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

FINAL REPORT OF BEARING STAKE TESTS  
JANUARY THRU MARCH 1976

9 JANUARY 1979

PREPARED FOR  
NAVAL AIR DEVELOPMENT CENTER  
WARMINSTER, PENNSYLVANIA

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

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OCEAN SYSTEMS DIVISION  
95 CANAL STREET  
NASHUA, NEW HAMPSHIRE 03061

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VOLUME IIIA

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

2

LEVEL III

FINAL REPORT OF BEARING STAKE TESTS  
JANUARY THRU MARCH 1978

Volume IIIA. Data Points 1, 2 and 3  
Raw Data

9 JANUARY 1979

Distribution limited to U.S. Gov't. agencies only; T&E/  
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WARMINSTER, PENNSYLVANIA 18974

UNDER CONTRACTS

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R. L. Townsend 10 Jan 1979  
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VOLUME

IA	Summary - Test Results
IB	Detailed Description, Test Results
IC	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
IVB	Data Points 7, 8 and 9 Raw Data
IVB	Data Points 10, 11 and 12 Raw Data

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TABLE OF CONTENTS

SECTION

- 1.0 Tabular Summary of Signal and SNR Measurements  
Summary of Data Point Noise Plots
  
- 2.0 Data Point 1 1-19-77 1551Z (Single Element Data)  
Noise Spectral Density Calculations  
Omni Signals vs. Element Position Number Plots  
Omni ALIU Plots
  
- 3.0 Data Point 1 1-19-77 1551Z (16 Element Beamformed Data)  
FRAZ Recording  
Signal Level and SNR Calculations  
Signal Gain Array Gain Calculations  
Beamformed ALIU Plots
  
- 4.0 Data Point 1 1-19-77 1551Z (32 Element Beamformed Data)  
Signal Level and SNR Calculations  
Signal Gain and Array Gain Calculations  
Beamformed ALIU Plots
  
- 5.0 Data Point 1 1-19-77 1551Z (52 Element Beamformed Data)  
Signal Level and SNR Calculations  
Signal Gain and Array Gain Calculations  
Beamformed ALIU Plots
  
- 6.0 Data Point 2 1-19-77 1600Z (Single Element Data)  
Noise Spectral Density Calculations  
Omni Signal Levels vs. Element Position Number Plots  
Omni ALIU Plots
  
- 7.0 Data Point 2 1-19-77 1600Z (16 Element Beamformed Data)  
FRAZ Recording  
Signal Level and SNR Calculations  
Signal Gain and Array Gain Calculations  
Beamformed ALIU Plots

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- 8.0 Data Point 2 1-19-77 16002 (32 Element Beamformed Data)
  - Signal Level and SNR Calculations
  - Signal Gain and Array Gain Calculations
  - Beamformed ALIU Plots
- 9.0 Data Point 2 1-19-77 1600Z (50 Element Beamformed Data)
  - Signal Level and SNR Calculations
  - Signal Gain and Array Gain Calculations
  - Beamformed ALIU Plots
- 10.0 Data Point 3 2-7-77 0934Z (Single Element Data)
  - Noise Spectral Density Calculations
  - Omni Signal Levels vs. Element Position Number Plots
  - Omni ALIU Plots
- 11.0 Data Point 3 2-7-77 0934Z (16 Element Beamformed Data)
  - Signal Level and SNR Calculations
  - Signal Gain and Array Gain Calculations
  - Beamformed ALIU Plots
- 12.0 Data Point 3 3-7-77 0934Z (32 Element Beamformed Data)
  - Signal Level and SNR Calculations
  - Signal Gain and Array Gain Calculations
  - Beamformed ALIU Plots
- 13. Data Point 3 3-7-77 0934Z (51 Element Beamformed Data)
  - Signal Level and SNR Calculations
  - Signal Gain and Array Gain Calculations

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NOTE ALI Plot Scales for Beamformed and

Omni Data are NOT the same.

SNR comparisons cannot be taken directly  
from plot comparisons.

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• OMNI NOISE LEVELS

19 JANUARY 1977 DATA POINT 1

290 Hz +64.6 dBre $\mu$ Pa/1 Hz  
295 Hz +64.2 dBre $\mu$ Pa/1 Hz

19 JANUARY 1977 DATA POINT 2

290 Hz +64.7 dBre $\mu$ Pa/1 Hz  
295 Hz +65.4 dBre $\mu$ Pa/1 Hz

7 FEBRUARY 1977 DATA POINT 3

140 Hz +74.5 dBre $\mu$ Pa/1 Hz  
290 Hz +67.5 dBre $\mu$ Pa/1 Hz

7 FEBRUARY 1977 DATA POINT 4

140 Hz +73.3 dBre $\mu$ Pa/1 Hz  
290 Hz +65.6 dBre $\mu$ Pa/1 Hz

7 FEBRUARY 1977 DATA POINT 5

140 Hz +76.6 dBre $\mu$ Pa/1 Hz  
290 Hz +68.4 dBre $\mu$ Pa/1 Hz

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7 FEBRUARY 1977		DATA POINT 6
140 Hz	+76.0	dBre $\mu$ Pa/1 Hz
290 Hz	+68.9	dBre $\mu$ Pa/1 Hz
8 FEBRUARY 1977		DATA POINT 7
143 Hz	+70.1	dBre $\mu$ Pa/1 Hz
290 Hz	+62.2	dBre $\mu$ Pa/1 Hz
15 MARCH 1977		DATA POINT 8
140 Hz	+67.3	dBre $\mu$ Pa/1 Hz
290 Hz	+61.6	dBre $\mu$ Pa/1 Hz
15 MARCH 1977		DATA POINT 9
140 Hz	+68.2	dBre $\mu$ Pa/1 Hz
290 Hz	+65.2	dBre $\mu$ Pa/1 Hz
16 MARCH 1977		DATA POINT 10
140 Hz	+74.2	dBre $\mu$ Pa/1 Hz
290 Hz	+64.6	dBre $\mu$ Pa/1 Hz
16 MARCH 1977		DATA POINT 11
140 Hz	+70.2	dBre $\mu$ Pa/1 Hz
290 Hz	+62.2	dBre $\mu$ Pa/1 Hz

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• OMNI NOISE LEVELS

16 MARCH 1977

DATA POINT 12

140 Hz	+72.0	dBrepPa/1 Hz
290 Hz	+65.5	dBrepPa/1 Hz

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OPERATIONAL DATA	AVE. SIGNAL LEVEL JBY	AVE. NOISE LEVEL JBY	BANDWIDTH CORRECT. TIME (MCP-32)	BANDWIDTH CORRECT. TIME (MCP-32)	ARRAY SENSITIVITY	% COMPRESSION	SNR	LINEAR PULSE CORRECTION TIME	CORRECTED SNR
1 DATE: 1-11-77 TIME: 1551Z RANGE: 910M 290HZ DEPTH: 1650FM 295HZ	-497 -513	-567 -571	-1.8 -1.8	+15 +15	+8 +8	+100 +100	7.0 7.8	-4.8 -5.8	+2.2 -1.0
2 DATE: 1-18-77 TIME: 1602Z RANGE: 910M 290HZ DEPTH: 1650FM 295HZ	-515 -512	-566 -559	-1.8 -1.8	+15 +15	+8 +8	+100 +100	5.0 4.7	-5.2 -5.4	- .2 - .7
3 DATE: 2-7-77 TIME: 0934Z RANGE: 1550M 140HZ DEPTH: 1900FM 200HZ	-225 -206	-457 -48.7	-1.8 -1.8	+10 +10	+12 +8	+100 +100	13.2 10.1	-4.2 -4.3	9.0 5.6
4 DATE: 2-7-77 TIME: 1018Z RANGE: 1550M 140HZ DEPTH: 1900FM 200HZ	-244 -216	-459 -506	-1.8 -1.8	+10 +10	+12 +8	+100 +100	12.5 11.0	-4.2 -4.2	8.3 6.9
5 DATE: 2-7-77 TIME: 1519Z RANGE: 1108M 140HZ DEPTH: 1900FM 200HZ	-200 -221	-475 -478	-1.8 -1.8	+10 +10	+12 +8	+100 +100	13.5 14.7	-4.2 -4.2	9.3 10.5
6 DATE: 2-7-77 TIME: 2032Z RANGE: 700M 140HZ DEPTH: 1900FM 200HZ	-247 -230	-442 -473	-1.8 -1.8	+10 +10	+12 +8	+100 +100	19.5 24.3	-4.0 -4.0	15.5 20.3

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OPERATIONAL DATA	AVE. SIGNAL LEVEL DBV	AVE. NOISE LEVEL DBV	BANDWIDTH CORREC-TION (Hertz)	BANDWIDTH CORREC-TION (Hertz)	ARRAY SENSITIVITY	ARRAY CONVERSION	SNR	LINBA PROCESS CORREC-TION	CONJECT CD SNR
7	DATE: 2-17-77 TIME: 0102Z RANGE: 28 NM, 140 HZ DEPTH: 1900 FM, 290 HZ	-16.0 -17.5	-1.8 -1.8	+10 +10	+12 +8	+100 +100	34.1 31.5	-4.0 -4.0	30.1 32.5
8	DATE: 3-15-77 TIME: 1501Z RANGE: 22 NM, 140 HZ DEPTH: 2800 FM, 290 HZ	-19.4 -15.2	-1.8 -1.8	+10 +10	+12 +8	+100 +100	33.5 39.4	-4.0 -4.0	28.5 35.4
9	DATE: 3-15-77 TIME: 2131Z RANGE: 72 NM, 140 HZ DEPTH: 2800 FM, 290 HZ	-19.4 -12.5	-1.8 -1.8	+10 +10	+12 +8	+100 +100	36.6 38.5	-4.0 -4.0	32.6 34.5
10	DATE: 3-16-77 TIME: 0432Z RANGE: 128 NM, 140 HZ DEPTH: 2800 FM, 290 HZ	-23.3 -38.0	-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: 0952Z RANGE: 122 NM, 140 HZ DEPTH: 2800 FM, 290 HZ	-29.8 -41.5	-1.8 -1.8	+10 +10	+12 +8	+100 +100	20.2 12.5	-4.0 -4.2	16.2 8.3
12	DATE: 3-16-77 TIME: 1148Z RANGE: 122 NM, 140 HZ DEPTH: 2800 FM, 290 HZ	-24.8 -38.6	-1.8 -1.8	+10 +10	+12 +8	+100 +100	23.4 12.1	-4.0 -4.2	19.4 7.9

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16 ELEMENT ARRAY

OPERATIONAL DATA	SIGNAL LEVEL DBV	MCP-32 CAL CORR-TIME	BEAM FORMER ATTN	BEAM FORMER CORR-TIME	B+C	A+E	J+K	I+5	NOISE LEVEL DBV	MCP-32 CAL CORR-TIME	BEAM FORMER ATTN	BEAM FORMER CORR-TIME	BEAM FORMER CORR-TIME WITH CAPTURE	BEAM FORMER CORR-TIME WITH CAPTURE	BEAM FORMER CORR-TIME WITH CAPTURE	BEAM FORMER CORR-TIME WITH CAPTURE	M's POWER-SHOW	SHR H-F	LINEAR CORRECT-TIME	SNR	SECRET-TIME	STRESSING	Q+L
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T			
DATE: 1-17-77 TIME: 1551Z																							
1. RANGE: 1100M 210 MZ	-60.4	+10	+7		20	-32.4	20	-50.1	-76.1	+10	+10	+7	-1.0	+15	+8	+100	17.7	-7.1	14.3				
DEPTH: 1500M 215 MZ	-68.6	+10	+9		20	-40.8	20	-50.1	-78.1	+10	+10	+9	-1.8	+15	+8	+100	9.3	-4.4	5.4				17.4
DATE: 1-17-77 TIME: 1600Z																							
2. RANGE: 1100M 210 MZ	-72.1	NA	0		0	-37.1	0	-44.6	-84.1	NA	0	+1.9	-1.8	+15	+8	+100	7.5	-9.8	7.6				16.4
DEPTH: 1500M 215 MZ	-78.7	NA	0		0	-38.7	0	-44.6	-84.6	NA	0	+1.9	-1.8	+15	+8	+100	5.9	-5.0	7.8				16.8
DATE: 2-2-77 TIME: 0931Z																							
3. RANGE: 1100M 140 MZ	-31.2	+10	+2		20	-8.2	20	-31.8	-69.8	+10	+10	+2	-1.8	+10	+8	+100	23.6	-4.0	14.8				23.8
DEPTH: 1500M 210 MZ	-43.5	+10	+10		20	-18.5	20	-31.8	-66.8	+10	+10	+10	-1.8	+10	+8	+100	23.3	-4.0	20.1				24.1
DATE: 2-7-77 TIME: 1615Z																							
4. RANGE: 1100M 140 MZ	-39.4	+10	+2		20	-11.4	20	-27.1	-66.1	+10	+10	+2	-1.8	+10	+8	+100	16.7	-4.2	11.7				16.3
DEPTH: 1500M 210 MZ	-46.2	+10	+6		20	-17.2	20	-31.8	-66.8	+10	+10	+6	-1.8	+10	+8	+100	20.6	-4.0	17.2				21.2
DATE: 2-7-77 TIME: 1654Z																							
5. RANGE: 1100M 140 MZ	-29.0	+10	+2		20	-1.0	20	-32.1	-60.1	+10	+10	+2	-1.8	+10	+8	+100	31.1	-4.0	27.3				31.3
DEPTH: 1500M 210 MZ	-38.4	+10	+9		20	-10.4	20	-36.8	-64.8	+10	+10	+9	-1.8	+10	+8	+100	26.4	-4.0	23.3				27.3
DATE: 2-7-77 TIME: 2037Z																							
6. RANGE: 1100M 140 MZ	-28.7	+10	+2		20	-1.7	20	-28.7	-56.7	+10	+10	+2	-1.8	+10	+8	+100	30	-4.0	24.2				30.2
DEPTH: 1500M 210 MZ	-25.3	+10	+6		20	-2.7	20	-34.2	-62.2	+10	+10	+6	-1.8	+10	+8	+100	34.9	-4.0	31.5				37.5

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**SECRET 16 ELEMENT ARRAY**

OPERATIONAL DATA	SIGNAL LEVEL (dB)	M-1032 CORR. TIME	BEAM-ANGLE ATTS	BEAM-DIM. CORR. TIME	B+C	A+E	T+K	I+G	AMISE DBV	MCS-32 CORR. TIME	BEAM-ANGLE ATTS	BEAM-DIM. CORR. TIME	BLIND WIDTH CORR. TIME	BLIND WIDTH CORR. TIME	ARRAY DIM. CORR. TIME	M <sup>2</sup> CORR. TIME	SNR H-F	LINEAR PRODU. CORR. TIME	CORRECT. STEER. ANGLE	Q+L	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
7 DATE: 2-8-77 TIME: 0202Z RANGE: 280 NM 190 HR DEPTH: 2800 FM 280 HR	-22.8	+10	+24	+2	24	+1.2	24	-41.4	-65.4	+10	+24	+2	-1.8	+10	+12	+100	47.6	-4.0	39.8	-21.5	47.8
8 DATE: 3-1-77 TIME: 1501Z RANGE: 280 NM 190 HR DEPTH: 2800 FM 280 HR	-27.1	+10	+18	+2	28	+5.9	28	-33.1	-64.6	+10	+18	+2	-1.8	+10	+12	+100	39.5	-4.8	35.7	+30.0	39.7
9 DATE: 3-1-77 TIME: 2122Z RANGE: 280 NM 190 HR DEPTH: 2800 FM 280 HR	-24.0	+10	+18	+2	28	+6.2	28	-45.6	-65.2	+10	+18	+2	-1.8	+10	+12	+100	51.8	-4.0	48.6	+30.0	52.6
10 DATE: 3-1-77 TIME: 0633Z RANGE: 280 NM 190 HR DEPTH: 2800 FM 280 HR	-35.8	+10	+12	+2	22	-5	22	-31.7	-58.7	+10	+12	+1	-1.8	+10	+12	+100	26.2	-4.0	32.3	+51.5	36.3
11 DATE: 3-1-77 TIME: 0935Z RANGE: 280 NM 190 HR DEPTH: 2800 FM 280 HR	-35.8	+10	+12	+2	22	-13.8	22	-37.4	-58.4	+10	+12	+1.7	-1.8	+10	+12	+100	23.6	-4.0	20.4	+61.0	24.4
12 DATE: 3-1-77 TIME: 1148Z RANGE: 280 NM 190 HR DEPTH: 2800 FM 280 HR	-39.9	+10	+18	+2	28	+5.2	28	-27.1	-55.1	+10	+18	+1.2	-1.8	+10	+12	+100	27.3	-4.0	28.5	+64.0	22.5

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ELEMENT ARRAY

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P T I O N	OPERATIONAL DATA	SIGNAL LEVEL DBV	NECESSARY CALCULATIONS			A+E	J+K	I+G	MISCELLANEOUS CALCULATIONS	BEAM- ANGLE ATD	BEAM- ANGLE RANGE- TIME	B+C	CORRECTIONS TO BE MADE			I J K	L M N	O P Q	R	SAR H-F	SAR M-F	SAR H-E	SAR M-E	SAR H-F	SAR M-F	SAR H-E	SAR M-E	SAR H-F	SAR M-F	SAR H-E	SAR M-E
			BEAM- ANGLE ATD	BEAM- ANGLE RANGE- TIME	BEAM- ANGLE RANGE- TIME																										
1	DATE: 1-19-77 TIME: 1500Z RANGE: 110 NM DEPTH: 15000M	-57.2 -65	+10 +10	+18 +18	+22 +22	+34 +34	-27.1 -27.1	+10 +10	+18 +18	+18 +18	+28 +28	+10 +10	+18 +18	+18 +18	+10 +10	+18 +18	+18 +18	+18 +18	+18 +18	+18 +18	+18 +18	+18 +18	+18 +18	+18 +18	+18 +18	+18 +18	+18 +18	+18 +18	+18 +18	+18 +18	
2	DATE: 1-19-77 TIME: 1600Z RANGE: 110 NM DEPTH: 15000M	-55.8 -61.3	+10 +10	+18 +18	+28 +28	+34 +34	-27.1 -27.1	+10 +10	+18 +18	+18 +18	+28 +28	+10 +10	+18 +18	+18 +18	+10 +10	+18 +18	+18 +18	+18 +18	+18 +18	+18 +18	+18 +18	+18 +18	+18 +18	+18 +18	+18 +18	+18 +18	+18 +18	+18 +18	+18 +18	+18 +18	
3	DATE: 2-7-77 TIME: 0100Z RANGE: 110 NM DEPTH: 15000M	-36.6 -45.2	+10 +10	+24 +24	+34 +34	+34 +34	-27.1 -27.1	+10 +10	+24 +24	+24 +24	+34 +34	+10 +10	+24 +24	+24 +24	+10 +10	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	
4	DATE: 2-7-77 TIME: 1010Z RANGE: 110 NM DEPTH: 15000M	-38.2 -54.4	+10 +10	+24 +24	+34 +34	+34 +34	-27.1 -27.1	+10 +10	+24 +24	+24 +24	+34 +34	+10 +10	+24 +24	+24 +24	+10 +10	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	
5	DATE: 3-7-77 TIME: 1540Z RANGE: 110 NM DEPTH: 15000M	-31.3 -41.2	+10 +10	+24 +24	+34 +34	+34 +34	-27.1 -27.1	+10 +10	+24 +24	+24 +24	+34 +34	+10 +10	+24 +24	+24 +24	+10 +10	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	
6	DATE: 3-7-77 TIME: 2030Z RANGE: 110 NM DEPTH: 15000M	-28.0 -29.2	+10 +10	+24 +24	+34 +34	+34 +34	-27.1 -27.1	+10 +10	+24 +24	+24 +24	+34 +34	+10 +10	+24 +24	+24 +24	+10 +10	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	+24 +24	

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ELEMENT

ARRAY

7 P I S	OPERATIONAL DATA	LOCAL LEVEL	MUSIC CON TIME	MUSIC CON TIME	MUSIC CON TIME	MUSIC CON TIME	MUSIC CON TIME	MUSIC CON TIME	MUSIC CON TIME	MUSIC CON TIME	MUSIC			MUSIC			MUSIC			
											A+B	C	D	B+C	A+E	J+K	I+L	MUSIC	MUSIC	MUSIC
7		DATE: 3-10-77 TIME: 2100Z RANGE: 2800A-3000Z DEPTH: 2000F-3000Z																		
8		DATE: 3-15-77 TIME: 2100Z RANGE: 2200A-3000Z DEPTH: 2000F-3000Z																		
9		DATE: 3-15-77 TIME: 2100Z RANGE: 2200A-3000Z DEPTH: 2000F-3000Z																		
10		DATE: 3-16-77 TIME: 0510Z RANGE: 1200A-1400Z DEPTH: 1000F-2000Z																		
11		DATE: 3-16-77 TIME: 0330Z RANGE: 1200A-1400Z DEPTH: 1000F-2000Z																		
12		DATE: 3-16-77 TIME: 1500Z RANGE: 1200A-1400Z DEPTH: 1000F-2000Z																		

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ELEMENT ARRAY

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7 8 9 10 11 12	OPERATIONAL DATA				ELEMENT					ARRAY					QTL									
	SIGNAL LEVEL DBV	MC-72 PARA- TIME	BEAM- PARA- TIME	BEAM- CORREC- TION	A+B	F	G	H	I	J	K	L	M	N		O	P	Q	R	S	T	U		
1																								
2	DATE: 2-6-77 TIME: 2022																							
3	RANGE: 280M 190 MZ																							
4	DEPTH: 190CM 240 MZ																							
5	DATE: 3-16-77 TIME: 1918																							
6	RANGE: 220M 190 MZ																							
7	DEPTH: 280CM 280 MZ																							
8	DATE: 3-16-77 TIME: 1918																							
9	RANGE: 220M 190 MZ																							
10	DEPTH: 280CM 280 MZ																							
11	DATE: 3-16-77 TIME: 1918																							
12	RANGE: 220M 190 MZ																							
13	DEPTH: 280CM 280 MZ																							

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

TIME 1551

DATE 1-19-77

DATA POINT 1

FREQUENCY 290 HZ

-56.7

INDICATED NOISE LEVEL  $\text{dBV} \frac{1/32}{\text{ABW}}$

-(-8)

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

+13.3

BANDWIDTH CONVERSION TO 1 HZ BAND

+100

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

+64.6

UNCLASSIFIED

UNCLASSIFIED

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

DATA POINT 1 DATE 1-19-77 TIME 155/2

FREQUENCY 295 HZ

INDICATED NOISE LEVEL  $\text{dBV} \frac{1/32}{\text{ABW}}$  -57.1

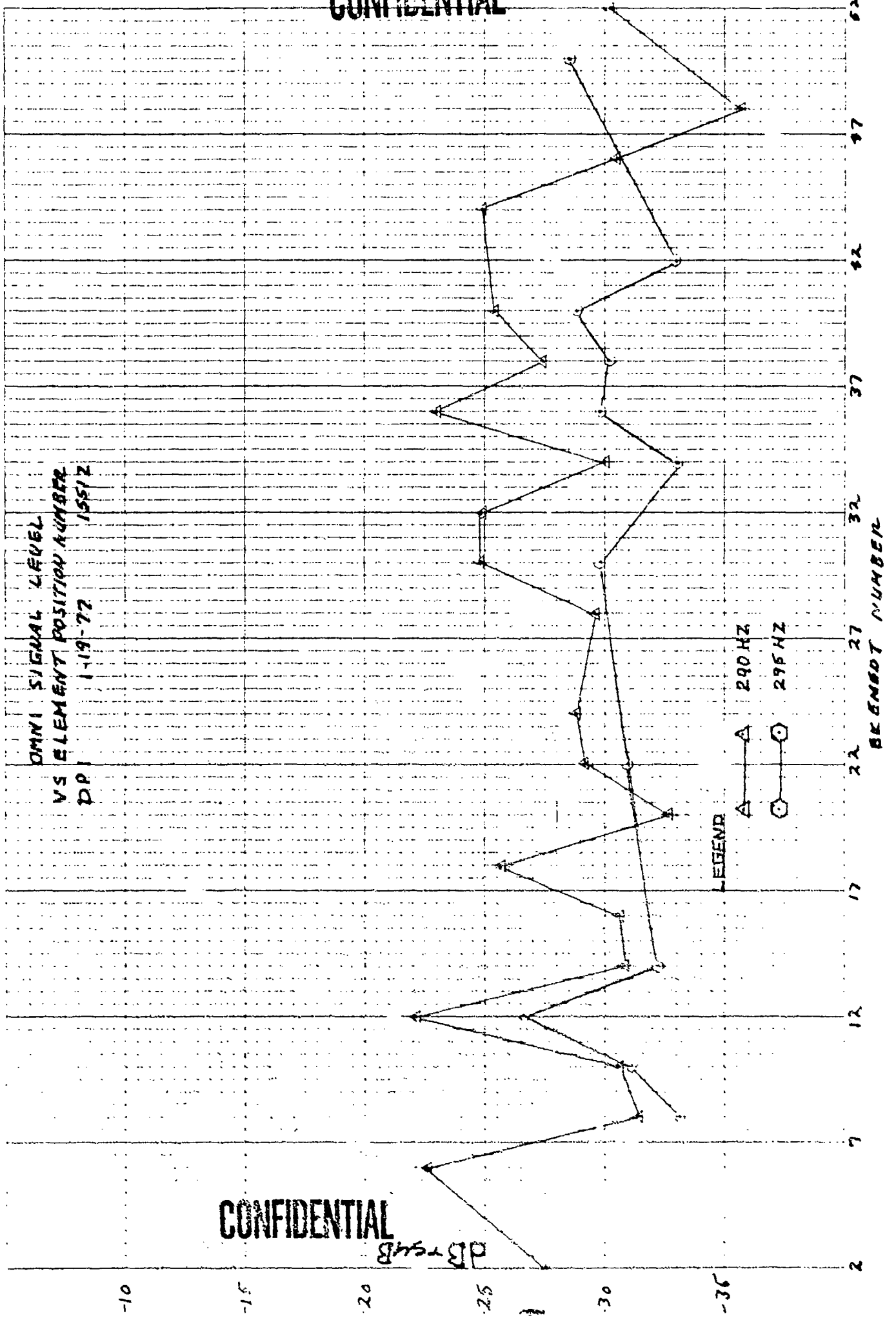
SYSTEM SENSITIVITY  $\text{dB}/\mu\text{B}$  -(-8) -49.1

BANDWIDTH CONVERSION TO 1 HZ BAND +17.3 -35.8

CONVERSION TO  $\text{dBre}\mu\text{Pa}/1\text{HZ}$  +100 +64.2

UNCLASSIFIED

CONFIDENTIAL



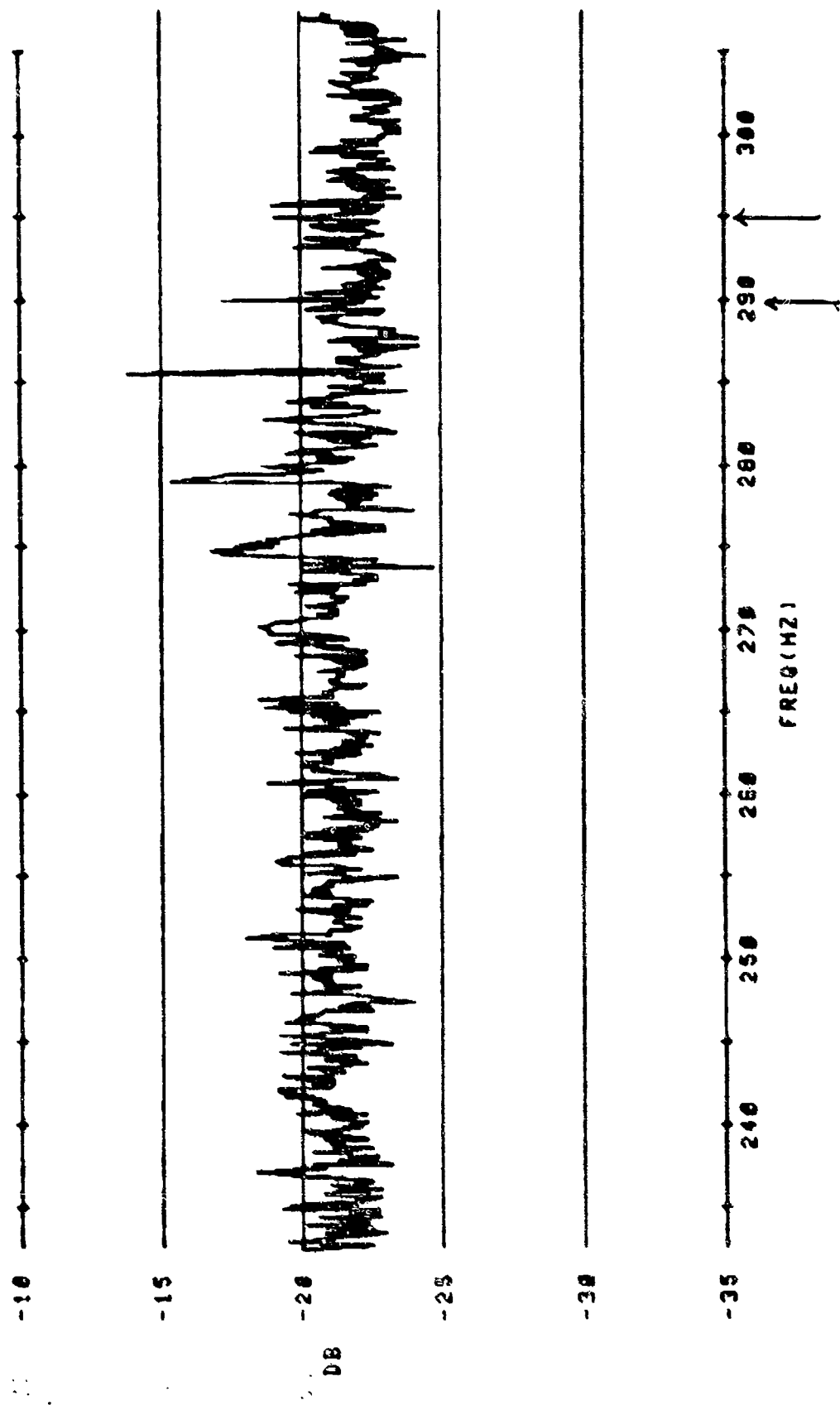
CONFIDENTIAL

DB TRS4B

46 93 5 3 2 1

CONTROL: 1/19-1681(82)    DATE OF ANALYSIS: 23JUL77 REEL: 00 SIDE: 0    INDEX: 6466  
 ONMI SPECTRUM (ELEMENT 23)  
 D2 REDUNDANCY: X2  
 EXERCISE: BEARING STAKE    DATE/TIME: 19 JAN77-1551Z    PROJECTOR RANGE: 91.5 NM  
 CENTER FREQ: 270 HZ ANALYSIS B/W: 1/32HZ INTEG TIME: 320 SECS B/F: 0 DB SWI: 27 DB  
 1 ELEMENT    DEG AZ STEER    NORMAL WEIGHTING

DPI



PLOT 3  
 1681(82)





2

SECRET

+ 94.4

+ 71.8

+ 64.2

+ 58.2

+ 53.1

+ 48.6

+ 44.4

+ 40.5

+ 36.9

+ 33.9

+ 30.9

+ 26.7

+ 23.6

+ 20.5

+ 17.3

+ 14.5

+ 11.5

+ 8.6

+ 5.7

+ 2.9

+ 0.9

- 2.9

- 5.7

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that this is essential for ensuring transparency and accountability in the organization's operations.

2. The second part of the document outlines the specific procedures and protocols that must be followed when recording transactions. This includes details on how to format entries, what information must be included, and how often records should be updated.

3. The third part of the document addresses the role of the accounting department in maintaining these records. It describes the responsibilities of the staff and the tools and systems used to manage the data.

4. The fourth part of the document discusses the importance of regular audits and reviews of the records. It explains how these checks help to identify any discrepancies or errors and ensure that the records are always up-to-date and accurate.

5. The fifth part of the document provides a summary of the key points discussed and offers some final thoughts on the importance of diligent record-keeping for the long-term success of the organization.

CONTROL NUMBER 100-1234-1002  
 NUMBER OF ELEMENTS 41  
 FREQUENCY BAND 3 TO 2 Hz  
 RANGE 11 N.M.

TM  
 AN  
 GW

DP2

00 HZ

HISTORICAL  
TAPE REEL NUMBER SIDE 6

ANALYSIS BAND WIDTH 1/32 HZ  
WATER DEPTH 1650 FMS

TAPE COUNT 1720

ELEMENT NUMBERS 11814 7100-12

DATE 1-19-77

EXERCISE: BEARING STAKE

SAN-XXX

5

...-8.6  
...-11.5  
...-14.5  
...-17.5  
...-20.5  
...-23.6  
...-26.7  
...-30.0  
...-33.9  
...-38.9  
...-40.5  
...-44.4  
...-48.6  
...-52.1  
...-58.2  
...-64.2  
...-71.0  
...-90.0

XXX-7

SAN-XXX-79-0126 ↑ SECRET

APR COUNT \_\_\_\_\_  
EARS \_\_\_\_\_  
Q-77 \_\_\_\_\_  
AIRING STATE \_\_\_\_\_

**CONFIDENTIAL**

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 1

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-60.4</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-50.4
BEAMFORMER GAIN	<u>+18</u>	-32.4 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .7</u>	-31.7 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-78.1</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-68.1
BEAMFORMER GAIN	<u>+18</u>	-50.1 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR	<u>-32.4</u>	
NOISE LEVEL FOR SNR	<u>-50.1</u>	17.7
PROCESSOR CORRECTION	<u>-4.1</u>	13.6
MRA CORRECTION	<u>+ .7</u>	14.3 SNR .031 HZ BAND
BANDWIDTH CONVERSION	<u>-13.2</u>	1.1 SNR 1 HZ BAND

**CONFIDENTIAL**

# CONFIDENTIAL

## SIGNAL LEVEL AND SNR

### CALCULATIONS

DATA POINT 1

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 16

#### SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-68.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-58.8
BEAMFORMER GAIN	<u>+18</u>	-40.8 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .9</u>	-39.9 SIG. LEVEL FOR SIGNAL GAIN

#### NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-77.4</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-67.4
BEAMFORMER GAIN	<u>+18</u>	-49.4 NOISE LEVEL FOR SNR CALCULATION

#### SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR	<u>-40.8</u>	
NOISE LEVEL FOR SNR	<u>-49.4</u>	8.6
PROCESSOR CORRECTION	<u>-4.5</u>	4.1
MRA CORRECTION	<u>+ .9</u>	5.8 SNR .031 HZ BAND
BANDWIDTH CONVERSION	<u>-17.2</u>	-7.4 SNR 1 HZ BAND

# CONFIDENTIAL

CONFIDENTIAL

DATA POINT 1

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	_____	<u>-49.7</u>	<u>-53.3</u>
MRA SIGNAL LEVEL	_____	<u>-31.7</u>	<u>-39.9</u>
ARRAY SIGNAL GAIN		<u>18.0</u>	<u>13.4</u>
20 LOG <u>16</u>	_____	<u>24</u>	<u>24</u>
# of elements			
DIFFERENCE	_____	<u>-6</u>	<u>-10.6</u>

ARRAY GAIN

MRA SNR	_____	<u>14.3</u>	<u>5.8</u>
MEAN OMNI SNR	_____	<u>2.2</u>	<u>-2.0</u>
ARRAY GAIN		<u>12.1</u>	<u>7.8</u>
THEORETICAL AZMUTH GAIN (at MRA)	_____	<u>10.5</u>	<u>10.3</u>
DIFFERENCE	_____	<u>+1.6</u>	<u>-2.5</u>

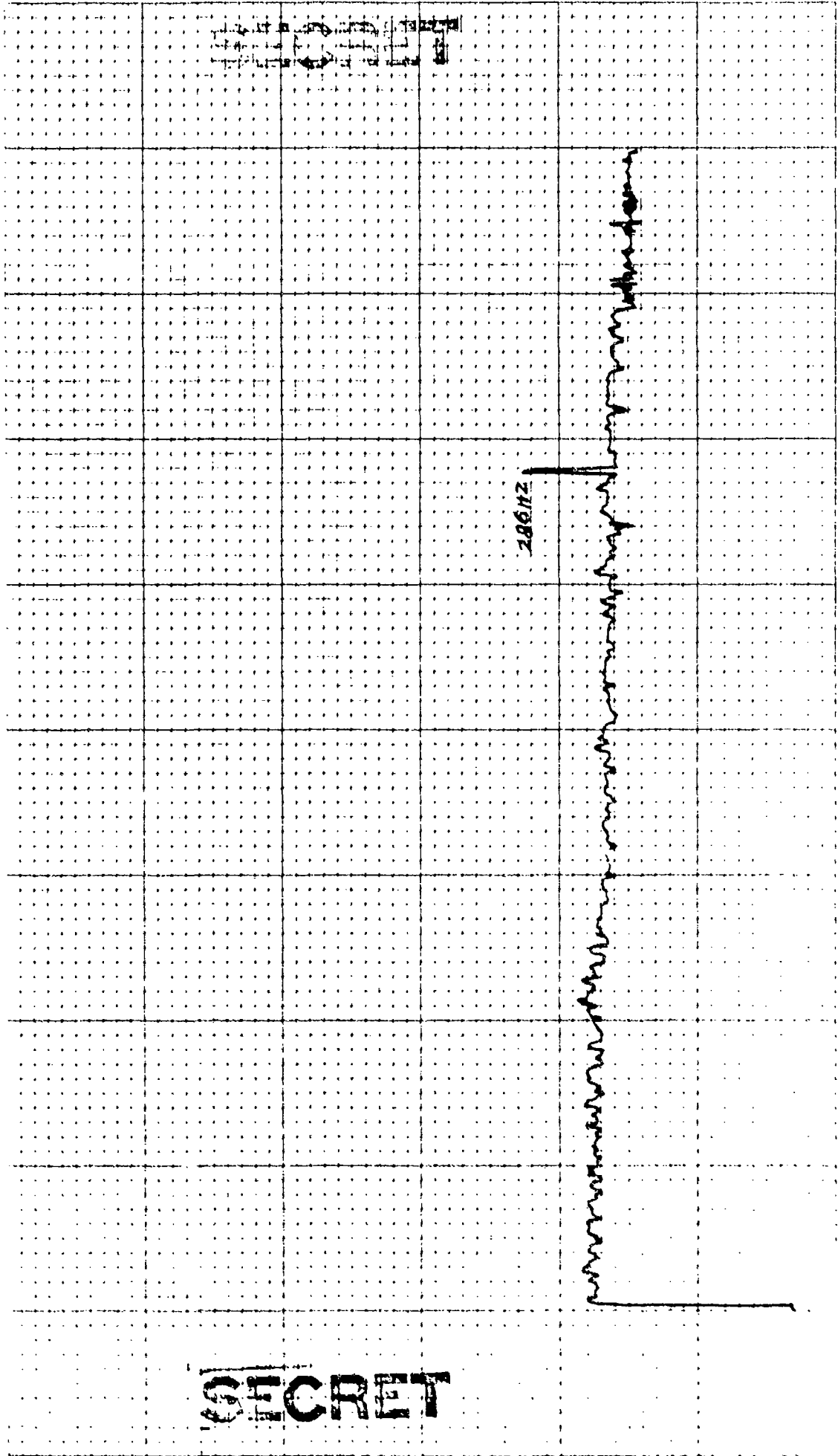
CONFIDENTIAL



CONTROL: 1/19 - 1551 (16)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
16 ELEMENTS

DATE OF ANALYSIS: 29 MAR 44  
DATE/TIME: 11/17/77 - 1551 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
-44 DEG. AZ STEERING

REEL: 6 INDE X 666  
INTEGRATION TIME 320 SECS ATTN: -10 DB  
FILTER WTC: HANNING



48-3

CONTROL: 1/1A - 1551 ( 1L )      DATE OF ANALYSIS: - - - -

BEAMFORMED SPECTRUM (ELEMENTS)      29 THRU 44

EXERCISE: BEARING STAKE      DATE/TIME: 1-19-77 - 1551 Z

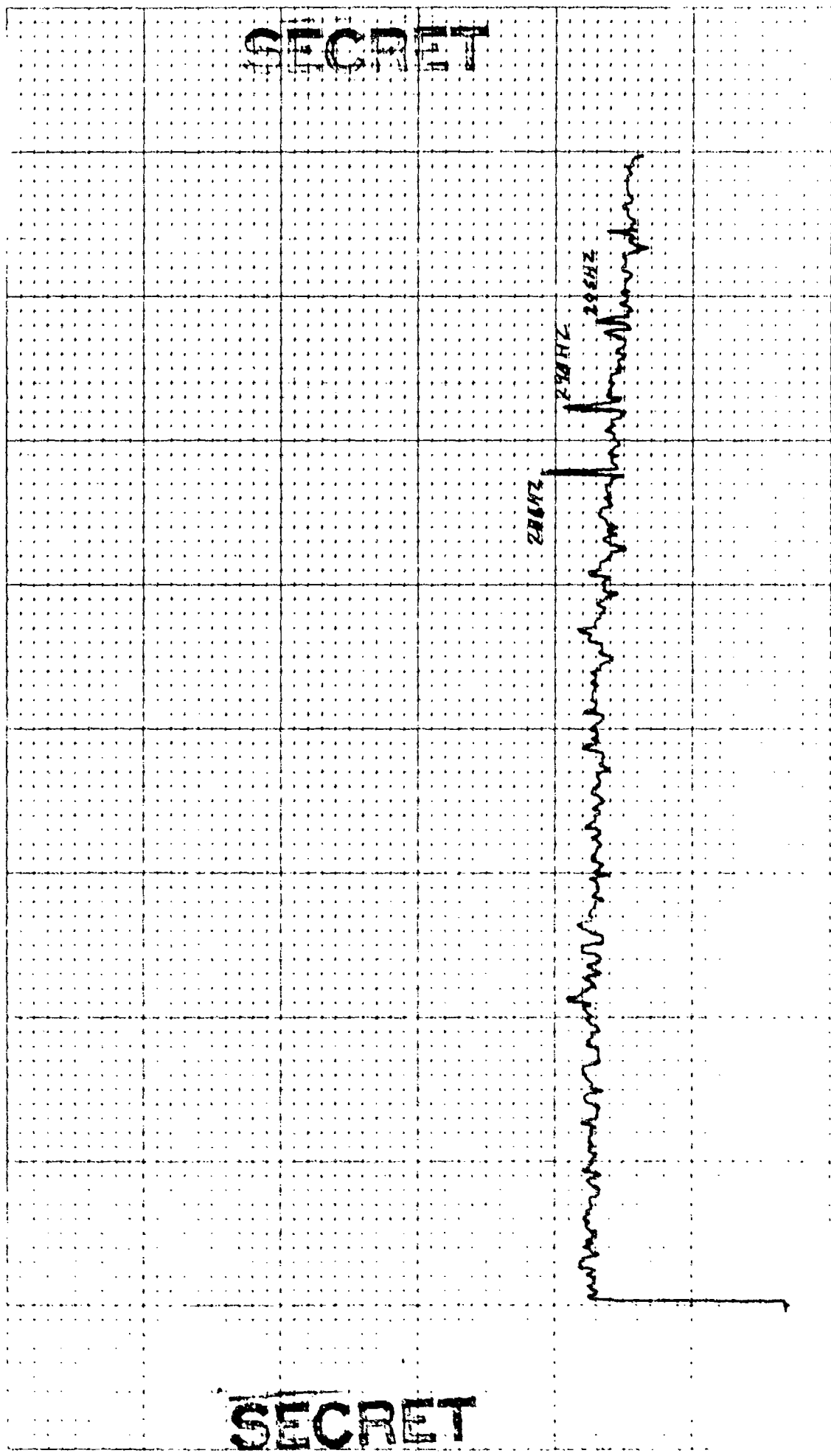
CENTER FREQ: 270 HZ      ANALYSIS BANDWIDTH: 17/10HZ

16 ELEMENTS      -46 DEC. AZ STEERING

REEL: 6      INDE X 6466

INTEGRATION TIME 320 SECS      ATTEN: -18 DB

FILTER      WTG: HANNING

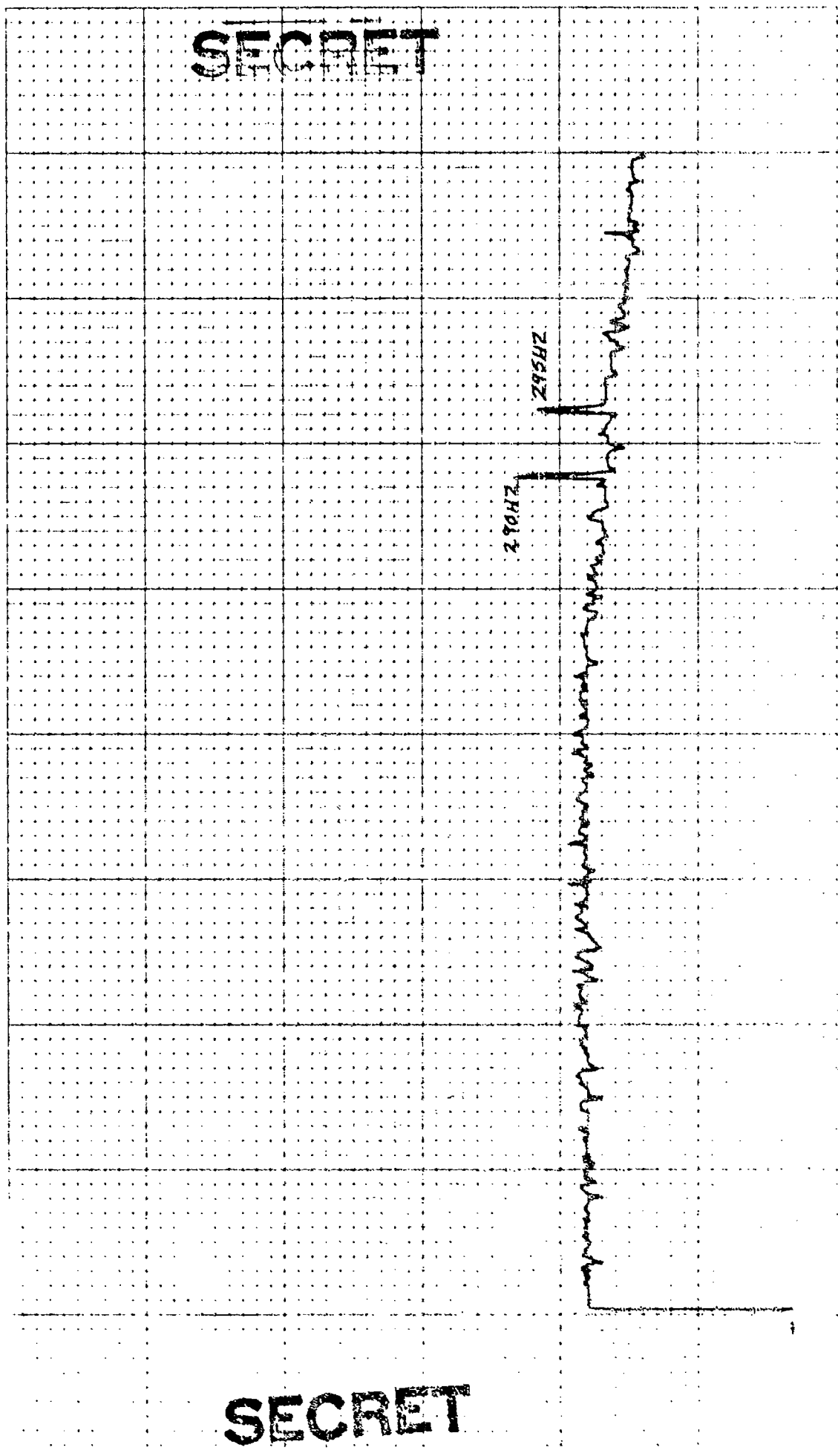


SECRET

CONTROL: 1/19 -1551 (16)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
16 ELEMENTS

DATE OF ANALYSIS: 29 THRU 44  
DATE/TIME: 1-19-77-1551 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
-48 DEG. AZ STEERING

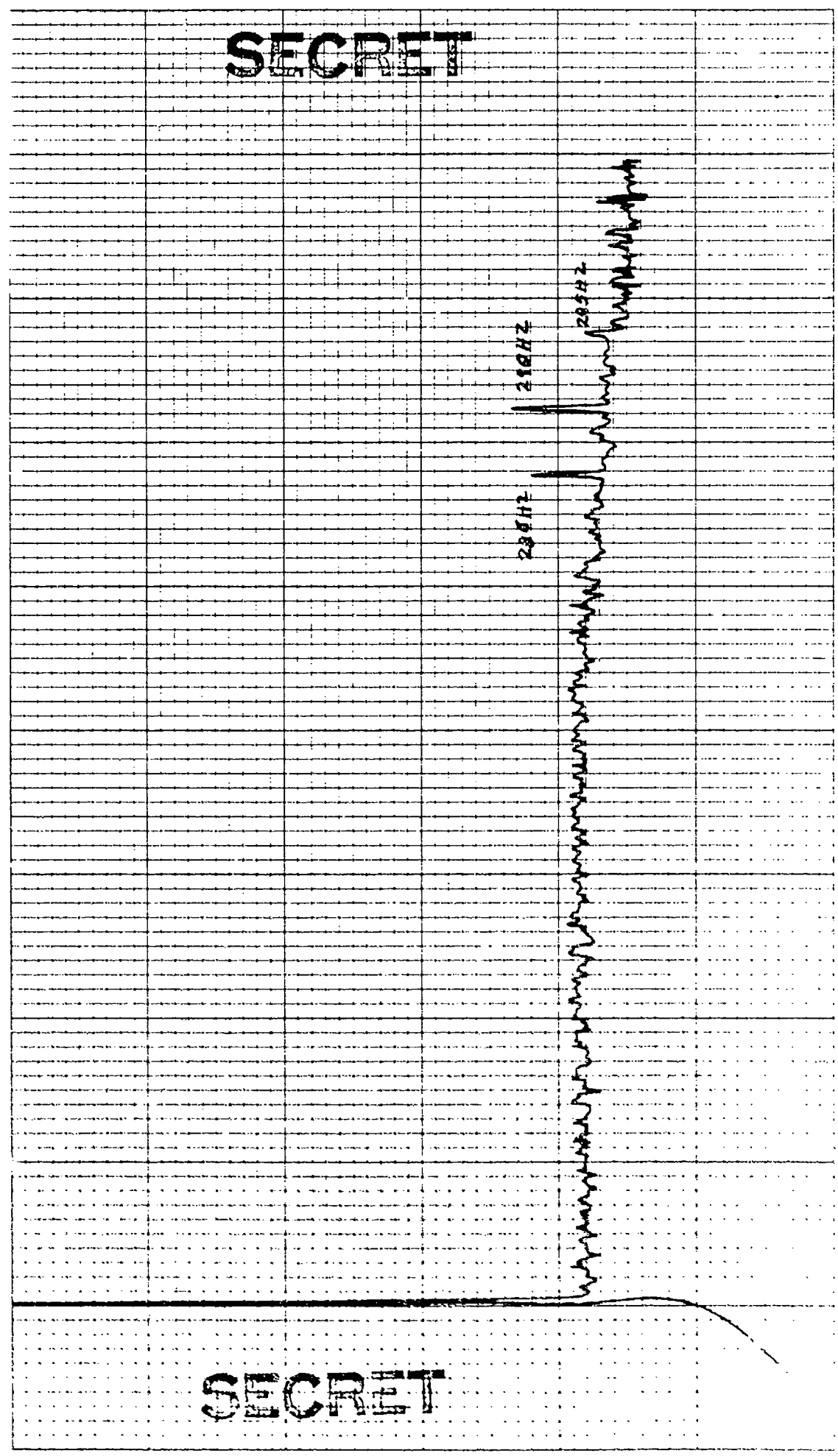
REEL: 6 INDE X 446  
INTEGRATION TIME 320 SECS ATTN: -18 DB  
FILTER WTG: HANNING



SECRET

CONTROL: 1/19 - 1551 (16 ) REEL: 6 INDE X 2066  
 BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: - - -  
 EXERCISE: BEARING STAKE 29 THRU 44 )  
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ  
 16 ELEMENTS -50 DEG. AZ STEERING

INTEGRATION TIME 320 SECS ATTN: -18 DB  
 FILTER WTG: HANNING



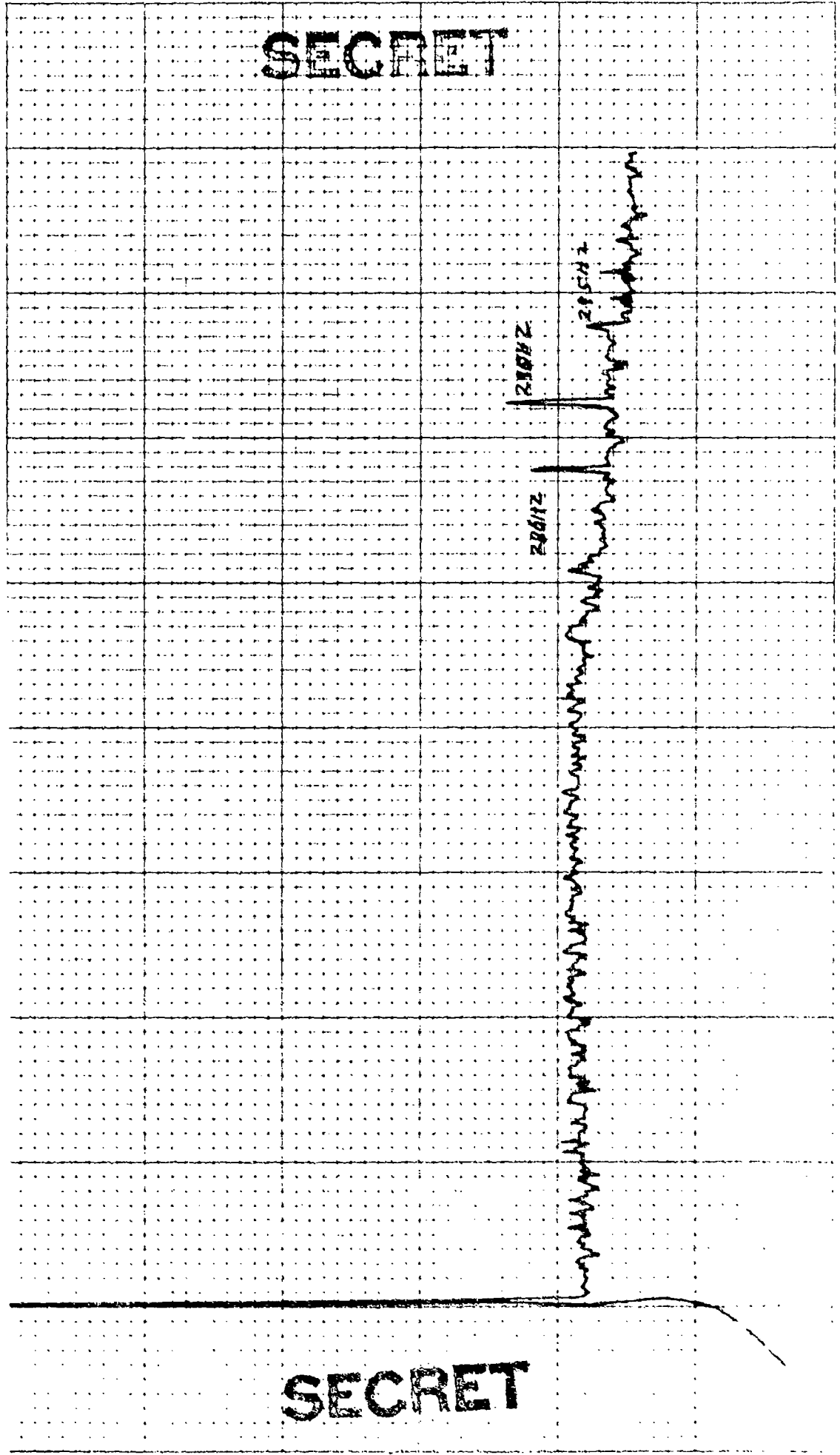
CONTROL: 1/9 - 1551 (16)  
 BEAMFORMED SPECTRUM(ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
 16 ELEMENTS

DATE OF ANALYSIS: - - -  
 29 JAN 77

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

REEL: 6  
 INDE X6866

ANALYSIS BANDWIDTH: 1/10HZ  
 -52 DEG. AZ STEERING



SECRET

SECRET

CONTROL: 1/19 -1551 (16 ) REEL: C INDE X 1666

BEAMPFORMED SPECTRUM(ELEMENTS)

EXERCISE: BEARING STAKE

CENTER FREQ: 276 HZ

16 ELEMENTS

DATE OF ANALYSIS: 29 THRU 44

DATE/TIME: 7-19-77 -1551 Z

ANALYSIS BANDWIDTH: 1710HZ

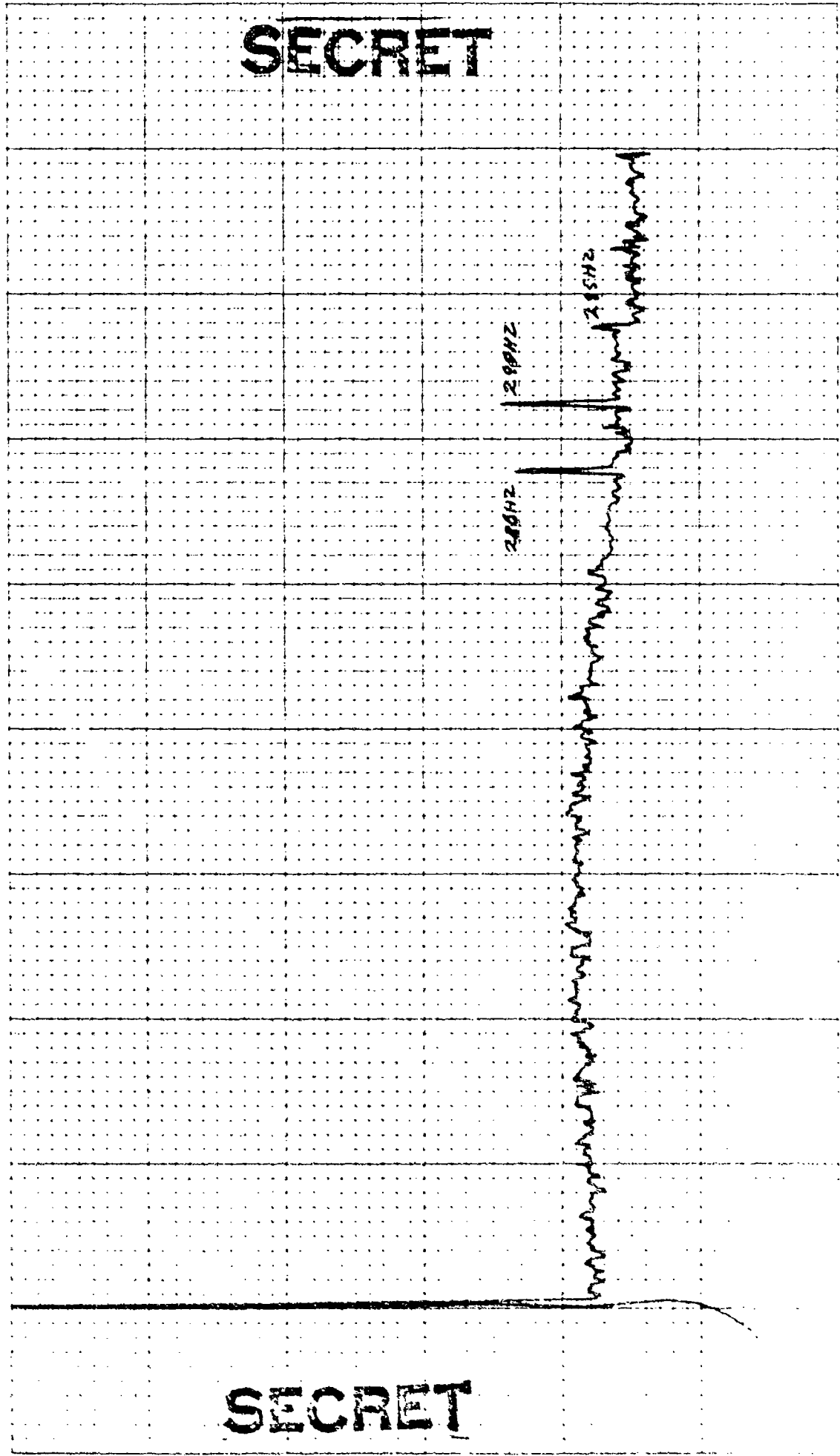
-54 DEG. AZ STEERING

INTEGRATION TIME 320 SECS

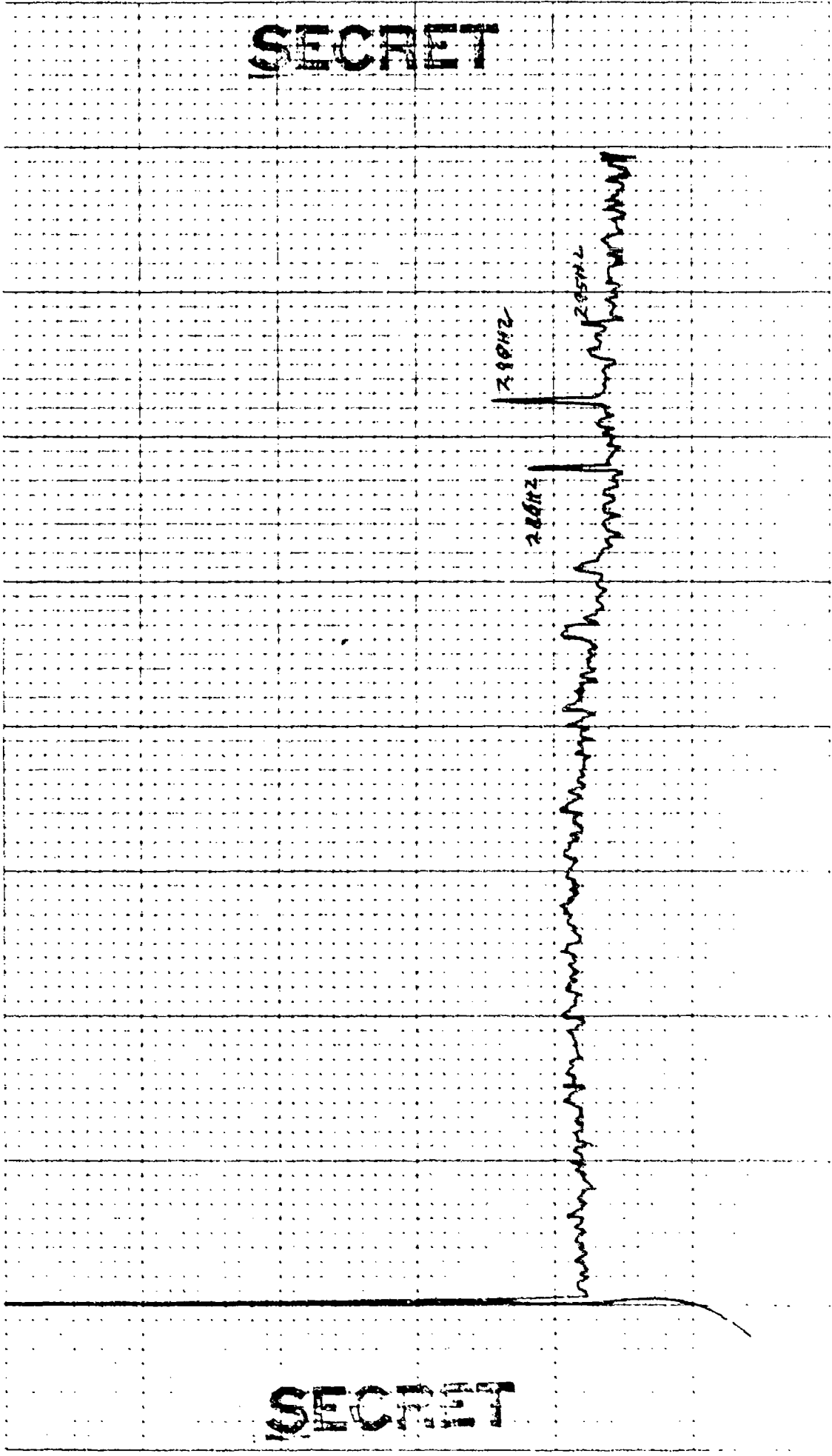
FILTER

ATTEN: -10 DB

WTG: HANNING



CONTROL: 1/19 - 1551 (16 )      DATE OF ANALYSIS: - - - -  
 BEAMFORMED SPECTRUM(ELEMENTS)      29 THRU 04  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
 16 ELEMENTS  
 REEL: 6      INDE X 6166  
 INTEGRATION TIME 320 SECS      ATTEN: -18 DB  
 FILTER      WTC: HANNING  
 ANALYSIS BANDWIDTH: 1/10HZ  
 -56 DEG. AZ STEERING



SECRET

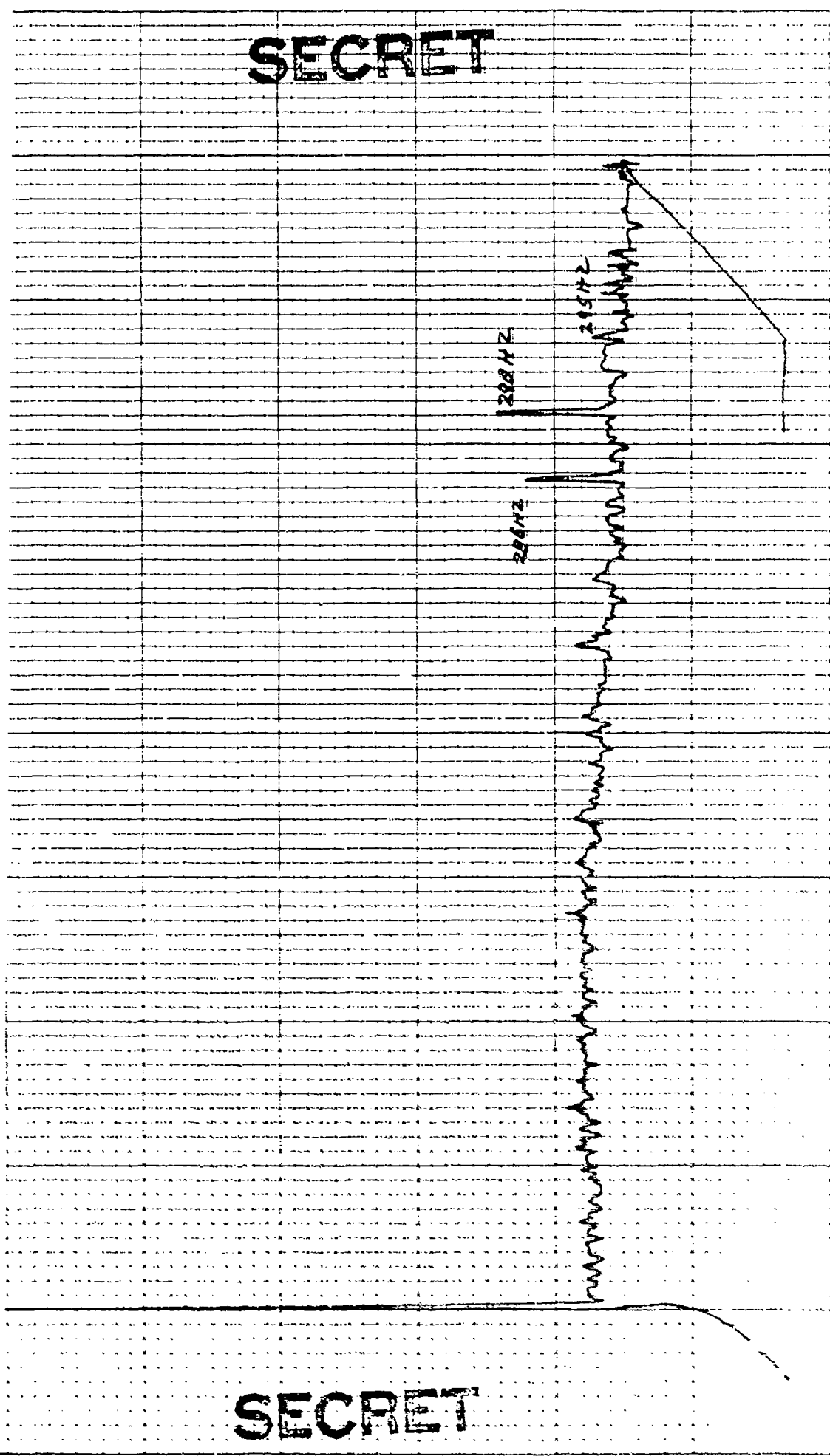
SECRET

CONTROL: 1-19 - 1551 (16)  
 BEAMFORMED SPECTRUM(ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
 16 ELEMENTS

DATE OF ANALYSIS: 29 THRU 44  
 DATE/TIME: 7-17-77 - 1551 Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 -58 DEG. AZ STEERING

REEL: 6  
 INTEGRATION TIME 320 SECS  
 FILTER WTG: HANNING

INDE X 6962  
 ATTN: 10 DB



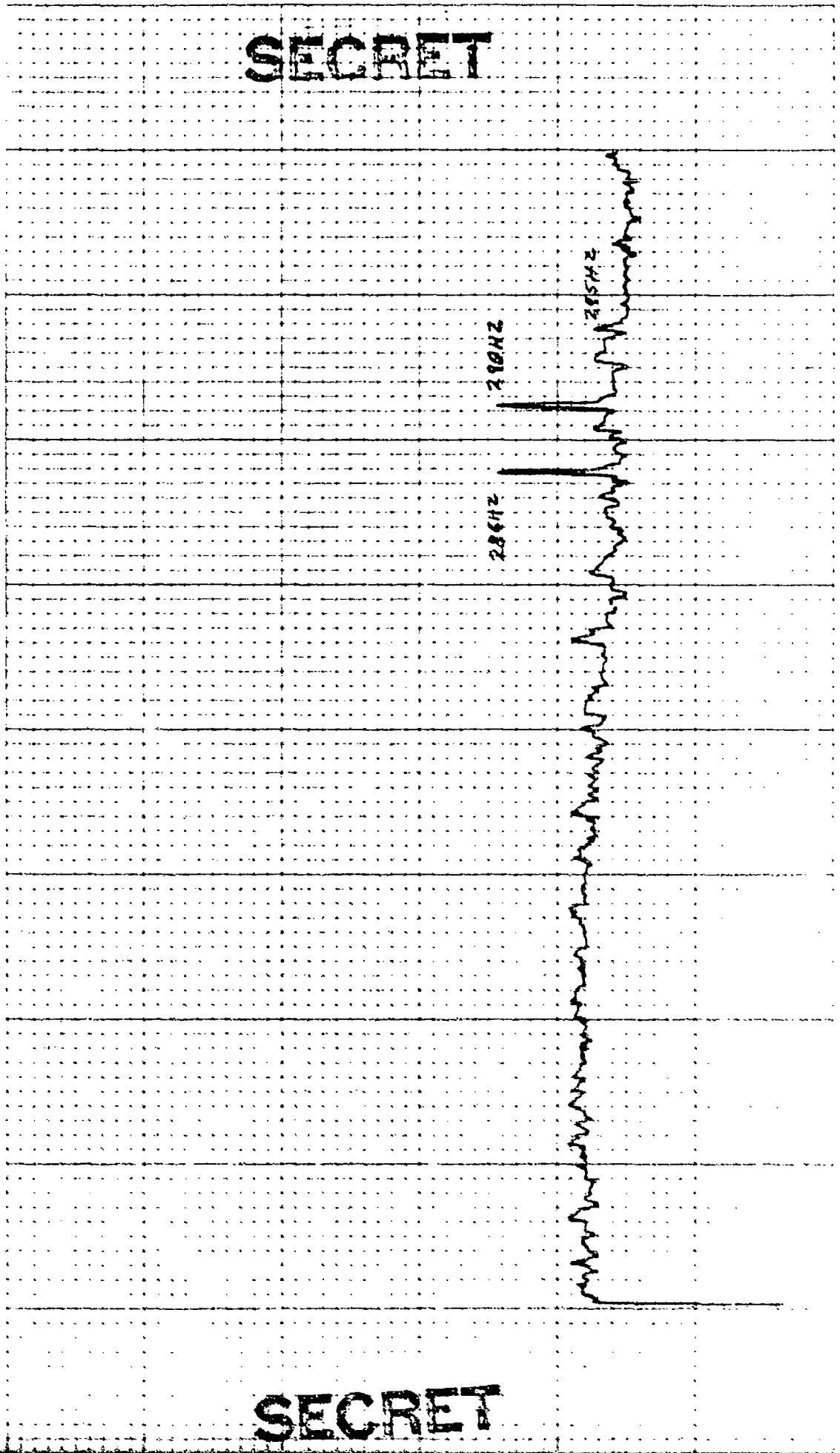
SECRET

SECRET

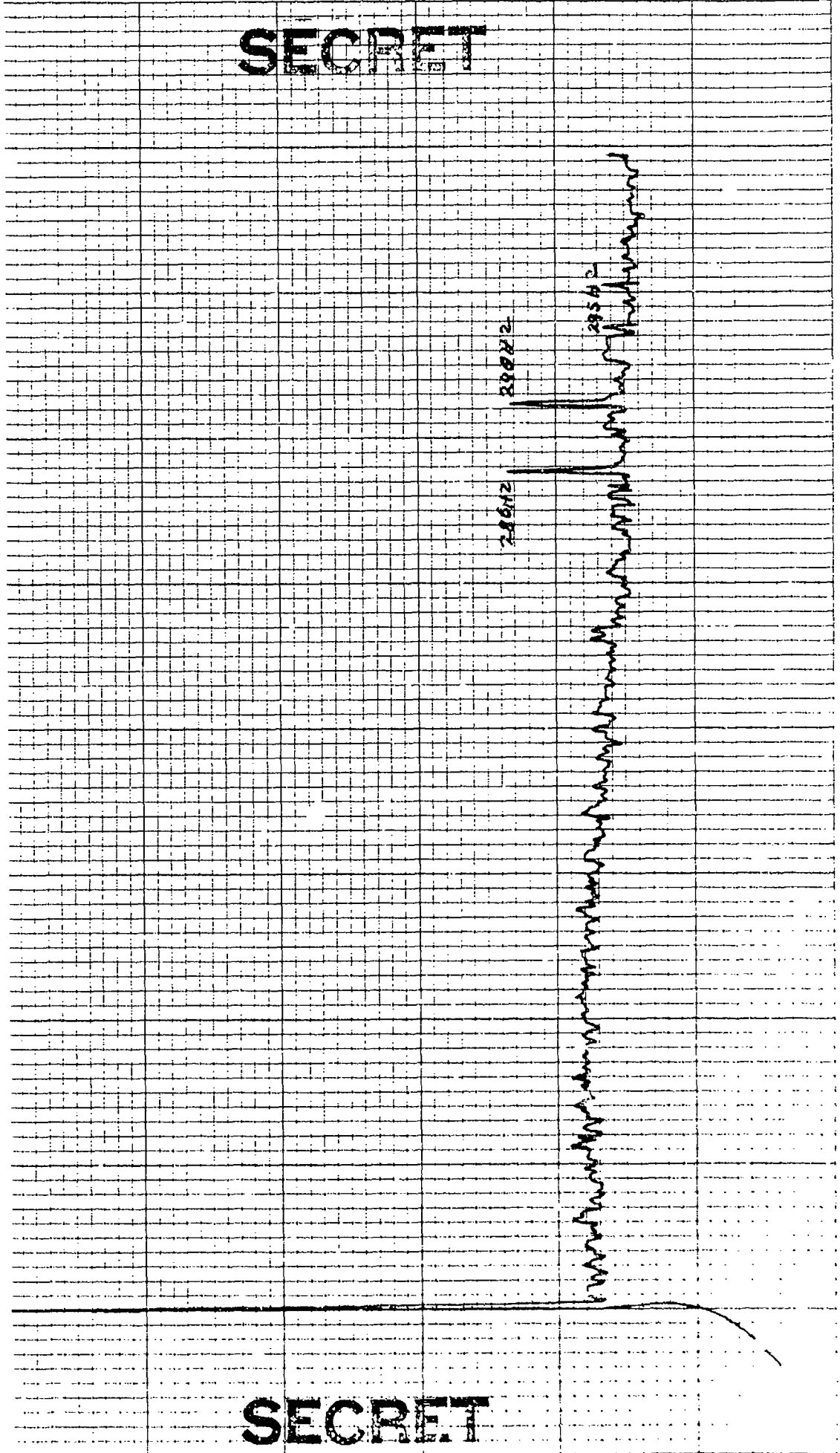


CONTROL: 111 -1551 (16)      DATE OF ANALYSIS: \_\_\_\_\_  
 BEAMFORMED SPECTRUM(ELEMENTS)      29 THRU 004  
 EXERCISE: BEARING STAKE      DATE/TIME: 1/19/77 - 1551 Z  
 CENTER FREQ: 270 MHz      ANALYSIS BANDWIDTH: 1/10Hz  
16 ELEMENTS      -59.5 DEG. AZ STEERING

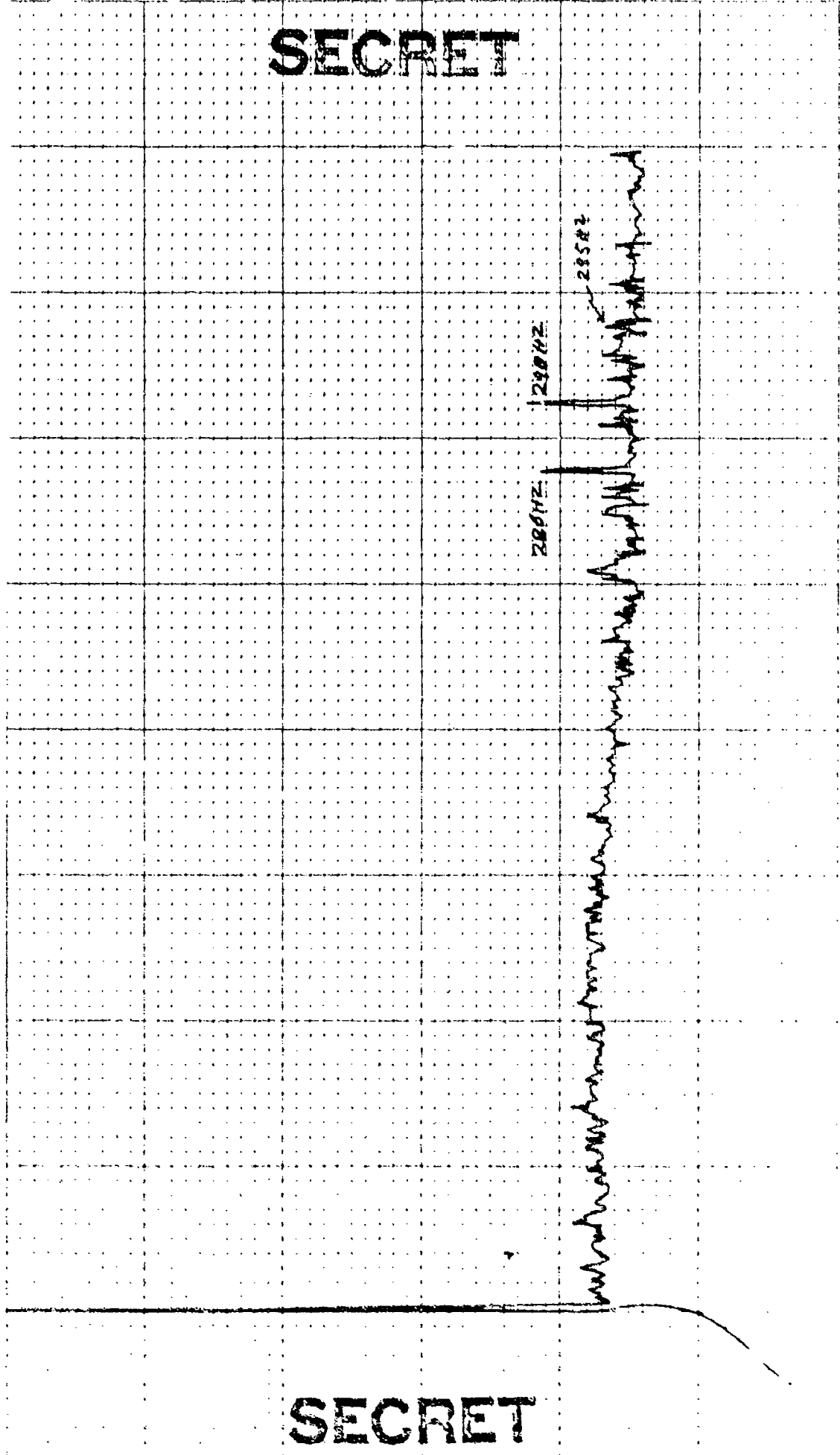
REEL: 6      INDE X6466  
 INTEGRATION TIME 320 SECS      ATTN: -10 DB  
 FILTER      WTC: HANNING



CONTROL: 111 3 1551 (16) DATE OF ANALYSIS: 29 MAR 44 REEL: 6 INDE X 466  
 BEAMFORMED SPECTRUM (ELEMENTS) 29 MAR 44  
 EXERCISE: BEARING STAKE DATE/TIME: 17-19-77 - 1551 Z INTEGRATION TIME 320 SECS ATTN: -19 DB  
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING  
16 ELEMENTS -60 DEG. AZ STEERING



CONTROL: 19-1551 (16)      DATE OF ANALYSIS: 26 MAR 44      REEL: 6      INDE X 666  
 BEAMFORMED SPECTRUM (ELEMENTS)      26 MAR 44  
 EXERCISE: BEARING STAKE      DATE/TIME: 1-19-77 - 1551 Z      INTEGRATION TIME 320 SECS      ATTN: DB  
 CENTER FREQ: 270 HZ      ANALYSIS BANDWIDTH: 1/10 HZ      FILTER      WTC: HANNING  
16 ELEMENTS      -62 DEG. AZ STEERING

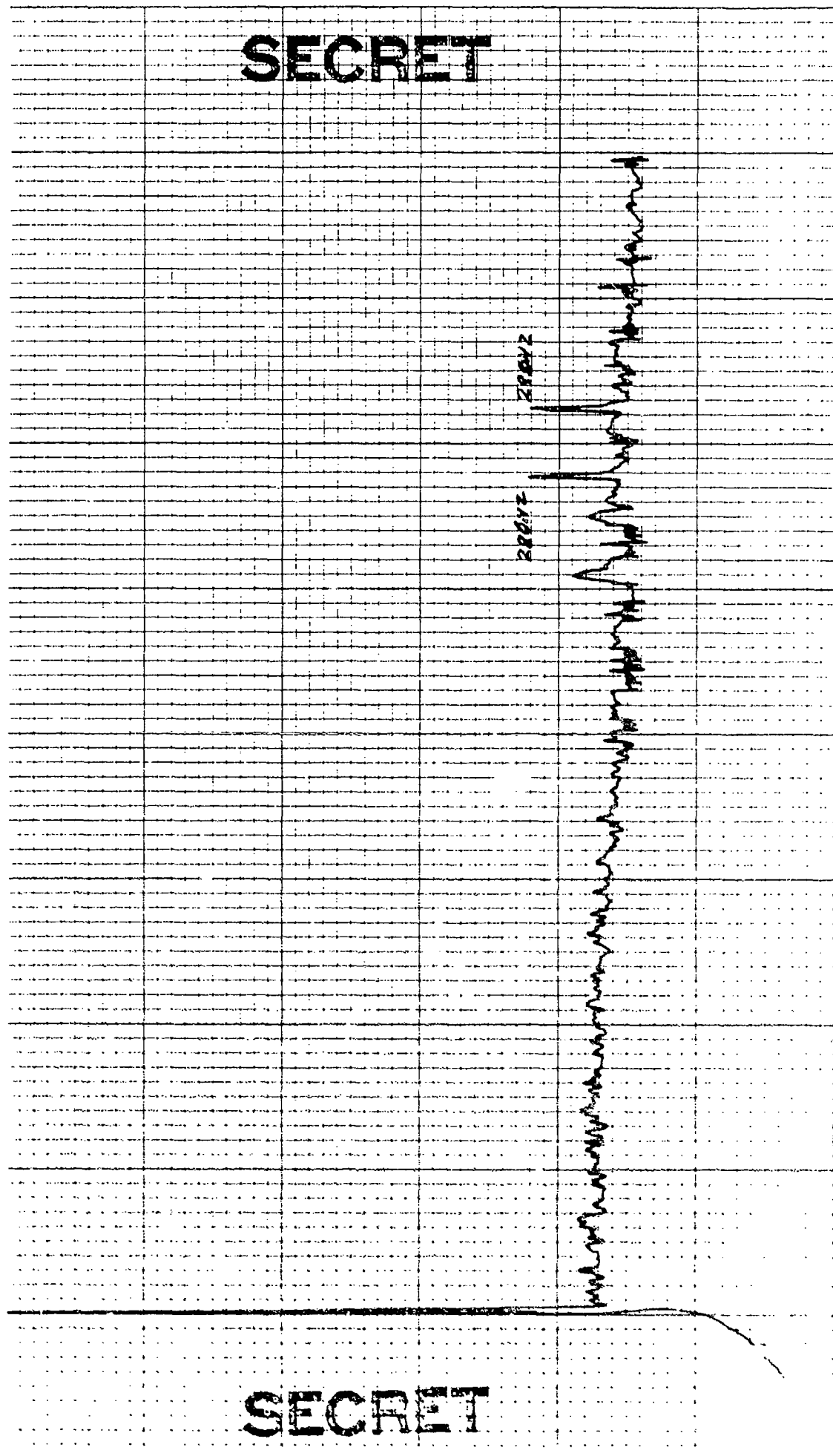


SECRET

CONTROL: 1/19 - 1551 (16)  
DEAMFORMED SPECTRUM(ELEMENTS  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
16 ELEMENTS

DATE OF ANALYSIS: 21 JAN 64  
DATE/TIME: 1-19-77 - 1551 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
-64 DEG. AZ STEERING

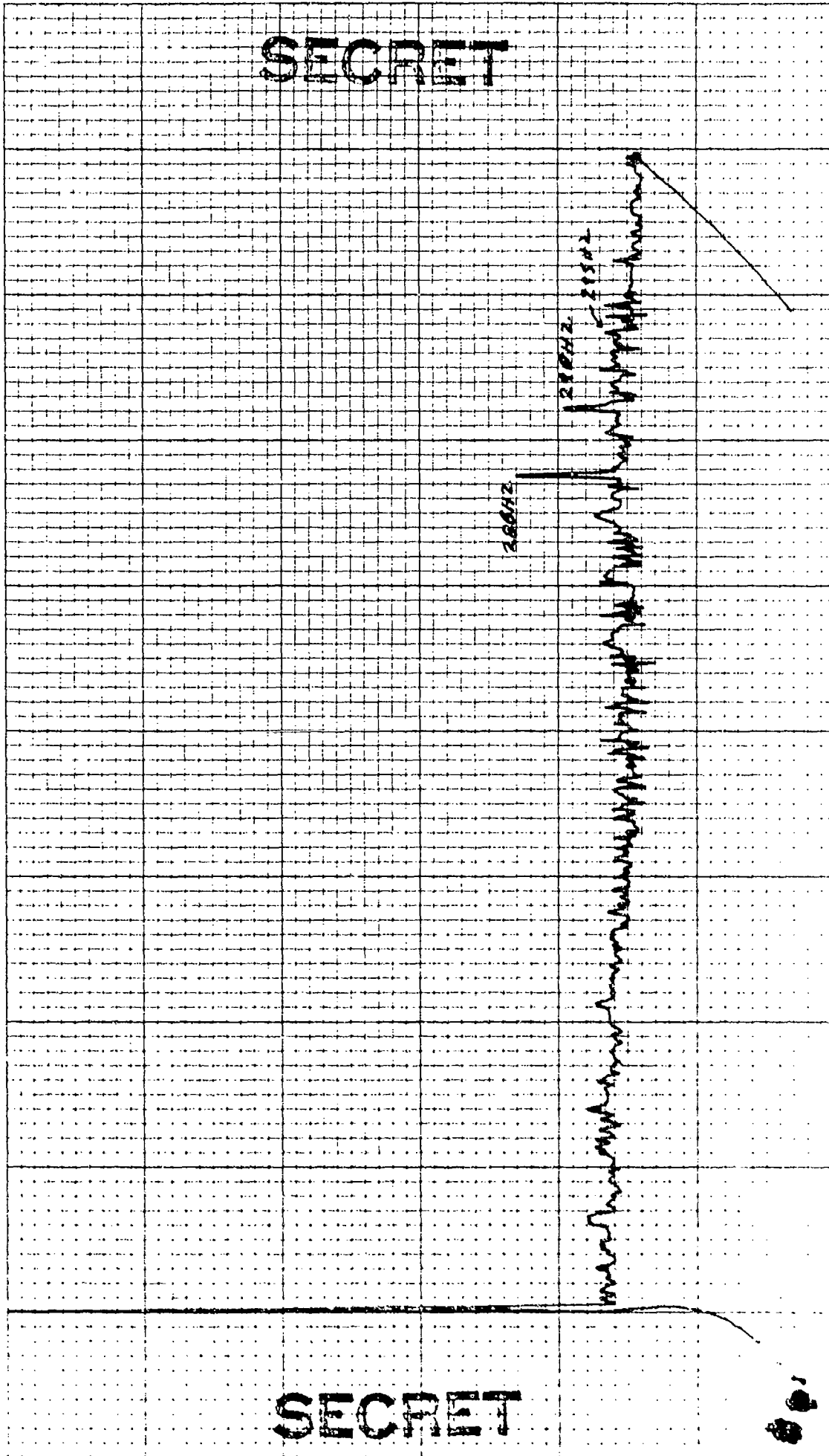
REEL: C INDE X666  
INTEGRATION TIME 320 SECS  
FILTER WTC: HANNING



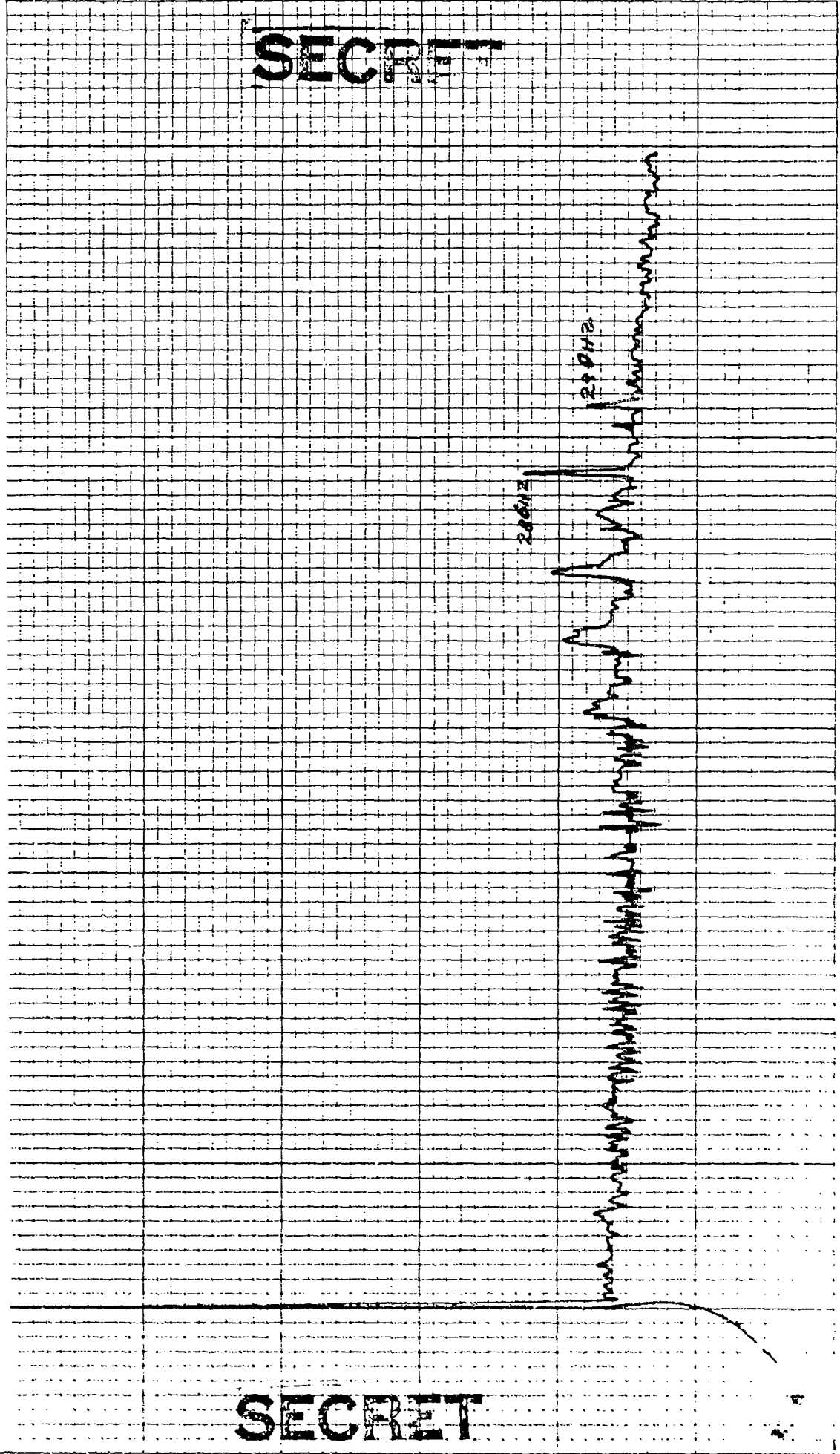
SECRET

SECRET

CONTROL: 1/1 - 1551 (16) DATE OF ANALYSIS: 29 MAR 66 REEL: 6 INDE X 66  
 BEAMFORMED SPECTRUM (ELEMENTS) )  
 EXERCISE: BEARING STAKE )  
 CENTER FREQ: 276 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: -10 DB  
70 ELEMENTS ) -66 DEG. AZ STEERING ) FILTER WTG: HANNING



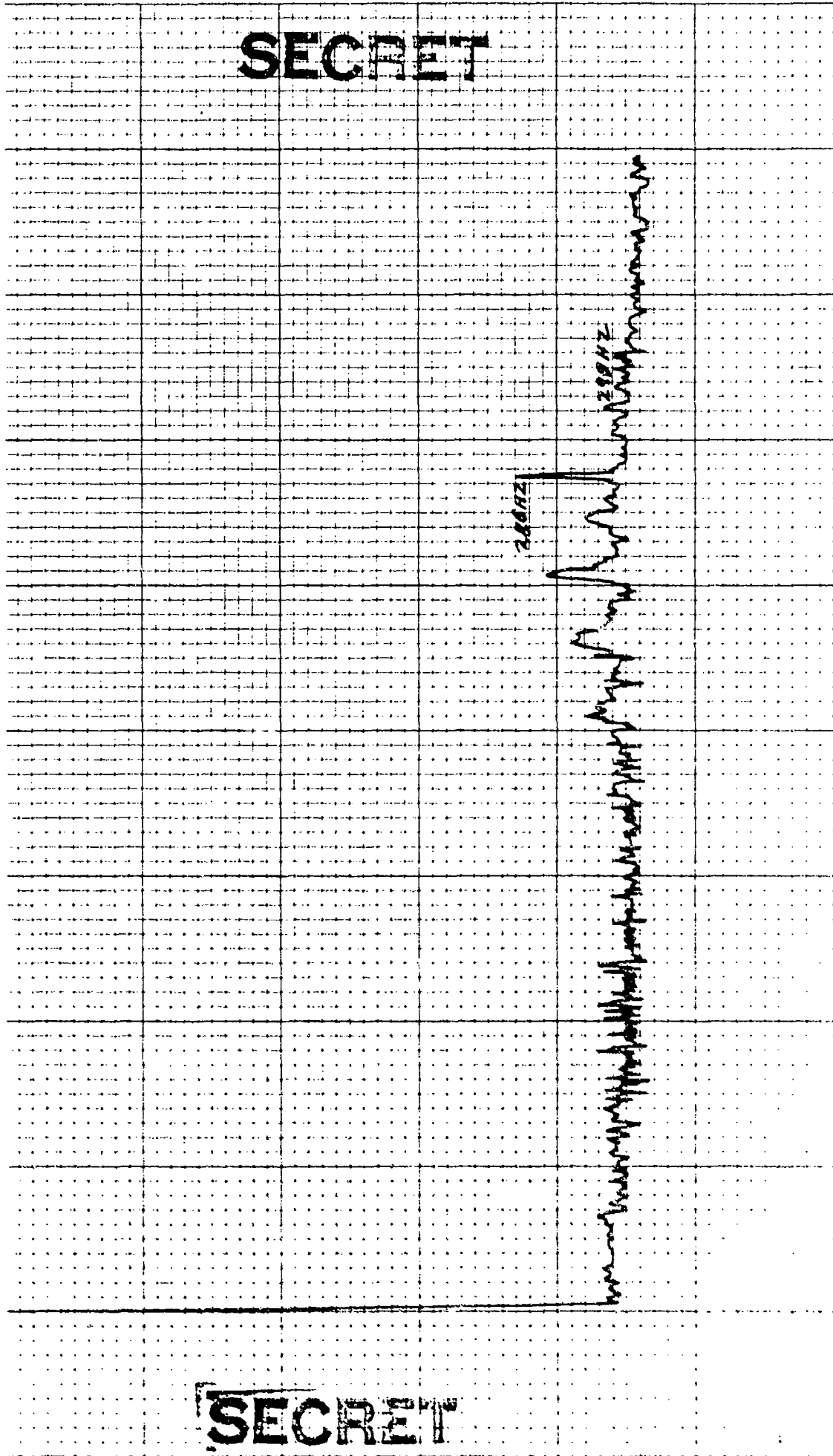
CONTROL: 1/19 - 1551 (16 ) DATE OF ANALYSIS: - - - REEL: 6 INDE: X4966  
 BEAMFORMED SPECTRUM (ELEMENTS) 29 THRU 44  
 EXERCISE: BEARING STAKE DATE/TIME: 1-18-77 - 1551Z INTEGRATION TIME: 320 SECS ATTEN: 70 DB  
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER: WTG: HANNING  
16 ELEMENTS -60 DEG. AZ STEERING



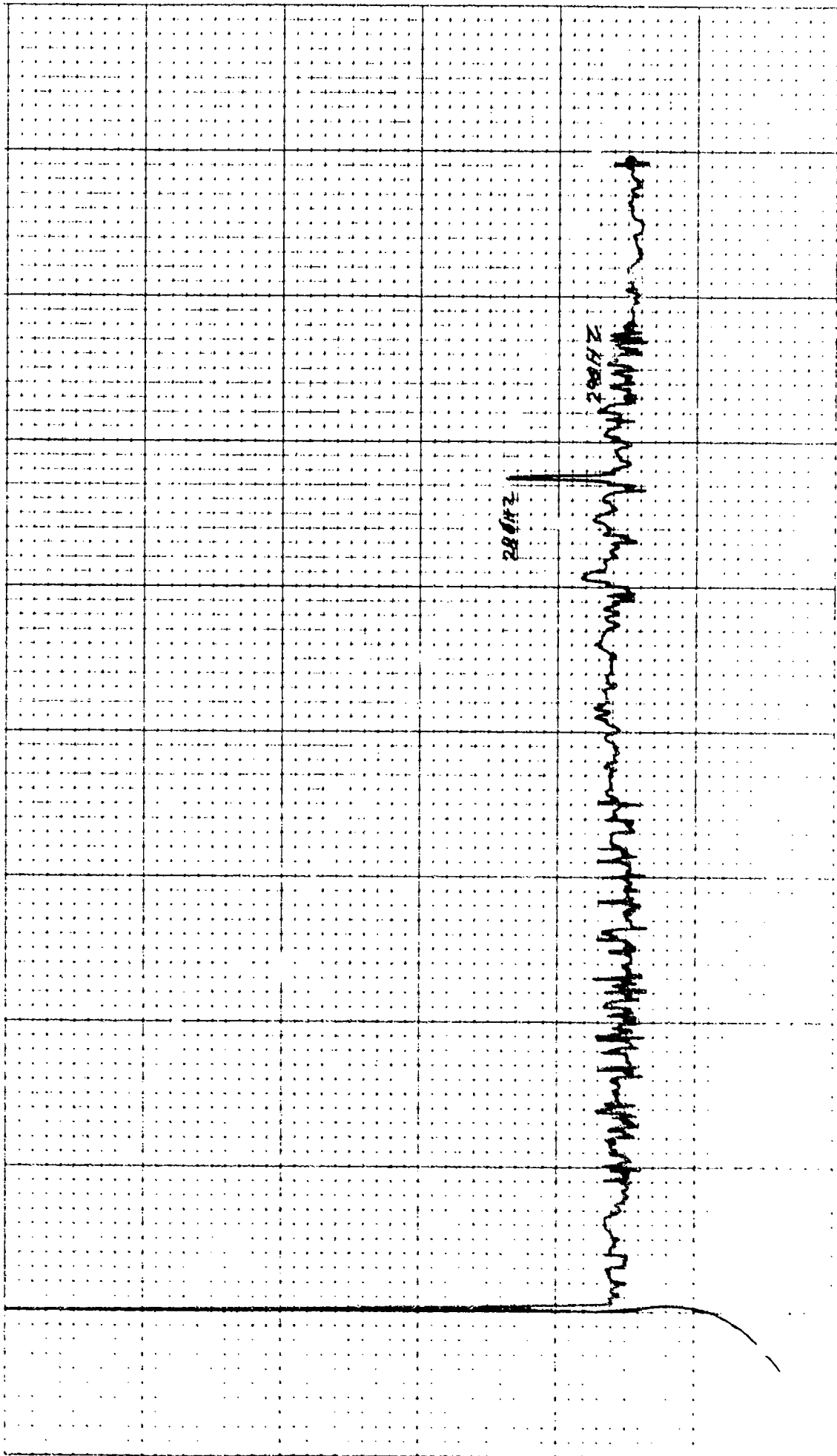
SECRET

SECRET

CONTROL: 1/19 - 150 (16)      DATE OF ANALYSIS: - - -      REEL: 6      INDE Y6166  
 BEAMFORMED SPECTRUM(ELEMENTS)      29 7M2044 )  
 EXERCISE: BEARING STAKE      DATE/TIME: 1-19-77 - 1551 Z      INTEGRATION TIME 320 SECS      ATTN: DB  
 CENTER FREQ: 290 HZ      ANALYSIS BANDWIDTH: 1/10HZ      FILTER      WTC: HANNING  
16 ELEMENTS      -70 DEG. AZ STEERING



CONTROL: 1/19 -1551 (16 )      DATE OF ANALYSIS: 29 MAR 84      REEL: 6      INDE X6466  
 BEAMFORMED SPECTRUM(ELEMENTS)      INTEGRATION TIME 320 SECS      ATEN: 70 DB  
 EXERCISE: BEARING STAKE      FILTER      WTG: HANNING  
 CENTER FREQ: 295 HZ      ANALYSIS BANDWIDTH: 1/10HZ  
16 ELEMENTS      -72 DEG. AZ STEERING





**CONFIDENTIAL**

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 1

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-57.2</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-47.2
BEAMFORMER GAIN	<u>+18</u>	-29.2
MRA CORRECTION	<u>+ .8</u>	-28.4

SIG. LEVEL FOR SNR CALCULATION

SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-74.9</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-64.9
BEAMFORMER GAIN	<u>+18</u>	-46.9

NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR	<u>-29.2</u>	
NOISE LEVEL FOR SNR	<u>-46.9</u>	17.7
PROCESSOR CORRECTION	<u>-4.1</u>	13.6
MRA CORRECTION	<u>+ .8</u>	17.4
BANDWIDTH CONVERSION	<u>-13.2</u>	1.2

SNR .031 HZ BAND

SNR 1 HZ BAND

SECTION 4

# CONFIDENTIAL

## SIGNAL LEVEL AND SNR CALCULATIONS

DATA POINT 1

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 32

### SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-65.0</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-55.0
BEAMFORMER GAIN	<u>+18</u>	-37.0 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	-36.2 SIG. LEVEL FOR SIGNAL GAIN

### NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-74.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-64.8
BEAMFORMER GAIN	<u>+18</u>	-46.8 NOISE LEVEL FOR SNR CALCULATION

### SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR	<u>-37.0</u>	
NOISE LEVEL FOR SNR	<u>-46.8</u>	9.8
PROCESSOR CORRECTION	<u>-4.3</u>	5.5
MRA CORRECTION	<u>+ .8</u>	6.3 SNR .031 HZ BAND
BANDWIDTH CONVERSION	<u>-17.2</u>	-6.9 SNR 1 HZ BAND

# CONFIDENTIAL

**CONFIDENTIAL**

DATA POINT 1

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	_____	<u>-49.7</u>	<u>-53.3</u>
MRA SIGNAL LEVEL	_____	<u>-28.4</u>	<u>-36.2</u>
ARRAY SIGNAL GAIN		<u>21.3</u>	<u>17.1</u>
20 LOG <u>32</u>	_____	<u>30.1</u>	<u>30.1</u>
# of elements			
DIFFERENCE	_____	<u>-8.8</u>	<u>-13.0</u>

ARRAY GAIN

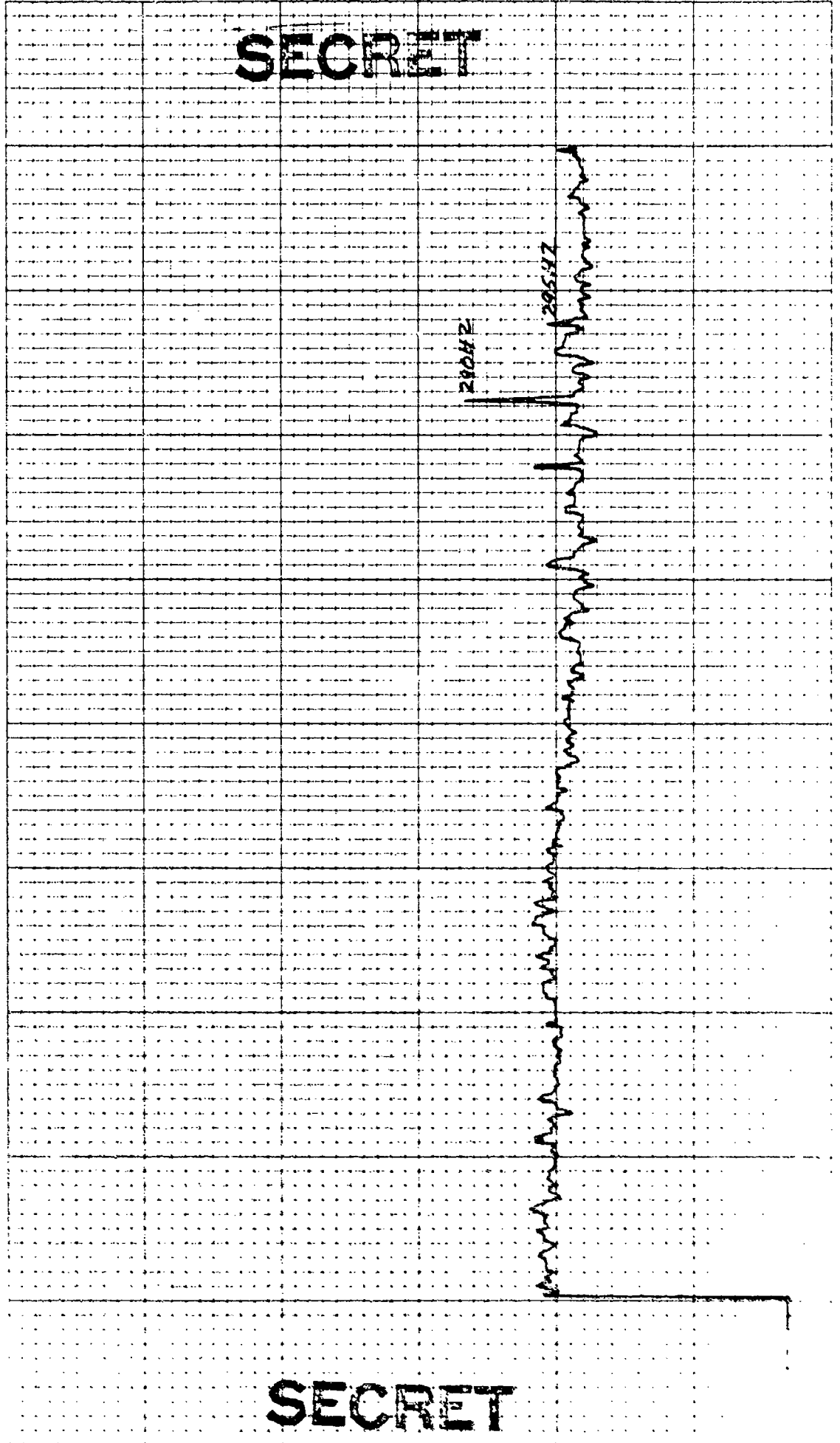
MRA SNR	_____	<u>14.4</u>	<u>6.3</u>
MEAN OMNI SNR	_____	<u>2.2</u>	<u>-2.0</u>
ARRAY GAIN		<u>12.2</u>	<u>8.3</u>
THEORETICAL AZMUTH GAIN (at MRA)	_____	<u>13.3</u>	<u>13.4</u>
DIFFERENCE	_____	<u>-1.1</u>	<u>-5.1</u>

