

UNCLASSIFIED

AD NUMBER

ADC017578

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

ACCESSION FOR	
DTIC	White Section <input type="checkbox"/>
DDI	Dist Section <input checked="" type="checkbox"/>
UNANNOUNCED <input type="checkbox"/>	
JUSTIFICATION	
BY	
DISTRIBUTION AVAILABILITY CODES	
Dist.	AVAIL. and or SPECIAL
B	

SECRET

2

VOLUME IVA

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

LEVEL III

FINAL REPORT OF BEARING STAKE TESTS

JANUARY THRU MARCH 1976

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

9 JANUARY 1979

Distribution limited to U.S. Gov't. agencies & T&E;
Proprietary Info.; 1 Feb 79. Other
for this document must be referred to

NAVAL AIR DEVELOPMENT CENTER

WARMINSTER, PENNSYLVANIA 18974

UNDER CONTRACTS

N62269-77-C-0139

N62269-78-M-6884

NATIONAL SECURITY INFORMATION
UNAUTHORIZED DISCLOSURE SUBJECT TO CRIMINAL SANCTIONS

DDC
RECEIVED
MAY 16 1979
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 #
1-10-574-1

**Best
Available
Copy**

UNCLASSIFIED

VOLUME

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

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 7 2-8-77 0202Z (Single Element Data)
Noise Spectral Density Calculations
Omni Signals vs. Element Position Number Plots
Omni ALIU Plots

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

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

- 5.0 Data Point 7 2-8-77 0202Z (52 Element Beamformed Data)
Signal Level and SNR Calculations
Signal Gain and Array Gain Calculations
Beamformed ALIU Plots

- 6.0 Data Point 8 3-15-77 1501Z (Single Element Data)
Noise Spectral Density Calculations
Omni Signal Levels vs. Element Position Number Plots
Omni ALIU Plots

- 7.0 Data Point 8 3-15-77 1501Z (16 Element Beamformed Data)
FRAZ Recording
Signal Level and SNR Calculations
Signal Gain and Array Gain Calculations
Beamformed ALIU Plots

UNCLASSIFIED

UNCLASSIFIED

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

- 9.0 Data Point 8 3-15-77 1501Z (50 Element Beamformed Data)
 - Signal Level and SNR Calculations
 - Signal Gain and Array Gain Calculations
 - Beamformed ALIU Plots

- 10.0 Data Point 9 3-15-77 2131Z (Single Element Data)
 - Noise Spectral Density Calculations
 - Omni Signal Levels vs. Element Position Number Plots
 - Omni ALIU Plots

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

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

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

UNCLASSIFIED

NOTE ALI Plot Scales for Beamformed and

Omni Data are NOT the same.

SNR comparisons cannot be taken directly
from plot comparisons.

UNCLASSIFIED

UNCL

SECRET

SUMMARY OF DATA (CONTINUED)

• OMNI NOISE LEVELS

19 JANUARY 1977 DATA POINT 1

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

19 JANUARY 1977 DATA POINT 2

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

7 FEBRUARY 1977 DATA POINT 3

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

7 FEBRUARY 1977 DATA POINT 4

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

7 FEBRUARY 1977 DATA POINT 5

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

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

DATA POINT 12

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

SECRET

SECRET

OPERATIONAL DATA

DATE	RANGE	DEPTH	AVE. SIGNAL LEVEL (dB)	AVE. NOISE LEVEL (dB)	BANDWIDTH (MHz)	ARRAY CENTER ELEVATION (ft)	ARRAY CENTER ELEVATION (ft)	SNR	LINEAR SCALE CORRECTION	CORRECTED SNR
1	DATE: 1-15-77 TIME: 1531Z RANGE: 910M 290HZ DEPTH: 1650FM 296HZ		-487	-567	-1.8	+15	+8	7.0	-1.8	+2.2
2	DATE: 1-15-77 TIME: 1602Z RANGE: 910M 290HZ DEPTH: 1650FM 295HZ		-515	-566	-1.8	+15	+8	5.0	-5.2	-1.2
3	DATE: 2-27-77 TIME: 0930Z RANGE: 1750M 140HZ DEPTH: 1900FM 260HZ		-325	-467	-1.8	+10	+12	15.2	-4.2	9.0
4	DATE: 2-27-77 TIME: 0918Z RANGE: 1570M 140HZ DEPTH: 1900FM 260HZ		-344	-469	-1.8	+10	+12	12.5	-4.2	8.3
5	DATE: 2-27-77 TIME: 1549Z RANGE: 1100M 140HZ DEPTH: 1900FM 260HZ		-300	-435	-1.8	+10	+12	13.5	-4.2	9.3
6	DATE: 2-27-77 TIME: 2032Z RANGE: 700M 140HZ DEPTH: 1900FM 260HZ		-247	-432	-1.8	+10	+12	19.5	-4.6	15.5

SECRET

SECRET

O M N I

PG NO T A L	OPERATIONAL DATA	Avg SIGNAL LEVEL dBV	Avg ROUTE LEVEL dBV	BAUD WIDTH CONVE- TION	BAUD WIDTH CONVE- TION	AREA SENSI- TIVITY	AREA CONVE- SION	SNR	CAMERA PAGES CONVE- SION	CONCERT CD SNR
7	DATE: 2-15-77 TIME: 0102Z RANGE: 28 NM, 140 MZ DEPTH: 1800 FM, 280 MZ	-16.0 -17.5	-20.1 -21.0	-1.8 -1.8	+10 +10	+12 +8	+100 +100	34.1 36.5	-4.0 -4.0	70.1 72.5
8	DATE: 3-15-77 TIME: 1501Z RANGE: 32 NM, 160 MZ DEPTH: 2800 FM, 280 MZ	-19.4 -15.2	-22.9 -24.6	-1.8 -1.8	+10 +10	+12 +8	+100 +100	33.3 39.4	-4.0 -4.0	29.5 35.4
9	DATE: 3-15-77 TIME: 2131Z RANGE: 72 NM, 140 MZ DEPTH: 2000 FM, 280 MZ	-19.4 -12.5	-22.0 -21.0	-1.8 -1.8	+10 +10	+12 +8	+100 +100	36.6 38.5	-4.0 -4.0	72.6 74.5
10	DATE: 3-16-77 TIME: 0633Z RANGE: 199 NM, 140 MZ DEPTH: 2000 FM, 280 MZ	-23.3 -38.0	-24.0 -21.6	-1.8 -1.8	+10 +10	+12 +8	+100 +100	22.7 13.6	-4.0 -4.2	18.7 9.4
11	DATE: 3-16-77 TIME: 0935Z RANGE: 122 NM, 140 MZ DEPTH: 2800 FM, 280 MZ	-29.9 -41.5	-50.0 -54.0	-1.8 -1.8	+10 +10	+12 +8	+100 +100	24.2 12.5	-4.0 -4.2	16.2 8.3
12	DATE: 3-16-77 TIME: 1148Z RANGE: 132 NM, 140 MZ DEPTH: 2800 FM, 280 MZ	-24.8 -36.6	-48.2 -50.7	-1.8 -1.8	+10 +10	+12 +8	+100 +100	23.4 12.1	-4.0 -4.2	19.4 7.9

SECRET

SECRET

16 ELEMENT ARRAY

P S T Y	OPERATIONAL DATA	SIGNAL LEVEL DBY	BEAM CORREC-TION			I+E	J+K	A+E	B+C	ARRAY CORREC-TION	BRAND- WIDTH	BRAND- WITH	ARRAY CORREC-TION	H-P CORREC-TION	SMP ANGLE	CONCOMP- ED	STEER- ING	Q+L
			A	B	C													
7	DATE: 2-8-77 TIME: 0222Z RANGE: 26 NM 140 HB DEPTH: 190 FT 270 HB 245 HB	-22.8 -26.6 -22.4	+10 +10 +10	+21 +24 +24	+2 +8 +8	24 24 24	+1.2 -2.6 -38.4	24 24 24	24 24 24	+1.2 +24 +24	+1.2 +24 +24	-1.8 +10 +10	+12 +8 +8	+100 +100 +100	+36 +4.0 9.4	39.8 42.0 5.1	-24.5 -31.5 -31.5	47.8 71.0 10.3
8	DATE: 2-8-77 TIME: 1901Z RANGE: 22 NM 140 HB DEPTH: 200 FT 240 HB 245 HB	-22.1 -27.8 -28.6	+10 +10 +10	+11 +11 +10	+2 +8 +8	28 28 28	+5.7 +6.2 -36.8	28 28 28	28 28 28	+17 +18 +18	+1.2 +1.8 +1.8	+10 +10 +10	+12 +8 +8	+100 +100 +100	38.5 41.8 8.8	35.7 48.6 5.0	+30 +30 +30	34.7 52.6 9.6
9	DATE: 2-8-77 TIME: 2131Z RANGE: 22 NM 140 HB DEPTH: 200 FT 240 HB 245 HB	-22.5 -27.3 -27.9	+10 +10 +10	+12 +12 +12	+1 +6 +7	22 22 22	-1.5 +1.7 -21.4	22 22 22	22 22 22	+12 +12 +12	+1.1 +1.6 +1.7	+10 +10 +10	+12 +8 +8	+100 +100 +100	36.2 41.9 12.9	32.3 48.5 .7	+51.5 +51.5 +51.5	36.3 52.5 9.9
10	DATE: 3-6-77 TIME: 0533Z RANGE: 12 NM 140 HB DEPTH: 200 FT 240 HB	-16.0 -35.8	+18 +18	+12 +12	+1 +8	22 22	+6.2 -18.8	22 22	22 22	+12 +12	+1.2 +1.8	+10 +10	+12 +8	+100 +100	28.8 23.6	35.0 30.4	+71.0 +71.0	39.0 24.4
11	DATE: 3-6-77 TIME: 0935Z RANGE: 12 NM 140 HB DEPTH: 200 FT 240 HB	-20.6 -35.4	+18 +18	+18 +18	+2 +8	28 28	-1.8 -17.4	28 28	28 28	+18 +18	+1.2 +1.8	+10 +10	+12 +8	+100 +100	27.4 18.8	33.6 15.5	+65.0 +65.0	37.6 19.6
12	DATE: 3-10-77 TIME: 1149Z RANGE: 12 NM 140 HB DEPTH: 200 FT 240 HB	-22.8 -39.9	+18 +18	+18 +18	+2 +8	28 28	+5.2 -11.4	28 28	28 28	+18 +18	+1.2 +1.8	+10 +10	+12 +8	+100 +100	32.3 17.9	38.5 14.5	+64.0 +64.0	32.5 18.7

SECRET

SECRET

32

ELEMENT

ARRAY

OP NO	OPERATIONAL DATA	SIGNAL		RECORD		RECORD		RECORD		RECORD		RECORD		RECORD		RECORD		RECORD		RECORD		RECORD	
		LEVEL	DB	CAL	TIME	ATM	TIME	ATM	TIME	ATM	TIME	ATM	TIME	ATM	TIME	ATM	TIME	ATM	TIME	ATM	TIME	ATM	TIME
1	DATE: 1-15-77 TIME: 1513Z RANGE: 1100M No 02 DEPTH: 1500FM 280 M	-57.2	010	+18	+8	-24.2	+22	+18	+8	-1.8	+15	+8	+100	17.7	-91	14.1	-58	18.5					
2	DATE: 1-15-77 TIME: 1600Z RANGE: 1100M No 02 DEPTH: 1500FM 280 M	-55.8	010	+18	+8	-24.2	+22	+18	+8	-1.8	+15	+8	+100	17.7	-91	14.1	-58	18.5					
3	DATE: 2-2-77 TIME: 0113Z RANGE: 1100M No 02 DEPTH: 1500FM 280 M	-36.6	010	+24	+2	-31	+31	+31	+2	-1.8	+10	+12	+100	20.3	-4.0	20.7	25.5	24.7					
4	DATE: 2-2-77 TIME: 1019Z RANGE: 1100M No 02 DEPTH: 1500FM 280 M	-38.2	010	+24	+2	-31	+31	+31	+2	-1.8	+10	+12	+100	19.6	-4.0	19.8	25.5	18.1					
5	DATE: 2-2-77 TIME: 1549Z RANGE: 1100M No 02 DEPTH: 1500FM 280 M	-31.3	010	+24	+2	-31	+31	+31	+2	-1.8	+10	+12	+100	20.3	-4.0	20.7	25.5	24.7					
6	DATE: 2-2-77 TIME: 2013Z RANGE: 1100M No 02 DEPTH: 1500FM 280 M	-29.8	010	+24	+2	-31	+31	+31	+2	-1.8	+10	+12	+100	20.3	-4.0	20.7	25.5	24.7					

SECRET

SECRET

32

ELEMENT

ARRAY

OPERATIONAL DATA	SIGNAL LEVEL DBV	MEASURED SIGNAL DBV	MEASURED SNR	SIGNAL TO NOISE RATIO	SIGNAL TO INTERFERENCE RATIO	COINTEGRATION	COINTEGRATION	COINTEGRATION	COINTEGRATION	COINTEGRATION	COINTEGRATION	COINTEGRATION	COINTEGRATION	COINTEGRATION	COINTEGRATION	COINTEGRATION	COINTEGRATION	COINTEGRATION	COINTEGRATION		
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
	SIGNAL LEVEL DBV	MEASURED SIGNAL DBV	MEASURED SNR	SIGNAL TO NOISE RATIO	SIGNAL TO INTERFERENCE RATIO	COINTEGRATION	COINTEGRATION	COINTEGRATION	COINTEGRATION	COINTEGRATION	COINTEGRATION	COINTEGRATION	COINTEGRATION	COINTEGRATION	COINTEGRATION	COINTEGRATION	COINTEGRATION	COINTEGRATION	COINTEGRATION	COINTEGRATION	COINTEGRATION
7 DATE: 2-27-77 TIME: 0201Z RANGE: 2200 M, 100 MZ DEPTH: 1000 FT, 20 MZ	-25.1	40	0.3	4.0	41.5	40	0.3	4.0	-27.2	40	0.3	4.0	-1.5	10	0.3	4.0	42.1	4.0	39.4	-20.5	43.4
8 DATE: 2-15-77 TIME: 1901Z RANGE: 2200 M, 100 MZ DEPTH: 200 FT, 20 MZ	-27.2	40	0.3	4.0	41.5	40	0.3	4.0	-25.1	40	0.3	4.0	-1.5	10	0.3	4.0	42.1	4.0	39.4	-20.5	43.4
9 DATE: 2-15-77 TIME: 2012Z RANGE: 2200 M, 100 MZ DEPTH: 200 FT, 20 MZ	-28.7	40	0.3	4.0	41.5	40	0.3	4.0	-25.1	40	0.3	4.0	-1.5	10	0.3	4.0	42.1	4.0	39.4	-20.5	43.4
10 DATE: 2-15-77 TIME: 0132Z RANGE: 2200 M, 100 MZ DEPTH: 200 FT, 20 MZ	-28.7	40	0.3	4.0	41.5	40	0.3	4.0	-25.1	40	0.3	4.0	-1.5	10	0.3	4.0	42.1	4.0	39.4	-20.5	43.4
11 DATE: 2-15-77 TIME: 0332Z RANGE: 2200 M, 100 MZ DEPTH: 200 FT, 20 MZ	-28.7	40	0.3	4.0	41.5	40	0.3	4.0	-25.1	40	0.3	4.0	-1.5	10	0.3	4.0	42.1	4.0	39.4	-20.5	43.4
12 DATE: 2-15-77 TIME: 0332Z RANGE: 2200 M, 100 MZ DEPTH: 200 FT, 20 MZ	-28.7	40	0.3	4.0	41.5	40	0.3	4.0	-25.1	40	0.3	4.0	-1.5	10	0.3	4.0	42.1	4.0	39.4	-20.5	43.4

SECRET

SECRET

MAX. ELEMENT ARRAY

OPERATIONAL DATA	SIGNAL LEVEL DBV	MCF32 CAL TYPE	BEAM FORM ATTN	B-C	A+E	JHK	ITG	MISE LEVEL DBV	MCF32 CAL TYPE	SUB-SCAN-PTN	SUB-SCAN-TIME	SUB-SCAN-ANGLE	SUB-SCAN-PAIR	SRP H.F.	MPs	REAR SCEN-TIME	SRP H.F.	CONVERT-SPEC-ANGLE	QTL		
	A	B	C	D	E	F	H	I	J	K	L	H	N	Q	P	O	R	S	T	U	
DATE: 1-19-77 TIME: 1518																					
1 RANGE: 150M 250 MZ	-284	NA	0	0	0	0	-43.7	-97.7	NA	0	0	-1.8	-1.8	11.3	+100	0	15.3	-9.2	11.9	-51°	16.1
DEPTH: 1500M 250 MZ	-374	NA	0	0	0	0	-42.7	-97.7	NA	0	0	-1.8	-1.8	11.3	+100	0	15.3	-9.2	11.9	-51°	16.1
DATE: 1-19-77 TIME: 1602																					
2 RANGE: 150M 250 MZ	-51.0	NO	+24	+8	+44	+34	-31.4	-92.4	NO	+24	+8	-1.8	-1.8	11.4	+100	+8	14.4	-4.2	11.0	-58°	15.2
DEPTH: 1500M 250 MZ	-61.2	NO	+24	+8	+44	+34	-32.2	-92.4	NO	+24	+8	-1.8	-1.8	11.4	+100	+8	14.4	-4.2	11.0	-58°	15.2
DATE: 2-7-77 TIME: 0912																					
3 RANGE: 175M 140 MZ	-37.5	NO	+30	+2	+40	+40	-25.8	-65.8	NO	+30	+2	-1.8	-1.8	11.0	+100	+2	18.7	-4.0	14.5	33°	14.4
DEPTH: 1500M 250 MZ	-47.4	NO	+30	+8	+40	+40	-33.2	-72.2	NO	+30	+8	-1.8	-1.8	11.0	+100	+8	18.7	-4.0	14.5	33°	14.4
DATE: 2-7-77 TIME: 1012																					
4 RANGE: 150M 140 MZ	-41.4	NO	+30	+2	+40	+40	-23.6	-62.6	NO	+30	+2	-1.8	-1.8	11.0	+100	+2	18.2	-4.0	14.4	35°	14.4
DEPTH: 1500M 250 MZ	-51.9	NO	+30	+8	+40	+40	-31.4	-71.4	NO	+30	+8	-1.8	-1.8	11.0	+100	+8	18.2	-4.0	14.4	35°	14.4
DATE: 2-7-77 TIME: 1512																					
5 RANGE: 150M 140 MZ	-30.2	NO	+30	+2	+40	+40	-24.2	-64.2	NO	+30	+2	-1.8	-1.8	11.0	+100	+2	18.0	-4.0	14.2	41°	14.2
DEPTH: 1500M 250 MZ	-42.8	NO	+30	+8	+40	+40	-31.2	-69.2	NO	+30	+8	-1.8	-1.8	11.0	+100	+8	18.0	-4.0	14.2	41°	14.2
DATE: 2-7-77 TIME: 2012																					
6 RANGE: 150M 140 MZ	-32.8	NO	+30	+2	+40	+40	-24.8	-64.8	NO	+30	+2	-1.8	-1.8	11.0	+100	+2	18.0	-4.0	14.0	17°	14.2
DEPTH: 1500M 250 MZ	-43.1	NO	+30	+8	+40	+40	-29.8	-69.8	NO	+30	+8	-1.8	-1.8	11.0	+100	+8	18.0	-4.0	14.0	17°	14.2

SECRET

SECRET

ELEMENT ARRAY

OPERATIONAL DATA	MAX.										ELEMENT ARRAY										CORRECTED TIME							
	SIGNAL LEVEL DBV	MODS-12 CAL. CORR. TIME	BEAM-ATTN	FORWARD TRANSM. LOSS	BTC CORR. TIME	A/E	JTR	I+B	NOISE LEVEL DBV	MODS-12 CORR. TIME	BEAM-ATTN	FORWARD TRANSM. LOSS	REAR TRANSM. LOSS	FORWARD CORR. TIME	M	N	O	MP CORR. TIME	SUR M-F	R	SUR	Q	R	SUR	T	U	Q+L	
7 DATE: 2-16-77 TIME: 0222Z RANGE: 280 NM DEPTH: 1800 FM	-338 -278 -150	410 410 410	+30 +30 +30	+2 +8 +9	+40 +40 +40	187 112 -31.0	+40 +40 +40	-38.5 -31.6 -33.3	410 410 410	+10 +10 +10	-1.8 -1.8 -1.8	+2 +8 +9	+2 +8 +9	+10 +10 +10	N	N	O	+100 +100 +100	442 432 7.3	-4.0 -4.0 -4.8	404 396 7.4	Q	R	SUR	T	U	-215 -215 -215	449 432 8.2
8 DATE: 3-15-77 TIME: 1501B RANGE: 220 NM DEPTH: 2600 FM	-270 -240 -180	410 410 410	+30 +30 +30	+2 +8 +8	+40 +40 +40	13.0 16.0 -30.0	+40 +40 +40	-31.6 -33.4 -33.1	410 410 410	+10 +10 +10	-1.8 -1.8 -1.8	+2 +8 +8	+2 +8 +8	+10 +10 +10	N	N	O	+100 +100 +100	44.6 39.4 13.1	-4.0 -4.0 -4.2	40.8 46.2 9.7	Q	R	SUR	T	U	+208 +200 +300	468 502 13.9
9 DATE: 3-15-77 TIME: 2018Z RANGE: 720 NM DEPTH: 2600 FM	-218 -182 -51.3	410 410 410	+30 +30 +30	+2 +9 +8	+40 +40 +40	16.2 21.8 -16.3	+40 +40 +40	-31.2 -31.9 -31.4	410 410 410	+10 +10 +10	-1.8 -1.8 -1.8	+2 +9 +8	+2 +9 +8	+10 +10 +10	N	N	O	+100 +100 +100	45.4 53.2 15.1	-4.0 -4.0 -4.2	41.6 50.1 11.7	Q	R	SUR	T	U	+515 +515 +515	453 581 15.9
10 DATE: 3-15-77 TIME: 0617Z RANGE: 1280 NM DEPTH: 2600 FM	-316 -316	410 410	+24 +24	+2 +1	+34 +34	13.4 -5.6	+34 +34	-30.9 -30.8	410 410	+10 +10	-1.8 -1.8	+2 +1	+2 +1	+10 +10	N	N	O	+100 +100	328 35.2	-4.0 -4.0	29.0 22.1	Q	R	SUR	T	U	+61 +61	310 261
11 DATE: 3-15-77 TIME: 0928Z RANGE: 1220 NM DEPTH: 2600 FM	-364 -474	410 410	+24 +24	+2 +1	+34 +34	3.6 -8.4	+34 +34	-37.5 -33.1	410 410	+10 +10	-1.8 -1.8	+2 +1	+2 +1	+10 +10	N	N	O	+100 +100	30.2 33.7	-4.0 -4.0	26.2 20.5	Q	R	SUR	T	U	+62 +62	345 245
12 DATE: 3-15-77 TIME: 1418Z RANGE: 1920 NM DEPTH: 2600 FM	-236 -312	410 410	+24 +24	+2 +1	+34 +34	-19.4 -5.2	+34 +34	-19.6 -33.2	410 410	+10 +10	-1.8 -1.8	+2 +1	+2 +1	+10 +10	N	N	O	+100 +100	30.0 18.0	-4.0 -4.1	24.2 14.7	Q	R	SUR	T	U	+64 +64	300 18.8

SECRET

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

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

FREQUENCY 140 HZ

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

-50.1

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

-(-12) = -38.1

BANDWIDTH CONVERSION TO 1 HZ BAND

+8.2 = -29.9

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

+100 = +70.1

UNCLASSIFIED

UNCLASSIFIED

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

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

FREQUENCY 290 HZ

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

-54.0

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

-(-8) = -46.0

BANDWIDTH CONVERSION TO 1 HZ BAND

+8.2 = -37.8

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

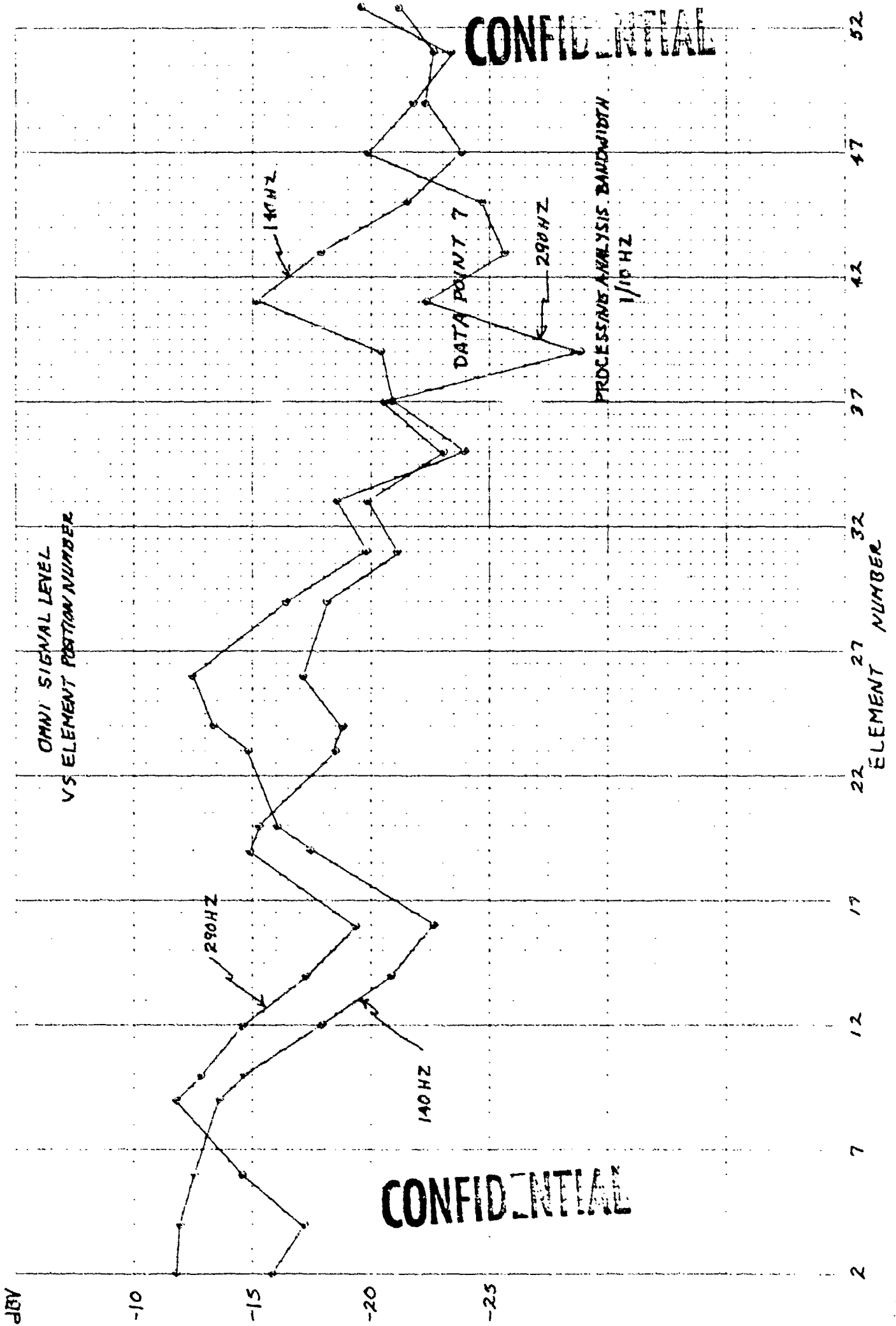
+100 = +62.2

UNCLASSIFIED

UNCLASSIFIED

46 0703

FIG. 2. SIGNAL LEVEL VS. ELEMENT POSITION



CONFIDENTIAL

CONFIDENTIAL

46 0703

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

REEL: F29 INDEX: 1/45

DATE OF ANALYSIS:

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

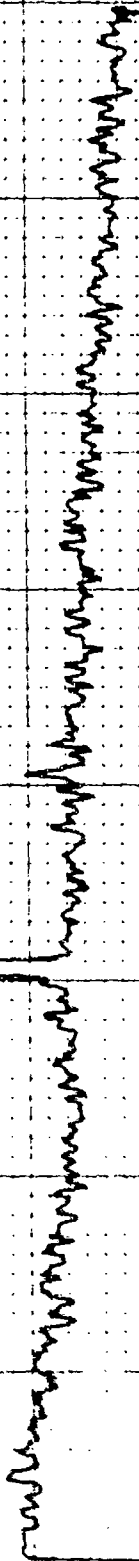
DATE/TIME: 2-8-77 - 0202 Z
ANALYSIS BANDWIDTH: 1710 HZ
 DEG AZ STEERING

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING

140 HZ

SECRET

SECRET



46 0703

REEL: F29 INDEX 1145

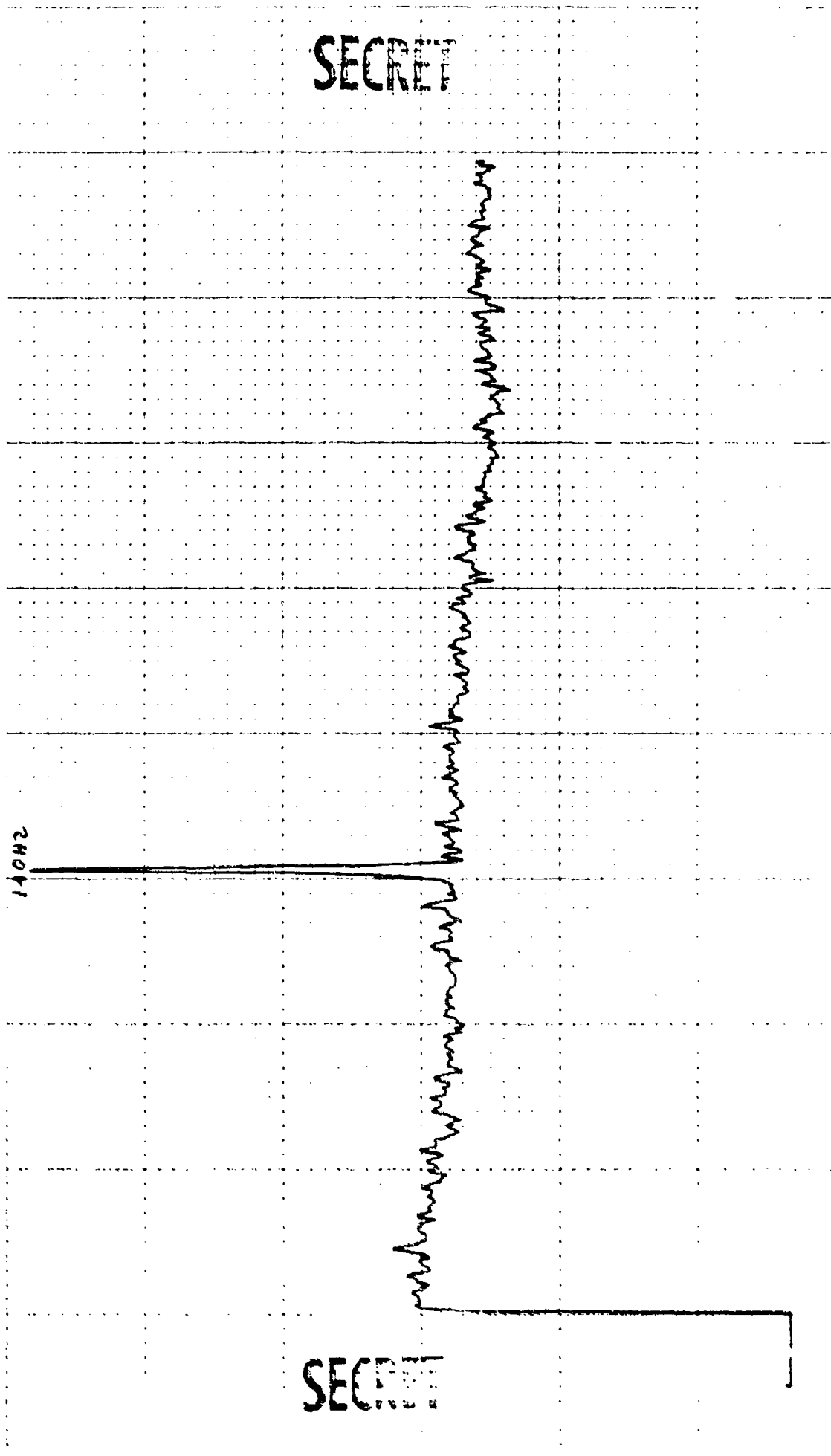
DATE OF ANALYSIS:

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

ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

INTEGRATION TIME 320 SECS ATTEN: DB
FILTER WIG: HANNING

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



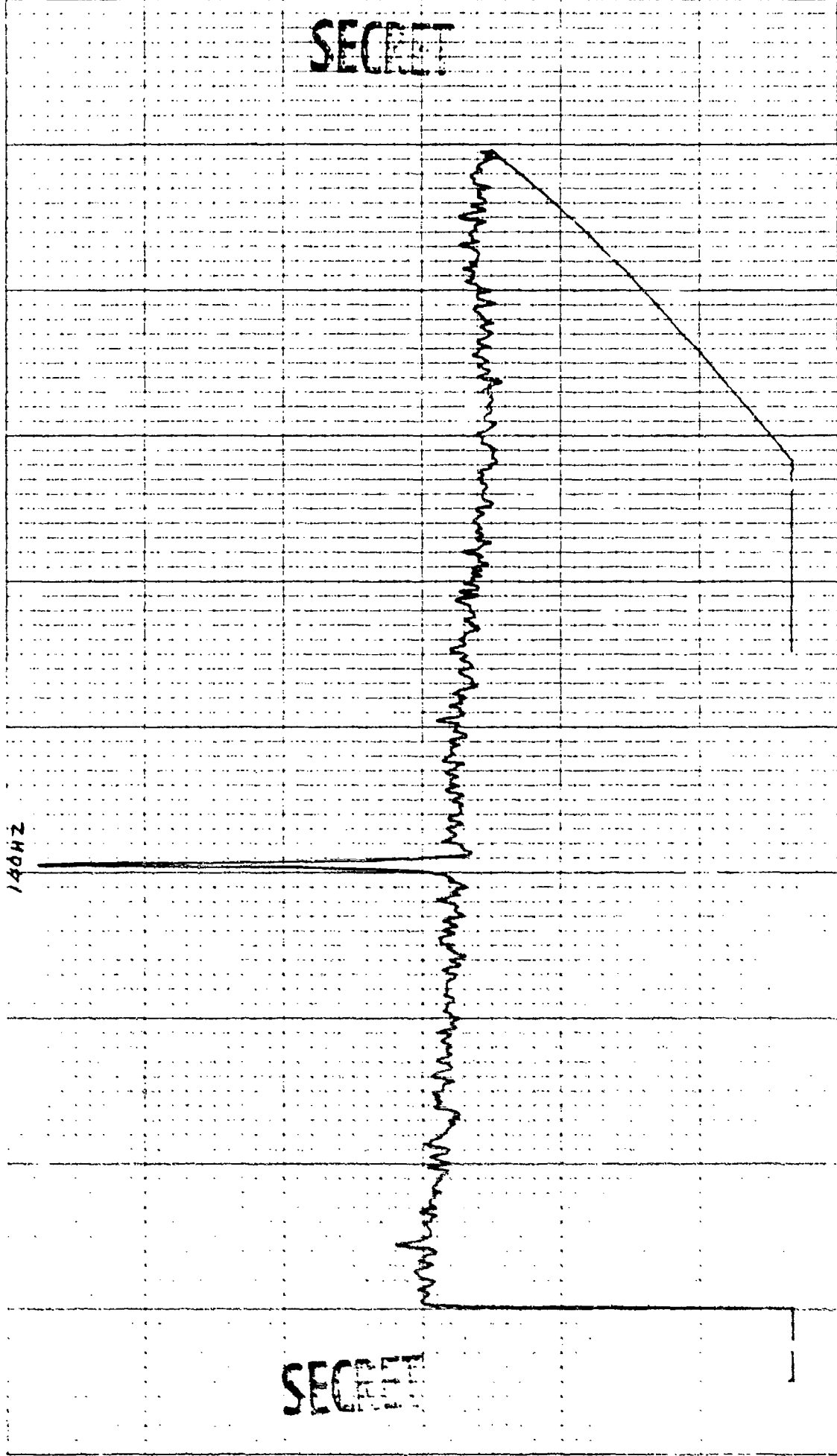
SECRET

SECRET

46 0703

(SEE SPECTRUM CONTROL PROCEDURES FOR DETAILS)

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

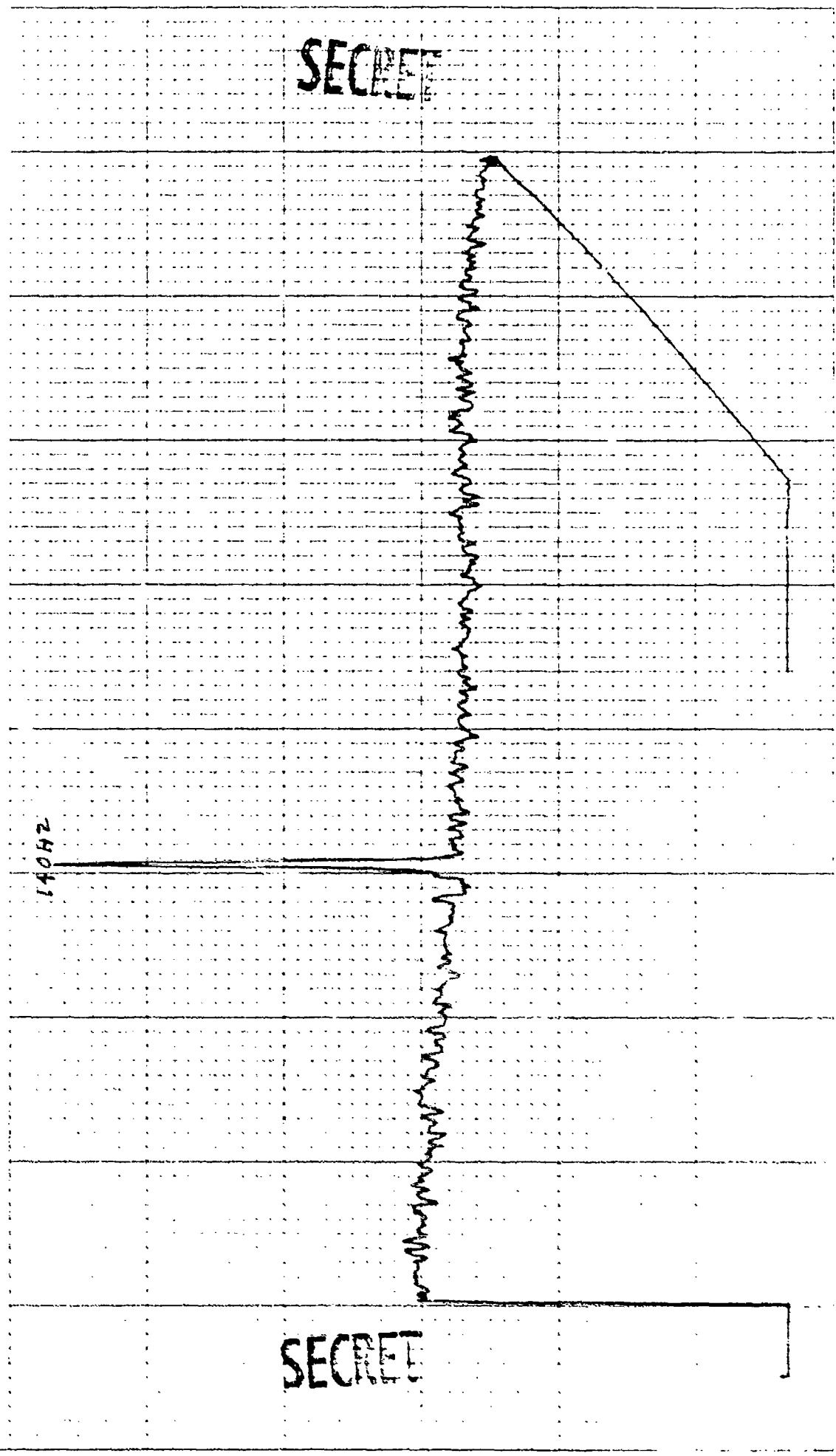


CONTROL: 2-B - 0202 (30)
OMNI SPECTRUM (ELEMENT 9)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F29 INDEX 1145
INTEGRATION TIME 320 SECS
FILTER
ATTEN: - DB
WTG: HANNING



46 0703

102 3 000 2 000 0 00

REEL: F29 INDEX 1145

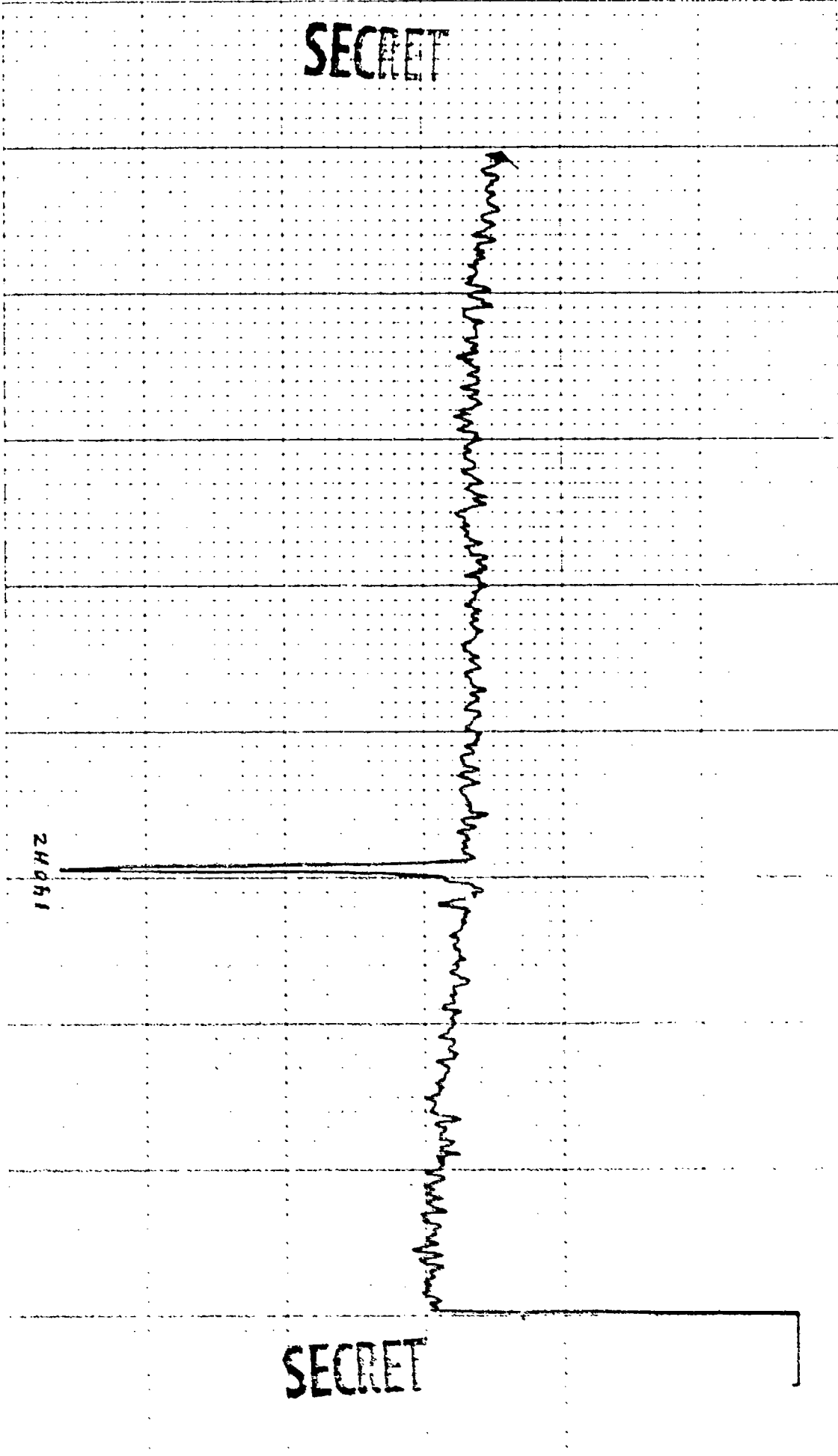
CONTROL: 2-8 - 0202 (J1)
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
ELEMENT

DATE OF ANALYSIS:

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

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

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



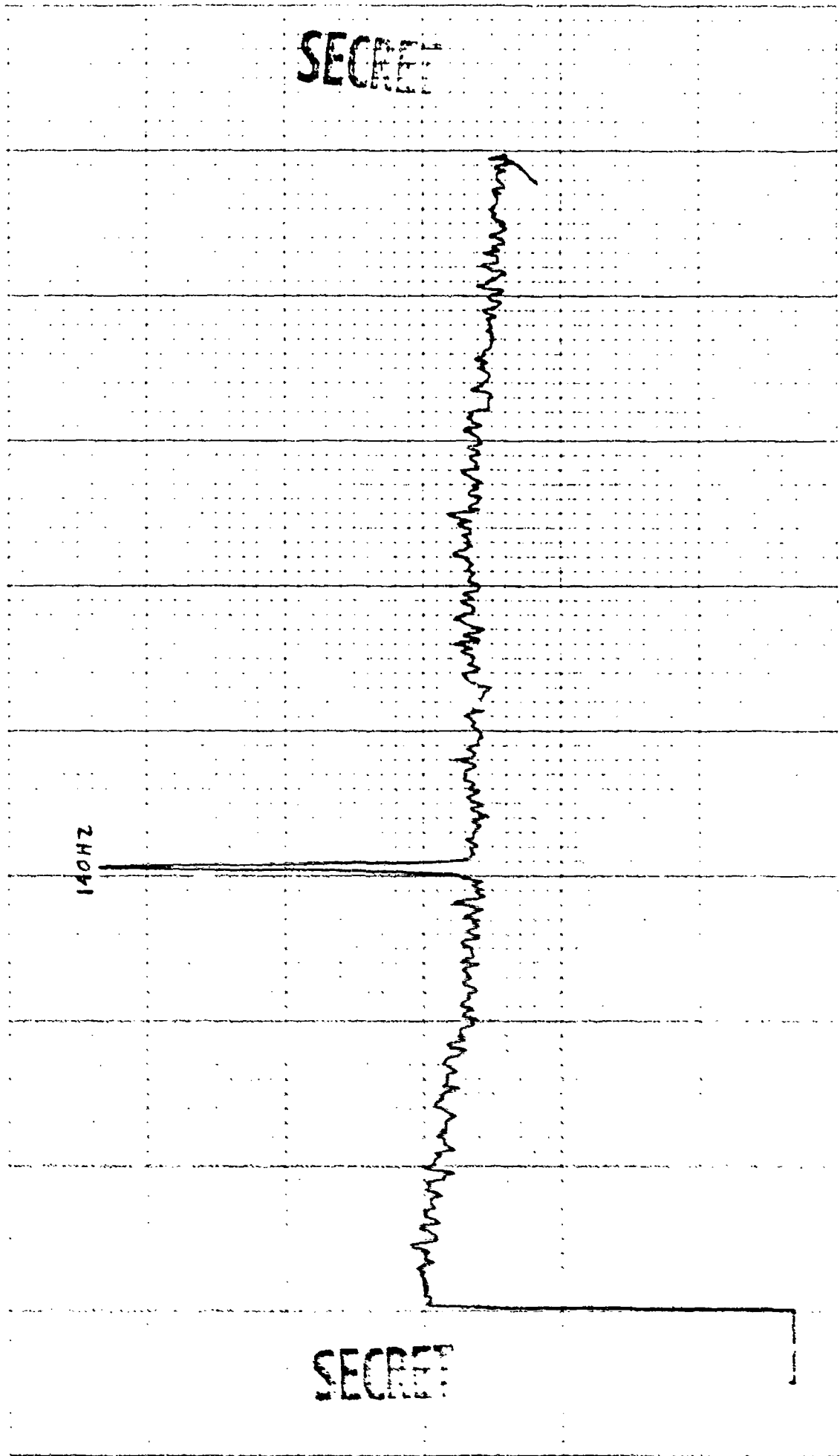
46 0703

REEL: F29 INDEX 1145

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

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

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



K&E 10 X 10 TO THE INCHES X 30 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

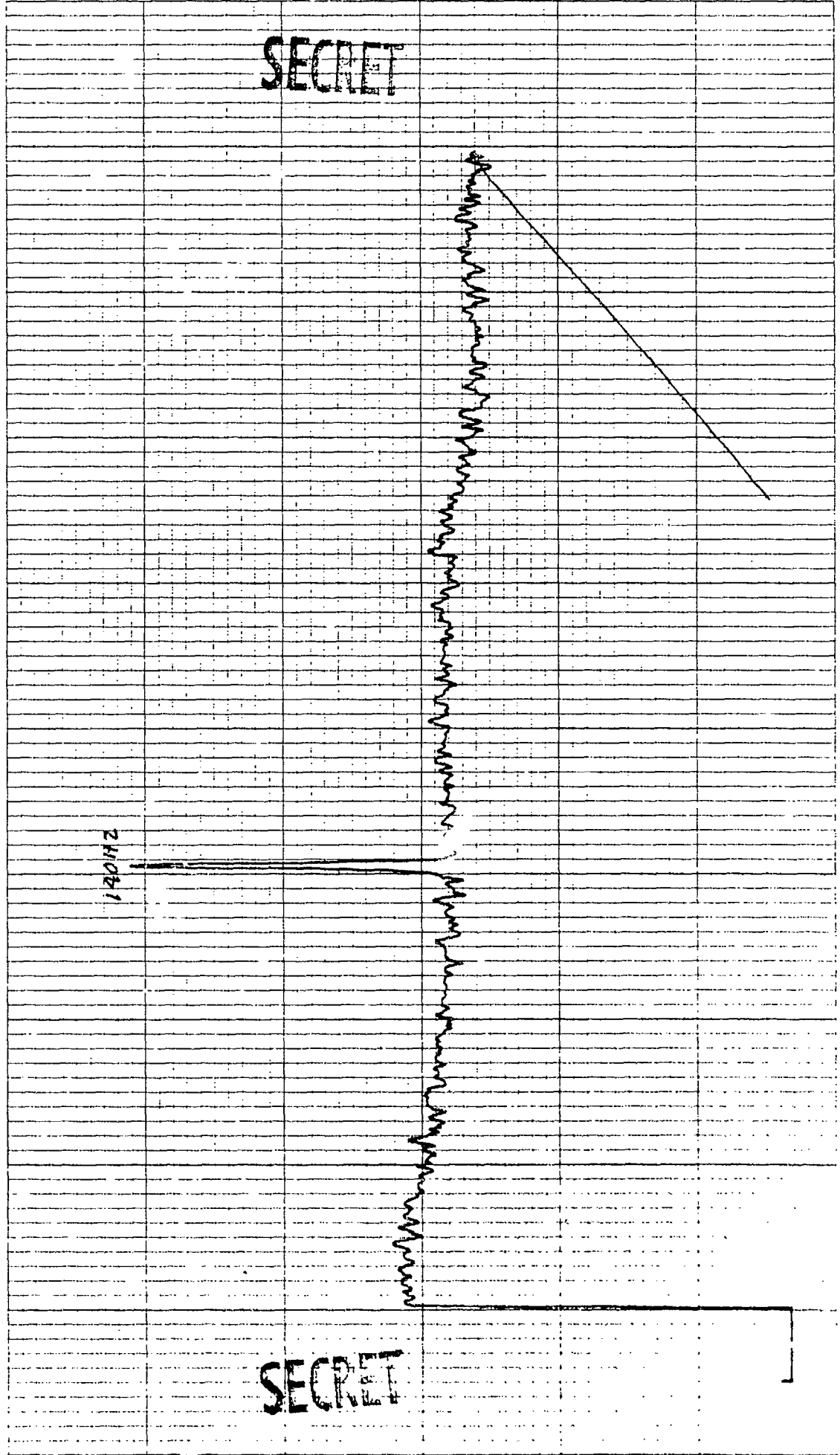
CONTROL: 2-8 -0202 (33)
OMNI SPECTRUM (ELEMENT 14)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F29 INDEX: 1145

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



46 0703

CONTROL: 2-8 -0202 (24)
QMI SPECTRUM/ELEMENT 16)
EXERCISE: BEARING STAVE
CENTER FREQ: 150 HZ
ELEMENT

DATE OF ANALYSIS:

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

ANALYSIS BANDWIDTH: 1/19HZ
DEC AZ STEERING

REEL: F29

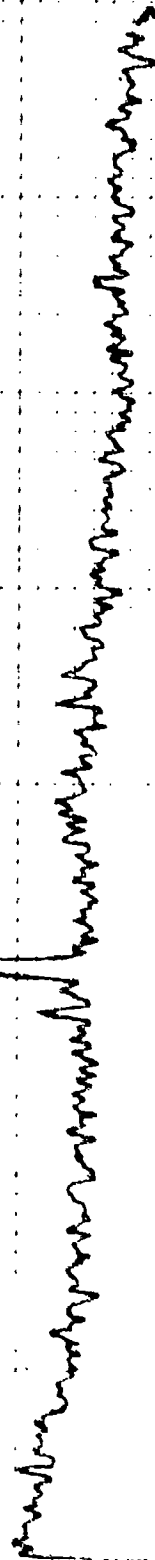
INDEX 1145

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

140HZ

SECRET

SECRET



46 0703

REF ID: A66822

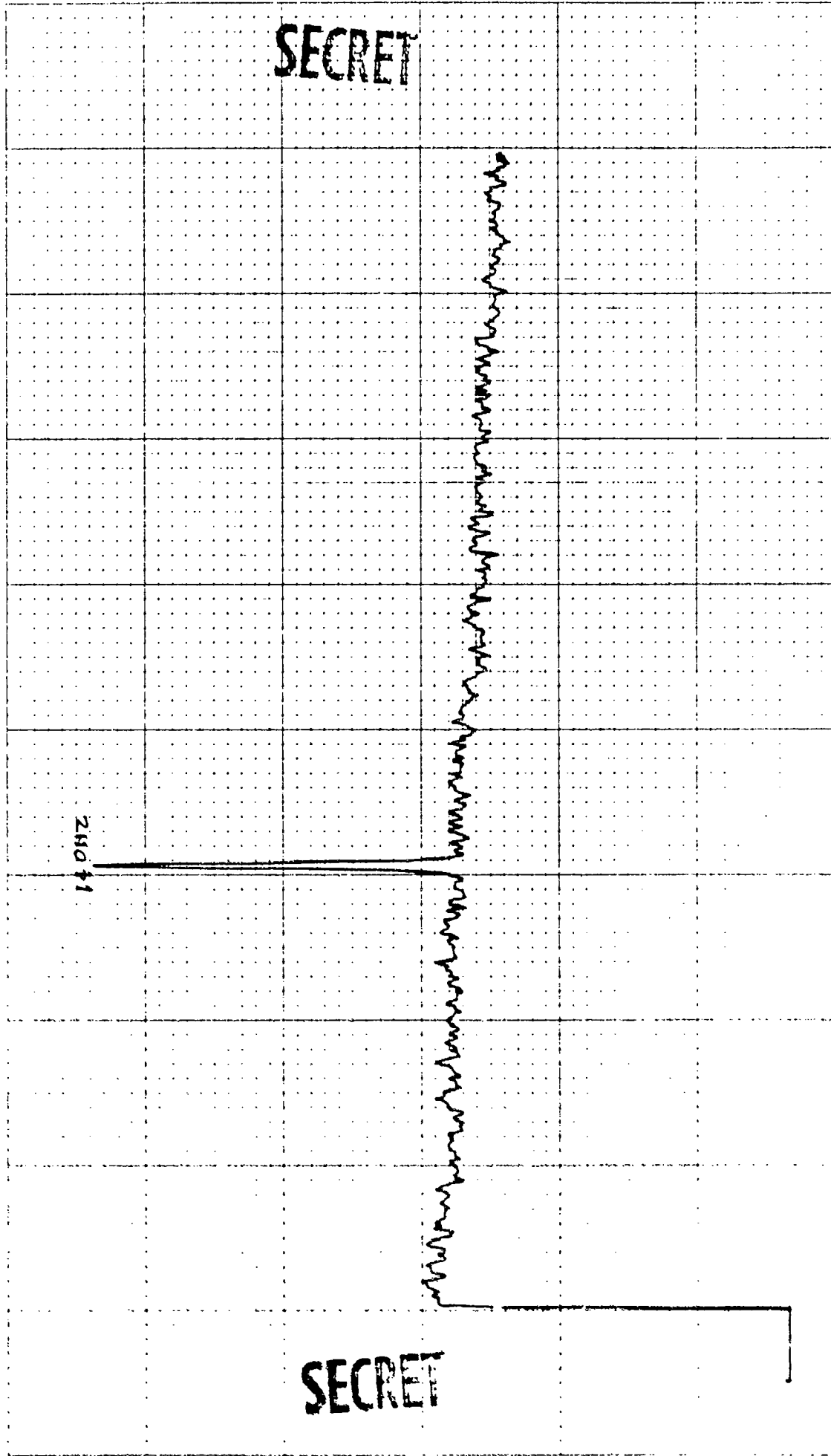
REEL: F29 INDEX 1145

DATE OF ANALYSIS:

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

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

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



46 0703

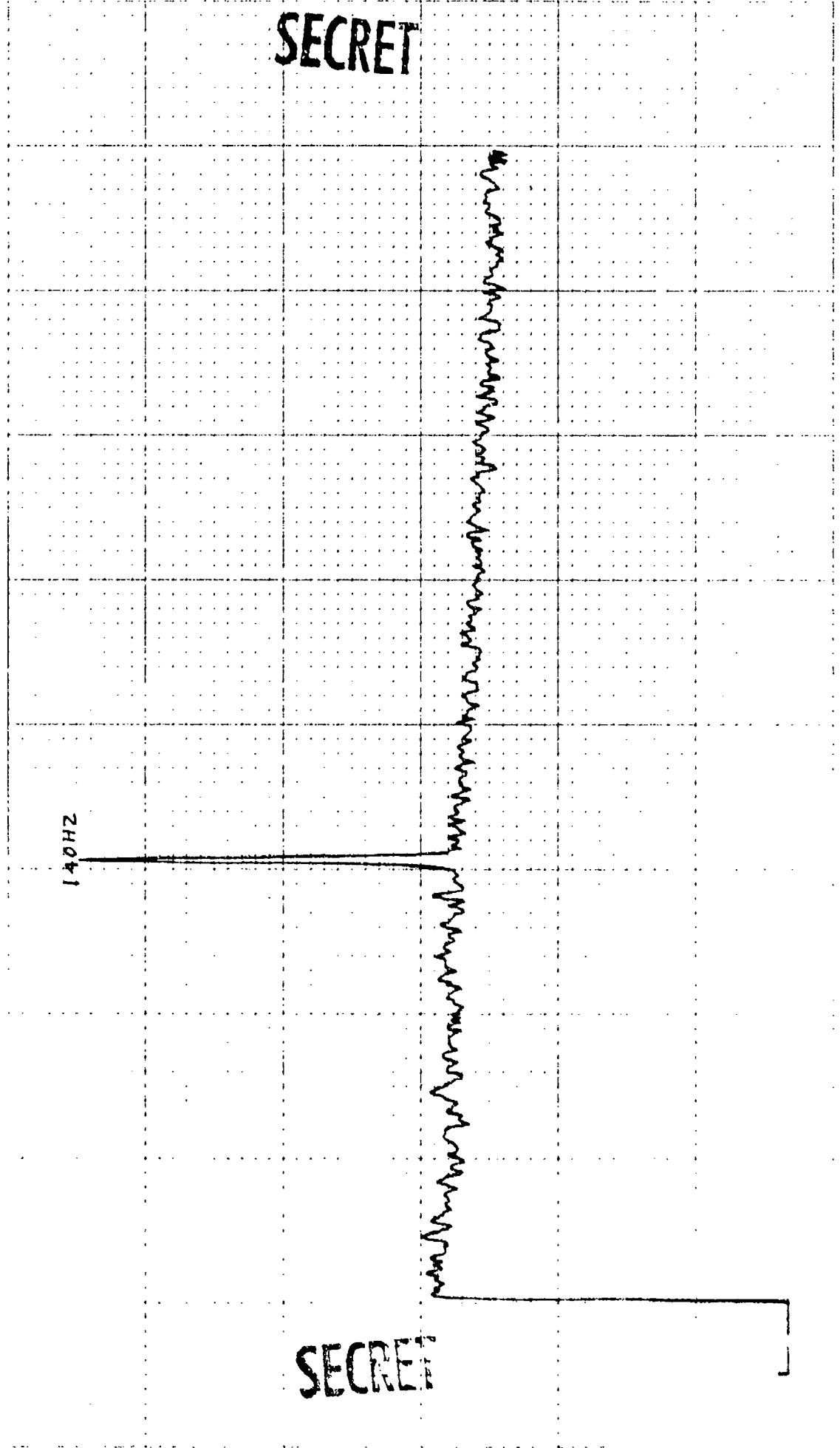
CONTROL: 2-8-0202 (36)
OMNI SPECTRUM (ELEMENT 20)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F29 INDEX 1145

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WIG: HANNING



SECRET

46 0703

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

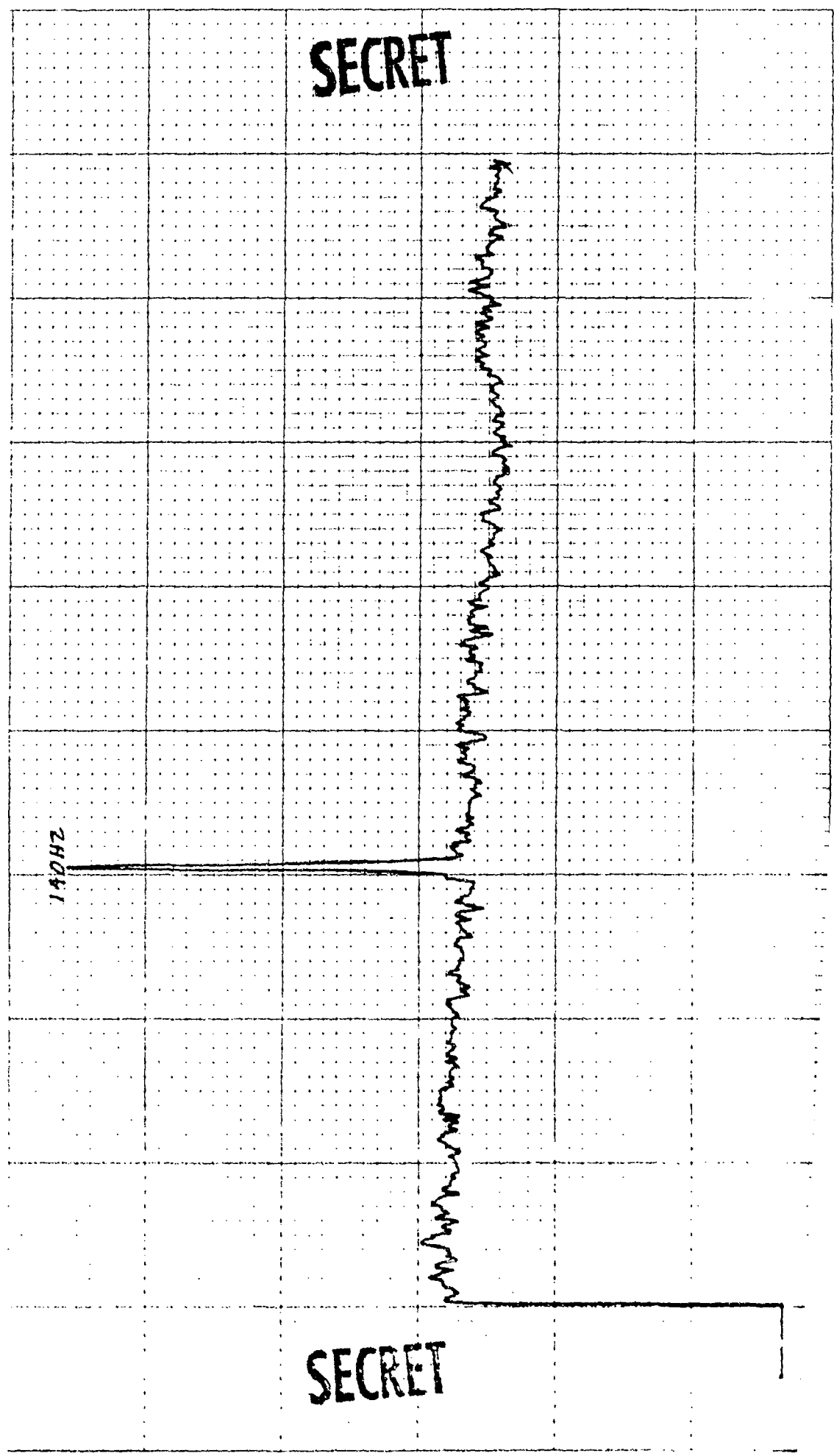
DATE OF ANALYSIS:

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

REEL: F29

INDEX: 1145

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



46 0703

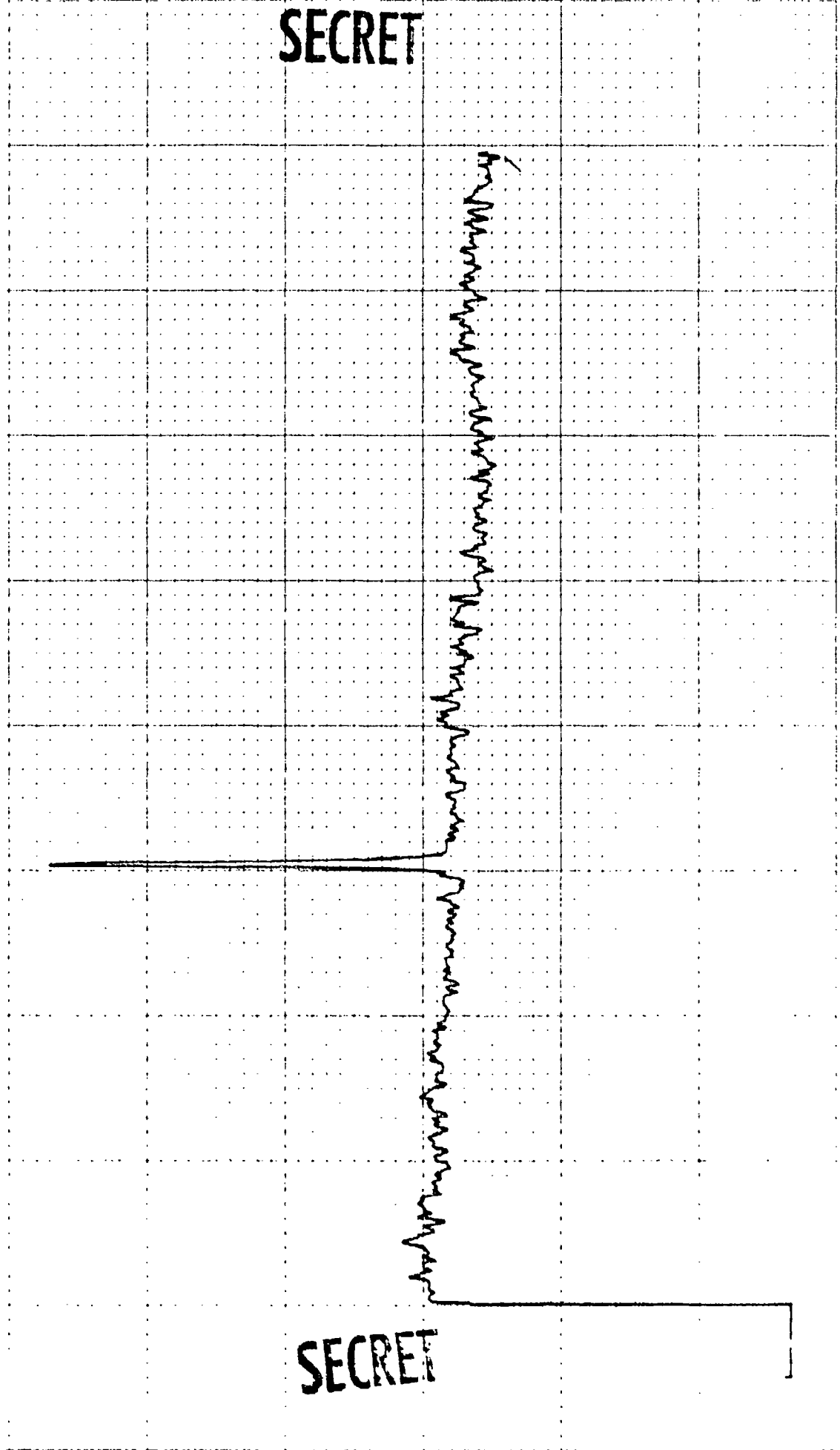
CONTROL: 2-0 - 0202 (38)
OMNI SPECTRUM (ELEMENT 24)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F29 INDEX 1145

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



SECRET

SECRET

46 0703

REF ID: A66087

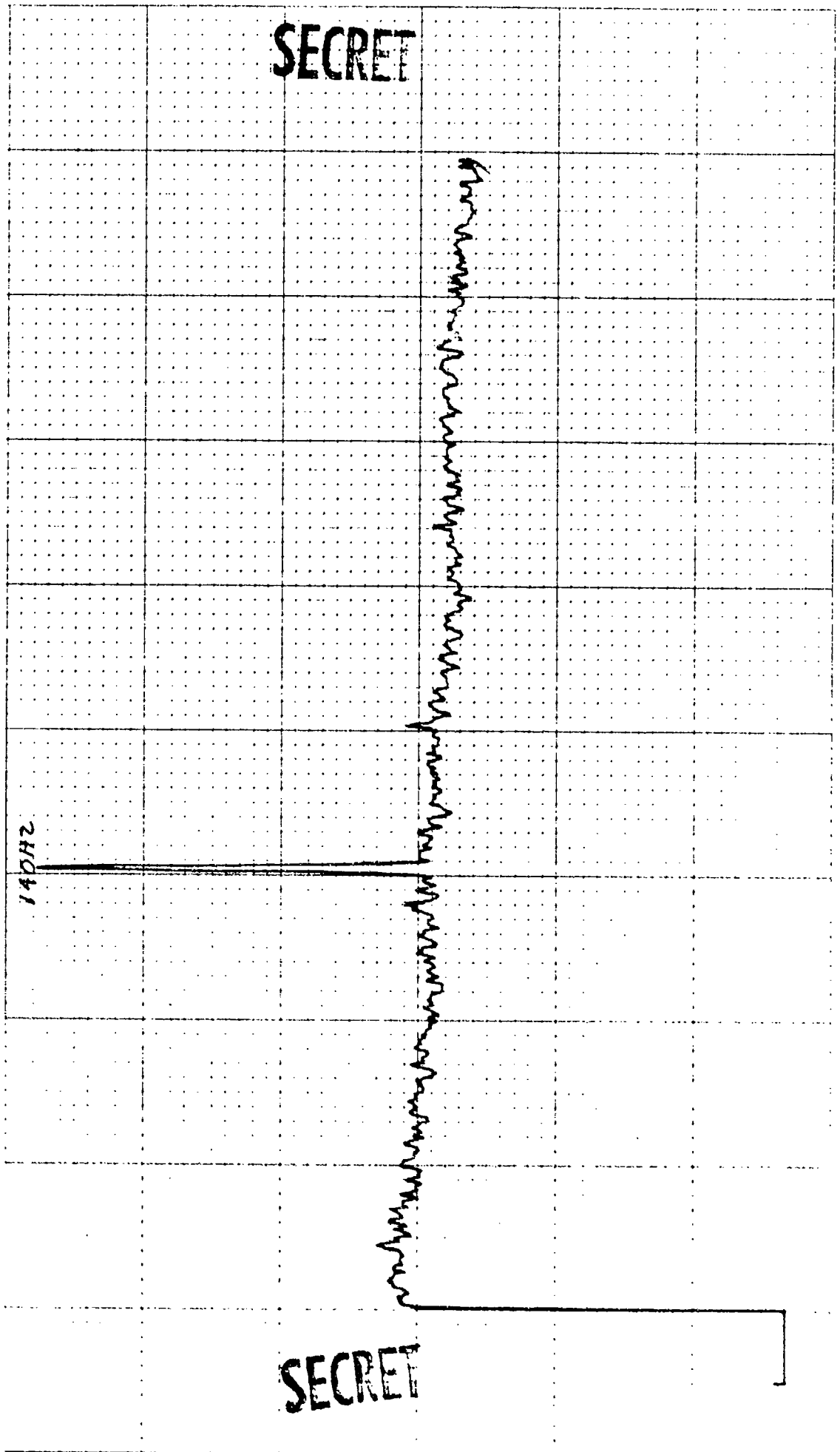
CONTROL: 28-0202(39)
OMNI SPECTRUM(ELEMENT 26)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F29 INDEX//45

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING



SECRET

SECRET

45 0703

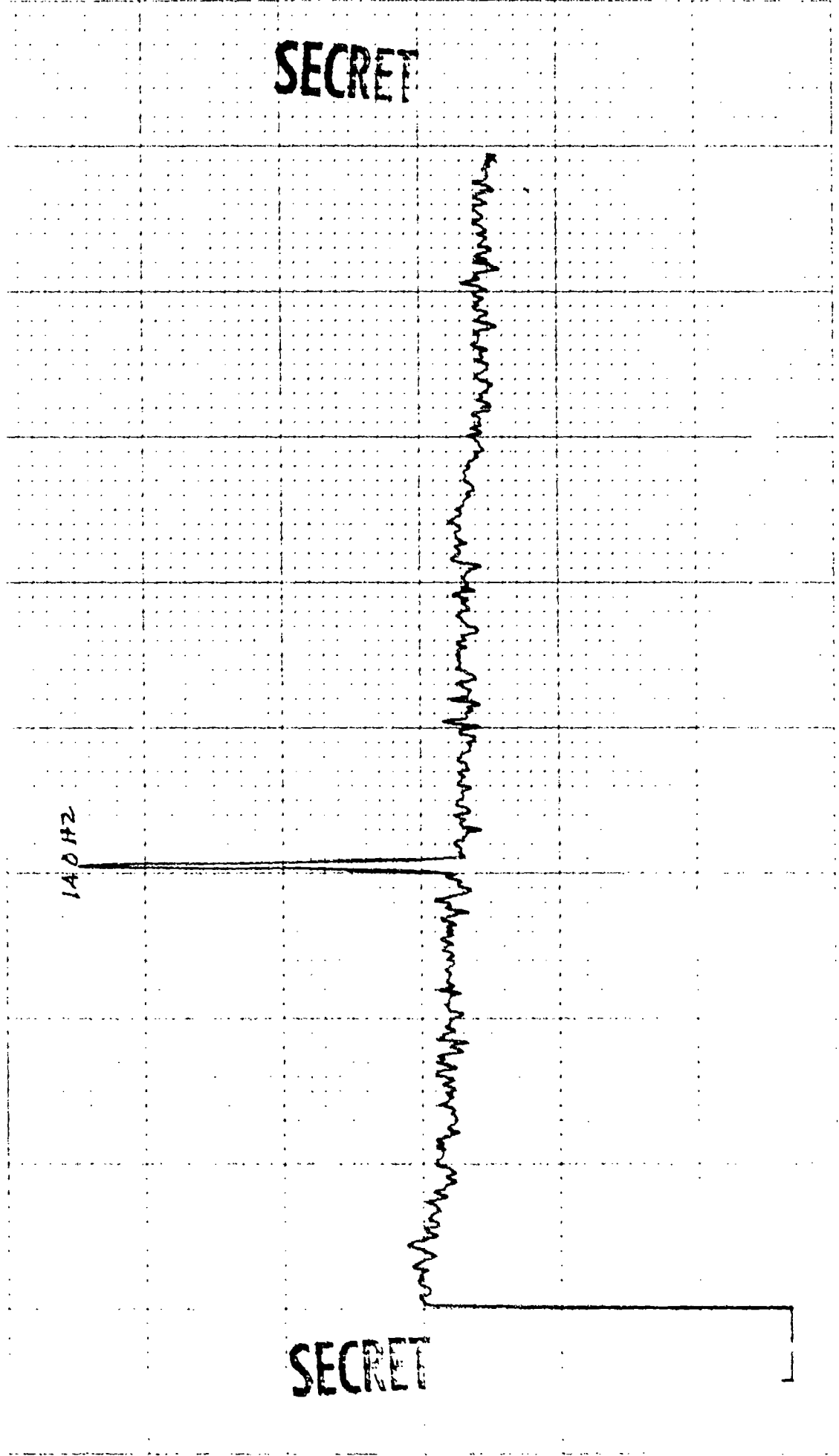
CONTROL: 2-8-0202 (10)
OMNI SPECTRUM (ELEMENT 29)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F29 INDEX 1145

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



SECRET

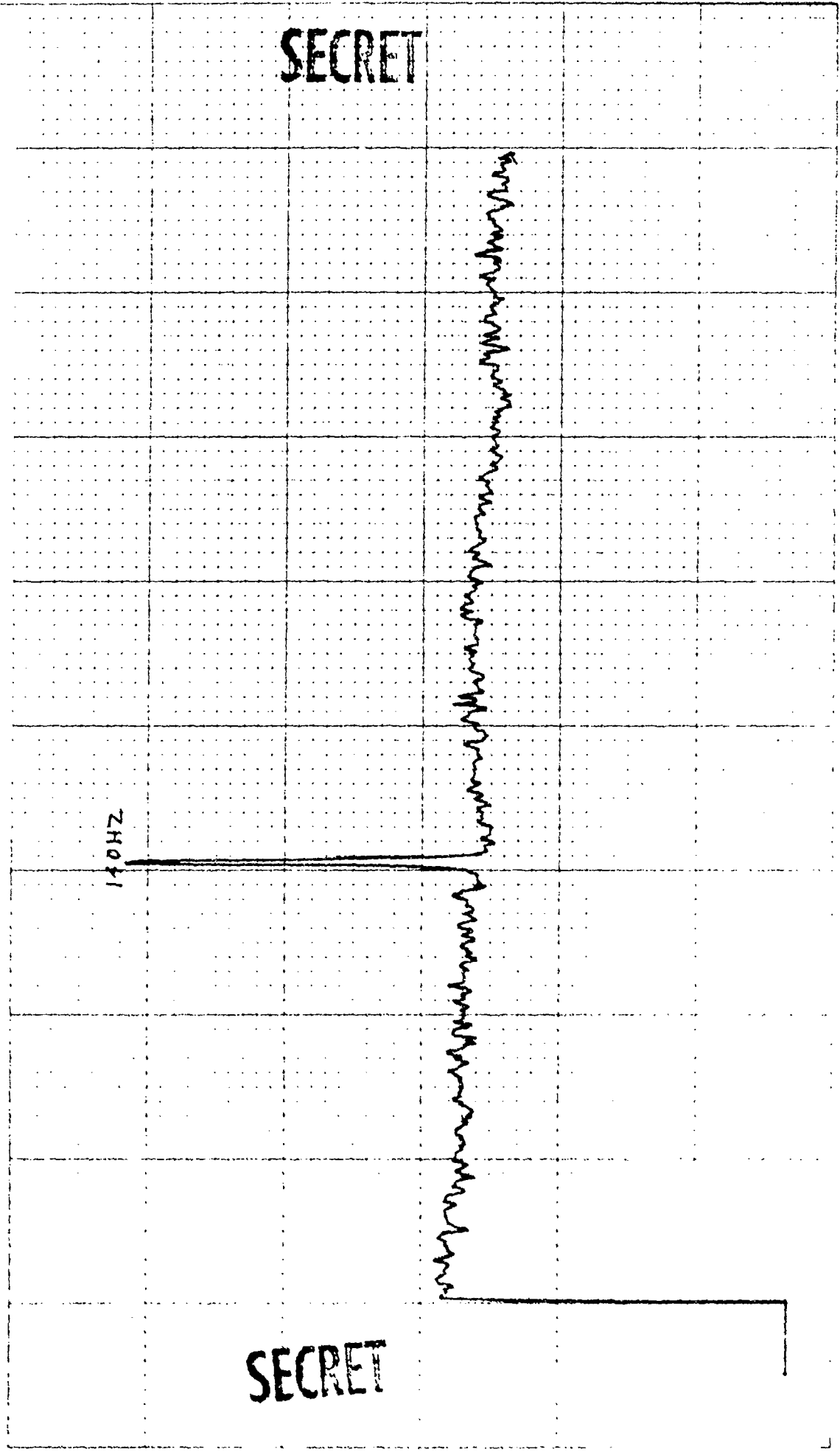
SECRET

46 0703

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

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

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



SECRET

SECRET

45 0703

142 500 K...

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

DATE OF ANALYSIS:

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

REEL: F29

INDEX 145

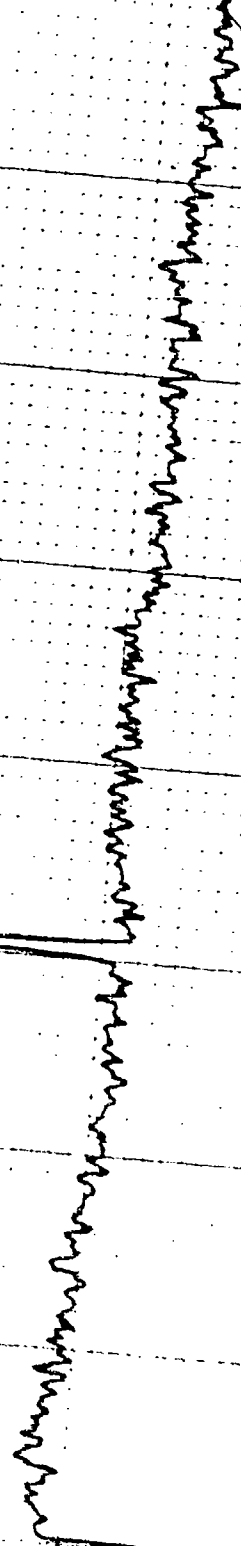
INTEGRATION TIME 320 SECS
FILTER

ATTEN: - DB
WTC: HANNING

140 HZ

SECRET

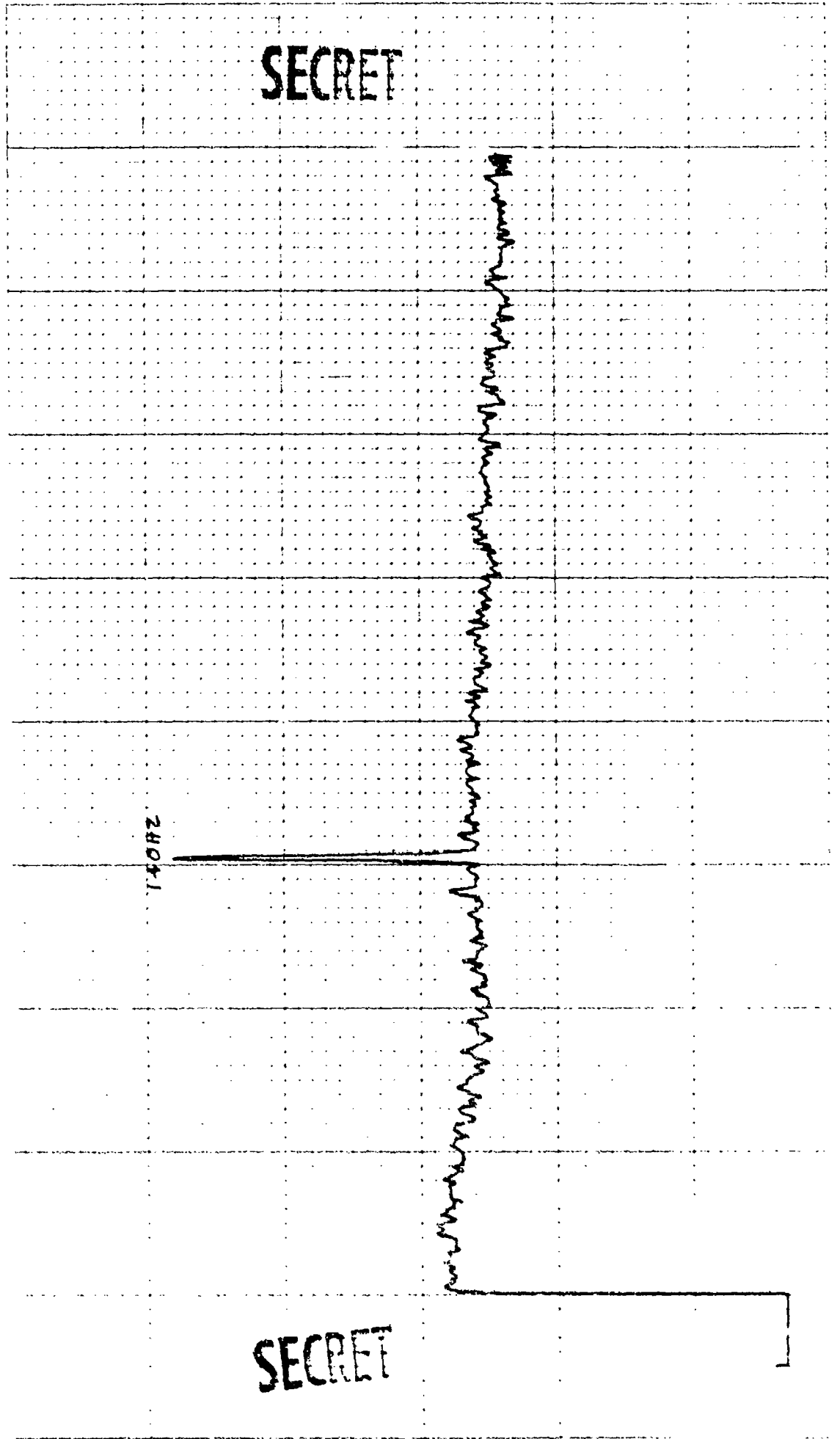
SECRET



46 0703

167 2-8-77 0202 (93)

CONTROL: 2-8-0202 (93) DATE OF ANALYSIS: REEL: F29 INDEX: 145
 OMNI SPECTRUM (ELEMENT 35)
 EXERCISE: BEARING STAKE DATE/TIME: 2-8-77-0202Z
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: DB
 1 ELEMENT DEC 1/2 STEERING FILTER WTC: HANNING



46 0703

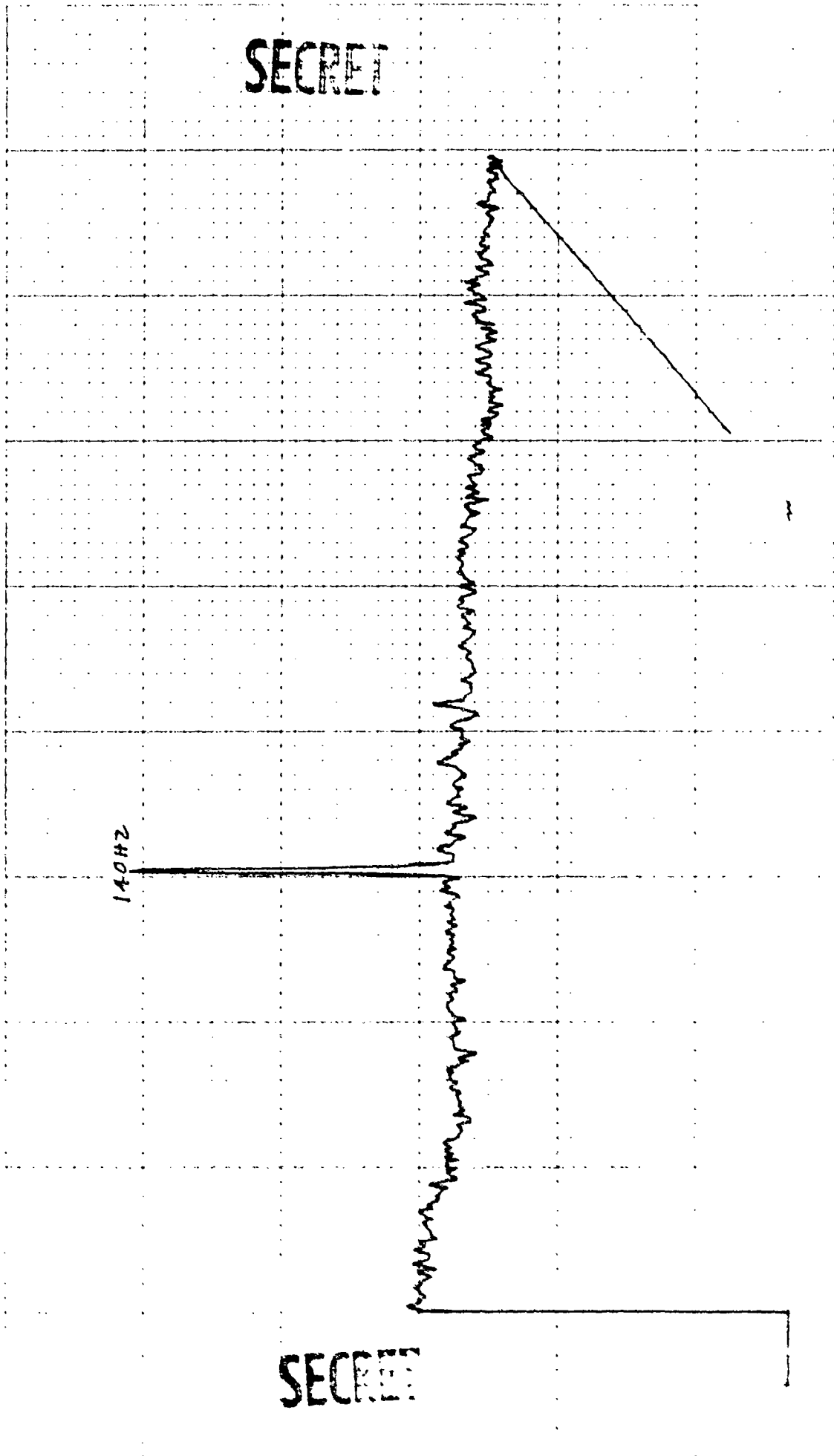
CONTROL: 2-8 -0202 (44)
OMNI SPECTRUM/ELEMENT 37
EXERCISE: BEARING STAKE
CENTER FREQ: 160 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F2-9 INDEX 1145

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



SECRET

SECRET

46 0703

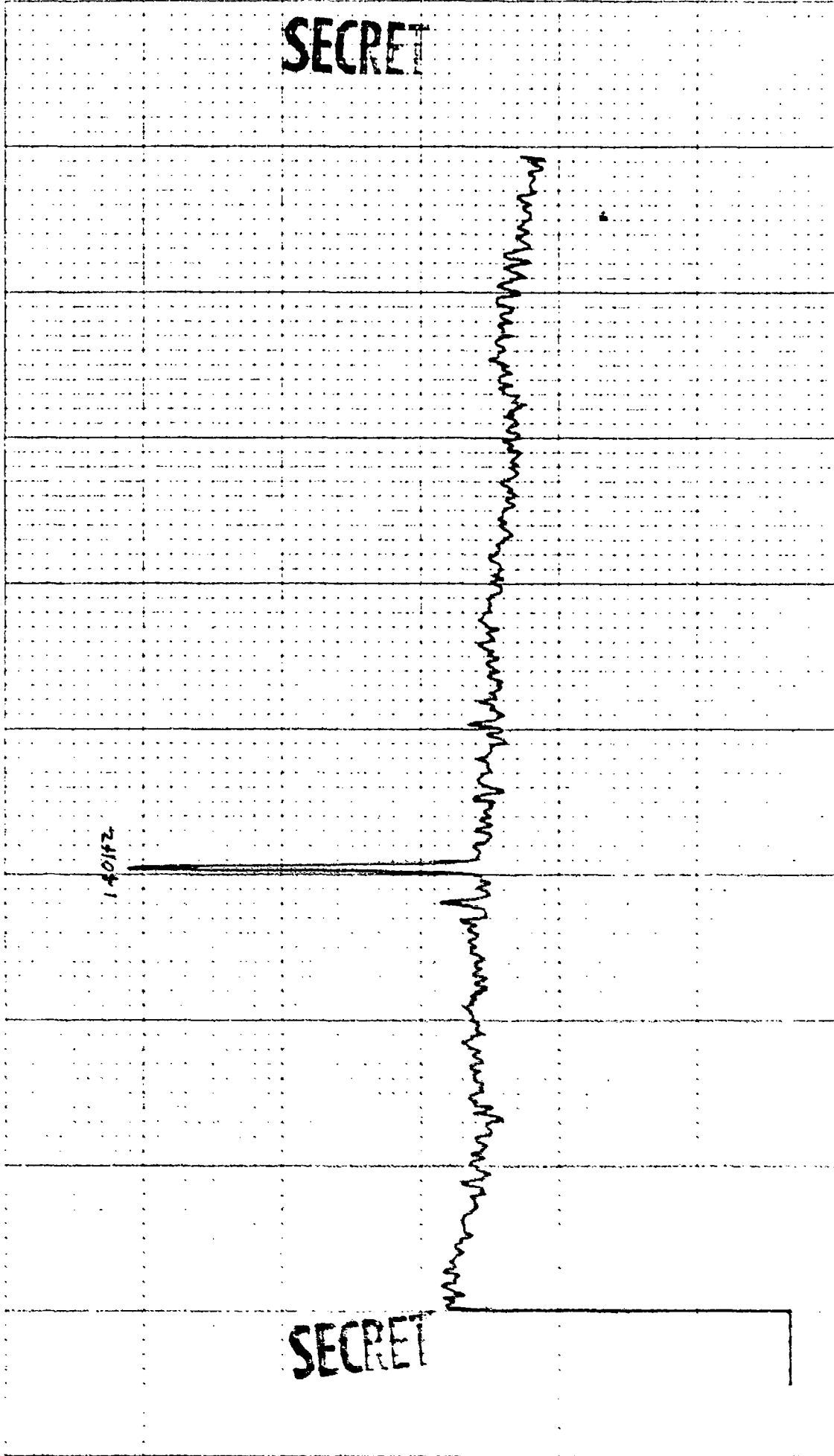
REEL: F-9 INDEX 1/45

DATE OF ANALYSIS:

CONTROL: 2-0-0202(45)
OMNI SPECTRUM (ELEMENT 39)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 MZ
1 ELEMENT

DATE/TIME: 2-0-77-0202.2
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



46 0703

REEL: F29 INDEX: 1145

CONTROL: Z-8 -0202 (41)
OMNI SPECTRUM (ELEMENT 41)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
ELEMENT

DATE OF ANALYSIS:

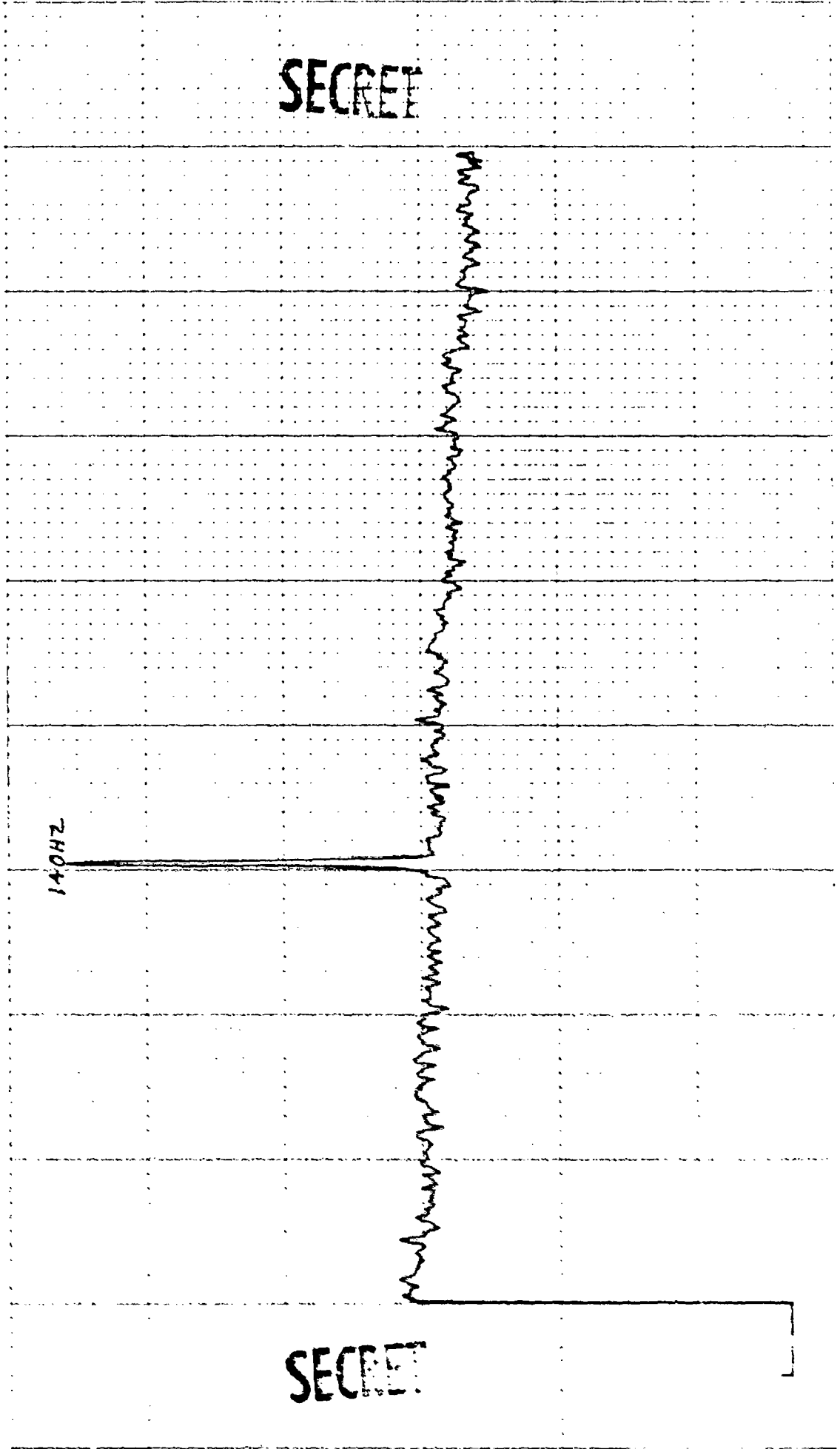
DATE/TIME: Z-8-77 -0202 Z
ANALYSIS BANDWIDTH: 1710 HZ
— DEC AZ STEERING

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

140HZ

SECRET

SECRET



45 0703

10 X 10 TO THE INCHES
K&E REUTEL & ESSER CO. WILKINSA

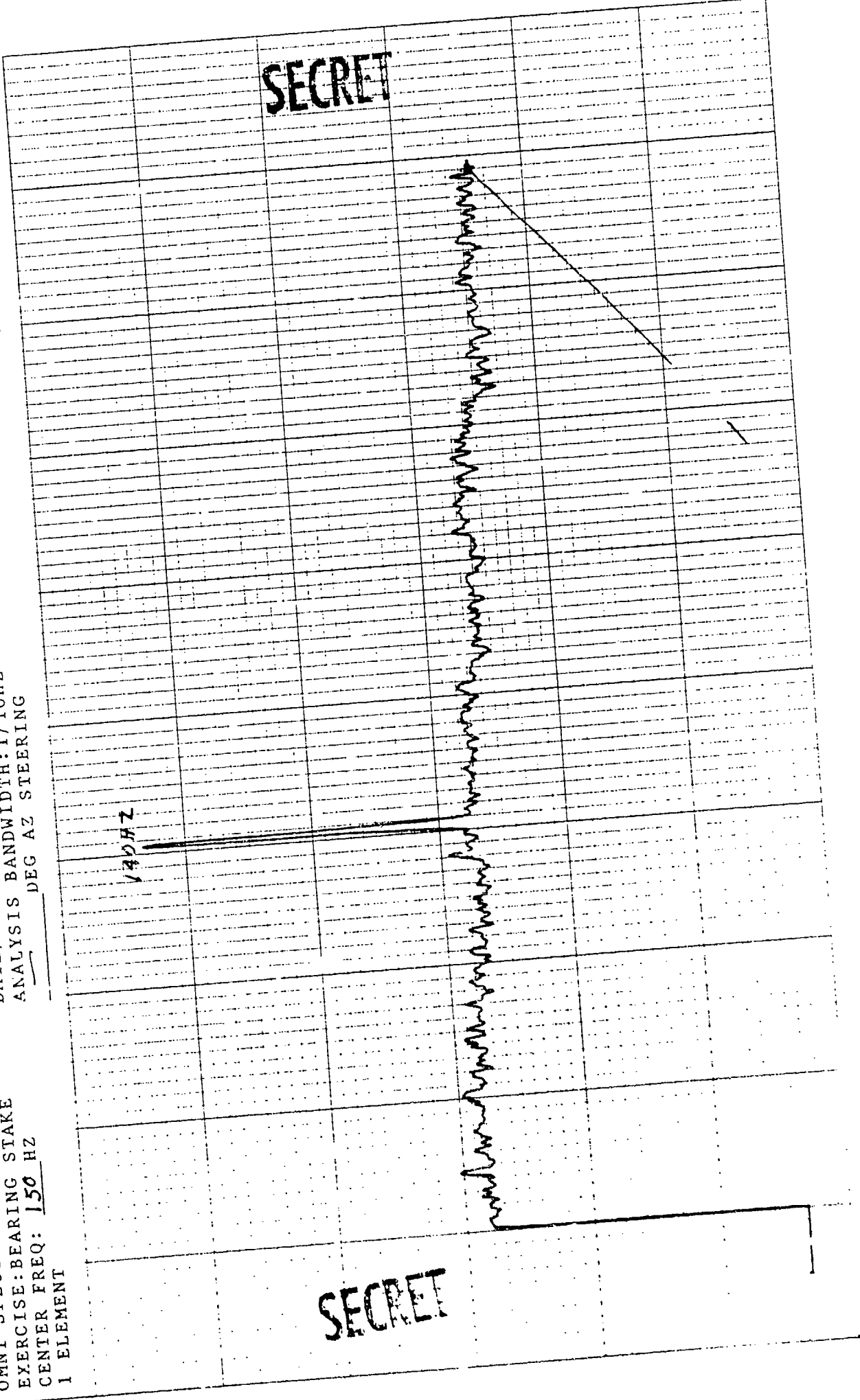
REEL: F29 INDEX: 1145

DATE OF ANALYSIS:

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

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

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC HANNING



SECRET

SECRET

45 0703

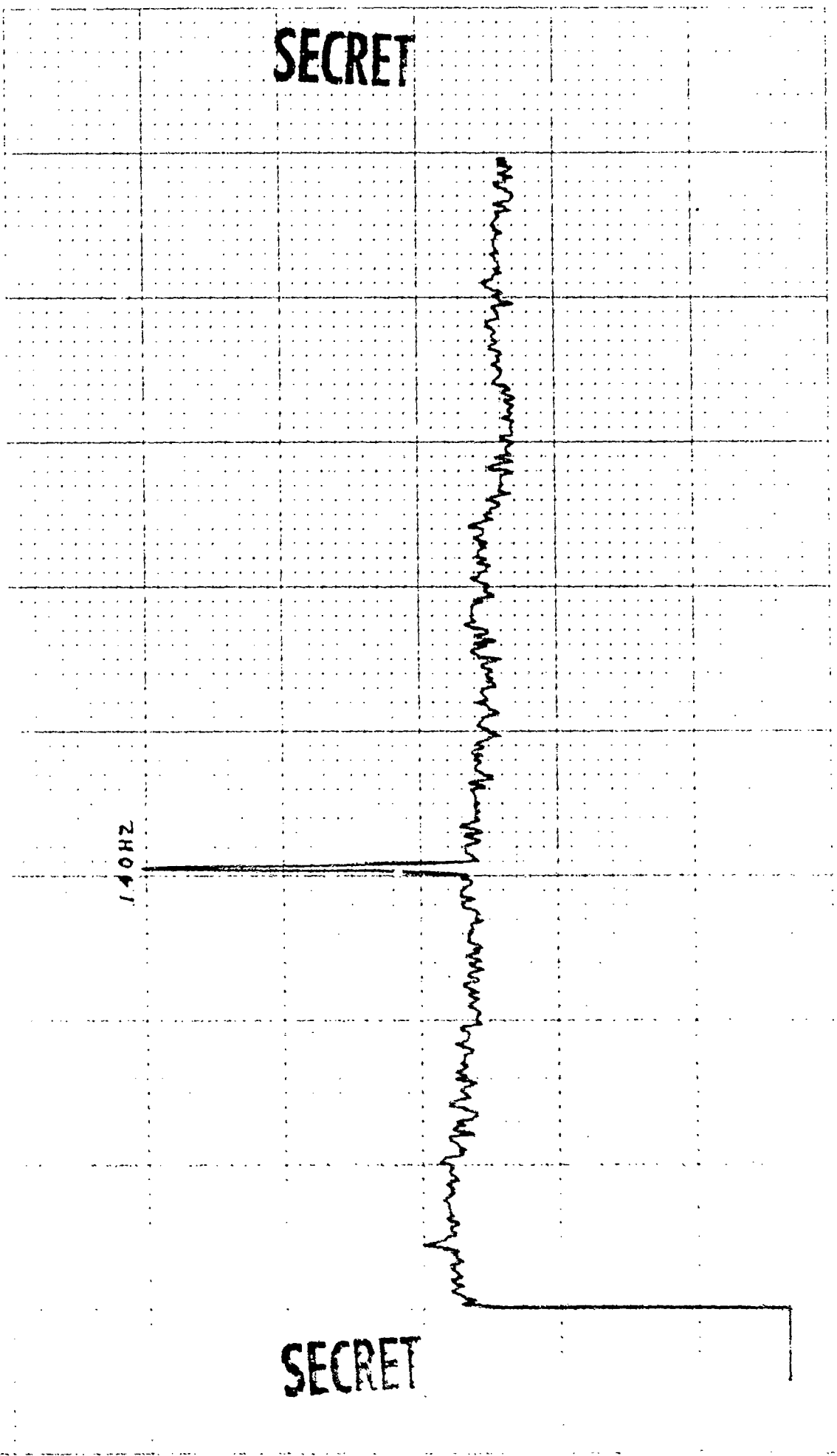
CONTROL: 2-8-0202(48)
OMNI SPECTRUM(ELEMENT 45)
EXERCISE: BEARING STAYE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F29 INDEX 1145

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



46 0703

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

DATE OF ANALYSIS:

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

ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F29

INDEX: 1145

INTEGRATION TIME 320 SECS

ATTEN: — DB

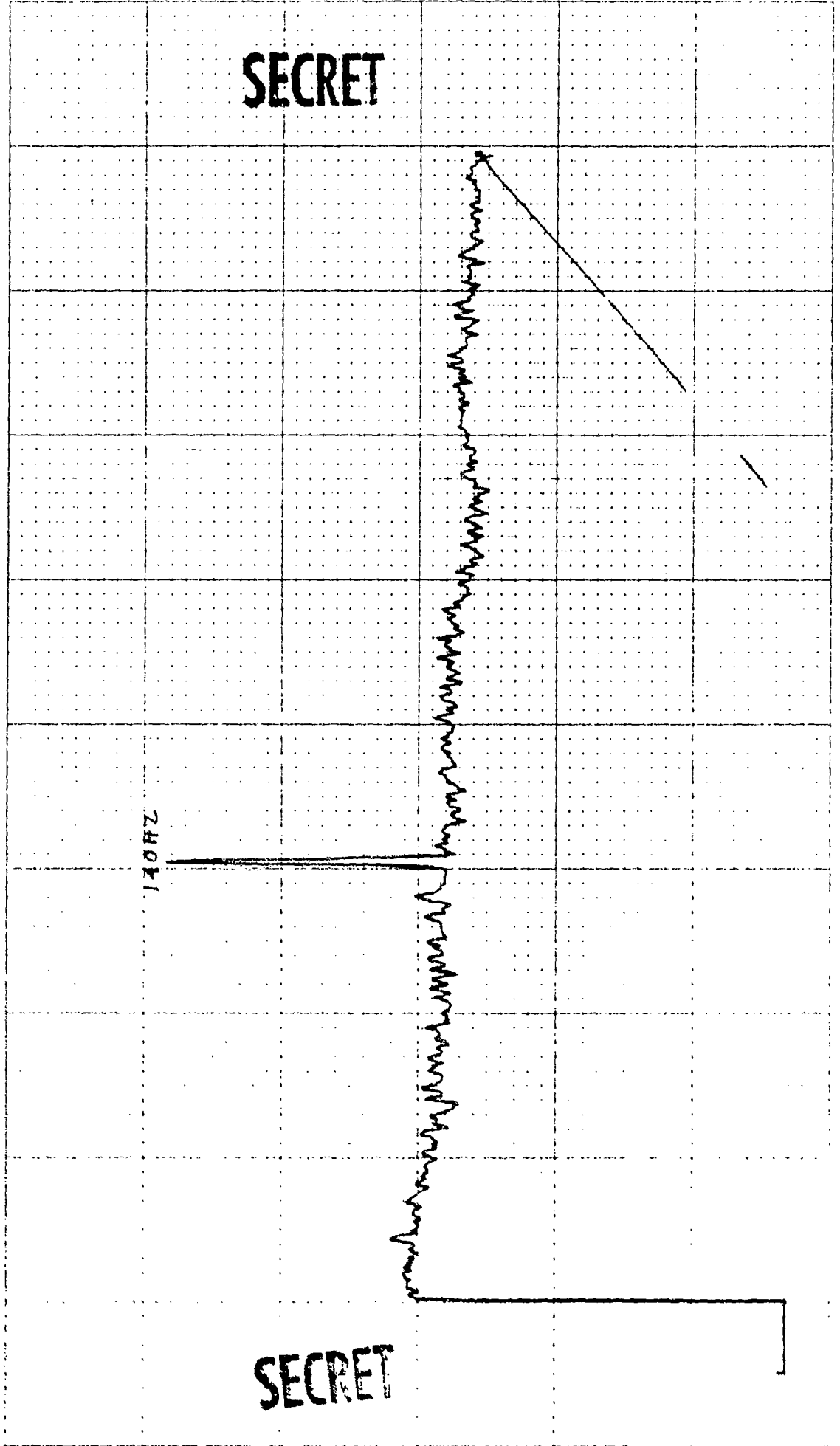
FILTER

WTG: HANNING

140HZ

SECRET

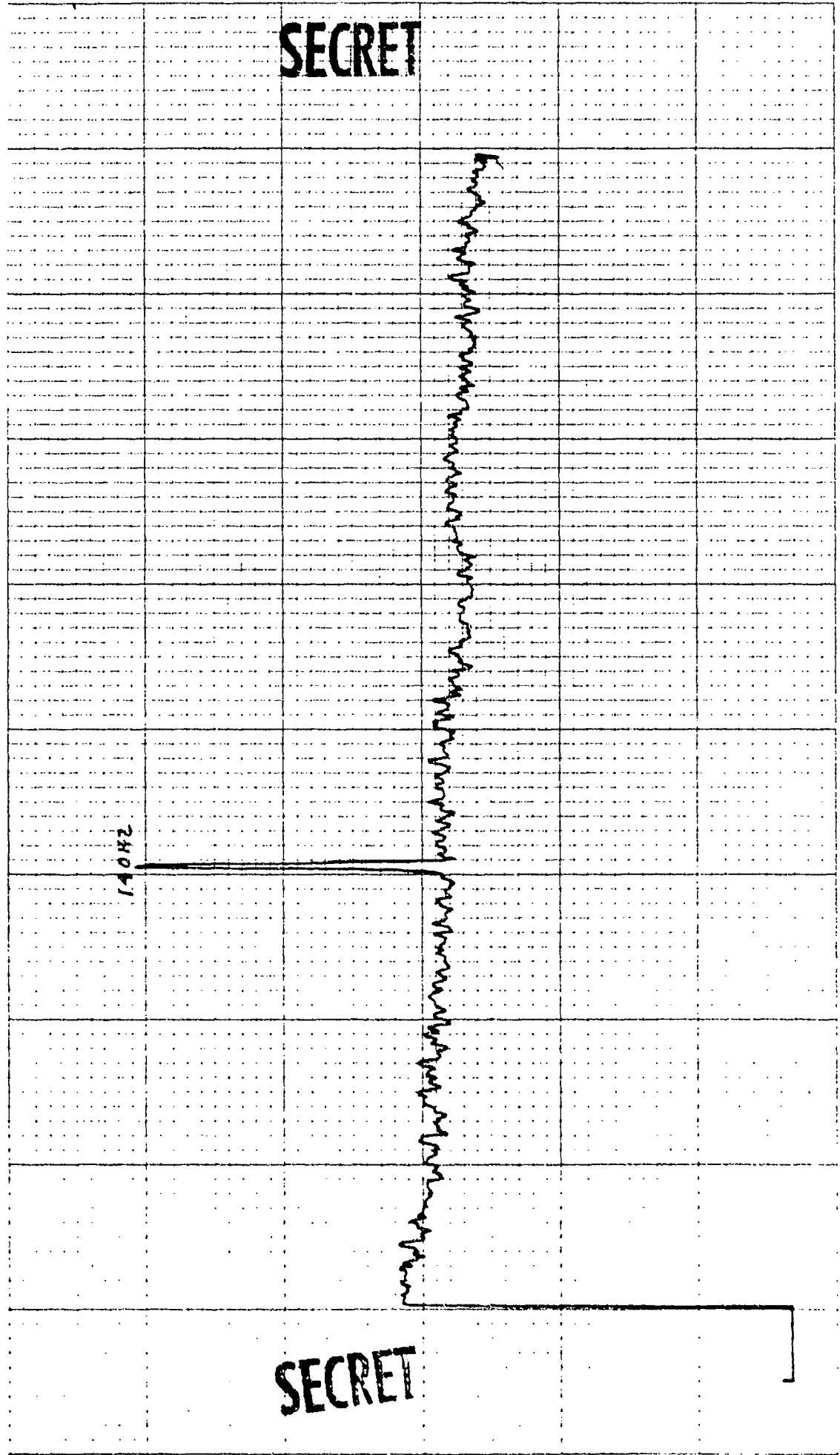
SECRET



46 0703

152 10.8 IN TO THE RIGHT OF THE CENTER OF THE TRACK

CONTROL: 2-8 -0202 (50) DATE OF ANALYSIS: REEL: F29 INDEX 1145
 OMNI SPECTRUM (ELEMENT 49)
 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



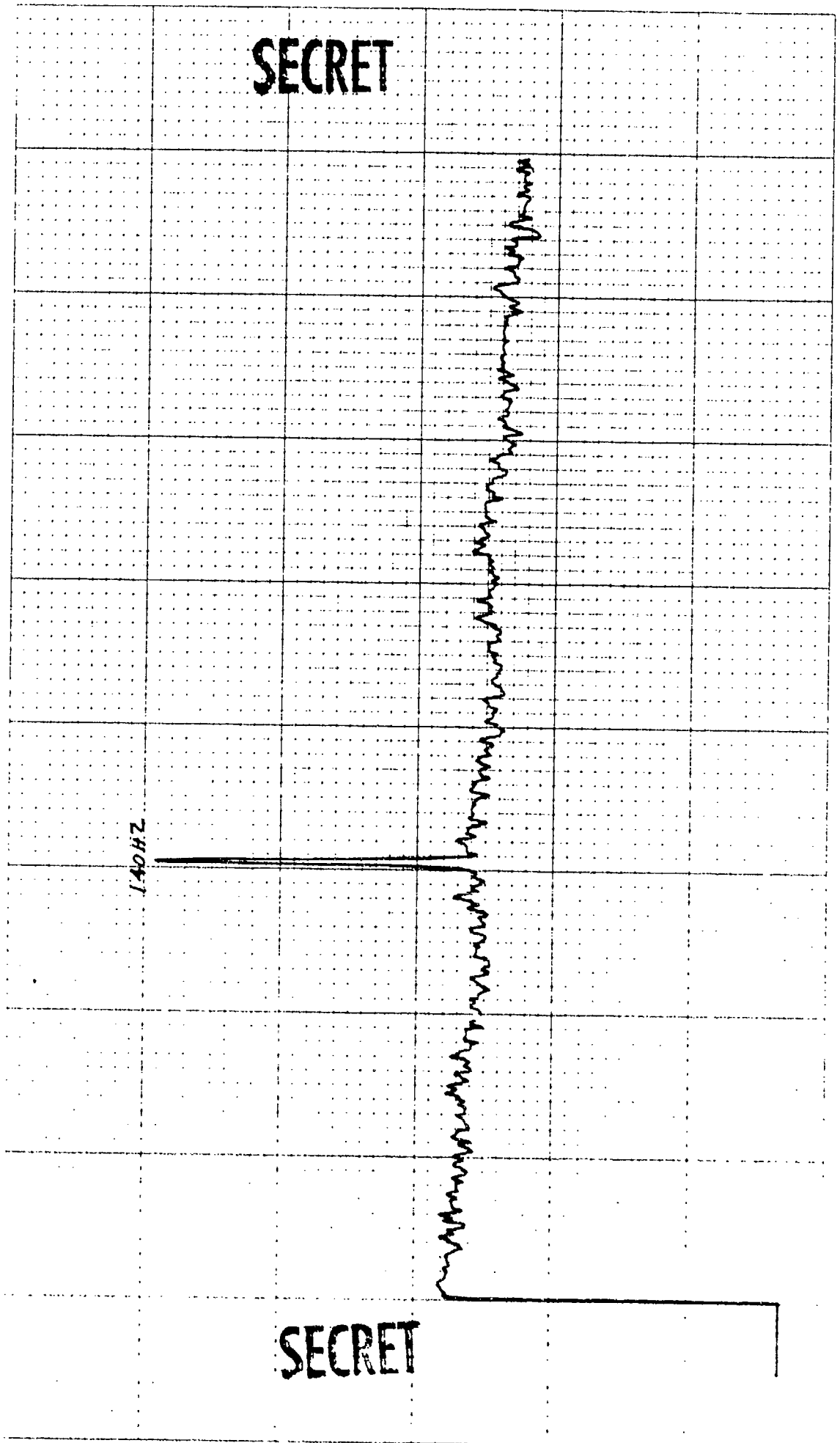
46 0703

DATE OF ANALYSIS: 2-8-77

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

INTEGRATION TIME 320 SECS ATTN: DB
 FILTER WIG: HANNING

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



46 0703

1-2-8 2-8-77 TO TIME 08:00:00 01-1-77

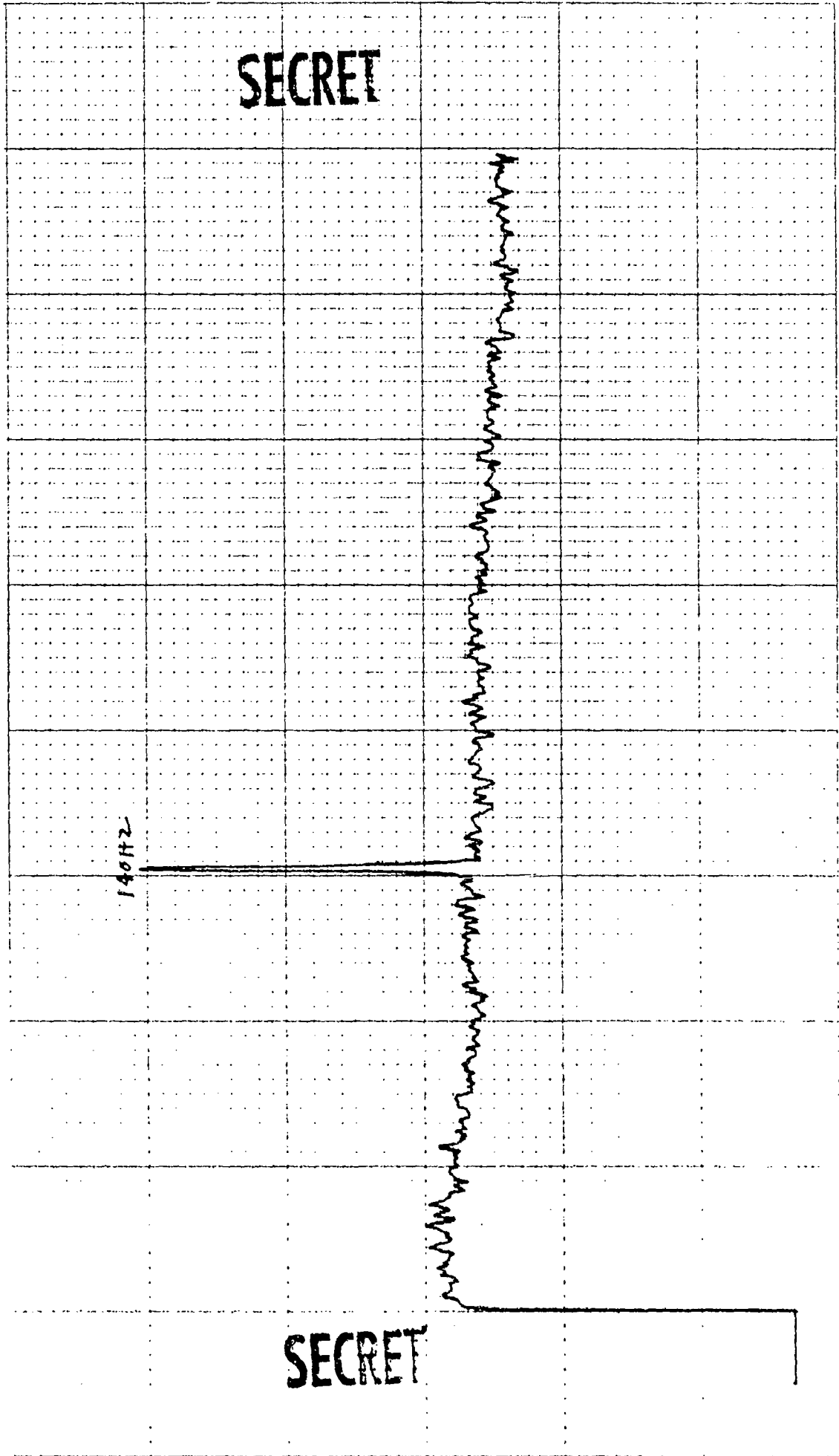
REEL: F29 INDEX 1195

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

DATE OF ANALYSIS:

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

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



46 0703

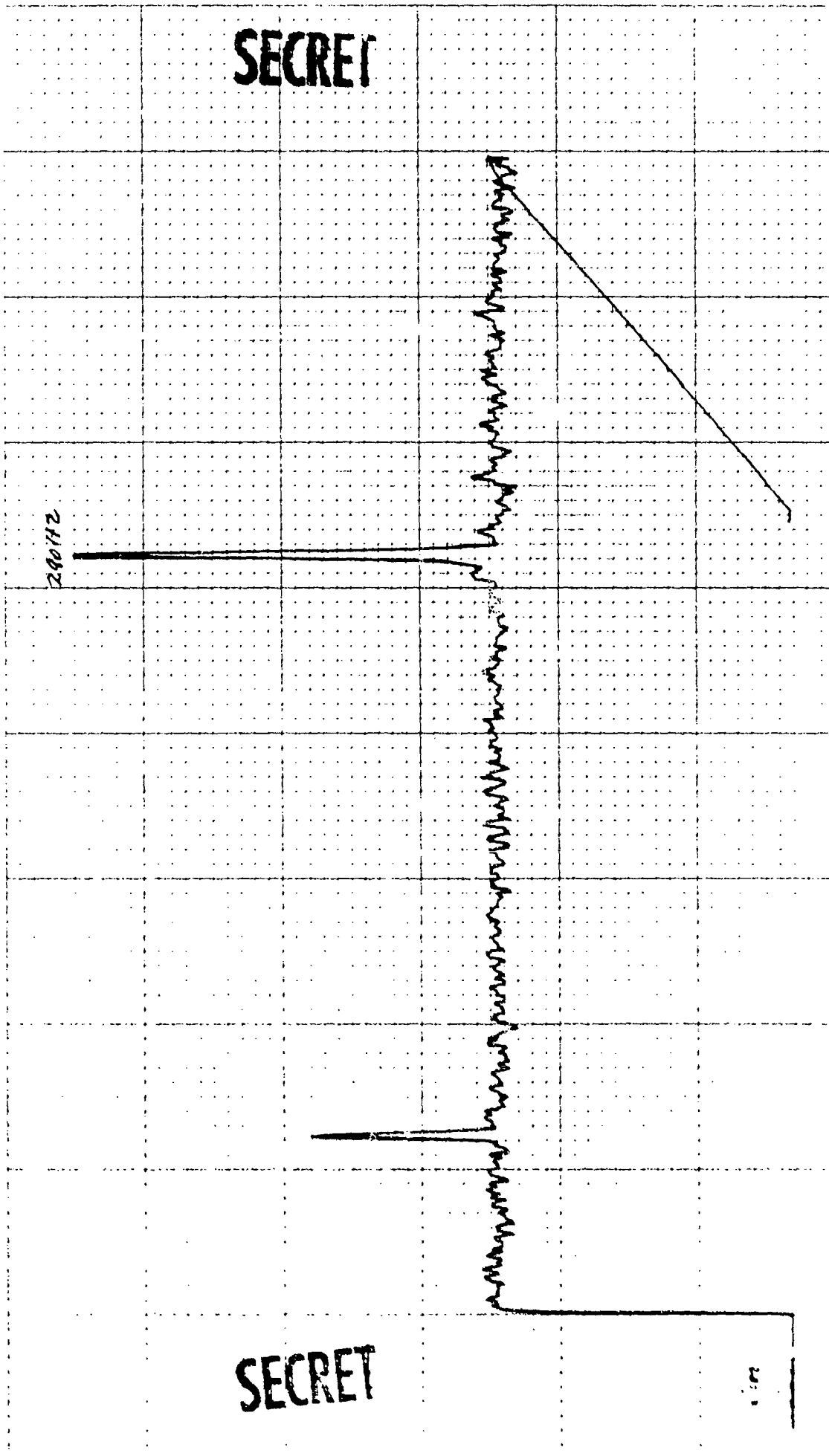
1492 1000 1000 1000 1000

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

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

PEEL: F29 INDEX: 1/45

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



SECRET

SECRET

1000

46 0703

INDEX 1145

REEL: F29

ATTEN: DB
WTG: HANNING

INTEGRATION TIME 320 SECS
FILTER

DATE OF ANALYSIS:

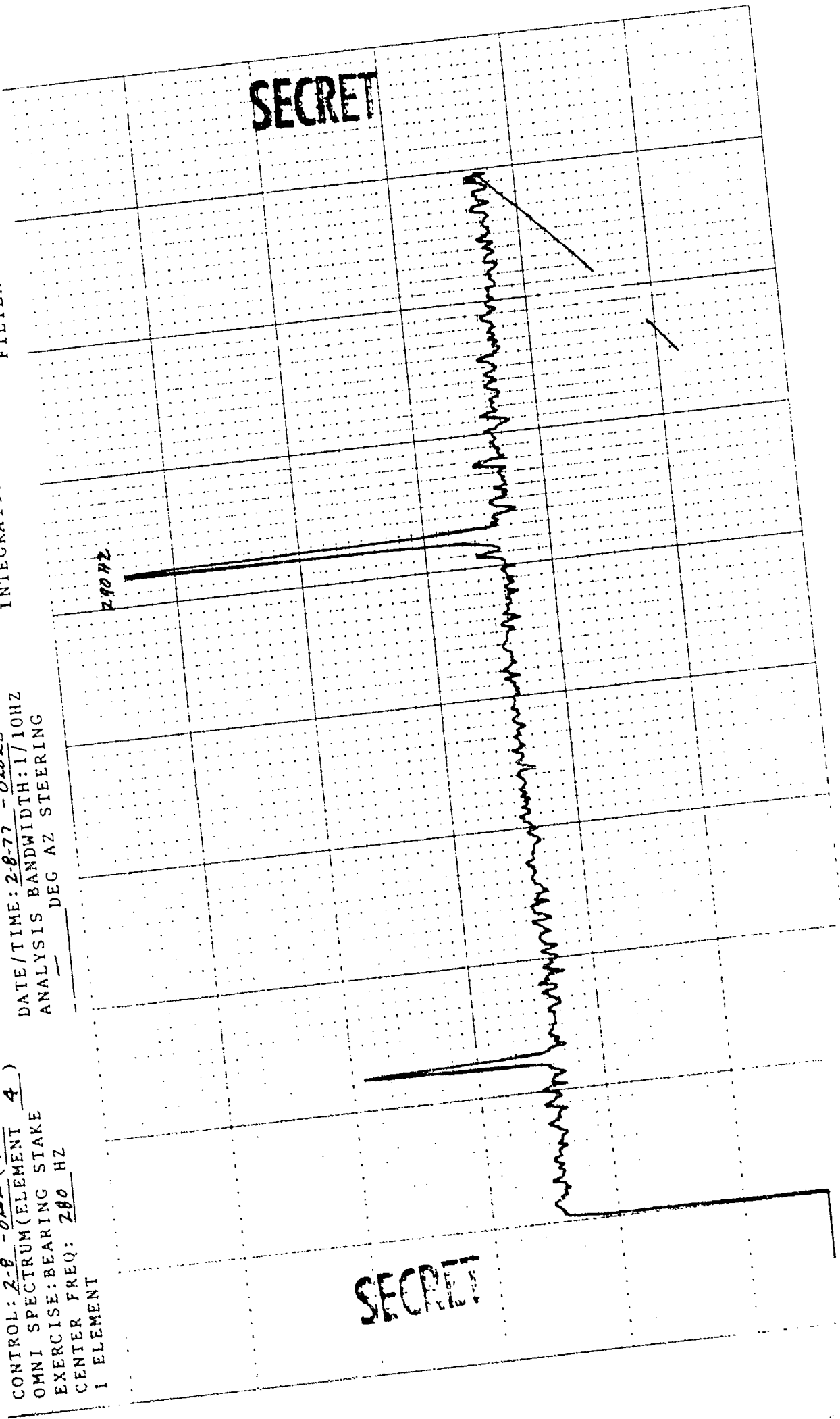
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

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

SECRET

280 HZ

SECRET



46 0703

1652 10.6.77 TO THE DEPT. OF DEFENSE

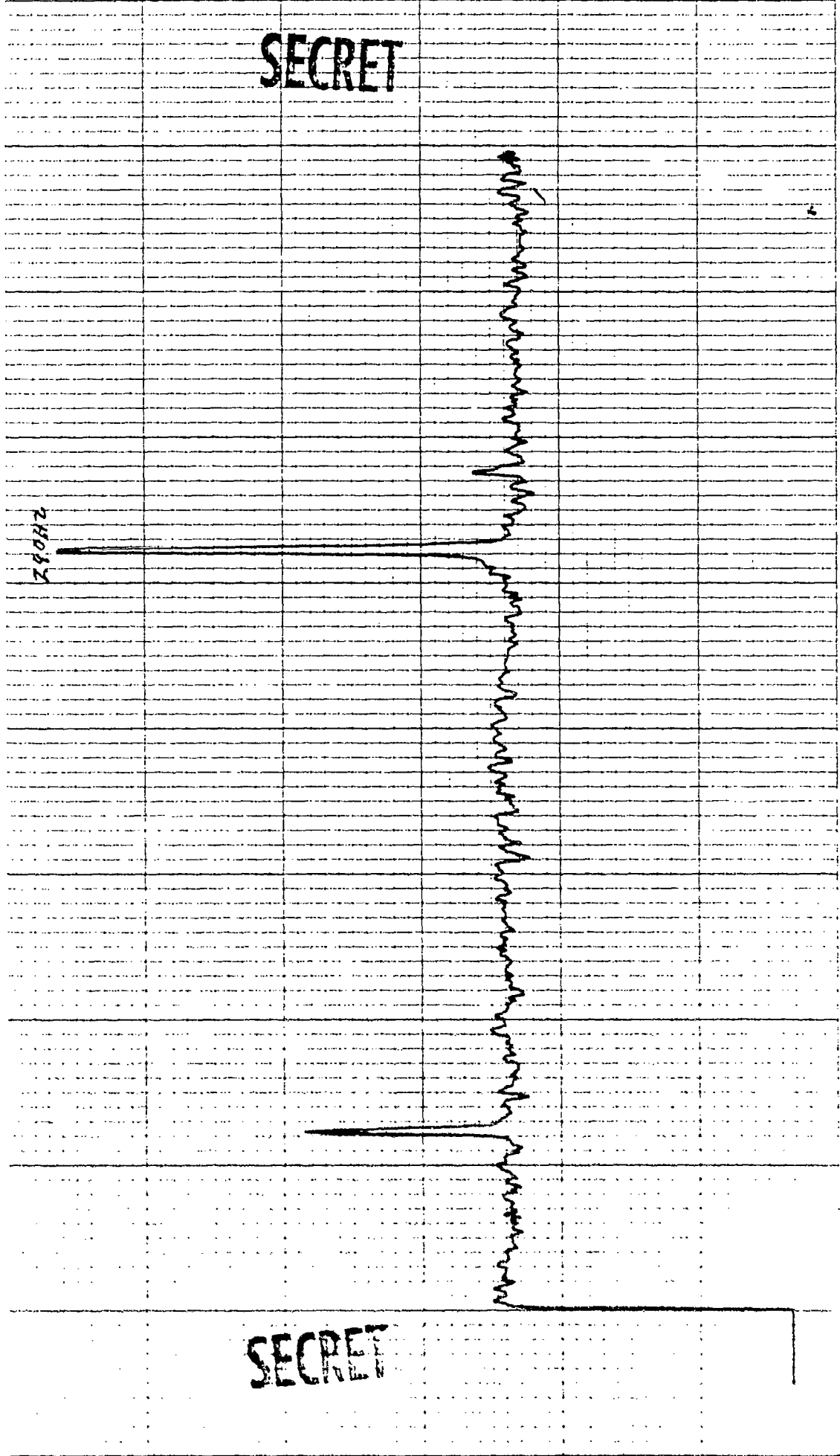
CONTROL: 2-8 - 0202 (3)
OMNI SPECTRUM (ELEMENT 6)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F29 INDEX: 145

INTEGRATION TIME 320 SECS
FILTER WTC: HANNING



46 0703

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

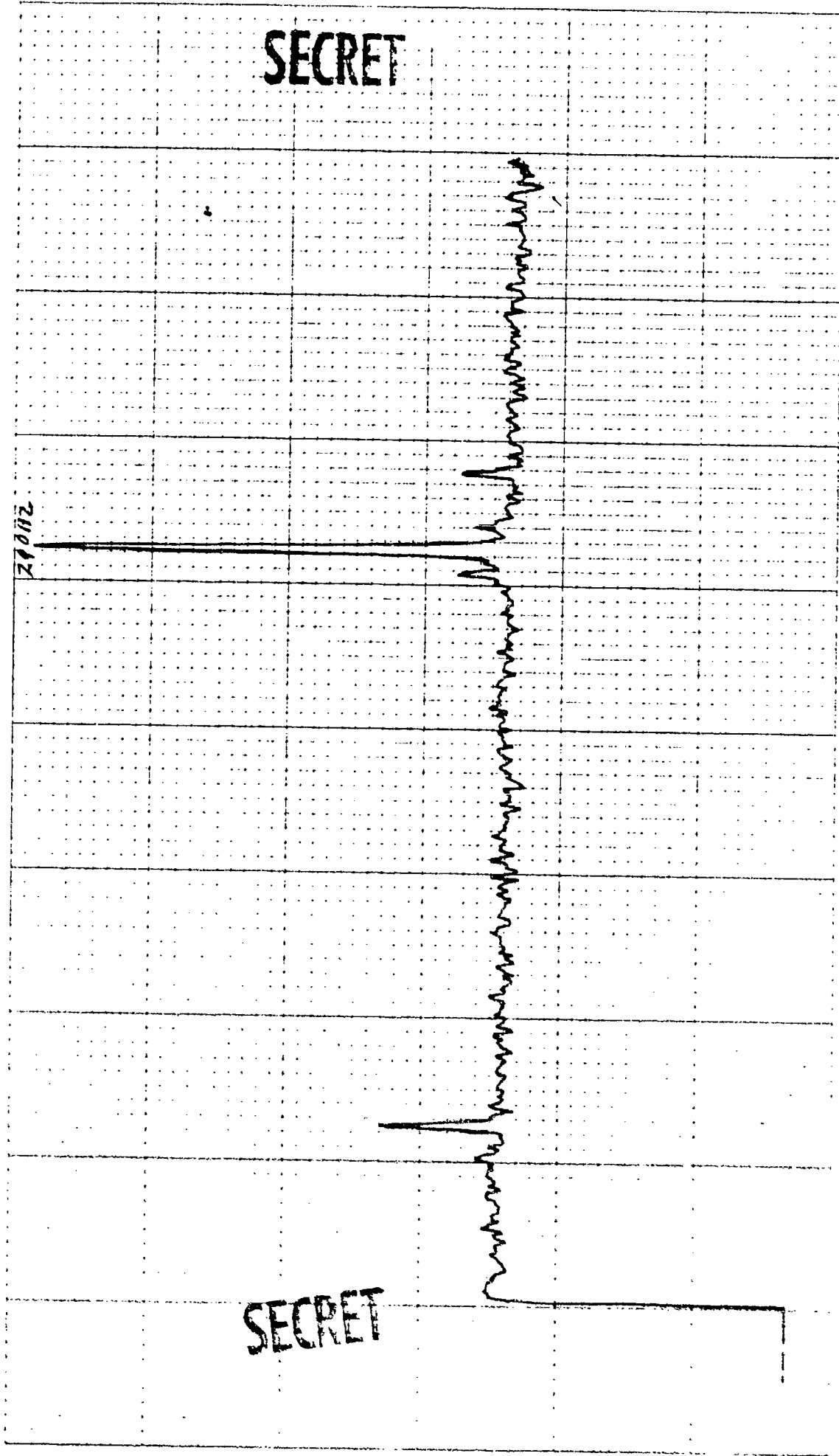
CONTROL: 2-8 -0202 (4)
OMNI SPECTRUM(ELEMENT 9)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F29 INDEX: 145

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING



SECRET

SECRET

45 0703

CONT POL: 2.8 - 0.222 (5)
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

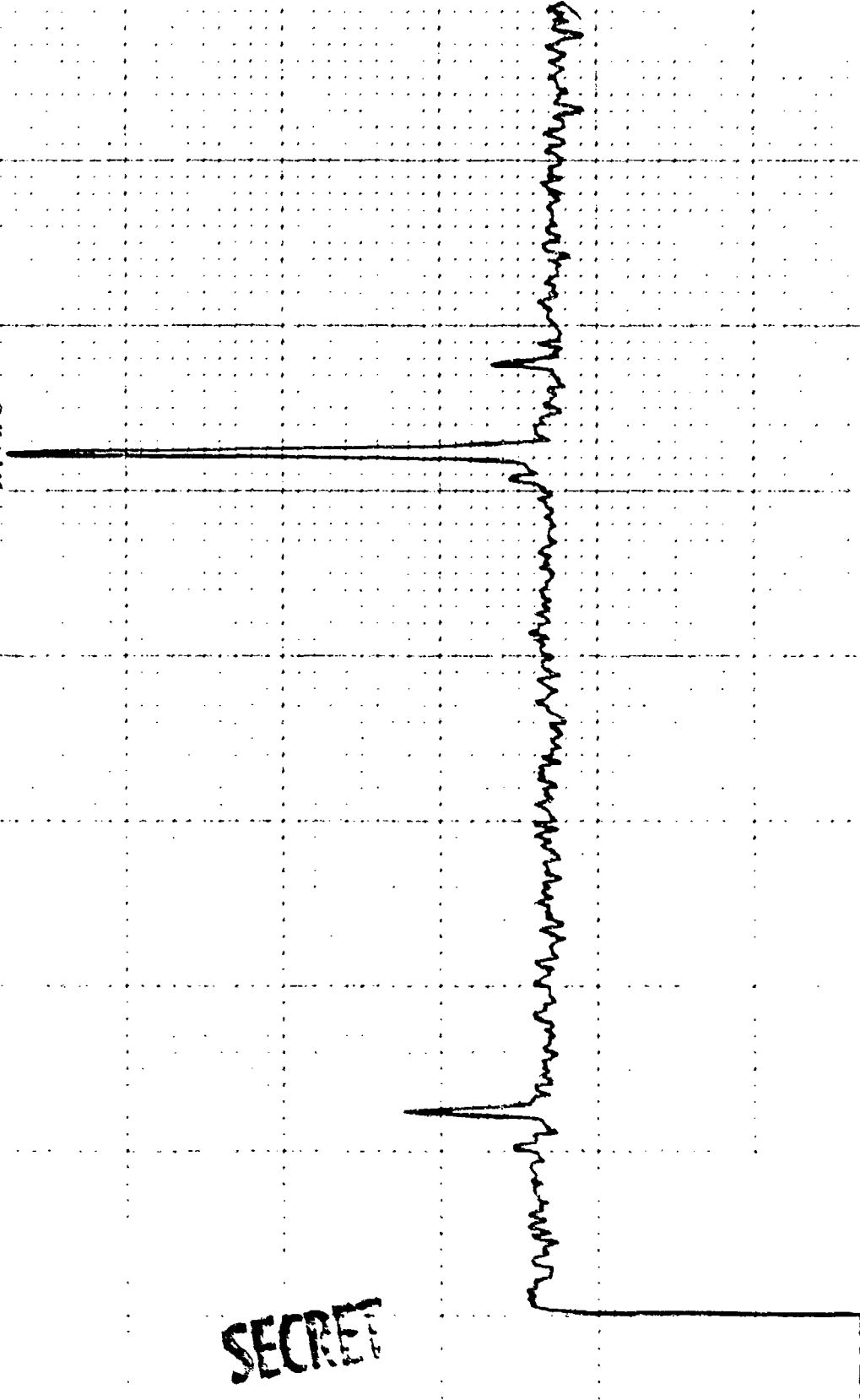
DATE/TIME: 2-8-77 - 0202 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

PEEL: F29

INDEX: 145

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

290HZ



SECRET

SECRET

46 0703

102 2000 2000 2000 2000

REEL: F29 INDEX 1145

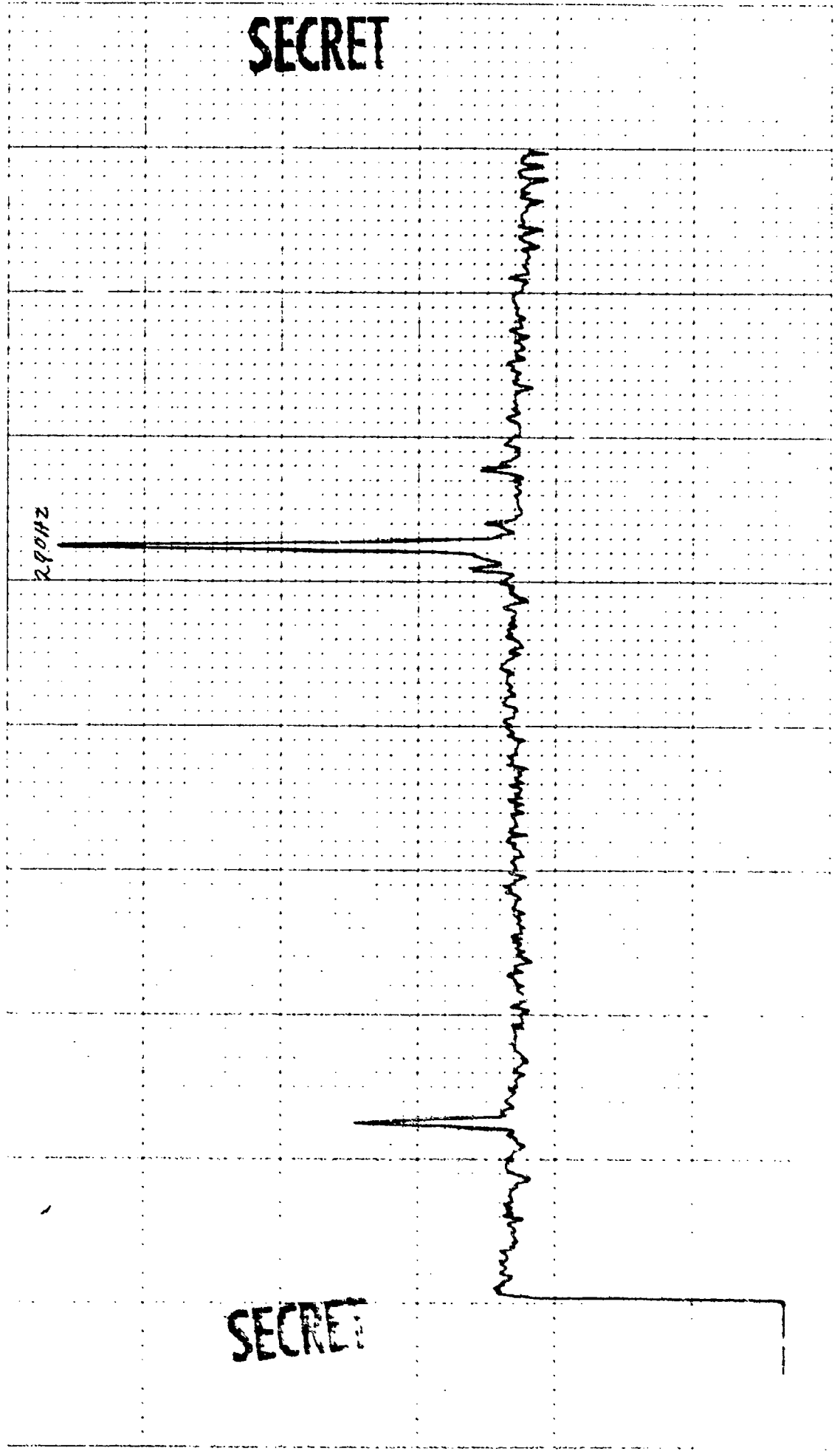
DATE OF ANALYSIS:

CONTROL: 2-0 - 0202 (6)
OMNI SPECTRUM (ELEMENT 12)

INTEGRATION TIME 320 SECS ATTEN: DB
FILTER WTG: HANNING

DATE/TIME: 2-0-77 - 0202Z
ANALYSIS BANDWIDTH: 1710HZ
 DEG AZ STEERING

EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT



SECRET

SECRET

46 0703

167. 2-8-77 0202Z

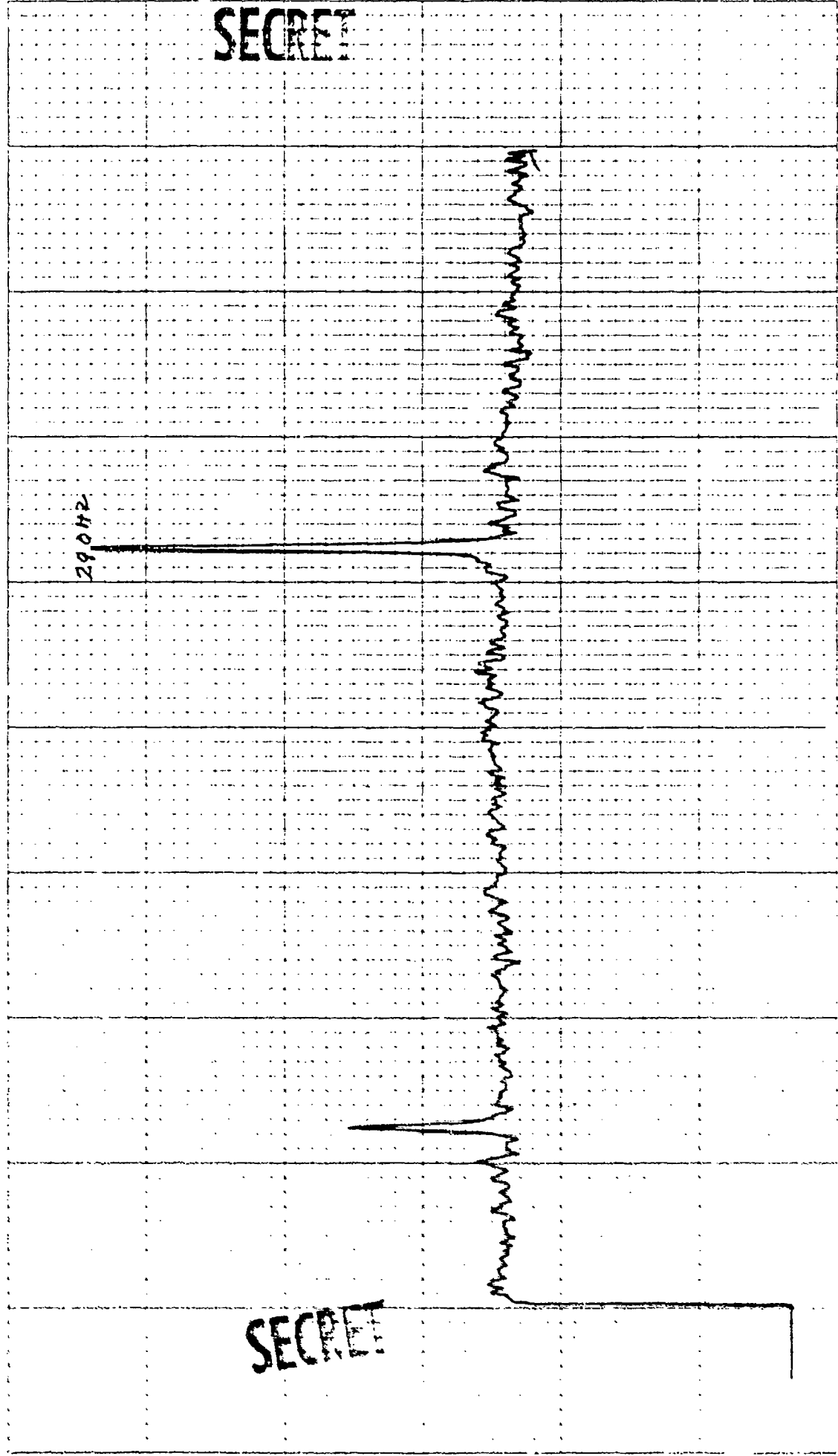
REEL: F21 INDEX: 1145

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

DATE OF ANALYSIS:

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

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



46 0703

1602 2000Z 2000Z 2000Z 2000Z

INDEX 1145

REEL: F29

DATE OF ANALYSIS:

CONTROL: 2-8 -0202 (8)

OMNI SPECTRUM (ELEMENT 16)

EXERCISE: BEARING STAKE

CENTER FREQ: 280 HZ

1 ELEMENT

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

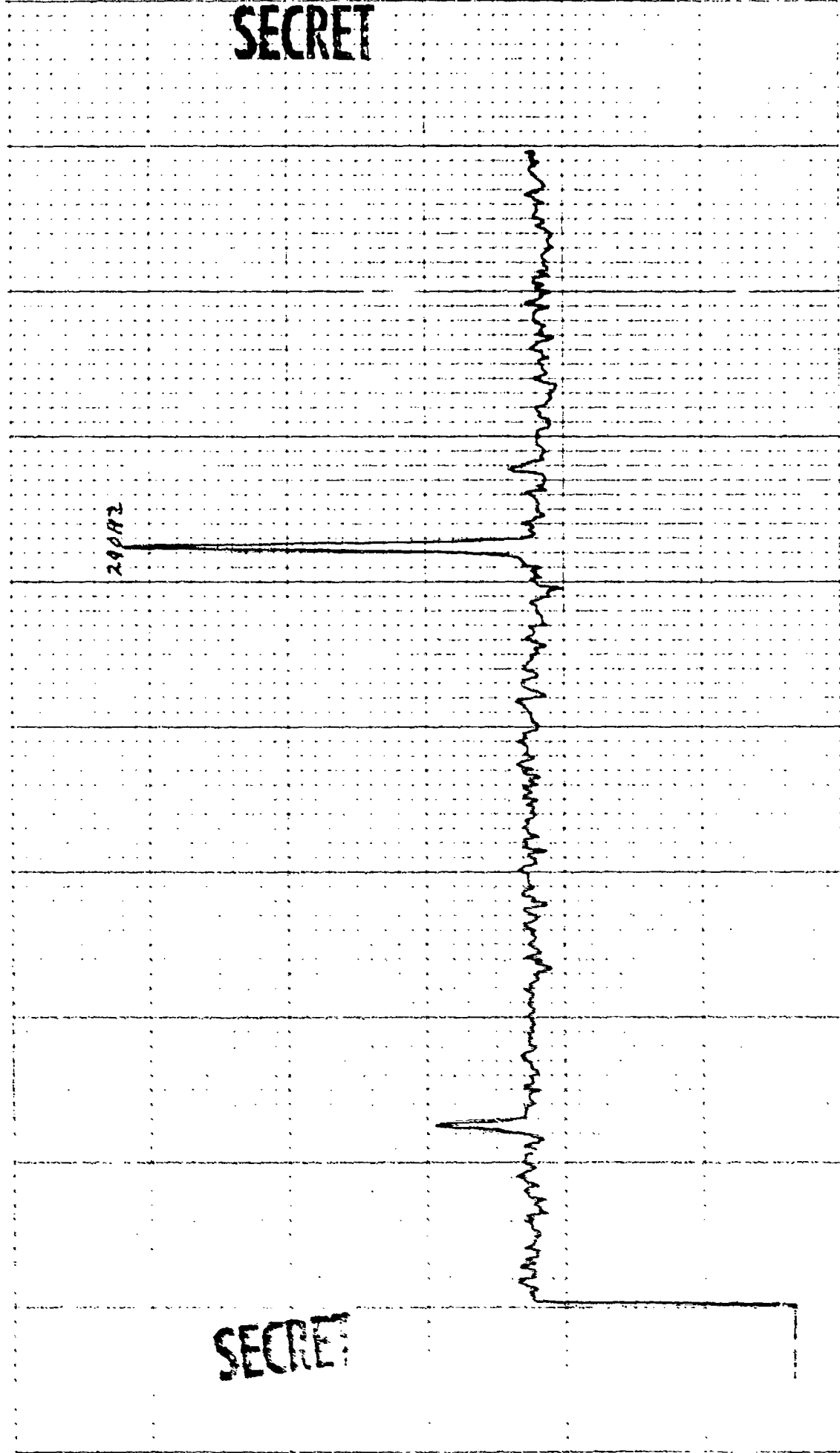
ANALYSIS BANDWIDTH: 1/10HZ

 DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER WTC: HANNING

ATTEN: - DB



SECRET

46 0703

REF ID: A660703

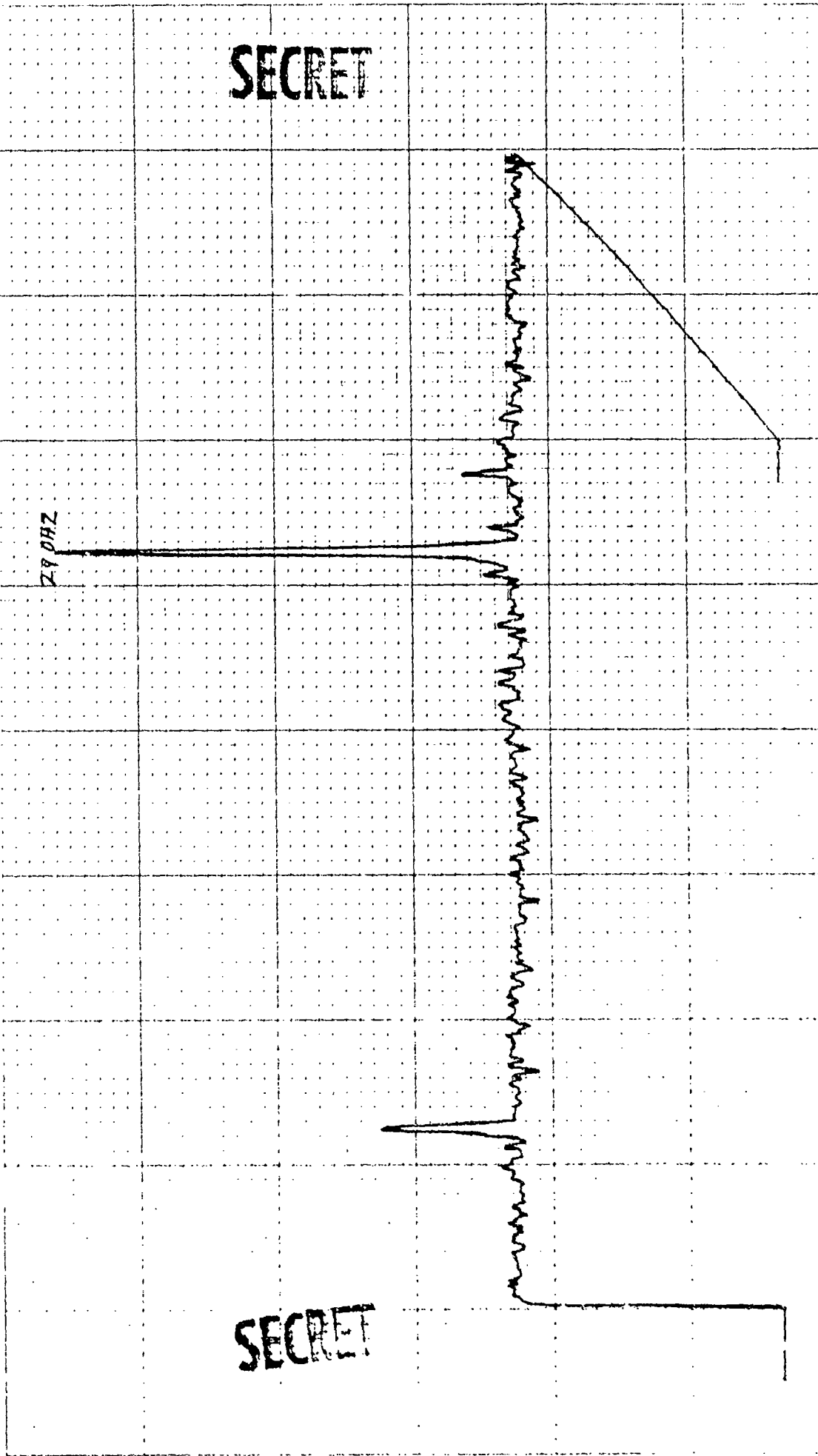
REEL: F29 INDEX: 1145

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

DATE OF ANALYSIS:

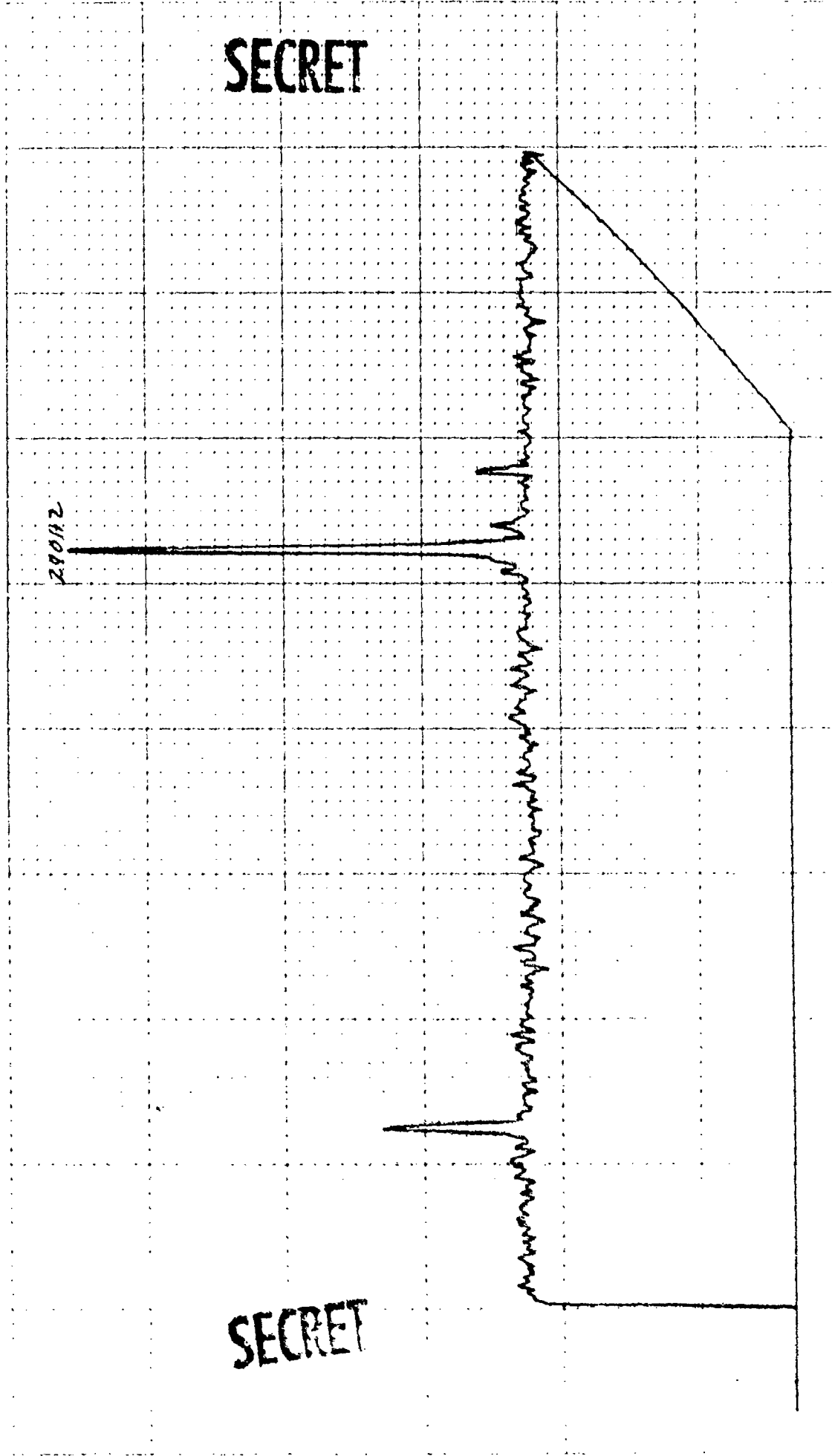
DATE/TIME: 2-8-77 - 0242Z
ANALYSIS BANDWIDTH: 1/10 HZ
1 DEG AZ SLEERING

INTEGRATION TIME 320 SECS
FILTER
ATTEN: DB
WTC: HANNING



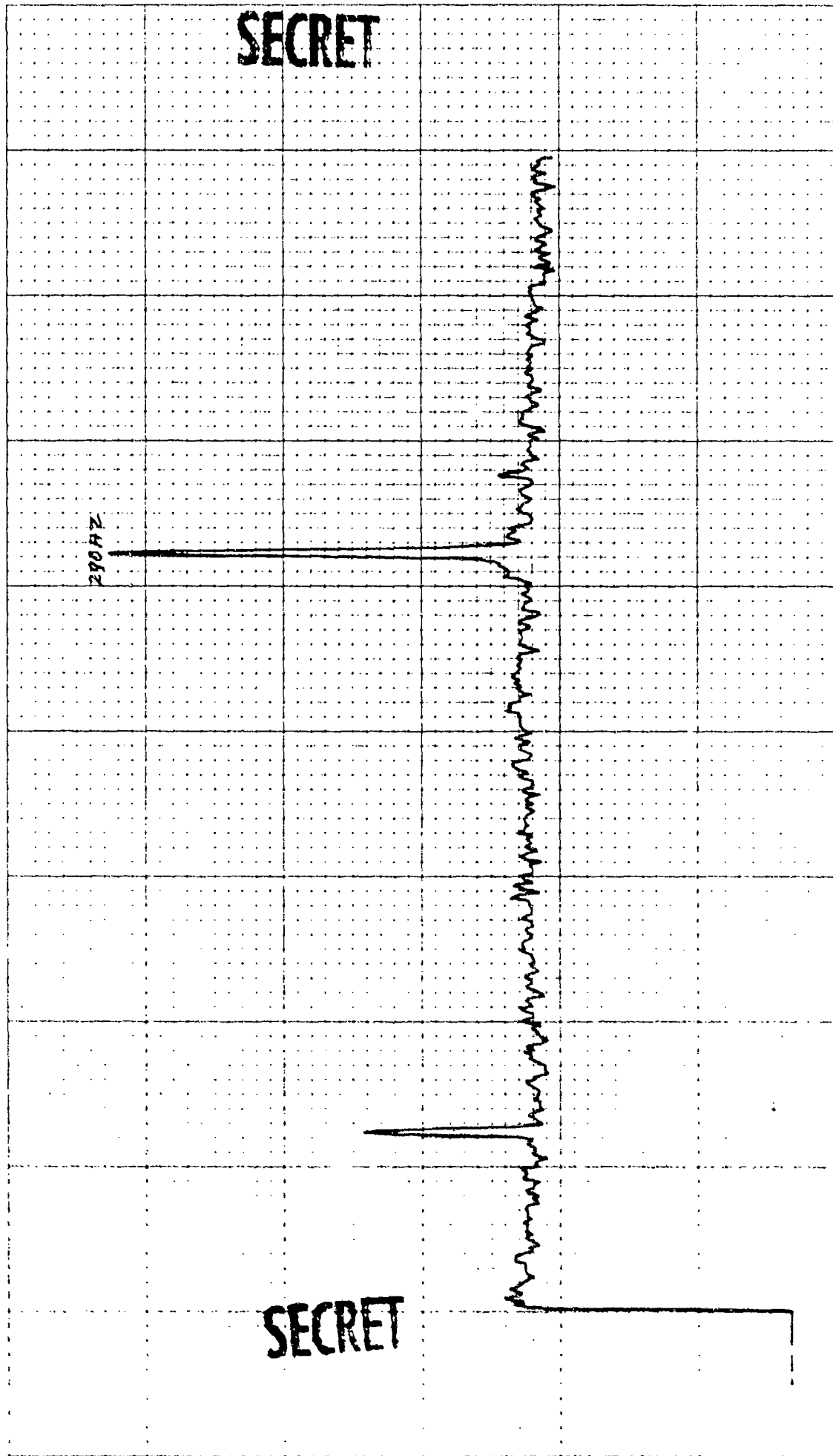
46 0703

CONTROL: 2.0 - 0202 (10) DATE OF ANALYSIS: REEL: F29 INDEX: 145
 OMNI SPECTRUM (ELEMENT 20)
 EXERCISE: BEARING: STAKE
 CENTER FREQ: 280 HZ INTEGRATION TIME 320 SECS ATTEN: - DB
 I ELEMENT FILTER WTG: HANNING
 DATE/TIME: 2-8-77 - 0202 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 _____ DEG AZ STEERING



46 0703

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



46 0703

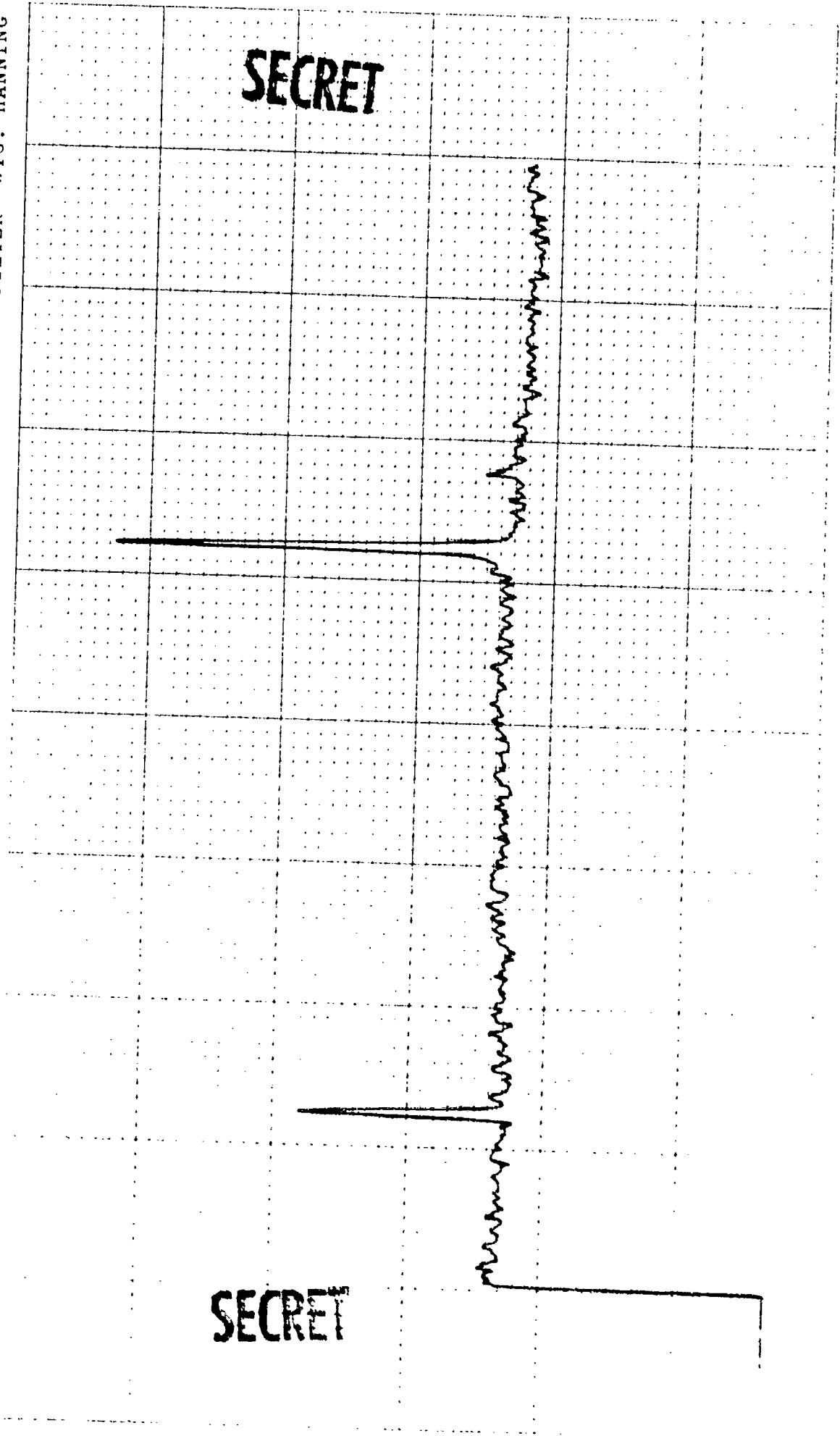
CONTROL: 2-8 - 0202 (12)
OMNI SPECTRUM (ELEMENT 24)
EXERCISE: BEAKING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-877 - 0202 Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ STEERING

REEL: F29 INDEX: 145

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



SECRET

SECRET

46 0703

4602 4602 TO THE BOMBING OF THE BOMBING

INDEX 1/45

REEL: F29

DATE OF ANALYSIS:

CONTROL: 2-8 -0202 (13)

OMNI SPECTRUM (ELEMENT 26)

EXERCISE: BEARING STAKE

CENTER FREQ: 280 HZ

1 ELEMENT

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

ANALYSIS BANDWIDTH: 1/10HZ

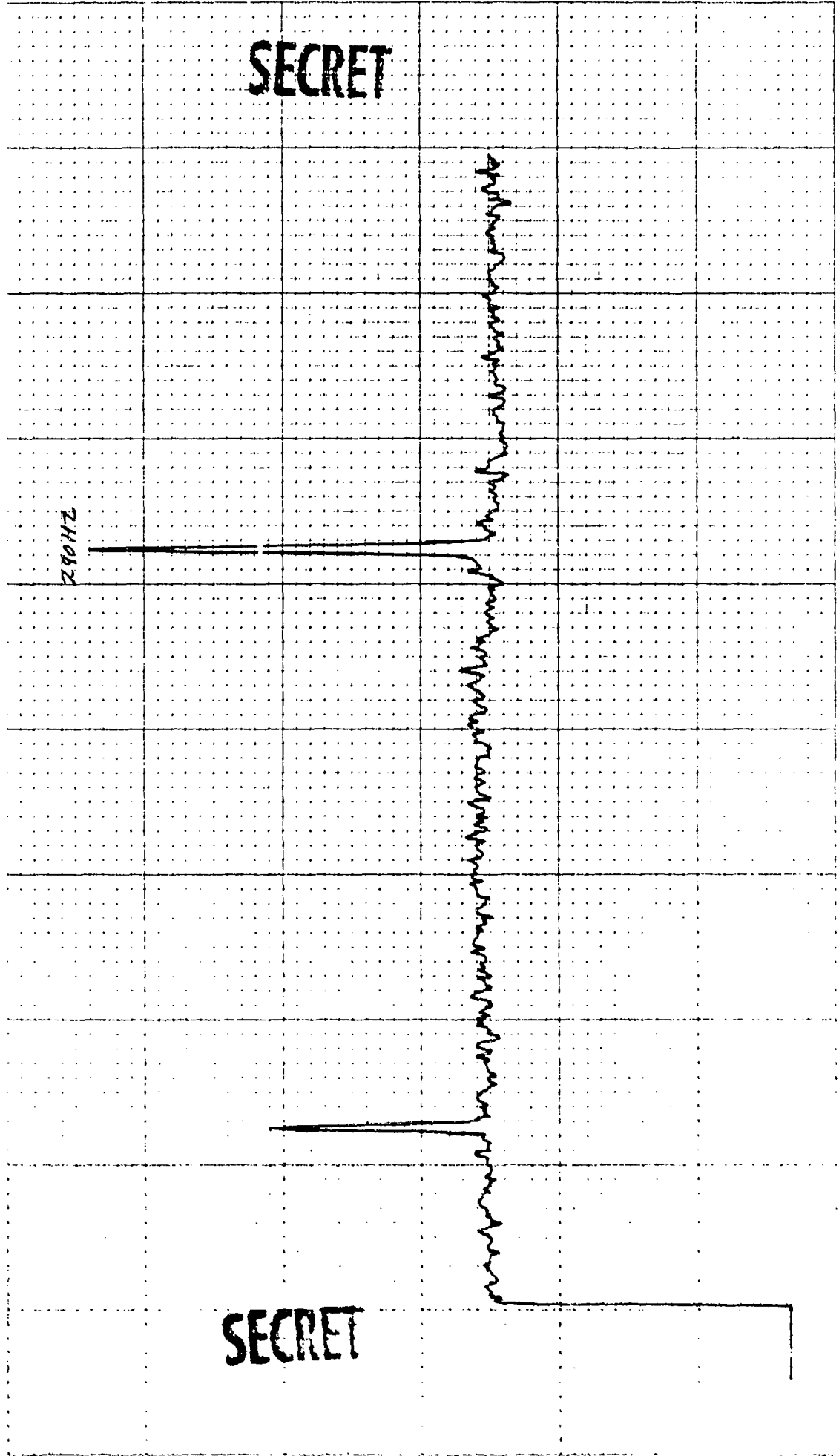
DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

ATTEN: DB

WTC: HANNING



46 0703

1/22 10:00 AM 10/10/77

REEL: F29 INDEX 1/45

DATE OF ANALYSIS: _____

CONTROL: 2-8-0202 (14)

OMNI SPECTRUM (ELEMENT 29)

EXERCISE: BEARING STAKE

CENTER FREQ: 280 HZ

1 ELEMENT

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

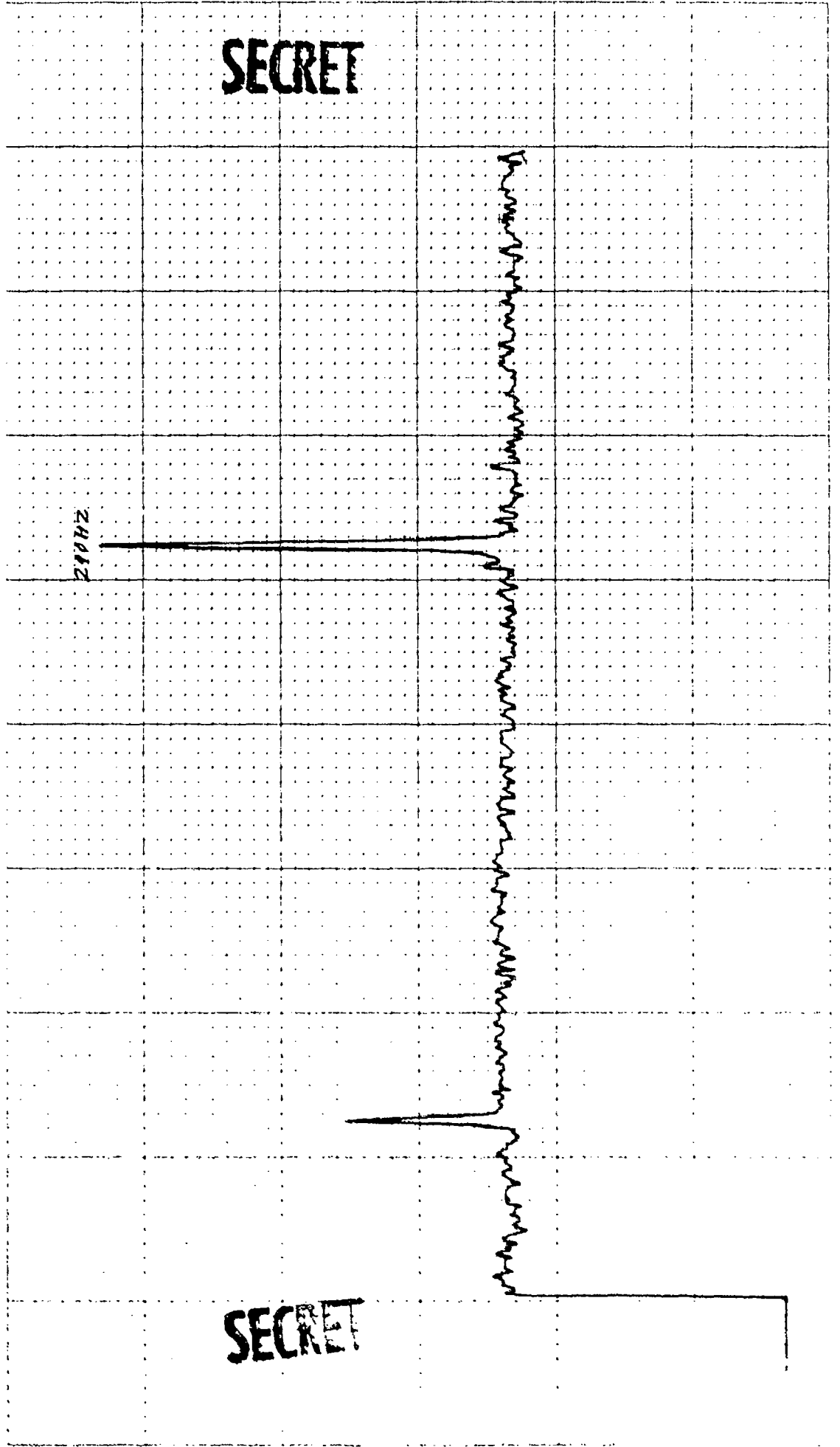
ANALYSIS BANDWIDTH: 1/10HZ

_____ DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER DB

ATTEN: HANNING



46 0703

Page 2 of 2

INDEX 1145

REEL: F29

DATE OF ANALYSIS:

CONTROL: 0202 - 51 (D07)

OMNI SPECTRUM (ELEMENT 31)

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

ANALYSIS BANDWIDTH: 1/10HZ

- DEG AZ STEERING

INTEGRATION TIME 320 SECS

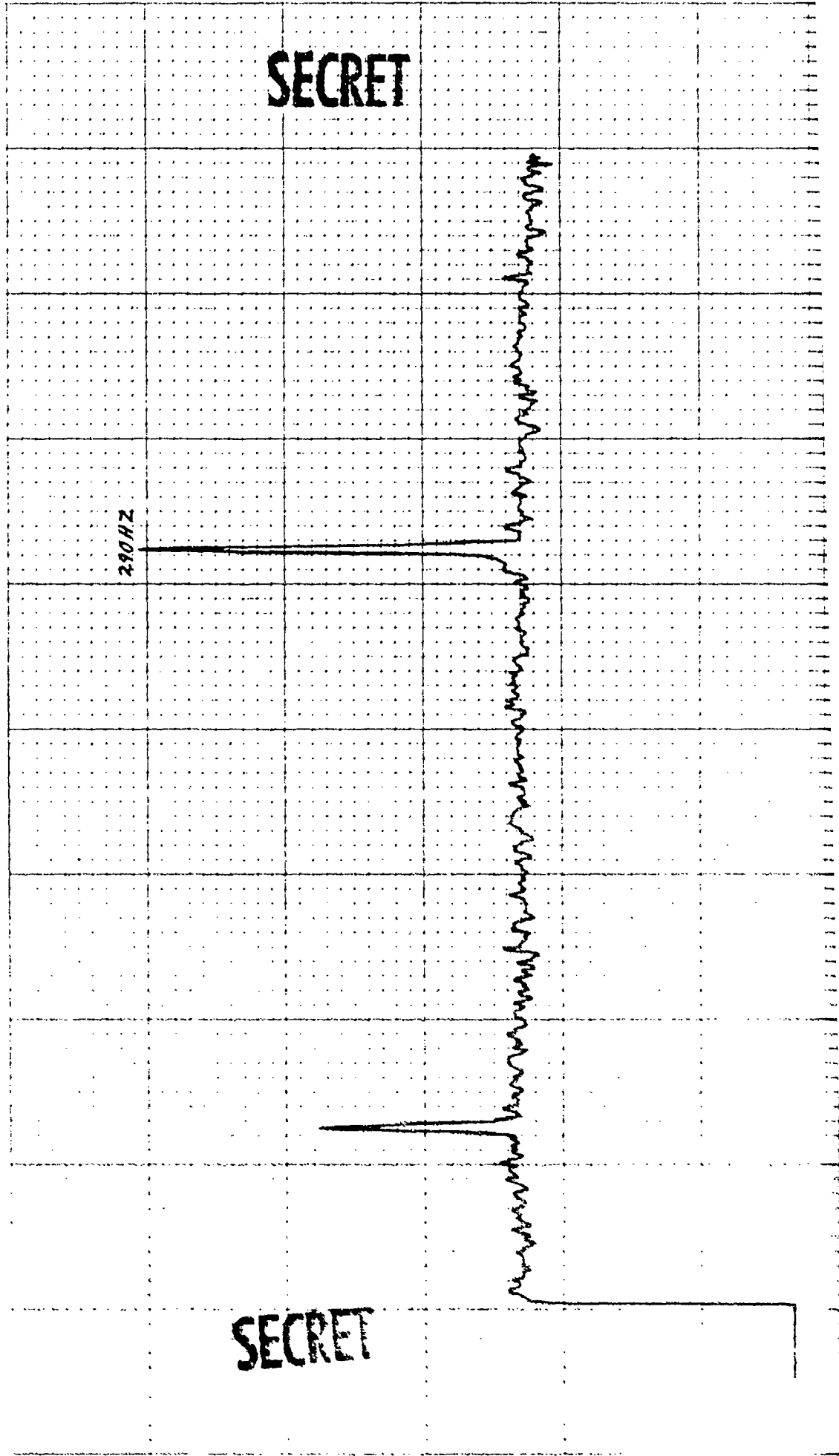
FILTER

ATTEN: - DB

WTG: HANNING

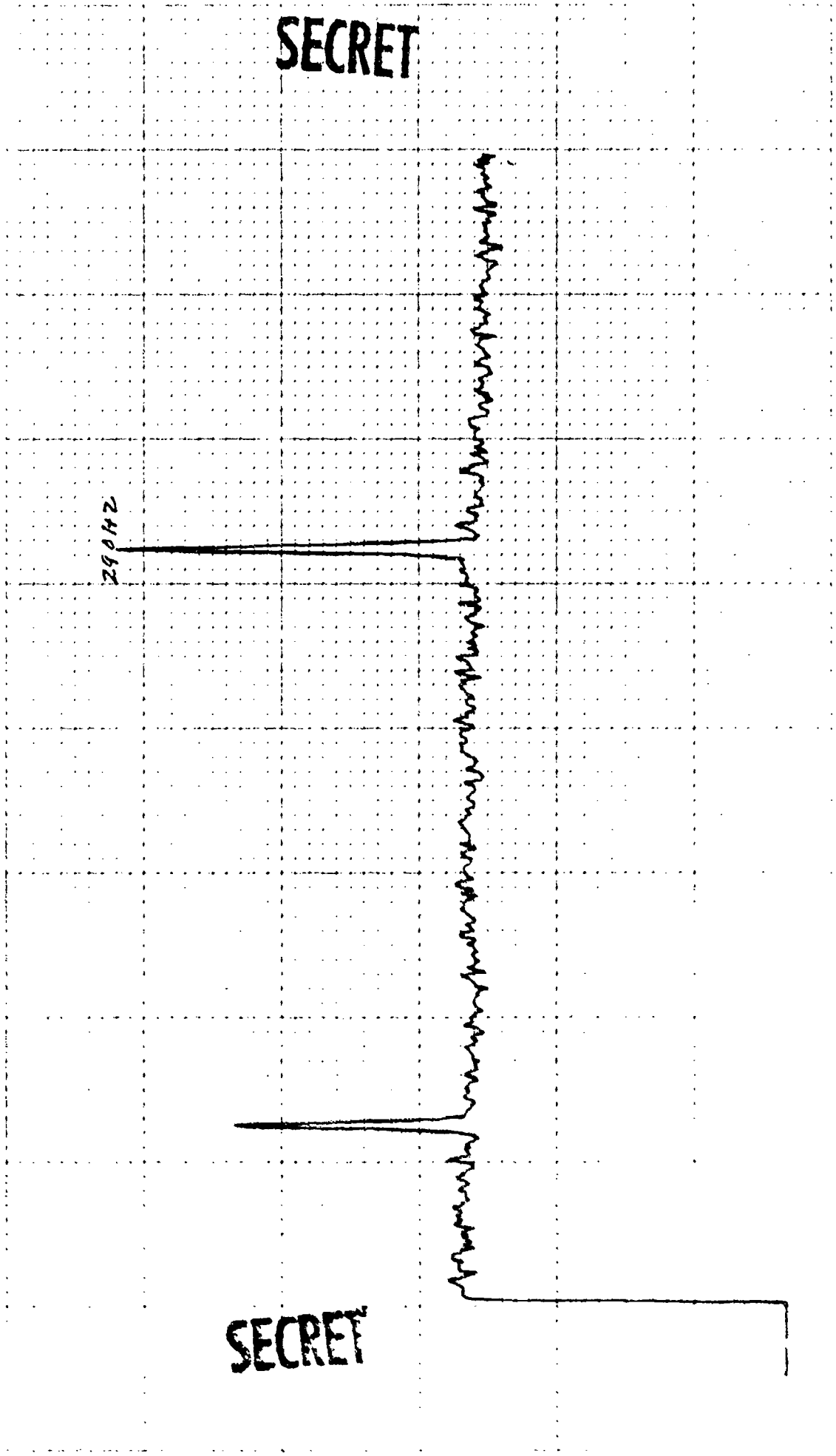
CENTER FREQ: 280 HZ

1 ELEMENT



45 0703

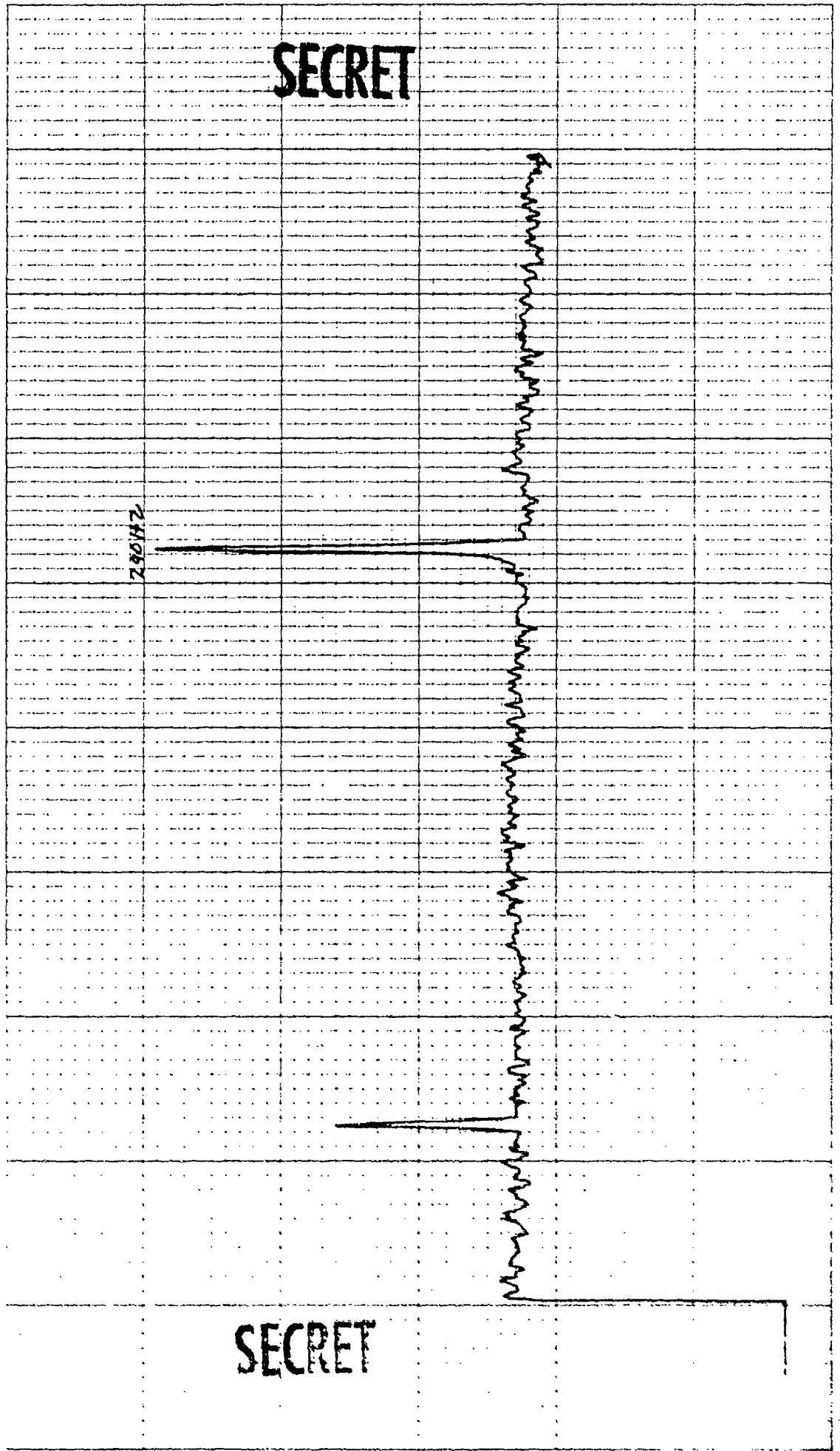
CONTROL: 2-8 -0202 (16) DATE OF ANALYSIS: PEEL: F29 INDEX: 1145
 OMNI SPECTRUM ELEMENT 23
 EXERCISE: BEAPING STAKE
 CENTER FREQ: 280 HZ
 I ELEMENT
 DATE/TIME: 2-8-77 -0202Z
 ANALYSIS BANDWIDTH: 1/10HZ
 ———— DEG AZ STEERING
 INTEGRATION TIME 320 SECS ATTEN: — DB
 FILTER WTG: HANNING



46 0703

FOR INFO TO THE HQ: ...

