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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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SANDERS ASSOCIATES, INC.
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

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for this document must be referred to
NAVAL AIR DEVELOPMENT CENTER
WARMINSTER, PENNSYLVANIA 18974

UNDER CONTRACTS

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

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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
IIIA	Data Points 7, 8 and 9 Raw Data
IVB	Data Points 10, 11 and 12 Raw Data

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Beamformed ALIU Plots

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FRAZ Recording
Signal Level and SNR Calculations
Signal Gain and Array Gain Calculations
Beamformed ALIU Plots

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- 8.0 Data Point 2 1-19-77 16002 (32 Element Beamformed Data)
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 - Beamformed ALIU Plots
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 - 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 μ Pa/1 Hz
295 Hz +64.2 dBre μ Pa/1 Hz

19 JANUARY 1977 DATA POINT 2

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

7 FEBRUARY 1977 DATA POINT 3

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

7 FEBRUARY 1977 DATA POINT 4

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

7 FEBRUARY 1977 DATA POINT 5

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

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

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• OMNI NOISE LEVELS

16 MARCH 1977

DATA POINT 12

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

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O M N I

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	-344 -316	-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	-290 -281	-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	BANDWIDTH CORREC-TION	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: 22 NM, 140 HZ DEPTH: 2800 FM, 290 HZ	-19.4 -12.5	-1.8 -1.8	+10 +10	+12 +8	+100 +100	31.6 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	MCPSZ BEAM CAL CORR- TION	BEAM FORMER ATTN	BEAM FORMER CORR- TION	MCPSZ BEAM CAL CORR- TION	NOISE LEVEL DBV	I+5	J+K	A+E	B+C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	
1. DATE: 1-17-77 TIME: 1551Z RANGE: 1100M 210 MZ DEPTH: 1500M 215 MZ	-60.4 -68.6	+10 +10	+10 +10	+10 +10	+10 +10	-76.1 -78.1	-50.1 -50.1	20 20	-32.4 -40.8	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	
2. DATE: 1-17-77 TIME: 1600Z RANGE: 1100M 210 MZ DEPTH: 1500M 215 MZ	-72.1 -78.7	NA NA	0 0	0 0	NA NA	-84.1 -88.6	-44.6 -44.6	0 0	-37.1 -38.7	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	
3. DATE: 2-2-77 TIME: 0921Z RANGE: 1100M 140 MZ DEPTH: 1500M 210 MZ	-31.2 -43.5	+10 +10	+10 +10	+10 +10	+10 +10	-69.8 -66.8	-31.8 -31.8	20 20	-8.2 -16.5	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20
4. DATE: 2-7-77 TIME: 1615Z RANGE: 1100M 140 MZ DEPTH: 1500M 210 MZ	-39.4 -46.2	+10 +10	+10 +10	+10 +10	+10 +10	-66.1 -66.8	-27.1 -37.8	20 20	-11.4 -17.2	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20
5. DATE: 2-7-77 TIME: 1659Z RANGE: 1100M 140 MZ DEPTH: 1500M 210 MZ	-29.0 -38.4	+10 +10	+10 +10	+10 +10	+10 +10	-60.1 -64.8	-33.1 -36.8	20 20	-1.0 -10.4	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20
6. DATE: 2-7-77 TIME: 2037Z RANGE: 1100M 140 MZ DEPTH: 1500M 210 MZ	-28.7 -25.3	+10 +10	+10 +10	+10 +10	+10 +10	-56.7 -62.2	-28.7 -34.2	20 20	-1.7 -2.7	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20

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P T A B	OPERATIONAL DATA	SIGNAL LEVEL DBV	M-PSK CORREC- TION	BEAM ANGLE ATTD.	BEAM CORREC- TION	B+C	A+E	J+K	I+G	MISE LEVEL DBV	MCS-32 CORREC- TION	BEAM- ANGLE ATTD.	BEAM- CORREC- TION	30M- CORREC- TION	30M- CORREC- TION	BLVD- WIDTH CORREC- TION	BLVD- WIDTH CORREC- TION	ARRAY DIVERSITY	M/F CORREC- TION	SNR H-F	LINEAR PROCES- SING	CORREC- TION ANGLE	Q+L
7	DATE: 2-8-77 TIME: 0202Z RANGE: 28 NM, 190 HB DEPTH: 1800 FM, 280 HB 285 HB	-22.8 -26.6 -27.4	+10 +10 +10	+24 24 +24	+2 +6 +6	24 24 24	+1.2 -2.6 -38.4	24 24 24	-41.4 -47.8 -47.8	-66.4 -71.8 -71.8	+10 +6 +10	+24 +24 +24	+1.2 +1.8 +1.8	+1.8 +1.8 +1.8	+1.8 +1.8 +1.8	+10 +10 +10	+12 +8 +8	+100 +100 +100	47.6 55.2 9.4	-4.0 -4.0 -4.4	39.8 42.0 5.9	-21.5° -21.5° -21.5°	47.8 46.0 10.3
8	DATE: 3-4-77 TIME: 1501Z RANGE: 22 NM, 190 HB DEPTH: 2800 FM, 280 HB 285 HB	-22.1 -26.0 -28.8	+10 +10 +10	+18 +18 +18	+2 +8 +8	28 28 28	+5.9 +6.2 -30.8	28 28 28	-33.1 -45.6 -37.6	-61.6 -73.6 -67.6	+10 +10 +10	+18 +18 +18	+1.2 +1.8 +1.8	+1.8 +1.8 +1.8	+10 +10 +10	+12 +8 +8	+100 +100 +100	39.5 51.8 8.8	-4.8 -4.0 -4.6	35.7 48.6 5.0	+20° +20° +20°	39.7 52.6 9.6	
9	DATE: 3-15-77 TIME: 2122Z RANGE: 22 NM, 190 HB DEPTH: 2800 FM, 280 HB 285 HB	-22.5 -23.3 -24.9	+10 +10 +10	+12 +12 +12	+1 +6 +7	22 22 22	-5 +8.7 -39.8	22 22 22	-31.7 -43.2 -42.8	-87 -65.2 64.8	+10 +10 +10	+12 +12 +12	+1 +1.6 +1.7	+1.8 +1.8 +1.8	+10 +10 +10	+12 +8 +8	+100 +100 +100	36.2 51.9 12.9	-4.0 -4.0 -4.2	32.3 46.5 7	+51.5° +51.5° +51.5°	32.3 50.5 4.9	
10	DATE: 3-16-77 TIME: 0133Z RANGE: 28 NM, 190 HB DEPTH: 2800 FM, 280 HB	-16.8 -25.8	+10 +10	+12 +12	+2 +8	22 22	+5.2 -13.8	22 22	-23.6 -37.8	-65.6 -58.4	+10 +10	+12 +12	+1.2 +1.8	+1.8 +1.8	+10 +10	+12 +8	+100 +100	28.8 23.6	-4.0 -4.0	35.0 20.4	+61° +61°	28.0 24.4	
11	DATE: 3-16-77 TIME: 0935Z RANGE: 22 NM, 190 HB DEPTH: 2800 FM, 280 HB	-28.0 -35.4	+10 +10	+18 +18	+2 +8	28 28	-1 -17.4	28 28	-28.2 -36.2	-56.2 -64.2	+10 +10	+18 +18	+1.2 +1.8	+1.8 +1.8	+10 +10	+12 +8	+100 +100	27.4 18.8	-4.0 -4.1	23.6 15.5	+62° +62°	27.6 18.6	
12	DATE: 3-16-77 TIME: 1148Z RANGE: 22 NM, 190 HB DEPTH: 2800 FM, 280 HB	-22.6 -39.9	+10 +10	+18 +18	+2 +8	28 28	+5.2 -11.9	28 28	-27.1 -29.8	-55.1 -57.8	+10 +10	+18 +18	+1.2 +1.8	+1.8 +1.8	+10 +10	+12 +8	+100 +100	32.3 17.9	-4.0 -4.2	28.5 14.5	+64° +64°	22.5 18.7	

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P T I T I O N	OPERATIONAL DATA	SIGNAL LEVEL DBV	REAR- BEAM- ATTN			FRONT- BEAM- ATTN			I+G	J+K	A+E	B+C	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V		
			CAL CMBR- TUM	BEAM- ATTN	FRONT- TUM	BEAM- ATTN	FRONT- TUM	REAR- TUM																						FRONT- TUM	REAR- TUM
1	DATE: 1-19-77 TIME: 1510Z RANGE: 1100M 280MZ DEPTH: 1500M 285MZ	-57.2 -65	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10		
2	DATE: 1-19-77 TIME: 1600Z RANGE: 1100M 280MZ DEPTH: 1500M 285MZ	-55.8 -61.3	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	+10 +10	
3	DATE: 2-27-77 TIME: 0110Z RANGE: 1100M 150MZ DEPTH: 1500M 280MZ	-36.6 -45.2	+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	+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: 2-27-77 TIME: 1010Z RANGE: 1100M 150MZ DEPTH: 1500M 280MZ	-38.2 -54.4	+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	+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: 3-27-77 TIME: 1540Z RANGE: 1100M 150MZ DEPTH: 1500M 280MZ	-31.3 -41.2	+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	+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: 3-27-77 TIME: 2010Z RANGE: 1100M 150MZ DEPTH: 1500M 280MZ	-28.0 -29.2	+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	+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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OPERATIONAL DATA	SIGNAL LEVEL DBM	MULTIPLIER	CONVERSION LOSS	TRANS. LOSS	ATTEN. LOSS	BTC	A+B	J+K	ITS	LOSS	MULTIPLIER	CONVERSION LOSS	TRANS. LOSS	ATTEN. LOSS	A+B	J+K	ITS	LOSS	MULTIPLIER	CONVERSION LOSS	TRANS. LOSS	ATTEN. LOSS	A+B	J+K	ITS	LOSS	MULTIPLIER	CONVERSION LOSS	TRANS. LOSS	ATTEN. LOSS	A+B	J+K	ITS	LOSS	MULTIPLIER	CONVERSION LOSS	TRANS. LOSS	ATTEN. LOSS	REMARKS	DATE	TIME	OPERATOR														
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ				
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OPERATIONAL DATA	SIGNAL MONITOR			MICROPROCESSOR				MICROPROCESSOR				MICROPROCESSOR				MICROPROCESSOR				MICROPROCESSOR									
	SIGNAL LEVEL	MONITOR CAL	MONITOR CORR	MONITOR CORR	MONITOR CORR	MONITOR CORR	MONITOR CORR	MONITOR CORR	MONITOR CORR	MONITOR CORR	MONITOR CORR	MONITOR CORR	MONITOR CORR	MONITOR CORR	MONITOR CORR	MONITOR CORR	MONITOR CORR	MONITOR CORR	MONITOR CORR	MONITOR CORR	MONITOR CORR	MONITOR CORR	MONITOR CORR	MONITOR CORR	MONITOR CORR	MONITOR CORR	MONITOR CORR		
1	-28.4	NA	0	-22.4	0	-22.4	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0
2	-31.4	NA	0	-27.1	0	-27.1	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0
3	-37.5	NA	0	-32.5	0	-32.5	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0
4	-42.4	NA	0	-37.4	0	-37.4	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0
5	-42.8	NA	0	-37.8	0	-37.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0
6	-32.8	NA	0	-27.8	0	-27.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0	+1.8	0

SECRET

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ELEMENT ARRAY

OP NO	OPERATIONAL DATA	SIGNAL LEVEL dBV	MCD-72 PARA- TUN	MAX.			ELEMENT			ARRAY			SAR M-F	MCD-72 PARA- TUN	SAR M-F	MCD-72 PARA- TUN	SAR M-F	MCD-72 PARA- TUN	SAR M-F
				Beam Para- TUN	Beam Para- TUN	Beam Para- TUN	A+E	F+G	H+I	J+K	L+M	N+O							
7	DATE: 2-6-77 TIME: 2232 RANGE: 280M 190 MZ DEPTH: 1900M 240 MZ	-23.8 -24.6 -25.0	110 110 110	2.2 2.8 3.0	4.4 4.8 4.9	18.2 11.2 -35.8	490 490 490	-33.5 -31.6 -32.3	10 10 10	20 20 20	+2 +3 +3	+1.8 +1.8 +1.8	+10 +10 +10	+12 +8 +8	+100 +100 +100	-4.0 -4.0 -4.8	40.4 38.6 3.4	-21.5 -21.5 -21.5	444 434 8.2
8	DATE: 2-6-77 TIME: 1918 RANGE: 220M 190 MZ DEPTH: 2800M 280 MZ	-27.0 -28.0 -29.0	110 110 110	2.2 2.6 2.8	4.8 4.4 4.4	13.8 16.0 -38.0	490 480 490	-31.6 -33.4 -22.1	10 10 10	20 20 20	+2 +3 +3	+1.8 +1.8 +1.8	+10 +10 +10	+12 +8 +8	+100 +100 +100	-4.0 -4.0 -4.2	40.8 46.2 8.7	+20.8 +20.0 +20.0	483 502 10.1
9	DATE: 2-6-77 TIME: 2128 RANGE: 120M 190 MZ DEPTH: 2800M 240 MZ	-27.8 -28.2 -28.3	110 110 110	2.2 2.6 2.8	4.8 4.4 4.4	16.2 21.8 -16.3	490 490 490	-28.2 -31.4 -31.4	10 10 10	20 20 20	+2 +3 +3	+1.8 +1.8 +1.8	+10 +10 +10	+12 +8 +8	+100 +100 +100	-4.0 -4.0 -4.2	41.6 50.7 11.7	+51.5 +51.5 +51.5	464 481 15.8
10	DATE: 2-6-77 TIME: 0128 RANGE: 120M 190 MZ DEPTH: 2800M 240 MZ	-27.6 -28.1	110 110	2.2 2.6	4.8 4.4	13.4 -5.6	434 434	-28.4 -30.8	10 10	20 20	+2 +3	+1.8 +1.8	+10 +10	+12 +8	+100 +100	-4.0 -4.0	32.8 25.2	+21.0 +21.0	310 261
11	DATE: 2-6-77 TIME: 0928 RANGE: 120M 190 MZ DEPTH: 2800M 240 MZ	-28.4 -27.4	110 110	2.2 2.6	4.8 4.4	3.6 -8.4	434 434	-22.6 -32.1	10 10	20 20	+2 +3	+1.8 +1.8	+10 +10	+12 +8	+100 +100	-4.0 -4.0	30.2 25.7	+26.2 +20.5	362 345
12	DATE: 2-6-77 TIME: 1938 RANGE: 120M 190 MZ DEPTH: 2800M 240 MZ	-27.6 -27.2	110 110	2.2 2.6	4.8 4.4	-1.04 -5.2	434 434	-18.6 -23.2	10 10	20 20	+2 +3	+1.8 +1.8	+10 +10	+12 +8	+100 +100	-4.0 -4.1	30.8 18.0	+26.2 +14.8	364 364

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UNCLASSIFIED

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 dBV $\frac{1/32}{ABW}$

-(-8)

-18.7

SYSTEM SENSITIVITY dB/ μ B

+13.3

-35.4

BANDWIDTH CONVERSION TO 1 HZ BAND

+100

+64.6

CONVERSION TO dBre μ Pa/1HZ

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

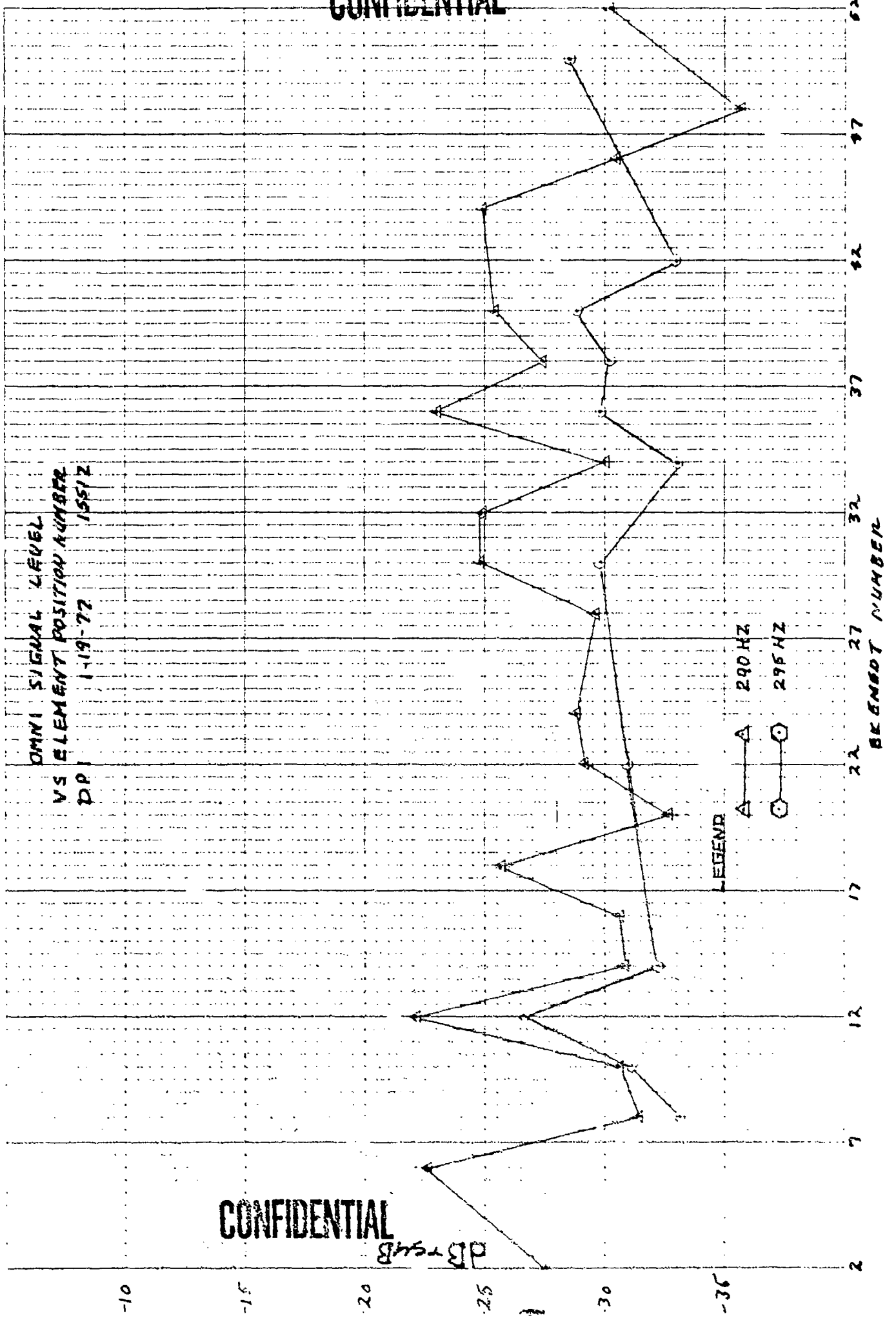
SYSTEM SENSITIVITY $\text{dB}/\mu\text{B}$ -(-8) -49.1

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



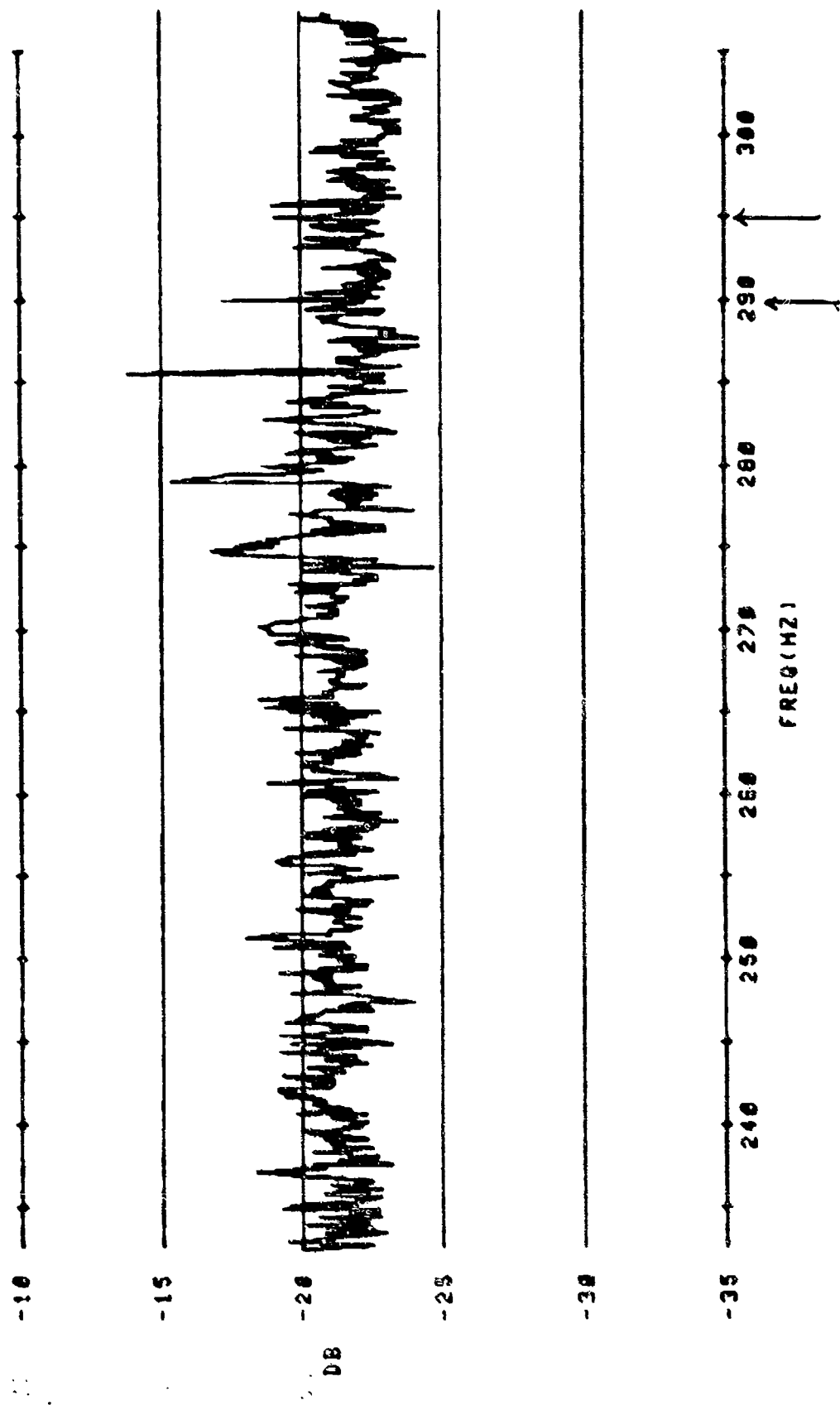
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DB TRS4B

46 93 5 3 2 1 0

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

The following information is provided for the purpose of identifying the elements of the system and the nature of the data contained therein. The information is presented in a tabular form for ease of reference. The information is presented in a tabular form for ease of reference. The information is presented in a tabular form for ease of reference.

CONTROL NUMBER	100-100-100	DATE	10/10/10
NUMBER OF ELEMENTS	10		
FREQUENCY BAND	10	TO	10 HZ
RANGE	10	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 _____
9-77 _____
AIRING STATE _____

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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

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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>

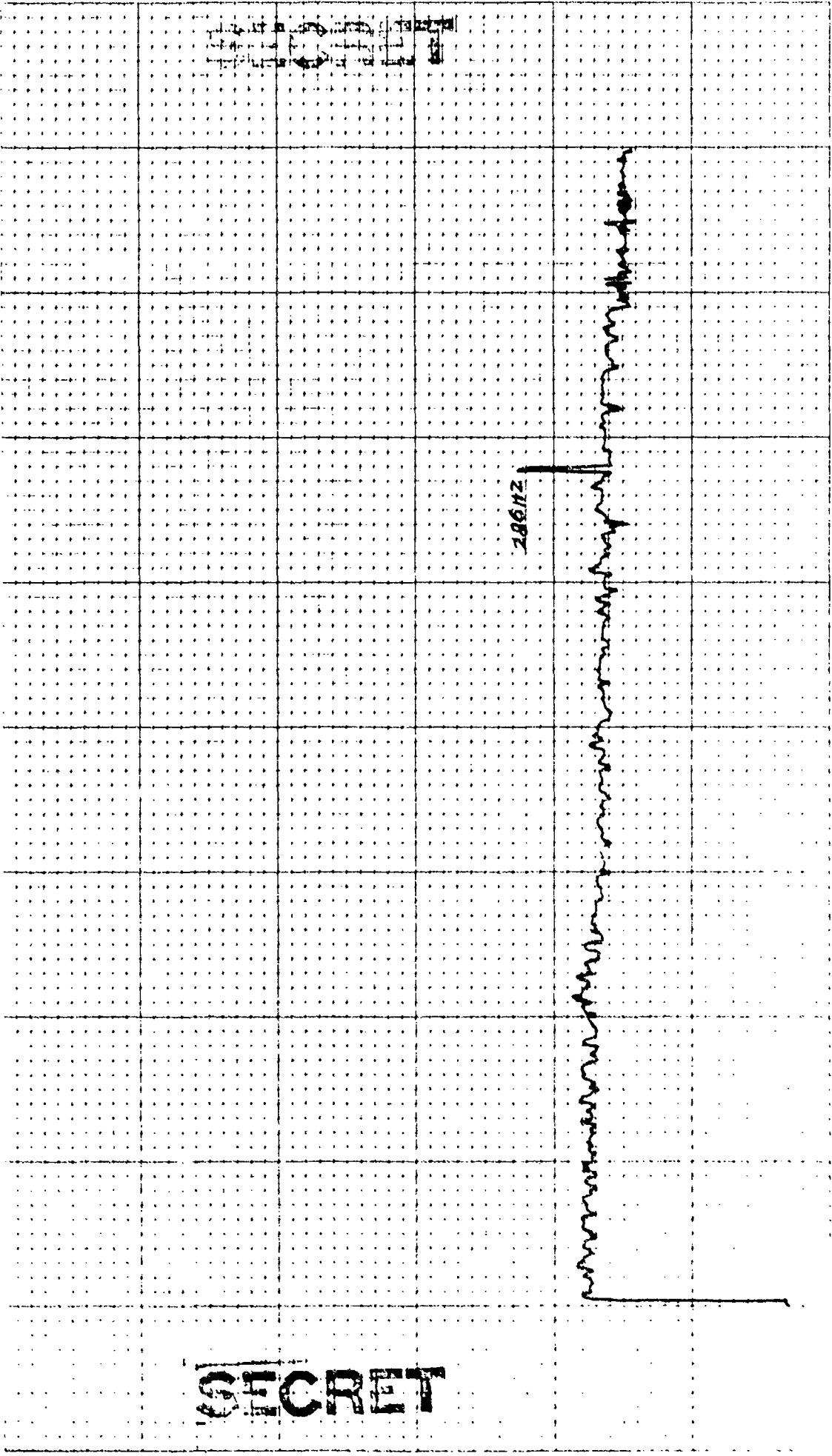
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4: 03

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

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

REEL: 6
INDE X 666
INTEGRATION TIME 320 SECS
ATTEN: -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

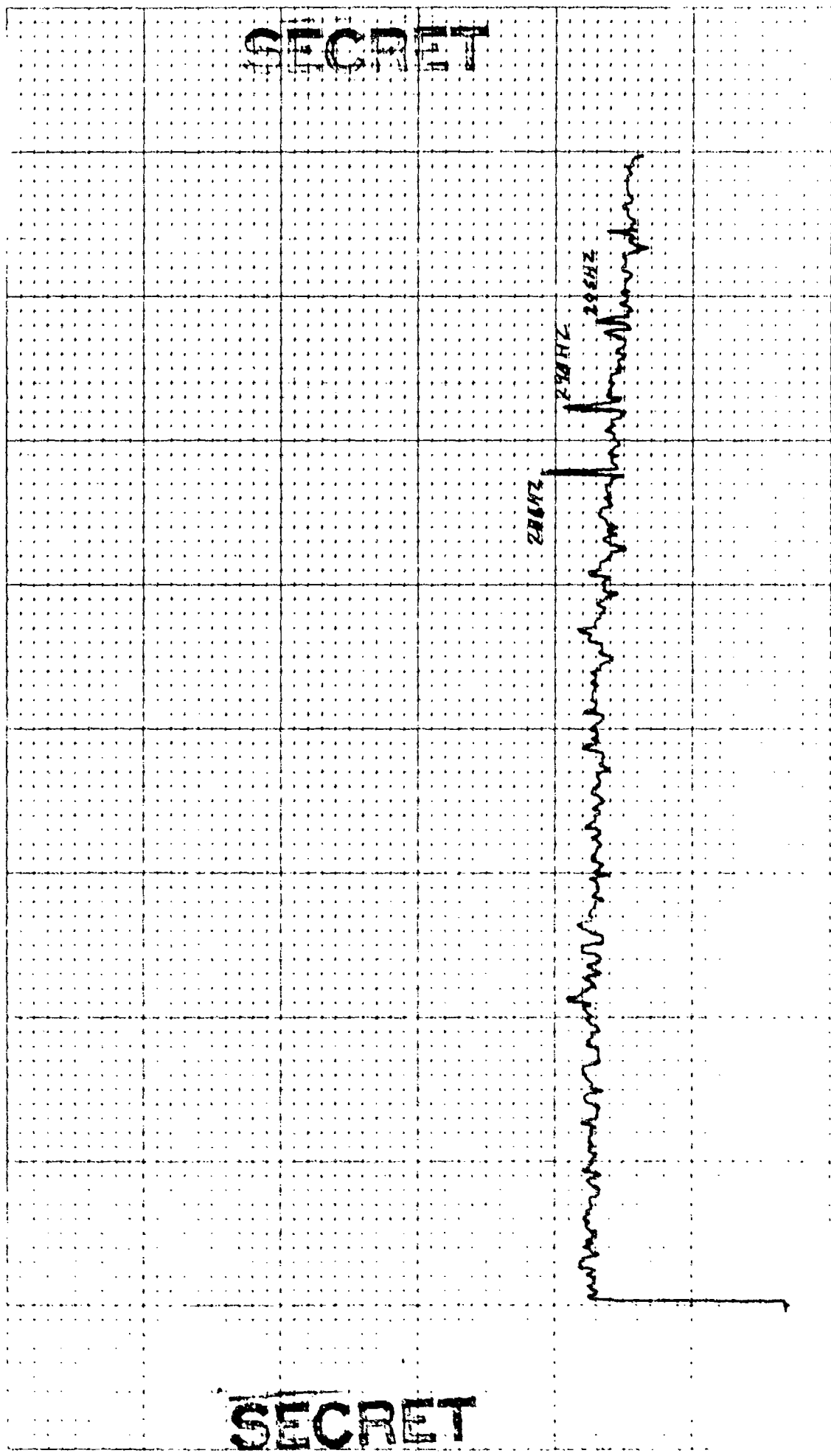
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 17/10HZ

16 ELEMENTS -46 DEC. AZ STEERING

REEL: 6 INDE X 646

INTEGRATION TIME 320 SECS ATTEN: -18 DB

FILTER WTG: HANNING

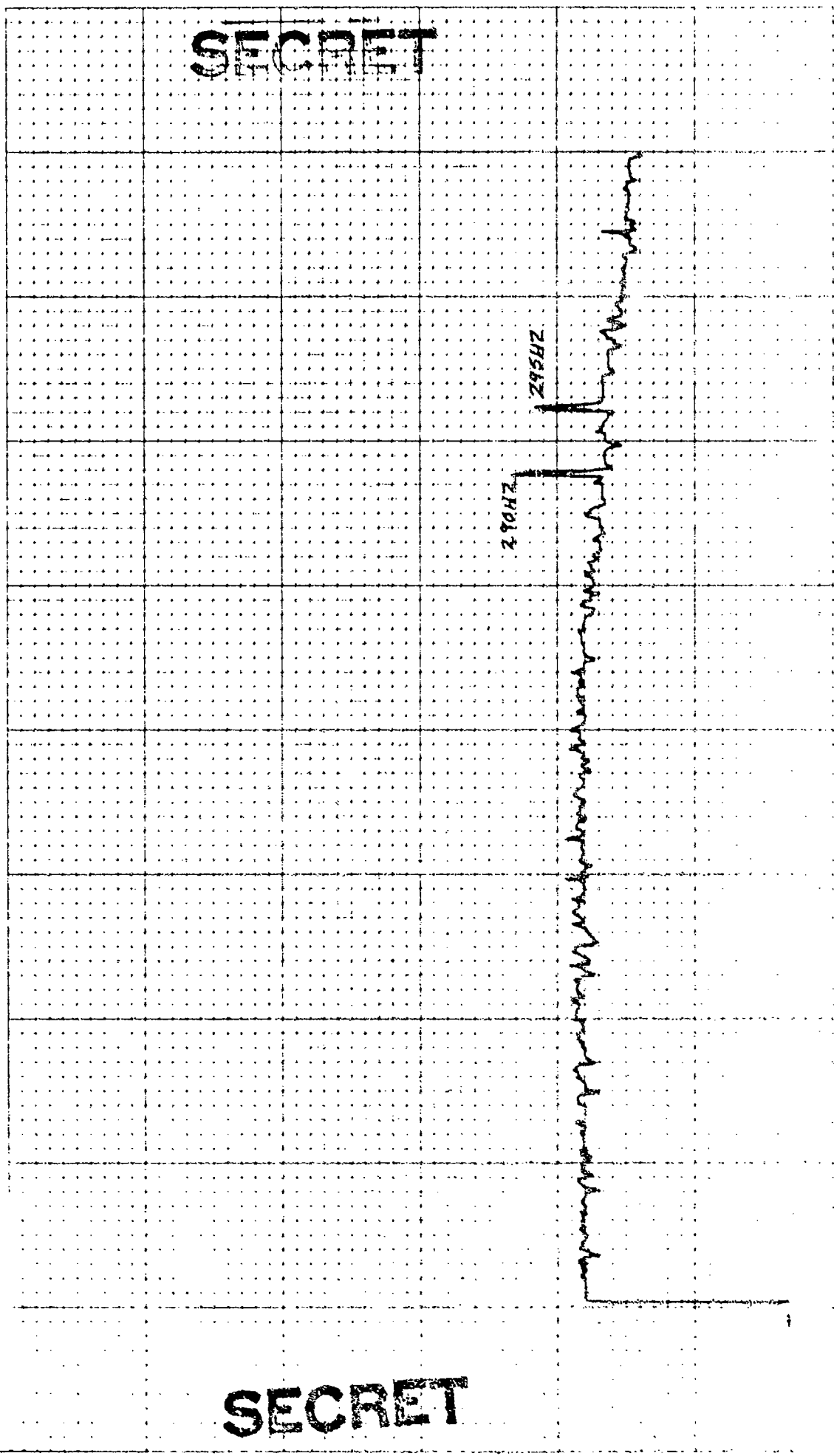


SECRET

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

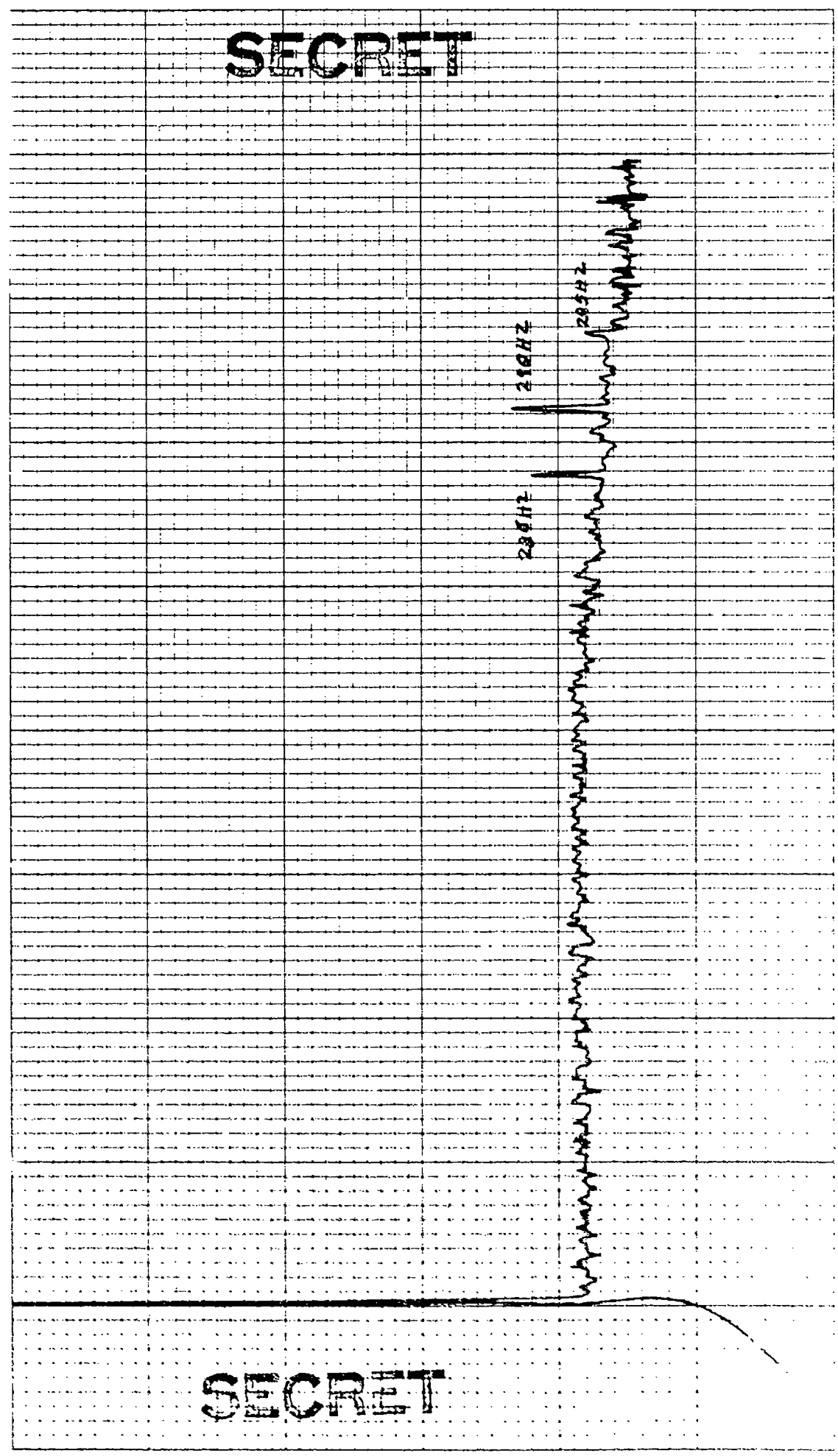
REEL: 6 INDE X 446
INTEGRATION TIME 320 SECS ATTN: -18 DB
FILTER WTG: HANNING



SECRET

CONTROL: 1/19 - 1551 (16) DATE OF ANALYSIS: 29 THRU 04 REEL: 6 INDE X 6066
 BEAMFORMED SPECTRUM (ELEMENTS) 29 THRU 04
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
16 ELEMENTS
 INTEGRATION TIME 320 SECS ATTN: -18 DB
 FILTER WTG: HANNING

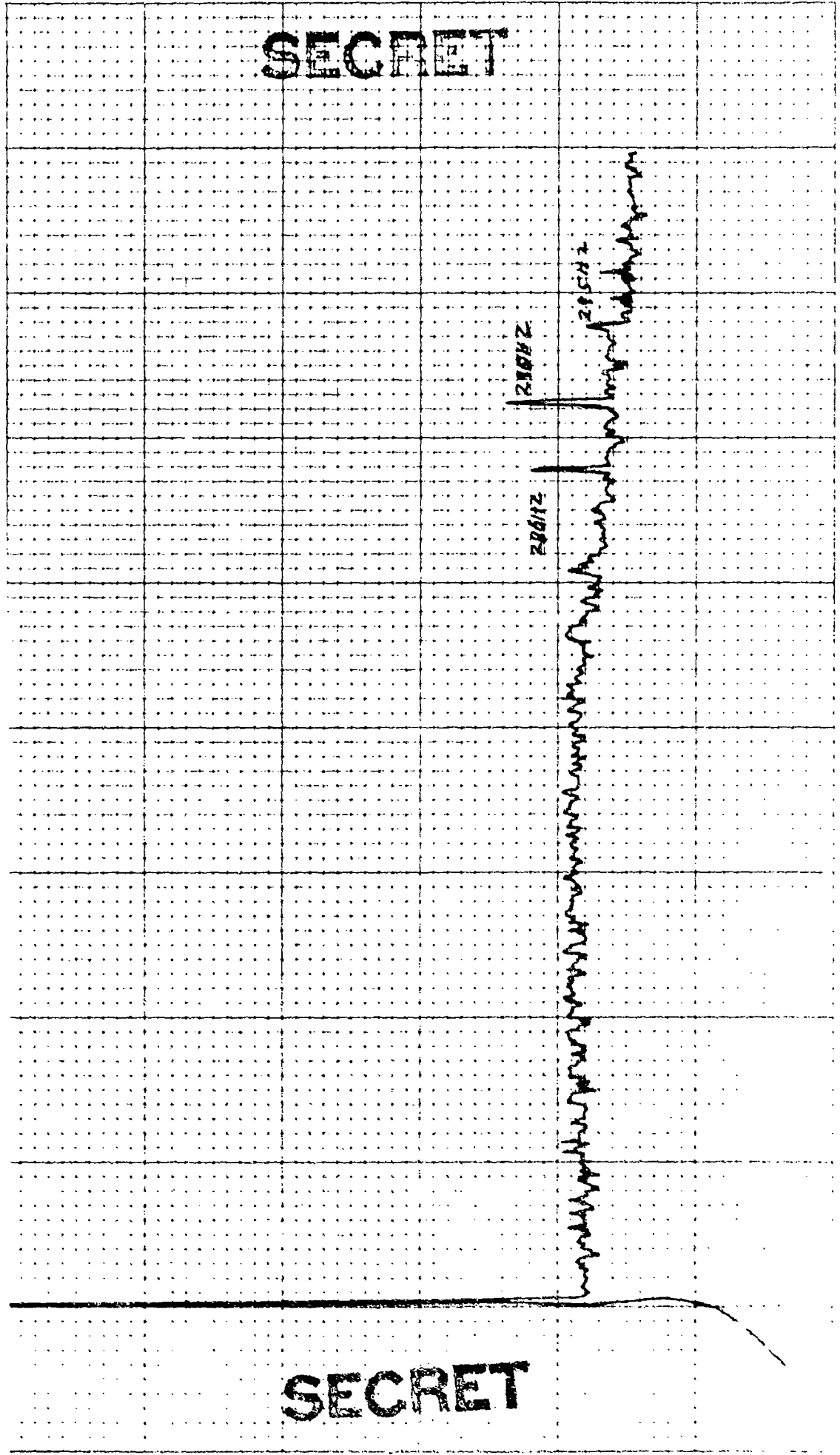
DATE OF ANALYSIS: 29 THRU 04
 DATE/TIME: 1/19/77 - 1551 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
-50 DEG. AZ STEERING



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

DATE OF ANALYSIS: - - -
29 JAN 77
DATE/TIME: 179-77 - 1551 Z
ANALYSIS BANDWIDTH: 1/10HZ
-5R DEG. AZ STEERING

REEL: 6 INDE X6866
INTEGRATION TIME 320 SECS ATTEN: 40 DB
FILT.FPR WTG: HANNING

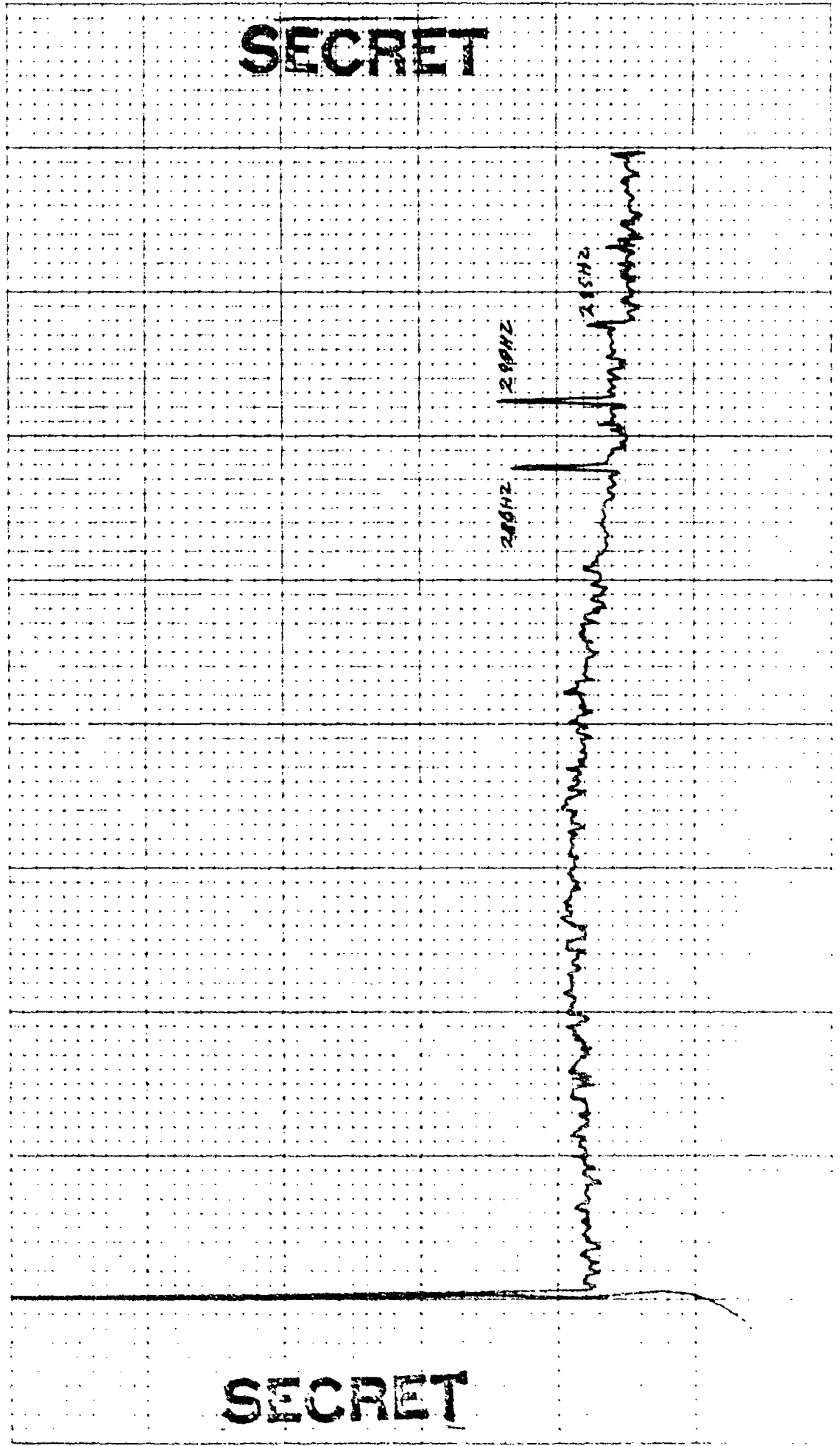


REEL: 6 INDE X 1666

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

DATE OF ANALYSIS: - -
29 THRU 44
DATE/TIME: 1977 - 155 / Z
ANALYSIS BANDWIDTH: 1/10 HZ
-54 DEG. AZ STEERING

CONTROL: 1/19 - 155 / 16)
BEAMPFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 276 HZ
16 ELEMENTS

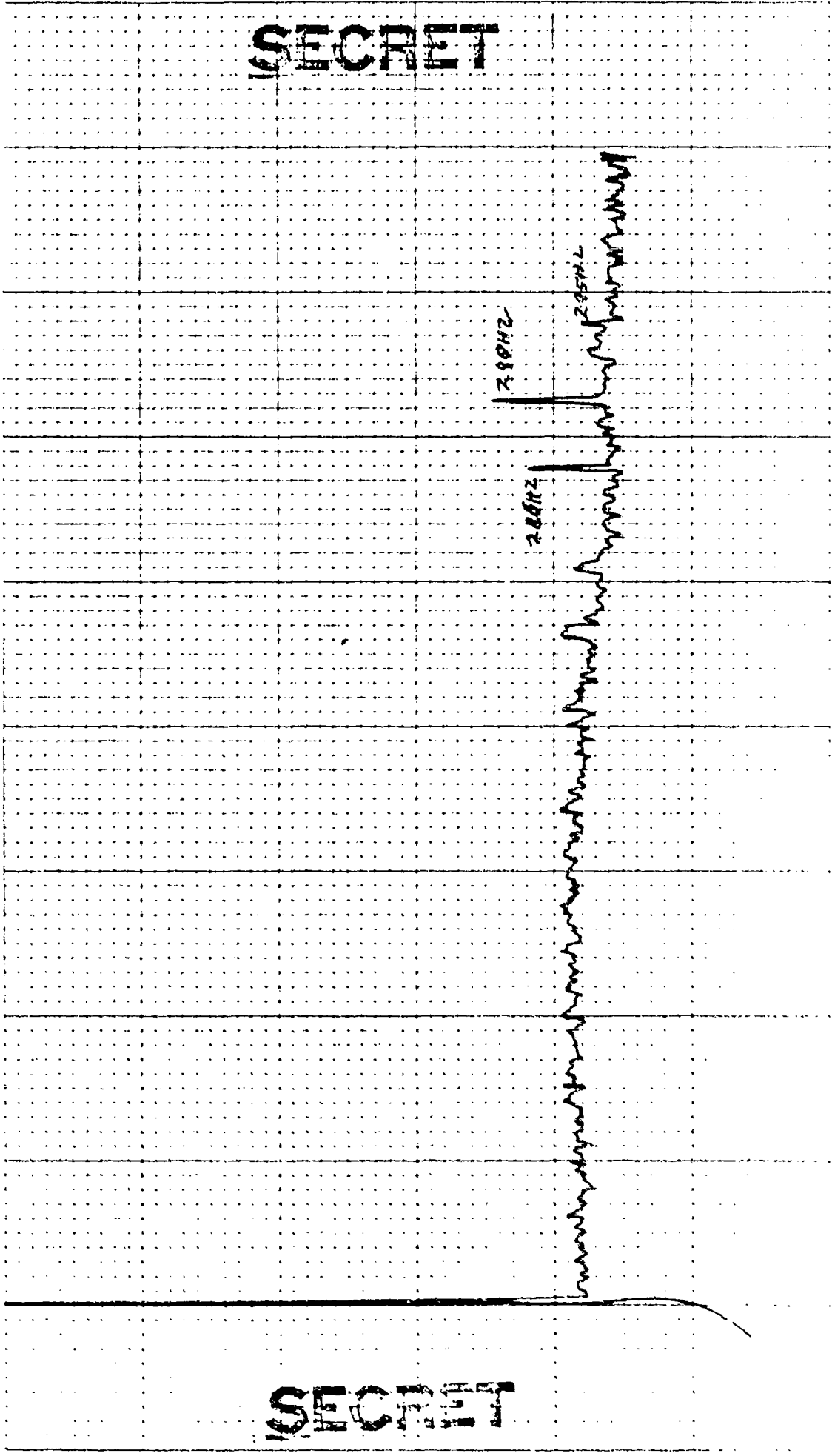


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SECRET

CONTROL: 1/19 -1551 (16) DATE OF ANALYSIS: - - -
BEAMFORMED SPECTRUM(ELEMENTS) 29 THRU 44)
EXERCISE: BEARING STAKE DATE/TIME: 7-19-44 - 1551 Z
CENTRE FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ
16 ELEMENTS -56 DEG. AZ STEERING

REEL: 6 INDE X 6166
INTEGRATION TIME 320 SECS ATTEN: -18 DB
FILTER WTC: HANNING



SECRET

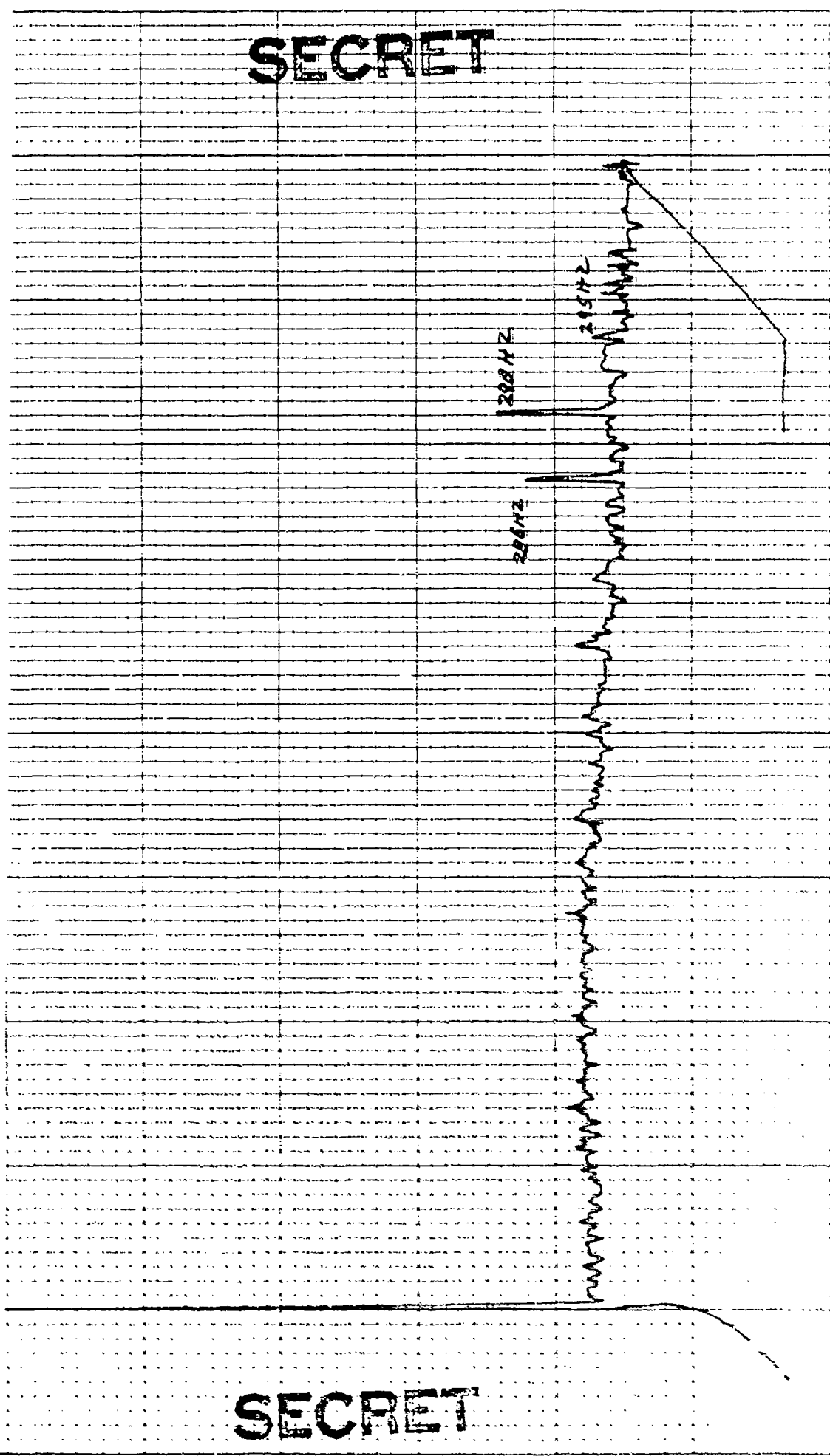
SECRET

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: 1-11-77 - 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

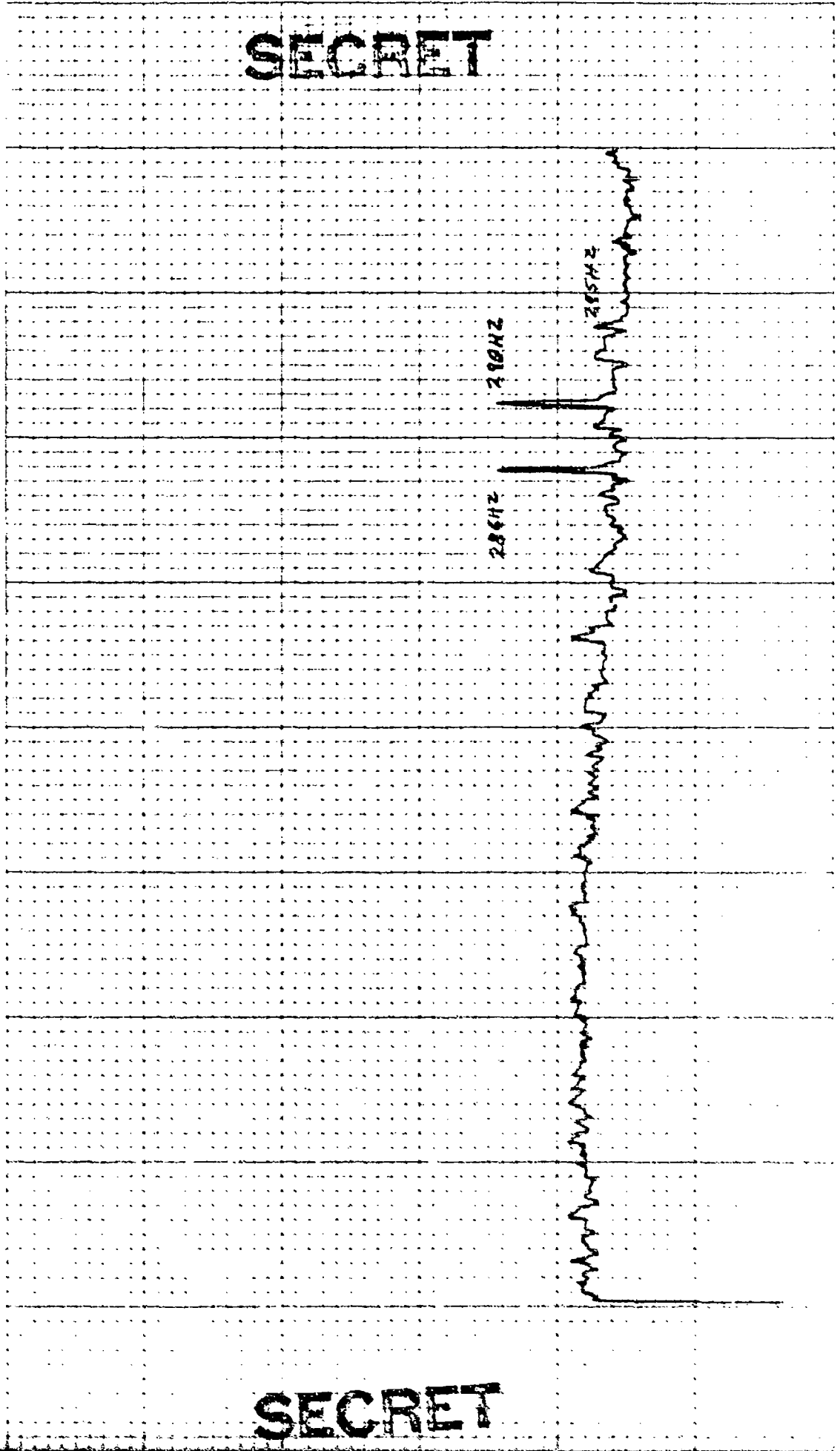


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SECRET

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

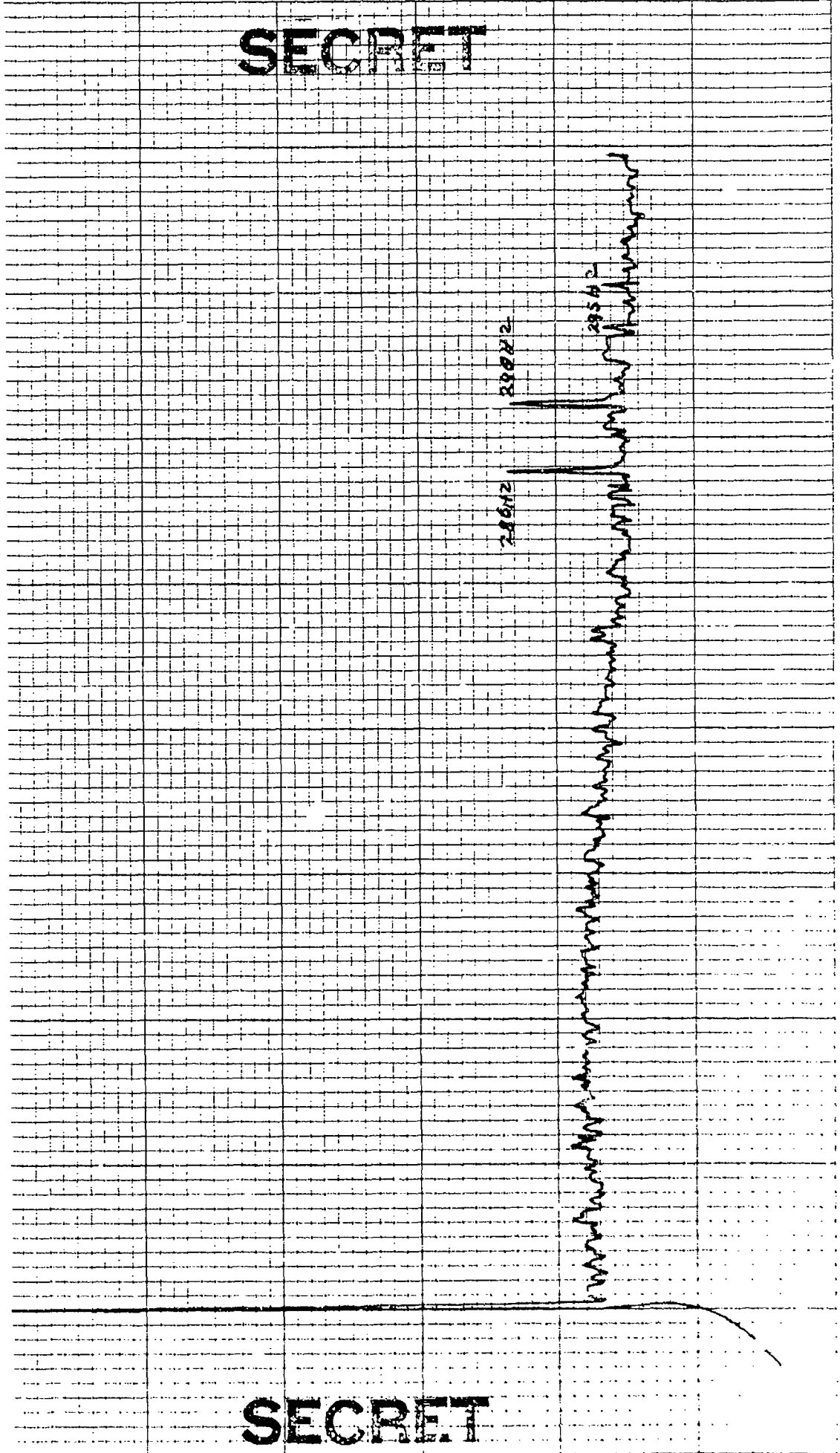
REEL: 6 INDE X6466
 INTEGRATION TIME 320 SECS ATTN: -10 DB
 FILTER WTC: HANNING



SECRET

SECRET

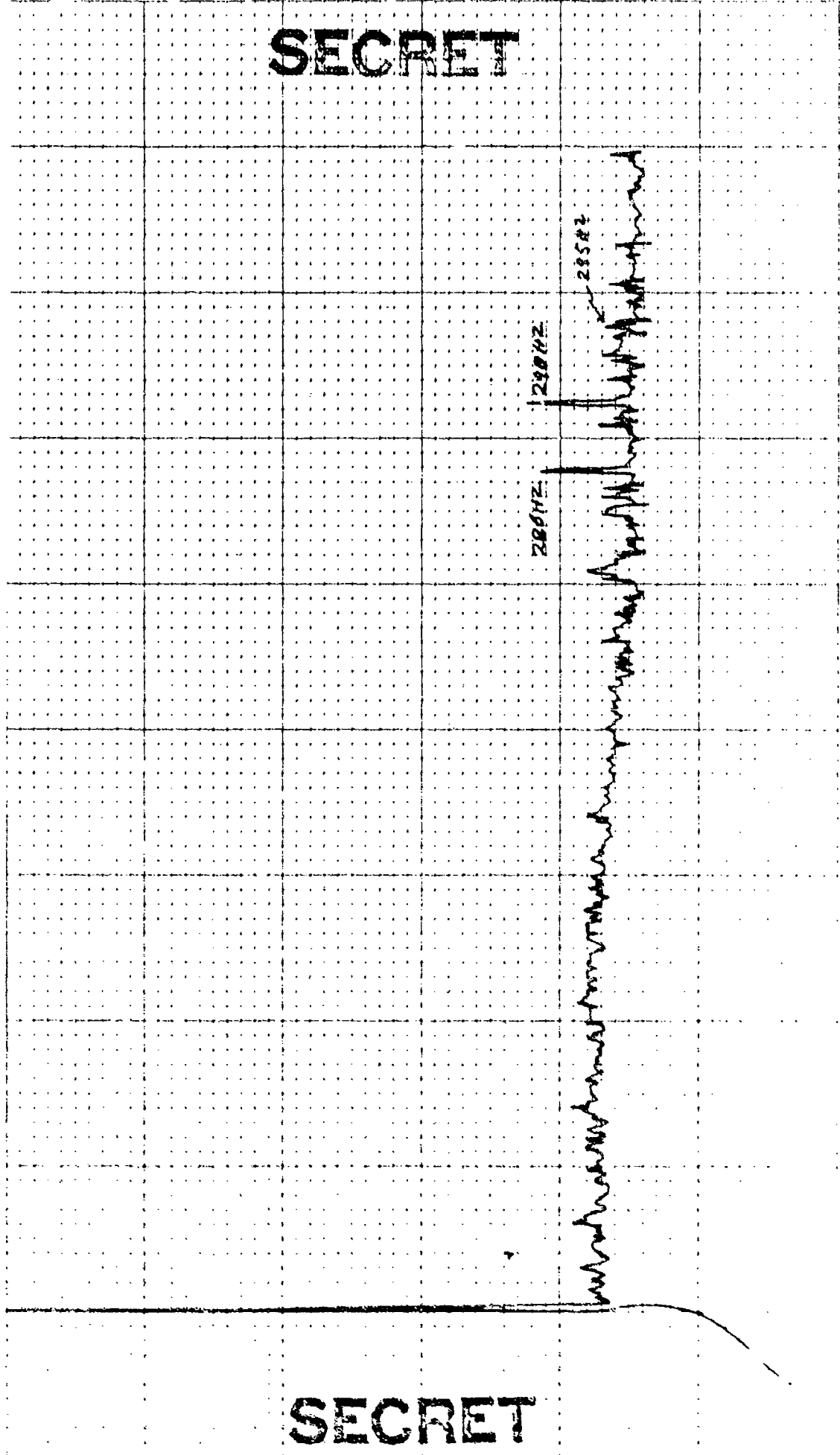
CONTROL: 111 3 1551 (16) DATE OF ANALYSIS: 29 MAR 44 REEL: 6 INDE X 466
BEAMFORMED SPECTRUM (ELEMENTS) EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: -19 DB
16 ELEMENTS -60 DEG. AZ STEERING FILTER WTG: HANNING