**CONFIDENTIAL**

CONTROL: H9 - 1551 (32.)  
BEAMFORMED SPECTRUM (ELEMENTS  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
32 ELEMENTS

DATE OF ANALYSIS: 16-264 29-49  
DATE/TIME: 1-19-77 - 1551 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
-60 DEG. AZ STEERING

REEL: 6 INDE X6866  
INTEGRATION TIME 320 SECS ATTN: -10 DB  
FILTER WTC: HANNING



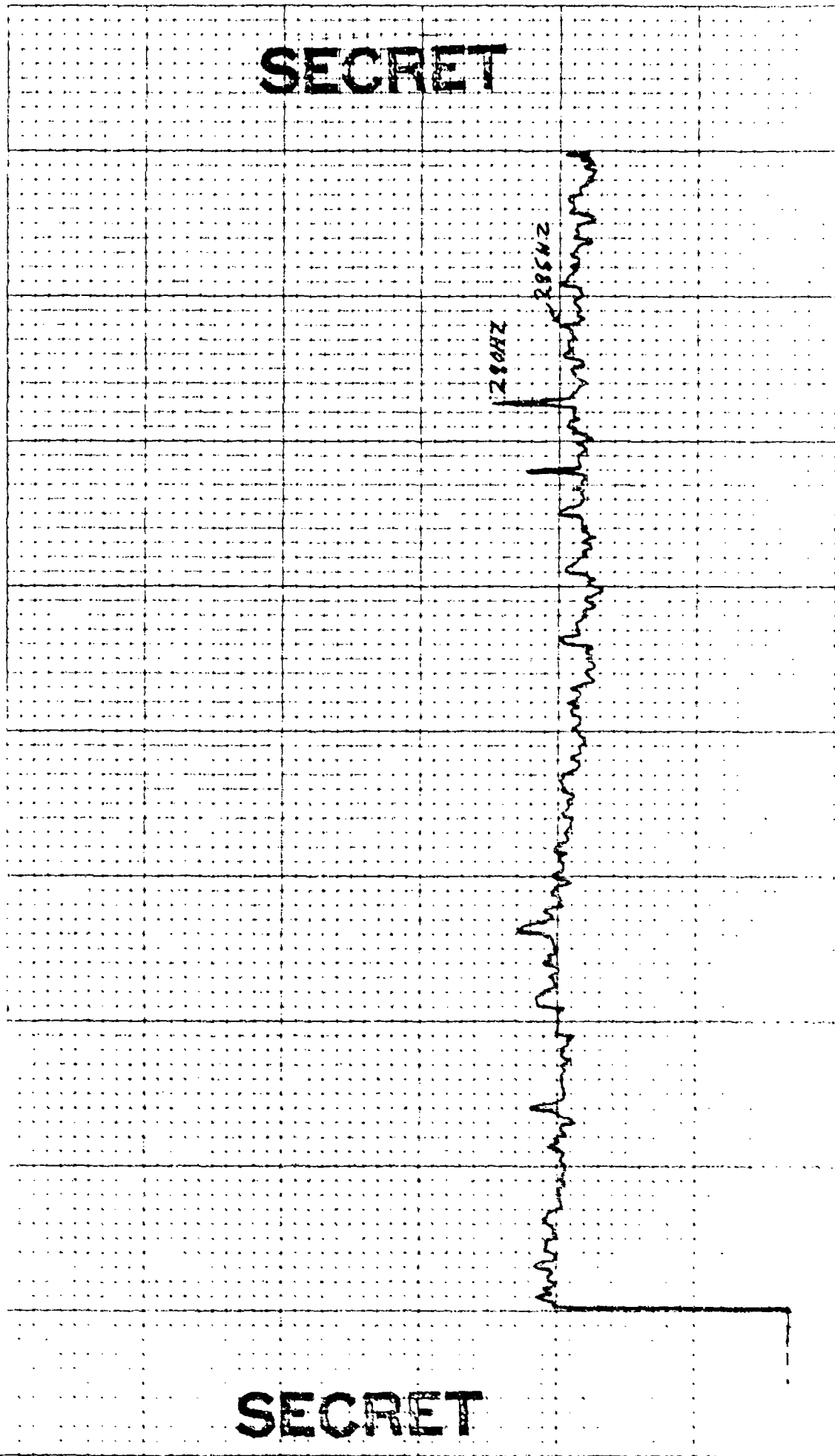
SECRET

SECRET

CONTROL: 1-19 -155/ (32)  
BEAMFORMED SPECTRUM(ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
32 ELEMENTS

DATE OF ANALYSIS: - - -  
16-26 4 29-49  
DATE/TIME: 1-19-77 -155/ 7  
ANALYSIS BANDWIDTH: 1/10HZ  
-62 DEG. AZ STEERING

REEL: 6 INDE X6466  
INTEGRATION TIME 320 SECS ATTN: -10 DB  
FILTER WTG: HANNING



SECRET

SECRET

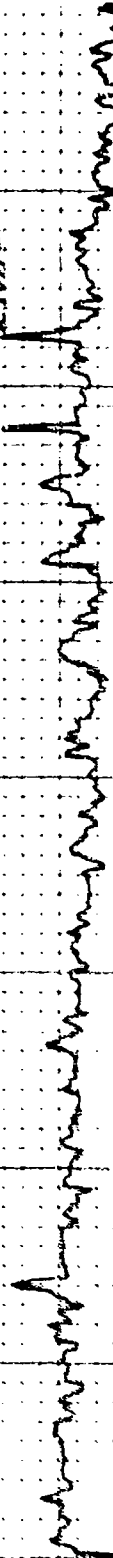
CONTROL: 1-19 - 1551 (32) DATE OF ANALYSIS:        REEL: 6 INDE X 6466  
BEAMFORMED SPECTRUM(ELEMENTS) 16-26 & 29-49  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 KZ  
32 ELEMENTS  
ANALYSIS BANDWIDTH: 1/10 KHZ  
-64 DEG. AZ STEERING  
INTEGRATION TIME 320 SECS ATTN: -18 DB  
FILTER WTC: HANNING

41 03

SECRET

SECRET

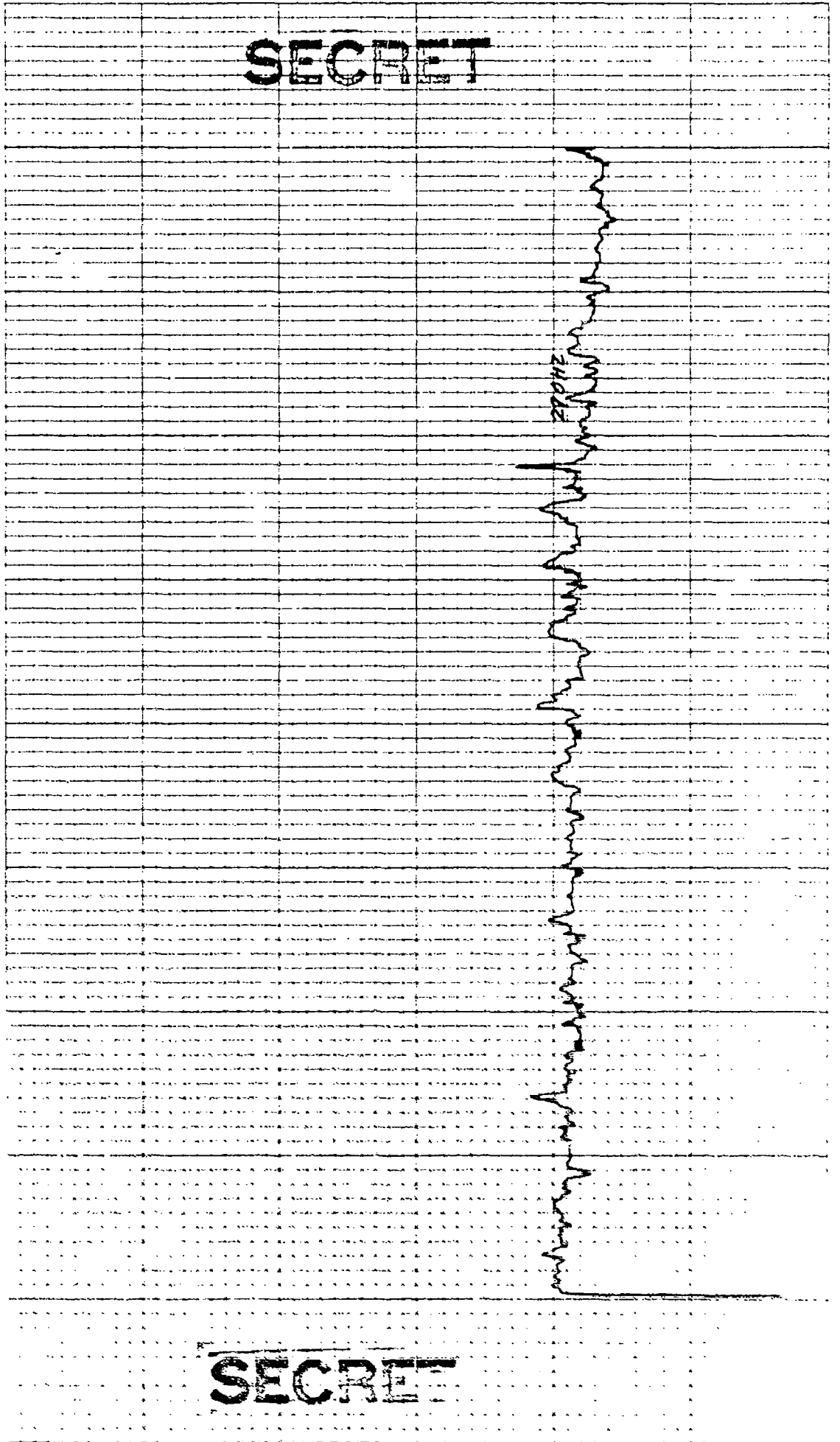
290KZ



CONTROL: 1-14 -155/ (12)  
 BEAMFORMED SPECTRUM(ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
 32 ELEMENTS

DATE OF ANALYSIS: - - -  
 16-26 29-49 )  
 DATE/TIME: 7-17-77 - 155/Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 -66 DEG. AZ STEERING

REEL: 6 INDE X6866  
 INTEGRATION TIME 320 SECS ATTEN: 18 DB  
 FILTER WTG: HANNING



SECRET

SECRET

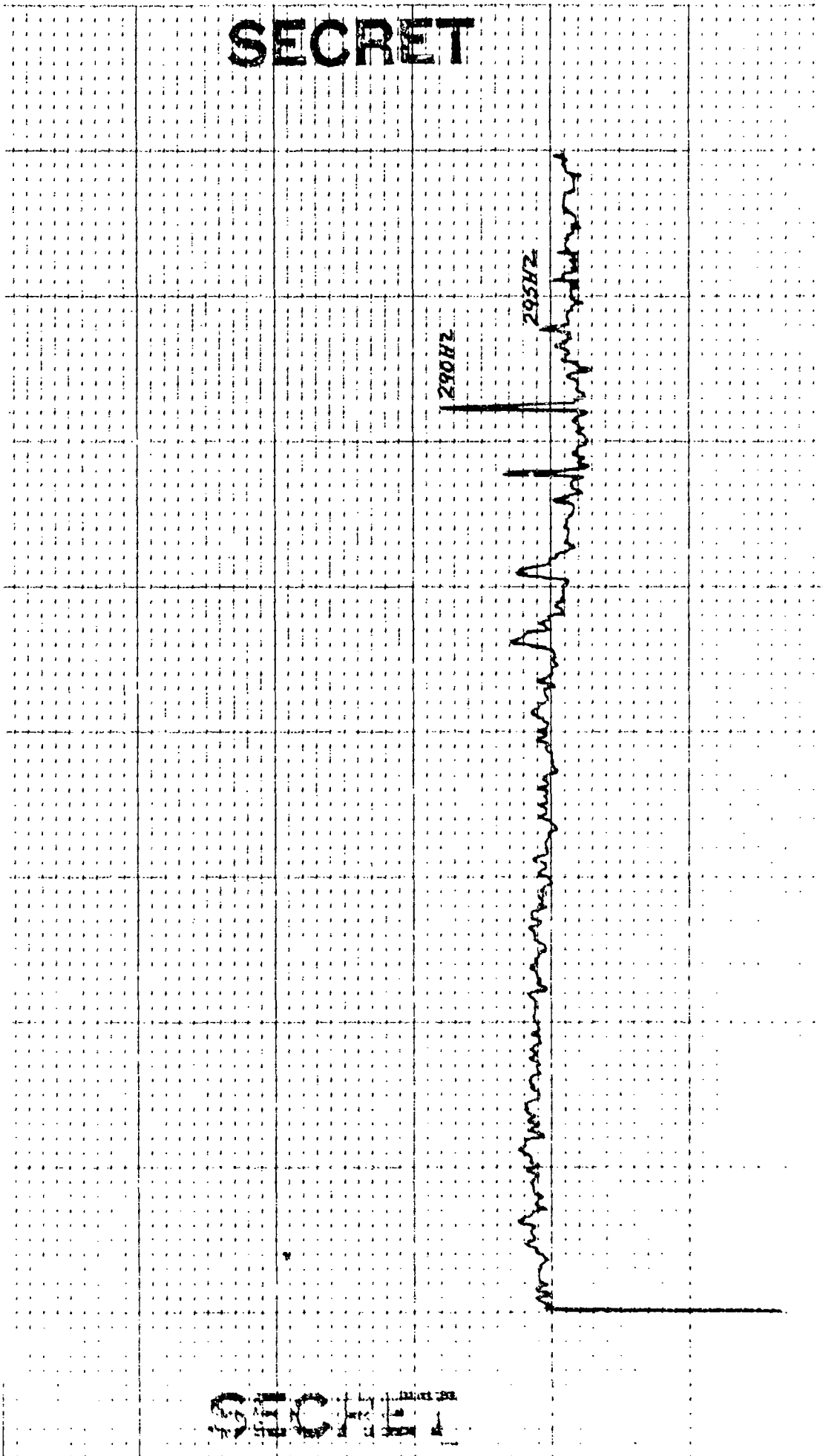
CONTROL: 1-19 -1551 (32)  
 BEAMFORMED SPECTRUM(ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
 32 ELEMENTS

DATE OF ANALYSIS: - - -  
 16-26 29-49

DATE/TIME: 1-19-77 -1551 Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 -58 DEG. AZ STEERING

REEL: 6 INDE X 4466

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



SECRET

SECRET

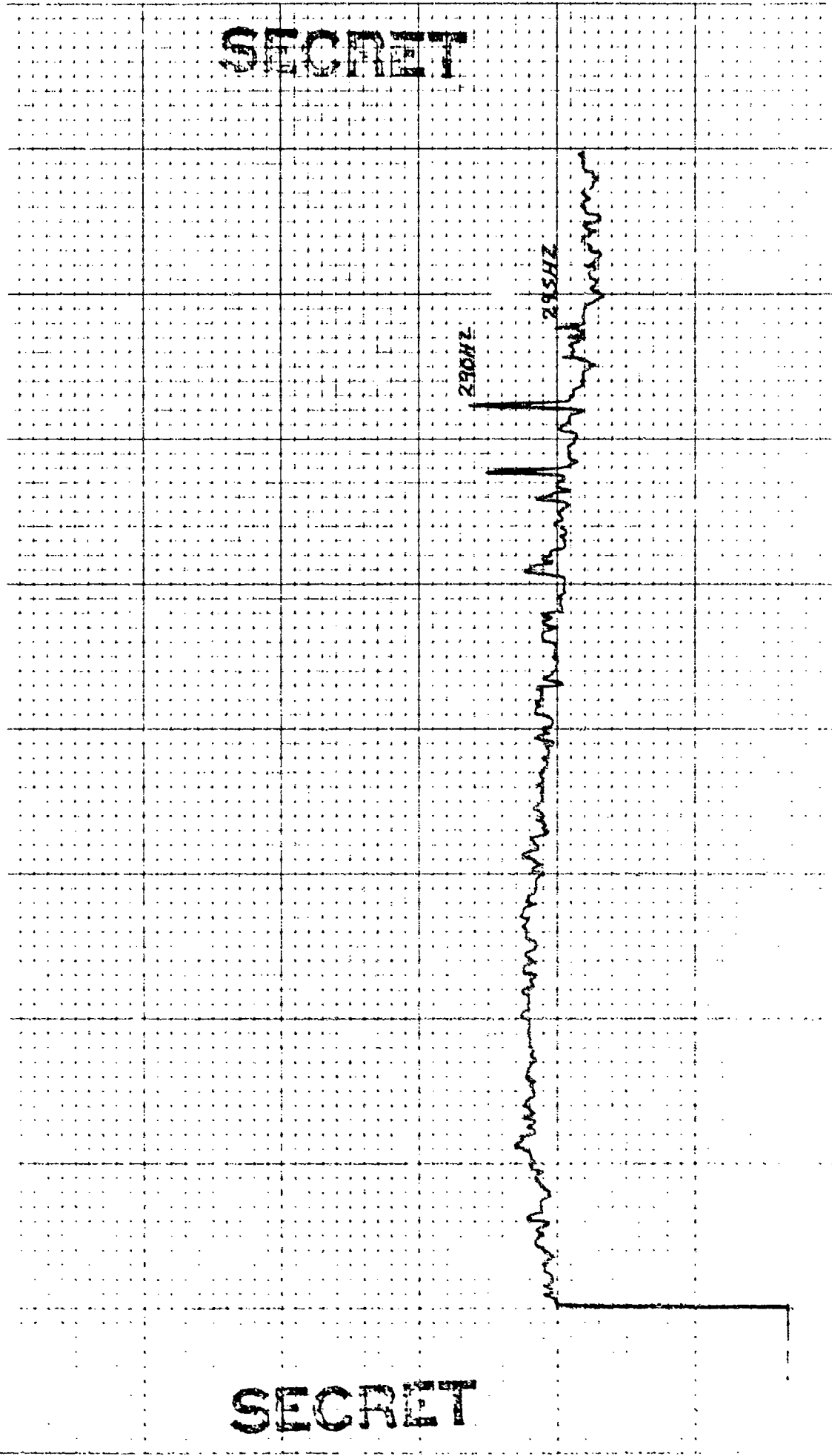


4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

CONTROL: 119 -1551 (72)  
BEAMFORMED SPECTRUM(ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
32 ELEMENTS

DATE OF ANALYSIS: - - -  
16. 26 & 29.49 )  
DATE/TIME: 1-19-77 -1551 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
-56 DEG. AZ STEERING

REEL: 6 INDE X6466  
INTEGRATION TIME 320 SECS  
ATTEN: -18 DB  
FILTER WTG: HANNING



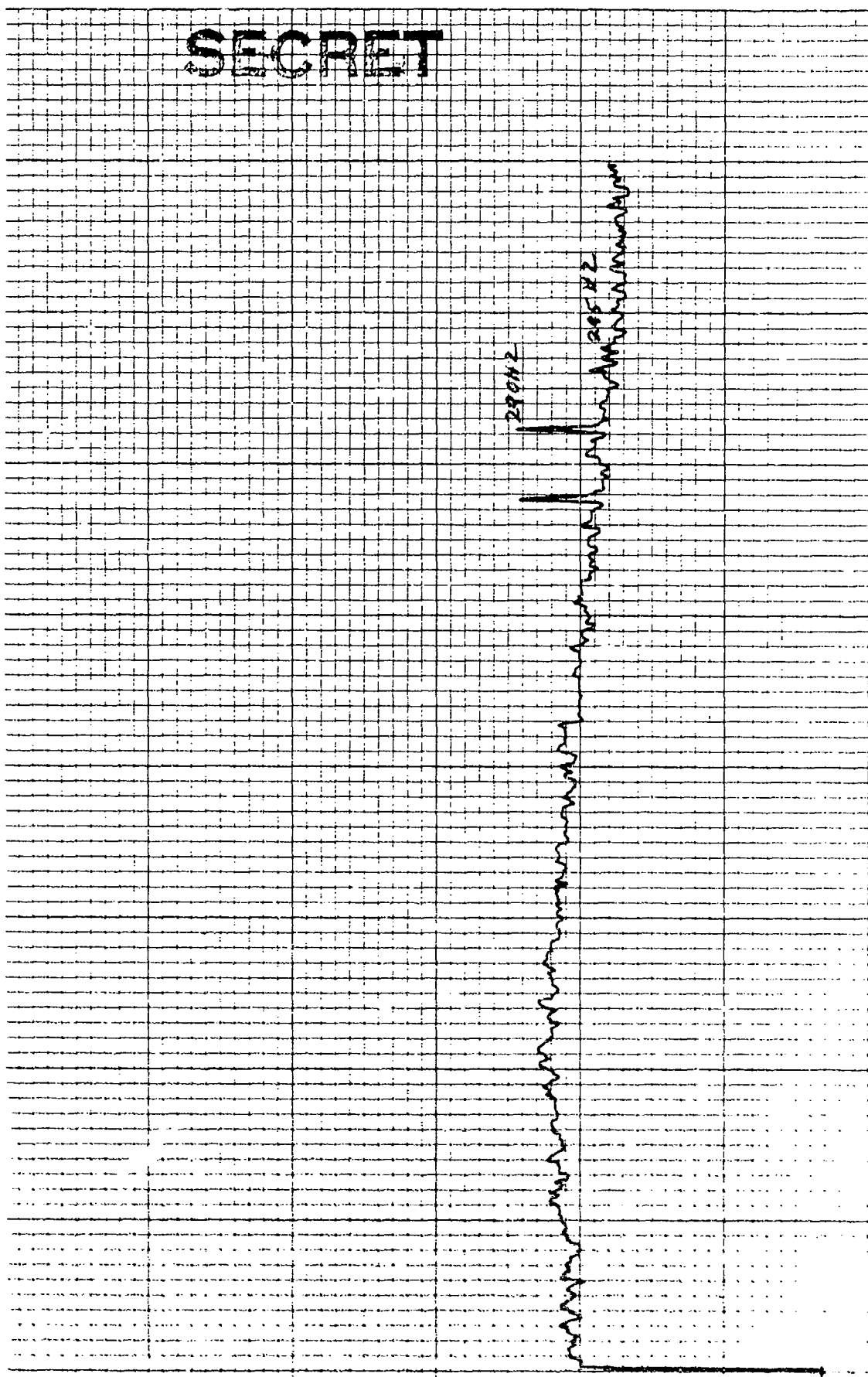
SECRET

SECRET

CONTROL: 1-14 -1551 (21) DATE OF ANALYSIS: ---  
 BEAMFORMED SPECTRUM(ELEMENTS) 16-26 28 30 49  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
 32 ELEMENTS

REEL: 6 INDE X 6466  
 INTEGRATION TIME 320 SECS ATTN: 70 DB  
 FILTER WTG: HANNING

ANALYSIS BANDWIDTH: 1/10HZ  
-54 DEG. AZ STEERING



SECRET

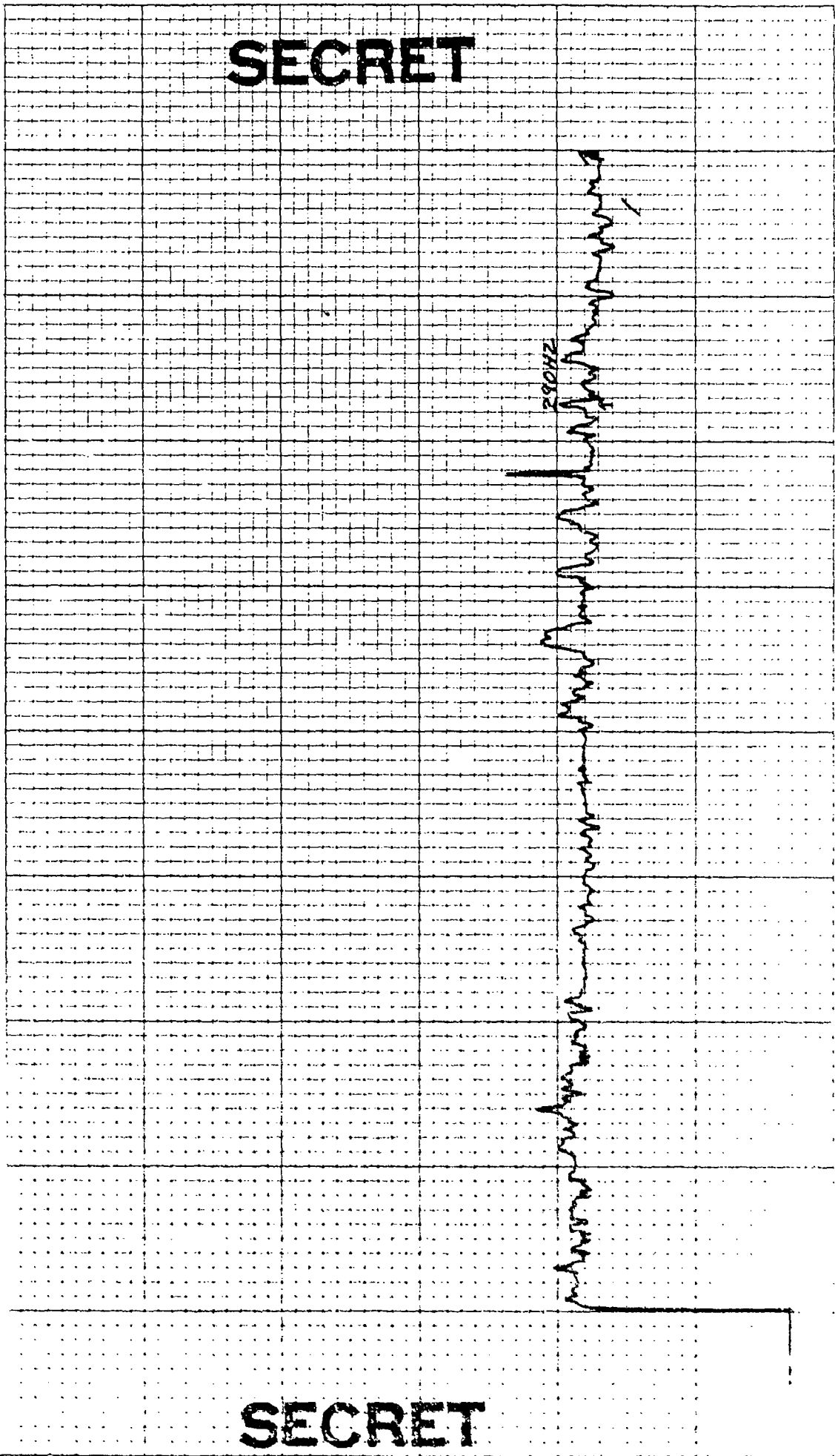
SECRET

4 03

CONTROL: 1-19 - 1551 (32)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
32 ELEMENTS

DATE OF ANALYSIS: - - -  
DATE/TIME: 1-19-77 - 1551 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
-20 DEG. AZ STEERING

REEL: 6 INDE XC466  
INTEGRATION TIME 320 SECS ATTN: -18 DB  
FILTER WTG: HANNING



SECRET

SECRET

CONTROL: 1/19 - 1551 (J2)      DATE OF ANALYSIS: ~ - -

BEAMFORMED SPECTRUM(ELEMENTS)      16-26 29-49

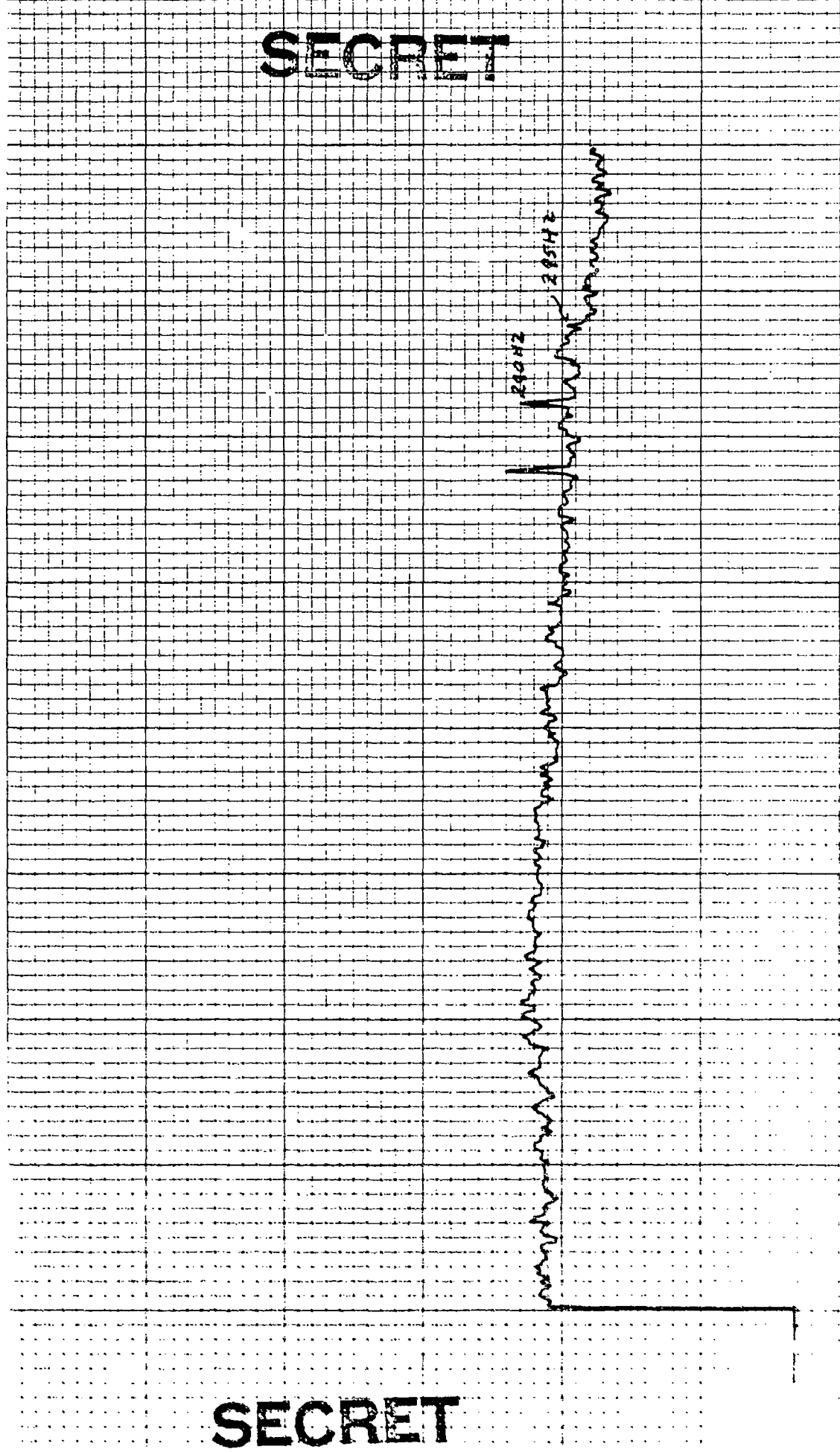
EXERCISE: BEARING STAKE      DATE/TIME: 1-19-77 - 1511 Z

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

32 ELEMENTS      -52 DEG. AZ STEERING

REEL: 6      INTEGRATION TIME 320 SECS      FILTER WTG: HANNING

INDE X6922      ATTEN: -18 DB



SECRET

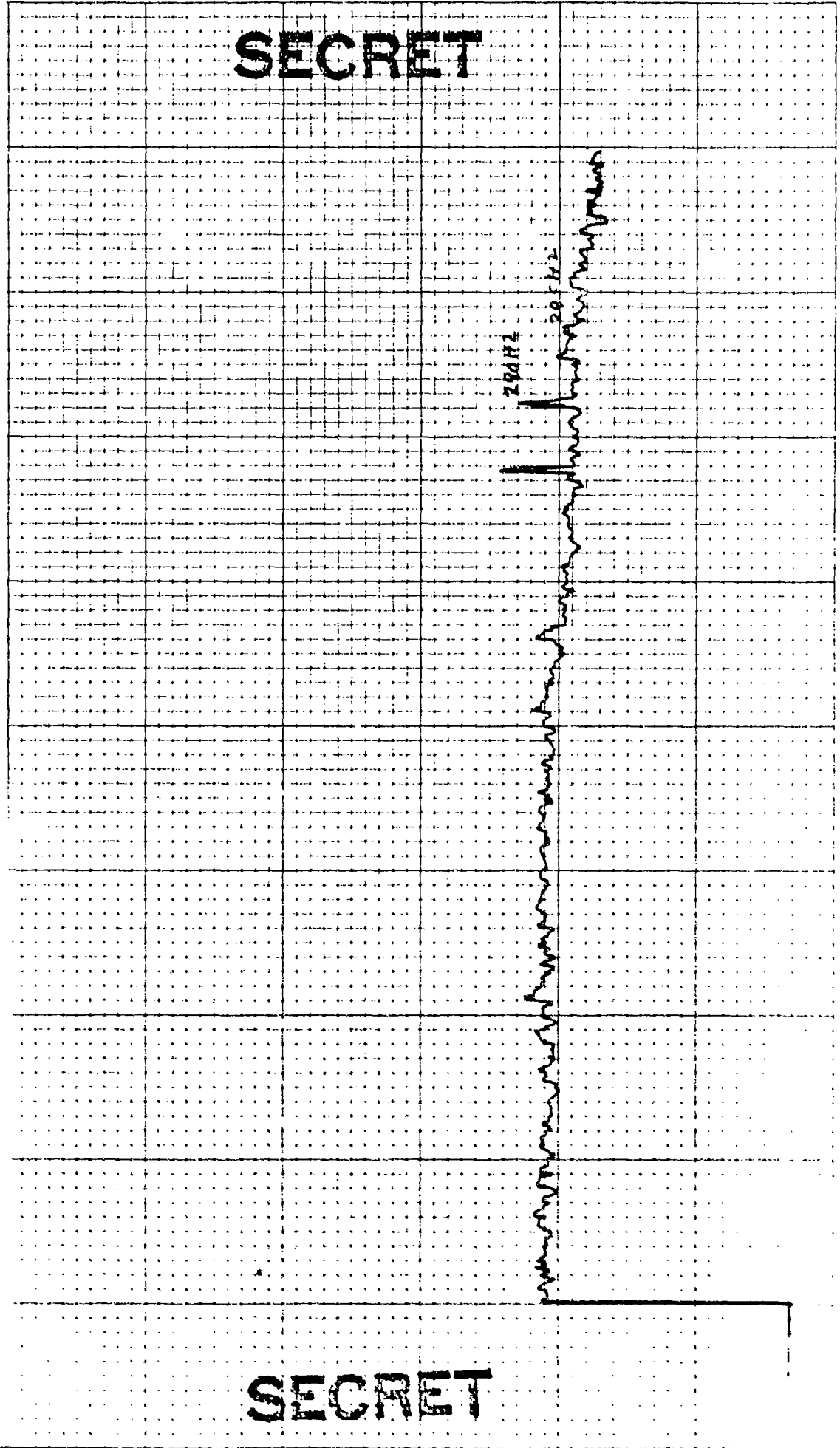
SECRET

CONTROL: 1/4 -1551 (32)  
 BEAMFORMED SPECTRUM(ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
 32 ELEMENTS

DATE OF ANALYSIS: 16-26 4 21-49  
 DATE/TIME: 1-18-77 - 1551 Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 -50 DEG. AZ STEERING

REEL: C  
 INTEGRATION TIME 320 SECS  
 FILTER WTG: HANNING

INDE X 226



SECRET

SECRET

4 03

E 11 TOL CH. 4

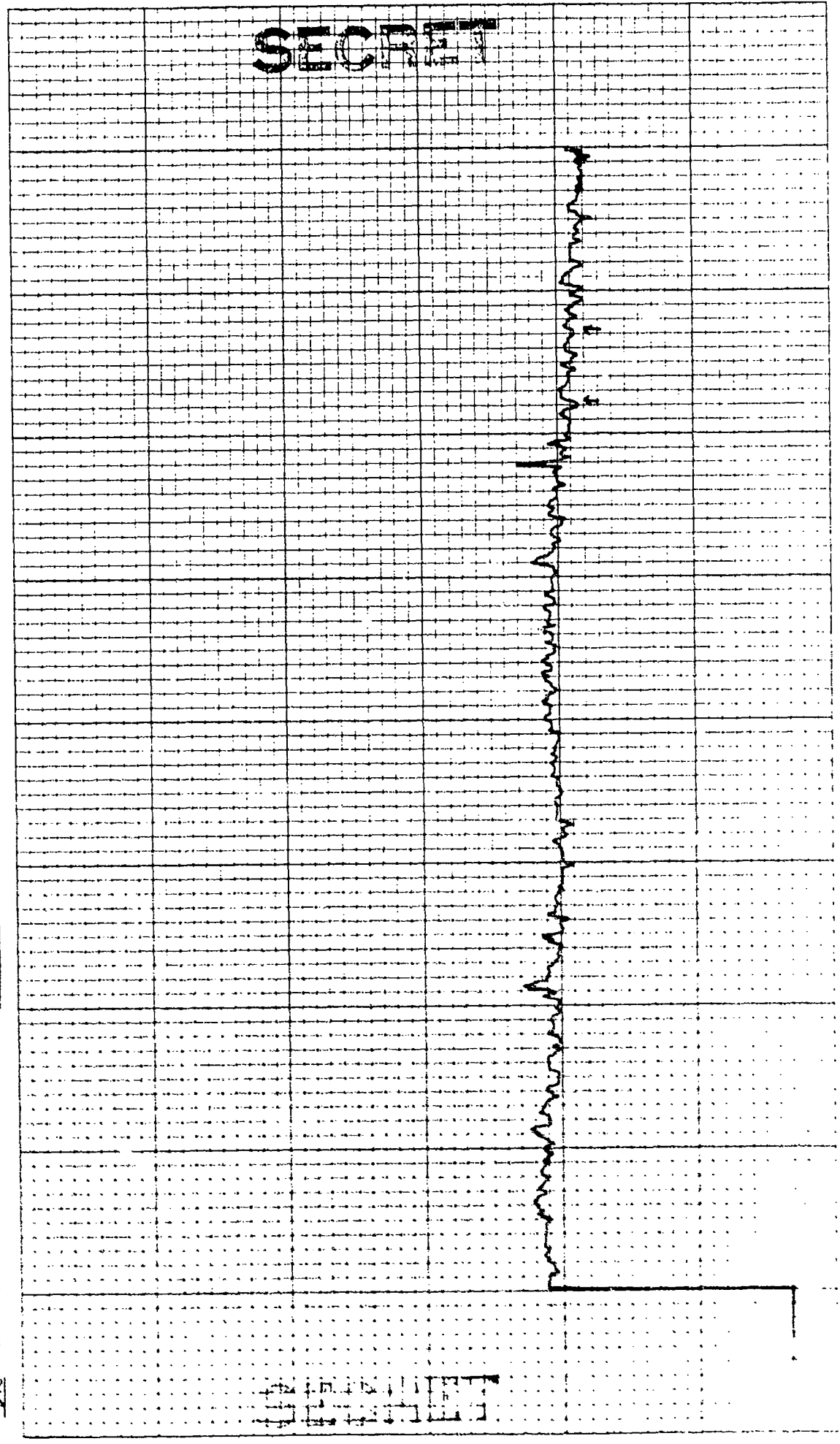
CONTROL: 1/11 - 1551 (22) DATE OF ANALYSIS: - - - -

BEAMFORMED SPECTRUM(ELEMENTS 16-26 & 29-49) REEL: 6 INDE 4666

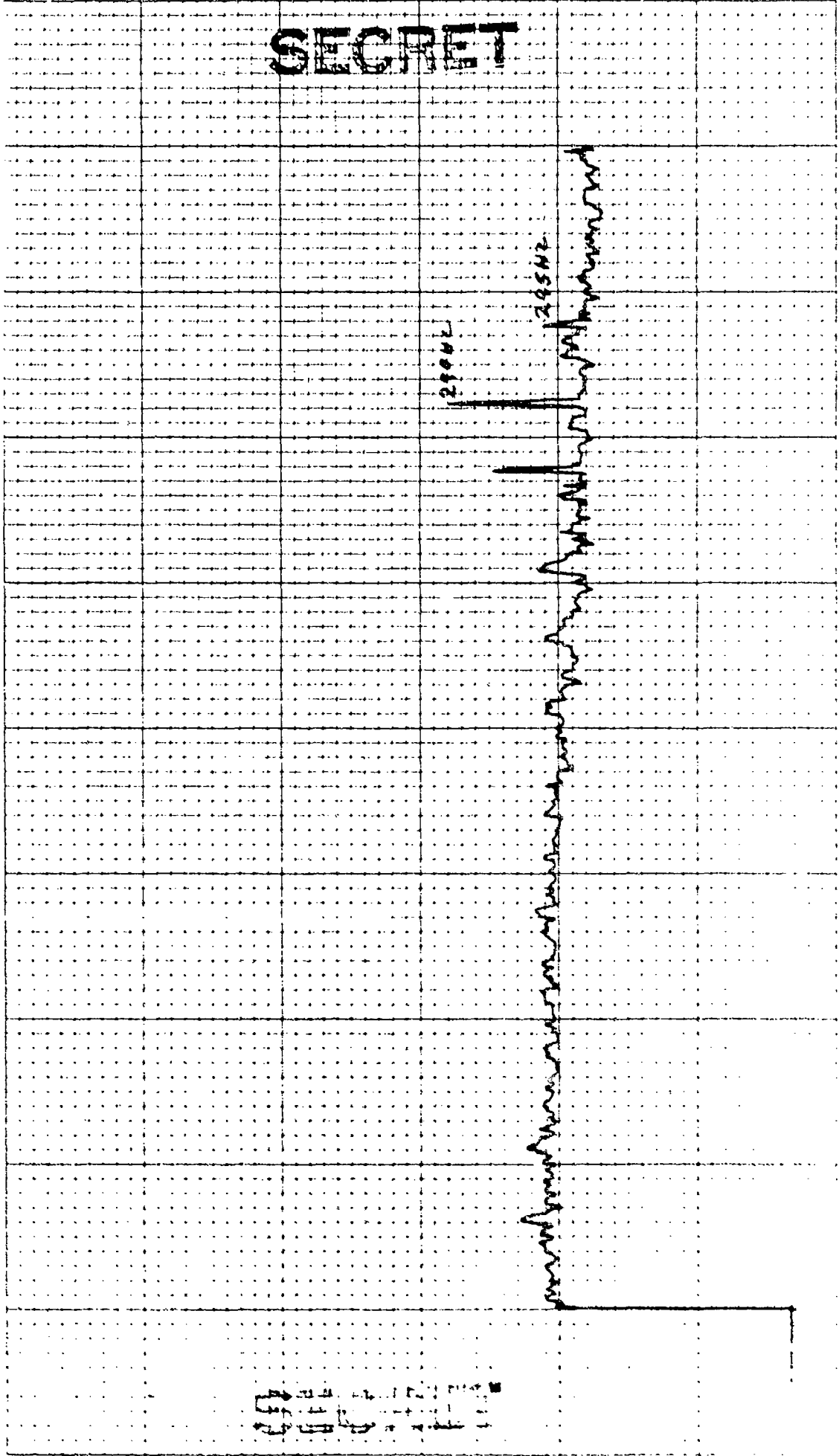
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTEN: -10 DB

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

22 ELEMENTS -48 DEG. AZ STEERING



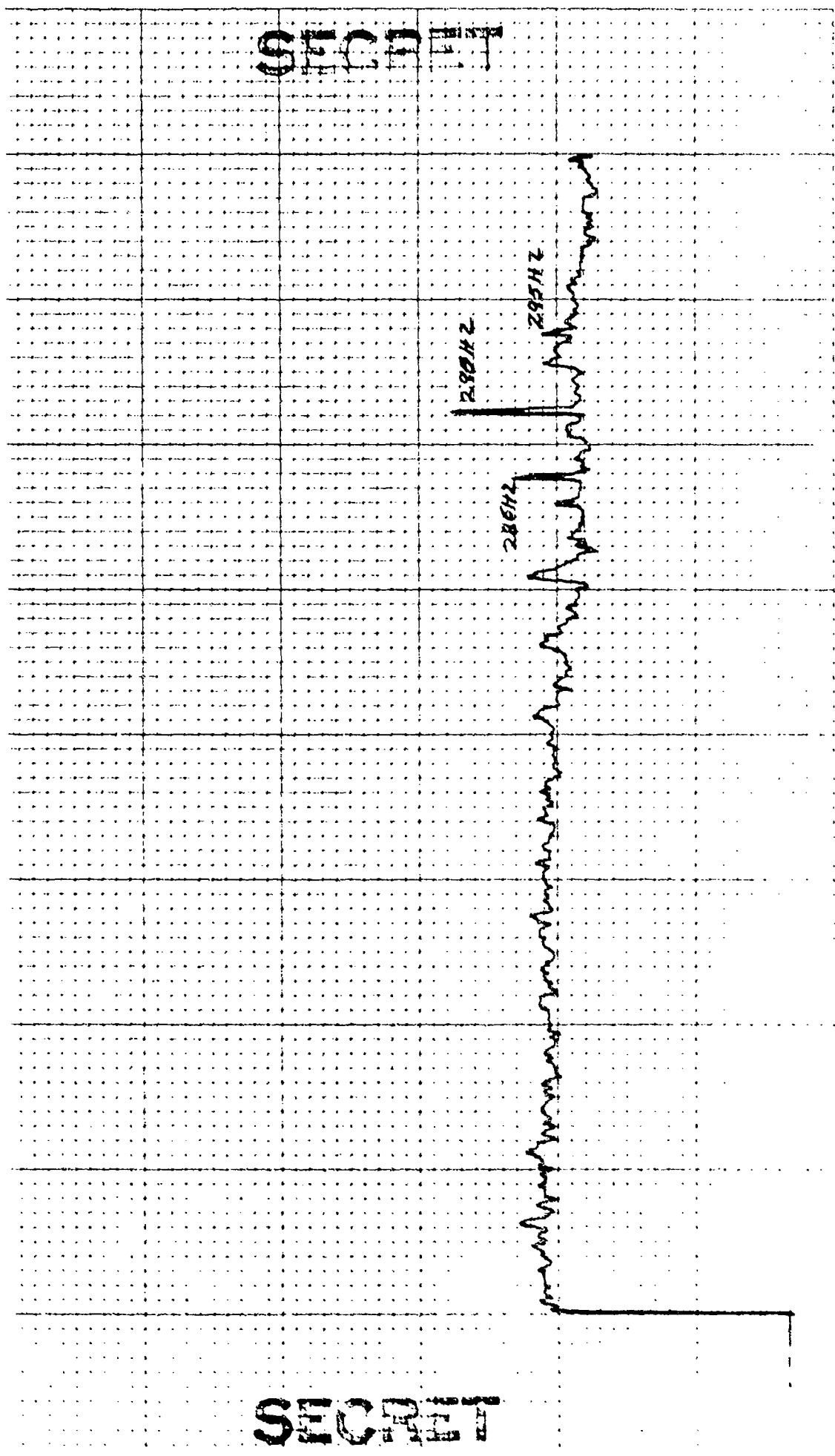
CONTROL: 1/14 -1551 (J2)      DATE OF ANALYSIS:             REEL: 6      INDEX: 5466  
 BEAMFORMED SPECTRUM (ELEMENTS 167.226 ± 297.49)  
 EXERCISE: BEARING STAKE      DATE/TIME: 1-18-77 -1551 Z      INTEGRATION TIME 320 SECS      ATTN: -10 DB  
 CENTER FREQ: 270 HZ      ANALYSIS BANDWIDTH: 1/10HZ      FILTER      WTG: HANNING  
32 ELEMENTS      -59 DEG. AZ STEERING



CONTROL: 1/19 -1557 (32)  
BEAMFORMED SPECTRUM(ELEMENTS  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
32 ELEMENTS

DATE OF ANALYSIS: - - - -  
1670264 287099  
DATE/TIME: - - - - 2  
ANALYSIS BANDWIDTH: 1/10 HZ  
-50.5 DEG. AZ STEERING

REEL: 6  
INDE X 6966  
INTEGRATION TIME 320 SECS  
ATTEN: -10 DB  
FILTER WTC: HANNING



SECRET

SECRET

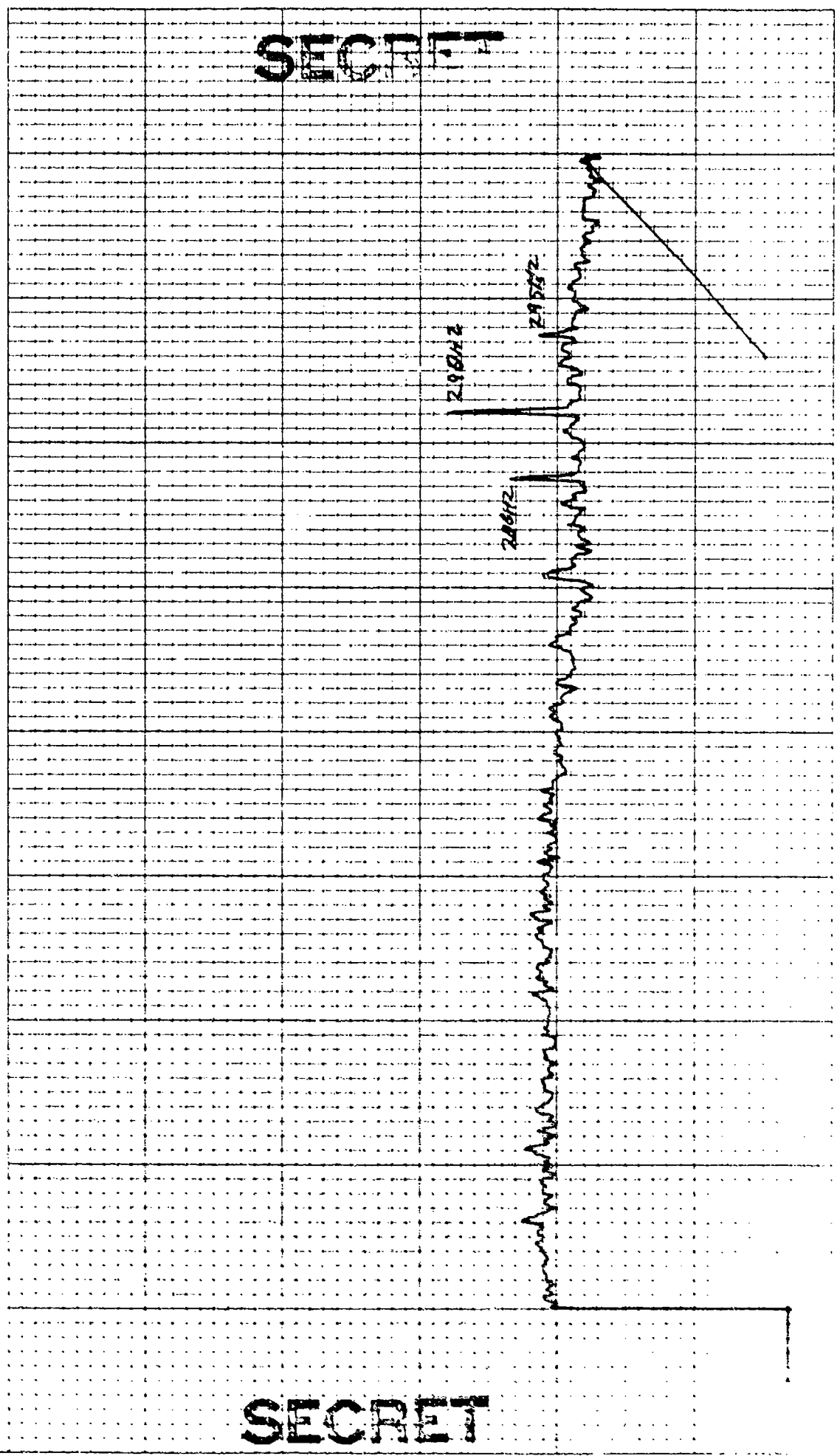


CONTROL: 1/9 -155/ (32)  
 BEAMFORMED SPECTRUM(ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
 32 ELEMENTS

DATE OF ANALYSIS: - - - - -  
 / 70264 29749 )  
 DATE/TIME: 1/16-72 -155/ 2  
 ANALYSIS BANDWIDTH: 1/10HZ  
 -57.5 DEC. AZ STEERING

REEL: 6  
 INTEGRATION TIME 320 SECS  
 FILTER WTG: HANNING

INDE X 6466  
 ATTN: -/0 DB



SECRET

SECRET

# CONFIDENTIAL

## SIGNAL LEVEL AND SNR CALCULATIONS

DATA POINT 1

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 52

### SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-37.1</u>	
MCPS-32 CAL. CORRECTION	<u>+ 0</u>	-37.1
BEAMFORMER GAIN	<u>+ 0</u>	-37.1 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .0</u>	-36.3 SIG. LEVEL FOR SIGNAL GAIN

### NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-43.7</u>	
MCPS-32 CAL. CORRECTION	<u>+ 0</u>	-43.7
BEAMFORMER GAIN	<u>+ 0</u>	-43.7 NOISE LEVEL FOR SNR CALCULATION

### SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR	<u>-37.1</u>	
NOISE LEVEL FOR SNR	<u>-43.7</u>	6.6
PROCESSOR CORRECTION	<u>-4.9</u>	1.7
MRA CORRECTION	<u>+ .8</u>	2.5 SNR .036 HZ BAND
BANDWIDTH CONVERSION	<u>-13.2</u>	-10.7 SNR 1 HZ BAND

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# CONFIDENTIAL

## SIGNAL LEVEL AND SNR CALCULATIONS

DATA POINT 1

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 52

### SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-28.4</u>	
MCPS-32 CAL. CORRECTION	<u>+ 0</u>	-28.4
BEAMFORMER GAIN	<u>+ 0</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>-43.7</u>	
MCPS-32 CAL. CORRECTION	<u>+ 0</u>	-43.7
BEAMFORMER GAIN	<u>+ 0</u>	-43.7 NOISE LEVEL FOR SNR CALCULATION

### SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR	<u>-28.4</u>	
NOISE LEVEL FOR SNR	<u>-43.7</u>	15.3
PROCESSOR CORRECTION	<u>- 4.2</u>	11.3
MRA CORRECTION	<u>+ .8</u>	12.1 SNR .031 HZ BAND
BANDWIDTH CONVERSION	<u>-13.2</u>	-1.1 SNR 1 HZ BAND

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DATA POINT 1

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	_____	<u>-49.7</u>	<u>-53.3</u>
MRA SIGNAL LEVEL	_____	<u>-27.6</u>	<u>-31.3</u>
ARRAY SIGNAL GAIN	_____	<u>22.1</u>	<u>17.0</u>
20 LOG <u>52</u> # of elements	_____	<u>34.3</u>	<u>34.3</u>
DIFFERENCE	_____	<u>-12.2</u>	<u>-17.3</u>

ARRAY GAIN

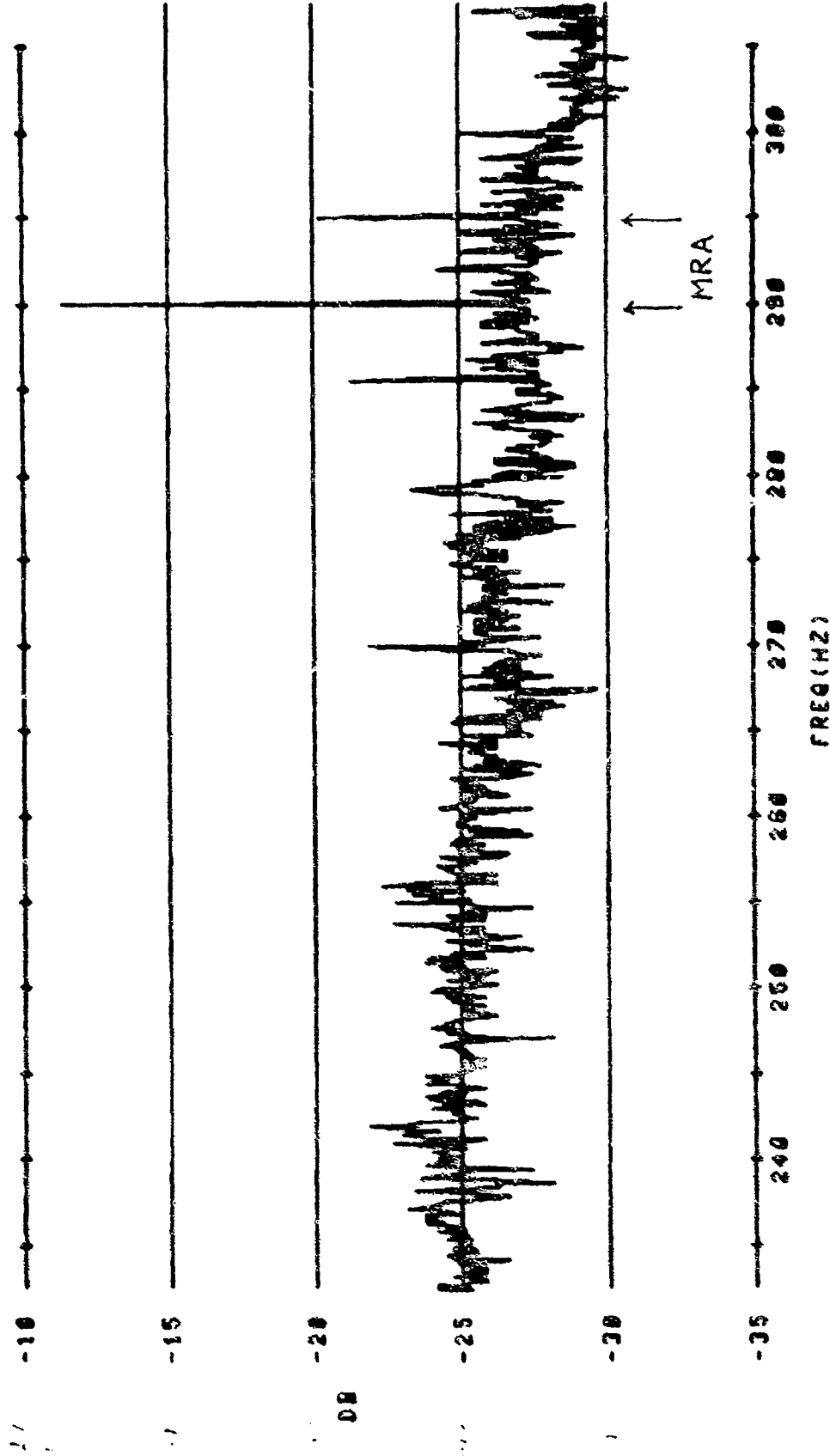
MRA SNR	_____	<u>12.1</u>	<u>2.5</u>
MEAN OMNI SNR	_____	<u>2.2</u>	<u>-2.0</u>
ARRAY GAIN	_____	<u>9.9</u>	<u>4.5</u>
THEORETICAL AZMUTH GAIN (at MRA)	_____	<u>15.4</u>	<u>15.4</u>
DIFFERENCE	_____	<u>-5.5</u>	<u>-11.9</u>

CONFIDENTIAL

# SECRET

CONTROL: 1/18-1851(62)    DATE OF ANALYSIS: 22JUL77 REEL: 00 SIDE: 0    INDEX: 0400  
BEAMFORMED SPECTRUM (ELEMENTS 1-14 AND 10-53)  
P2 REDUNDANCY: X2  
EXERCISE: BEARING STAKE    DATE/TIME: 18JAN77-1851Z    PROJECTOR RANGE: 91.5 NM  
CENTER FREQ: 270 HZ ANALYSIS B/W: 1/32HZ INTEG TIME: 320 SECS B/F: -10DB SWI: 27 DB  
B2 ELEMENTS    -59.0 DEG AZ STEER    NORMAL WEIGHTING

DP1



PLOT 1

SECRET

UNCLASSIFIED

(U)

NOISE SPECTRAL DENSITY CALCULATIONS FOR SPRAY/BEARING STAKE

TIME 1600Z

DATE 1-19-77

DATA POINT 2

FREQUENCY 290 HZ

-56.6

INDICATED NOISE LEVEL  $\text{dBV} \frac{1}{32}$  ABW

-(-8) = -48.6

SYSTEM SENSITIVITY dB/μB

+13.3 = -35.3

BANDWIDTH CONVERSION TO 1 HZ BAND

+100 = +64.7

CONVERSION TO  $\text{dBrePa/1HZ}$

UNCLASSIFIED

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

DATA POINT 2 DATE 1-19-77 TIME 1600Z

FREQUENCY 295 HZ

INDICATED NOISE LEVEL  $\text{dBV} \frac{1}{\sqrt{2}}$  ABW -55.89

SYSTEM SENSITIVITY  $\text{dB}/\mu\text{B}$  -(-8) -47.9

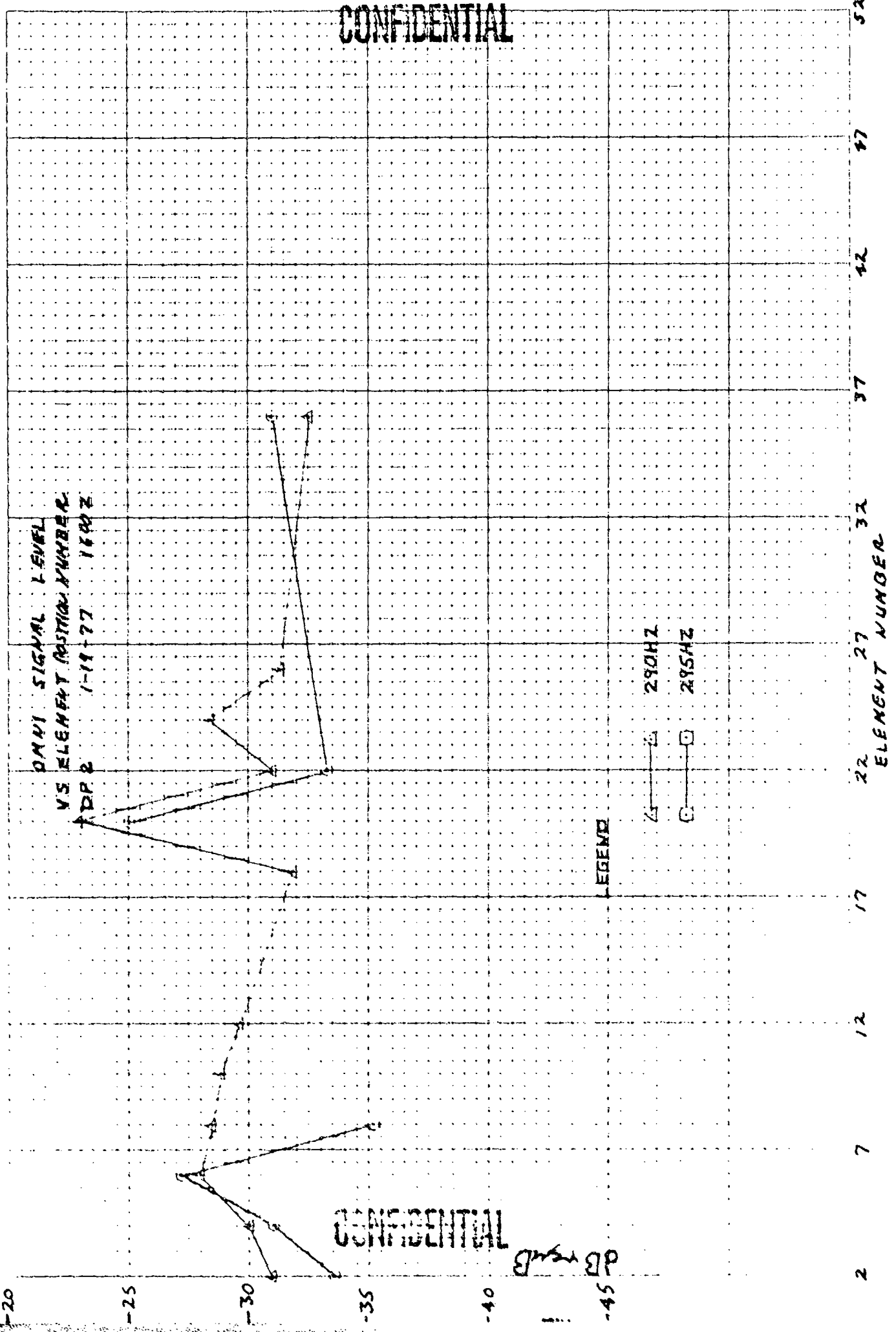
BANDWIDTH CONVERSION TO 1 HZ BAND +13.3 -34.6

CONVERSION TO  $\text{dBre}\mu\text{Pa}/1\text{HZ}$  +100 +65.4

UNCLASSIFIED

UNCLASSIFIED

CONFIDENTIAL



CONFIDENTIAL

DB REFB

ELEMENT NUMBER

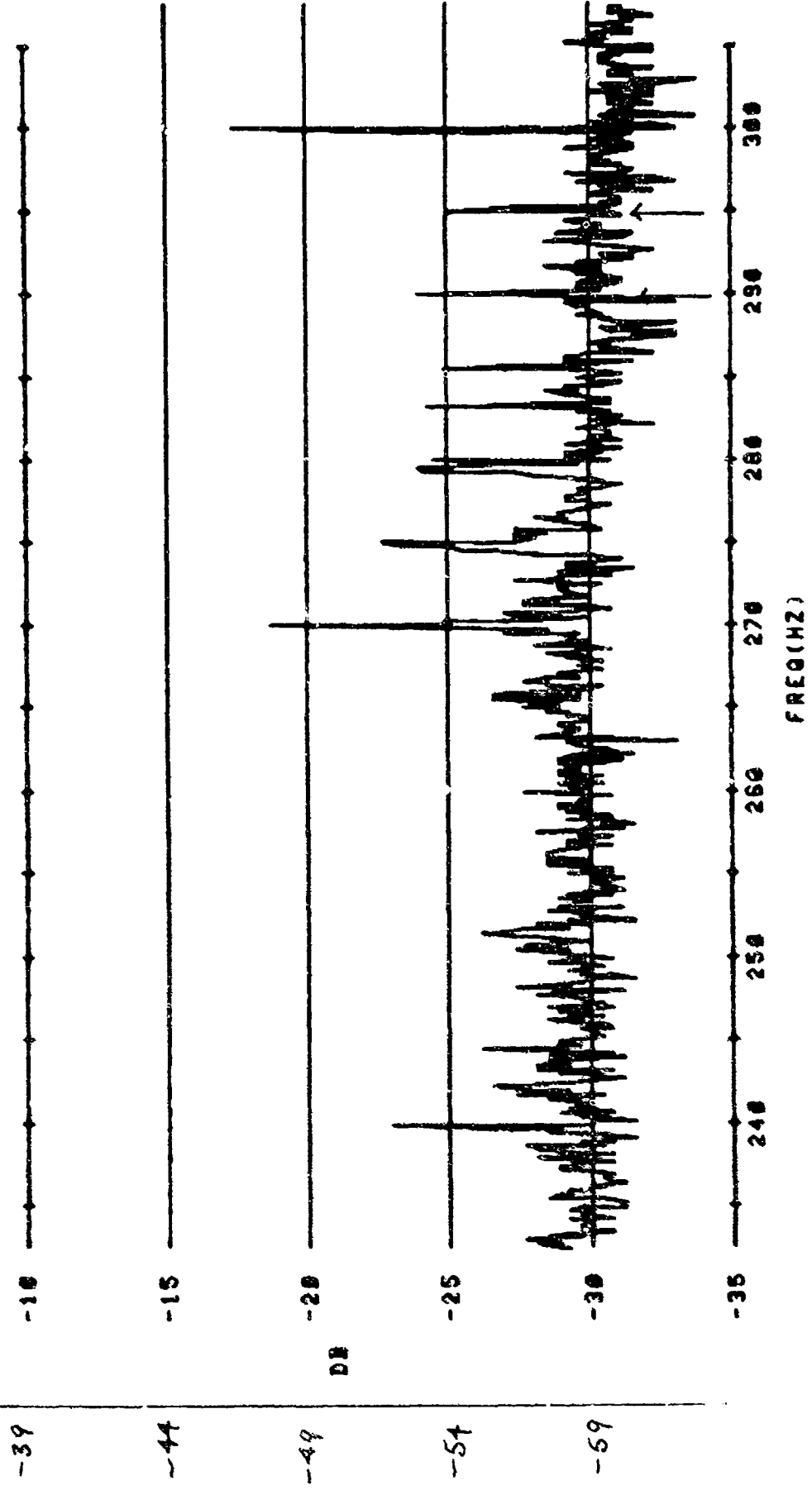


-29  
-30  
-31

**SECRET**

CONTROL: 1/19-1559(62)    DATE OF ANALYSIS: 24 AUG 77    REEL: 00    SIDE: 6    INDEX: 7578  
OMNI SPECTRUM (ELEMENT 4)  
D2 REDUNDANCY: X2  
EXERCISE: BEARING STAKE    DATE/TIME: 19 JAN 77-1559Z    PROJECTOR RANGE: 81.6 NM  
CENTER FREQ: 270 MZ ANALYSIS B/W: 1/32 HZ    INTEG TIME: 320 SECS    B/F DB SW1: -9 DB  
1 ELEMENT    DEG AZ STEER    NORMAL HEIGHTING

*DP2*



PL074

**SECRET**

1. The first part of the document discusses the importance of maintaining accurate records for all transactions. It emphasizes that every entry must be supported by proper documentation and that the books should be kept up-to-date at all times.

2. The second part of the document outlines the specific procedures for recording sales and purchases. It details how to handle cash transactions, credit sales, and returns, ensuring that all entries are correctly classified and posted to the appropriate accounts.

3. The third part of the document addresses the process of reconciling bank statements with the company's cash account. It provides a step-by-step guide to identifying discrepancies and adjusting the books accordingly to ensure the accuracy of the financial statements.

4. The fourth part of the document discusses the preparation of financial statements, including the balance sheet, income statement, and statement of cash flows. It explains how to summarize the data from the books and how to interpret the results to assess the company's financial health.

5. The fifth part of the document covers the final steps of the accounting cycle, including the closing of temporary accounts and the preparation of the final financial statements for the period. It stresses the importance of reviewing all entries and ensuring that the books are balanced before finalizing the reports.

6. The sixth part of the document discusses the role of the accountant in providing financial information to management and other stakeholders. It highlights the need for clear communication and the ability to explain complex financial data in a way that is easy to understand.

7. The seventh part of the document addresses the ethical responsibilities of accountants. It discusses the importance of integrity, objectivity, and confidentiality, and provides guidance on how to handle difficult ethical situations that may arise in the course of their work.

8. The eighth part of the document covers the latest developments in accounting technology, including the use of spreadsheets, accounting software, and data analytics. It discusses how these tools can improve the efficiency and accuracy of the accounting process.

9. The ninth part of the document discusses the impact of international accounting standards and how they differ from domestic standards. It provides an overview of the key differences and offers advice on how to navigate the complexities of international accounting.

10. The tenth part of the document concludes with a summary of the key points covered in the document and offers some final thoughts on the importance of accounting in the business world. It encourages students to continue to learn and stay up-to-date on the latest developments in the field.

2

SECRET

+ 96.8

+ 71.8

+ 64.2

+ 58.2

+ 53.1

+ 48.6

+ 44.4

+ 40.5

+ 36.9

+ 33.9

+ 30.8

+ 26.7

+ 23.6

+ 20.5

+ 17.3

+ 14.5

+ 11.5

+ 8.6

+ 5.7

+ 2.9

0.8

- 2.9

- 5.7

[The main body of the document contains approximately 20 lines of extremely faint, illegible text. The text is too light to transcribe accurately.]

CONTROL NUMBER 100-41-1012  
NUMBER OF ELEMENTS 41  
FREQUENCY BAND 1 TO 2 HZ  
RANGE 11 N.M.

FM  
AN  
WV

SAN-XXX-78-012

H I S T O R Y  
T A P E R E E L N U M B E R 510E C

T A P E C O U N T 1720

E L E M E N T N U M B E R S 1 1 1 4 4 1 1 1 1 1

A N A L Y S I S B A N D W I D T H 1/32 H Z  
W A T E R D E P T H 1650 F M G

D A T E 1-19-77

E X E R C I S E : B E A R I N G S T E E

26

8.6  
 11.5  
 14.5  
 17.5  
 20.5  
 23.6  
 26.7  
 30.9  
 35.9  
 40.5  
 44.4  
 48.6  
 53.1  
 58.2  
 64.2  
 71.8  
 80.6

SAN-XXX-78-0126

↑ SECRET

TAPE COUNT \_\_\_\_\_  
 ELEMENT NUMBERS \_\_\_\_\_  
 DATE 1-19-77 \_\_\_\_\_  
 EXERCISE: BEARING STALE

**CONFIDENTIAL**

SIGNAL LEVEL AND SNR  
CALCULATIONS

DATA POINT 2

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -37.1

MCPS-32 CAL. CORRECTION + 0 -37.1

BEAMFORMER GAIN + 0 -37.1 SIG. LEVEL FOR SNR CALCULATION

MRA CORRECTION + .9 -36.2 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -44.6

MCPS-32 CAL. CORRECTION + 0 -44.6

BEAMFORMER GAIN + 0 -44.6 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR -37.1

NOISE LEVEL FOR SNR -44.6 7.5

PROCESSOR CORRECTION - 4.7 2.8

MRA CORRECTION + .9 3.7 SNR .031 HZ BAND

BANDWIDTH CONVERSION -17.2 -9.5 SNR 1 HZ BAND

**CONFIDENTIAL**



**CONFIDENTIAL**

SIGNAL LEVEL AND SNR  
CALCULATIONS

DATA POINT 2

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-38.7</u>	
MCPS-32 CAL. CORRECTION	<u>+0</u>	-38.7
BEAMFORMER GAIN	<u>+0</u>	-38.7 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .9</u>	-37.8 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-44.6</u>	
MCPS-32 CAL. CORRECTION	<u>+0</u>	-44.6
BEAMFORMER GAIN	<u>+0</u>	-44.6 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR	<u>-38.7</u>	
NOISE LEVEL FOR SNR	<u>-44.6</u>	5.9
PROCESSOR CORRECTION	<u>-5.0</u>	.9
MRA CORRECTION	<u>+ .9</u>	1.8 SNR .031 HZ BAND
BANDWIDTH CONVERSION	<u>-13.2</u>	-11.4 SNR 1 HZ BAND

**CONFIDENTIAL**

CONFIDENTIAL

DATA POINT 2

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	_____	<u>-51.5</u>	<u>-51.2</u>
MRA SIGNAL LEVEL	_____	<u>-36.2</u>	<u>-37.8</u>
ARRAY SIGNAL GAIN	_____	<u>15.3</u>	<u>13.4</u>
20 LOG <u>16</u> # of elements	_____	<u>24</u>	<u>24</u>
DIFFERENCE	_____	<u>-8.7</u>	<u>-10.6</u>

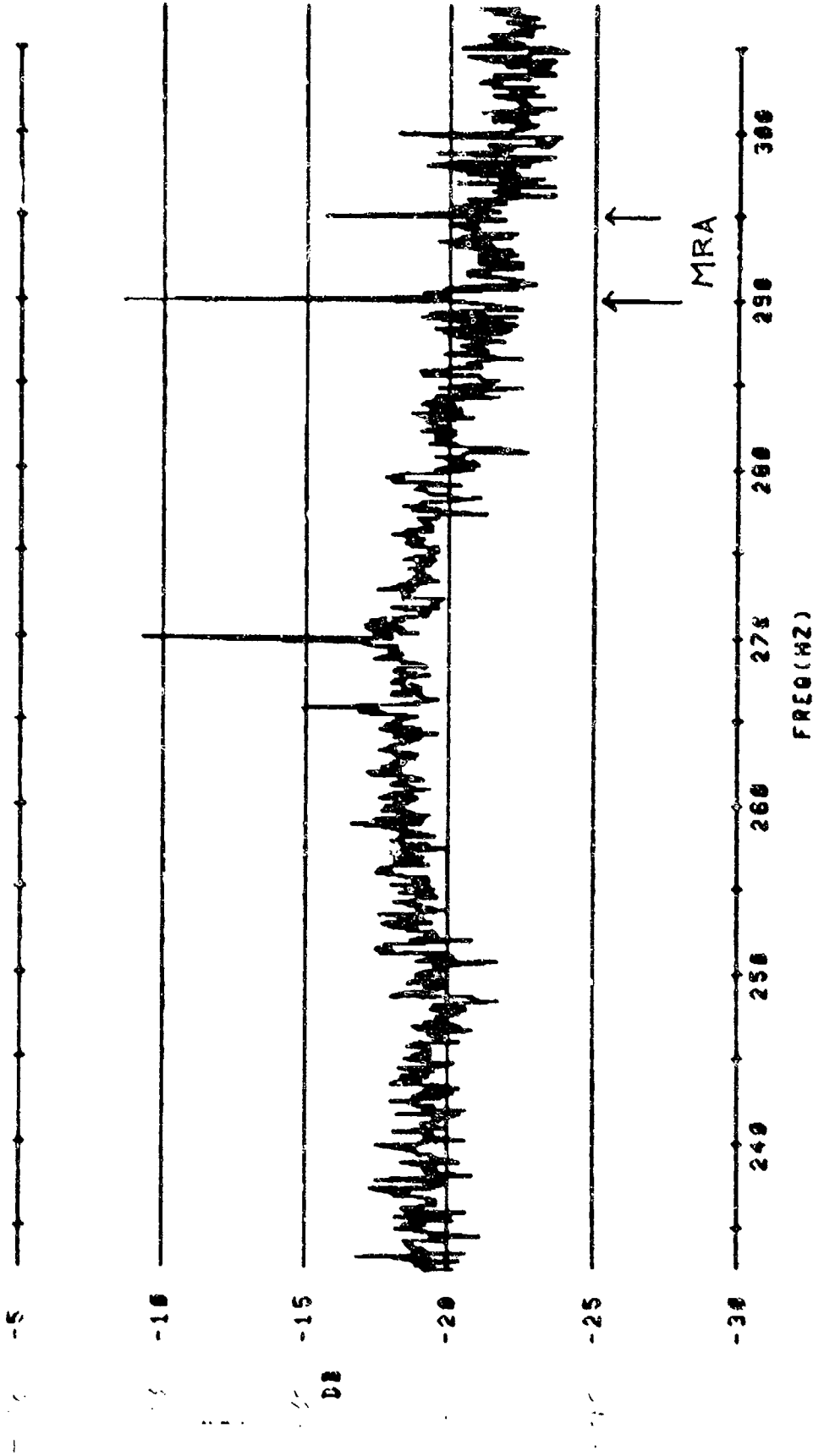
ARRAY GAIN

MRA SNR	_____	<u>3.7</u>	<u>1.8</u>
MEAN OMNI SNR	_____	<u>-.2</u>	<u>-.7</u>
ARRAY GAIN	_____	<u>3.9</u>	<u>2.5</u>
THEORETICAL AZMUTH GAIN (at MRA)	_____	<u>10.4</u>	<u>10.4</u>
DIFFERENCE	_____	<u>-6.5</u>	<u>-7.9</u>

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# SECRET

CONTROL: 1/12-1600(16) DATE OF ANALYSIS: 2 AUG 77 REEL: 00 SIDE: 0 INDEX: 7579  
DEFORMED SPECTRUM (ELEMENTS 10-31)  
REUNDANCY: X2  
EXERCISE: BEARING STAKE DATE/TIME: 19 JAN 77 - 1800Z PROJECTOR RANGE: 91.5 NM  
CENTER FREQ: 278 HZ ANALYSIS B/W: 1/32 HZ INTEG TIME: 320 SECS B/F: -1200 SWI: 27 DB  
16 ELEMENTS -57.0 DEG AZ STEER  
DP2



CONFIDENTIAL

SIGNAL LEVEL AND SNR  
CALCULATIONS

DATA POINT 2

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -55.8

MCPS-32 CAL. CORRECTION +10 -45.8

BEAMFORMER GAIN +18 -27.8 SIG. LEVEL FOR SNR CALCULATION

MRA CORRECTION + .8 -27.0 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -69.0

MCPS-32 CAL. CORRECTION +10 -59.0

BEAMFORMER GAIN +18 -41.0 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR -27.8

NOISE LEVEL FOR SNR -41.0 13.2

PROCESSOR CORRECTION -4.2 9.2

MRA CORRECTION + .8 10.0 SNR .031 HZ BAND

BANDWIDTH CONVERSION -13.2 -3.2 SNR 1 HZ BAND

CONFIDENTIAL

SECTION 8

**CONFIDENTIAL**

SIGNAL LEVEL AND SNR  
CALCULATIONS

DATA POINT 2

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-61.3</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-51.3
BEAMFORMER GAIN	<u>+18</u>	-33.3 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	-32.5 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED	<u>-69.0</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-59.0
BEAMFORMER GAIN	<u>+18</u>	-41.0 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR	<u>-33.3</u>	
NOISE LEVEL FOR SNR	<u>-41.0</u>	7.7
PROCESSOR CORRECTION	<u>-4.7</u>	3.0
MRA CORRECTION	<u>+ .8</u>	3.8 SNR .031 HZ BAND
BANDWIDTH CONVERSION	<u>-13.2</u>	-9.4 SNR 1 HZ BAND

SECTION 8

**CONFIDENTIAL**

**CONFIDENTIAL**

DATA POINT 2

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	_____	<u>-51.5</u>	<u>-51.2</u>
MRA SIGNAL LEVEL	_____	<u>-27.0</u>	<u>-32.5</u>
ARRAY SIGNAL GAIN		<u>24.5</u>	<u>18.7</u>
20 LDG <u>32</u>	_____	<u>30.1</u>	<u>30.1</u>
# of elements			
DIFFERENCE	_____	<u>-5.6</u>	<u>-11.4</u>

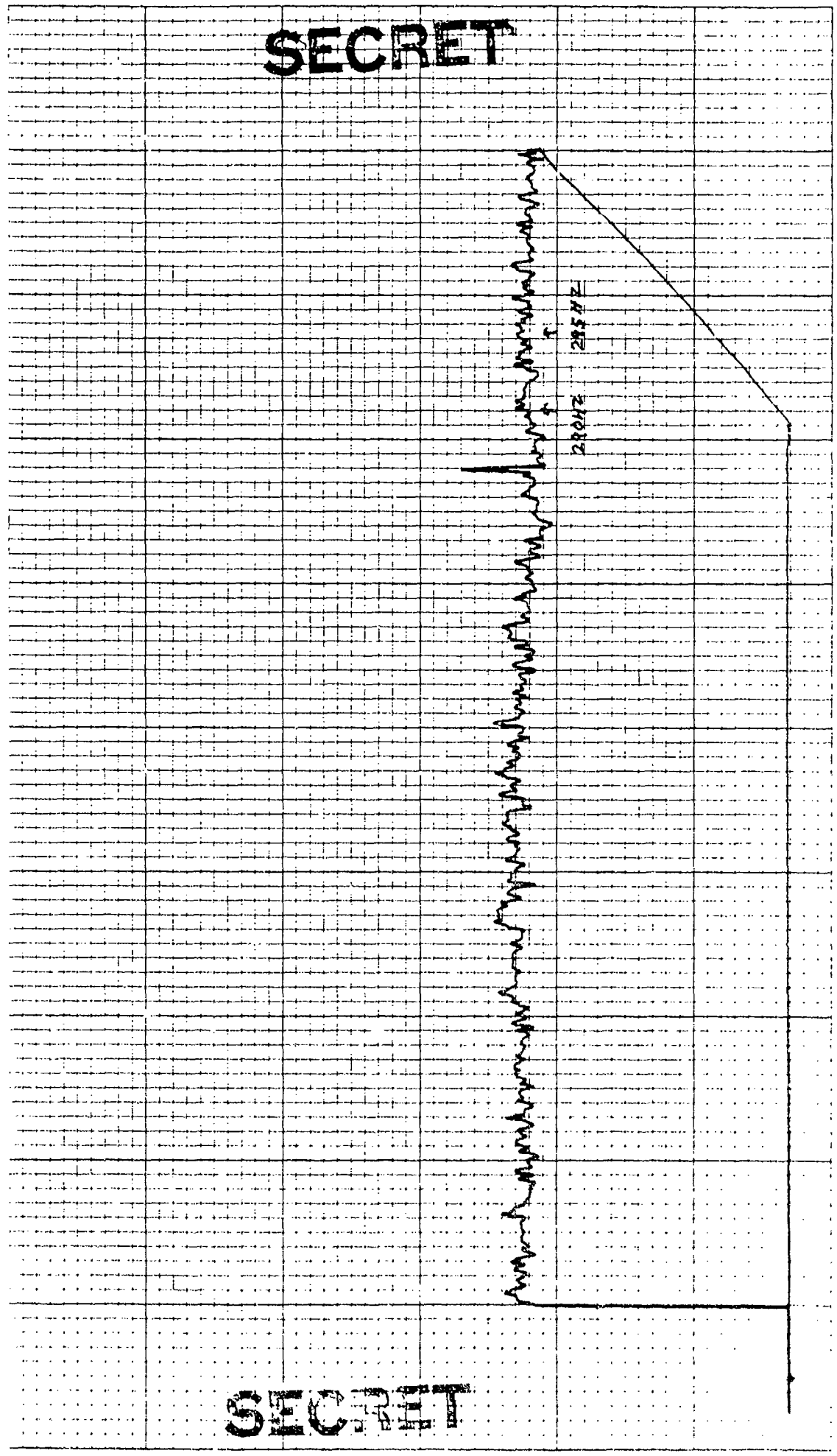
ARRAY GAIN

MRA SNR	_____	<u>10.0</u>	<u>3.8</u>
MEAN OMNI SNR	_____	<u>- .2</u>	<u>-.7</u>
ARRAY GAIN		<u>12.2</u>	<u>4.5</u>
THEORETICAL AZMUTH GAIN (at MRA)	_____	<u>13.3</u>	<u>13.4</u>
DIFFERENCE	_____	<u>- 1.1</u>	<u>-8.4</u>

**CONFIDENTIAL**

TO: CH. / MAIL  
& EE / MAIL

CONTROL: 1-19 -1600 (32) DATE OF ANALYSIS: - - - REEL: C INDEX X 7575  
 BEAMFORMED SPECTRUM (ELEMENTS) 16-26 & 28-49  
 EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS FILTER WTG: HANNING  
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ  
32 ELEMENTS - 4\* DEG. AZ STEERING



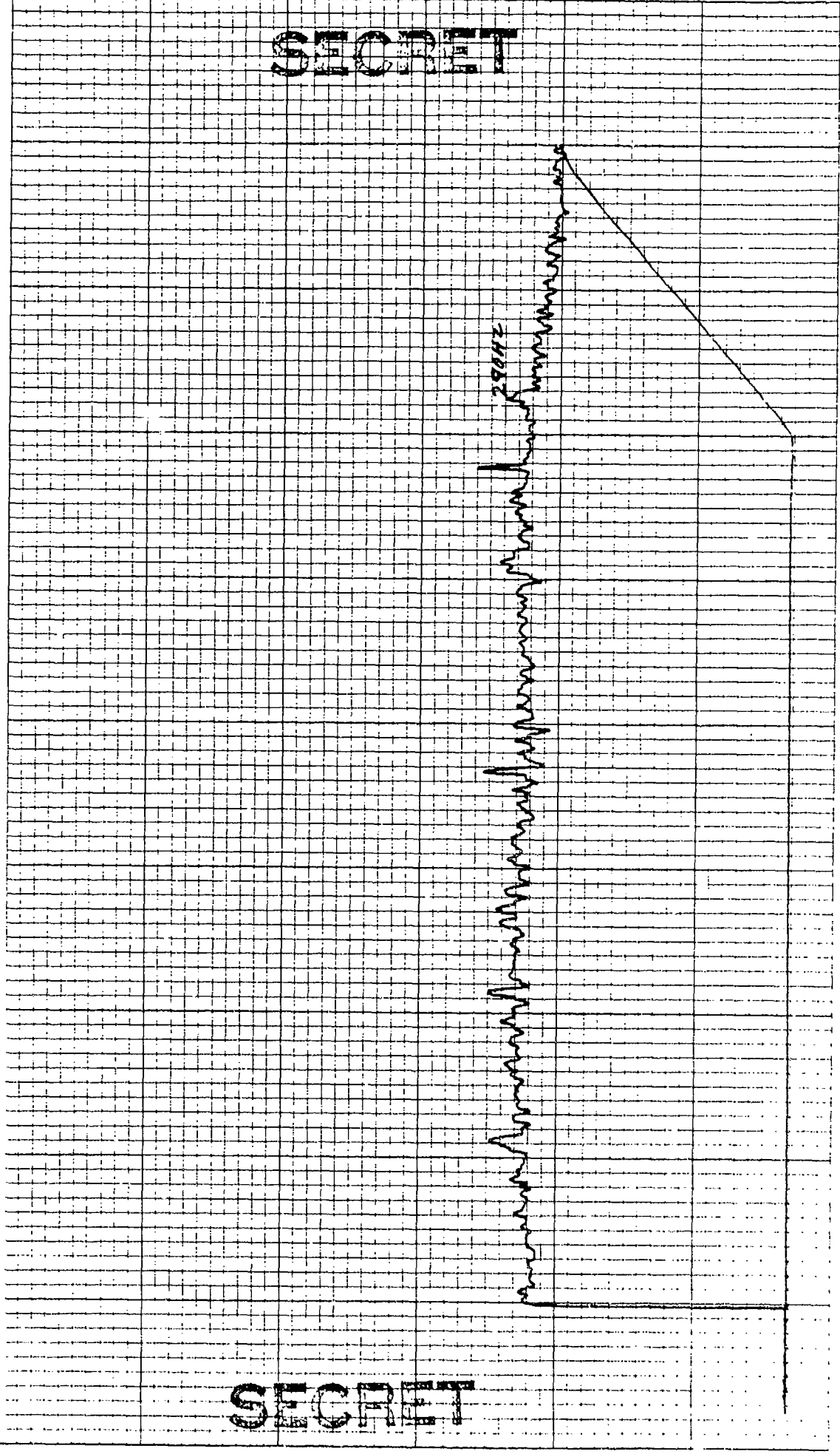
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4 '03

CONTROL: 149 -1600 (32) DATE OF ANALYSIS: 16-26 & 29-49 REEL: 6 INDE X7575  
 BEAMFORMED SPECTRUM(ELEMENTS) )  
 EXERCISE: BEARING STAKE )  
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: -10 DB  
32 ELEMENTS -46 DEG. AZ STEERING FILTER WTG: HANNING



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CONTROL: 1-19 -1600 (32 ) REEL: 6 INDE X7575

BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: - - -

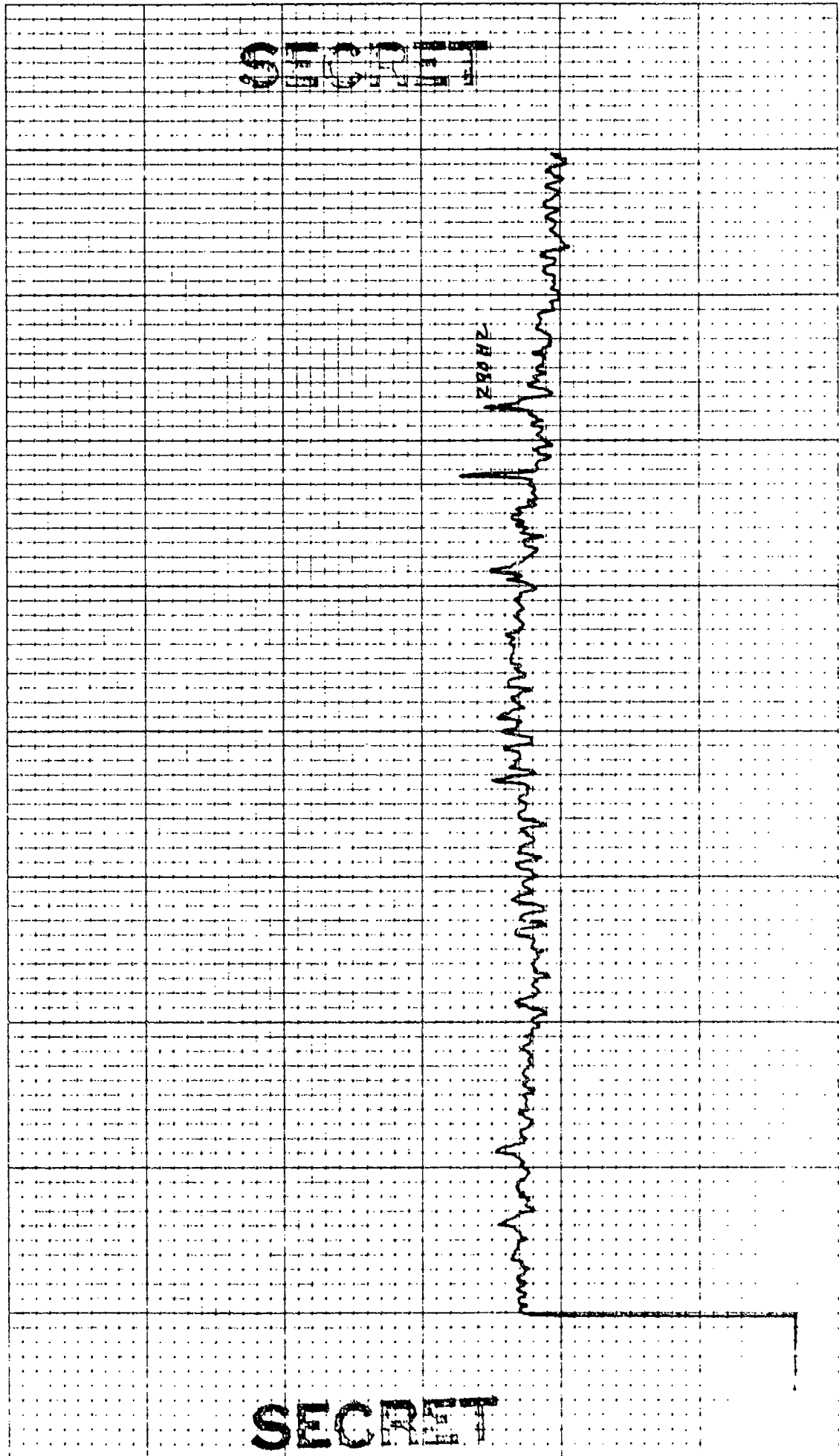
EXERCISE: BEARING STAKE /6-26 4 29-49 )

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

32 ELEMENTS -48 DEG. AZ STEERING

INTEGRATION TIME 320 SECS ATEN: -1 DB

FILTER WTC: HANNING



03

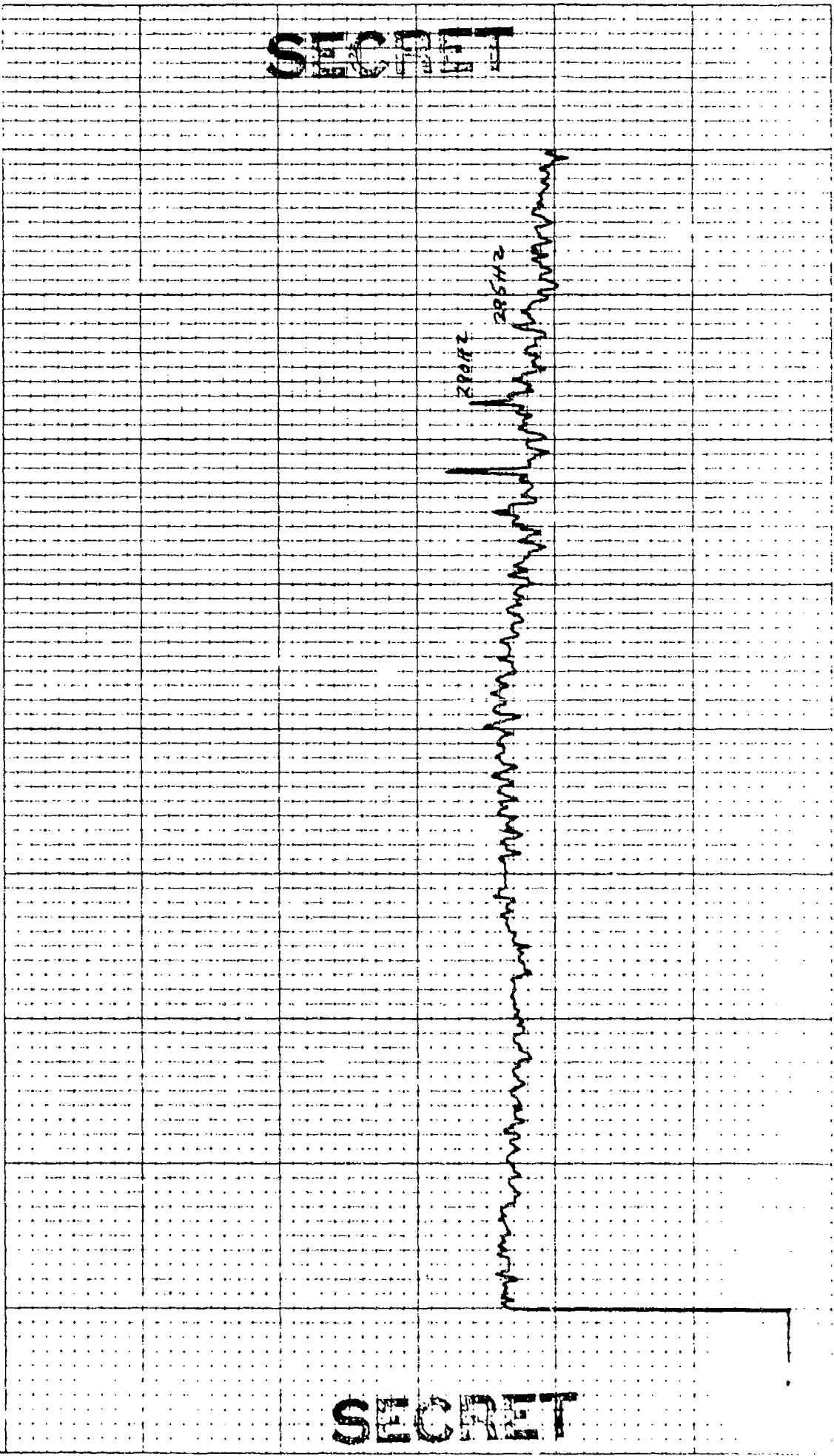
CONTROL: 1-19 -1600 (32)  
 BEAMFORMED SPECTRUM(ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
 32 ELEMENTS

DATE OF ANALYSIS: 16-264 29-49

DATE/TIME: 1-19-77 -1600 Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 -50 DEG. AZ STEERING

REEL: 6 INDE X7575

INTEGRATION TIME 320 SECS  
 FILTER WTG: HANNING



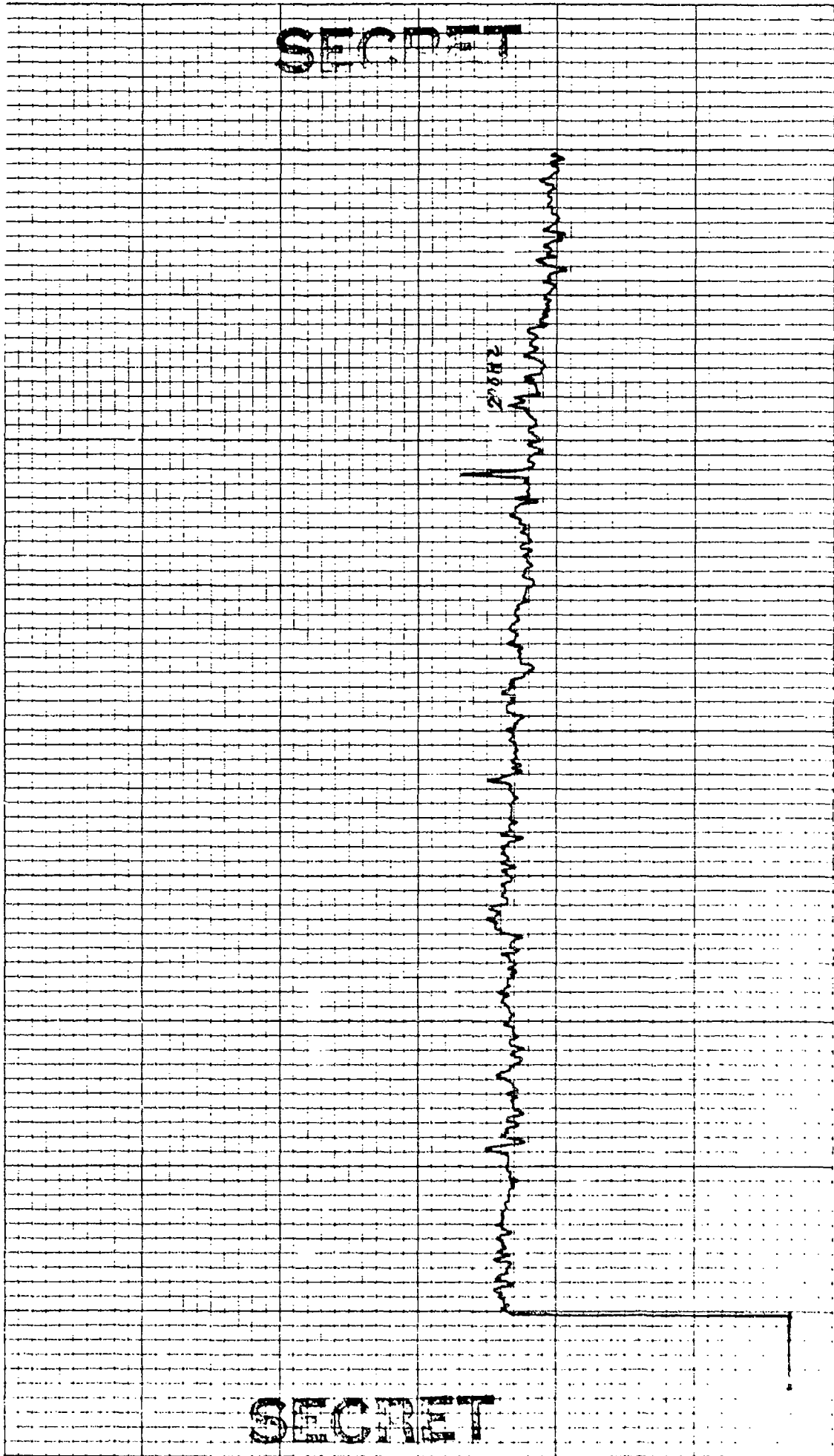
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4 '03

Σ 1 L&L CH: 5 M: 100 Hz

CONTROL: 1-19 -1600 (32) DATE OF ANALYSIS: 16-26-79 REEL: 6 INDE X7575  
 BEAMFORMED SPECTRUM(ELEMENTS) 16-26-79-49 INTEGRATION TIME 320 SECS ATTN: -18 DB  
 EXERCISE: BEARING STAKE DATE/TIME: 1-19-79 -1600 Z FILTER WTG: HANNING  
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ  
32 ELEMENTS -52 DEG. AZ STEERING



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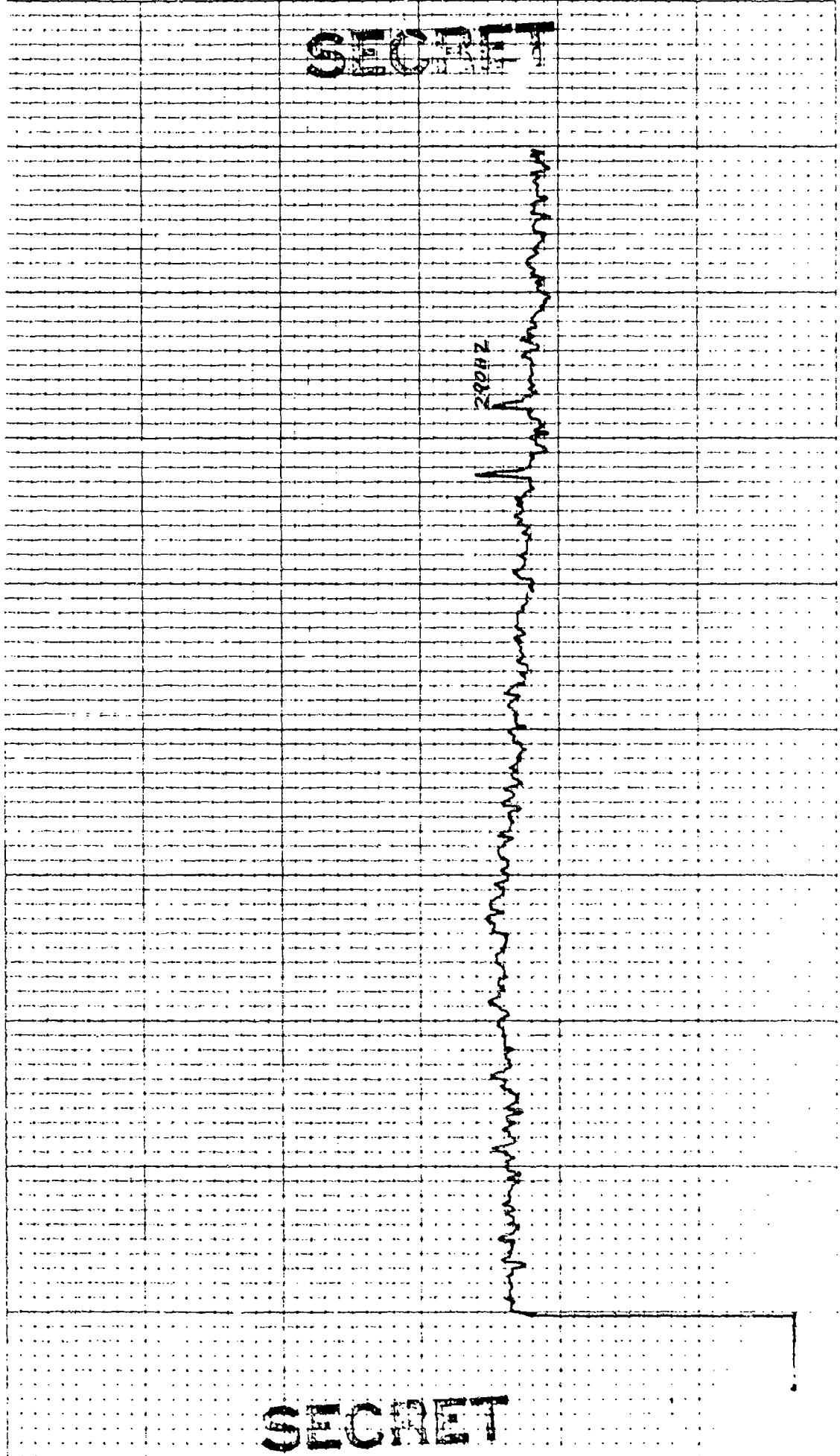
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4 '03

Σ 100 1000

CONTROL: 1-19 -1600 (J22)      DATE OF ANALYSIS: - - - - -  
 BEAMFORMED SPECTRUM(ELEMENTS)      16-264 29-49  
 EXERCISE: BEARING STAKE      DATE/TIME: 19-77 -1600 Z  
 CENTER FREQ: 270 HZ      ANALYSIS BANDWIDTH: 1/10HZ  
 32 ELEMENTS      -54 DEC. AZ STEERING