CONTROL: 2-8-0202(17) DATE OF ANALYSIS: REEL: F29 INDEX: 1145
 OMNI SPECTRUM(ELEMENT 35)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: - DB
 1 ELEMENT _____ DEG AZ STEERING FILTER WTC: HANNING



46 0703

REF: 2-8-77 0202 Z

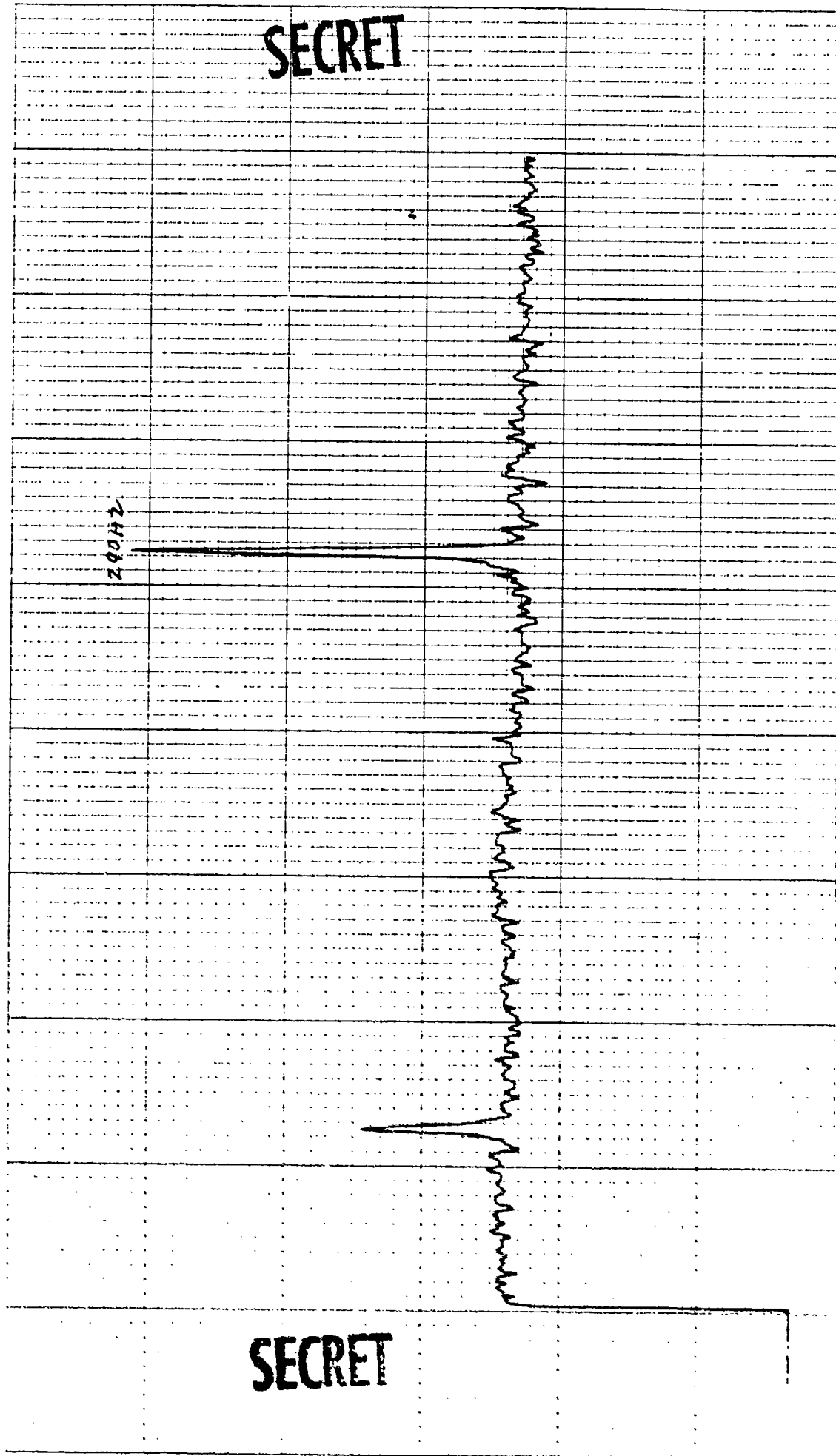
CONTROL: 2-8 - 0202 (18)
OMNI SPECTRUM (ELEMENT 37)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F29 INDEX: 1145

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



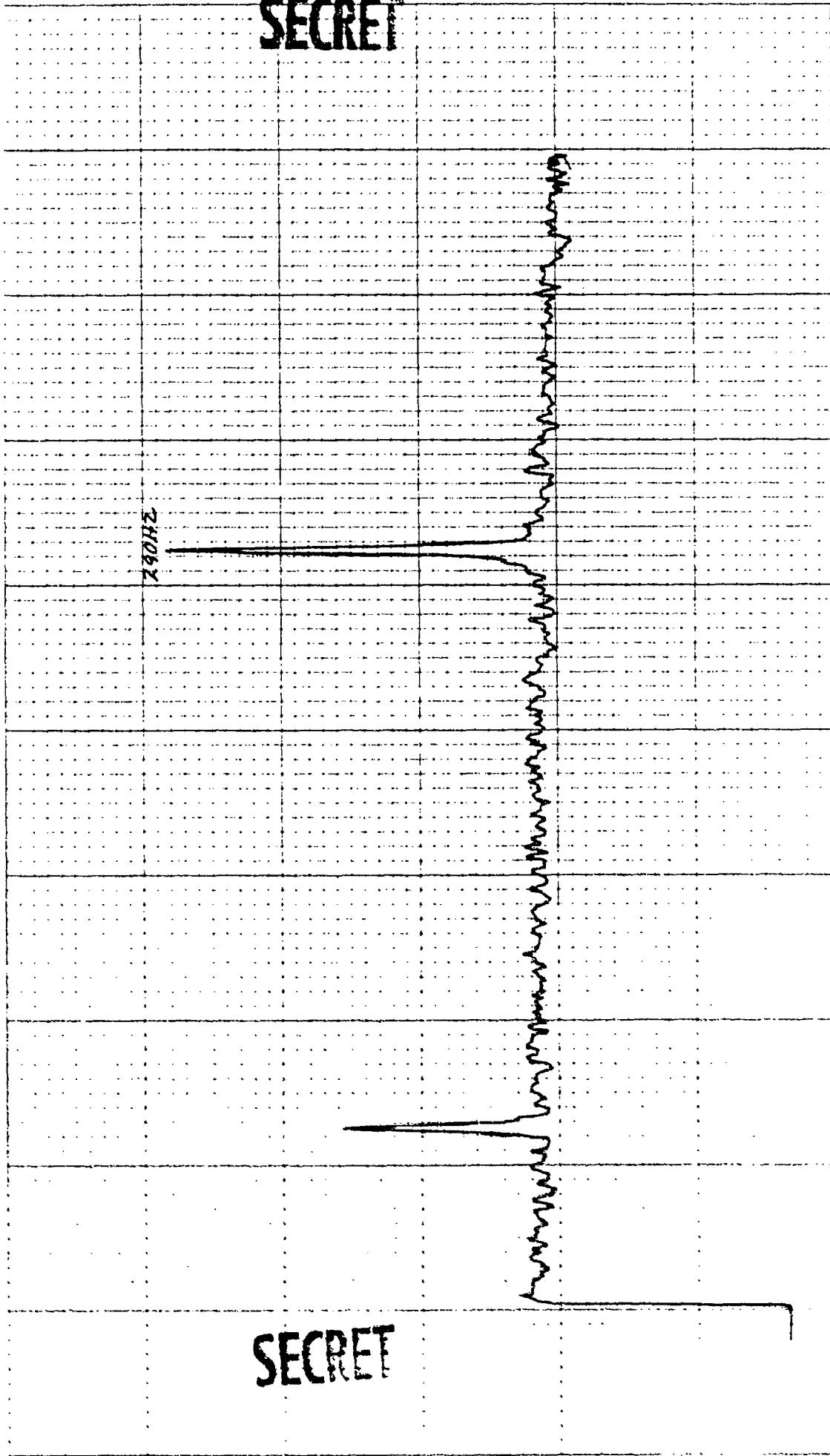
46 0703

142 5000 12106 0010 0010 0010

CONTROL: 2-8 - 0202 (19) DATE OF ANALYSIS: REEL: F29 INDEX: 1145
 OMNI SPECTRUM (ELEMENT 39)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 HZ
 I ELEMENT

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

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



SECRET

SECRET

46 0703

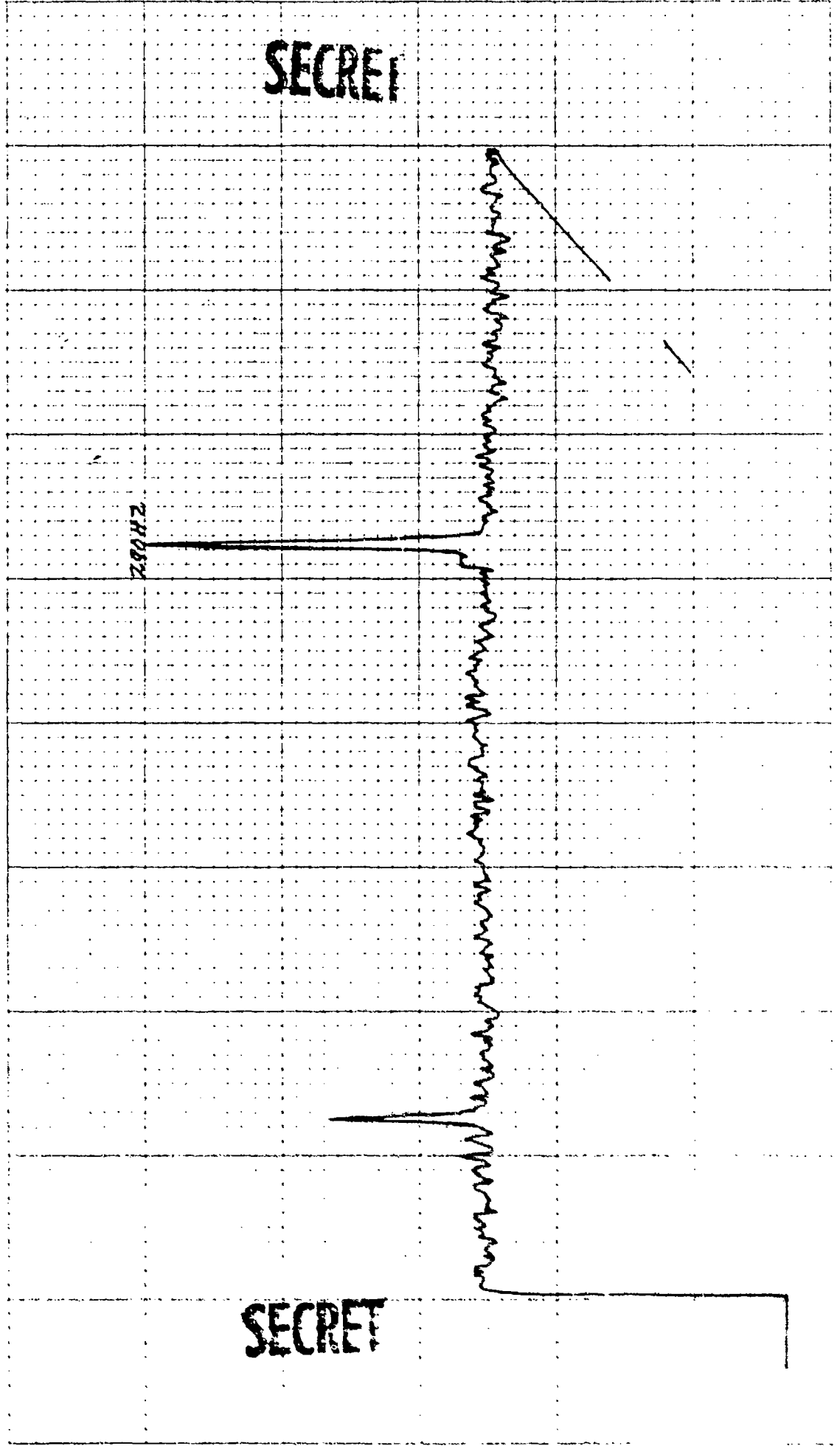
REEL: F29 INDEX: 1195

DATE OF ANALYSIS:

CONTROL: 2-8 -0202 (20)
OMNI SPECTRUM (ELEMENT 41)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
ELEMENT

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

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER WTC: HANNING



SECRET

SECRET

46 0703

187 2 10 10 10 10 10

INDEX/145

REEL: F29

DATE OF ANALYSIS:

CONTROL: 2-0 -0202 (2/)

OMNI SPECTRUM (ELEMENT 43)

EXERCISE: BEARING STAKE

CENTER FREQ: 280 HZ

1 ELEMENT

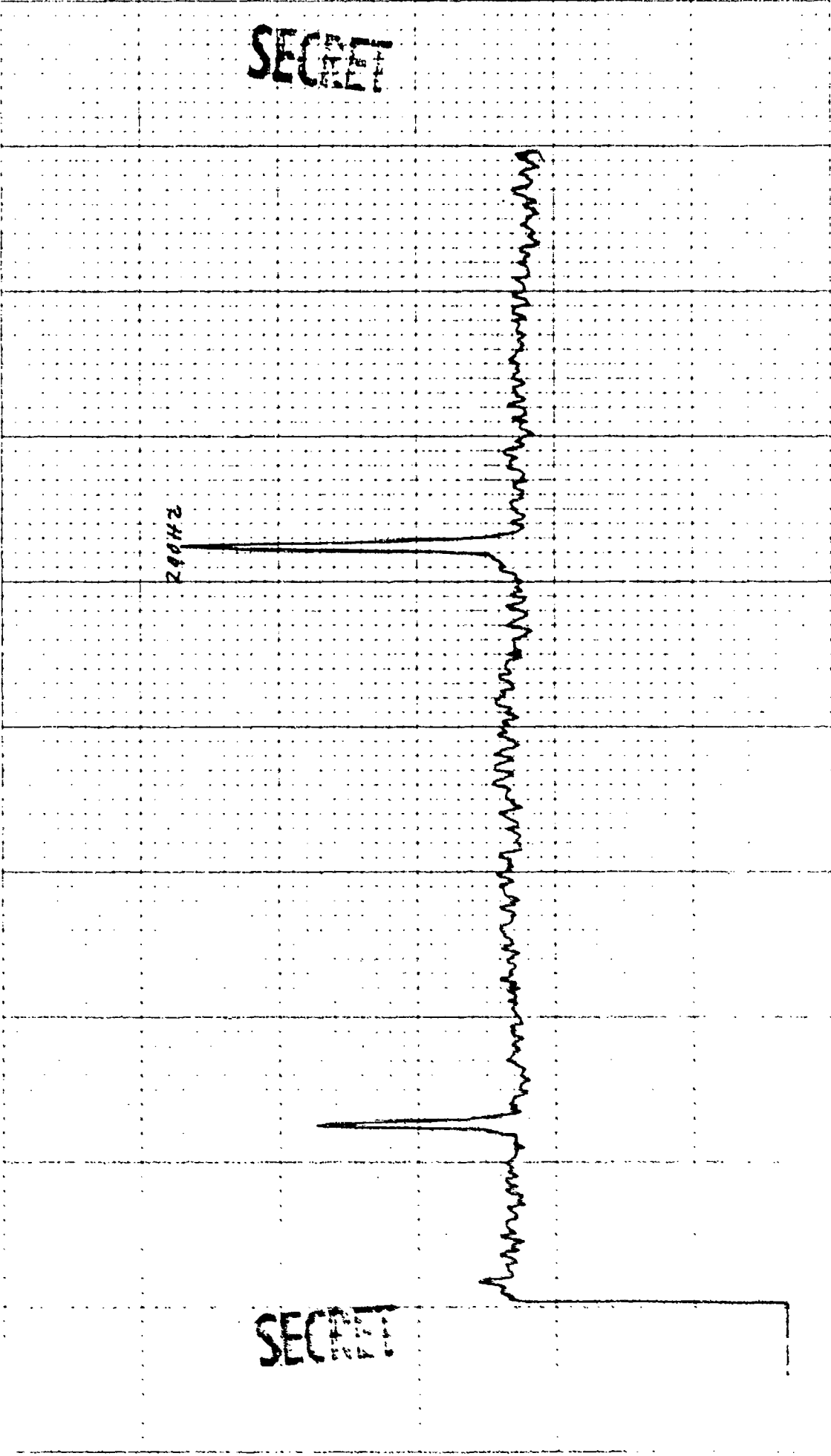
INTEGRATION TIME 320 SECS

FILTER WTC: HANNING

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

ANALYSIS BANDWIDTH: 1/10HZ

DEG AZ STEERING



SECRET

SECRET

46 0703

REF ID: A66843

REEL: F29 INDEX: 1145

DATE OF ANALYSIS:

CONTROL: 2-8 -0202 (22)

OMNI SPECTRUM (ELEMENT 45)

EXERCISE: BEARING STAKE

CENTER FREQ: 280 HZ

1 ELEMENT

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

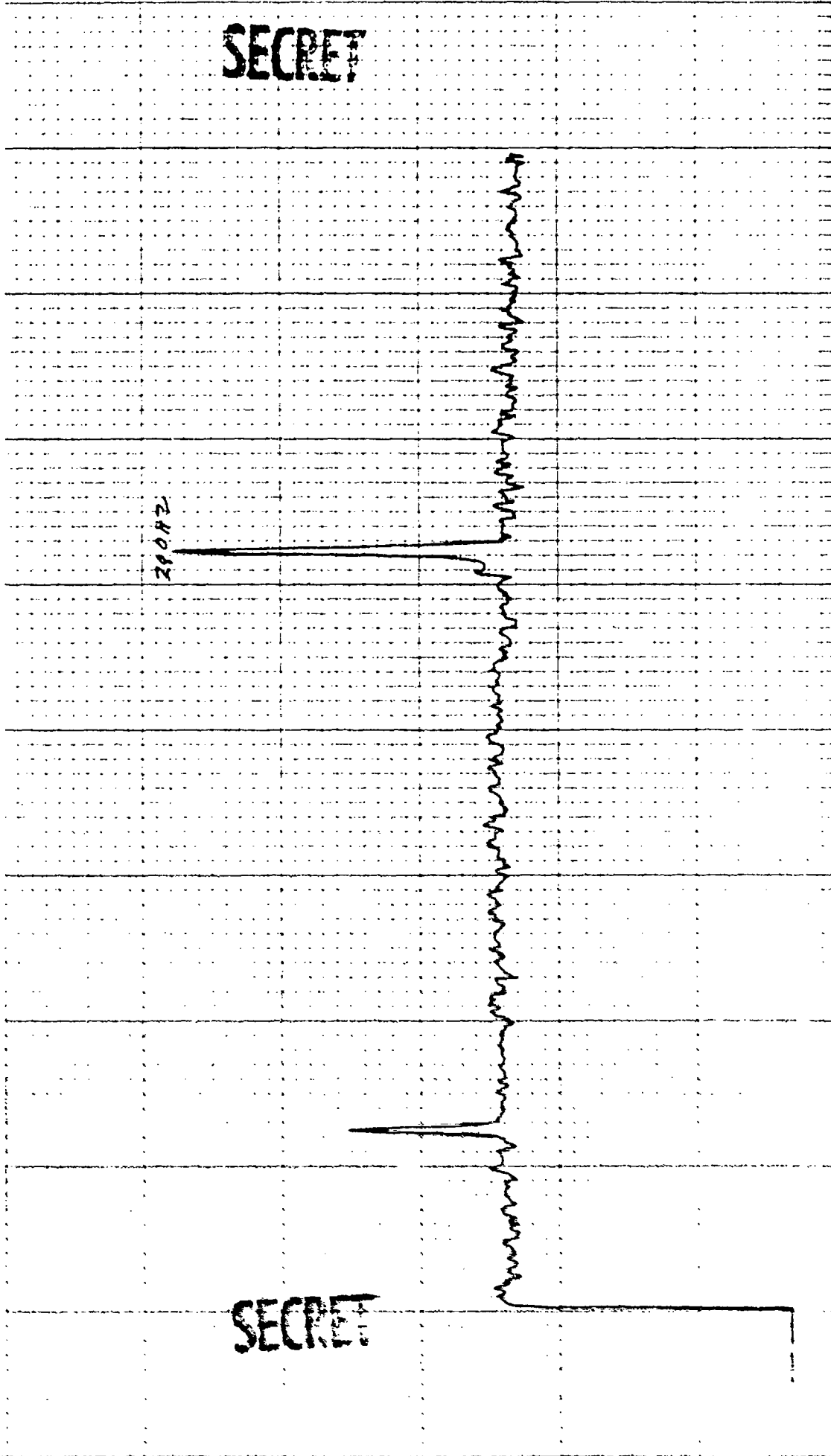
ANALYSIS BANDWIDTH: 1/10HZ

 DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER ATTEN: DB

WTC: HANNING



CONTROL: 2-8 - 0202 (23)
OMNI SPECTRUM (ELEMENT 47)
EXERCISE: BEARING STAKE
CENTER FREQ: 2800 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

PEEL: F29

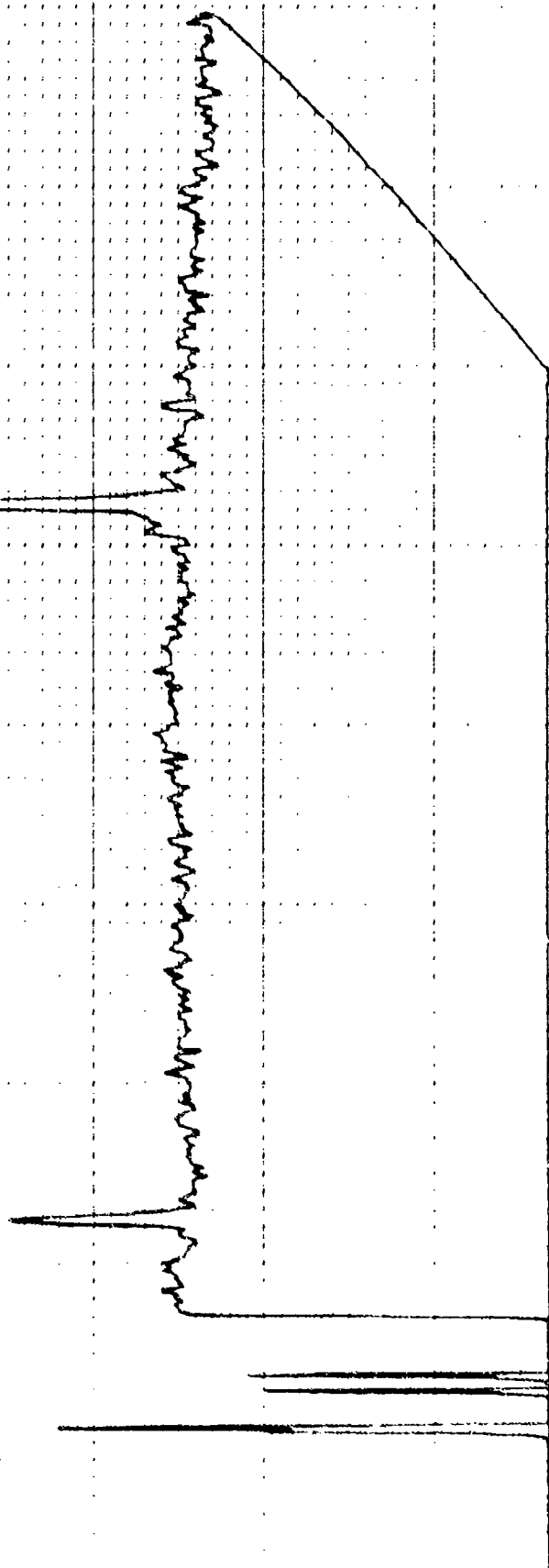
INDEX: 1145

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

290HZ

SECRET

SECRET



46 0703

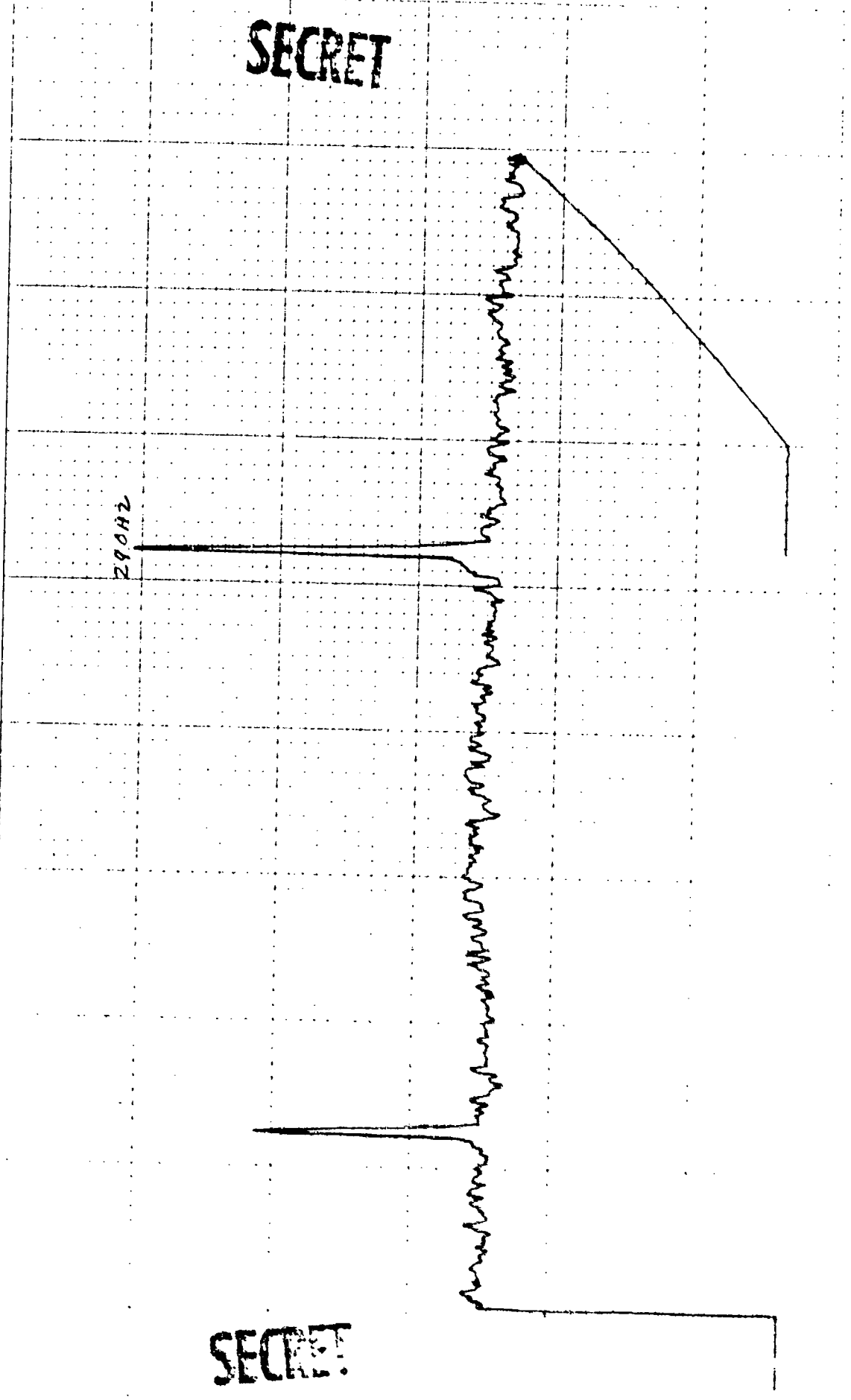
CONTROL: 2-0 - 0202 (24)
OMNI SPECTRUM (ELEMENT 49)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
ELEMENT

DATE OF ANALYSIS:

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

REEL: F29 INDEX: 145

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



SECRET

SECRET

45 0703

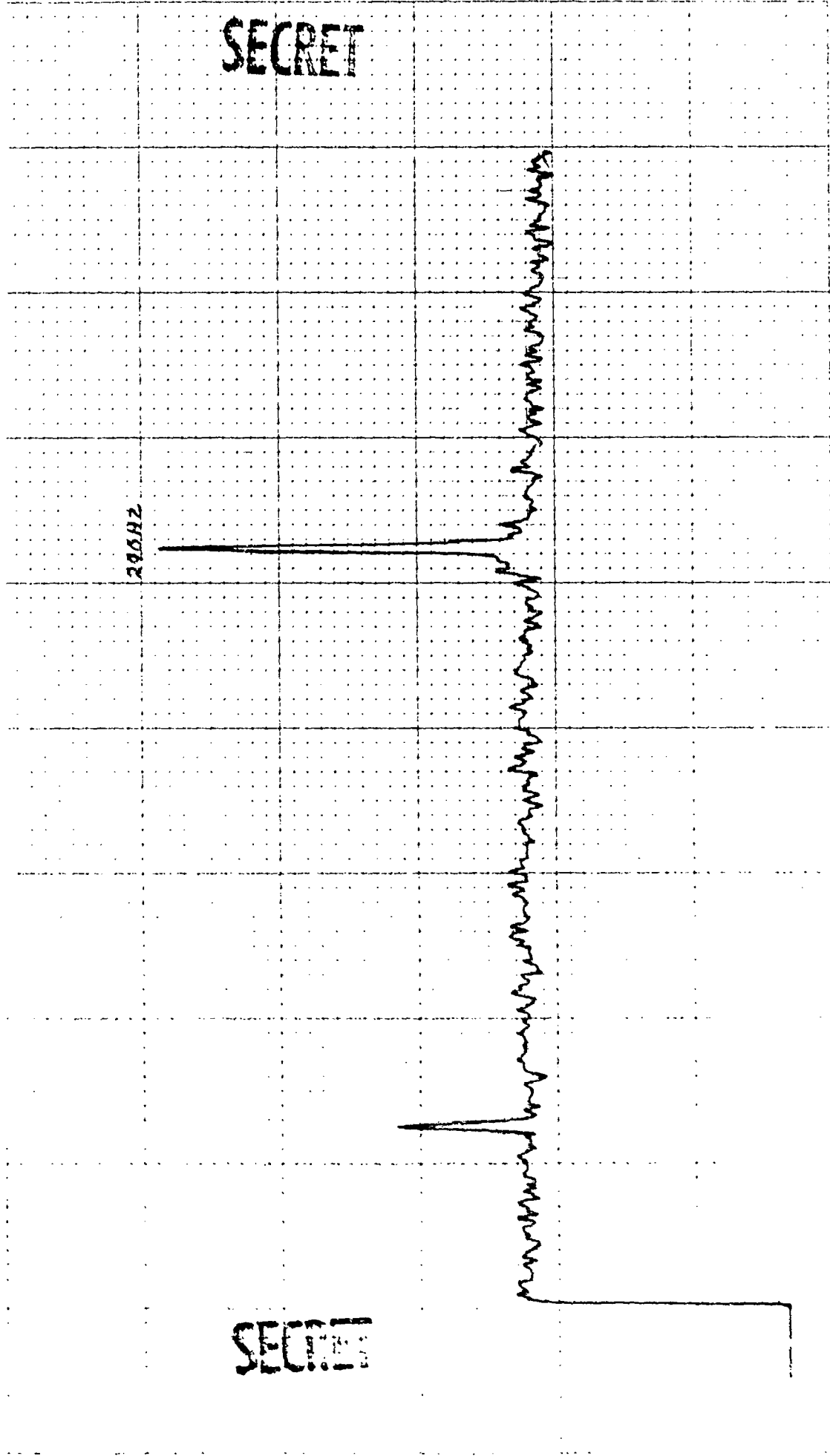
CONTROL: 2-8 -0202 (25)
OMNI SPECTRUM (ELEMENT 51)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F29 INDEX 145

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



46 0702

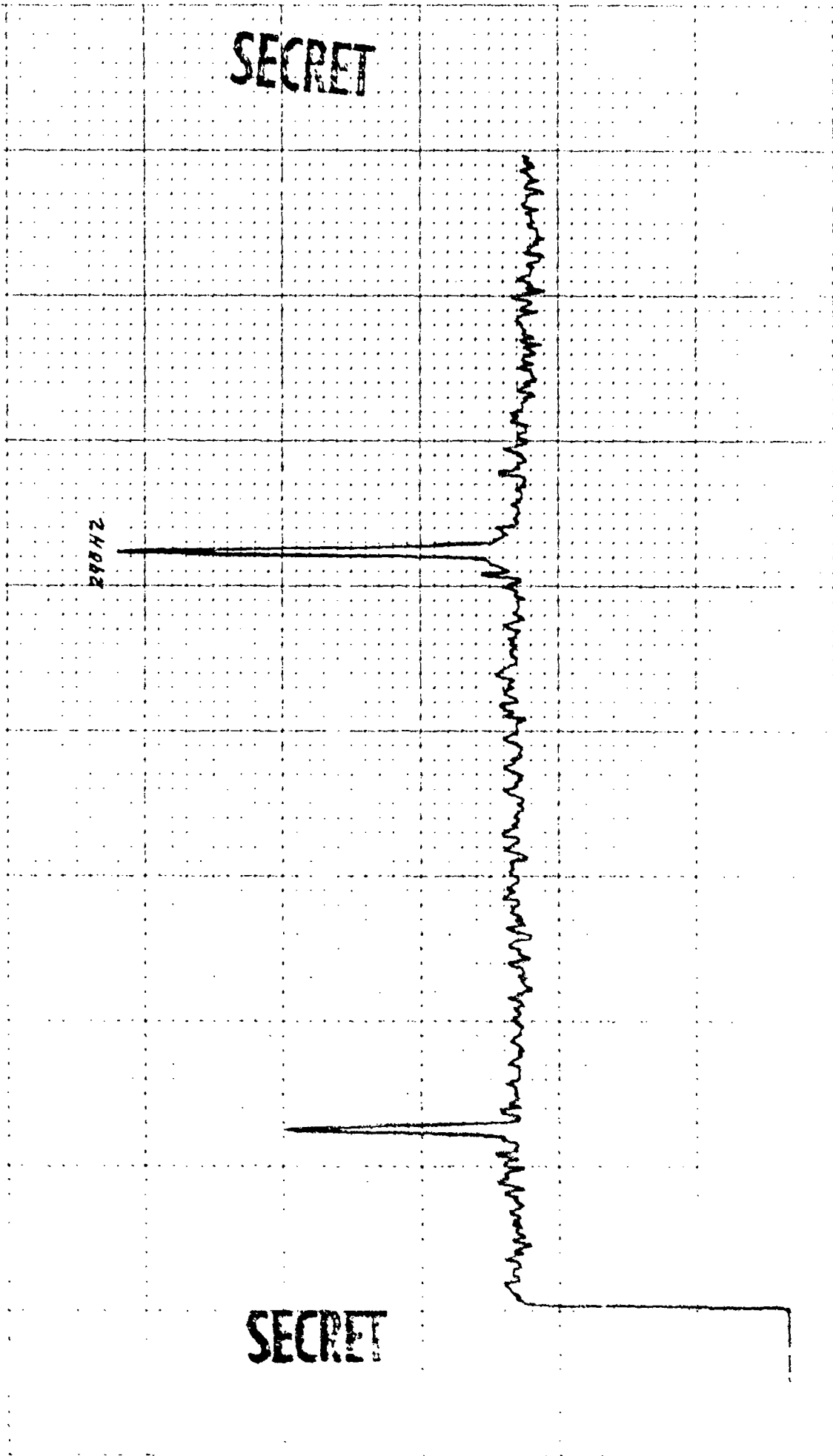
CONTROL: 2-0 - 0202 (26)
OMNI SPECTRUM (ELEMENT 53)
EXERCISE: BEARING, STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

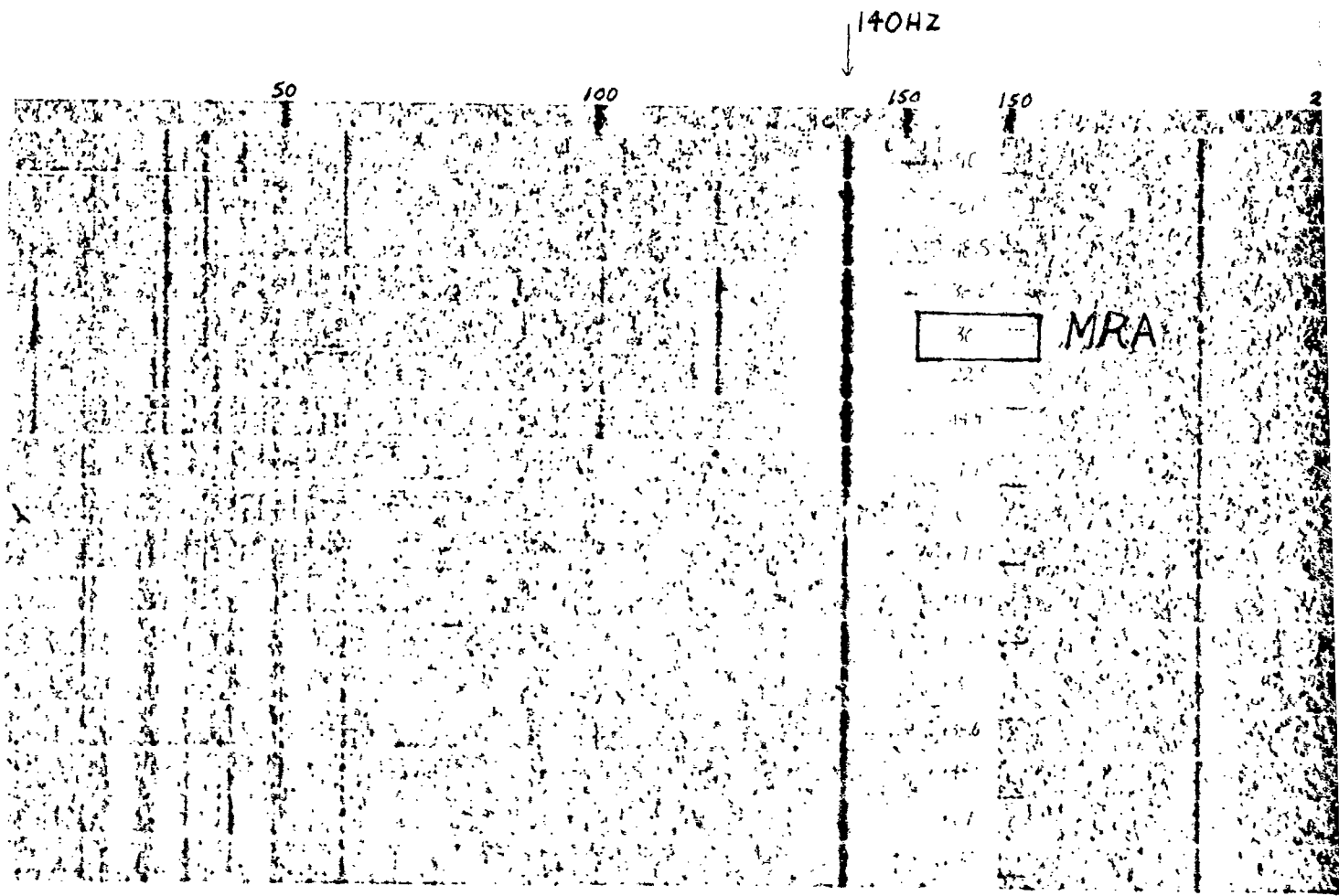
REEL: F29 INDEX: 145

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



SECRET

SECRET



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

H I S T O R Y
 TAPE REEL NUMBER _____

ANALYSIS BAND WIDTH _____ HZ
 WATER DEPTH _____ FMS

EEEMR
 DATE _____
 ENERK

140HZ

SECRET

290HZ

295HZ

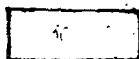
150

150

200

250

300



MRA

HISTORICAL

TAPE REEL NUMBER _____

TAPE COUNT _____

SECRET

ELEMENT NUMBERS _____

ANALYSIS BAND WIDTH _____ HZ

DATE _____

SAN-XXX-78-0135

WATER DEPTH _____ FMS

EXERCISE: BEARING STAKE

EMISS
TE
SIC

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 7

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

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

NOISE LEVEL

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

SIGNAL-NOISE-RATIO

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

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 7

FREQUENCY 296 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

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

NOISE LEVEL

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

SIGNAL-NOISE-RATIO

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

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 7

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

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

NOISE LEVEL

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

SIGNAL-NOISE-RATIO

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

CONFIDENTIAL

CONFIDENTIAL

DATA POINT 7

SIGNAL GAIN

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

ARRAY GAIN

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

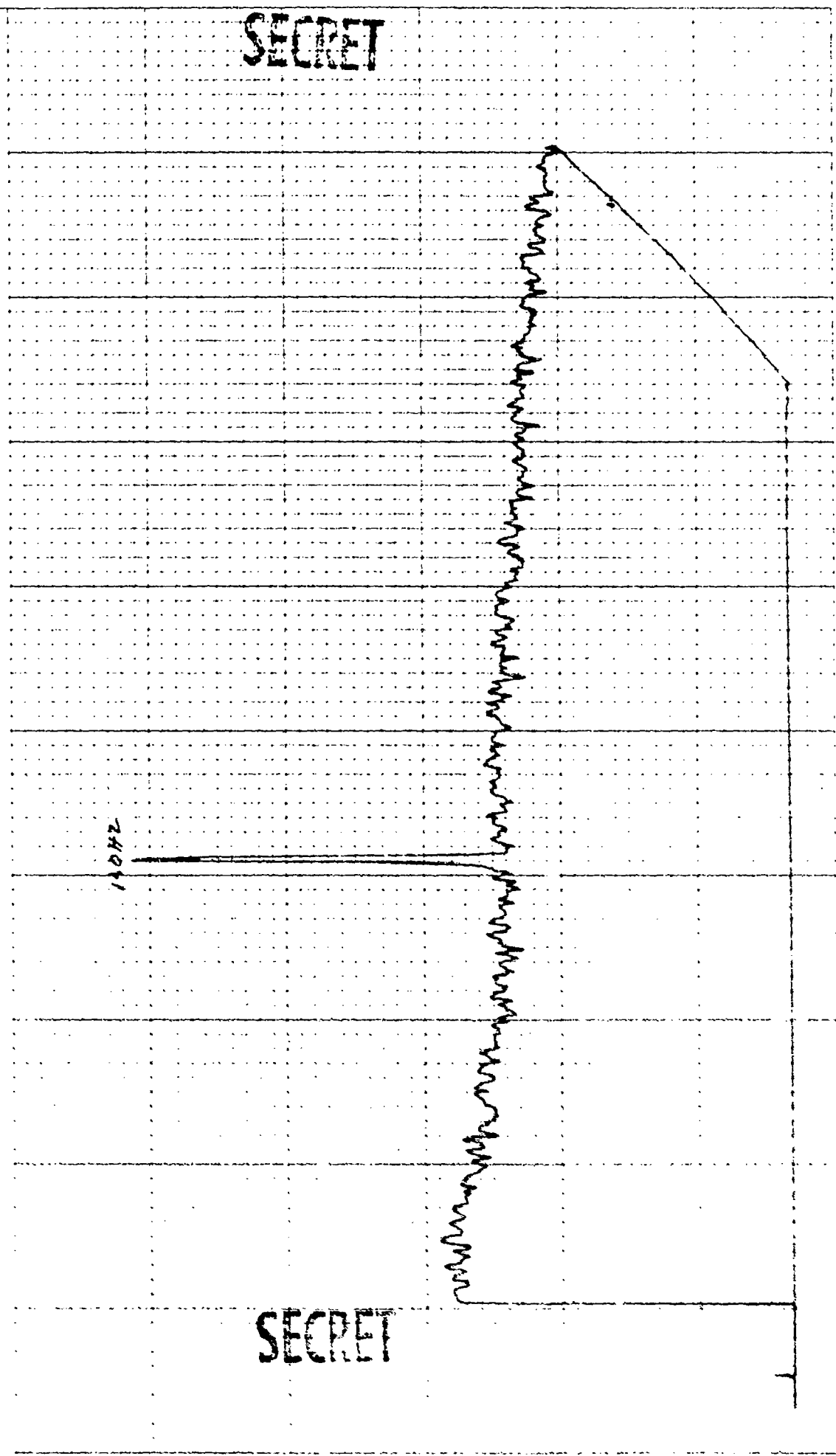
CONFIDENTIAL

46 0703

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

DATE OF ANALYSIS: - - -
/ - / 6
DATE/TIME: 2-8-77 - 0202Z
ANALYSIS BANDWIDTH: 1/10HZ
- 12 DEG. AZ STEERING

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



SECRET

SECRET

46 0703

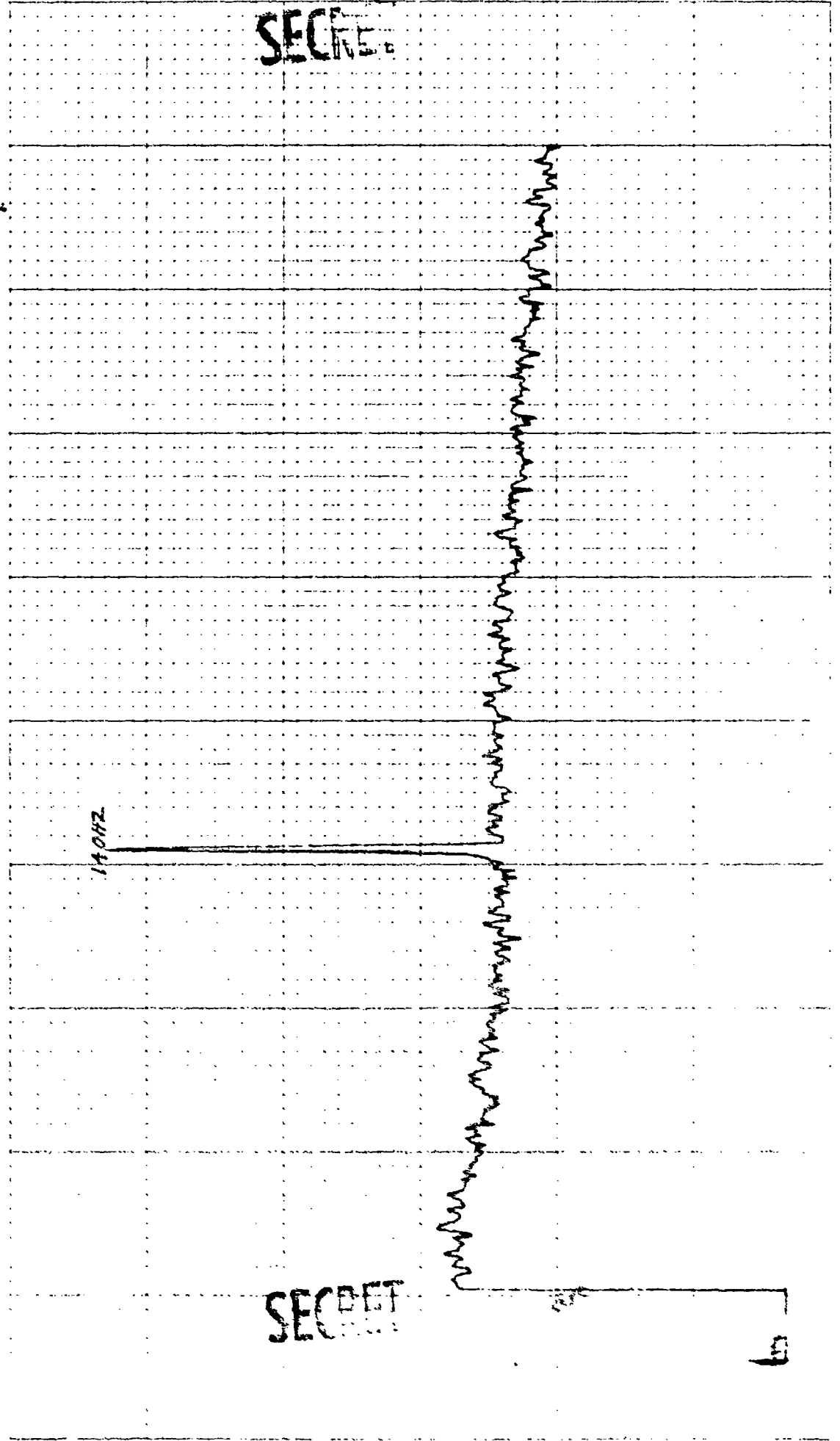
CONTROL: 0202 - 16 (DP7)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 16 ELEMENTS

DATE OF ANALYSIS: 1-16

DATE/TIME: 2-8-77 - 0201Z
 ANALYSIS BANDWIDTH: 1710HZ
 -14 DEG. AZ STEERING

REEL: F89 INDE X145

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

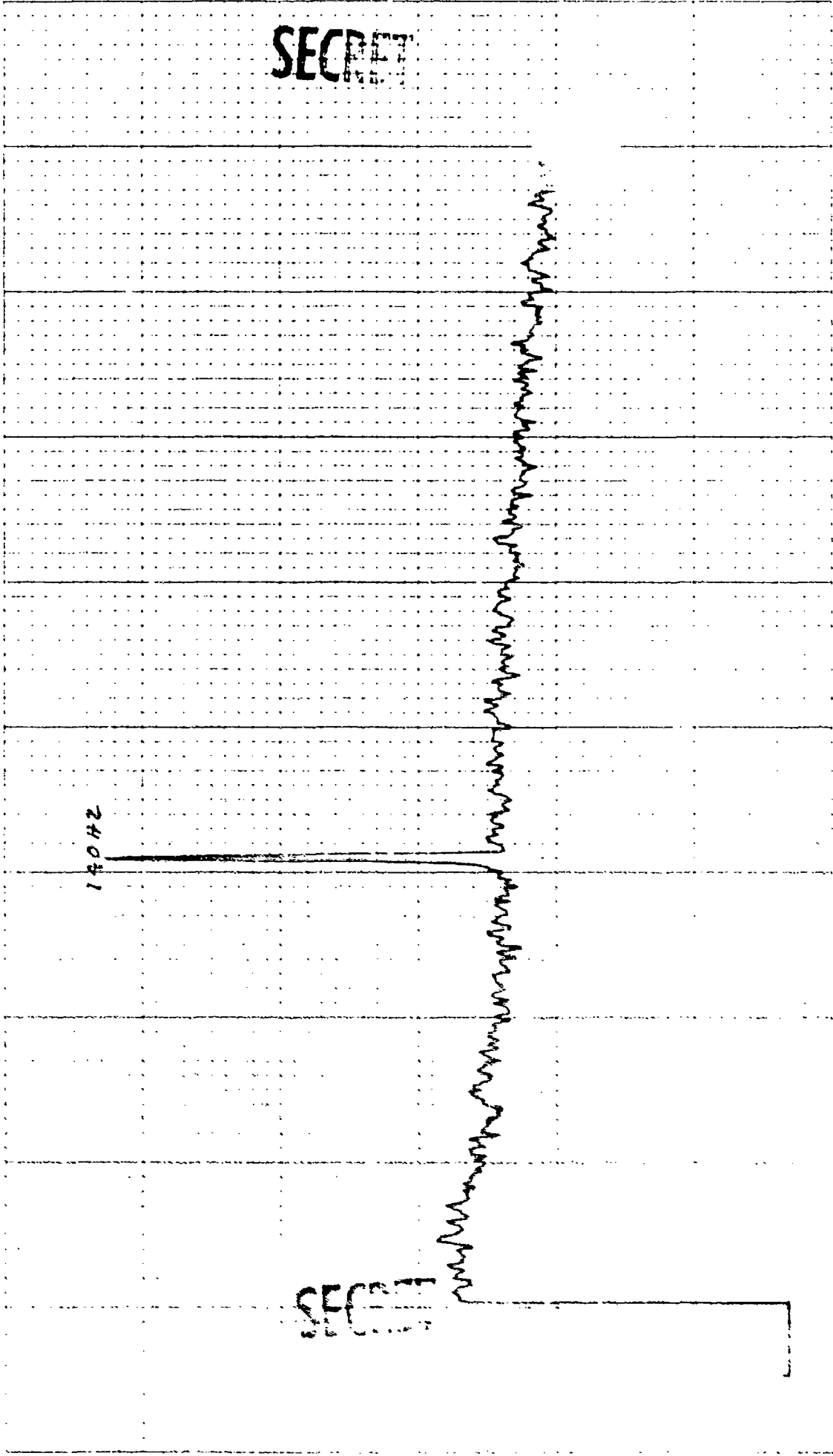


45 0703

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

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

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



SECRET

SECRET

46 0703

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

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

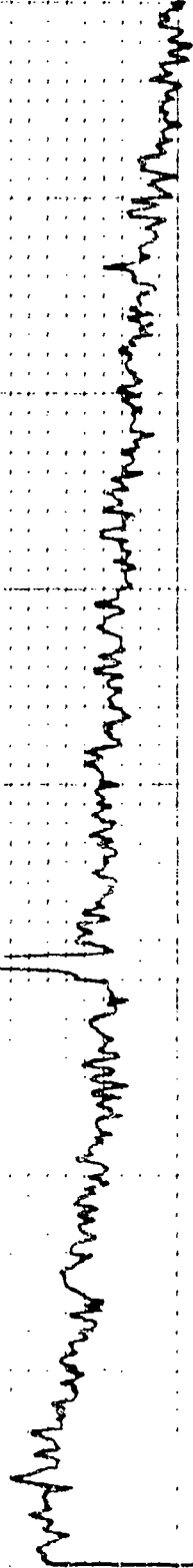
REEL: F29
INTEGRATION TIME 320 SECS
ATTEN: -2V DB
FILTER WTC: HANNING

INDE X 1195

130112

SECRET

SECRET



45 3793

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

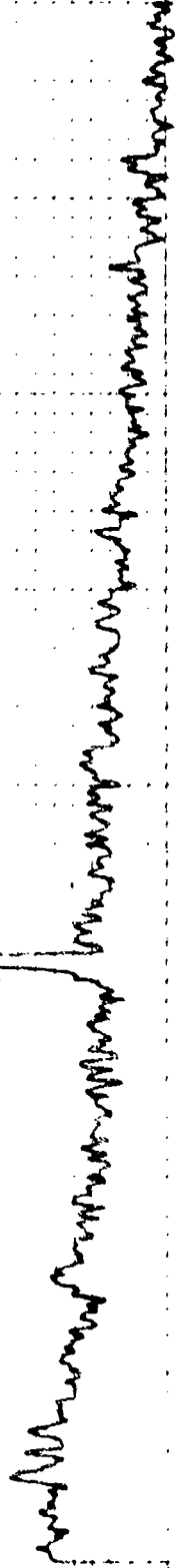
DATE OF ANALYSIS: - - -
 DATE/TIME: 2-8-77 - 0202 Z
 ANALYSIS BANDWIDTH: 1710HZ
 -19.5 DEG. AZ STEERING

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

140HZ

SECRET

SECRET

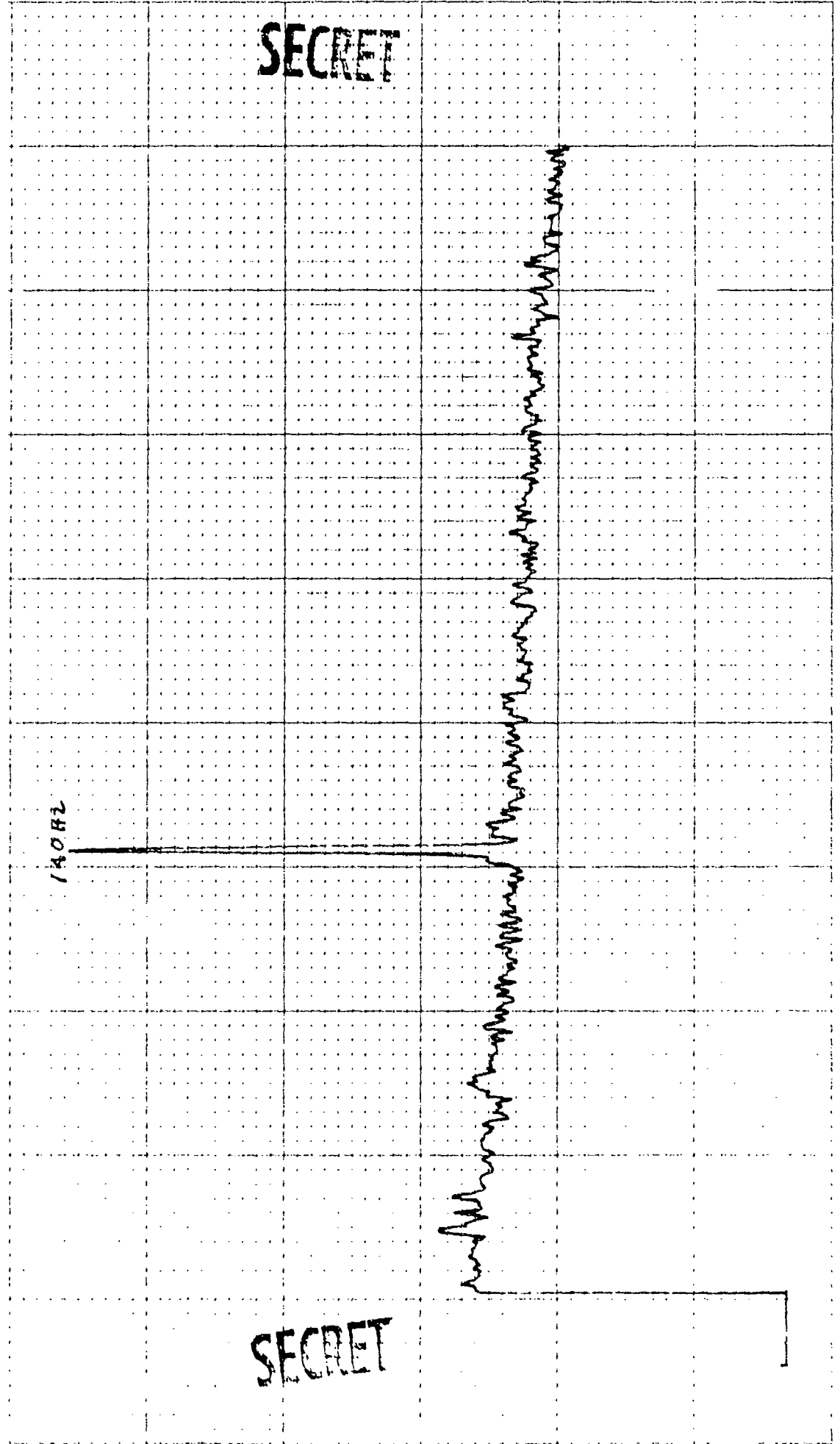


45 0703

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

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

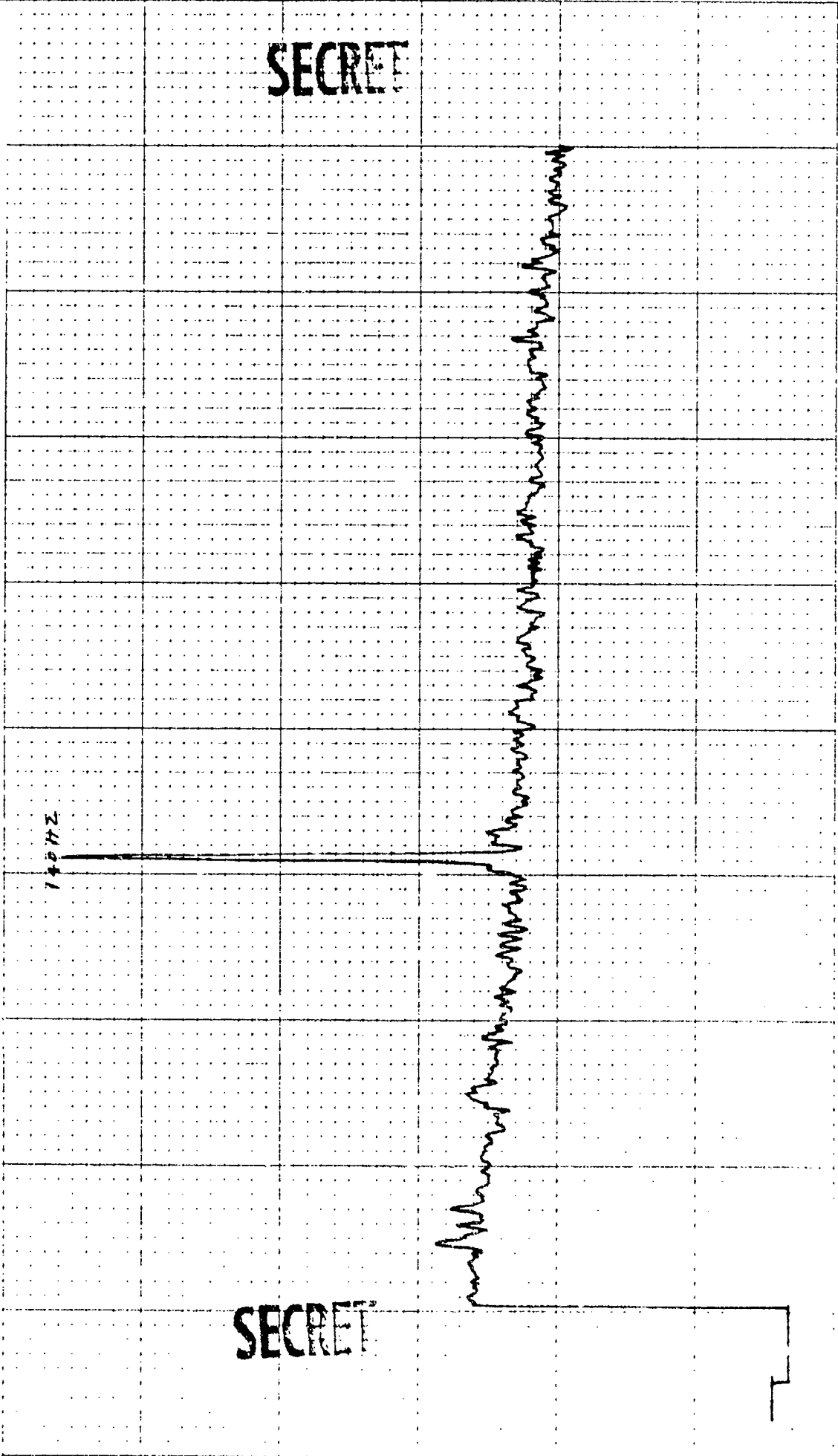
REEL: F29 INDE X1145
INTEGRATION TIME 320 SECS ATTN: -2Y DB
FILT.FP WTG: HANNING



46 0703

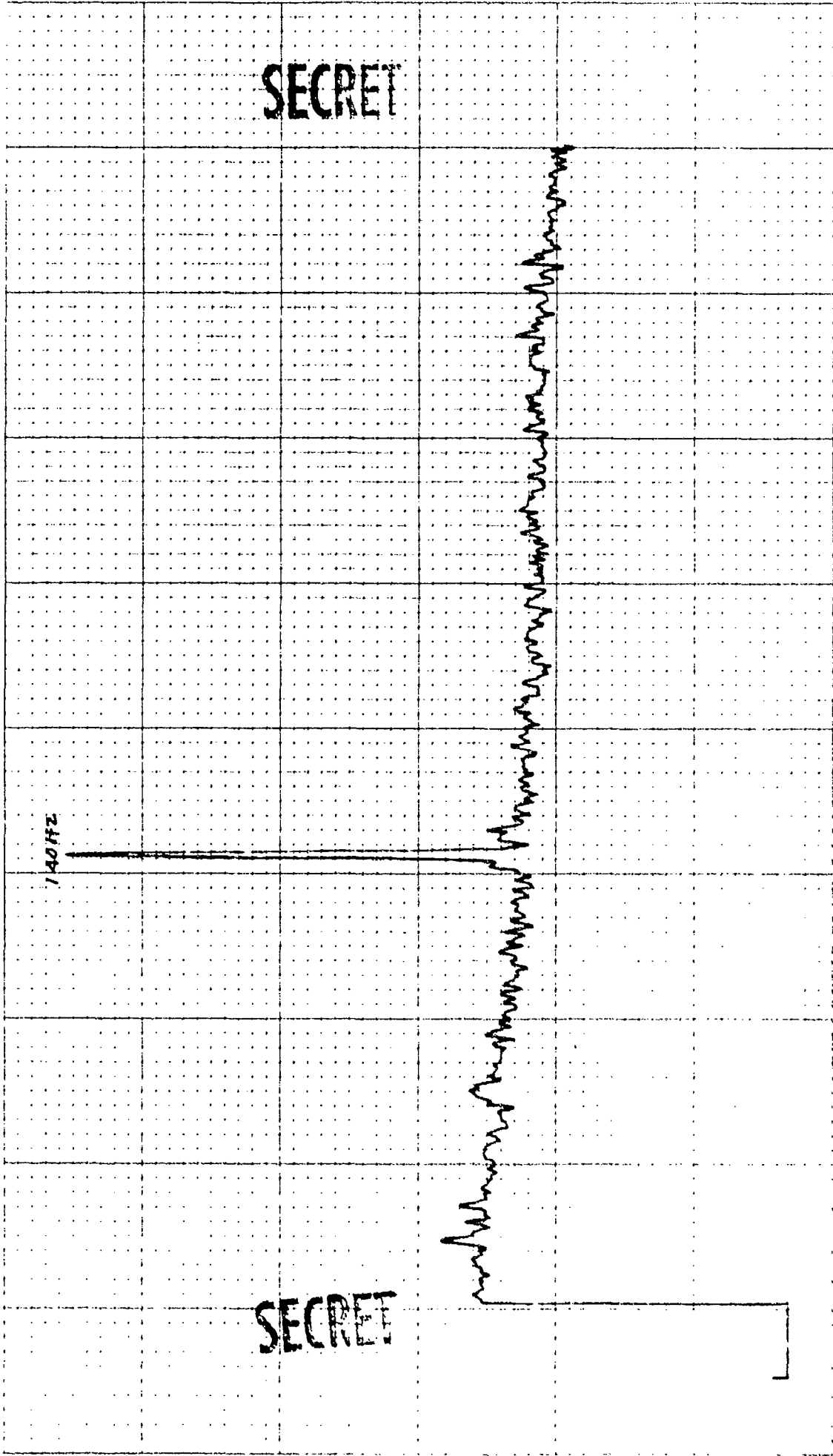
462 46201 TO THE DEPT OF DEFENSE

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



46 0703

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



46 0703

REF ID: A6719 TO THE DEPT OF DEFENSE

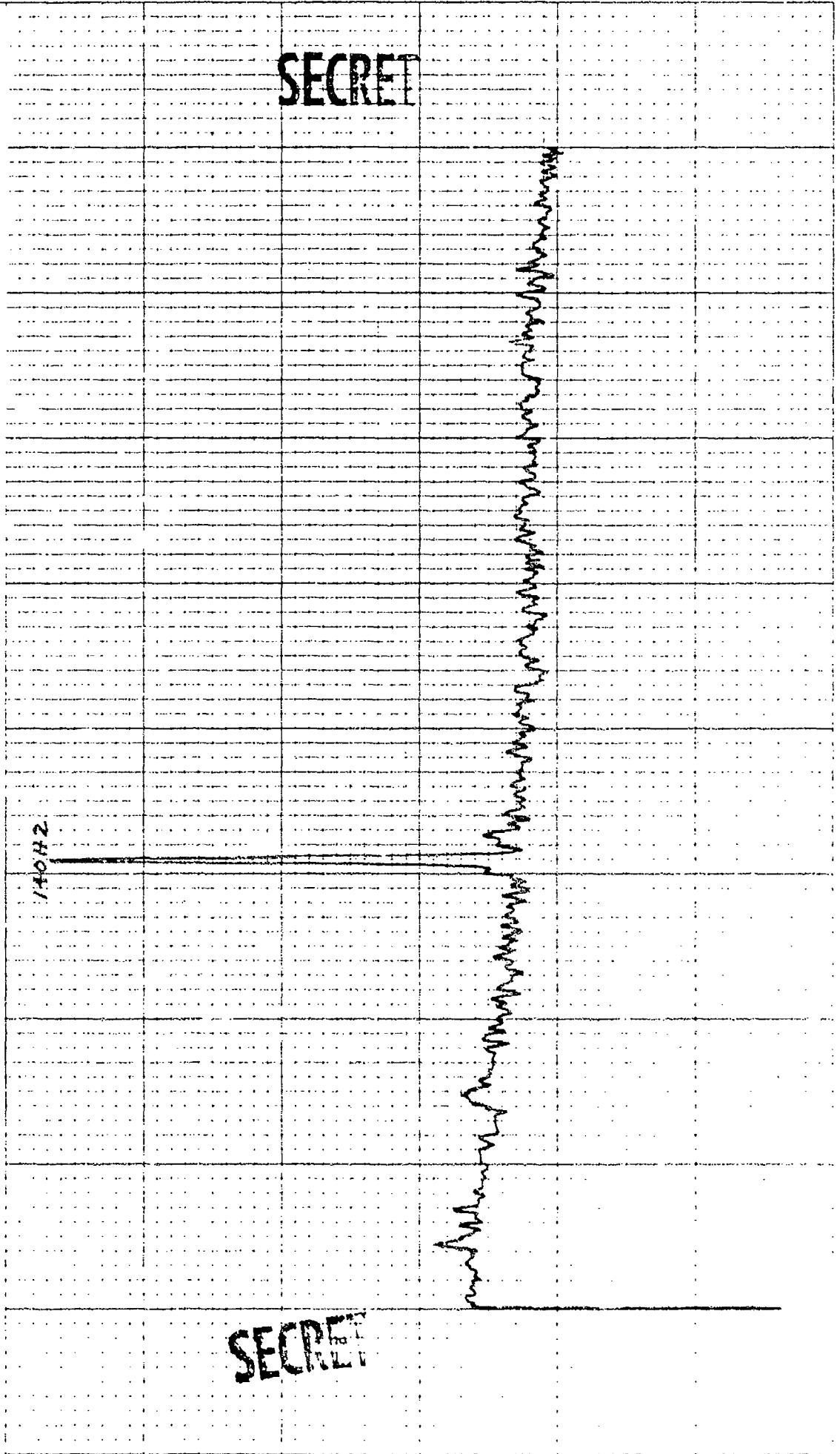
CONTROL: 0202-16 (DP7) DATE OF ANALYSIS: 1-16 REEL: F39 INDE X/145

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

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

CENTER FREQ: 150 HZ -27 DEG. AZ STEERING

16 ELEMENTS

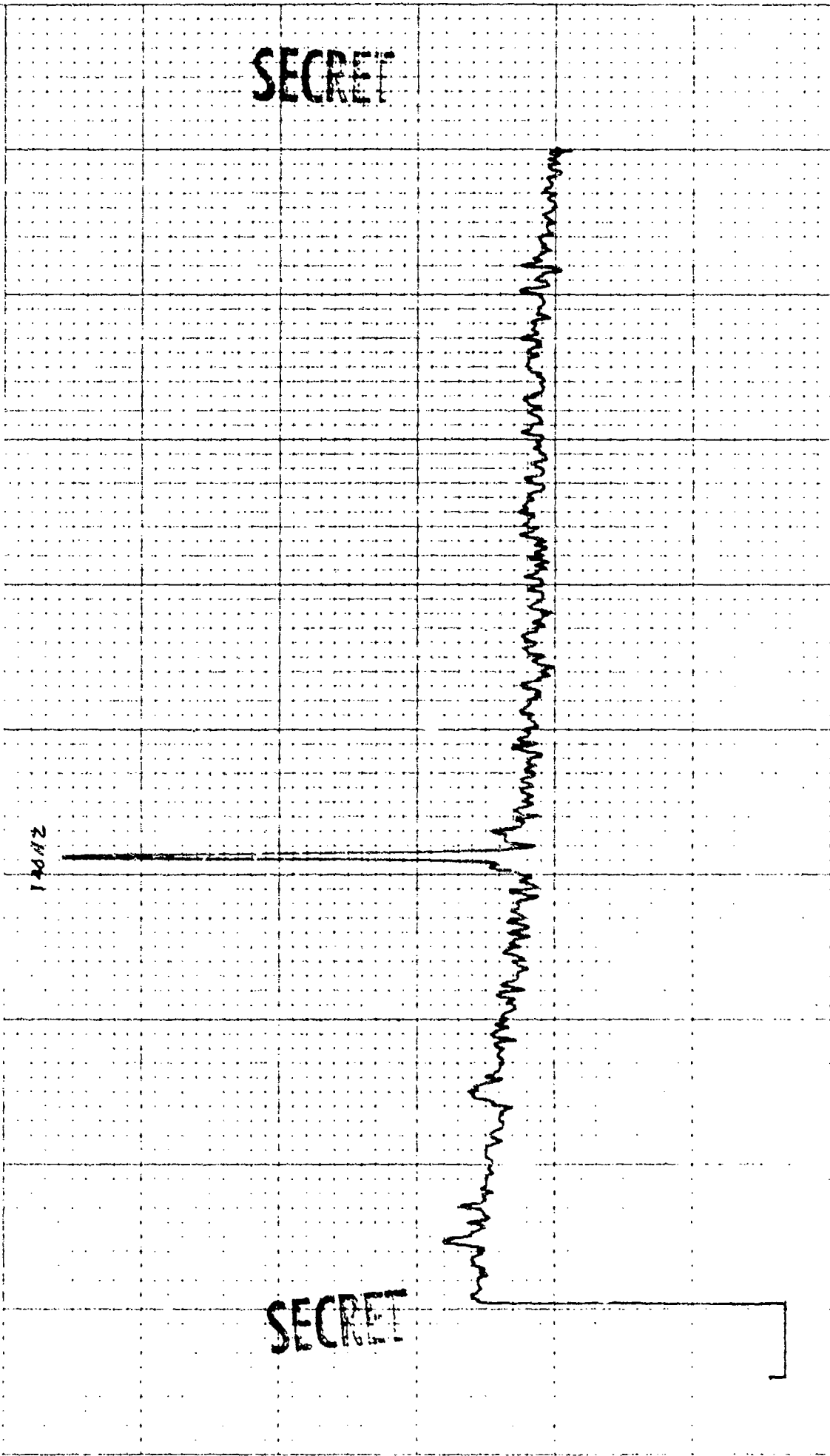


46 0703

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

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

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



46 0703

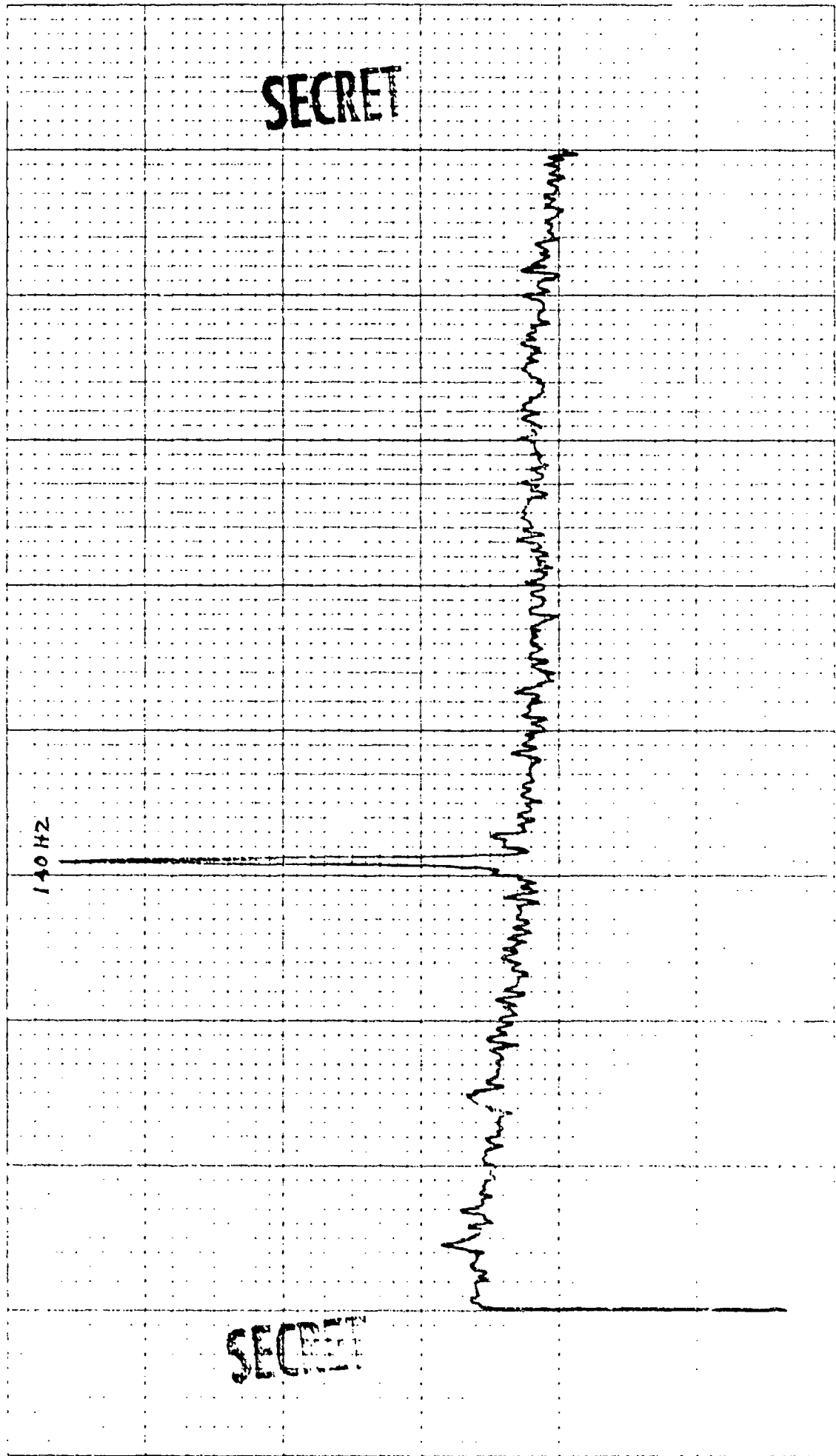
CONTROL: 0202-16 (DP7) DATE OF ANALYSIS: - - REEL: F09 INDE X/195

BEAMFORMED SPECTRUM(ELEMENTS) /-16 INTEGRATION TIME 320 SECS ATTN:-24 DB

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

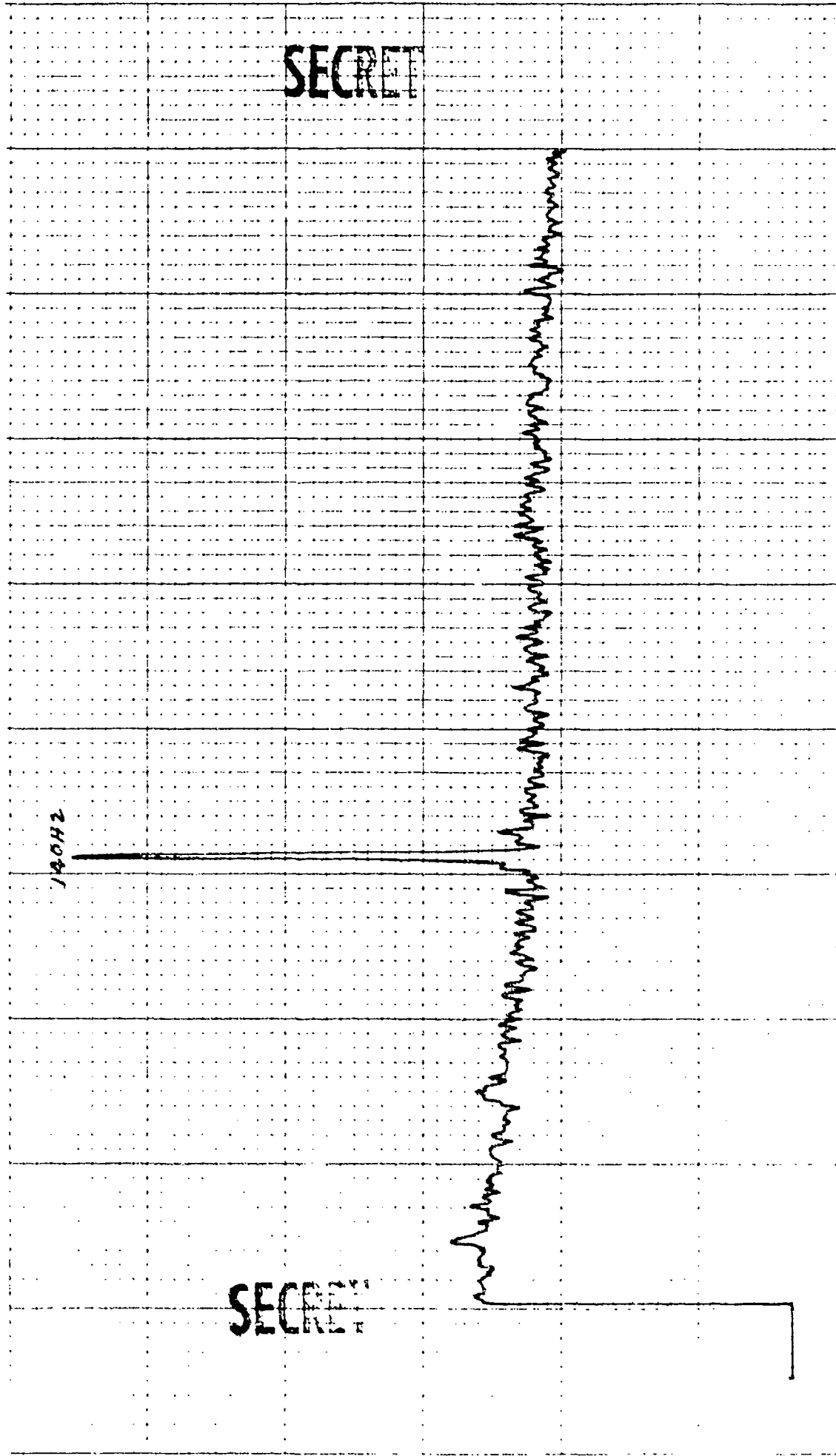
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ WTC: HANNING

16 ELEMENTS -29 DEG. AZ STEERING



46 0703

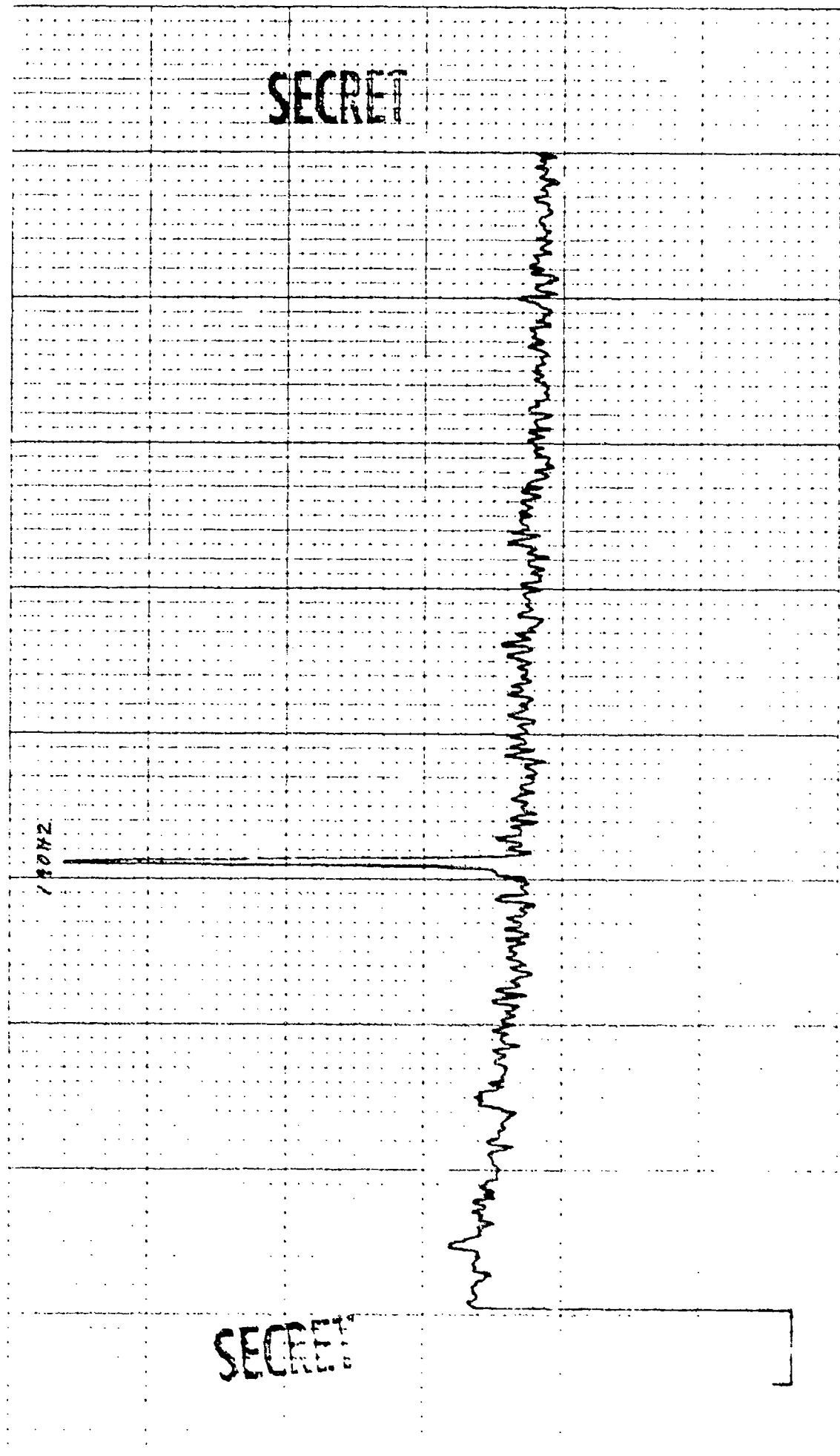
CONTROL: 0202-16 (DPT) DATE OF ANALYSIS: 1-16 REEL: F29 INDE X/145
BEAMFORMED SPECTRUM(ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTN: 2Y DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FII.TFR WTC: HANNING
16 ELEMENTS -30 DEG. AZ STEERING



46 0703

Page 3 of 4

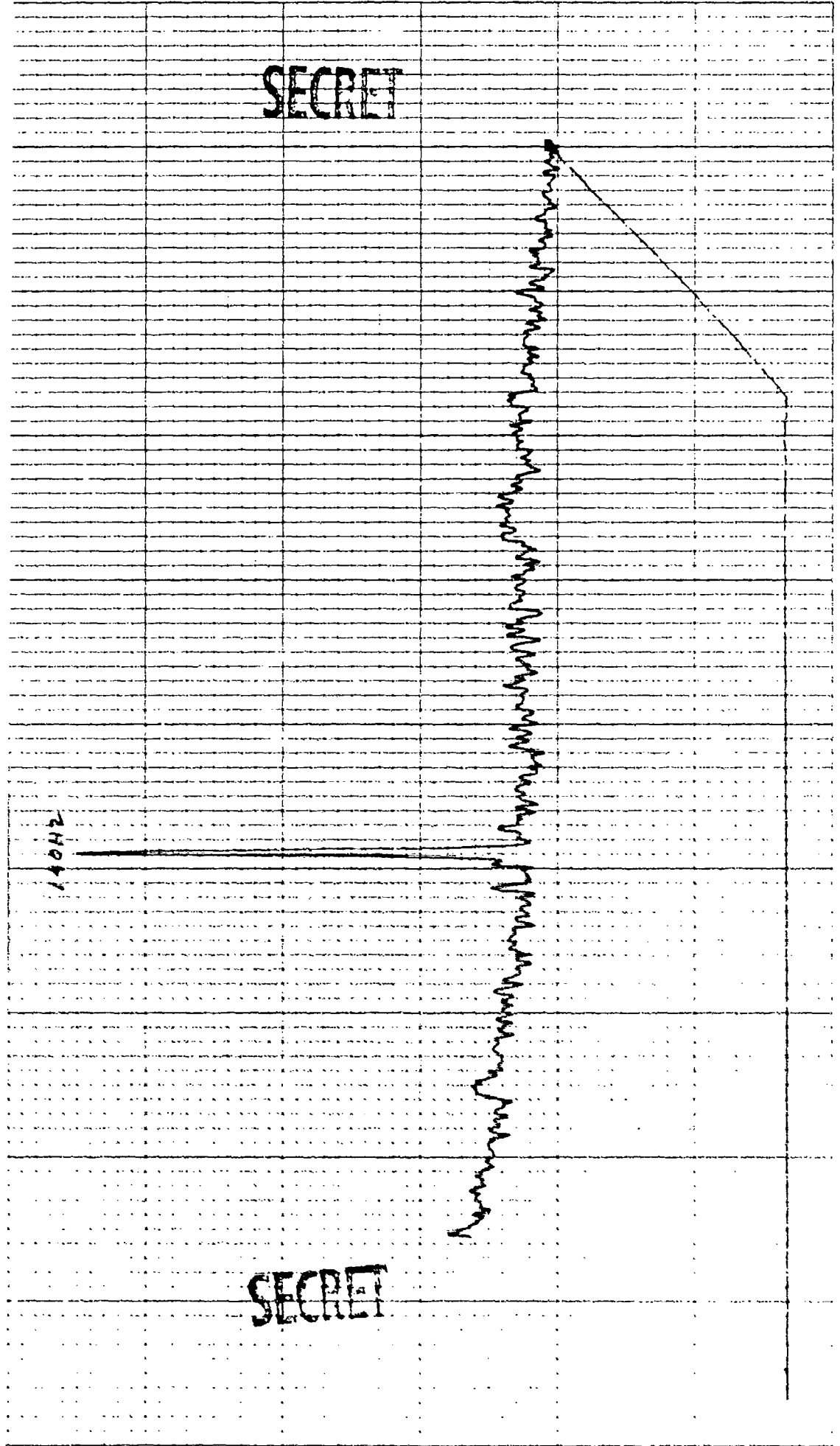
CONTROL: 0202-16 (DP7) DATE OF ANALYSIS: 1-1-6 REEL: F29 INDE X1145
 BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTN: -24 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1710HZ FIL.TFR WTC: HANNING
 CENTER FREQ: 150 HZ -32 DEG. AZ STEERING



46 0703

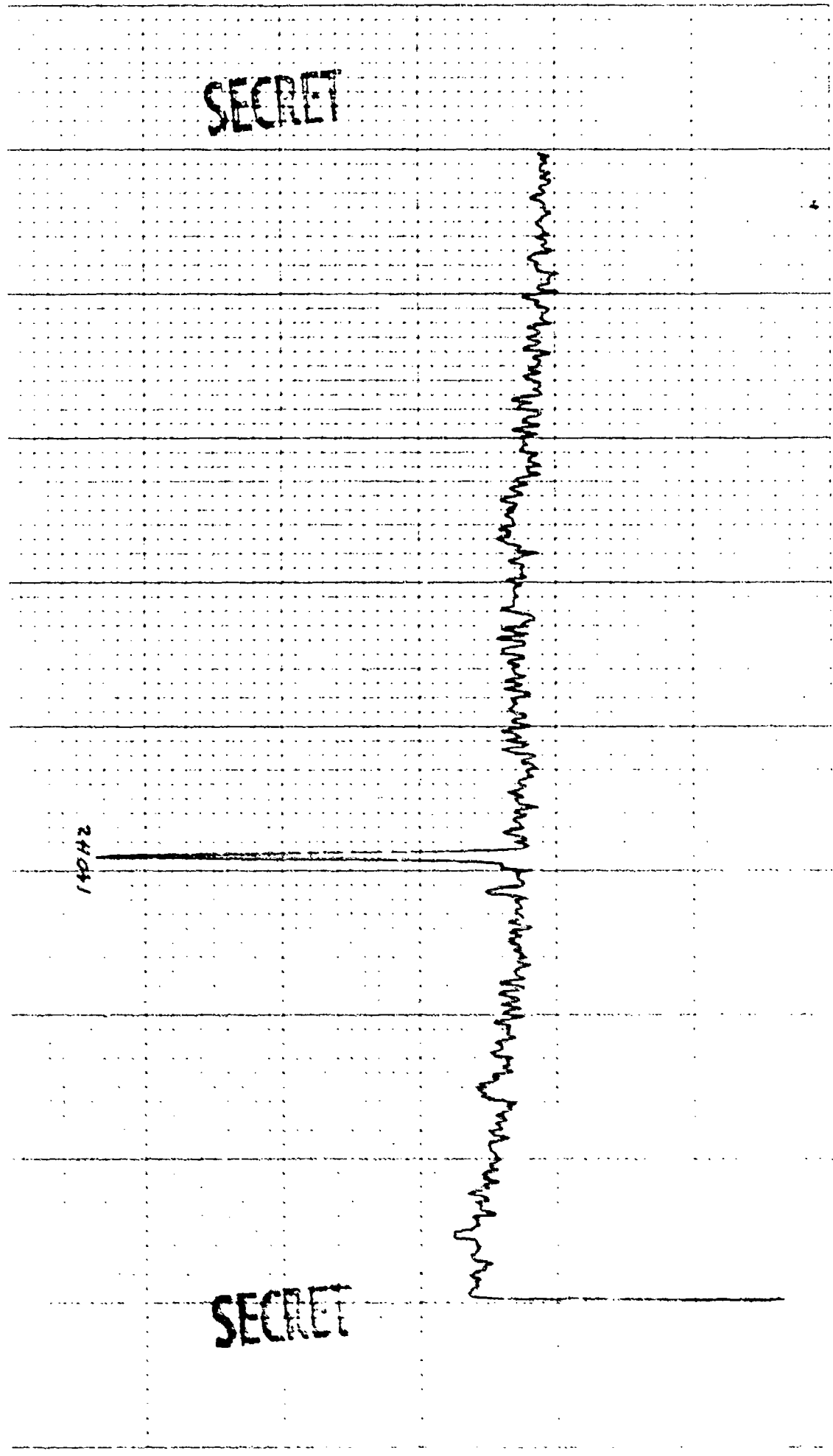
REF: 2022-16 (DP7)

CONTROL: 0222-16 (DP7) DATE OF ANALYSIS: 1-16 REEL: F29 INDE X 1145
 BEAMFORMED SPECTRUM(ELEMENTS))
 EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTEN: -24 DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1710HZ FILTFR WTG: HANNING
16 ELEMENTS - 74 DEG. AZ STEERING



46 0703

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



46 0703

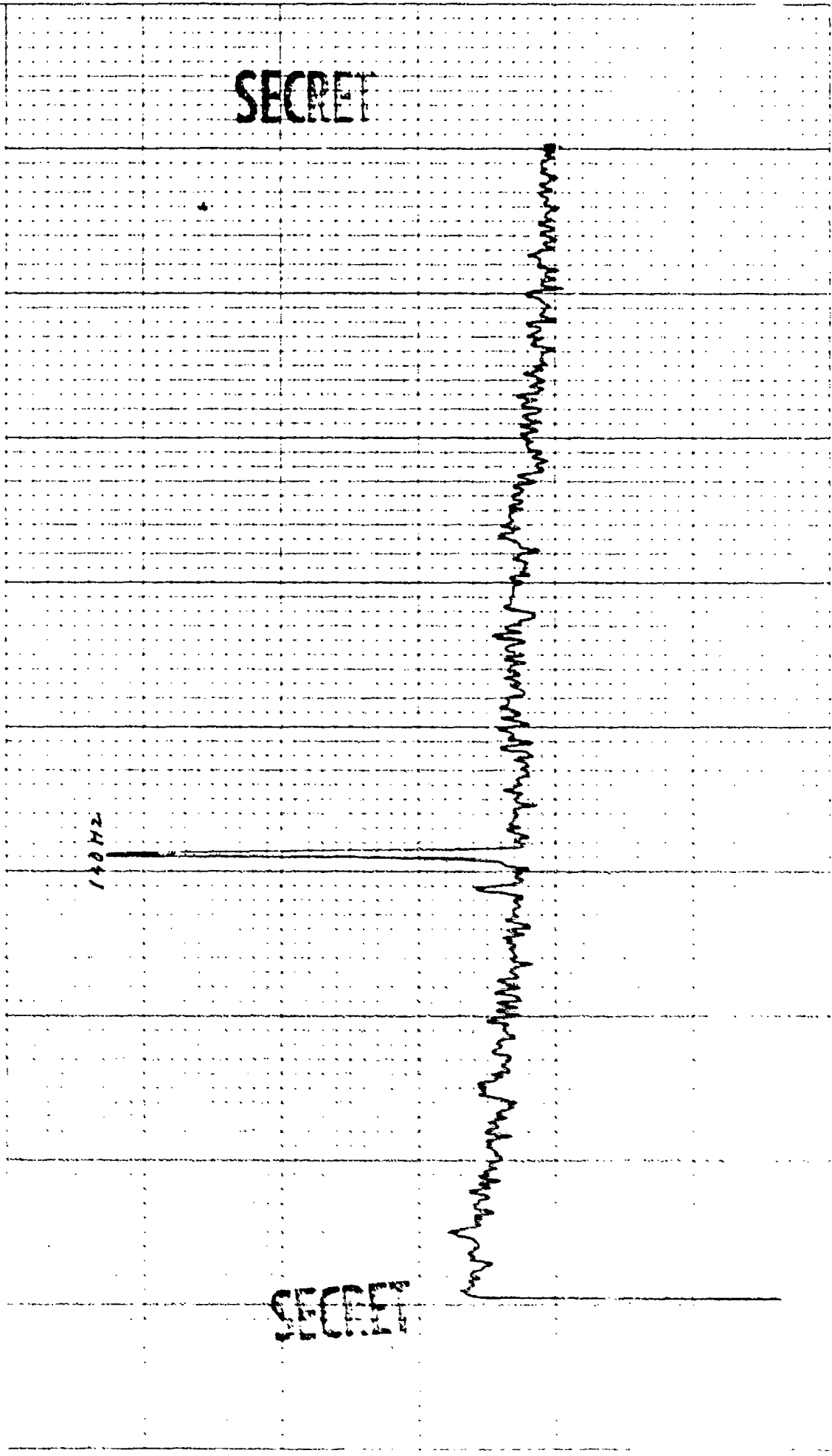
CONTROL: 0202 - 16 (DP7) DATE OF ANALYSIS: 1-12 REF: F29 INDE X1145

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

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

CENTER FREQ: 150 HZ - 30 DEG. AZ STEERING

16 ELEMENTS

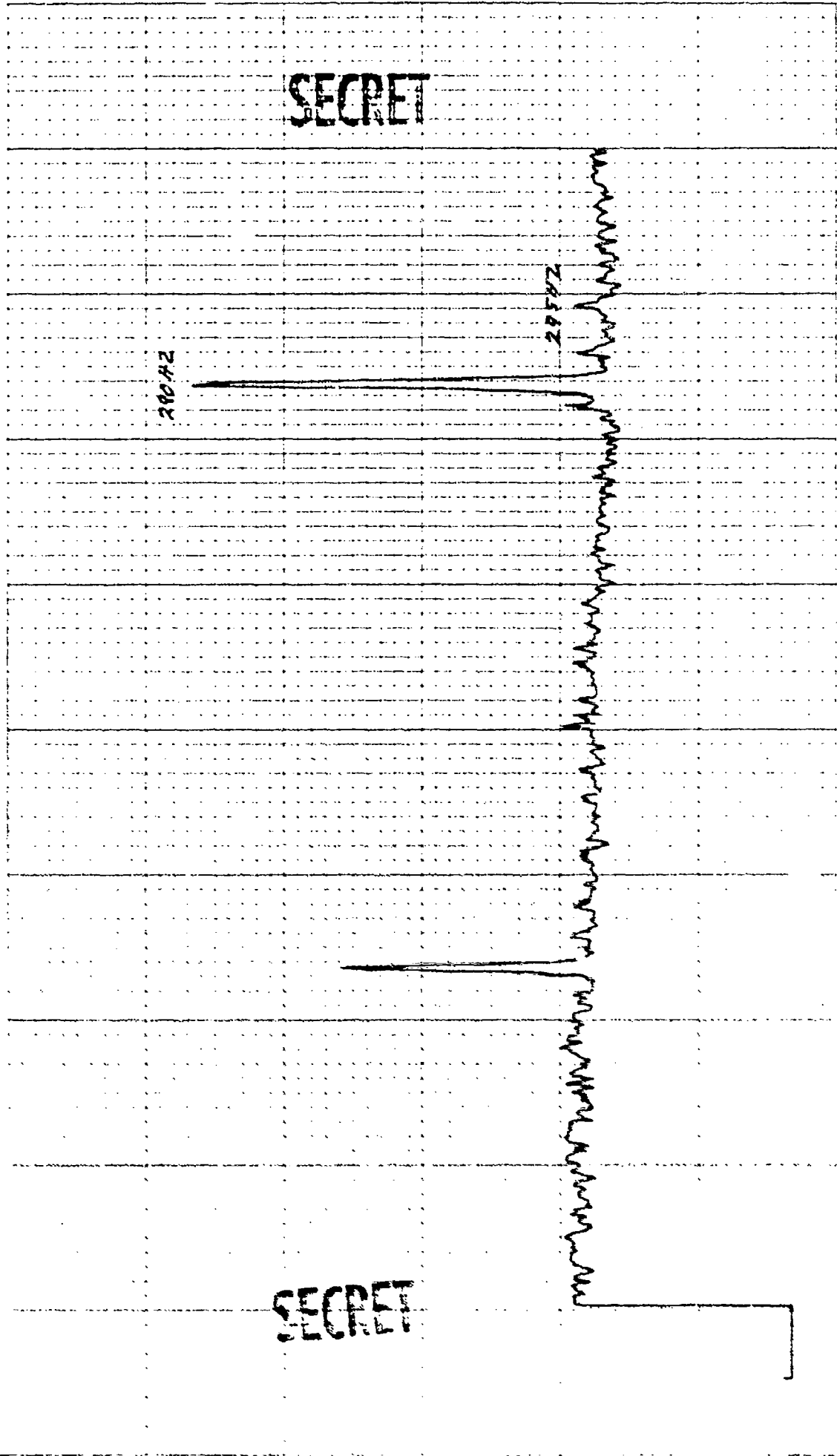


46 0703

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

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

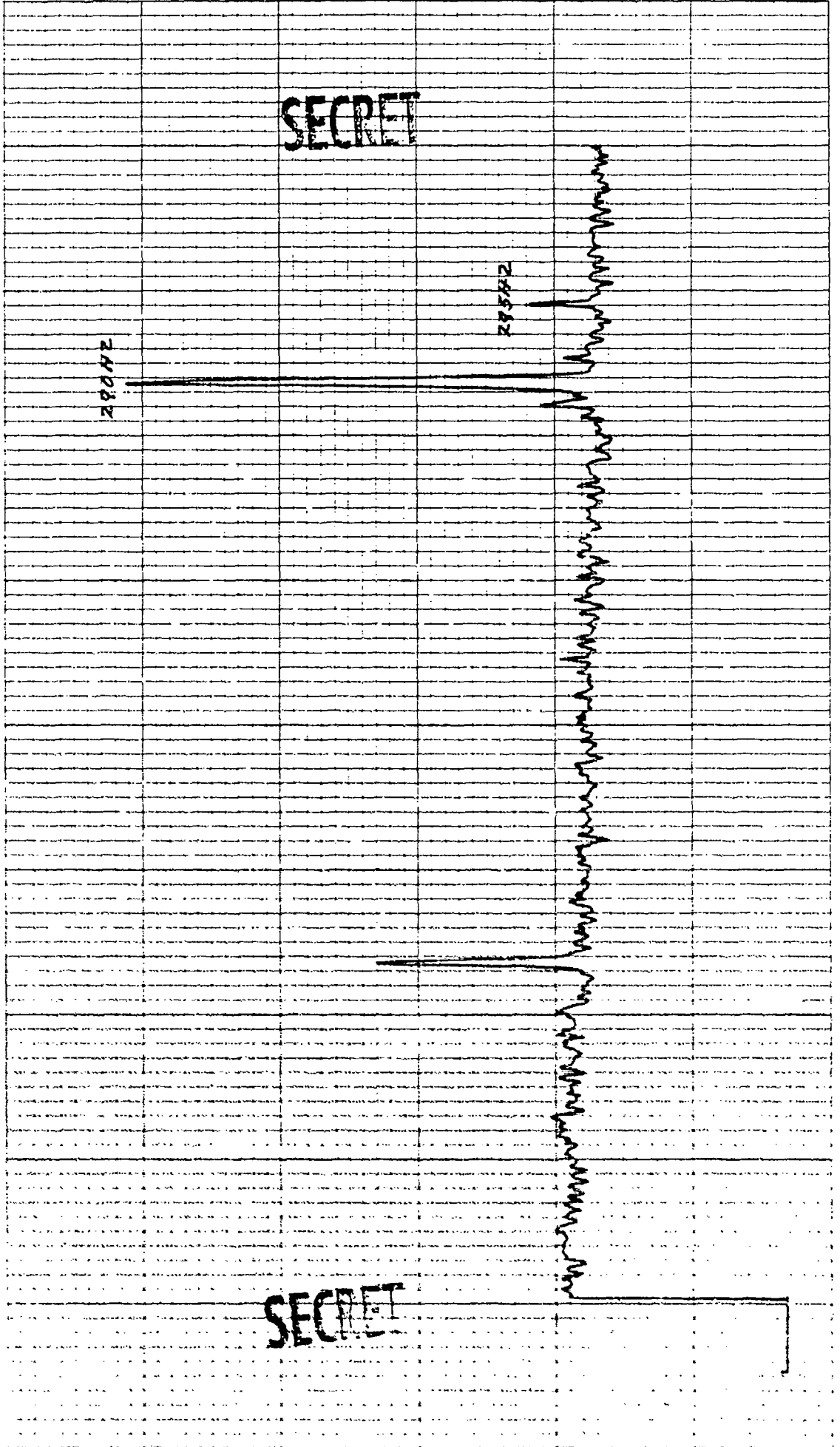
REEL: F29 INDE X/145
INTEGRATION TIME 320 SECS
ATTN: 24 DB
FILTR: WTG: HANNING



SECRET

SECRET

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

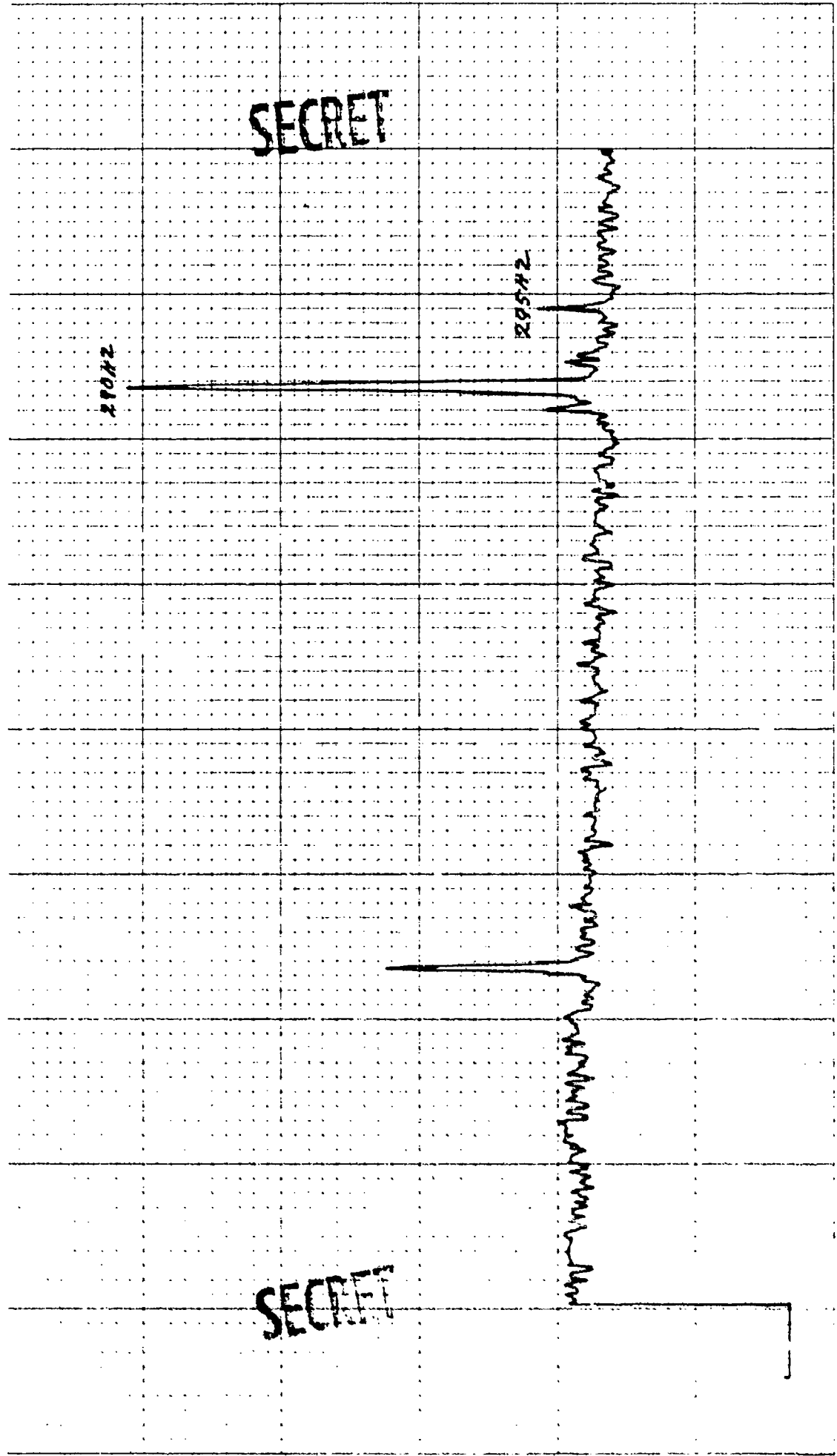


46 0703

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

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

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

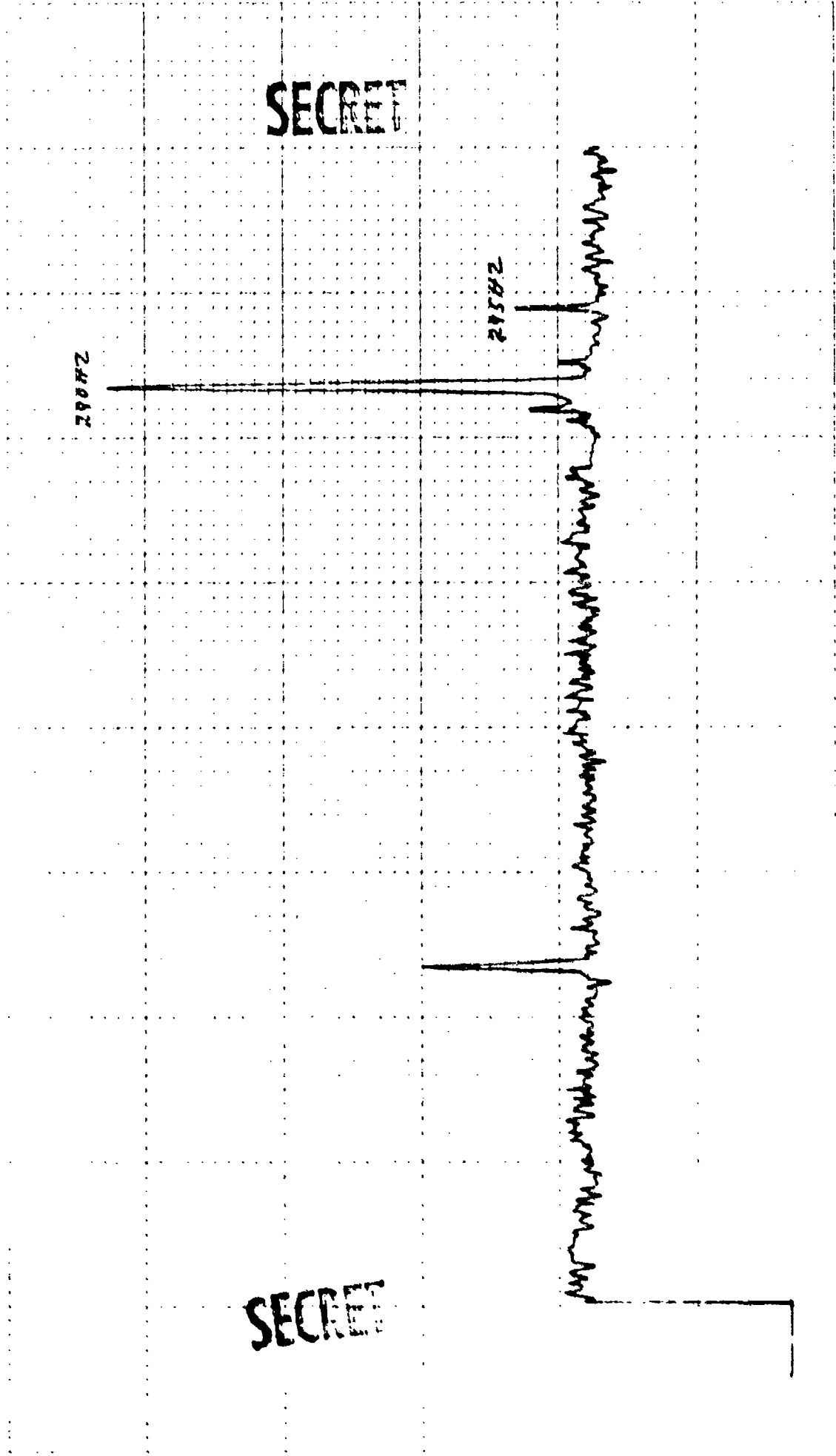


46 07 33

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

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

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

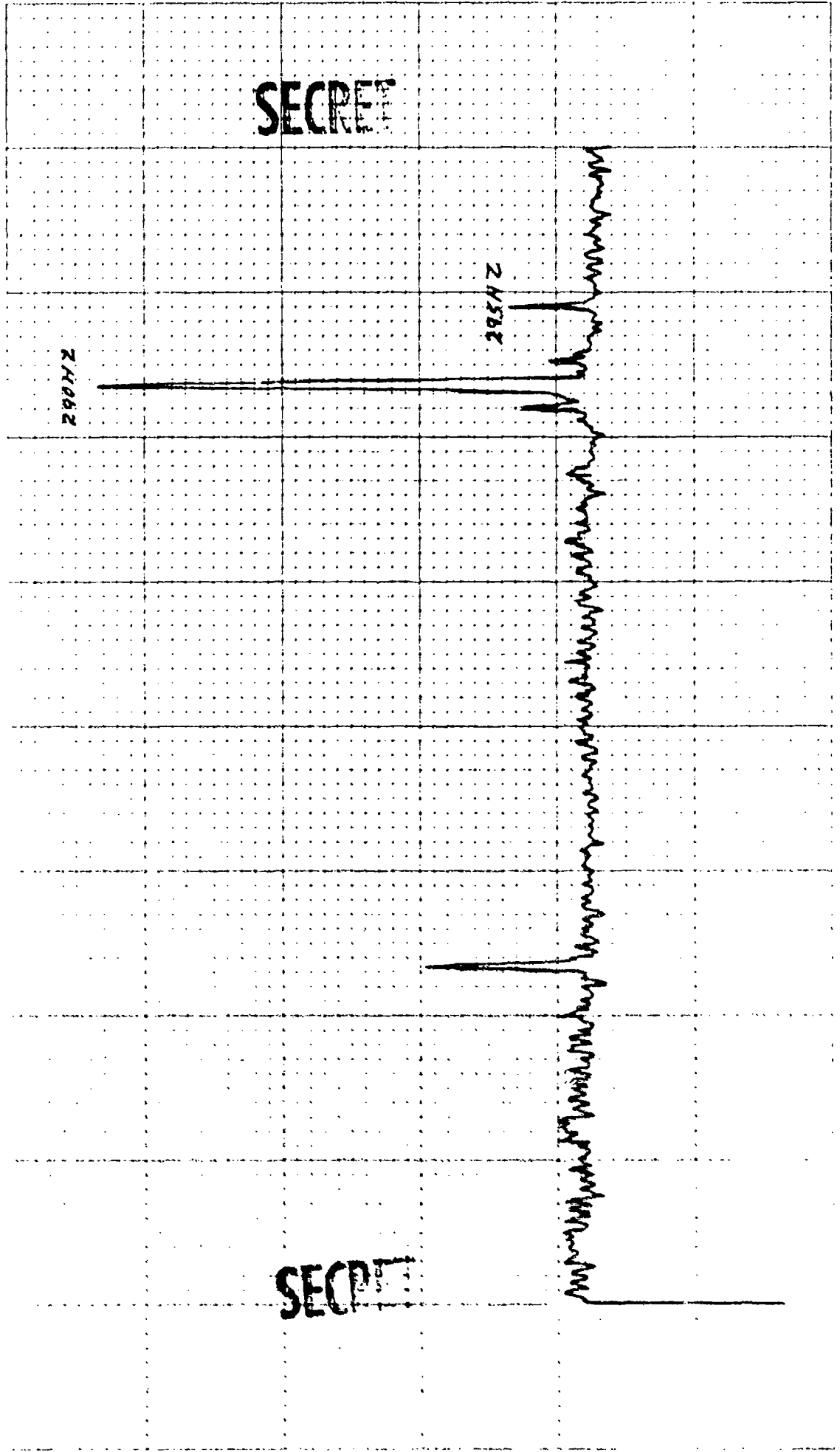


SECRET

SECRET

46 0703

CONTROL: 0202 - 5/ (D07) DATE OF ANALYSIS: _____ REEL: F29 INDE X 1105
 BEAMFORMED SPECTRUM(ELEMENTS) / - 16
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: 24 DB
 CENTER FREQ: 270 HZ -20 DEG. AZ STEERING FILTER WTC: HANNING

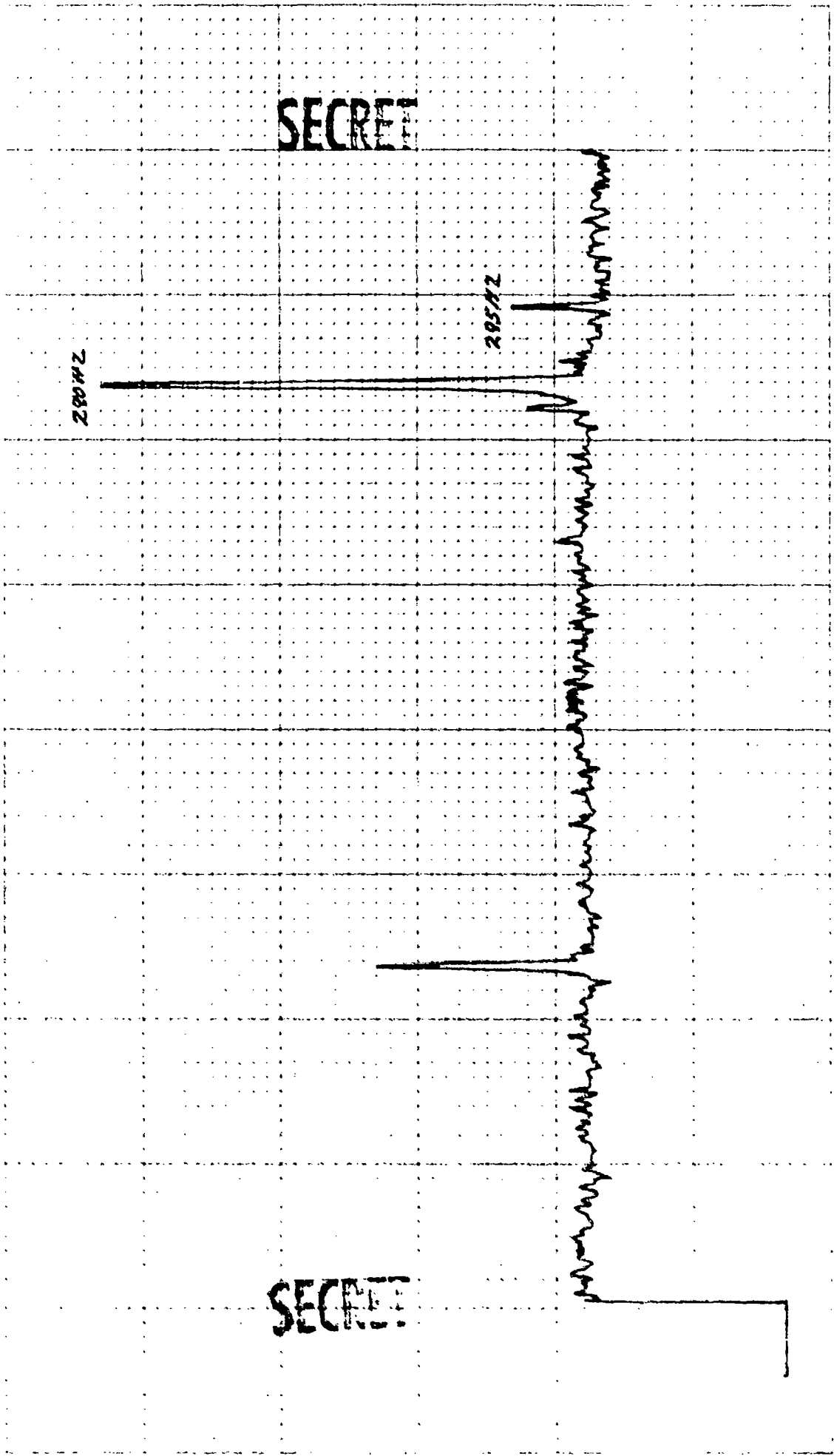


45 0793

CONTROL: 0202 - 16 (207)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 2800 HZ
16 ELEMENTS

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

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

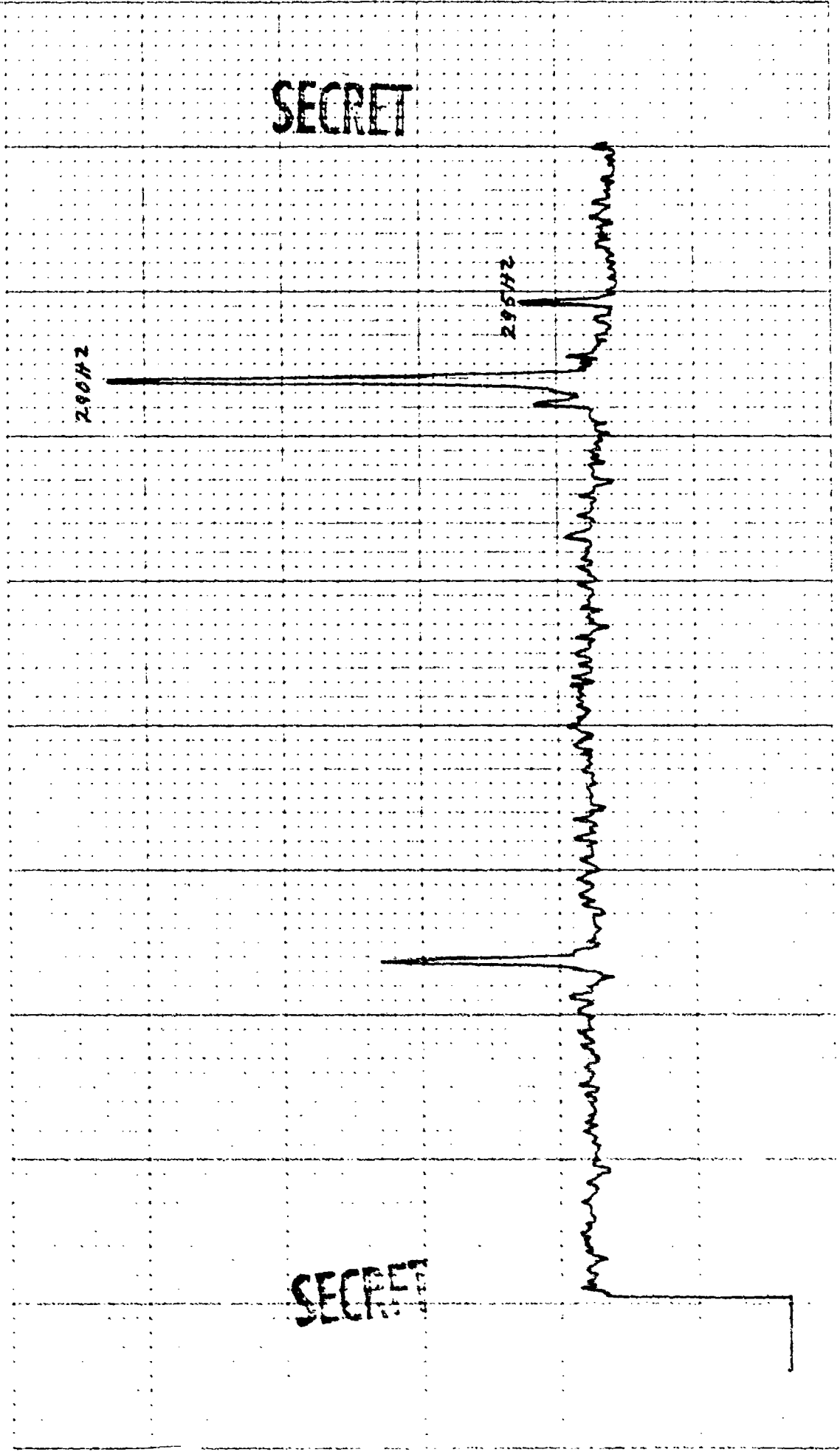


SECRET

SECRET

46 0703

CONTROL: 0202-16 (207) DATE OF ANALYSIS: 1-16 REEL: F09 INDE X 1145
 BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-8-77-0202Z INTEGRATION TIME 320 SECS ATTEN: -24 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
 CENTER FREQ: 200 HZ -24 DEG. AZ STEERING



SECRET

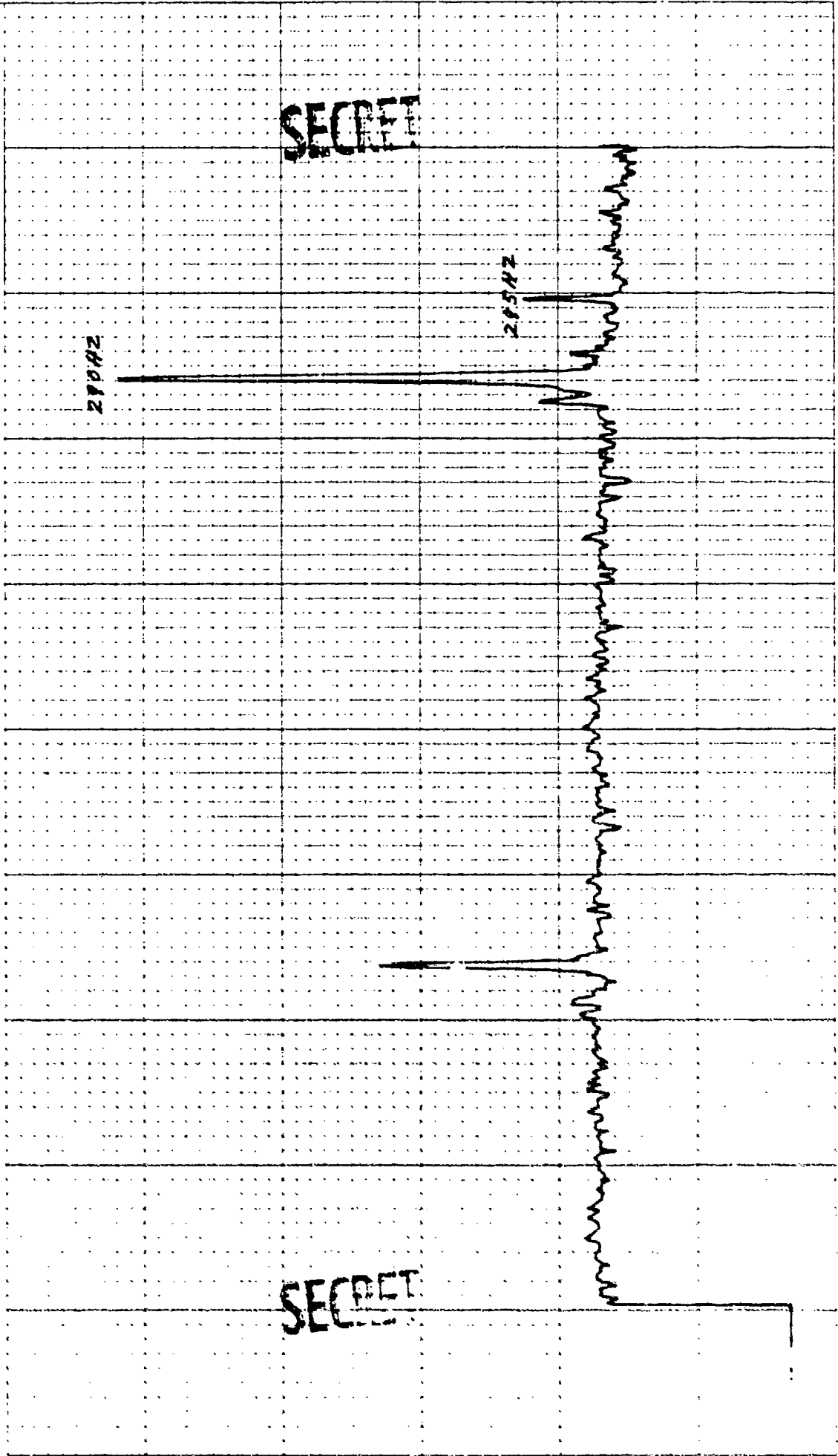
SECRET

46 0703

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

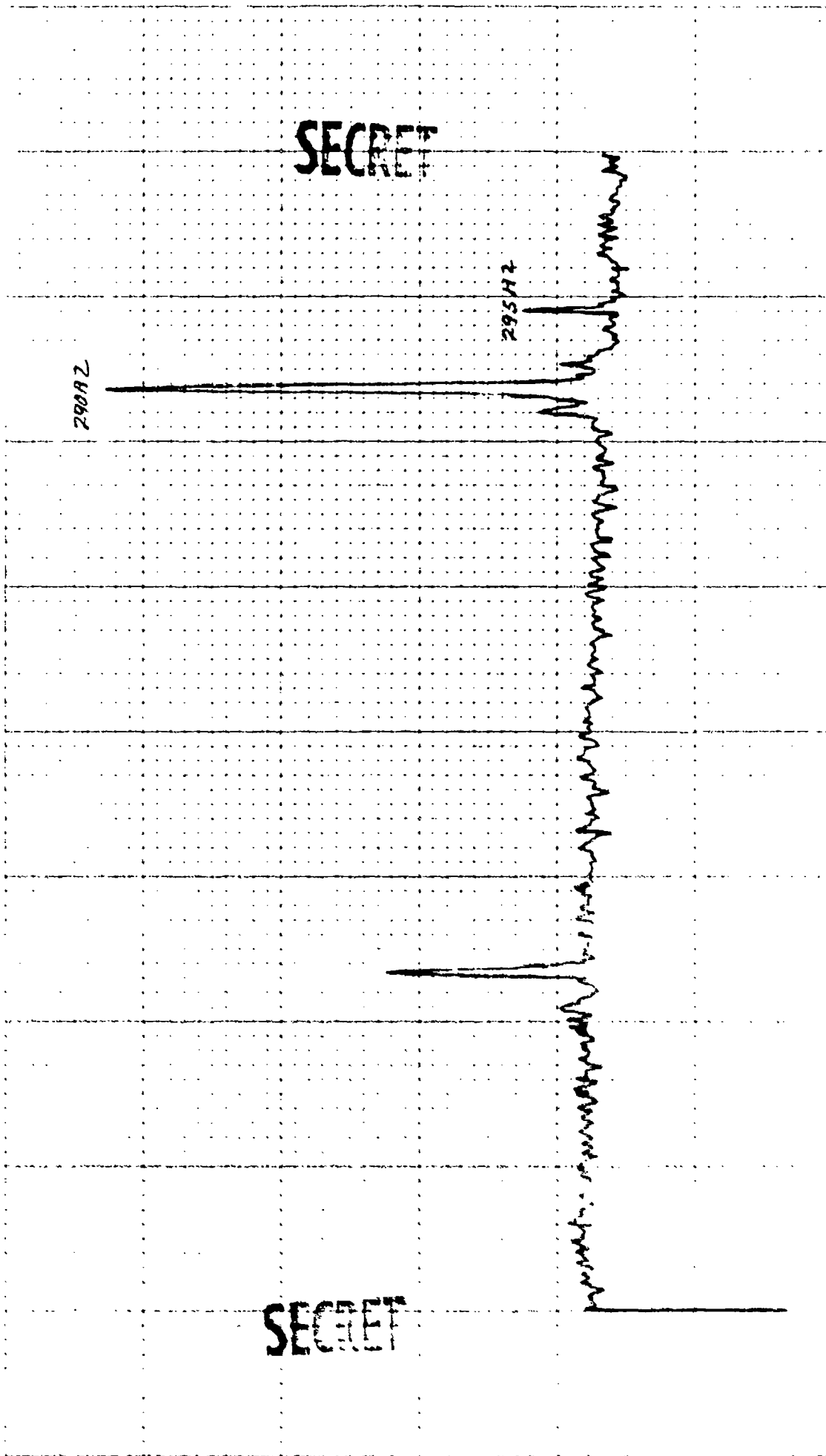
DATE OF ANALYSIS: / 16 /
 DATE/TIME: 2-8-77 - 0202Z
 ANALYSIS BANDWIDTH: 1/10HZ
 - 26 DEG. AZ STEERING

REEL: F29 INDEX X1195
 INTEGRATION TIME 320 SECS ATTEN: -24 DB
 FIITFP WTG: HANNING



46 0703

CONTROL: 0202-16 (207) DATE: ANALYSIS: -16 REEL: F29 INDE X/45
 BEAMFORMED SPECTRUM (ELEMENTS) DATE: TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTEN: -2Y DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1710HZ FILTER WTC: HANNING
 CENTER FREQ: 280 HZ -27 DEG. AZ STEERING

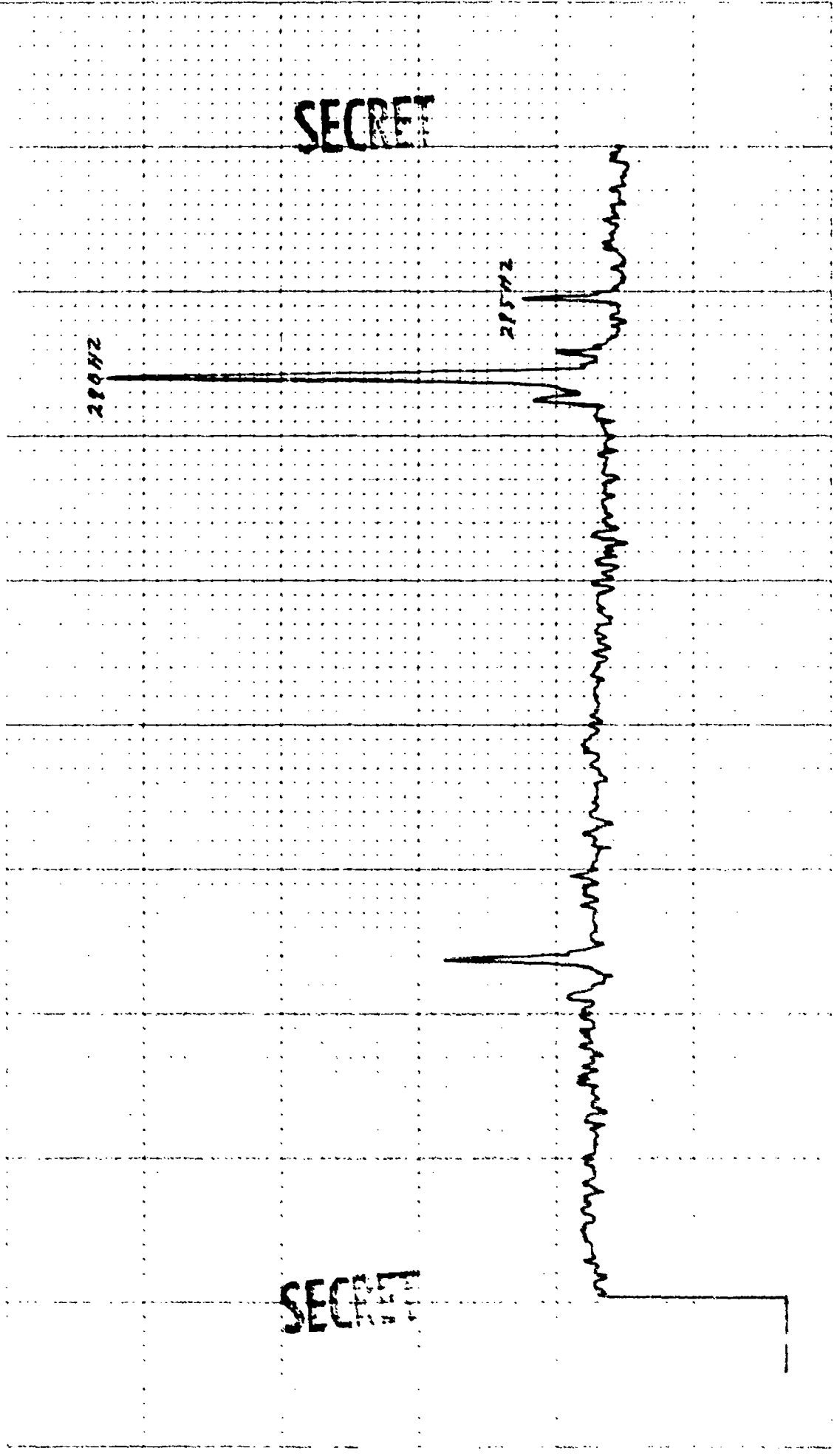


SECRET

SECRET

46 0703

CONTROL: 0202 - 16 (007) DATE OF ANALYSIS: REEL: E23 INDE X 1195
 BEAMFORMED SPECTRUM (ELEMENTS) / - / 6
 EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTEN: -24 DB
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 / 6 ELEMENTS - 20 DEG. AZ STEERING



SECRET

SECRET

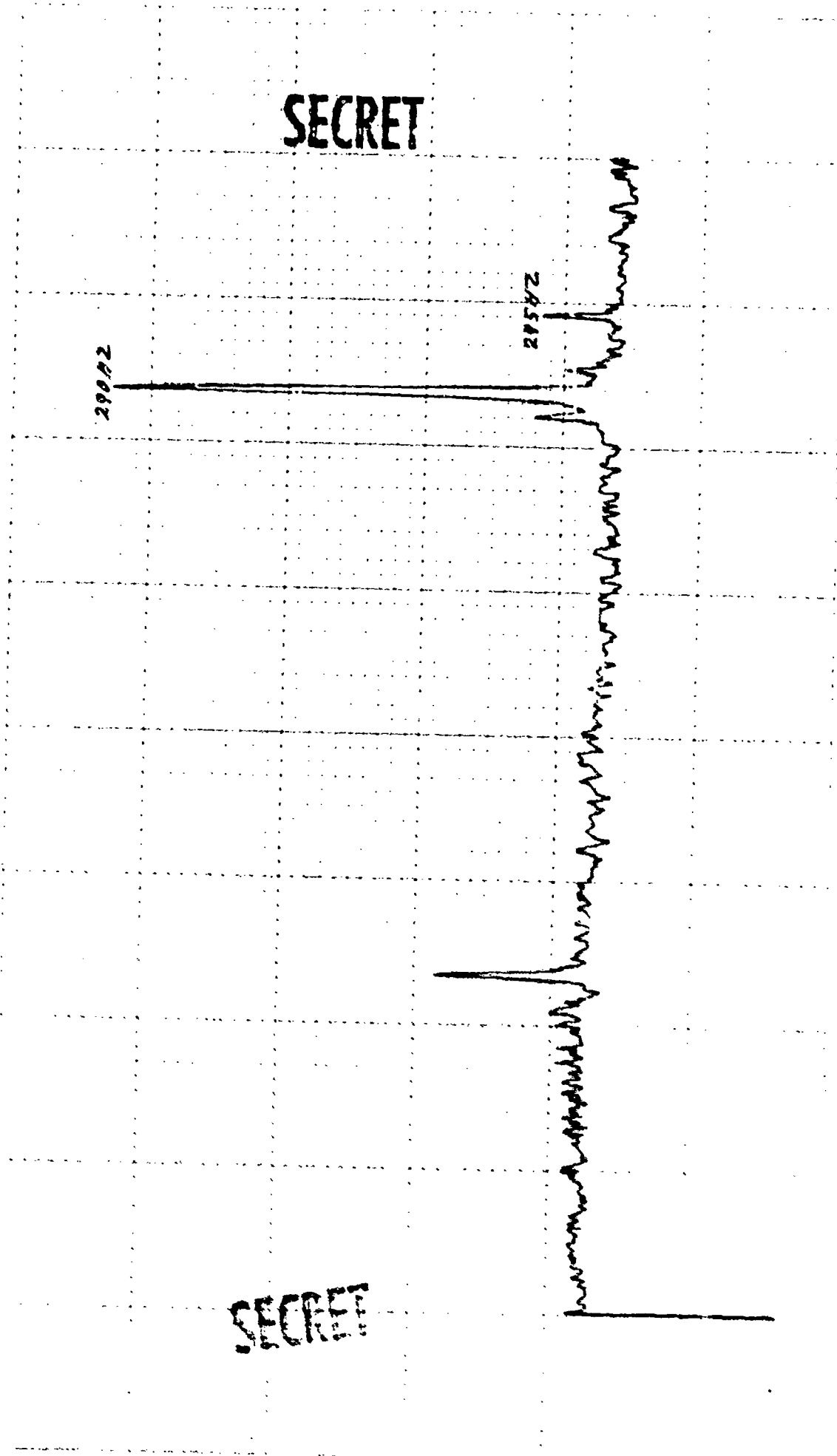
44 0703

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

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

REEL: F39
 INTEGRATION TIME 320 SECS
 FITTED WTC: HANNING

INDEX: 1145
 ATTEN: 20 DB



SECRET

SECRET

46 070

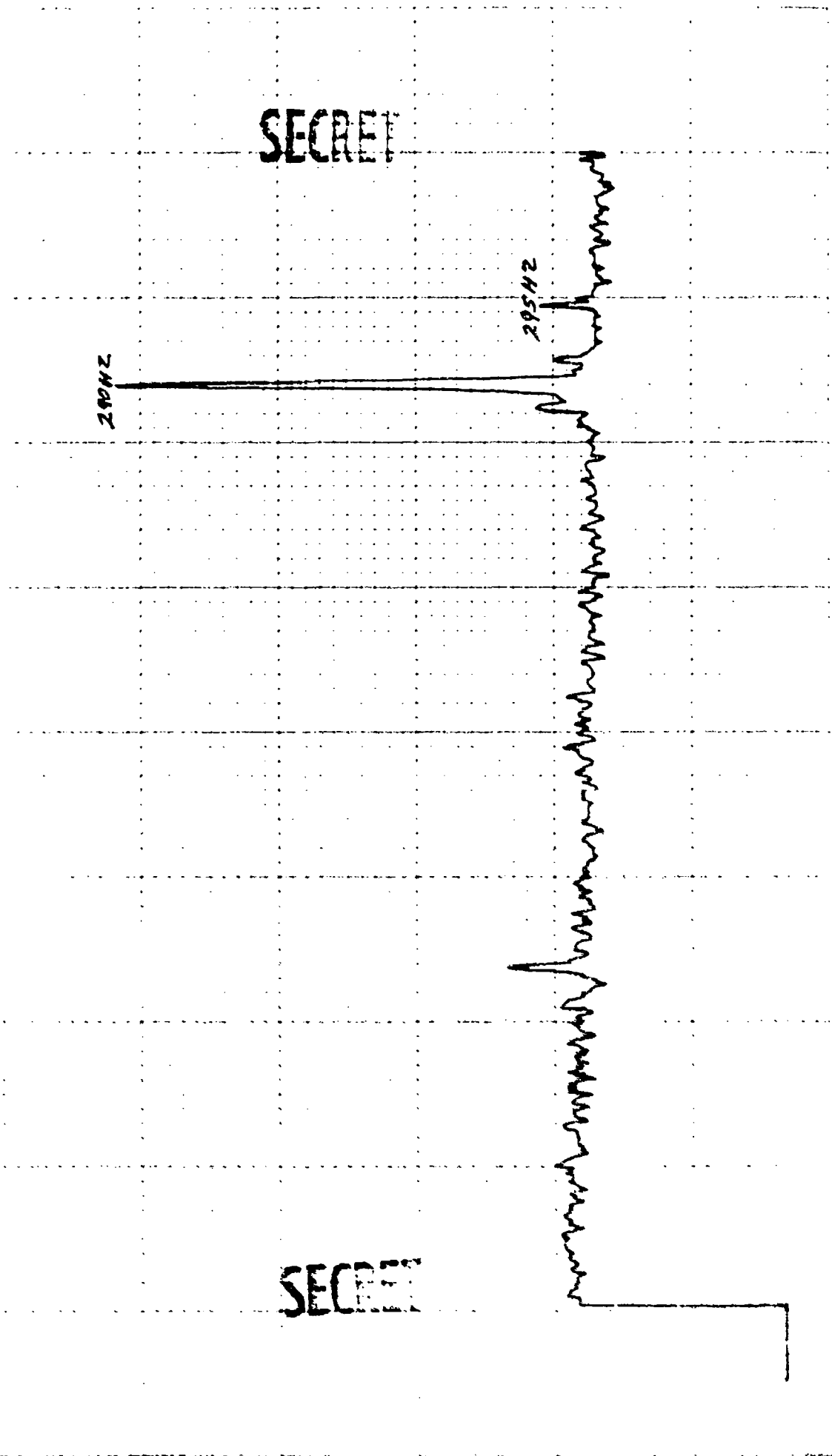
CONTROL: 0202-16 (027) DATE OF ANALYSIS: 1-16 REEL: F27 INDE X 045

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

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

CENTER FREQ: 280 HZ -30 DEG. AZ STEERING

16 ELEMENTS



46 0/03

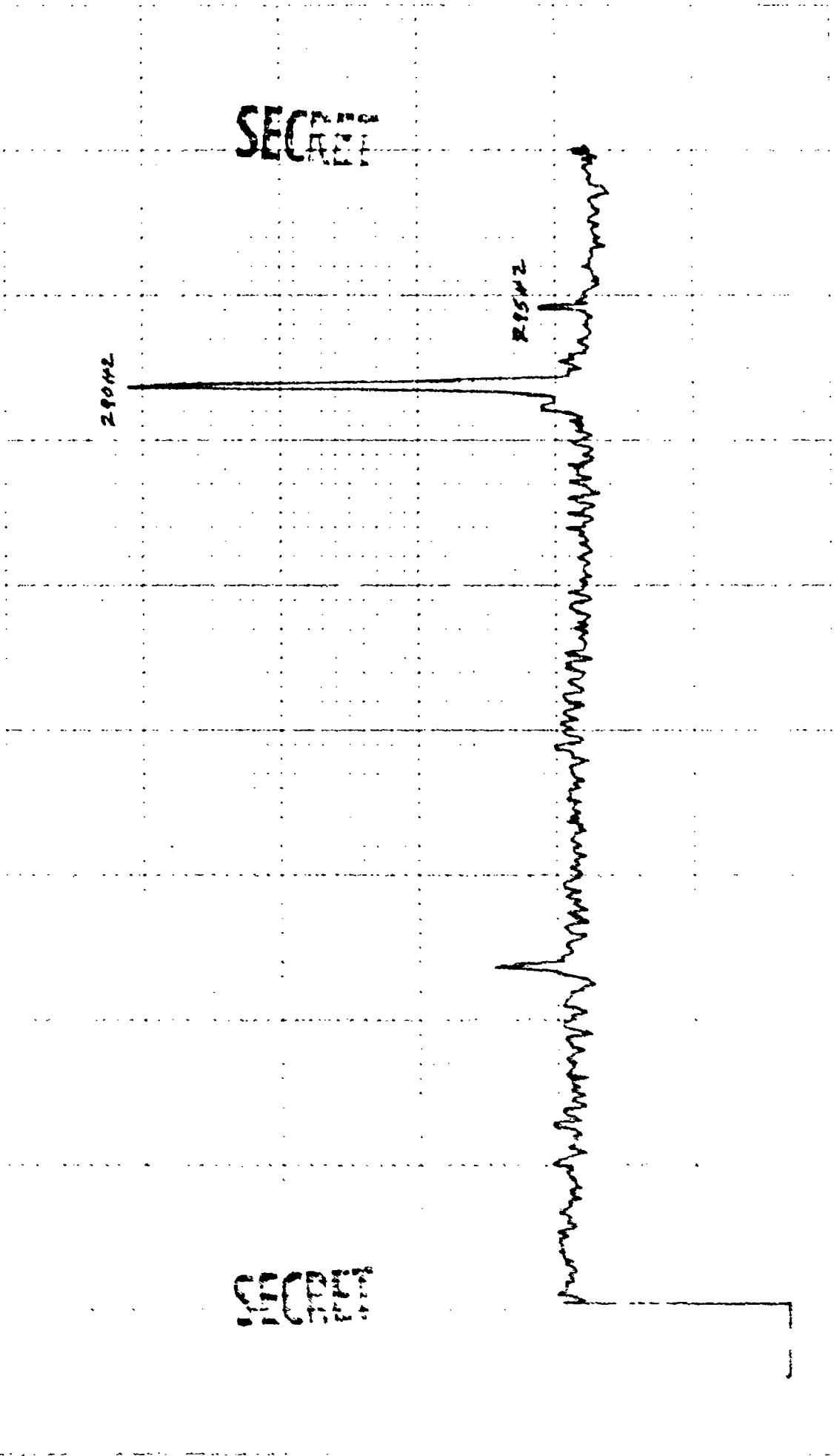
CONTROL: 0202 - J6 (007) DATE OF ANALYSIS: 7-76 REEL: F29 INDE X/VS

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

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

CENTER FREQ: 280 HZ -32 DEG. AZ STEERING

J6 ELEMENTS



SECRET

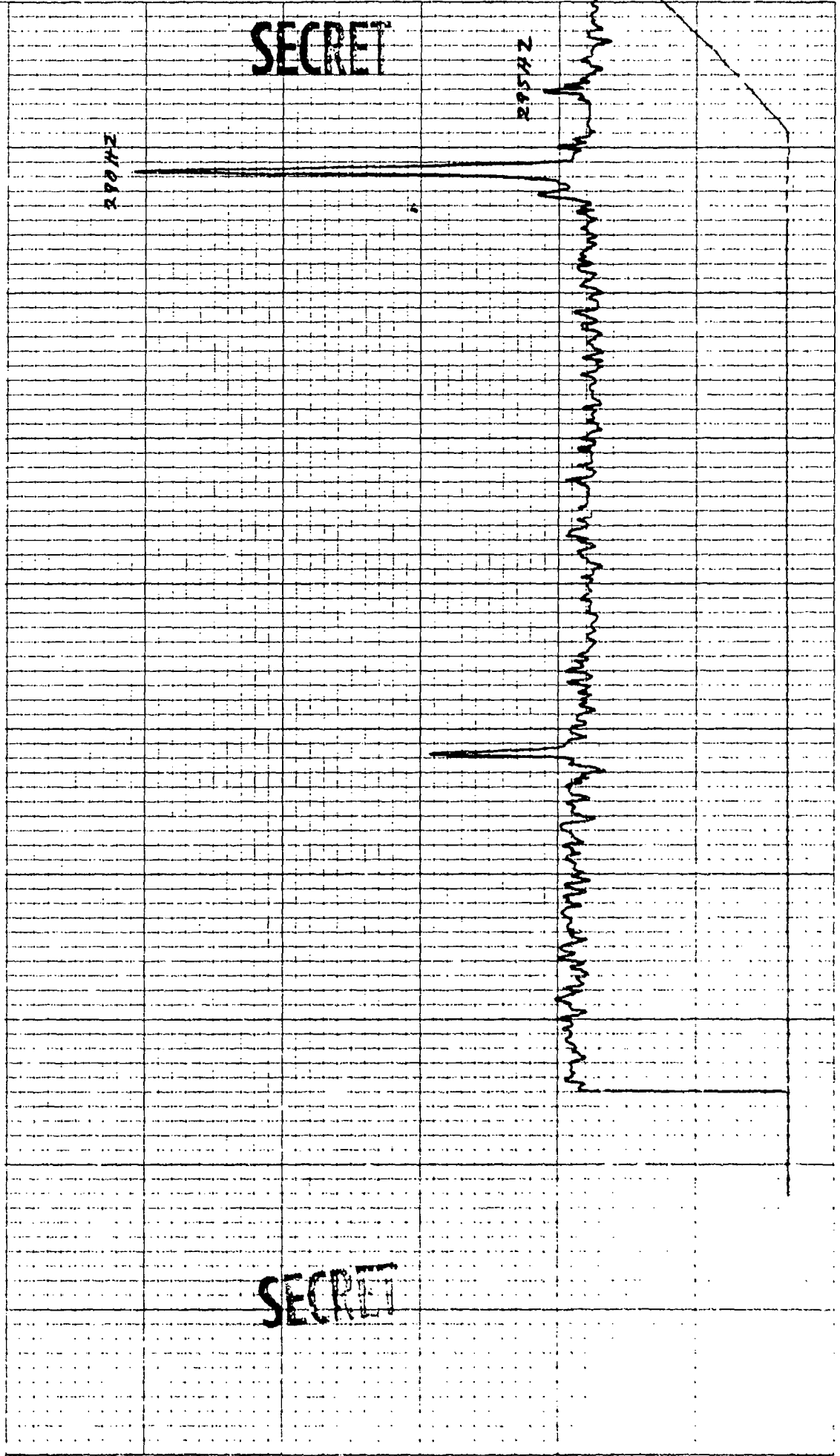
14-00000 10.0 TO THE INCHES IN THE HORIZONTAL
14-00000 1/2 INCHES IN THE VERTICAL

46 0703

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

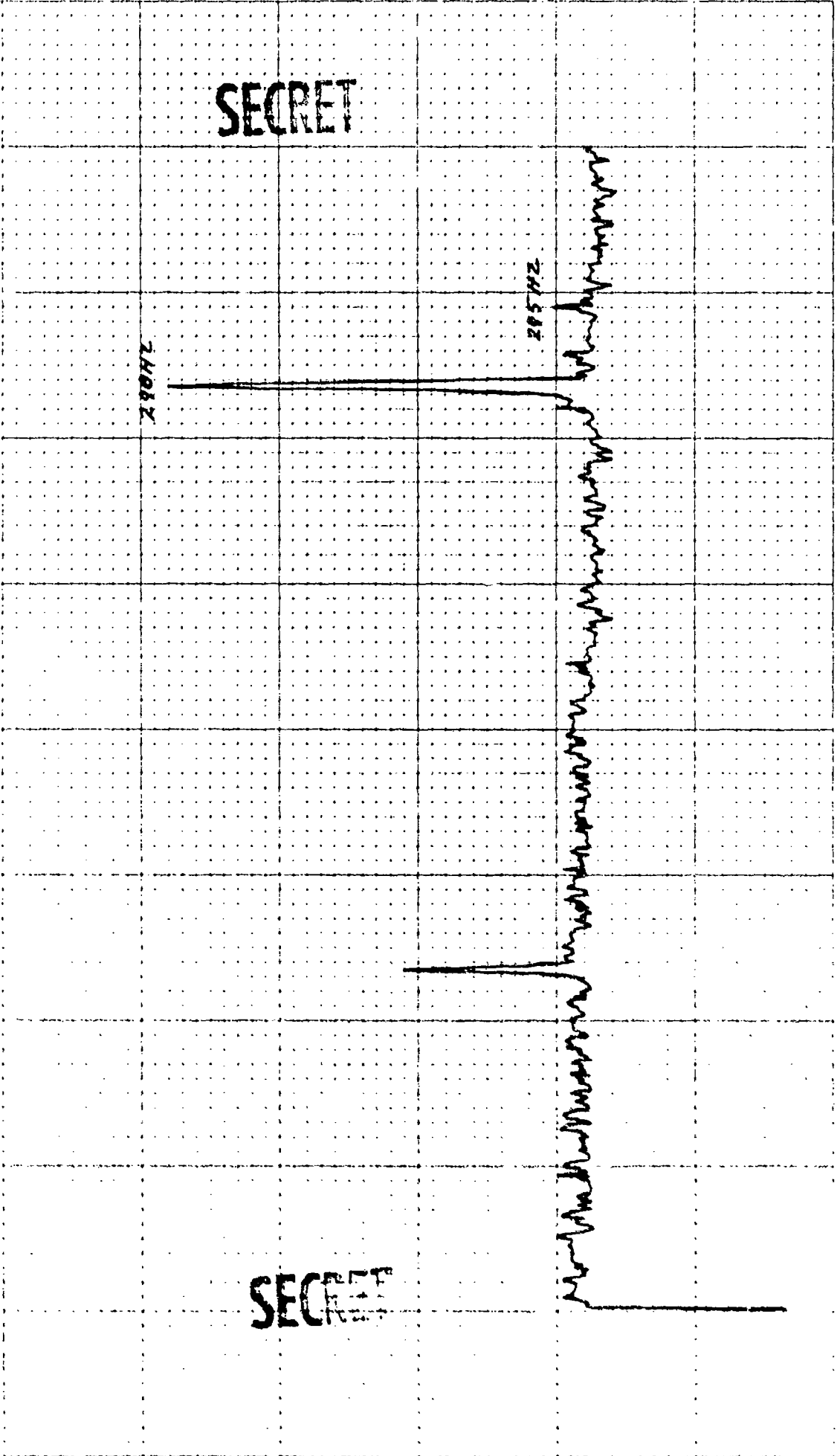
DATE OF ANALYSIS: 1-16
DATE/TIME: 2-8-77 - 0202 Z
ANALYSIS BANDWIDTH: 1/10 HZ
-34 DEG. AZ STEERING

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



46 0703

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



46 5753

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

DATE OF ANALYSIS: 1-16
DATE/TIME: 20-72-0202Z
ANALYSIS BANDWIDTH: 10HZ
30 DEC. AZ STEERING

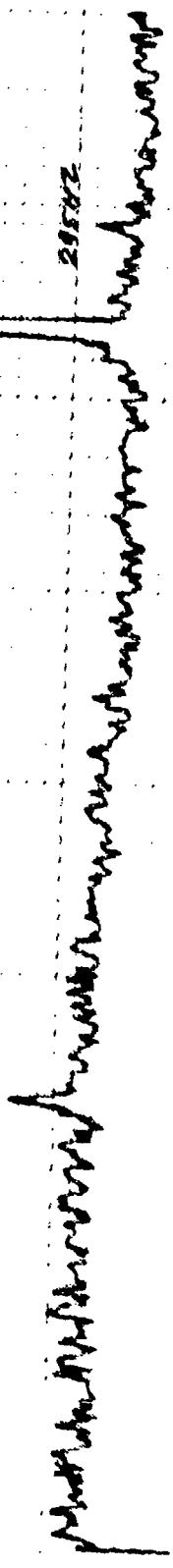
PEEL: F29
INTEGRATION TIME 320 SECS
FIT: 50 WIG: HANNING
INDE X/145
ATTEN: -24 DB

SECRET

SECRET

290HZ

295HZ



CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 7

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

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

NOISE LEVEL

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

SIGNAL-NOISE-RATIO

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

CONFIDENTIAL

CONFIDENTIAL
SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 7

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

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

NOISE LEVEL

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

SIGNAL-NOISE-RATIO

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

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 7

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

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

NOISE LEVEL

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

SIGNAL-NOISE-RATIO

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

CONFIDENTIAL

SIGNAL GAIN

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

ARRAY GAIN

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

45 0703

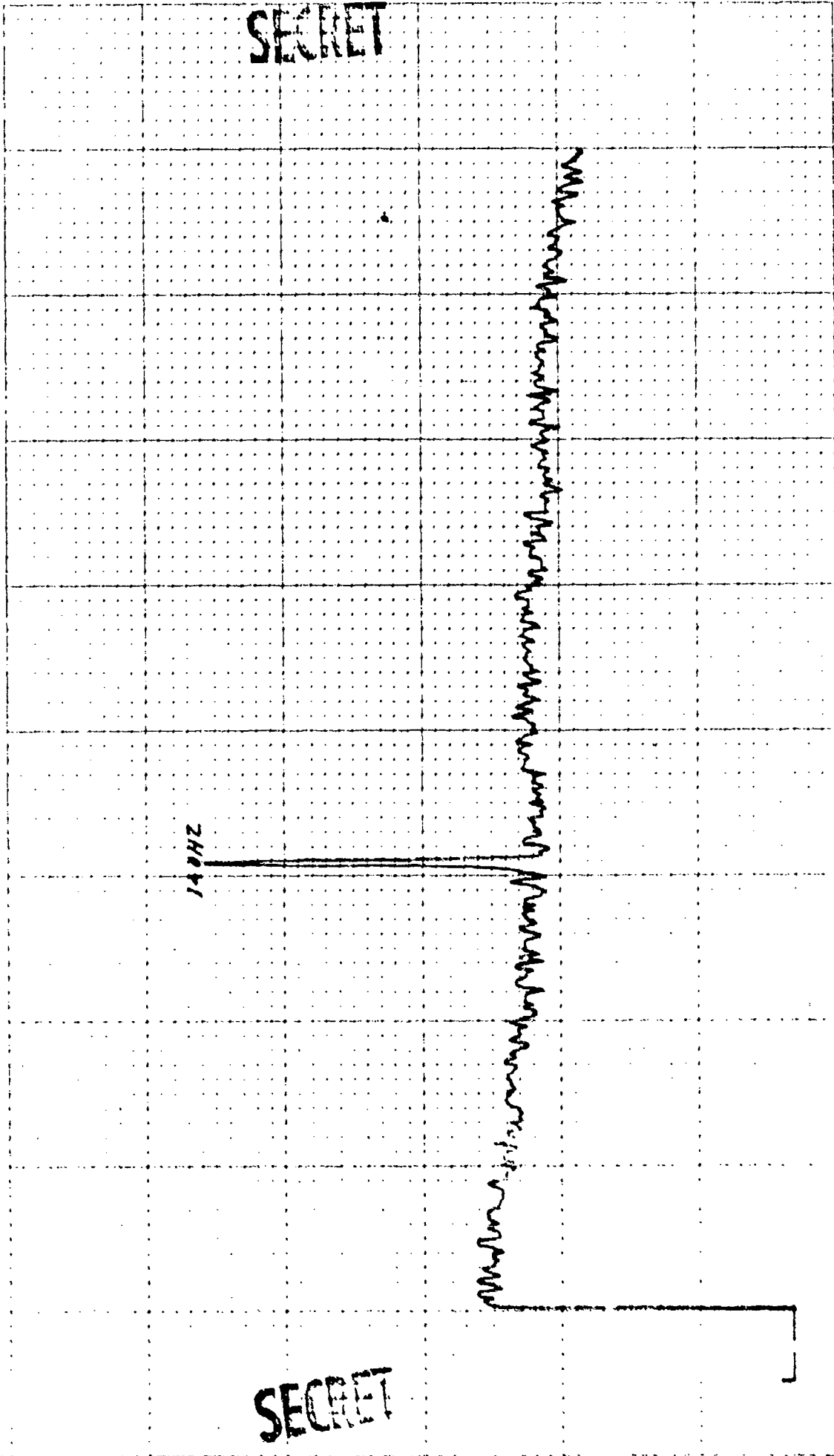
CONTROL: 0202 - J2 (DPT) DATE OF ANALYSIS: 1-26-82 REEL: F09 INDE X/195

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

EXERCISE: BEARING STAKE DATE/TIME: 08-77 - 0202Z FILTFR WTG: HANNING

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

32 ELEMENTS

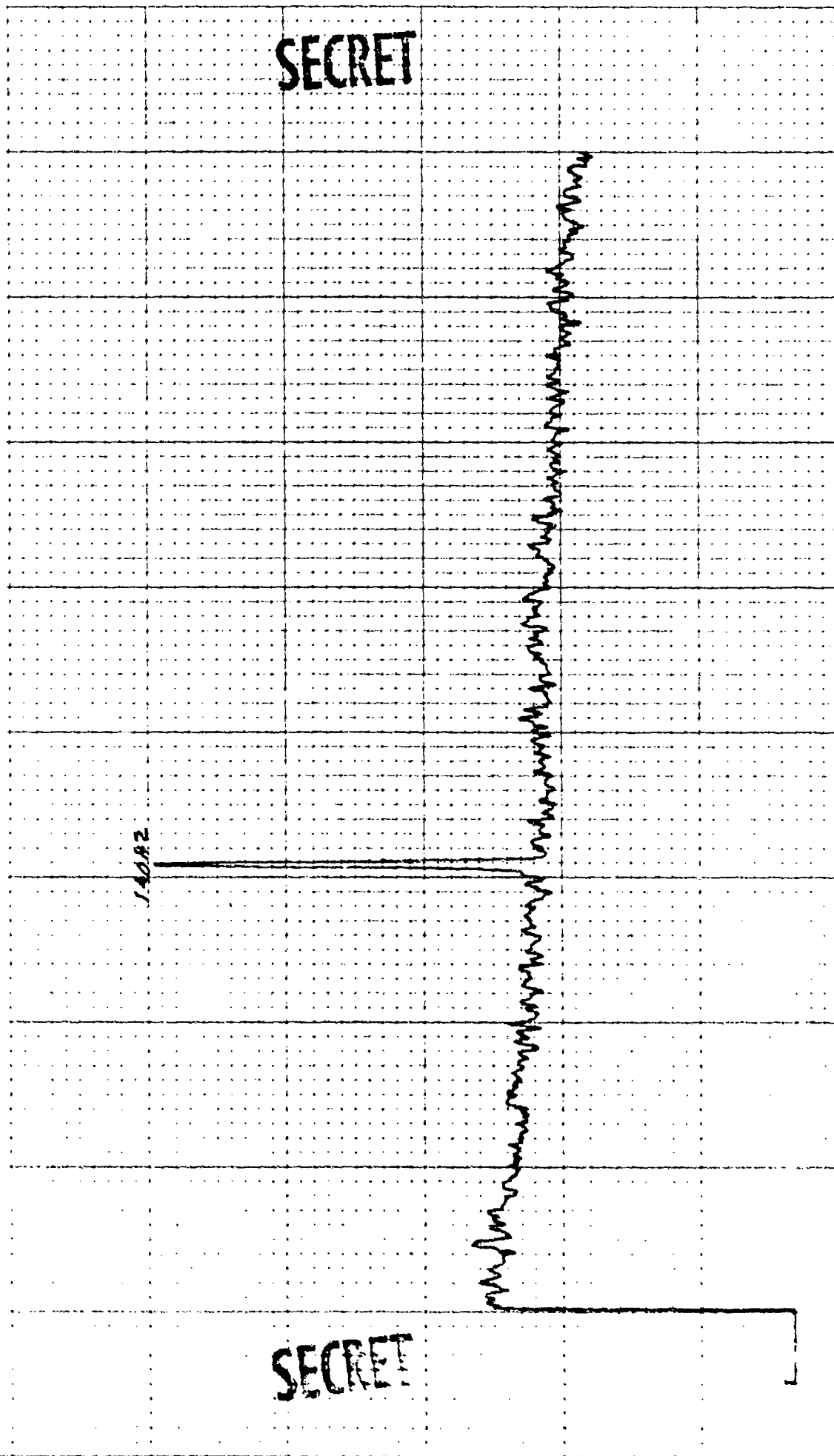


46 0703

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

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

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



SECRET

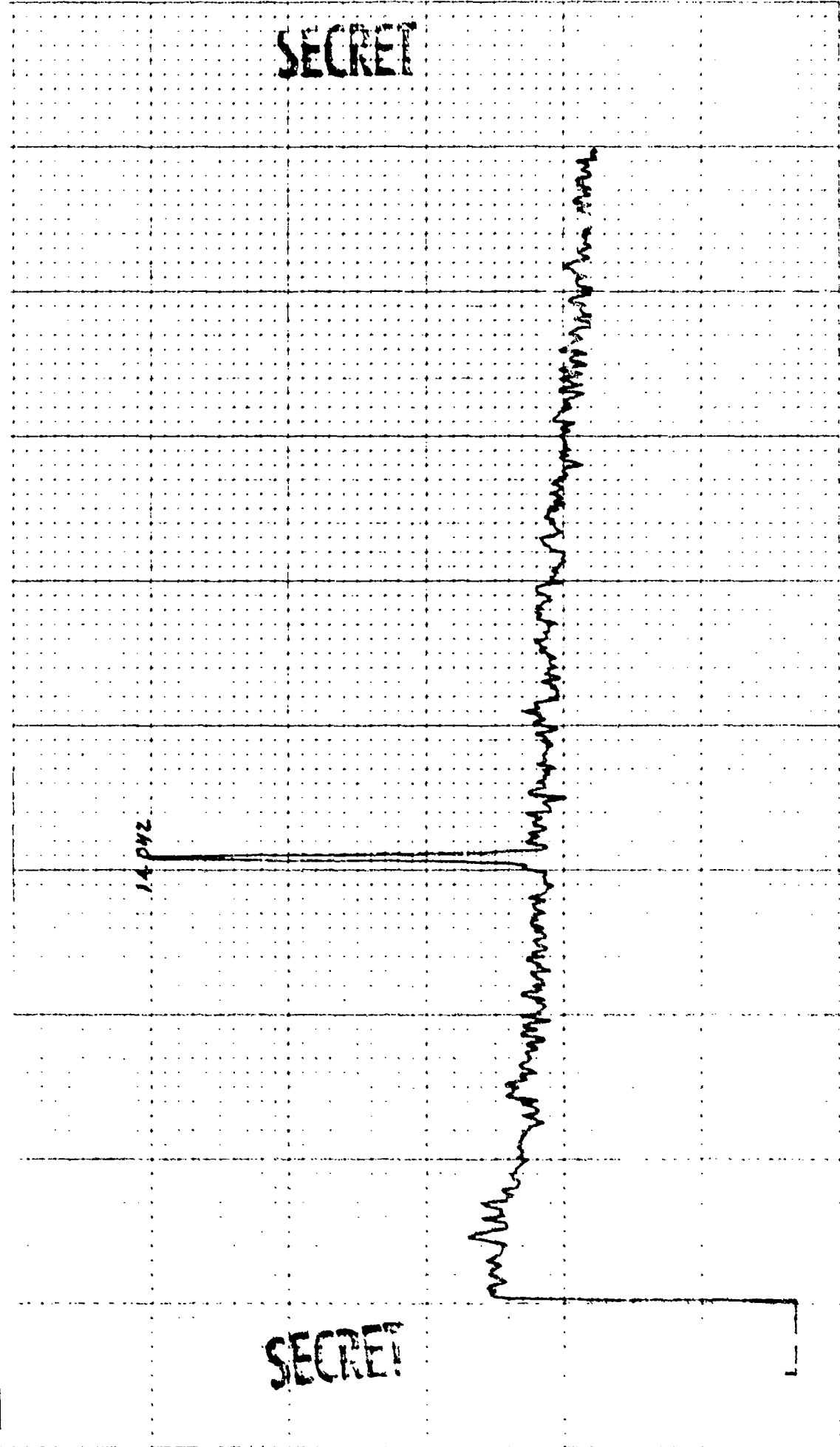
SECRET

46 0703

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

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

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



SECRET

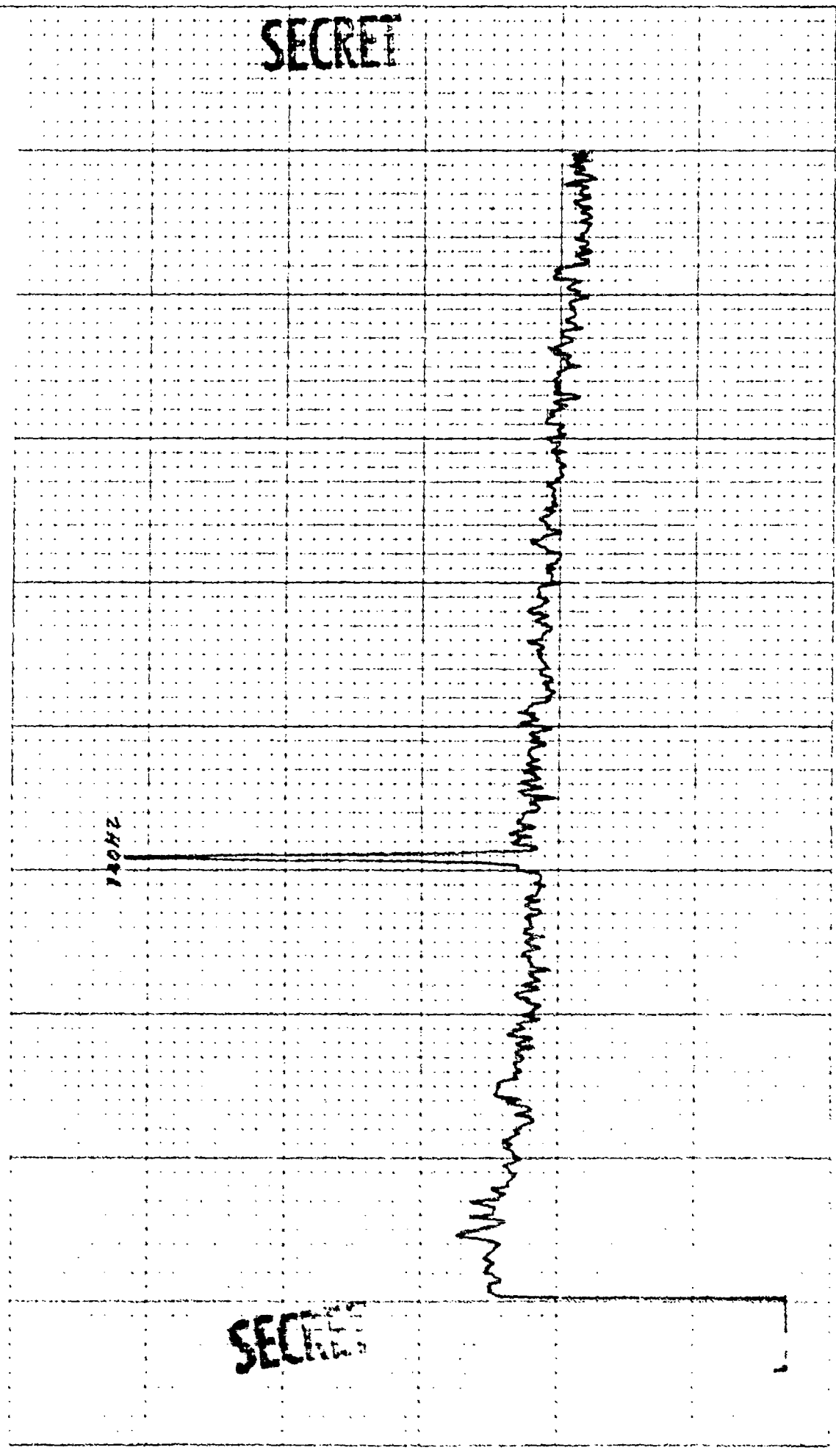
SECRET

46 0703

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

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

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

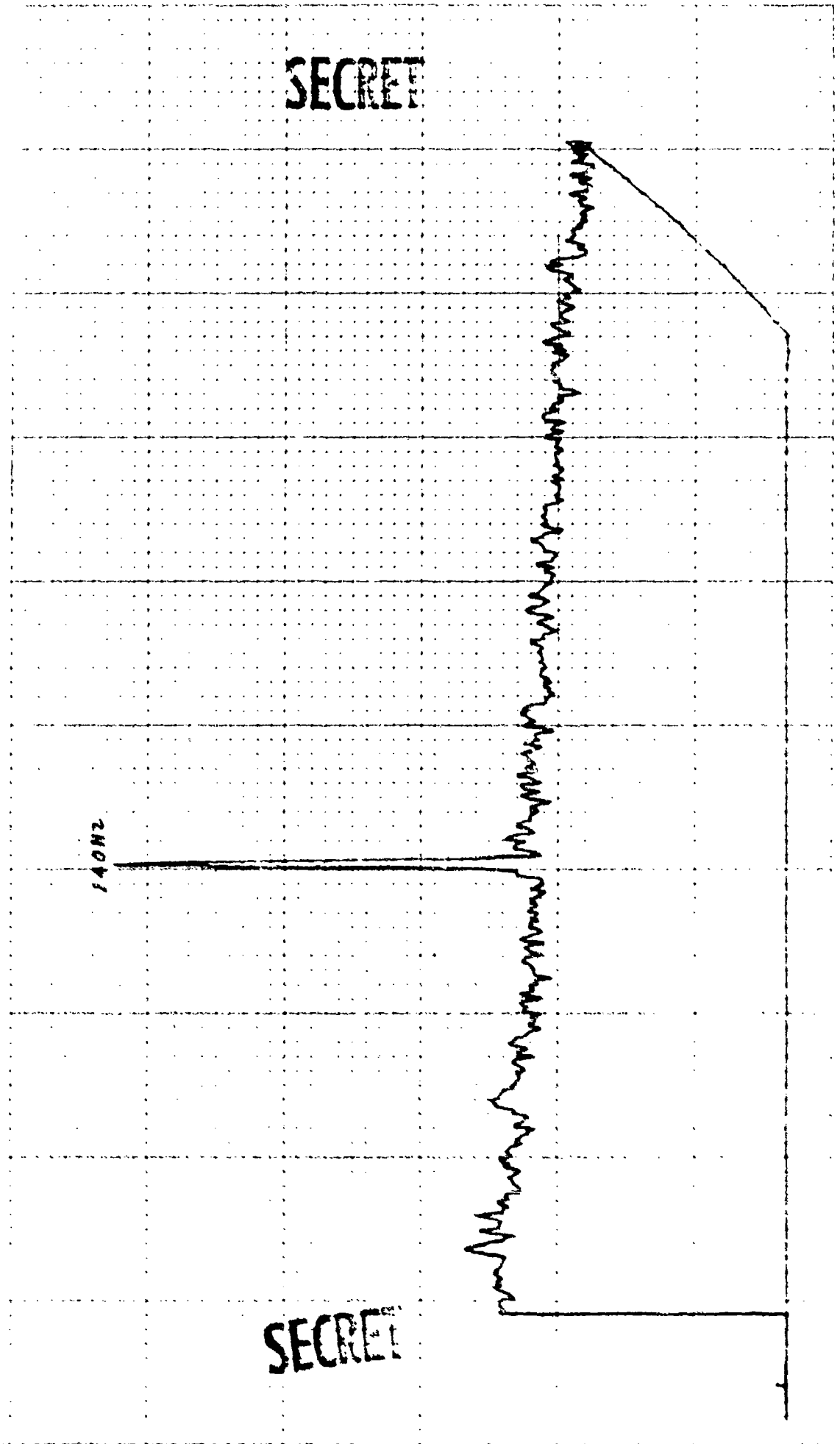


SECRET

SECRET

46 0703

CONTROL: 0202-30 (DP7) DATE OF ANALYSIS: 1-26-77 REEL: F29 INDE X/45
 BEAMFORMED SPECTRUM(ELEMENTS) 28-34
 EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 -02027 INTEGRATION TIME 320 SECS ATTEN: -30 DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
32 ELEMENTS -20 DEG. AZ STEERING



SECRET

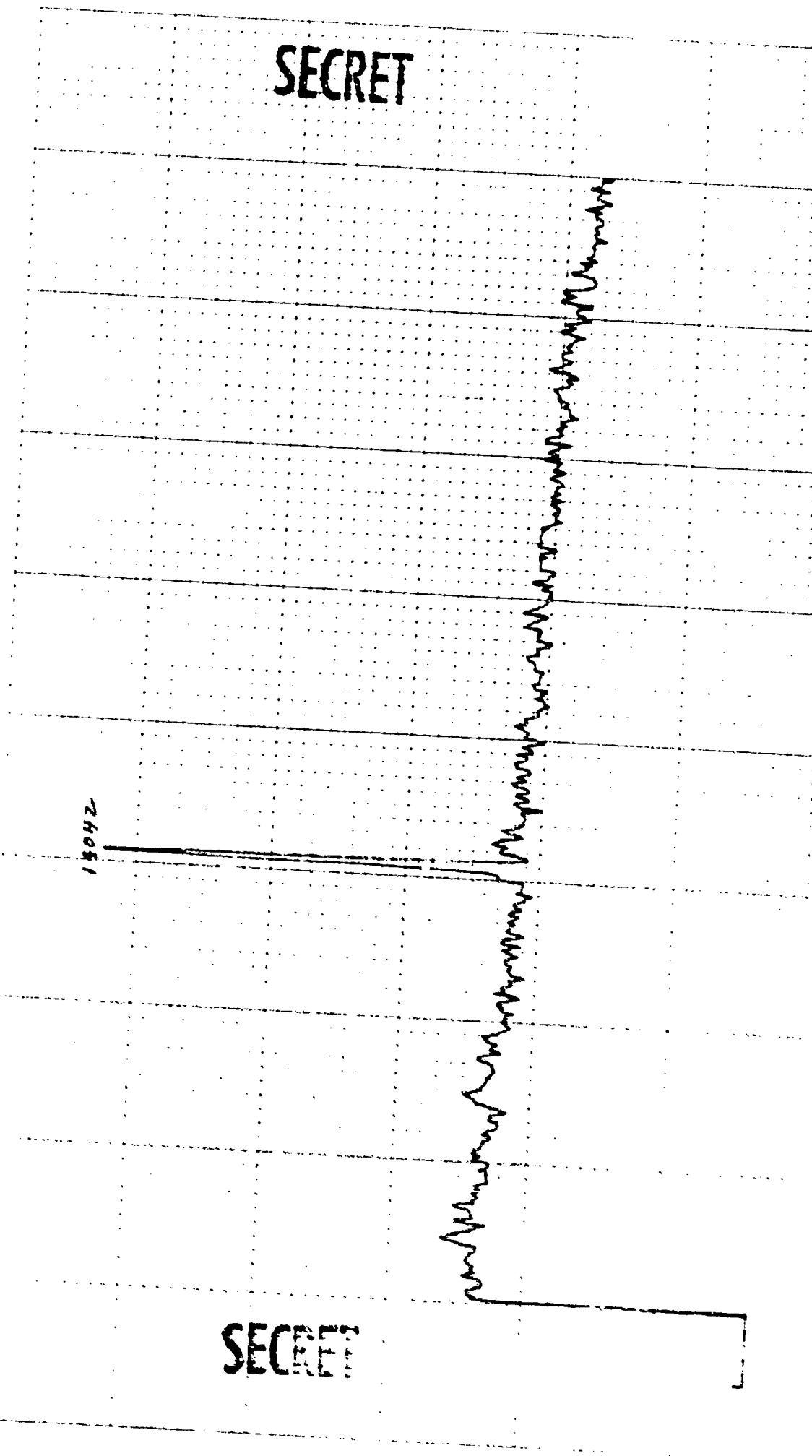
SECRET

66-0763

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

DATE OF ANALYSIS: 1-26-54
DATE/TIME: 2-8-77 - 0212 Z
ANALYSIS BANDWIDTH: 1710HZ
-2/5 DEG. AZ STEERING

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



SECRET

SECRET

46 0703

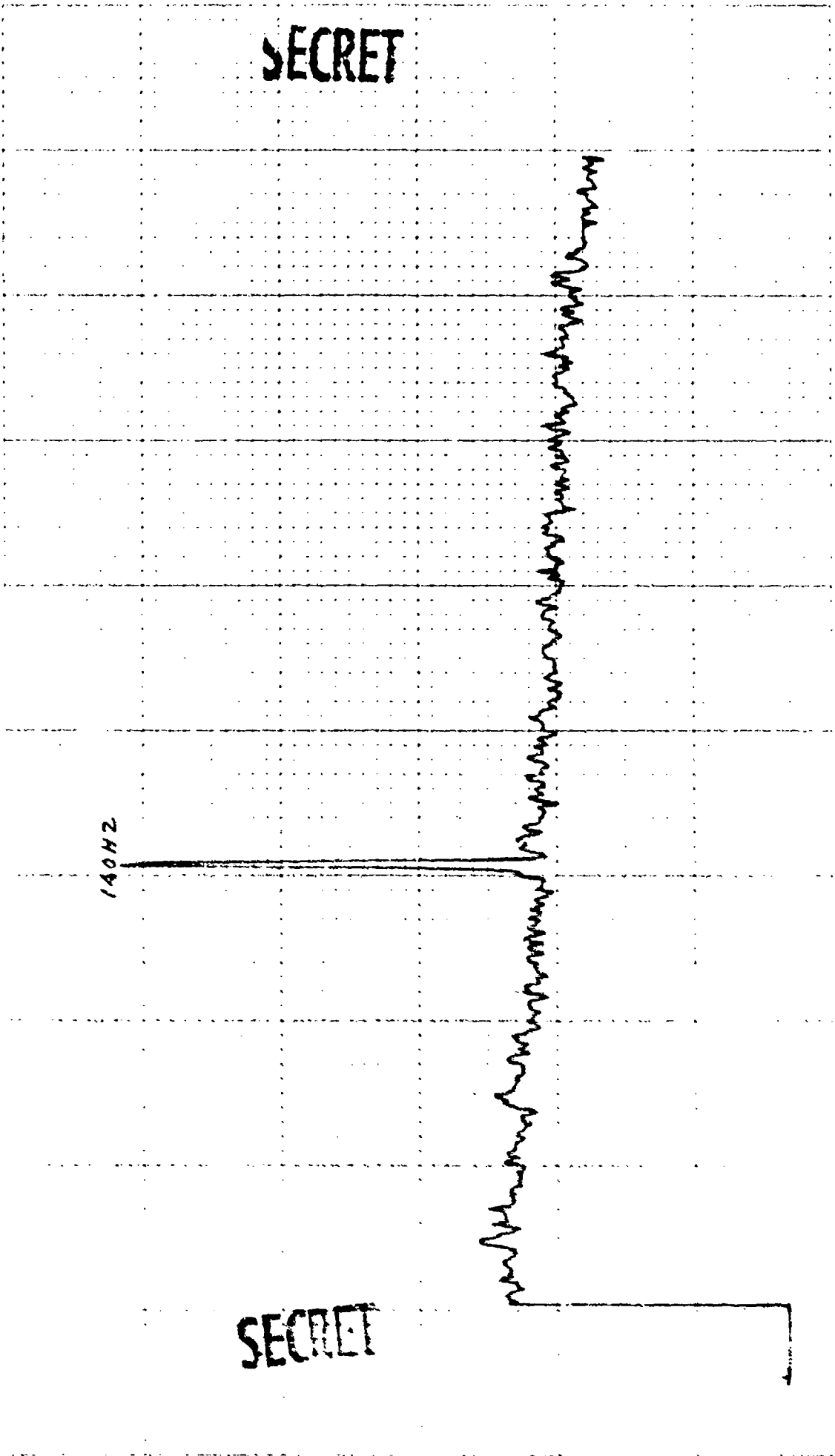
CONTROL: 0202 - 32 (DP7) DATE OF ANALYSIS: 1-26-89-37 REEL: F39 INDE X/145

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

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

CENTER FREQ: 150 HZ - 22 DEG. AZ STEERING

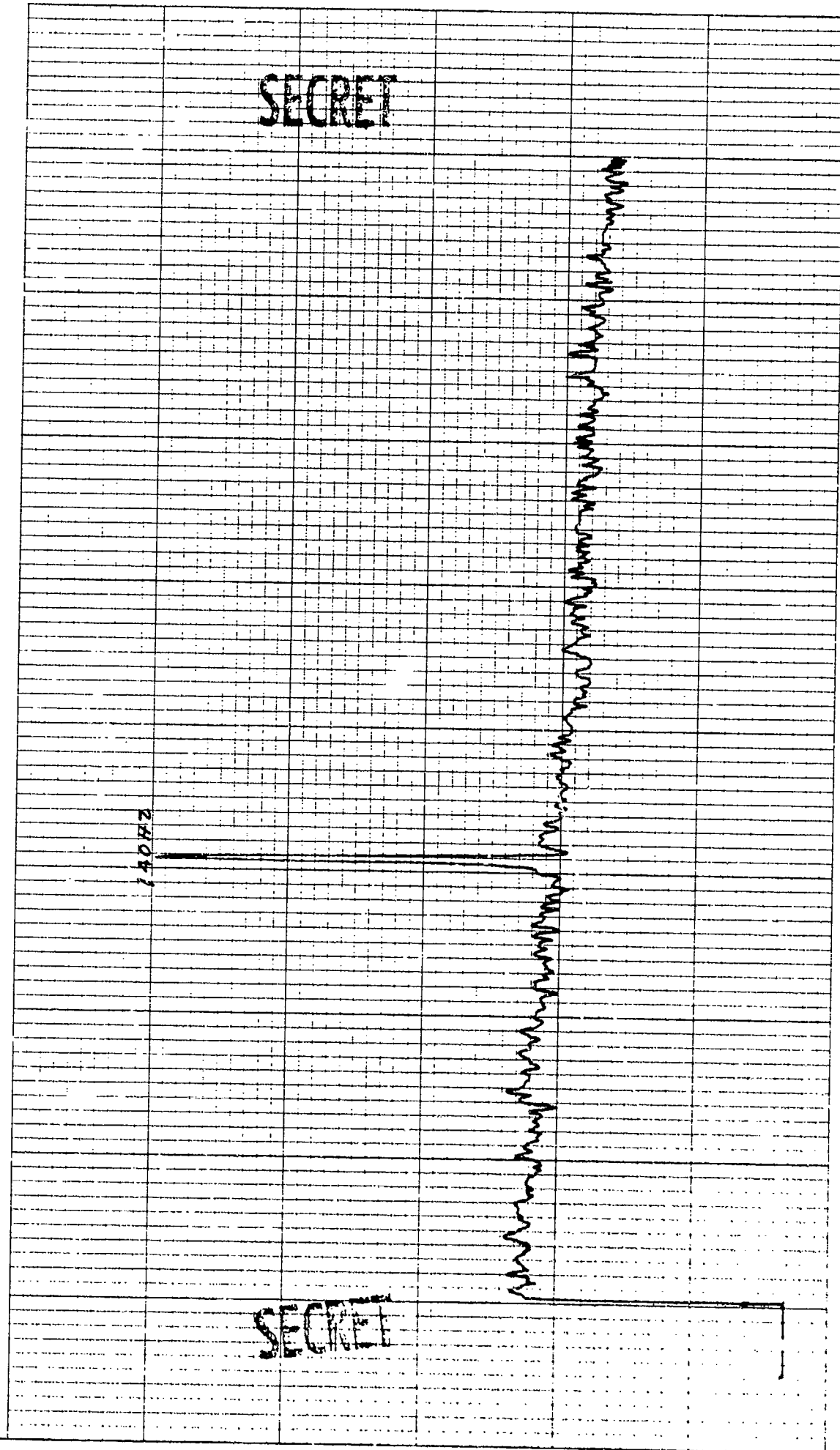
32 ELEMENTS



SECRET

SECRET

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



44 0703

CONTROL: 0202 - 30 (107)
 BEAMFORMED SPECTRAL ELEMENTS
 EXERCISE: BEARING STAYE
 CENTER FREQ: 150 HZ
 32 ELEMENTS

DATE OF ANALYSIS: - - -
 1-26-89-53
 DATE TIME: 2-8-77 - 0202Z
 ANALYSIS: BANDWIDTH 1115HZ
 -86 DEG. AZ STEERING

FEEL: F29
 INTEGRATION TIME 320 SECS
 FILTERS WTC: HANNING

INDE 7/1/95

140HZ

SECRET

SECRET



46 0753

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

140HZ

SECRET

SECRET

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

46 0703

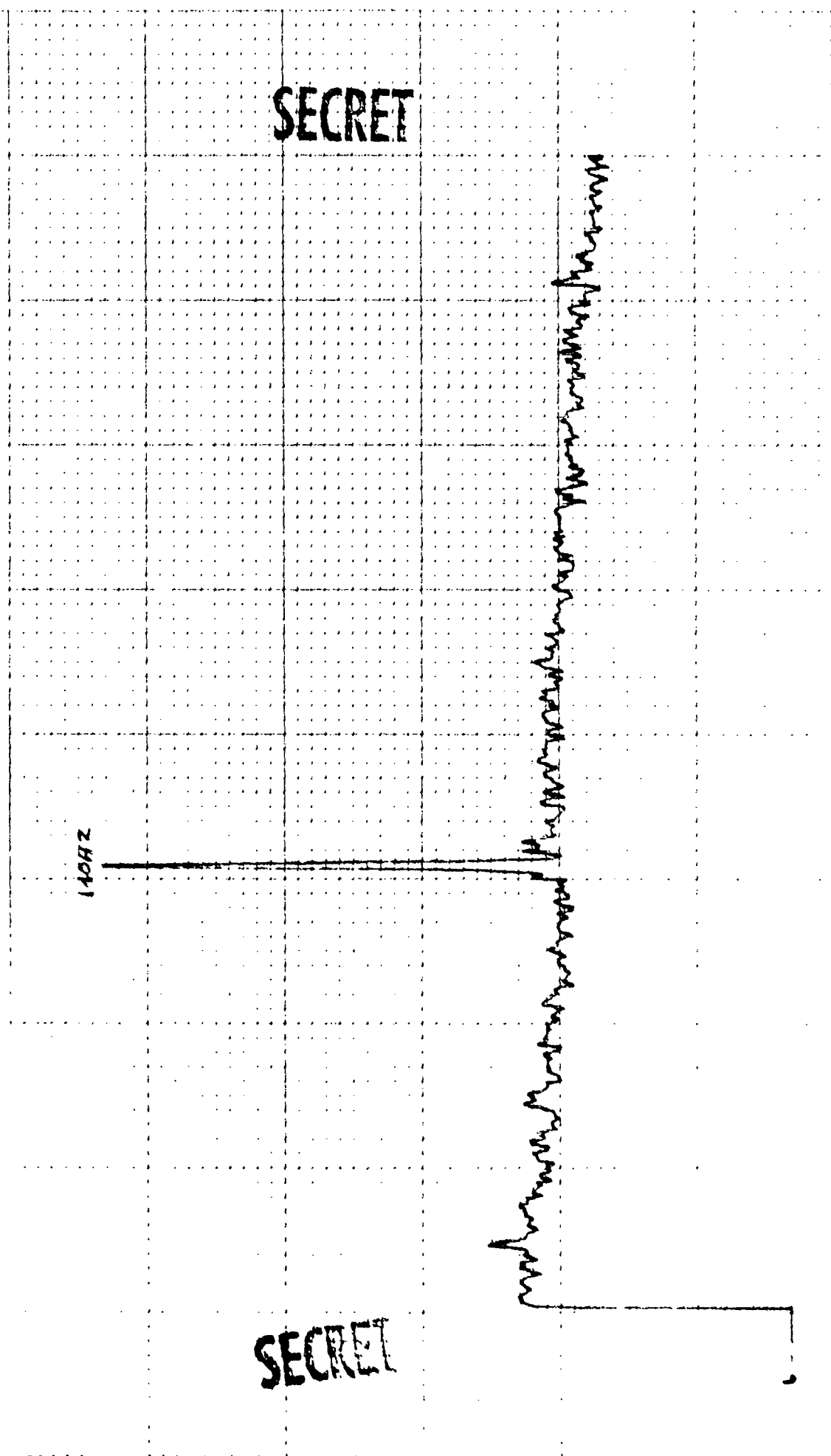
CONTROL: 0202 - 32 (DP7) DATE OF ANALYSIS: REEL: F29 INDE X 1145

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

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

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

32 ELEMENTS -30 DEG. AZ STEERING



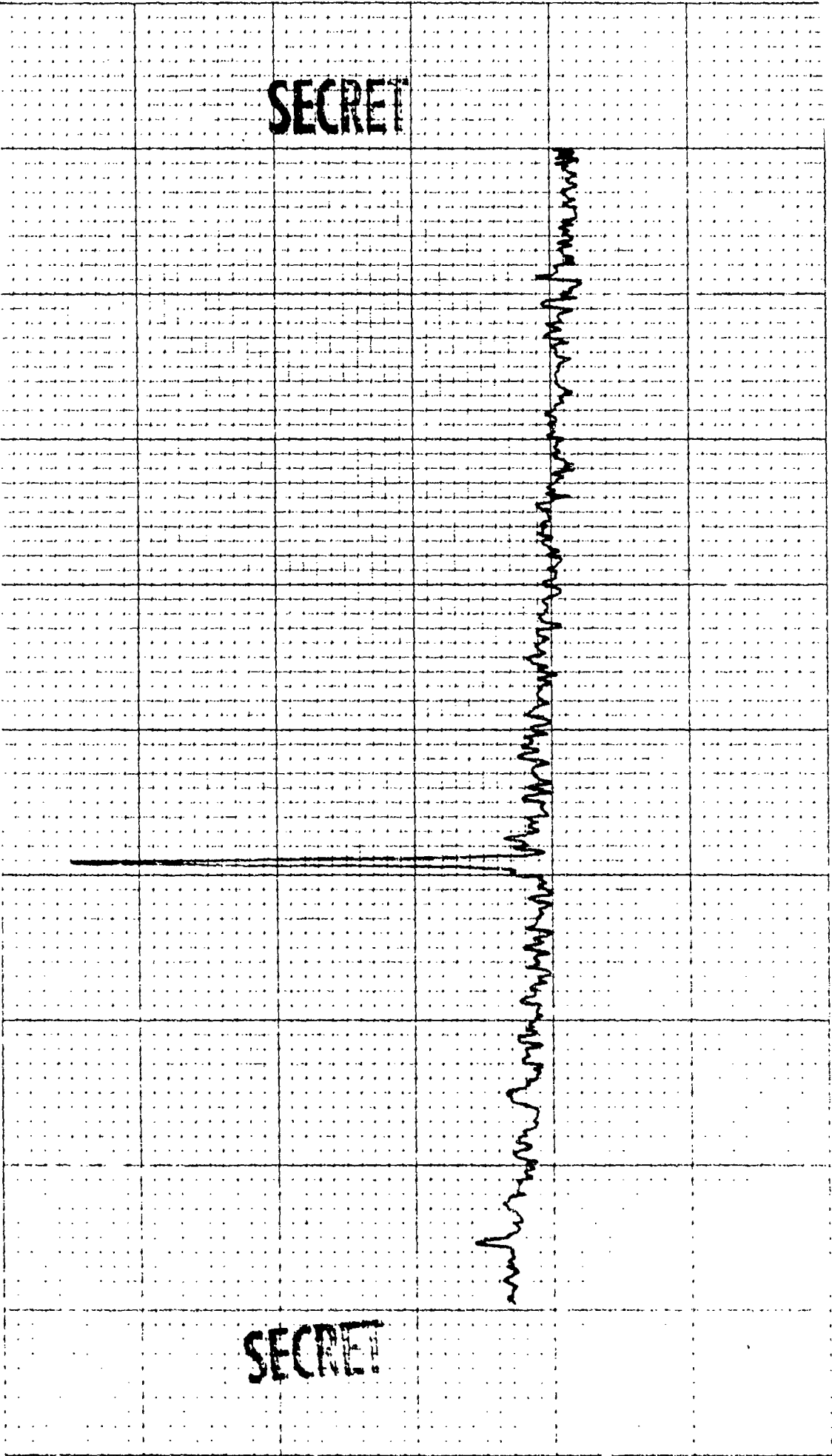
SECRET

SECRET

46 0703

1-2-72 15:10 TO THE DIRECTOR

CONTROL: 0202-32 (DPT) DATE OF ANALYSIS: 1-26-72 REEL: F29 INDE X/145
 BEAMFORMED SPECTRUM(ELEMENTS) 28-77-0202Z INTEGRATION TIME 320 SECS ATTEN: -30 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTFR WTG: HANNING
 CENTER FREQ: 150 HZ -32 DEG. AZ STEERING



46 0703

REF ID: A66666

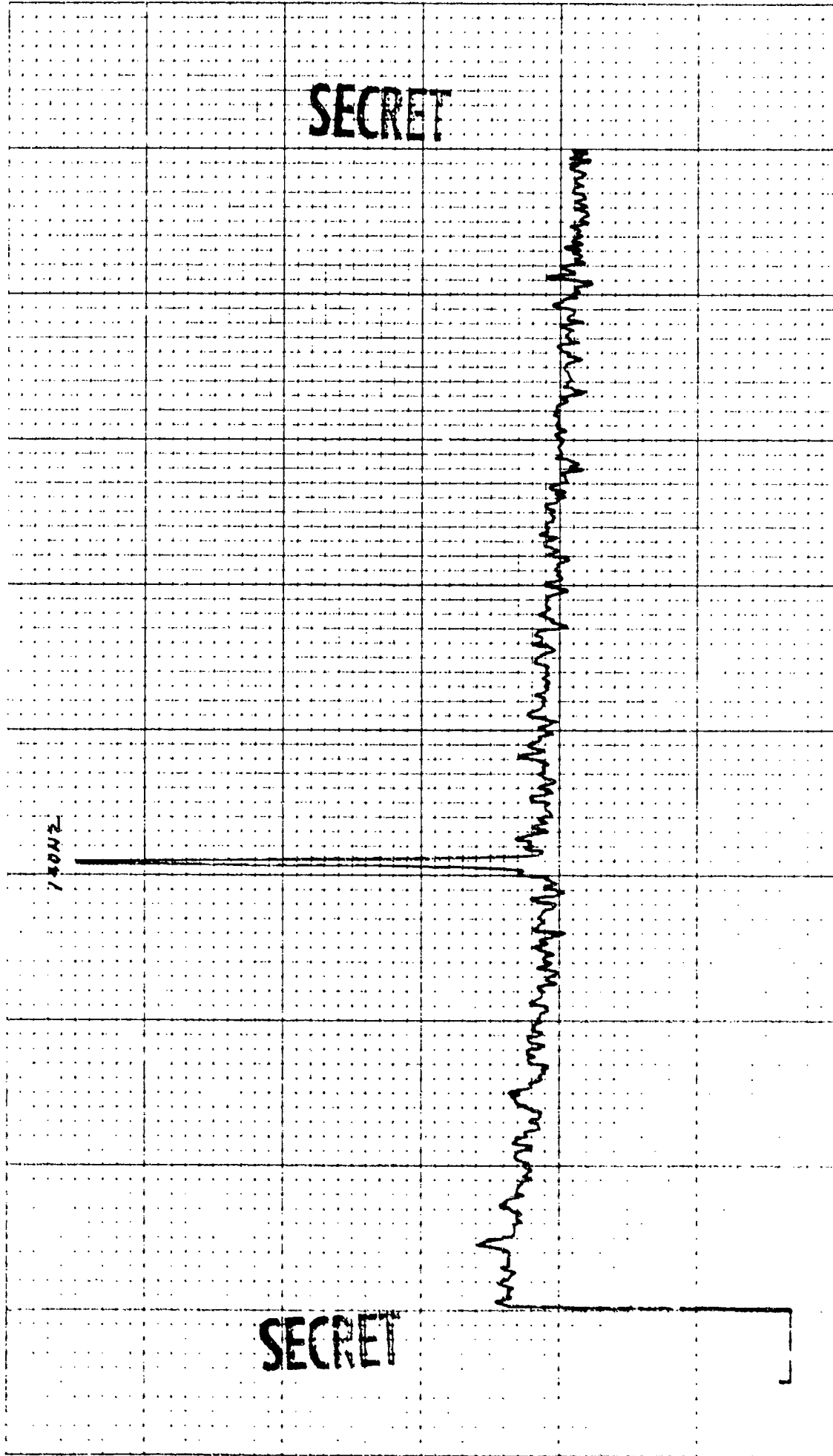
CONTROL: 0202 - 51 (007) DATE OF ANALYSIS: _____ REEL: F29 INDE X // 145

BEAMFORMED SPECTRUM(ELEMENTS) 1-26 29-34

EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0202.2 INTEGRATION TIME 320 SECS ATTEN: 30 DB

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

32 ELEMENTS -33 DEC. AZ STEERING



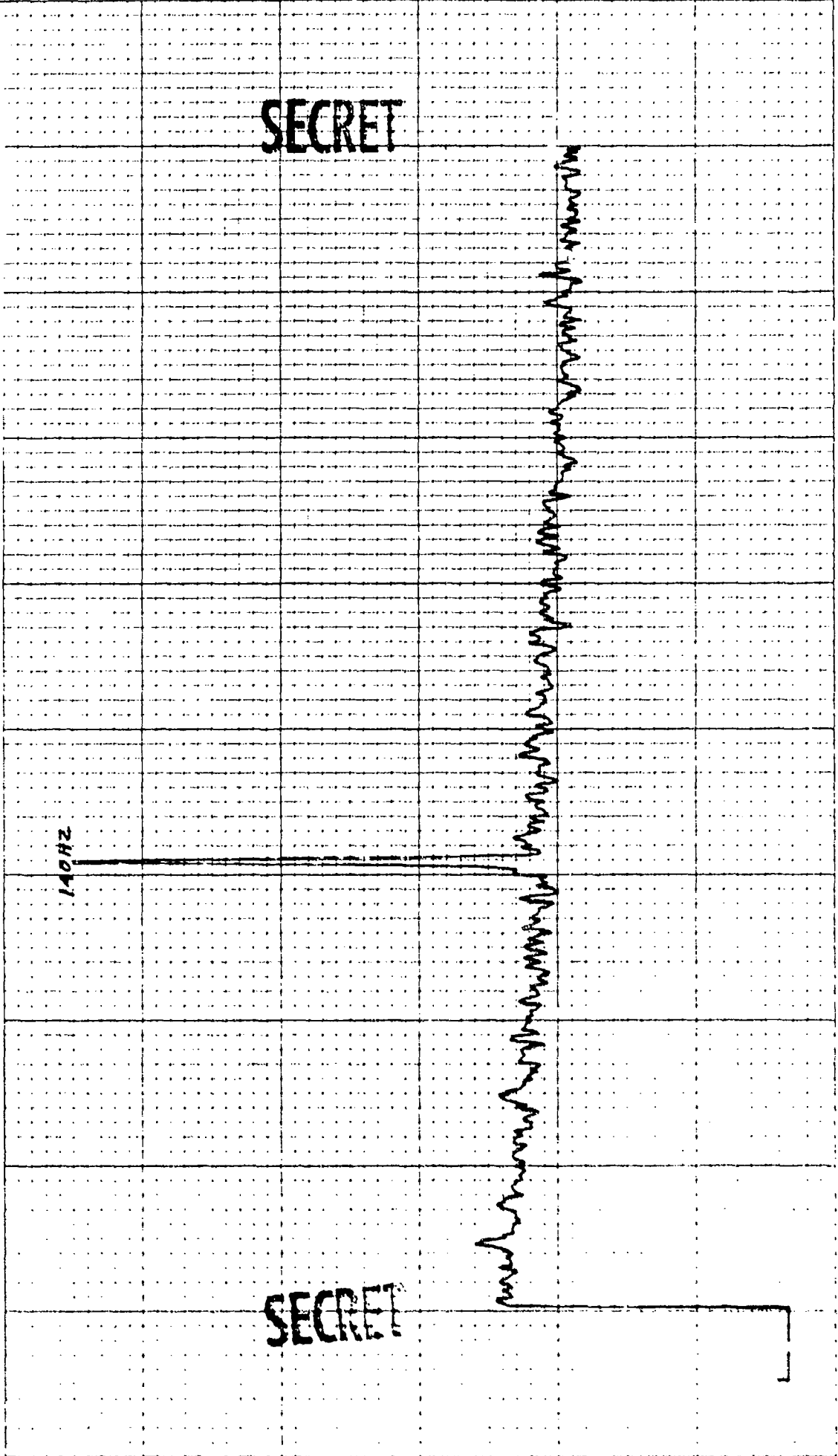
SECRET

SECRET

46 0703

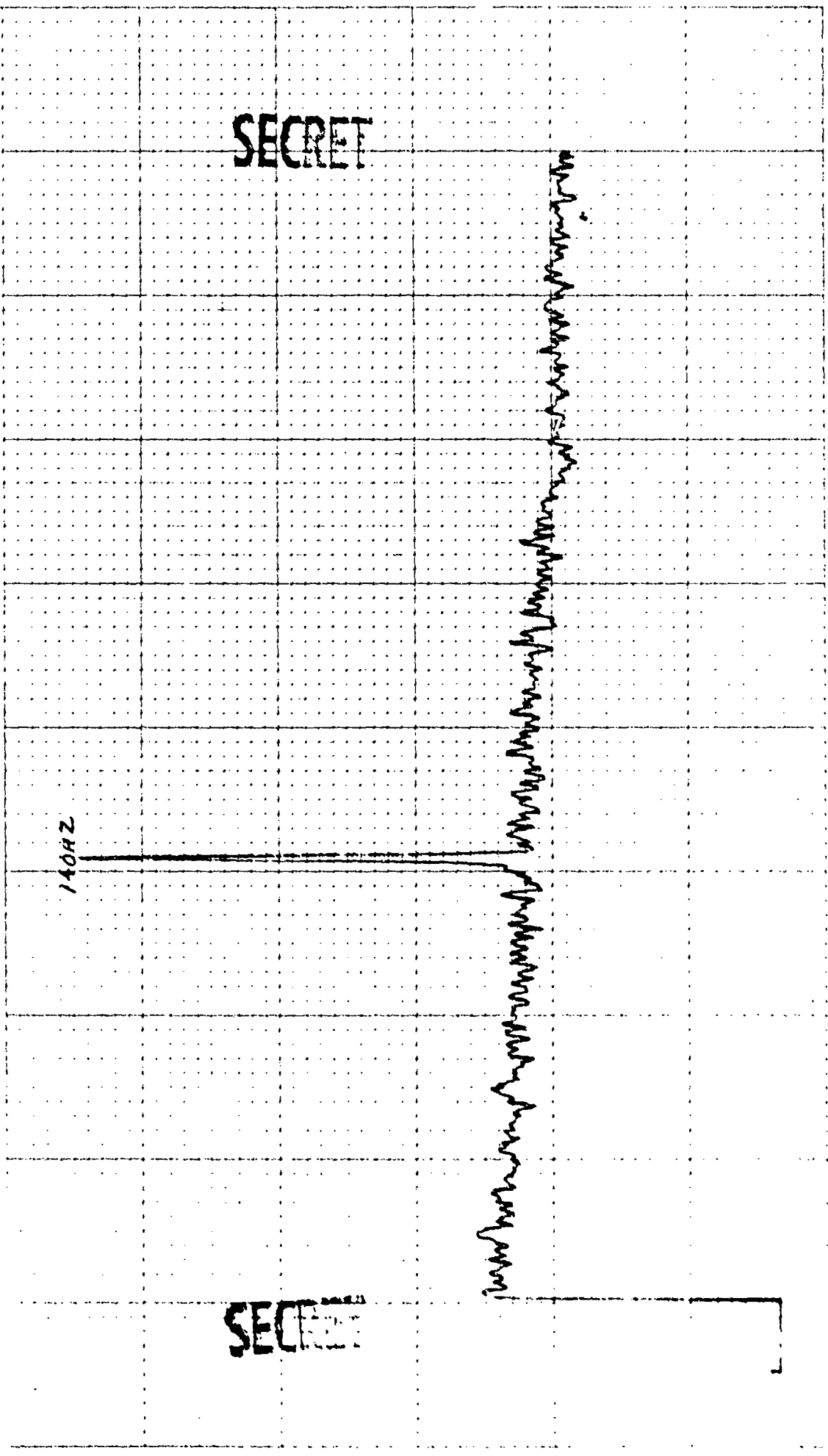
REF: 1-26-89-34

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



46 0703

CONTROL: 0202-32 (DP7) DATE OF ANALYSIS: 1-26-87 REEL: F29 INDEX: 1145
 BEAMFORMED SPECTRUM(ELEMENTS) 28-34 INTEGRATION TIME 320 SECS ATTEN: -30 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER: WTG: HANNING
 CENTER FREQ: 150 HZ -36 DEG. AZ STEERING



Handwritten note: 140HZ

46 0703

1-26-77 08-34

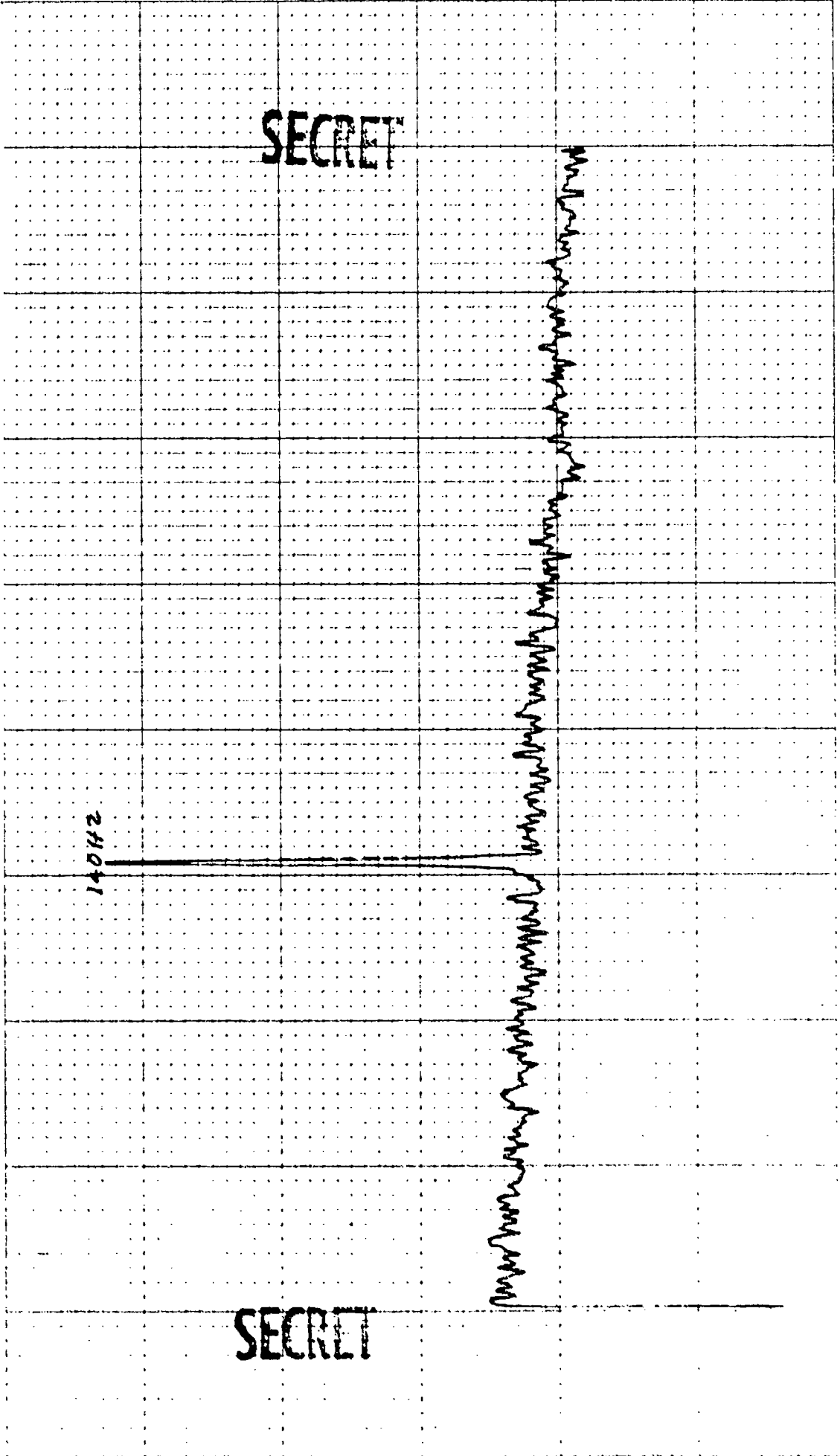
CONTROL: 0202 - 32 (DP7) DATE OF ANALYSIS: 1-26-77 08-34 REEL: F29 INDE X/145

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

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

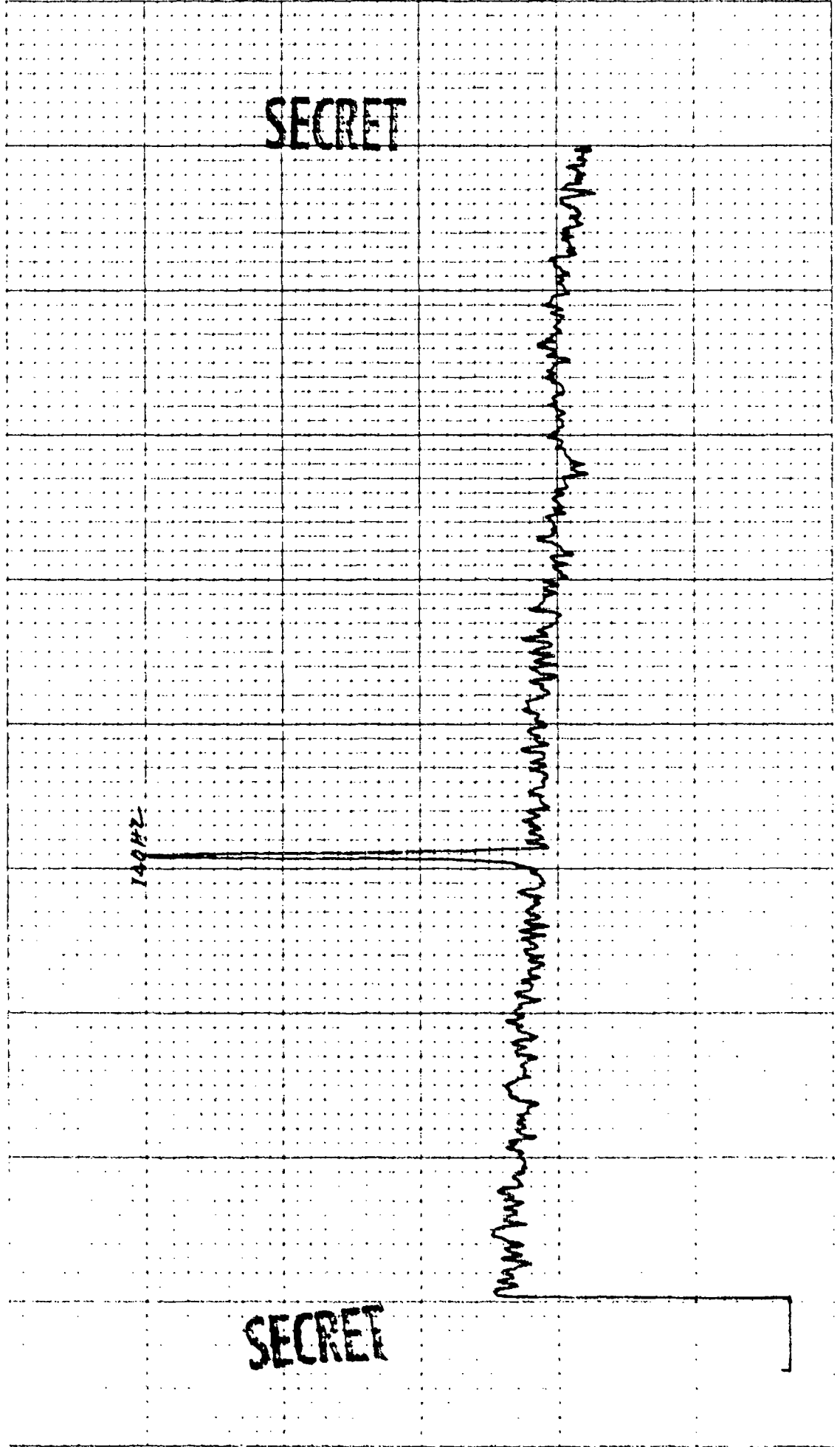
CENTER FREQ: 150 HZ - 38 DEG. AZ STEERING

32 ELEMENTS



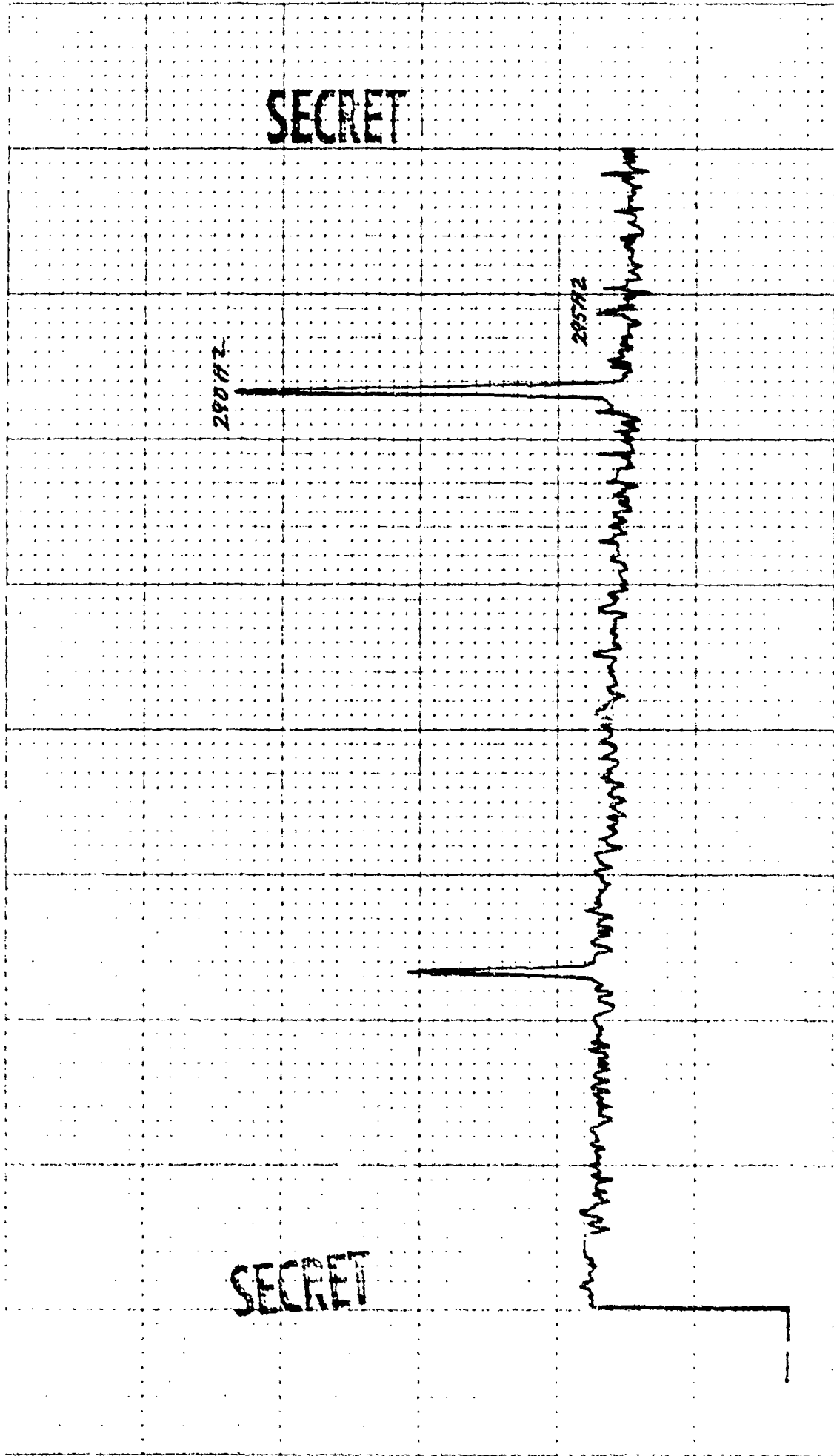
46 0703

CONTROL: 0202 - 30 (DP7) DATE OF ANALYSIS: REEL: F29 INDE X1145
 BEAMFORMED SPECTRUM (ELEMENTS) 1-26 & 28-34) INTEGRATION TIME 320 SECS ATTEN: -30 DB
 EXERCISE: BEARING STAKE 02022 FILTER: WTG: HANNING
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
32 ELEMENTS -40 DEG. AZ STEERING