SECRET

SECRET

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: 1/10HZ FILTER WTC: HANNING
16 ELEMENTS -62 DEG. AZ STEERING

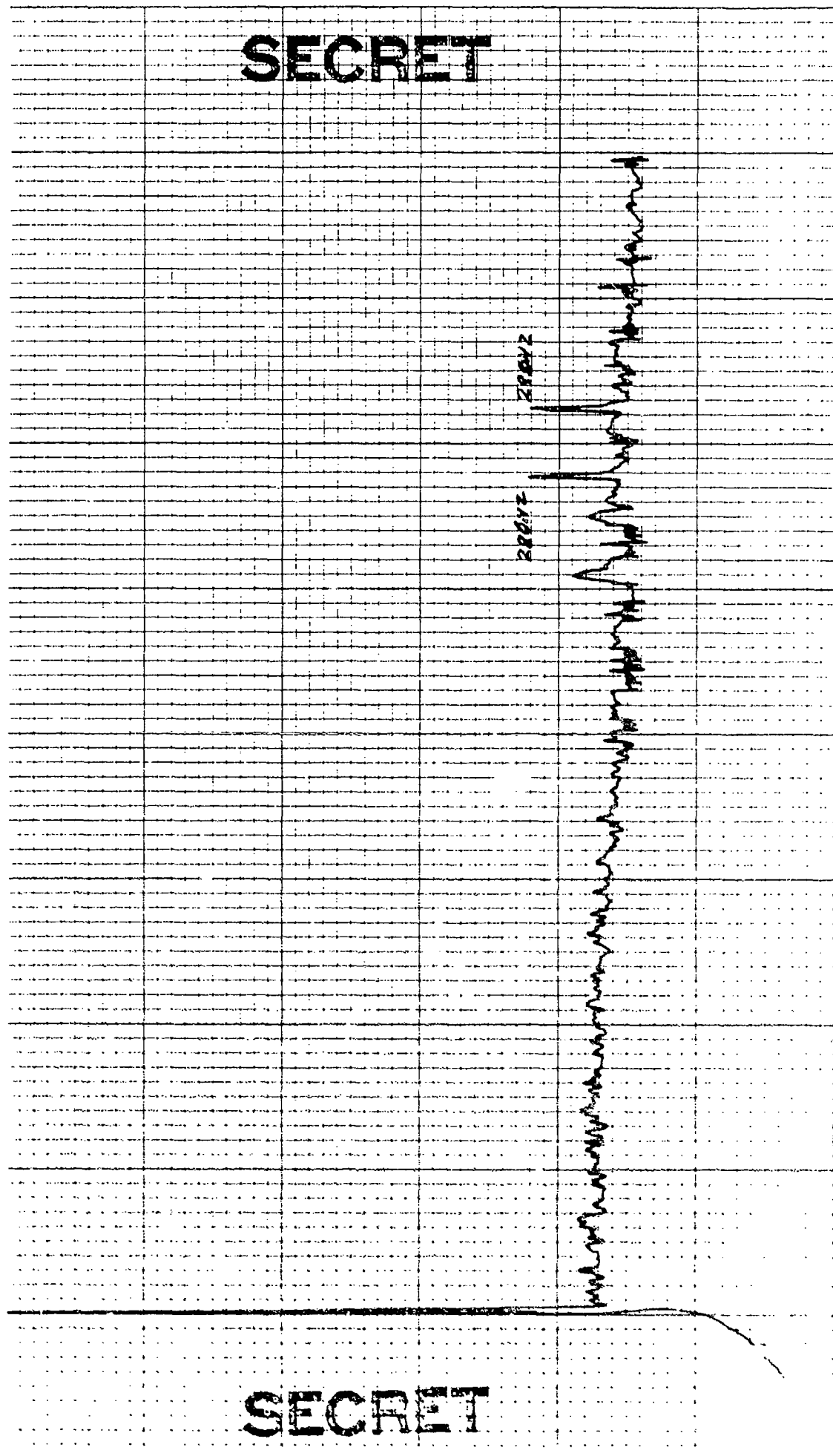


SECRET

CONTROL: 1/11 - 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

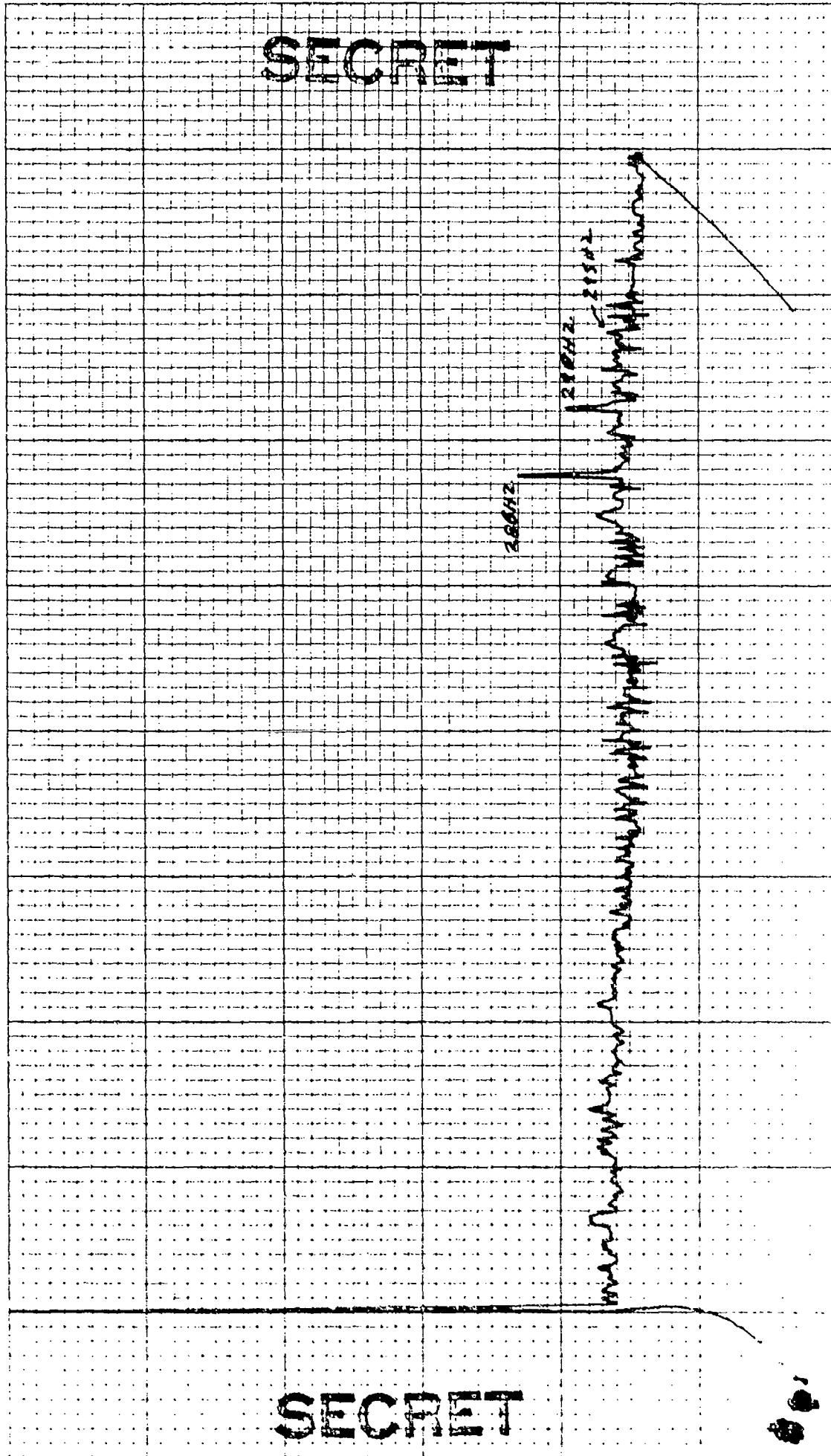
REEL: C INDE X666
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING



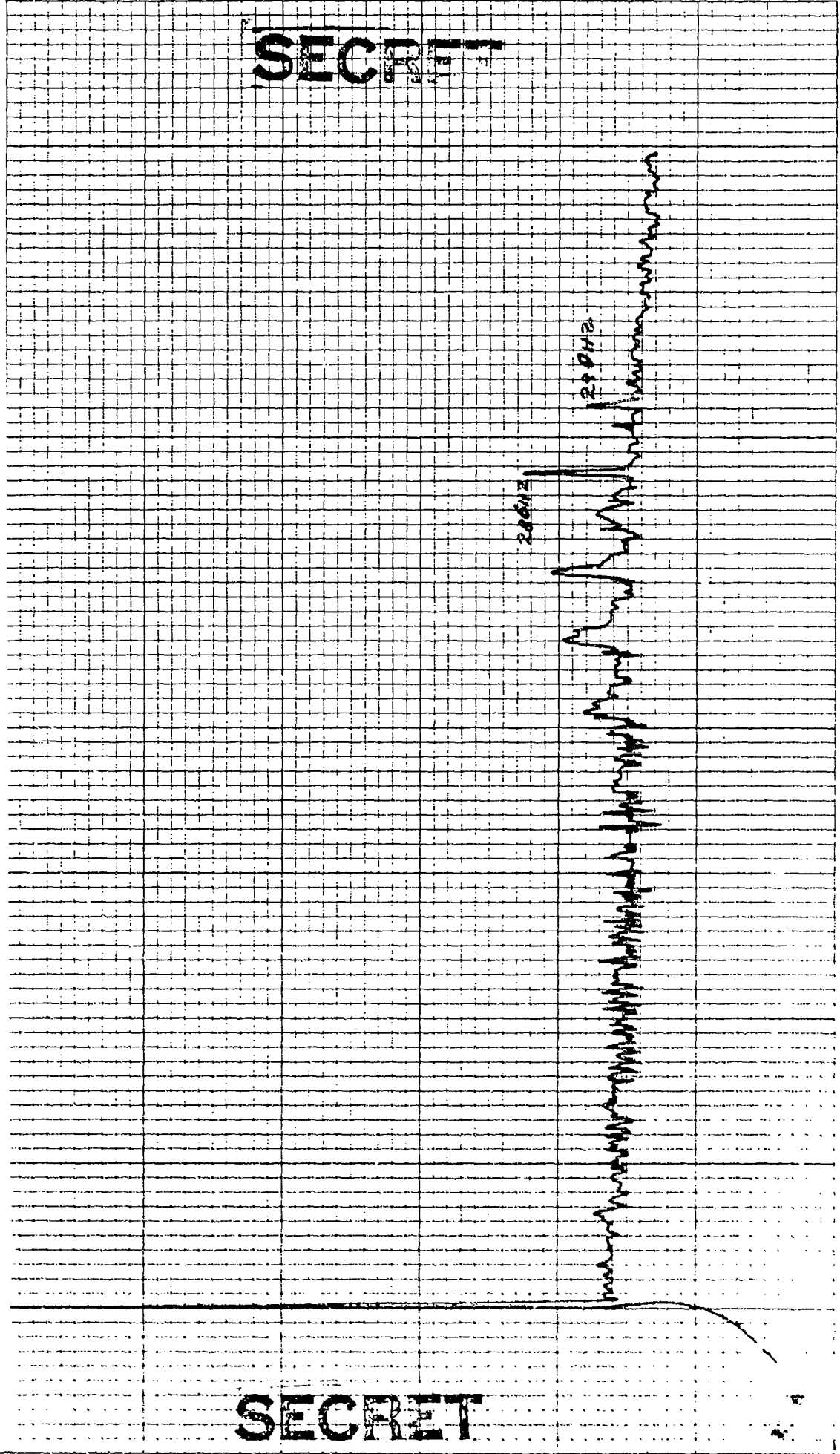
SECRET

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 ATEN: -10 DB
70 ELEMENTS -66 DEG. AZ STEERING FILTER WTC: HANNING



CONTROL: 1/19 - 1551 (1C) DATE OF ANALYSIS: - - - REEL: 6 INDE X6966
 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
1C ELEMENTS -60 DEG. AZ STEERING



SECRET

SECRET

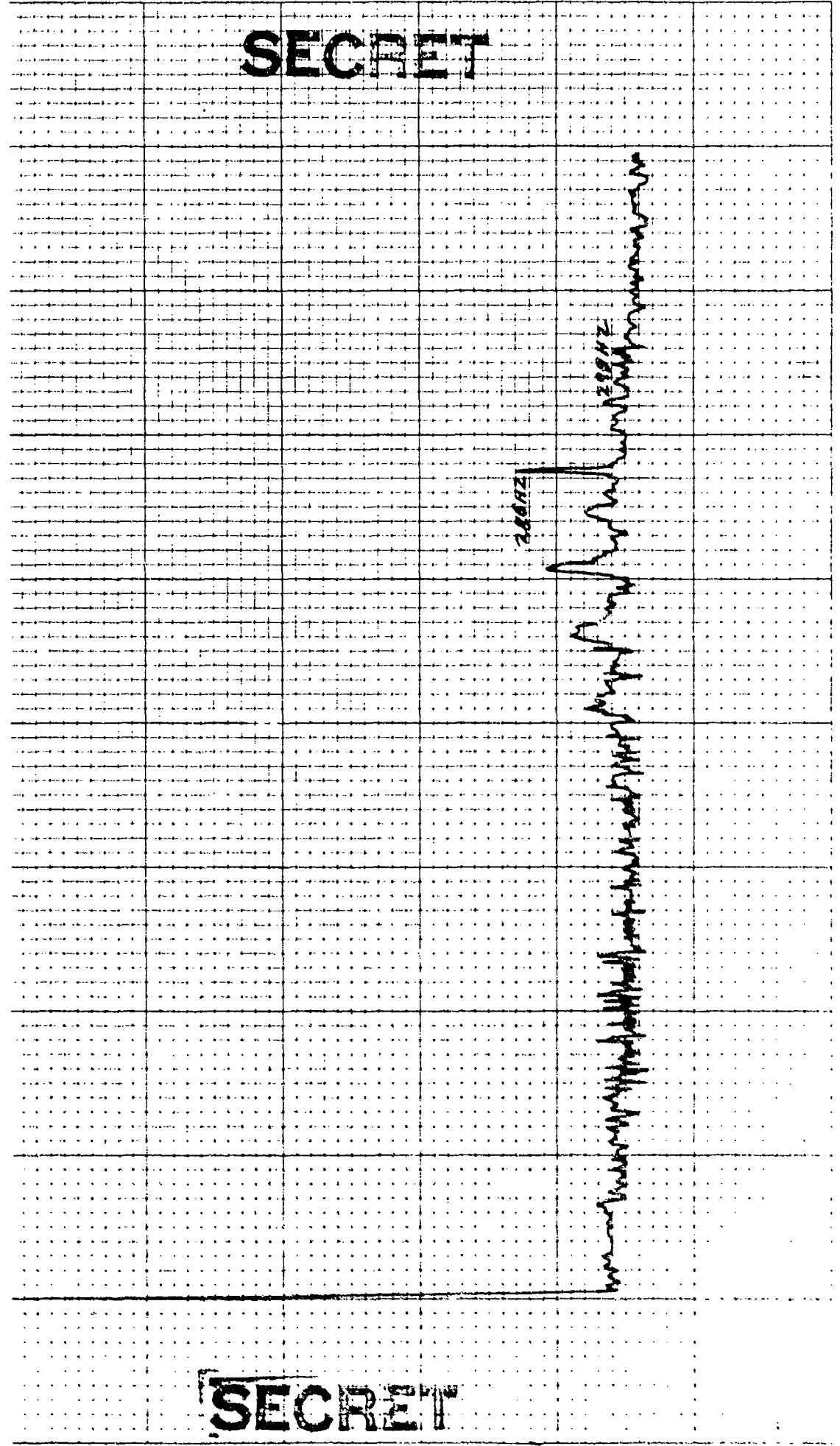
CONTROL: 1/19 - 150 (16) DATE OF ANALYSIS: - - -

BEAMFORMED SPECTRUM(ELEMENTS) 29 7M2044) REEL: 6 INDE Y6166

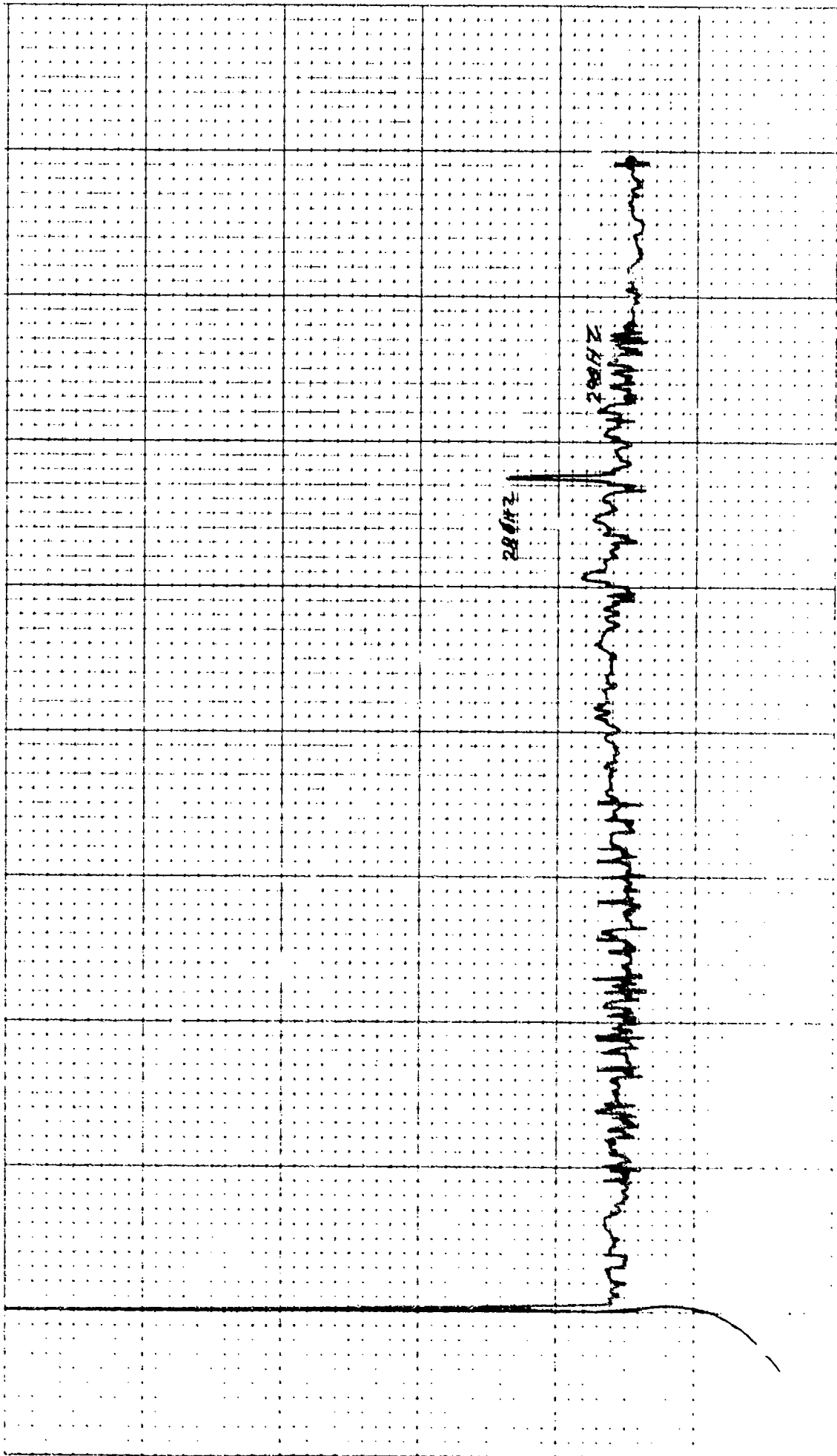
EXERCISE: BEARING STAKE DATE/TIME: 1-19-77 - 1551 Z INTEGRATION TIME 320 SECS ATTN: JS DB

CENTER FREQ: 290 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC 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 -57.2

MCPS-32 CAL. CORRECTION +10 -47.2

BEAMFORMER GAIN +18 -29.2 SIG. LEVEL FOR SNR CALCULATION

MRA CORRECTION + .8 -28.4 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -74.9

MCPS-32 CAL. CORRECTION +10 -64.9

BEAMFORMER GAIN +18 -46.9 NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR -29.2

NOISE LEVEL FOR SNR -46.9 17.7

PROCESSOR CORRECTION -4.1 13.6

MRA CORRECTION + .8 17.4 SNR .031 HZ BAND

BANDWIDTH CONVERSION -13.2 1.2 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

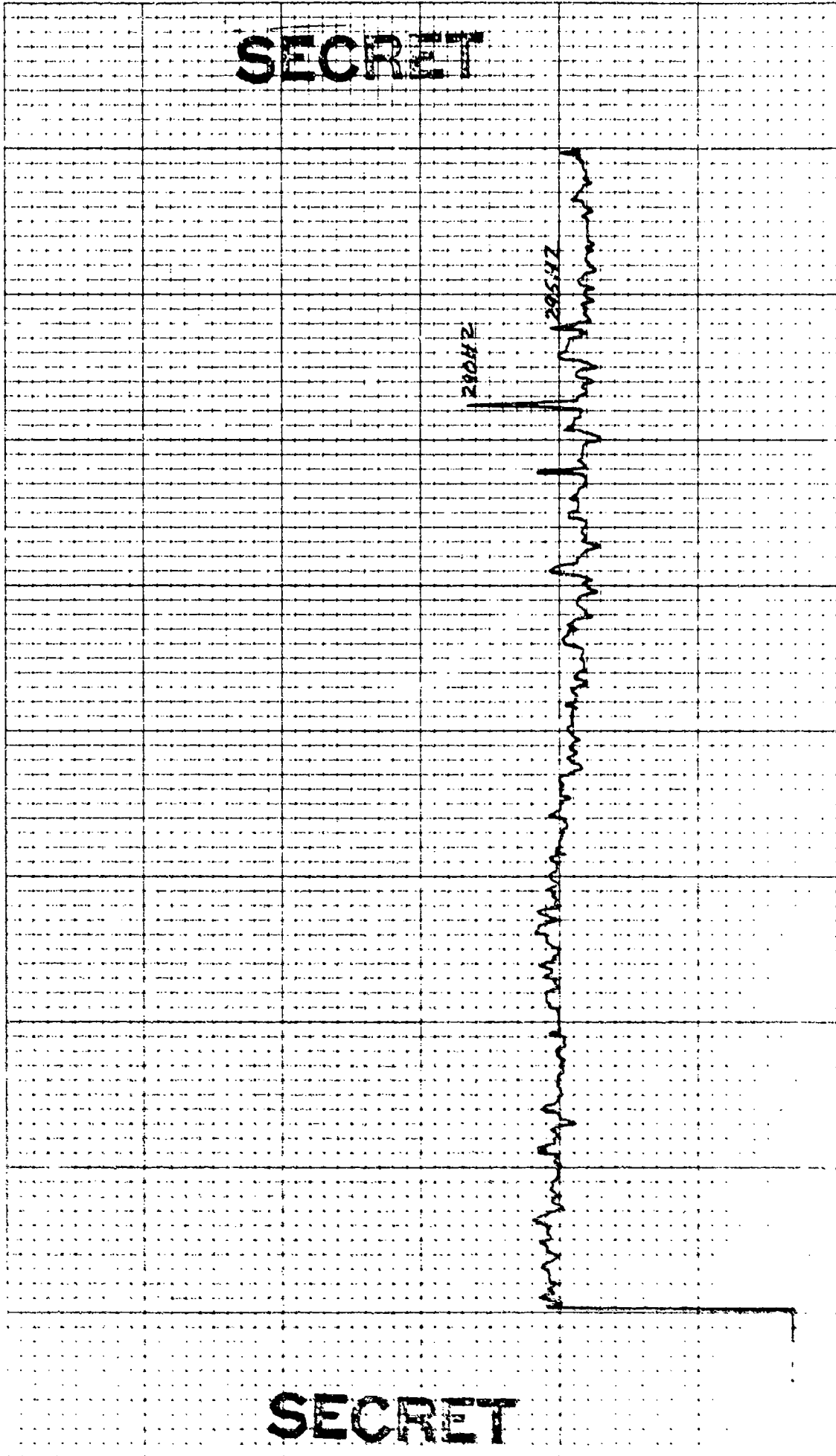
MRA SNR	_____	<u>14.4</u>	<u>6.3</u>
MEAN OMNI SNR	_____	<u>2.2</u>	<u>-2.0</u>
ARRAY GAIN	_____	<u>12.2</u>	<u>8.3</u>
THEORETICAL AZMUTH GAIN (at MRA)	_____	<u>13.3</u>	<u>13.4</u>
DIFFERENCE	_____	<u>-1.1</u>	<u>-5.1</u>

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



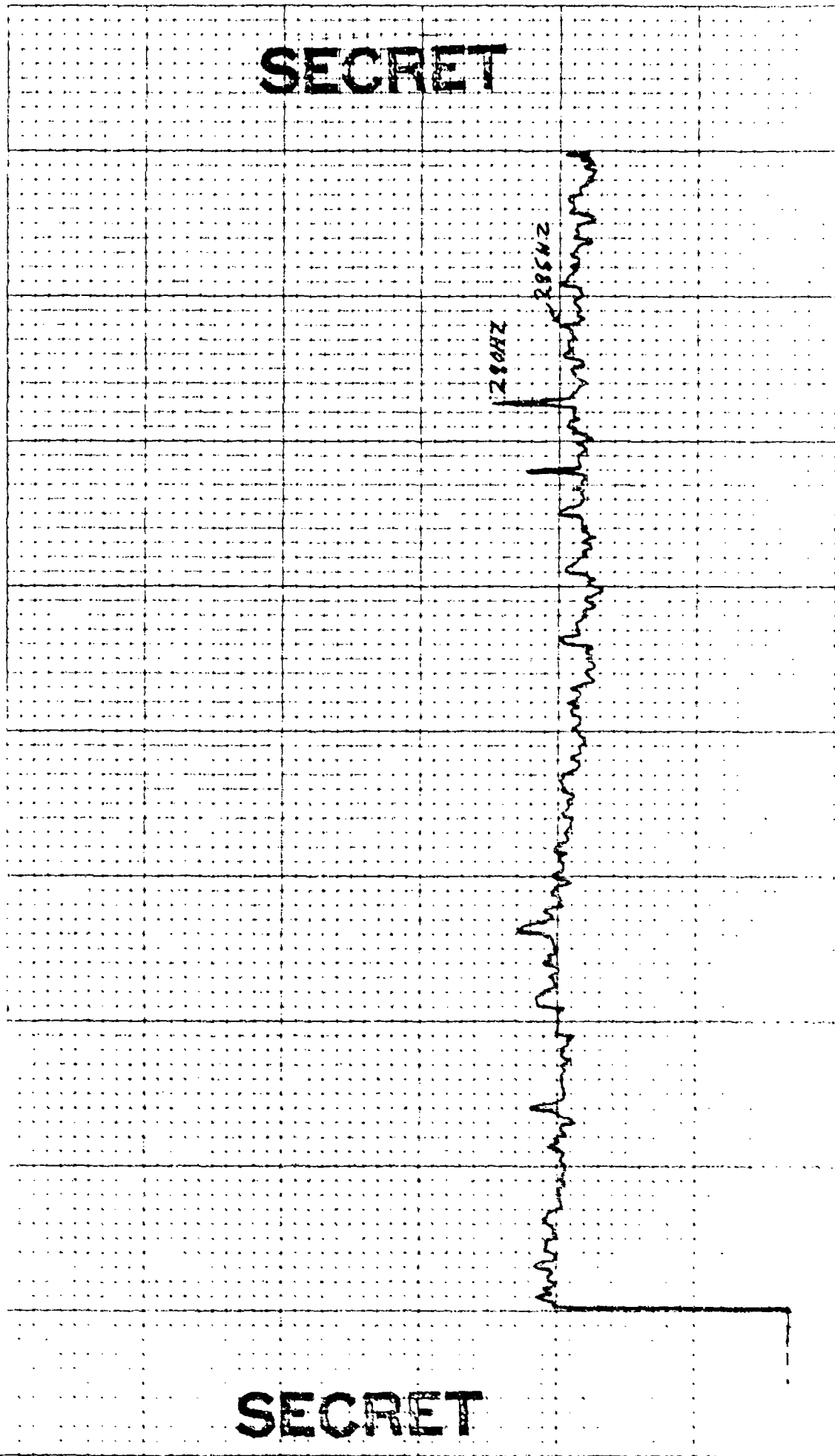
SECRET

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
FILTER WTG: HANNING
ATTEN: -10 DB



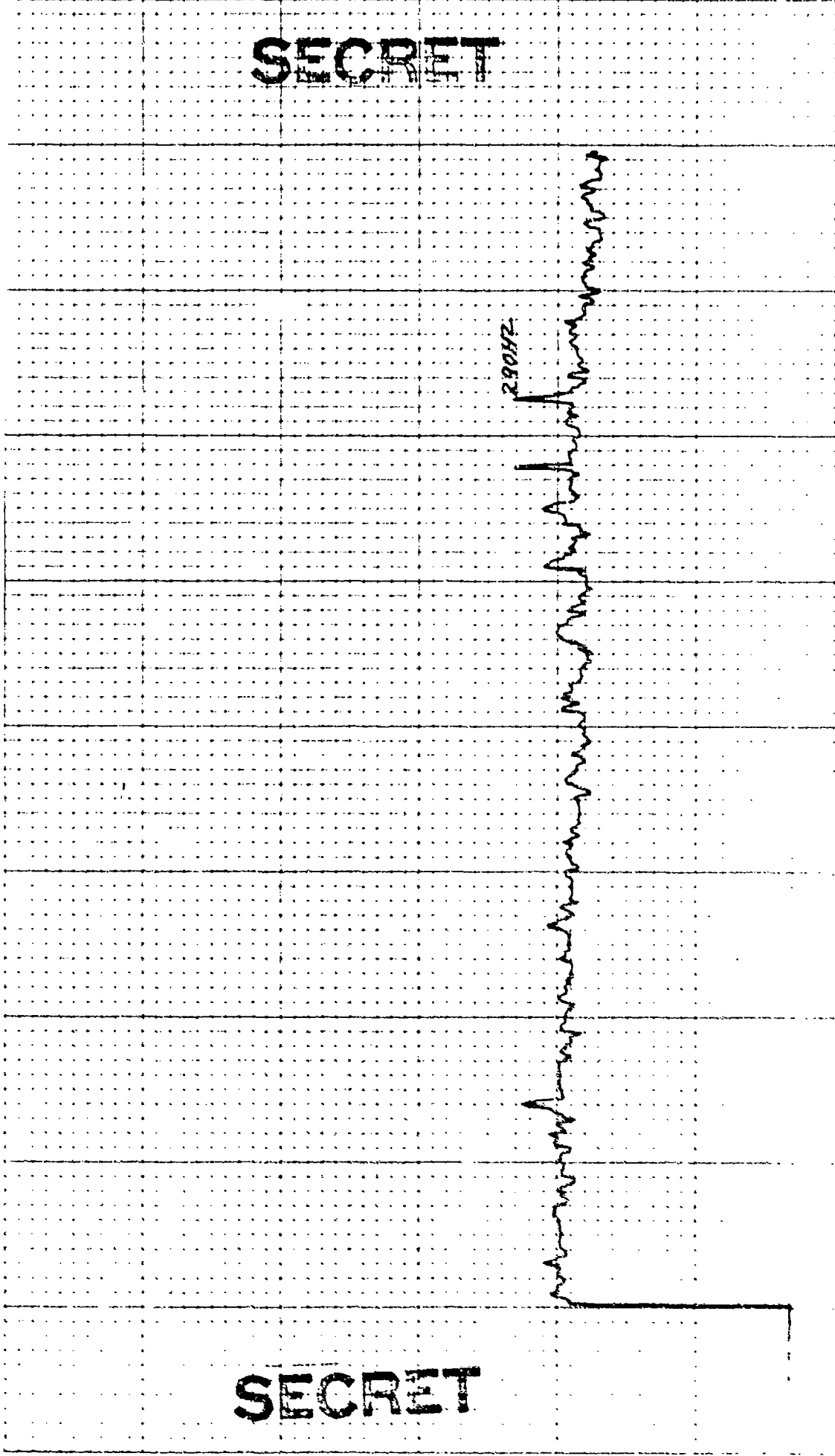
SECRET

SECRET

CONTROL: 1-19 - 1551 (32)
 BEAMPFORMED 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
 -64 DEG. AZ STEERING

REEL: 6 INDE X 6466
 INTEGRATION TIME 320 SECS
 FILTER WTC: HANNING
 ATTEN: -18 DB



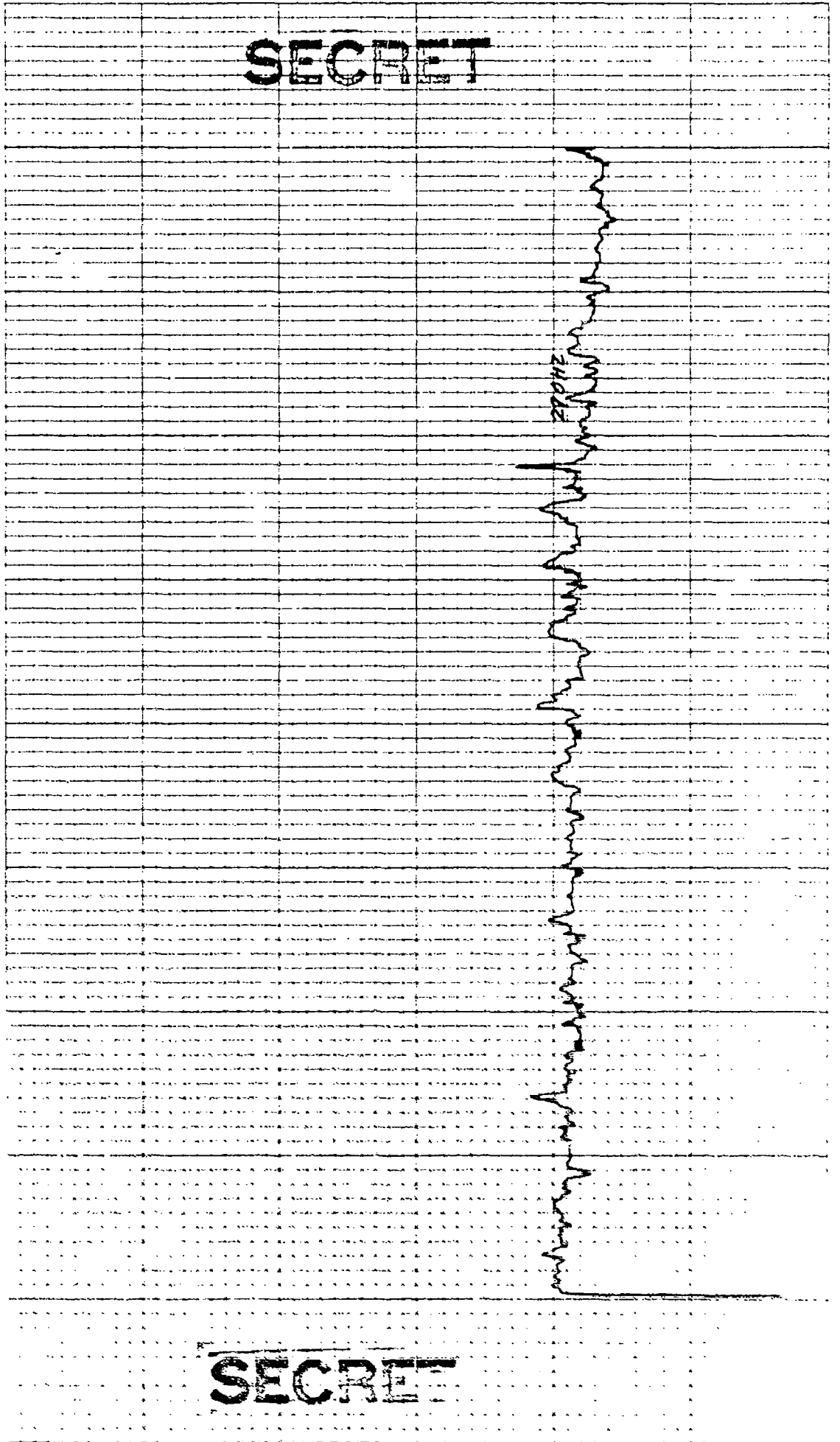
SECRET

SECRET

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

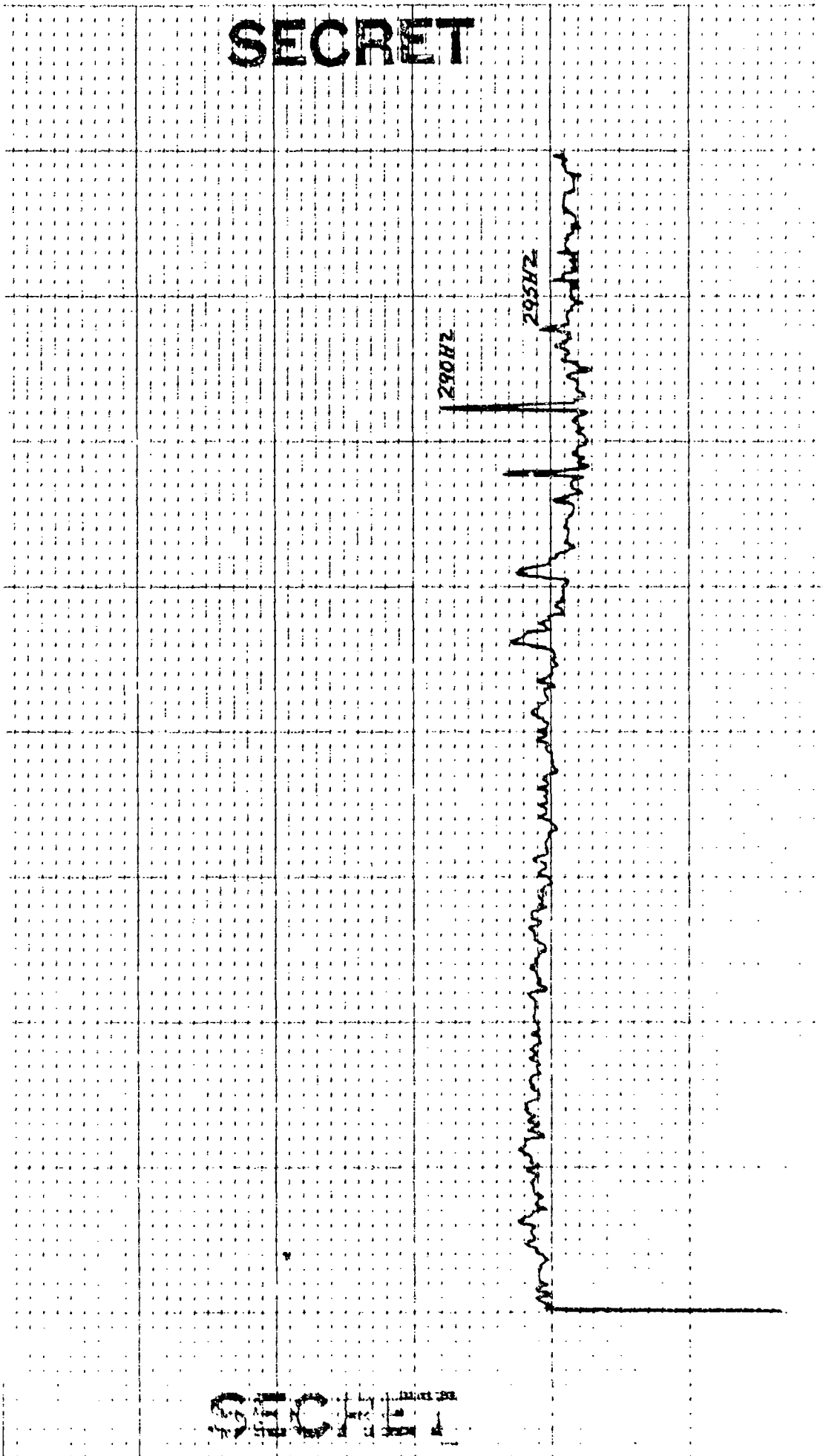
CONTROL: 1-19 -1551 (32)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
 32 ELEMENTS

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: -18 DB
 FILTER WIG: HANNING



SECRET

SECRET

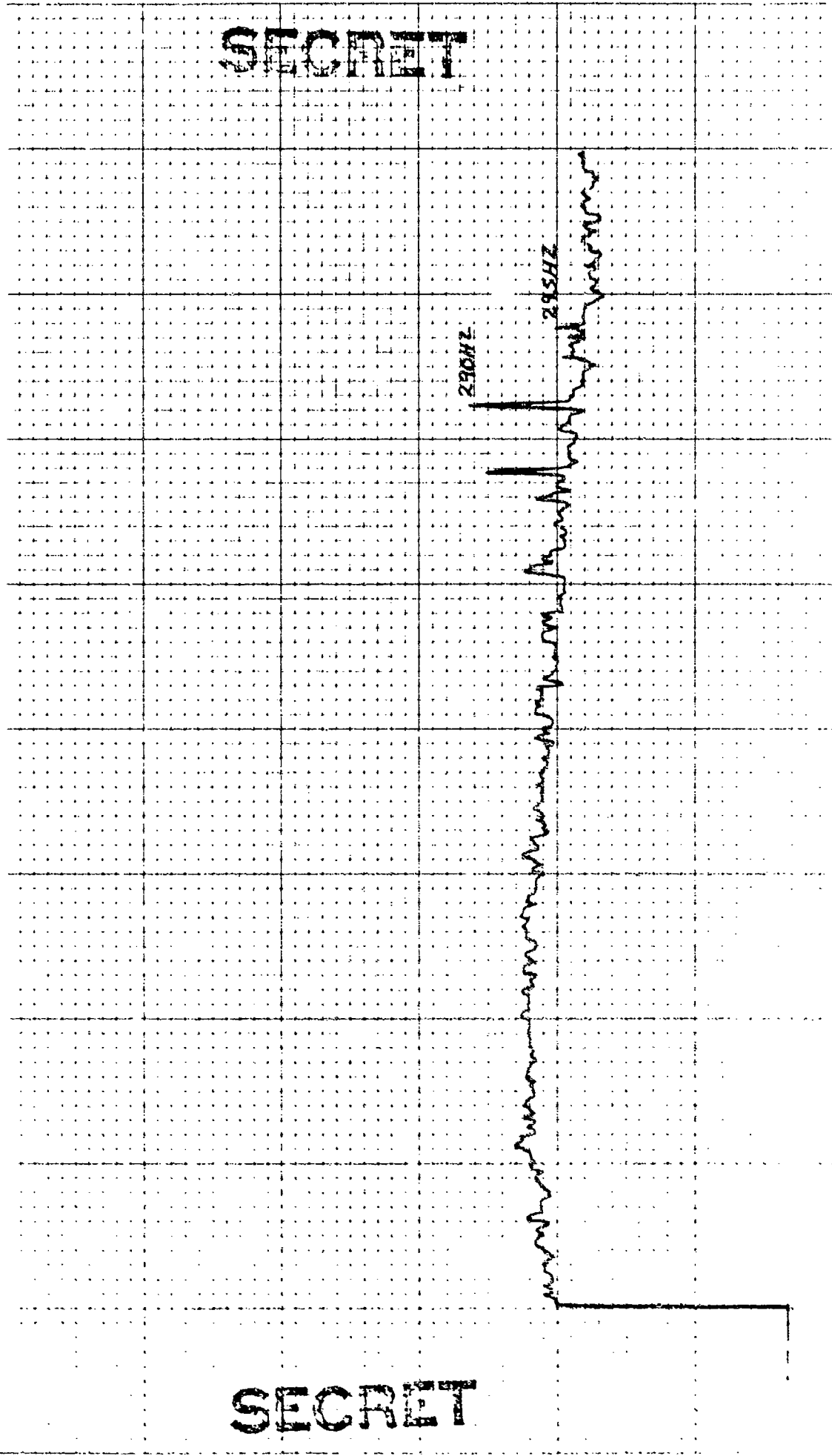
4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

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

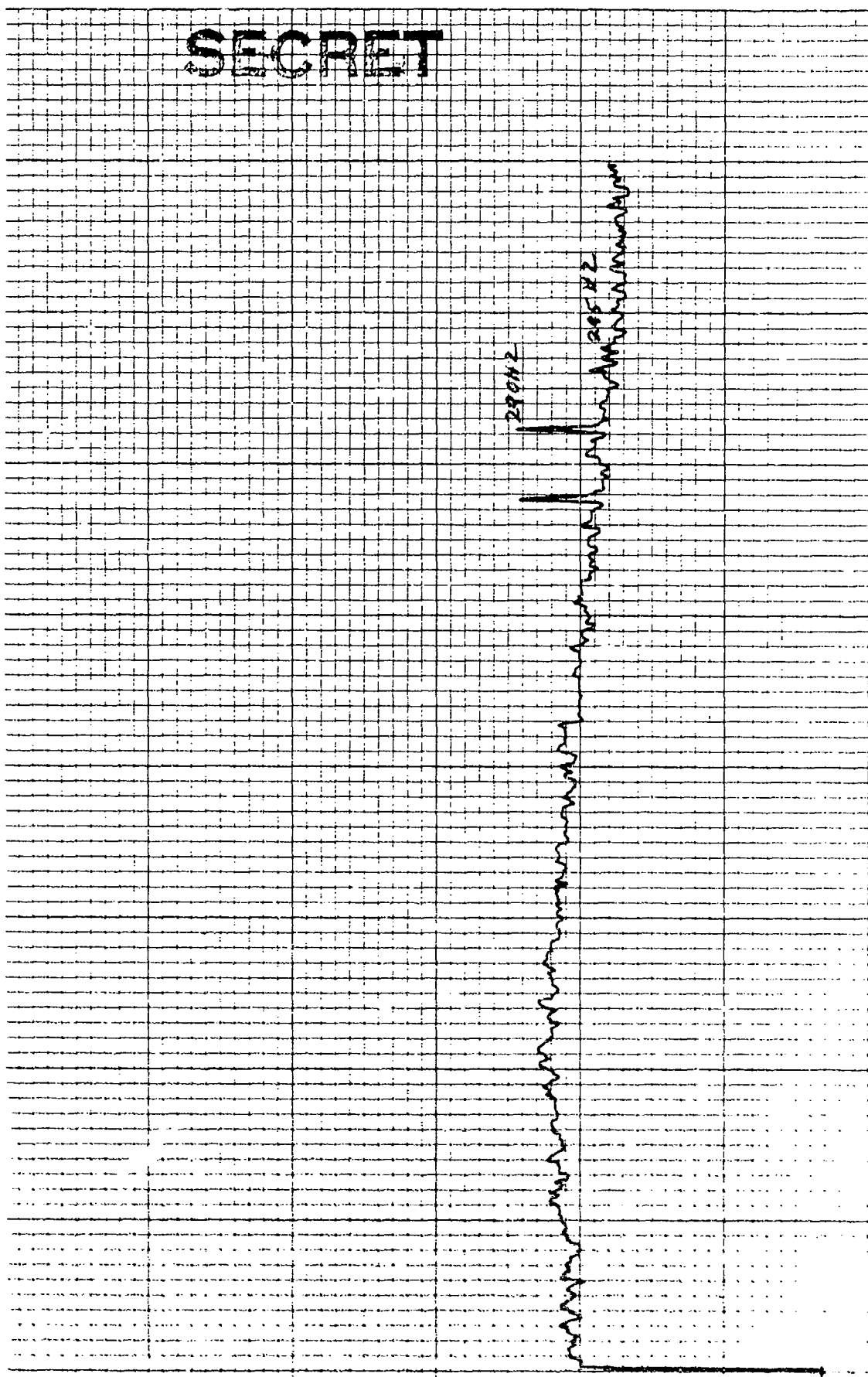
DATE OF ANALYSIS: 10-26-77
 DATE/TIME: 19-77 -1551 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 -56 DEG. AZ STEERING

REEL: 6
 INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

INDE X6466
 ATTEN:-18 DB



CONTROL: 1-14 -1551 (21) DATE OF ANALYSIS: REEL: 6 INDE X 6466
 BEAMFORMED SPECTRUM(ELEMENTS) 16-26 28 30 49 INTEGRATION TIME 320 SECS ATTN: 70 DB
 EXERCISE: BEARING STAKE DATE/TIME: 1-14-77 -1551 Z FILTER WTG: HANNING
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ
32 ELEMENTS -54 DEG. AZ STEERING



SECRET

SECRET

4 03

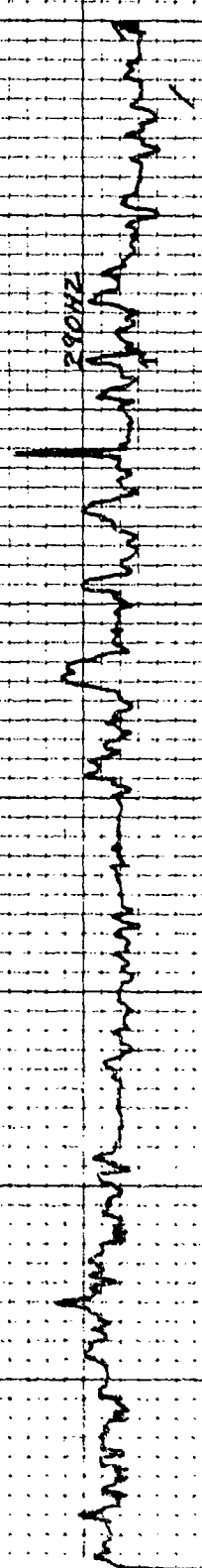
CONTROL: 1-19 - 1551 (32)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

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

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

SECRET

SECRET



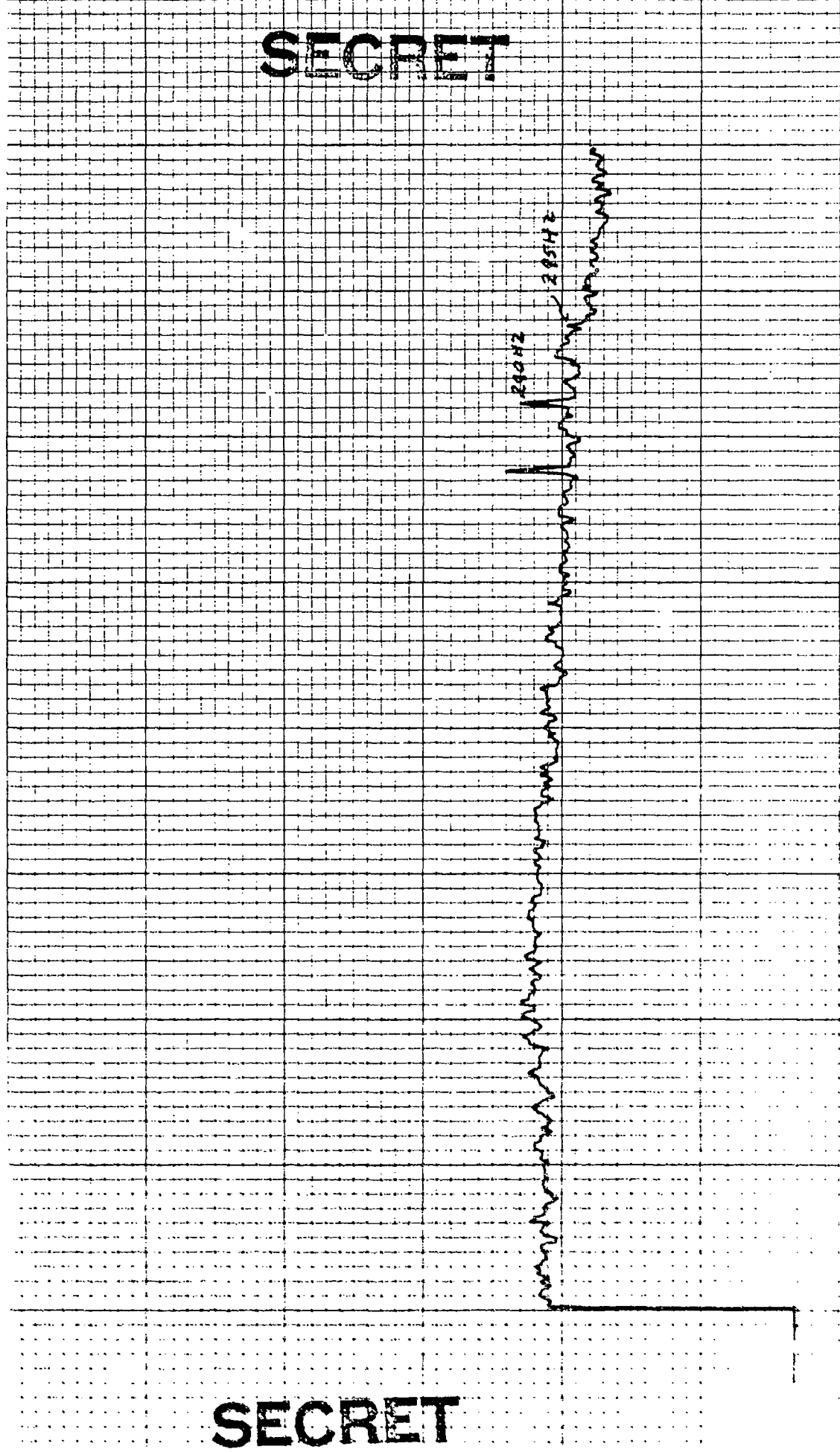
CONTROL: 1/19 - 1551 (J2) DATE OF ANALYSIS: 16-26-79 REEL: 6 INDE X6922

BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 1-19-79 - 1551 Z INTEGRATION TIME 320 SECS ATTEN: -18 DB

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

CENTER FREQ: 270 HZ -52 DEG. AZ STEERING

32 ELEMENTS



SECRET

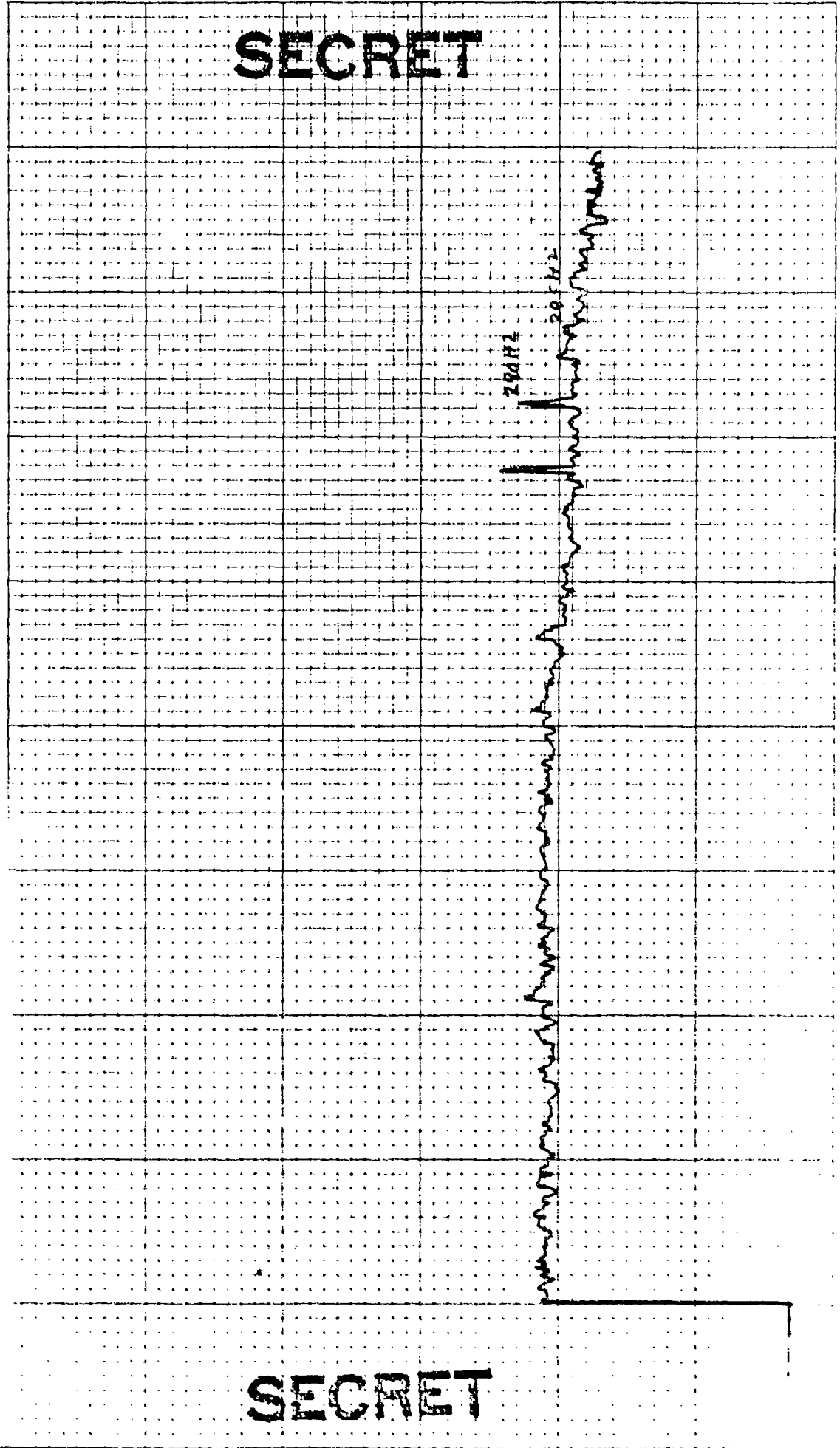
SECRET

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

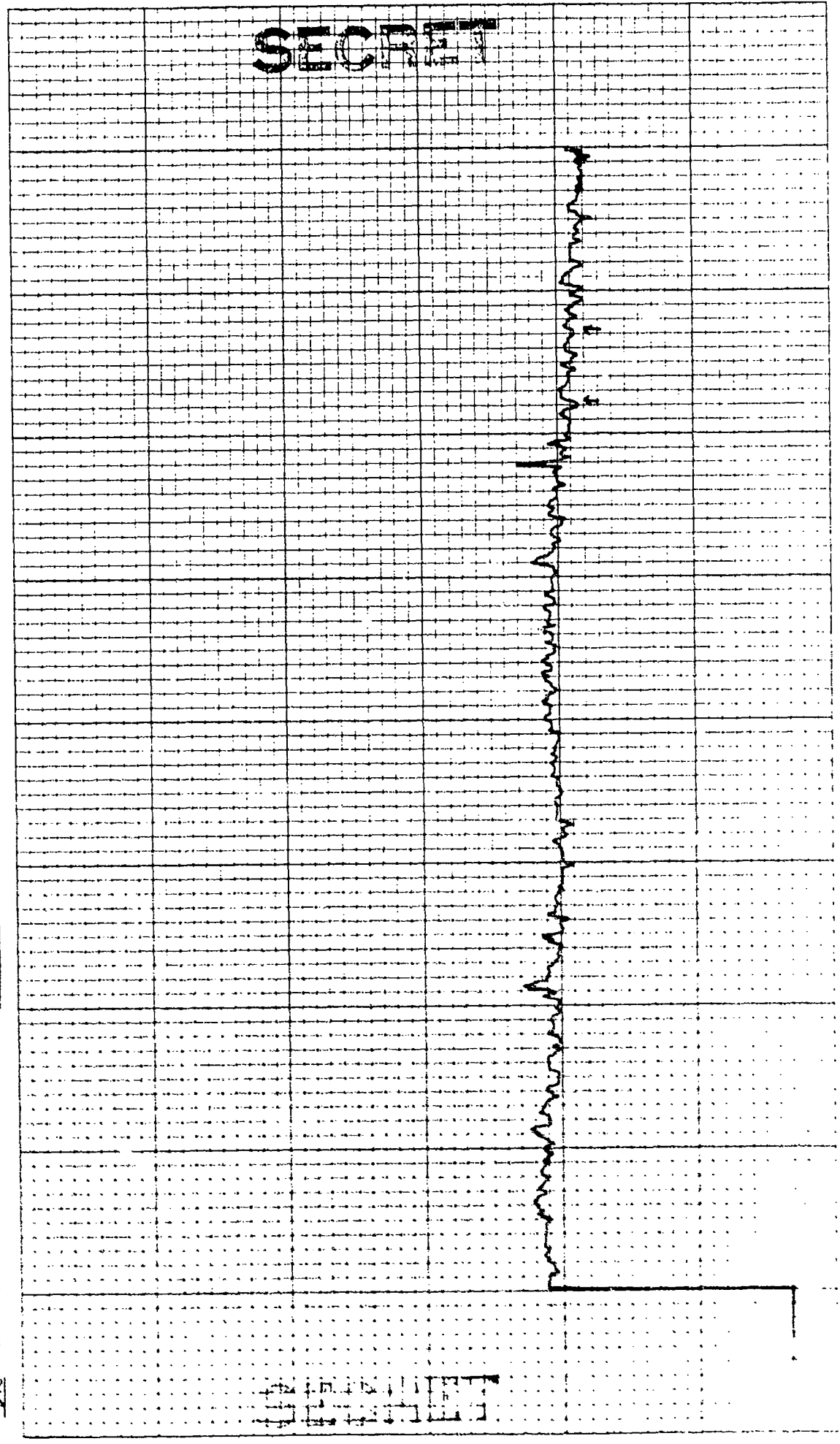
INDE X 226



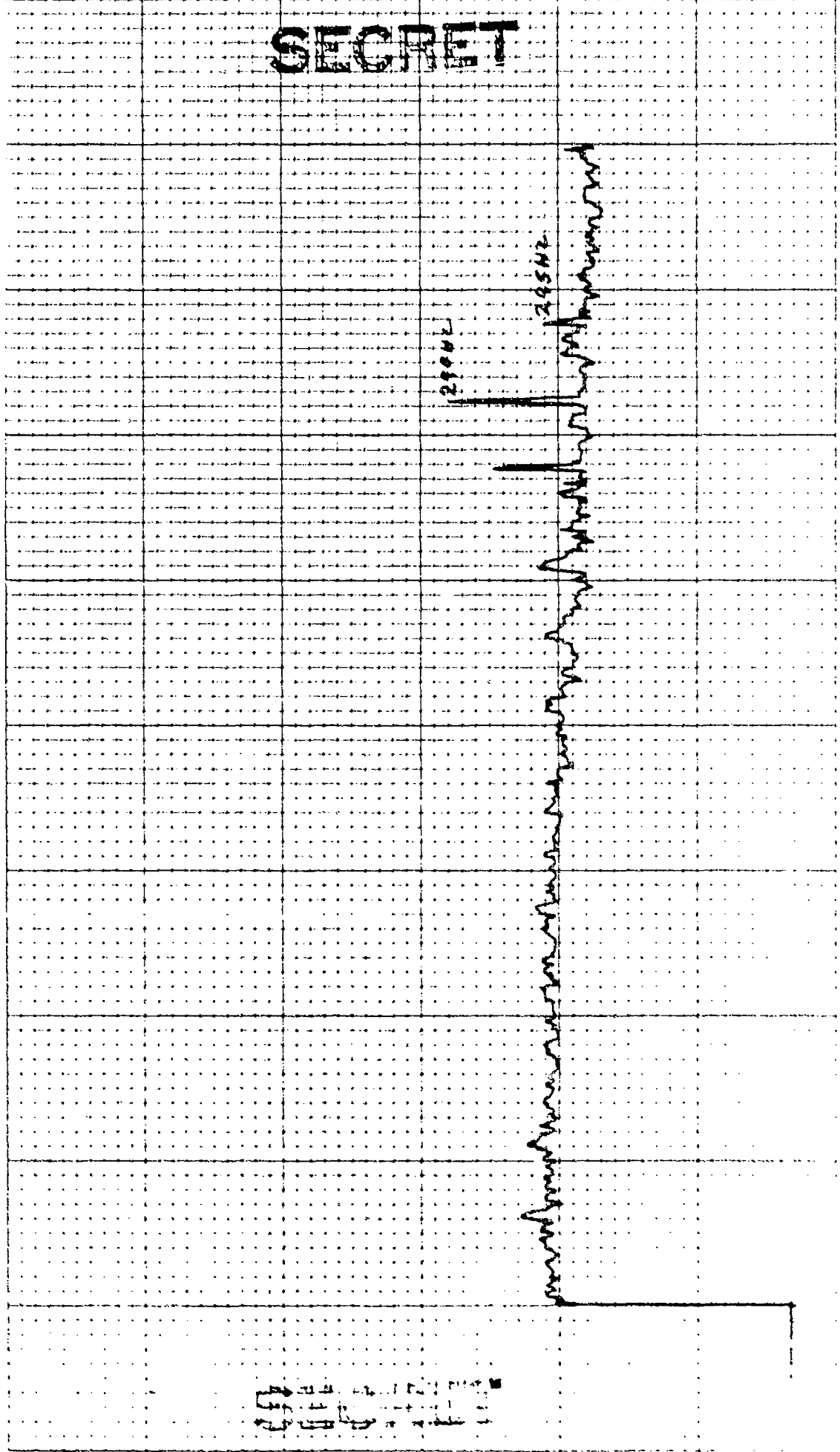
4 03

E " TOI CH. V.MI.

