41)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

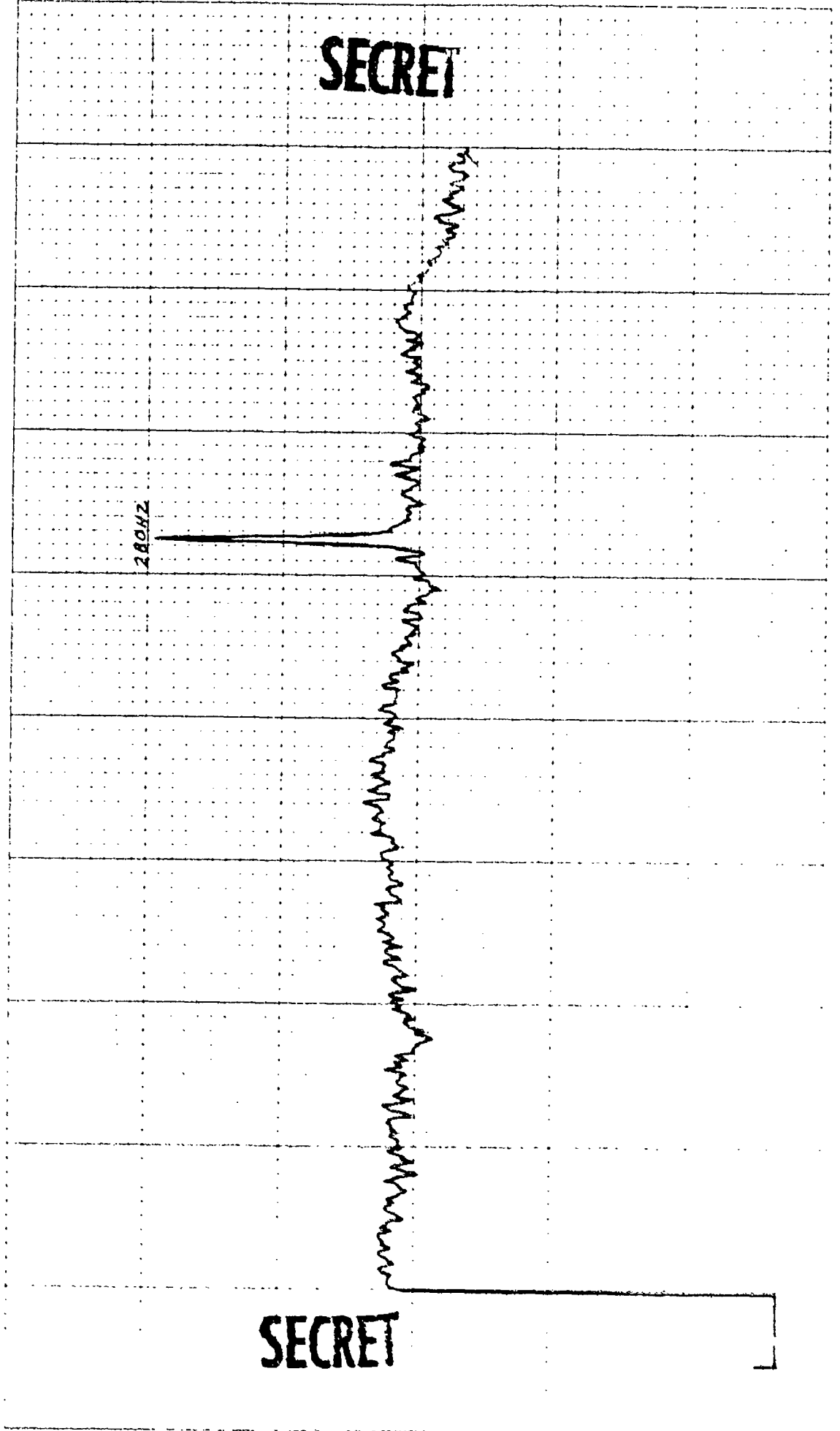
DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

INDEX: J320

REEL: F23

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



SECRET

SECRET

46 0703

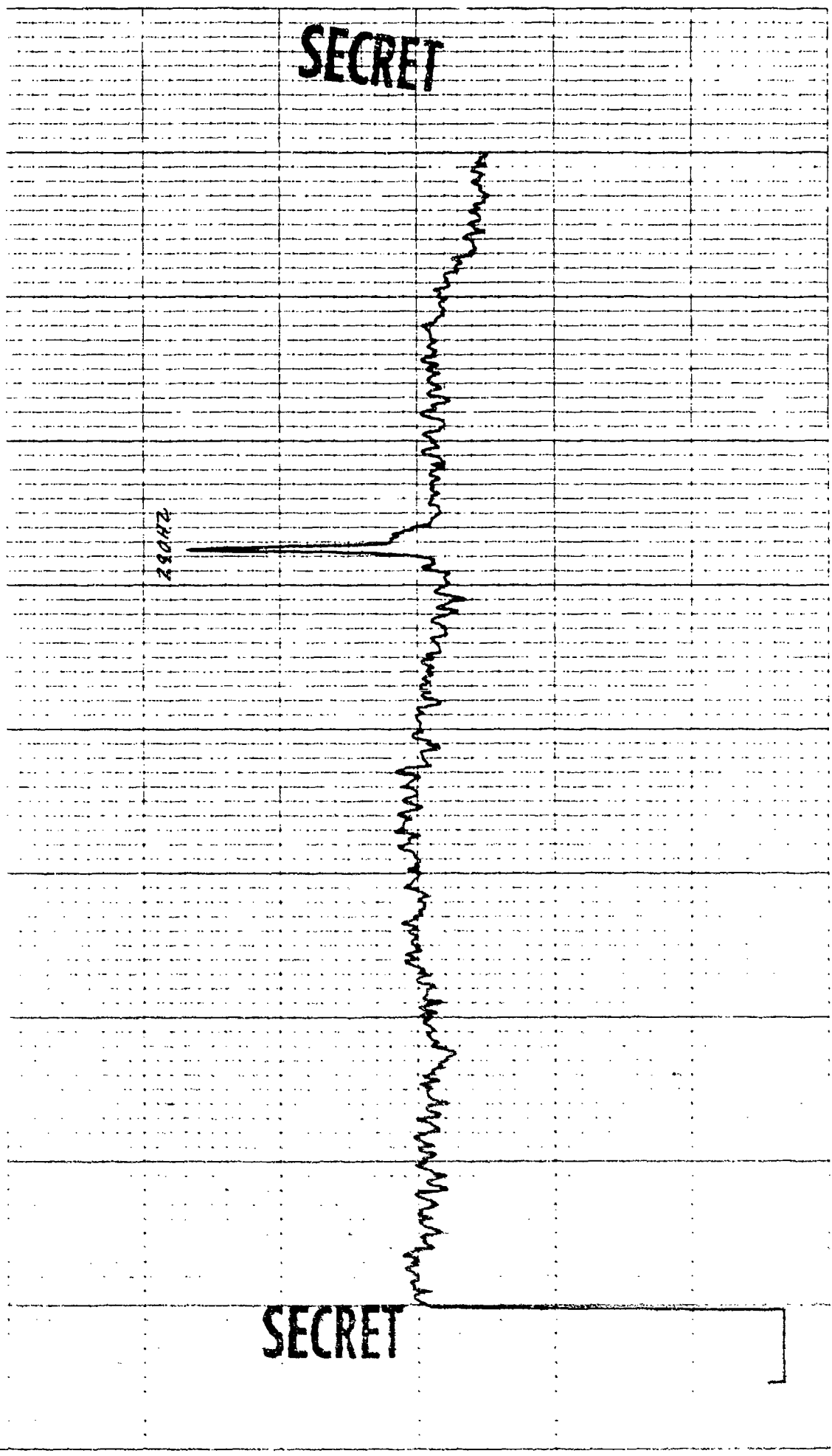
10-2 10-11 10-12 10-13 10-14 10-15 10-16 10-17 10-18 10-19 10-20 10-21 10-22 10-23 10-24 10-25 10-26 10-27 10-28 10-29 10-30 10-31 11-1 11-2 11-3 11-4 11-5 11-6 11-7 11-8 11-9 11-10 11-11 11-12 11-13 11-14 11-15 11-16 11-17 11-18 11-19 11-20 11-21 11-22 11-23 11-24 11-25 11-26 11-27 11-28 11-29 11-30 12-1 12-2 12-3 12-4 12-5 12-6 12-7 12-8 12-9 12-10 12-11 12-12 12-13 12-14 12-15 12-16 12-17 12-18 12-19 12-20 12-21 12-22 12-23 12-24 12-25 12-26 12-27 12-28 12-29 12-30 12-31 1977

CONTROL: 2-7 - 2033 (21)
 OMNI SPECTRUM (ELEMENT 43)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
 I ELEMENT

DATE OF ANALYSIS:
 DATE/TIME: 2-7-77 - 2033 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 _____ DEG AZ STEERING

REEL: F23 INDEX: 220

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



46 0703

1-1 4.200 15.000 10.000 10.000

INDEX 3320

REEL: F23

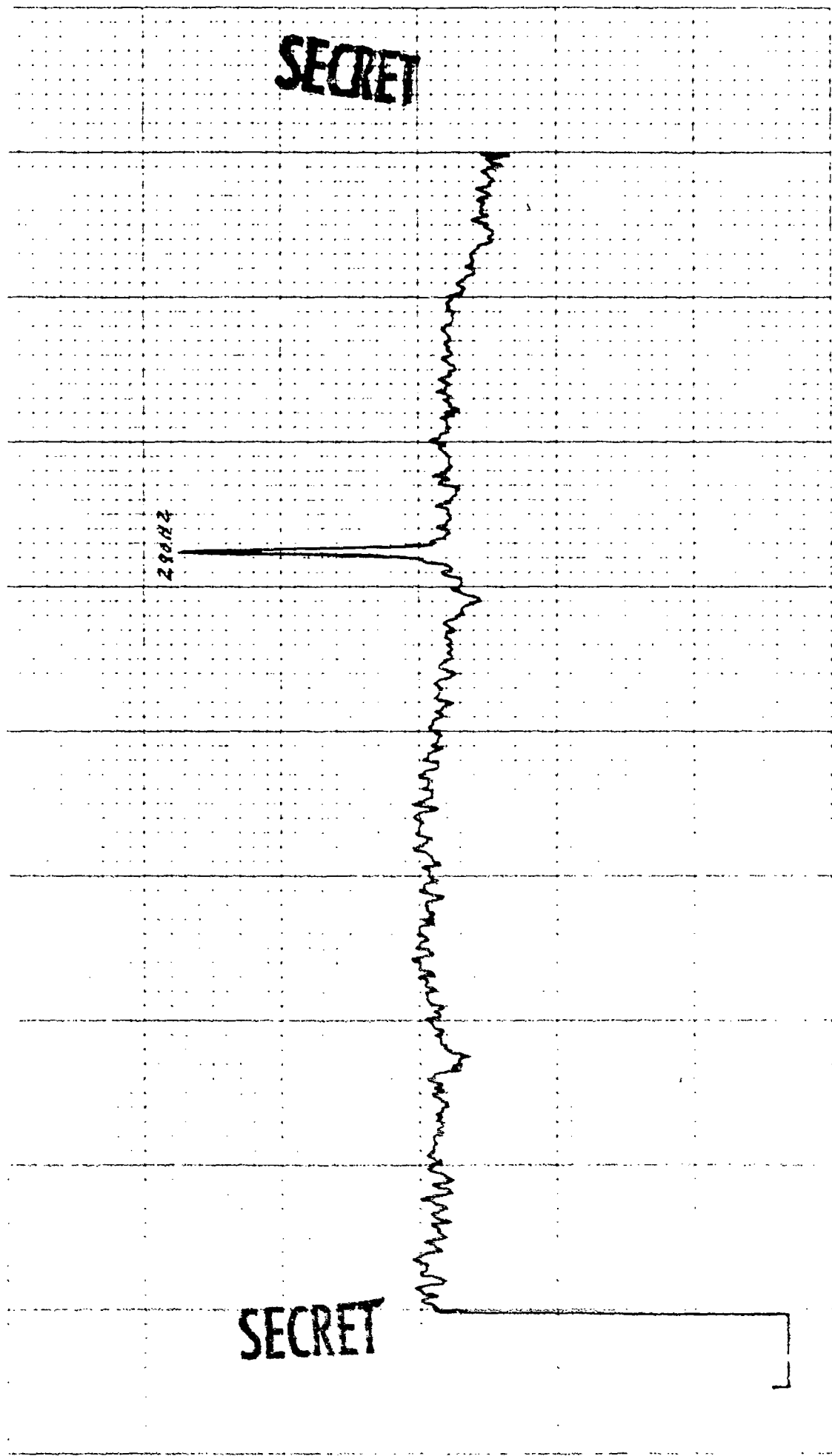
DATE OF ANALYSIS:

CONTROL: 2-7 -2033 (22)

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

DATE/TIME: 2-7-77 -2033Z
ANALYSIS BANDWIDTH: 1/10HZ
_____ DEG AZ STEERING

OMNI SPECTRUM(ELEMENT 45)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT



SECRET

SECRET

46 0703

142 2000 04 00 00 00 00 00

INDEX 3320

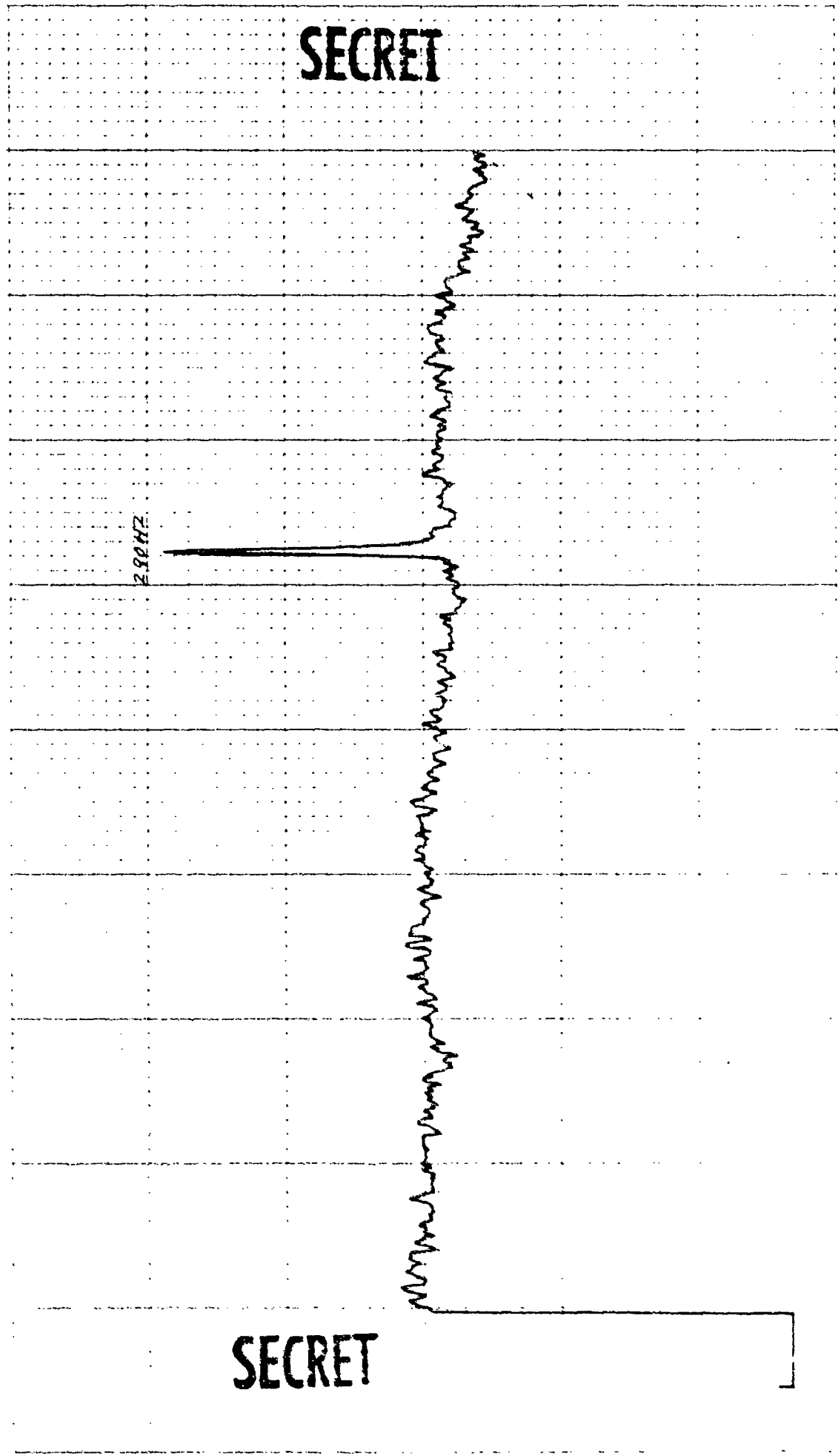
REEL: F23

DATE OF ANALYSIS:

CONTROL: 2-7 - 2033 (23)
OMNI SPECTRUM (ELEMENT 47)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE/TIME: 2-7-77 - 2033Z
ANALYSIS BANDWIDTH: 1/10 HZ
— — — — — DEG AZ STEERING

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



SECRET

SECRET

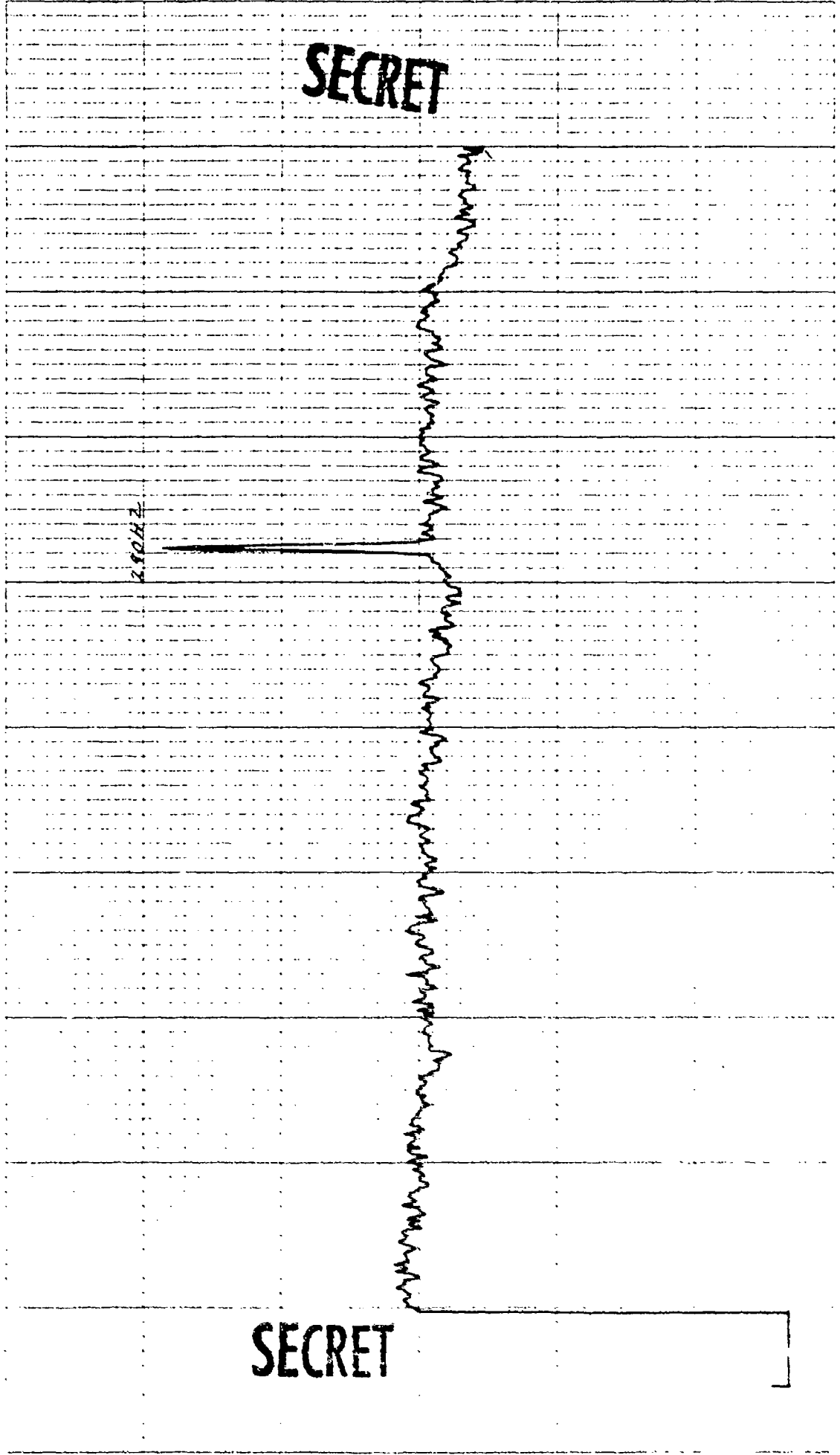
46 0703

CONTROL: 2.7 - 2.877 (24)
OMNI SPECTRUM (ELEMENT 49)
EXERCISE: BEARING STAKE
CENTER FREQ: 2.80 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

REEL: F23 INDEX 3320
INTEGRATION TIME 320 SECS
FILTER WTC: HANNING
ATTEN: - DB



46 0703

10-2 2-7-77 0900Z

INDEX JJA

REEL: F23

DATE OF ANALYSIS:

CONTROL: 2-7 - 2077 (25)

OMNI SPECTRUM(ELEMENT 57)

EXERCISE: BEARING STAKE

CENTER FREQ: 260 HZ

1 ELEMENT

DATE/TIME: 2-7-77 - 2033 Z

ANALYSIS BANDWIDTH: 1/10 HZ

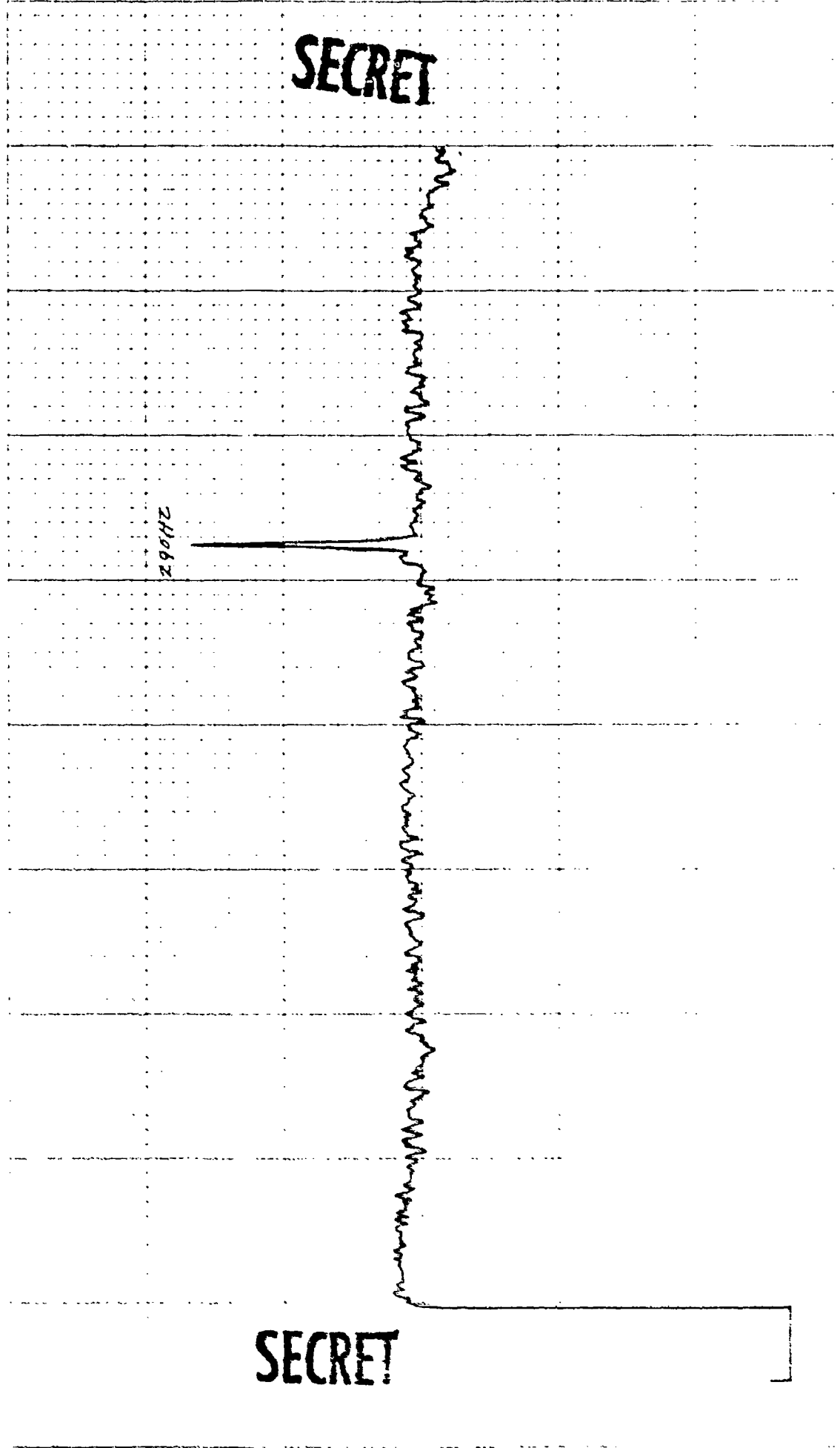
DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

ATTEN: - DB

WTG: HANNING



SECRET

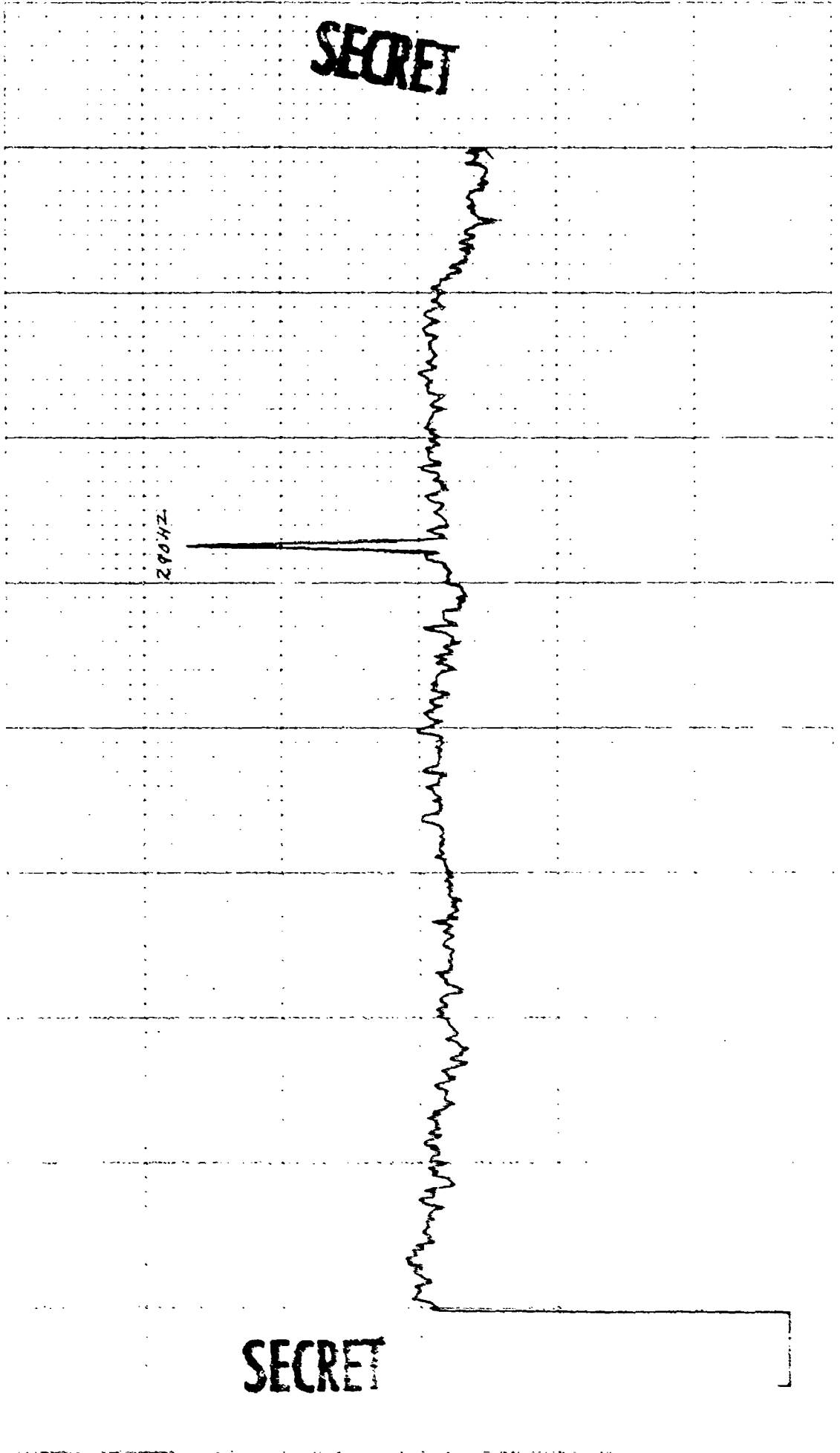
SECRET

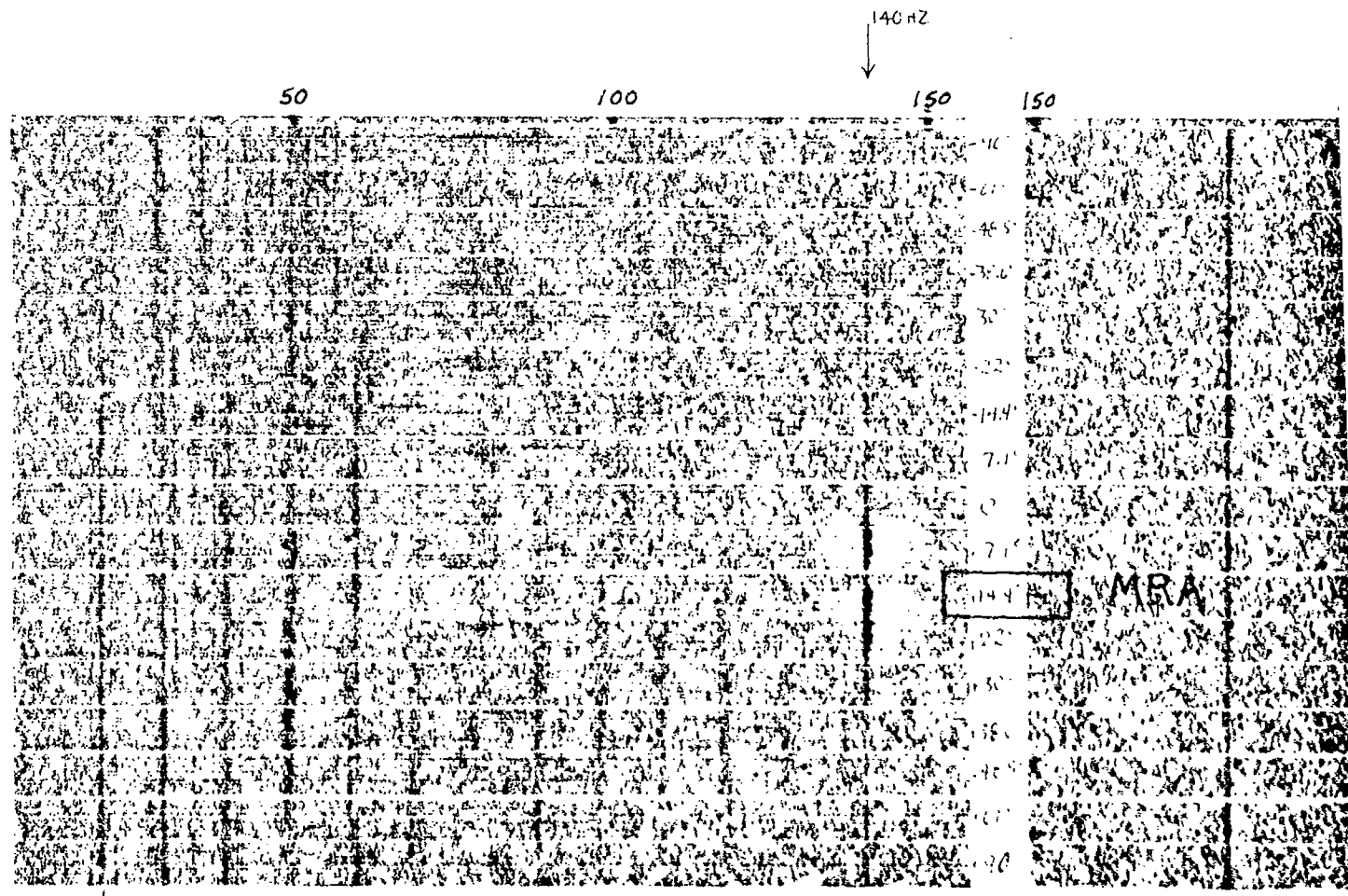
46 0703

CONTROL: 2-7 -2033 (2C)
 OMNI SPECTRUM(ELEMENT 53)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
 1 ELEMENT

DATE OF ANALYSIS:
 DATE/TIME: 2-7-77 -2033 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 DEG AZ STEERING

REEL: F23 INDEX 3320
 INTEGRATION TIME 320 SECS ATTN: DB
 FILTER WTG: HANNING



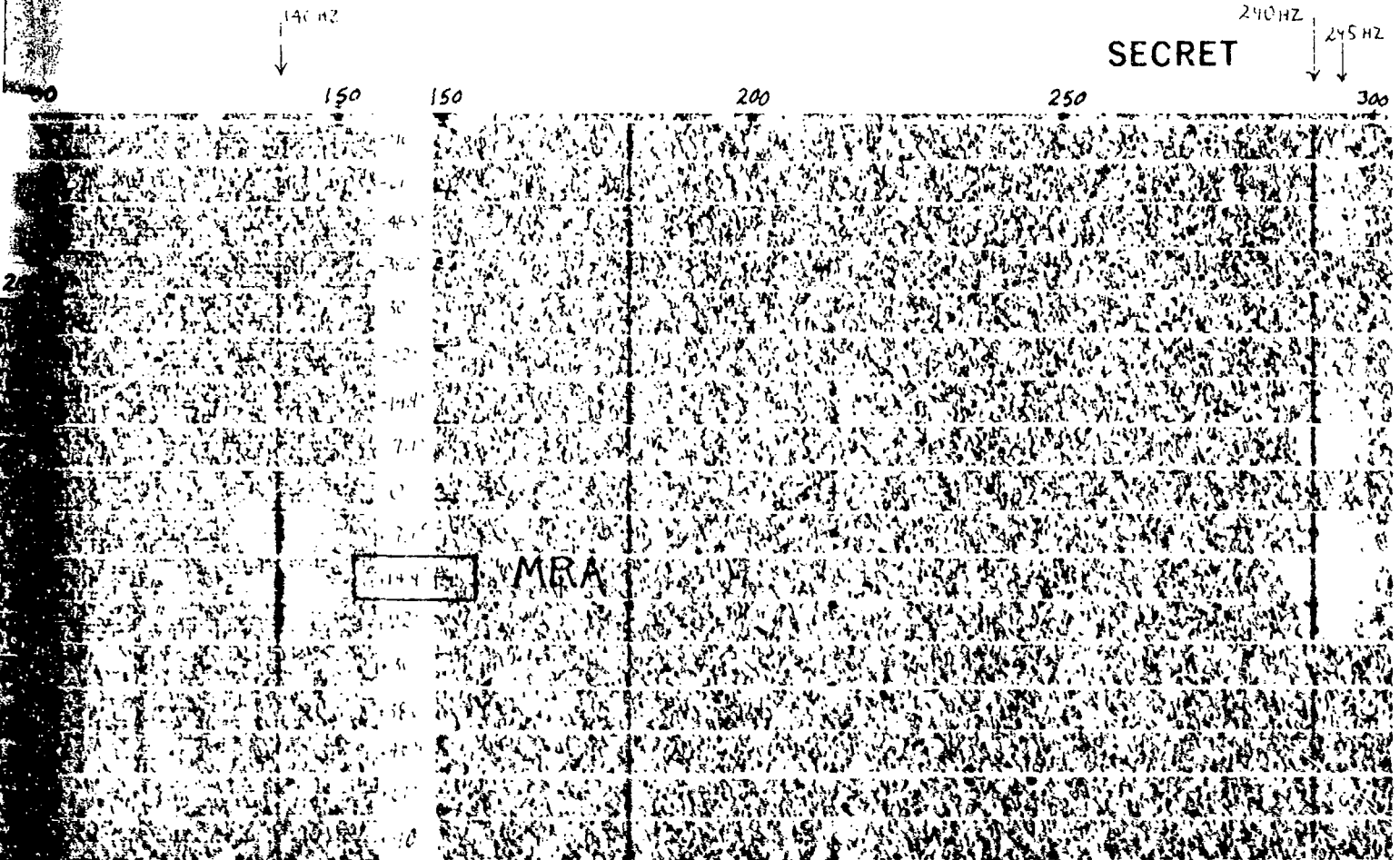


CONTROL NUMBER 20732-49-DPC
 NUMBER OF ELEMENTS 10
 FREQUENCY BAND 10 TO 300 HZ
 RANGE 70 N.M.

H I S T O R Y
 TAPE REEL NUMBER 173
 ANALYSIS BAND WIDTH 20 HZ
 WATER DEPTH 200 FMS

FILED
 DATE
 EXEM

SECRET
240 HZ
245 HZ
150 200 250 300



H I S T O R Y
 TAPE REEL NUMBER 1-2-5
 ANALYSIS BAND WIDTH 2.2 Hz
 WATER DEPTH 200 FMS

SECRET
 TAPE COUNT 1-2-5
 ELEMENT NUMBERS 1-2-5
 DATE 1-2-5
 EXERCISE: BEARING STAKE
 SAN-XXX-78-0136

ELEMENT
 DATE
 EXERCISE

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 6

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-28.7</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-18.7	
BEAMFORMER GAIN	<u>+18</u>	- .7	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	- .5	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-56.7</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-46.7	
BEAMFORMER GAIN	<u>+18</u>	-28.7	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>- .5</u>	
SIGNAL LEVEL FOR SNR	<u>-28.7</u>	28.2	
PROCESSOR CORRECTION	<u>-4.0</u>	24.2	
MRA CORRECTION	<u>+ .2</u>	24	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	15.8	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 6

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-25.3</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-15.5	
BEAMFORMER GAIN	<u>+18</u>	+2.5	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .6</u>	+3.1	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-62.6</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-52.6	
BEAMFORMER GAIN	<u>+18</u>	-34.8	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+3.1</u>	
SIGNAL LEVEL FOR SNR	<u>-34.6</u>	37.7	
PROCESSOR CORRECTION	<u>-4.0</u>	33.7	
MRA CORRECTION	<u>+ .6</u>	34.3	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	26.1	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

DATA POINT 6

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-24.7</u>	<u>-23.0</u>	<u> </u>
MRA SIGNAL LEVEL	<u>- .5</u>	<u>+ 3.1</u>	<u> </u>
ARRAY SIGNAL GAIN	<u>24.2</u>	<u>19.9</u>	<u> </u>
20 LOG <u>16</u>	<u>24</u>	<u>24</u>	<u> </u>
# of elements			
DIFFERENCE	<u>+ .2</u>	<u>-4.1</u>	<u> </u>

ARRAY GAIN

MRA SNR	<u>24.0</u>	<u>34.3</u>	<u> </u>
MEAN OMNI SNR	<u>15.4</u>	<u>19.9</u>	<u> </u>
ARRAY GAIN	<u>8.6</u>	<u>14.4</u>	<u> </u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>10.4</u>	<u>12.5</u>	<u> </u>
DIFFERENCE	<u>-1.8</u>	<u>+ 1.9</u>	<u> </u>

CONFIDENTIAL

46 0703

16E BEARING STAKE 150 HZ

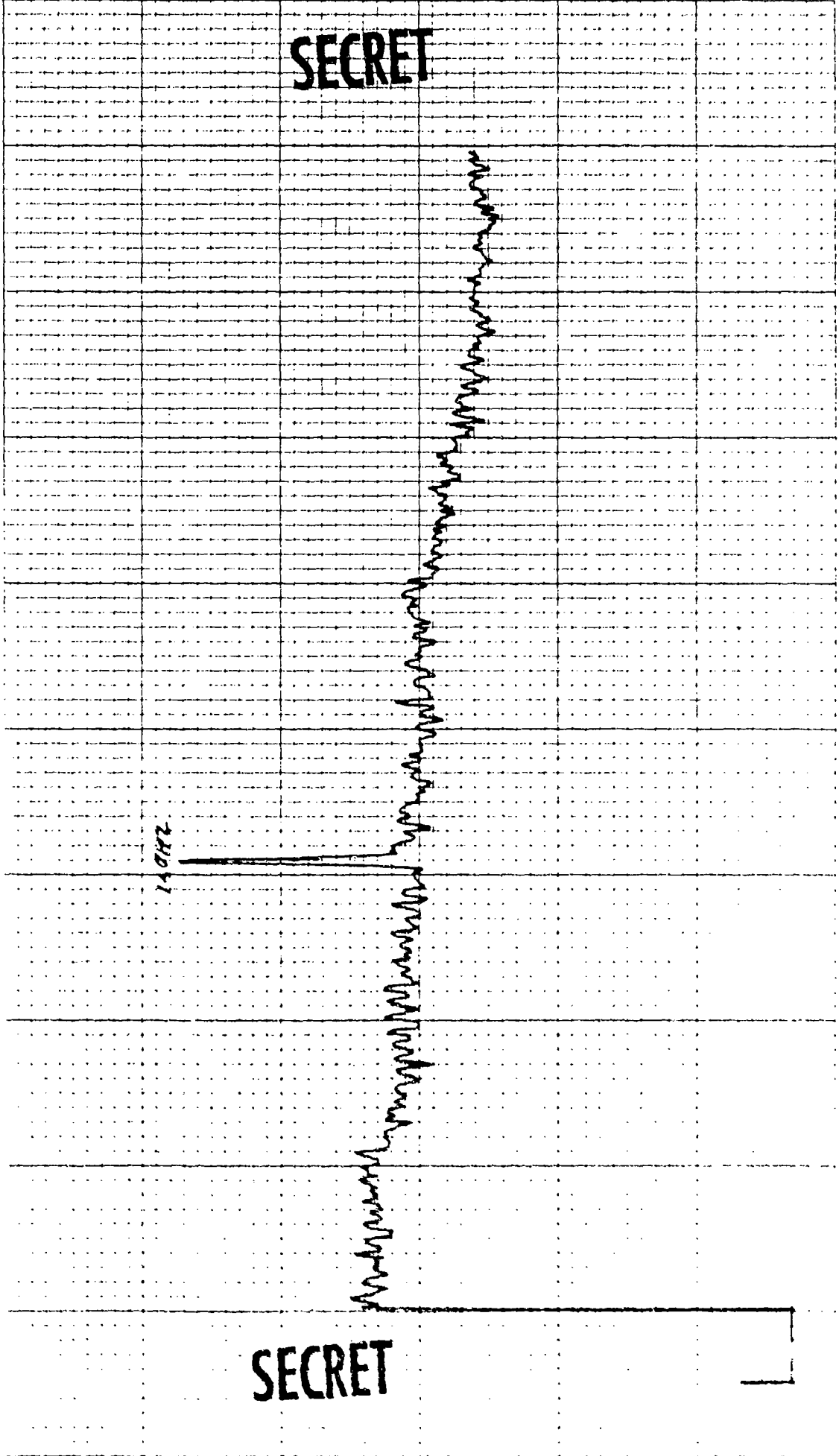
CONTROL: 2033 - 16 (206)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 16 ELEMENTS

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

DATE/TIME: 2-7-77 - 2033 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 * 2 DEG. AZ STEERING

REEL: C-13
 INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

INDE X 300



46 0703

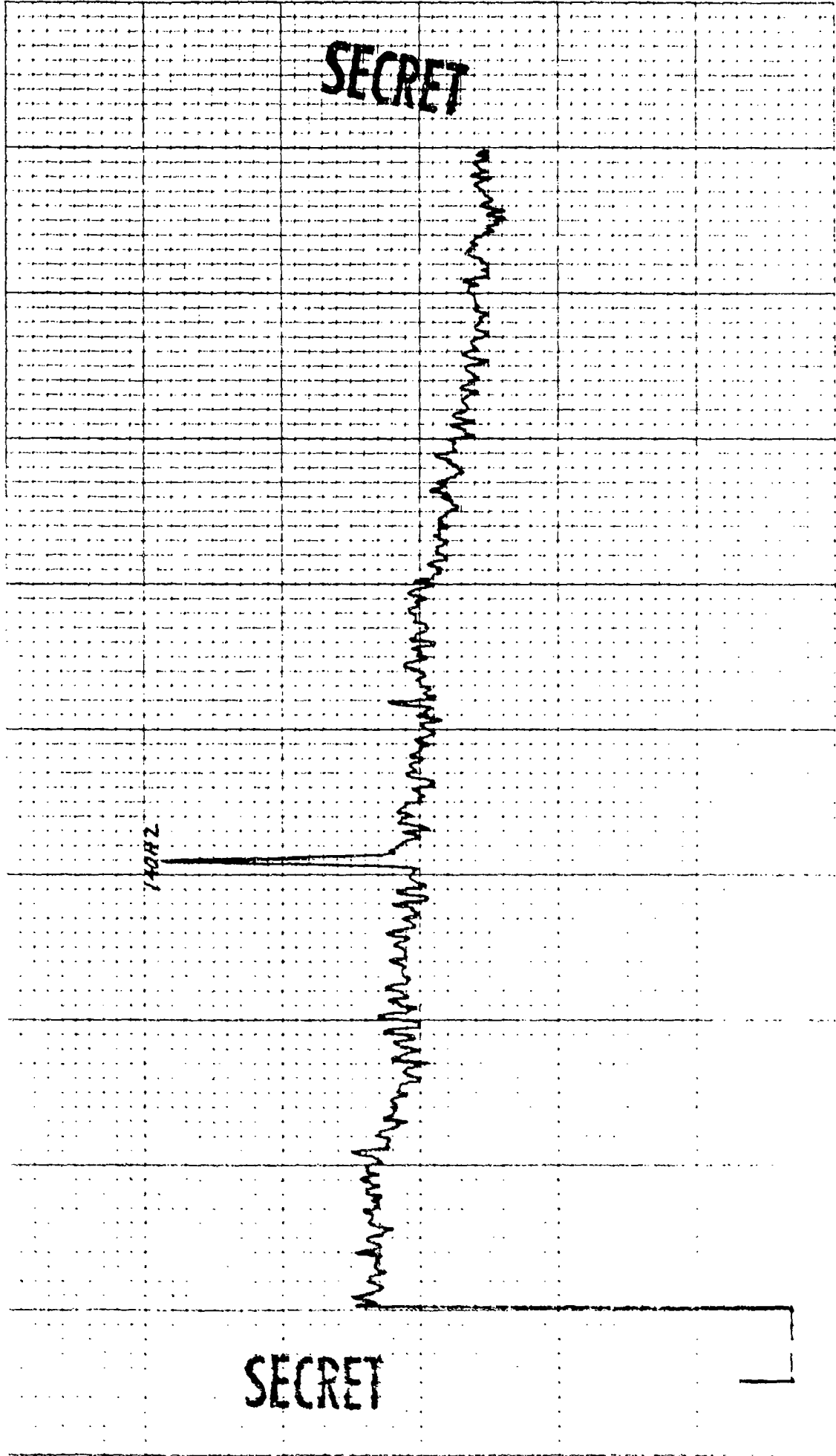
K-E 2-7-77 TO THE 1000 Hz

CONTROL: 2033 - /6 (DP6)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
/6 ELEMENTS

DATE OF ANALYSIS: - - - -
/ - /6
DATE/TIME: 2-7-77 - 2033Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 4 DEC. AZ STEERING