REEL: C      INDE X7575  
 INTEGRATION TIME 320 SECS      ATTN: -18 DB  
 FILTER      WTC: HANNING



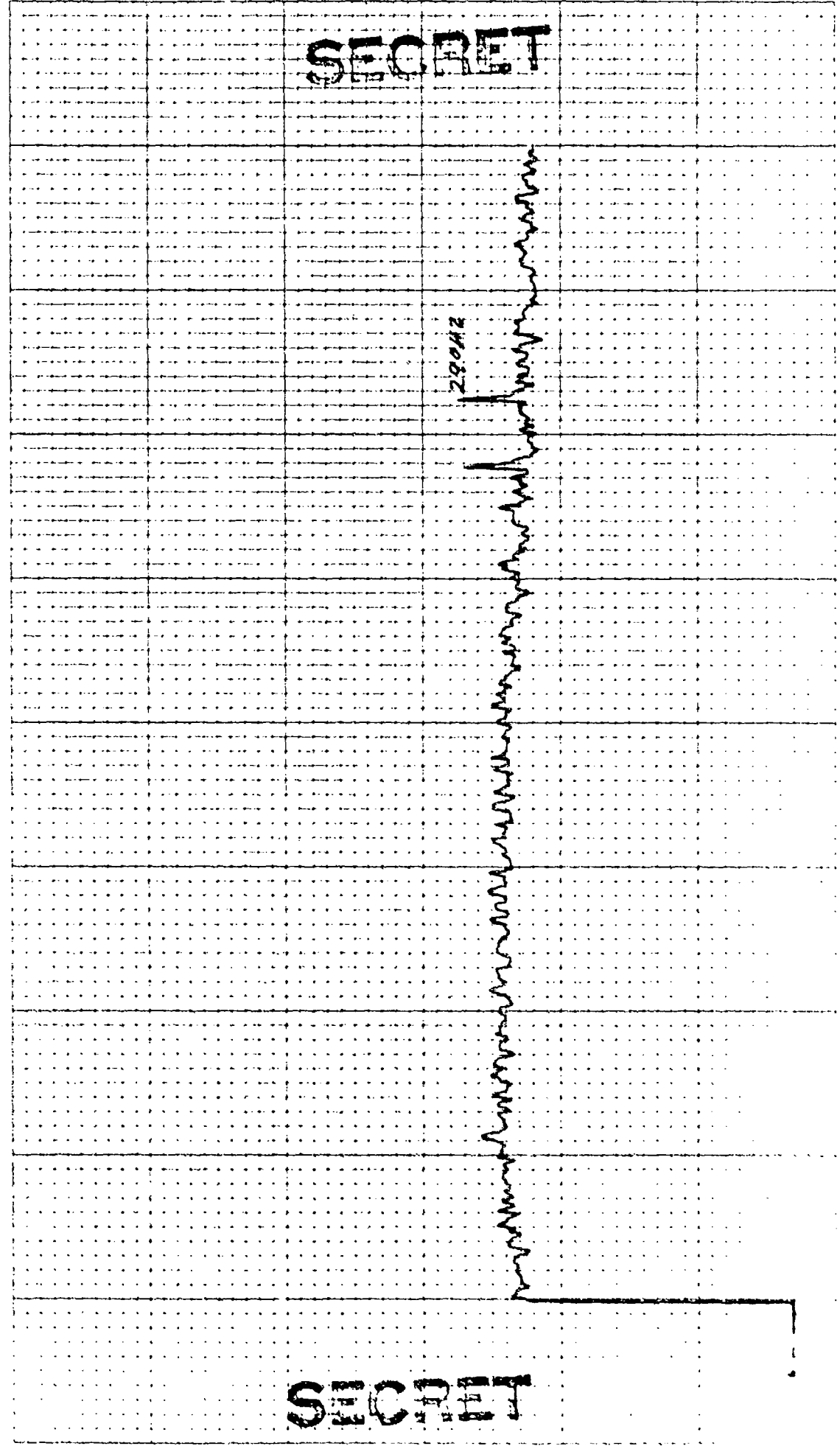
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4 '03

CONTROL: 1-19 -1600 (J2) DATE OF ANALYSIS: ~ - - - -  
 BEAMFORMED SPECTRUM(ELEMENTS) 16-28 / 29-49  
 EXERCISE: BEARING STAKE DATE/TIME: 1-19-77 - 1600 Z  
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ  
 32 ELEMENTS -56 DEG. AZ STEERING

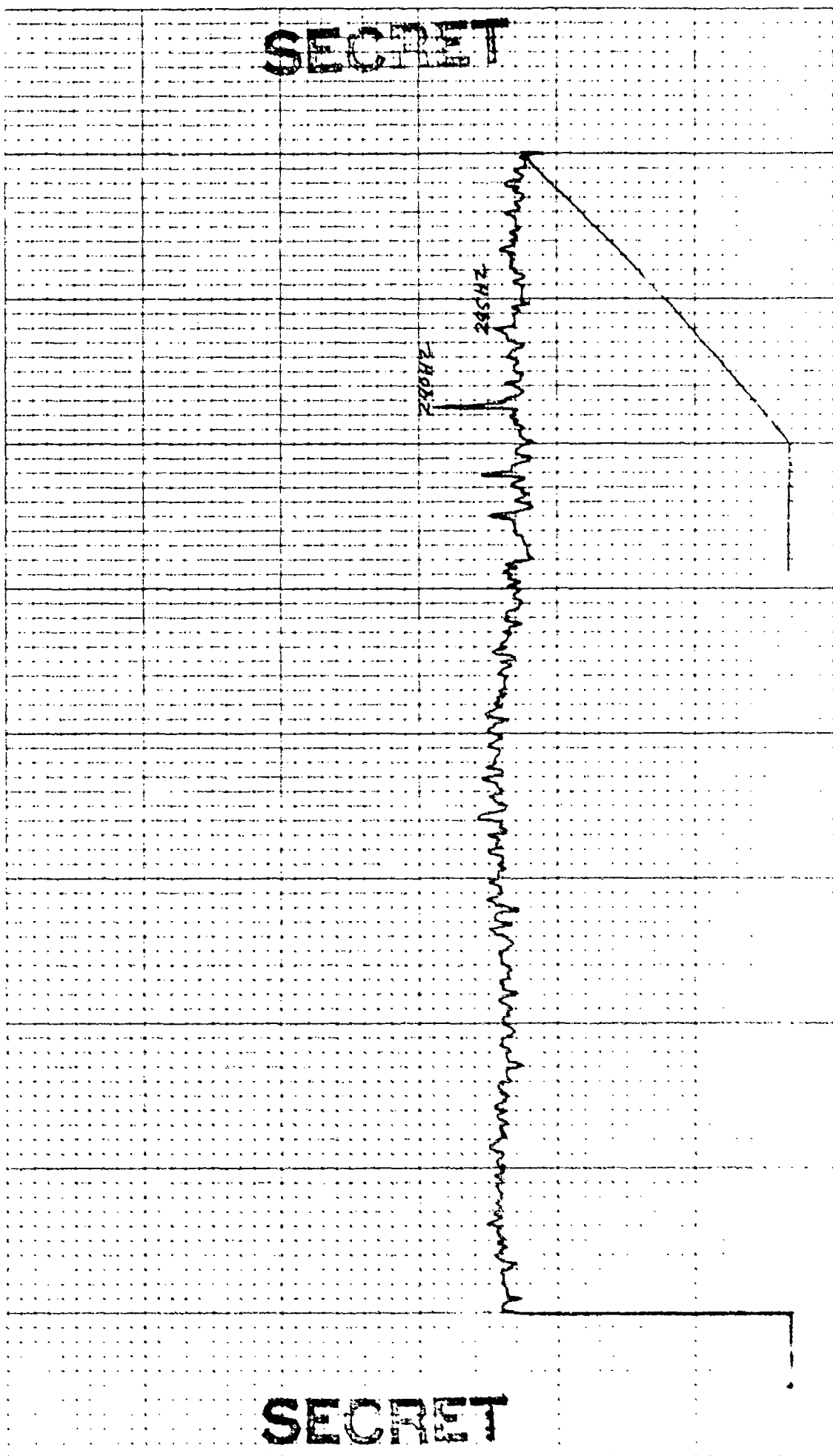
REEL: C INDE X7575  
 INTEGRATION TIME 320 SECS ATEN: -18 DB  
 FILTER WTC: HANNING



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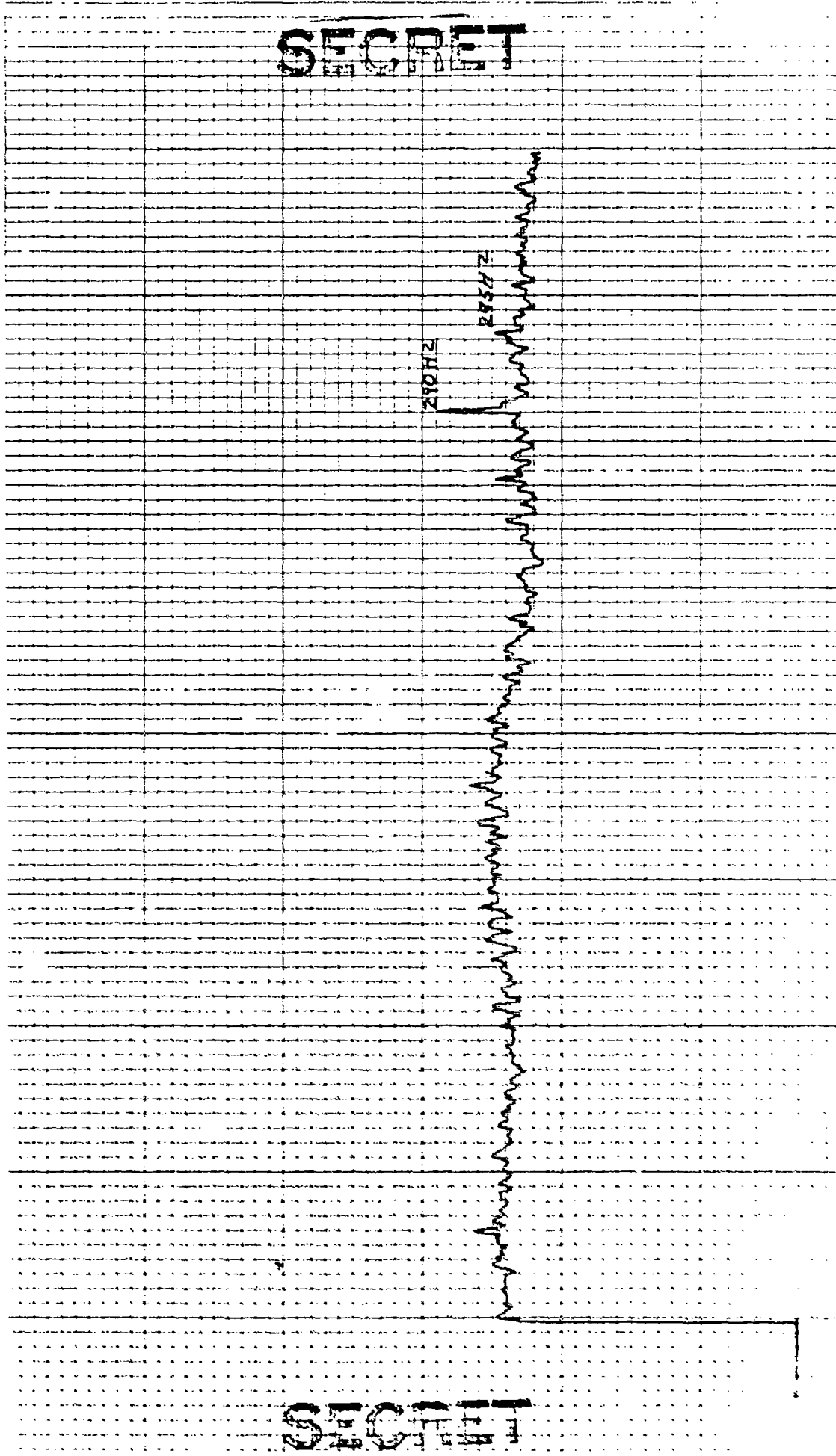
CONTROL: 1-19 - 1600 (32) REEL: C INDE X7525  
 BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 16-26-49  
 EXERCISE: BEARING STAKE DATE/TIME: 1-19-77 - 1600 Z INTEGRATION TIME 320 SECS ATTN: 78 DB  
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING  
32 ELEMENTS -50 DEG. AZ STEERING



6 '03

CONTROL: 1-19 - 1600 (32)      DATE OF ANALYSIS: - - - -  
BEAMFORMED SPECTRUM(ELEMENTS)      16-26 & 29-41 )  
EXERCISE: BEARING STAKE      DATE/TIME: 1-19-77 - 1600 Z  
CENTER FREQ: 270 HZ      ANALYSIS BANDWIDTH: 1/10HZ  
32 ELEMENTS      -58.5 DEG. AZ STEERING

REEL: 6      INDE X7575  
INTEGRATION TIME 320 SECS      ATTN: -18 DB  
FILTER      WTC: HANNING



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Σ 110 400 03

CONTROL: 1-19 -1600 (32.) REEL: 6 INDE X7575

BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: 16.268 29.49

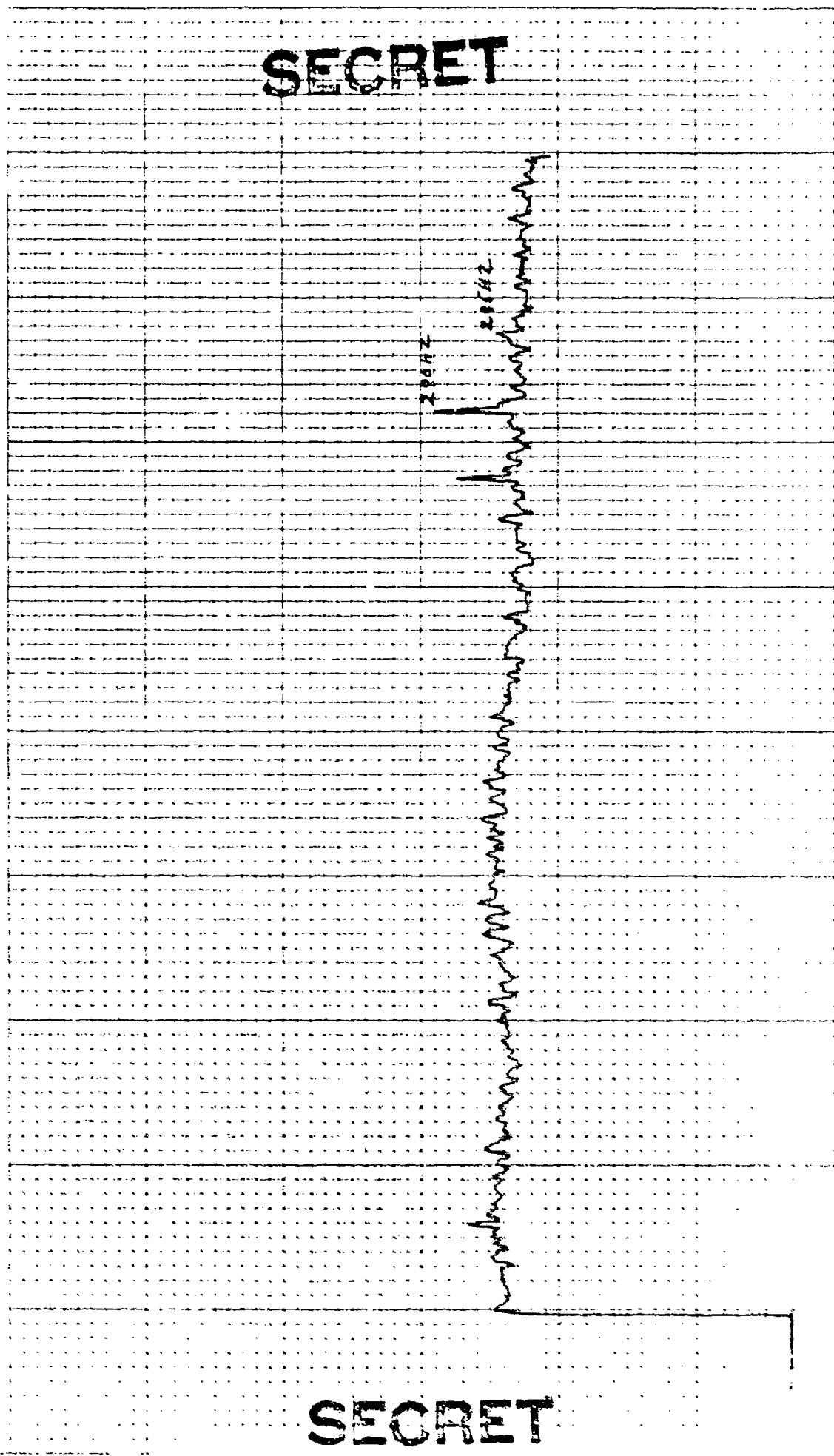
EXERCISE: BEARING STAKE DATE/TIME: 1-19-77 - 1600 Z

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

32 ELEMENTS -59 DEG. AZ STEERING

INTEGRATION TIME 320 SECS FILTER WTG: HANNING

ATTEN: -10 DB

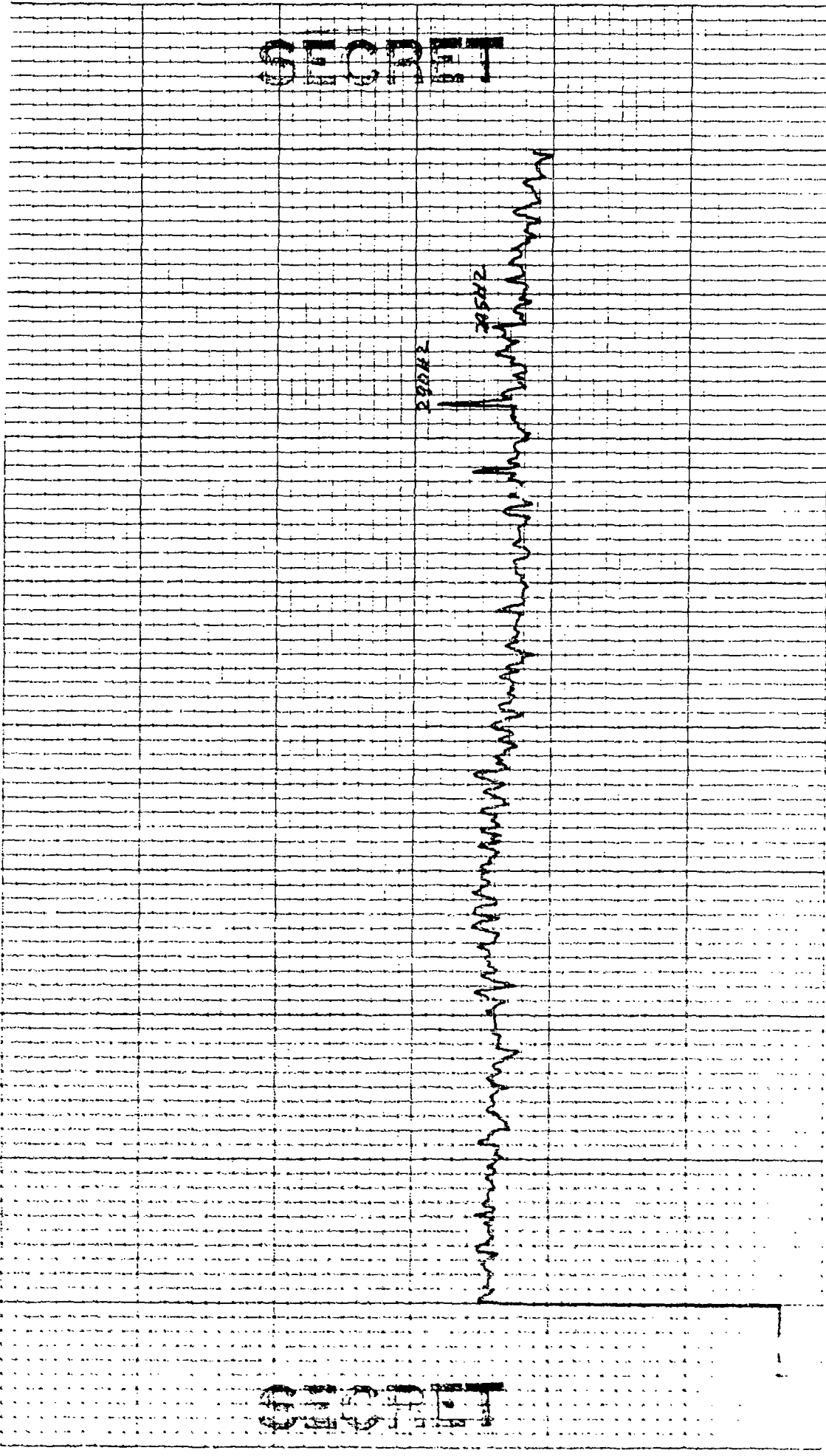


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CONTROL: 1-19 -1600 (32)      DATE OF ANALYSIS: 10-28-77      REEL: 6      INDEX: X7575  
 BEAMFORMED SPECTRUM(ELEMENTS)      10-28-77      INTEGRATION TIME 320 SECS      ATTN: 18 DB  
 EXERCISE: BEARING STAKE      ANALYSIS BANDWIDTH: 1600.2      FILTER      WTG: HANNING  
 CENTER FREQ: 2970.12      -60 DEG. AZ STEERING



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REEL: 6 INDE X7575

DATE OF ANALYSIS: - - -

16-20-49

DATE/TIME: 7-10-77 -1000 Z

ANALYSIS BANDWIDTH: 1/10HZ

-02 DEG. AZ STEERING

CONTROL: 1-14 -1000 (32)

BEAMFORMED SPECTRUM(ELEMENTS)

EXERCISE: BEARING STAKE

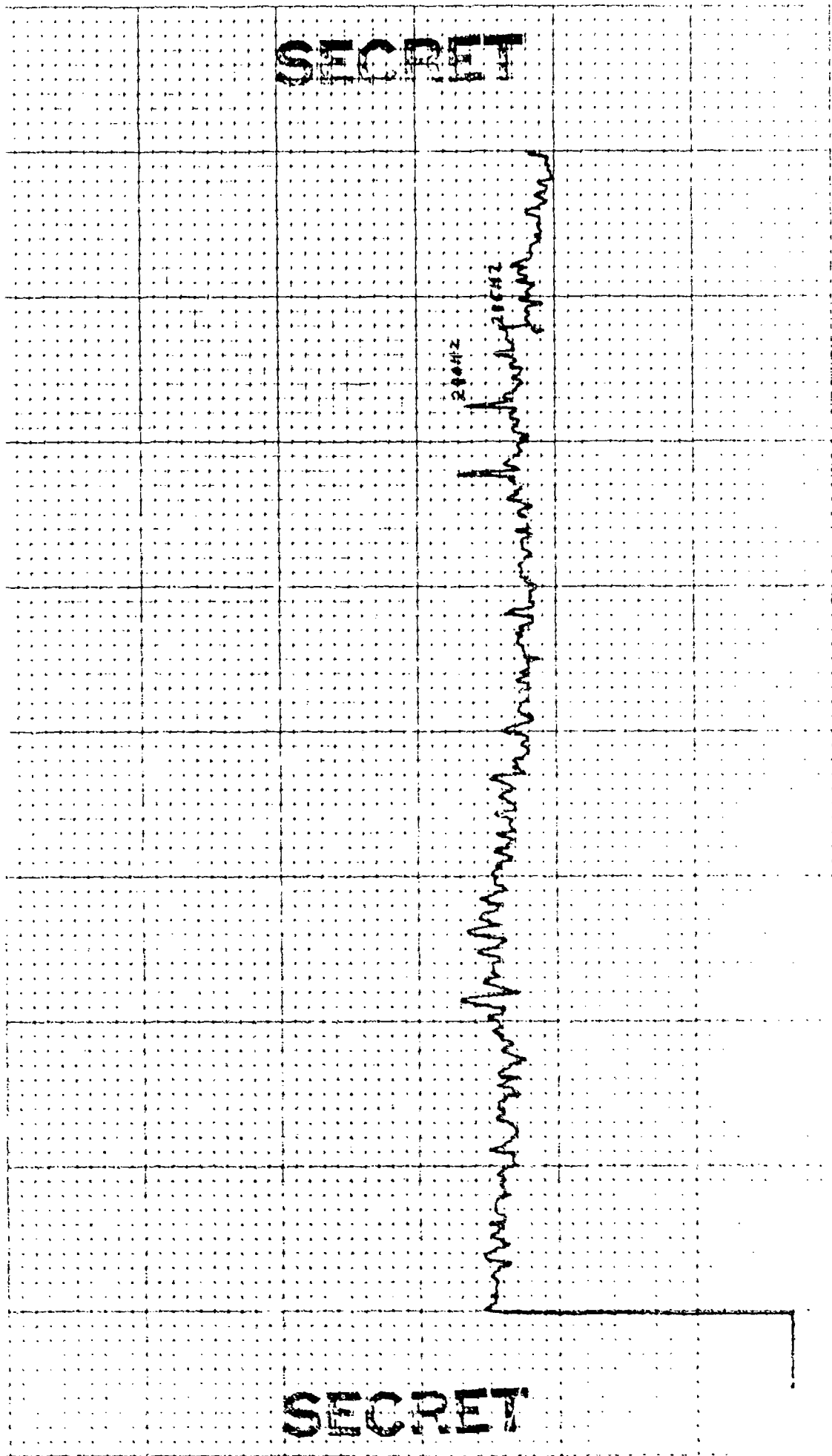
CENTER FREQ: 2700 HZ

32 ELEMENTS

INTEGRATION TIME 320 SECS

FILTER WTC: HANNING

ATTEN: -18 DB



SPECTRUM

SPECTRUM

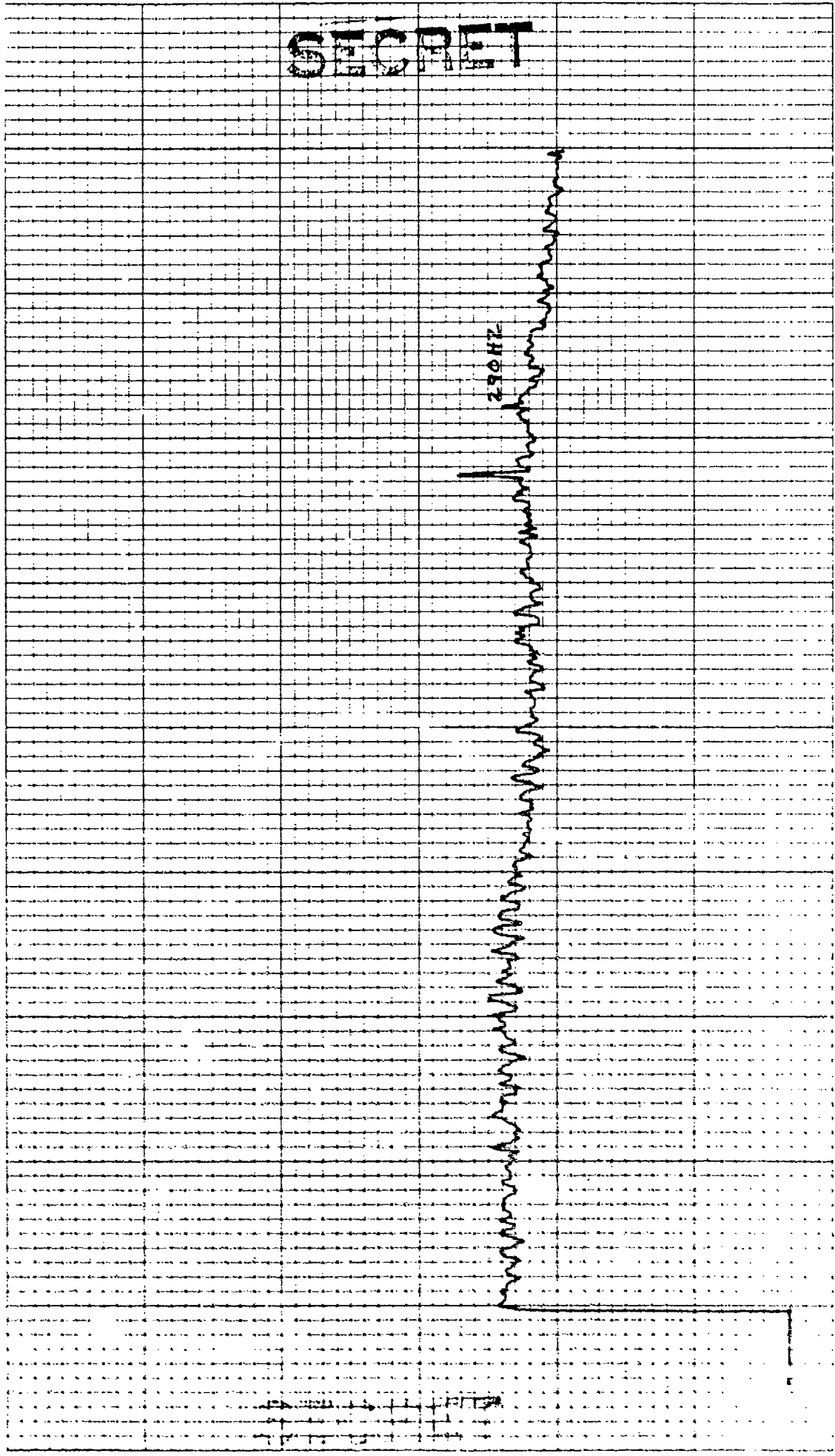
CONTROL: 149 -1600 (32)  
 BEAMFORMED SPECTRUM(ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
 32 ELEMENTS

DATE OF ANALYSIS: - - - - -  
 16-26-77 28-49

INTEGRATION TIME 320 SECS  
 FILTER WTG: HANNING

REEL: 6  
 INDE 47575

ANALYSIS BANDWIDTH: 1/10HZ  
 -64 DEG. AZ STEERING



SECRET

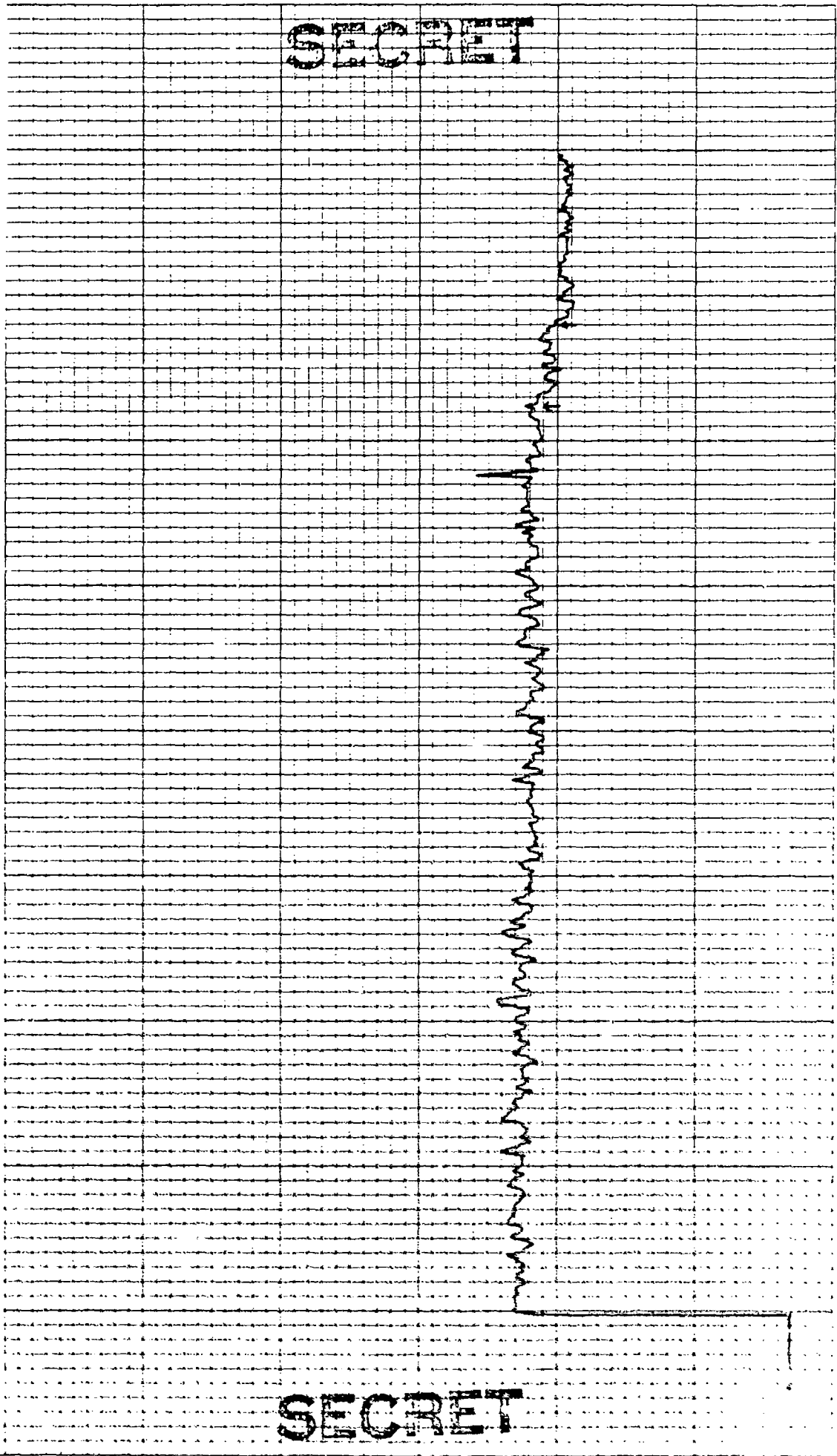
4 '03

CONTROL: 1-19 -1600 (JZ)  
 BEAMFORMED SPECTRUM(ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FRQ: 270 HZ  
 32 ELEMENTS

DATE OF ANALYSIS: 16-26-77  
 DATE/TIME: 1-15-77 -1600 Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 -66 DEG. AZ STEERING

REEL: 6  
 INDE X2575

INTEGRATION TIME 320 SECS  
 FILTER WTG: HANNING  
 ATTN: 1/1 DB



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SECRET

11/2/77

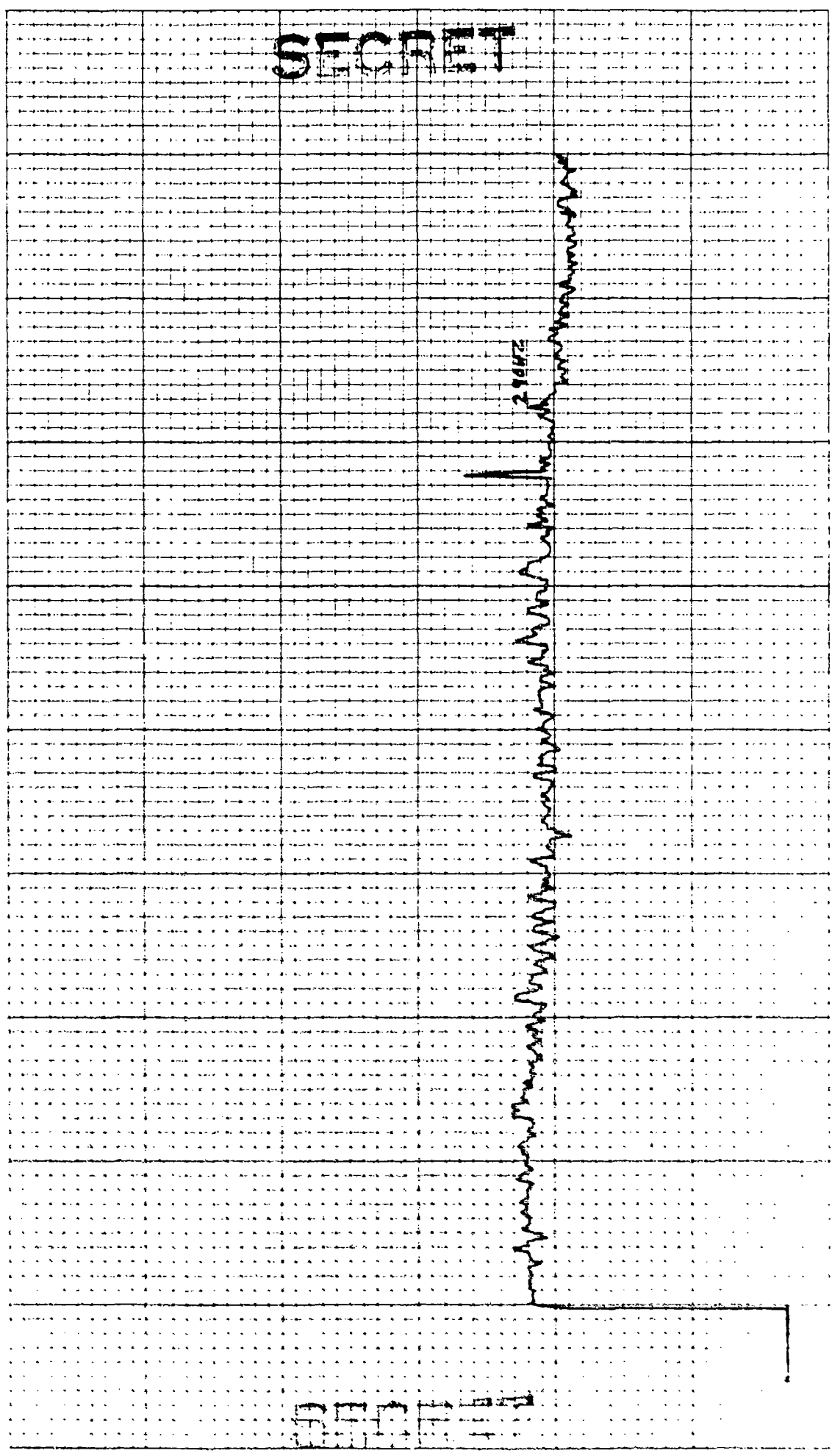
CONTROL: 1-19 -1600 (J2) REEL: 6 INDE X7575

BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: 16-26-77 29-49

EXERCISE: BEARING STAKE DATE/TIME: 1-19-77 -1600 Z INTEGRATION TIME 320 SECS ATTN: -10 DB

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

32 ELEMENTS -60 DEG. AZ STEERING



SECRET

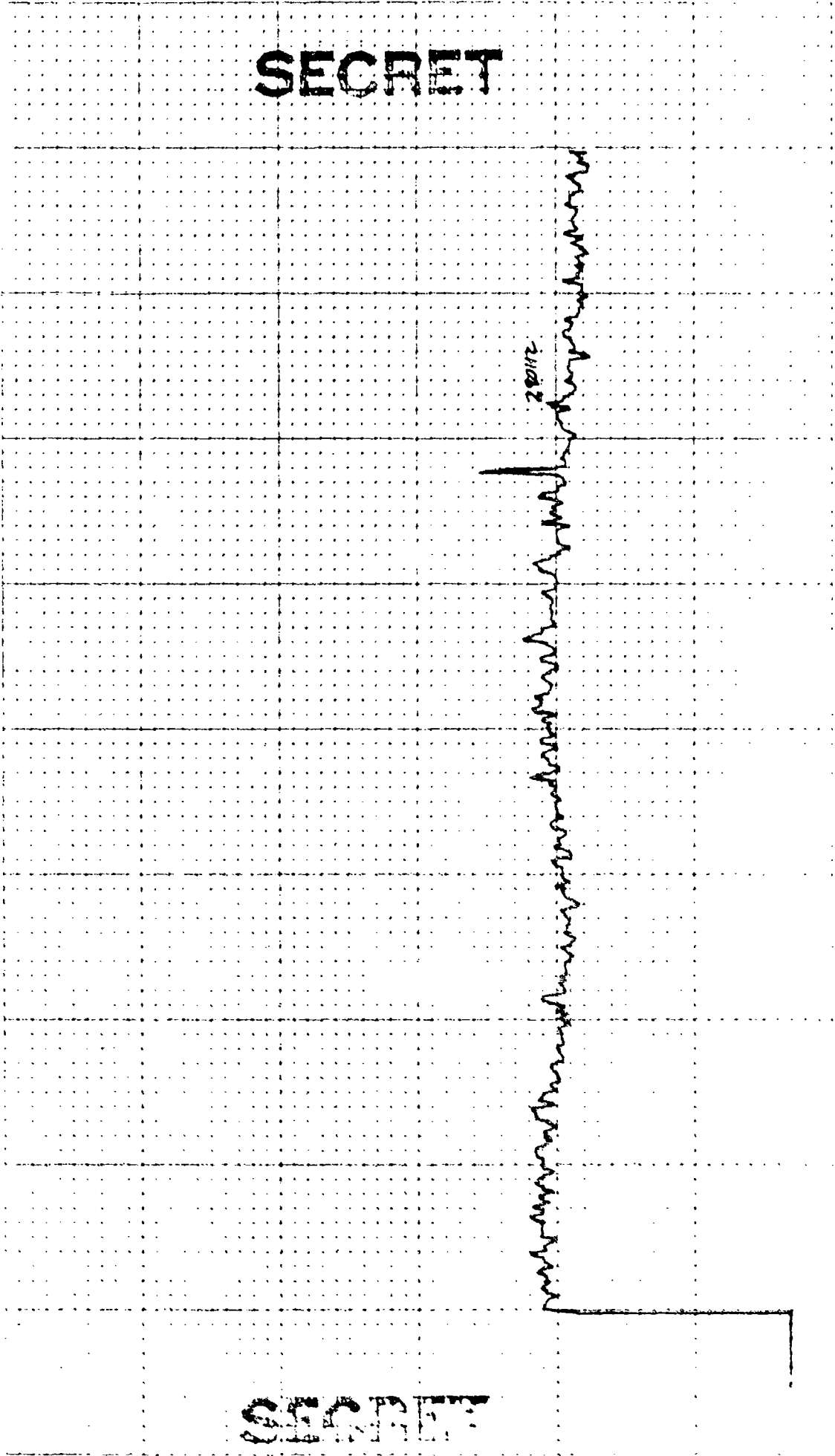
SECRET

CONTROL: 1-19 -1600 (J2 )  
 BEAMFORMED SPECTRUM(ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
 J2- ELEMENTS

DATE OF ANALYSIS: 6-26-72  
 DATE/TIME: 1-19-72 -1600 Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 -70 DEG. AZ STEERING

REEL: 6  
 INTEGRATION TIME 320 SECS  
 FILTER WTC: HANNING

INDE X2575  
 ATTN:-/0 DB



SECRET

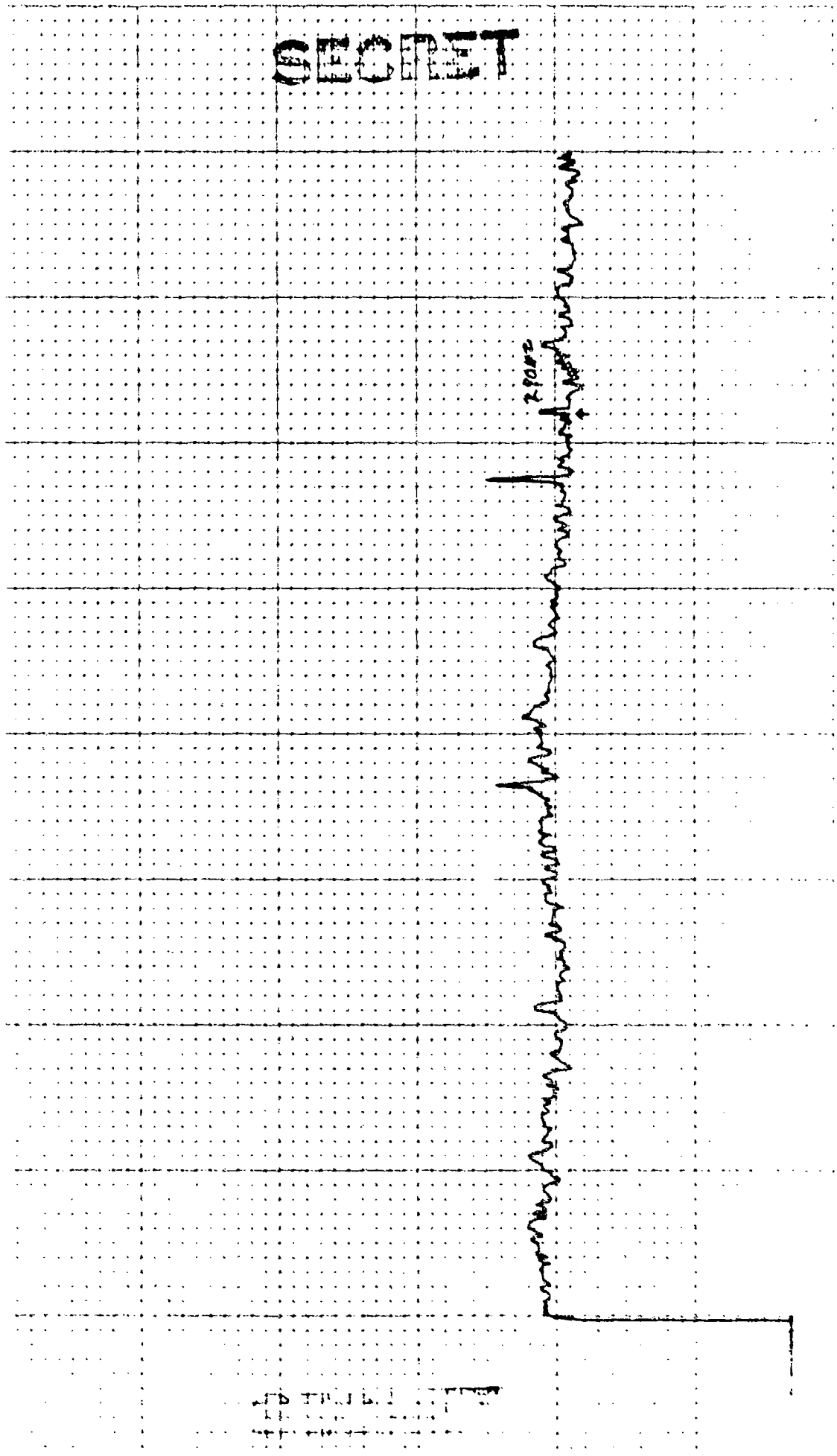
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CONTROL: 1-19 -1600 (32 )  
 BEAMFORMED SPECTRUM (ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
 32 ELEMENTS

DATE OF ANALYSIS: 16-26-77  
 DATE/TIME: 1-19-77 -1600 Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 -72 DEG. AZ STEERING

REEL: 6  
 INDE X7575

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



SECRET

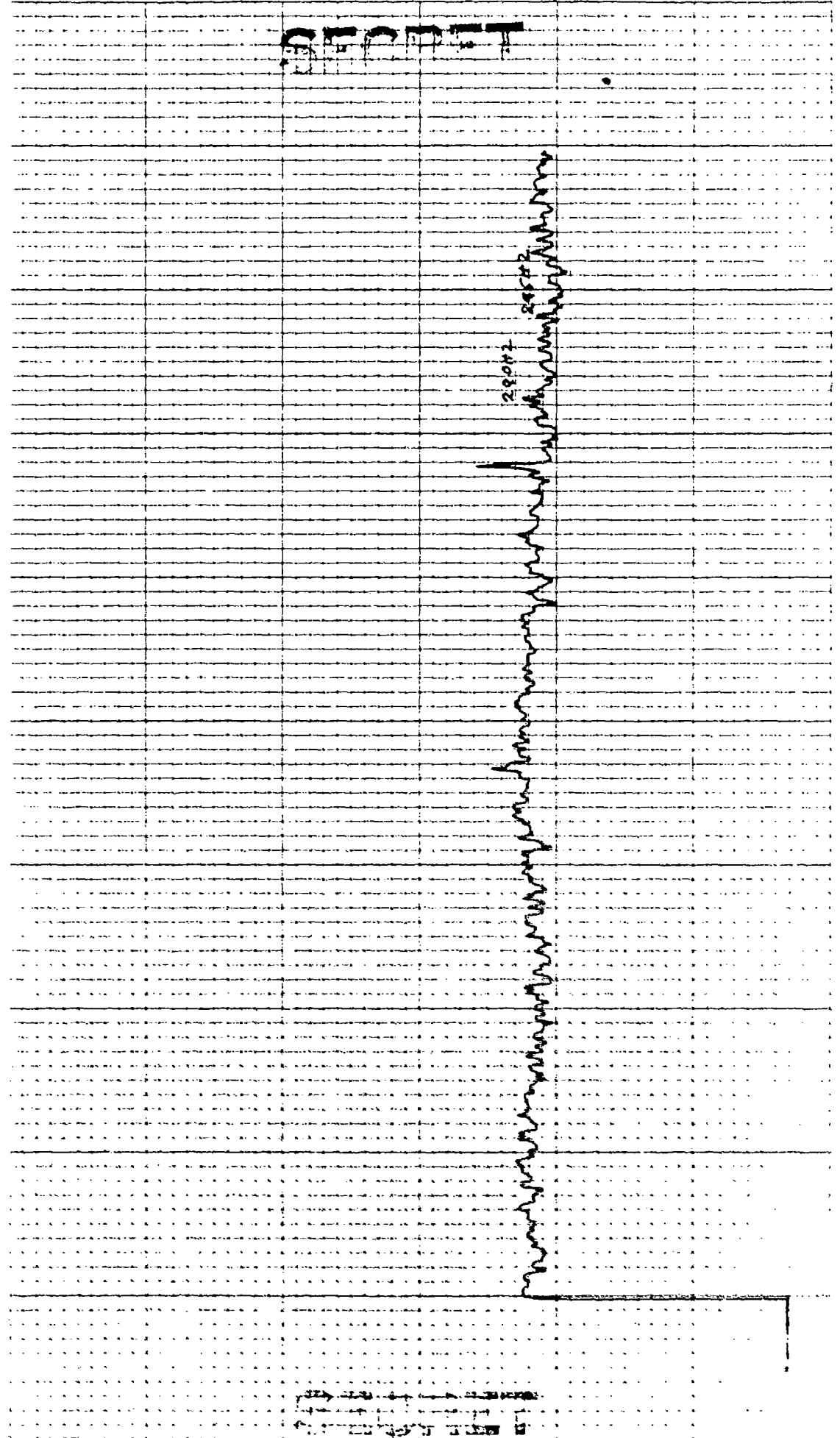
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CONTROL: 1-19 - 1600 (JA)  
BEAMFORMED SPECTRUM(ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
32 ELEMENTS

DATE OF ANALYSIS: - - -  
16-26 1979  
DATE/TIME: 1-19-77 - 1600 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
-74 DEG. AZ STEERING

REEL: 6 INDE X7575  
INTEGRATION TIME 320 SECS  
ATTEN: -0 DB  
FILTER WTG: HANNING





# CONFIDENTIAL

## SIGNAL LEVEL AND SNR CALCULATIONS

DATA POINT 2                      FREQUENCY 290 HZ                      NUMBER OF ELEMENTS 50

### SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED                      -59.0  
MCPS-32 CAL. CORRECTION                      +10    -49.0  
BEAMFORMER GAIN                      +24    -25.0    SIG. LEVEL FOR SNR CALCULATION  
MRA CORRECTION                      + .9    -24.1    SIG. LEVEL FOR SIGNAL GAIN

### NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED                      -73.4  
MCPS-32 CAL. CORRECTION                      +10    -63.4  
BEAMFORMER GAIN                      +24    -39.4    NOISE LEVEL FOR SNR CALCULATION

### SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR                      -25.0  
NOISE LEVEL FOR SNR                      -39.4    14.4  
PROCESSOR CORRECTION                      -4.2    10.2  
MRA CORRECTION                      + .9    11.1    SNR .931 HZ BAND  
BANDWIDTH CONVERSION                      -13.2    -2.1    SNR 1    HZ BAND

CONFIDENTIAL

**CONFIDENTIAL**

**SIGNAL LEVEL AND SNR  
CALCULATIONS**

DATA POINT 2

FREQUENCY 295 HZ

NUMBER OF ELEMENTS 50

**SIGNAL LEVEL**

MCPS-32 SIGNAL LEVEL INDICATED	<u>-66.2</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-56.2
BEAMFORMER GAIN	<u>+24</u>	-32.2 SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	-31.4 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>+24</u>	-39.4 NOISE LEVEL FOR SNR CALCULATION

**SIGNAL-NOISE-RATIO**

SIGNAL LEVEL FOR SNR	<u>-32.2</u>	
NOISE LEVEL FOR SNR	<u>-39.4</u>	7.2
PROCESSOR CORRECTION	<u>-4.8</u>	2.4
MRA CORRECTION	<u>+ .4</u>	3.2 SNR . HZ BAND
BANDWIDTH CONVERSION	<u>-13.2</u>	-10.0 SNR 1 HZ BAND

**CONFIDENTIAL**

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DATA POINT 2

SIGNAL GAIN

	<u>140 HZ</u>	<u>200HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	_____	<u>- 51.5</u>	<u>- 51.2</u>
MRA SIGNAL LEVEL	_____	<u>- 24.1</u>	<u>- 31.4</u>
ARRAY SIGNAL GAIN	_____	<u>27.4</u>	<u>19.8</u>
20 LOG <u>50</u>	_____	<u>33.9</u>	<u>33.9</u>
# of elements	_____		
DIFFERENCE	_____	<u>- 6.5</u>	<u>- 14.1</u>

ARRAY GAIN

MRA SNR	_____	<u>11.1</u>	<u>3.2</u>
MEAN OMNI SNR	_____	<u>- .2</u>	<u>- .7</u>
ARRAY GAIN	_____	<u>11.3</u>	<u>3.9</u>
THEORETICAL AZMUTH GAIN (at MRA)	_____	<u>15.4</u>	<u>15.5</u>
DIFFERENCE	_____	<u>- 4.1</u>	<u>- 11.6</u>

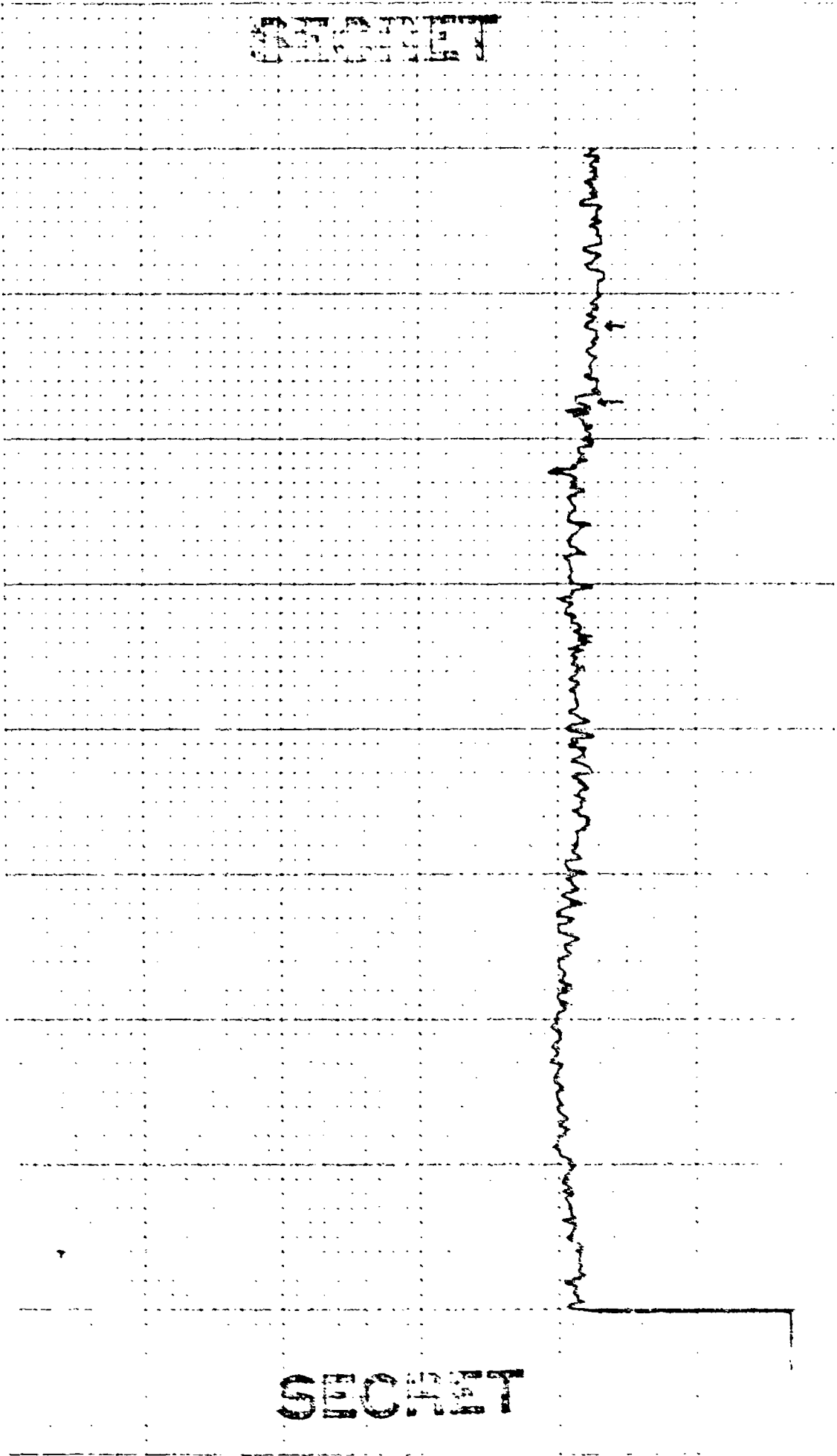
CONFIDENTIAL

4 03

CONTROL: 1-19 -100 (50) DATE OF ANALYSIS: 1-14-76  
 BEAMFORMED SPECTRUM (ELEMENTS 1-14-76 20 x 29-53)  
 EXERCISE: BEARING STAVE DATE/TIME: 1-19-77 - 1600 Z  
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ  
 50 ELEMENTS 46 DEG. AZ STEERING

REEL: 6 INTEGRATION TIME 320 SECS ATTN: 2Y DB  
 FILTER WTC: HANNING

INDE X 7575

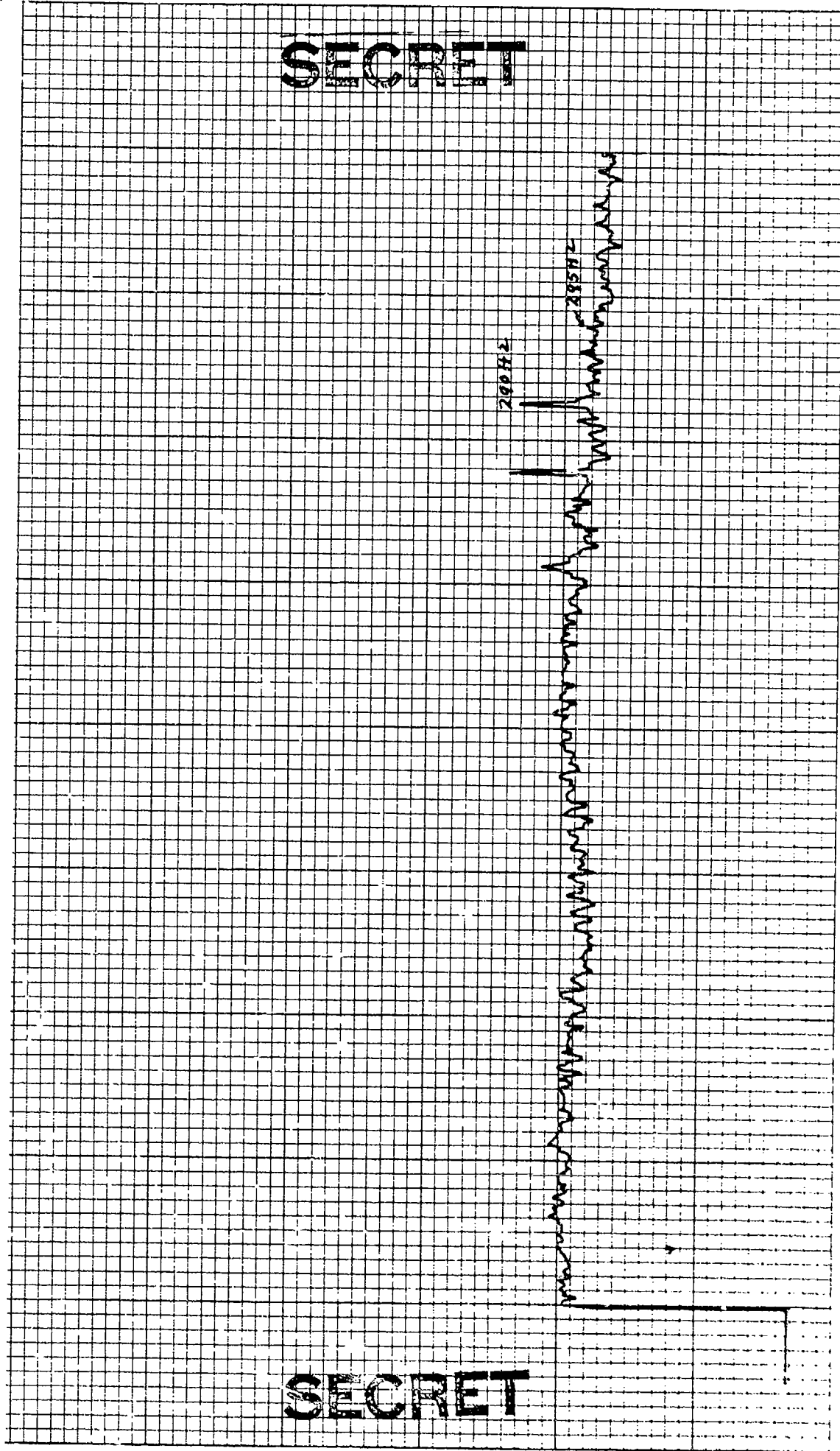


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CONTROL: 1-19 -1600 (50 )      DATE OF ANALYSIS: - - - - -  
 BEAMFORMED SPECTRUM(ELEMENTS 1-14416-264 21-53 )  
 EXERCISE: BEARING STAKE      DATE/TIME: 1-19-77 -1600 Z  
 CENTER FREQ: 270 HZ      ANALYSIS BANDWIDTH: 1710HZ  
 50 ELEMENTS      -48 DEG. AZ STEERING

REEL: 6      INDE X7575  
 INTEGRATION TIME 320 SECS      ATTN:-21 DB  
 FILTER      WTG: HANNING



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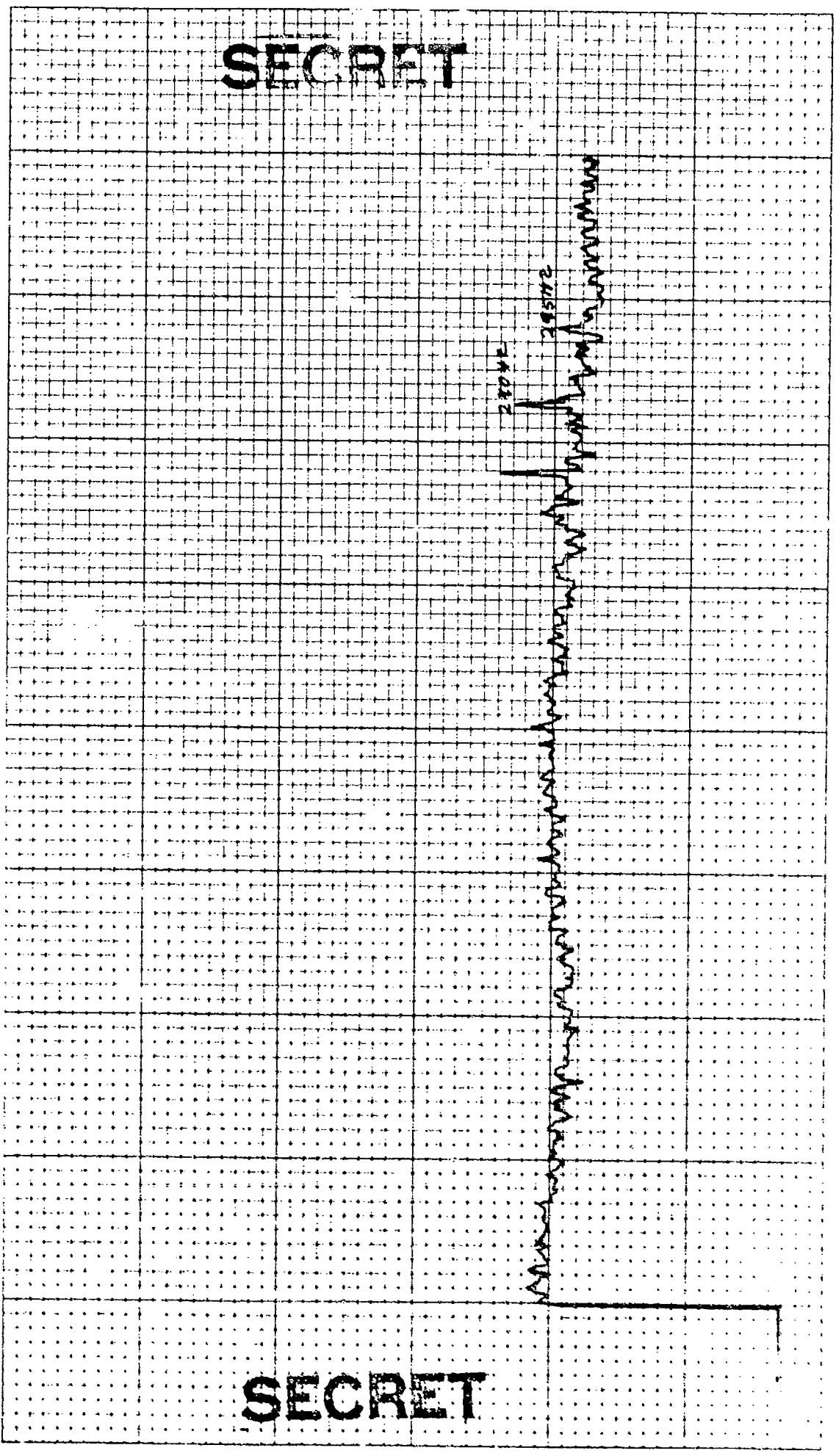
CONTROL: 149-1600 (50)      DATE OF ANALYSIS: 1-14-77      REEL: 6      INDE X7575

BEAMFORMED SPECTRUM (ELEMENTS) 1-14-77-1600/29-53      INTEGRATION TIME 320 SECS      ATTEN: -24DB

EXERCISE: BEARING STAKE      DATE/TIME: 1-18-77-1600Z      FILTER      WTG: HANNING

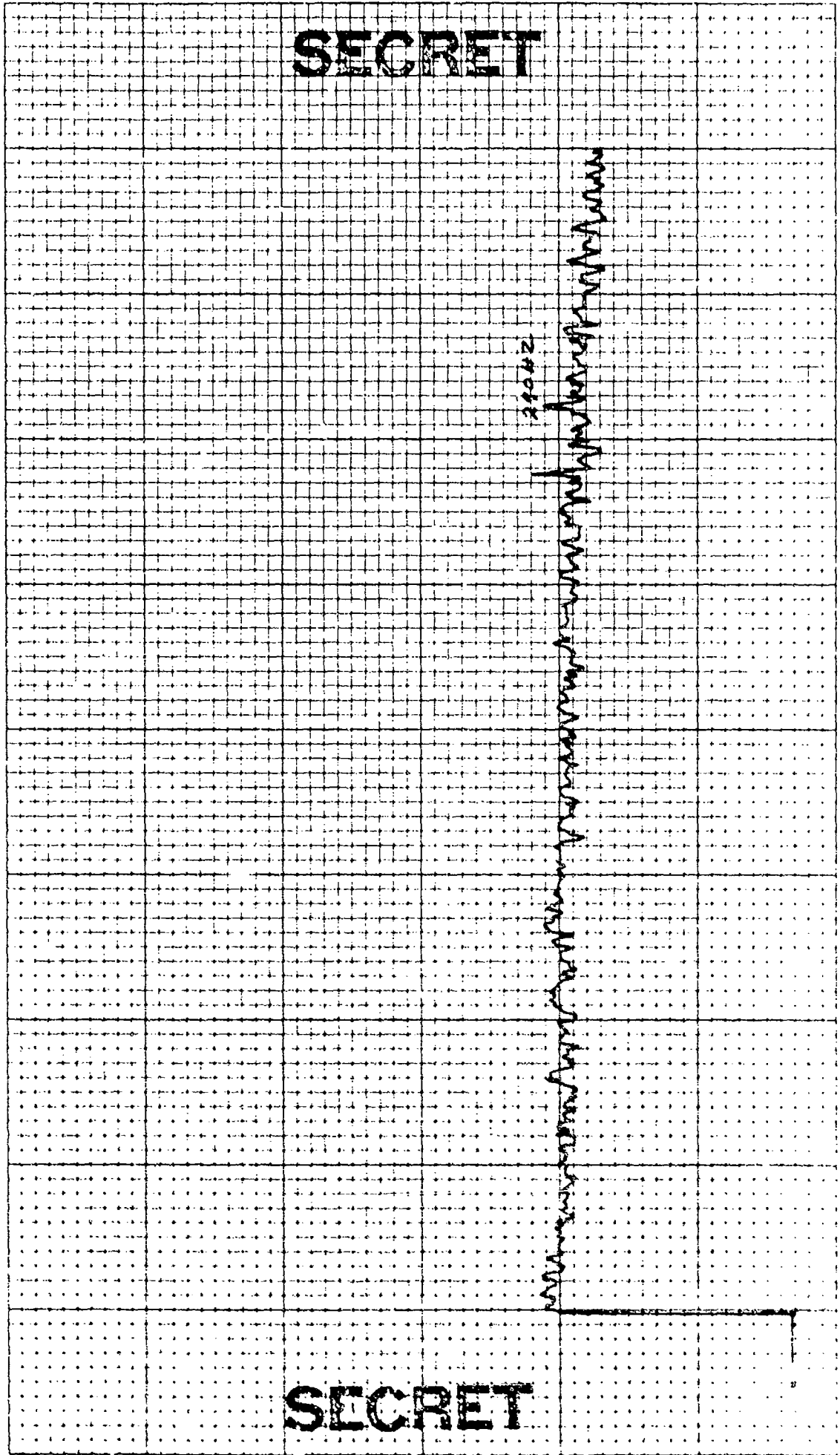
CENTER FREQ: 276 HZ      ANALYSIS BANDWIDTH: 1/10HZ      -50 DEG. AZ STEERING

50 ELEMENTS



CONTROL: /-14 -100 (50 ) DATE OF ANALYSIS: - - -  
 BEAMFORMED SPECTRUM(ELEMENTS) /-14 16-26 29-53 )  
 EXERCISE: BEARING STAKE DATE/TIME: /18-77 - /600Z  
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ  
 50 ELEMENTS -52 DEG. AZ STEERING

REEL: 6 INDE X2675  
 INTEGRATION TIME 320 SECS ATTEN:-24 DB  
 FILTER WTG: HANNING



4-515

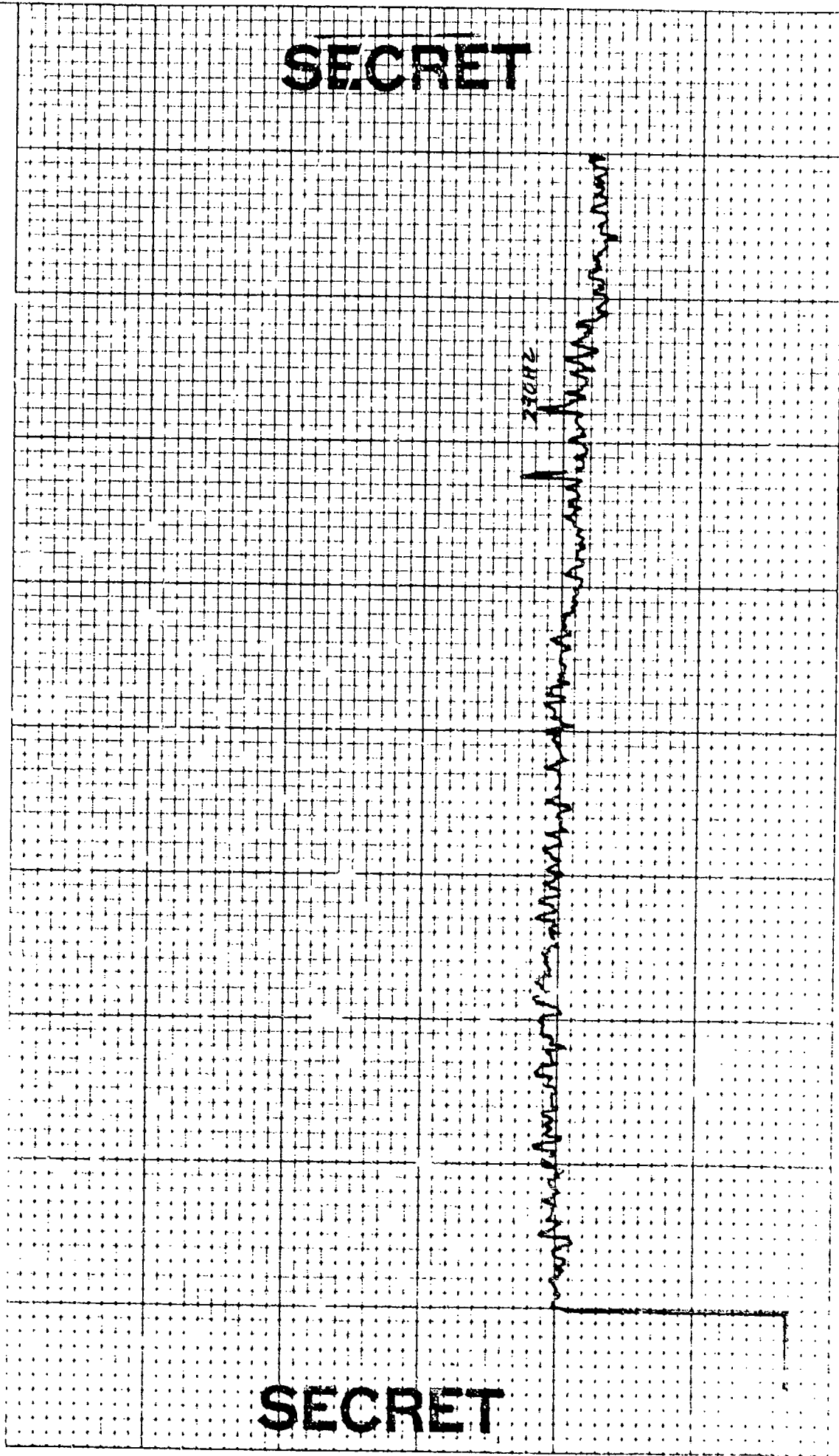
CONTROL: 1-19 - 1600 (50)  
 BEAMFORMED SPECTRUM (ELEMENTS 1-14 & 16-26 & 28-53)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ.  
 50 ELEMENTS

DATE OF ANALYSIS: - - - -  
 DATE/TIME: 1-19-77 - 1600 Z  
 ANALYSIS BANDWIDTH: 1/10 HZ  
 -54 DEG. AZ STEERING

INTEGRATION TIME 320 SECS  
 FILTER WTG: HANNING

REEL: 6  
 INDE X7575

ATTEN: -2Y DB



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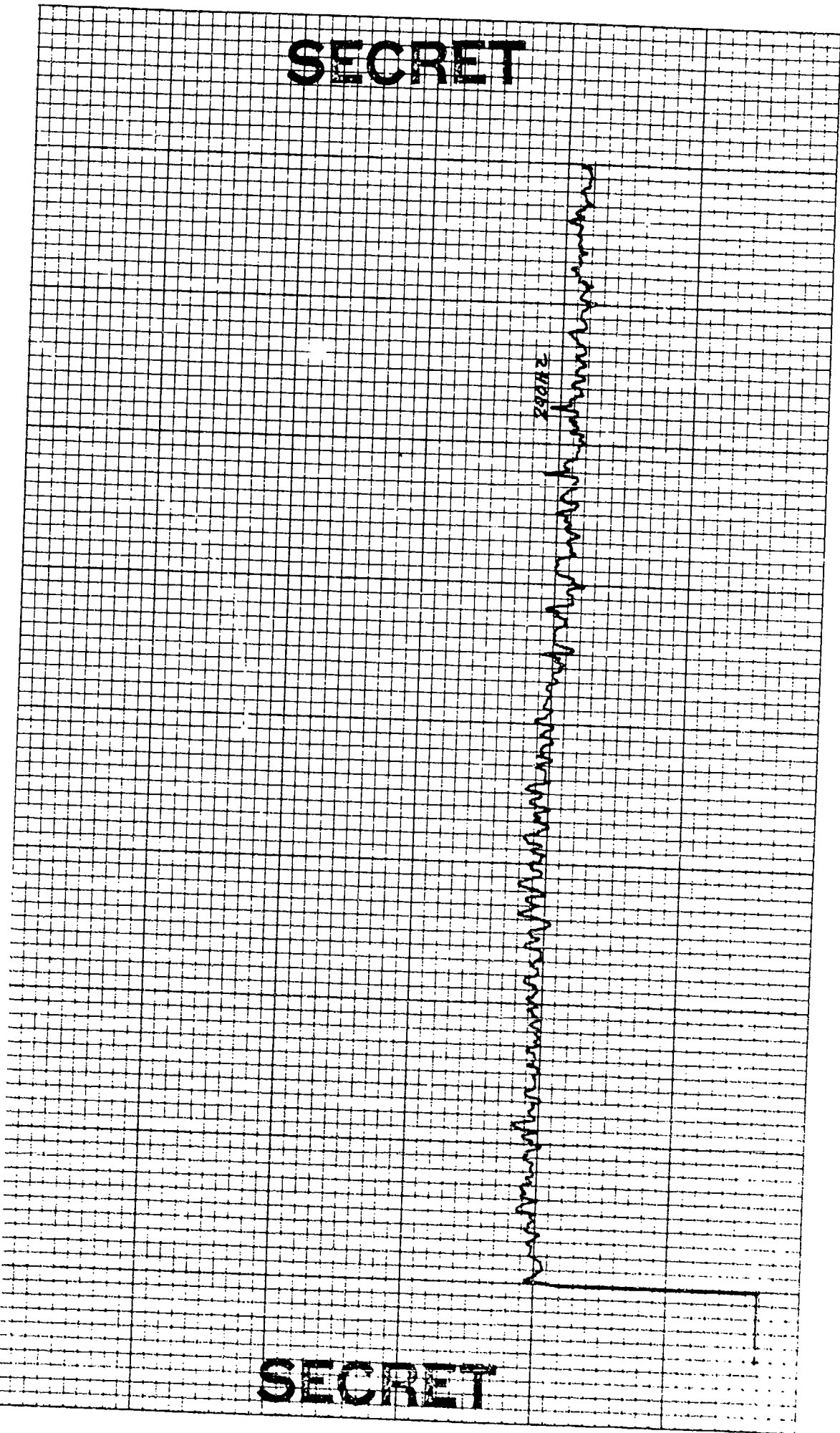
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3-506

CONTROL: 1-19 - 1600 (50 )  
 BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: ---  
 EXERCISE: BEARING STAKE 1-14 16.26 29-53 )  
 CENTER FREQ: 270 HZ DATE/TIME: 1-18-77 - 1600 Z  
 50 ELEMENTS ANALYSIS BANDWIDTH: 1/10HZ  
 -56 DEC. AZ STEERING

REEL: 6 INDE X 7575  
 INTEGRATION TIME 320 SECS ATTEN: -24DB  
 FILTER WTG: HANNING



SECRET

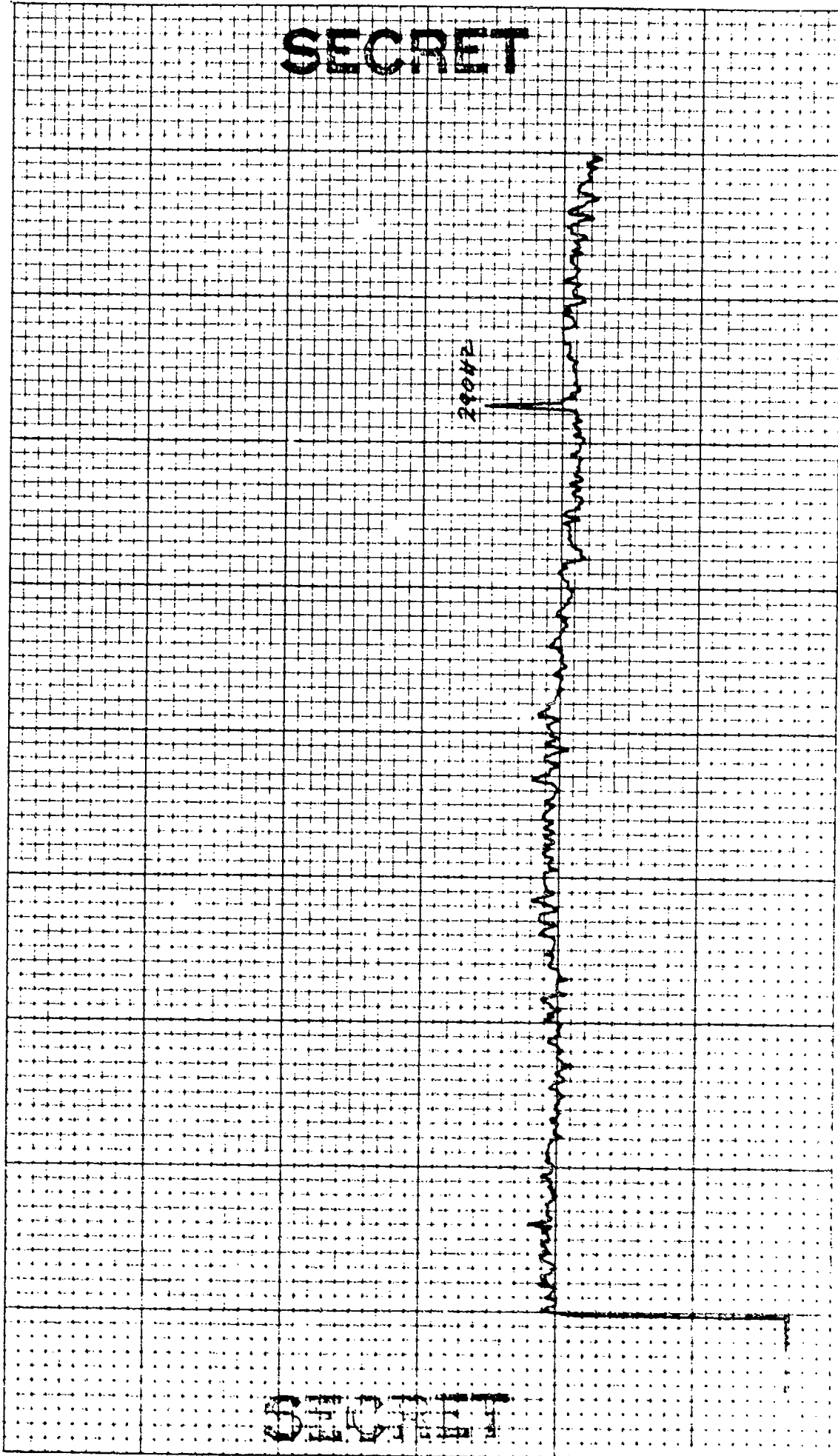
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E J TGT CH# SCHE

6-506

CONTROL: 1-19-1600 (50)      DATE OF ANALYSIS:           REEL: 6      INDE X2775  
 BEAMFORMED SPECTRUM (ELEMENTS)      1-14-16-264 29-53      INTEGRATION TIME 320 SECS      ATTN: 24 DB  
 EXERCISE: BEARING STAKE      DATE/TIME: 1-19-77 - 1600 Z      FILTER      WTG: HANNING  
 CENTER FREQ: 270 HZ      ANALYSIS BANDWIDTH: 1/10HZ  
50 ELEMENTS      -50 DEG. AZ STEERING



E I TO: CH: W:ME

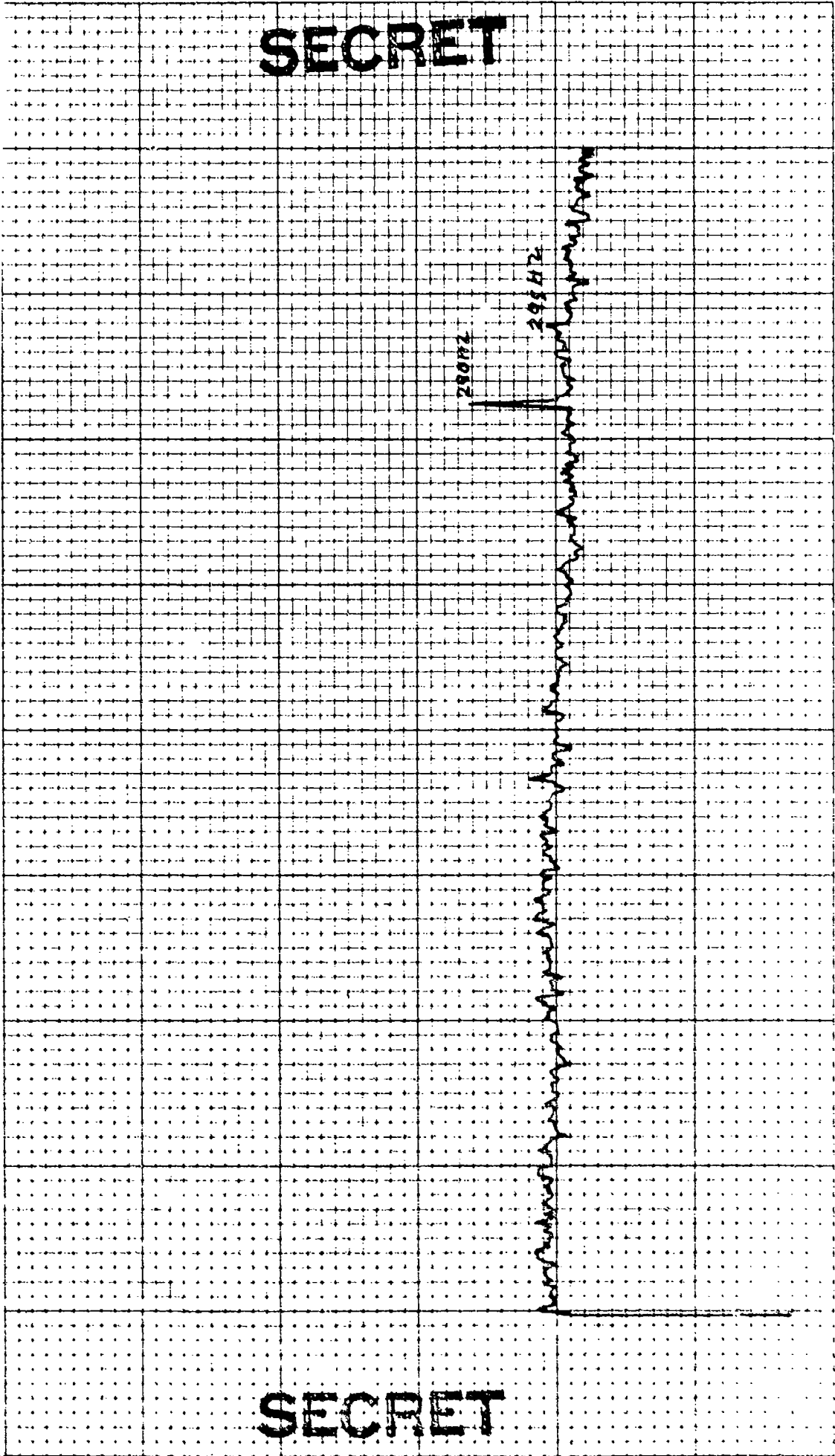
4 '03

14-506

CONTROL: 1-19 - 1600 (50)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
50 ELEMENTS

DATE OF ANALYSIS: - - -  
1-14-76 26 29-53  
DATE/TIME: 1-18-77 - 1600Z  
ANALYSIS BANDWIDTH: 1710HZ  
-59 DEG. AZ STEERING

REEL: 6 INDE X 7575  
INTEGRATION TIME 320 SECS ATTN: 24 DB  
FILTER WIG: HANNING



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1-506

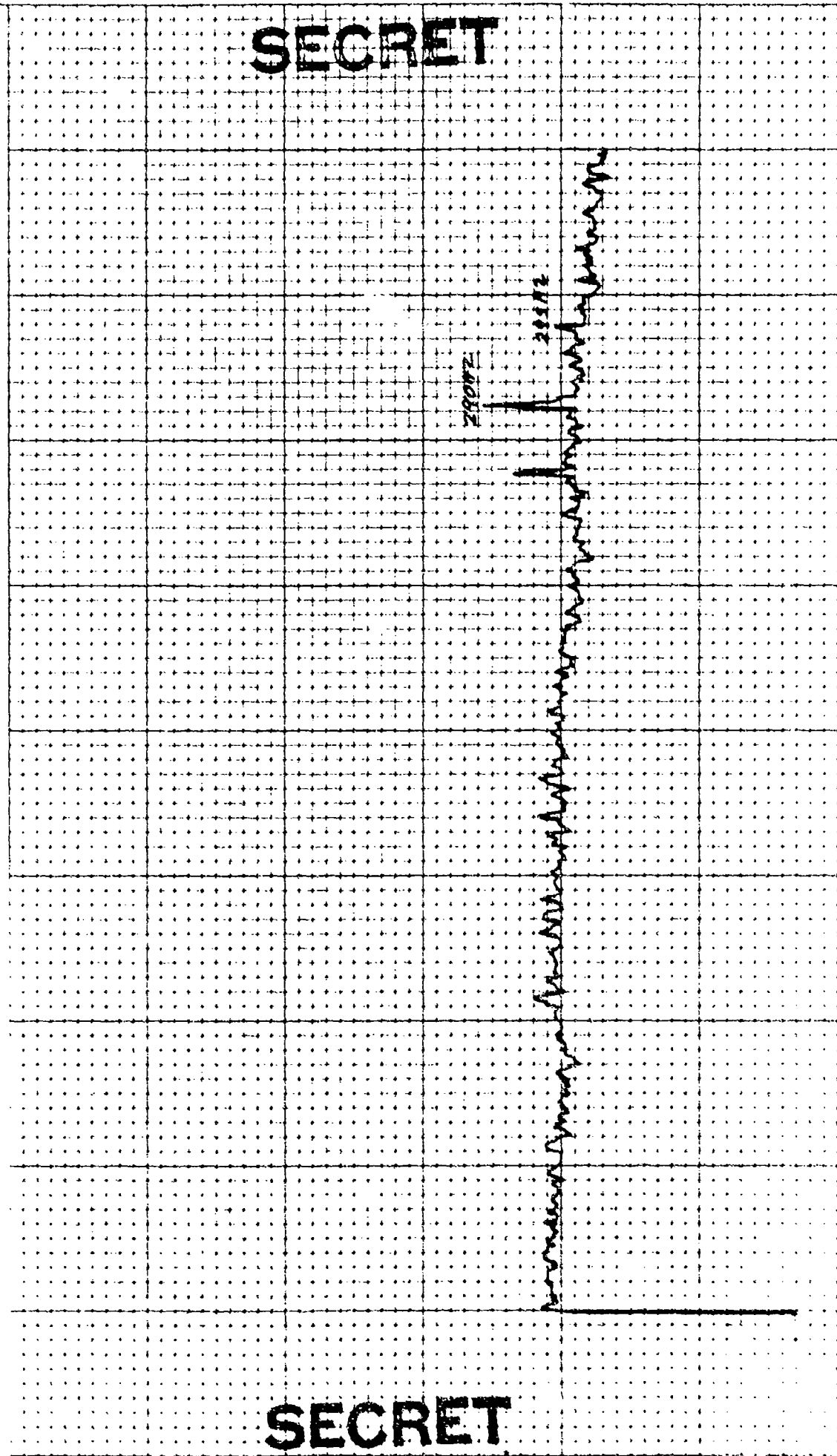
CONTROL: 1-19 -1600 (50)  
 BEAMFORMED SPECTRUM (ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
 50 ELEMENTS

DATE OF ANALYSIS: - - -  
 1-14-76-26828-53

DATE/TIME: 1-18-77 - 1600 Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 -60 DEG. AZ STEERING

REEL: 6  
 INTEGRATION TIME 320 SECS  
 FILTER WTC: HANNING

INDE X7575



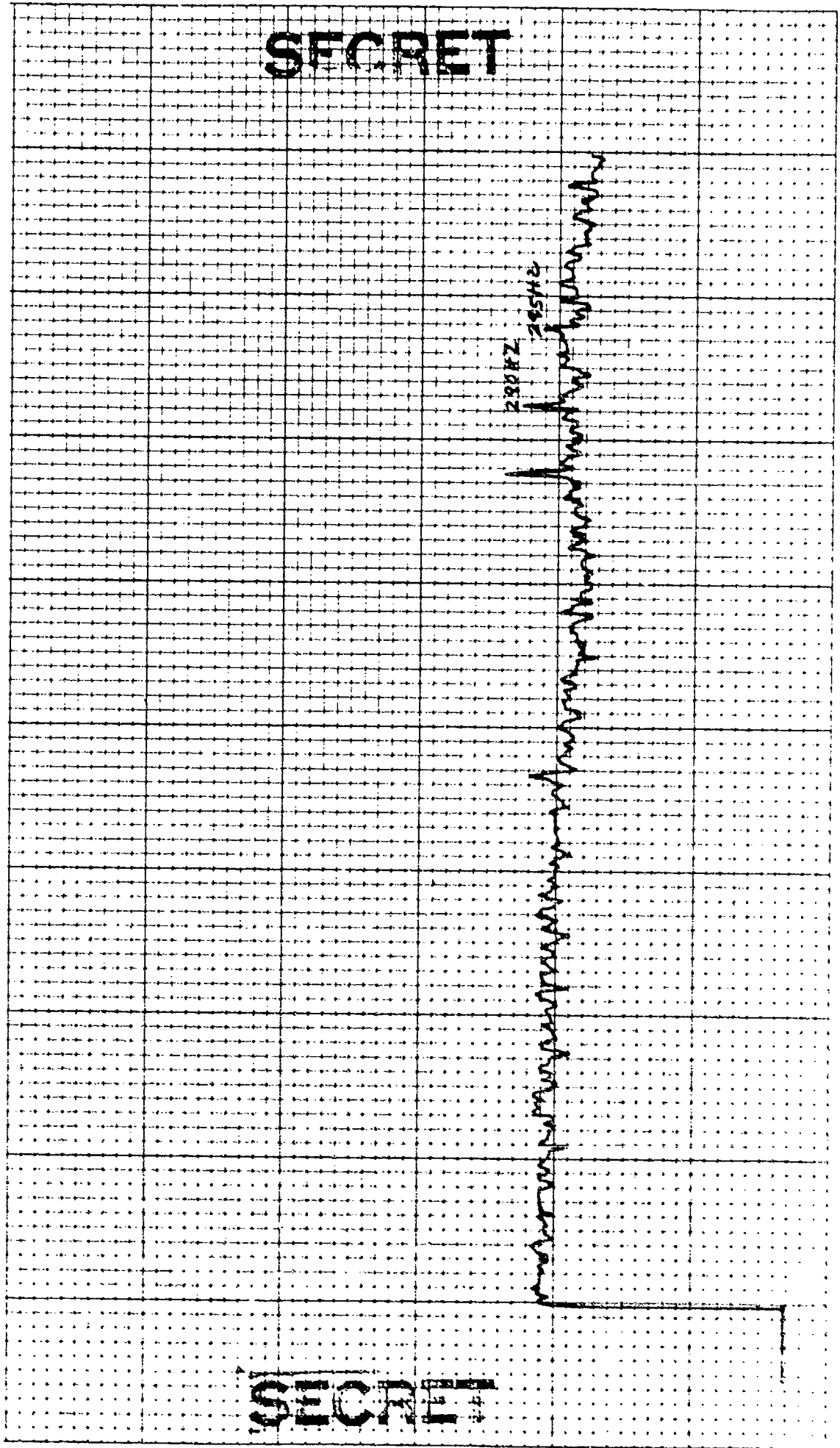
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CONTROL: 1-19 - 1600 ( 50 )  
 BEAMPFORMED SPECTRUM (ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
 50 ELEMENTS

DATE OF ANALYSIS: - - - - -  
 DATE/TIME: 1-14-76 20-53 )  
 ANALYSIS BANDWIDTH: 1710HZ  
 -6λ DEG. AZ STEERING

REEL: 6 INDE X7575  
 INTEGRATION TIME 320 SECS ATTEN: 24 DB  
 FILTER WTG: HANNING



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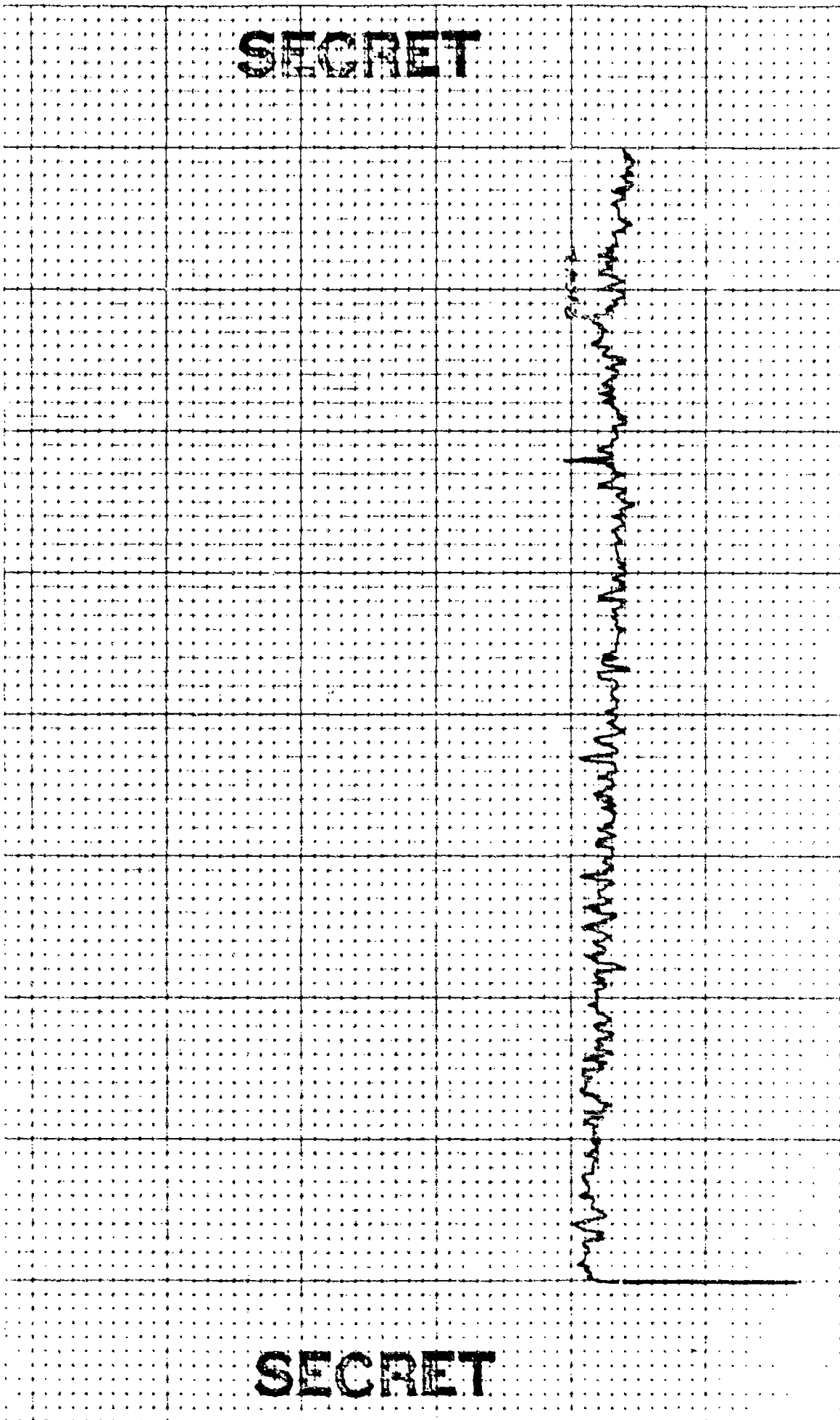
230 HZ 295 HZ

CONTROL: 1-19 -1600 (50 )  
 BEAMPFORMED SPECTRUM(ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
 50 ELEMENTS

DATE OF ANALYSIS: - - - -  
 1-14-66-264 29-53 )  
 DATE/TIME: 1-11-77 - 1600 Z  
 ANALYSIS BANDWIDTH: 1710HZ  
 -64 DEC. AZ STEERING

REEL: 6 INDE X 7075

INTEGRATION TIME 320 SECS ATEN: 2Y DB  
 FILTER WTC: HANNING



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CONTROL: 1-19 - 1600 (50) REEL: 6 INDE X7575

BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: 1-14-76-26 (29-53)

EXERCISE: BEARING STAKE DATE/TIME: 1-19-77 - 1600 Z

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

50 ELEMENTS -66 DEC. AZ STEERING

INTEGRATION TIME 320 SECS FILTER WTC: HANNING

ATTN: -2Y DB

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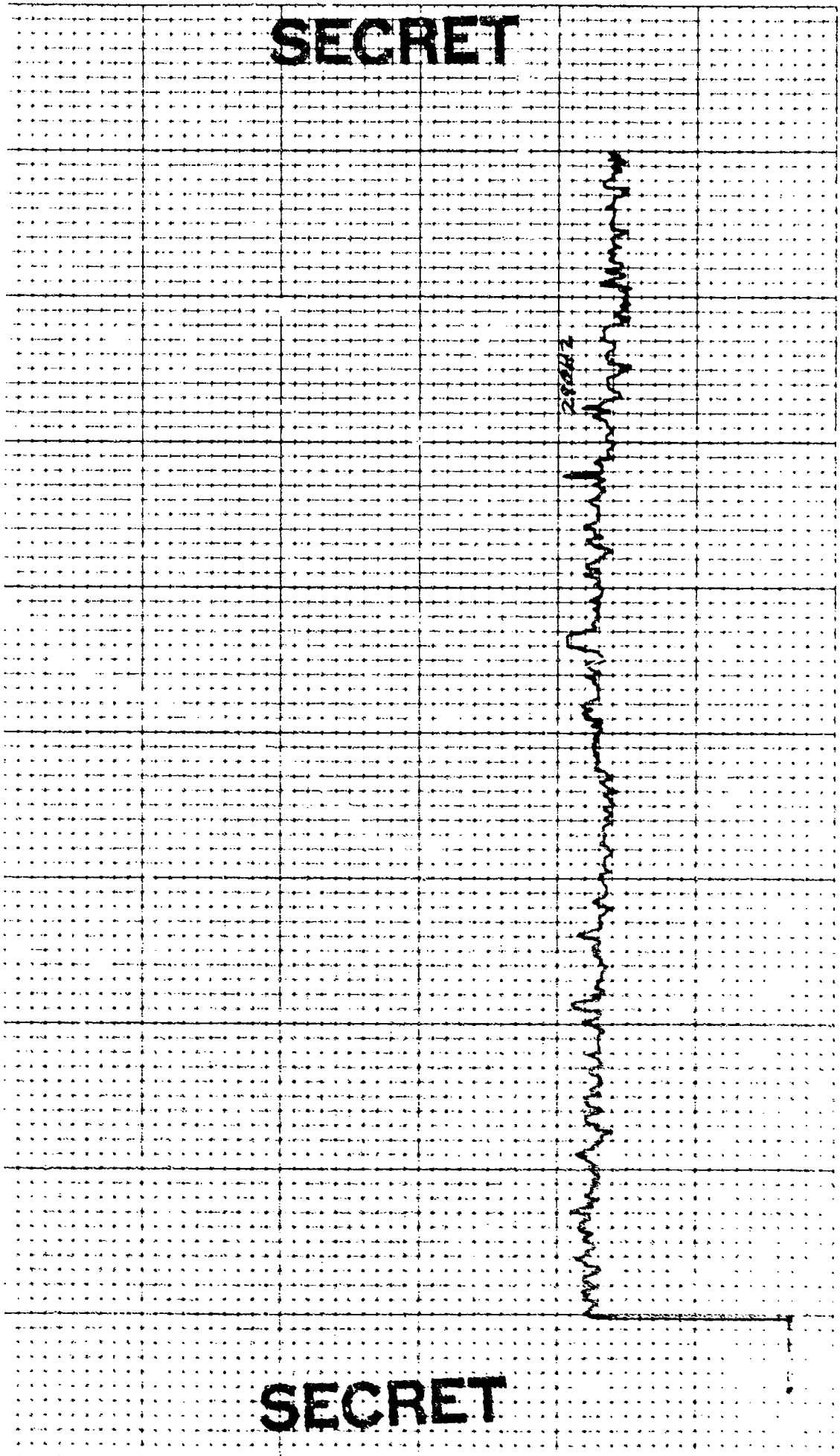
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*[Handwritten signature]*  
 280 HZ

CONTROL: 119 -1600 (50)  
 BEAMFORMED SPECTRUM (ELEMENTS 50)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 276 HZ  
 50 ELEMENTS

DATE OF ANALYSIS: 1-14-77  
 DATE/TIME: 1-19-77 -1600 Z  
 ANALYSIS BANDWIDTH: 1/10 HZ  
 -68 DEG. AZ STEERING

REEL: 6 INDE X7575  
 INTEGRATION TIME 320 SECS  
 FILTER WTC: HANNING





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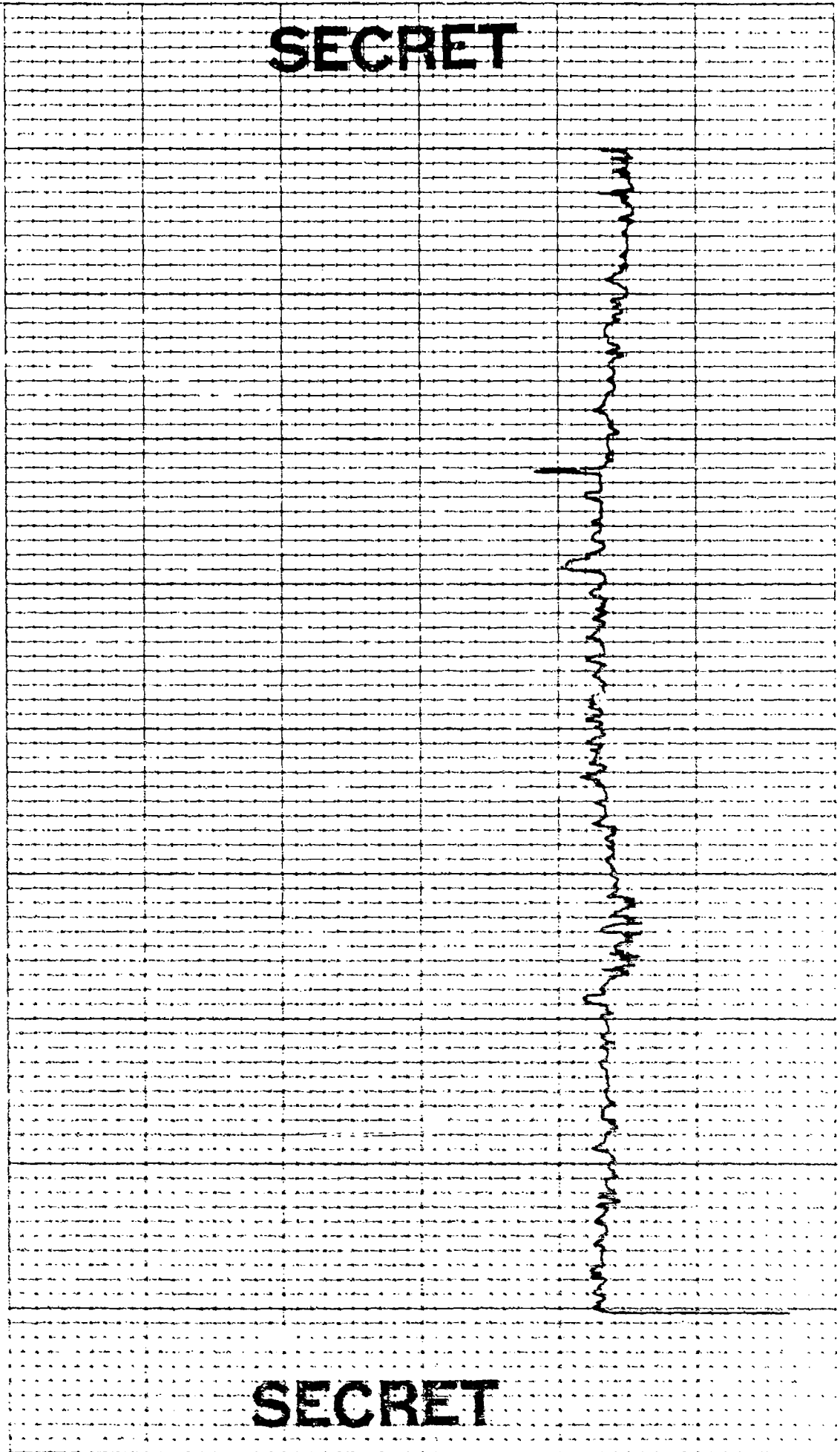
CONTROL: 1-19 - 1600 (50)      DATE OF ANALYSIS:      REEL: 2      INDE X2522