CONTROL: 1/11 - 1551 (22) DATE OF ANALYSIS: REEL: 6 INDE V6666
 BEAMFORMED SPECTRUM(ELEMENTS 16-26 & 29-49)
 EXERCISE: BEARING STAKE DATE/TIME: 1-19-77 - 1551 Z INTEGRATION TIME 320 SECS ATEN: -10 DB
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
22 ELEMENTS -48 DEG. AZ STEERING



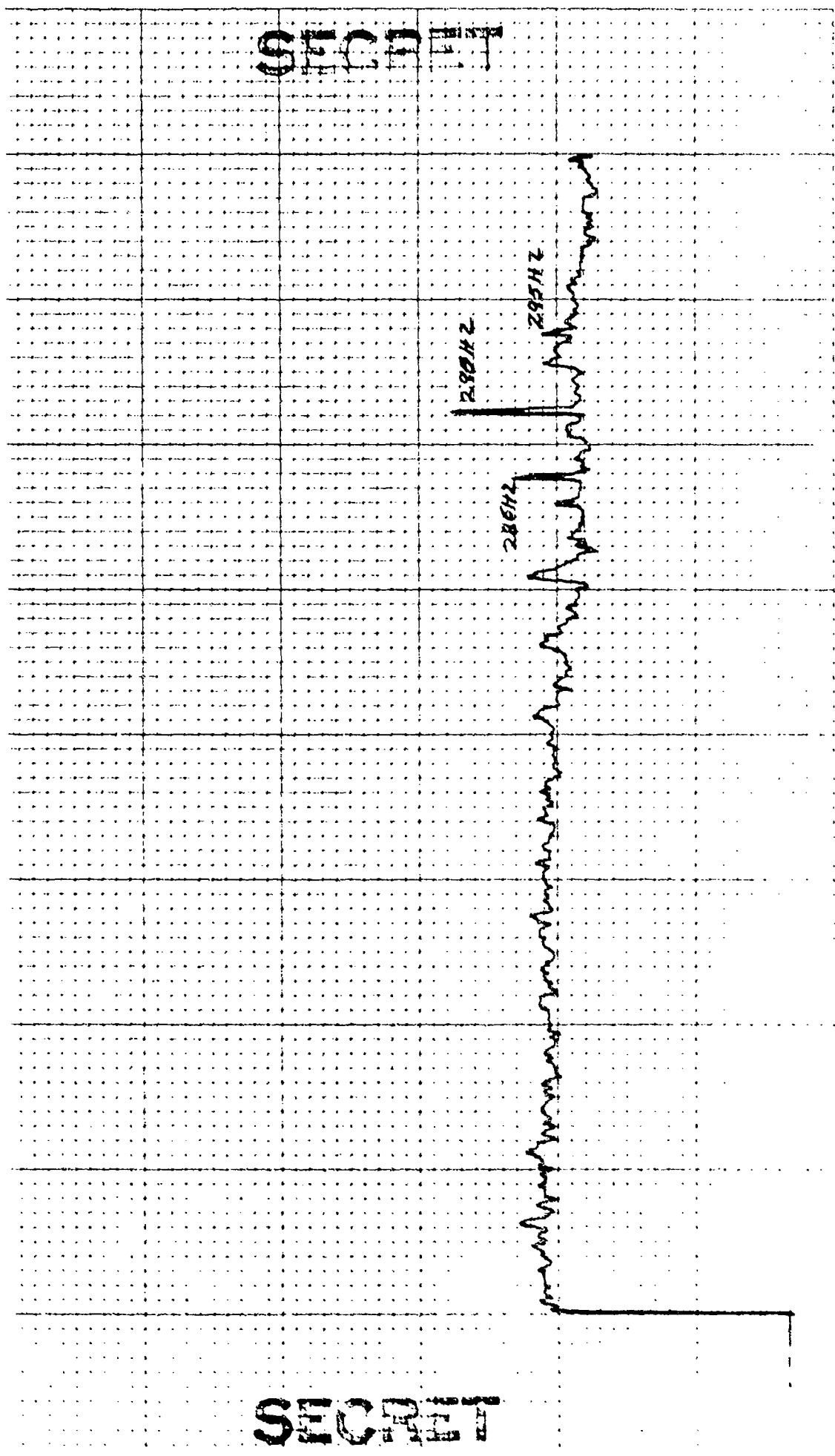
CONTROL: 1/14 -1551 (J2) DATE OF ANALYSIS: 1/17/77 REEL: 6 INDEX: X5466
 BEAMFORMED SPECTRUM (ELEMENTS 167.226 & 297.49)
 EXERCISE: BEARING STAKE DATE/TIME: 1/17-77 -1551 Z INTEGRATION TIME 320 SECS ATTN: -10 DB
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
32 ELEMENTS -59 DEG. 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

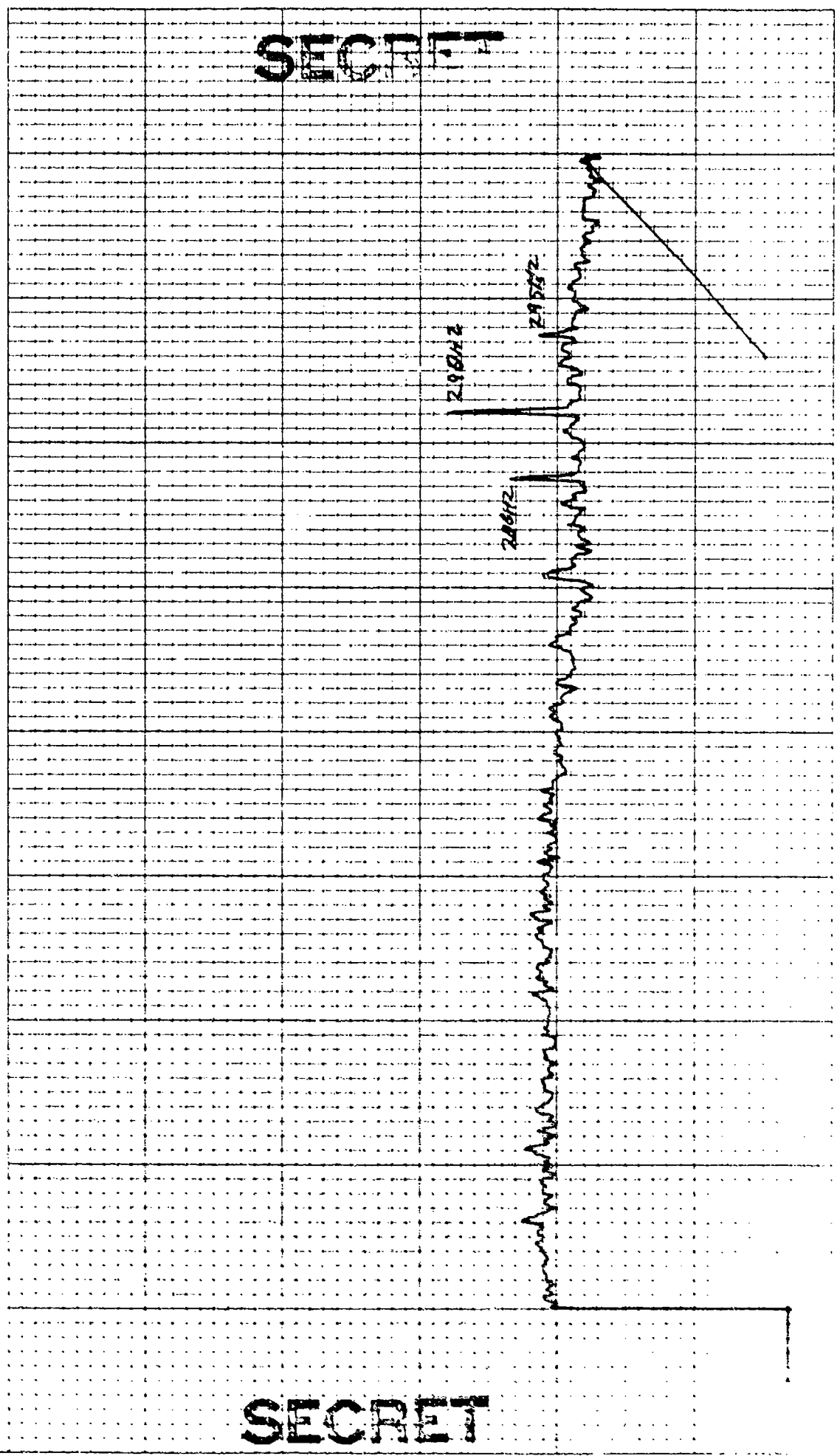
SECRET

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

DATE OF ANALYSIS: - - - - -
 / 670264 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

CONFIDENTIAL

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

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>-27.6</u>	<u>-31.3</u>
ARRAY SIGNAL GAIN		<u>22.1</u>	<u>17.0</u>
20 LOG <u>52</u>	_____	<u>34.3</u>	<u>34.3</u>
# of elements			
DIFFERENCE	_____	<u>-12.2</u>	<u>-17.3</u>

ARRAY GAIN

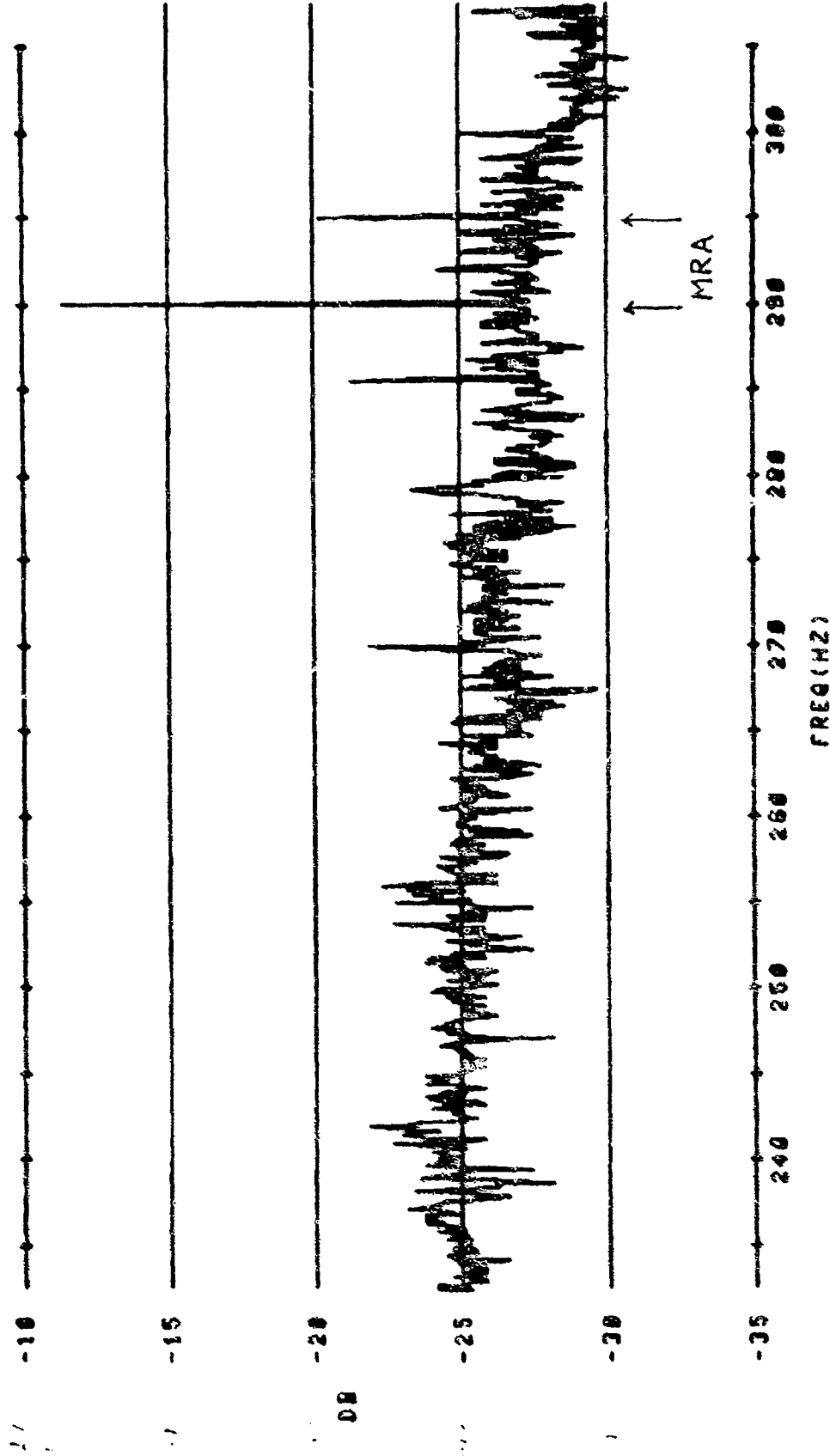
MRA SNR	_____	<u>12.1</u>	<u>2.5</u>
MEAN OMNI SNR	_____	<u>2.2</u>	<u>-2.0</u>
ARRAY GAIN		<u>9.9</u>	<u>4.5</u>
THEORETICAL AZMUTH GAIN (at MRA)	_____	<u>15.4</u>	<u>15.4</u>
DIFFERENCE	_____	<u>-5.5</u>	<u>-11.9</u>

CONFIDENTIAL

SECRET

CONTROL: 1/18-1851(62) DATE OF ANALYSIS: 22 JUL 77 REEL: 00 SIDE: 0 INDEX: 0400
BEAMFORMED SPECTRUM (ELEMENTS 1-14 AND 10-53)
P2 REDUNDANCY: X2
EXERCISE: BEARING STAKE DATE/TIME: 18 JAN 77-1851Z PROJECTOR RANGE: 91.5 NM
CENTER FREQ: 270 HZ ANALYSIS B/W: 1/32 HZ INTEG TIME: 320 SECS B/F: -1000 SW1: 27 DB
B2 ELEMENTS -59.0 DEG AZ 8TEER NORMAL WEIGHTING

DP1



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 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

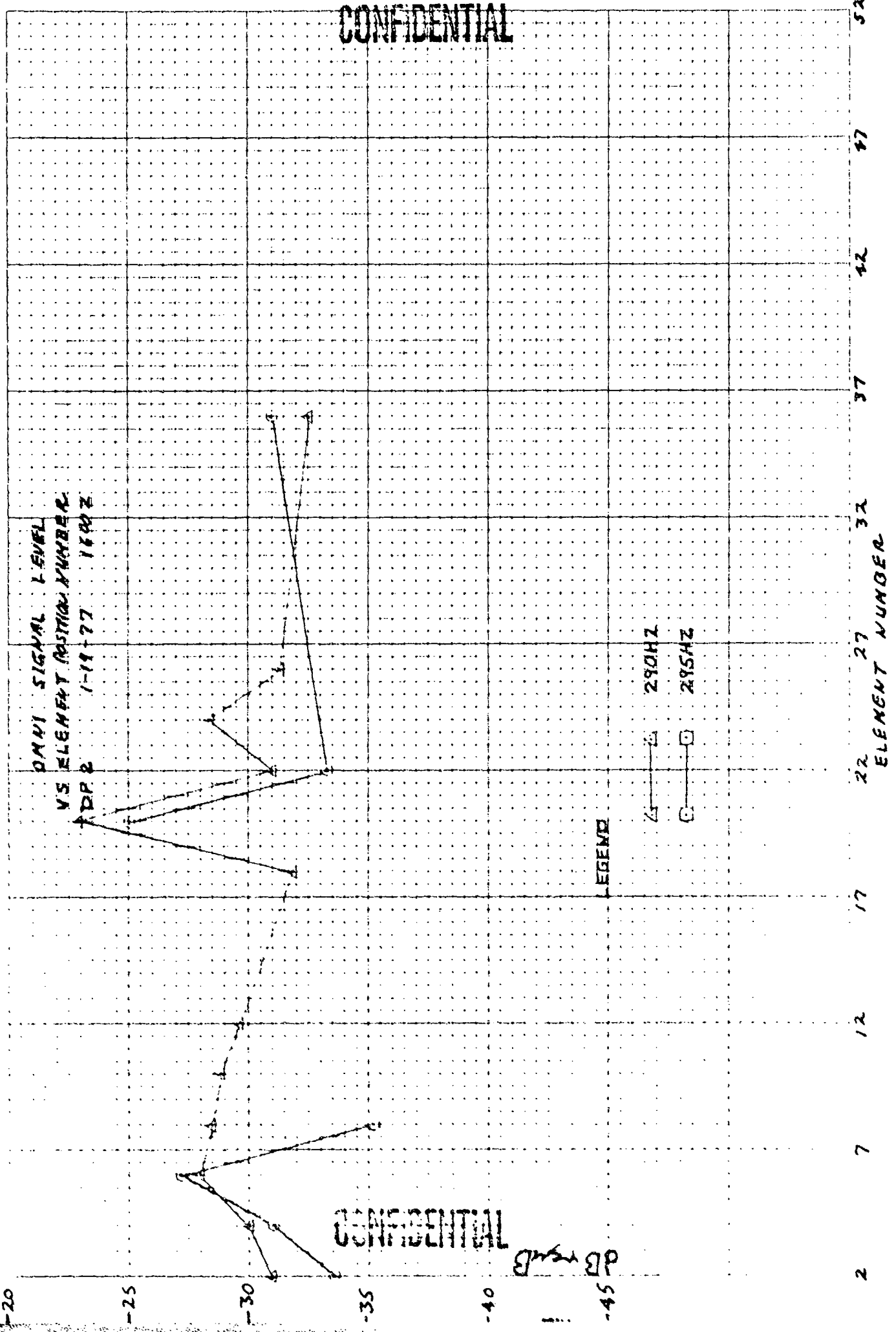
BANDWIDTH CONVERSION TO 1 HZ BAND +13.3 -34.6

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

UNCLASSIFIED

UNCLASSIFIED

CONFIDENTIAL

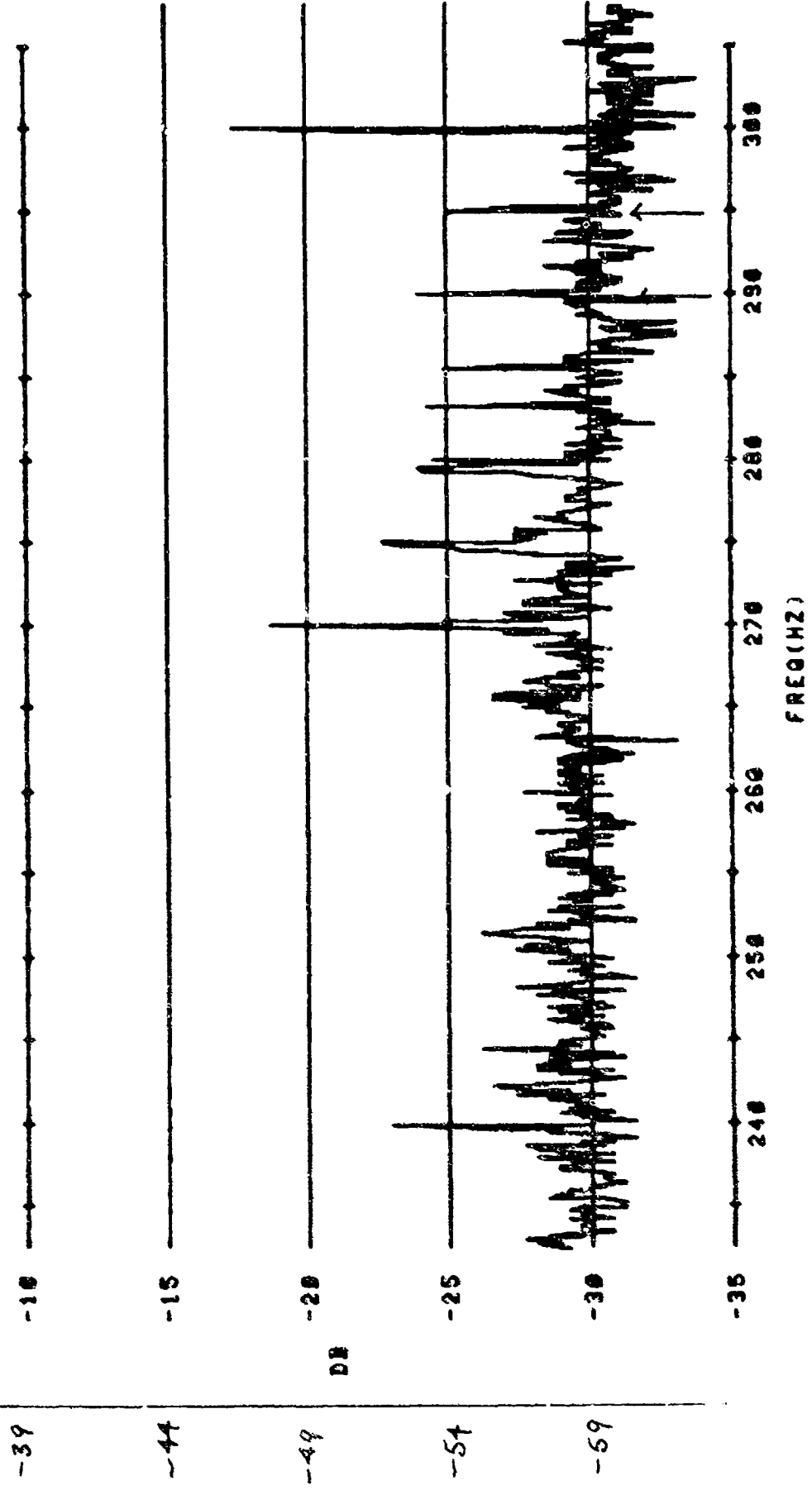


-29
-30
-31

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 sales, credit sales, and returns, as well as the proper way to record expenses and assets.

3. The third part of the document covers the process of reconciling bank statements and ensuring that the company's records match the bank's records. It also discusses the importance of regular audits and reviews to identify any discrepancies or errors.

4. The final part of the document provides a summary of the key points and offers some advice on how to maintain good financial habits and ensure the long-term success of the business.

5. The first part of this section 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.

6. The second part of this section outlines the specific procedures for recording sales and purchases. It details how to handle cash sales, credit sales, and returns, as well as the proper way to record expenses and assets.

7. The third part of this section covers the process of reconciling bank statements and ensuring that the company's records match the bank's records. It also discusses the importance of regular audits and reviews to identify any discrepancies or errors.

8. The final part of this section provides a summary of the key points and offers some advice on how to maintain good financial habits and ensure the long-term success of the business.

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

+ 17.5

+ 14.5

+ 11.5

+ 8.6

+ 5.7

+ 2.9

0.8

- 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 the need for transparency and accountability in financial reporting.

2. The second part of the document details the various methods used to collect and analyze data. It includes a comprehensive list of sources and techniques employed to ensure the reliability and validity of the information.

3. The third part of the document provides a detailed analysis of the findings. It identifies key trends and patterns, and discusses their implications for the organization's overall performance and future strategy.

4. The fourth part of the document outlines the recommendations and conclusions drawn from the analysis. It provides clear guidance on how to address identified issues and capitalize on opportunities for improvement.

5. The fifth part of the document serves as a summary of the entire report, highlighting the most significant points and providing a clear overview of the findings and recommendations.

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

FM
 AN
 WY

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

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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>

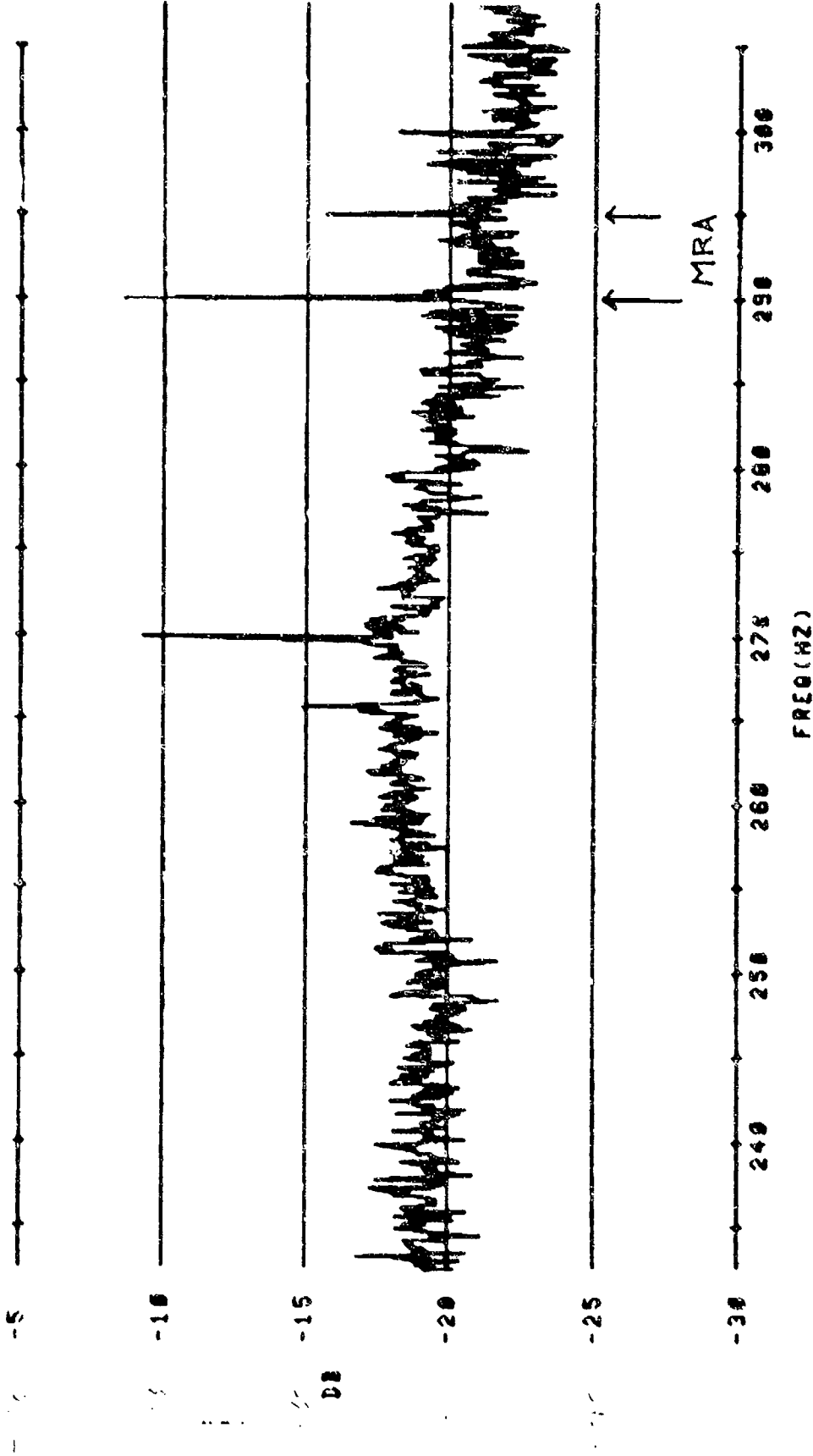
ARRAY GAIN

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>

CONFIDENTIAL

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 MZ 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>

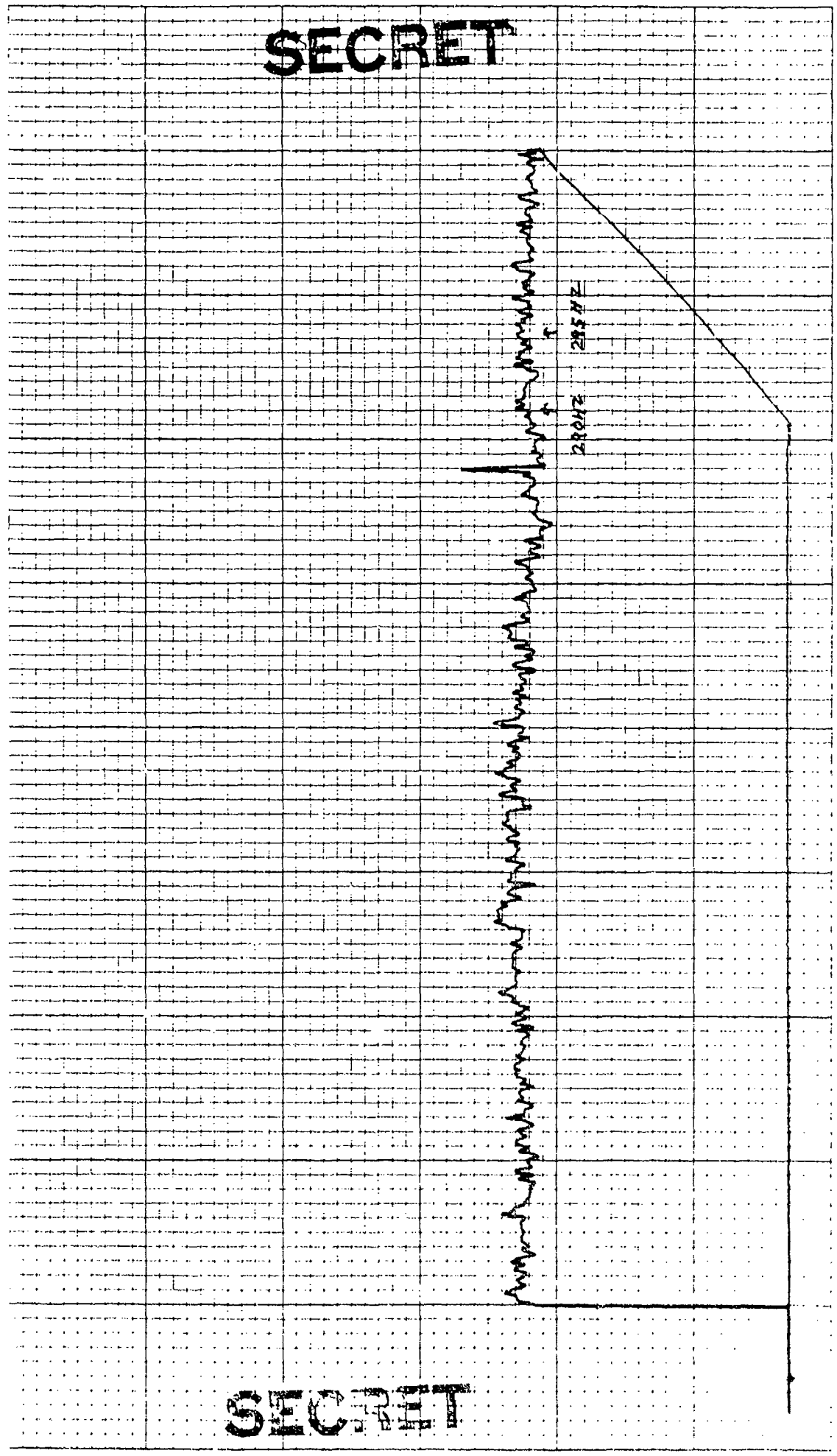
ARRAY GAIN

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) /6-26 & 29-49
 EXERCISE: BEARING STAKE DATE/TIME: 1-19-77 - 1600 Z INTEGRATION TIME 320 SECS ATTN: -/8 DB
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
32 ELEMENTS - 4 DEG. AZ STEERING



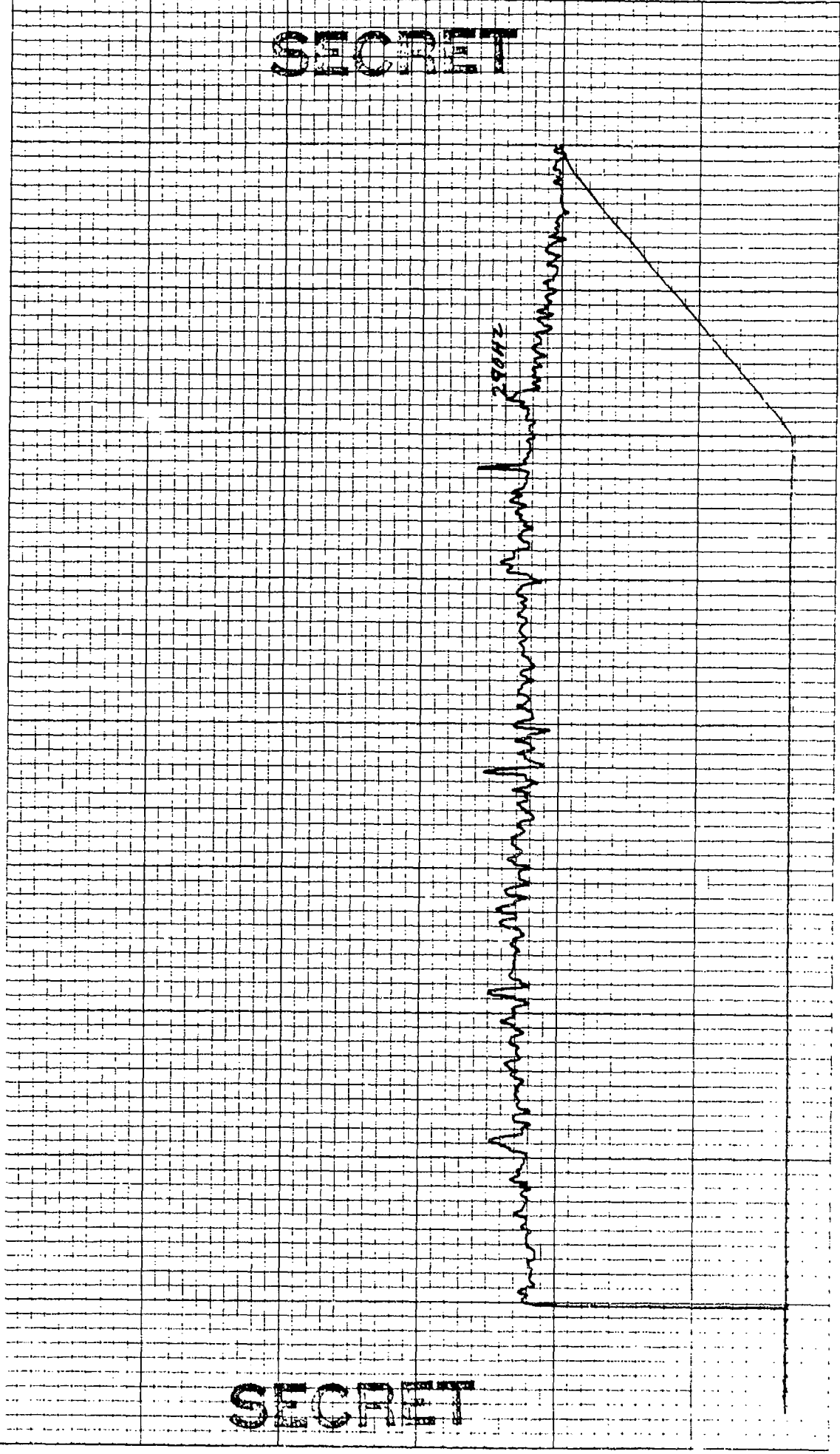
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4 '03

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)
32 ELEMENTS)
 ANALYSIS BANDWIDTH: 1/10HZ)
-46 DEG. AZ STEERING)

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



SECRET

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

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

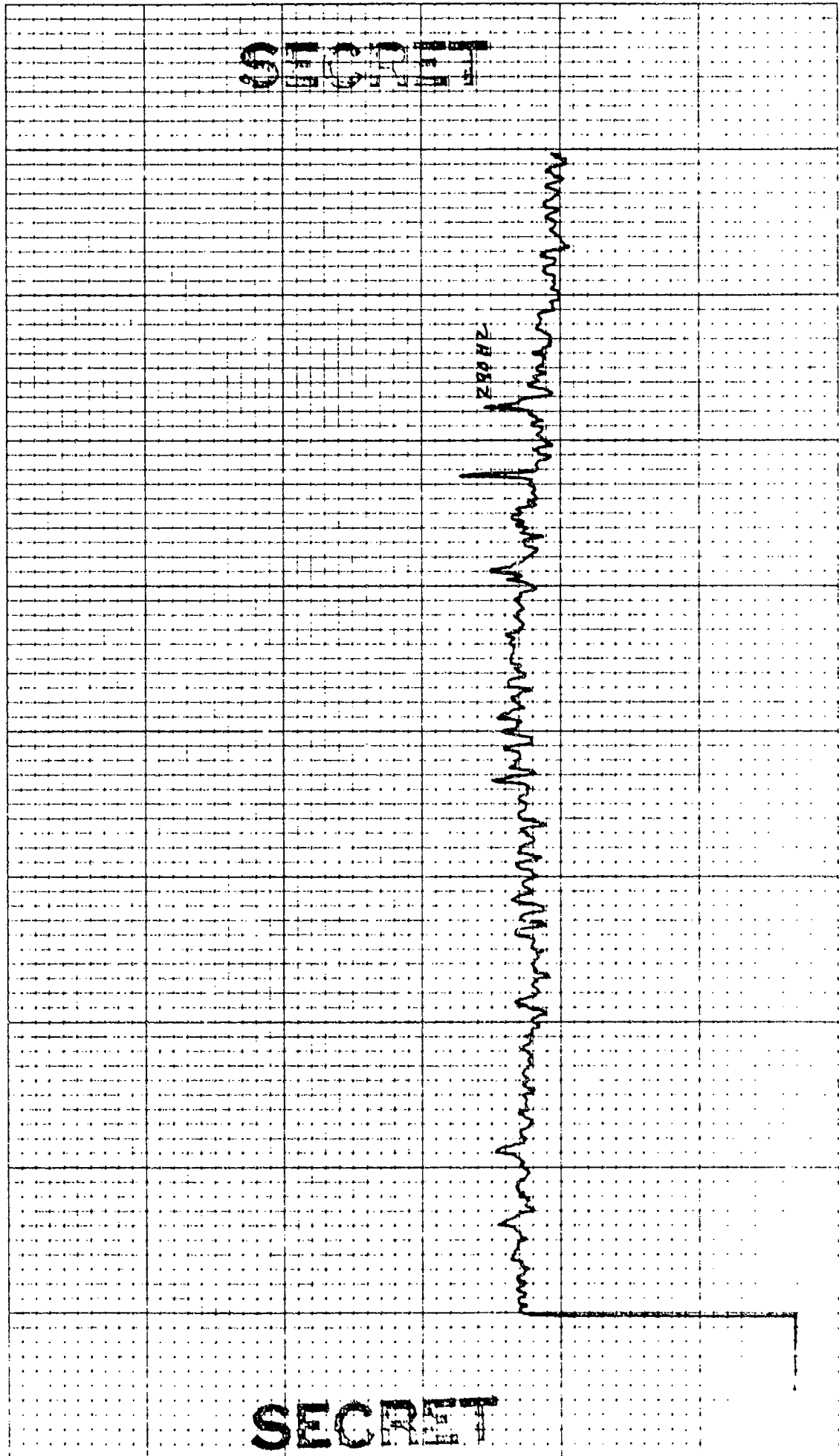
EXERCISE: BEARING STAKE /6-26 4 29-49)

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

32 ELEMENTS -48 DEG. AZ STEERING

INTEGRATION TIME 320 SECS ATEN: -1 DB

FILTER WTC: HANNING



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03

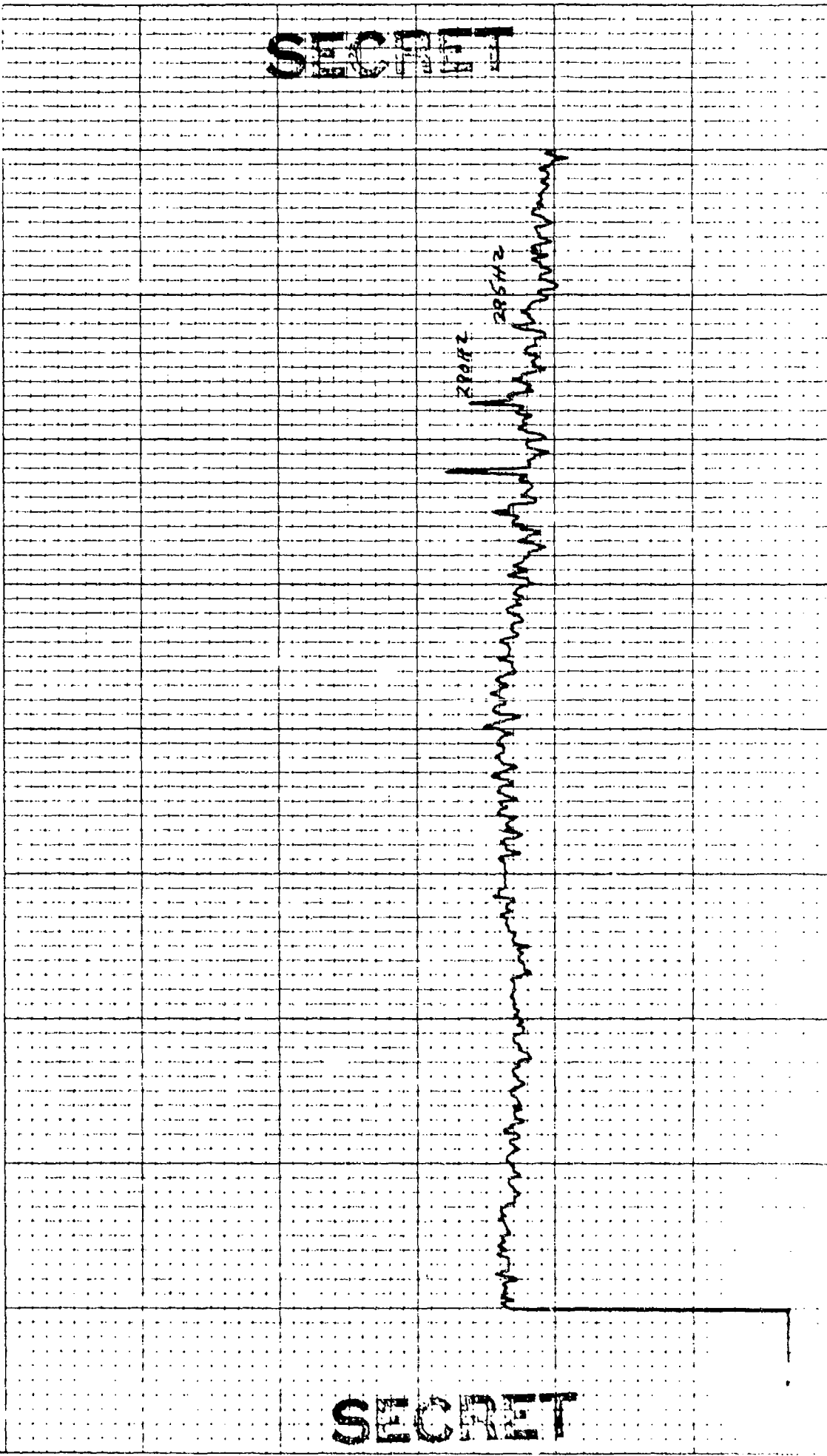
CONTROL: 1-19 -1600 (32)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
 32 ELEMENTS

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



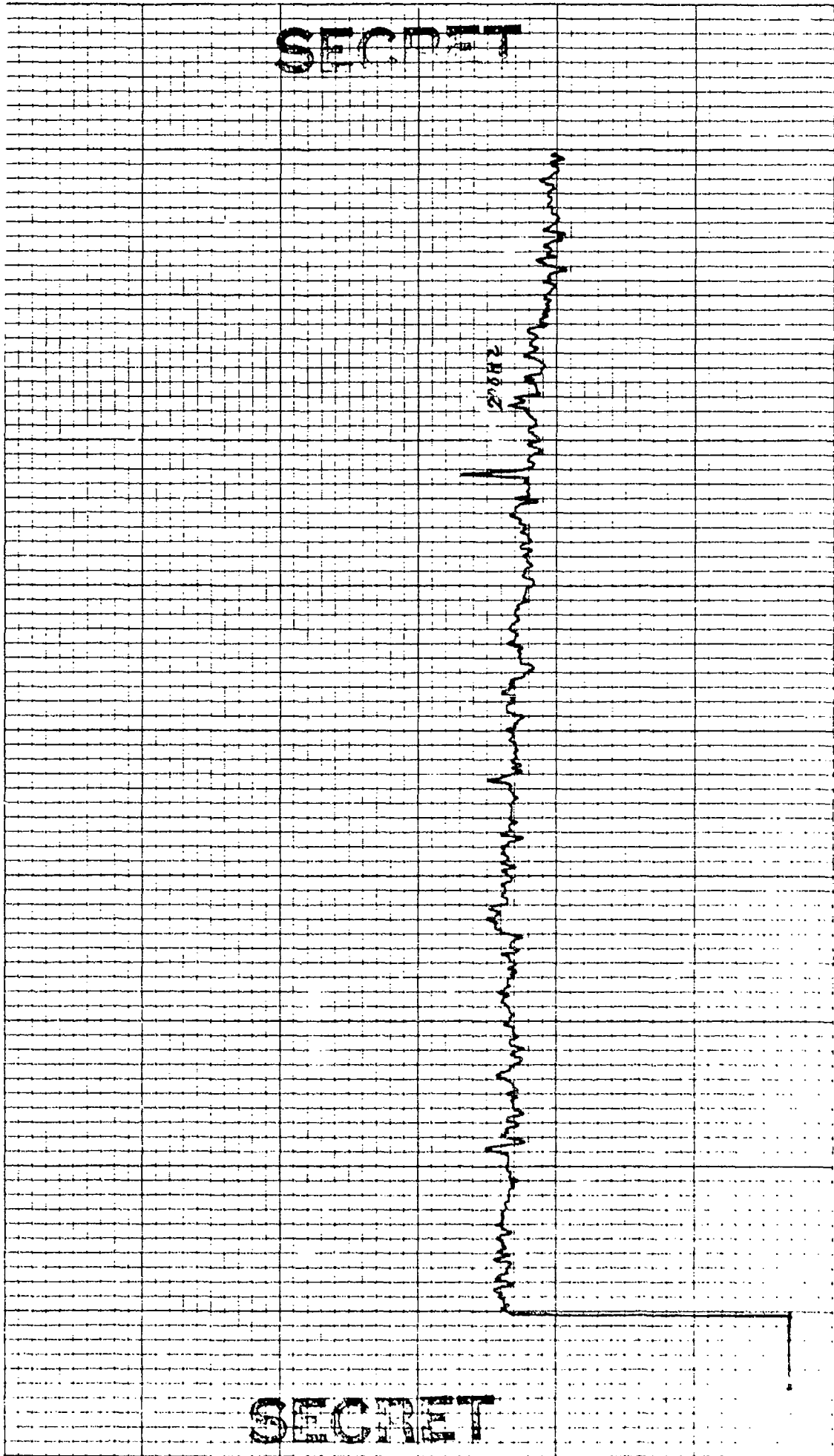
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4 '03

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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



SECRET

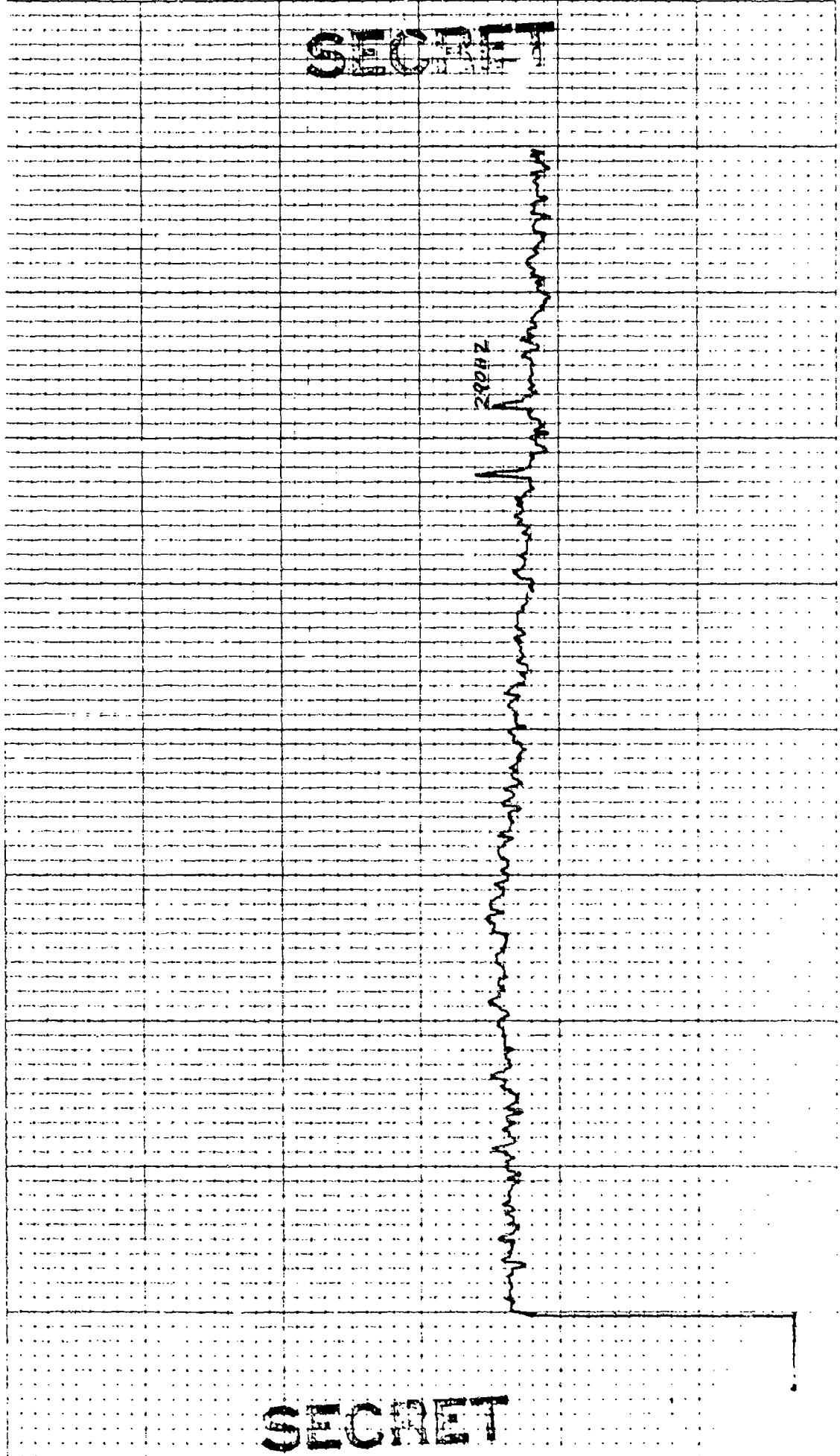
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4 '03

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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

REEL: 6 INDE X7575

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

DATE OF ANALYSIS: 16-28-49

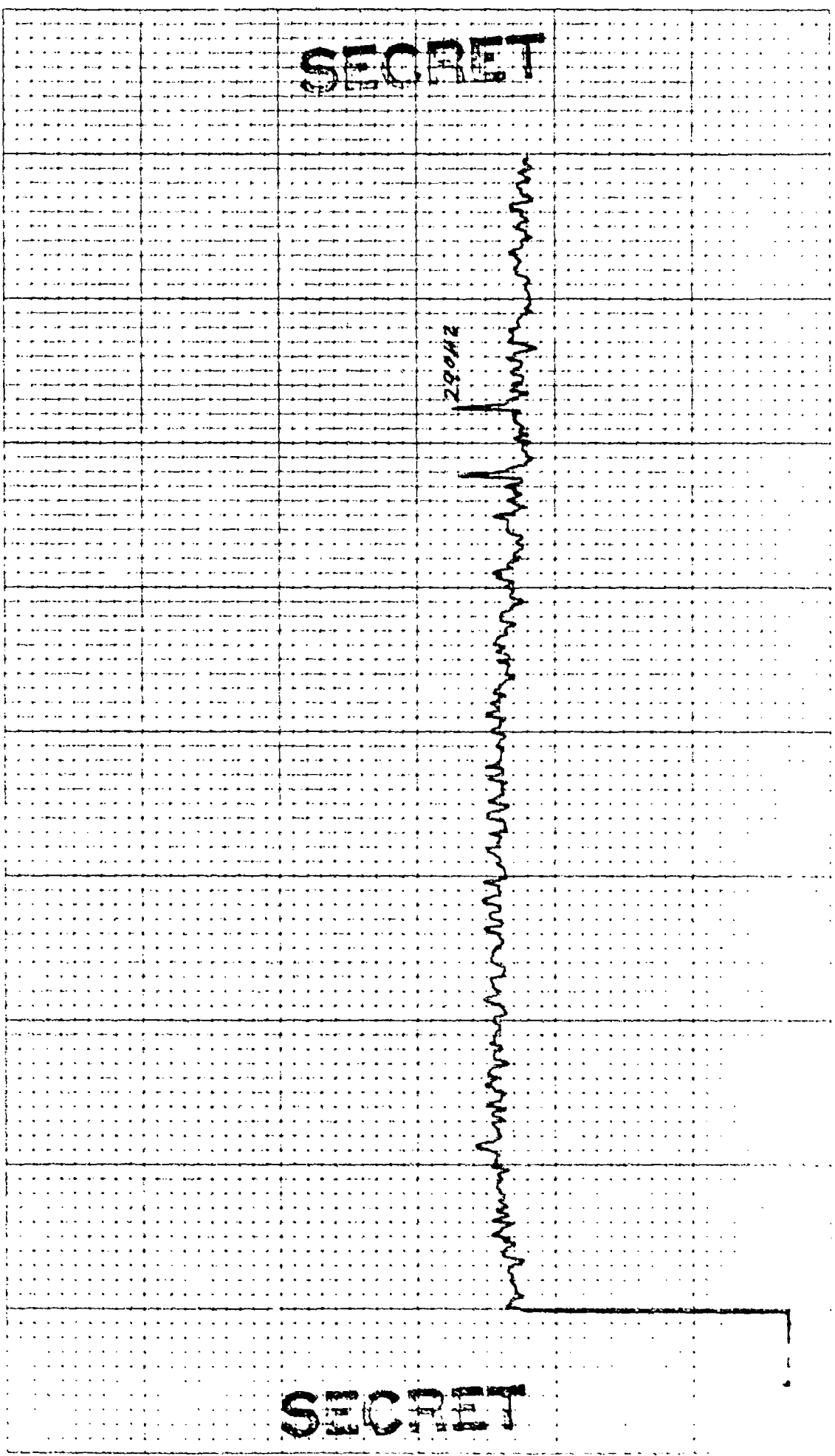
DATE/TIME: 1-19-77 - 1600 Z

ANALYSIS BANDWIDTH: 1/10HZ
-56 DEG. AZ STEERING

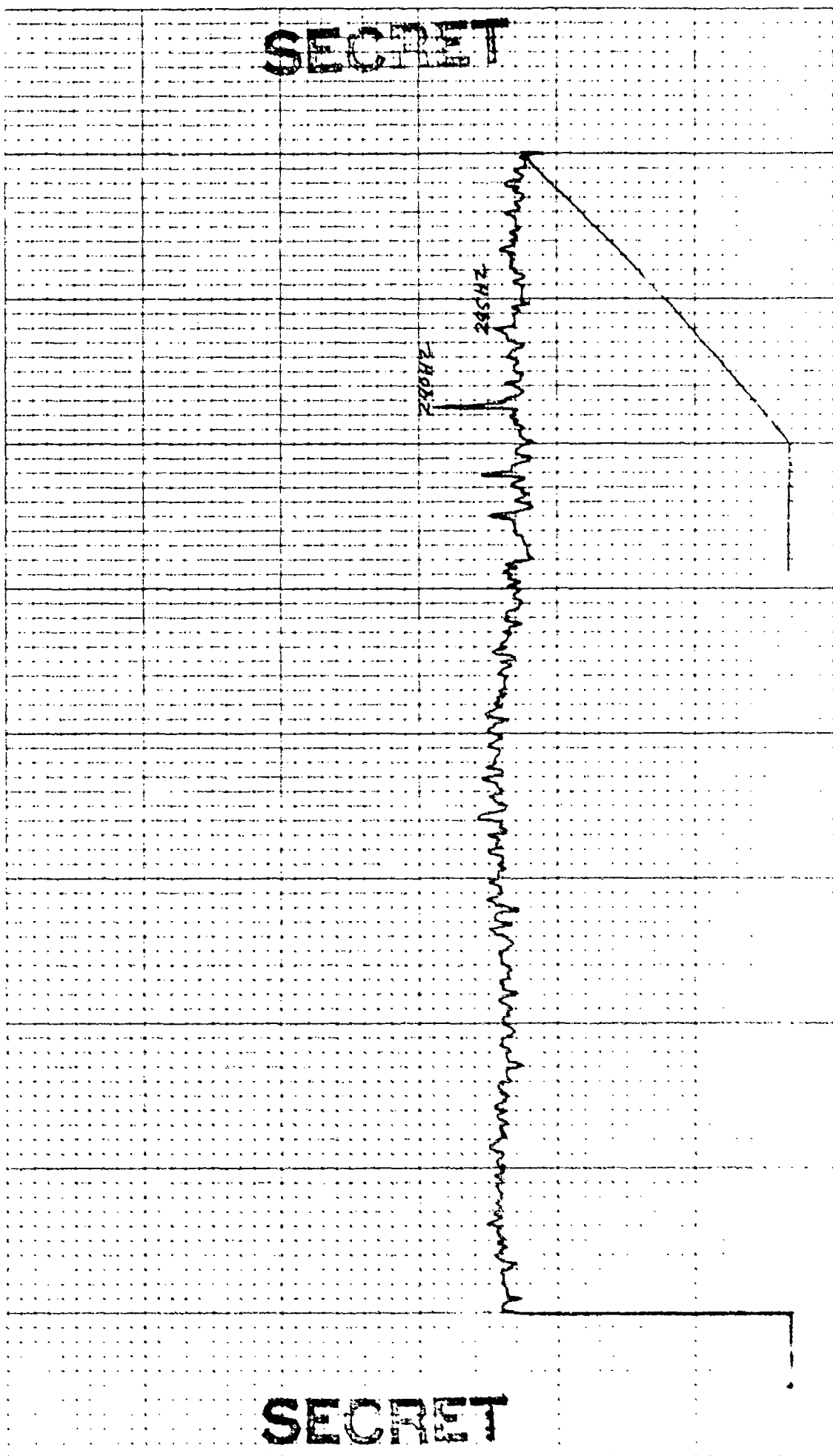
CONTROL: 1-19 - 1600 (J2)
BEAMFORMED SPECTRUM(ELEMENTS)

EXERCISE: BEARING STAKE

CENTER FREQ: 270 HZ
32 ELEMENTS



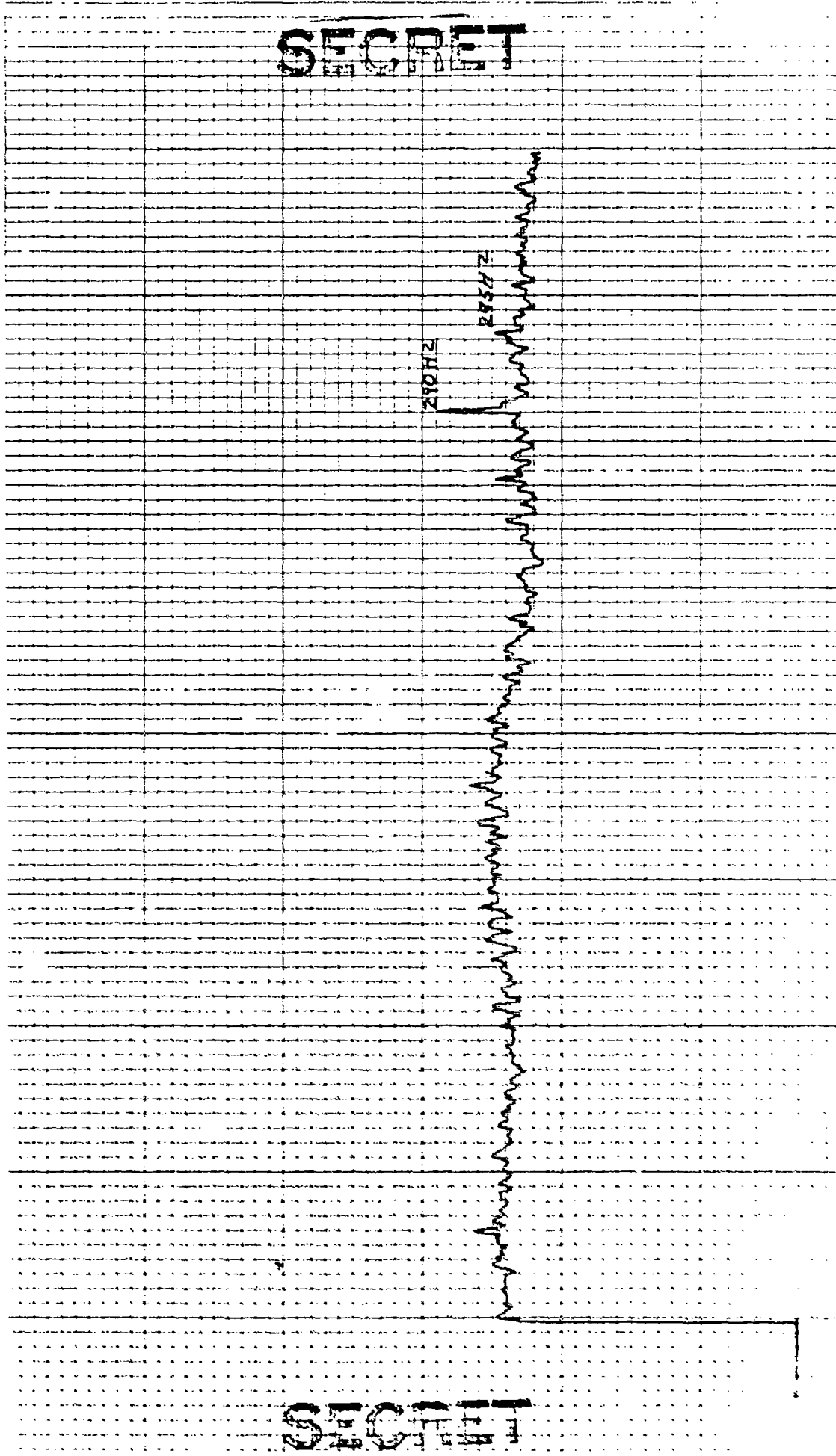
CONTROL: 1-19 - 1600 (32) REEL: C INDE X7525
 BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 16-26-49
 EXERCISE: BEARING STAKE DATE/TIME: 1-19-77 - 1600 Z INTEGRATION TIME 320 SECS ATTN: 78 DB
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
32 ELEMENTS -50 DEG. AZ STEERING



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

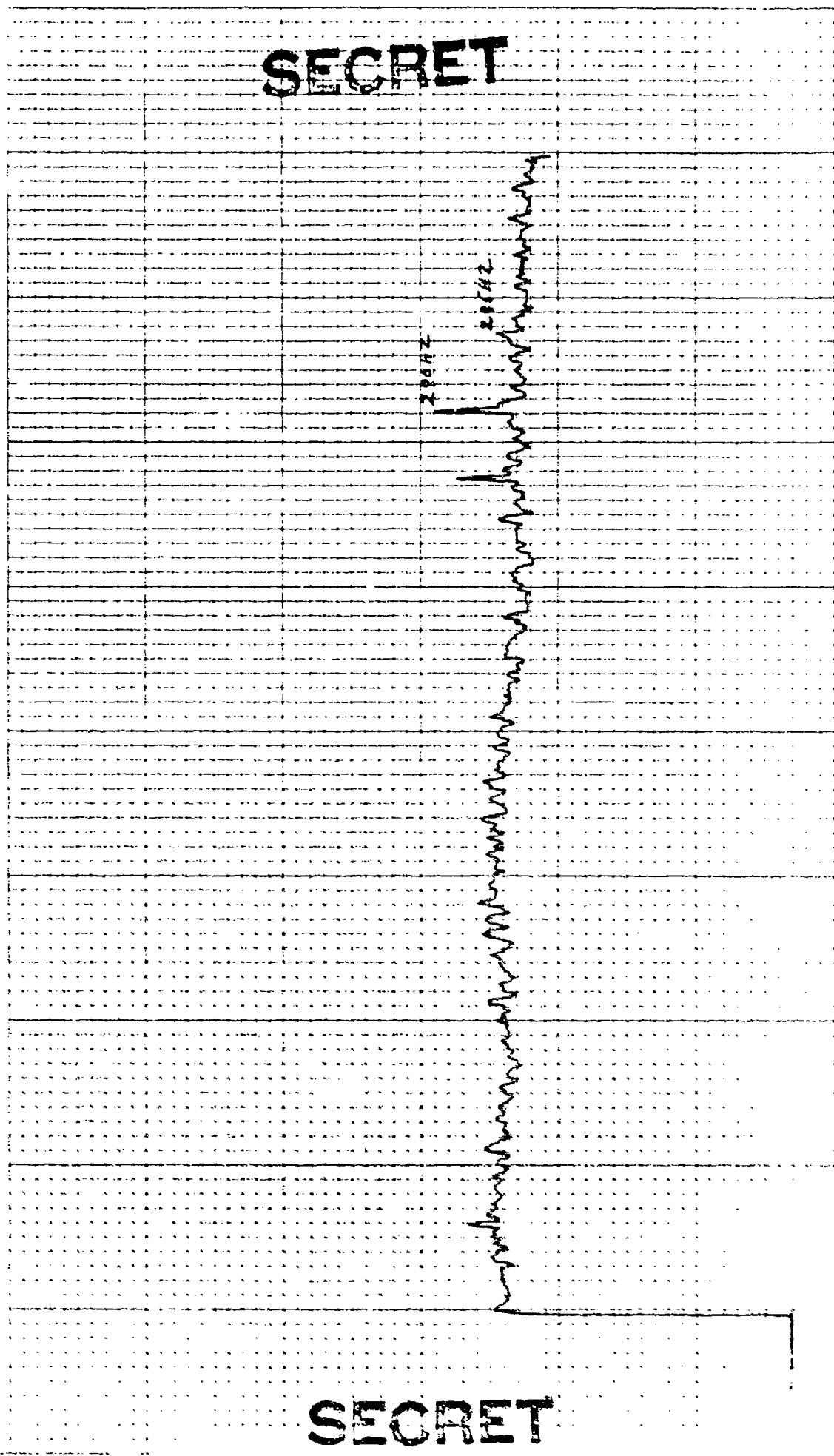
BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: 16.268 29.49

EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ

CENTER FREQ: 270 HZ -59 DEG. AZ STEERING

32 ELEMENTS FILTER WTG: HANNING

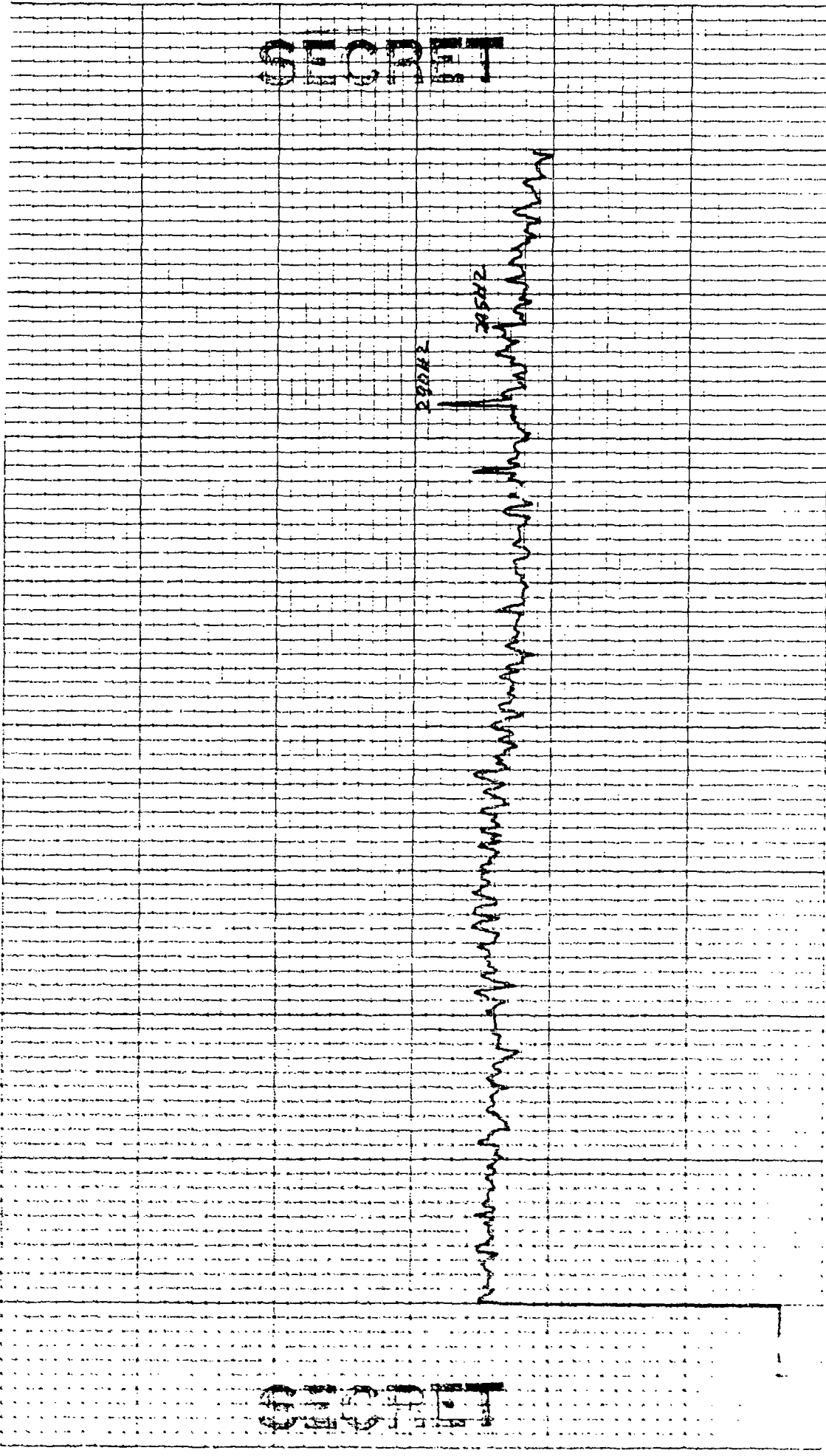
INTEGRATION TIME 320 SECS ATTN:-10 DB



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CONTROL: 1-19 -1600 (32) REEL: 6 INDE X7575
 BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: 10-28-77
 EXERCISE: BEARING STAKE DATE/TIME: 1-19-77 -1600Z INTEGRATION TIME 320 SECS ATTN: 1/8 DB
 CENTER FREQ: 2970 HZ ANALYSIS BANDWIDTH: 1710HZ FILTER WTG: HANNING
32 ELEMENTS -60 DEG. AZ STEERING