REEL: F23
INTEGRATION TIME 320 SECS
FILTER
ATTEN: -78 DB
WTG: HANNING

INDE X3000



SECRET

REF 19 2 19 TO THE Hqs. 2 1 19 19 19

46 0703

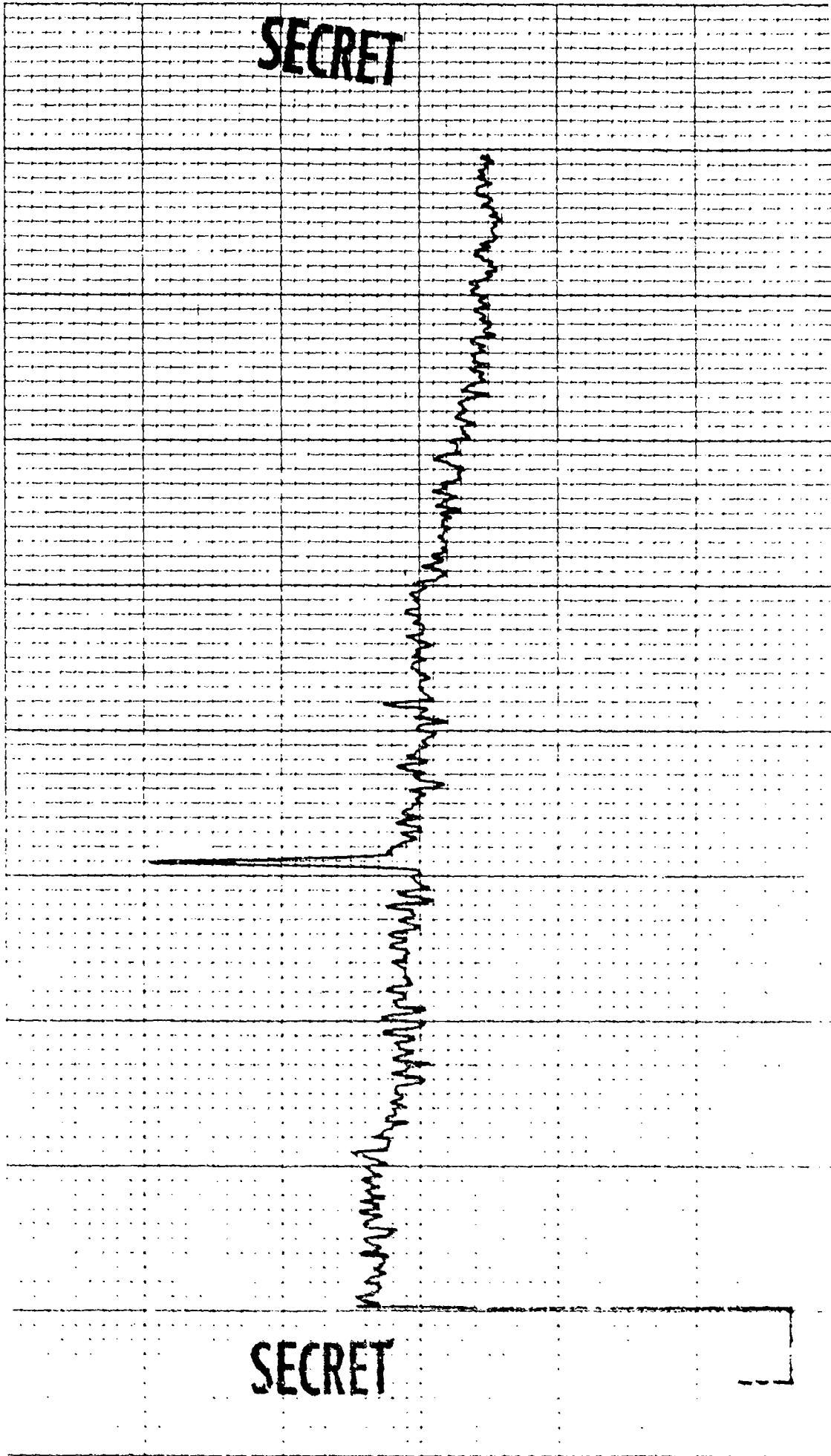
CONTROL: 2032 - 16 (DBL)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 16 ELEMENTS

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

DATE/TIME: 2-7-77 - 2033Z
 ANALYSIS BANDWIDTH: 1710HZ
 +6 DEG. AZ STEERING

REEL: F33
 INTEGRATION TIME 320 SECS
 FILTER WTC: HANNING

INDE X 3000
 ATTN: -8 DB

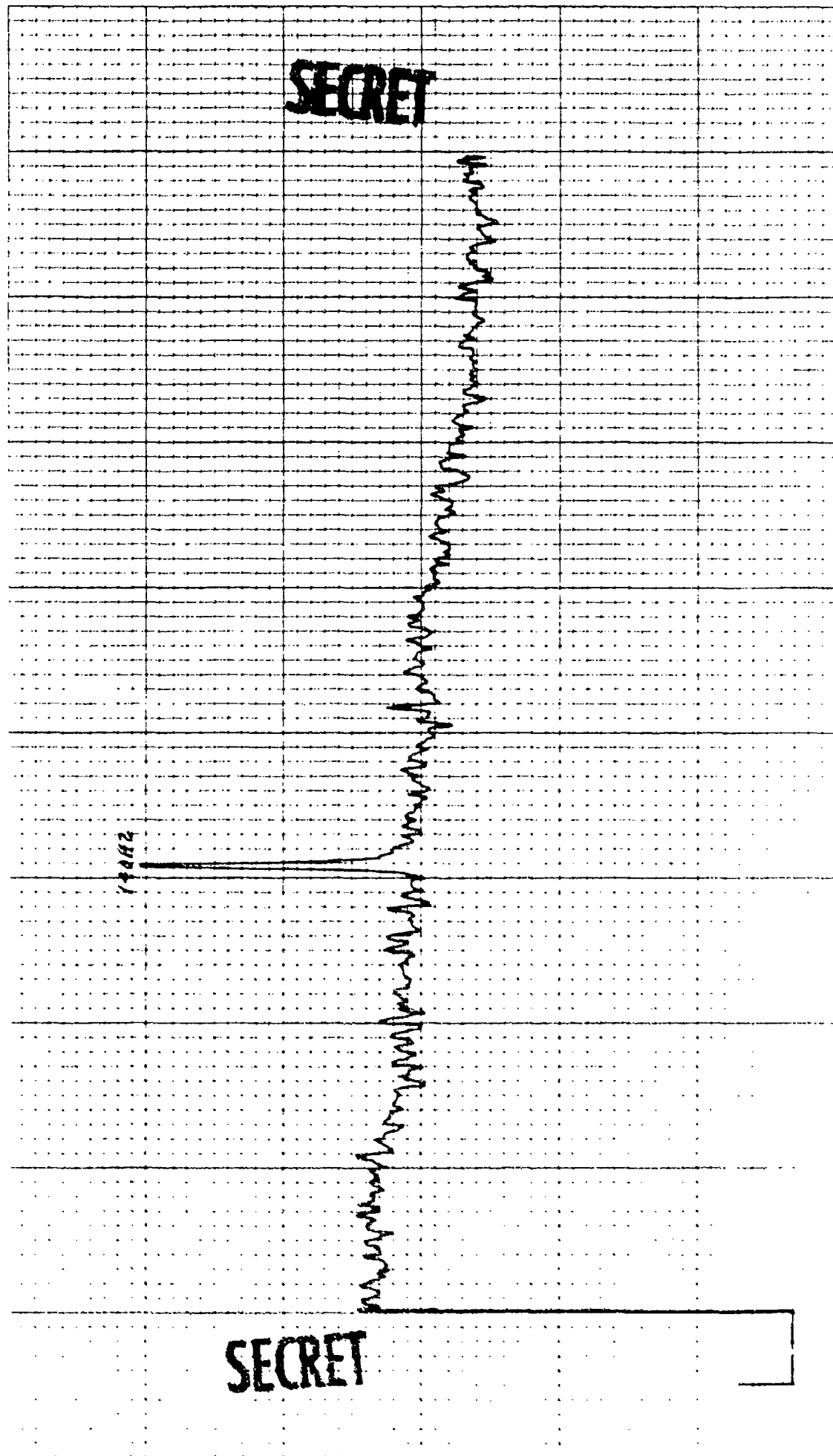


46 0703

REF ID: A66486

CONTROL: 2033 - 10 (DPC) DATE OF ANALYSIS: -- -- --
 BEAMFORMED SPECTRUM (ELEMENTS) / - / -
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033 Z
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 17/10HZ
 /C ELEMENTS + 0 DEG. AZ STEERING

REEL: F23 INDE X3000
 INTEGRATION TIME 320 SECS ATTN: -10 DB
 FILTER WTC: HANNING



46 0703

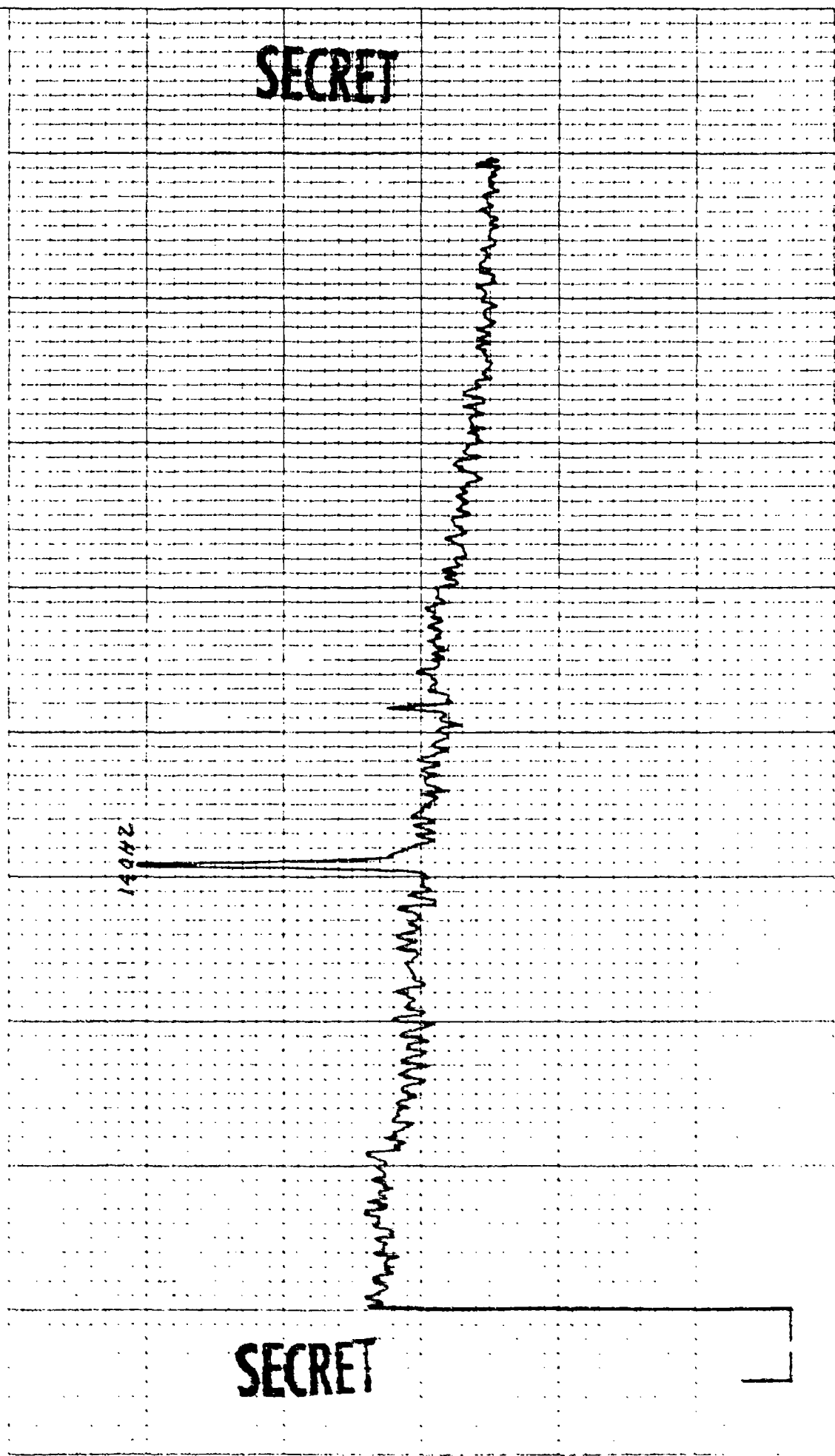
10-2 2033 2033 2033 2033 2033

CONTROL: 2033 - 16 (2033) DATE OF ANALYSIS: - - - - -
 BEAMFORMED SPECTRUM (ELEMENTS) / - /
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033Z
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ
 16 ELEMENTS + 10 DEG. AZ STEERING

INDE X 3000

REEL: F13

INTEGRATION TIME 320 SECS ATTEN: -18 DB
 FILTER WTG: HANNING

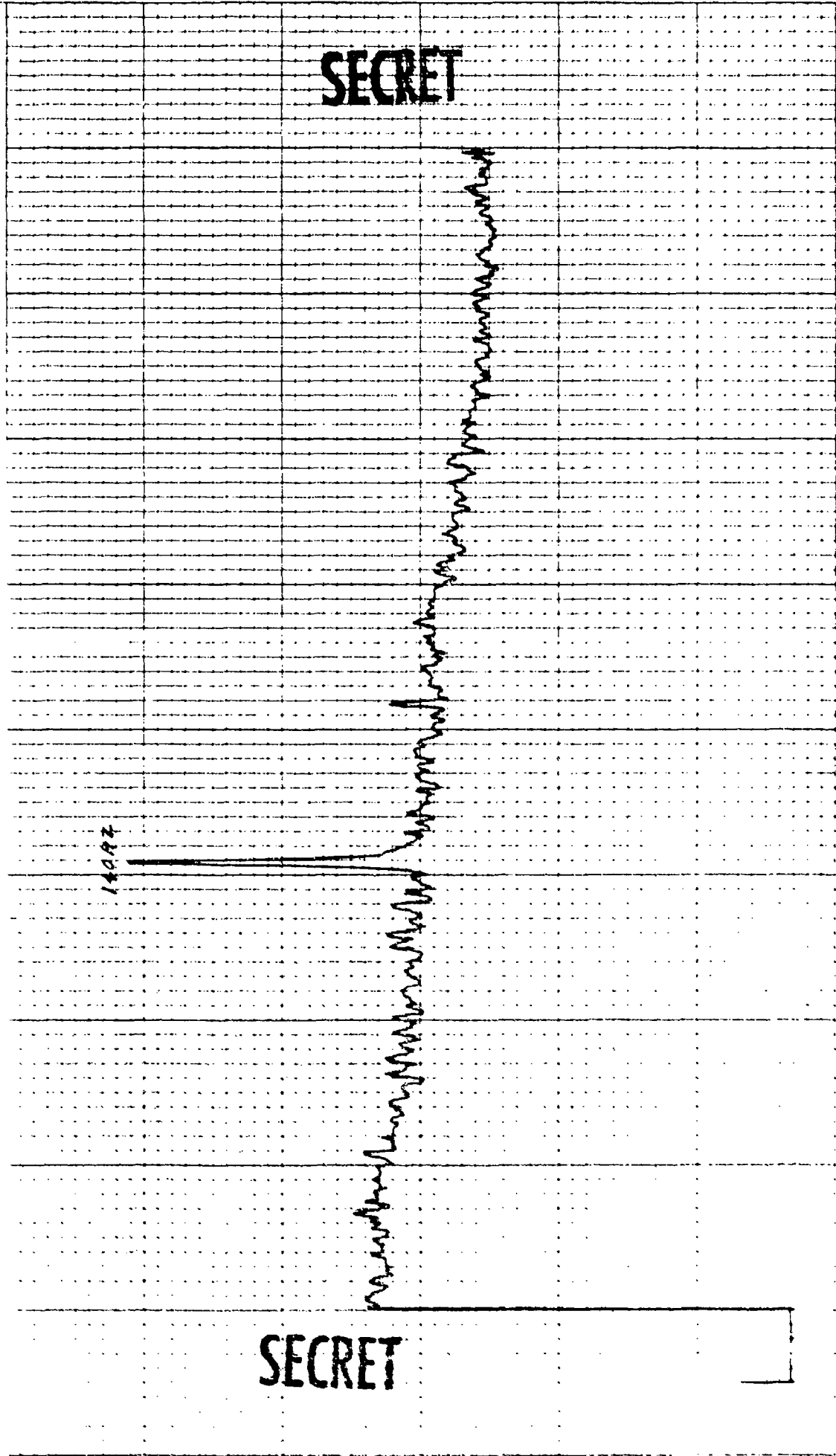


46 0703

1000 2000 3000 4000 5000 6000 7000 8000 9000 10000

CONTROL: 2073 - 16 (DPL) DATE OF ANALYSIS:
 BEAMFORMED SPECTRUM(ELEMENTS) /-16)
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033 Z
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
 /6 ELEMENTS +// DEC. AZ STEERING

REEL: F23 INDE X 3220
 INTEGRATION TIME 320 SECS ATTN: -18 DB
 FILTER WTG: HANNING



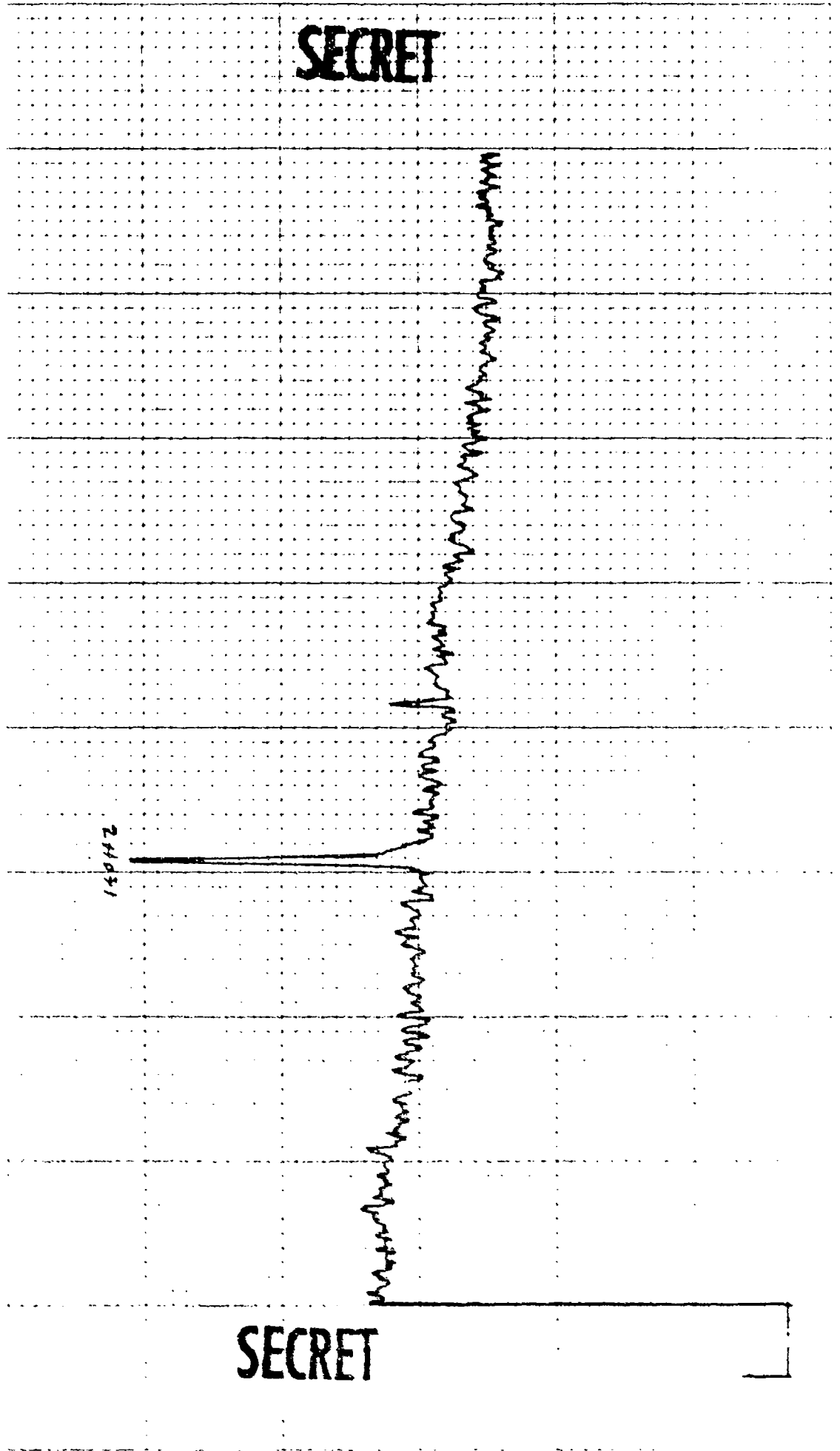
46 0703

K-2 1160 13000000 11000000

CONTROL: 2033 - /6 (296)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
/6 ELEMENTS

DATE OF ANALYSIS: - - -
/ - /6
DATE/TIME: 2-7-77 - 2033Z
ANALYSIS BANDWIDTH: 1/10HZ
+12 DEG. AZ STEERING

REEL: 1-13 INDE X 3000
INTEGRATION TIME 320 SECS ATTEN: -18 DB
FILTER WTC: HANNING



46 0703

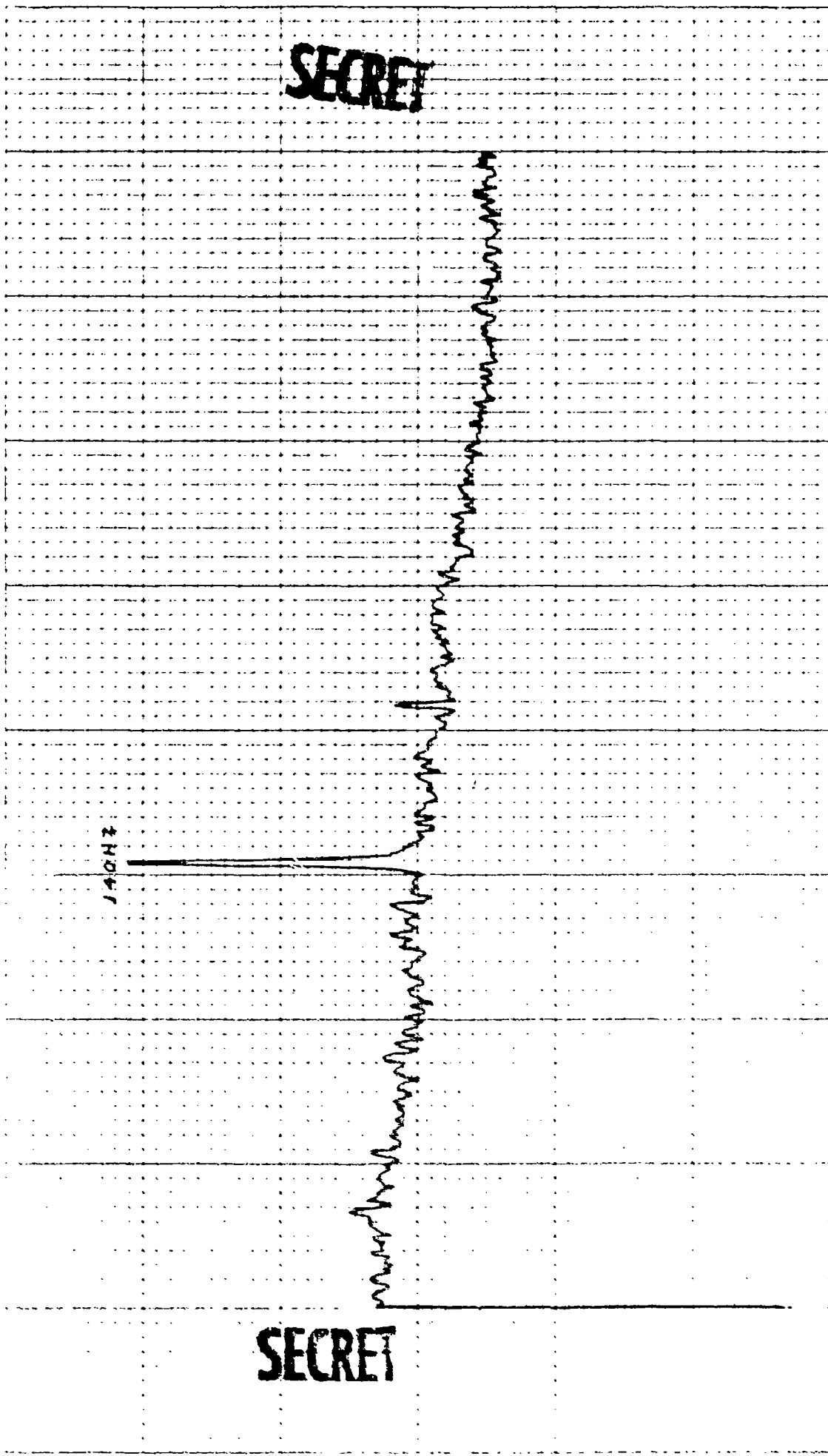
CONTROL: 2033 - 51 (DPC) REEL: F23 INDE X 2000

BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: / - /

EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: /8 DB

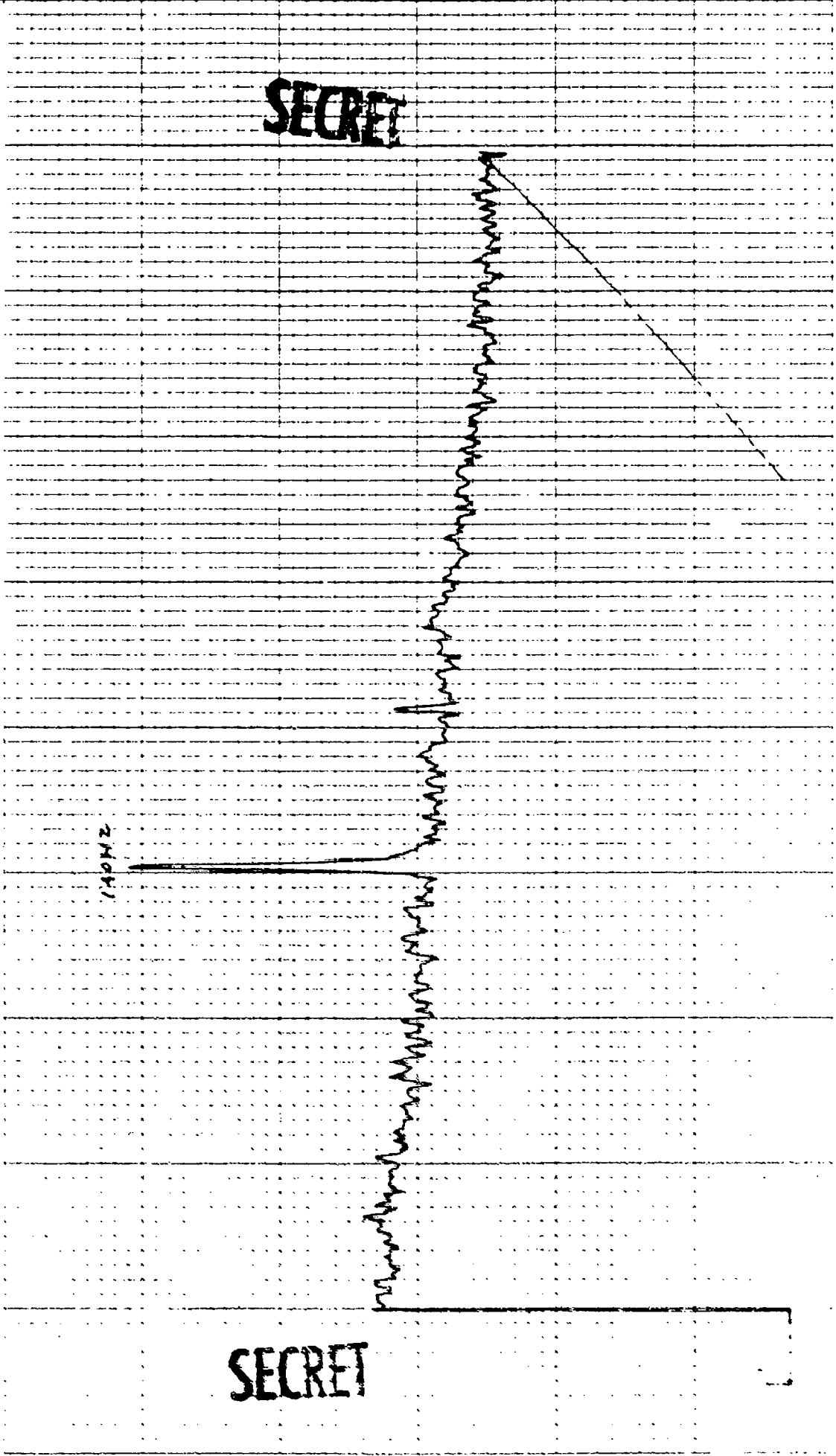
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING

16 ELEMENTS +13 DEG. AZ STEERING



46 0703

CONTROL: 2033 - 16 (DPG) DATE OF ANALYSIS: / - /
 BEAMFORMED SPECTRUM (ELEMENTS) REEL: F23 INDE X3000
 EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: -18 DB
 CENTER FREQ: 150 HZ FILTER WTC: HANNING
 16 ELEMENTS 474 DEG. AZ STEERING ANALYSIS BANDWIDTH: 1710HZ
 DATE/TIME: 2-7-77 - 2033Z

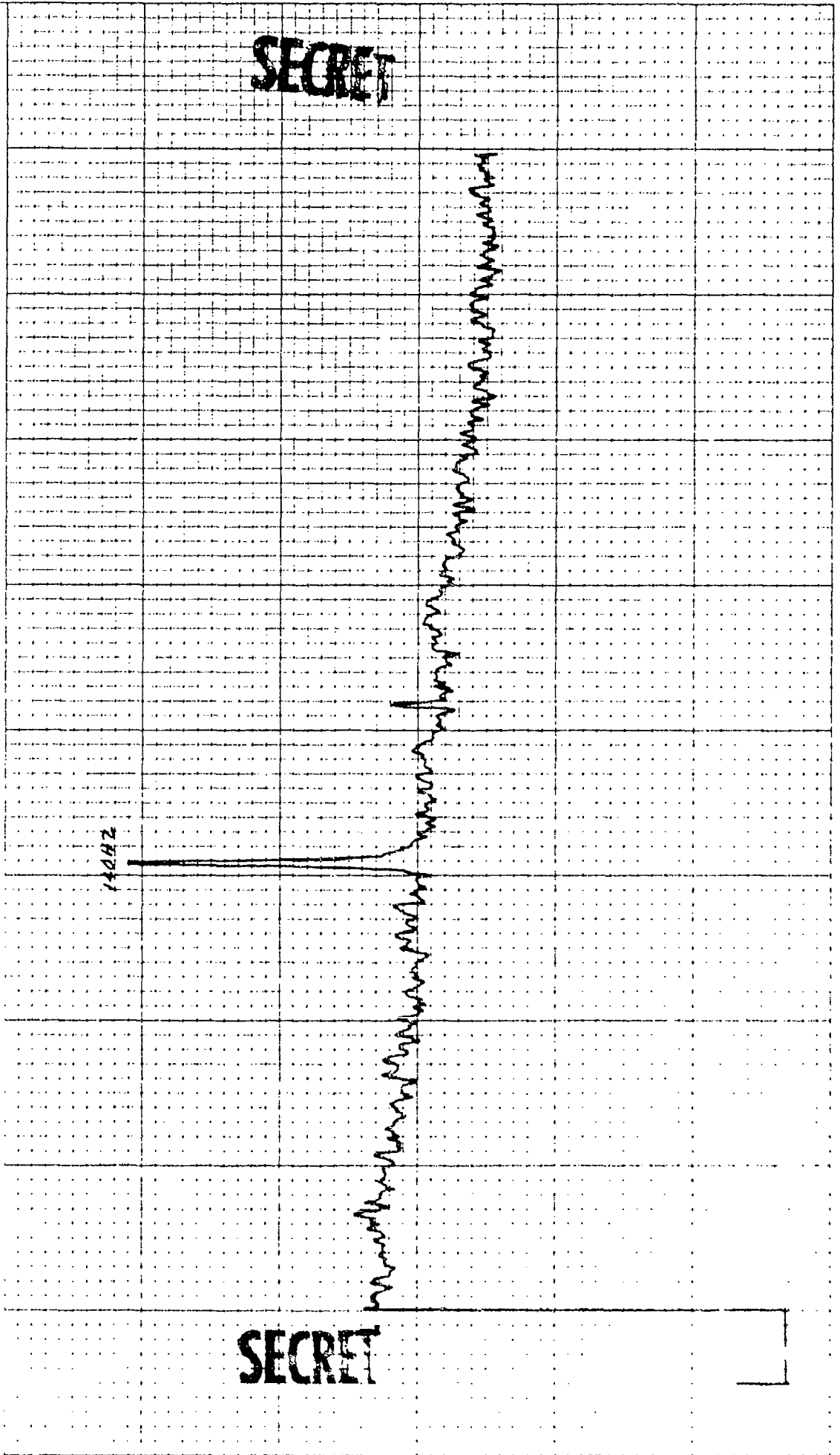


SECRET

CONTROL: 2033 - 16 (DPL)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

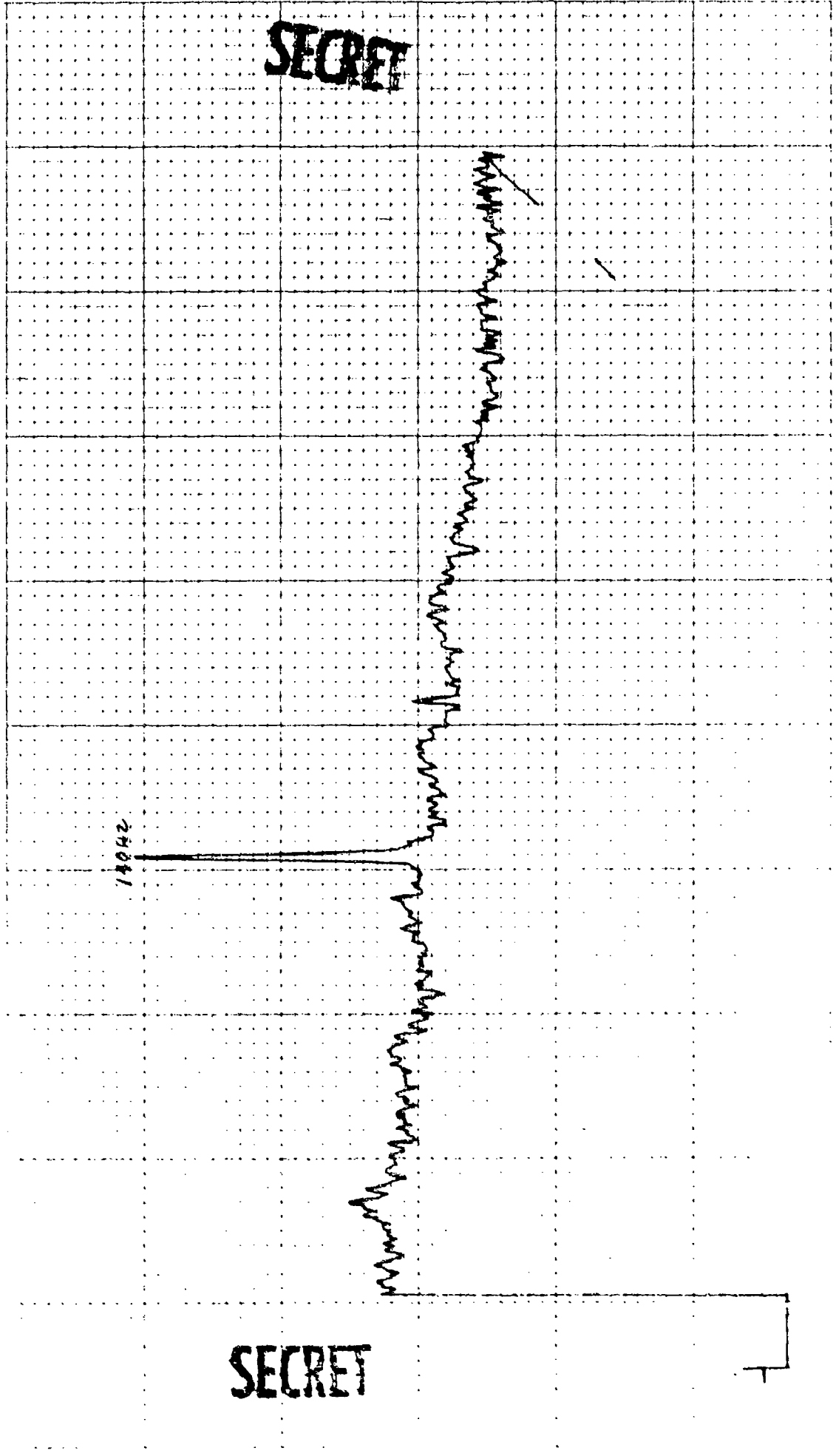
DATE OF ANALYSIS: - - -
/ - /
DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
715 DEG. AZ STEERING

REEL: F23
INDE X100e
INTEGRATION TIME 320 SECS
ATTEN: -18 DB
FILTER
WTG: HANNING



46 0703

CONTROL: 2033-1C (DPC) DATE OF ANALYSIS: REEL: F23 INDE X 1000
 BEAMFORMED SPECTRUM(ELEMENTS) / - / C
 EXERCISE: BEARING STAKE DATE/TIME: 27-77 - 2033Z INTEGRATION TIME 320 SECS ATTEN: -10 DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 /C ELEMENTS DEG. AZ STEERING



SECRET

SECRET

46 0703

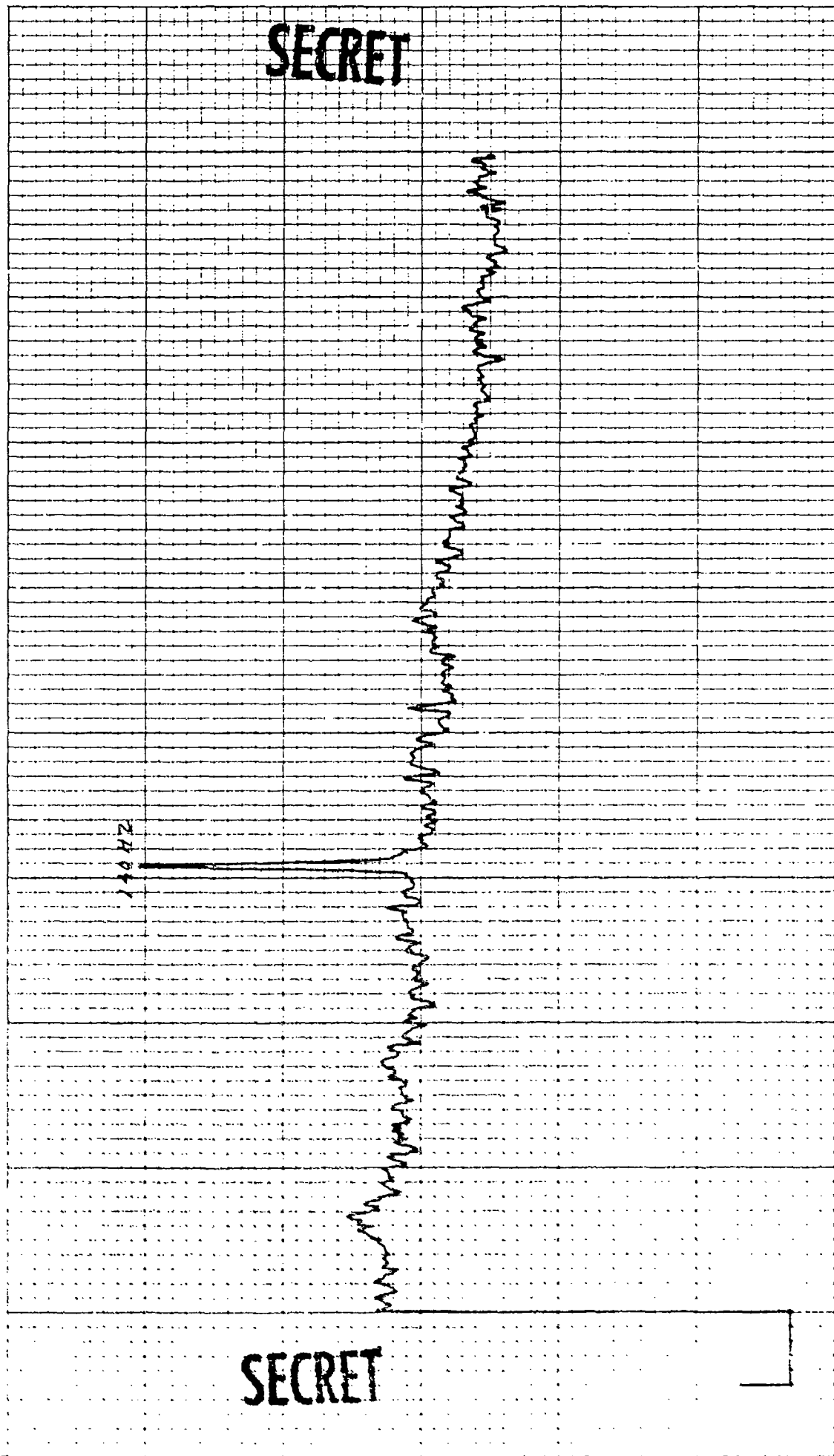
REF: 14-00000-00000-00000

REEL: F23 INDE X3000
ATTEN: -78 DB
WTG: HANNING

INTEGRATION TIME 320 SECS
FILTER

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10 HZ
17 DEG. AZ STEERING

CONTROL: 2033 - 16 (2036)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

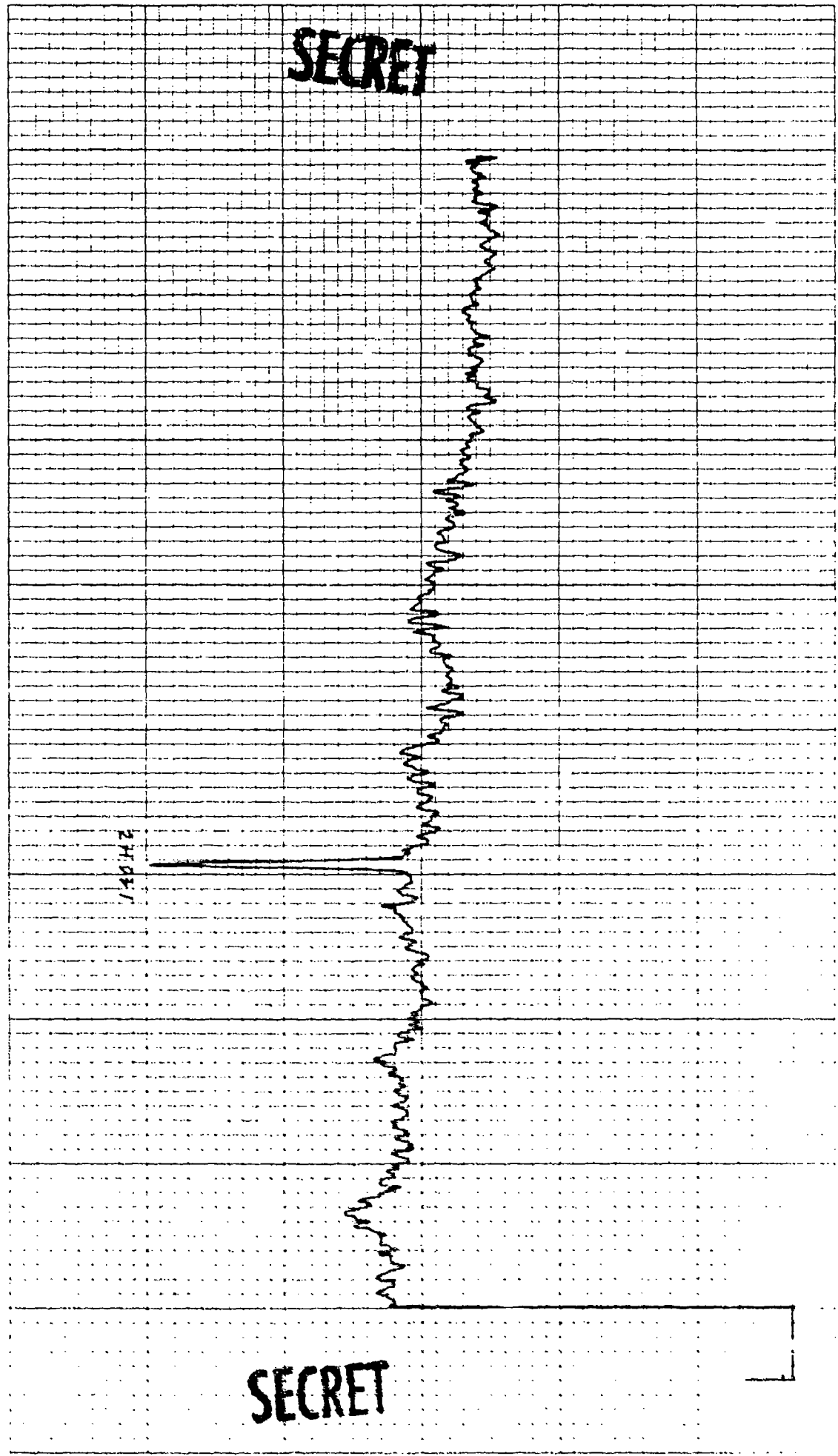


46 0703

REF: 2033 - /C (DPL)

CONTROL: 2033 - /C (DPL) DATE OF ANALYSIS: -- -- --
 BEAMFORMED SPECTRUM(ELEMENTS) /- /C
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-7 - 2033 Z
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
 /C ELEMENTS +18 DEG. AZ STEERING

REEL: F33 INDE X 3000
 INTEGRATION TIME 320 SECS ATTN: -10 DB
 FILTER WTG: HANNING



KSE BEARING STAKE SPECTRUM

46 0703

CONTROL: 2033 - 16 (206)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 16 ELEMENTS

DATE OF ANALYSIS: - - - - -
 / - / C)