46 0703

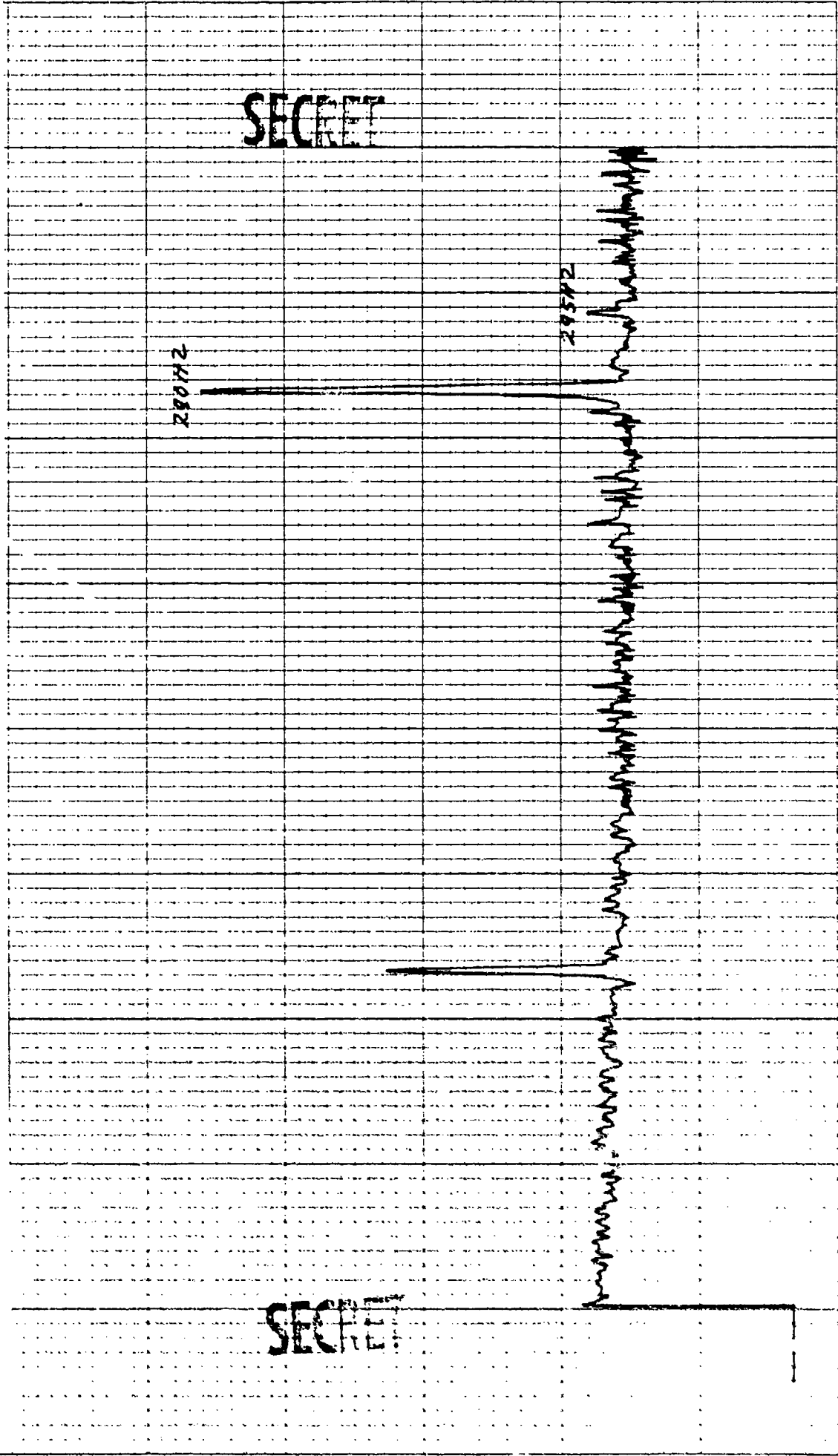
CONTROL: 0202-72 (DP7)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
72 ELEMENTS
 DATE OF ANALYSIS: 1-26-89-34
 DATE/TIME: 28-77-0202Z
 ANALYSIS BANDWIDTH: 171017
-12 DEC. AZ STEERING
 REEL: F29 INDE X 1145
 INTEGRATION TIME 320 SECS ATTEN: -30 DB
 FILTER WTC: HANNING



46 0703

(EX) 10419 TO 10418 US 10419

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



SECRET

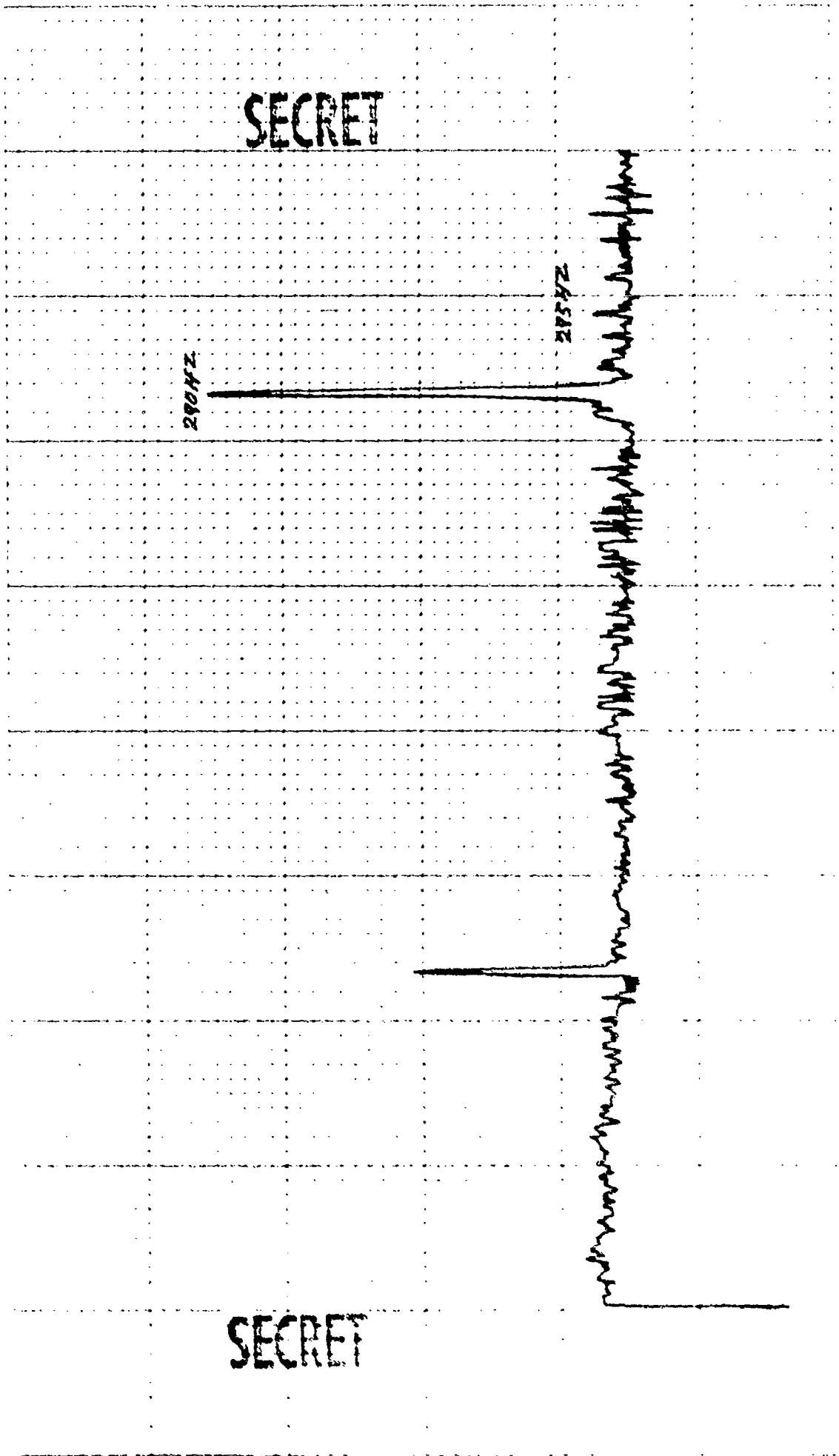
SECRET

46 0763

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

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

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



SECRET

SECRET

46 0703

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

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

EXERCISE: BEARING STAKE -10 DEG. A2 STEERING

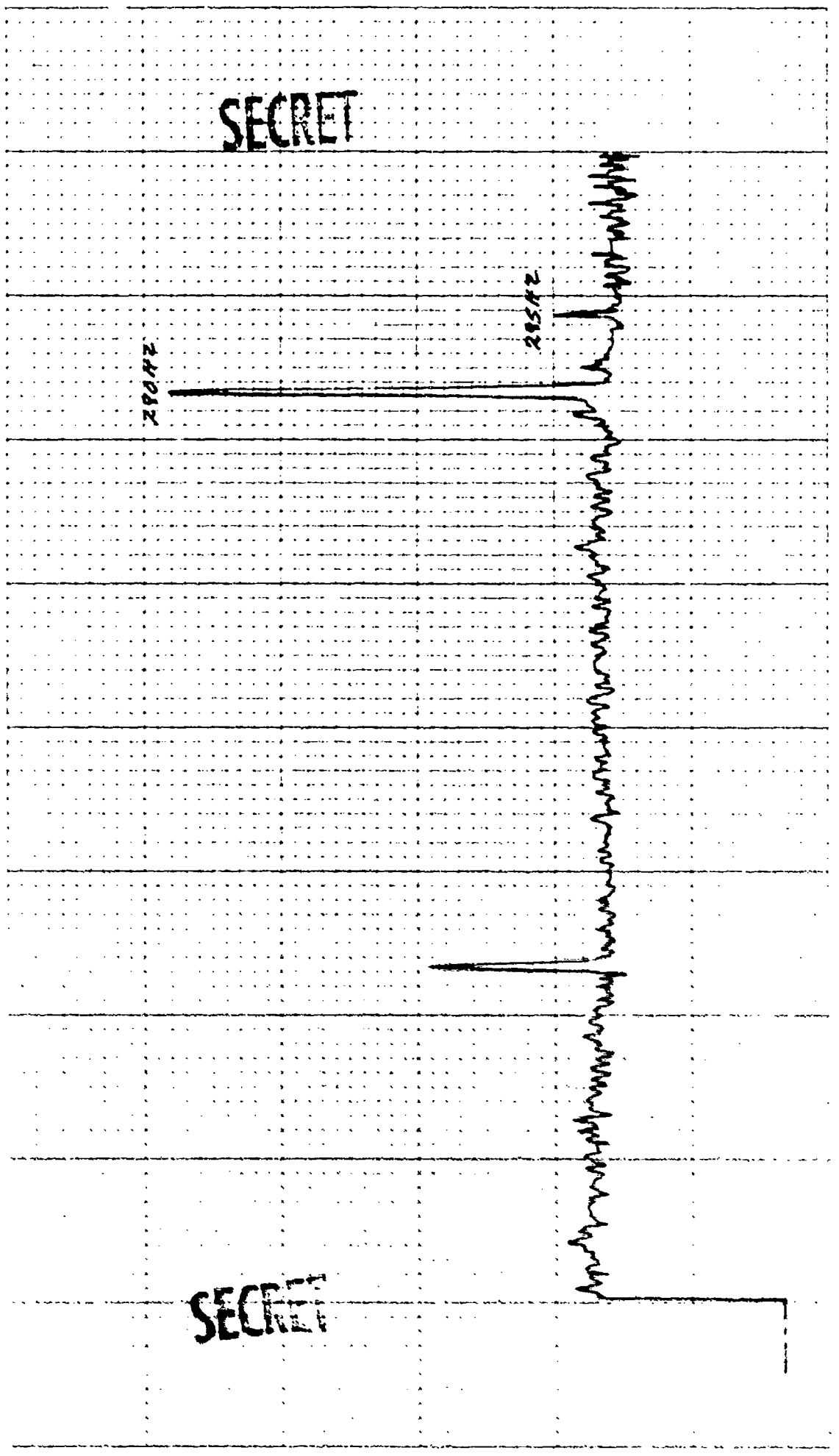
CENTER FREQ: 280 HZ

32 ELEMENTS

REEL: F29 INDE X/145

INTEGRATION TIME 320 SECS ATTN: -20DB

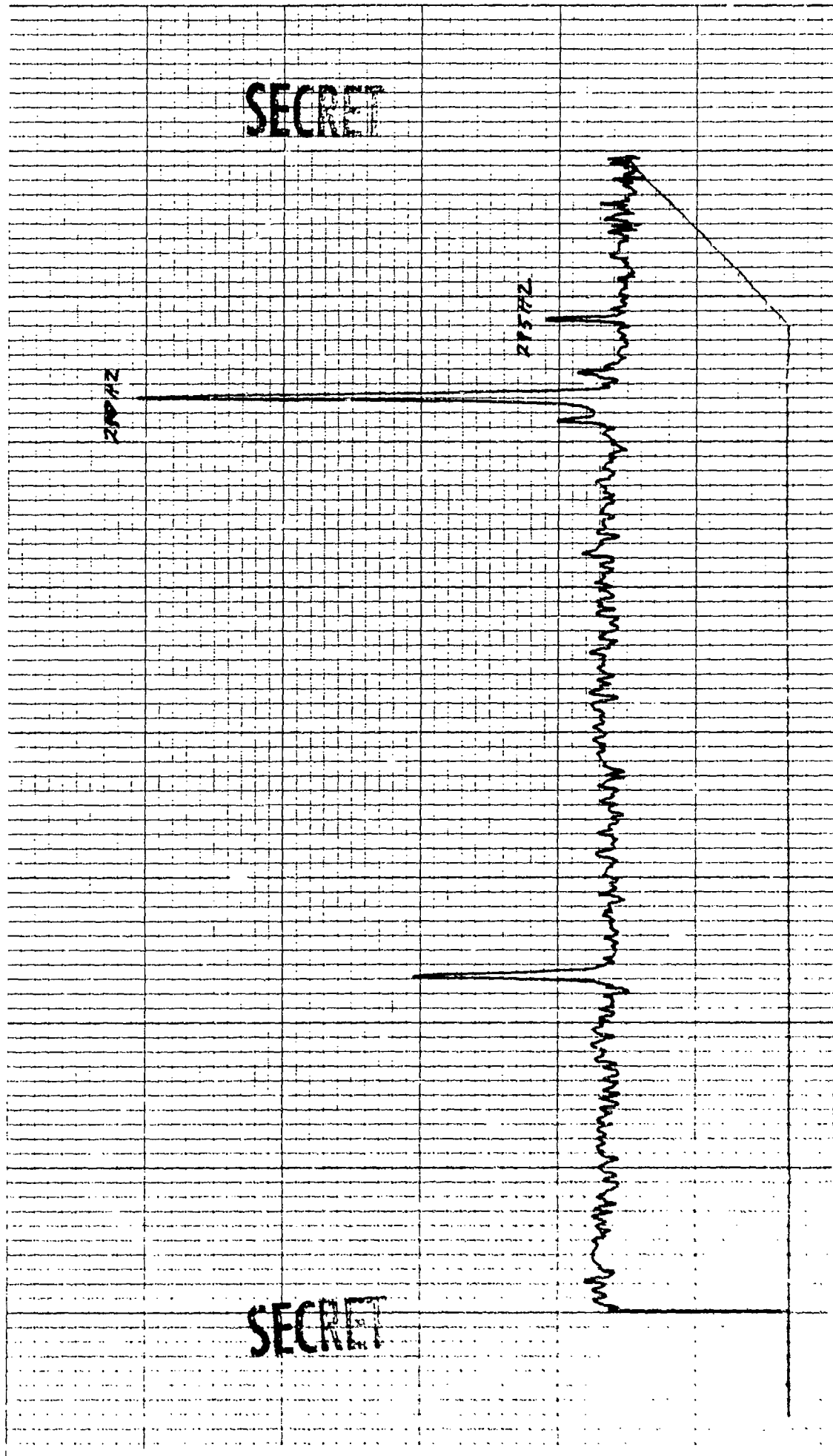
FILTR: HANNING



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

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

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



SECRET

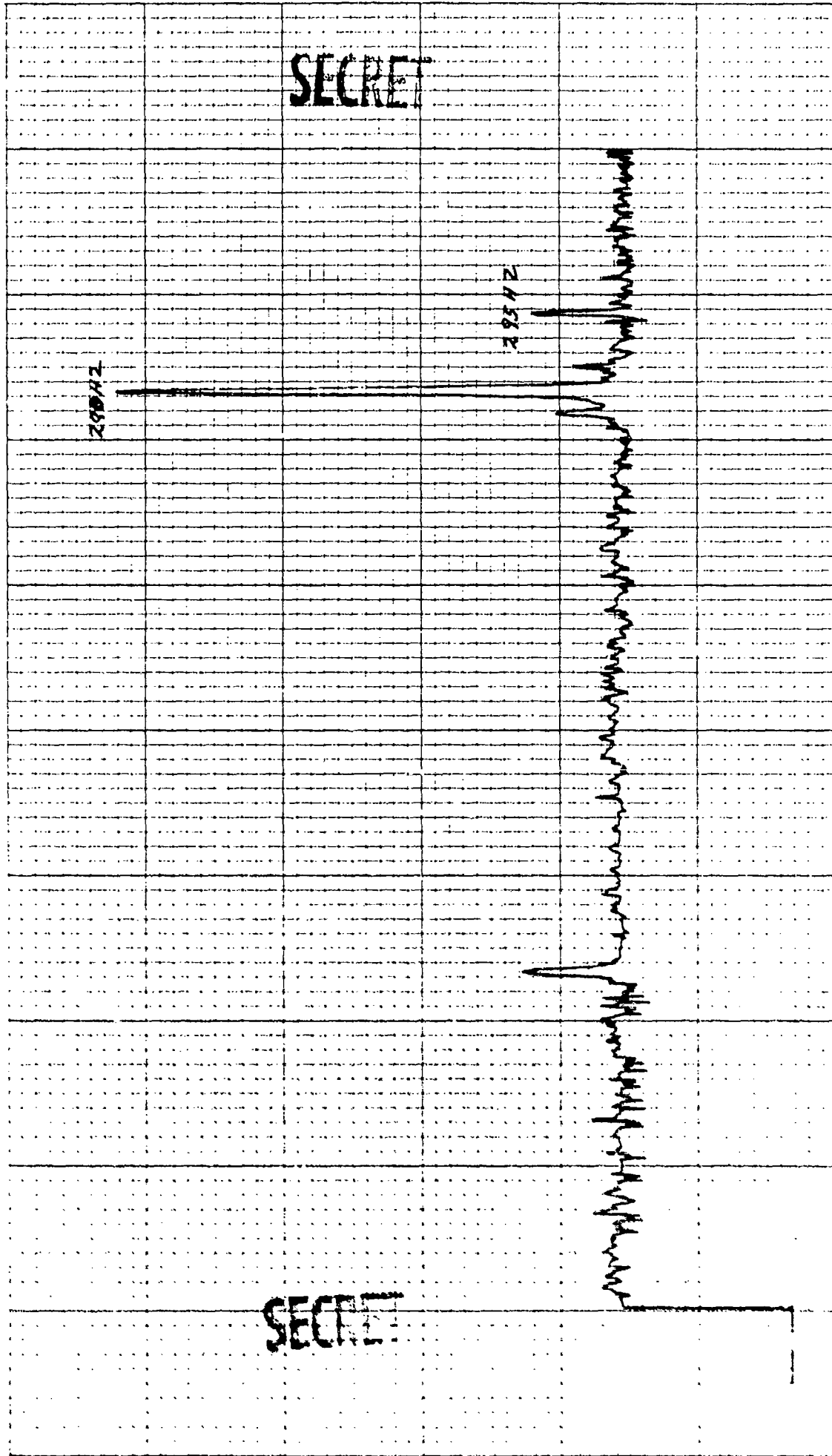
SECRET

46 0703

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

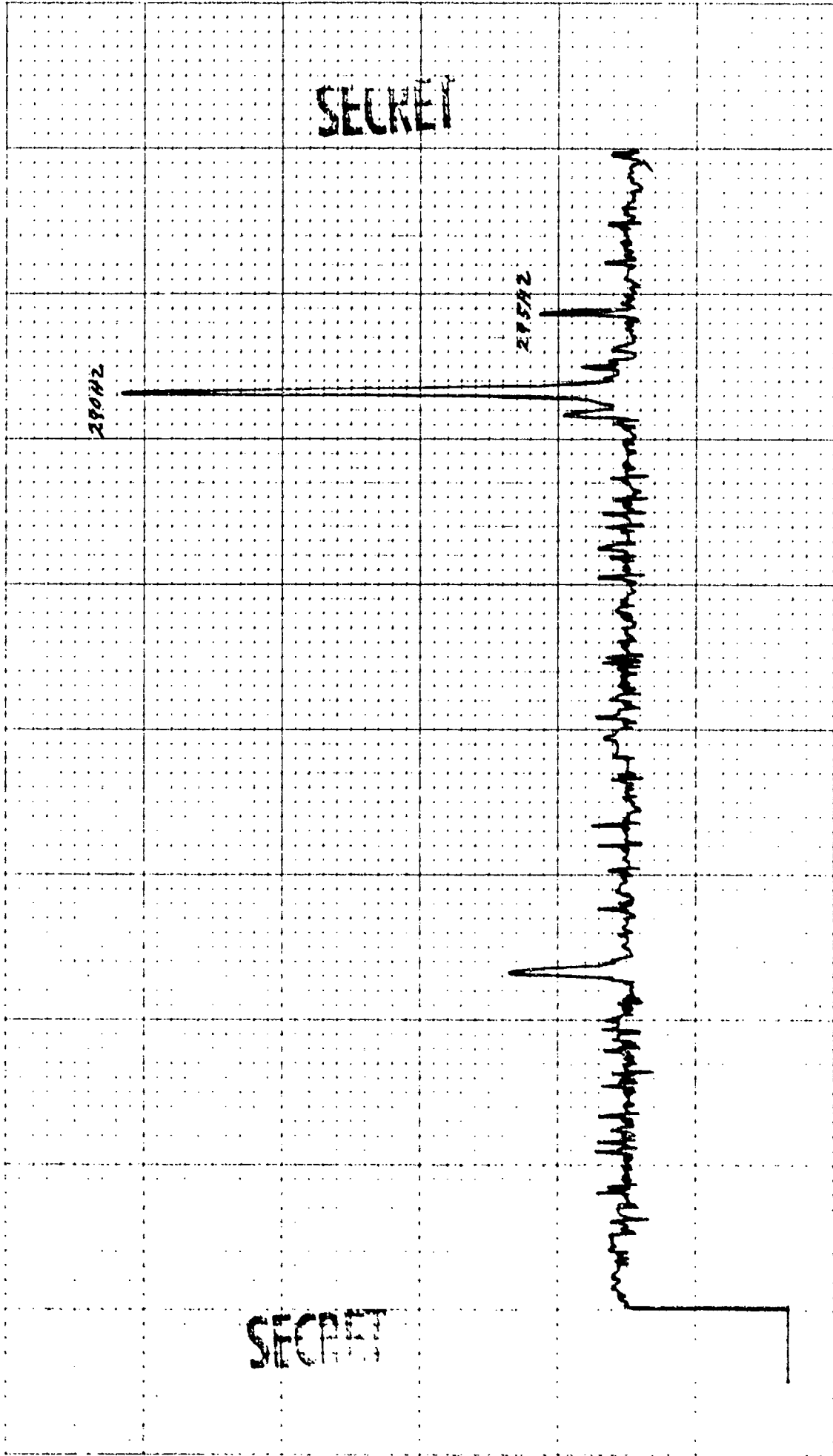
DATE OF ANALYSIS: _____
 1-26-77 (29-34)
 DATE/TIME: 2-8-77 - 0202Z
 ANALYSIS BANDWIDTH: 1/10HZ
 -2/5 DEG. AZ STEERING

REEL: F24 INDE X 1/43
 INTEGRATION TIME 320 SECS ATTN: 30 DB
 FILTER WTG: HANNING



46 0703

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



Handwritten notes:
 280 Hz
 275 Hz
 280 Hz
 275 Hz

46 0703

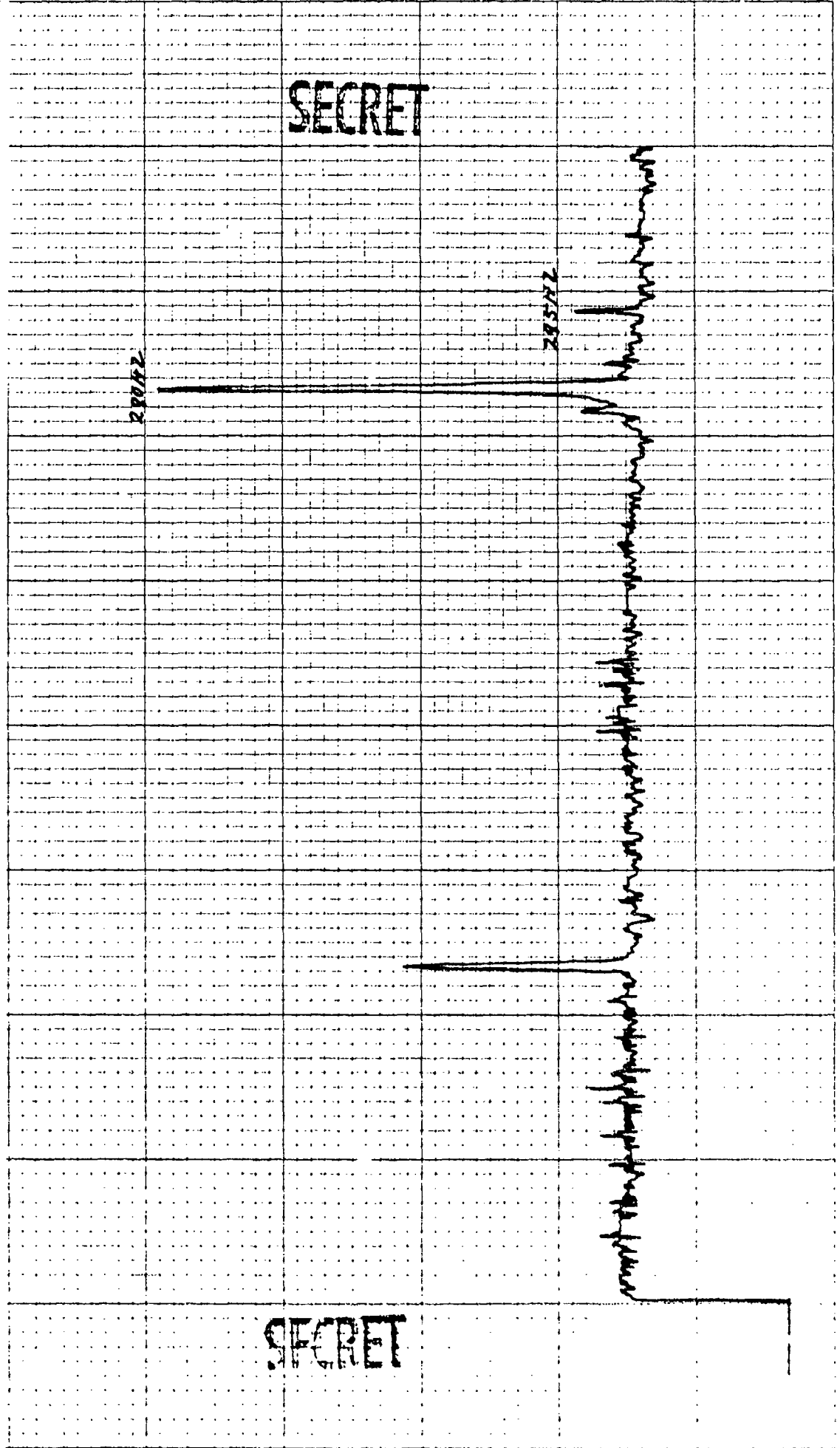
1-26-77 TO THE INCHES

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

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

REEL: F39
 INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

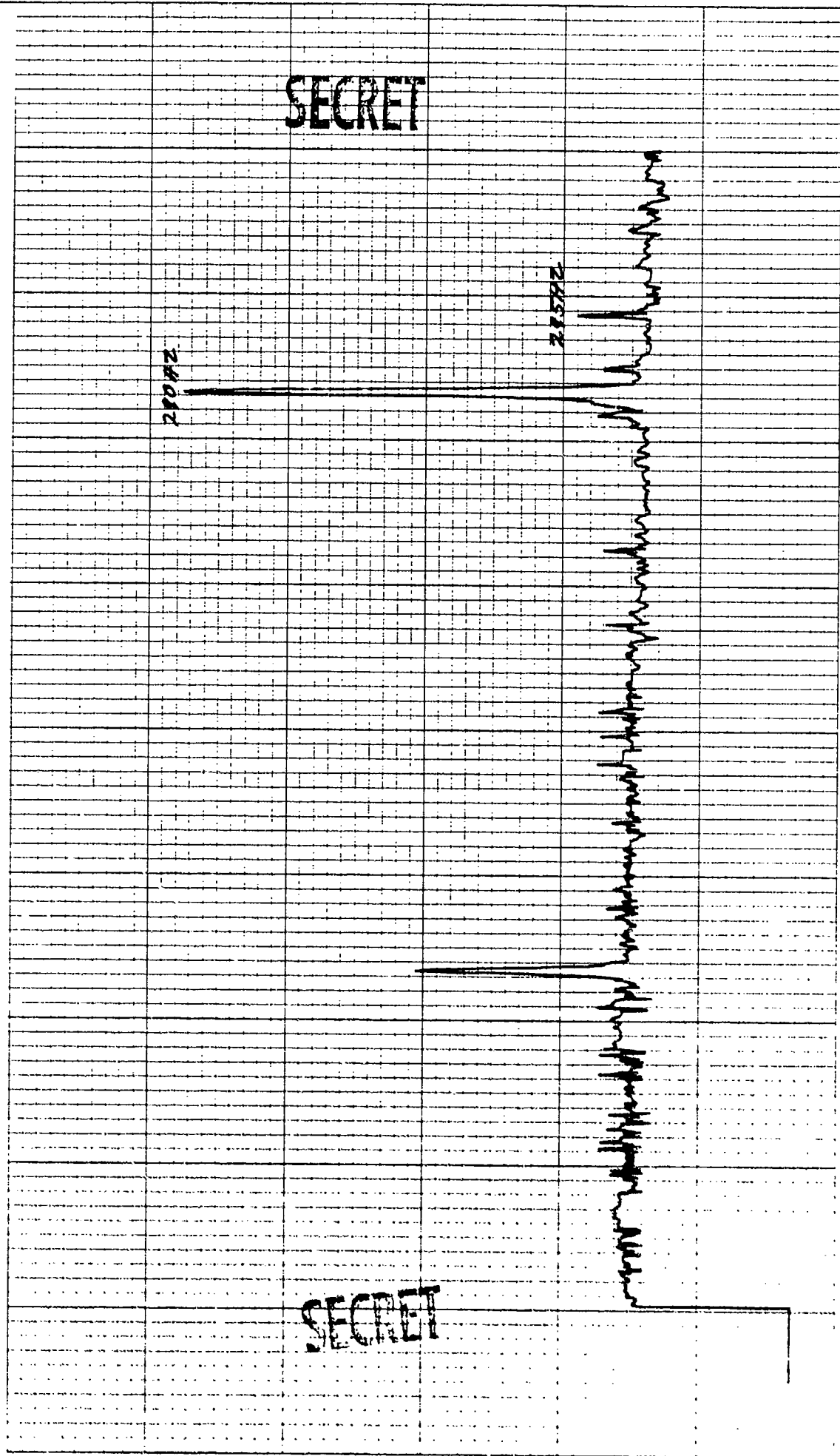
INDE X/145



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

46 0703

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



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

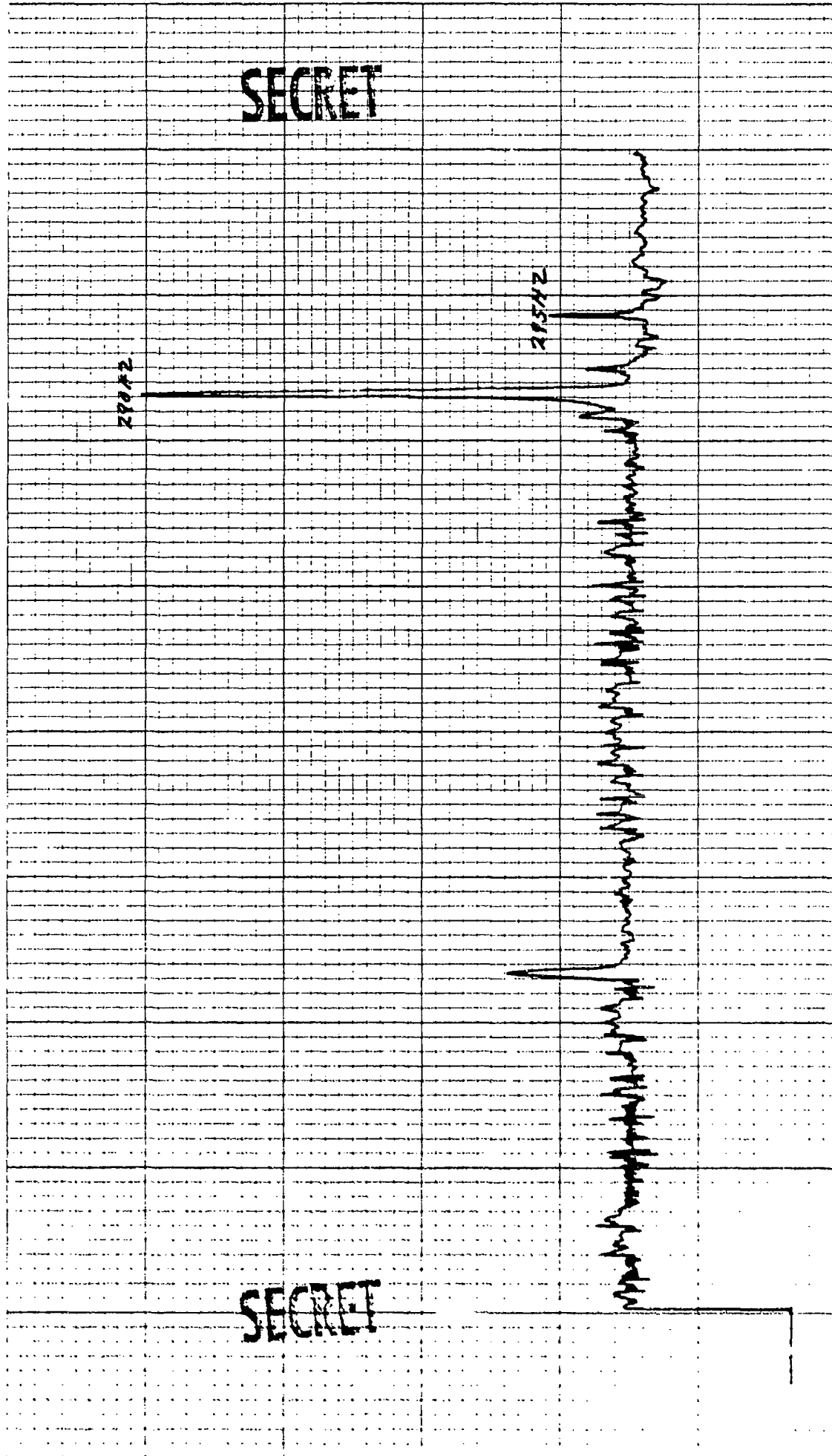
46 0703

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

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

REEL: F09
INTEGRATION TIME 320 SECS
FILTRR WTG: HANNING

INDE X 1195
ATTEN: -30 DB

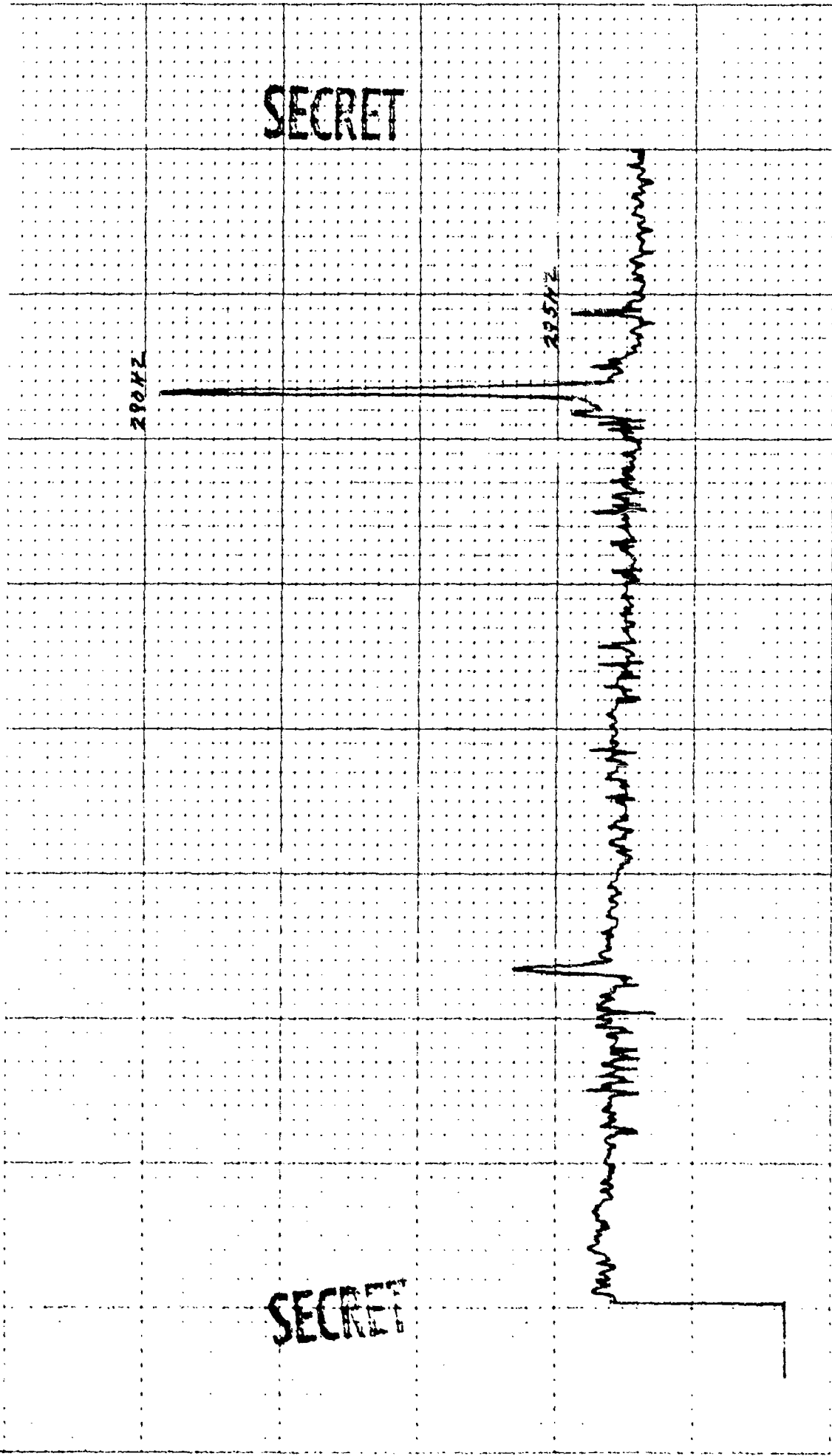


SECRET

SECRET

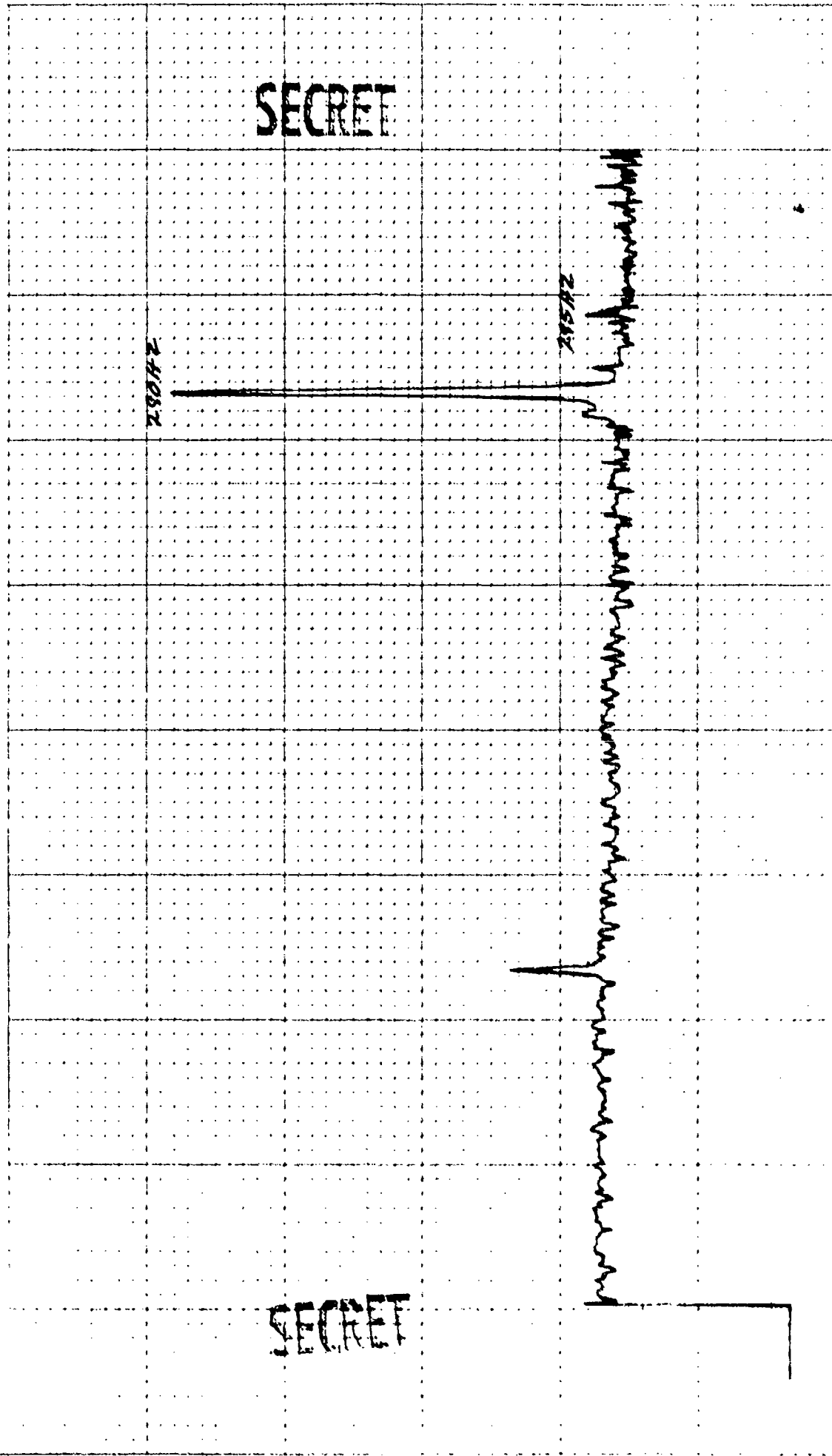
46 0703

CONTROL: 0202-32 (DP7) DATE OF ANALYSIS: 1-26-77 REEL: F99 INDE X 1195
 BEAMPORMED SPECTRUM (ELEMENTS) 1-26-77-34 INTEGRATION TIME 320 SECS ATTEN: -30 DB
 EXERCISE: BEARING STAKE DATE/TIME: 2-8-77-0202Z FILTFR WTC: HANNING
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ
32 ELEMENTS +30 DEG. AZ STEERING



46 0703

CONTROL: 0202-32 (D07) DATE OF ANALYSIS: REEL: F39 INDE X 1145
 BEAMFORMED SPECTRUM (ELEMENTS) 1-069 08-34)
 EXERCISE: BEARING STAKE DATE/TIME: 2-8-77-0202Z INTEGRATION TIME 320 SECS ATTN: -30DB
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTC: HANNING
32 ELEMENTS -32 DEG. AZ STEERING



SECRET

SECRET

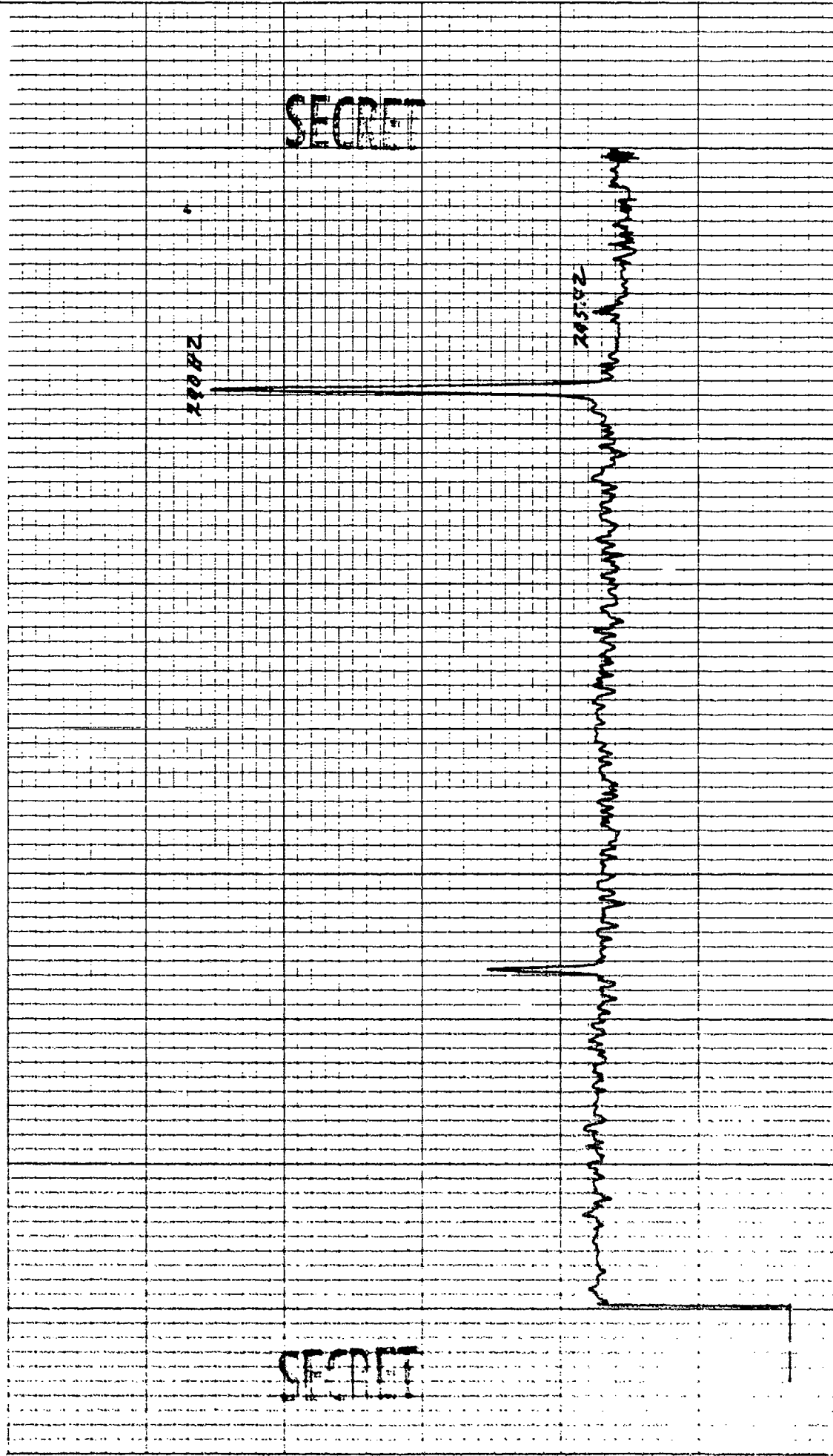
280HZ

215HZ

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

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

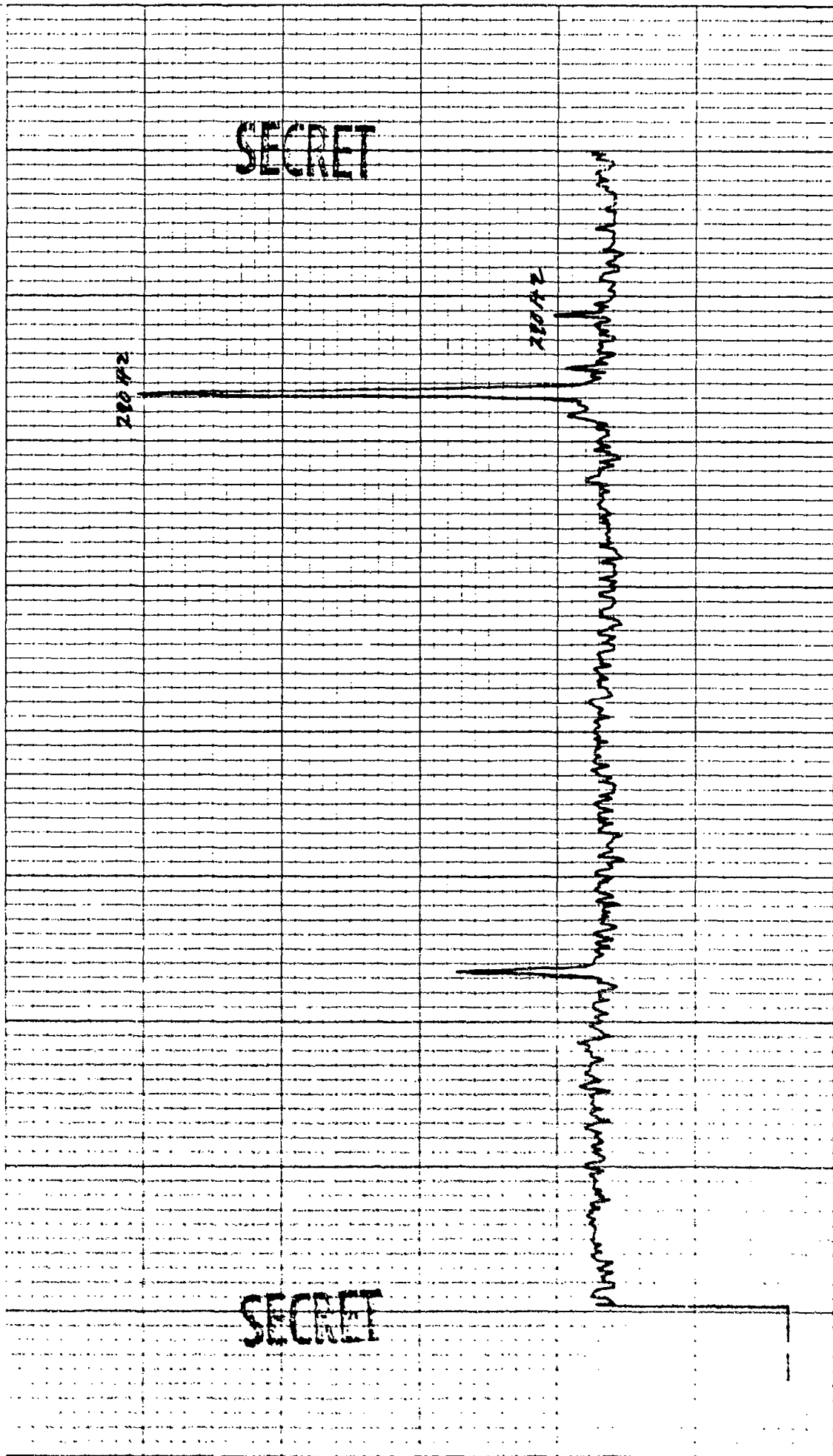
REEL: F29
INDE X 1145
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTER
WTG: HANNING



100% TO A TO THE POINTS. 2. 100% TO THE POINTS.

46 0703

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



46 0703

142E 2000 2000 2000 2000 2000

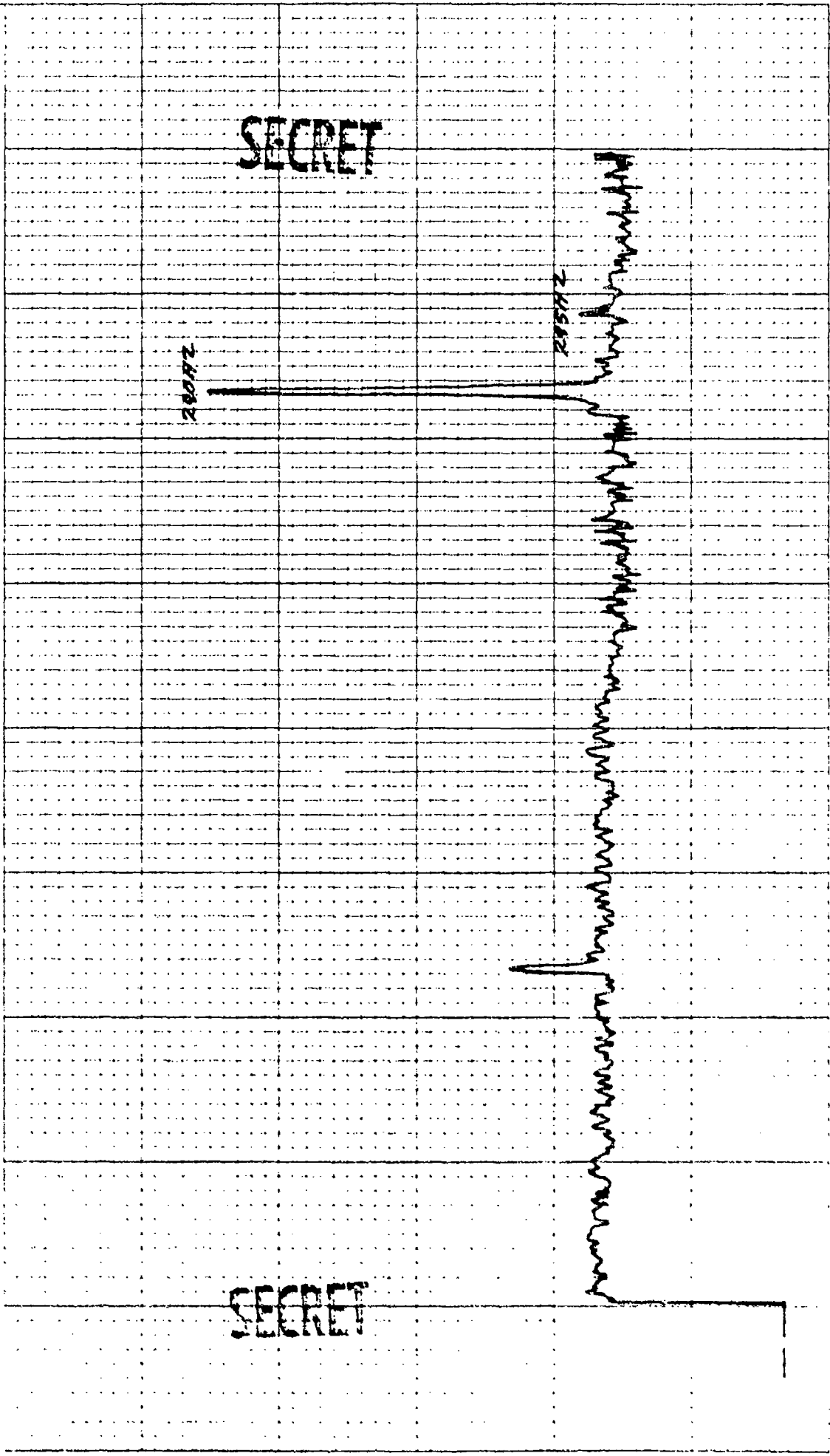
CONTROL: 0202-32 (DPT) DATE OF ANALYSIS: 1-26-77 REEL: F29 INDE X/145

BEAMFORMED SPECTRUM(ELEMENTS) 29-34 INTEGRATION TIME 320 SECS ATTN:-30 DB

EXERCISE: BEARING STAKE DATE/TIME: 2077-0202Z FIL.TPR WIG: HANNING

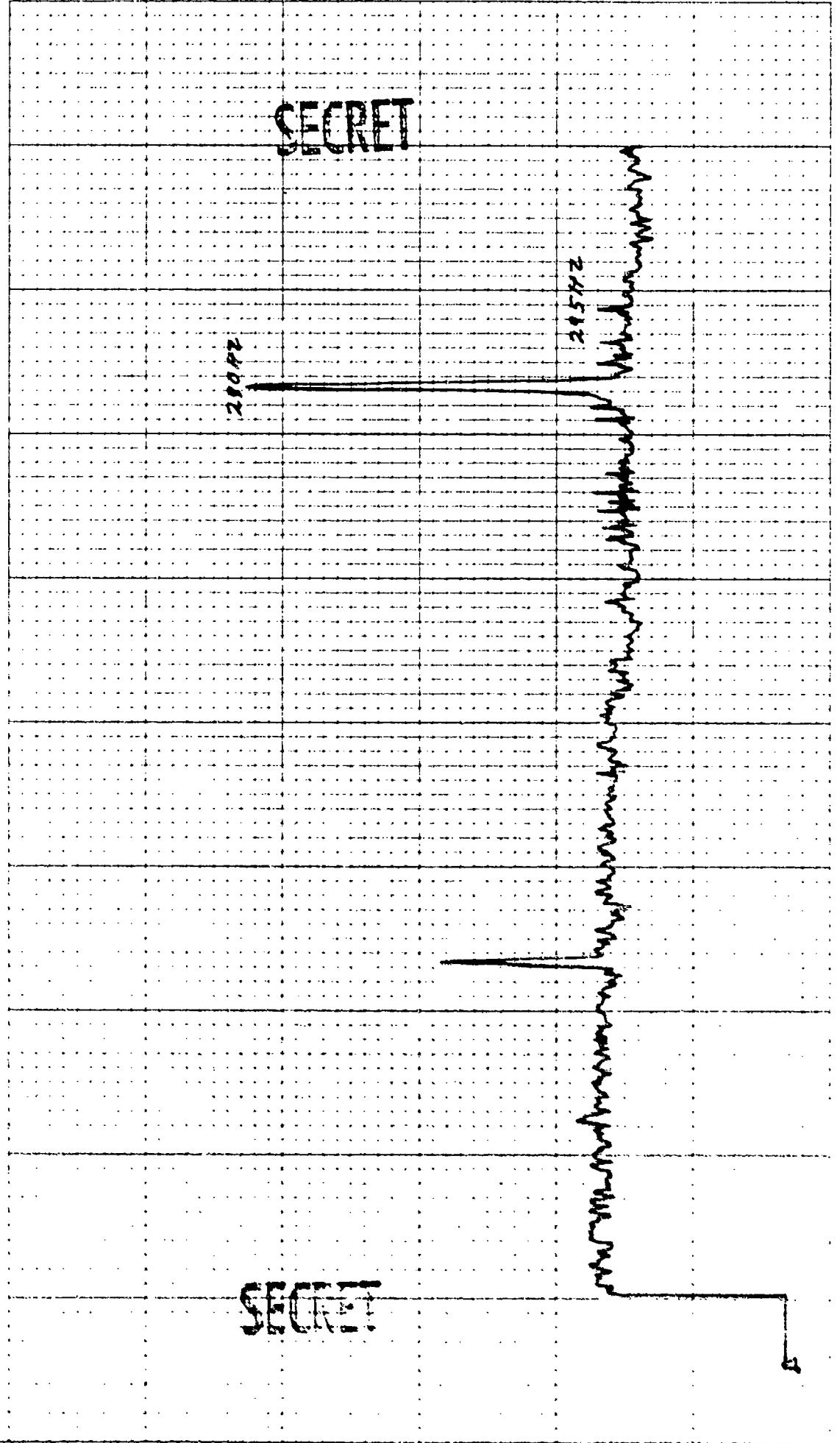
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ -36 DEG. AZ STEERING

72 ELEMENTS



46 0703

CONTROL: 0202-32 (087) DATE OF ANALYSIS: 1-26-77 REEL: F29 INDE X1185
 BEAMFORMED SPECTRUM (ELEMENTS) 28-34
 EXERCISE: BEARING STAKE DATE/TIME: 2-8-77-0202Z INTEGRATION TIME 320 SECS ATTN: -30 DB
 CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER: WTG: HANNING
32 ELEMENTS -30 DEG. AZ STEERING



SECRET

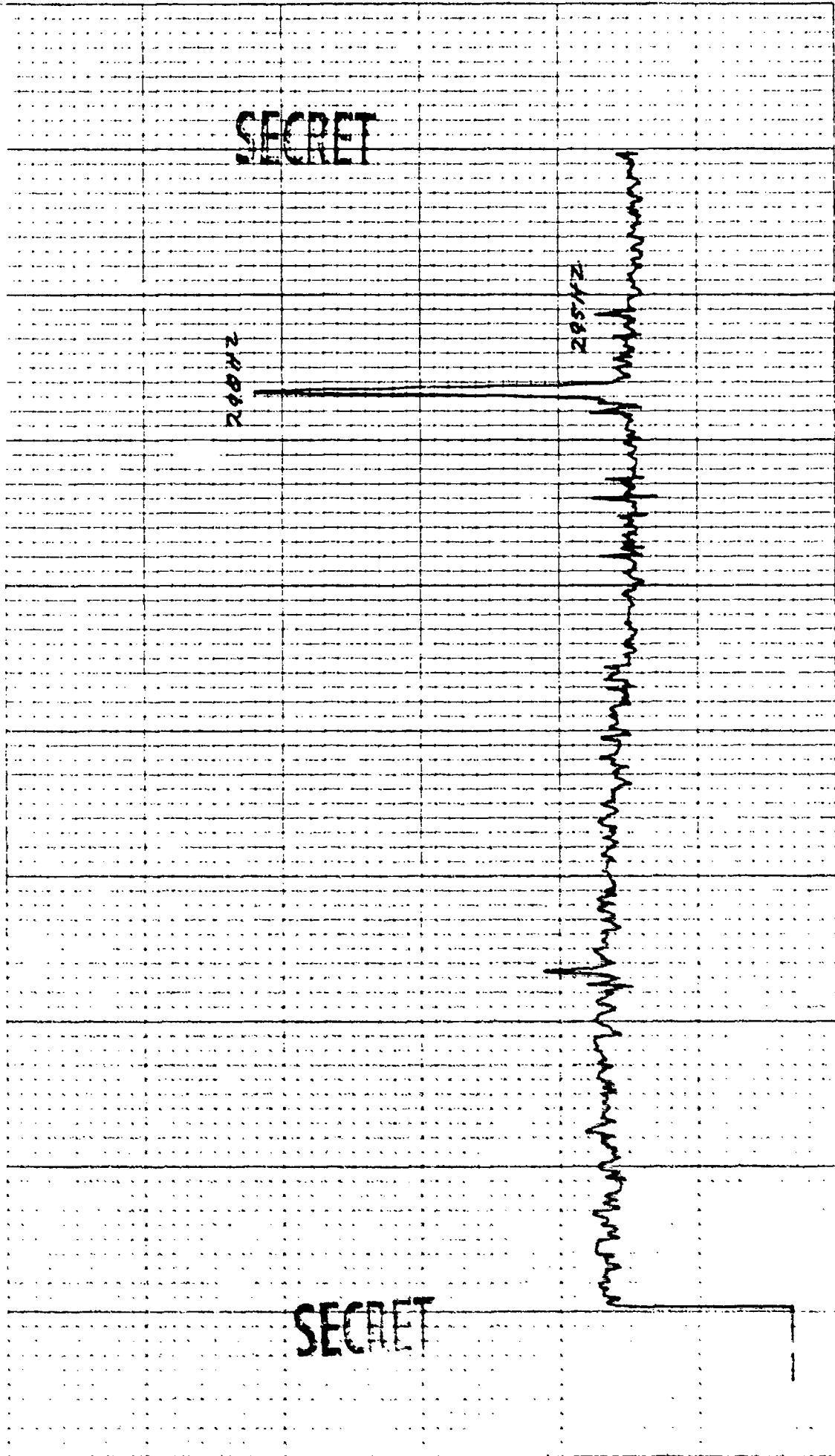
SECRET

46 0703

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

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

REEL: F01 INDEX X 145
INTEGRATION TIME 320 SECS ATTN: -20DB
FII.TFR WTG: HANNING



3

11/11/54
11/11/54
11/11/54
11/11/54

11/11/54
11/11/54
11/11/54
11/11/54

11/11/54
11/11/54
11/11/54

11/11/54
11/11/54
11/11/54

11/11/54
11/11/54
11/11/54
11/11/54
11/11/54

	<u>-16.2</u>	
	41.7	
-25.5	<u>37.7</u>	
-4.2	37.9	SNR 1/10 HZ BAND
+ .2	29.7	SNR 1 HZ BAND
-8.2		

Best Available Copy

CONFIDENTIAL

CONFIDENTIAL
 SIGNAL LEVEL AND SNR
 CALCULATIONS
 FREQUENCY 290 HZ

NUMBER OF ELEMENTS 51

DATA POINT 7

SIGNAL LEVEL

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

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

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

NOISE LEVEL

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

	<u>-7.6</u>
	-6.6
<u>+10</u>	
<u>+30</u>	-31.6

NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

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

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

SNR 1/10 HZ BAND
 SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL
SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 7

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 51

SIGNAL LEVEL

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

NOISE LEVEL

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

SIGNAL-NOISE-RATIO

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

CONFIDENTIAL

SIGNAL GAIN

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

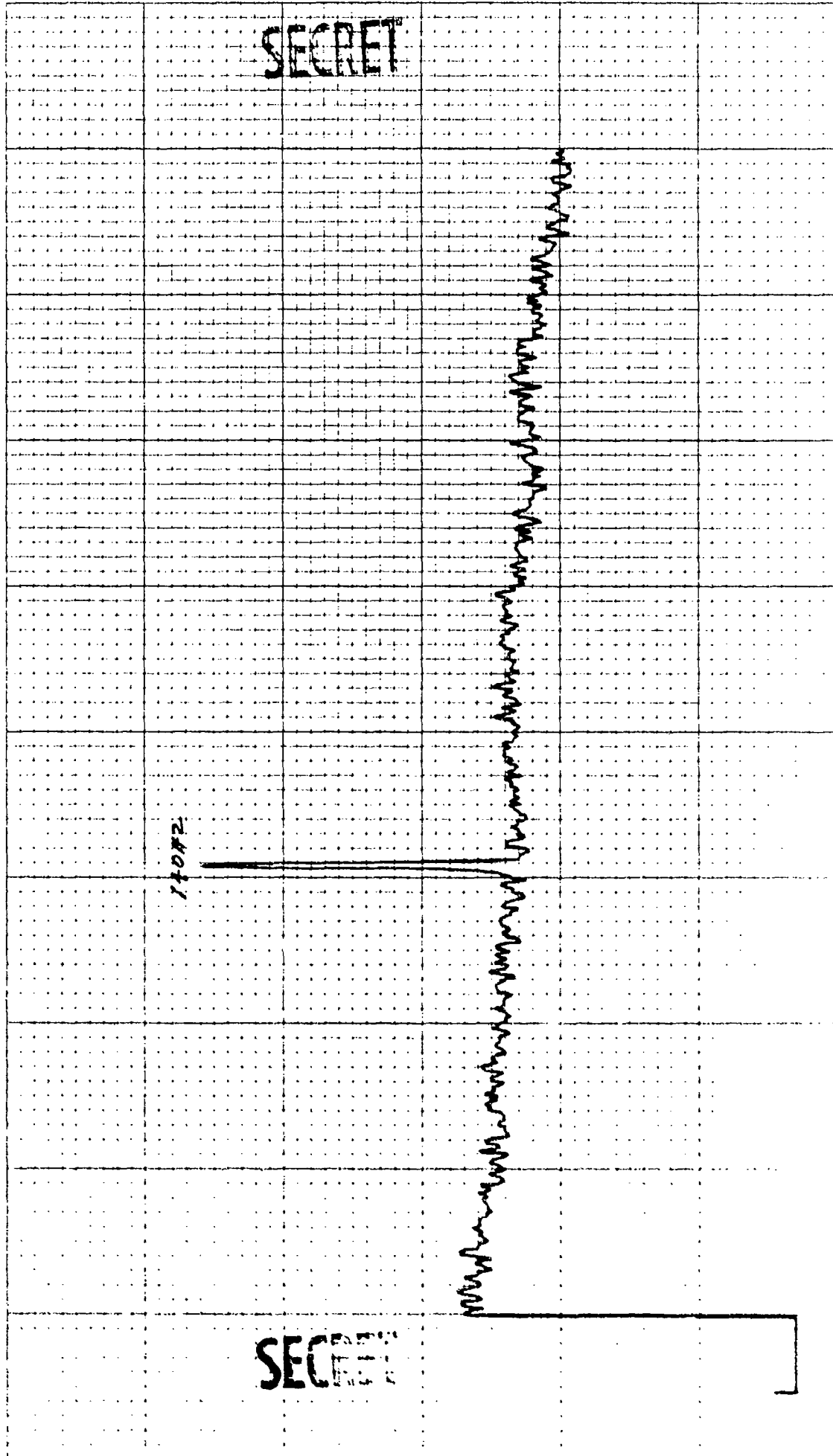
ARRAY GAIN

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

46 0703

NOTE: PLUG TO THE RIGHT OF THE STEREO PAIR

CONTROL: 0202-51 (DP7) DATE OF ANALYSIS: 1-26-88-53 REEL: F09 INDE X 1145
 BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-8-77-0202Z INTEGRATION TIME 320 SECS ATTN: -30 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1710HZ FI.TFR WTG: HANNING
 CENTER FREQ: 150 HZ -12 DEG. AZ STEERING

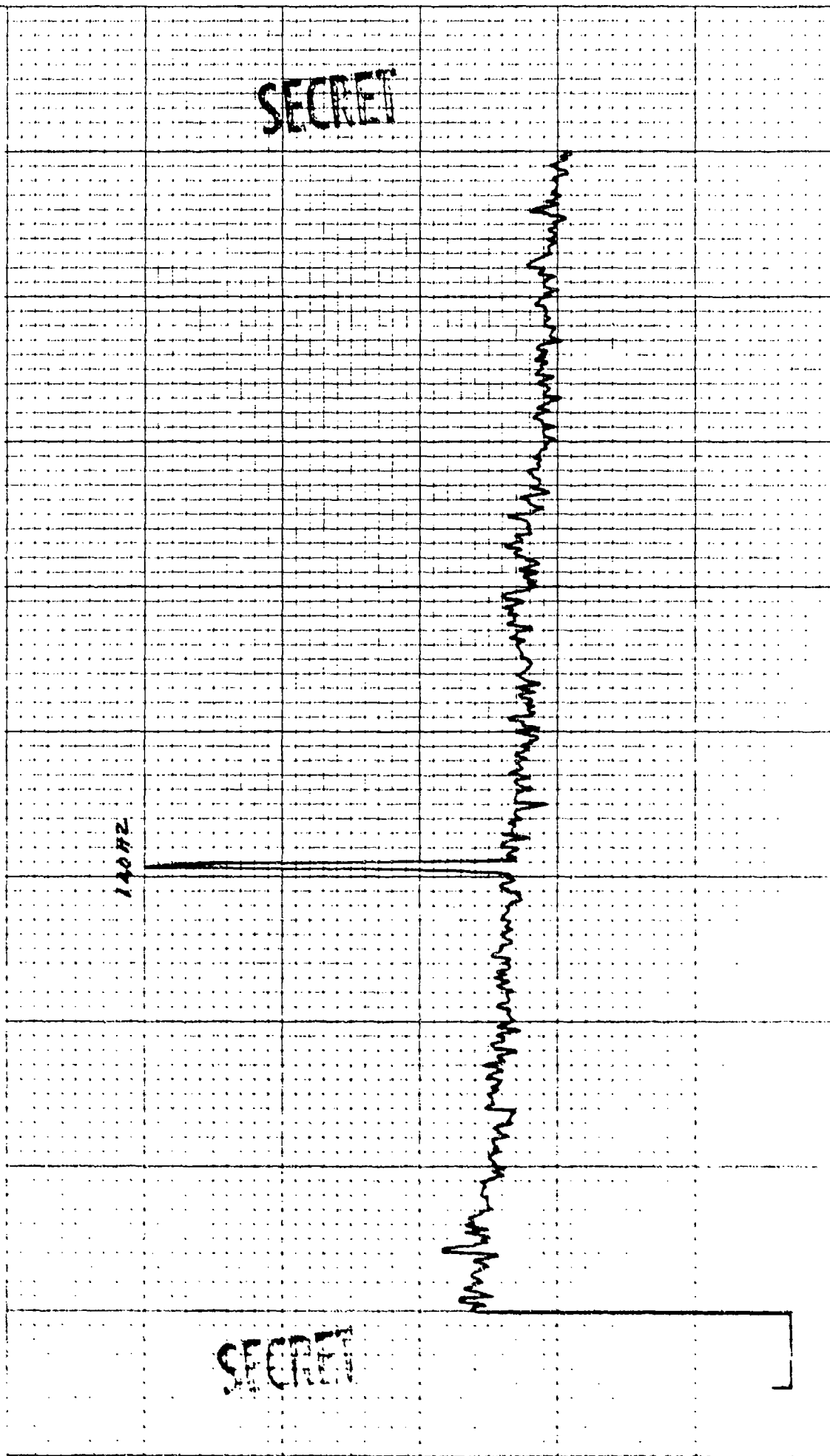


46 0703

1-22 14 100 200000 0000

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

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



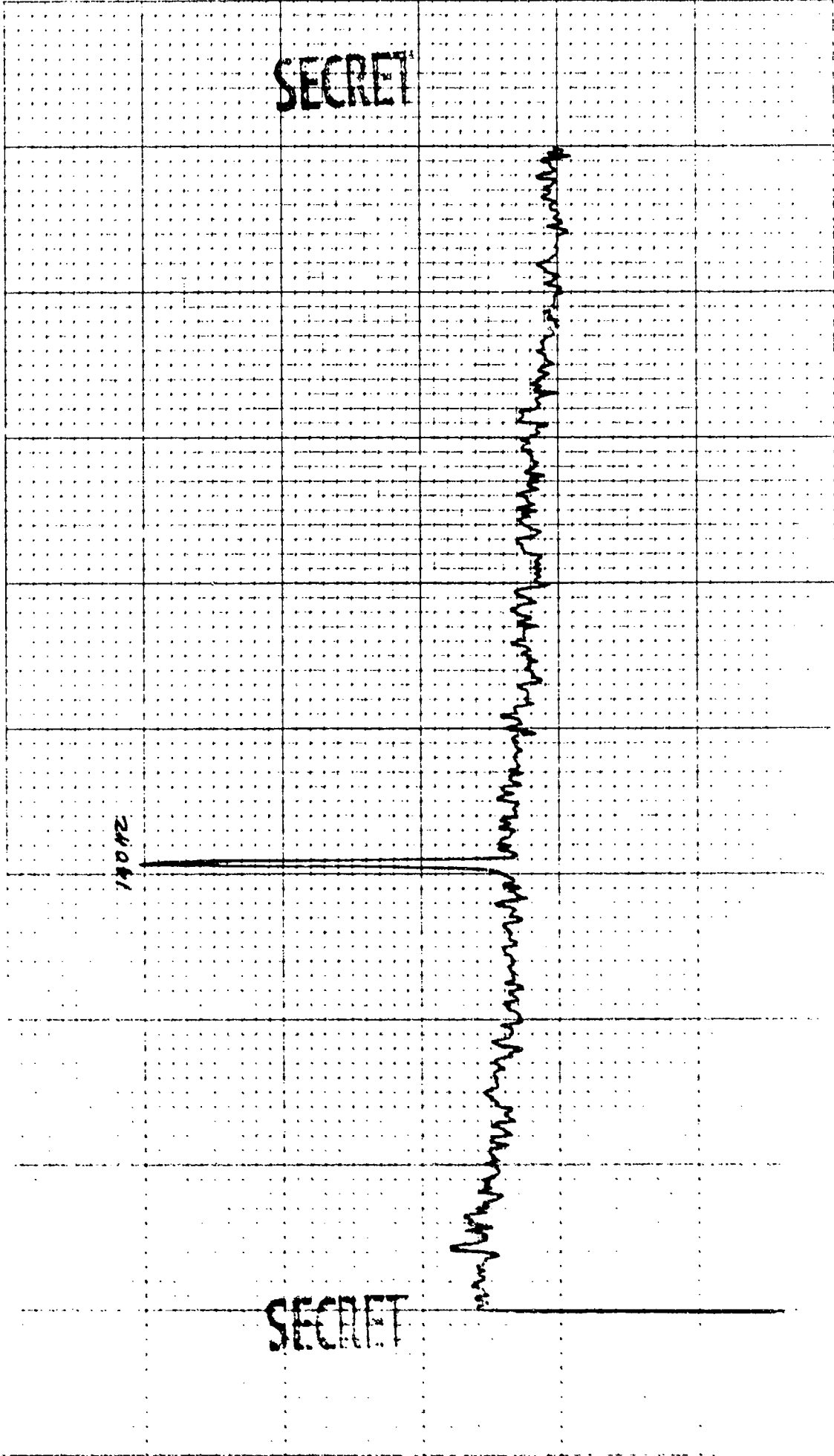
SECRET

SECRET

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

DATE OF ANALYSIS: 1-26-53
DATE/TIME: 2077-0202Z
ANALYSIS BANDWIDTH: 1710HZ
-16 DEG. AZ STEERING

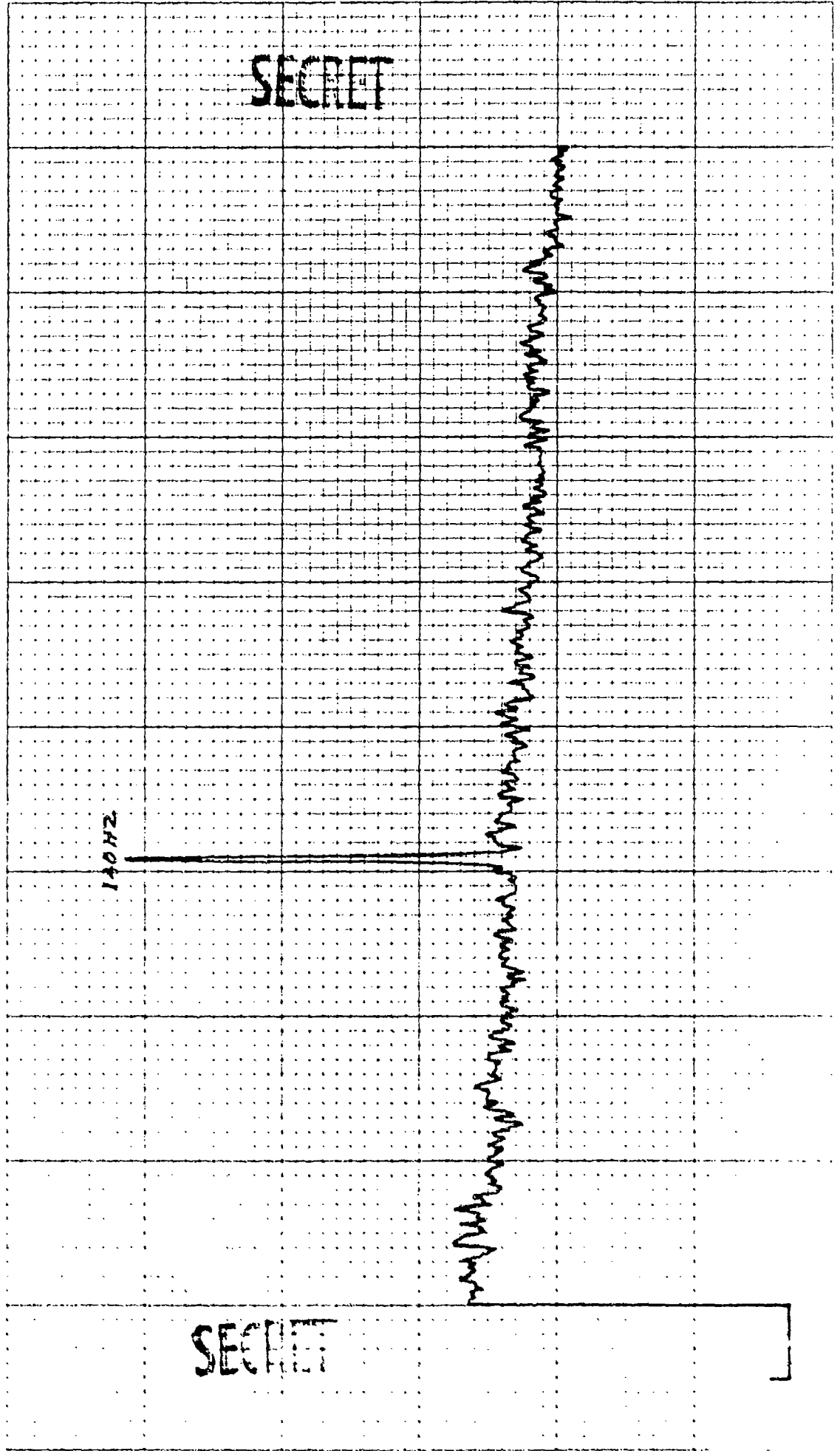
REEL: F99 INDE X 1145
INTEGRATION TIME 320 SECS
ATTN: -30 DB
FILTER WTC: HANNING



REF ID: A66878

46 0703

CONTROL: 0202-51 (DP1) DATE OF ANALYSIS: - - REEL: F29 INDE X 1145
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 1-26-78 08-53 INTEGRATION TIME 320 SECS ATTEN: 30 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTFR WTG: HANNING
 CENTER FREQ: 150 HZ -10 DEC. AZ STEERING



SECRET

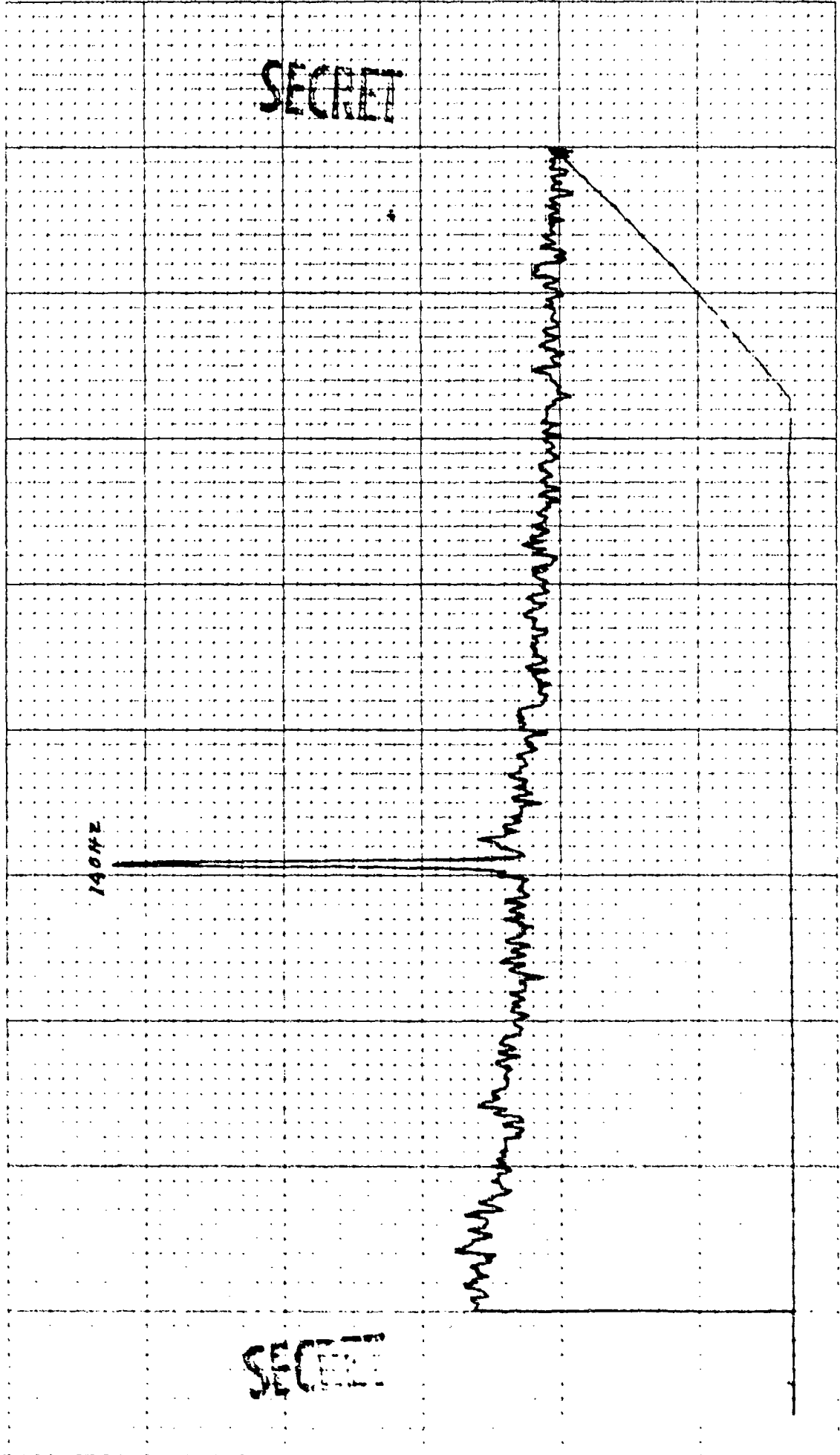
SECRET

46 0703

CONTROL: 0202 - 51 (DP7)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
51 ELEMENTS

DATE OF ANALYSIS: 1-26-77
DATE/TIME: 2-8-77 - 0201 Z
ANALYSIS BANDWIDTH: 1/10 HZ
-20 DEG. AZ STEERING

REEL: F29
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTER WIG: HANNING



46 0703

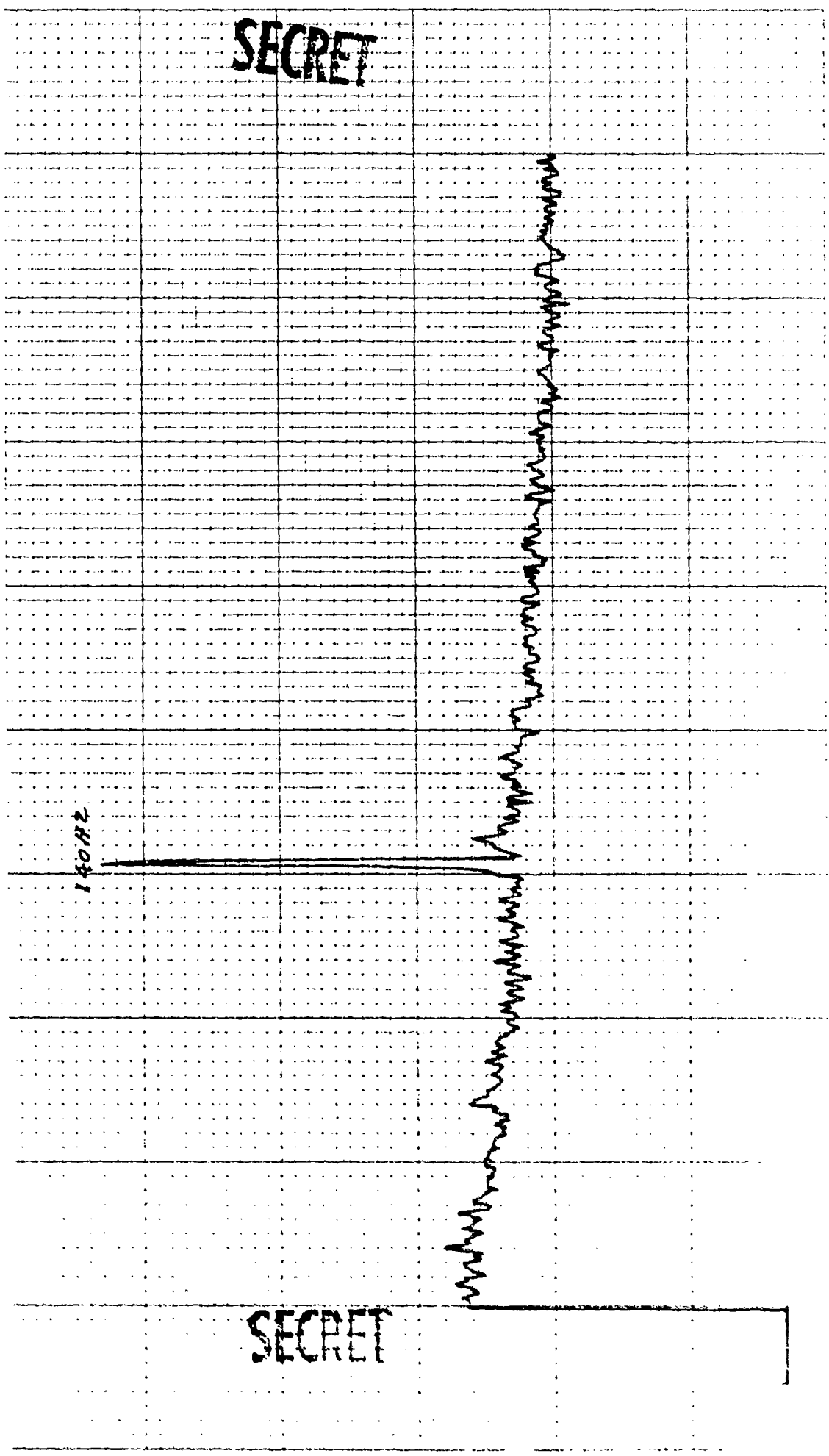
14-2 WAVE NUMBER 1000

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

DATE OF ANALYSIS: 1-26-53
DATE/TIME: 08-77-0002Z
ANALYSIS BANDWIDTH: 1/10HZ
- 0/ DEC. AZ STEERING

REEL: 529
INTEGRATION TIME 320 SECS
ATTEN: -30DB
WTG: HANNING
FIL.TFR

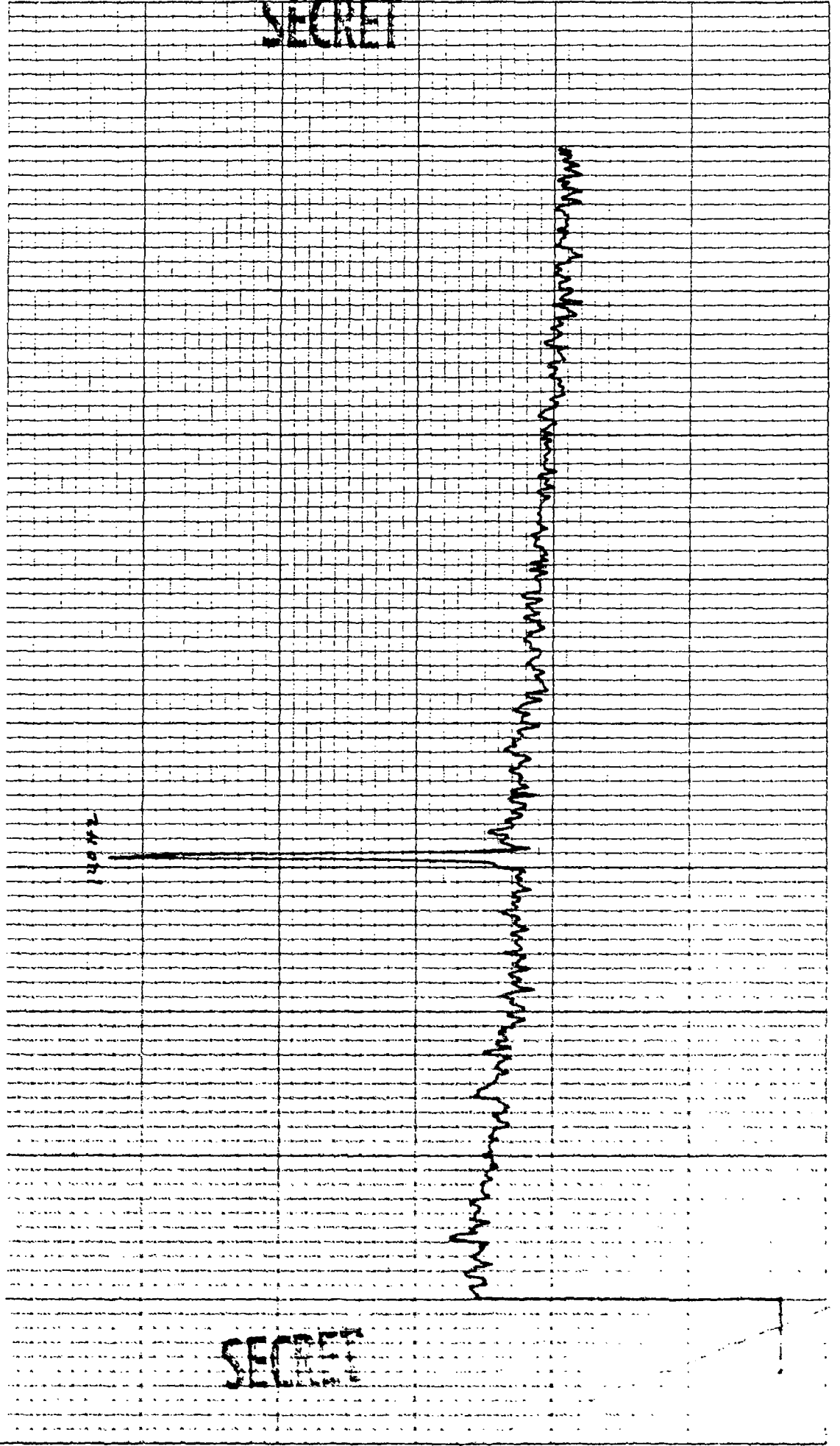
INDEX: 1145



KEY IS IN IN TO TIME (FACTS) TO IN THE S
REPAIR A PAPER CO. MADE IN U.S.A.

46 0703

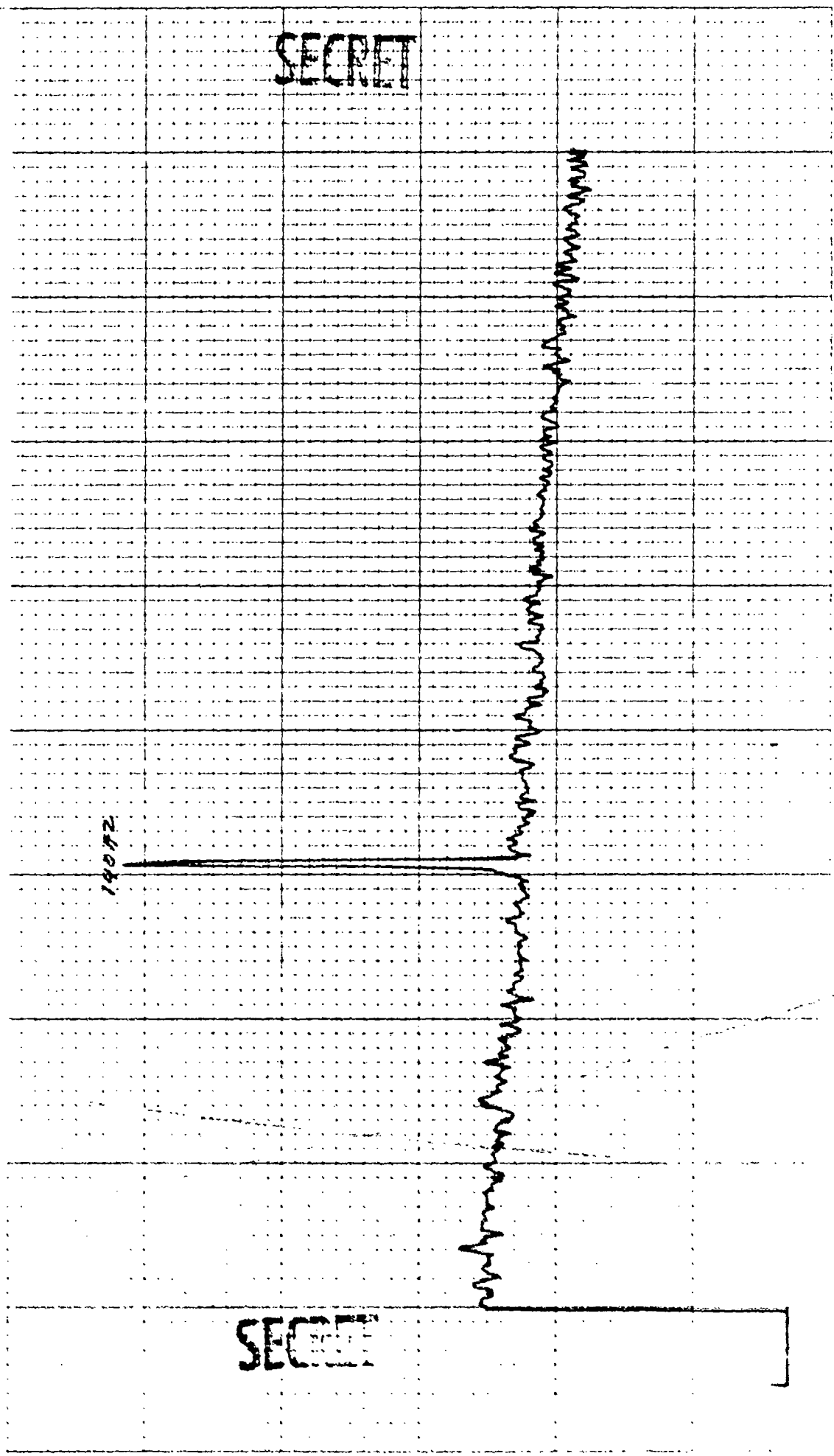
CONTROL: 0202 - 51 (DPT) DATE OF ANALYSIS: 1-26-77 REEL: F29 INDE X//45
BEAMFORMED SPECTRUM(ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTN: -30 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
51 ELEMENTS - 22 DEG. AZ STEERING



46 0703

1-26-53

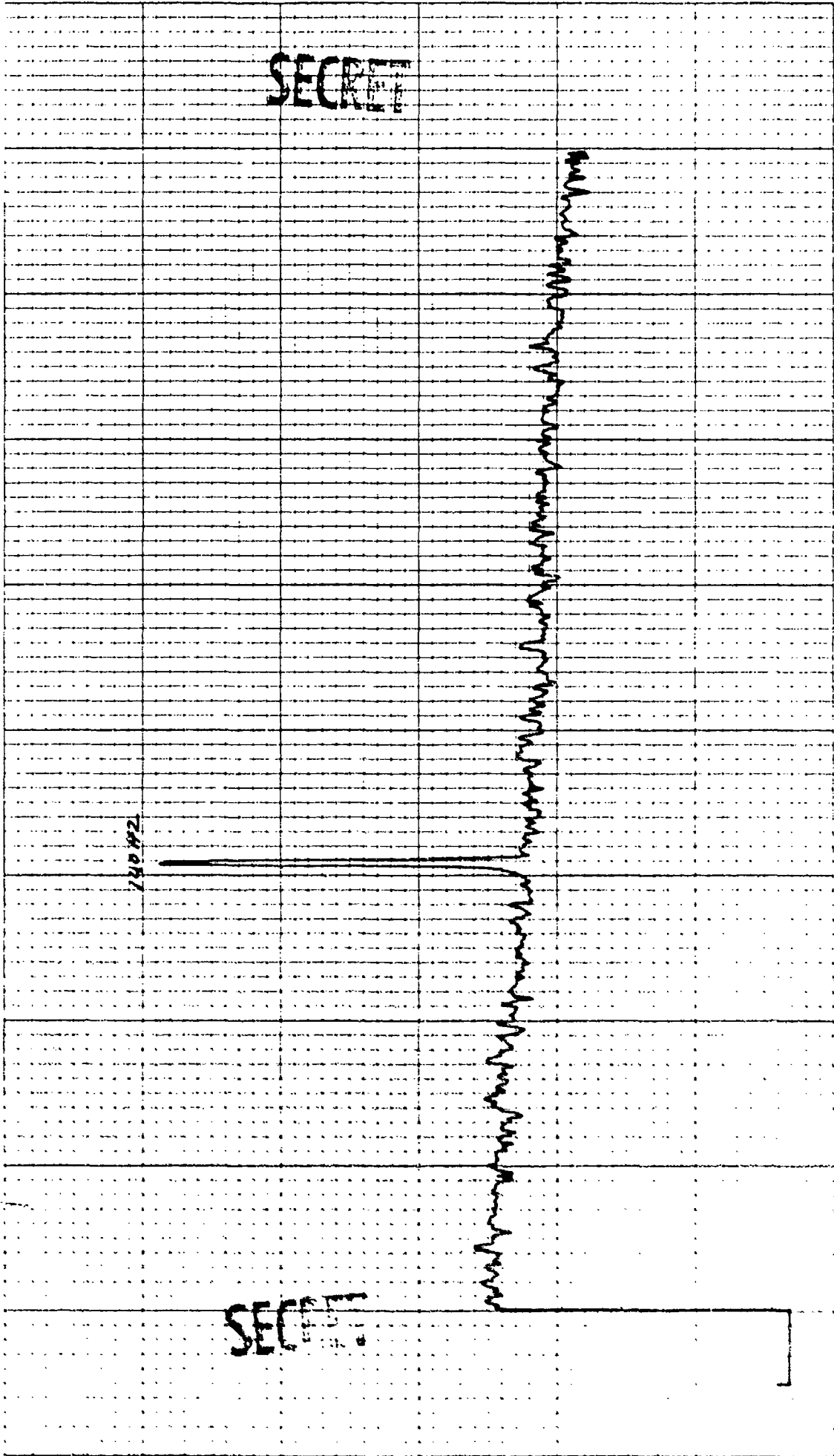
CONTROL: 0202-51 (007) DATE OF ANALYSIS: 1-26-53 REEL: F29 INDE X11VS
 BEAMFORMED SPECTRUM(ELEMENTS) 2-8-72-0202Z INTEGRATION TIME 320 SECS ATTN: 30 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 CENTER FREQ: 150 HZ 23 DEG. AZ STEERING



46 0703

REF: 1-26-53

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



46 0703

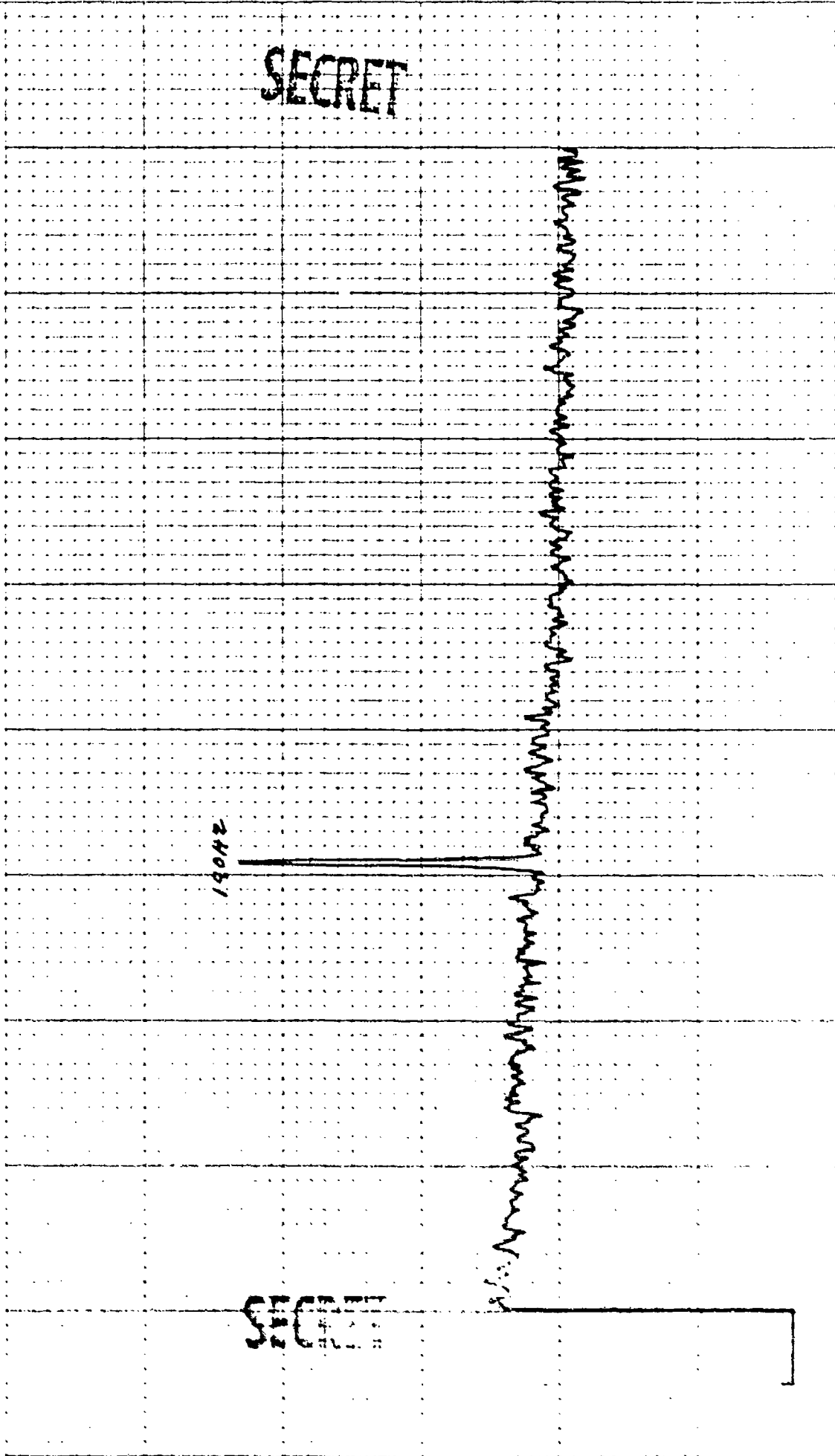
REF ID: A66000

CONTROL: 020 - 51 (007) DATE OF ANALYSIS: - - -
 BEAMFORMED SPECTRUM (ELEMENTS) 1-26-88-93
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ
 CENTER FREQ: 150 HZ -26 DEC. AZ STEERING

REEL: F29

INDE X/145

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

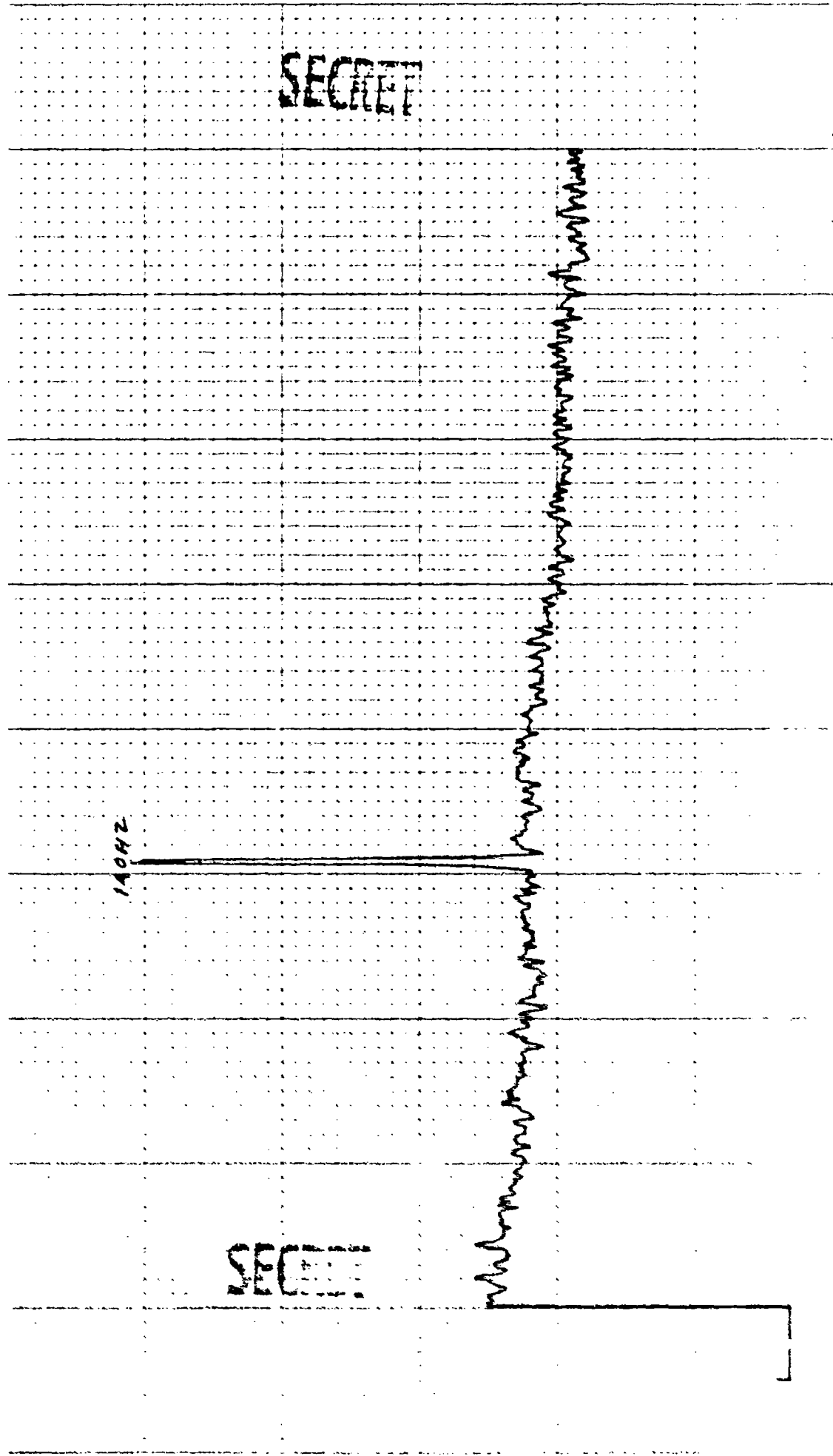


SECRET

SECRET

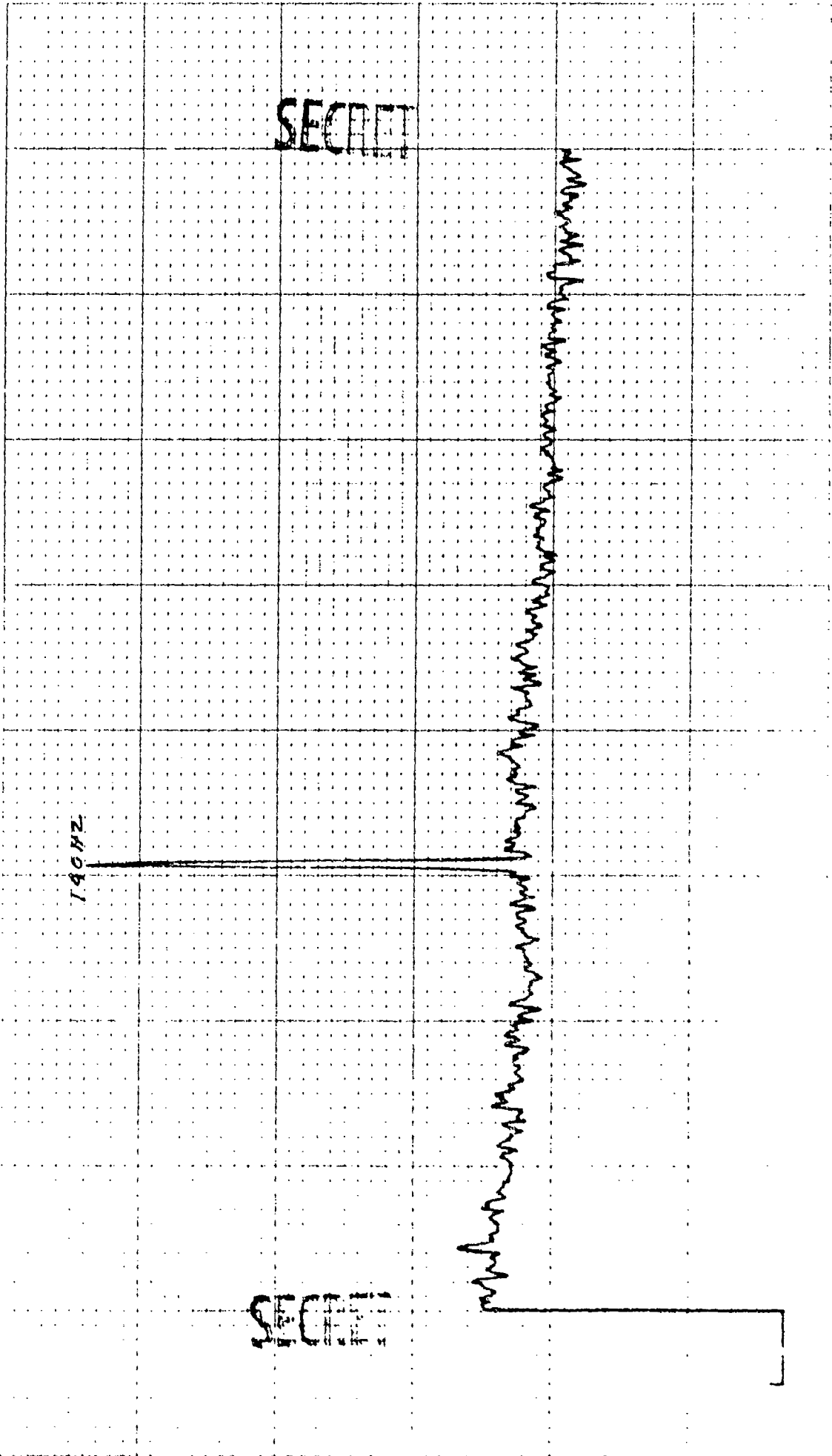
46 0703

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



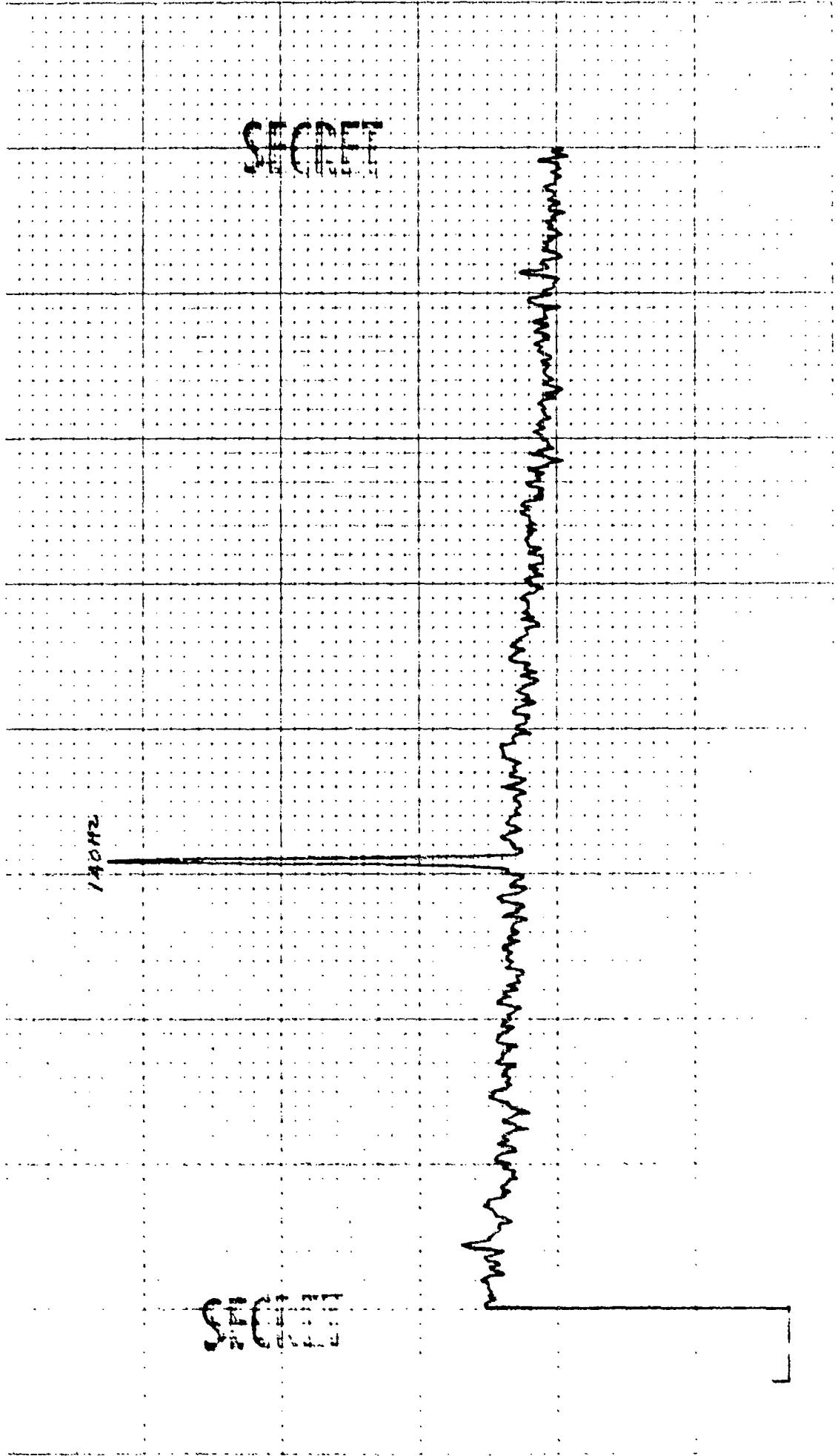
46 0703

CONTROL: 0202-51 (001) DATE OF ANALYSIS: 1-26-89-53 REEL: F29 INDE X 1145
 BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 0-0-77-0202Z INTEGRATION TIME 320 SECS ATTEN:-30 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTFF WTG: HANNING
 CENTER FREQ: 150 HZ -30 DEG. AZ STEERING



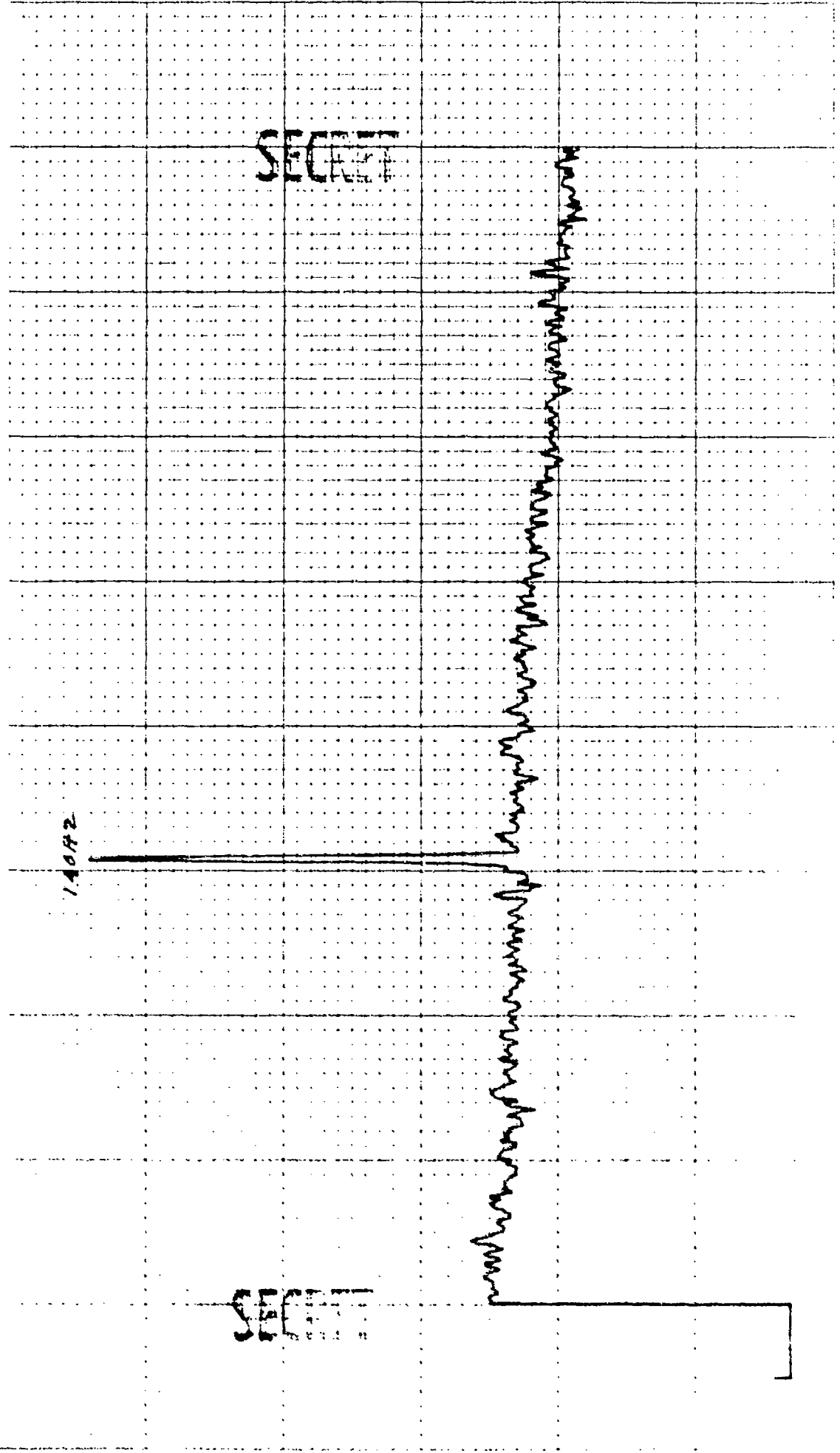
46 0703

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



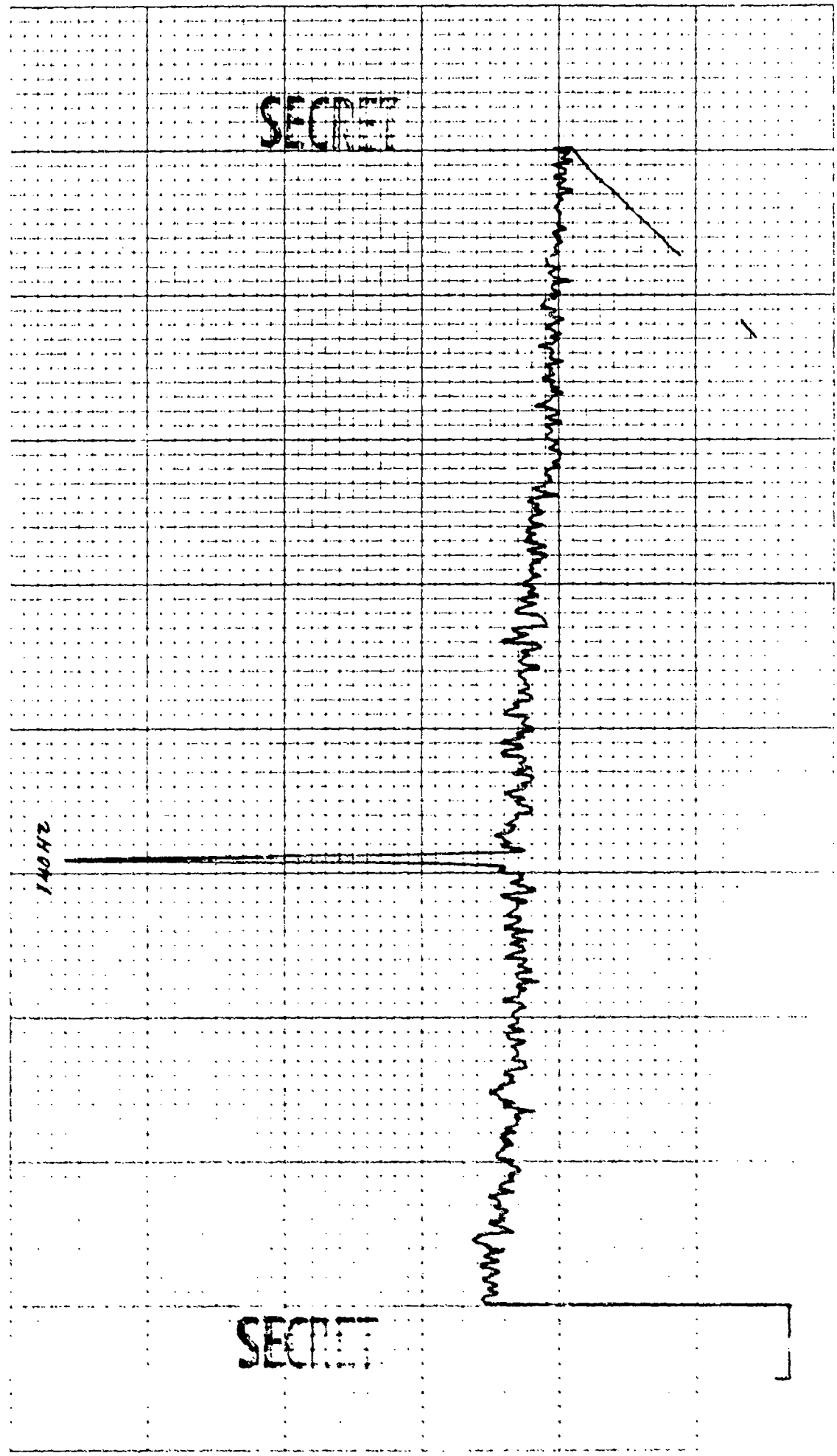
46 0703

CONTROL: 0202 - 51 (DP7) DATE OF ANALYSIS: 1-26-89-53 REEL: F29 INDE X/145
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-8-77 - 0202 Z INTEGRATION TIME 320 SECS ATTEN: -30 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WIG: HANNING
CENTER FREQ: 150 HZ -74 DEG. AZ STEERING



46 0703

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



46 0703

INDE X 1145

REEL: F21

ATTEN: -70 DB
WTG: HANNING

INTEGRATION TIME 320 SECS
FILTER

DATE OF ANALYSIS: 1-26-53

DATE/TIME: 2-8-77 -0002 Z

ANALYSIS BANDWIDTH: 1/10HZ

-30 DEG. AZ STEERING

CONTROL: Q202 - 51 (LPT)

BEAMFORMED SPECTRUM (ELEMENTS)

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

51 ELEMENTS

140HZ

SECRET

SECRET

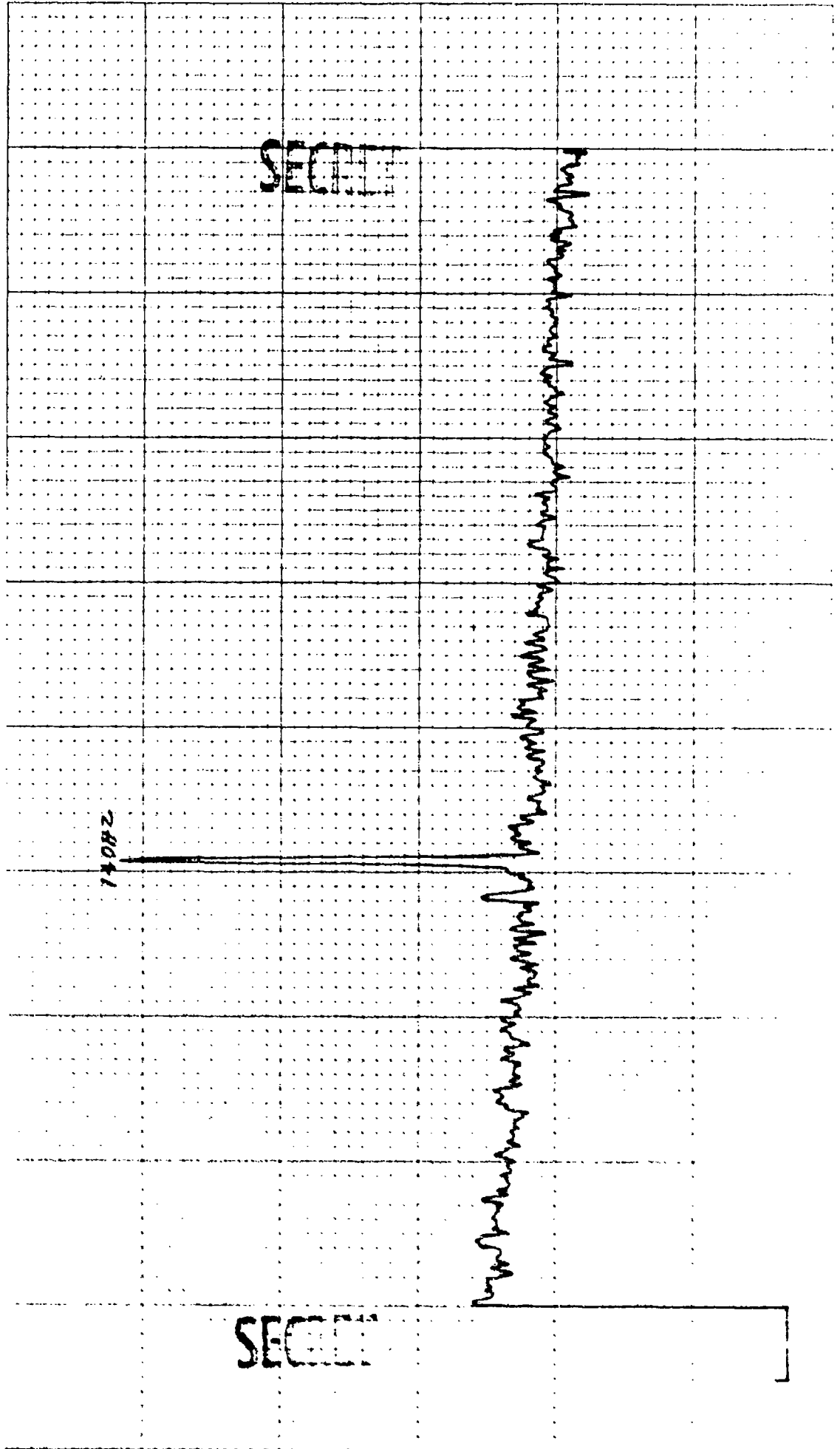
[Handwritten scribbles and markings across the grid]

46 0703

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

DATE OF ANALYSIS: 1-26-89 29-53
 DATE/TIME: 2-8-77 -0002Z
 ANALYSIS BANDWIDTH: 1/10HZ
40 DEG. AZ STEERING

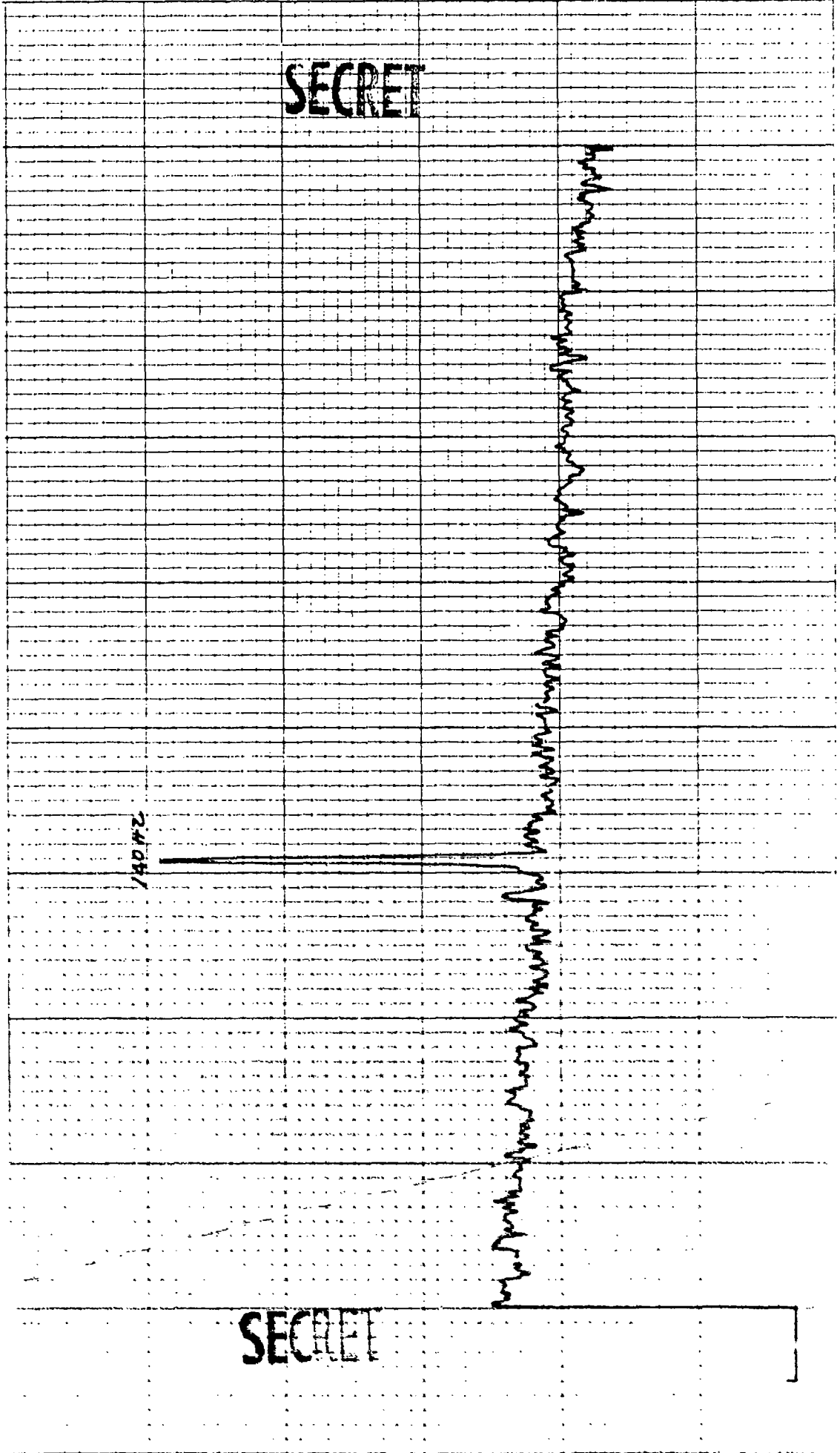
REEL: F29 INDE X/145
 INTEGRATION TIME 320 SECS ATTEN: -30 DB
 FILTFR WTG: HANNING



46 0703

1-26 0909-53

CONTROL: 0202-51 (DP7) DATE OF ANALYSIS: REEL: F29 INDE X/145
 BEAMFORMED SPECTRUM(ELEMENTS) 1-26 0909-53 INTEGRATION TIME 320 SECS ATTEN:-30 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 CENTER FREQ: 150 HZ - 42 DEG. AZ STEERING



SECRET

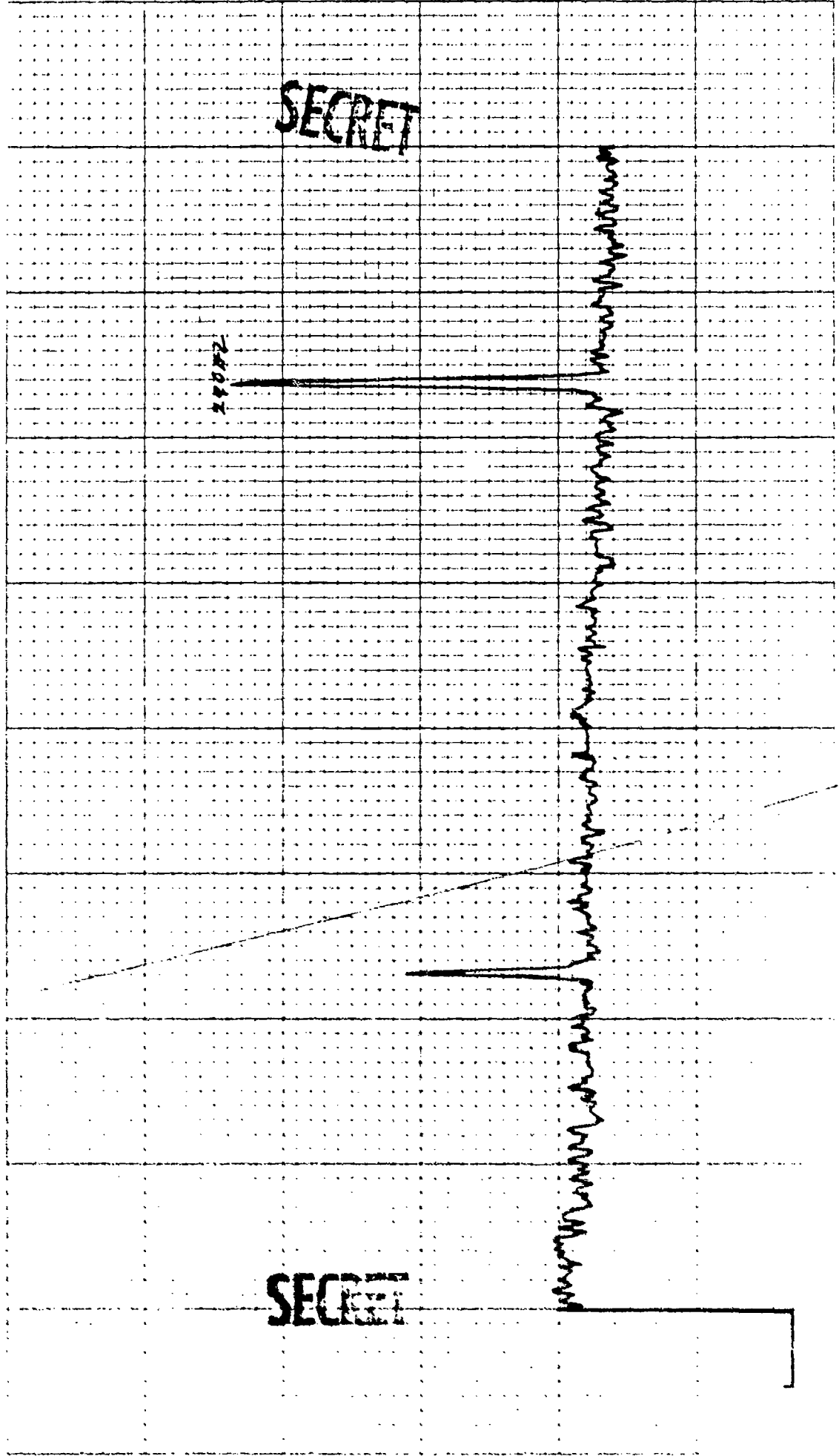
SECRET

46 0703

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

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

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



SECRET

SECRET

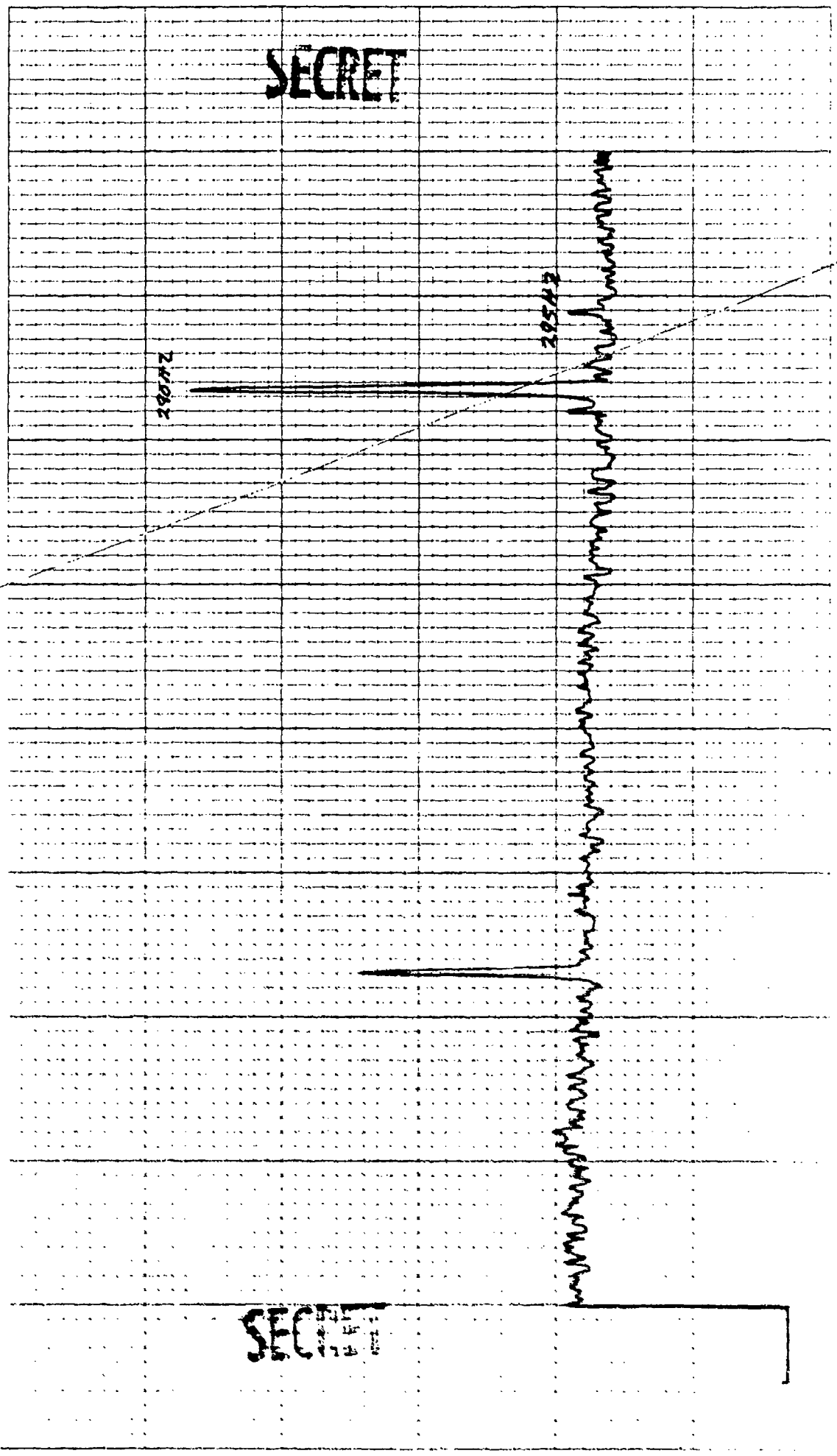
1-2-51 10:45 TO THE DIRECTOR, NSA

46 0703

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

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

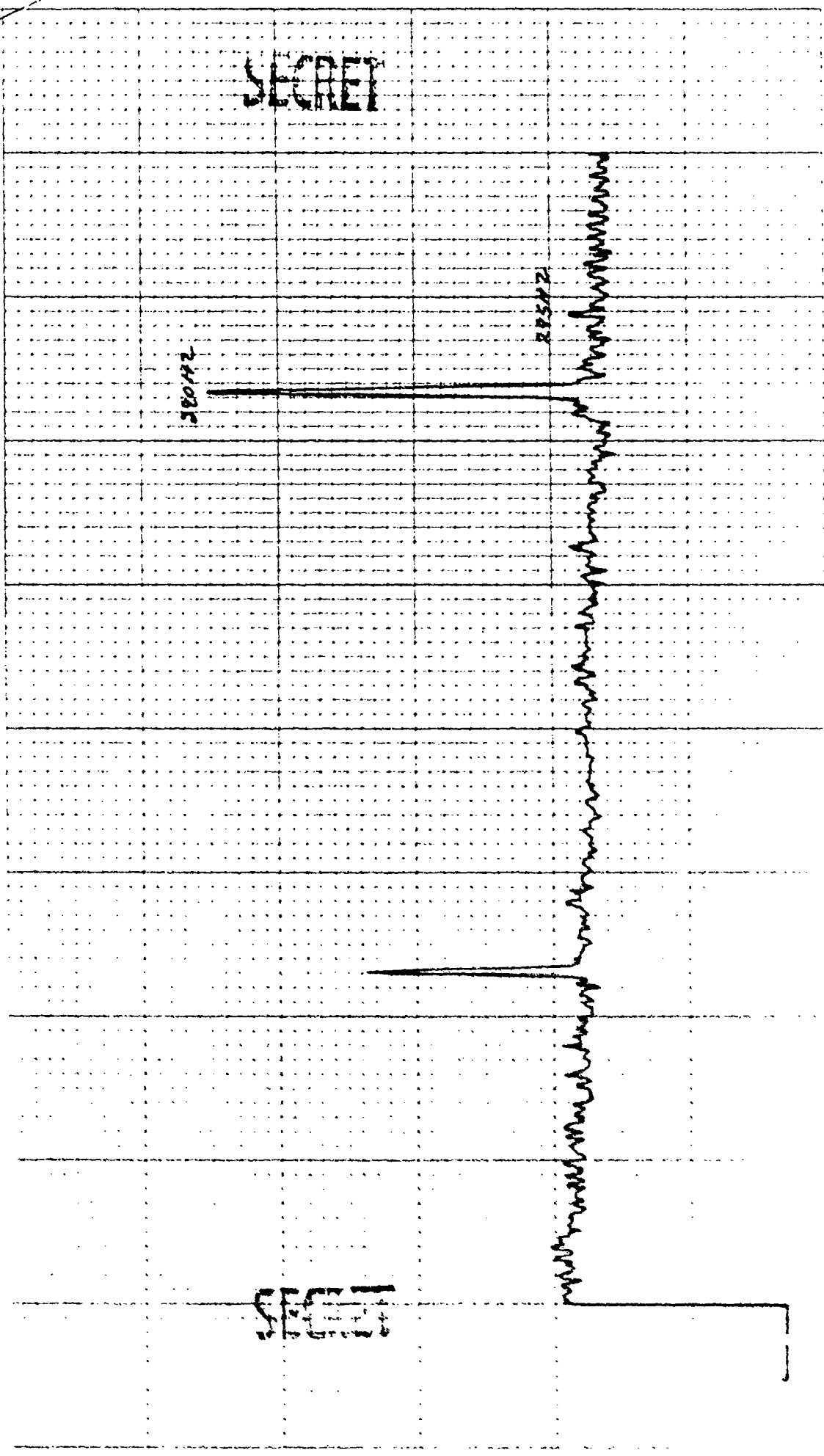
REEL: F39
INDE X/145
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTER WTG: HANNING



SECRET

46 0703

CONTROL: 0302-51 (207) DATE OF ANALYSIS: _____ REEL: F09 INDE: X145
 BEAMFORMED SPECTRUM (ELEMENTS) 1-268 89-53) INTEGRATION TIME 320 SECS ATTEN: -20 DB
 EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 -0202 Z FILTER: _____ WTC: HANNING
 CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1/10 HZ
5/ ELEMENTS -/6 DEG. AZ STEERING



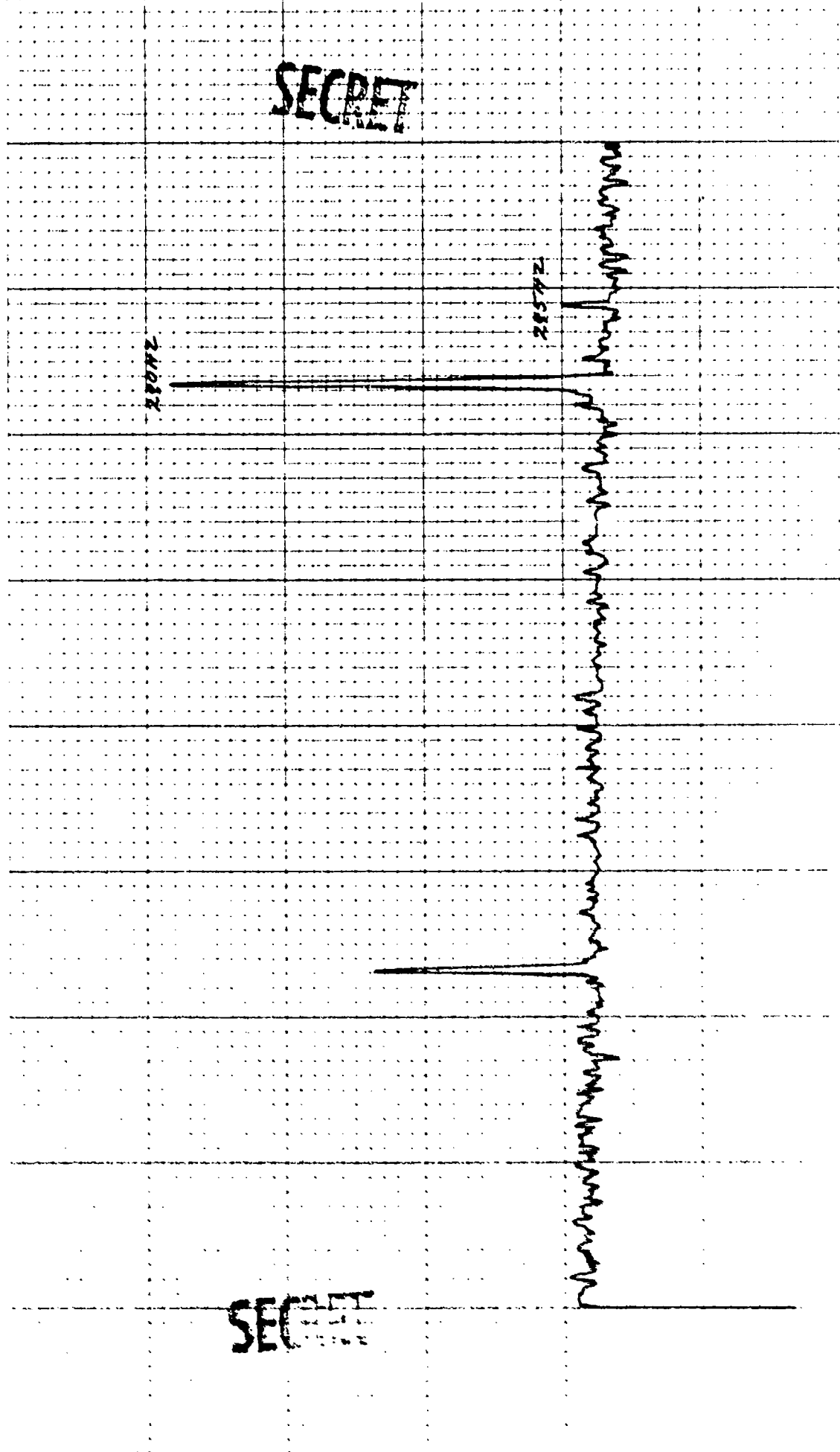
45 0703

REF ID: A66666

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

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

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



SECRET

SECRET

46 0703

CONTROL: 0202 - 51 (007) DATE OF ANALYSIS: - - - - -

BEAMFORMED SPECTRUM (ELEMENTS) 1-26-77 28-53

EXERCISE: BEARING STAKE DATE/TIME: 2-6-77 - 0202 Z

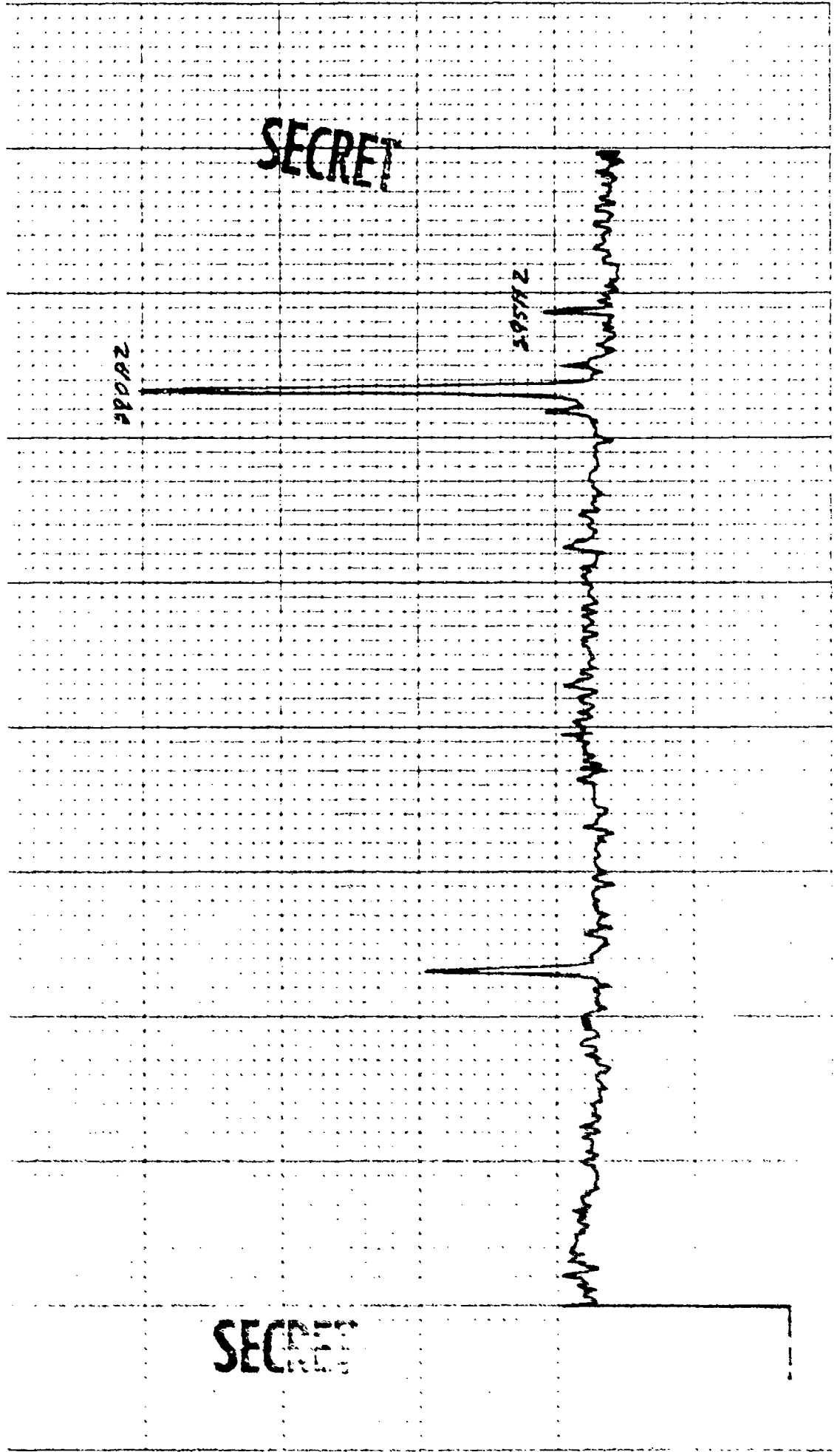
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ

51 ELEMENTS - 20 DEG. AZ STEERING

REEL: F29 INDE X 1195

INTEGRATION TIME 320 SECS ATTEN: 30 DB

FILTER WTC: HANNING



46 0703

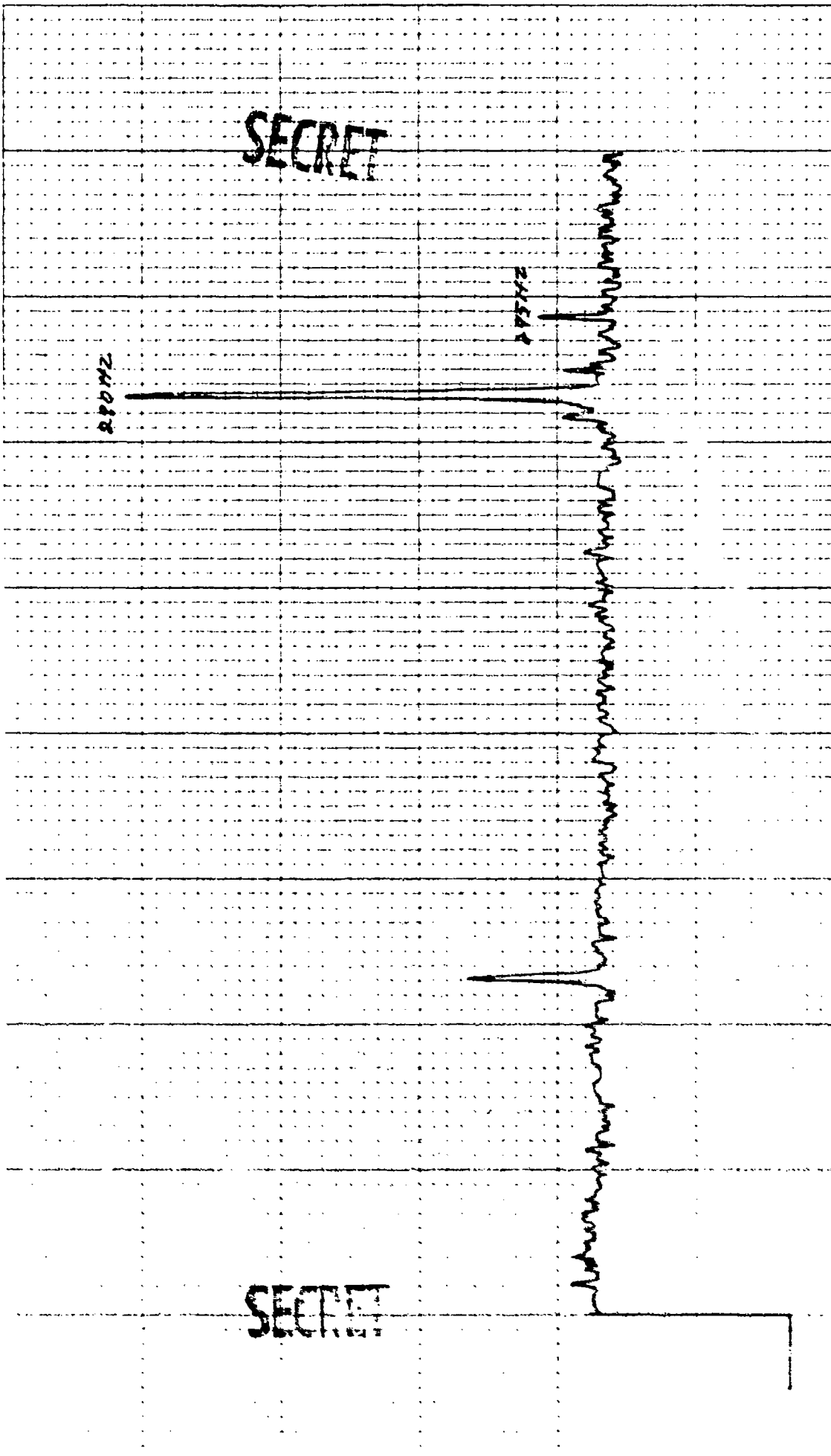
CONTROL: 0202-5/ (207) DATE OF ANALYSIS: REEL: F39 INDE X/145

BEAMFORMED SPECTRUM (ELEMENTS) 1-264 21-53 INTEGRATION TIME 320 SECS ATTEN: -30 DB

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

CENTER FREQ: 290 HZ 22 DEG. AZ STEERING

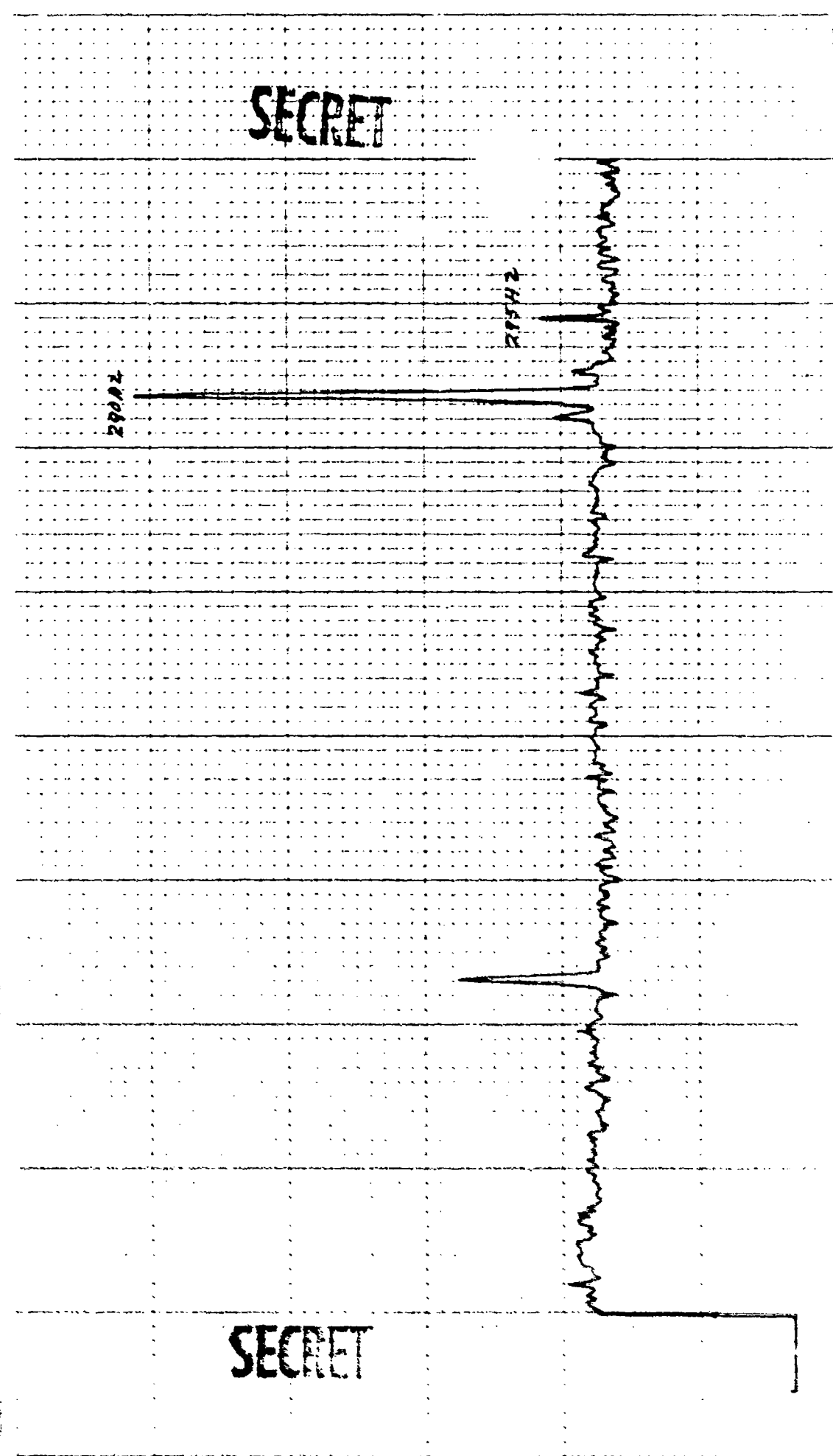
5/ ELEMENTS



46 0703

CONTROL: 0202 - 5/ (007) DATE OF ANALYSIS: _____
 BEAMFORMED SPECTRUM(ELEMENTS) 1-20 8 29-53)
 EXERCISE: BEARING STAKE DATE/TIME: 2877 -0202Z
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ
 5/ ELEMENTS -2/ DEG. AZ STEERING

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



45 0703

REF ID: A66888

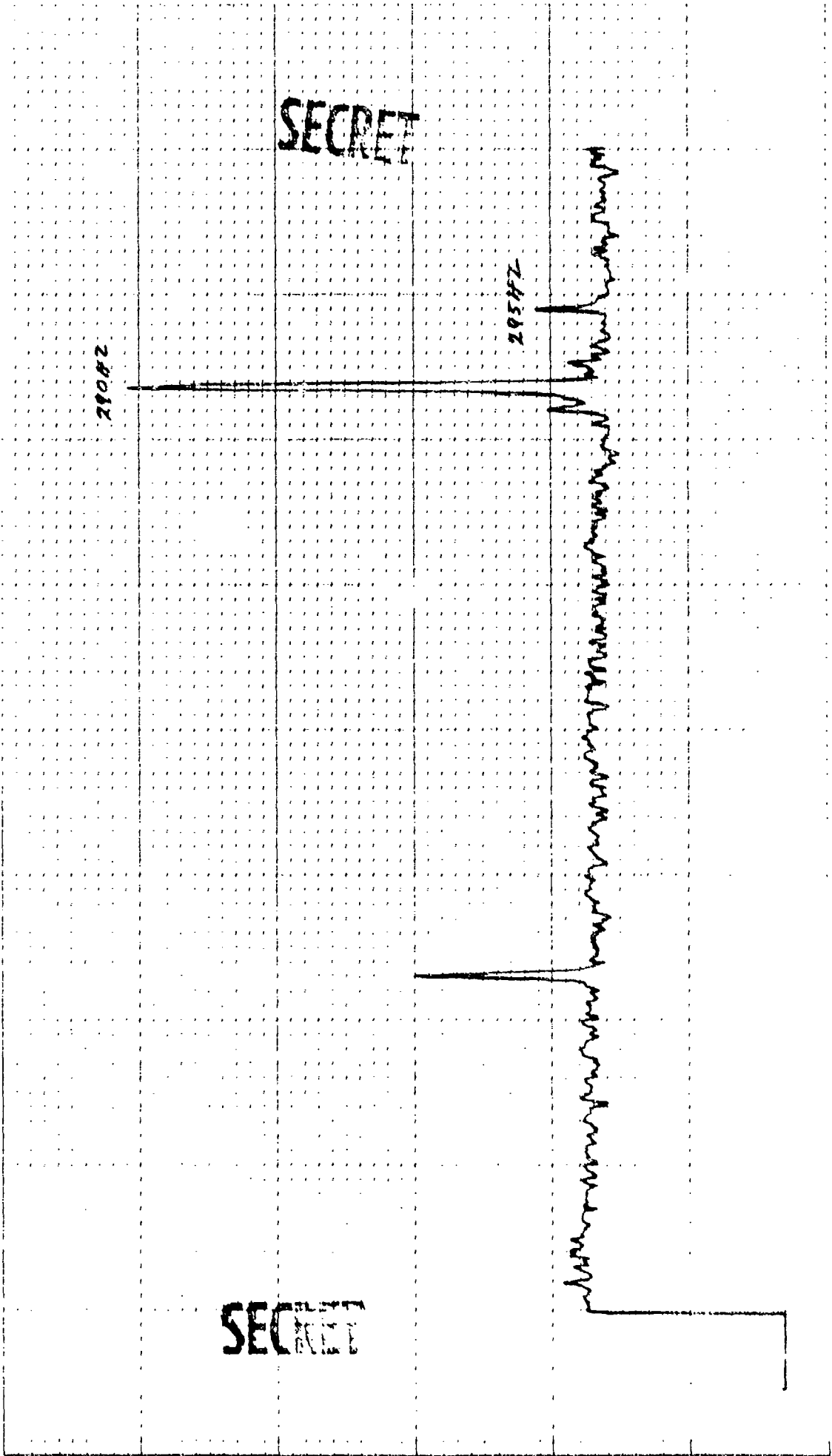
CONTROL: 0202-51 (DP7) DATE OF ANALYSIS: 1-26-53 REEL: F29 INDE X1145

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

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

CENTER FREQ: 000 HZ - 03 DEG. AZ STEERING

51 ELEMENTS



SECRET

SECRET

46 0703

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

DATE OF ANALYSIS: -- -- --

1-26 198-53

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

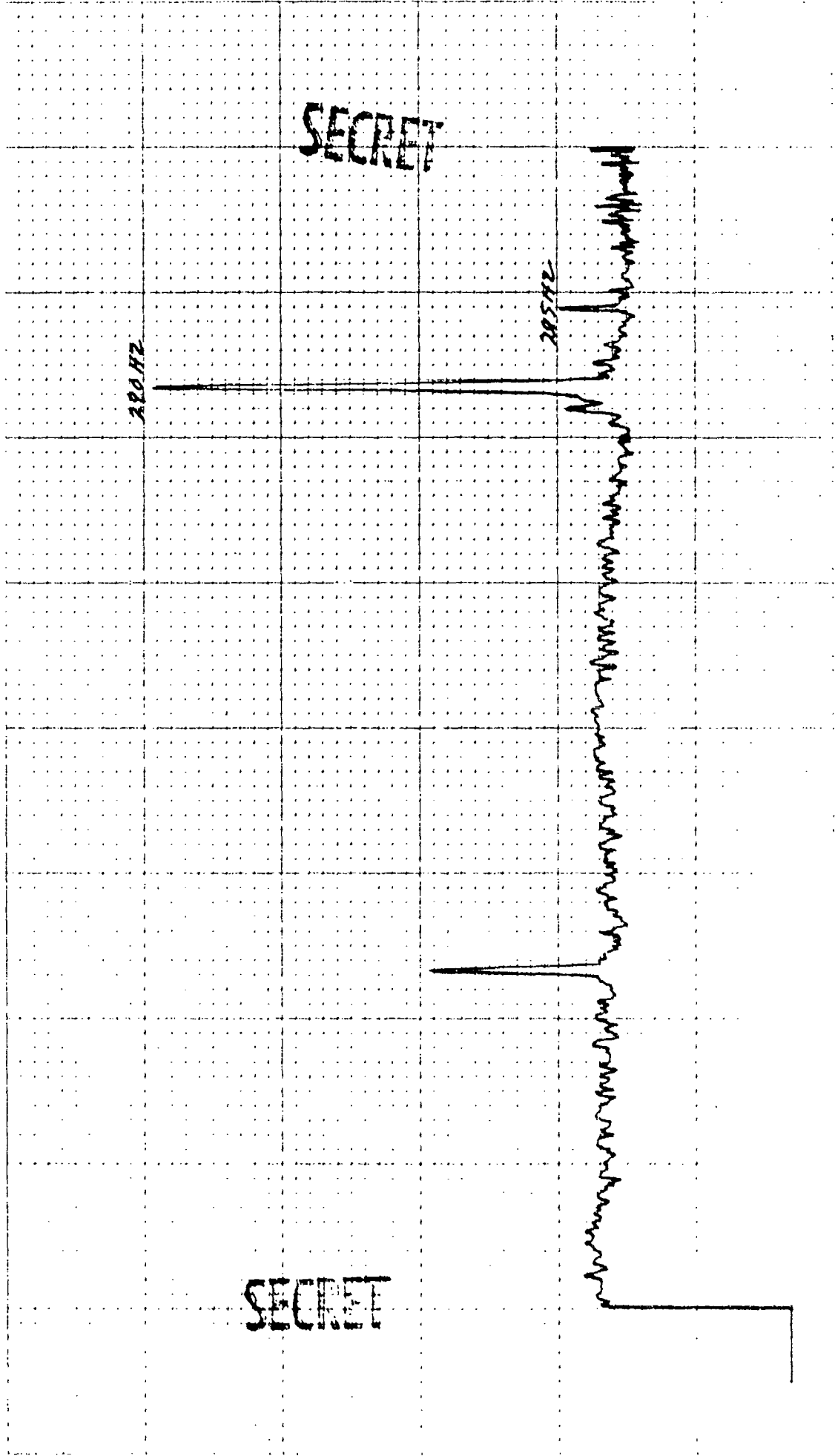
ANALYSIS BANDWIDTH: 1/10HZ

-04 DEG. AZ STEERING

REEL: F89 INDE X1145

INTEGRATION TIME 320 SECS

FILTER WIG: HANNING



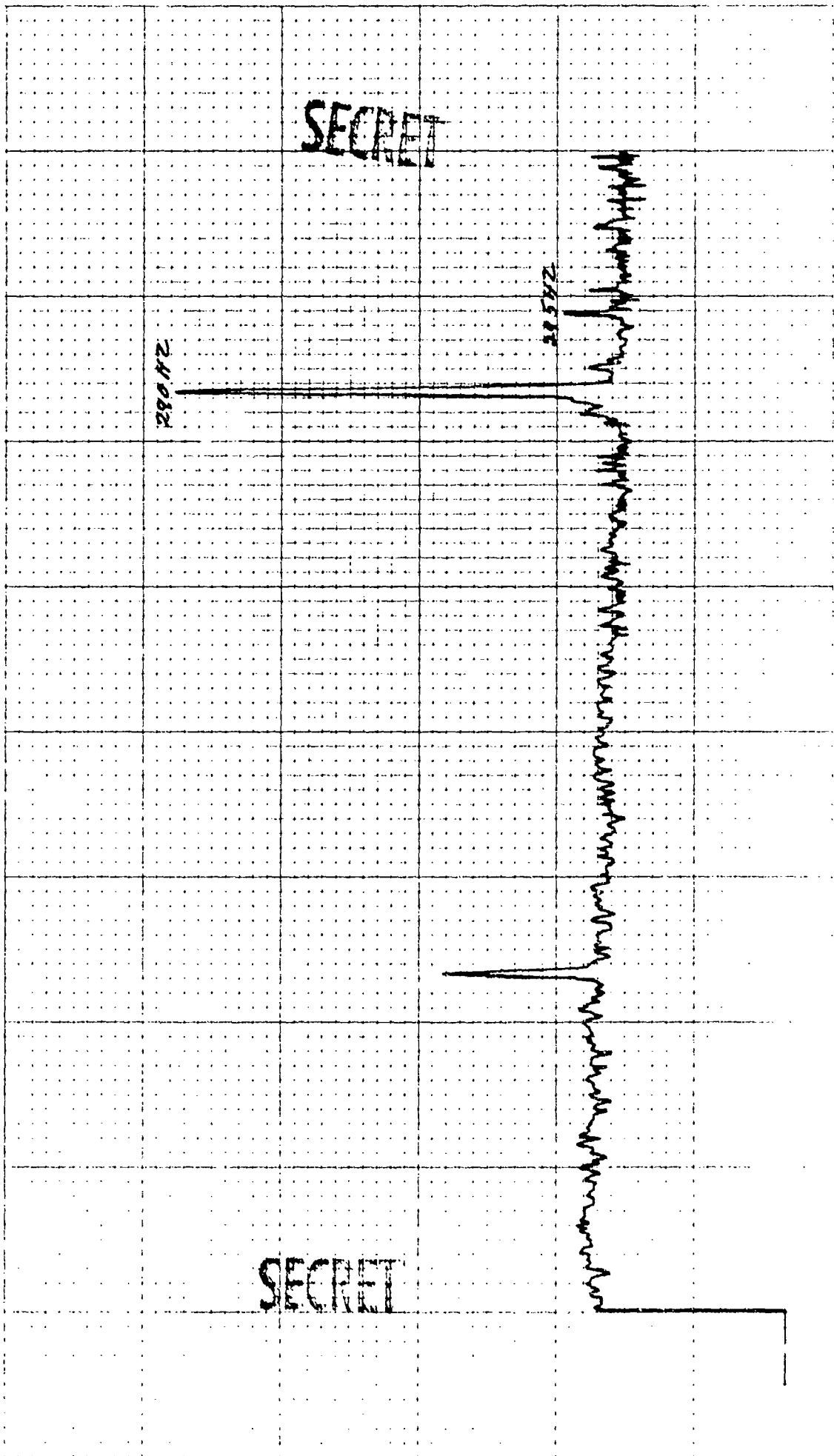
SECRET

SECRET

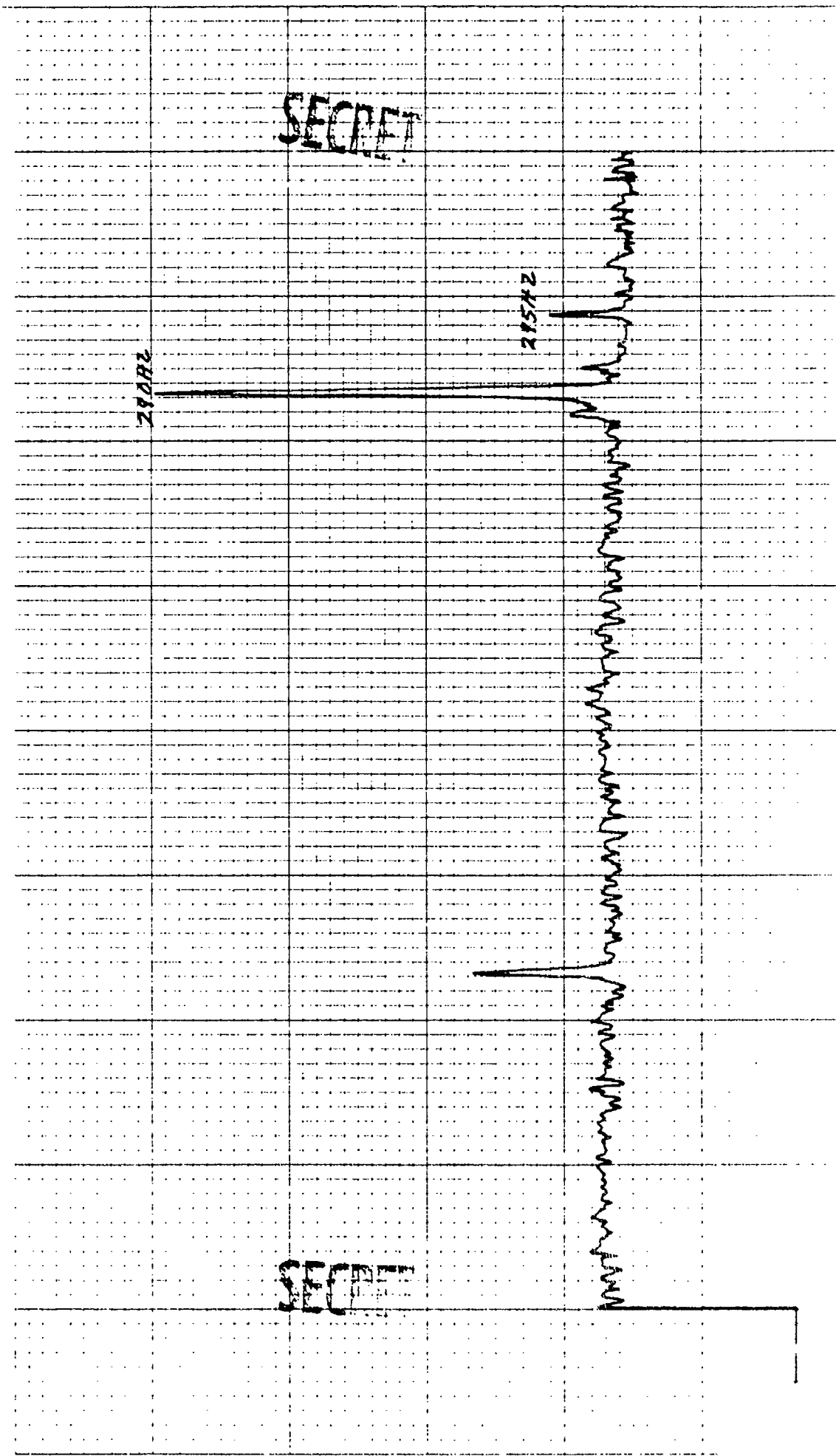
46 0703

46 0703

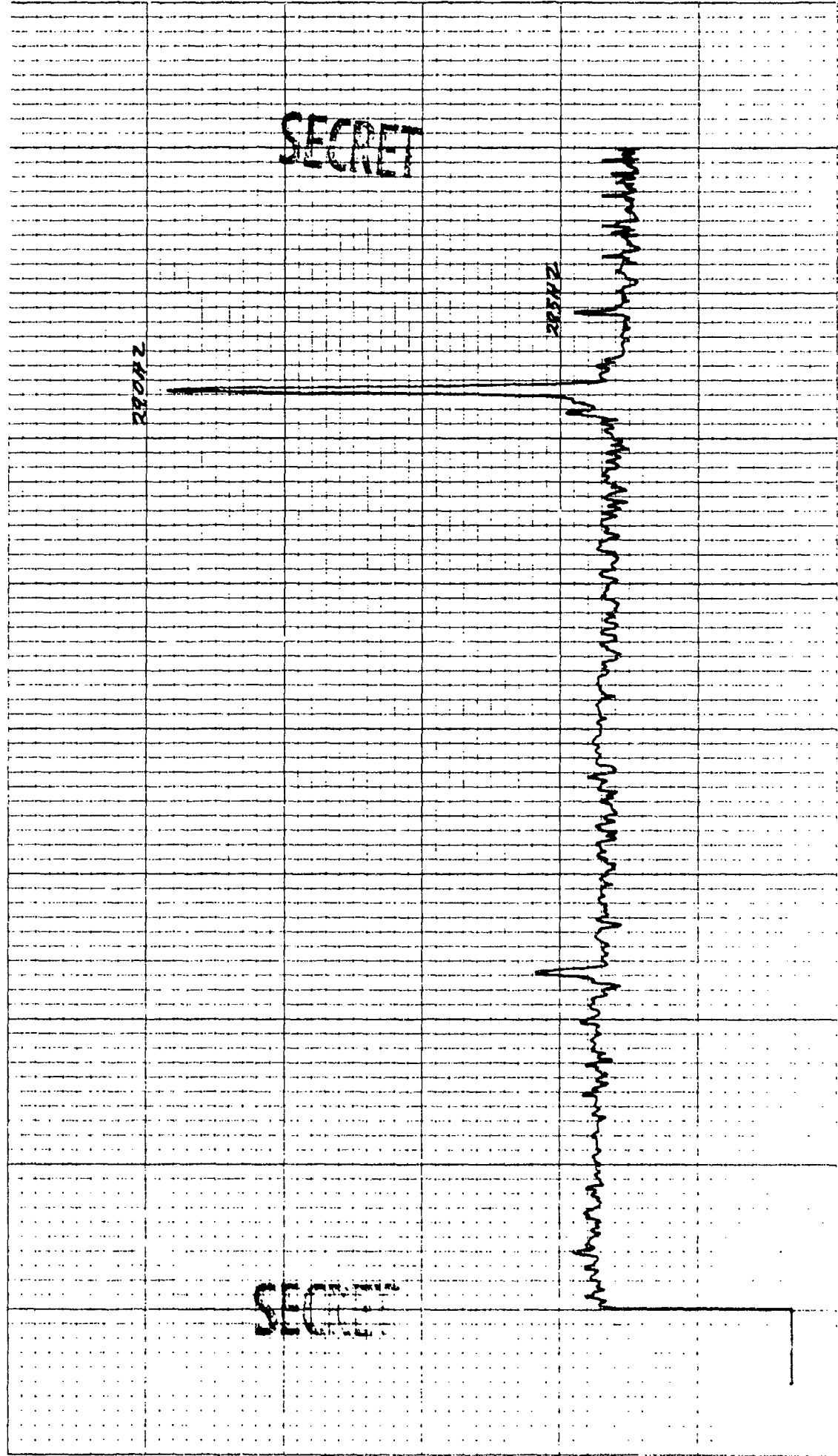
CONTROL: 0202-51 (DP7) DATE OF ANALYSIS: 1-26-53 REEL: F39 INDE X: 145
 BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-8-77-0202Z INTEGRATION TIME 320 SECS ATTEN: -30 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER: WTG: HANNING
 CENTER FREQ: 280 HZ -26 DEC. AZ STEERING



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



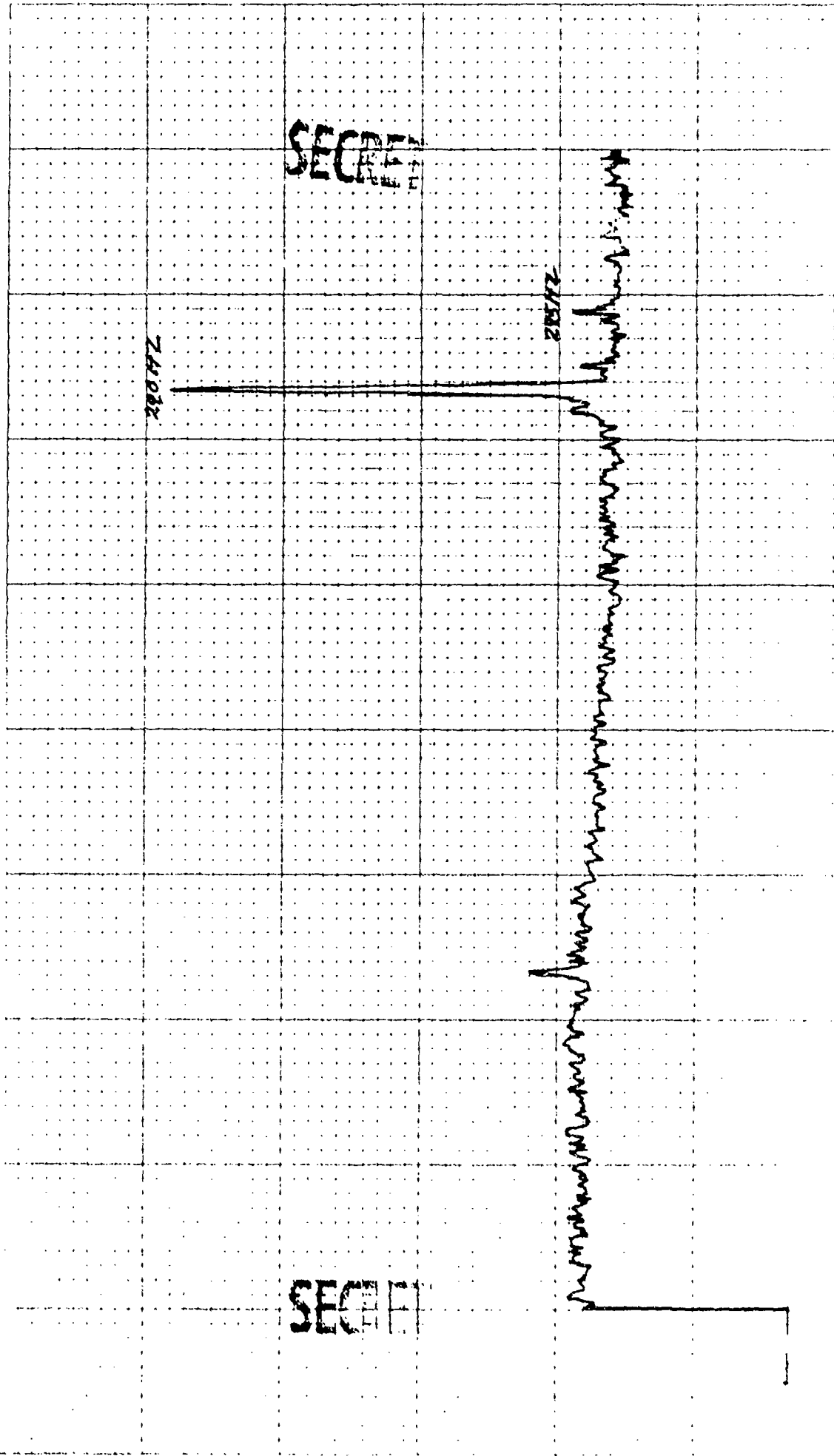
CONTROL: 0202 - 51 (DPT) DATE OF ANALYSIS: 1 - 26 8 28-53 REEL: F29 INDE X 1195
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-8-77 - 0202Z INTEGRATION TIME 320 SECS ATTEN: -70 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTFR WTG: HANNING
 CENTER FREQ: 280 HZ -30 DEG. AZ STEERING



46 0703

Page 2 of 2

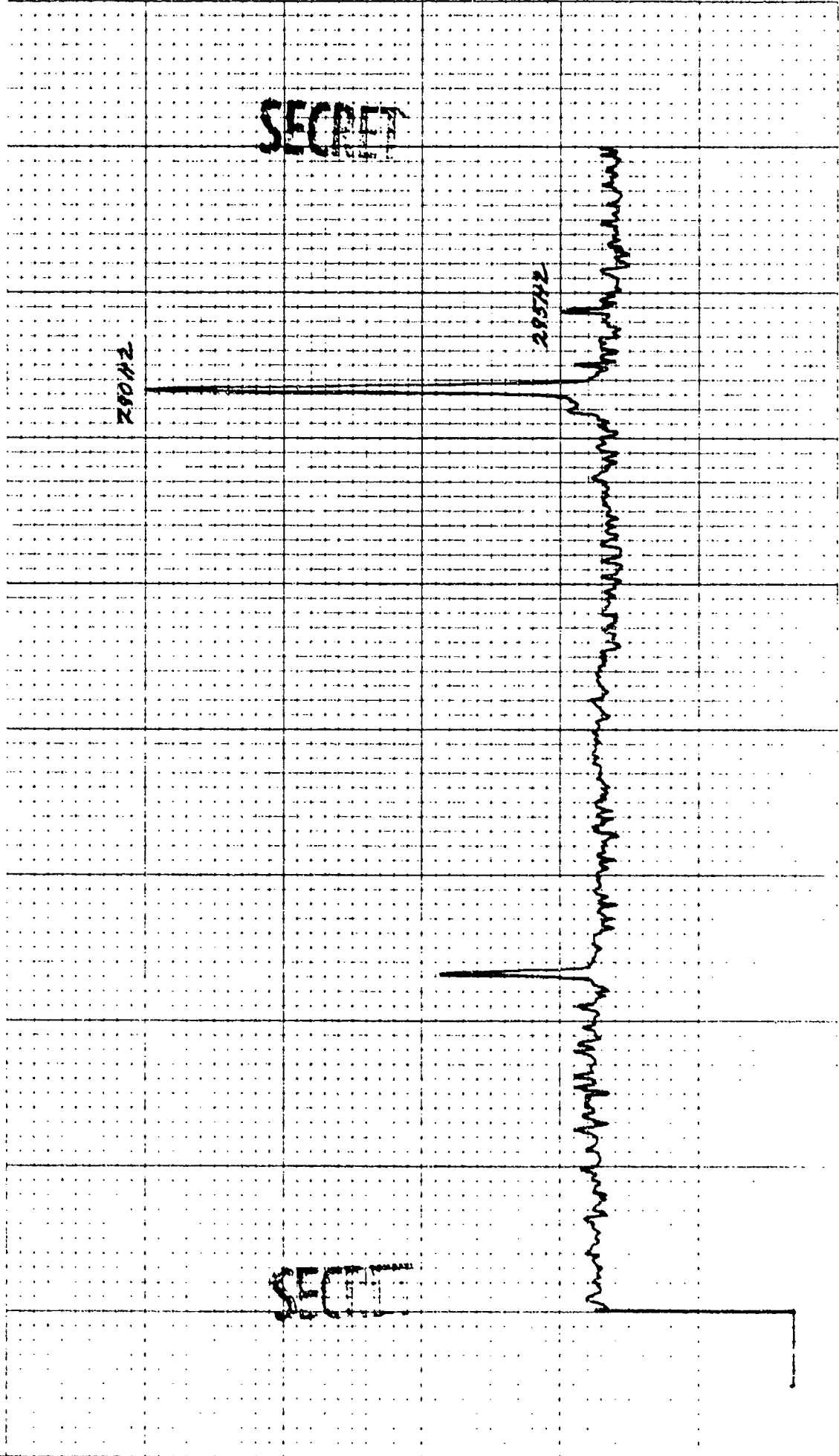
CONTROL: 0202-51 (DP7) DATE OF ANALYSIS: 1-26-53 REEL: E21 INDEX: X/145
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-8-77-0202Z INTEGRATION TIME: 320 SECS ATTEN: -76 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTFR: WTG: HANNING
CENTER FREQ: 280 HZ -32 DEG. AZ STEERING



46 0703

FILE 10210 TO THE HIGH...