SECRET

SECRET

REEL: 6 INDE X7575

DATE OF ANALYSIS: - - -

16-20-49

DATE/TIME: 7-10-77 - 1600 Z

ANALYSIS BANDWIDTH: 1/10HZ

-02 DEG. AZ STEERING

CONTROL: 1-14 -100 (32)

BEAMFORMED SPECTRUM(ELEMENTS)

EXERCISE: BEARING STAKE

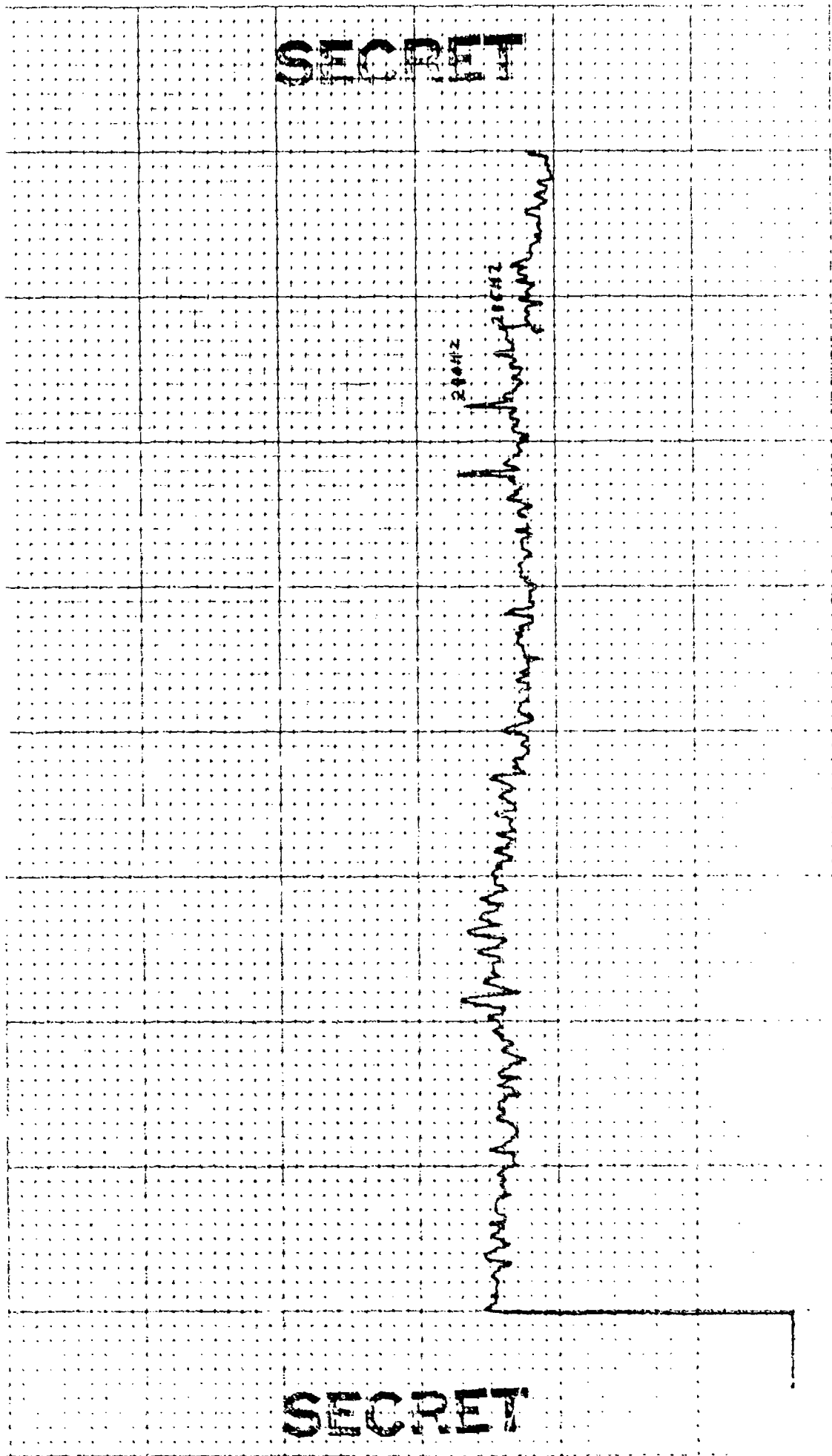
CENTER FREQ: 270 HZ

32 ELEMENTS

INTEGRATION TIME 320 SECS

FILTER WTC: HANNING

ATTEN: -18 DB



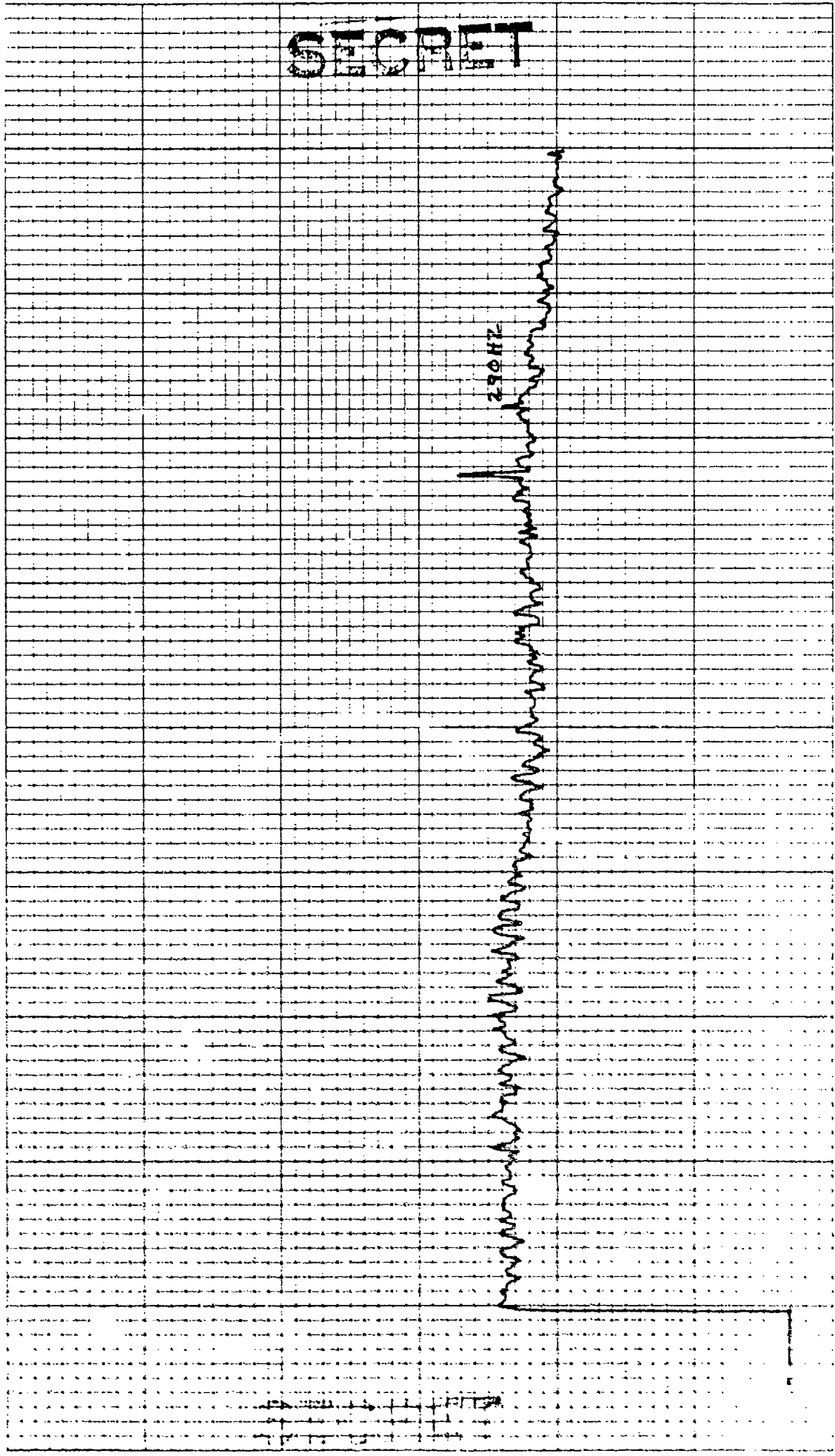
CONTROL: 149 -1600 (32)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
 32 ELEMENTS

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



4 '03

CONTROL: 1-19 -1600 (JZ) REEL: 6 INDE X2575

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

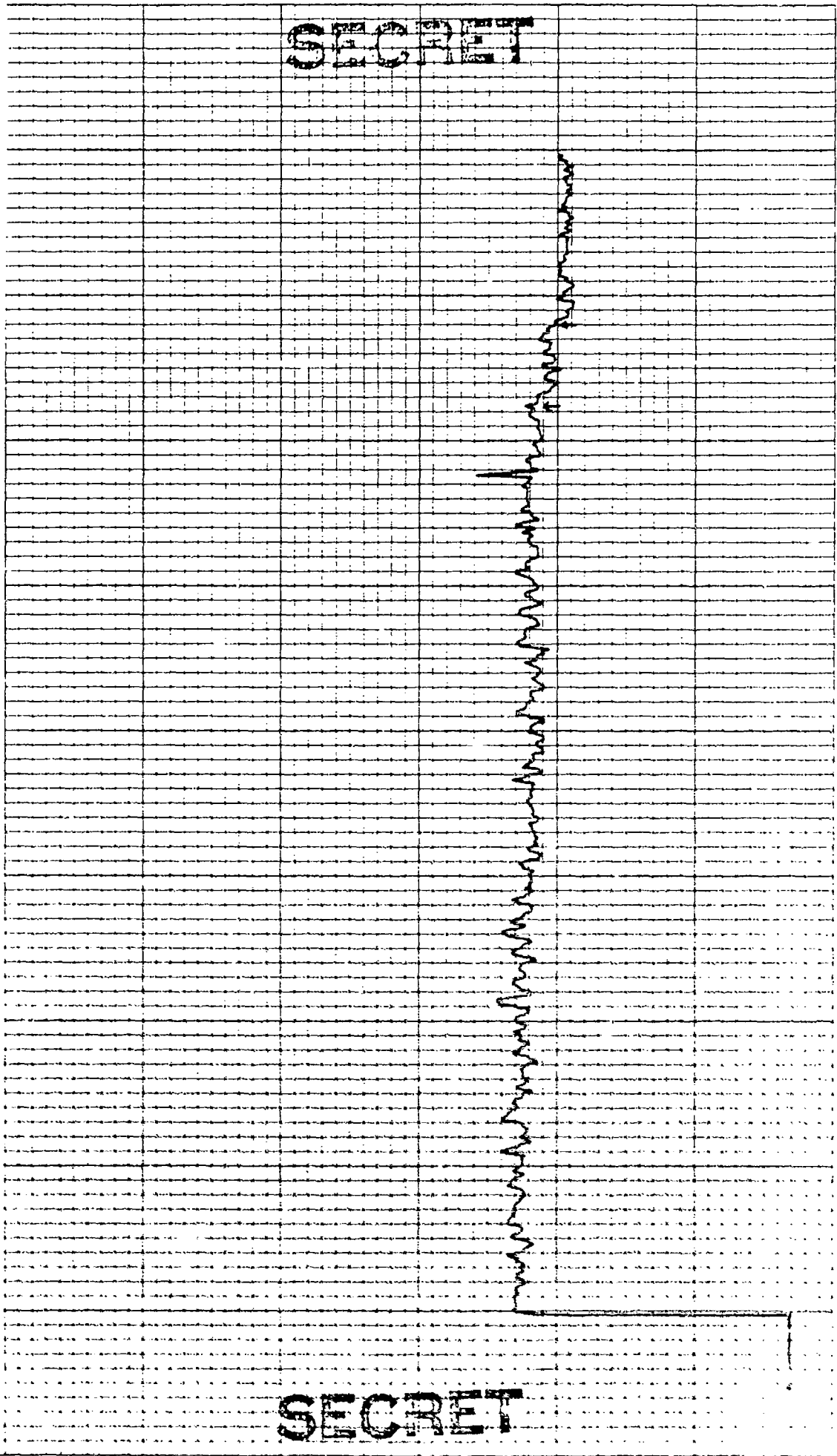
EXERCISE: BEARING STAKE /6-26 + 29-49)

CENTER FRQ: 270 HZ DATE/TIME: 1-15-77 -1600 Z

32 ELEMENTS ANALYSIS BANDWIDTH: 1/10HZ

-66 DEG. AZ STEERING FILTER WTG: HANNING

INTEGRATION TIME 320 SECS ATTN: 7/ DB



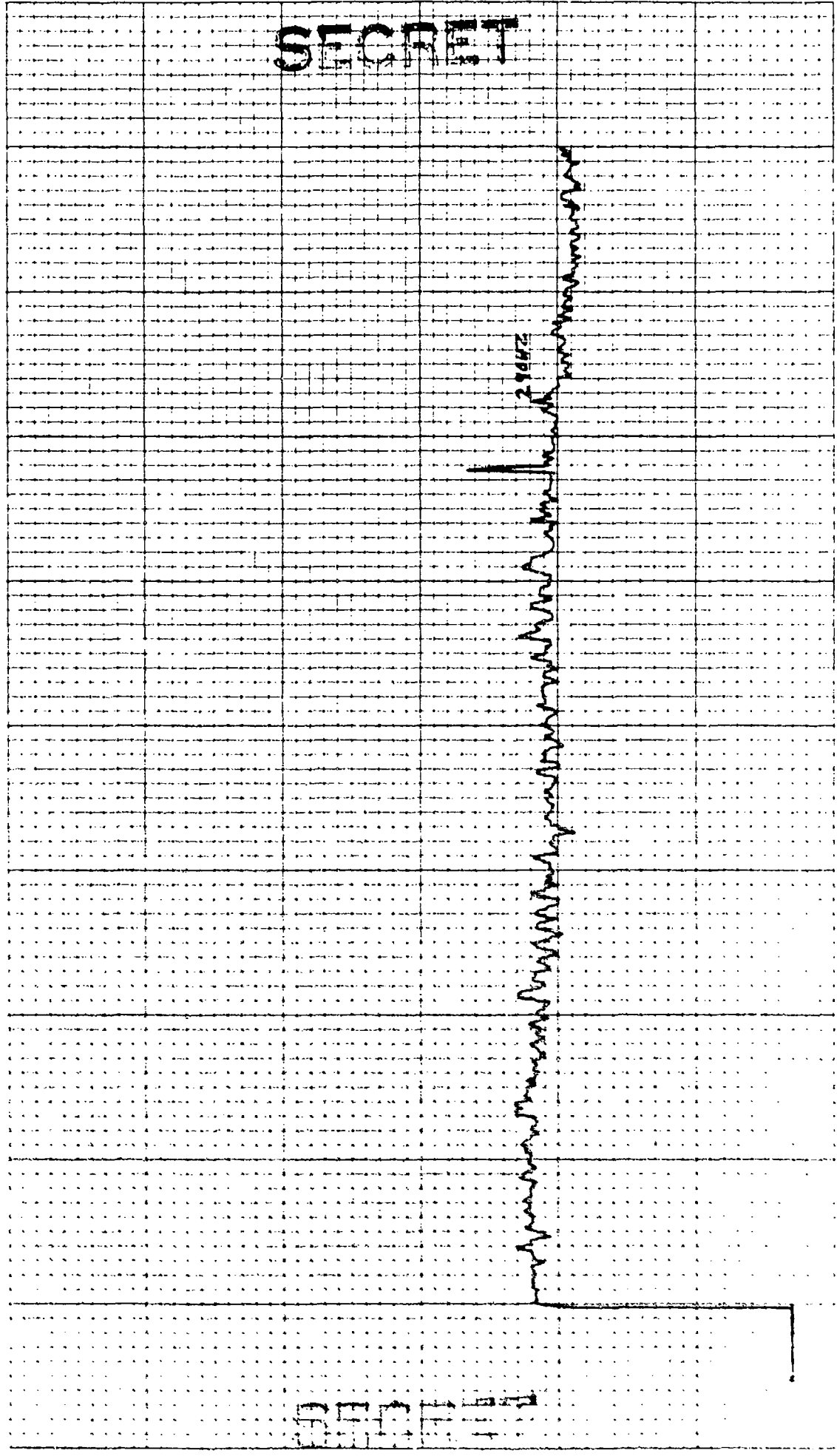
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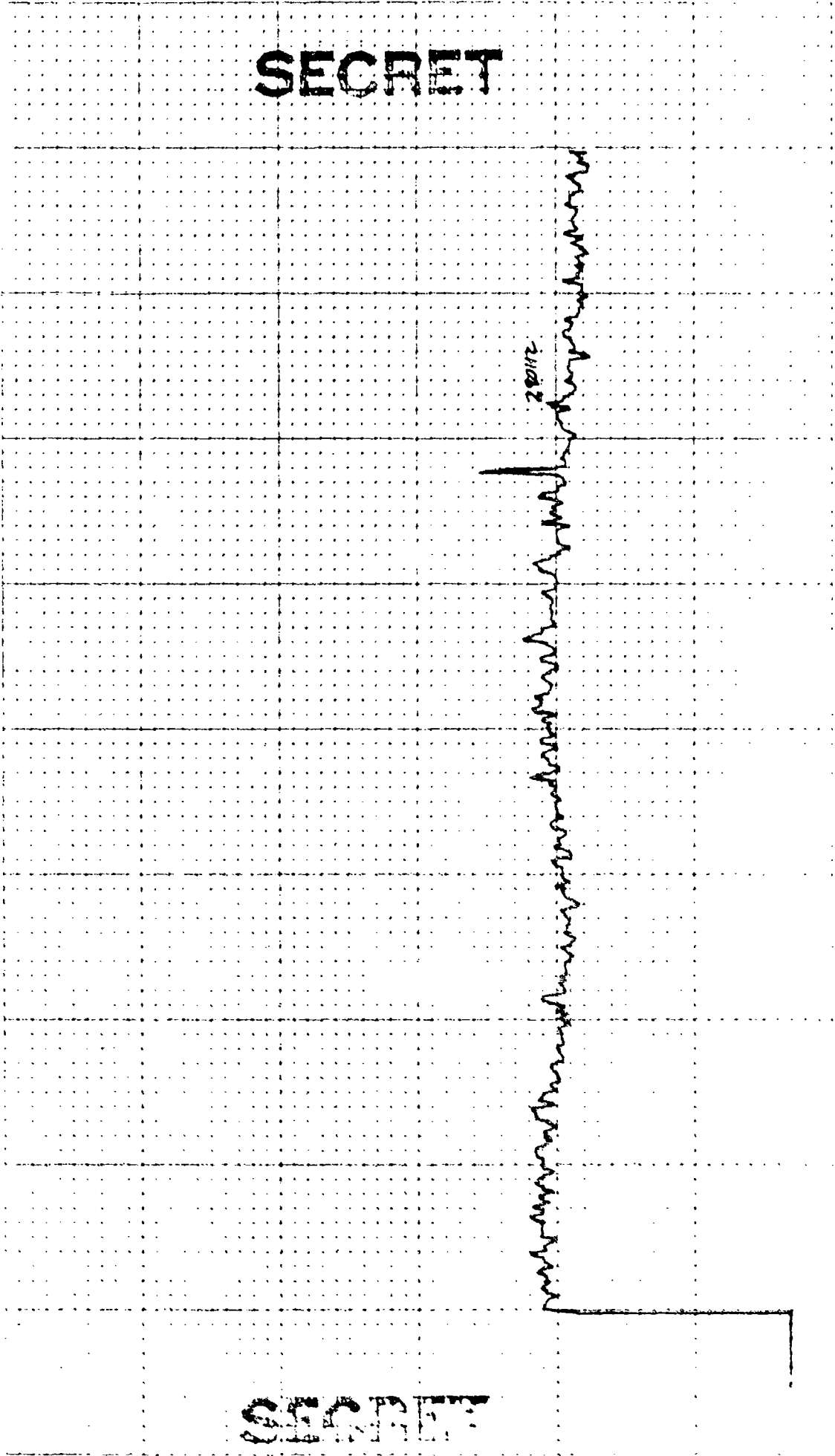
CONTROL: 1-19 -1600 (J2) REEL: 6 INDE X7575
BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: 16-26-49
EXERCISE: BEARING STAKE DATE/TIME: 1-19-77 - 1600 Z INTEGRATION TIME 320 SECS ATTN: -10 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
32 ELEMENTS -60 DEG. AZ STEERING



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
 INDE X2575
 INTEGRATION TIME 320 SECS
 FILTER WTC: HANNING
 ATTN:-10 DB



SECRET

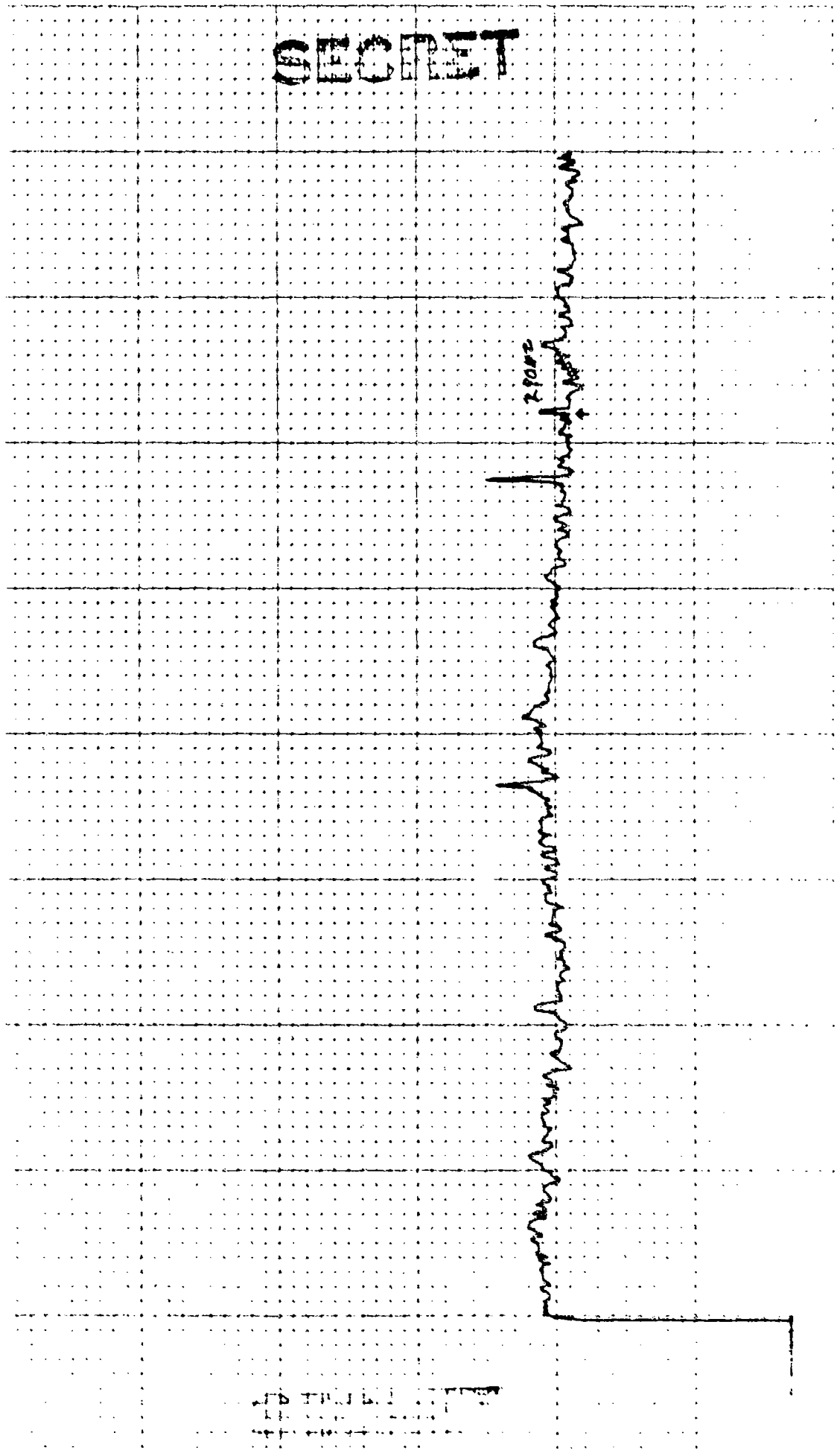
SECRET

REEL: 6 INDE X7775

DATE OF ANALYSIS: 16-20-77
DATE/TIME: 1-11-77 - 1600 Z
ANALYSIS BANDWIDTH: 1/10HZ
-72 DEG. AZ STEERING

CONTROL: 1-11 -1600 (32)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

INTEGRATION TIME 320 SECS
FILTER WTC: HANNING



SECRET

2-10-77

1 1 1 1 1 1 1 1 1 1

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

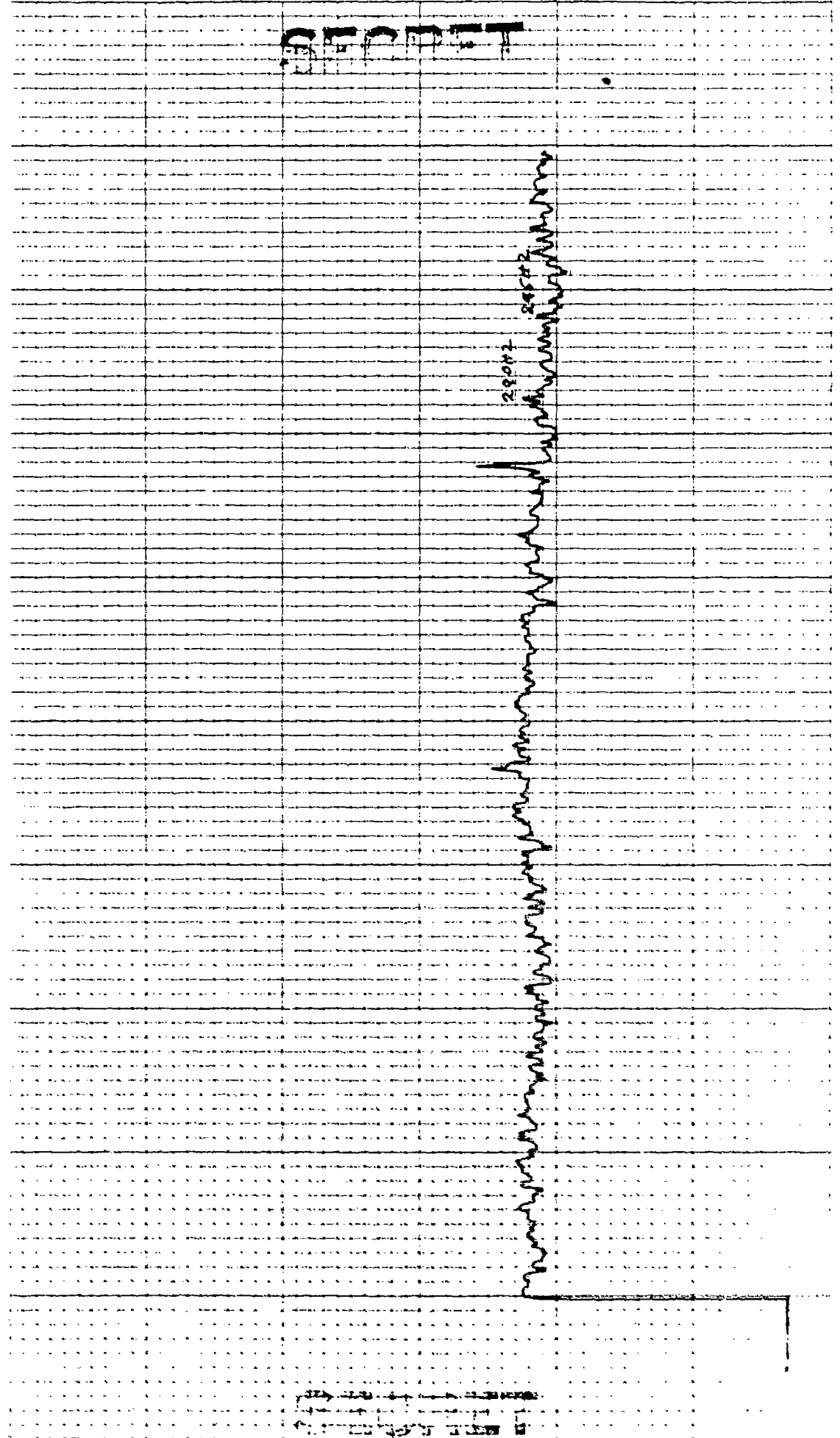
BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: - - -

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

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

32 ELEMENTS - 74 DEG. AZ STEERING FILTER WTG: HANNING

INTEGRATION TIME 320 SECS ATTN: -10 DB



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 .031 HZ BAND
BANDWIDTH CONVERSION -13.2 -2.1 SNR 1 HZ BAND

SECTION 9

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

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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

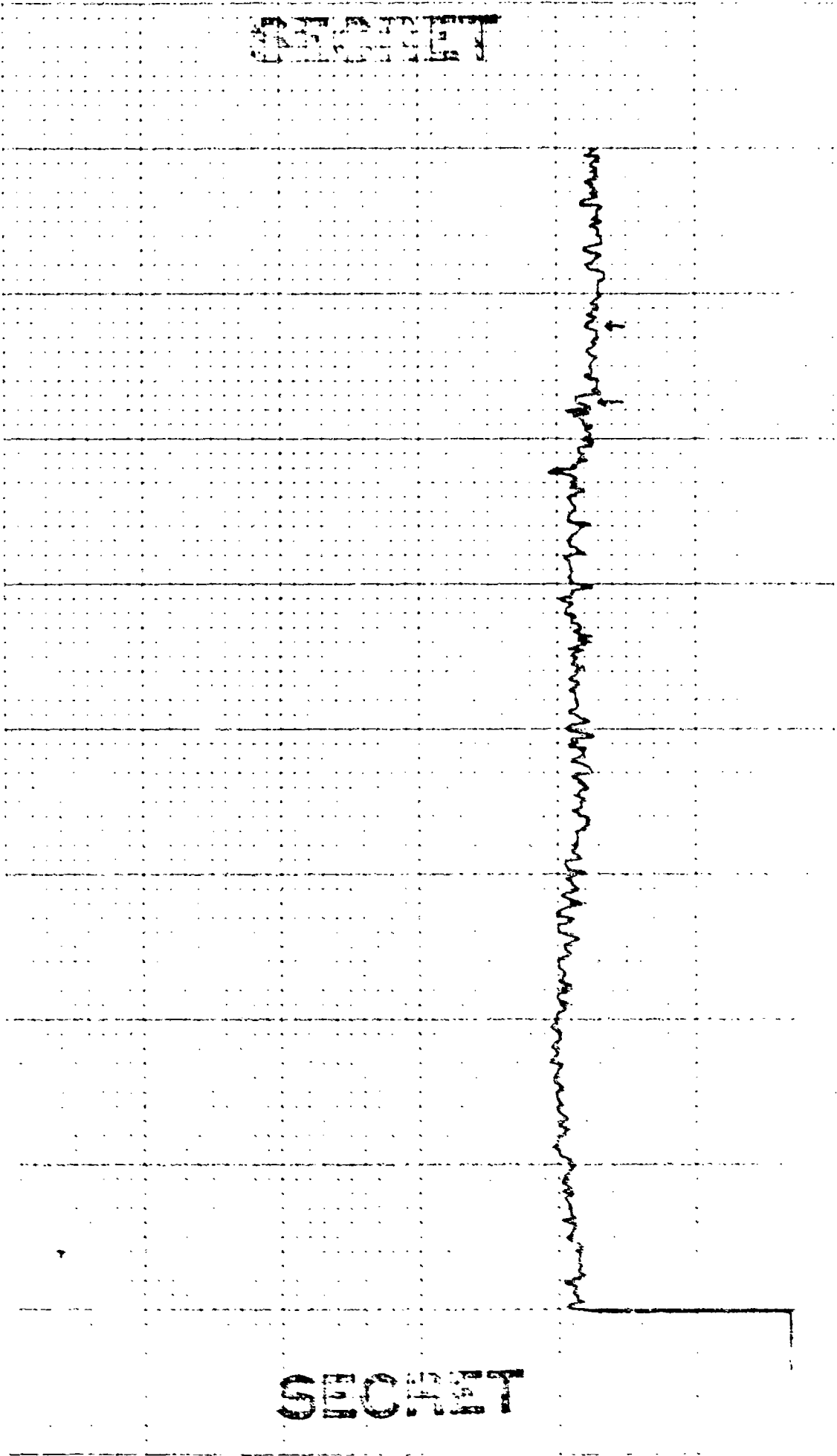
MRA SNR	_____	<u>11.1</u>	<u>3.2</u>
MEAN OMNI SNR	_____	<u>- .2</u>	<u>- .7</u>
ARRAY GAIN	_____	<u>11.3</u>	<u>3.9</u>
THEORETICAL AZMUTH GAIN (at MRA)	_____	<u>15.4</u>	<u>15.5</u>
DIFFERENCE	_____	<u>- 4.1</u>	<u>- 11.6</u>

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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: 1-18-77 - 1600 Z
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ
 50 ELEMENTS 46 DEG. AZ STEERING

REEL: 6 INTEGRATION TIME 320 SECS
 FILTER WTC: HANNING
 INDE X 7575



SECRET

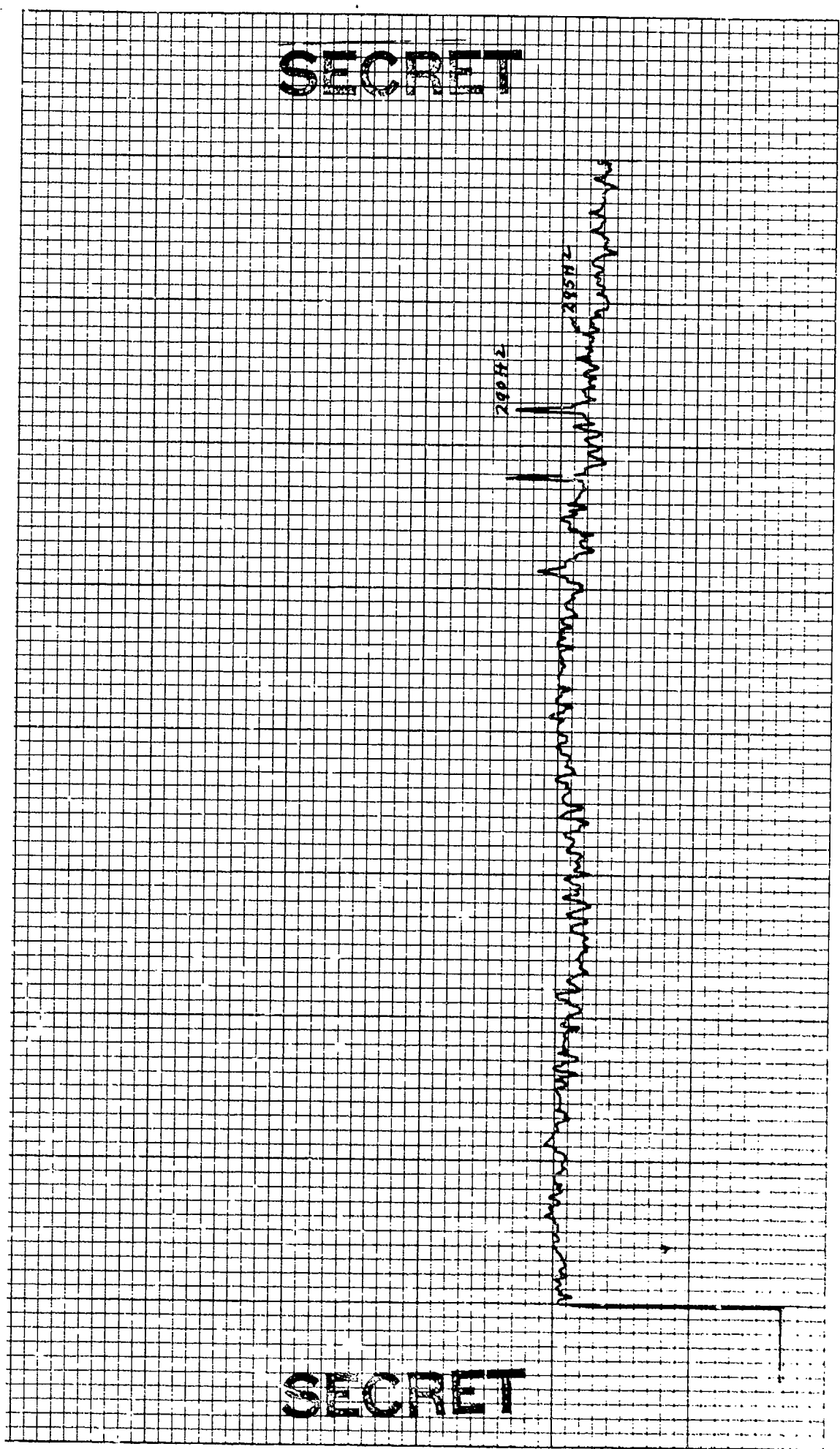
SECRET

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

DATE OF ANALYSIS: - - - - -
 1-14-76-264 21-53)
 DATE/TIME: 1-19-77 -1600 Z
 ANALYSIS BANDWIDTH: 1710HZ
 -48 DEG. AZ STEERING

REEL: 6
 INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

INDE X 7575



SECRET

SECRET

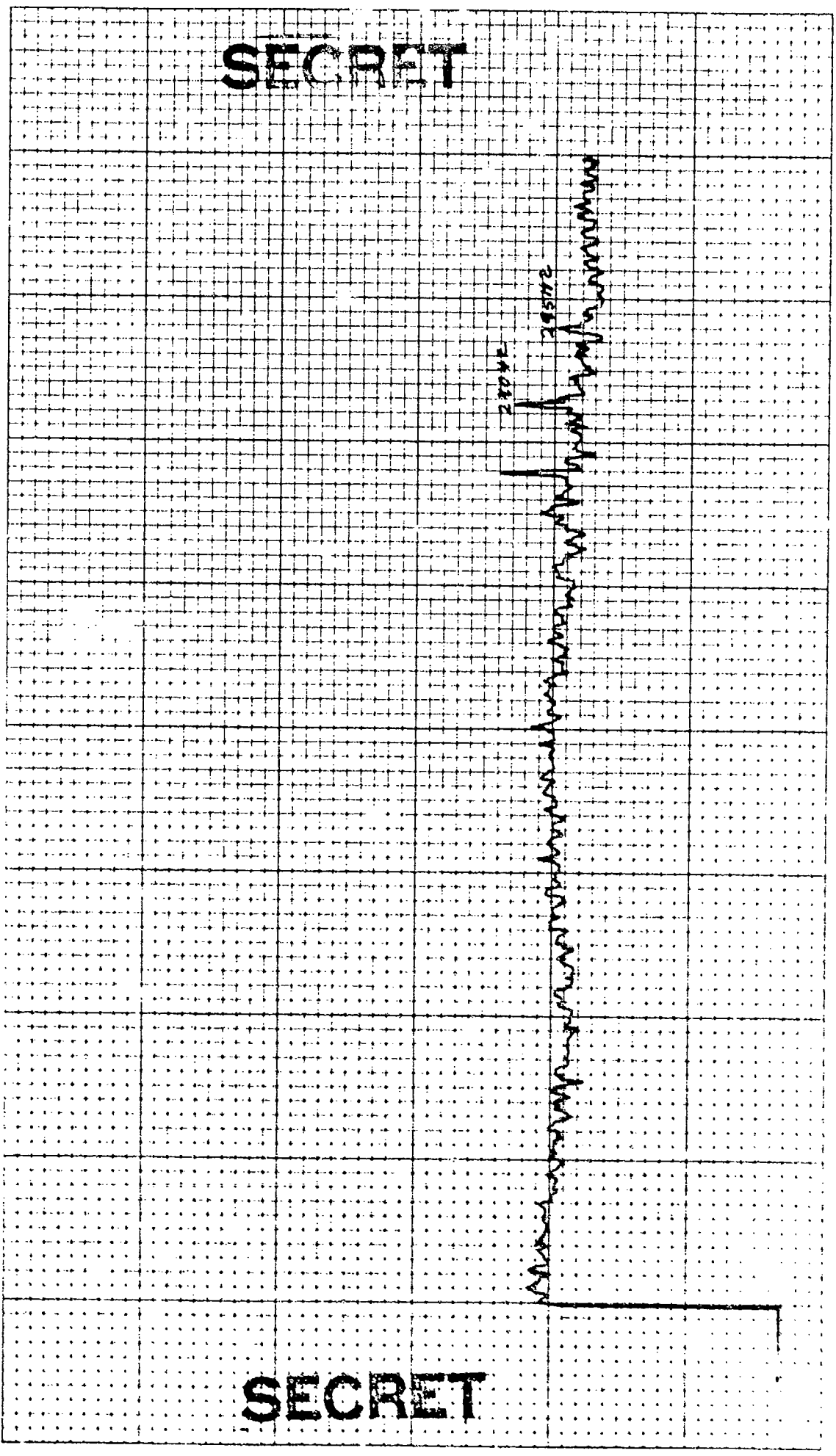
CONTROL: 149-1600 (50) DATE OF ANALYSIS: 1-14-77 REEL: 6 INDE X7575

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

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

CENTER FREQ: 276 HZ -50 DEG. AZ STEERING

50 ELEMENTS



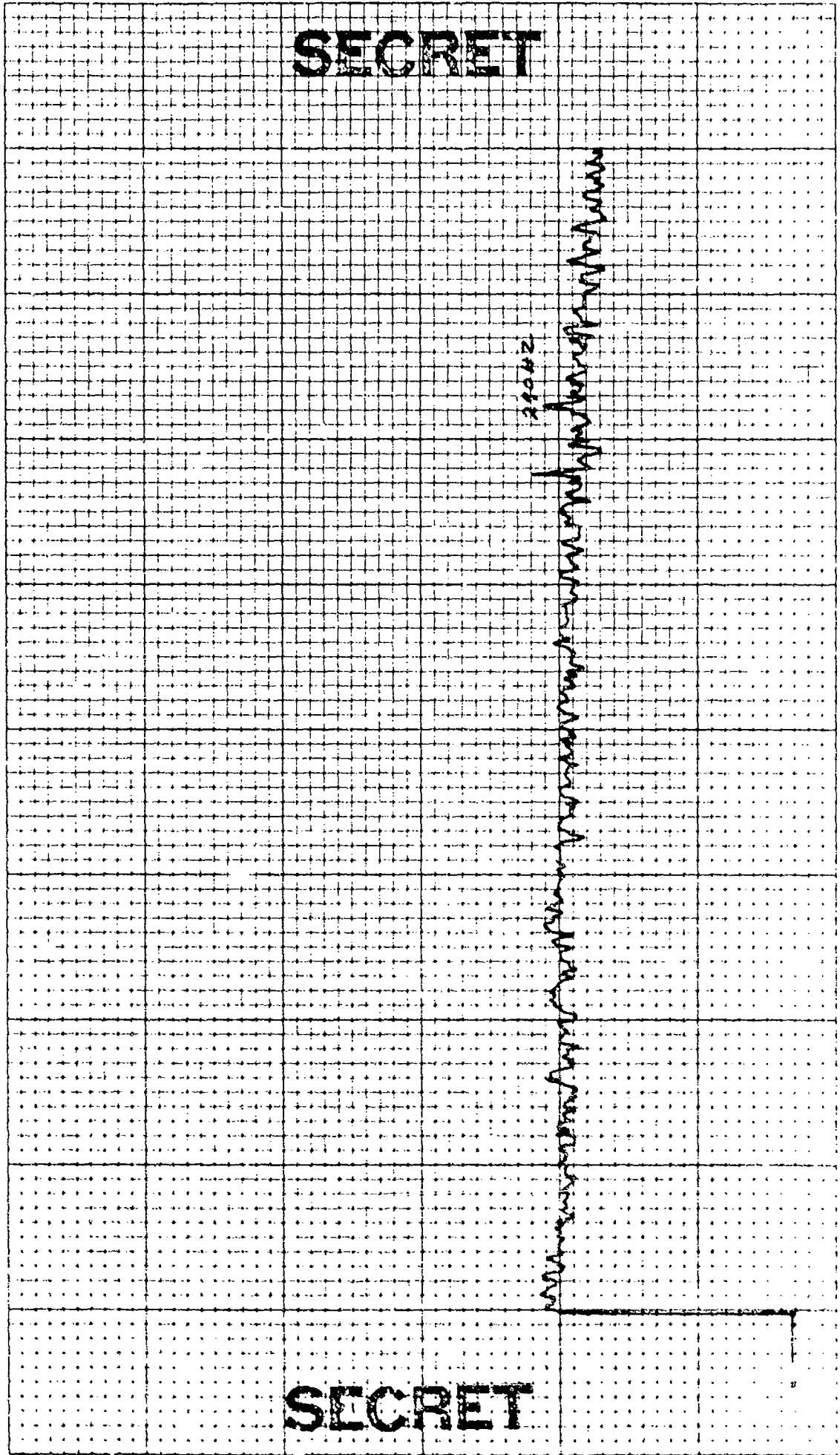
CONTROL: /-14 -100 (50) DATE OF ANALYSIS: - - -

BEAMFORMED SPECTRUM(ELEMENTS) /-14 16-26 29-53)

EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS REEL: 6 INDE X7675

CENTER FREQ: 270 HZ FILTER WTG: HANNING

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



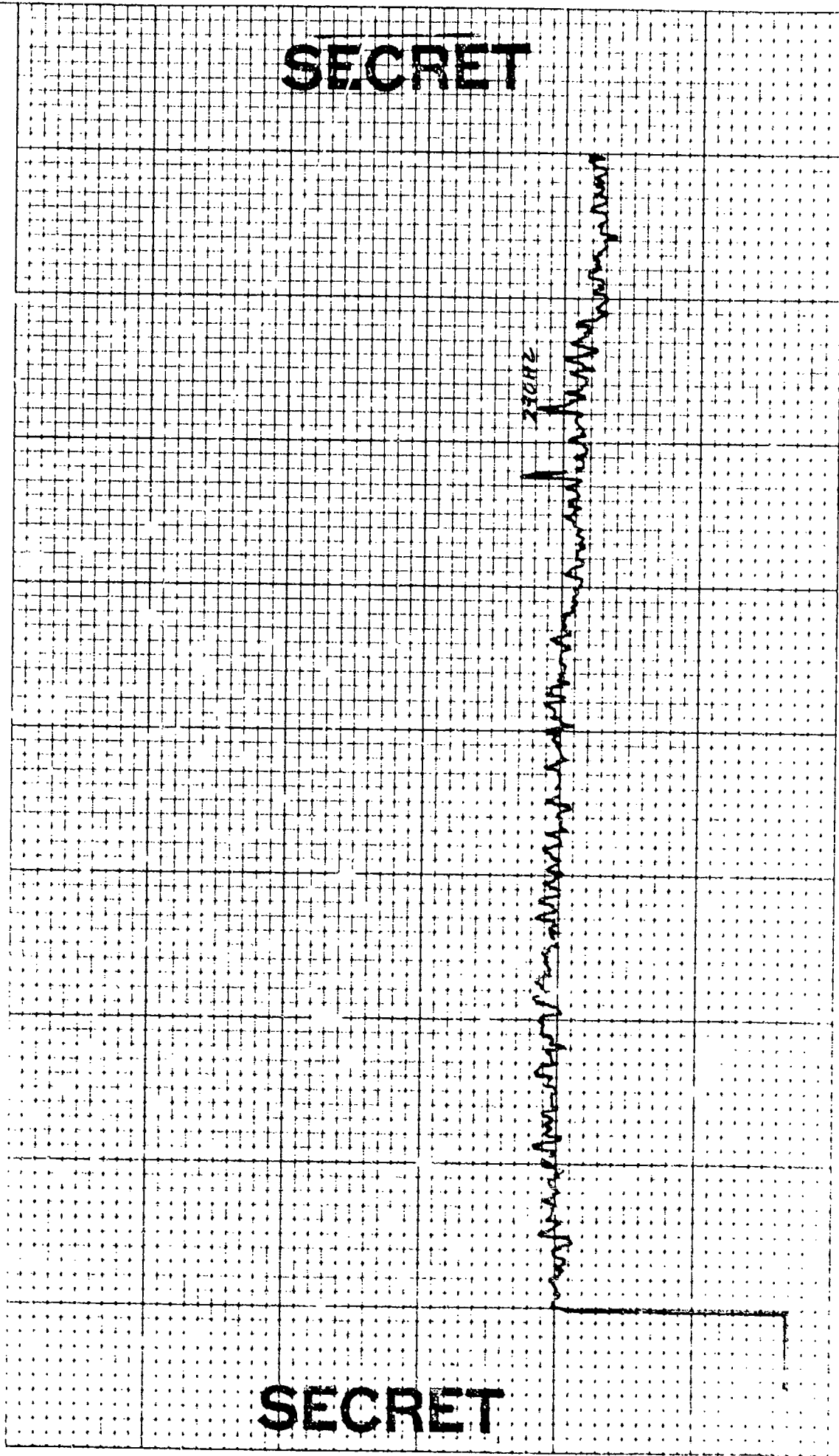
4-515

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: 1/10HZ
 -54 DEG. AZ STEERING

REEL: 6
 INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

INDE X7575
 ATTN: -2Y DB



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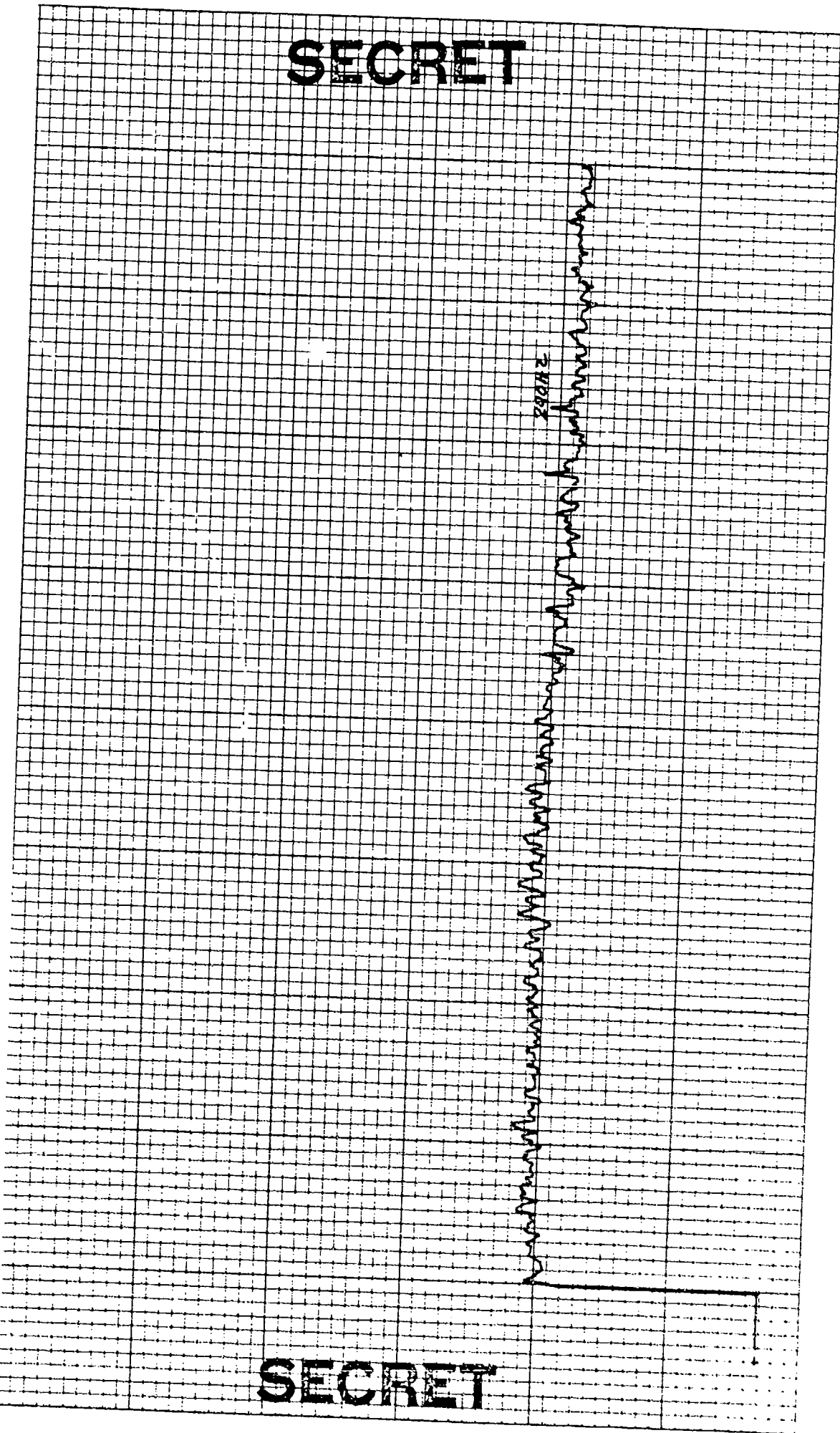
3-506

CONTROL: 1-19 - 1600 (50)
 BEAMFORMED SPECTRUM (ELEMENTS 1-14 & 16-26 & 29-53)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
 50 ELEMENTS

DATE OF ANALYSIS: ---
 DATE/TIME: 1-18-77 - 1600 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 -56 DEC. AZ STEERING

REEL: 6
 INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

INDE X 2575
 ATTN: -2YDB



290HZ

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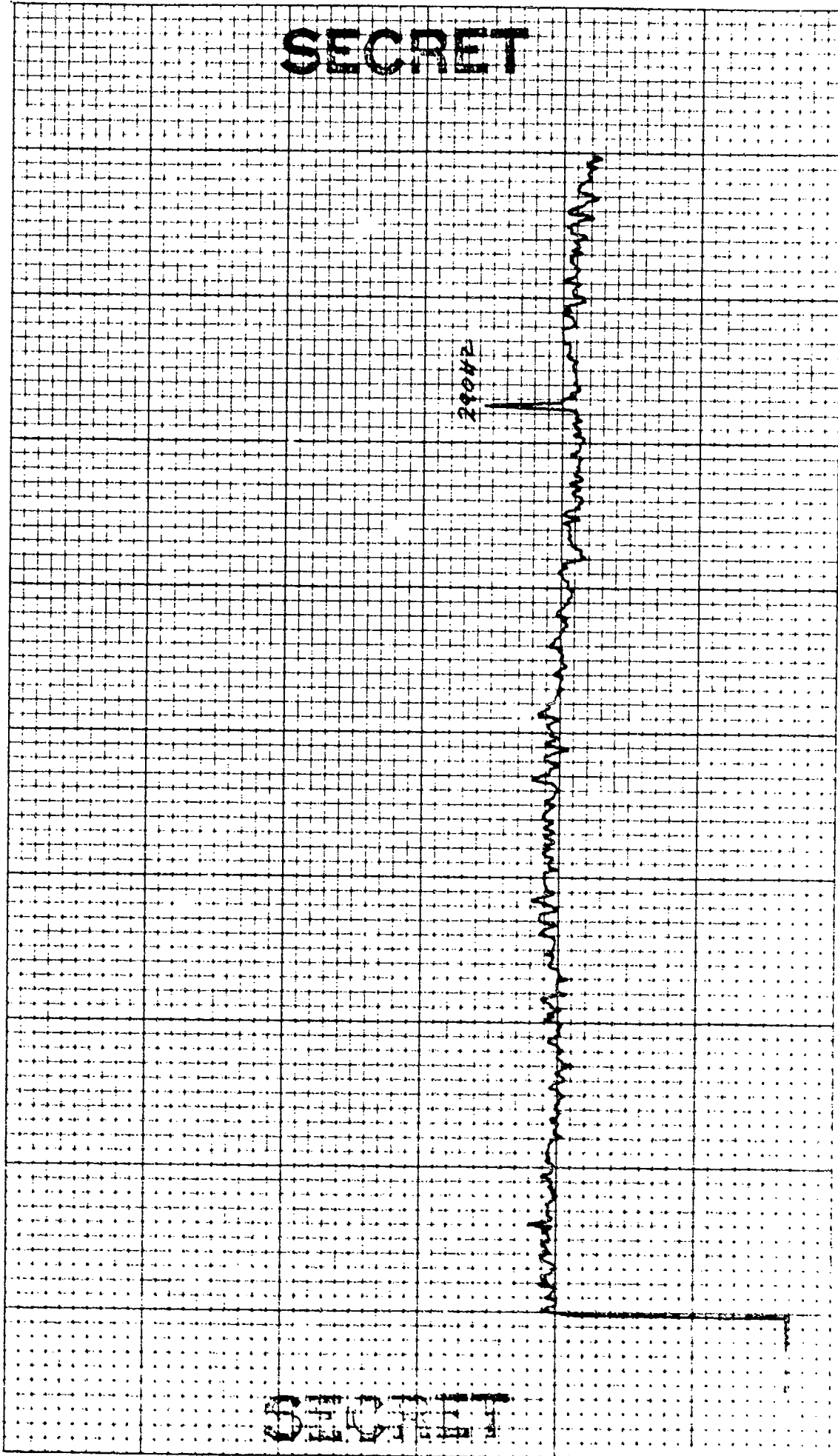
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6-506

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

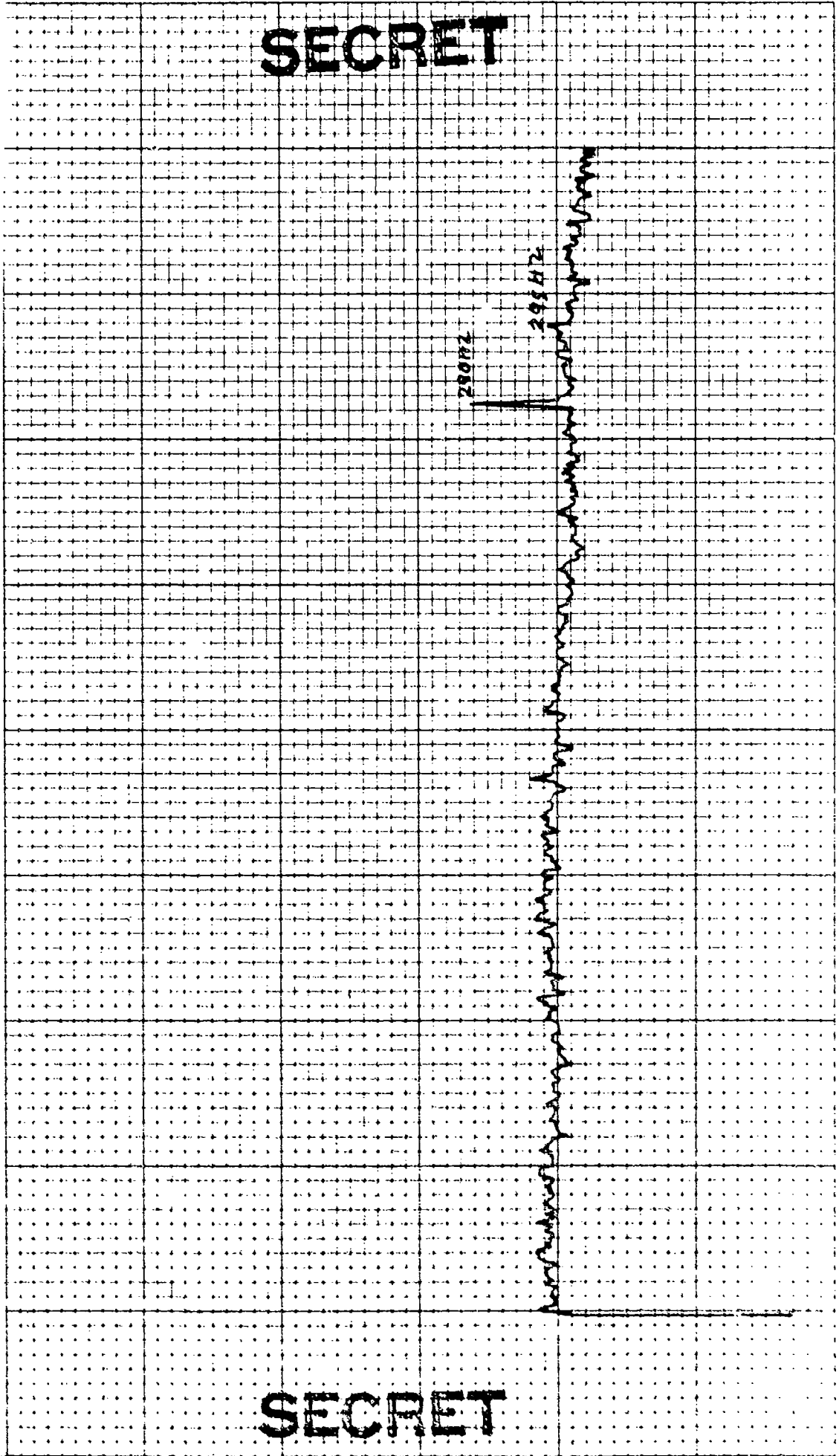


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14-526

CONTROL: 1-19 - 1600 (50) DATE OF ANALYSIS: REEL: 6 INDE X 7575
BEAMFORMED SPECTRUM(ELEMENTS 1-144/16-264 29-53)
EXERCISE: BEARING STAKE DATE/TIME: 1-18-77 - 1600Z INTEGRATION TIME 320 SECS ATTN: 24 DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1710HZ FILTER WTG: HANNING
50 ELEMENTS -59 DEG. AZ STEERING



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1-506

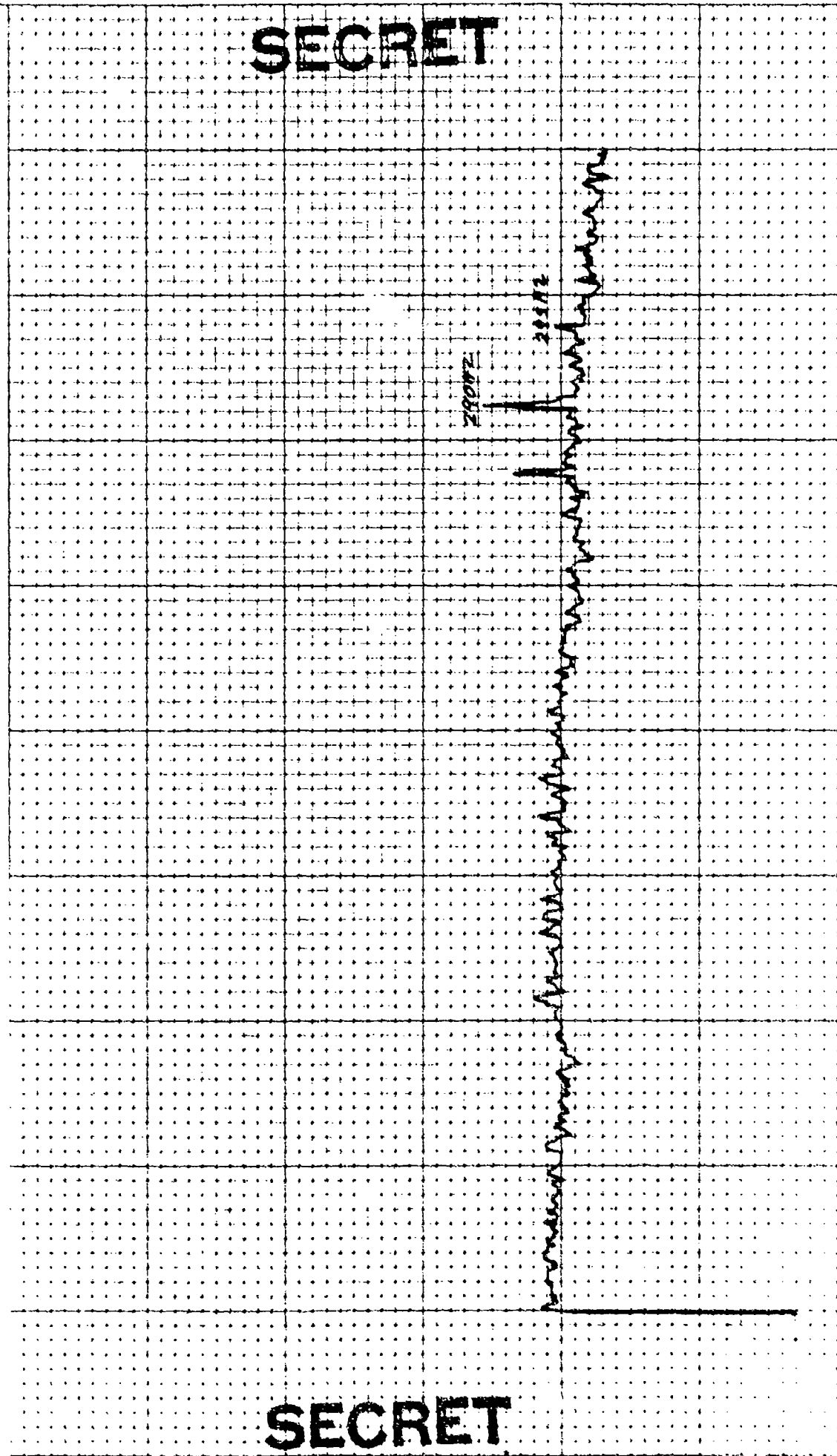
CONTROL: 1-19 -1600 (50)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
 50 ELEMENTS