BEAMFORMED SPECTRUM (ELEMENTS 1-14 1-16-26 28-49)      INTEGRATION TIME 320 SECS      ATTEN: 24 DB

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

CENTER FREQ: 270 HZ      -70 DEG. AZ STEERING

50 ELEMENTS



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UNCLASSIFIED

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

DATA POINT 3 DATE 2-7-77 TIME 0934Z

FREQUENCY 290 HZ

INDICATED NOISE LEVEL  $\text{dBV} \frac{1}{\sqrt{10}}$  ABW -48.7

SYSTEM SENSITIVITY  $\text{dB}/\mu\text{B}$  -(-8) -40.7

BANDWIDTH CONVERSION TO 1 HZ BAND +8.2 -32.5

CONVERSION TO  $\text{dBre}\mu\text{Pa}/1\text{HZ}$  +100 +67.5

UNCLASSIFIED

UNCLASSIFIED

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

DATA POINT 3 DATE 2-7-77 TIME 0934Z

FREQUENCY 140 HZ

INDICATED NOISE LEVEL  $\frac{\text{dBV}}{\sqrt{\text{ABW}}}$  -45.7

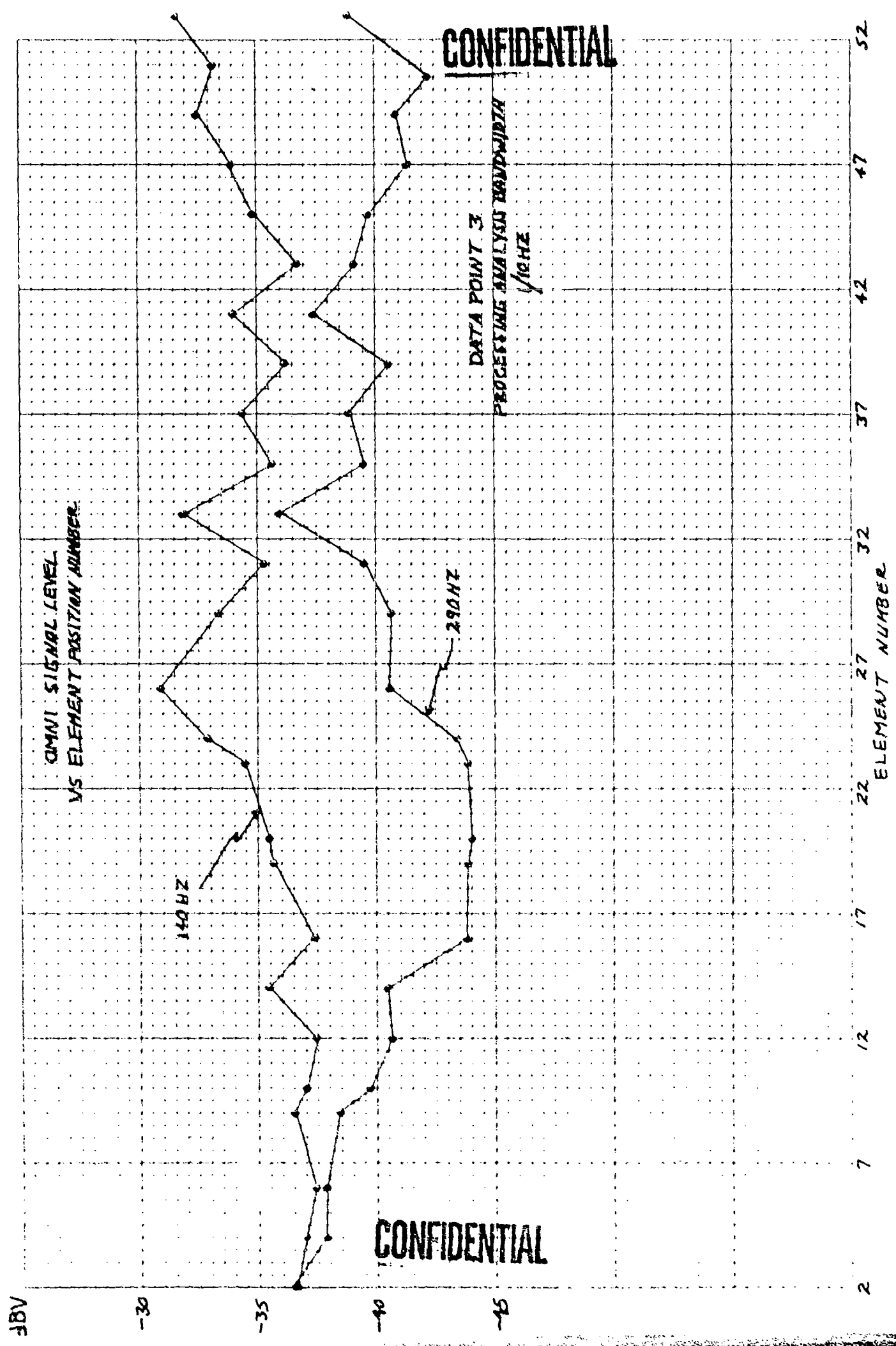
SYSTEM SENSITIVITY  $\text{dB}/\mu\text{B}$  -(-12) = -33.7

BANDWIDTH CONVERSION TO 1 HZ BAND +8.2 = 25.5

CONVERSION TO  $\text{dBre}\mu\text{Pa}/\text{1HZ}$  +100 = +74.5

UNCLASSIFIED

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CONFIDENTIAL

CONFIDENTIAL

CONTROL: 2.7 - 0934 (27)  
OMNI SPECTRUM (ELEMENT 2)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 0934 Z

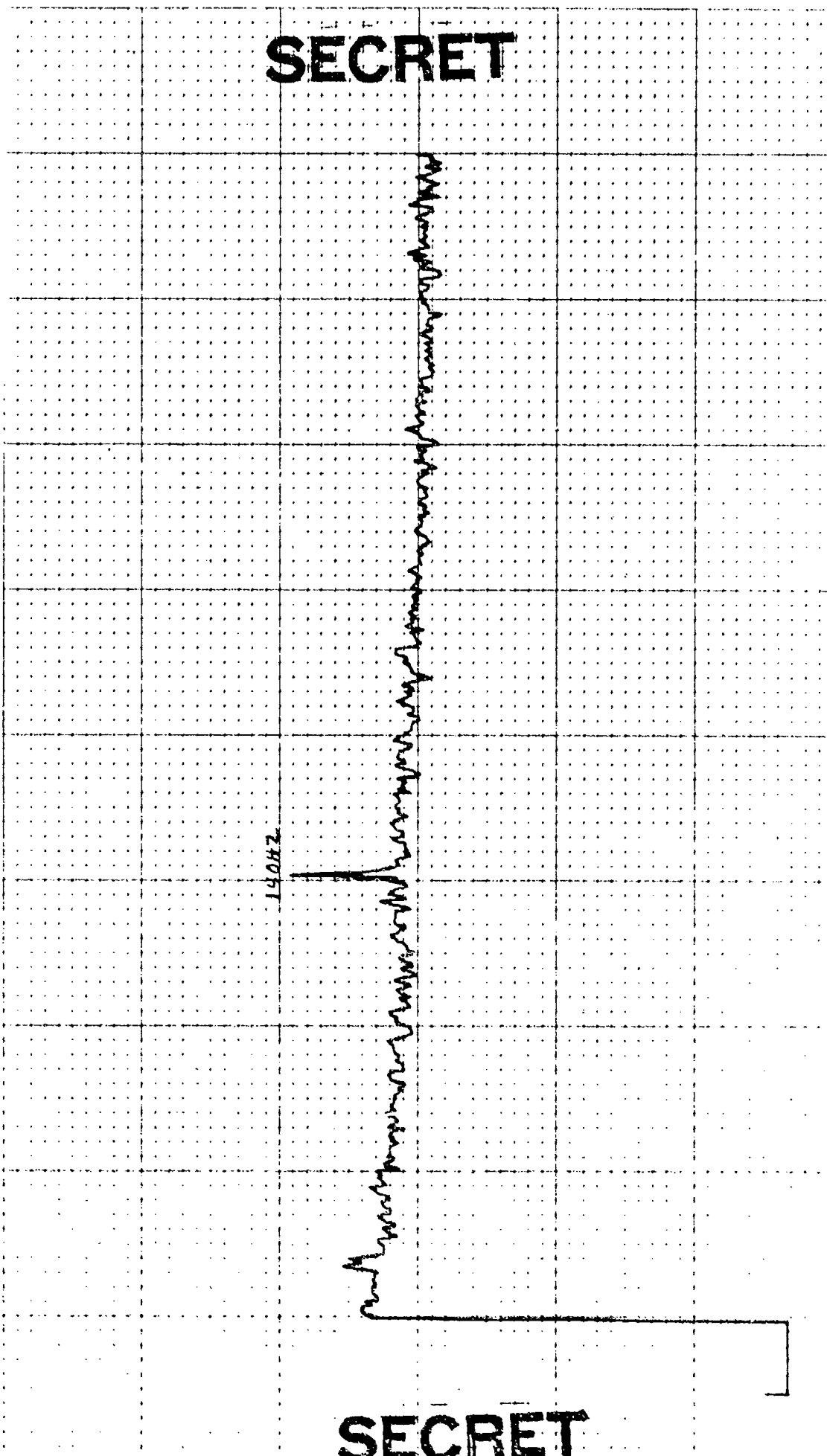
ANALYSIS BANDWIDTH: 1/10 HZ  
DEC AZ STEERING

REEL: F14

INDEX 3575

INTEGRATION TIME 320 SECS  
FILTER WTC: HANNING

ATTEN: DB



140 HZ

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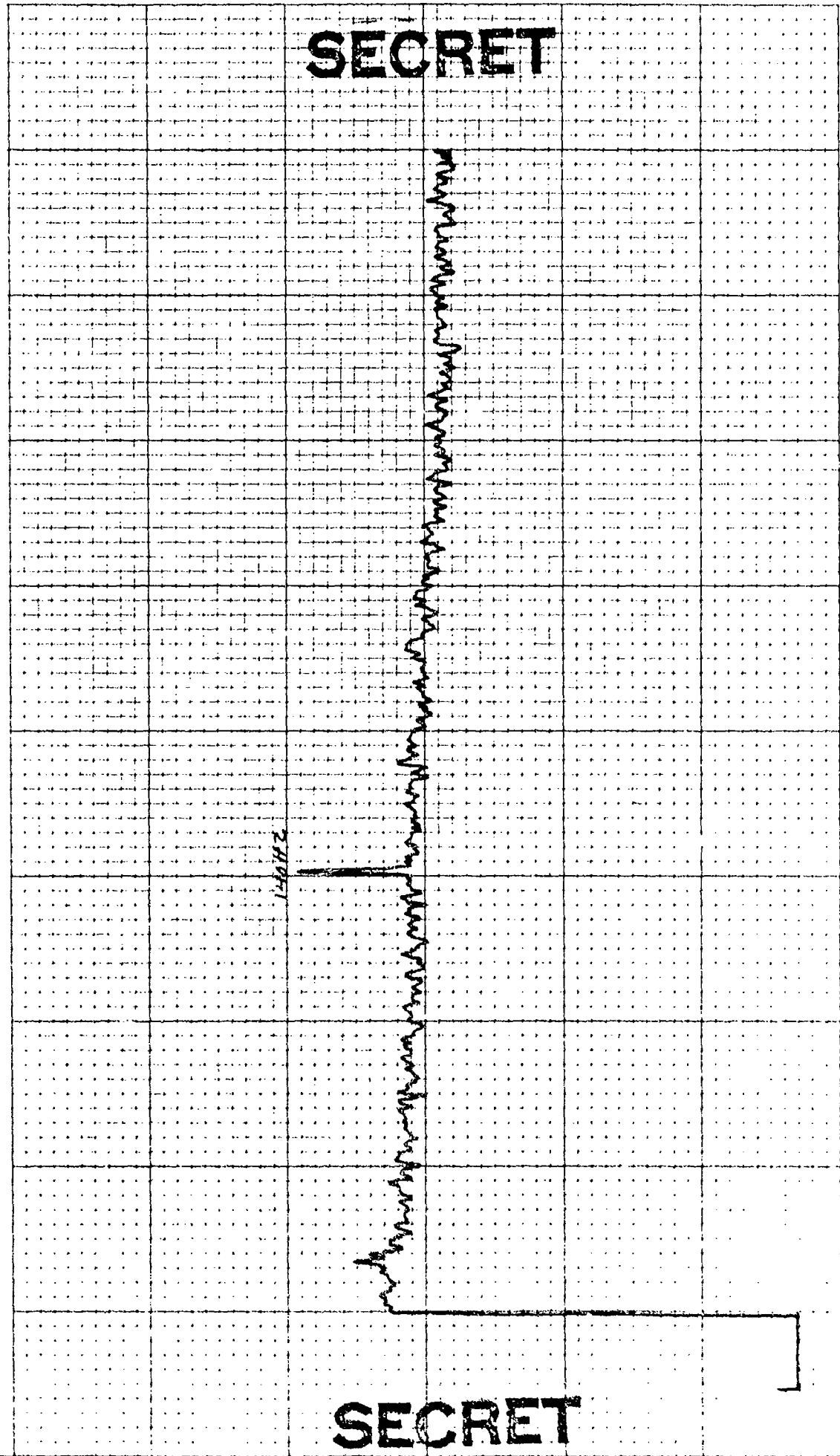
CONTROL: 2-7 -097Y (18)  
OMNI SPECTRUM (ELEMENT 4)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -097Y 2  
ANALYSIS BANDWIDTH: 1/10HZ  
DEG AZ STEERING

REEL: F/4 INDEX: 3375

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



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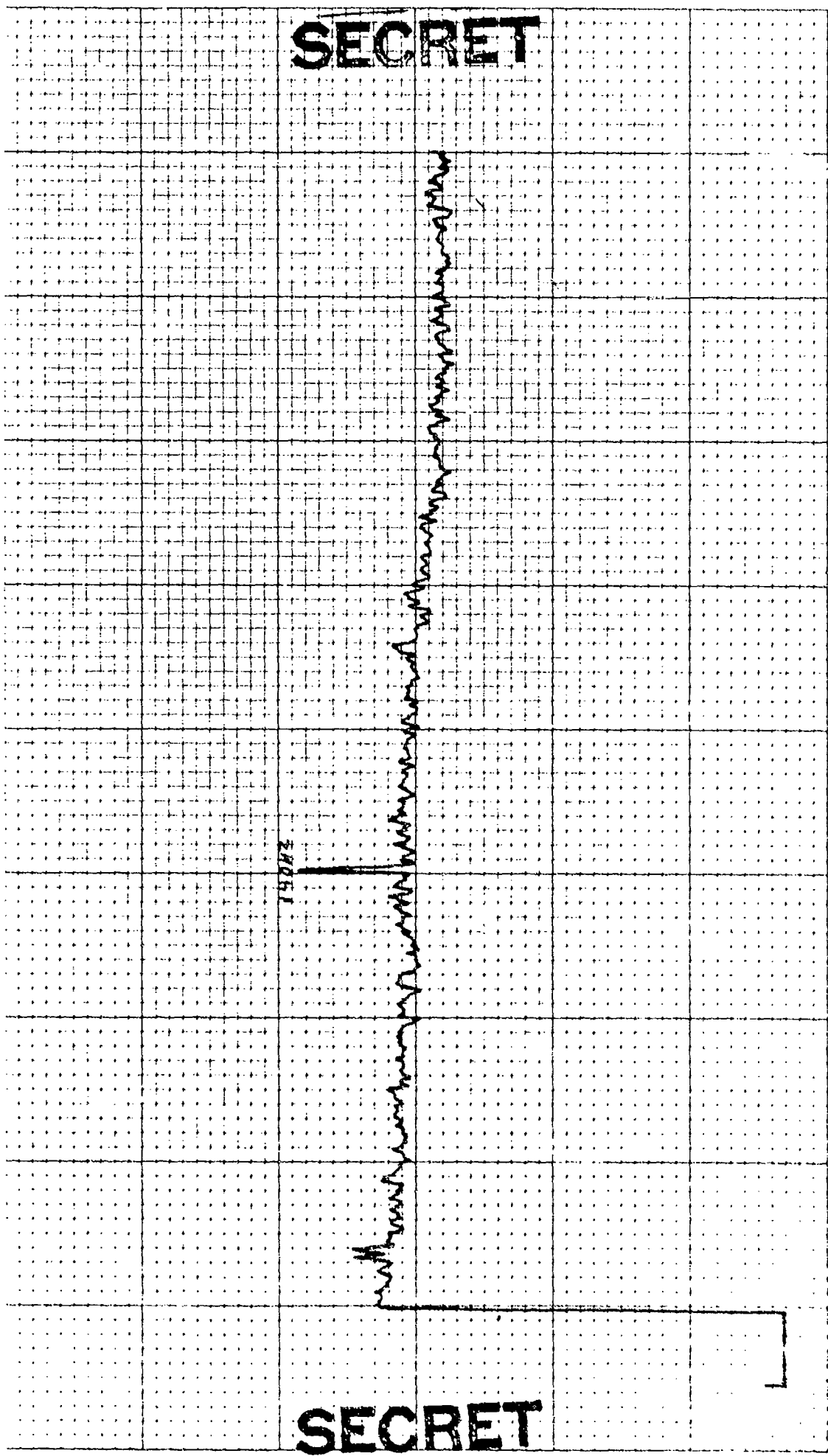
REEL: F/4 INDEX: 3575

DATE OF ANALYSIS:

CONTROL: 27-0934(29)  
OMNI SPECTRUM (ELEMENT 6)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
1 ELEMENT

INTEGRATION TIME 320 SECS ATTN: DB  
FILTER WTG: HANNING

DATE/TIME: 2-7-77 - 0934Z  
ANALYSIS BANDWIDTH: 1/10HZ  
    DEG AZ STEERING



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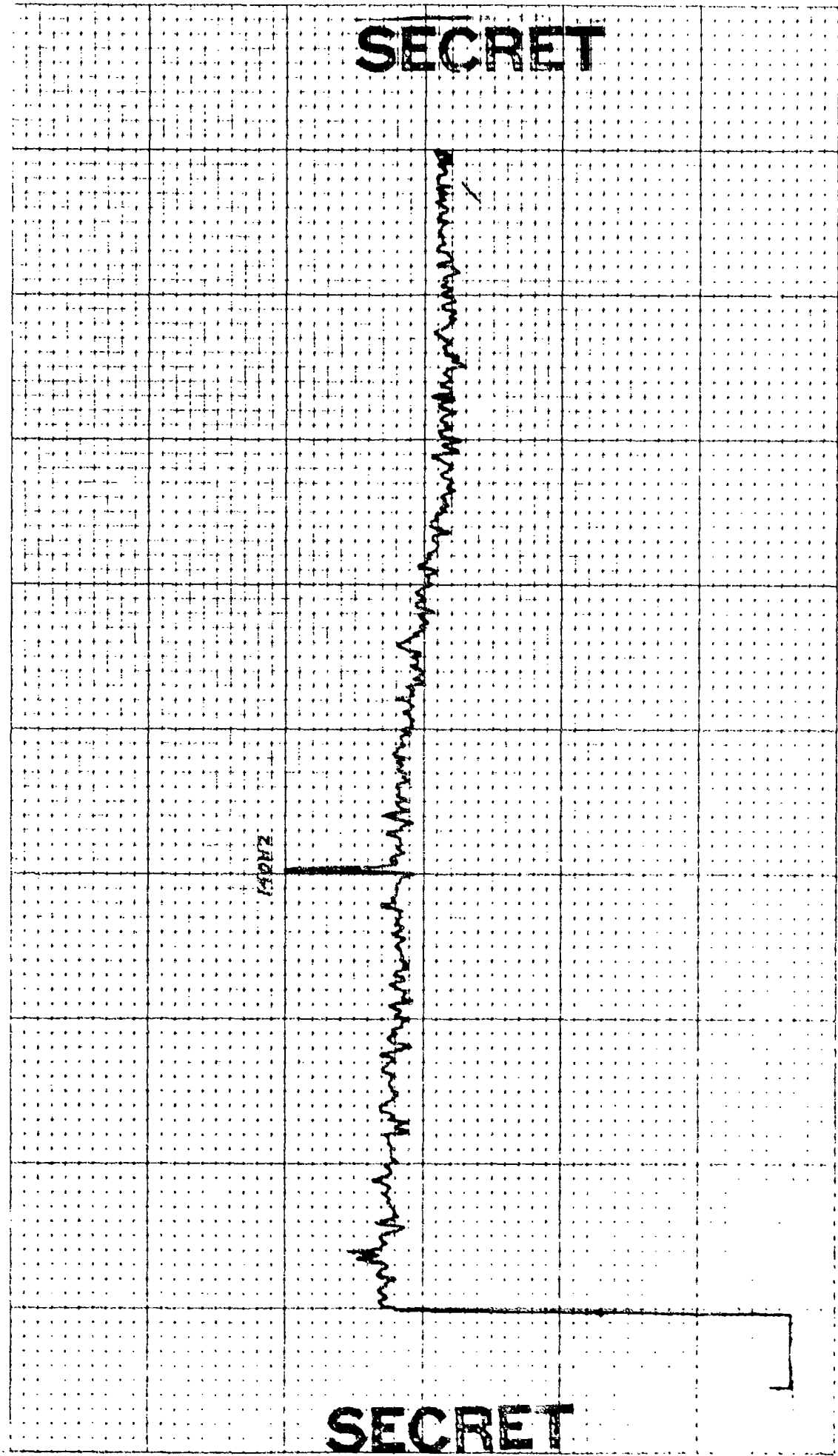
CONTROL: 0934 - 51 (DP3)  
OMNI SPECTRUM (ELEMENT 9)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 0934 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
DEG AZ STEERING

REEL: F14 INDEX 3575

INTEGRATION TIME 320 SECS  
FILTER WTG: HANNING



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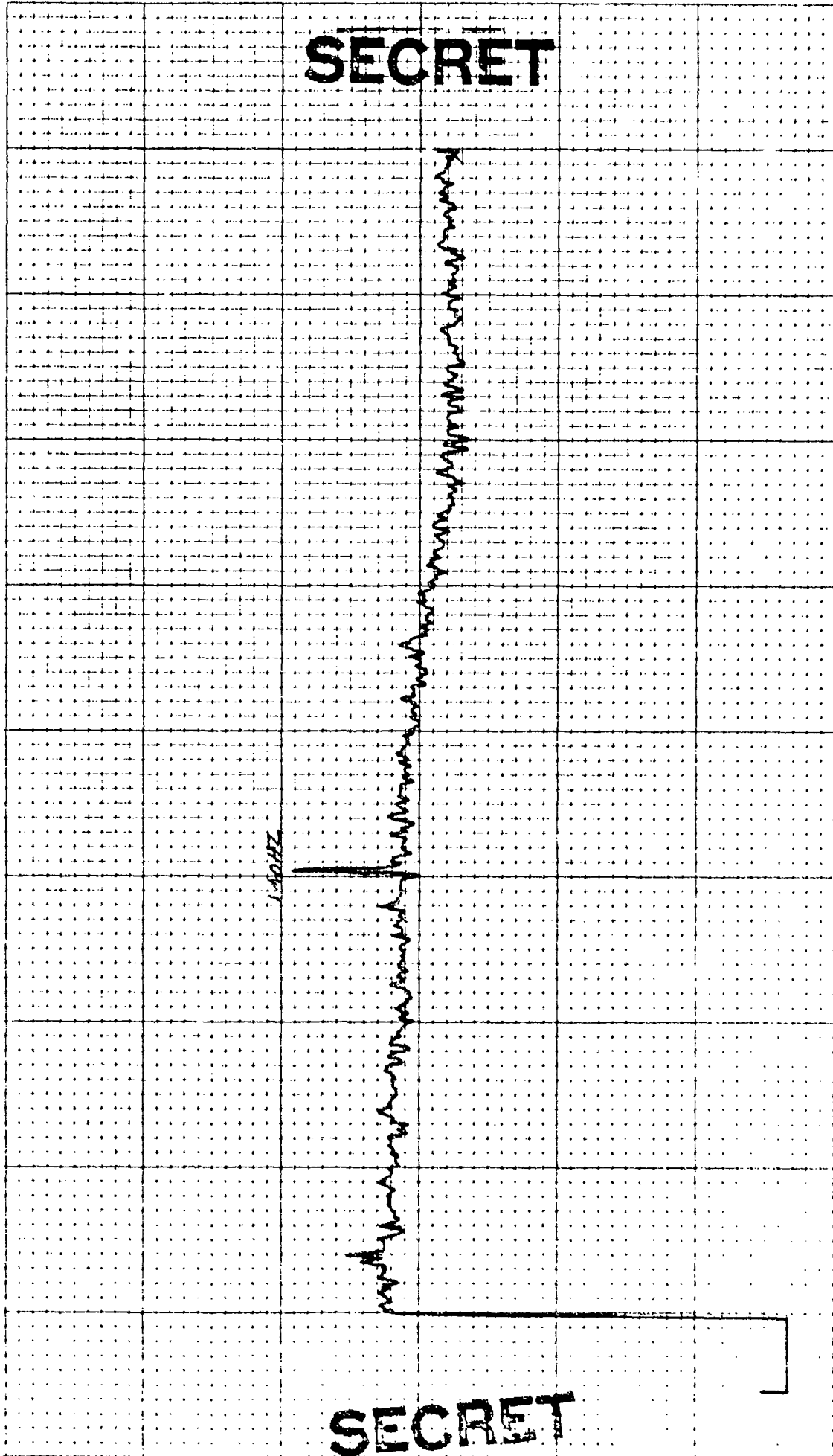
CONTROL: 2-7 -0934 (31 )  
OMNI SPECTRUM (ELEMENT 10 )  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -0934 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
DEC AZ STEERING

REEL: F/4 INDEX 3575

INTEGRATION TIME 320 SECS ATTN: DB  
FILTER WTG: HANNING



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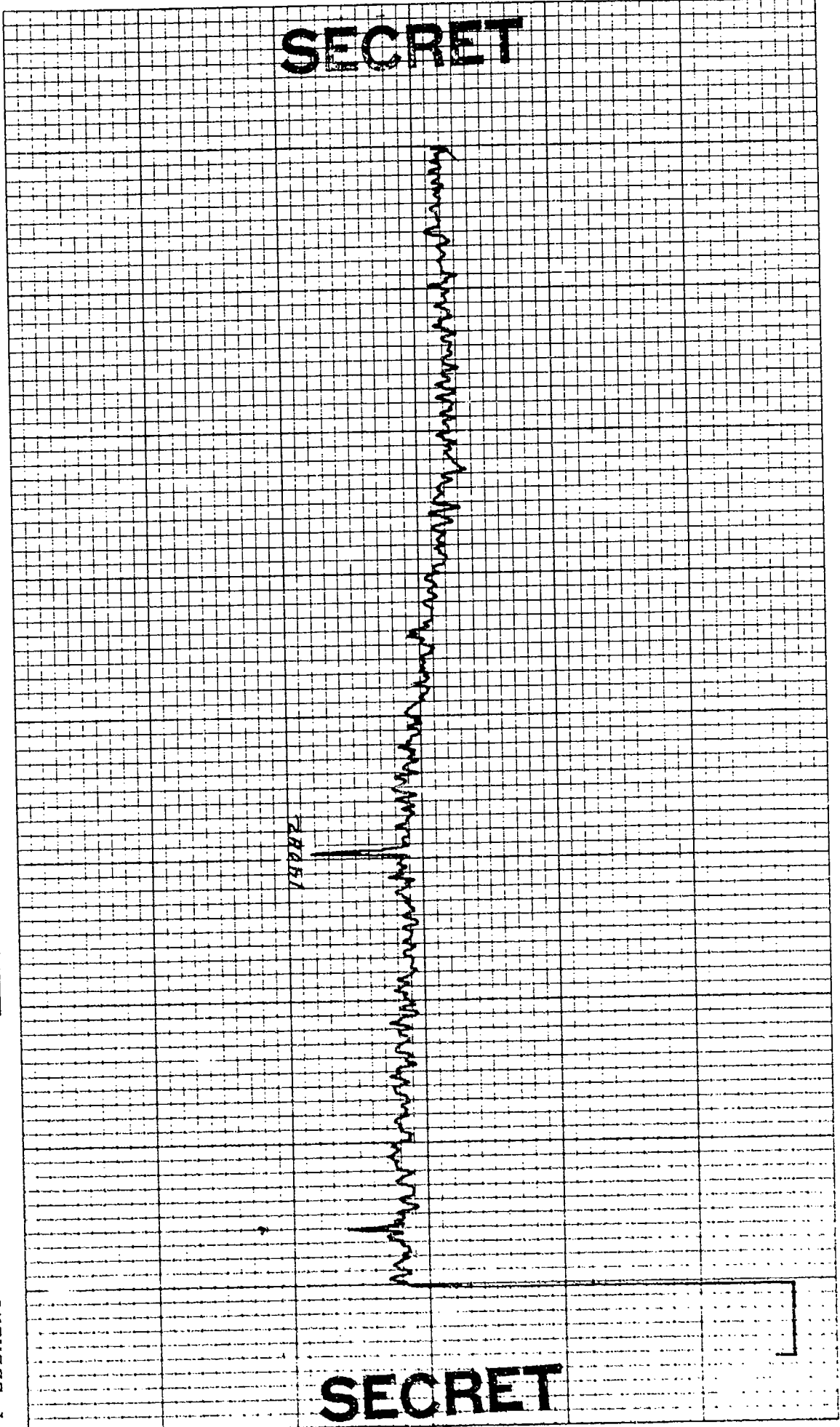
REEL: F14 INDEX 3575

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 0934Z  
ANALYSIS BANDWIDTH: 1/10HZ  
       DEG AZ STEERING

INTEGRATION TIME 320 SECS ATTN: DB  
FILTER WTG: HANNING

CONTROL: 27-0934 (32)  
OMNI SPECTRUM (ELEMENT 12)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
1 ELEMENT



CONTROL: 2-7 -0924(JJ)

DATE OF ANALYSIS:

REEL: F14

INDEX 3575

OMNI SPECTRUM(ELEMENT 14)

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

DATE/TIME: 2-7-77 -0934Z

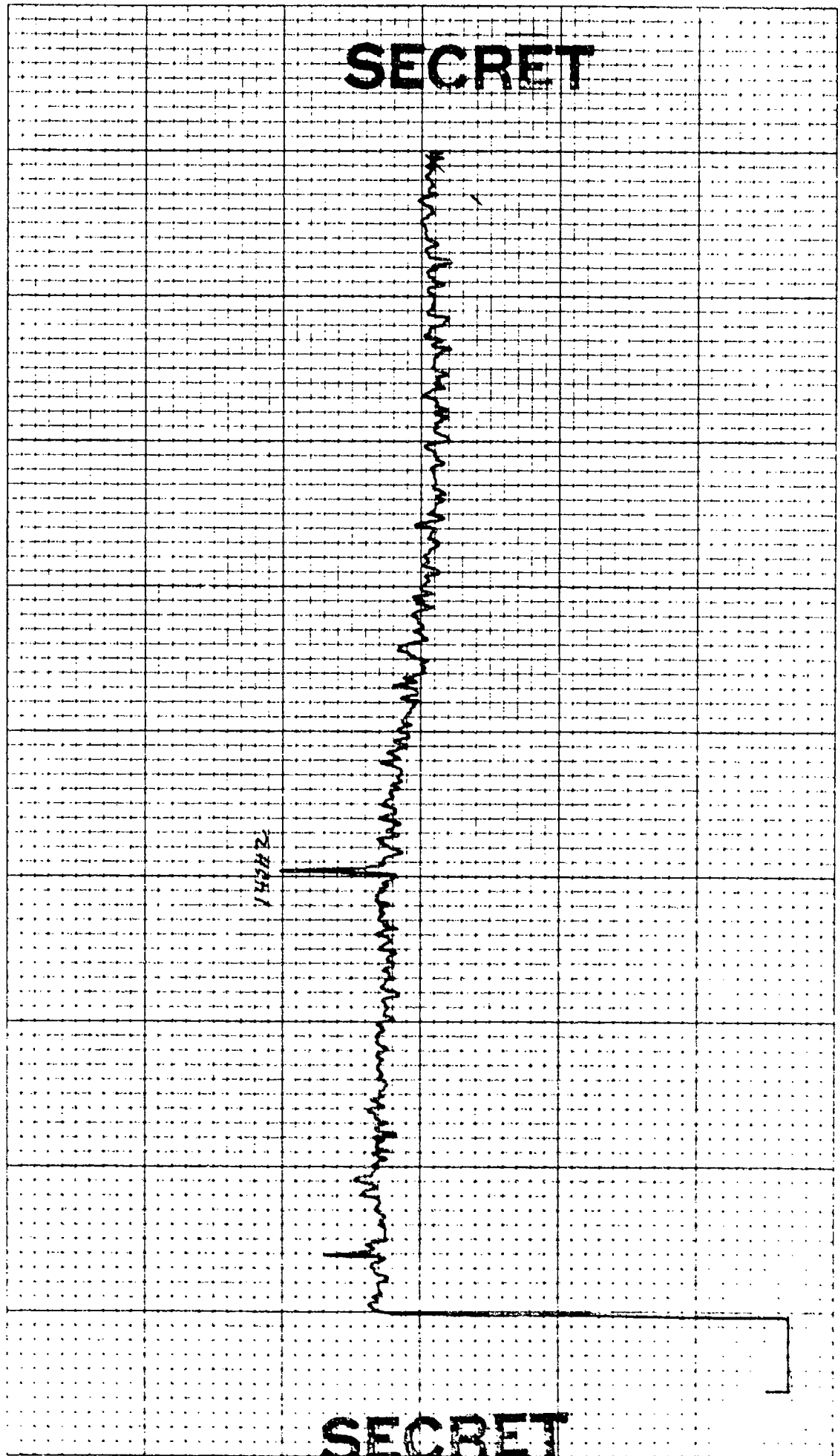
ANALYSIS BANDWIDTH: 1/10HZ

INTEGRATION TIME 320 SECS

FILTER

ATTEN: DB

WTG: HANNING



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INDEX 3575

REEL: F14

DATE OF ANALYSIS:

CONTROL: 2-7 -0934 (34)  
OMNI SPECTRUM (ELEMENT 16)

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

1 ELEMENT

DATE/TIME: 2-7-77 -0934Z

ANALYSIS BANDWIDTH: 1/10HZ

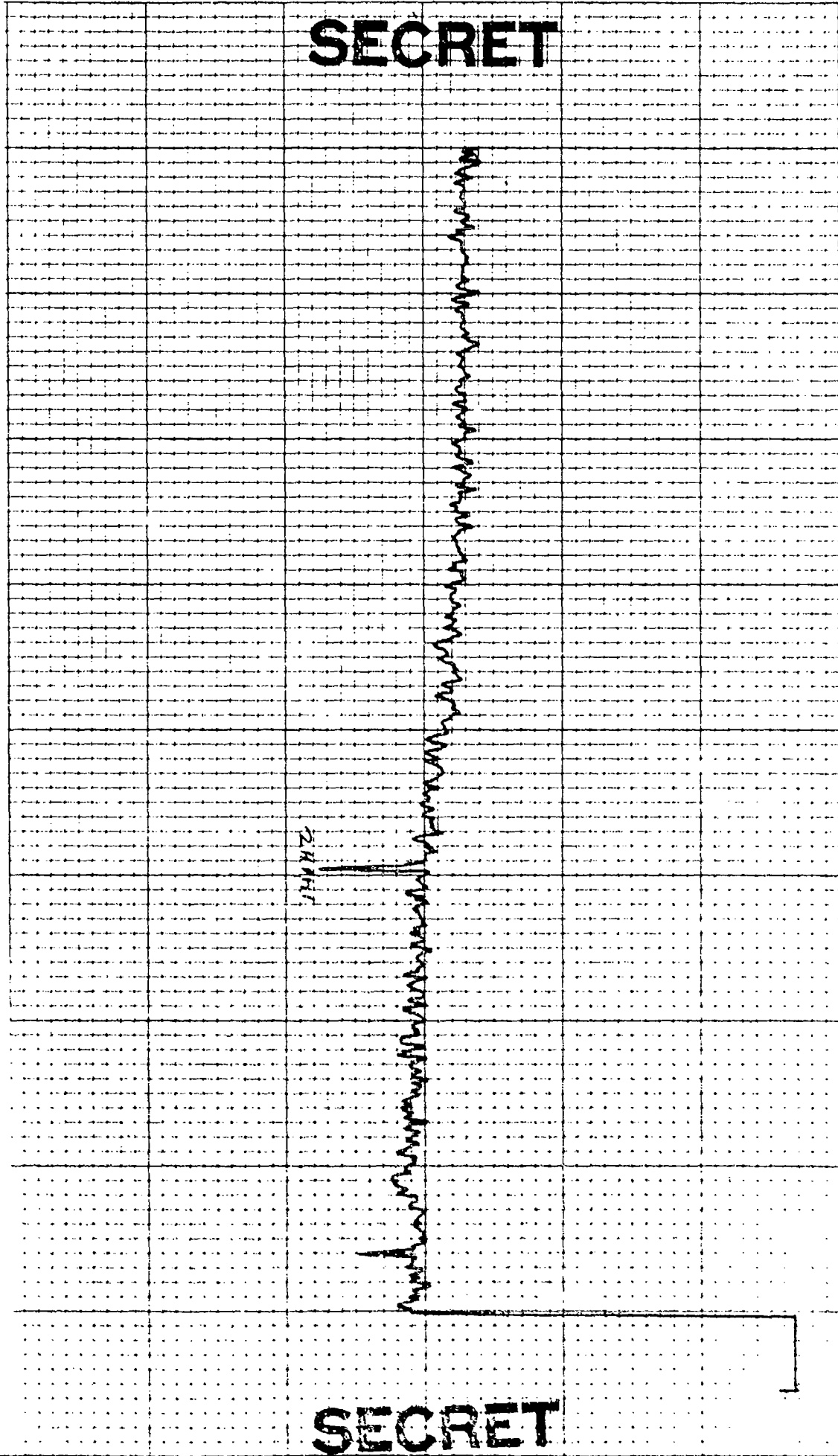
         DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

ATTEN: - DB

WTC: HANNING



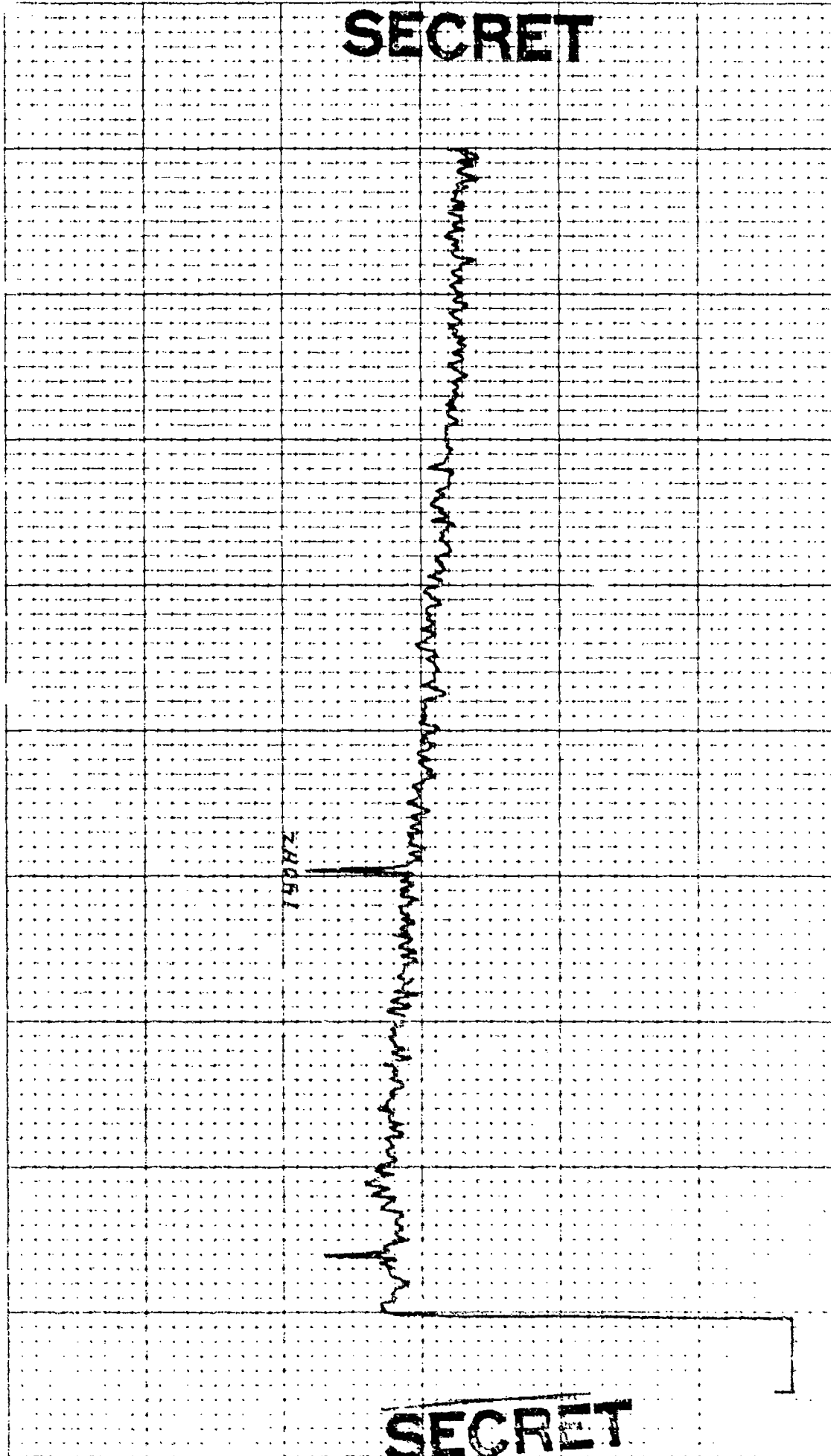
REEL: F14 INDEX J575

DATE OF ANALYSIS:

CONTROL: 2-7 -0934 (J5)  
OMNI SPECTRUM (ELEMENT 19)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
1 ELEMENT

DATE/TIME: 2-7-77 - 0934 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
— DEC AZ STEERING

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



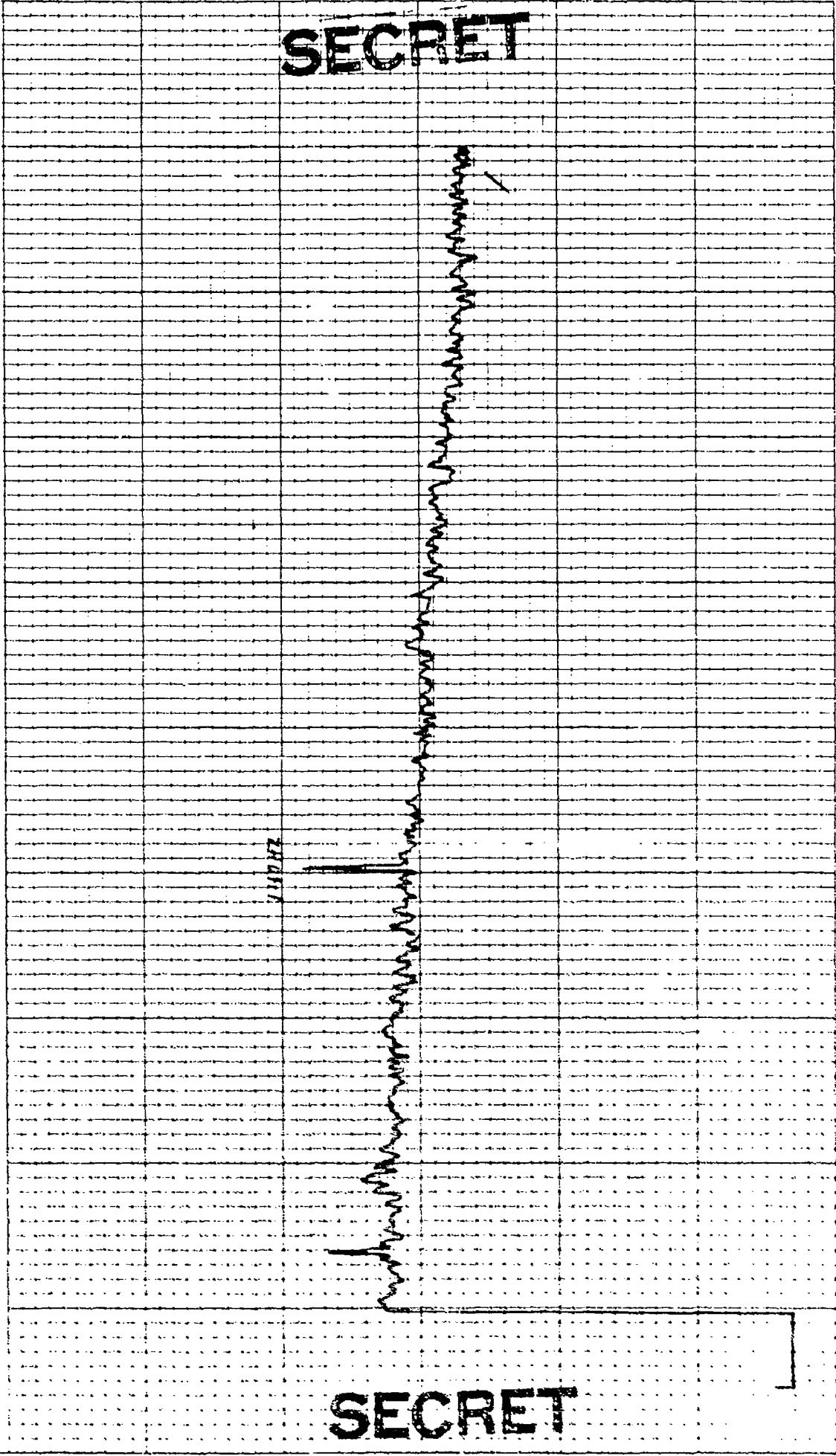
REEL: F74 INDEX 3575

DATE OF ANALYSIS:

CONTROL: 2-7 - 0934 (36)  
OMNI SPECTRUM (ELEMENT 20)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
1 ELEMENT

DATE/TIME: 2-7-77 - 0934 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
— DEG AZ STEERING

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



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REEL: F14 INDEX 3575

DATE OF ANALYSIS:

CONTROL: 2.7 - 0934 (77)

OMNI SPECTRUM (ELEMENT 21)

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

1 ELEMENT

DATE/TIME: 2-7-77 - 0934 Z

ANALYSIS BANDWIDTH: 1/10 HZ

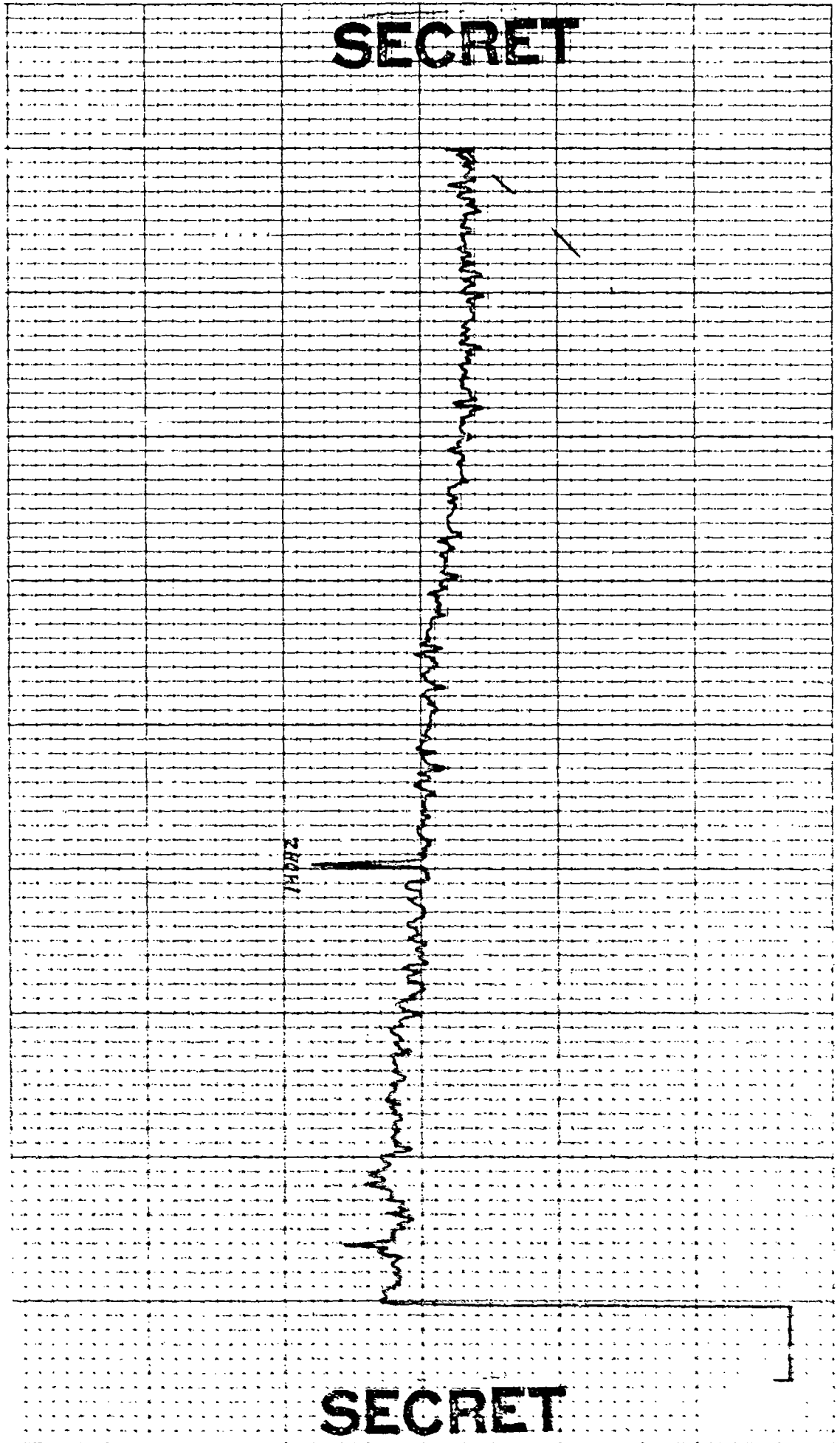
DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

ATTEN: DB

WTC: HANNING



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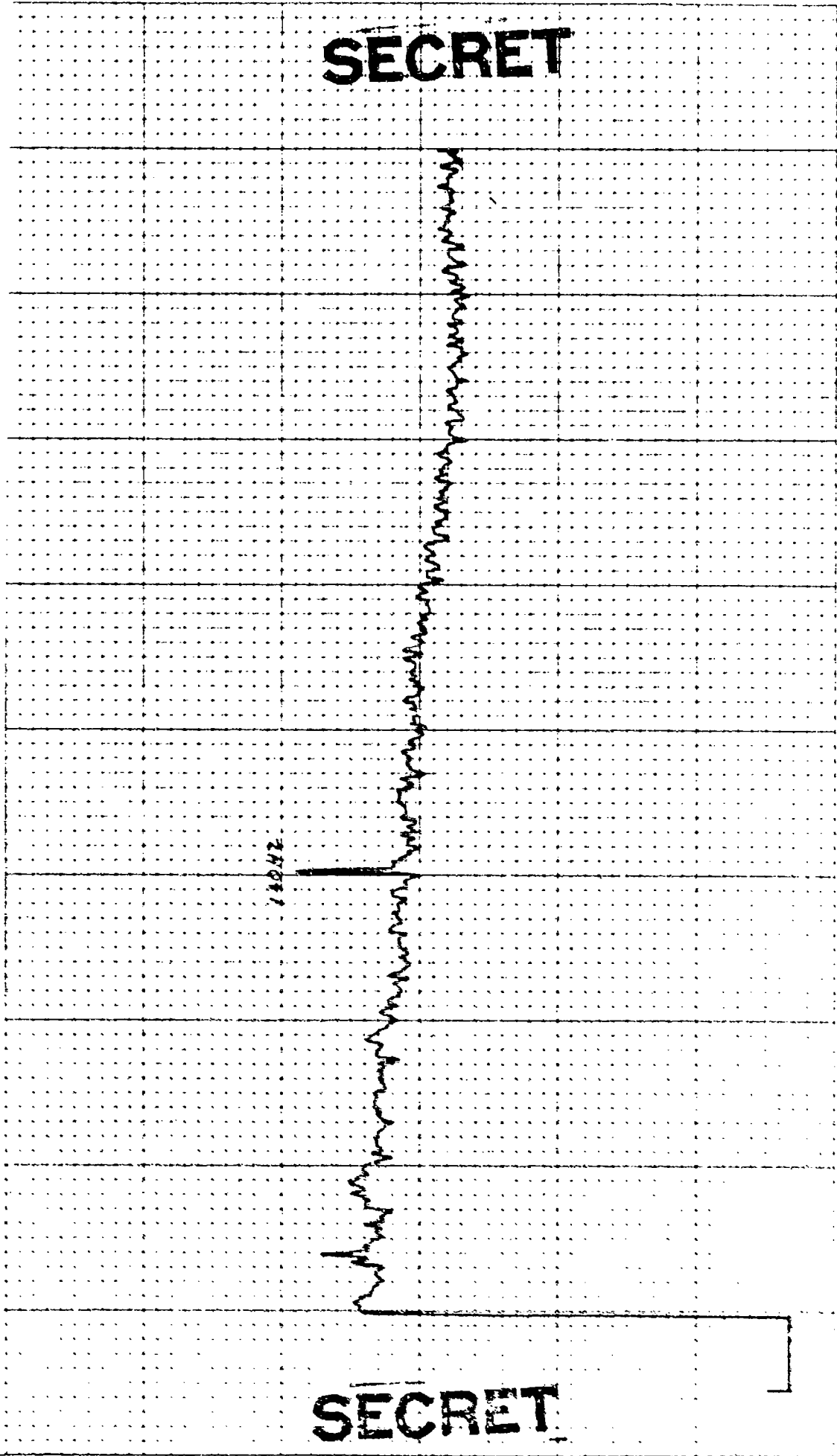
CONTROL: 27 - 0934 (78)  
OMNI SPECTRUM (ELEMENT 24)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 0934 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
DEC AZ STEERING

REEL: F14 INDEX 3575

INTEGRATION TIME 320 SECS  
FILTER WTC: HANNING  
ATTEN: DB





INDEX J575

REEL: F4

DATE OF ANALYSIS:

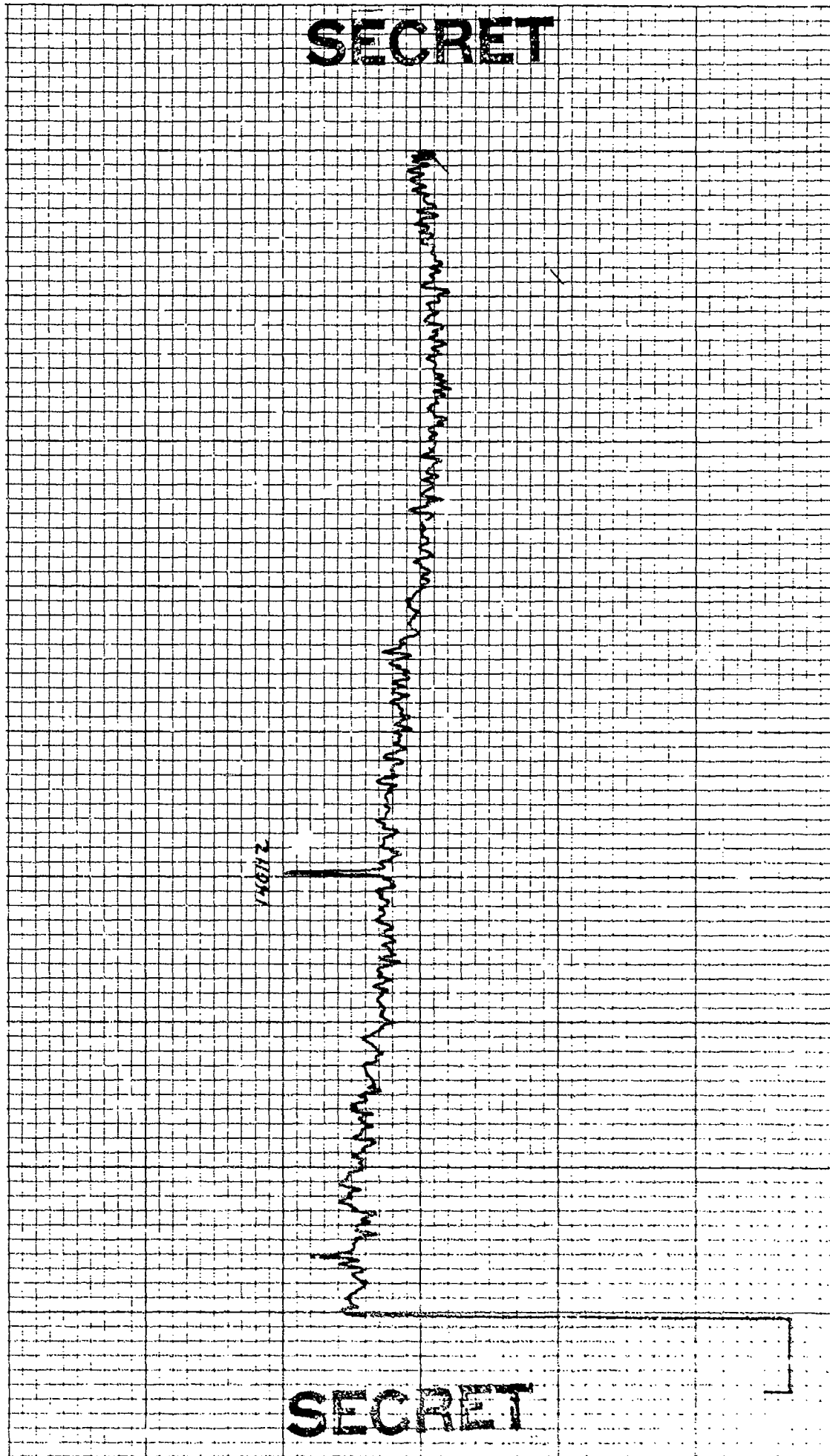
DATE/TIME: 2-7-77 - 0934 Z  
ANALYSIS BANDWIDTH: 1/10 HZ

ATTN: DB  
WTG: HANNING

INTEGRATION TIME 320 SECS  
FILTER

     DEG AZ STEERING

CONTROL: 2-7 -0934 (39)  
OMNI SPECTRUM (ELEMENT 26)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
1 ELEMENT



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REEL: F4 INDEX: 1575

DATE OF ANALYSIS:

CONTROL: 2-7 - (274 (46))

OMNI SPECTRUM (ELEMENT 29)

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

1 ELEMENT

DATE/TIME: 2-7-72 - 0934 Z

ANALYSIS BANDWIDTH: 1/10 HZ

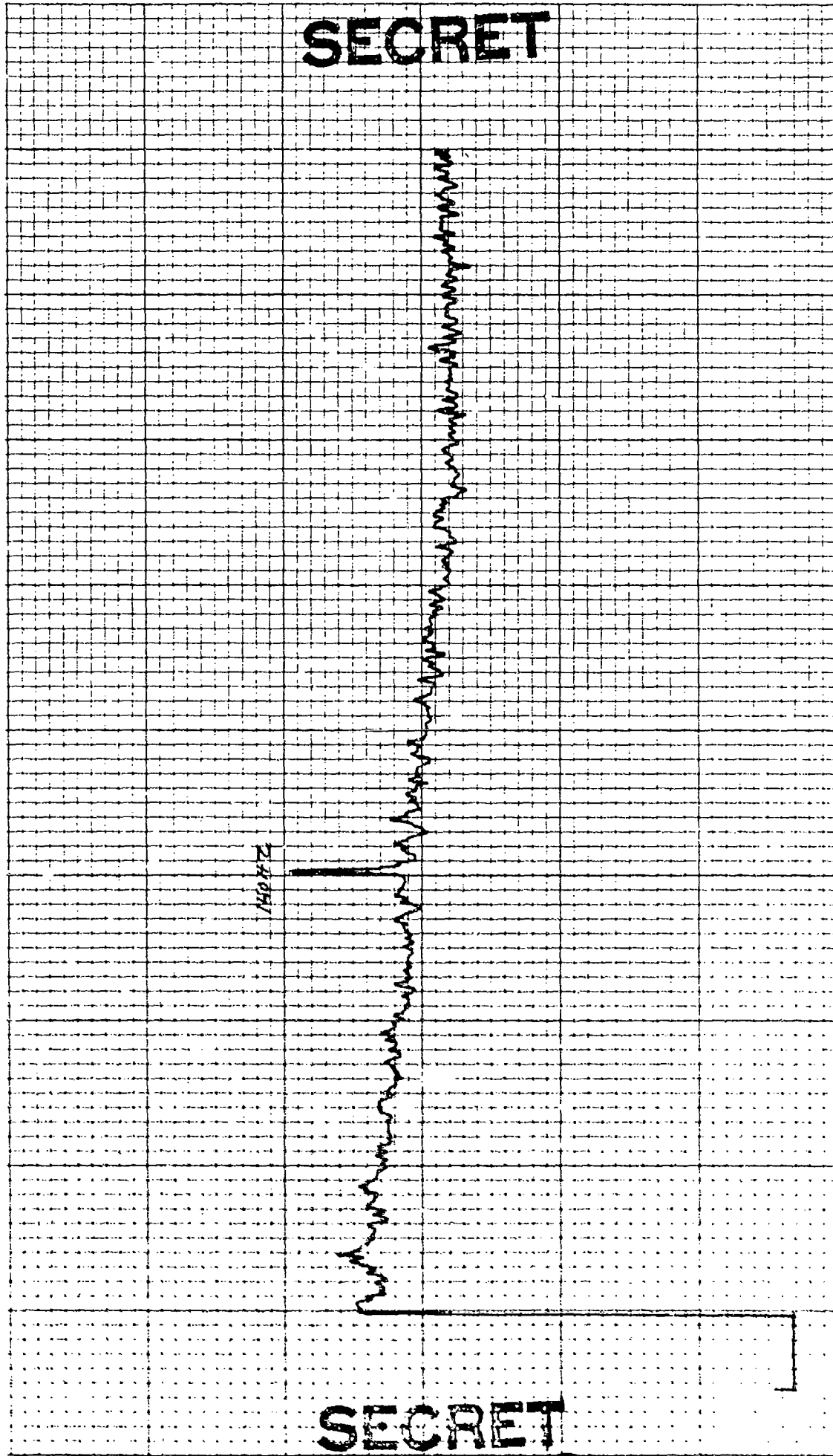
     DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

ATTEN: DB

WTC: HANNING



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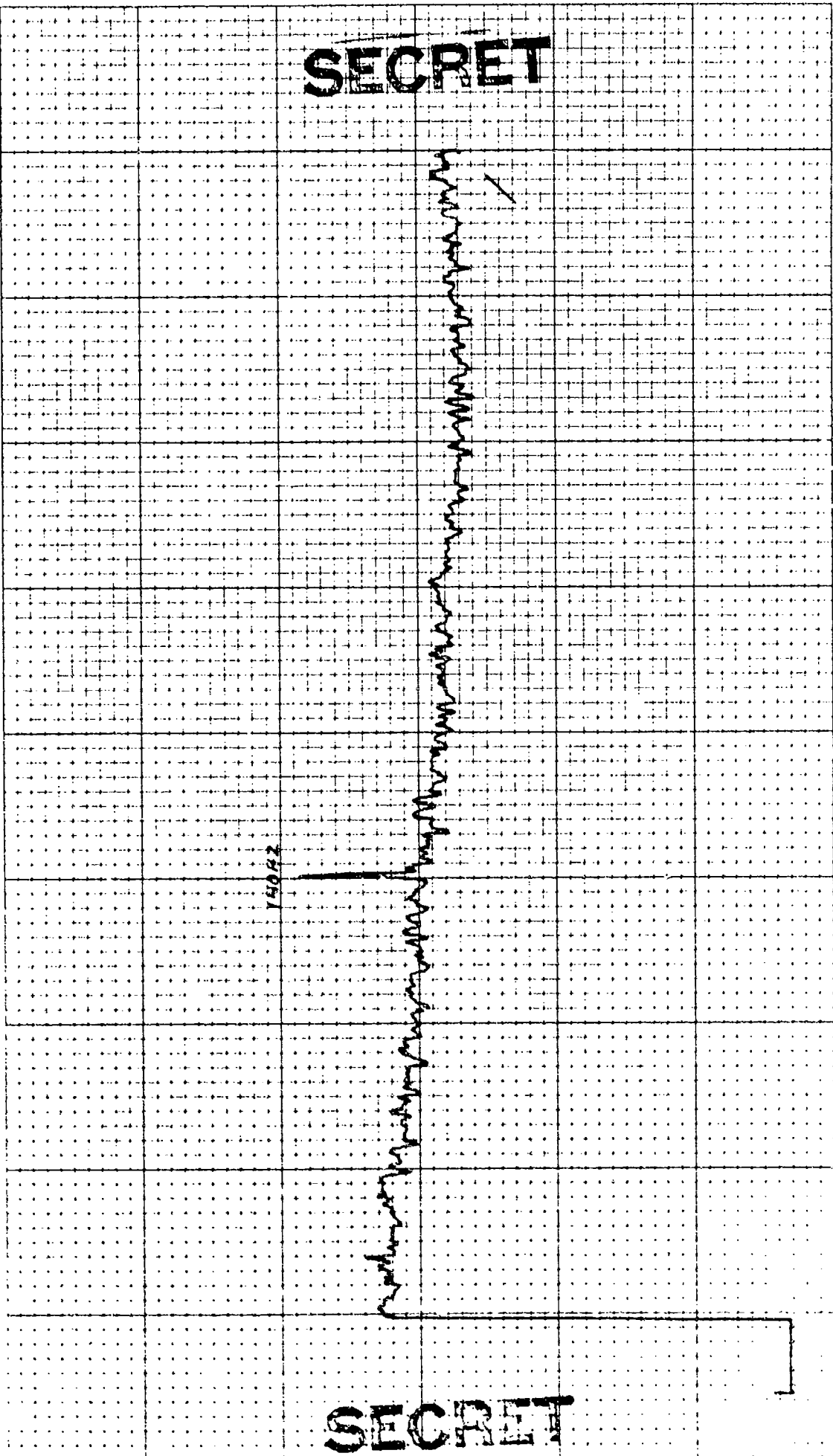
CONTROL: 2.7 -0934 (41)  
OMNI SPECTRUM (ELEMENT 31)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2.7.77 -0934 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
DEC AZ STEERING

REEL: F14 INDEX: 5575

INTEGRATION TIME 320 SECS  
ATTEN: DB  
FILTER WTC: HANNING



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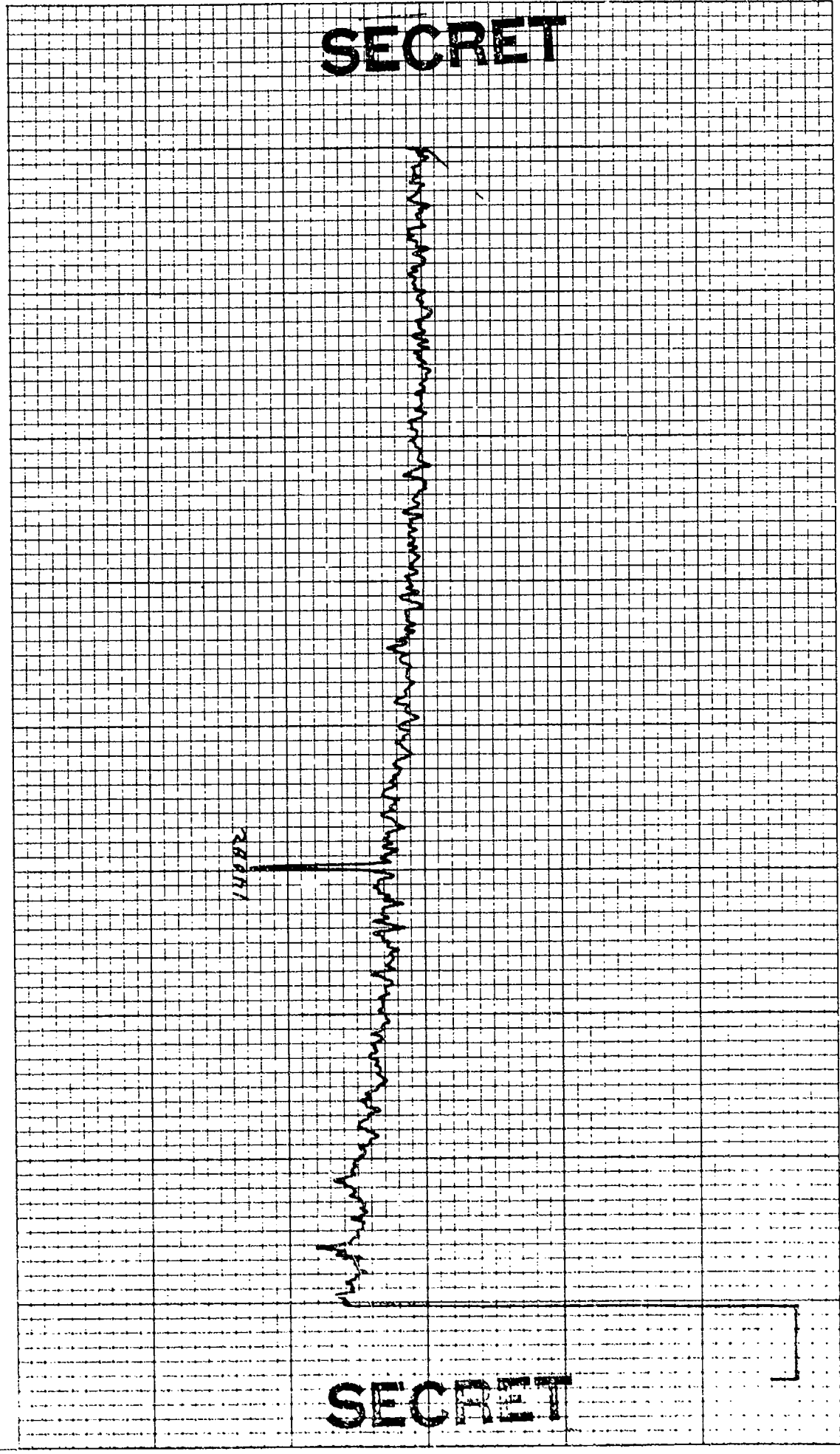
2848

REEL: F14 INDEX J575

CONTROL: 2-7 -0934 (42)  
 OMNI SPECTRUM (ELEMENT 33)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 150 HZ  
 1 ELEMENT

DATE OF ANALYSIS:  
 DATE/TIME: 2-7-77 -0934 Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 — DEC AZ STEERING

INTEGRATION TIME 320 SECS ATEN: DB  
 FILTER WTG: HANNING



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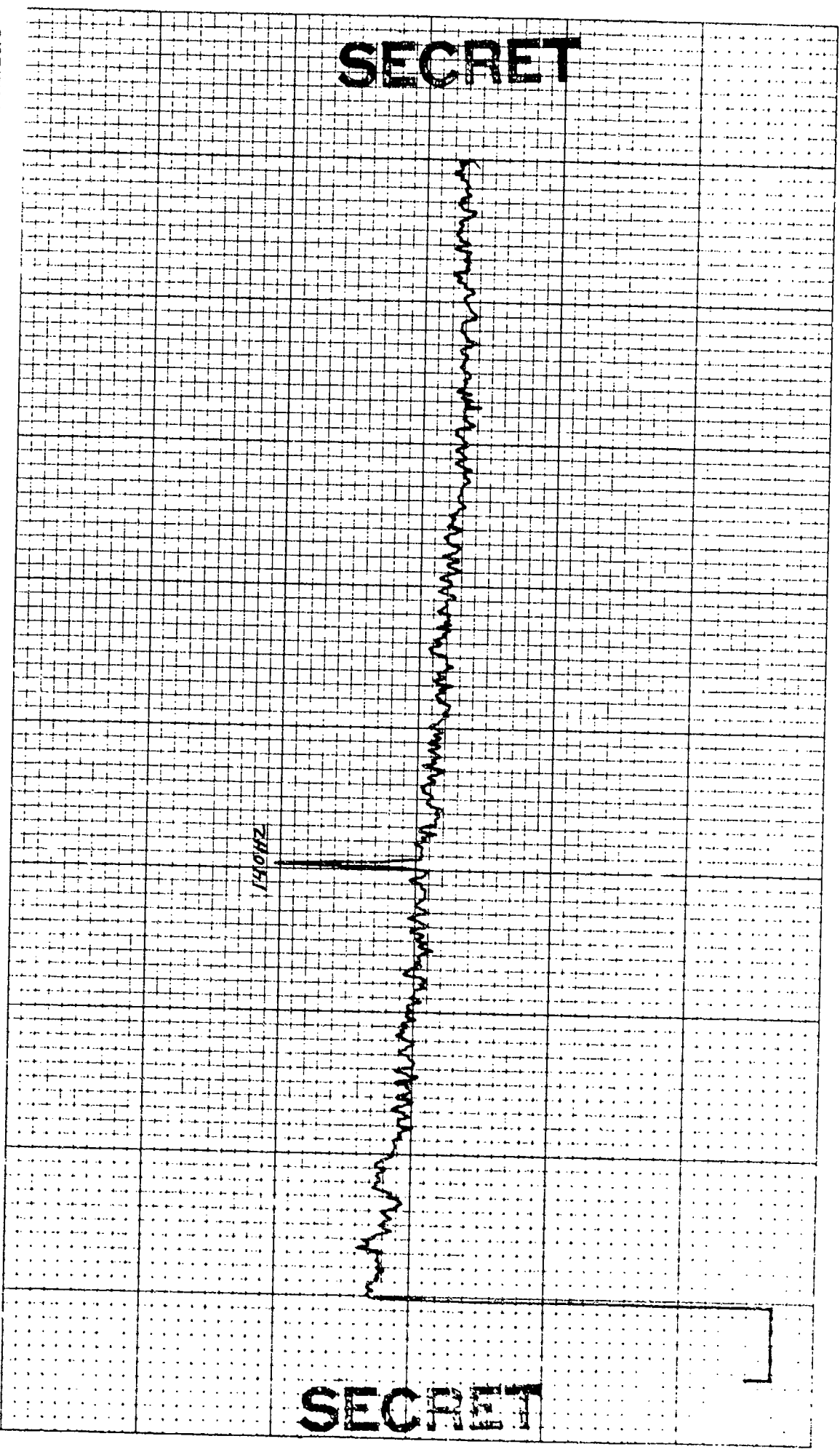
REEL: F14 INDEX 3575

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -0934Z  
ANALYSIS BANDWIDTH: 1/10HZ  
— DEG AZ STEERING

INTEGRATION TIME 320 SECS ATTN: DB  
FILTER WTG: HANNING

CONTROL: 2-7 -0934 (43)  
OMNI SPECTRUM(ELEMENT 35)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
1 ELEMENT

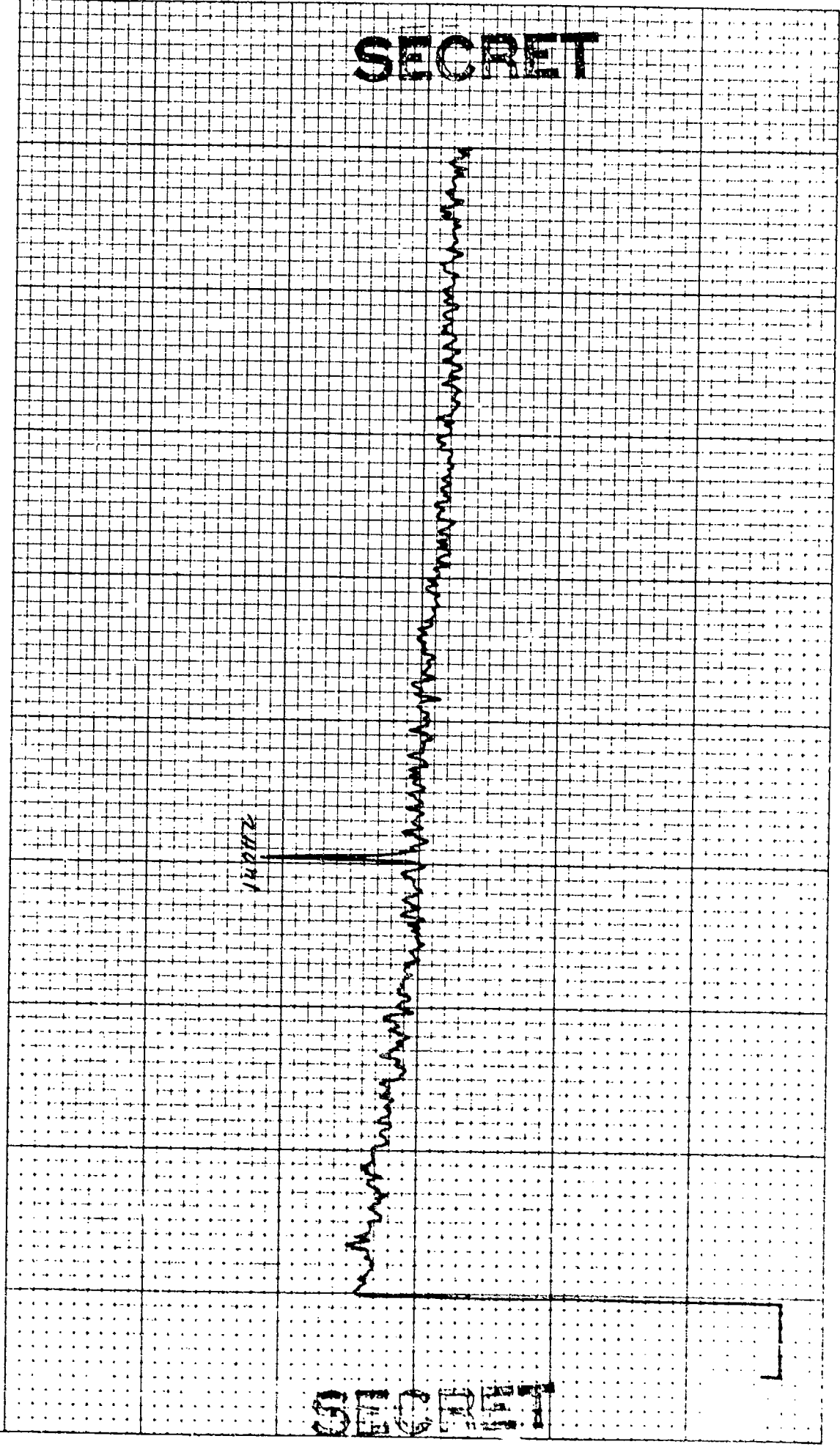


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CONTROL: 2-7 - 0434 (44)      DATE OF ANALYSIS:      REEL: F14      INDEX 3575  
 OMNI SPECTRUM (ELEMENT 37)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 150 HZ  
 1 ELEMENT

DATE/TIME: 2-7-77 - 0934 Z      INTEGRATION TIME 320 SECS      ATTN: - DB  
 ANALYSIS BANDWIDTH: 1/10 HZ      FILTER      WTG: HANNING  
   DEG AZ STEERING



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REEL: F14 INDEX 7575

DATE OF ANALYSIS:

CONTROL: 2.7 - 0934 (45)

OMNI SPECTRUM (ELEMENT 39)

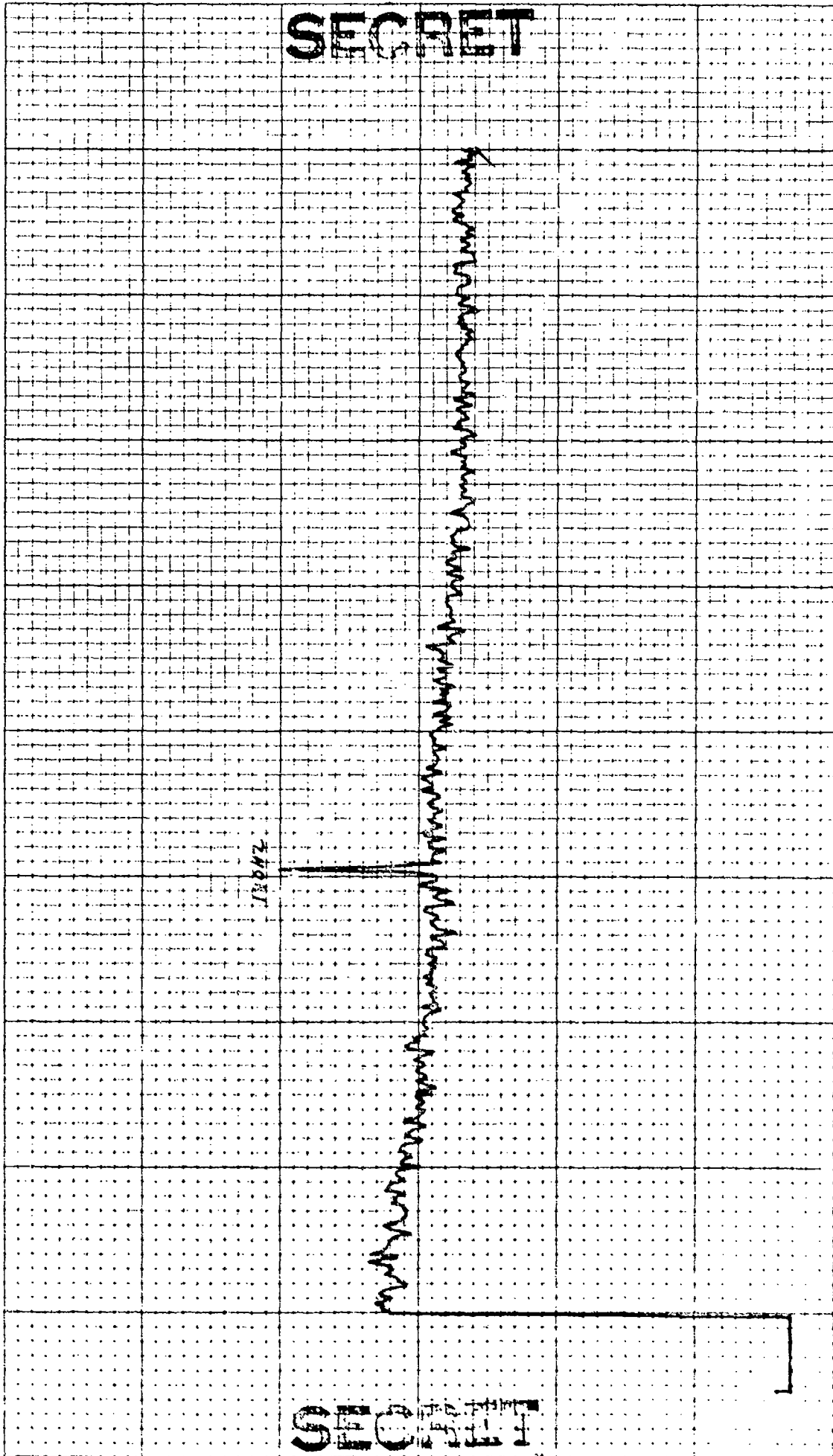
DATE/TIME: 2-7-77 - 0934 Z

INTEGRATION TIME 320 SECS ATTN: DB

ANALYSIS BANDWIDTH: 1/10HZ

FILTER WTC WTG: HANNING

    DEG AZ STEERING



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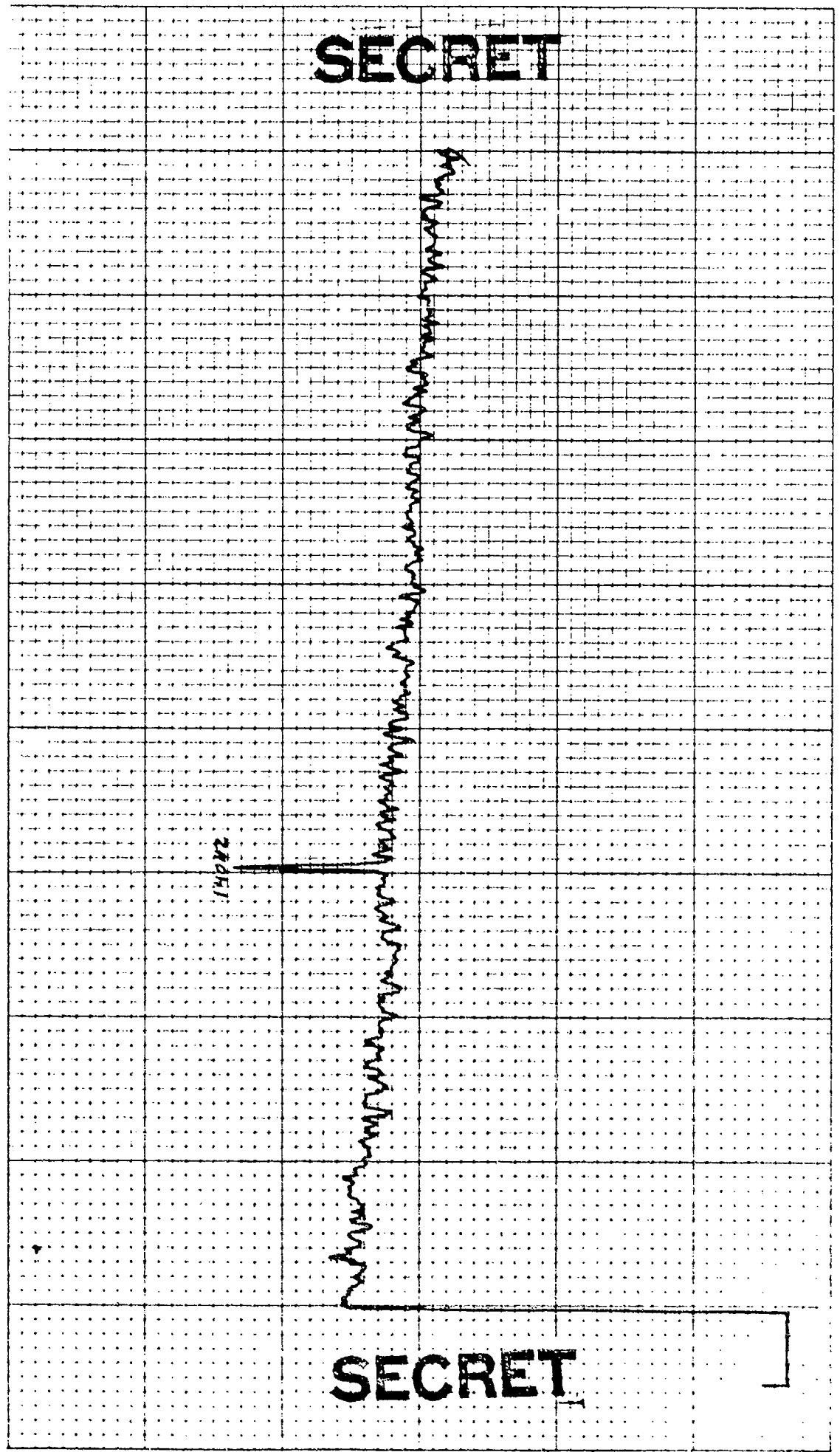
CONTROL: 2-7 - 0934 (46)  
 OMNI SPECTRUM (ELEMENT 41)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 150 HZ  
 1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 0934Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 — DEG AZ STEERING

REEL: F14 INDEX: 3525

INTEGRATION TIME 320 SECS ATTN: DB  
 FILTER WTC: HANNING



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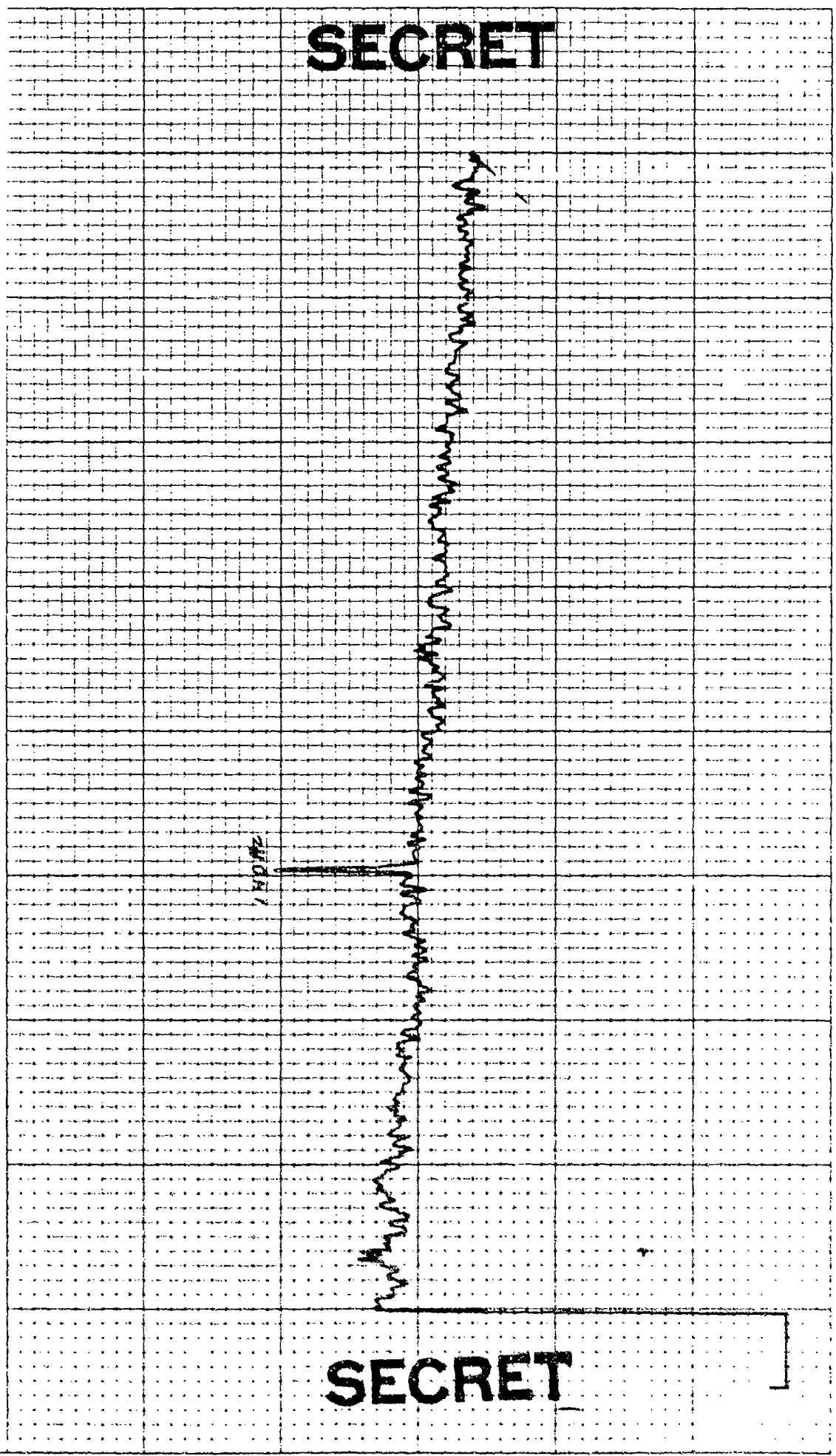
CONTROL: 2.7 -0934 (47)  
OMNI SPECTRUM(ELEMENT 43)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2.7-77 -0934 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
DEG AZ STEERING

REEL: F14 INDEX 3575

INTEGRATION TIME 320 SECS  
FILTER  
ATTEN: DB  
WTG: HANNING



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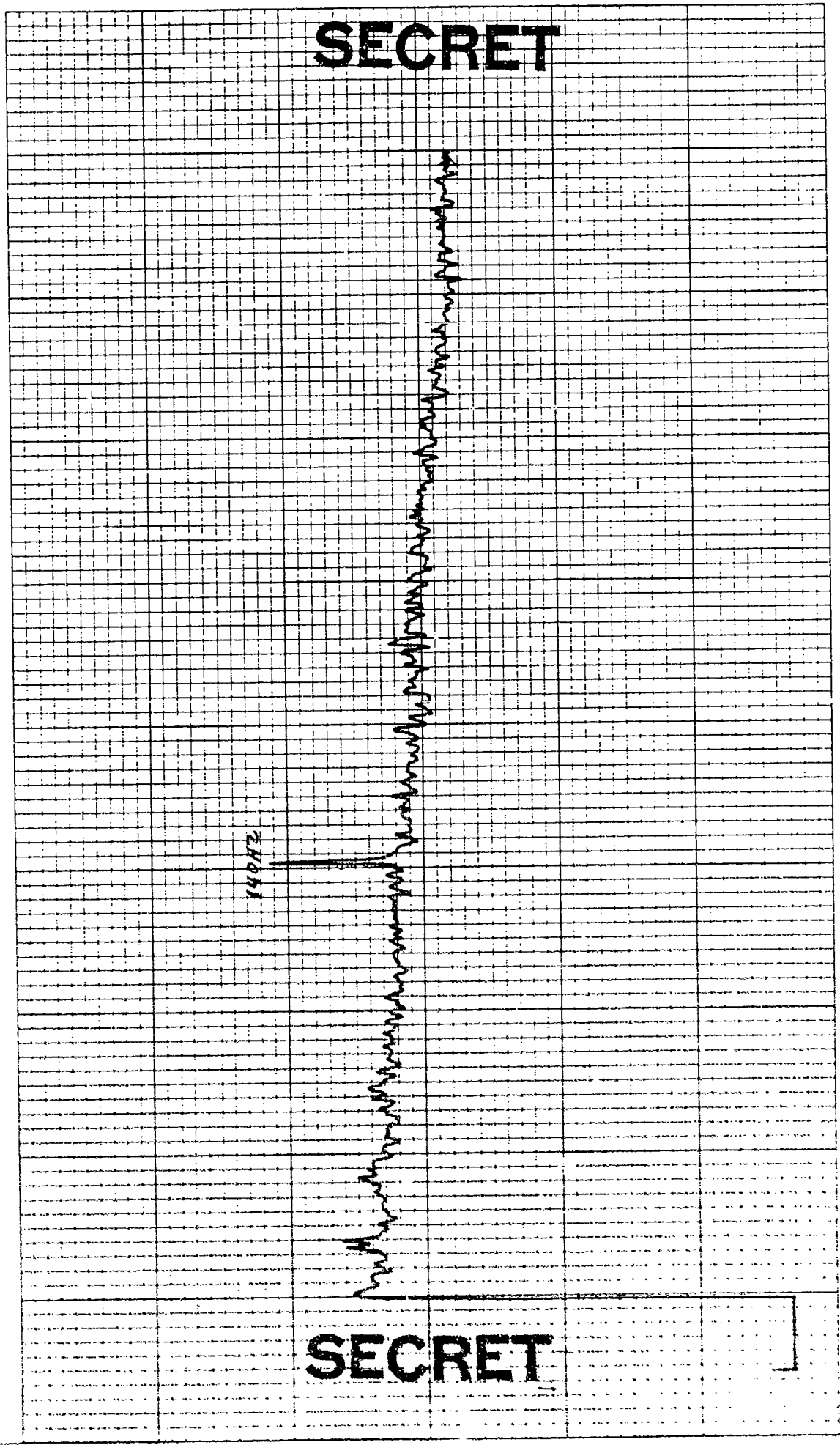
REEL: F14 INDEX 353

DATE OF ANALYSIS:

CONTROL: 27-0934 (40)  
OMNI SPECTRUM (ELEMENT 45)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
1 ELEMENT

DATE/TIME: 2-7-77 -0934 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
    DEG AZ STEERING

INTEGRATION TIME 320 SECS ATTN: DB  
FILTER WTG: HANNING



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INDEX: 1575

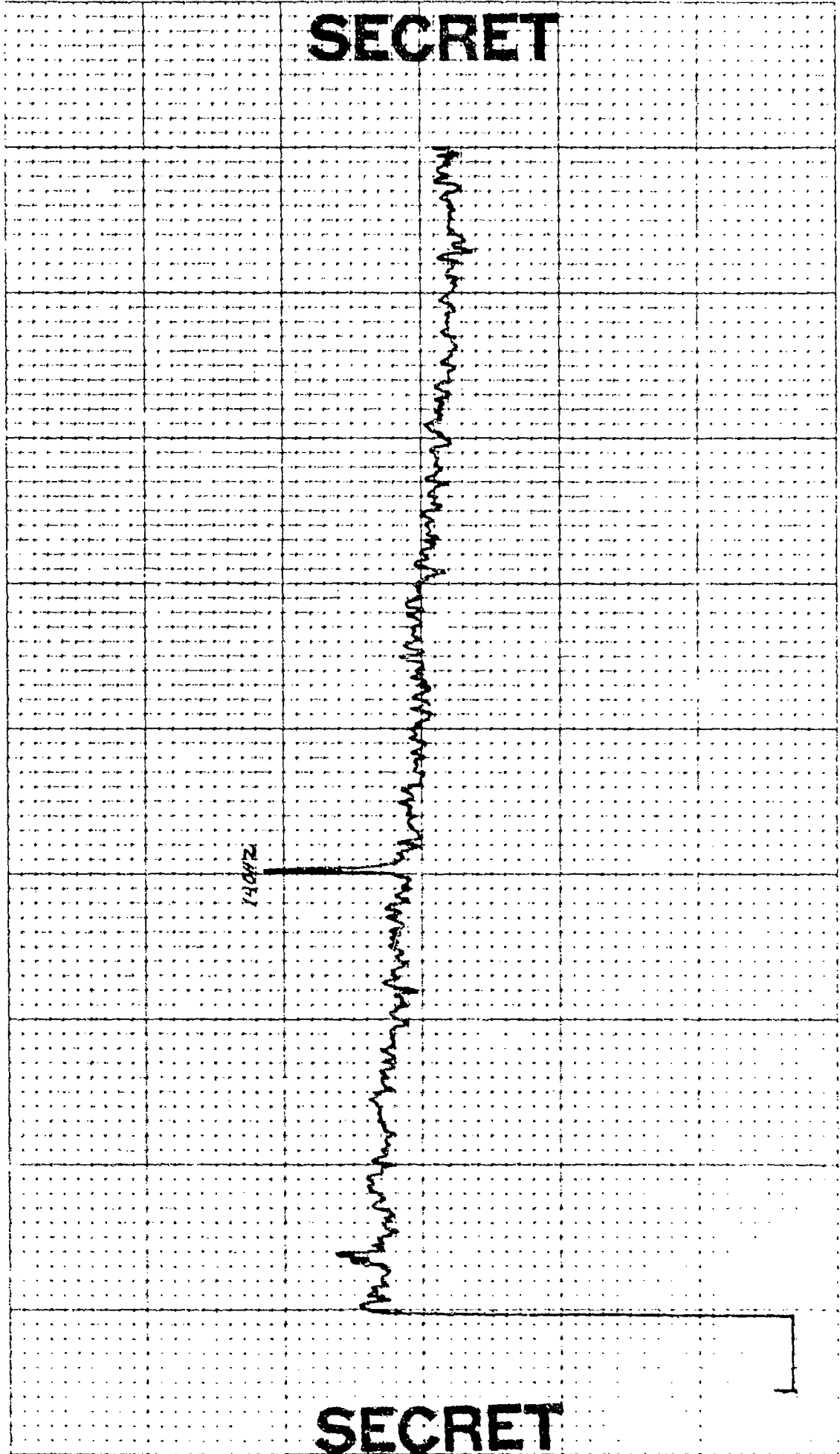
CONTROL: 2-7 -0934 (49)  
OMNI SPECTRUM (ELEMENT 47)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -0934 Z

ANALYSIS BANDWIDTH: 1/10HZ  
DEC AZ STEERING

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



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REEL: F14 INDEX 3575

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 0924Z

CONTROL: 2-7 -0914 (50)  
OMNI SPECTRUM (ELEMENT 49)

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

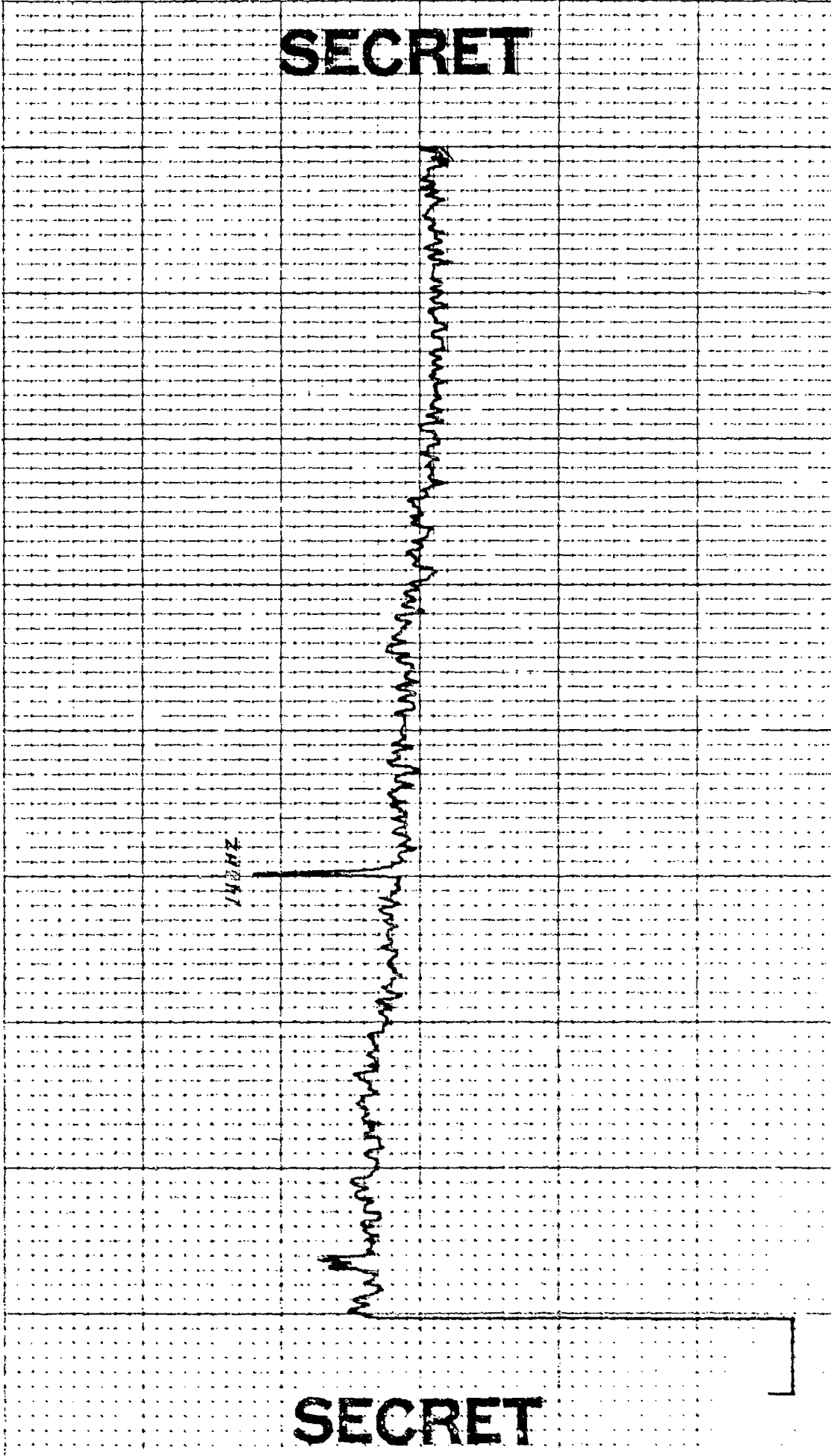
1 ELEMENT

ANALYSIS BANDWIDTH: 1/10 HZ

    DEG AZ STEERING

INTEGRATION TIME 320 SECS

ATTEN:     DB  
FILTER WTG: HANNING



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TIME:

FREQ:

UNIT:

INDEX 3575

REEL: F74

DATE OF ANALYSIS:

CONTROL: 2-7 - 0134 (51)

OMNI SPECTRUM (ELEMENT 51)

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

1 ELEMENT

DATE/TIME: 2-7-17 - 0934 Z

ANALYSIS BANDWIDTH: 1/10HZ

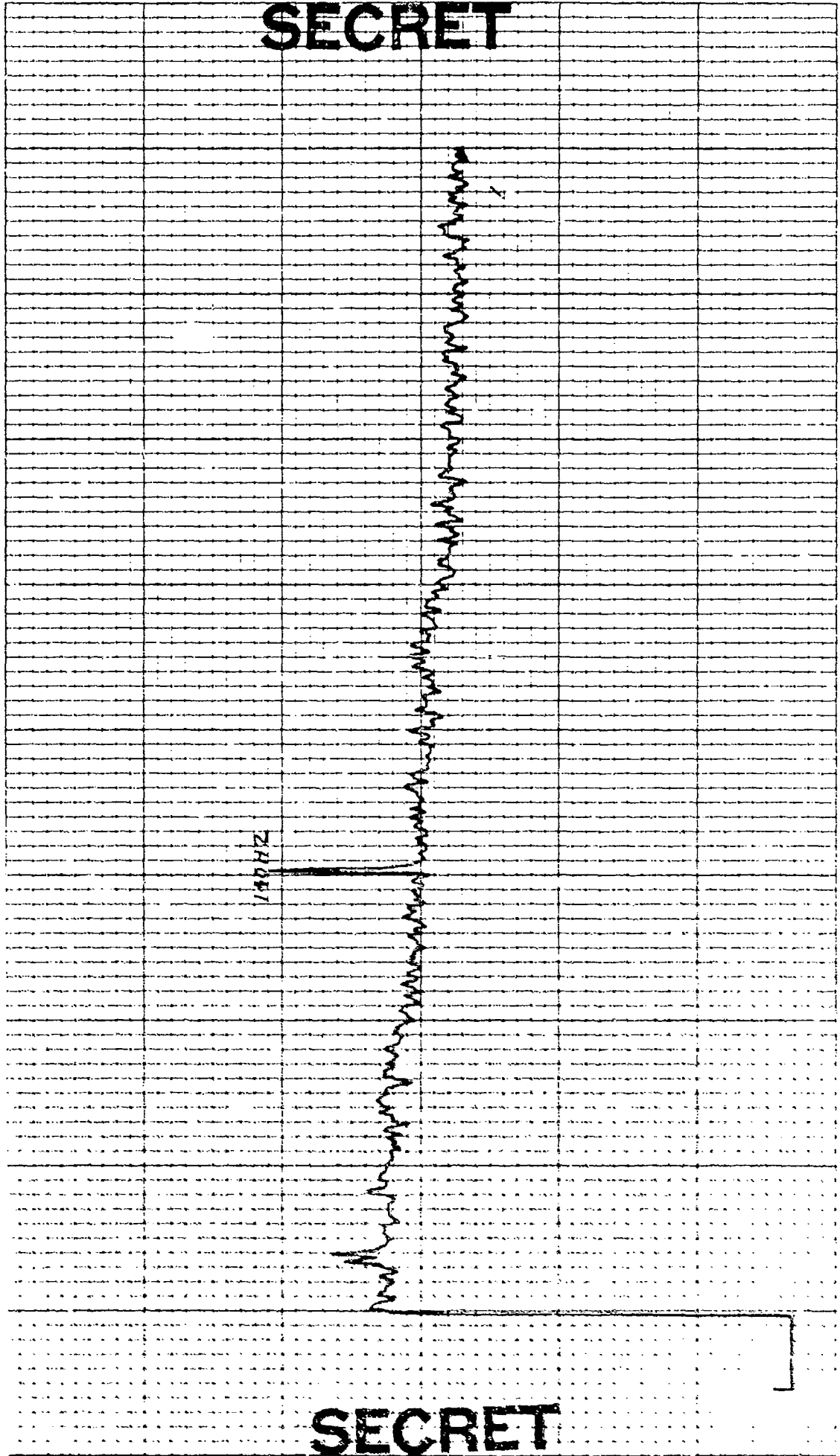
DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

ATTEN: DB

WTC: HANNING



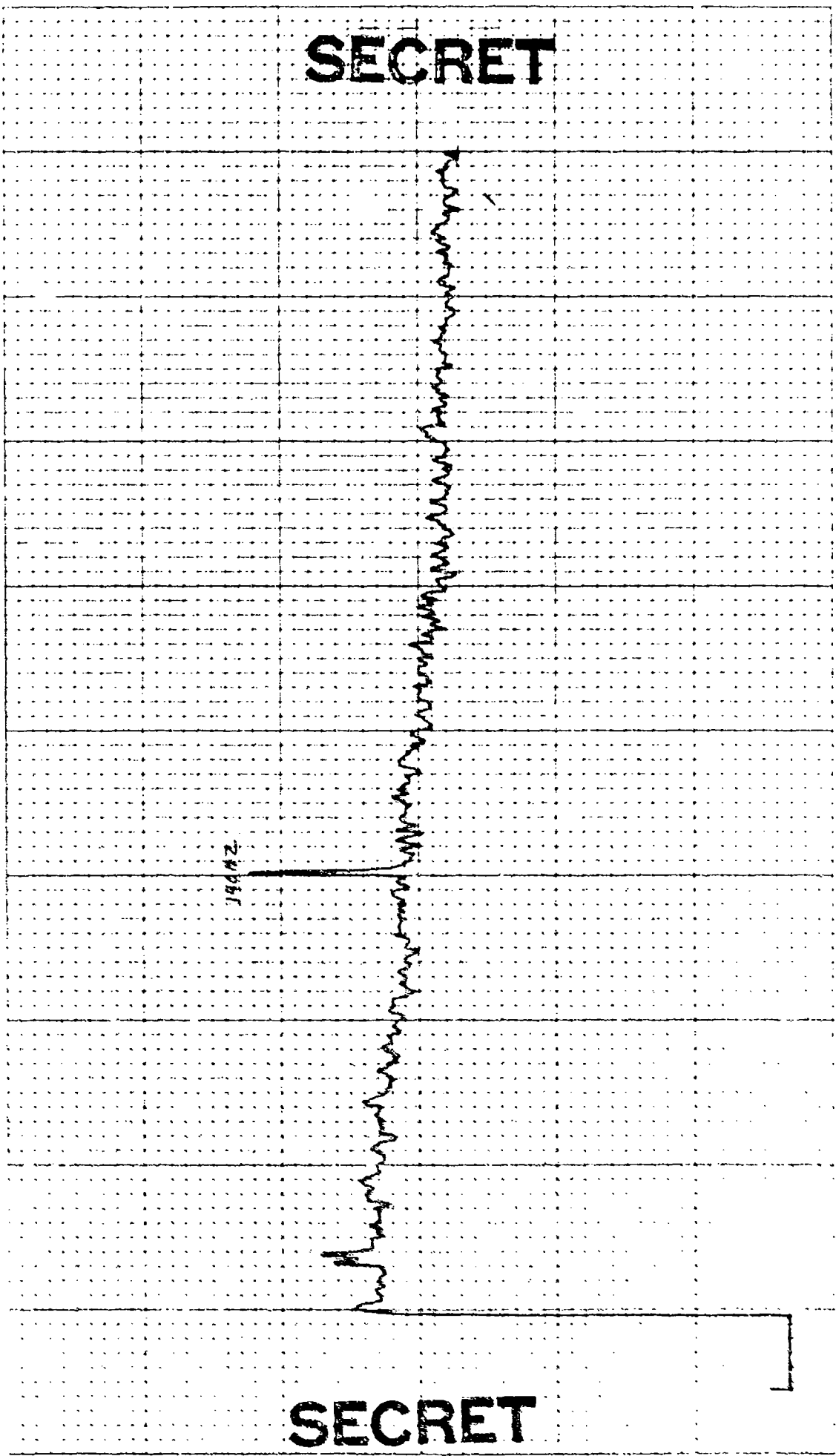
REEL: F19 INDEX JS75

DATE OF ANALYSIS:

DATE/TIME: 2.7.77 - 0934 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
DEG AZ STEERING

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

CONTROL: 2.7 - 044 (52)  
OMNI SPECTRUM (ELEMENT 53)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
1 ELEMENT



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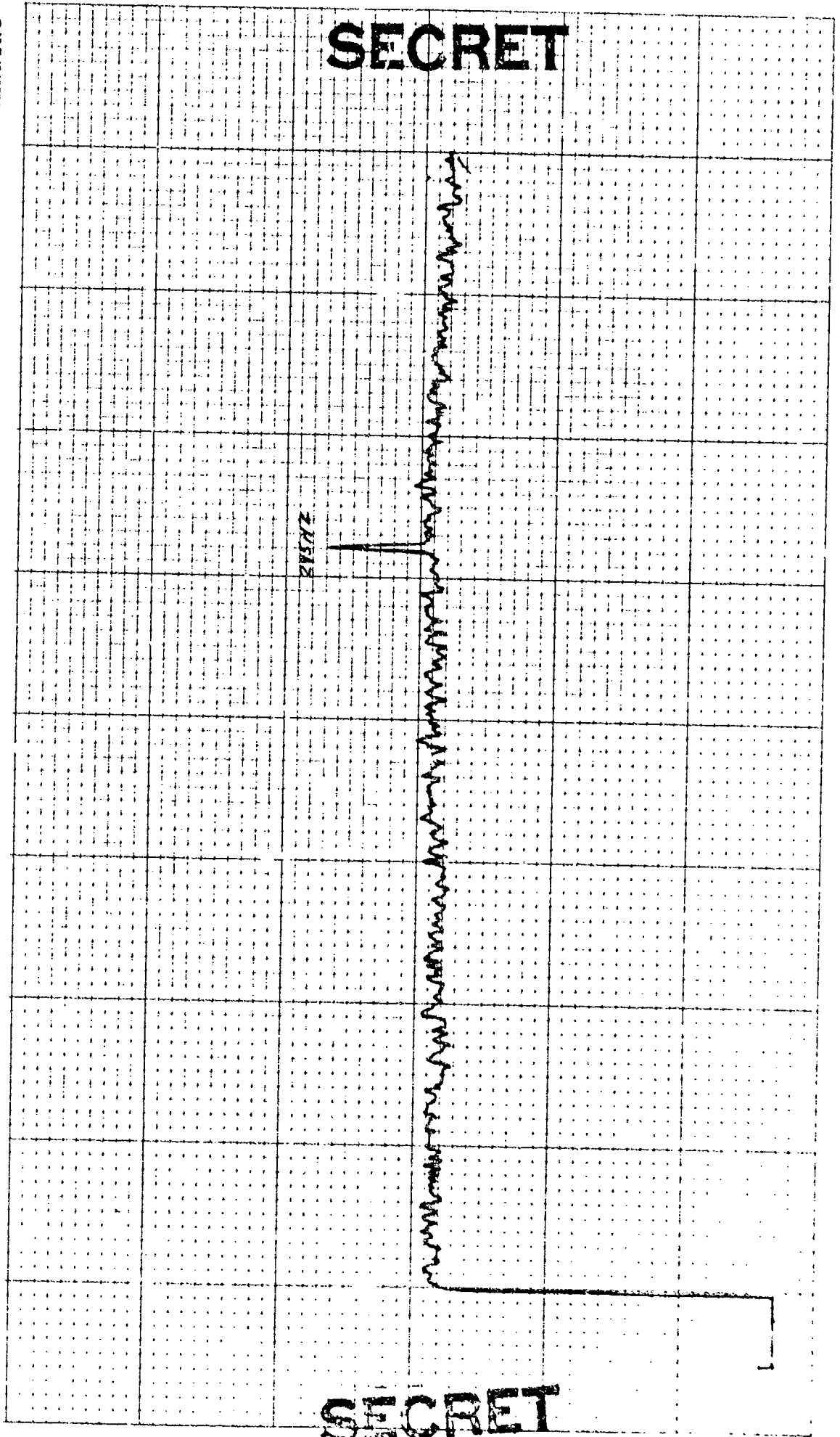
CONTROL: 2-7 - 0934 ( 1 )  
OMNI SPECTRUM (ELEMENT 2 )  
EXERCISE: BEAKING STAKE  
CENTER FREQ: 200 HZ  
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 0934 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
\_\_\_\_\_ DEG AZ STEERING

REEL: F14 INDEX 3575

INTEGRATION TIME 320 SECS ATTN: DB  
FILTER WTG: HANNING



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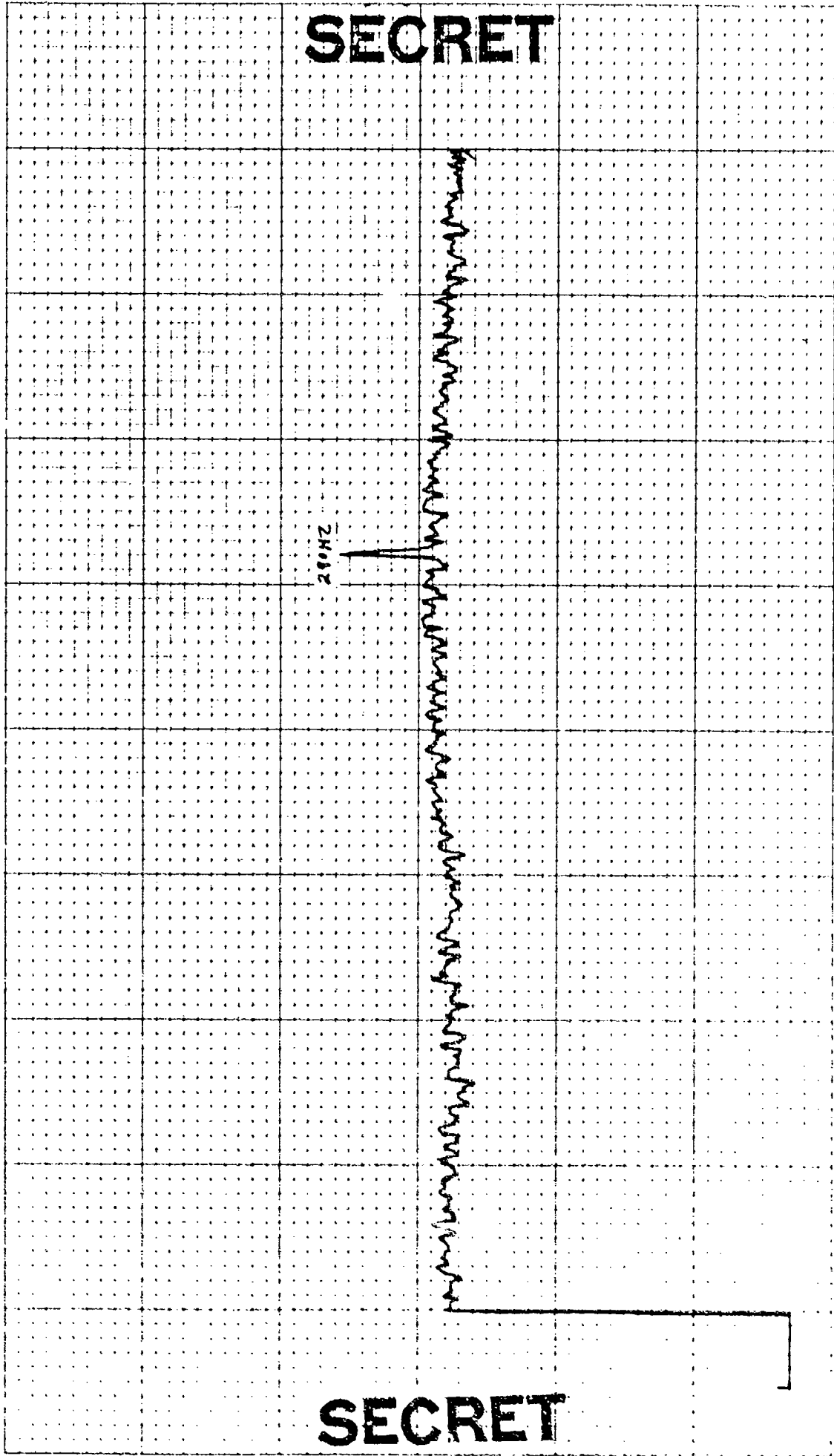
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CONTROL: 2-7-0974 (2)      DATE OF ANALYSIS:      REEL: F14      INDEX: J575  
 OMNI SPECTRUM (ELEMENT 4)      DATE/TIME: 2-7-77 - 0834 Z      INTEGRATION TIME 320 SECS      ATTN: DB  
 EXERCISE: BEARING STAKE      ANALYSIS BANDWIDTH: 1/10HZ      FILTER      WTC: HANNING  
 CENTREP FREQ: 290 HZ      \_\_\_\_\_ DEG AZ STEERING



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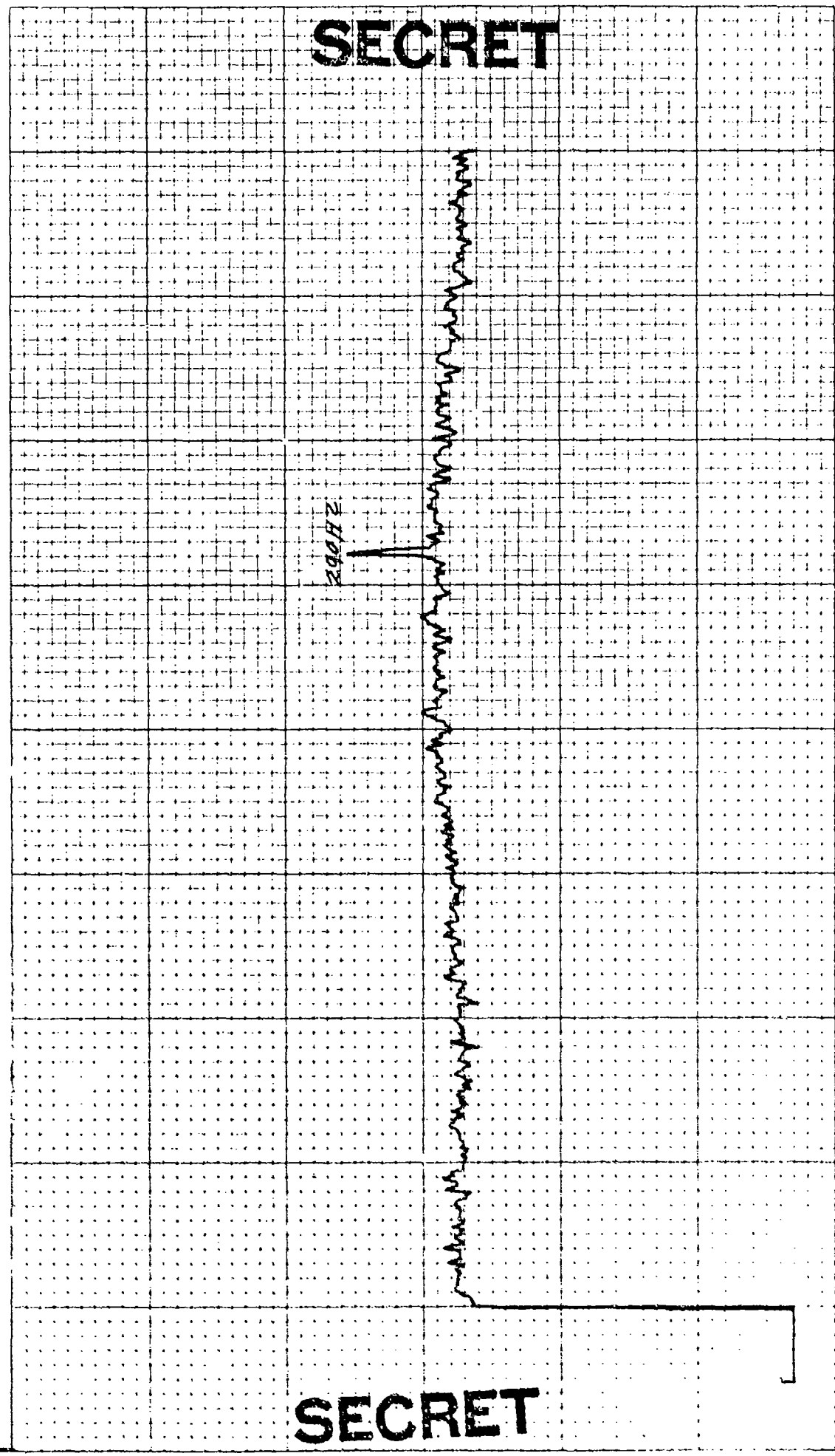
REEL: F14 INDEX 3575

DATE OF ANALYSIS:

CONTROL: 2-7-0924(3)  
OMNI SPECTRUM(ELEMENT 6)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 260 HZ  
1 ELEMENT

DATE/TIME: 2-7-77-0924Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
DEG AZ STEERING

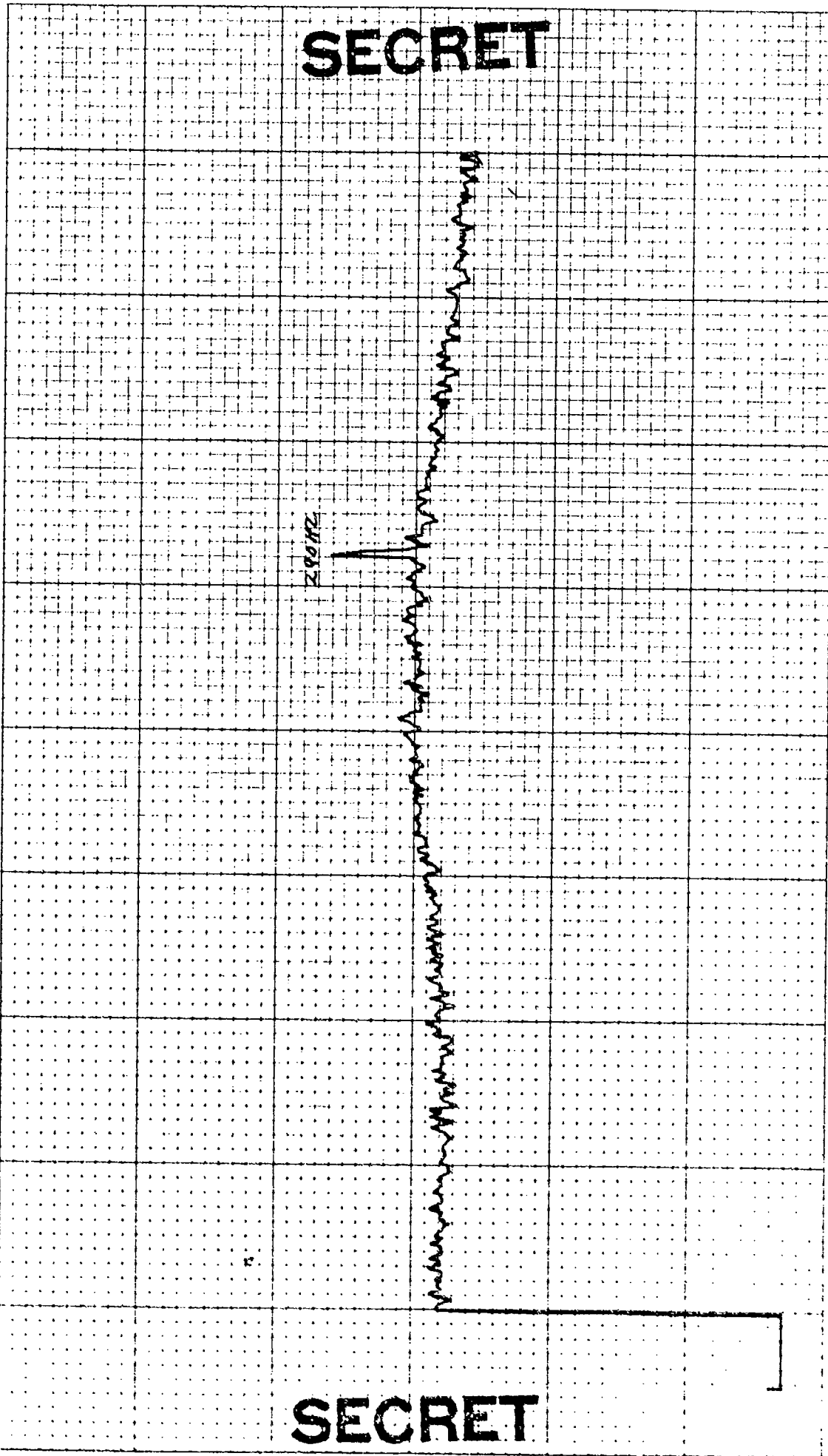
INTEGRATION TIME 320 SECS  
ATTEN: DB  
FILTER  
WTG: HANNING



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CONTROL: 2-7 -0924 ( 4 ) REEL: F14 INDEX 3575  
 OMNI SPECTRUM (ELEMENT 9)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 260 HZ INTEGRATION TIME 320 SECS ATTN: DB  
 1 ELEMENT FILTER WTG: HANNING  
 DATE OF ANALYSIS: ANALYSIS BANDWIDTH: 1/10HZ  
DEC AZ STEERING



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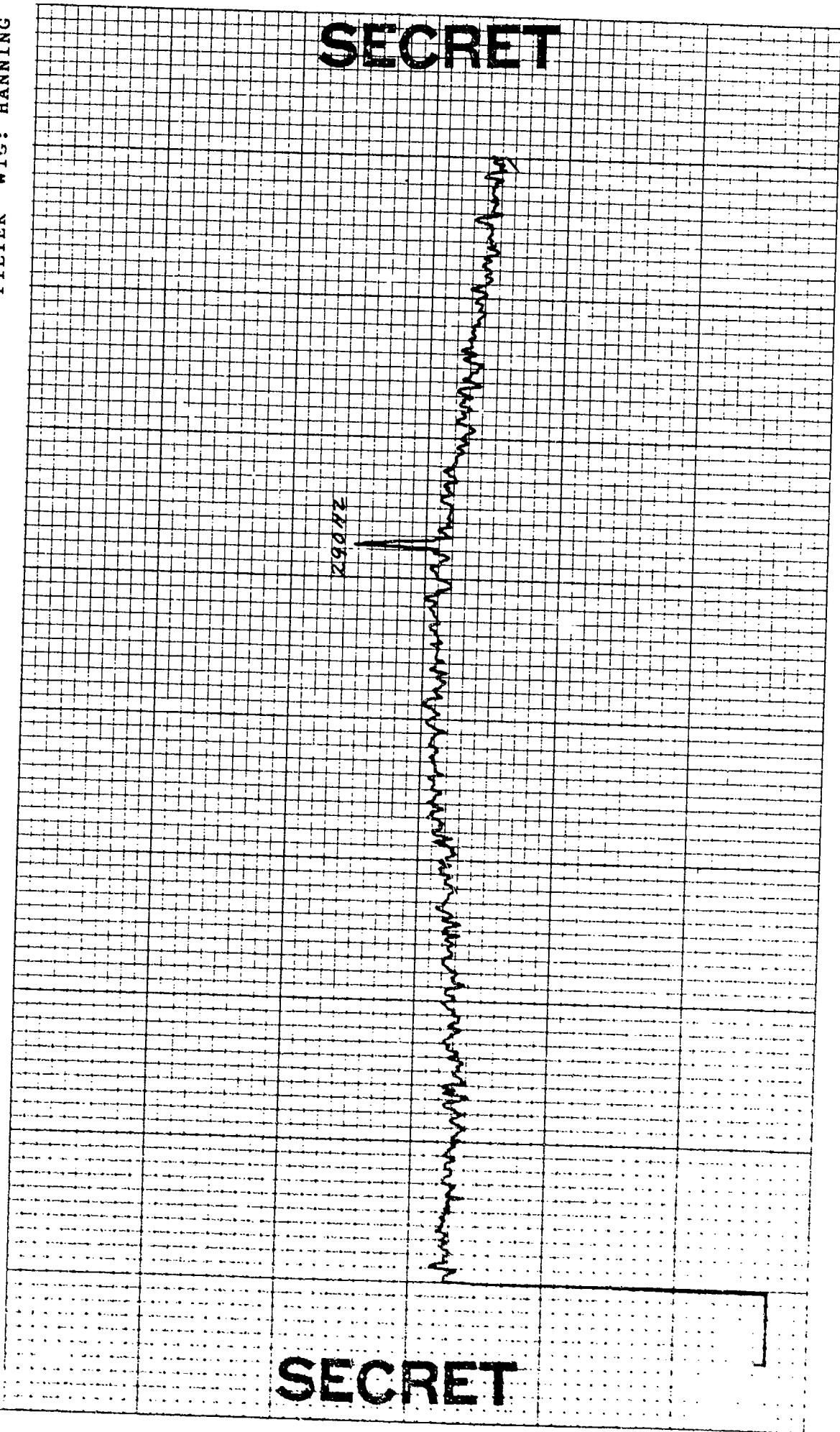
CONTROL: 2.7 - 0934( 5 )  
OMNI SPECTRUM(ELEMENT 10)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 290 HZ  
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 0934Z  
ANALYSIS BANDWIDTH: 1/10HZ  
DEG AZ STEERING

REEL: F14 INDEX 5575

INTEGRATION TIME 320 SECS ATTN: DB  
FILTER WTG: HANNING



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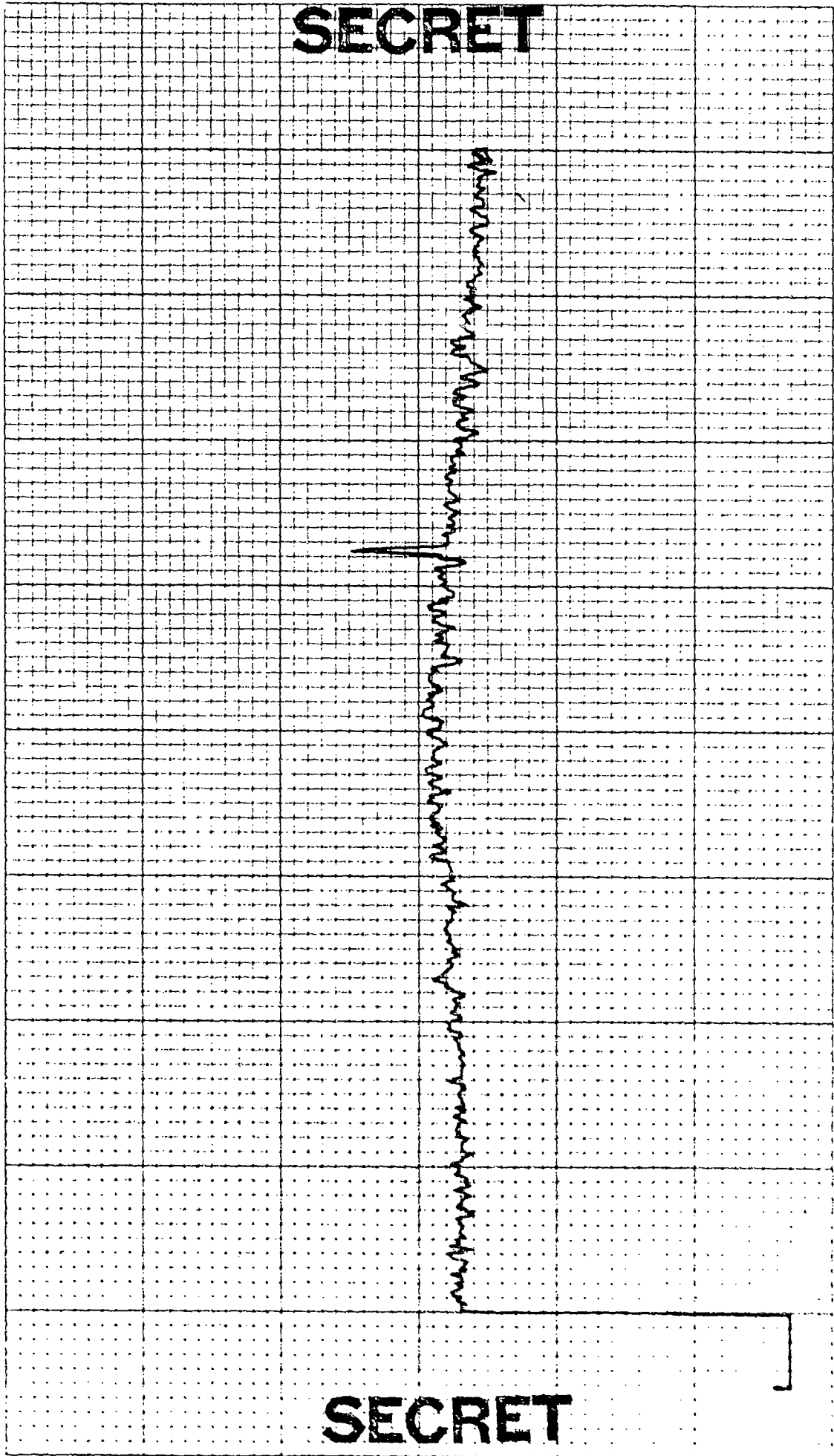
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CONTROL: 0934 - 61 (2P3)  
 OMNI SPECTRUM (ELEMENT 12)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 280 KHZ  
 1 ELEMENT

DATE OF ANALYSIS:  
 DATE/TIME: 2-7-77 - 0934Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 DEG AZ STEERING

REEL: F14  
 INDEX 3575

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



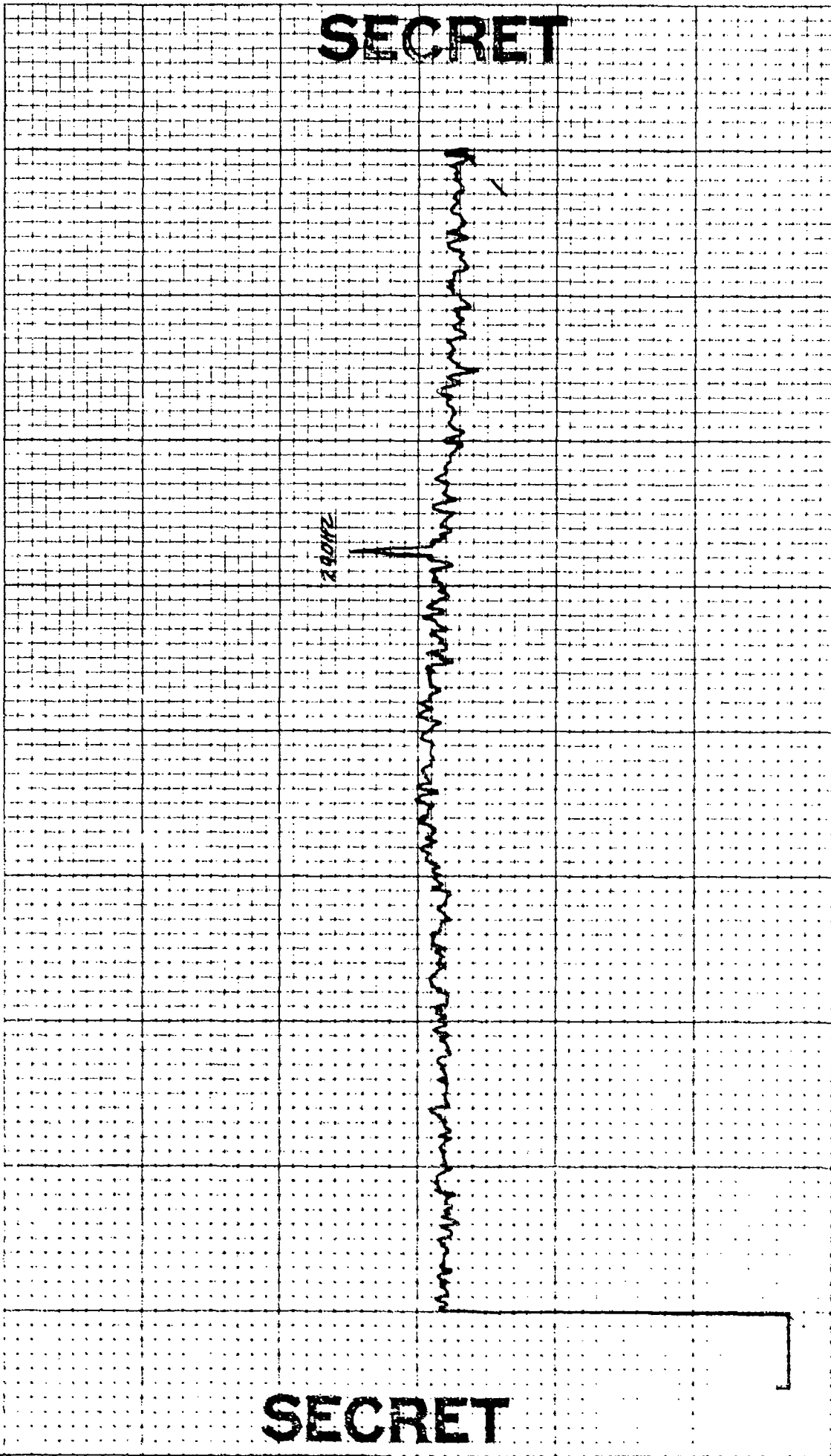
REEL: F14 INDEX 3575

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 0934 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
DEG AZ STEERING

INTEGRATION TIME 320 SECS ATTN: DB  
FILTER WTG: HANNING

CONTROL: 2-7-0934 (7)  
OMNI SPECTRUM (ELEMENT 14)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 200 HZ  
1 ELEMENT



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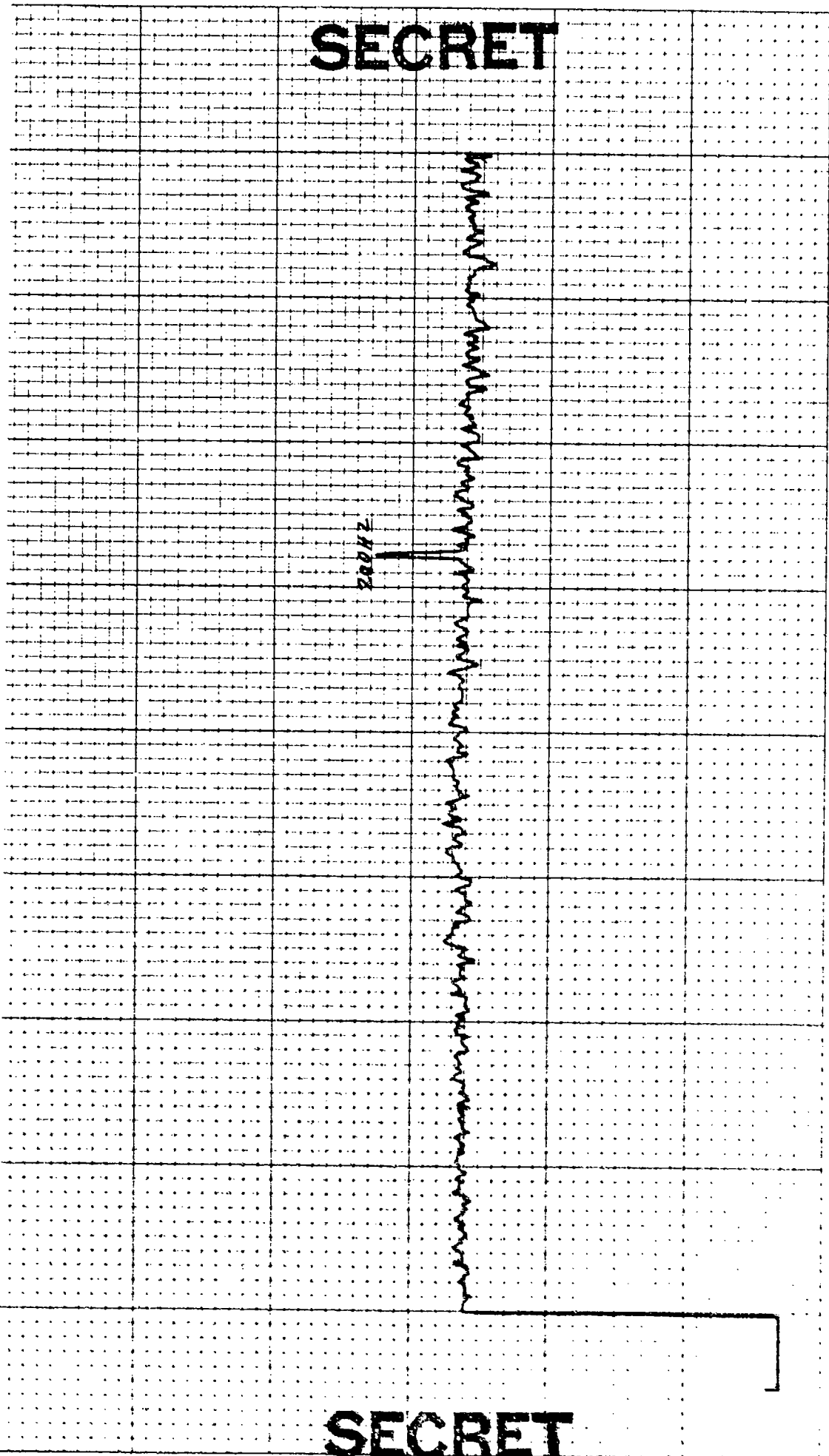
CONTROL: 2-7 -0934 ( 8 )  
OMNI SPECTRUM (ELEMENT 16 )  
EXERCISE: BEARING STAKE  
CENTER FREQ: 280 HZ  
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -0934Z  
ANALYSIS BANDWIDTH: 1/10HZ  
— DEG AZ STEERING

REEL: F14 INDEX 3525

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



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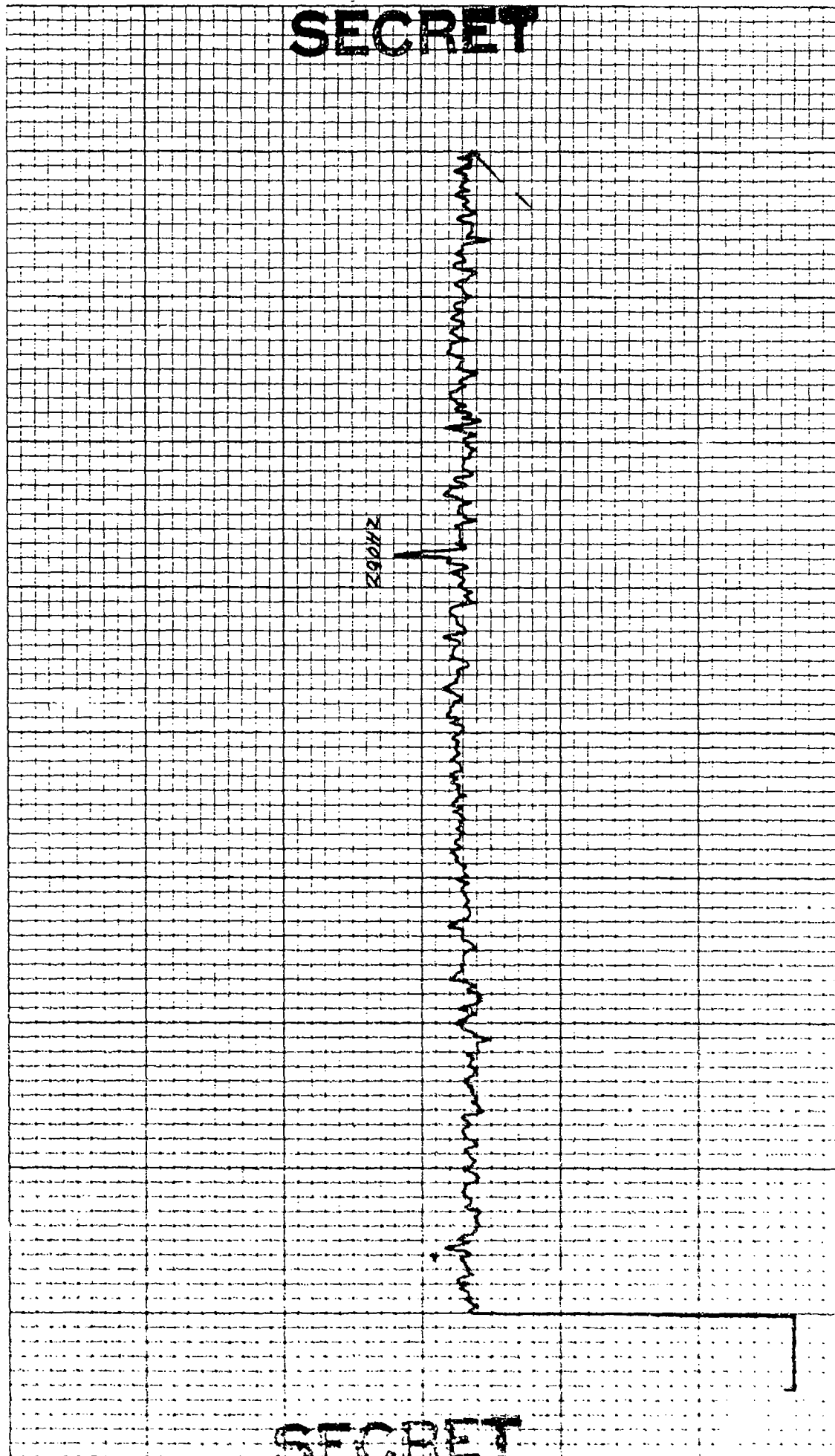
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REEL: F14 INDEX 3575

INTEGRATION TIME 320 SECS ATTN: DB  
FILTER WTG: HANNING

DATE OF ANALYSIS:  
DATE/TIME: 2-7-77 - 0934 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
DEC AZ STEERING

CONTROL: 2-7 - 0934 ( 9 )  
OMNI SPECTRUM (ELEMENT 19)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 280 HZ  
1 ELEMENT



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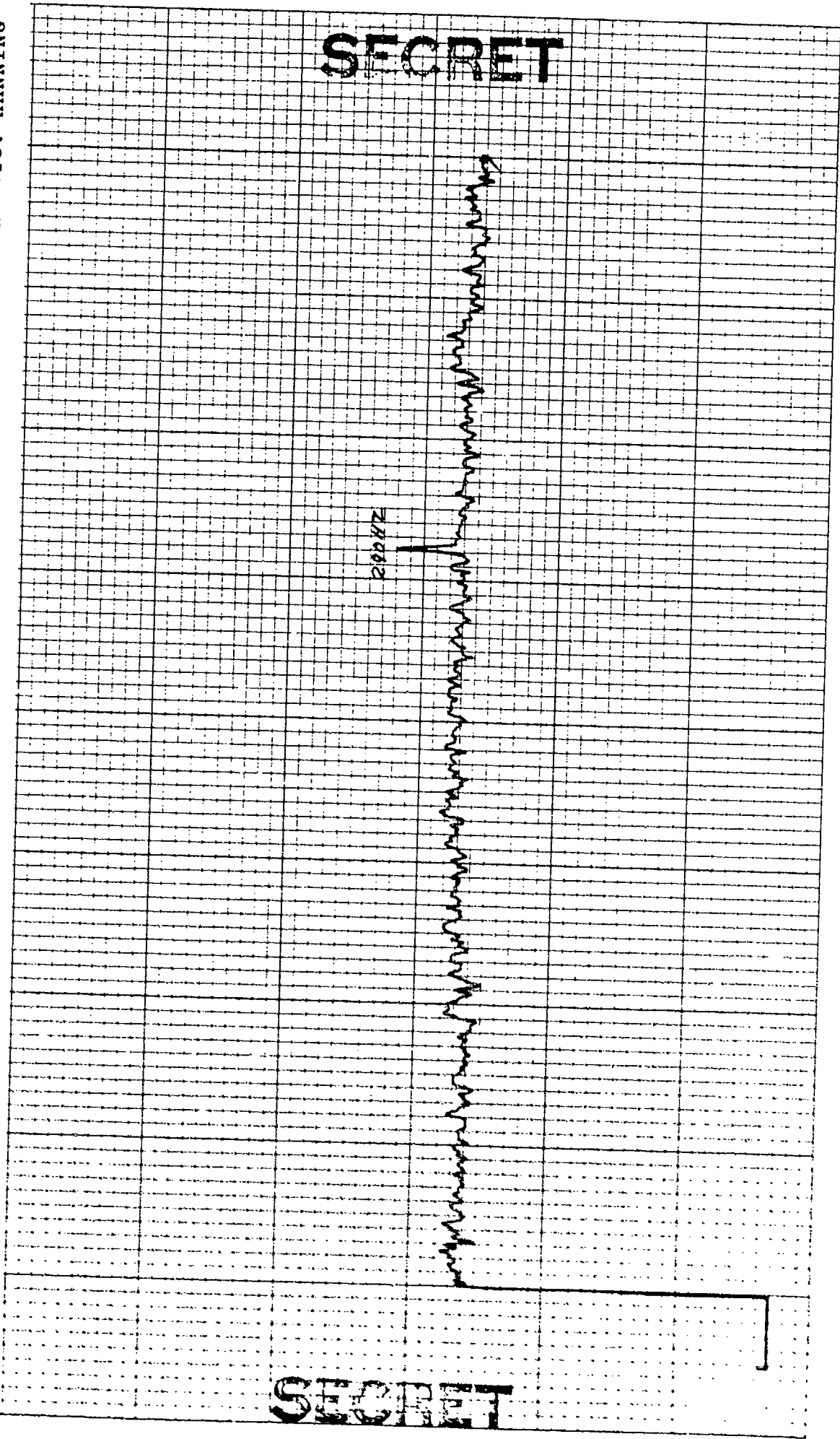
CONTROL: 2.7 - 0934 (10)  
OMNI SPECTRUM (ELEMENT 20)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 280 HZ  
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 0934Z  
ANALYSIS BANDWIDTH: 1/10HZ  
DEG AZ STEERING

REEL: F14 INDEX 3575

INTEGRATION TIME 320 SECS  
FILTER  
ATTEN: DB  
WTG: HANNING



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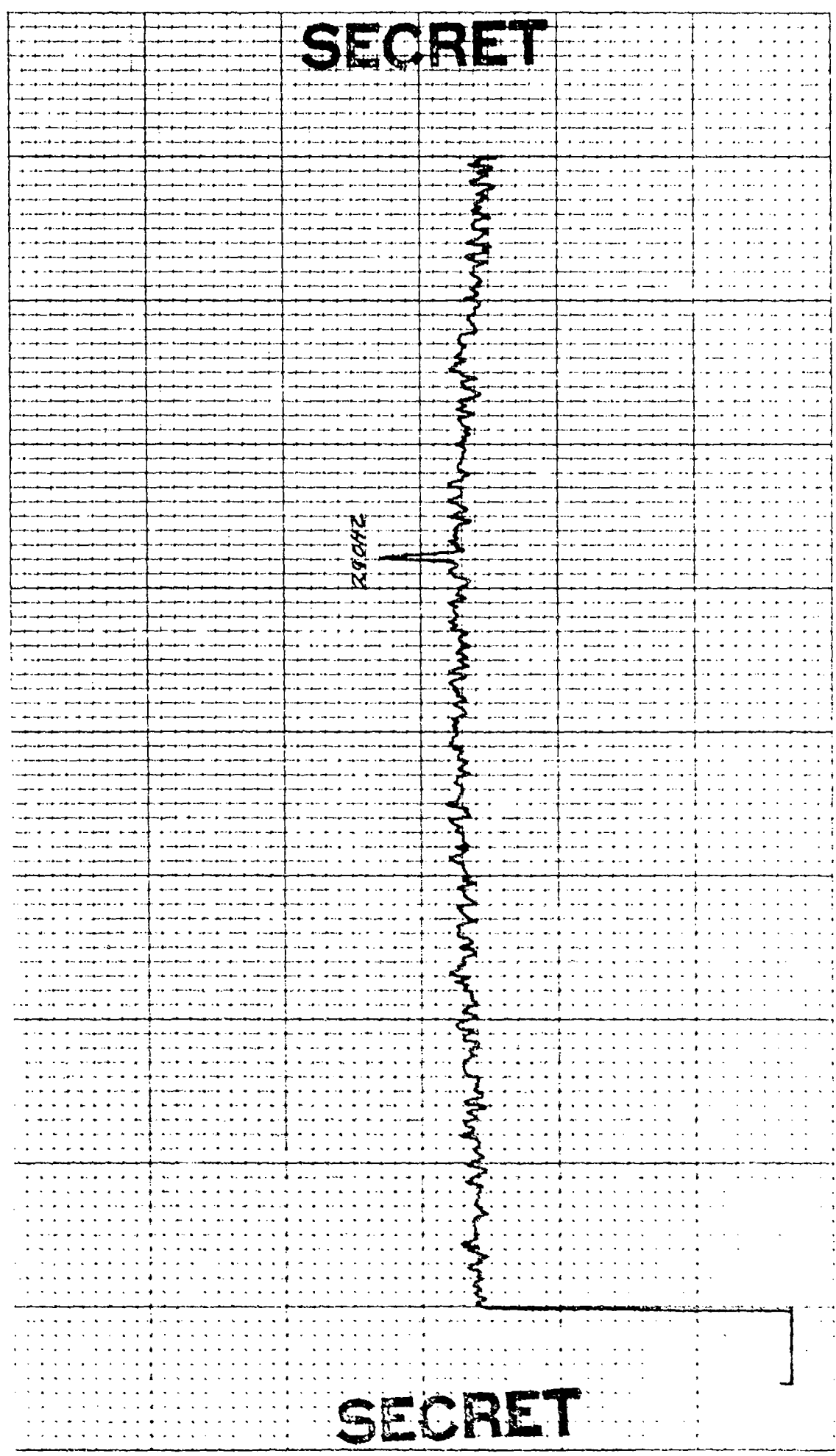
REEL: F14 INDEX 3575

DATE OF ANALYSIS:

CONTROL: 2-7 -0934 (11)  
OMNI SPECTRUM(ELEMENT 33)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 200 HZ  
1 ELEMENT

DATE/TIME: 2-7-77 -0934Z  
ANALYSIS BANDWIDTH: 1/10HZ  
— DEG AZ STEERING

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



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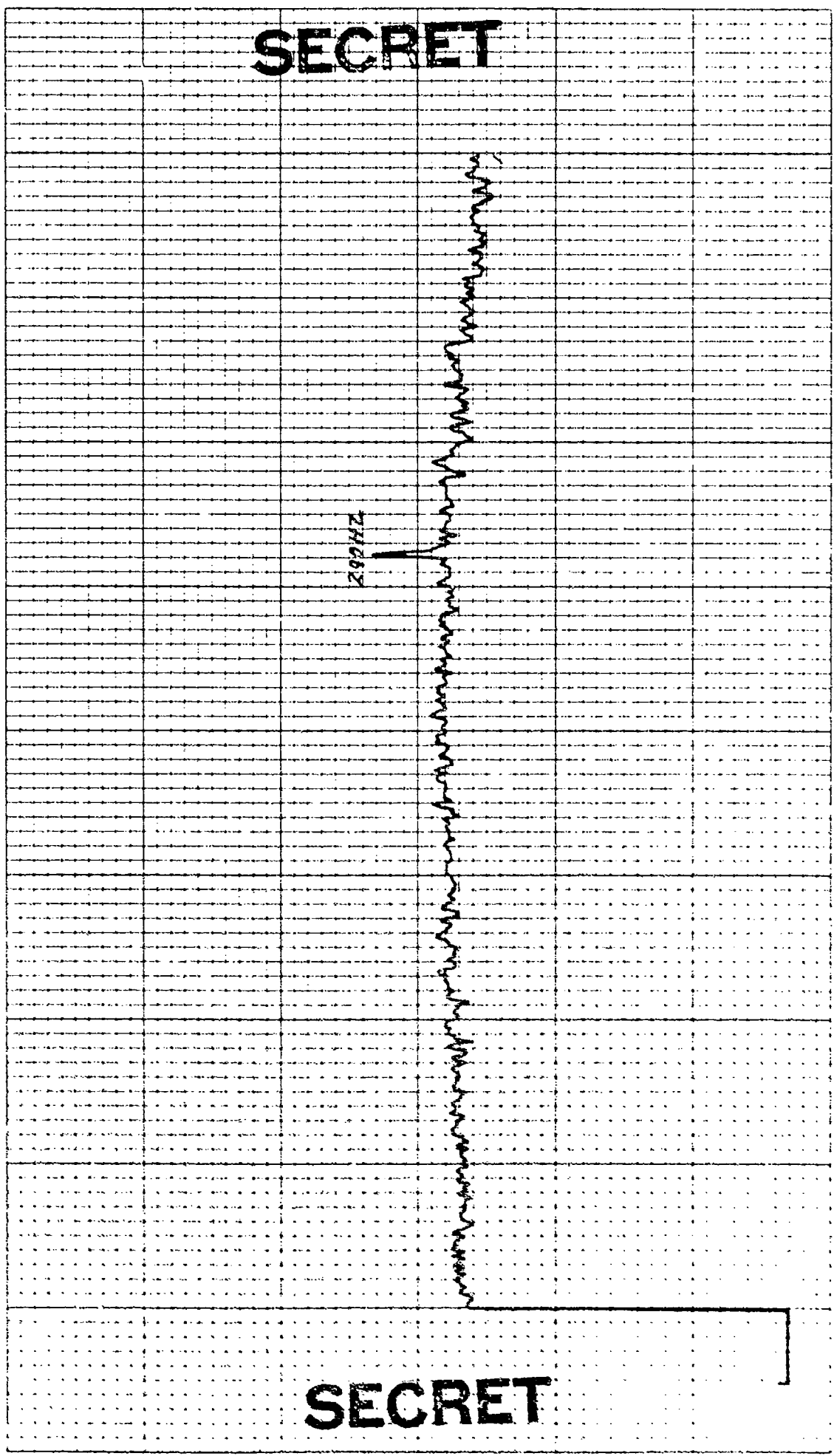
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REEL: F14 - INDEX 3575

INTEGRATION TIME 320 SECS  
FILTER WTG: HANNING

DATE OF ANALYSIS:  
DATE/TIME: 2-7-77 -0934Z  
ANALYSIS BANDWIDTH: 1/10HZ  
    DEG AZ STEERING

CONTROL: 2-7-0914 (12)  
OMNI SPECTRUM (ELEMENT 14)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 200 HZ  
1 ELEMENT



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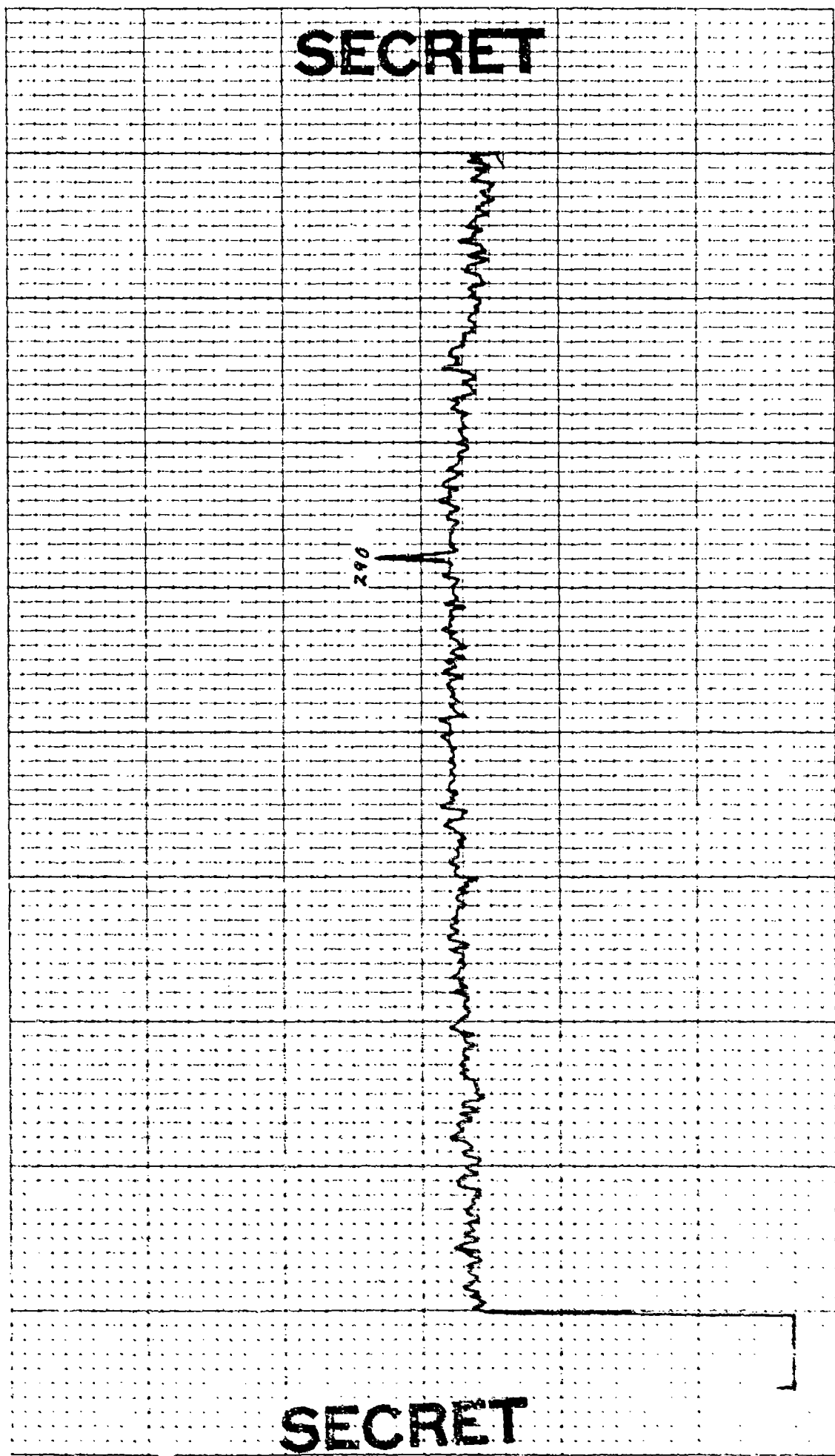
REEL: F14 INDEX 2575

DATE OF ANALYSIS:

CONTROL: 2-7-09M (13)  
OMNI SPECTRUM (ELEMENT 26)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 280 HZ  
1 ELEMENT

DATE/TIME: 2-7-77 - 0934 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
— DEG AZ STEERING

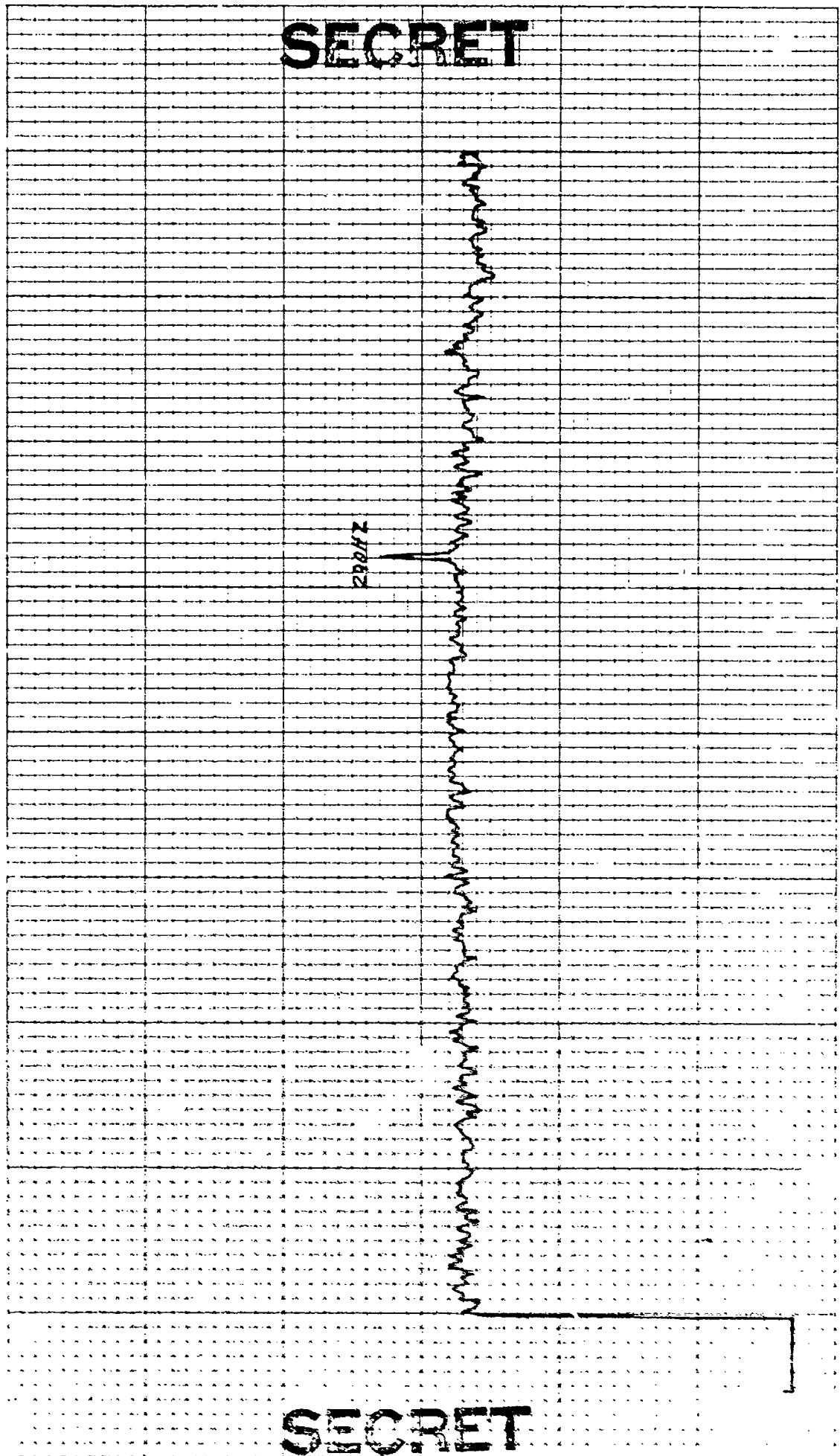
INTEGRATION TIME 320 SECS ATTN: - DB  
FILTER WTC: HANNING



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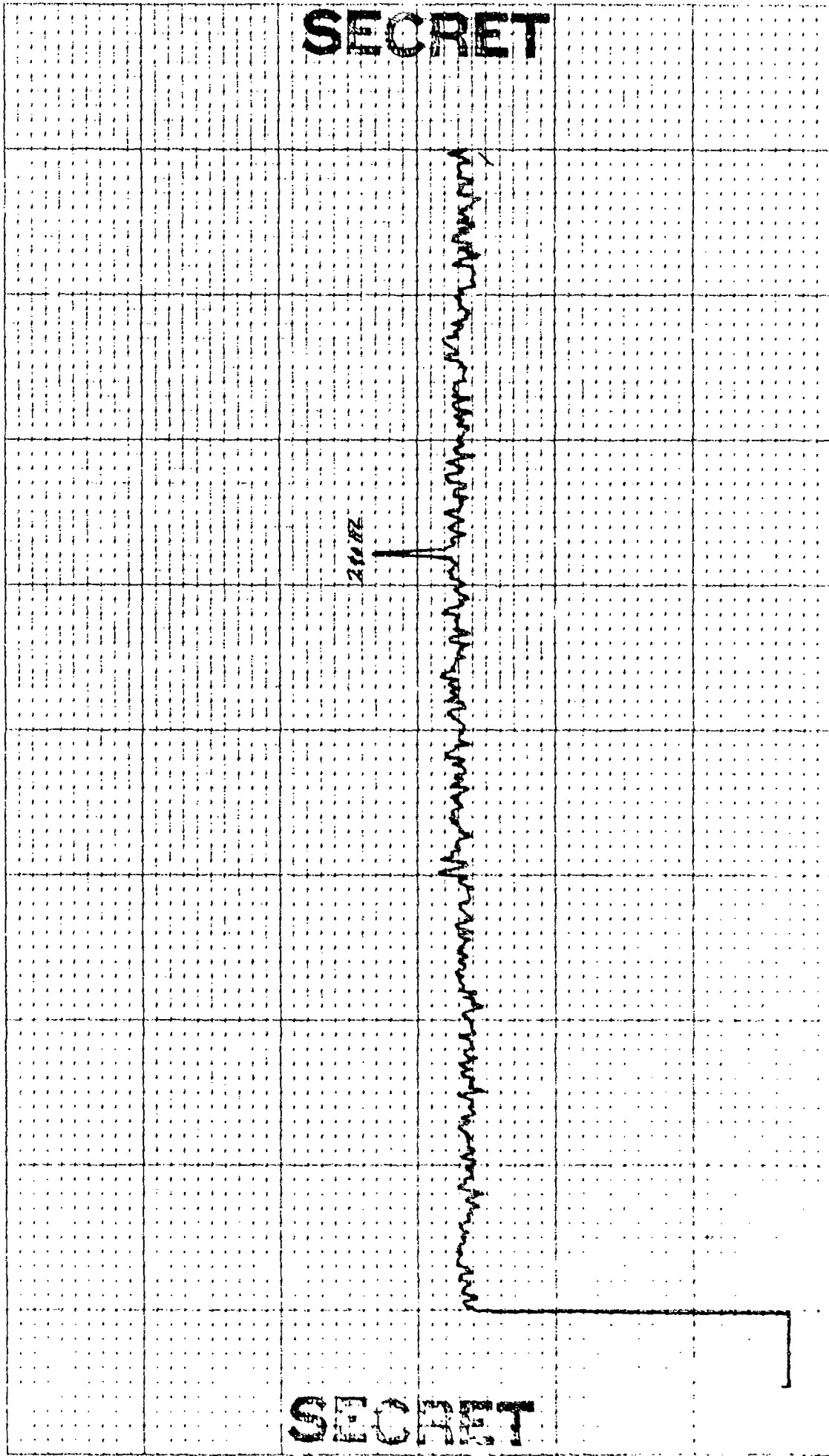
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CONTROL: 2-7 -0934 (14)      DATE OF ANALYSIS:      REEL: F14      INDEX 3573  
 OMNI SPECTRUM (ELEMENT 29)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 280 HZ      INTEGRATION TIME 320 SECS      ATTN: DB  
 1 ELEMENT      DEC AZ STEERING      FILTER      WTC: HANNING



CONTROL: 2-7 -0934 (15)      DATE OF ANALYSIS:      REEL: F14      INDEX 3575  
 OMNI SPECTRUM (ELEMENT 31)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 280 HZ  
 1 ELEMENT

DATE/TIME: 2-7-77 -0934 Z      INTEGRATION TIME 320 SECS      ATTN: DB  
 ANALYSIS BANDWIDTH: 1/10HZ      FILTER      WTC: HANNING  
   DEG AZ STEERING



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CONTROL: 27-0074 (16)  
COMNI SPECTRUM (ELEMENT 33)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 280 HZ  
1 ELEMENT

DATE OF ANALYSIS:

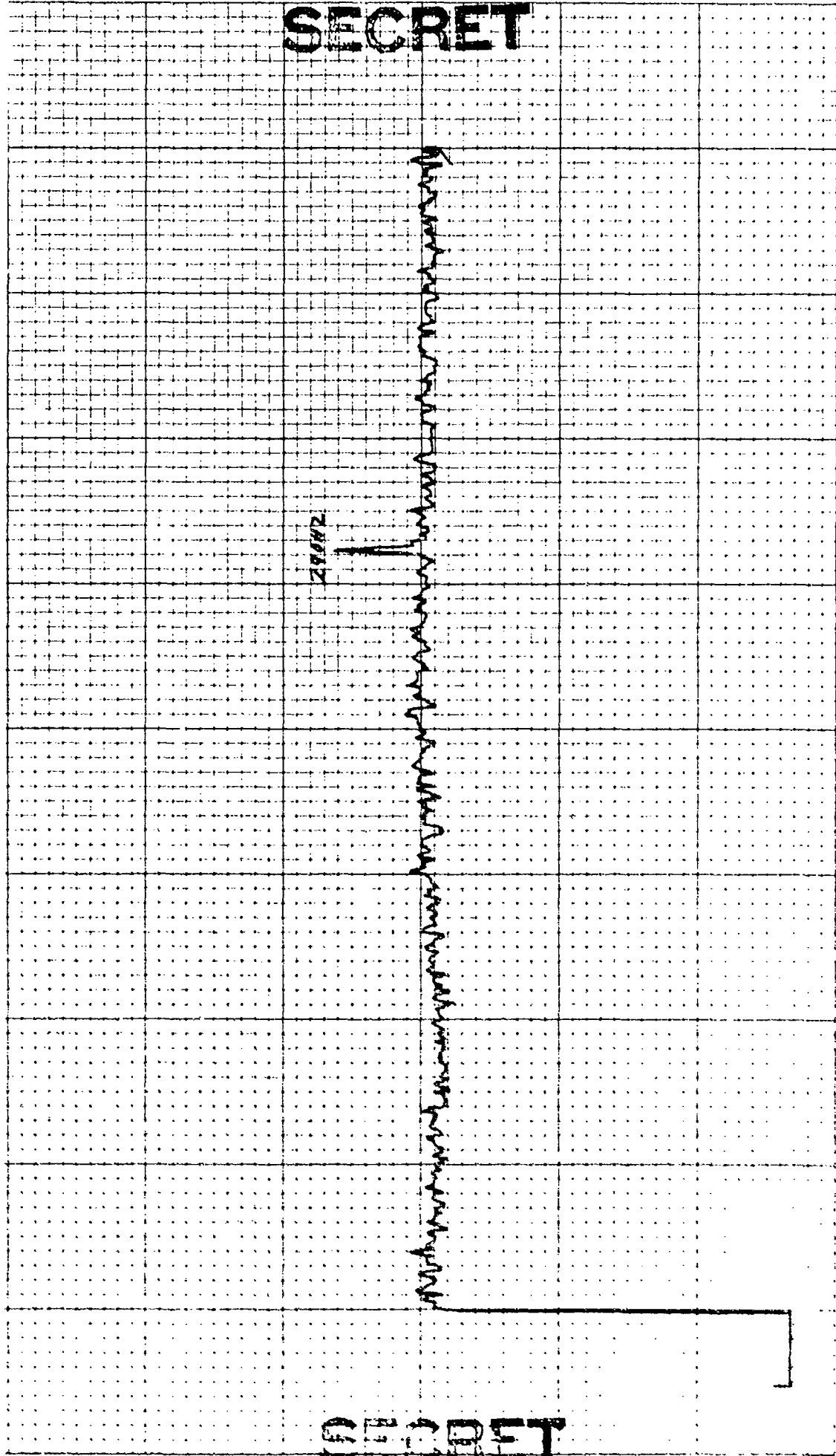
DATE/TIME: 2-7-77 - 0934 Z

ANALYSIS BANDWIDTH: 1/10HZ  
DEG AZ STEERING

REEL: F14

INDEX J575

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



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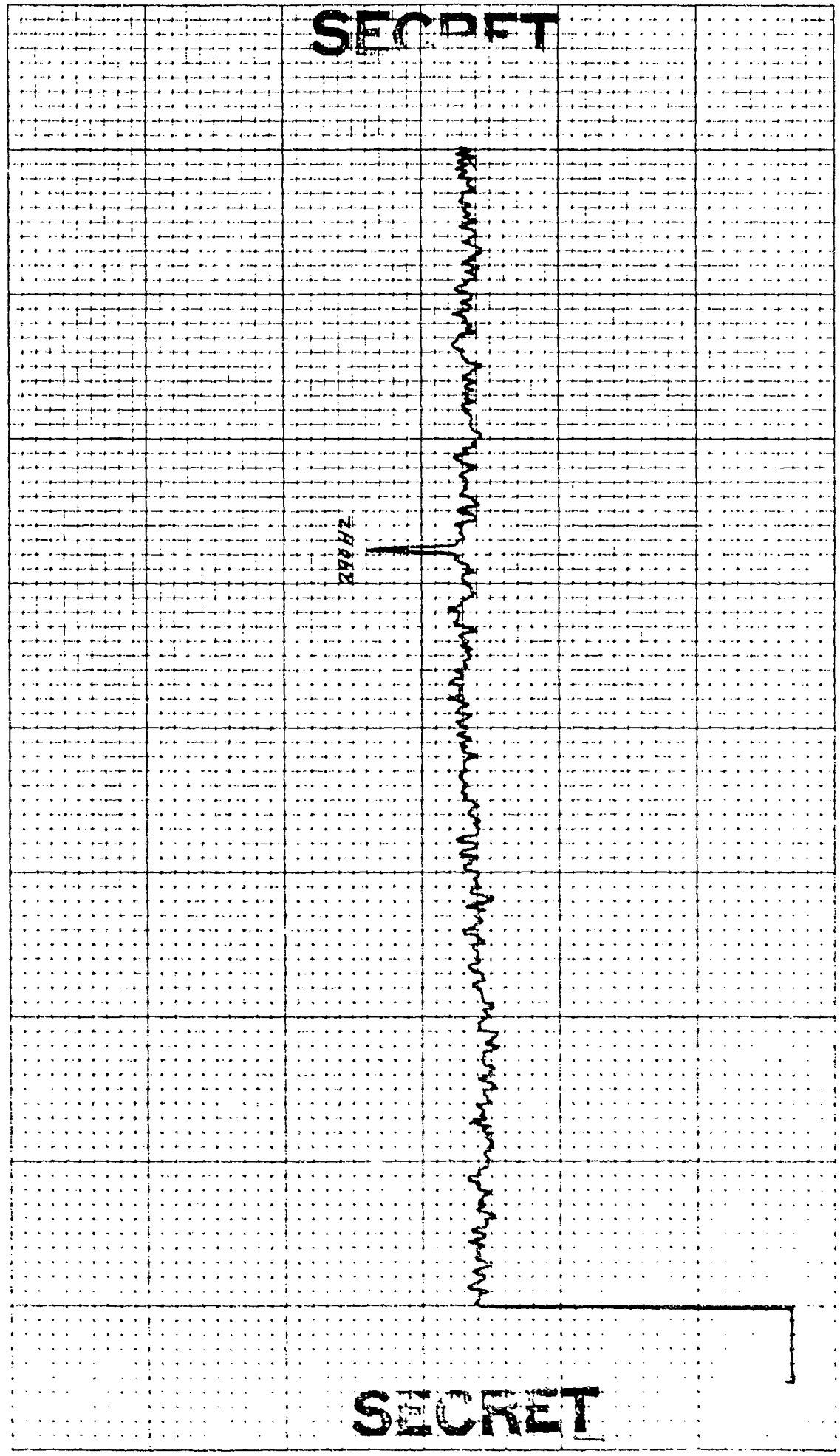
Σ 184 50m: 17m

CONTROL: 2-7-0934 (17 )  
 OMNI SPECTRUM(ELEMENT 35 )  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 200 HZ  
 1 ELEMENT

DATE OF ANALYSIS:  
 DATE/TIME: 2-7-77 - 0934 Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 DEG AZ STEERING

REEL: 514 INDEX: 3525

INTEGRATION TIME 320 SECS ATTN: DB  
 FILTER WTG: HANNING



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CONTROL: 2-7 -0934 (10 ) INDEX: F14

OMNI SPECTRUM(ELEMENT 37 )

EXERCISE: BEARING STAKE

CENTER FREQ: 280 HZ

1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -0934 Z

ANALYSIS BANDWIDTH: 1/10HZ

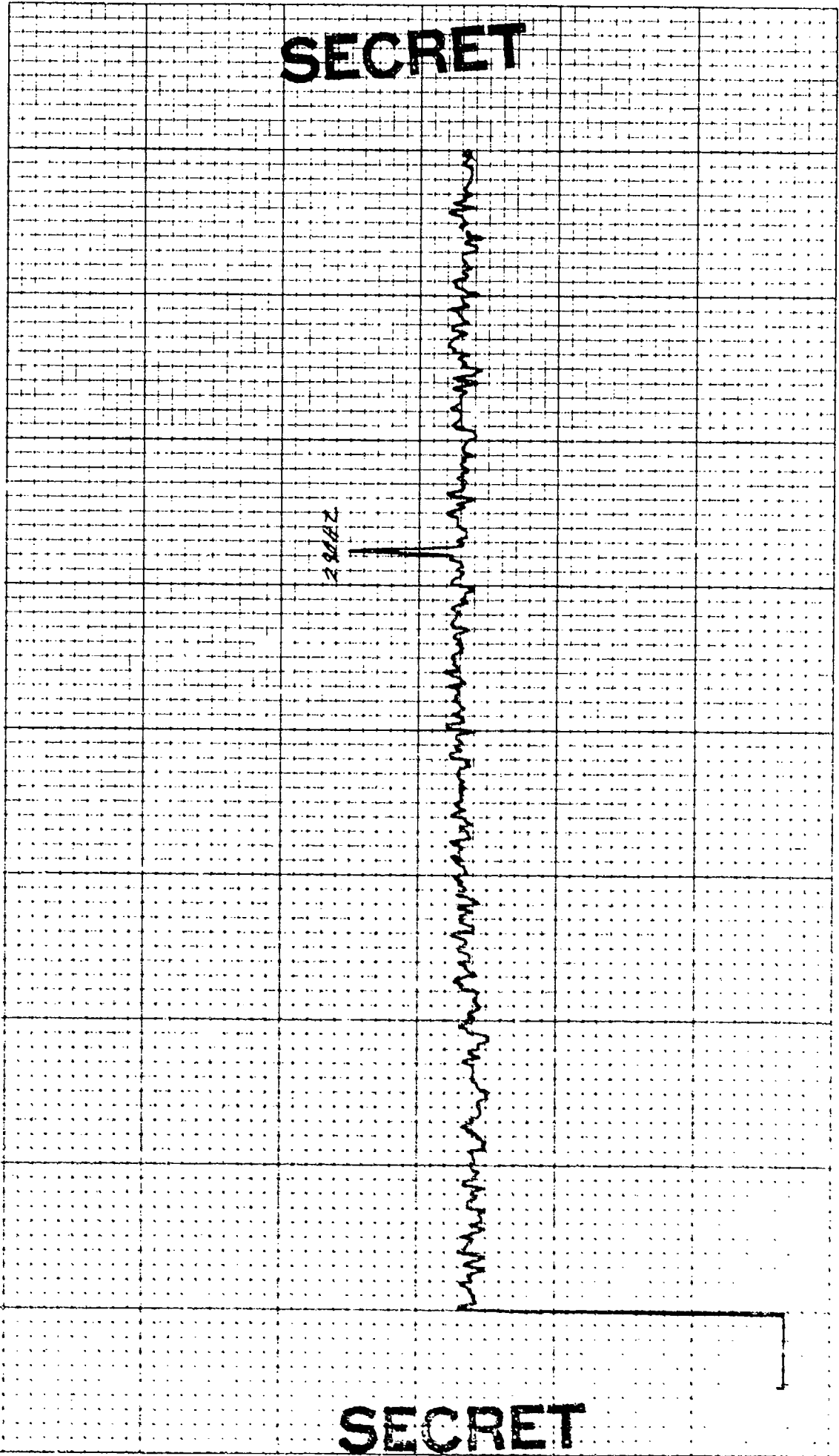
DEC AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

ATTEN: DB

WTG: HANNING



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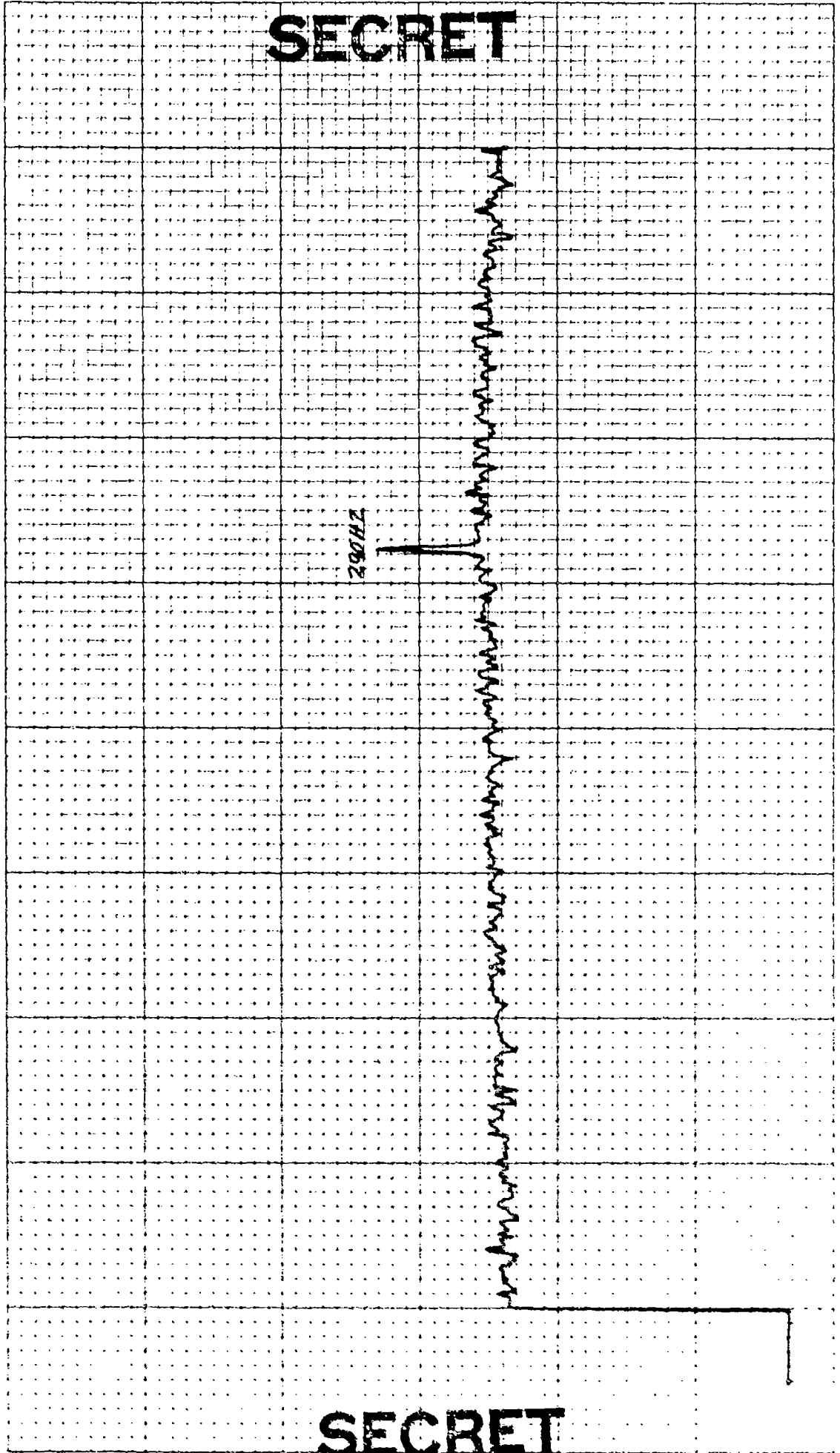
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CONTROL: 2-7 -0934 (19 )  
 OMNI SPECTRUM (ELEMENT 79 )  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 280 HZ  
 1 ELEMENT

DATE OF ANALYSIS:  
 DATE/TIME: 2-7-77 -0934 Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 DEG AZ STEERING

REEL: F/4 INDEX: 5575

INTEGRATION TIME 320 SECS ATTN: DB  
 FILTER WTC: HANNING



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CONTROL: 2-7 -0934 (20)  
OMNI SPECTRUM (ELEMENT 41)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 280 HZ  
1 ELEMENT

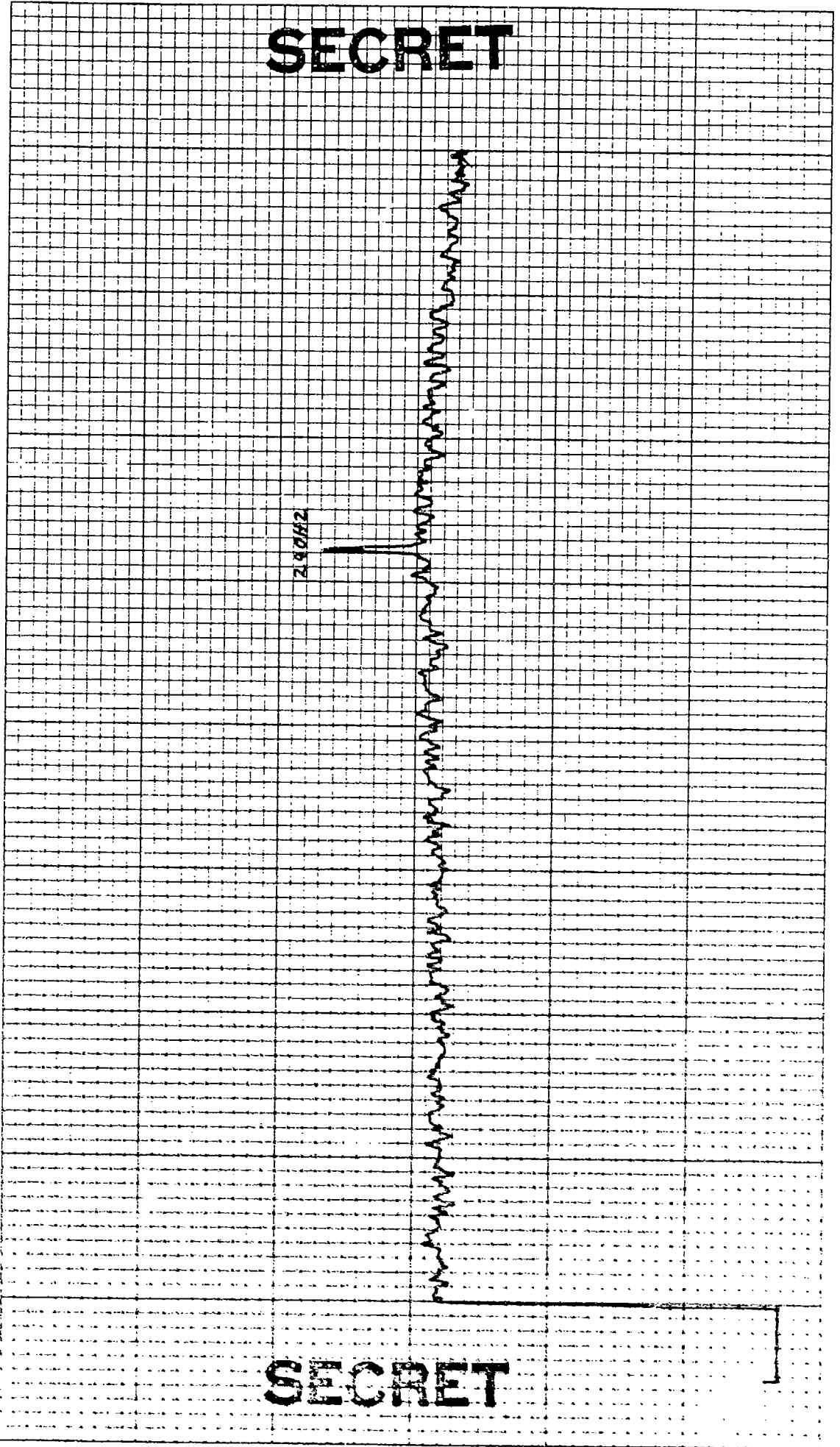
DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -0934 Z

ANALYSIS BANDWIDTH: 1/10 HZ  
DEG AZ STEERING

REEL: F14 INDEX 3575

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



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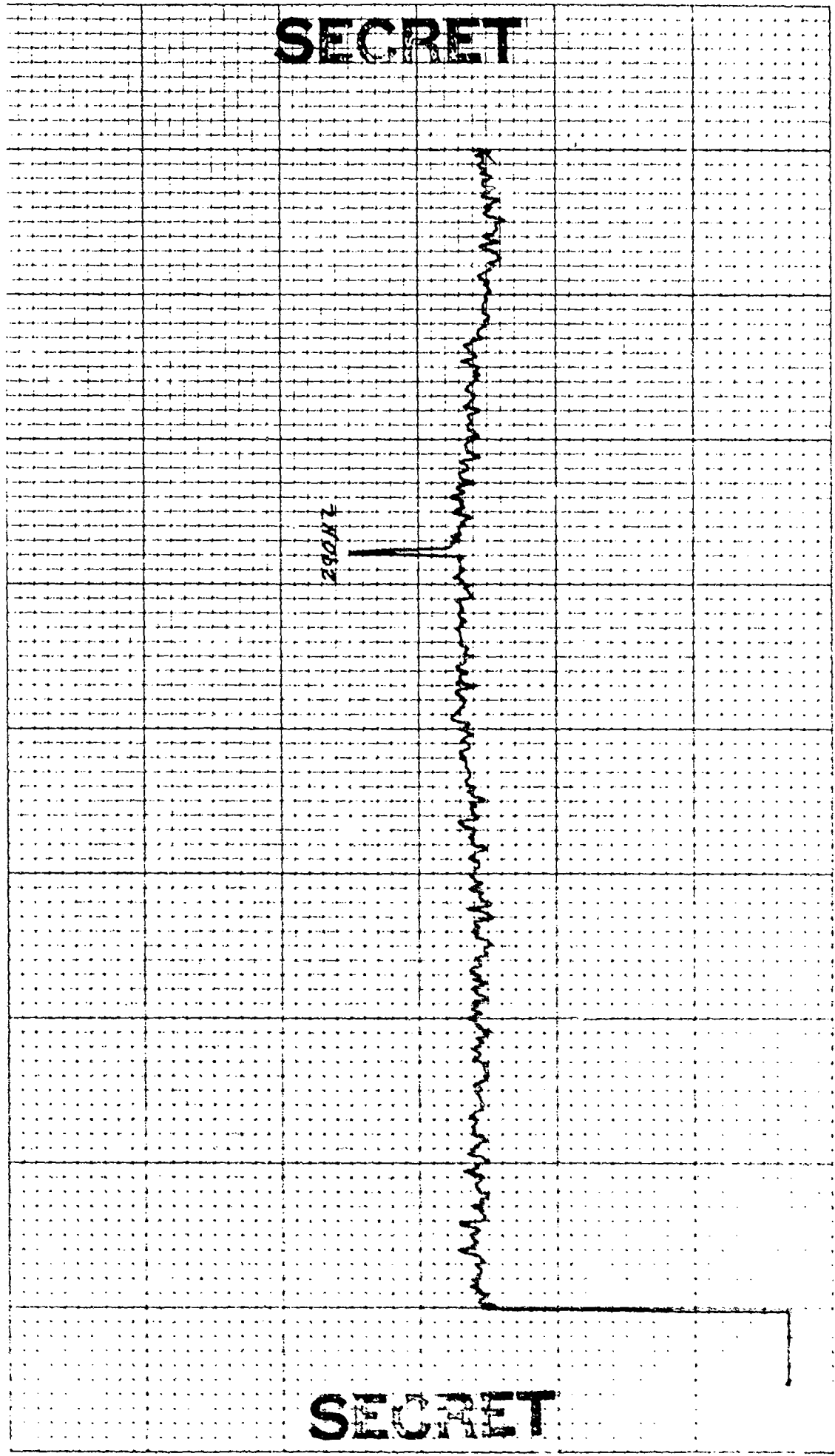
REEL: F14 INDEX 3575

DATE OF ANALYSIS:

CONTROL: 27 -0974 (31)  
OMNI SPECTRUM (ELEMENT 43)

EXERCISE: BEARING STAKE  
CENTER FREQ: 200 HZ  
1 ELEMENT

DATE/TIME: 27-77 -0974 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
INTEGRATION TIME 320 SECS  
ATTEN: DB  
FILTER WTG: HANNING  
DEG AZ STEERING



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REEL: F14 INDEX 7575

DATE OF ANALYSIS:

CONTROL: 2.7 -0934 (22)

INTEGRATION TIME 320 SECS

DATE/TIME: 2-7-77 -0934 Z

OMNI SPECTRUM (ELEMENT 45)

FILTER WTG: HANNING

ANALYSIS BANDWIDTH: 1/10HZ

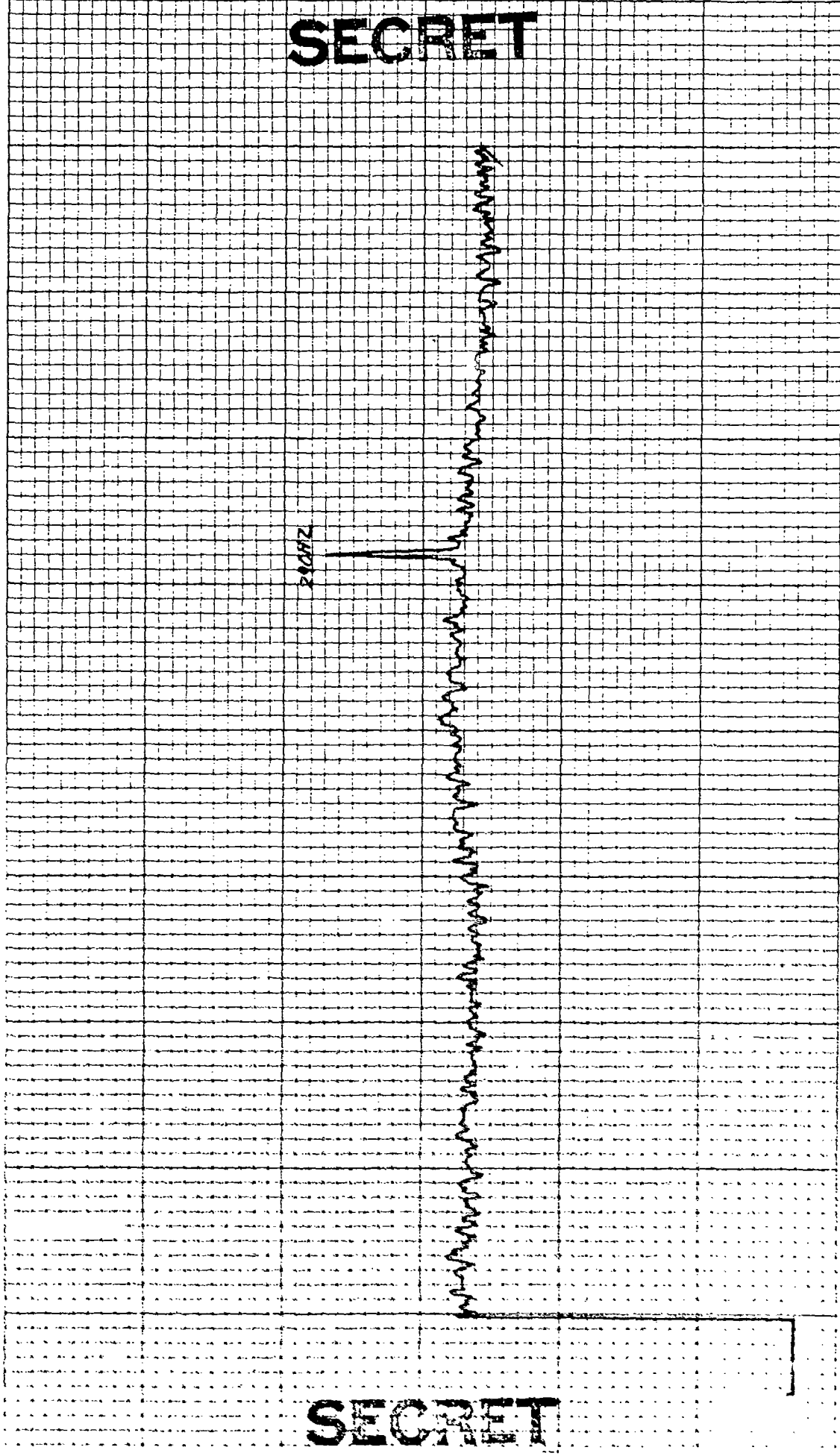
EXERCISE: BEARING: STAKE

ATTEN: - DB

DEG AZ STEERING

CENTER FREQ: 280 HZ

1 ELEMENT



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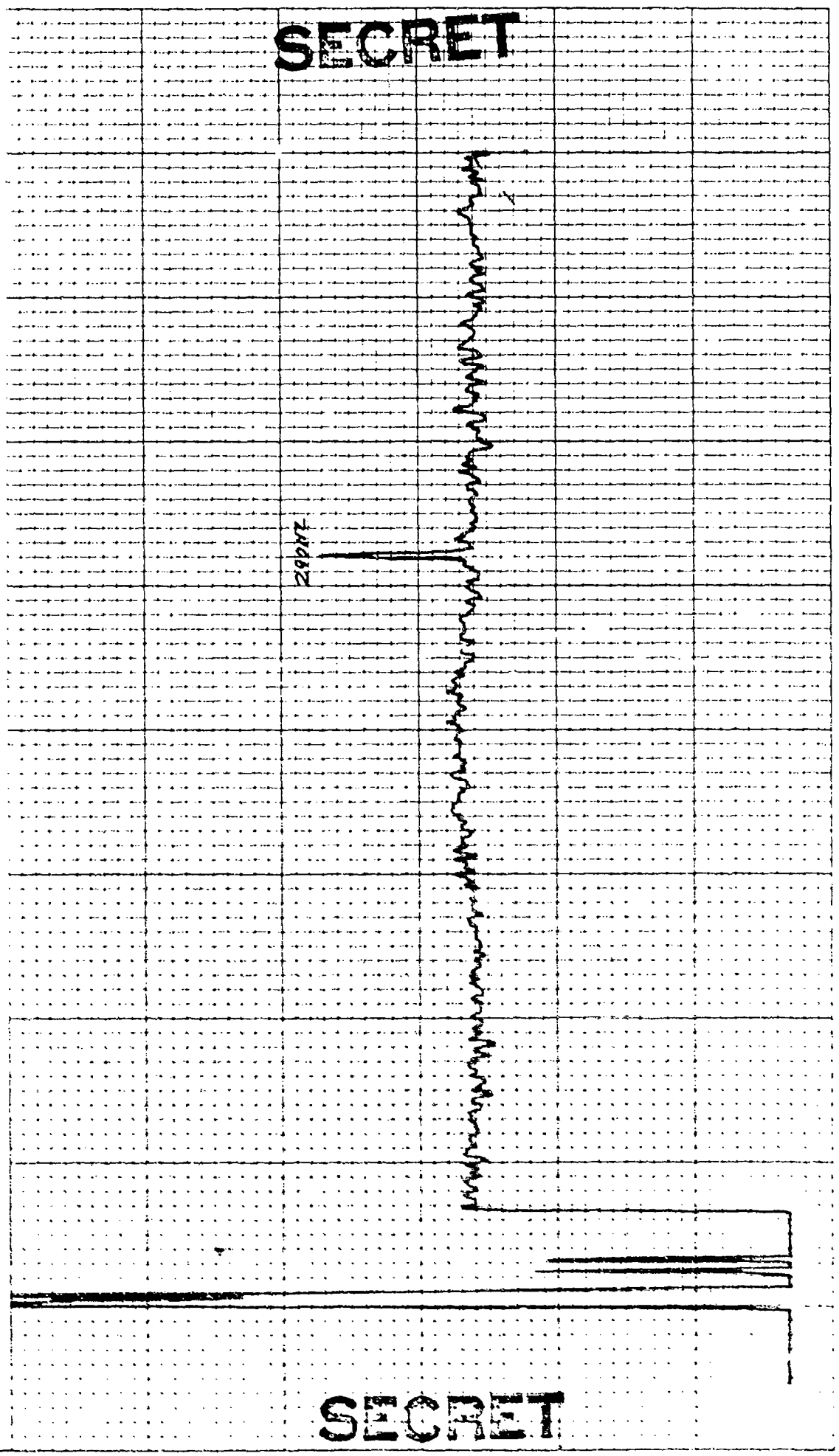
REEL: F14 INDEX J575

DATE OF ANALYSIS:

CONTROL: 2-7 -0934 (43)  
OMNI SPECTRUM (ELEMENT 47)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 280 HZ  
1 ELEMENT

DATE/TIME: 2-7-77 -0934 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
1 DEG AZ STEERING

INTEGRATION TIME 320 SECS ATTN: DB  
FILTER WTG: HANNING



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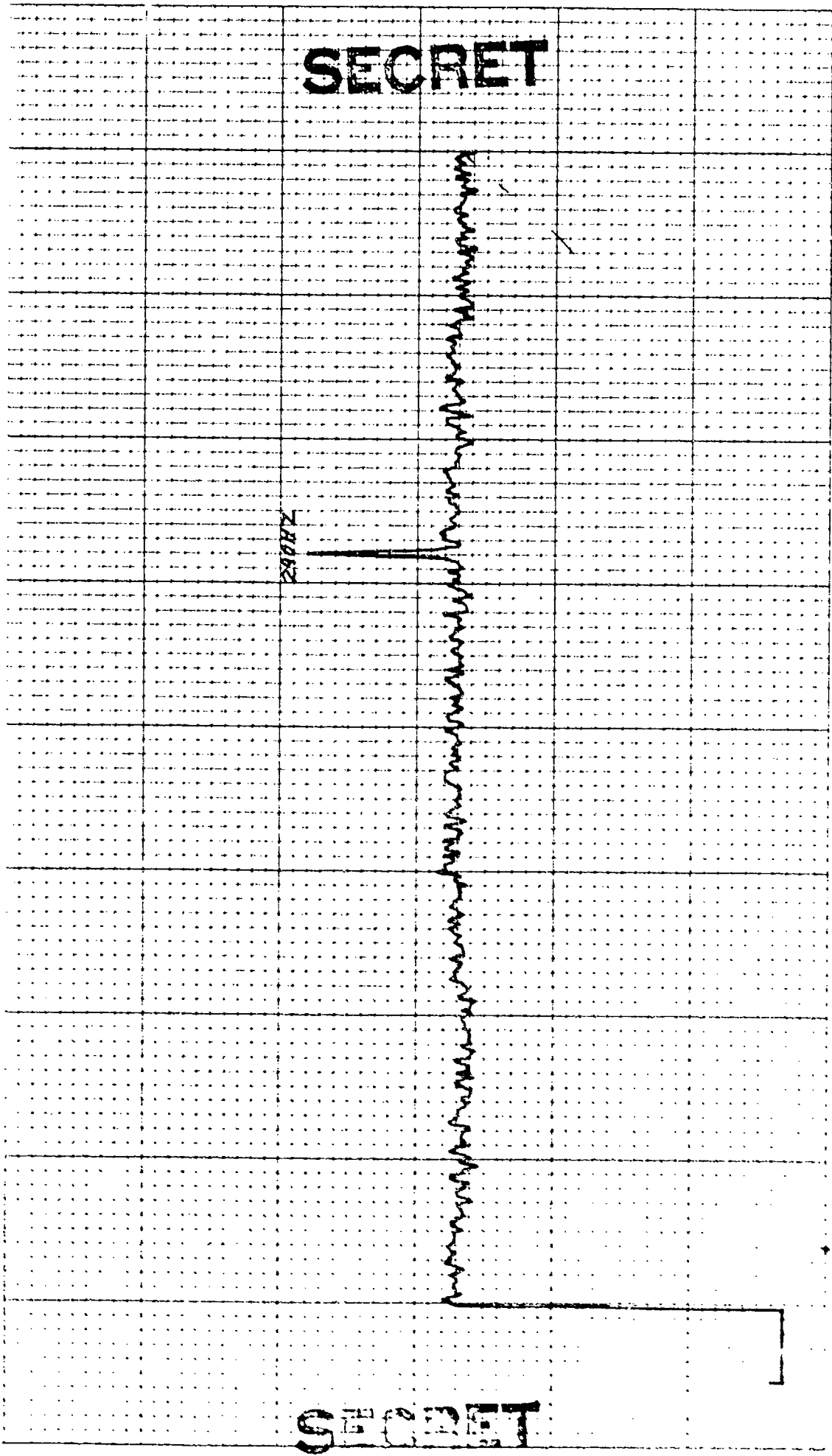
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CONTROL: 2.7 -0974 ( 24 )  
 OMNI SPECTRUM(ELEMENT 49 )  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 200 HZ  
 1 ELEMENT

DATE OF ANALYSIS:  
 DATE/TIME: 2-7-78 -0934 Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 DEC AZ STEERING

REEL: F14 INDEX: 3575

INTEGRATION TIME 320 SECS ATTN: DB  
 FILTER WTG: HANNING

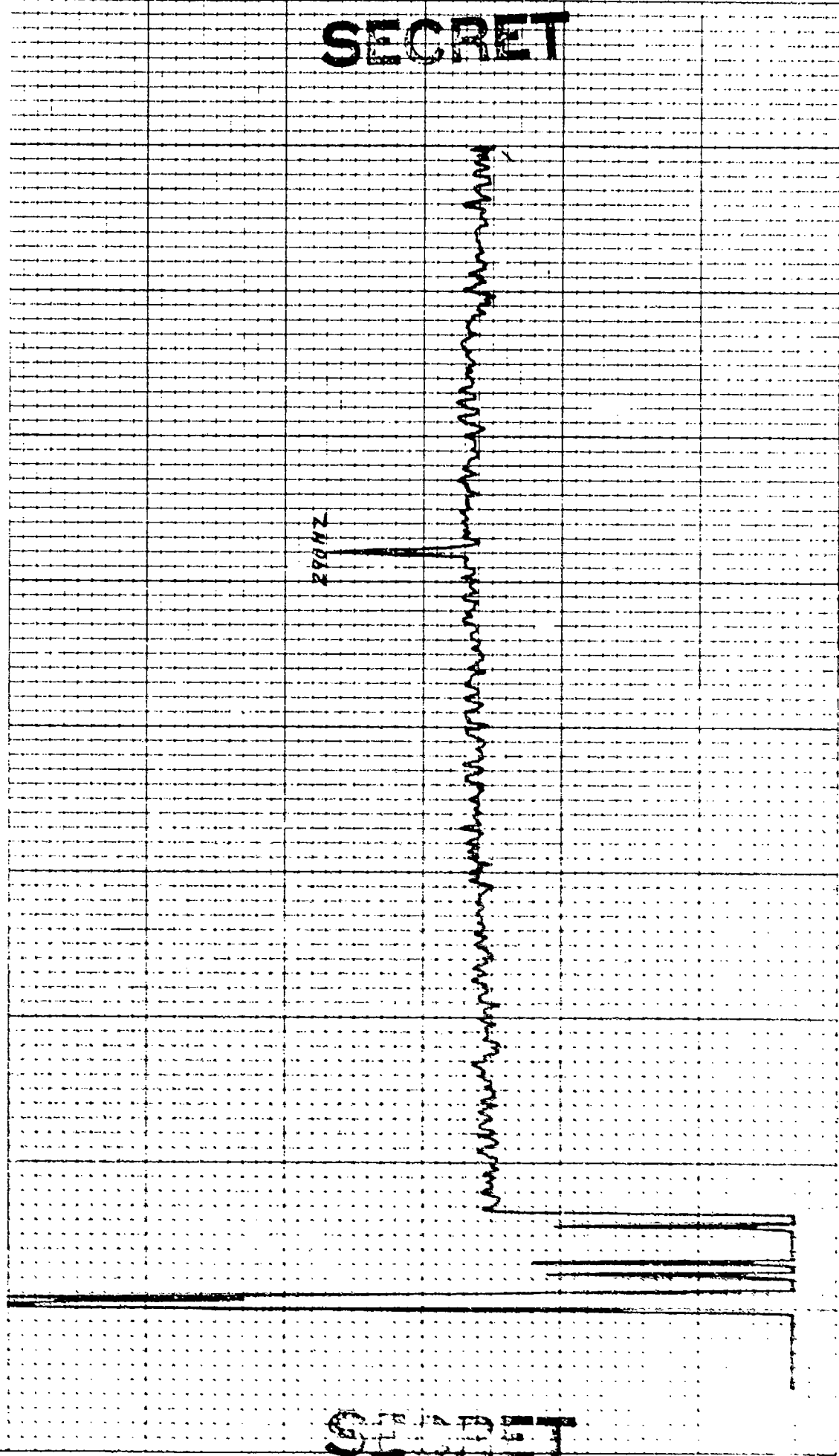


CONTROL: 2-7 -0934 ( 25 )  
 OMNI SPECTRUM(ELEMENT 5/ )  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 230 HZ  
 1 ELEMENT

DATE OF ANALYSIS:  
 DATE/TIME: 2-7-77 -0934 Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 — DEC AZ STEERING

REEL: F14 INDEX: 3575

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



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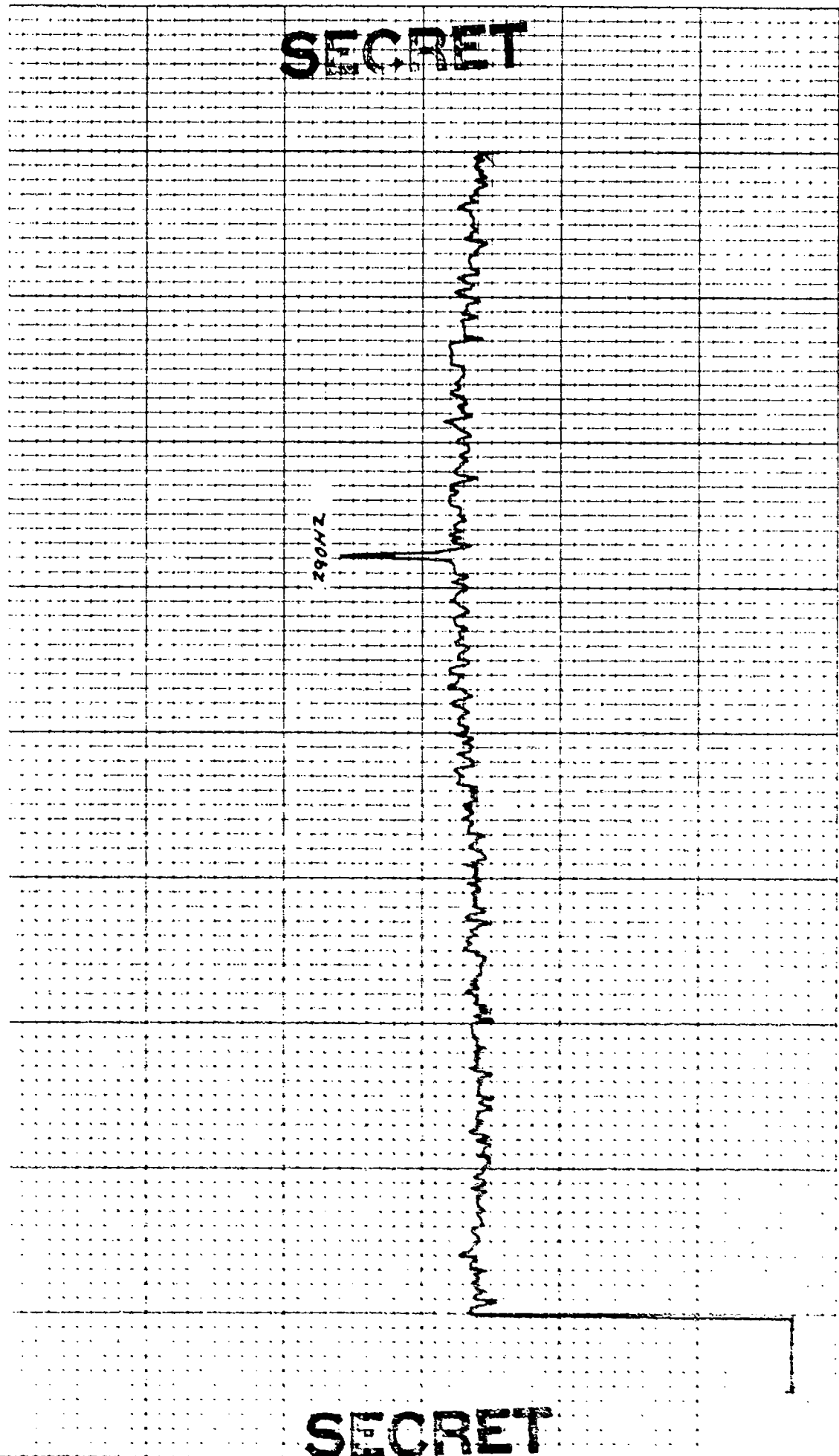
REEL: F14 INDEX 3575

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -0934Z  
ANALYSIS BANDWIDTH: 1/10HZ  
DEC AZ STEERING

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

CONTROL: 2/7 -0934 (26)  
OMNI SPECTRUM(ELEMENT 53)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 280 HZ  
1 ELEMENT

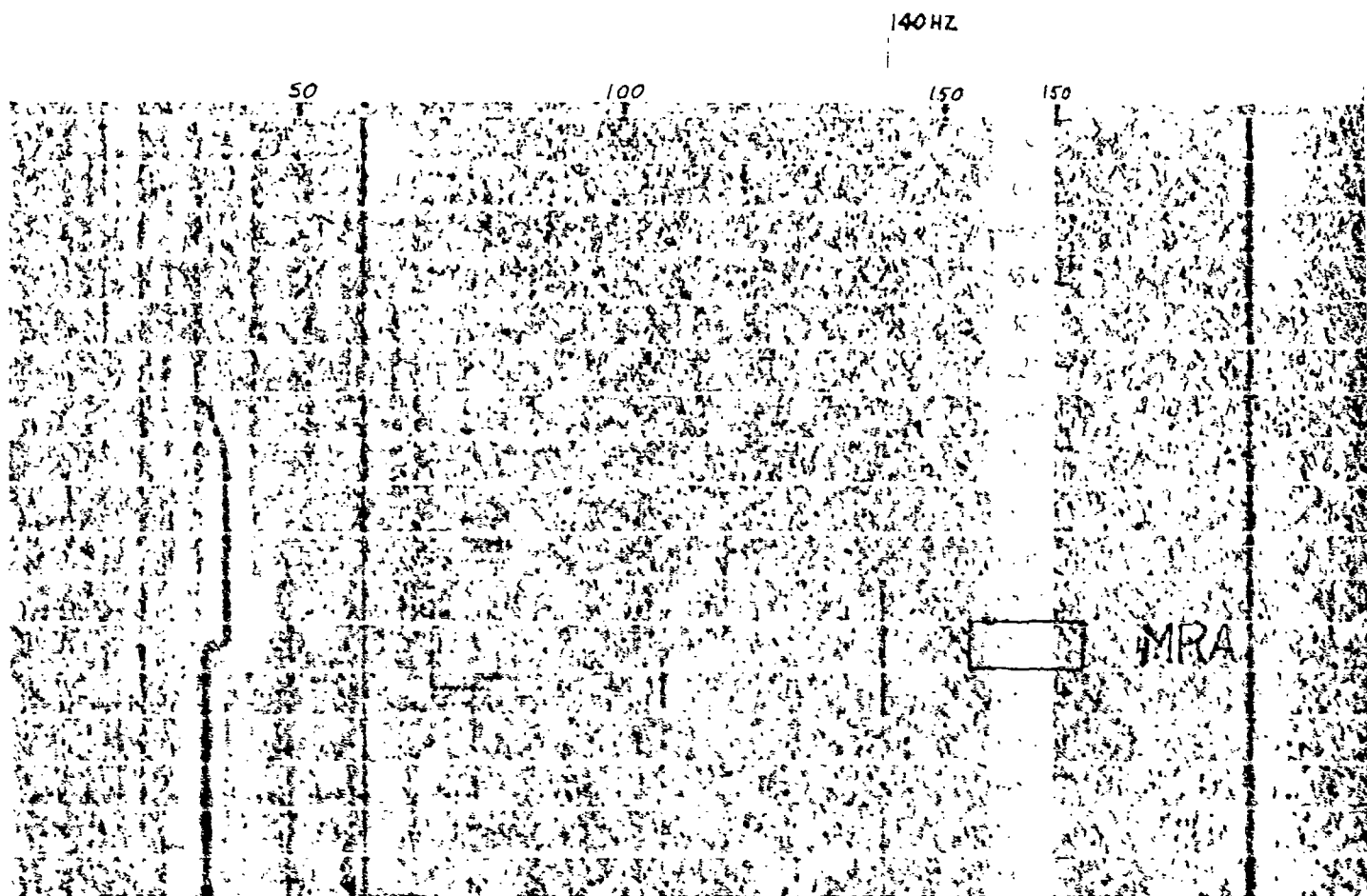


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CONTROL NUMBER 143 3 171  
 NUMBER OF ELEMENTS             
 FREQUENCY BAND        Hz        Hz  
 RANGE        V.M.