CONTROL: 0002-51 (007) DATE OF ANALYSIS: 1-26-77 REEL: F-89 INDE X 1195
 BEAMFORMED SPECTRUM(ELEMENTS) 28-77-0002Z INTEGRATION TIME 320 SECS ATTEN: -30 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTFR WTG: HANNING
 CENTER FREQ: 280 HZ -34 DEG. AZ STEERING



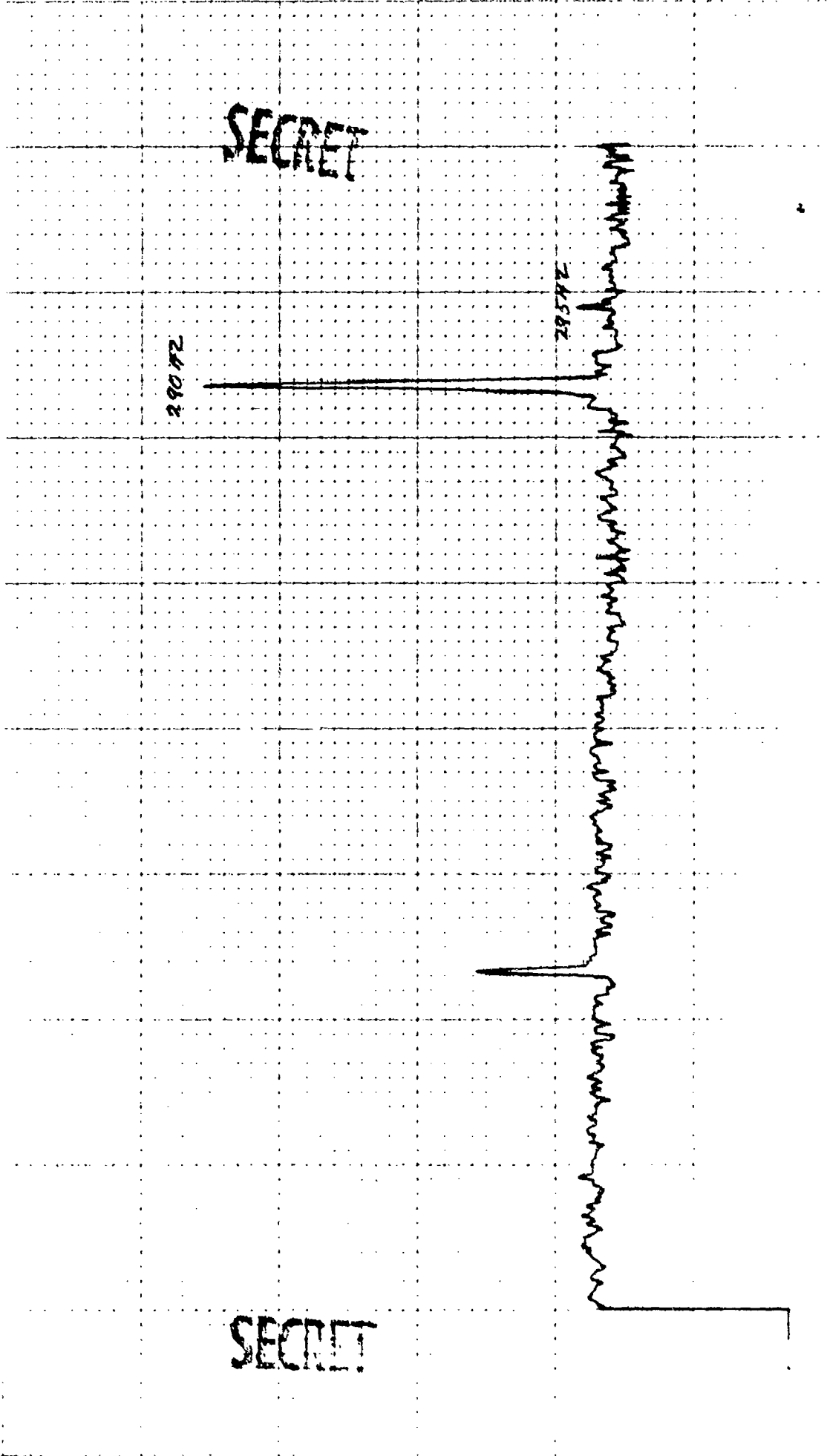
46 0703

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

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

ANALYSIS BANDWIDTH: 1710HZ
-36 DEG. AZ STEERING

REEL: F01 INDE X 1140
INTEGRATION TIME 320 SECS
ATTEN: -20 DB
FILTER WTG: HANNING



46 0703

REF: [illegible]

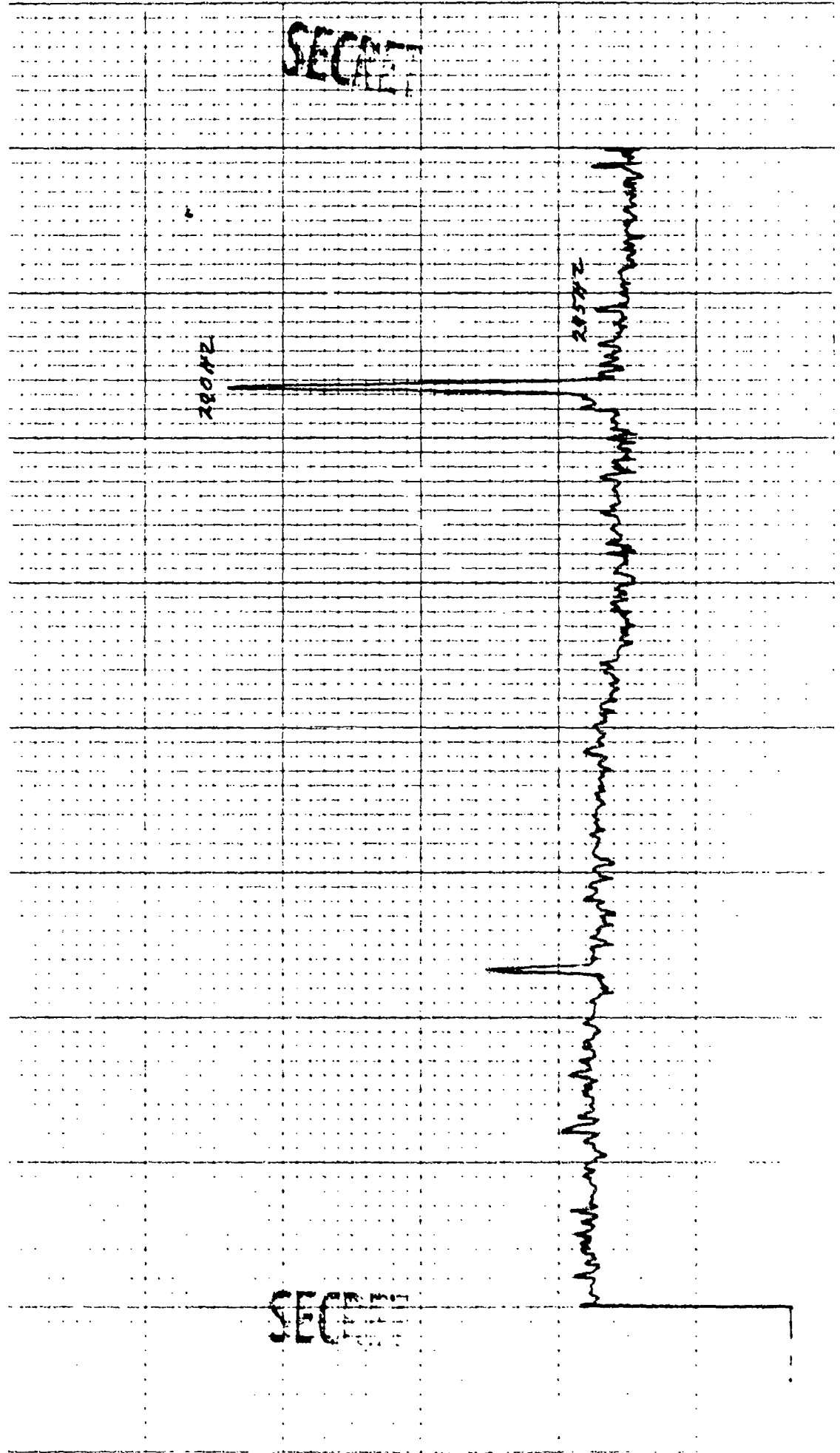
CONTROL: 0202 - 51 (207) DATE OF ANALYSIS: 1-26-88-53 REEL: F29 INDE X/145

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

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

CENTER FREQ: 280 HZ -38 DEG. AZ STEERING

51 ELEMENTS



46 0703

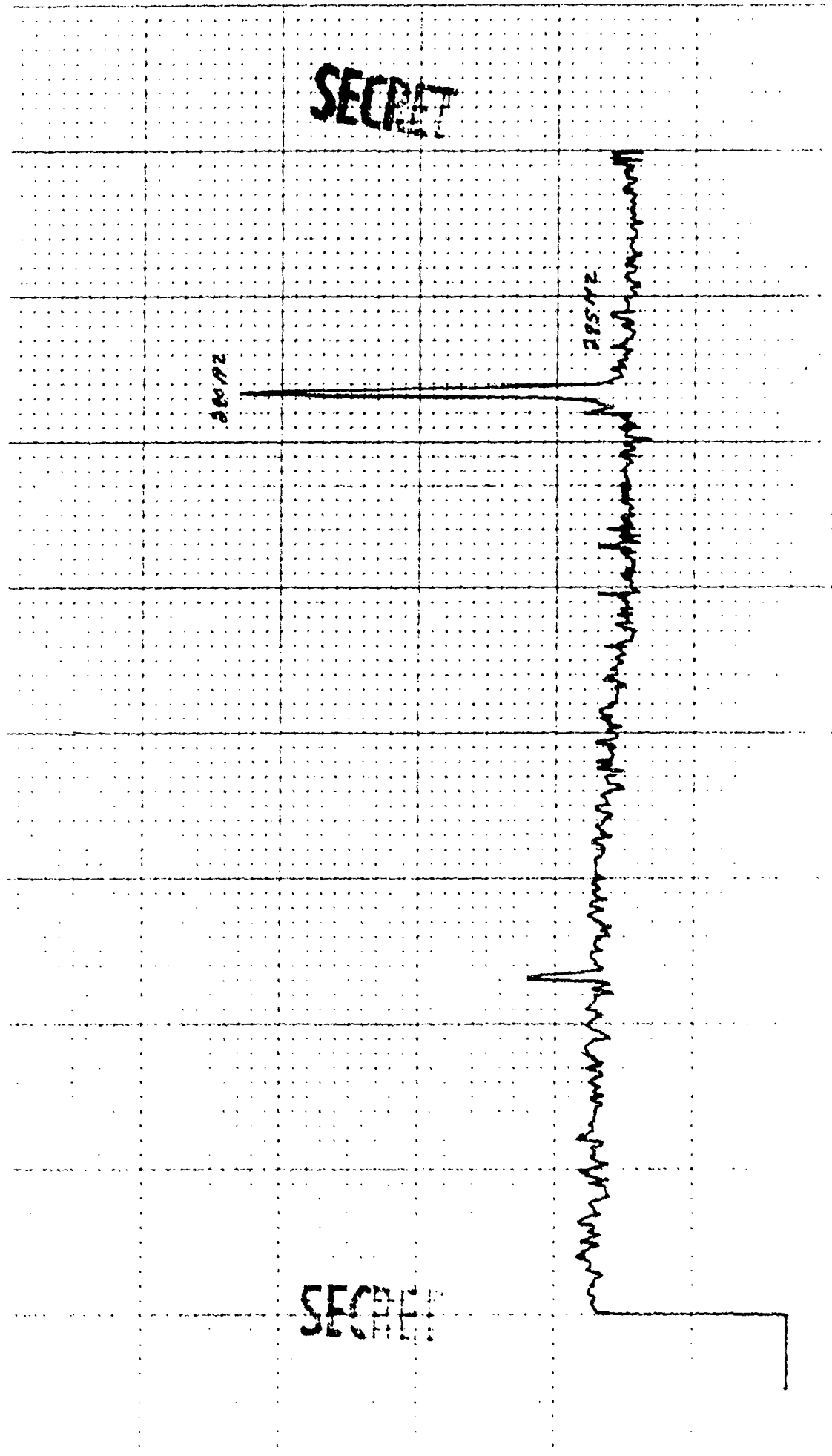
CONTROL: 0002-51 (007)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
51 ELEMENTS

DATE OF ANALYSIS: 1-26-89-53
DATE/TIME: 08:37-0002Z
ANALYSIS BANDWIDTH: 1/10 HZ
-40 DEG. AZ STEERING

REEL: F01

INDE X1/45

INTEGRATION TIME 320 SECS ATTN: -30 DB
FILT.FPR WTC: HANNING



SECRET

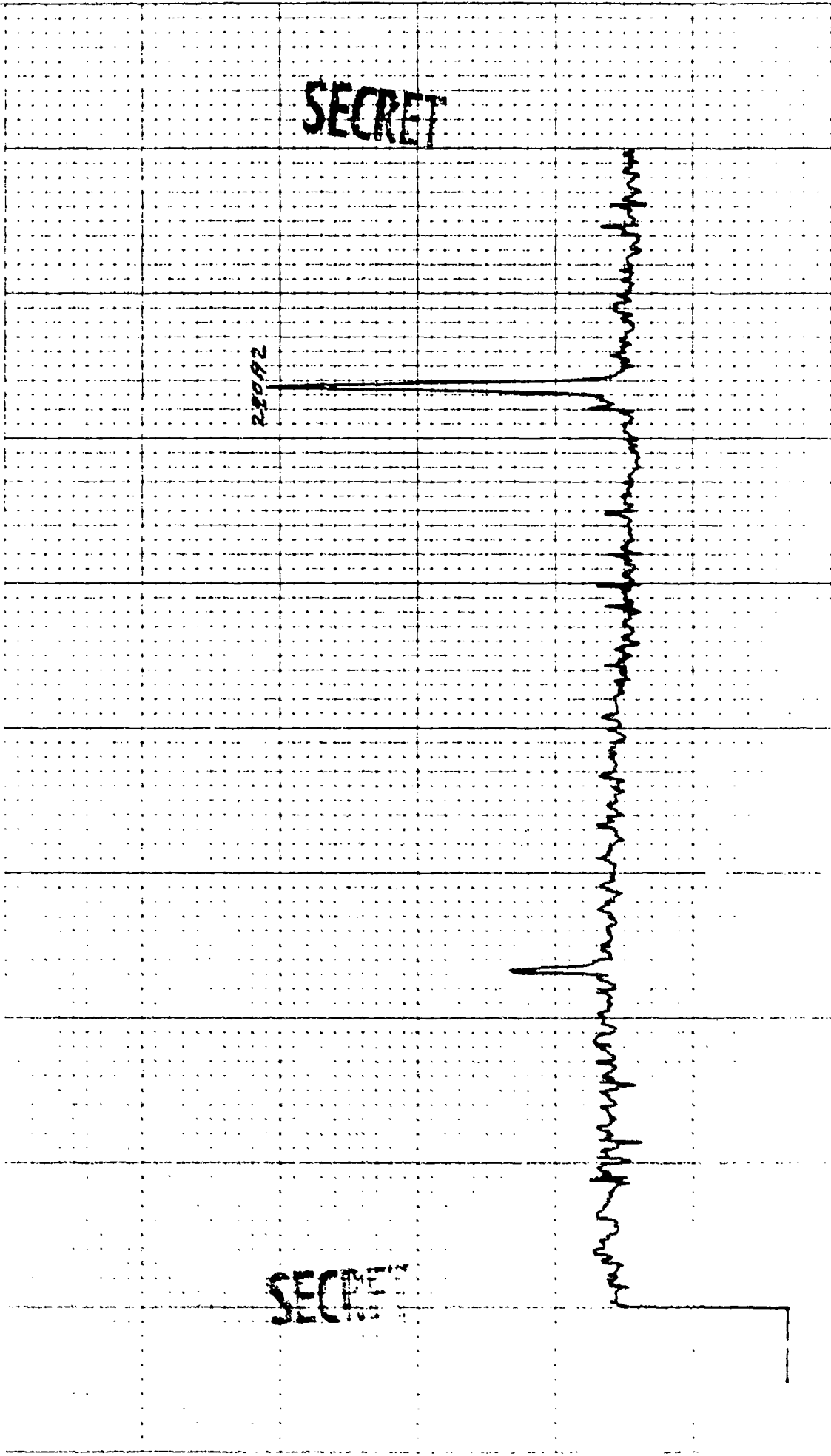
SECRET

200 Hz

46 0703

CONTROL: 0202 - 51 (007) DATE OF ANALYSIS: -- -- --
 BEAMFORMED SPECTRUM (ELEMENTS) 1-268 89-53
 EXERCISE: BEARING STAKE DATE/TIME: 2-8-77 - 0207Z
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ
 5/ ELEMENTS - 42 DEG. AZ STEERING

REEL: F29 INDE X 1145
 INTEGRATION TIME 320 SECS ATTEN: -30DB
 FI.I.T.FP WTC: HANNING



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

TIME 150/Z

DATA POINT 8 DATE 3-15-77

FREQUENCY 140 HZ

-52.9

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

-(-12)

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

+8.2

BANDWIDTH CONVERSION TO 1 HZ BAND

-32.7

+100

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

+17.3

UNCLASSIFIED

UNCLASSIFIED

UNCLASSIFIED

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

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

FREQUENCY 290 HZ

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

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

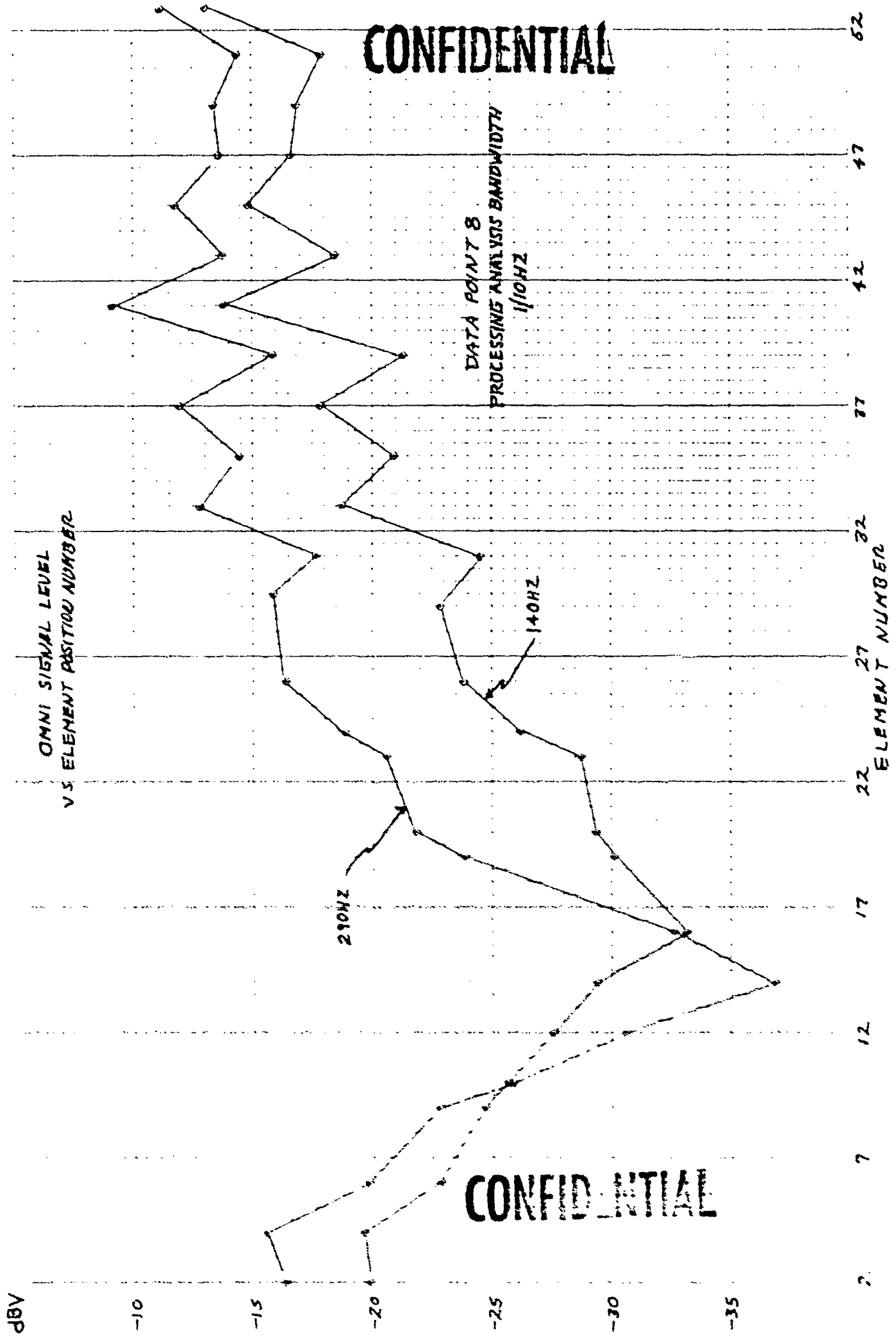
BANDWIDTH CONVERSION TO 1 HZ BAND +8.2 -38.4

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

UNCLASSIFIED

46 0703

Fig. 2. Signal Level vs. Element Number



CONFIDENTIAL

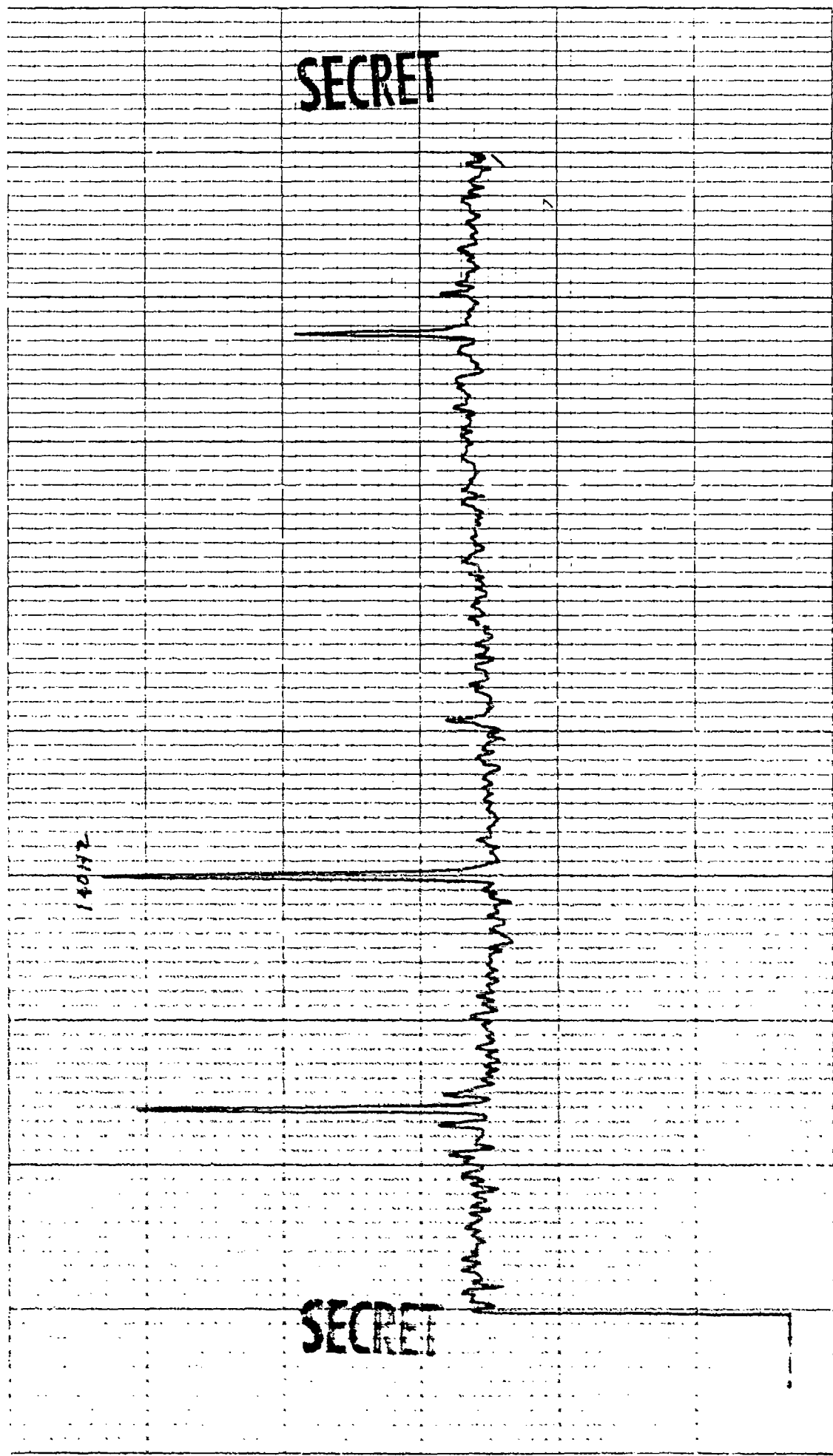
CONFIDENTIAL

46 0703

REF ID: A66000

CONTROL: 3-45 - 1501 (2.7) DATE OF ANALYSIS: REEL: 14 INDEX 3340
 OMNI SPECTRUM (ELEMENT 2)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 MHz INTEGRATION TIME 320 SECS ATTN: DB
 1 ELEMENT FILTER WTG: HANNING

DATE/TIME: 3-7-57 - 1501 Z
 ANALYSIS BANDWIDTH: 1/1 CHZ
 DEG AZ SIEERING



46 6703

INDEX 3360

REEL: 14

DATE OF ANALYSIS:

CONTROL: 3-5 - 1501 (10)

OMNI SPECTRUM ELEMENT 4

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

1 ELEMENT

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

ANALYSIS BANDWIDTH: 1/10HZ

DEC AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

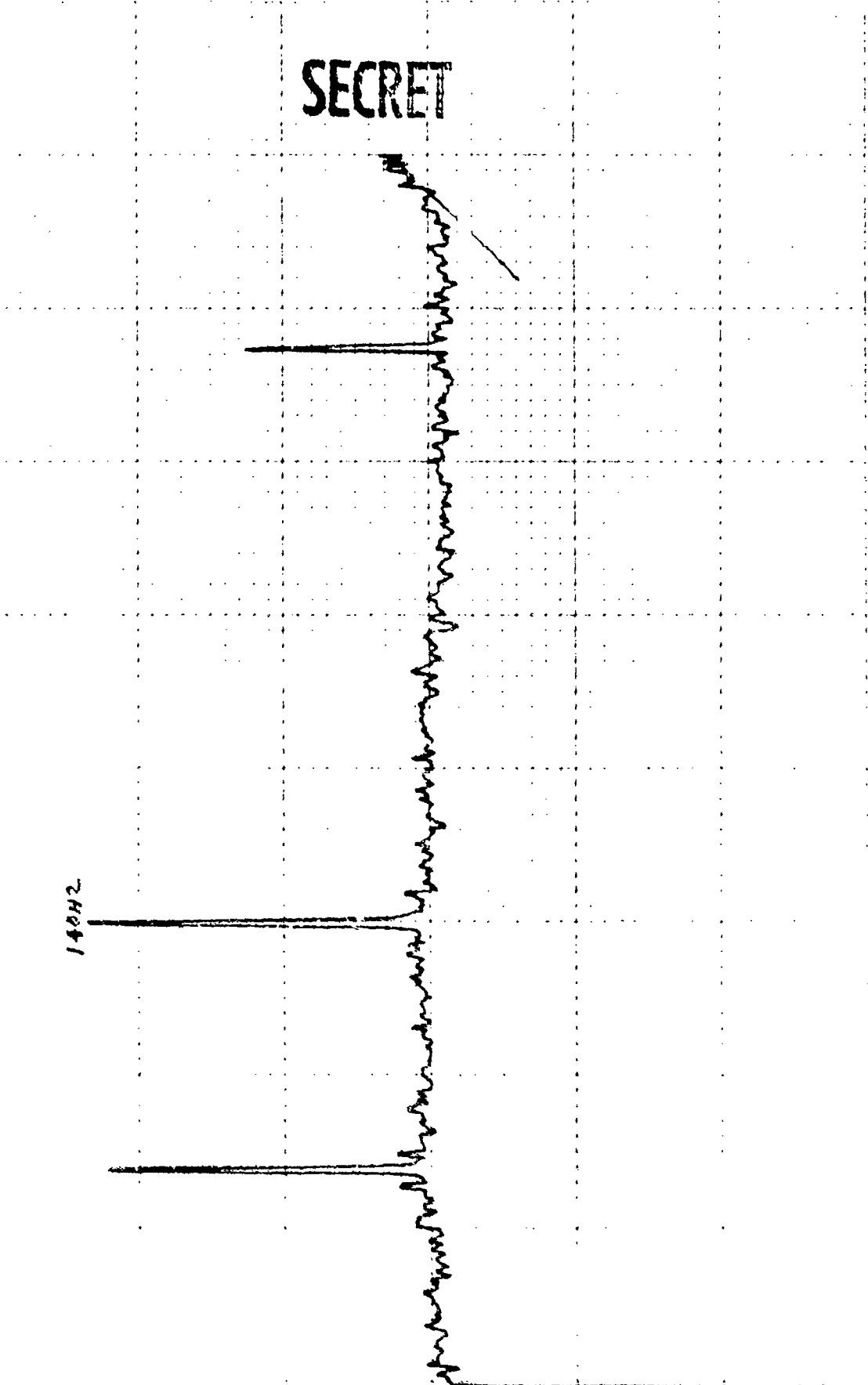
ATTEN: DB

WTG: HANNING

140HZ

SECRET

SECRET



4F 9793

CONTROL: 345 -1501 (29)
OMNI SPECTRUM(ELEMENT 6)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
ELEMENT

DATE OF ANALYSIS:

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

ANALYSIS BANDWIDTH: 1/10 HZ

 DEG AZ STEERING

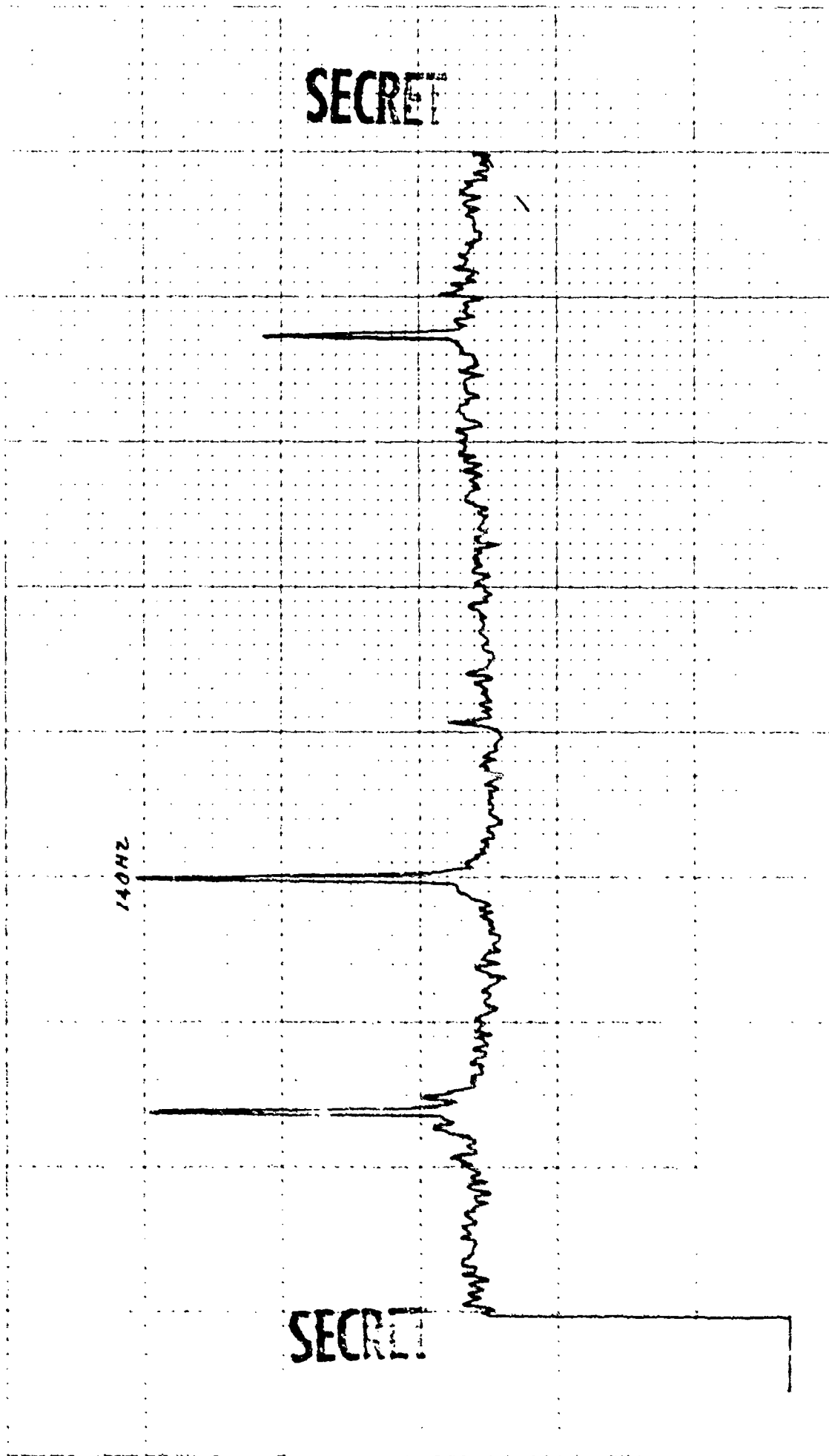
REEL: MY

INDEX 3746

INTEGRATION TIME: 320 SECS

ATTEN: DB

FILTER WTC: HANNING



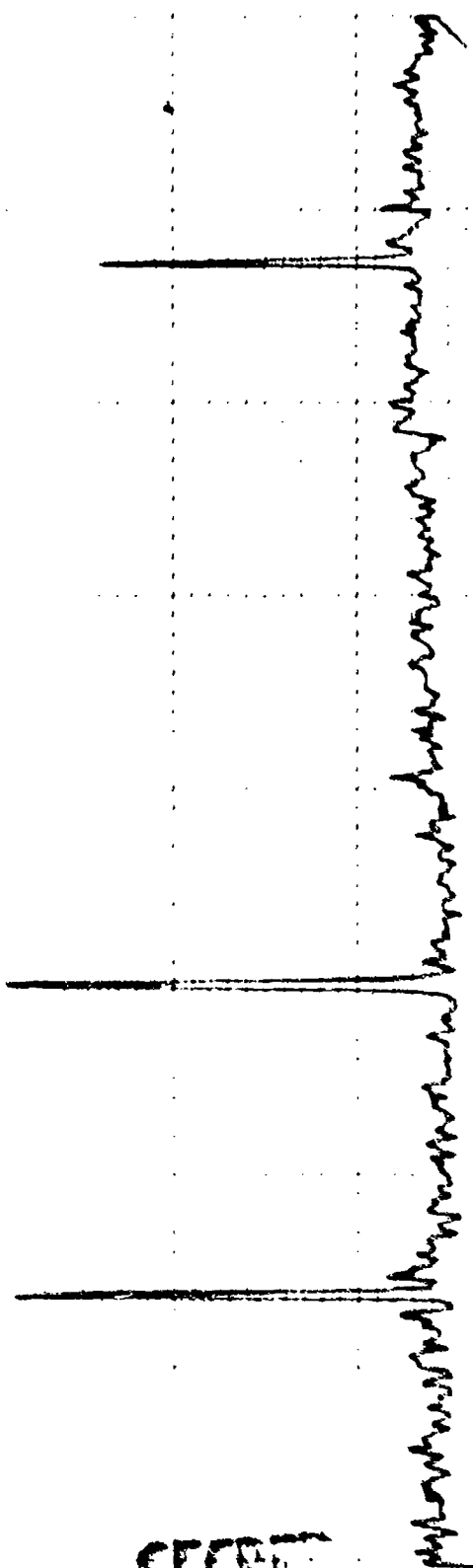
SECRET

SECRET

45 5753

CONTROL: 745-1501-130 / DATE OF ANALYSIS: PERL: M4 INDEX 3340
 OMNI SPECTRUM ELEMENT: 9.3 / DATE TIME: 24577-1501 Z
 SPECTRUM BEARING: STAVE / ANALYSIS BANDWIDTH: 10HZ
 CENTER FREQ: 150 HZ / FILTER: AZ STEERING
 ELEMENT: / FILTER: WIG: HANNING

140HZ



SECRET

SECRET

66 0703

REEL: NY INDEX 3000

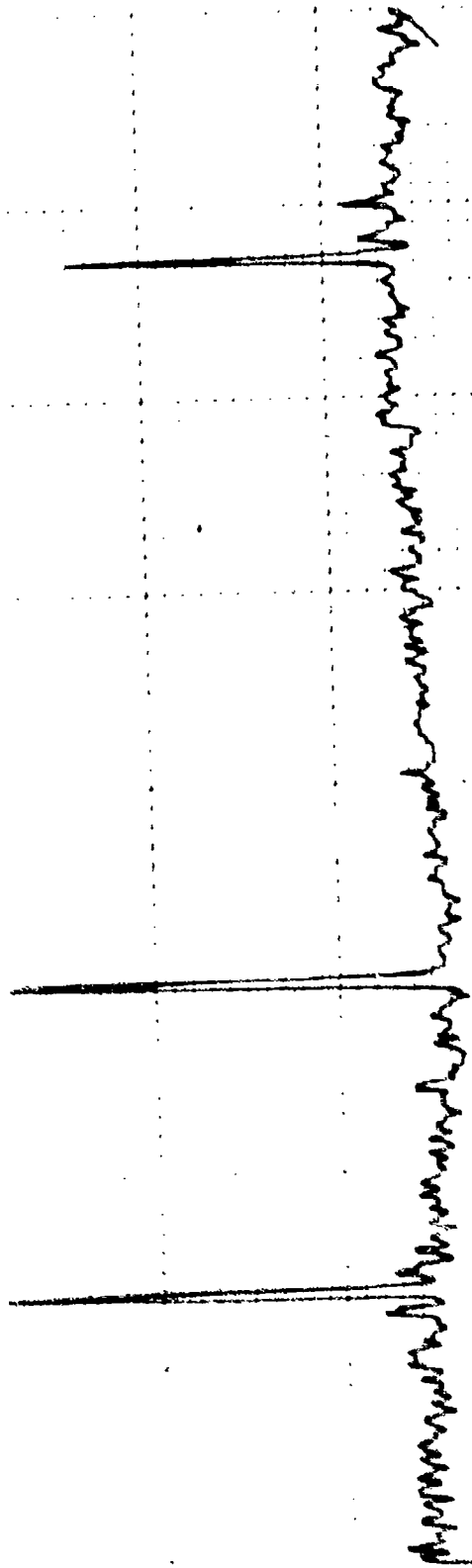
DATE OF ANALYSIS:

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

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

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

140HZ



SECRET

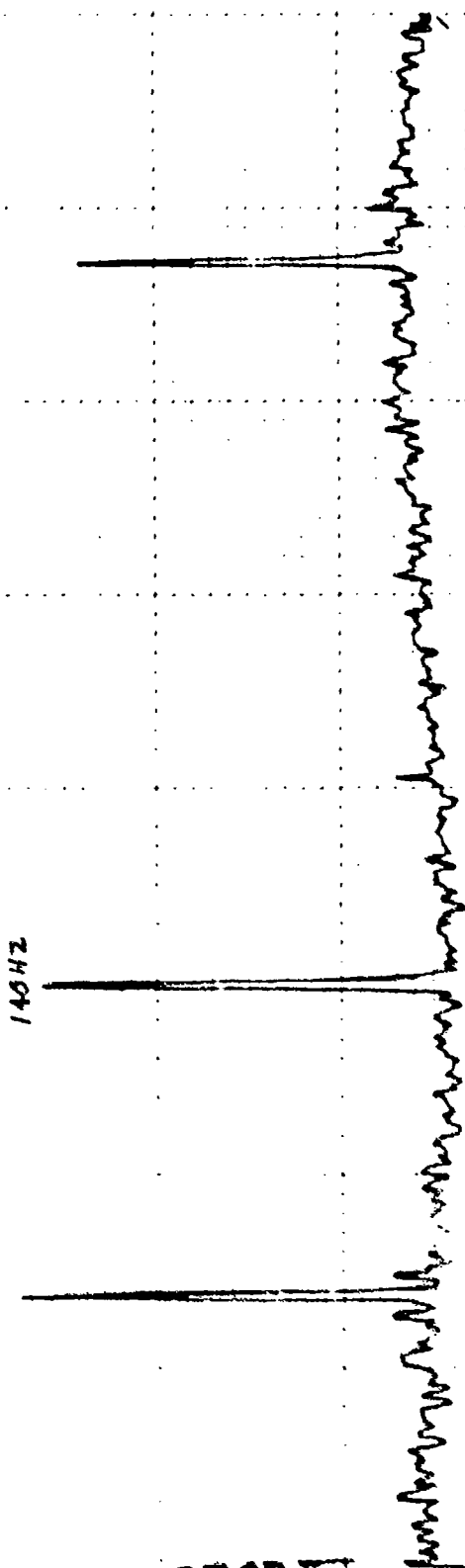
SECRET

46 6763

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

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

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

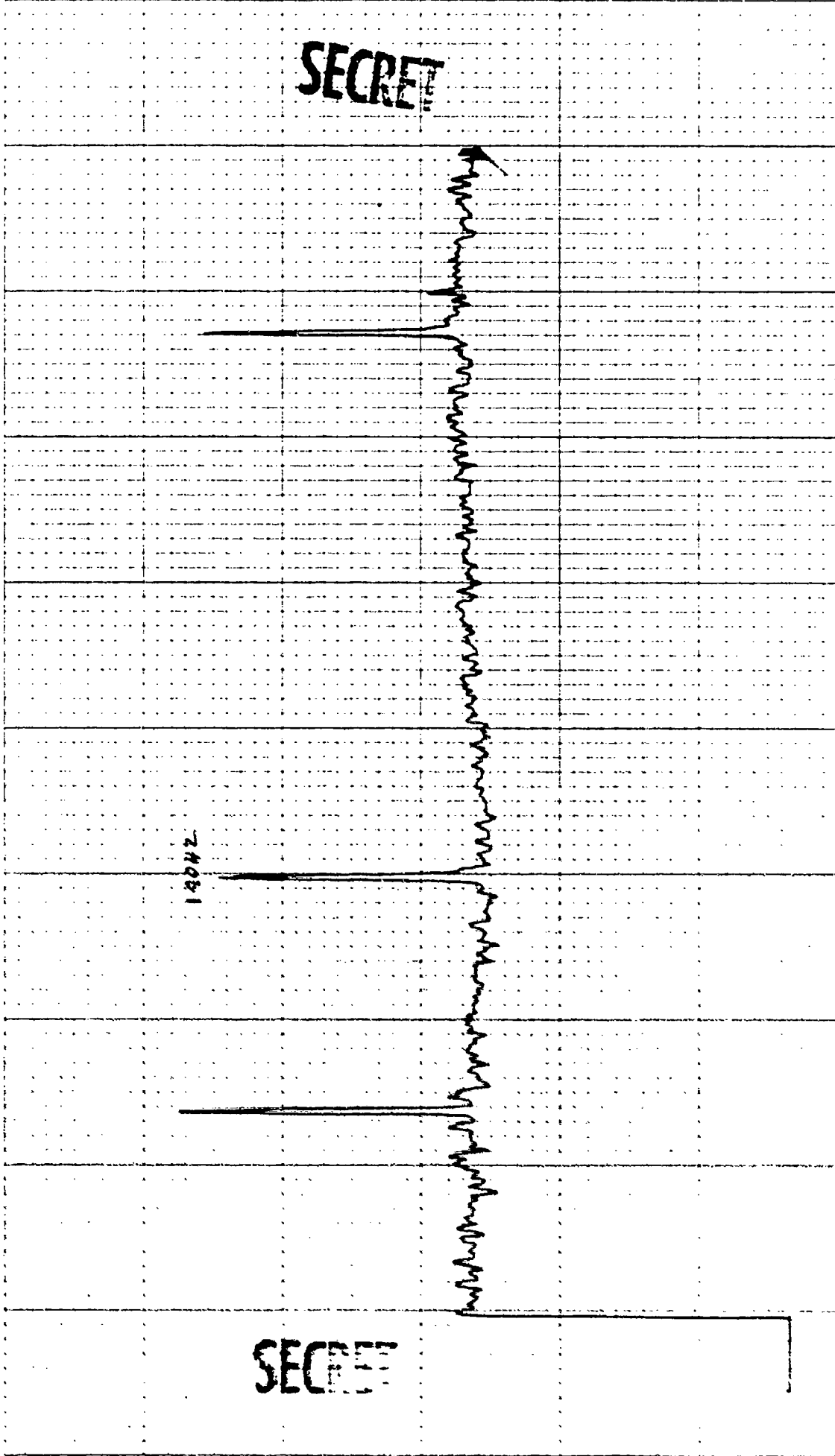


SECRET

46 0703

REF: 10000000000000000000

CONTROL: 3-15 - 1501 (J3) DATE OF ANALYSIS: REEL: M4 INDEX 3340
 OMNI SPECTRUM (ELEMENT 14)
 EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 1501 Z
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTEN: — DB
 1 ELEMENT — DEG AZ STEERING FILTER WTG: HANNING



46 0703

INDEX 3340

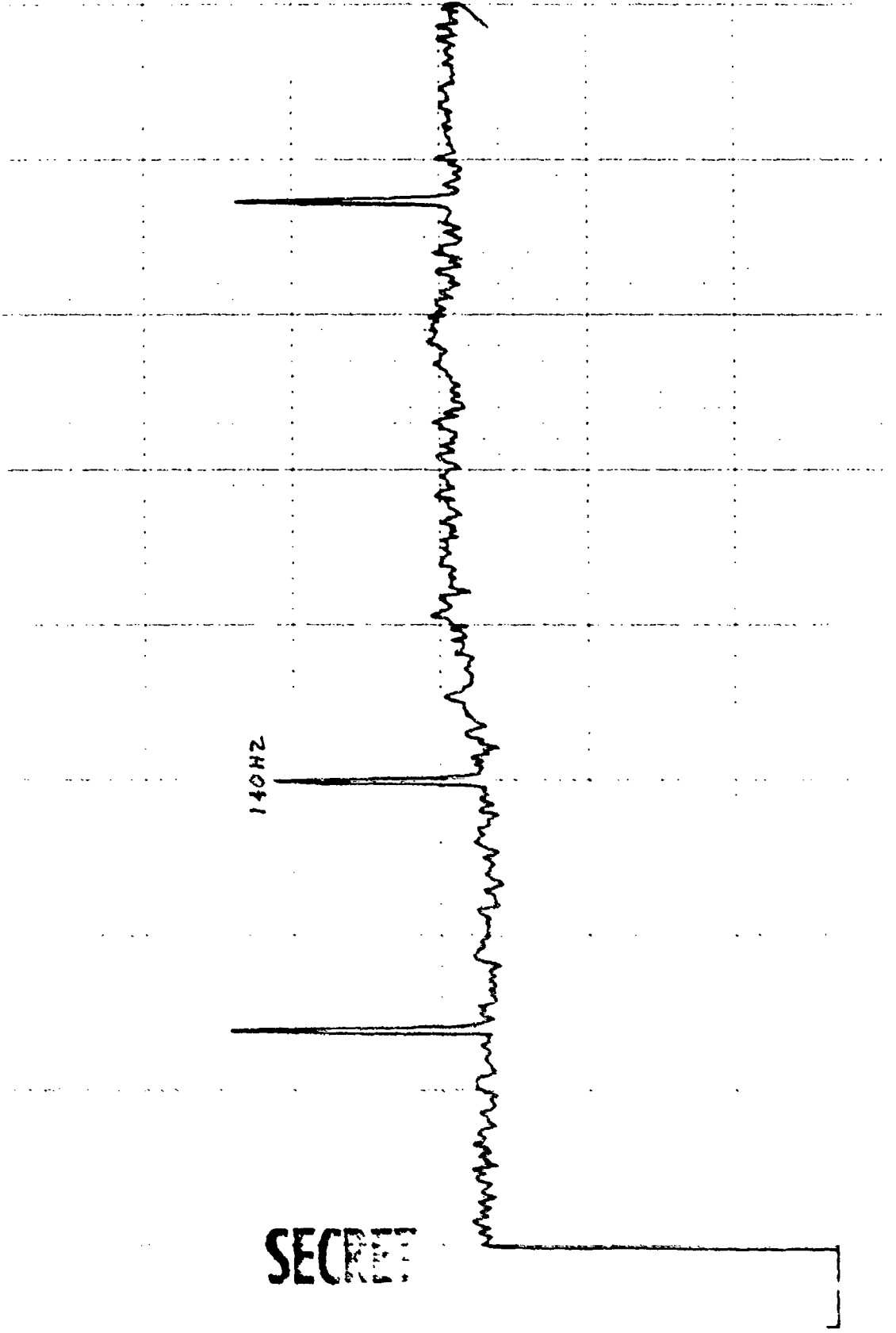
REEL: M4

DATE OF ANALYSIS:

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

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

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



SECRET

SECRET

40 9793

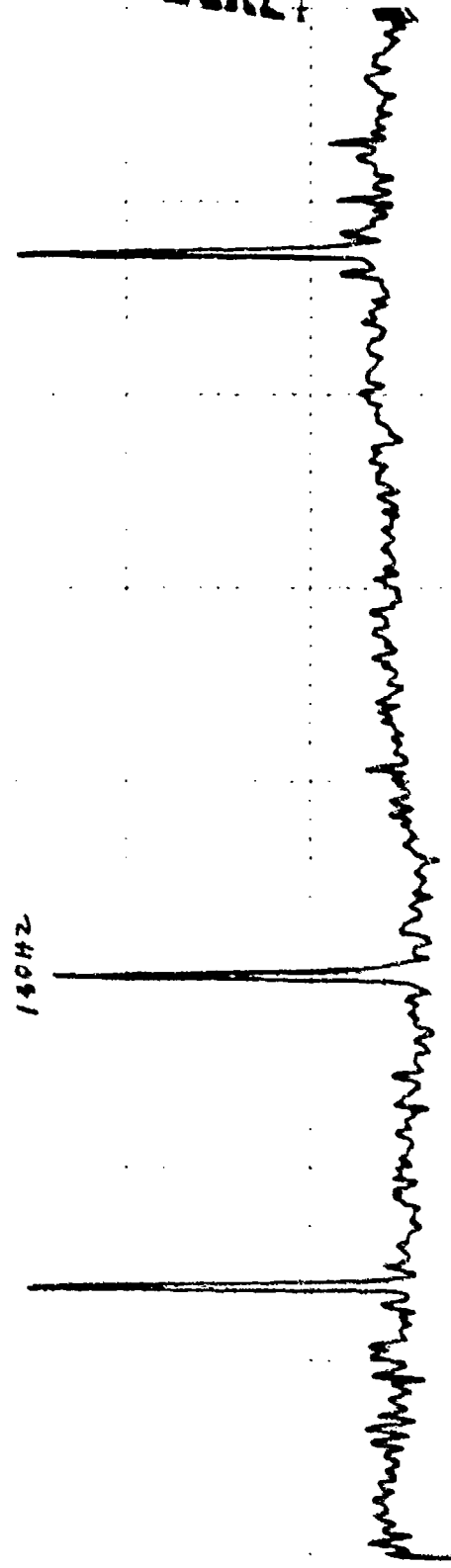
CONTROL: 3-15 -1501 (35)
OMNI SPECTRUM(ELEMENT 19)
EXERCISE: BEARING STAFF
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

PEEL: NY INDEX 3340

INTEGRATION TIME 320 SECS ATTN: DB
FILTYP WTG: HANNING



SECRET

SECRET

45 0753

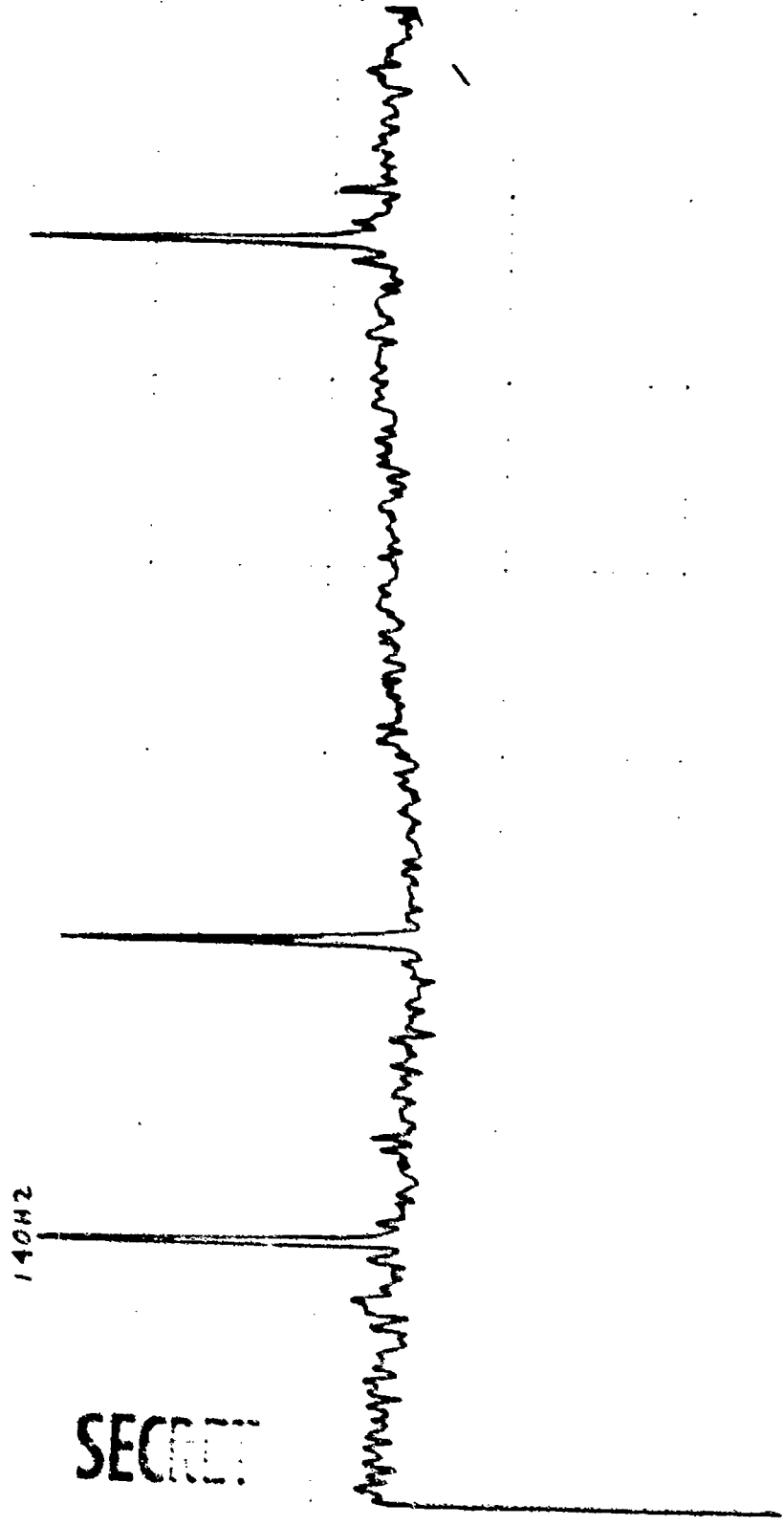
CONTROL: 375-1501 (26)
 GMMI SPECTRUM ELEMENT 20.
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150.000 MHz
 ELEMENT

DATE OF ANALYSIS:

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

PEEL: 1/4 INDEX 334C

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



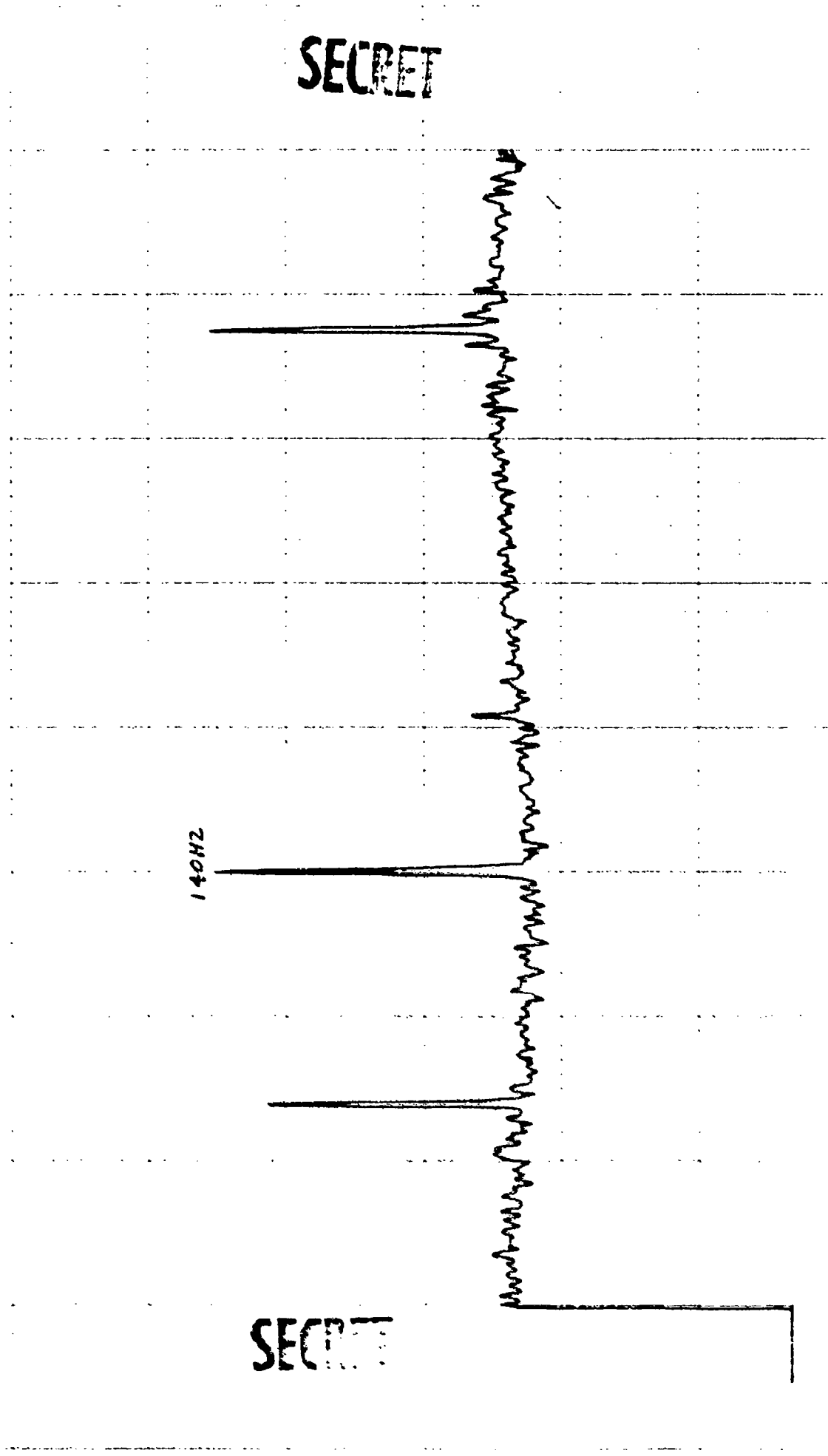
45 0703

CONTROL: 3-15 - 1501 (17)
 OMNI SPECTRUM (ELEMENT 23)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 1 ELEMENT

DATE OF ANALYSIS:
 DATE/TIME: 175-77 - 1501 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 ———— DEG AZ STEERING

REEL: 44 INDEX 3340

INTEGRATION TIME 320 SECS A.IEN: — DB
 FILTER WTC: HANNING



SECRET

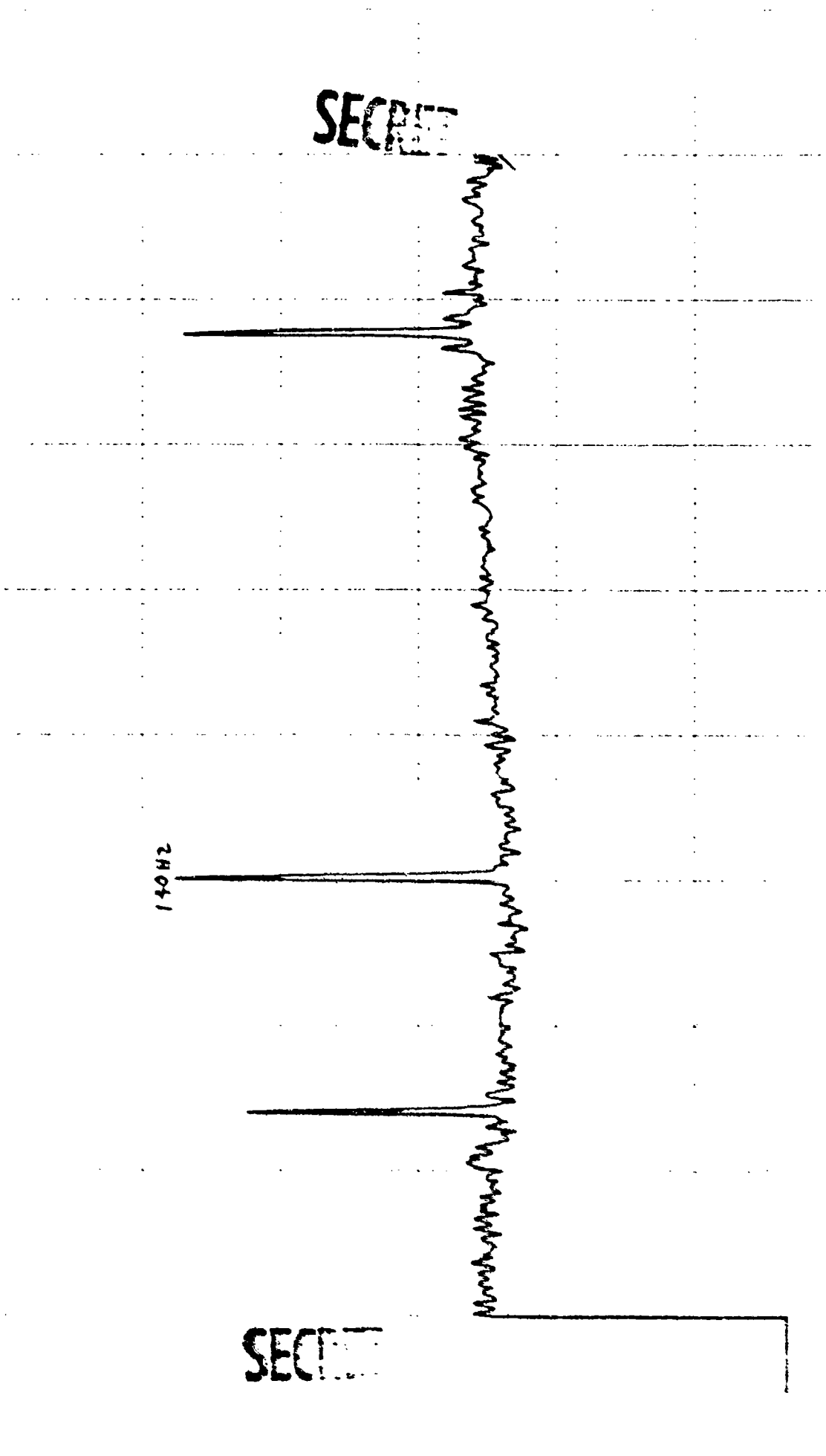
SECRET

46 0703

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

DATE OF ANALYSIS:
 DATE/TIME: 375-77 - 1501 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 DEC AZ STEERING

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



SECRET

SECRET

46 0703

SECRET

CONTROL: 3-15 - 1501 (39)

OMNI SPECTRUM (ELEMENT 26)

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

1 ELEMENT

DATE OF ANALYSIS:

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

ANALYSIS BANDWIDTH: 1/10HZ

1 DEG AZ STEERING

INTEGRATION TIME 320 SECS

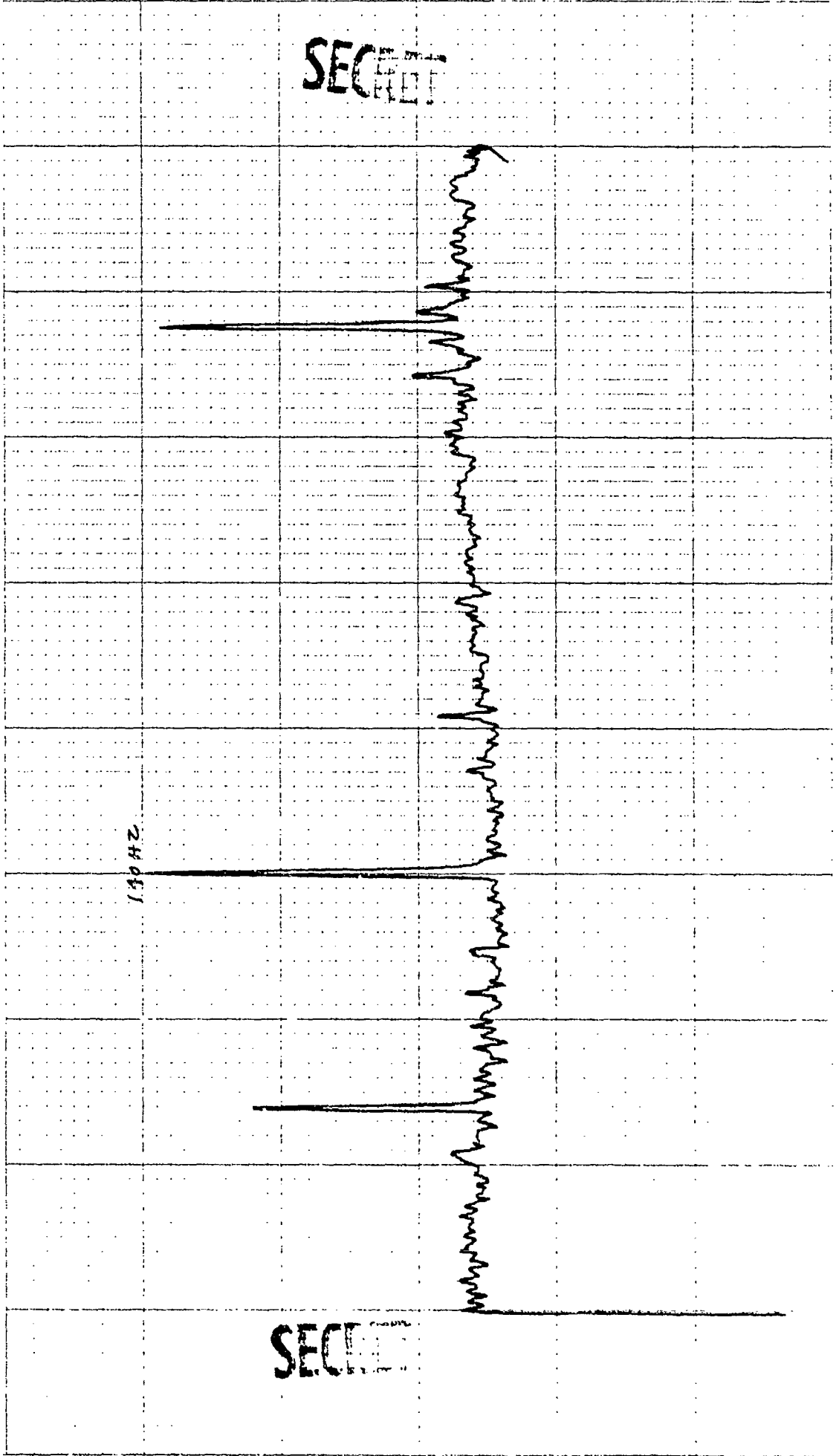
FILTER

ATTEN: - DB

WTG: HANNING

REEL: M4

INDEX 3340



SECRET

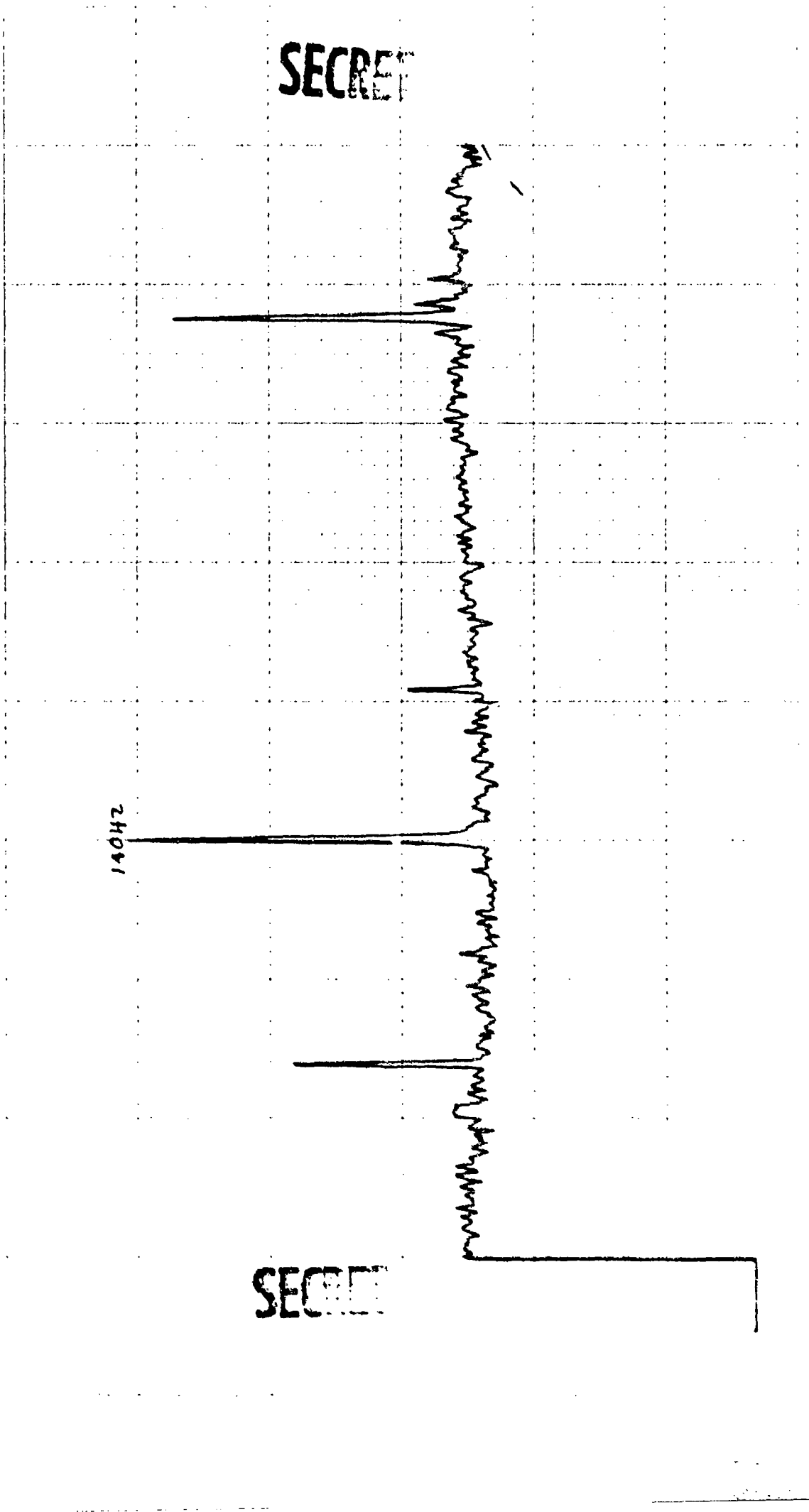
SECRET

46 0703

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

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

INTEGRATION TIME 320 SECS ATTEN: DB
 FILTER WTG: HANNING



SECRET

SECRET

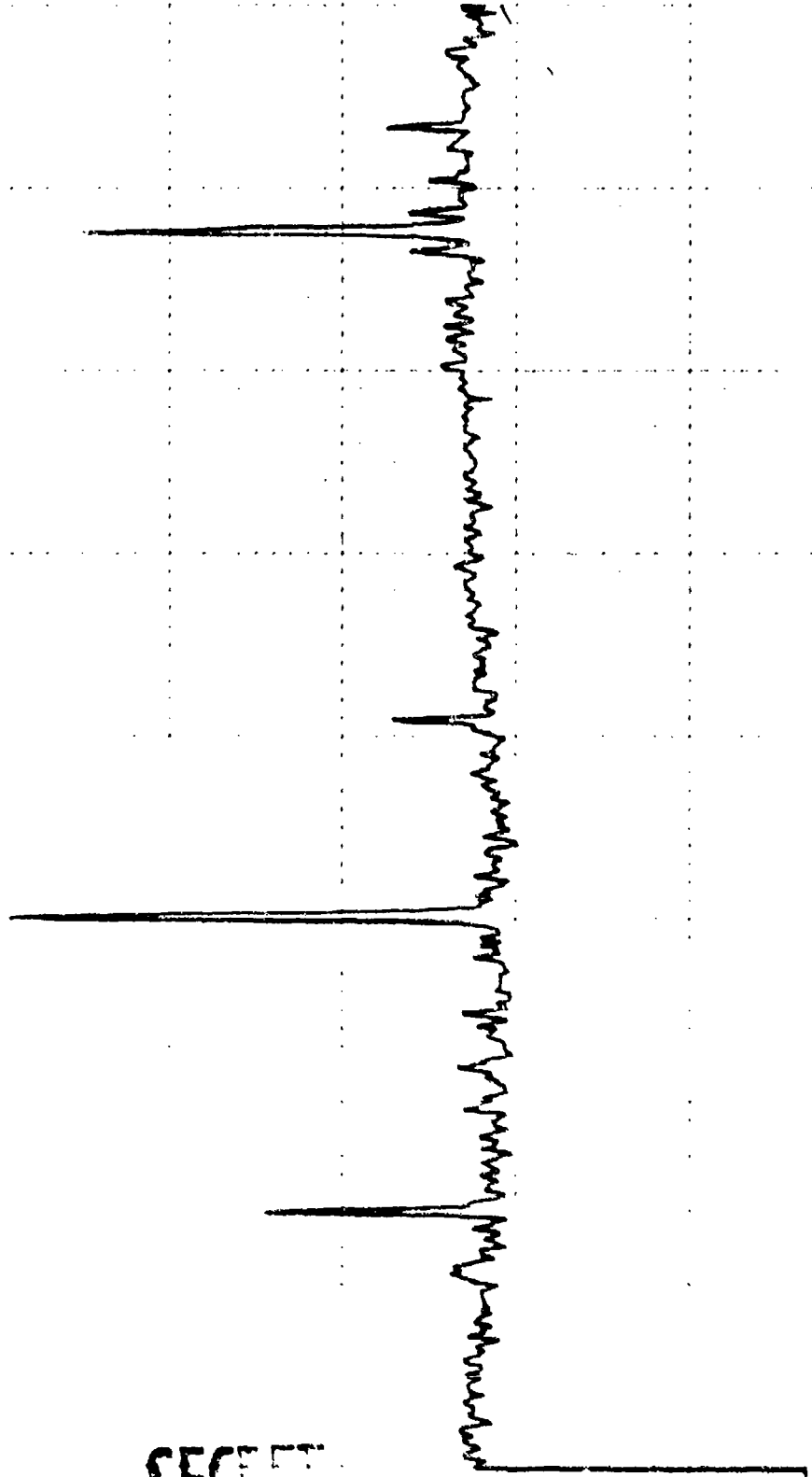
46 0763

CONTROL: 345 - 1501 (41) DATE OF ANALYSIS: REEL: 144 INDEX 3340
 OMNI SPECTRUM/ELEMENT 31
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 1 ELEMENT

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

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

140HZ



SECRET

SECRET

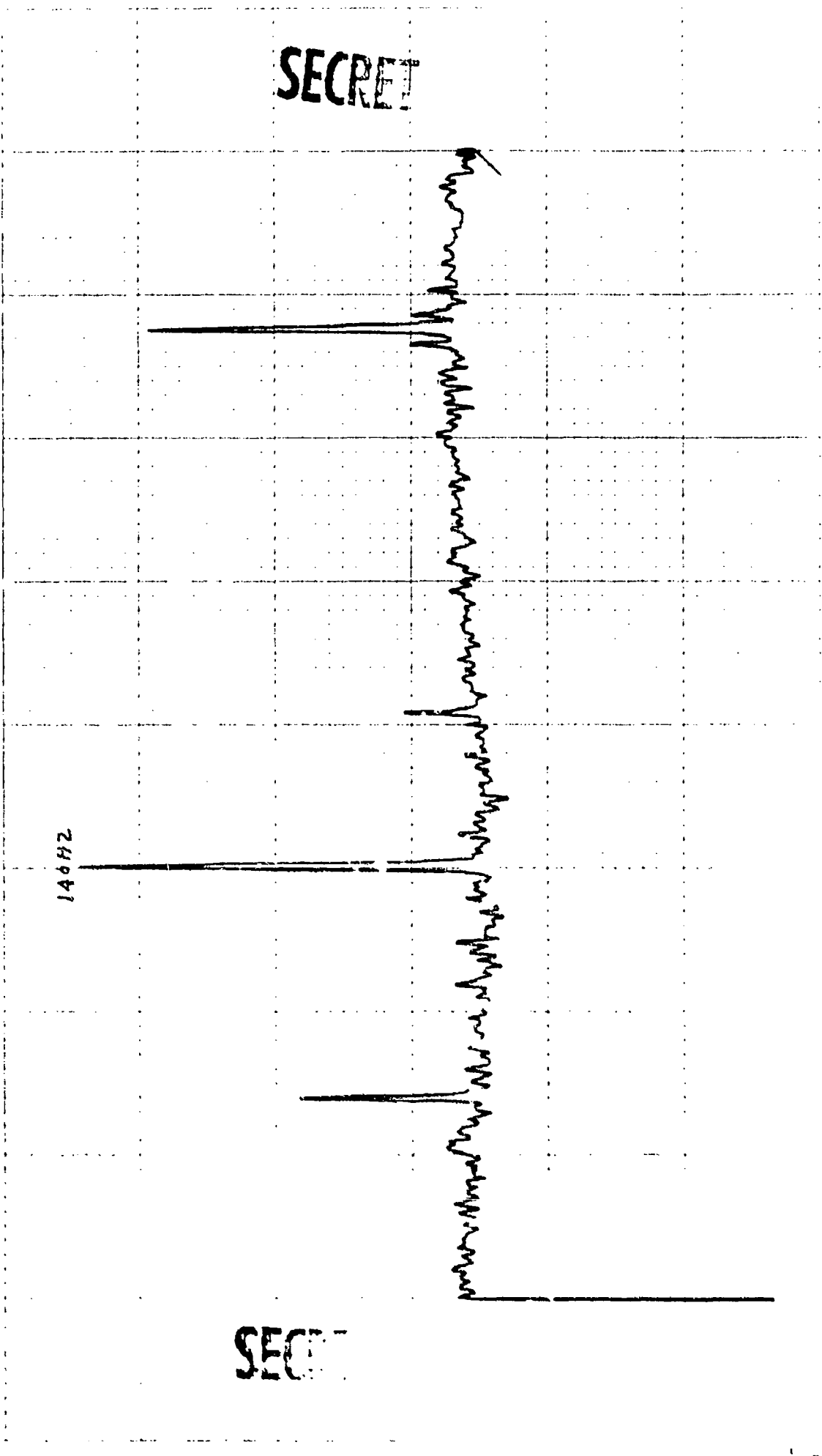
46 0703

1467 25 000 25 THE DEPT. OF DEFENSE

CONTROL: 3-15 -1501 (42) DATE OF ANALYSIS: REEL: MY INDEX 3340
 OMNI SPECTRUM (ELEMENT 33)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 1 ELEMENT

INTEGRATION TIME 320 SECS ATTEN: DB
 FILTER: HANNING

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



SECRET

SECRET

46 0703

INDEX 3346

REEL: M4

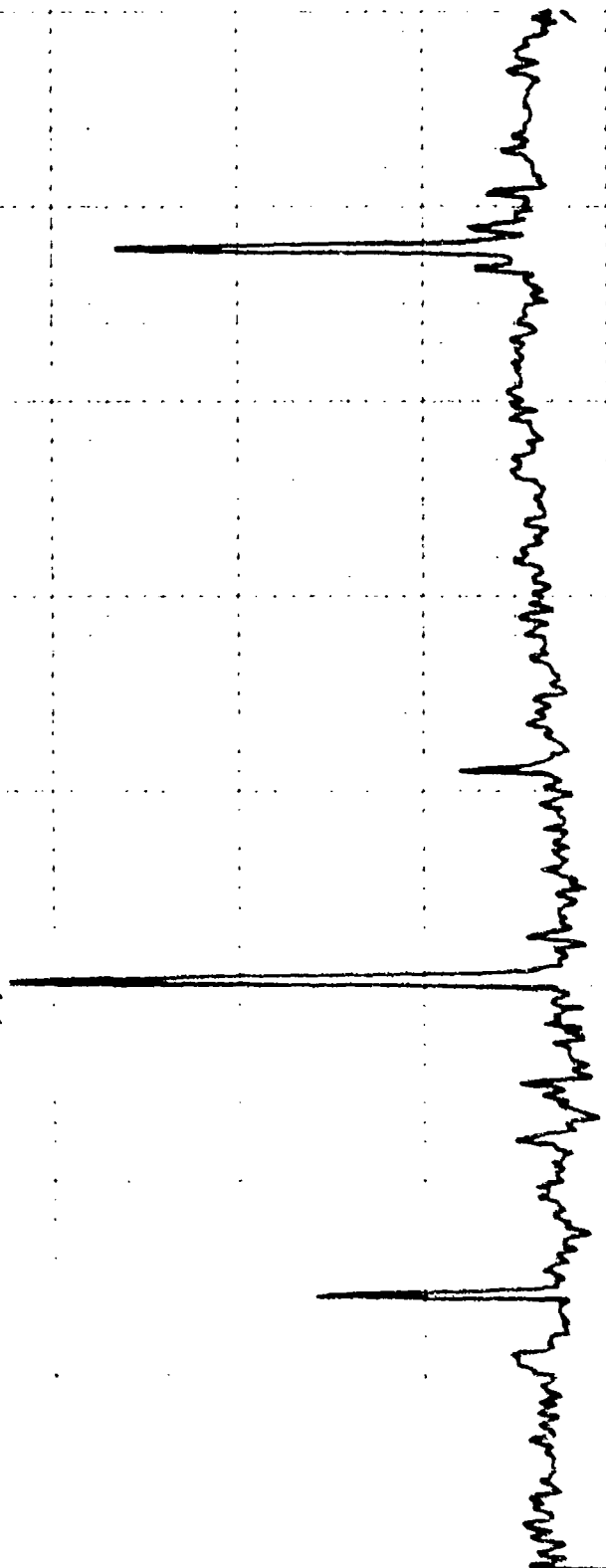
DATE OF ANALYSIS:

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

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

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING

140 HZ



SECRET

SECRET

46 0703

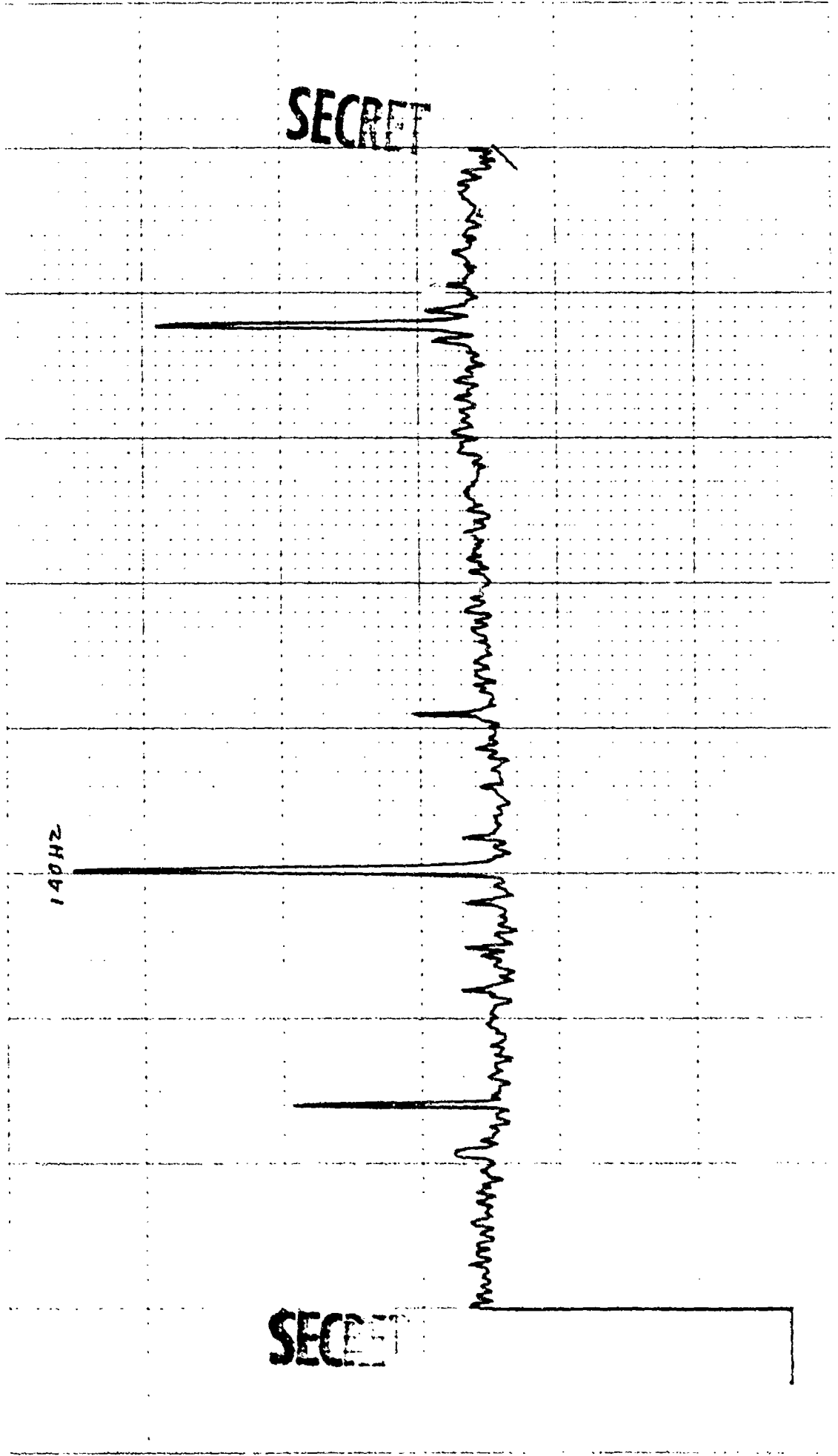
CONTROL: 3-15 - 1501 (44)
OMNI SPECTRUM (ELEMENT 37)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: M4 INDEX 3340

INTEGRATION TIME 320 SECS ATTEN: DB
FILTER WTG: HANNING



SECRET

SECRET

46 0703

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

DATE OF ANALYSIS:

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

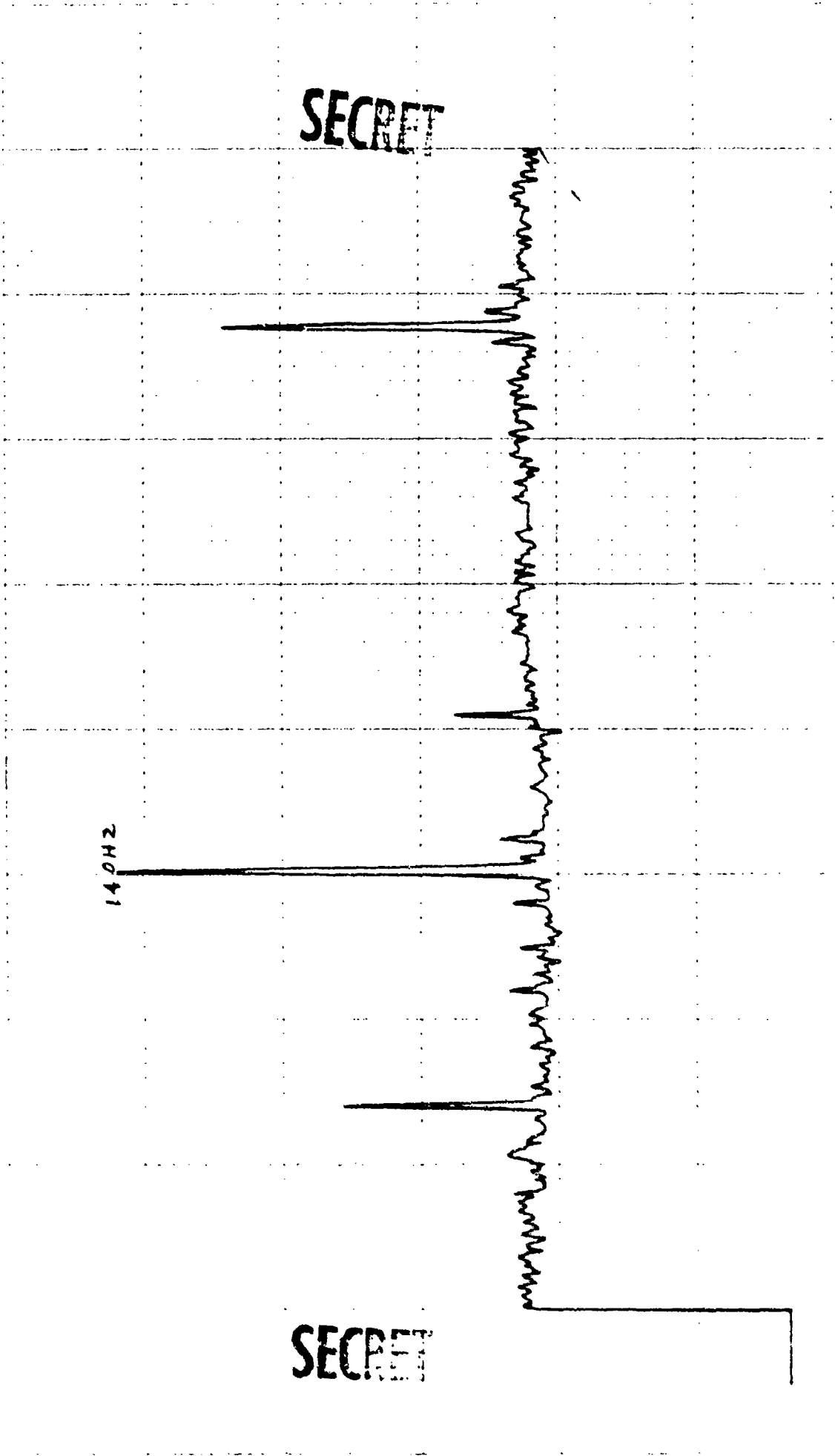
REEL: 44 INDEX 3340

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING

140HZ

SECRET

SECRET



46 0703

SECRET

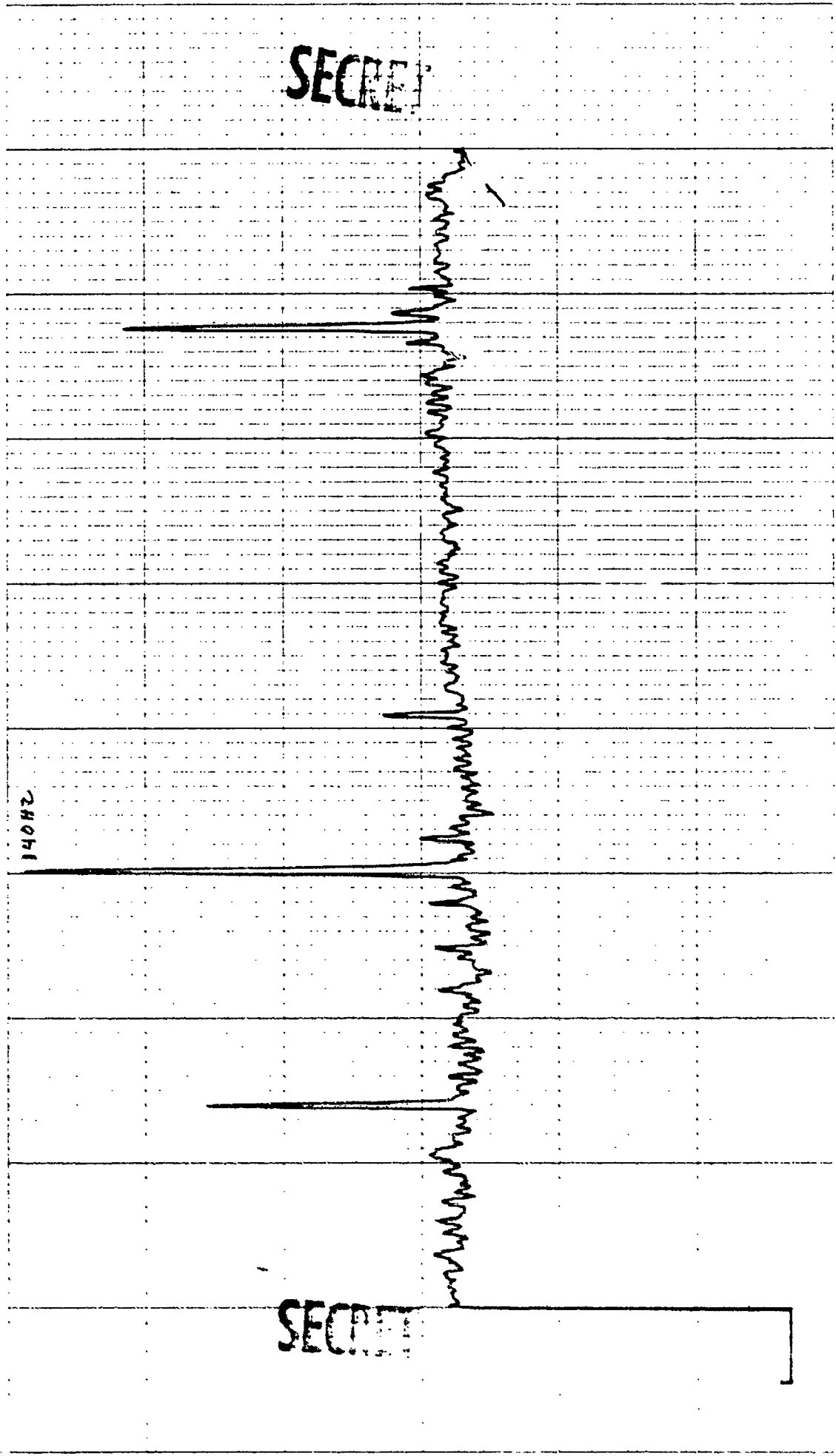
CONTROL: 3-15 - 1501 (46) DATE OF ANALYSIS: REEL: 114 INDEX 3340

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

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

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

1 ELEMENT



46 0703

DATE TIME GROUP (DTG) 070300Z

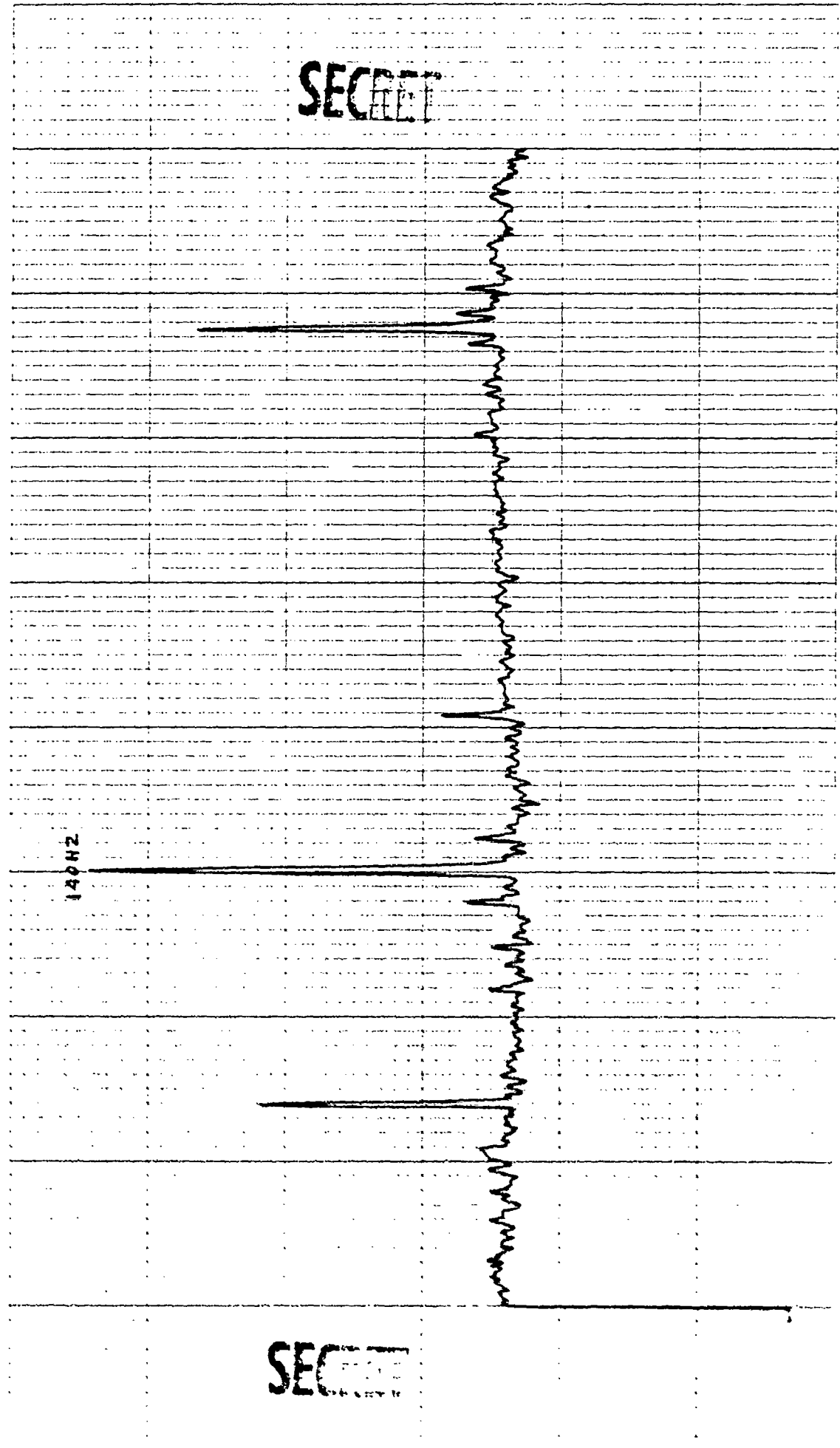
CONTROL: 3-15 - 1501 (47)
OMNI SPECTRUM (ELEMENT 43)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: MY INDEX 3390

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



SECRET

SECRET

46 0703

DATE OF ANALYSIS:

REEL: M4 INDEX 3380

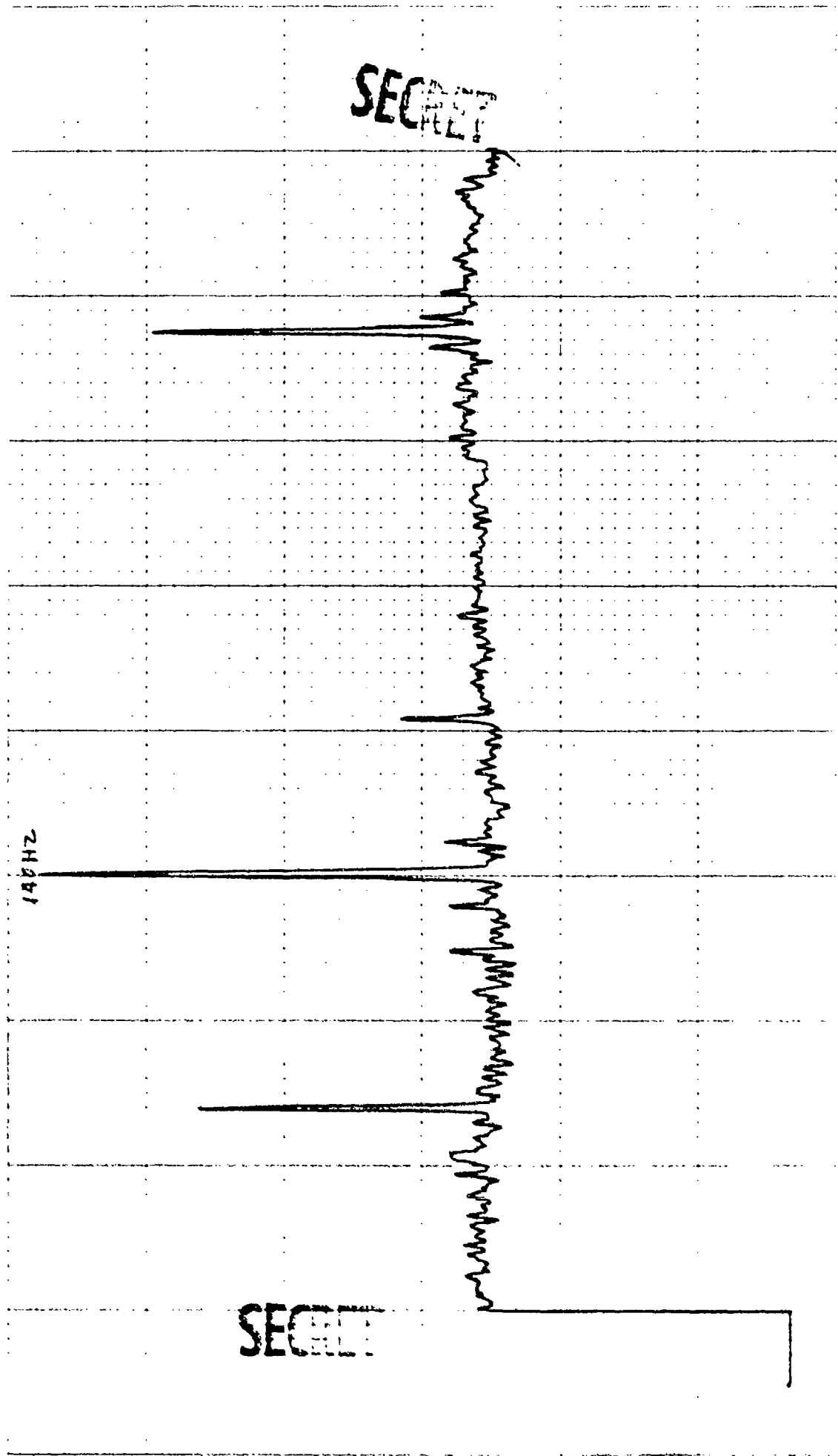
DATE/TIME: 3-15-77 - 1501 Z

ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

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

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

140 HZ



SECRET

SECRET

45 0703

REEL: M4 INDEX 3390

DATE OF ANALYSIS

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

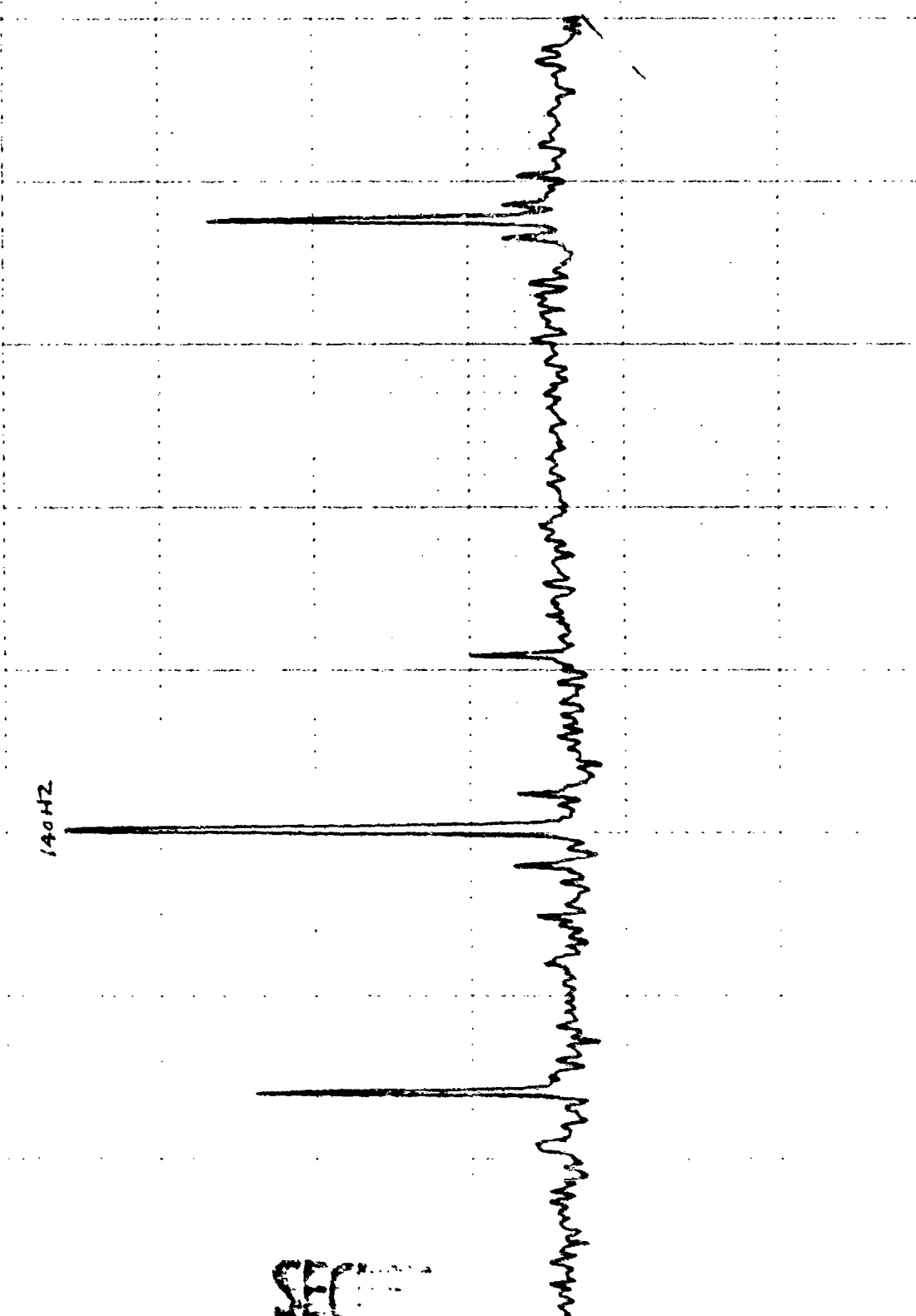
DATE/TIME: 3-5-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEC AZ STEERING

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

140 HZ

SECRET

SECRET



46 0703

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

DATE OF ANALYSIS:

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

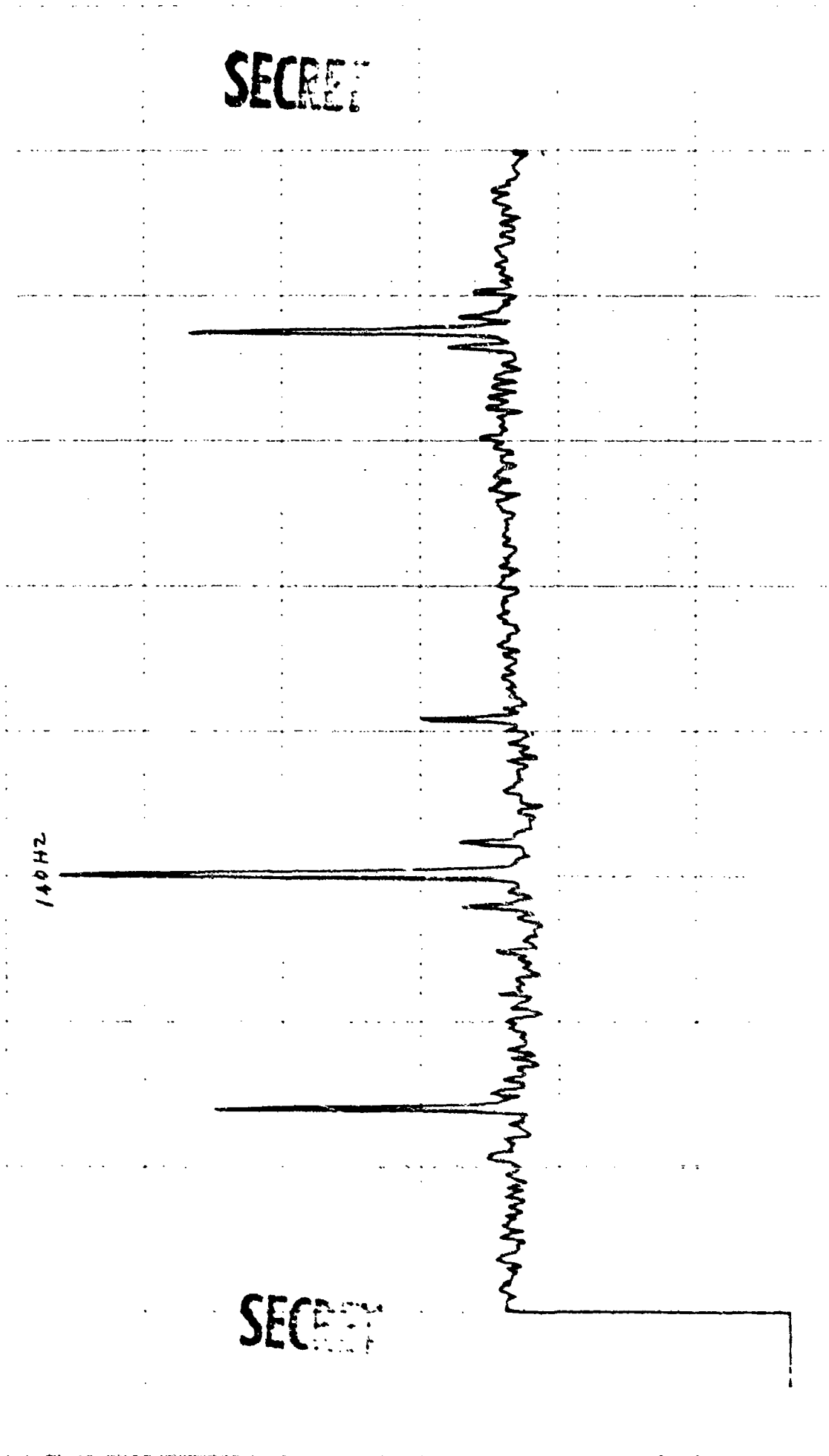
REEL: 44 INDEX 3240

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING

140 HZ

SECRET

SECRET



46 0703

INDEX 3340

REEL: 44

DATE OF ANALYSIS:

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

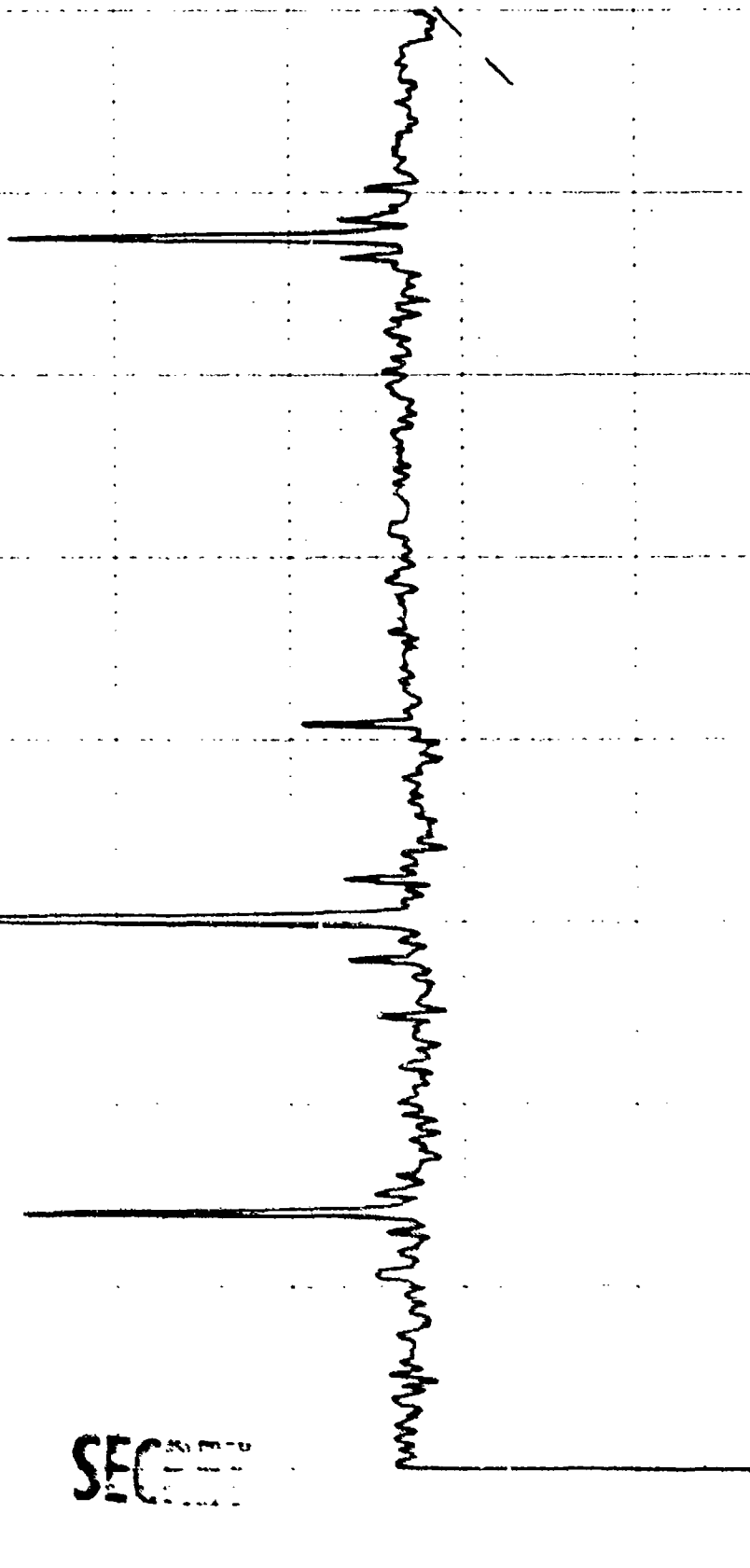
DATE/TIME: 3-15-72 - 1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ STEERING

INTEGRATION TIME 320 SECS
FILTER WTC: HANNING
ATTEN: DB

140 HZ

SECRET

SECRET



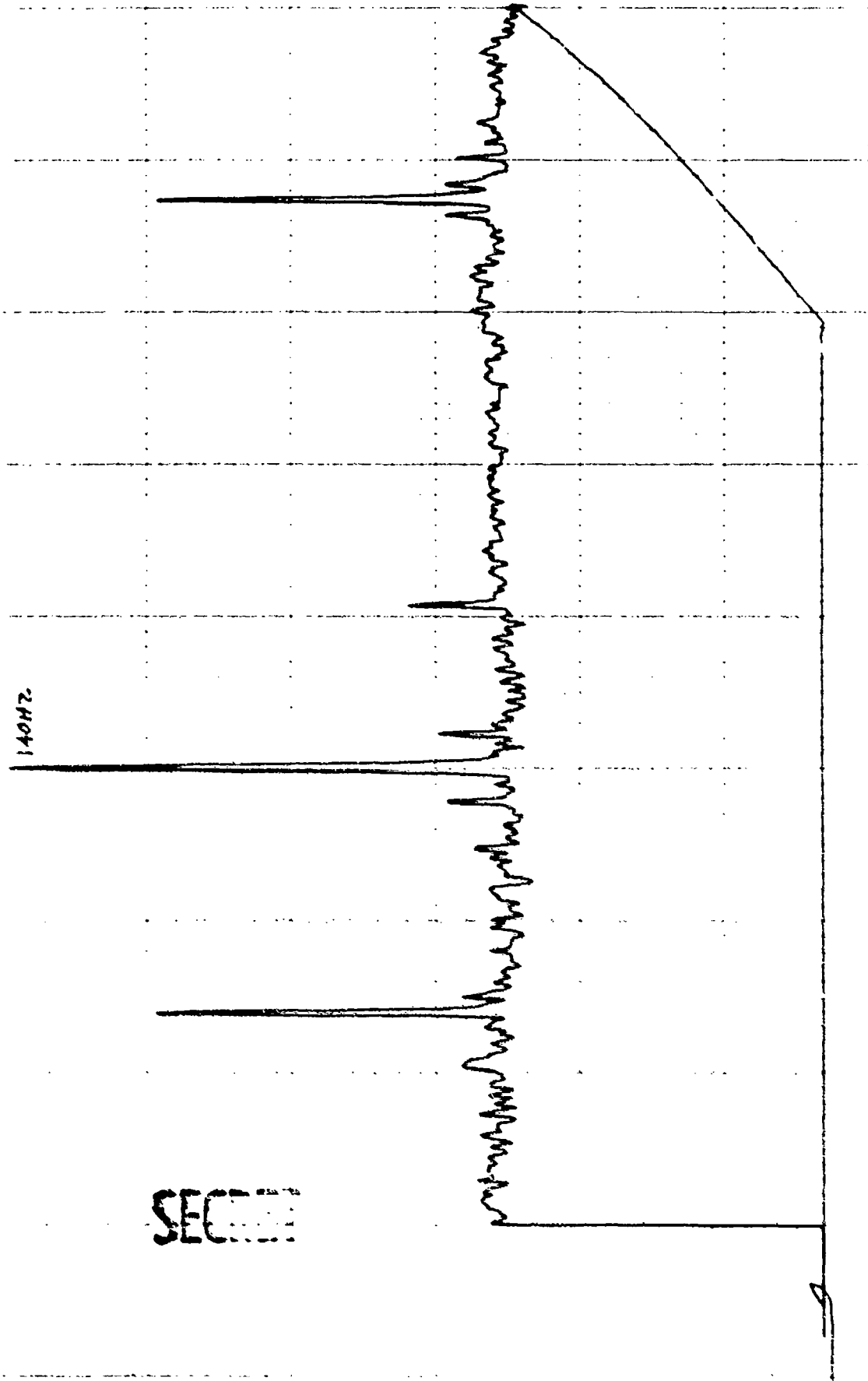
CONTROL: 3-15 - 1501 (52)
OMNI SPECTRUM (ELEMENT 53)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: M4 INDEX 334

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING



140HZ

SECRET

SECRET

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

46 0703

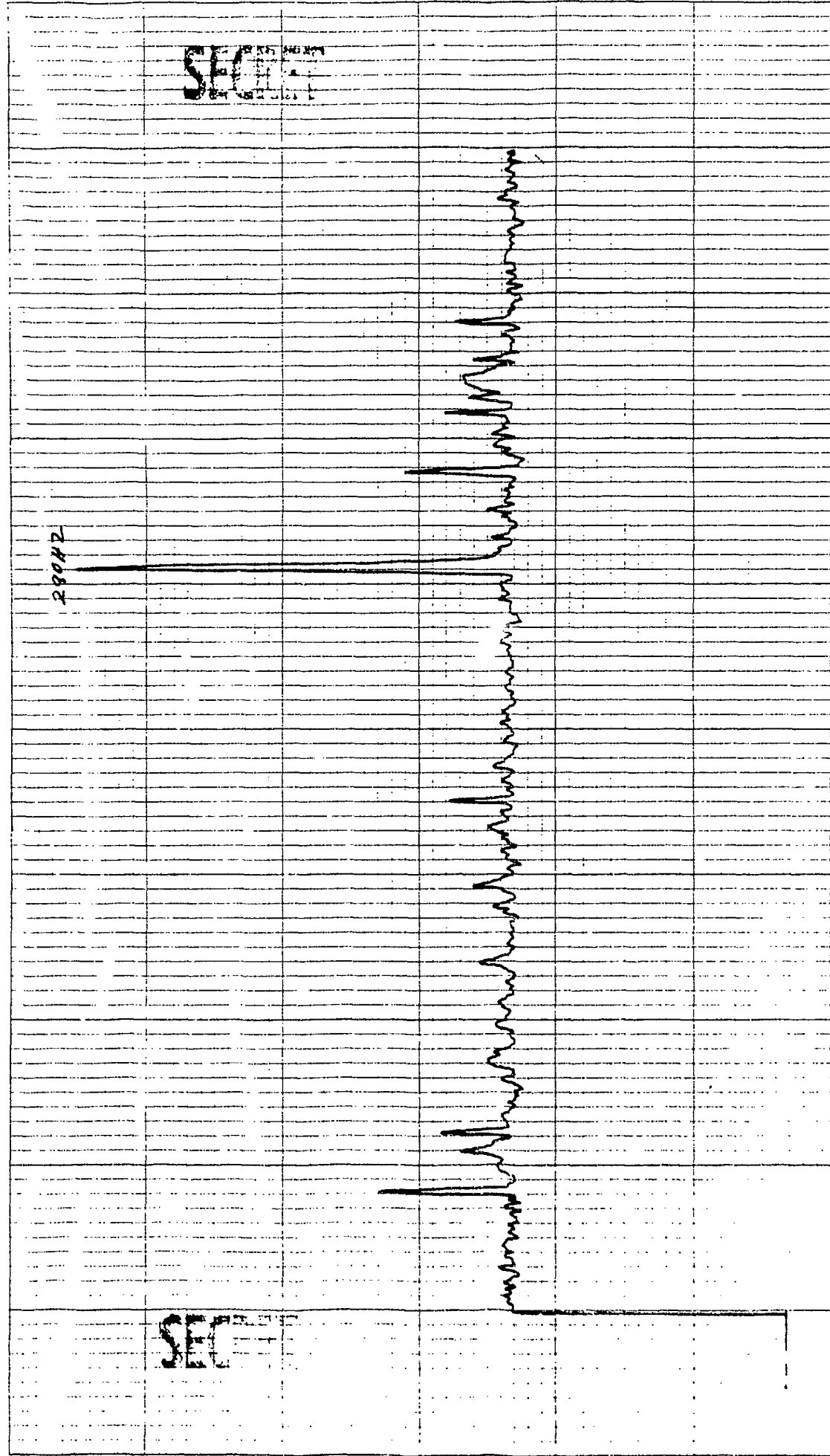
CONTROL: 3-15-1501 (1)
OMNI SPECTRUM (ELEMENT 2)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: 114 INDEX 3340

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

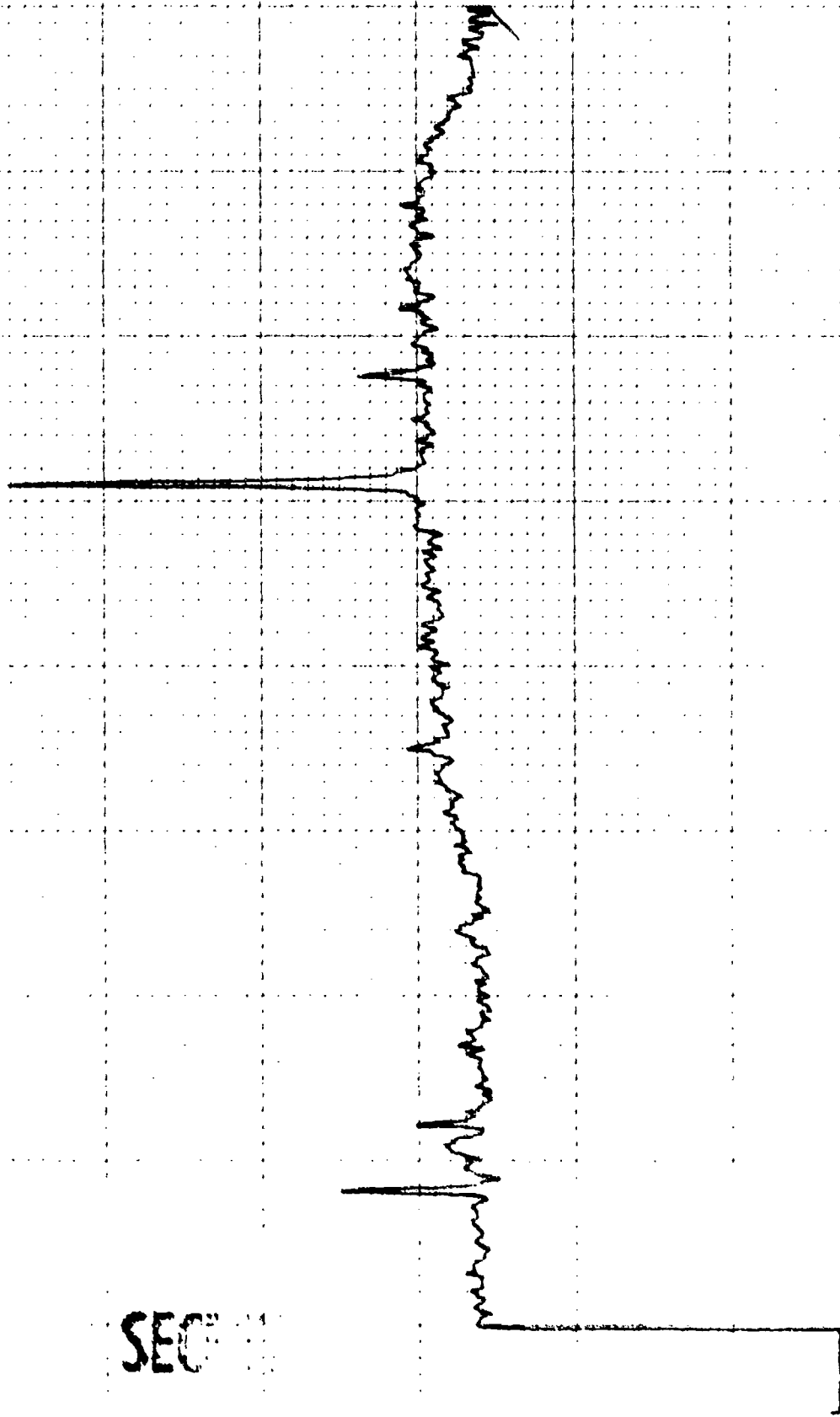


45 0703

MoZ 116 2055207 1111

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

210 HZ



SECRET

SECRET

46 0703

REEL: M4 INDEX 3340

DATE OF ANALYSIS:

CONTROL: 3-15-1501 (3)

OMNI SPECTRUM (ELEMENT 6)

EXERCISE: BEARING STAKE

CENTER FREQ: 280 HZ

1 ELEMENT

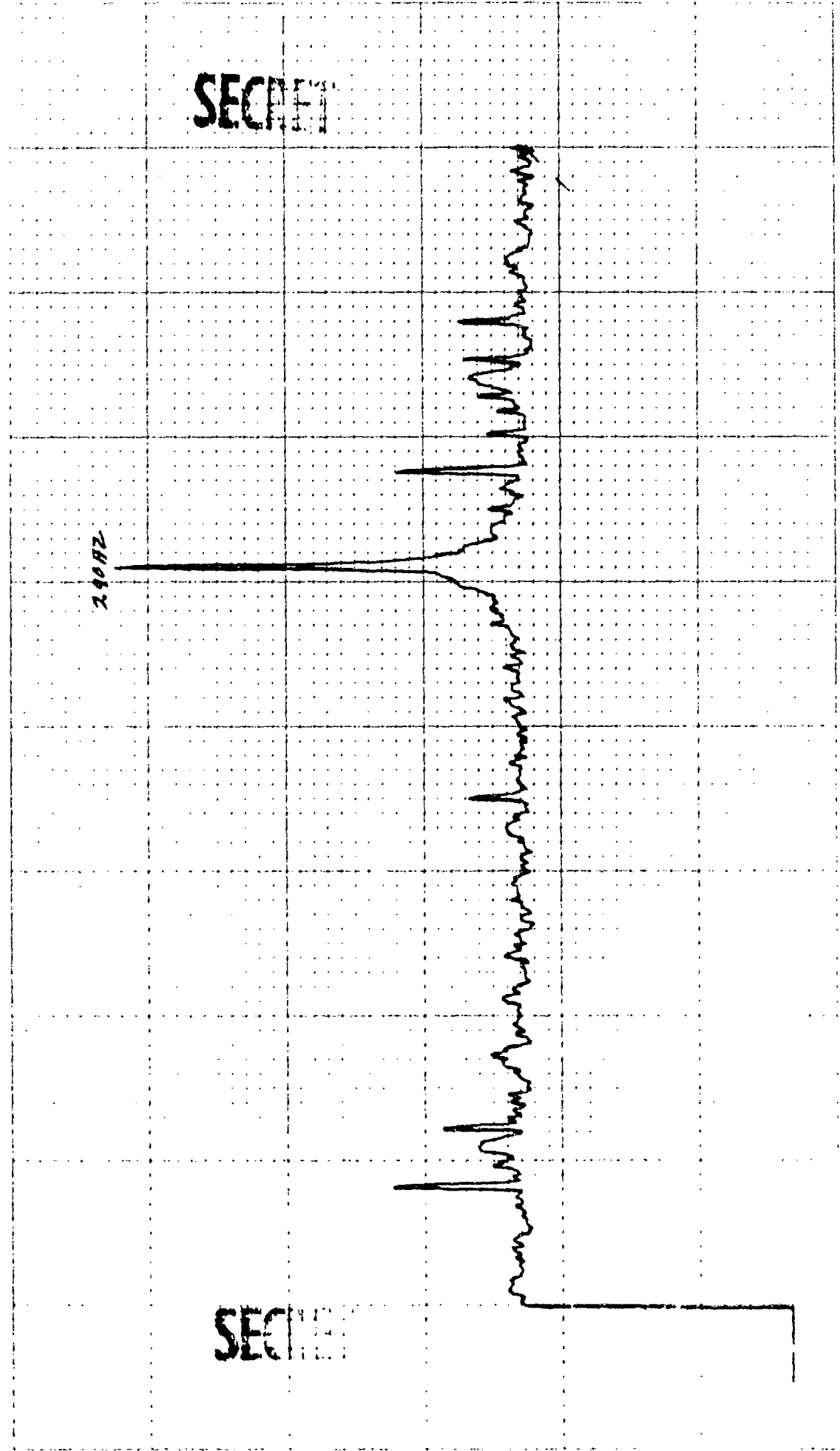
DATE/TIME: 3-15-77 - 1501 Z

ANALYSIS BANDWIDTH: 1/10 HZ

— DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER WIG: HANNING



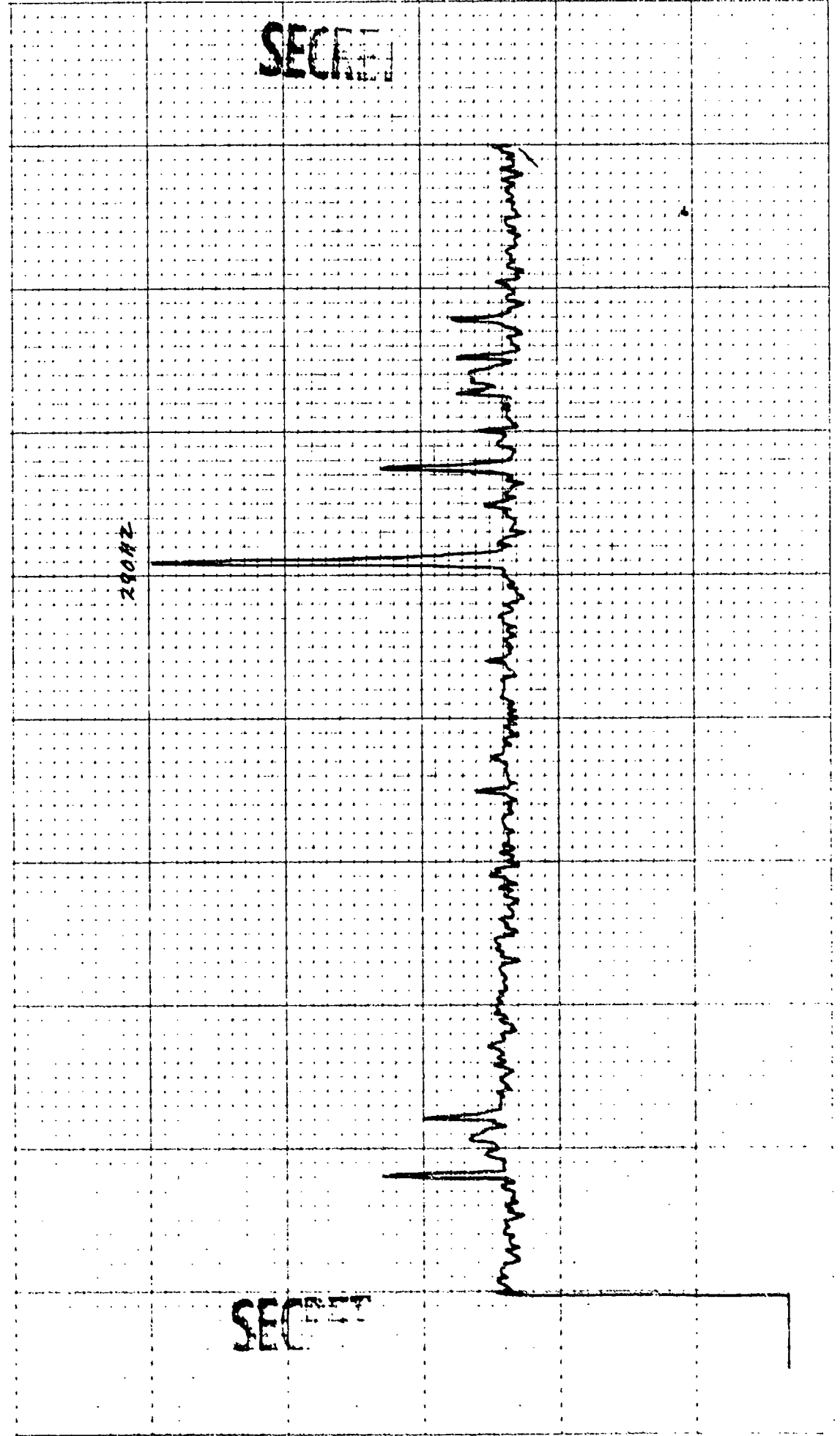
46 0703

REEL: 14 INDEX 3390

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

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

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



REF ID: A660703

46 0703

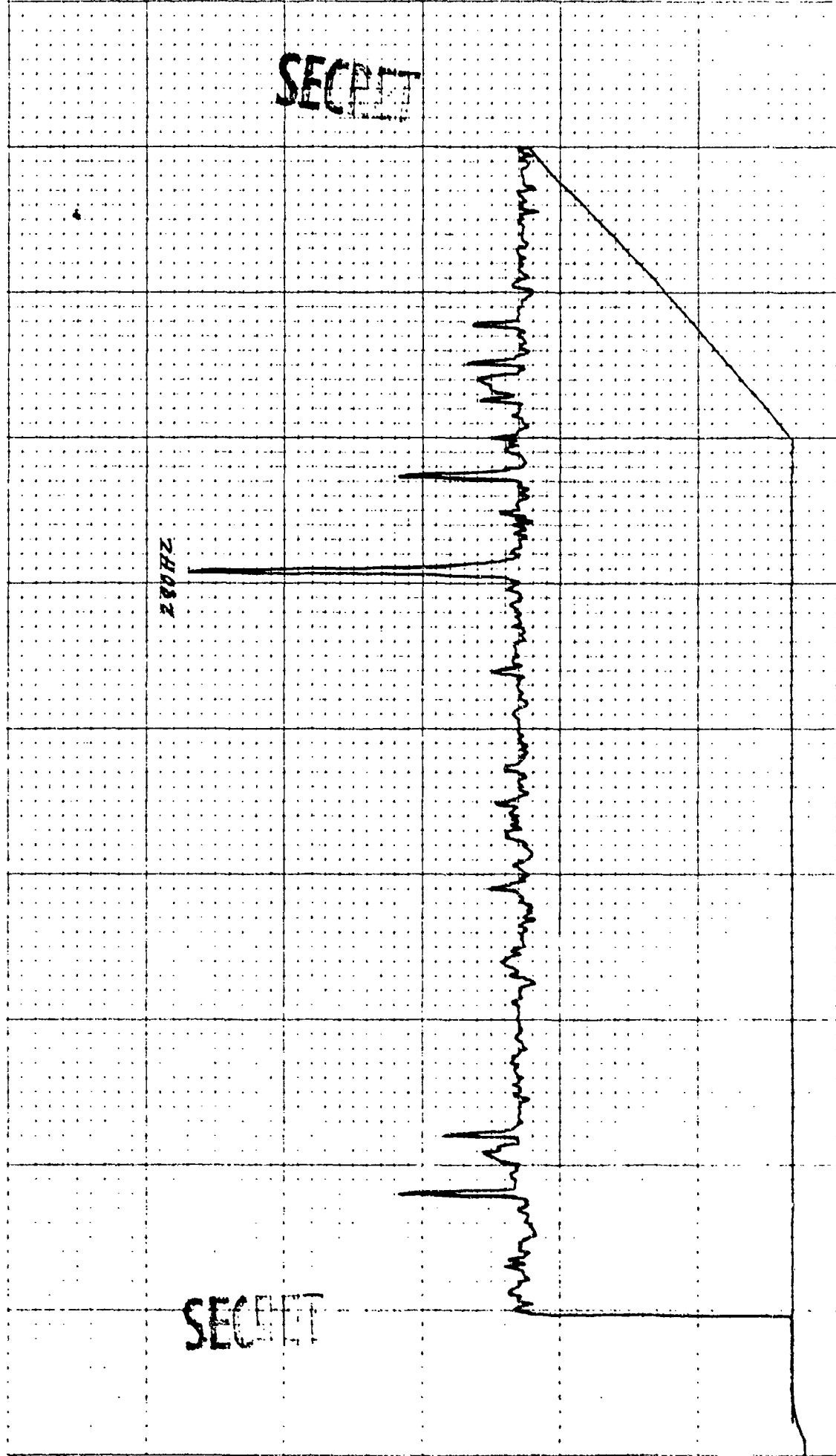
CONTROL: 3-15-1501 (5)
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: M4 INDEX 3340

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



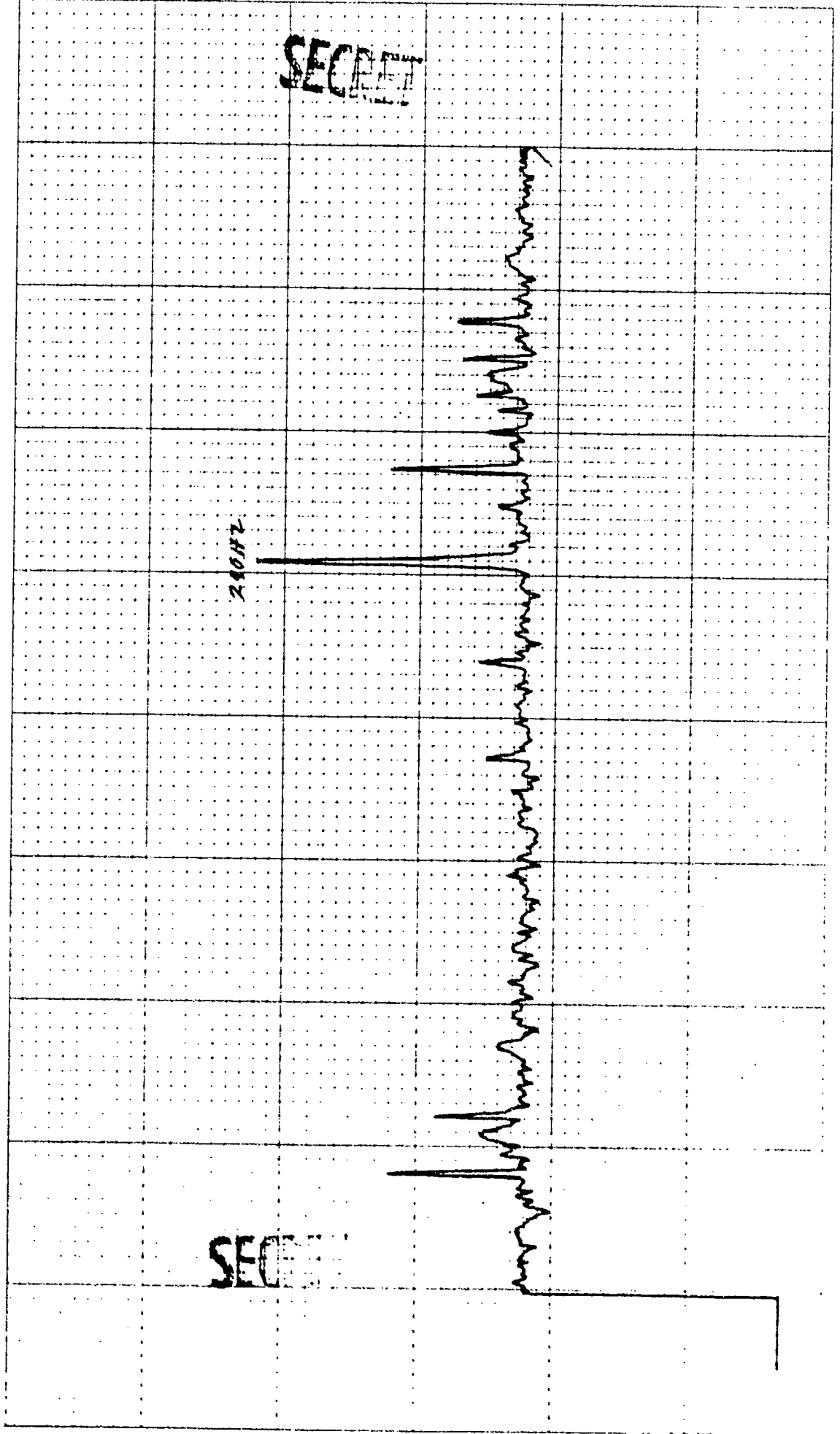
CONTROL: 3-15 - 1501 (6)
OMNI SPECTRUM (ELEMENT 12)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: N4 INDEX 3340

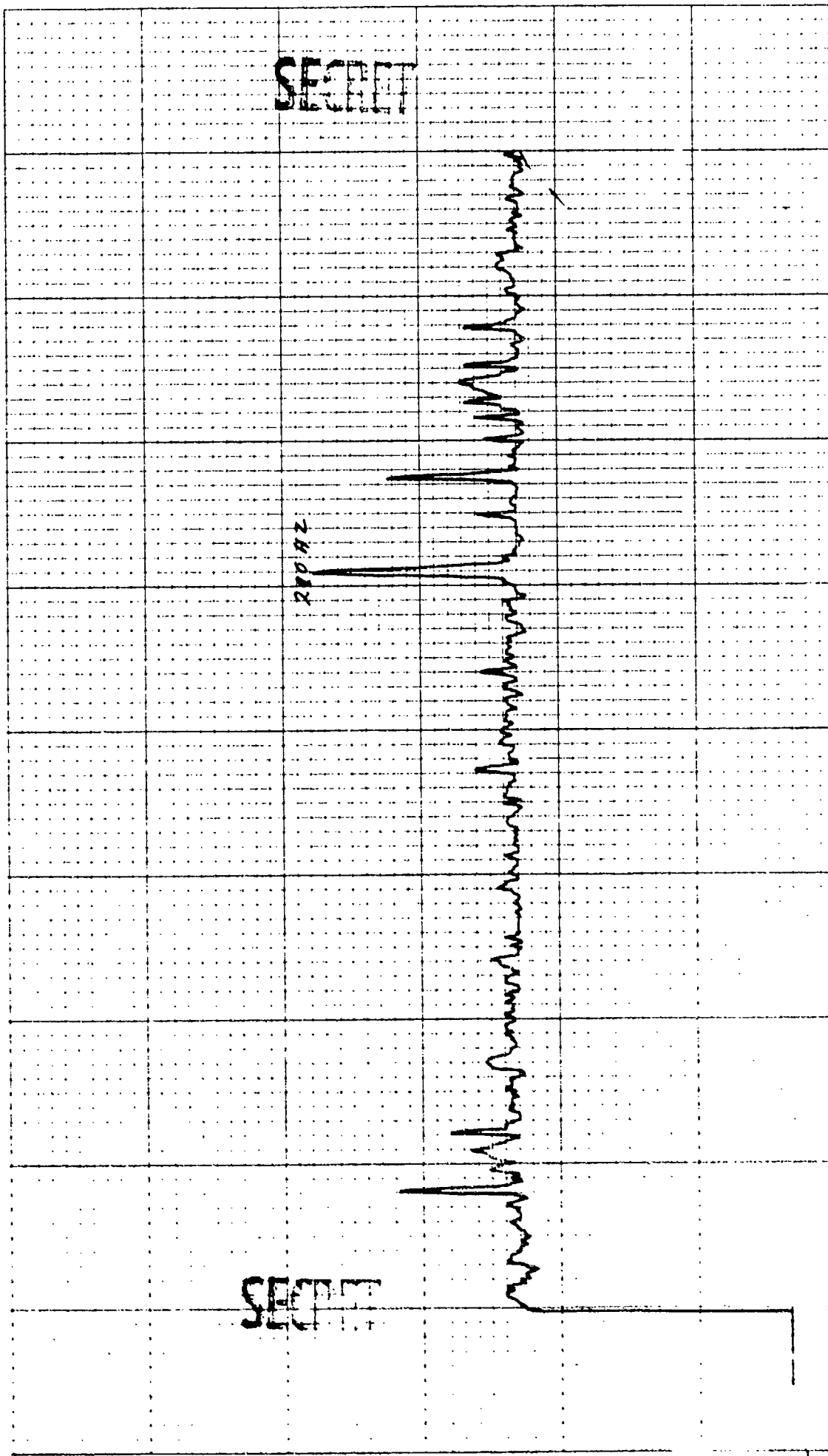
INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTG: HANNING



46 0703

1602 10/11/77 10:00 AM

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



46 0703

REF ID: A66000

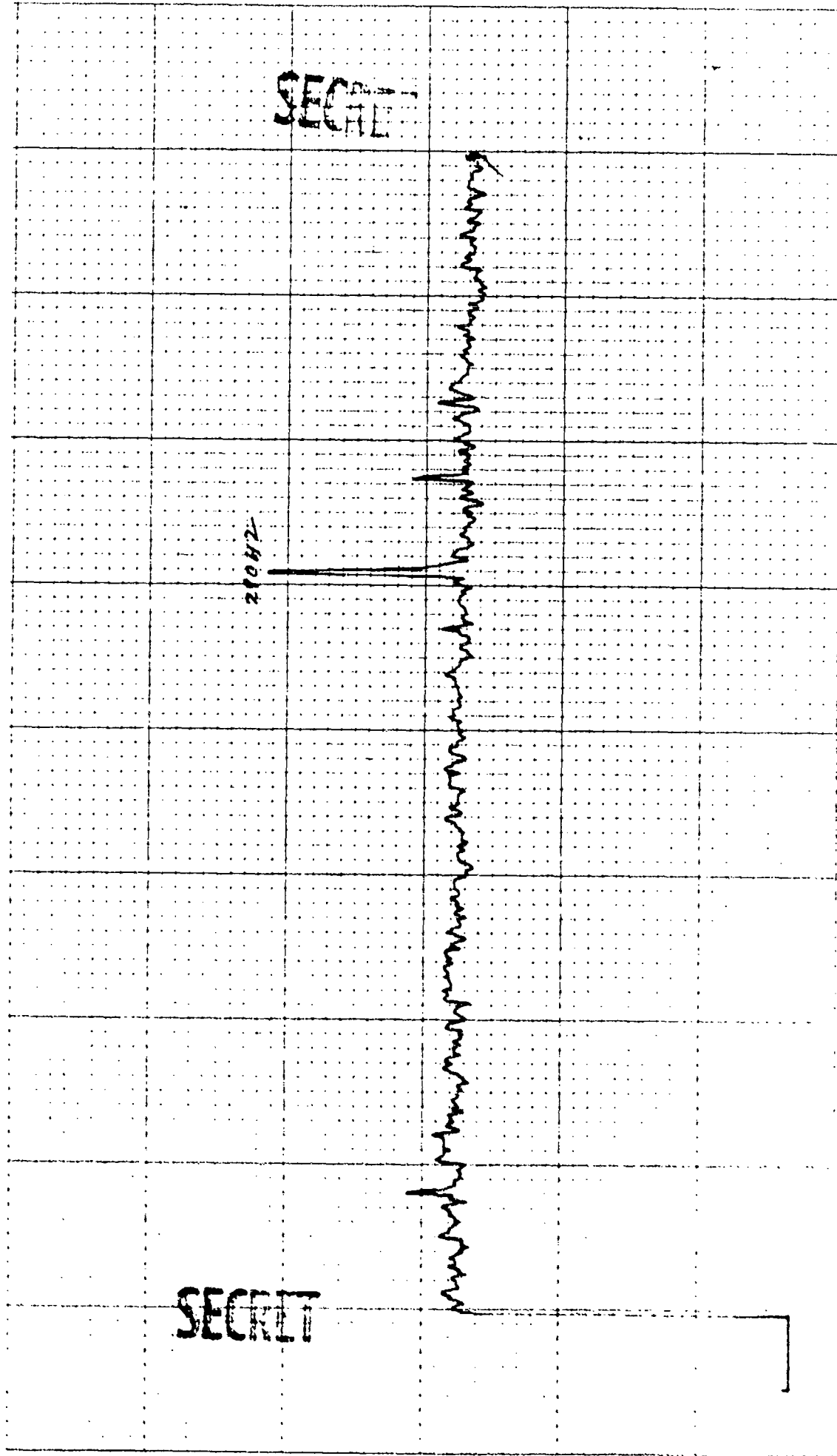
CONTROL: 375-1501 (8)
OMNI SPECTRUM (ELEMENT 16)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: 144 INDEX 3340

INTEGRATION TIME 320 SECS
FILTER WTC: HANNING



SECRET

SECRET

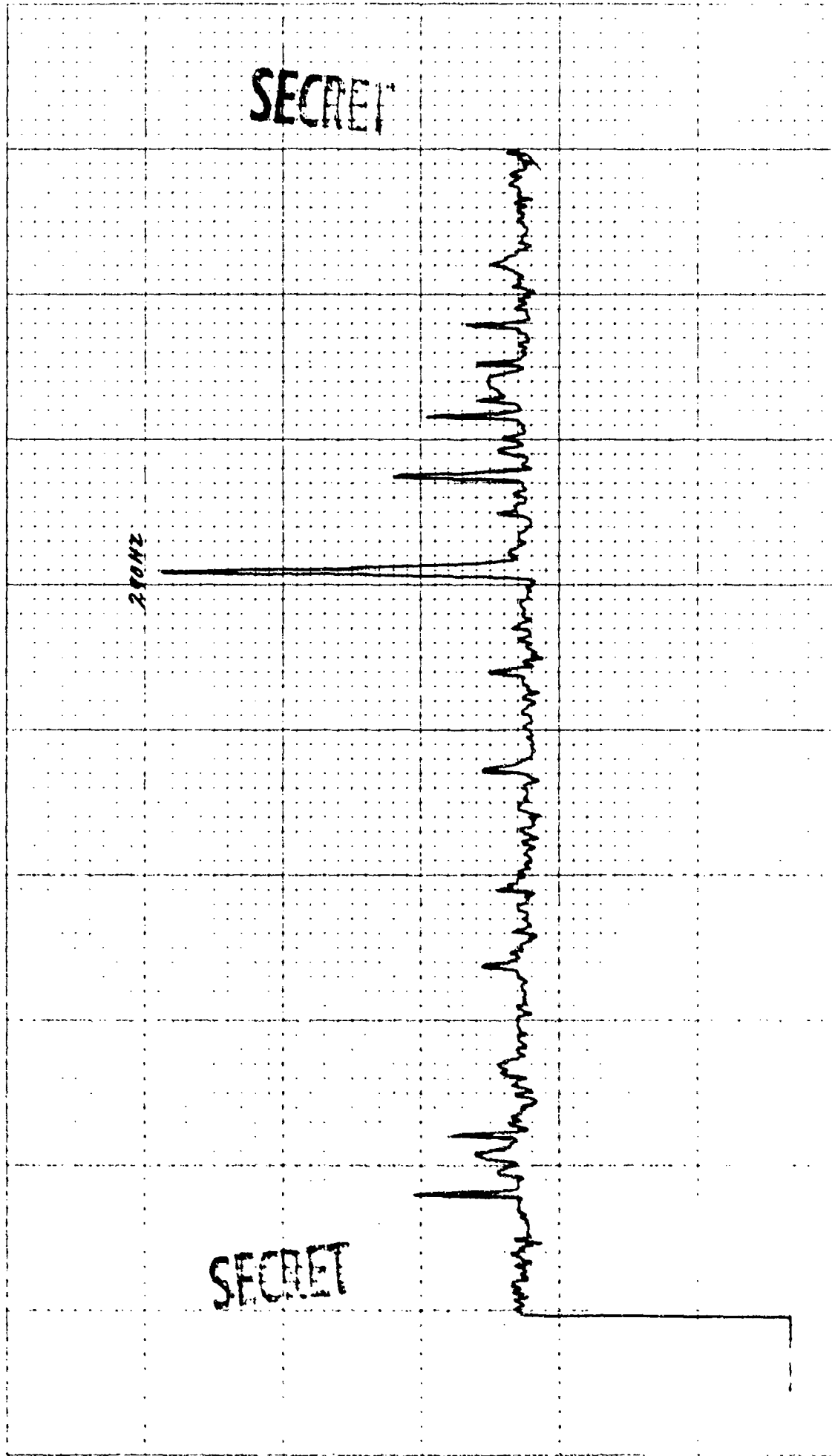
46 0703

FILE NAME: 3-15-1501 (9)

CONTROL: 3-15-1501 (9) DATE OF ANALYSIS: REEL: 144 INDEX 3340
 OMNI SPECTRUM (ELEMENT 19)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 HZ
 1 ELEMENT

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

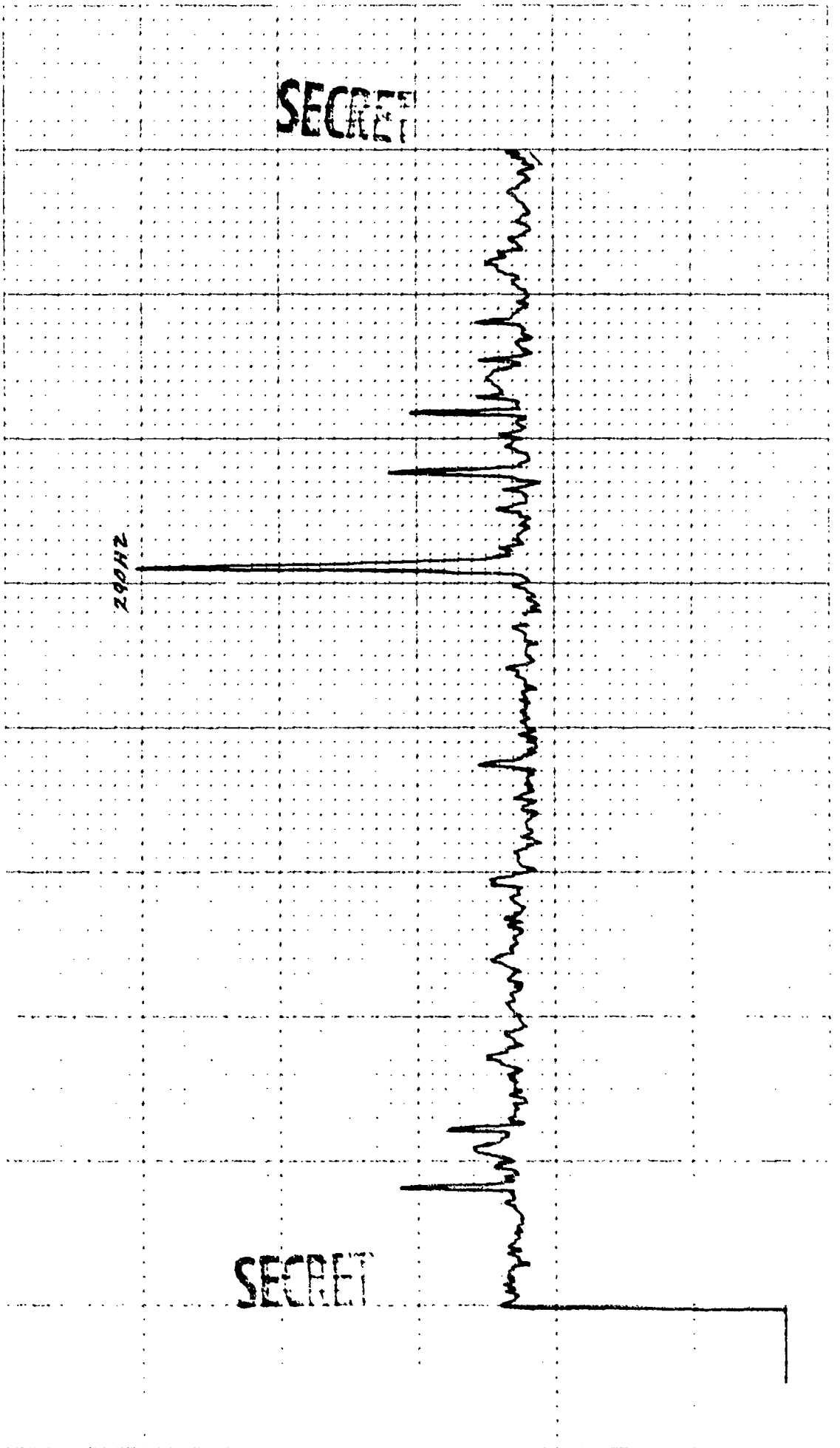
DATE/TIME: 3-15-77-1501 Z
 ANALYSIS BANDWIDTH: 170 HZ
— DEG AZ STEERING



46 0703

14-2 21 00 200000 000000

CONTROL: 3-15-1501(10.) DATE OF ANALYSIS: REEL: M4 INDEX J740
 OMNI SPECTRUM(ELEMENT 20)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: - DB
 I ELEMENT DEG AZ STEERING FILTER WTG: HANNING



46 0703

USE OF THIS INFORMATION IS RESTRICTED

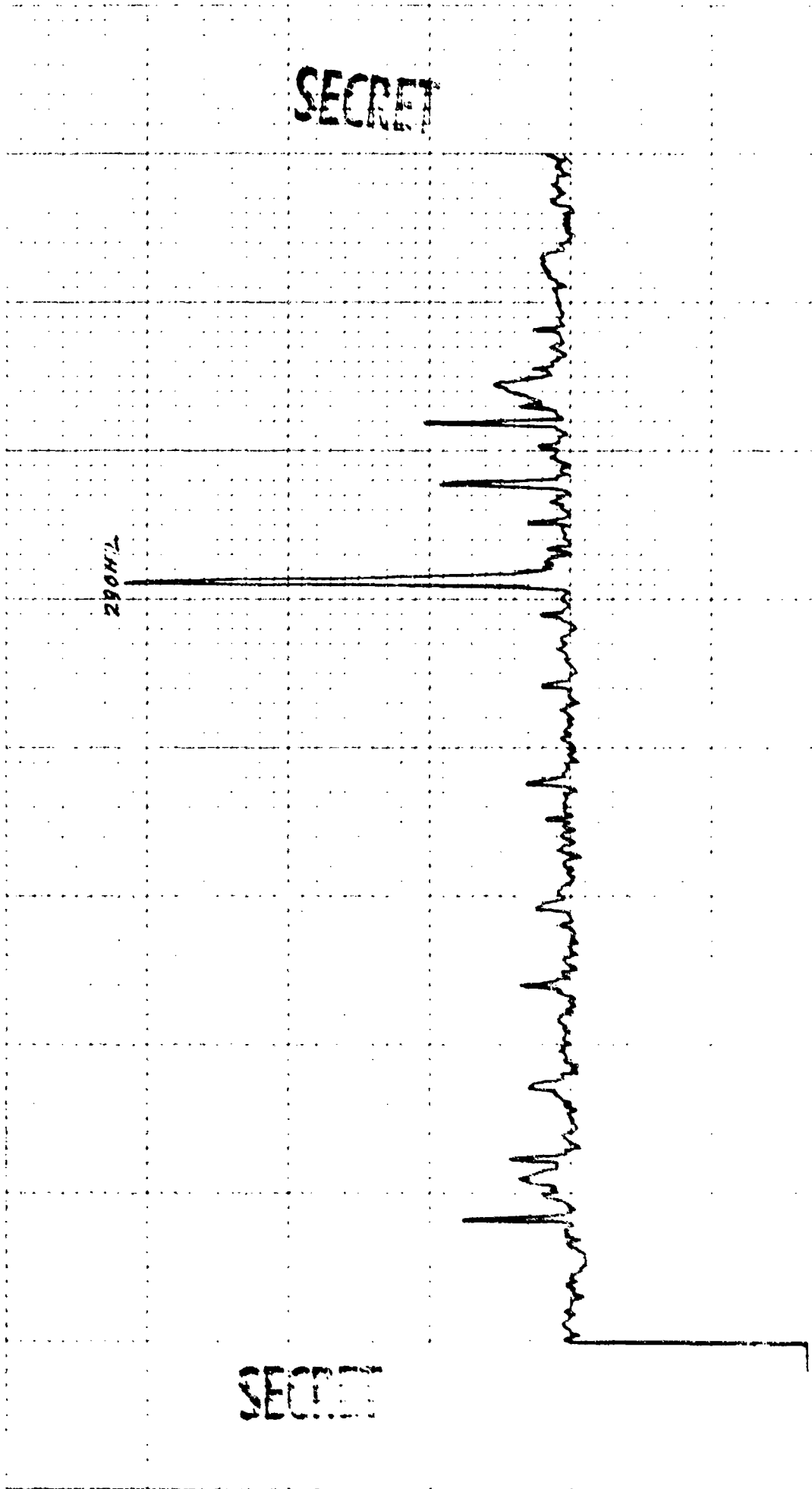
CONTROL: 3-15 - 1501 (11)
OMNI SPECTRUM (ELEMENT 23)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: M4 INDEX J340

INTEGRATION TIME 320 SECS
FILTER WTG: HANNING



SECRET

SECRET

46 0703

10E 11.110 10.110 10.110 10.110

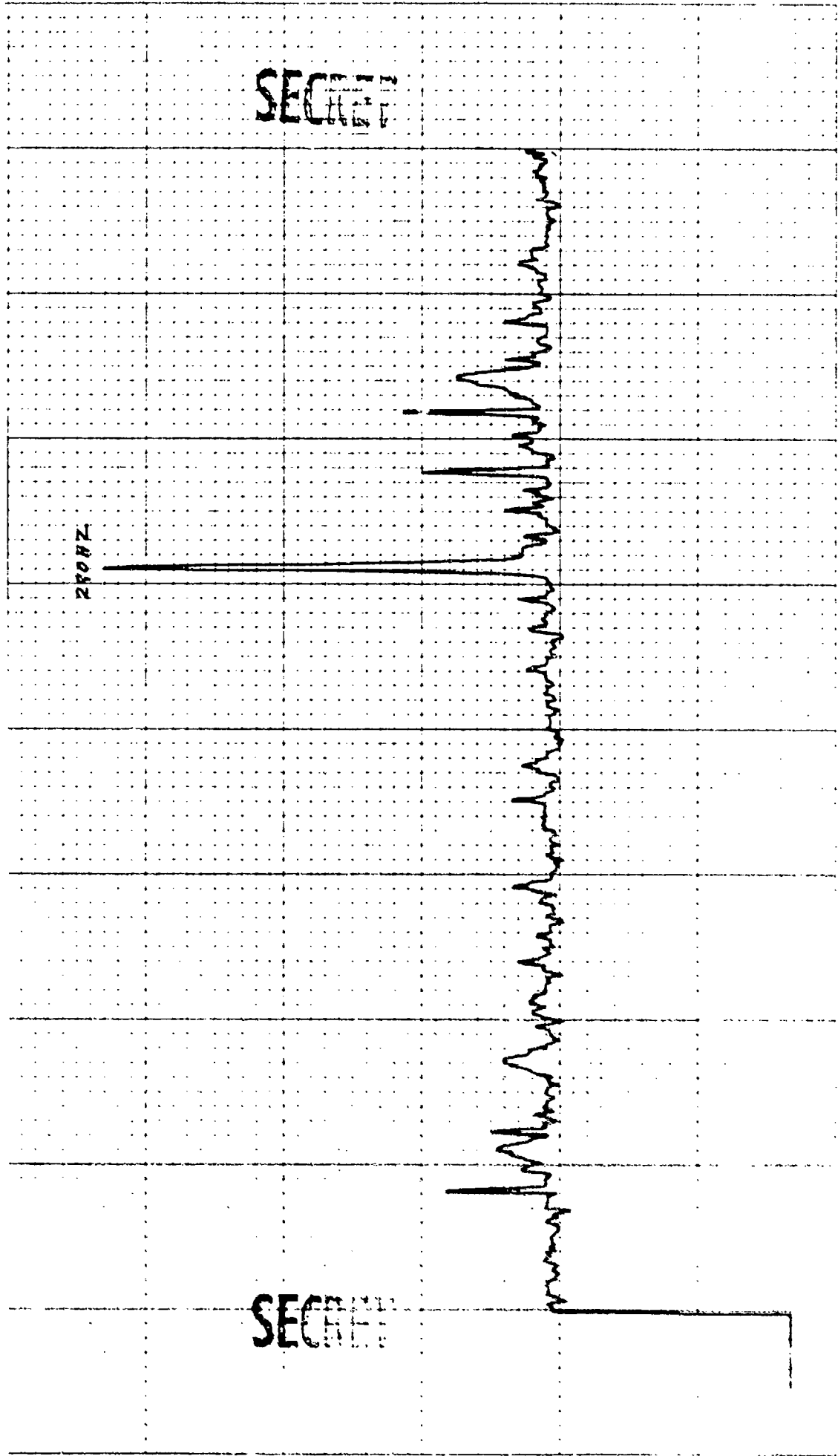
CONTROL: 3-15-1501 (12)
OMNI SPECTRUM (ELEMENT 24)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: M4 INDEX 3340

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



46 0703

REEL: M4 INDEX 3740

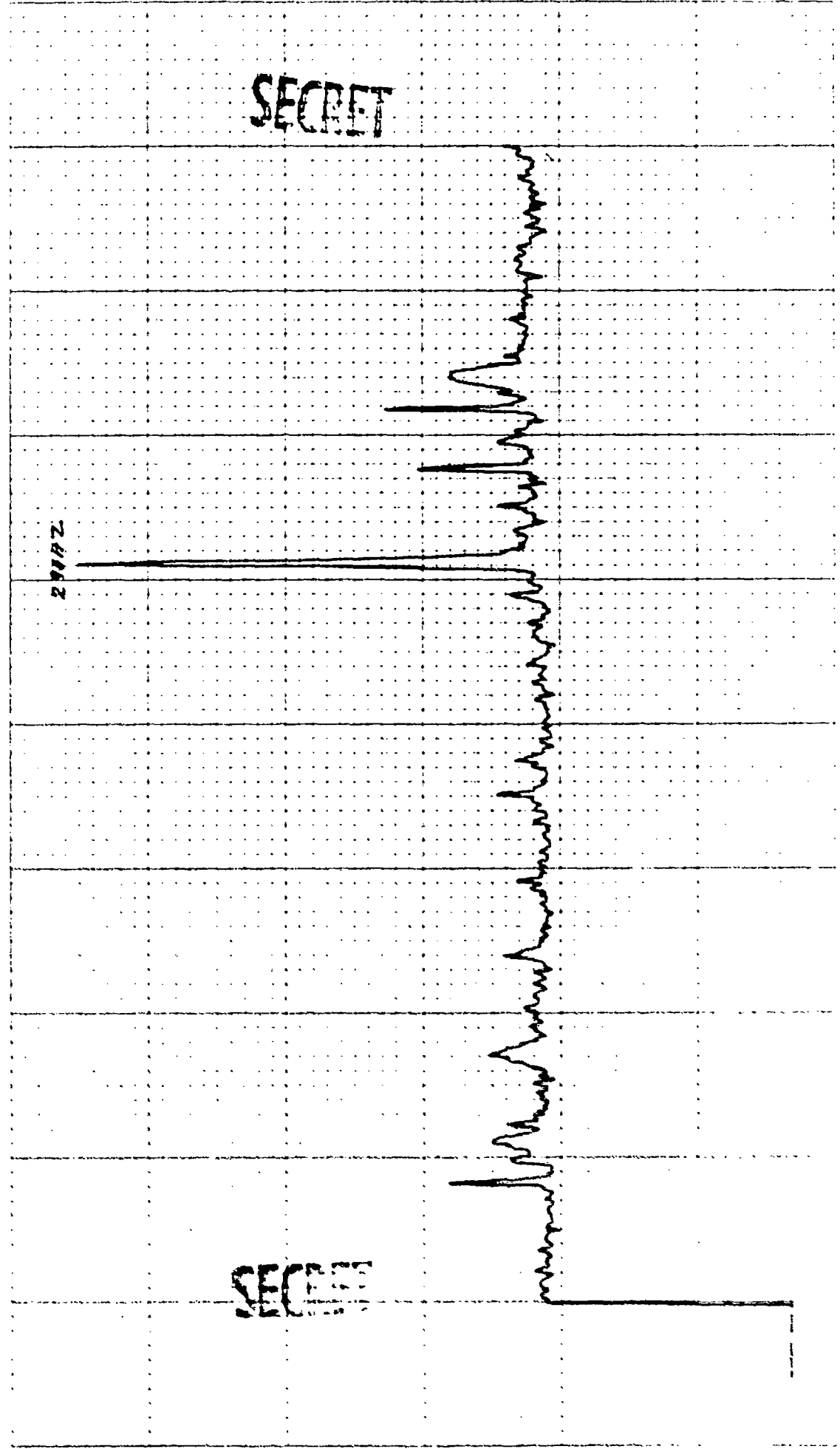
DATE OF ANALYSIS:
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

CONTROL: 375-1501 (13)
OMNI SPECTRUM (ELEMENT 26)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

INTEGRATION TIME 320 SECS

FILTER ATEN: DB
WTG: HANNING

200HZ



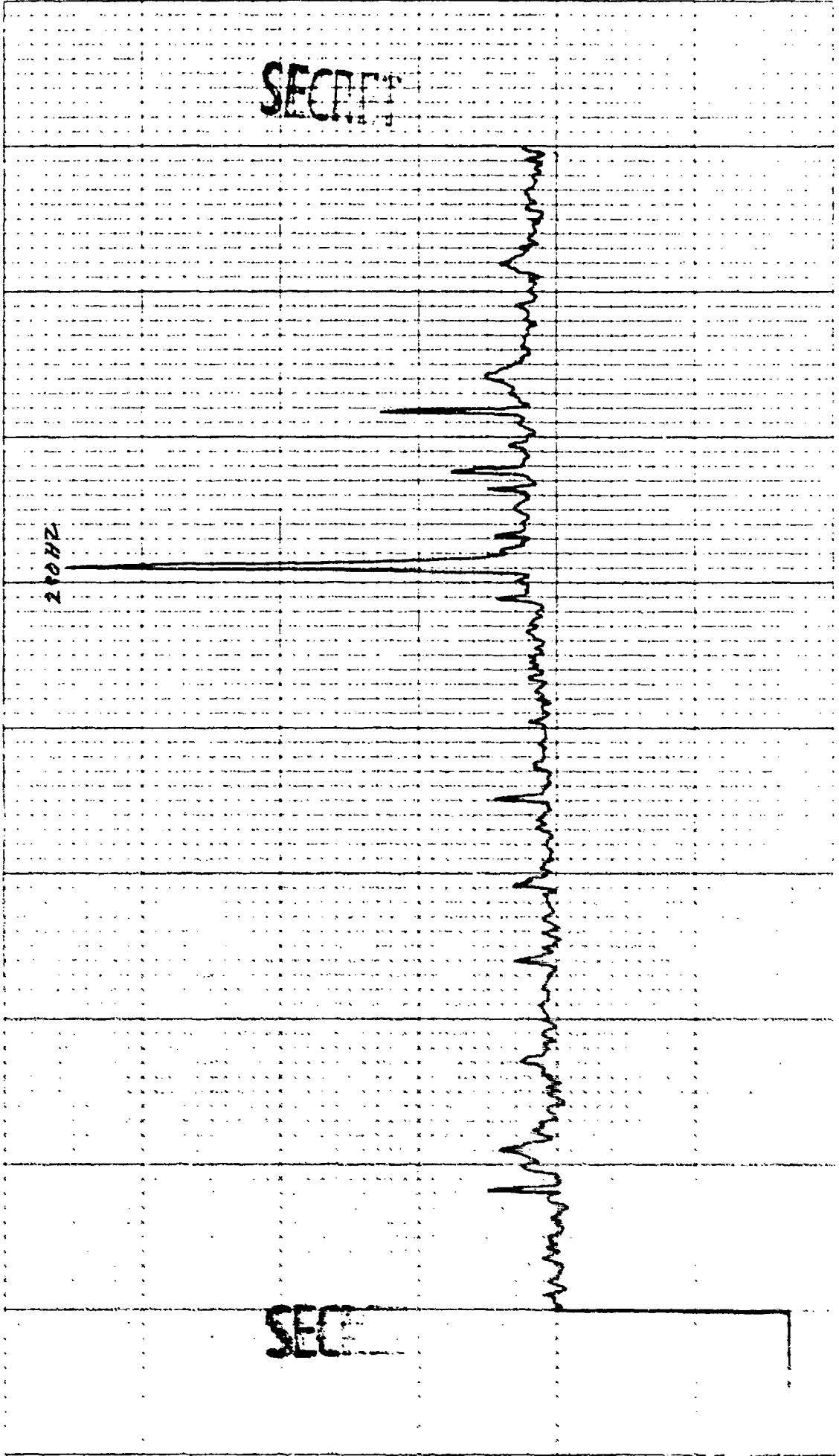
SECRET

SECRET

46 0703

SECRET

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



SECRET

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

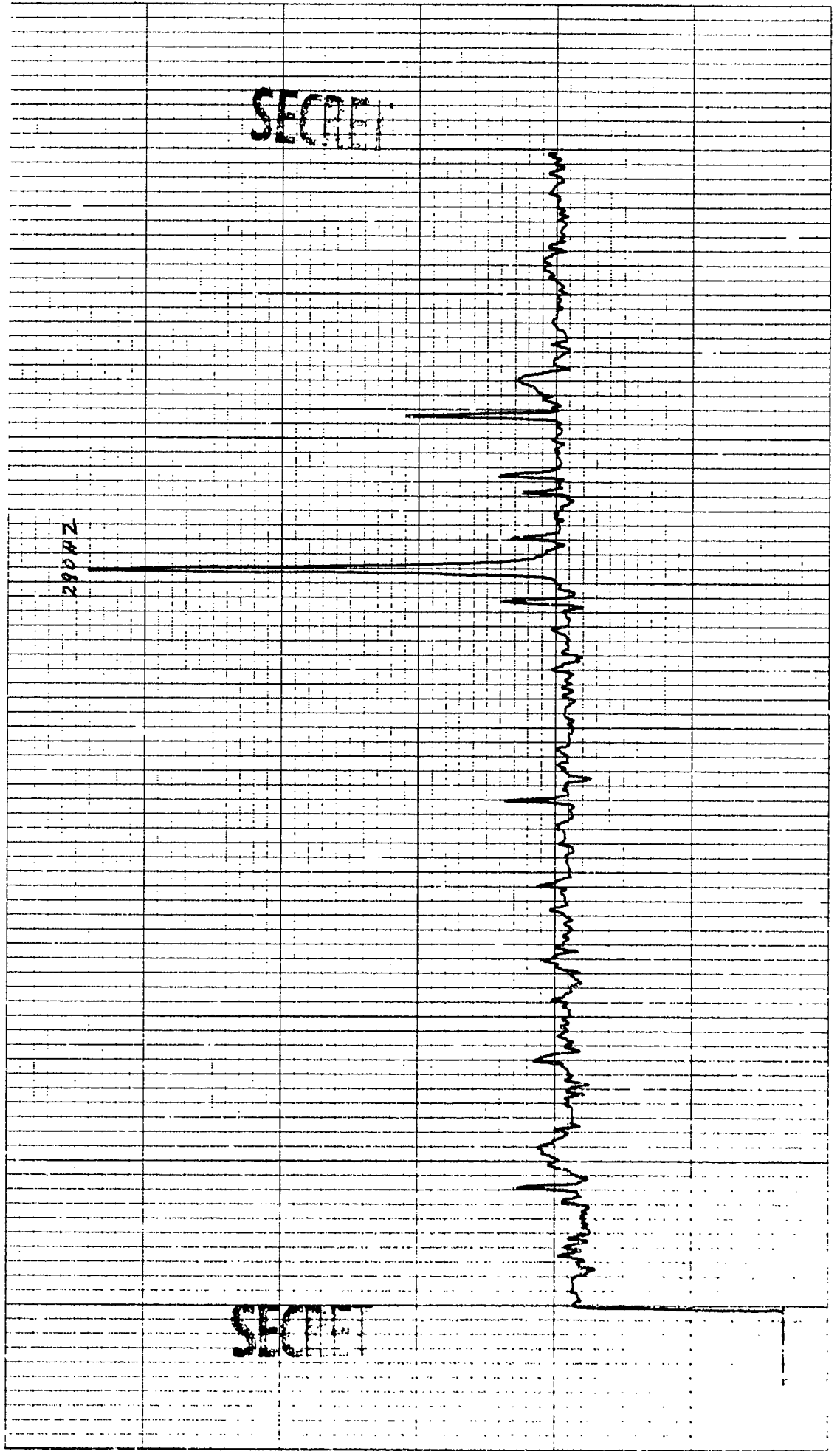
DATE OF ANALYSIS:

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

REEL: M4

INDEX 3340

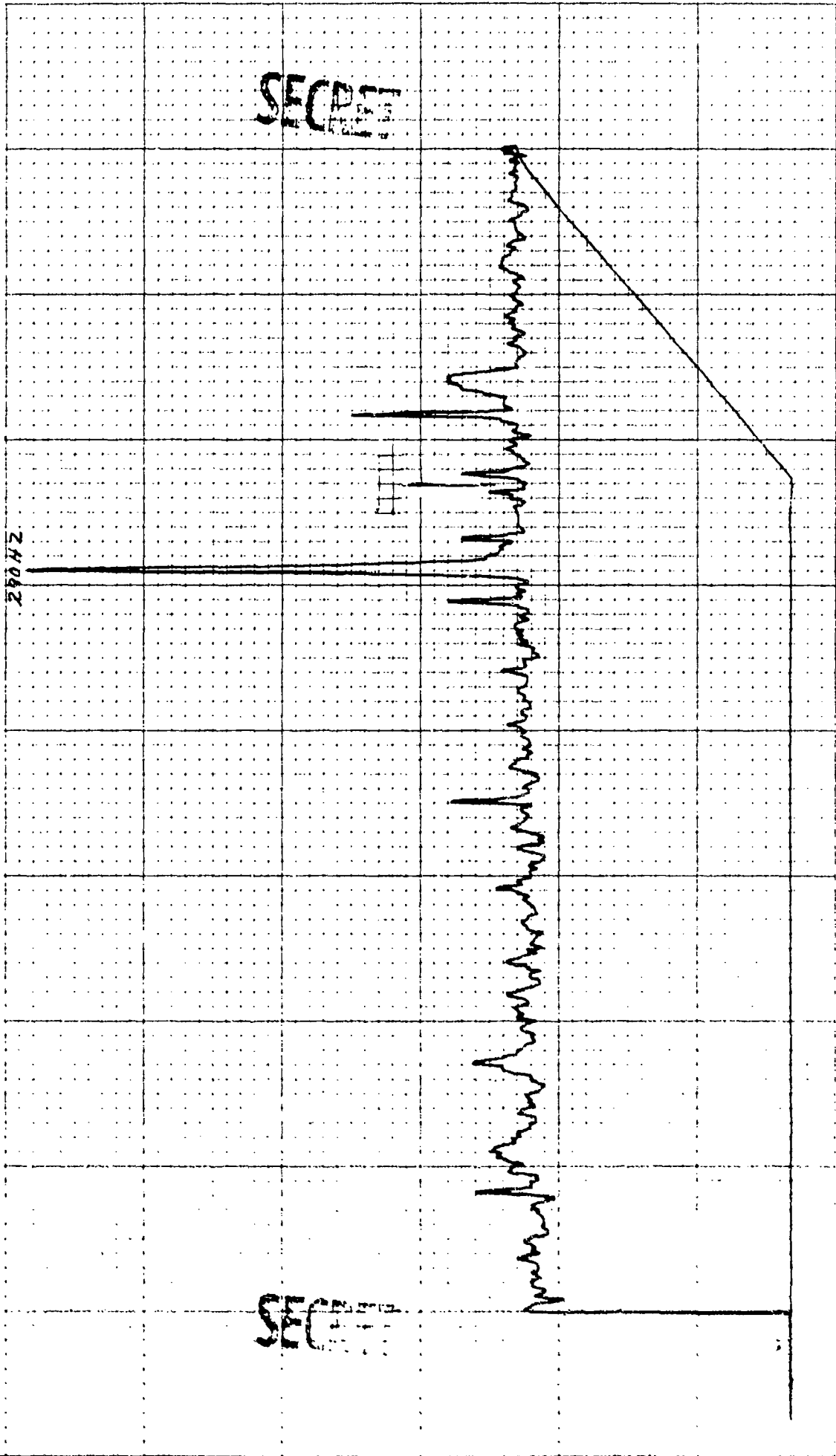
INTEGRATION TIME 320 SECS
FILTER
ATTEN: - DB
WTG: HANNING



46 0703

MODE 1501 TO THE USCHS 20 01 1501 Z

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



46 0703

1602 000000 000000 000000

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

OMNI SPECTRUM(ELEMENT 35)

EXERCISE: BEARING STAKE

CENTER FREQ: 200 HZ

1 ELEMENT

DATE OF ANALYSIS:

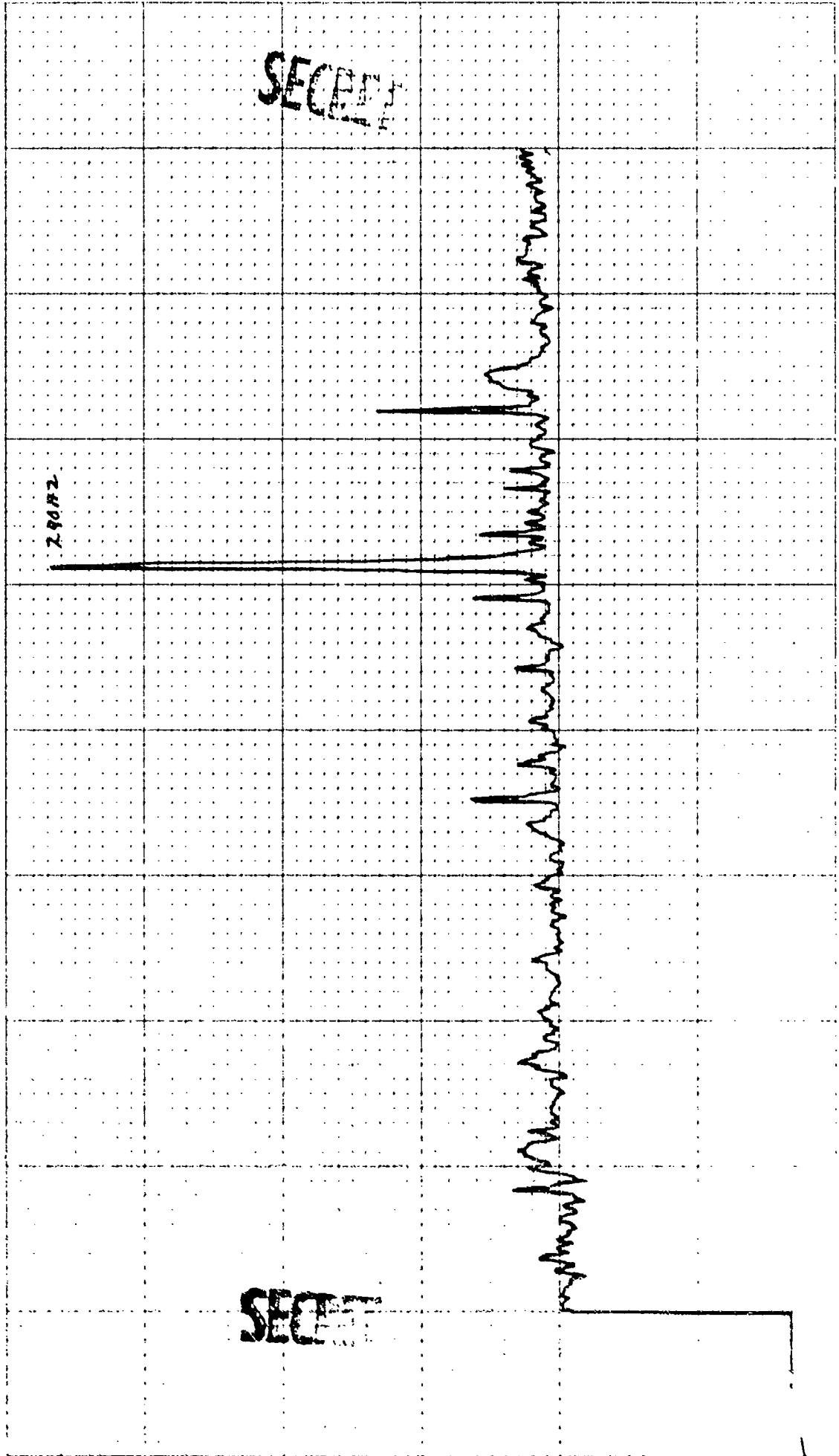
DATE/TIME: 3-15-77 -150/ 2

ANALYSIS BANDWIDTH: 1/10HZ

INTEGRATION TIME 320 SECS ATTEN: DB

FILTER WTC: HANNING

DEG AZ STEERING



152
10 X III TO THE PRCH...
REDFIELD & ESSER CO. ...

46 0703

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

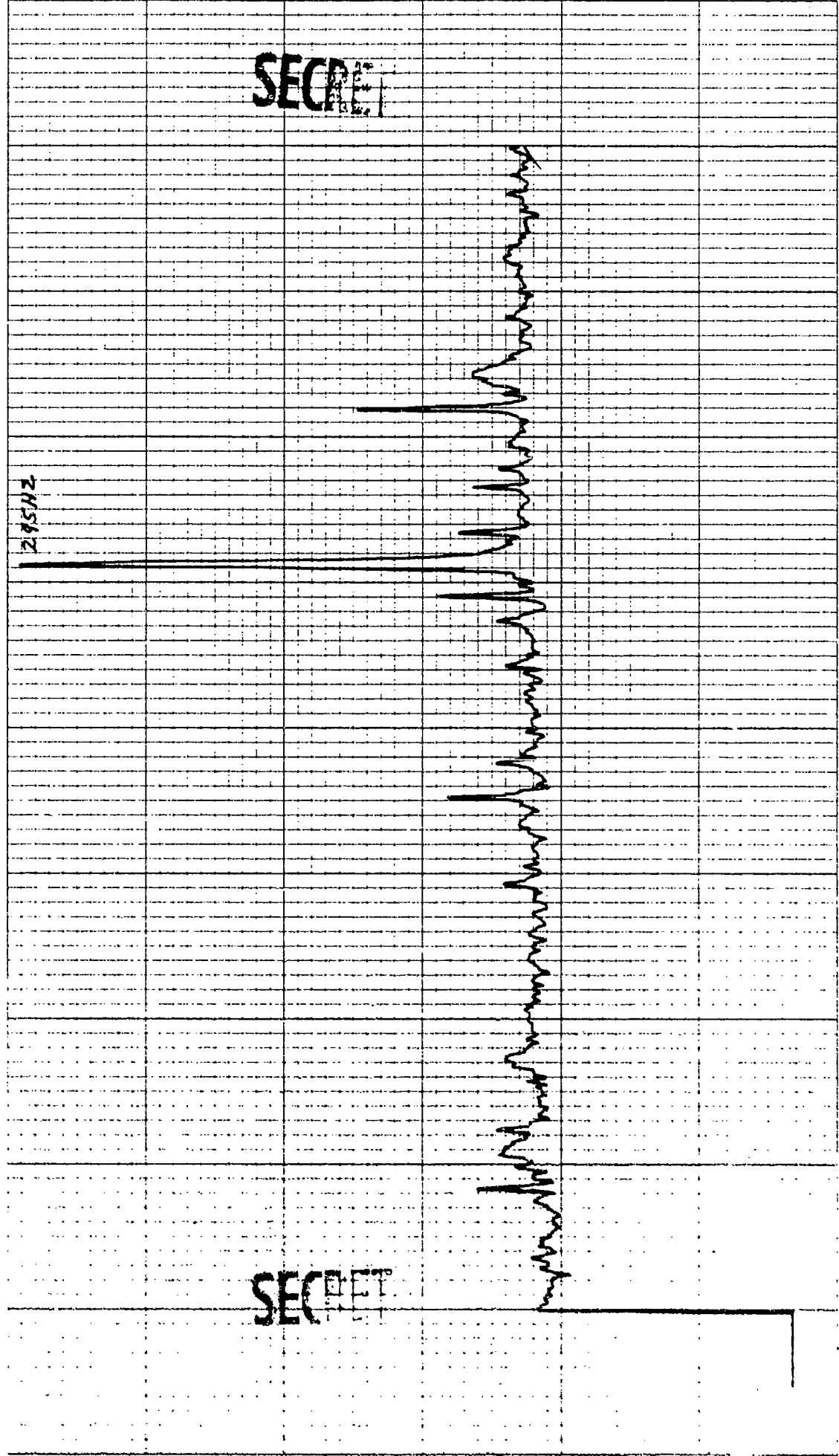
DATE OF ANALYSIS:

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

REEL: M4

INDEX 3346

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



SECRET

SECRET

46 0703

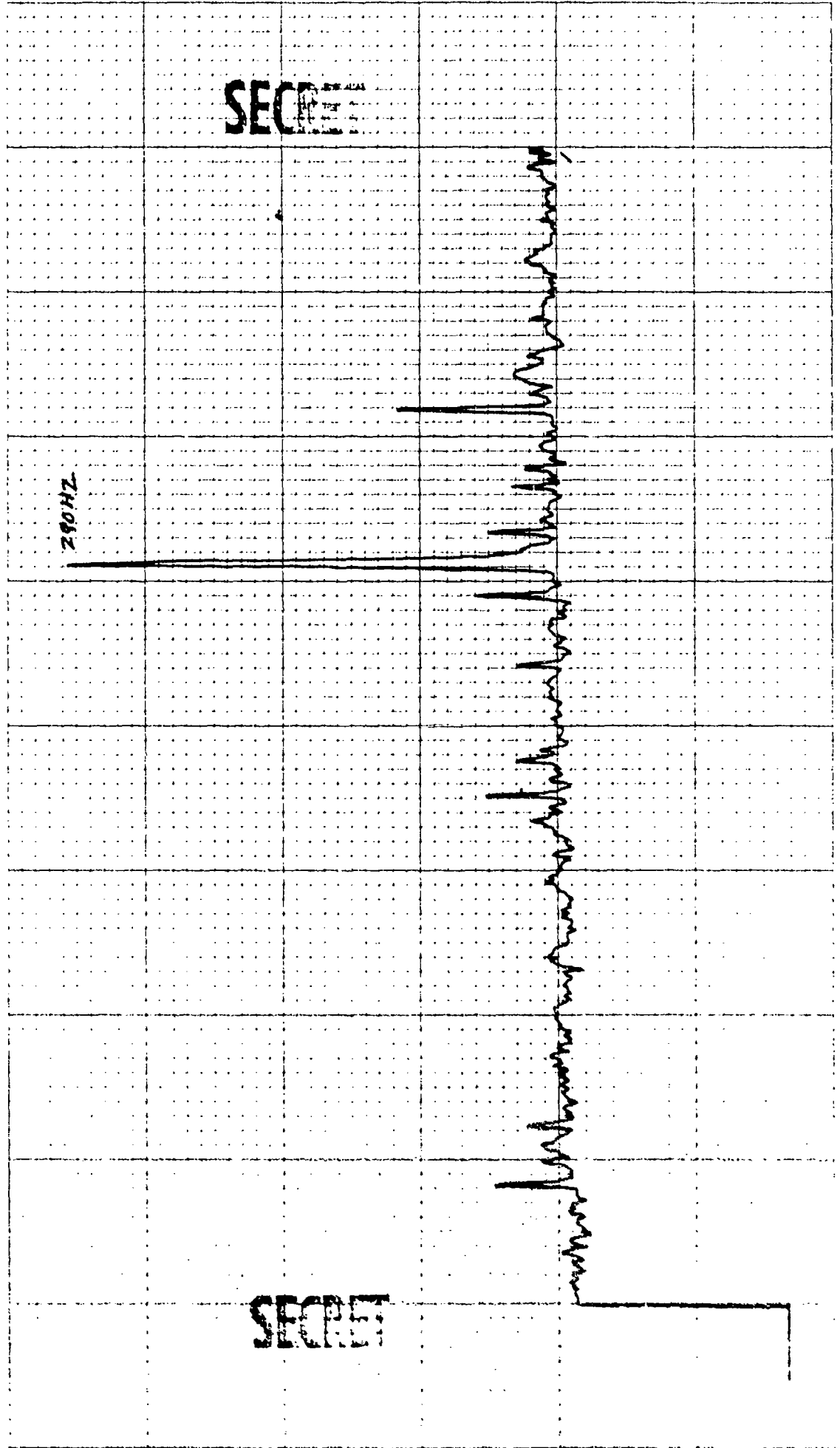
460703 3-15-77 TO THE DIRECTOR, NSA

CONTROL: 3-15-1501 (19)
 OMNI SPECTRUM (ELEMENT 39)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 HZ
 1 ELEMENT

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

REEL: 144 INDEX 3340

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



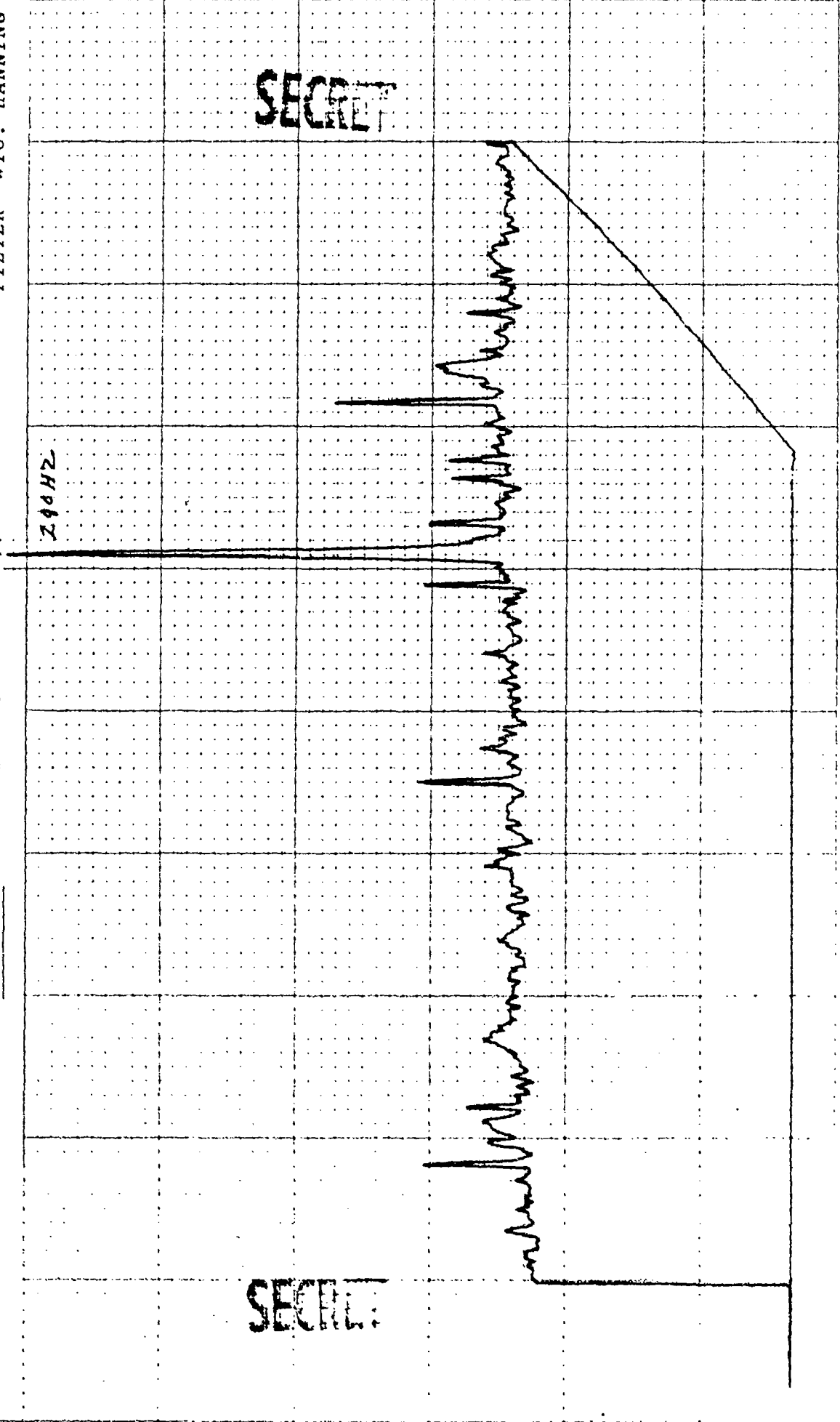
46 0703

REF ID: A66020

CONTROL: 3-15 -1501 (20) DATE OF ANALYSIS: REEL: M4 INDEX 3340
 OMNI SPECTRUM (ELEMENT 41)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
 ELEMENT

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

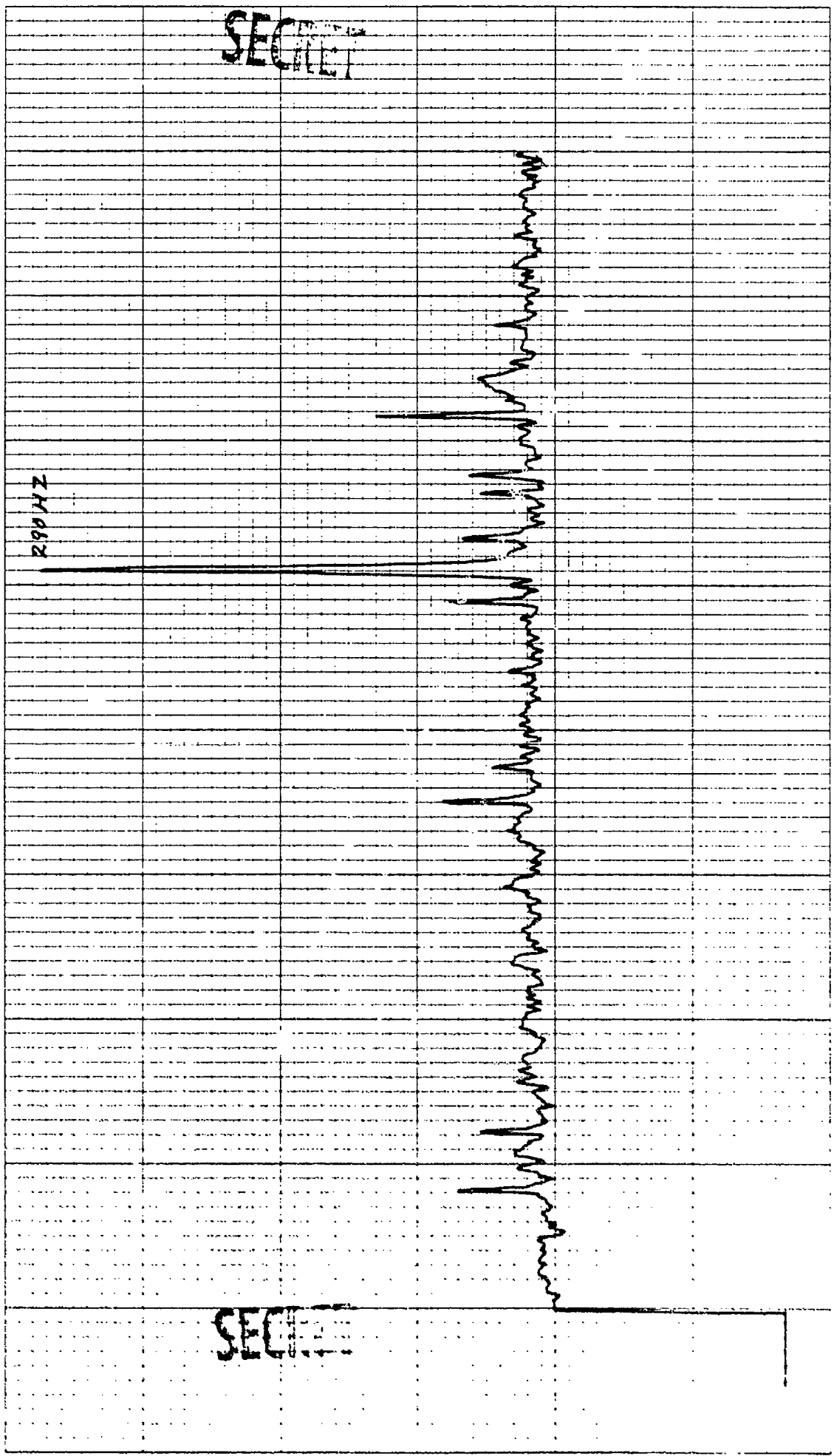
DATE/TIME: 3-15-77 -1501 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING



16 X 10 TO THE INCH + 1 X TO THE INCH
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

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



46 0703

1672 5.11.77 THE BUGH: 1.0000

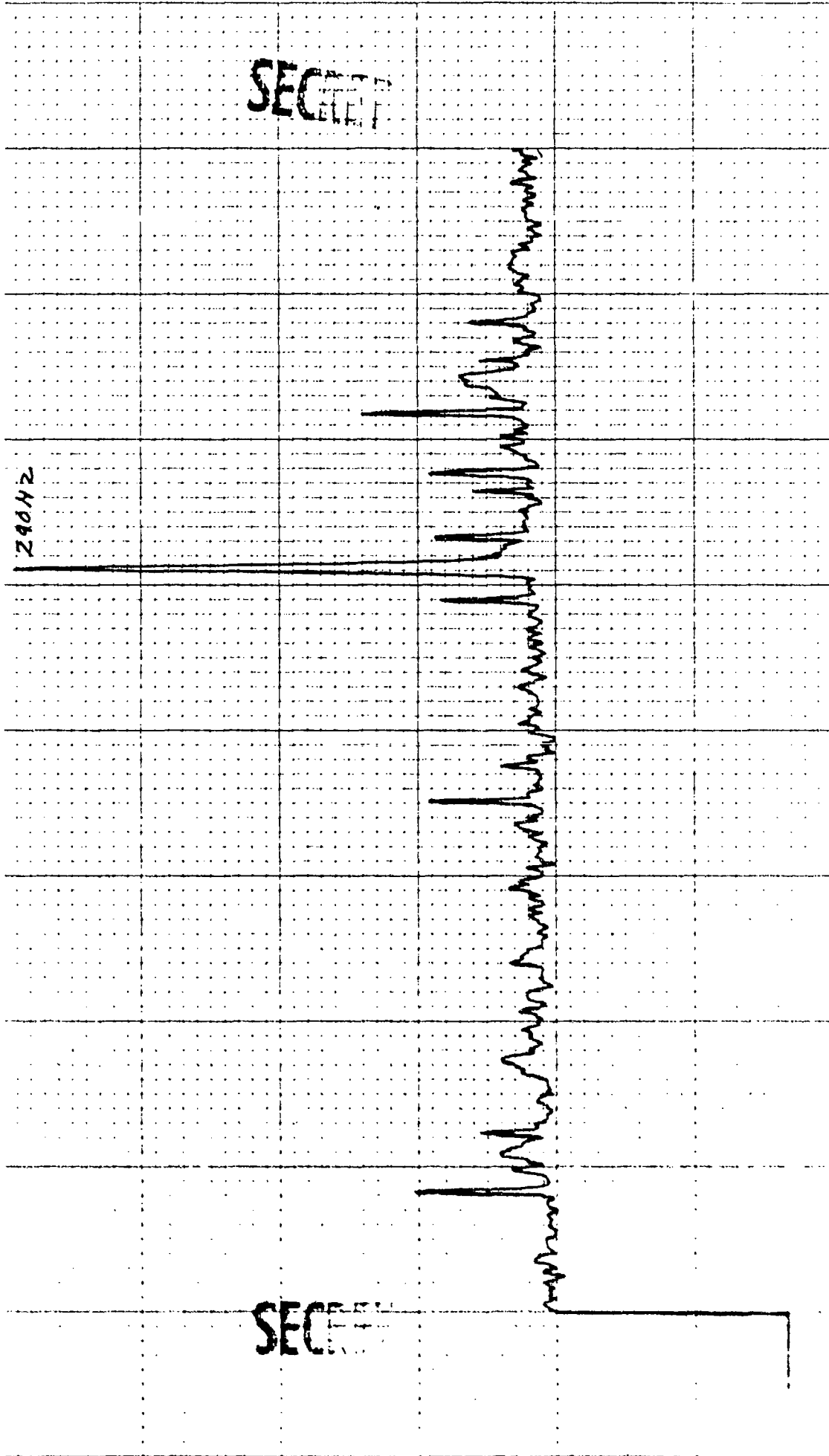
REEL: M4 INDEX 3340

CONTROL: 345 - 1501 (22)
OMNI SPECTRUM (ELEMENT 45)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 375-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEC AZ STEERING

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



46 0703

REF: 3-15-77 1501 (23)

REEL: MY INDEX 3390

DATE OF ANALYSIS:

CONTROL: 3-15 -1501 (23)

OMNI SPECTRUM (ELEMENT 47)

EXERCISE: BEARING STAKE

CENTER FREQ: 290 HZ

1 ELEMENT

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

ANALYSIS BANDWIDTH: 1/10 HZ

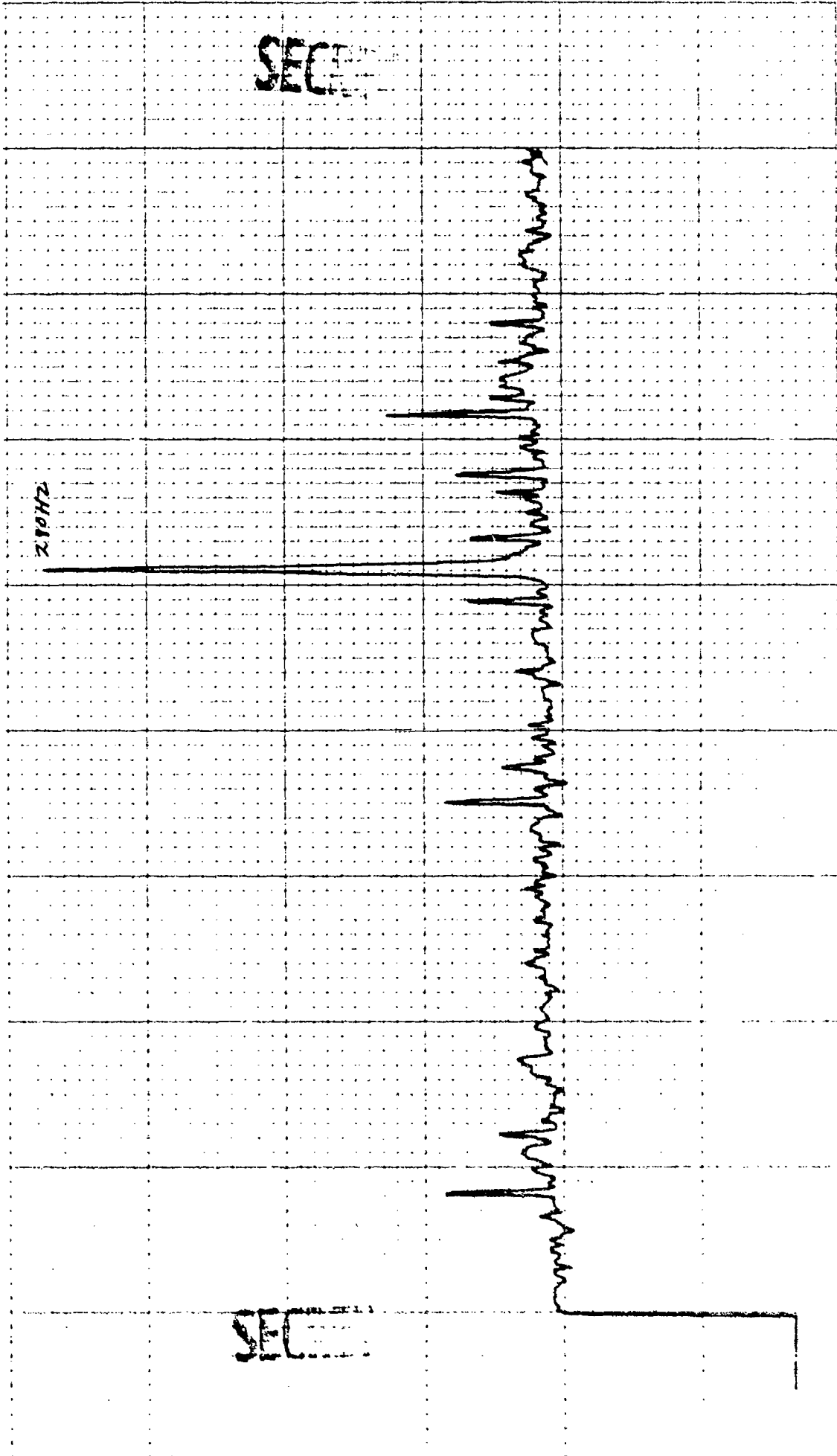
 DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

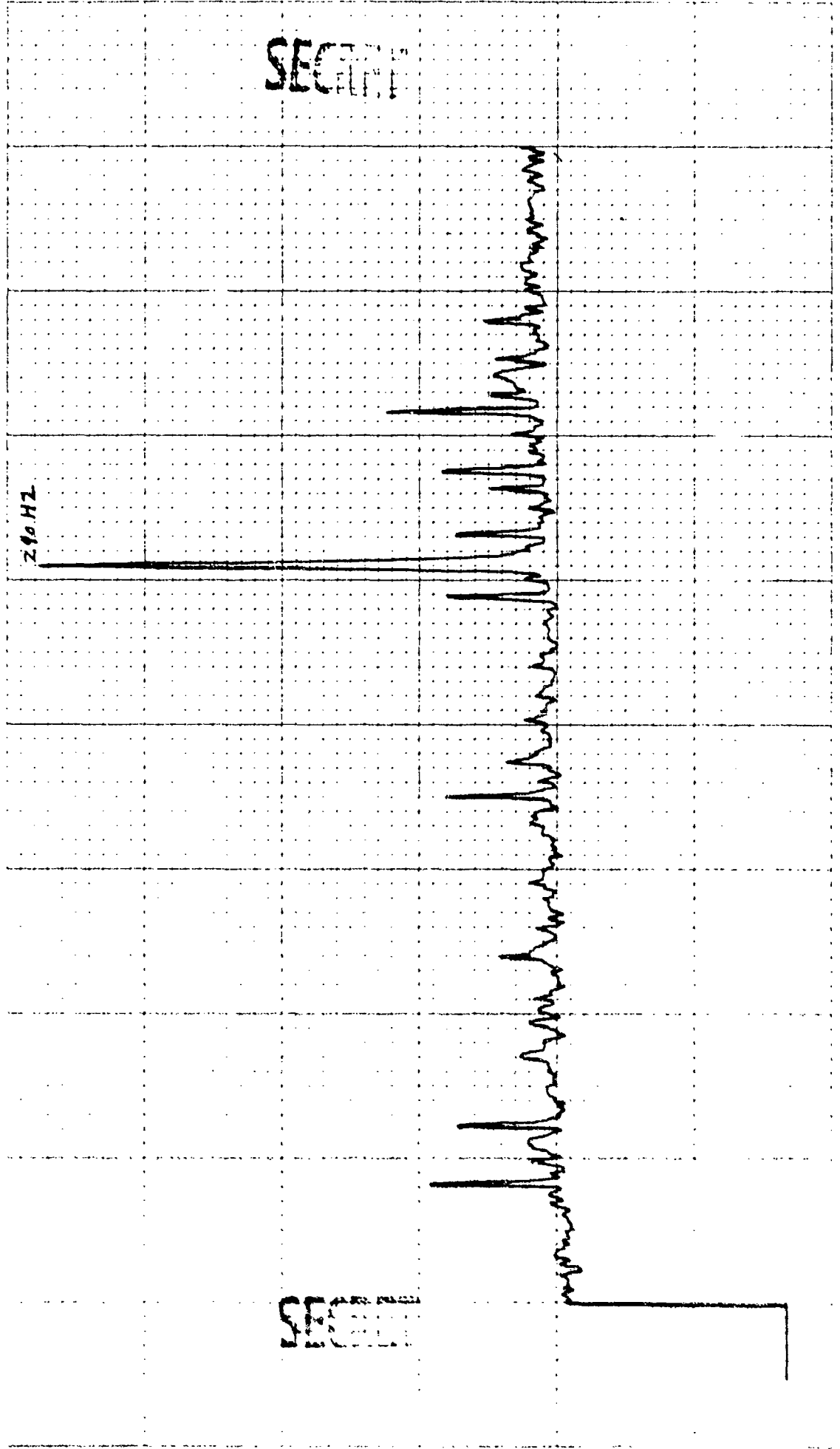
ATTEN: — DB

WIG: HANNING



46 0703

CONTROL: 315 - 1501 (24) DATE OF ANALYSIS: REEL: M4 INDEX 374e
OMNI SPECTRUM (ELEMENT 49)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: - DB
1 ELEMENT _____ DEG AZ STEERING FILTER WTG: HANNING



46 0703

REF: 21 AUG 70 DEC 8000 21 AUG 70

REEL: M4 INDEX 3340

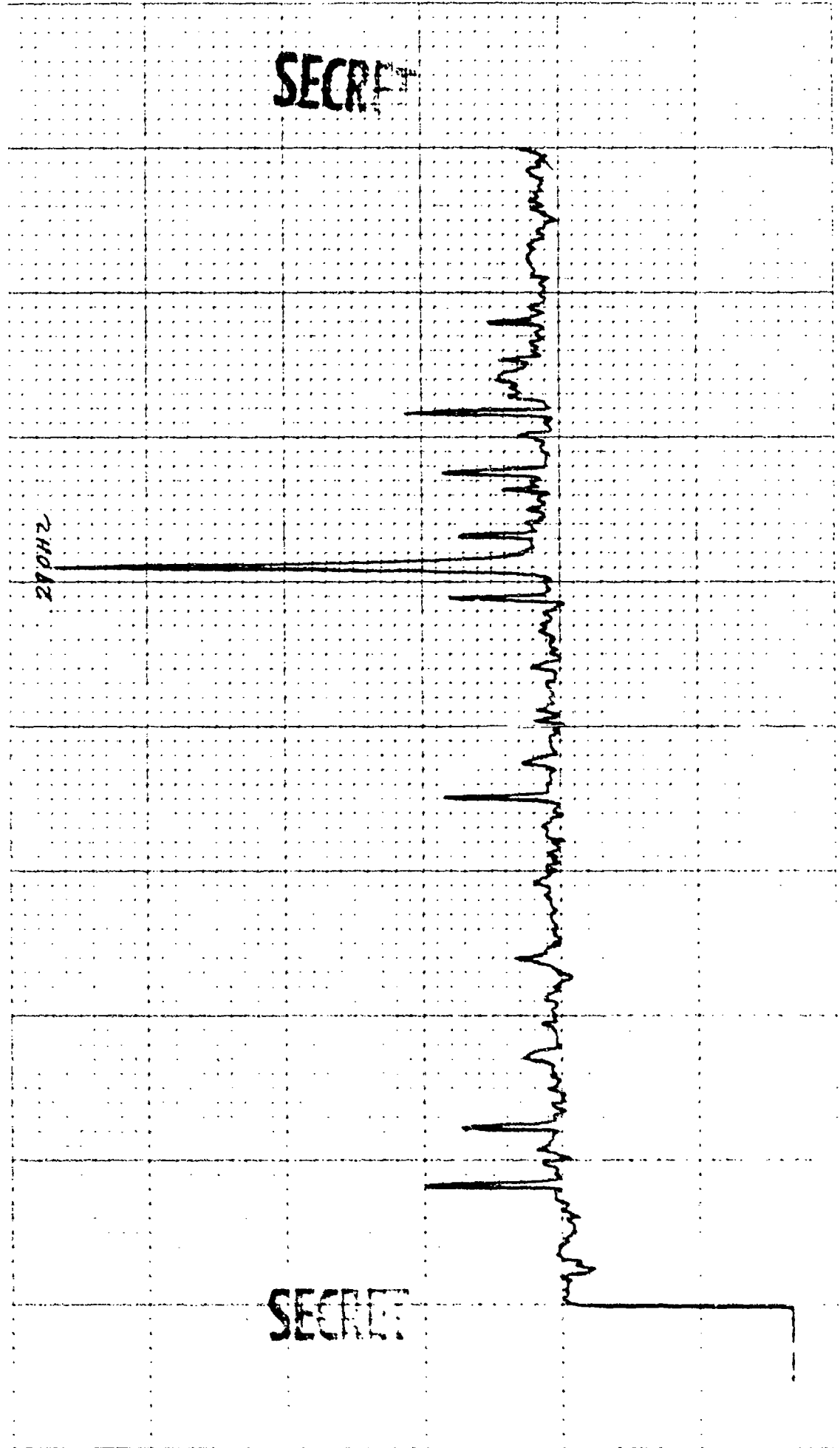
DATE OF ANALYSIS:

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

EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING

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



46 0703

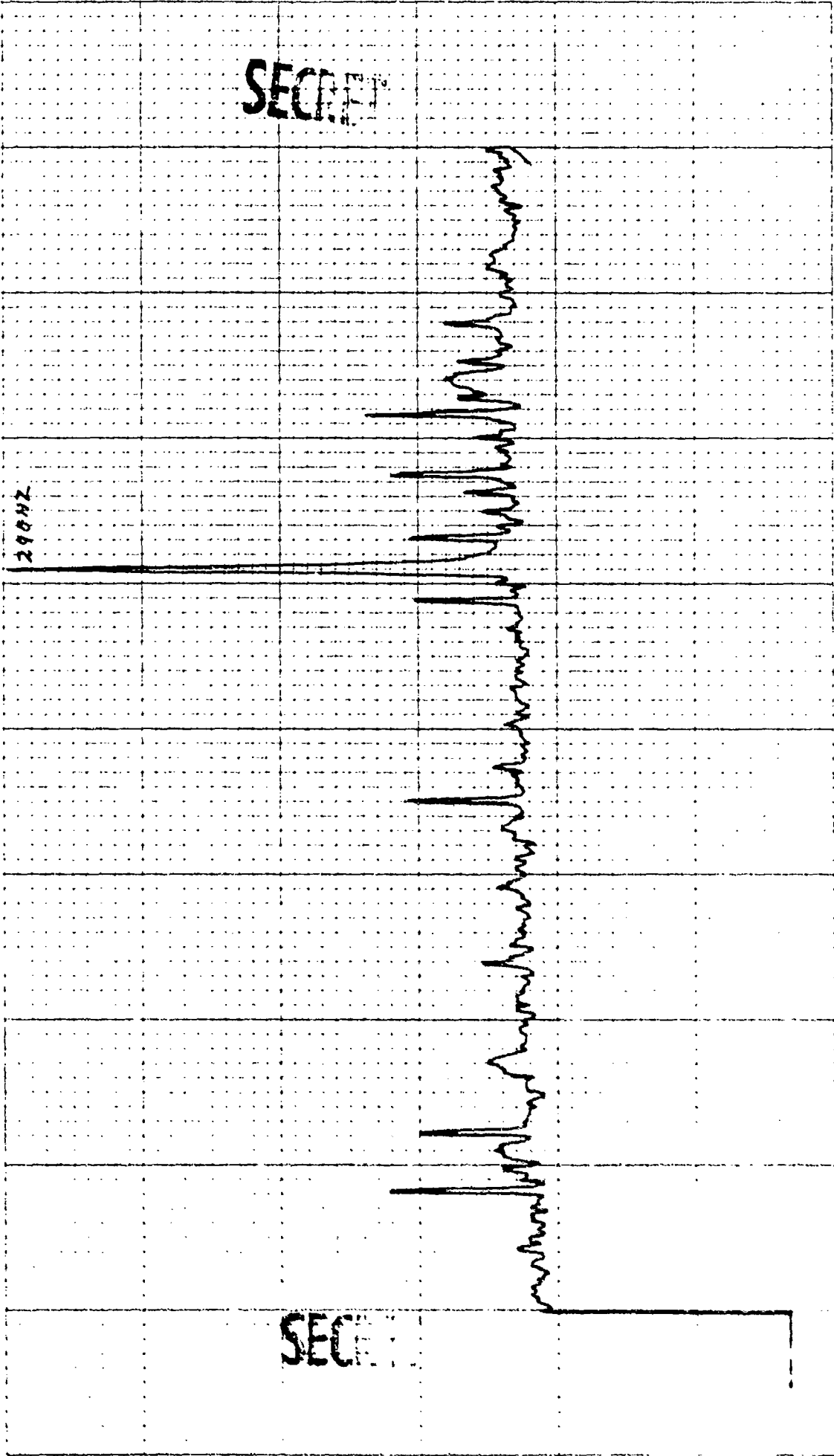
CONTROL: 3-15 - 1501 (26)
OMNI SPECTRUM (ELEMENT 53)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

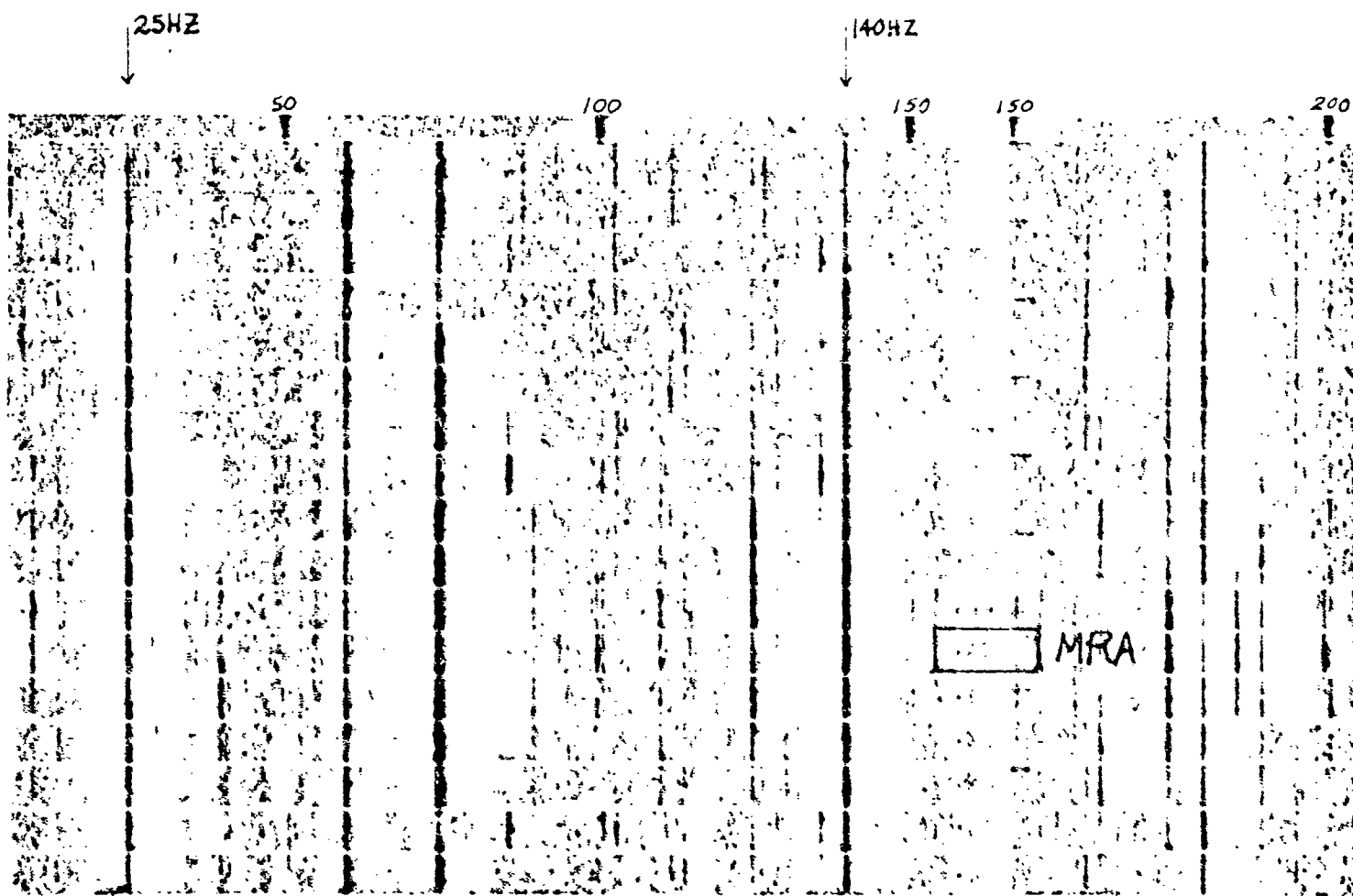
DATE OF ANALYSIS:

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

REEL: 114 INDEX 3740

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





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

H I S T O R Y
 TAPE REEL NUMBER 114

ANALYSIS BAND WIDTH HZ
 WATER DEPTH FMS

FILED
 DATE
 ENCL

140HZ

290HZ 295HZ

SECRET

150

150

200

250

300

MRA

LIST OF FRAMES
TAPE REEL NUMBER _____

ANALYSIS BAND WIDTH _____ Hz
WATER DEPTH _____ FMS

TAPE COUNT _____

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

SECRET

TIME
DATE
SOURCE

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 8

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

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

NOISE LEVEL

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

SIGNAL-NOISE-RATIO

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

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 8

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

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

NOISE LEVEL

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

SIGNAL-NOISE-RATIO

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

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 8

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

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

NOISE LEVEL

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

SIGNAL-NOISE-RATIO

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

CONFIDENTIAL

CONFIDENTIAL

DATA POINT 8

SIGNAL GAIN

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

ARRAY GAIN

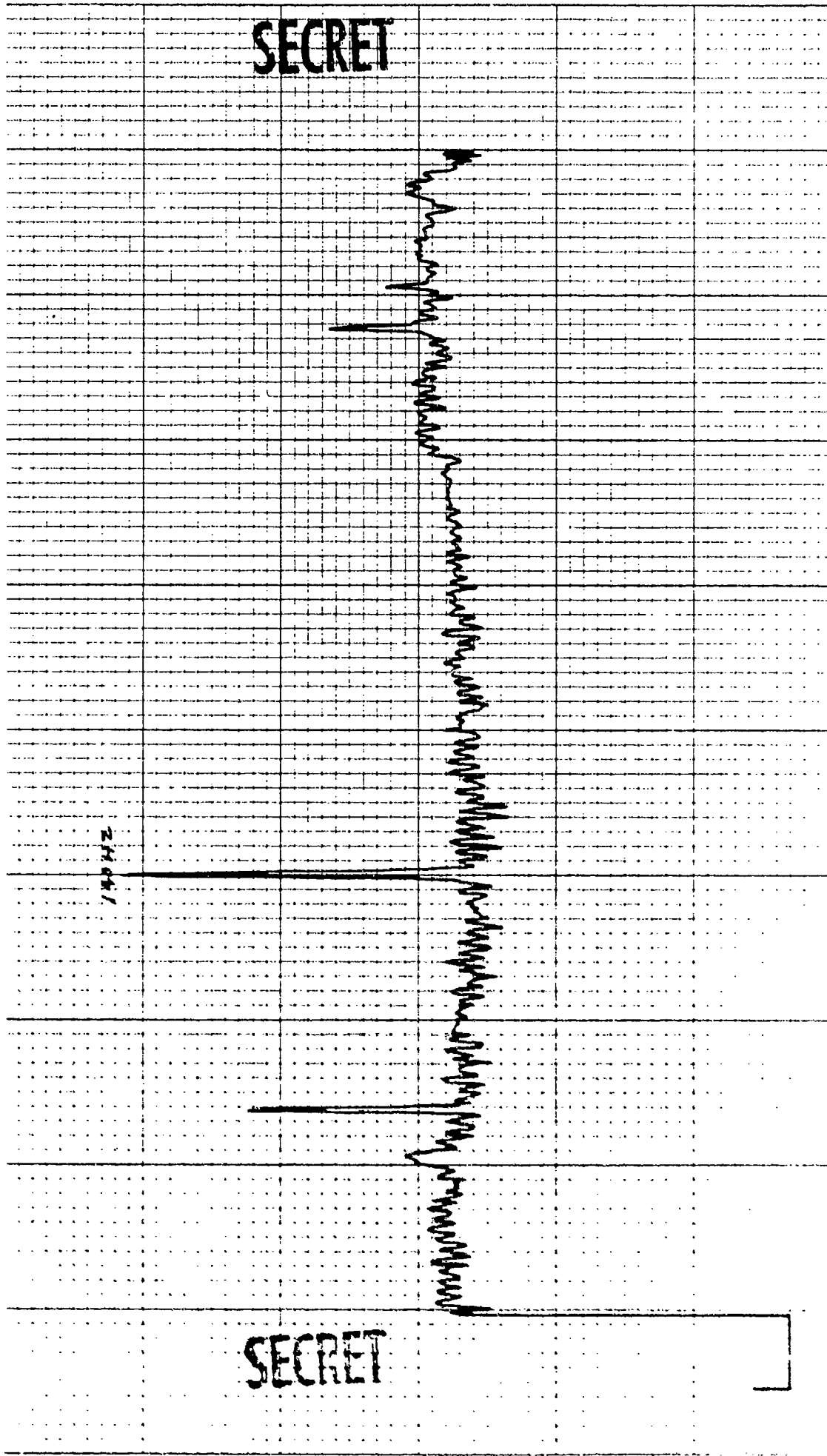
MRA SNR	<u>35.7</u>	<u>48.6</u>	<u>5.3</u>
MEAN OMNI SNR	<u>29.4</u>	<u>35.4</u>	<u> </u>
ARRAY GAIN	<u>6.3</u>	<u>13.2</u>	<u> </u>
THEORETICAL VERTICAL GAIN	<u>10.4</u>	<u>12.1</u>	<u>12.3</u>
(at MRA)			
DIFFERENCE	<u>-4.1</u>	<u>+1.1</u>	<u> </u>

CONFIDENTIAL

46 0703

PLS RETURN TO THE 100th ...