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



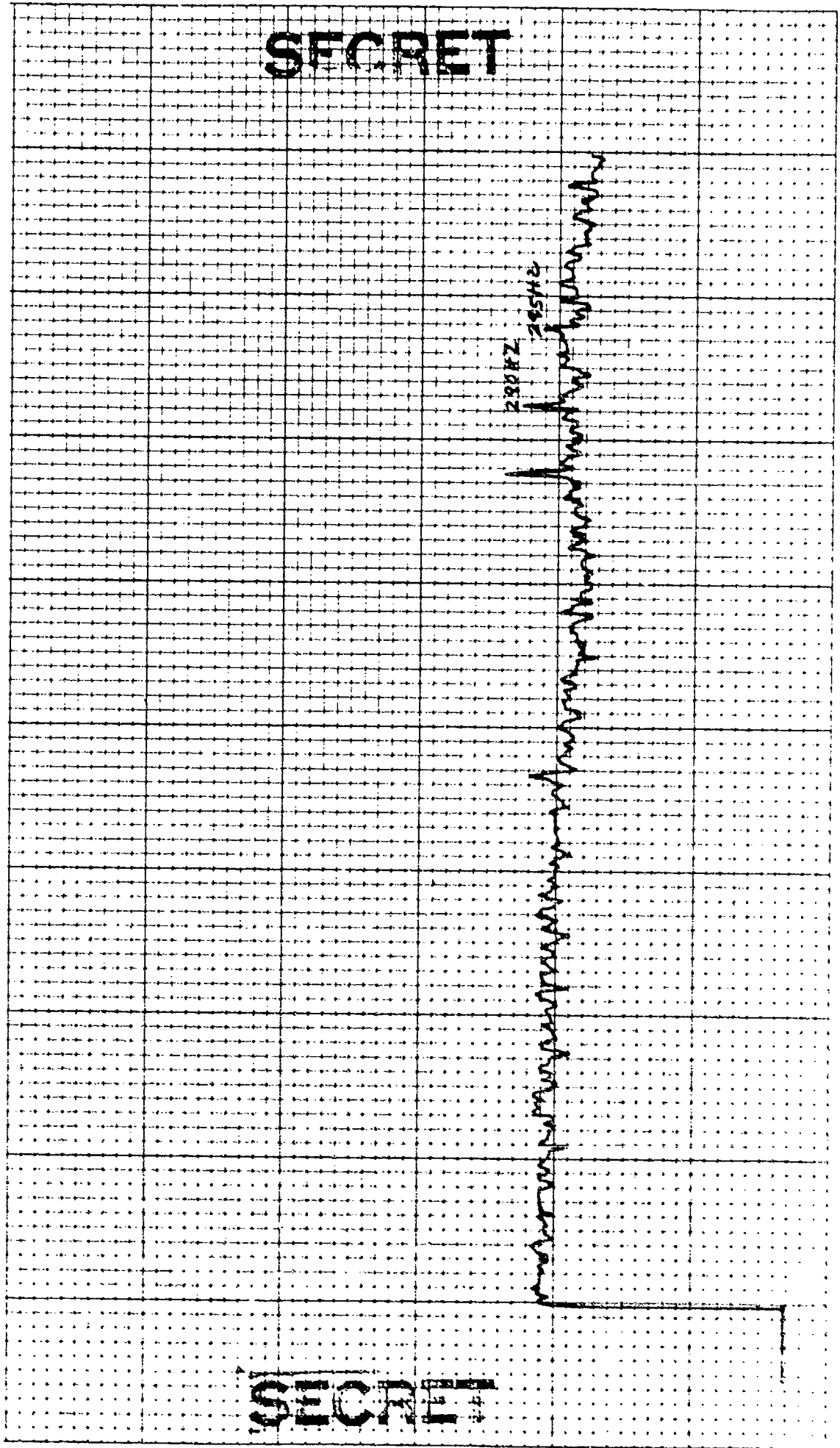
SECRET

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

DATE OF ANALYSIS: - - - - -
 1-14-76 16-26-53)
 DATE/TIME: 1-17-77 - 1600 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 -6λ DEG. AZ STEERING

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



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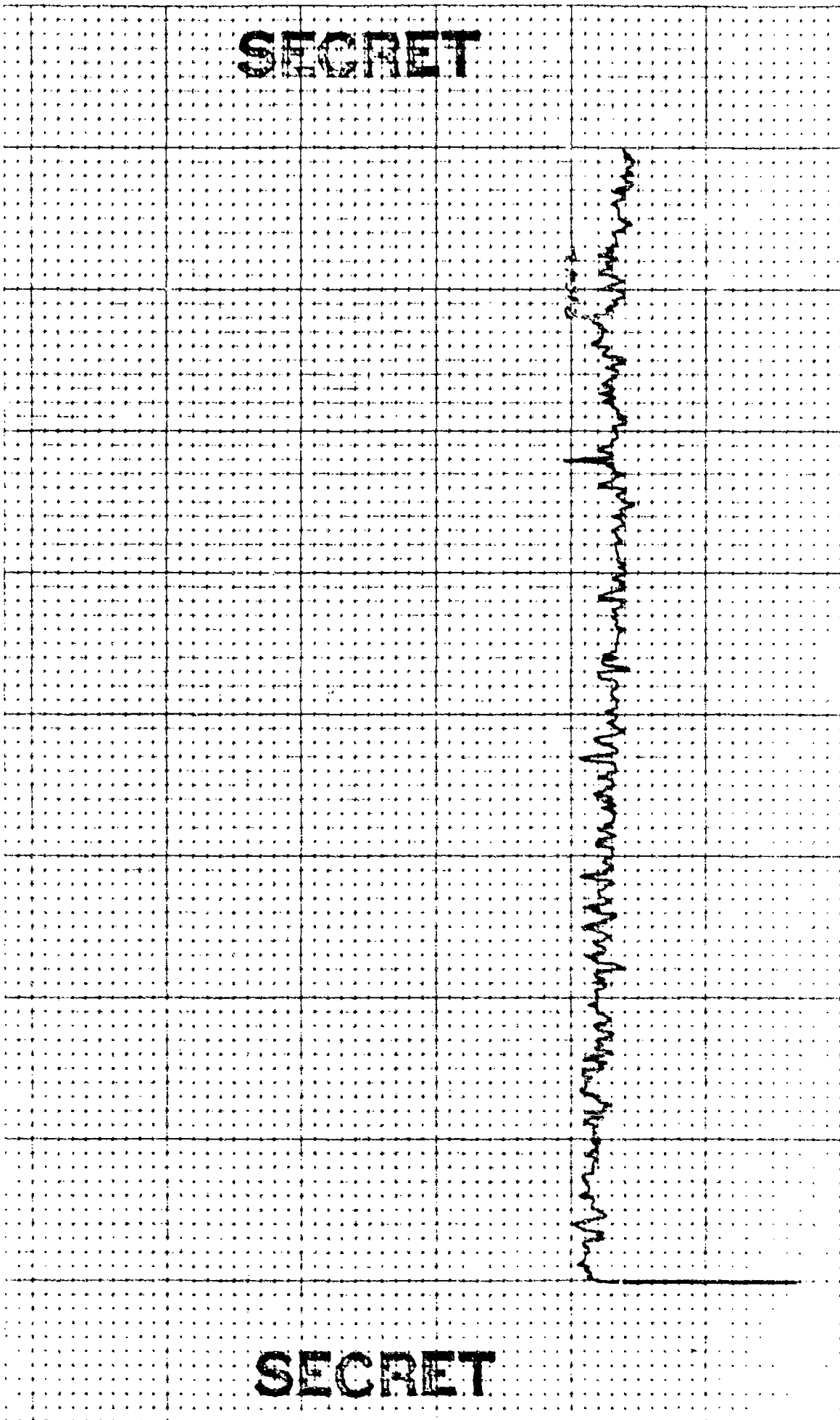
230 HZ 295 HZ

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: _____
EXERCISE: BEARING STAKE DATE/TIME: 1-14-76-20-29-53 INTEGRATION TIME 320 SECS ATTN: -2Y DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
50 ELEMENTS -66 DEC. AZ STEERING

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[Handwritten scribble]
280 HZ
[Handwritten scribble]

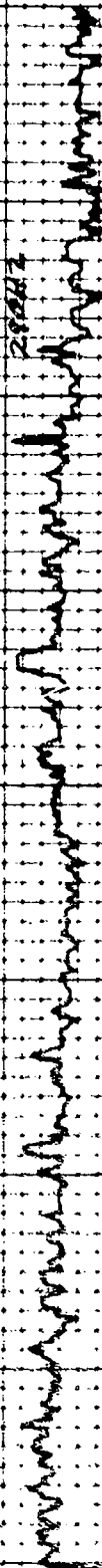
SECRET

CONTROL: 119 -1600 (50)
BEAMFORMED SPECTRUM (ELEMENTS
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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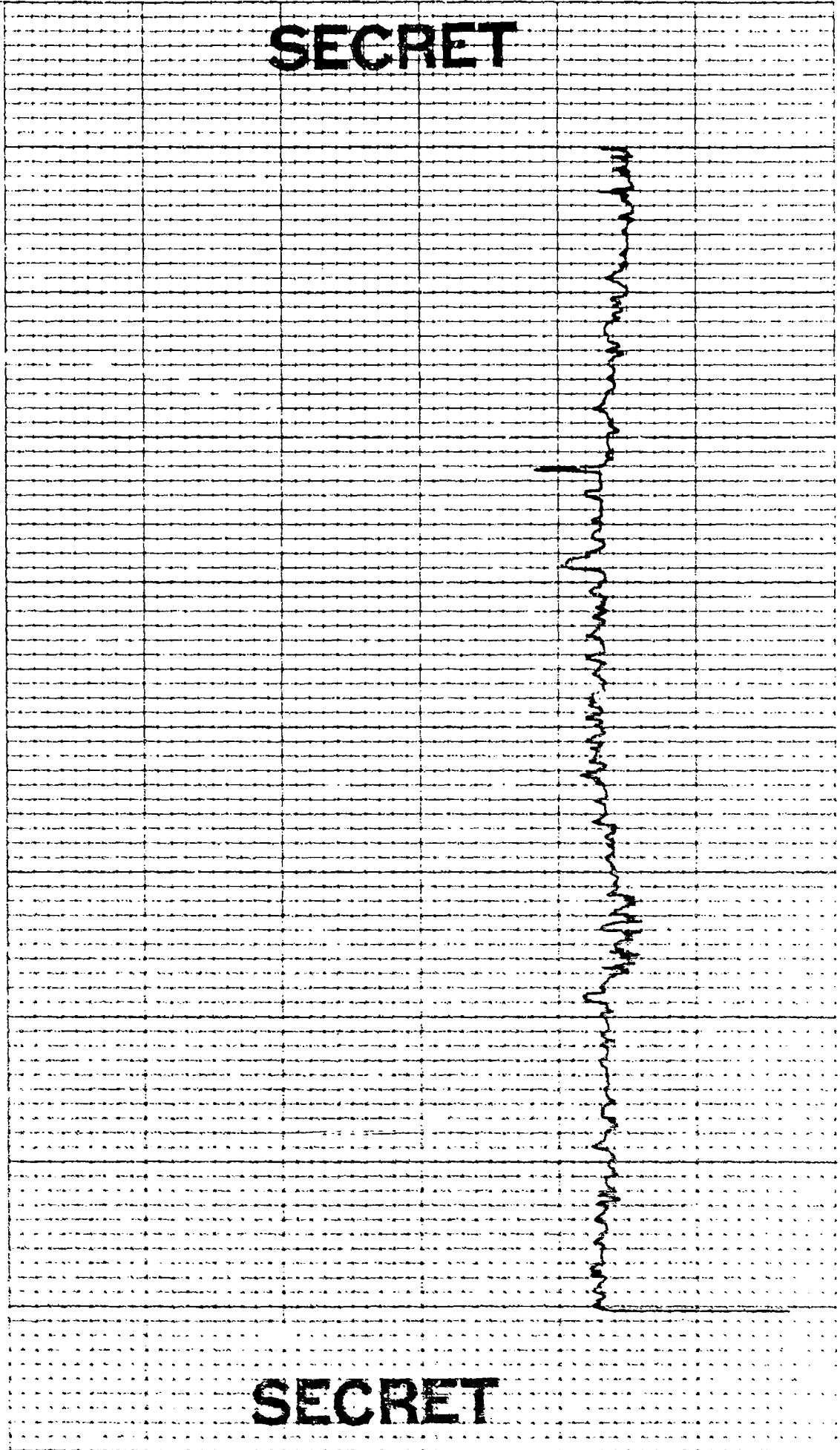
SECRET

17-5003

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

DATE OF ANALYSIS: - - - -
1-14 1-16-77 28-49
DATE/TIME: 1-18-77 -1600 Z
ANALYSIS BANDWIDTH: 1/10HZ
-70 DEG. AZ STEERING

REEL: 2 INDE X2522
INTEGRATION TIME 320 SECS ATTEN: 24 DB
FILTER WTC: HANNING



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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

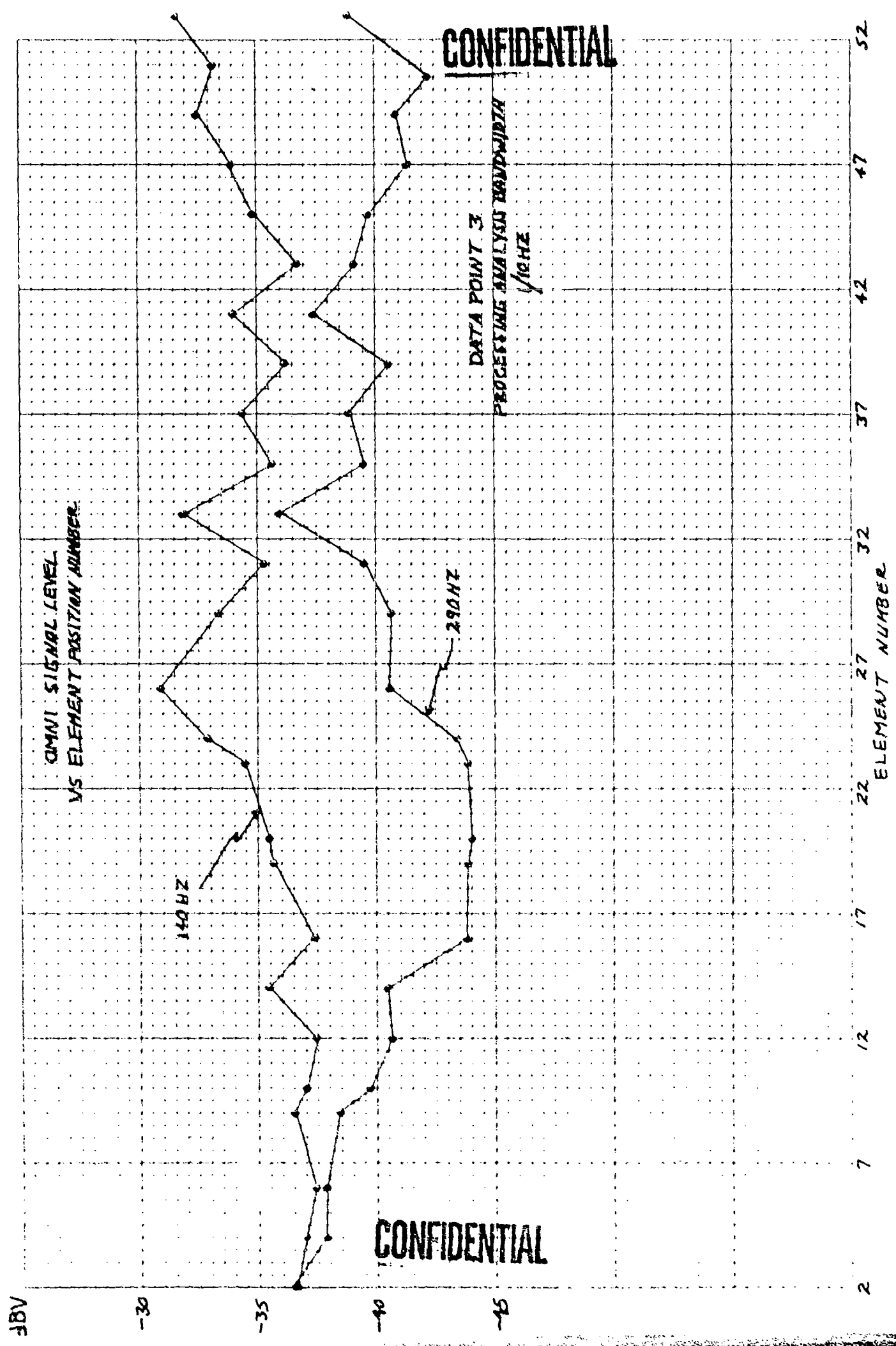
SYSTEM SENSITIVITY $\text{dB}/\mu\text{B}$ -(-12) = -33.7

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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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

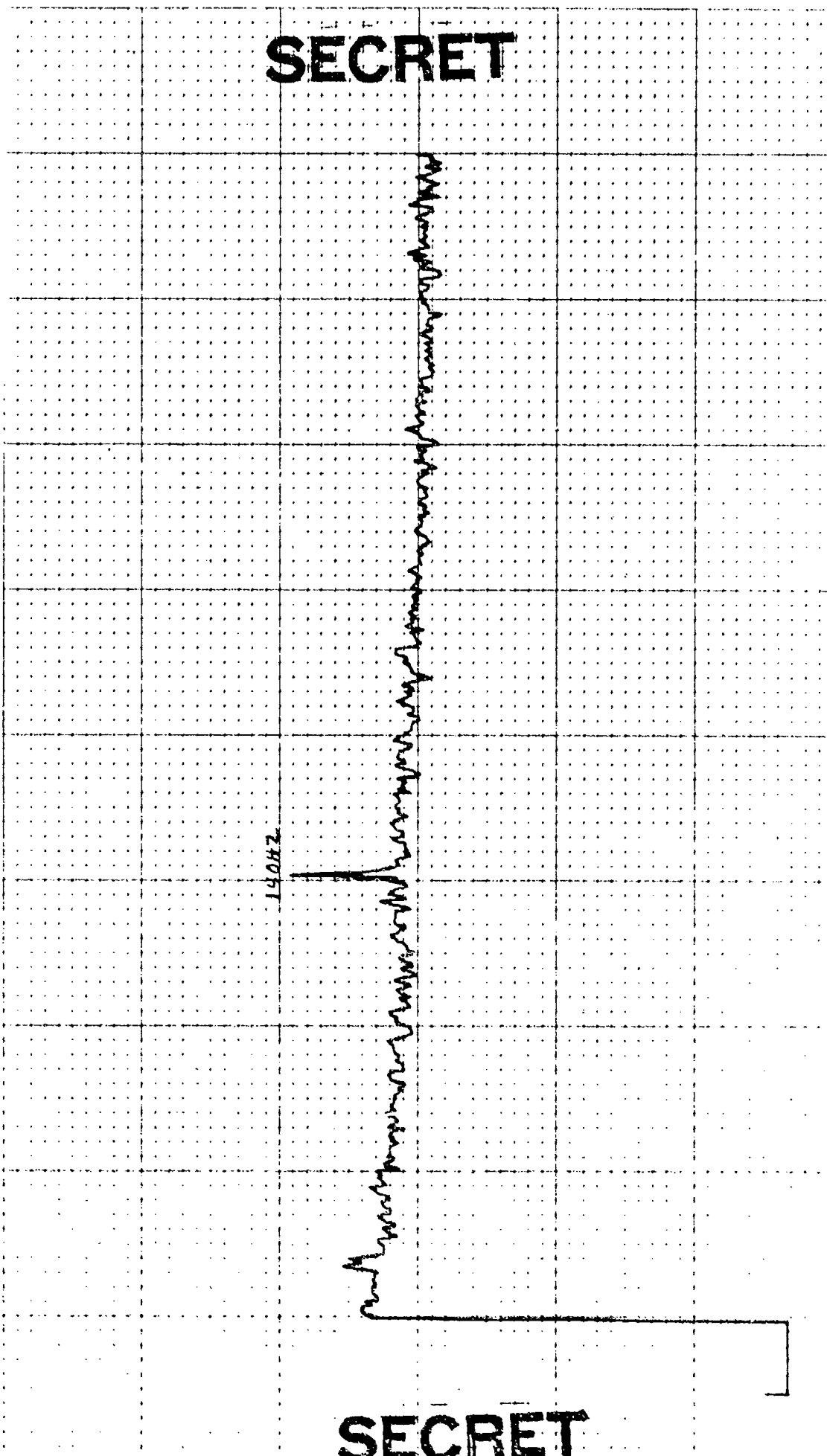
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

REEL: F14

INDEX 3575

INTEGRATION TIME 320 SECS
FILTER WTC: HANNING

ATTEN: DB



140HZ

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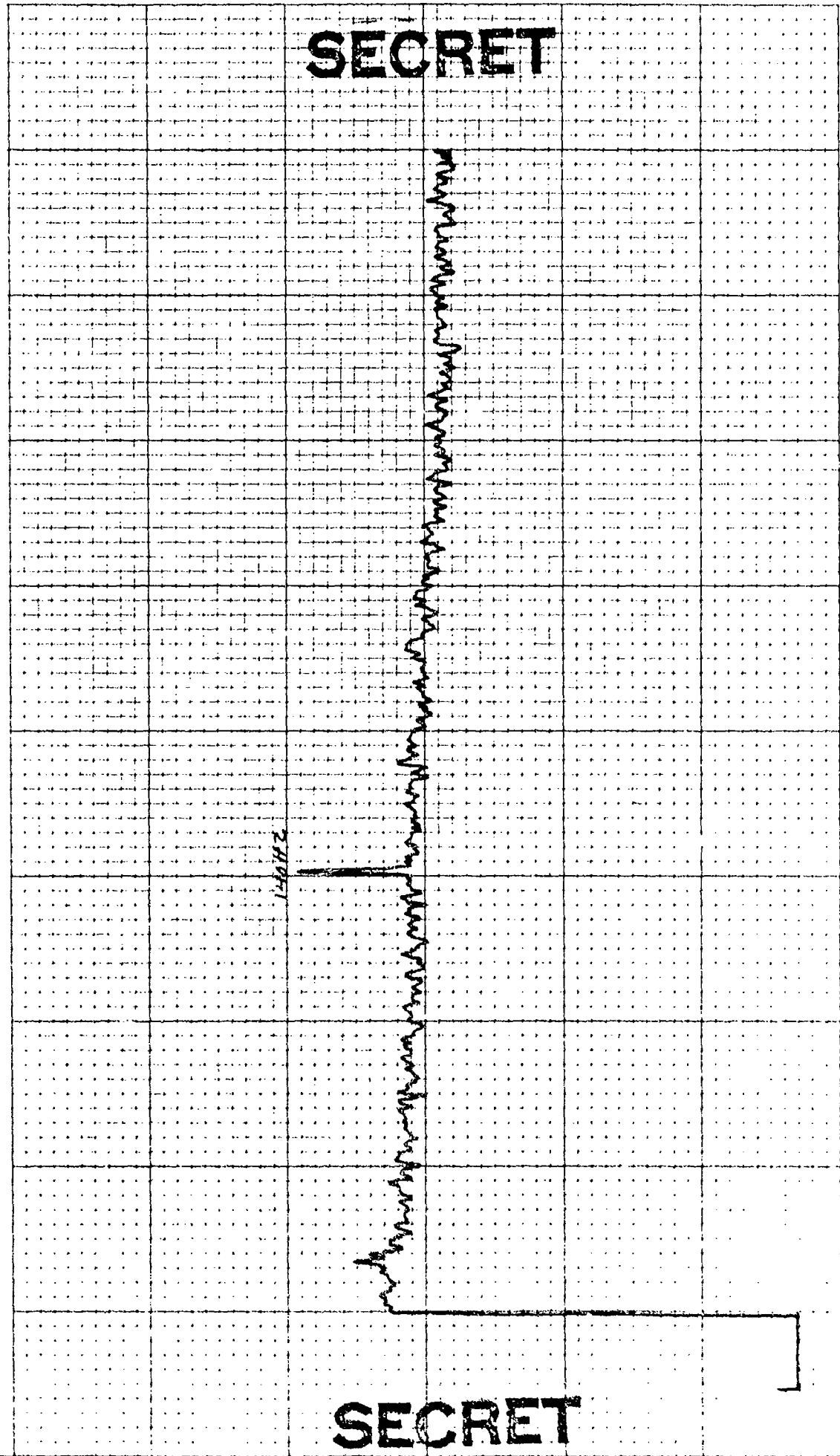
CONTROL: 2-7 -097Y (18)
OMNI SPECTRUM (ELEMENT 4)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

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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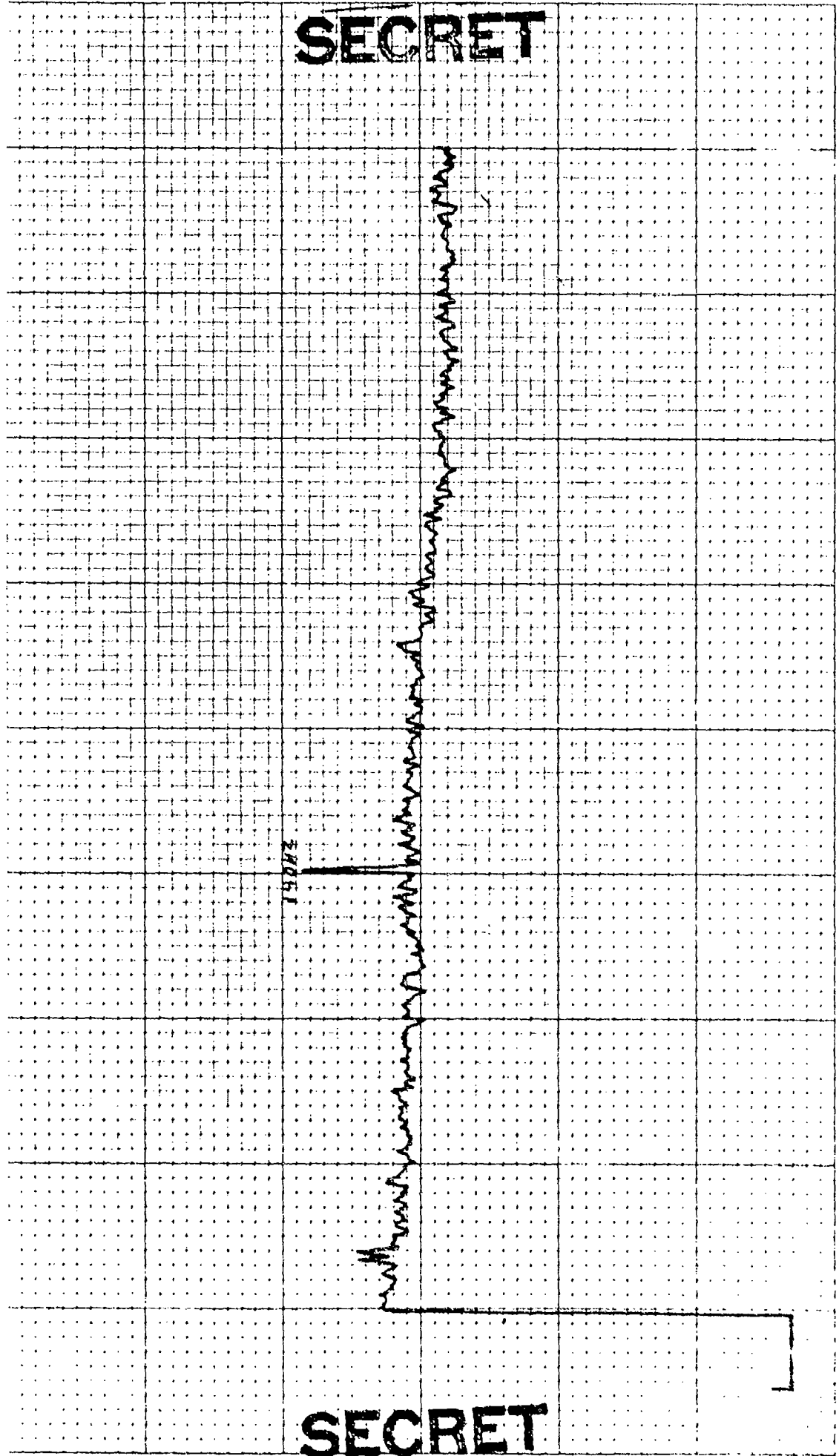
REEL: F/4 INDEX: 3575

DATE OF ANALYSIS:

CONTROL: 27 - 093: (29)
OMNI SPECTRUM (ELEMENT 6)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

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

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER WTG: HANNING



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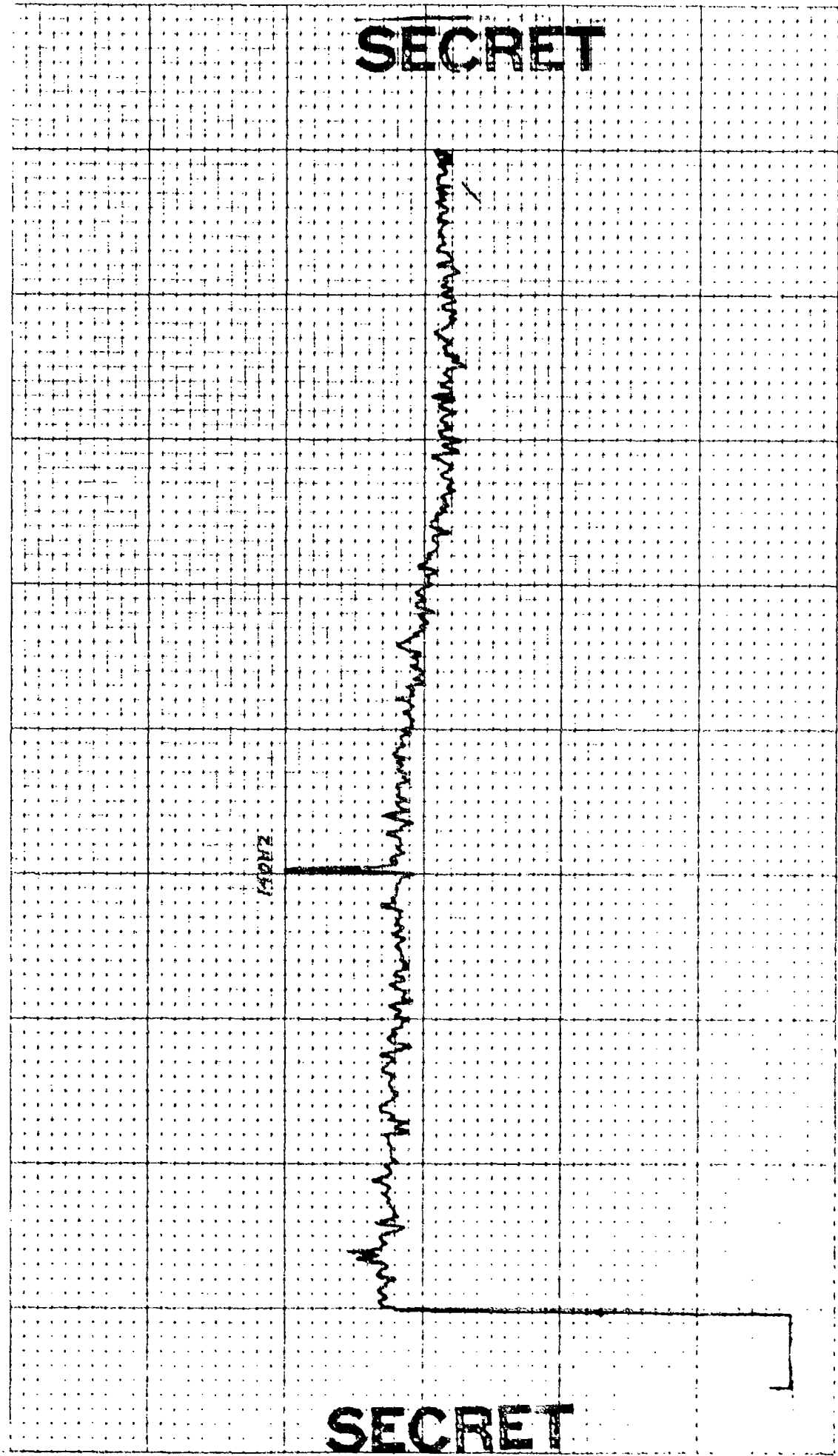
CONTROL: 0934 - 51 (DP3)
OMNI SPECTRUM (ELEMENT 9)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

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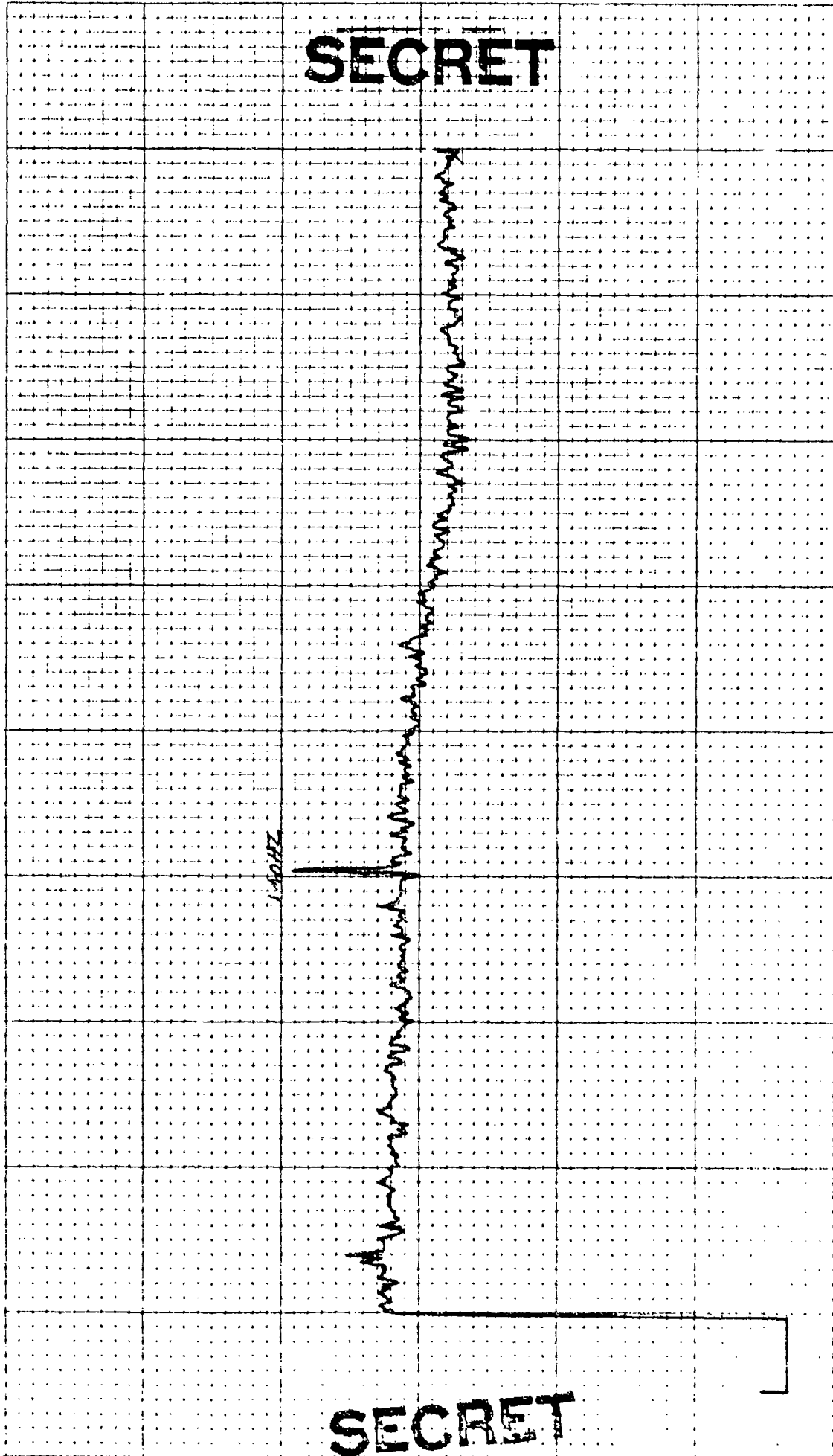
CONTROL: 2-7 -0934 (31)
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

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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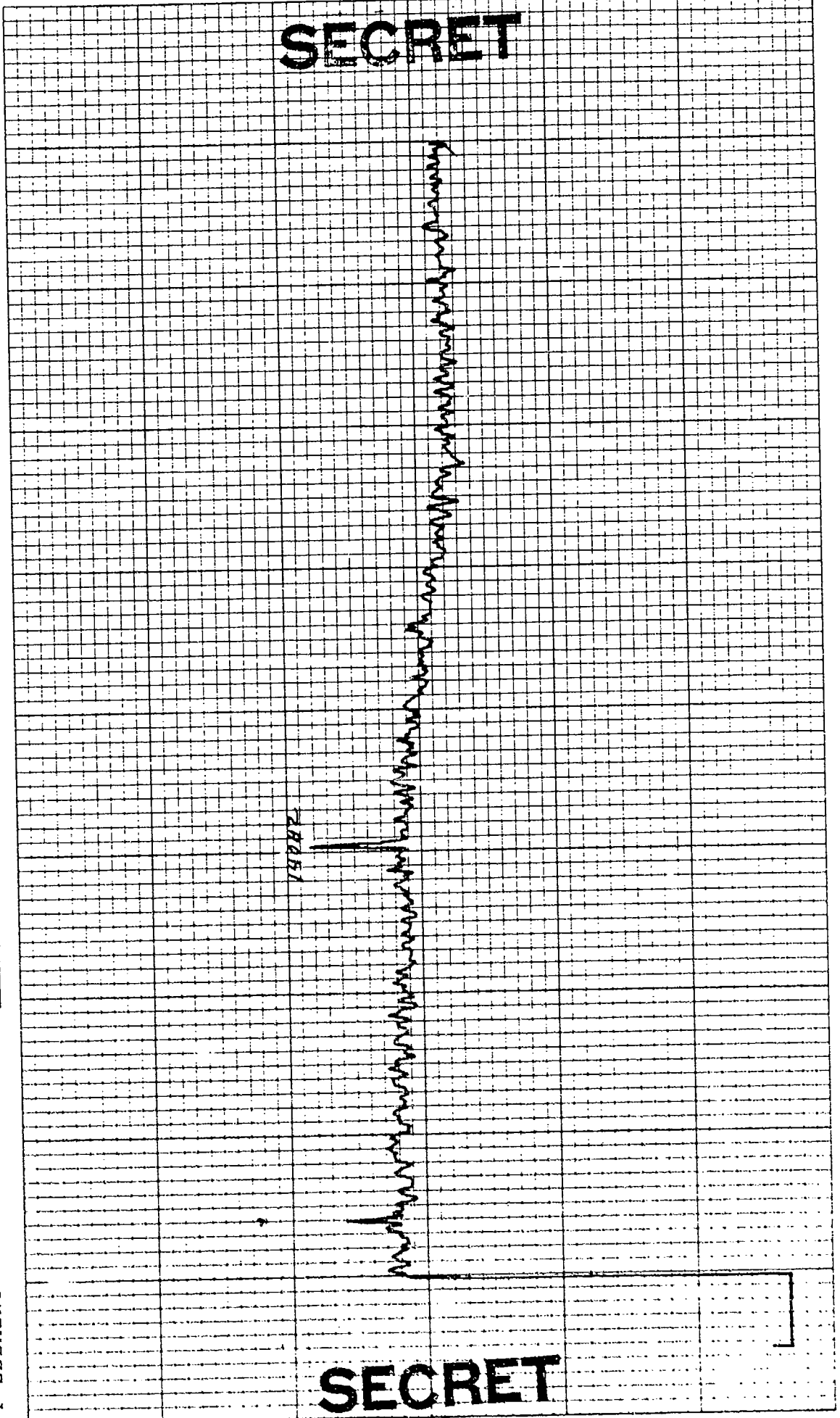
REEL: F14 INDEX 3575

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



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CONTROL: 2-7 -0924(JJ)

OMNI SPECTRUM(ELEMENT 14)

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

1 ELEMENT

DATE OF ANALYSIS:

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

ANALYSIS BANDWIDTH: 1/10HZ

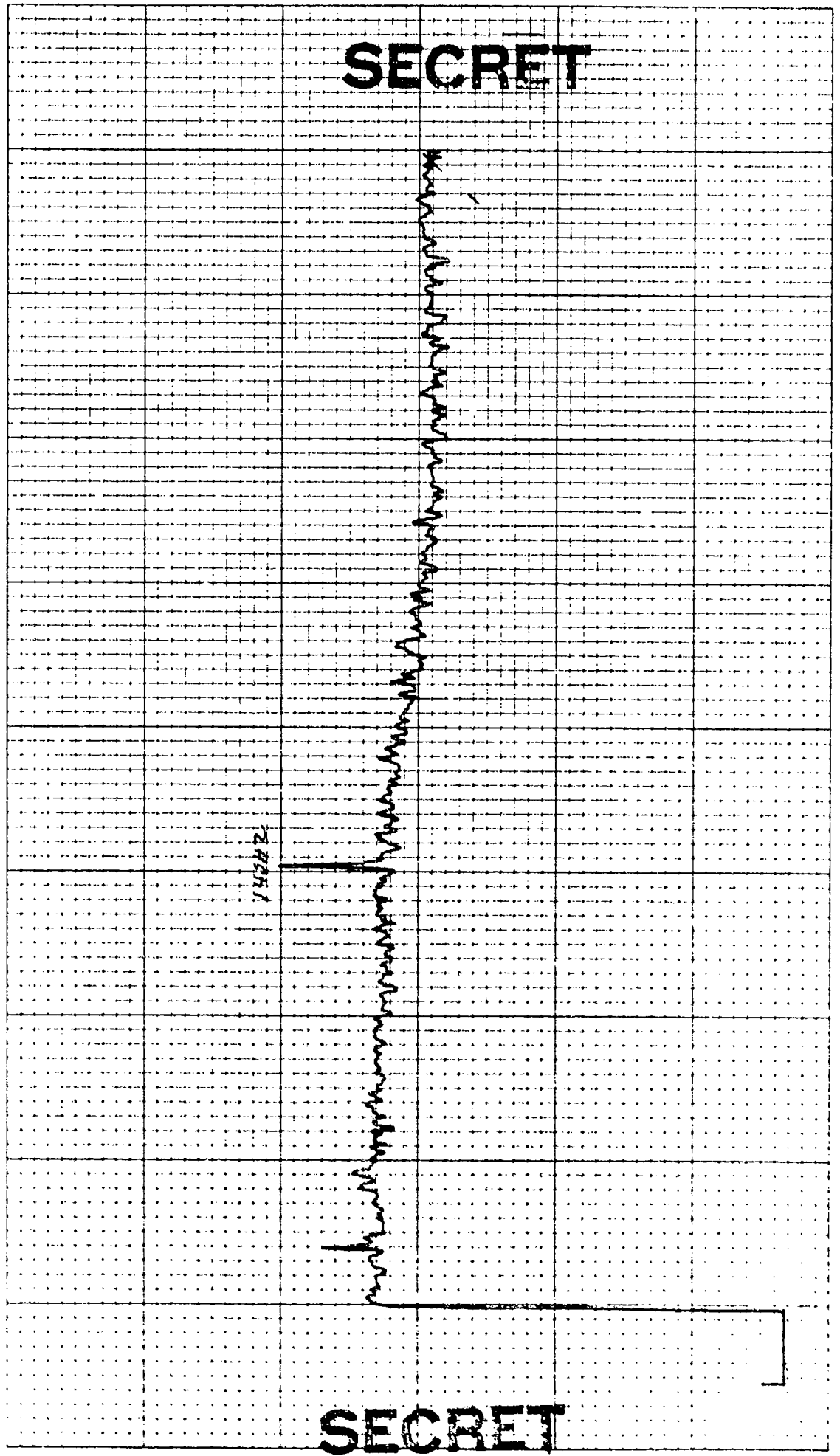
DEC A7 STEERING

REEL: F14

INDEX: J575

INTEGRATION TIME 320 SECS

FILTER 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

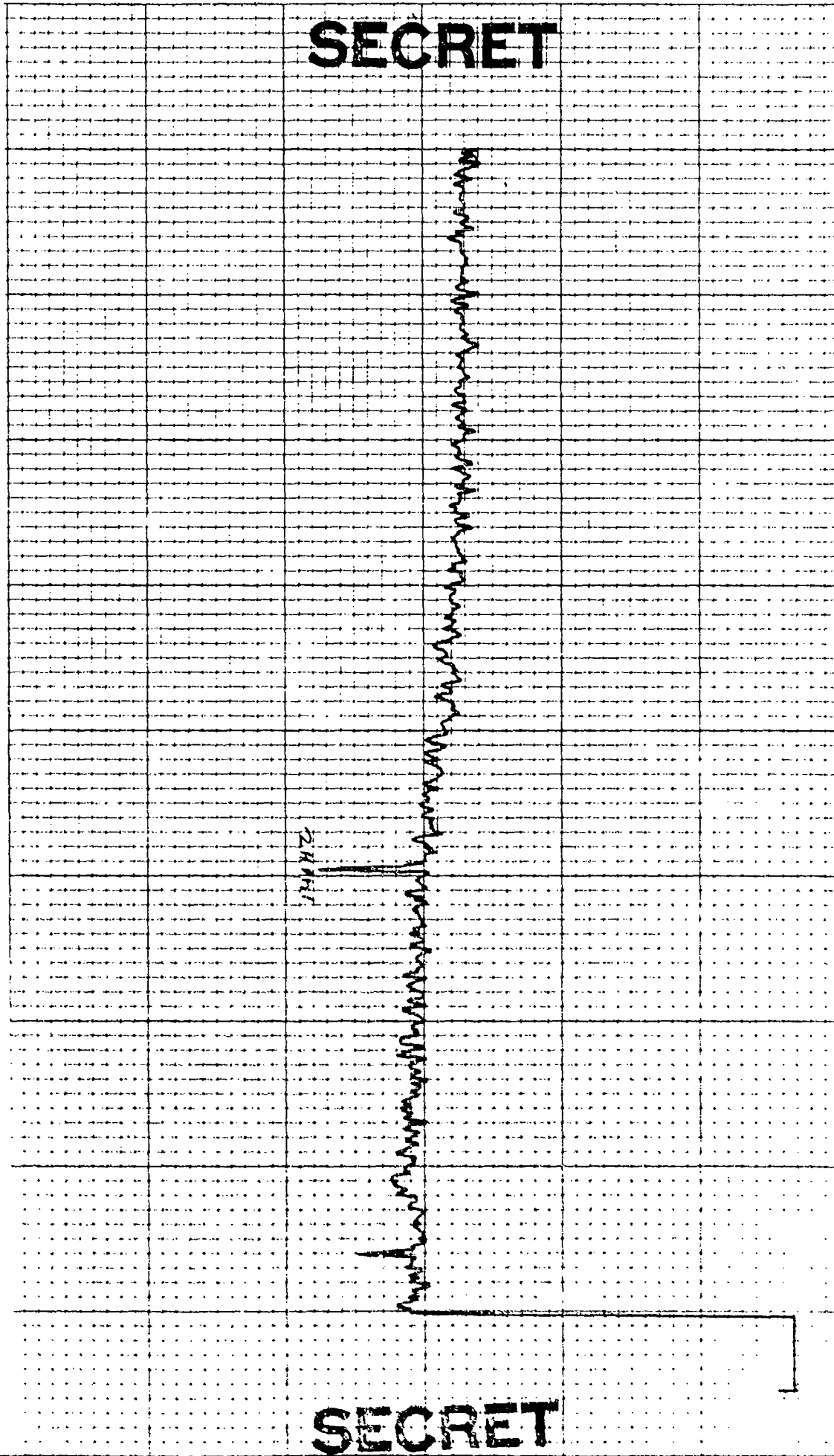
 DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

ATTEN: - DB

WTC: HANNING



CONTROL: 2-7 -0934 (J5)

DATE OF ANALYSIS:

REEL: F14 INDEX: J5J5

OMNI SPECTRUM (ELEMENT 19)

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

1 ELEMENT

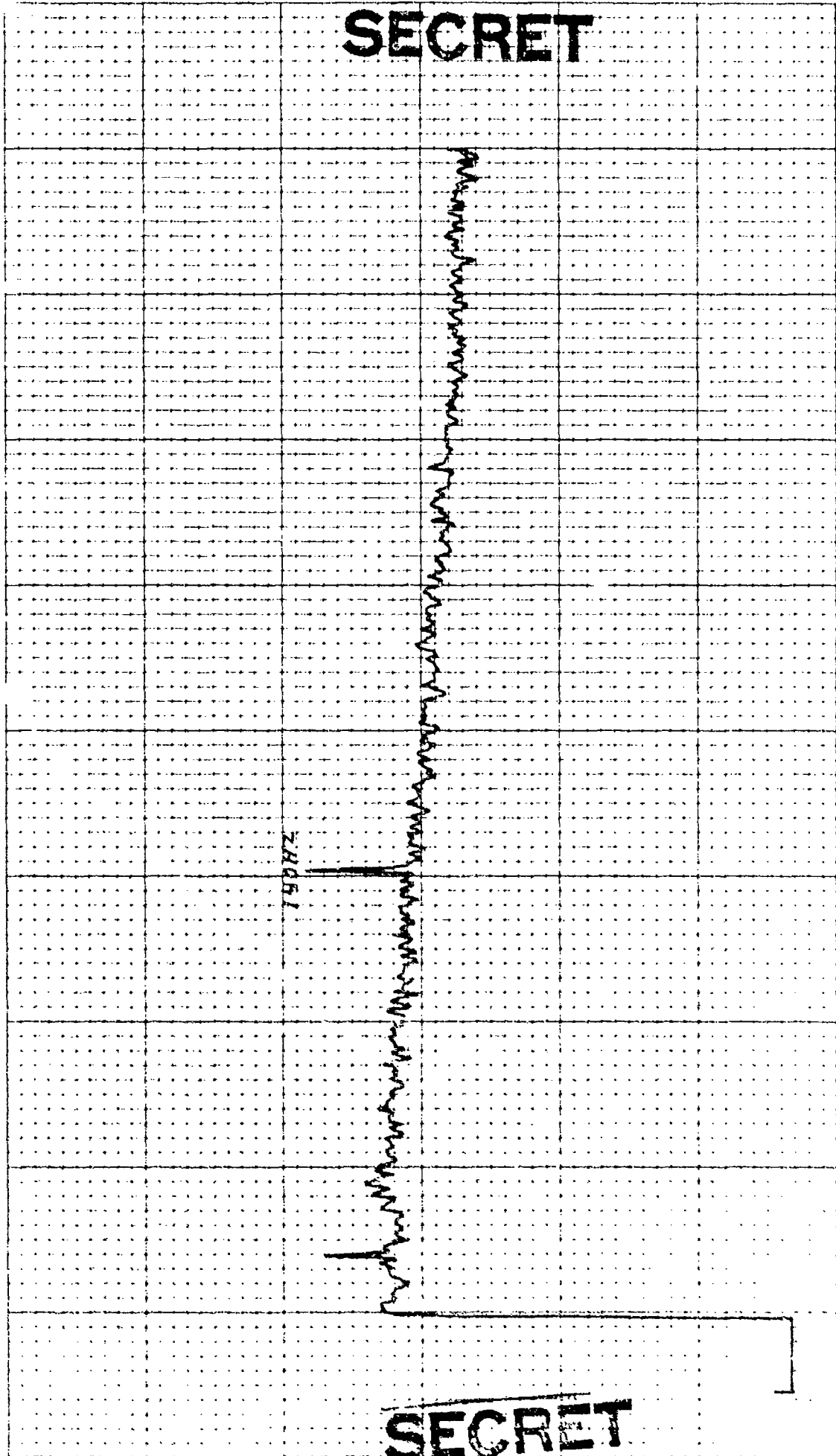
DATE/TIME: 2-7-77 - 0934 Z

ANALYSIS BANDWIDTH: 1/10 HZ

— DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER WTG: HANNING



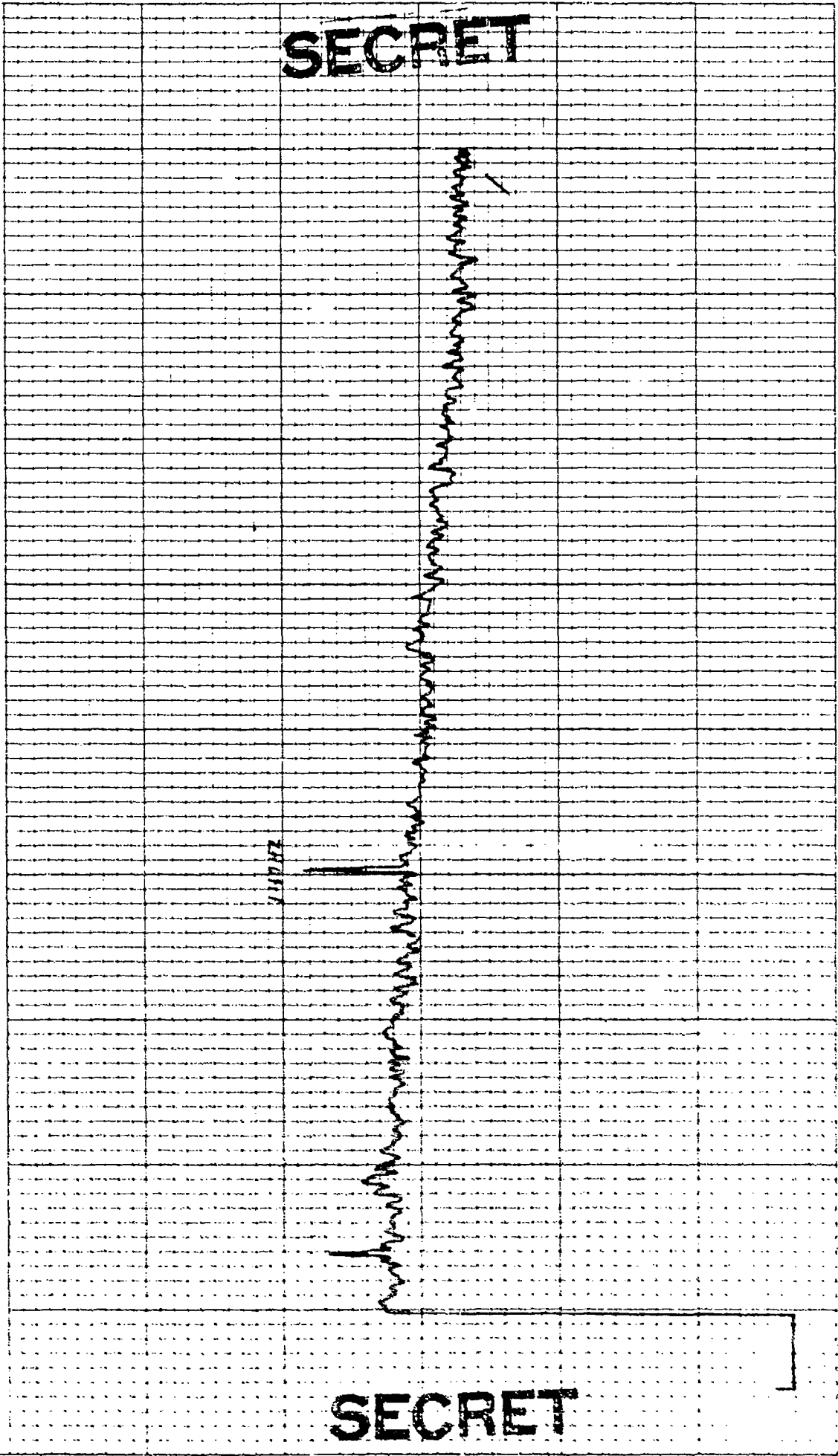
REEL: F74 INDEX 3575

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
1 DEG AZ STEERING

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



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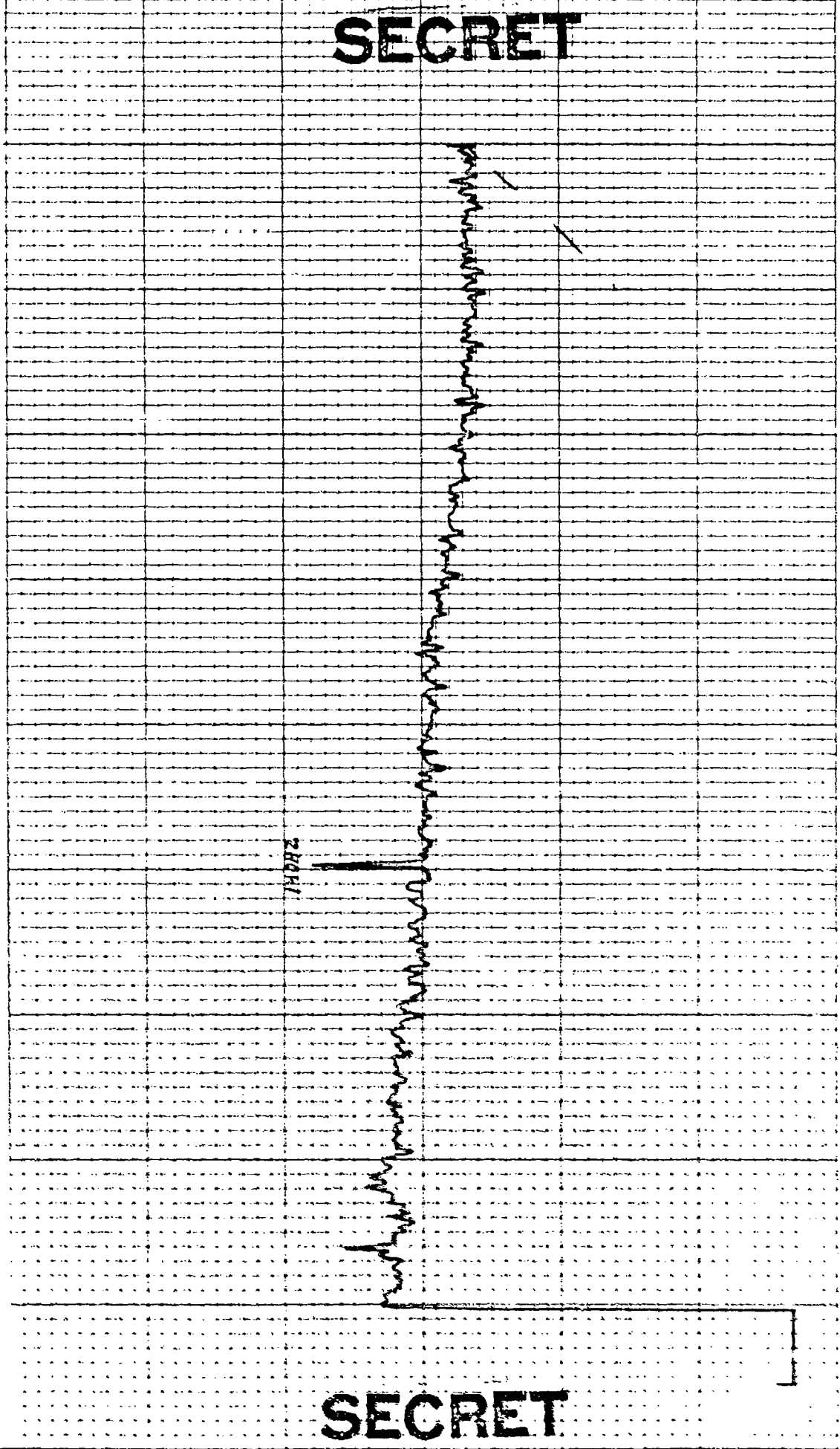
REEL: F14 INDEX 3575

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
ATTEN: DB
FILTER WTC: HANNING



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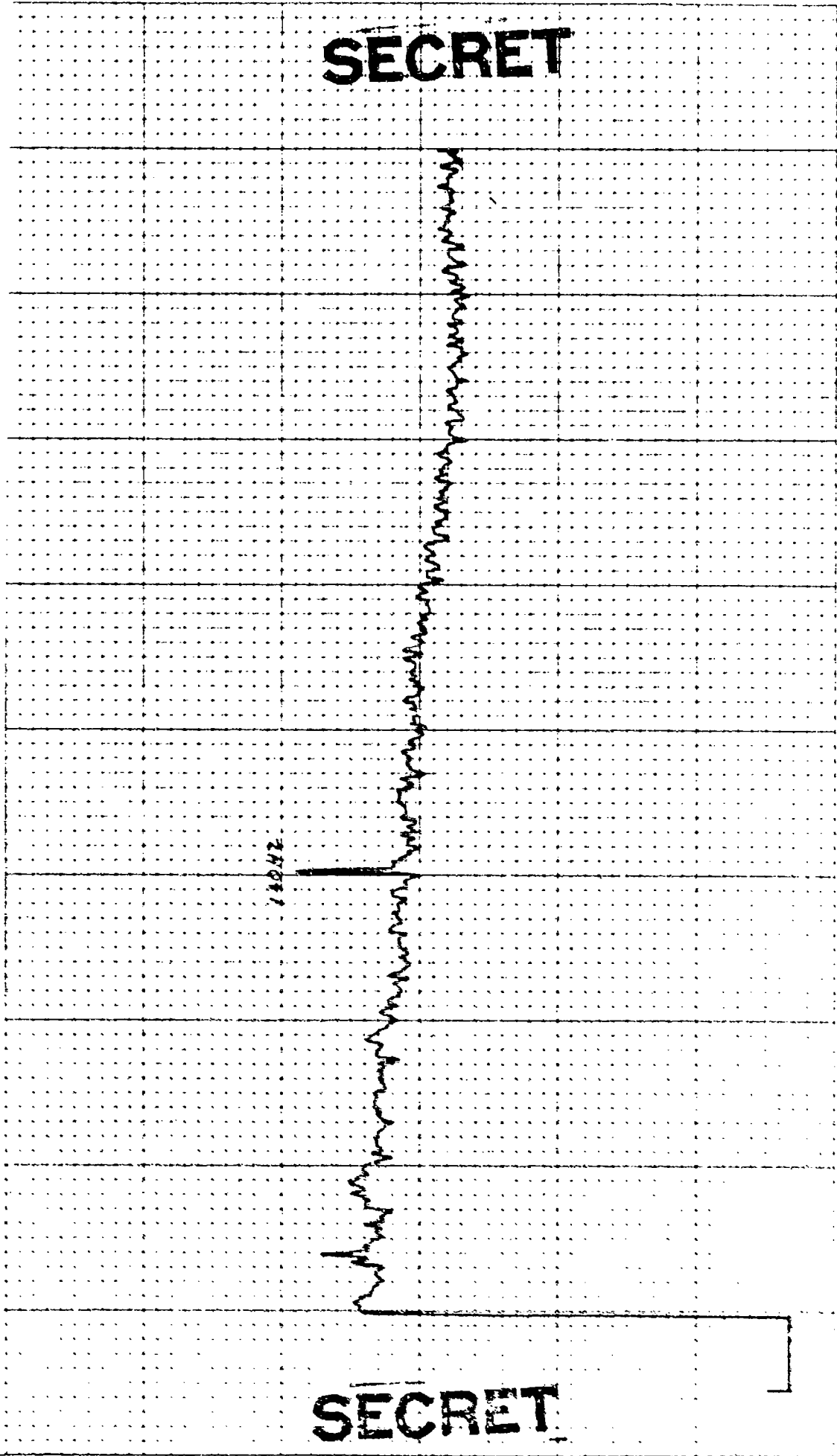
CONTROL: 27 - 0934 (78)
OMNI SPECTRUM (ELEMENT 24)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

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:

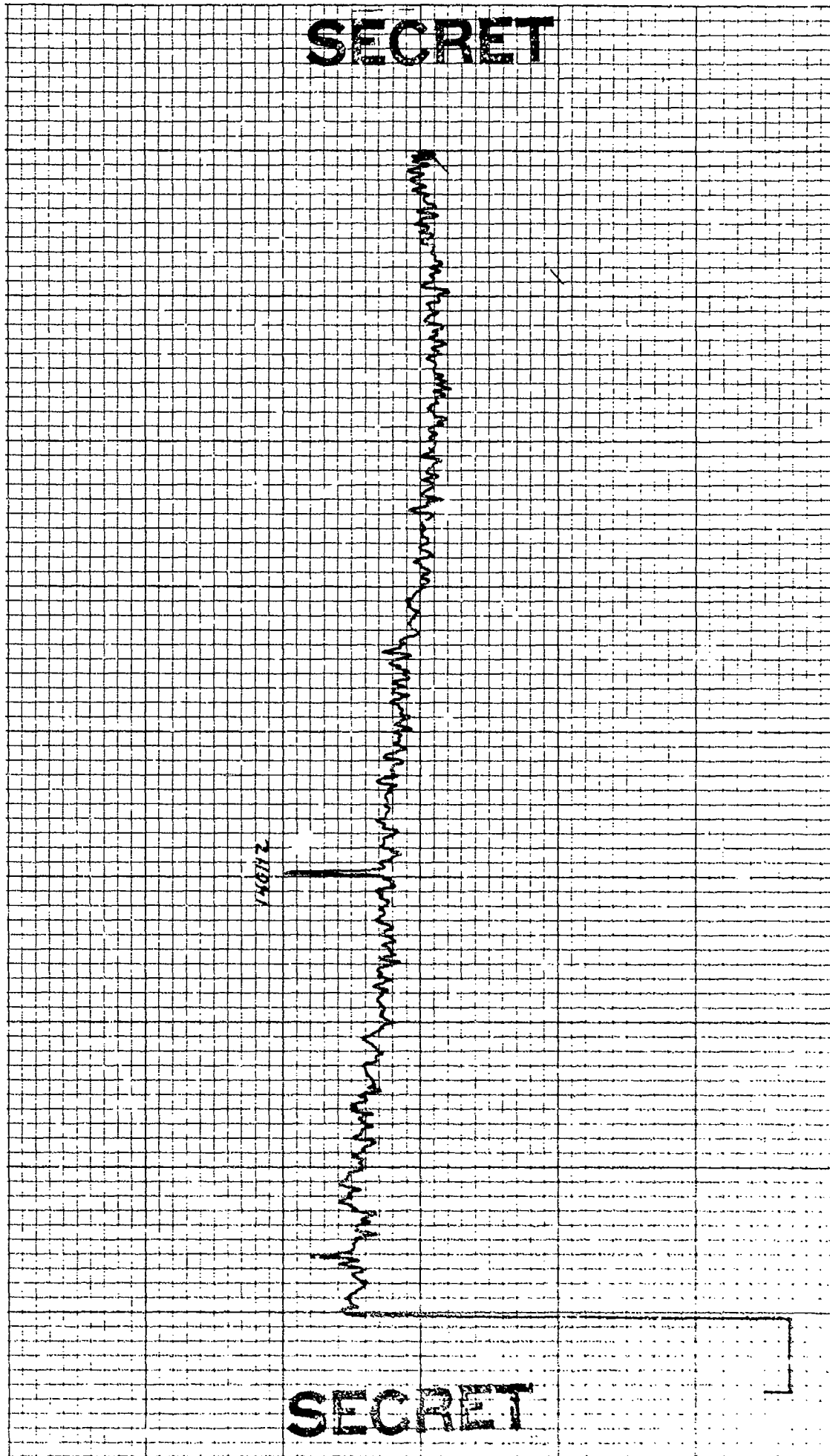
DATE/TIME: 2-7-77 - 0934 Z
ANALYSIS BANDWIDTH: 1/10 HZ