HISTOGRAM  
 TAPE REEL NUMBER         
 ANALYSIS BAND WIDTH        Hz  
 WATER DEPTH        FMS

EE  
 DU  
 EX

140HZ

SECRET

290HZ

295HZ

150

150

200

250

300

MRA

IDENTIFICATION

RECORD NUMBER 11

ANALYSIS BAND WIDTH

Hz

PER DEPTH (YOC)

PM

TAPE COUNT 3

ELEMENT NUMBERS

DATE

EXERCISE: BEARING STALE

SECRET

SAN-XXX-78-0133

# CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 3

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 16

## SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-36.2</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-26.2	
BEAMFORMER GAIN	<u>+18</u>	-8.2	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	-8.0	SIG. LEVEL FOR SIGNAL GAIN

## NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-59.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-49.8	
BEAMFORMER GAIN	<u>+18</u>	-31.8	NOISE LEVEL FOR SNR CALCULATION

## SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-9.2</u>	
SIGNAL LEVEL FOR SNR	<u>-31.8</u>	23.6	
PROCESSOR CORRECTION	<u>-4.0</u>	19.6	
MRA CORRECTION	<u>+ .2</u>	19.4	SNR 1/16 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	11.2	SNR 1 HZ BAND

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# CONFIDENTIAL

# CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 3

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 16

## SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-43.5</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-33.5	
BEAMFORMER GAIN	<u>+18</u>	-15.5	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	-14.7	SIG. LEVEL FOR SIGNAL GAIN

## NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-66.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-56.8	
BEAMFORMER GAIN	<u>+18</u>	-38.8	NOISE LEVEL FOR SNR CALCULATION

## SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-15.5</u>	
SIGNAL LEVEL FOR SNR	<u>-38.8</u>	23.3	
PROCESSOR CORRECTION	<u>-4.0</u>	19.3	
MRA CORRECTION	<u>+ .8</u>	20.1	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	11.9	SNR 1 HZ BAND

# CONFIDENTIAL

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DATA POINT 3

## SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-32.5</u>	<u>-38.6</u>	<u>      </u>
MRA SIGNAL LEVEL	<u>- 8.0</u>	<u>-14.7</u>	<u>      </u>
ARRAY SIGNAL GAIN	<u>24.5</u>	<u>23.9</u>	<u>      </u>
20 LOG <u>16</u>	<u>24</u>	<u>24</u>	<u>      </u>
# of elements			
DIFFERENCE	<u>+ .5</u>	<u>- .1</u>	<u>      </u>

## ARRAY GAIN

MRA SNR	<u>19.8</u>	<u>20.0</u>	<u>      </u>
MEAN OMNI SNR	<u>9.0</u>	<u>8.8</u>	<u>      </u>
ARRAY GAIN	<u>10.8</u>	<u>14.2</u>	<u>      </u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>10</u>	<u>12.3</u>	<u>      </u>
DIFFERENCE	<u>+ .8</u>	<u>+ 1.9</u>	<u>      </u>

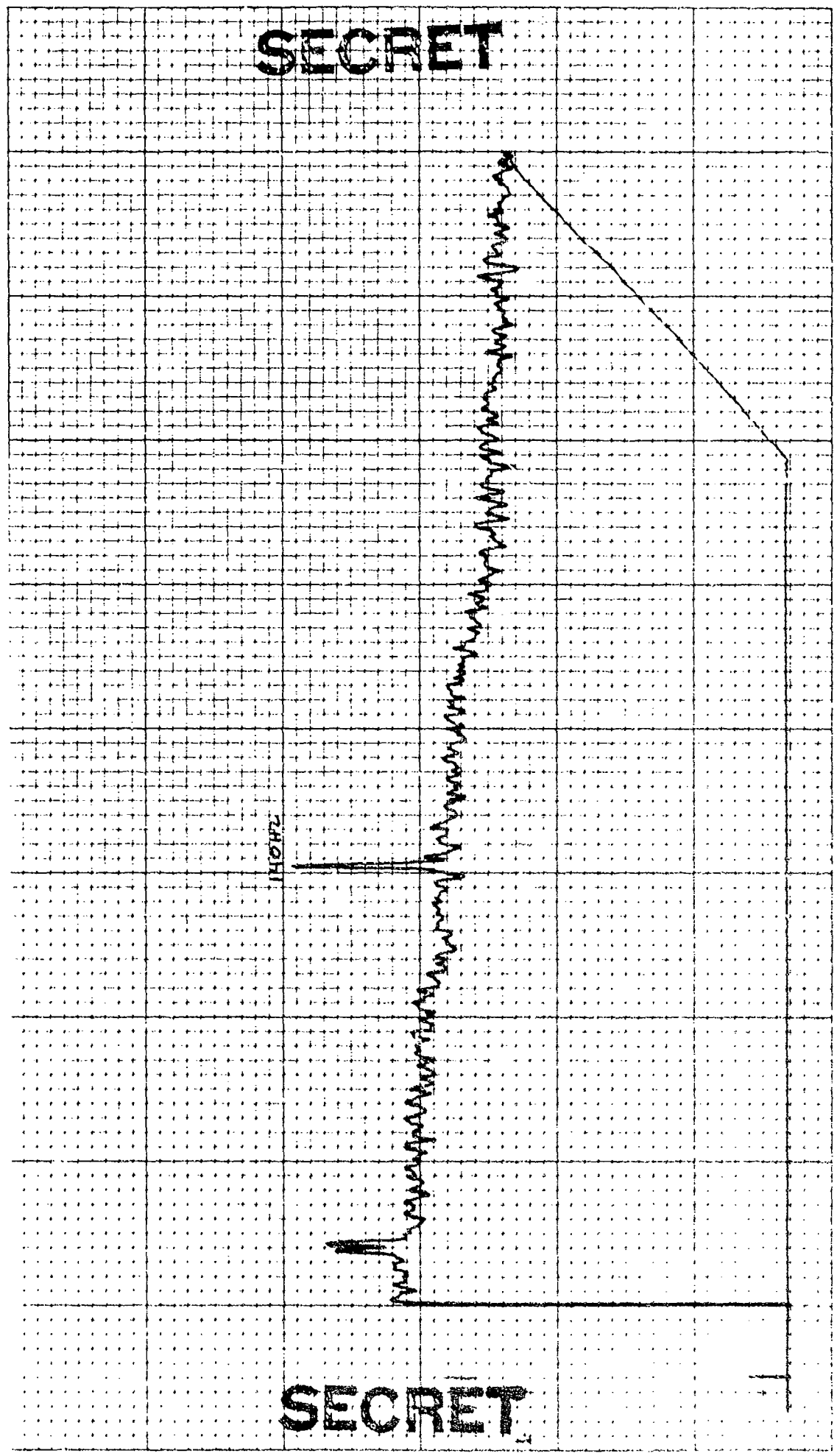
# CONFIDENTIAL

CONTROL: 2.7 -0934 (16)  
 BEAMFORMED SPECTRUM(ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 150 HZ  
 16 ELEMENTS

DATE OF ANALYSIS: 1-16 )  
 DATE/TIME: 2-7-77 -0934 Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 +/- DEG. AZ STEERING

REEL: F 14  
 INTEGRATION TIME 320 SECS  
 FILTER WTG: HANNING

INDE X357S  
 ATTN: -10 DB



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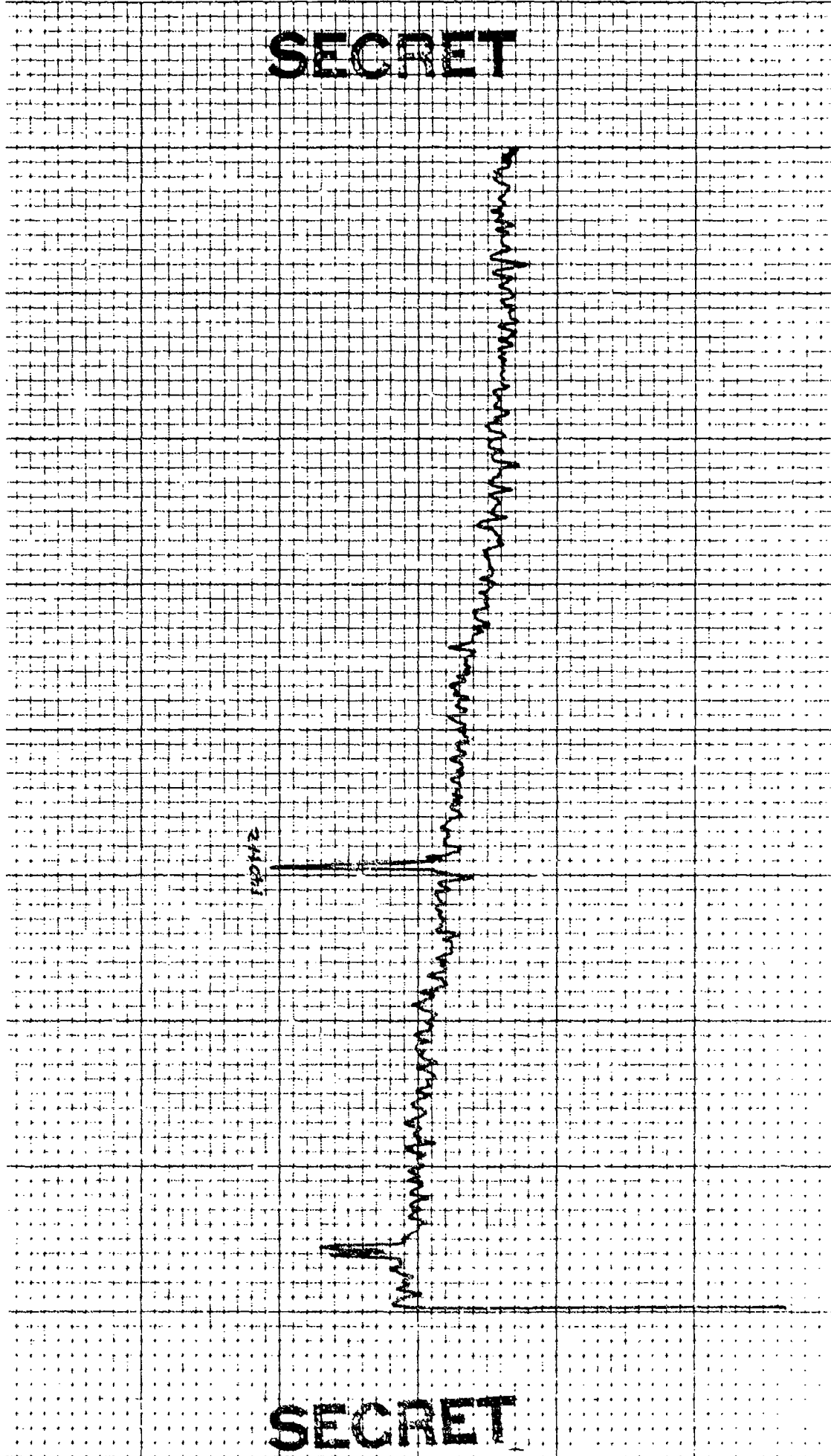
SECRET

10-104

CONTROL: 2-7 -0934 (16)  
BEAMFORMED SPECTRUM(ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
16 ELEMENTS

DATE OF ANALYSIS: 1-16  
DATE/TIME: 2-7-77 -0935 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
+10 DEG. AZ STEERING

REEL: F-4 INDE X3575  
INTEGRATION TIME 320 SECS  
ATTEN: -18 DB  
FILTER WTC: HANNING





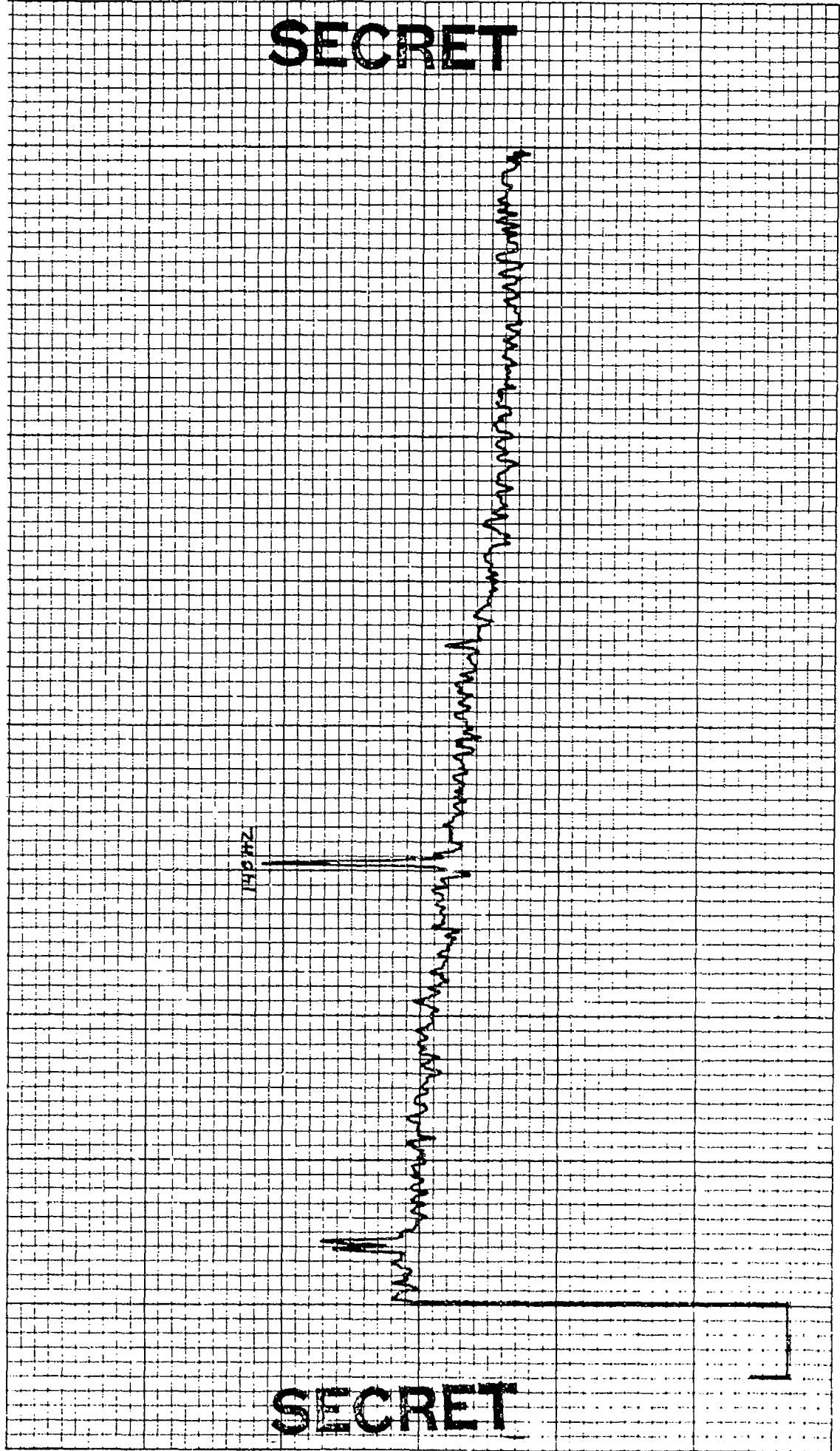
21-10P

CONTROL: 2-7 -0834 (16)  
 BEAMFORMED SPECTRUM(ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 150 HZ  
 16 ELEMENTS

DATE OF ANALYSIS: 1-16  
 DATE/TIME: 2-7-77 -0834 Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 +20 DEG. AZ STEERING

REEL: F/4  
 INTEGRATION TIME 320 SECS  
 FILTER WTC: HANNING

INDE XJ575  
 ATTN: -/8 DB



4( )3

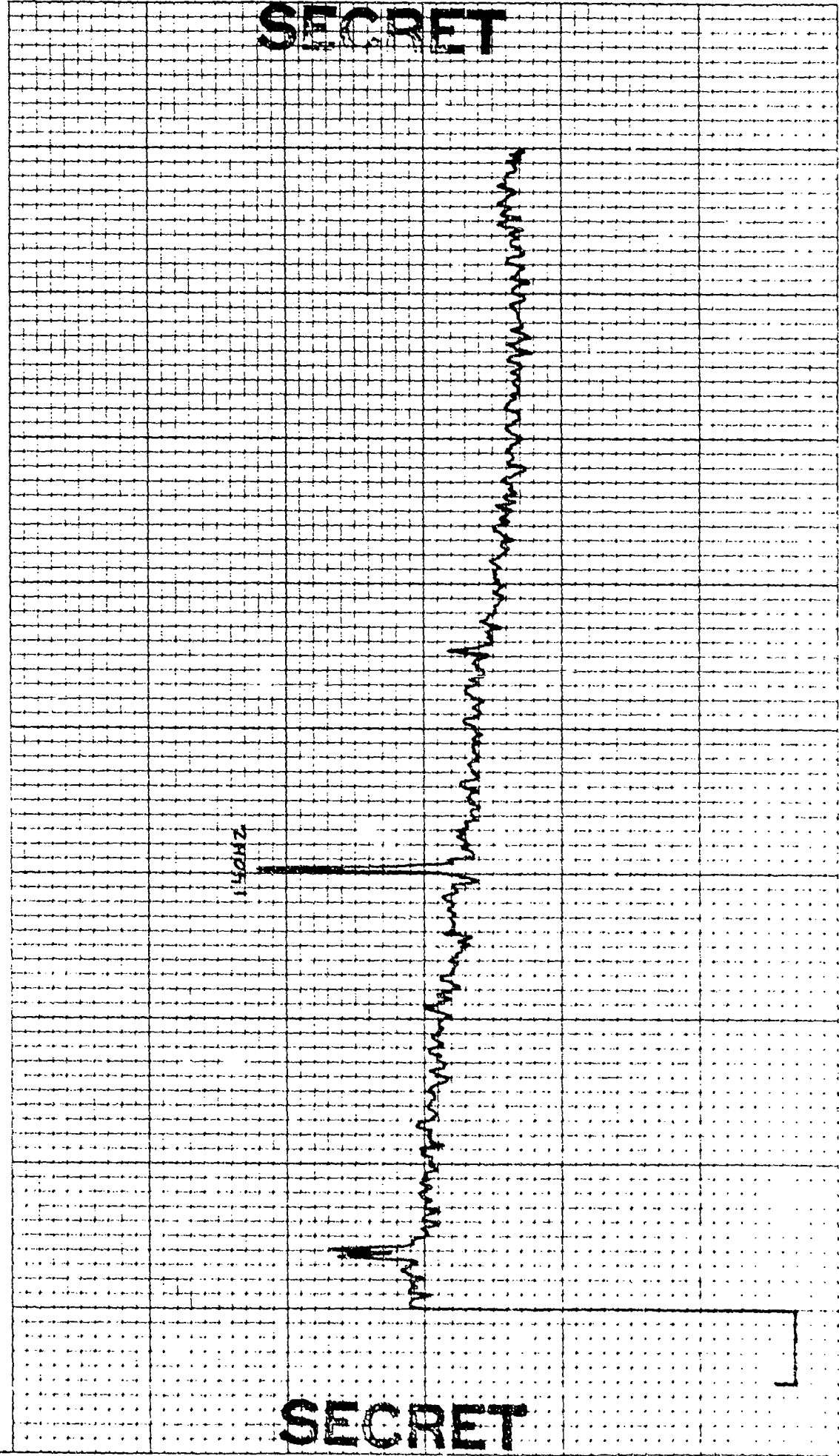
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& ES

2 16

CONTROL: 2-7 -0934 (16)      DATE OF ANALYSIS:             REEL: F14      INDE X3575  
BEAMFORMED SPECTRUM(ELEMENTS)      1-16  
EXERCISE: BEARING STAKE      DATE/TIME: 2-7-77 -0934 Z      INTEGRATION TIME 320 SECS      ATTEN: -10 DB  
CENTER FREQ: 150 HZ      ANALYSIS BANDWIDTH: 1/10HZ      FILTER      WTG: HANNING  
16 ELEMENTS      222 DEG. AZ STEERING



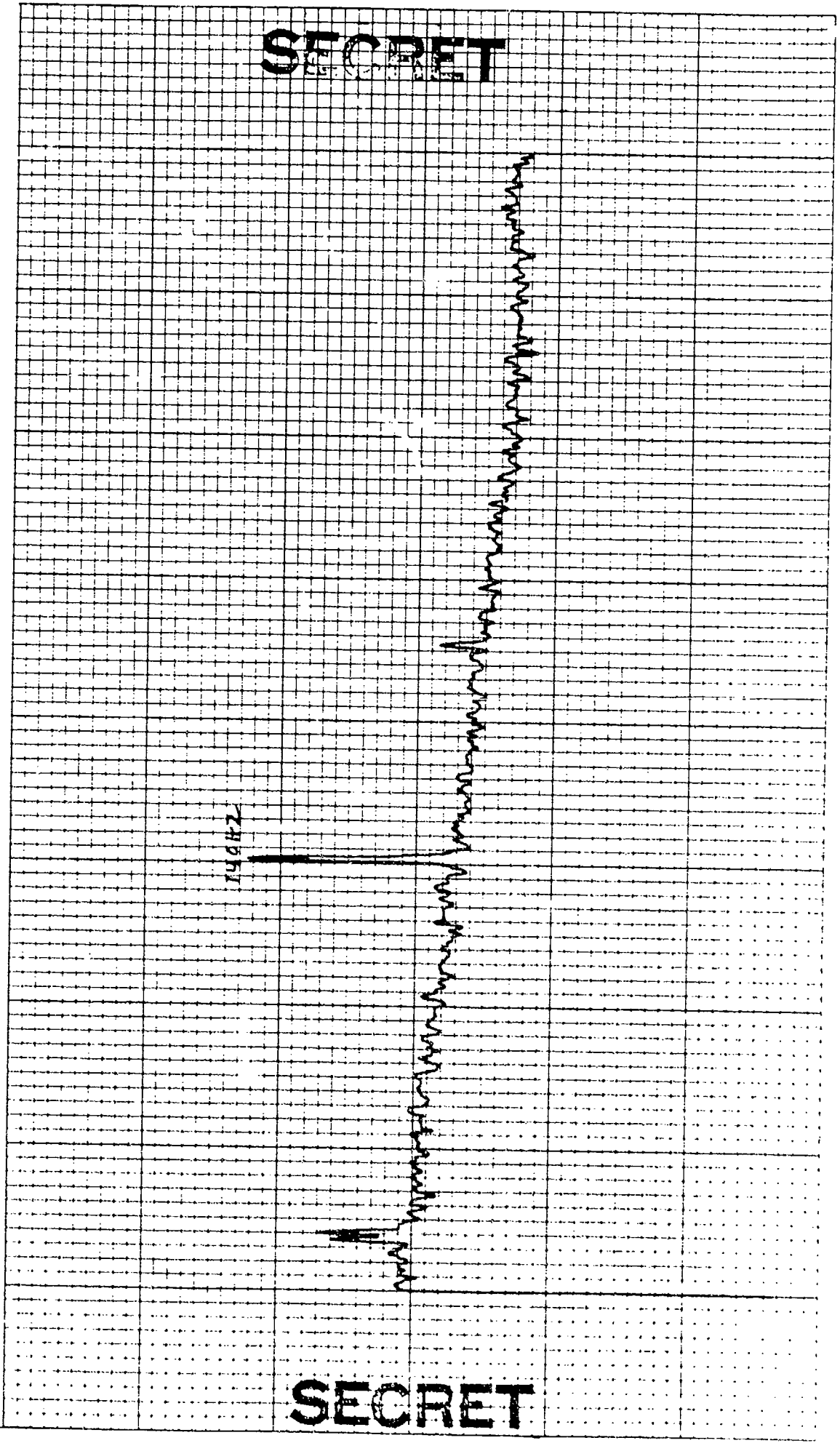
CONTROL: 2-7 - 0934 (16 )  
 BEAMFORMED SPECTRUM(ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 150 HZ  
 16 ELEMENTS

DATE OF ANALYSIS: - - - - -  
 1-16

DATE/TIME: 2-7-77 - 0934 Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 124 DEG. AZ STEERING

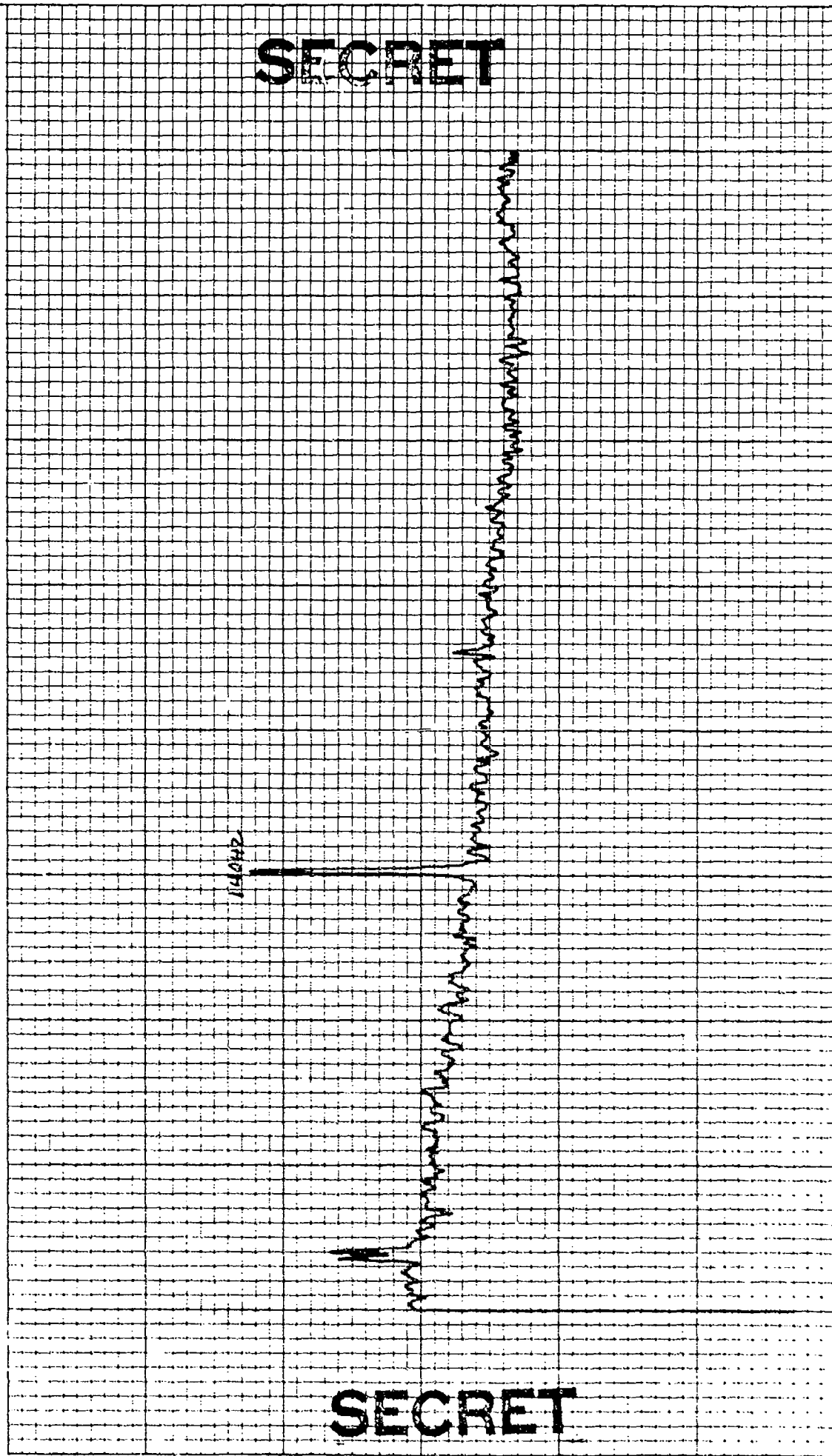
REEL: F14 INDE X3575

INTEGRATION TIME 320 SECS ATTN: -/0 DB  
 FILTER WTG: HANNING

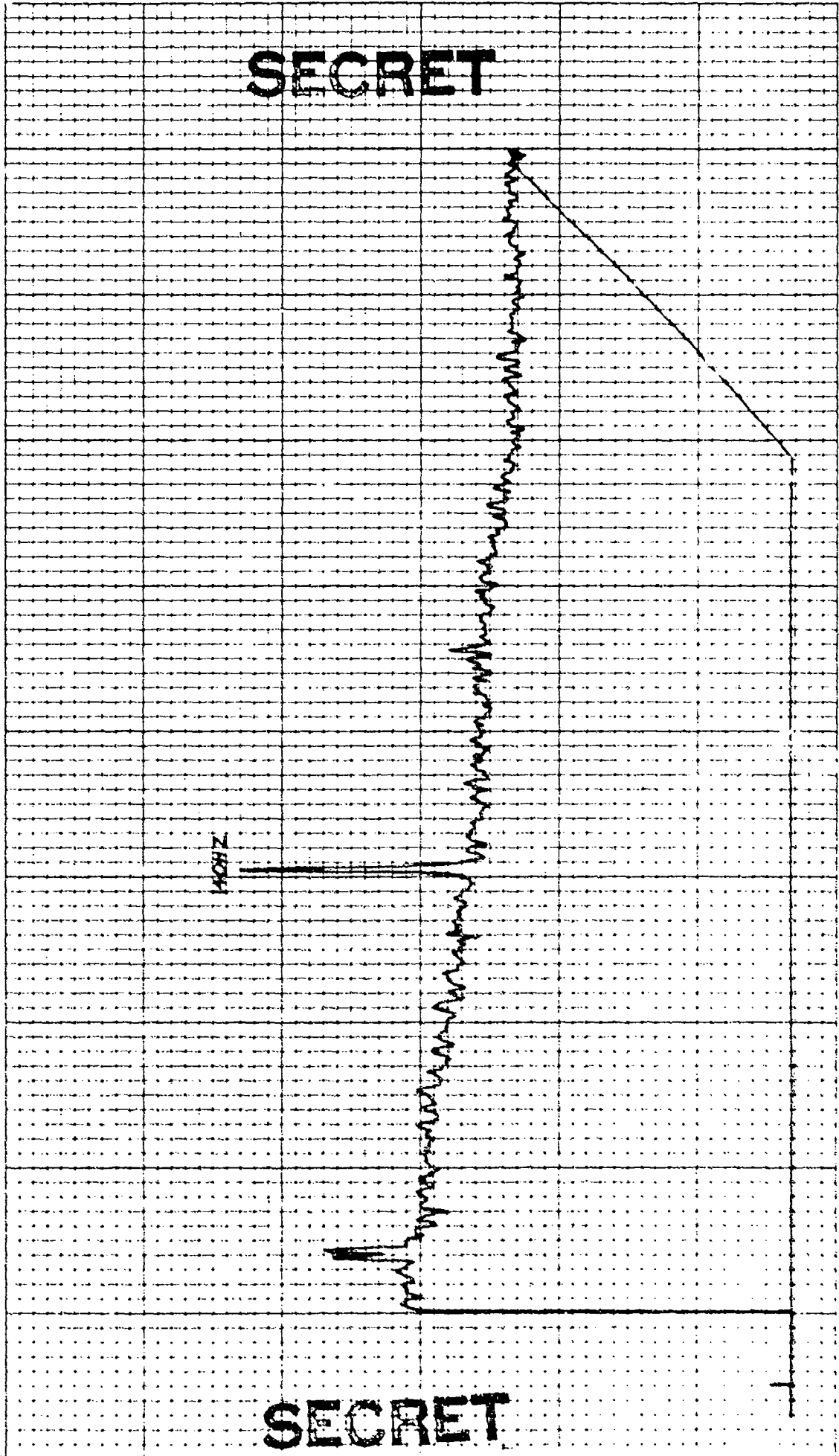


160

CONTROL: 2-7 -0974 (16) REEL: F14 INDE XR375  
 BEAMFORMED SPECTRUM (ELEMENTS)  
 EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: -10 DB  
 CENTER FREQ: 150 HZ FILTER WTG: HANNING  
 16 ELEMENTS  
 DATE OF ANALYSIS: 1-16  
 DATE/TIME: 2-7-77 -0934 Z  
 ANALYSIS BANDWIDTH: 1/10 HZ  
 120 DEG. AZ STEERING



CONTROL: 0934 - 51 (DP3)      DATE OF ANALYSIS:      REEL: F/V      INDE X3525  
 BEAMFORMED SPECTRUM(ELEMENTS)      / - /  
 EXERCISE: BEARING STAKE      DATE/TIME: 2-7-77 - 0934Z      INTEGRATION TIME 320 SECS      ATTN: 10 DB  
 CENTER FREQ: 150 HZ      ANALYSIS BANDWIDTH: 1/10HZ      FILTER      WTG: HANNING  
 /6 ELEMENTS      +27 DEG. AZ STEERING



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REEL: F/4 INDE X3525

INTEGRATION TIME 320 SECS ATTEN: 7/ DB  
FILTER WTG: HANNING

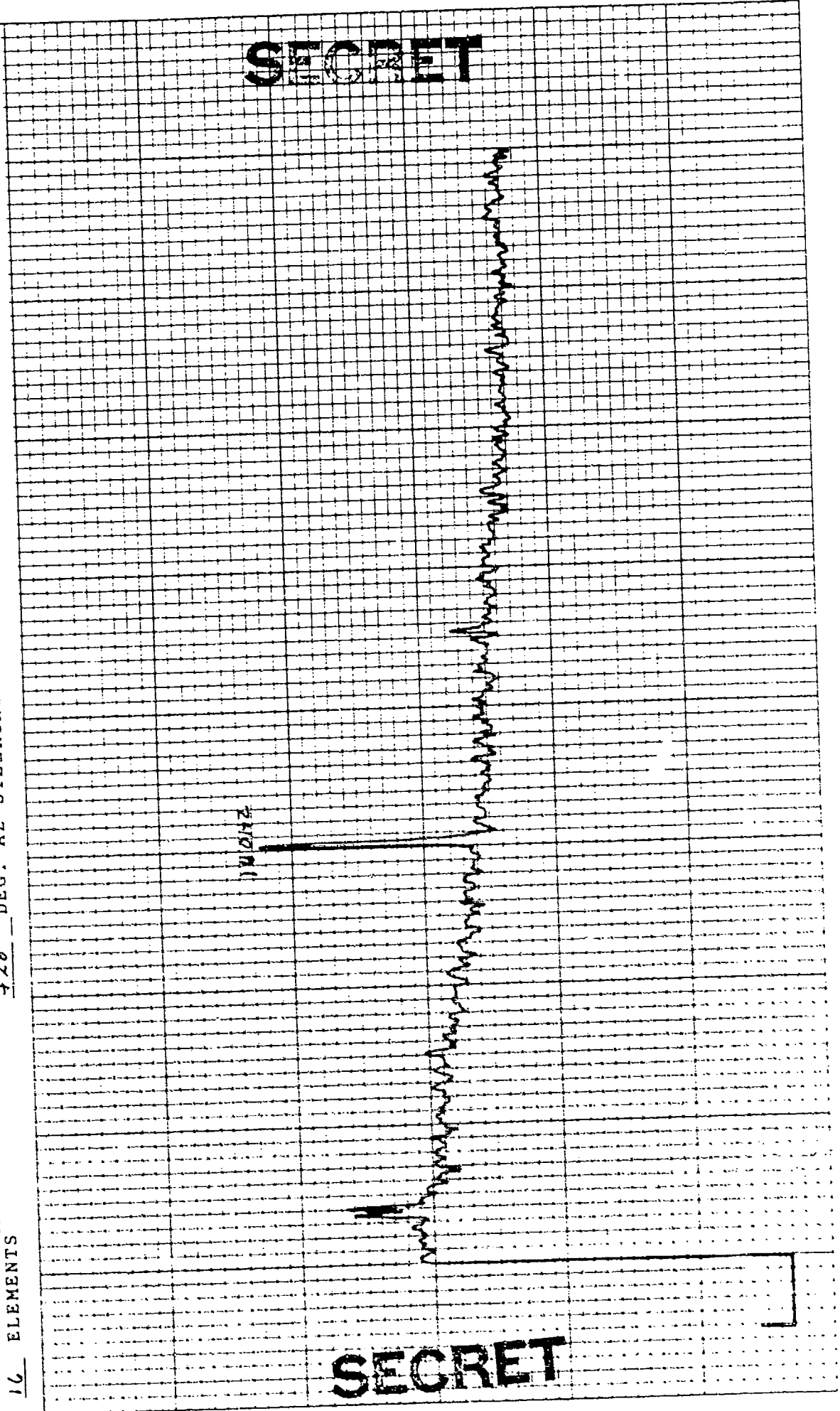
DATE OF ANALYSIS: 1-16

DATE/TIME: 2-7-77 - 0934 Z

ANALYSIS BANDWIDTH: 1/10HZ

+20 DEG. AZ STEERING

CONTROL: 27 - 0934 (16)  
BEAMFORMED SPECTRUM (ELEMENTS  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
16 ELEMENTS



**SECRET**

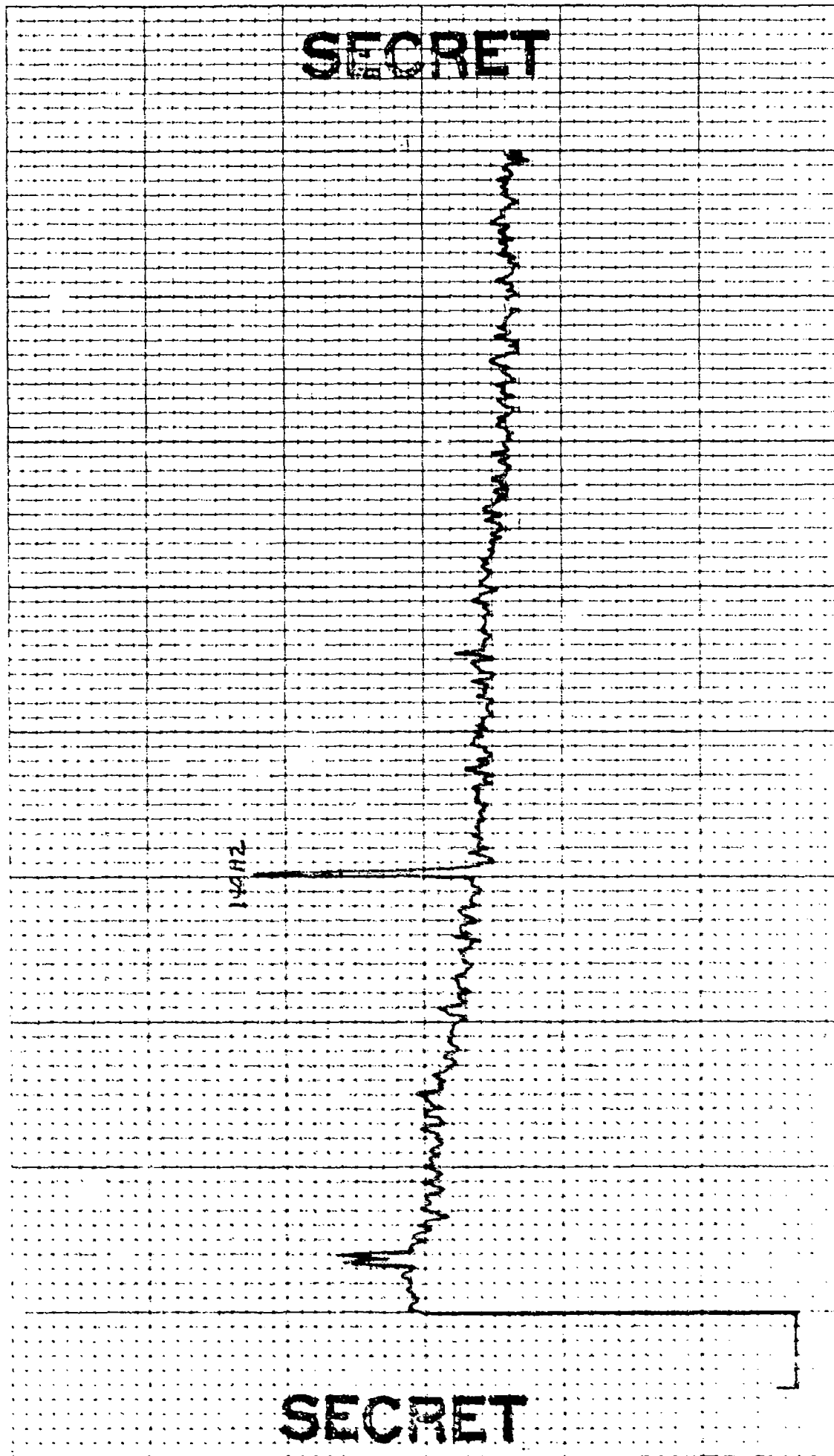
**SECRET**

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CONTROL: 2-7 -0934 (16 )  
BEAMFORMED SPECTRUM(ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
16 ELEMENTS

DATE OF ANALYSIS: - - - - -  
1-16 )  
DATE/TIME: 2-7-77 -0934 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
+30 DEG. AZ STEERING

REEL: F14 INDE X3575  
INTEGRATION TIME 320 SECS ATTEN: -10 DB  
FILTER WTG: HANNING



47-03

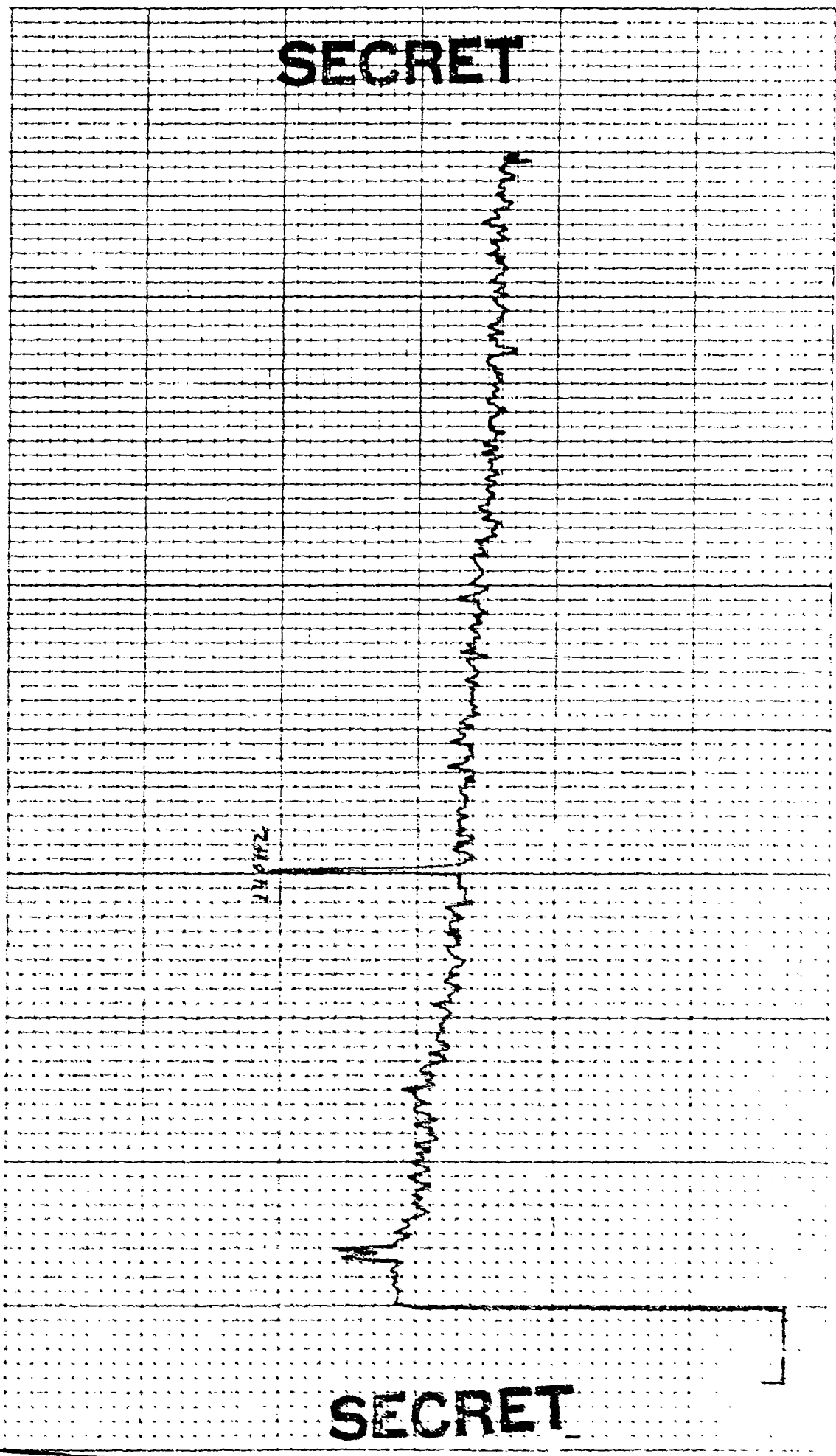
CONTROL: 2.7 - 0934 (16)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
16 ELEMENTS

DATE OF ANALYSIS: 1-16

DATE/TIME: 2-7-77 - 0934 Z  
ANALYSIS BANDWIDTH: 1/10 HZ  
+32 DEG. AZ STEERING

REEL: F14 INDE X1573

INTEGRATION TIME 320 SECS  
ATTEN: -11 DB  
FILTER WTG: HANNING



2.7 GHz

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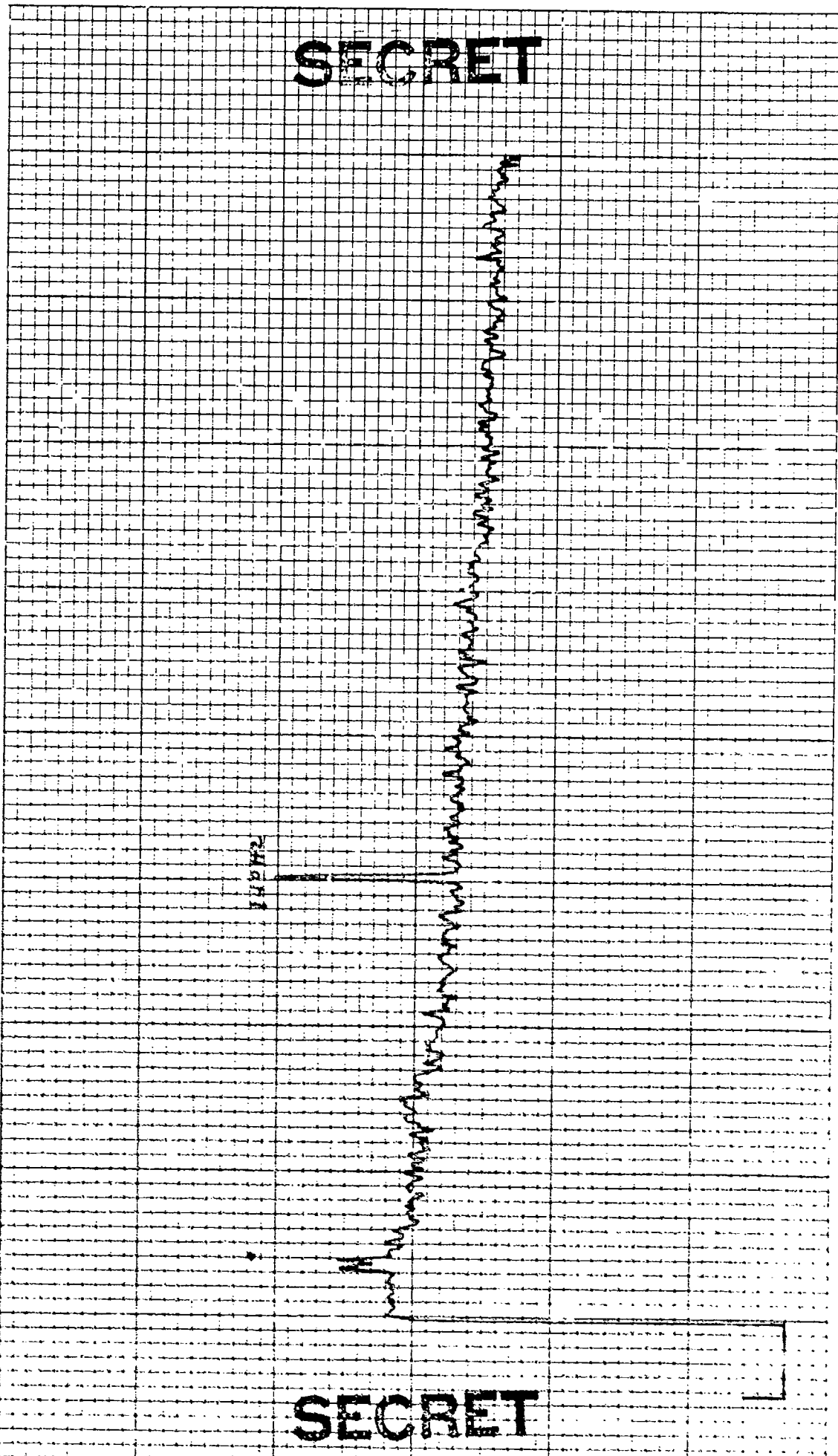


CONTROL: 2-7 -0914 (16)  
 BEAMFORMED SPECTRUM (ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 150 HZ  
 16 ELEMENTS

DATE OF ANALYSIS: 1-16  
 DATE/TIME: 2-7-77 -0934Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 +34 DEG. AZ STEERING

REEL: F-14  
 INTEGRATION TIME 320 SECS  
 FILTER WTG: HANNING

INDE XJ5-25



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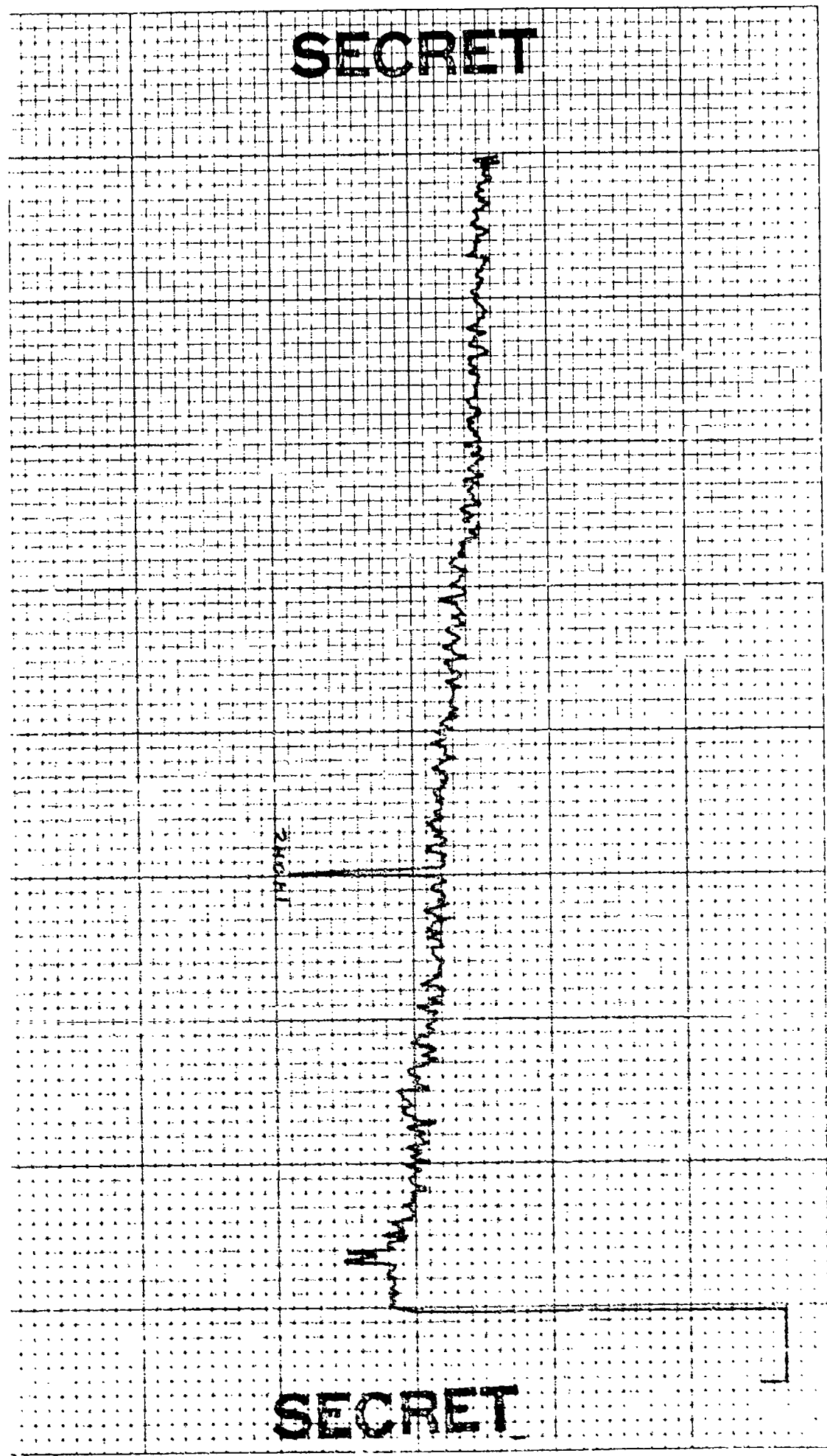
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4

CONTROL: 2-2 -0834 (16)  
DEAMPFORMED SPECTRUM(ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
16 ELEMENTS

DATE OF ANALYSIS: / - /  
DATE/TIME: 2-7-77 - 0834 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
+376 DEG. AZ STEERING

REEL: F/4 INDE X3575  
INTEGRATION TIME 320 SECS ATTEN: -70 DB  
FILTER WTC: HANNING



121

INDE X3575

REL: F/4

DATE OF ANALYSIS: 1-16

CONTROL: 2-7 - 0934 (16)

INTEGRATION TIME 320 SECS

DATE/TIME: 2-7-77 - 0934 Z

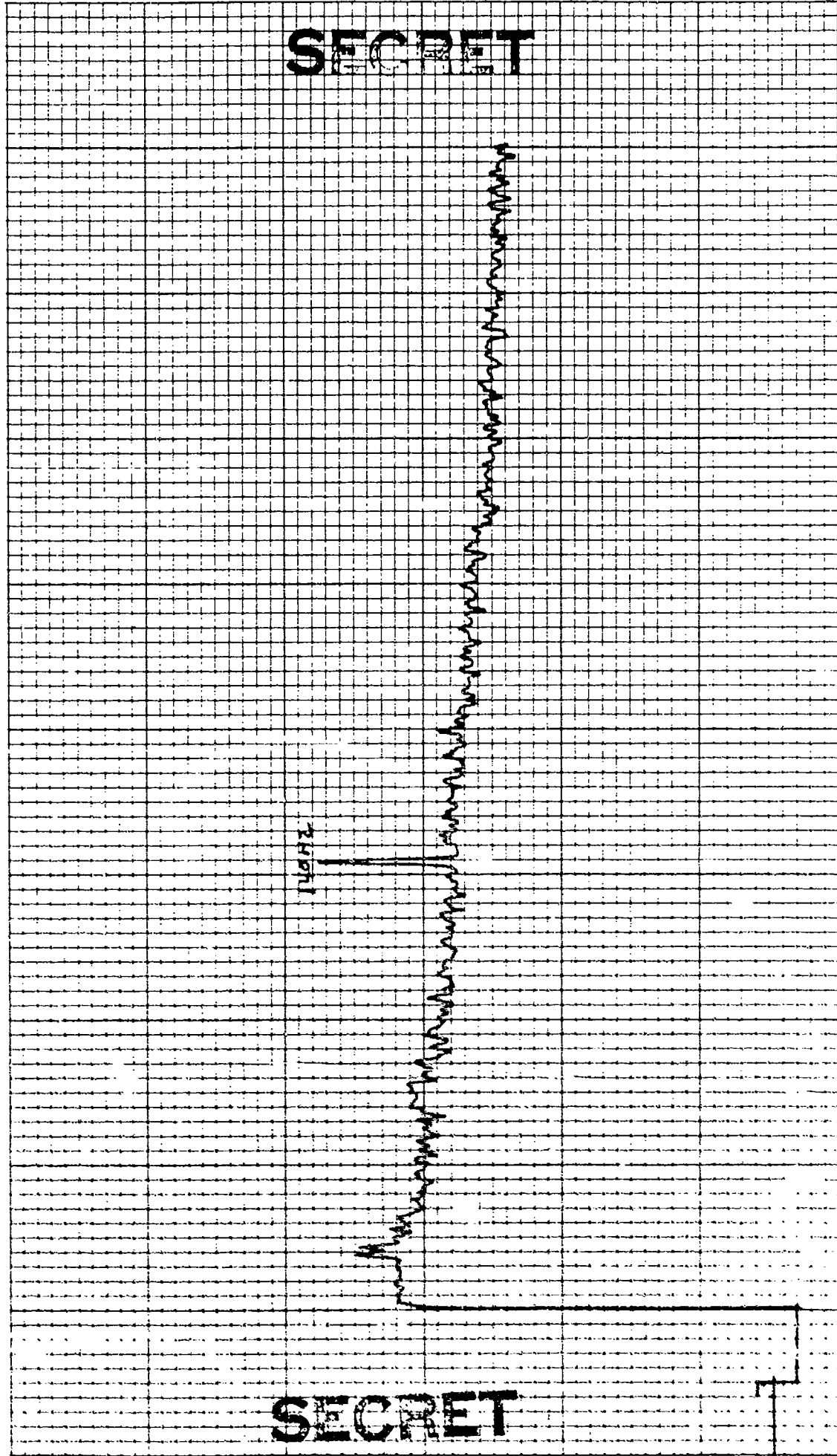
ATTEN: -70 DB

ANALYSIS BANDWIDTH: 1/10HZ

FILTER WTG: HANNING

+30 DEG. AZ STEERING

BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
16 ELEMENTS



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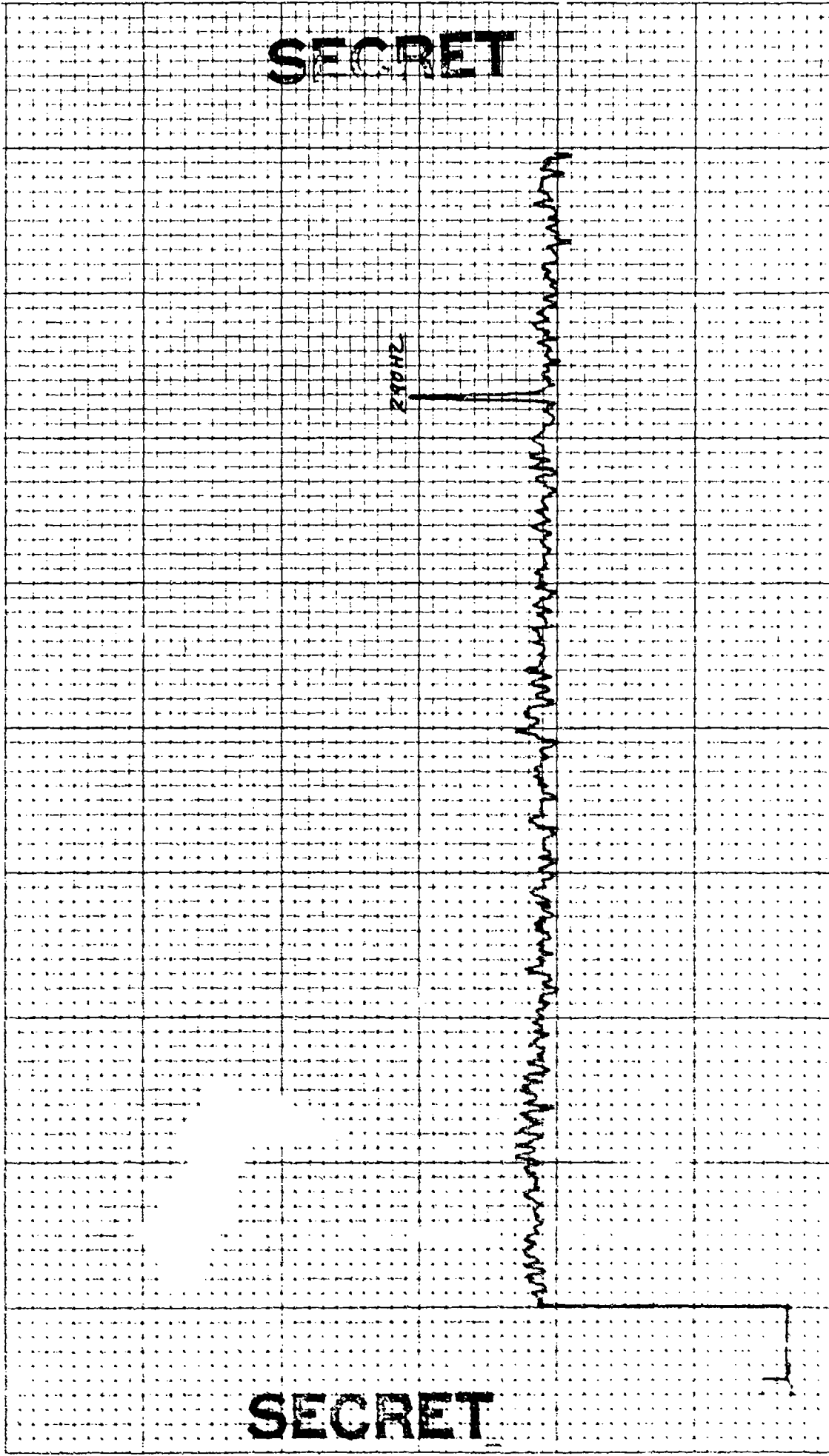
CONTROL: 2-7 -0734 (16 )  
 BEAMFORMED SPECTRUM(ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
 16 ELEMENTS

DATE OF ANALYSIS: - - - -  
 1 - 16

DATE/TIME: 2-7-77 -0734 Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 +/- DEG. AZ STEERING

REEL: F14 INDE X3575

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



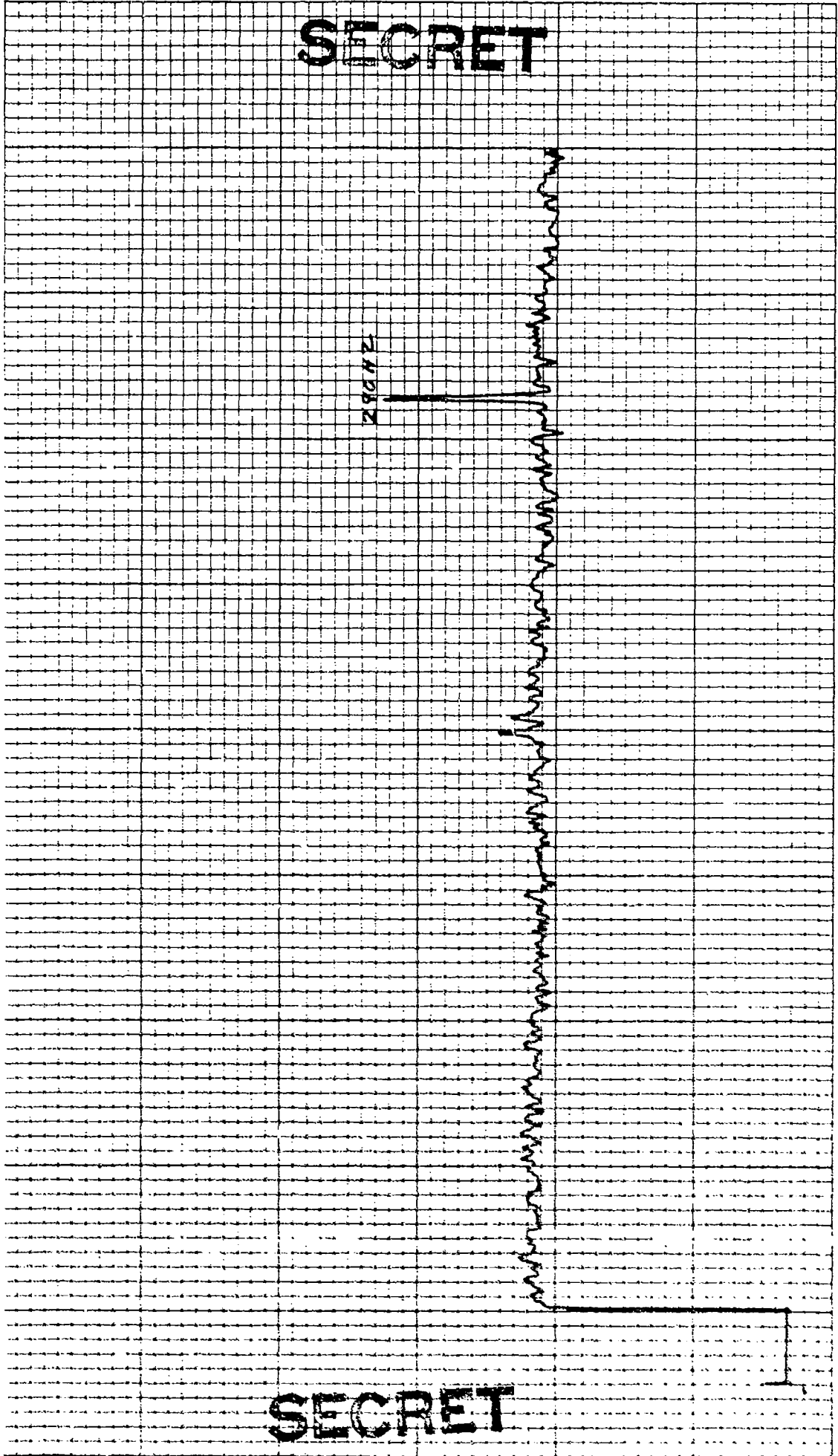
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CONTROL: 2.7 - 0934 (16)      DATE OF ANALYSIS:      REEL: F/4      INDE X3575  
 BEAMFORMED SPECTRUM(ELEMENTS)      1-16  
 EXERCISE: BEARING STAKE      DATE TIME: 2.7.77 - 0934 Z      INTEGRATION TIME 320 SECS      ATTN: -18 DB  
 CENTER FREQ: 270 HZ      ANALYSIS BANDWIDTH: 1/10HZ      FILTER      WTC: HANNING  
16 ELEMENTS      +18 DEG. AZ STEERING



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REEL: F14 INDE X3575

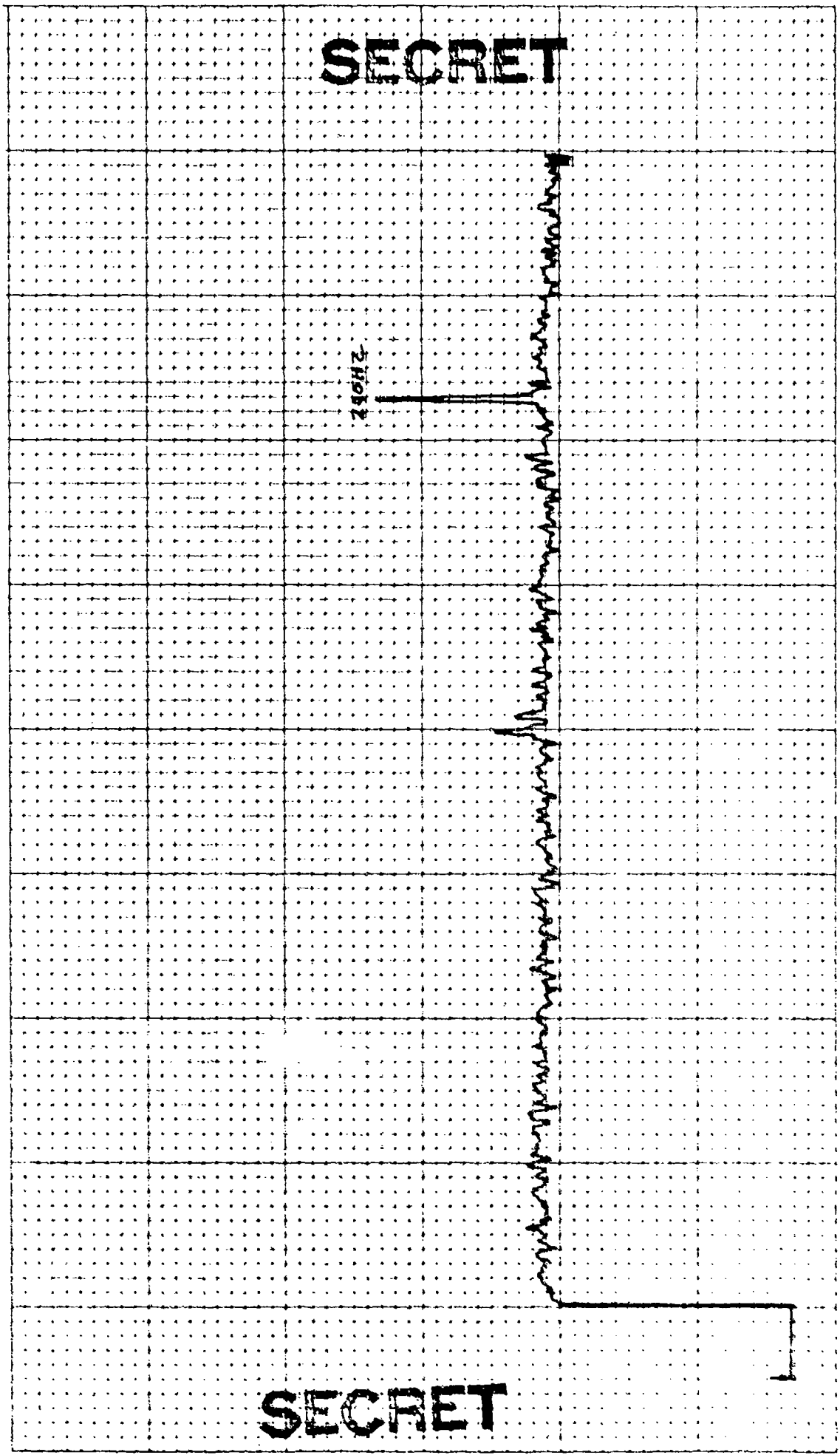
INTEGRATION TIME 320 SECS

ATTEN: 70 DB  
FILTER WTG: HANNING

DATE OF ANALYSIS: - - - - -  
/ - / 6

DATE/TIME: 2-7-77 -0934 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
+2.0 DEG. AZ STEERING

CONTROL: 2.7 -0934 (16 )  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
/6 ELEMENTS



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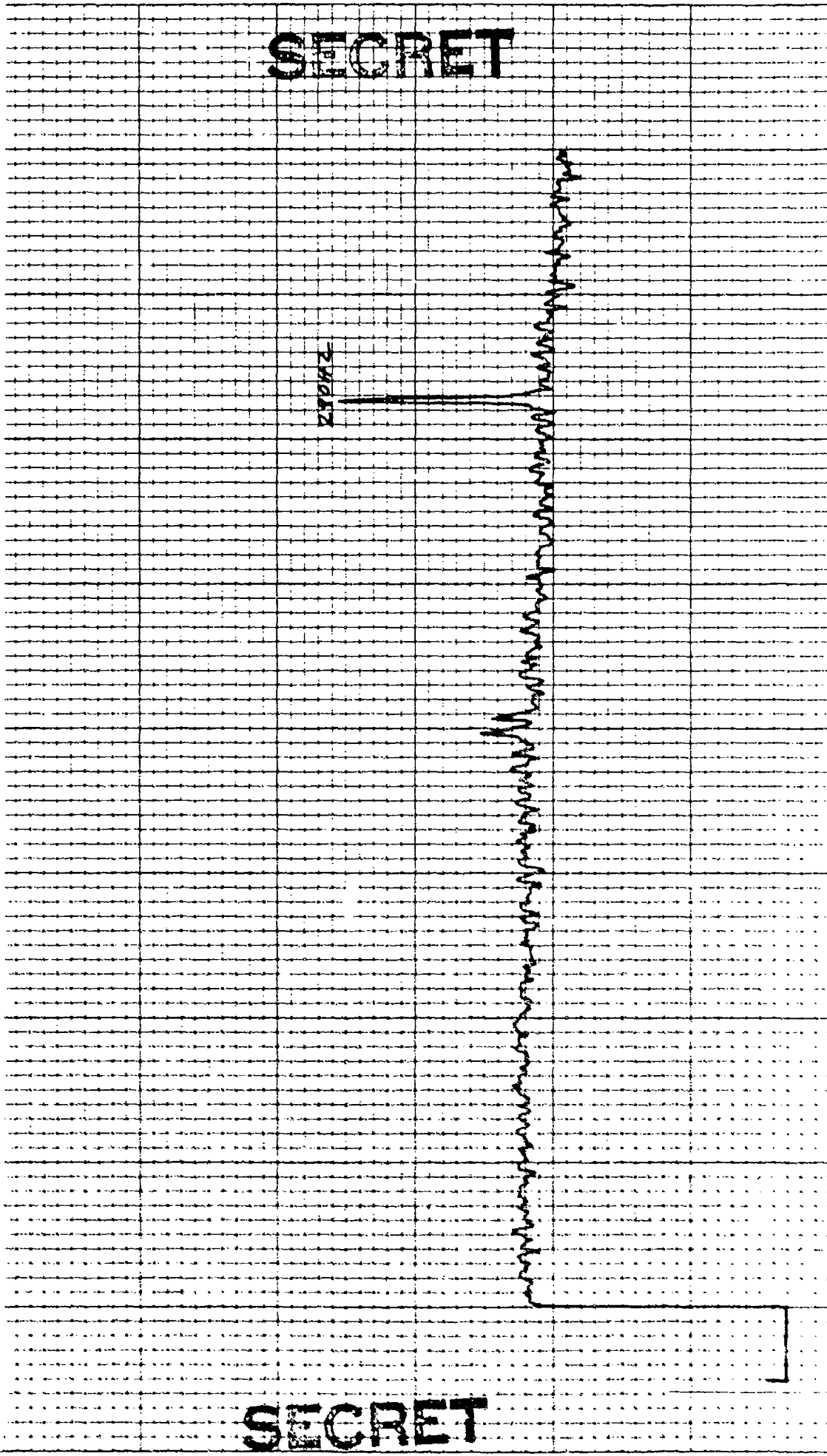
CONTROL: 27-0834 (16)  
 BEAMFORMED SPECTRUM (ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
16 ELEMENTS

DATE OF ANALYSIS: - - - -  
1-16

DATE/TIME: 2-7-77 - 0834 Z  
 ANALYSIS BANDWIDTH: 1/10 HZ  
+222 DEG. AZ STEERING

REEL: F14      INDE X3575

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



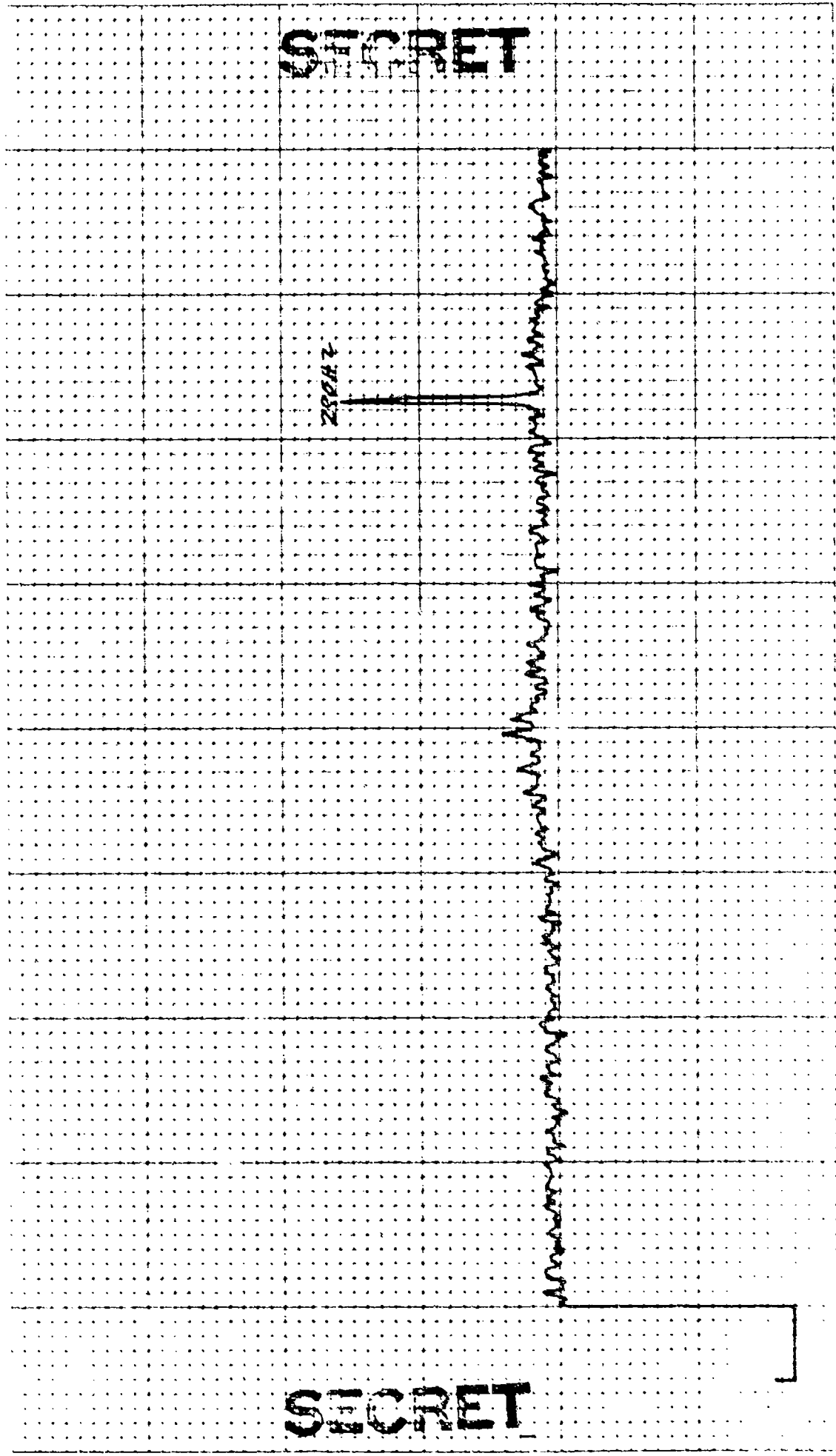
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CONTROL: 2-7-77-0934 (16)  
 BEAMFORMED SPECTRUM(ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
16 ELEMENTS

DATE OF ANALYSIS: 1-16  
 DATE/TIME: 2-7-77-0934 Z  
 ANALYSIS BANDWIDTH: 1/10 HZ  
+24 DEG. AZ STEERING

REEL: F/4 INDE XB75  
 INTEGRATION TIME 320 SECS ATTN: -18 DB  
 FILTER WTC: HANNING



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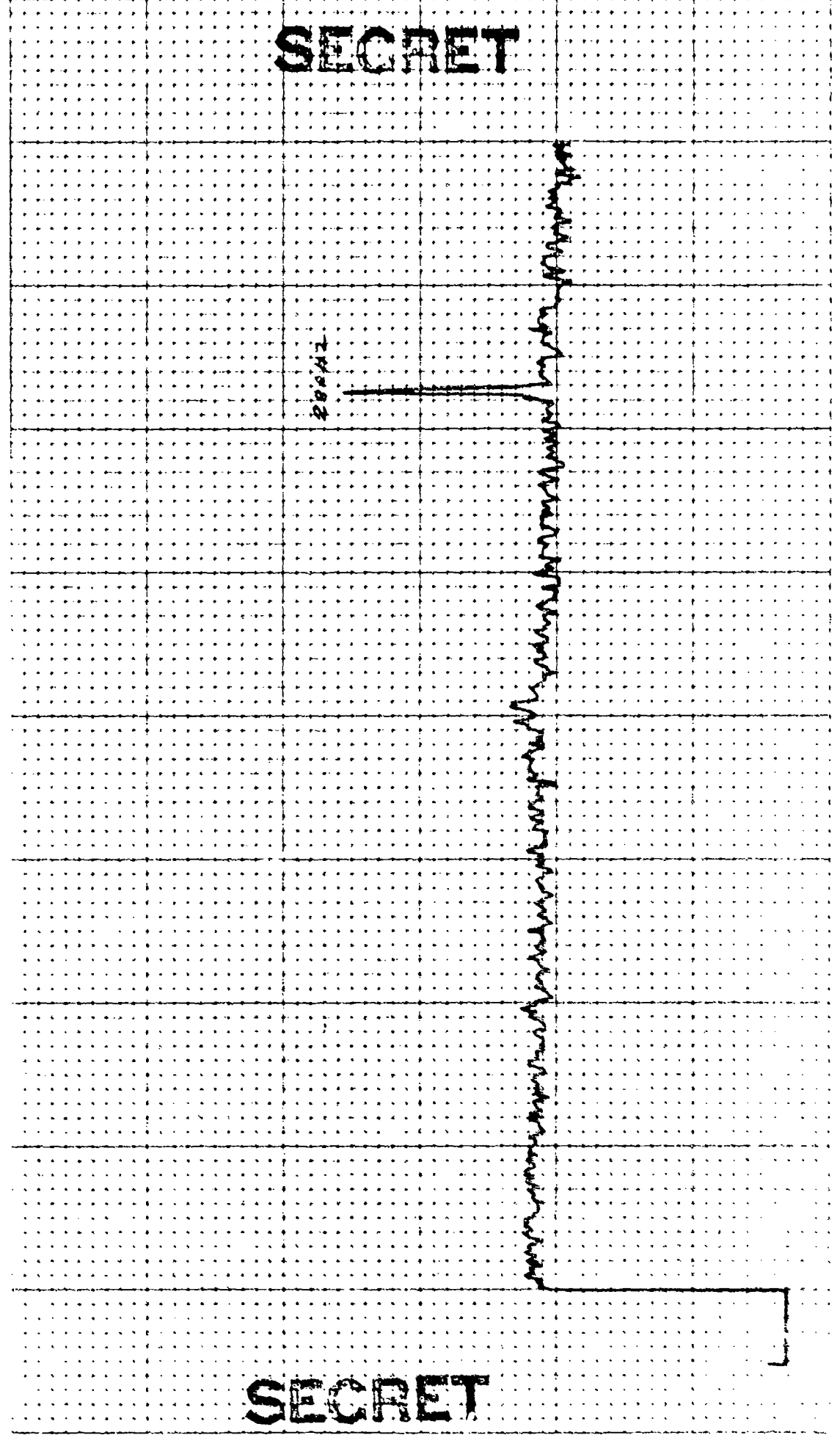


CONTROL: 2-7 -0934 (16)  
 BEAMFORMED SPECTRUM(ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
 16 ELEMENTS

DATE OF ANALYSIS: 1-16  
 DATE/TIME: 2-7-77 -0934 Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 X26 DEG. AZ STEERING

REEL: F/4  
 INTEGRATION TIME 320 SECS  
 FILTER WTC: HANNING

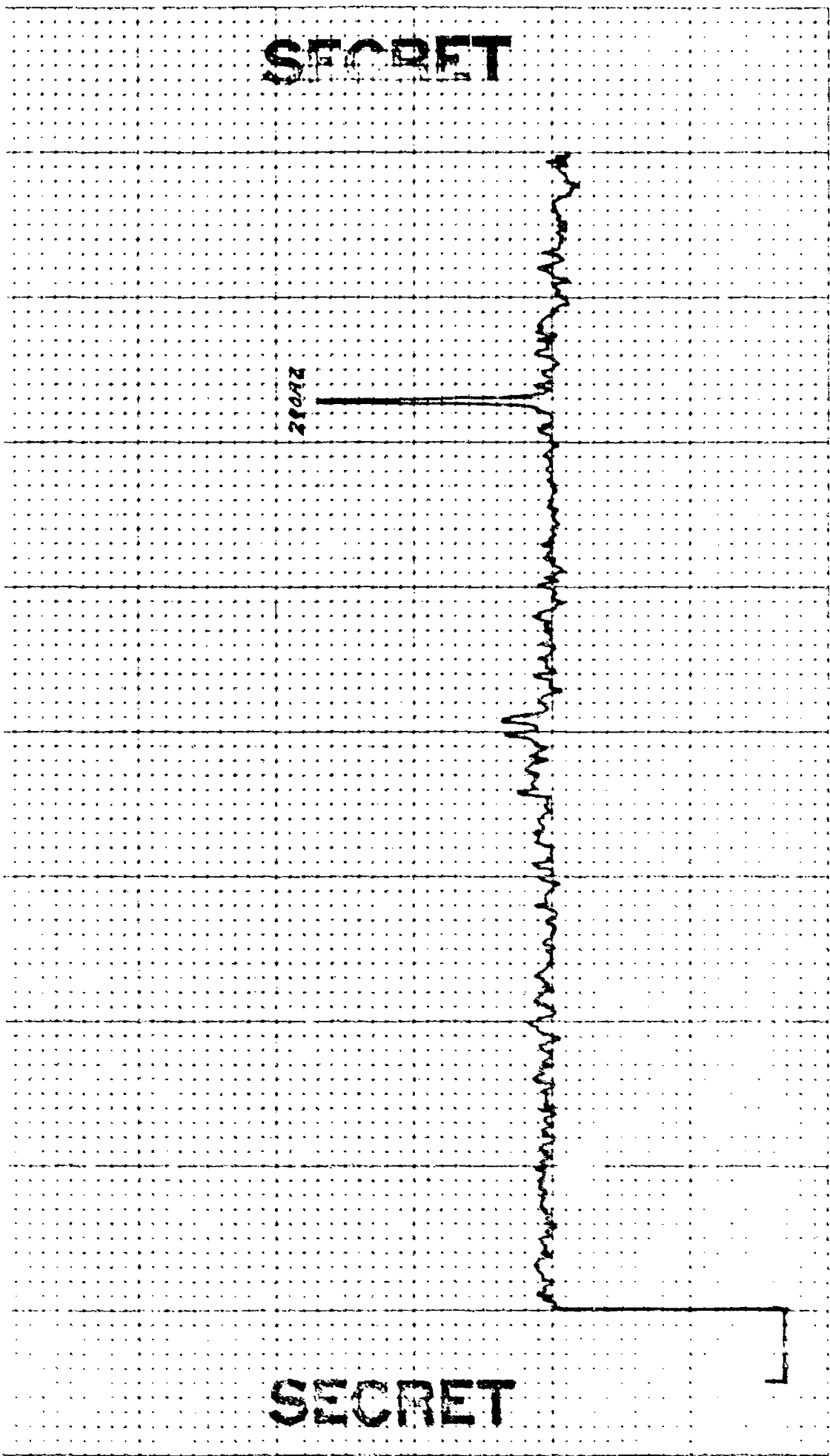
INDE X3375  
 ATTN: -// DB



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CONTROL: 0934 - 51 (093)      DATE OF ANALYSIS: \_\_\_\_\_      REEL: F/4      INDE X 7575  
 BEAMFORMED SPECTRUM(ELEMENTS)      / - /  
 EXERCISE: BEARING STAKE      DATE/TIME: 2-7-77 - 0934 Z      INTEGRATION TIME 320 SECS      ATTEM: 18 DB  
 CENTER FREQ: 270 HZ      ANALYSIS BANDWIDTH: 1/10HZ      FILTER      WIG: HANNING  
16 ELEMENTS      437 DEG. AZ STEERING



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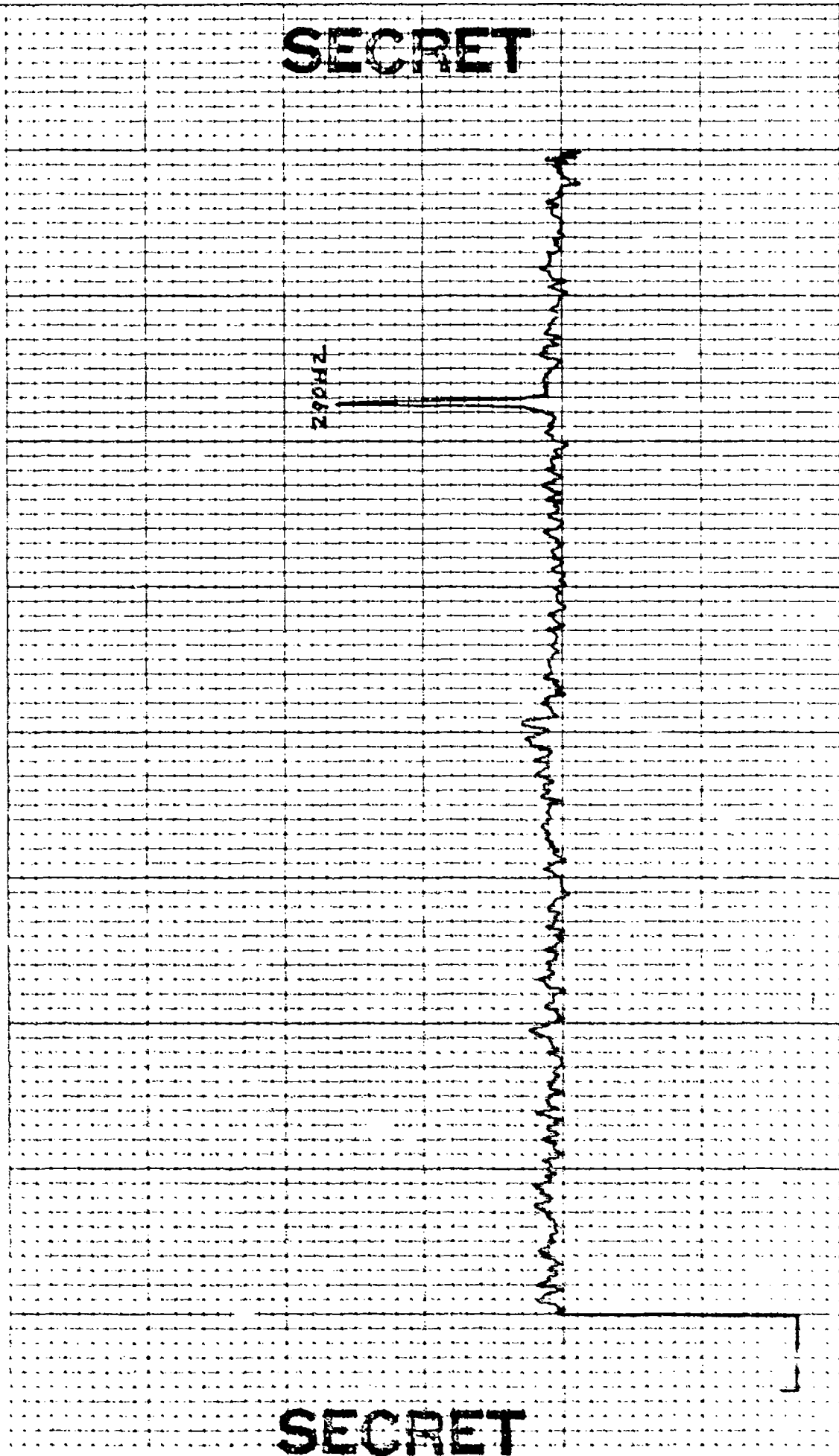
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CONTROL: 2-7 -0934 ( 16 )  
 BEAMFORMED SPECTRUM(ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
 16 ELEMENTS

DATE OF ANALYSIS: 1-16  
 DATE/TIME: 2-7-77 -0934 Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 +20 DEG. AZ STEERING

REEL: F1Y  
 INTEGRATION TIME 320 SECS  
 FILTER WTG: HANNING

INDE X3575



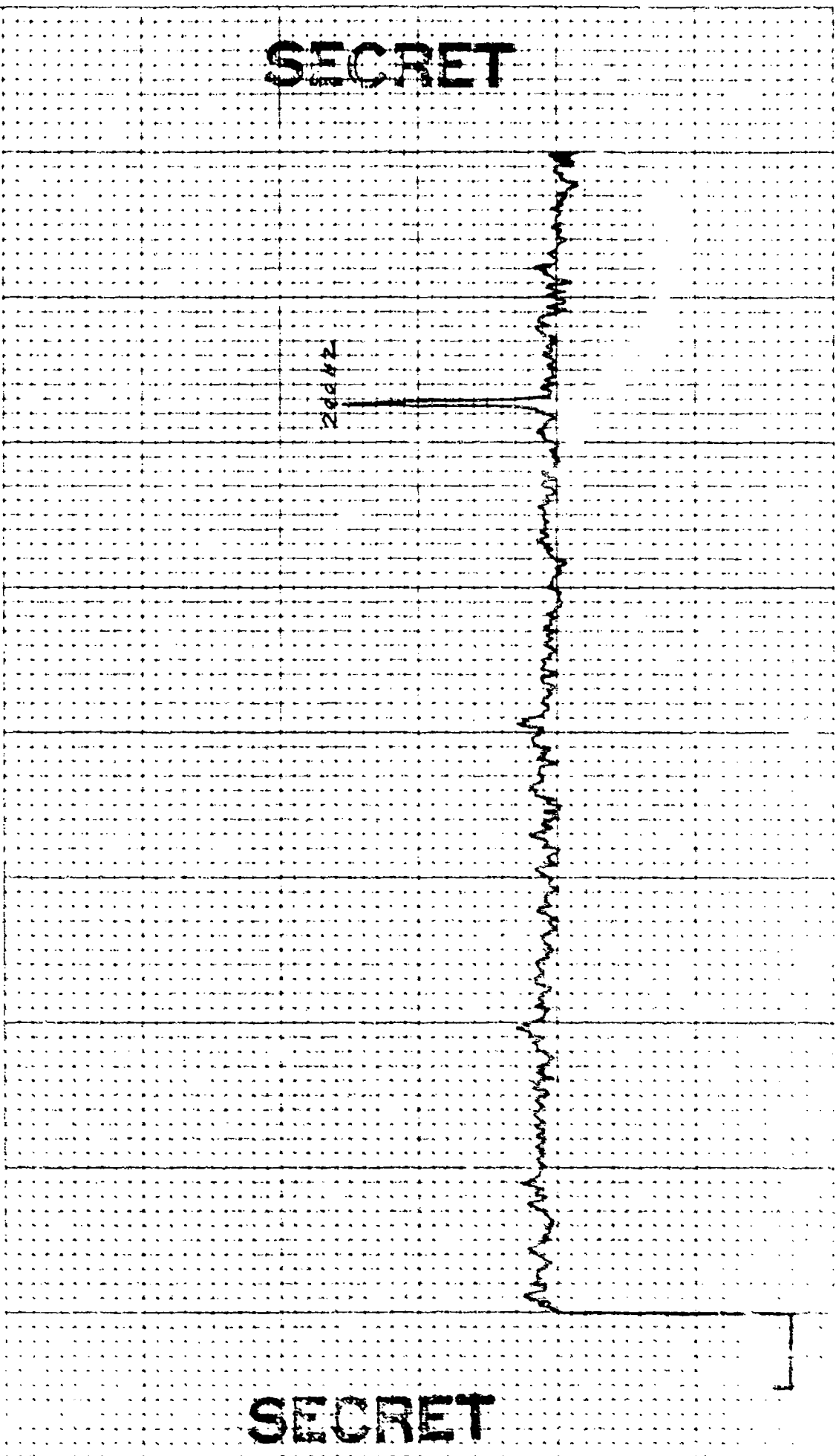
46 13

CONTROL: 2-7 -0834 (16 )      DATE OF ANALYSIS: - - - -  
BEAMFORMED SPECTRUM(ELEMENTS)      /- /6  
EXERCISE: BEARING STAKE      DATE/TIME: 2-7-77 -0834 Z  
CENTRY FREQ: 270 HZ      ANALYSIS BANDWIDTH: 1/10HZ  
16 ELEMENTS      +30 DEC. AZ STEERING

REEL: F14

INDE X3525

INTEGRATION TIME 320 SECS  
FILTER WTC: HANNING



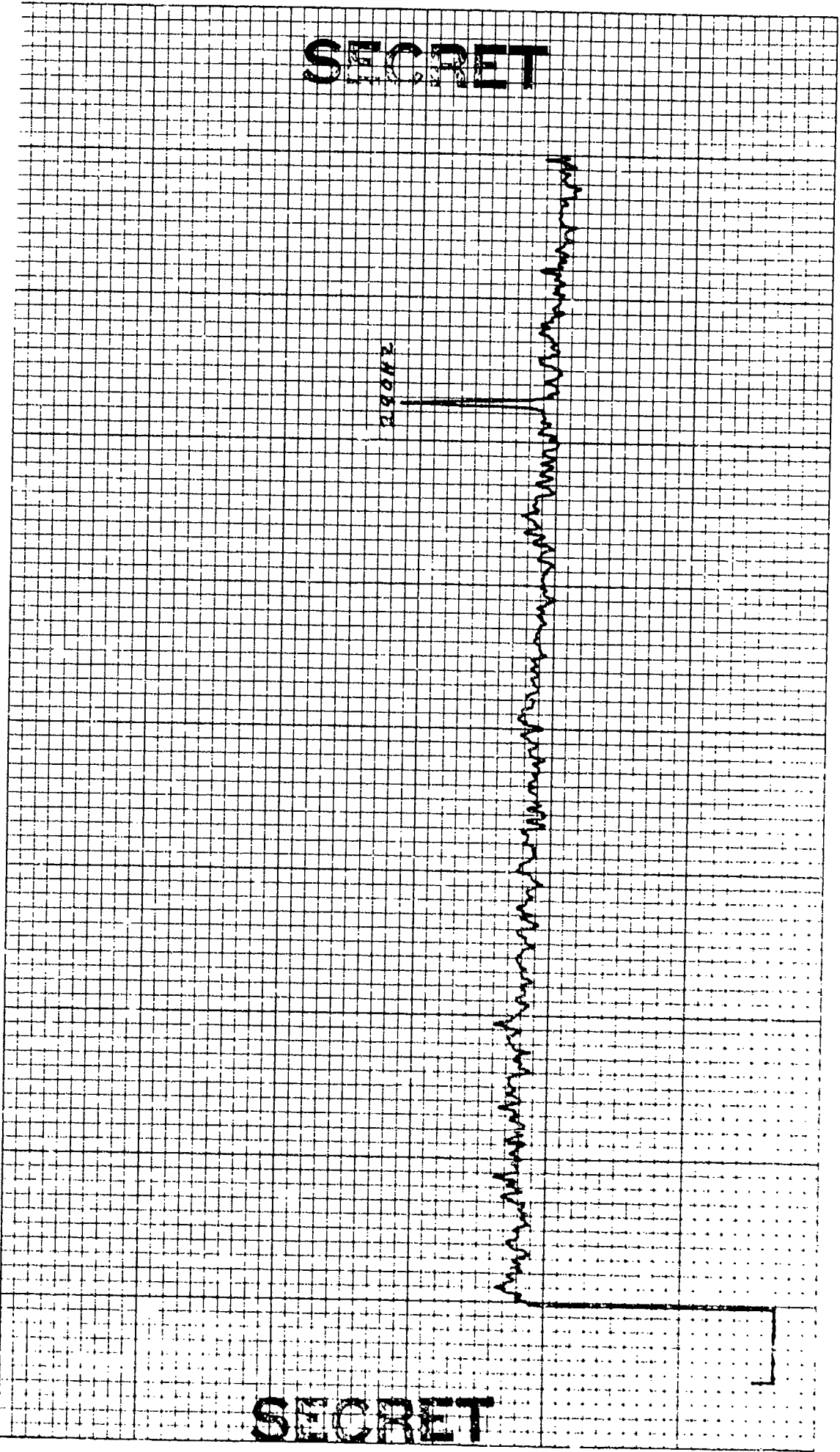
SECRET

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CONTROL: 2-7 -0934 (1/2)  
BEAMFORMED SPECTRUM(ELEMENTS  
EXERCISE: BEARING STAYE  
CENTER FREQ: 270 HZ  
/6 ELEMENTS

DATE OF ANALYSIS: / - /  
DATE/TIME: 2-7-77 -0934Z  
ANALYSIS BANDWIDTH: 1/10HZ  
+72 DEG. AZ STEERING

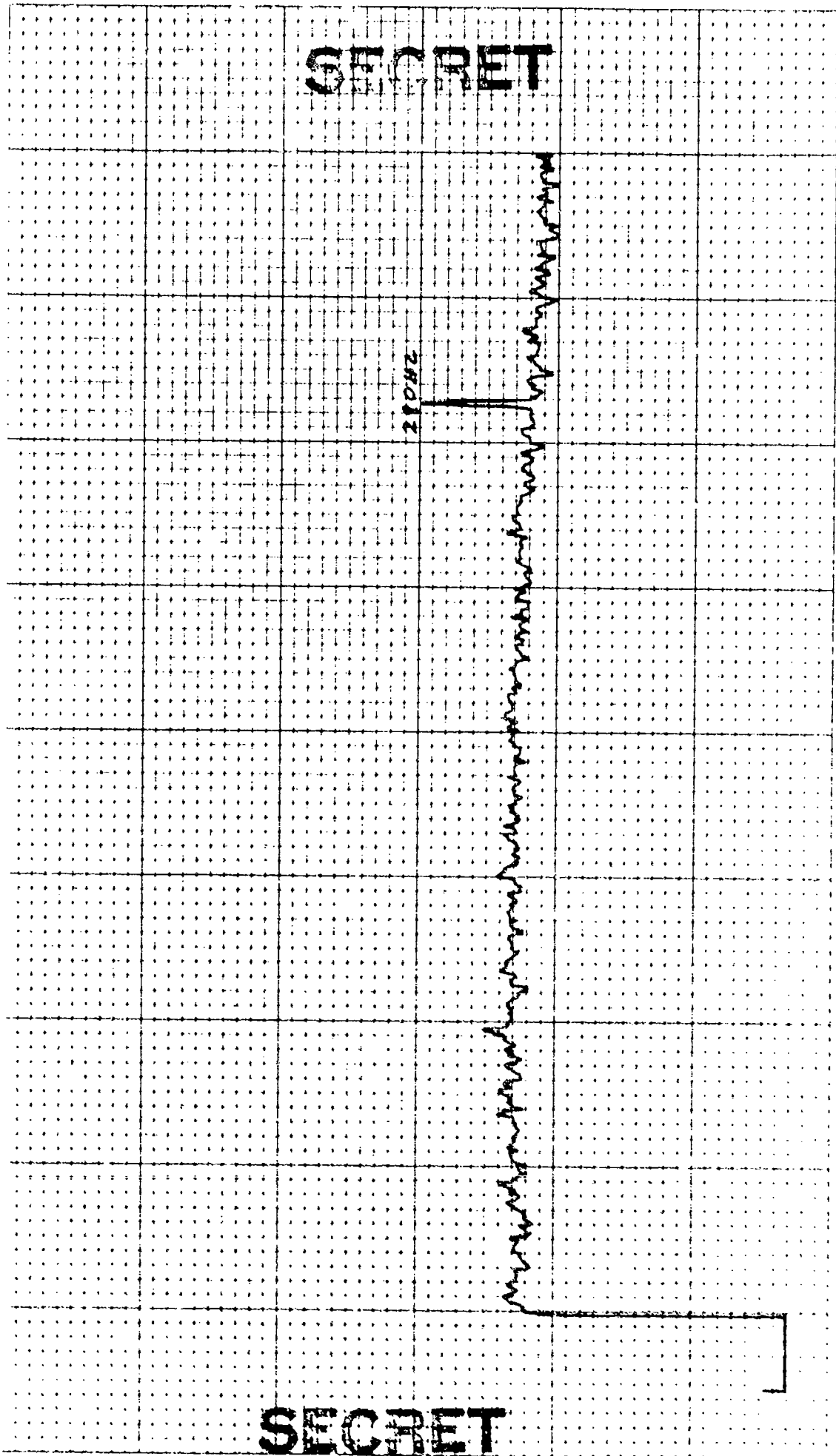
REEL: 514 INDE XJS75  
INTEGRATION TIME 320 SECS  
ATTEN: -18 DB  
FILTER WTG: HANNING



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CONTROL: 2-7 -0934 (16 )      DATE OF ANALYSIS: 1-16      REEL: F14      INDE XJ575  
 BEAMFORMED SPECTRUM(ELEMENTS)      DATE/TIME: 2-7-77 -0934 Z      INTEGRATION TIME 320 SECS      ATTEN: -18 DB  
 EXERCISE: BEARING STAKE      ANALYSIS BANDWIDTH: 1/10HZ      FILTER      WTC: HANNING  
 CENTER FREQ: 270 HZ      434 DEG. AZ STEERING