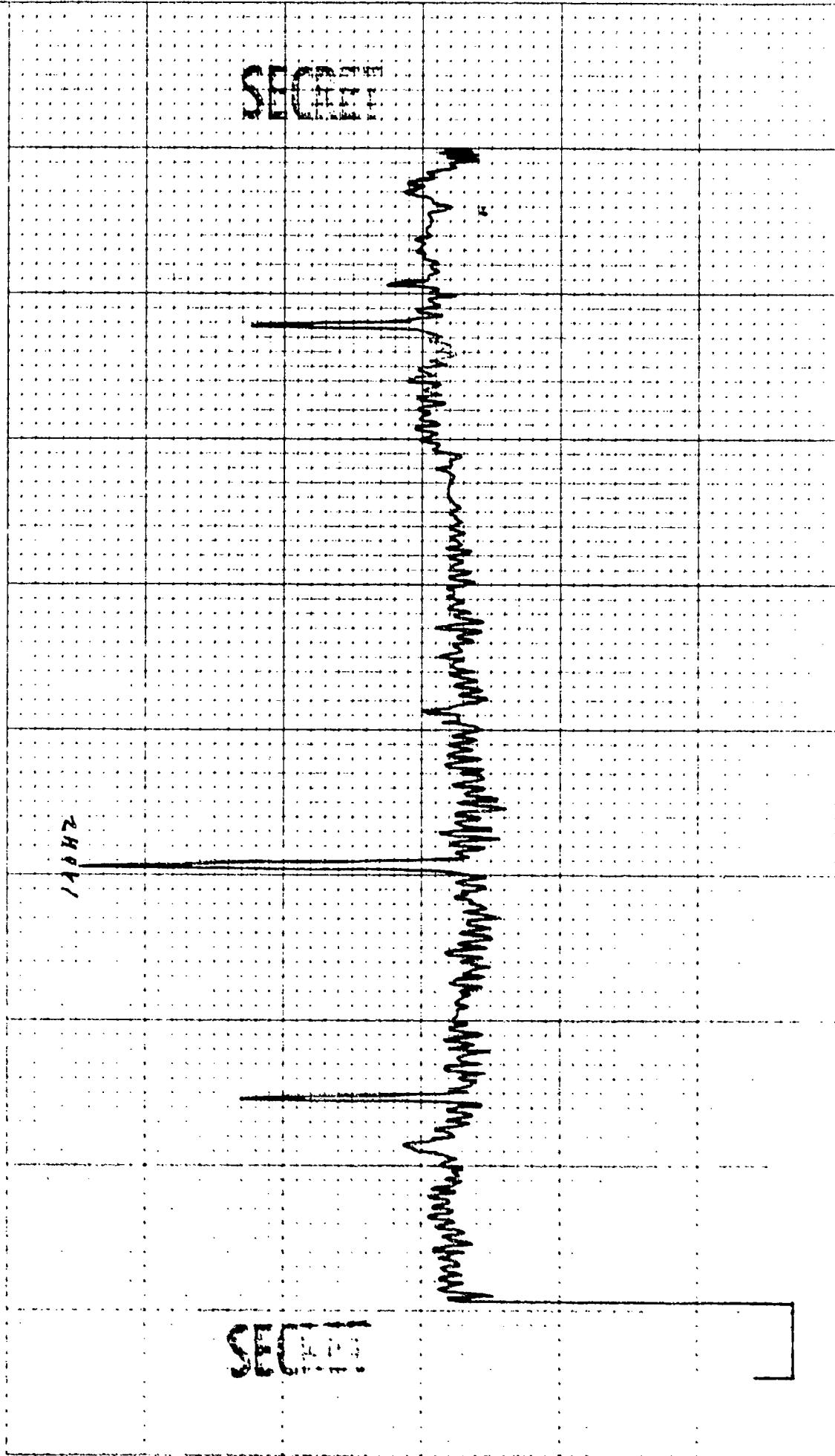
CONTROL: 1501 - 16 (DPR) DATE OF ANALYSIS: 28-44 REEL: M4 INDE X 3000
 BEAMFORMED SPECTRUM (ELEMENTS))
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: -10 DB
 CENTER FREQ: 150 HZ +7 DEG. AZ STEERING FILTER WTG: HANNING



1408 28 1000 2000 3000 4000

46 0703

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



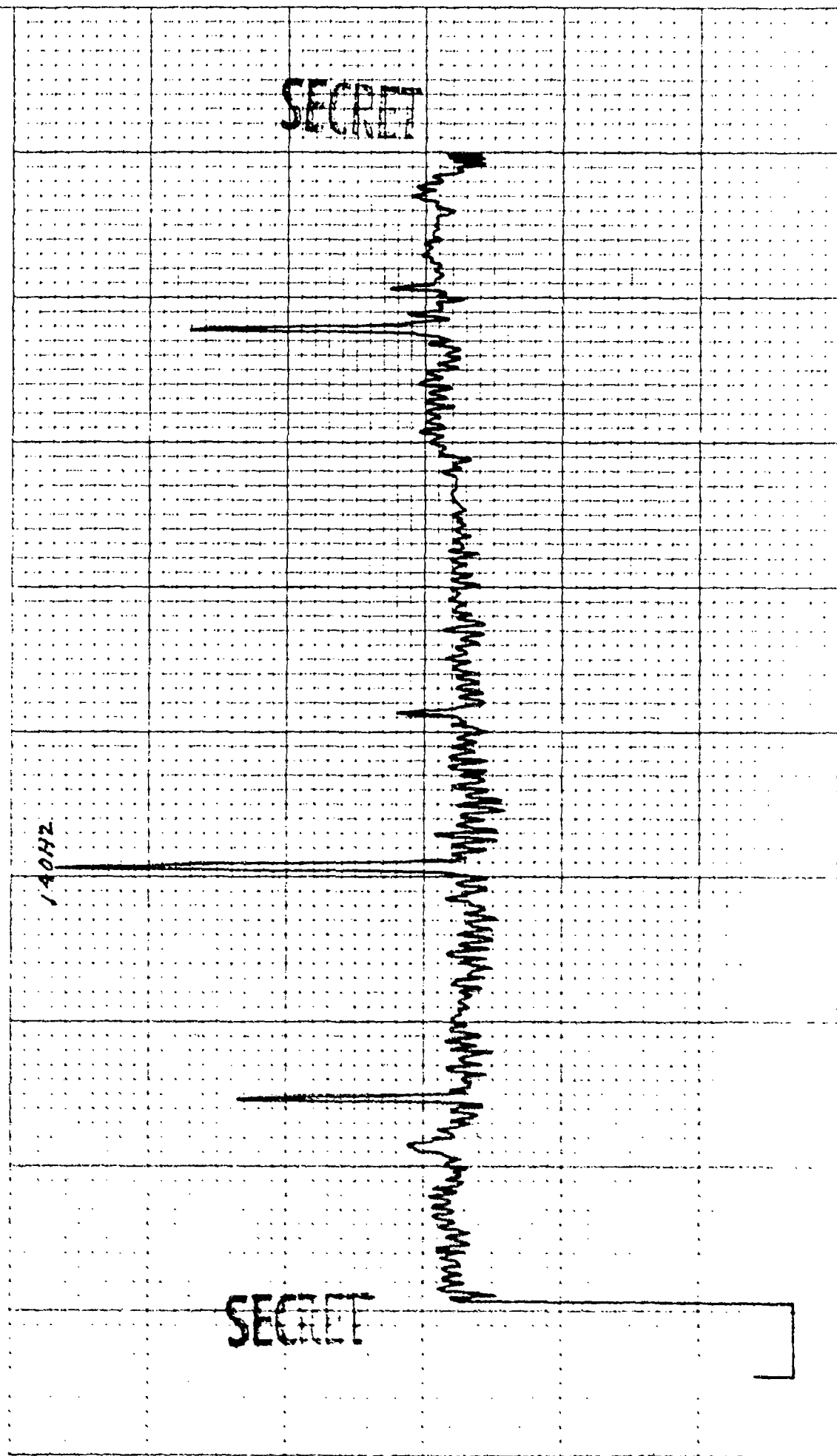
46 0703

REF ID: A66096

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

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

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



46 0703

REF ID: A66000

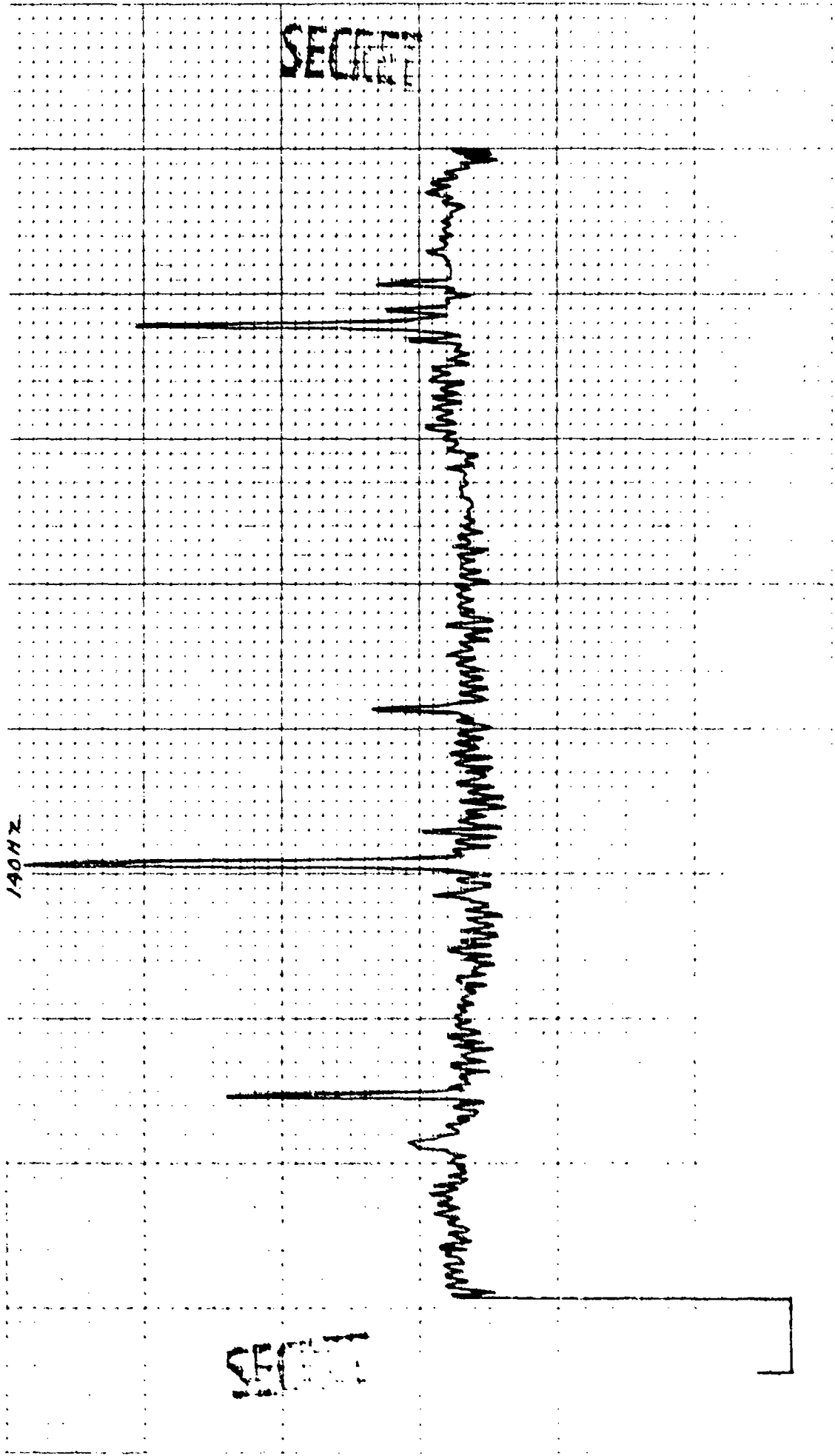
CONTROL: 1501 - 40 (DBE) DATE OF ANALYSIS: _____ REEL: 114 INDE X 3000

BEAMFORMED SPECTRUM (ELEMENTS) 29-44

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

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

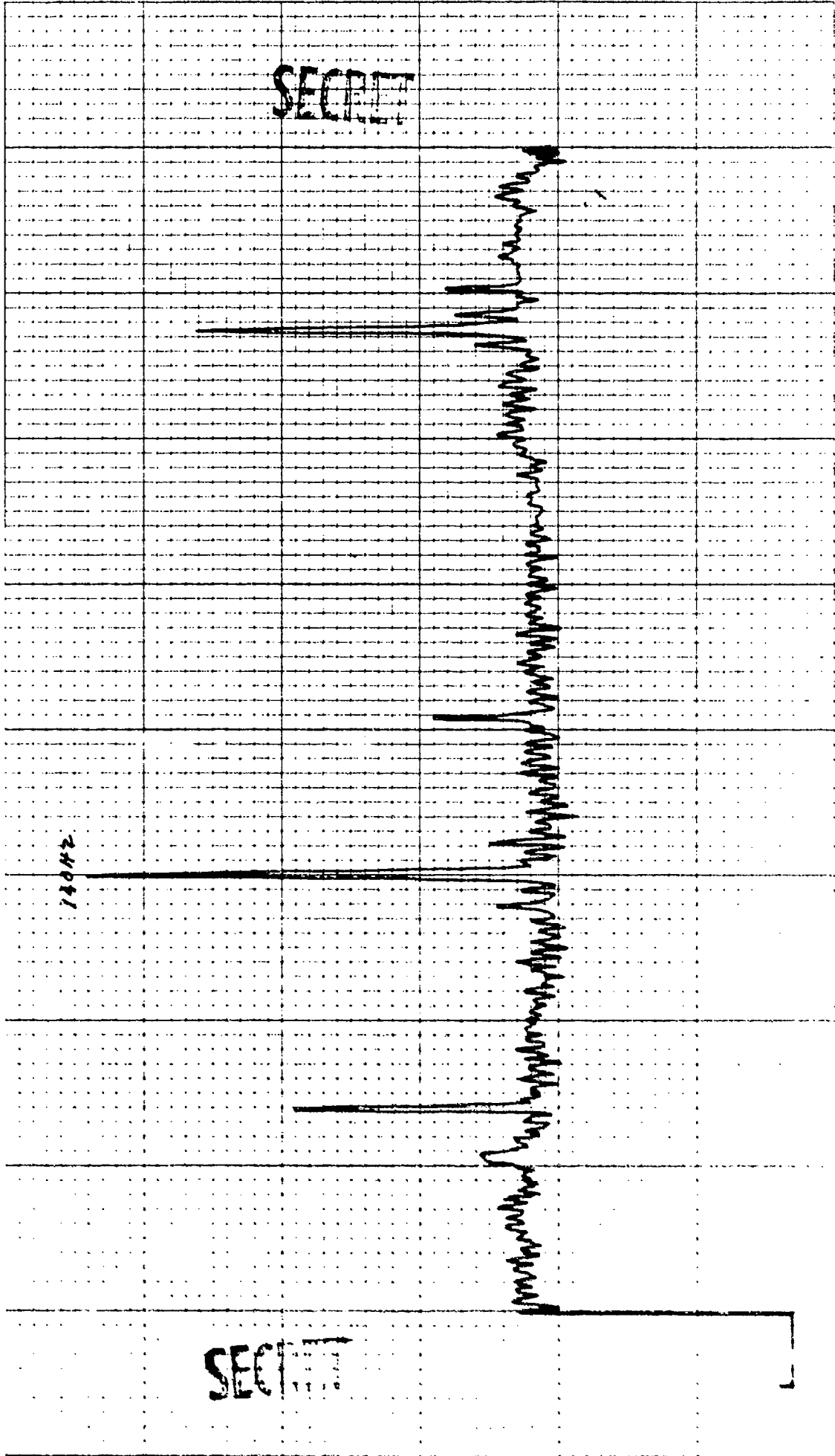
16 ELEMENTS +13 DEG. AZ STEERING



46 0703

NOE BY THE OPERATOR

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



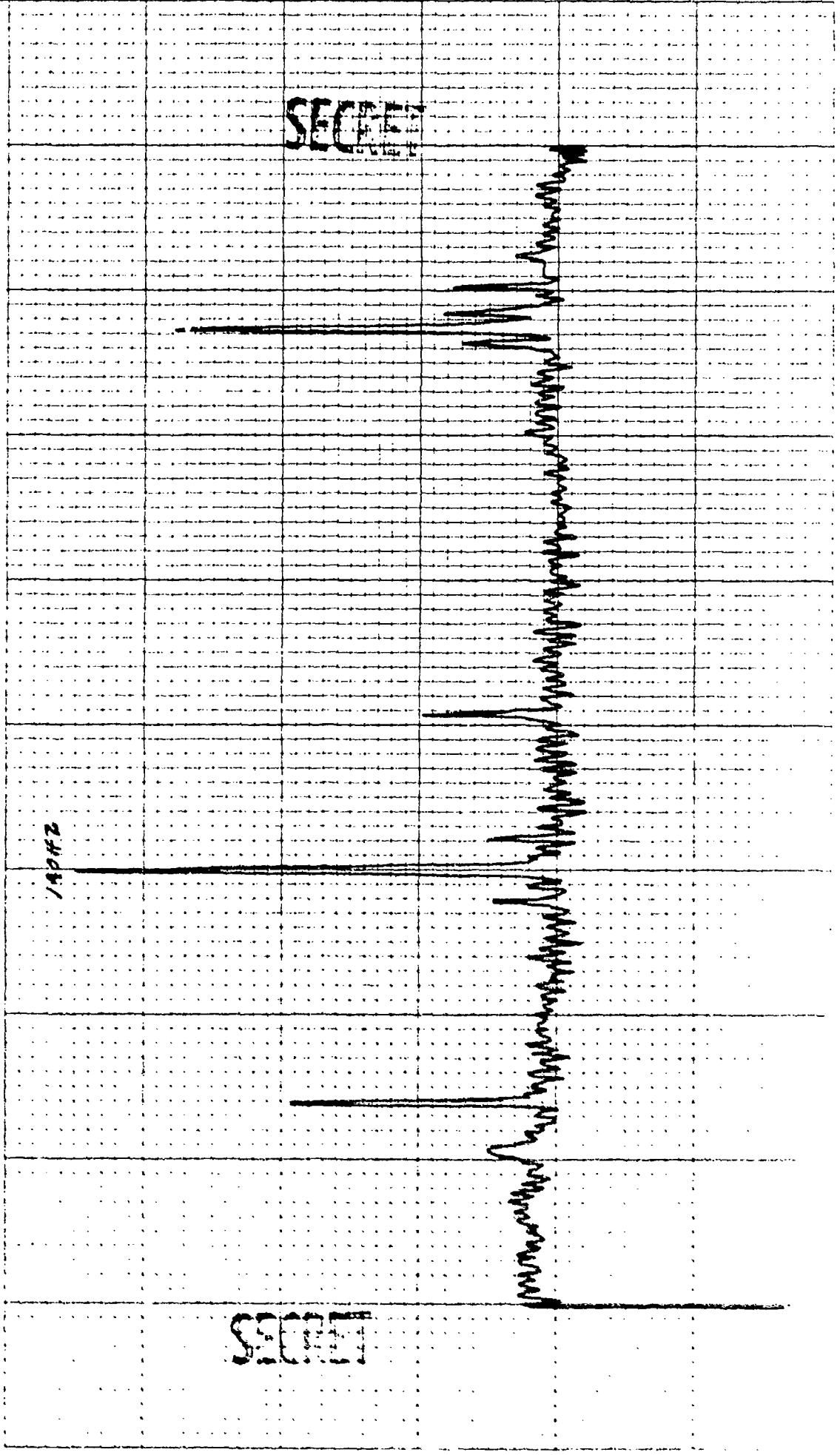
NOE VARIOUS WAVEFORMS

46 0703

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

DATE OF ANALYSIS: _____
29-44
DATE/TIME: 3-15-77-1501 Z
ANALYSIS BANDWIDTH: 1/10 HZ
± 17 DEG. AZ STEERING

REEL: 74
INTEGRATION TIME 320 SECS
ATTEN: -1 DB
FILTER WTG: HANNING



SECRET

SECRET

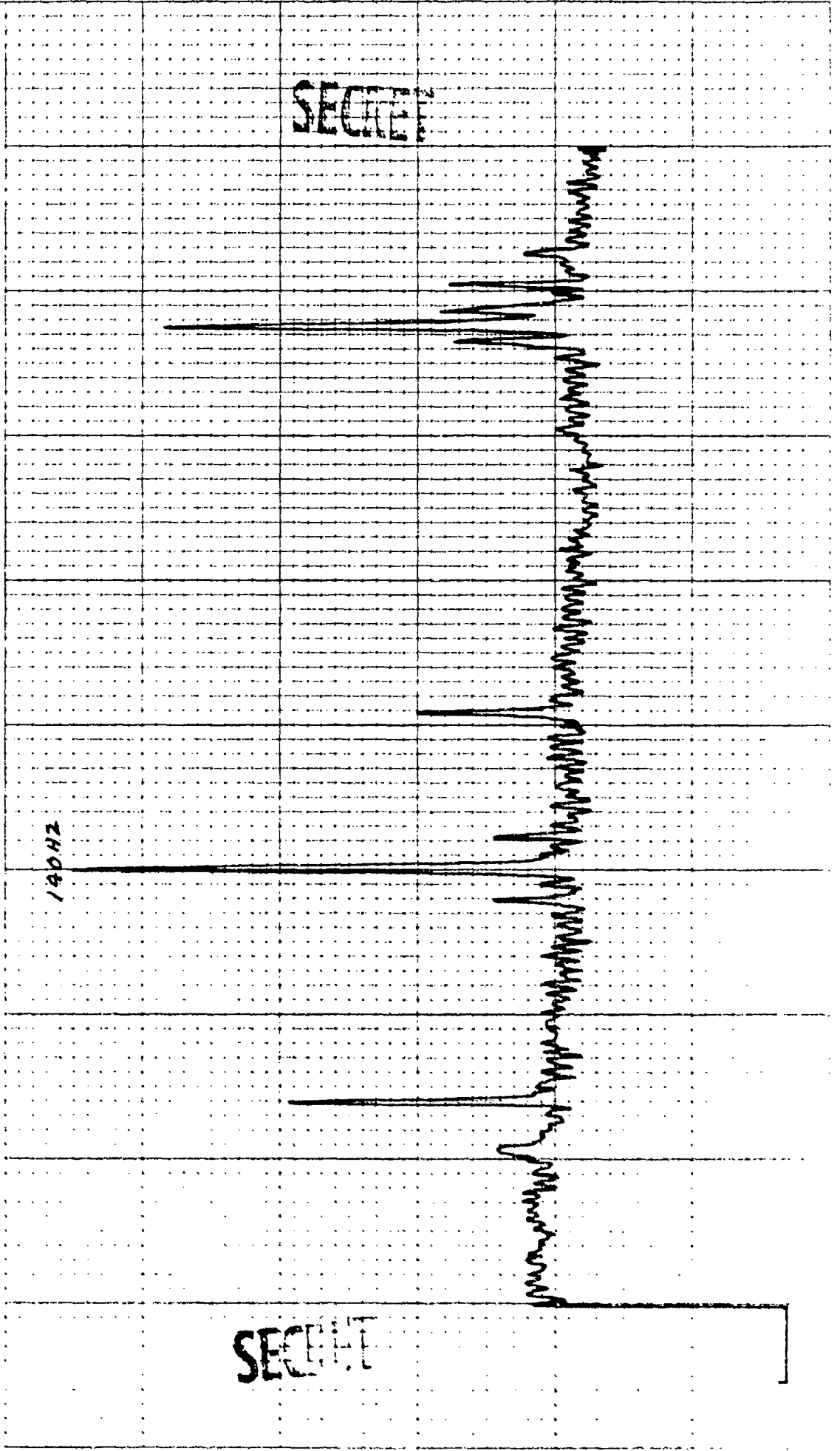
46 0703

REF: 1501-16 (DDB)

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

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

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



46 0703

CONTROL: 1501 - 16 (000)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

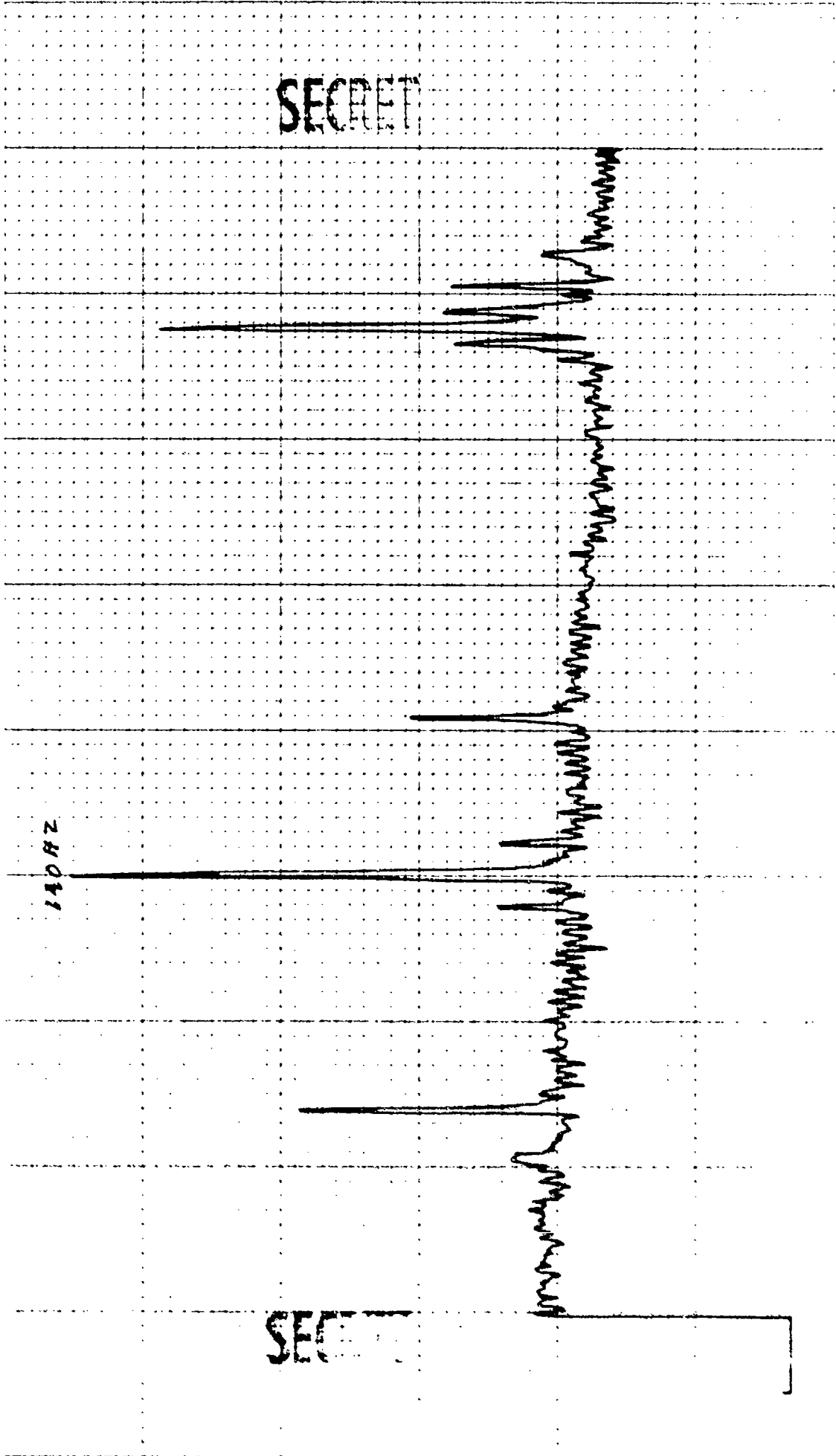
DATE OF ANALYSIS: 28-44
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
120 DEG. AZ STEERING

REEL: M4 INDE X3000
INTEGRATION TIME 320 SECS ATTEN: -10 DB
FILTER WTC: HANNING

140 HZ

SECRET

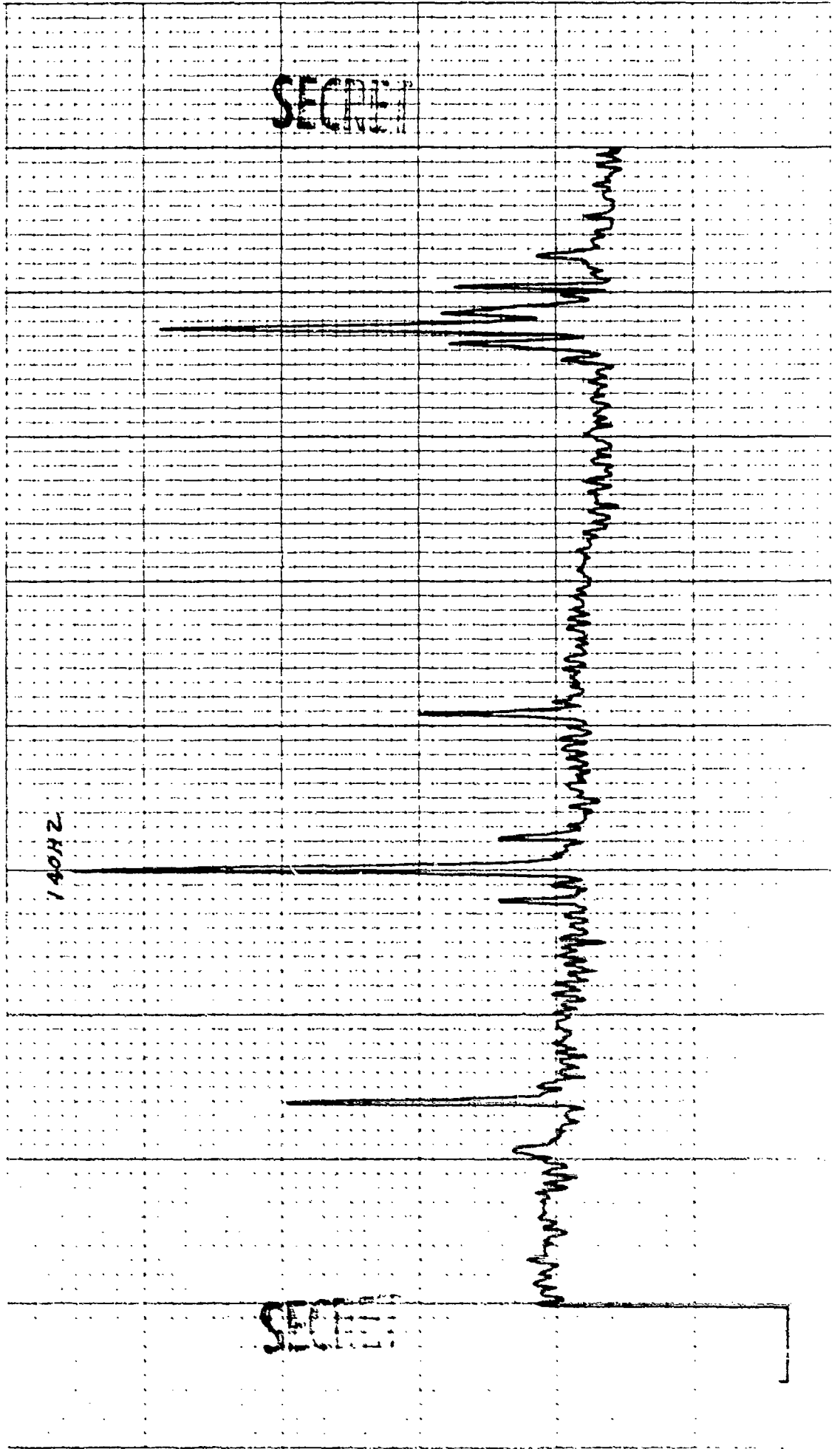
SECRET



46 0703

REF 30.5 TO THE DEPT. OF DEFENSE

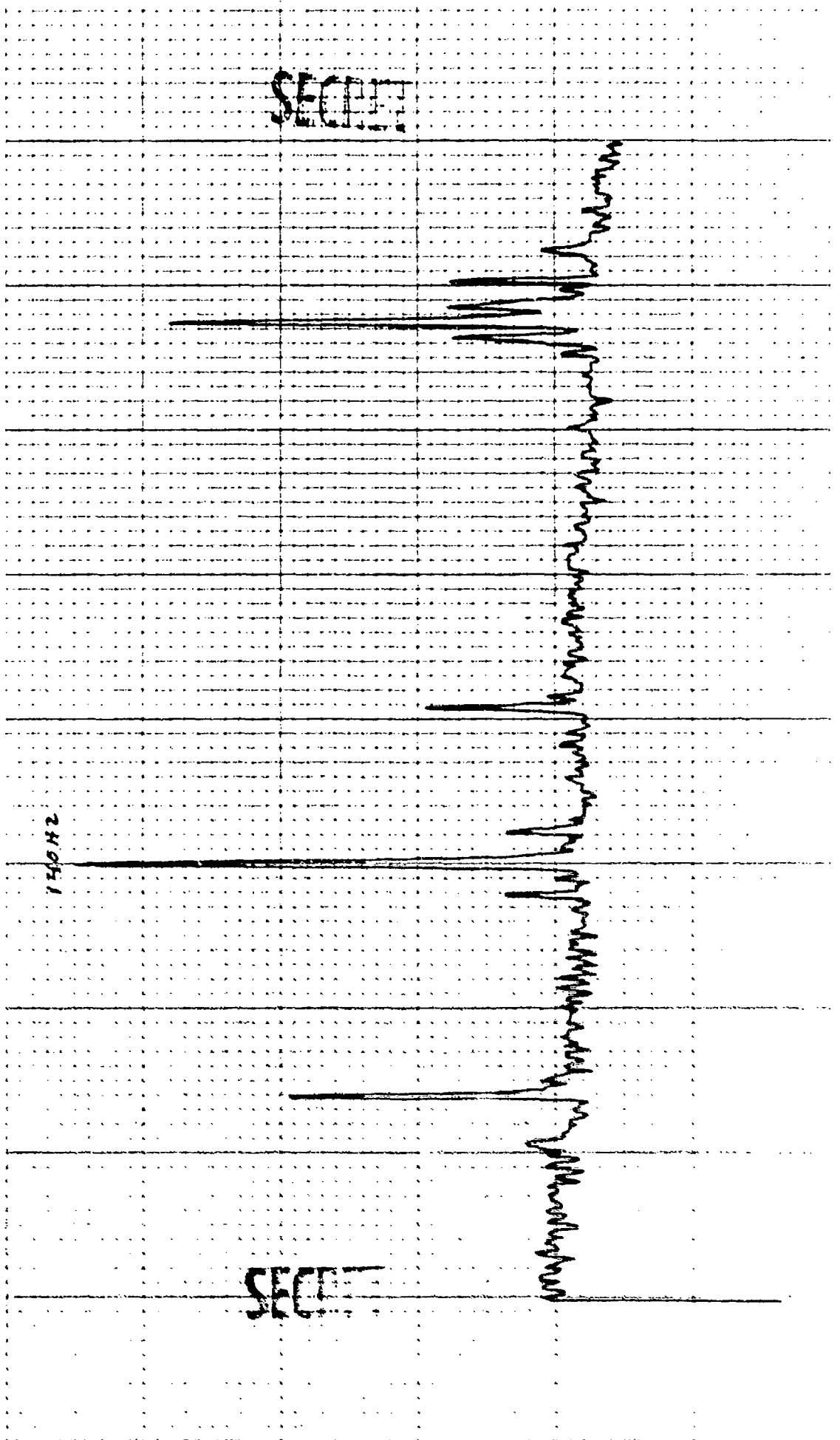
CONTROL: 1501 - 16 (DP)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
16 ELEMENTS
 DATE OF ANALYSIS: 29-44
 DATE/TIME: 3-15-77 - 150/2
 ANALYSIS BANDWIDTH: 1/10HZ
+2/ DEG. AZ STEERING
 REEL: 44 INDE X3000
 INTEGRATION TIME 320 SECS ATTN: -7.5 DB
 FILTER WTC: HANNING



46 0703

145 20.000 20.000 20.000 20.000

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



45 0703

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

REEL: 144

INDE X 3000

INTEGRATION TIME 320 SECS

ATTEN: -18 DB

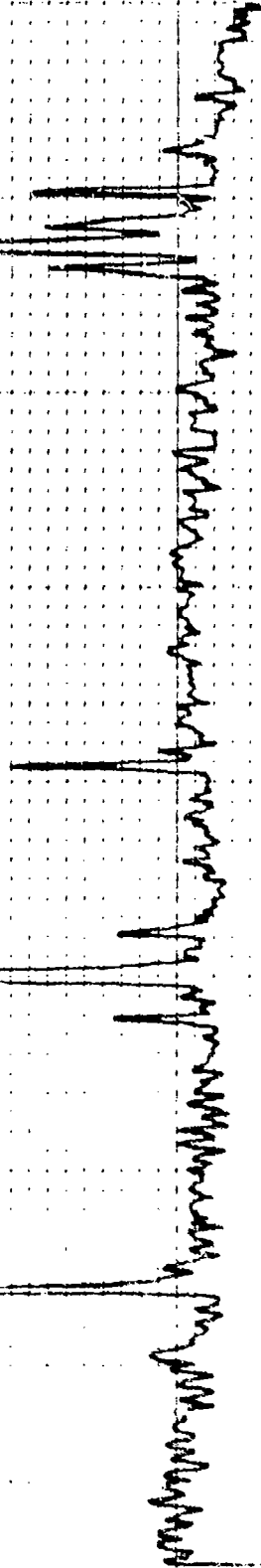
FILT: FB

WTG: HANNING

140HZ

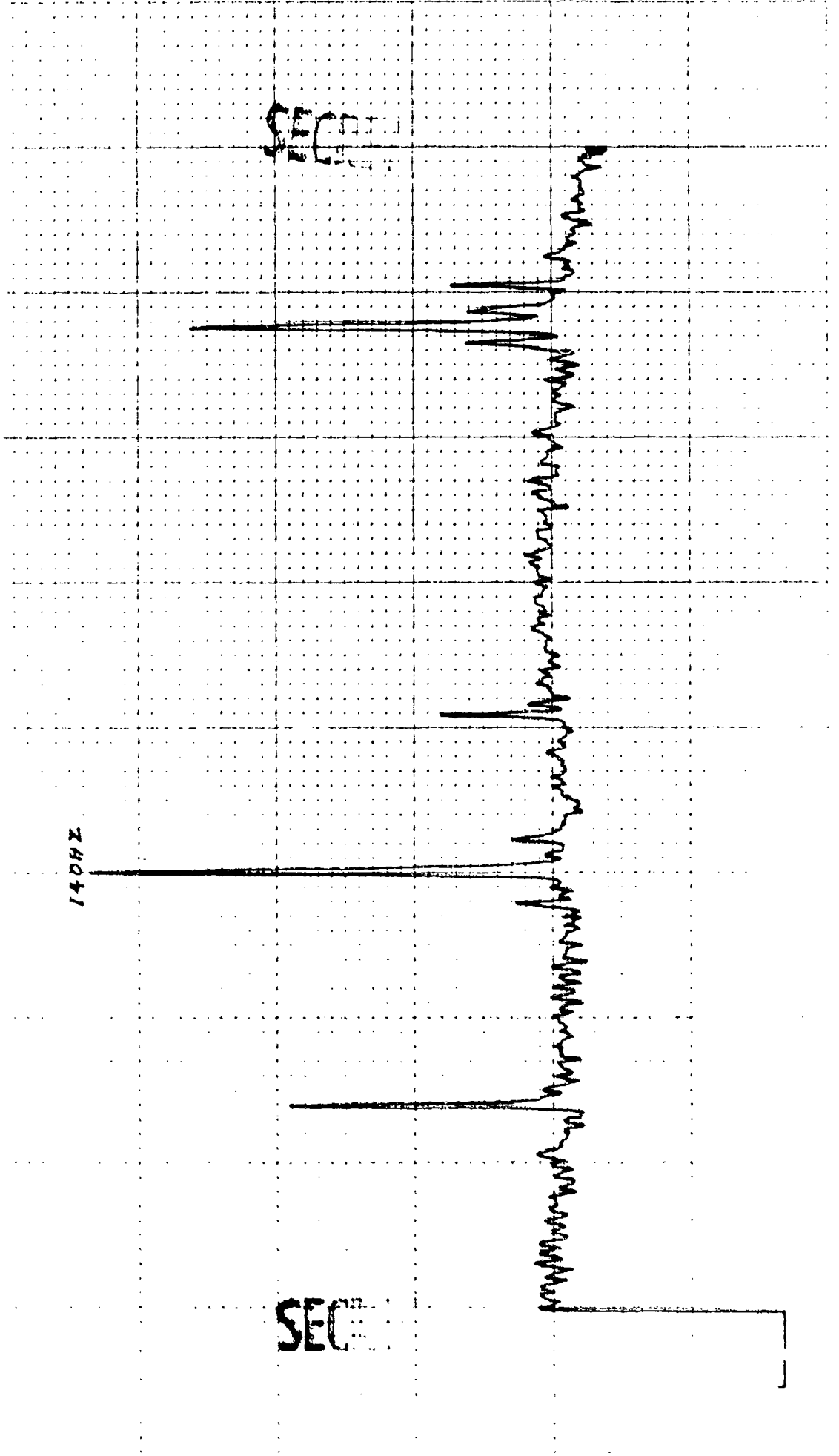
SECRET

SECRET



46 0703

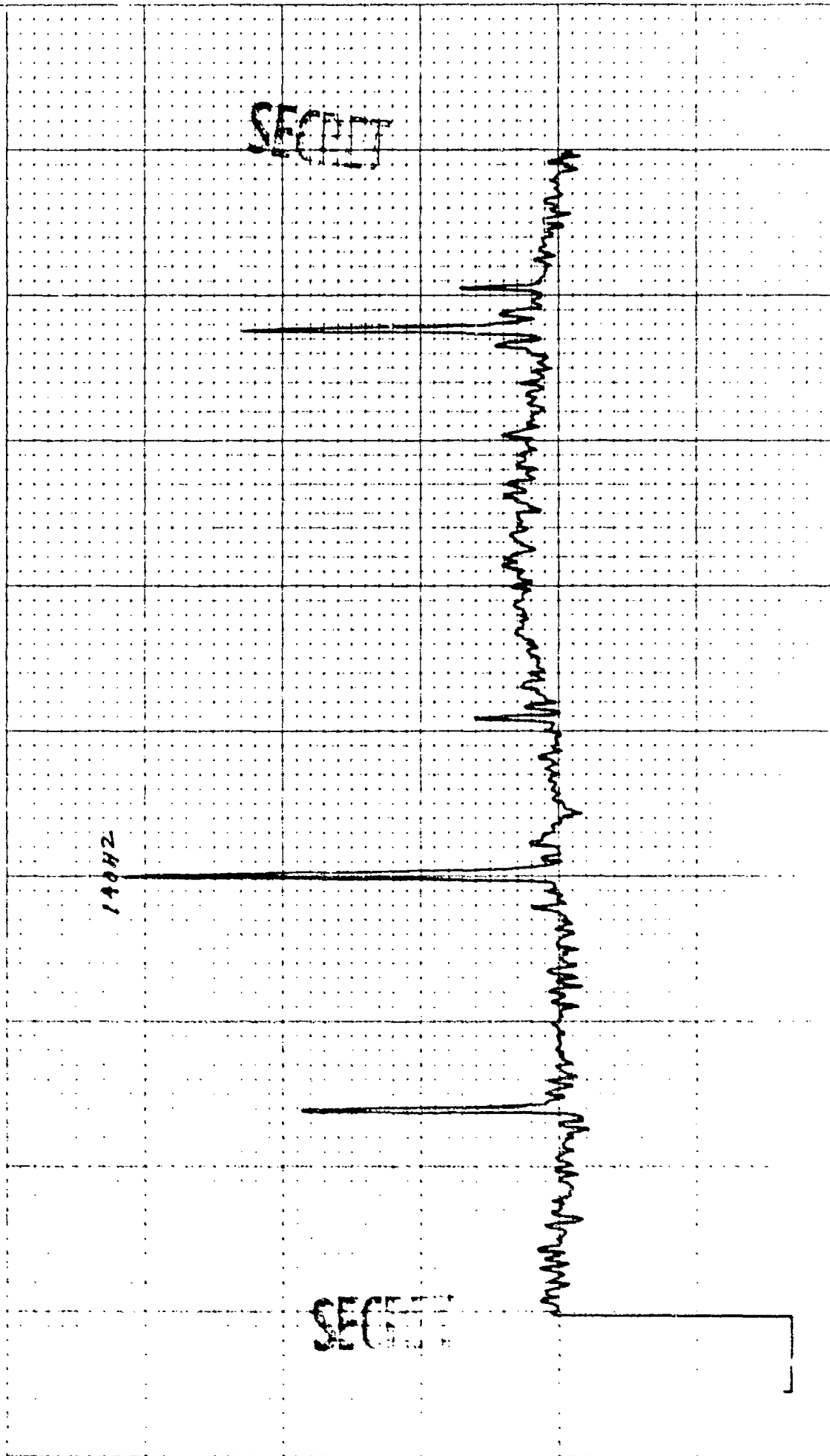
CONTROL: 1501-16 (DPB) DATE OF ANALYSIS: 29-44 REEL: 44 INDE X 3000
 BEAMFORMED SPECTRUM(ELEMENTS) 29-44
 EXERCISE: BEARING STAKE DATE/TIME: 7-15-77 - 1501 Z INTEGRATION TIME 320 SECS ATTN: -10 DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1710HZ FILTER WIG: HANNING
16 ELEMENTS +27 DEG. AZ STEERING



46 0703

DATE OF ANALYSIS: 29-54

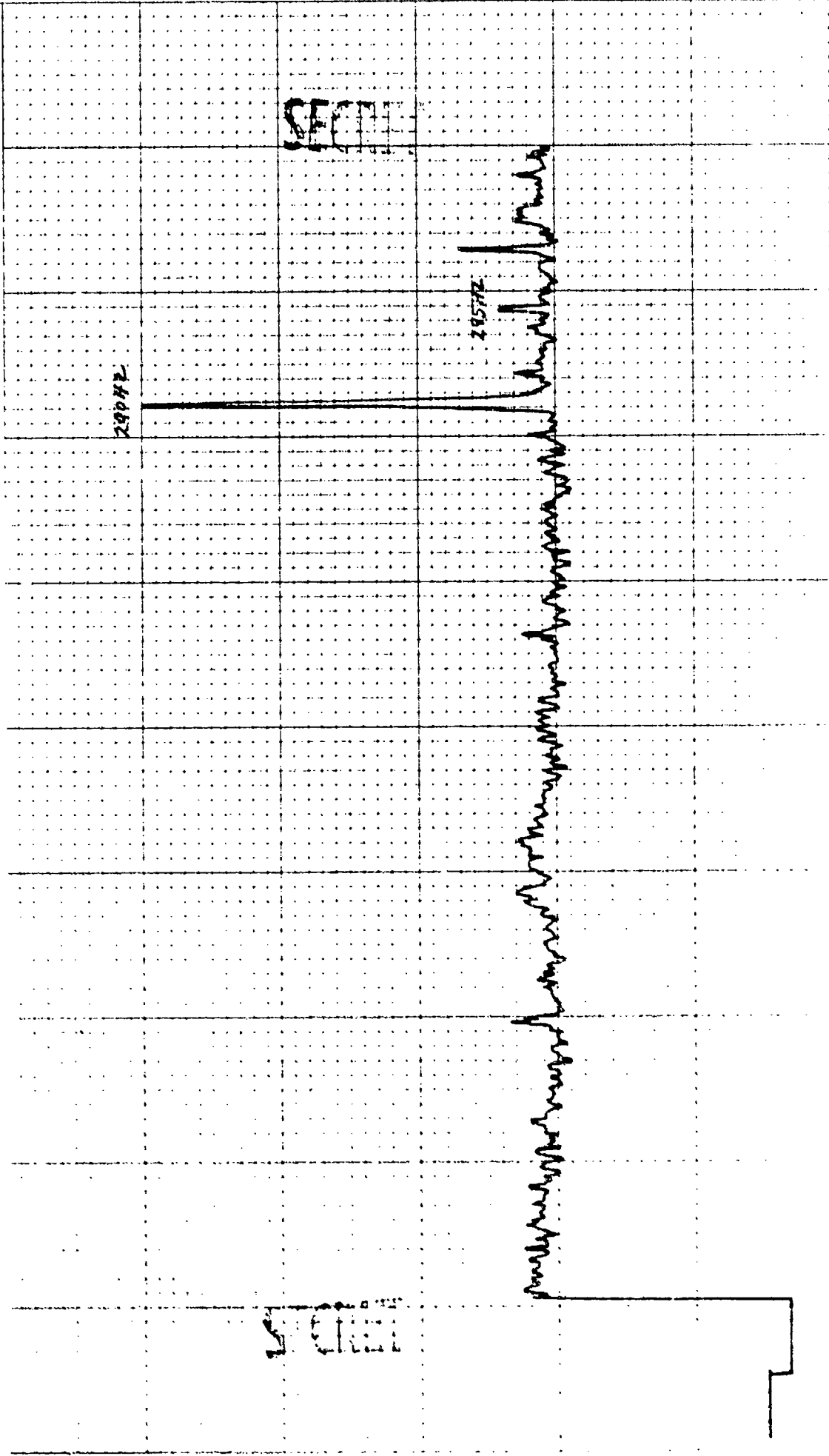
CONTROL: 1501 - 16 (DPR) DATE OF ANALYSIS: 29-54 REEL: 144 INDE X3000
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 3-25-77 - 1501 Z INTEGRATION TIME 320 SECS ATTN: -18 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ F.I.T.F.R W.T.G: HANNING
16 ELEMENTS +29 DEG. AZ STEERING



46 0703

10-21-54 10:00 AM

CONTROL: 1501 - 16 (DPR) DATE OF ANALYSIS: 99-44 REEL: M4 INDE X3000
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 1501 Z INTEGRATION TIME 320 SECS ATTEN: 70 DB
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER: WTG: HANNING
16 ELEMENTS +7 DEG. AZ STEERING



REF: 28000000000000000000

46 0703

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

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

REEL: M4

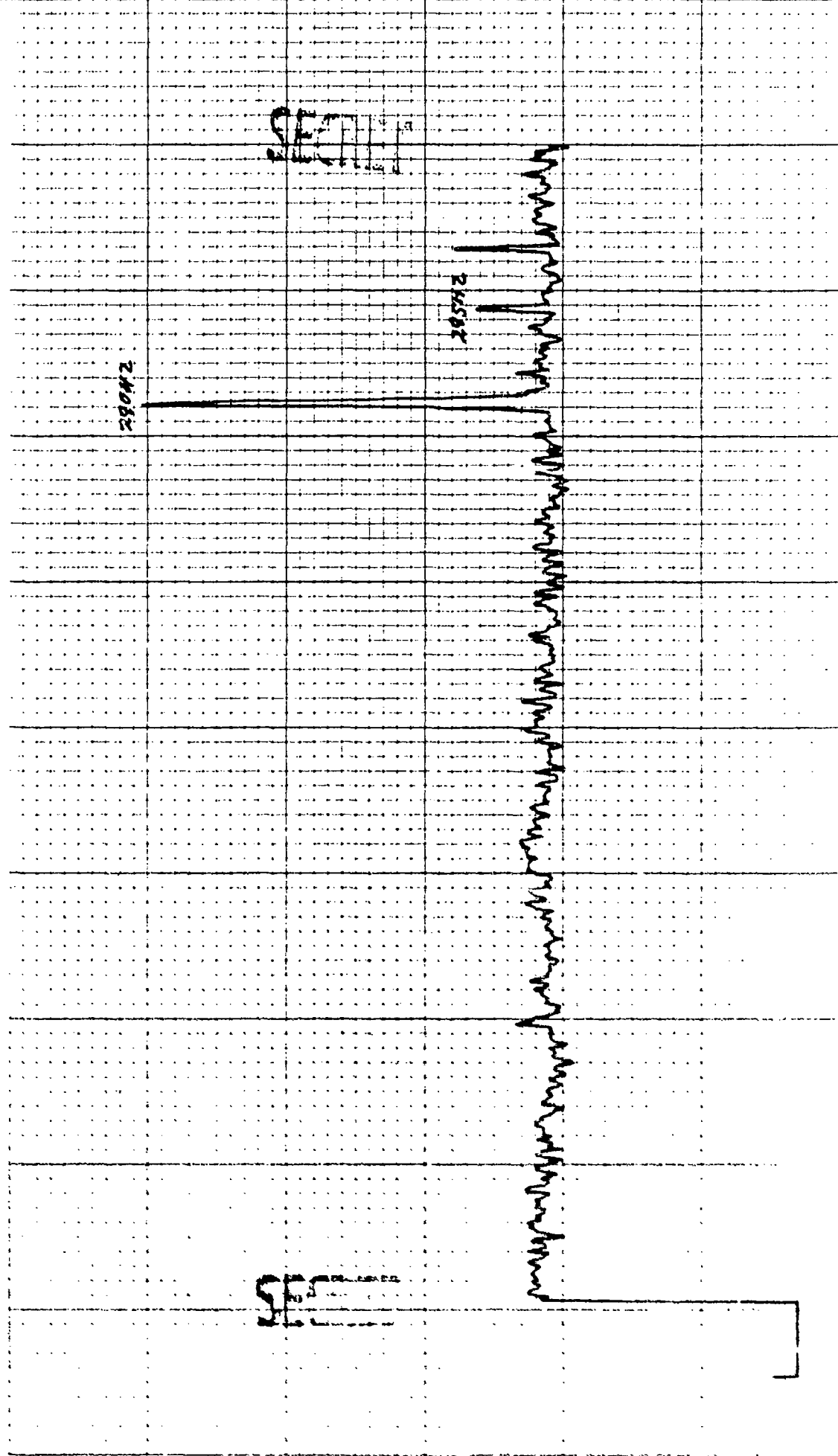
INDE X3000

INTEGRATION TIME 320 SECS

ATTEN: 70 DB

FILTER

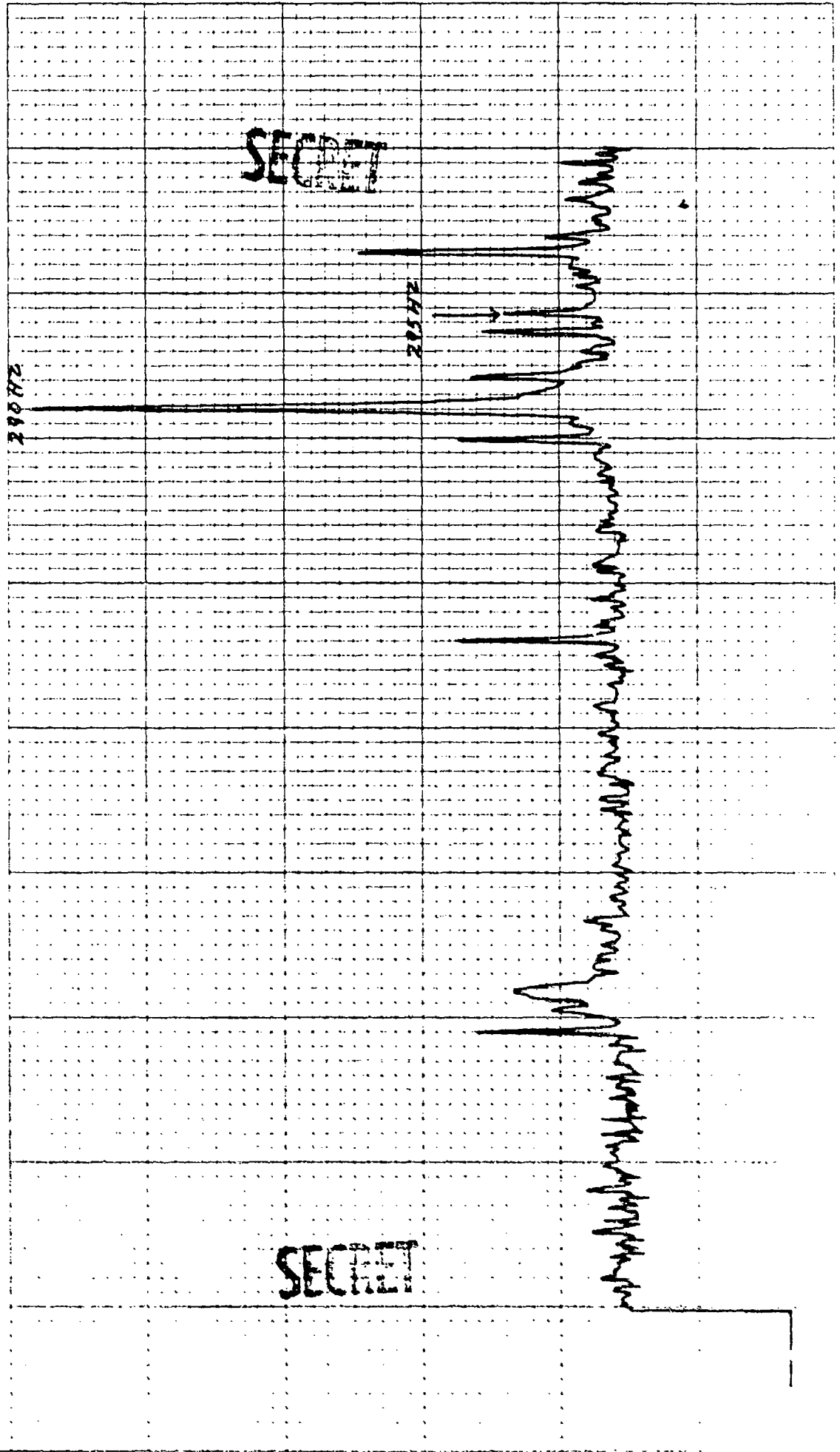
WTG: HANNING



45 0703

107 2400 VOLTS RMS 100 100 100

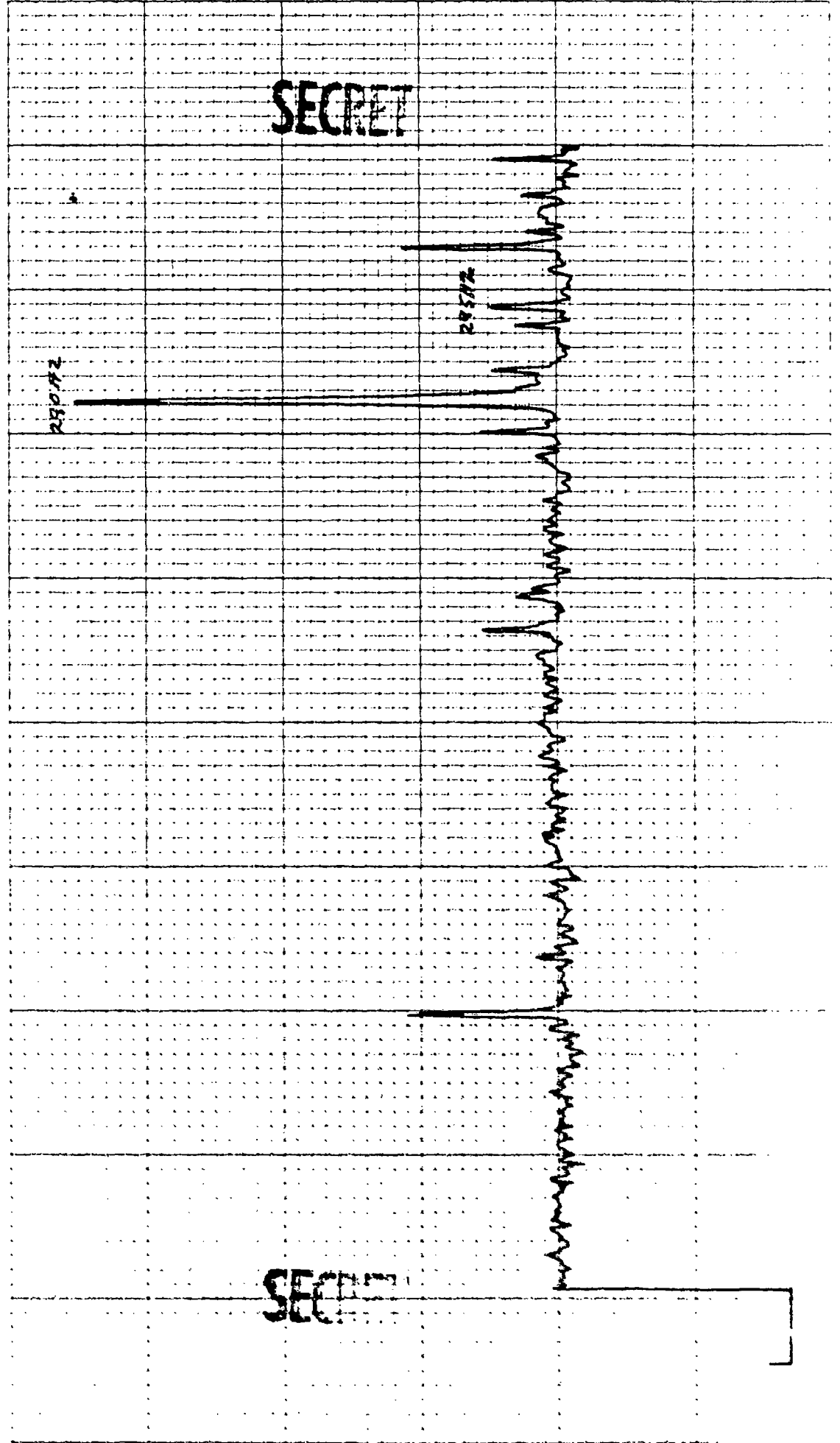
CONTROL: 1501 - 48 (0P8) DATE OF ANALYSIS: _____ REEL: M4 INDE XC2000
 REAMFORMED SPECTRUM(ELEMENTS) 29-44
 EXERCISE: BEARING STAKE DATE/TIME: 3-15-77-1501 Z INTEGRATION TIME 320 SECS ATTEN: 18 DB
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 /6 ELEMENTS † // DEG. AZ STEERING



46 0703

REF ID: A66070

CONTROL: 1501 - 16 (DPR) DATE OF ANALYSIS:
 BEAMFORMED SPECTRUM(ELEMENTS) 09-44
 EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: -18 DB
 CENTER FREQ: 270 HZ FILTER WTG: HANNING
 /c ELEMENTS + 13 DEG. AZ STEERING



SECRET

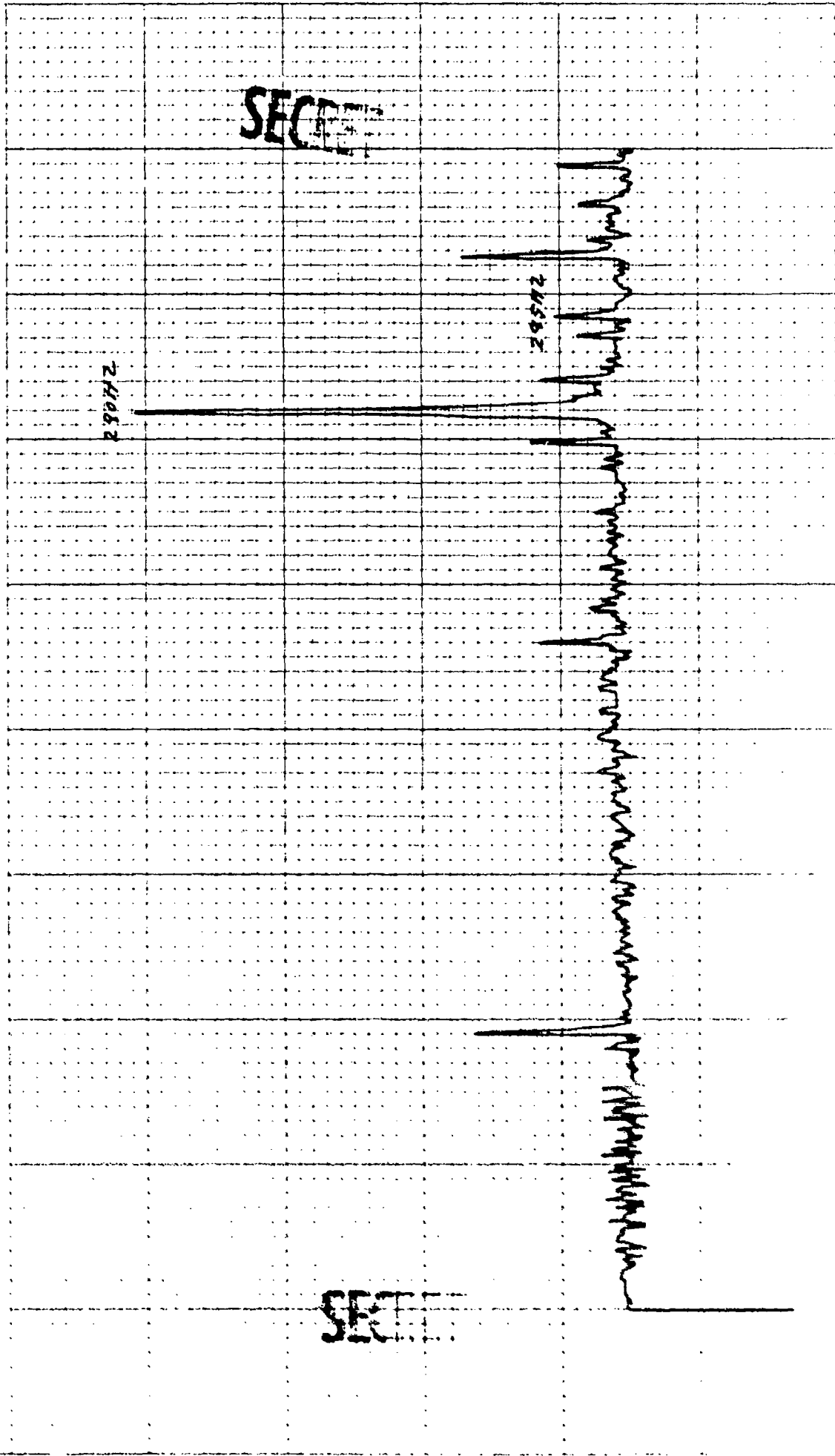
SECRET

46 0703

REF: 5415 TO THE DEPT. OF DEFENSE

CONTROL: 1501 - 16 (DDB)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS
DATE OF ANALYSIS: 29-44
DATE/TIME: 375-72-1501 Z
ANALYSIS BANDWIDTH: 1710 HZ
+15 DEG. AZ STEERING

REEL: 19 INDE X 3000
INTEGRATION TIME 320 SECS ATTN: -16 DB
FILTER WTG: HANNING



45 0703

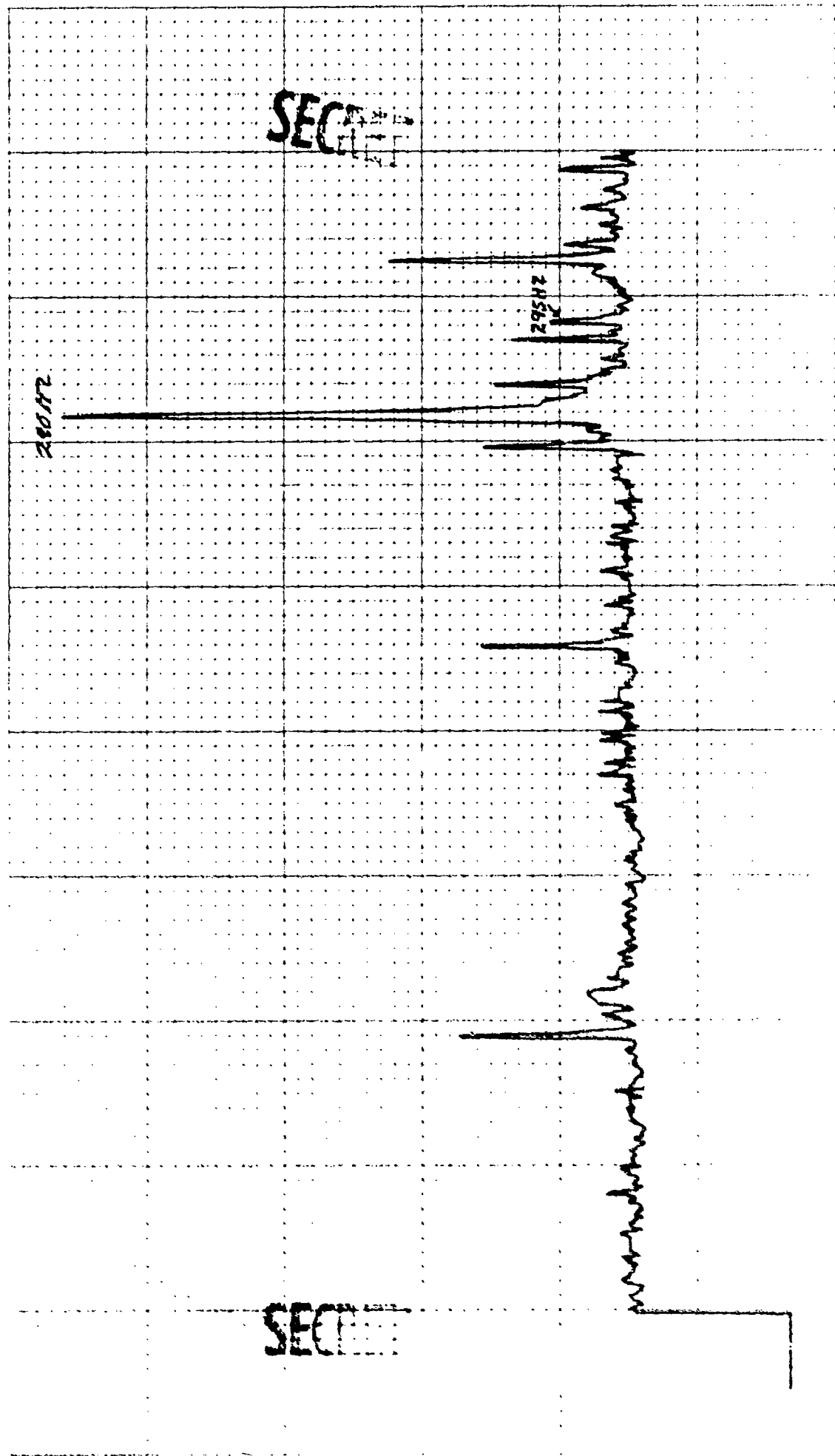
CONTROL: 1501 - 16 (008) REEL: 14 INDE X3000

BEAMFORMED SPECTRUM/ELEMENTS DATE OF ANALYSIS: 09-44

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

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

16 ELEMENTS + 17 DEG. AZ STEERING



46 0703

1952 SEP 20 10 00 AM

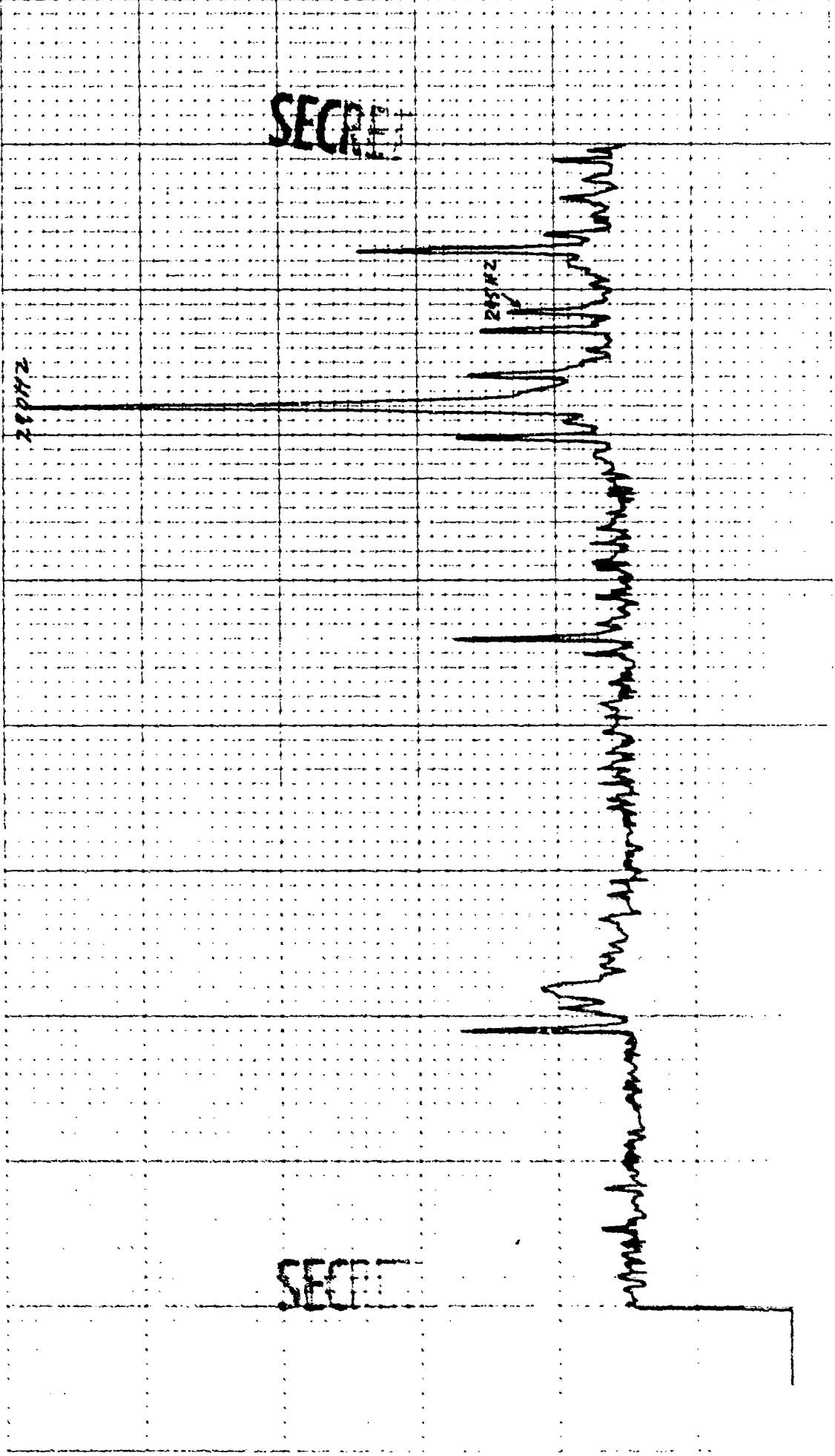
CONTROL: 1501 - 16 (2PB) DATE OF ANALYSIS: REEL: M4 INDE X3000

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

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

CENTER FREQ: 270 HZ +19 DEG. AZ STEERING

16 ELEMENTS

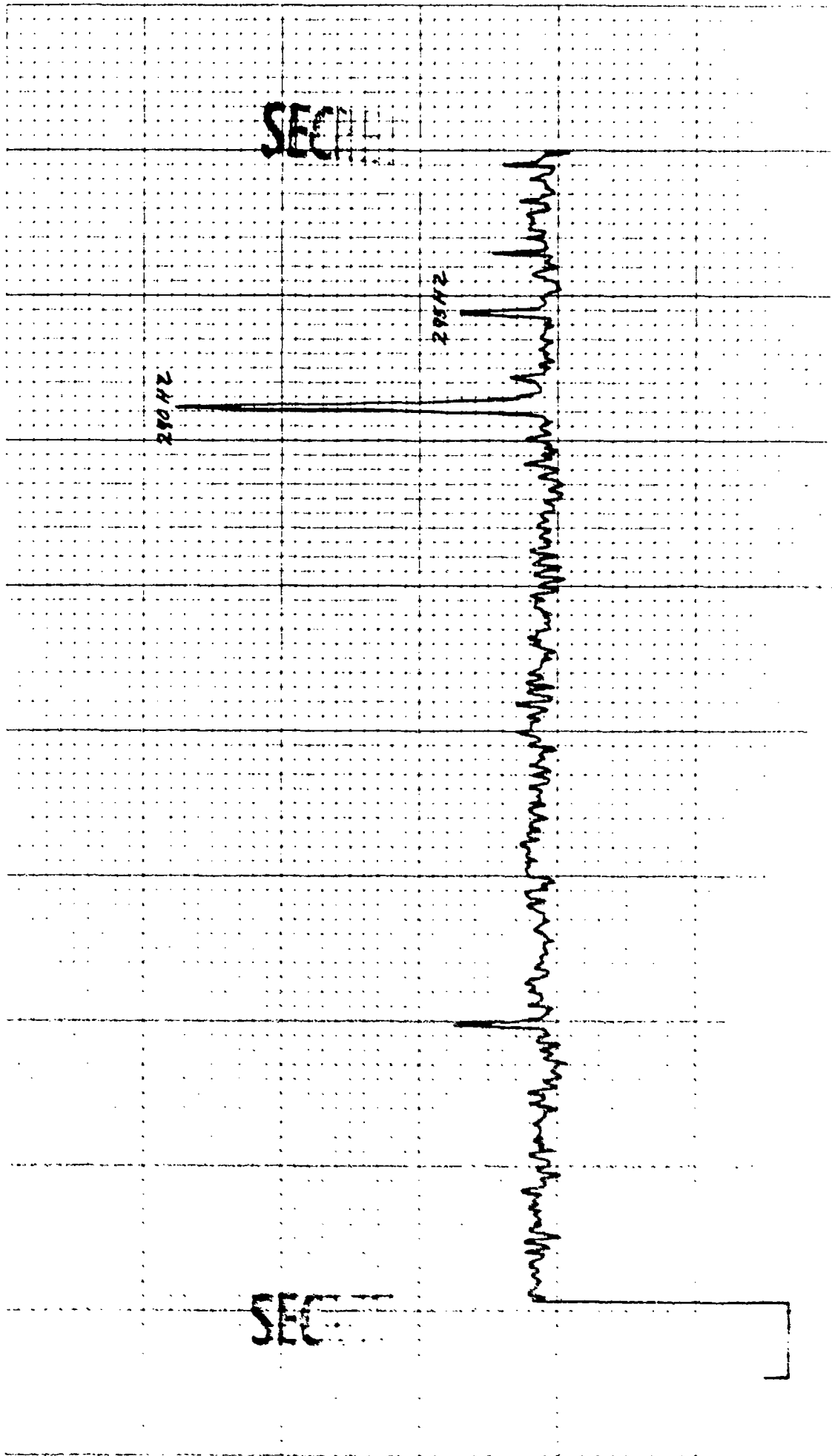


46 0703

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

DATE OF ANALYSIS: _____
29-44)
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
+20 DEG. AZ STEERING

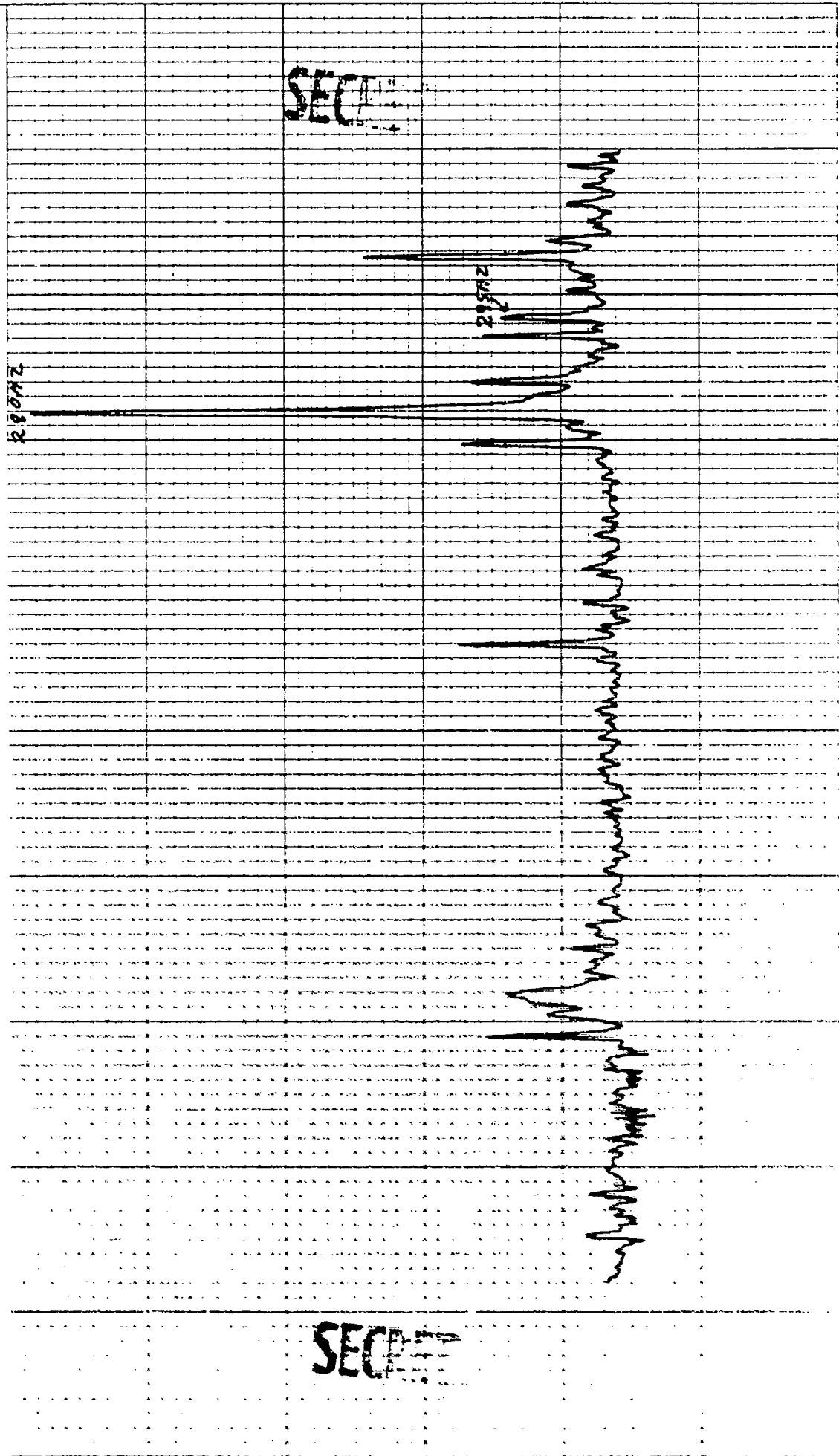
REEL: _____ INDEX _____
INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



46 0703

10.2.10.10 THE TIME INTERVAL IS IN SECS

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



46 0703

102 2040 0000 0000 0000 0000

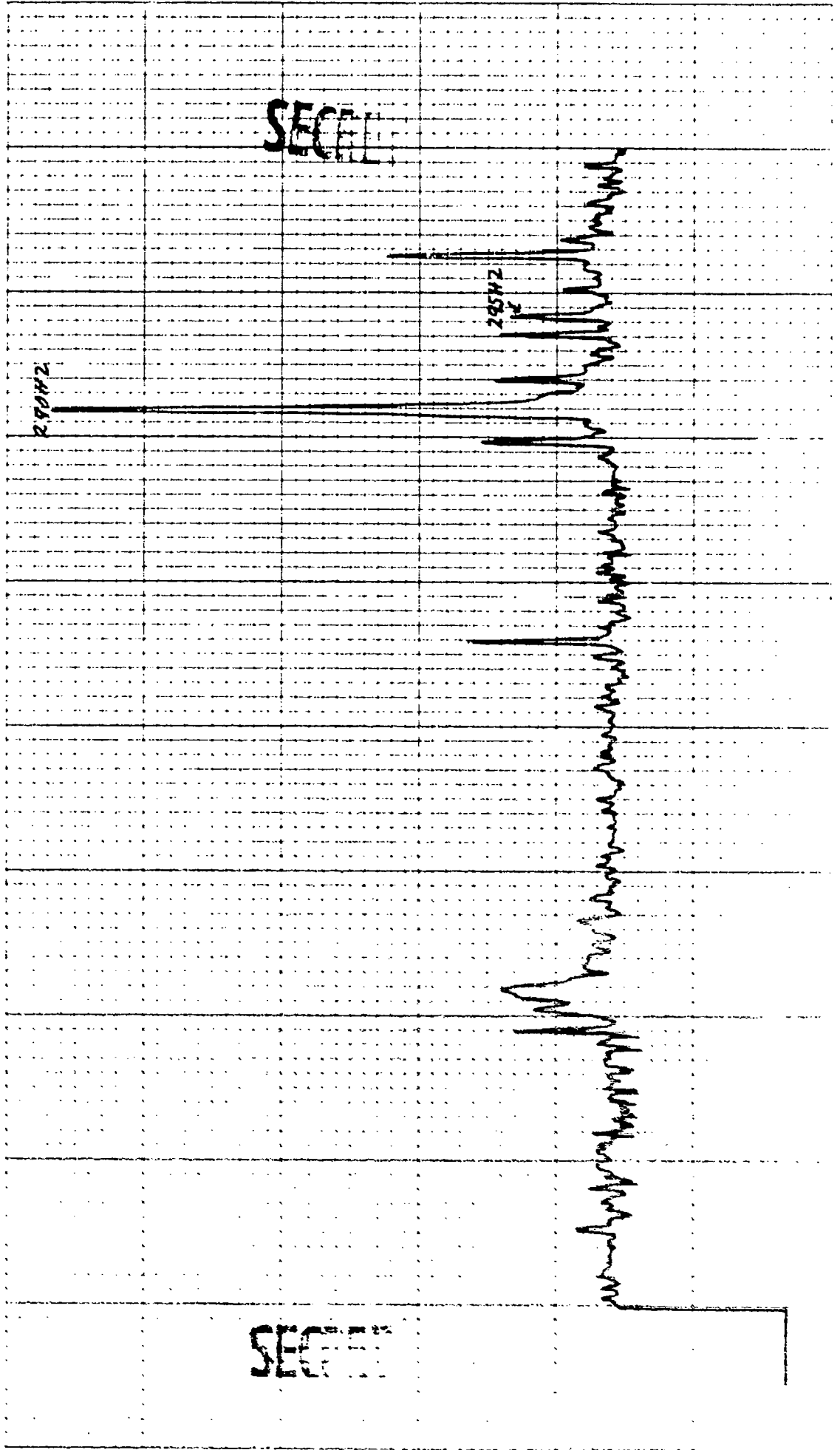
CONTROL: 1501 - 16 (DPO)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
16 ELEMENTS

DATE OF ANALYSIS: - - - - -
29-44

INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

REEL: M4 INDEX X300c

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

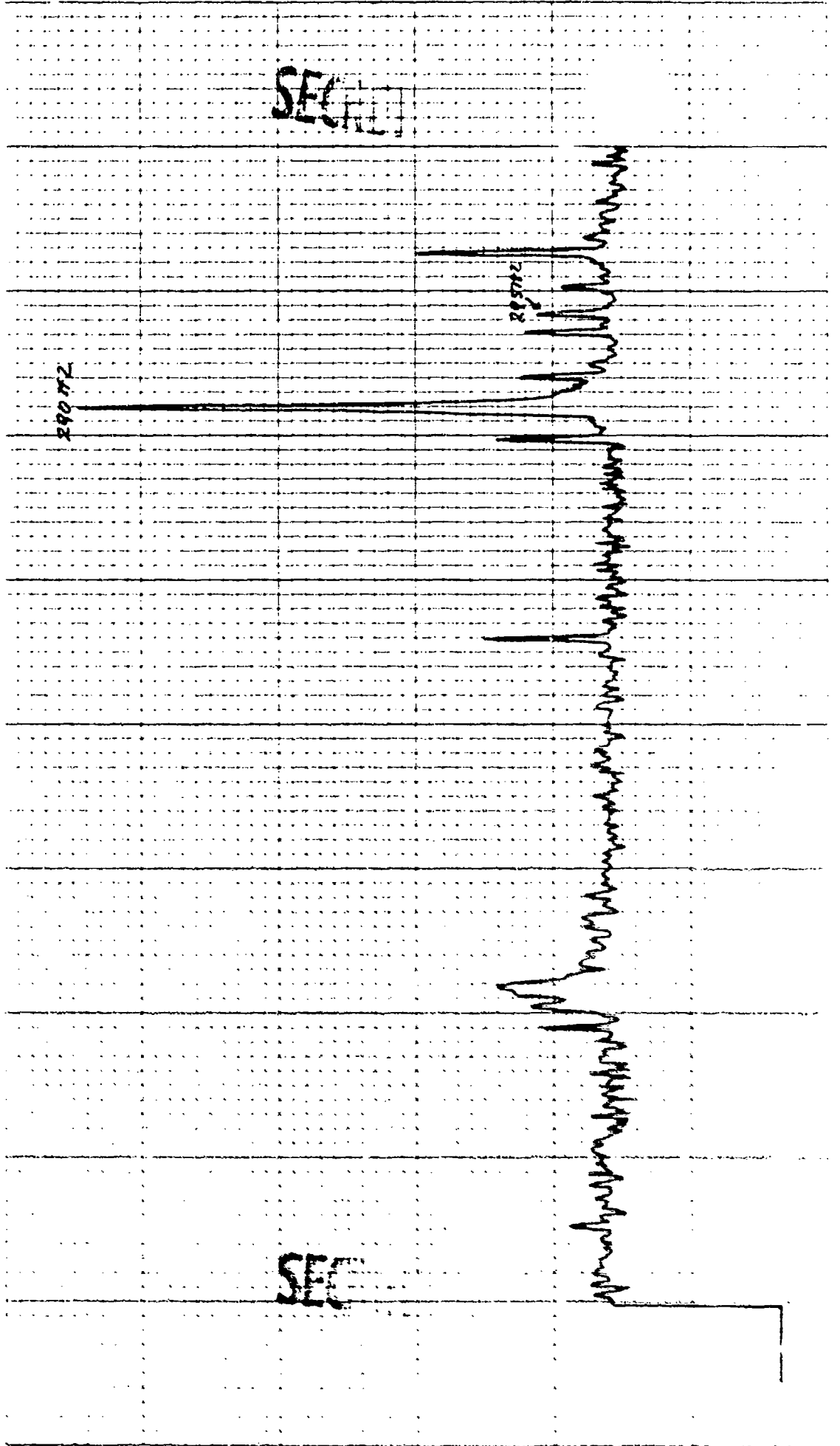


46 0703

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

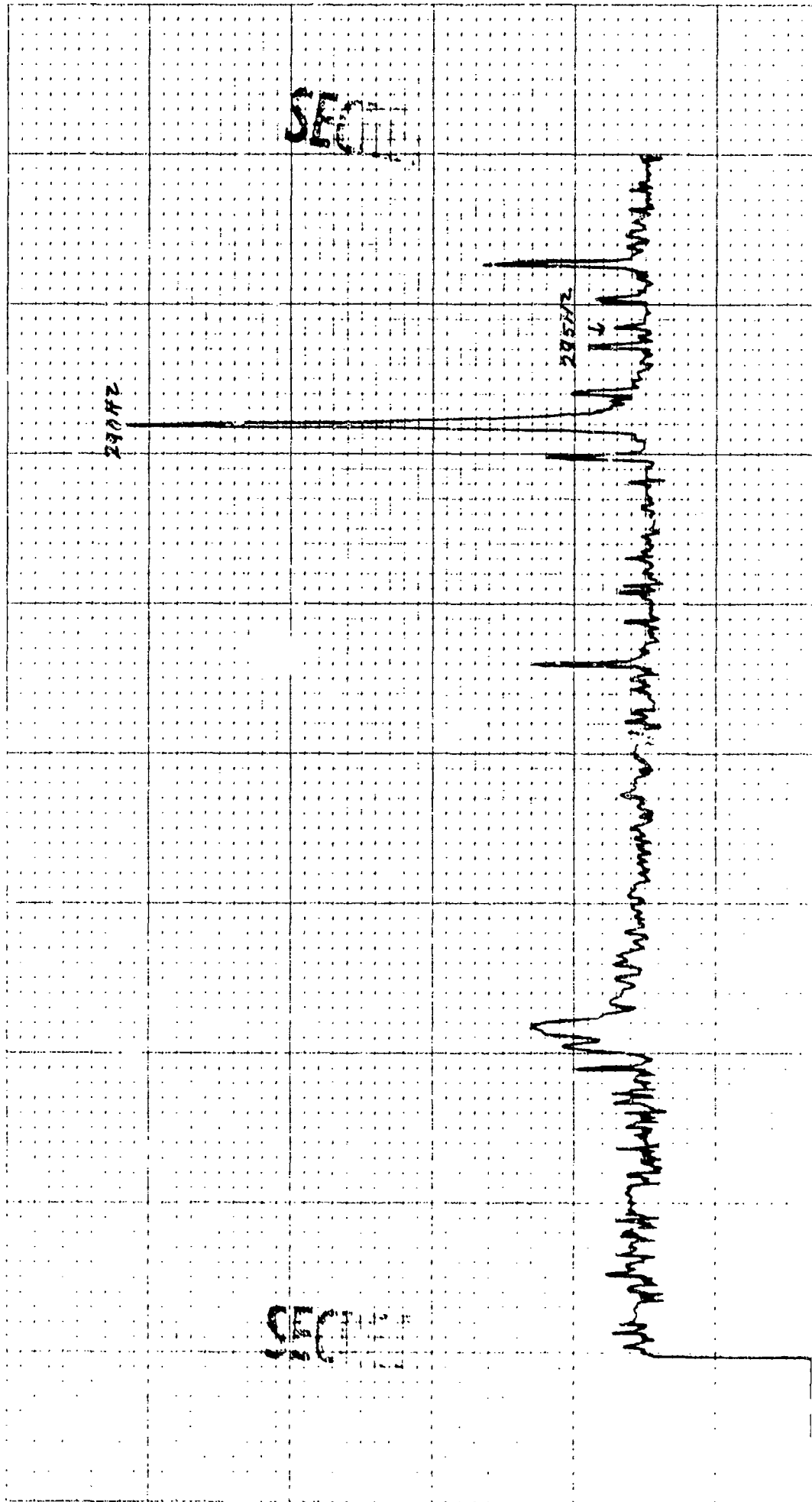
DATE OF ANALYSIS: - - -
28-44
DATE/TIME: 17577 - 150/Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 25 DEG. AZ STEERING

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



46 0703

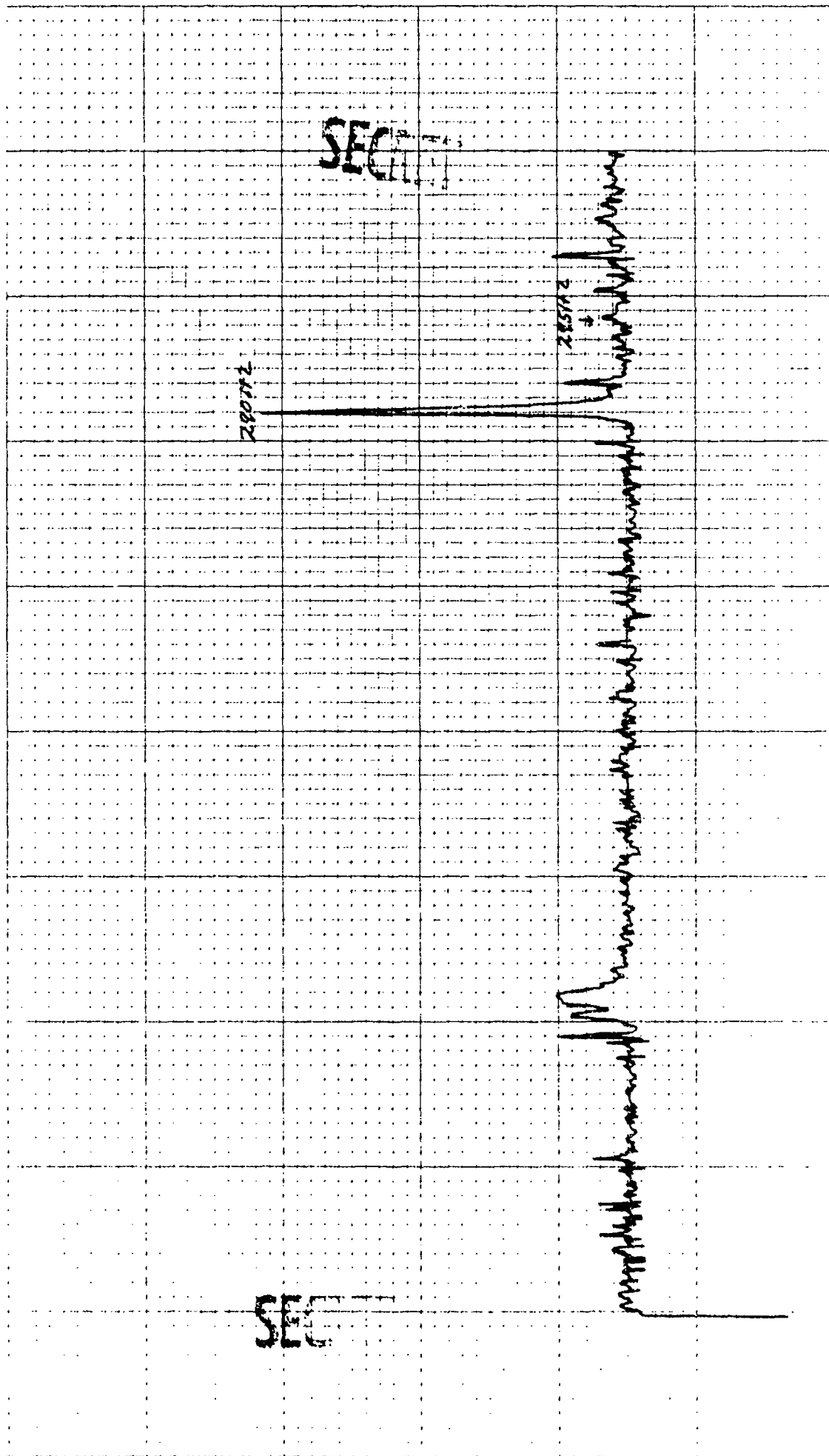
CONTROL: 1501-16 (DP8) DATE OF ANALYSIS: 29-44 REEL: 114 INDE X 3000
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-15-77 -1501Z INTEGRATION TIME 320 SECS ATTEN: -18 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 CENTER FREQ: 270 HZ +27 DEG. AZ STEERING



46 0703

NOTE: REFER TO THE INSTRUMENT MANUAL

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



CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 8

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

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

NOISE LEVEL

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

SIGNAL-NOISE-RATIO

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

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 8

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

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

NOISE LEVEL

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

SIGNAL-NOISE-RATIO

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

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 8

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

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

NOISE LEVEL

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

SIGNAL-NOISE-RATIO

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

CONFIDENTIAL

CONFIDENTIAL

DATA POINT 8

SIGNAL GAIN

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

ARRAY GAIN

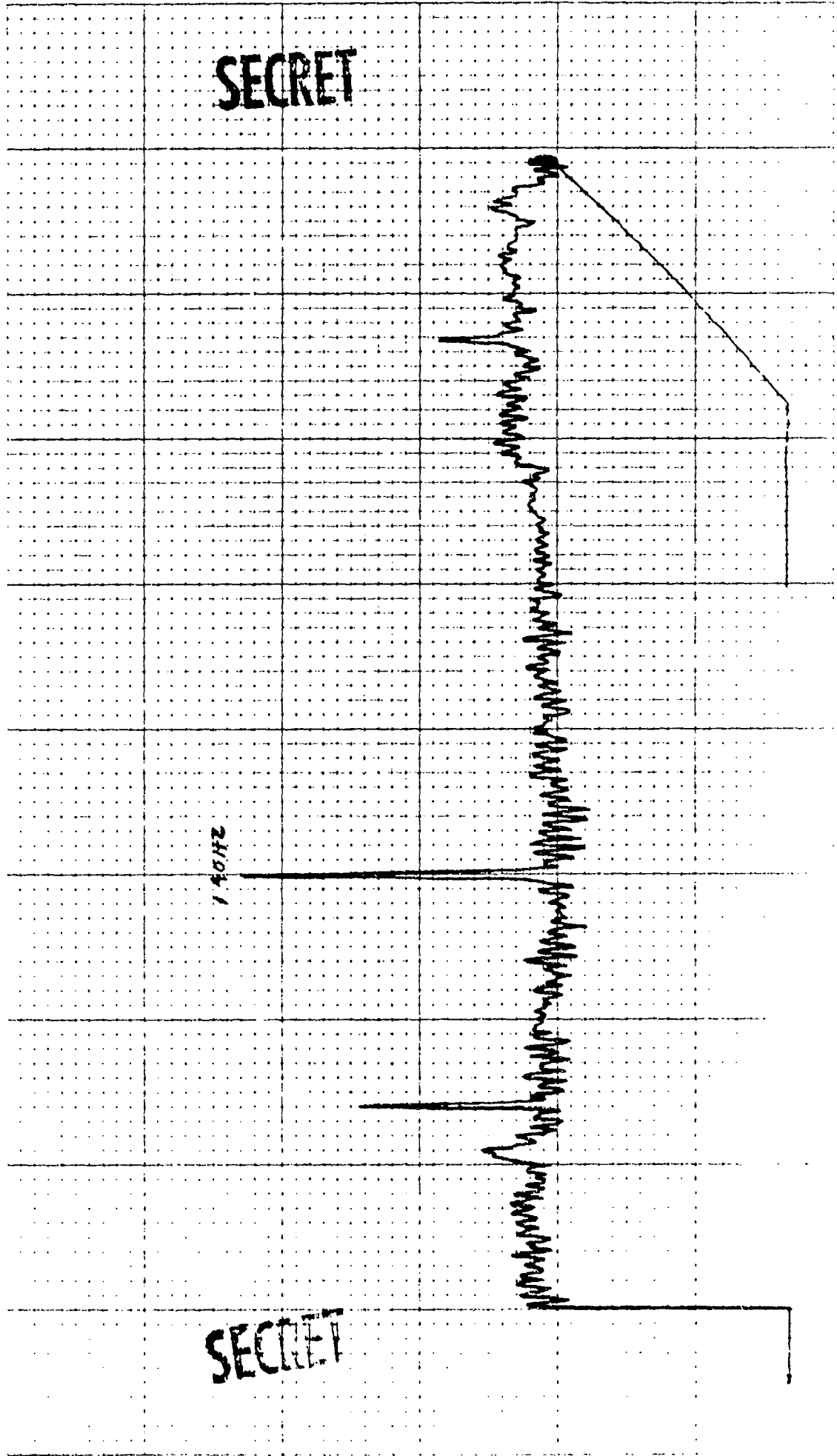
MRA SNR	<u>44.1</u>	<u>48.2</u>	<u>10.6</u>
MEAN OMNI SNR	<u>29.4</u>	<u>35.4</u>	<u>_____</u>
ARRAY GAIN	<u>14.7</u>	<u>12.8</u>	<u>_____</u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>13.4</u>	<u>15.2</u>	<u>14.7</u>
DIFFERENCE	<u>+ 1.3</u>	<u>- 2.4</u>	<u>_____</u>

CONFIDENTIAL

46 0703

REF 19.6 IS TO THE FROM: 11.1 11.1

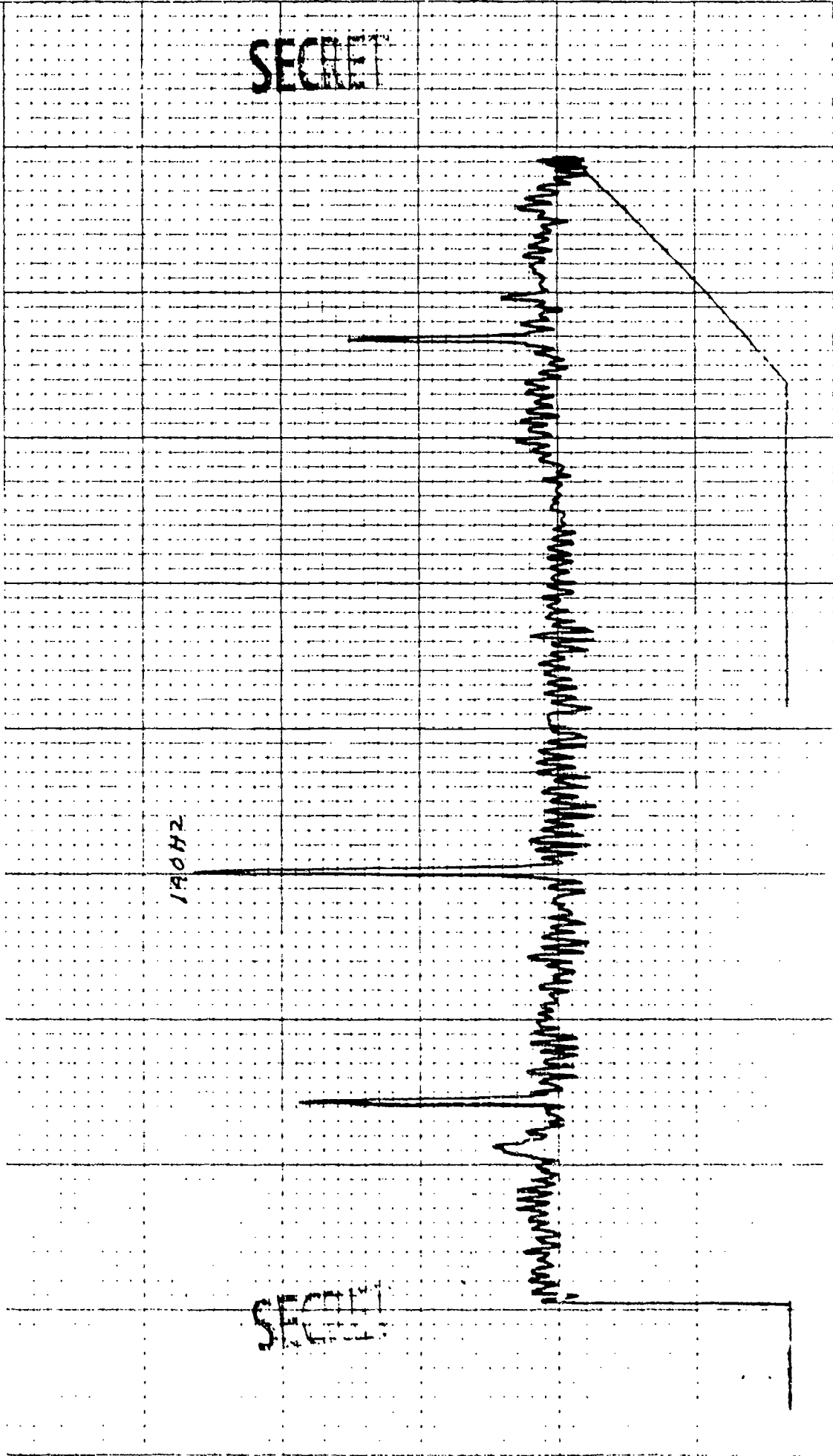
CONTROL: 1501 - 32 (DP8) DATE OF ANALYSIS: - - REEL: M4 INDE X3000
 BEAMFORMED SPECTRUM(ELEMENTS) 20-26 & 29-53)
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: -30 DB
 CENTER FREQ: 150 HZ 1/0 DEG. AZ STEERING FILTFR WTG: HANNING



REF ID: A660703

46 0703

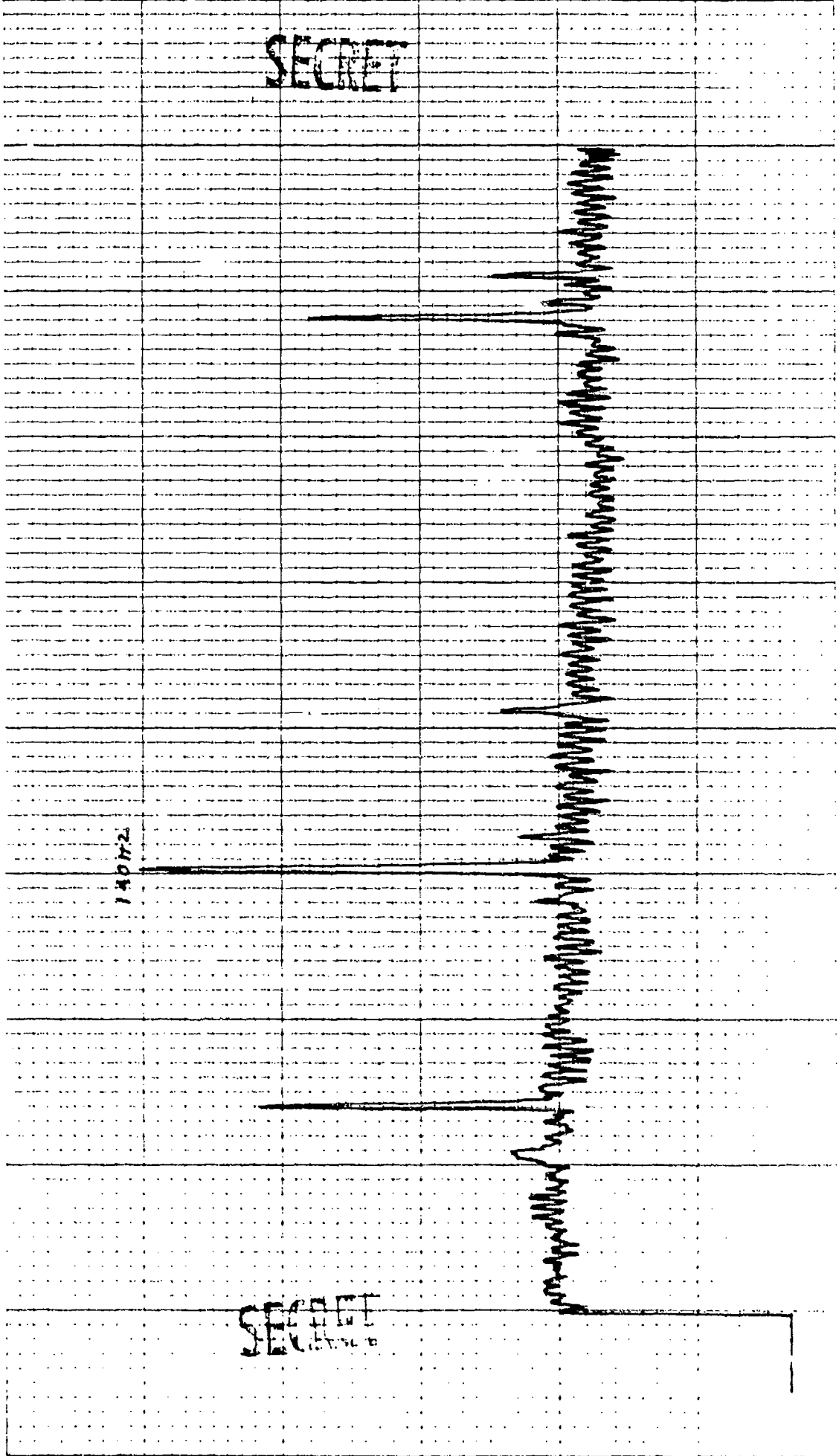
CONTROL: 1501 - 32 (DP8) DATE OF ANALYSIS: REEL: M4 INDE X3000
BEAMFORMED SPECTRUM (ELEMENTS) 30-269 28-53
EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 1501 Z INTEGRATION TIME 320 SECS ATTEN: 30 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1710 HZ FILTER WTC: HANNING
32 ELEMENTS 12 DEG. AZ STEERING



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

46 0703

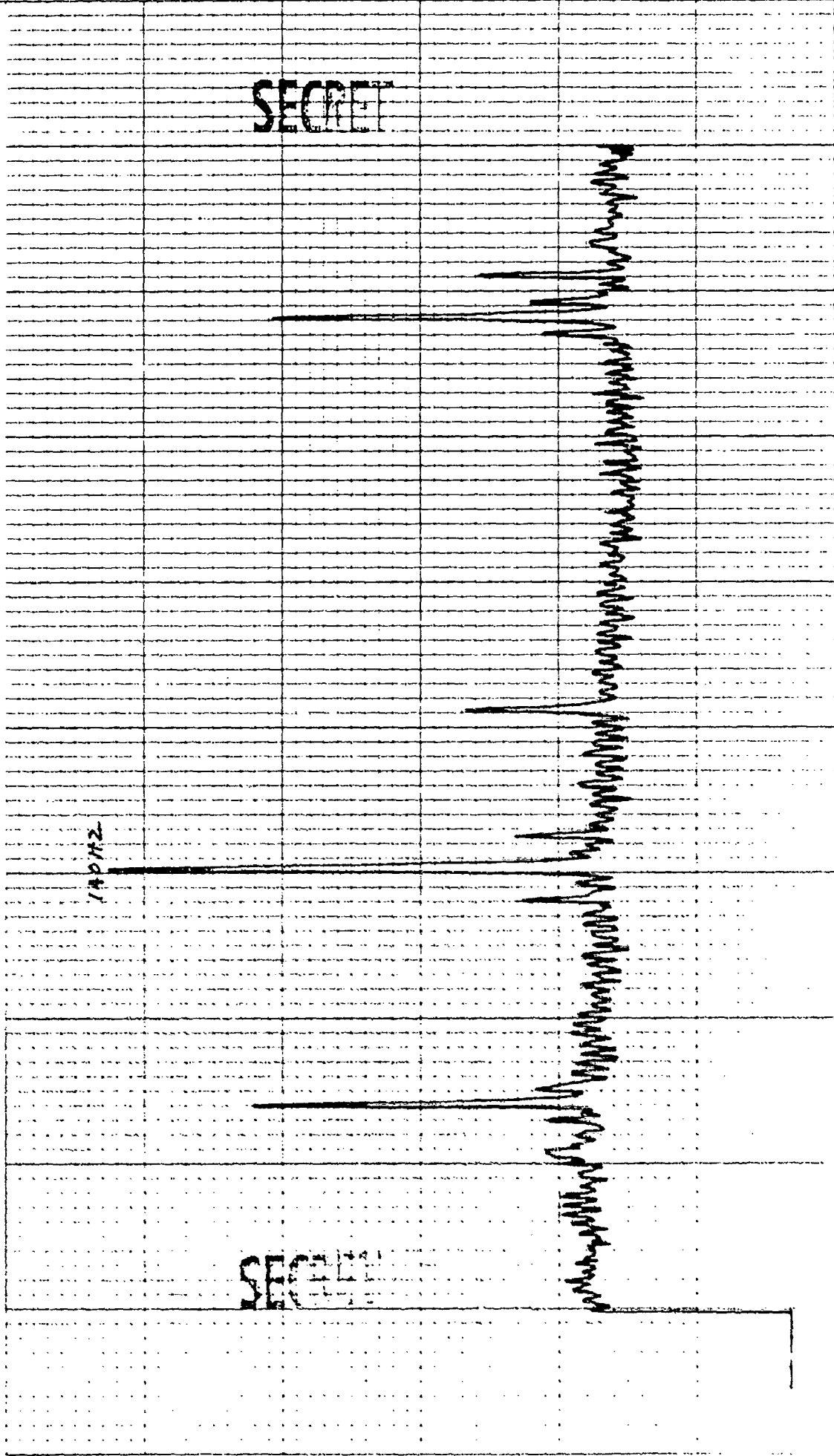
CONTROL: 1501 - 32 (DPE) REEL: 14 INDE X3000
BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: 20-26-09-53
EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 1501Z INTEGRATION TIME 320 SECS ATTN: -30 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTFR WTG: HANNING
32 ELEMENTS +1/4 DEG. AZ STEERING



10 X 10 TO THE RIGHT OF THE CENTER OF THE PAGE

46 0703

CONTROL: 1501 - 32 (DP8) DATE OF ANALYSIS: REEL: 144 INDE X 3000
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 20-26429-53
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTEN: -30 DB
 CENTER FREQ: 150 HZ 1/6 DEC. AZ STEERING FI.TFR WTG: HANNING



46 0703

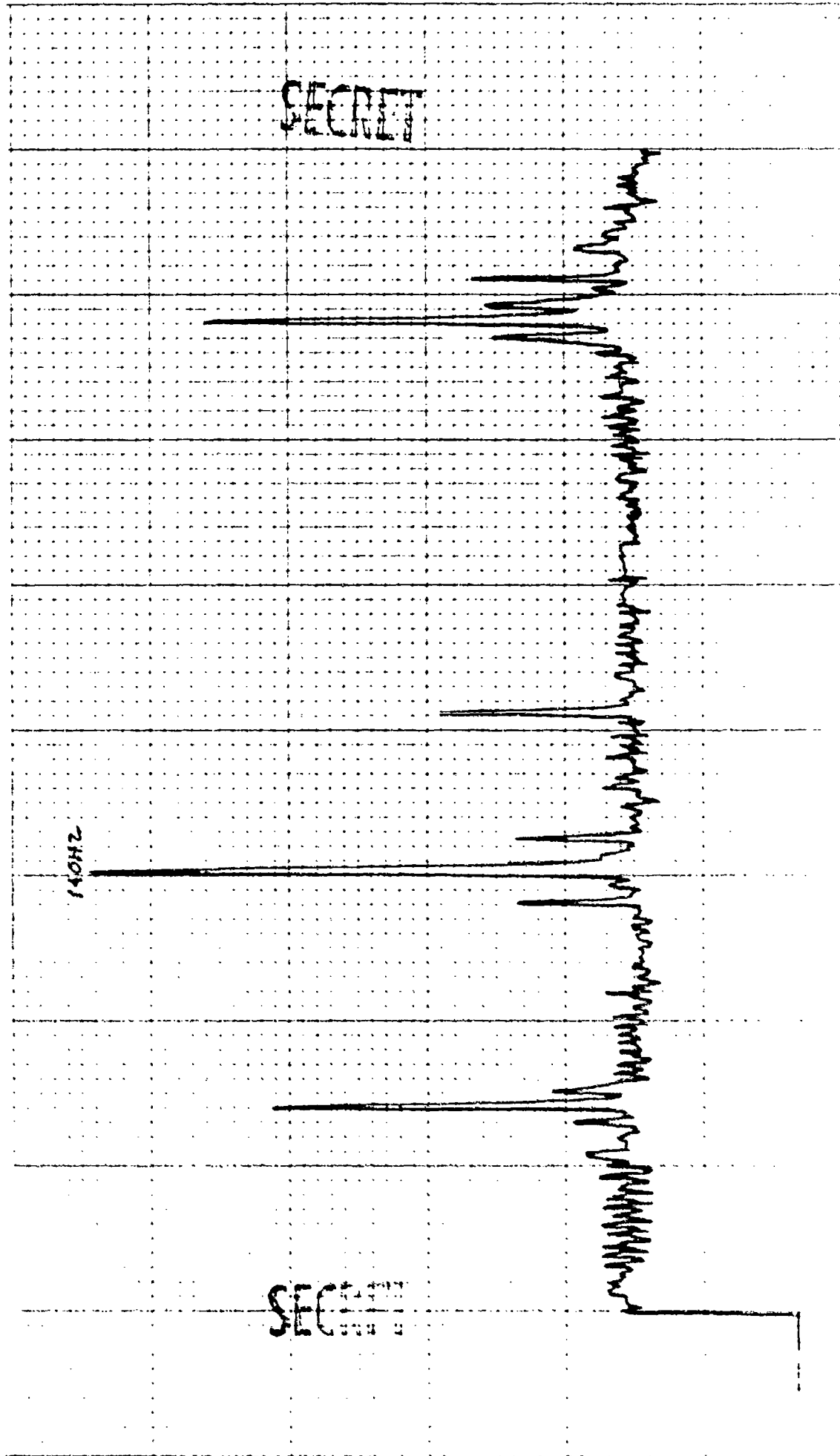
1/2 X 2 1/2 INCHES

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

DATE OF ANALYSIS: 20-268/29-53
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
+18 DEG. AZ STEERING

REEL: 44
INDE X 100c

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

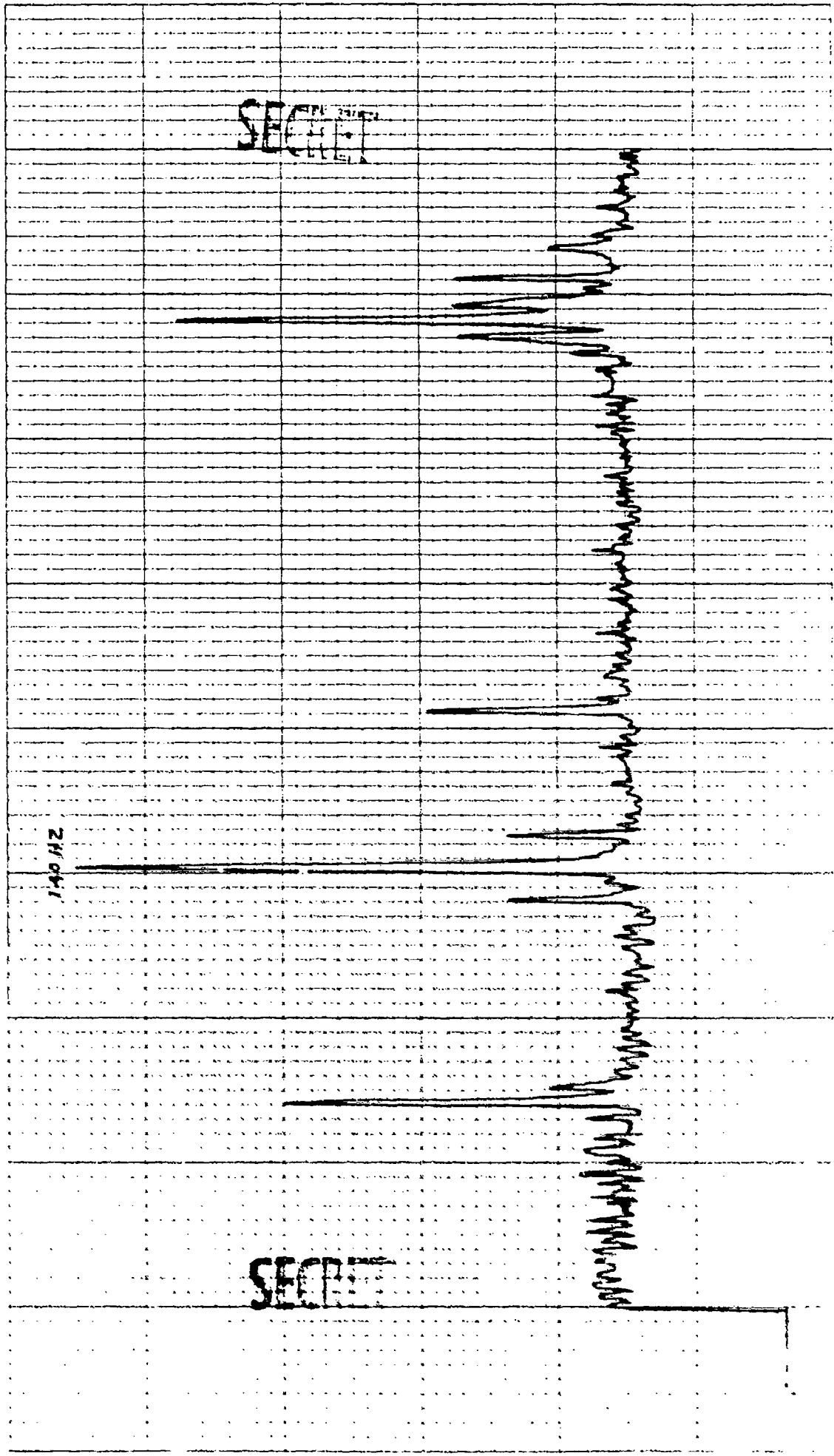


46 0703

PLATE TO THE DEPT. OF DEFENSE

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

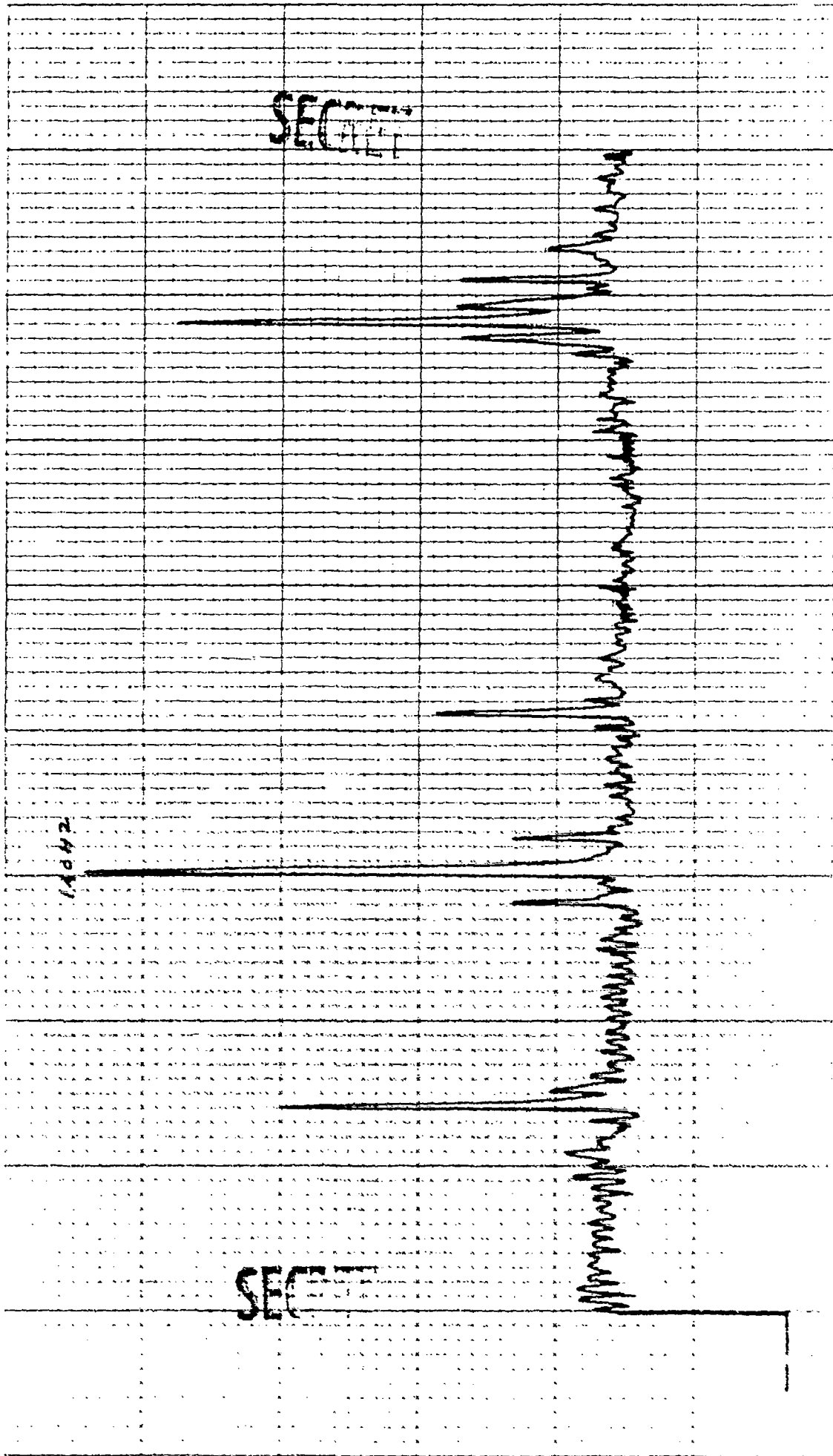
REEL: M4 INDE X 3100
INTEGRATION TIME 320 SECS ATTN: 30 DB
FILTER WTG: HANNING



10-10-53 10-10-53 10-10-53 10-10-53

46 0703

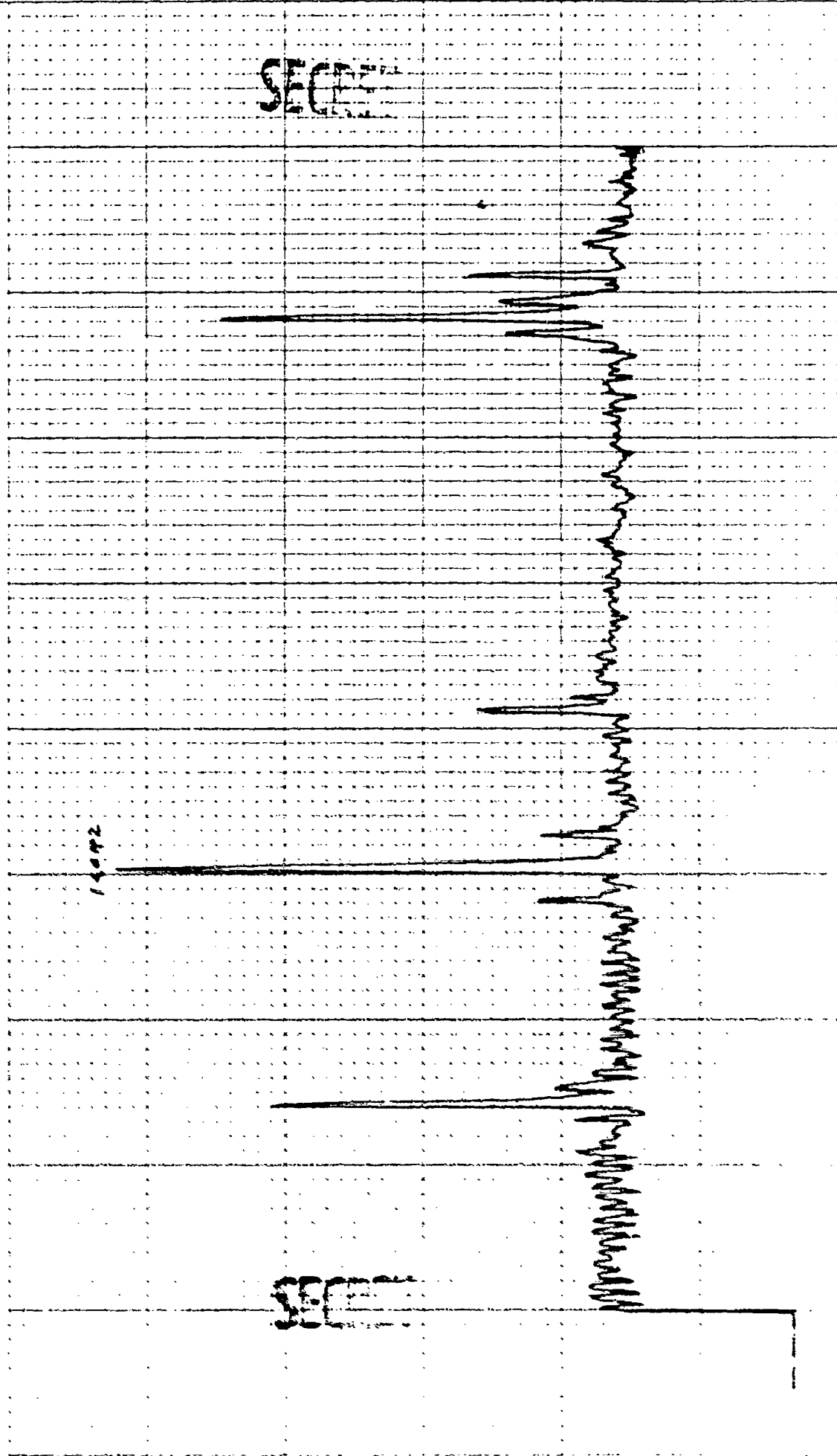
CONTROL: 1501 - 72 (DBE) REEL: 114 INDE XJ000
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 20-26-09-53
EXERCISE: BEARING STAKE DATE/TIME: 3-5-77-150/Z INTEGRATION TIME 320 SECS ATTN: -30 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
32 ELEMENTS DEG. AZ STEERING



46 0703

REF: 20-268 29-53

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



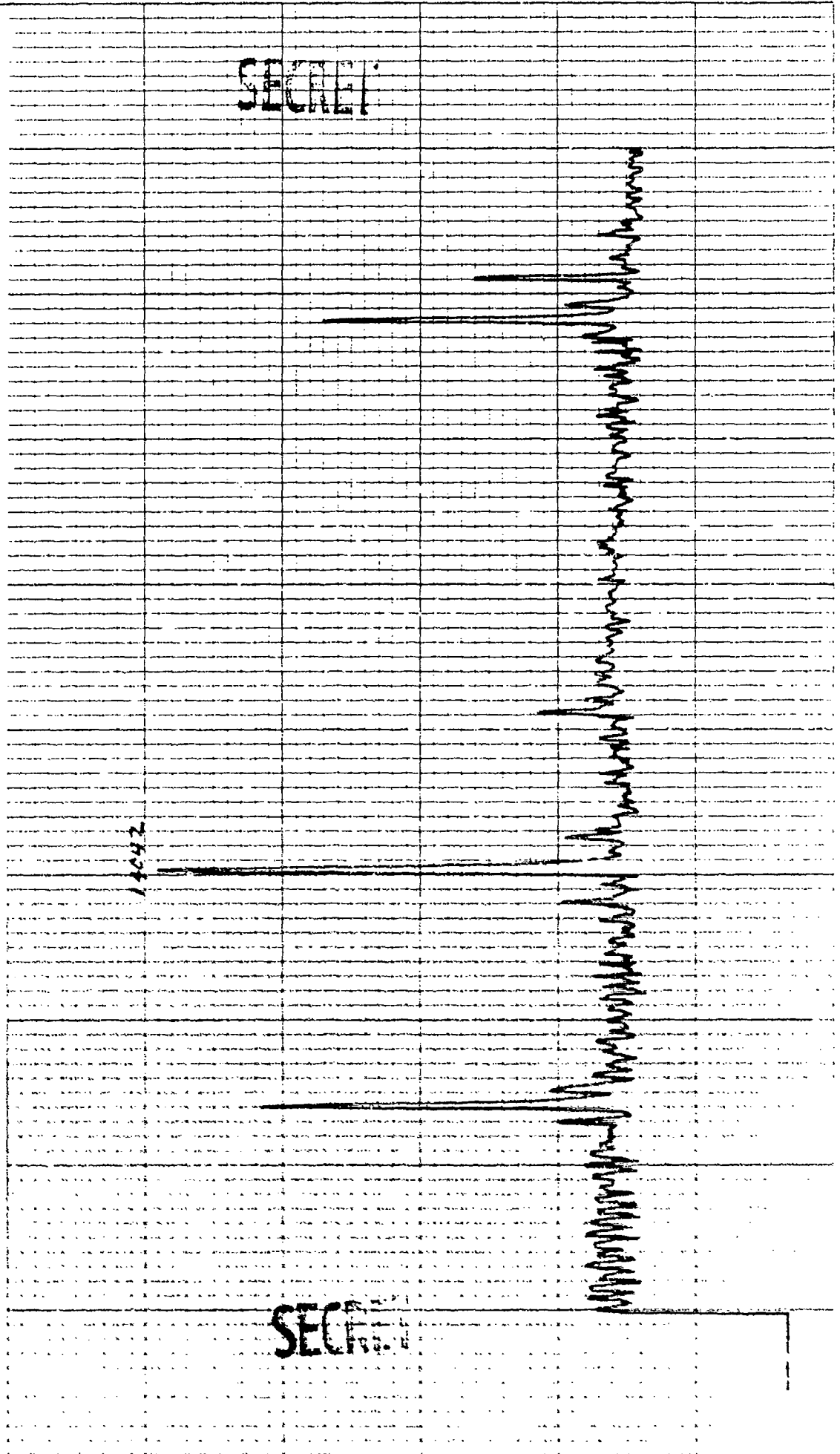
46 0703

1 (SEE REPORT TO THE INCHIEF OF THE...

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

DATE OF ANALYSIS: 20-268 29-53
 DATE/TIME: 3-15-77 - 1501 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
+ 26 DEG. AZ STEERING

REEL: 14 INDE X3000
 INTEGRATION TIME 320 SECS ATTEN: -30 DB
 FIJ.TFR WTG: HANNING



45 0703

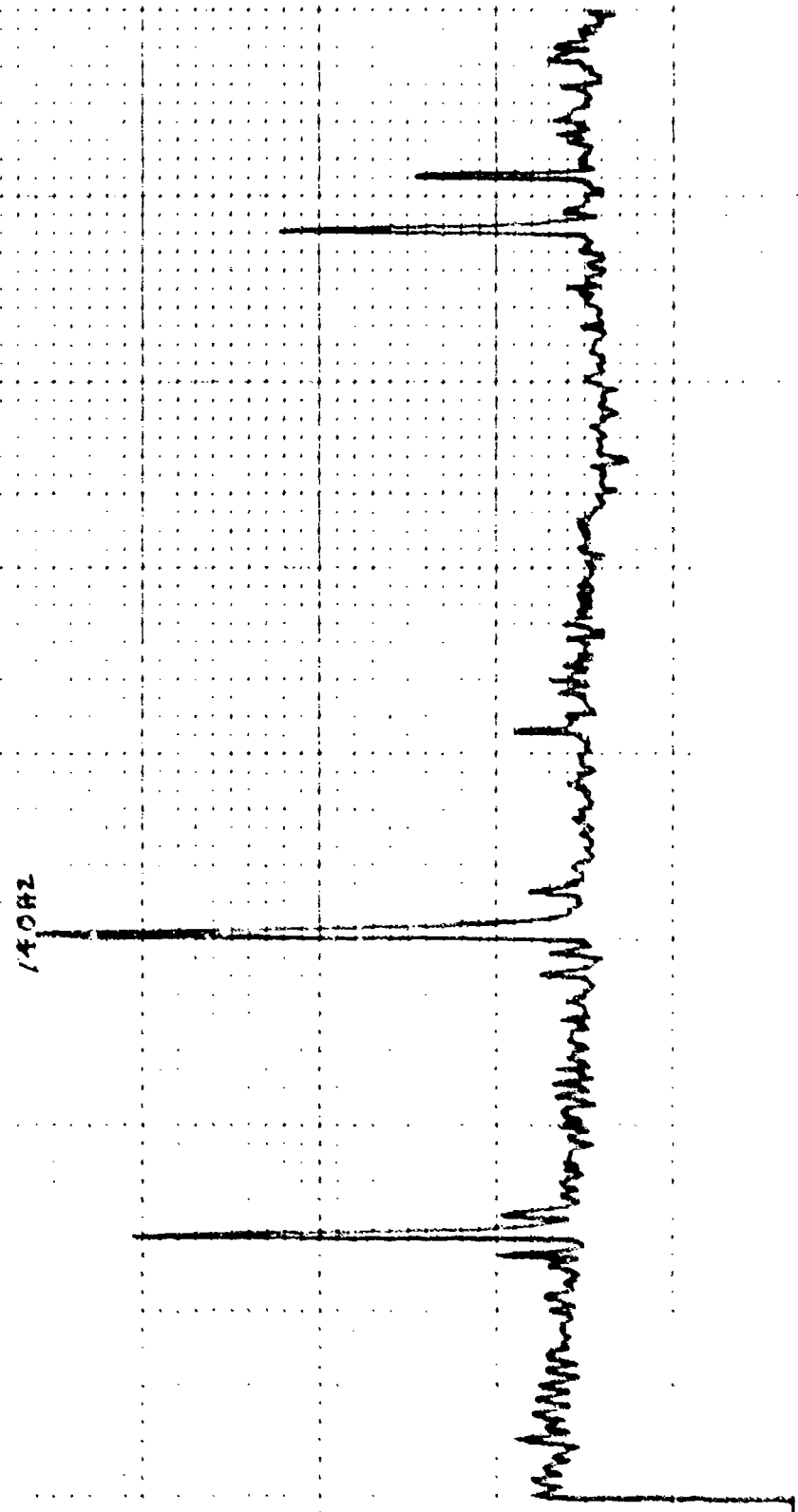
CONTROL: 1501 - 70 (200) DATE OF ANALYSIS: 20-06-89-53 REEL: 44 INDE X300

BEAMFORMED SPECTRUM/ELEMENTS DATE TIME: 2-15 77 - 1507 Z INTEGRATION TIME 320 SECS ATTEN: 30 DB

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

CENTER FREQ: 150 HZ + 20 DEG. AZ STEERING

32 ELEMENTS



SECRET

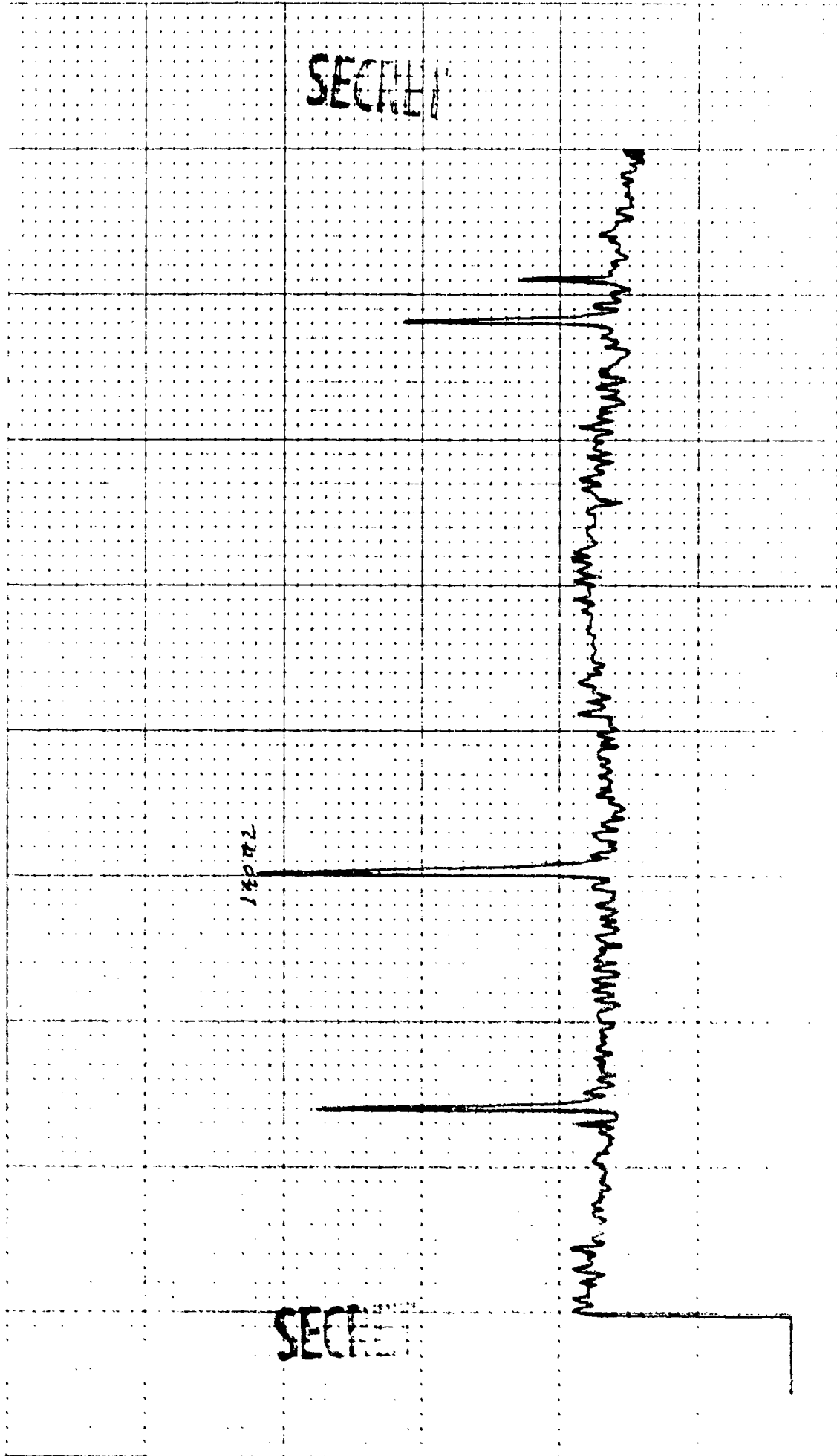
SECRET

46 0703

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

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

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



SECRET

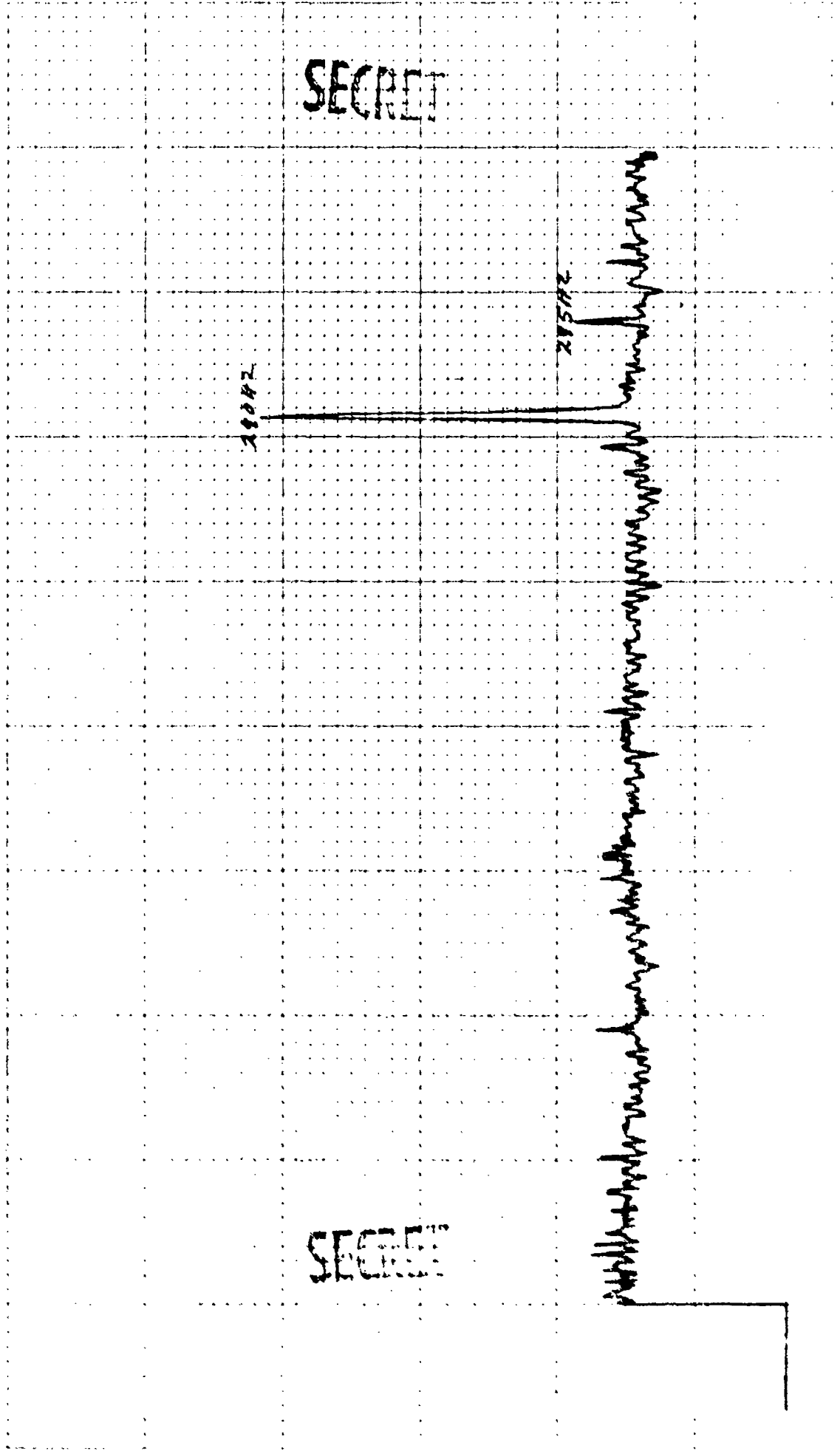
SECRET

46 0703

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

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

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



SECRET

SECRET

[Handwritten signature]

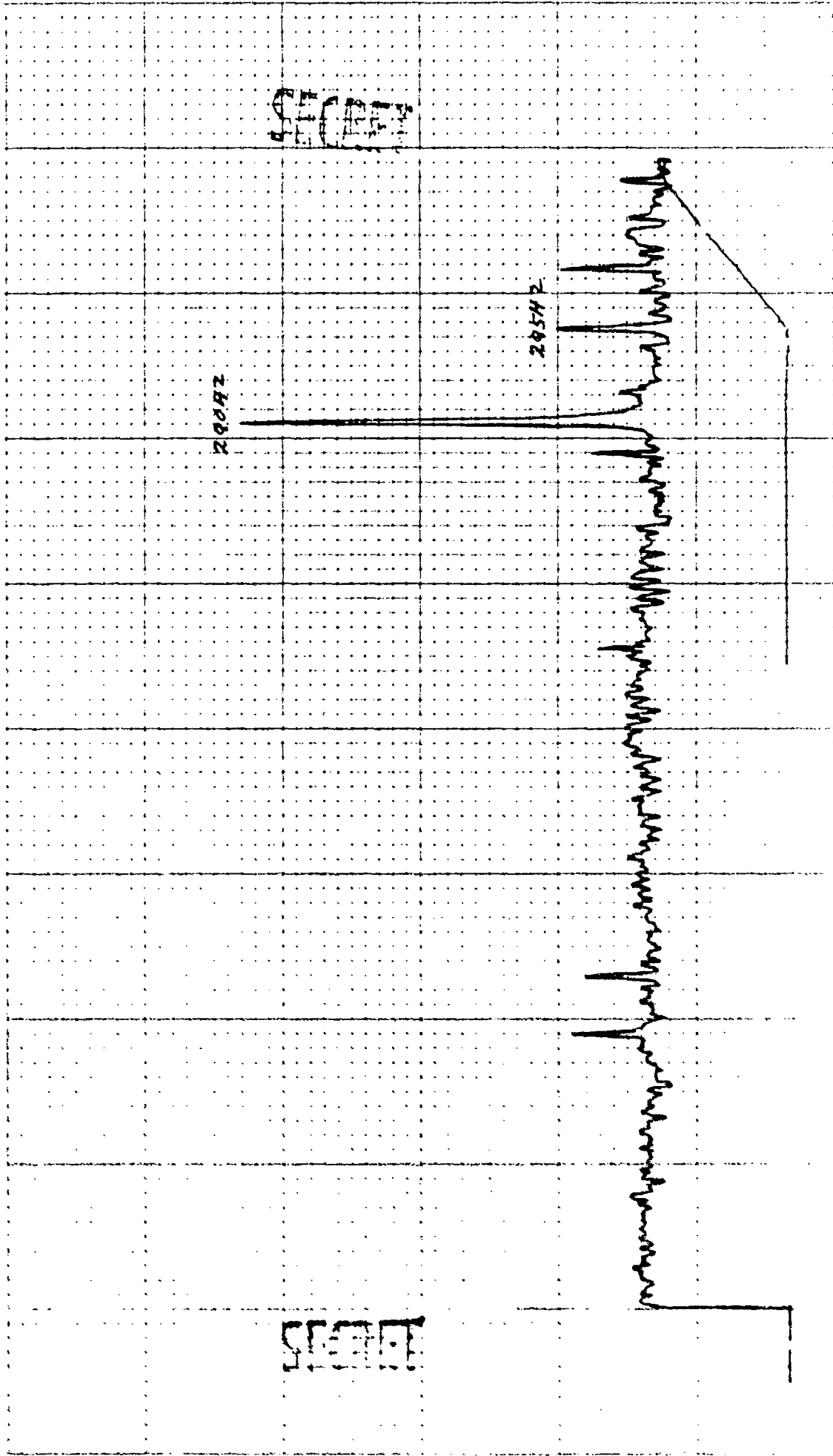
46 0703

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

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

REEL: MY
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILT: TP
WTG: HANNING

INDE X 3000

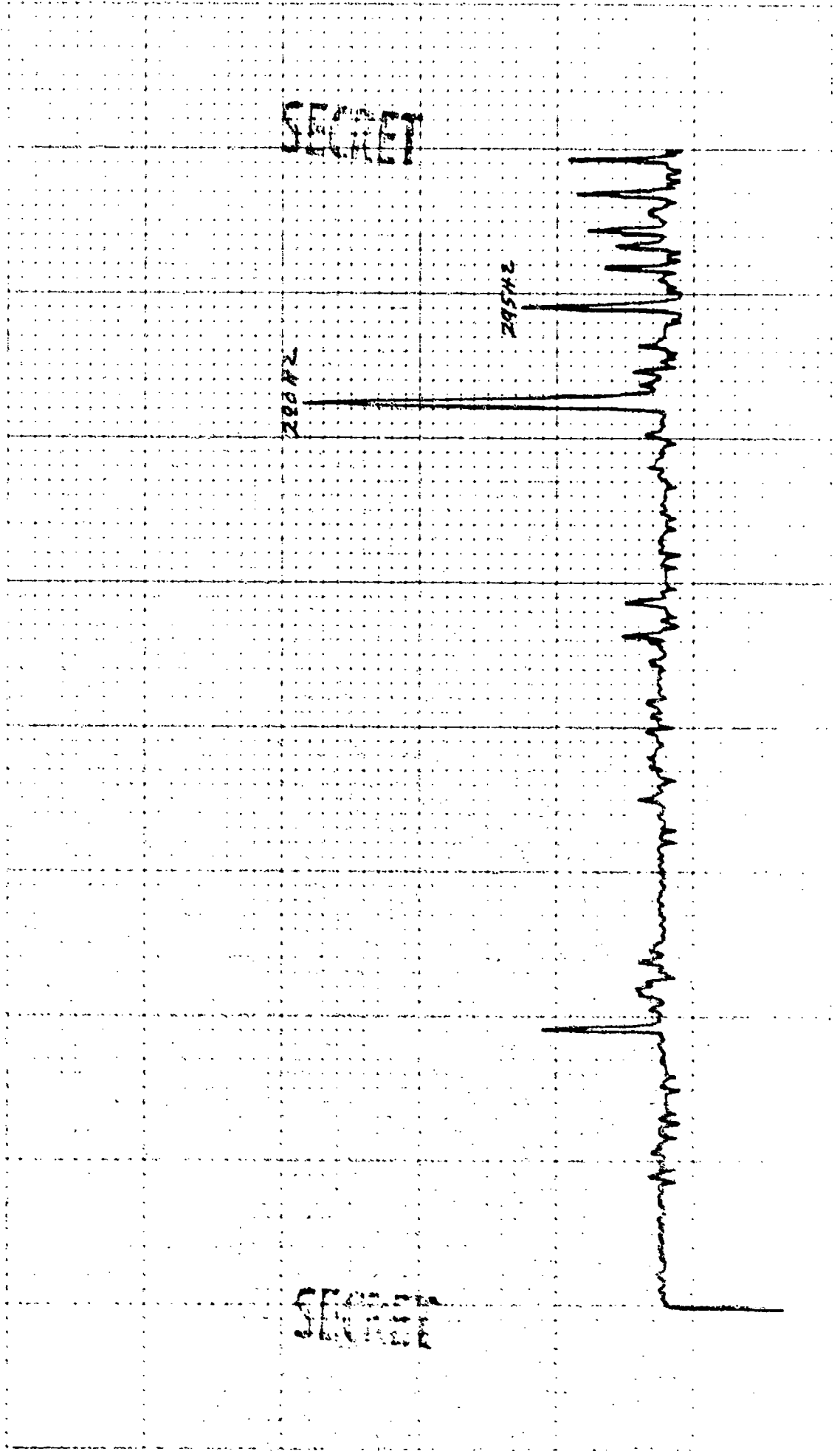


46 0703

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

DATE OF ANALYSIS: 20-268 2953
 DATE/TIME: 1-15-77 - 1501 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 104 DEG. AZ STEERING

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

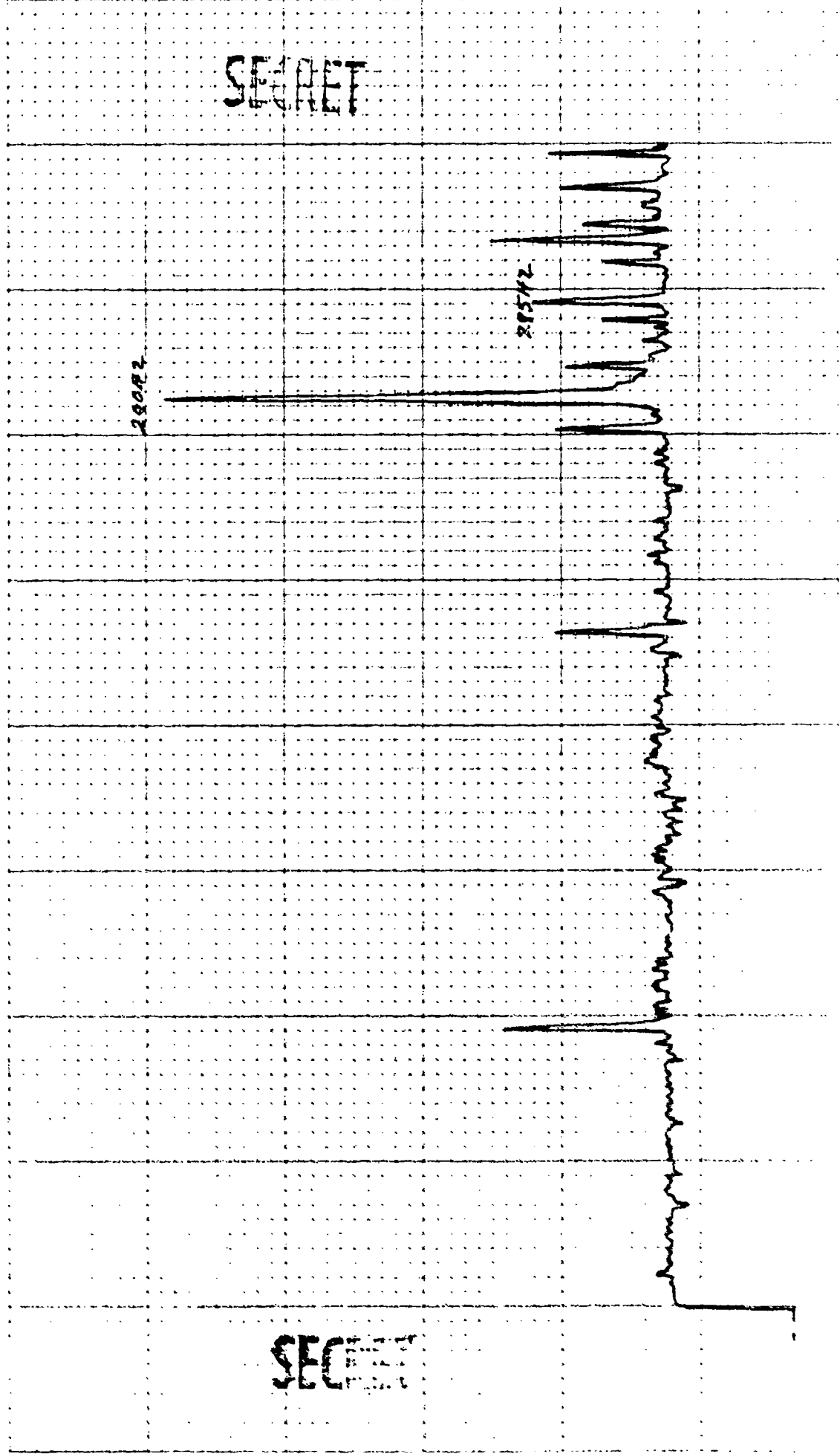


46 0703

CONTROL: 150/ - 32 (DPS)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

DATE OF ANALYSIS: 20-20-53
DATE/TIME: 3-15-77 - 150/2
ANALYSIS BANDWIDTH: 1/10HZ
+1/2 DEG. AZ STEERING

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

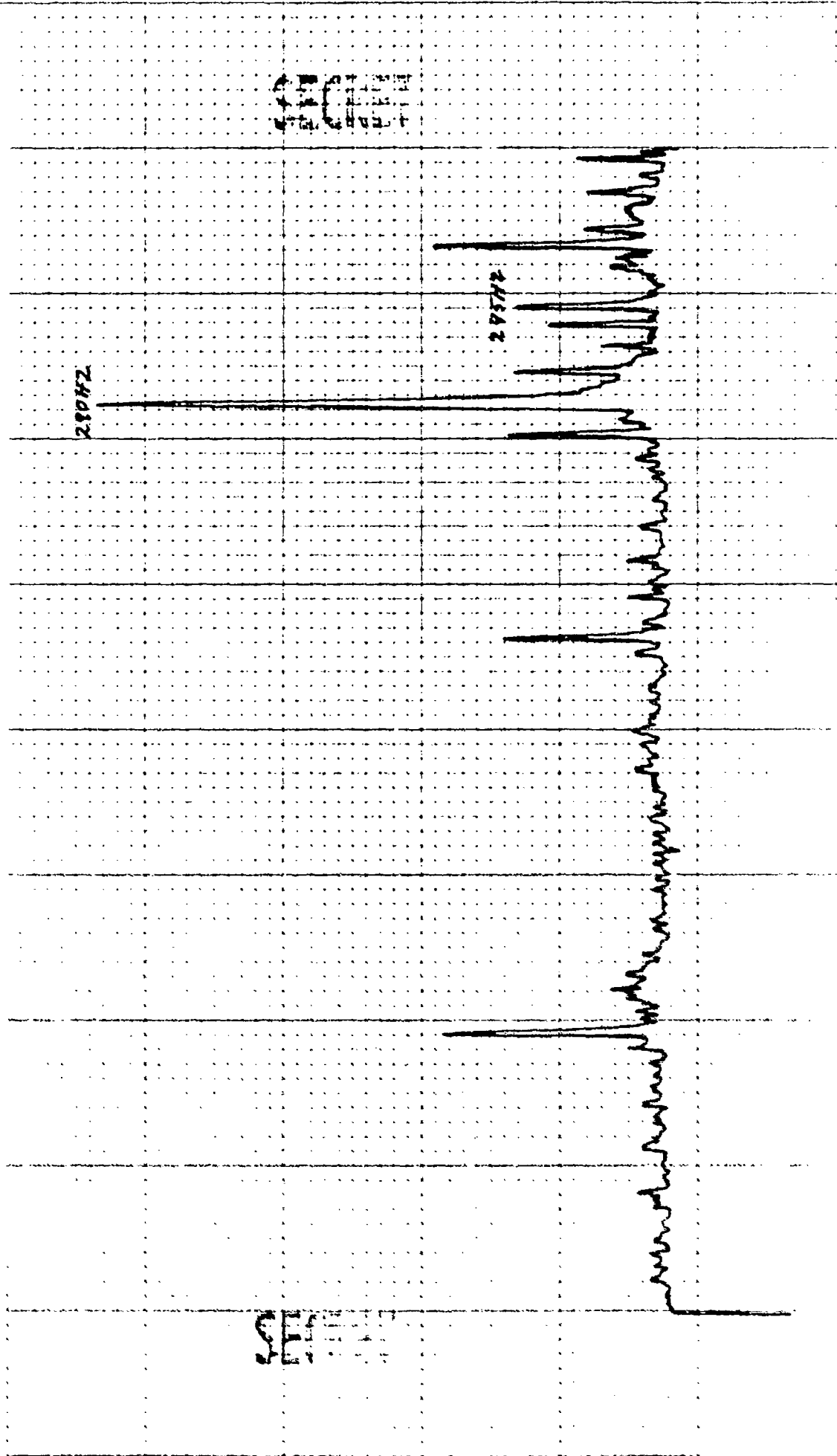


46 0703

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

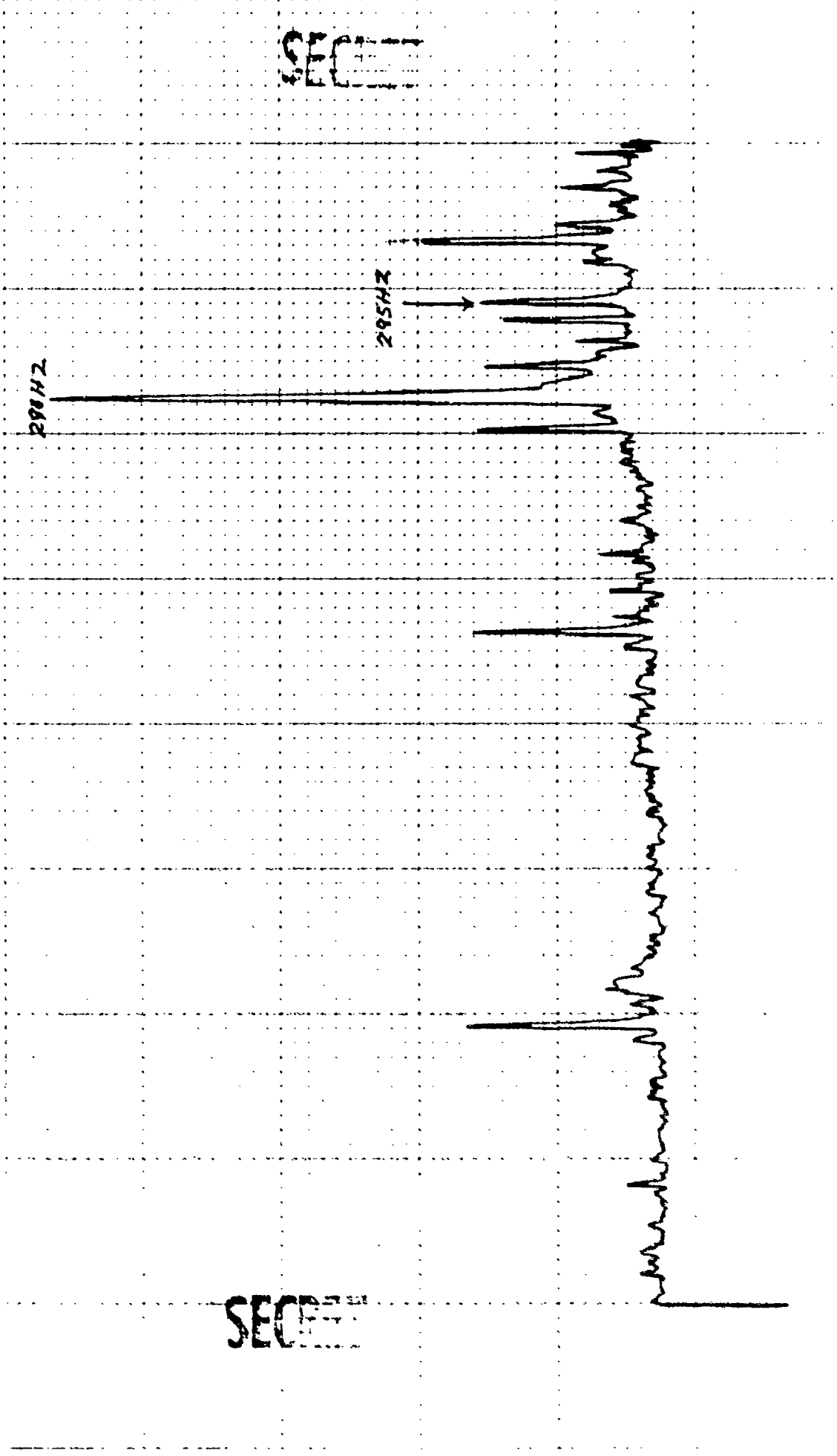
DATE OF ANALYSIS: 20-26-78
DATE: 20-26-78
ANALYSIS BANDWIDTH: 1/10 HZ
+18 DEG. AZ STEERING

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



46 0703

CONTROL: 1501 - 48 (DP2) DATE OF ANALYSIS: _____ REEL: M4 INDE X 3000
 BEAMFORMED SPECTRUM(ELEMENTS) 20 26 29-53) INTEGRATION TIME 320 SECS ATTEN: 30 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 CENTER FREQ: 270 HZ + 20 DEG. AZ STEERING



SECRET

46 0707

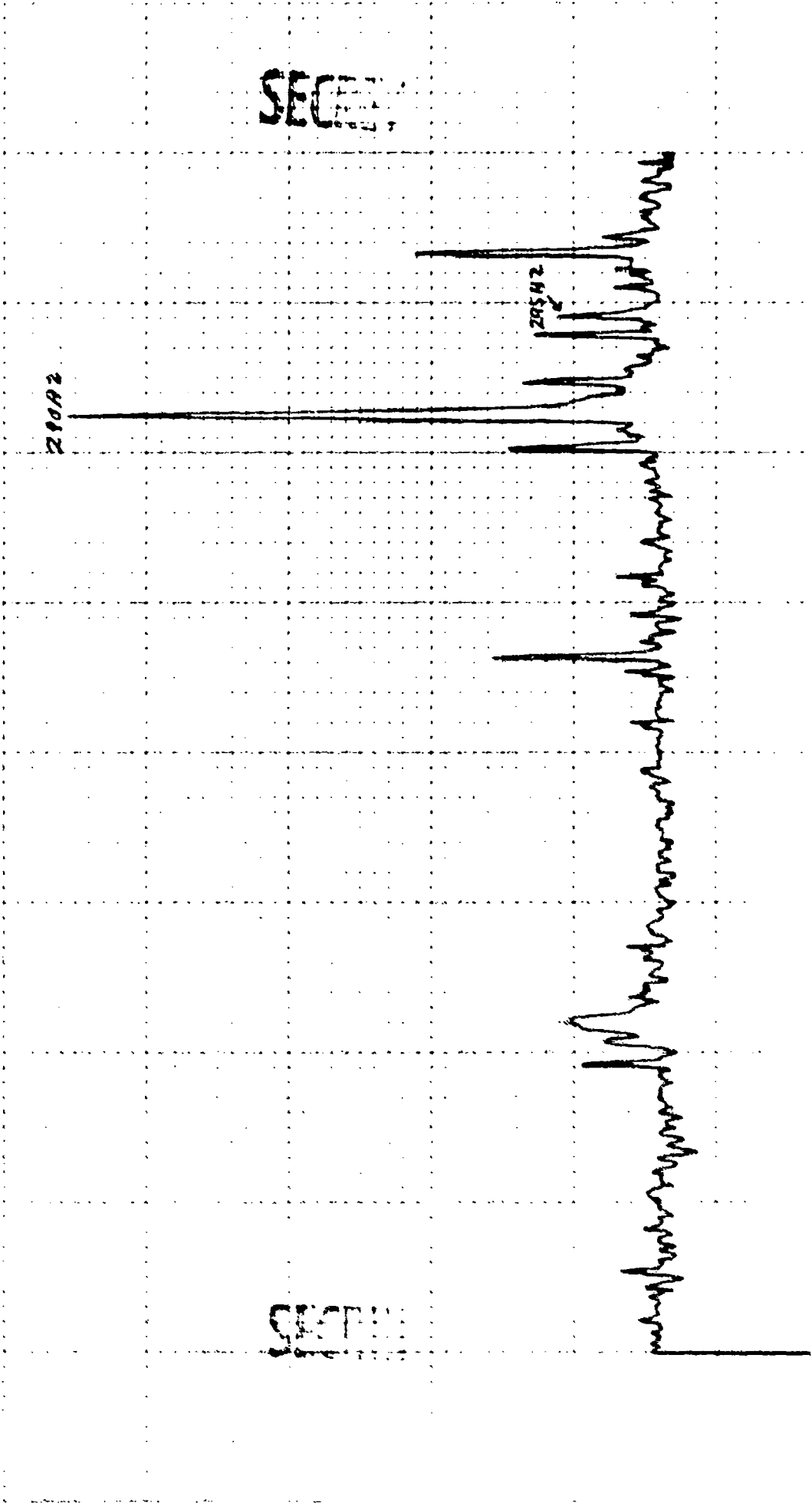
CONTROL: 1501 - 32 (000)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 220 HZ
32 ELEMENTS

DATE OF ANALYSIS: ---
DATE/TIME: 20-26 08-53
ANALYSIS BANDWIDTH: 1/10HZ
12.2 DEG. AZ STEERING

REEL: M4

INDE X3000

INTEGRATION TIME 320 SECS
FILTER: WTC: HANNING

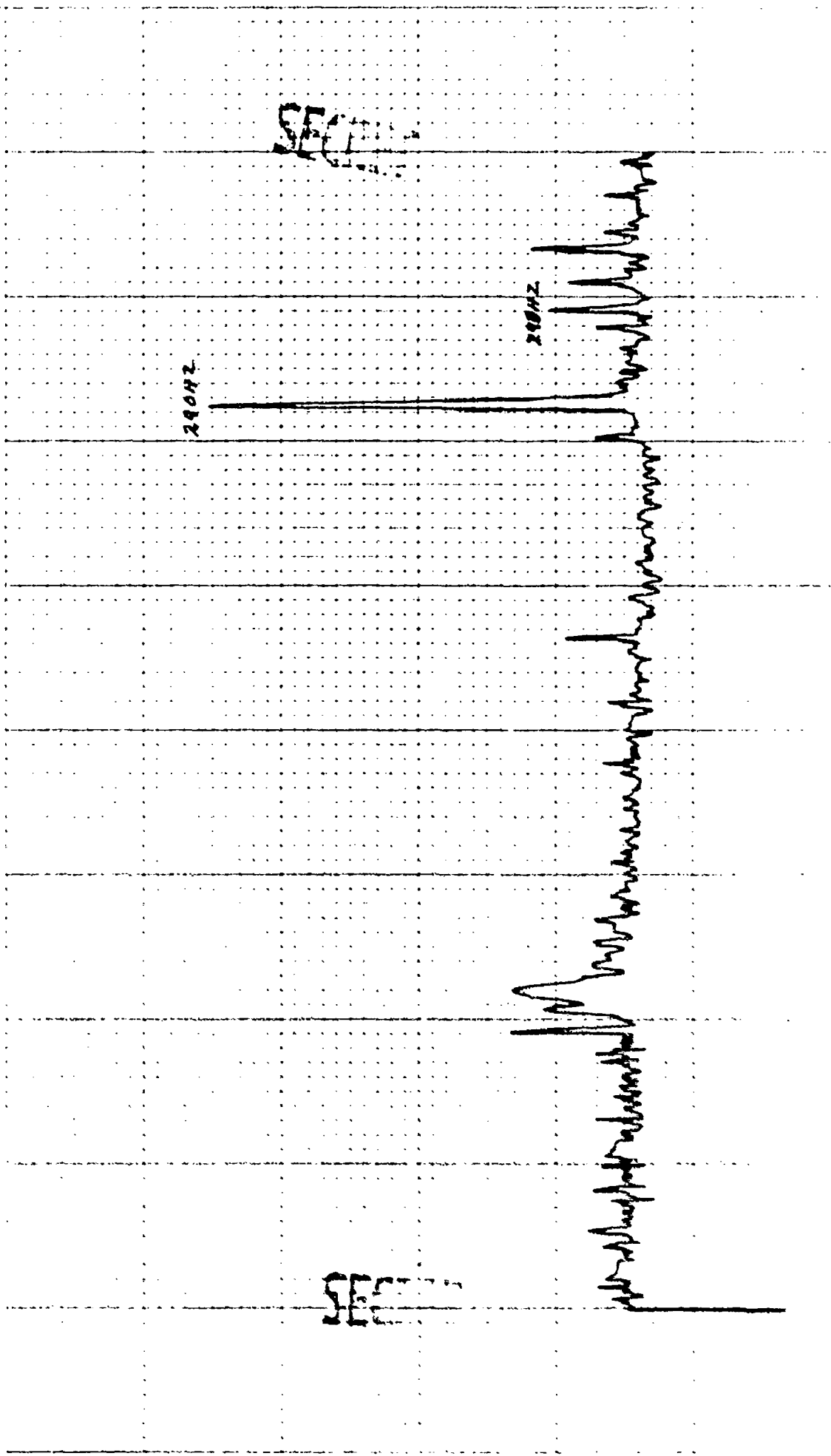


SECRET

SECRET

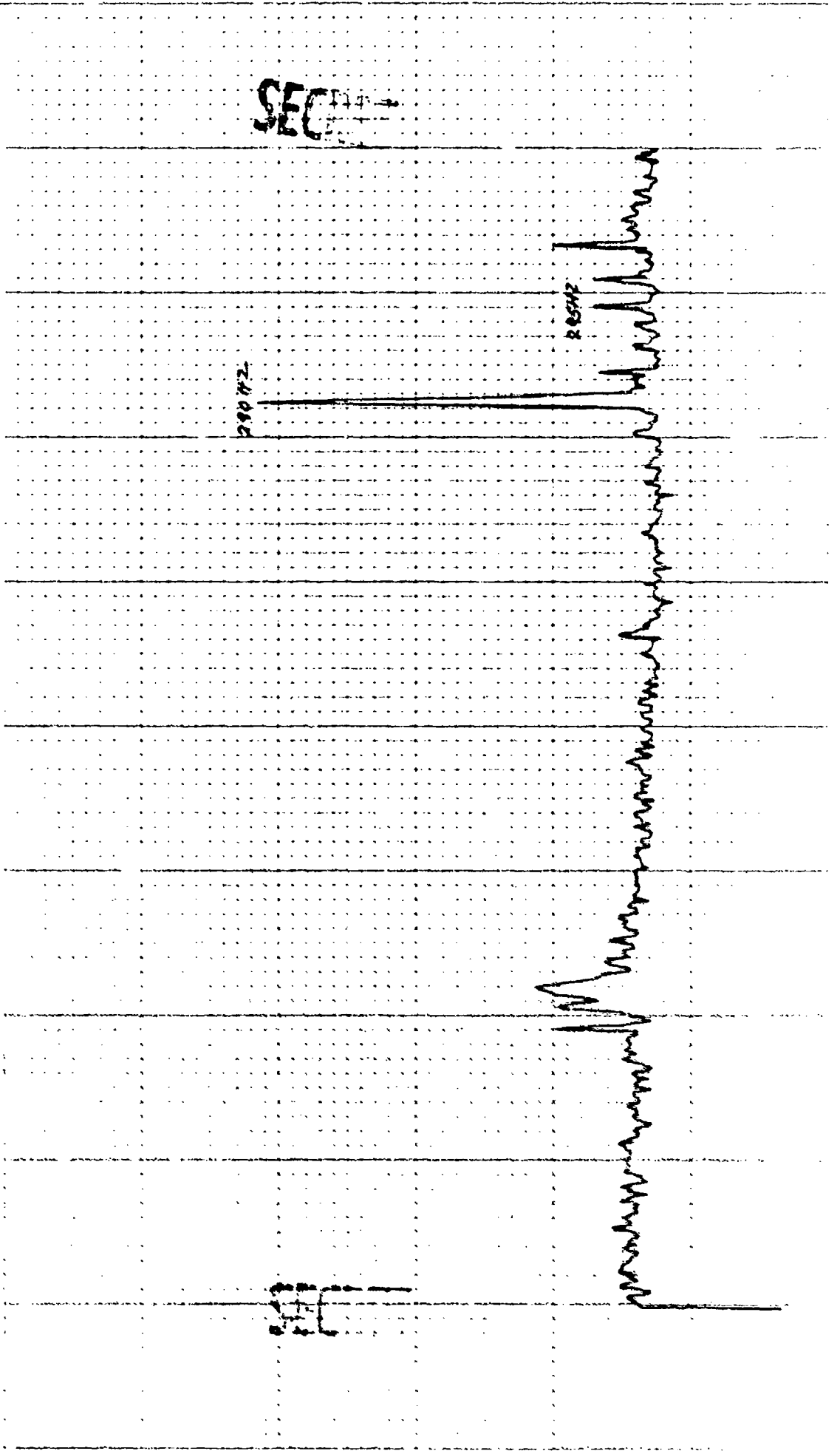
46 0703

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



45 0703

CONTROL: 1501 - 72 (200) DATE OF ANALYSIS: _____
 BEAMFORMED SPECTRUM(ELEMENTS) 20.208 38-53
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ
 CENTER FREQ: 270 HZ 726 DEG. AZ STEERING
 72 ELEMENTS
 REEL: M4 INDE X 300c
 INTEGRATION TIME 320 SECS ATTEN: -30 DB
 FILTER WTC: HANNING

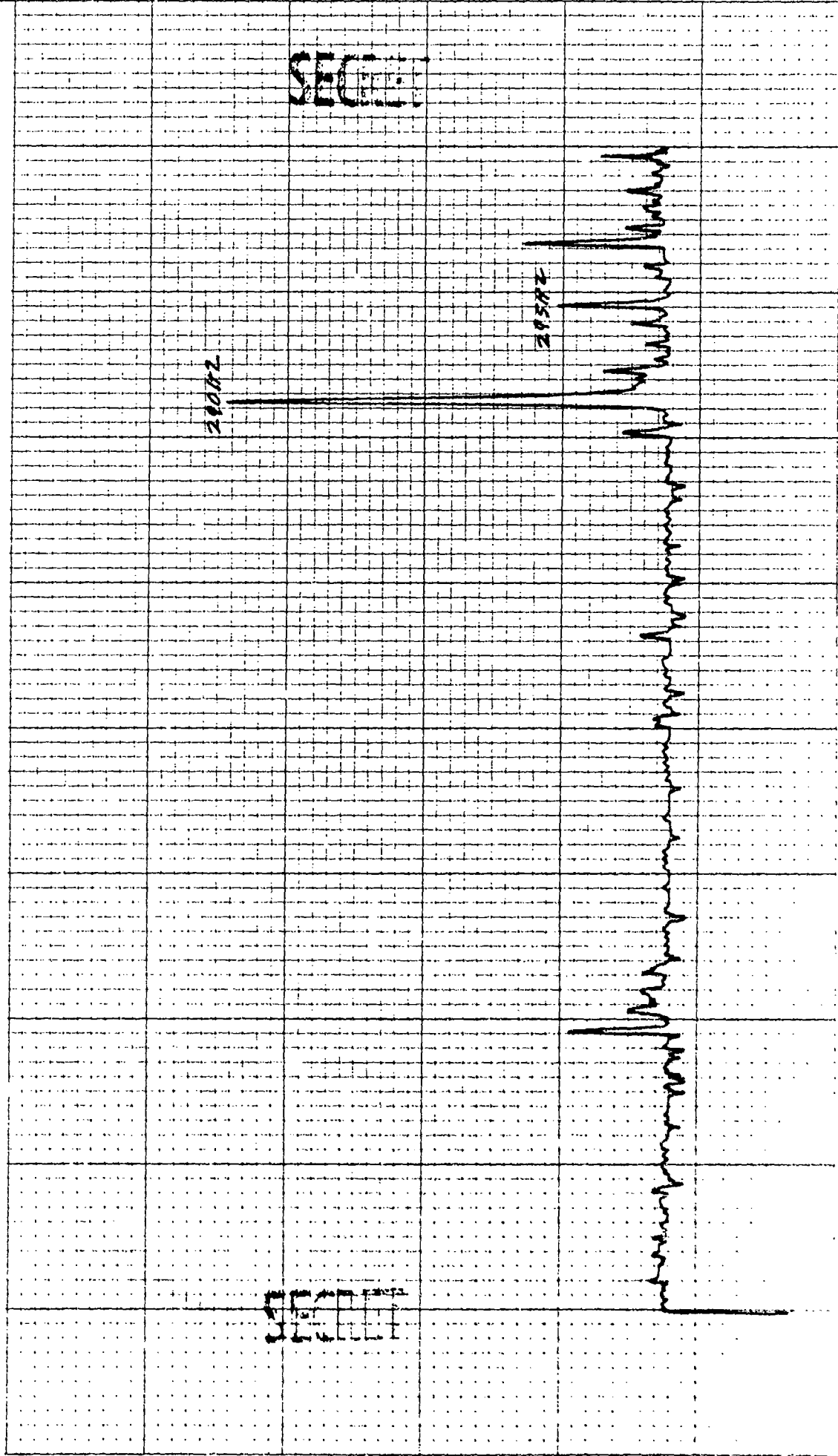


K-Σ 1/2 X 10 TO THE INCH * X 10 DIVIDES
KEUPPEL & ESS * CO * MADE IN U.S.A.