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

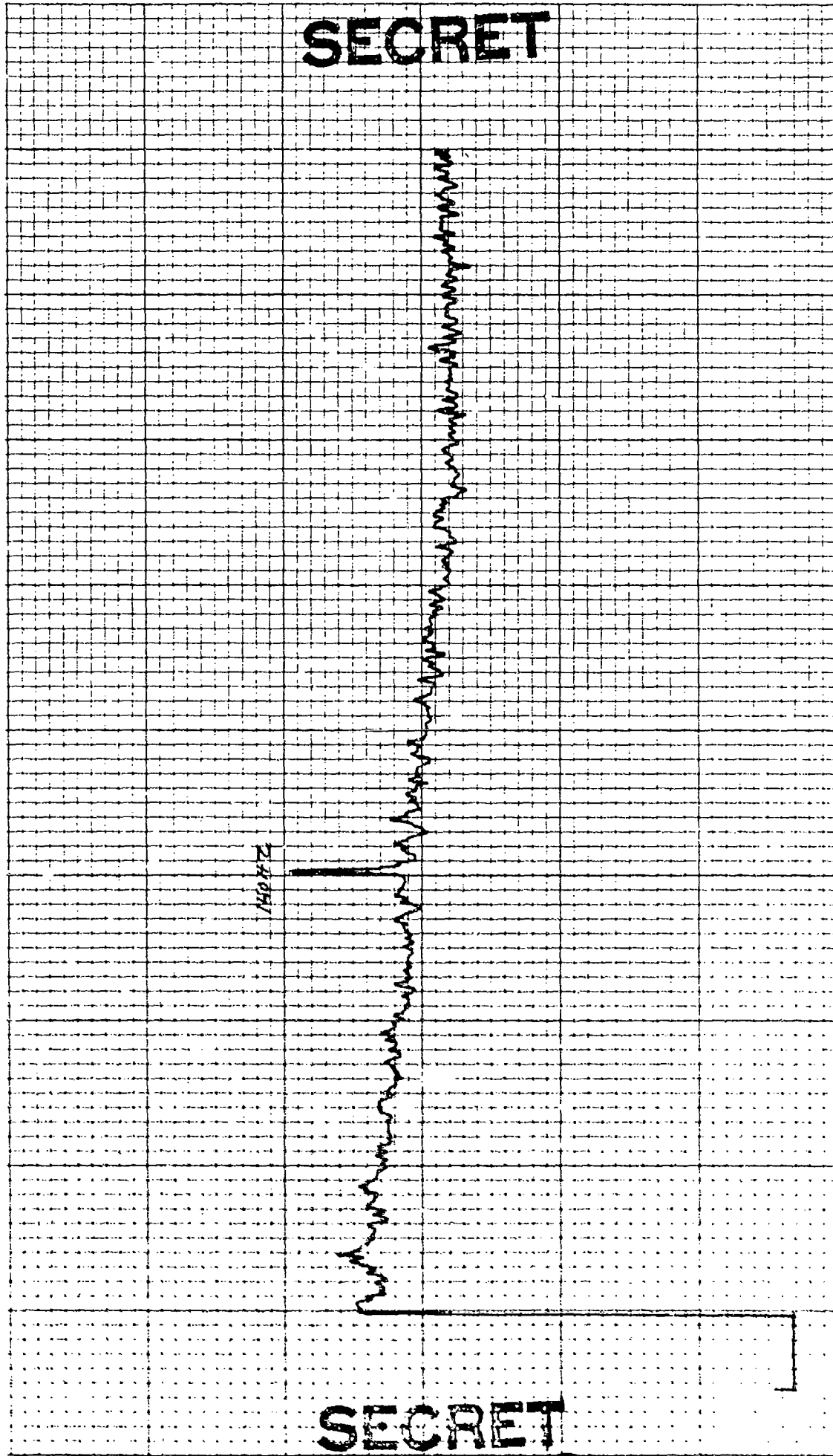
 DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

ATTEN: DB

WTC: HANNING



441

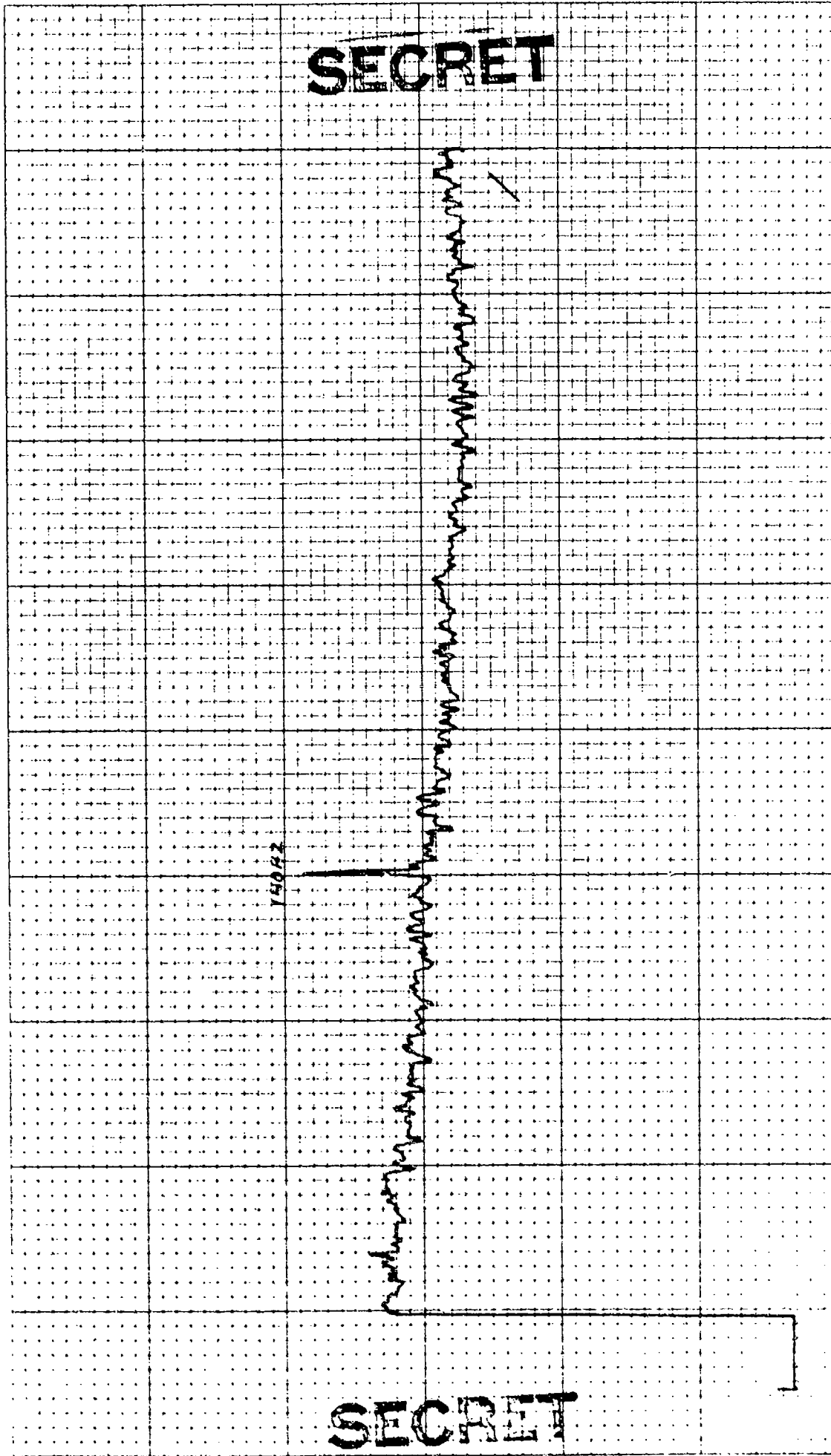
CONTROL: 2.7 -0934(41)
OMNI SPECTRUM(ELEMENT 31)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

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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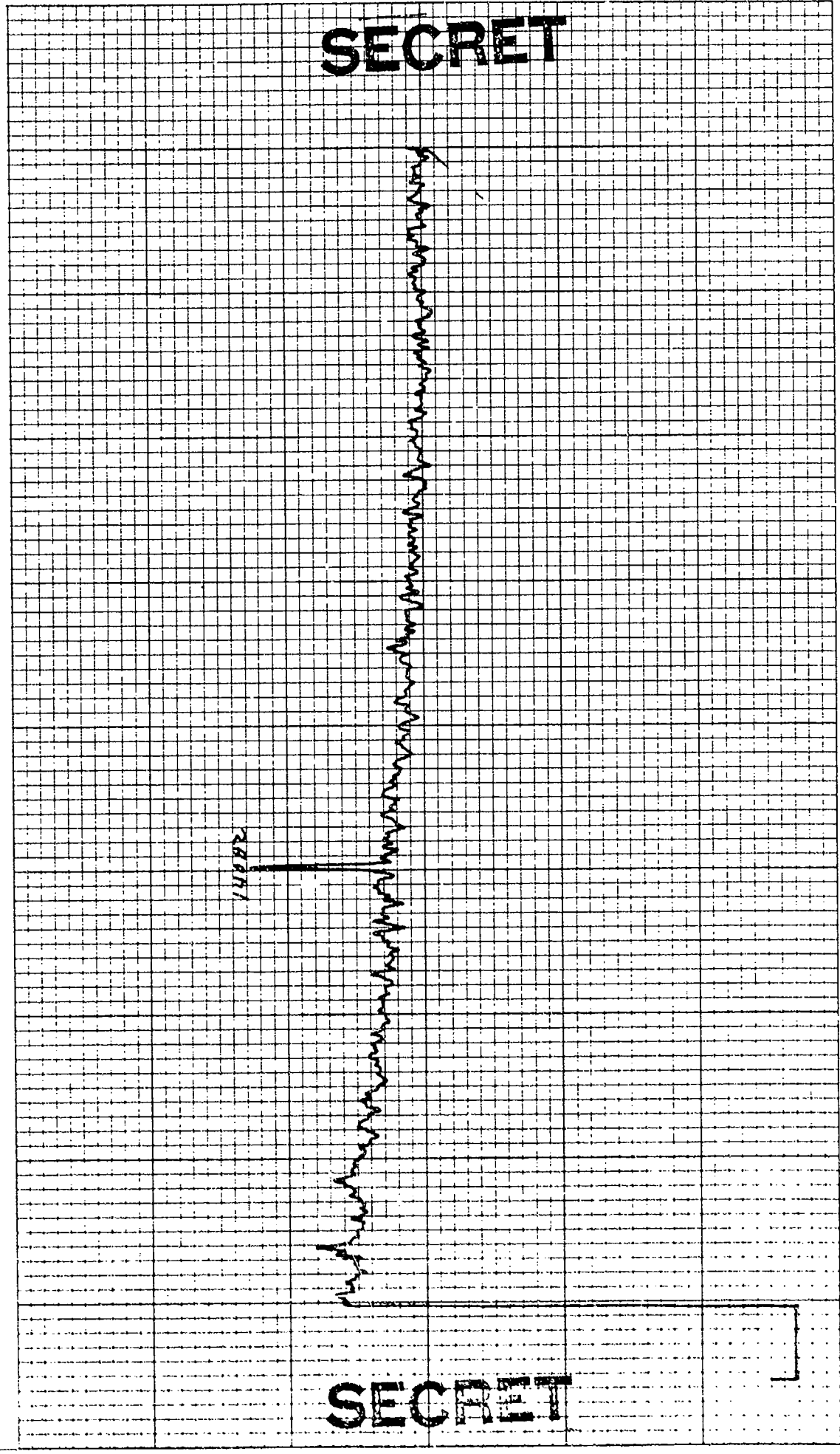
2848

REEL: F14 INDEX 3575

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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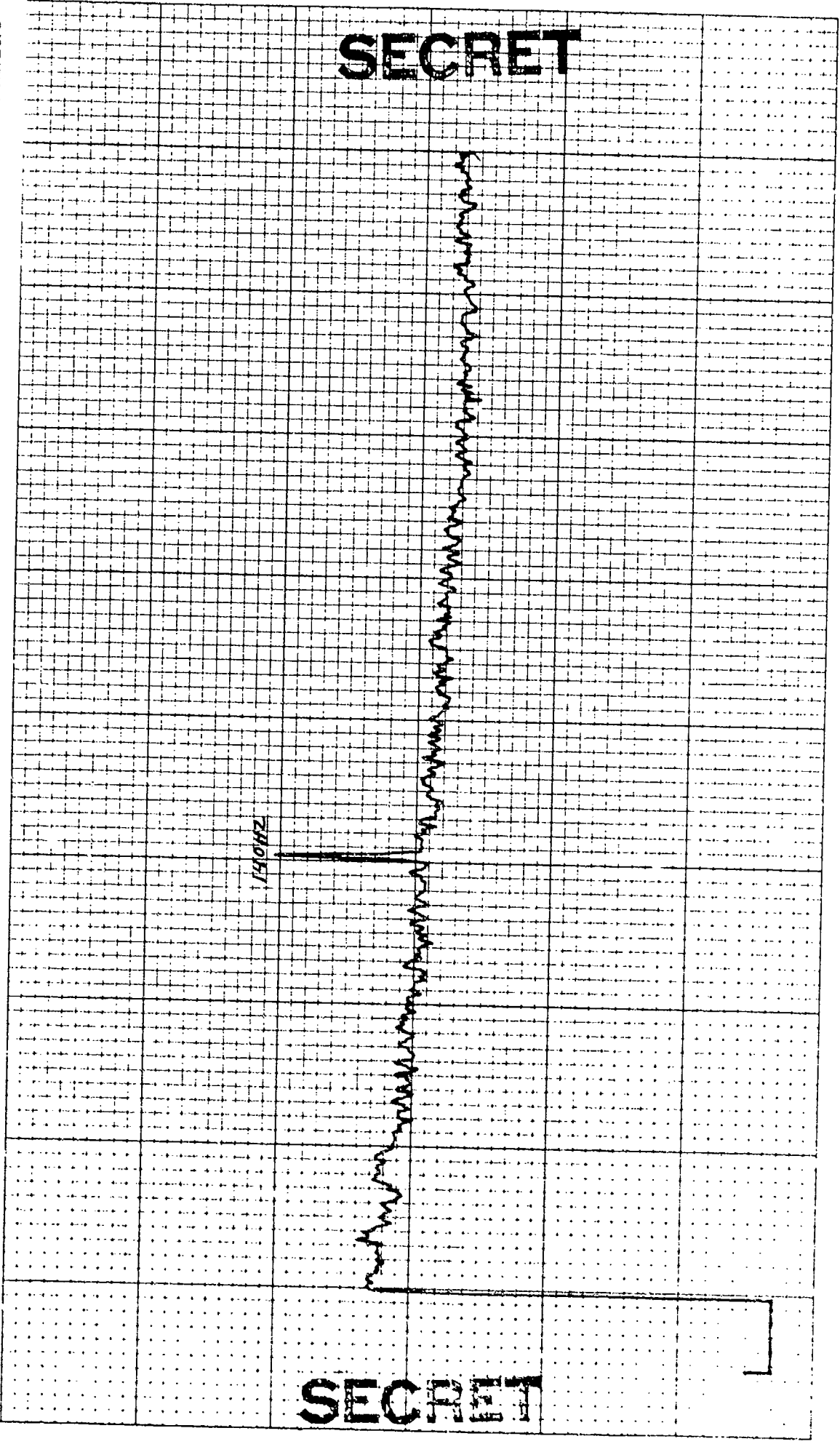
443

CONTROL: 2-7 -0934 (43)
 OMNI SPECTRUM(ELEMENT 35)
 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: 3575

INTEGRATION TIME 320 SECS ATTN: DB
 FILTER WTG: HANNING

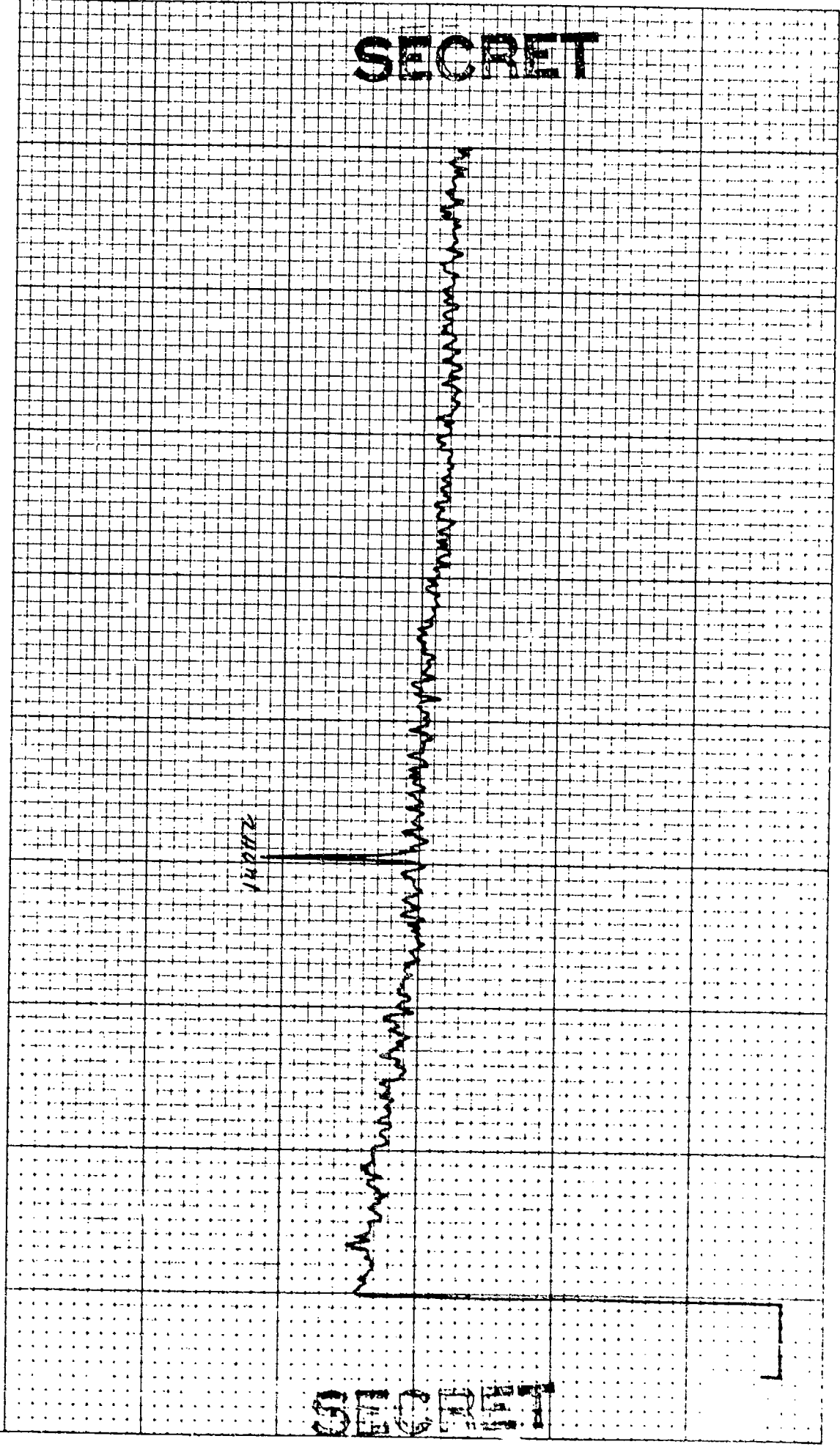


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CONTROL: 2-7 - 0434 (44) DATE OF ANALYSIS: REEL: F14 INDEX 3575
 OMNI SPECTRUM (ELEMENT 37)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 1 ELEMENT

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



REEL: F14 INDEX 7575

DATE OF ANALYSIS:

CONTROL: 2.7 - 0934 (45)

OMNI SPECTRUM (ELEMENT 39)

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

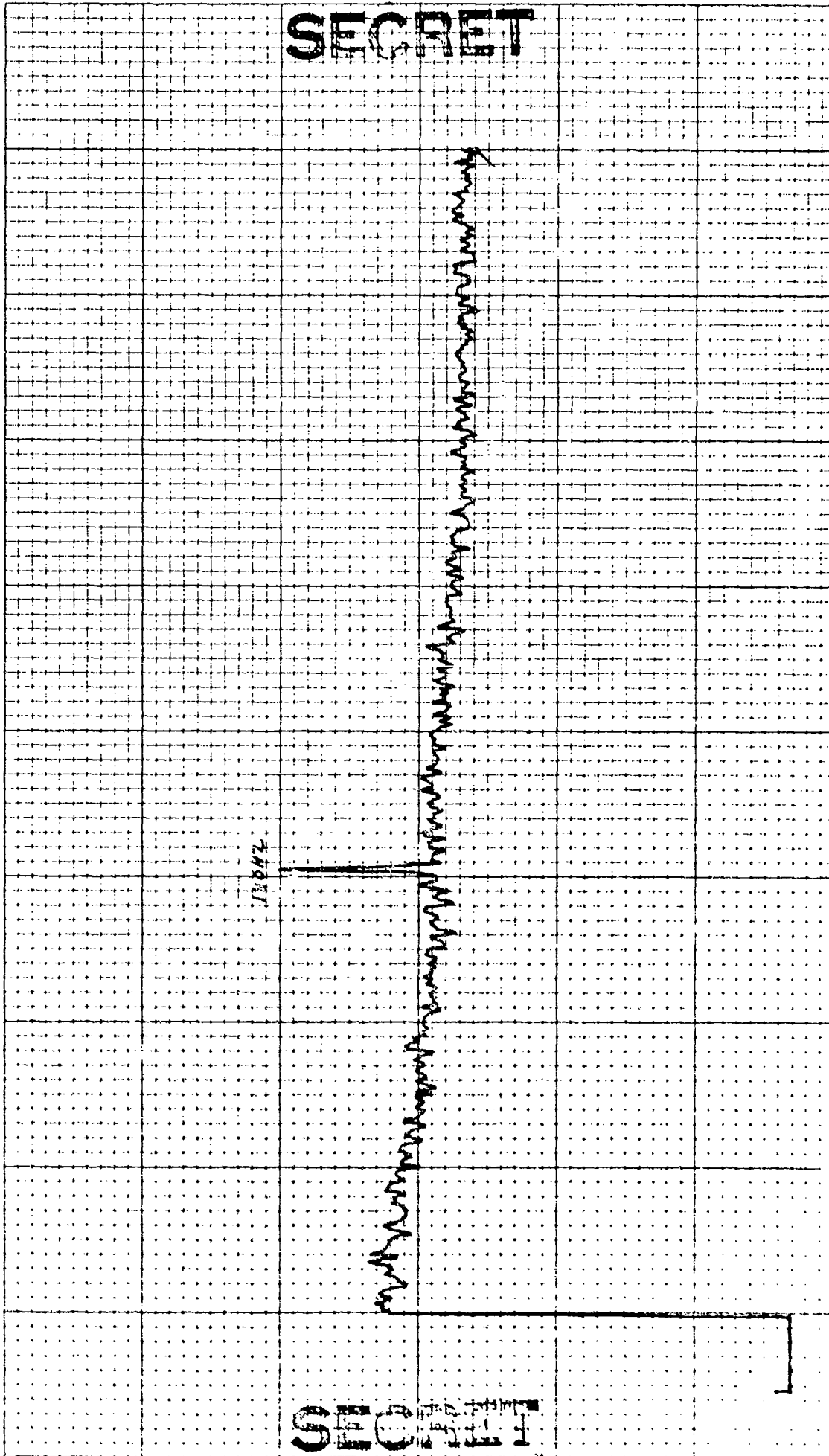
1 ELEMENT

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

ANALYSIS BANDWIDTH: 1/10 HZ

DEC AZ STEERING

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING



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

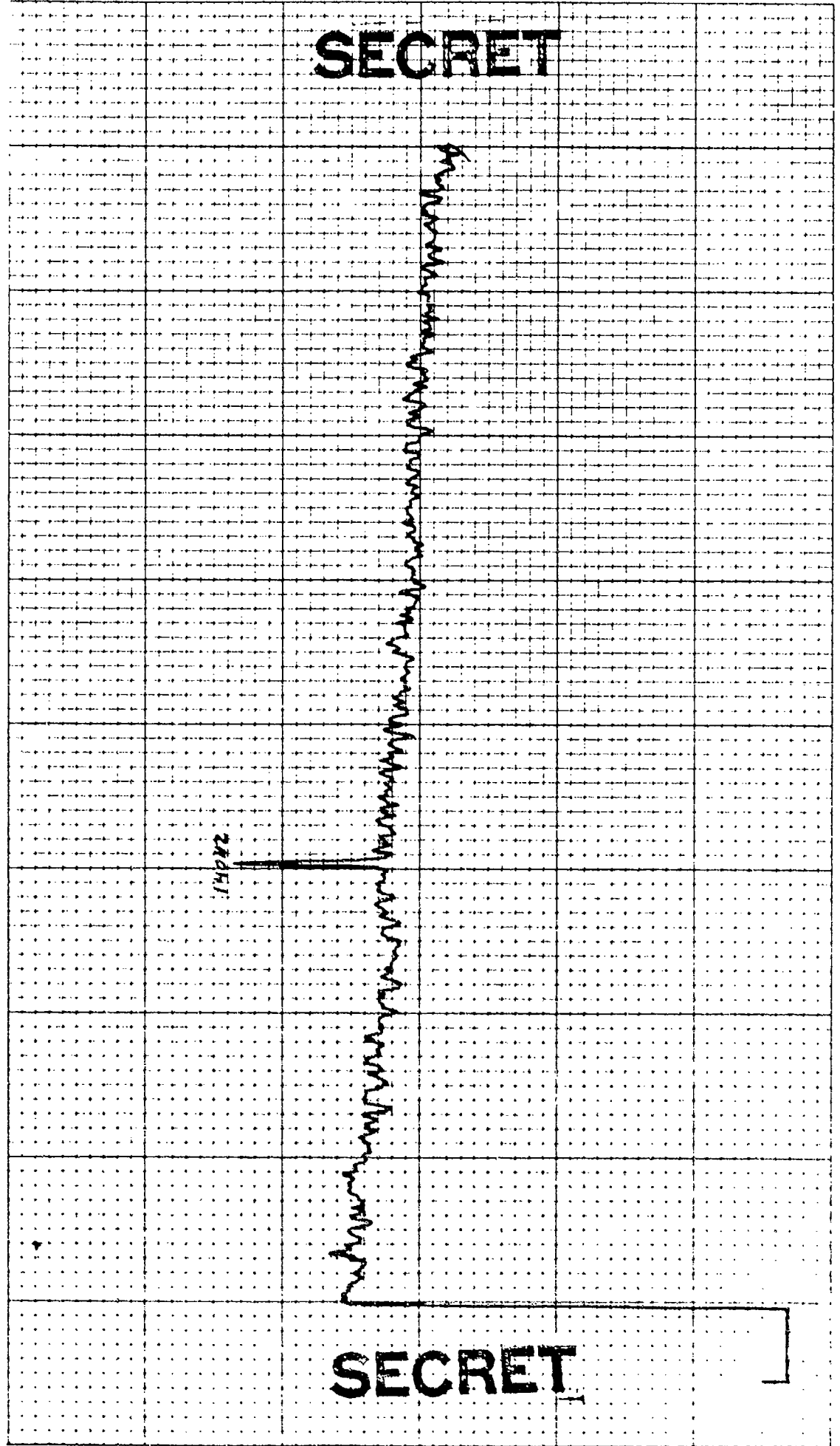
DATE OF ANALYSIS:

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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47

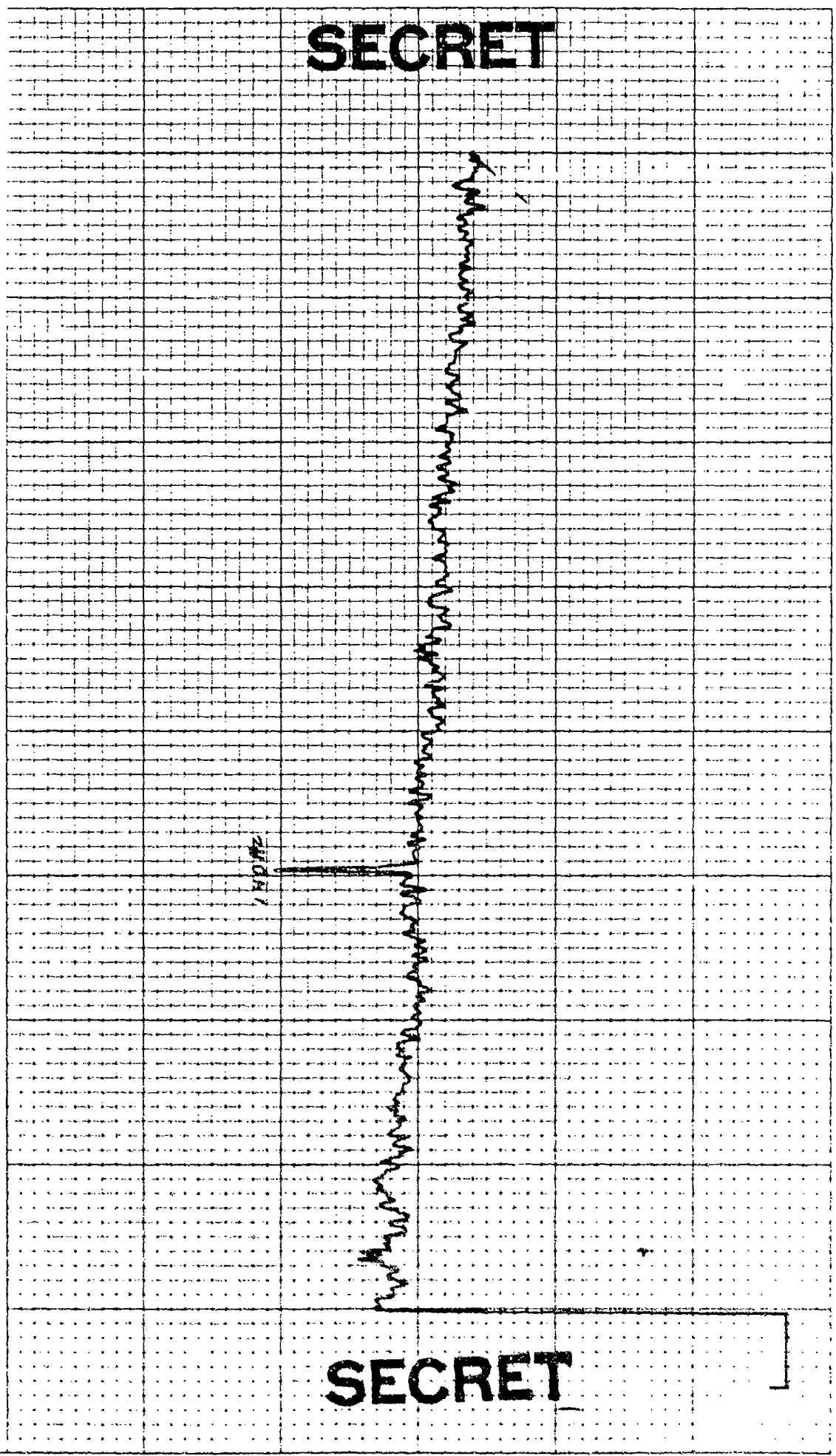
CONTROL: 2.7 -0934 (47)
OMNI SPECTRUM(ELEMENT 43)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

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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48

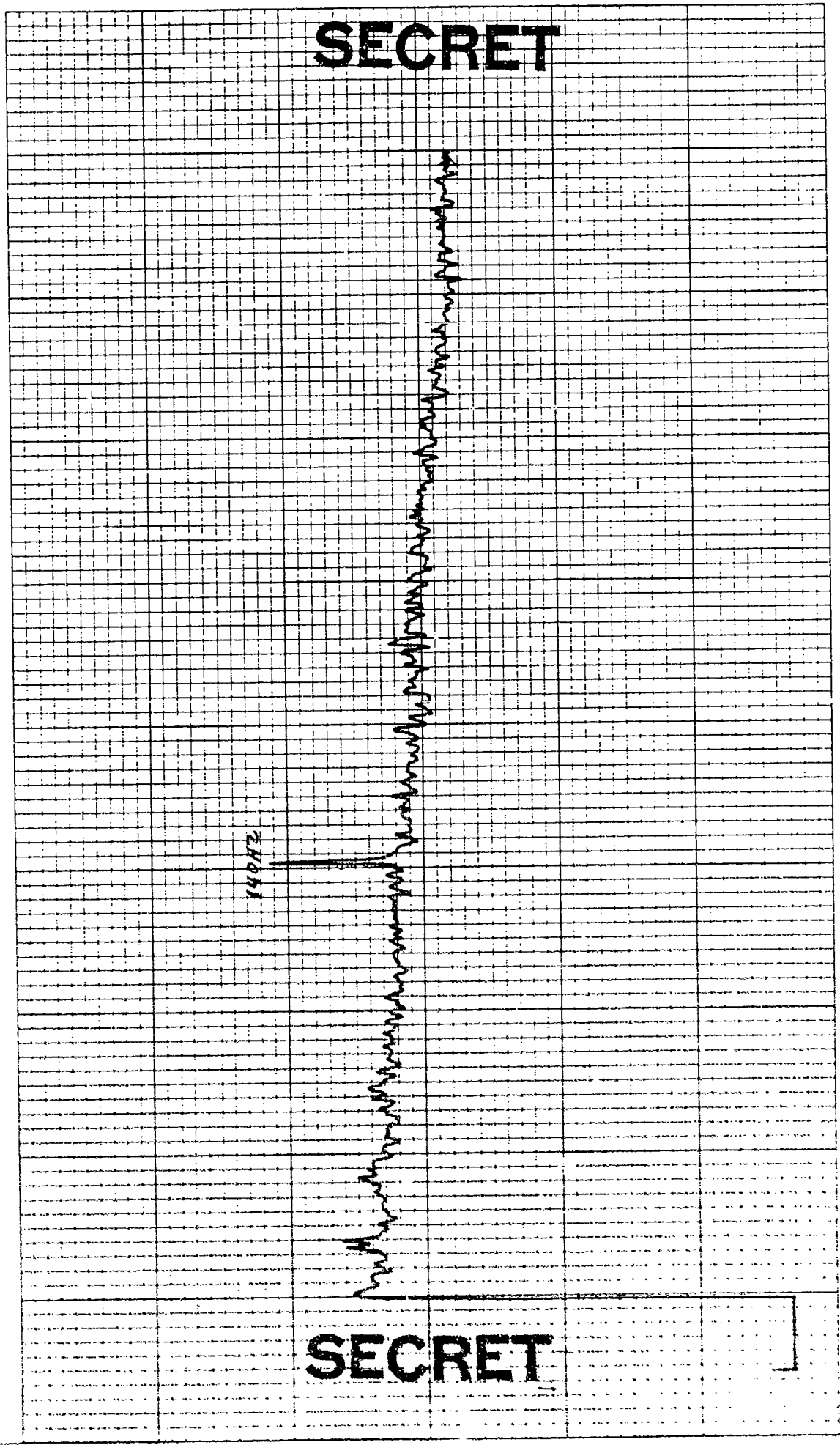
REEL: F14 INDEX 353

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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REEL: F14

INDEX: 1575

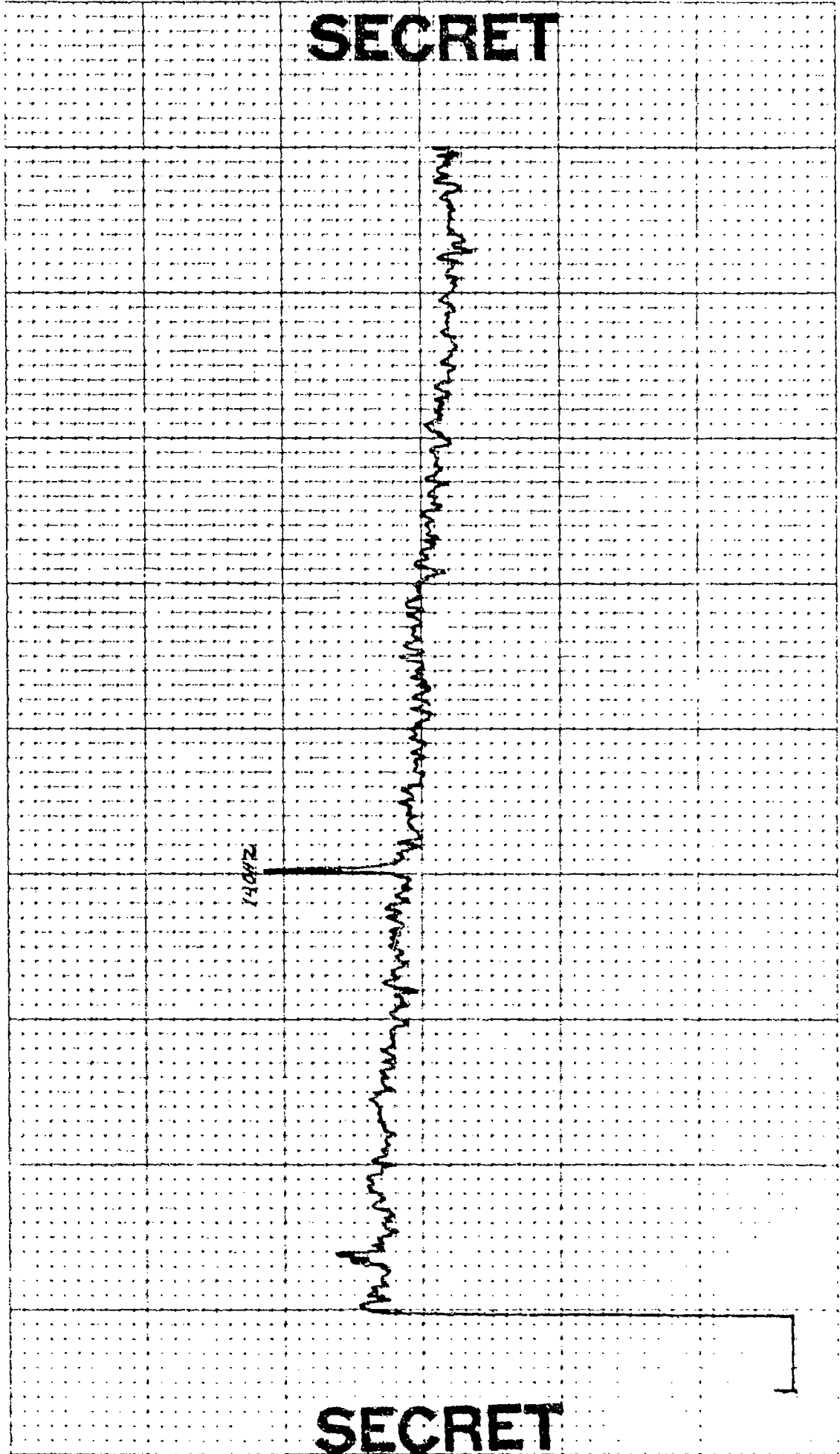
CONTROL: 2-7 -0934 (49)
OMNI SPECTRUM (ELEMENT 47)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

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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CONTROL: 2.7 - 0914 (50)

DATE OF ANALYSIS:

REEL: F/4 INDEX 3575

OMNI SPECTRUM (ELEMENT 49)

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

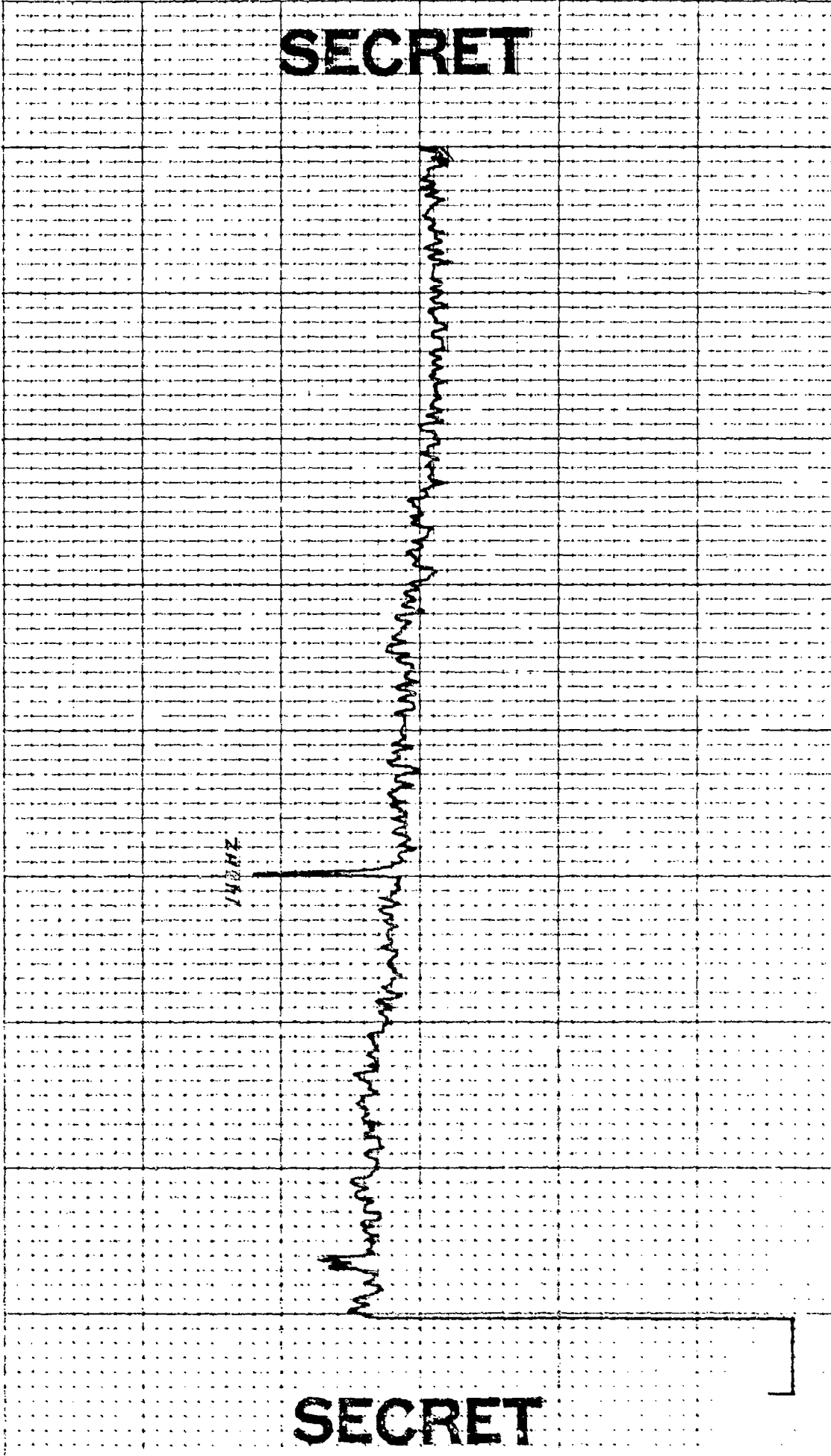
INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING

ANALYSIS BANDWIDTH: 1/10HZ

DEG AZ STEERING

CENTER FREQ: 150 HZ

1 ELEMENT



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DATE:

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

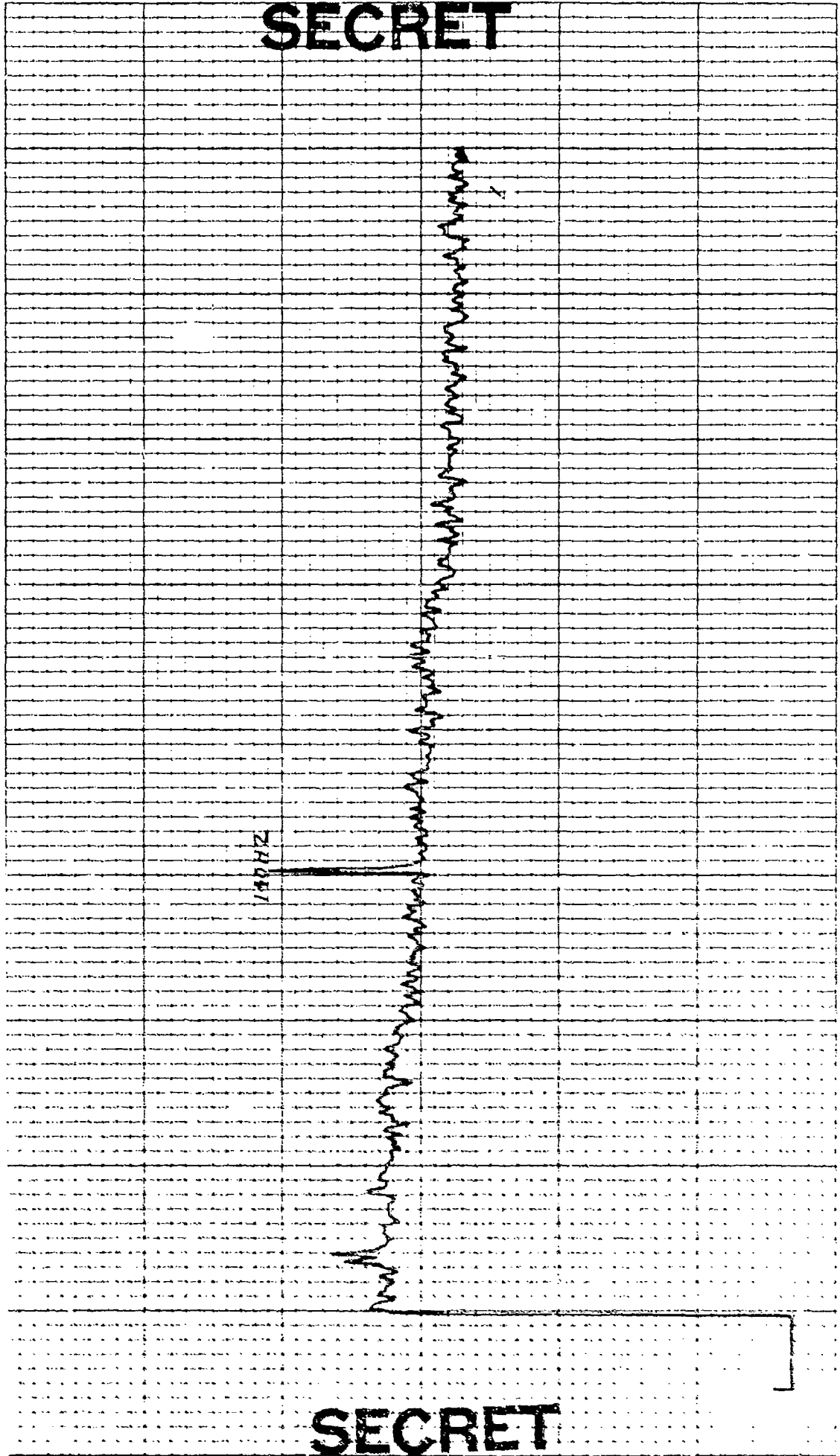
DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

ATTEN: DB

WTC: HANNING



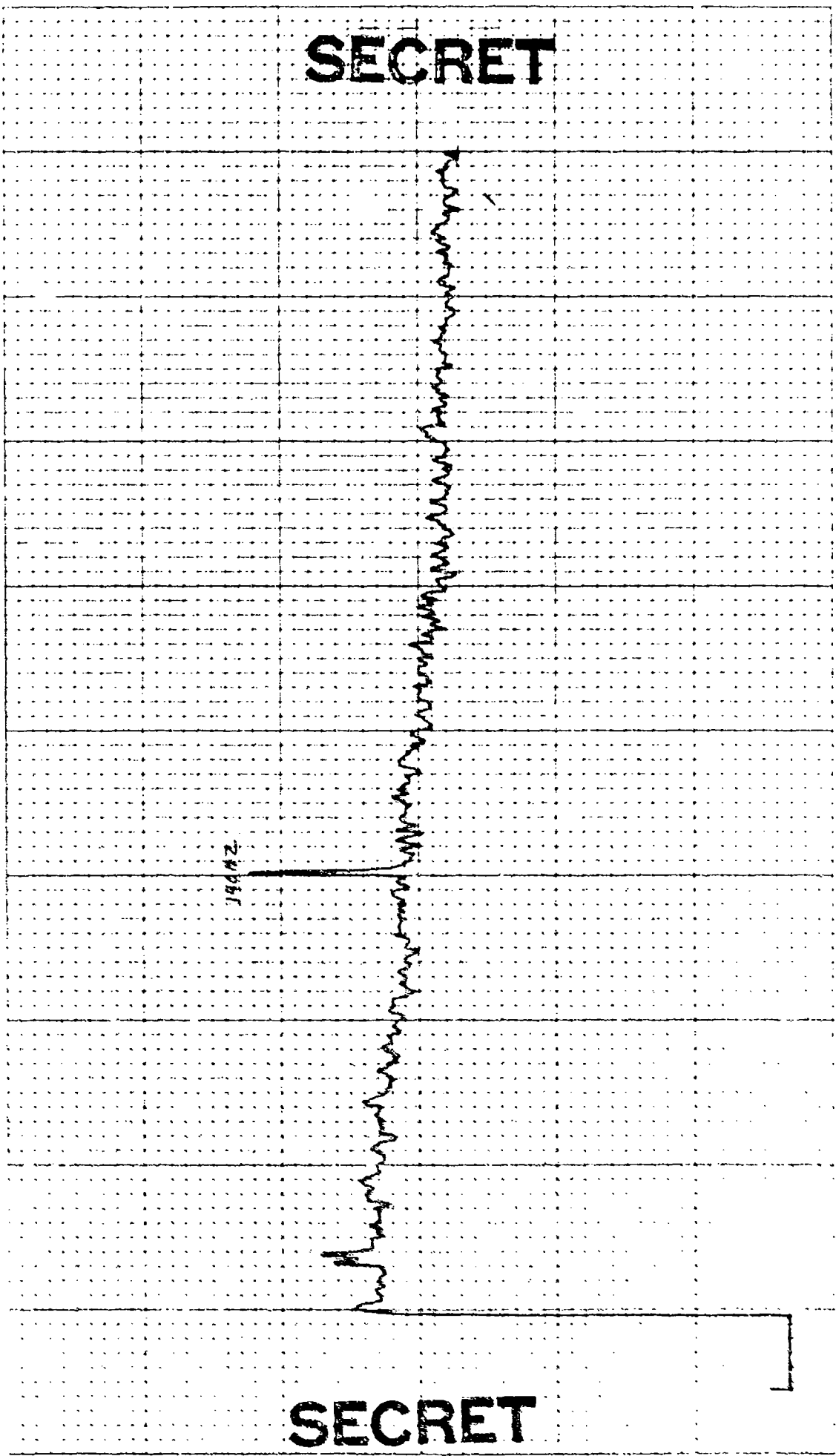
REEL: F19 INDEX JS75

DATE OF ANALYSIS:

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

DATE/TIME: 2.7.77 - 0974 Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ STEERING

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



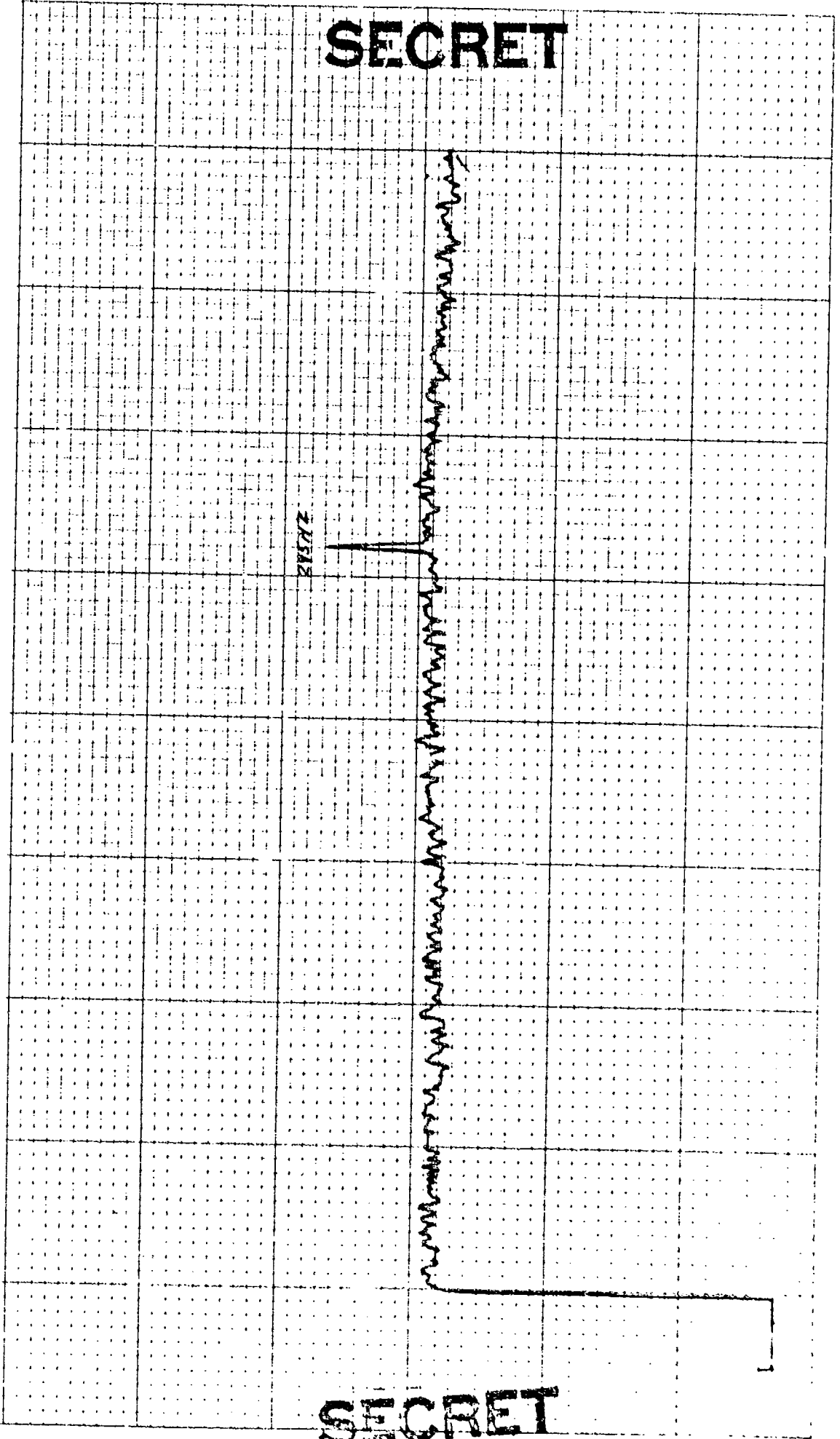
CONTROL: 2-7 - 0934 (1)
OMNI SPECTRUM (ELEMENT 2)
EXERCISE: BEAKING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

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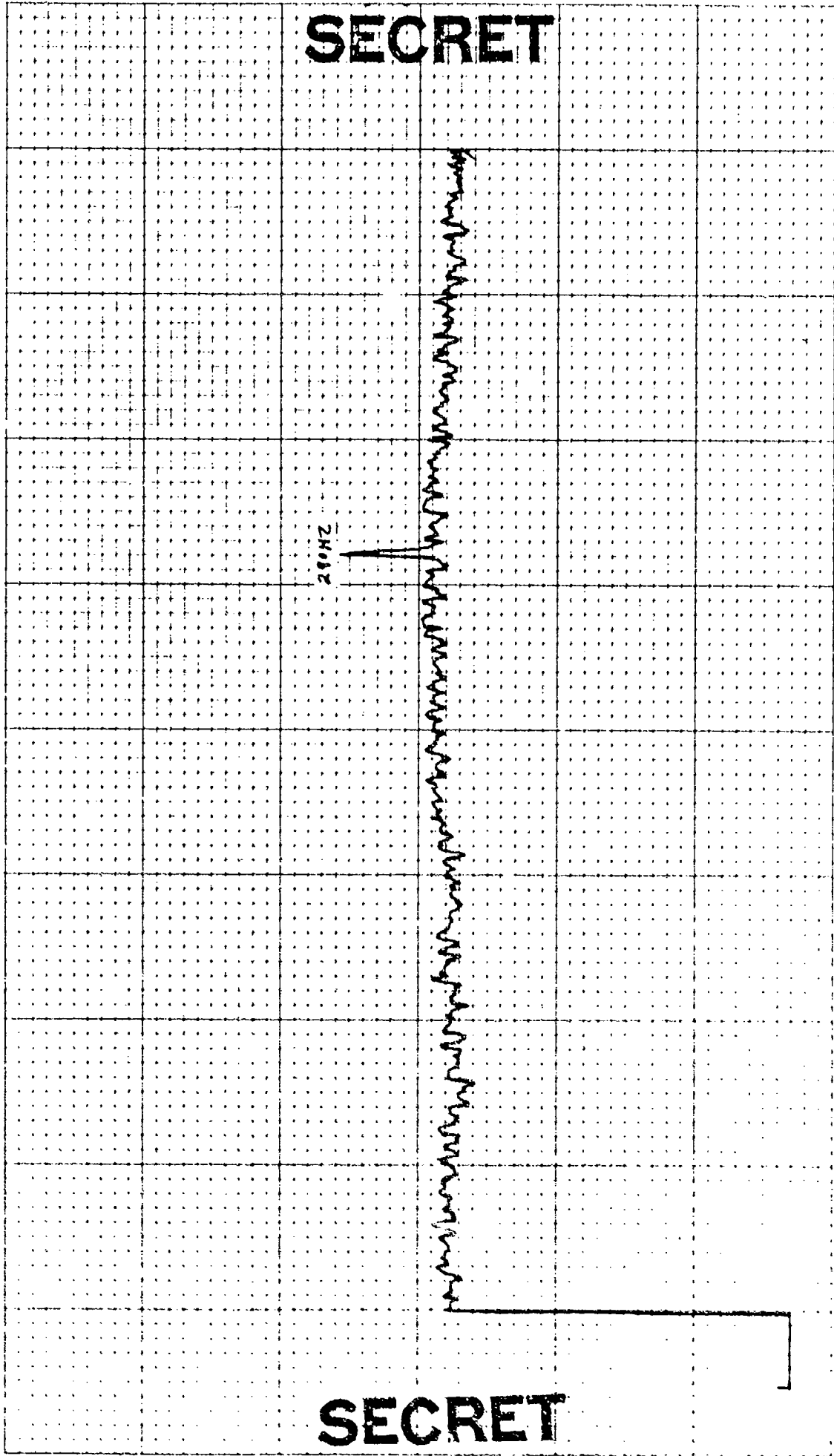
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CONTROL: 2-7-0974 (2) DATE OF ANALYSIS: REEL: F14 INDEX: J575
 OMNI SPECTRUM (ELEMENT 4) DATE/TIME: 2-7-77 - 0834 Z INTEGRATION TIME 320 SECS ATTN: DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 CENTREP FREQ: 290 HZ _____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



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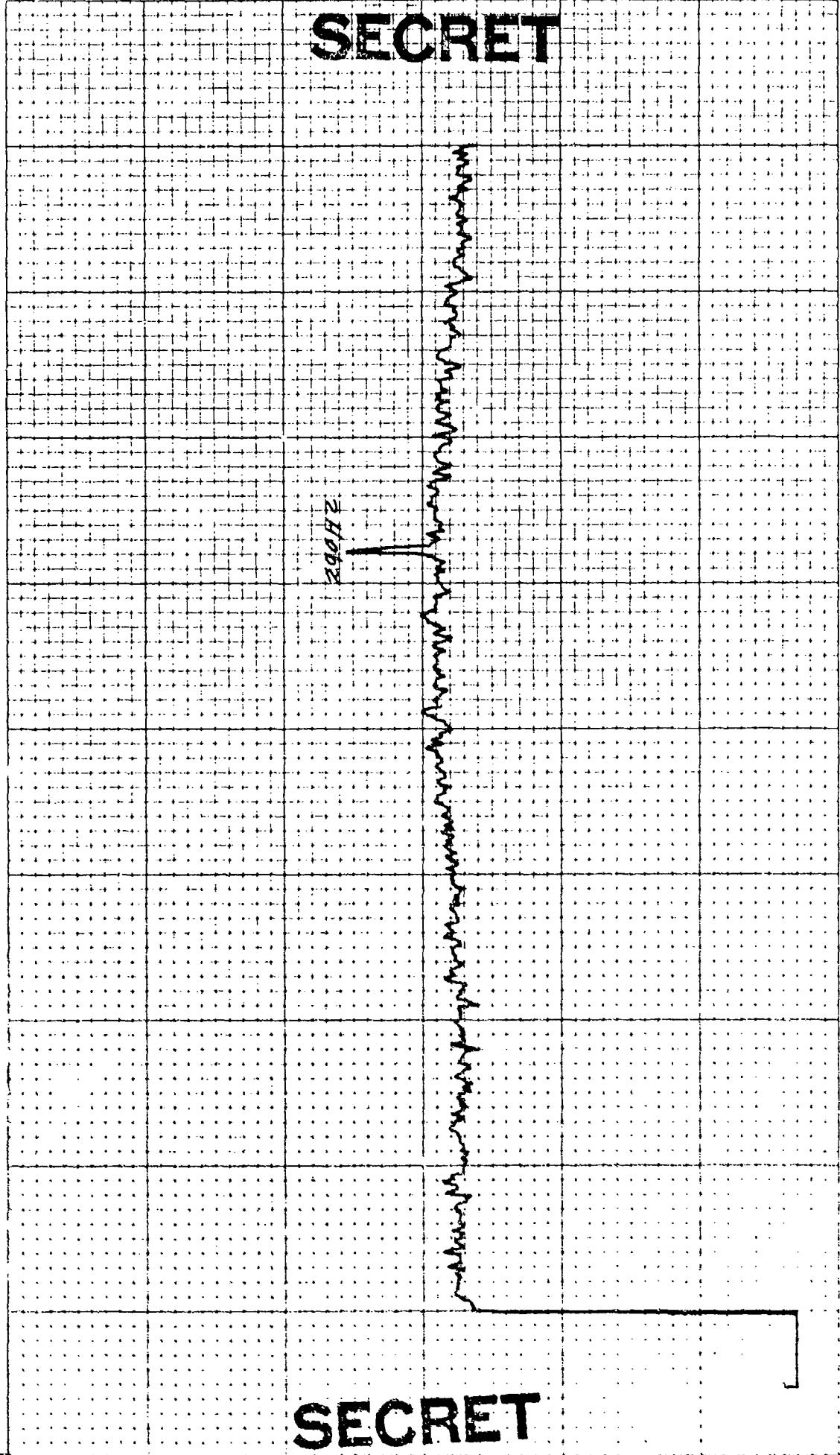
REEL: F14 INDEX 3575

DATE OF ANALYSIS:

DATE/TIME: 27-77-0934Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING

CONTROL: 27-0934(3)
OMNI SPECTRUM(ELEMENT 6)
EXERCISE: BEARING STAKE
CENTER FREQ: 260 HZ
1 ELEMENT



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CONTROL: 2-7 -0924 (4) REEL: F14 INDEX 3575

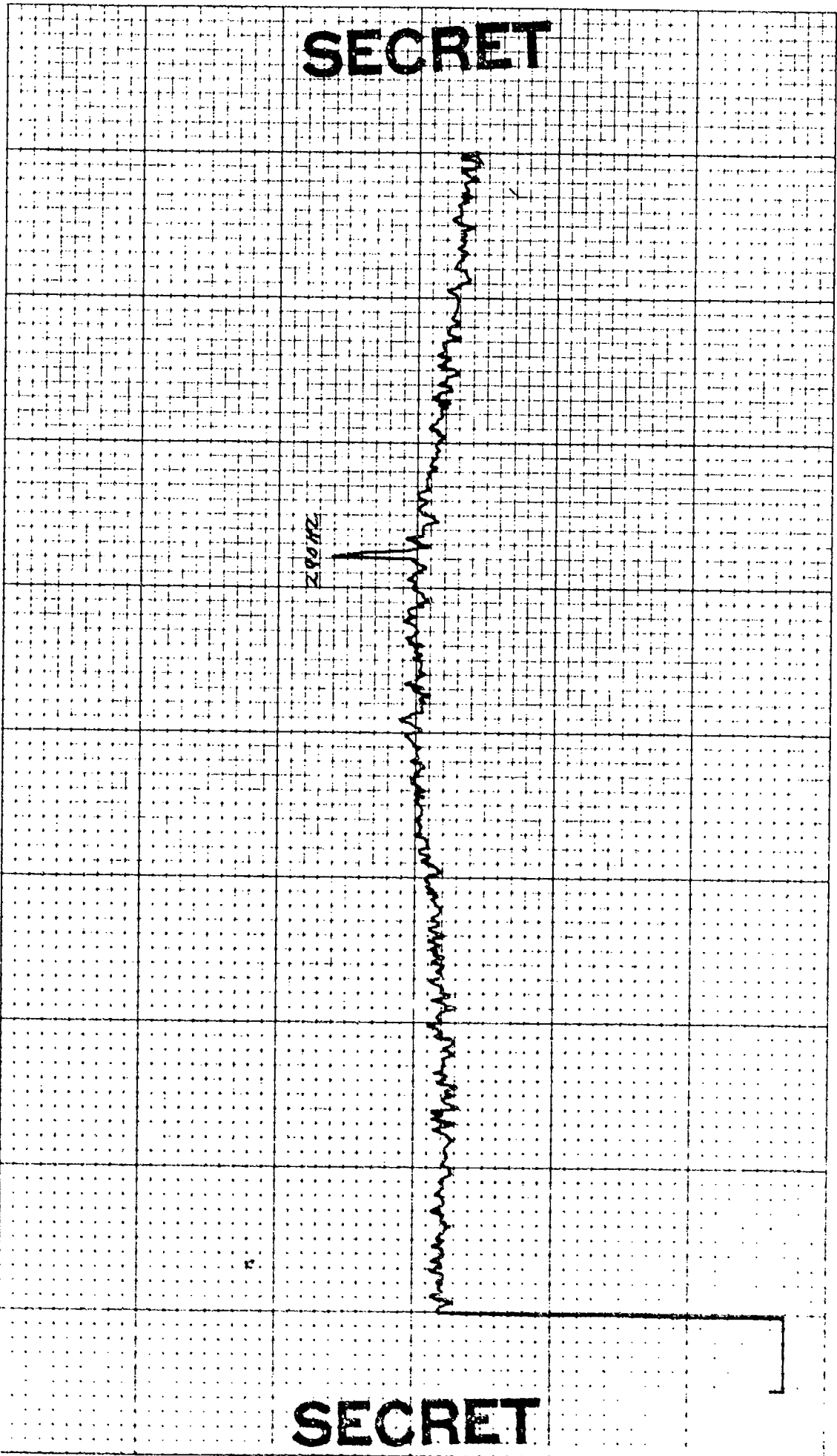
OMNI SPECTRUM (ELEMENT 9) DATE OF ANALYSIS:

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

CENTER FREQ: 260 HZ ANALYSIS BANDWIDTH: 1/10HZ

1 ELEMENT _____ DEC AZ STEERING FILTER WTG: HANNING

INTEGRATION TIME 320 SECS ATTN: DB



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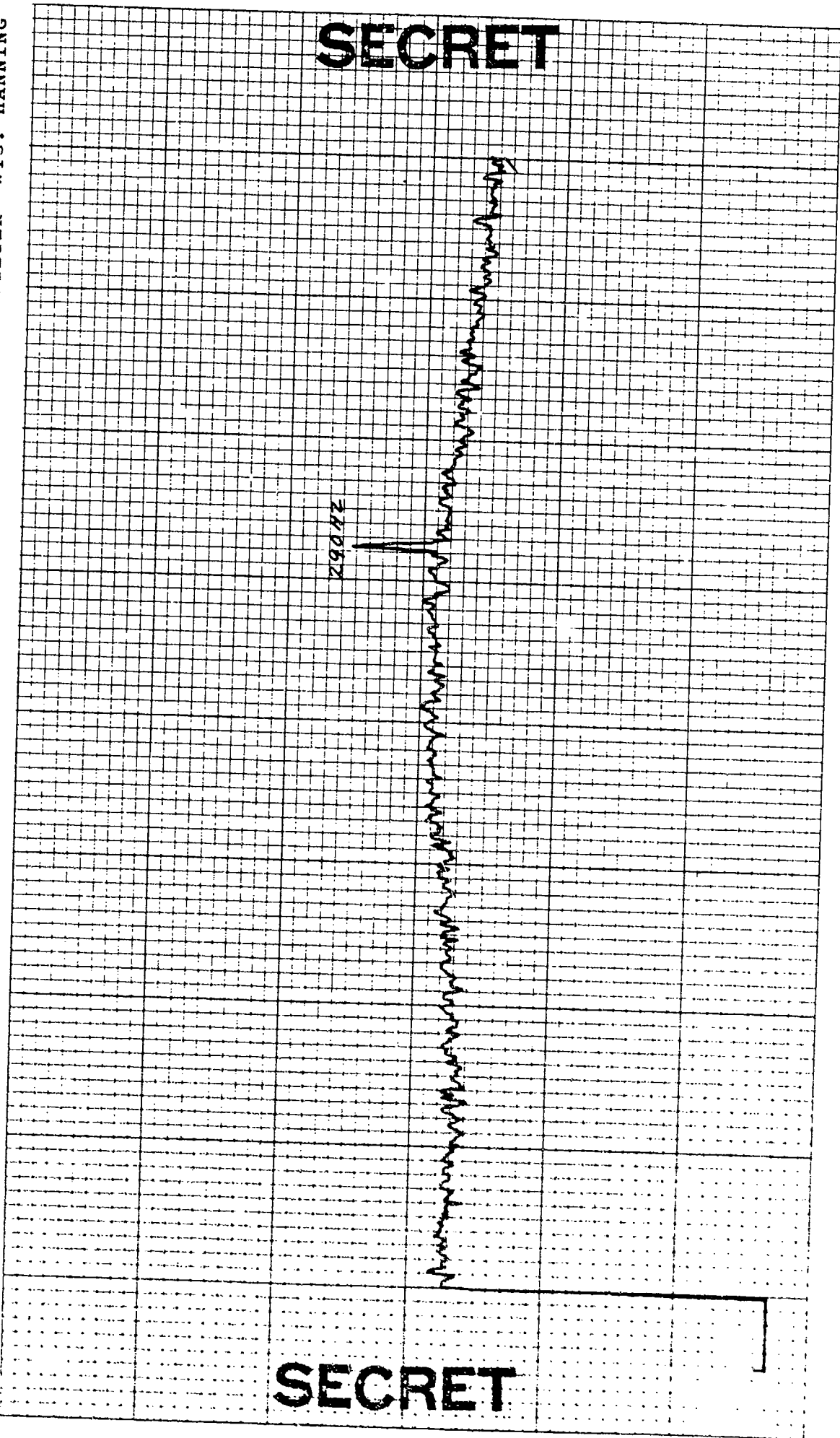
CONTROL: 2-7 - 0934(5)
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 290 HZ
1 ELEMENT