REEL: F23

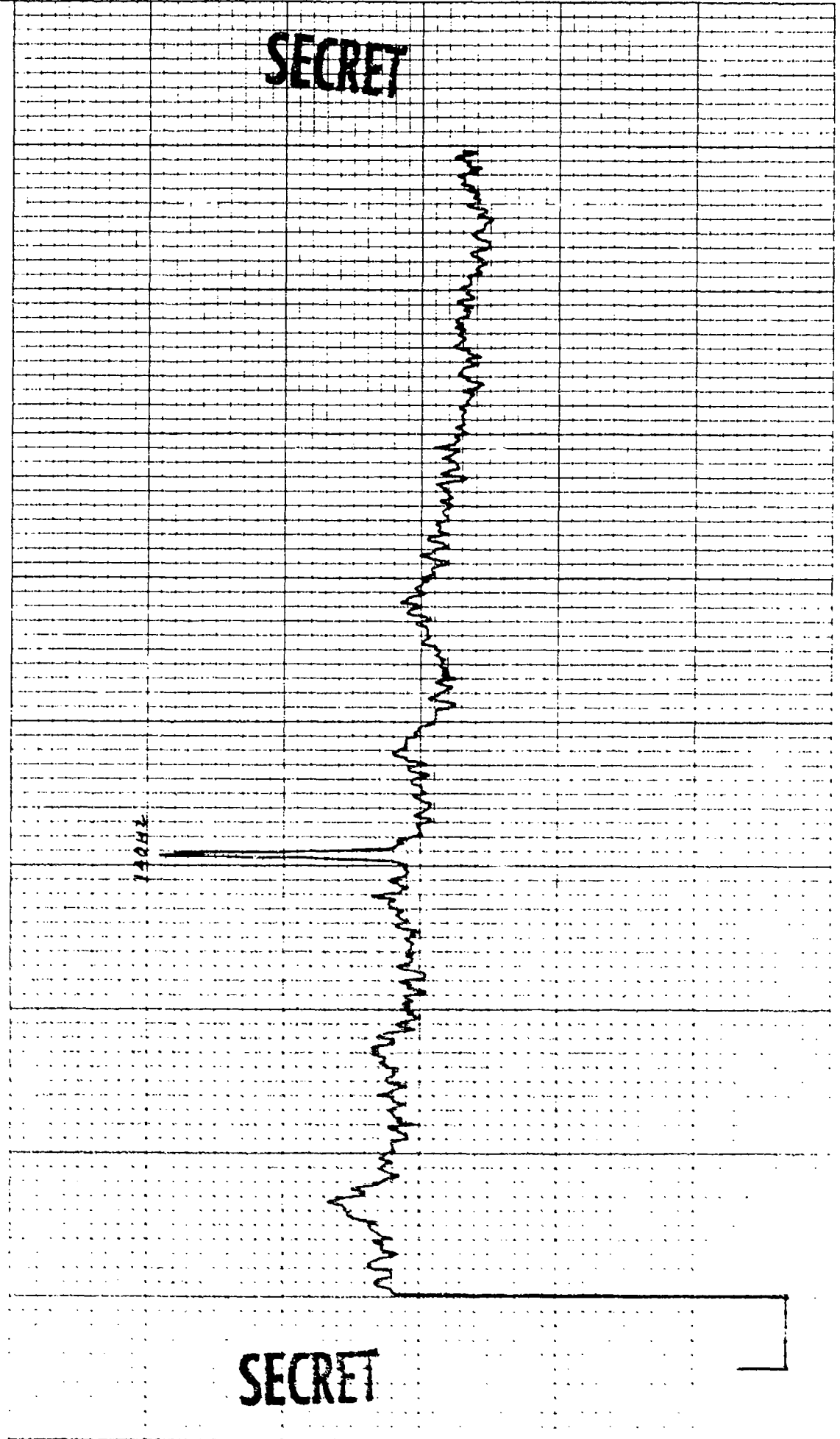
INTEGRATION TIME 320 SECS

ATTEN: -18 DB

FILTER WTG: HANNING

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

INDE X3000



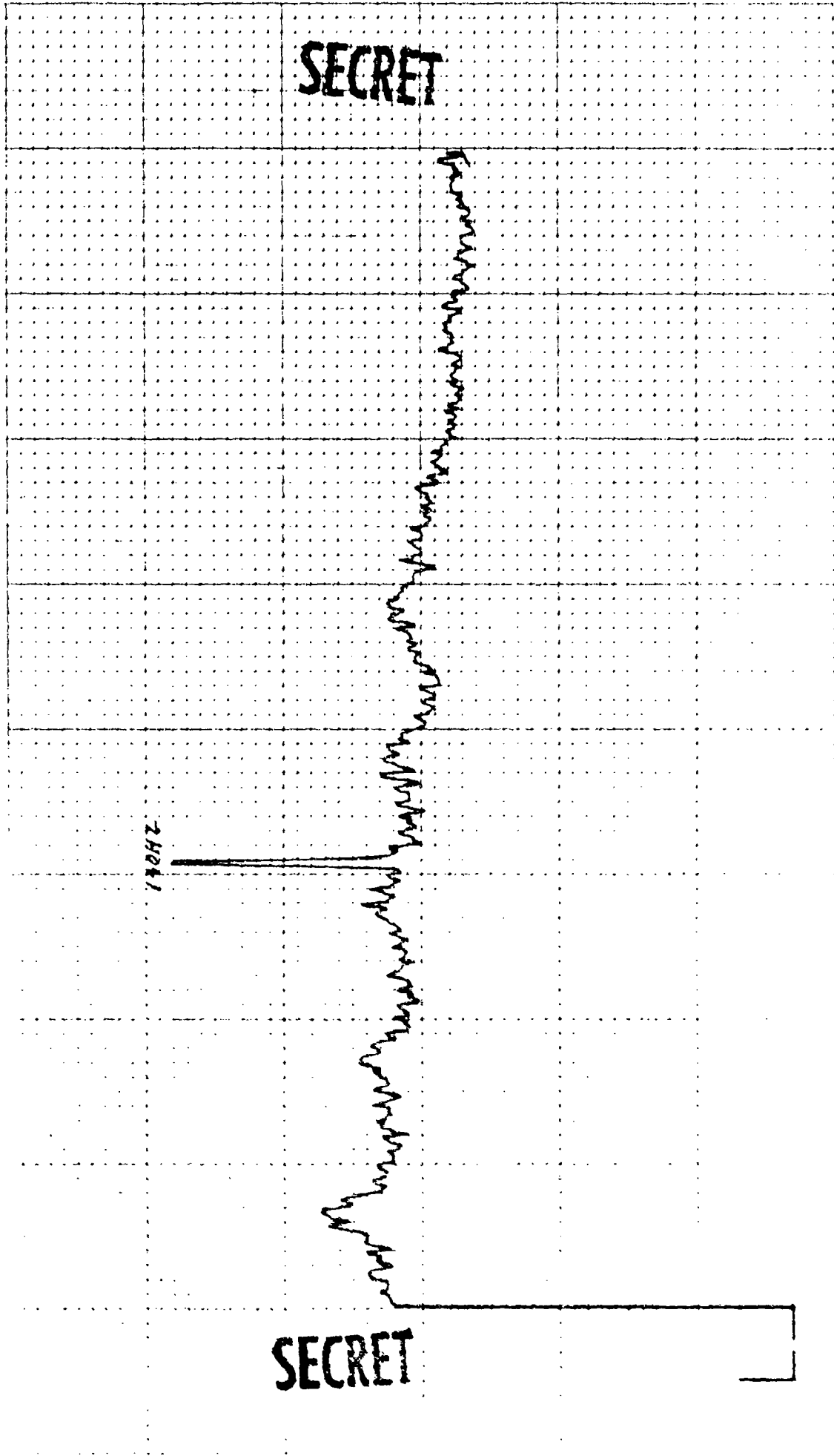
46 0703

K-2 2-7-77 02 100

CONTROL: 2033 - 12 (DPG) DATE OF ANALYSIS: - - - -
BEAMFORMED SPECTRUM(ELEMENT: / - /C)
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTEN: ~18 DB
CENTER FREQ: 150 HZ FILTER WTC: HANNING
/2 ELEMENTS + 22 DEG. AZ STEERING

REEL: F23 INDE X3000

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10HZ



SECRET

SECRET

46 0703

INDE X 3000

REEL: F23

INTEGRATION TIME 320 SECS
ATTEN: -18 DB
FILTER WTG: HANNING

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

DATE/TIME: 2-7-77 - 2033 Z

ANALYSIS BANDWIDTH: 1/10HZ

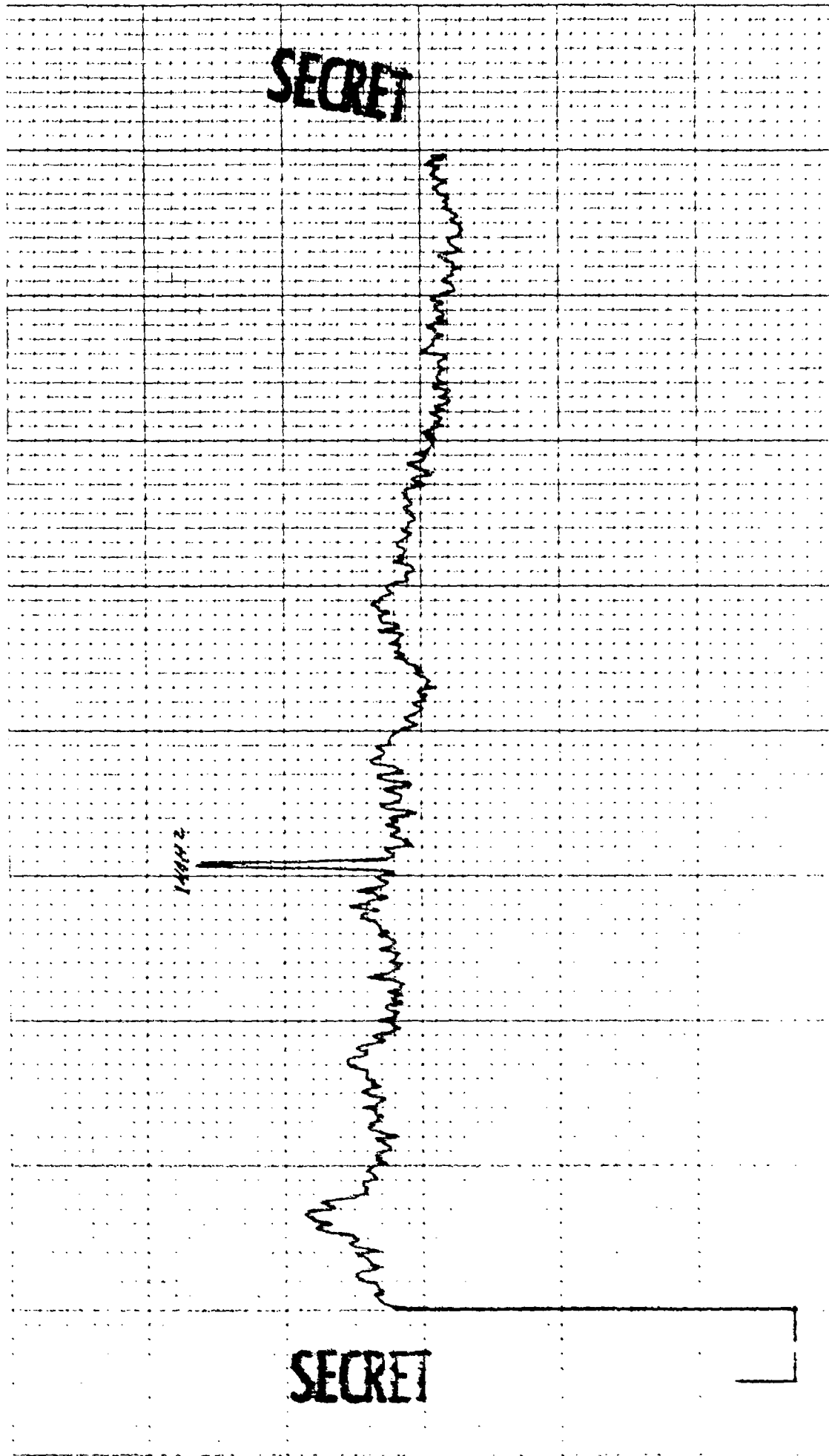
+ 24 DEG. AZ STEERING

CONTROL: 2033 - /c (DPC)
BEAMFORMED SPECTRUM (ELEMENTS)

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

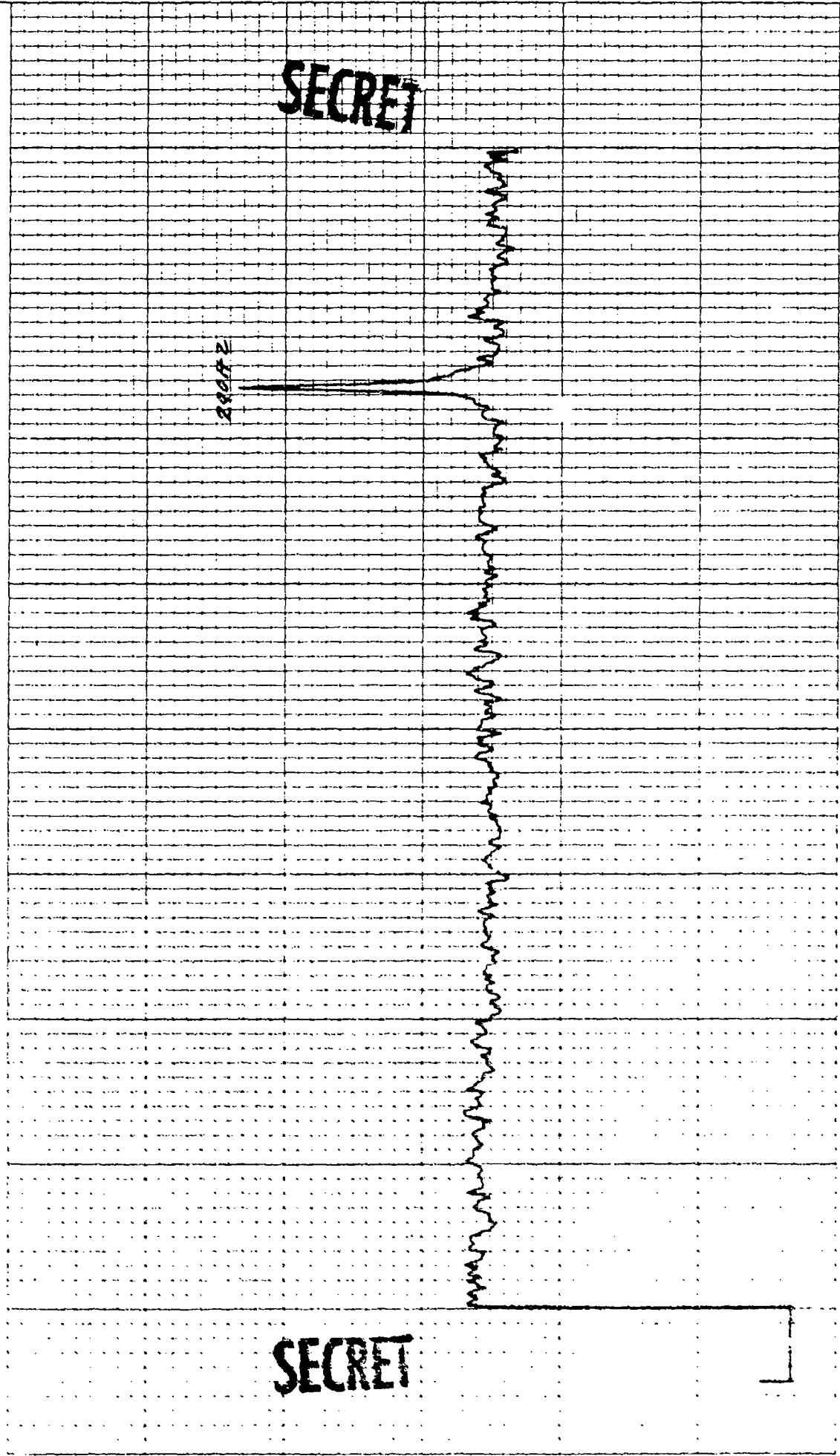
/c ELEMENTS



46 0703

CONTROL: 2073 - 16 (206) DATE OF ANALYSIS: -- -- --
 BEAMFORMED SPECTRUM(ELEMENTS) / - / 6)
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2073 Z
 CENTER FREQ: 210 HZ ANALYSIS BANDWIDTH: 1710HZ
 16 ELEMENTS * 2 DEG. AZ STEERING

REEL: F23 INDE X3000
 INTEGRATION TIME 320 SECS ATTN: -10 DB
 FILTER WTG: HANNING

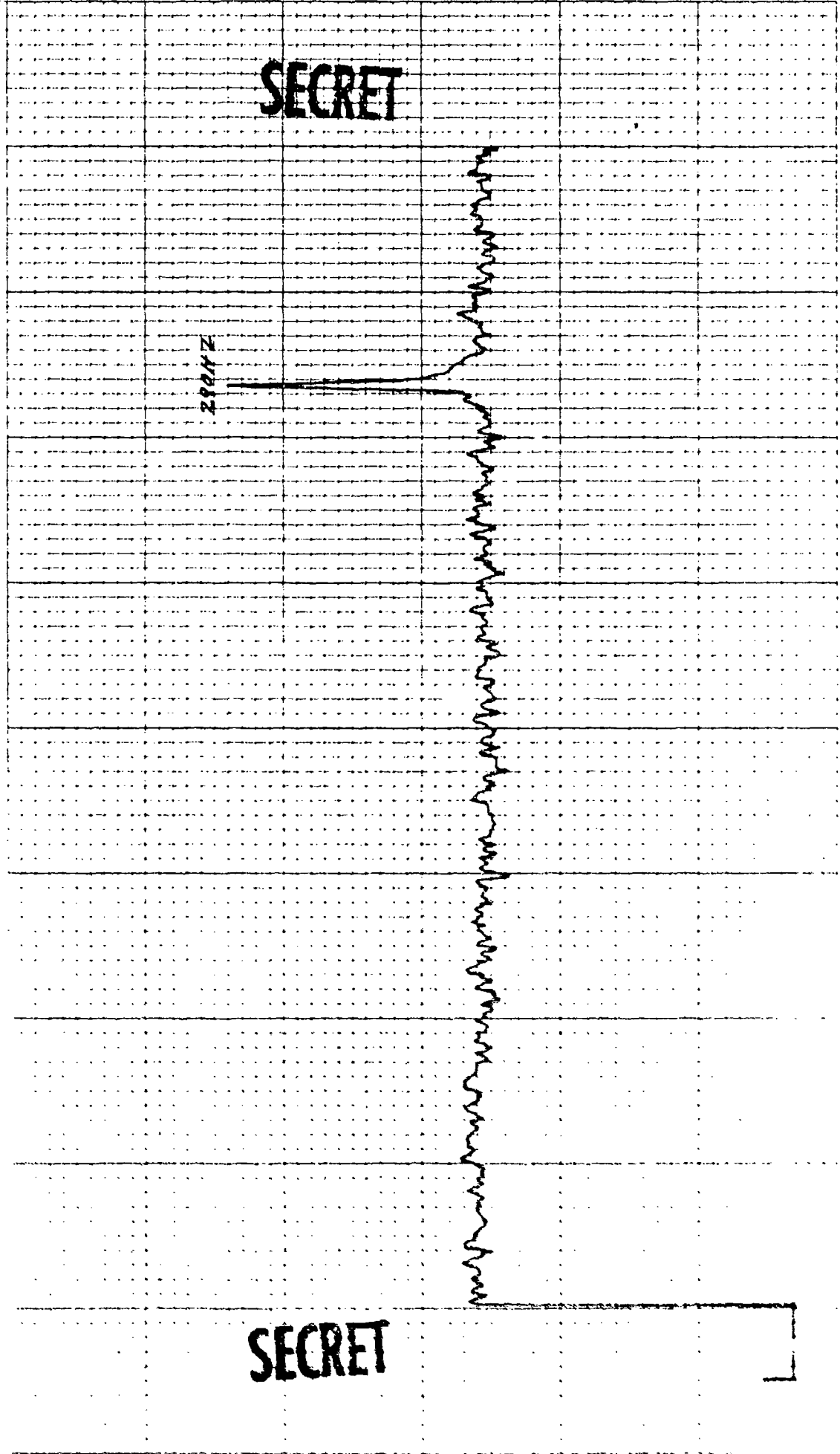


SECRET

SECRET

46 0703

CONTROL: 2033-16 (DPL) DATE OF ANALYSIS: - - - - REEL: F23 INDE X3000
 BEAMFORMED SPECTRUM(ELEMENTS) 1-16
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1710HZ INTEGRATION TIME 320 SECS ATTN: -18 DB
 CENTER FREQ: 200 MZ 4 DEG. AZ STEERING FILTER WTC: HANNING
16 ELEMENTS



46 0703

CONTROL: 2077 - 16 (DP6)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16

DATE/TIME: 2-7-77 - 2073Z

ANALYSIS BANDWIDTH: 1/10HZ

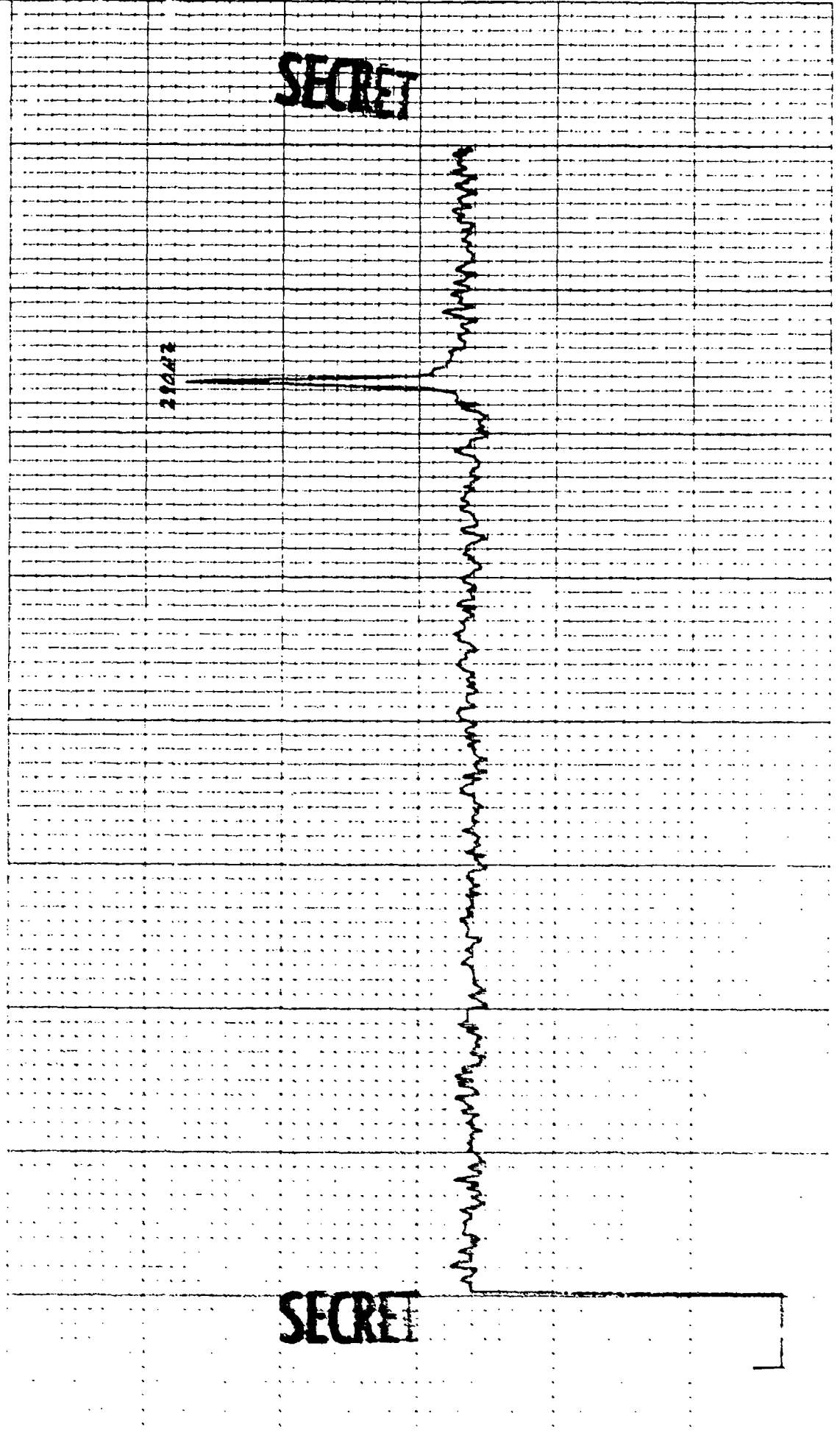
16 DEG. AZ STEERING

REEL: F23 INDE X3000

INTEGRATION TIME 320 SECS

FILTER WTG: HANNING

ATTEN: -10 DB

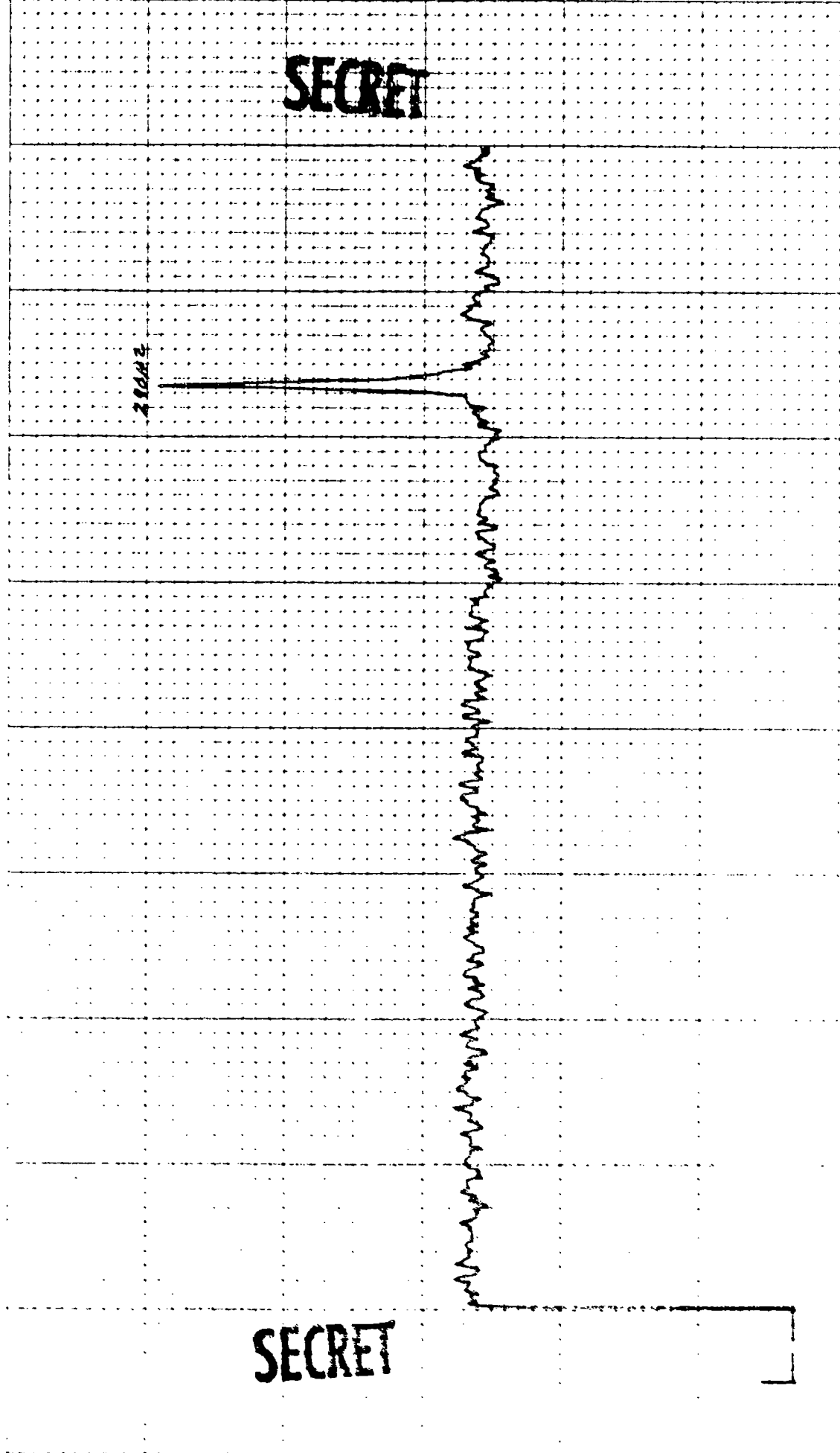


46 0703

CONTROL: 2033 - 16 (2P6) DATE OF ANALYSIS: - - - - -
 BEAMFORMED SPECTRUM(ELEMENTS) / - / 6
 EXERCISE: BEARING STAFF DATE/TIME: 2-7-77 - 2033Z
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ
 16 ELEMENTS + 8 DEG. AZ STEERING

REEL: F23 INDE X3000

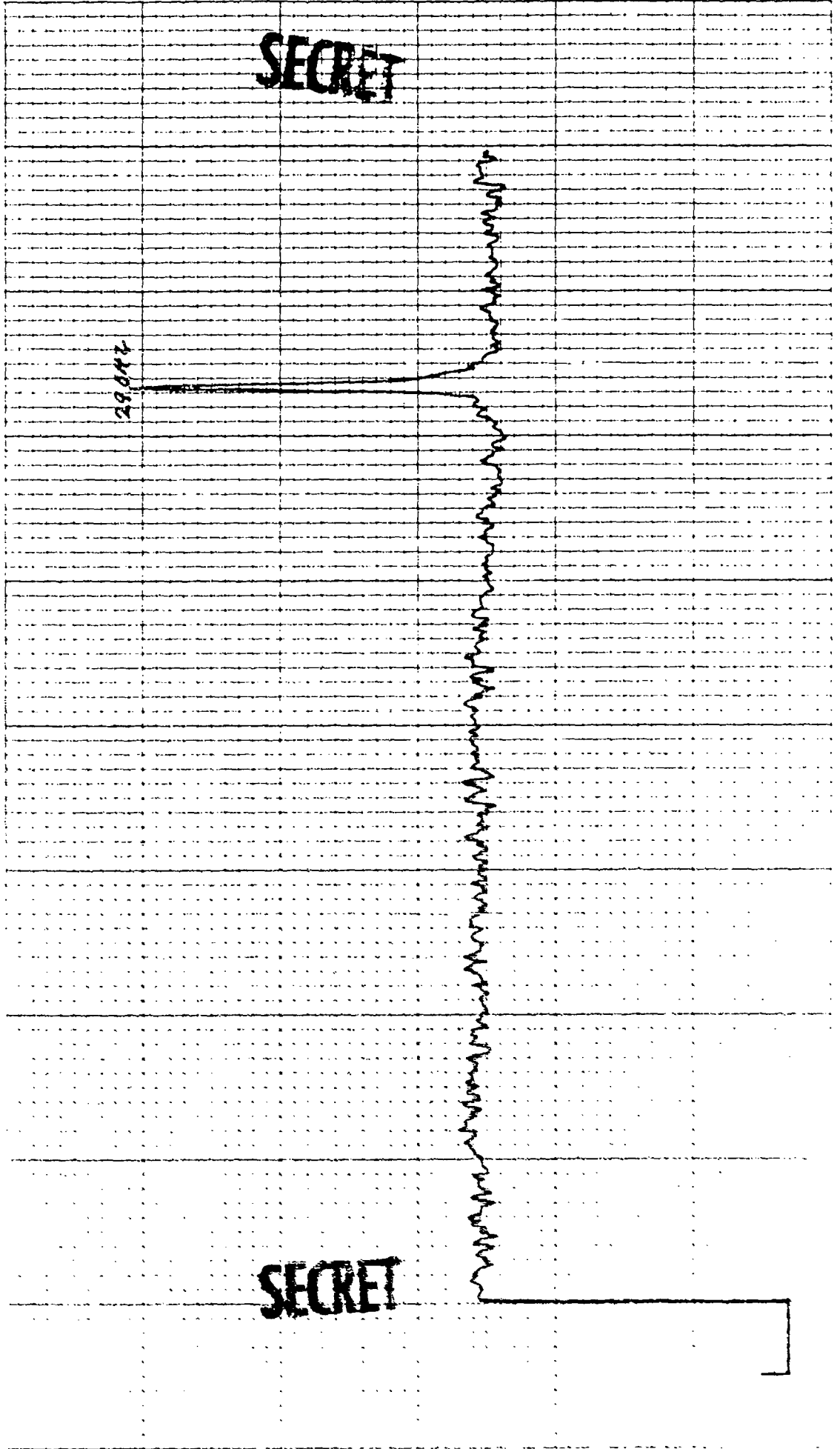
INTEGRATION TIME 320 SECS ATTN: -18 DB
 FILTER WTC: HANNING



46 0703

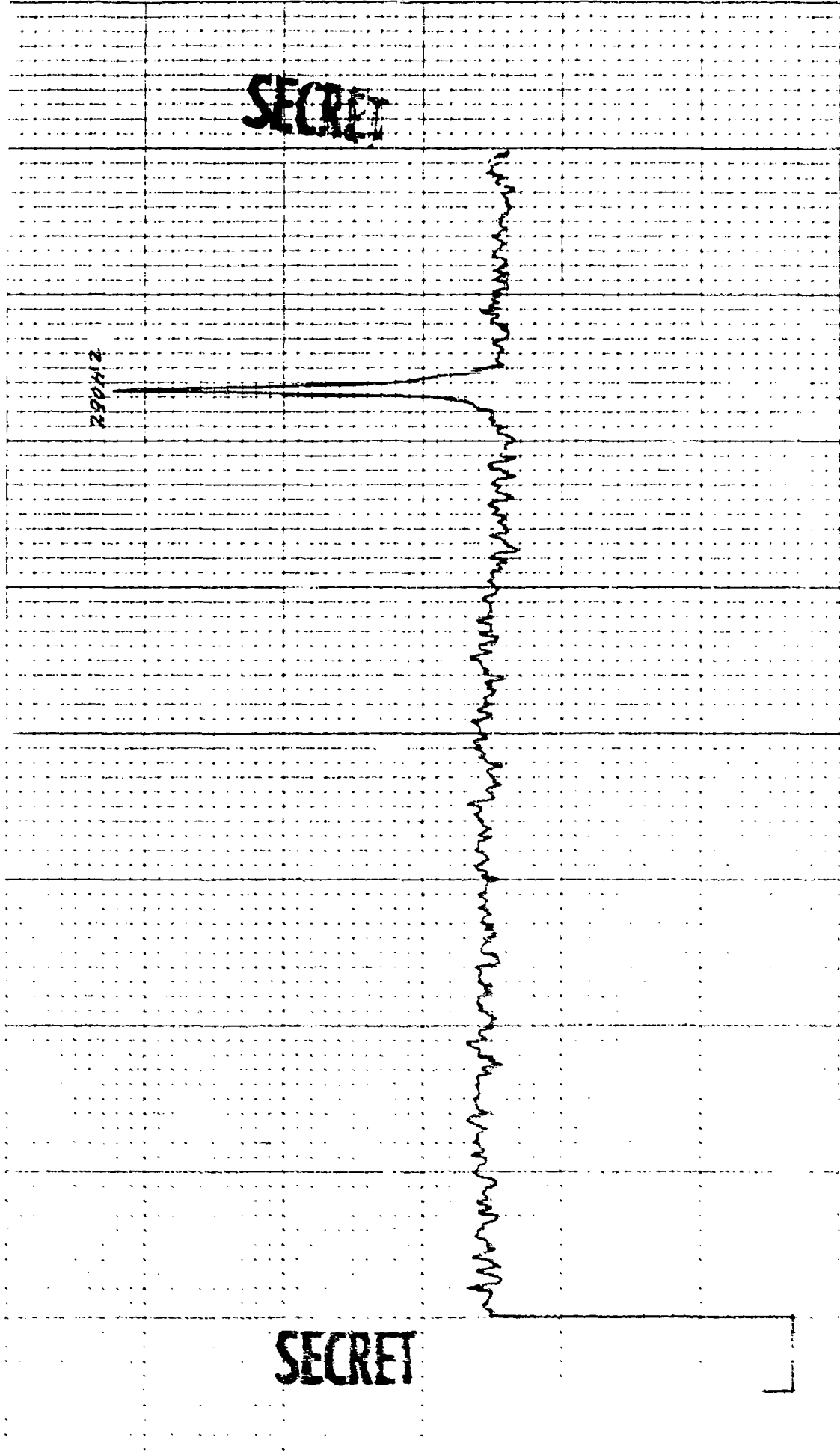
CONTROL: 2033 - 16 (DPC) DATE OF ANALYSIS: - - - - -
 BEAMFORMED SPECTRUM (ELEMENTS) / - / 6
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033 Z
 CENTER FREQ: 210 MHz ANALYSIS BANDWIDTH: 1/10 HZ
 16 ELEMENTS 410 DEG. AZ STEERING

REEL: F23 INDE X 3000
 INTEGRATION TIME 320 SECS ATTN: -18 DB
 FILTER WIG: HANNING



46 0703

CONTROL: 2033 - 16 (2066) DATE OF ANALYSIS: 1-76 REEL: F23 INDE XJ000
BEAMFORMED SPECTRUM(ELEMENTS) INTEGRATION TIME 320 SECS ATTEN: 70 DB
EXEFCISE: BEARING STAKE FILTER WTC: HANNING
CENTER FREQ: 2000 HZ
16 ELEMENTS 4// DEG. AZ STEERING



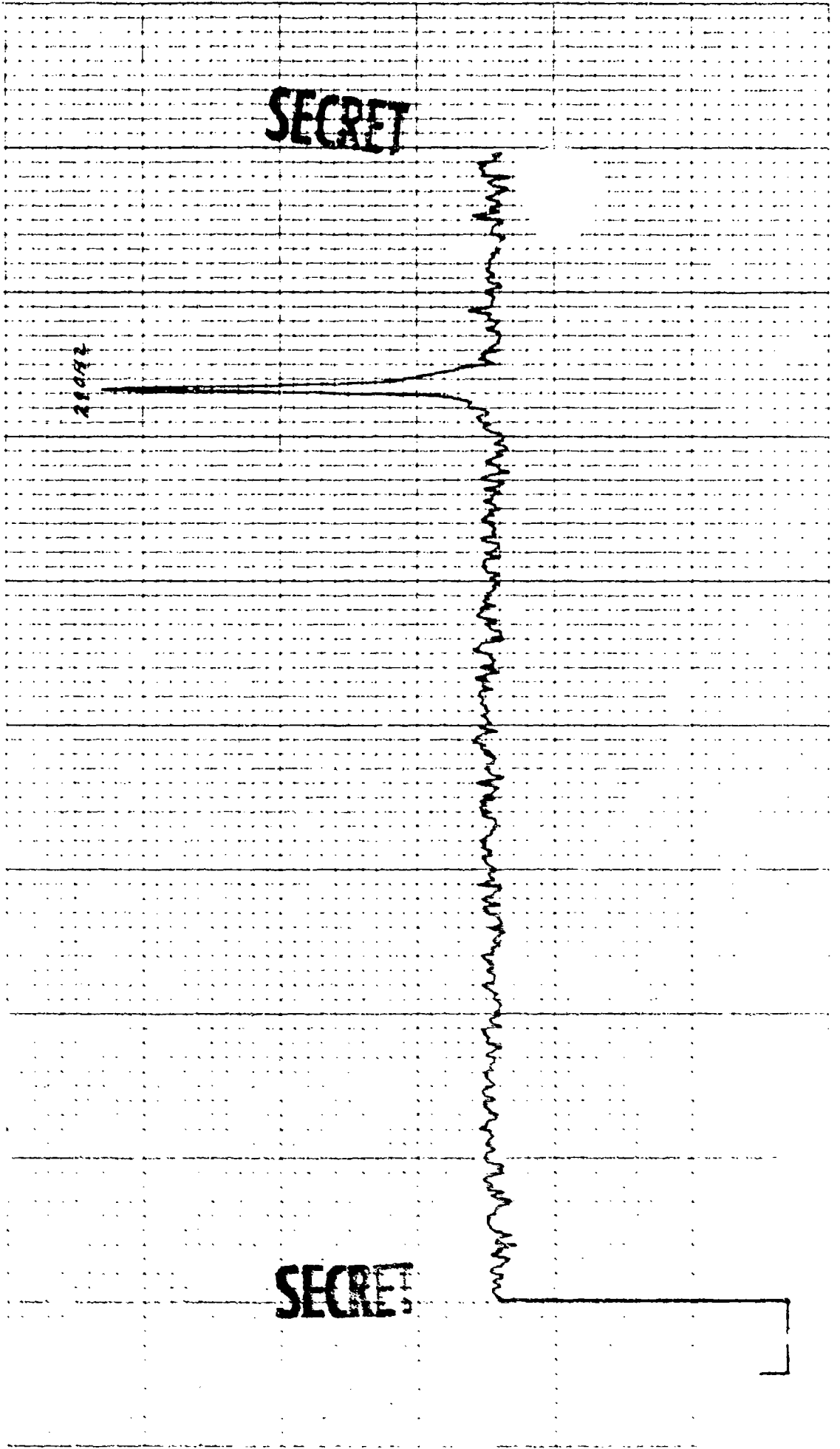
46 0703

FILE 2033-16 (DPC)

CONTROL: 2033 - 16 (DPC)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
16 ELEMENTS

DATE OF ANALYSIS: /-16
DATE/TIME: 2-7-77 - 2033Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 12 DEG. AZ STEERING

REEL: F-13 INDE X 7000
INTEGRATION TIME 320 SECS
ATTEN: -10 DB
FILTER WTG: HANNING

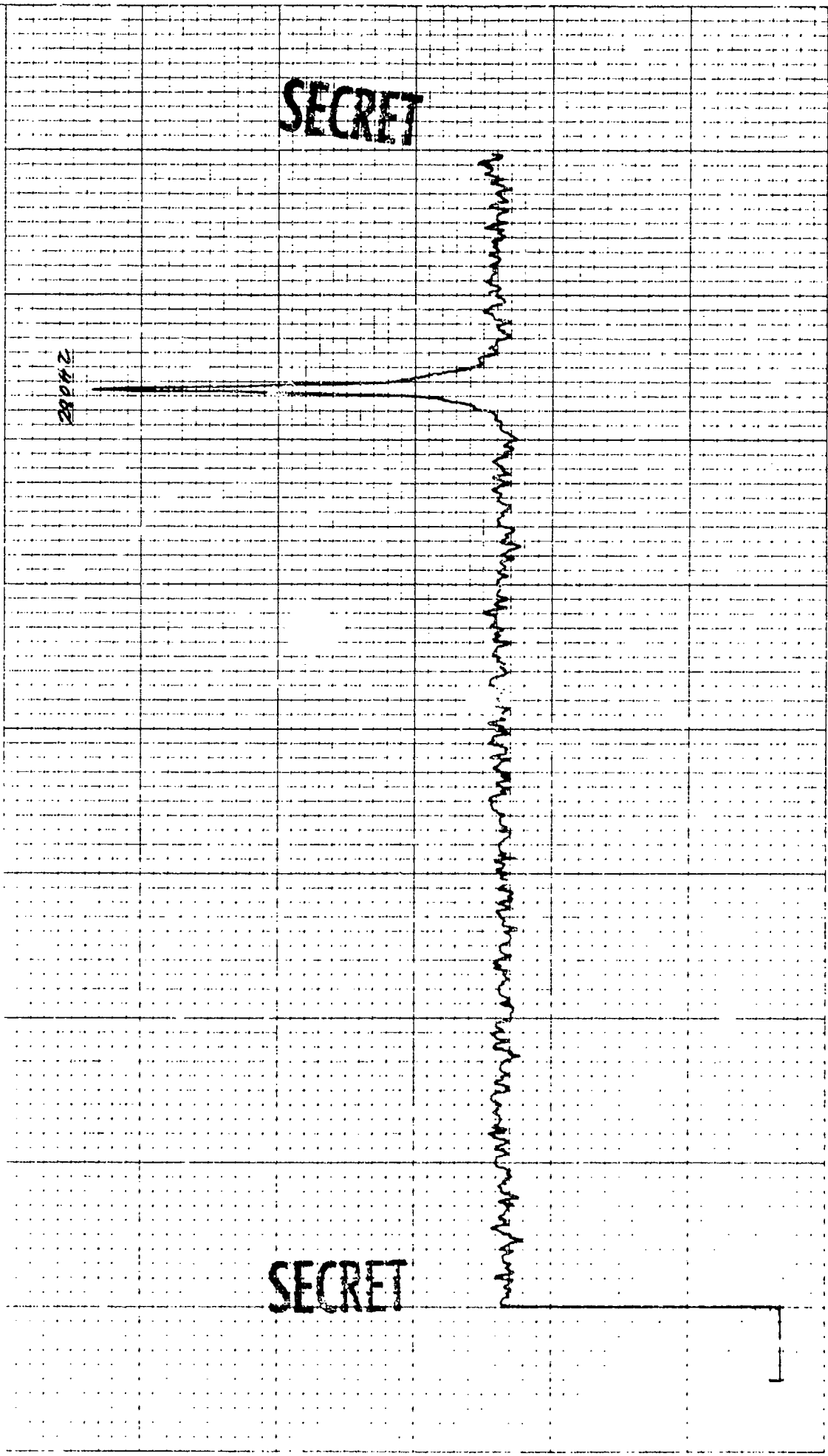


46 0703

REF: 2-7-77

CONTROL: 2033 - 16 (DP6) DATE OF ANALYSIS: - - - - -
 BEAMFORMED SPECTRUM (ELEMENTS) / - / 6
 EXERCISE: BEARING STAGE DATE/TIME: 2-7-77 - 2033Z
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ
 16 ELEMENTS + 13 DEG. AZ STEERING

REEL: F23 INDE X 1000
 INTEGRATION TIME 320 SECS ATTEN: -18 DB
 FILTER WTC: HANNING



46 0703

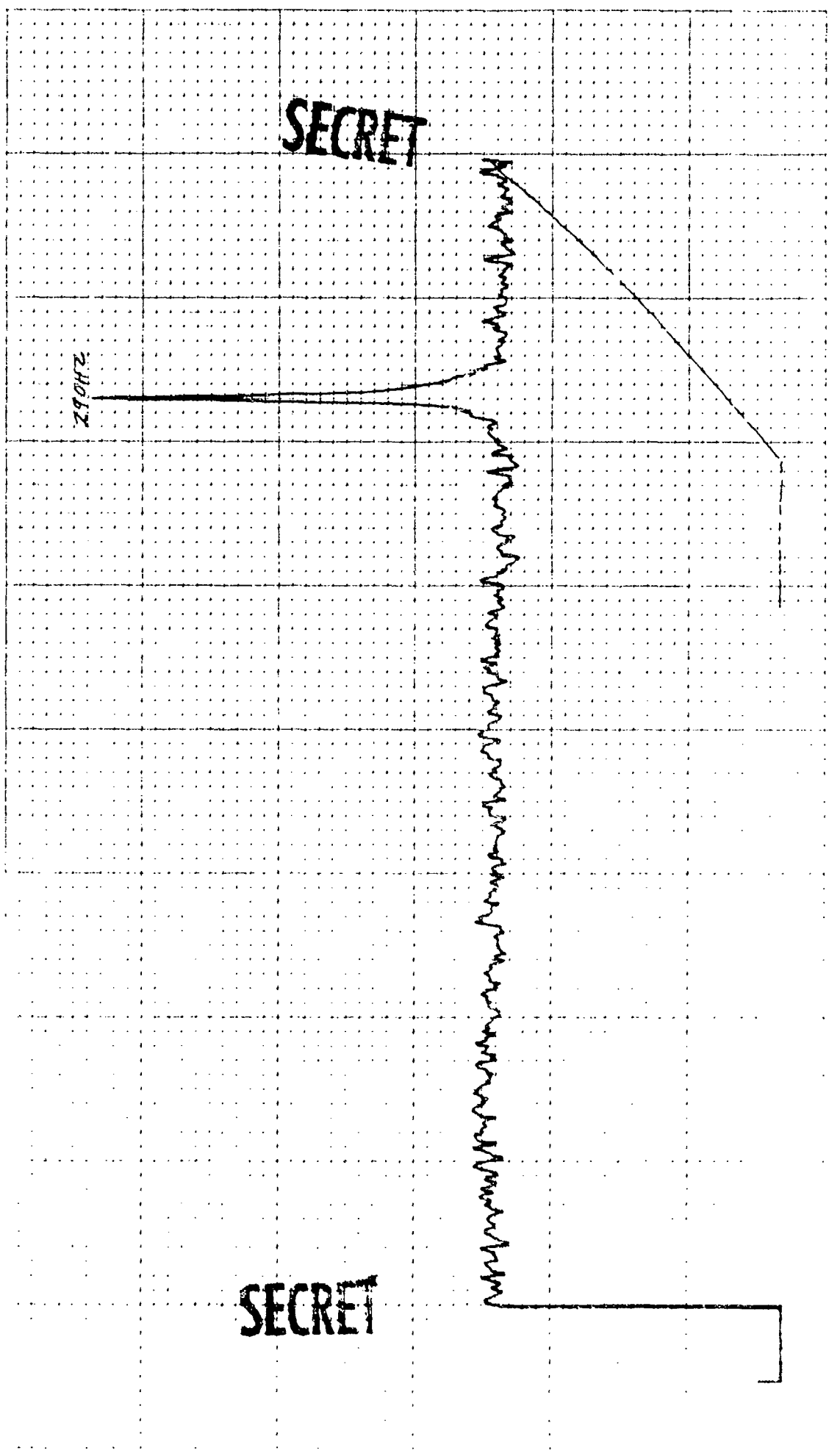
CONTROL: 2033 - 16 (186)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 HZ
 16 ELEMENTS

DATE OF ANALYSIS: - - - -
 / - /

DATE/TIME: 2-7-77 - 2033 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 +14 DEG. AZ STEERING