46 0703

CONTROL: 1501 - 32 (DPB)
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: -- -- --
EXERCISE: BEARING STAKE 20-26 2 28-53)
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ
32 ELEMENTS +38 DEG. AZ STEERING

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

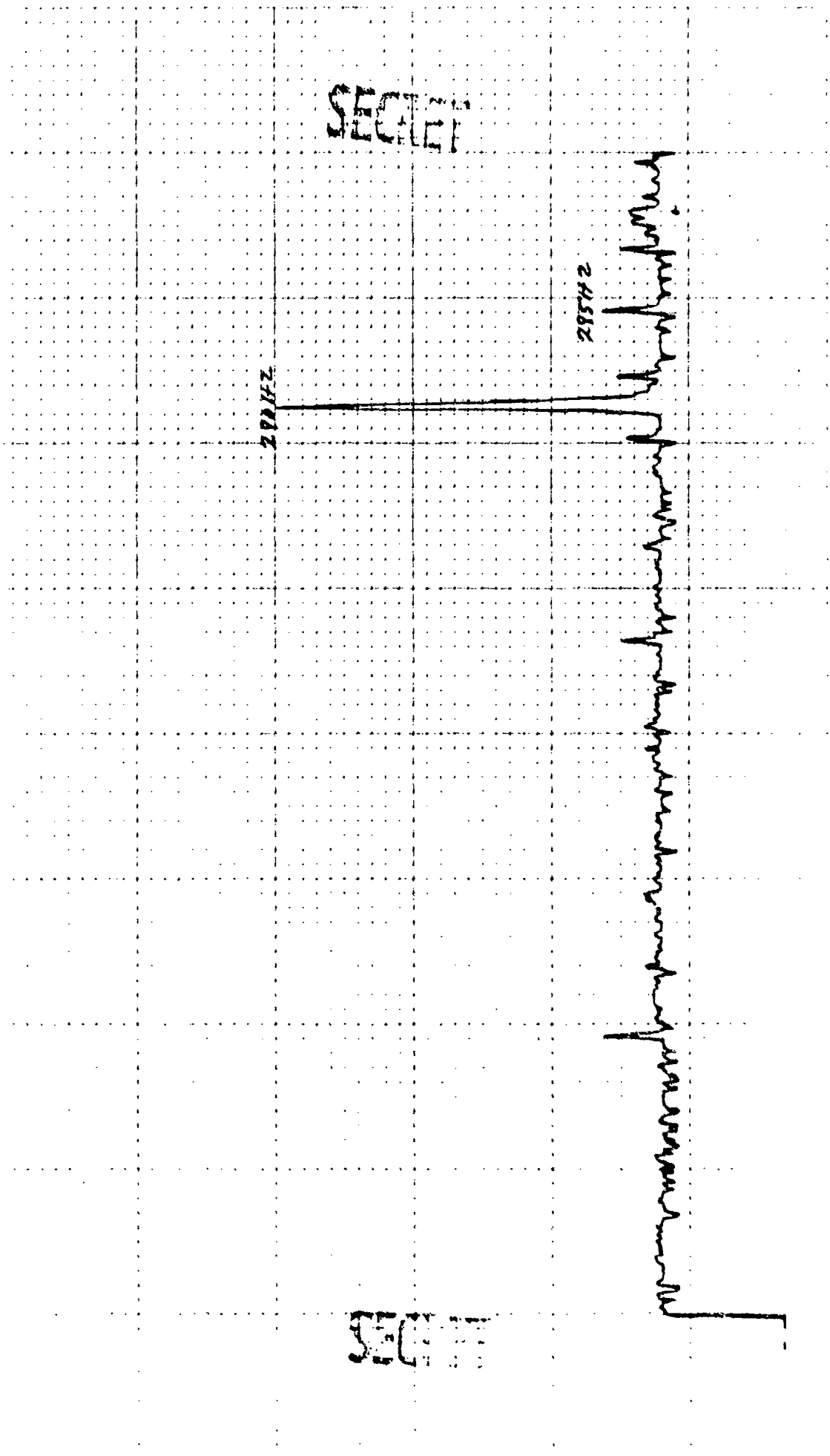


45 0703

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

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

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



CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 8

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 48

SIGNAL LEVEL

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

NOISE LEVEL

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

SIGNAL-NOISE-RATIO

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

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR
CALCULATIONS

DATA POINT 8

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 48

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-24.0</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-14.0	
BEAMFORMER GAIN	<u>+30</u>	+16.0	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	+16.8	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

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

SIGNAL-NOISE-RATIO

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

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 8

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 40

SIGNAL LEVEL

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

NOISE LEVEL

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

SIGNAL-NOISE-RATIO

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

CONFIDENTIAL

CONFIDENTIAL

DATA POINT 8

SIGNAL GAIN

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

ARRAY GAIN

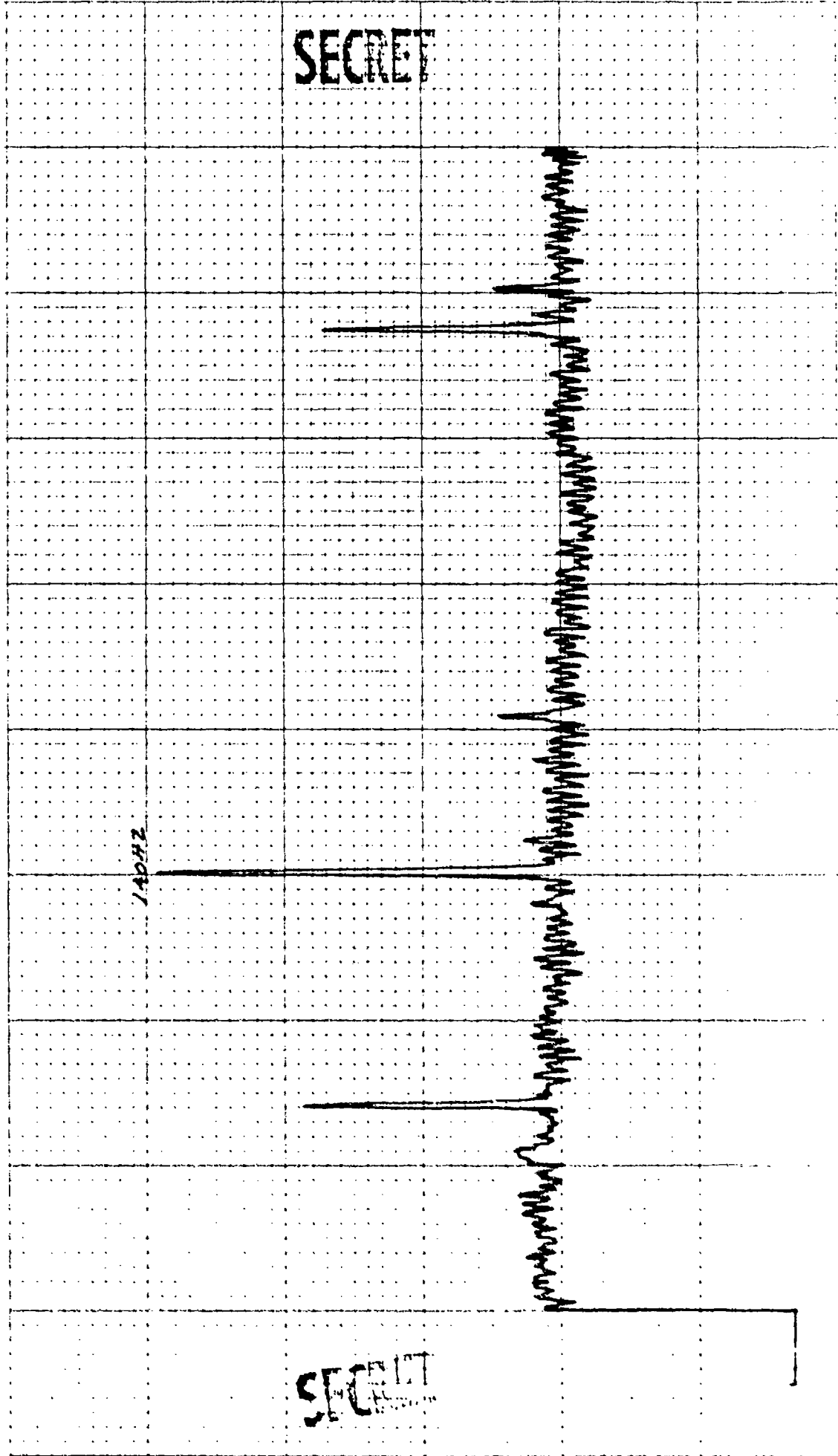
MRA SNR	<u>40.8</u>	<u>46.2</u>	<u>9.7</u>
MEAN OMNI SNR	<u>29.4</u>	<u>35.4</u>	<u> </u>
ARRAY GAIN	<u>11.4</u>	<u>10.8</u>	<u> </u>
THEORETICAL AZIMUTH GAIN (at MRA)	<u>15.3</u>	<u>16.9</u>	<u>17.0</u>
DIFFERENCE	<u>-3.9</u>	<u>-6.1</u>	<u> </u>

CONFIDENTIAL

46 0703

1072 1060 1060 1060 1060

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



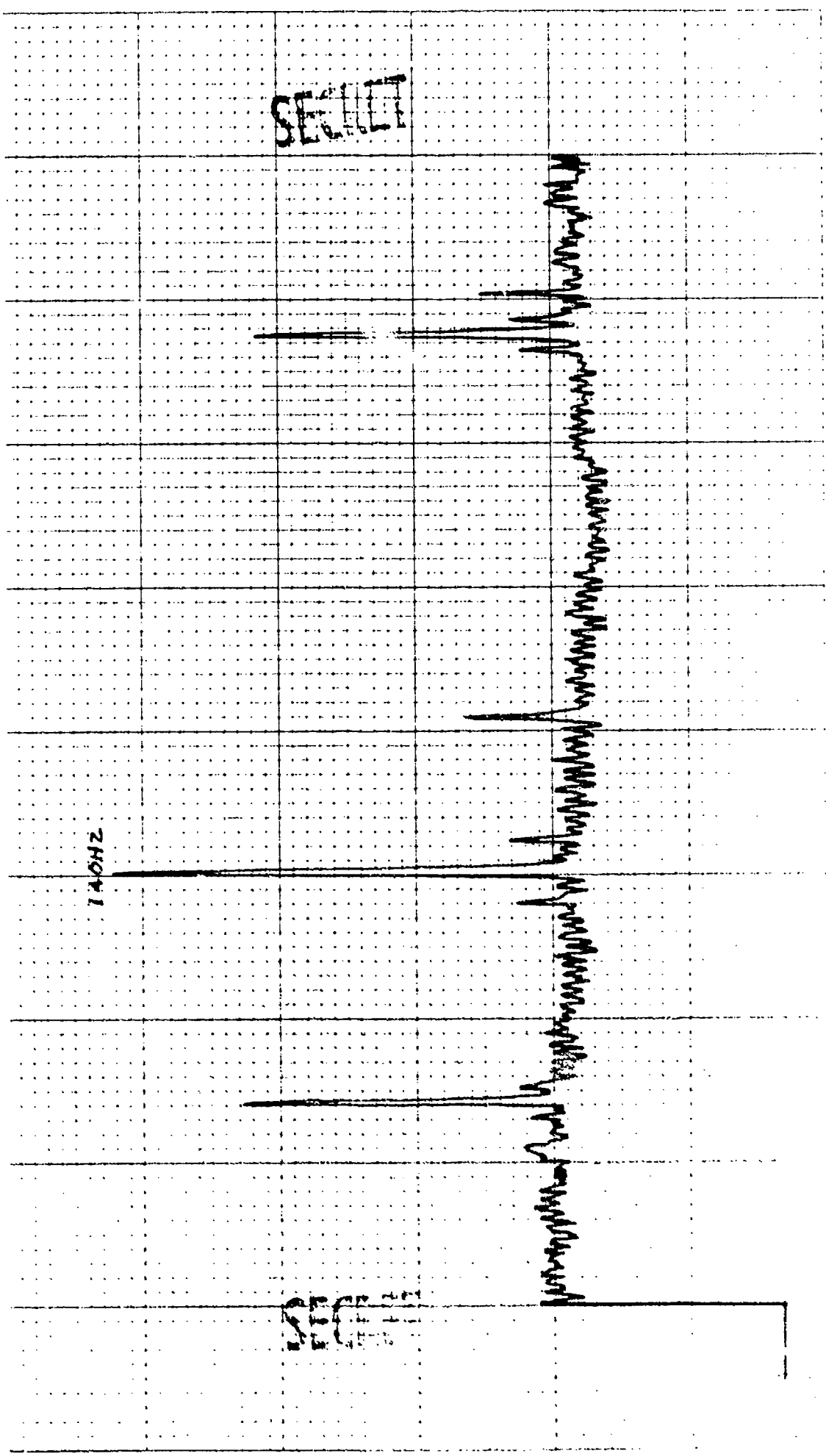
SECRET

SECRET

46 0703

102 5400 1000 1000 1000

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



46 0703

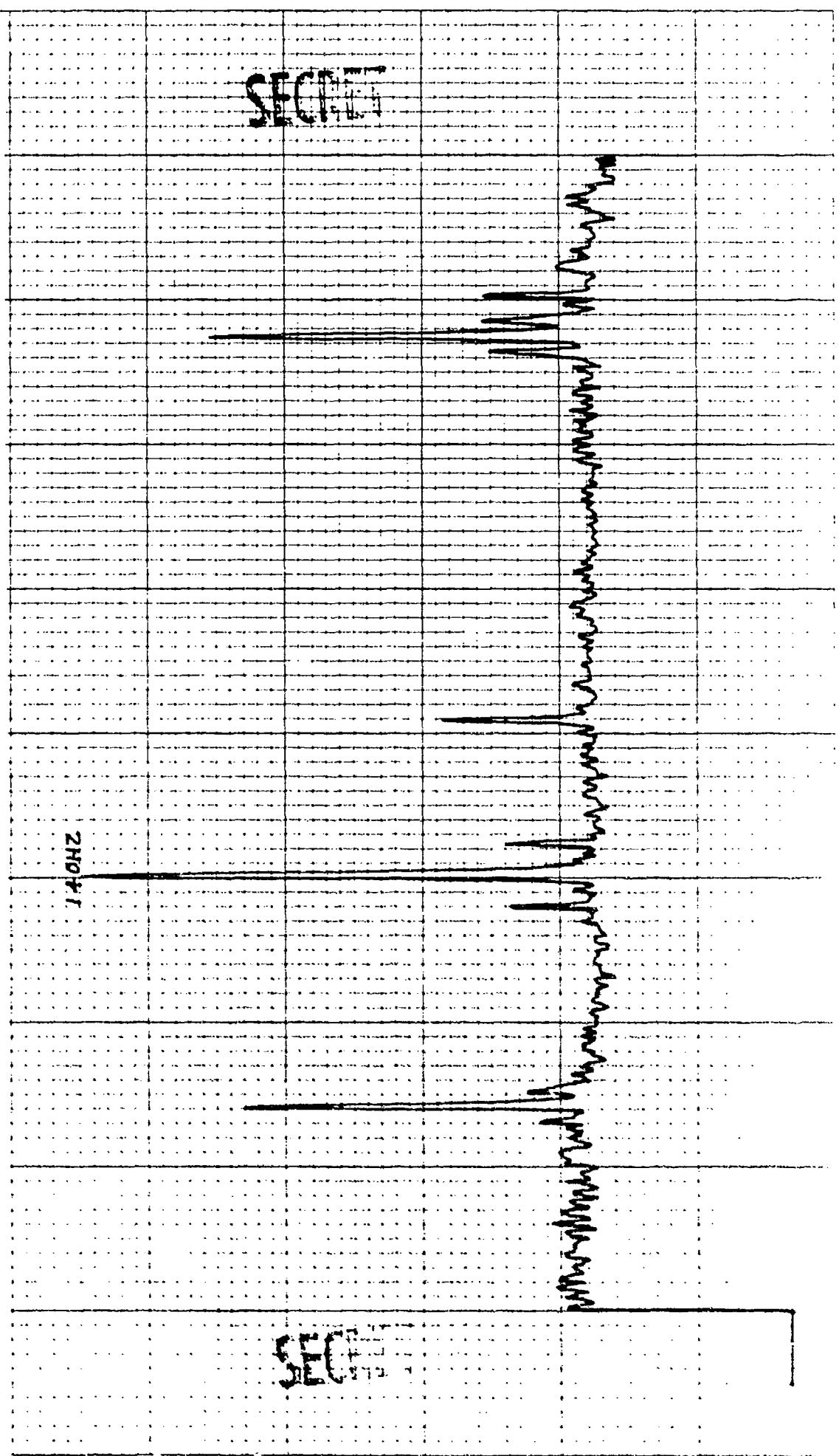
102 10 100 100 100 100 100 100

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

DATE OF ANALYSIS: - - - -
1-6-49-14 (16-257 298-53)
DATE/TIME: 3-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
+10 DEG. AZ STEERING

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

INDE X 3000



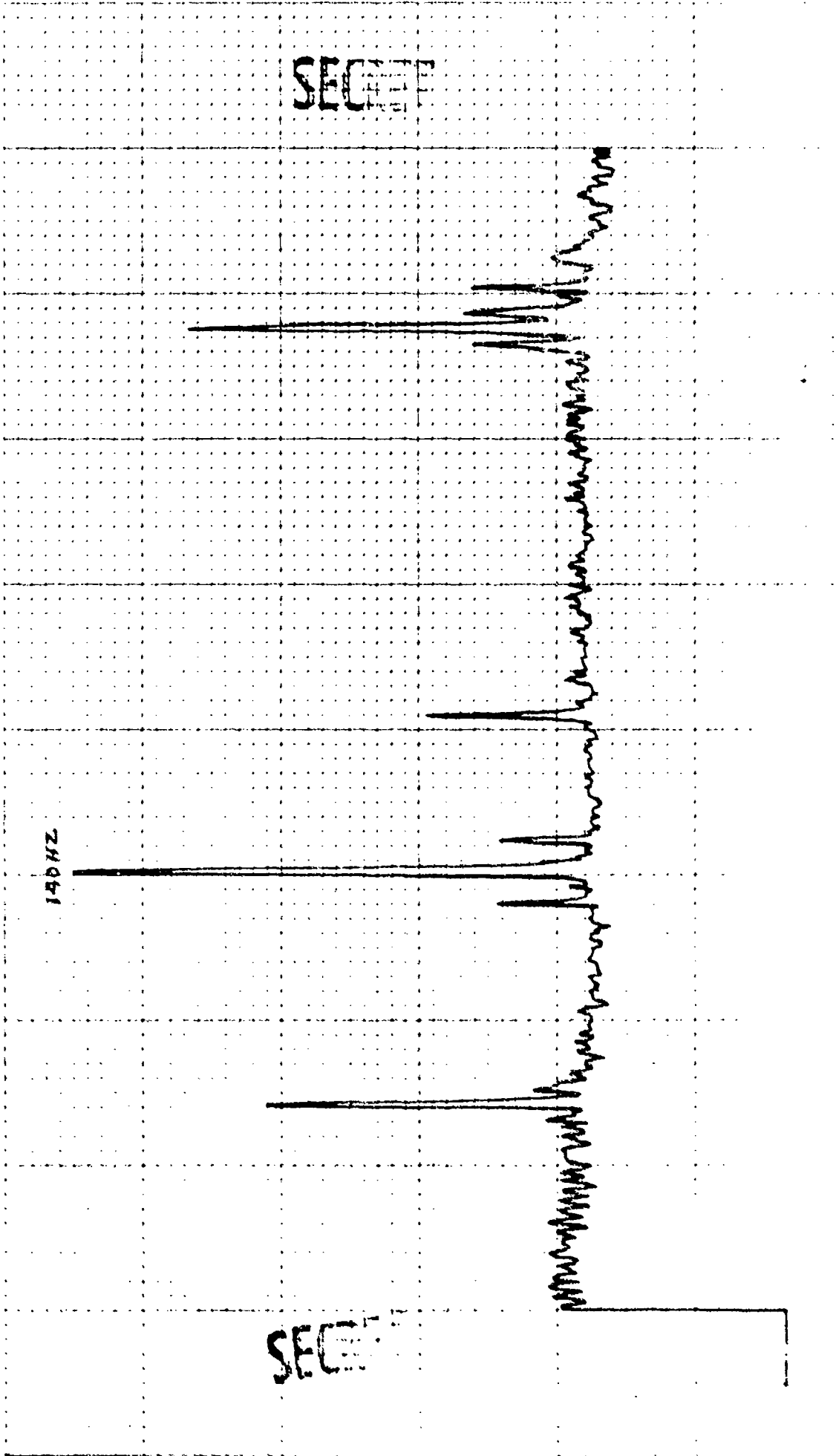
SECRET

SECRET

46 0703

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

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



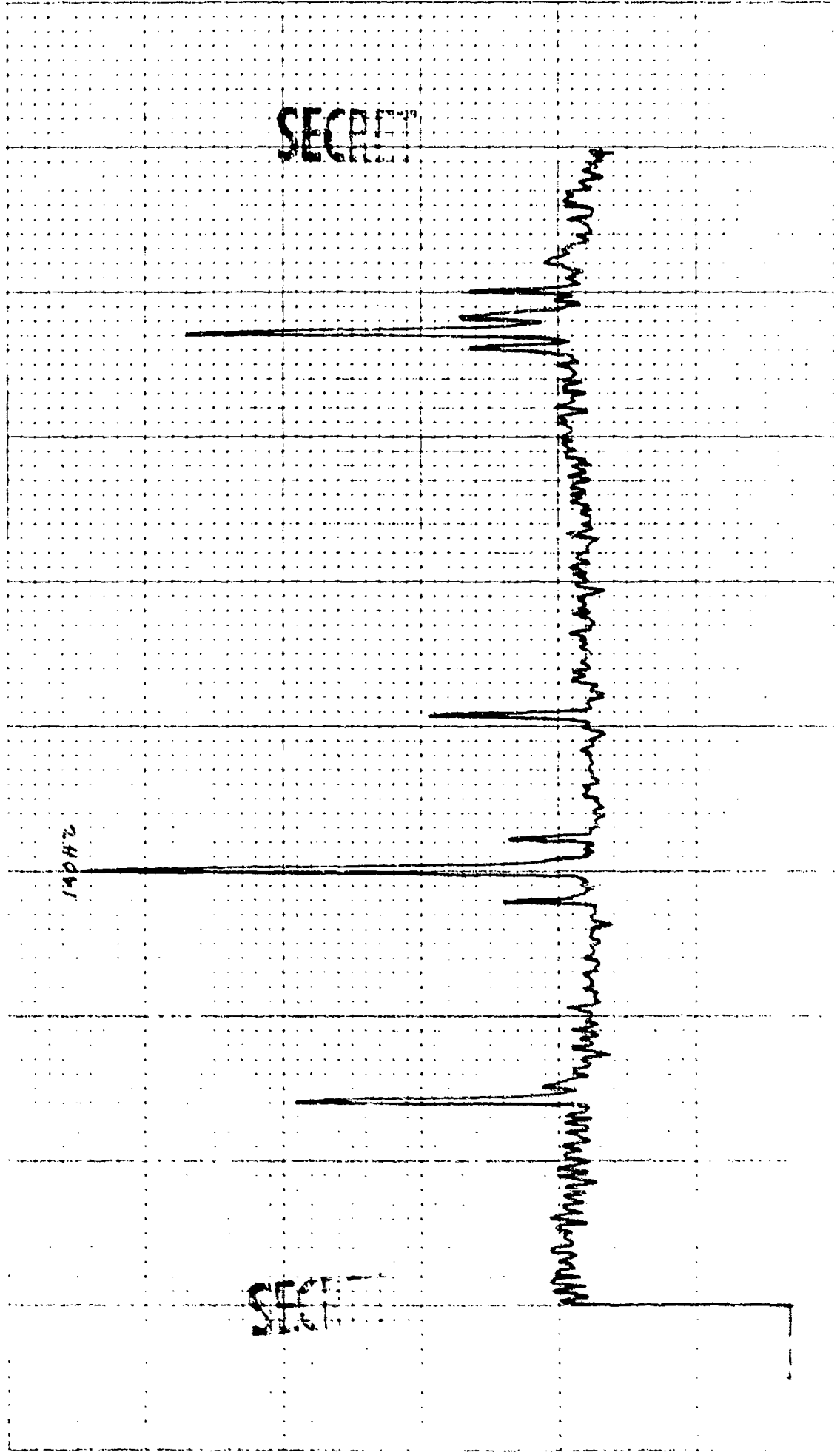
46 0703

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

REEL: 44

INDE X 3000

INTEGRATION TIME 320 SECS
 { FILTER WIG: HANNING

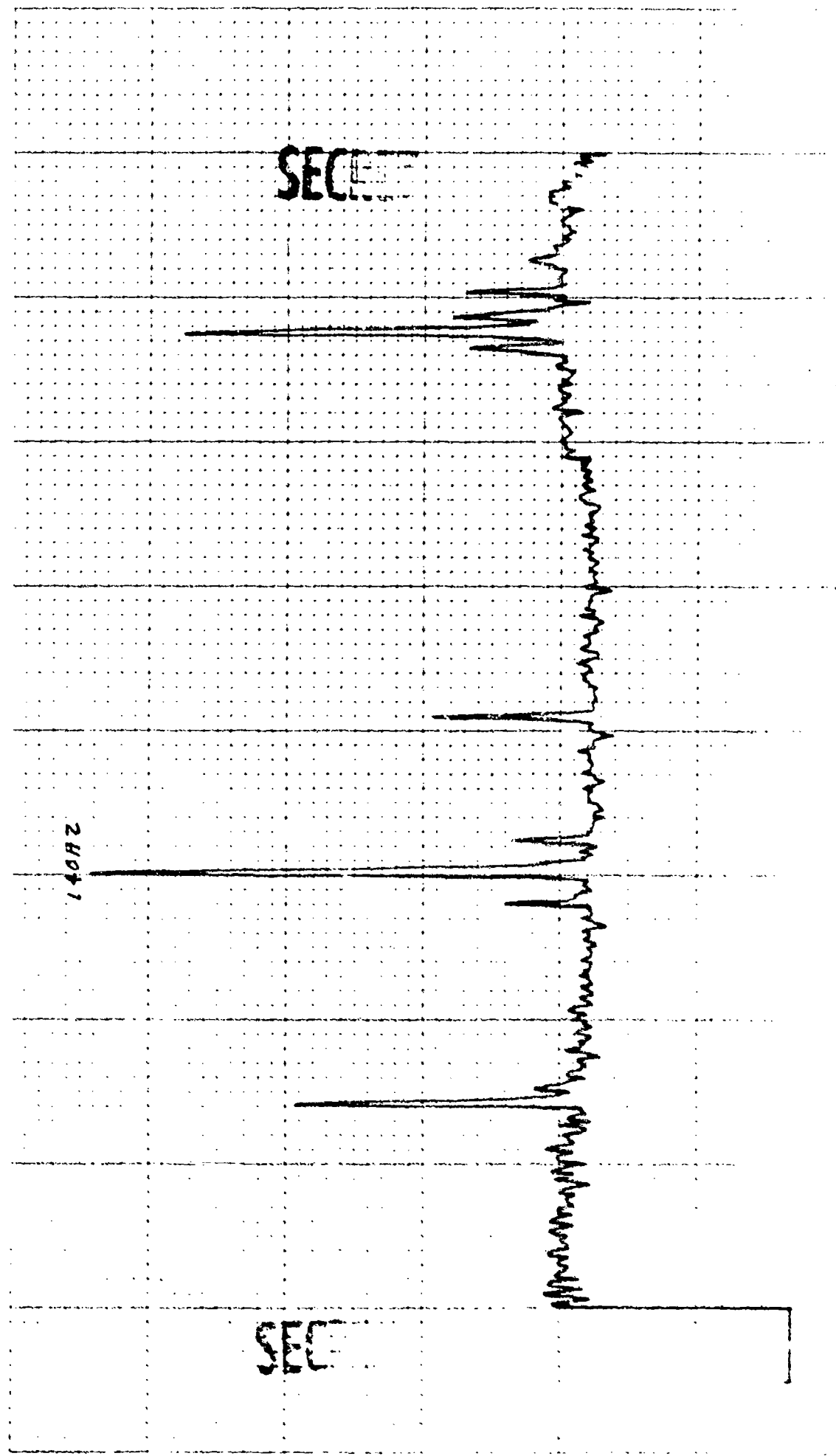


46 0703

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

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

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

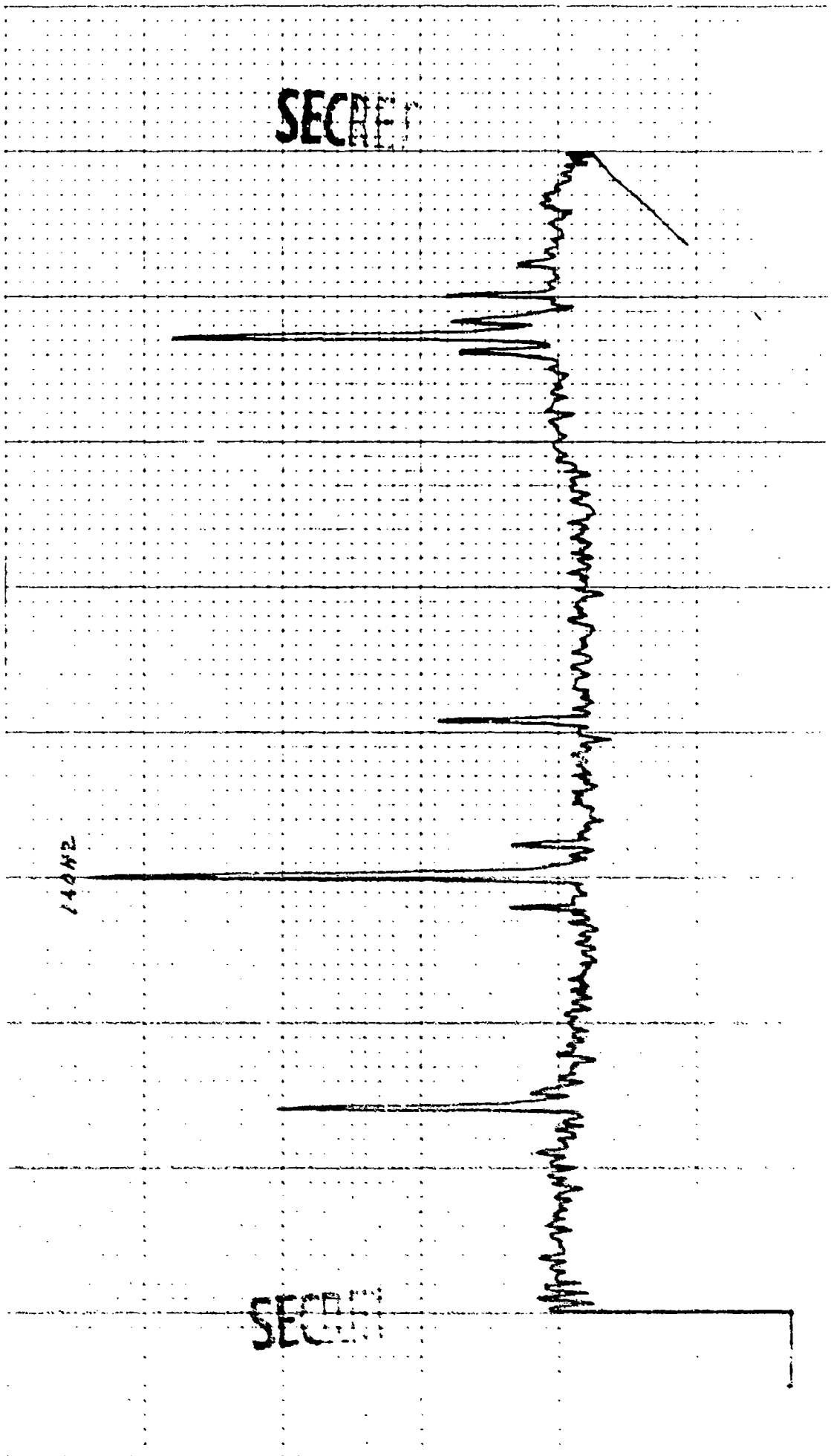


46 0703

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

DATE OF ANALYSIS: 1-6-8-1946
 DATE/TIME: 3-15-77 - 1501 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 122 DEG. AZ STEERING

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



SECRET

SECRET

46 0703

REEL: 44 INDE X 3000

CONTROL: 1501 - 41 (DPO) DATE OF ANALYSIS:

BEAMFORMED SPECTRUM (ELEMENTS 1-24 9-194 10-204 20-53)

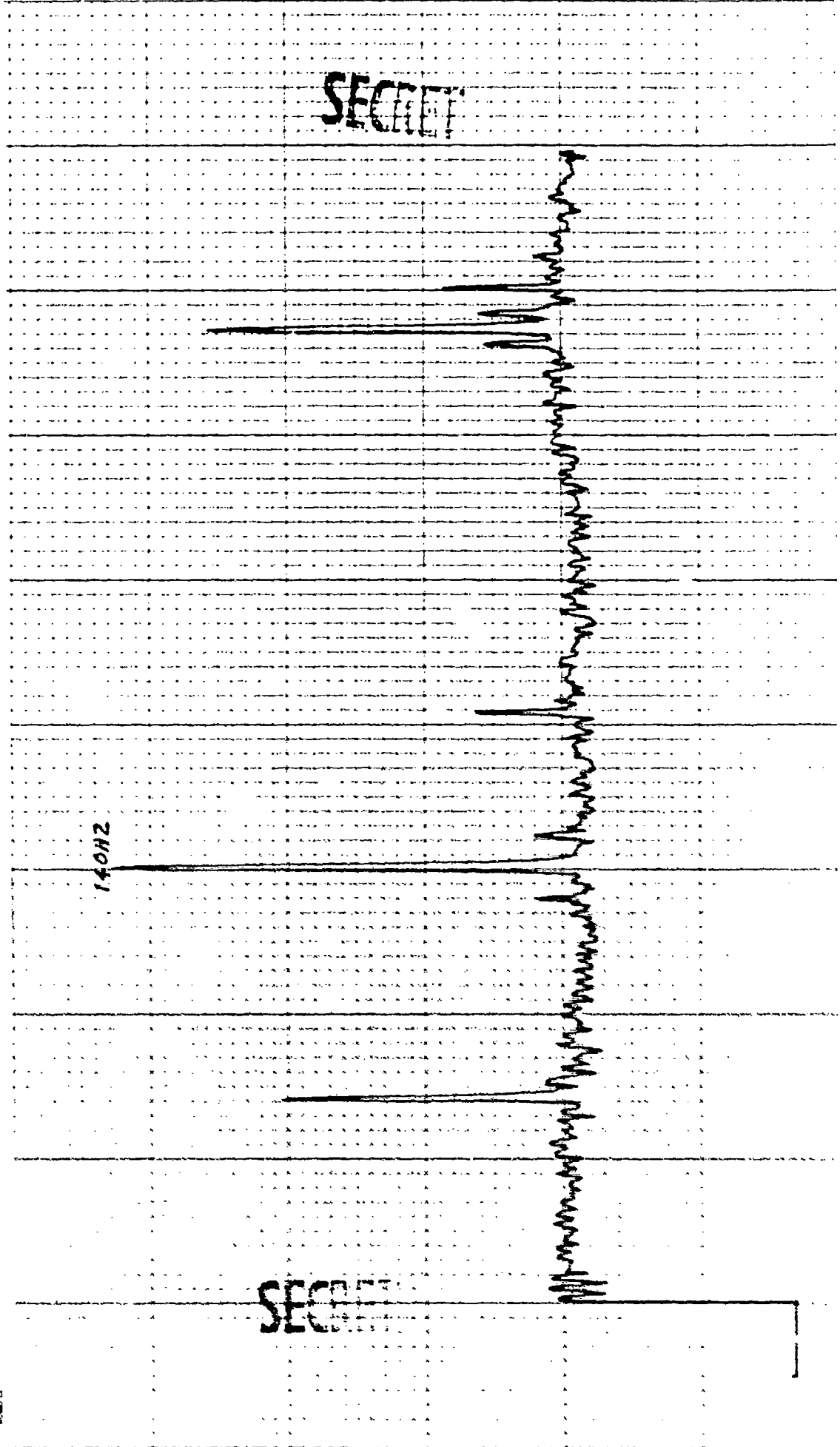
EXERCISE: BEARING STAKE DATE/TIME: 7-15-77 - 1501 Z

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

40 ELEMENTS +24 DEG. AZ STEERING

INTEGRATION TIME 320 SECS ATTEN: -30 DB

FILTER WTG: HANNING

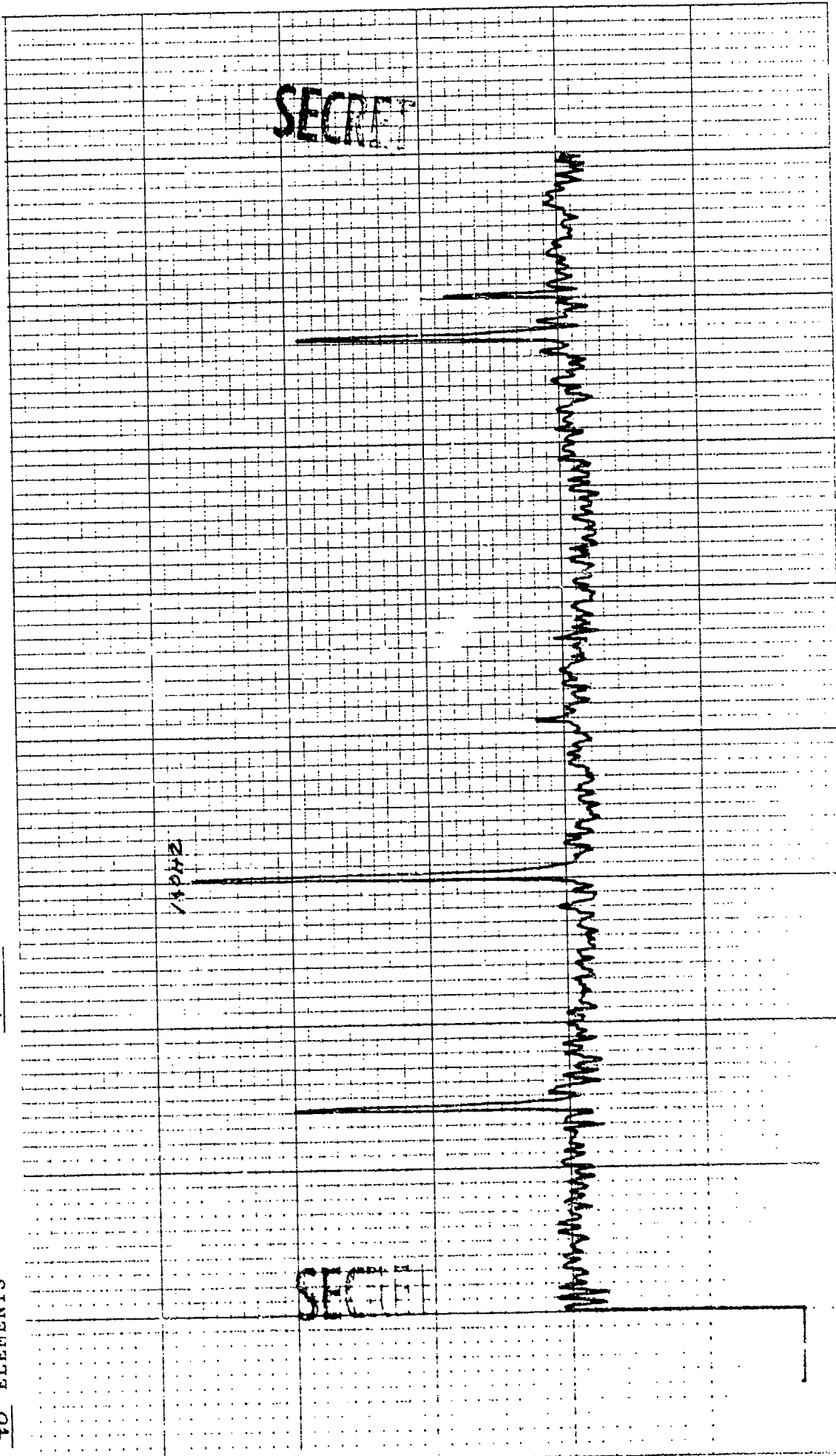


CONTROL: 150/ - 48 (DPE)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
48 ELEMENTS

DATE OF ANALYSIS: -- -- --
1-6-79-14416-26X29-53
DATE/TIME: 3-15-77 - 150/ Z
ANALYSIS BANDWIDTH: 1/10 HZ
+ 20 DEG. AZ STEERING

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

REEL: 44
INDE X3000

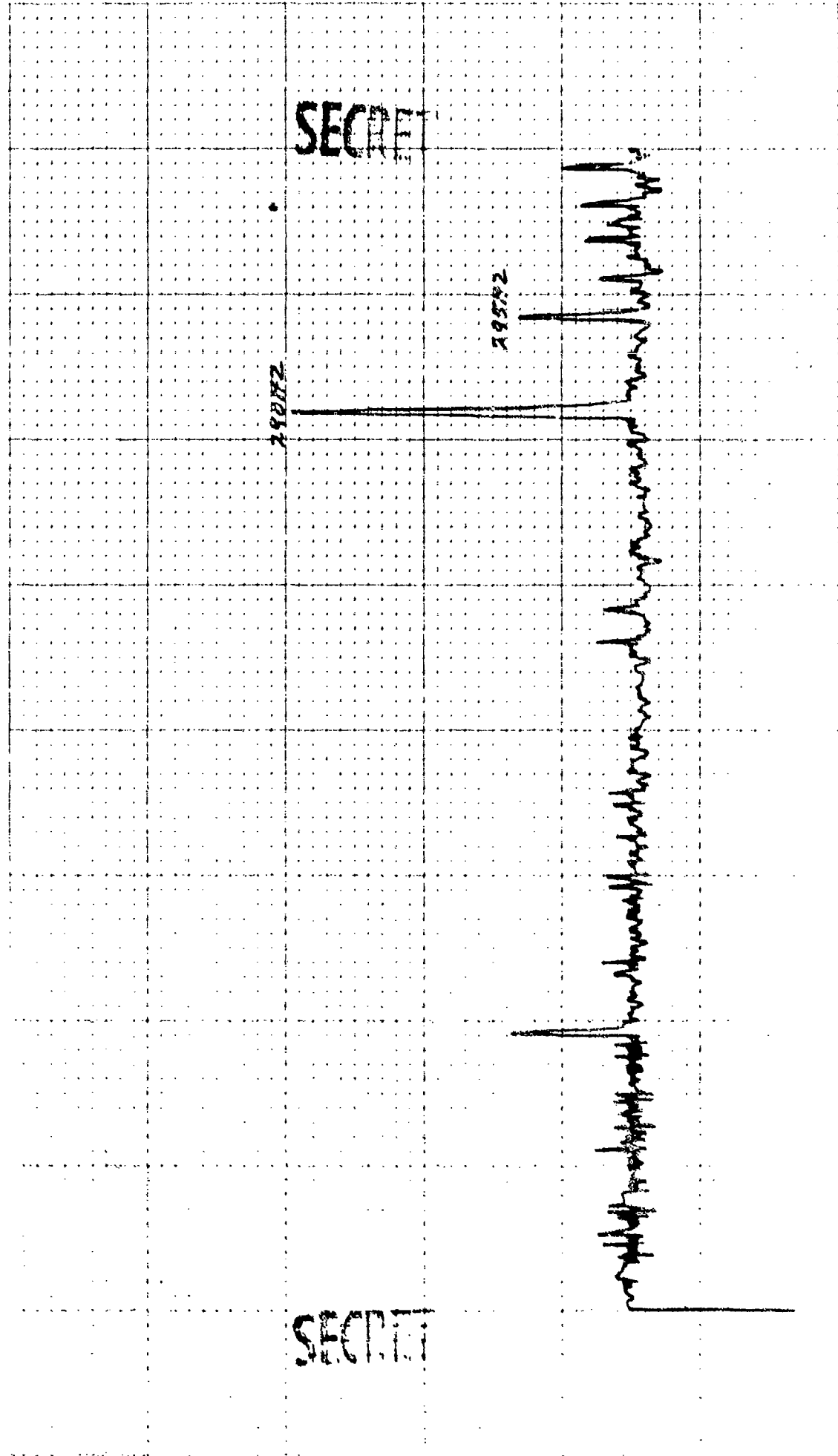


SECRET

SECRET

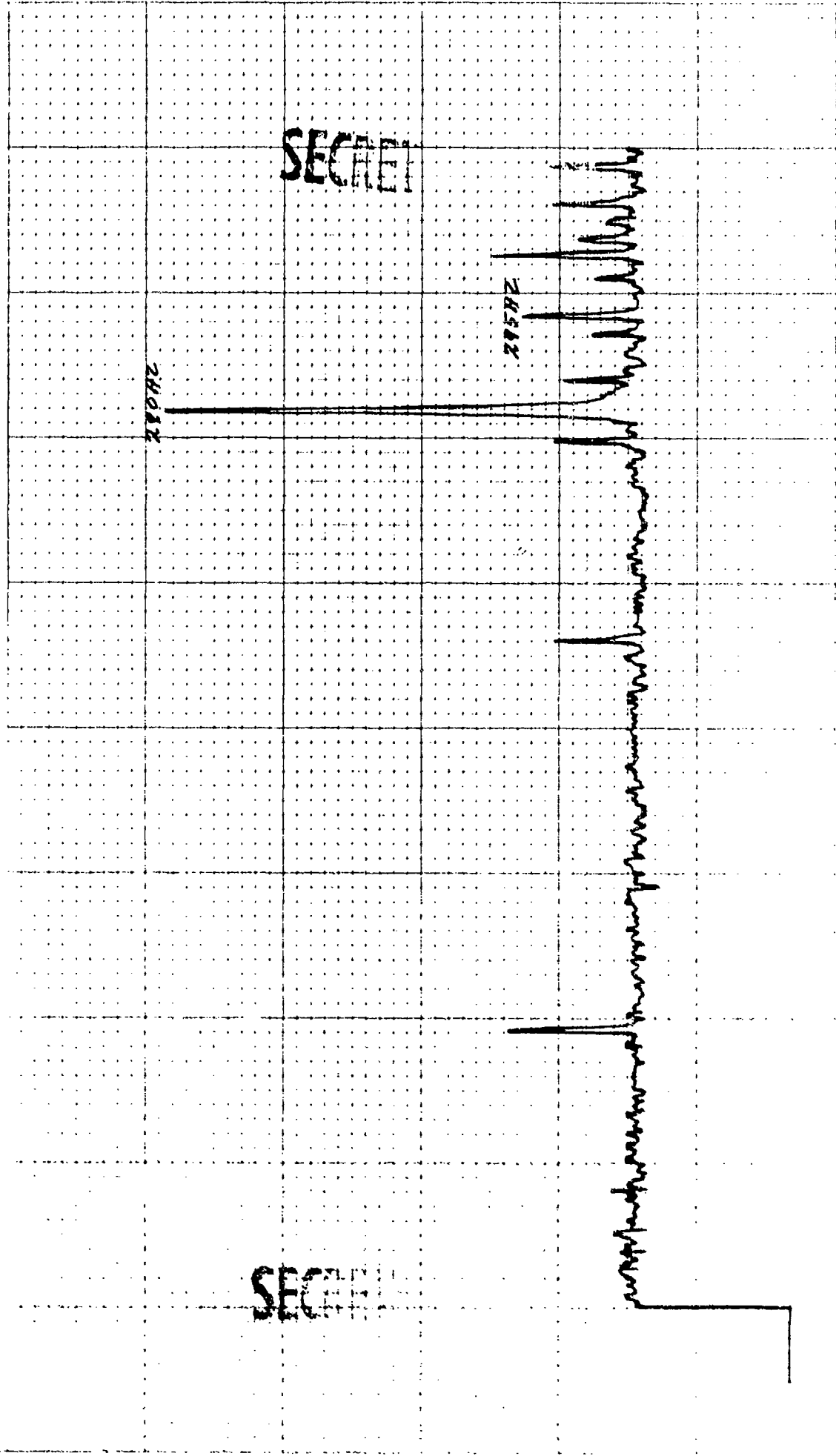
46 0703

CONTROL: 1501 - 40 (DPB) DATE OF ANALYSIS: REEL: 14 INDE X3000
 BEANFORMED SPECTRUM (ELEMENTS) 1-16-89-14 20 20 20 20 20
 EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 1501 Z INTEGRATION TIME 320 SECS ATTEN: -30 DB
 CENTER FREQ: 270 MZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WIG: HANNING
40 ELEMENTS + 14 DEG. AZ STEERING



46 0703

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



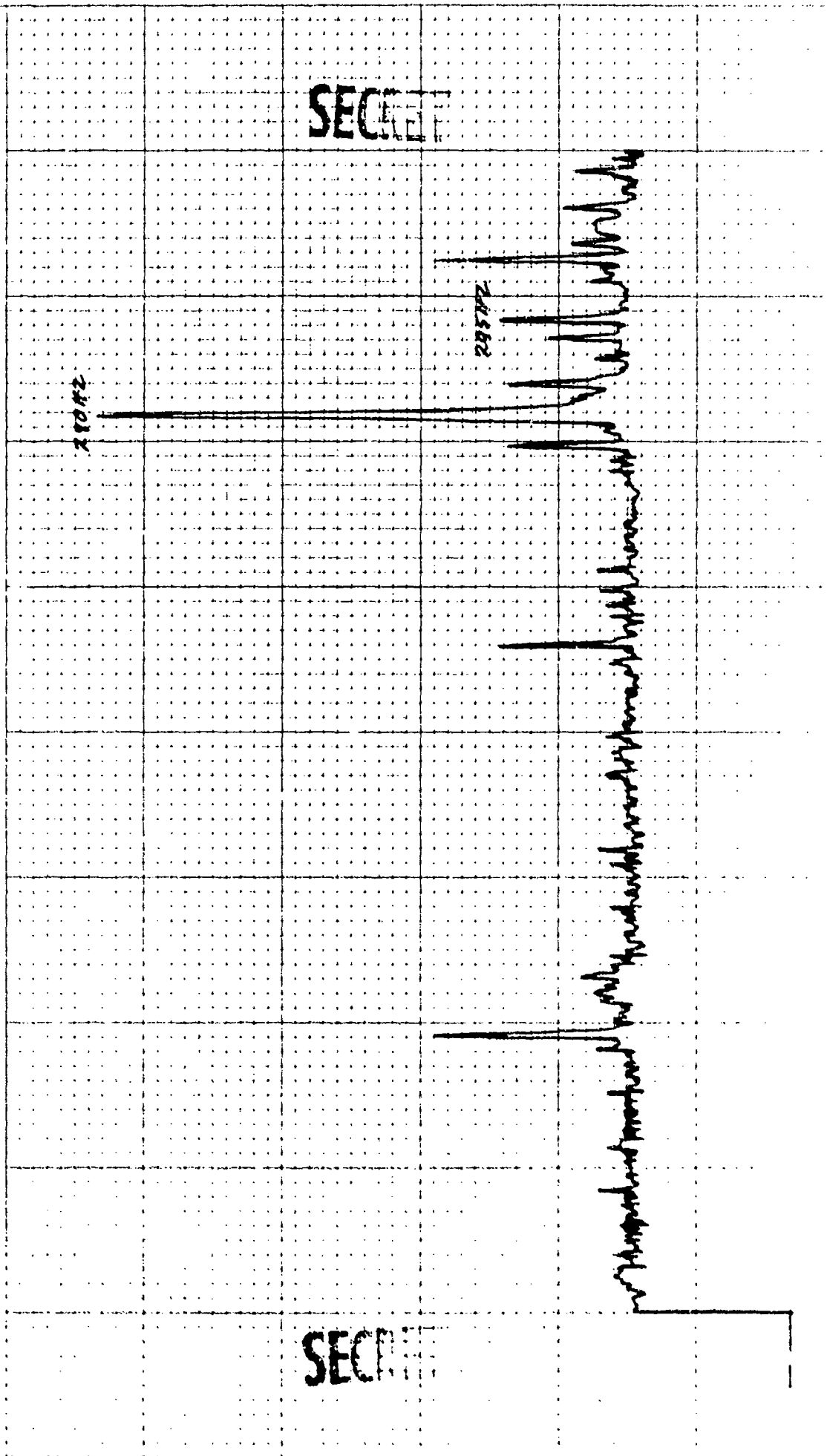
46 0703

CONTROL: 1501 - 40 (D86)
BEAMFORMED SPECTRUM (ELEMENTS 1-688-148/16-208 20-55)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
48 ELEMENTS

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

REEL: 14
INTEGRATION TIME 320 SECS
FI.TFR WTG: HANNING

INDE X3000



SECRET

SECRET

REF: 19 240 TO THE HQMC: 2 11 1977

46 0703

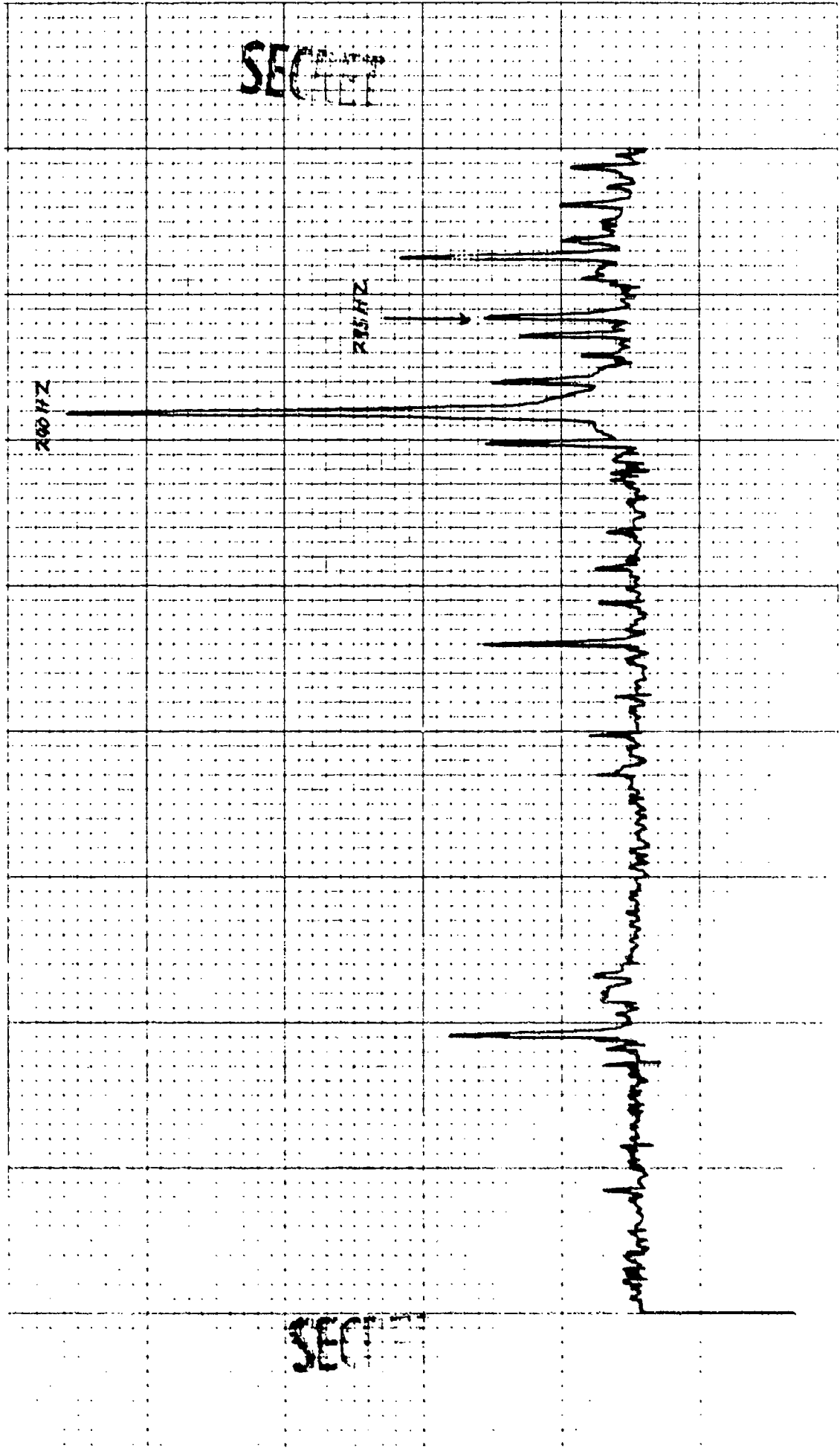
CONTROL: 1501 - 48 (DPE) DATE OF ANALYSIS: _____ INDE X 3000

BEAMFORMED SPECTRUM (ELEMENTS 1-64 9-144 16-264 28-53) REEL: M4

EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTEN: 30 DB

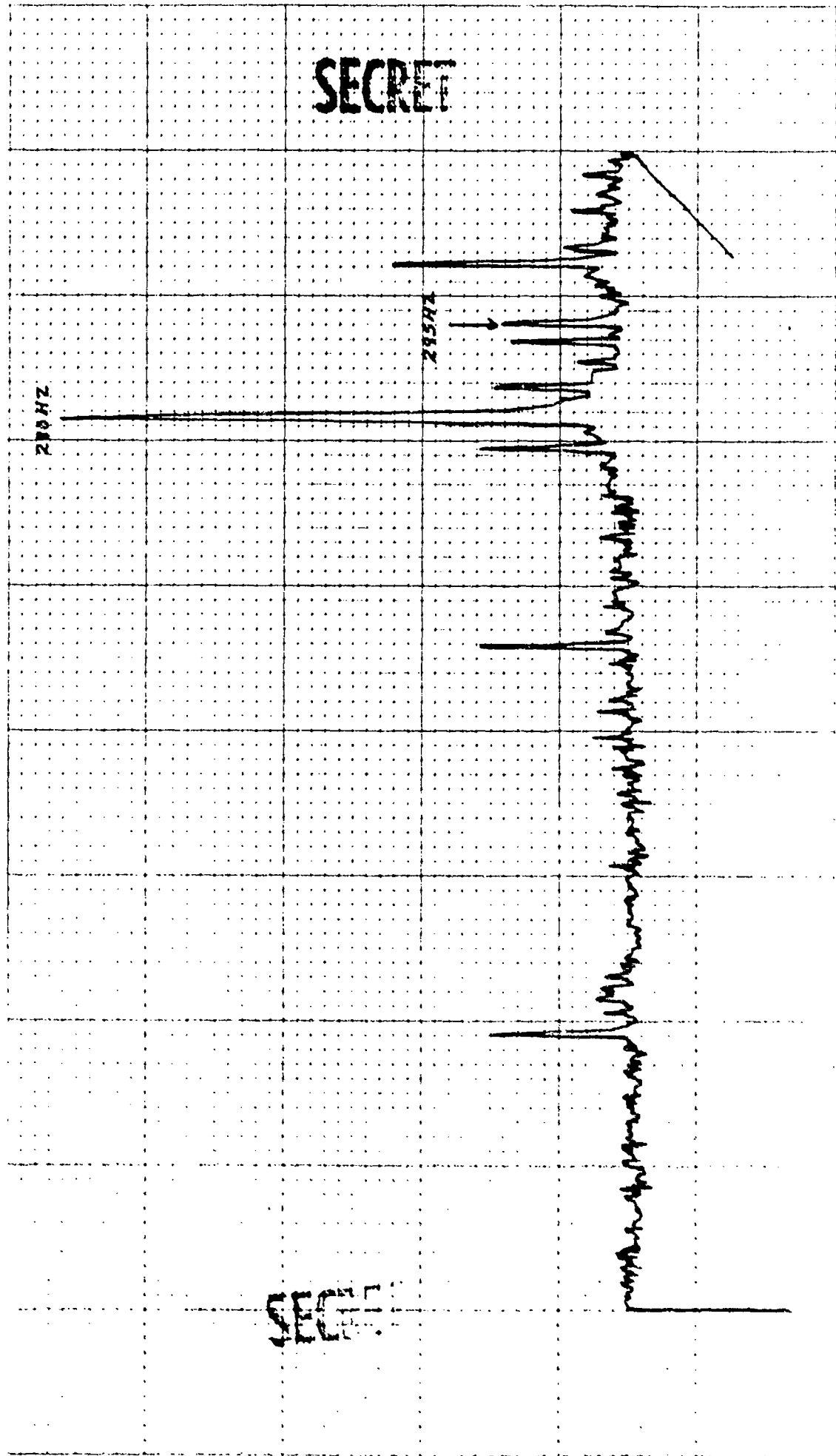
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING

48 ELEMENTS +19 DEG. AZ STEERING



46 0703

CONTROL: 1501 - 48 (DOB) DATE OF ANALYSIS: _____ REEL: MY INDE X 3000
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 1-28-77 16-200 219-53
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ
 CENTER FREQ: 270 HZ +20 DEG. AZ STEERING INTEGRATION TIME 320 SECS ATTEN: 30 DB
 48 ELEMENTS FILTER WTG: HANNING

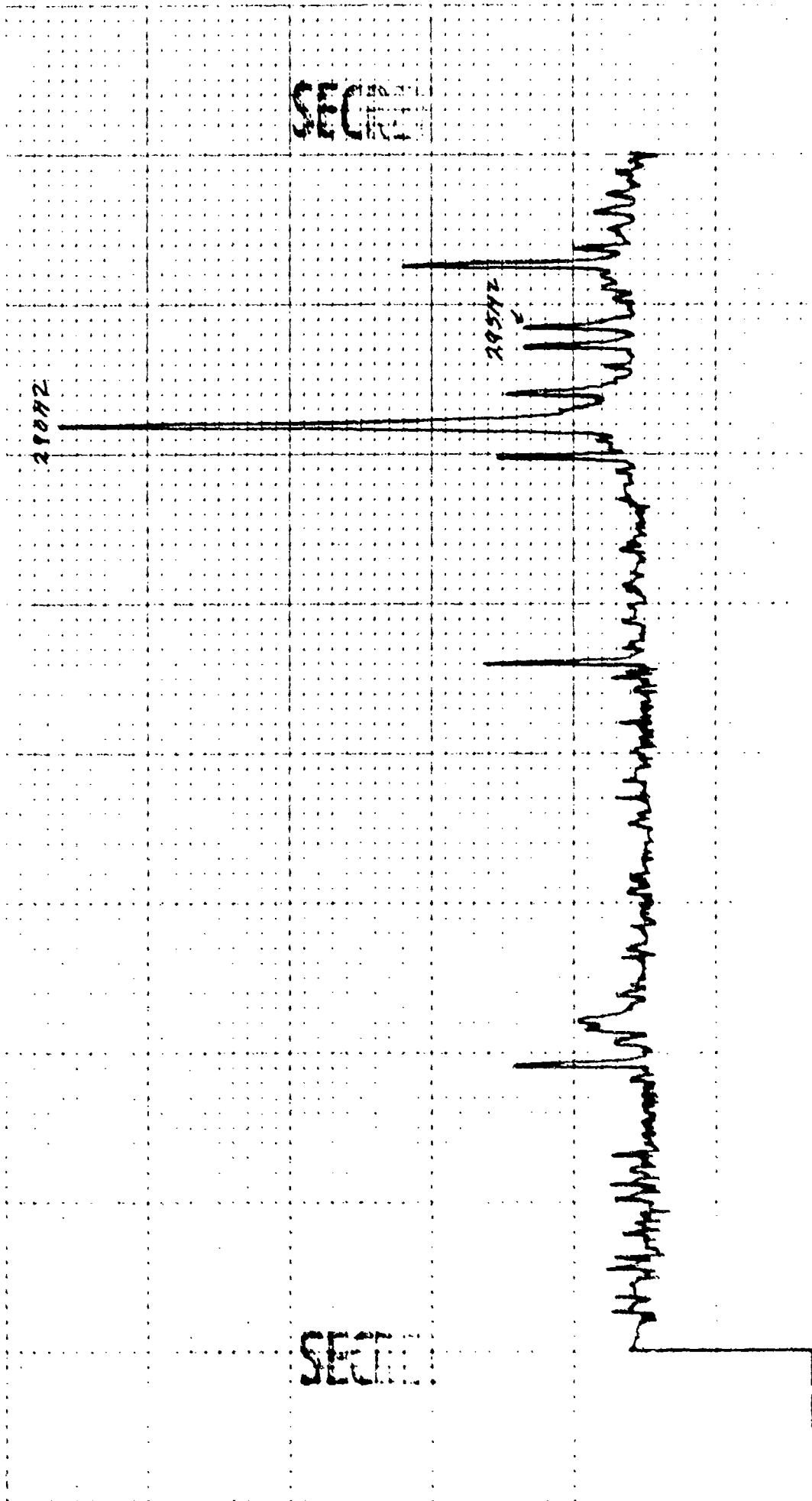


46 0703

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

DATE OF ANALYSIS: - - -
1-6-89-14416-06808-53
DATE/TIME: 9-15-77 - 1501 Z
ANALYSIS BANDWIDTH: 1/10HZ
+ X / DEG. AZ STEERING

REEL: M4 INDE X1000
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTER WTC: HANNING



SECRET

SECRET

46 0703

10 X 10 TO THE INCHES
PER INCH

REEL: 14 INDE X 3000

CONTROL: 1501 - 40 (DPE) DATE OF ANALYSIS: ---

BEAMFORMED SPECTRUM (ELEMENTS 1-688-148/16-20488-53)

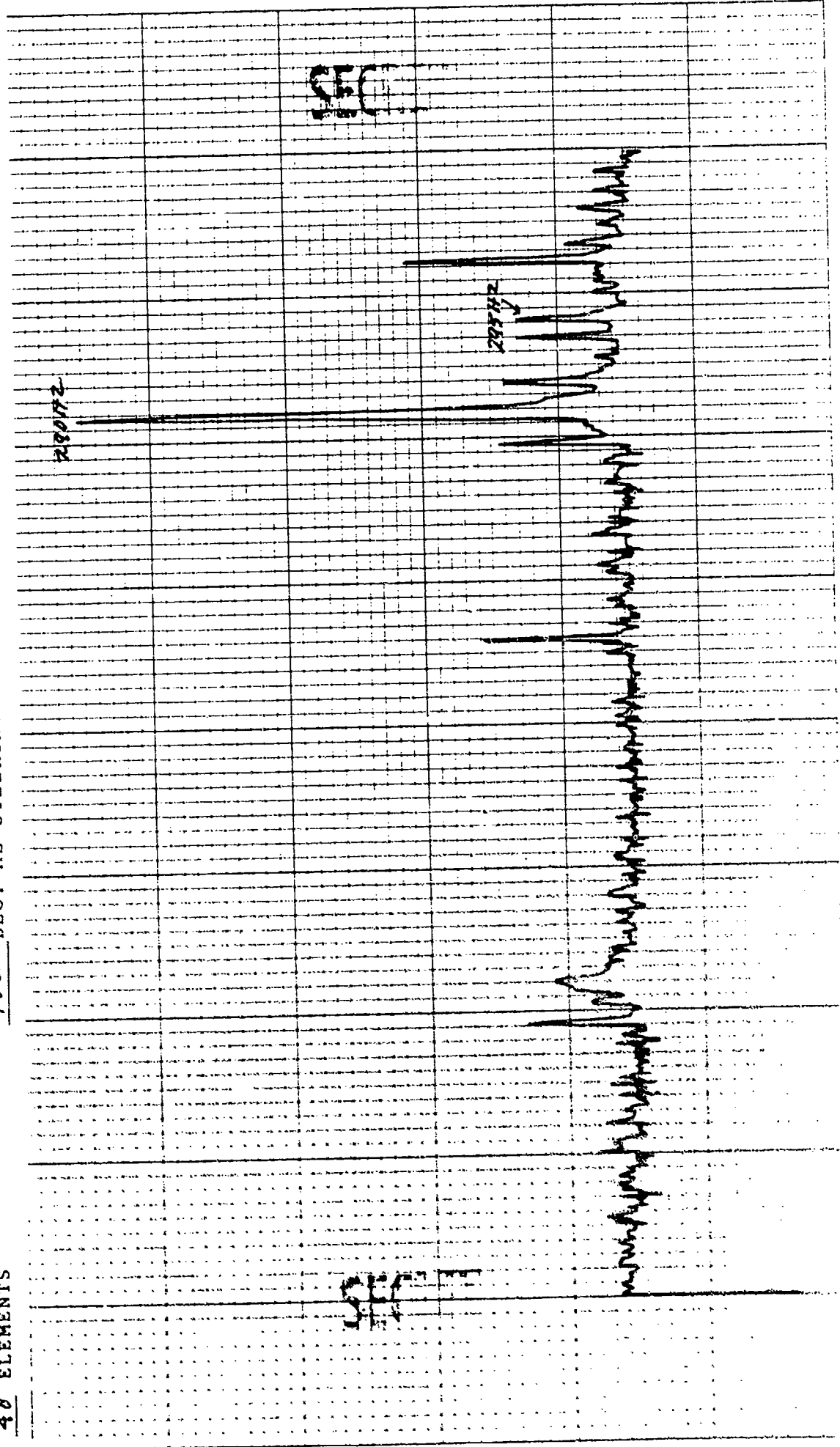
EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 1501 Z

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

40 ELEMENTS +22 DEG. AZ STEERING

INTEGRATION TIME 320 SECS ATTN: -30 DB

FILTER HANNING WIG: HANNING

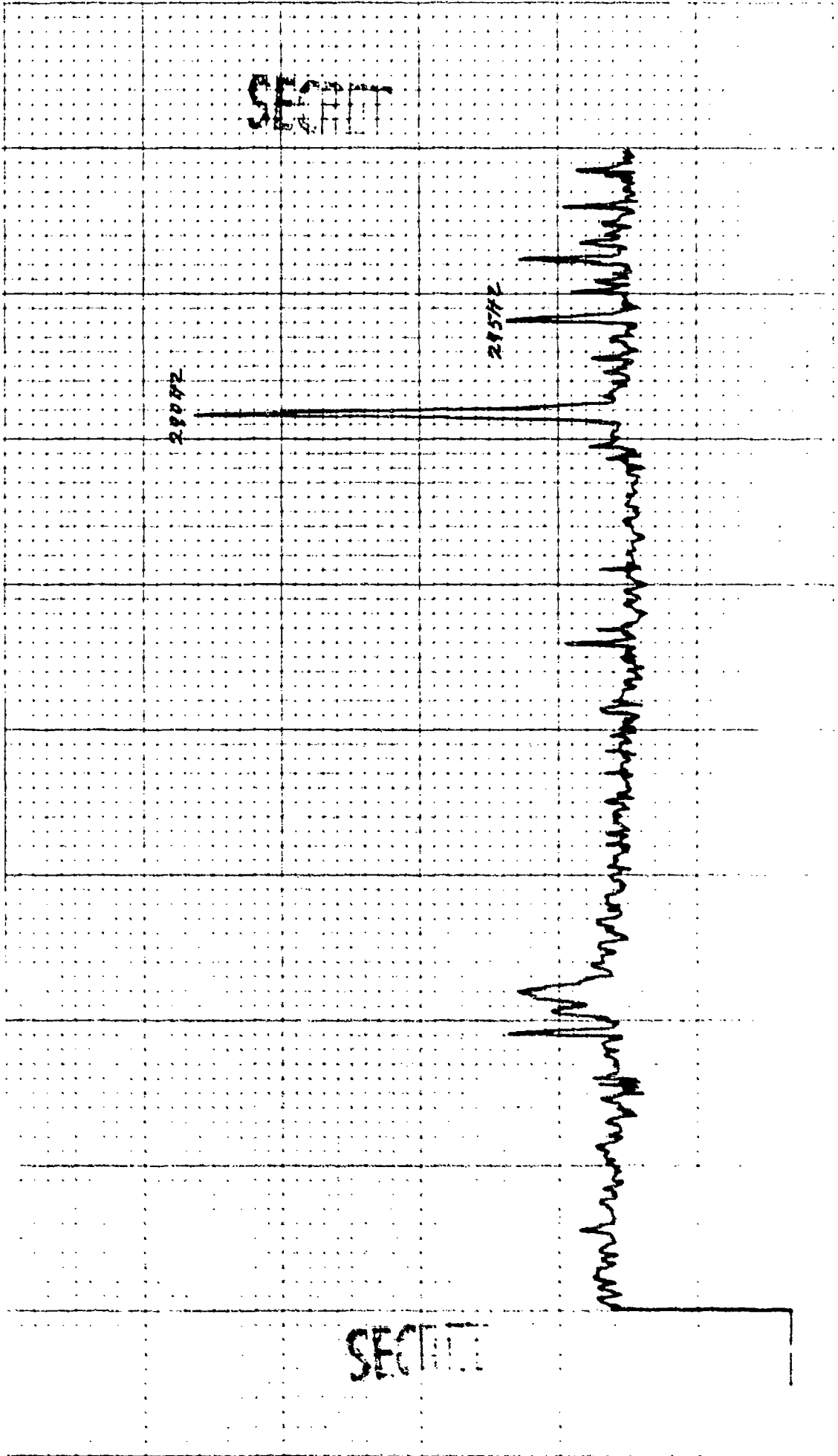


46 0703

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

DATE OF ANALYSIS: ---
DATE/TIME: 1-6-77 16-26-33
ANALYSIS BANDWIDTH: 1/10 HZ
+ 24 DEG. AZ STEERING

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



SECRET

46 0703

1-28-53

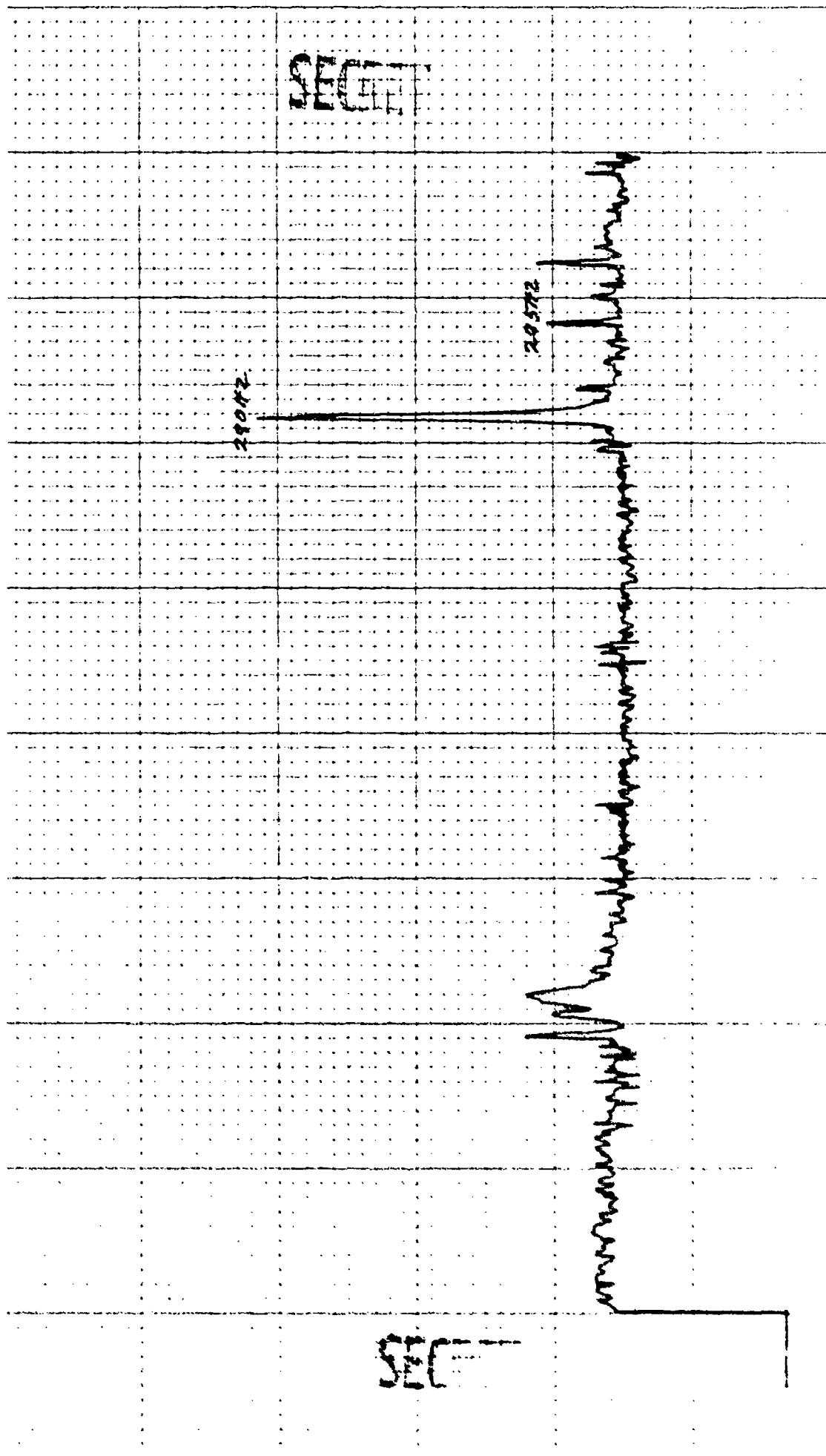
CONTROL: 1501 - 40 (D00) REEL: 44 INDE XJ000

BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-28-53

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

CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FI.F.T.P. WTG: HANNING

46 ELEMENTS + 26 DEC. AZ STEERING



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

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

FREQUENCY 140 HZ

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

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

BANDWIDTH CONVERSION TO 1 HZ BAND +8.2 -31.8

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

UNCLASSIFIED

UNCLASSIFIED

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

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

FREQUENCY 290 HZ

INDICATED NOISE LEVEL $\frac{1}{10}$ ABW -51.0

SYSTEM SENSITIVITY dB/μB -(-9) -43.0

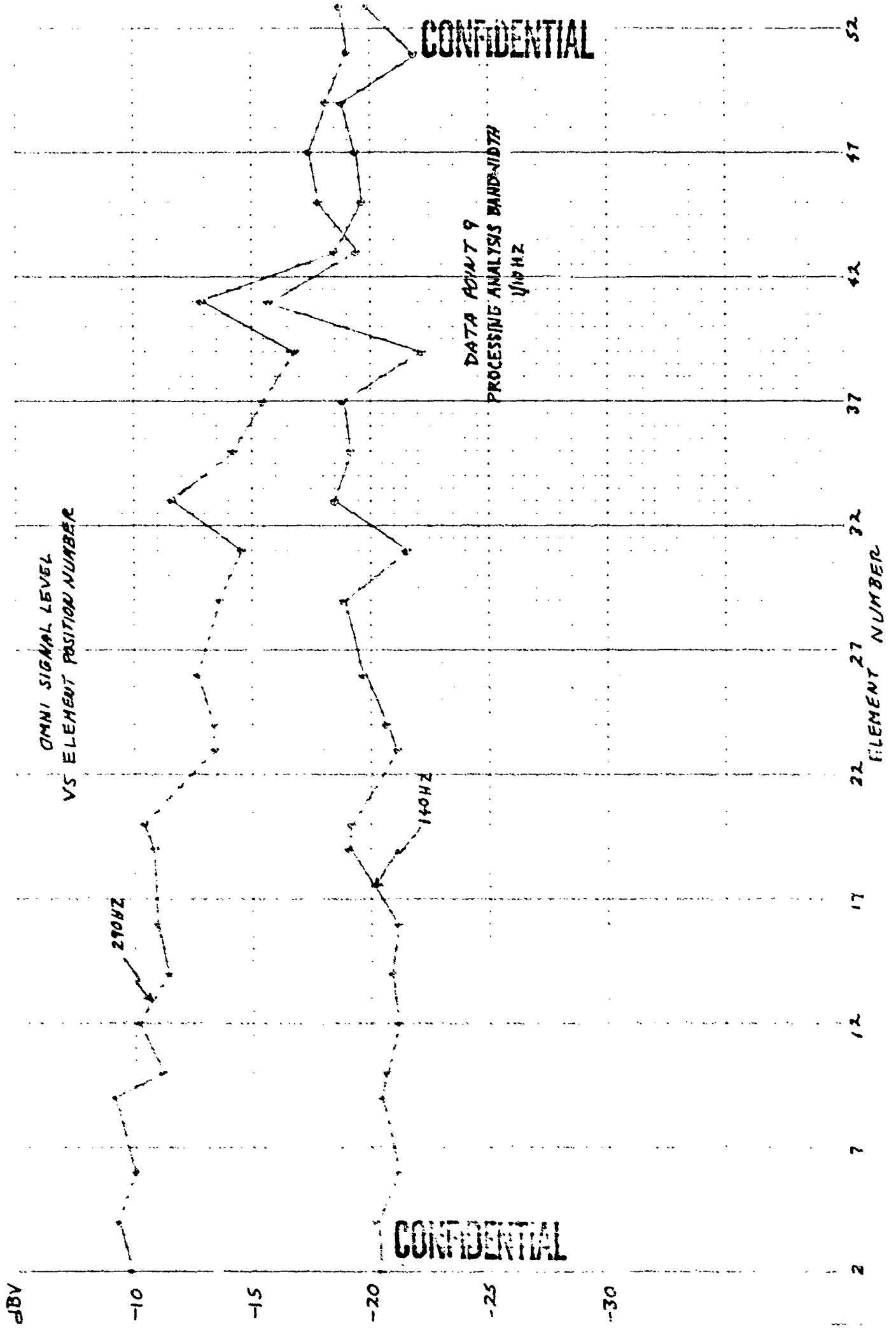
BANDWIDTH CONVERSION TO 1 HZ BAND +8.2 -34.8

CONVERSION TO $\text{dBre}\mu\text{Pa}/\text{1HZ}$ +160 +65.2

UNCLASSIFIED

UNCLASSIFIED

46 0703



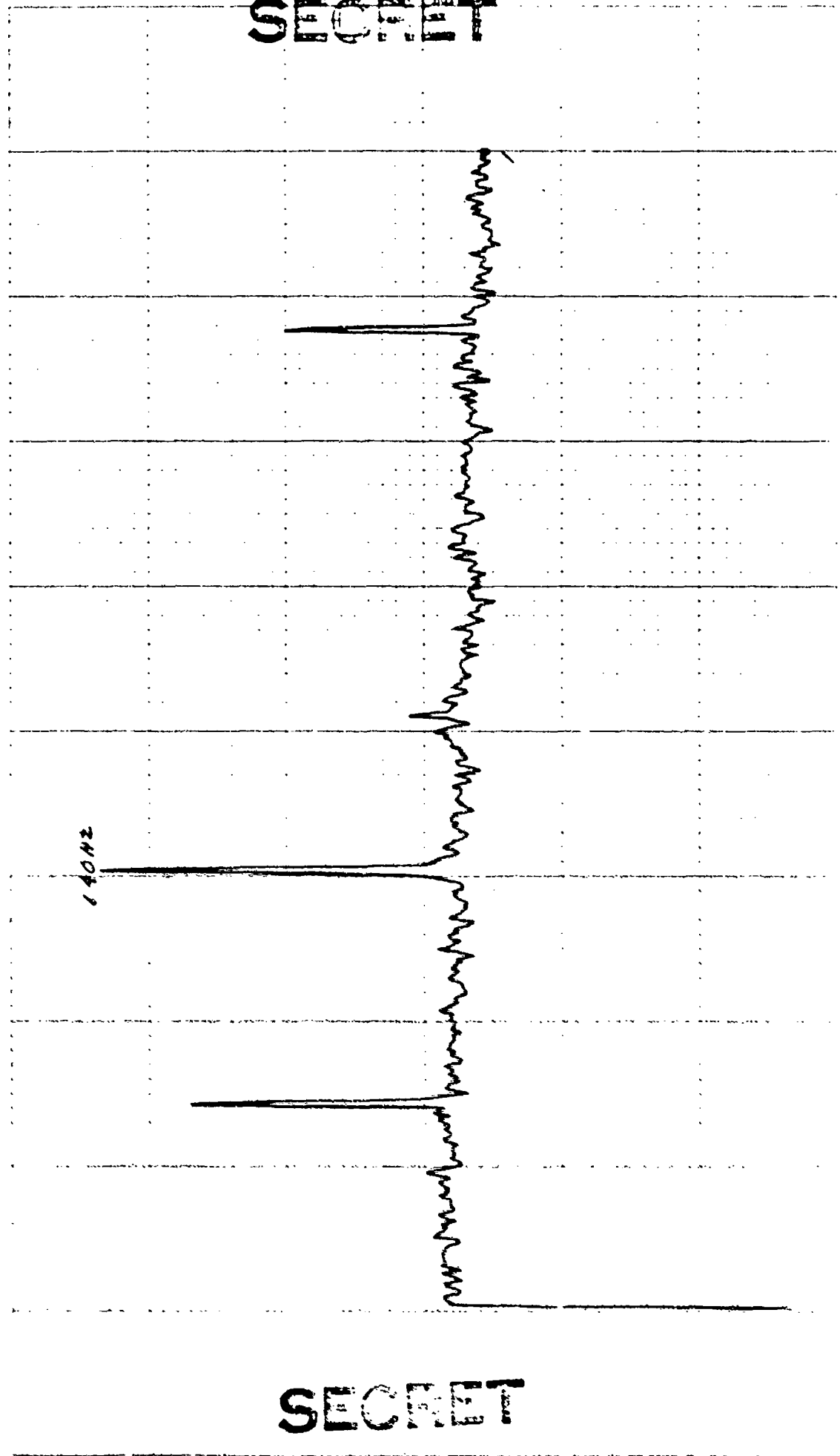
CONFIDENTIAL

CONFIDENTIAL

45 0703

CONTROL: 3-15-2171 (27) (27) DATE OF ANALYSIS: REEL: N10 INDEX 3620
 OMNI SPECTRUM (ELEMENT 2)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 1 ELEMENT

DATE/TIME: 3-15-77 - 2131 Z INTEGRATION TIME 320 SECS ATTN: - DB
 ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTC: HANNING
 - DEG AZ STEERING



SECRET

SECRET

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

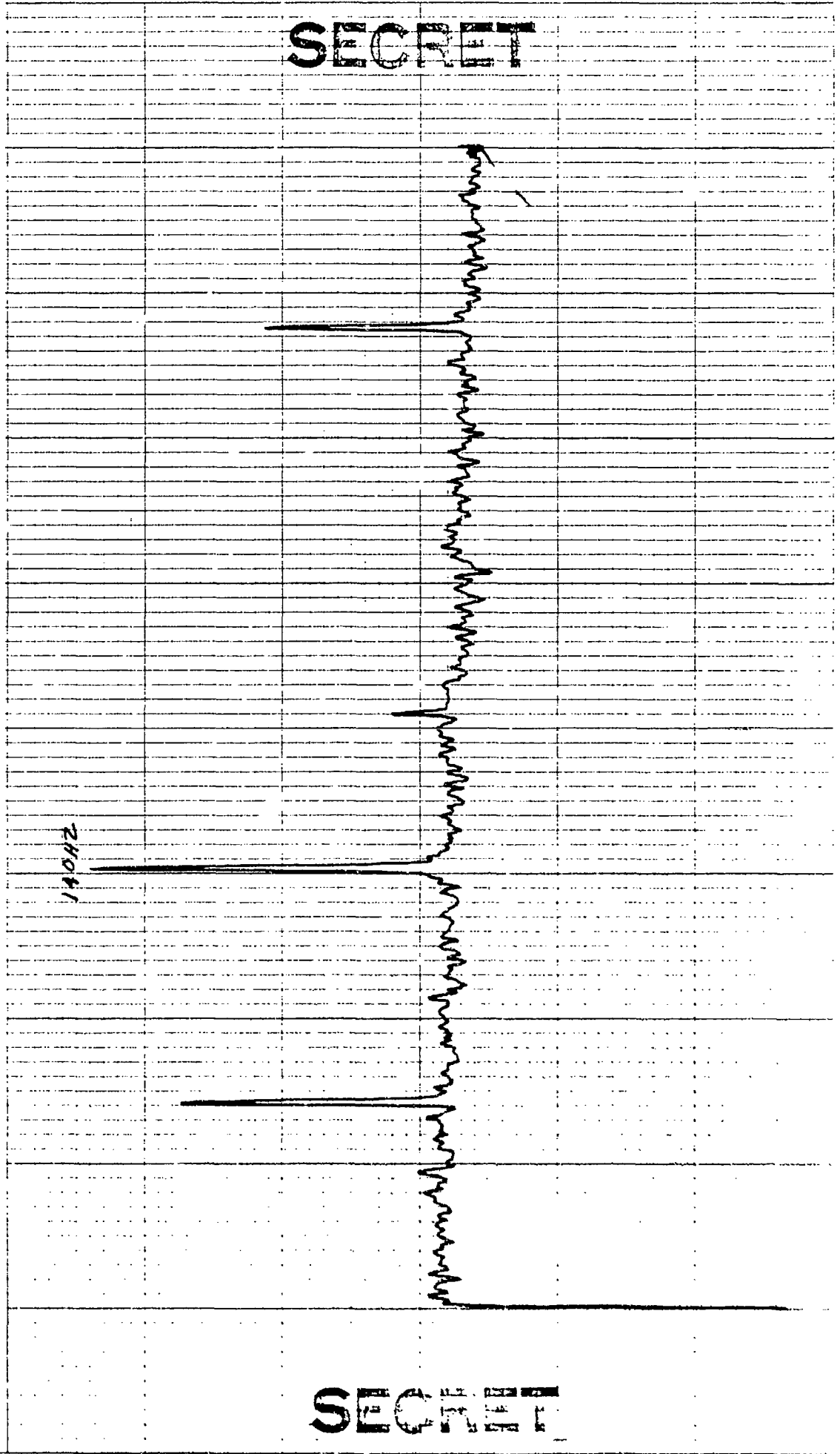
DATE OF ANALYSIS:

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

REEL: M10

INDEX 3620

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER WT: HANNING



SECRET

SECRET

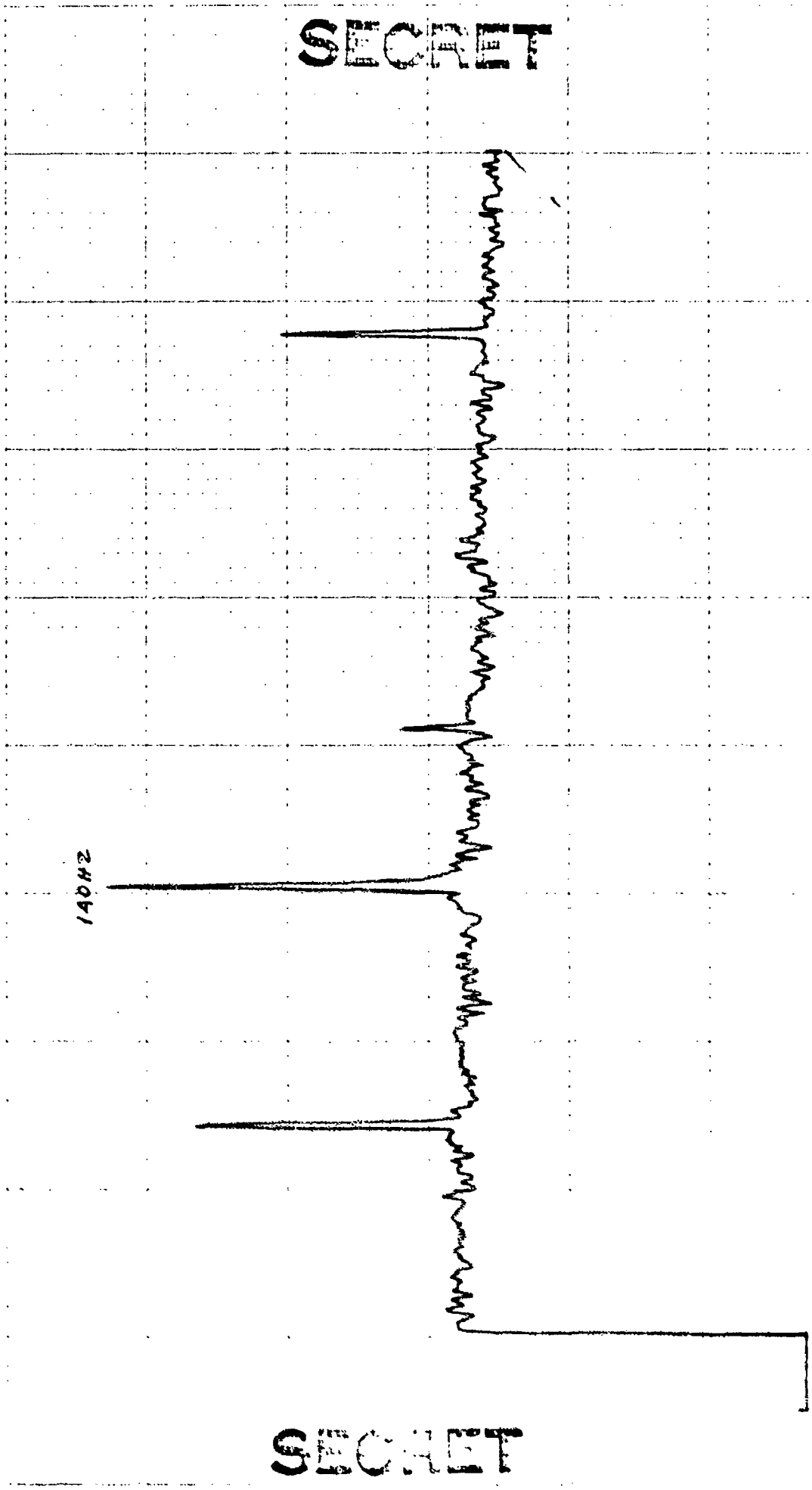
46 0703

1427 2400 2400 2400 2400

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

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

INTEGRATION TIME 320 SECS ATTN: DB
 FILTER WTG: HANNING



46 0703

1973 05 10 09 00 00

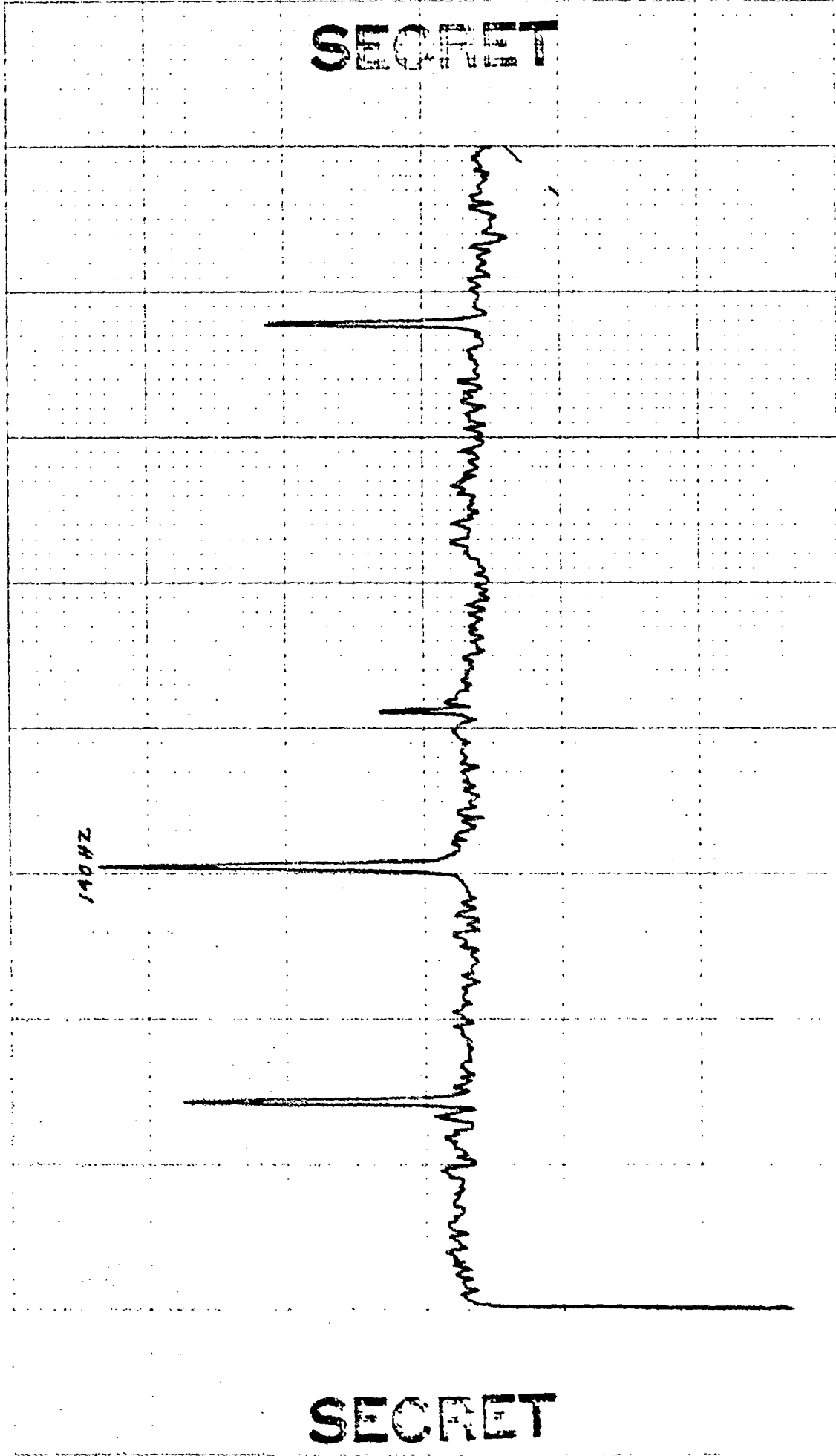
CONTROL: 3-15 - 201 (30)
OMNI SPECTRUM (ELEMENT 9)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 203Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: N10 INDEX 3020

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



SECRET

SECRET

46 0703

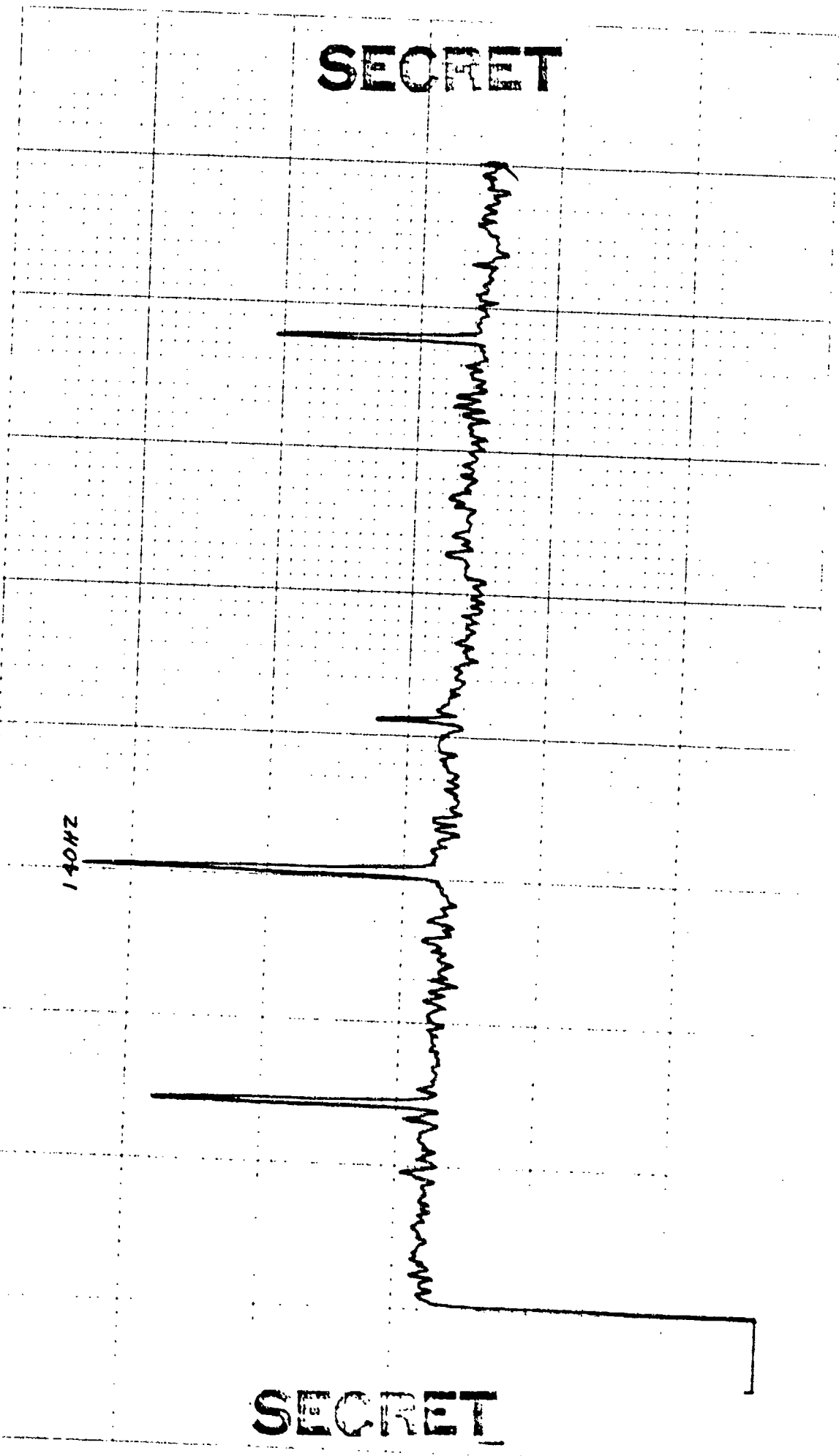
CONTROL: 375-2131 (31)
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: M10 INDEX 3620

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING

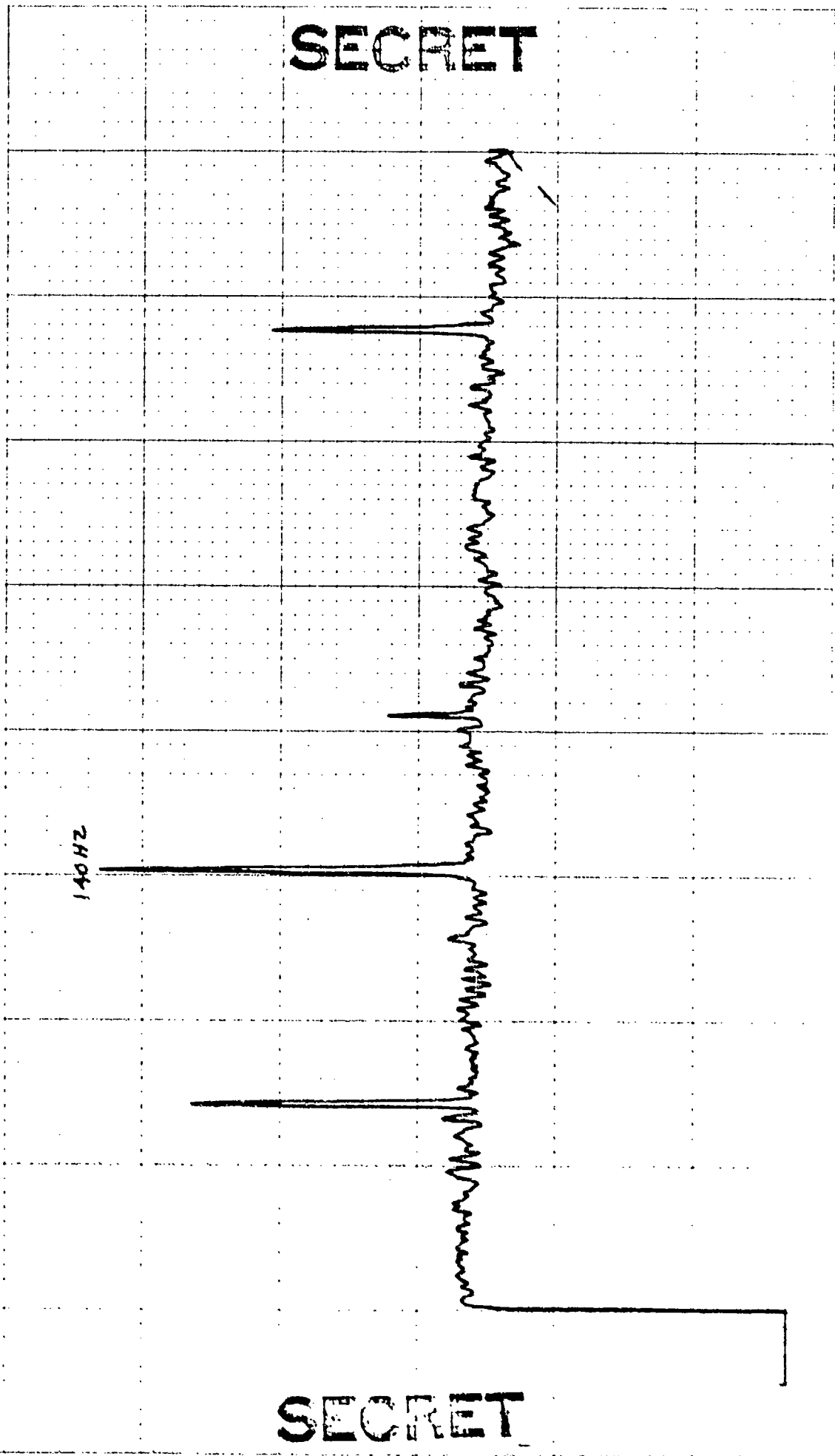


SECRET

SECRET

46 0703

CONTROL: 345-2/31 (12) DATE OF ANALYSIS: REEL: A10 INDEX 3620
 OMNI SPECTRUM (ELEMENT 12)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: - DB
 1 ELEMENT DEG AZ STEERING FILTER WTG: HANNING



SECRET

SECRET

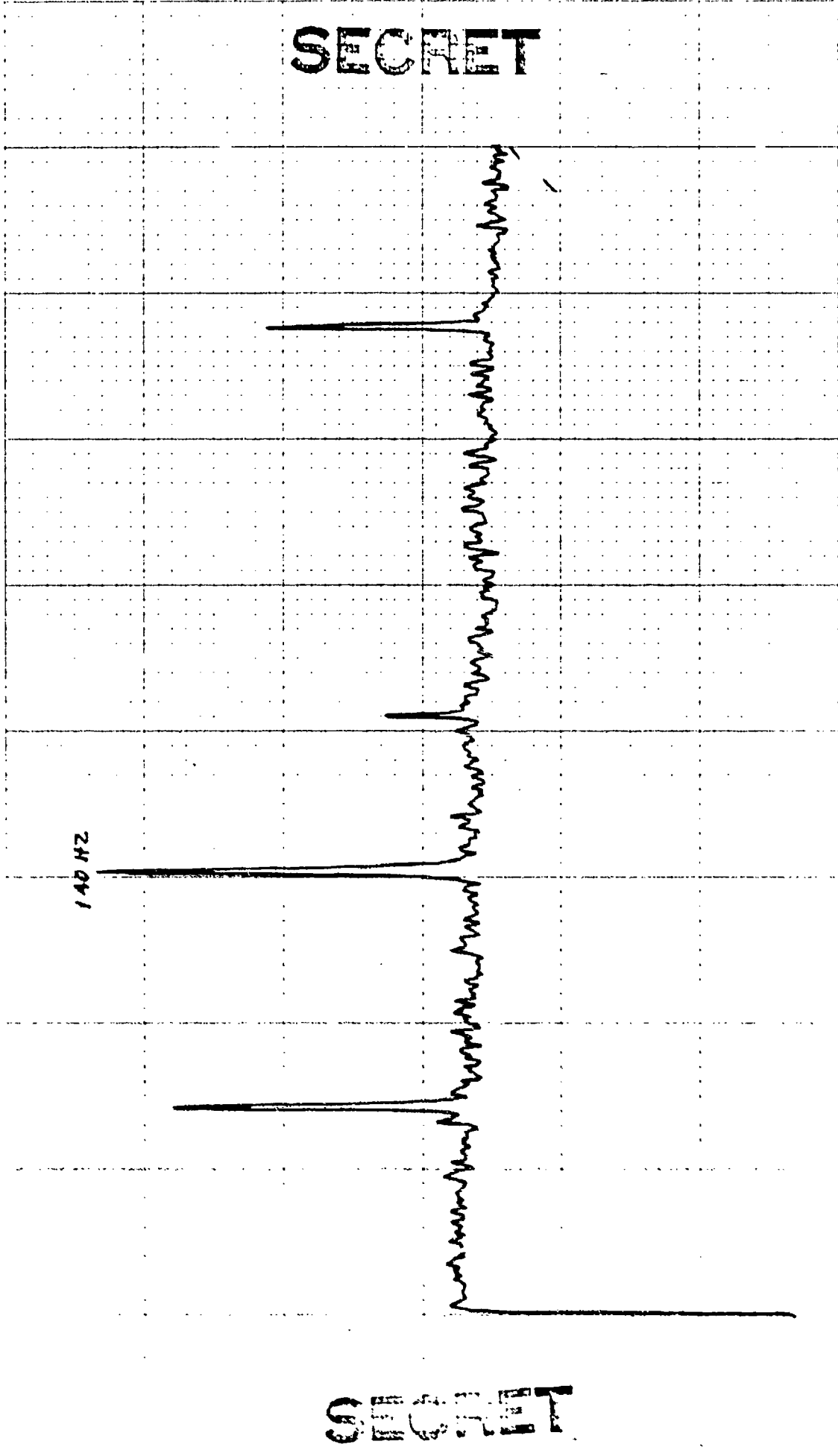
46 0703

142 25 00 30.15 00.00 0.00

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

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

INTEGRATION TIME 320 SECS
 FILTER WTC: HANNING



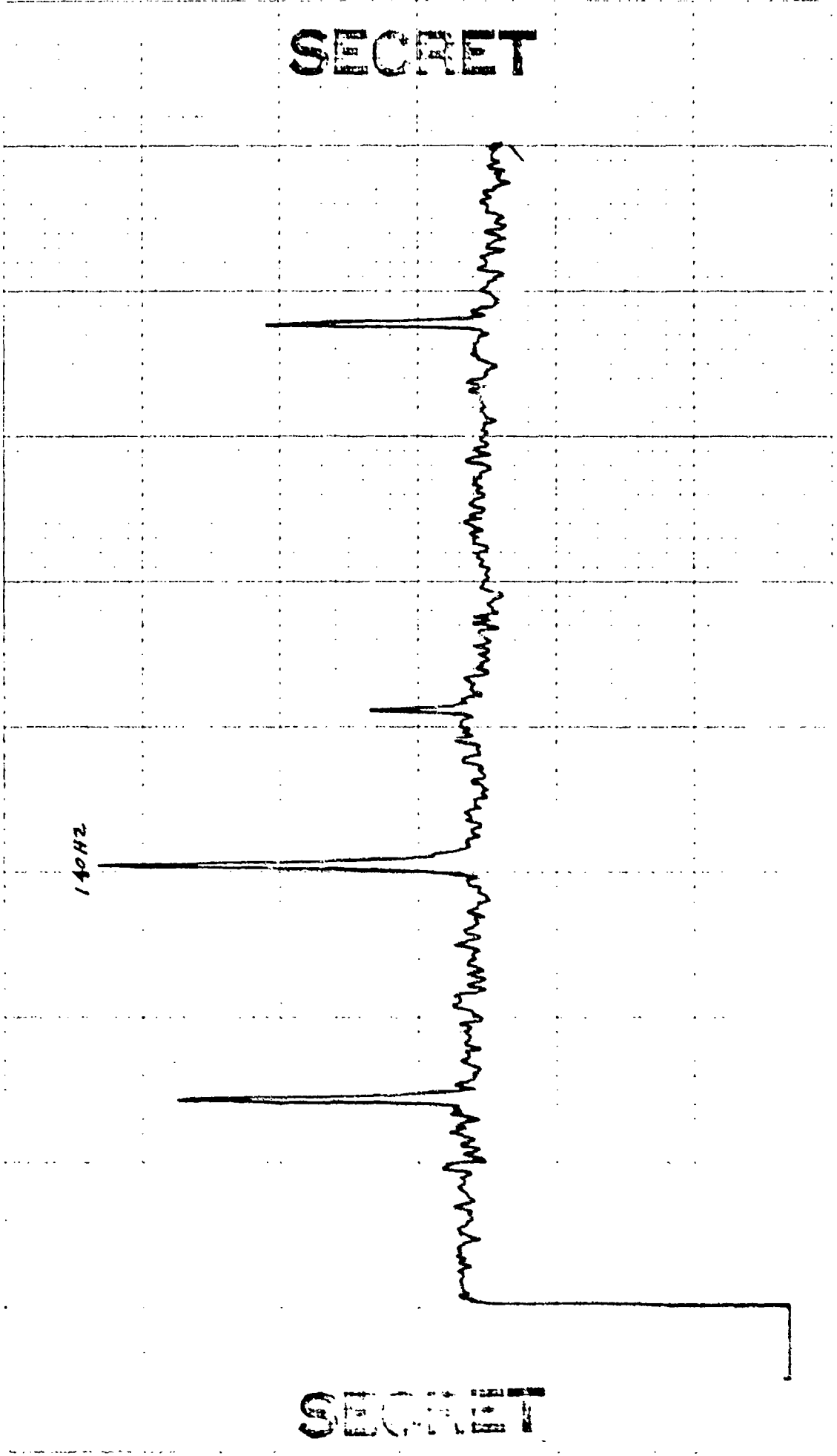
SECRET

SECRET

46 0703

1657 24 0000 0000 0000 0000

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



SECRET

SECRET

160E 2400K 2400K 2400K 2400K

46 0703

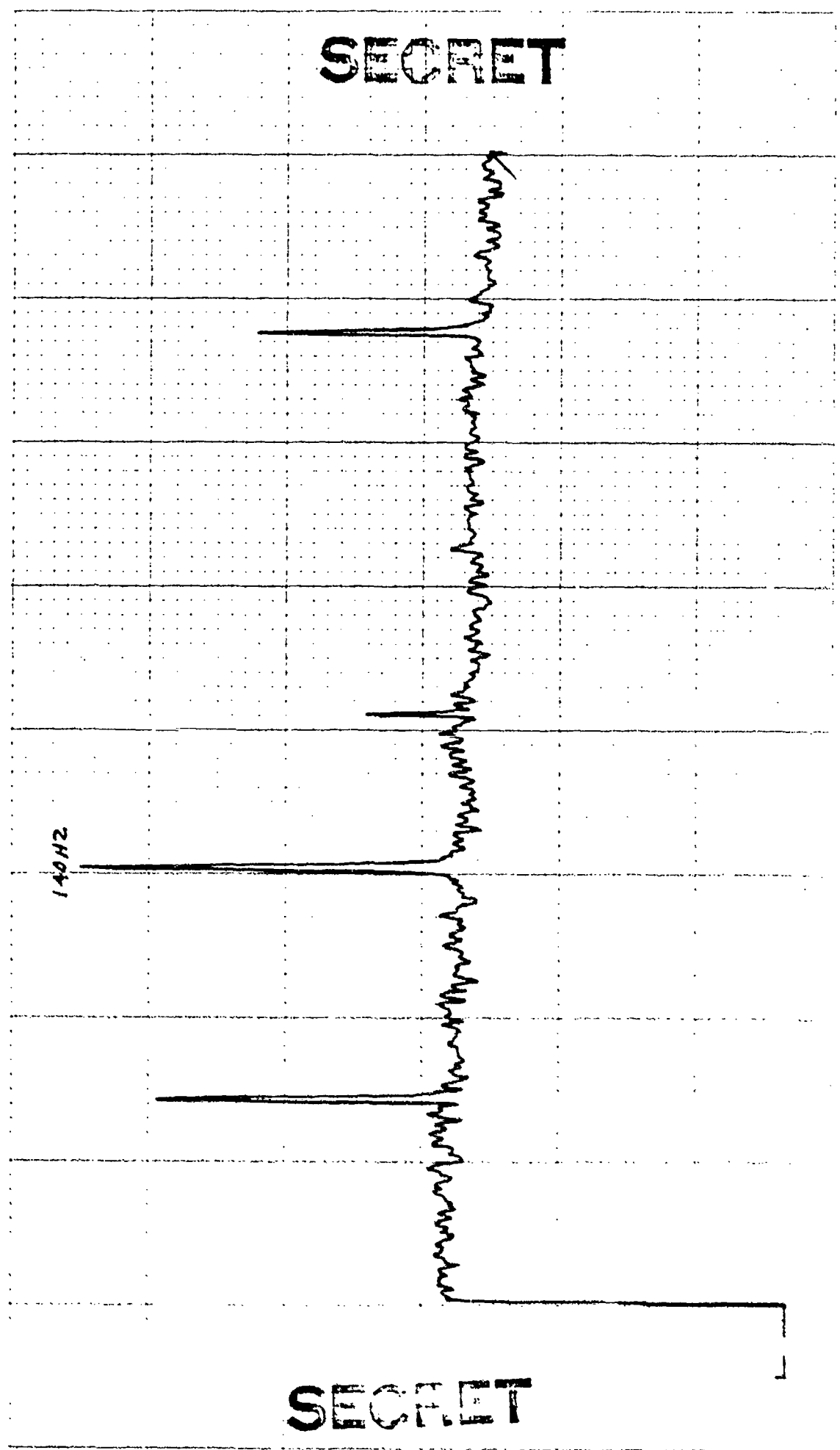
CONTROL: 3-15 - 2431 (35)
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: M10 INDEX 3620

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



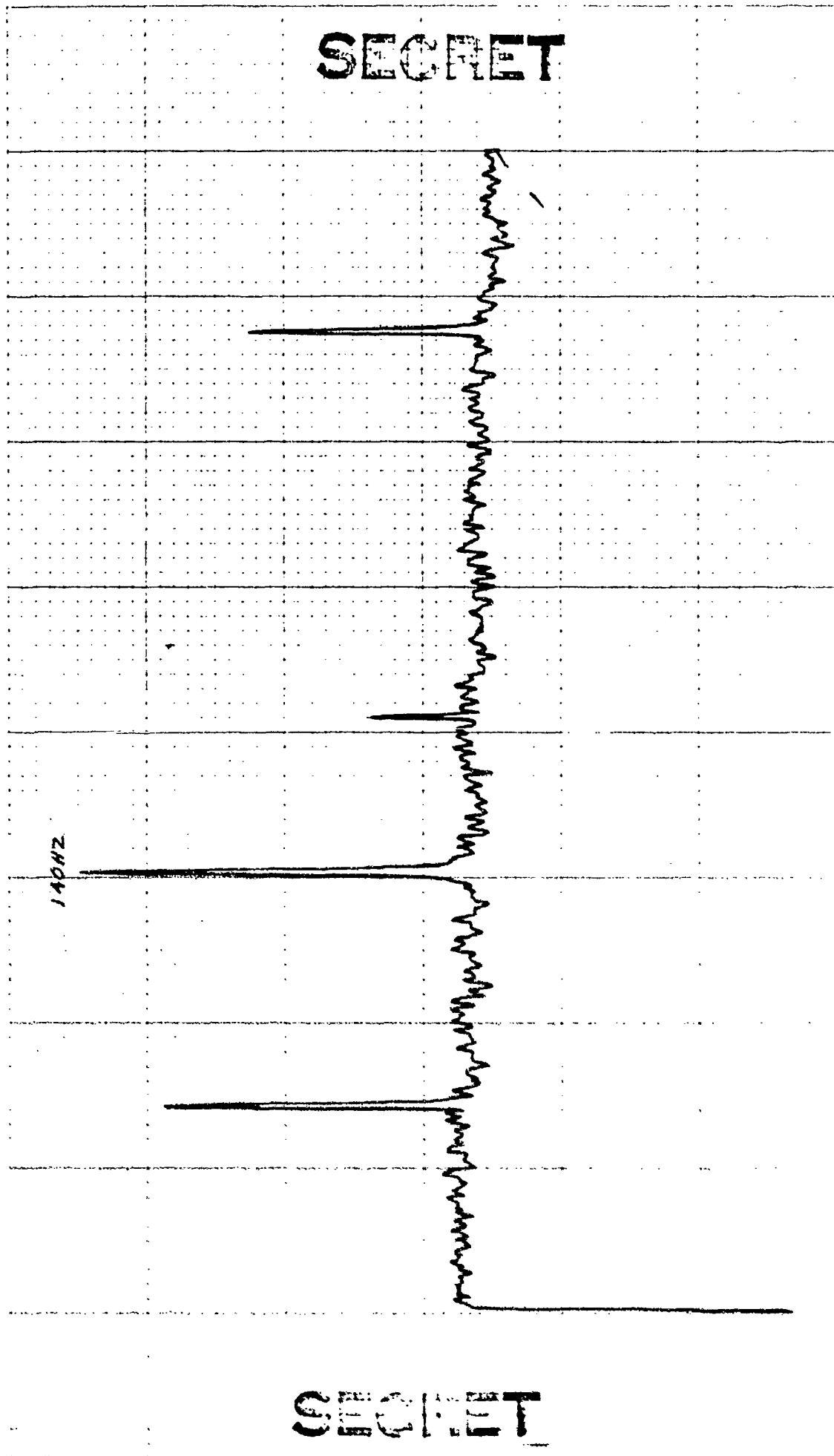
SECRET

SECRET

46 0703

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

CONTROL: 3-15-77 (36) DATE OF ANALYSIS: REEL: M10 INDEX 3620
 OMNI SPECTRUM (ELEMENT 20)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: DB
 1 ELEMENT DEG AZ STEERING FILTER WTG: HANNING



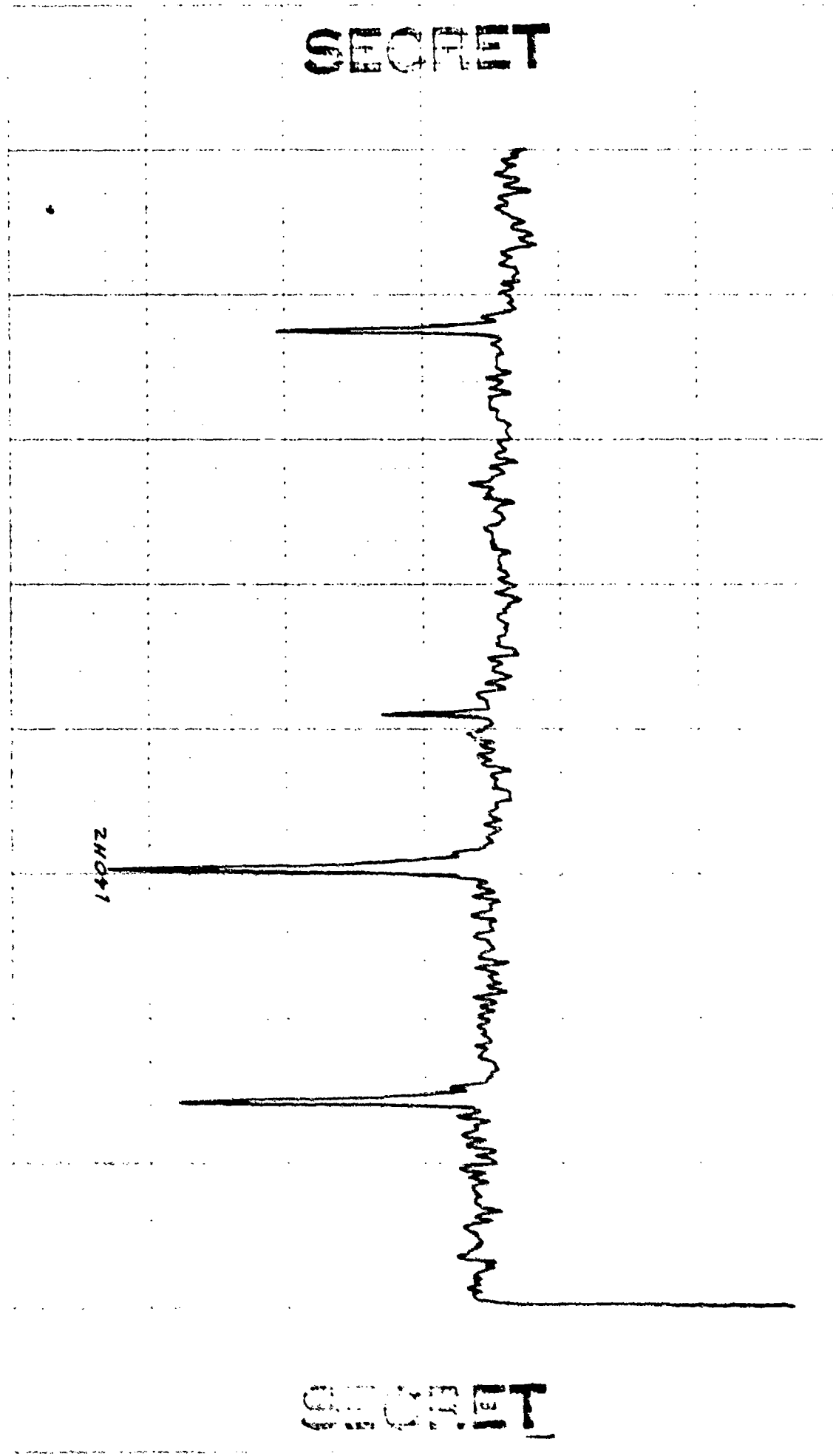
SECRET

SECRET

45 0703

143 50 50 20 10 00 00

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



SECRET

SECRET

46 0703

CONTROL: 3-15 - 2127 (J8)
OMNI SPECTRUM (ELEMENT 24)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

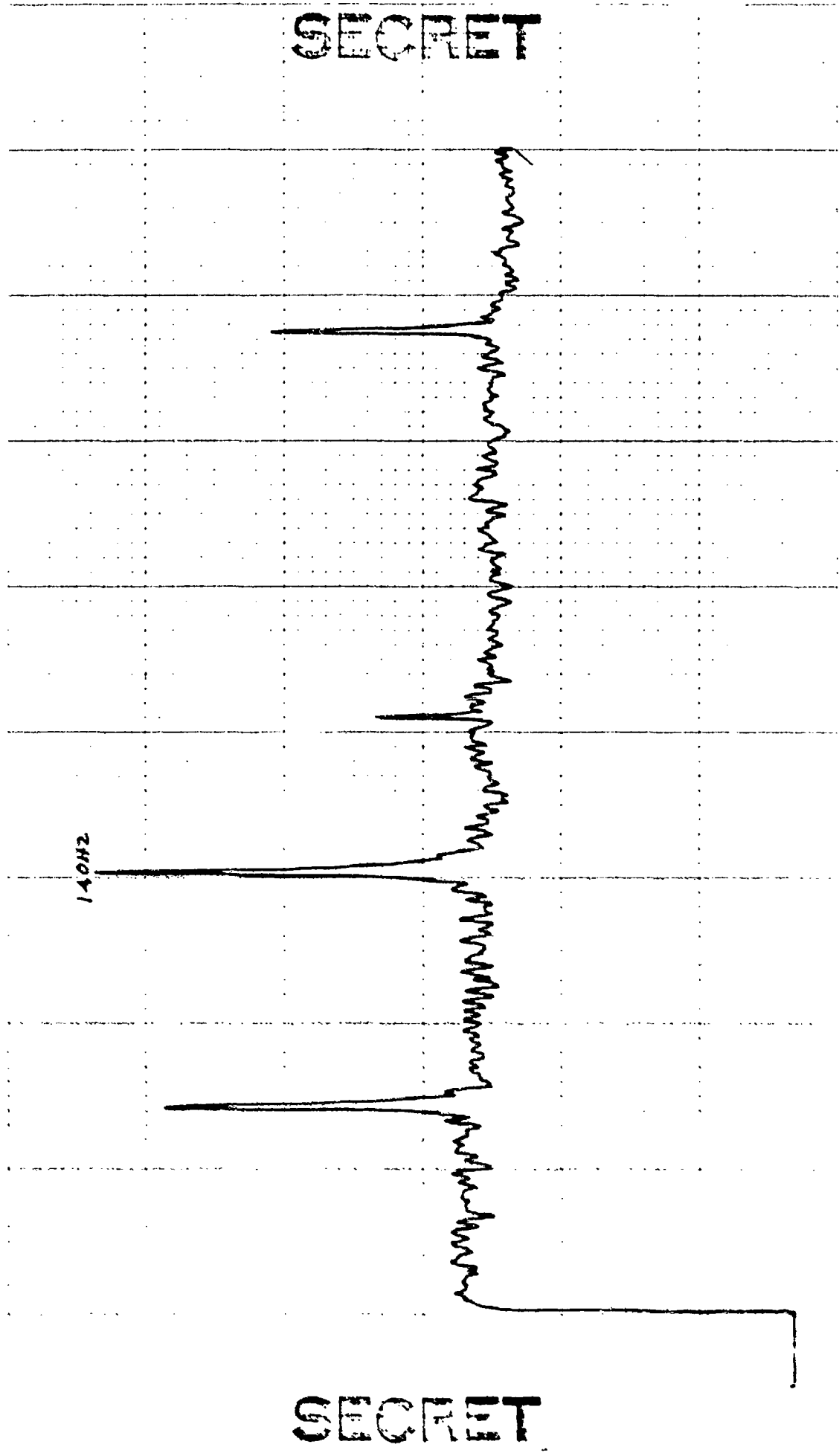
DATE/TIME: 3-15-77 - 2131 Z

ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: M10

INDEX 3620

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



SECRET

SECRET

46 0703

SECRET

SECRET

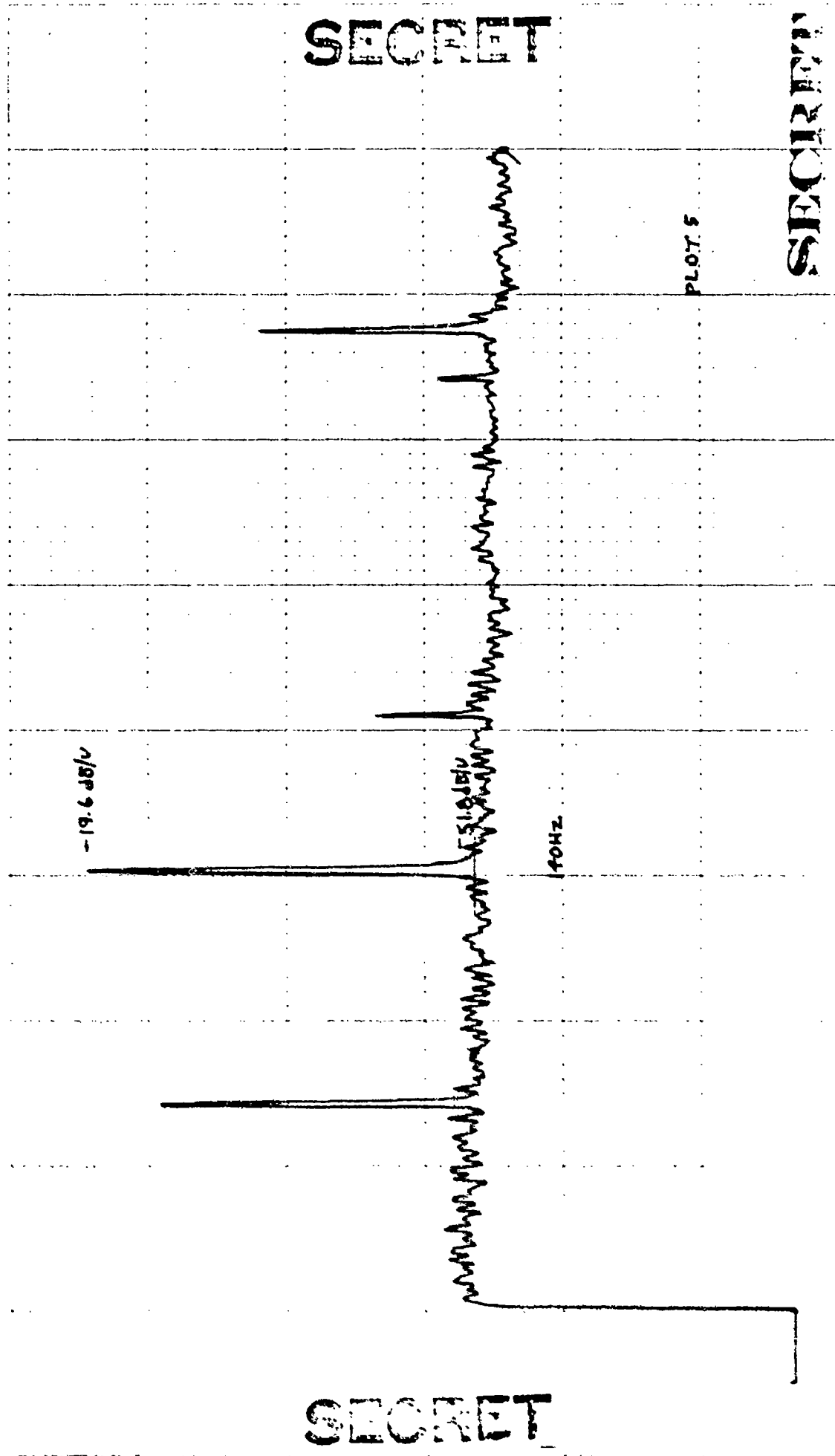
CONTROL: 2/J - 5 / (DPY)
OMNI SPECTRUM (ELEMENT 26)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: MIO INDEX 3620

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



100HZ

150HZ

180HZ

PLOT 5

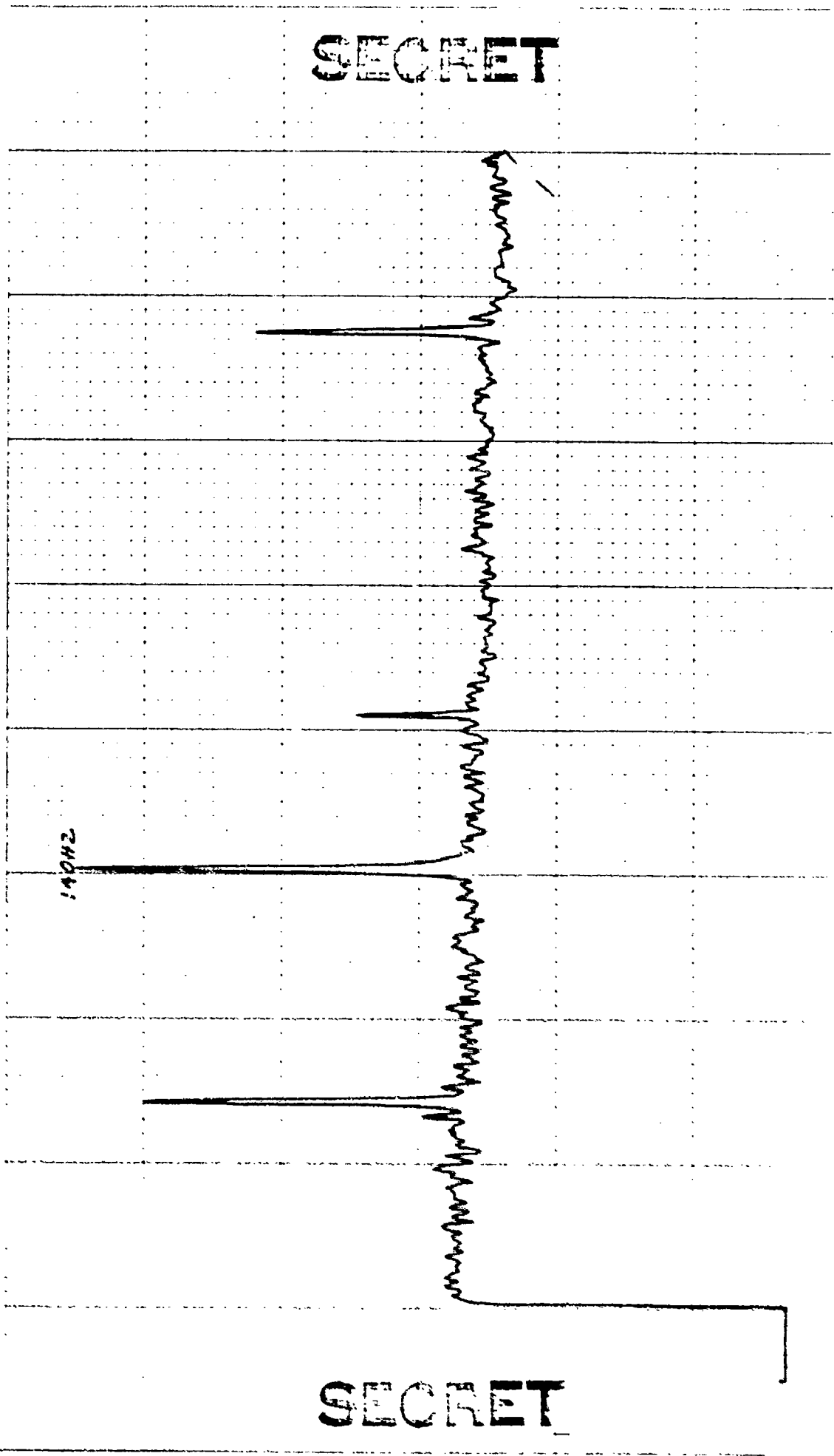
SECRET

SECRET

46 0703

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

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



SECRET

SECRET

46 0703

MAY 20 1977 08:00 AM

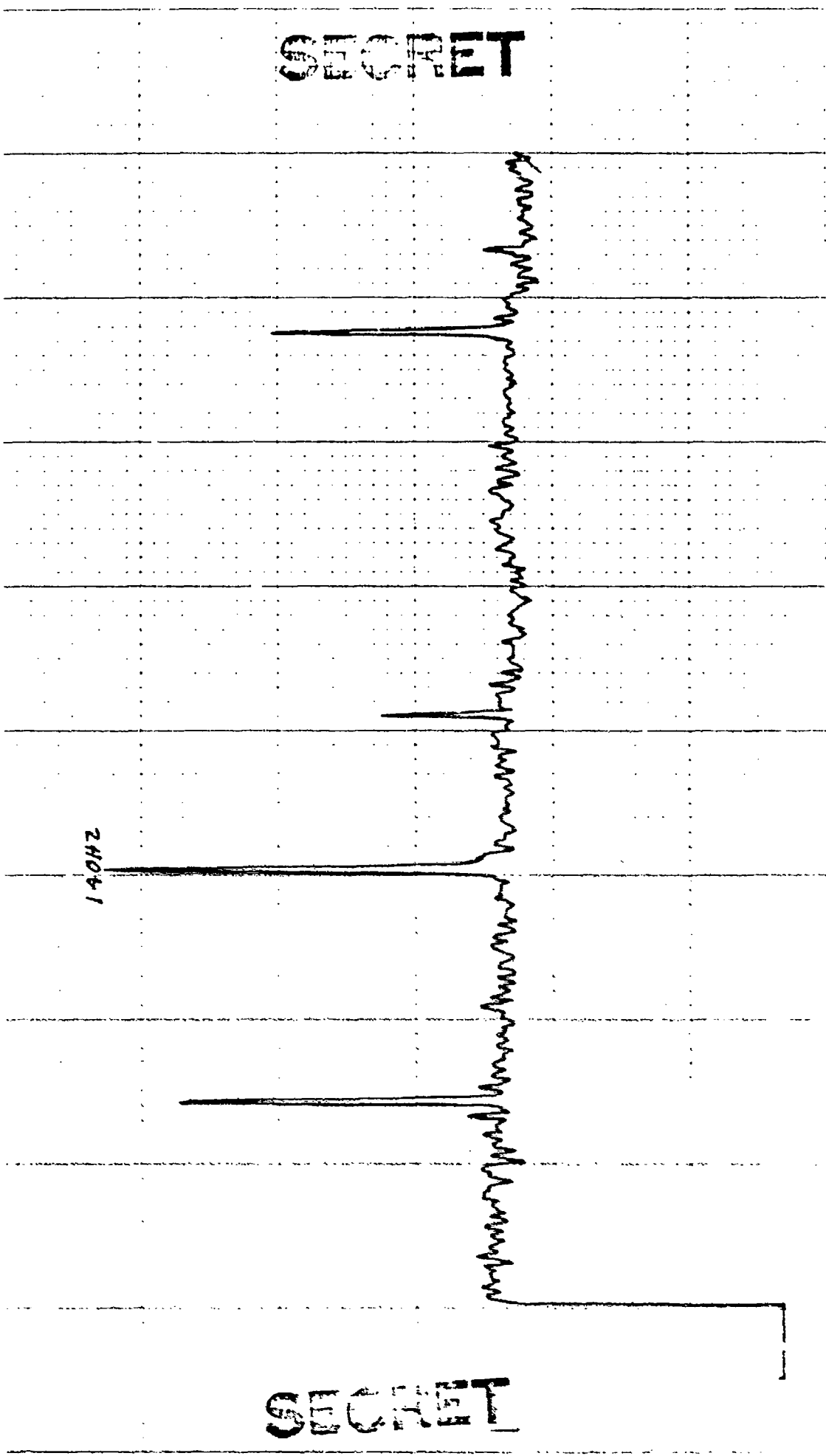
CONTROL: 7-45 - 2/77 (41)
OMNI SPECTRUM (ELEMENT 31)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: 410 INDEX: 3620

INTEGRATION TIME 320 SECS
FILTER WTG: HANNING



SECRET

SECRET

INDEX 7620

REEL: M/9

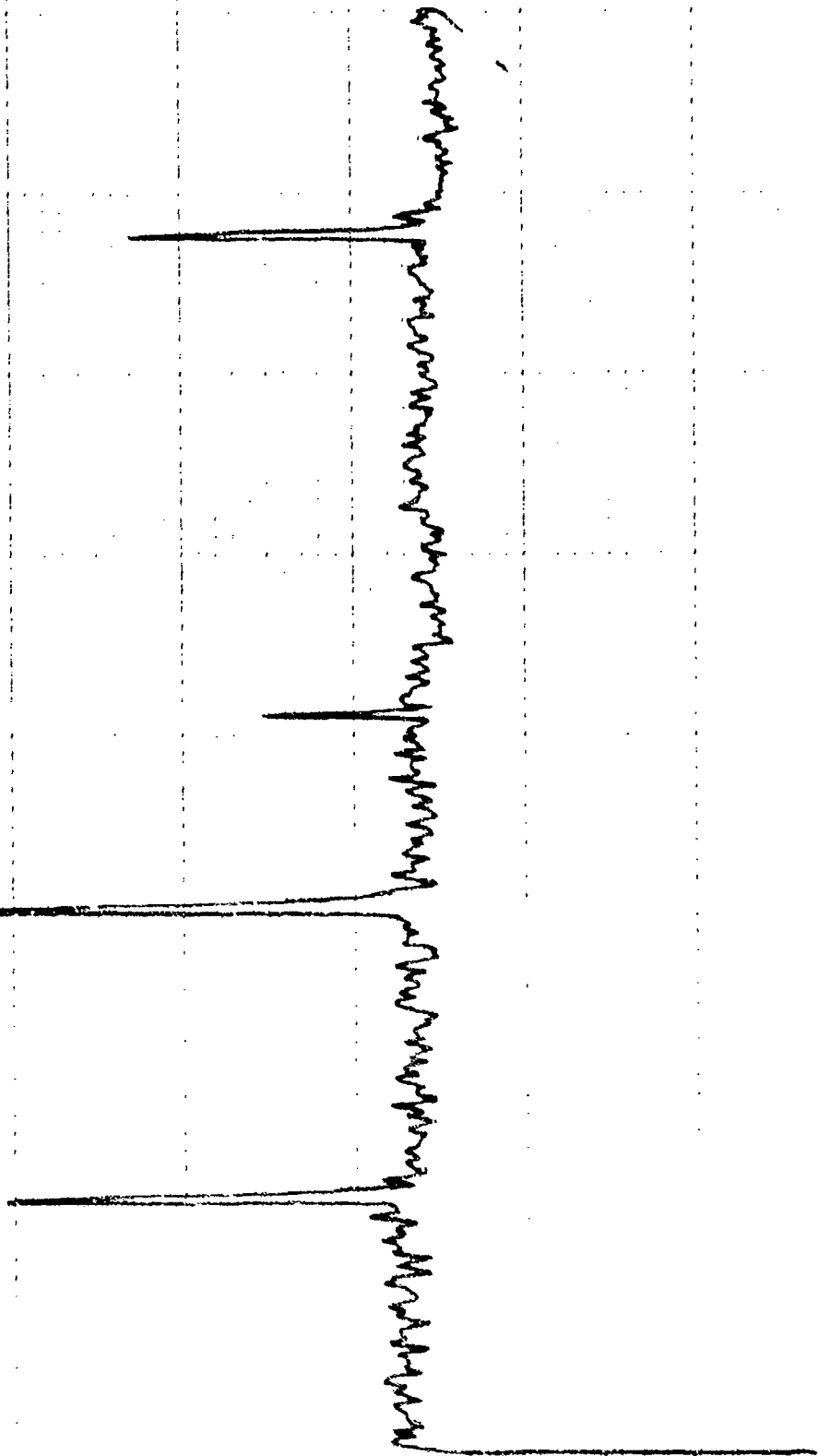
DATE OF ANALYSIS:

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

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

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

140 HZ



SECRET

SECRET

45 0703

REEL: M10 INDEX 3620

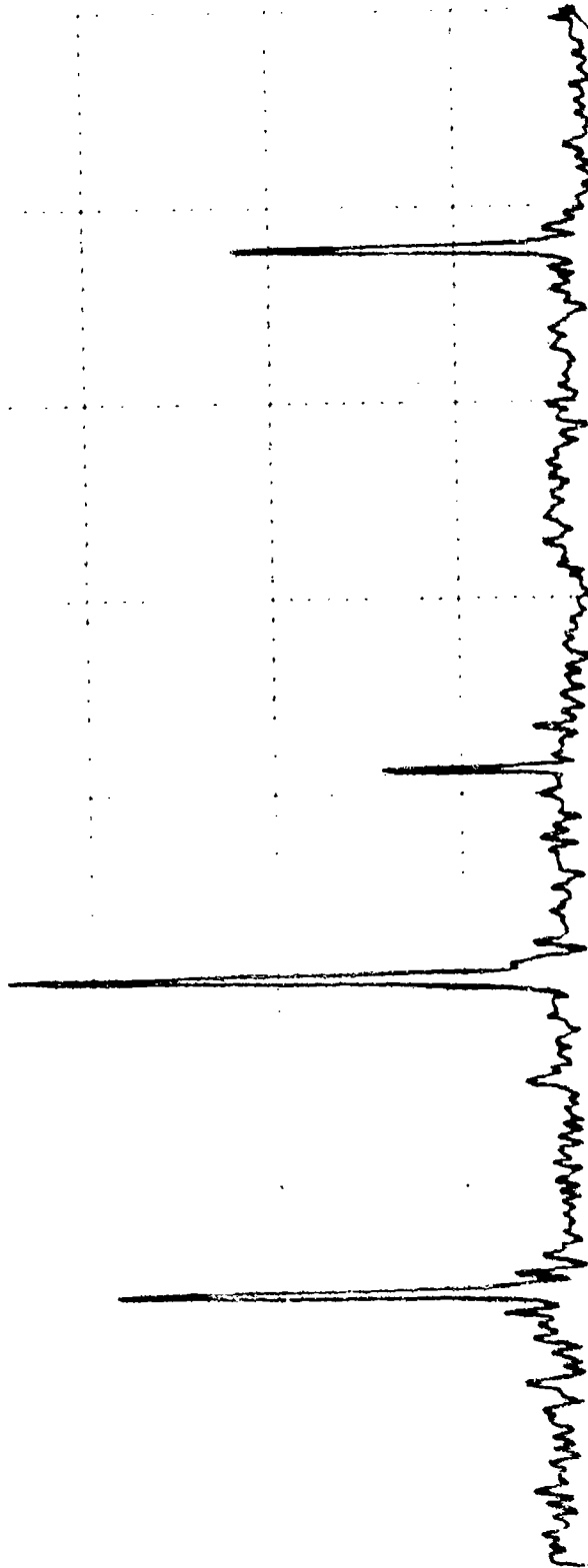
DATE OF ANALYSIS:

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

COMIPOL: 2131 - 51 (089)
OMNI SPECIPUM (ELEMENT 35)
EXERCISE: BEARING STAKE
CENTER FREQ: 152 HZ
1 ELEMENT

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

170HZ



SECRET

SECRET

46 0703

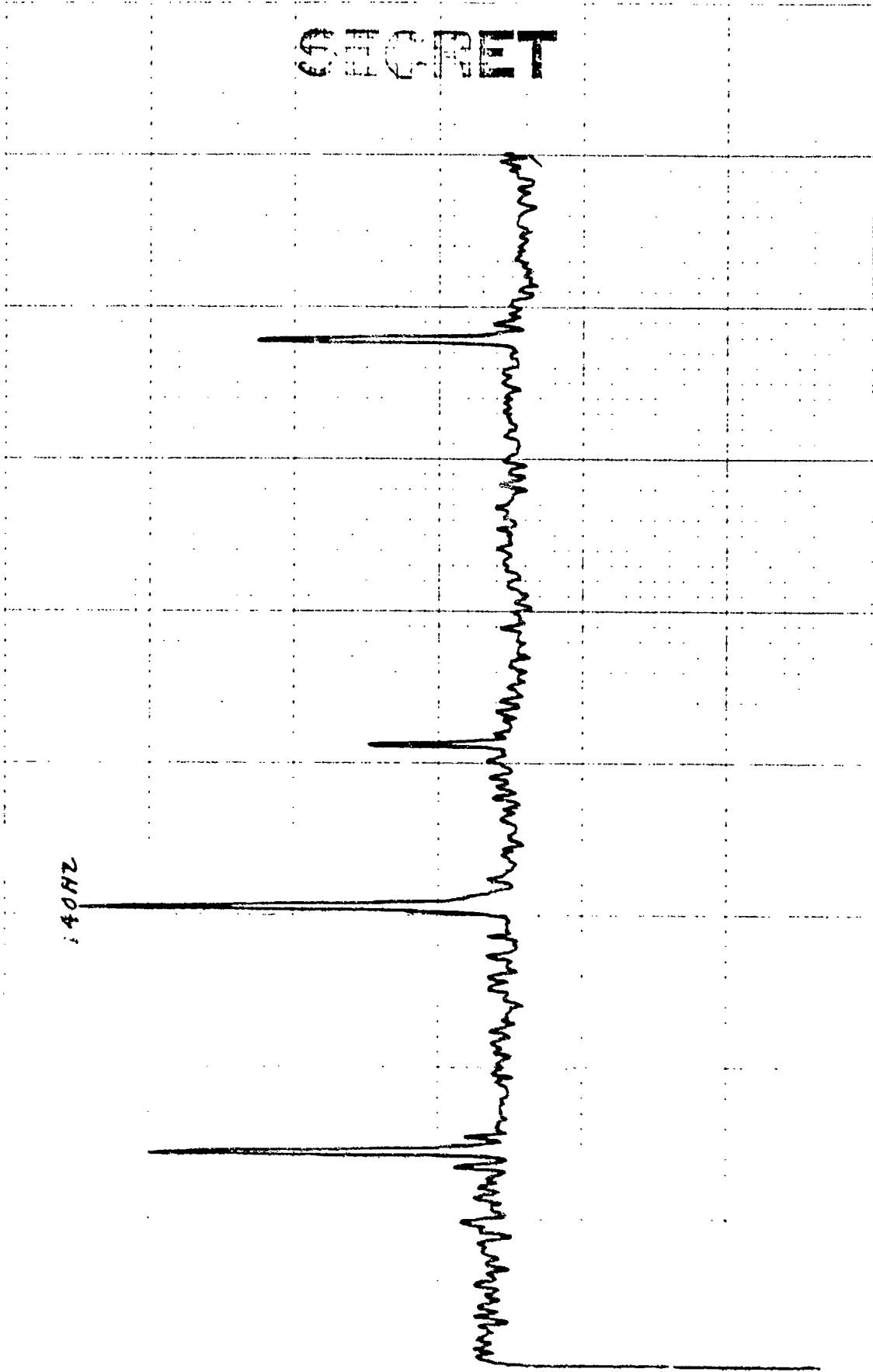
CONTROL: 3-15 - 2131 (44)
OMNI SPECTRUM (ELEMENT 37)
EXEPCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: M10 INDEX 3620

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



SECRET

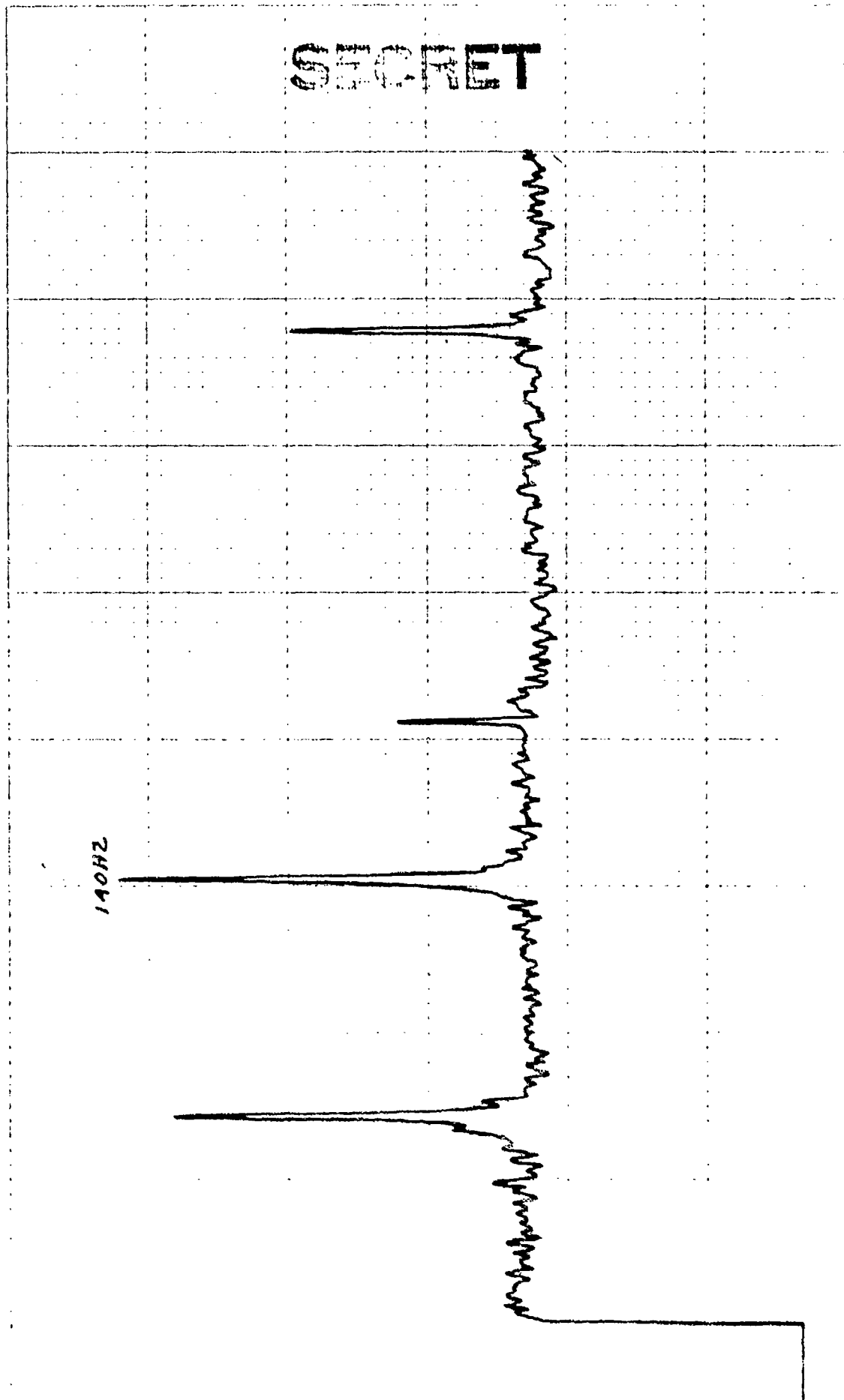
SECRET

46 0703

CONTROL: 3-5 - 2/31 (45) DATE OF ANALYSIS: REEL: M10 INDEX 3620
 OMNI SPECTRUM (ELEMENT 39)
 EXERCISE: BEARING STAYE
 CENTER FREQ: 150 HZ
 1 ELEMENT

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

DATE/TIME: 3-5-77 - 2/31 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 DEG AZ STEERING



SECRET

SECRET

46 0703

1622 20000 20000 20000 20000

REEL: M10 INDEX 3620

DATE OF ANALYSIS:

CONTROL: 3-15 -2131 (41)

OMNI SPECTRUM (ELEMENT 41)

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

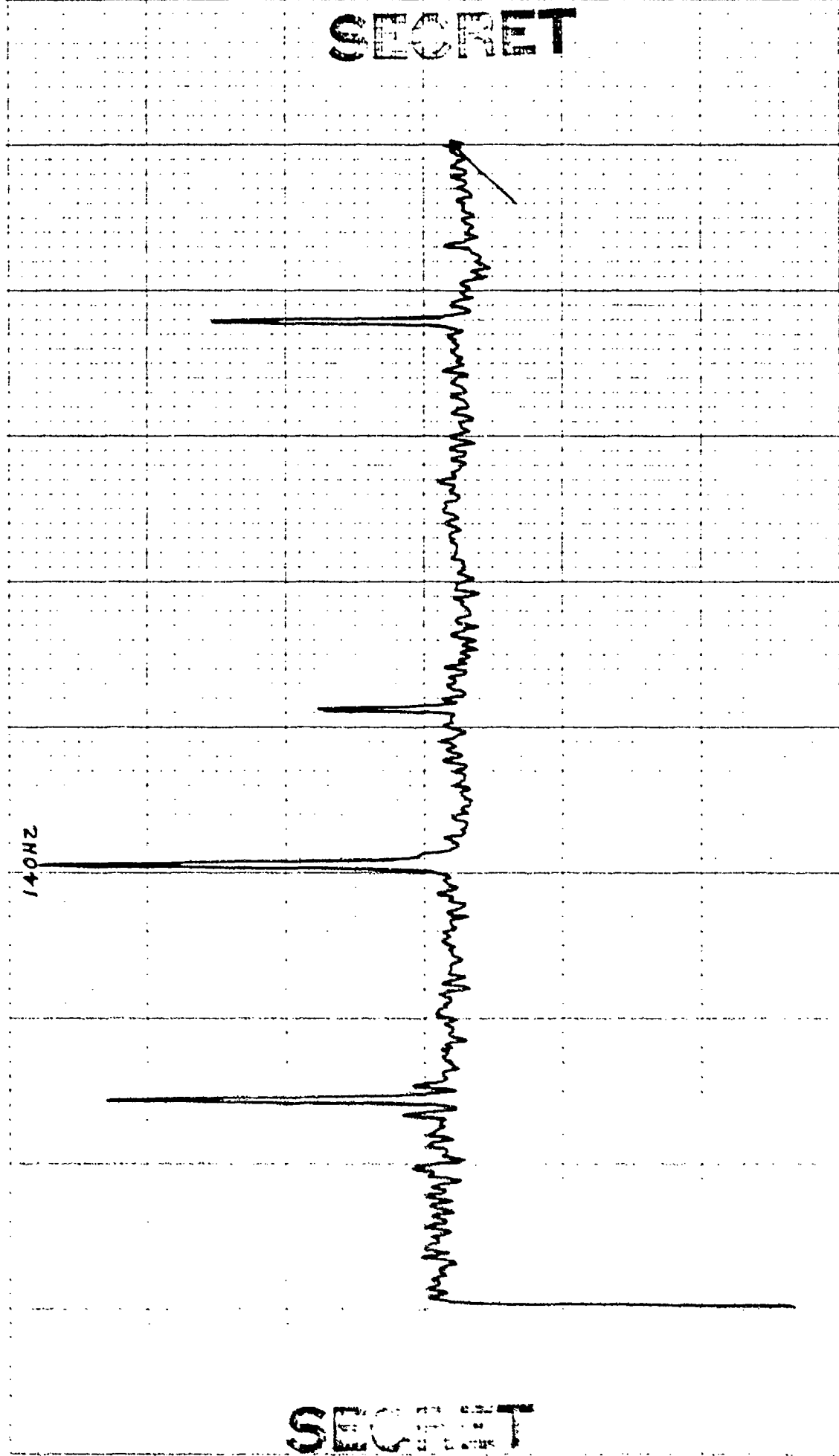
1 ELEMENT

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

ANALYSIS BANDWIDTH: 1/10 HZ

 DEG AZ STEERING

INTEGRATION TIME 320 SECS
FILTER ATTEN: DB
WTG: HANNING



SECRET

SECRET

46 0703

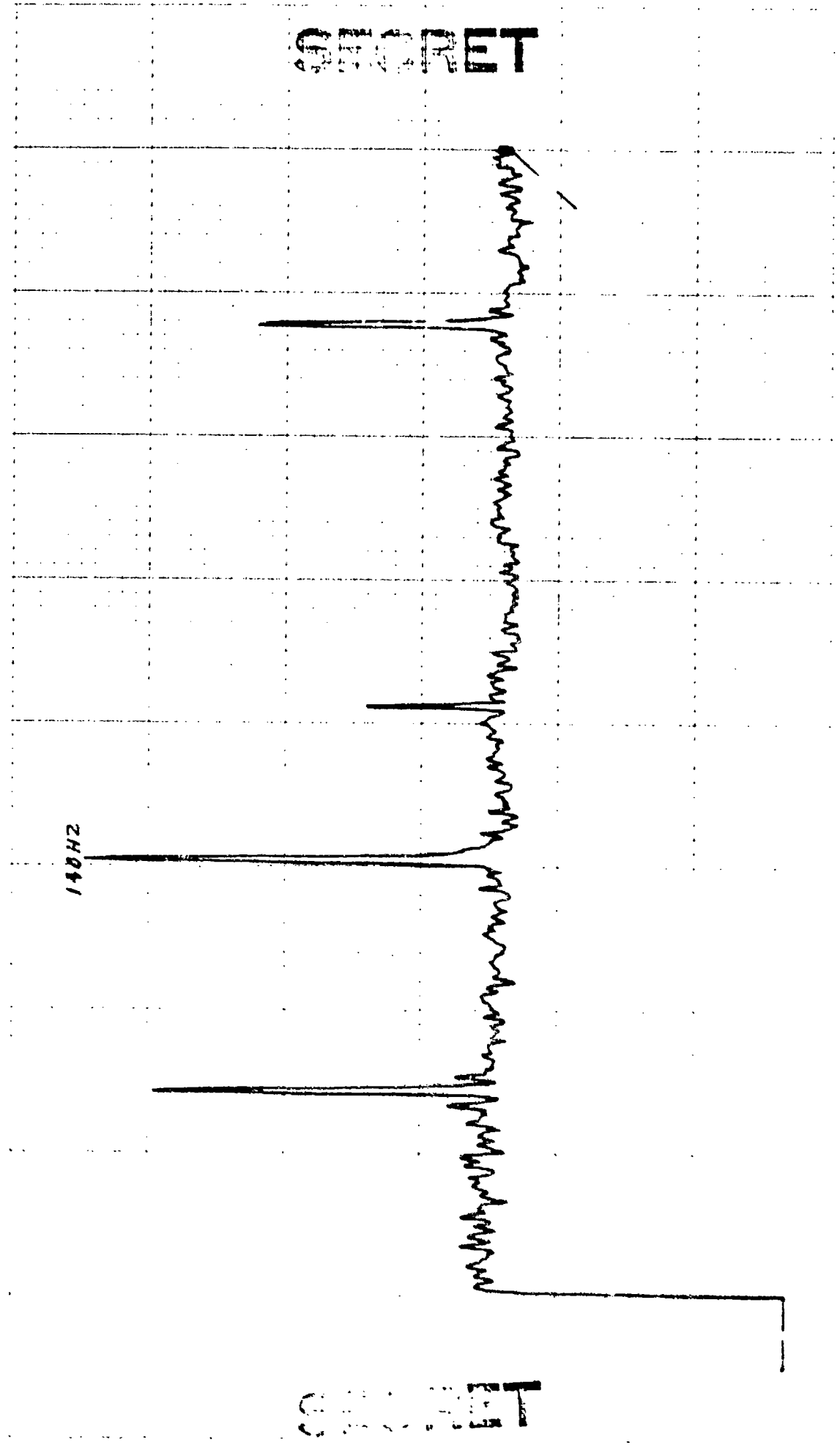
CONTROL: 3-15 - 2/31 (47)
OMNI SPECTRUM(ELEMENT 43)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: 1910 INDEX J620

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



SECRET

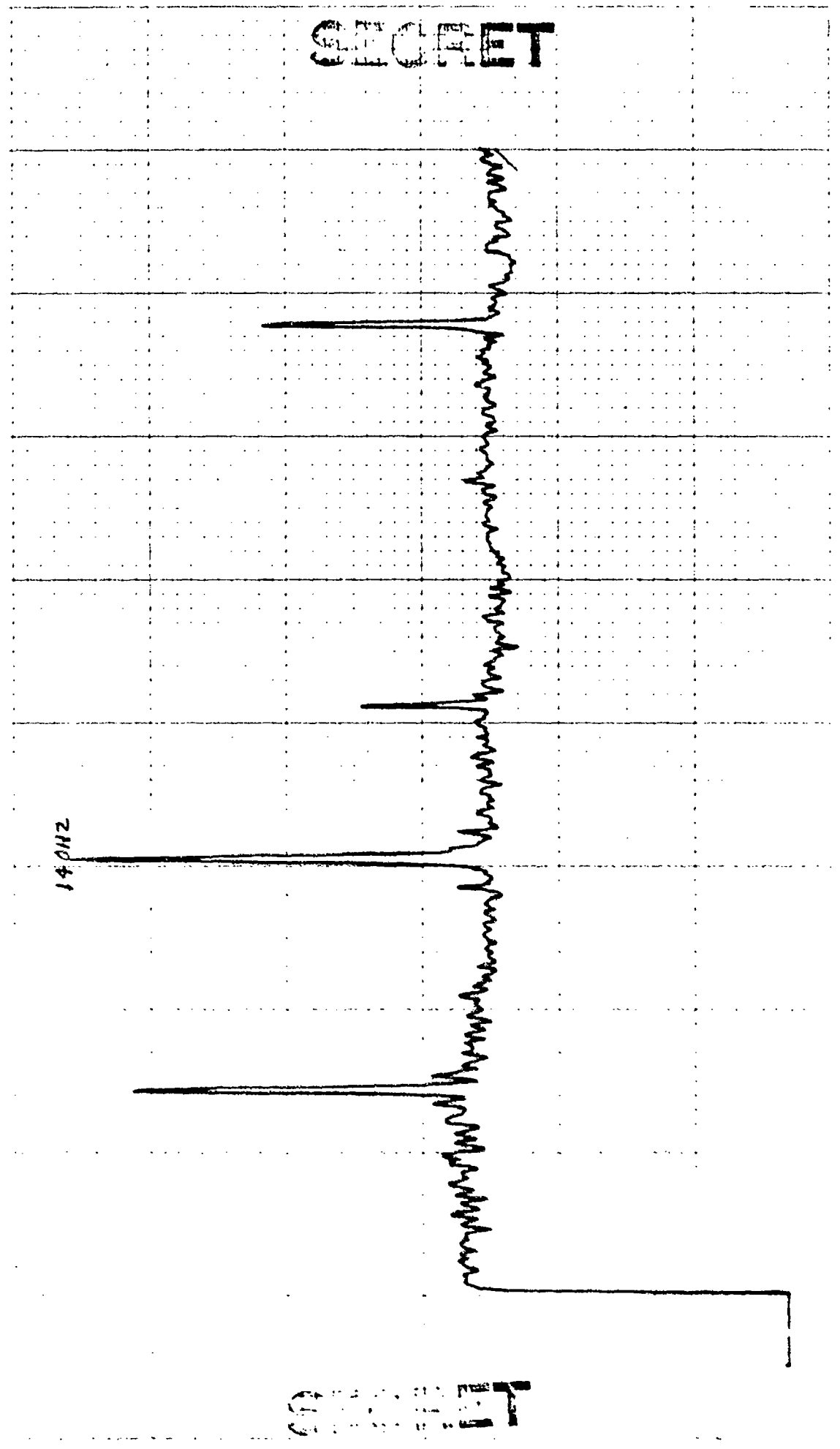
SECRET

46 0703

CONTROL: 3-15 - 2121 (40) REEL: M10 INDEX 3/20
 OMNI SPECTRUM (ELEMENT 45)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ INTEGRATION TIME 320 SECS ATTN: - DB
 1 ELEMENT FILTER WIG: HANNING

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 2121 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING



SECRET

SECRET

46 0703

1487 16500 20000 25000 30000

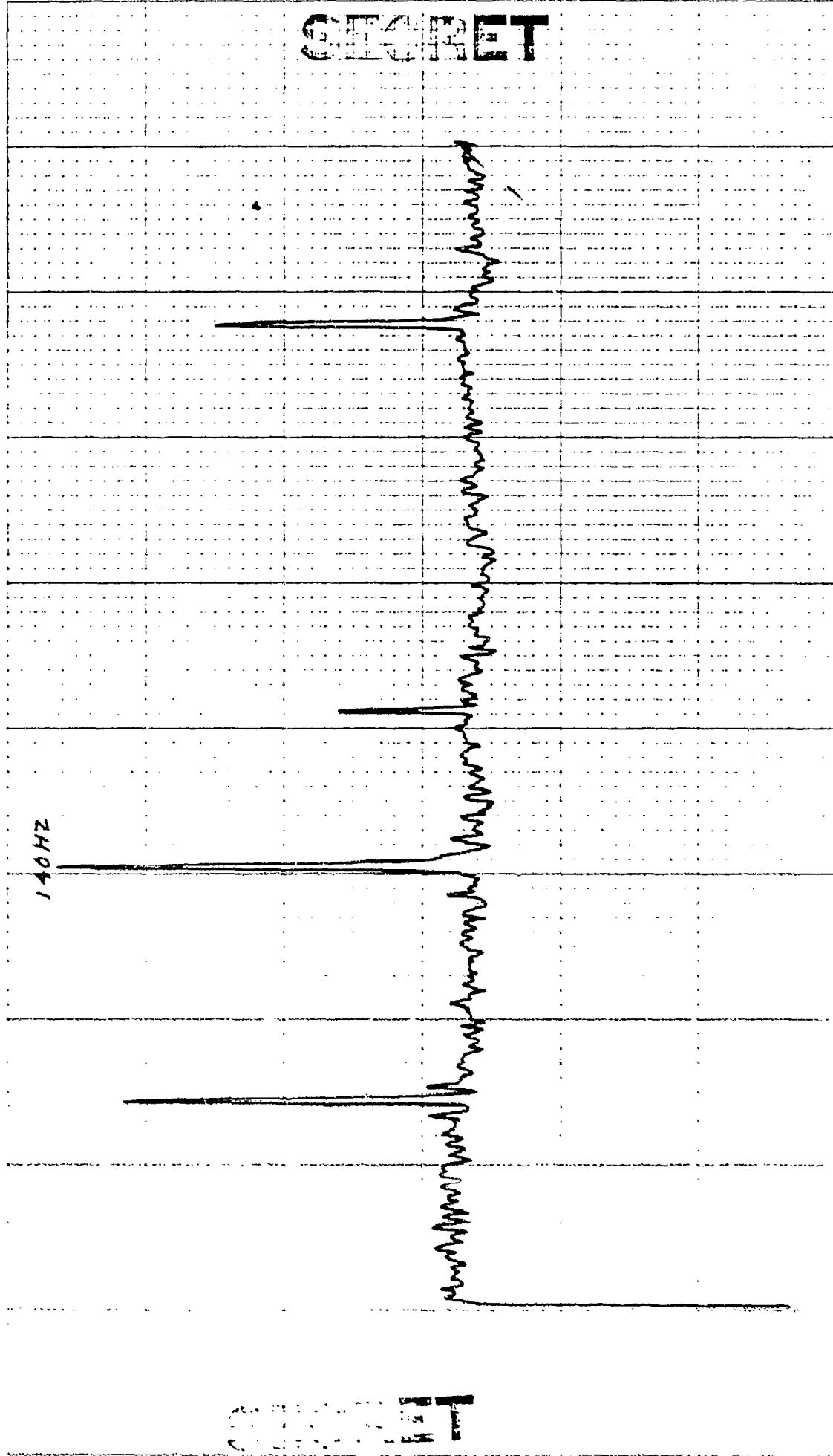
CONTROL: 3-15 - 2131 (49)
OMNI SPECTRUM (ELEMENT 47)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: M10 INDEX 3620

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



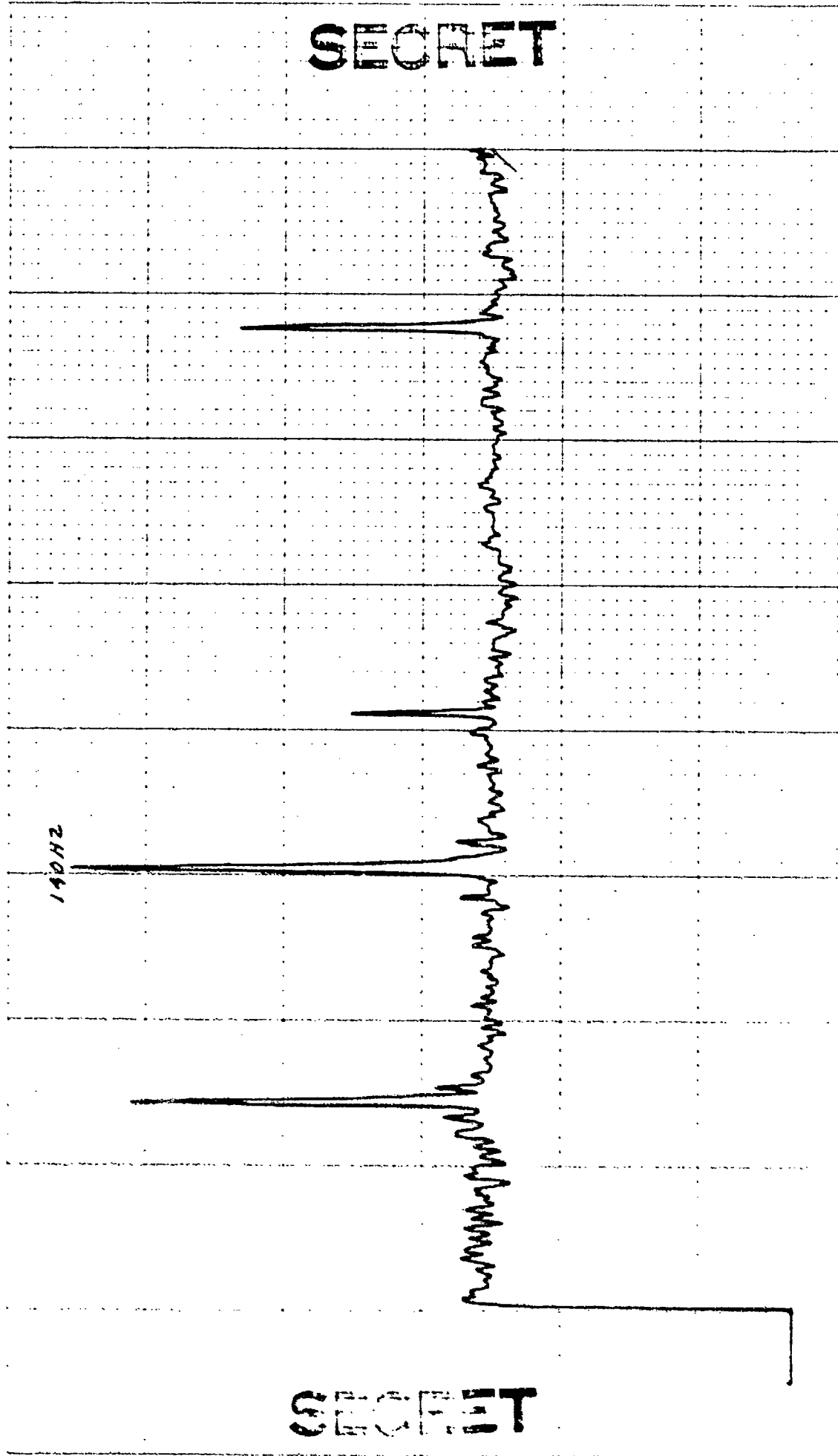
46 0703

REF: 20000 200000 200000

CONTROL: 3-15 - 2131 (50) REEL: M10 INDEX: 7620
 OMNI SPECTRUM (ELEMENT 49)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 1 ELEMENT

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

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



SECRET

SECRET

46 0703

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

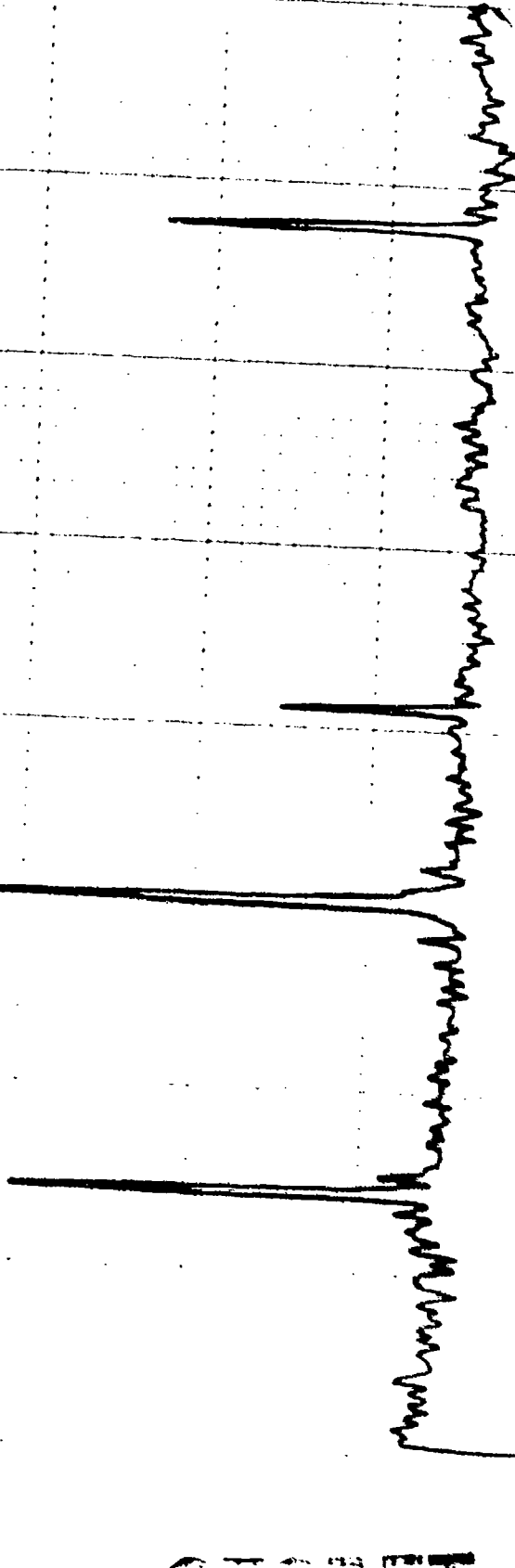
DATE OF ANALYSIS:

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

REEL: A10 INDEX J620

INTEGRATION TIME 320 SECS ATTEN: DB
FILTER WTG: HANNING

140 HZ



SECRET

SECRET

46 0703

REF: 3243 10100 DEPT: 3243 10100

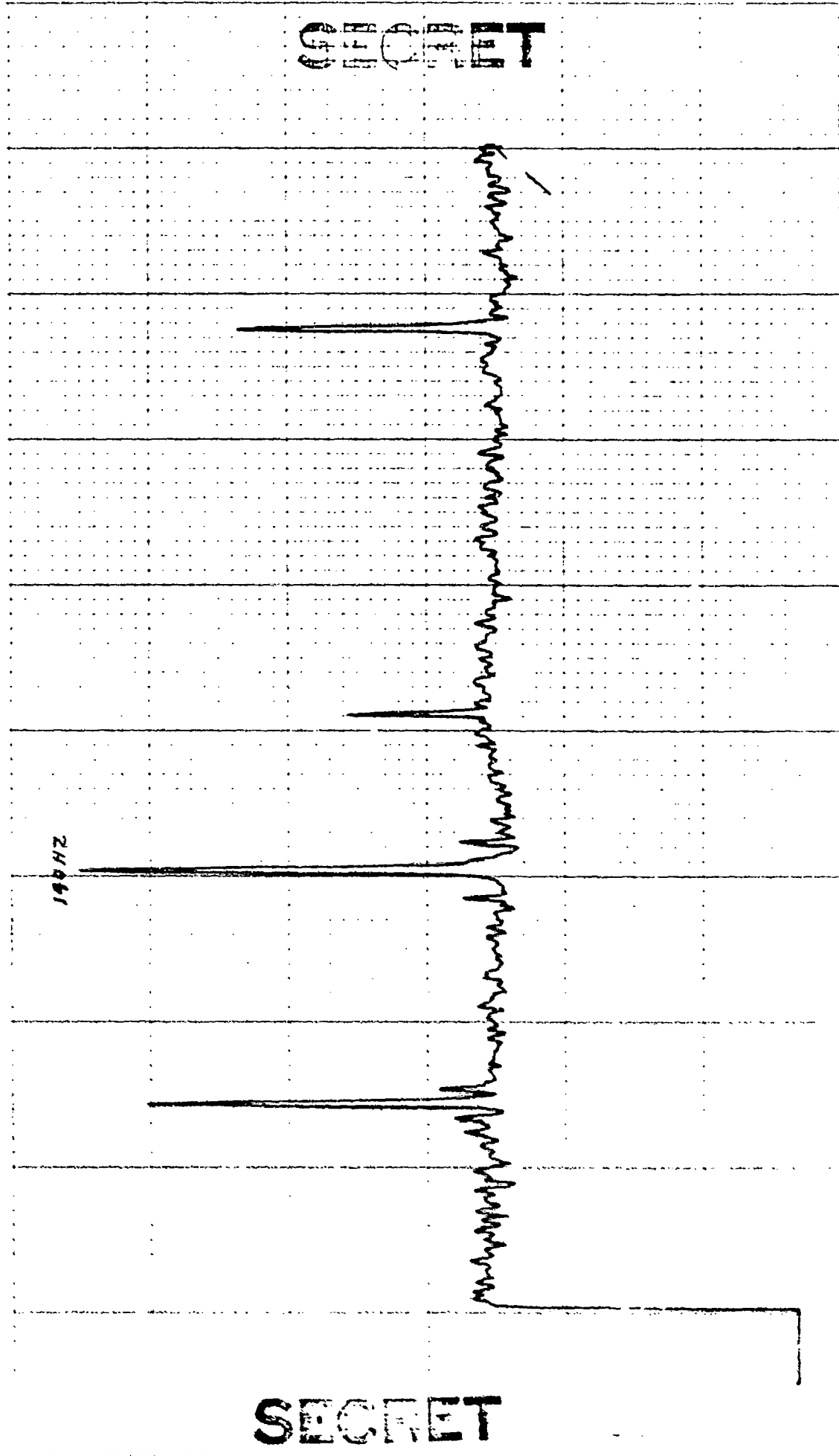
CONTROL: 3-75 - 2131 (52)
OMNI SPECTRUM (ELEMENT 53)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

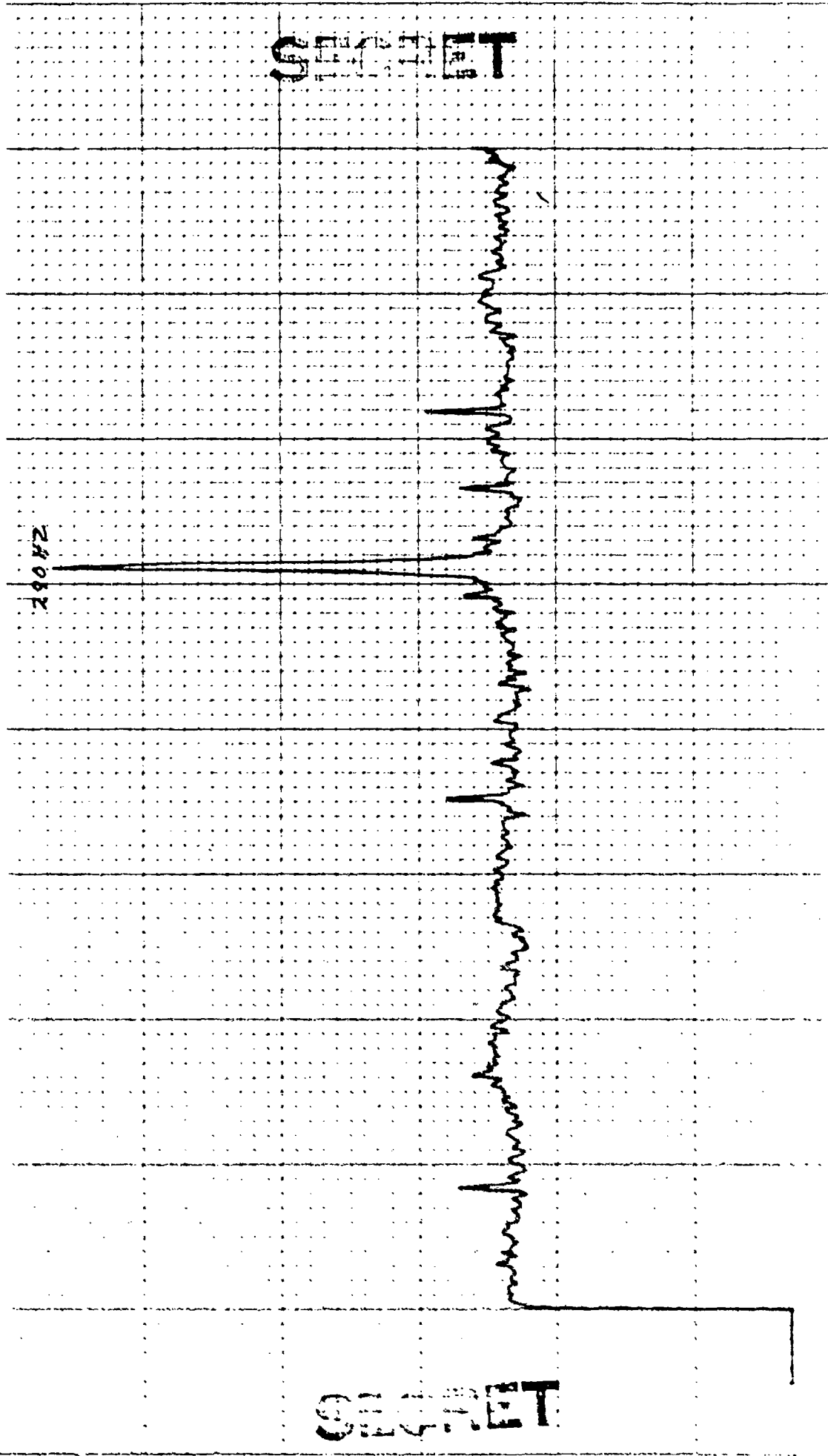
REEL: 1910 INDEX 3620

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



46 0703

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



46 0703

INDEX 3600

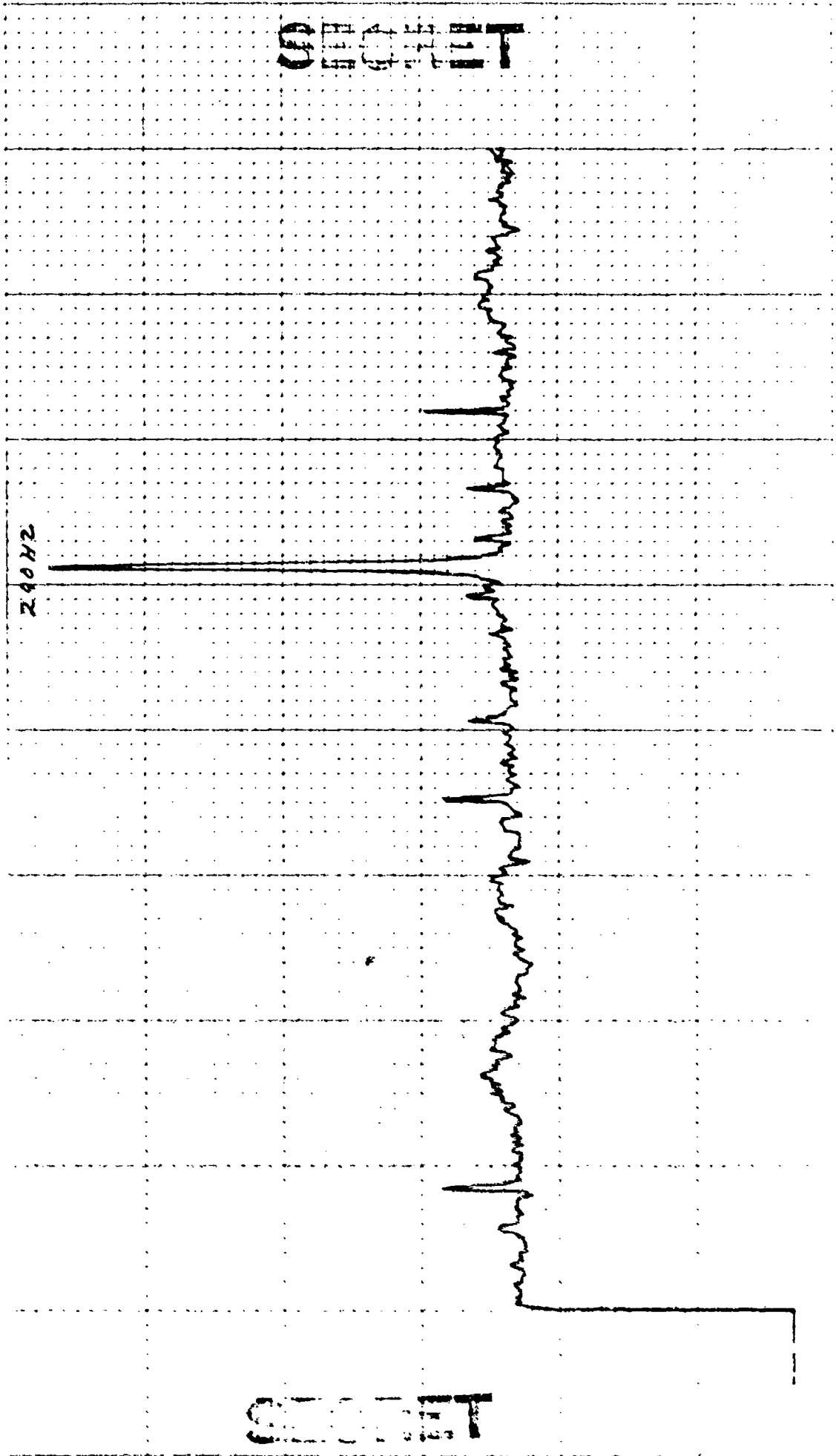
REEL: M10

DATE OF ANALYSIS:

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

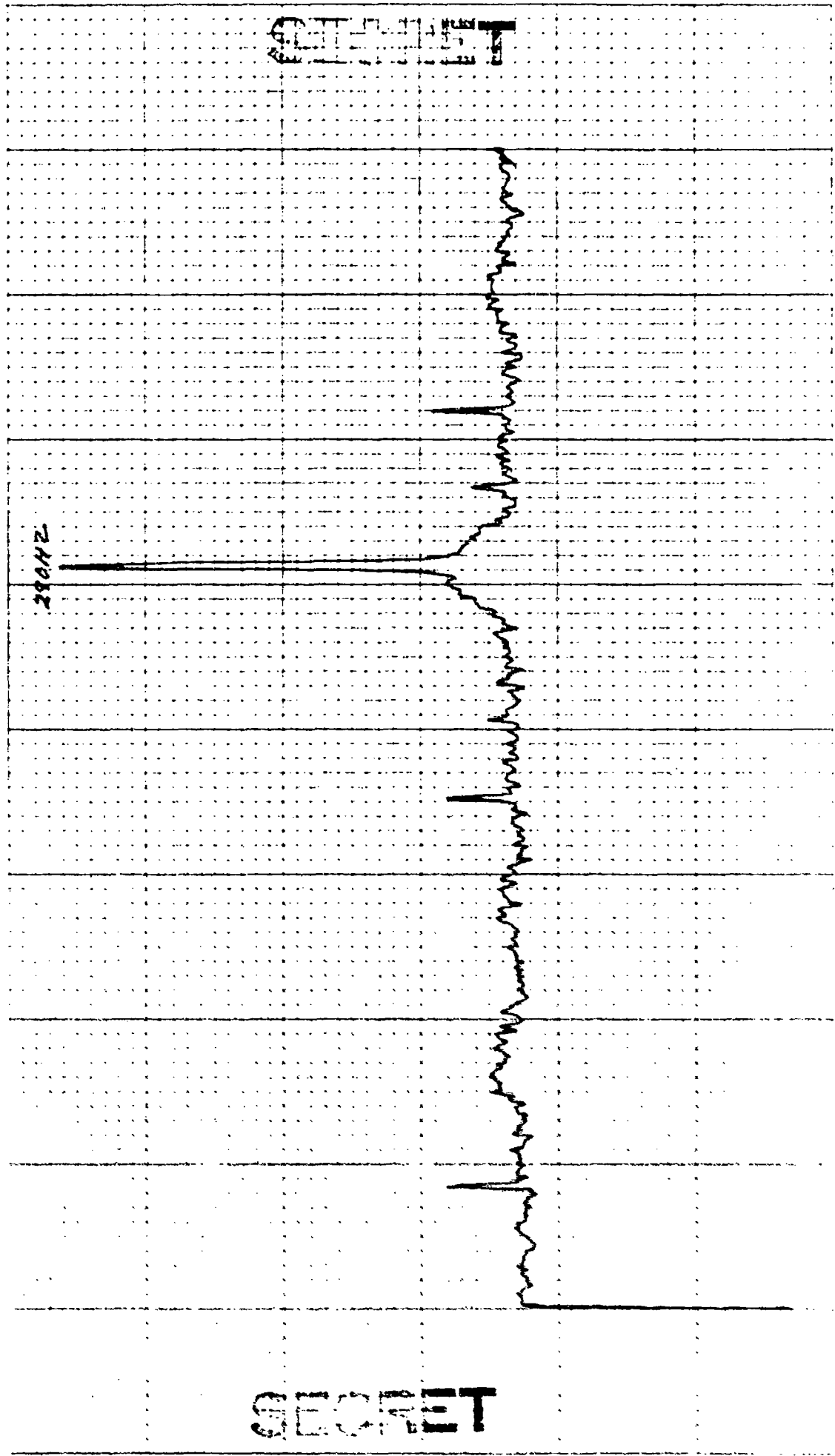
DATE/TIME: 2-5-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEC AZ STEERING

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



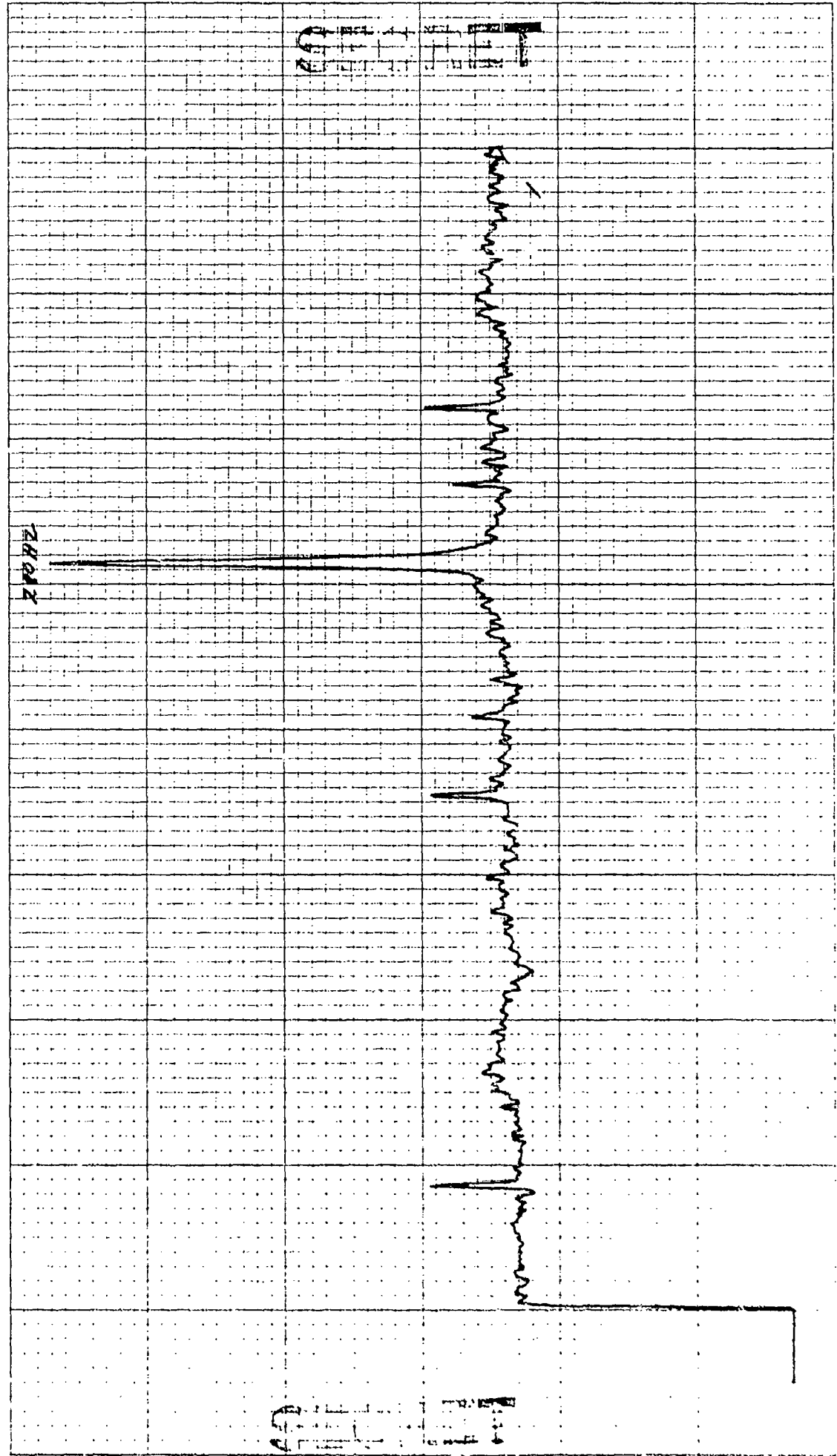
46 0703

CONTROL: 3-15 - 201 (55) DATE OF ANALYSIS: REEL: M10 INDEX 312
 OMNI SPECTRUM (ELEMENT 6)
 EXERCISE: BEARING: STAKE
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1710 HZ INTEGRATION TIME 320 SECS ATTN: DB
 1 ELEMENT DEG AZ STEERING FILTER WTC: HANNING



SECRET

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



CONTROL: 3-15 - 2131 (57)
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

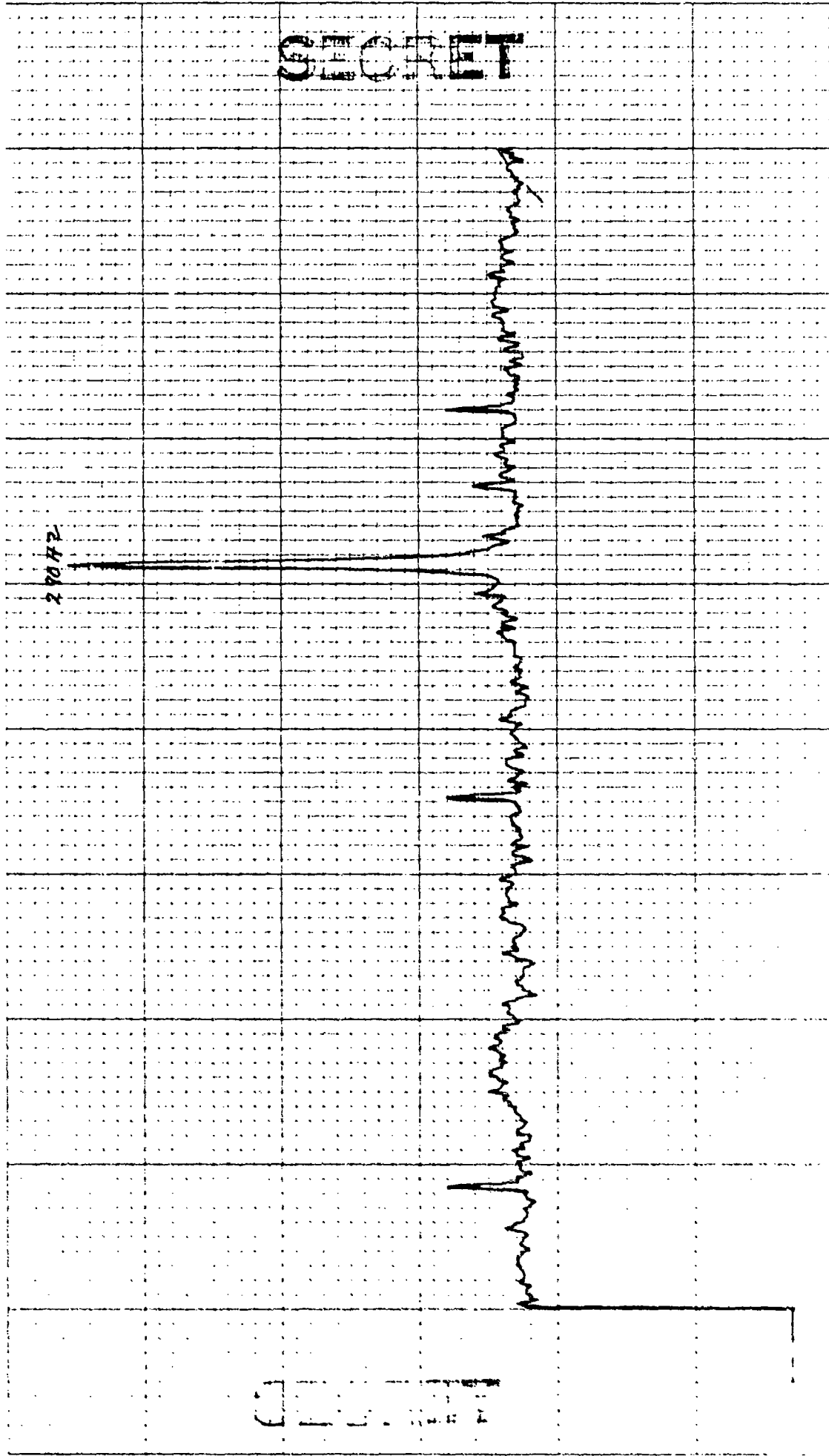
DATE OF ANALYSIS:

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

REEL: N10

INDEX 3620

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



46 0703

16Z 0400 20 SEP 77

INDEX 3690

REEL: N10

DATE OF ANALYSIS:

CONTROL: 375-2131 (58)

OMNI SPECTRUM (ELEMENT 12)

EXERCISE: BEARING STAKE

CENTER FREQ: 200 HZ

I ELEMENT

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

ANALYSIS BANDWIDTH: 1710 HZ

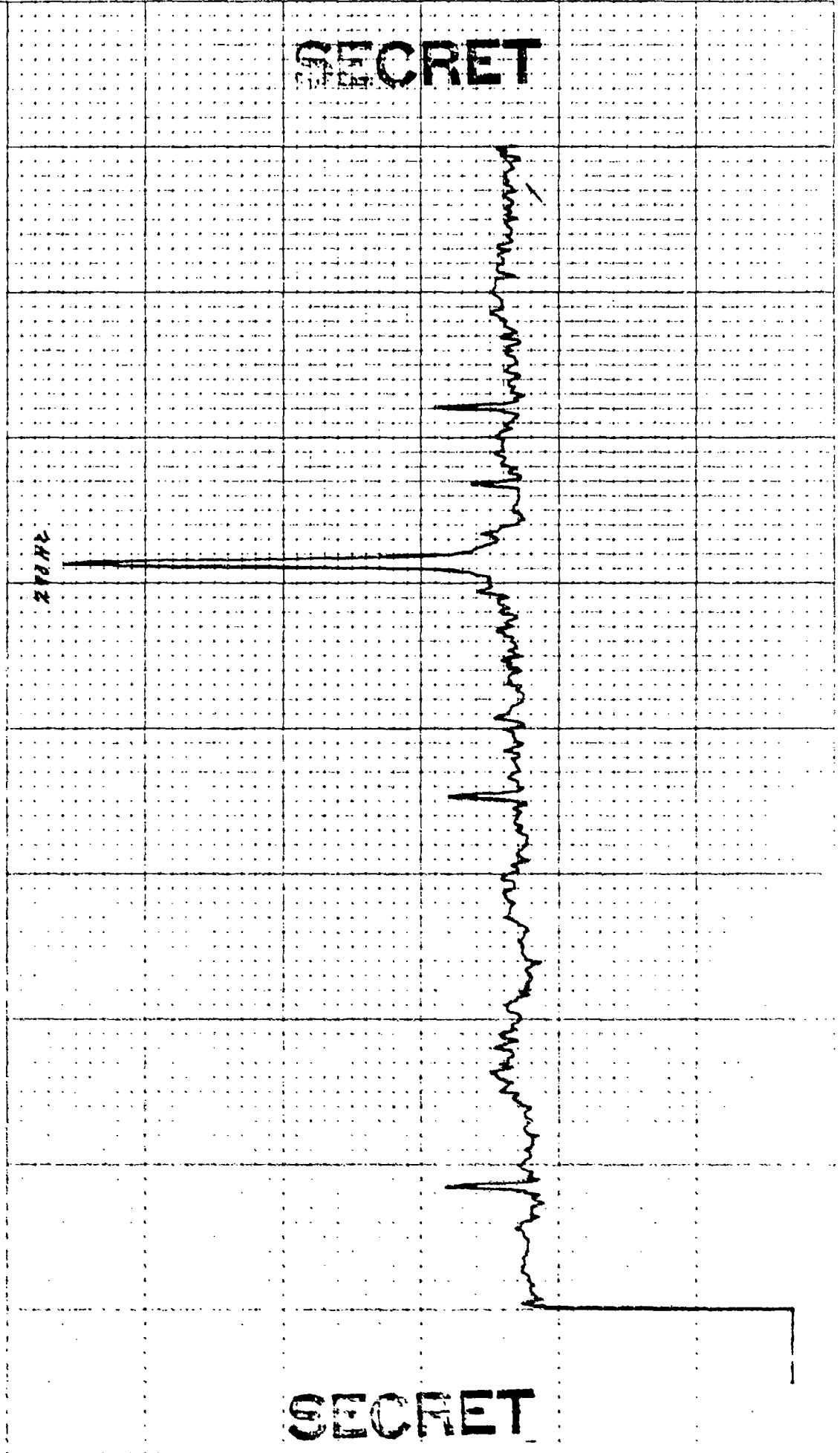
 DEG AZ STEERING

INTEGRATION TIME 320 SECS

ATTEN: - DB

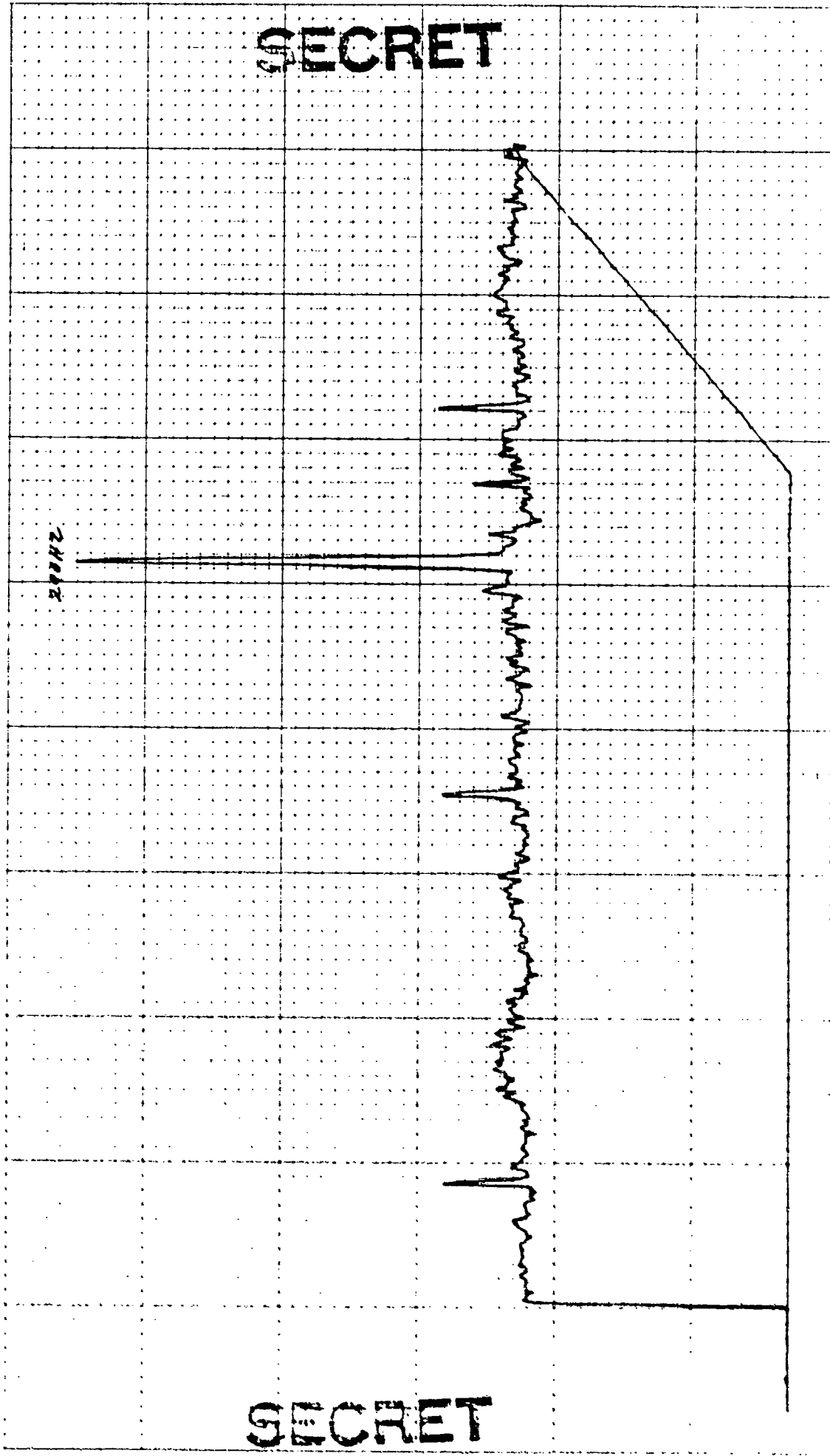
FILTER

WTG: HANNING



46 0703

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



SECRET

SECRET

46 0703

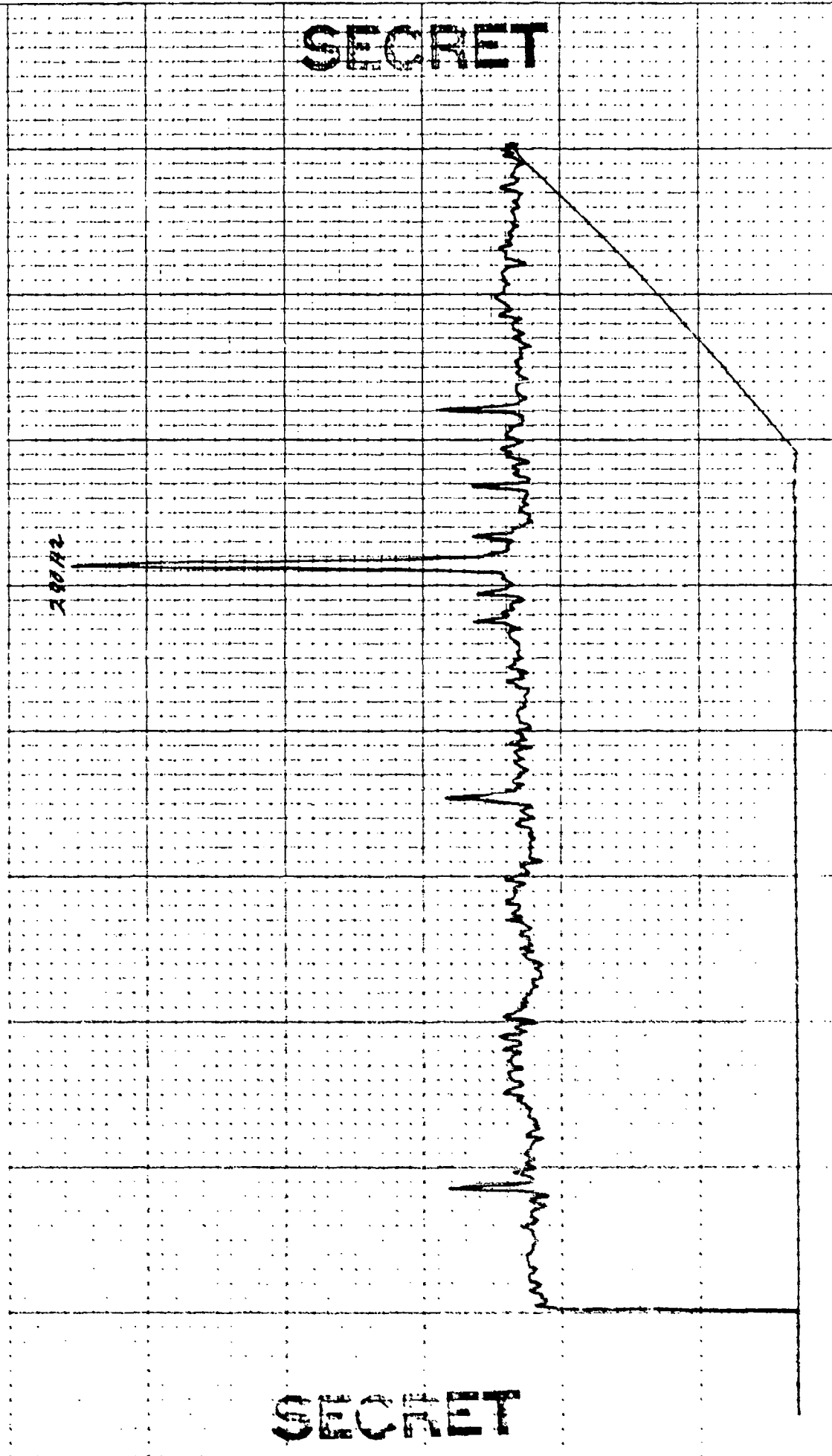
CONTROL: 3-15-2131 (60)
OMNI SPECTRUM (ELEMENT 16)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: 110 INDEX 3620

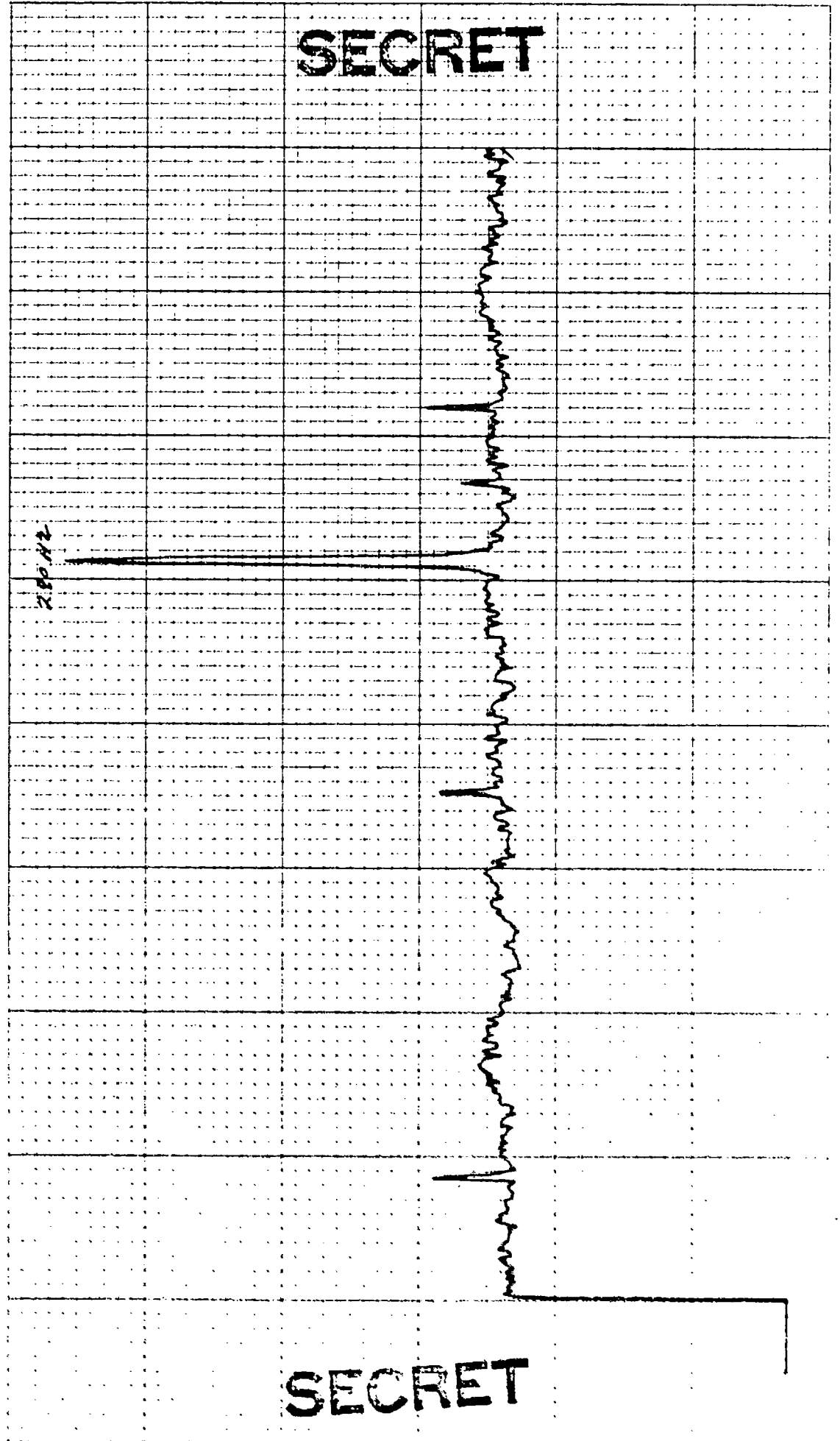
INTEGRATION TIME 320 SECS
FILTER WIG: HANNING



46 0703

(Z) 460703 0703 0703 0703

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



SECRET

SECRET

46 0703

16-2 20000 20000 20000 20000

CONTROL: 3-15 - 2171 (62) REEL: M10 INDEX 362C
OMNI SPECTRUM (ELEMENT 30)
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: - DB
CENTER FREQ: 280 HZ FILTER WTC: HANNING
1 ELEMENT DEC AZ STEERING

DATE OF ANALYSIS:

DATE/TIME: 3-15-77 - 2101 Z

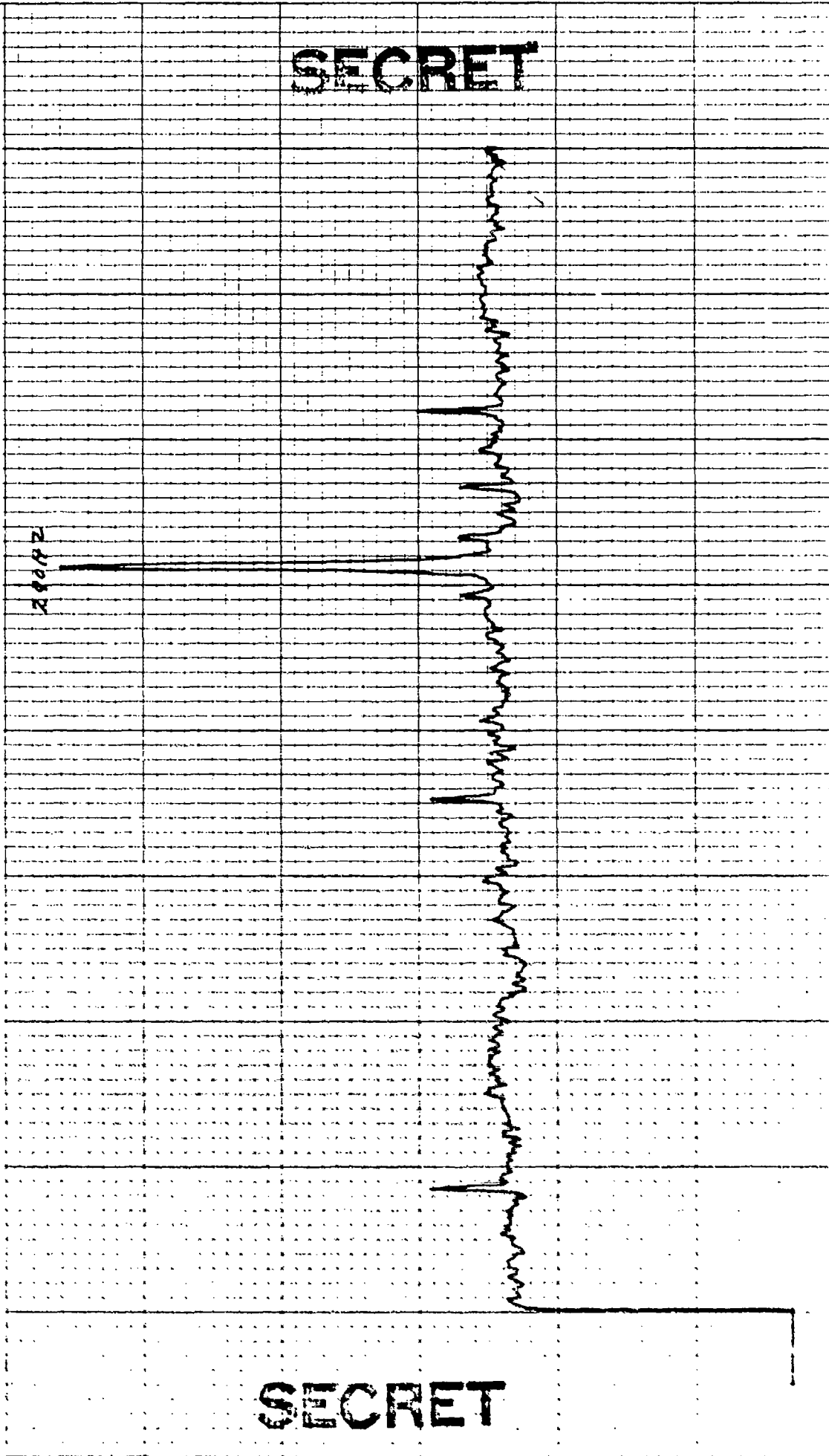
ANALYSIS BANDWIDTH: 1/10 HZ

DEC AZ STEERING

28000

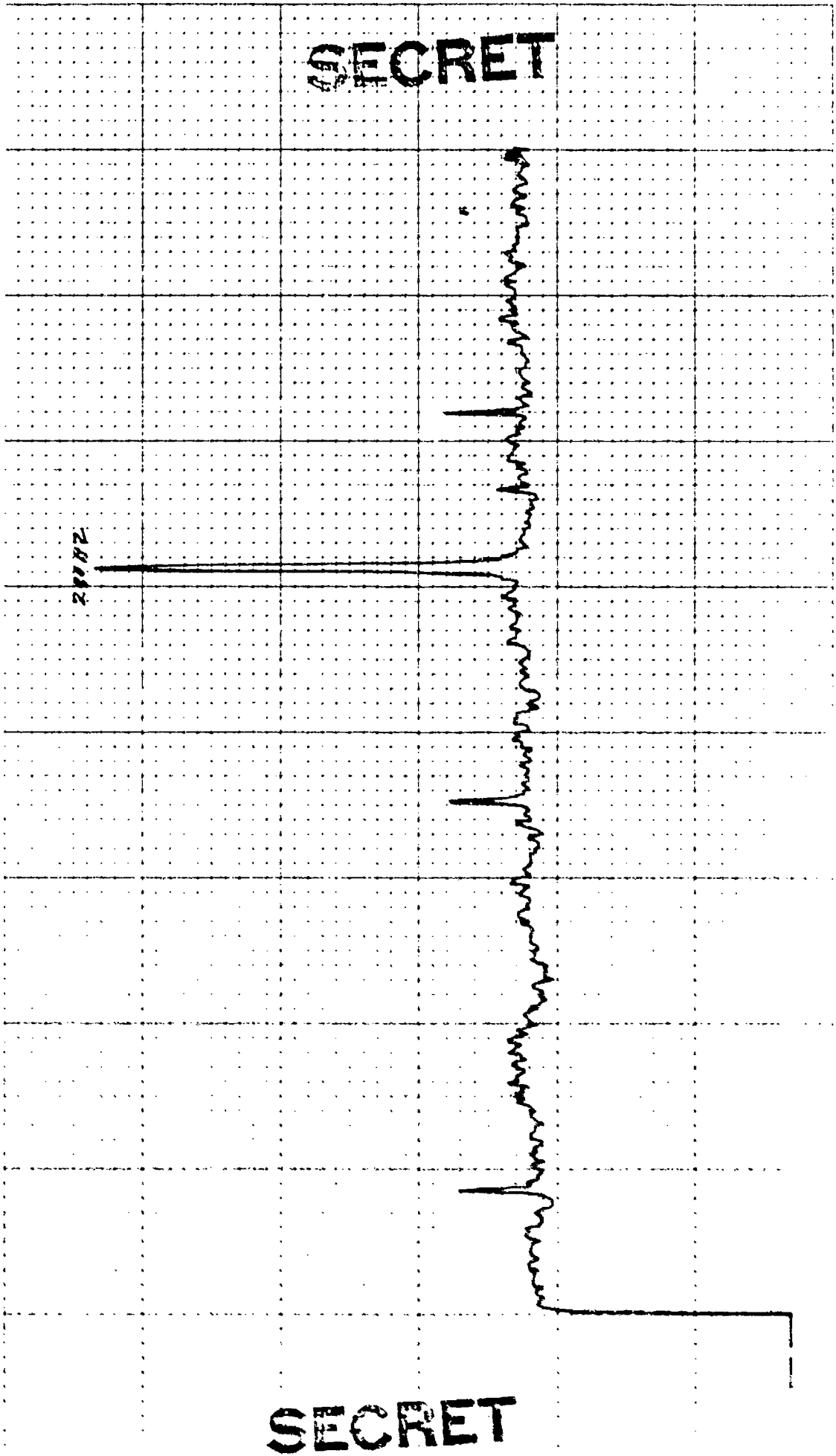
SECRET

SECRET



46 0703

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



SECRET

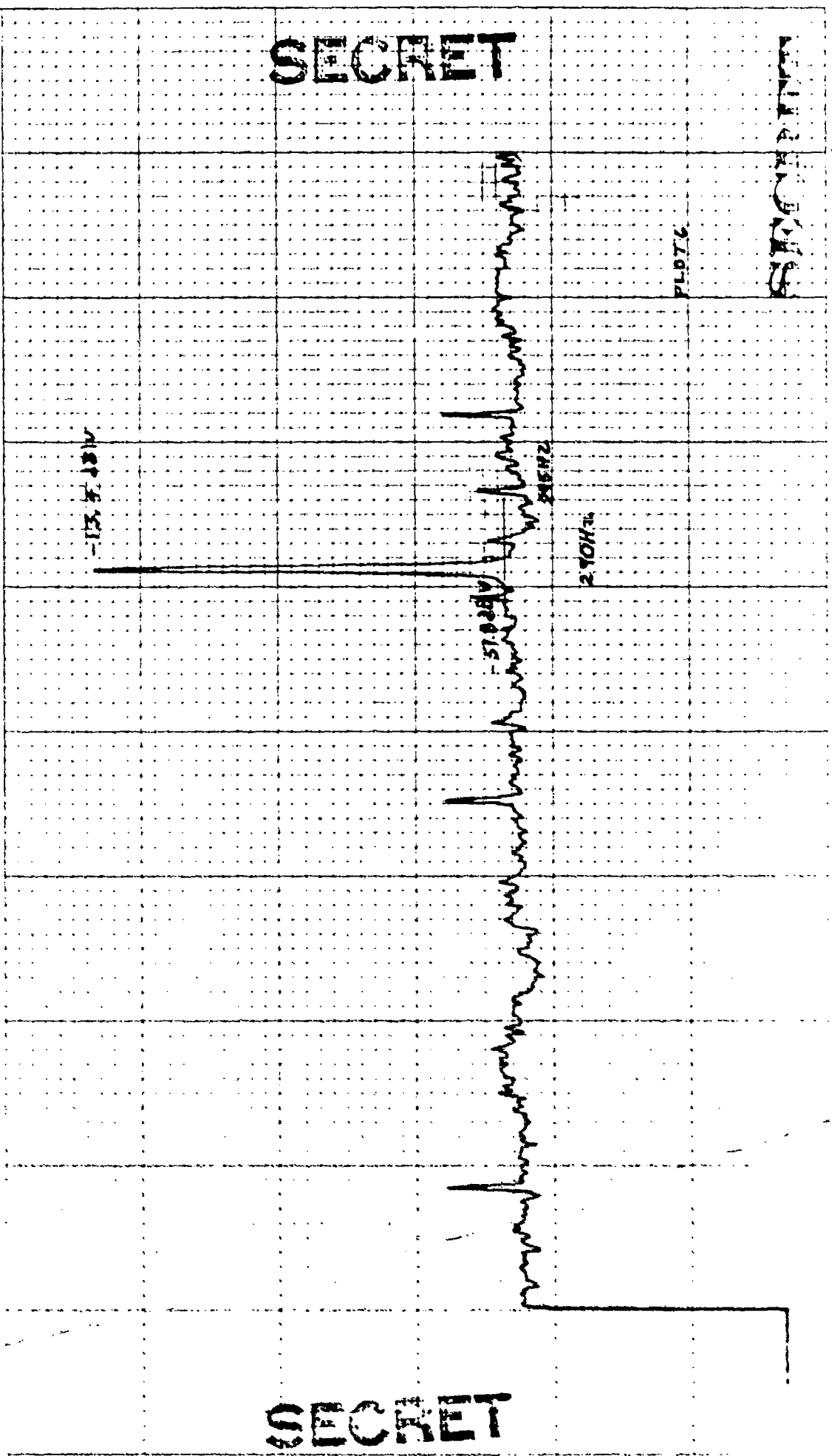
SECRET

46 0703

SECRET

SECRET

CONTROL: 2/3/ - 5/ (DP7) DATE OF ANALYSIS: REEL: M10 INDEX: 3620
 OMNI SPECTRUM (ELEMENT 24) DATE/TIME: 3-15-77 - 2/3/ 7 INTEGRATION TIME 320 SECS ATTN: - DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 CENTER FREQ: 280 HZ - DEG AZ STEERING