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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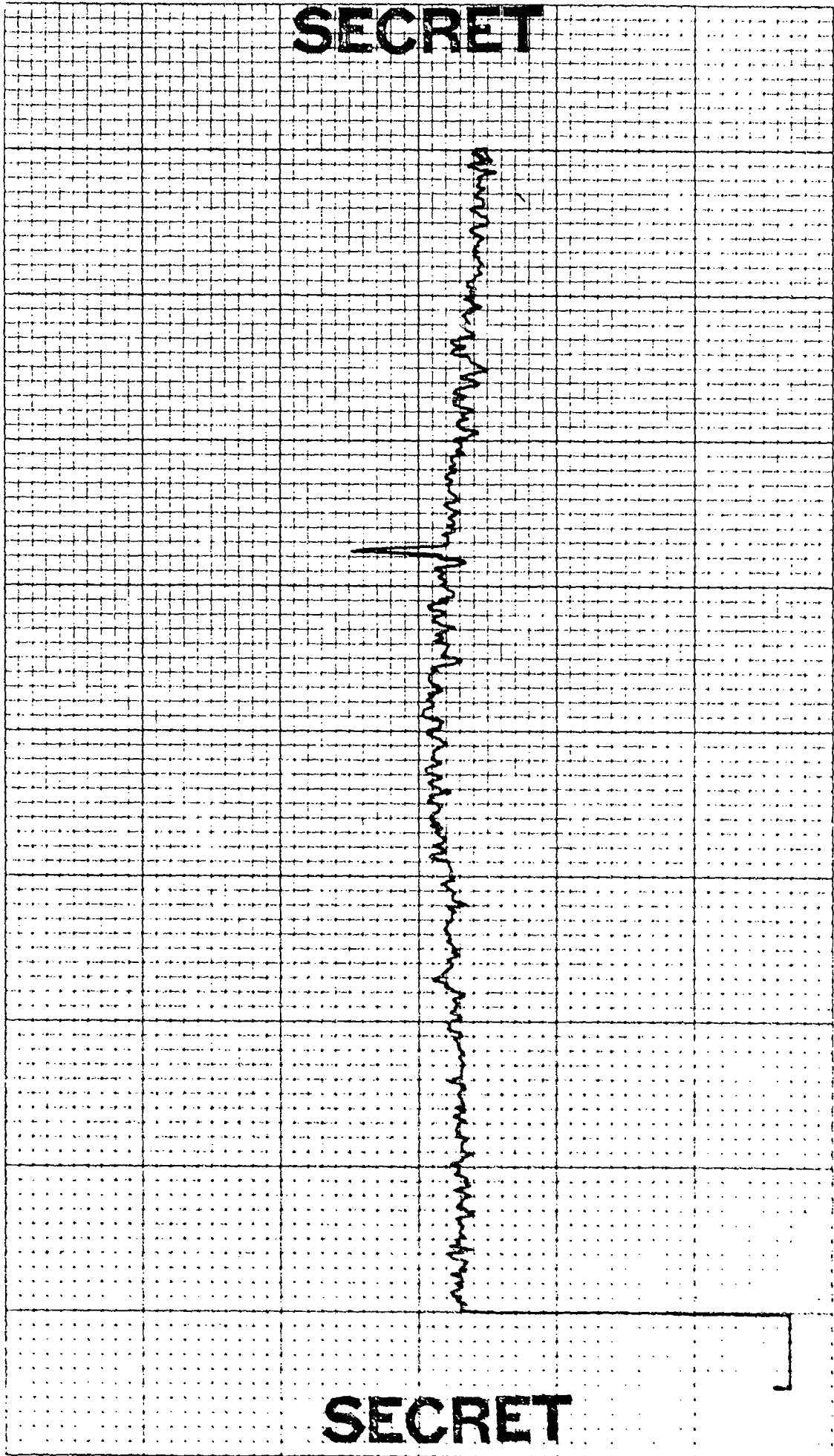
REEL: F14 INDEX 3575

DATE OF ANALYSIS:

CONTROL: 0934 - 61 (DP3)
OMNI SPECTRUM (ELEMENT 12)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 KHZ
1 ELEMENT

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

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



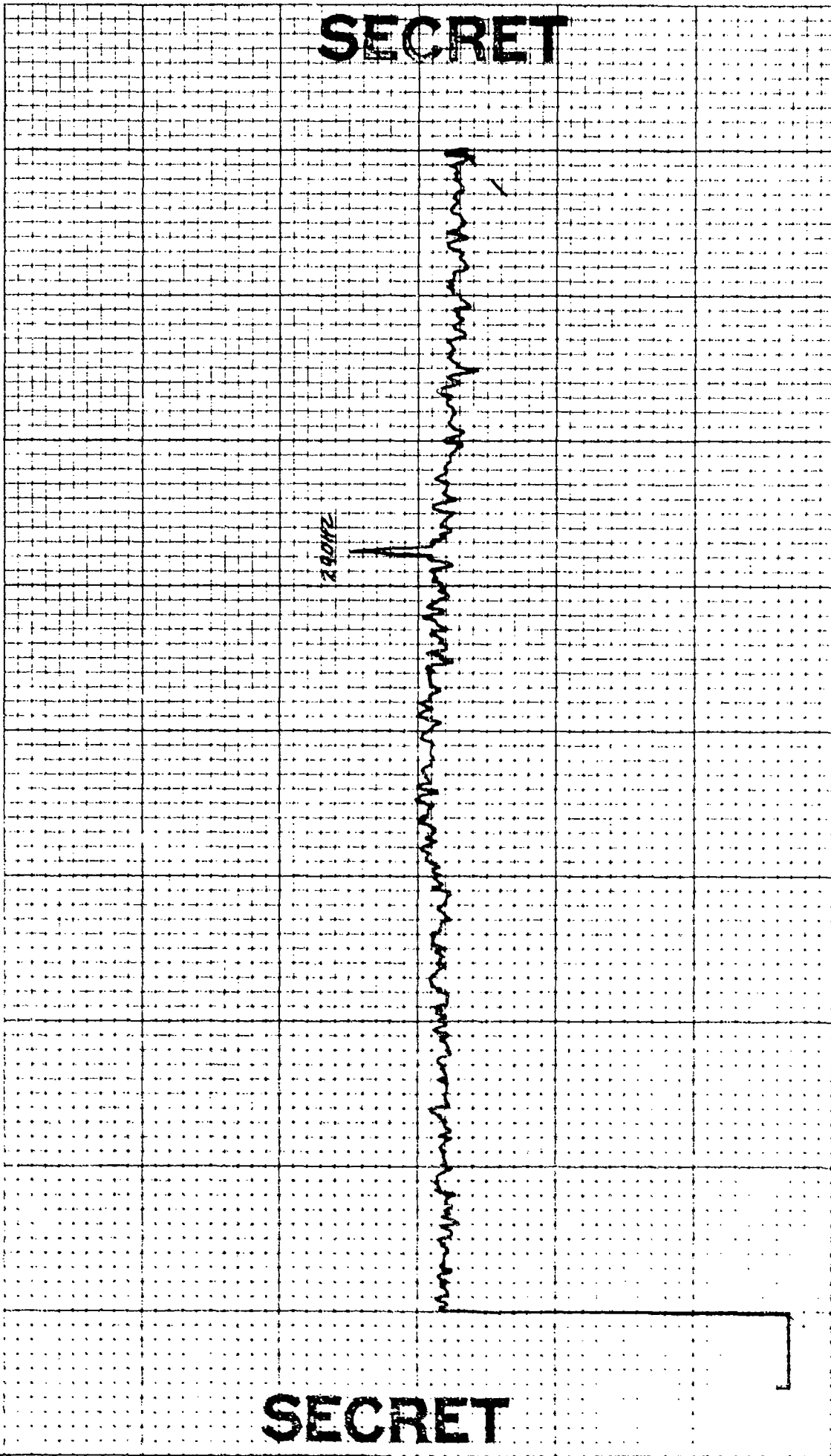
REEL: F14 INDEX 3575

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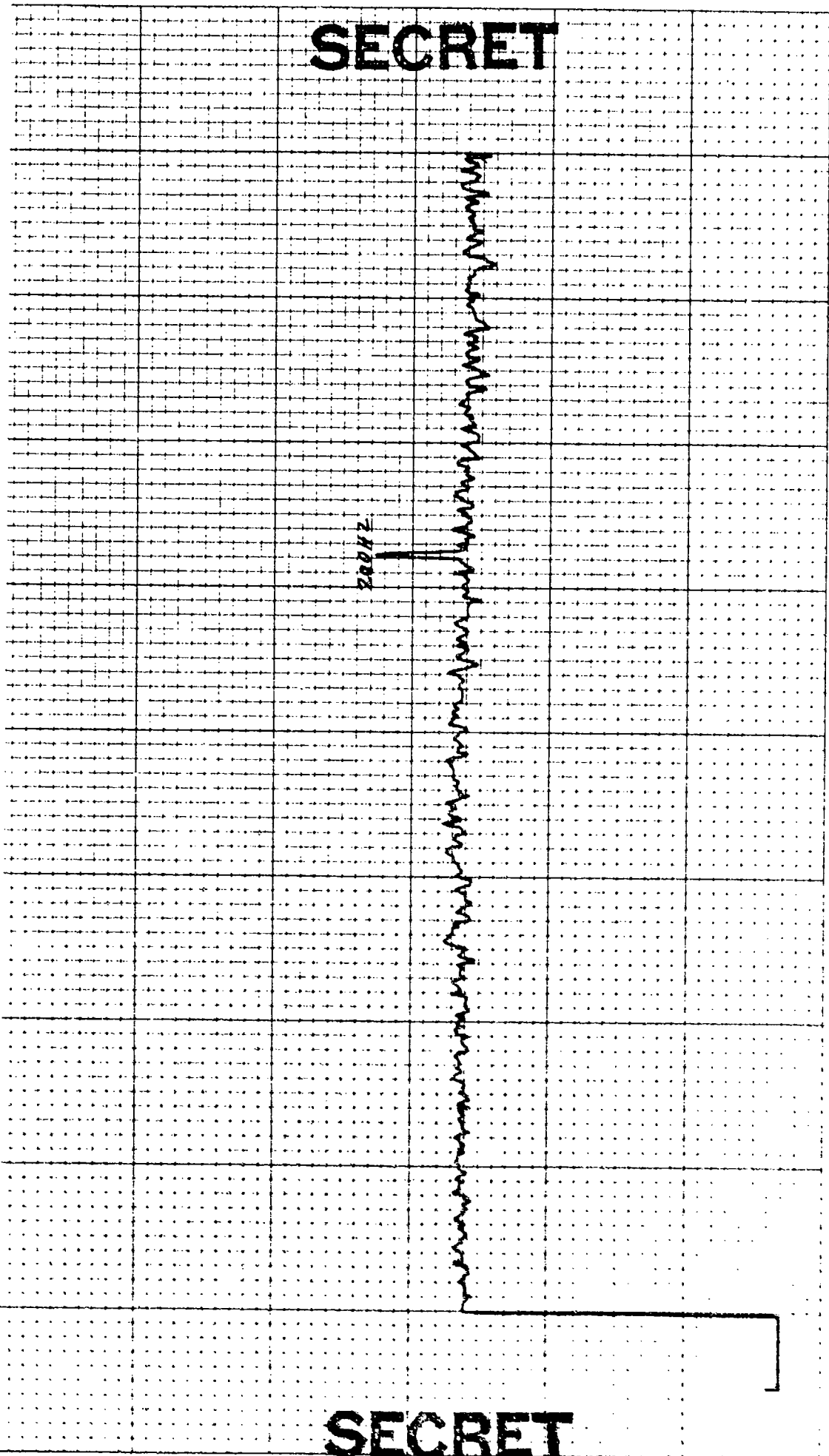
CONTROL: 2-7 -0934 (8)
OMNI SPECTRUM(ELEMENT 16)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F14 INDEX 3525

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



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CONTROL: 2-7 -0934 (9)
OMNI SPECTRUM(ELEMENT 19)
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

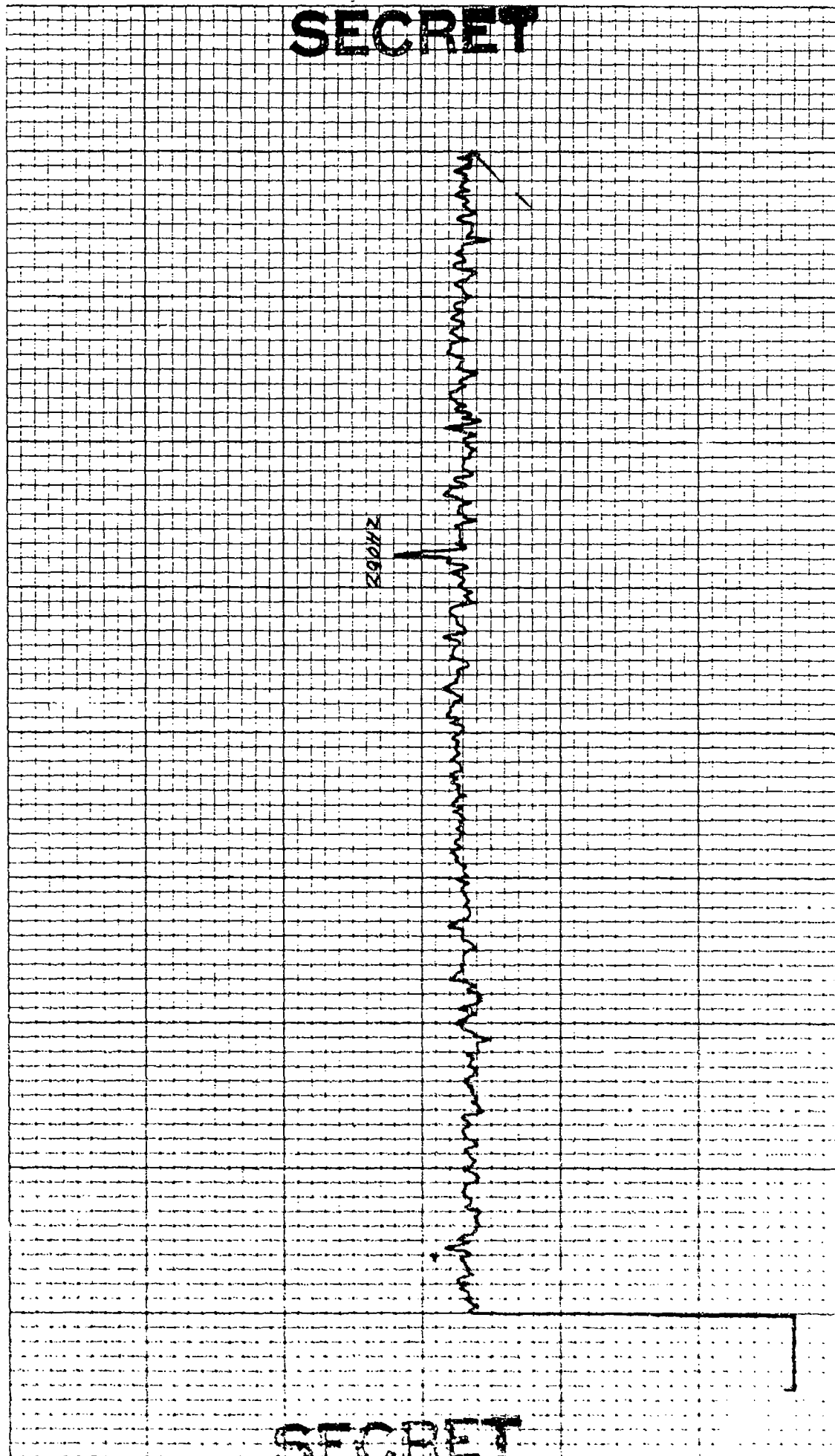
FILTER

ATTEN: DB

WTG: HANNING

REEL: F14

INDEX 3575



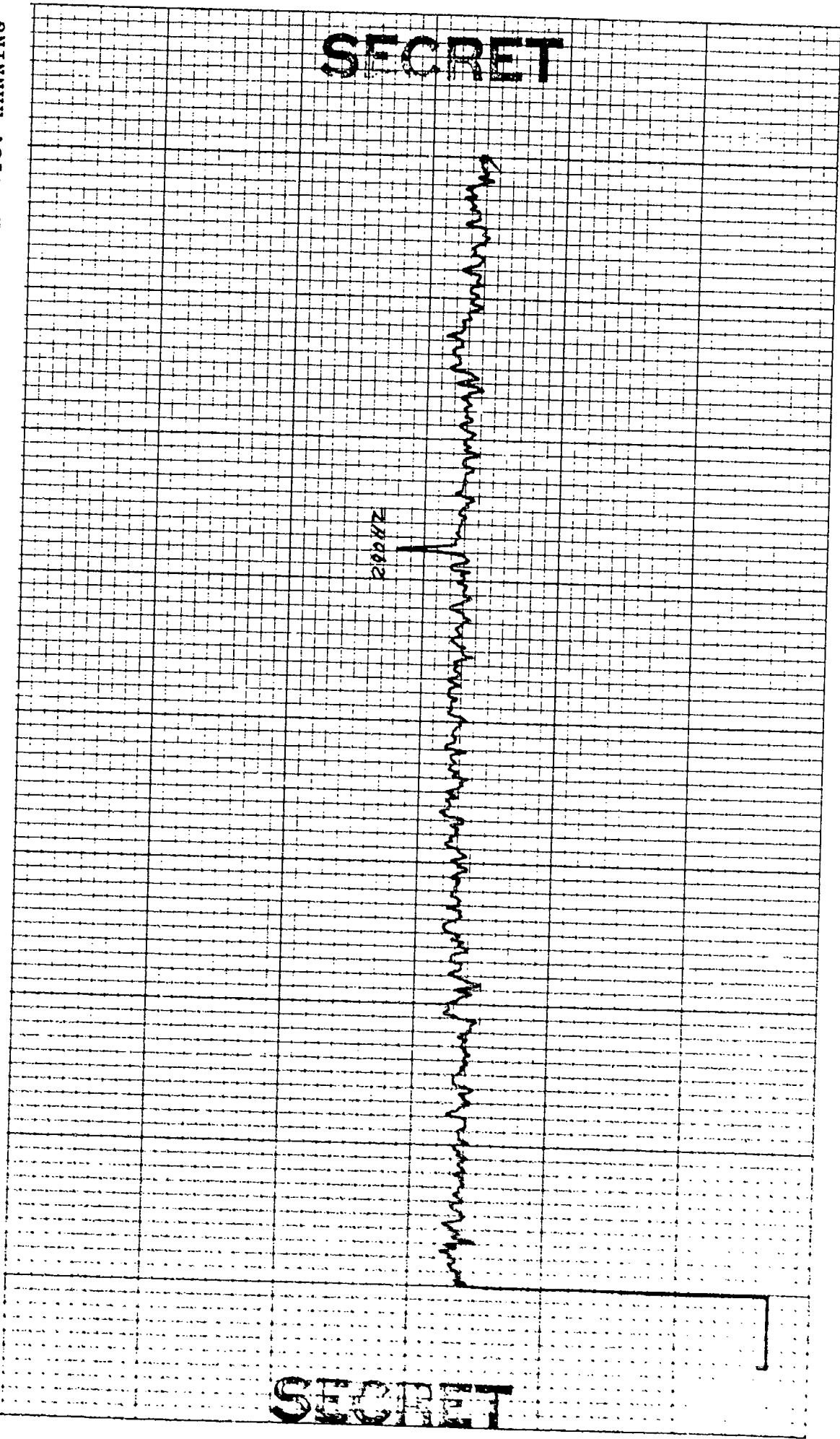
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CONTROL: 2.7 - 0934 (10)
 OMNI SPECTRUM (ELEMENT 20)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
 1 ELEMENT

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

REEL: F14 INDEX 3575
 INTEGRATION TIME 320 SECS ATTN: DB
 FILTER WTG: HANNING



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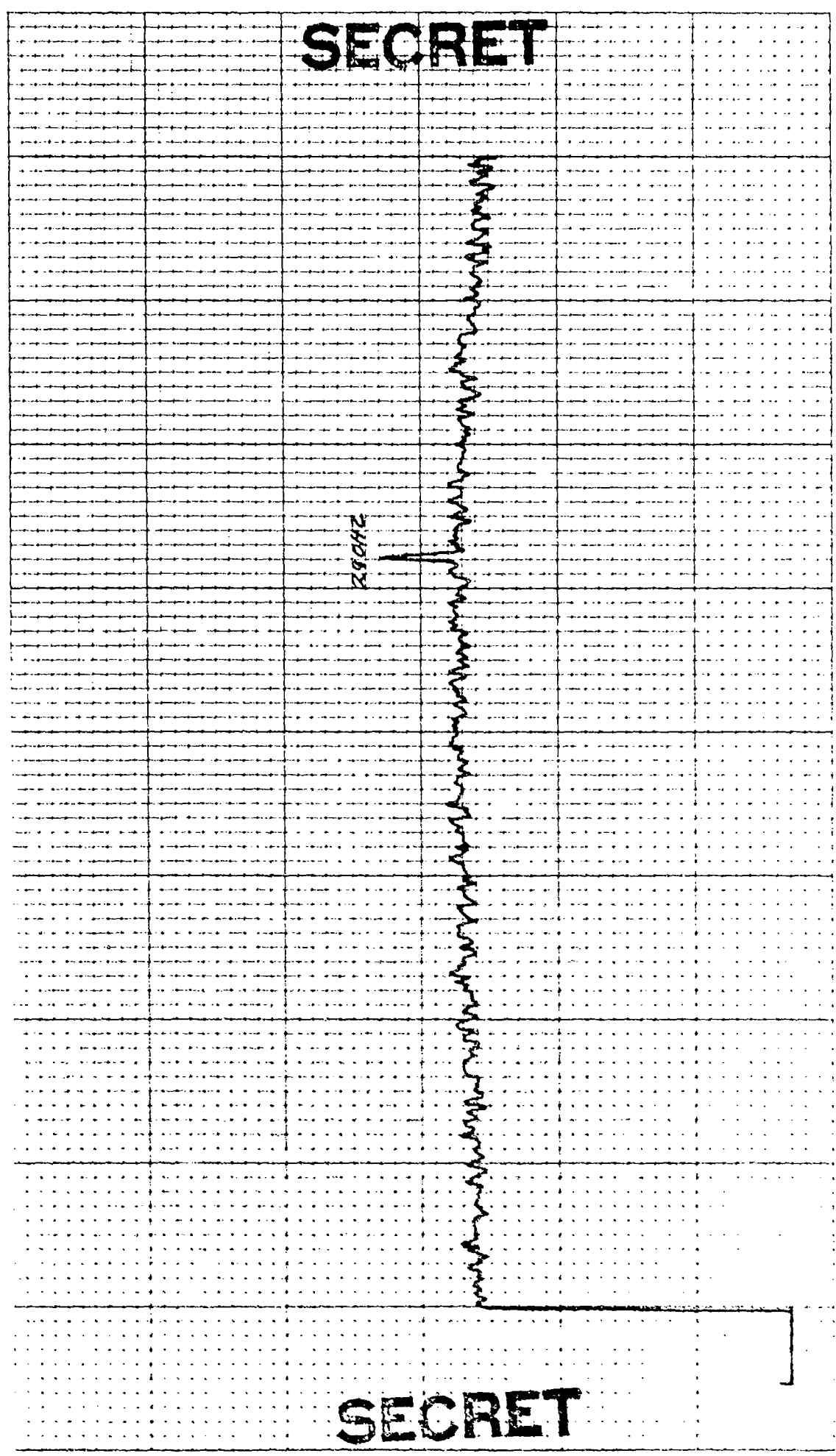
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CONTROL: 2-7 -0934 (11)
 OMNI SPECTRUM(ELEMENT 33)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 HZ
 I ELEMENT

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 WTC: HANNING
 ATTN: DB



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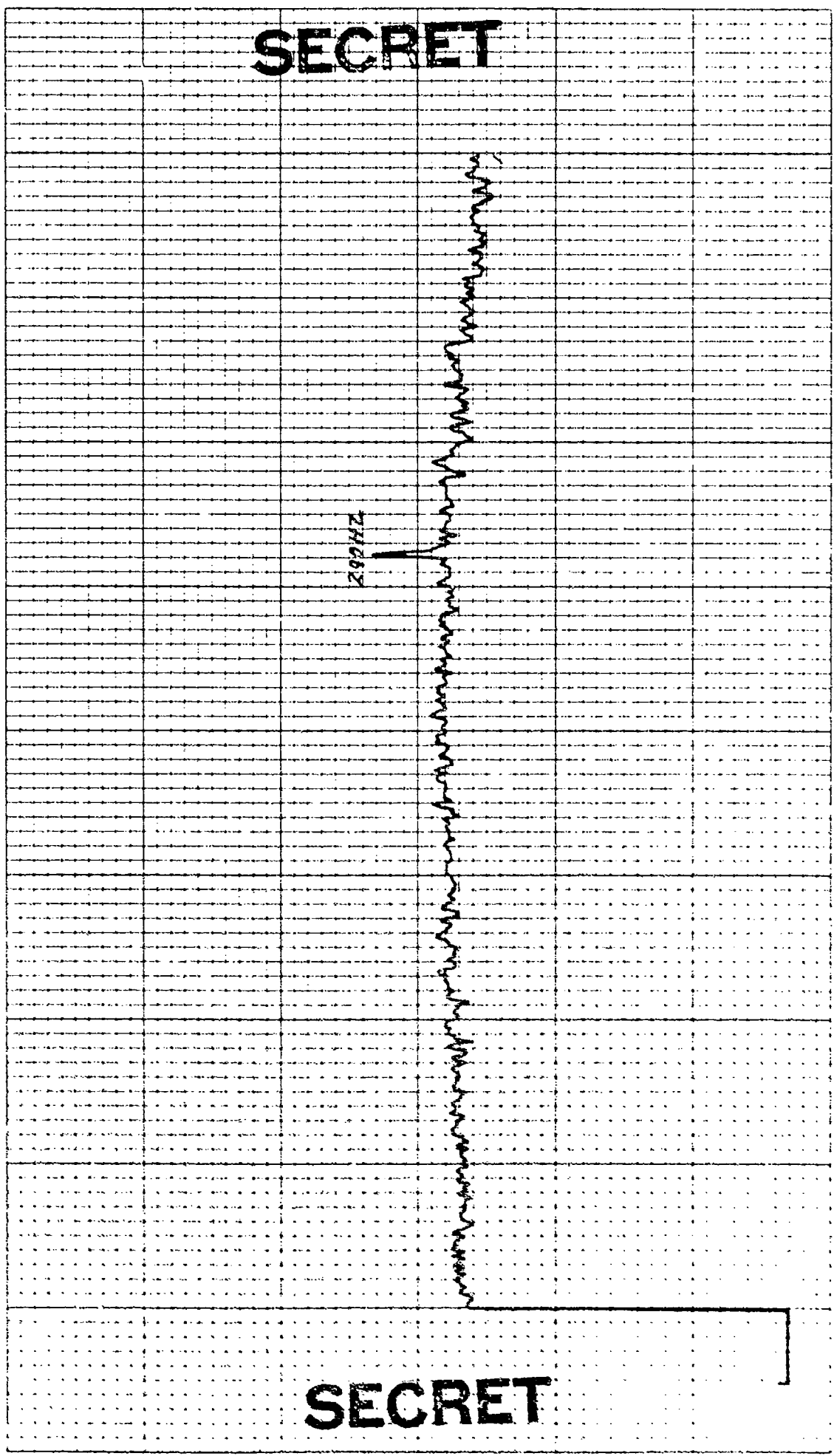
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REEL: F14 - INDEX 3575

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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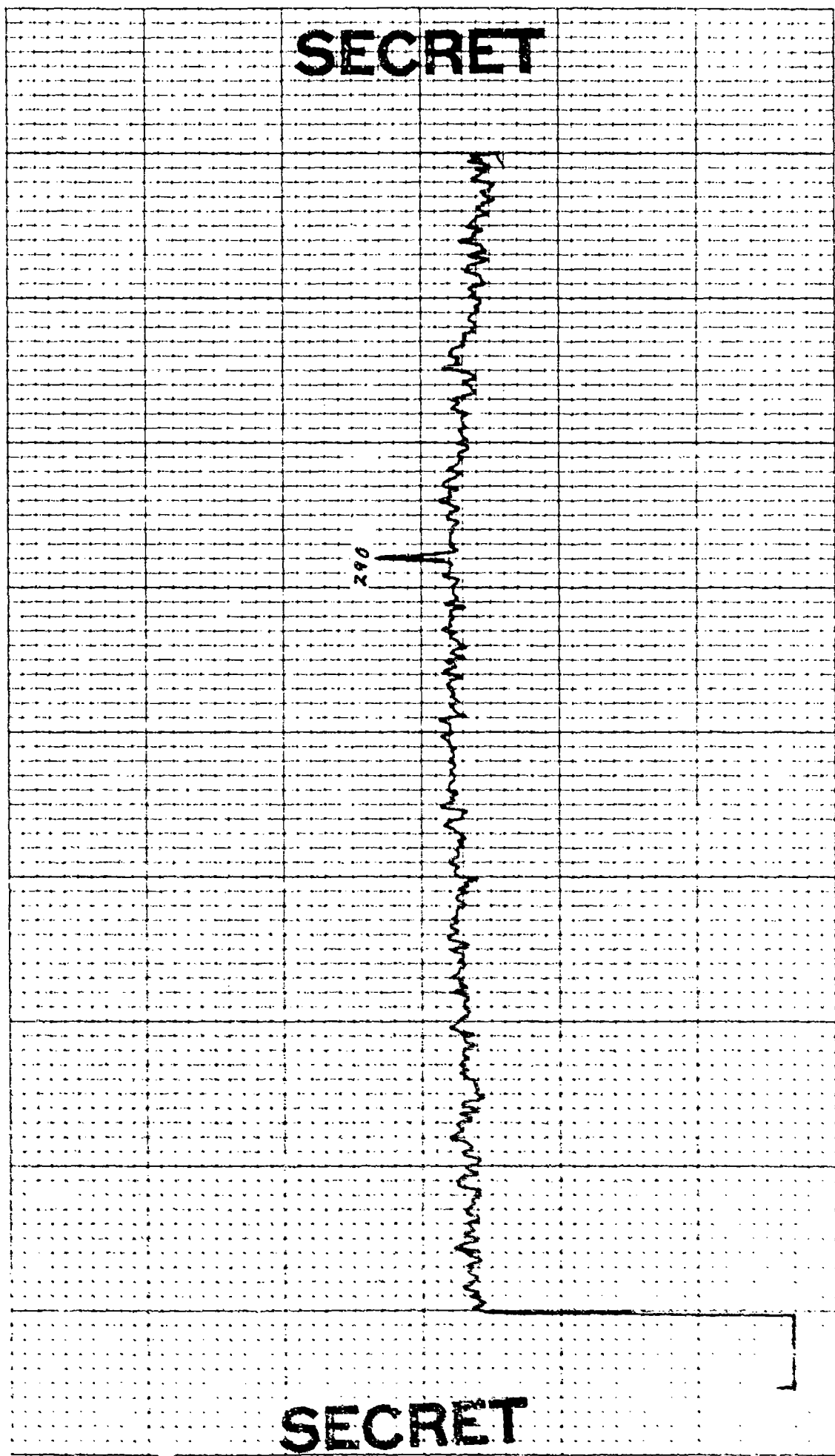
REEL: F14 INDEX 2575

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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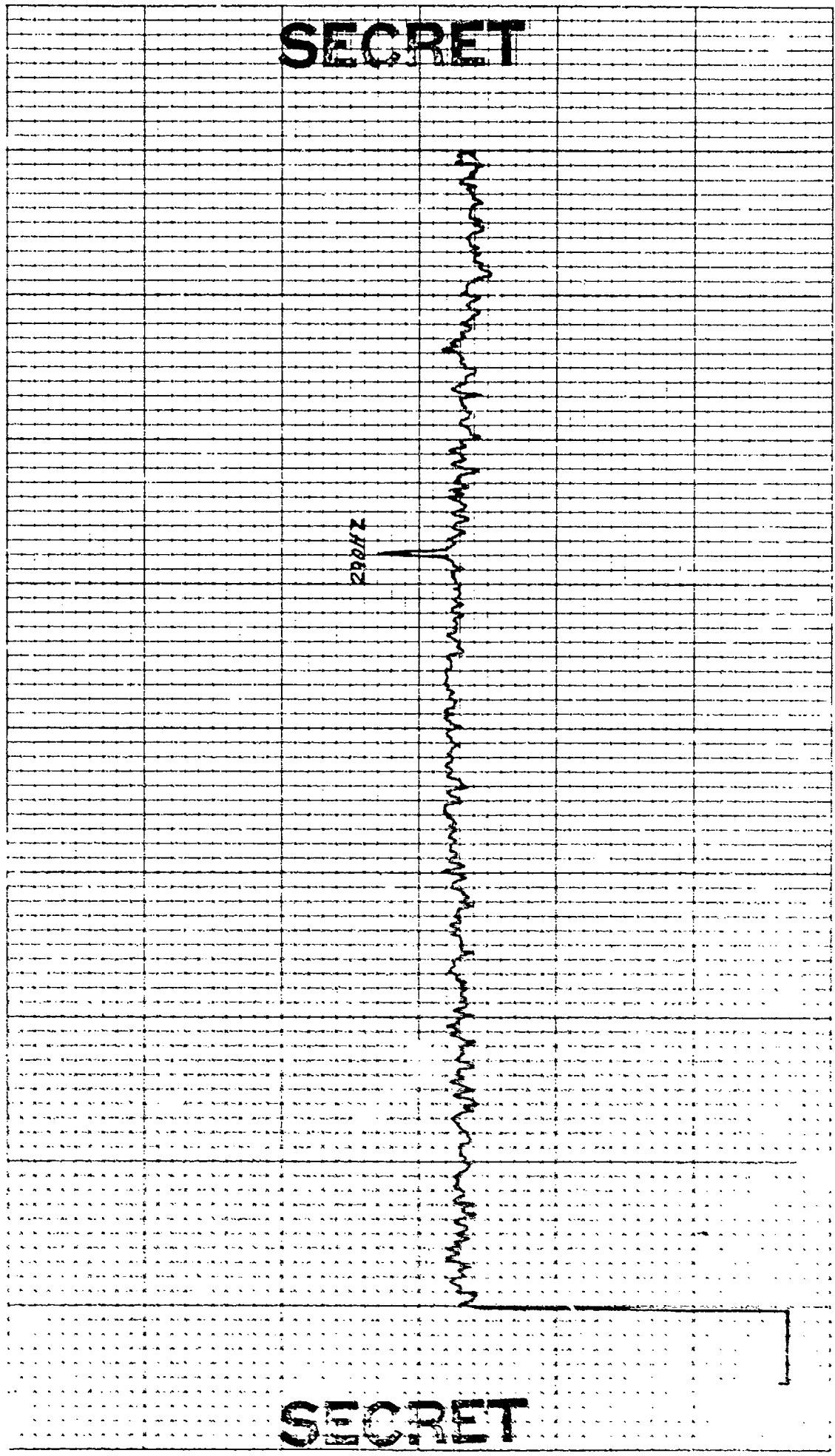
CONTROL: 2-7 -0934 (14) REEL: F14 INDEX 3573

OMNI SPECTRUM (ELEMENT 29)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

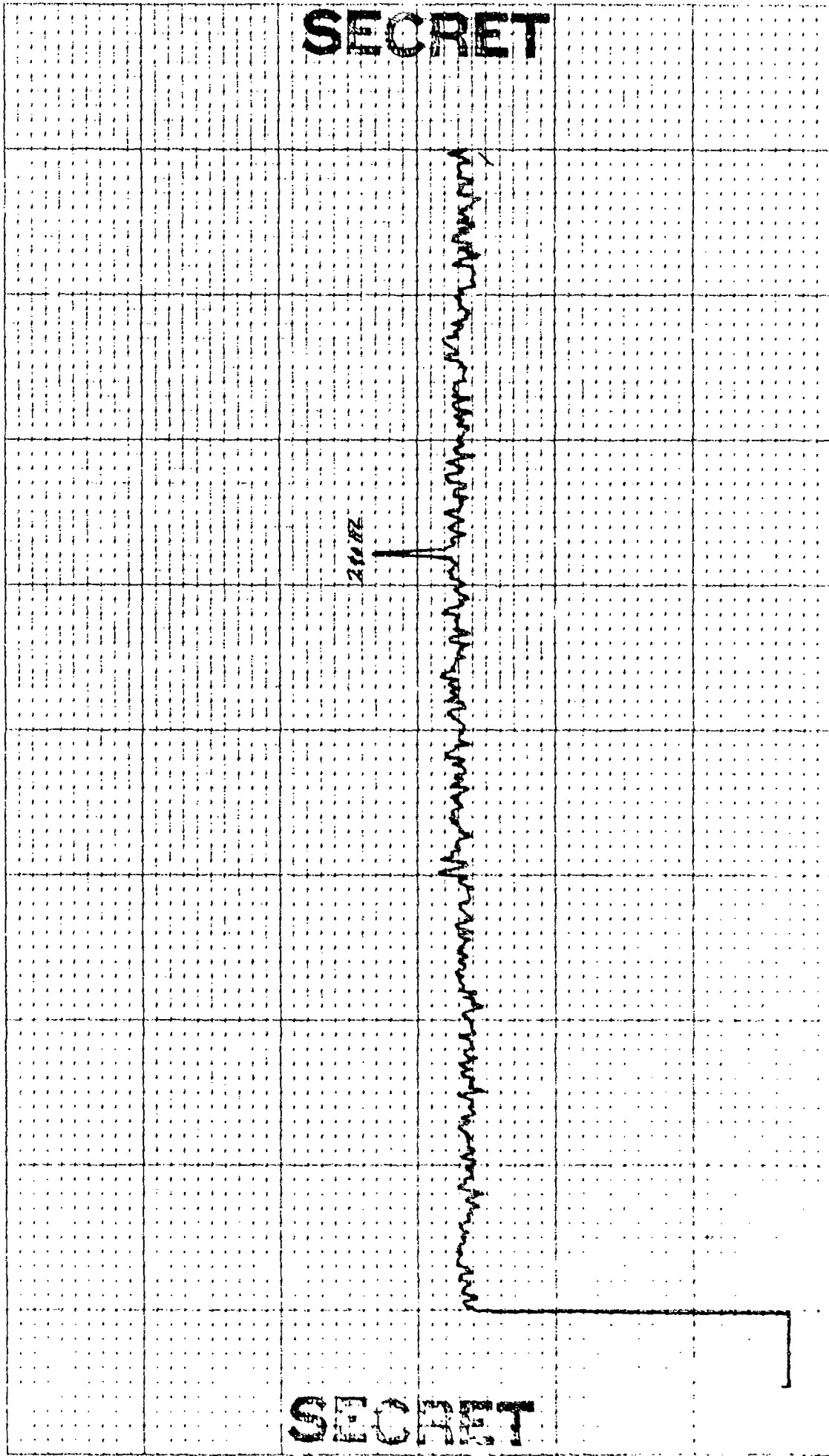
DATE/TIME: 2-7-77 -0934 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEC AZ STEERING

INTEGRATION TIME 320 SECS ATTN: DB
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:

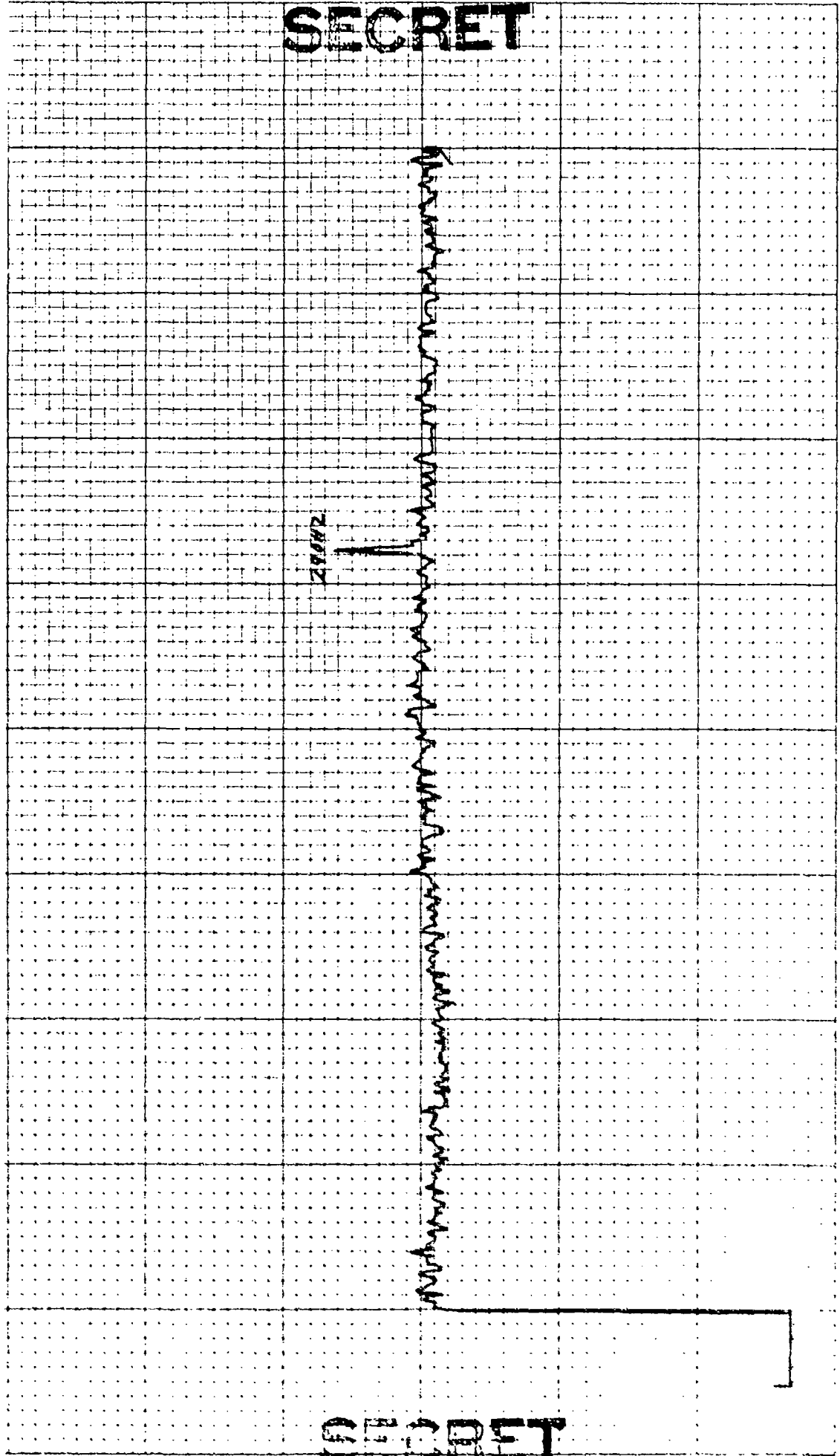
DATE/TIME: 2-7-77 - 0934 Z

ANALYSIS BANDWIDTH: 1/10 HZ
DEG AZ STEERING

REEL: F14

INDEX J575

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



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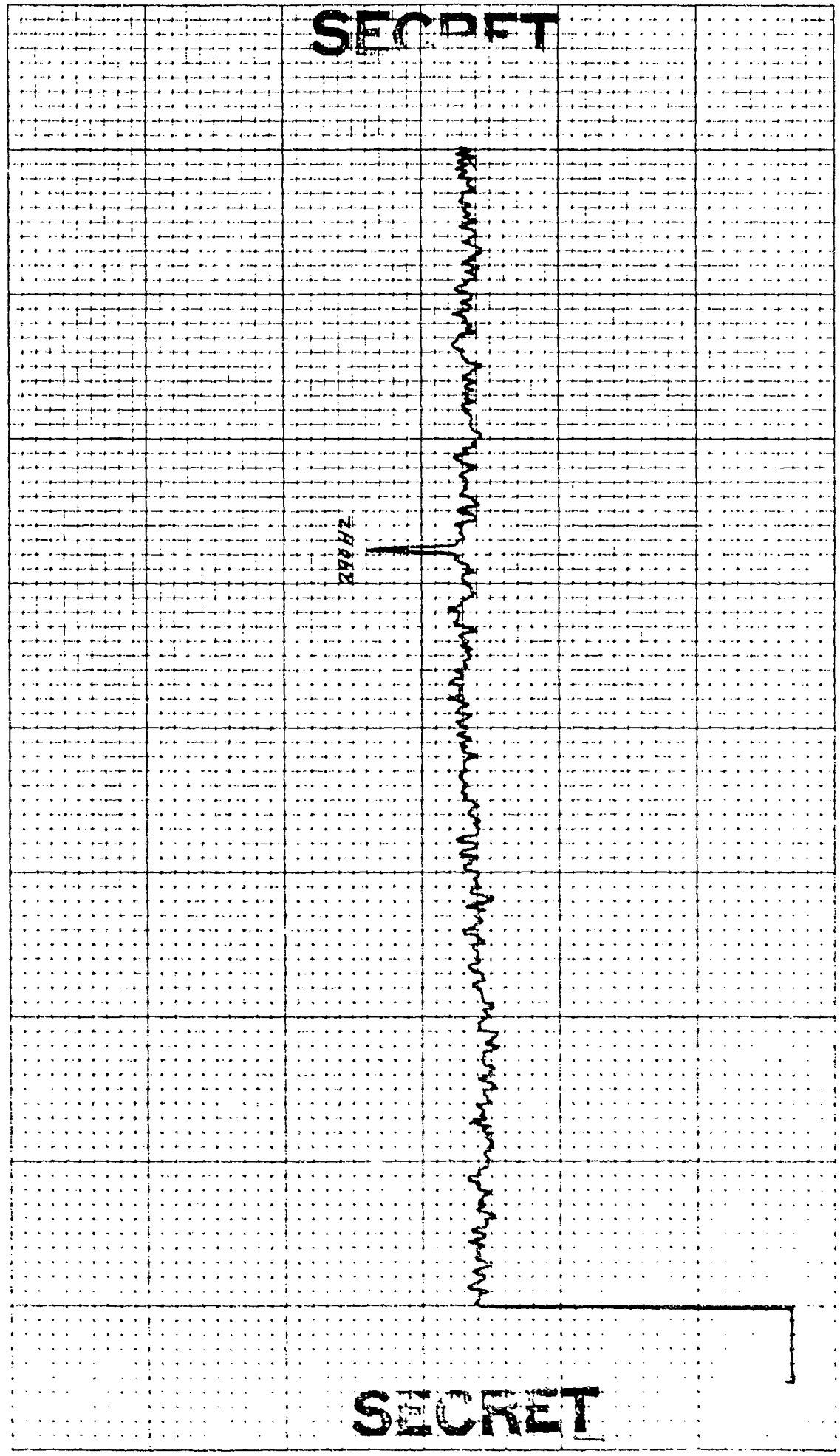
Σ 184 50m 5m

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)
OMNI SPECTRUM(ELEMENT 37)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

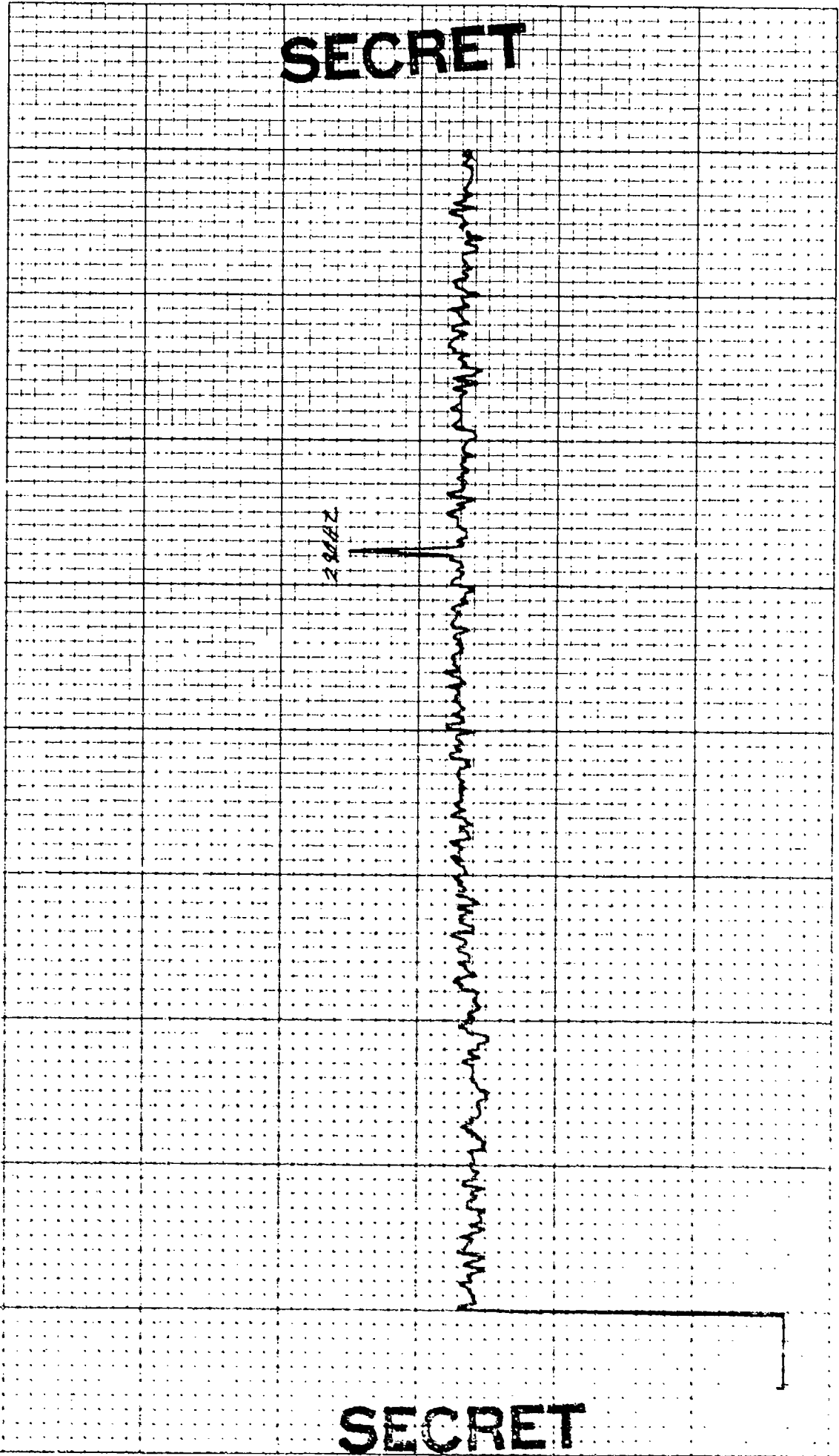
DATE OF ANALYSIS:

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

ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

REEL: F14 INDEX: 5525

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING



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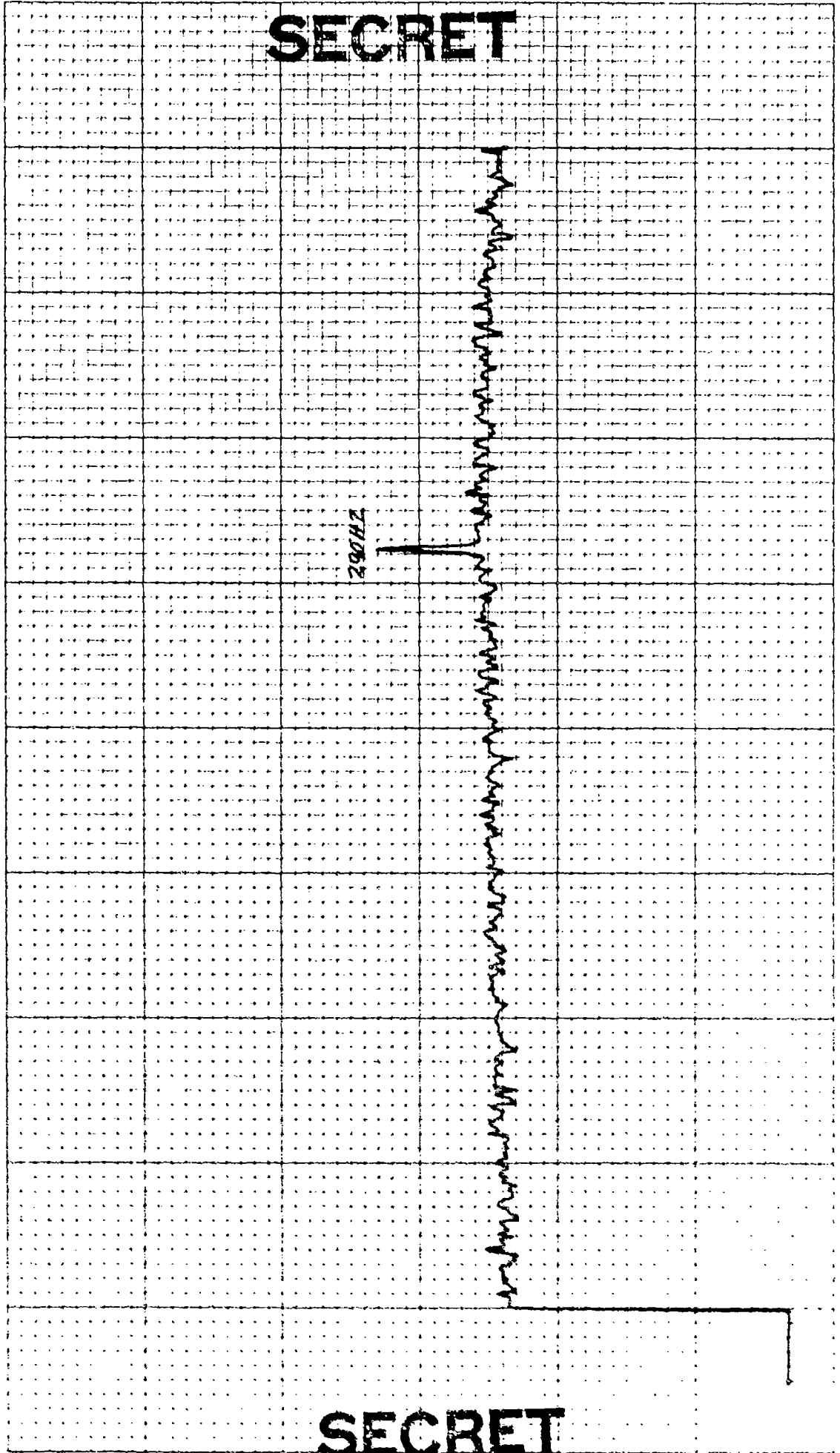
Σ 1 TO: 181 4CH: 5 10001

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:

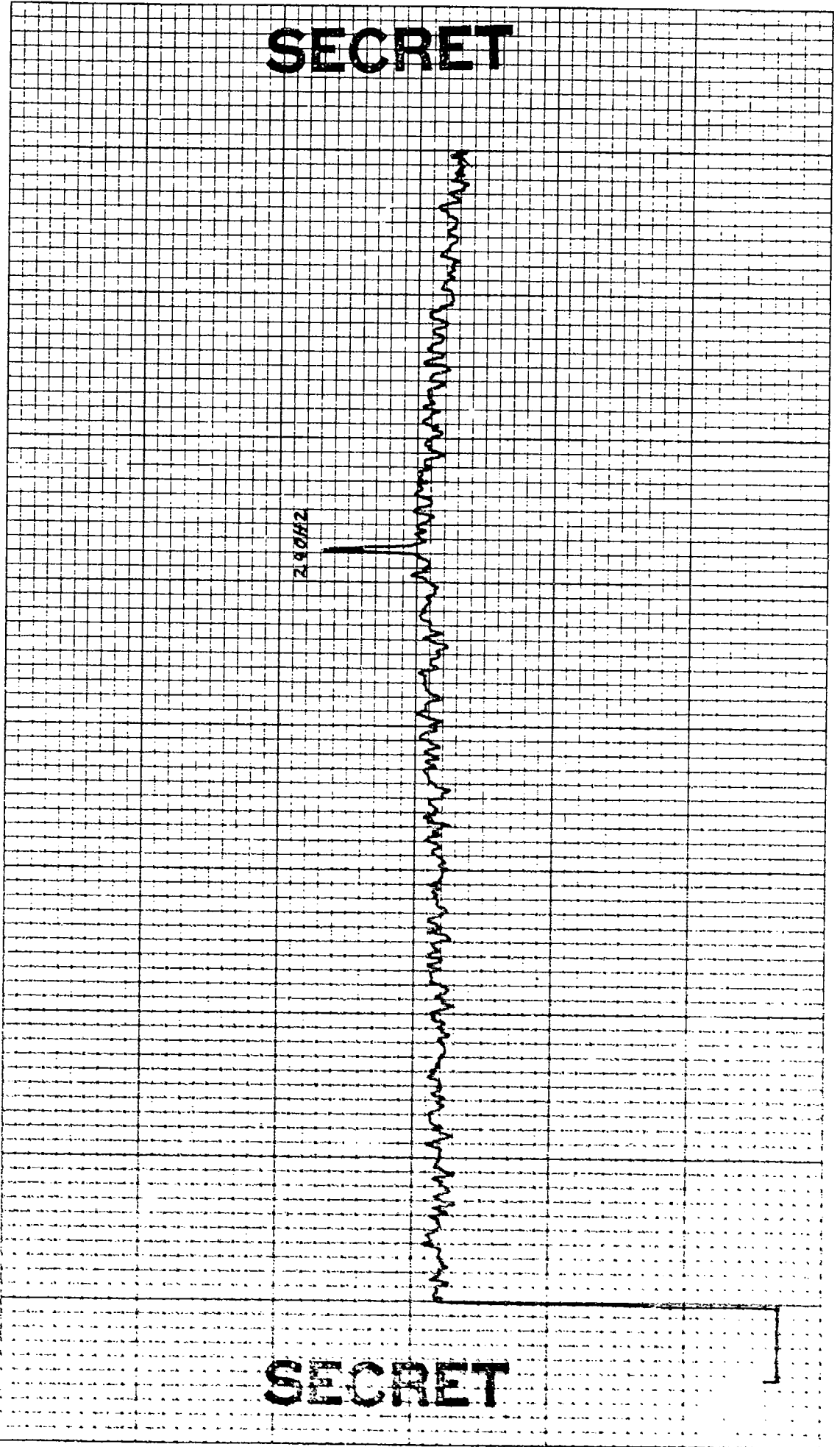
DATE/TIME: 2-7-77 -0934 Z

ANALYSIS BANDWIDTH: 1/10 HZ
DEG AZ STEERING

REEL: F14

INDEX 3575

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



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REEL: F14 INDEX 3575

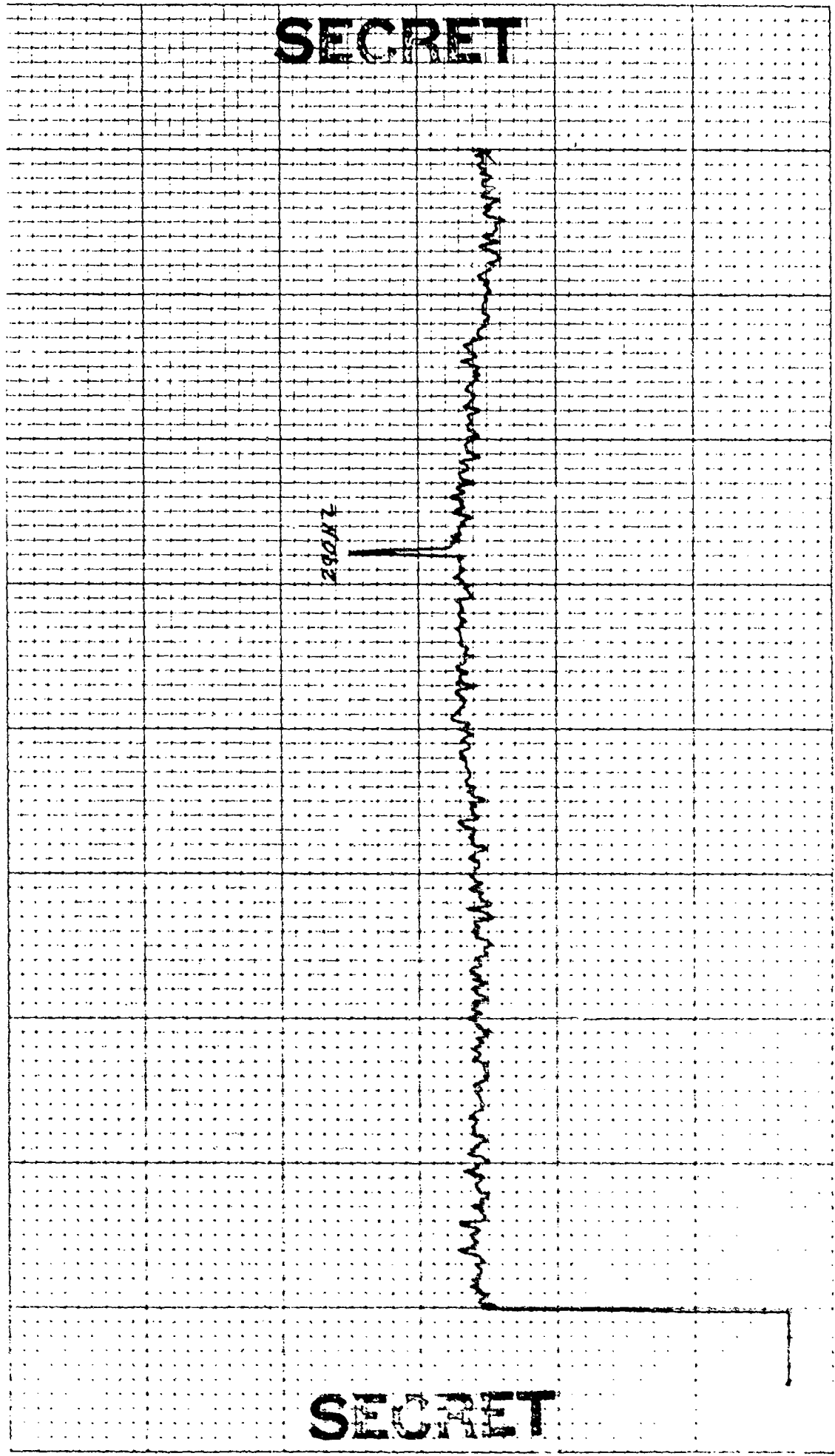
DATE OF ANALYSIS:

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

DATE/TIME: 27-77 -0974 Z
ANALYSIS BANDWIDTH: 1/10HZ
 DEG AZ STEERING

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING

CENTER FREQ: 200 HZ
1 ELEMENT



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REEL: F14 INDEX 7575

DATE OF ANALYSIS:

CONTROL: 2.7 -0934 (22)

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

OMNI SPECTRUM (ELEMENT 45)