REEL: F-23 INDE X3000

INTEGRATION TIME 320 SECS ATTN: -14 DB
 FILTER WTC. HANNING



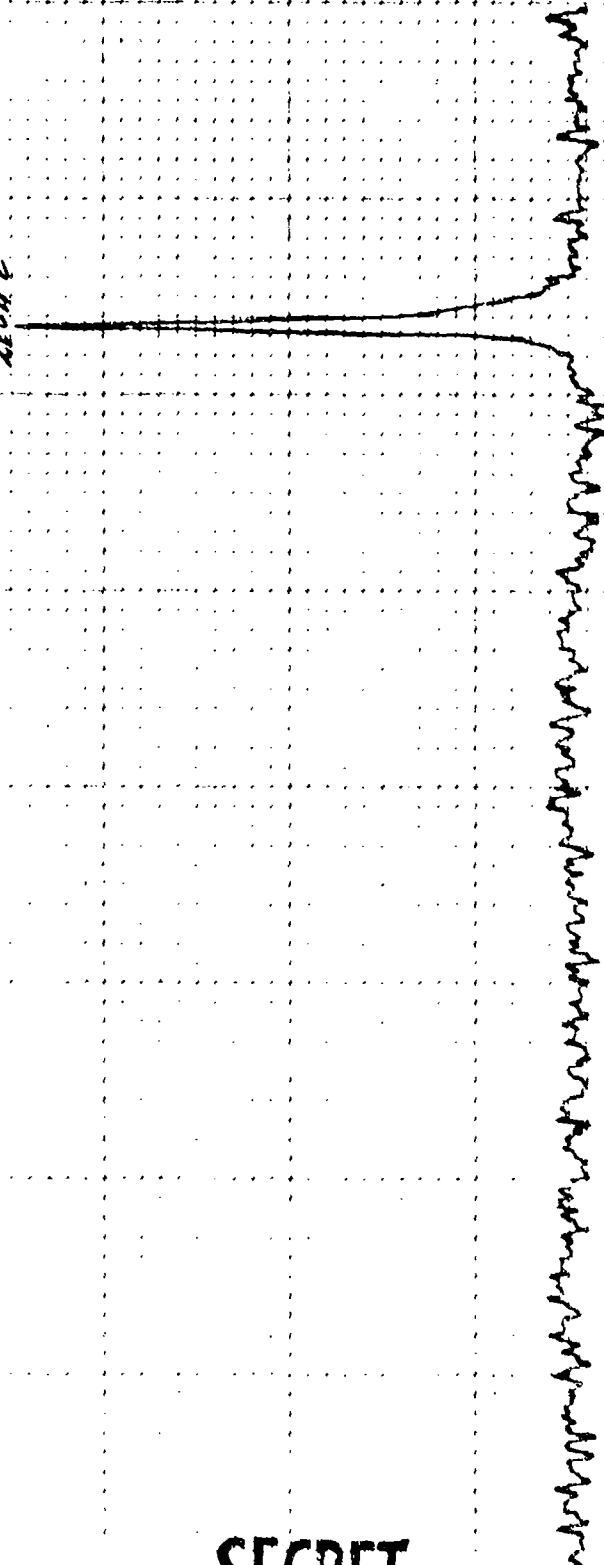
46 0703

CONTROL: 2033-16 (OPG)
BEAMFORMED SPECTRUM/ELEMENTS
EXERCISE: BEARING STAYE
CENTER FREQ: 200 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-6
DATE/TIME: 2-7-77 - 2032Z
ANALYSIS BANDWIDTH: 1/10HZ
+15 DEG. AZ STEERING

REEL: F23 INDE K3000
INTEGRATION TIME 320 SECS ATTN: 1/0 DB
FILTER WTC: HANNING

200HZ



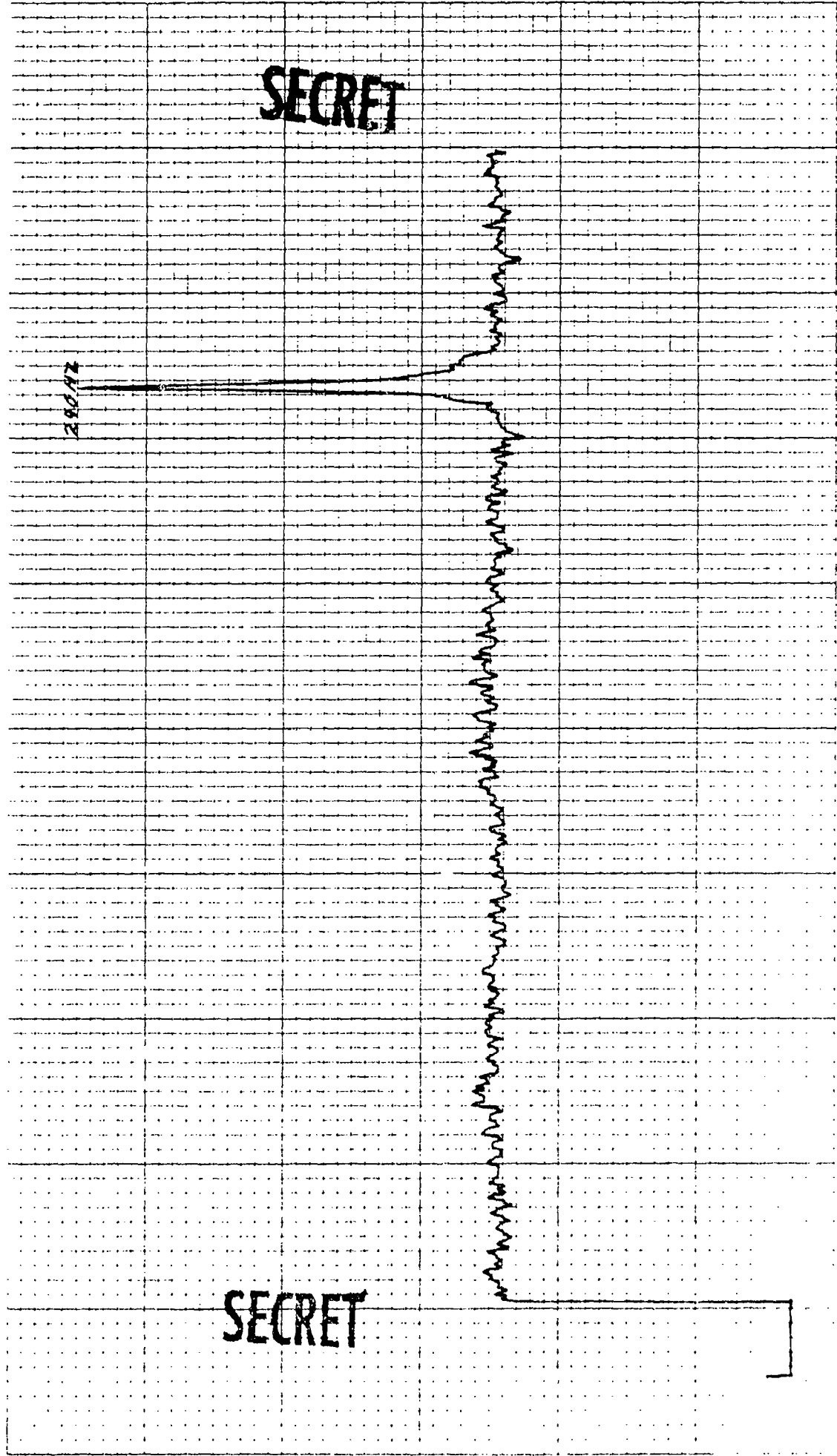
SECRET

SECRET

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

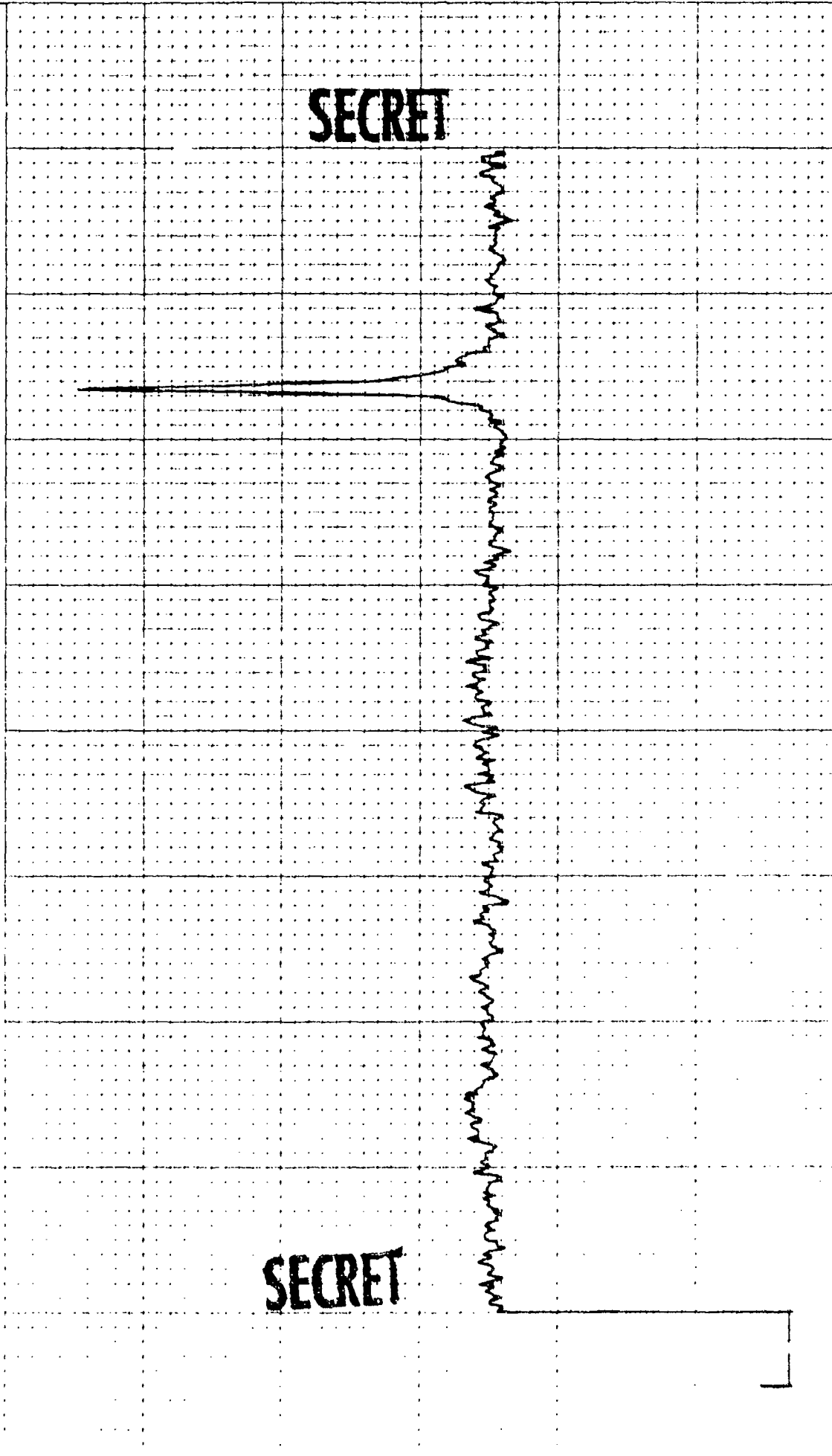
46 0703

CONTROL: 2033 - 51 (DPC) DATE OF ANALYSIS: _____ REEL: F23 INDE X3000
BEAMFORMED SPECTRUM (ELEMENTS) 1 - / 6
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033 Z INTEGRATION TIME 320 SECS ATTN: 18 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTC: HANNING
16 ELEMENTS +/- DEC. AZ STEERING



46 0703

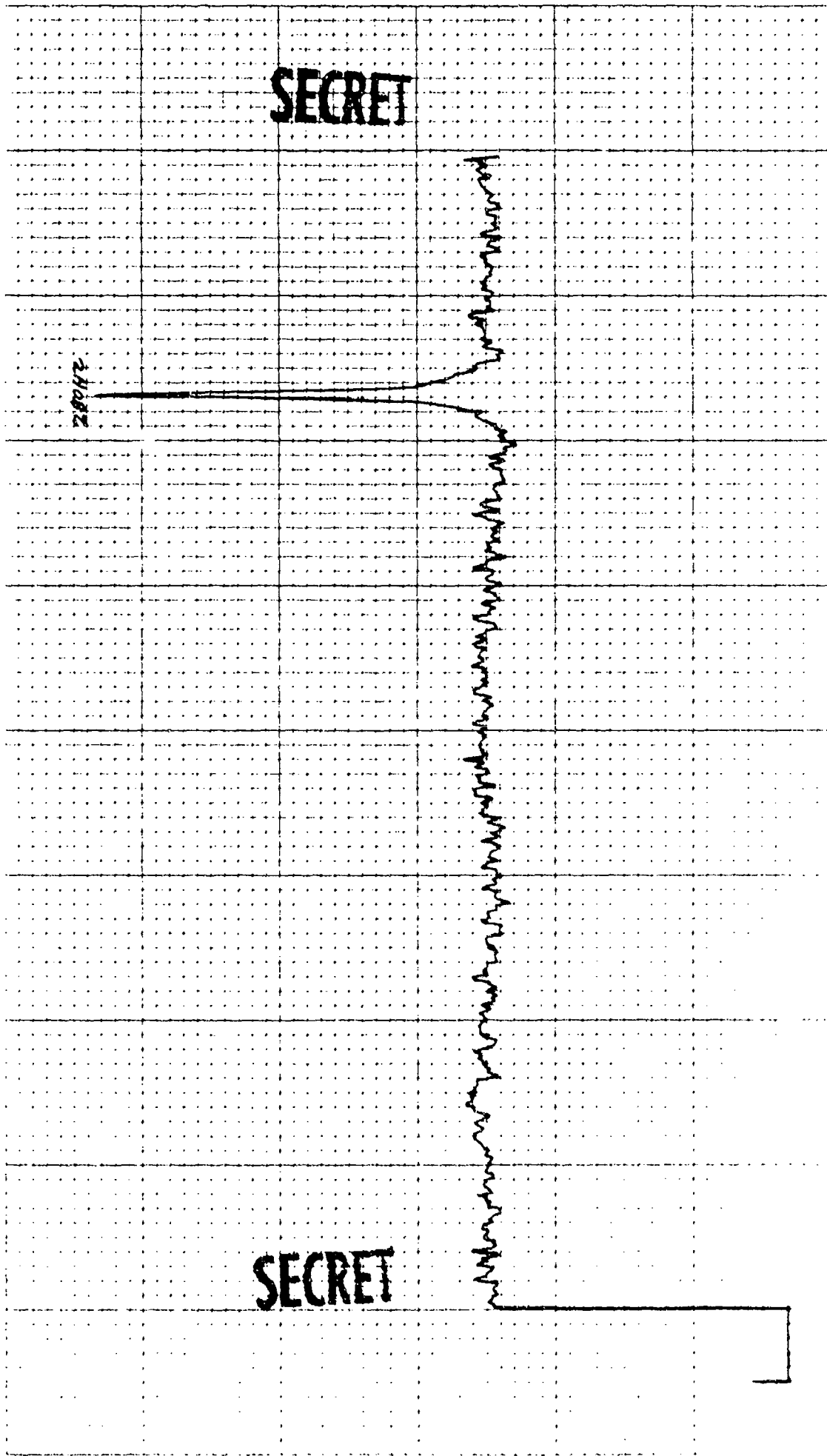
CONTROL: 2033 - 16 (DPC) REEL: F23 INDE X3000
BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: - - -
EXERCISE: BEARING STAKE / - / 2
CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1/10HZ
/ 6 ELEMENTS f17 DEG. AZ STEERING FILTER WTG: HANNING ATTN: -18 DB
INTEGRATION TIME 320 SECS



46 0703

REF ID: A66888

CONTROL: 2033 - 16 (DPL) DATE OF ANALYSIS: 1-16 REEL: F33 INDE X3000
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033 Z INTEGRATION TIME 320 SECS ATTN: 70 DB
CENTER FREQ: 250 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
16 ELEMENTS 118 DEG. AZ STEERING



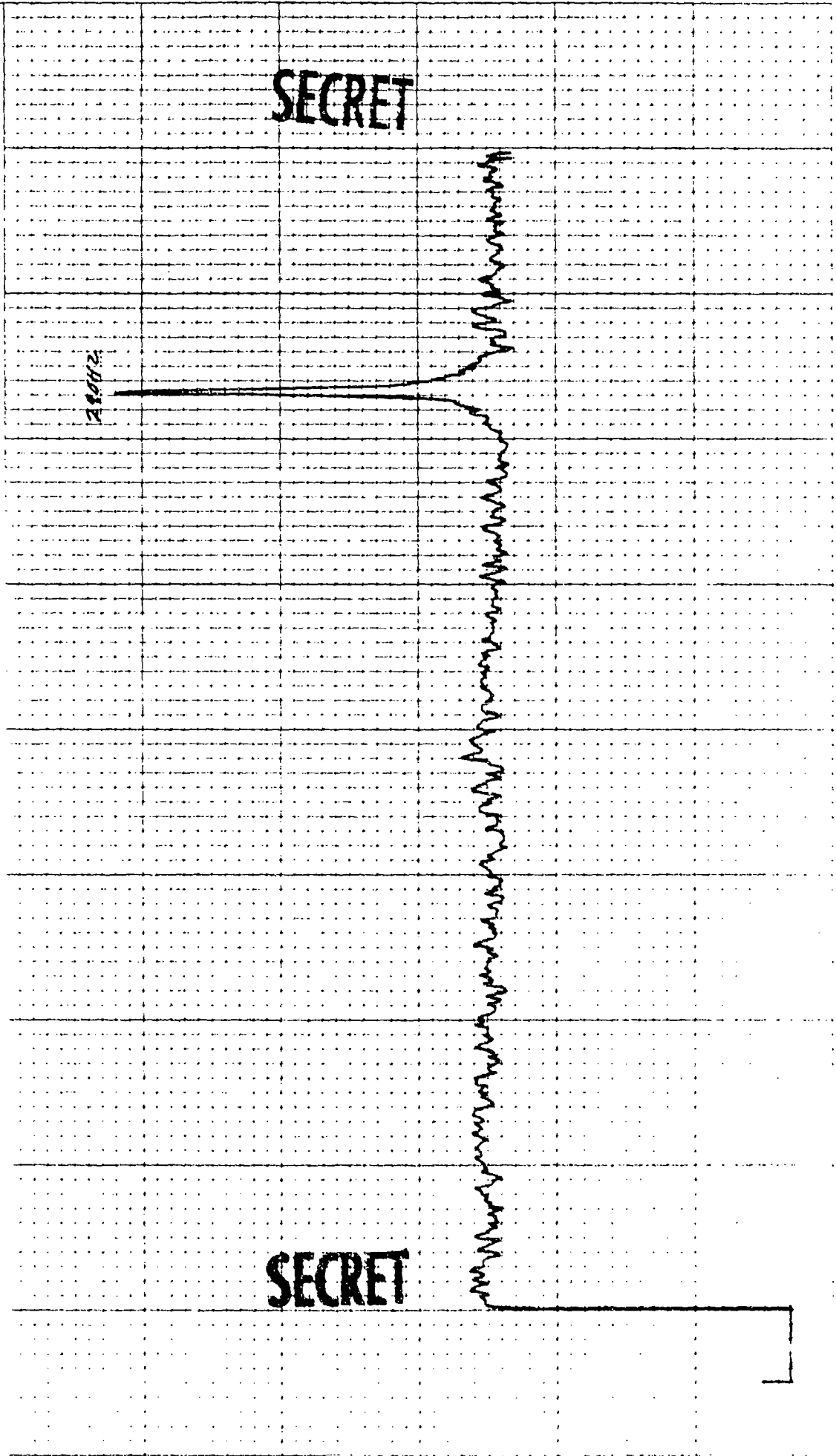
46 0703

REF ID: A66888

CONTROL: 2033 - /C (DPL)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
/C ELEMENTS

DATE OF ANALYSIS: - - - -
/ - / C)
DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 20 DEC. AZ STEERING

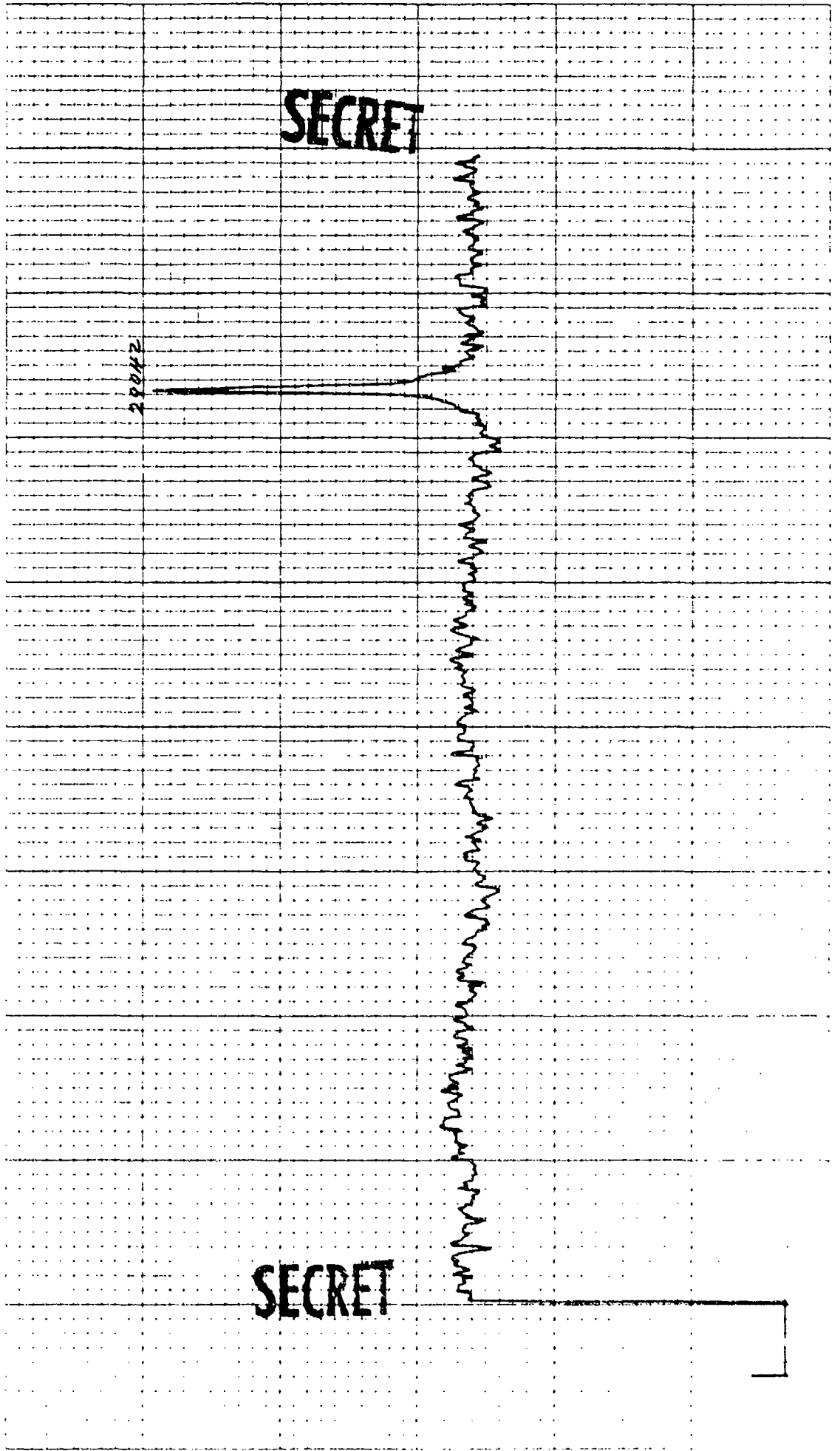
REEL: F23
INDE X300
INTEGRATION TIME 320 SECS
ATTEN: 7/ DB
FILTER WTC: HANNING



46 0703

FORM 5419 10 APR 66 USE PREVIOUS EDITIONS

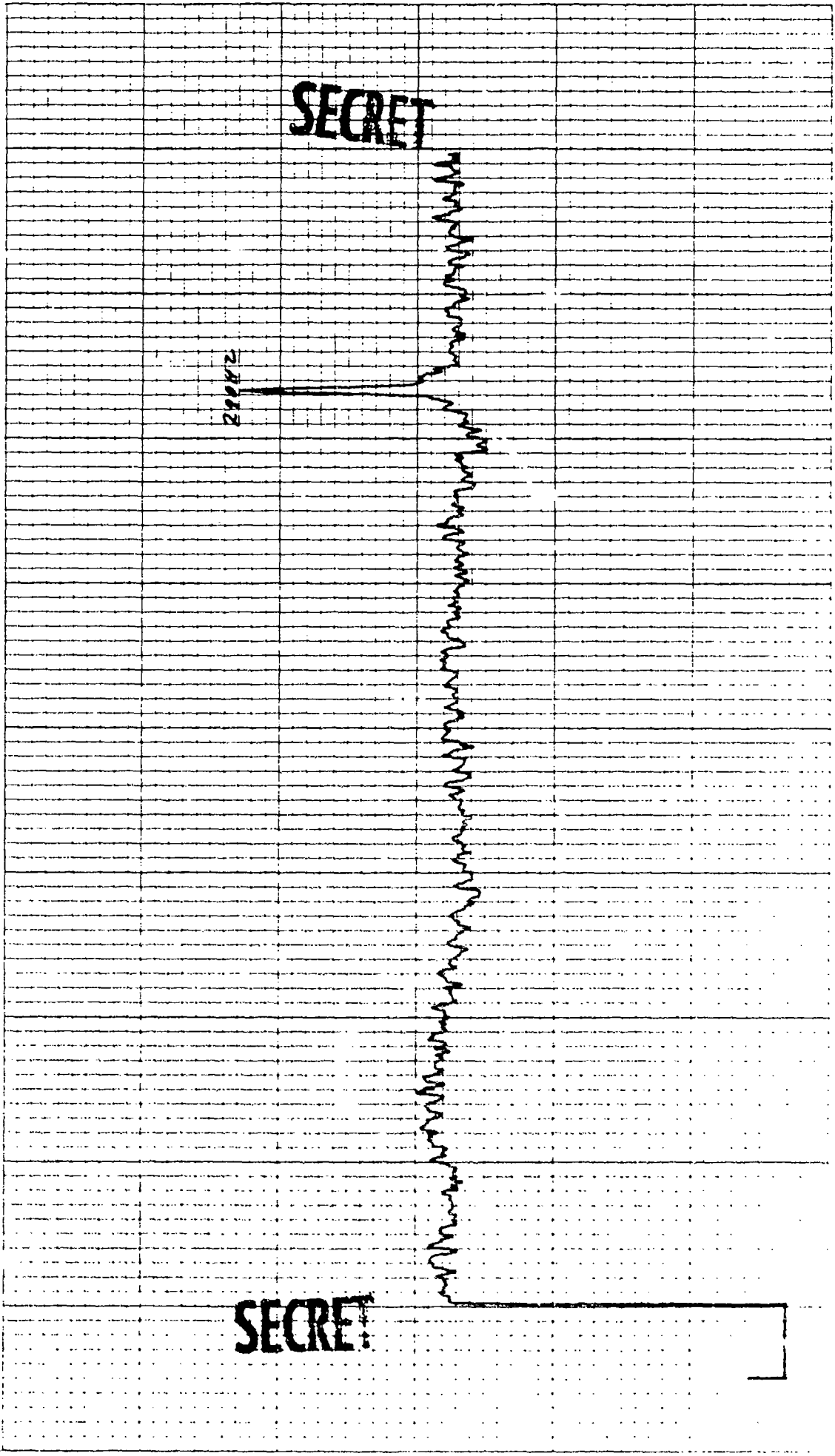
CONTROL: 2033 - 16 (DP6) DATE OF ANALYSIS: 1-16 REEL: F23 INDE X 3000
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 27-72 - 2037 Z INTEGRATION TIME 320 SECS ATTN: -18 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1710HZ FILTER WTG: HANNING
CENTER FREQ: 200 HZ 7.5 DEG. AZ STEERING



1605 IN X TO THE INCH • 10 HOURS
REDFIELD ELECTRONIC CO. MADE IN U.S.A.

46 0703

CONTROL: 2037-16 (DPC) DATE OF ANALYSIS: 1-16 REEL: F23 INDE X 3000
BEAMFORMED SPECTRUM(ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033Z INTEGRATION TIME 320 SECS ATTN: -10 DB
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
16 ELEMENTS +24 DEG. AZ STEERING



SECRET

SECRET

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 6

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-29.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-19.8	
BEAMFORMER GAIN	<u>+24</u>	+ 4.2	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	+ 4.4	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-60.3</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-50.3	
BEAMFORMER GAIN	<u>+24</u>	-26.3	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+4.4</u>	
SIGNAL LEVEL FOR SNR	<u>-26.3</u>	30.7	
PROCESSOR CORRECTION	<u>-4.0</u>	26.7	
MRA CORRECTION	<u>+ .2</u>	26.9	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	18.7	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 6

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-29.2</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-19.2	
BEAMFORMER GAIN	<u>+24</u>	+4.8	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	+5.6	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-65.5</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-55.5	
BEAMFORMER GAIN	<u>+24</u>	-31.5	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+5.6</u>	
SIGNAL LEVEL FOR SNR	<u>-31.5</u>	37.1	
PROCESSOR CORRECTION	<u>-4.0</u>	33.1	
MRA CORRECTION	<u>+ .8</u>	33.9	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	25.7	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

DATA POINT 6

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-24.7</u>	<u>-23.0</u>	<u> </u>
MRA SIGNAL LEVEL	<u>+ 4.4</u>	<u>+ 5.6</u>	<u> </u>
ARRAY SIGNAL GAIN	<u>29.1</u>	<u>28.6</u>	<u> </u>
20 LOG <u>32</u>	<u>30.1</u>	<u>30.1</u>	<u> </u>
# of elements			
DIFFERENCE	<u>-1.0</u>	<u>-1.5</u>	<u> </u>

ARRAY GAIN

MRA SNR	<u>26.9</u>	<u>33.9</u>	<u> </u>
MEAN OMNI SNR	<u>15.4</u>	<u>19.9</u>	<u> </u>
ARRAY GAIN	<u>11.5</u>	<u>14.0</u>	<u> </u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>13.5</u>	<u>15.3</u>	<u> </u>
DIFFERENCE	<u>-2.0</u>	<u>-1.3</u>	<u> </u>

CONFIDENTIAL

46 0703

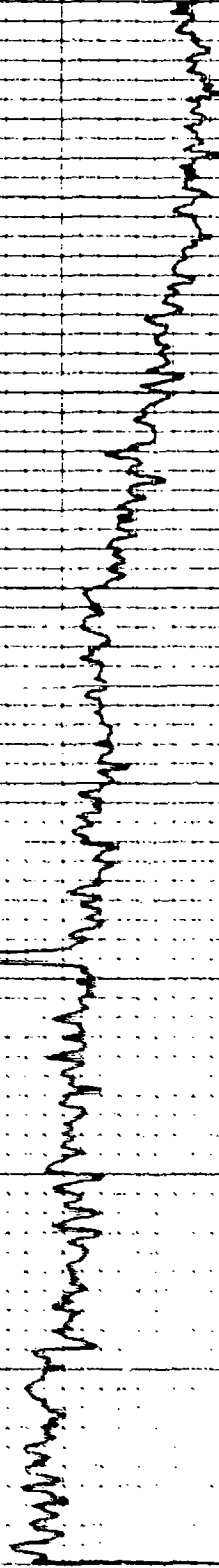
1002 25000 10000 10000 10000

CONTROL: 2033 - 32 (DPG) DATE OF ANALYSIS: REEL: F23 INDE X 3000
BEAMFORMED SPECTRUM(ELEMENTS) /-2000 29-34)
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033 Z INTEGRATION TIME 320 SECS ATTN: -2Y DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
32 ELEMENTS + 4 DEG. AZ STEERING

SECRET

SECRET

10000 2



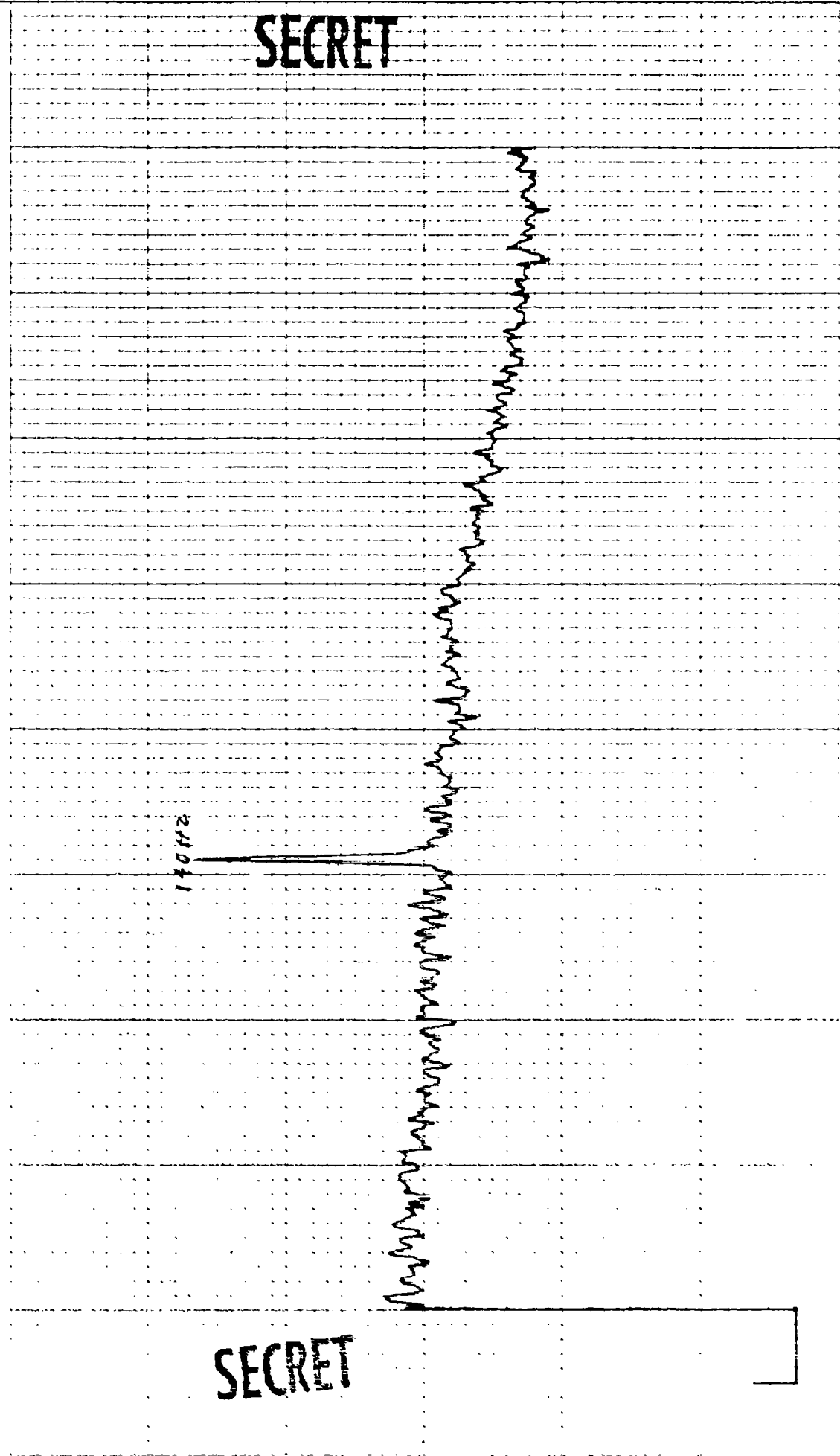
46 0703

CONTROL: 2033 - 32 (DPC)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150. HZ
 32 ELEMENTS

DATE OF ANALYSIS: 1-26-84
 DATE/TIME: 2-7-77 - 2033 Z
 ANALYSIS BANDWIDTH: 1710HZ
 76 DEG. AZ STEERING

REEL: F33
 INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

INDEX 300



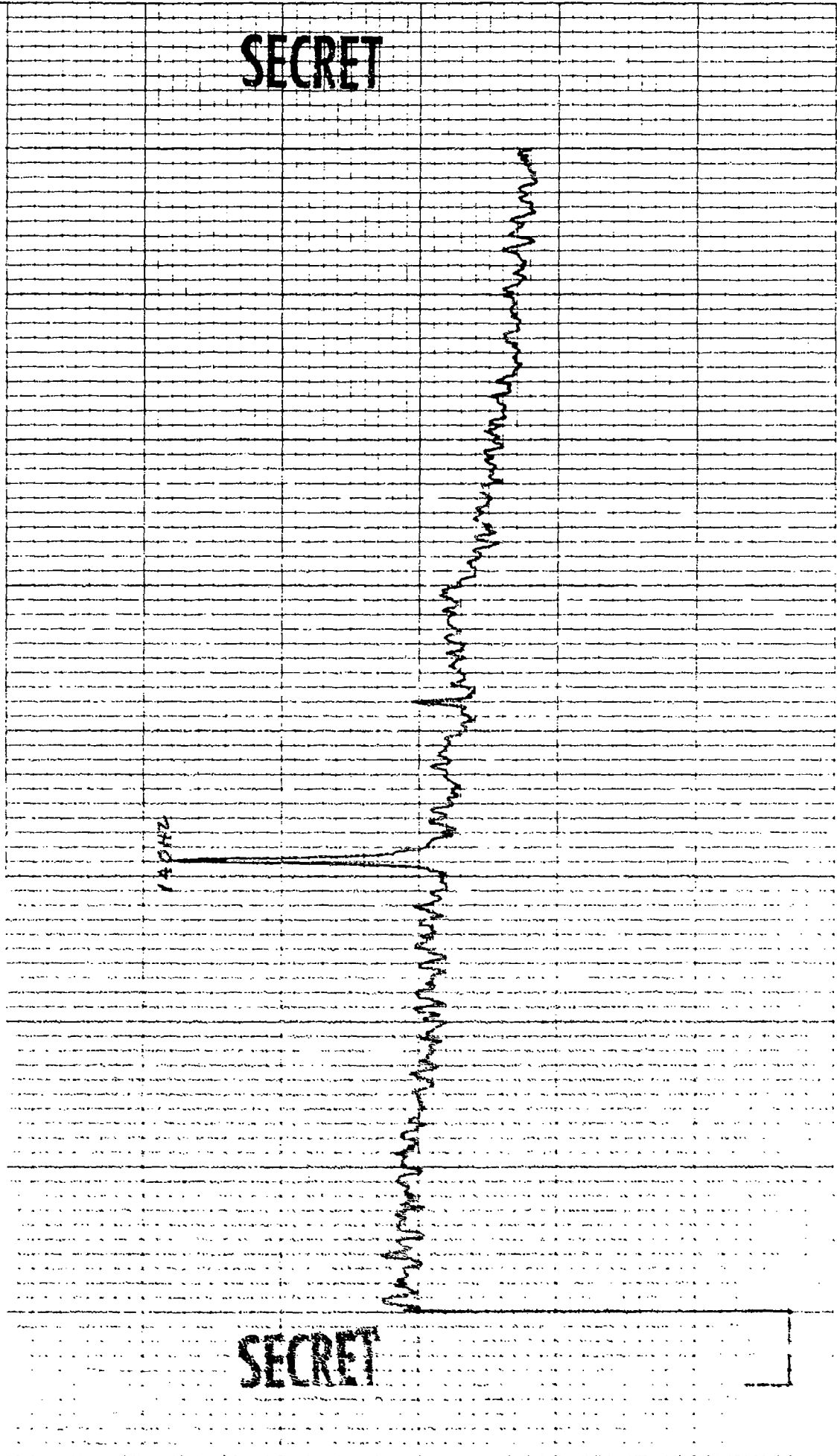
SECRET

SECRET

CONTROL: 2073 - 30 (DPG)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 32 ELEMENTS

DATE OF ANALYSIS: 1-26-89-34)
 DATE/TIME: 2-7-77 - 2033 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 +8 DEG. AZ STEERING

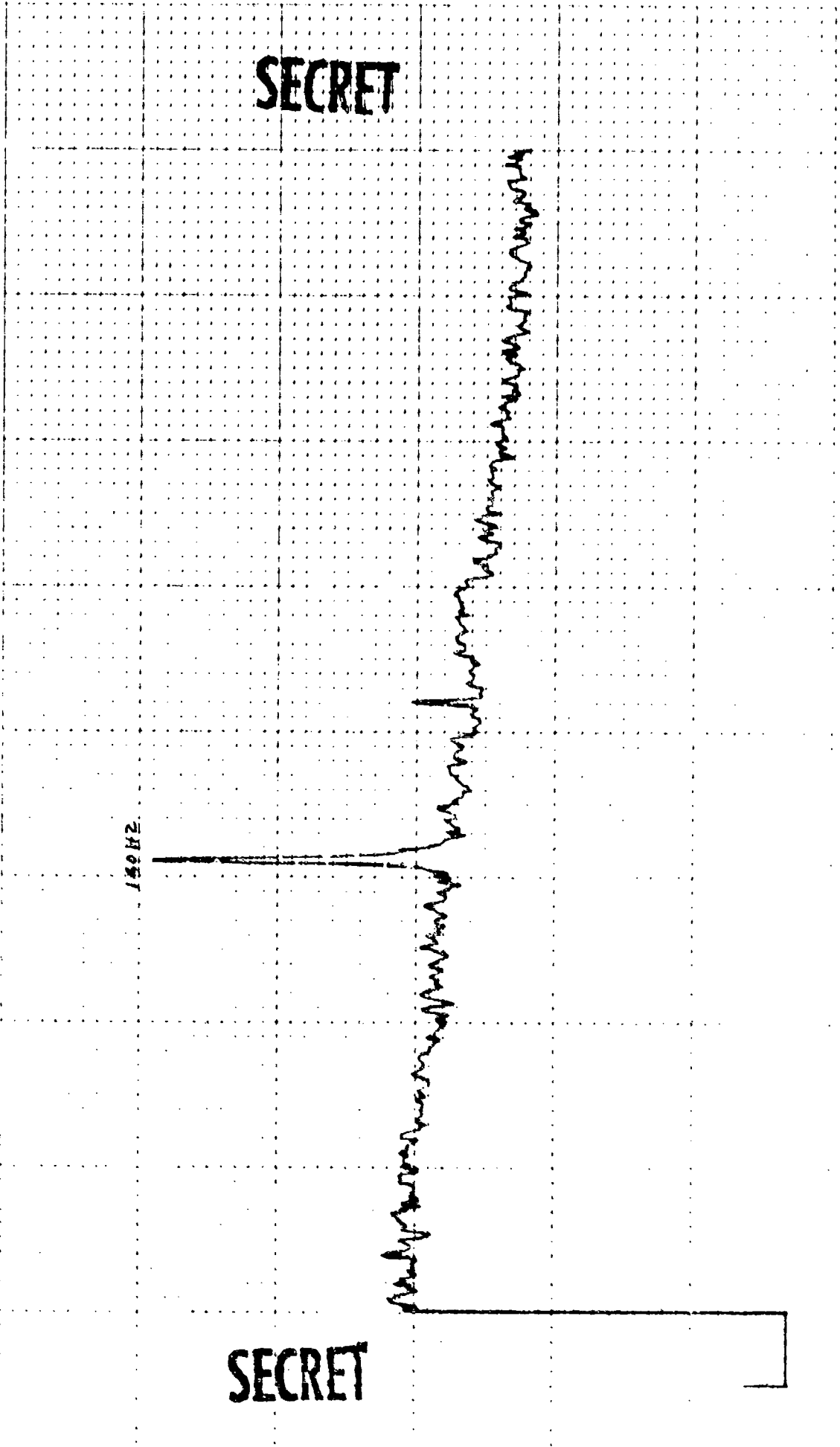
REEL: F23 INDE X 3000
 INTEGRATION TIME 320 SECS ATTEN: -2Y DB
 FILTER WTG: HANNING



SECRET

46 0703

CONTROL: 2033-32 (DPG) REEL: F23 INDE X 100c
 BEAMFORMED SPECTRUM/ELEMENTS DATE OF ANALYSIS: 1-26-68 09-3Y
 EXERCISE: BEARING STAFF DATE/TIME: 2-777 -2033 Z INTEGRATION TIME 320 SECS ATTEN: -24 DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1710HZ FILTER WTG: HANNING
 32 ELEMENTS F10 DEG. AZ STEERING



SECRET

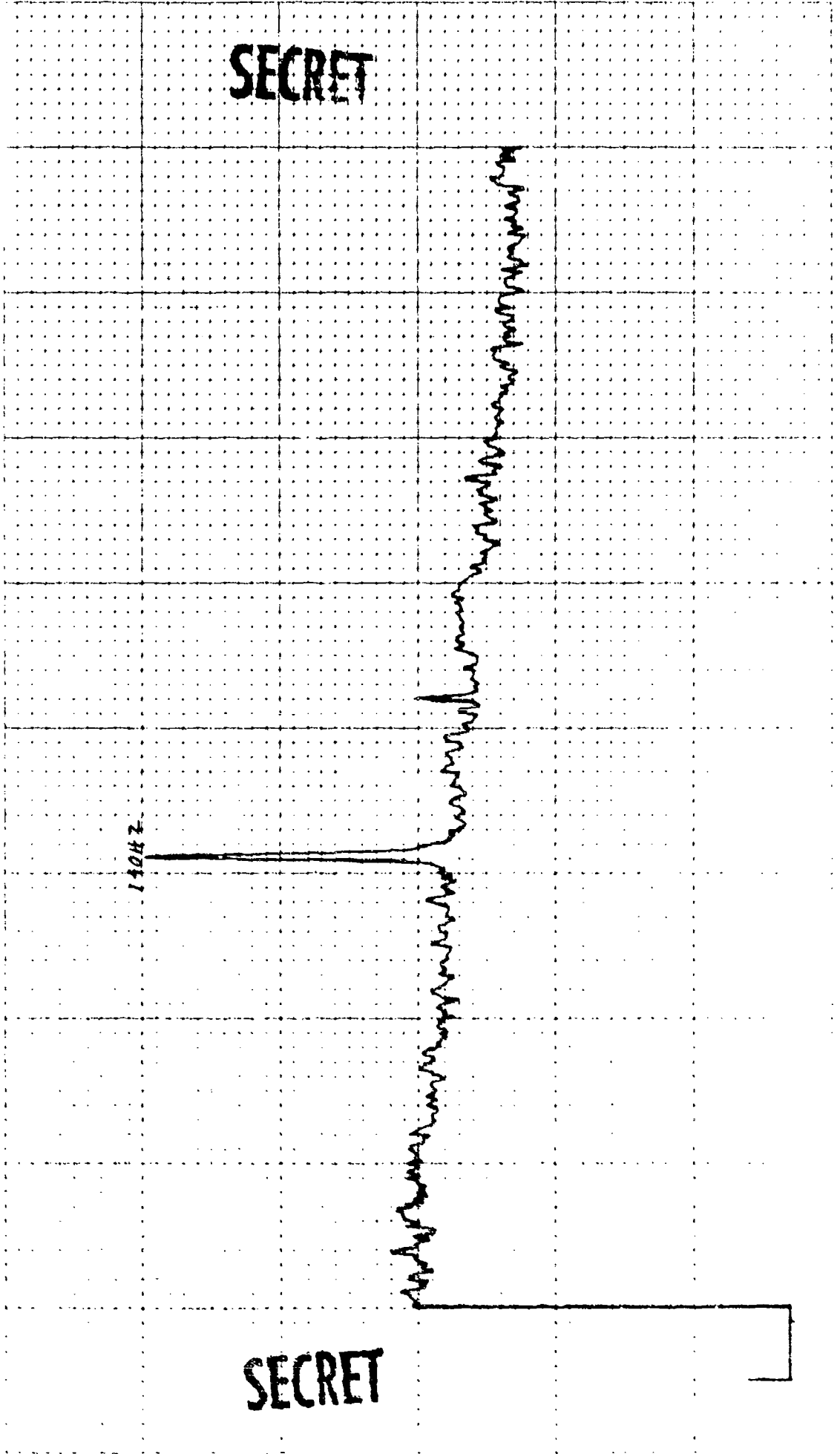
SECRET

46 0703

CONTROL: 2033 - 32 (DPG) DATE OF ANALYSIS: 1-26-77
 BEAMFORMED SPECTRUM (ELEMENTS) /-26-77-34
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033 Z
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ
 32 ELEMENTS 112 DEG. AZ STEERING