SECRET

241HZ

280HZ

318HZ

46 0703

REF ID: A66000

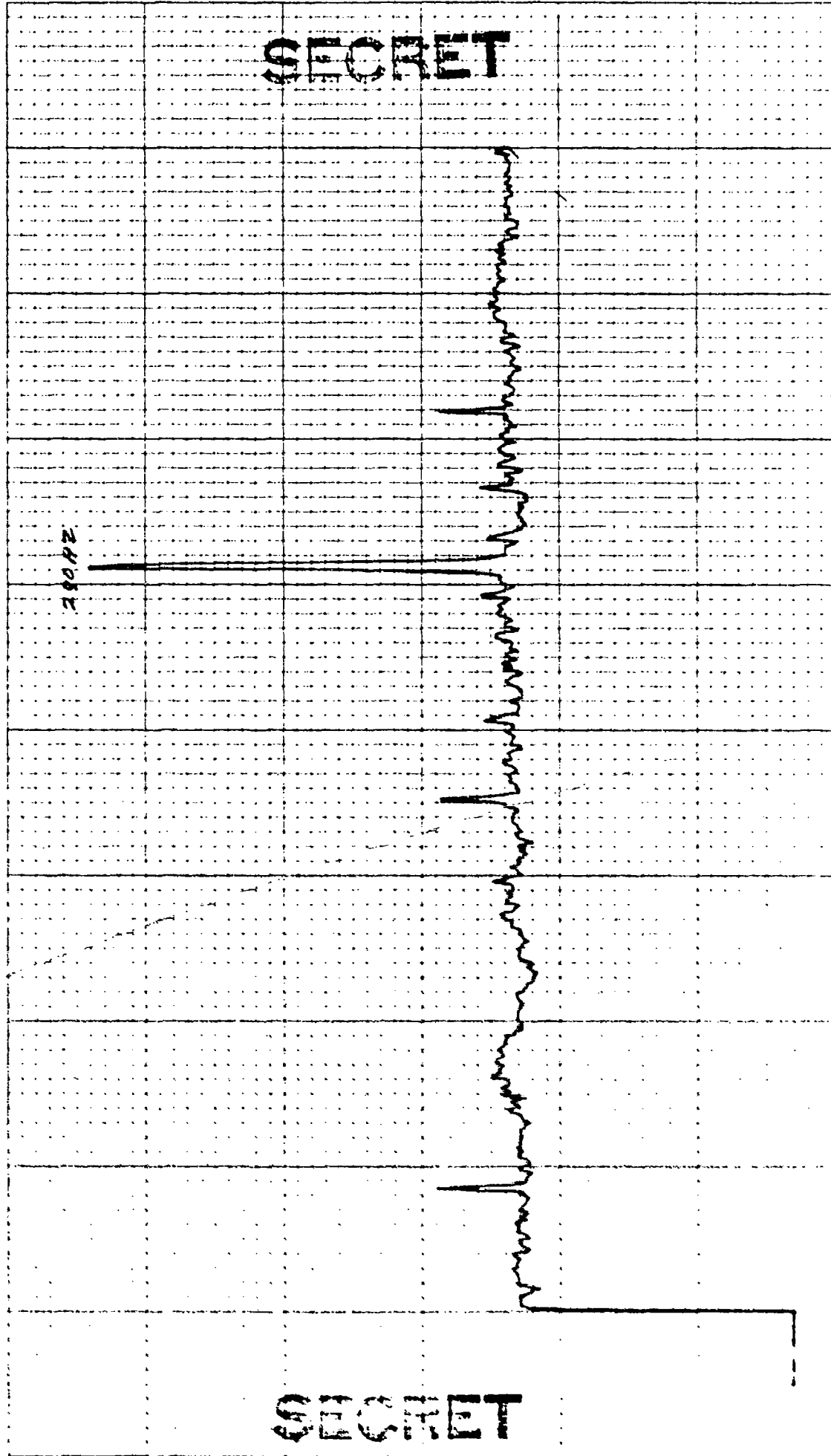
CONTROL: 3-15 - 2171 (65)
OMNI SPECTRUM (ELEMENT 26)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

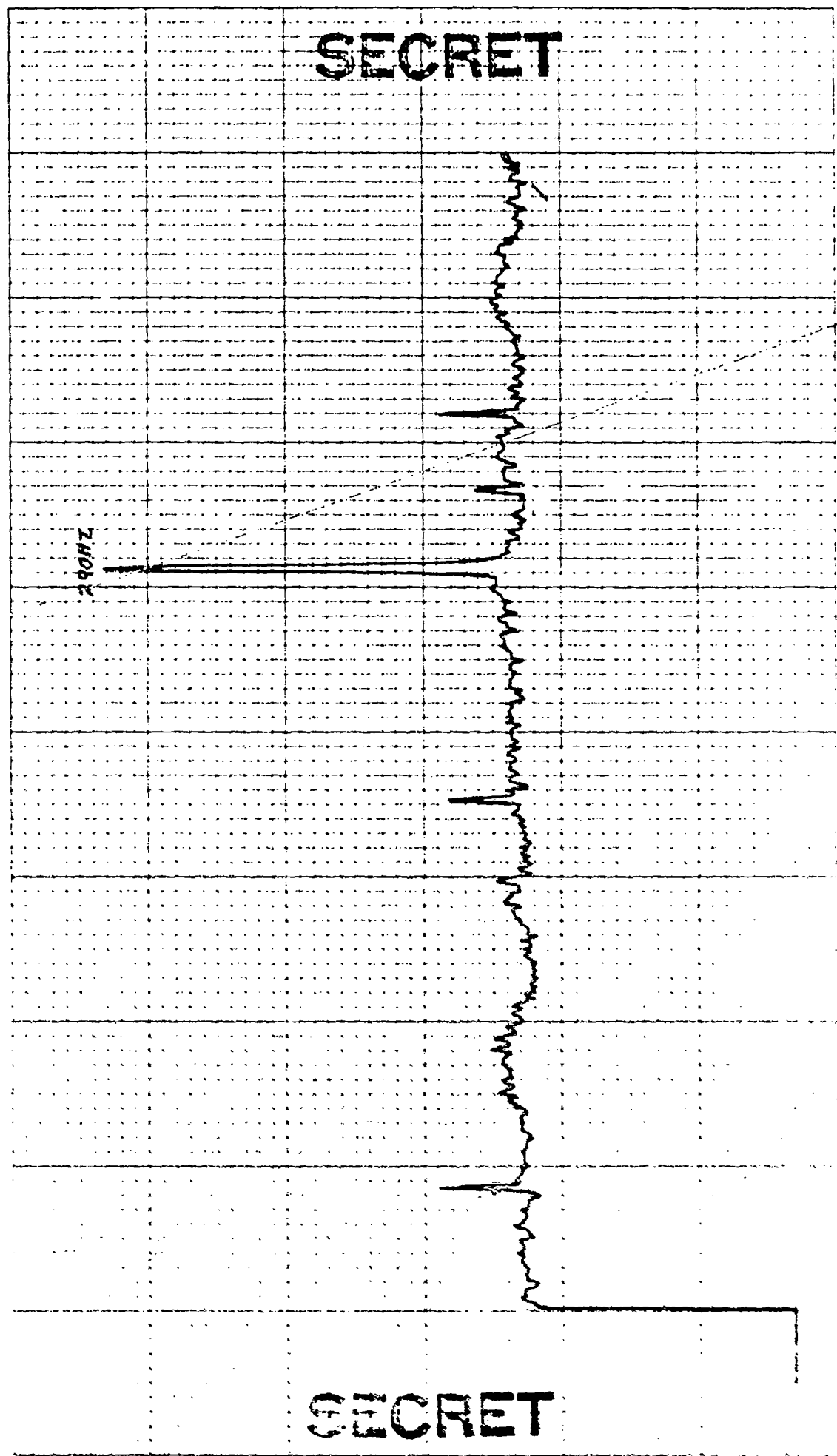
REEL: M10 INDEX 3620

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC HANNING



46 0703

CONTROL: 2131 - 51 (DP3) DATE OF ANALYSIS: REEL: M10 INDEX 3620
 OMNI SPECTRUM (ELEMENT 29)
 EXERCISE: BEARING: STAKE DATE/TIME: 3-6-77 - 2131 Z INTEGRATION TIME 320 SECS ATTN: - DB
 CENTER FREQ: 280 KHZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 1 ELEMENT - DEG AZ STEERING

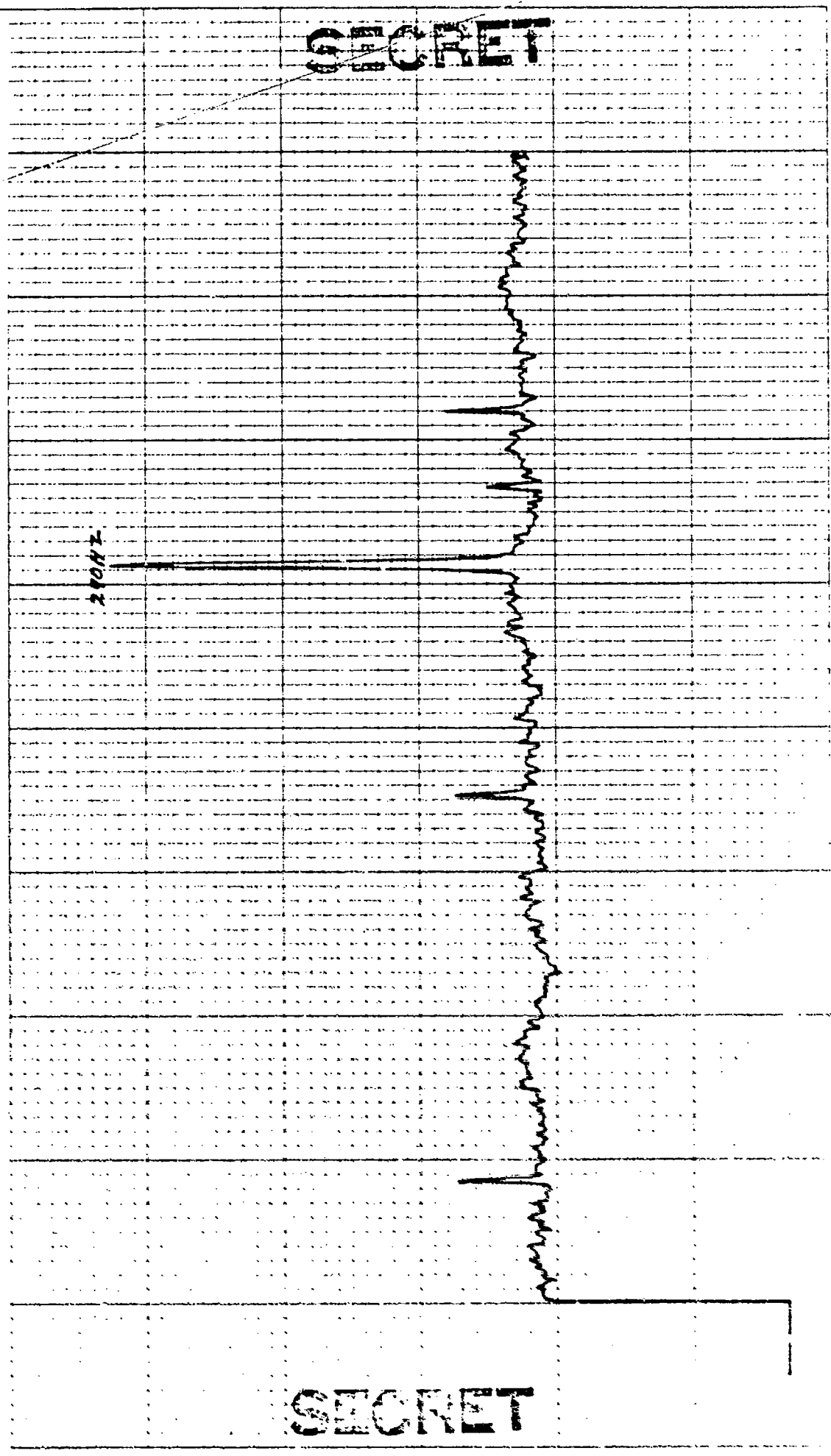


SECRET

SECRET

46 0703

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



46 0703

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

DATE OF ANALYSIS:

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

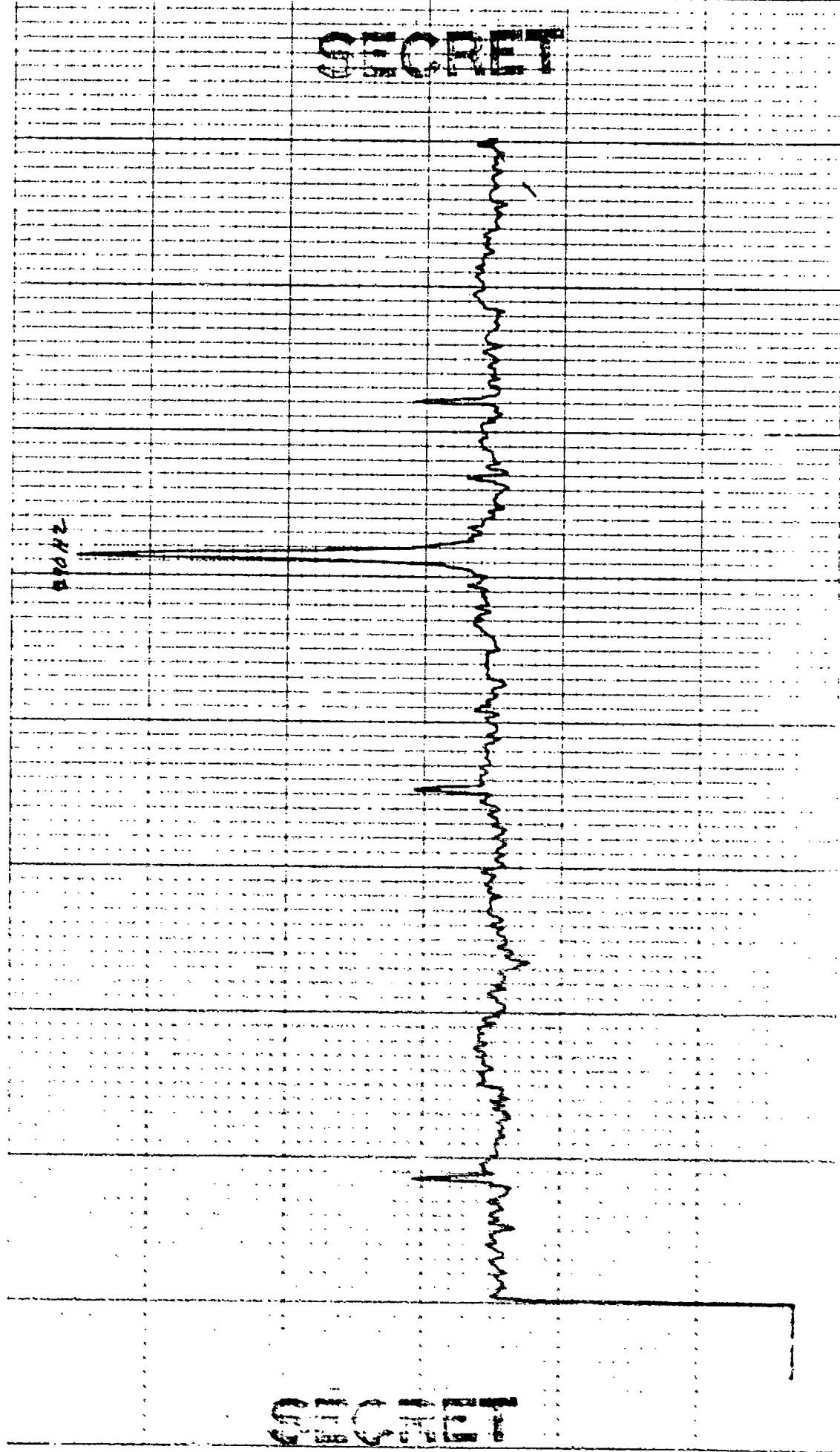
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

REEL: M10

INTEGRATION TIME 320 SECS
FILTER

INDEX 362c

ATTEN: - DB
WTG: HANNING



SECRET

SECRET

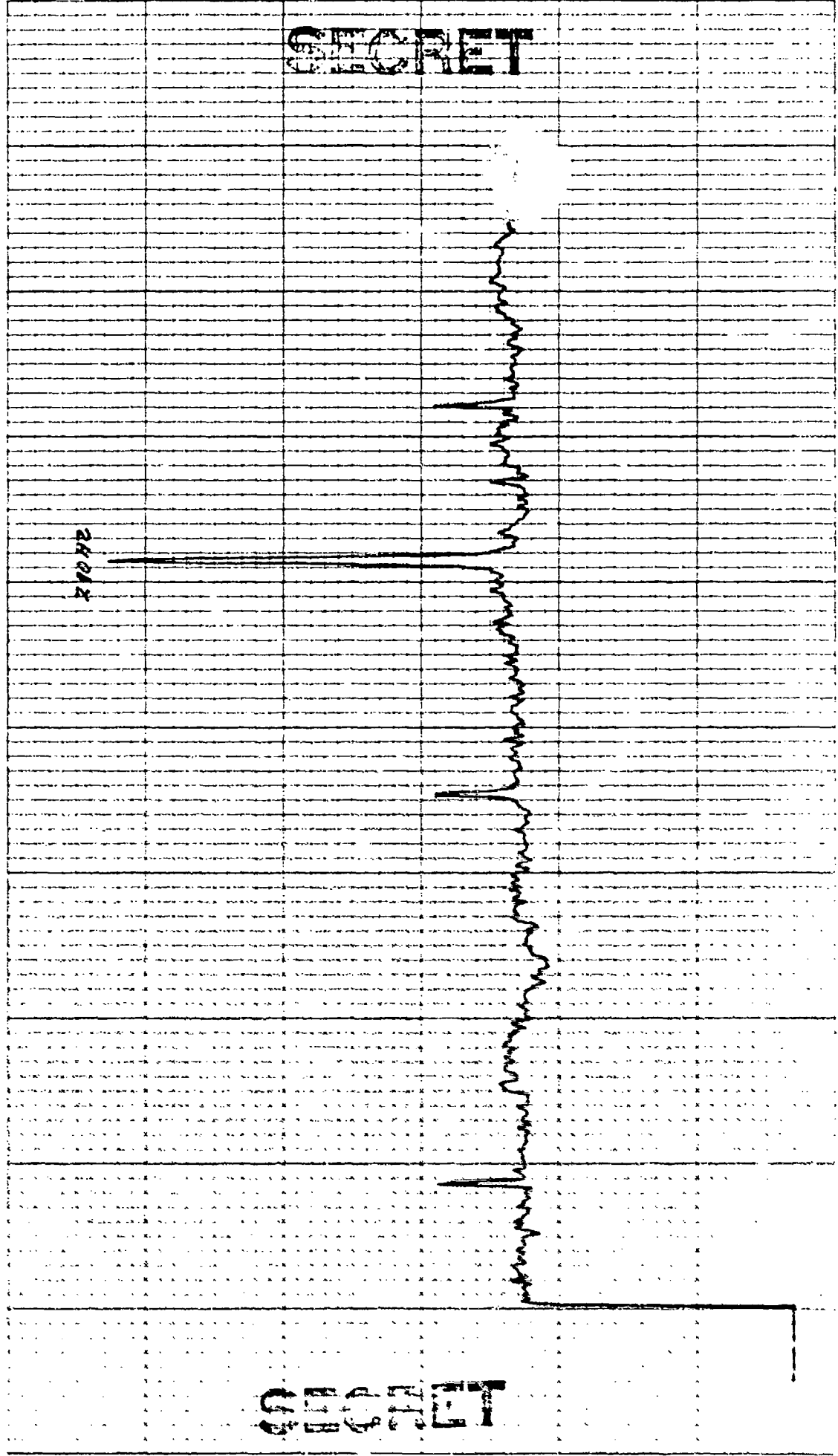
46 0703

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

CONTROL: 3-15-2131(69) DATE OF ANALYSIS: REEL: N/O INDEX J620
 OMNI SPECTRUM (ELEMENT 15)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 HZ
 1 ELEMENT

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

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



4° 0703

4° 0703

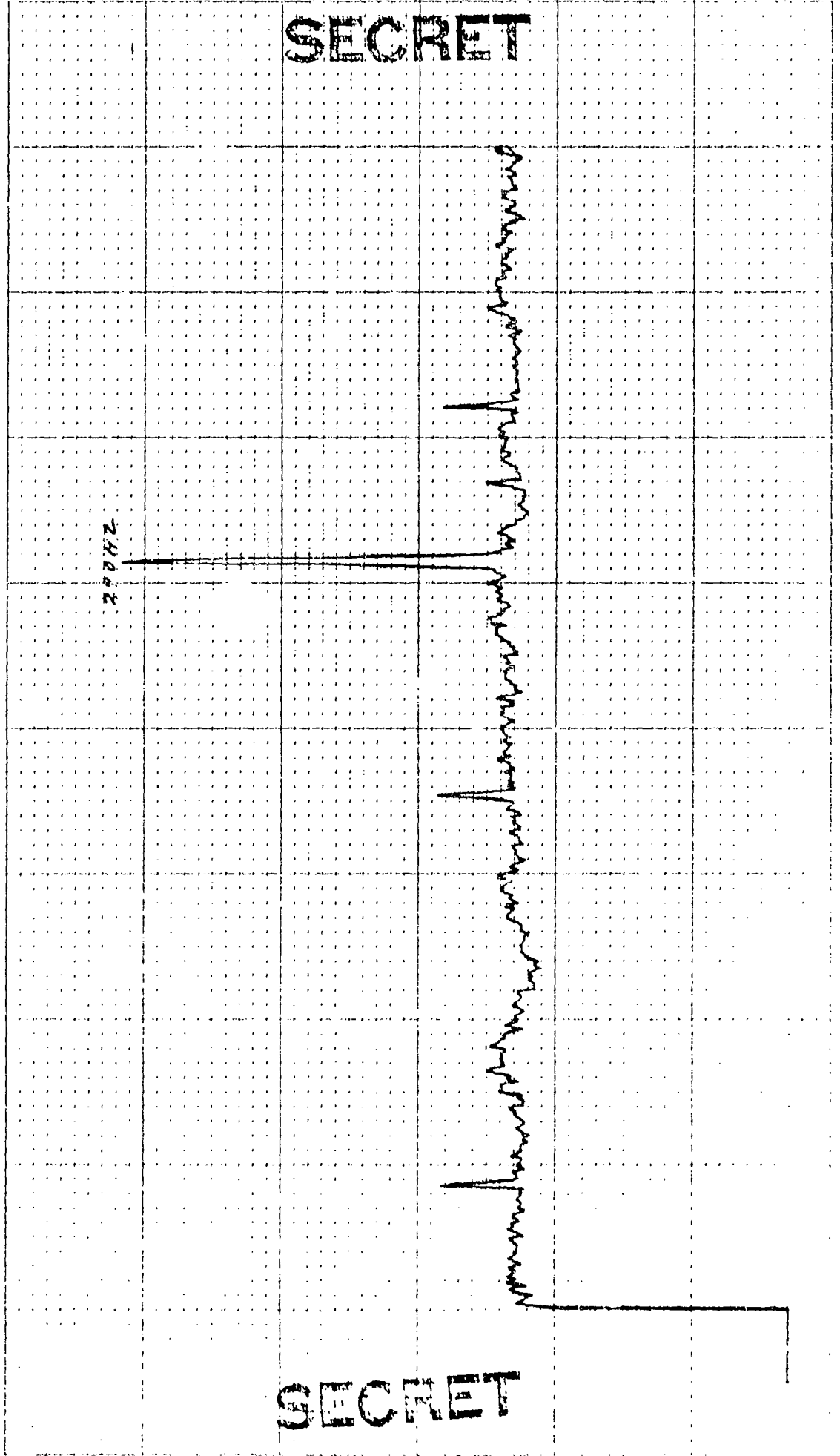
REEL: M10 INDEX 3690

DATE OF ANALYSIS:

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

INTEGRATION TIME 320 SECS ATTEN: DB
FILTER WTG: HANNING

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



SECRET

SECRET

46 0703

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

DATE OF ANALYSIS:

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

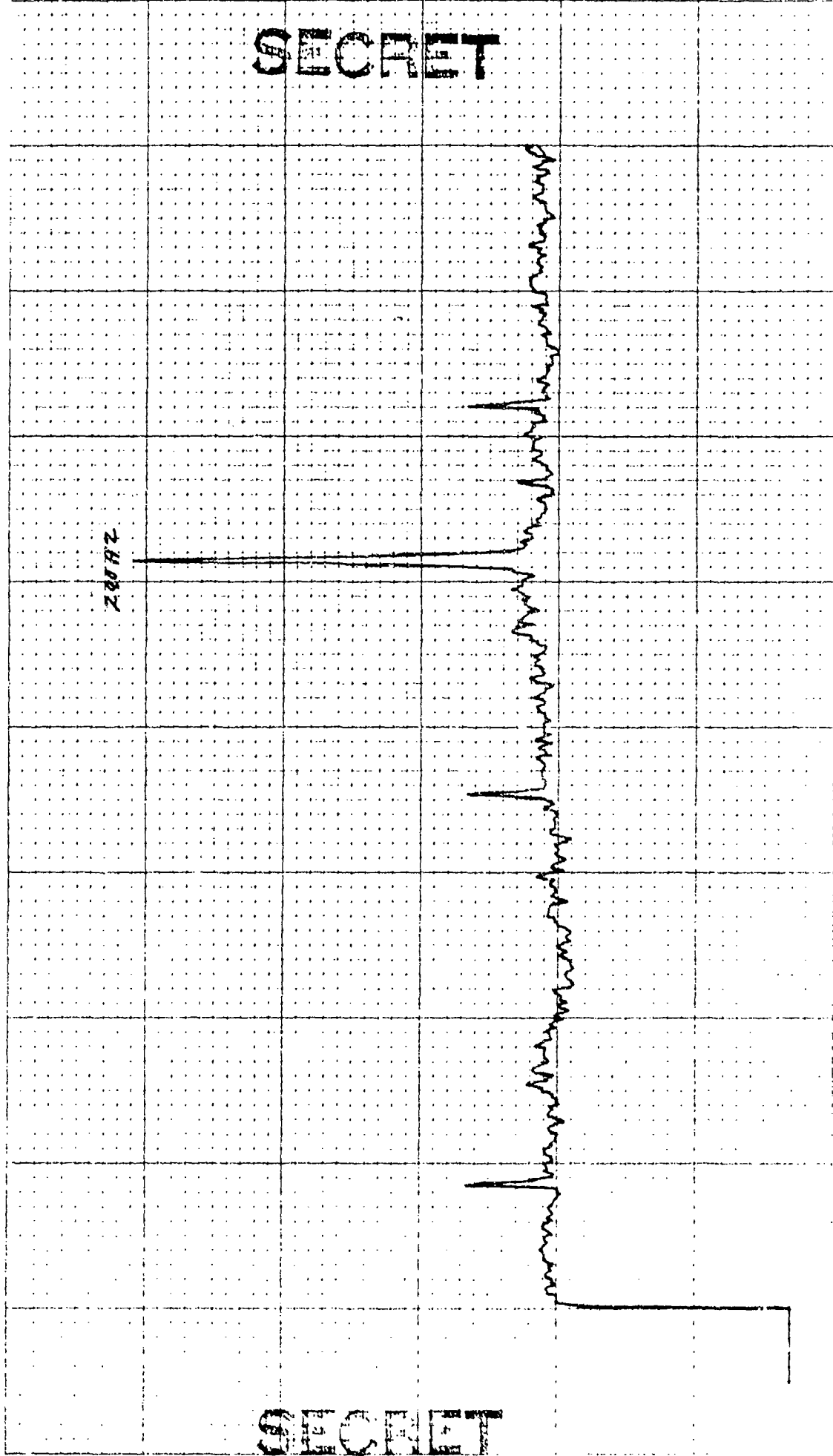
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: M10

INDEX 3120

INTEGRATION TIME 320 SECS

ATTEN: DB
FILTER WTG: HANNING



46 0703

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

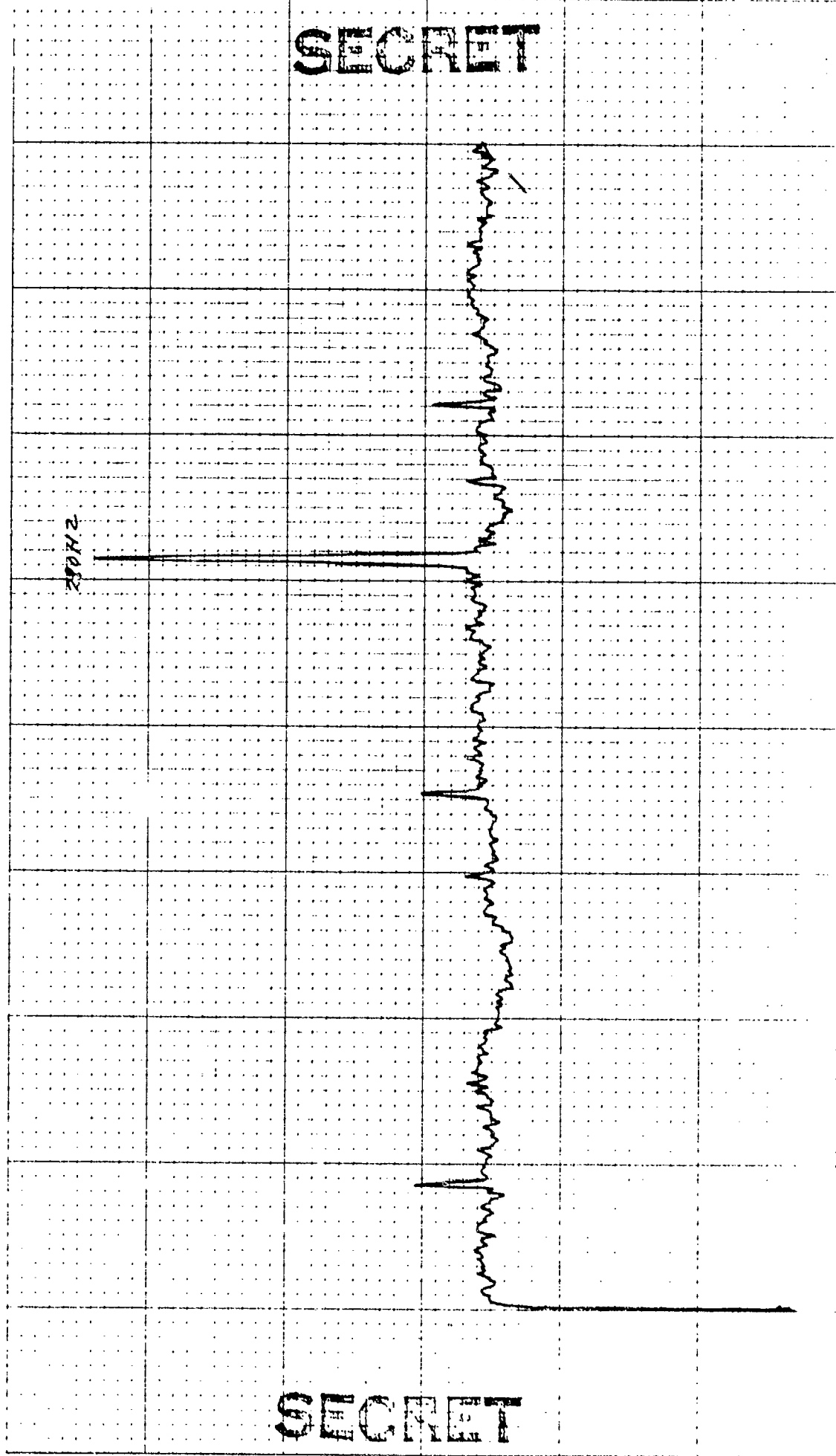
CONTROL: 3-15 - 2/31 (72)
OMNI SPECTRUM(ELEMENT 41)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: A10 INDEX 362c

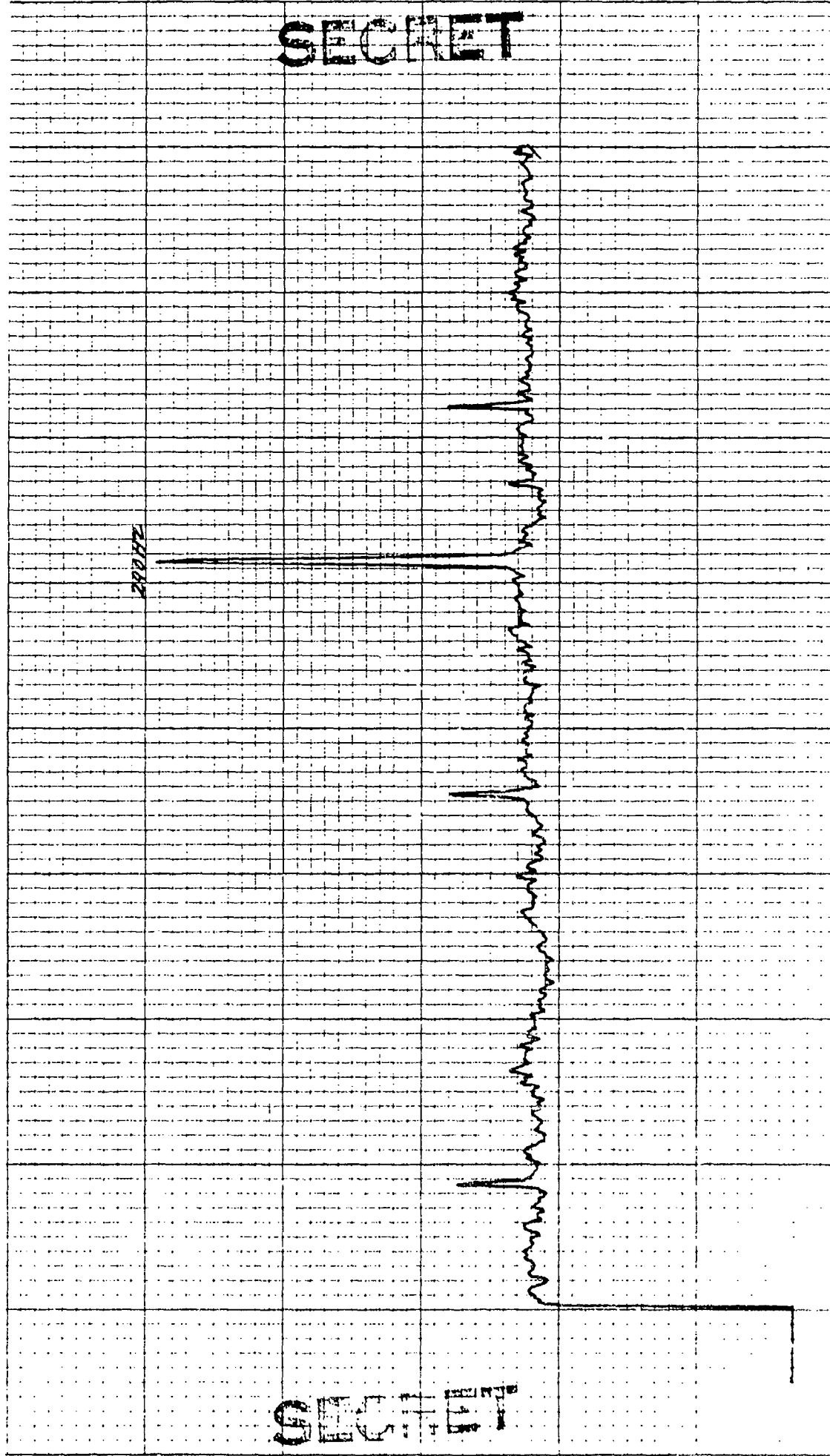
INTEGRATION TIME 320 SECS
FILTER ATTN: DB
WTC: HANNING



FOR USE TO THE BUCHHEIM CO. 46 0703

46 0703

CONTROL: 3-15-2131 (73) DATE OF ANALYSIS: REEL: A10 INDEX 3620
 OMNI SPECTRUM (ELEMENT 43)
 EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 2131 Z
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: — DB
 1 ELEMENT — DEG AZ STEERING FILTER WTG: HANNING



46 0703

REEL 410 INDEX 3020

814

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

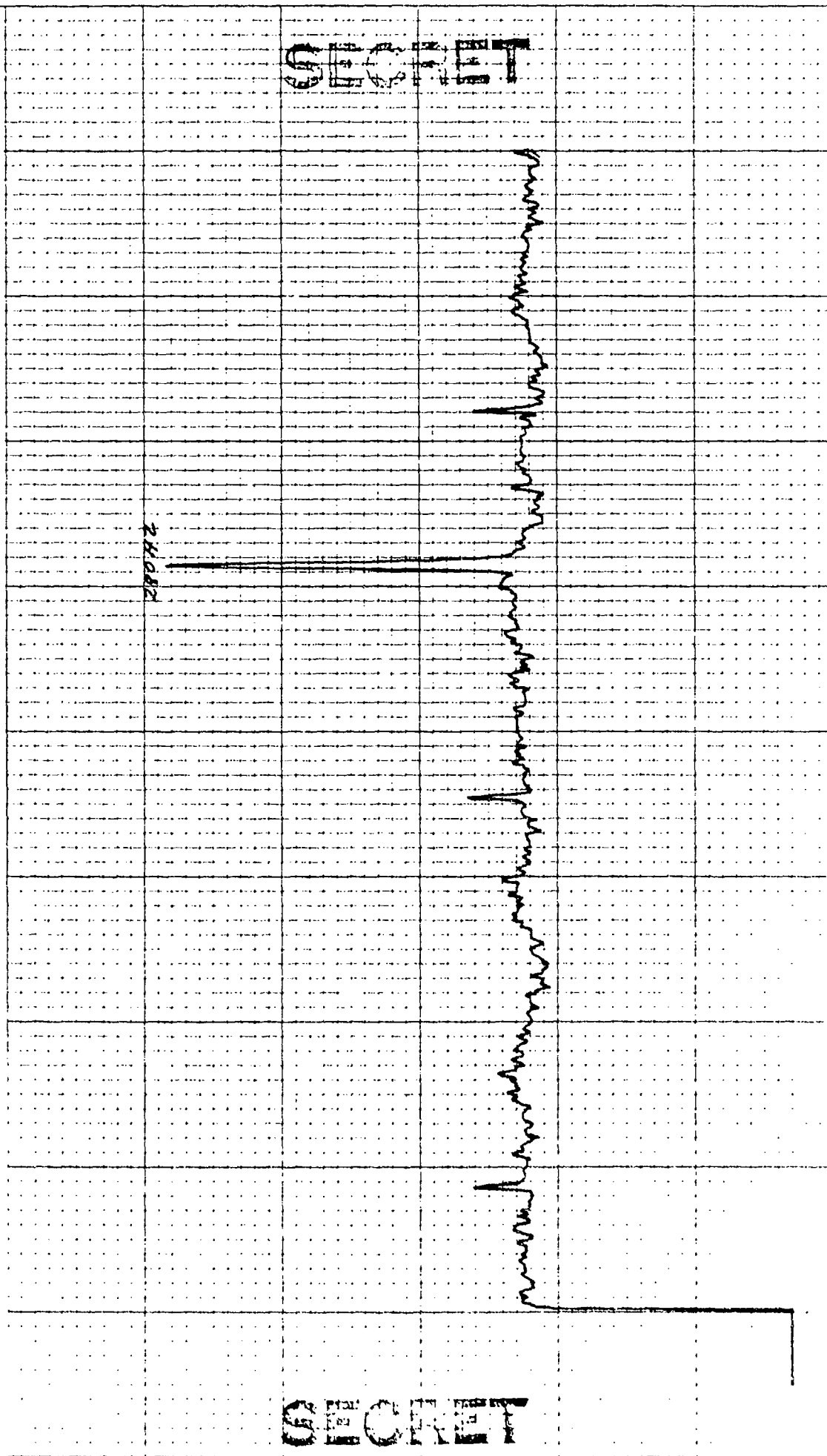
DATE OF ANALYSIS:

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

REEL: 410

INDEX 3020

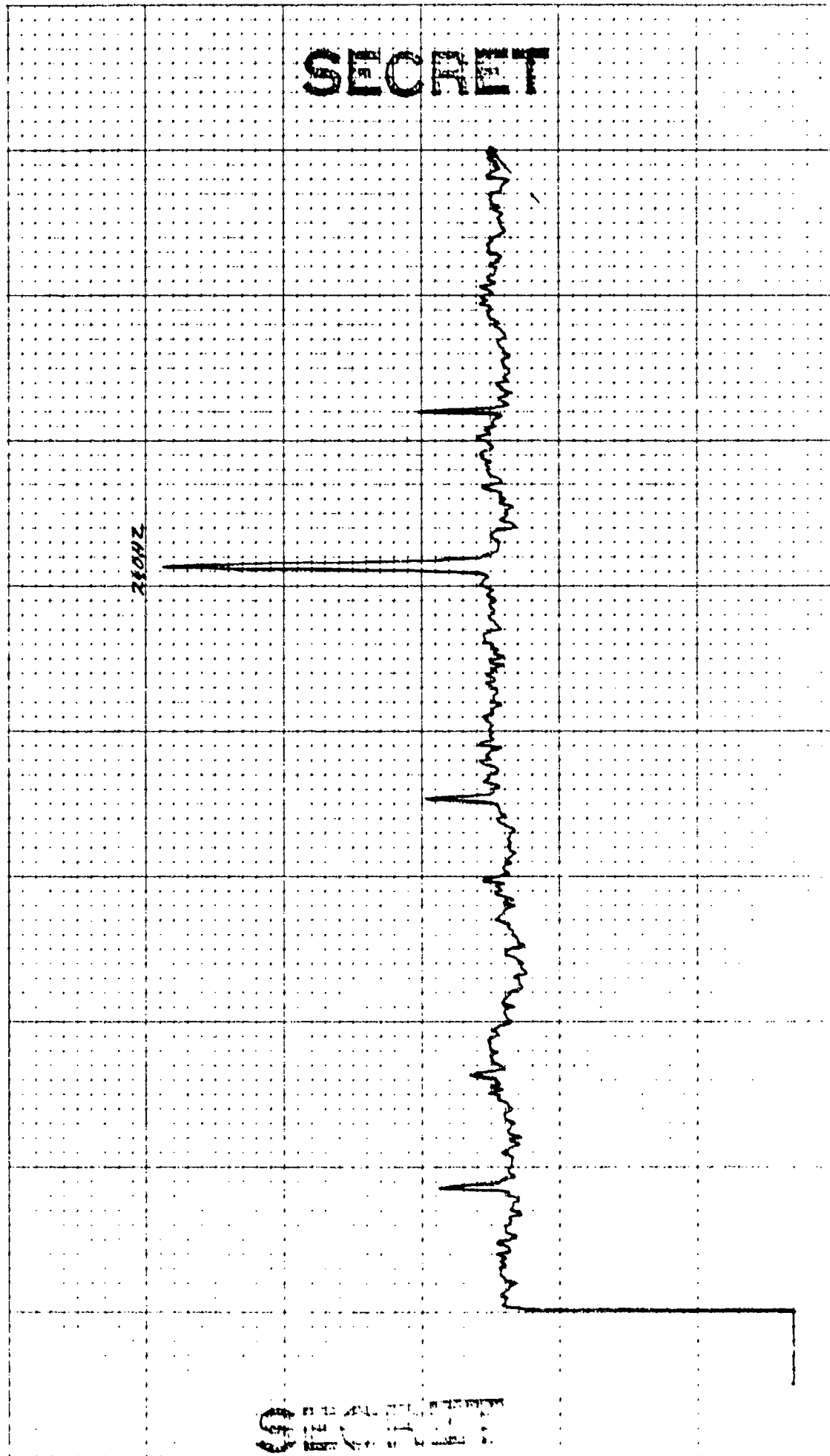
INTEGRATION TIME 320 SECS
ATTEN: - DB
FILTER
WIG: HANNING



46 0703

Page 17 of 20

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



46 0703

WZL 10/15/77 10:00

INDEX 3020

REEL: M10

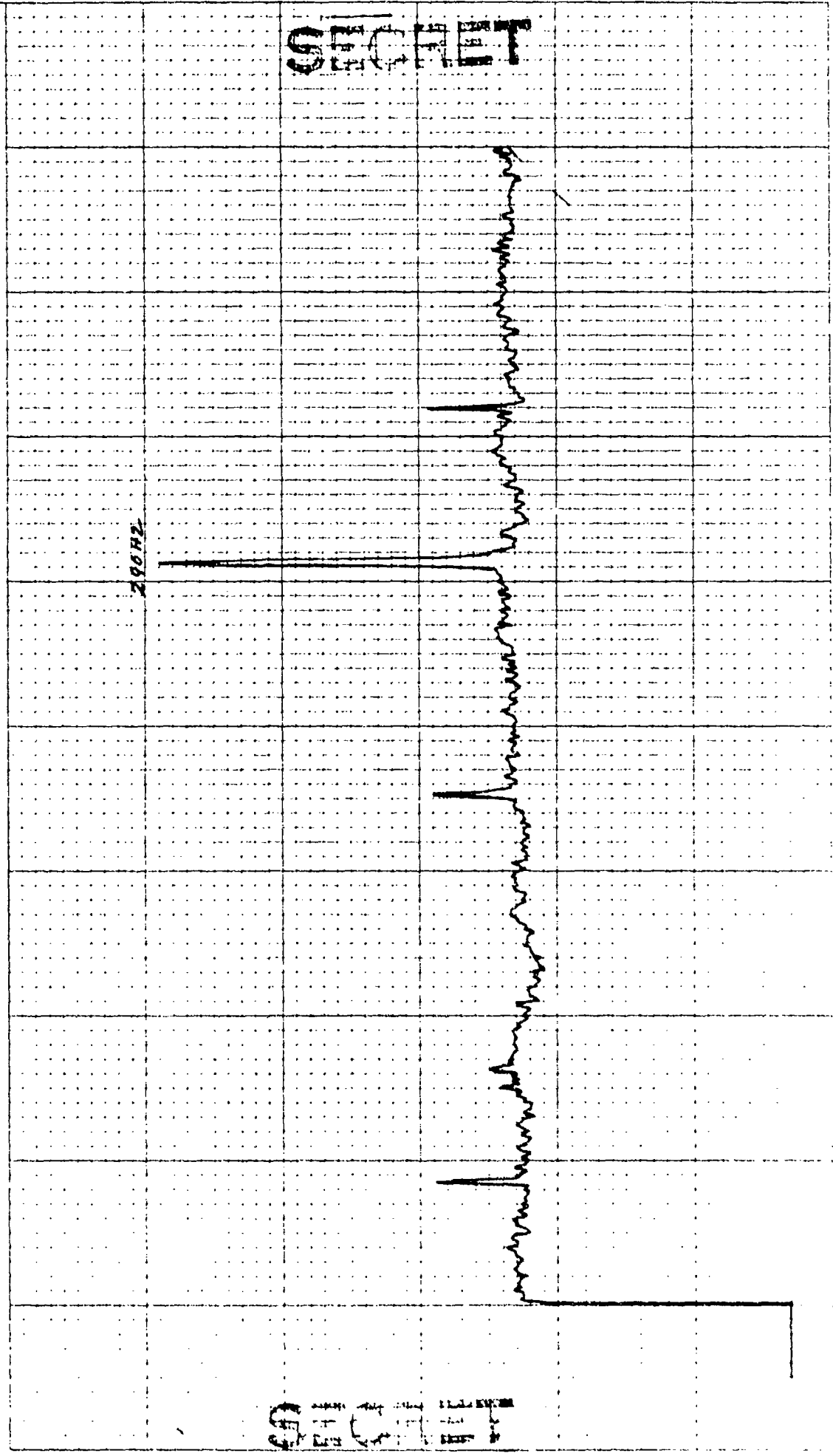
DATE OF ANALYSIS:

CONTROL: 3-15 - 2131 (76)
OMNI SPECTRUM(ELEMENT 49)

INTEGRATION TIME 320 SECS ATTEN: — DB
FILTER HANNING

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

EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
I ELEMENT



SECRET

SECRET

45 0793

REEL: N10 INDEX J62c

DATE OF ANALYSIS:

CONTROL: 3-15-77 - 2131 (77)

OMNI SPECTRUM (ELEMENT 51)

EXERCISE: BEARING STAKE

CENTER FREQ: 280 HZ

1 ELEMENT

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

ANALYSIS BANDWIDTH: 1/10 HZ

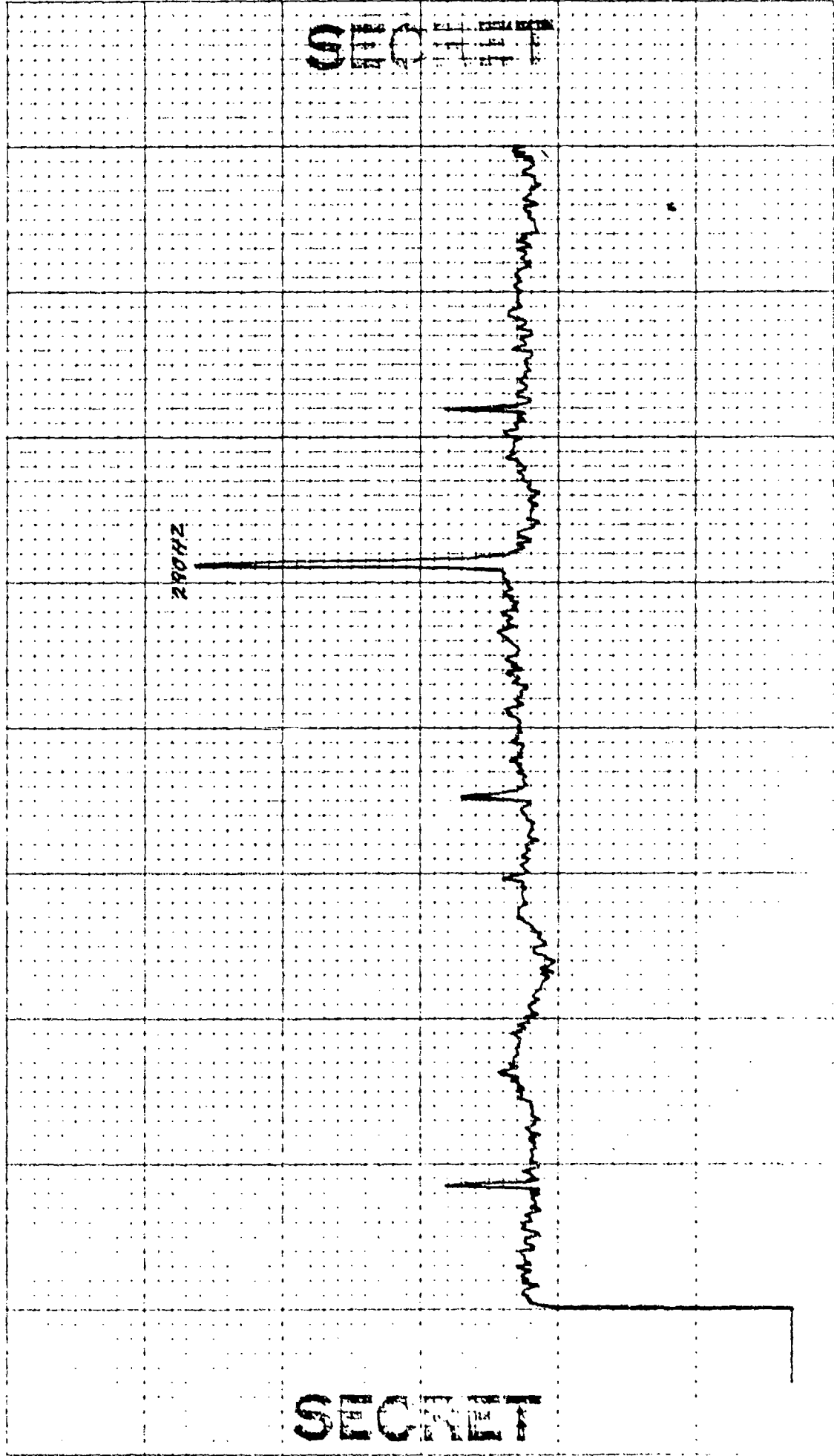
— DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

ATTEN: — DB

WTC: HANNING



46 0703

CONTROL: 3-15 - 2131 (76)
OMNI SPECTRUM(ELEMENT 53)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
I ELEMENT

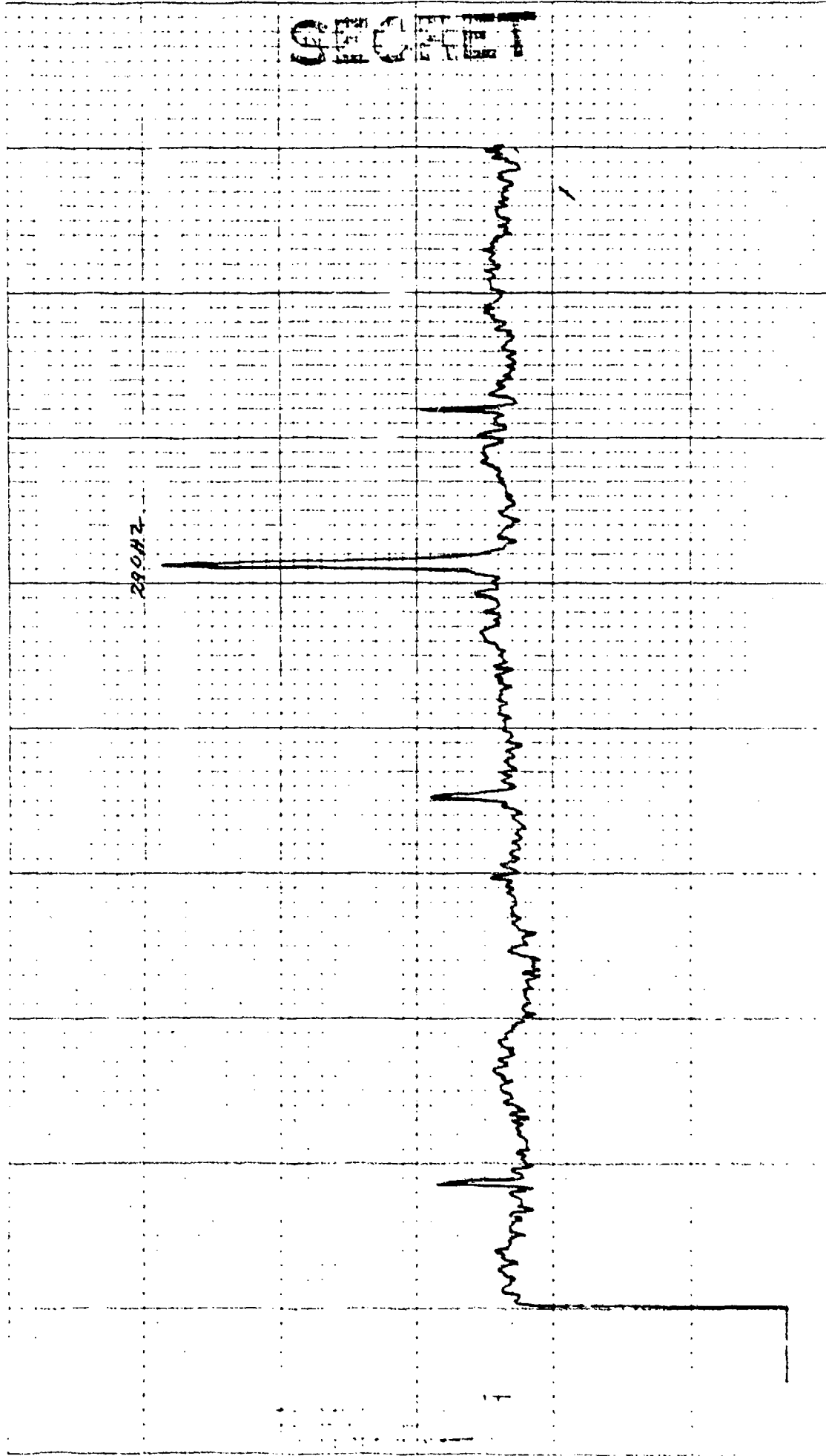
DATE OF ANALYSIS:

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

REEL: M10

INDEX J120

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



25HZ

140HZ

50

100

150

150

MRA

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

HISTORICAL
TAPE REEL NUMBER 17

ANALYSIS BAND WIDTH 11
WATER DEPTH 100

REF
DATE
EXPI

140HZ

SECRET

290HZ 296HZ

MRA

SECRET

REF ID: A7

PAGE COUNT _____
ELEMENT NUMBERS _____
DATE _____
EXERCISE BEARING _____

SAN-XXX-78-0128

DATE _____
EXERCISE BEARING _____

EXERCISE BEARING _____

CONFIDENTIAL

SIGNAL LEVEL AND SNR
CALCULATIONS

DATA POINT 9

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-22.5</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-12.5
BEAMFORMER GAIN	<u>+12</u>	- .5 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	- .3 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-58.7</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-48.7
BEAMFORMER GAIN	<u>+12</u>	-36.7 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR	<u>- .5</u>	
SIGNAL LEVEL FOR SNR	<u>-36.7</u>	36.2
PROCESSOR CORRECTION	<u>- 4.0</u>	32.2
MRA CORRECTION	<u>+ .2</u>	32.4 SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>- 8.2</u>	24.2 SNR 1 HZ BAND

CONFIDENTIAL

SIGNAL LEVEL AND SNR
CALCULATIONS

DATA POINT 9

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

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

NOISE LEVEL

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

SIGNAL-NOISE-RATIO

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

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 9

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

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

NOISE LEVEL

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

SIGNAL-NOISE-RATIO

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

CONFIDENTIAL

CONFIDENTIAL

DATA POINT 9

SIGNAL GAIN

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

ARRAY GAIN

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

CONFIDENTIAL

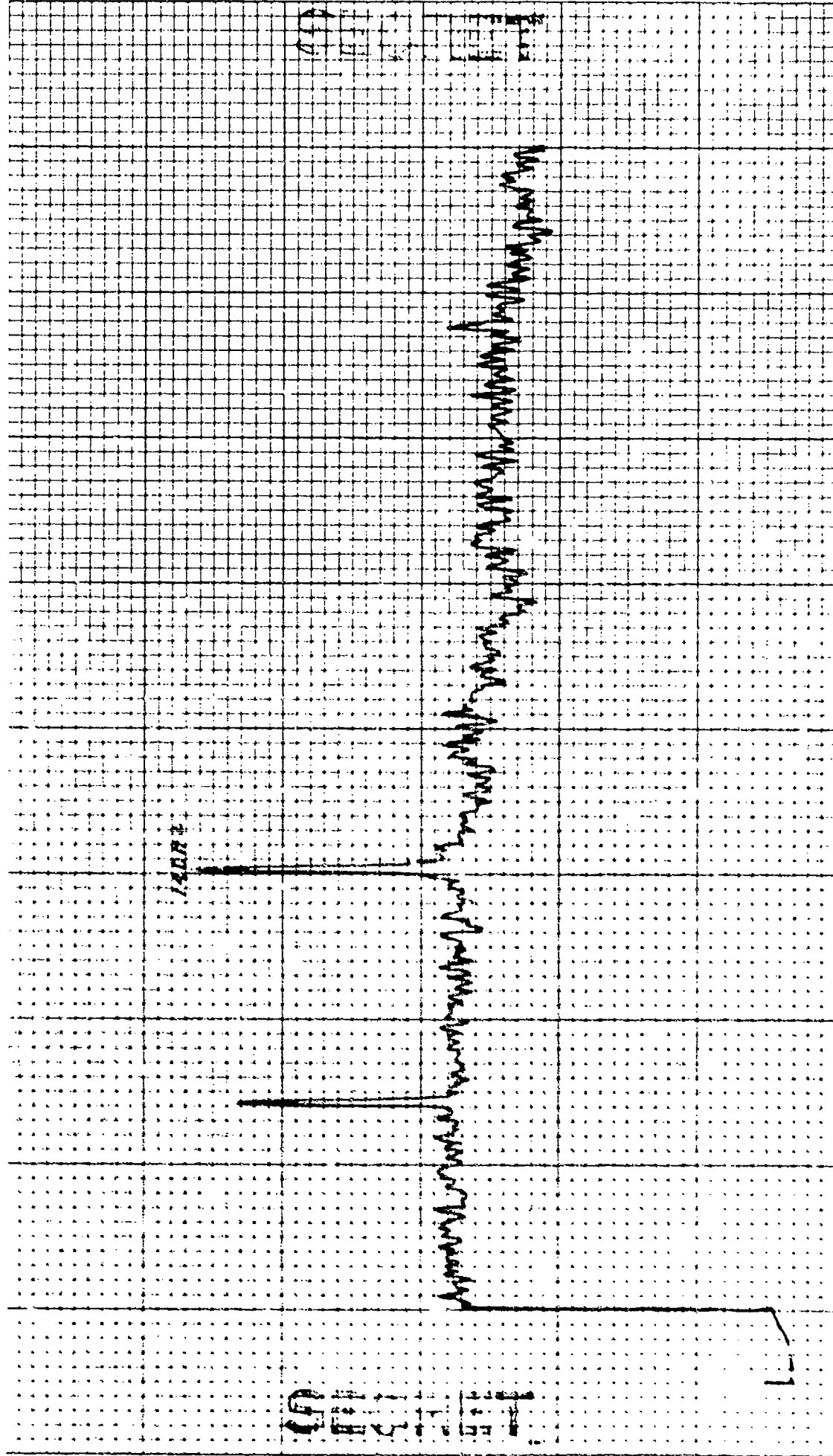
K&E
SEARCH & ANALYSIS CO. INCORPORATED

46 0703

CONTROL: 2171 - 16 (DP1)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 3-15-77 - 2:31 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+ 36 DEG. AZ STEERING

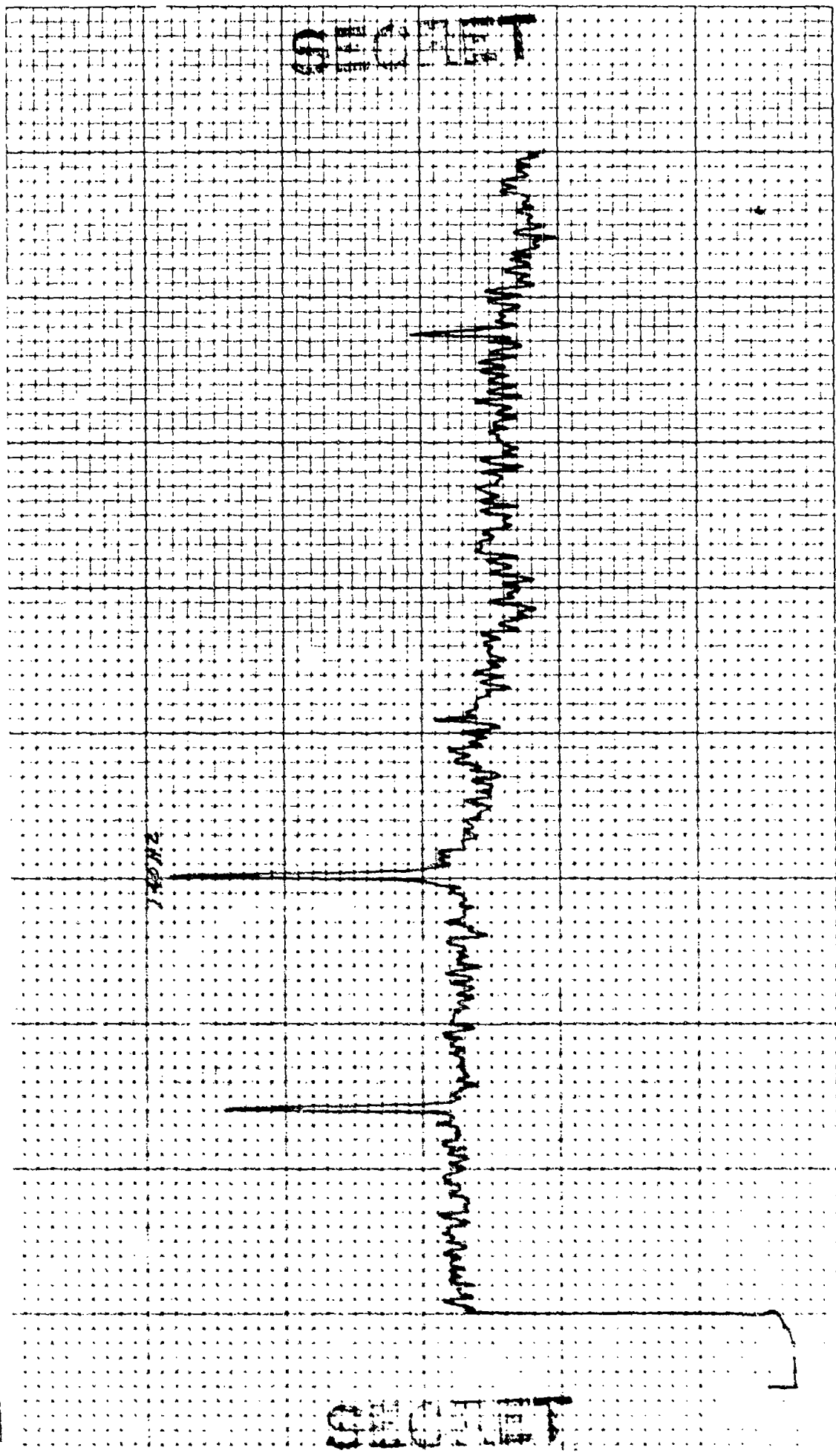
REEL: 410 INDE X3680
INTEGRATION TIME 320 SECS ATTN: -12 DB
FILTER WTG: HANNING



KOE 15.6 IS TO THE INSTRUMENTS

46 0703

CONTROL: 2131 - 16 (D01) DATE OF ANALYSIS: 1-16 REEL: M10 INDE X3620
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-15-77 - 2131 Z INTEGRATION TIME 320 SECS ATTEN: -12 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 CENTER FREQ: 150 HZ + 30 DEG. AZ STEERING



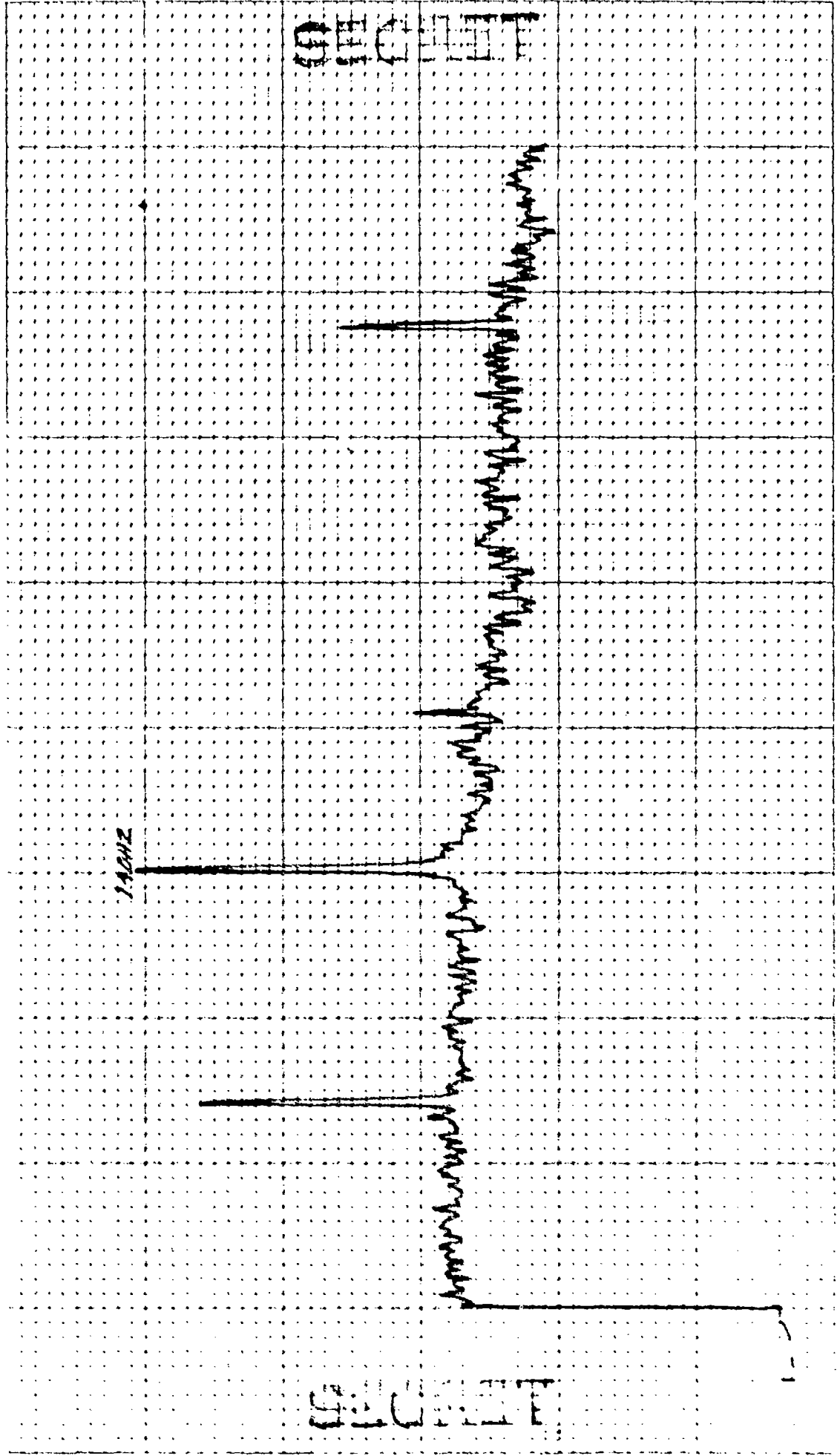
SECRET

SECRET

MEASUREMENTS

46 0703

CONTROL: 2(3) - 16 (189) DATE OF ANALYSIS: 7-16-76 PEEL: A10 INDE X3220
 BEAMFORMED SPECTRUM ELEMENTS DATE/TIME: 7-15-77 - 217/2 INTEGRATION TIME 320 SECS ATTEN: -7.2 DB
 EXPICISE: BEARING, STAFF ANALYTIC BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 CENTER FREQ: 150 HZ 4.40 DEG. AZ SLEEPING

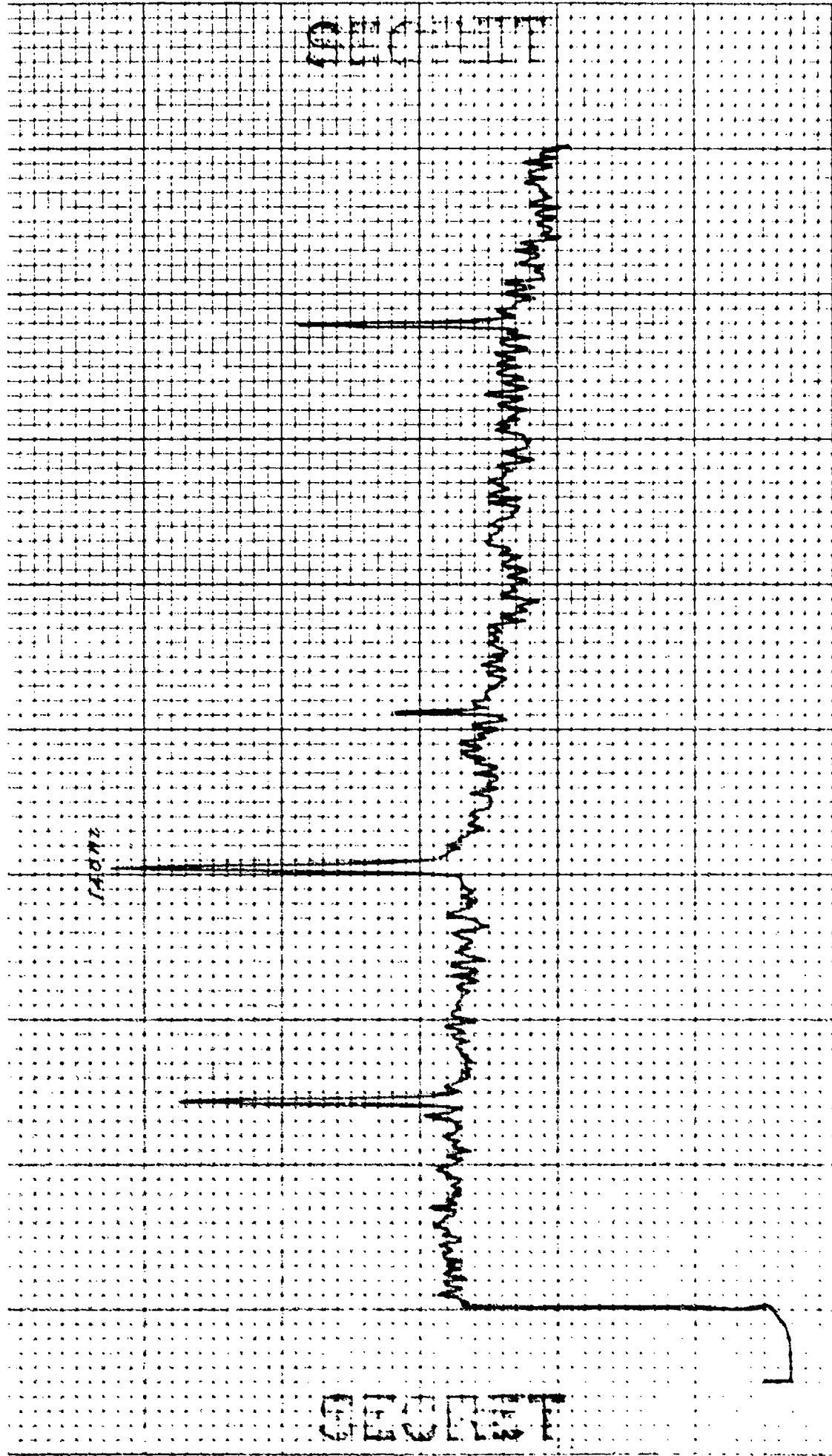


CONTROL: 213 - 16 (DPI)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: - - - - -
1-16

DATE/TIME: 3-25-77 - 213/2
ANALYSIC BANDWIDTH: 1/10 HZ
+ 42 DEG. AZ STEERING

REEL: 110 INDE XJ720
INTEGRATION TIME 320 SECS ATTEN: -12 DB
FILTER WIG: HANNING



KOE 10 X 10 TO THE INCHES
KELUPELL A EVELAND CO MADE IN U.S.A.

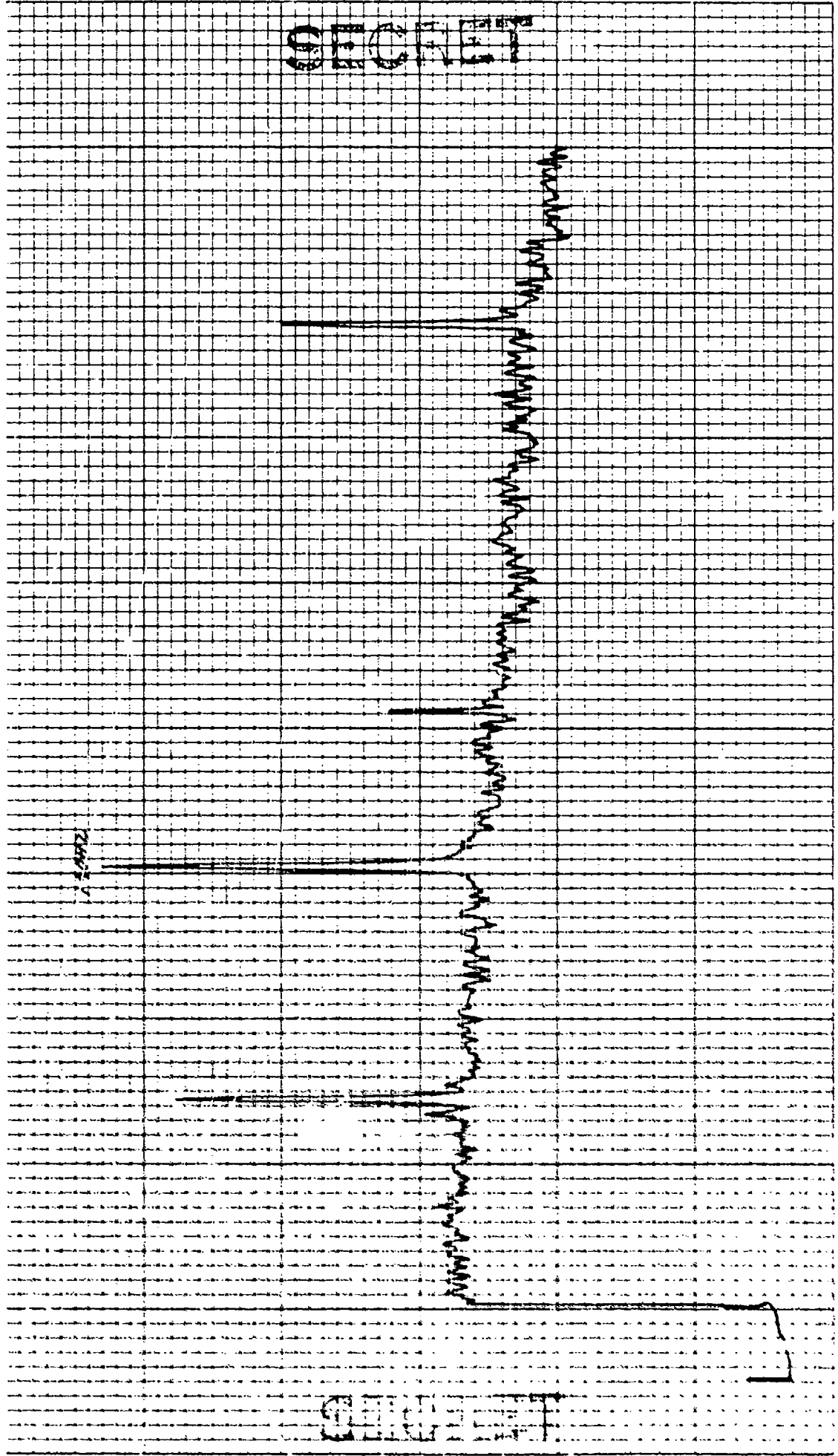
46 0703

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

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

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

INDE X 3620



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

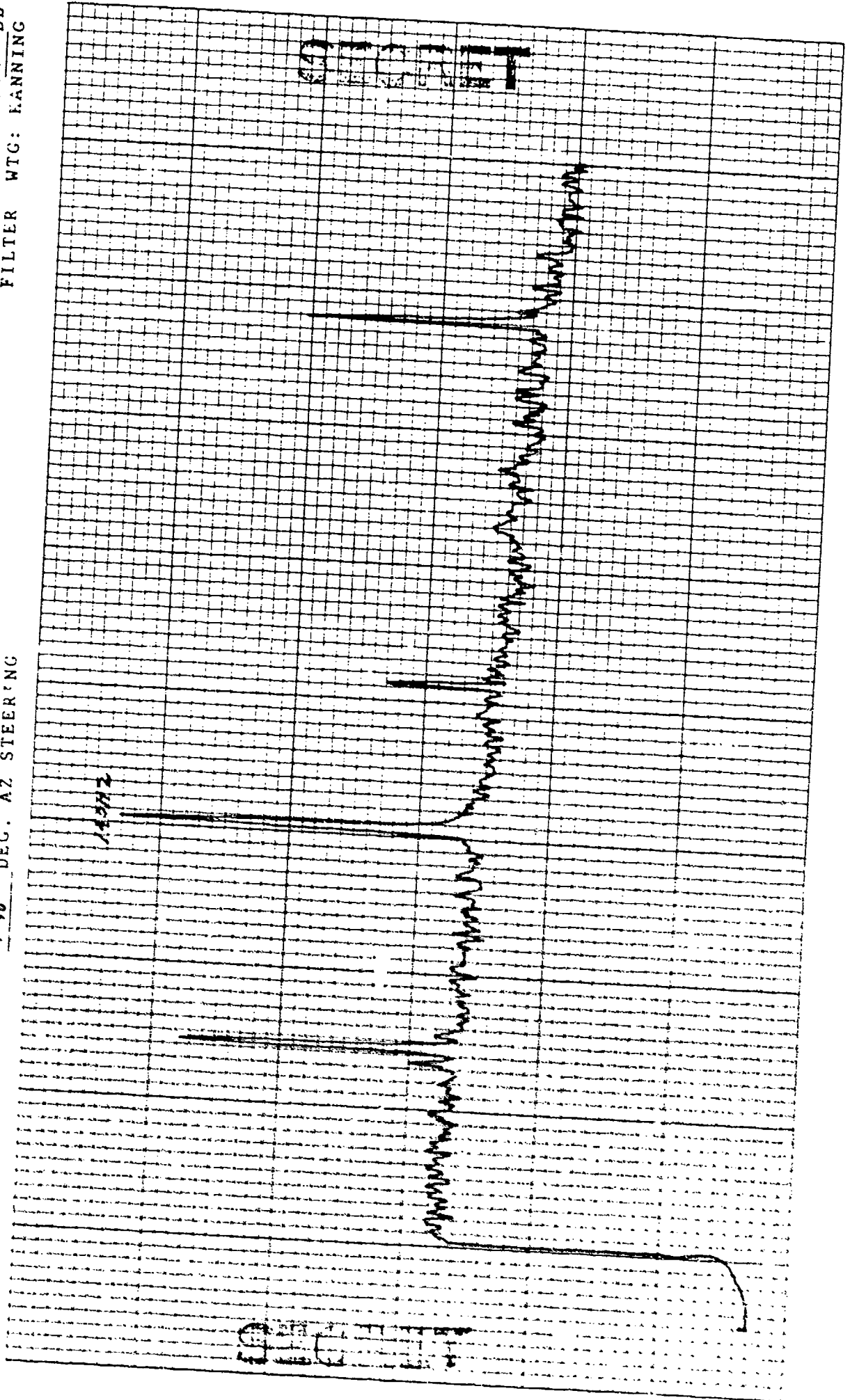
46 0703

CONTROL: 2231 - 16 (009)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: REARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

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

REEL: M10 INDE X3610

INTEGRATION TIME 320 SECS
ATTEN: 72 DB
FILTER
WTG: HANNING



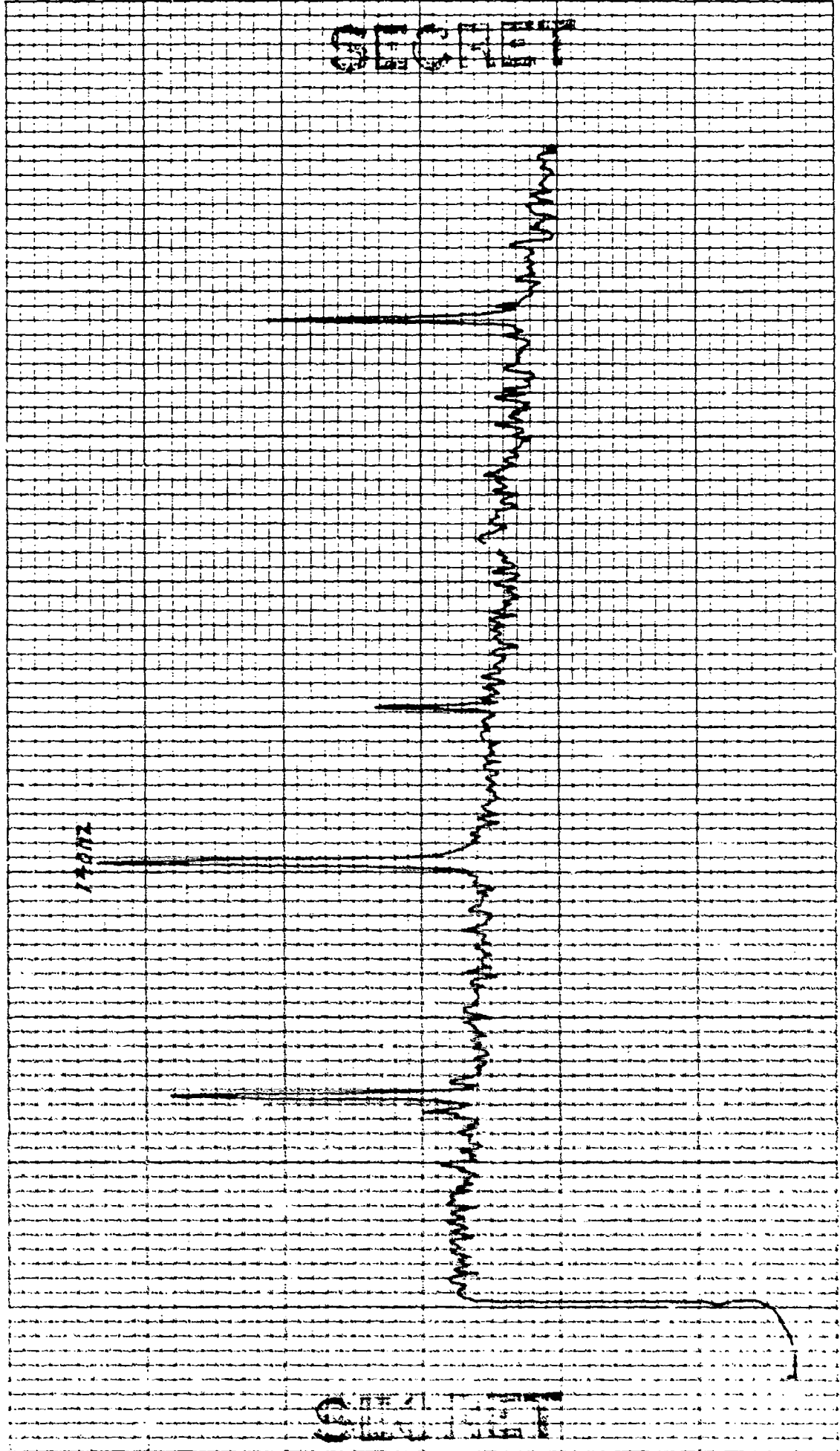
100E 10 X 10 TO THE ...
GENERAL ELECTRIC CO. MADE IN U.S.A.

46 0703

CONTROL: 2/31 - 16 (211)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

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

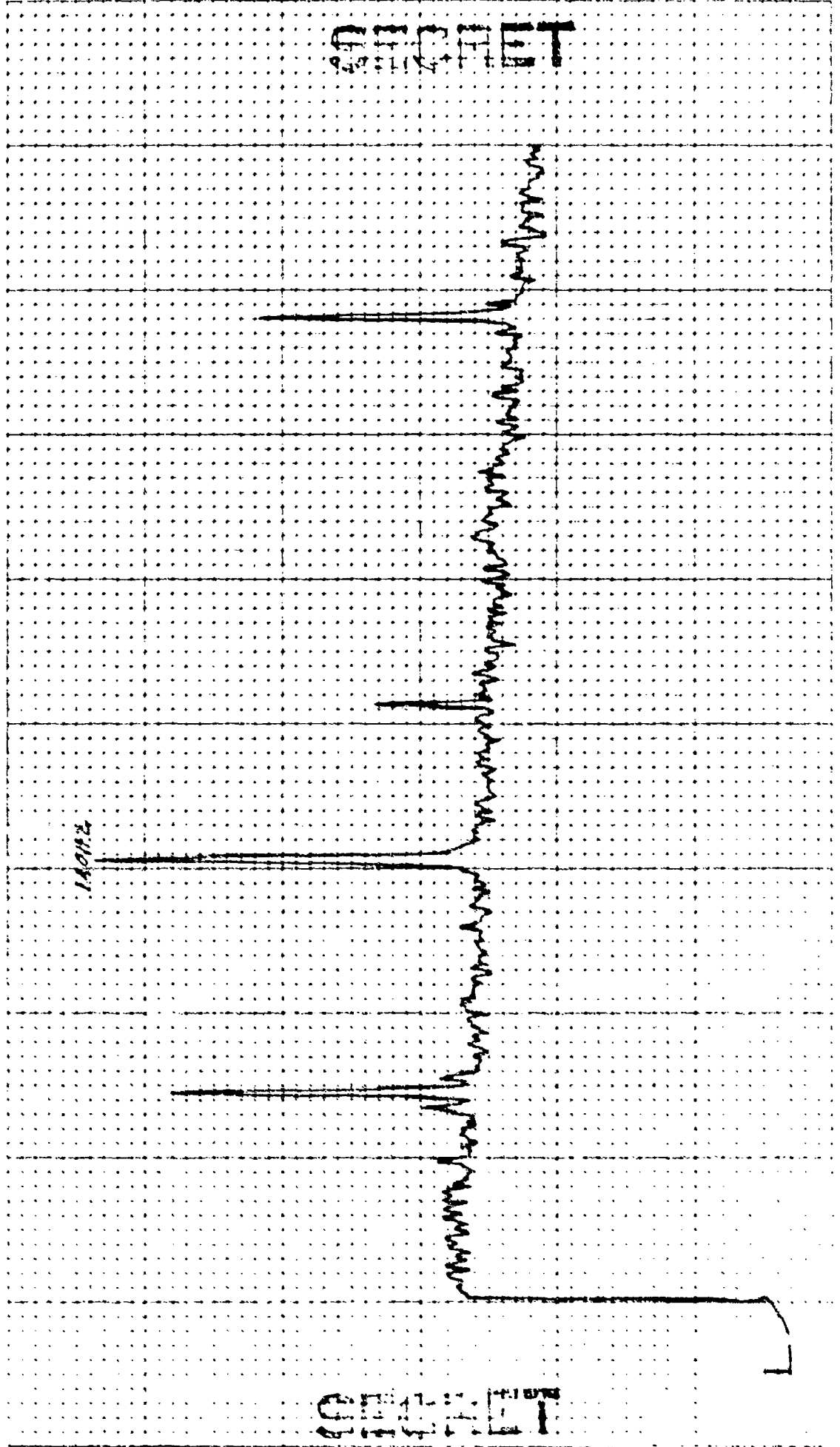
REEL: 410 INDE X360
INTEGRATION TIME 320 SECS
ATTEN: 7.5 DB
FILTER WTG: HANNING



NOE 15300 12000 10000 8000 6000 4000 2000

46 0703

CONTROL: 2131 - 16 (DB9) DATE OF ANALYSIS: PEEL: A10 INDE X3220
 BEAMFORMED SPECTRUM/ELEMENTS DATE/TIME: 3-15-77 - 2131 Z INTEGRATION TIME 320 SECS ATTEN: -72-DB
 EXERCISE: BEARING STAFF ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 CENTER FREQ: 150 HZ 4-50 DEG. AZ STEERING



160HZ

140HZ

KOE 18 JUL 50 THE DEPT. OF DEFENSE

46 0703

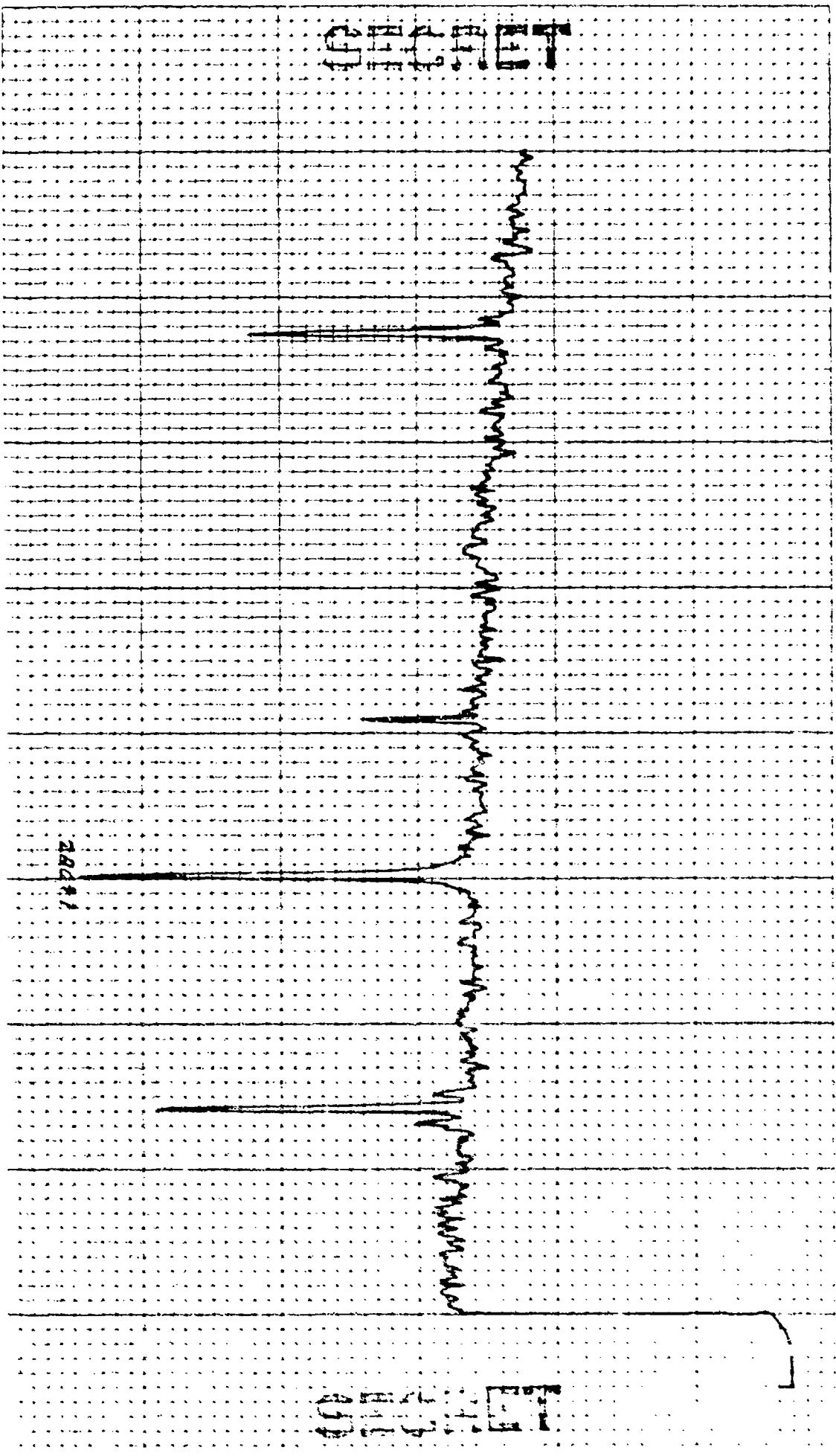
CONTROL: 2071 - 16 (088) REEL: M10 INDE X3626

BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-16

EXERCISE: BEARING: STAKE INTEGRATION TIME 320 SECS ATTN: 1/2 DB

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

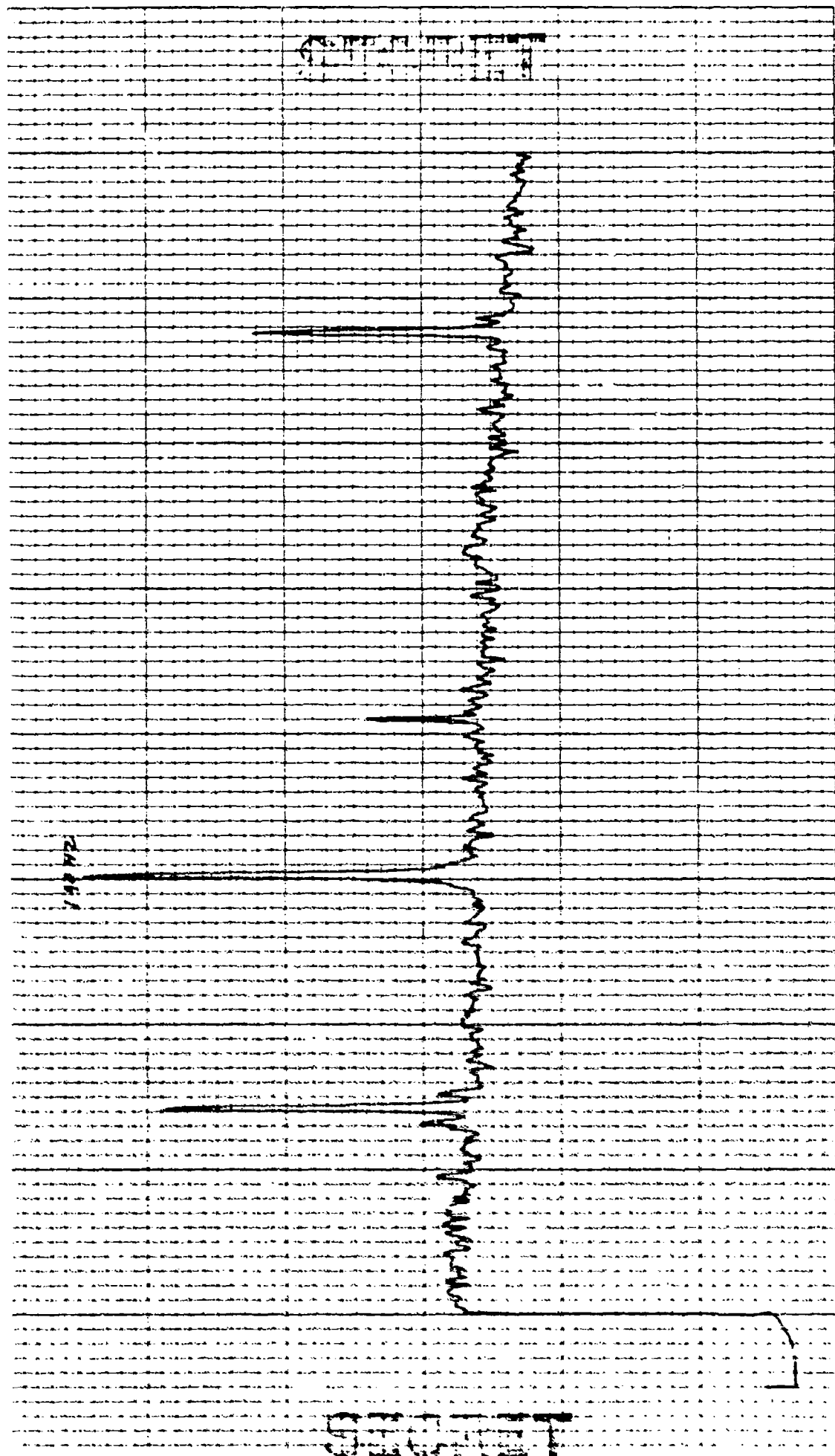
16 ELEMENTS +505 DEG. AZ STEERING



KOE 10 X 10 TO THE 10th 100 HZ 2 TO THE 10th 5
ROPER & POWER CO. MADE IN U.S.A.

46 0703

CONTROL: 2131 - 16 (DPF) REEL: 400 INDE X 200
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-76
EXERCISE: BEARING STAKE DATE/TIME: 7-15-77 - 2131 Z INTEGRATION TIME 320 SECS ATTN: 12 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTC: HANNING
16 ELEMENTS + 5/ DEG. AZ STEERING



EXERCISE

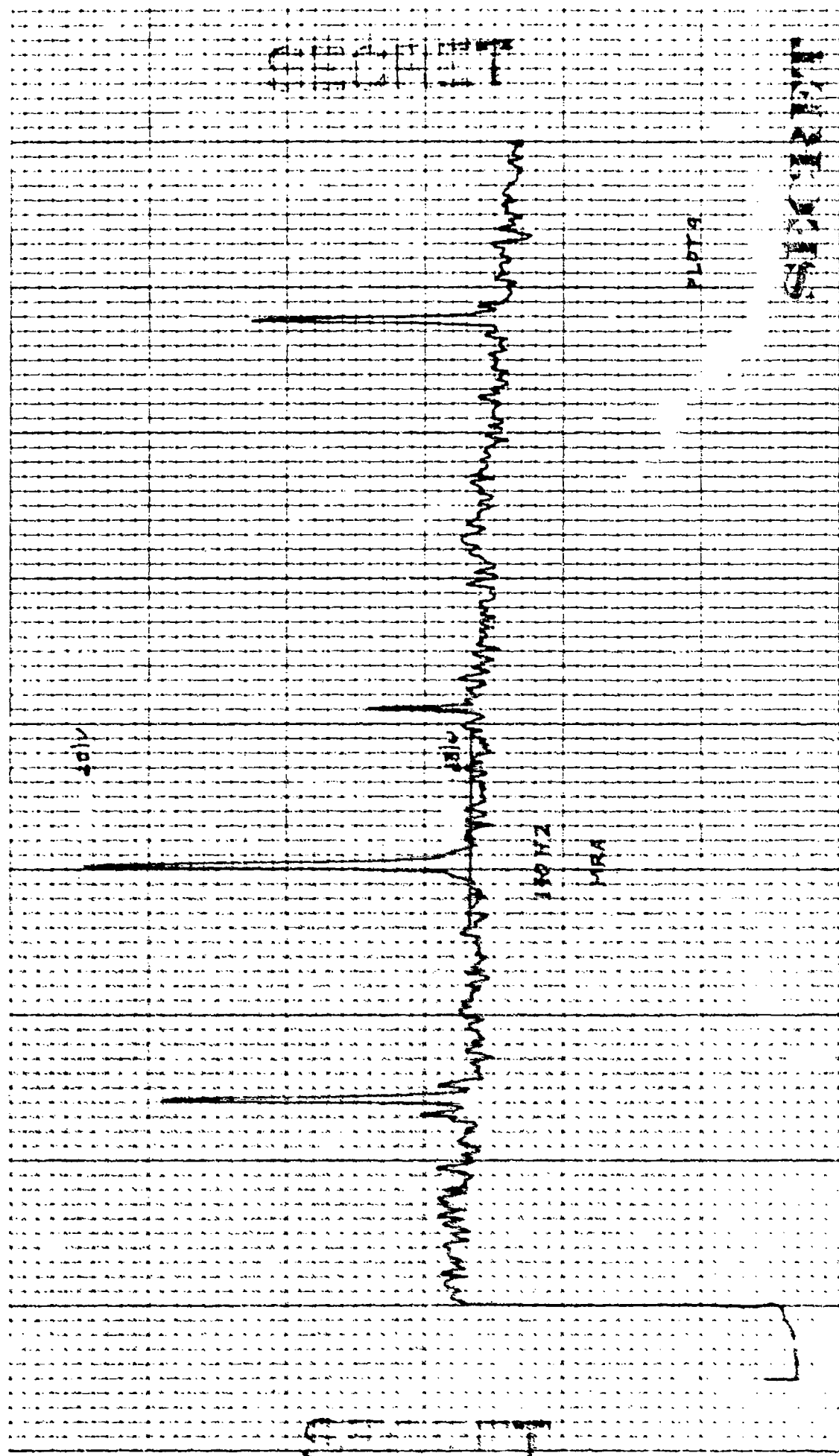
CONTROL: 211 - 51 (DP9)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BFAIRING STAKE
 CENTER FREQ: 150 HZ
 76 ELEMENTS

DATE OF ANALYSIS: _____

REEL: M10 INDE X7620

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

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



110 HZ

150 HZ

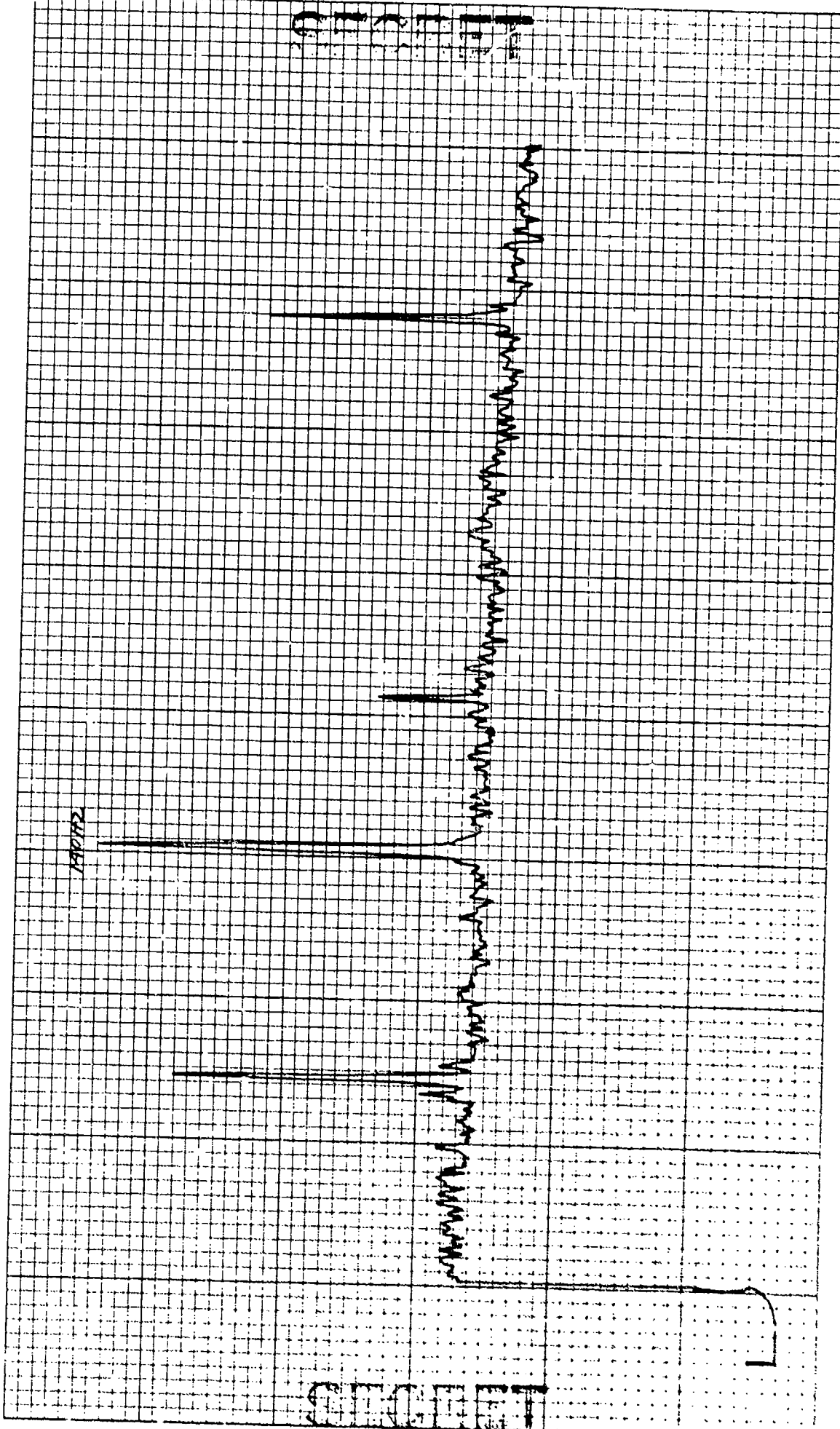
180 HZ

PLT9

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

DATE OF ANALYSIS: 1-16
DATE/TIME: 3-15-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+ 52 DEG. AZ STEERING

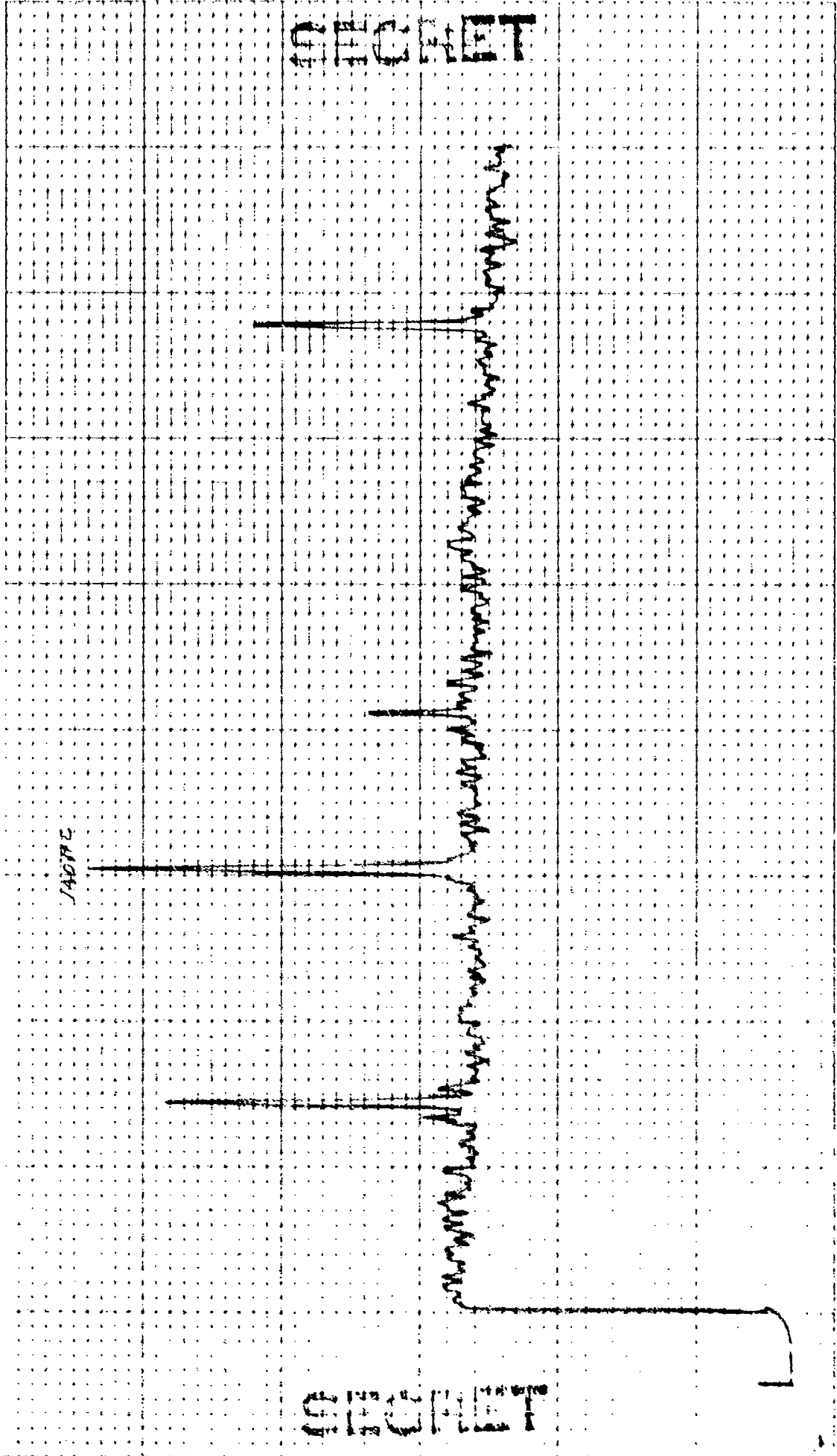
REEL: A10 INDE X3620
INTEGRATION TIME 320 SECS ATTN: 72 DB
FILTER WTG: HANNING



KOE 2/27/77 TO TIME NORMAL 6.12. 2000000000

46 0703

CONTROL: 2/27 - 16 (489) DATE OF ANALYSIS: - - - REEL: M10 INDE X320
 BEAMFORMED SPECTRUM/ELEMENTS DATE/TIME: 77-2/3/Z INTEGRATION TIME 320 SECS ATTEN: 7A DB
 EXERCISE: BEARING STAKE ANALYSIS BA WIDTH: 1710HZ FILTER WTG: HANNING
 CENTER FREQ: 150 HZ +54 DEG. AT STEERING

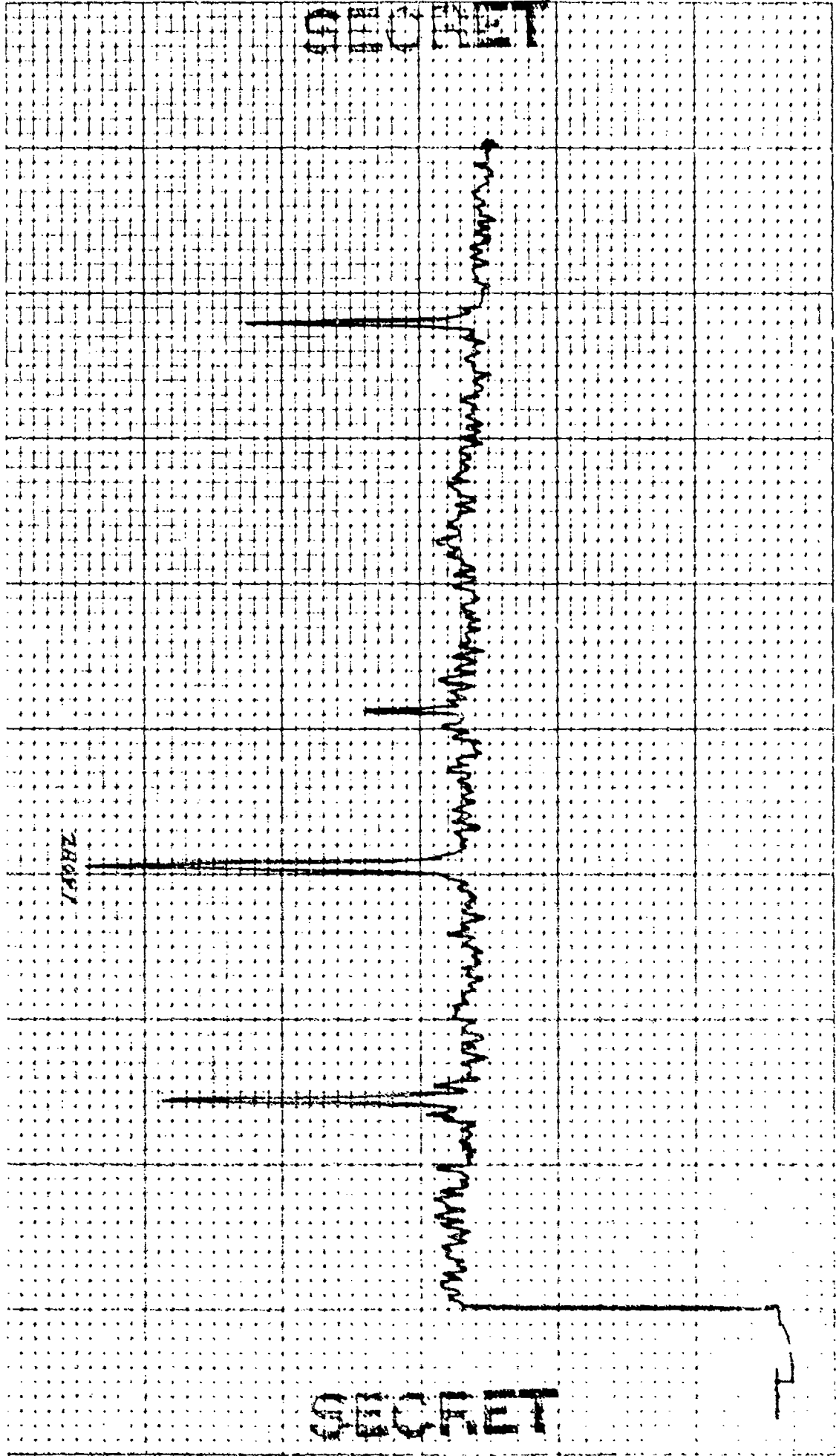


46 0703

CONTROL: 2131 - 16 (PPT)
BEAMFORMED SPECIFUM/ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: - - -
/ - /
DATE/TIME: 7-75-77 - 2131 Z
ANALYSIS BANDWIDTH: 11/10HZ
+56 DEG. AZ STEERING

REEL: M10 INDE X 2620
INTEGRATION TIME 320 SECS ATTEN: 72 DB
FILTER MTG: HANNING

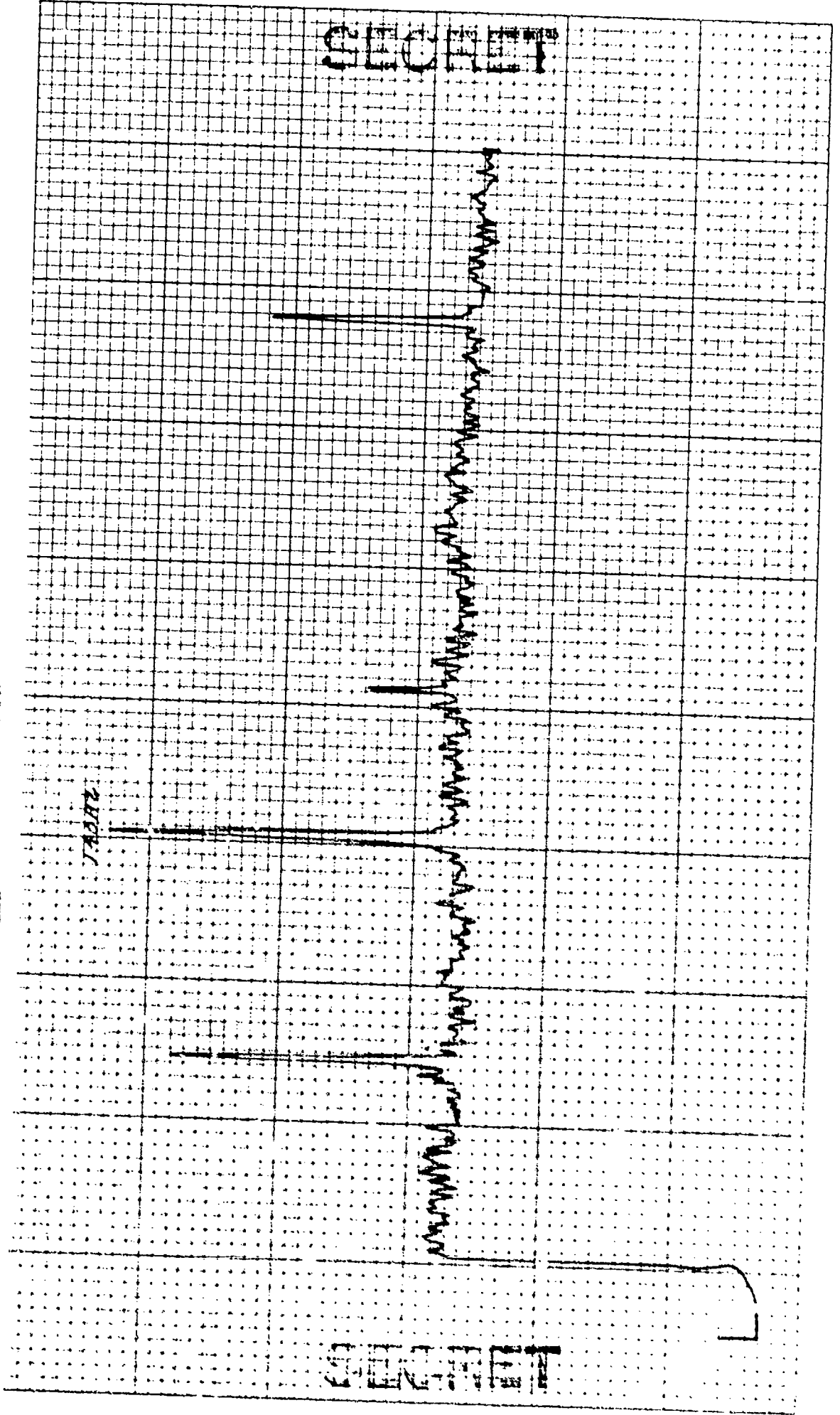


CONTROL: 2131 - 16 (DP9)
BEAMFORMED SPECTRUM ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 150 MHz
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 3-15-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/1 MHz
+50 DEG. A. STEERING

REEL: 110 INDE X3626

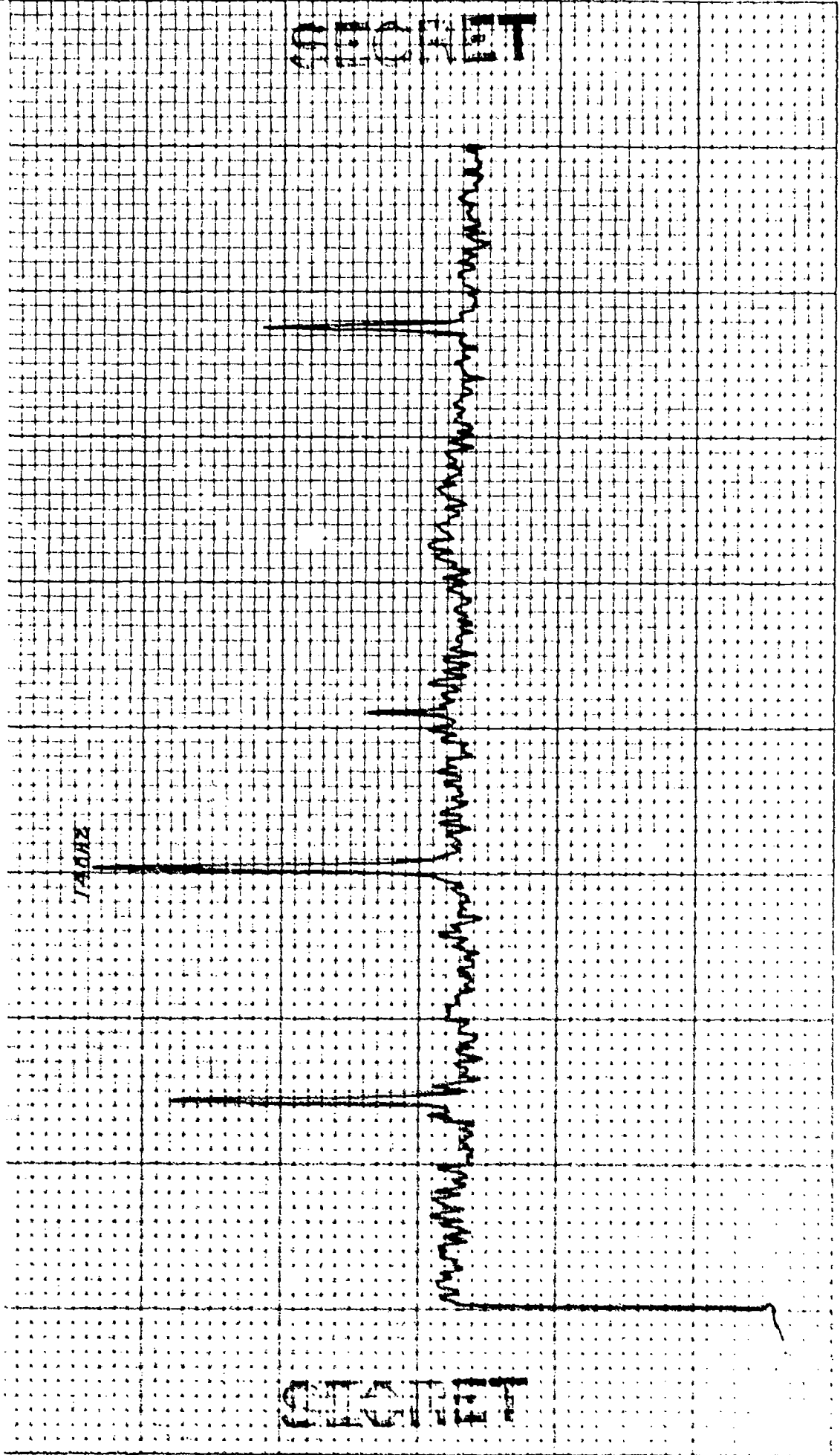
INTEGRATION TIME 320 SECS
ATTEN: 2 DB
FILTER WTG: HANNING



KOE 12.7 16 TO THE INCH... 1 1/2 INCHES
PULP & ESSENCE CO. MADE IN U.S.A.

46 0703

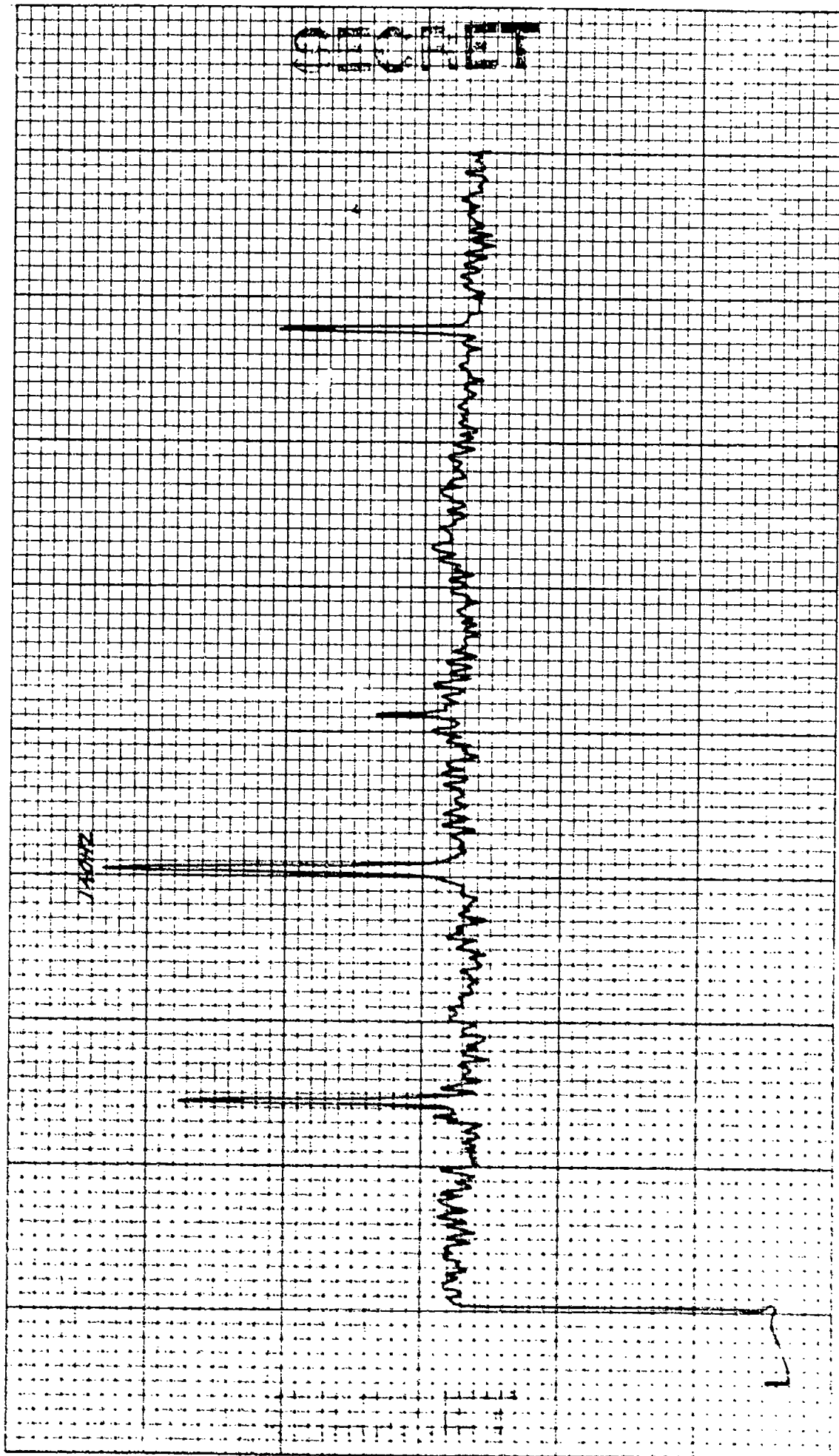
CONTROL: 2131 - 16 (209) DATE OF ANALYSIS: 1-16 REEL: 410 INDE X3620
 BEAMFORMED SPECTRUM (ELEMENTS) INTEGRATION TIME 320 SECS ATTEN: 72 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WIG: HANNING
 CENTER FREQ: 150 HZ +60 DEG. AZ STEERING



CONTROL: 2131 - 16 (DPP)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 3-15-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+62 DEG. AZ STEERING

REEL: 1910 INDE X 3626
INTEGRATION TIME 320 SECS ATTN: -12 DB
FILTER WTG: HANNING



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

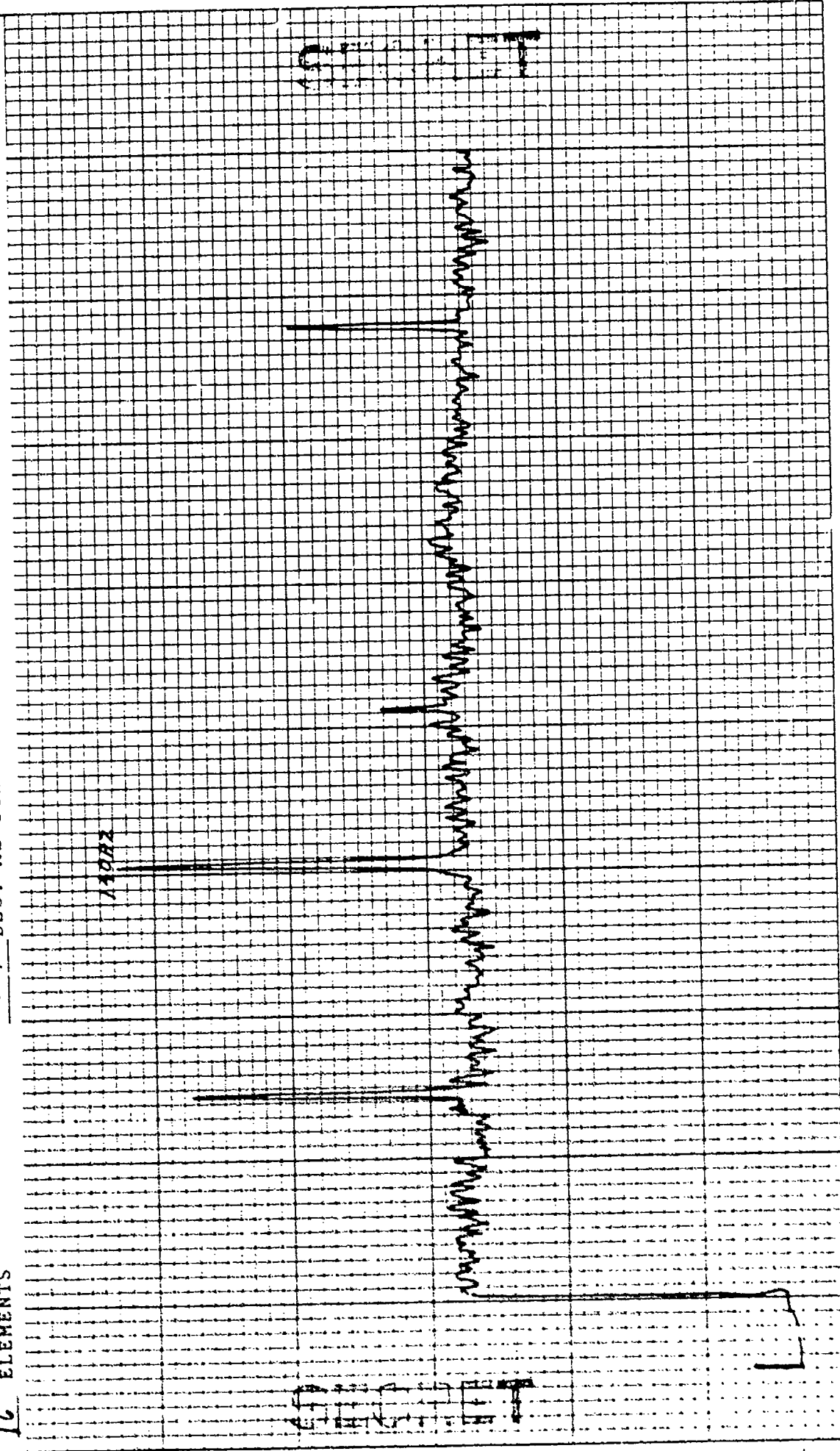
46 0703

CONTROL: 2131 - 16 (DP9)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 3-13-07-2131 Z
ANALYSIS BANDWIDTH: 1710 HZ
+24 DEG. AZ STEERING

REEL: 110 INDE X 7620

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



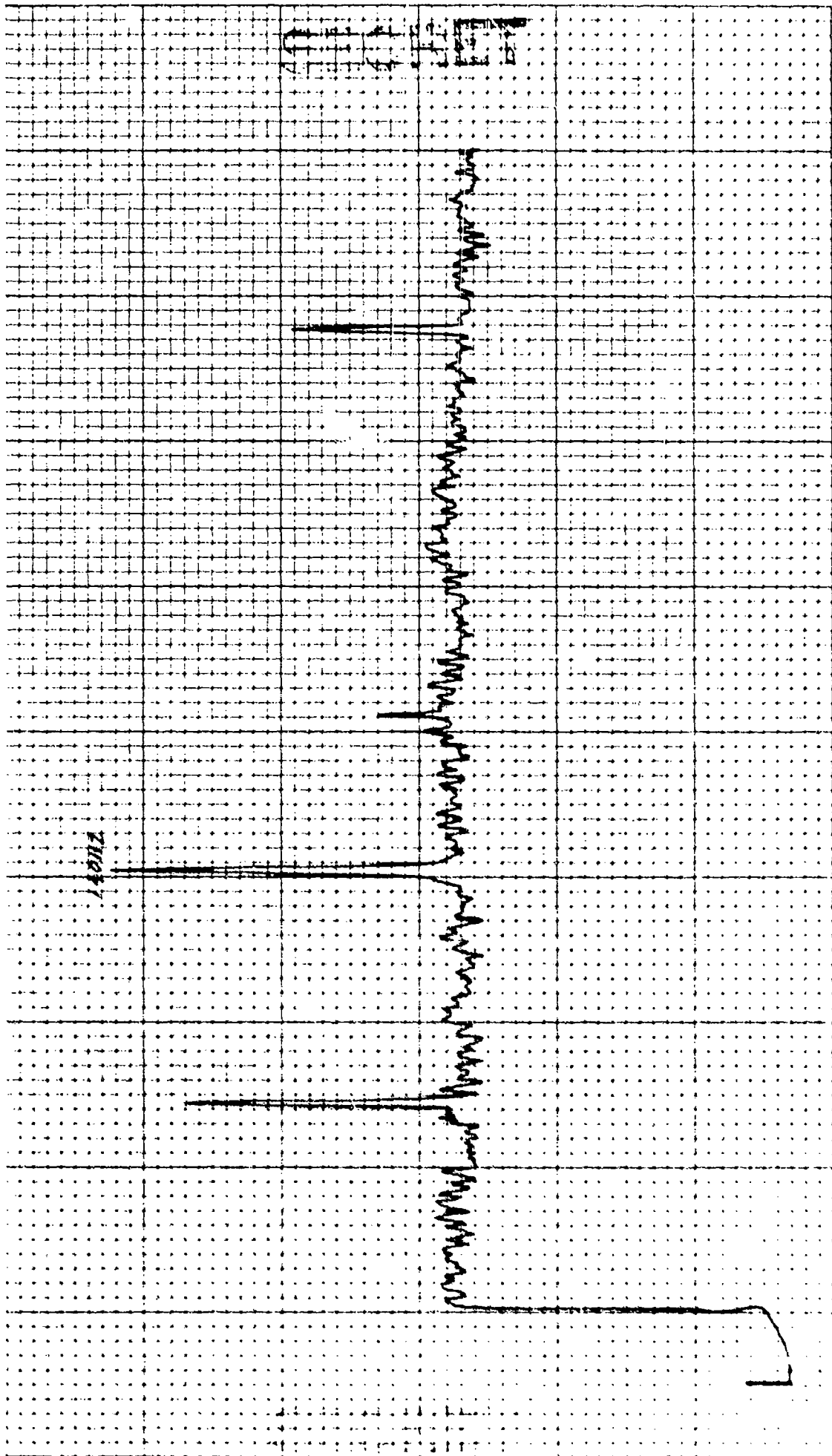
KOE 16 X 16 TO THE INCH...
PAPER & LESSER CO. (MILITARY)

46 0703

CONTROL: 2131 - 16 (DP1)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 3-25-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10HZ
+66 DEG. AZ STEERING

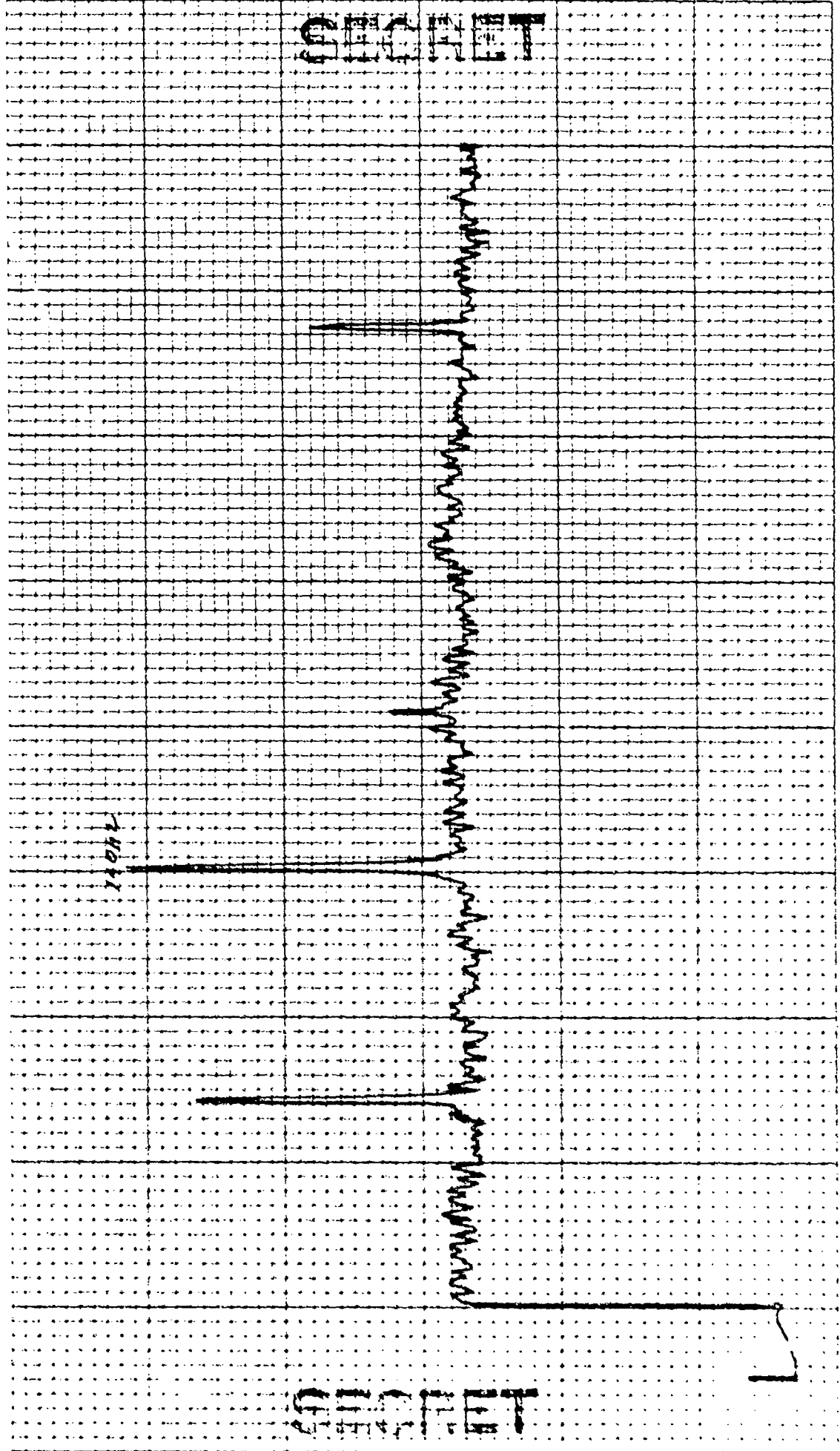
REEL: 419 INDE X 221
INTEGRATION TIME 320 SECS ATTN: -12DB
FILTER WTC: HANNING



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

46 0703

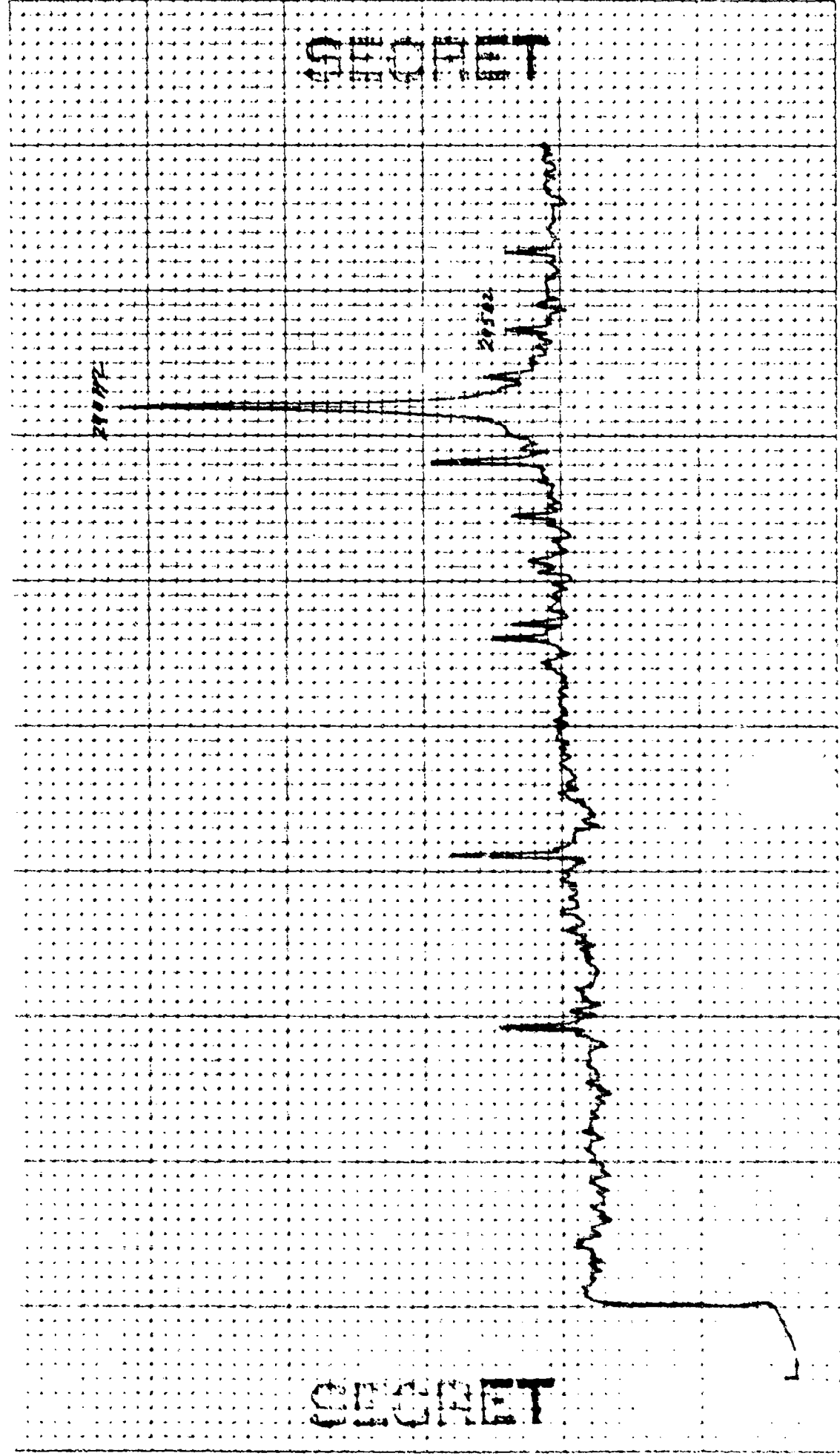
CONTROL: 2131 - 16 (DAP) DATE OF ANALYSIS: 1-16 REEL: A10 INDE X360
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-15-77 - 2131Z INTEGRATION TIME 320 SECS ATTEN: 4 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WIG: HANNING
CENTER FREQ: 150 HZ 60 DEG. AZ STEERING



46 0703

REF: [Illegible]

CONTROL: 2031 - 16 (DPP) DATE OF ANALYSIS: 1-16
 BEAMFORMED SPECTRUM(ELEMENT) INTEGRATION TIME 320 SECS ATTEN: -14 DB
 EXCEPT: BEARING STAYE FILTER WIG: HANNING
 CENTER FREQ: 070 HZ +36 DEG. AZ STEERING



SECRET

KOE 2410 TO THE DEPT. OF THE ARMY

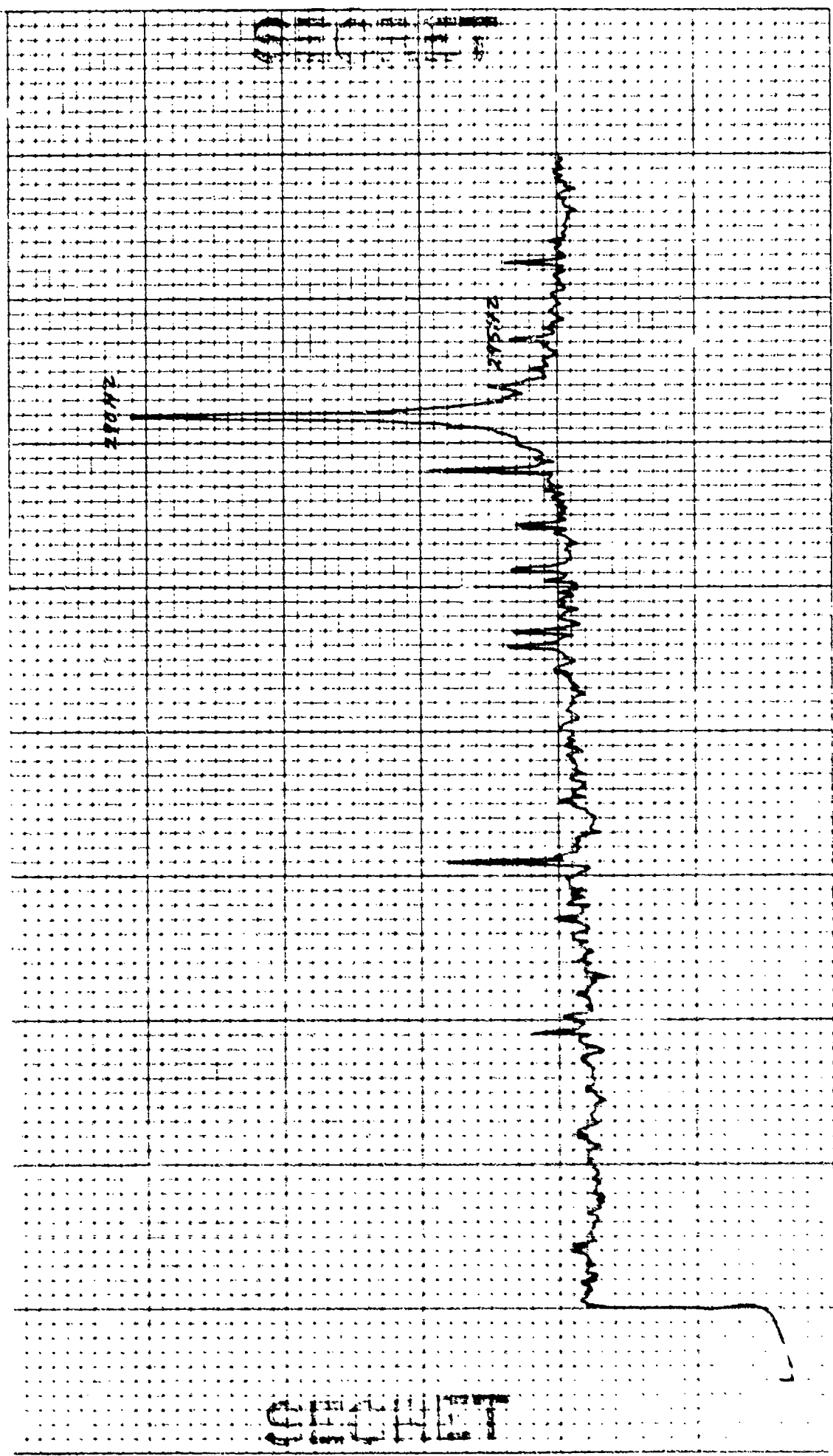
46 0703

CONTROL: 2410 - 16 (201)
 BEAMFORMED SPECTRUM ELEMENTS
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
 16 ELEMENTS

DATE OF ANALYSIS: 1-16
 DATE/TIME: 7-8-77 - 2131 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 + 30 DEG. AZ STEERING

REEL: 410
 INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

INDE X362c



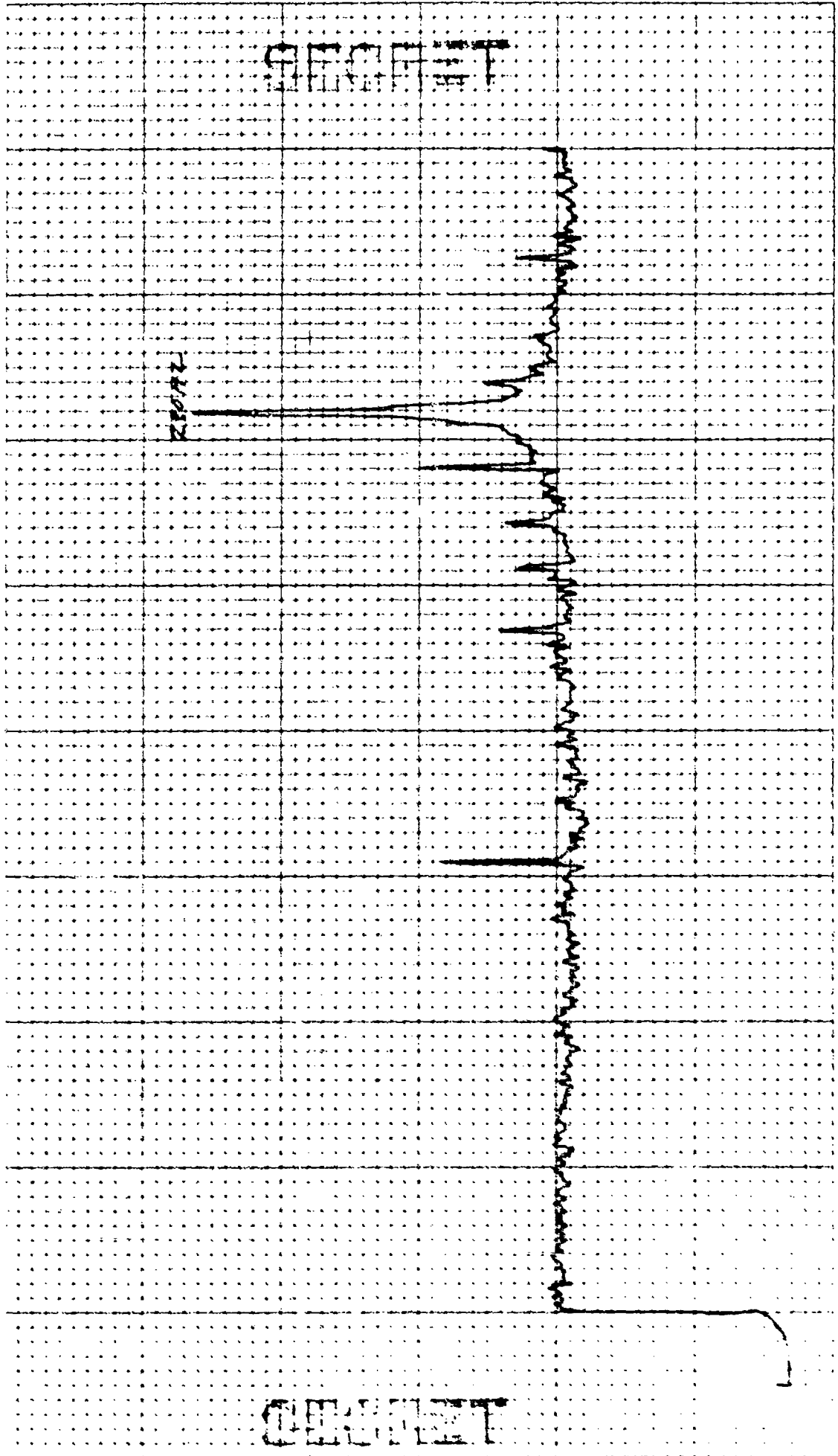
46 0703

KOE PLANS TO THE HIGHER FREQUENCIES

CONTROL: 2031 - 16 (DM)
 BEAMFORMED SPECTRUM/ELEMENTS
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
 16 ELEMENTS

DATE OF ANALYSIS: 1-76
 DATE/TIME: 3-15-77 - 131 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 +40 DEG. AZ STEERING

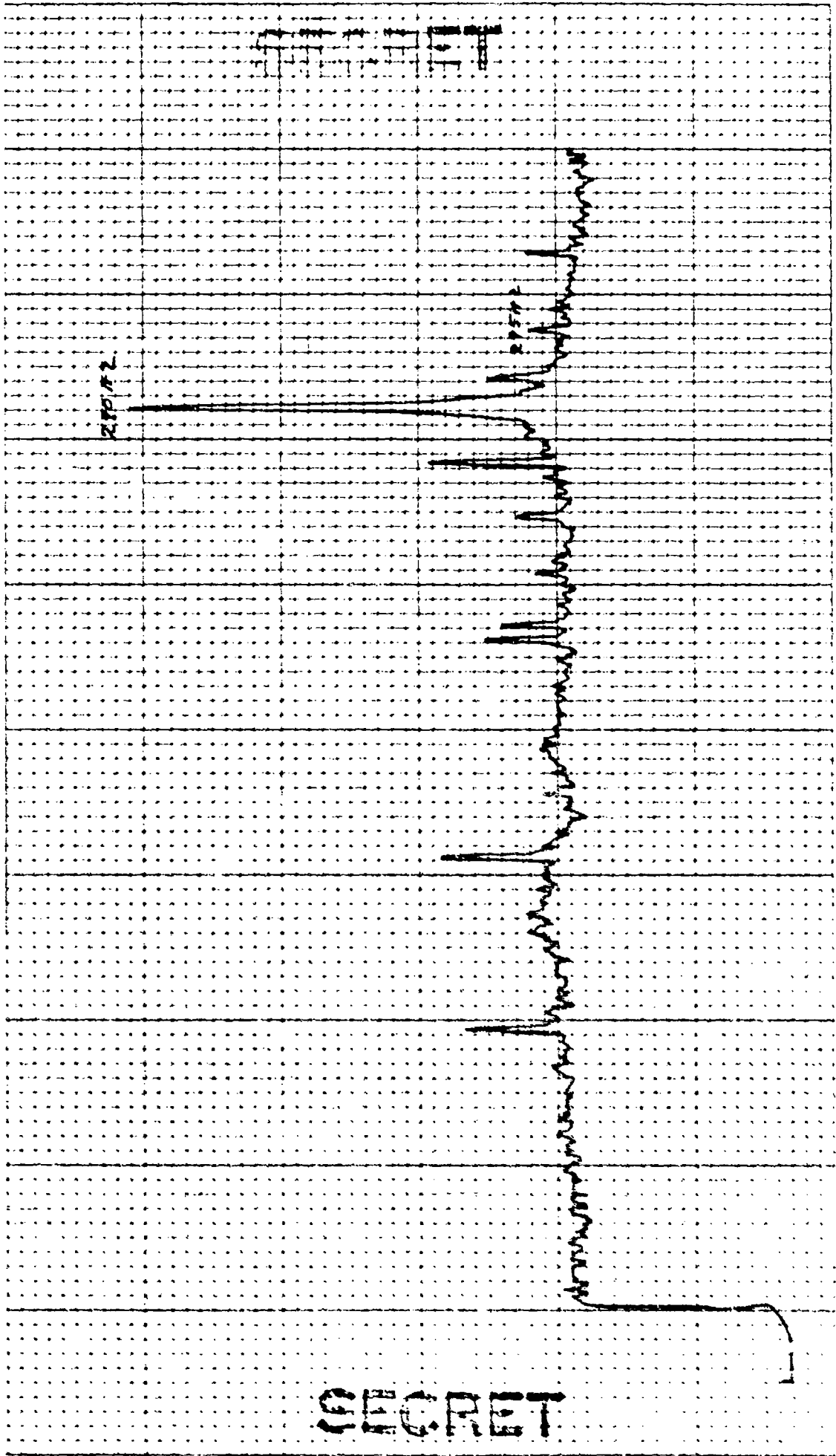
REEL: 410
 INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING
 INDE K3620
 ATTN: 72 DB



K-2 19.7 IS TO THE INCHES. 2.5 CM PER

46 0703

CONTROL: 2131 - 16 (DPI) DATE OF ANALYSIS: 1-16 REEL: M10 INDE X3680
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-15-77 - 2131 Z INTEGRATION TIME 320 SECS ATTEN: -12 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 CENTER FREQ: 270 HZ +42 DEG. AZ STEERING

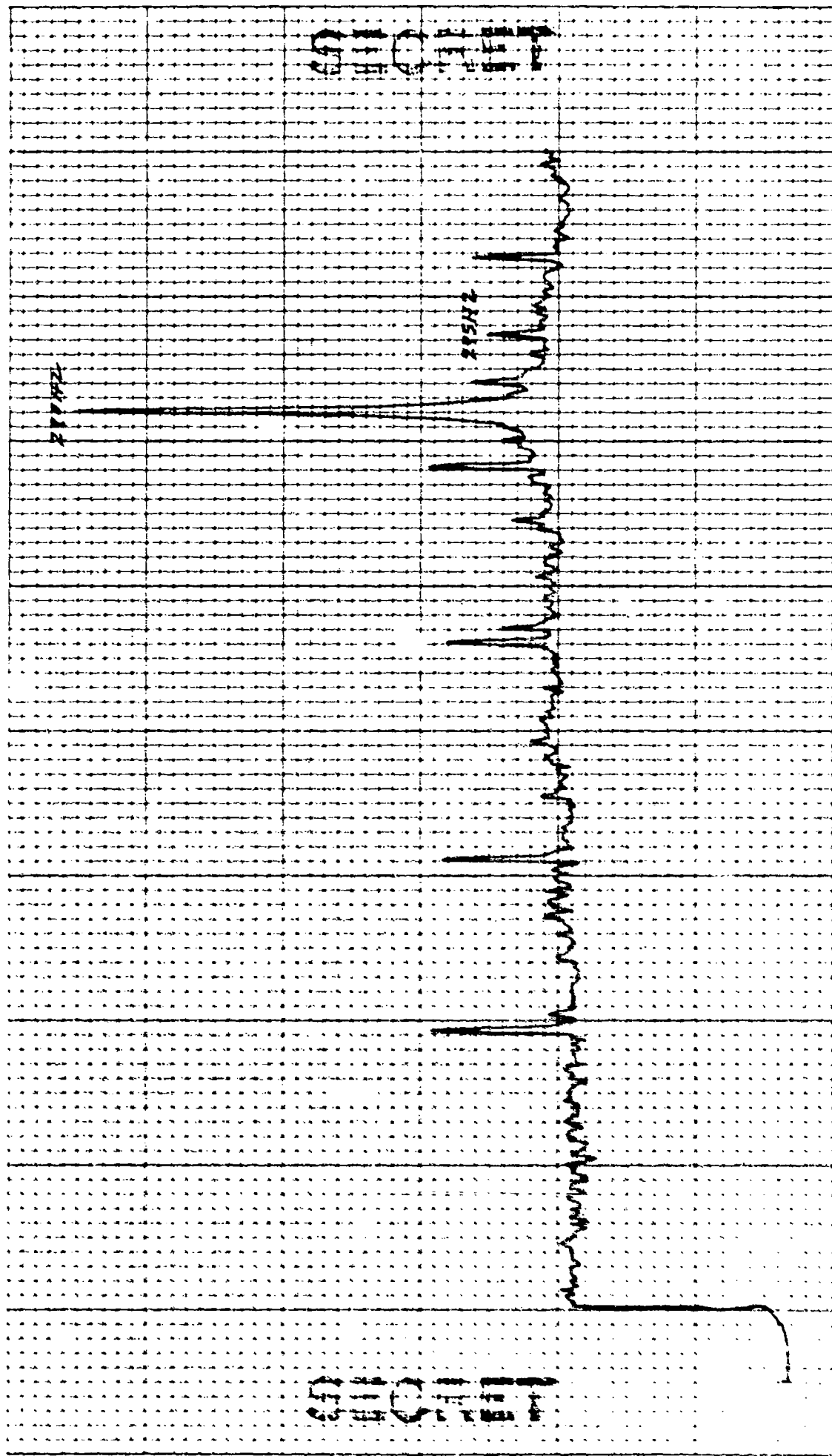


SECRET

K-E 15.418 TO 15.422 (15.420) 15.420

46 0703

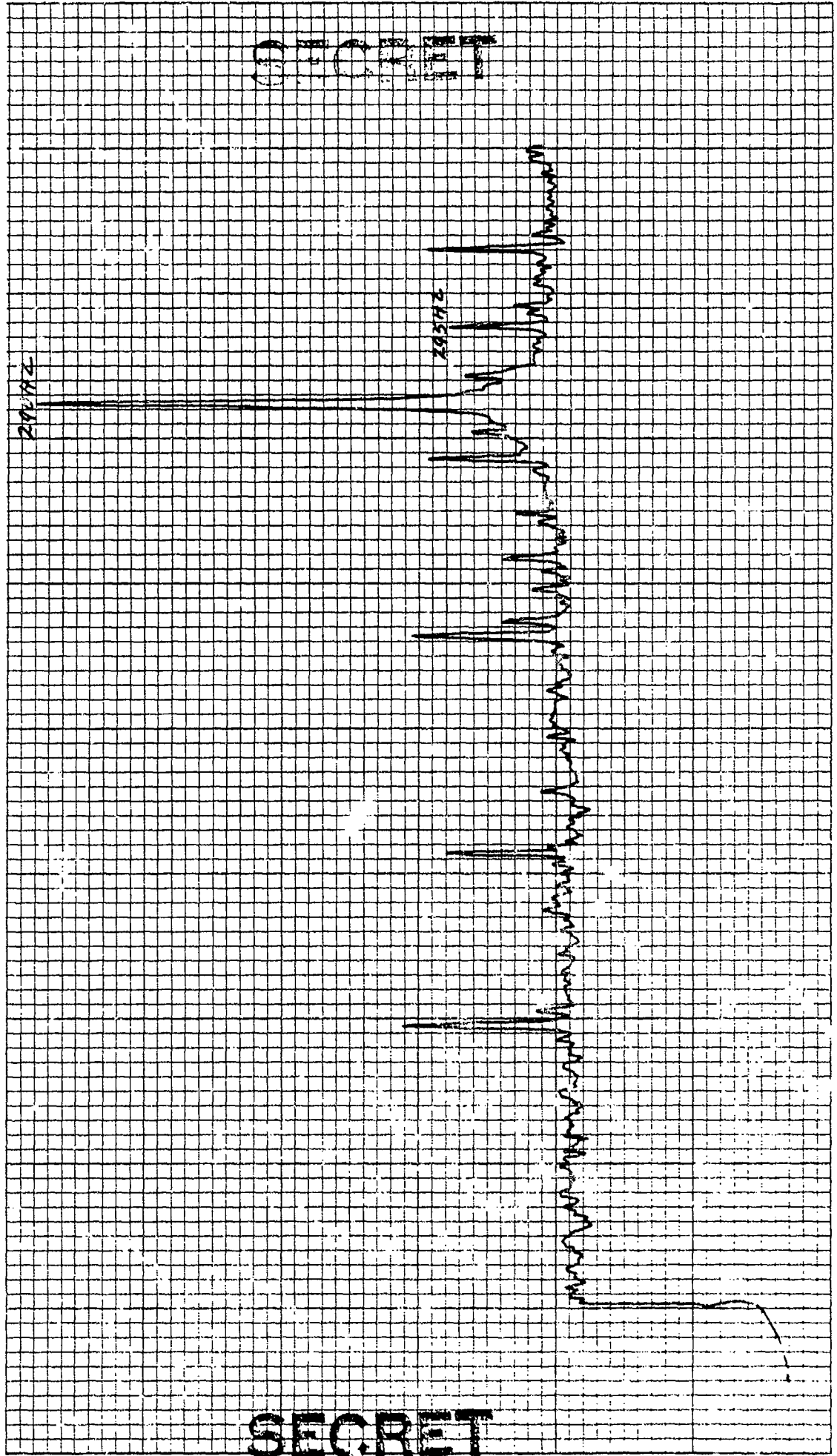
CONTROL: 2071 - 16 (DPF) DATE OF ANALYSIS: 1-16 REEL: A10 INDE X 360
 BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 7-25-77 - 203/2 INTEGRATION TIME 320 SECS ATTEN: 72 DB
 EXERCISE: BEARING STAFF ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 CENTER FREQ: 270 HZ 4-44 DEG. AZ STEERING



CONTROL: 2131 - 16 (DPP)
BEAMFORMED SPECTRUM (ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS

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

REFL: 410 INDE X 3620
INTEGRATION TIME 320 SECS ATTN: -72.DB
FILTER WTG: HANNING

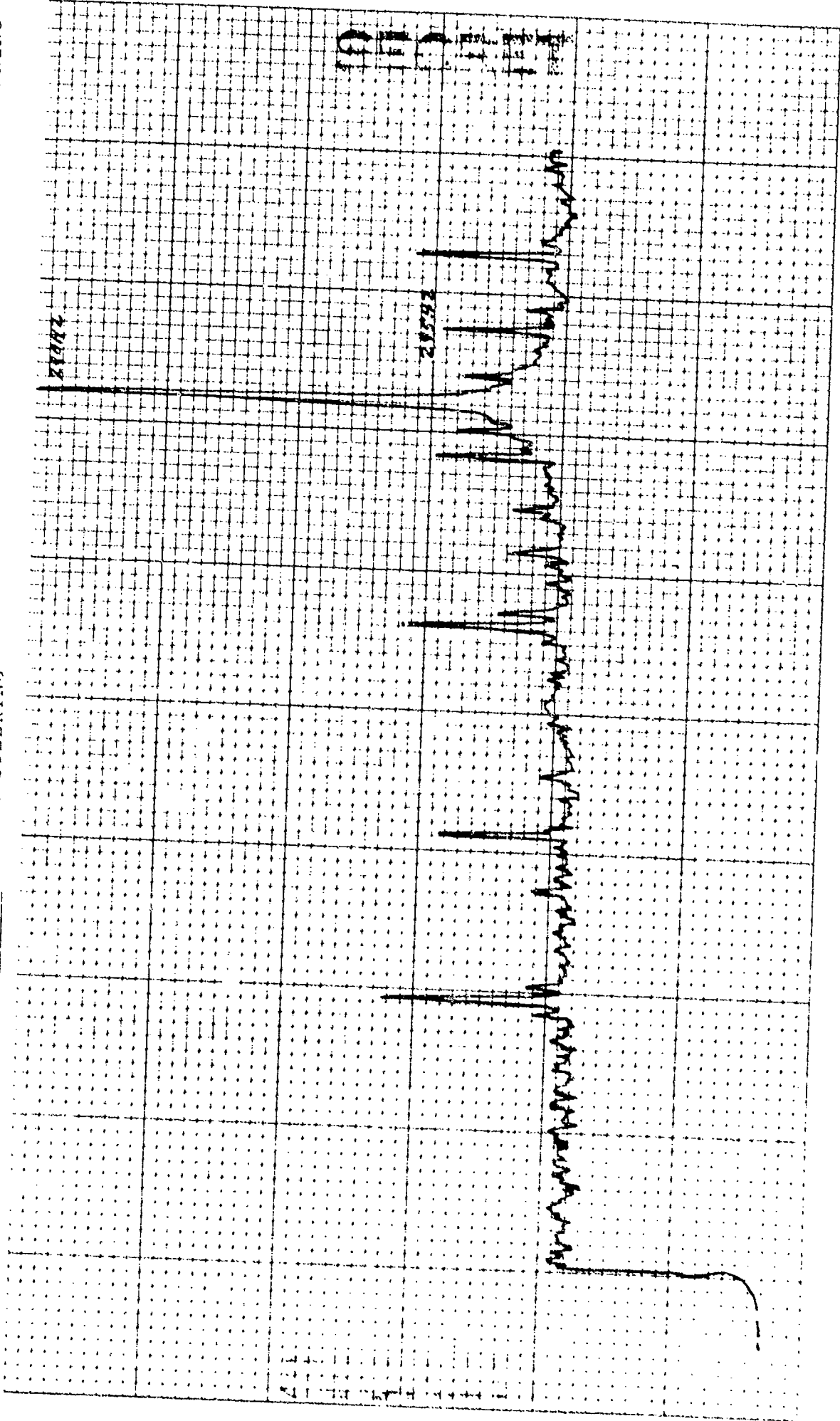


SECRET

NOE REFERENCE TO THE DOCUMENT INCHES

46 0703

CONTROL: 2031 - 16 (DPL) DATE OF ANALYSIS: 1-16 REEL: 415 INDE X3620
 BEAMFORMED SPECTRUM/ELEMENTS
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTEN: -12 DB
16 ELEMENTS 440 DEG. AZ STEERING FILTER WTC: HANNING



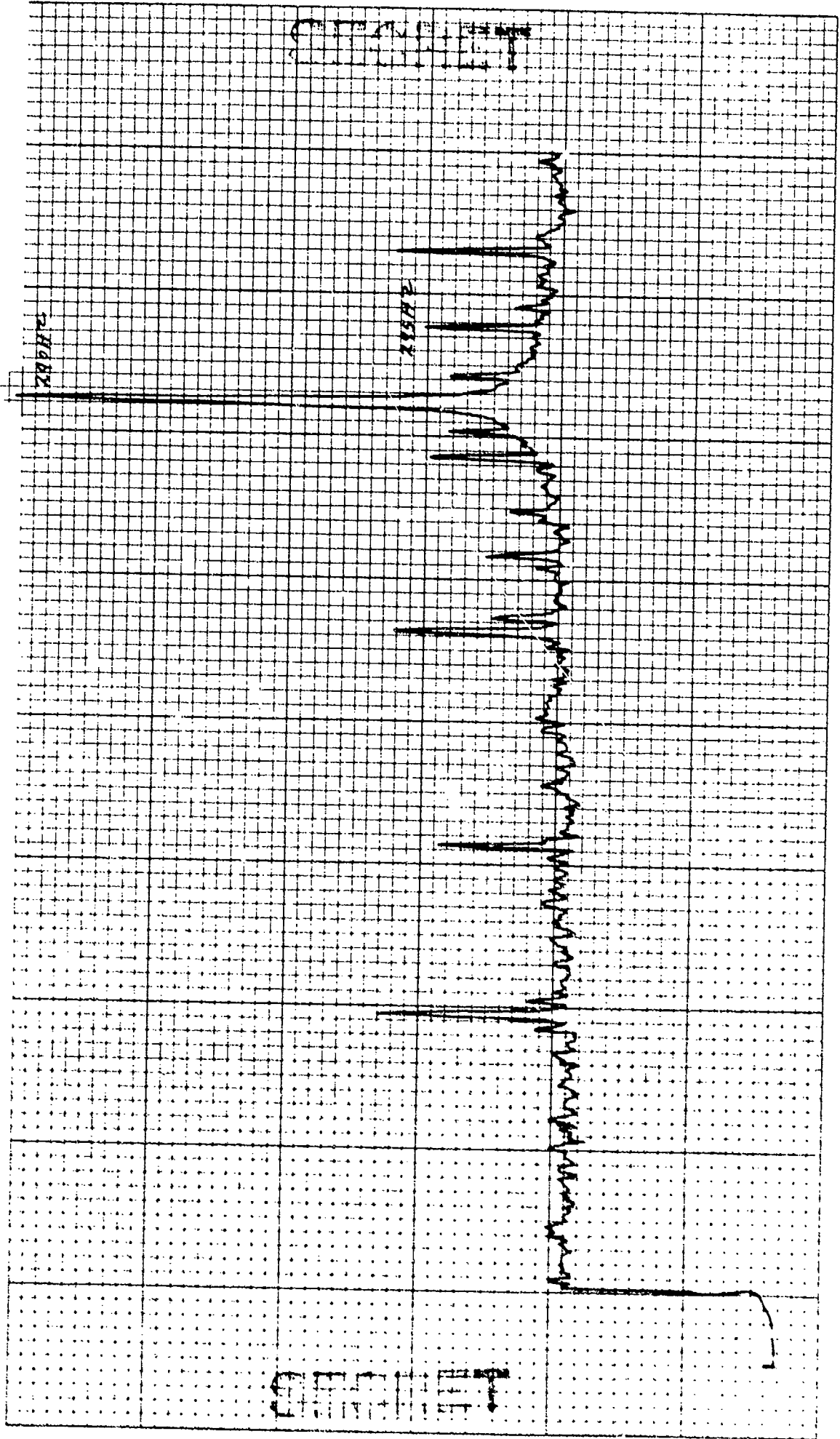
K₀E 10 X 10 TO THE INCH • X 10 INCHES
PEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

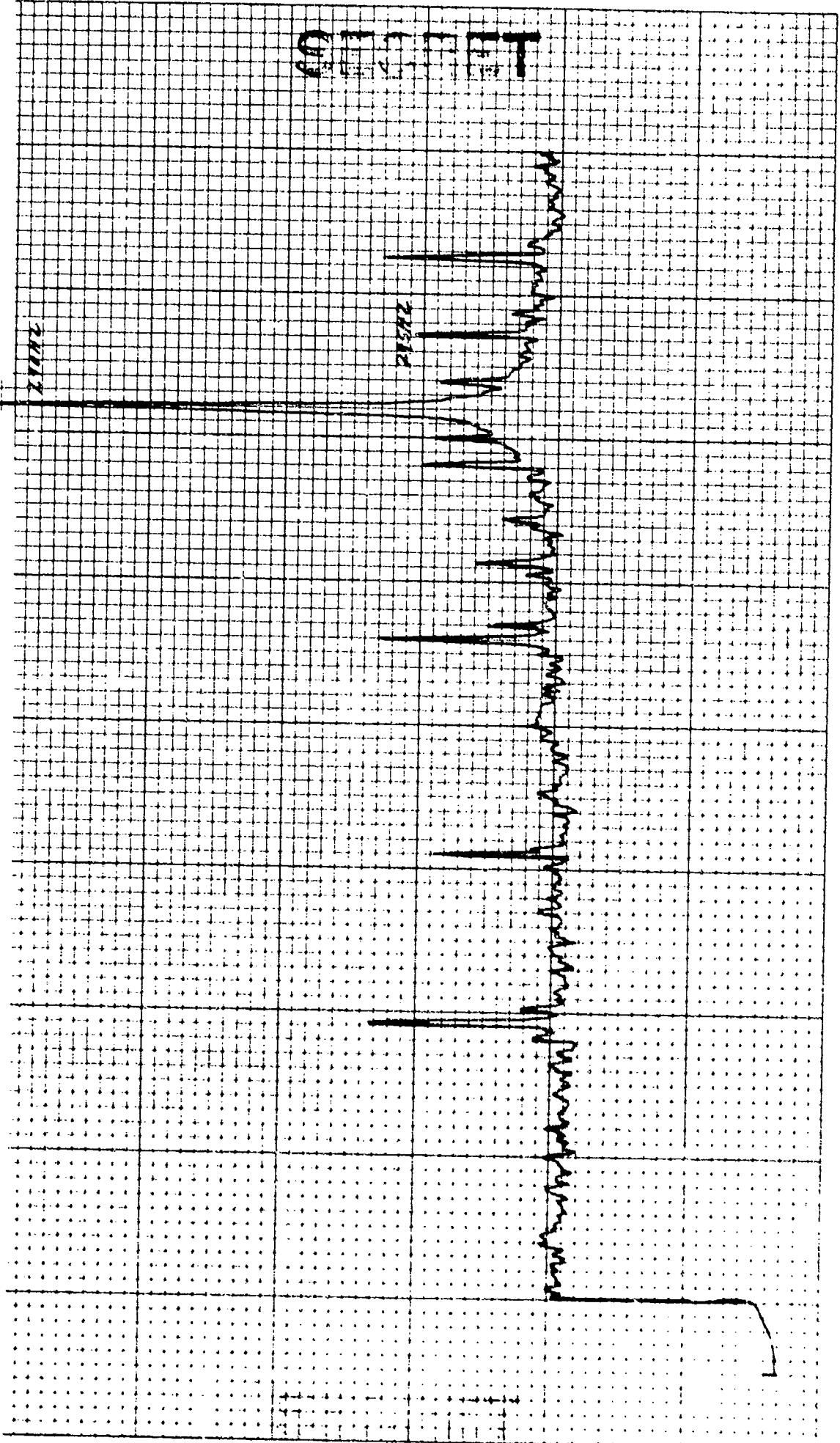
CONTROL: 2131 - 16 (DP9)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16)
DATE/TIME: 3-25-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 50 DEG. AZ STEERING

REEL: A10 INDE XJ620
INTEGRATION TIME 320 SECS ATTEN: 72 DB
FILTER WTC: HANNING



CONTROL: 2131 - 16 (DP9) DATE OF ANALYSIS: 1-16 REEL: 410 INDE XJ620
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-15-77 - 2131Z INTEGRATION TIME 320 SECS ATTEN: -12 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WIG: HANNING
CENTER FREQ: 270 HZ + 50.5 DEG. AZ STEERING

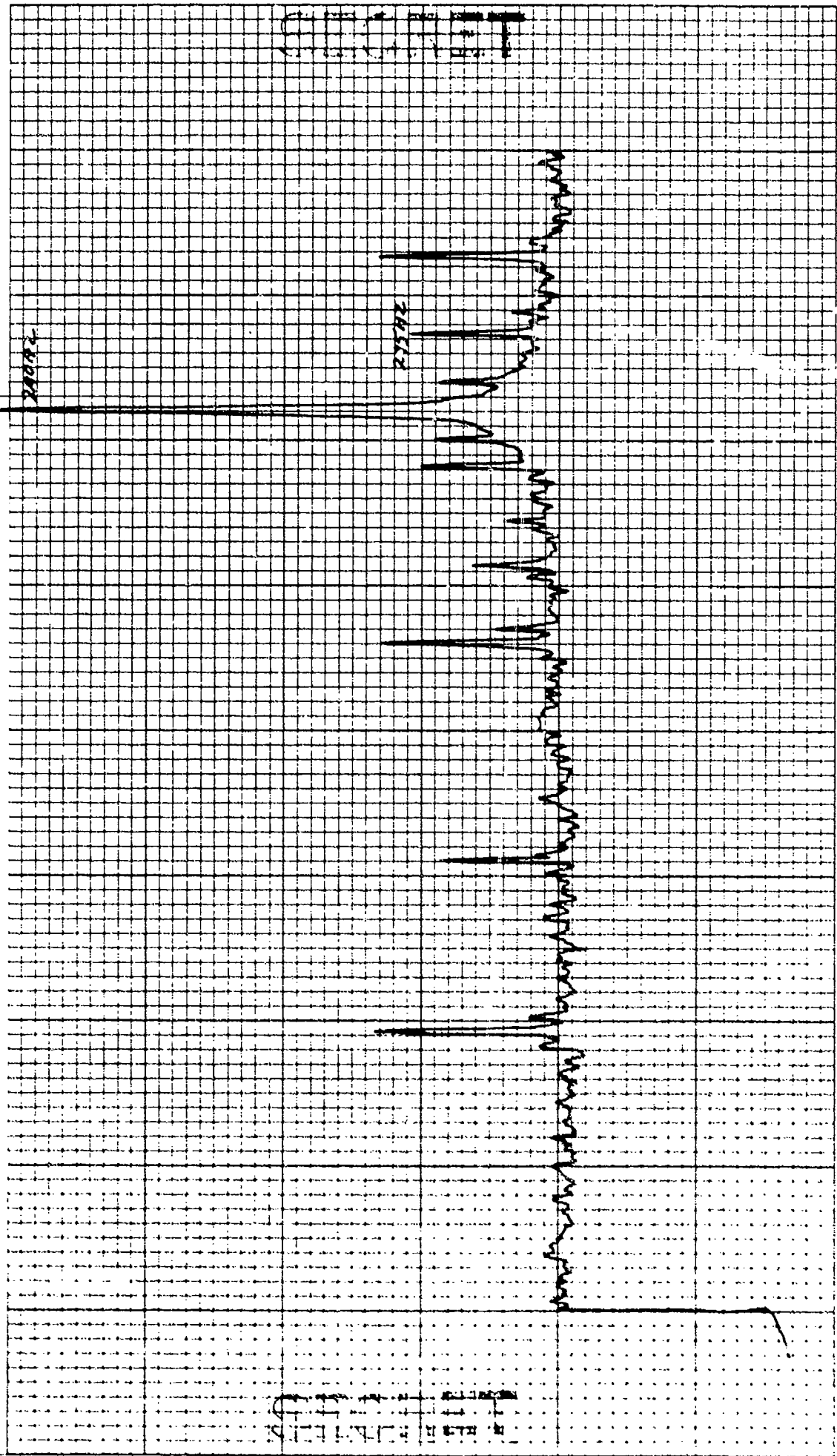


LEAD

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

46 0703

CONTROL: 2131 - 16 (DP9) DATE OF ANALYSIS: 1-16 REEL: M10 INDE X 3620
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 201 Z INTEGRATION TIME 320 SECS ATTEN: -7.2 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTC WTG: HANNING
16 ELEMENTS + 51 DEG. AZ STEERING



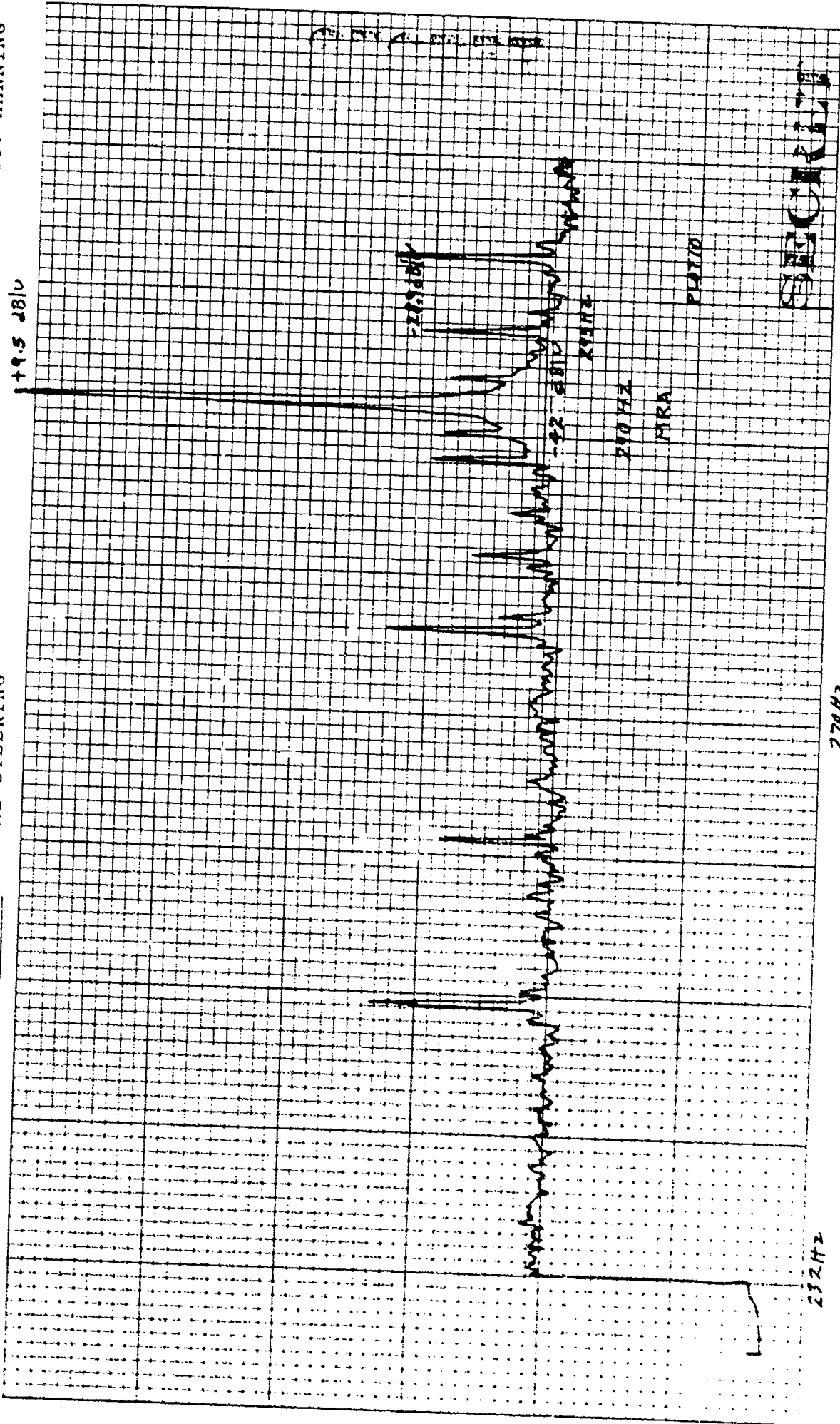
KOE 10 X 10 TO THE INCH 7 X 10 INCHES
HEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

SECRET

CONTROL: 2131 - 51 (2131)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS
DATE OF ANALYSIS: / 70 / 10
DATE/TIME: 7-15-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+51.5 DEG. AZ STEERING

REEL: M10 INDE X3670
INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTC: HANNING



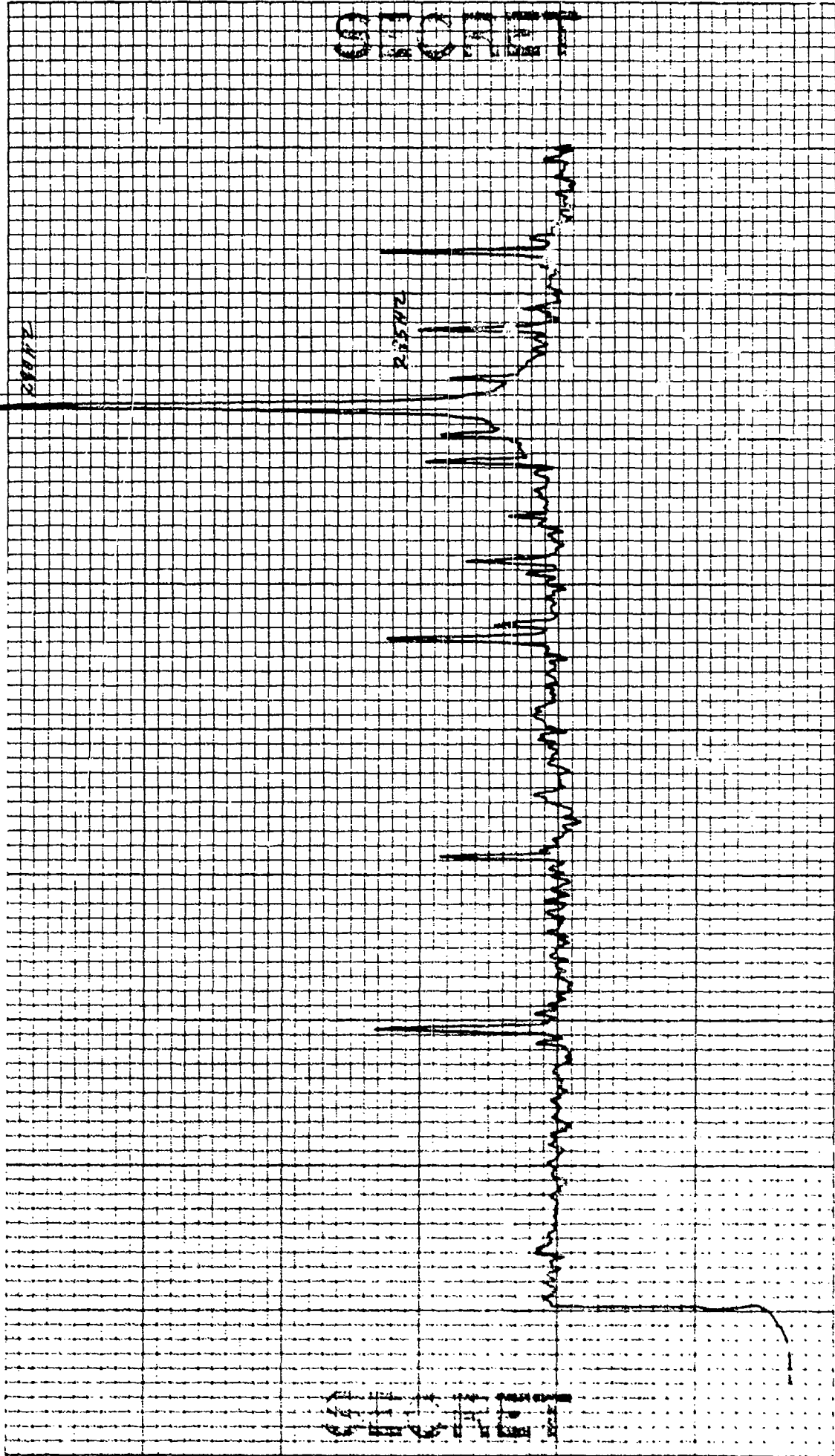
SECRET

JOHN

270 HZ

270 HZ

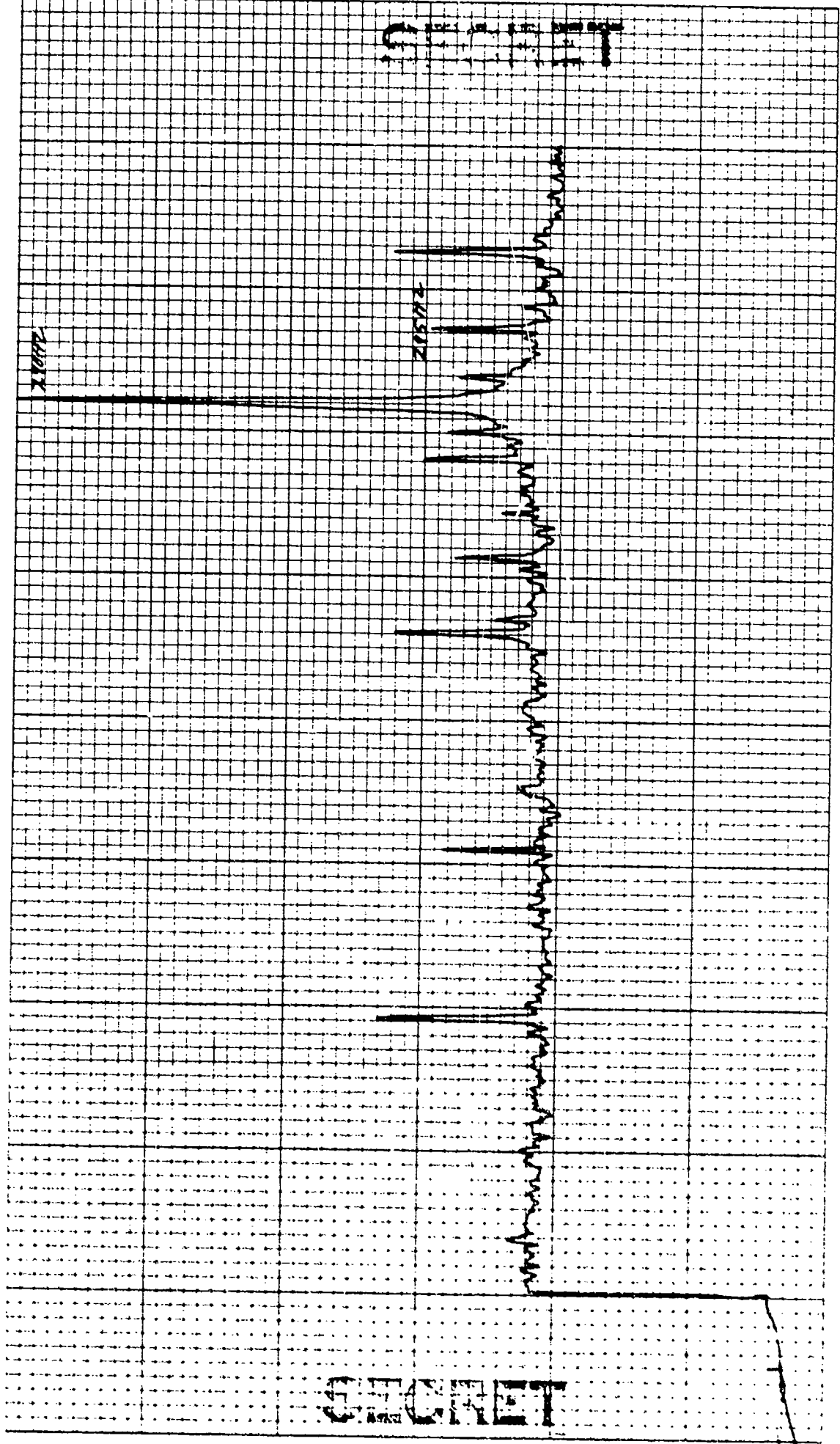
CONTROL: 2131 - 16 (DPI) DATE OF ANALYSIS: 1-16 REEL: A10 INDE X 3620
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 2131 Z INTEGRATION TIME 320 SECS ATTEN: -12 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
16 ELEMENTS +52 DEG. AZ STEERING



CONTROL: 2/31 - 16 (289)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16)
DATE/TIME: 345-77 - 2/3/ Z
ANALYSIS BANDWIDTH: 1/10 HZ
+ 54 DEG. AZ STEERING

REEL: 110 INDE X 360
INTEGRATION TIME 320 SECS ATTN: -12 DB
FILTER WTG: HANNING



KOE REPORT TO THE DIRECTOR, 1977-01-16

46 0703

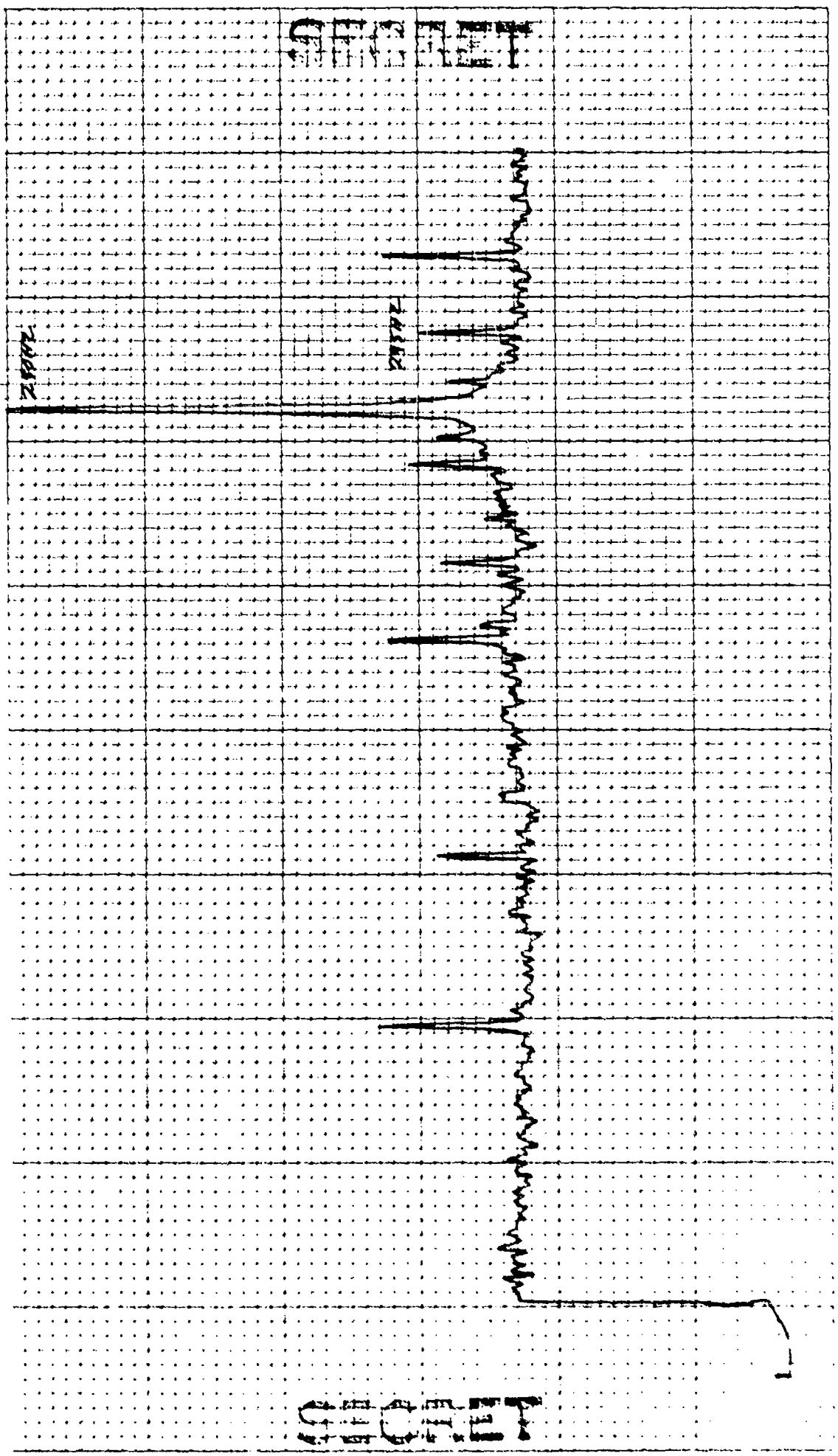
CONTROL: 0131 - 16 (001) DATE OF ANALYSIS: 1-16 REEL: 410 INDE X3620

BEAMFORMED SPECTRUM (ELEMENTS))

EXERCISE: BEARING STAFF DATE/TIME: 346-77-0131Z INTEGRATION TIME 320 SECS ATTEN: -12 DB

CENTER FREQ: 070 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING

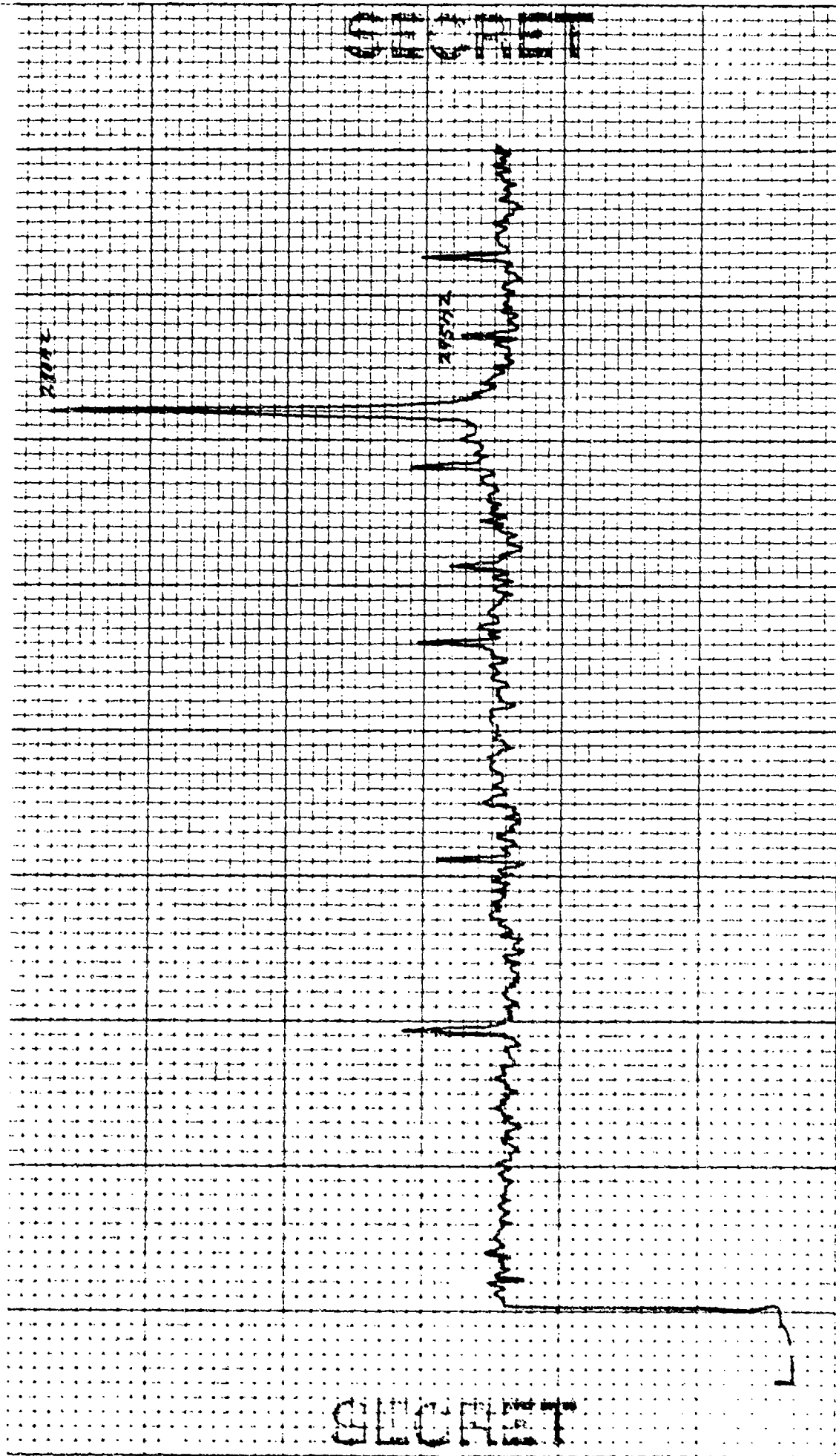
16 ELEMENTS +56 DEG. AZ STEERING



KOE 10.2 IS TO THE INCHES 2.5 INCHES
16 APRIL 1964 00 00000000

46 0703

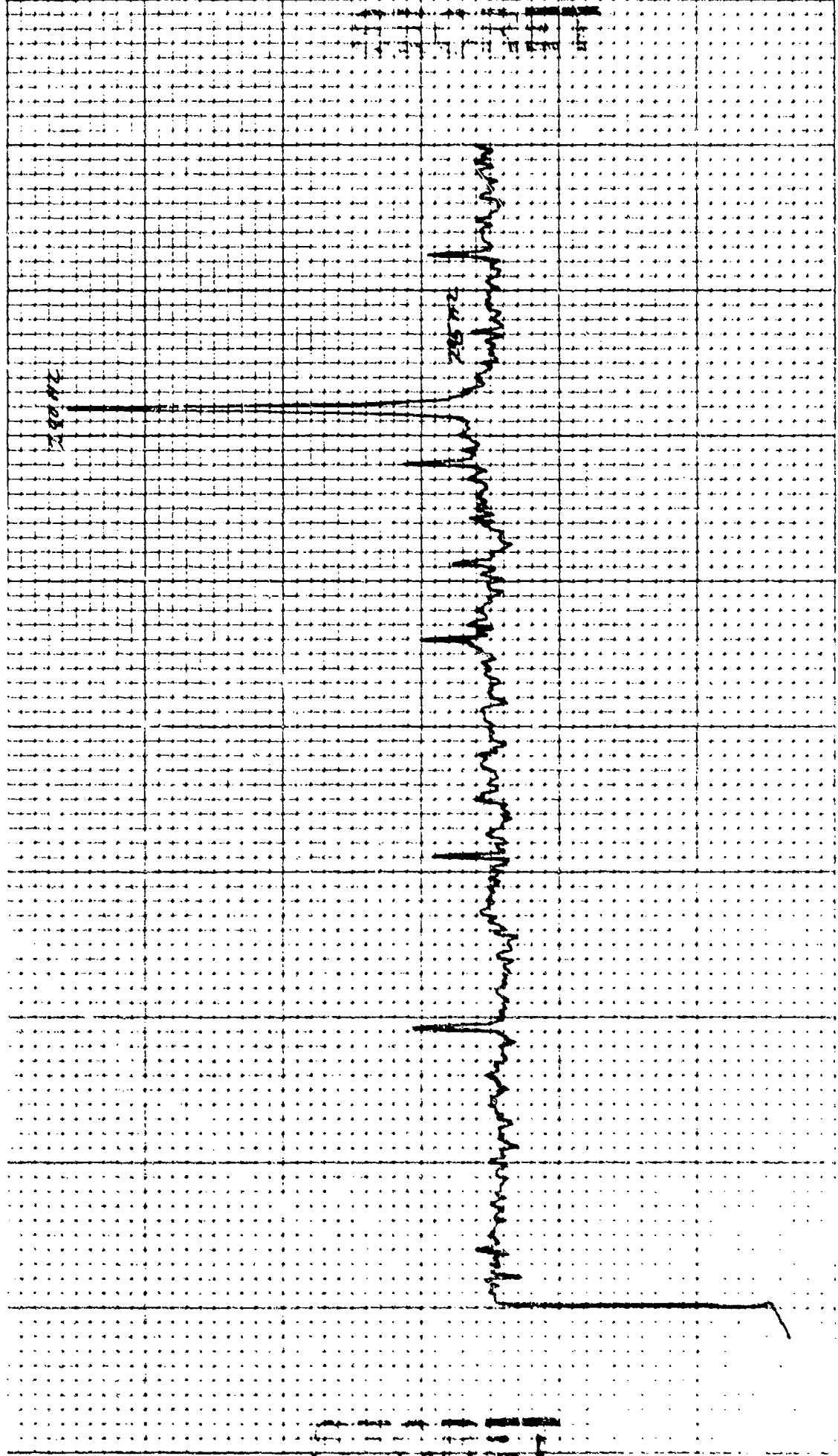
CONTROL: 2031 - 16 (DPF) DATE OF ANALYSIS: 1-16 REEL: M10 INDE X3120
BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 3-8-77 - 0131 Z INTEGRATION TIME 320 SECS ATTEN: -12 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
CENTER FREQ: 270 HZ +50 DEG. AZ STEERING



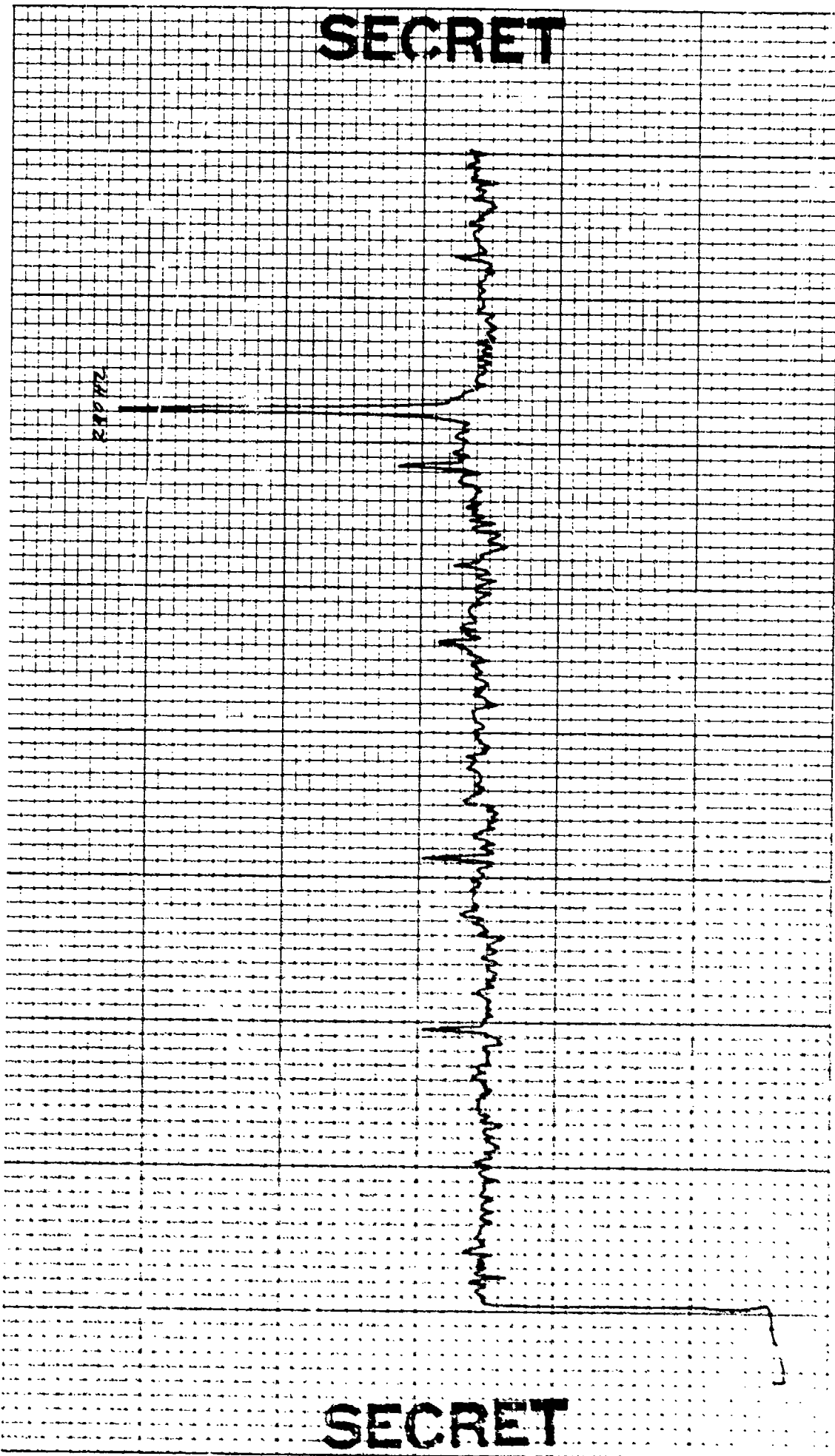
NOISE POWER SPECTRUM ANALYSIS

46 0703

CONTROL: 2001 - 16 (DP9) DATE OF ANALYSIS: 1-16 REEL: 110 INDE X3620
 REAMFORMED SPECTRUM(ELEMENTS))
 EXERCISE: BEARING STAKE DATE/TIME: 0957 - 2031 Z INTEGRATION TIME 320 SECS ATTEN: 7.5 DB
 CENTER FREQ. 240 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
16 ELEMENTS +60 DEG. AZ STEERING



CONTROL: 2231 - 16 (DPT) DATE OF ANALYSIS: 1-16 REEL: A10 INDE X3620
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: 72 DB
16 ELEMENTS +62 DEG. AZ STEERING FILTER WTG: HANNING



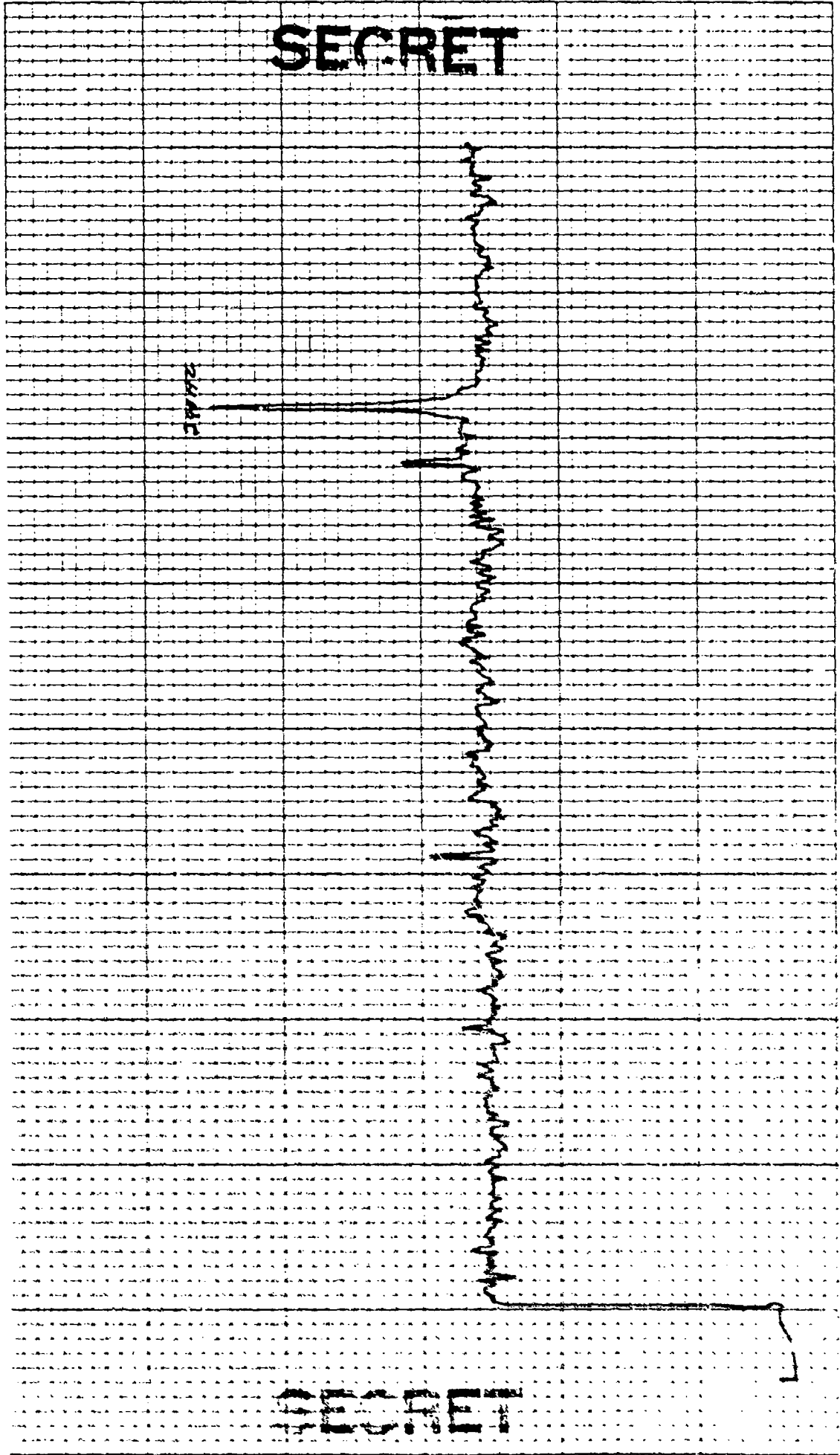
KOE 10.8 IS TO THE INCHES
REEL AT THE CO. MADE IN U.S.A.