SECRET

16 1/16

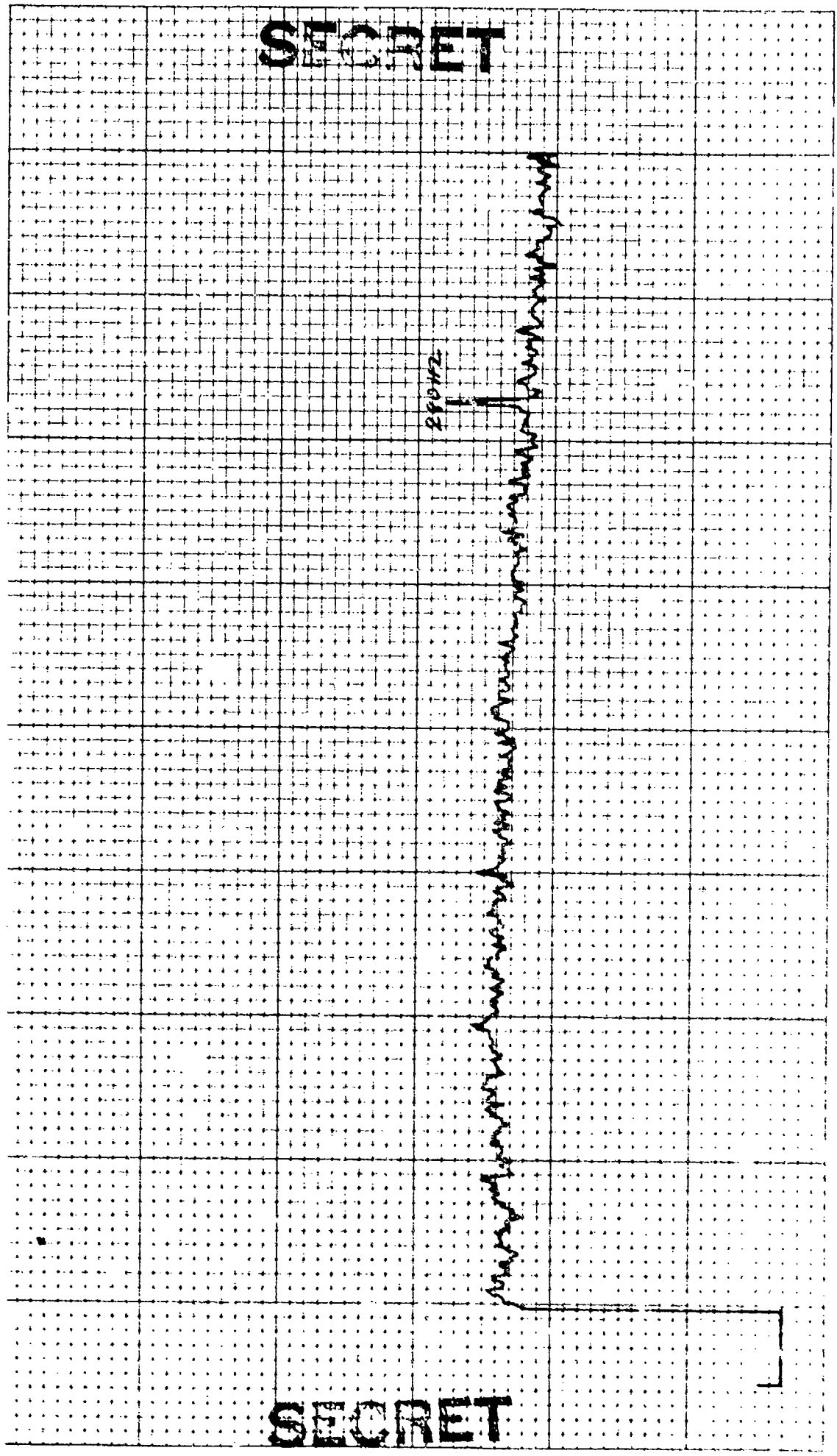
CONTROL: 2-7 -0824 (16)      DATE OF ANALYSIS: 1-16      REEL: F/4      INDE X3575

BEAMFORMED SPECTRUM(ELEMENTS)      INTEGRATION TIME 320 SECS      ATTN:-/8 DB

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

CENTER FREQ: 270 HZ      +36 DEG. AZ STEERING

16 ELEMENTS

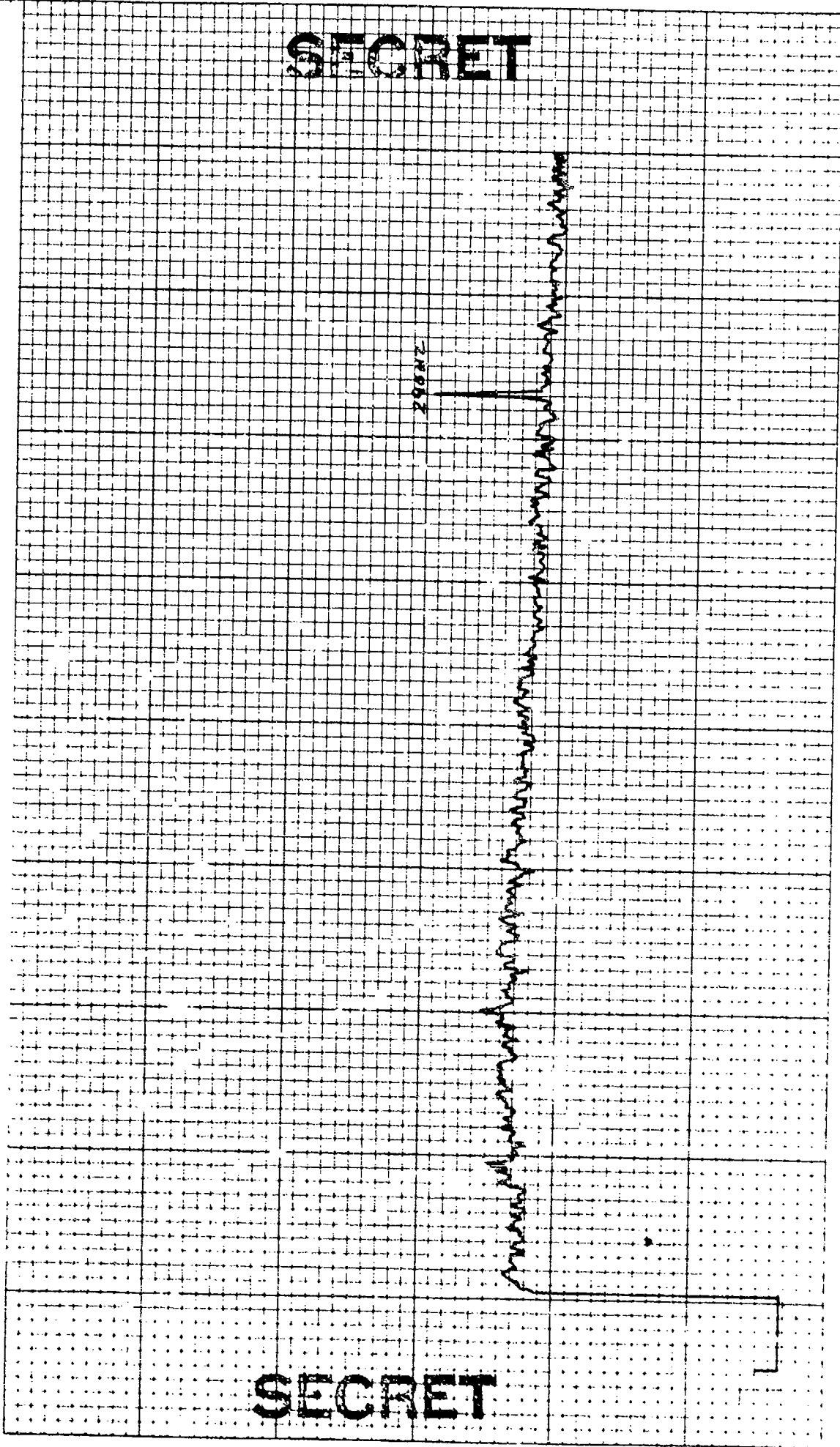


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CONTRCL: 2-7 -0934 (16 )  
BEAMFORMED SPECTRUM(ELEMENTS  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
14 ELEMENTS

DATE OF ANALYSIS: - - - - -  
1-16  
DATE/TIME: 2-7-70 -0934 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
430 DEG. AZ STEERING

REEL: F14 INDE X3525  
IN. ECRATION TIME 320 SECS ATTN: -1/ DB  
FILTER WTG: HANNING





# CONFIDENTIAL

## SIGNAL LEVEL AND SNR

### CALCULATIONS

DATA POINT 3

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 32

#### SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-36.6</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-26.6</u>	
BEAMFORMER GAIN	<u>+24</u>	<u>-2.8</u>	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	<u>-2.4</u>	SIG. LEVEL FOR SIGNAL GAIN

#### NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-61.1</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-51.1</u>	
BEAMFORMER GAIN	<u>+24</u>	<u>-27.1</u>	NOISE LEVEL FOR SNR CALCULATION

#### SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-2.6</u>	
SIGNAL LEVEL FOR SNR	<u>-27.1</u>	<u>24.5</u>	
PROCESSOR CORRECTION	<u>-1.0</u>	<u>20.5</u>	
MRA CORRECTION	<u>+ .2</u>	<u>20.7</u>	SNR 40 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	<u>12.5</u>	SNR 1 HZ BAND

SECTION 12

# CONFIDENTIAL

# CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 3

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 32

## SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-45.2</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-35.2</u>	
BEAMFORMER GAIN	<u>+24</u>	<u>-11.2</u>	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	<u>-10.4</u>	SIG. LEVEL FOR SIGNAL GAIN

## NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-69.1</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-59.1</u>	
BEAMFORMER GAIN	<u>+24</u>	<u>-35.1</u>	NOISE LEVEL FOR SNR CALCULATION

## SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-11.2</u>	
SIGNAL LEVEL FOR SNR	<u>-35.1</u>	<u>23.9</u>	
PROCESSOR CORRECTION	<u>-4.0</u>	<u>19.9</u>	
MRA CORRECTION	<u>+ .8</u>	<u>20.7</u>	
BANDWIDTH CONVERSION	<u>-8.2</u>	<u>12.5</u>	

CONFIDENTIAL

# CONFIDENTIAL

DATA POINT 3

## SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-32.5</u>	<u>-38.6</u>	<u>      </u>
MRA SIGNAL LEVEL	<u>- 3.4</u>	<u>-10.4</u>	<u>      </u>
ARRAY SIGNAL GAIN	<u>30.1</u>	<u>28.2</u>	<u>      </u>
20 LOG <u>32</u> # of elements	<u>30.1</u>	<u>30.1</u>	<u>      </u>
DIFFERENCE	<u>0</u>	<u>- 1.9</u>	<u>      </u>

## ARRAY GAIN

MRA SNR	<u>21.1</u>	<u>20.7</u>	<u>      </u>
MEAN OMNI SNR	<u>9.0</u>	<u>5.8</u>	<u>      </u>
ARRAY GAIN	<u>12.1</u>	<u>14.9</u>	<u>      </u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>13.1</u>	<u>15.2</u>	<u>      </u>
DIFFERENCE	<u>-1.0</u>	<u>- .3</u>	<u>      </u>

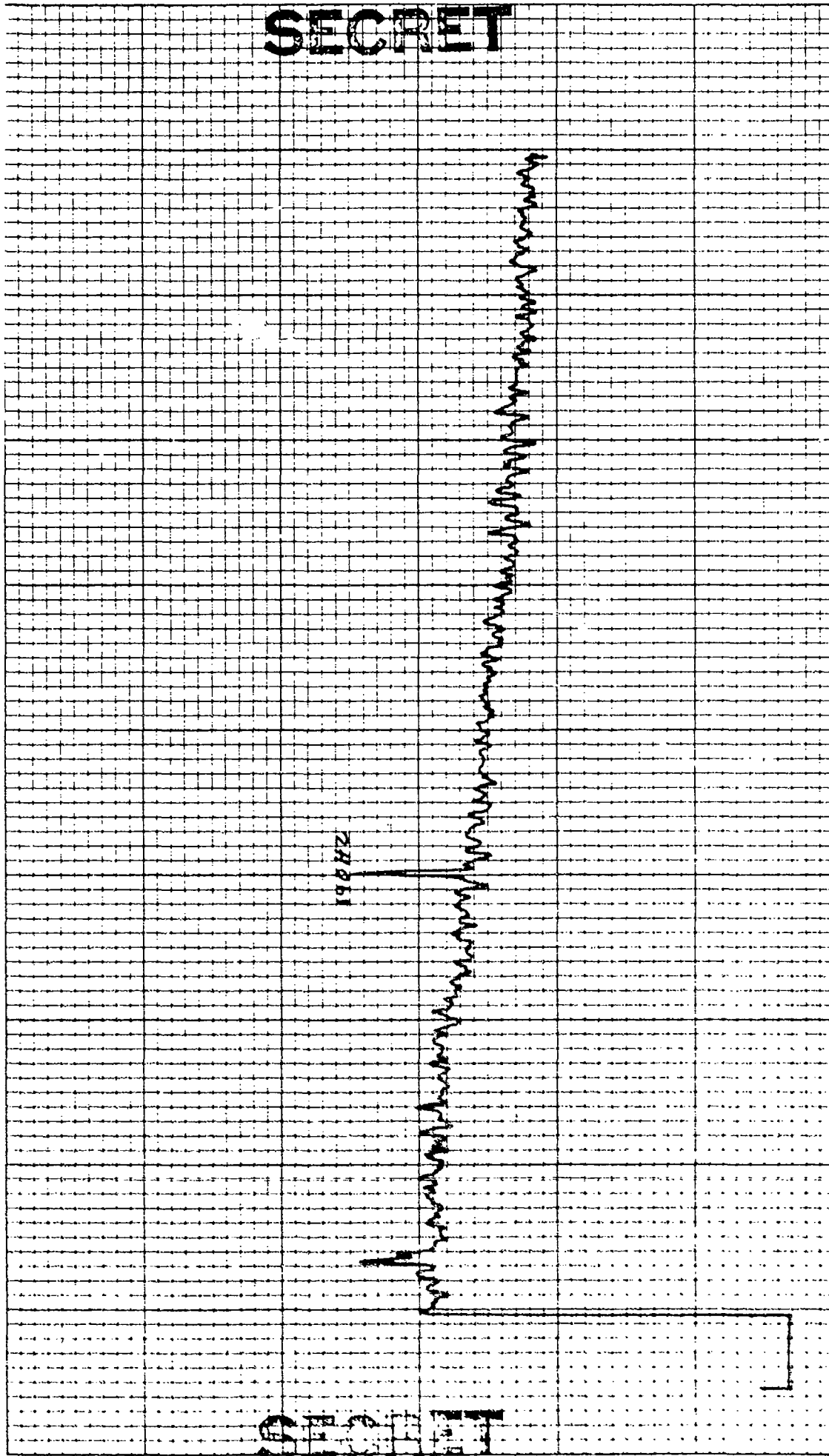
# CONFIDENTIAL

APC-01

CONTROL: 2.7 -0934 (JP )  
 BEAMFORMED SPECTRUM(ELEMENTS 1-26 / 29-34 )  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 150 HZ  
 72 ELEMENTS

DATE OF ANALYSIS: - - - - -  
 DATE/TIME: 2-7-77 -0934 Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 +/- DEG. AZ STEERING

REEL: F14 INDE X3573  
 INTEGRATION TIME 320 SECS ATTN: -24 DB  
 FILTER WTC: HANNING

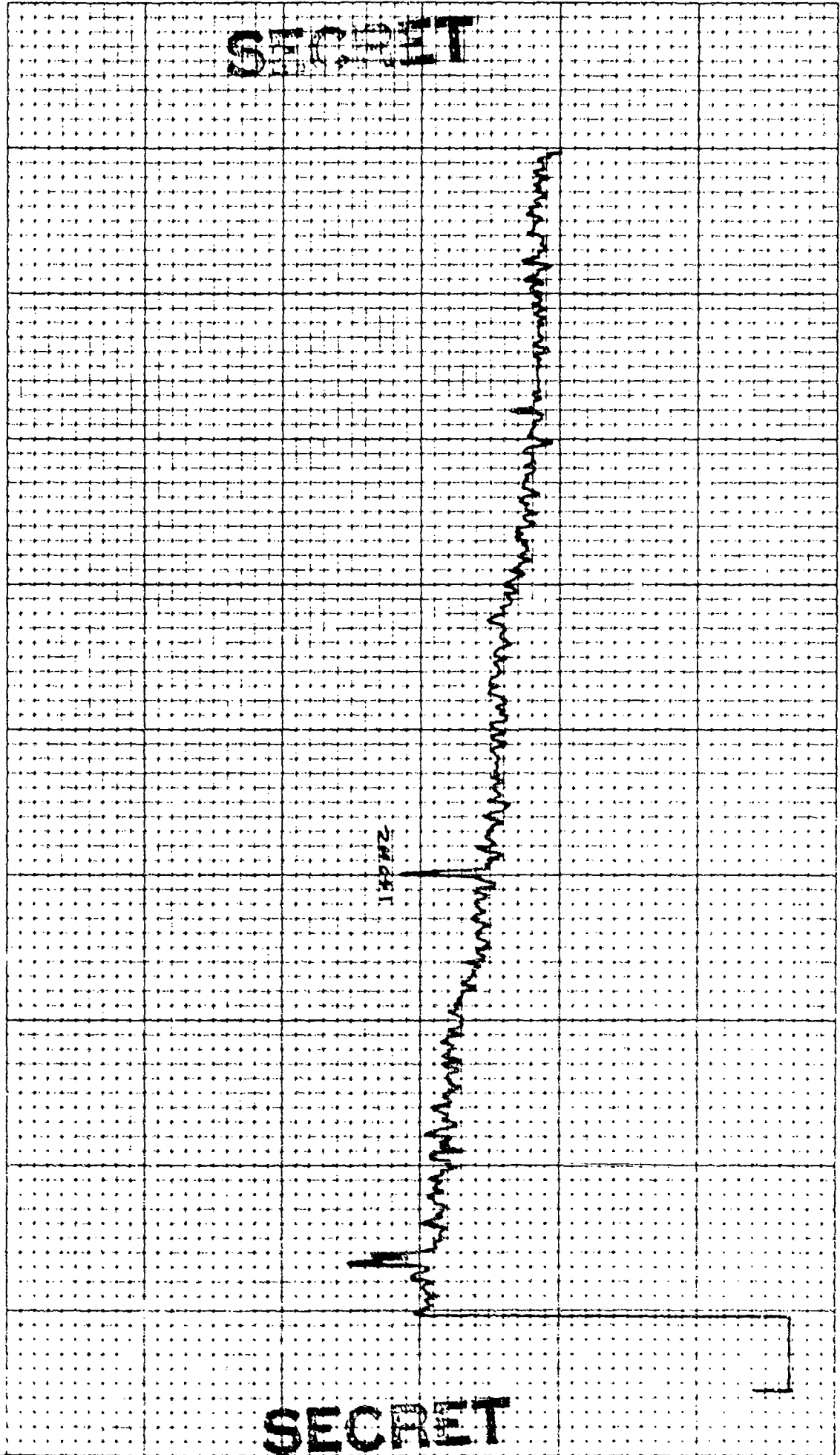


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1-26-77

CONTROL: 2-7-093Y (32) DATE OF ANALYSIS: 1-26-77 REEL: F14 INDE: X3575  
 BEAMFORMED SPECTRUM(ELEMENTS) 1-26-77 INTEGRATION TIME 320 SECS ATTEN: -2Y DB  
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 093Y Z FILTER WTG: HANNING  
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ  
32 ELEMENTS 4/8 DEC. AZ STEERING



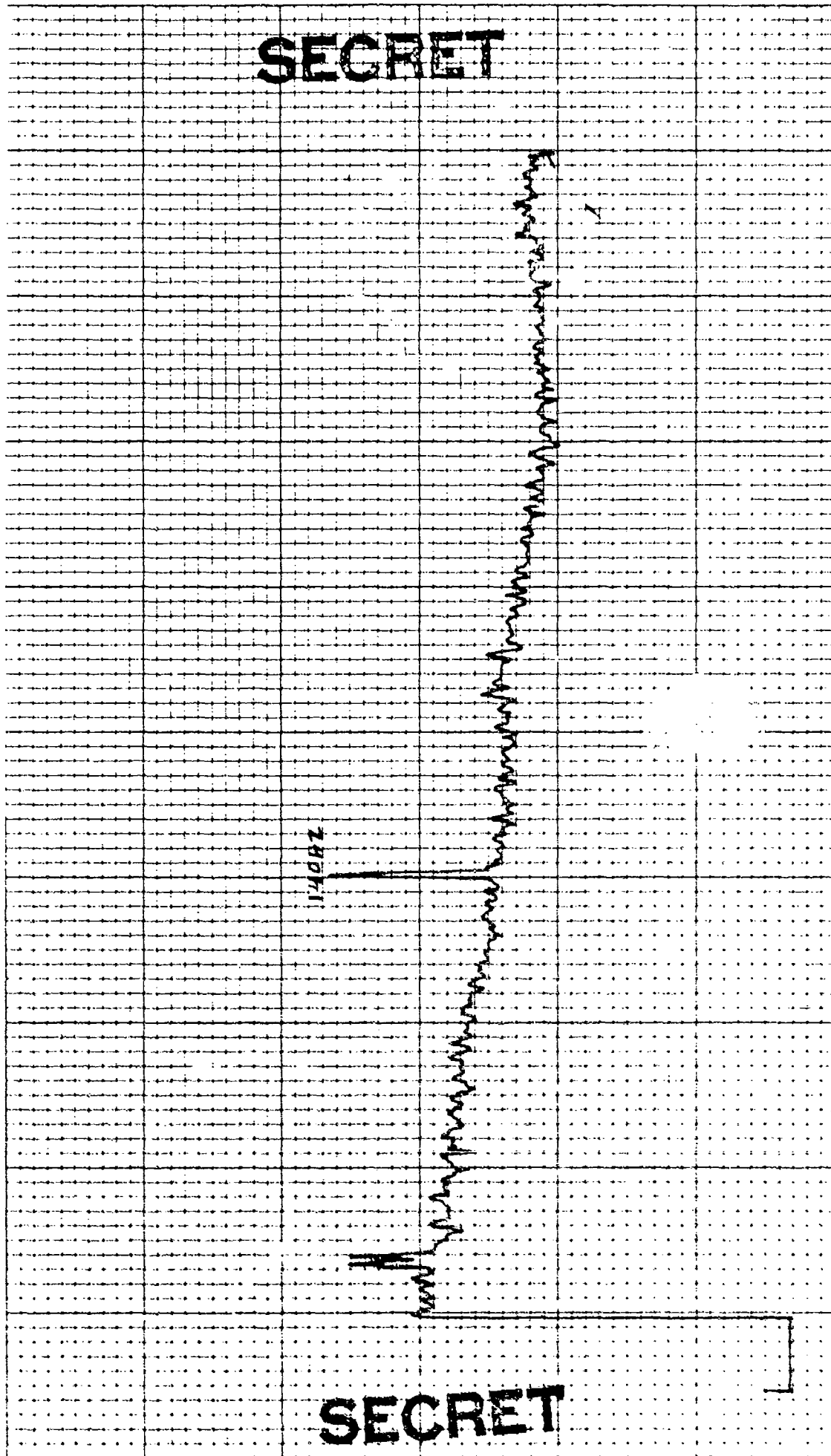
CONTROL: 27 -0934 (32) REEL: F/4 INDE XJ57C

BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: - - -

EXERCISE: BEARING STAKE 1-26-77 29-34

CENTER FREQ: 150HZ DATE/TIME: 2-7-77 -0934Z INTEGRATION TIME 320 SECS ATTN: -2Y DB

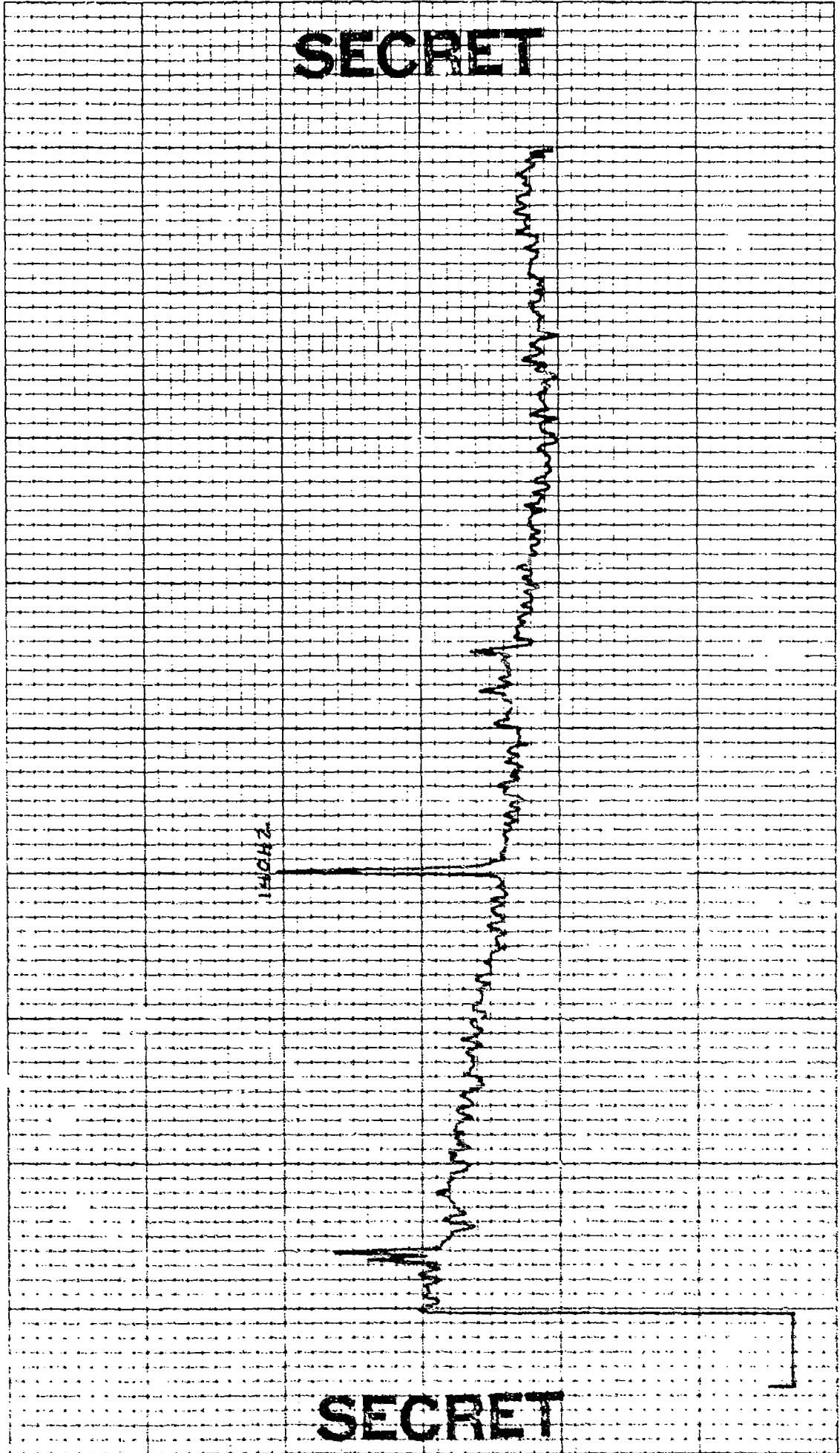
32 ELEMENTS 120 DEG. AZ STEERING FILTER WTG: HANNING



17-304

CONTROL: 27 -0834 (32) DATE OF ANALYSIS: - - - -  
 BEAMFORMED SPECTRUM(ELEMENTS 1-20 & 29-34)  
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 -0834Z  
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ  
 32 ELEMENTS 422 DEG. AZ STEERING

REEL: F14 INDE X3575  
 INTEGRATION TIME 320 SECS ATTN: -24 DB  
 FILTER WTC: HANNING



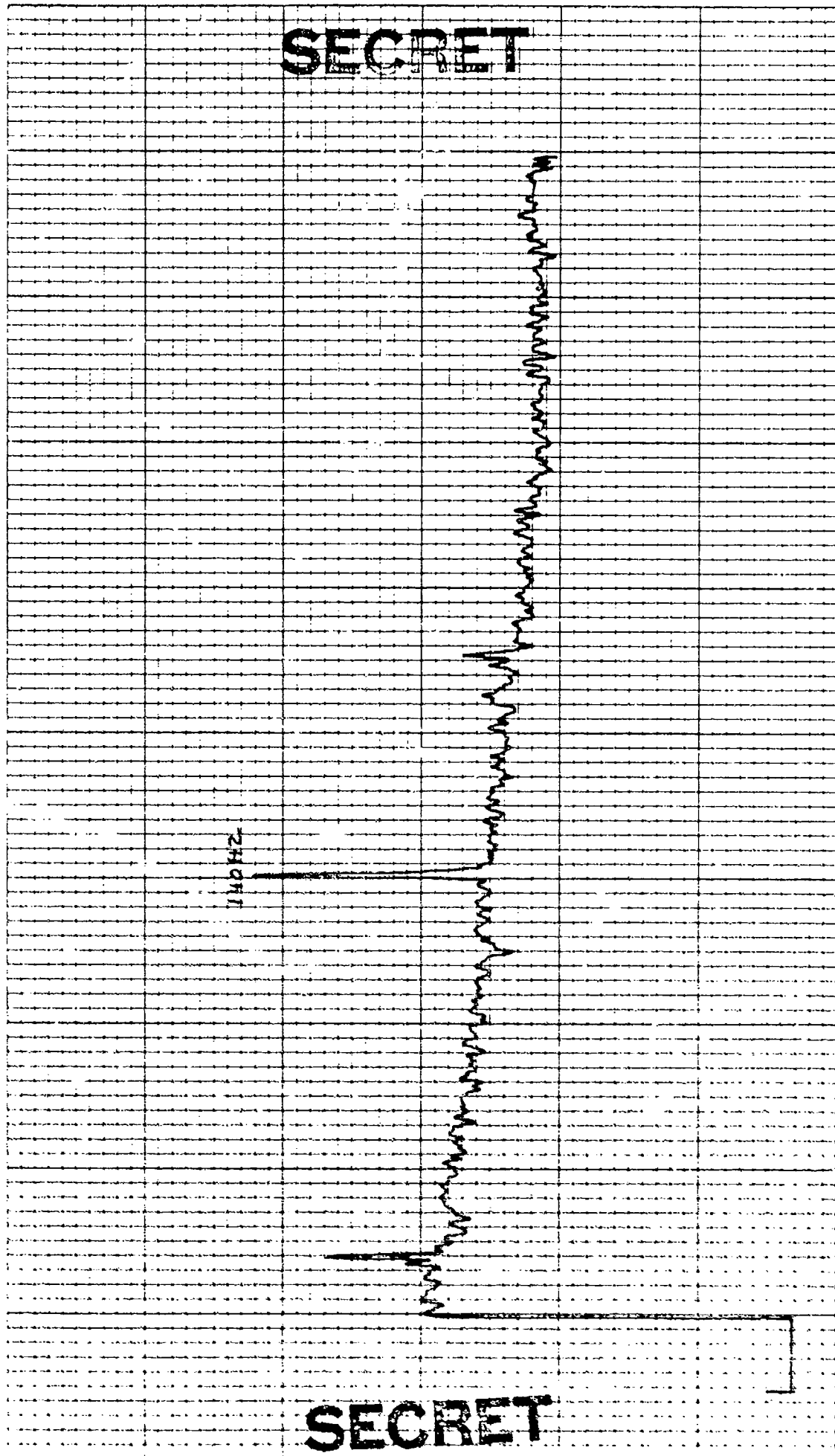
CONTROL: 27 - 0934 (J2)      DATE OF ANALYSIS: - - - - -      REEL: F14      INDE X3575

BEAMFORMED SPECTRUM (ELEMENTS)      1-26 & 29-34      INTEGRATION TIME 320 SECS      ATTEN: -24 DB

EXERCISE: BEARING STAKE      DATE/TIME: 2-7-77 - 0934Z      FILTER      WTC: HANNING

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

32 ELEMENTS



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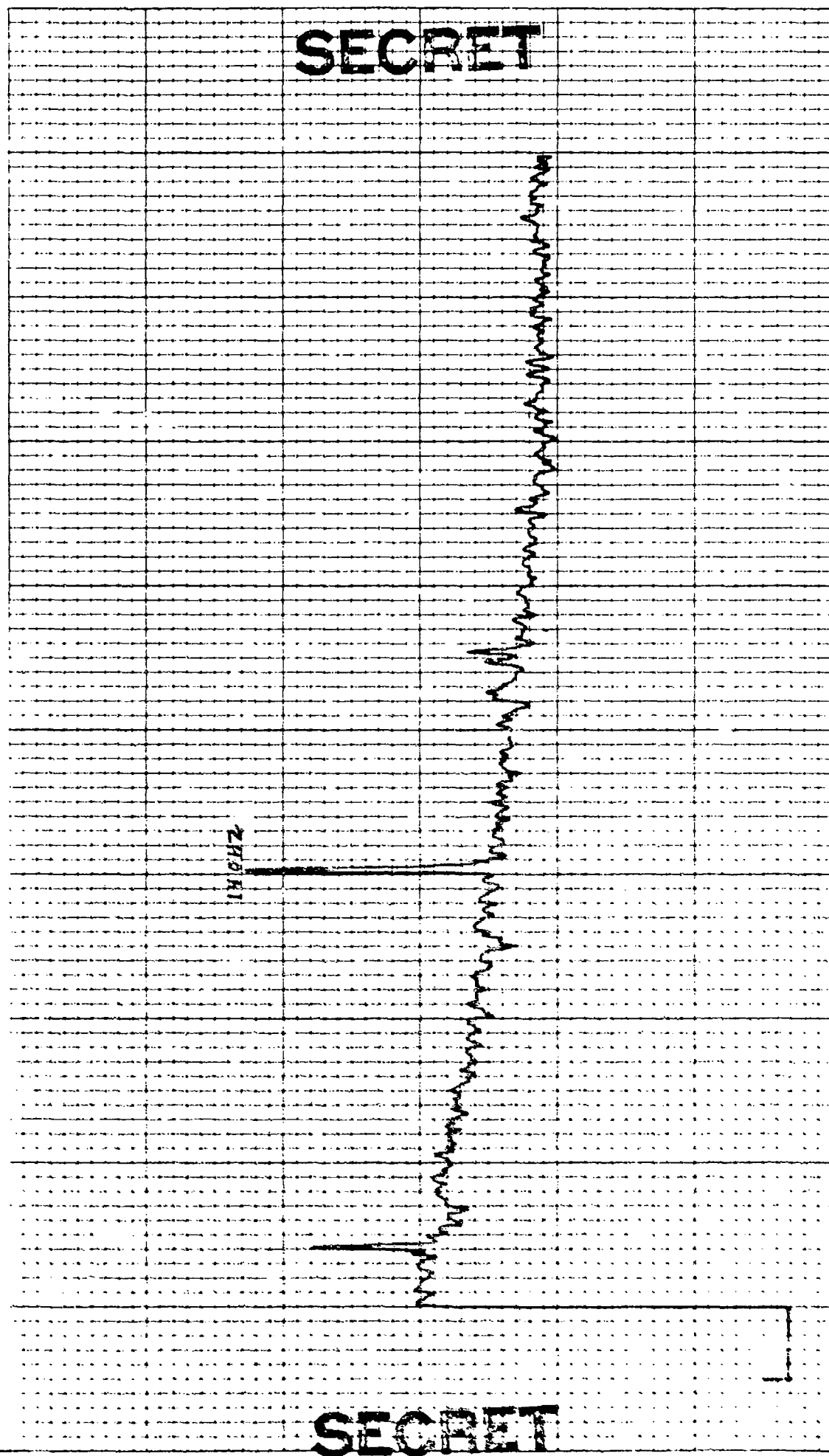
4

33

CONTROL: 2-7 -0934 (72)  
BEAMFORMED SPECTRUM(ELEMENTS  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
72 ELEMENTS

DATE OF ANALYSIS: - - -  
1-26 + 29-34  
DATE/TIME: 2-7-77 -0934 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
725 DEG. AZ STEERING

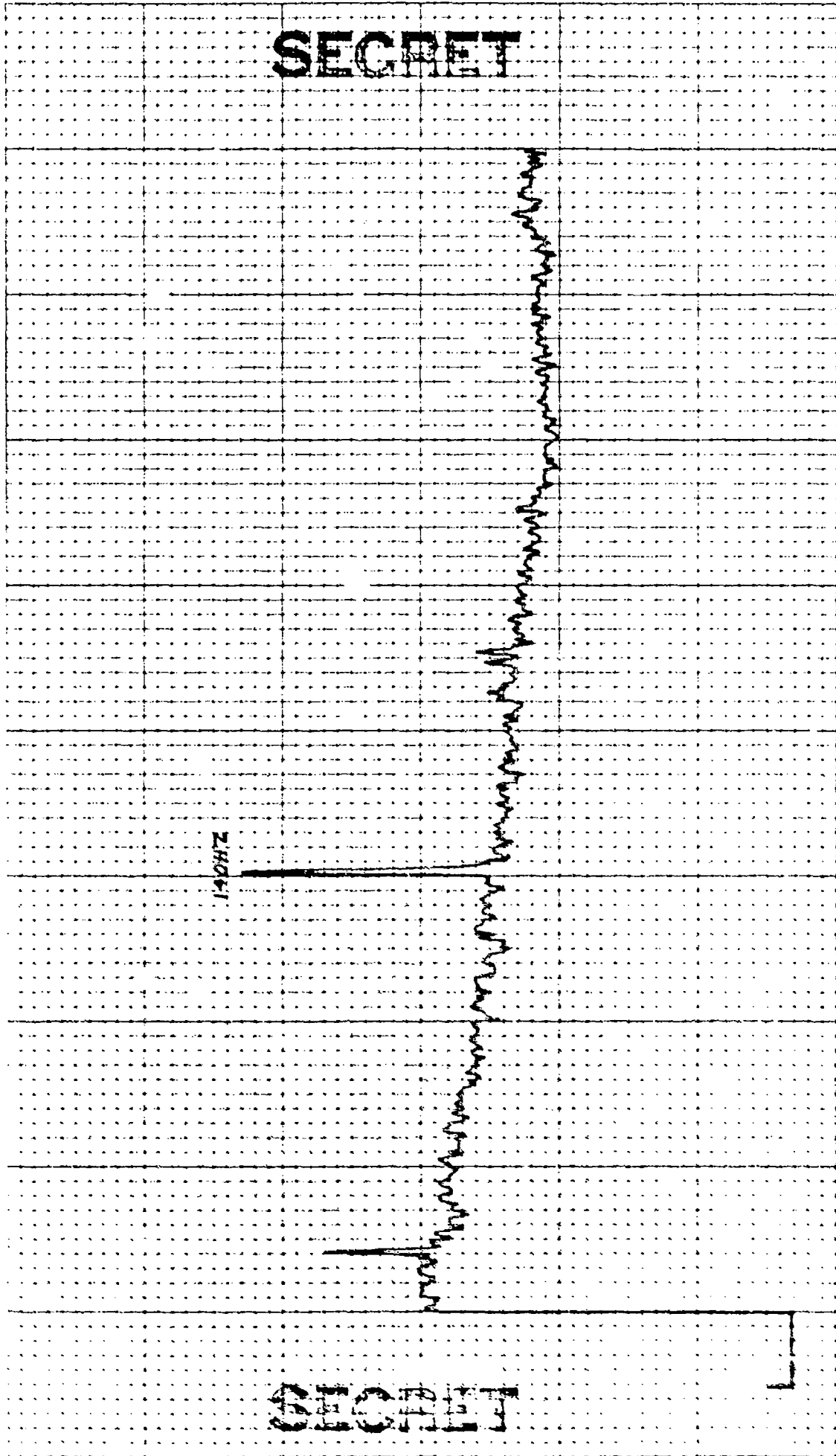
REEL: F14 INDE X3572  
INTEGRATION TIME 320 SECS  
FILTER WTG: HANNING  
ATTEN: -24 DB



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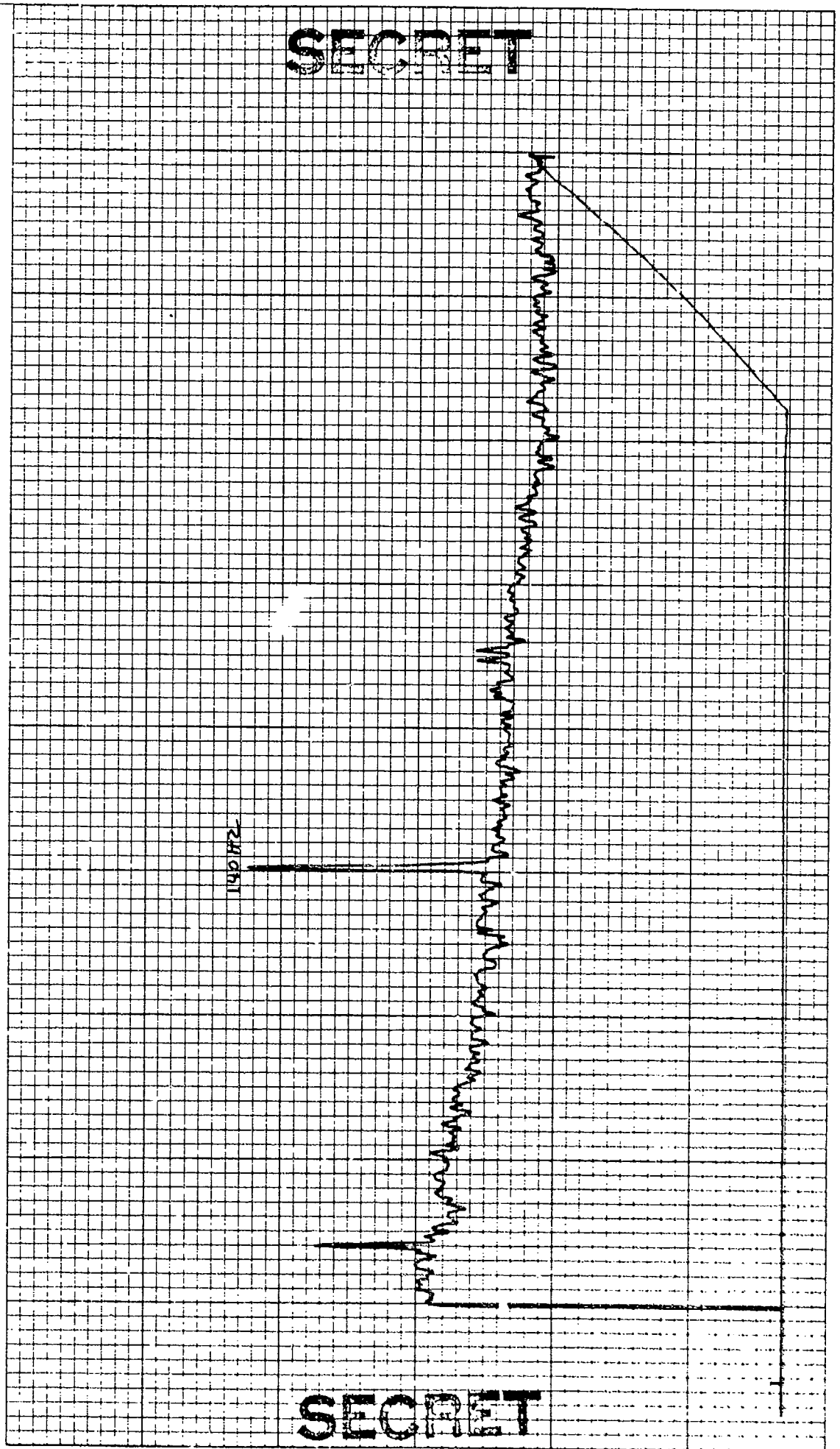
CONTROL: 0934 - 51 (303)      DATE OF ANALYSIS: \_\_\_\_\_      REEL: 14      INDEX X3575  
 BEAMFORMED SPECTRUM(ELEMENTS)      1-26 \* 29-34 )  
 EXERCISE: BEARING STAKE      DATE/TIME: 2-7-77 - 0934 Z      INTEGRATION TIME 320 SECS      ATTEN: 24 DB  
 CENTER FREQ: 150 HZ      ANALYSIS BANDWIDTH: 1/10HZ      FILTER      WIC: HANNING  
12 ELEMENTS      +25.5 DEG. AZ STEERING



CONTROL: 27 -0934 (32-)  
 BEAMFORMED SPECTRUM(ELEMENTS 1-26 & 28-34)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 150 HZ  
 32 ELEMENTS

DATE OF ANALYSIS: ~ - - -  
 DATE/TIME: 2-7-77 - 0934Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 426 DEG. AZ STEERING

REEL: F/4 INDE X34Z  
 INTEGRATION TIME 320 SECS ATTN:-24 DB  
 FILTER WTG: HANNING



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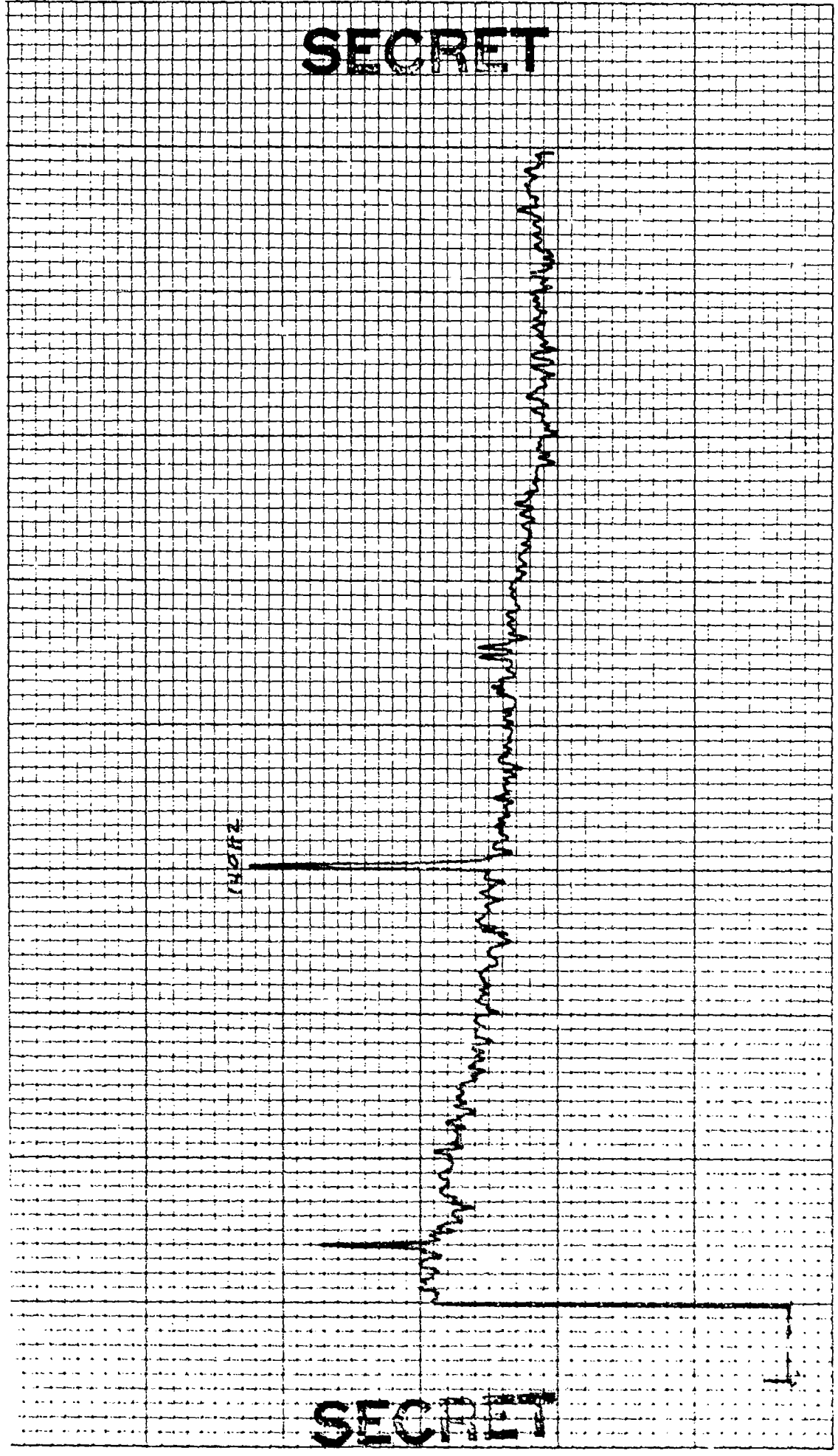
CONTROL: 2-7 -0834 (32) DATE OF ANALYSIS: 1-26-77 28-34 REEL: F14 INDE X1575

BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-7-77 -0834Z INTEGRATION TIME 320 SECS ATTN: -24 DB

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

CENTER FREQ: 150 HZ 426 DEG. AZ STEERING

32 ELEMENTS



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CONTROL: 27 - 2834 (32) REEL: F/4 INDE X3575

BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: - - - -

EXERCISE: BEARING STAKE 1-26428-34

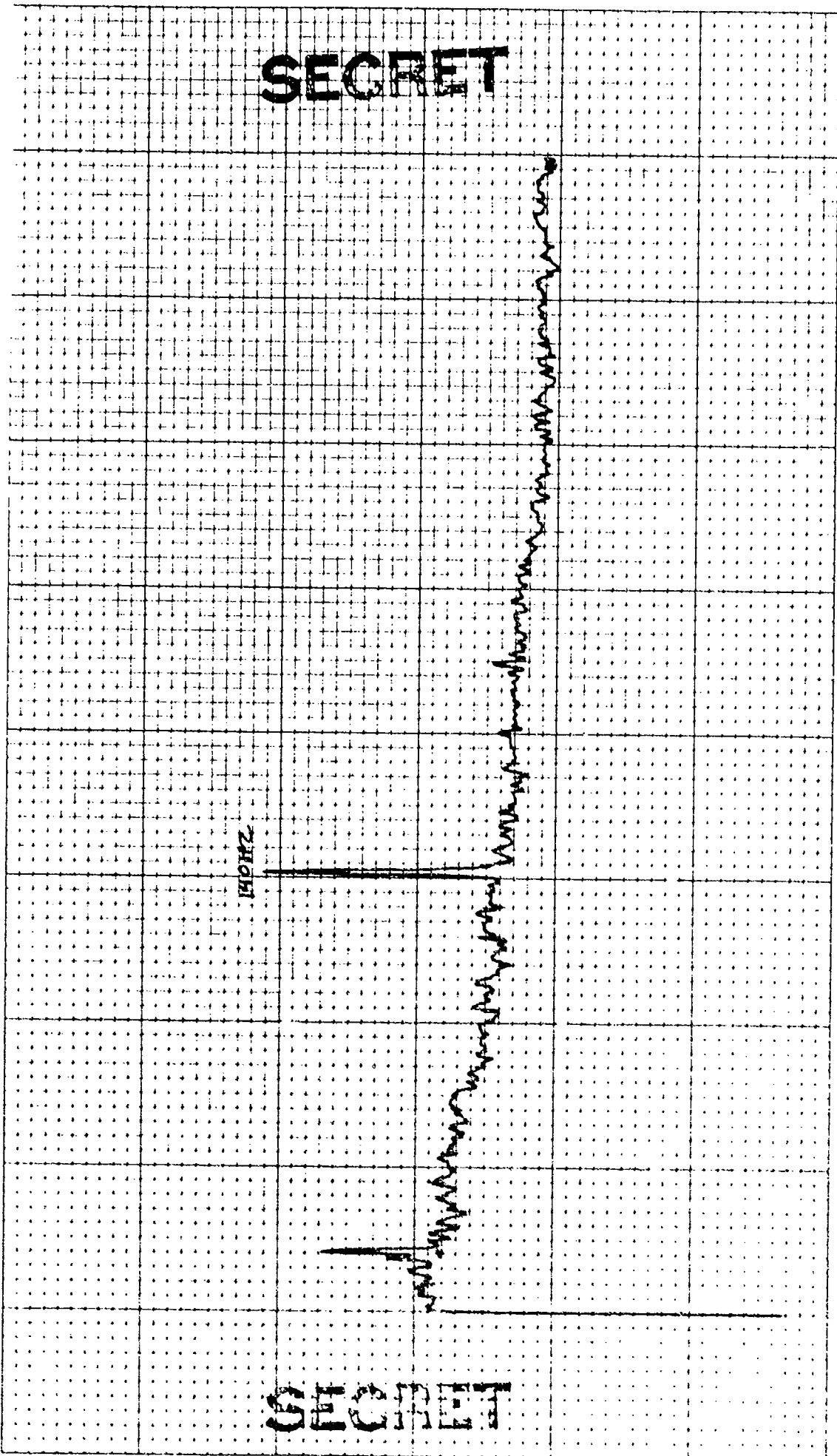
CENTER FREQ: 150 HZ DATE/TIME: 27-27 - 0834Z

32 ELEMENTS ANALYSIS BANDWIDTH: 1/10HZ

INTEGRATION TIME 320 SECS ATTN: -2YDB

FILTER WTC: HANNING

420 DEG. AZ STEERING

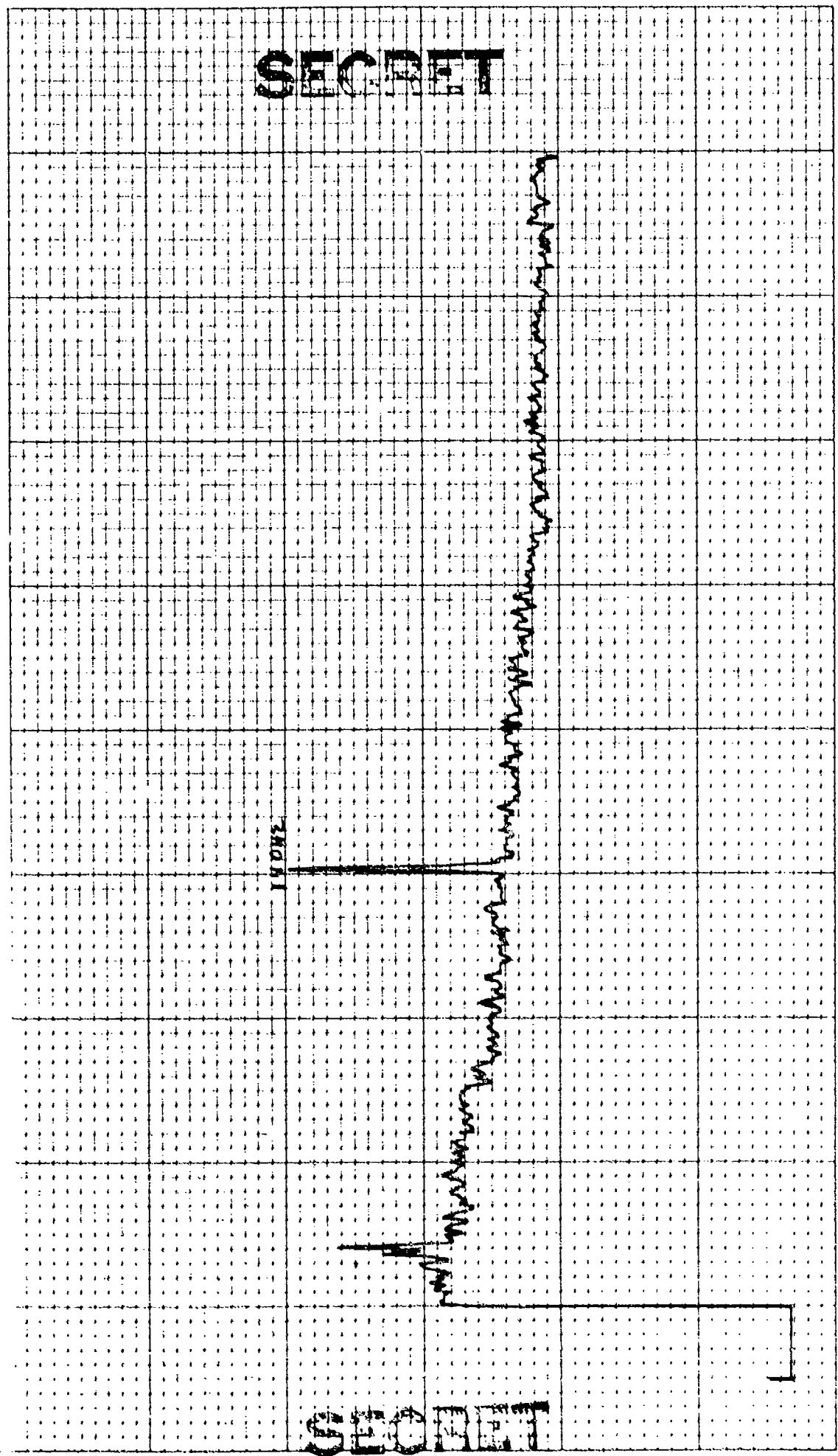


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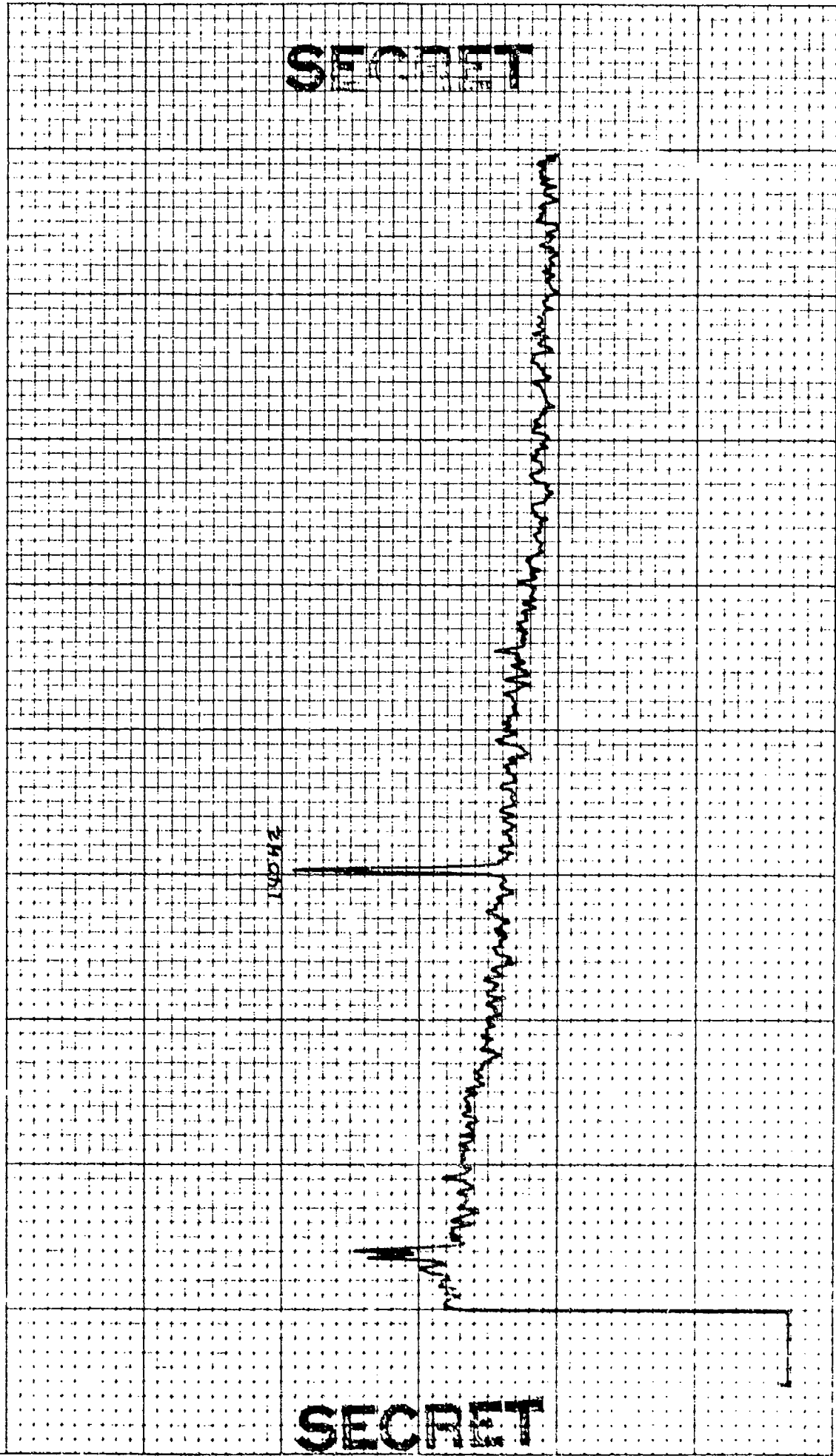
SECRET

CONTROL: 27 - 0934 (J2) DATE OF ANALYSIS: - - - -  
 BEAMPFORMED SPECTRUM (ELEMENTS) 1-26 & 2834 )  
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 0934Z  
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ  
 32 ELEMENTS +30 DEG. AZ STEERING

REEL: F/4 INDE X3575  
 INTEGRATION TIME 320 SECS ATEN: -24DB  
 FILTER WTG: HANNING



CONTROL: 27 -0934 ( 12 ) REEL: F/4 INDE X325  
BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: - - -  
EXERCISE: BEARING STAKE 1-26 29-34  
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ  
32 ELEMENTS +32 DEG. AZ STEERING  
INTEGRATION TIME 320 SECS ATEN:-2Y DB  
FILTER WTG: HANNING



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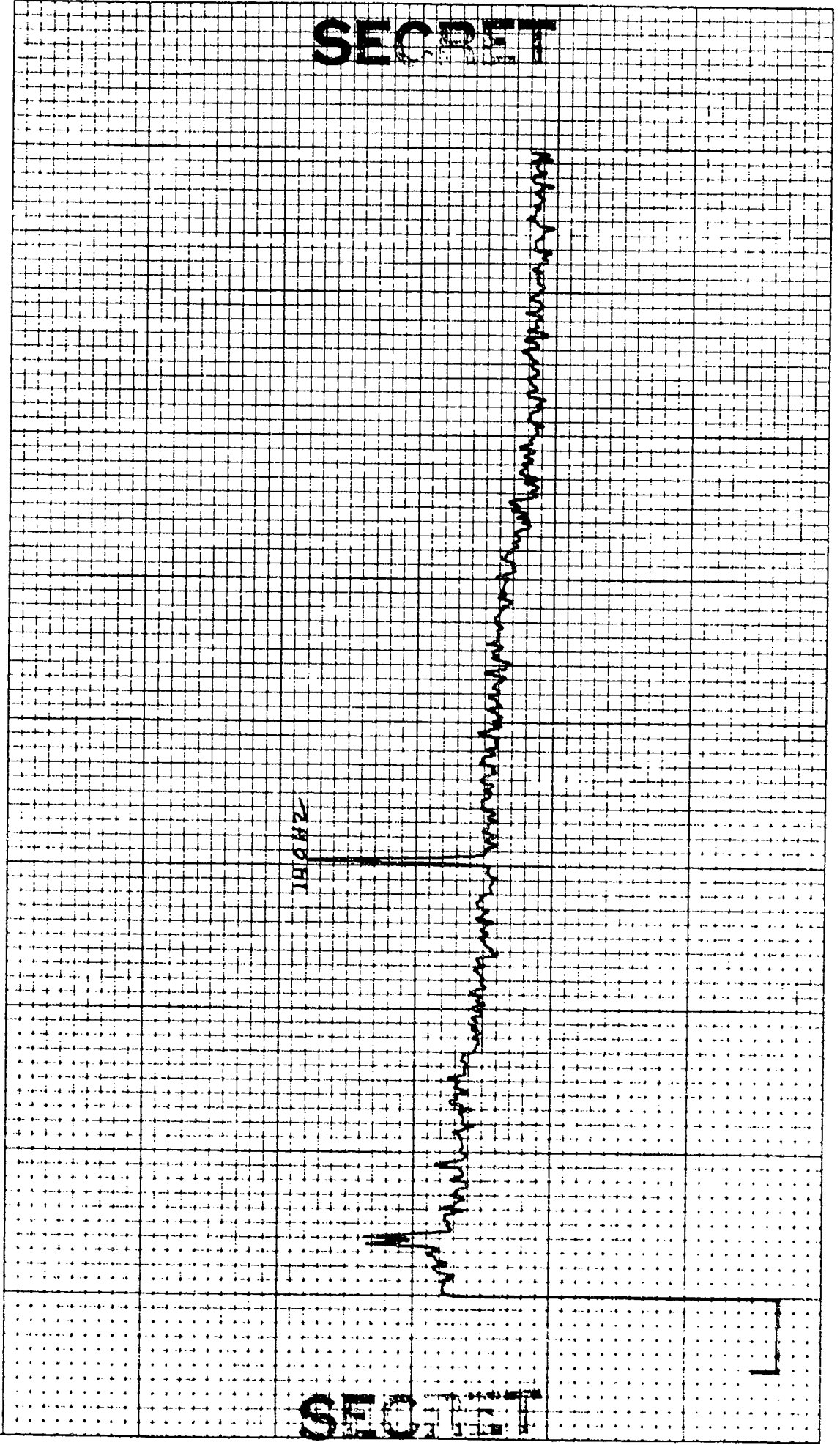
7-38

INSTRUMENT TO: [unintelligible] CH: 7 [unintelligible] FREQ: [unintelligible] MAG: [unintelligible]  
ELEMENTS: [unintelligible] CENTER FREQ: [unintelligible] BANDWIDTH: [unintelligible] FILTER: [unintelligible] WGTG: [unintelligible] ATTN: [unintelligible] DB  
REEL: F14 INDE X3575

CONTROL: 27-0834 (32-)  
BEAMPFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 160 HZ  
32 ELEMENTS

DATE OF ANALYSIS: 1-26-77  
DATE/TIME: 2-7-77 - 0834Z  
ANALYSIS BANDWIDTH: 1/10HZ  
+34 DEG. AZ STEERING

REEL: F14 INDE X3575  
INTEGRATION TIME 320 SECS  
ATTEN: -24 DB  
FILTER WGTG: HANNING



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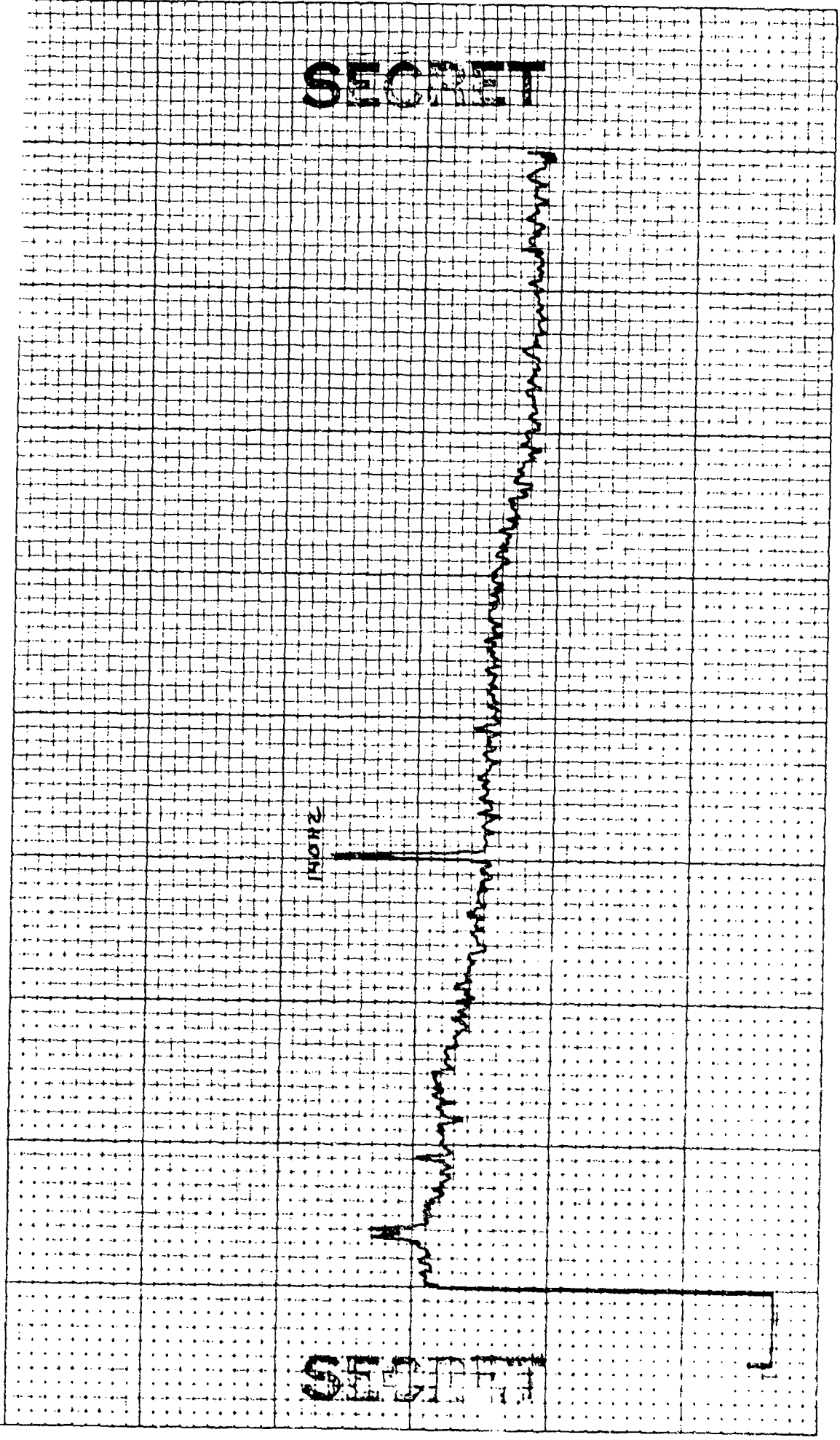


CONTROL: 2-7 -093V (32)  
 BEAMFORMED SPECTRUM(ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 160 HZ  
 32 ELEMENTS

DATE OF ANALYSIS: 1-26-77  
 DATE/TIME: 2-7-77 -093VZ  
 ANALYSIS BANDWIDTH: 1/10HZ  
 +36 DEG. AZ STEERING

REEL: F/4  
 INTEGRATION TIME 320 SECS  
 FILTER WTG: HANNING

INDE X3575  
 ATTN: -2V DB



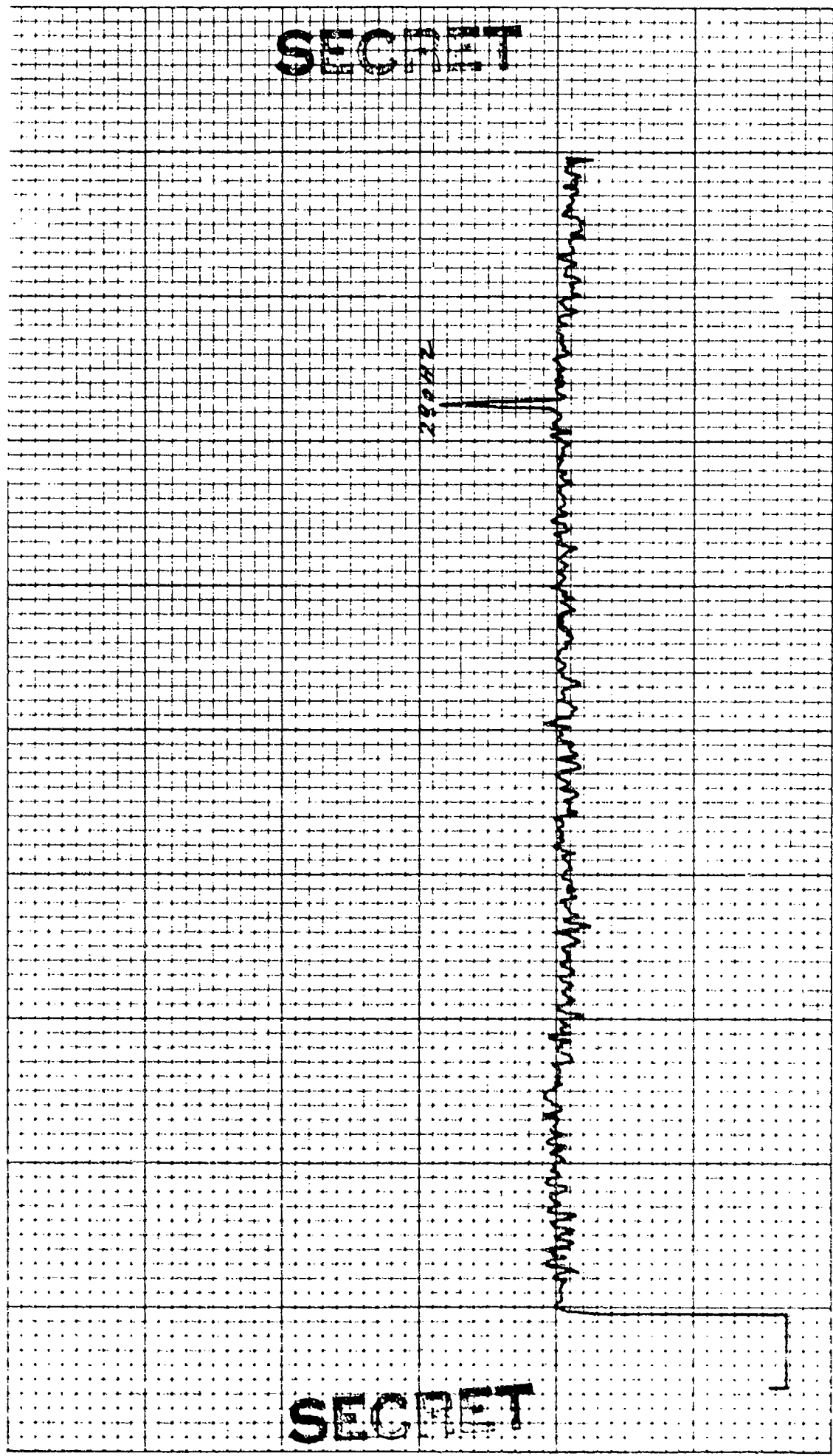
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CONTROL: 2.7 -0934 (32)  
BEAMFORMED SPECTRUM(ELEMENTS  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
32 ELEMENTS

DATE OF ANALYSIS: 1-26-77  
DATE/TIME: 22-77 -0934Z  
ANALYSIS BANDWIDTH: 1/10HZ  
1/6 DEG. AZ STEERING

REEL: F/4  
INTEGRATION TIME 320 SECS  
FILTER WTG: HANNING  
ATTEN: -2Y DB  
INDE X3575



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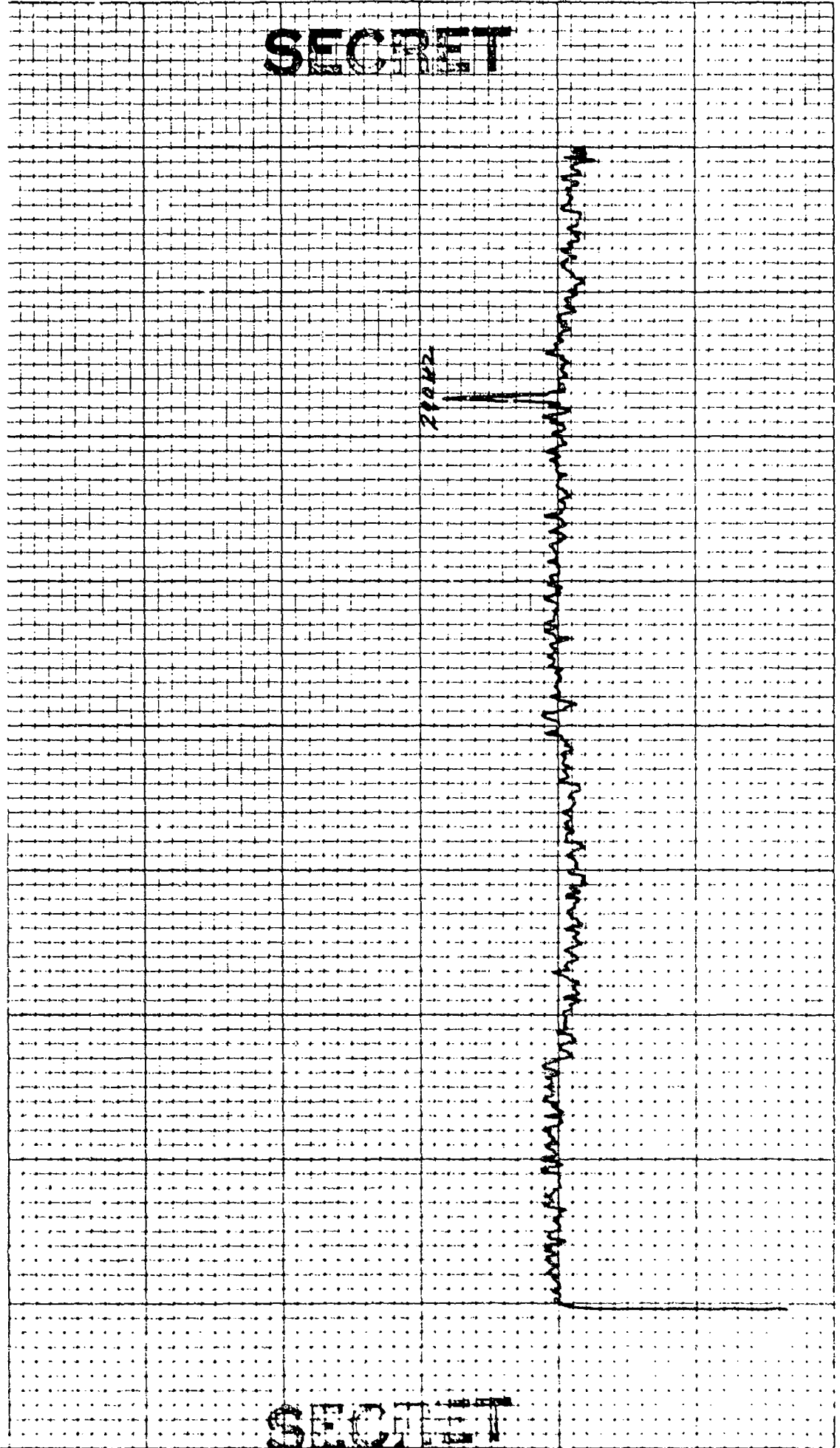
CONTROL: 27 -0934(32)  
 BEAMFORMED SPECTRUM(ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
 32- ELEMENTS

DATE OF ANALYSIS: - - - - -  
 (-20 29-34)

DATE/TIME: 2-7-77 -0934Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 +/- DEG. AZ STEERING

REEL: F/4 INDE X3575

INTEGRATION TIME 320 SECS ATTN: ~2V DB  
 FILTER WTG: HANNING



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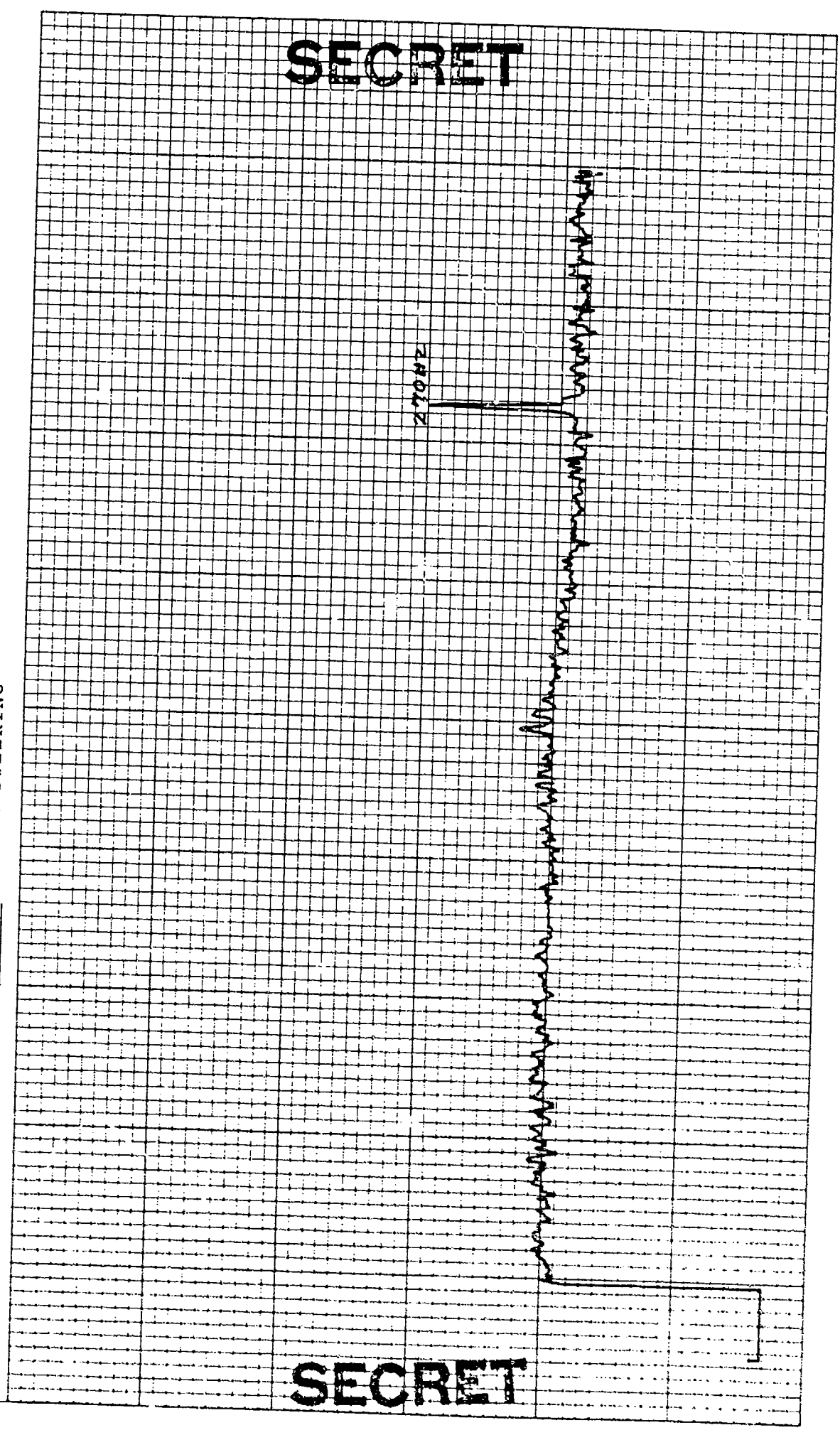
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CONTROL: 2-7 -0934 (32-)  
 BEAMFORMED SPECTRUM (ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
 32 ELEMENTS

DATE OF ANALYSIS: 1-26-77  
 DATE/TIME: 2-7-77 - 0934Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 +2.0 DEG. AZ STEERING

REEL: F/4  
 INTEGRATION TIME 320 SECS  
 FILTER WTG: HANNING

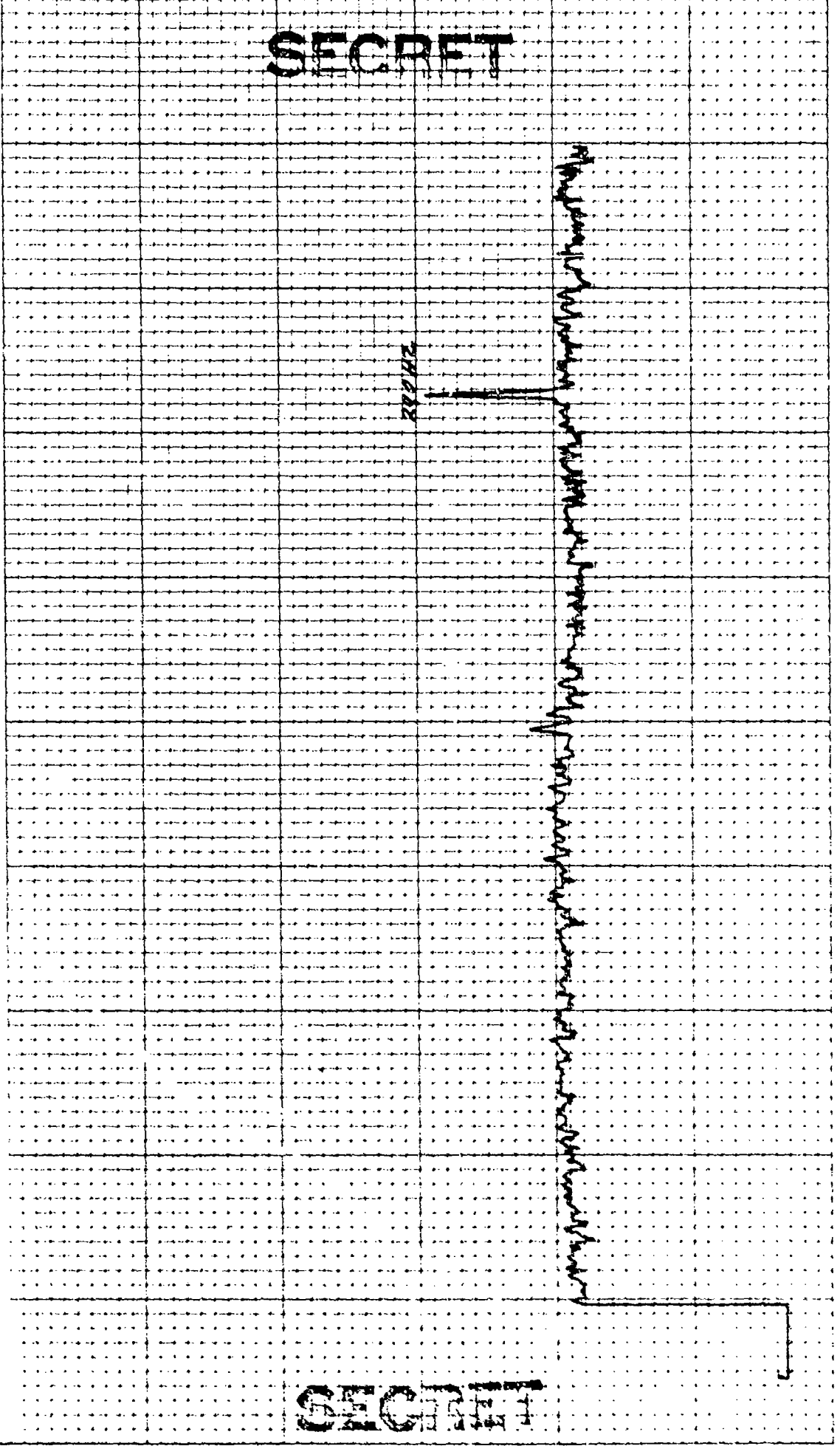
INDE X3575  
 ATTN: -24 DB



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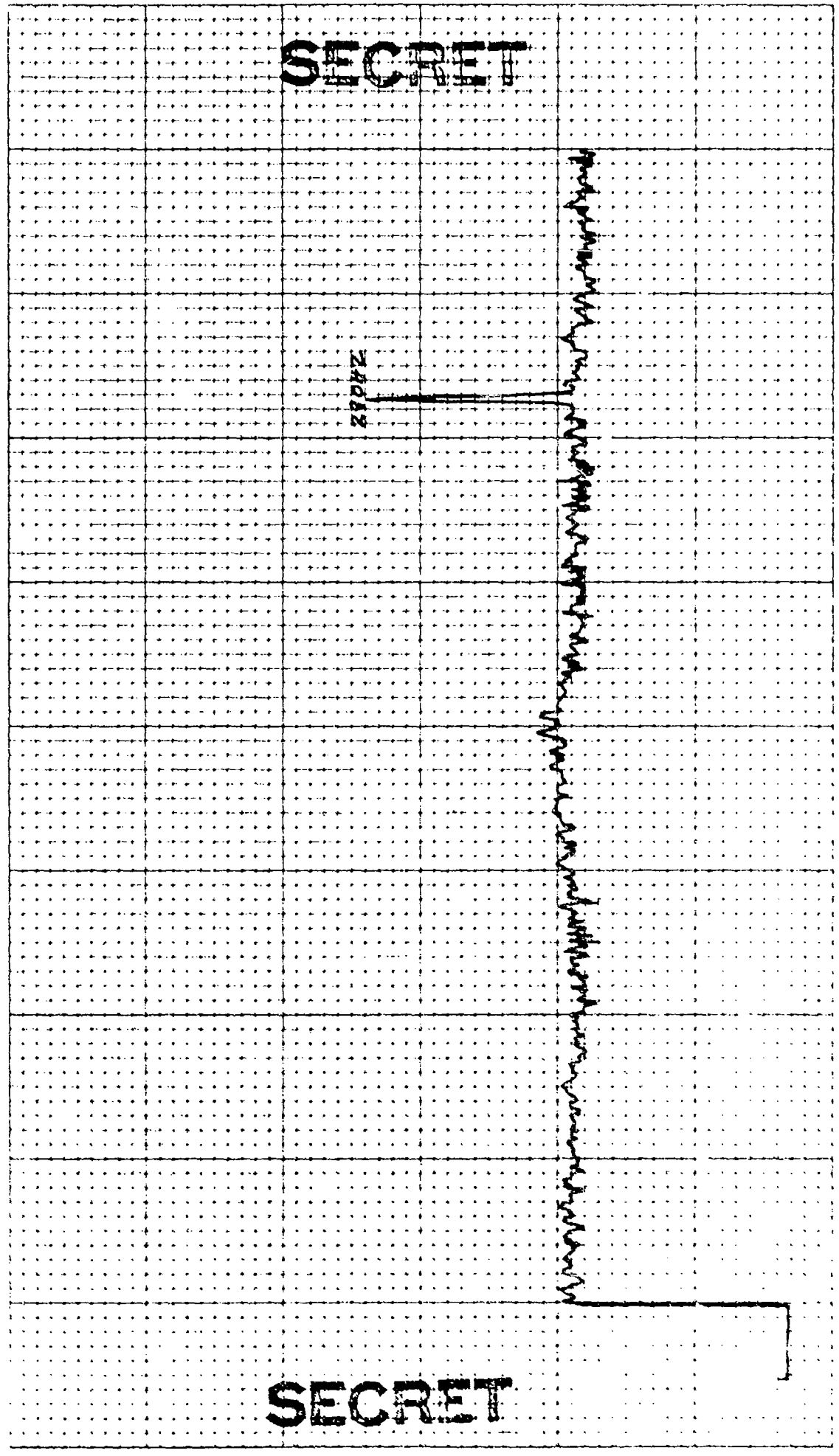
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CONTROL: 2-7 -0134 (32)      DATE OF ANALYSIS: 1-26-77      REEL: F14      INDE XJ575  
 BEAMFORMED SPECTRUM (ELEMENTS)      29-31  
 EXERCISE: BEARING STAKE      DATE/TIME: 2-7-77 -0834 Z      INTEGRATION TIME 320 SECS      ATTER: 27 DB  
 CENTER FREQ: 270 HZ      ANALYSIS BANDWIDTH: 1/10HZ      FILTER      WTG: HANNING  
32 ELEMENTS      122 DEG. AZ STEERING

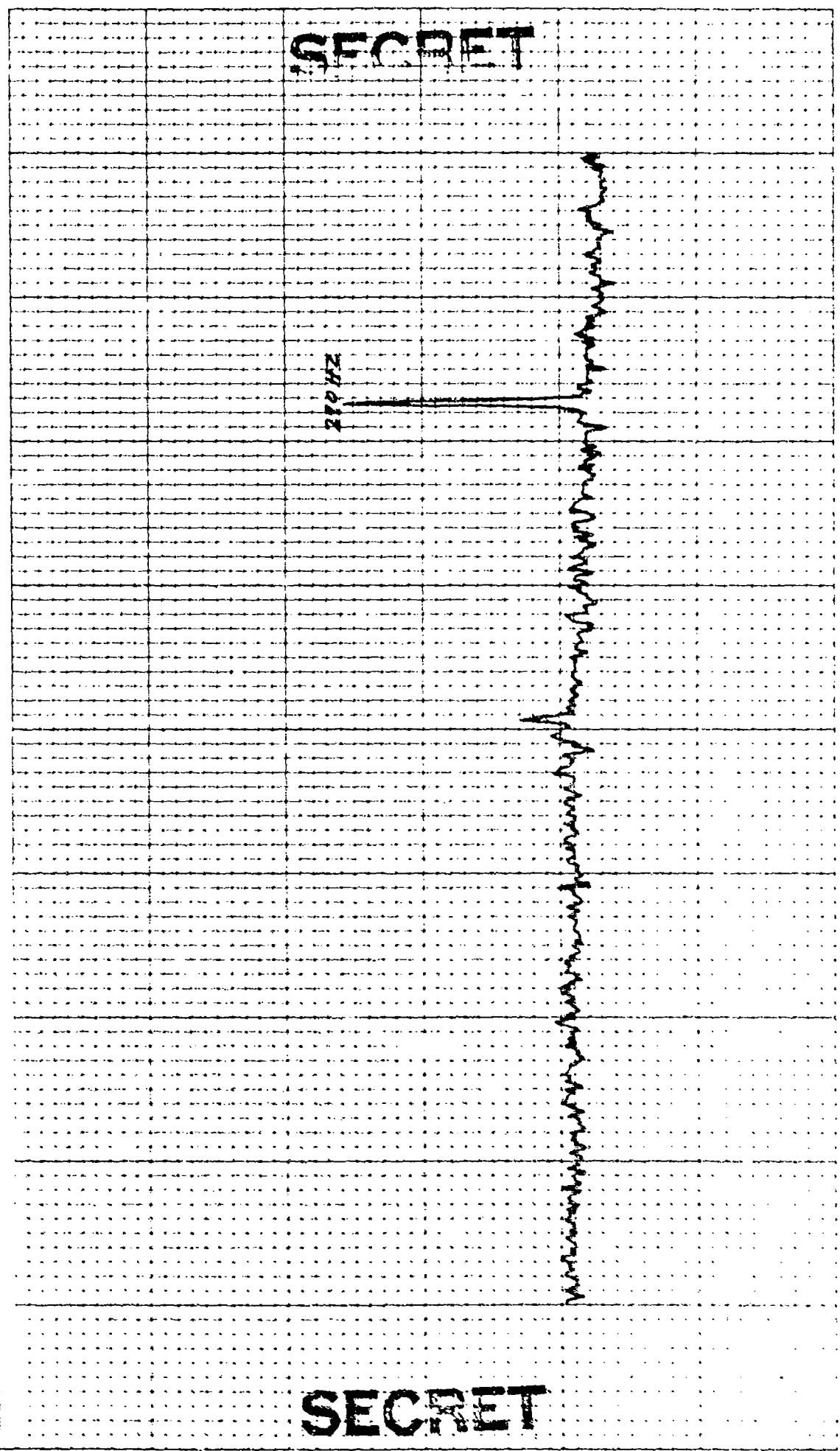


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CONTROL: 2-7 -0934 (32)      DATE OF ANALYSIS: 1-26-54      REEL: F44      INDE X3575  
 BEAMFORMED SPECTRUM (ELEMENTS)      DATE/TIME: 2-7-77 -0934 Z      INTEGRATION TIME 320 SECS      ATTN: 2Y DB  
 EXERCISE: BEARING STAKE      ANALYSIS BANDWIDTH: 1/10HZ      FILTER      WTG: HANNING  
 CENTER FREQ: 270 HZ      +24 DEG. AZ STEERING



CONTROL: 27-0934 (72) DATE OF ANALYSIS: 1-26-77 REEL: F14 INDE X3275  
 BEAMFORMED SPECTRUM (ELEMENTS) 1-26-77 INTEGRATION TIME 320 SECS ATTEN: -24 DB  
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1710HZ FILTER WTC: HANNING  
 CENTER FREQ: 270 HZ 4.5 DEG. AZ STEERING



26-380

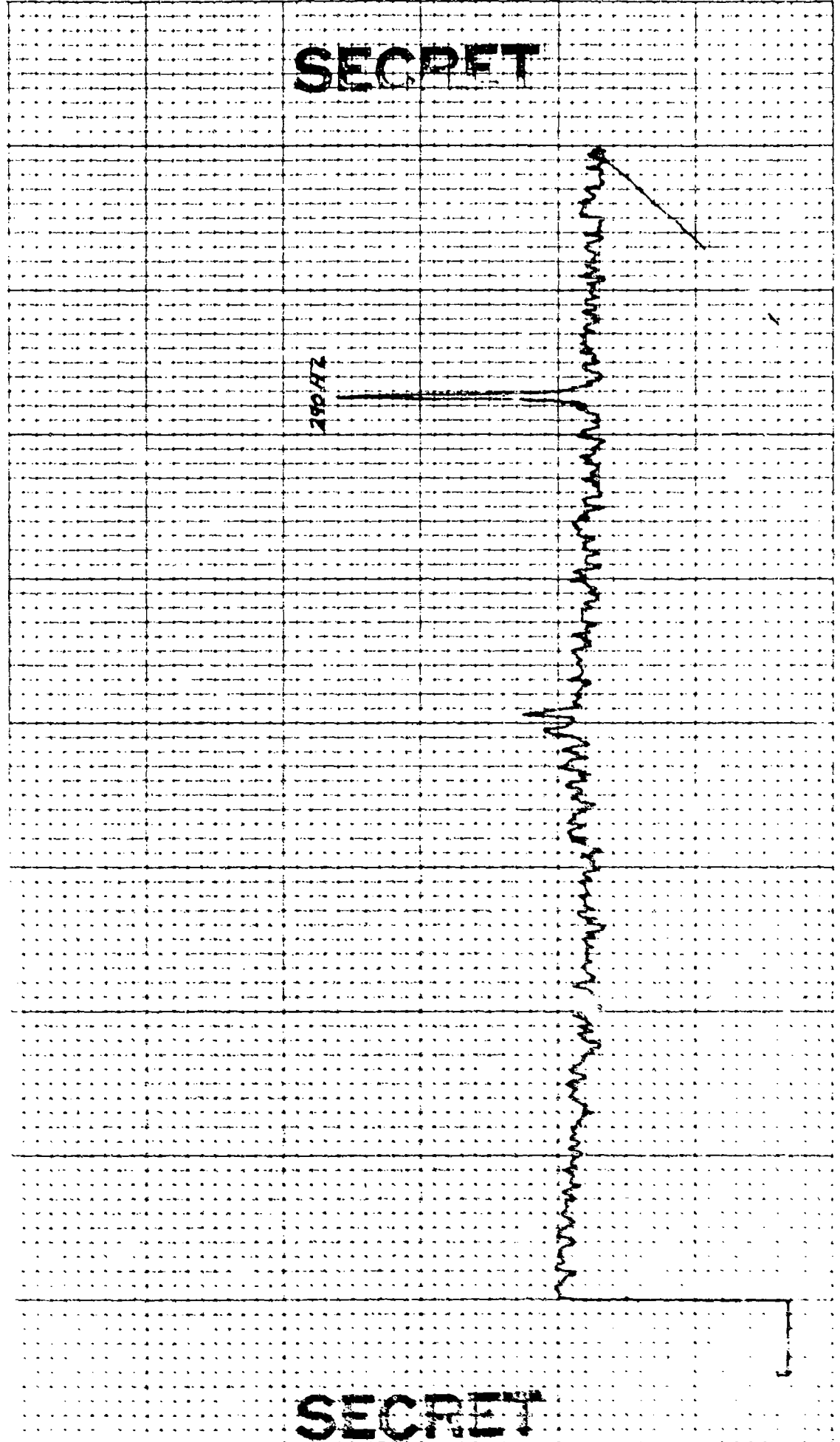
40 003

REEL: F/Y INDE XJ575

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

DATE OF ANALYSIS: \_\_\_\_\_  
1-26 & 29-74  
DATE/TIME: 2-7-77 - 0914 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
+ 25.5 DEG. AZ STEERING

CONTROL: 0914 - 5/ (0913)  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
22 ELEMENTS





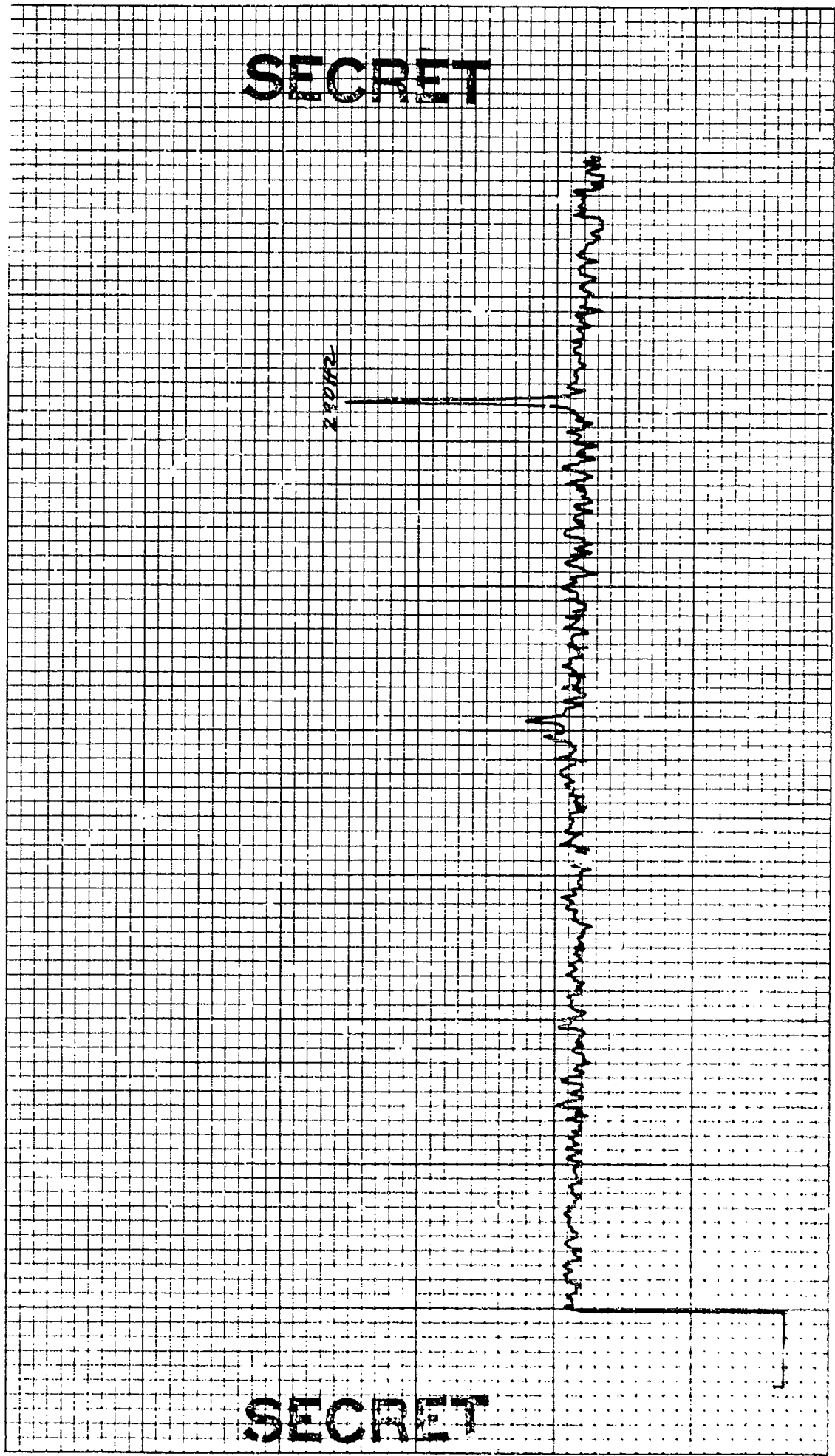
CONTROL: 2-2 -0934 (32) DATE OF ANALYSIS: 1-26-77 28-34 REEL: F14 INDE X3573

BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-7-77 -0934 Z INTEGRATION TIME 320 SECS ATTEN: -2Y DB

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

CENTER FREQ: 270 HZ +26 DEG. AZ STEERING

32 ELEMENTS



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DATE OF ANALYSIS: 1-26-77

14 526

CONTROL: 2-7 -0934 (32)      DATE OF ANALYSIS: 1-26-77

BEAMFORMED SPECTRUM(ELEMENTS 429-34)

EXERCISE BEARING STAKE      ANALYSIS BANDWIDTH: 1/10HZ

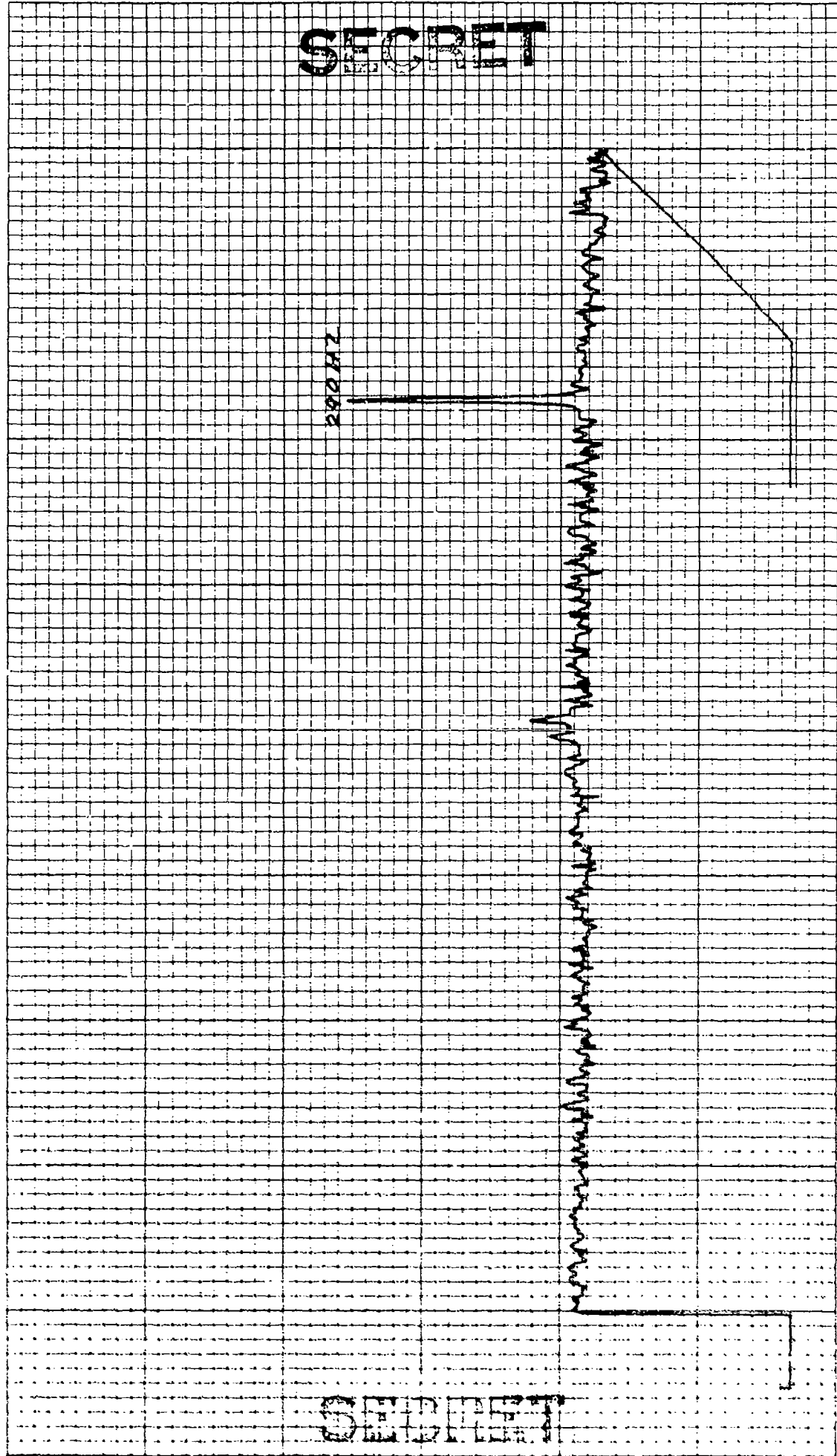
CENTER FREQ: 270 HZ      ANALYSIS BANDWIDTH: 1/10HZ