KEEL: F23 INDE X 3000

INTEGRATION TIME 320 SECS ATTN: -24 DB
FILTER WTC: HANNING



SECRET

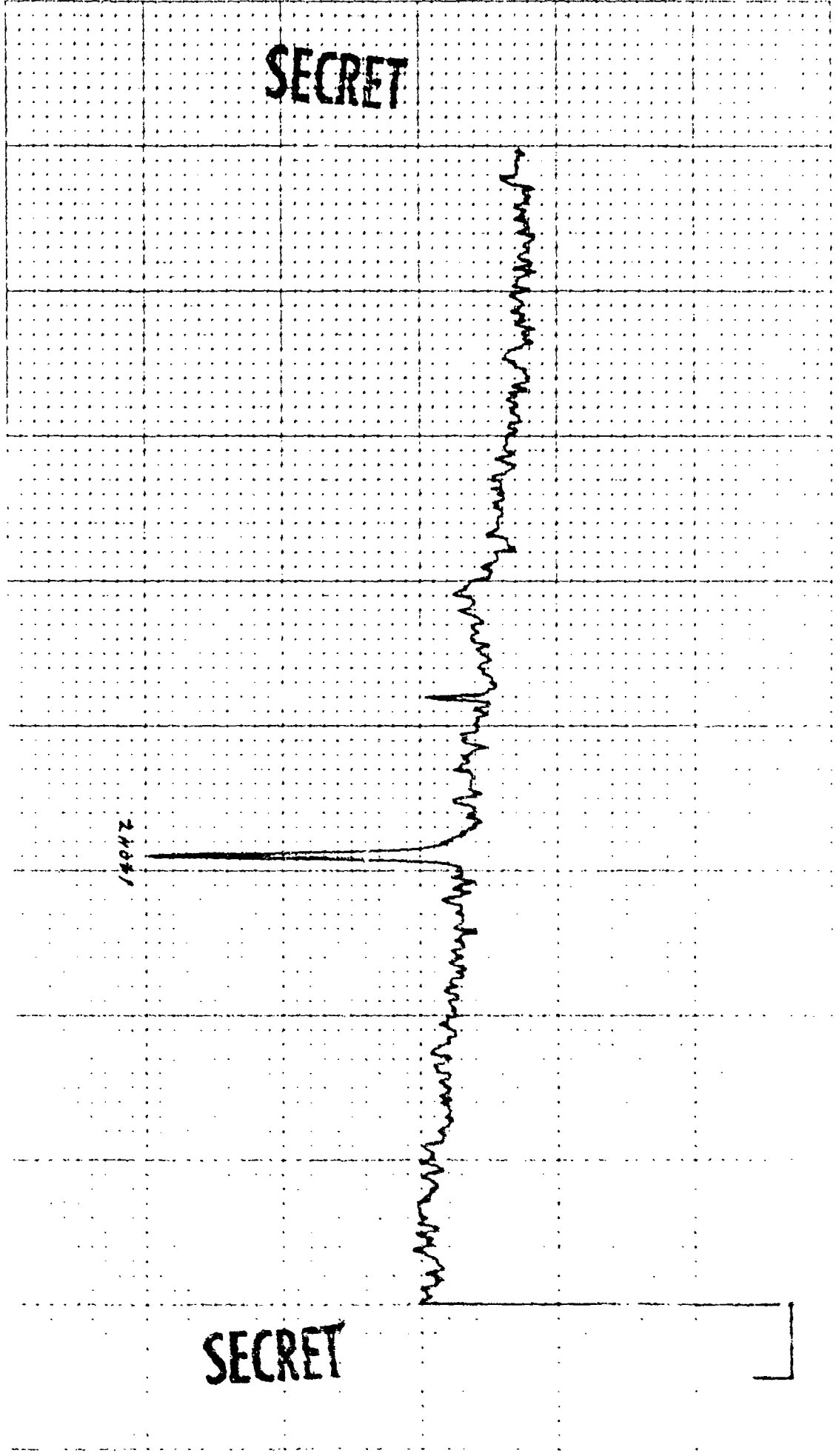
SECRET

46 0703

REF ID: A66903

CONTROL: 2033 - 51 (DPC) DATE OF ANALYSIS: _____
 BEAMFORMED SPECTRUM (ELEMENTS) 1-76 # 27-34
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033 Z
 CENTER FREQ: 150 MHz ANALYSIS BANDWIDTH: 1/10HZ
 32 ELEMENTS 4/3 DEG. AZ STEERING

REEL: F23 INDE X 3000
 INTEGRATION TIME 320 SECS ATTEN: 24 DB
 FILTER WIG: HANNING



46 0703

(S) 2033-72 (DP6)

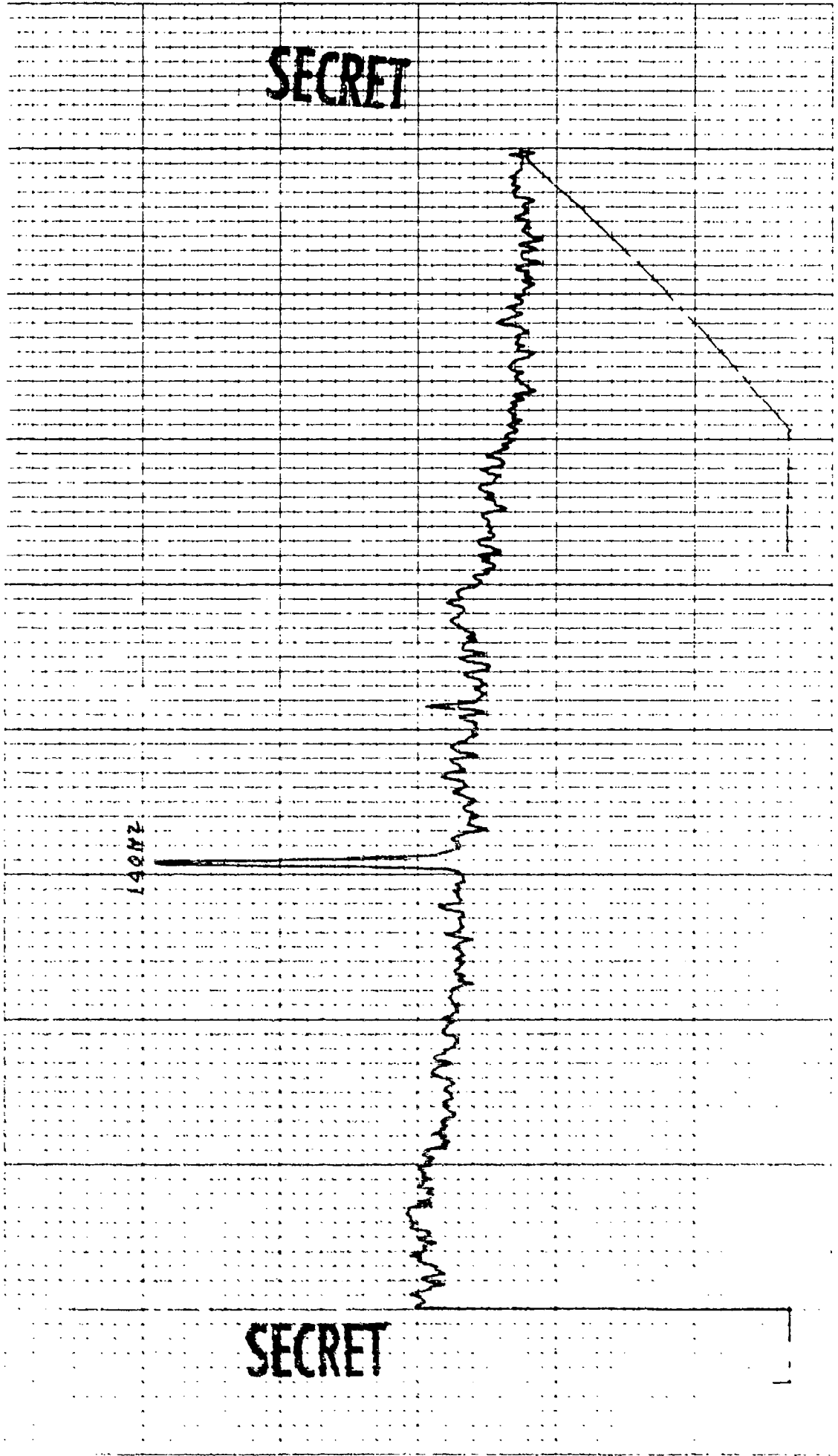
CONTROL: 2033 - 72 (DP6) DATE OF ANALYSIS: 26 29-34 REEL: F33 INDE X 300

BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-7-77 - 2033 Z INTEGRATION TIME 320 SECS ATTN: -34 DB

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

CENTER FREQ: 150 HZ 14 DEC. AZ STEERING

32 ELEMENTS



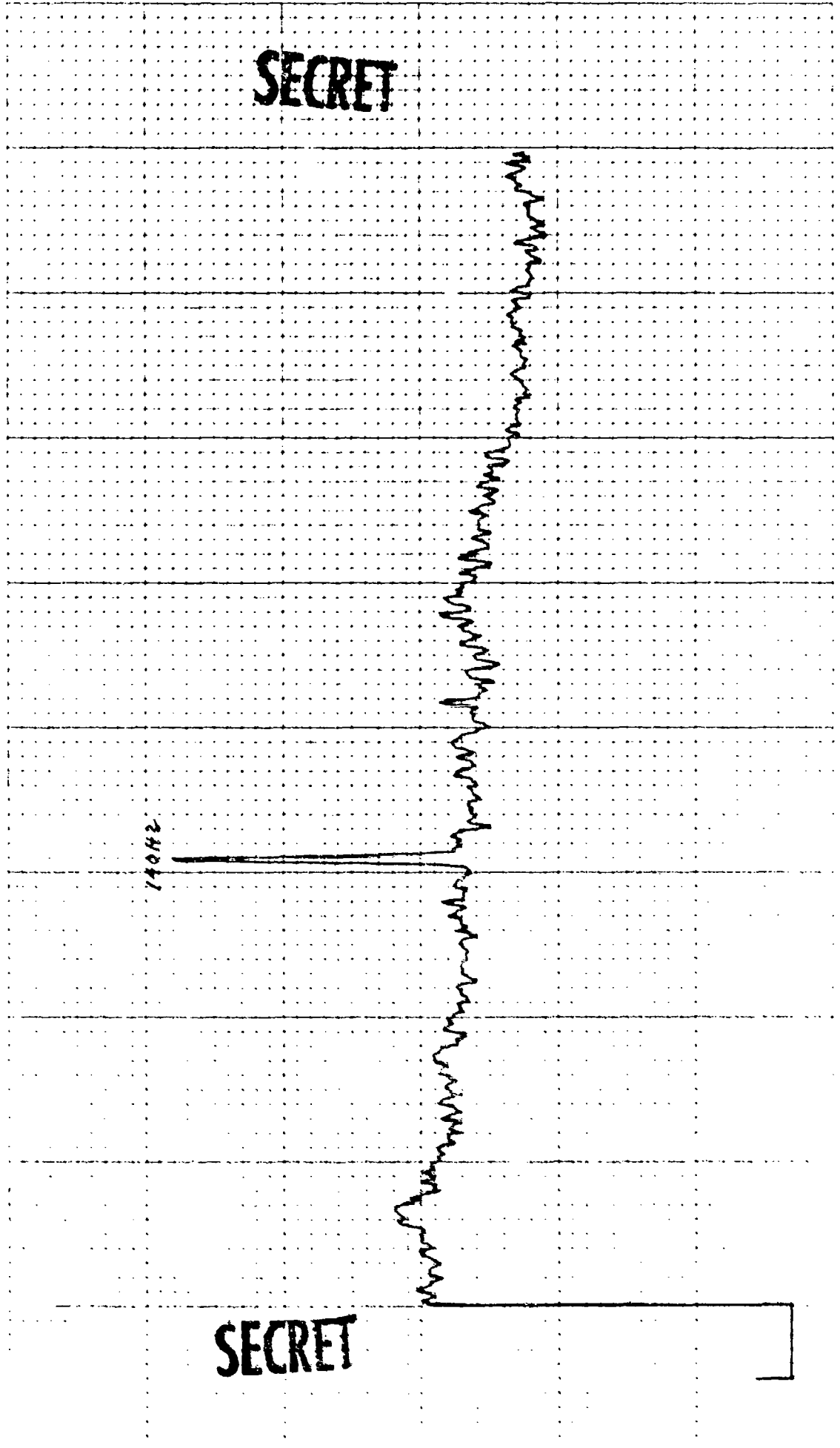
46 0703

CONTROL: 2073-72 (006)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS

DATE OF ANALYSIS: 7-26 & 29-34)
DATE/TIME: 27-77 -2033Z
ANALYSIS BANDWIDTH: 1/10HZ
1/4 DEG. AZ STEERING

REEL: F23
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING

INDE X 3000
ATTEN: -24 DB



46 0703

CONTROL: 2037 - 32 (2PG)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS

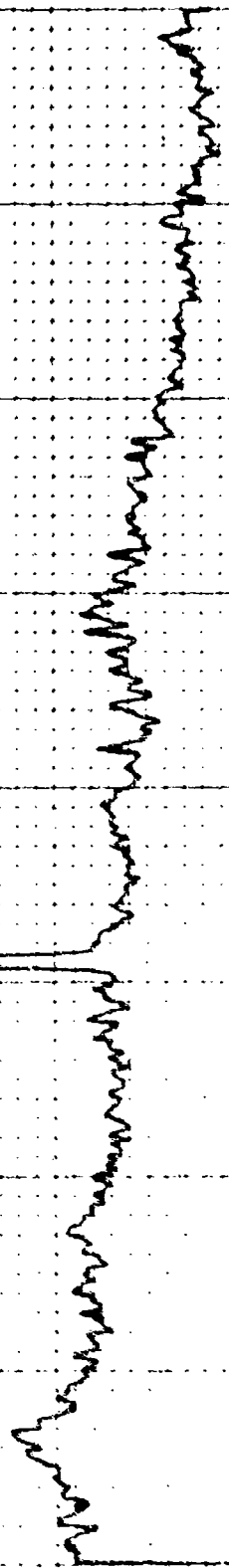
DATE OF ANALYSIS: -
1-26-79 JV
DATE/TIME: 2-7-77 - 2037Z
ANALYSIS BANDWIDTH: 1/10HZ
+17 DEG. AZ STEERING

REEL: F23
INTEGRATION TIME 320 SECS
FILTER WTC: HANNING

INDE X 2000

SECRET

SECRET

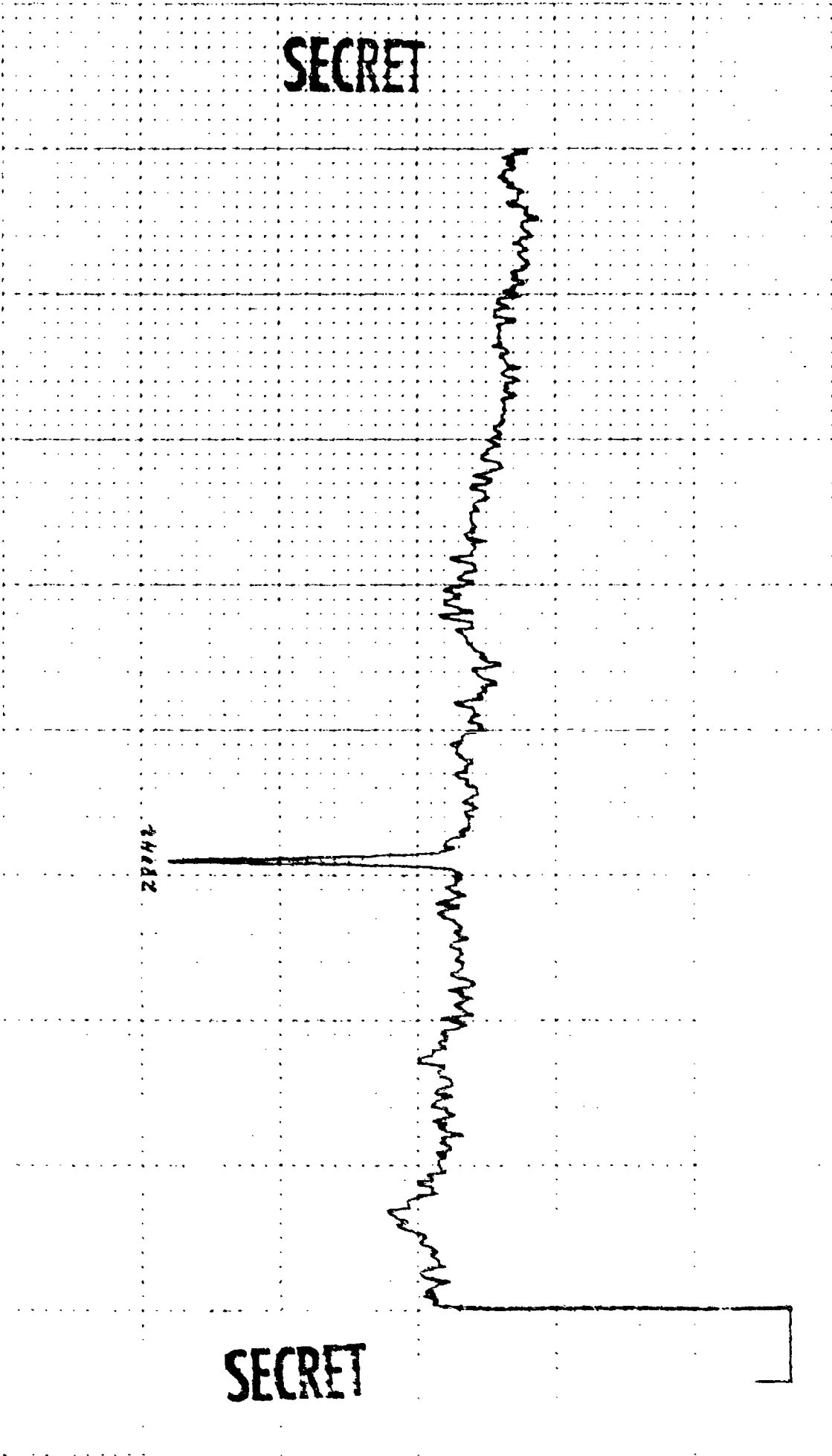


46 0703

CONTROL: 2033 - 32 (206)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEAKING STAVE
 CENTER FREQ: 150 HZ
 22 ELEMENTS

DATE OF ANALYSIS: 1-26-79-34
 DATE/TIME: 2-7-77 - 2033 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 418 DEG. AZ STEERING

REEL: F23 INDE X 300
 INTEGRATION TIME 320 SECS ATTN: -2Y DB
 FILTER WTC: HANNING

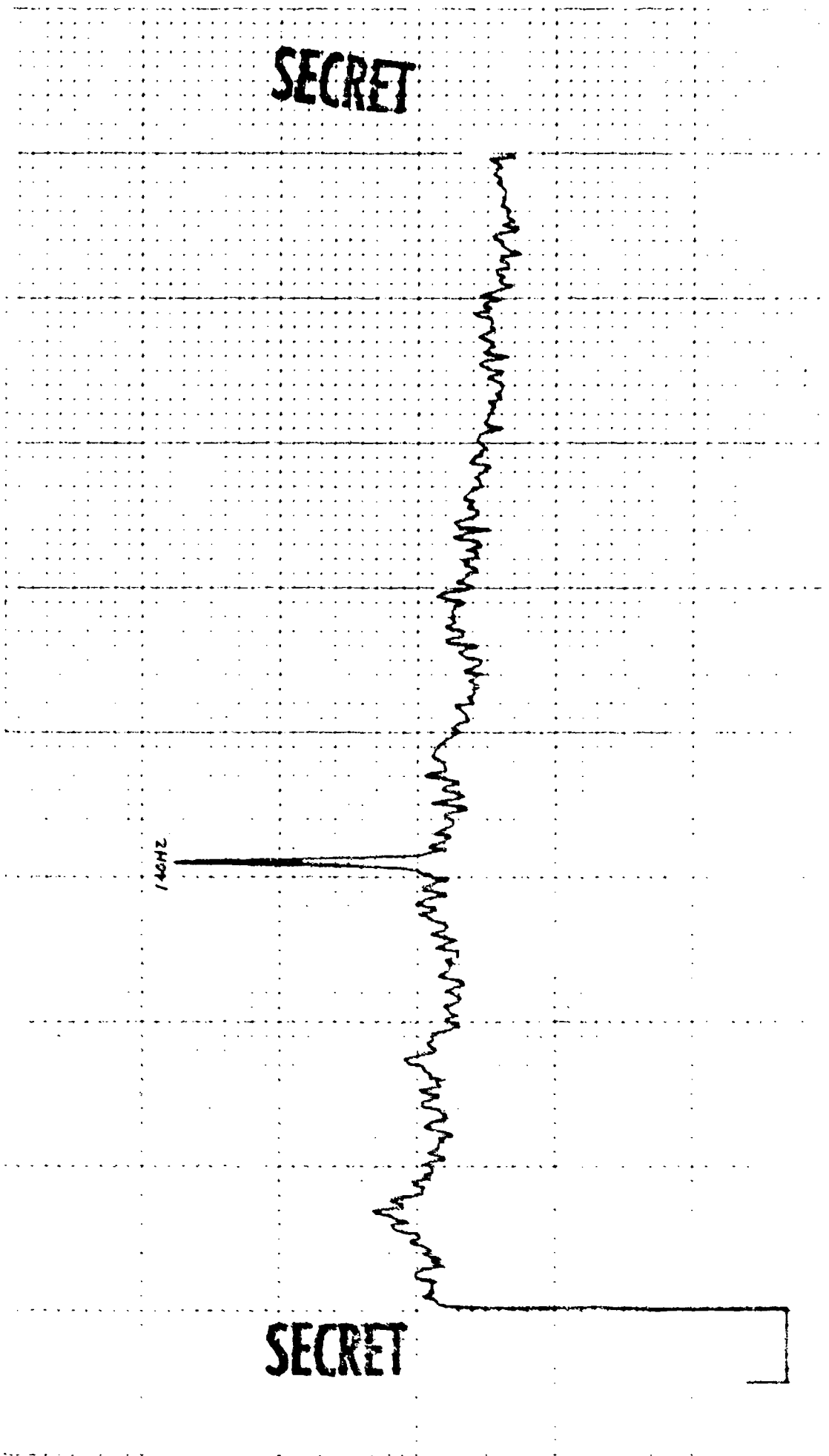


46 0703

CONTROL: 2033 - 32 (LAC)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAFF
CENTER FREQ: 150 MHz
32 ELEMENTS

DATE OF ANALYSIS: 1-26-84
DATE/TIME: 2-2-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
720 DEG. AZ STEERING

REEL: E23
INDE X 300
INTEGRATION TIME 320 SECS
ATTEN: -2Y DB
FIITPP WTC: HANNING



SECRET

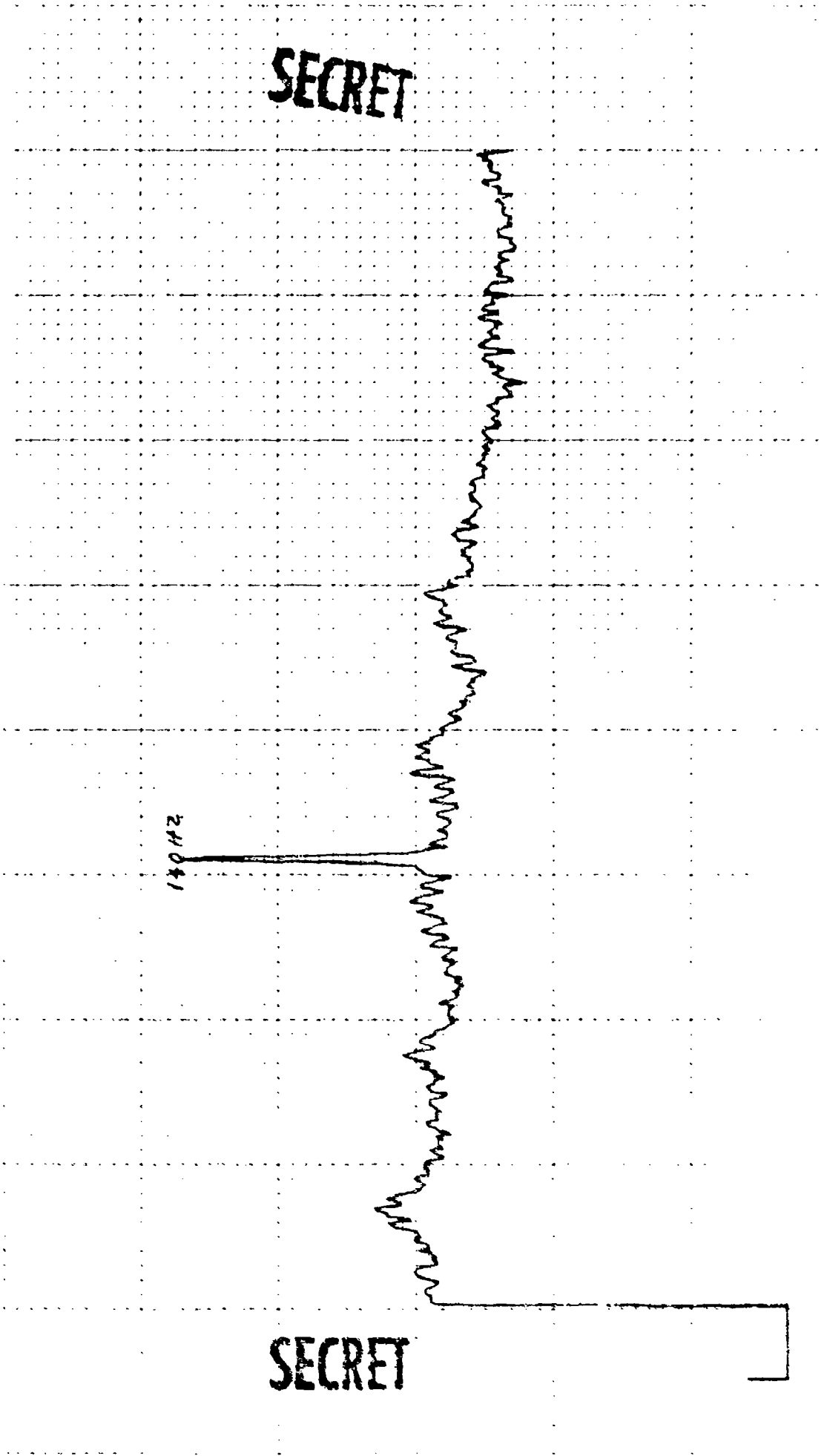
SECRET

46 0703

CONTROL: 2073 - 33 (2066)
BEAMFORMED SPECIPUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 158 HZ
32 ELEMENTS

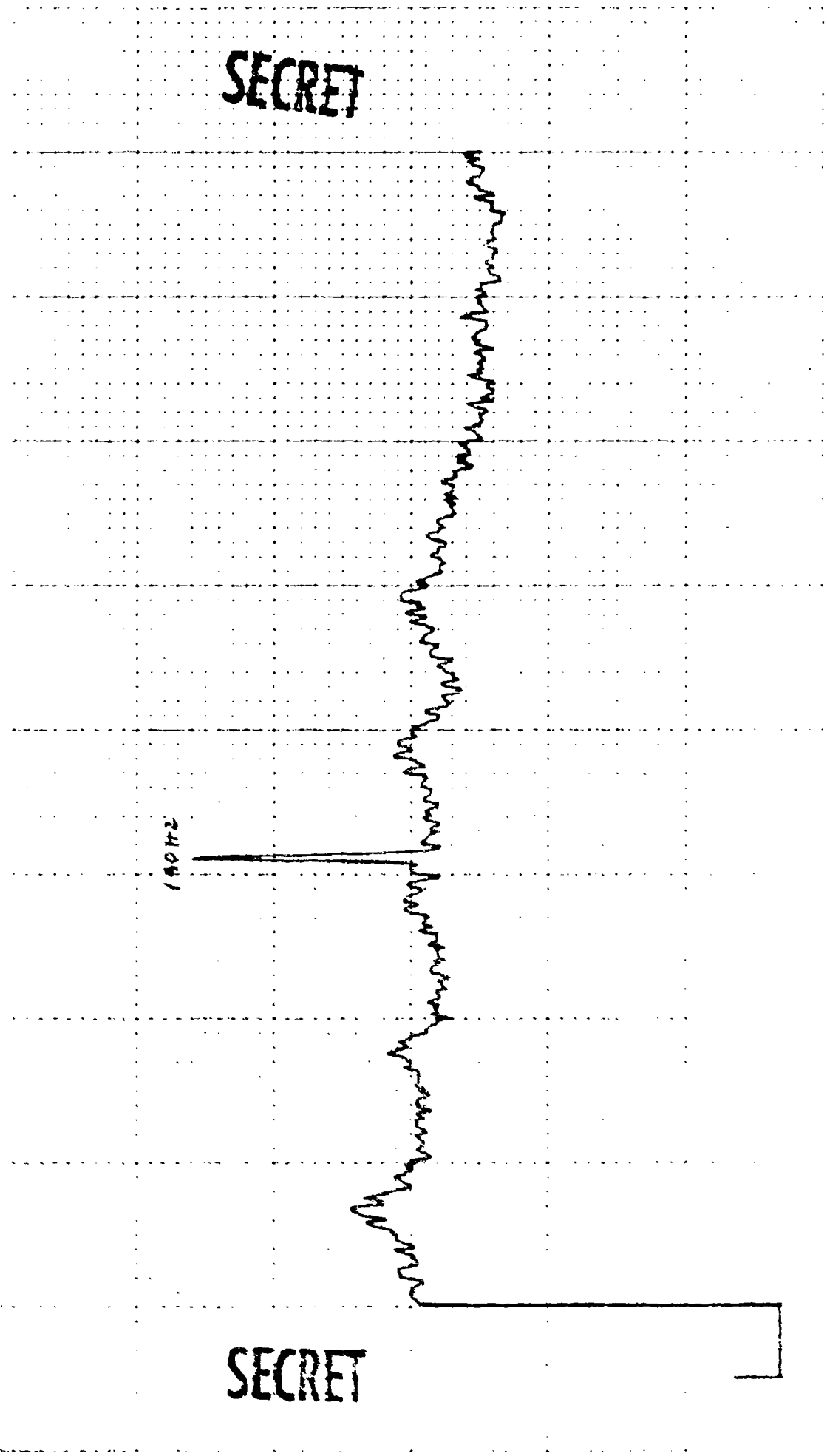
DATE OF ANALYSIS: 7-26 8 29 14
DATE/TIME: 3 7-17 -2073 Z
ANALYSIS BANDWIDTH: 1/100HZ
P 22 DEG. AZ STEERING

REEL: F33
INTEGRATION TIME 320 SECS
ATTEN: -2Y DB
FILTRV WTC: HANNING



46 0703

CONTROL: 2077 - 22 (DPS) DATE OF ANALYSIS: 7-26-74 INDE X 300
 BEAMFORMED SPECTRUM/ELEMENTS /-26 28-34 REEL: F23
 EXERCISE: BEARING STAFF DATE/TIME: 27-27 - 2077 Z INTEGRATION TIME 320 SECS ATTEN: -27 DB
 CENTER FREQ: 150 MZ ANALYSIS BANDWIDTH: 1/10MZ FILTER WTC: HANNING
 22 ELEMENTS 734 DEG. AZ STEERING



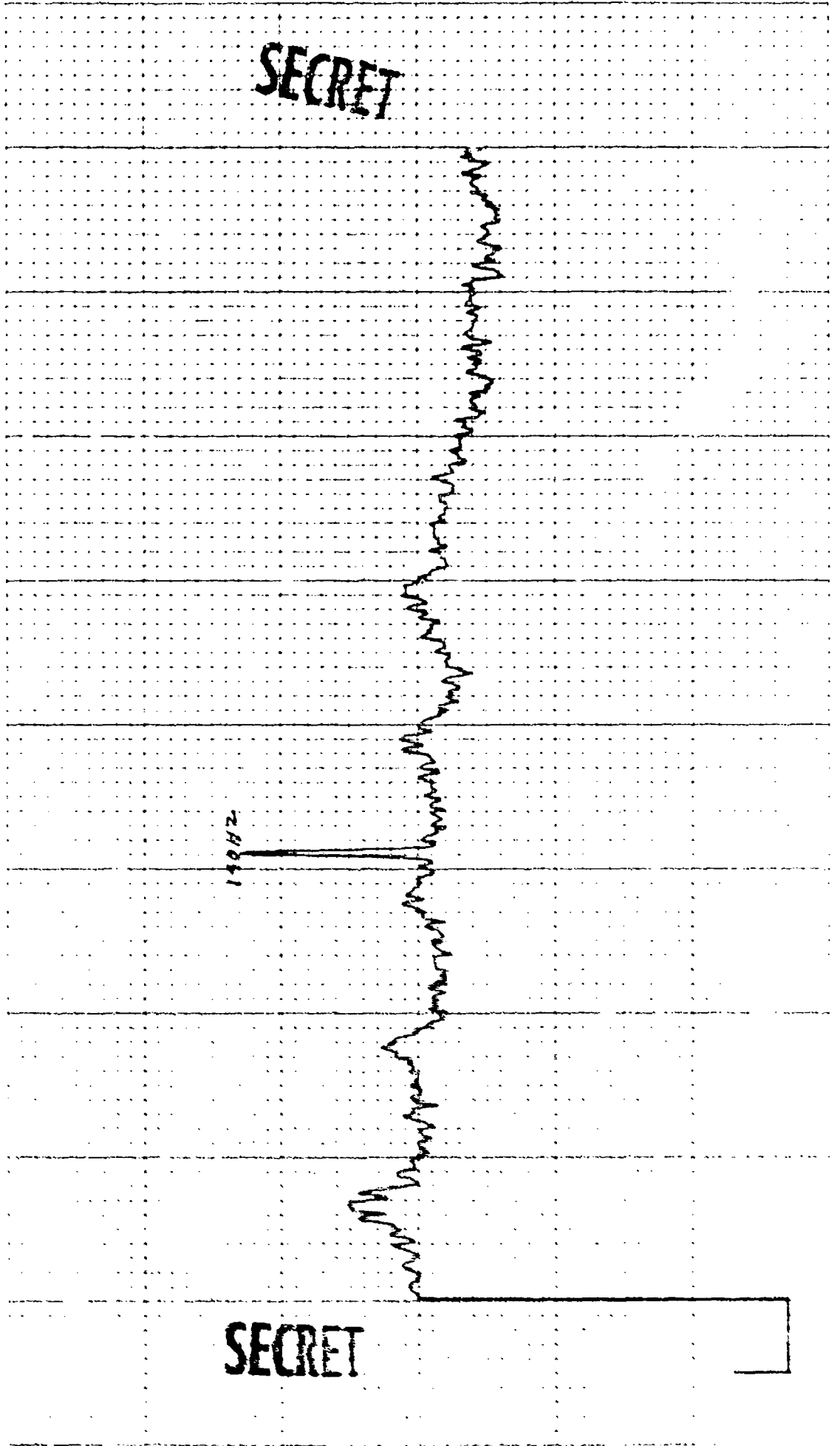
46 0703

CONTROL: 2033 - 32 (206)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAFF
 CENTER FREQ: 150 HZ
 32 ELEMENTS

DATE OF ANALYSIS: 17 26 8 28 34
 DATE/TIME: 2-7-77 - 2033Z
 ANALYSIS BANDWIDTH: 1/10HZ
 +20 DEG. AZ STEERING

REEL: F23
 INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

INDE X 2000



46 0703

CONTROL: 2033 - 32 (JPG)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
 32 ELEMENTS

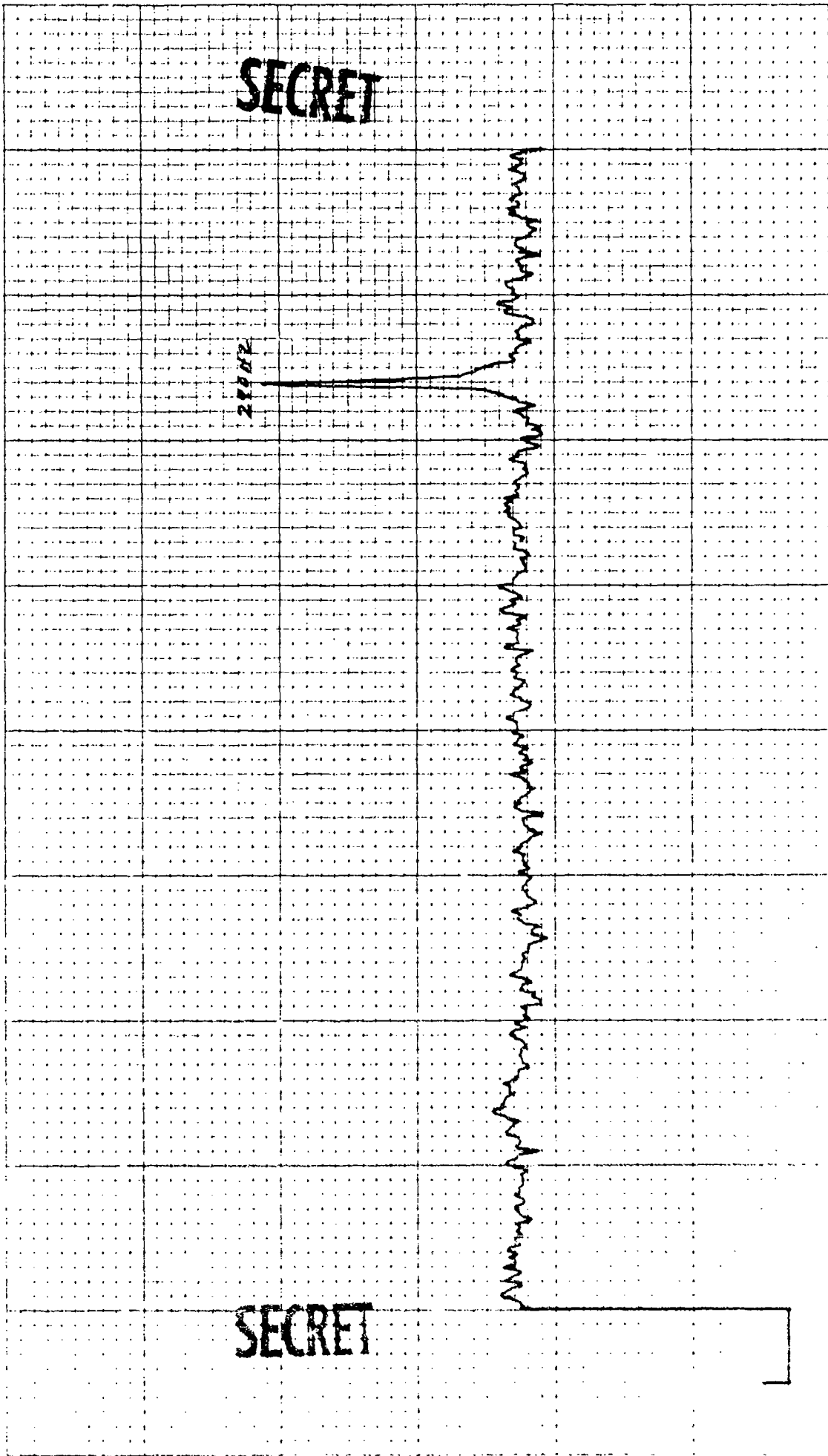
DATE OF ANALYSIS: - - - -
 1-26-77 21-34

INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

REEL: F23 INDE X3000

ANALYSIS BANDWIDTH: 1/10HZ
 +4 DEG. AZ STEERING

ATTEN: -24 DB



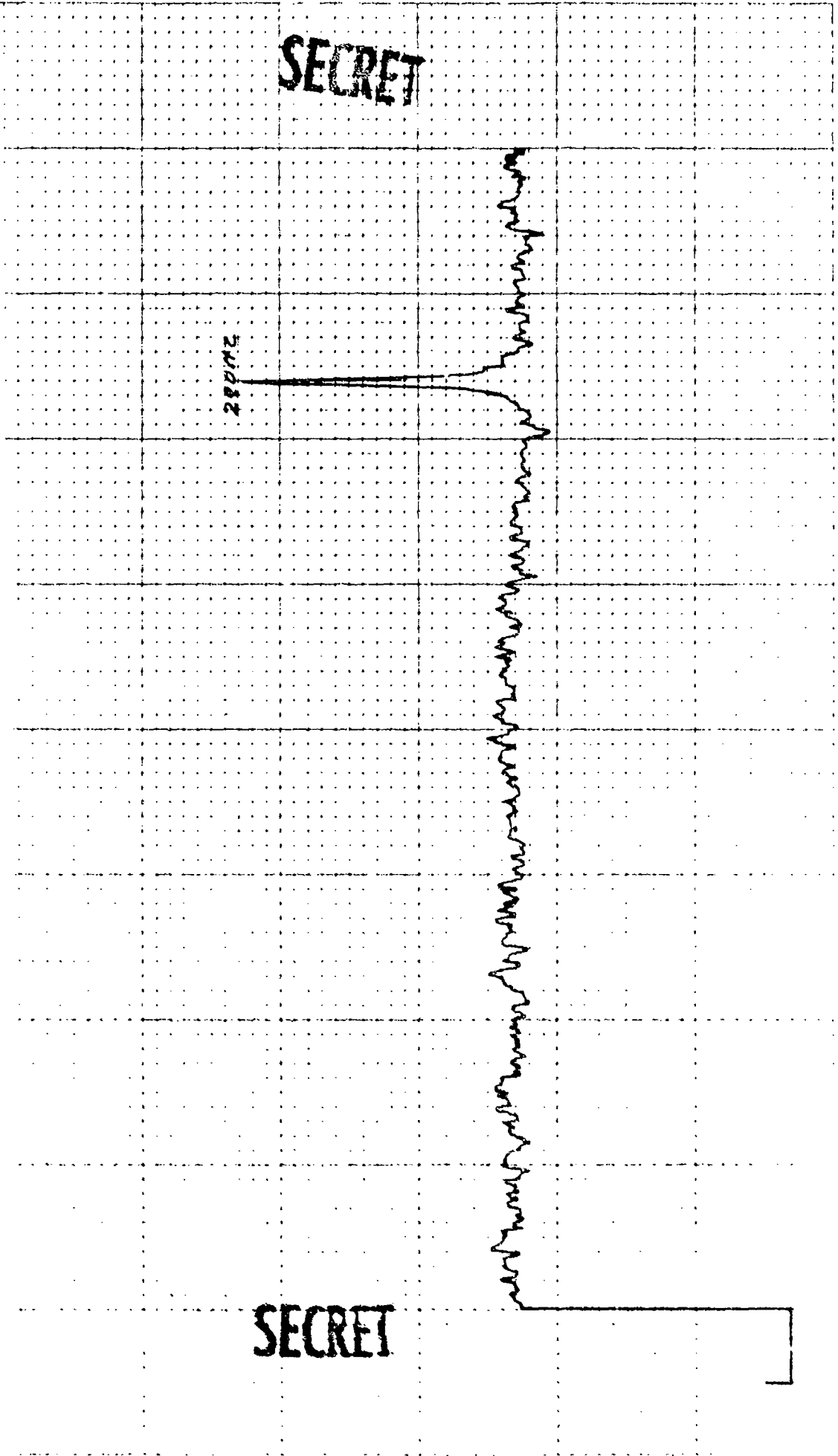
46 0703

CONTROL: 2033 - 32 (DPC)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 HZ
 32 ELEMENTS

DATE OF ANALYSIS: 1-26-77
 DATE/TIME: 2-7-77 - 2033 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 +6 DEG. AZ STEERING

REEL: F23
 INTEGRATION TIME 320 SECS
 FILTER WTC: HANNING

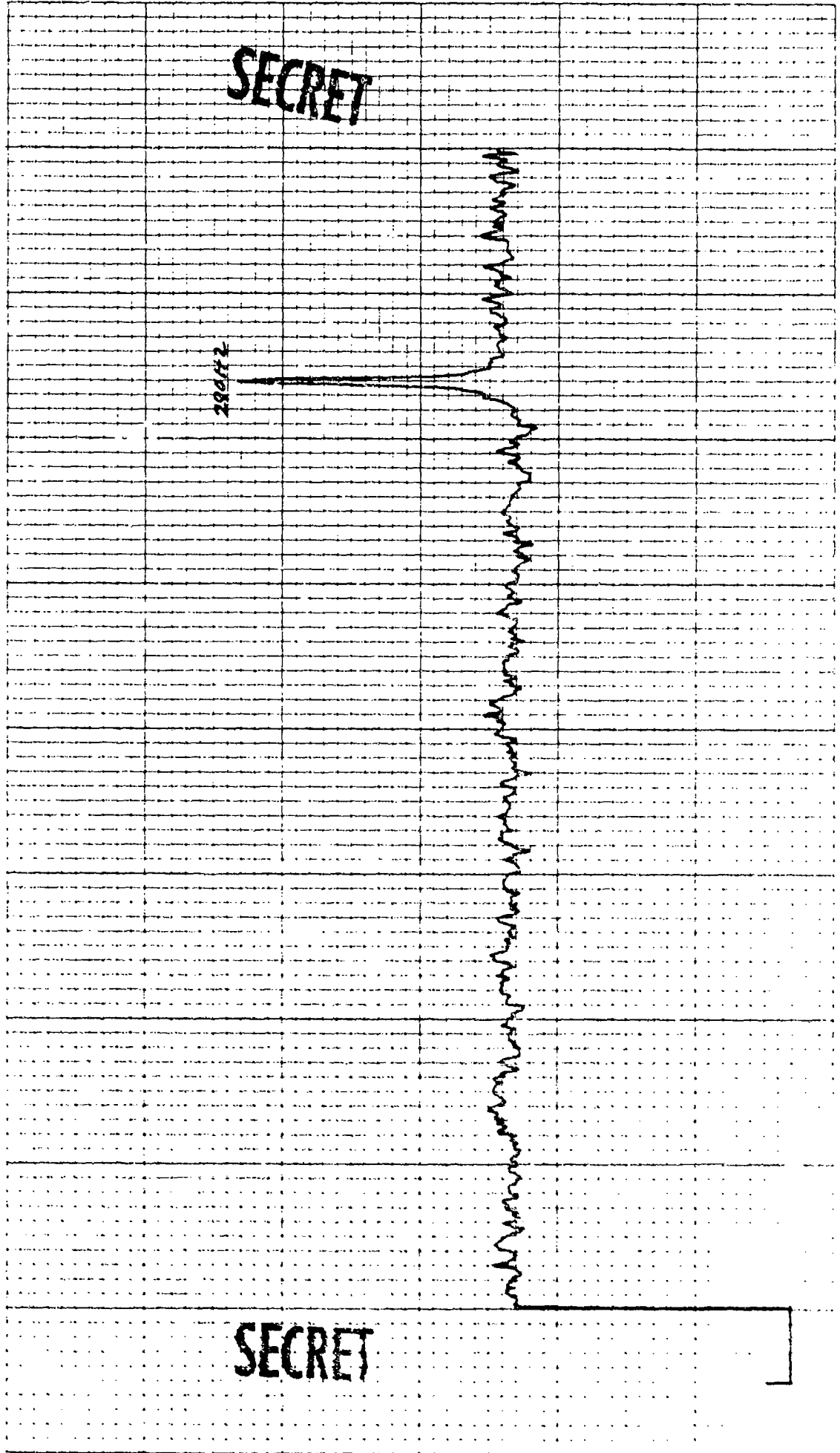
INDE X3000
 ATTEN: -24 DB



46 0703

(COPY BEARING TO THE INDEX IS 46 0703)

CONTROL: 2033-32 (DPI) DATE OF ANALYSIS: - - REEL: F23 INDE X3000
 BEAMFORMED SPECTRUM(ELEMENTS) / - 288 28-34)
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033 Z INTEGRATION TIME 320 SECS ATTEN: -24 DB
 CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
32 ELEMENTS +8 DEG. AZ STEERING