46 0703

CONTROL: 2431 - 16 (DP1)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
/6 ELEMENTS

DATE OF ANALYSIS: - - - -
(-/6)
DATE/TIME: 7-15-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10 HZ
464 DEG. AZ STEERING

REEL: M10 INDE X362c
INTEGRATION TIME 320 SECS
ATTEN: -12 DB
FILTER WTG: HANNING



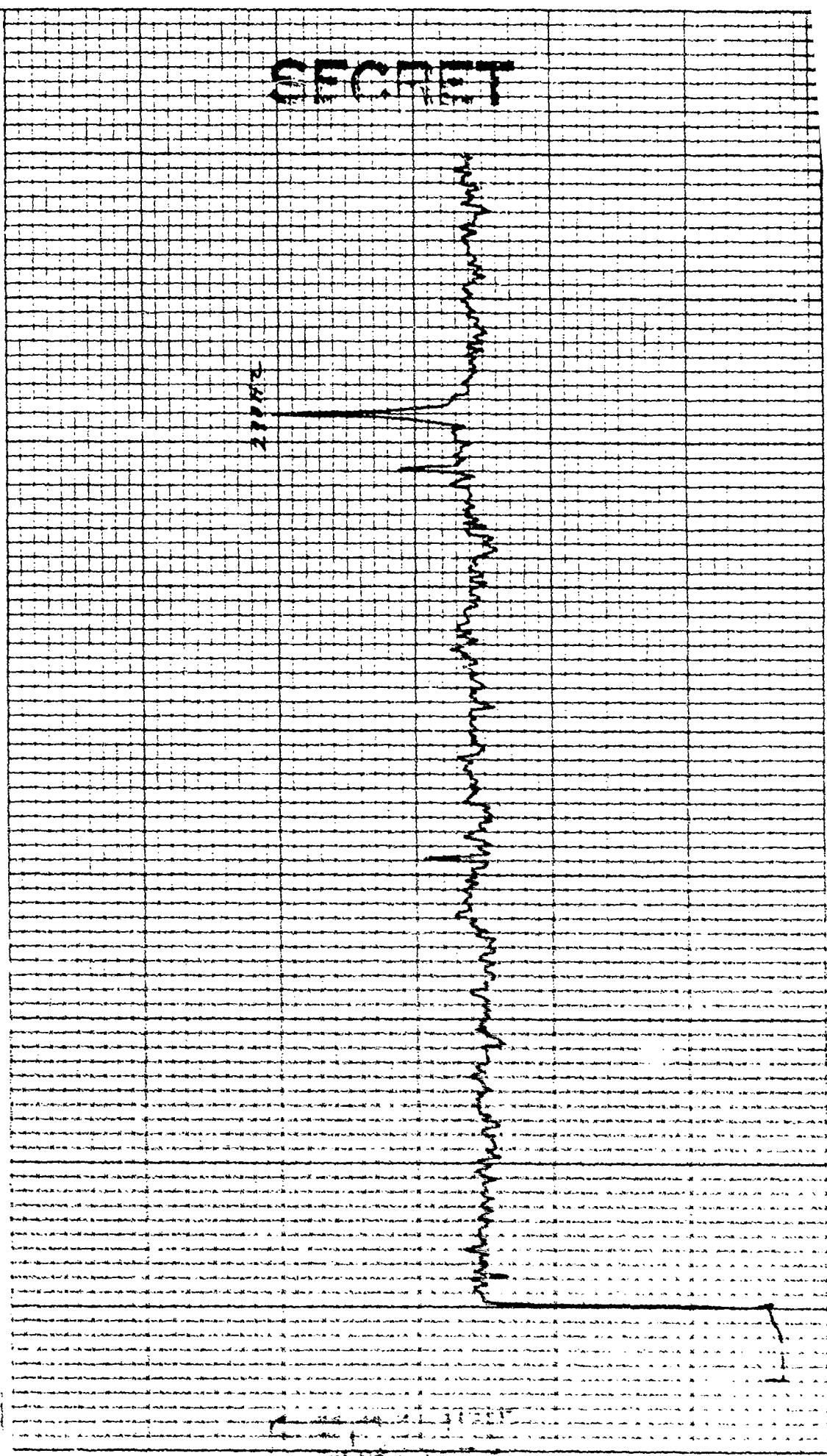
16E 10 X 10 TO 100 INCHES X 10 CMES
MELFORD W. EGGAN CO. MADE IN U.S.A.

46 0703

CONTROL: 2031 - 16 (200)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 245-277 - 2031 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+ 22 DEG. AZ STEERING

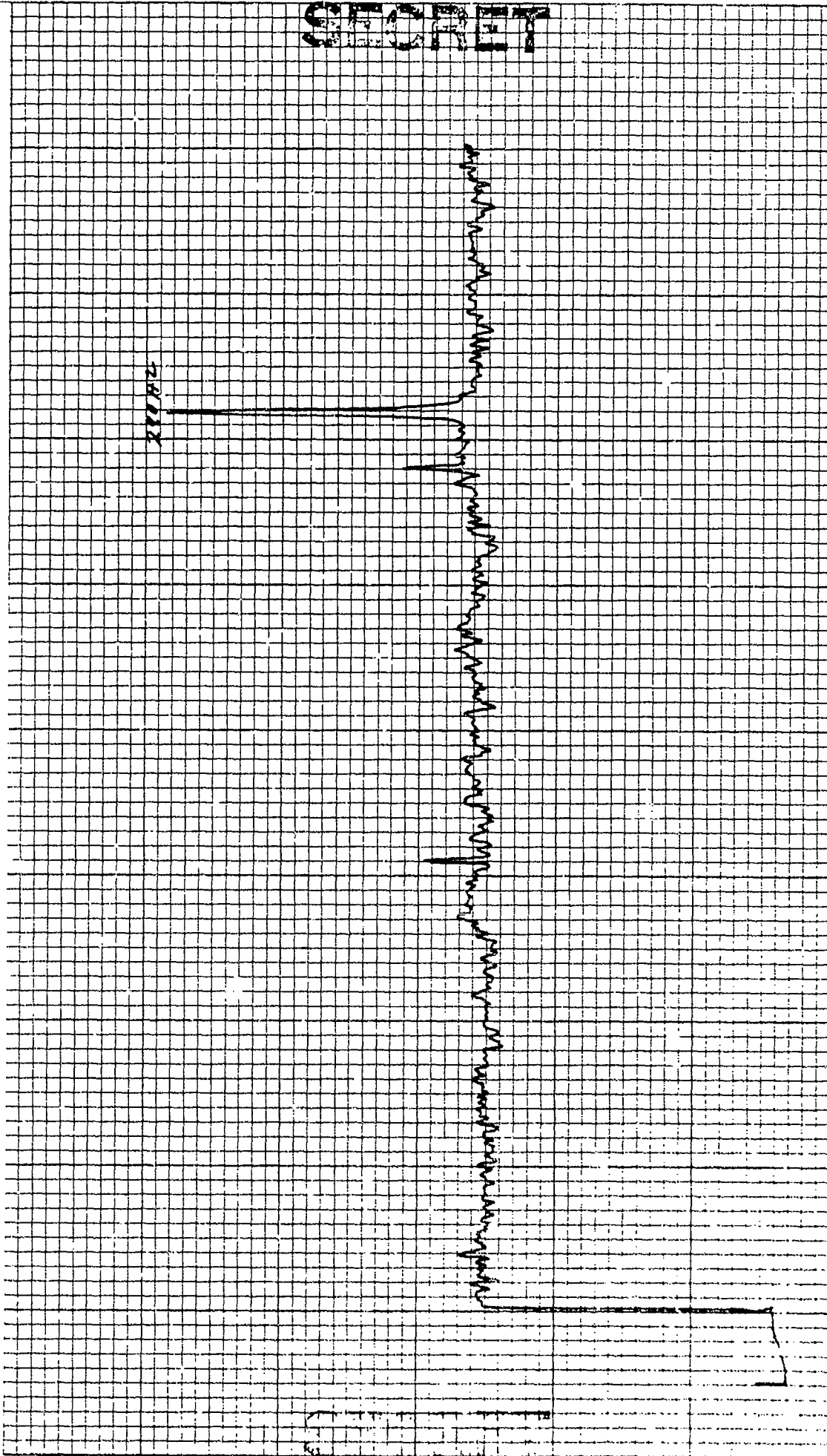
REEL: M10 INDE XJG90
INTEGRATION TIME 320 SECS ATTN: 72 DB
FILTER WTG: HANNING



CONTROL: 2/31-16 (DP9)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE/TIME: 3-15-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+68 DEG. AZ STEERING

REEL: M10 INDE X 3670
INTEGRATION TIME 320 SECS ATTN: -12 DB
FILTER WTG: HANNING



SECRET

CONFIDENTIAL

SIGNAL LEVEL AND SNR CALCULATIONS

DATA POINT 9

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-21.9</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-11.9
BEAMFORMER GAIN	<u>+24</u>	+12.1 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	+12.3 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-64.5</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-54.5
BEAMFORMER GAIN	<u>+24</u>	-30.5 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR	<u>+12.1</u>	
SIGNAL LEVEL FOR SNR	<u>-30.5</u>	+2.6
PROCESSOR CORRECTION	<u>-4.0</u>	38.6
MRA CORRECTION	<u>+ .2</u>	38.8 SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	30.6 SNR 1 HZ BAND

SECTION 12

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 9

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-14.2</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	- 4.2
BEAMFORMER GAIN	<u>+24</u>	+19.9 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .6</u>	+20.5 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-67.1</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-57.1
BEAMFORMER GAIN	<u>+24</u>	-33.1 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR	<u>+19.9</u>	
SIGNAL LEVEL FOR SNR	<u>-33.1</u>	53.0
PROCESSOR CORRECTION	<u>-4.0</u>	+9.0
MRA CORRECTION	<u>+ .6</u>	+9.6 SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	+1.4 SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR CALCULATIONS

DATA POINT 9

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-52.7</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-42.7
BEAMFORMER GAIN	<u>+24</u>	-18.7 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .9</u>	-17.8 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-67.2</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-57.2
BEAMFORMER GAIN	<u>+24</u>	-33.2 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR	<u>-18.7</u>	
SIGNAL LEVEL FOR SNR	<u>-33.2</u>	14.5
PROCESSOR CORRECTION	<u>-4.0</u>	10.5
MRA CORRECTION	<u>+ .9</u>	11.4 SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	3.2 SNR 1 HZ BAND

CONFIDENTIAL

DATA POINT 9

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-19.4</u>	<u>-17.5</u>	<u>N.D.</u>
MRA SIGNAL LEVEL	<u>+12.3</u>	<u>+20.4</u>	<u>-17.8</u>
ARRAY SIGNAL GAIN	<u>31.7</u>	<u>30.9</u>	
20 LOG <u>32</u>	<u>30.1</u>	<u>30.1</u>	<u>30.1</u>
# of elements			
DIFFERENCE	<u>+1.6</u>	<u>+2.8</u>	

ARRAY GAIN

MRA SNR	<u>38.8</u>	<u>49.6</u>	<u>11.4</u>
MEAN OMNI SNR	<u>28.6</u>	<u>34.5</u>	<u>N.D.</u>
ARRAY GAIN	<u>10.2</u>	<u>15.1</u>	
THEORETICAL BEAMWIDTH GAIN (at MRA)	<u>11.7</u>	<u>14.2</u>	<u>14.0</u>
DIFFERENCE	<u>-1.5</u>	<u>+ .9</u>	

46 0703

REF ID: A66000

INDE X3620

REEL: M10

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

DATE OF ANALYSIS: - - - - -

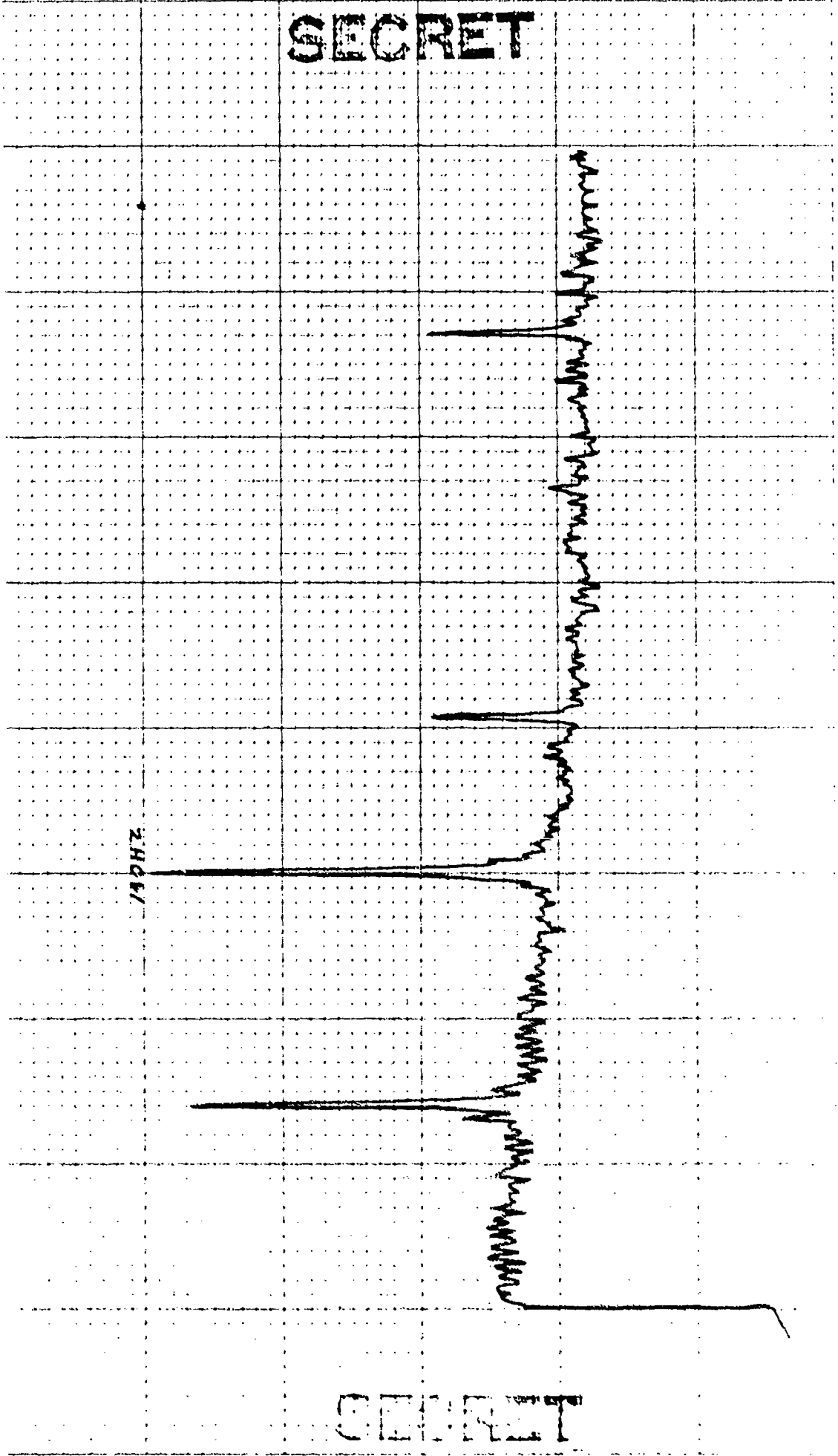
1-26 29-34

DATE/TIME: 3-75-77 - 2/31 Z

ANALYSIS BANDWIDTH: 1/10 HZ

+44 DEG. AZ STEERING

CONTROL: 231 - 22 (DP)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS

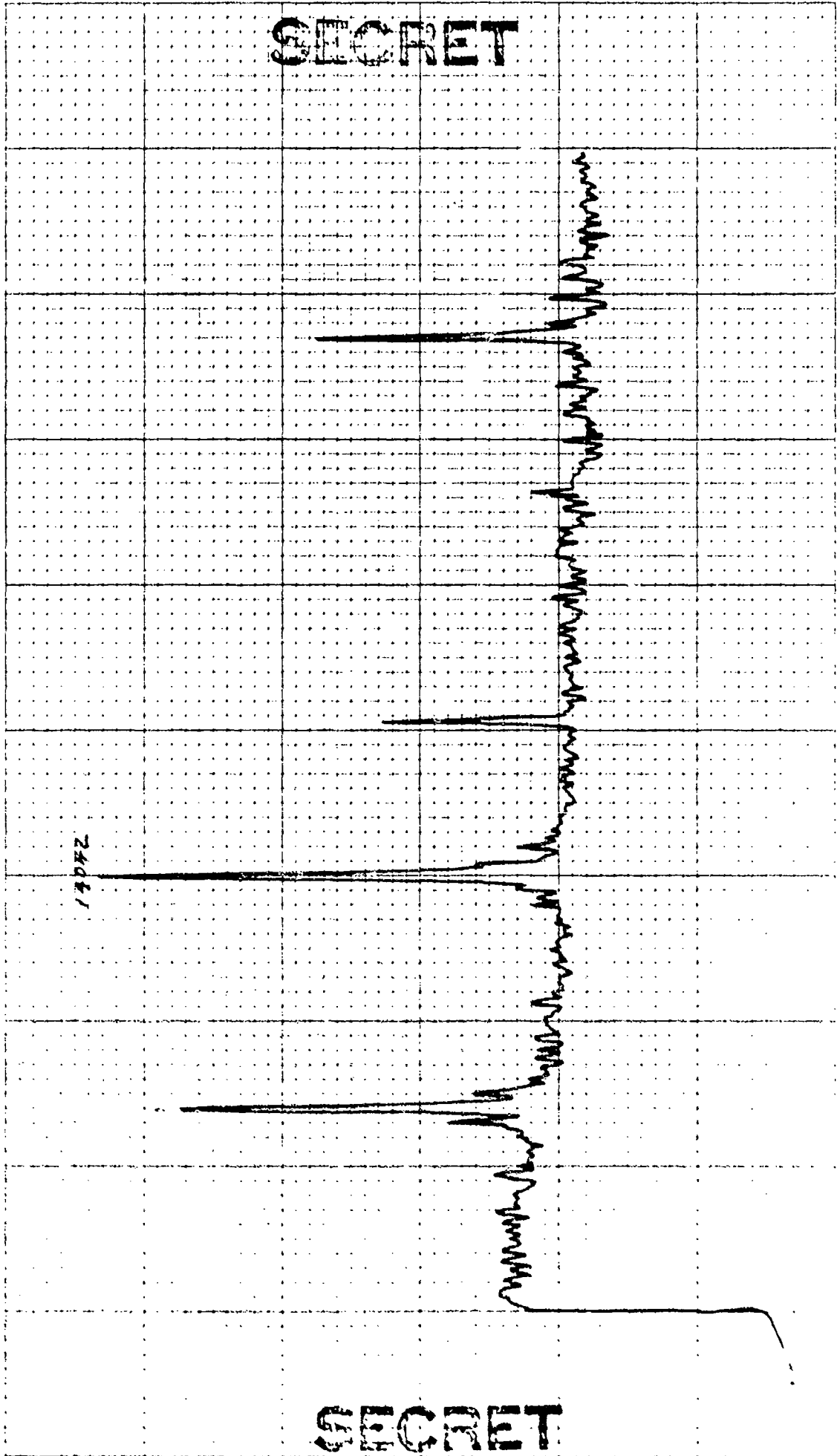


46 0703

REF ID: A66000

CONTROL: 2131 - 32 (DP9) DATE OF ANALYSIS: - - - -
 BEAMFORMED SPECTRUM(ELEMENTS) 1-26-8 29-34
 EXERCISE: BEARING STAKE DATE/TIME: 75-77-213/Z
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
 72 ELEMENTS + 42 DEG. AZ STEERING

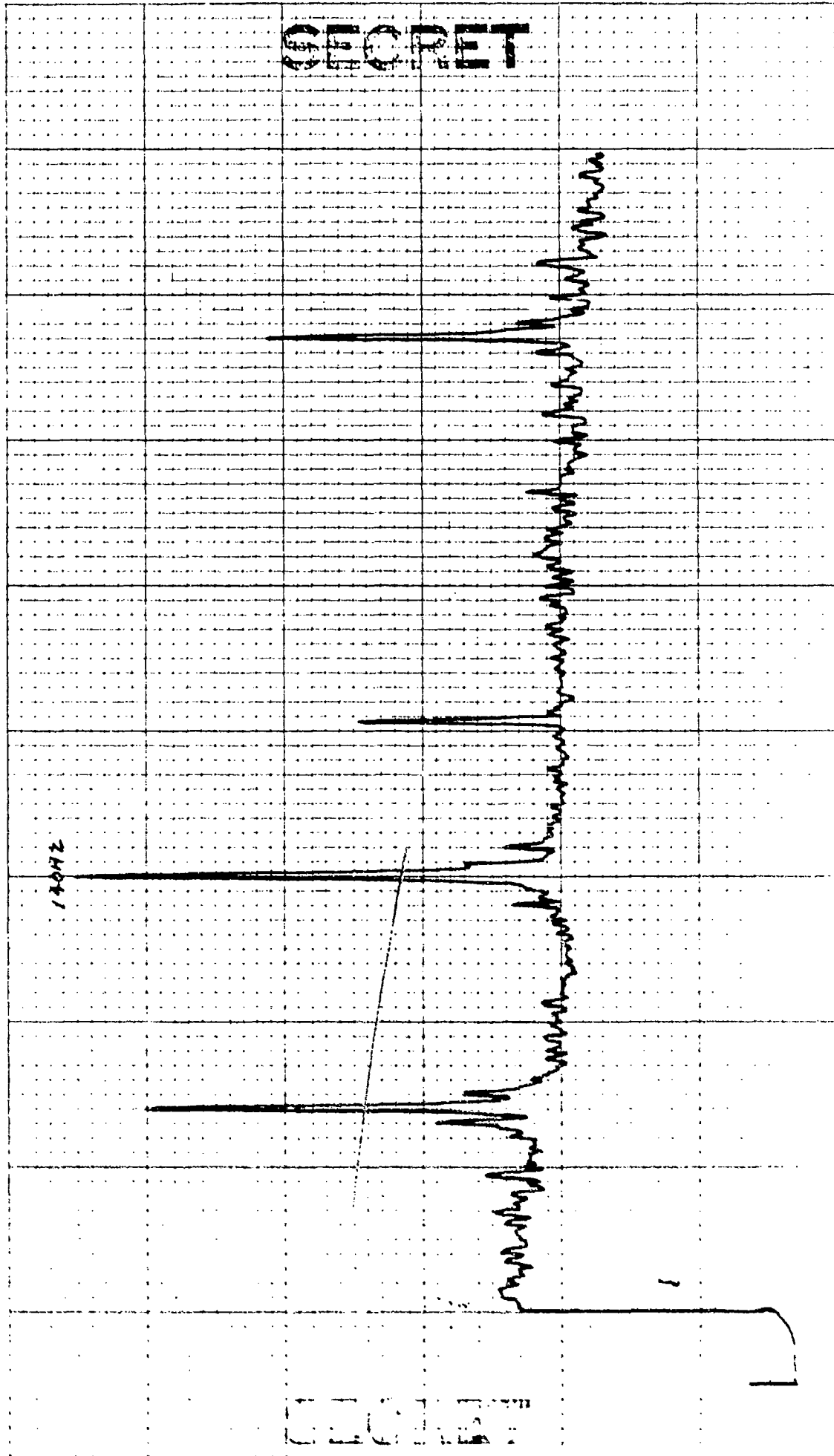
REEL: M10 INDE XJ62c
 INTEGRATION TIME 320 SECS ATTEN: -2YDB
 FILTER WTG: HANNING



46 0703

NOE 10 10 TO THE INCHES 1/1000

CONTROL: 2131 - 32 (009) DATE OF ANALYSIS: INDE X2120
 BEAMFORMED SPECTRUM(ELEMENTS) 1-26 009-54 REE.: A10
 EXERCISE: BEARING STAKE 2131 Z INTEGRATION TIME 320 SECS ATTN: -2Y DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
32 ELEMENTS +40 DEG. AZ STEERING



SECRET

SECRET

46 0703

1500 1500 TO TIME IN CHARGE...

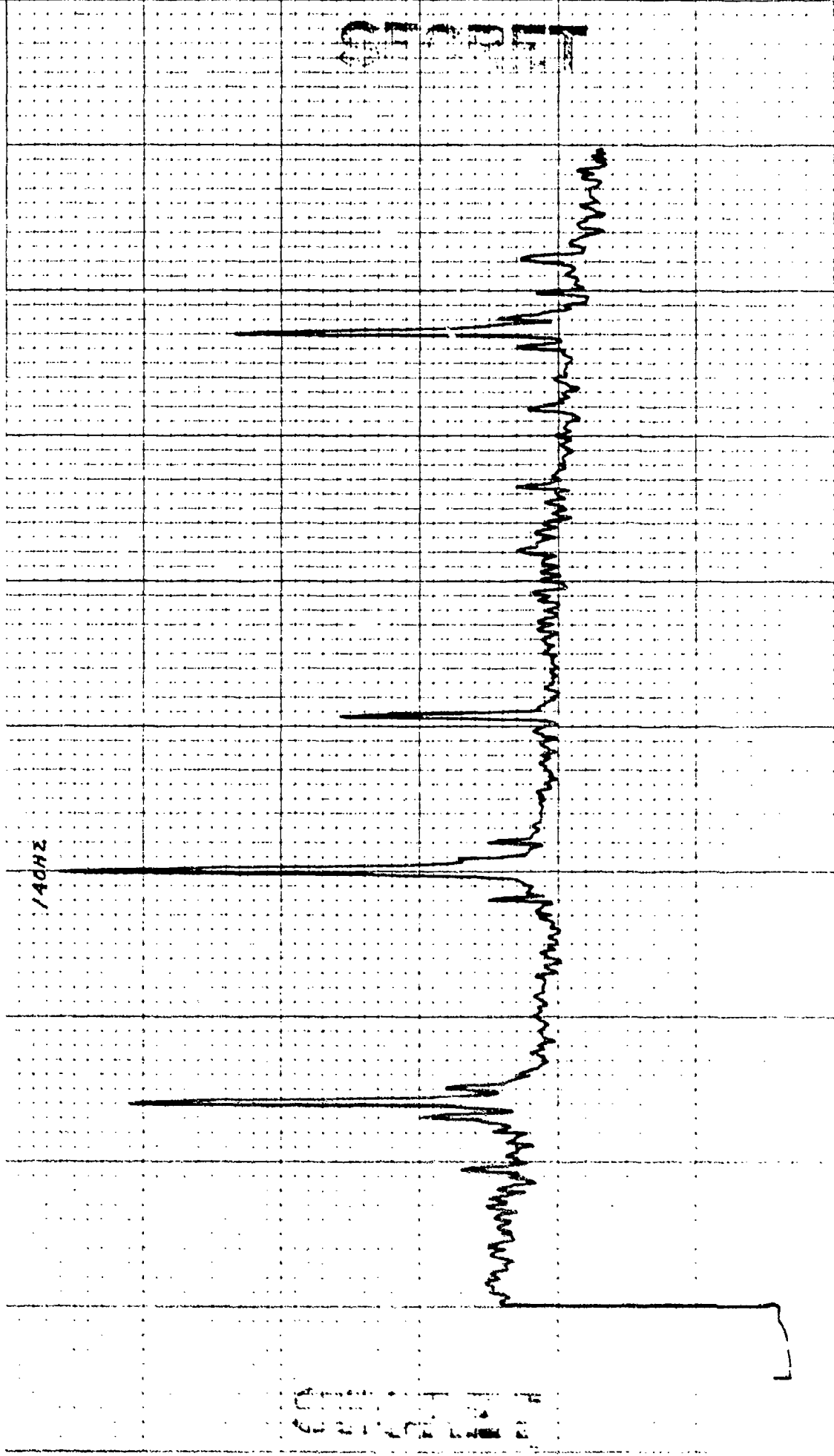
CONTROL: 2/31 - 22 (DPP)
BEAMFORMED SPECTRUM (ELEMENTS) 1-26 28-34
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS

DATE OF ANALYSIS: - - - - -
REEL: 410

INTEGRATION TIME 320 SECS
ATTEN: -2Y DB

DATE/TIME: 2-15-77 - 213/Z
ANALYSIS BANDWIDTH: 1/10HZ
+50 DEG. AZ STEERING
FILTER WTG: HANNING

INDE X3620

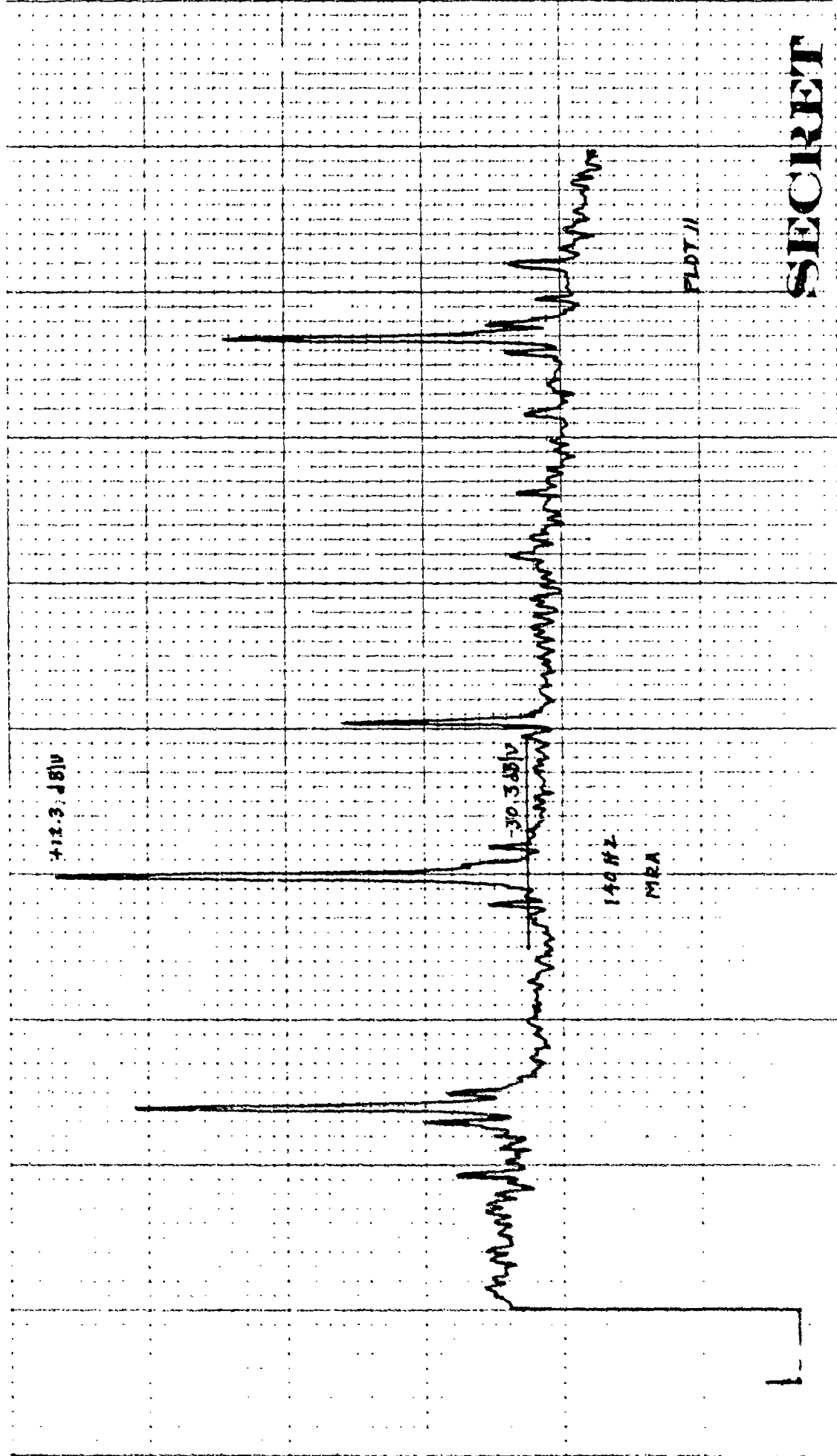


46 0703

1/22 14 508 24 100 00 00 00 00 00 00

SECRET

CONTROL: 2/31 - 5/ (009) DATE OF ANALYSIS: _____
 BEAMFORMED SPECTRUM (ELEMENTS) 17.26 2970 34)
 EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: DB
 CENTER FREQ: 150 HZ FILTER WIC: HANNING
32 ELEMENTS ANALYSIS BANDWIDTH: 1/10HZ
+51.6 DEG. AZ STEERING



SECRET

100HZ

150HZ

2/11

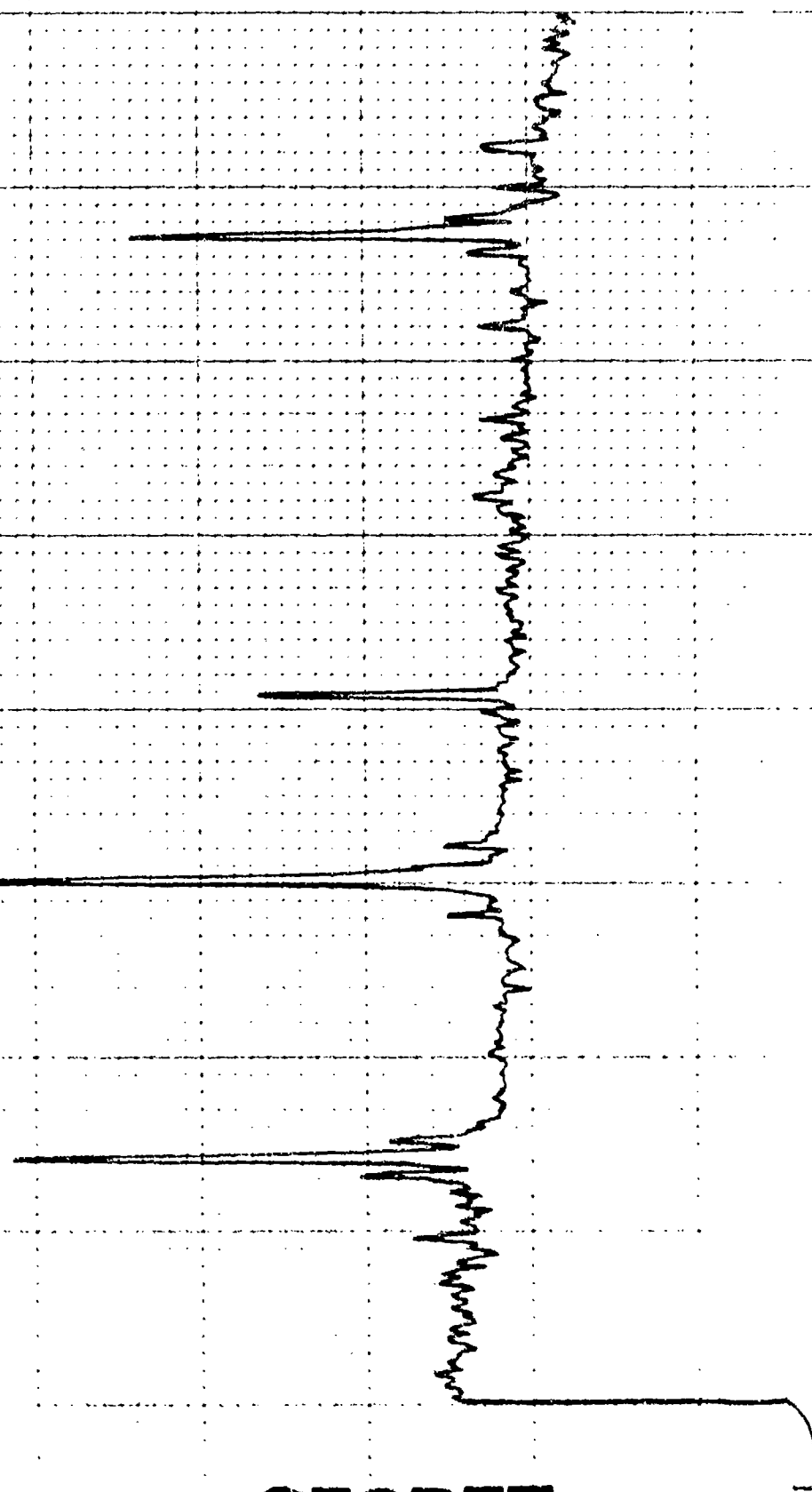
45 0703

CONTROL: 2131 -32 (DP9)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS

DATE OF ANALYSIS: - - -
1-26 8 08 34
DATE/TIME: 3-15-77 - 013/Z
ANALYSIS BANDWIDTH: 1/10HZ
+5/ DEG. AZ STEERING

REEL: 210
INTEGRATION TIME 320 SECS
FILTER
WTG: HANNING
INDE X3626

140 Hz



SECRET

SECRET

46 0703

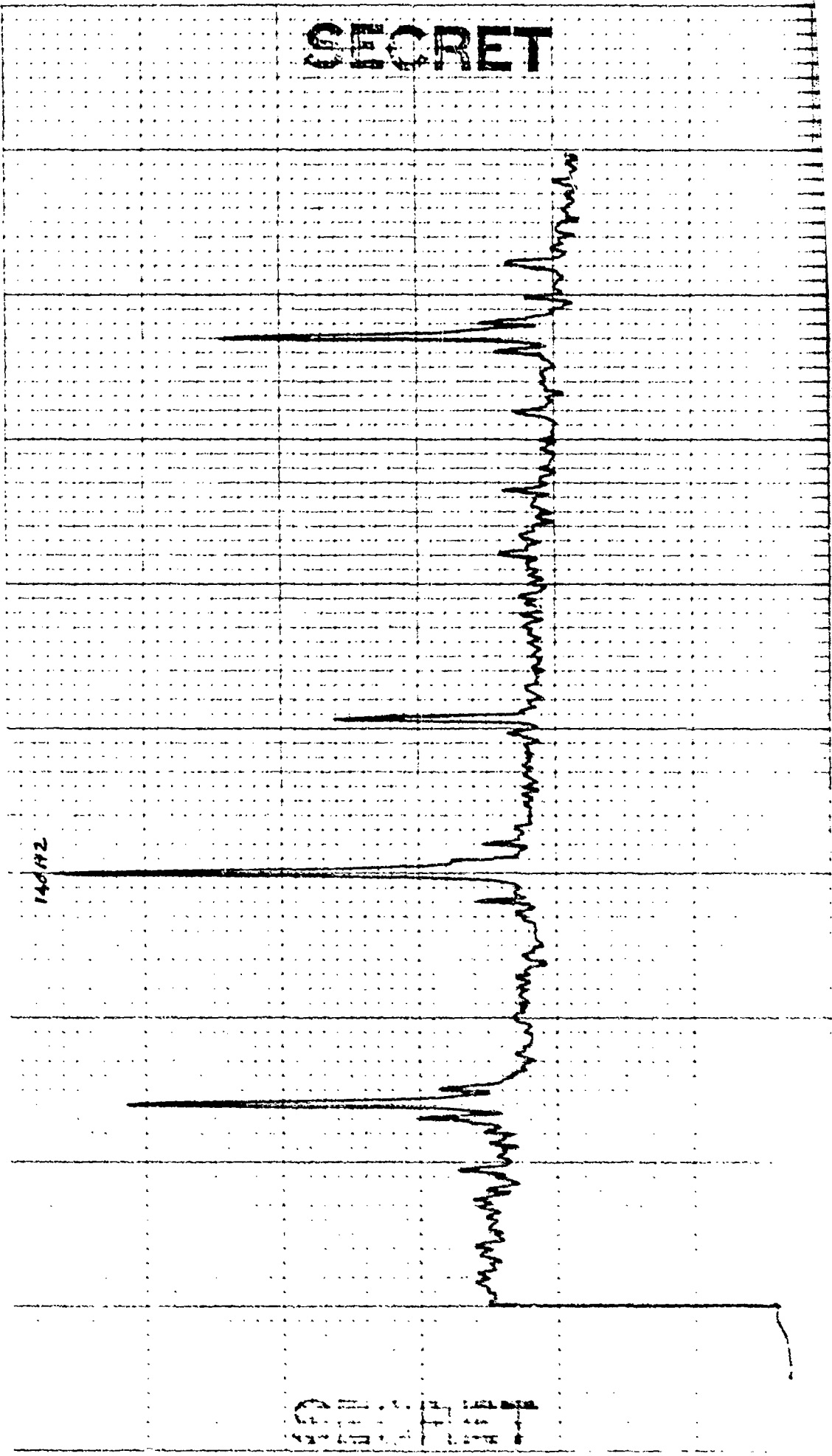
1603 240000 240000 240000 240000

11

CONTROL: 2131 - 72 (209)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
72 ELEMENTS

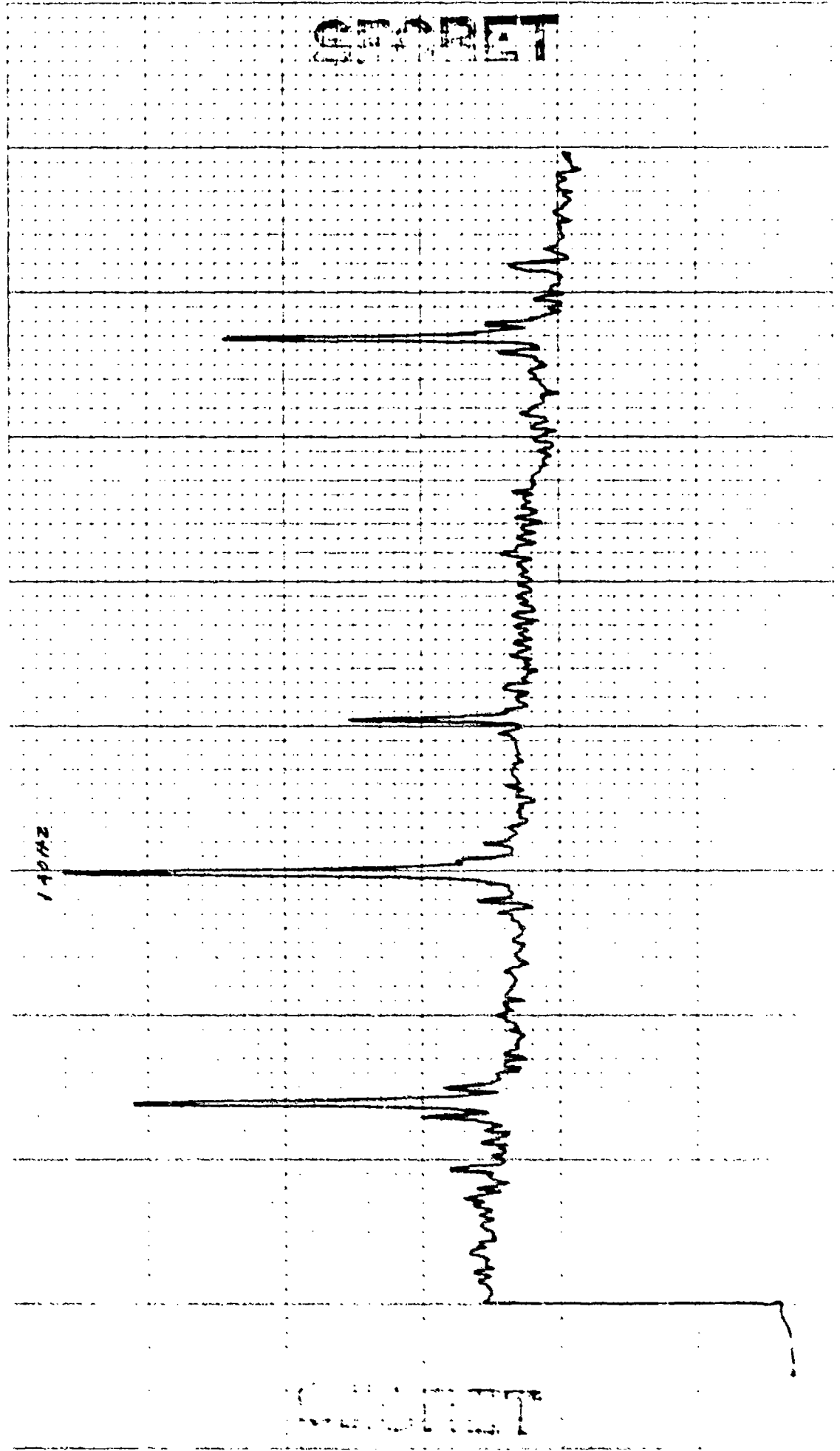
DATE OF ANALYSIS: - - - -
/ - 26 08 74)
DATE/TIME: 7-5-77 - 2171 Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 52 DEG. AZ STEERING

REEL: 410 INDE XJ620
INTEGRATION TIME 320 SECS ATTEN: -2V DB
FILTER WTG: HANNING



46 0703

CONTROL: 213/ - 72 (DP9) DATE OF ANALYSIS: 1-26-77 REEL: M10 INDE X3624
 BEAMFORMED SPECTRUM(ELEMENTS) 289-34 INTEGRATION TIME 320 SECS ATTEN: 27 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1710HZ FILTER WTG: HANNING
 CENTER FREQ: 150 HZ 754 DEG. AZ STEERING



213/

X3624

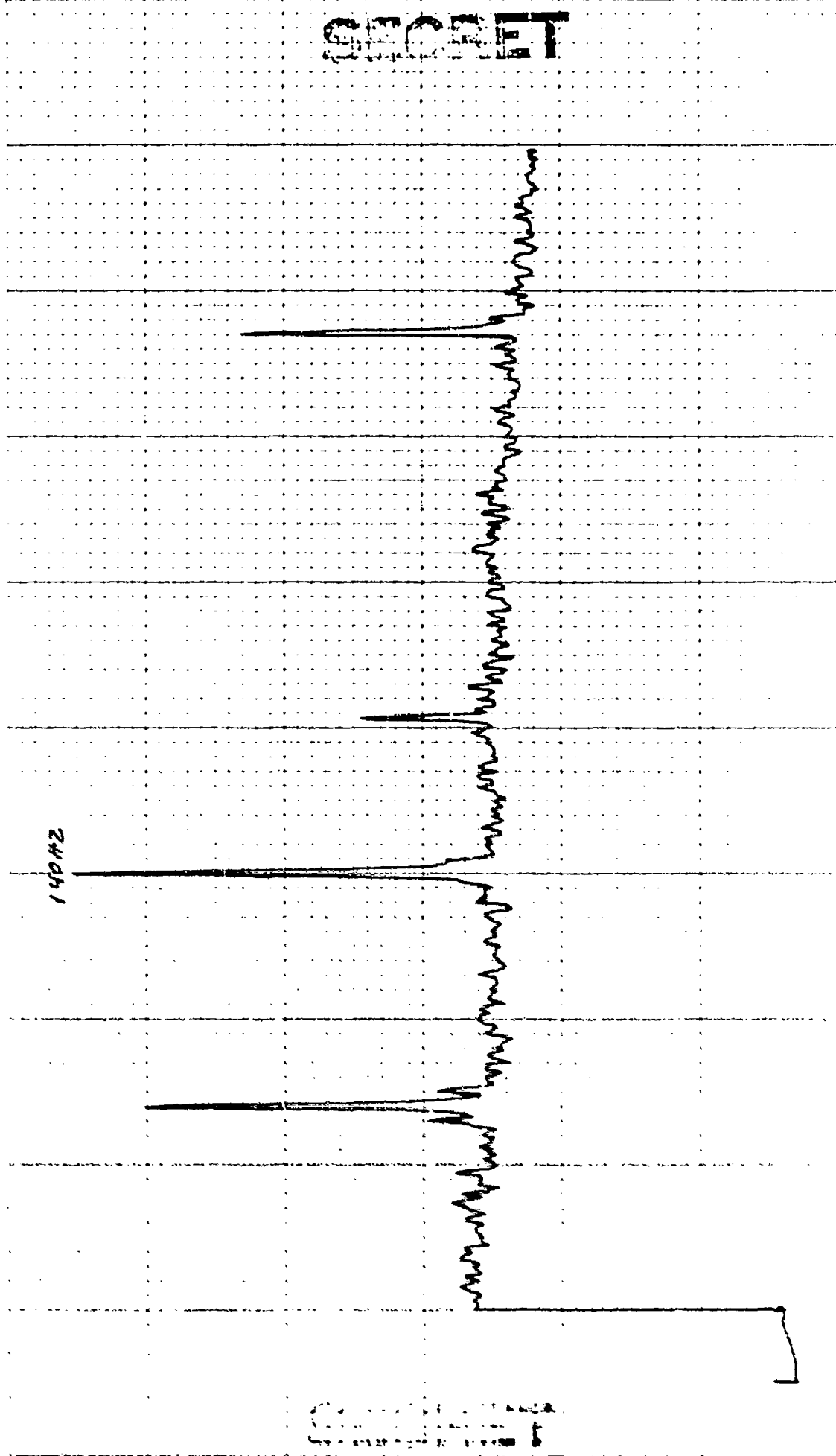
46 0703

REEL: A10 INDE X 3020

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

DATE OF ANALYSIS: 1-26-77
ANALYSIS BANDWIDTH: 1710HZ
+ 56 DEG. AZ STEERING

CONTROL: 2131-32 (DPY)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTF FREQ: 150 HZ
ELEMENTS



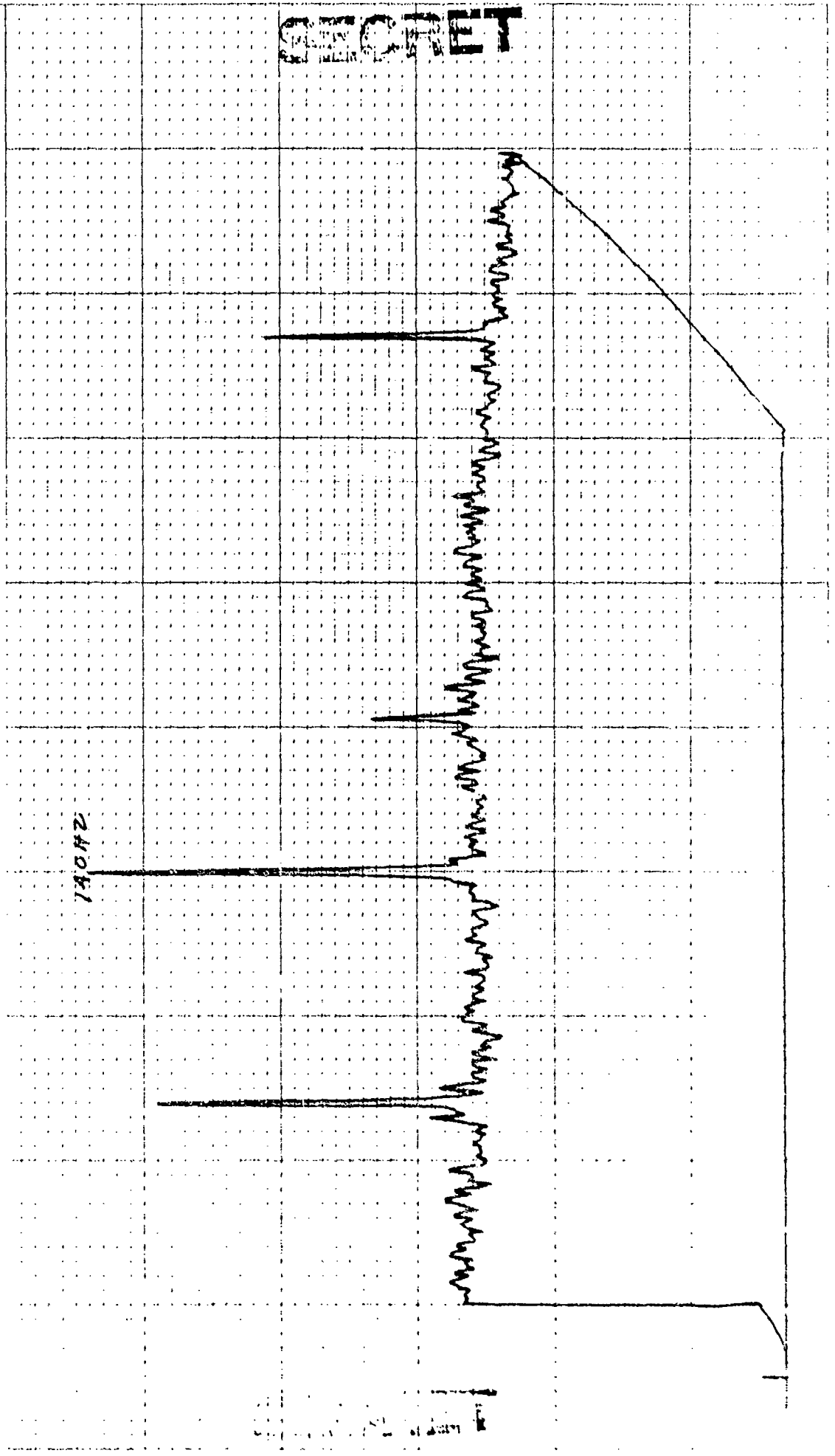
3020

2131

CONTROL: 2131 - 32 (349)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING TAKE
 CENTER FREQ: 250 HZ
 32 ELEMENTS

DATE OF ANALYSIS: 1-26-69 (29-34)
 INTEGRATION TIME 320 SECS
 ANALYSIS BANDWIDTH: 1/10 HZ
 +50 DEG. AZ STEERING

REEL: A10
 INDE XJ620
 ATTEN: -24 DB
 FILTER WIG: HANNING

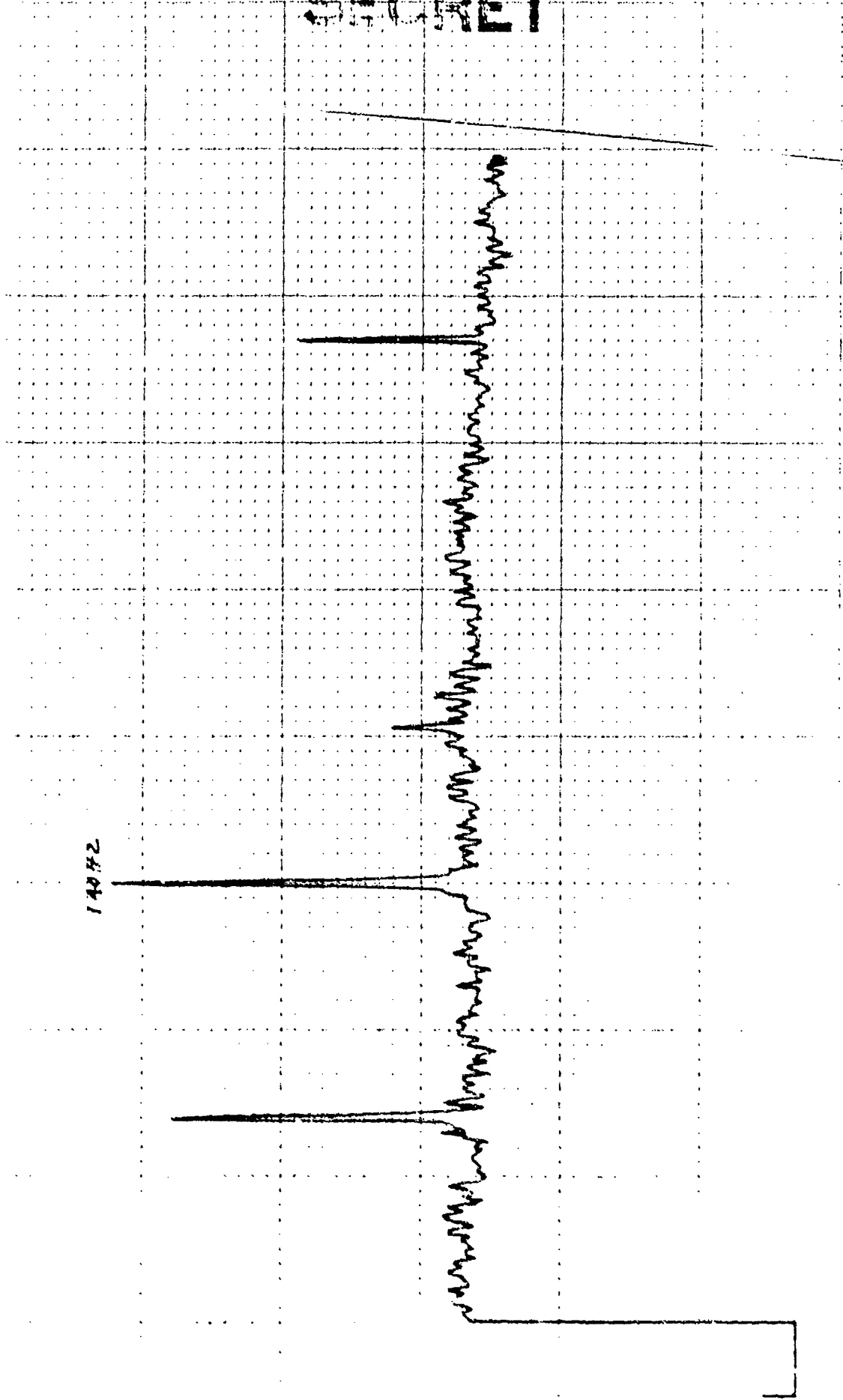


46 0703

CONTROL: 2131 - 72 (209)
BEAMFORMED SPECTRUM ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 150 KHZ
72 ELEMENTS

DATE OF ANALYSIS: 1-26-89-34
DATE/TIME: 2-15-87 - 2131Z
ANALYSIS BANDWIDTH: 1710HZ
+60 DEG. AZ STEERING

REEL: M10 INDE X3600
INTEGRATION TIME 320 SECS
ATTEN: -24DB
FILTER WIG: HANNING



SECRET

SECRET

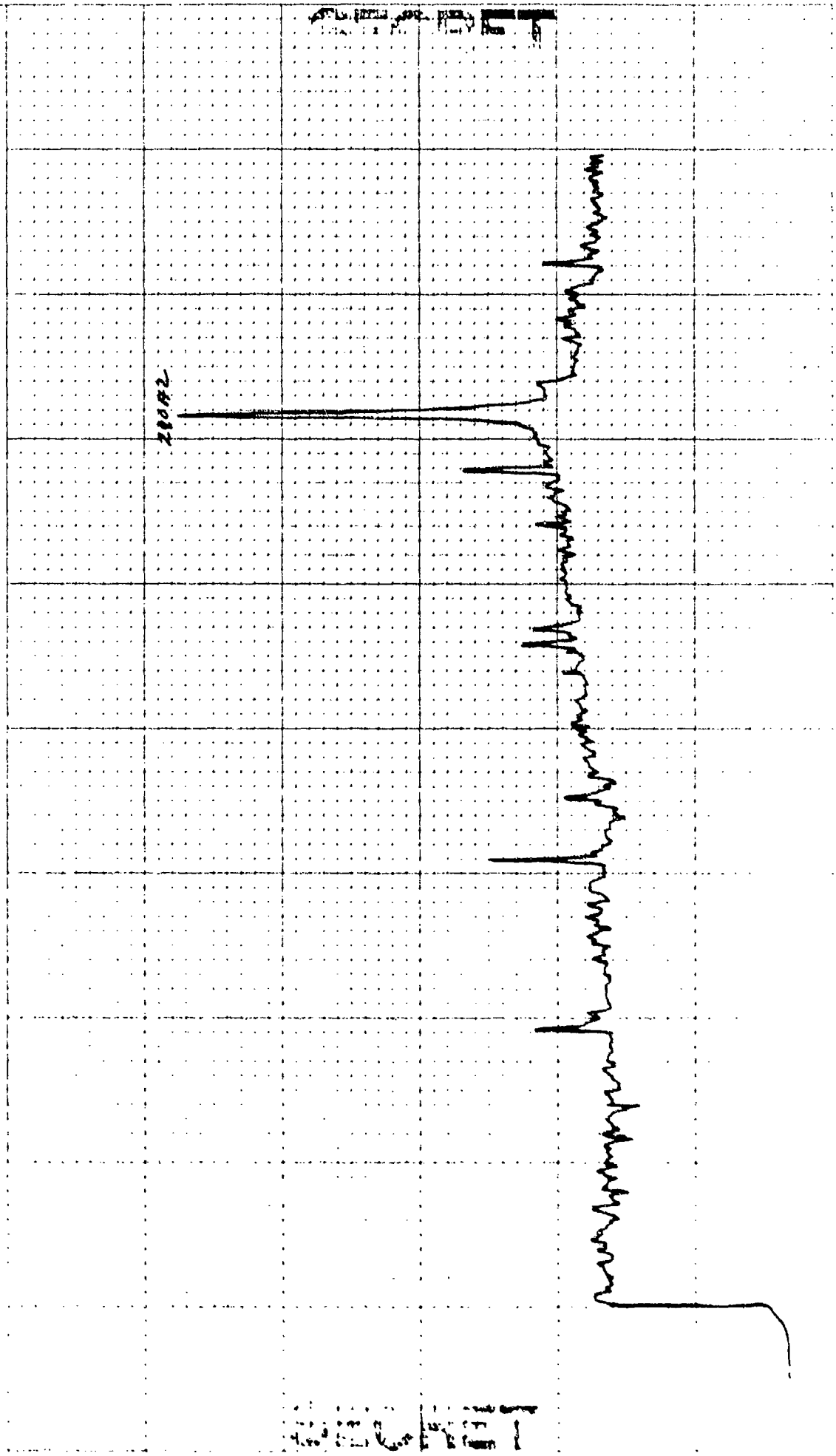
45 0703

CONTROL: 2131 - 22 (DPP) DATE OF ANALYSIS: 1-26-77
 REFORMED SPECTRUM(ELEMENTS) 1-26-77-34
 EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 2131Z
 CENTER FREQ: 276 HZ ANALYSIS BANDWIDTH: 1/10HZ
 32 ELEMENTS + 44 DEG. AZ STEERING

REEL: H10

INDE X3626

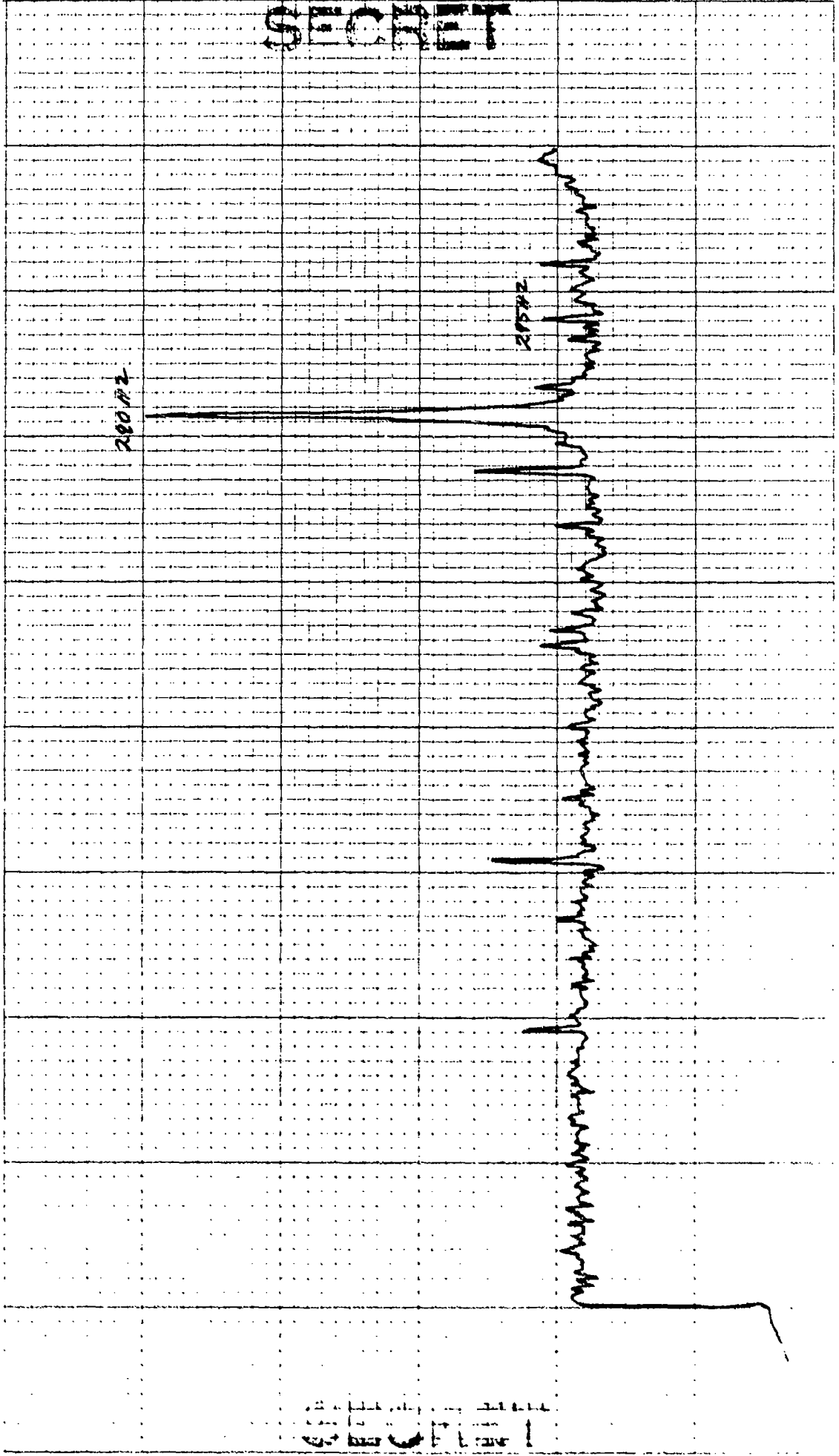
INTEGRATION TIME 320 SECS ATEN: -24DB
 FILTER WIG: HANNING



46 0703

REF ID: A66000

CONTROL: 2131 - 72 (DPT) DATE OF ANALYSIS: 1-26-89 REEL: M10 INDE X 3610
 BEAMFORMED SPECTRUM (ELEMENTS) 3-75-77 - 2131 Z INTEGRATION TIME 320 SECS ATTEN: -24 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 CENTER FREQ: 270 HZ 46 DEG. AZ STEERING



SECRET

SECRET

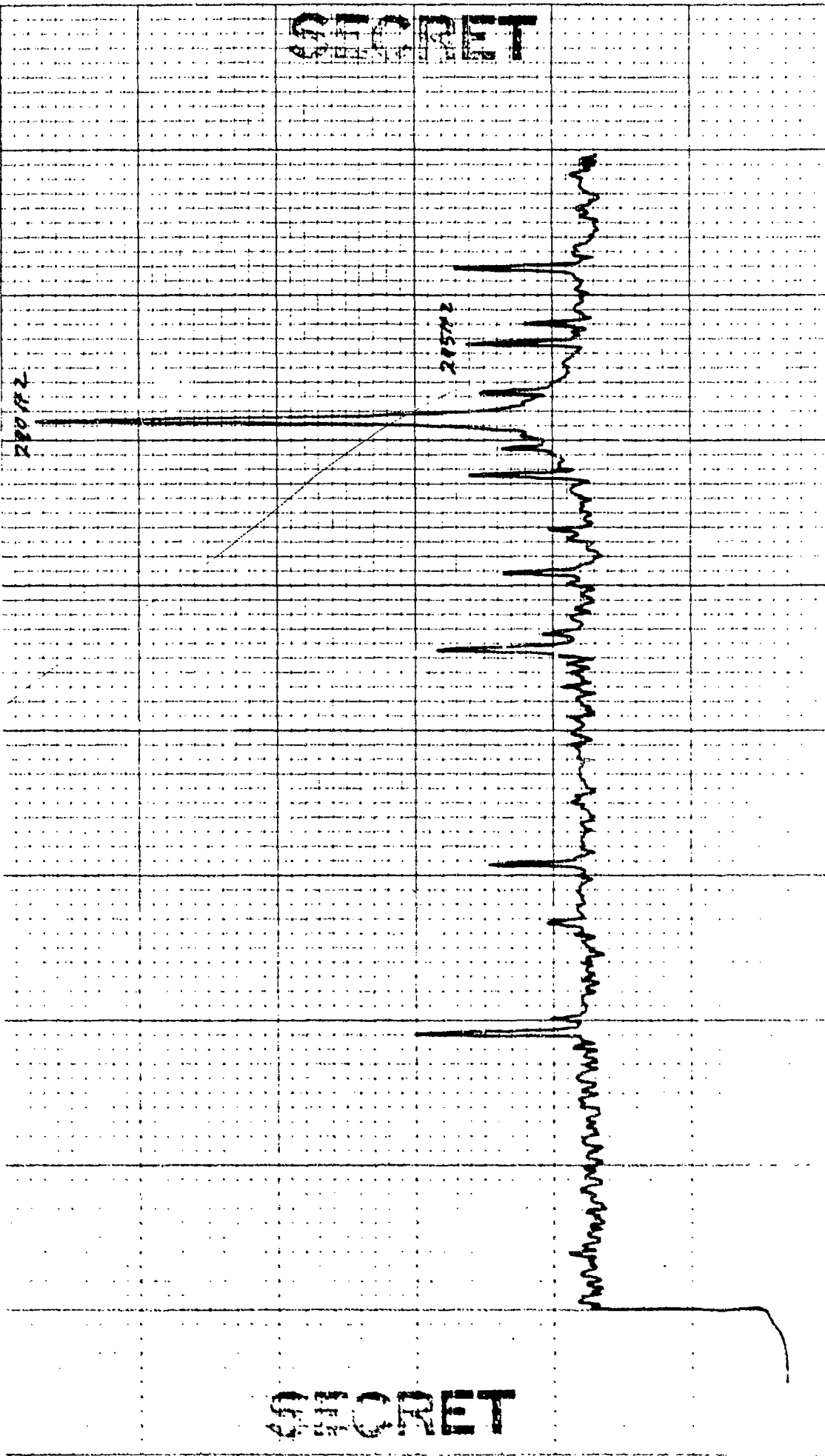
46 0703

1/22 15:48 TO THE DEPT. OF DEFENSE

CONTROL: 2131 - 32 (089)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-77
DATE/TIME: 3-5-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10 HZ
448 DEG. AZ STEERING

REEL: 110 INDE X 3620
INTEGRATION TIME 320 SECS
ATTEN: -34 DB
FILTER WTC: HANNING



SECRET

SECRET

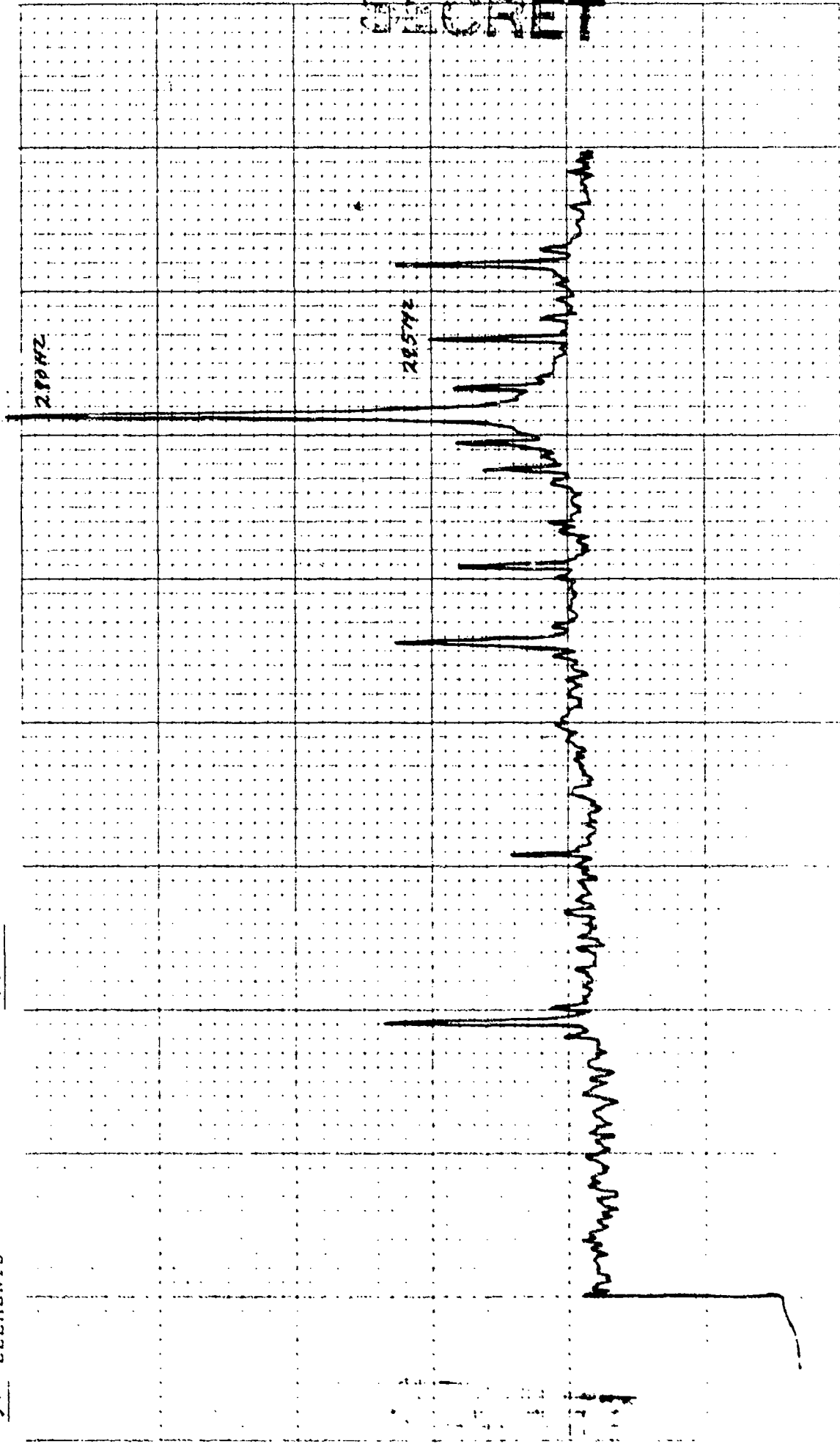
46 0703

REEL: M10 INDE XJ620

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

DATE OF ANALYSIS: 1-26-82 29-34
DATE/TIME: 3-15-77 2131 Z
ANALYSIS BANDWIDTH: 1/10HZ
+50 DEG. AZ STEERING

CONTROL: 2171 - 32 (DP9)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS



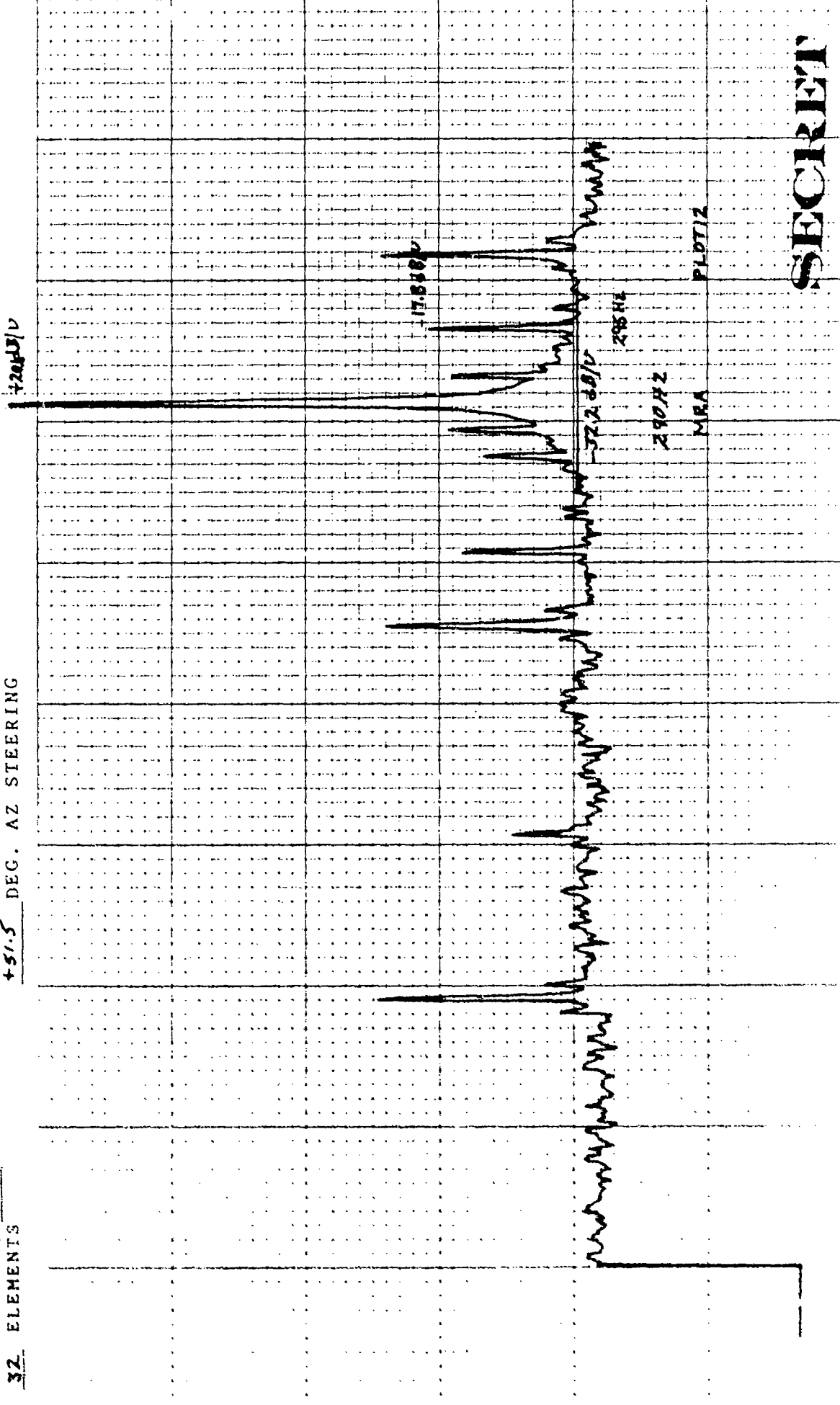
46 0703

SECRET

102 124 TO THE USCGC 100000

CONTROL: 2131 - 51 (P19) DATE OF ANALYSIS: _____
 BEAMFORMED SPECTRUM (ELEMENTS 17020 297034)
 EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: - DB
 CENTER FREQ: 270 HZ FILTER WTG: HANNING
32 ELEMENTS +51.5 DEG. AZ STEERING

REEL: M10 INDE X3220



222 Hz

270 Hz

308 Hz

SECRET

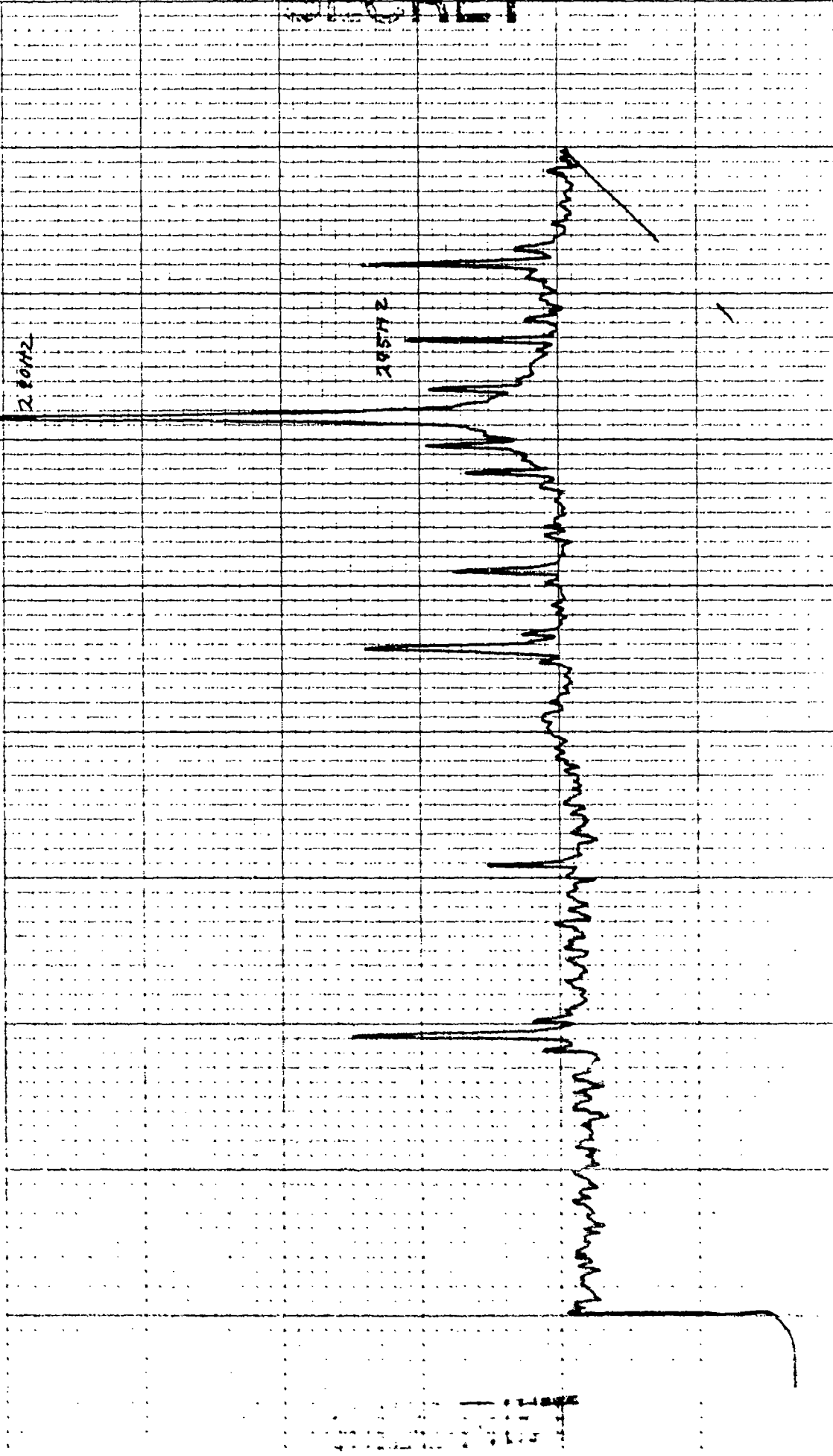
46 0703

10 X 10 TO THE INCHES

CONTROL: 231 - 22 (DPI)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
22 ELEMENTS

DATE OF ANALYSIS: _____
1-26-58 (28-34)
 ANALYSIS BANDWIDTH: 1/10 HZ
+5/ DEG. AZ STEERING

REEL: 410 INDE X3620
 INTEGRATION TIME 320 SECS ATTEN: 0Y DB
 FILTER WTG: HANNING

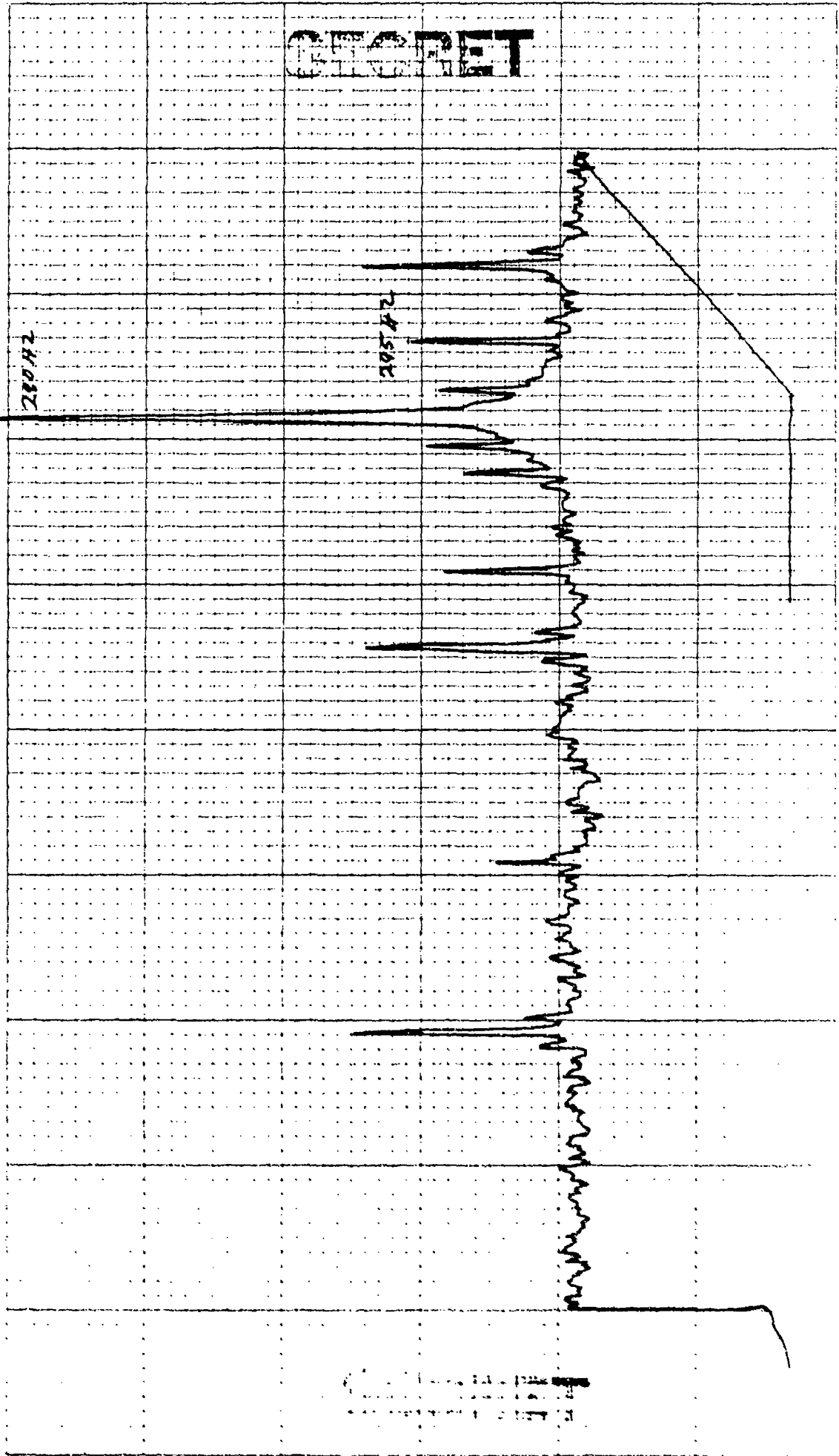


SECRET

46 0703

REF ID: A66000

CONTROL: 2131 - 32 (399) DATE OF ANALYSIS: 1-26-54 REEL: 410 INDE X362c
 BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 7-15-77 - 217/Z INTEGRATION TIME 320 SECS ATTEN: -7Y DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 CENTER FREQ: 270 HZ 752 DEG. AZ STEERING



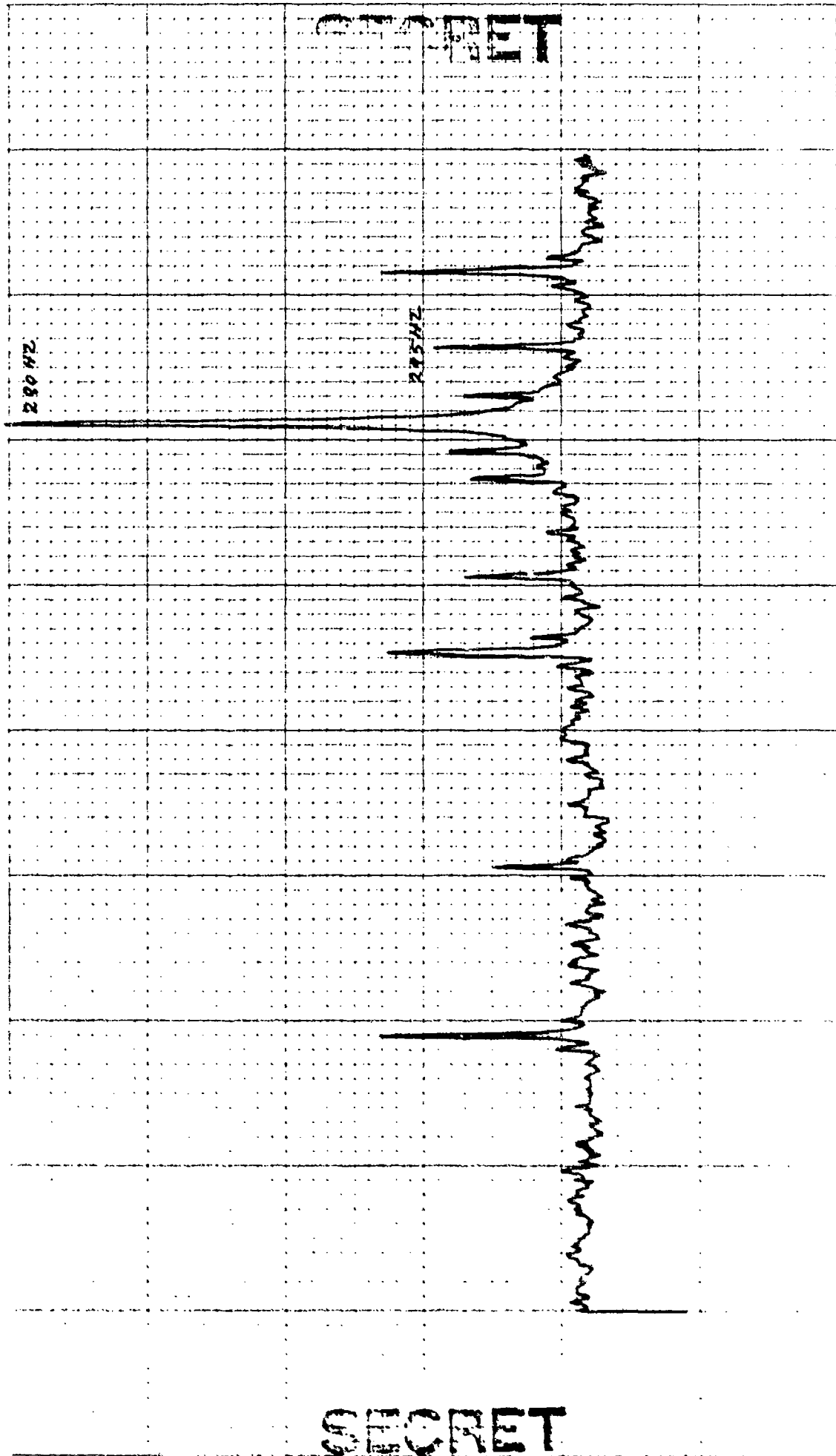
46 0703

CONTROL: 201 - 32 (209)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
 32 ELEMENTS

DATE OF ANALYSIS: 7-26-74
 DATE/TIME: 3-5-77 - 3:03 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 154 DEG. AZ STEERING

REEL: _____ INDEX _____

INTEGRATION TIME 320 SECS
 FILTER WTC: HANNING
 ATTN: DB

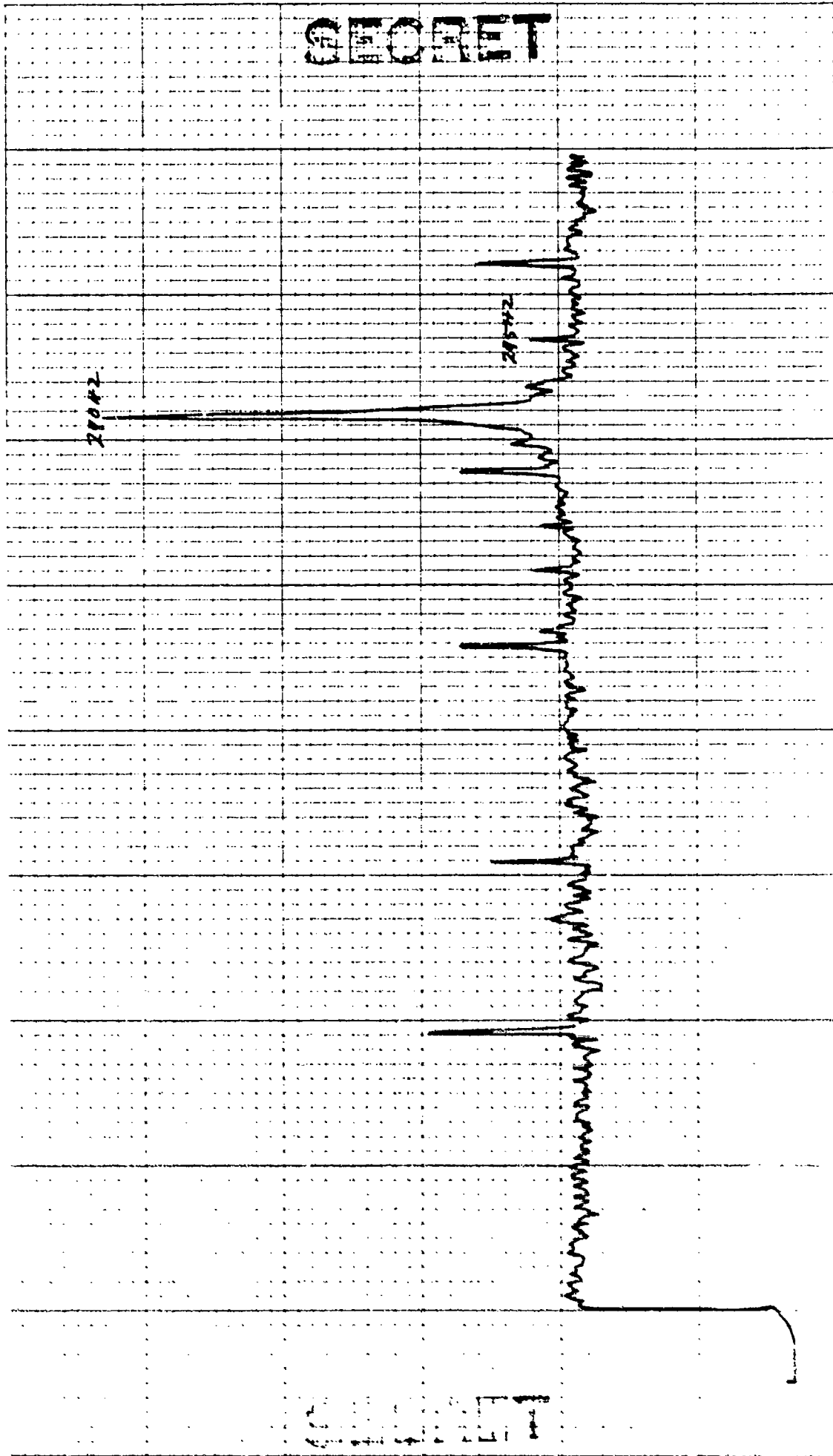


46 0703

CONTROL: 2101 - 32 (DPP)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-89-34
DATE/TIME: 3-15-77 - 2137 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+56 DEG. AZ STEERING

KEEL: M10 INDE X3600
INTEGRATION TIME 320 SECS
ATTEN: 24 DB
FILTER WTG: HANNING



46 0703

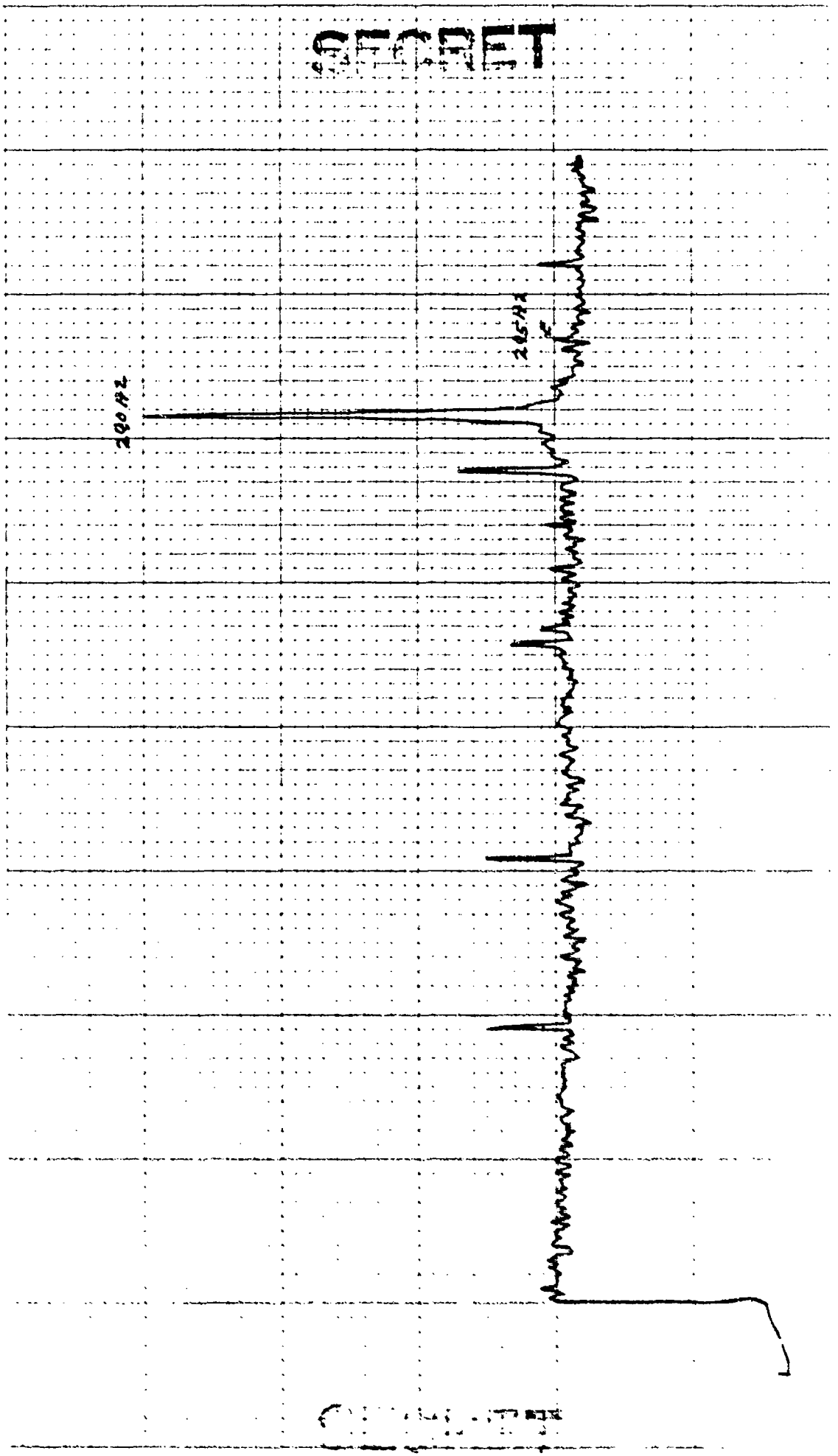
CONTROL: 2171 - 32 (209) REEL: 410 INDE X 3620

BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-26-8 29-34

EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTEN: -24 DB

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

72 ELEMENTS 450 DEG. AZ STEERING



200 HZ

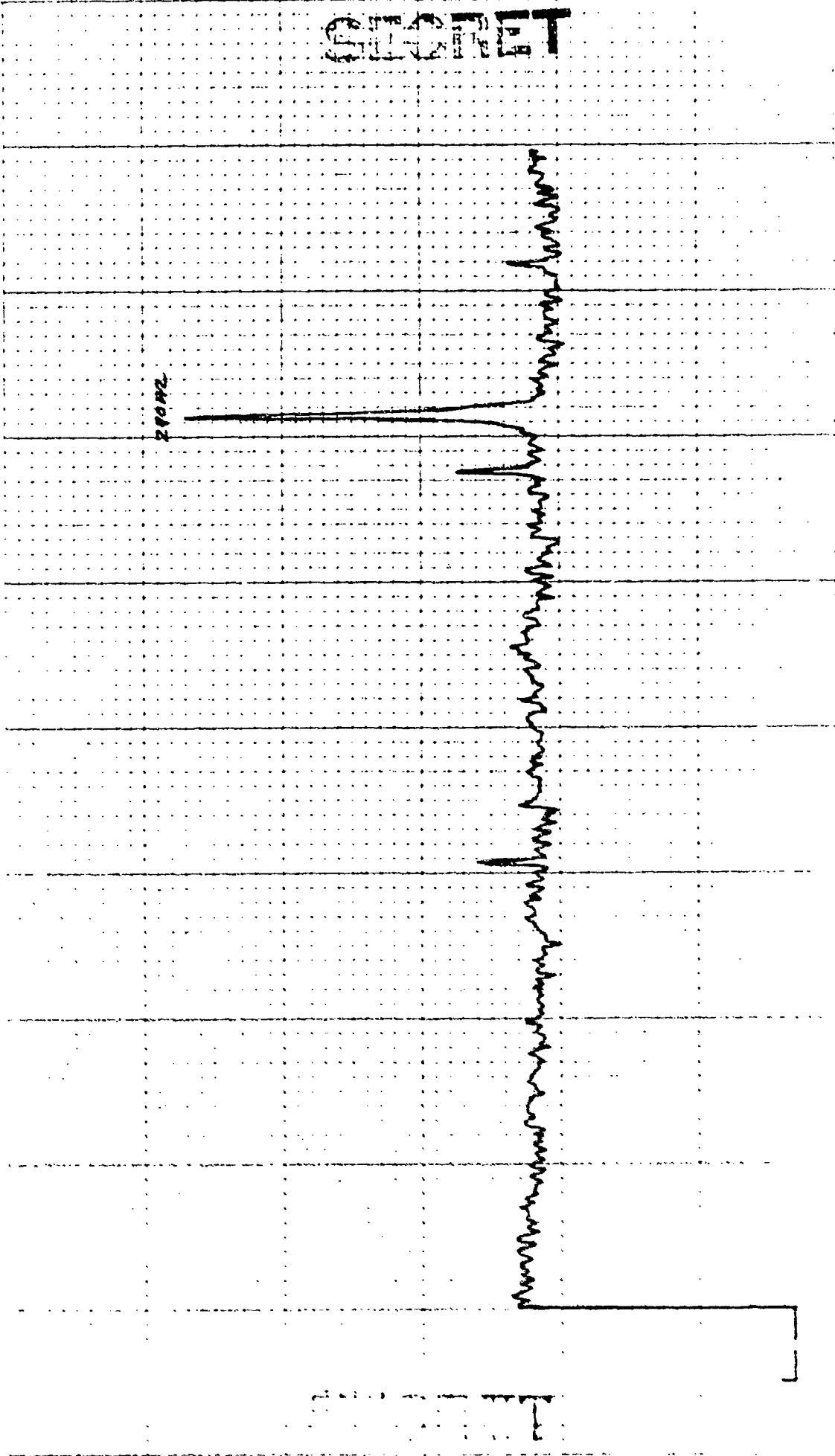
205 HZ

45 0703

CONTROL: 2031 - 22 (D07)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
72 ELEMENTS

DATE OF ANALYSIS: - - -
1-26 8 28-34)
DATE/TIME: 3-5-77 - 2031 Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 60 DEG. AZ STEERING

REEL: M10 INDE X3600
INTEGRATION TIME 320 SECS ATTEN: -3Y DB
FILTER WTG: HANNING



SECRET

CONFIDENTIAL

SIGNAL LEVEL AND SNR
CALCULATIONS

DATA POINT 9

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 51

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-23.6</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-13.6
BEAMFORMER GAIN	<u>+30</u>	+26.4 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	+16.6 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-69.2</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-59.2
BEAMFORMER GAIN	<u>+30</u>	-29.2 NOISE LEVEL FOR SNR CALCULATION

SECTION 13

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR	<u>+16.4</u>	
SIGNAL LEVEL FOR SNR	<u>-29.2</u>	45.6
PROCESSOR CORRECTION	<u>-4.0</u>	41.6
MRA CORRECTION	<u>+ .2</u>	41.8 SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-0.2</u>	53.6 SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR CALCULATIONS

DATA POINT 9

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 51

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-18.2</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-8.2
BEAMFORMER GAIN	<u>+30</u>	+21.8 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	+22.6 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

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

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR	<u>+21.8</u>	
SIGNAL LEVEL FOR SNR	<u>-31.4</u>	53.2
PROCESSOR CORRECTION	<u>-4.0</u>	49.2
MRA CORRECTION	<u>+ .8</u>	50.0 SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	41.8 SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 9

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 51

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-56.3</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-46.3
BEAMFORMER GAIN	<u>+20</u>	-16.3 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	-15.5 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-71.4</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-61.4
BEAMFORMER GAIN	<u>+20</u>	-31.4 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR	<u>-16.3</u>	
SIGNAL LEVEL FOR SNR	<u>-31.4</u>	15.1
PROCESSOR CORRECTION	<u>-4.2</u>	10.9
MRA CORRECTION	<u>+ .8</u>	11.7 SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	3.5 SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

DATA POINT 9

SIGNAL GAIN

	<u>140 HZ</u>	<u>200HZ</u>	<u>205HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-19.4</u>	<u>-12.5</u>	<u>N.D</u>
MRA SIGNAL LEVEL	<u>+16.6</u>	<u>+22.6</u>	<u>-15.5</u>
ARRAY SIGNAL GAIN	<u>36.0</u>	<u>35.1</u>	
20 LOG <u>51</u>	<u>34.1</u>	<u>34.1</u>	<u>34.1</u>
# of elements			
DIFFERENCE	<u>+ 1.9</u>	<u>+ 1.0</u>	

ARRAY GAIN

MRA SNR	<u>41.8</u>	<u>50.0</u>	<u>11.7</u>
MEAN OMNI SNR	<u>28.6</u>	<u>34.5</u>	<u>N.D.</u>
ARRAY GAIN	<u>13.2</u>	<u>15.5</u>	
THEORETICAL AZMUTH GAIN (at MRA)	<u>13.6</u>	<u>16.0</u>	<u>16.2</u>
DIFFERENCE	<u>- .4</u>	<u>- .5</u>	

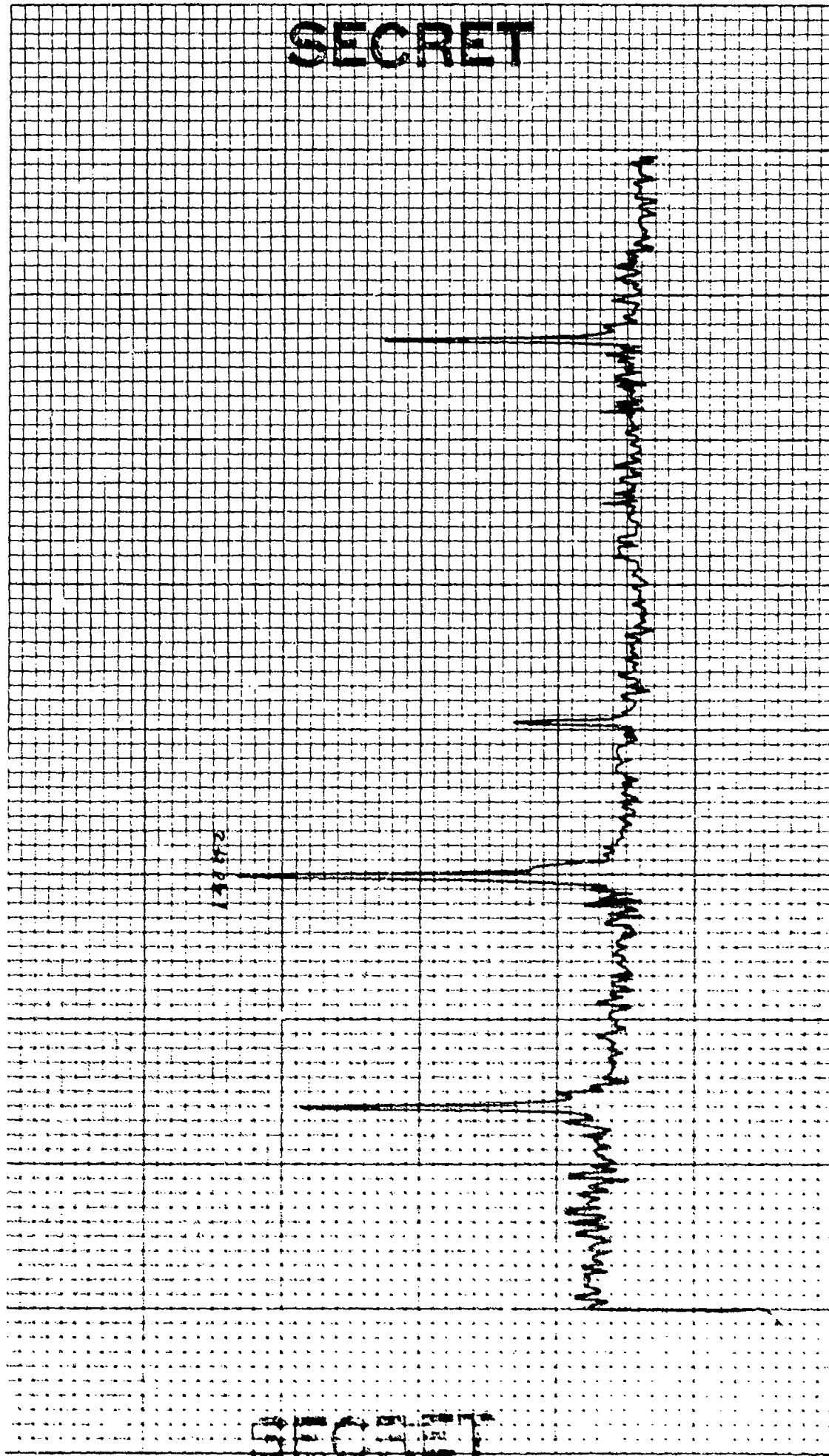
CONFIDENTIAL

KOE 12 X 10 TO TIME INCHES
10 INCHES
EQUIP. & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2131 - 57 (208) DATE OF ANALYSIS: ---
BEAMFORMED SPECTRUM (ELEMENTS) / - 26 28-53)
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS * ATTEN: -30 DB
CENTER FREQ: 150 HZ FILTER WTG: HANNING
57 ELEMENTS + 44 DEG. AZ STEERING

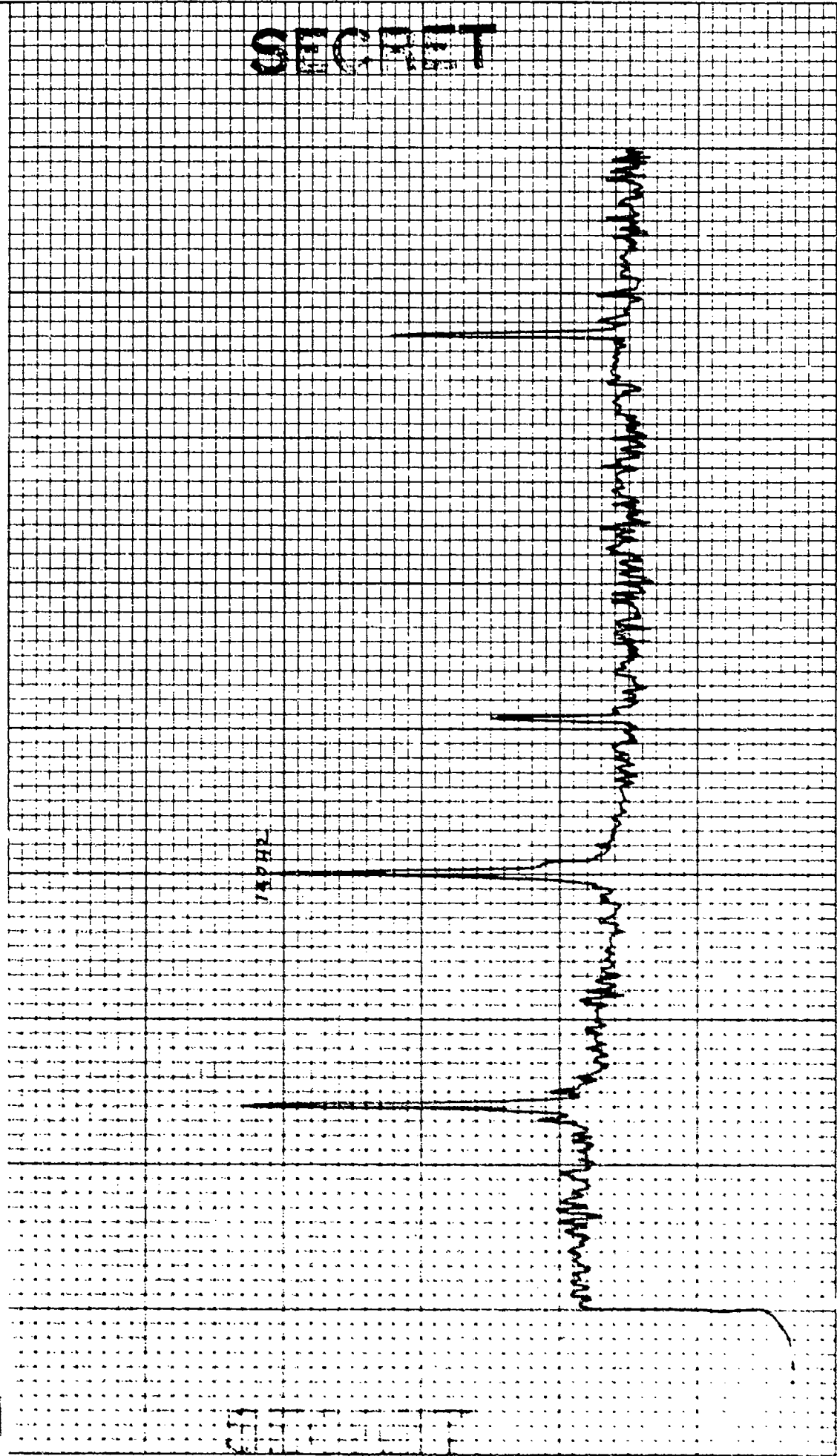
REEL: A110 INDE X3620



K&E FAX TO THE INCH. 7.4 IS. INCHES
FLUOR. P. ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2/31 - 51 (D89) DATE OF ANALYSIS: REEL: 410 INDE X3126
BEAMFORMED SPECTRUM (ELEMENTS) 1-264 28-53) INTEGRATION TIME 320 SECS ATTN: -70 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 150 HZ +46 DEG. AZ STEERING

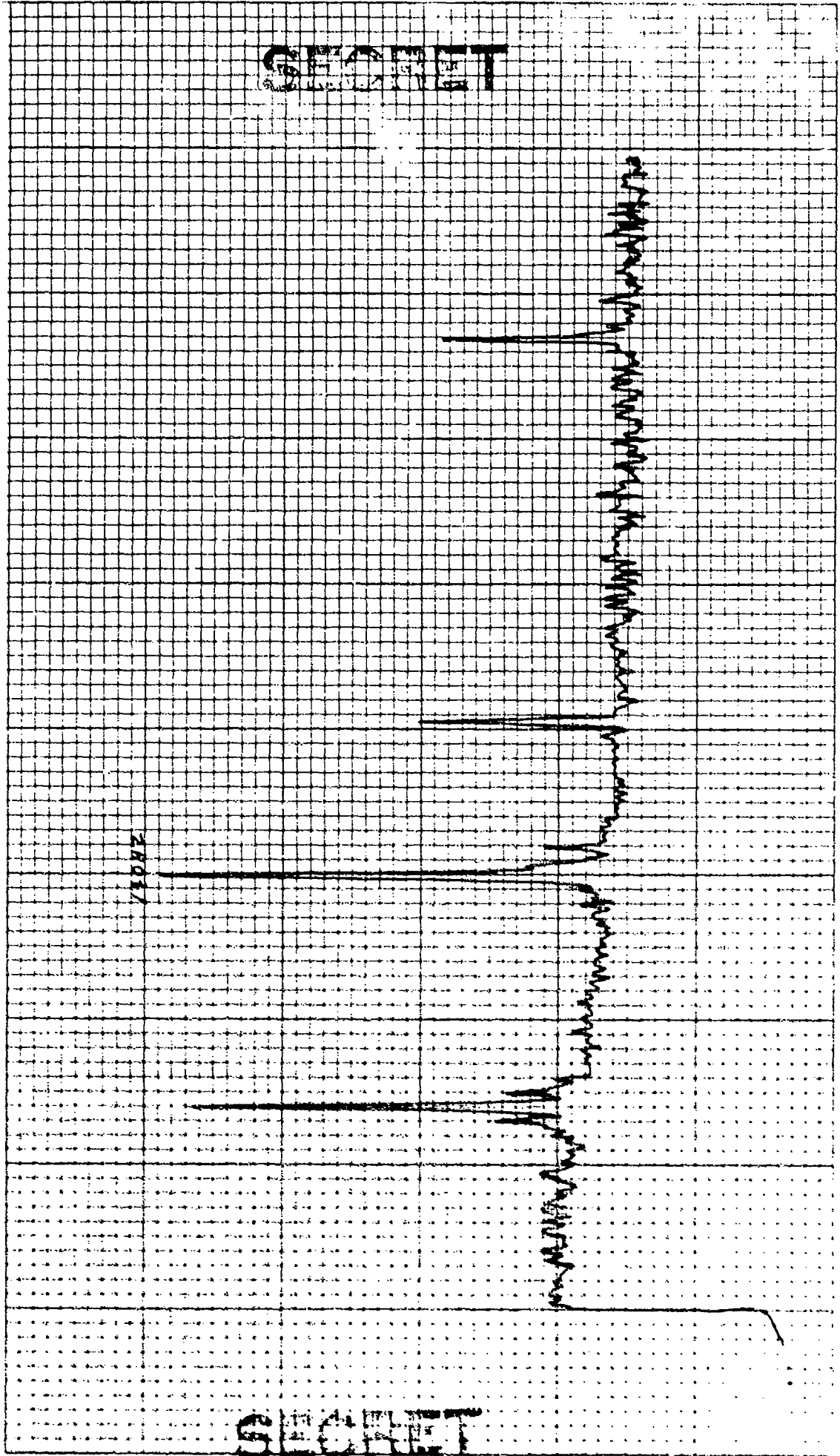


SECRET

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

46 0703

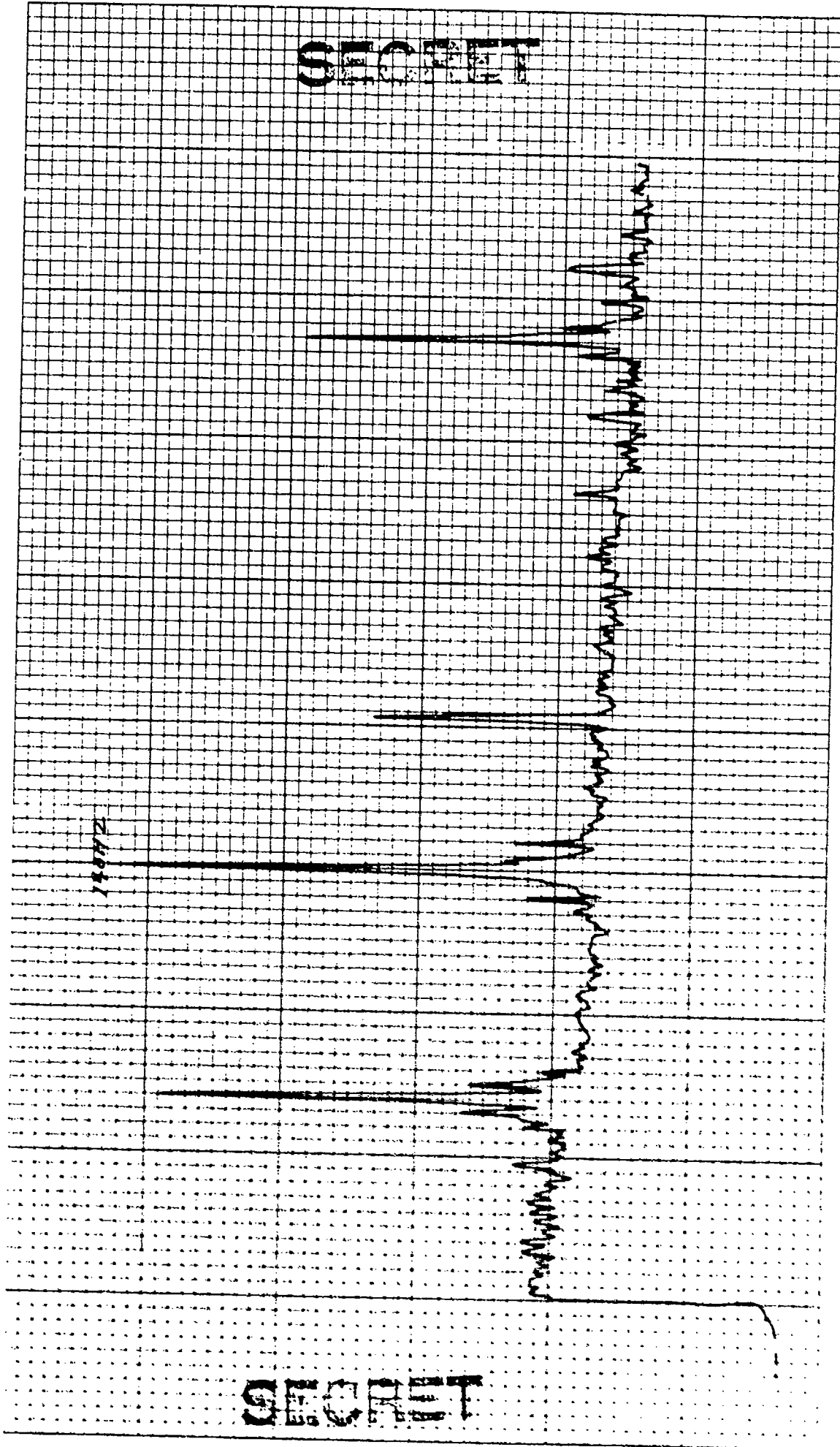
CONTROL: 2131 - 51 (DP9) DATE OF ANALYSIS: REEL: M10 INDE XJ62
BEAMFORMED SPECTRUM (ELEMENTS) 1-26 28-53)
EXERCISE: BEARING STAKE DATE/TIME: 3-5-77 - 2131/2 INTEGRATION TIME 320 SECS ATTEN: -30 DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTC: HANNING
51 ELEMENTS 440 DEG. AZ STEERING



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

46 0703

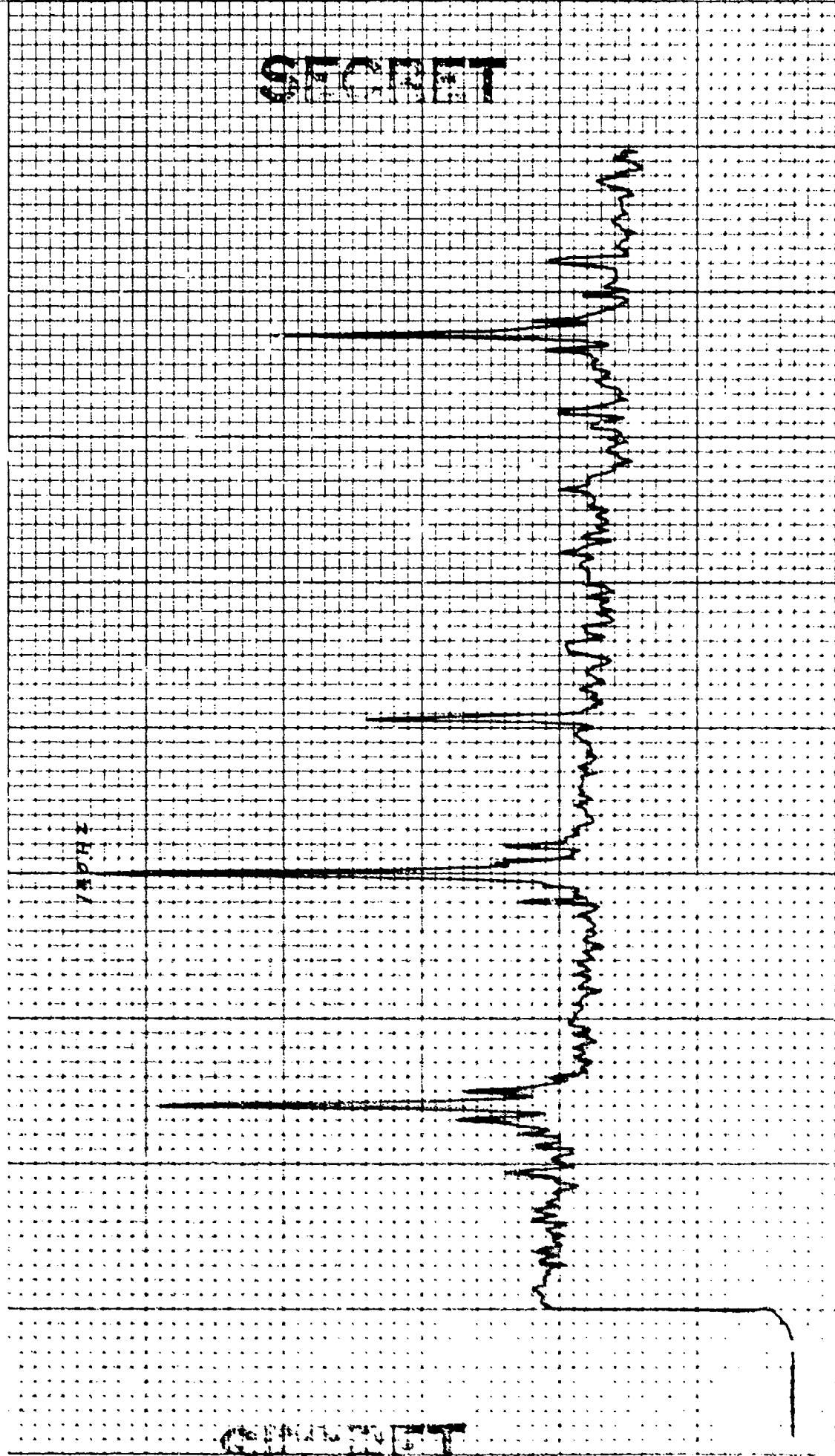
CONTROL: 2/31 - 5/ (D99) DATE OF ANALYSIS: 1-26-89-53 REEL: 110 INDE XJ620
BEAMFORMED SPECTRUM (ELEMENTS) EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTEN: -30DB
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
51 ELEMENTS +50 DEG. AZ STEERING



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

46 0703

CONTROL: 2131 - 51 (D91) DATE OF ANALYSIS: -- -- --
BEAMFORMED SPECTRUM (ELEMENTS) 1-26 * 21-53
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATEN: -30 DB
CENT'R FREQ: 150 HZ FILTER WTG: HANNING
51 ELEMENTS + 51 DEG. AZ STEERING ANALYSIS BANDWIDTH: 1/10HZ



46 0703

USE PAPER TO THE RIGHT OF THIS PAGE

SECRET

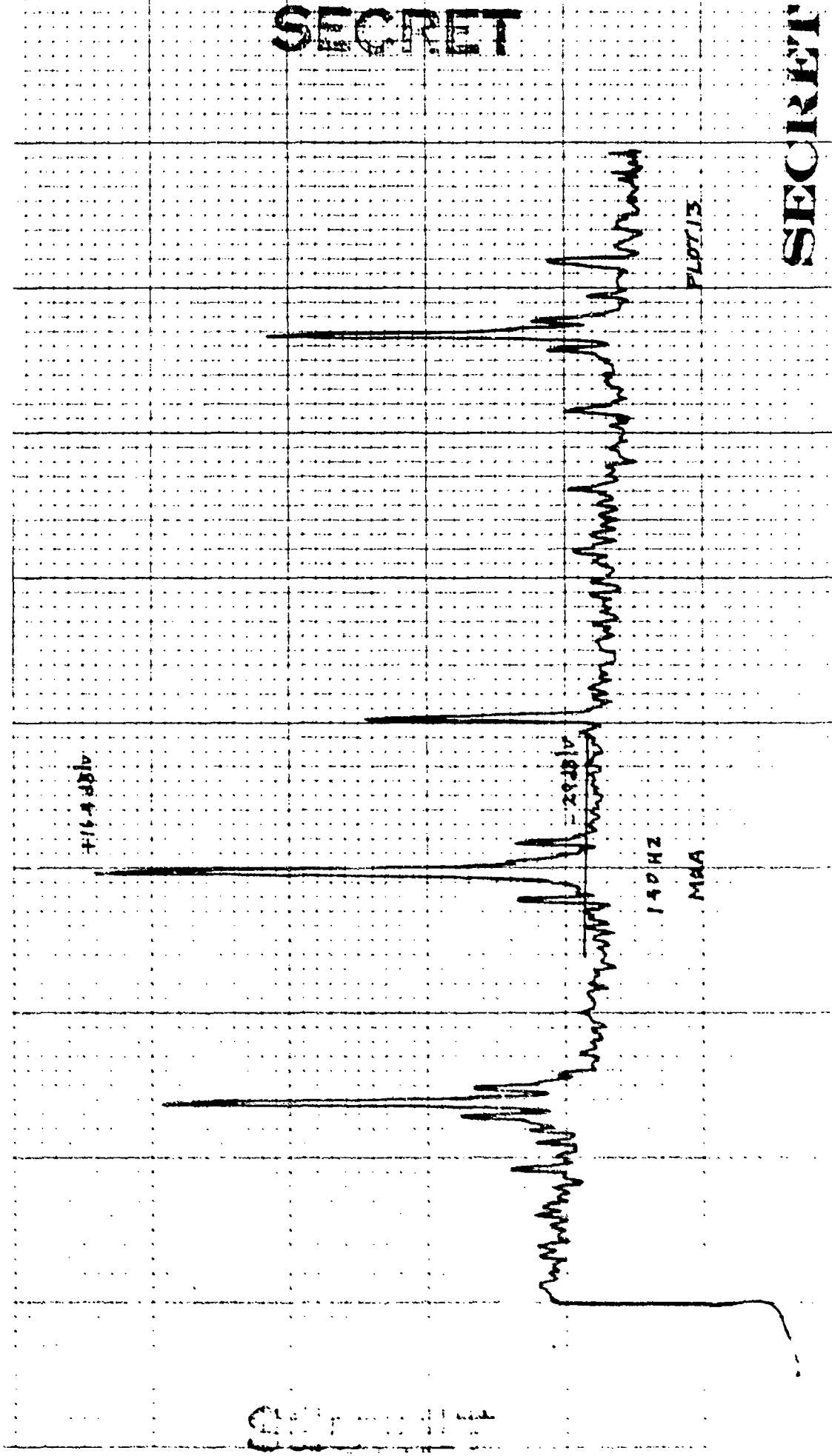
CONTROL: 2/3/ - 5/ (PP9)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
51 ELEMENTS

DATE OF ANALYSIS:
17.26 297.53

DATE/TIME: 3-9-77 - 2/3/ 2
ANALYSIS BANDWIDTH: 1/10 HZ
157.5 DEG. AZ STEERING

REEL: MIC INDE X1620

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



180HZ

150 HZ

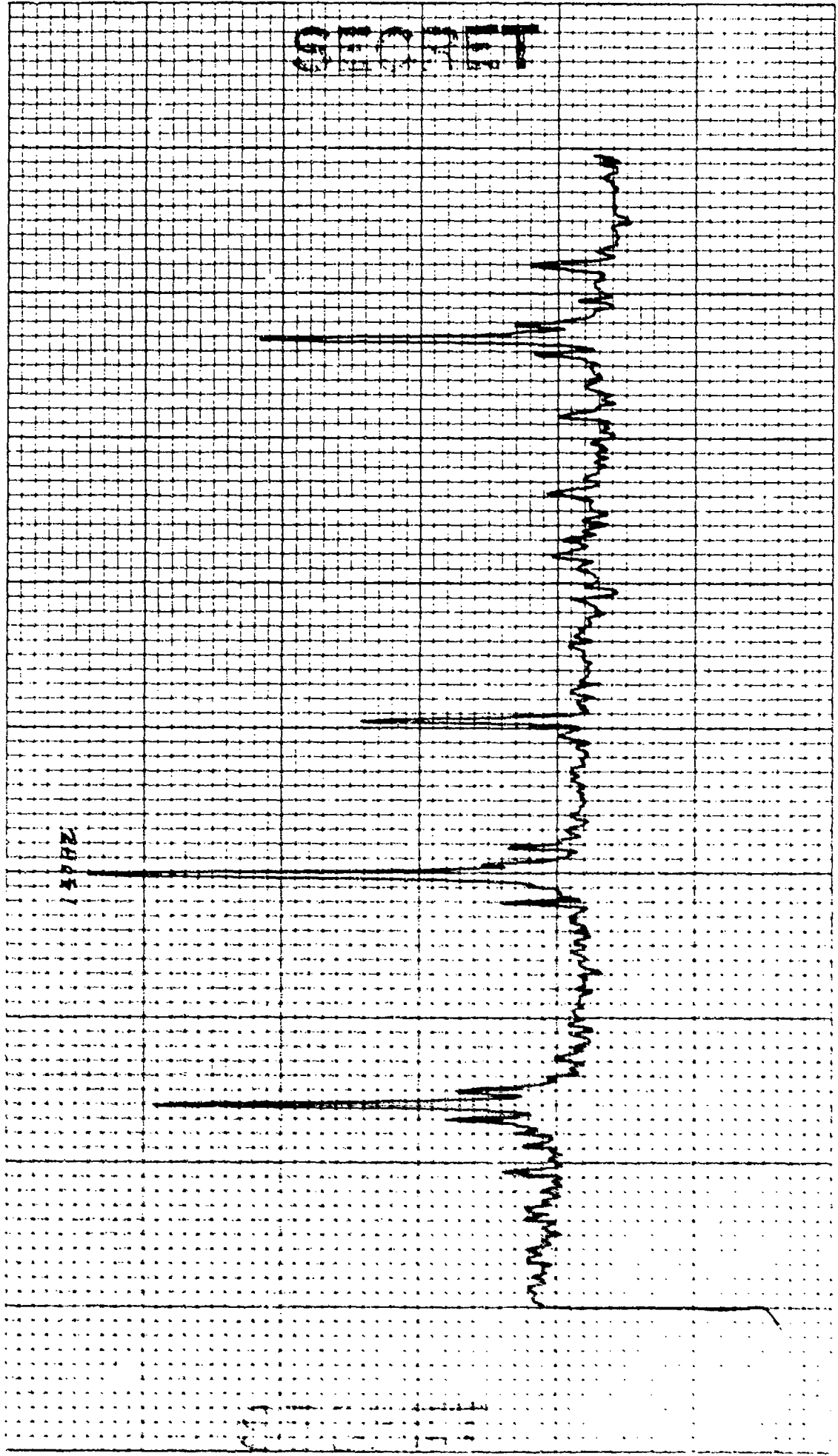
111HZ

KOE 15.3 IS TO THE INSTRUMENTS
PERDRELL & ROSSER CO. WASH. D.C.

46 0703

CONTROL: 2131 - 51 (DP9) DATE OF ANALYSIS: - - -
BEAMFORMED SPECTRUM (ELEMENTS) 1-264 08-53
EXERCISE: BEARING STAKE DATE/TIME: 2-15-77 - 20/ Z
CENTER FREQ: 150 MHz ANALYSIS BANDWIDTH: 1/10 HZ
51 ELEMENTS +52 DEG. AZ STEERING

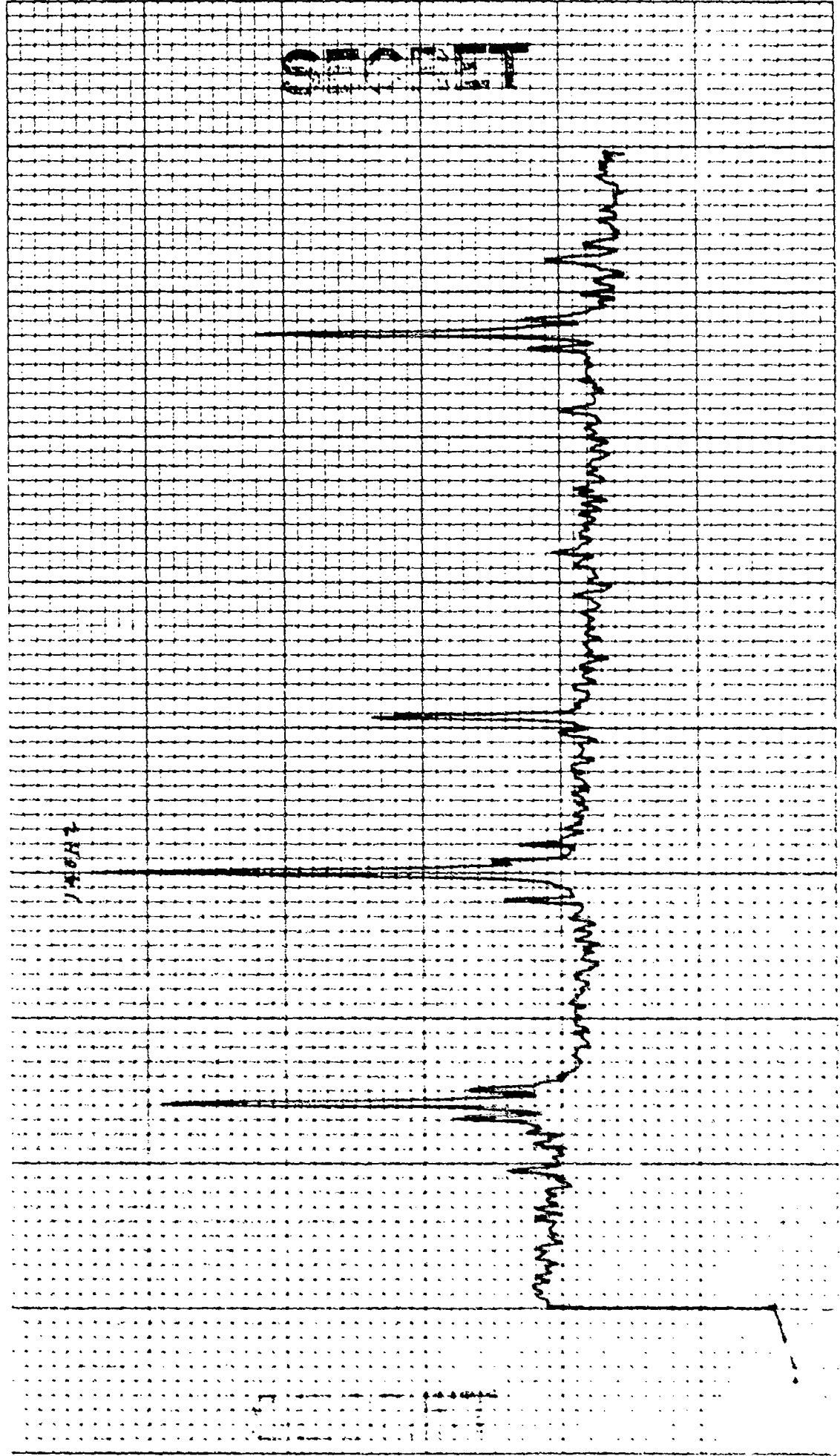
REEL: M10 INDE X 3620
INTEGRATION TIME 320 SECS ATTEN: -30 DB
FILTER WTC: HANNING



KOE 15.4 IS TO THE DIRECTION OF THE ELEMENTS

46 0703

CONTROL: 2131 - 51 (DP9)
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-26-77
EXERCISE: BEARING STAKE DATE/TIME: 7-15-77 - 2131Z
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
51 ELEMENTS +54 DEG. AZ STEERING
INTEGRATION TIME 320 SECS FILTER WTG: HANNING
REEL: 410 INDE X 3620 ATTN: -30 DB



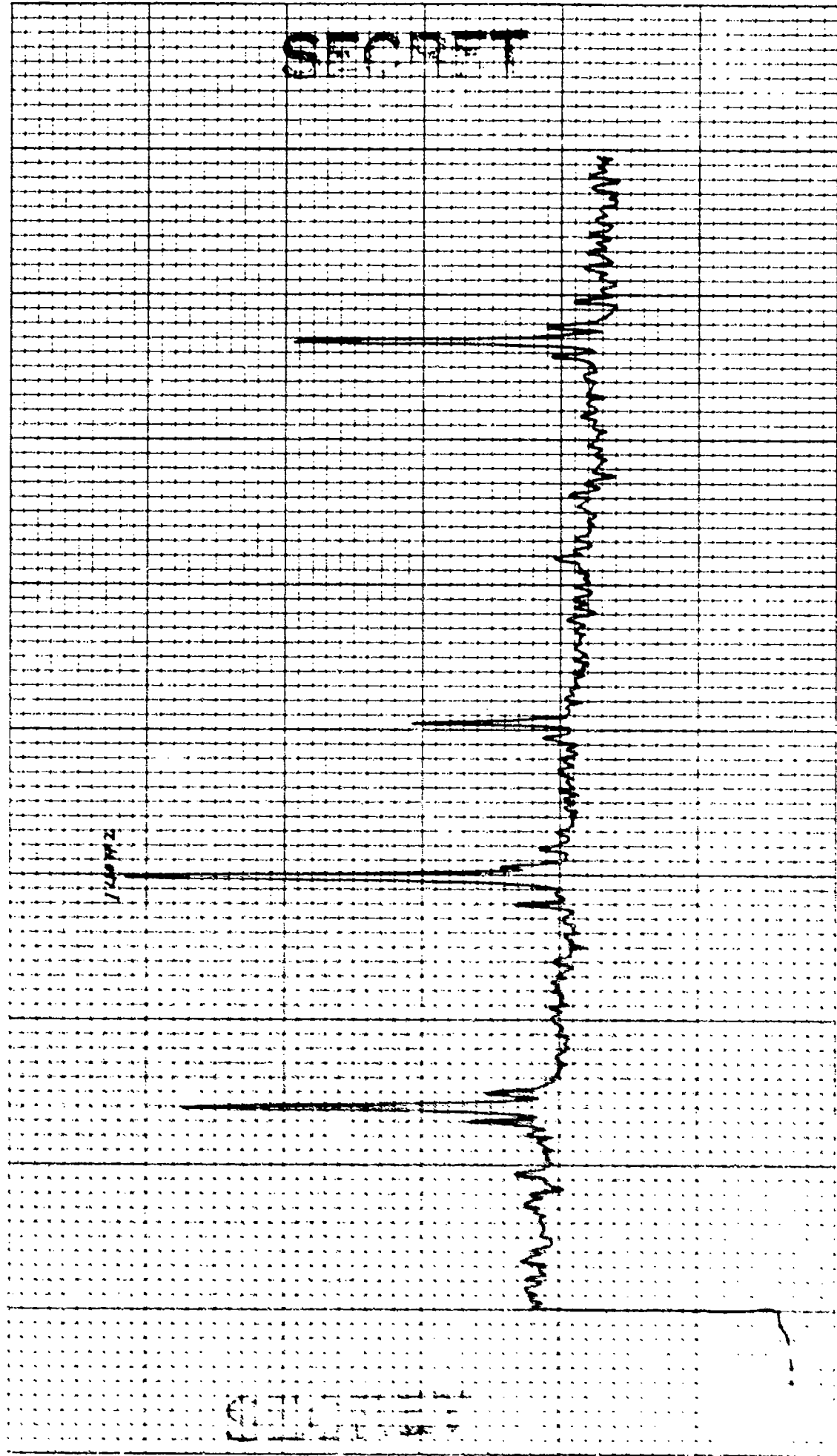
REF ID: A6 TO THE US...
PERFECT & POWER CO.

46 0703

CONTROL: 2131-57 (D09)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
57 ELEMENTS

DATE OF ANALYSIS: -- -- --
1-268 29-53)
DATE/TIME: 3-15-77 - 2131 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+56 DEG. AZ STEERING

REEL: M10 INDE X3620
INTEGRATION TIME 320 SECS ATTN: -3.0 DB
FILTER WTC: HANNING



MOE 10 X 10 TO THE INCHES 1.4 TO INCHES
REDFIELD & PETER CO. MADE IN U.S.A.

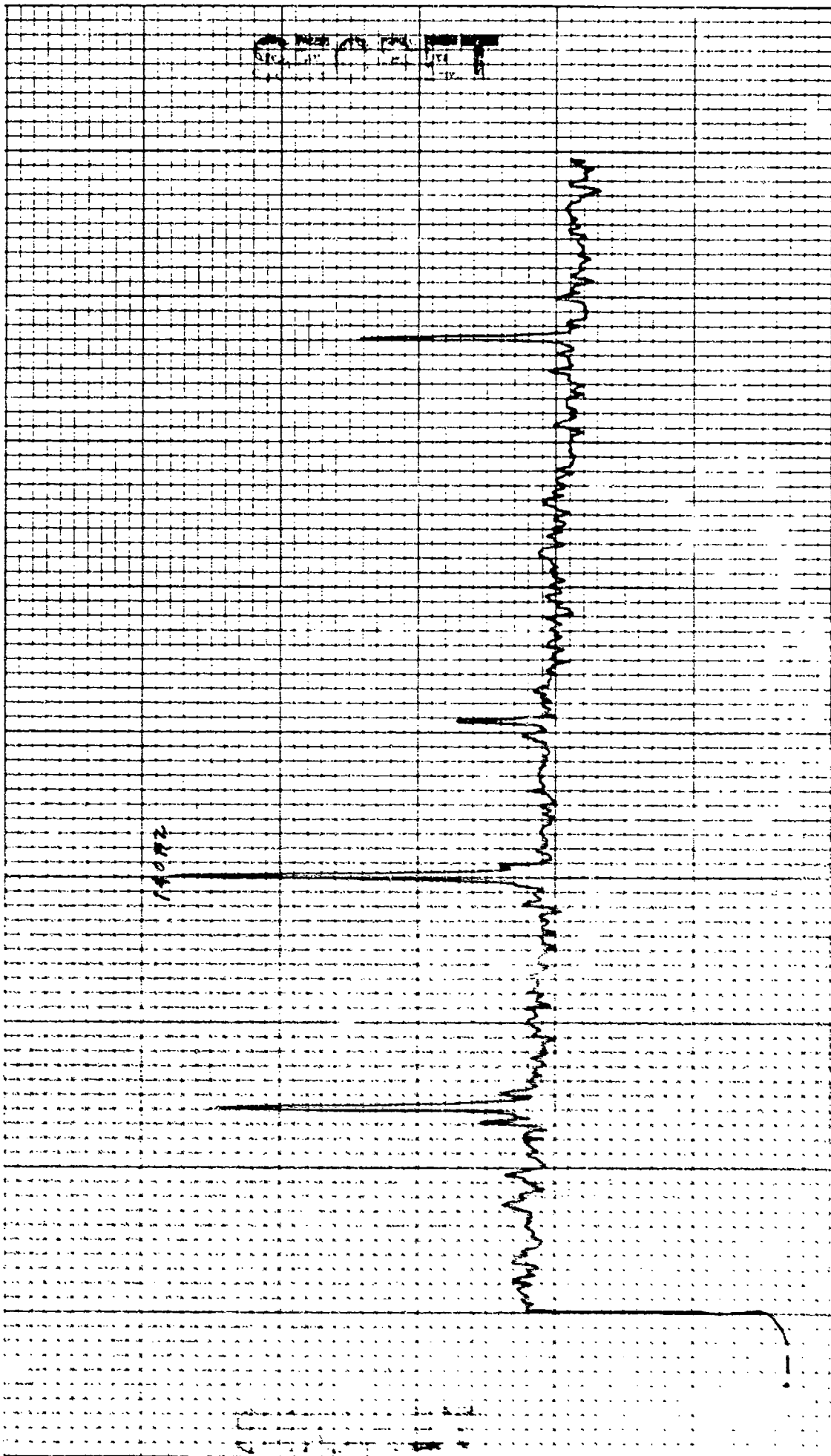
46 0703

CONTROL: 231 - 51 (DP9)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
51 ELEMENTS

DATE OF ANALYSIS: 1-26-89-53)
DATE/TIME: 3-15-77 - 213 / Z
ANALYSIS BANDWIDTH: 1 / 10 HZ
+ 50 DEG. AZ STEERING

REEL: N10
INDE X 2620

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

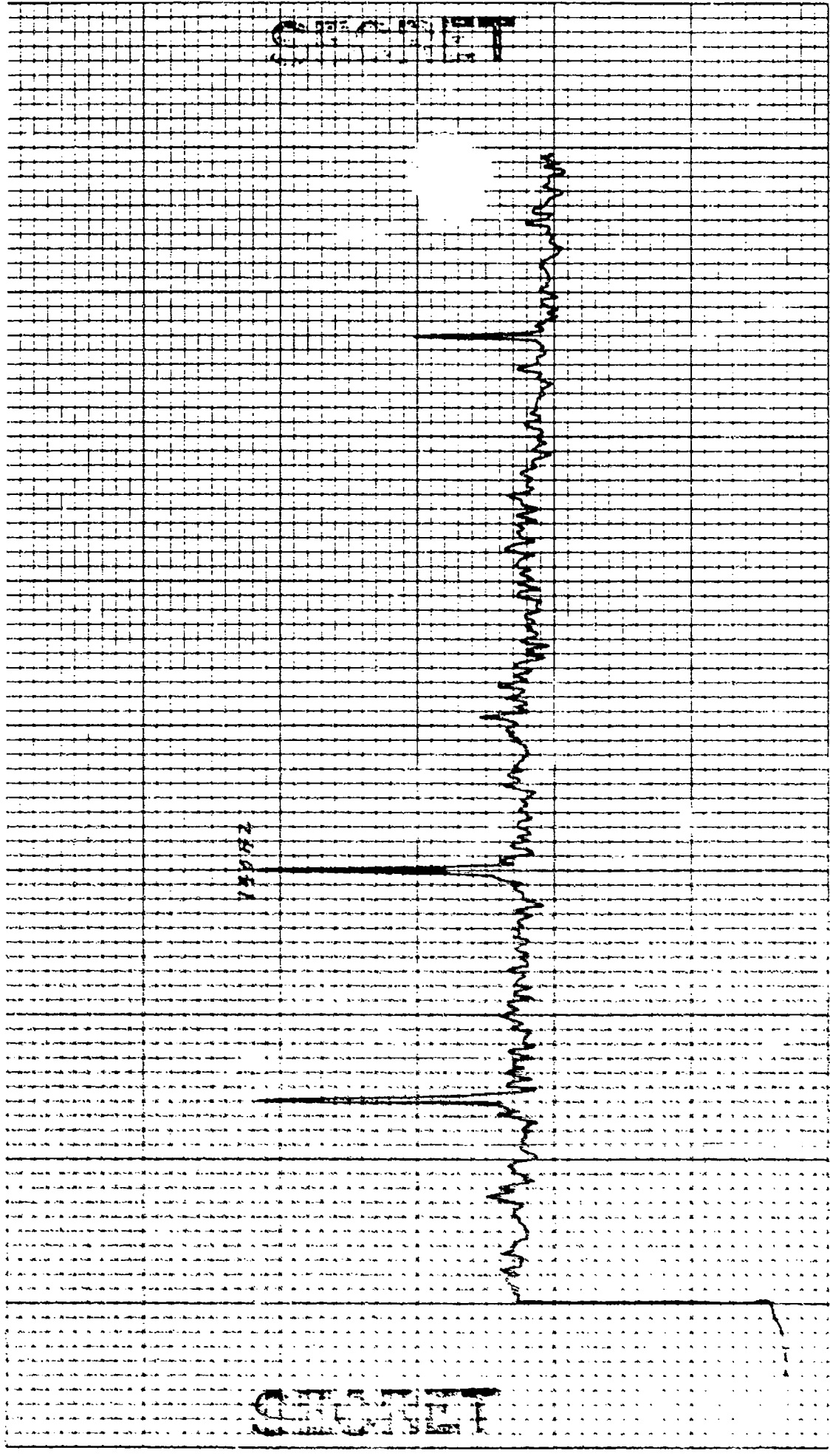


K·E 10 2 10 10 10 TIME INCHES 1 2 10 INCHES
MILWAUKEE METER CO. MADE IN U.S.A.

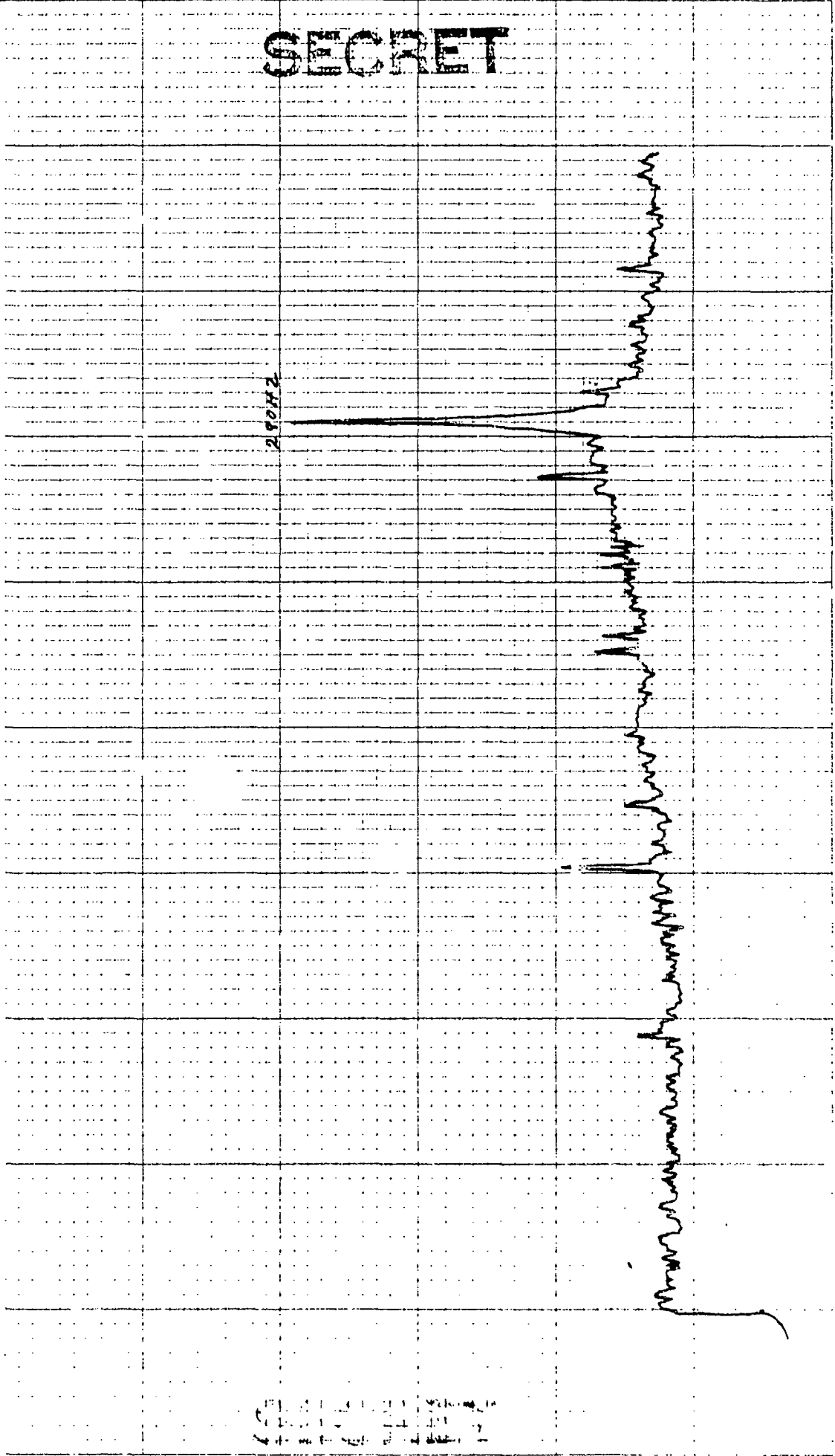
45 0703

CONTROL: 2131 - 51 (DP9) DATE OF ANALYSIS: - - - -
BEAMFORMED SPECTRUM (ELEMENTS) 1-26 * 29-53)
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTEN: -70DB
CENTER FREQ: 150 HZ FILTER WTG: HANNING
51 ELEMENTS +60 DEG. AZ STEERING

REEL: A10 INDE X3620



CONTROL: 2/31 - 51 (DP9) DATE OF ANALYSIS: 1-26-77 REEL: A10 INDE X360
 BEAMFORMED SPECTRUM (ELEMENTS) 28-53
 EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 2:31Z INTEGRATION TIME 320 SECS ATTN: -30 DB
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
51 ELEMENTS + 44 DEG. AZ STEERING



SECRET

NOE
1/2 INCH TO TIME INCHES
1/2 INCHES
1/2 INCHES

46 0703

INDE X 3620

REEL: 710

DATE OF ANALYSIS: - - -

CONTROL: 213(-5/ (DPT)

BEAMFORMED SPECTRUM(ELEMENTS)

EXERCISE: BLARING STAKE

CENTER FREQ: 270 HZ

5/ ELEMENTS

DATE/TIME: 1-26-89 29-53

ANALYSIS BANDWIDTH: 1/10HZ

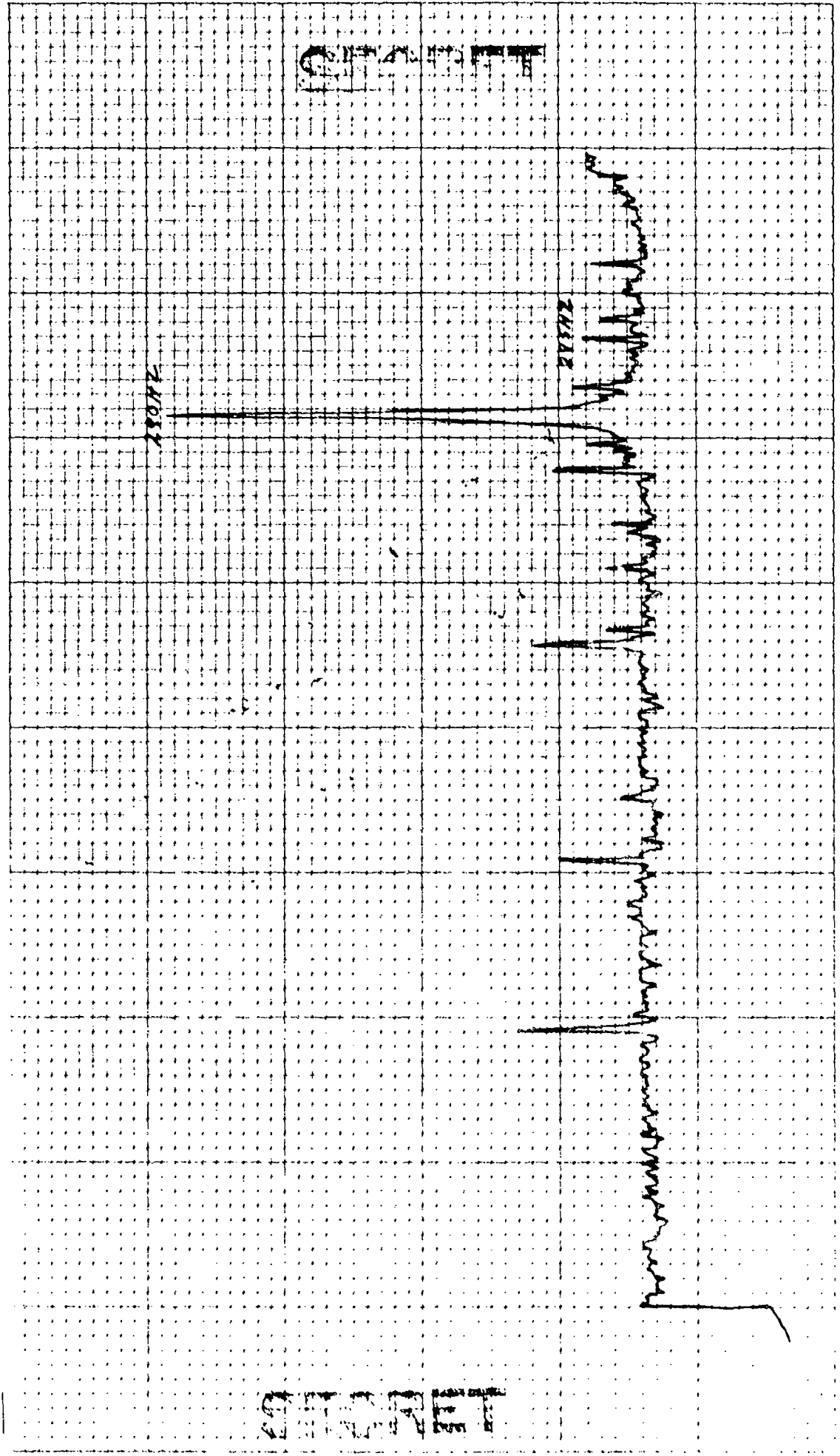
+46 DEG. AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

WTG: HANNING

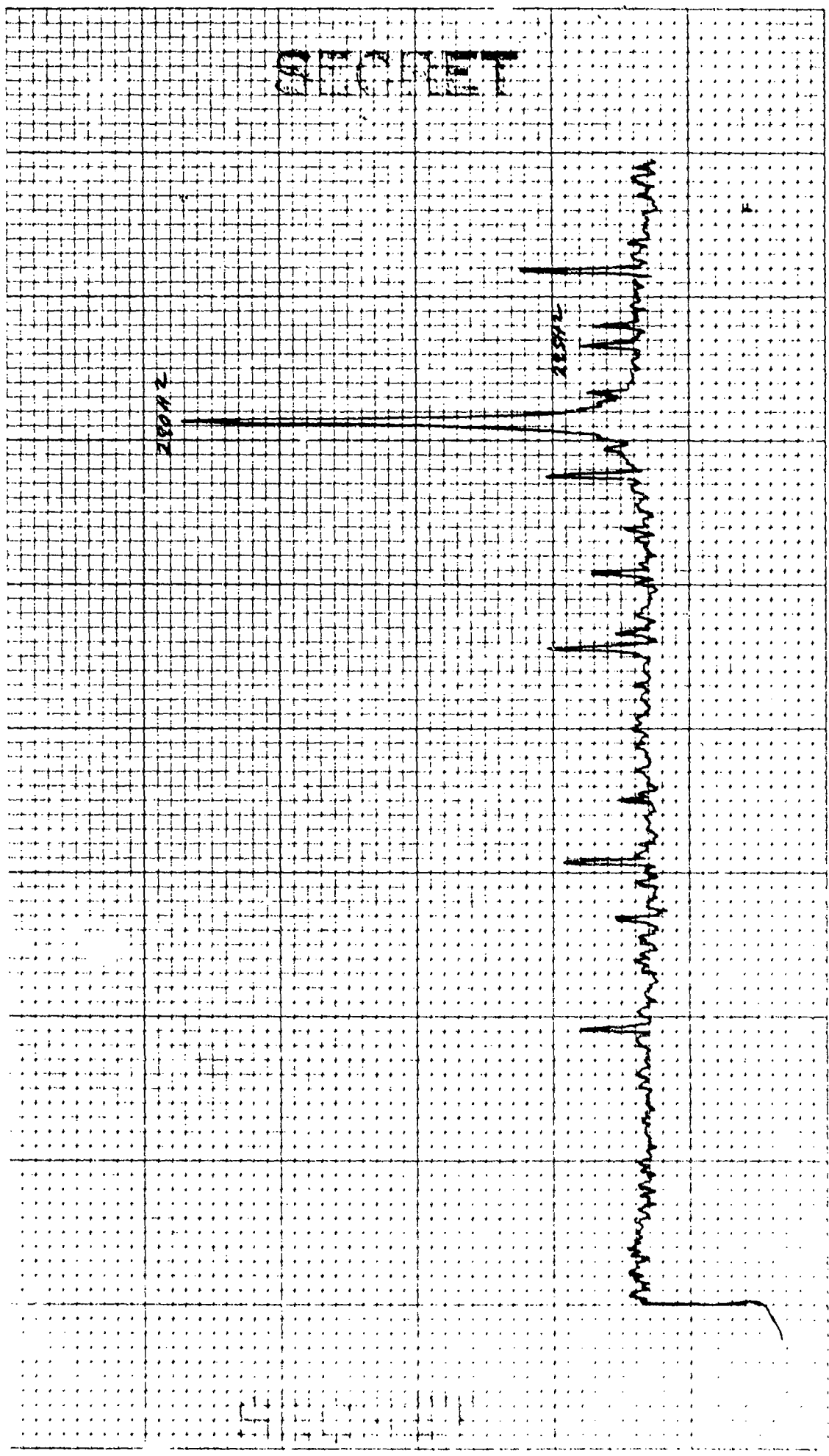
ATTEN: -30 DB



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

46 0703

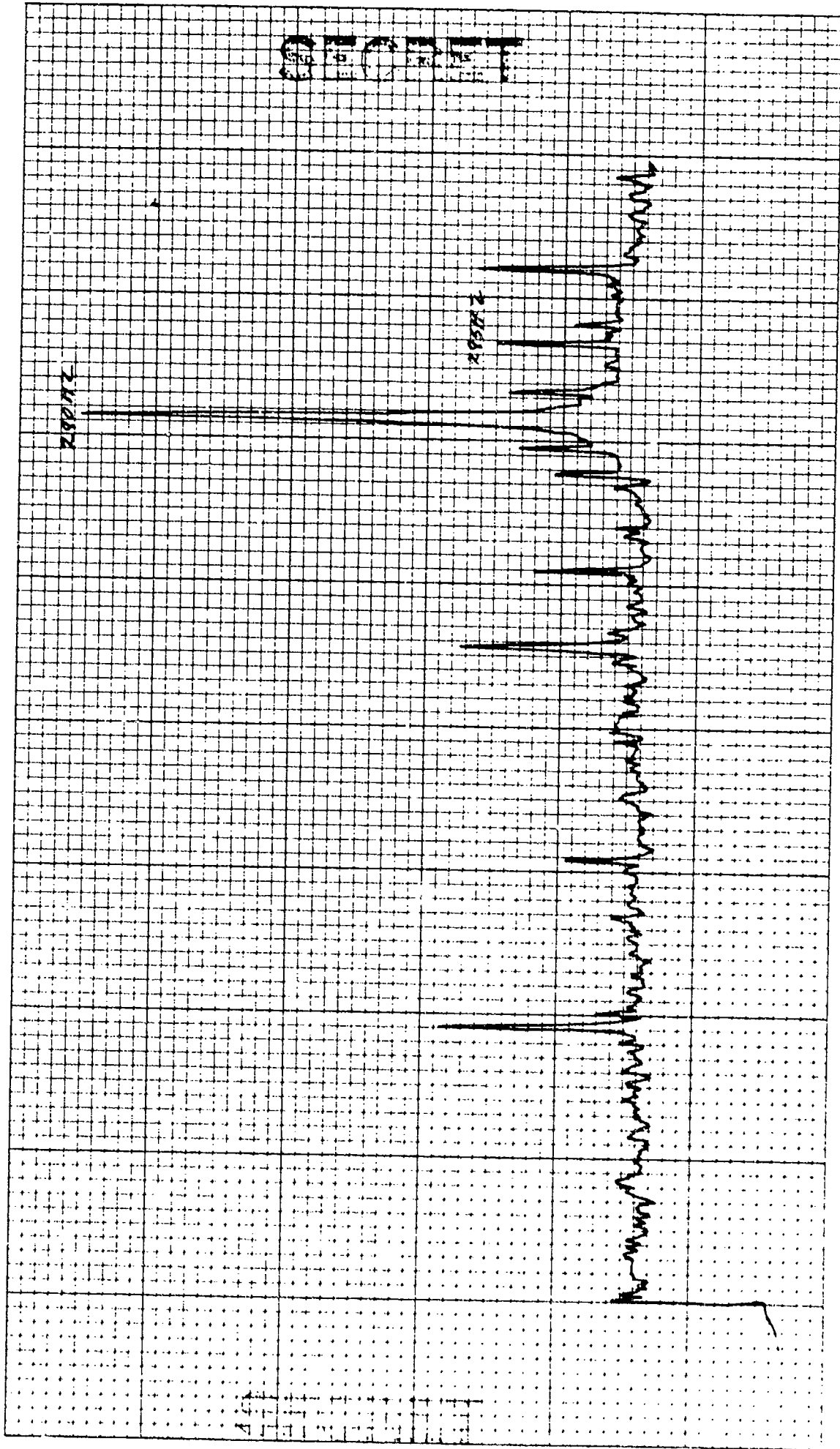
CONTROL: 2131 - 51 (DP1) REEL: N10 INDE X3620
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-26-53 (21-53)
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTEN: -30 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
51 ELEMENTS +48 DEG. AZ STEERING



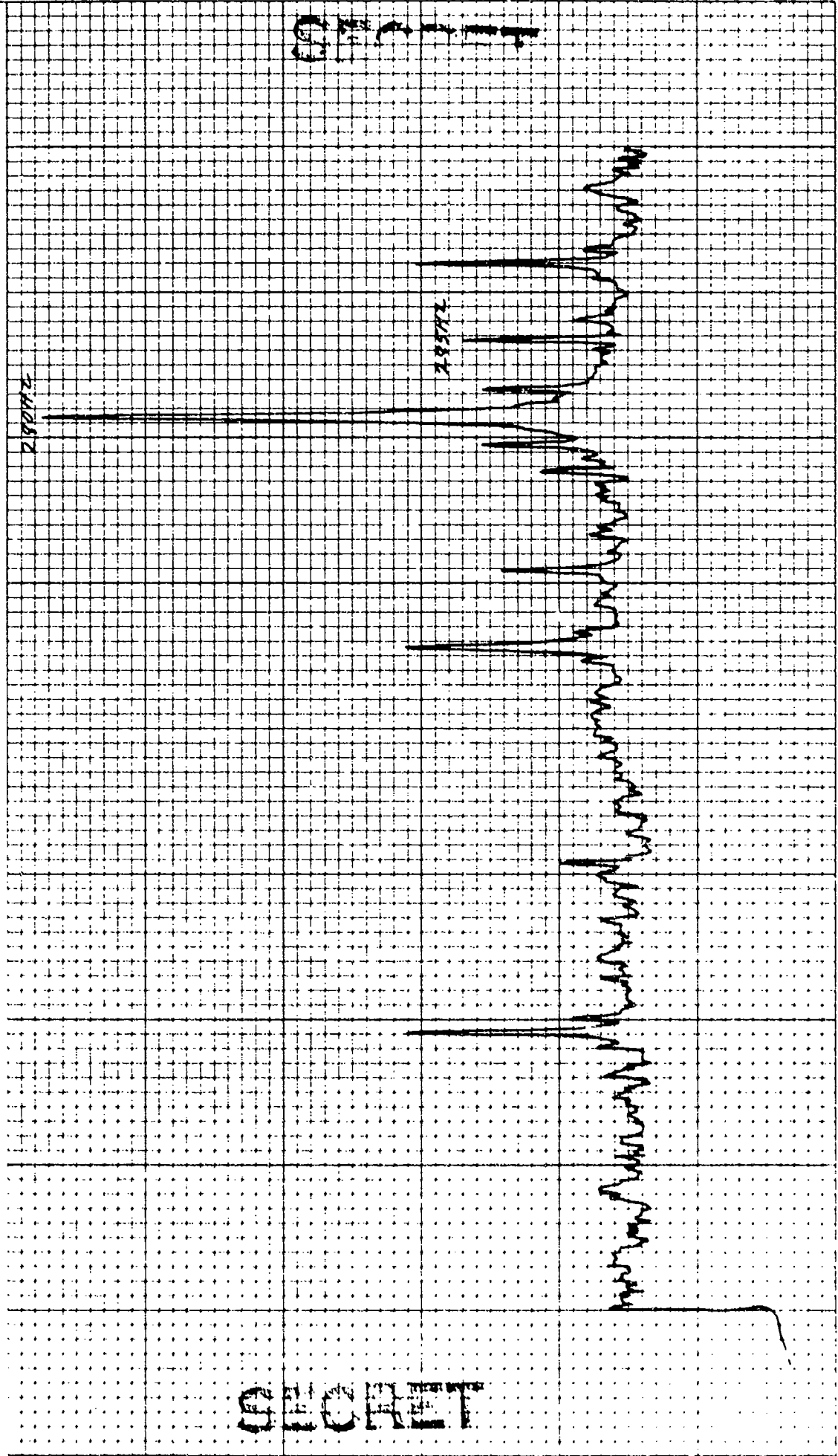
KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2121 - 51 (389) DATE OF ANALYSIS: 1-20-53 REEL: A10 INDE X360
BEAMFORMED SPECTRUM(ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 213 / Z INTEGRATION TIME 320 SECS ATTN: -30DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
51 ELEMENTS +50 DEG. AZ STEERING



CONTROL: 2131 - 51 (DP9) DATE OF ANALYSIS: - - REEL: 410 INDE X 3620
BEAMFORMED SPECTRUM (ELEMENTS) 1-26421-53
EXERCISE: BEARING STAKE DATE/TIME: 375-77 - 2151 Z INTEGRATION TIME 320 SECS ATEN: -30DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WIG: HANNING
51 ELEMENTS 457 DEG. AZ STEERING

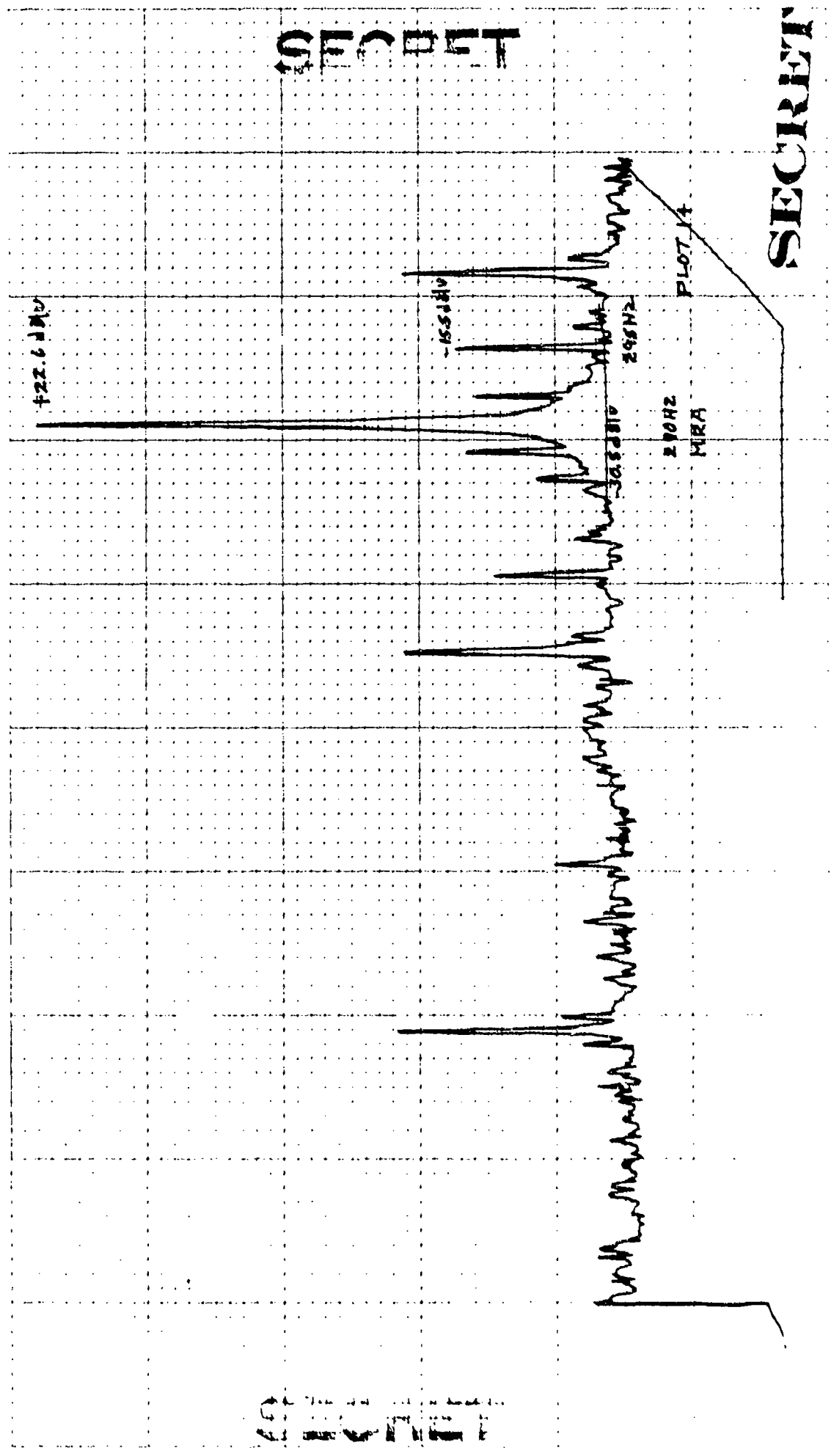


45 0703

1422 2100 2100 2100 2100

SECRET

CONTROL: 2131 - 51 (DP9) DATE OF ANALYSIS: _____ REEL: N10 INDE X 3620
 BEAMFORMED SPECTRUM(ELEMENTS) 1524 297053 INTEGRATION TIME 320 SECS ATTEN: - DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WIG: HANNING
 CENTER FREQ: 270 HZ
51 ELEMENTS 151.5 DEG. AZ STEERING



270HZ

232Hz

308Hz

SECRET

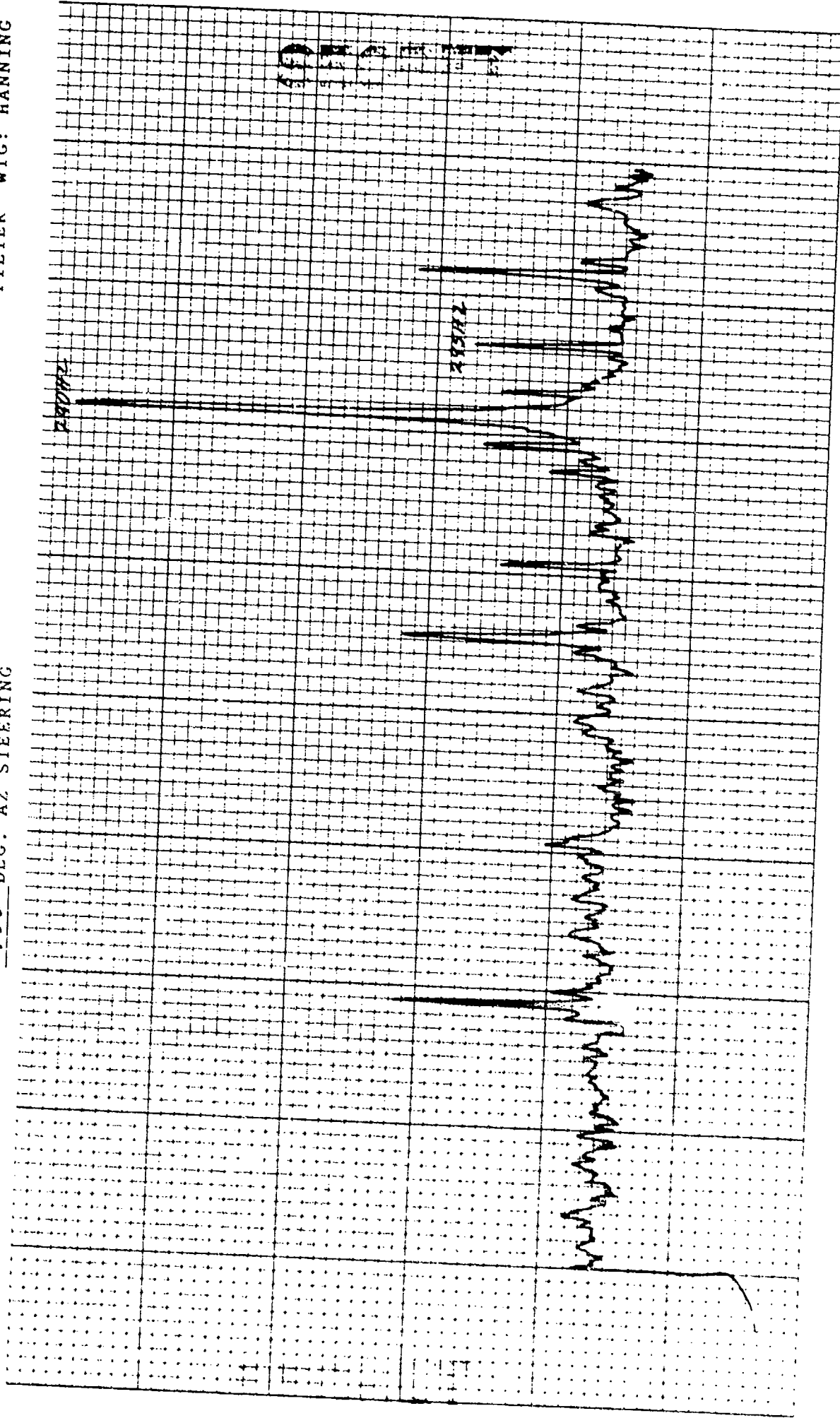
KOE 10 X 10 TO THE INCH .7 X 10 INCHES
PEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2131 - 51 (DPF)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
51 ELEMENTS

DATE OF ANALYSIS: 1-26-53
DATE/TIME: 3-15-77-013(Z)
ANALYSIS BANDWIDTH: 1/10 HZ
+52 DEG. AZ STEERING

REEL: 410 INDE X7600
INTEGRATION TIME 320 SECS ATTN: -30 DB
FILTER WIG: HANNING



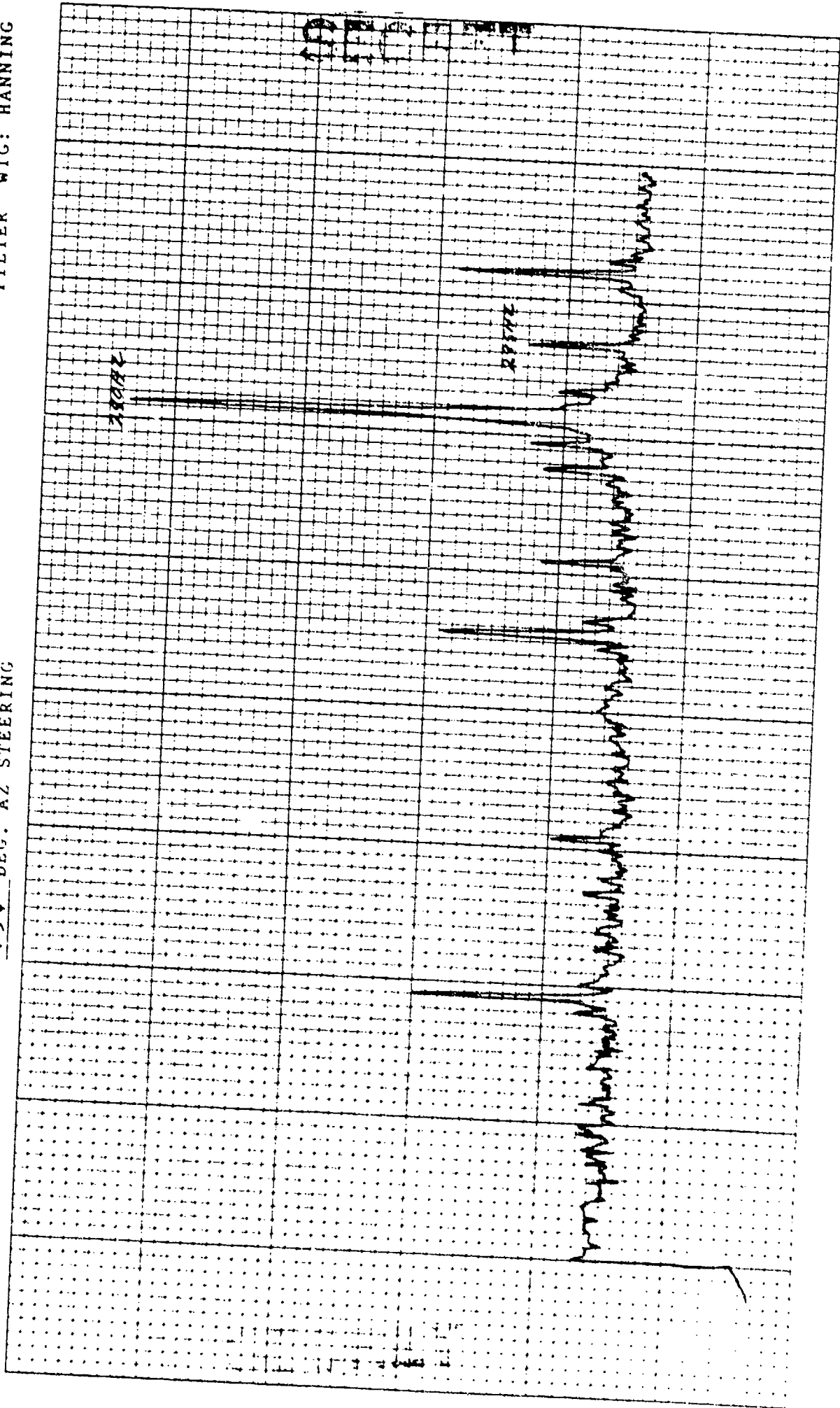
KOE 10 X 10 TO THE INCH • 7 1/2 INCHES
PEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2131 - 51 (DPP)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
51 ELEMENTS

DATE OF ANALYSIS: ---
1-26-53
DATE/TIME: 215-77 - 2121 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+ 54 DEG. AZ STEERING

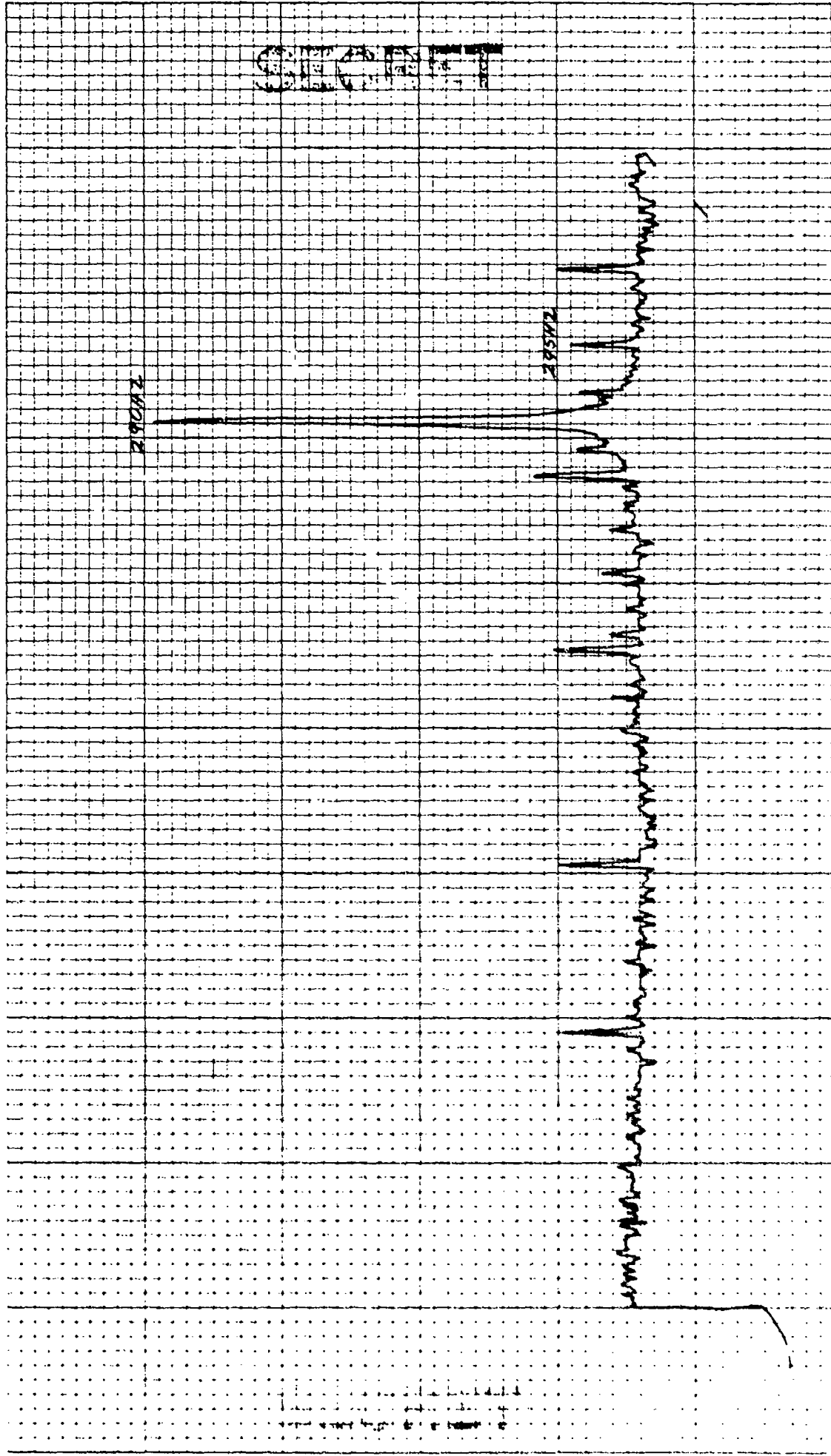
REF: A10 INDE X3620
INTEGRATION TIME 320 SECS ATTN: -30 DB
FILTER WTG: HANNING



K·E 10 X 10 TO THE INCH = 2.5 CM. HCFHS
PERUCEL & ESCOFFIER CO. MADE IN U.S.A.

46 0703

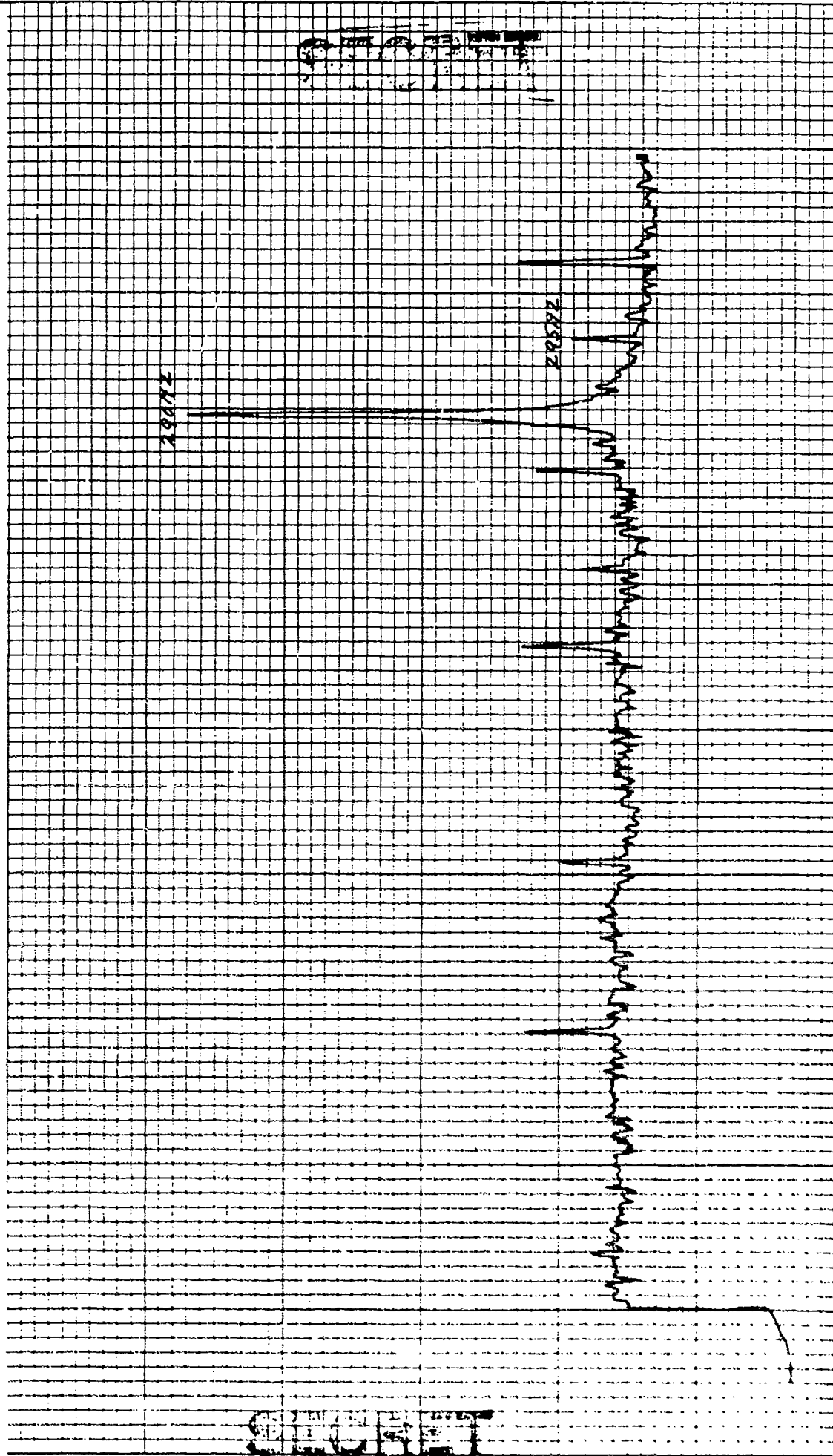
CONTROL: 2131-51 (DP9) DATE OF ANALYSIS: - - - -
BEAMFORMED SPECTRUM (ELEMENTS 1-26 & 28-53)
EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 2131Z ATTEN: -20 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
5/ ELEMENTS + 56 DEG. AZ STEERING REEL: 110 UNDE X 3620



KOE 10 X 10 TO TIME INCH. 7 X 10 INCHES
REUPTEL BY ESCRER CO. MADE IN U.S.A.

46 0703

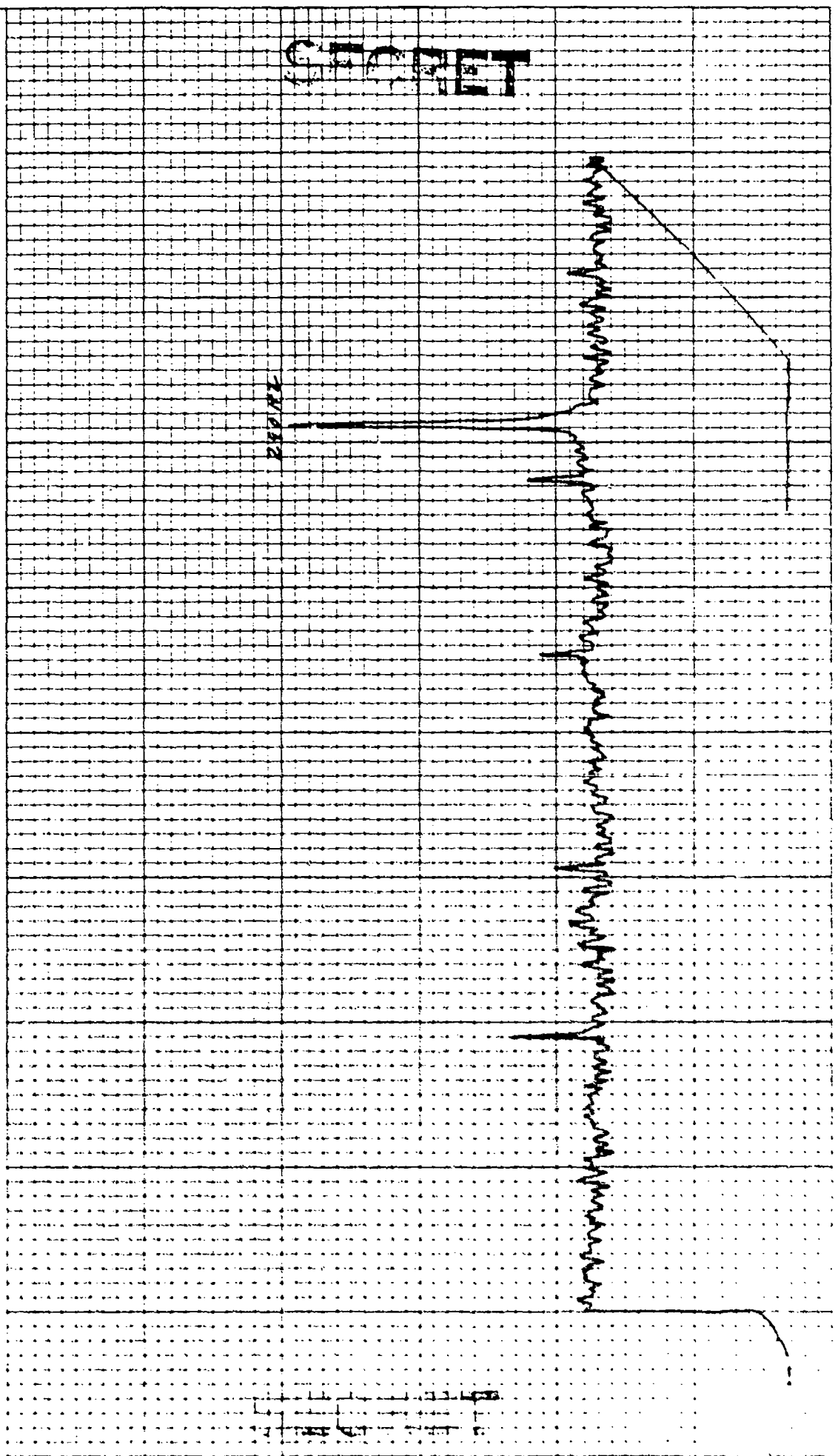
CONTROL: 2131 - 51 (DPF) DATE OF ANALYSIS: REEL: 410 INDE X3600
BEAMFORMED SPECTRUM (ELEMENTS) 1-26-79 29-53)
EXERCISE: BEARING STAKE DATE/TIME: 3-15-77 - 2131 Z INTEGRATION TIME 320 SECS ATTN: -30 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
51 ELEMENTS +50 DEG. AZ STEERING



MOE 10.8 IN TO THE INCHES
REDFIELD & CO. INC. MA. U.S.A.

46 0703

CONTROL: 2131 - 51 (DP9) DATE OF ANALYSIS: 1-26-77 REEL: 410 INDE X 3620
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 3-15-77 - 2131 Z INTEGRATION TIME 320 SECS ATTEN: -30 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
CENTER FREQ: 270 HZ 460 DEC. AZ STEERING





DEPARTMENT OF THE NAVY

OFFICE OF NAVAL RESEARCH
875 NORTH RANDOLPH STREET
SUITE 1425
ARLINGTON VA 22203-1995

IN REPLY REFER TO:

5510/1
Ser 321OA/011/06
31 Jan 06

MEMORANDUM FOR DISTRIBUTION LIST

Subj: DECLASSIFICATION OF LONG RANGE ACOUSTIC PROPAGATION PROJECT
(LRAPP) DOCUMENTS

Ref: (a) SECNAVINST 5510.36

Encl: (1) List of DECLASSIFIED LRAPP Documents

1. In accordance with reference (a), a declassification review has been conducted on a number of classified LRAPP documents.
2. The LRAPP documents listed in enclosure (1) have been downgraded to UNCLASSIFIED and have been approved for public release. These documents should be remarked as follows:

Classification changed to UNCLASSIFIED by authority of the Chief of Naval Operations (N772) letter N772A/6U875630, 20 January 2006.

DISTRIBUTION STATEMENT A: Approved for Public Release; Distribution is unlimited.

3. Questions may be directed to the undersigned on (703) 696-4619, DSN 426-4619.

BRIAN LINK
By direction

Subj: DECLASSIFICATION OF LONG RANGE ACOUSTIC PROPAGATION PROJECT
(LRAPP) DOCUMENTS

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 616 220	U
Unavailable	Watrous, B. A.	PARKA I OCEANOGRAPHIC DATA COMPENDIUM	Naval Ocean R&D Activity	781101	ADB115967	U
Unavailable	Dunbar, B., et al.	LAMBDA PROCESSING LABORATORY AND ENGINEERING SUPPORT, FINAL REPORT 1 JANUARY 1977 - 31 OCTOBER 1978	Texas Instruments, Inc.	781129	ND	U
Unavailable	Blumen, L. S., et al.	ASTRAL MODEL. VOLUME 2: SOFTWARE IMPLEMENTATION	Science Applications, Inc.	790101	ADA956122	U
Unavailable	Spofford, C. W.	ASTRAL MODEL. VOLUME 1: TECHNICAL DESCRIPTION	Science Applications, Inc.	790101	ADA956124	U
Unavailable	Townsend, R., et al.	SELF-TENSIONING ACOUSTICAL HORIZONTAL LINE ARRAY (SPRAY) DATA ANALYSIS. FINAL REPORT OF BEARING STAKE TESTS JANUARY THRU MARCH 1977. VOLUME IA. OVERALL PROGRAM PERFORMANCE RESULTS WITH TEST RESULTS SUMMARY	Sanders Associates, Inc.	790101	ADC017573	U
Unavailable	Unavailable	SELF-TENSIONING ACOUSTICAL HORIZONTAL LINE ARRAY (SPRAY) DATA ANALYSIS. FINAL REPORT OF BEARING STAKE TESTS JANUARY THRU MARCH 1977. VOLUME IB. DETAILED DESCRIPTION. TEST RESULTS	Sanders Associates, Inc.	790101	ADC017574	U
Unavailable	Unavailable	SELF-TENSIONING ACOUSTICAL HORIZONTAL LINE ARRAY (SPRAY) DATA ANALYSIS. FINAL REPORT OF BEARING STAKE TESTS JANUARY THRU MARCH 1977. VOLUME II. DATA ANALYSIS FACILITY AND DATA REDUCTION METHODOLOGY	Sanders Associates, Inc.	790109	ADC017575	U
Unavailable	Unavailable	SELF-TENSIONING ACOUSTICAL HORIZONTAL LINE ARRAY (SPRAY) DATA ANALYSIS. FINAL REPORT OF BEARING STAKE TESTS JANUARY THRU MARCH 1977. VOLUME IIIA. DATA POINTS 1, 2 AND 3 RAW DATA	Sanders Associates, Inc.	790109	ADC017576	U
Unavailable	Unavailable	SELF-TENSIONING ACOUSTICAL HORIZONTAL LINE ARRAY (SPRAY) DATA ANALYSIS. FINAL REPORT OF BEARING STAKE TESTS JANUARY THRU MARCH 1977. VOLUME IIIB. DATA POINTS 4, 5 AND 6 RAW DATA	Sanders Associates, Inc.	790109	ADC017577	U
Unavailable	Unavailable	SELF-TENSIONING ACOUSTICAL HORIZONTAL LINE ARRAY (SPRAY) DATA ANALYSIS. FINAL REPORT OF BEARING STAKE TESTS JANUARY THRU MARCH 1977. VOLUME IVA. DATA POINTS 7, 8 AND 9 RAW DATA	Sanders Associates, Inc.	790109	ADC017578	U