32 ELEMENTS      426 DEG. AZ STEERING

REEL: F/4      INDE X5575

INTEGRATION TIME 320 SECS      ATEN: -2Y DB

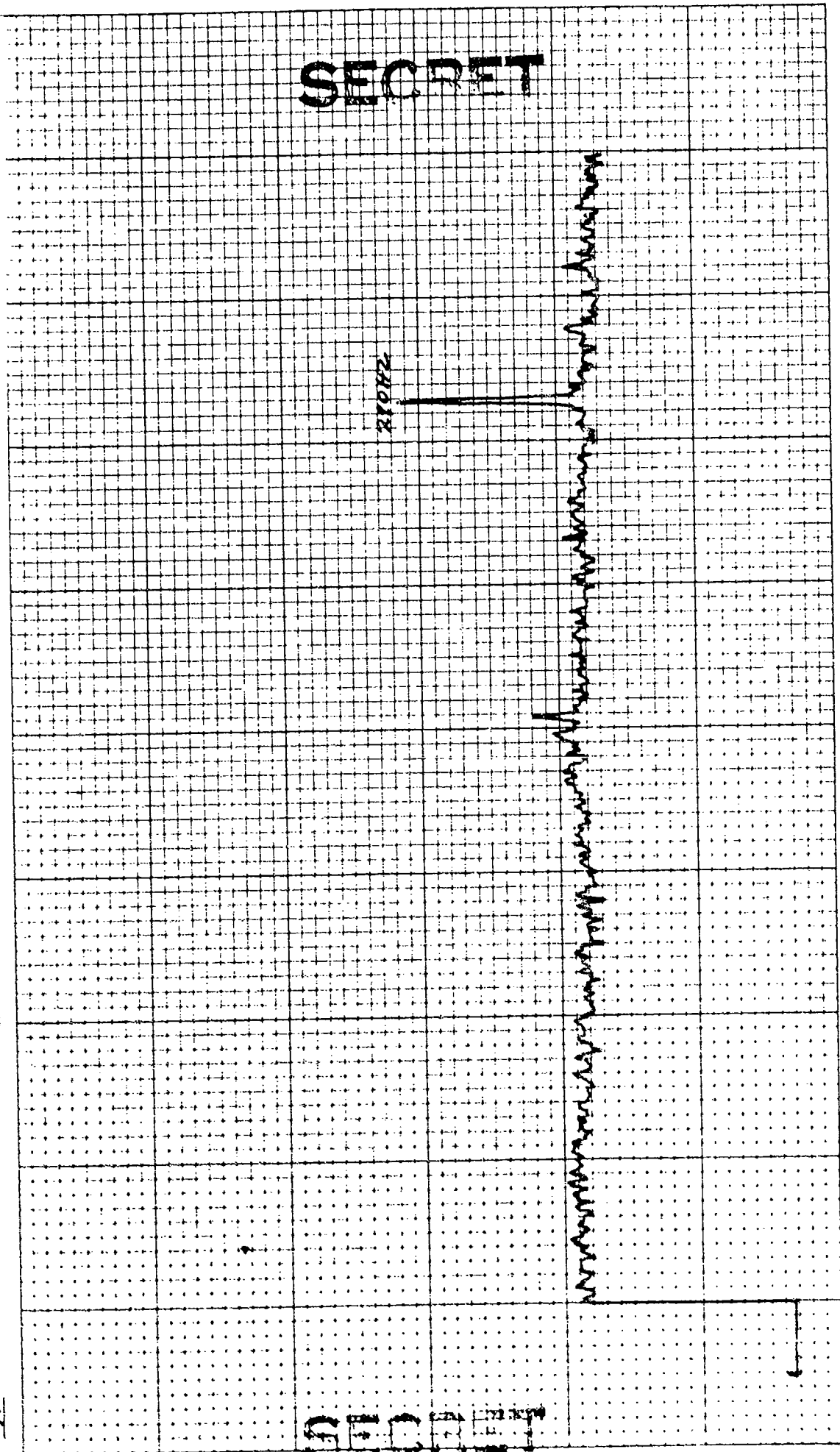
FILTER      WTG: HANNING



REEL: F14 INDE X3575

INTEGRATION TIME 320 SECS ATTN: -2Y DB  
FILTER WTG: HANNING

CONTROL: 2-7 -0934 (72-) DATE OF ANALYSIS: 1-26-77  
BEAMFORMED SPECTRUM (ELEMENTS 29-34)  
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 -0934 Z  
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ  
32 ELEMENTS +28 DEG. AZ STEERING



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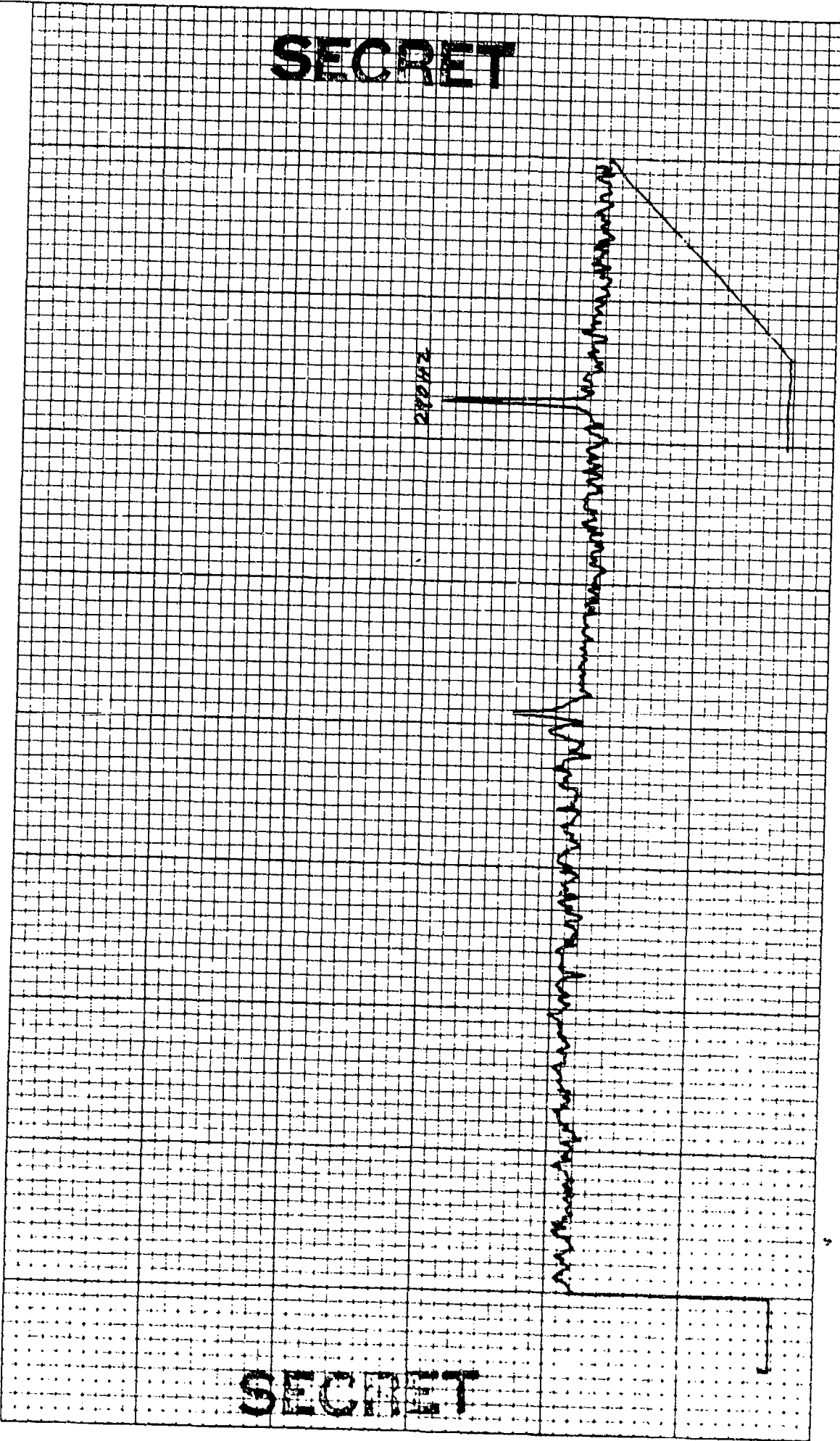
4f 03

CONTROL: 27-0934 (22)  
 BEAMFORMED SPECTRUM (ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
 72 ELEMENTS

DATE OF ANALYSIS: 1-26-77  
 DATE/TIME: 2-7-77 0934Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 +30 DEG. AZ STEERING

REEL: F14  
 INTEGRATION TIME 320 SECS  
 FILTER WTC: HANNING

INDE X3575  
 ATTN: ->V DB



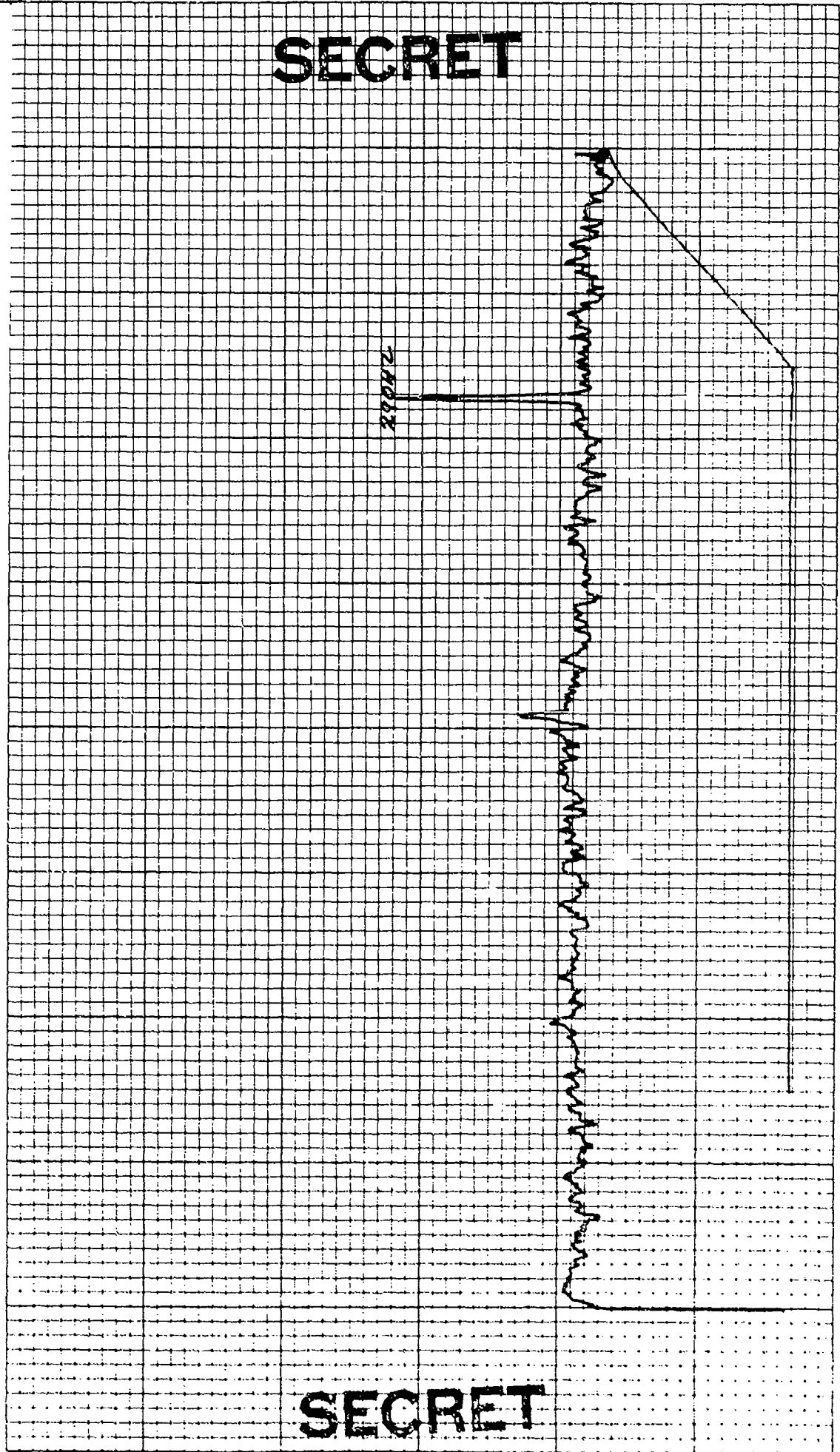
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CONTROL: 2-7 -0134 (32 )  
BPAMFORMED SPECTRUM(ELEMENTS  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
32 ELEMENTS

DATE OF ANALYSIS: 1-26-54  
DATE/TIME: 2-7-72 -0934Z  
ANALYSIS BANDWIDTH: 1/10HZ  
+32 DEG. AZ STEERING

REEL: F14 INDE X3575  
INTEGRATION TIME 320 SECS ATTN:-2Y DB  
FILTER WTG: HANNING



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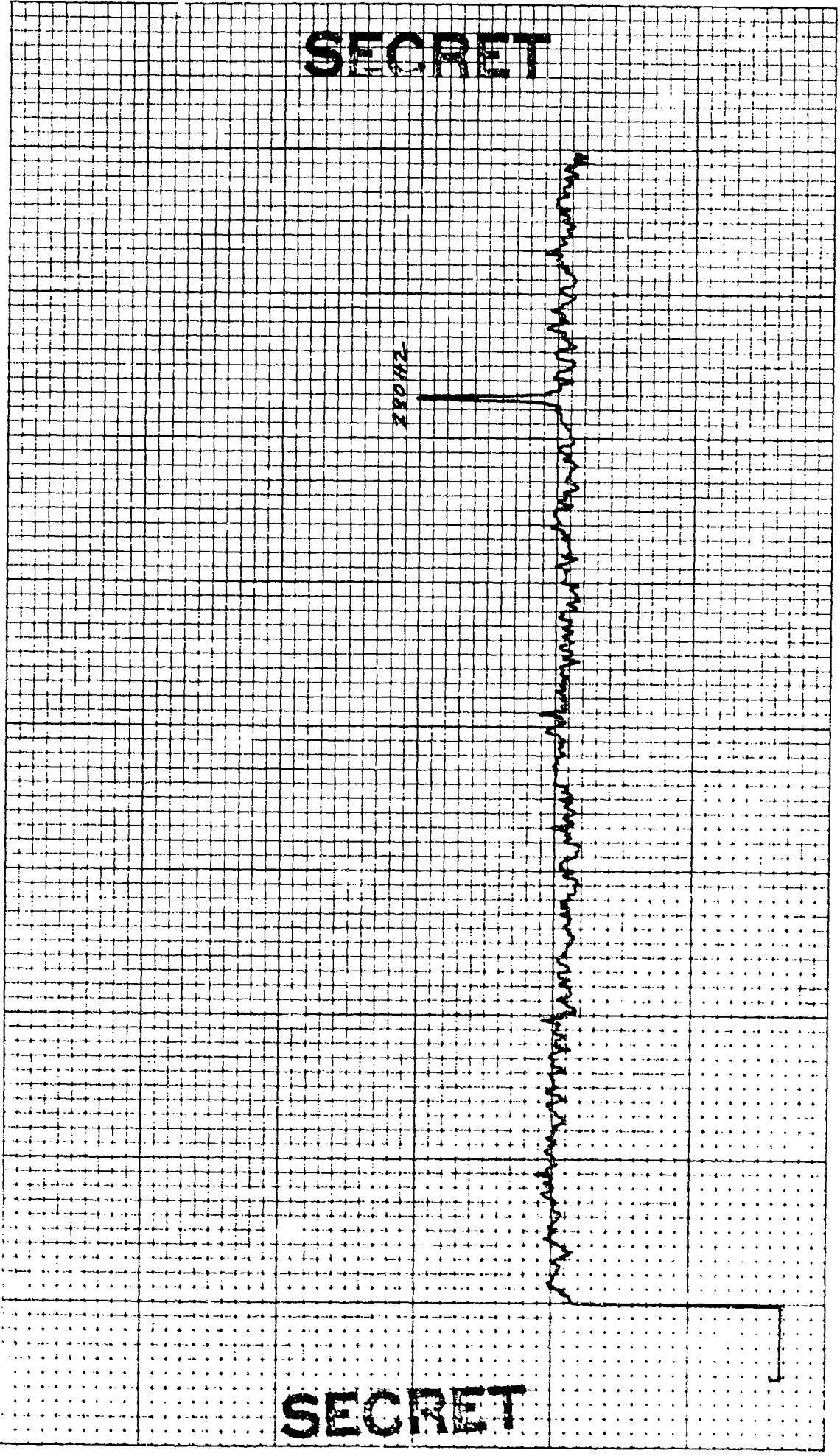
4' 03

CONTROL: 2-7 -0974 (22)  
 BEAMFORMED SPECTRUM(ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
 32 ELEMENTS

DATE OF ANALYSIS: 1-26-77  
 DATE/TIME: 2-7-77 -0930Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 +34 DEG. A2 STEERING

REEL: F14  
 INTEGRATION TIME 320 SECS  
 FILTER WTG: HANNING

INDE X3575  
 ATTN: -2VDB



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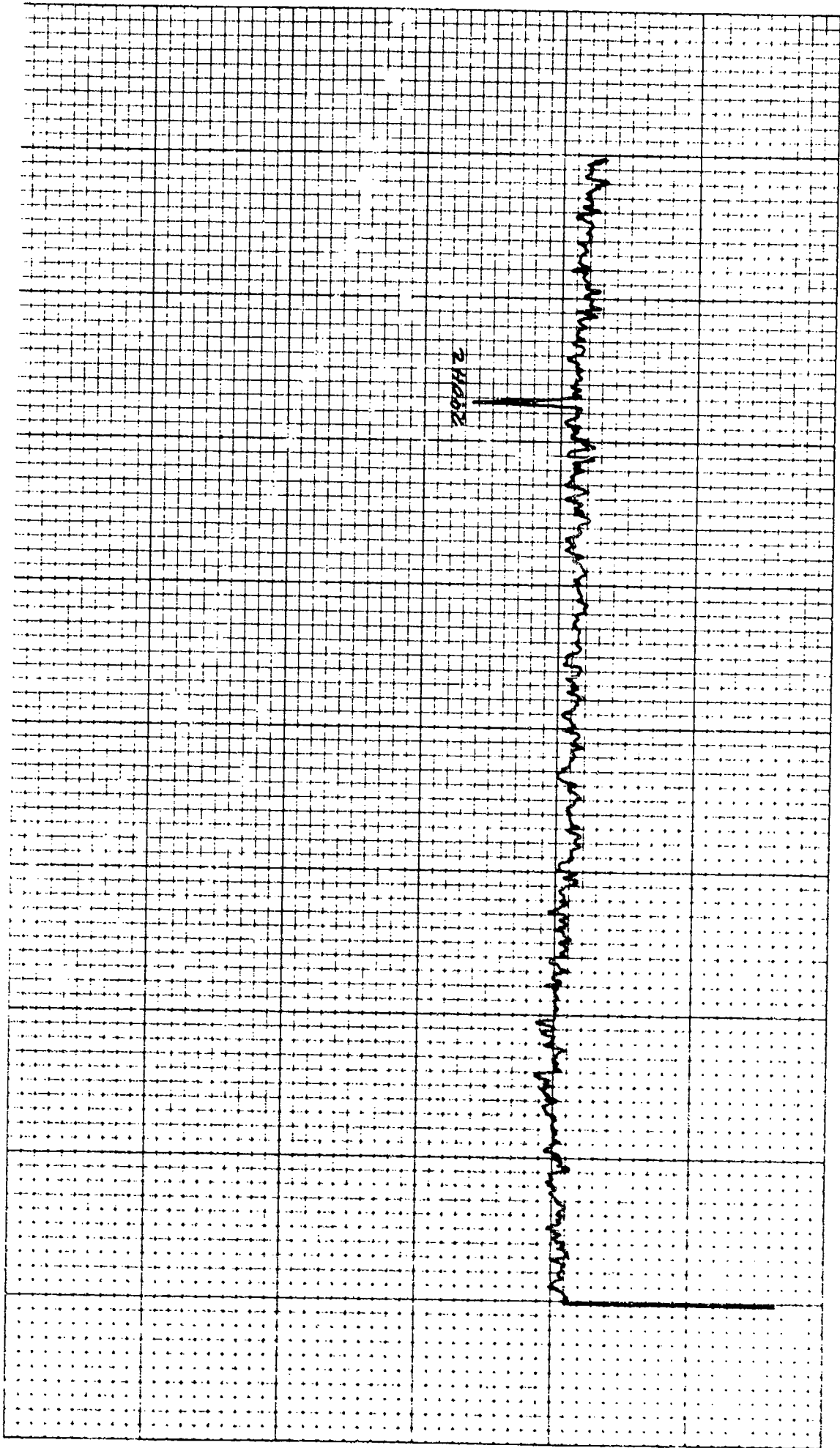
CONTROL: 2-7 -093Y (32)  
 BEAMFORMED SPECTRUM (ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
 32 ELEMENTS

DATE OF ANALYSIS: - - - - -  
 1-26 4 29-74

DATE/TIME: 2-7-77 -0934Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 +36 DEG. AZ STEERING

REEL: F14 INDE X3575

INTEGRATION TIME 320 SECS ATTN:-2V DB  
 FILTER WTG: HANNING



# CONFIDENTIAL

## SIGNAL LEVEL AND SNR

### CALCULATIONS

DATA POINT 3

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 51

#### SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-37.5</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-27.5	
BEAMFORMER GAIN	<u>+30</u>	+ 2.5	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	+ 2.7	SIG. LEVEL FOR SIGNAL GAIN

#### NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-65.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-55.8	
BEAMFORMER GAIN	<u>+30</u>	-25.8	NOISE LEVEL FOR SNR CALCULATION

#### SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+2.5</u>	
SIGNAL LEVEL FOR SNR	<u>-25.8</u>	28.3	
PROCESSOR CORRECTION	<u>- 4.0</u>	24.3	
MRA CORRECTION	<u>+ .2</u>	24.5	SNR 1/2 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	16.3	SNR 1 HZ BAND

SECTION 13

# CONFIDENTIAL



# CONFIDENTIAL

## SIGNAL LEVEL AND SNR

### CALCULATIONS

DATA POINT 3

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 51

#### SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-47.4</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-37.4	
BEAMFORMER GAIN	<u>+30</u>	-7.4	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	-6.6	SIG. LEVEL FOR SIGNAL GAIN

#### NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-73.2</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-63.2	
BEAMFORMER GAIN	<u>+30</u>	-33.2	NOISE LEVEL FOR SNR CALCULATION

#### SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-7.4</u>	
SIGNAL LEVEL FOR SNR	<u>-33.2</u>	25.8	
PROCESSOR CORRECTION	<u>-4.0</u>	21.8	
MRA CORRECTION	<u>+ .8</u>	22.6	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	14.4	SNR 1 HZ BAND

# CONFIDENTIAL

# CONFIDENTIAL

DATA POINT 3

## SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-32.5</u>	<u>-38.6</u>	<u>      </u>
MRA SIGNAL LEVEL	<u>+ 2.7</u>	<u>- 6.5</u>	<u>      </u>
ARRAY SIGNAL GAIN	<u>35.2</u>	<u>32.1</u>	<u>      </u>
20 LOG <u>51</u>	<u>34.1</u>	<u>34.1</u>	<u>      </u>
# of elements			
DIFFERENCE	<u>+ 1.1</u>	<u>- 2.0</u>	<u>      </u>

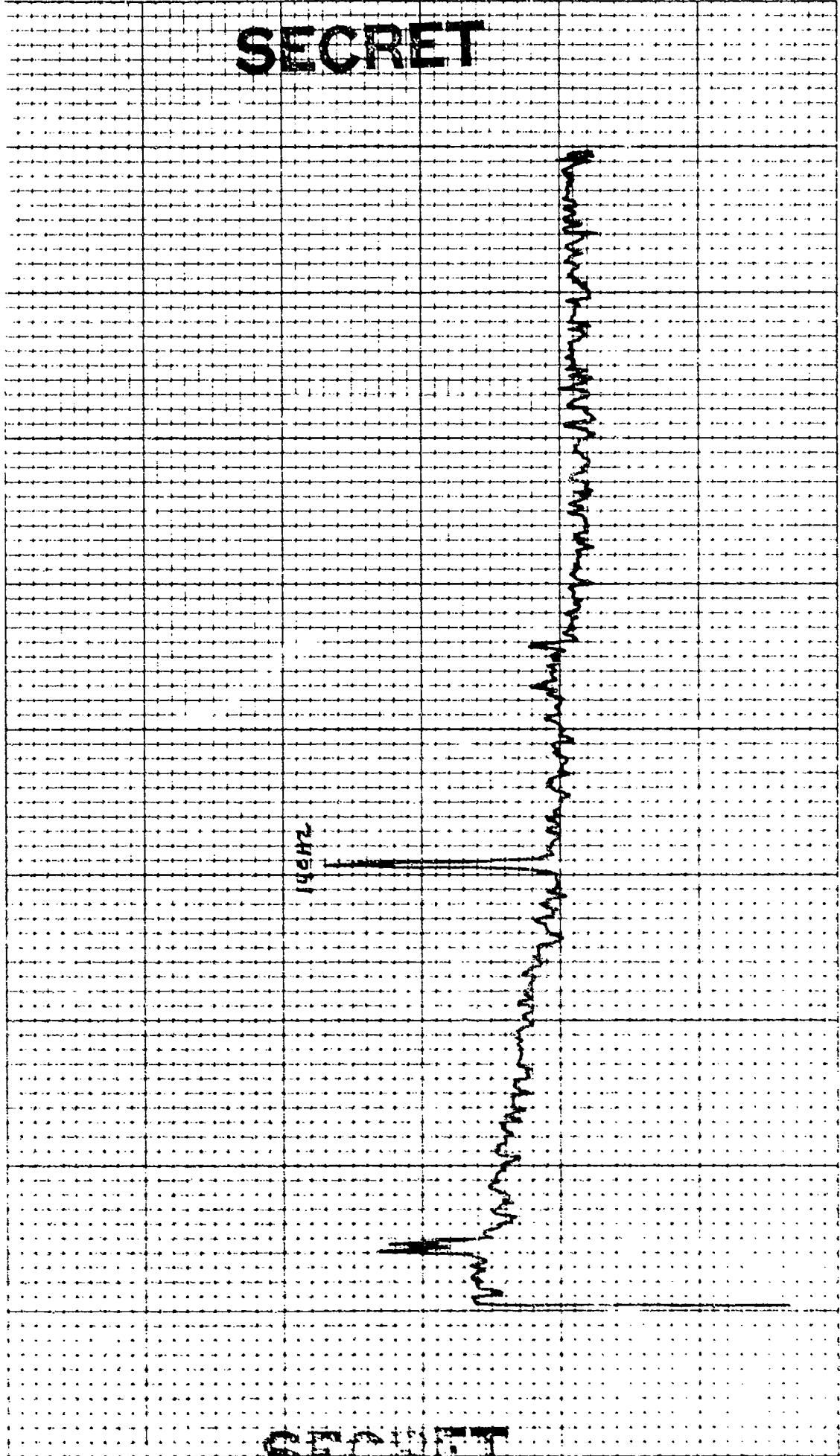
## ARRAY GAIN

MRA SNR	<u>24.5</u>	<u>22.6</u>	<u>      </u>
MEAN OMNI SNR	<u>9.0</u>	<u>8.85.6</u>	<u>      </u>
ARRAY GAIN	<u>15.5</u>	<u>16.8</u> 17.0	<u>      </u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>15.1</u>	<u>17.2</u>	<u>      </u>
DIFFERENCE	<u>+ .4</u>	<u>- .4</u>	<u>      </u>

# CONFIDENTIAL

CONTROL: 2-7 -0834 (51 )      DATE OF ANALYSIS: -- -- --  
 BEAMFORMED SPECTRUM(ELEMENTS)      1-26 4 29-63  
 EXERCISE: BEARING STAKE      DATE/TIME: 2-7-77 -0834 Z  
 CENTER FREQ: 150 HZ      ANALYSIS BANDWIDTH: 1710HZ  
 51 ELEMENTS      +24 DEG. AZ STEERING

REEL: F14      INDE XJ575  
 INTEGRATION TIME 320 SECS      ATTN: -30DB  
 FILTER      WTG: HANNING



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11-516

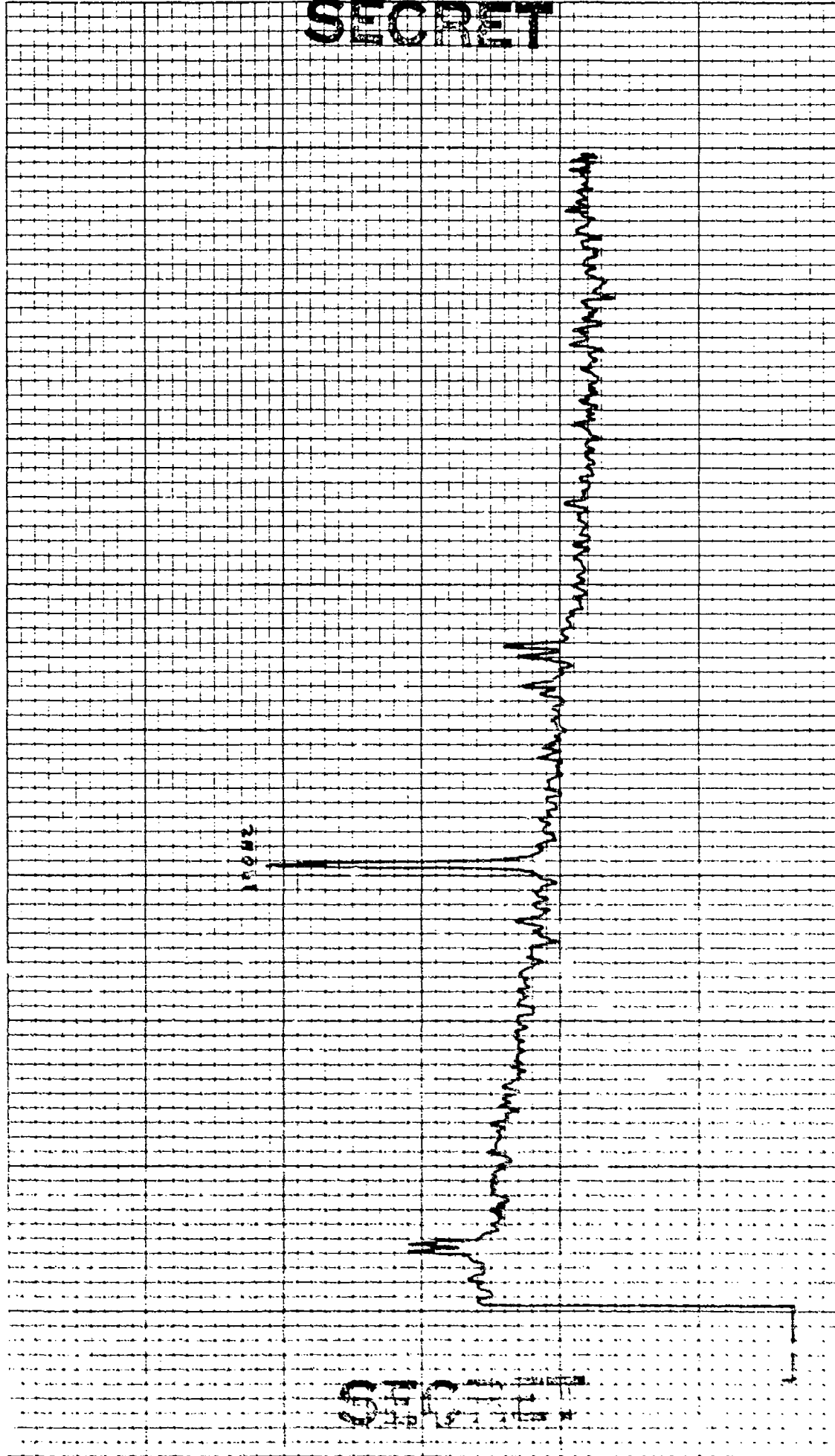
CONTROL: 27 - 0834 (51)      DATE OF ANALYSIS: - - -      REEL: F/Y      INDE X3572

BEAMFORMED SPECTRUM (ELEMENTS)      1-26-28-52

EXERCISE: BEARING STAKE      DATE/TIME: 27-77 - 0834 Z      INTEGRATION TIME 320 SECS      ATTN: -30 DB

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

51 ELEMENTS      124 DEG. AZ STEERING

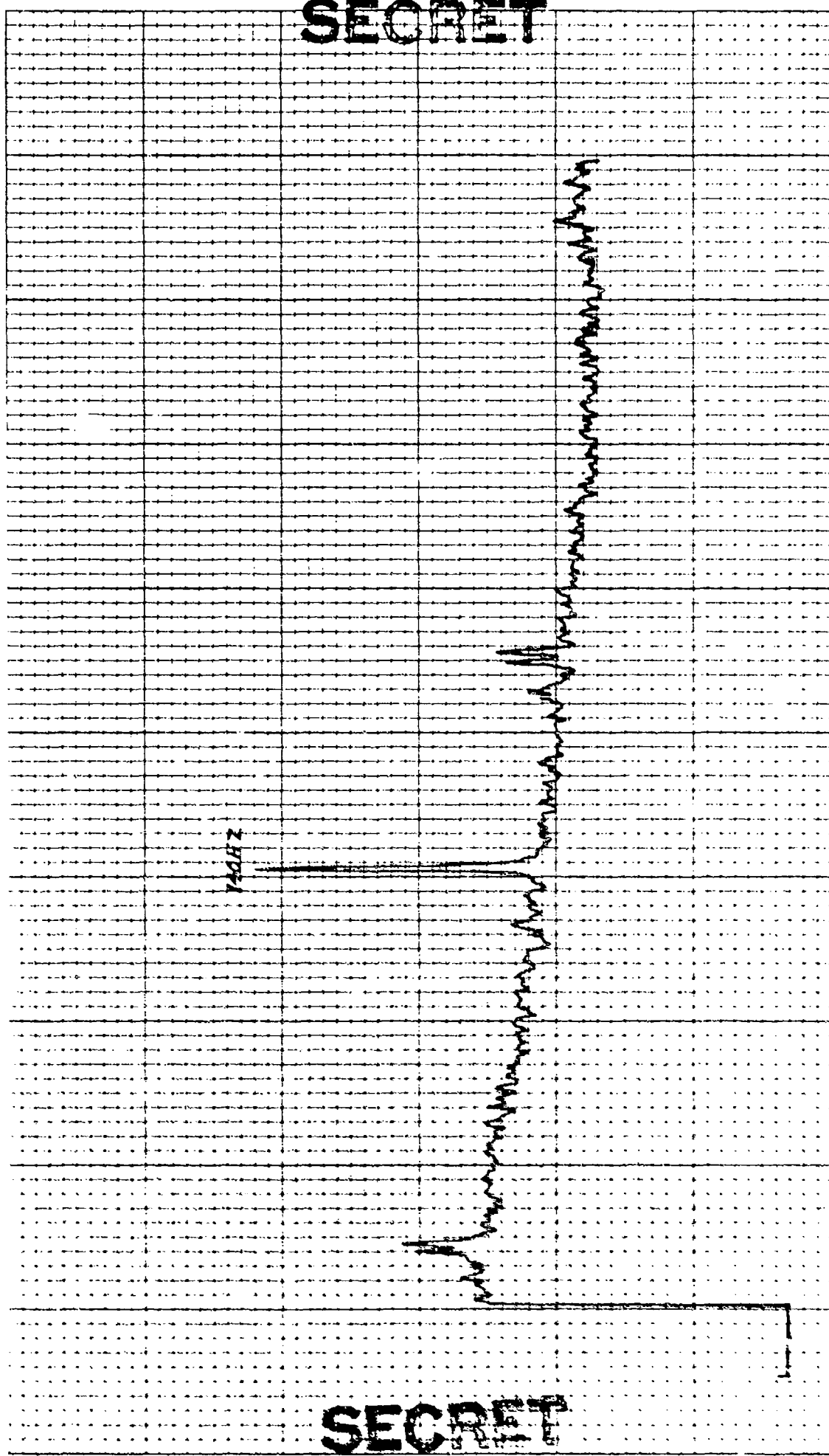


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CONTROL: 0934 - 51 (293) DATE OF ANALYSIS: \_\_\_\_\_  
BEAMFORMED SPECTRUM (ELEMENTS) 1 - 26 @ 29 - 63  
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 0934 Z  
CENTER FRFQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ  
51 ELEMENTS + 25 DEG. AZ STEERING

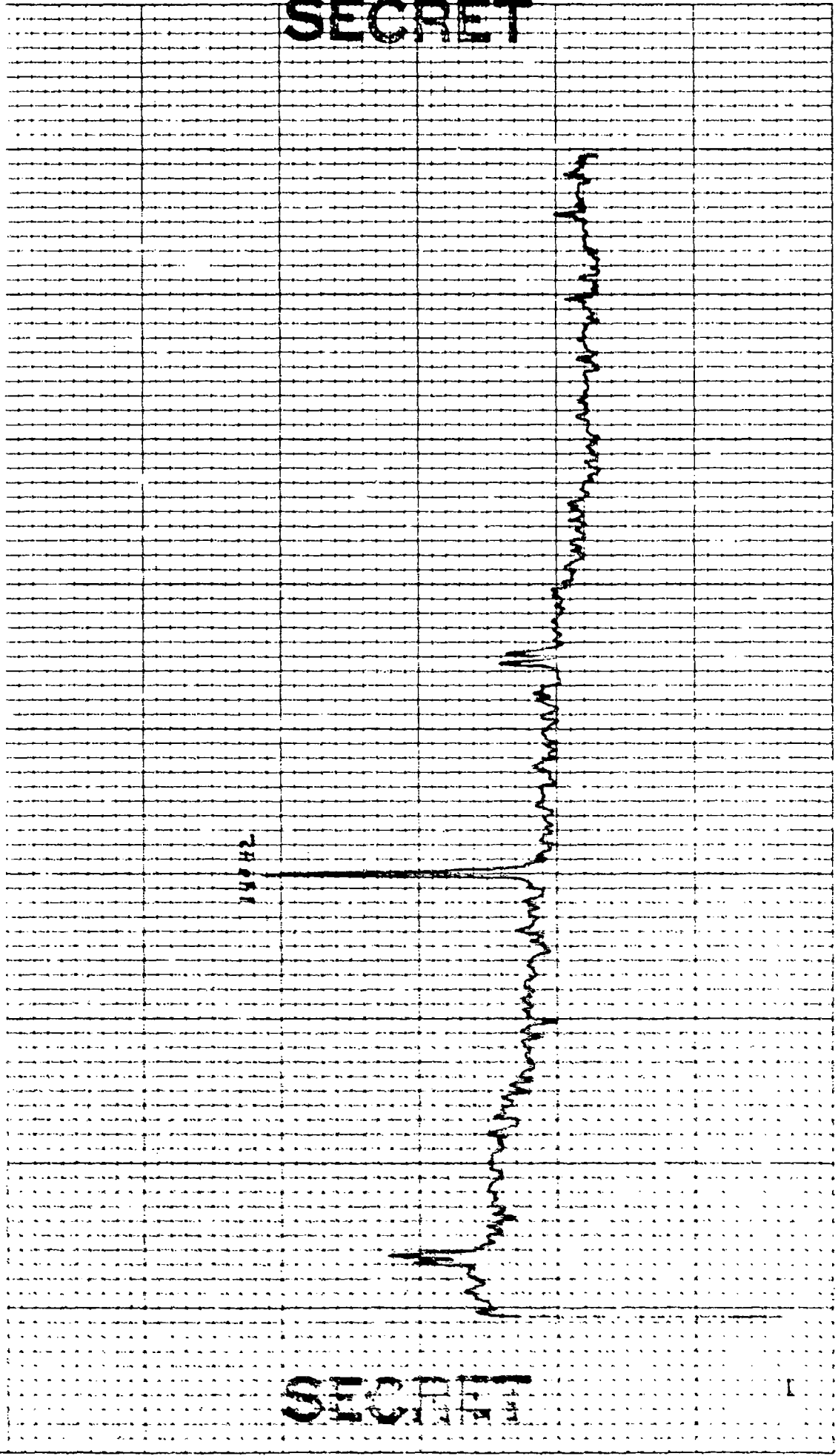
REEL: F14 INDE X 3575  
INTEGRATION TIME 320 SECS ATTEN: 30 DB  
FILTER WTC: HANNING



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CONTROL: 27-0974 (51)      DATE OF ANALYSIS: 1-26-77      REEL: F14      INDE X3572  
 BEAMFORMED SPECTRUM(ELEMENTS)      DATE/TIME: 27-77-0974Z      INTEGRATION TIME 320 SECS      ATTN: -70 DB  
 EXERCISE: BLANKING STAKE      ANALYSIS BANDWIDTH: 110HZ      FILTER      WTC: HANNING  
 CENTER FREQ: 150 HZ      26 DEG. AZ STEERING



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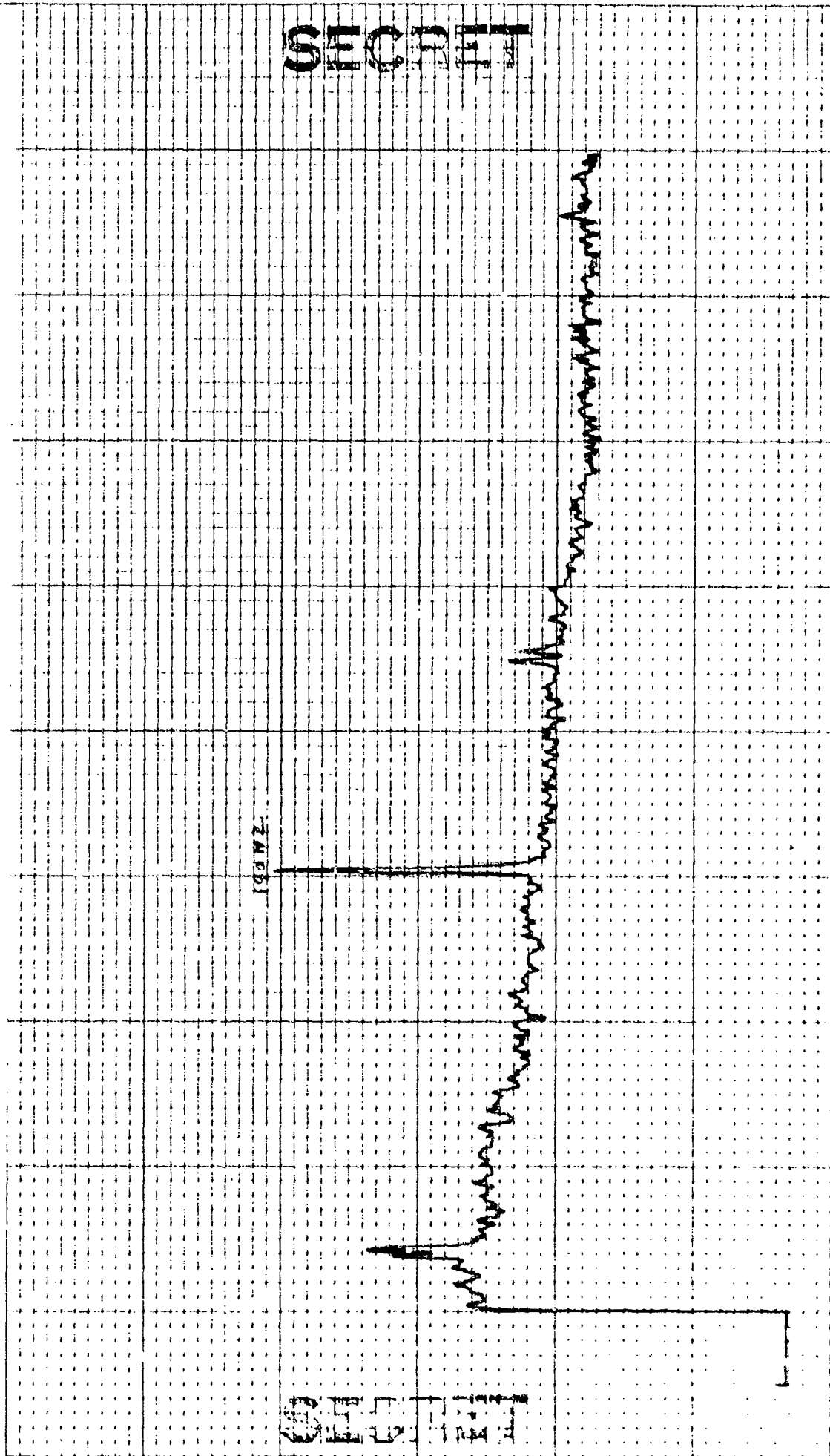
915-1

CONTROL: 2-7 - 0934 (51)  
 BEAMFORMED SPECTRUM (ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 150 HZ  
 51 ELEMENTS

DATE OF ANALYSIS: 1-26-77  
 DATE/TIME: 2-7-77 - 0934 Z  
 ANALYSIS BANDWIDTH: 1/10 HZ  
 +27 DEG. AZ STEERING

INTEGRATION TIME 320 SECS  
 FILTER WTG: HANNING

INDE X3575

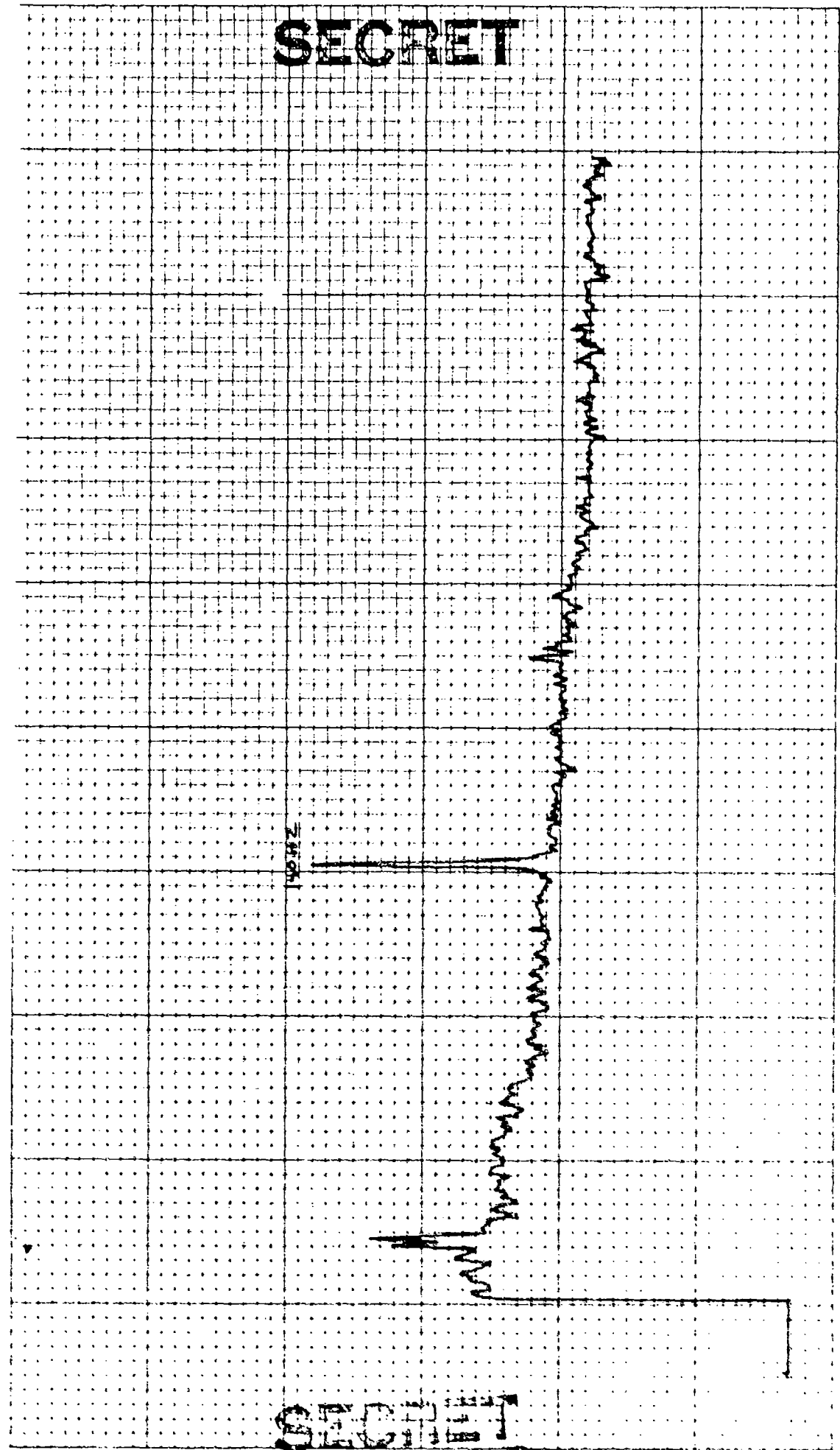


03

CONTROL: 27 -0834 (51 )  
 BEAMFORMED SPECTRUM(ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 150 HZ  
 51 ELEMENTS

DATE OF ANALYSIS: -- -- --  
 1-26 4 29-53  
 DATE/TIME: 2-7-77 -0834 Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 426 DEG. AZ STEERING

REEL: F/4 INDE X3575  
 INTEGRATION TIME 320 SECS ATTN:-70 DB  
 FILTER WTG: HANNING

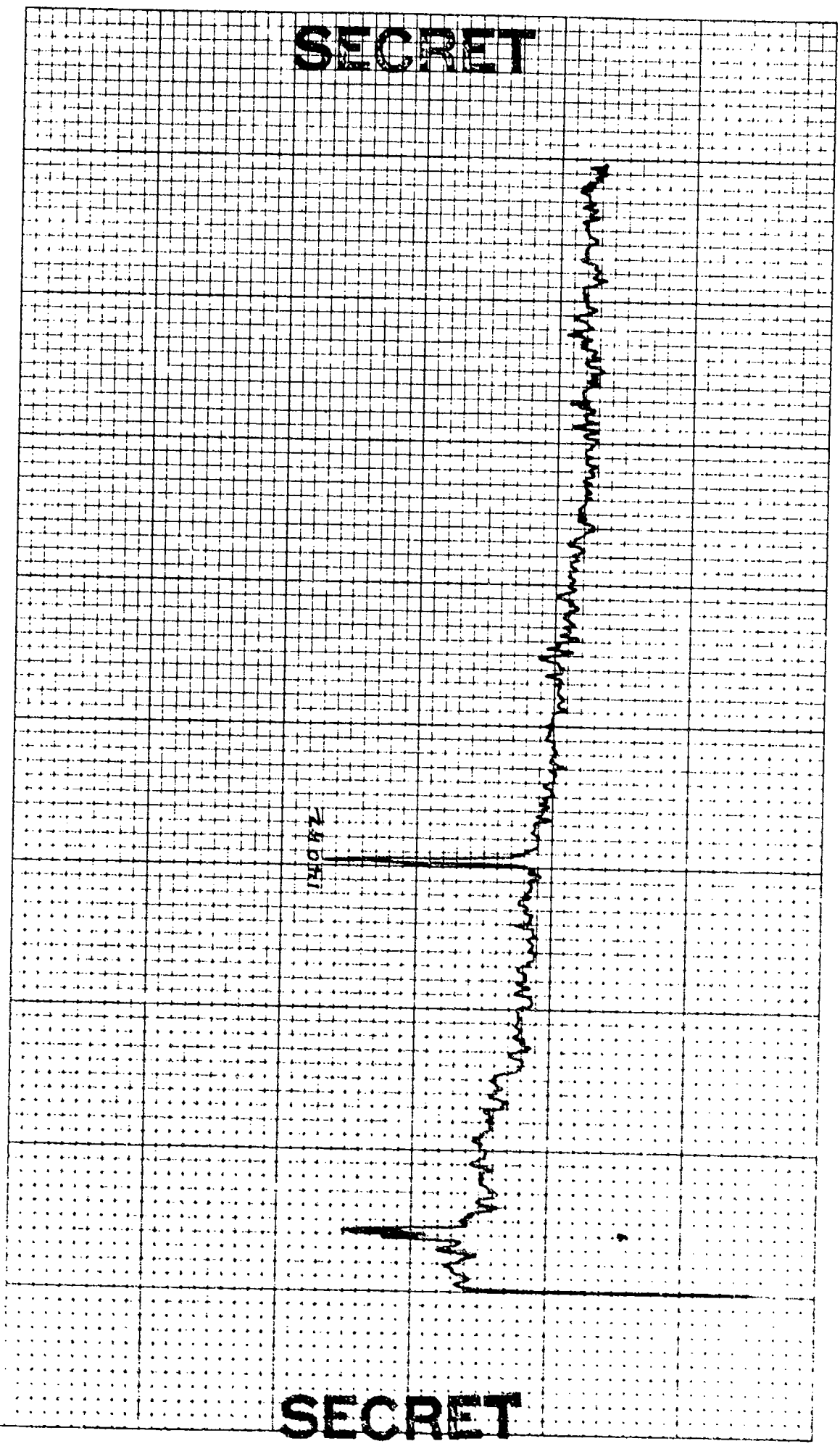




E 1 TO: 5CH: 4 '03

CONTROL: 2-7 -0934 (61 )  
BEAMFORMED SPECTRUM (ELEMENTS)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 150 HZ  
51 ELEMENTS  
DATE OF ANALYSIS: 1-26-77  
DATE/TIME: 2-7-77 - 0934Z  
ANALYSIS BANDWIDTH: 1/10HZ  
129 DEG. AZ STEERING

REEL: F/4  
INDE XJ5Z  
INTEGRATION TIME 320 SECS  
ATTEN: -30 DB  
FILTER WTG: HANNING



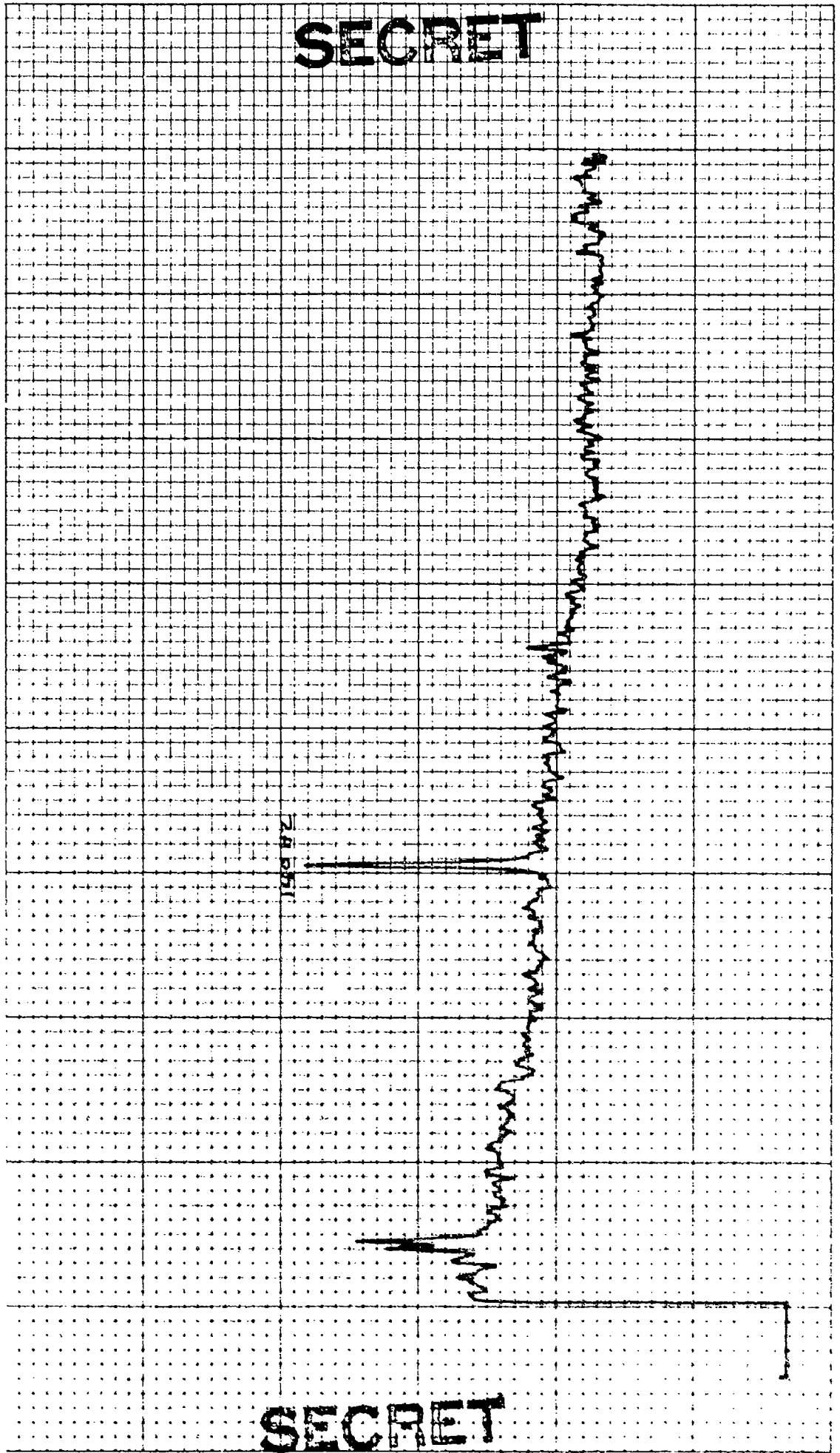
CONTROL: 2-7 -0934 (51)  
 BEAMFORMED SPECTRUM(ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 150 HZ  
 51 ELEMENTS

DATE OF ANALYSIS: - - - -  
 1-26-67

DATE/TIME: 2-7-77 -0934 Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 +30 DEG. AZ STEERING

REEL: F14  
 INTEGRATION TIME 320 SECS  
 FILTER WTG: HANNING

INDE X3576  
 ATTN: -30 DB



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4 03

E K TO J CH. 7 RCHL: 1 MAG

7-510

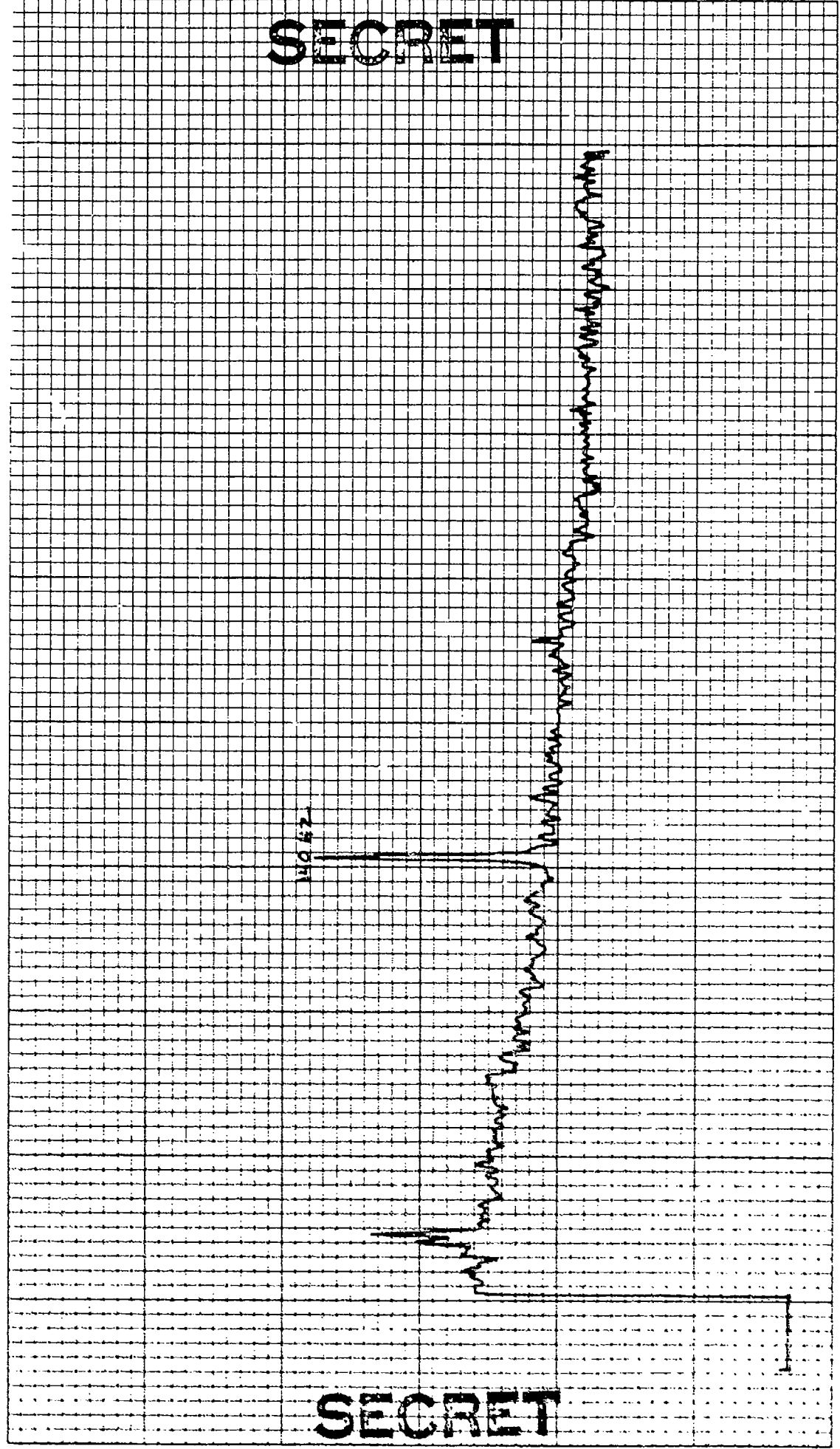
CONTROL: 2-7 - 0934 (51) REEL: F14 INDE X3575

BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: - - -

EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 0934 Z INTEGRATION TIME 320 SECS ATTN: -30 DB

CENTER FREQ: 160 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING

51 ELEMENTS +32 DEG. AZ STEERING



E K

YGT  
& ES

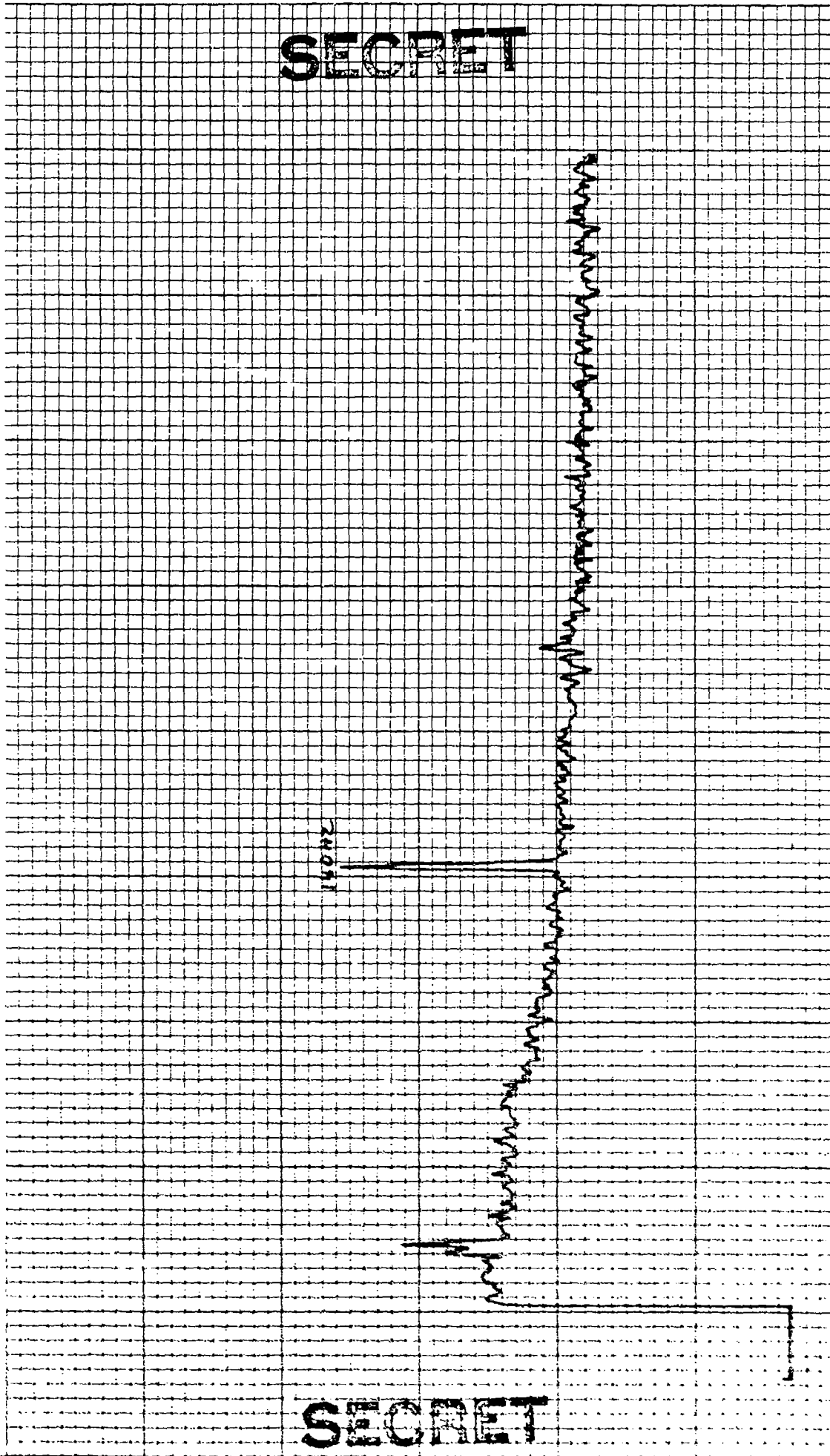
CH+7  
, MAG

NCHET

4 03

01-016

CONTROL: 2-7 -0934 (51)      DATE OF ANALYSIS: 1-26-53      REEL: F/4      INDE X3575  
 BEAMFORMED SPECTRUM(ELEMENTS)      )  
 EXERCISE: BEARING STAKE      DATE/TIME: 2-7-77 -0934 Z      INTEGRATION TIME 320 SECS      ATTN: -30 DB  
 CENTER FREQ: 150 HZ      ANALYSIS BANDWIDTH: 1/10HZ      FILTER WTG: HANNING  
S1 ELEMENTS      434 DEG. AZ STEERING



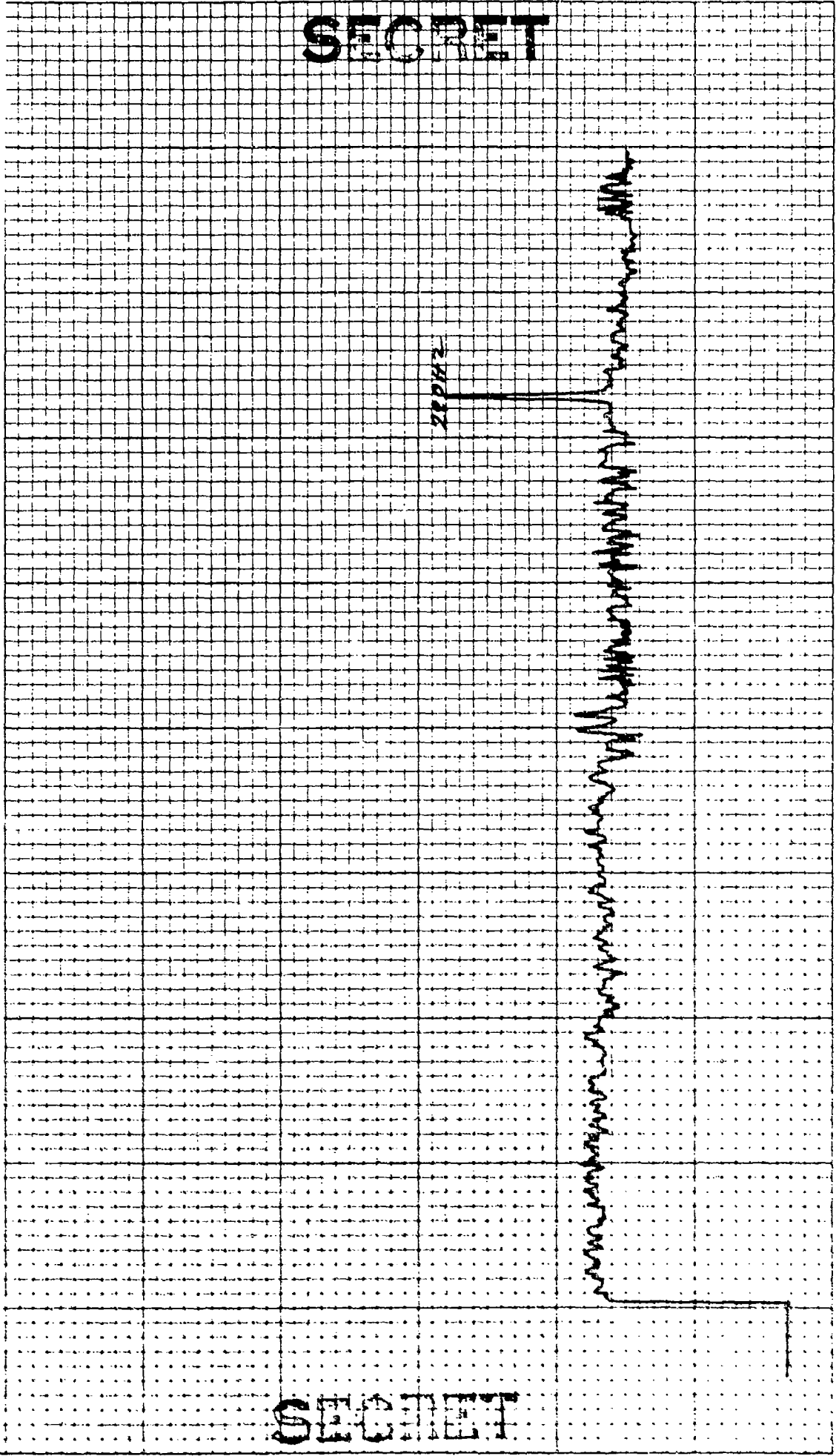
4 03

CONTROL: 27 -0874 (51)  
 BEAMFORMED SPECTRUM(ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
 51 ELEMENTS

DATE OF ANALYSIS: 1-26-77  
 DATE/TIME: 27-77 -0834 Z  
 ANALYSIS BANDWIDTH: 1710HZ  
 422 DEG. AZ STEERING

REEL: F/4  
 INTEGRATION TIME 320 SECS  
 FILTER WTC: HANNING

INDE X3575  
 ATTN: -30 DB

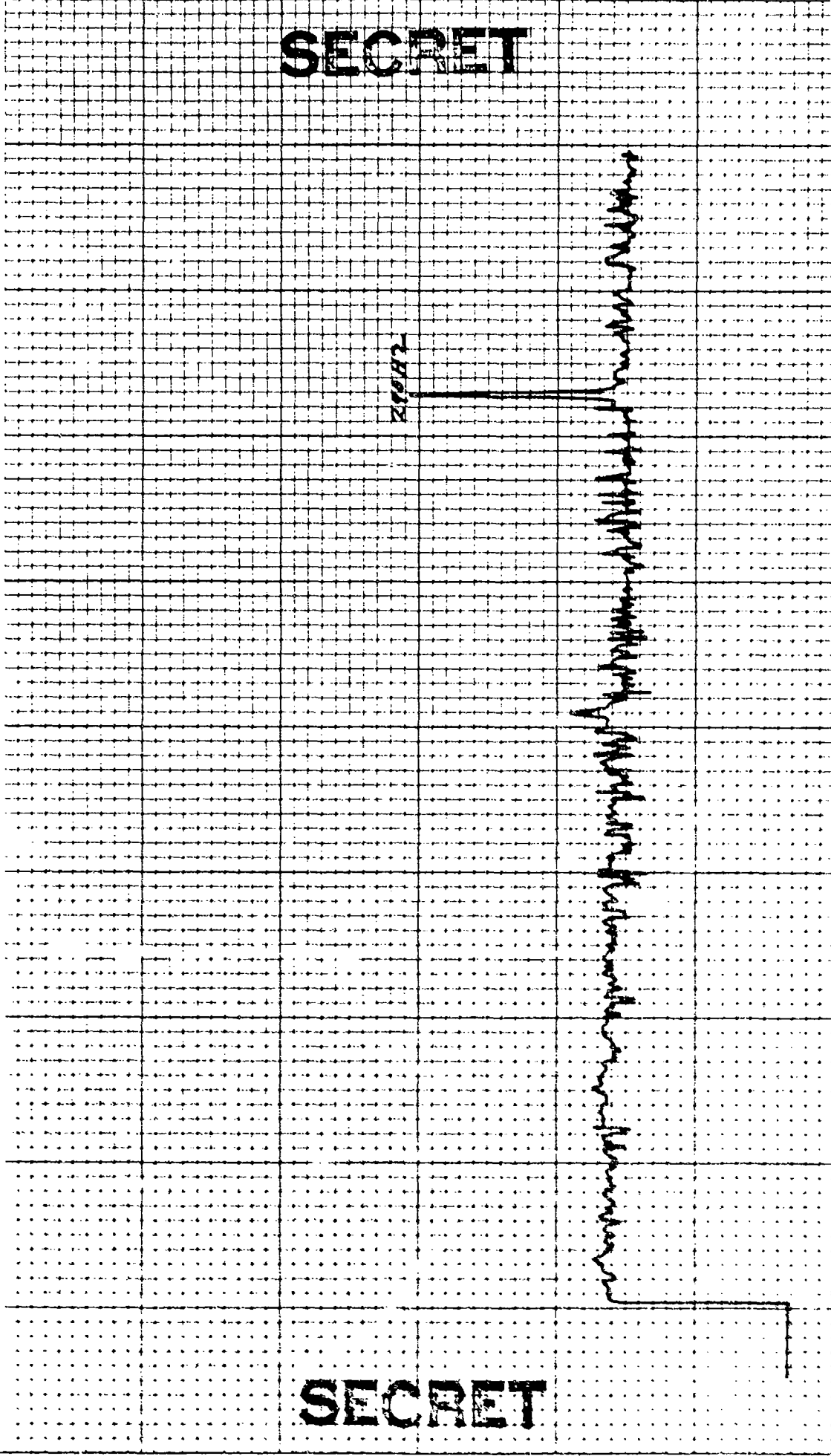


CONTROL: 27-0974 (51)  
 BEAMFORMED SPECTRUM (ELEMENTS 51)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
 51 ELEMENTS

DATE OF ANALYSIS: 1-26-83  
 DATE/TIME: 2-7-77 - 0939Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 124 DEG. AZ STEERING

REEL: F14  
 INTEGRATION TIME 320 SECS  
 FILTER WTG: HANNING

INDE XJS75  
 ATTN: -30 DB



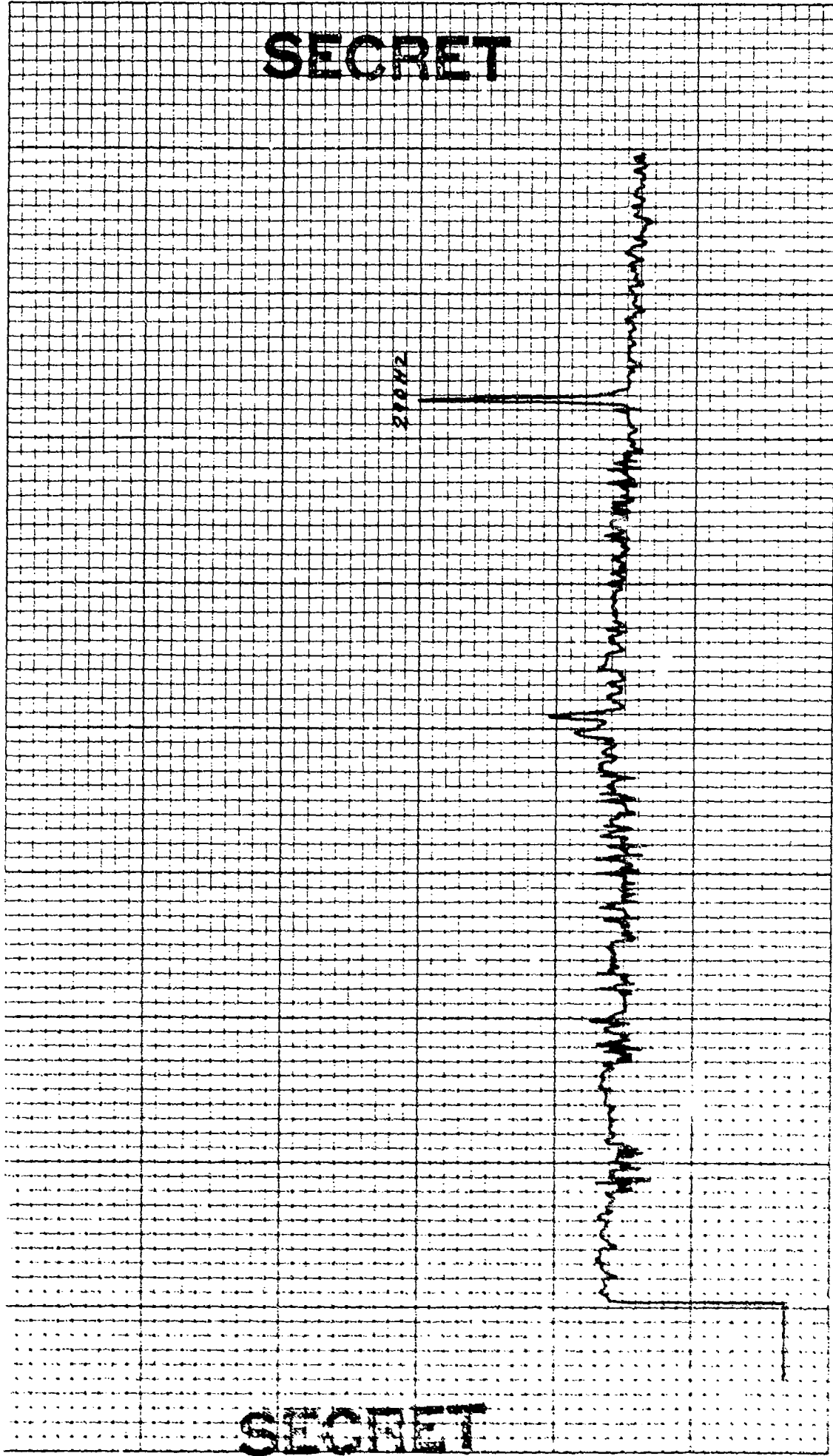
CONTROL: 2-7 -0934 (51)  
BEAMFORMED SPECTRUM(ELEMENTS 51)  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
DATE OF ANALYSIS: 1-26 4 21-53  
DATE/TIME: 2-7-77 - 0934 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
435 DEG. AZ STEERING

REEL: F/4

INDE X3675

INTEGRATION TIME 320 SECS  
FILTER WTG: HANNING

ATTEN: 20 DB



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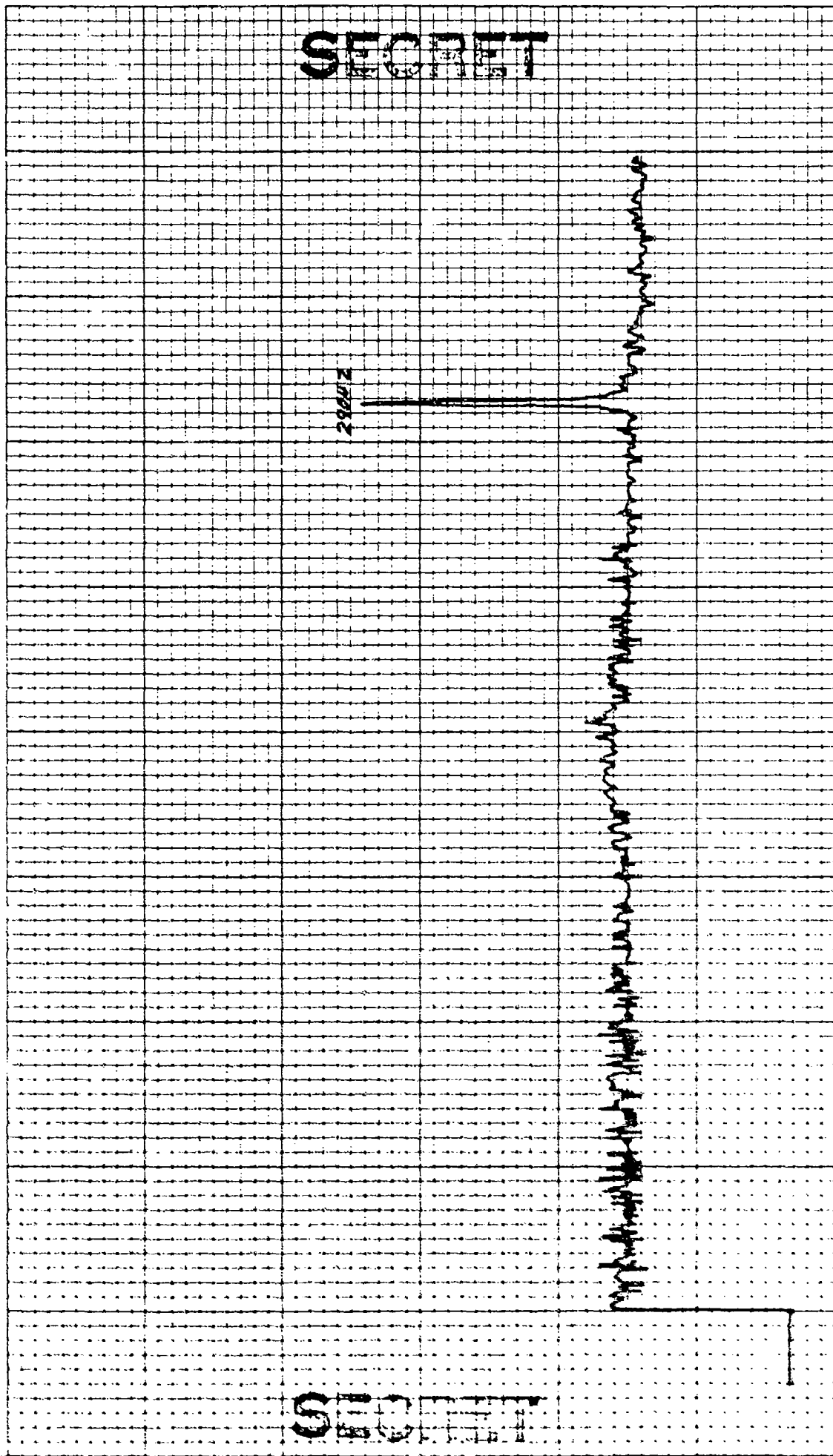
12  
510

03

TO: FROM: INSTRUMENT

CONTROL: 0934 - 61 (0934) DATE OF ANALYSIS: \_\_\_\_\_  
 BEAMFORMED SPECTRUM(ELEMENTS) /- 26 28-53 )  
 EXERCISE: BEAKING STAKE DATE/TIME: 27-77 - 0934 Z  
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ  
 51 ELEMENTS +27 DEG. AZ STEERING

REEL: F/4 INDE X 3575  
 INTEGRATION TIME 320 SECS ATTEN: 30 DB  
 FILTER WTG: HANNING

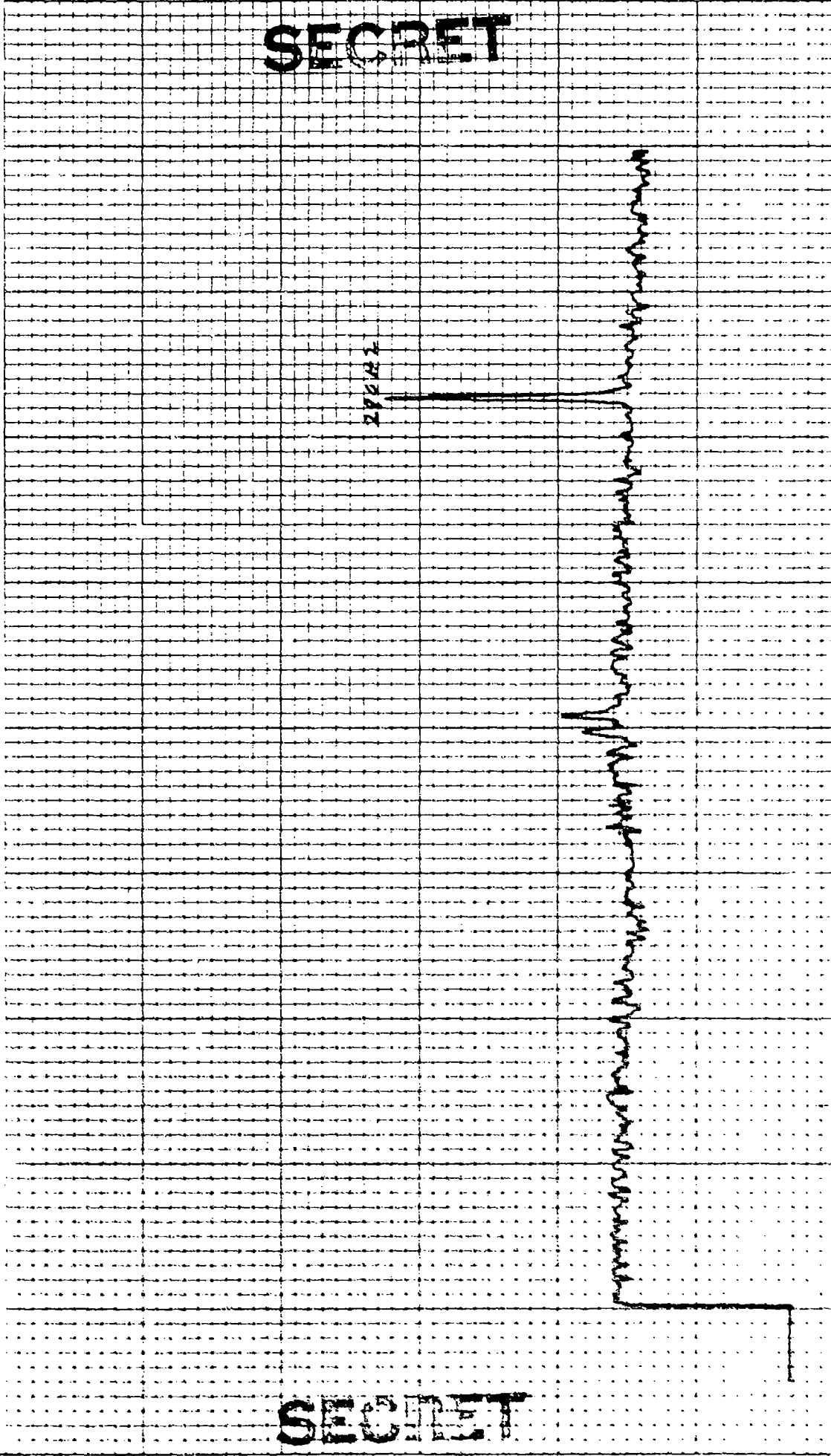




CONTROL: 2.7 -0834 (51)  
 BEAMFORMED SPECTRUM(ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
 ELEMENTS

DATE OF ANALYSIS: - - -  
 DATE/TIME: 1-26 21-53  
 ANALYSIS BANDWIDTH: 1/10HZ  
 126 DEG. AZ STEERING

REEL: F14 INDE XJ525  
 INTEGRATION TIME 320 SECS ATTEN:-70DB  
 FILTER WTG: HANNING



4 03

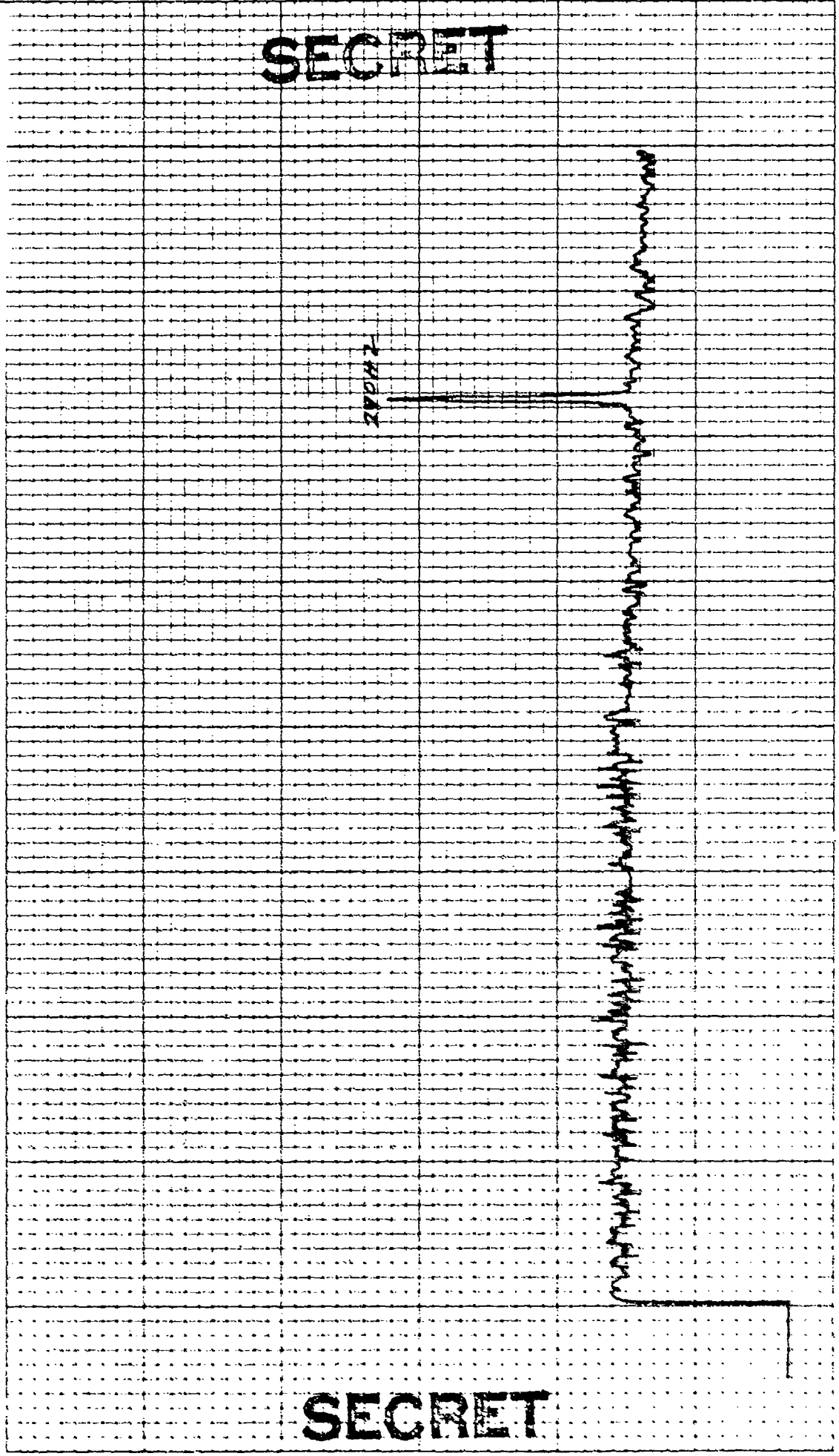
CONTROL: 2.7 - 0934 (51)      DATE OF ANALYSIS:      REEL: F/4      INDE XR75

BEAMFORMED SPECTRUM(ELEMENTS) 1-26 29-53      INTEGRATION TIME 320 SECS      ATTEN:-30 DB

EXERCISE: BEARING STAKE      DATE/TIME: 27-77 - 0934 Z      FILTER      WTC: HANNING

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

51 ELEMENTS      100 DEG. AZ STEERING

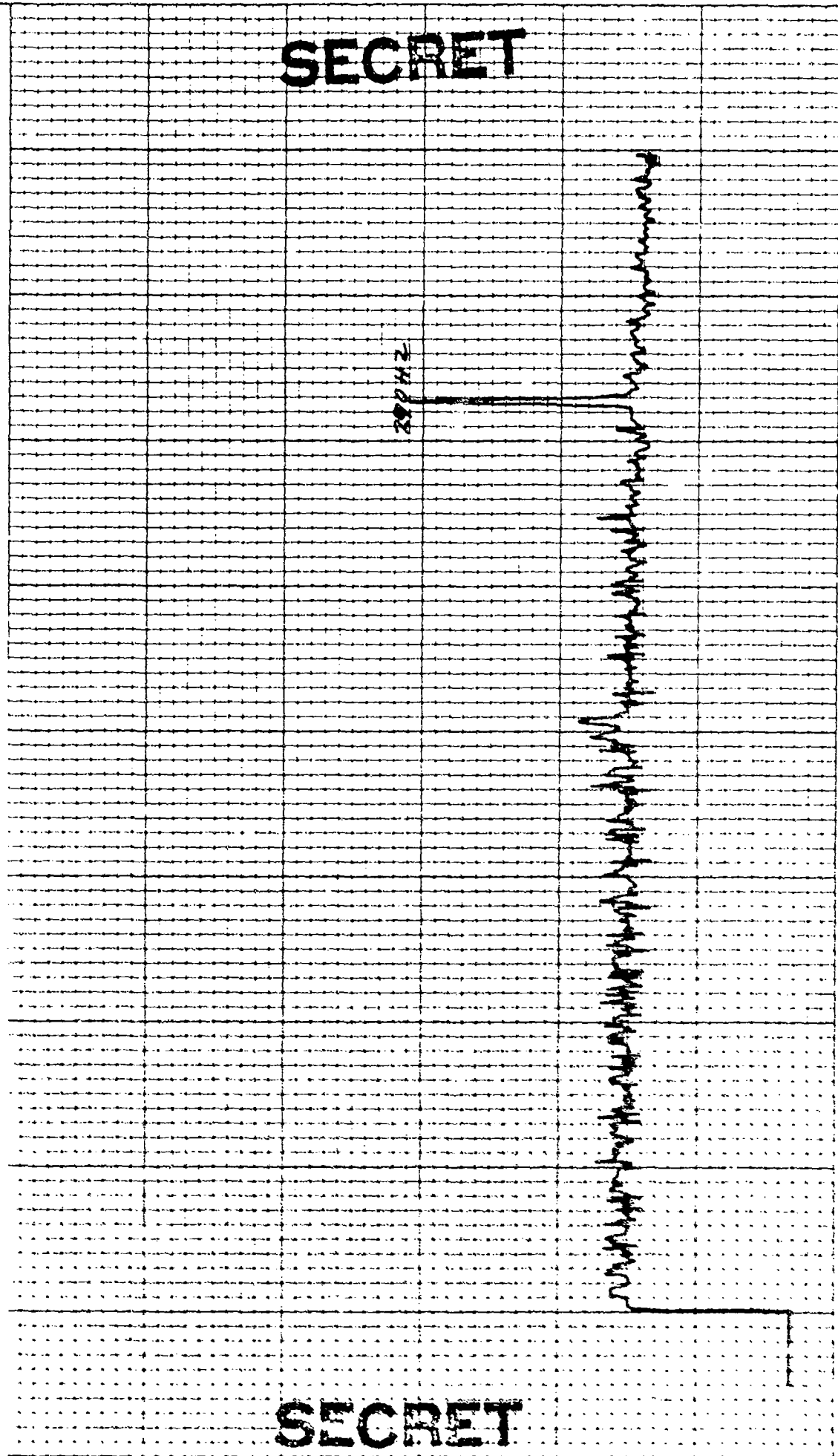


4 03

CONTROL: 2-7 -0874 (51)  
BEAMFORMED SPECTRUM(ELEMENTS  
EXERCISE: BEARING STAKE  
CENTER FREQ: 270 HZ  
51 ELEMENTS

DATE OF ANALYSIS: - - - -  
1-264 29-53  
DATE/TIME: 2-7-77 -0874 Z  
ANALYSIS BANDWIDTH: 1/10HZ  
+29 DEG. AZ STEERING

REEL: F14 INDE X3575  
INTEGRATION TIME 320 SECS ATTN: -36 DB  
FILTER WTC: HANNING



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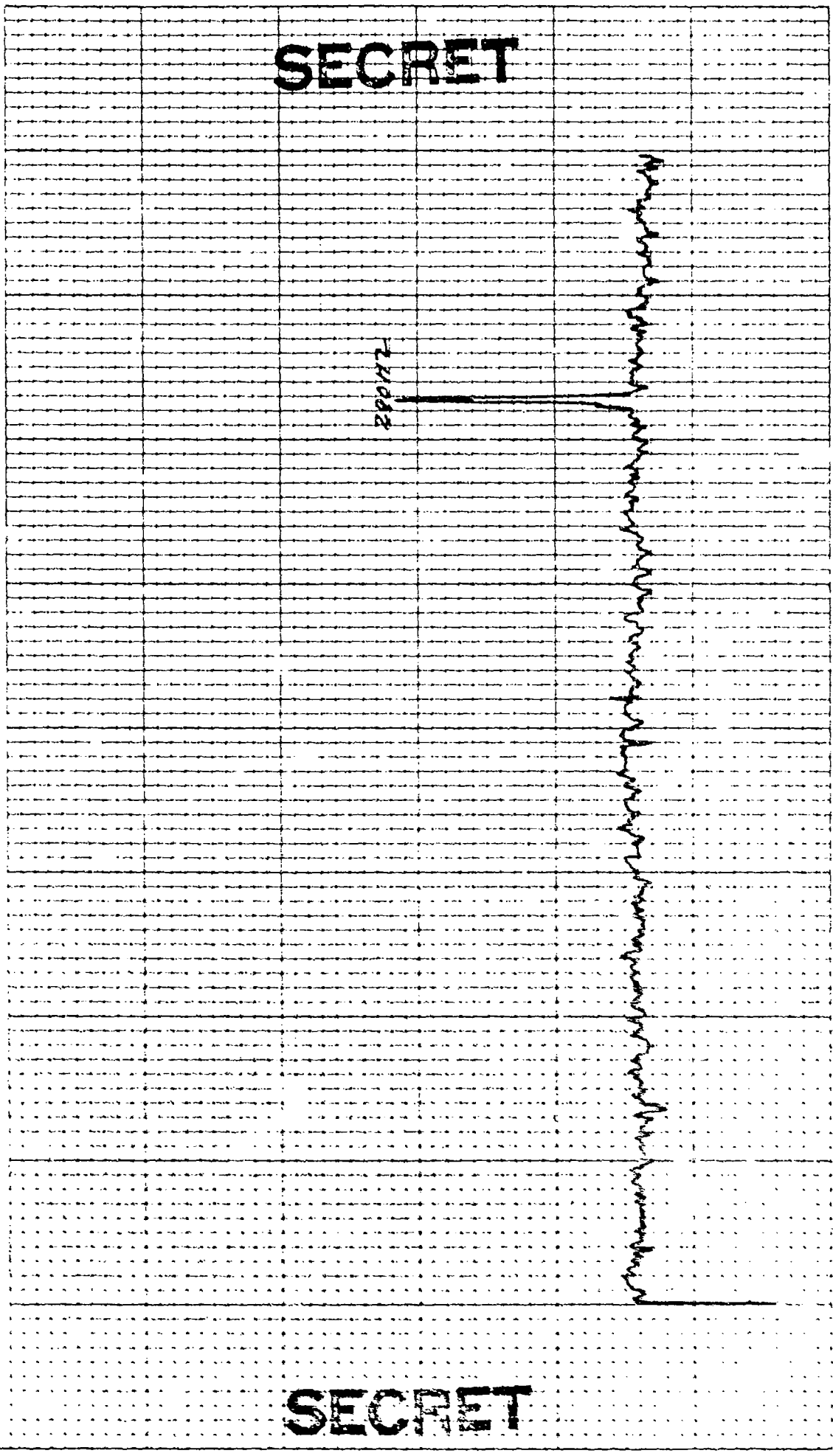
6-511

CONTROL: 2.7 -0934 (51)  
 BEAMFORMED SPECTRUM(ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
 51 ELEMENTS

DATE OF ANALYSIS: ---  
 1-26 4 29-50

DATE/TIME: 2-7-77 -0934 Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 170 DEG. AZ STEERING

REEL: F/4 INDE XJ075  
 INTEGRATION TIME 320 SECS ATTN:-30 DB  
 FILTER WTG: HANNING



SECRET

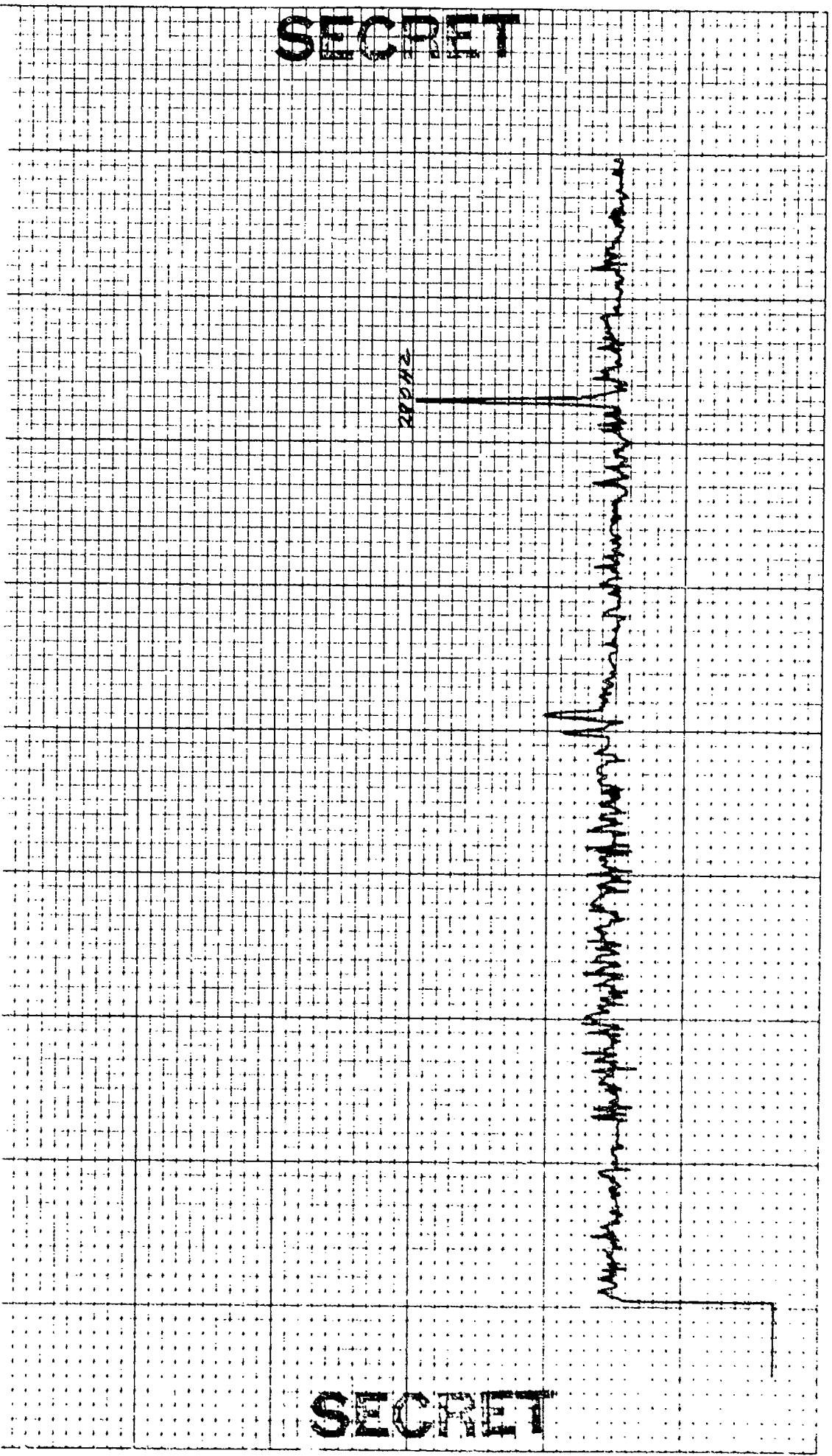
6-516

CONTROL: 27 -0934 (51 )  
 BEAMFORMED SPECTRUM(ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 290 HZ  
 S1 ELEMENTS

DATE OF ANALYSIS: - - - - -  
 1-26 & 29-53 )  
 DATE/TIME: 2-7-77 -0934Z  
 ANALYSIS BANDWIDTH: 1/10HZ  
 +32 DEG. AZ STEERING

REEL: F14  
 INTEGRATION TIME 320 SECS  
 FILTER  
 ATEN:-30 DB  
 WTG: HANNING

INDE X3575



*Handwritten note:* Spectrum from the right side of the plot is the same as the spectrum from the left side.

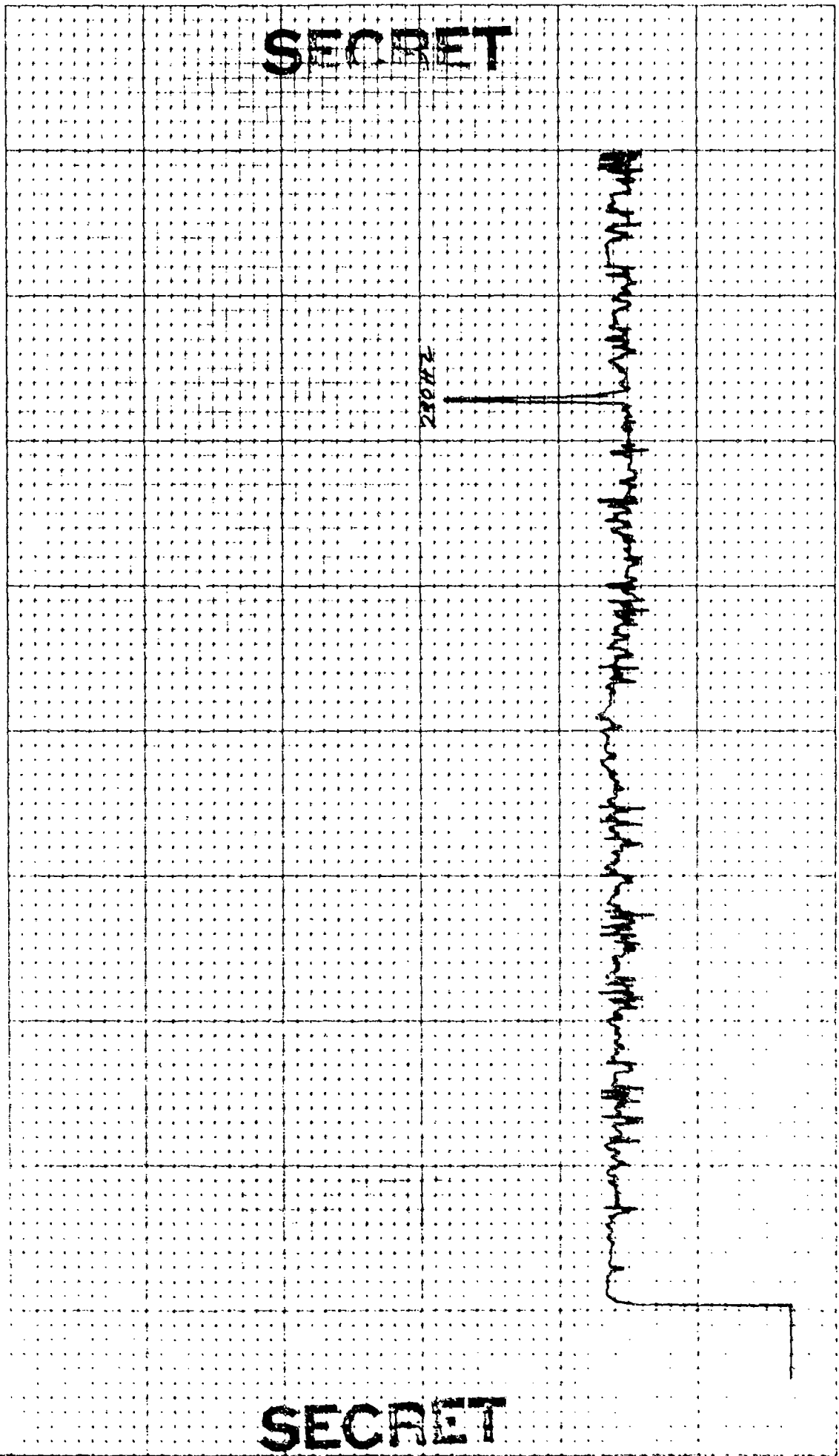
SECRET

SECRET

CONTROL: 27 - 0934 ( 51 )  
 BEAMFORMED SPECTRUM (ELEMENTS)  
 EXERCISE: BEARING STAKE  
 CENTER FREQ: 270 HZ  
51 ELEMENTS

DATE OF ANALYSIS: 1-26-77 ( 29-53 )  
 DATE/TIME: 2-7-77 - 0934Z  
 ANALYSIS BANDWIDTH: 1/10 HZ  
Y34 DEG. AZ STEERING

REEL: F14 INDE X2573  
 INTEGRATION TIME 320 SECS ATTN: -30 DB  
 FILTER WTC: HANNING



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SECRET



**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 3210A/011/06  
31 Jan 06

MEMORANDUM FOR DISTRIBUTION LIST

Subj: DECLASSIFICATION OF LONG RANGE ACOUSTIC PROPAGATION PROJECT  
(LRAPP) DOCUMENTS

Ref: (a) SECNAVINST 5510.36

Encl: (1) List of DECLASSIFIED LRAPP Documents

1. In accordance with reference (a), a declassification review has been conducted on a number of classified LRAPP documents.
2. The LRAPP documents listed in enclosure (1) have been downgraded to UNCLASSIFIED and have been approved for public release. These documents should be remarked as follows:

Classification changed to UNCLASSIFIED by authority of the Chief of Naval Operations (N772) letter N772A/6U875630, 20 January 2006.

DISTRIBUTION STATEMENT A: Approved for Public Release; Distribution is unlimited.

3. Questions may be directed to the undersigned on (703) 696-4619, DSN 426-4619.

A handwritten signature in black ink, appearing to read "B. F. Link".

BRIAN LINK  
By direction

Subj: DECLASSIFICATION OF LONG RANGE ACOUSTIC PROPAGATION PROJECT  
(LRAPP) DOCUMENTS

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## Declassified LRAPP Documents

Report Number	Personal Author	Title	Publication Source (Originator)	Pub. Date	Current Availability	Class.
Unavailable	Bossard, David C.	ACOUSTIC ANALYSIS/ASEPS	Wagner Associates	780726	ADA076268	U
NRLMR3832	Heitmeyer, R., et al.	PRELIMINARY RESULTS OF AN ANALYSIS OF BEAM NOISE IN THE MEDITERRANEAN (U)	Naval Research Laboratory	780901	ADC <i>file 220</i>	U
Unavailable	Watrous, B. A.	PARKA 1 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