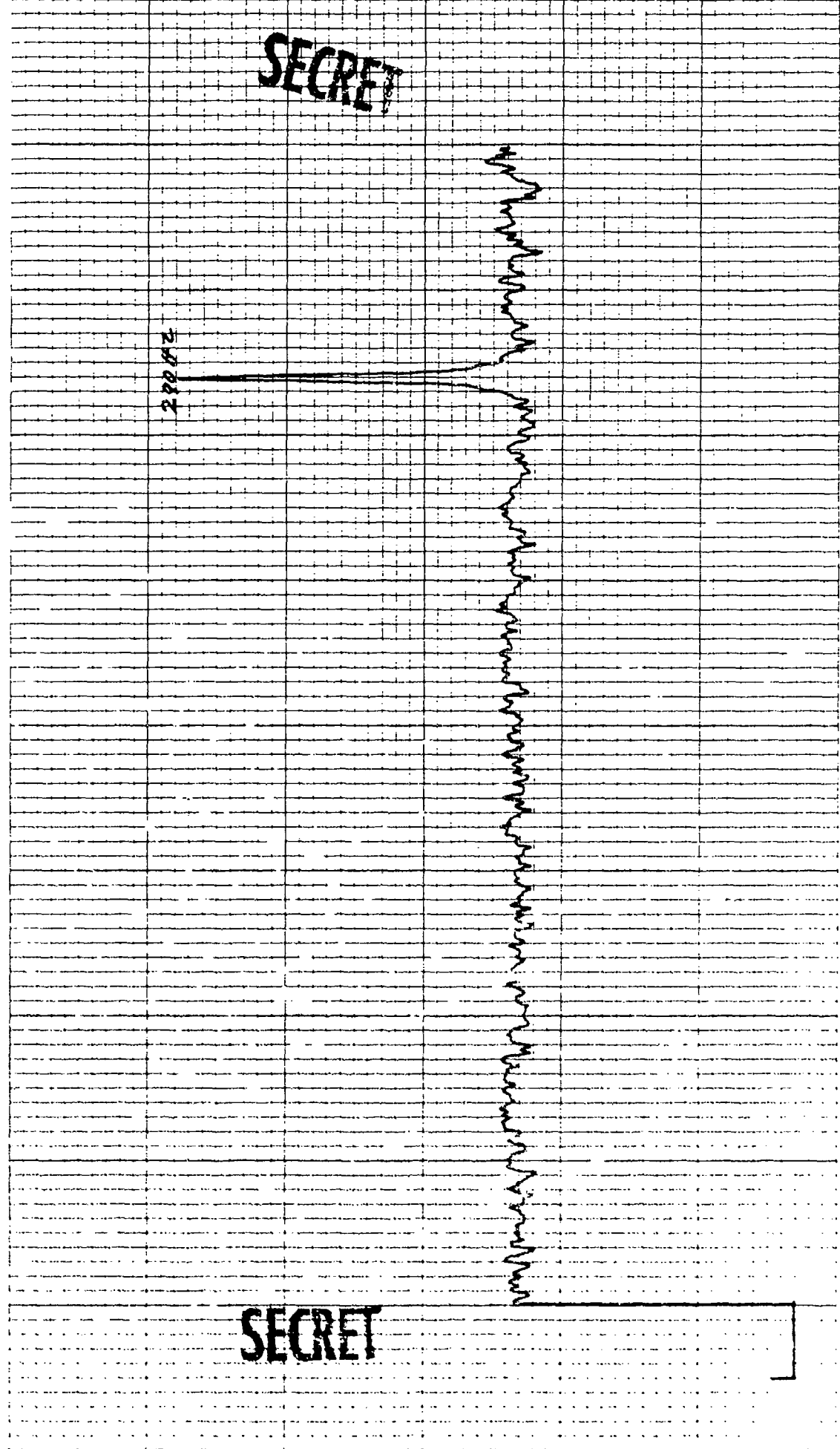


10X 10 TO THE INCHES

46 0703

CONTROL: 2033 - 32 (DPA) DATE OF ANALYSIS: -- -- --
 BEAMFORMED SPECTRUM(ELEMENTS) 1-26-89-34)
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033Z
 CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1/10HZ
 32 ELEMENTS TIC DEG. AZ STEERING

REEL: F.3 INDE X3200
 INTEGRATION TIME 320 SECS ATTN: -29 DB
 FILTER WTG: HANNING



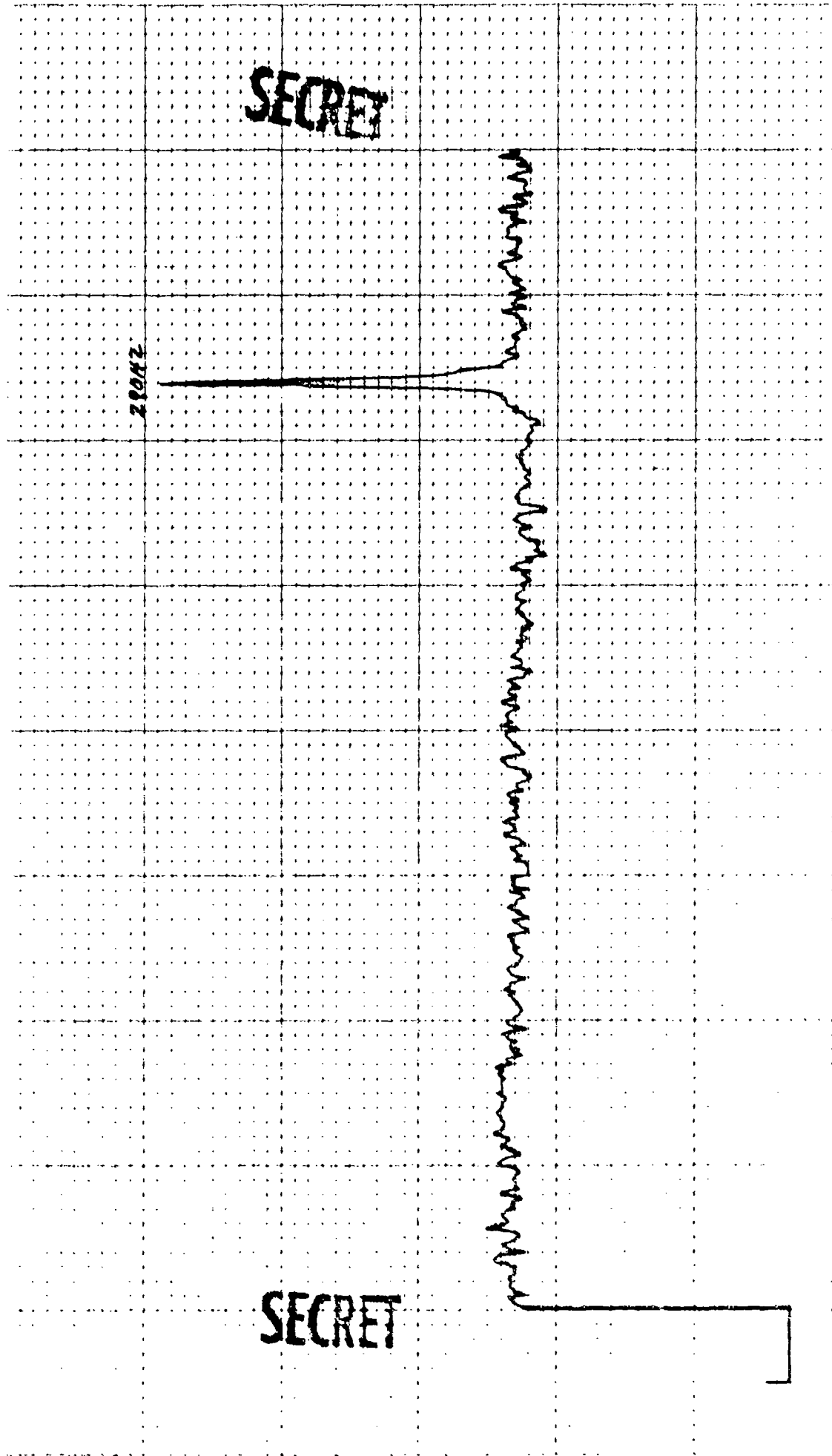
SECRET

SECRET

46 0703

NOE 2300 2300 2300 2300

CONTROL: 2033 - 32 (DPC) DATE OF ANALYSIS: 1 - 26 8 29-34 REEL: F23 INDE X3000
BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-7-77 - 2033Z INTEGRATION TIME 320 SECS ATTN: -24 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 2800 HZ # 12 DEC. AZ STEERING

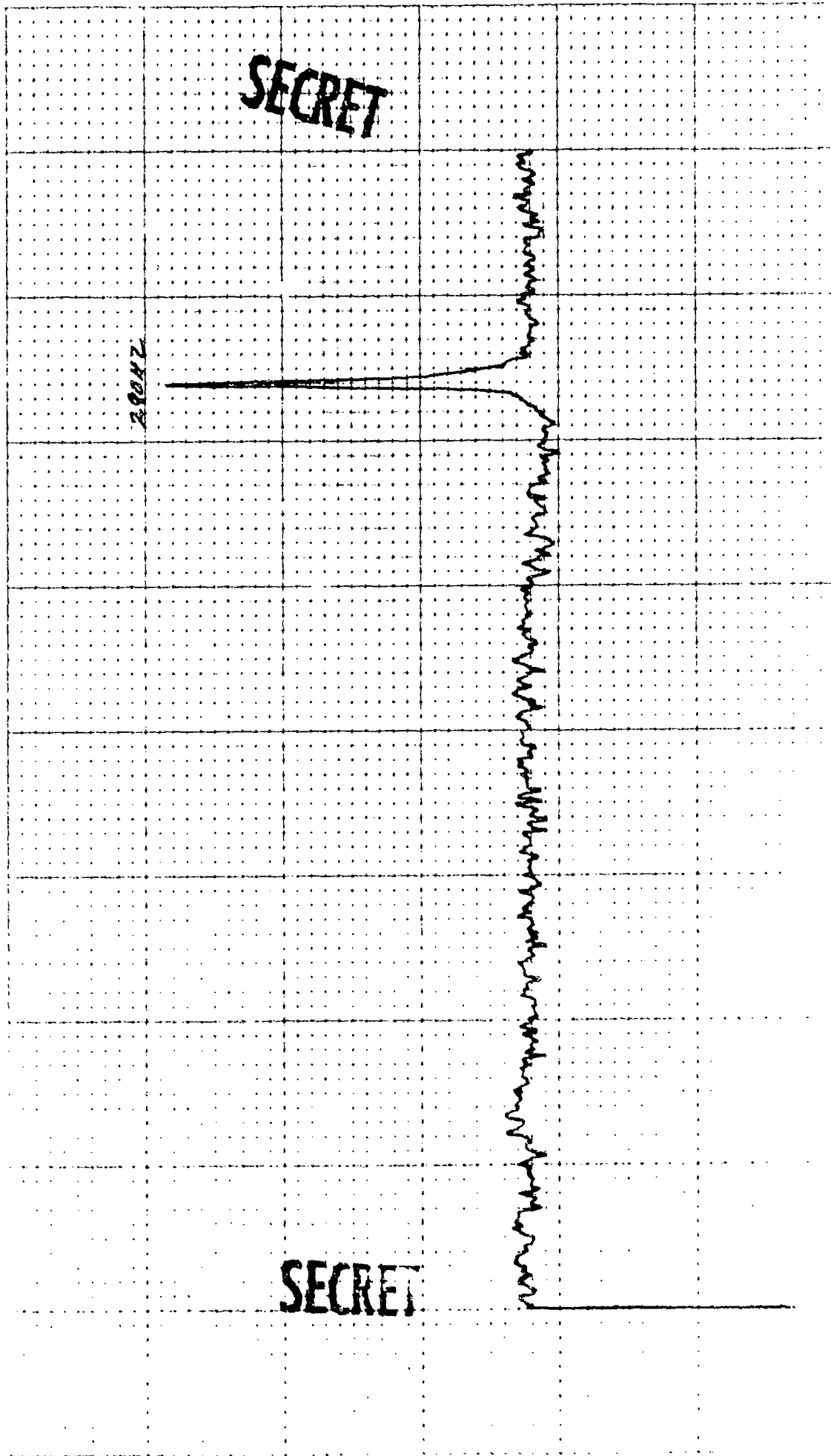


46 0703

CONTROL: 2073 - 32 (206)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
JA ELEMENTS

DATE OF ANALYSIS: - - -
1-26-74
DATE/TIME: 2-7-77 - 2073 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+13 DEG. AZ STEERING

REEL: F23 INDE X3000
INTEGRATION TIME 320 SECS ATTN: -24 DB
FILTER WTC: HANNING



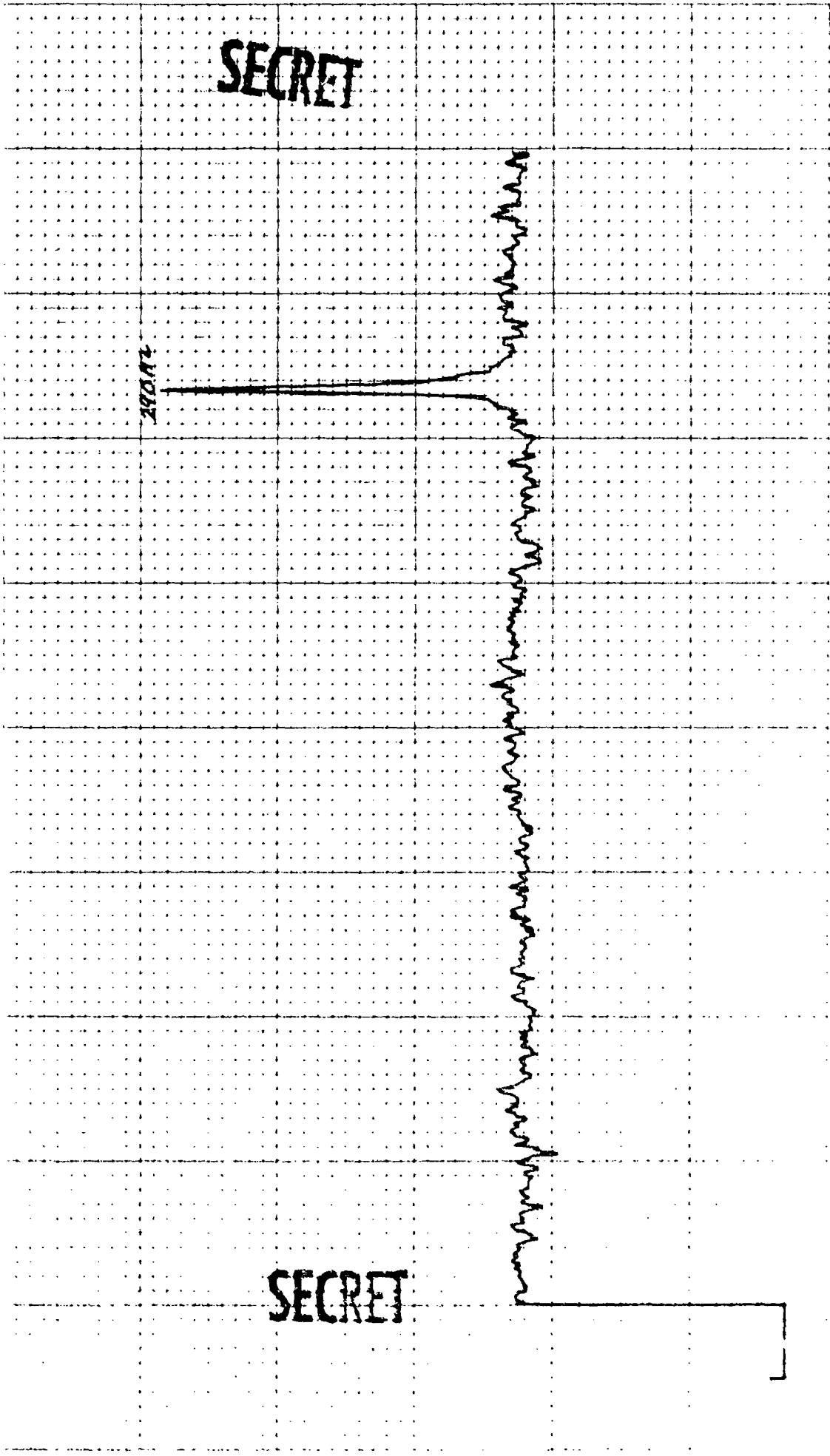
46 0703

CONTROL: 2033-32 (POC)
 BEAMPFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 HZ
 32 ELEMENTS

DATE OF ANALYSIS: 1-26/79-34
 DATE/TIME: 2-7-77 - 2033Z
 ANALYSIS BANDWIDTH: 1/10HZ
 1/4 DEG. AZ STEERING

REEL: F23
 INTEGRATION TIME 320 SECS
 FILTFR WTC: HANNING

INDE X 1000



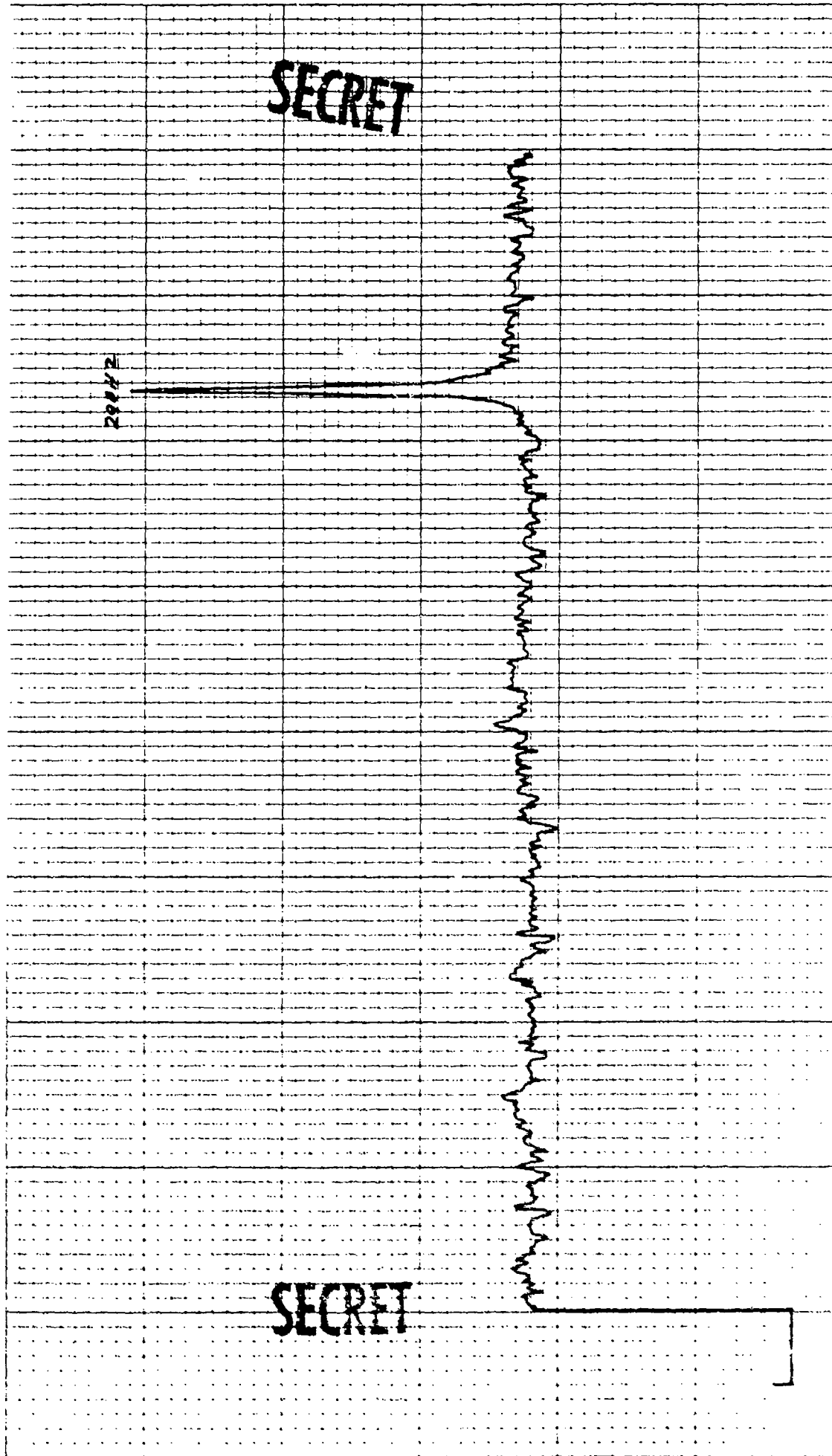
162E 30 X 10 TO THE INCHES 2 1/2 IN. DIA. 1000
REDFIELD & FESSER CO. WASHINGTON, D.C.

46 0703

CONTROL: 2073 - 32 (DPL)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
32 ELEMENTS

DATE OF ANALYSIS: -- -- --
1-26-77
DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
+16 DEG. AZ STEERING

REEL: F23 INDE X 1000
INTEGRATION TIME 320 SECS ATTEN: 24 DB
FILTER WTG: HANNING



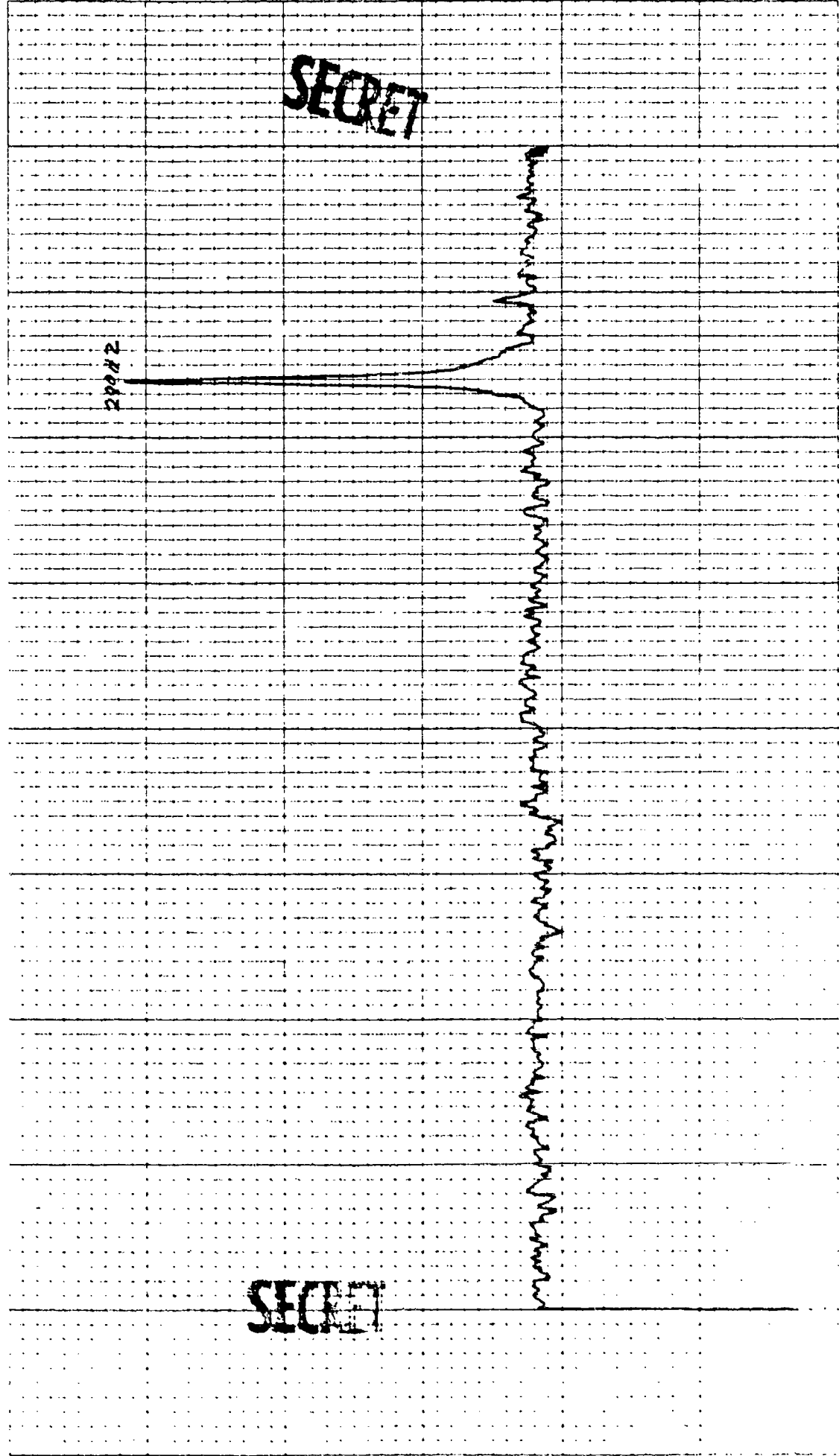
46 0703

REF ID: A16 10 108 0000 0000 0000

CONTROL: 2033 - 5/ (DPL)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

DATE OF ANALYSIS: _____
1-26-84 29-34)
DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
+17 DEG. AZ STEERING

REEL: F23 INDE X J000
INTEGRATION TIME 320 SECS ATTN: 24 DB
FILTER WTG: HANNING

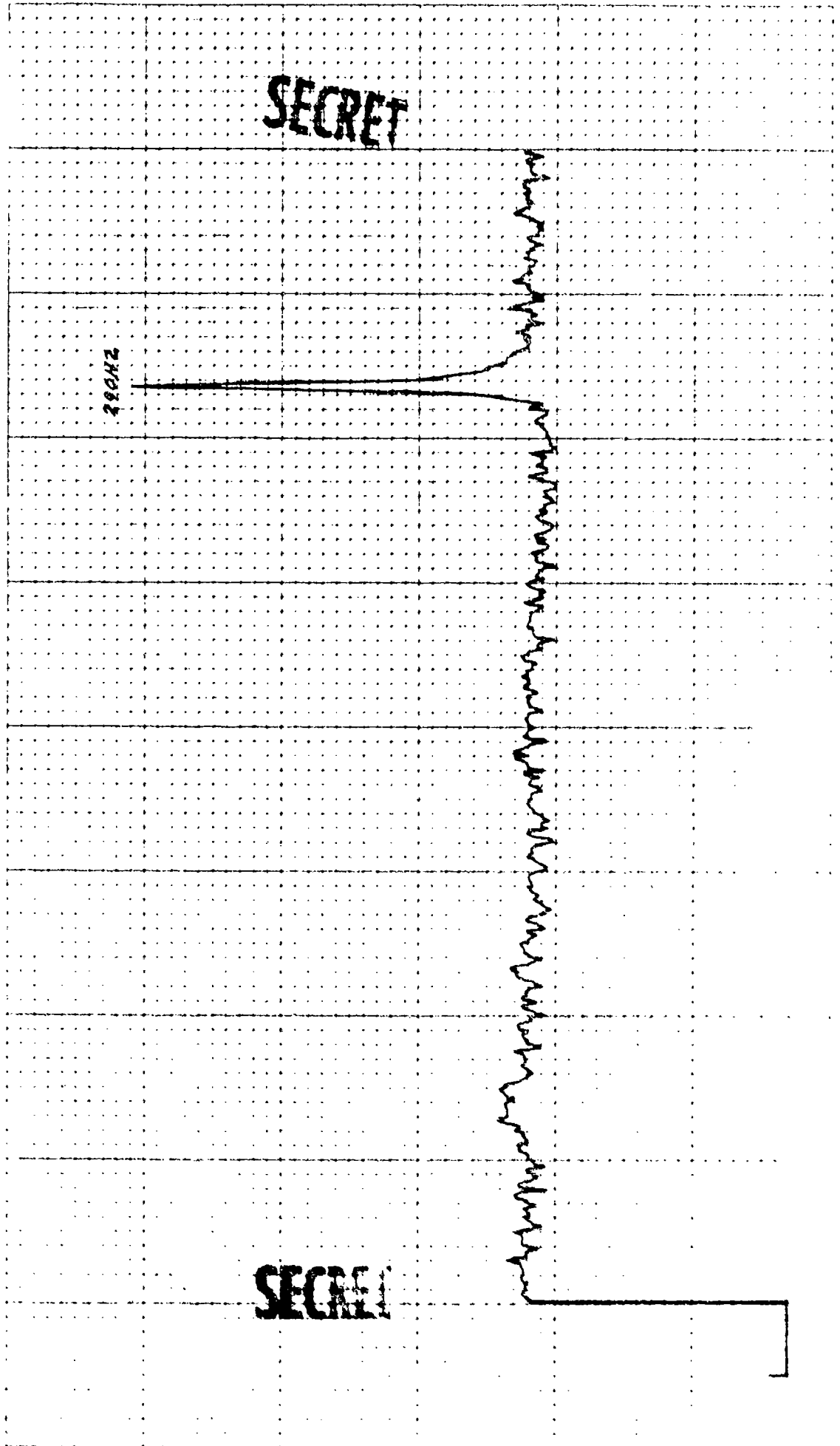


46 0703

CONTROL: 2073 - 32 (DPL)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-77
DATE/TIME: 2-7-77 - 2073 Z
ANALYSIS BANDWIDTH: 1/10HZ
+18 DEG. AZ STEERING

REEL: FA3 INDE X3000
INTEGRATION TIME 320 SECS ATTN: -24 DB
FILTFR WTC: HANNING



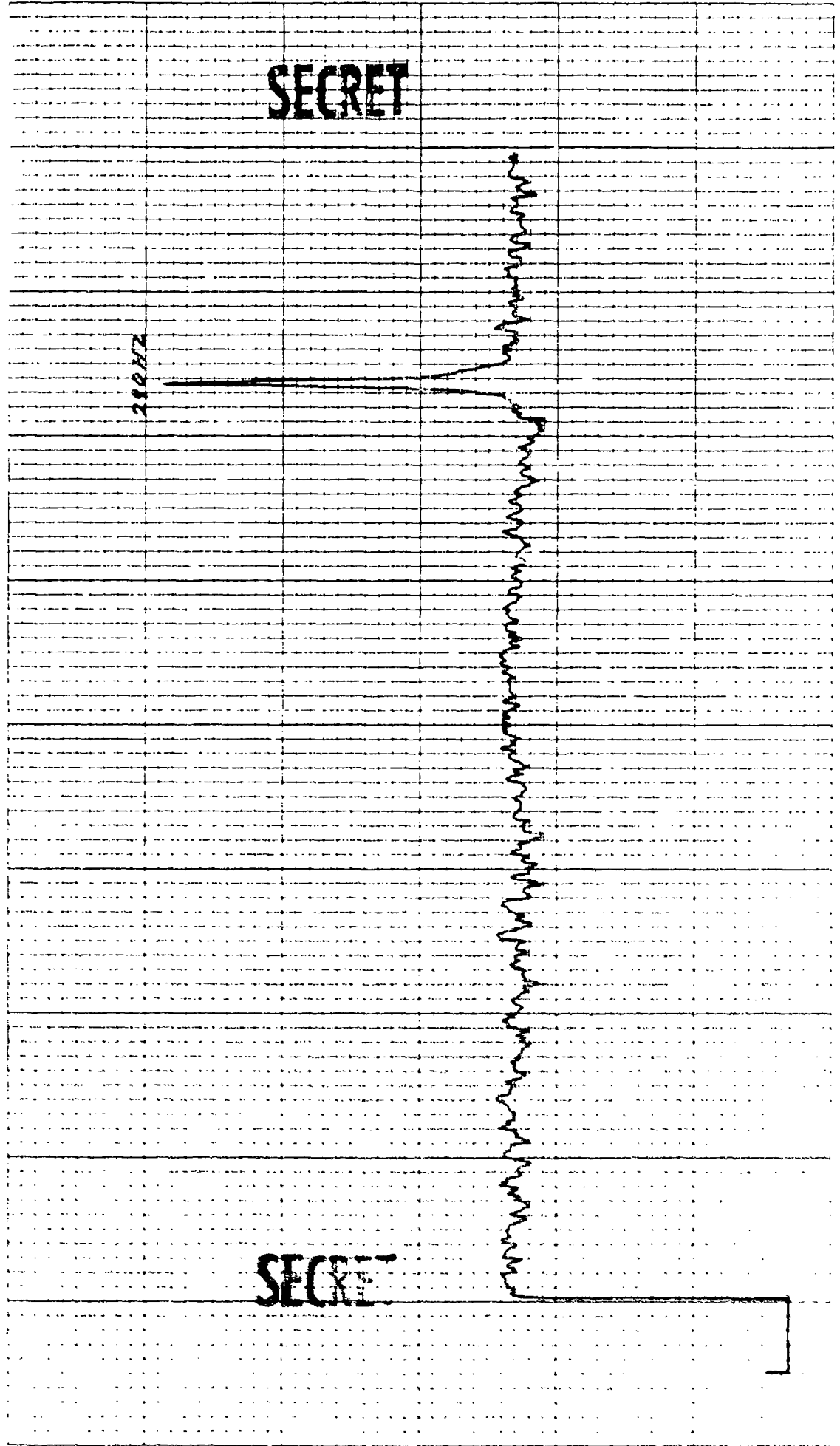
46 0703

1000 19 4 19 10 10 00 00 00 00 00 00

CONTROL: 2073 - 32 (DPC)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
32 ELEMENTS

DATE OF ANALYSIS: -- -- --
1-26 29-34
DATE/TIME: 2-7-77 - 2073 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+20 DEG. AZ STEERING

REEL: F23 INDE X1000
INTEGRATION TIME 320 SECS ATTEN: -24 DB
FILTER WTC: HANNING



46 0703

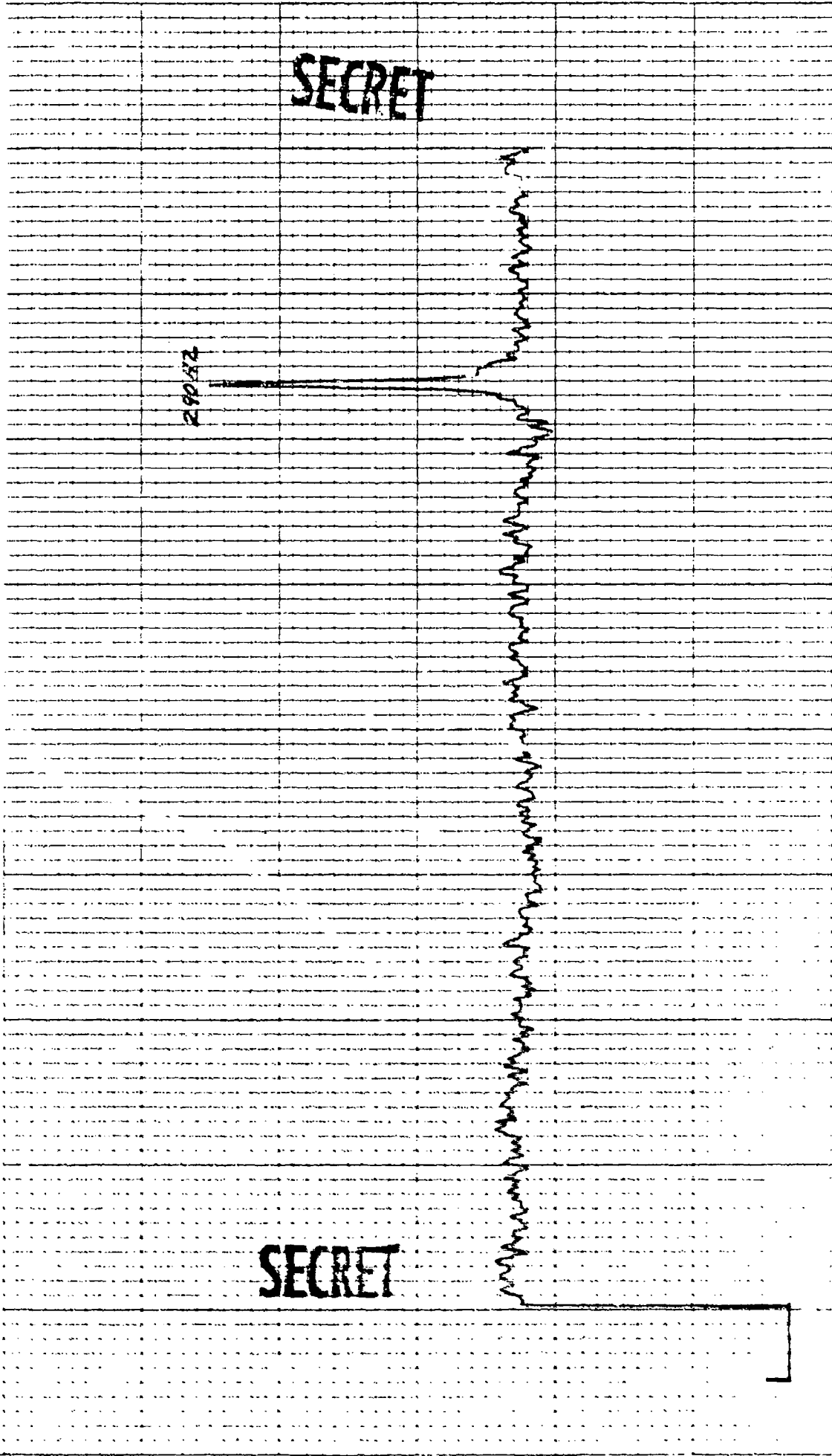
CONTROL: 2033 - 32 (D06)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 HZ
 72 ELEMENTS

DATE OF ANALYSIS: -- -- --
 / - 26 8 22-34

DATE/TIME: 2-7-77 - 2033 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 + 22 DEG. AZ STEERING

REEL: F23 INDE X 3000

INTEGRATION TIME 320 SECS ATTN: -24 DB
 FILTER WTC: HANNING

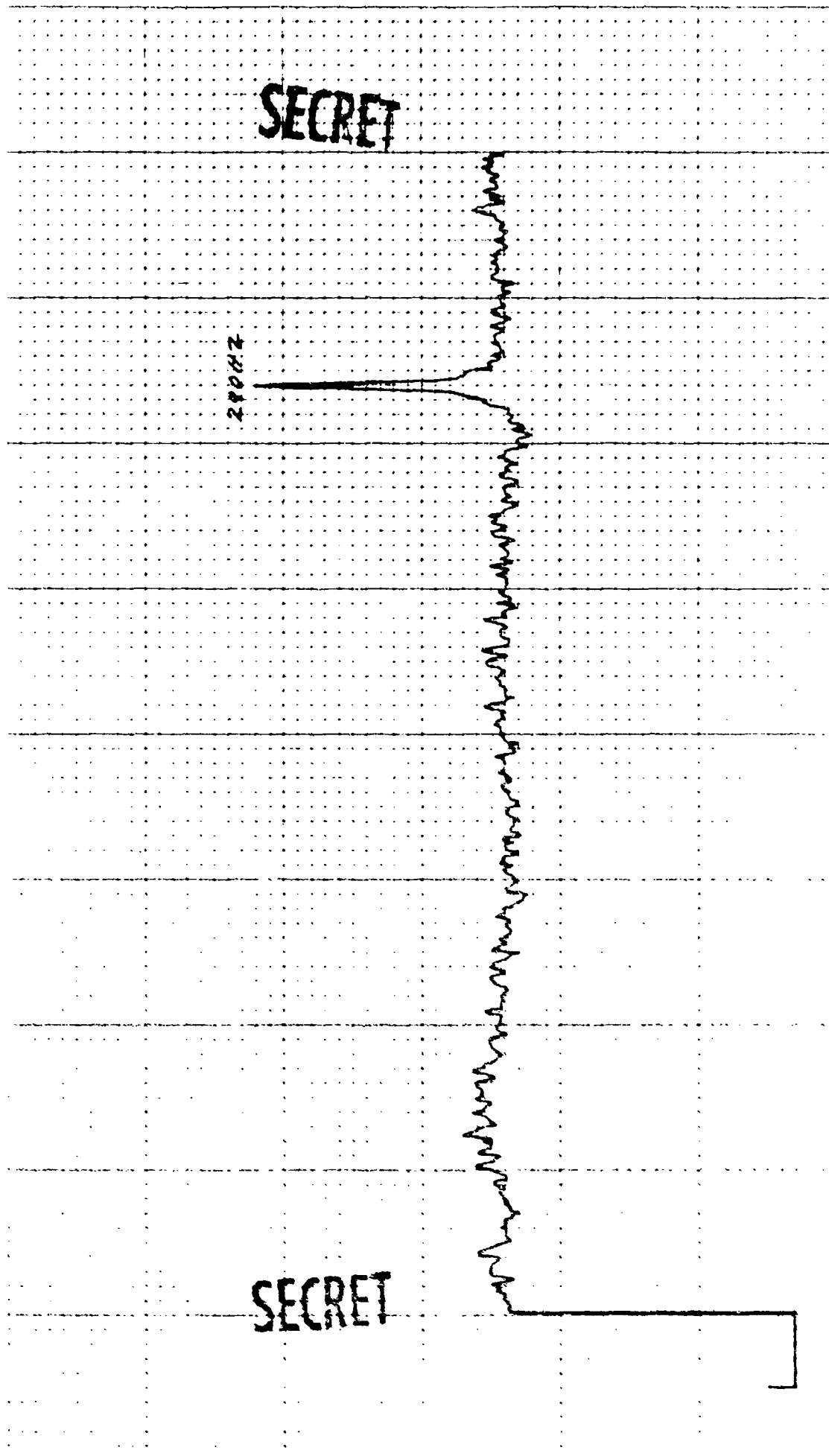


46 0703

CONTROL: 2033 - 32 (DP6) DATE OF ANALYSIS: - - -
BEAMFORMED SPECTRUM(ELEMENTS) /- 20 8 29 - 34)
EXERCISE: BEARING STAFF DATE/TIME: 2-7-77 - 2033Z
CENTER FREQ: 180 HZ ANALYSIS BANDWIDTH: 1/10HZ
32 ELEMENTS 4 2Y DEG. AZ STEERING

REEL: F33 INDE X3000

INTEGRATION TIME 320 SECS ATTN: -2Y DB
FILTER WTC: HANNING



SECRET

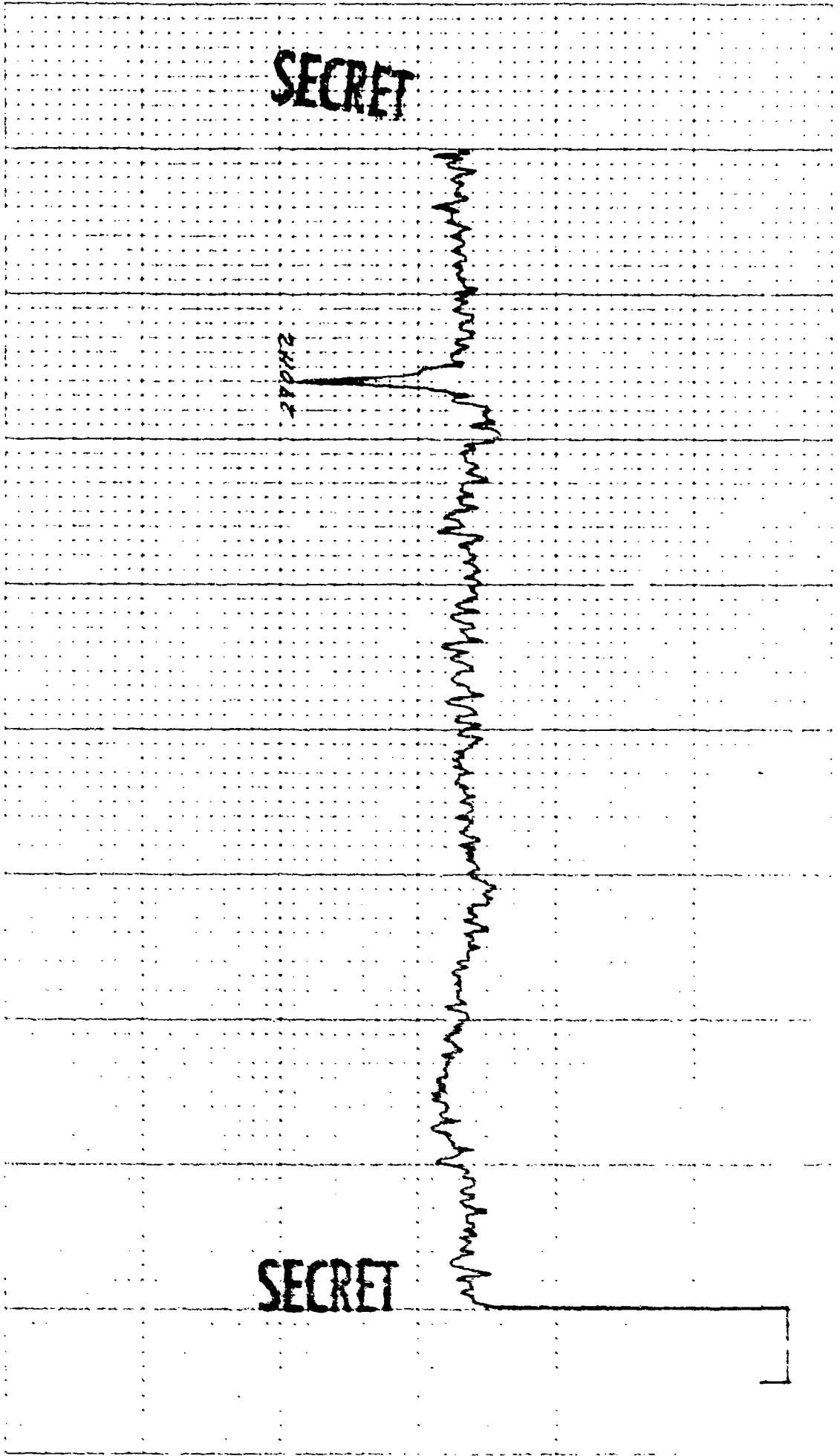
SECRET

46 0703

CONTROL: 2037 - 32 (006)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 HZ
 32 ELEMENTS

DATE OF ANALYSIS: 1-26-89 (89-34)
 DATE/TIME: 2-7-77 - 2033Z
 ANALYSIS BANDWIDTH: 1/10HZ
 + 26 DEG. AZ STEERING

REEL: F23 INDE X 3000
 INTEGRATION TIME 320 SECS ATTEN: -24 DB
 FILTER WTG: HANNING



CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 6

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 51

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-32.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-22.8	
BEAMFORMER GAIN	<u>+30</u>	+7.2	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	+7.4	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-66.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-56.8	
BEAMFORMER GAIN	<u>+30</u>	-26.8	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+7.2</u>	
SIGNAL LEVEL FOR SNR	<u>-26.8</u>	34	
PROCESSOR CORRECTION	<u>-4.0</u>	30	
MRA CORRECTION	<u>+ .2</u>	30.2	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	22	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 6

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 51

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-34.1</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-24.1</u>	
BEAMFORMER GAIN	<u>+30</u>	<u>+5.9</u>	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	<u>+6.7</u>	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-69.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-59.8</u>	
BEAMFORMER GAIN	<u>+30</u>	<u>-29.8</u>	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+5.9</u>	
SIGNAL LEVEL FOR SNR	<u>-29.8</u>	<u>35.7</u>	
PROCESSOR CORRECTION	<u>-4.0</u>	<u>31.7</u>	
MRA CORRECTION	<u>+ .8</u>	<u>32.5</u>	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	<u>24.3</u>	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

DATA POINT 6

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-24.7</u>	<u>-23.0</u>	<u> </u>
MRA SIGNAL LEVEL	<u>+ 7.4</u>	<u>+ 6.7</u>	<u> </u>
ARRAY SIGNAL GAIN	<u>32.1</u>	<u>29.7</u>	<u> </u>
20 LOG <u>5/</u>	<u>34.1</u>	<u>34.1</u>	<u> </u>
# of elements			
DIFFERENCE	<u>- 2.0</u>	<u>- 4.4</u>	<u> </u>

ARRAY GAIN

MRA SNR	<u>30.2</u>	<u>32.5</u>	<u> </u>
MEAN OMNI SNR	<u>15.4</u>	<u>19.9</u>	<u> </u>
ARRAY GAIN	<u>14.8</u>	<u>12.6</u>	<u> </u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>15.5</u>	<u>17.5</u>	<u> </u>
DIFFERENCE	<u>- .7</u>	<u>- 4.9</u>	<u> </u>

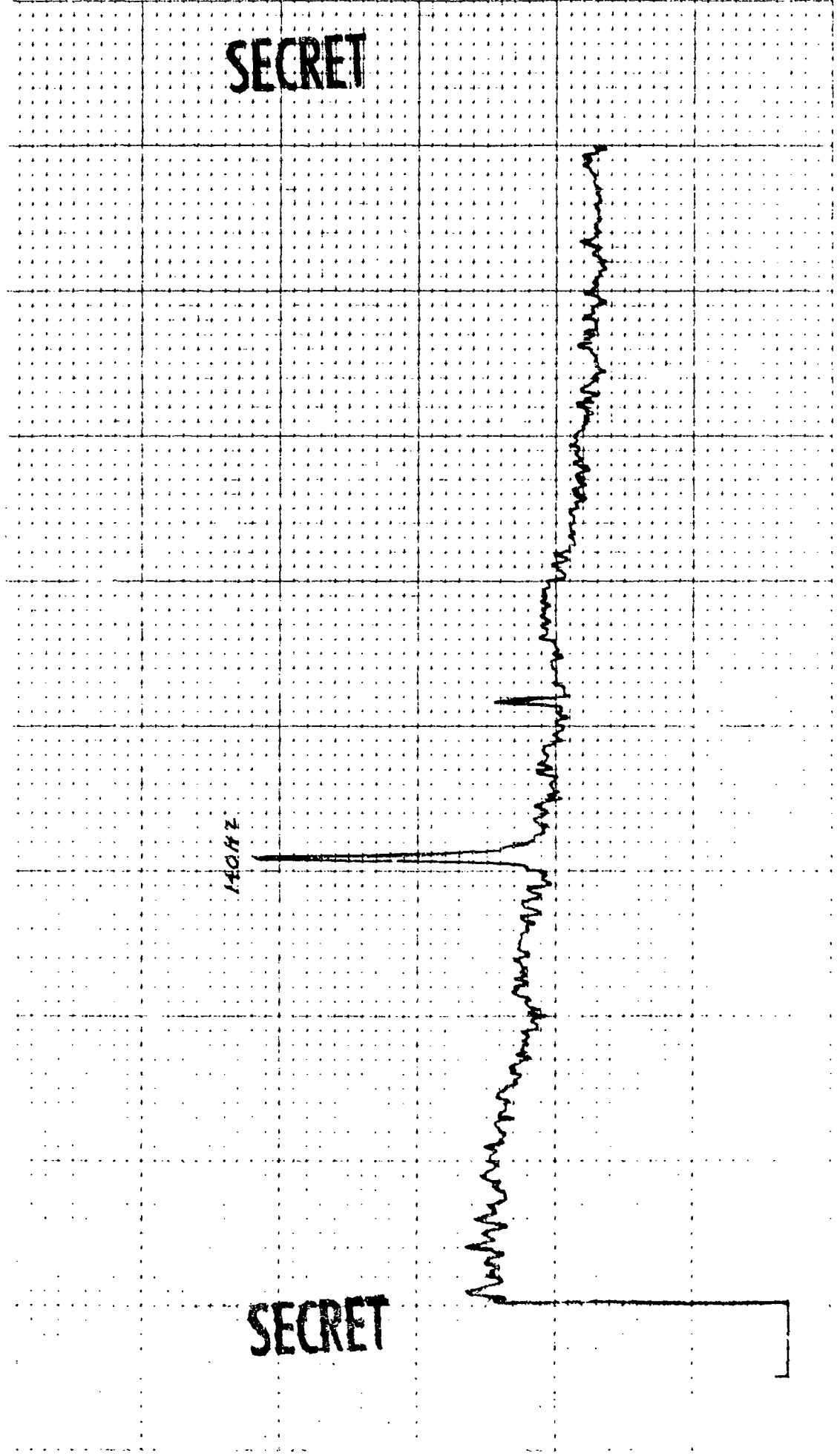
CONFIDENTIAL

46 0703

CONTROL: 2033 - 51 (DPC)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
51 ELEMENTS

DATE OF ANALYSIS: -- -- --
1-26-89-53
DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
48 DEG. AZ STEERING

REEL: F23
INTEGRATION TIME 320 SECS
FILTFR
ATTEN: -70 DB
WTG: HANNING



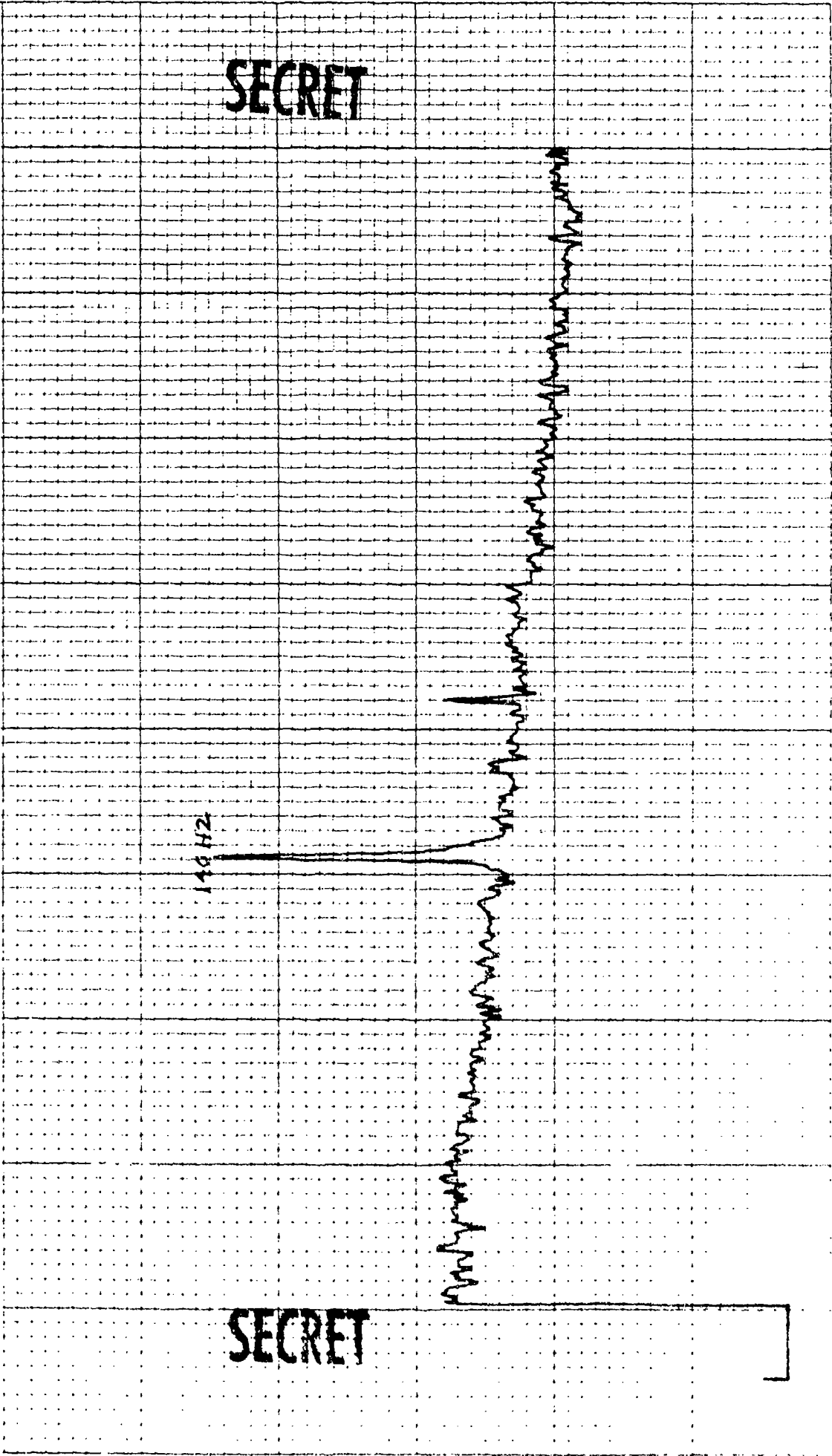
SECRET

SECRET

46 0703

REC'D BY: [unclear] DATE: [unclear]

CONTROL: 2033-51 (DP6) DATE OF ANALYSIS: - - REEL: F23 INDE X 3000
 BEAMFORMED SPECTRUM(ELEMENTS) 1-26 & 29-53) INTEGRATION TIME 320 SECS ATTEN: -30 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1710HZ FILTER WTG: HANNING
 CENTER FREQ: 150 HZ +10 DEG. AZ STEERING



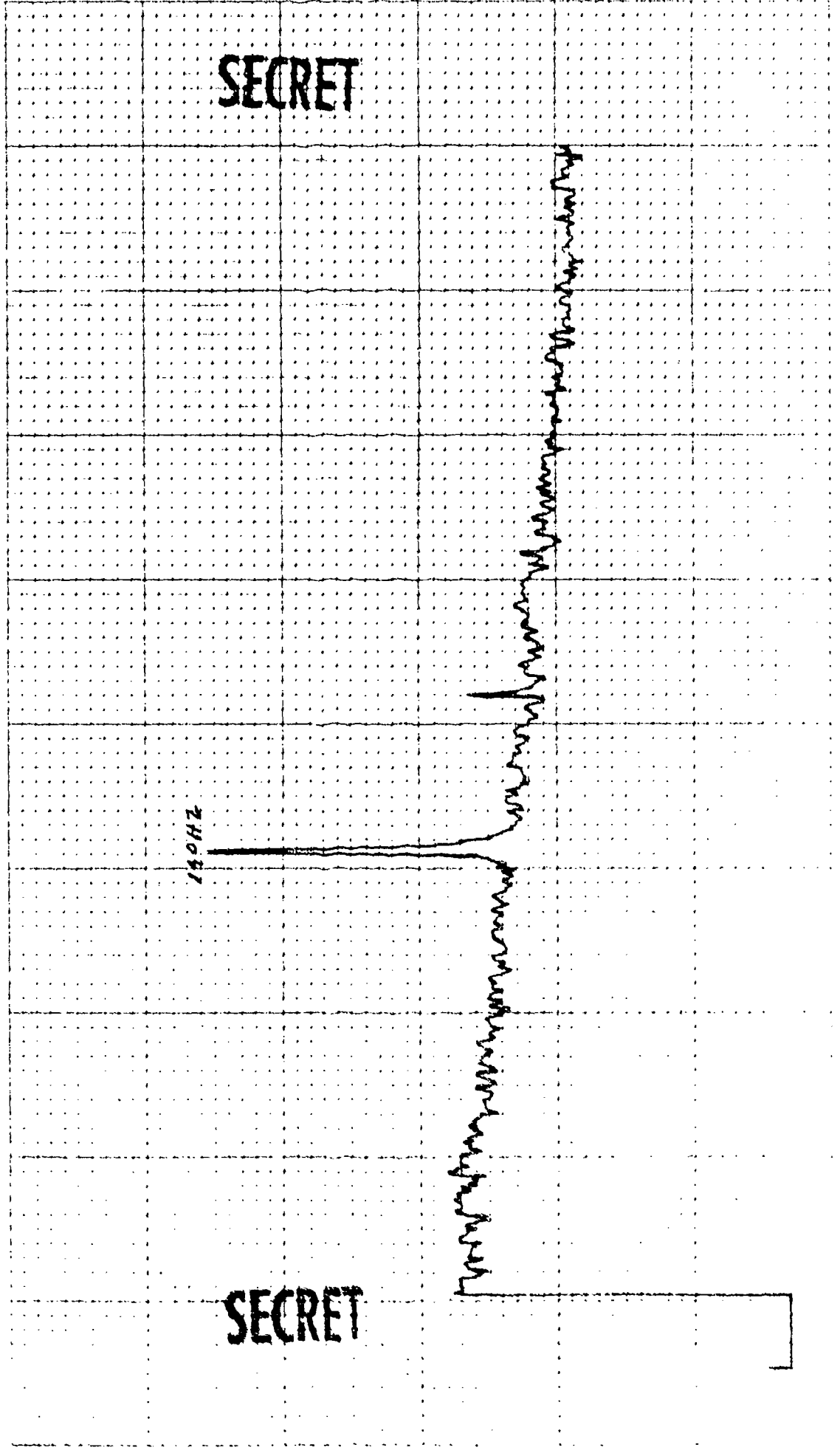
SECRET

SECRET

46 0703

KEY BEARING STAKE

CONTROL: 2033 - 51 (206) DATE OF ANALYSIS: - - REEL: F23 INDE X J00c
 BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 1-26-77 21-53 INTEGRATION TIME 320 SECS ATTEN: -30 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTFR WTG: HANNING
 CENTER FREQ: 150 HZ +12 DEG. AZ STEERING



SECRET

SECRET

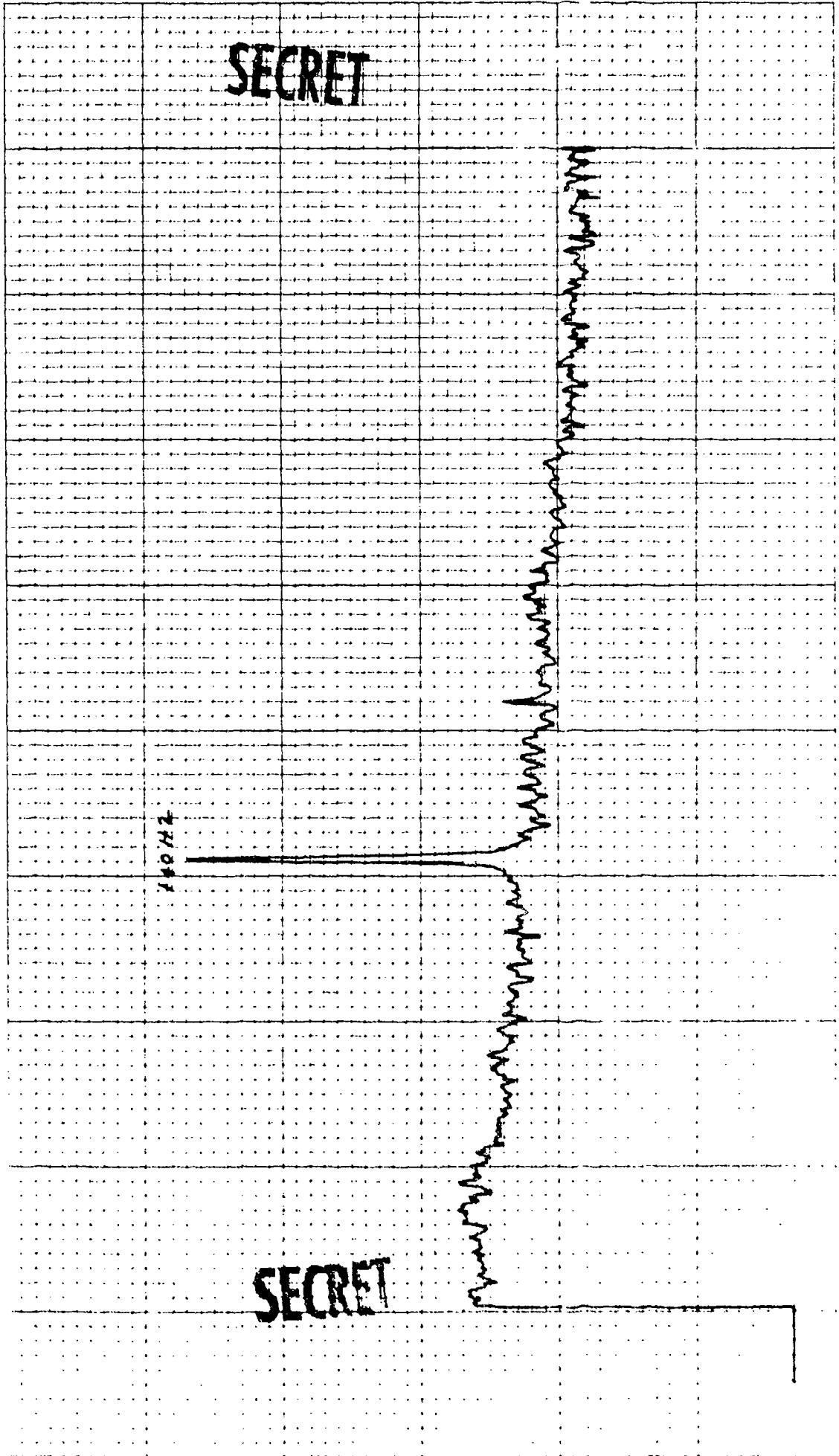
10-2 IN TO THE INCHS. 2.5 CM PER INCH.
REFLECT & ENERGY. 2.5 CM PER INCH.

46 0703

CONTROL: 2033 - 51 (D6)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
B/ ELEMENTS

DATE OF ANALYSIS: - - - -
1-26 & 28-53
DATE/TIME: 2-7-77 - 2033Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 14 DEG. AZ STEERING

REEL: F23 INDE X3000
INTEGRATION TIME 320 SECS ATTEN: -30 DB
FILTER WTC: HANNING

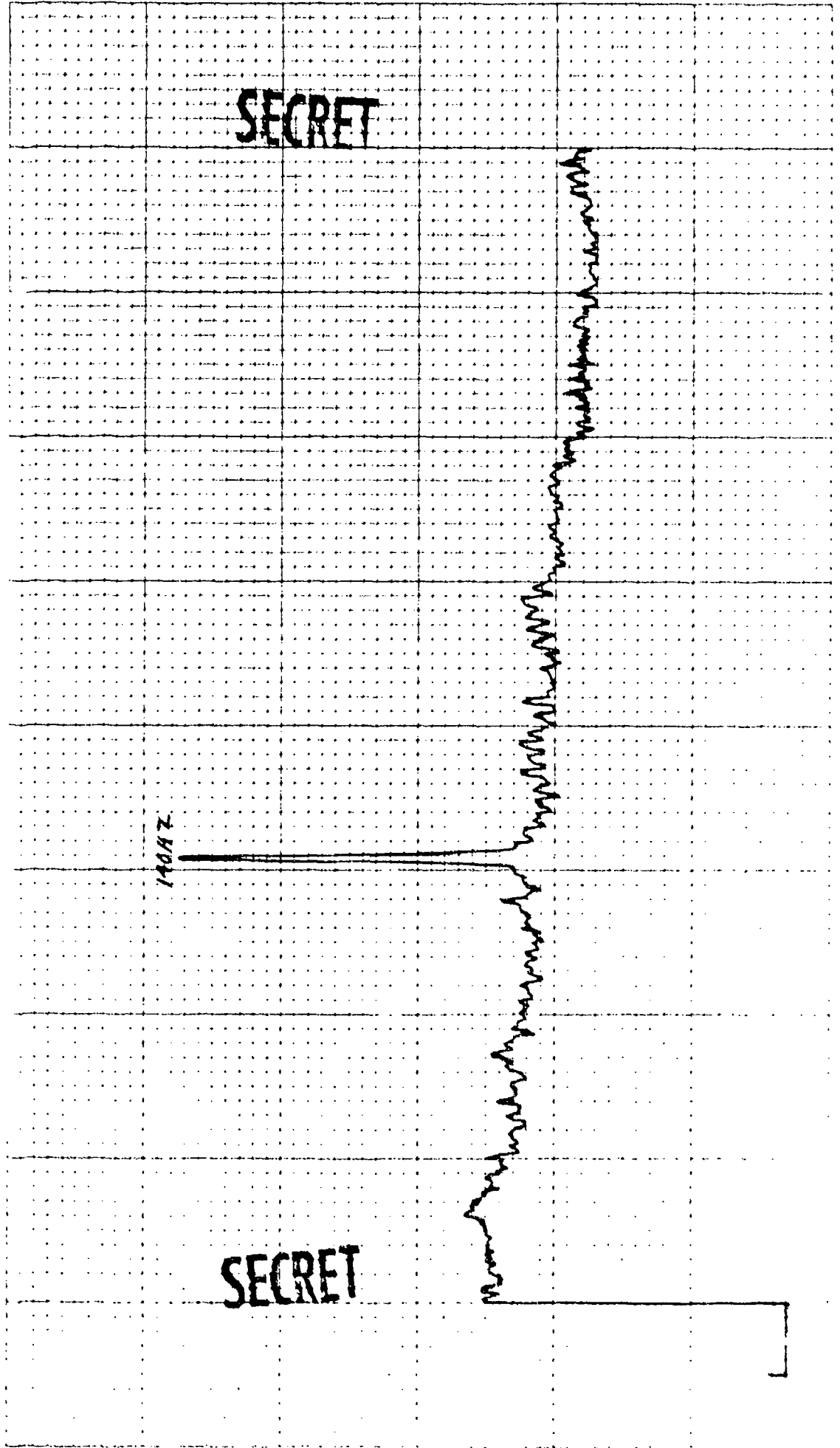


46 0703

CONTROL: 2033 - 5/ (DPC)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 5/ ELEMENTS

DATE OF ANALYSIS: _____
 1-26-77 29-53
 DATE/TIME: 2-7-77 - 2033 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 4/5 DEG. AZ STEERING

REEL: F23 INDE X 3000
 INTEGRATION TIME 320 SECS ATTEN: 30 DB
 FILTER WTC: HANNING

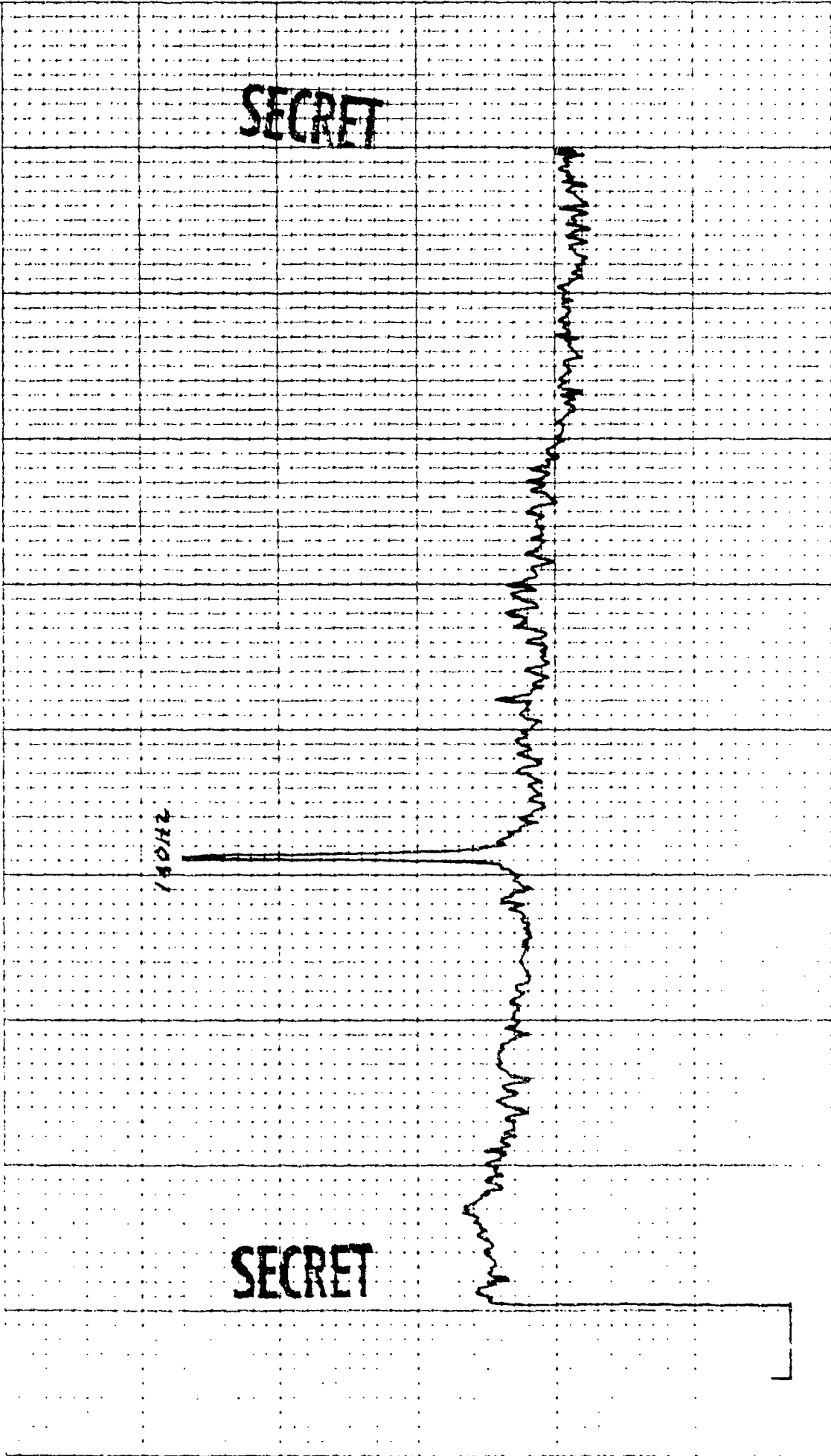


46 0703

CONTROL: 2033 - 51 (DP6)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
51 ELEMENTS

DATE OF ANALYSIS: -- -- --
1-26-8 20-53
DATE/TIME: 2-7-77 - 2033Z
ANALYSIS BANDWIDTH: 1710HZ
+ 16 DEG. AZ STEERING

INTEGRATION TIME 320 SECS
FILTFR WTC: HANNING
REEL: F23
INDE X3000



CONTROL: 2033 - 51 (206)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 51 ELEMENTS

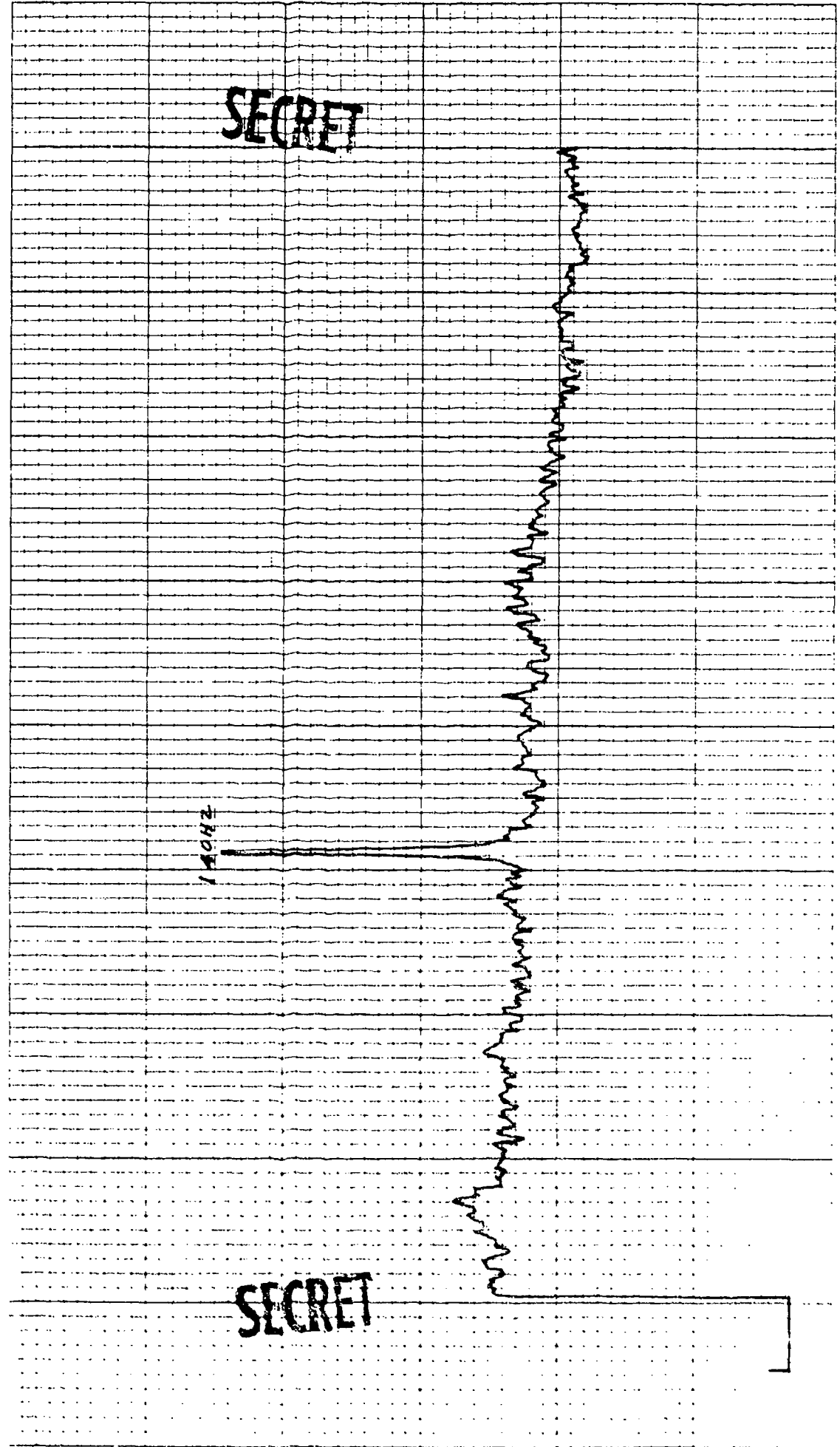
DATE OF ANALYSIS: - - - -
 1-26-89 09-53

INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

REEL: F23 INDE X 3000

ATTEN: -90 DB

ANALYSIS BANDWIDTH: 1/10HZ
 + 18 DEG. AZ STEERING



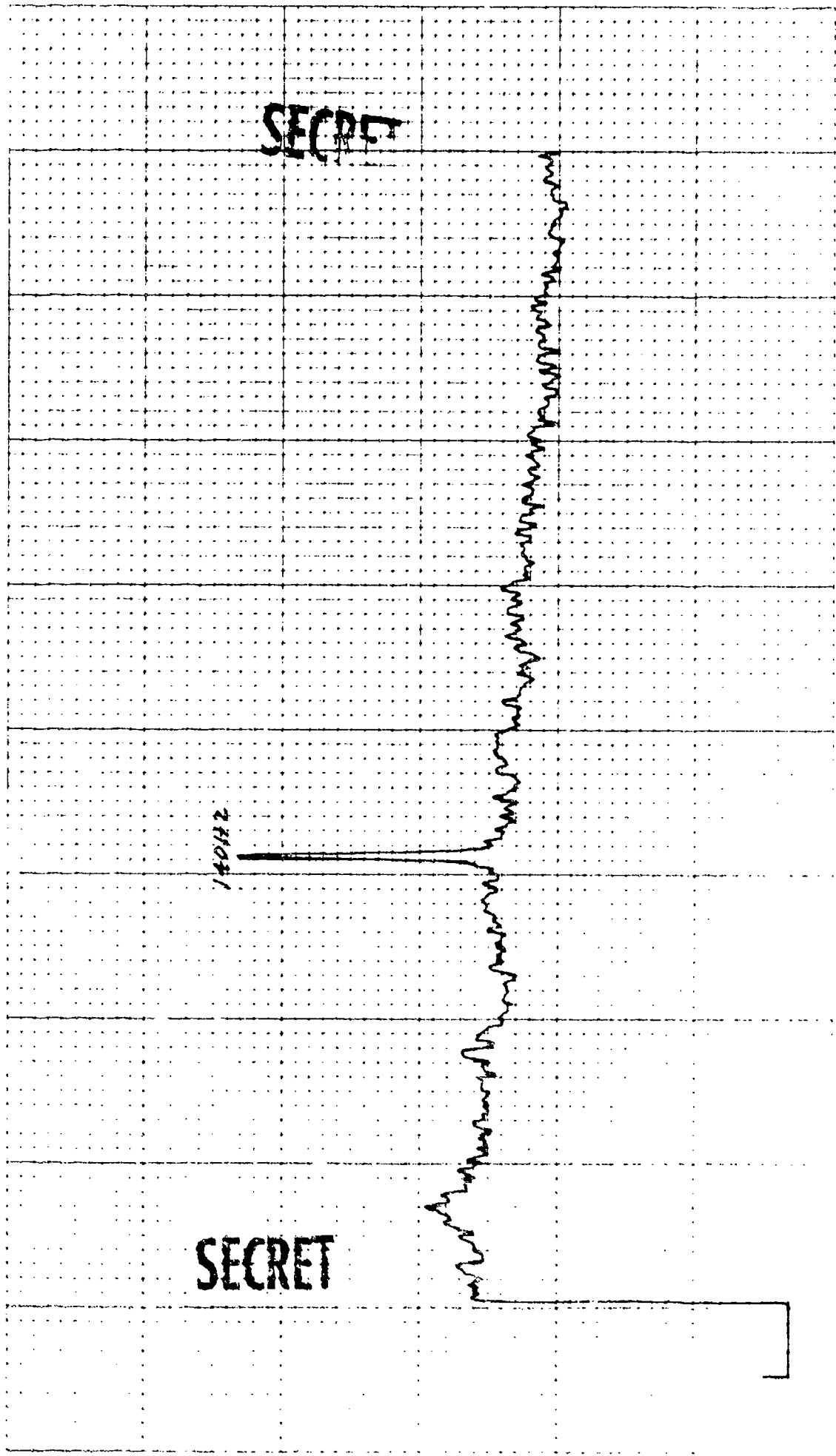
SECRET

SECRET

CONTROL: 2033-51 (DPG)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
51 ELEMENTS

DATE OF ANALYSIS: 1-26-77
 DATE/TIME: 2-7-77 - 2033 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
+20 DEG. AZ STEERING

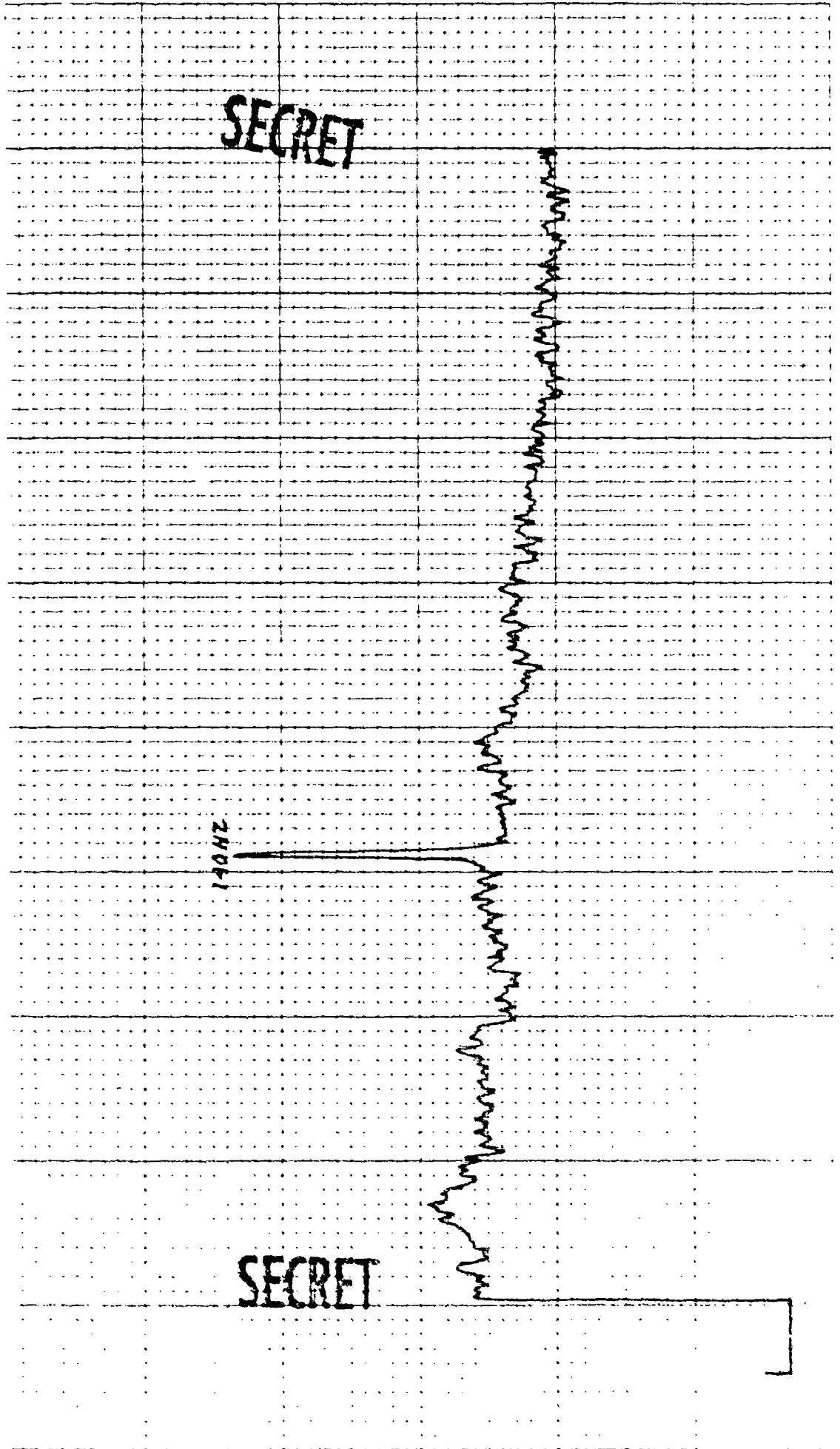
REEL: F23 INDE X 3000
 INTEGRATION TIME 320 SECS ATTN: -30 DB
 FILTFR WTC: HANNING



46 0703

1000 0000 0000 0000 0000 0000

CONTROL: 2033 - 51 (DPG) DATE OF ANALYSIS: REEL: F23 INDE X3000
 BEAMFORMED SPECTRUM(ELEMENTS) 1-26 8 28 -53)
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033Z INTEGRATION TIME 320 SECS ATTEN: -30 DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
5/ ELEMENTS T22 DEG. AZ STEERING

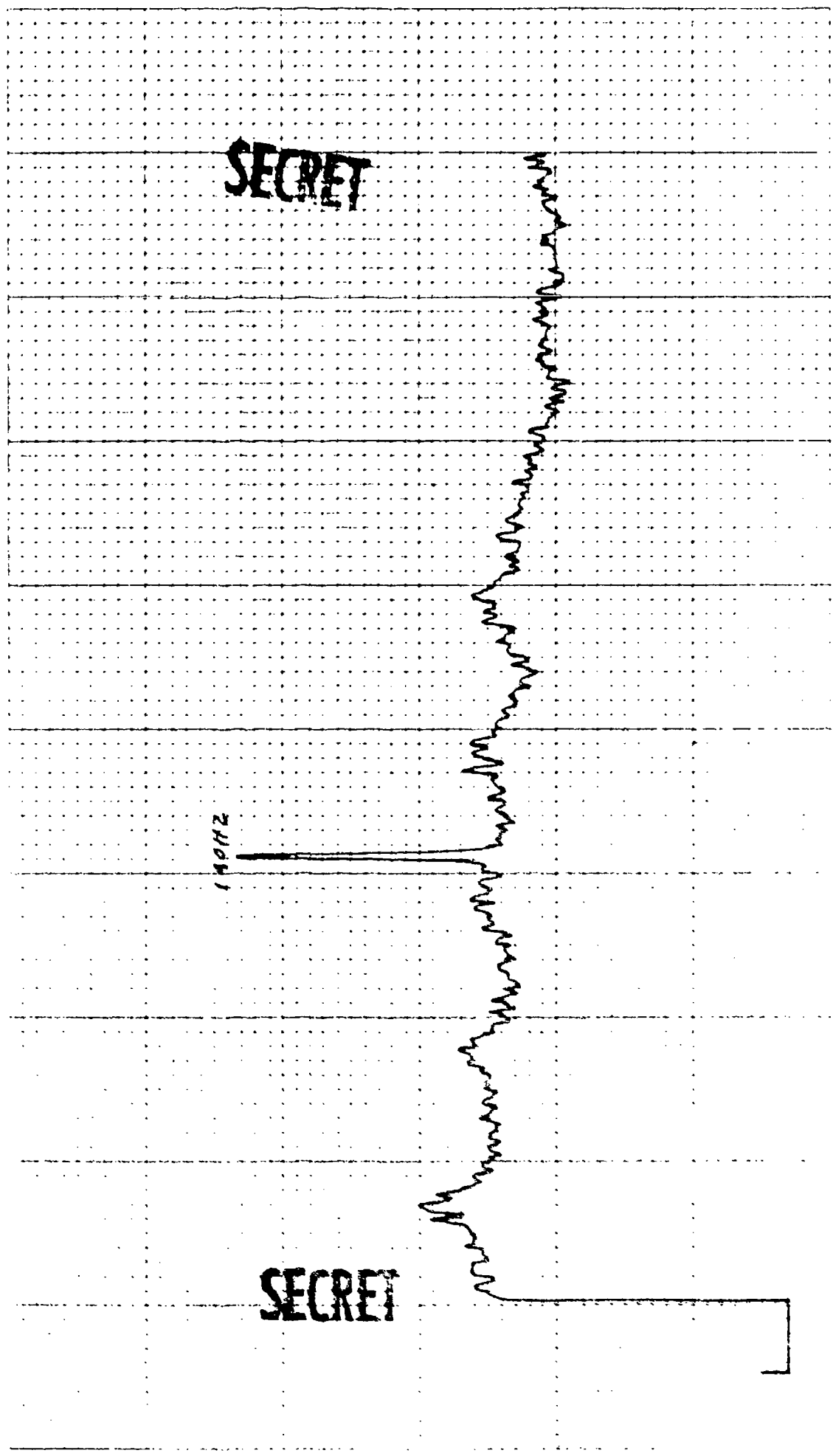


46 0703

CONTROL: 2033-51 (D06)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
51. ELEMENTS

DATE OF ANALYSIS: - - -
1-26-89-53)
DATE/TIME: 2-7-77-2033Z
ANALYSIS BANDWIDTH: 17/10HZ
+ 24 DEG. AZ STEERING

REEL: F23 INDE X3000
INTEGRATION TIME 320 SECS
ATTEN: 30 DB
FILTER WTG: HANNING

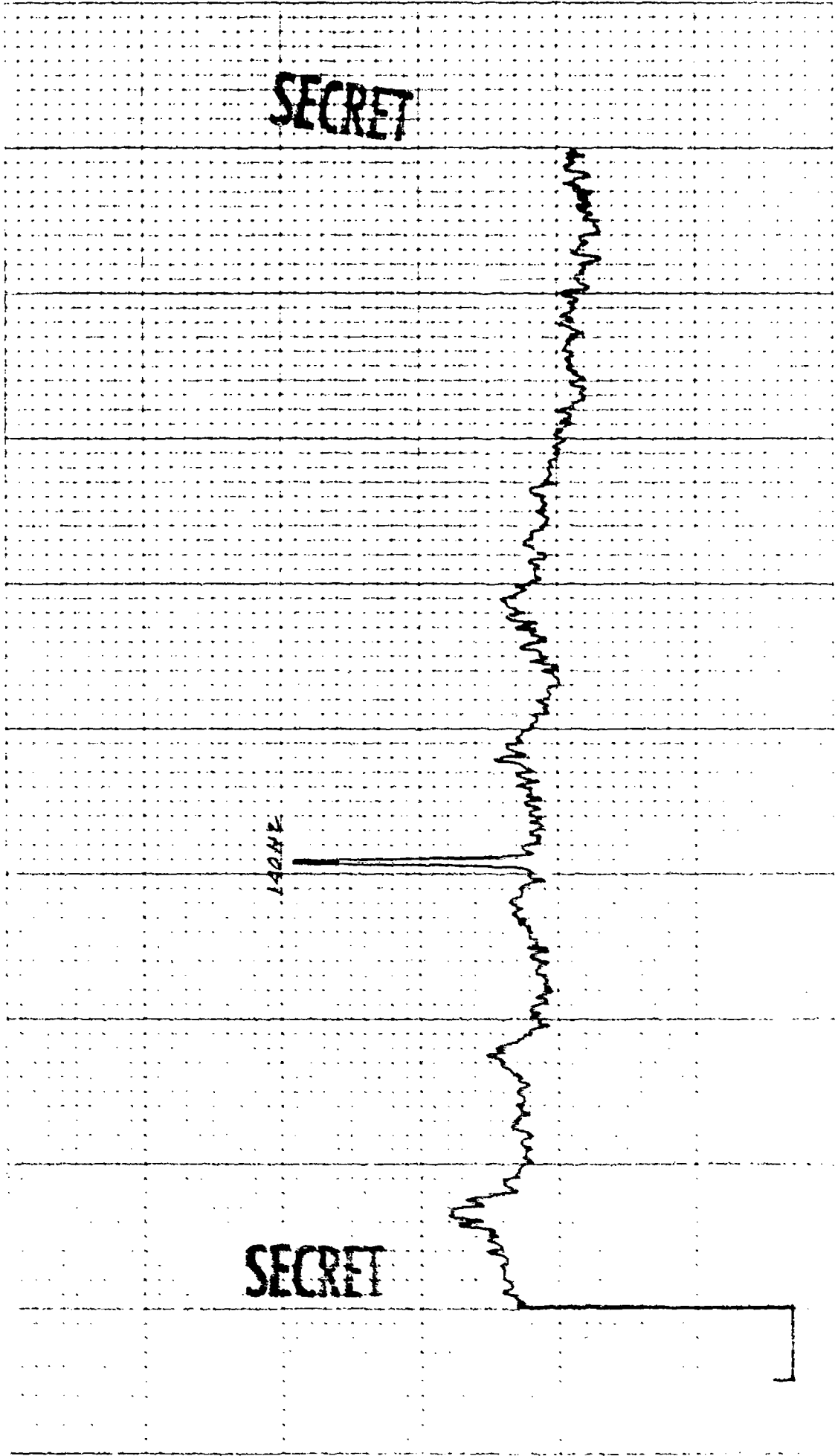


46 0703

CONTROL: 2033 - 51 (DPG)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
51 ELEMENTS

DATE OF ANALYSIS: 1-26-89-53
DATE/TIME: 2-7-77 - 2033Z
ANALYSIS BANDWIDTH: 1/10HZ
26 DEG. AZ STEERING

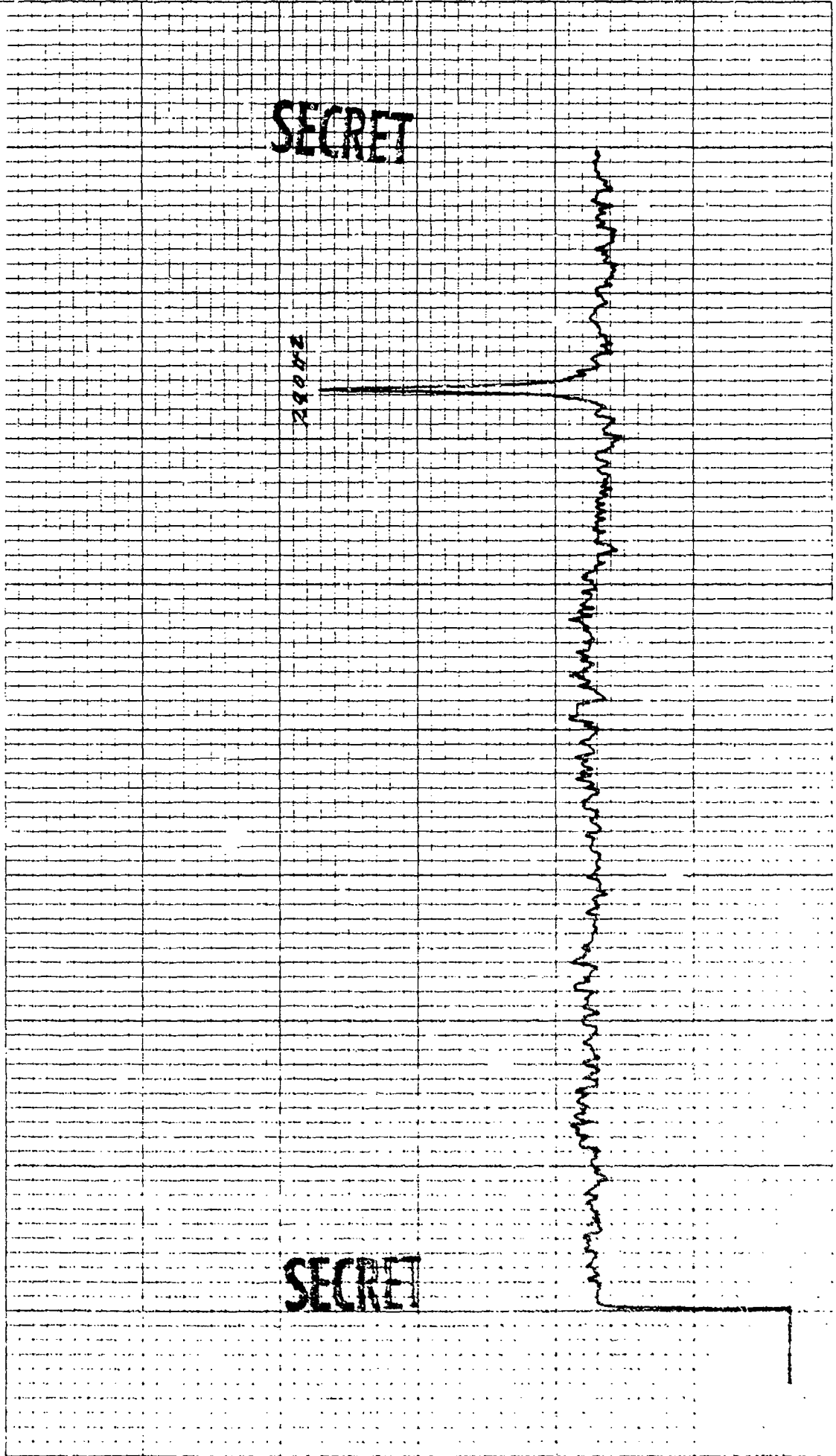
REEL: F23 INDE X 3000
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING



CONTROL: 2033-51 (DP6) DATE OF ANALYSIS: -- -- --
BEAMFORMED SPECTRUM (ELEMENTS) /-268 28-53)
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033Z
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ
51 ELEMENTS +8 DEG. AZ STEERING

REEL: F23 INDE X 7000

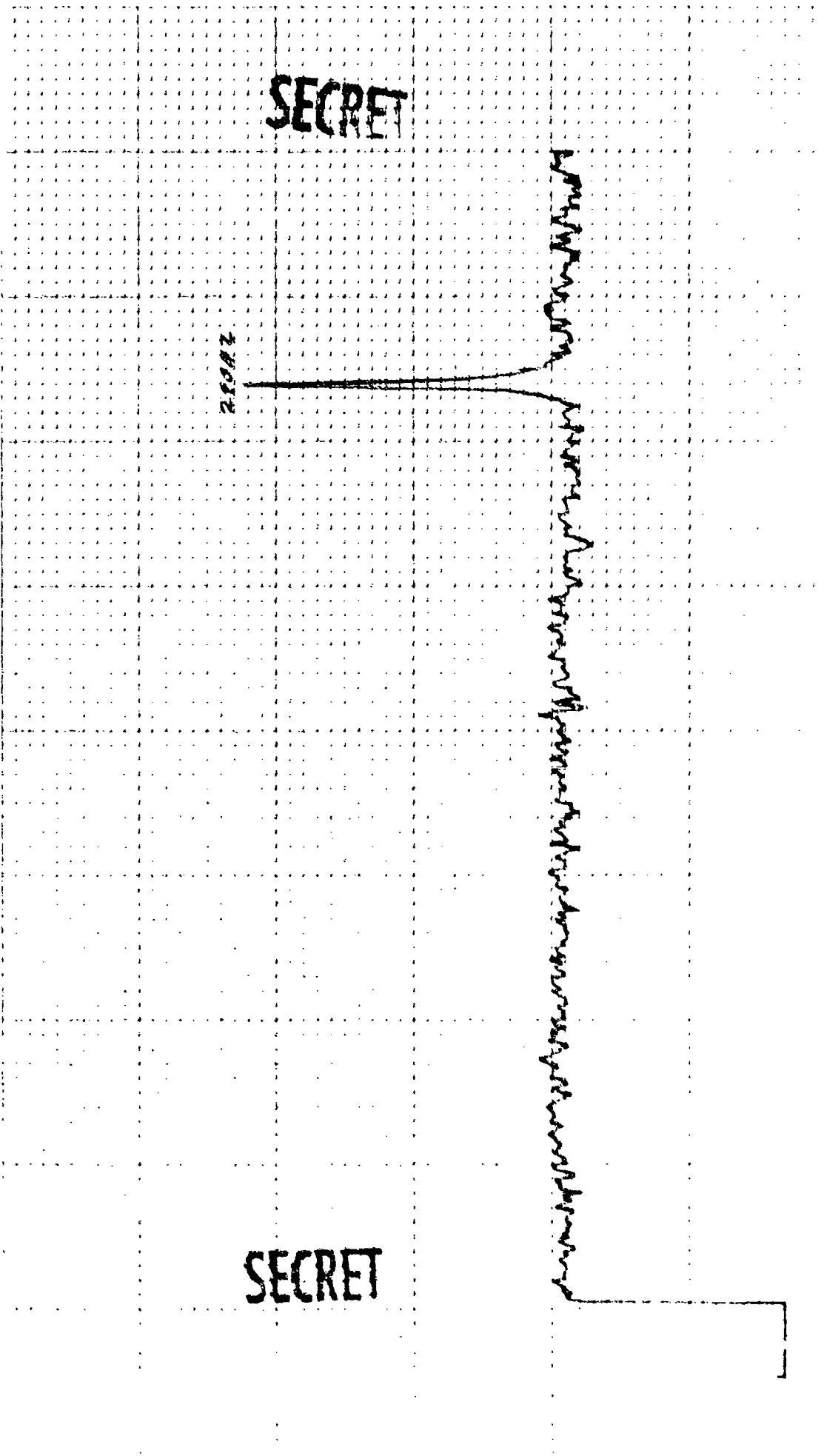
INTEGRATION TIME 320 SECS ATTN: -30 DB
FILTER W/G: HANNING



46 0703

CONTROL: 2037 - 51 (086) DATE OF ANALYSIS: - - -
 BEAMFORMED SPECTRUM/ELEMENTS 1-26-89-53
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033Z
 CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1/10HZ
 51 ELEMENTS F: 0 DEG. AZ STEERING

REEL: F33 INDE X3000
 INTEGRATION TIME 320 SECS ATTEN: -30 DB
 FILTER: WTC: HANNING



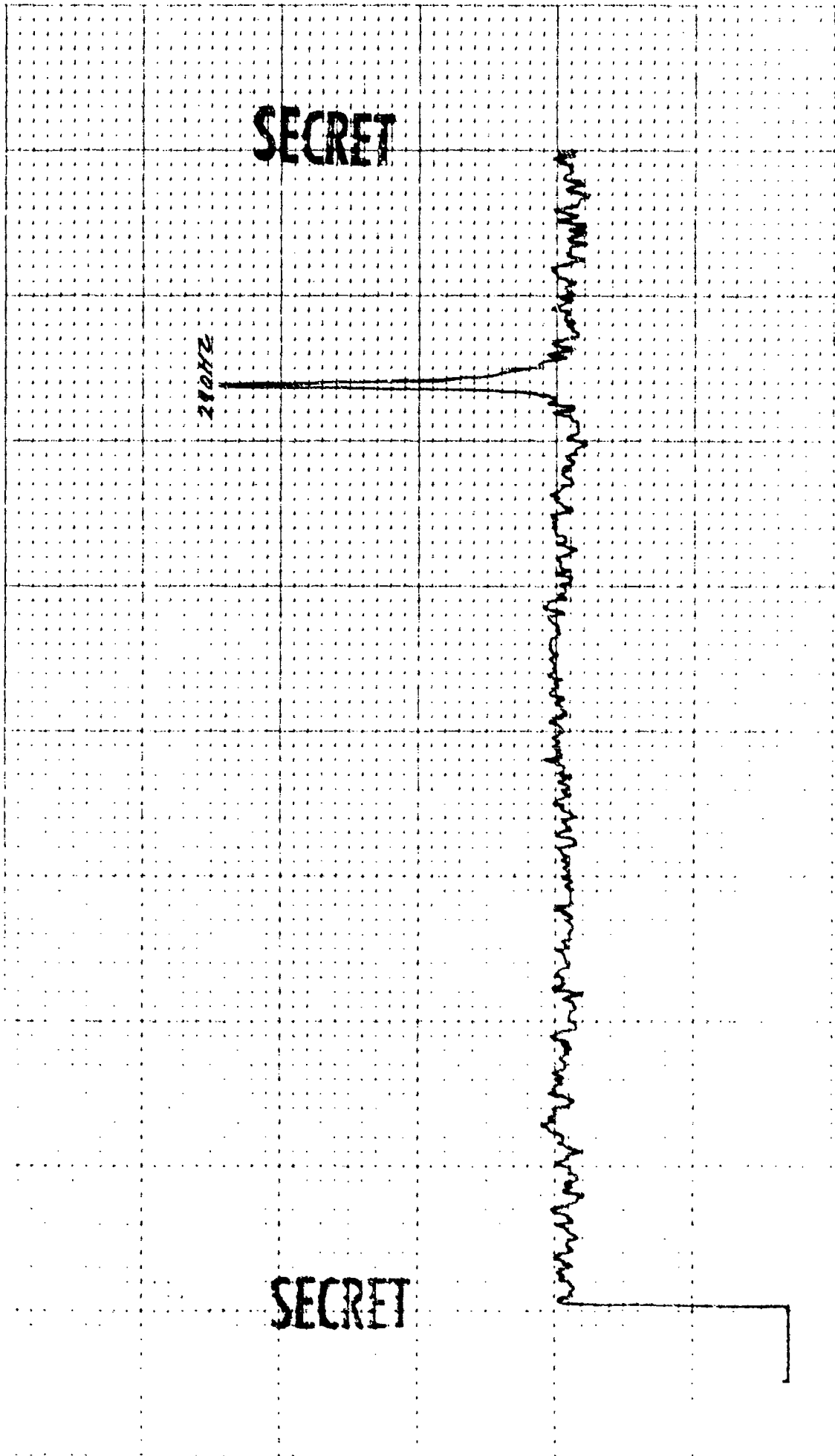
SECRET

SECRET

46 0703

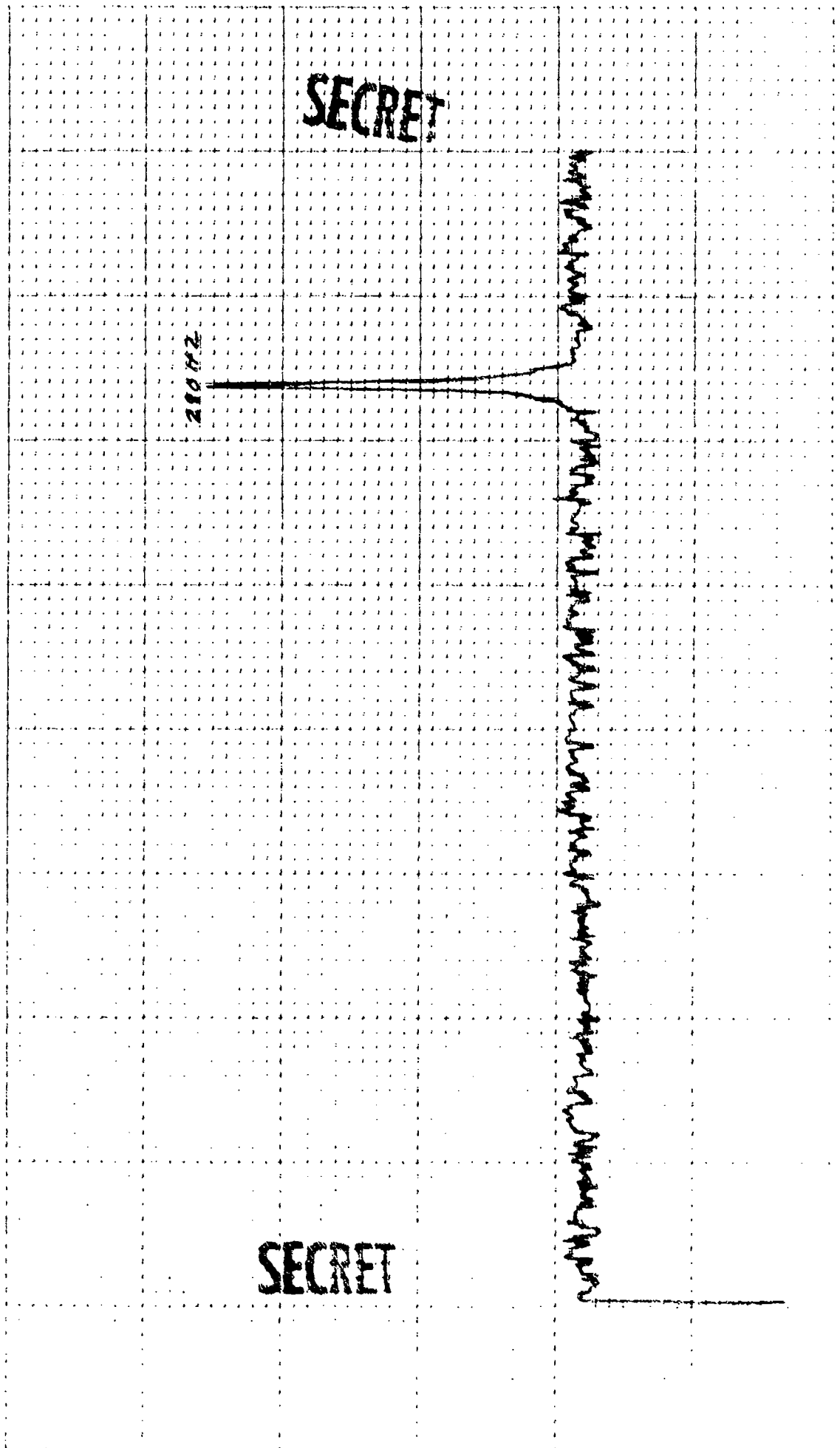
CONTROL: 2033 - 51 (DPG) DATE OF ANALYSIS: -- -- --
BEAMFORMED SPECTRUM (ELEMENTS) 1-268 00-53
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033 Z
CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1710HZ
51 ELEMENTS F12 DEG. AZ STEERING

REEL: F23 INDE X3000
INTEGRATION TIME 320 SECS ATTEN: -30 DB
FILTER WTG: HANNING



46 0703

CONTROL: 2033 - 51 (DPC)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
 51 ELEMENTS
 DATE OF ANALYSIS: 1-26-88-53
 DATE/TIME: 2-7-77-2033 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 1/4 DEG. AZ STEERING
 REEL: F-3
 INTEGRATION TIME 320 SECS
 FILTER WTC: HANNING
 INDE X1000
 ATTN: 30 DB



SECRET

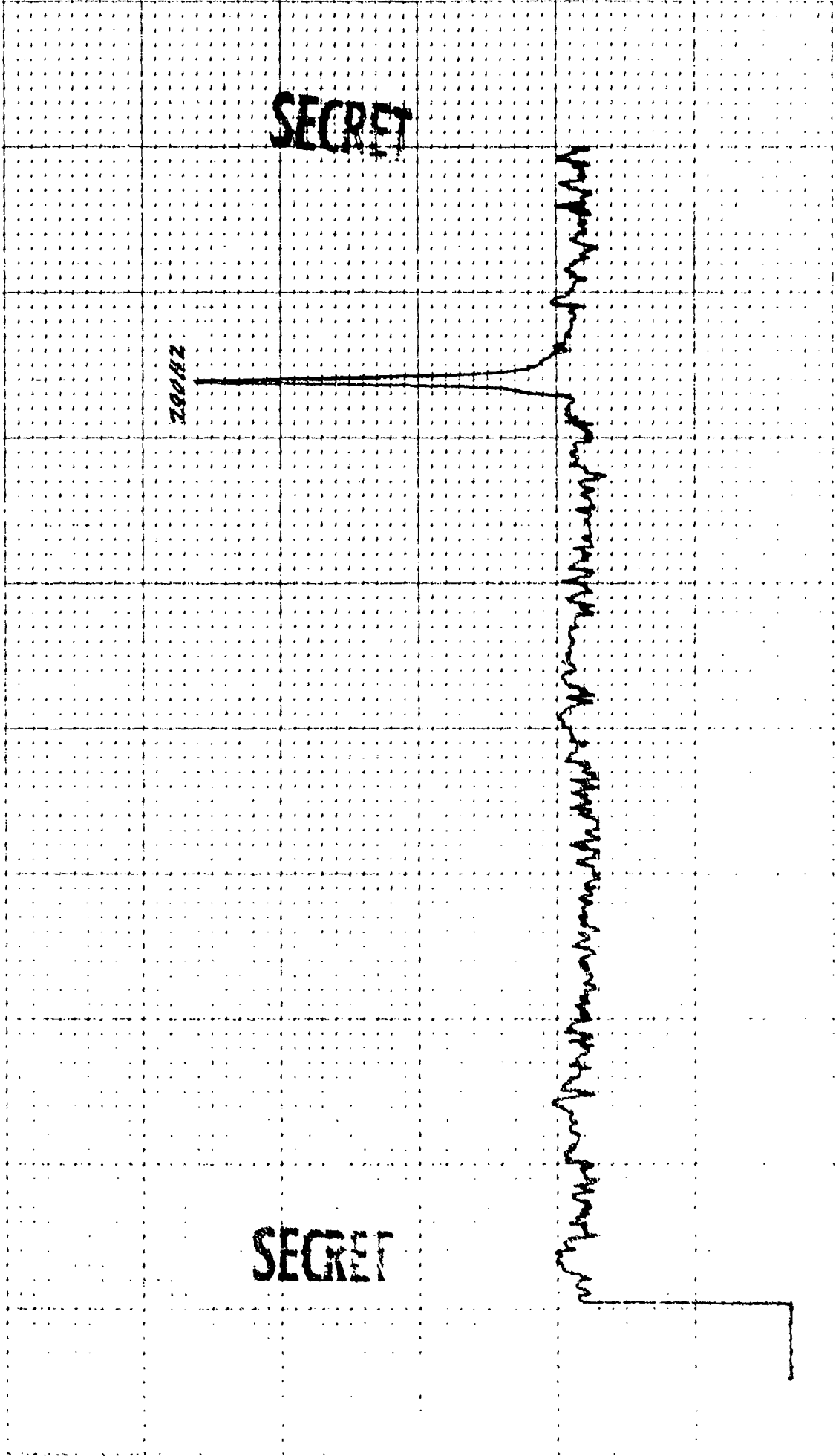
SECRET

This plot shows a single sharp peak at 280 HZ. The peak is labeled '280 HZ' at its apex. The plot is enclosed in a rectangular frame with a grid background.

46 0703

CONTROL: 2033-51 (006) DATE OF ANALYSIS: - - -
BEAMFORMED SPECTRUM(ELEMENTS) 1-26804-53
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
51 ELEMENTS
+ 16 DEG. AZ STEERING

REEL: F33 INDE X3000
INTEGRATION TIME 320 SECS ATTN: -30 DB
FILTER WTC: HANNING



SECRET

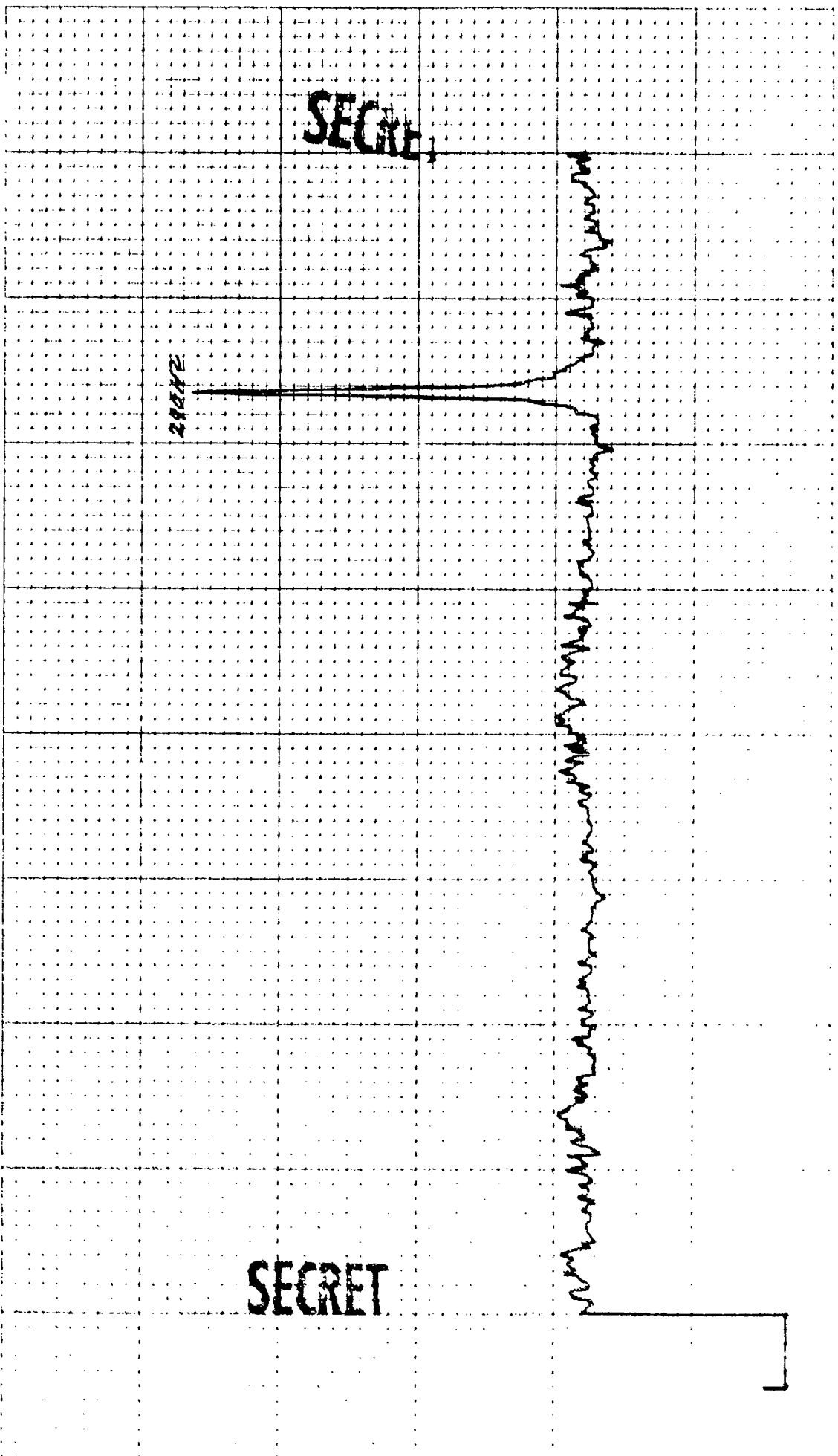
SECRET

200HZ

46 0703

REF: 2-7-77 09-53

CONTROL: 2033-51 (DP6) DATE OF ANALYSIS: REEL: F23 INDE X3000
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-7-77 - 2033Z INTEGRATION TIME 320 SECS ATTEN: -30 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER: WTG: HANNING
 CENTER FREQ: 280 HZ +17 DEG. AZ STEERING



46 0703

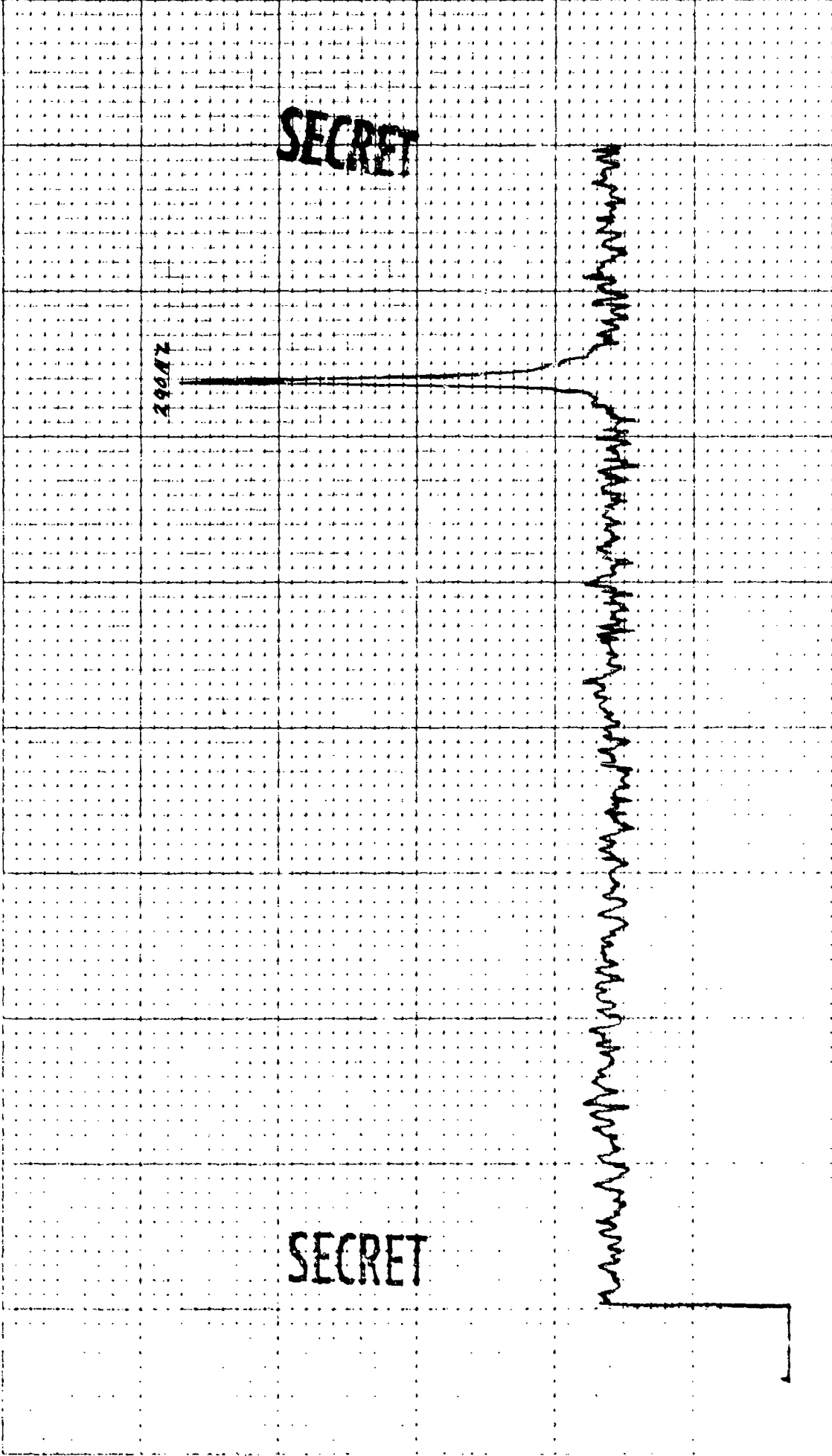
REF ID: A66010 TO THE DIRECTOR, NSA

CONTROL: 2033 - 51 (DP6)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 220 HZ
 61 ELEMENTS

DATE OF ANALYSIS: 1-26-82 29-53
 DATE/TIME: 2-7-77 - 2033 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 +/- DEC. AZ STEERING

REEL: F23
 INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

INDE X3000



SECRET

SECRET

46 0703

FOR THE RECORD

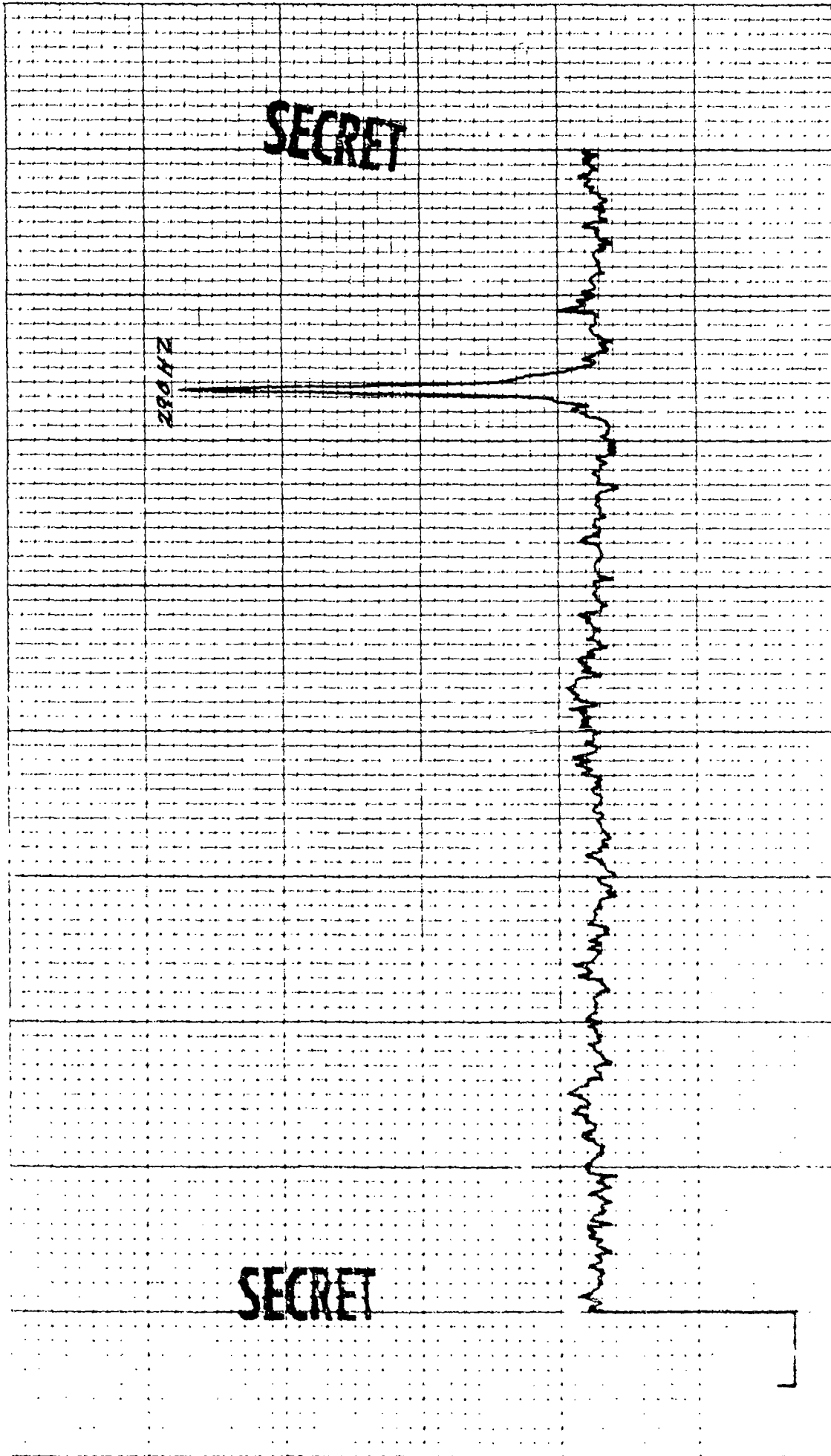
CONTROL: 2033 - 51 (DPG) REEL: F23 INDE X300C

BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: 1-26-82 29-53

EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033Z INTEGRATION TIME 320 SECS ATTEN: -30 DB

CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING

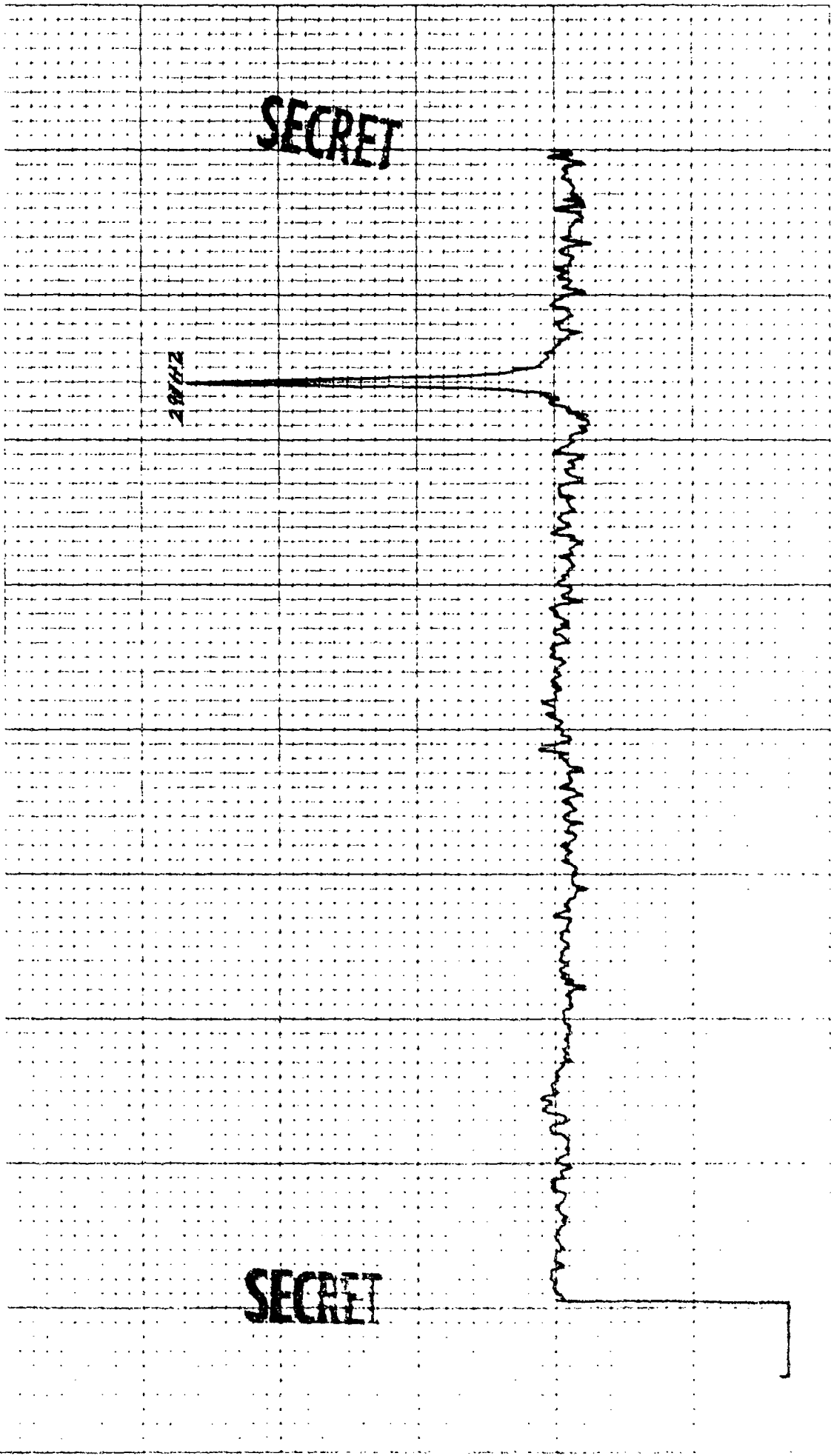
51 ELEMENTS + 19 DEG. AZ STEERING



46 0703

REF: 165000 TO THE DIRECTOR, NSA, WASH, DC

CONTROL: 2033 - 51 (001) DATE OF ANALYSIS: 1-26-82 REEL: F23 INDE: X3000
 BEAMPORMED SPECTRUM(ELEMENTS))
 EXERCISE: BEARING STAKE DATE/TIME: 27-77 -2033 Z INTEGRATION TIME 320 SECS ATTN: -30 DB
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
51 ELEMENTS + 20 DEG. AZ STEERING



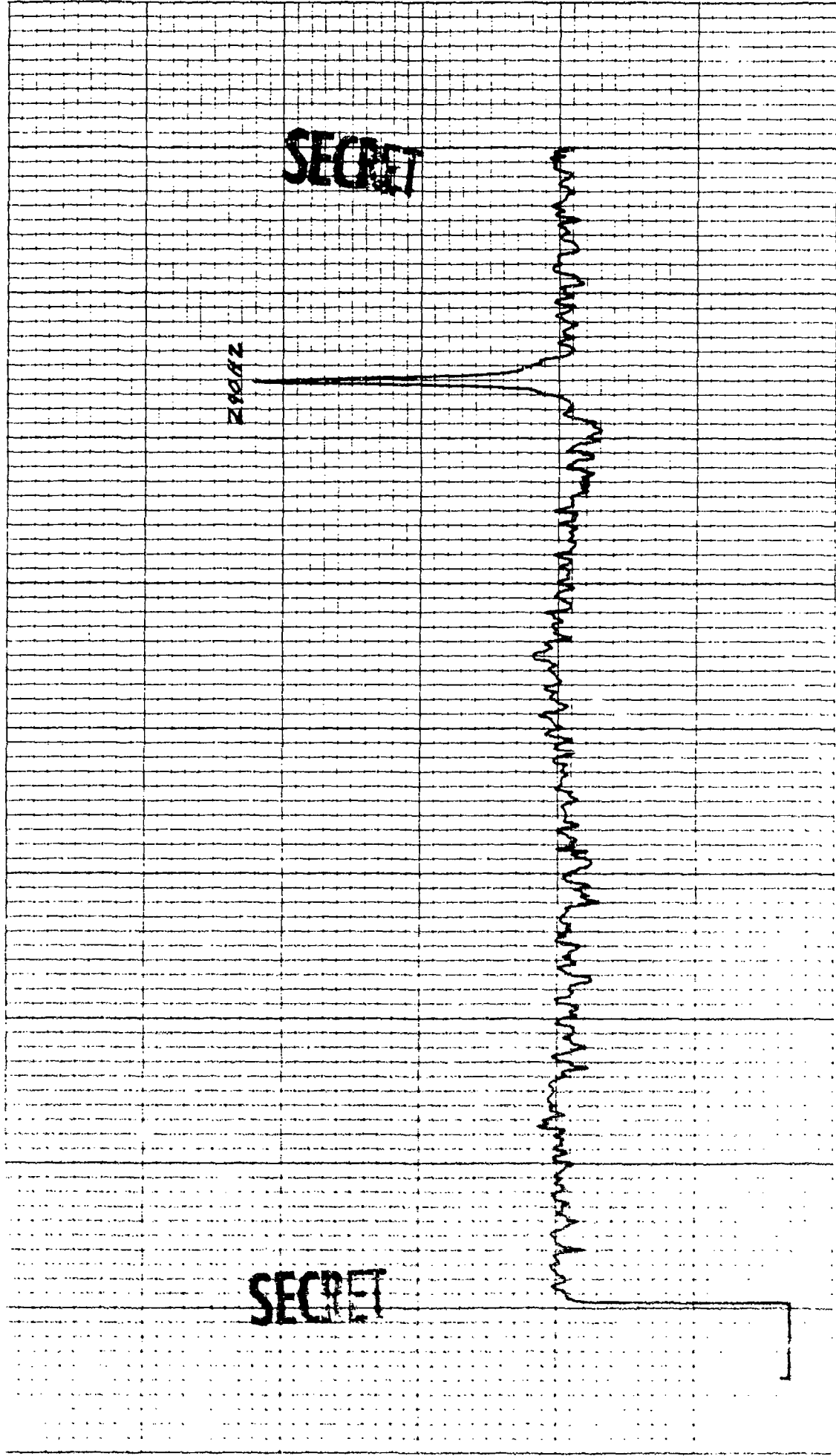
10 X 10 TO THE INFR. & TO THE VIB.
REUFFEL & LESSEA CO. MADE IN U.S.A.

46 0703

CONTROL: 2033 - 51 (206)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 250 HZ
51 ELEMENTS

DATE OF ANALYSIS: 1-26-53
DATE/TIME: 2-7-77 - 2033Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 22 DEG. AZ STEERING

REEL: F-3
INDE X 3000
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTFR WTG: HANNING



SECRET

SECRET

46 0703

160E 2000 2000 2000 2000 2000

CONTROL: 2033 - 51 (DPL)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
 5/ ELEMENTS

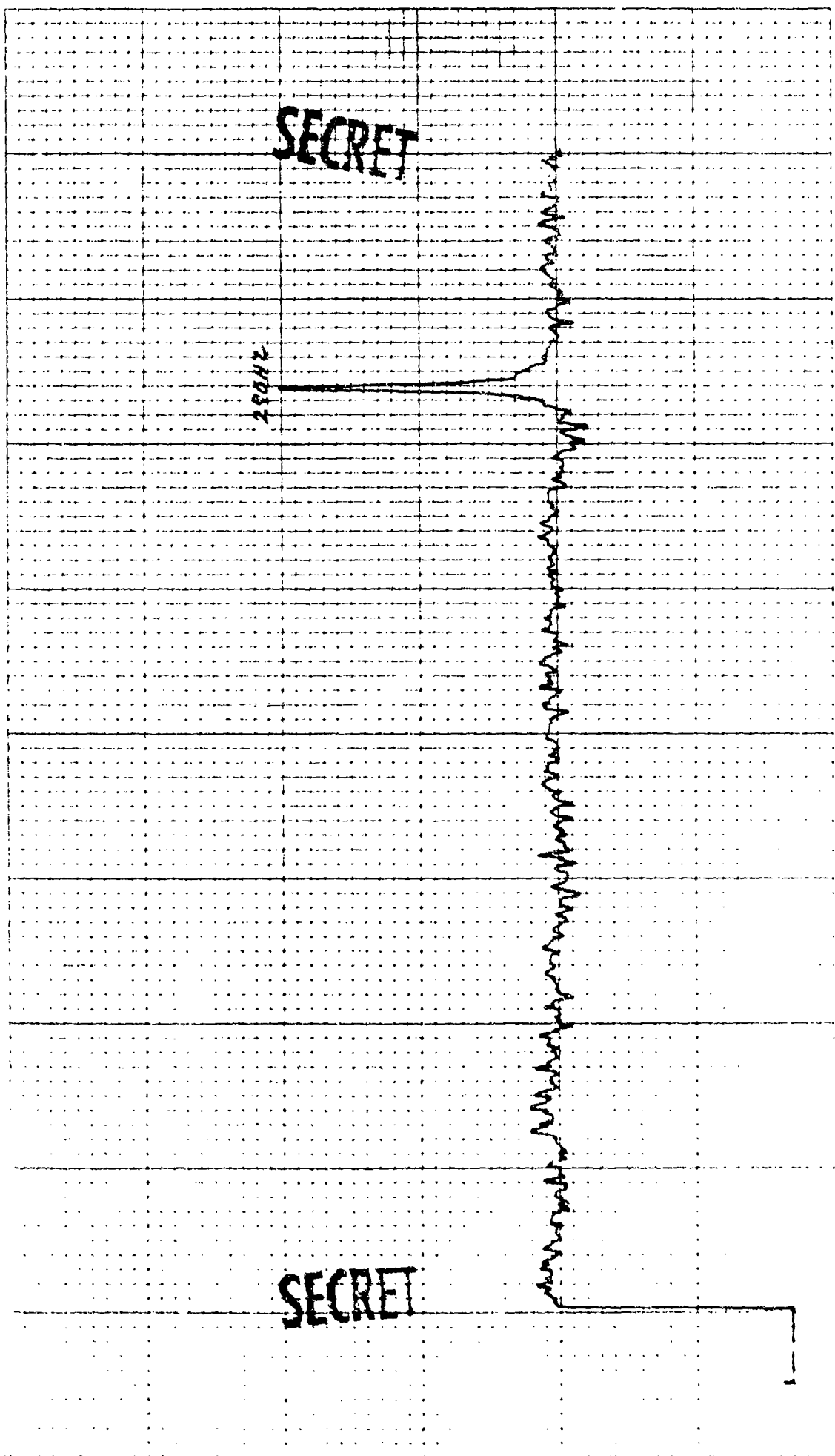
DATE OF ANALYSIS: - - - - -
 1-26-89-53

INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

ATTEN: -20 DB

REEL: F03 INDE X 3000

ANALYSIS BANDWIDTH: 1/10 HZ
 24 DEG. AZ STEERING

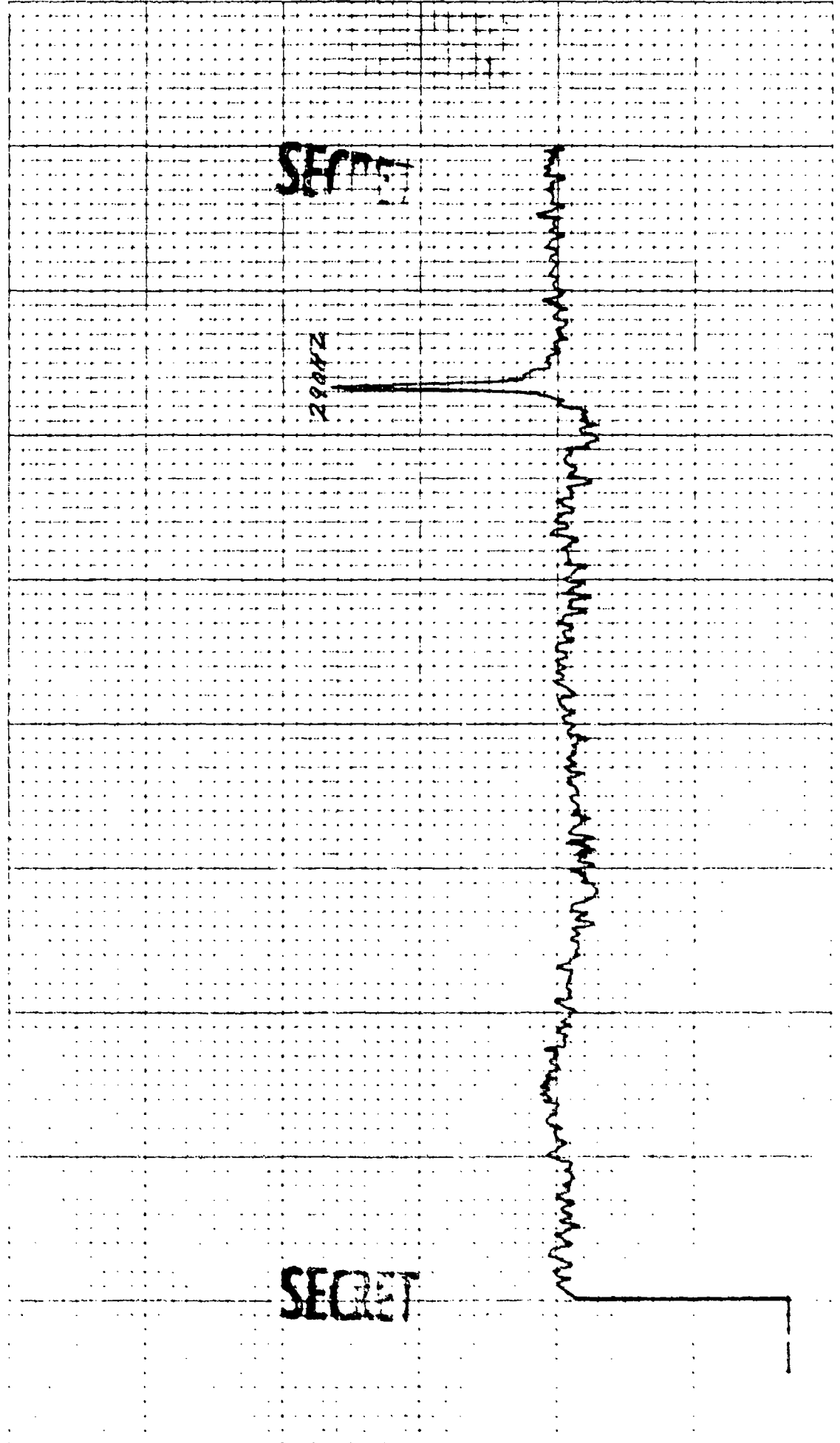


46 0703

CONTROL: 2033 - 51 (D86)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
51 ELEMENTS

DATE OF ANALYSIS: - - -
1 - 26 8 89 - 53)
DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+ 26 DEG. AZ STEERING

REEL: F23 INDE X3000
INTEGRATION TIME 320 SECS ATTN: 30 DB
FILTER WTG: HANNING





DEPARTMENT OF THE NAVY

OFFICE OF NAVAL RESEARCH
875 NORTH RANDOLPH STREET
SUITE 1425
ARLINGTON VA 22203-1995

IN REPLY REFER TO:

5510/1
Ser 321OA/011/06
31 Jan 06

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.

A handwritten signature in black ink, appearing to read "B. Link", is positioned above the typed name.

BRIAN LINK
By direction

Subj: DECLASSIFICATION OF LONG RANGE ACOUSTIC PROPAGATION PROJECT
(LRAPP) DOCUMENTS

DISTRIBUTION LIST:

NAVOCEANO (Code N121LC – Jaime Ratliff)
NRL Washington (Code 5596.3 – Mary Templeman)
PEO LMW Det San Diego (PMS 181)
DTIC-OCQ (Larry Downing)
ARL, U of Texas
Blue Sea Corporation (Dr. Roy Gaul)
ONR 32B (CAPT Paul Stewart)
ONR 321OA (Dr. Ellen Livingston)
APL, U of Washington
APL, Johns Hopkins University
ARL, Penn State University
MPL of Scripps Institution of Oceanography
WHOI
NAVSEA
NAVAIR
NUWC
SAIC

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 <i>file 220</i> ADB115967	U
Unavailable	Watrous, B. A.	PARKA I OCEANOGRAPHIC DATA COMPENDIUM	Naval Ocean R&D Activity	781101		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