ANALYSIS BANDWIDTH: 1/10HZ

EXERCISE: BEARING: STAKE

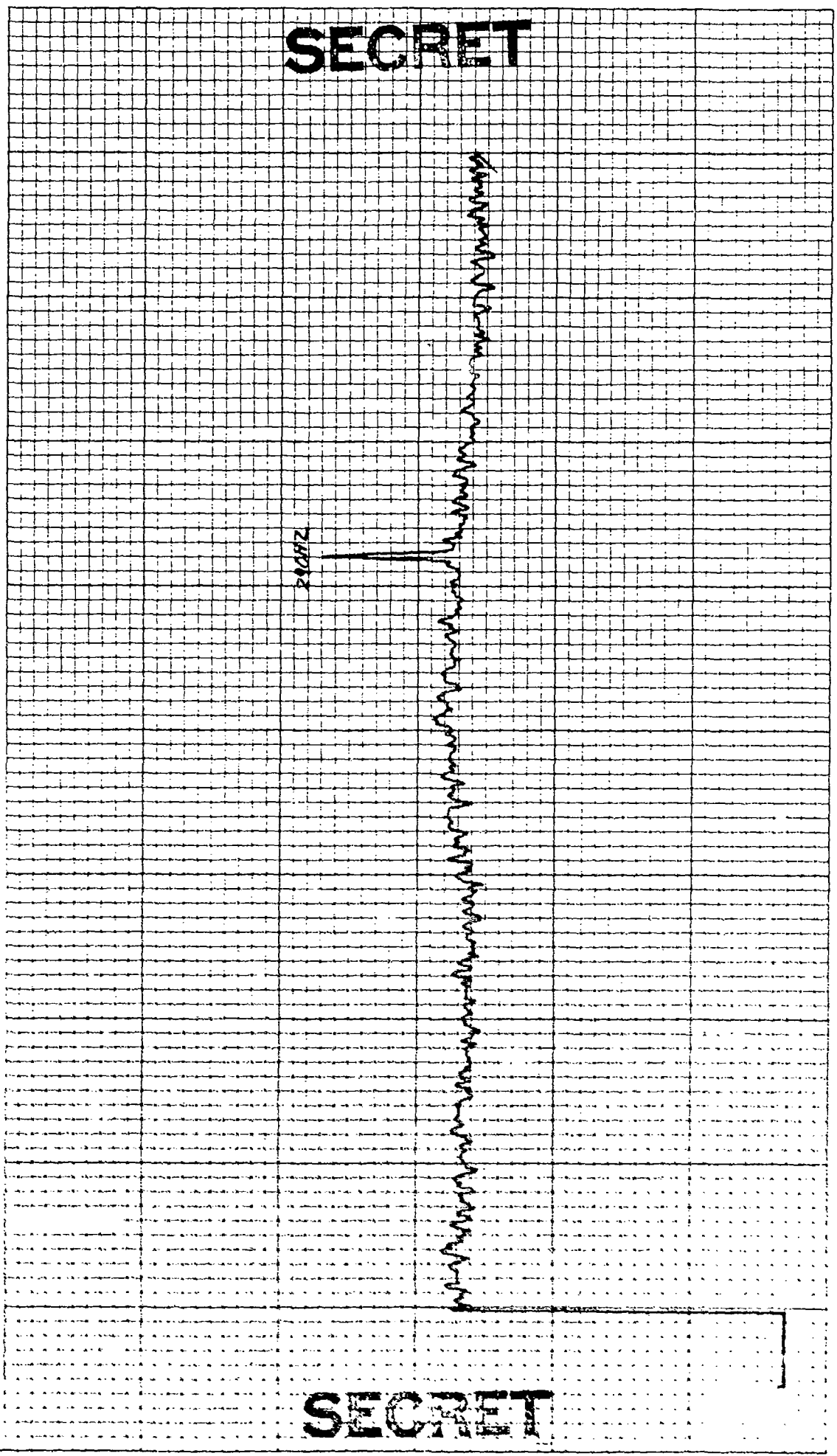
DEG AZ STEERING

CENTER FREQ: 280 HZ

INTEGRATION TIME 320 SECS

FILTER WTG: HANNING

ATTEN: - DB



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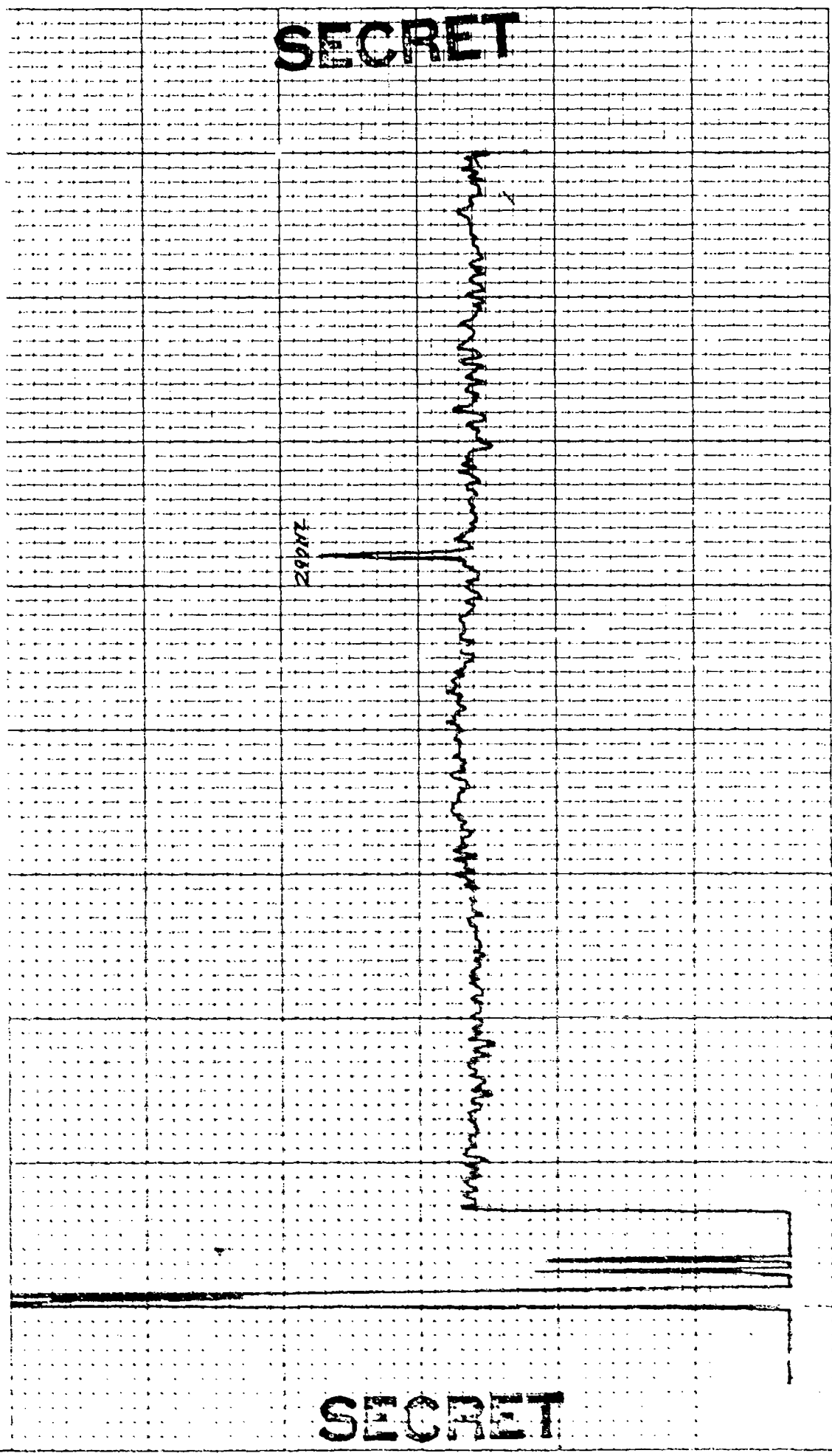
REEL: F14 INDEX J575

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 (43)
OMNI SPECTRUM (ELEMENT 47)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT



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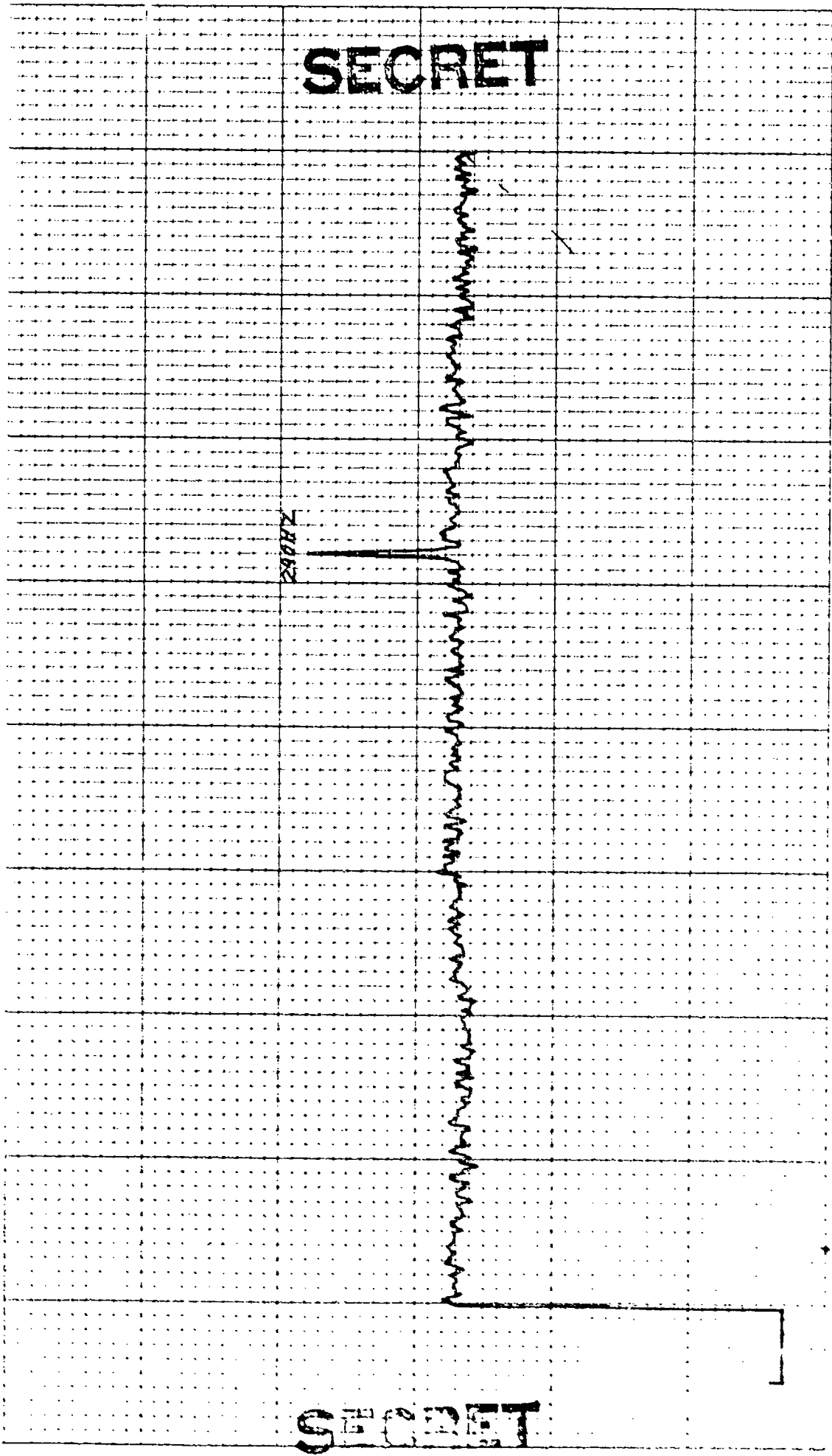
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CONTROL: 2.7 -0974 (24)
 OMNI SPECTRUM(ELEMENT 49)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 HZ
 1 ELEMENT

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

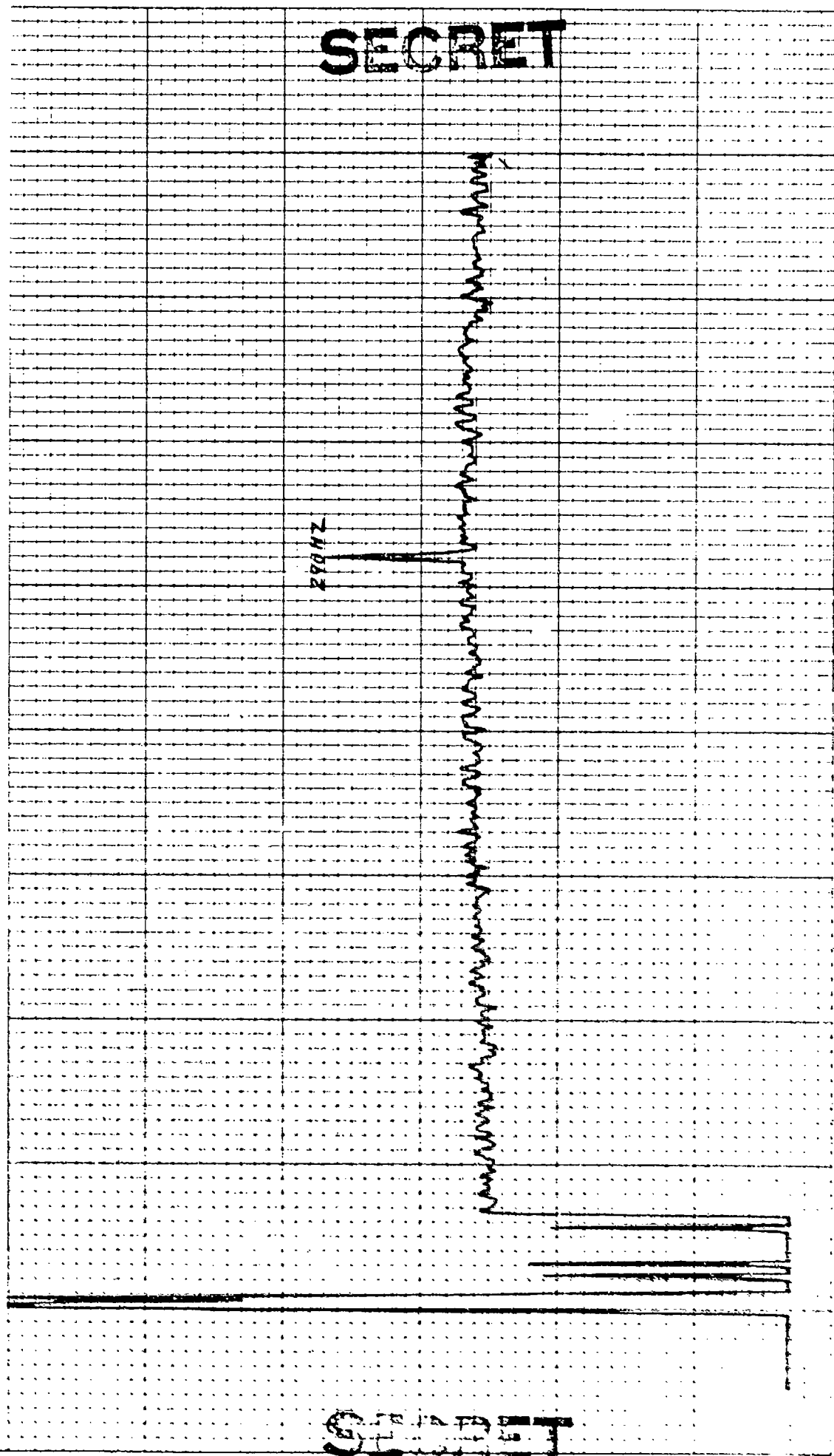


CONTROL: 2-7 -0934 (25)
 OMNI SPECTRUM(ELEMENT 5/)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 230 HZ
 1 ELEMENT

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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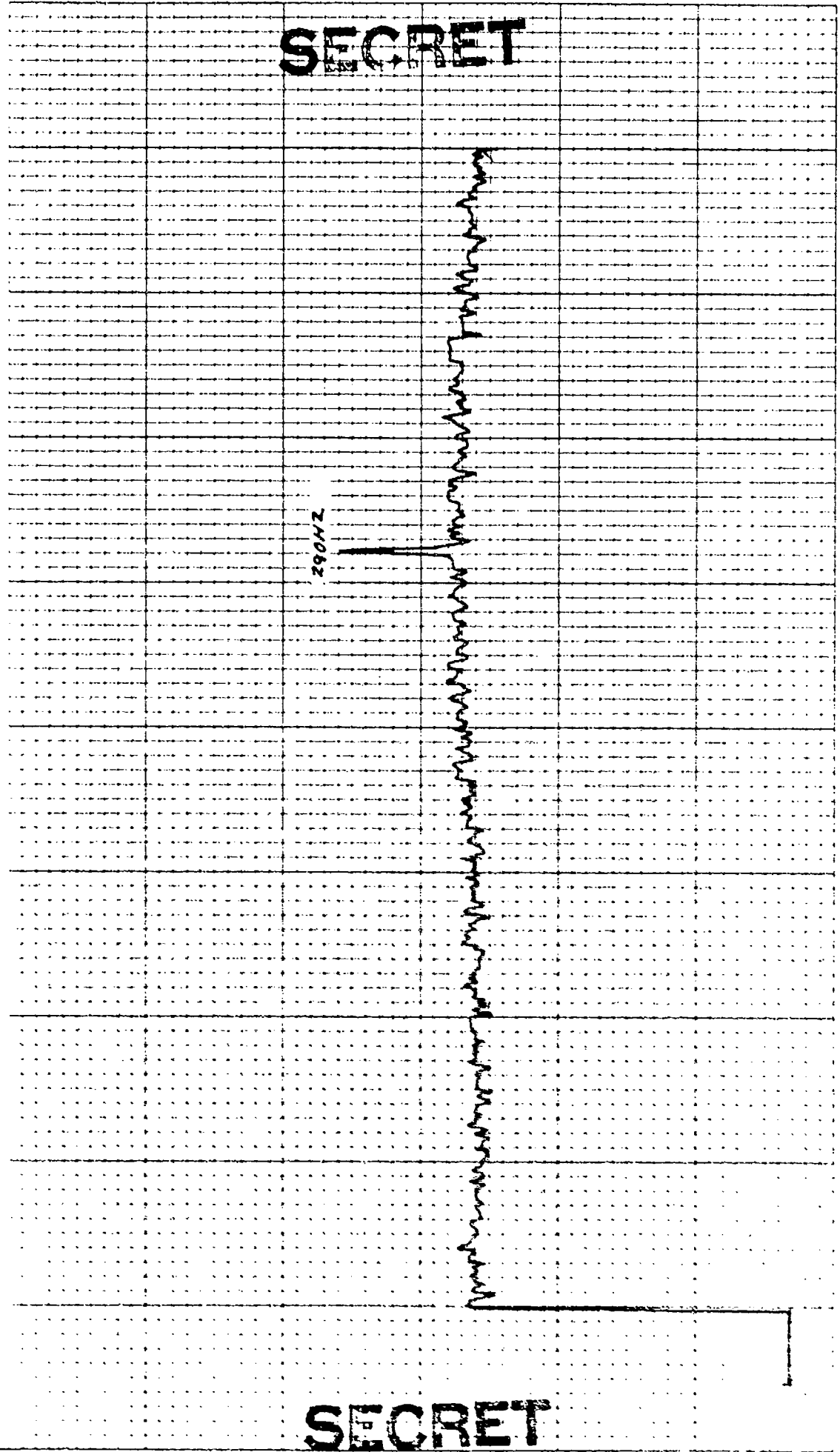
REEL: F14 INDEX 3575

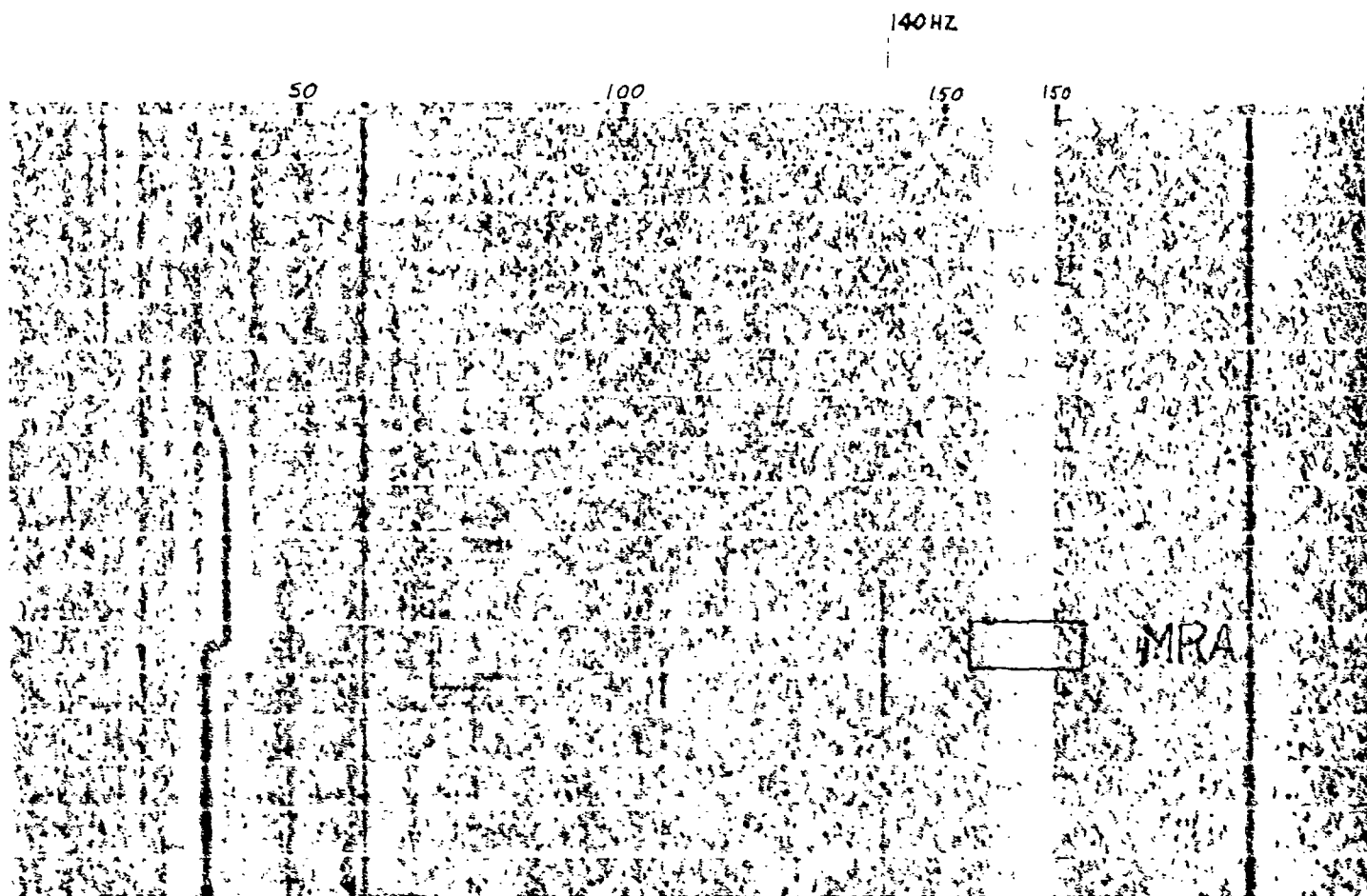
DATE OF ANALYSIS:

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

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

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





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

REF ID: A66888

REF ID: A66888

ANALYSIS BAND WIDTH
PER DEPTH (CYC)

H
PM

TAPE COUNT 3

ELEMENT NUMBERS

DATE
EXERCISE: BEARING STALE

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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>-8.2</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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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

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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>

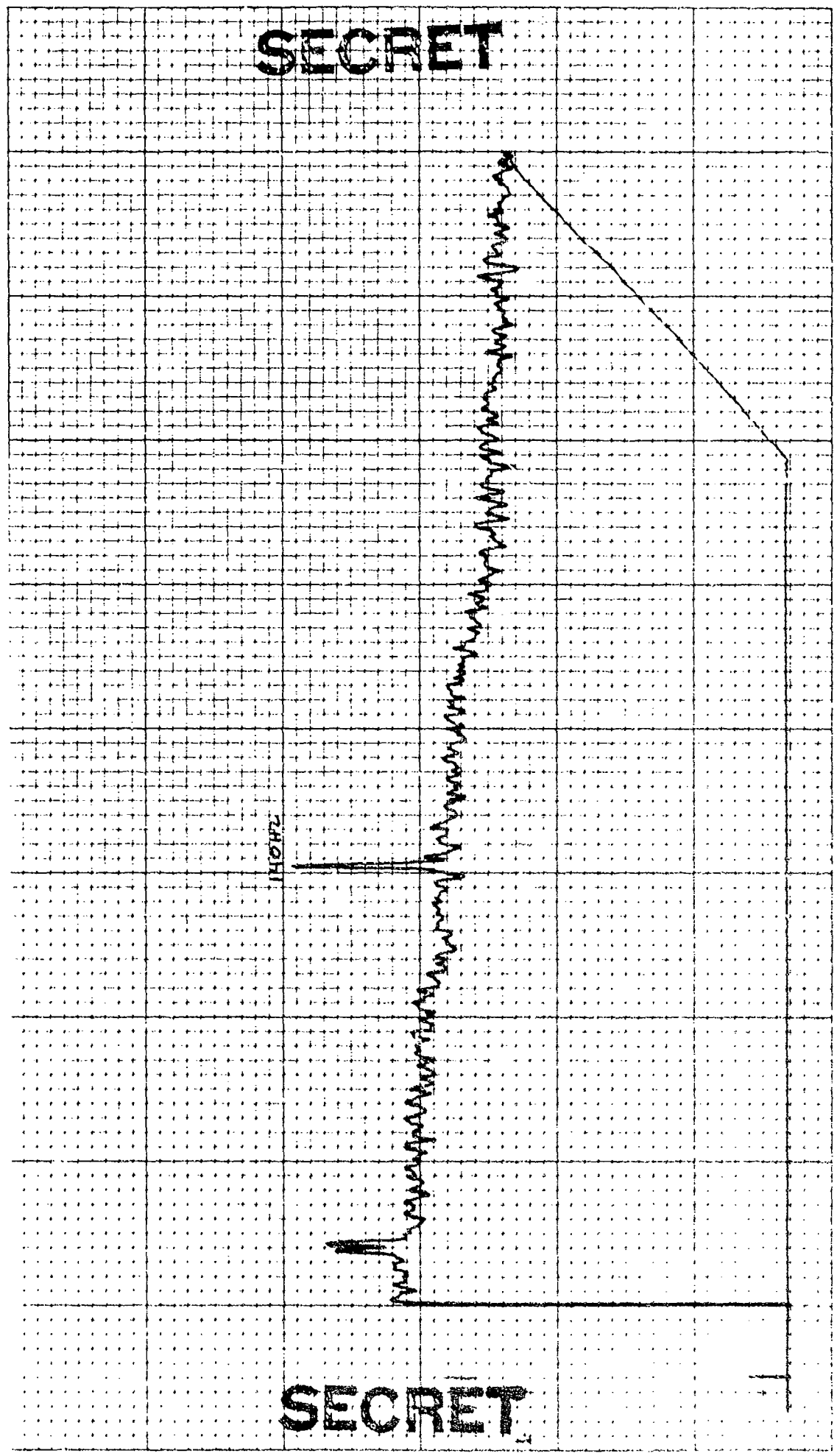
CONFIDENTIAL

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

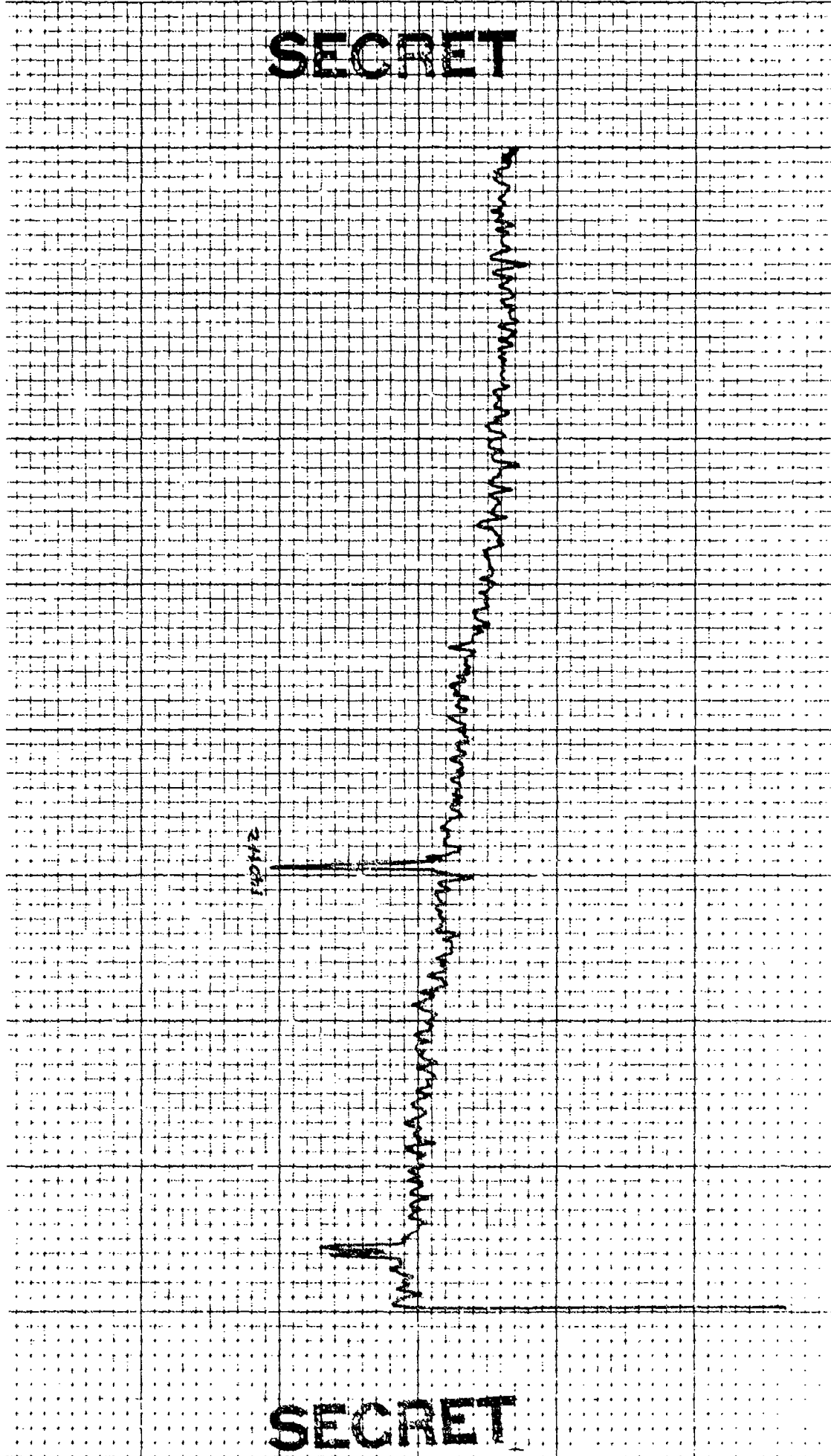


10-104

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

DATE OF ANALYSIS: - - -
1 - / 6)
DATE/TIME: 2-7-77 - 0935 Z
ANALYSIS BANDWIDTH: 1/10HZ
+10 DEG. AZ STEERING

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



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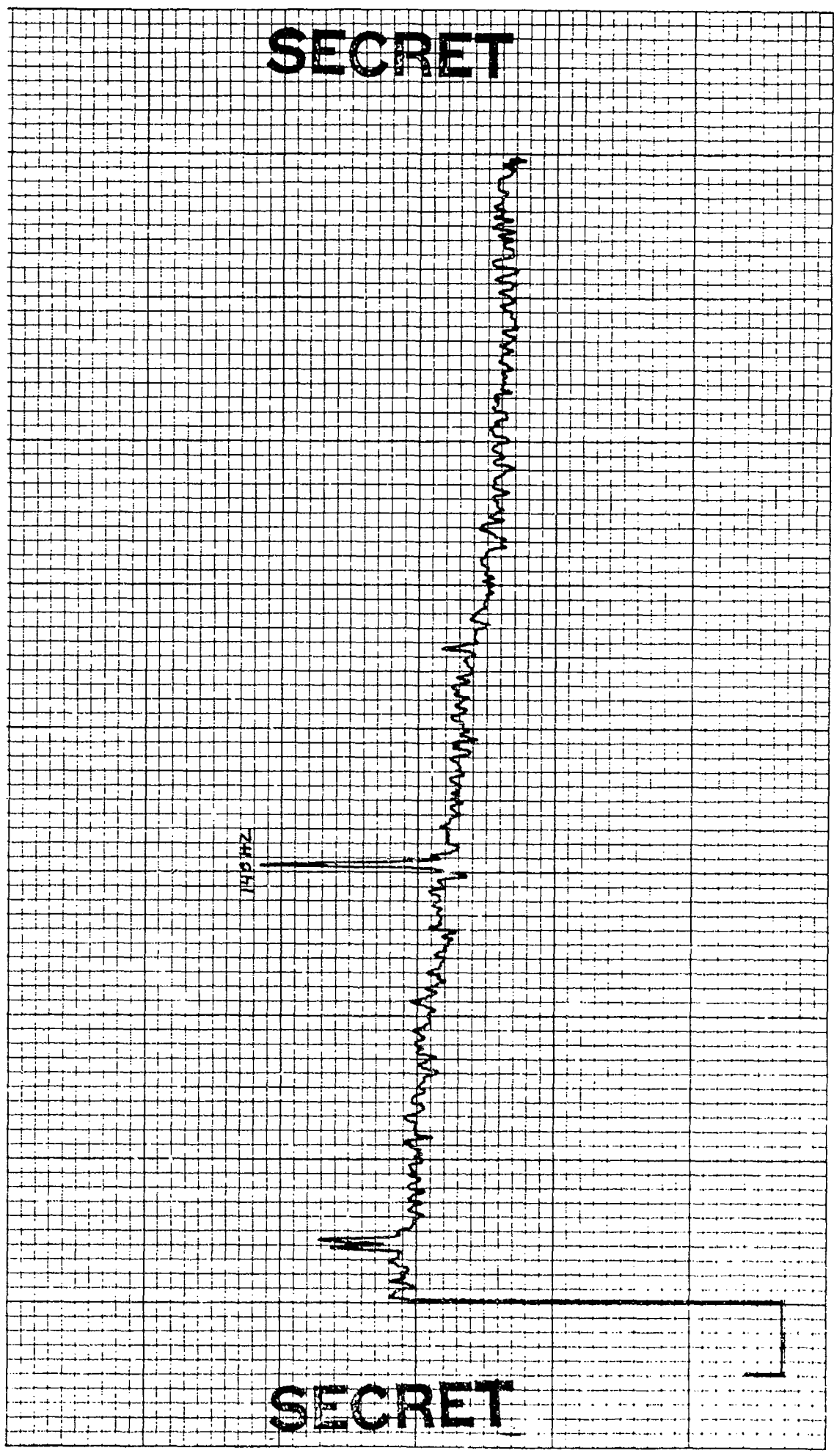
21-10P

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



150 HZ

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4()3

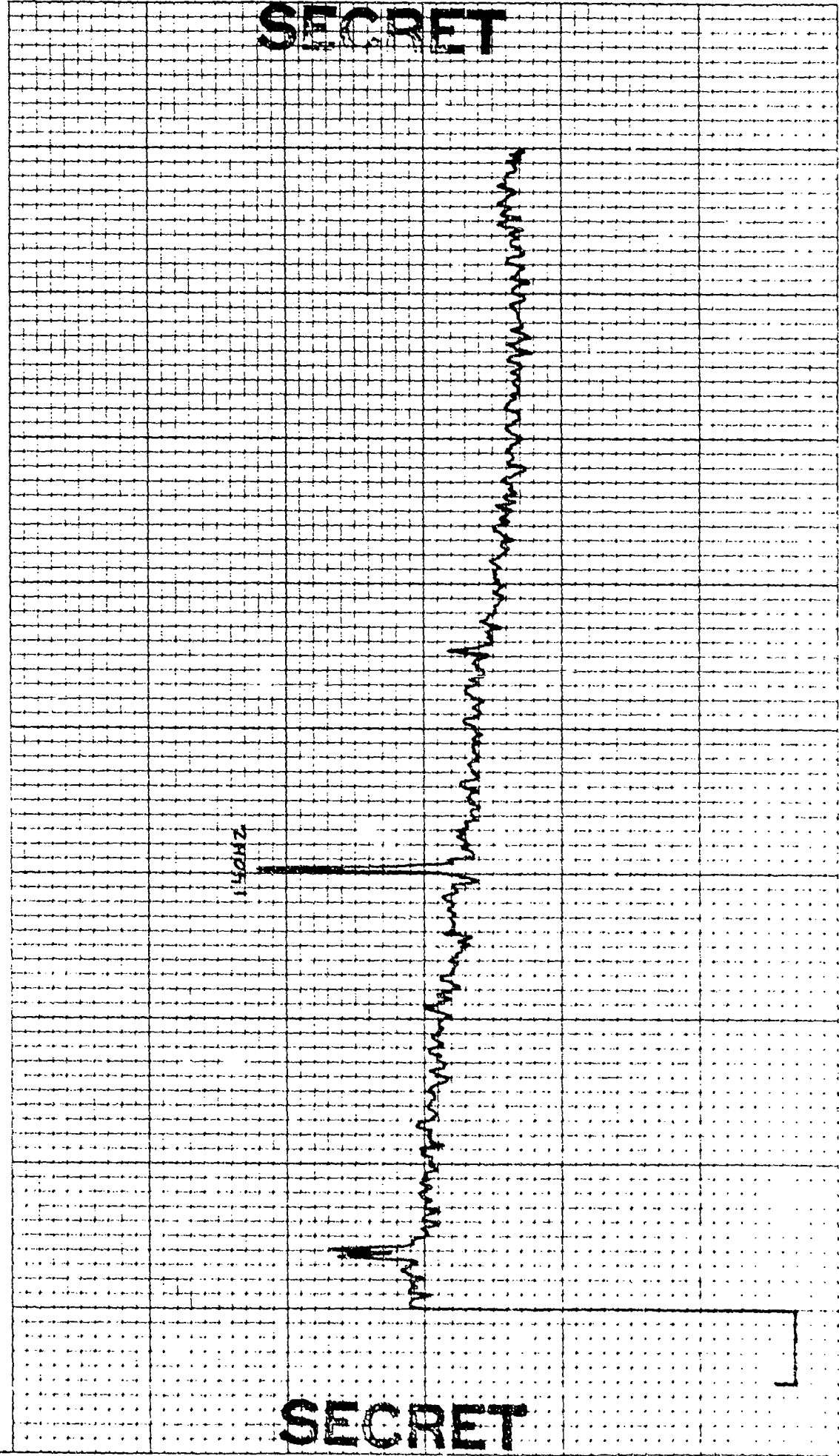
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2 16

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: 1/10 HZ FILTER WTG: HANNING
16 ELEMENTS 222 DEG. AZ STEERING



1062

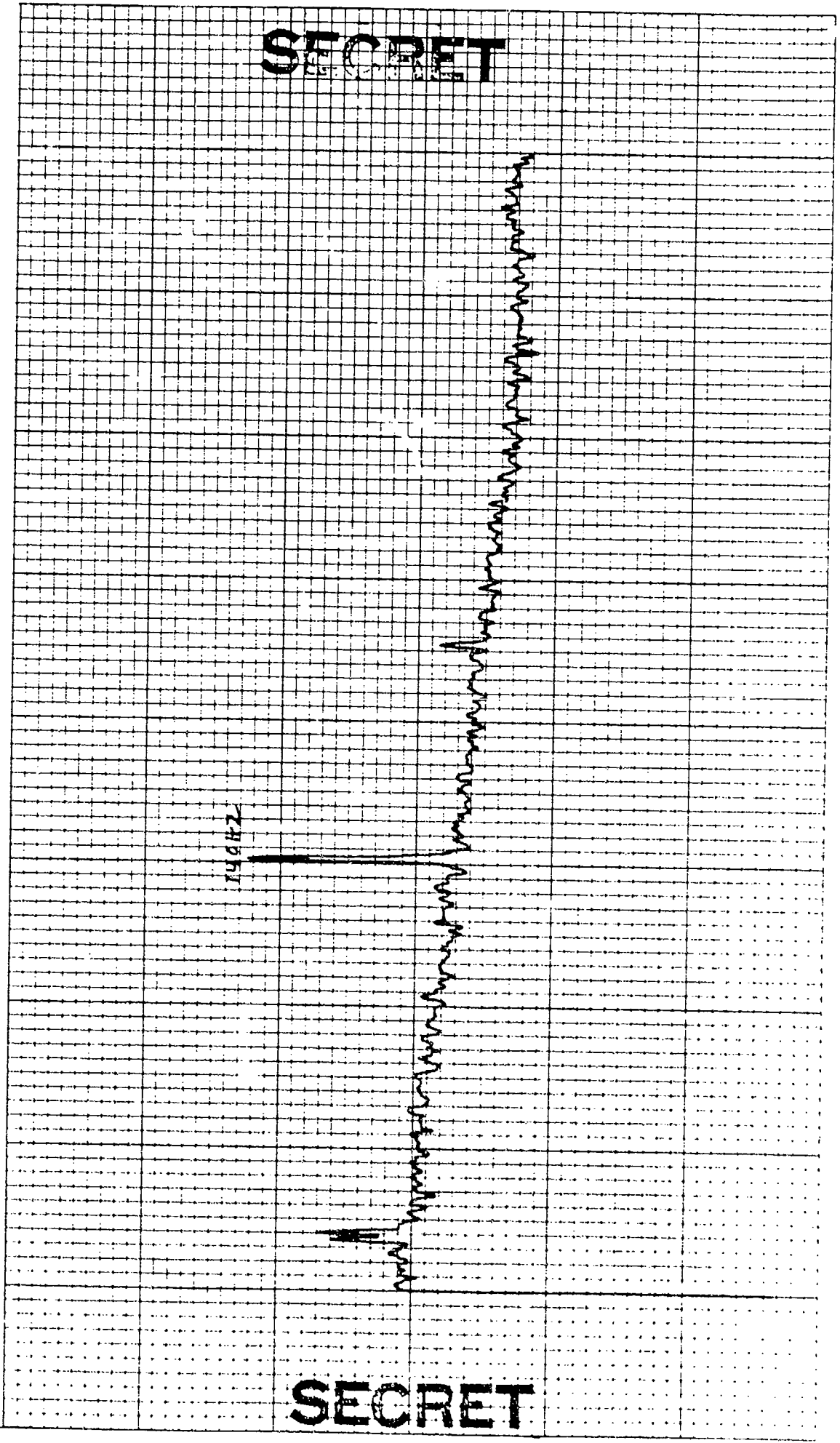
CONTROL: 2-7 - 0934 (16)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 16 ELEMENTS

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

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

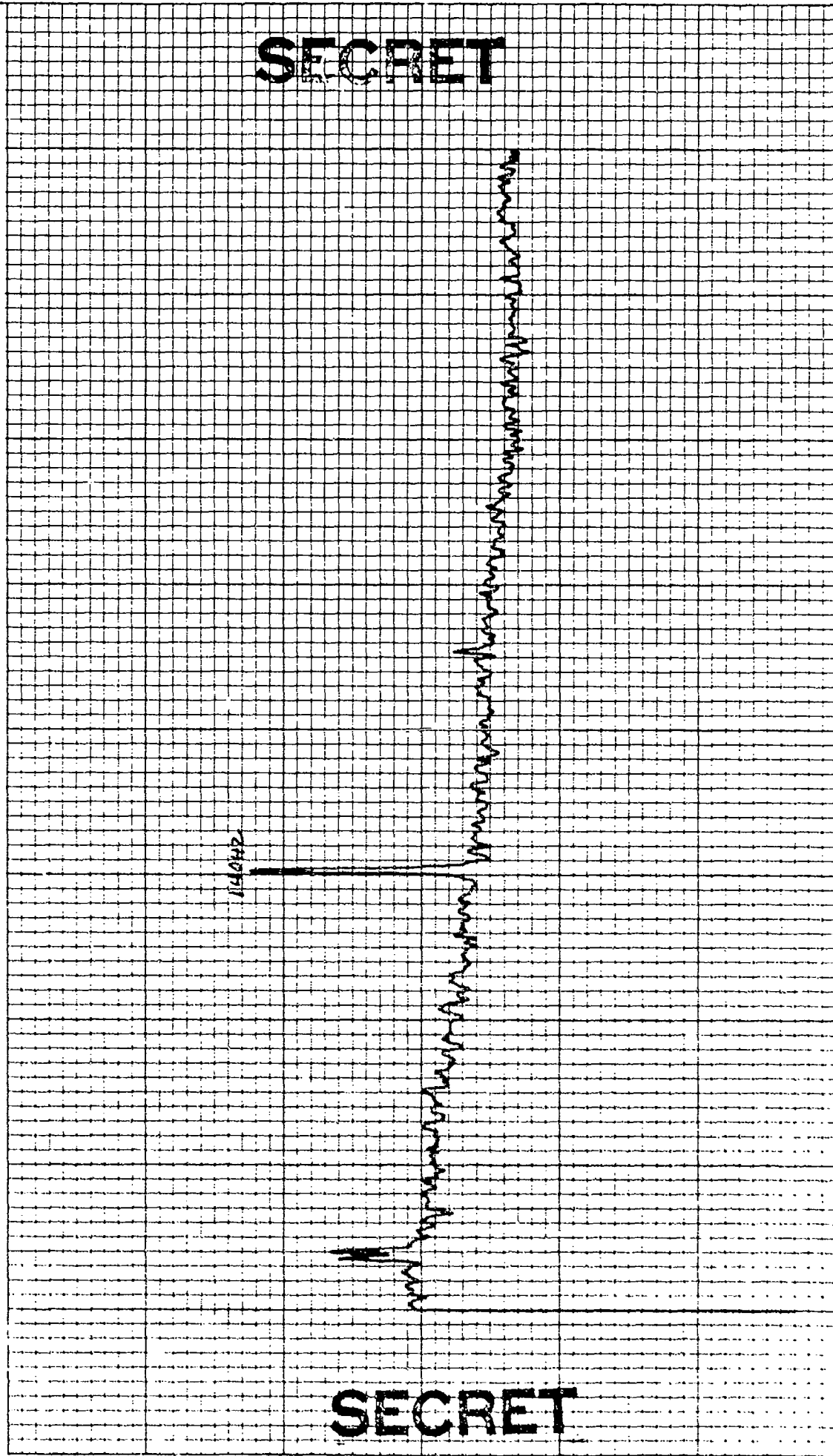
REEL: F14 INDE X3575

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

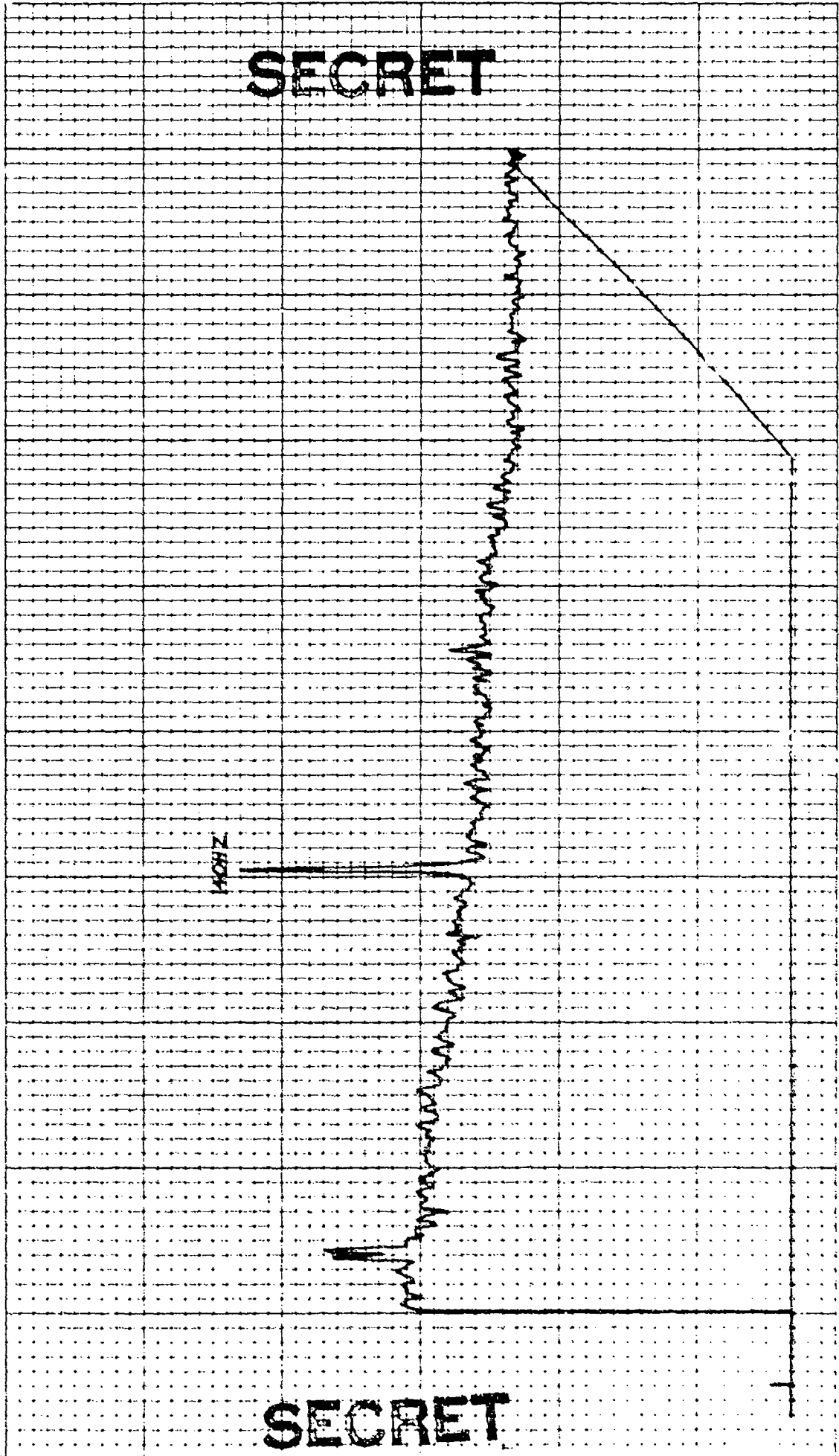


CONTROL: 2-7 -0974 (16) REEL: F14 INDE X3375
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: -10 DB
 CENTER FREQ: 150 HZ FILTER WTG: HANNING
 16 ELEMENTS +20 DEC. AZ STEERING

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



CONTROL: 0934 - 51 (DP3) DATE OF ANALYSIS: REEL: F14 INDE X3525
 BEAMFORMED SPECTRUM(ELEMENTS) / - / 6
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 0934Z INTEGRATION TIME 320 SECS ATTN: 16 DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
16 ELEMENTS +27 DEG. AZ STEERING



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REEL: F/4 INDE X3525

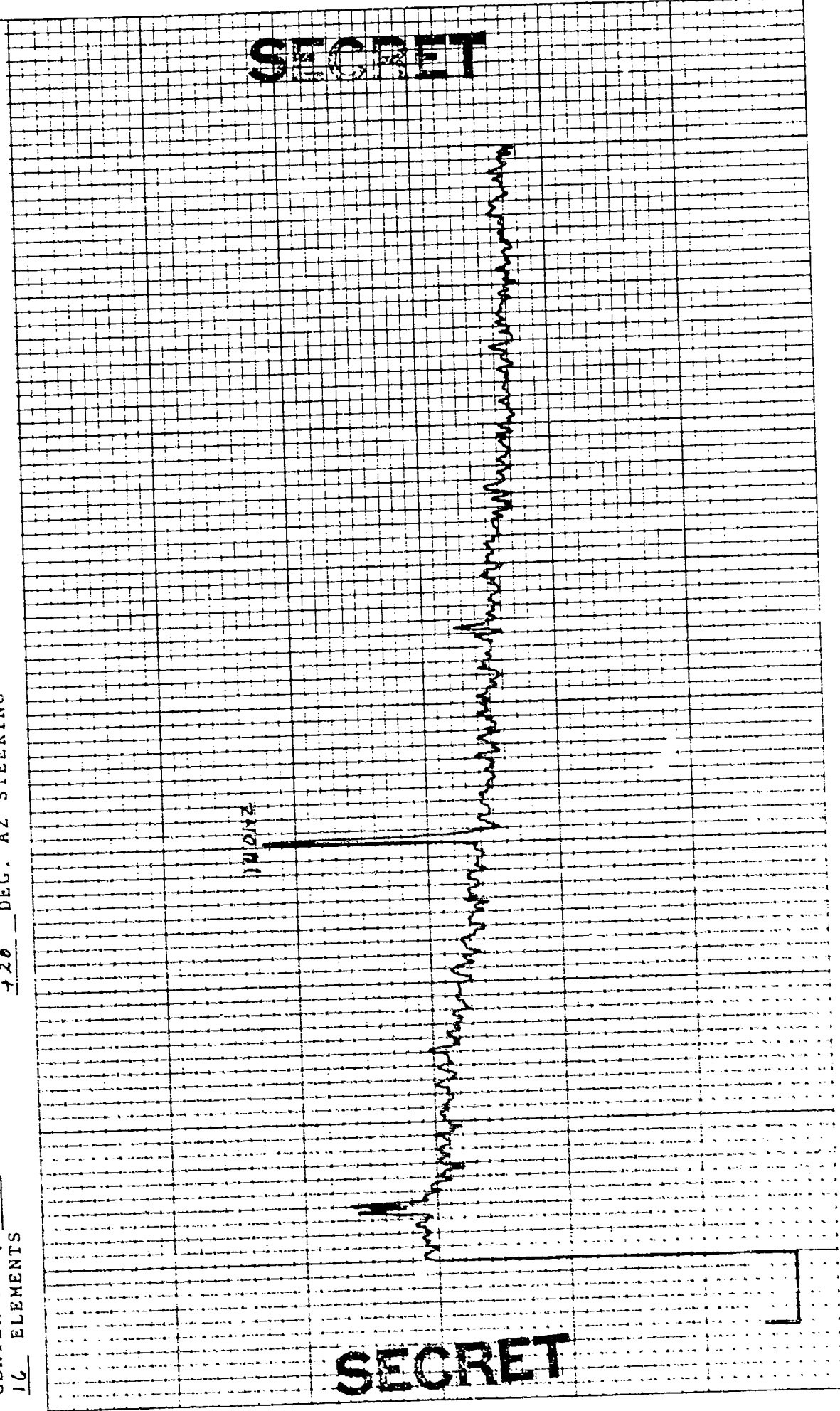
INTEGRATION TIME 320 SECS ATTEN: 7/ DB
FILTER WTG: HANNING

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



150 HZ

SECRET

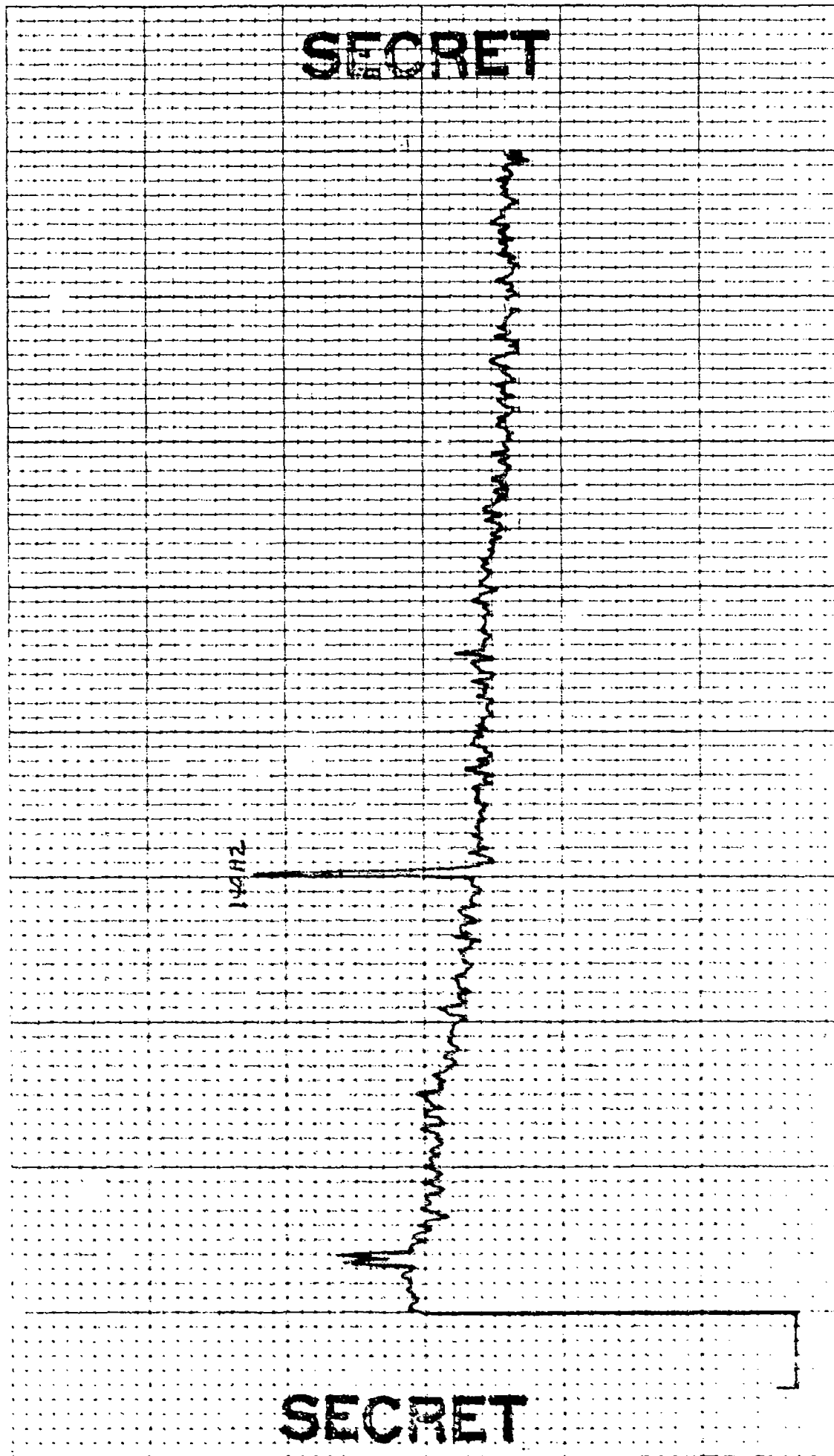
SECRET

4(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: 1/10HZ
+30 DEG. AZ STEERING

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

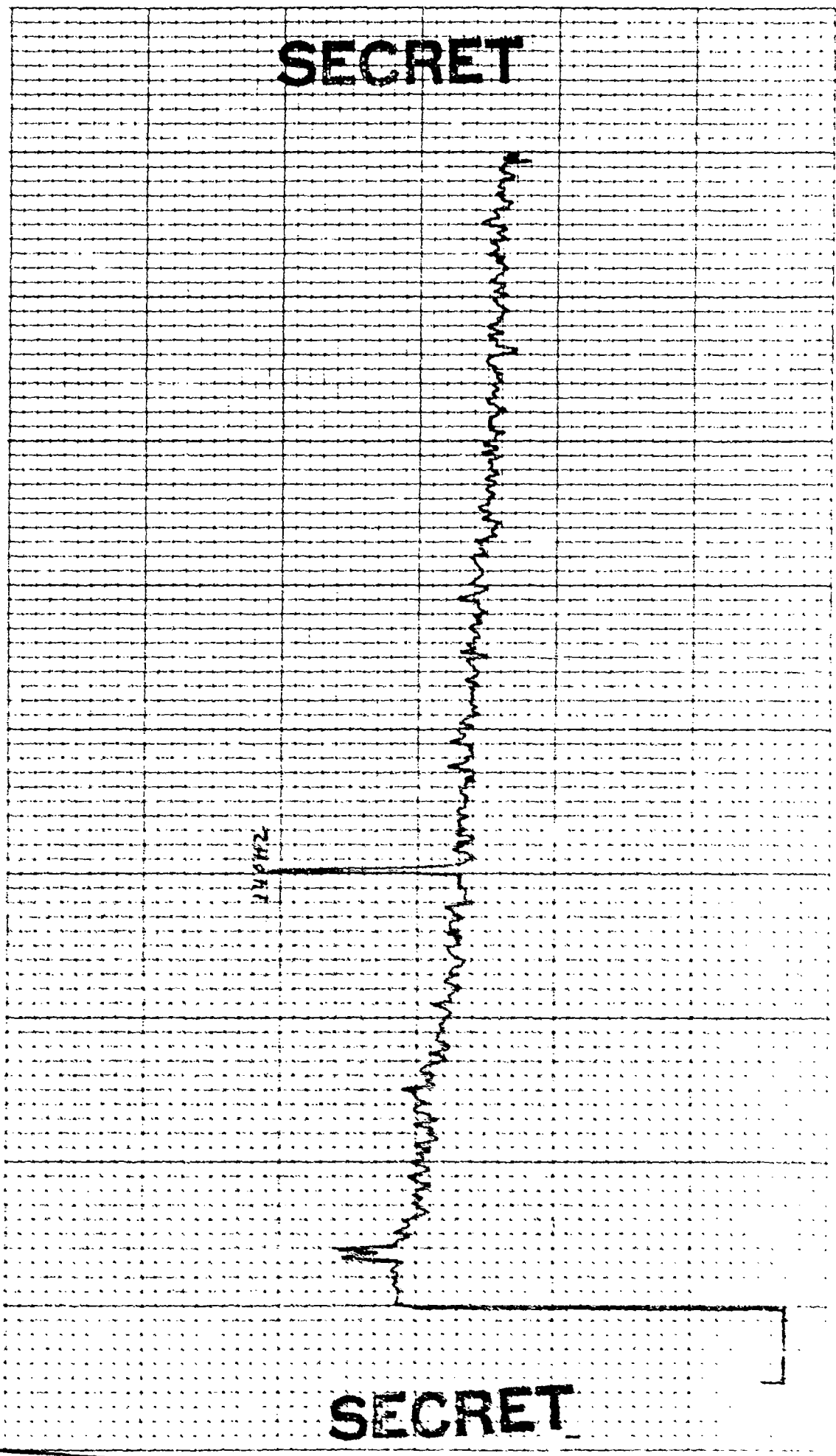


47-03

CONTROL: 2.7 - 0934 (1/6)
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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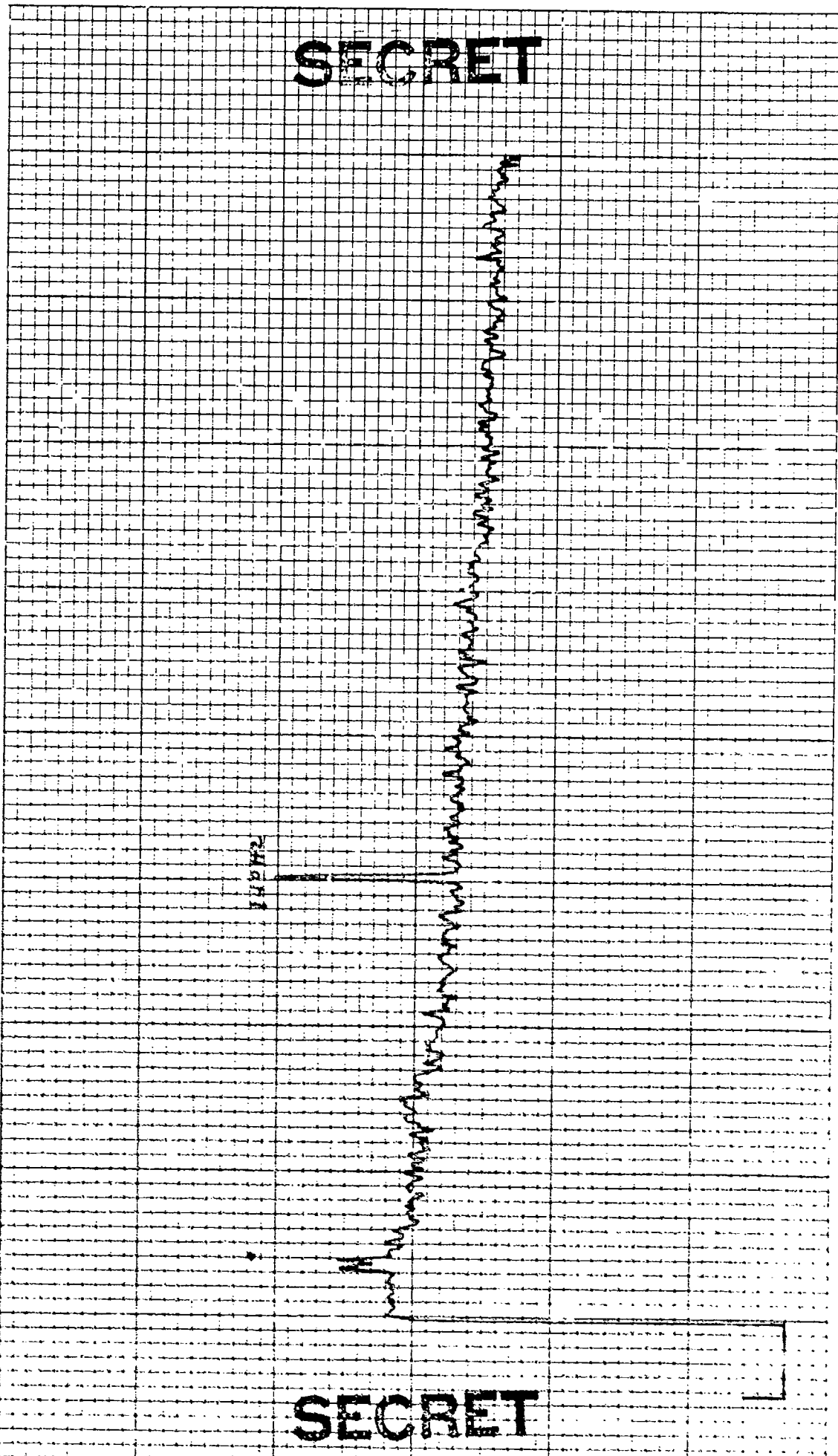
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CONTROL: 2-7 -0914 (16)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 16 ELEMENTS

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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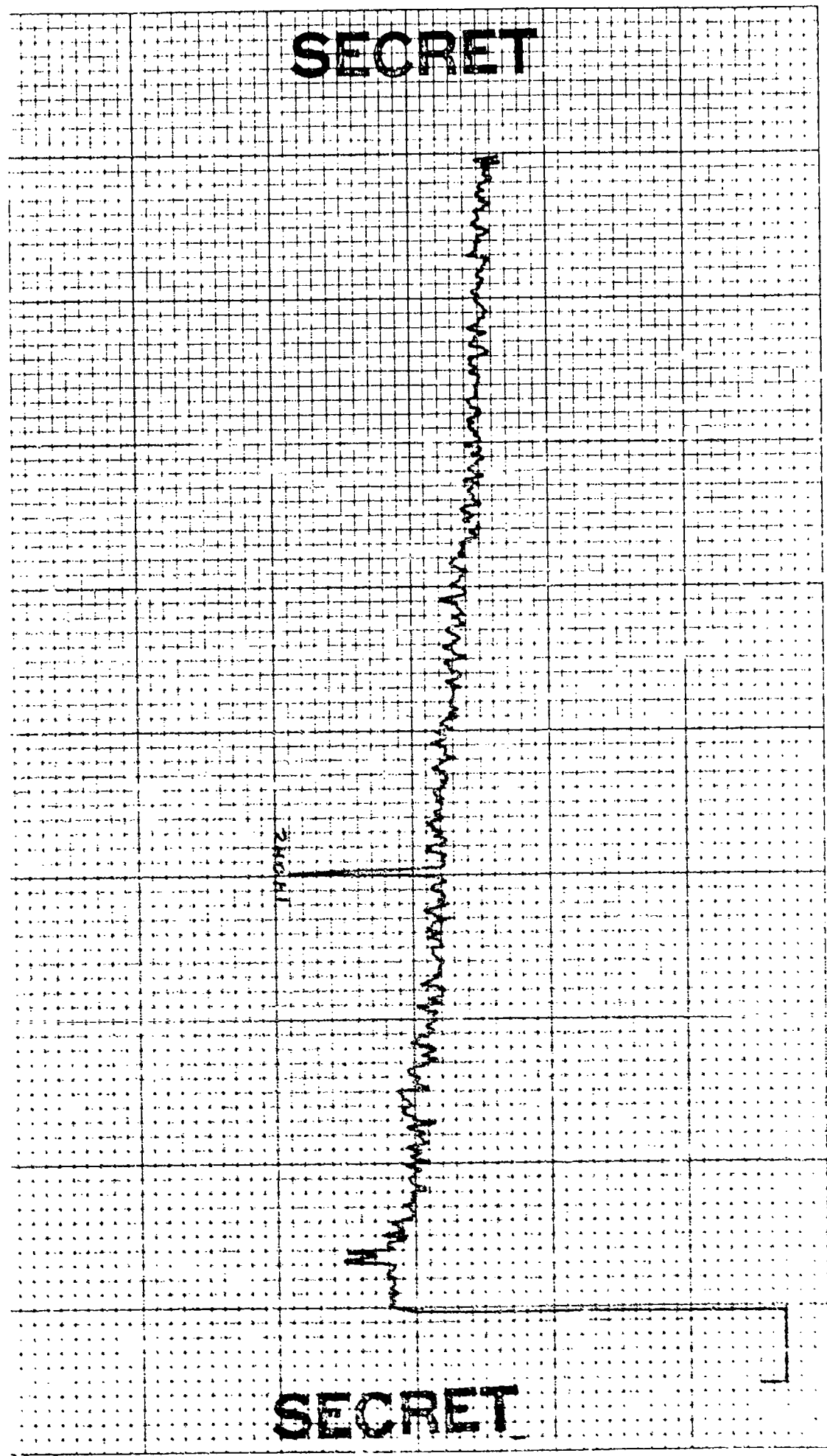
SECRET

4

CONTROL: 2-2 -0834 (16)
BEAMFORMED 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 ATTN: -70 DB
FILTER WTC: HANNING



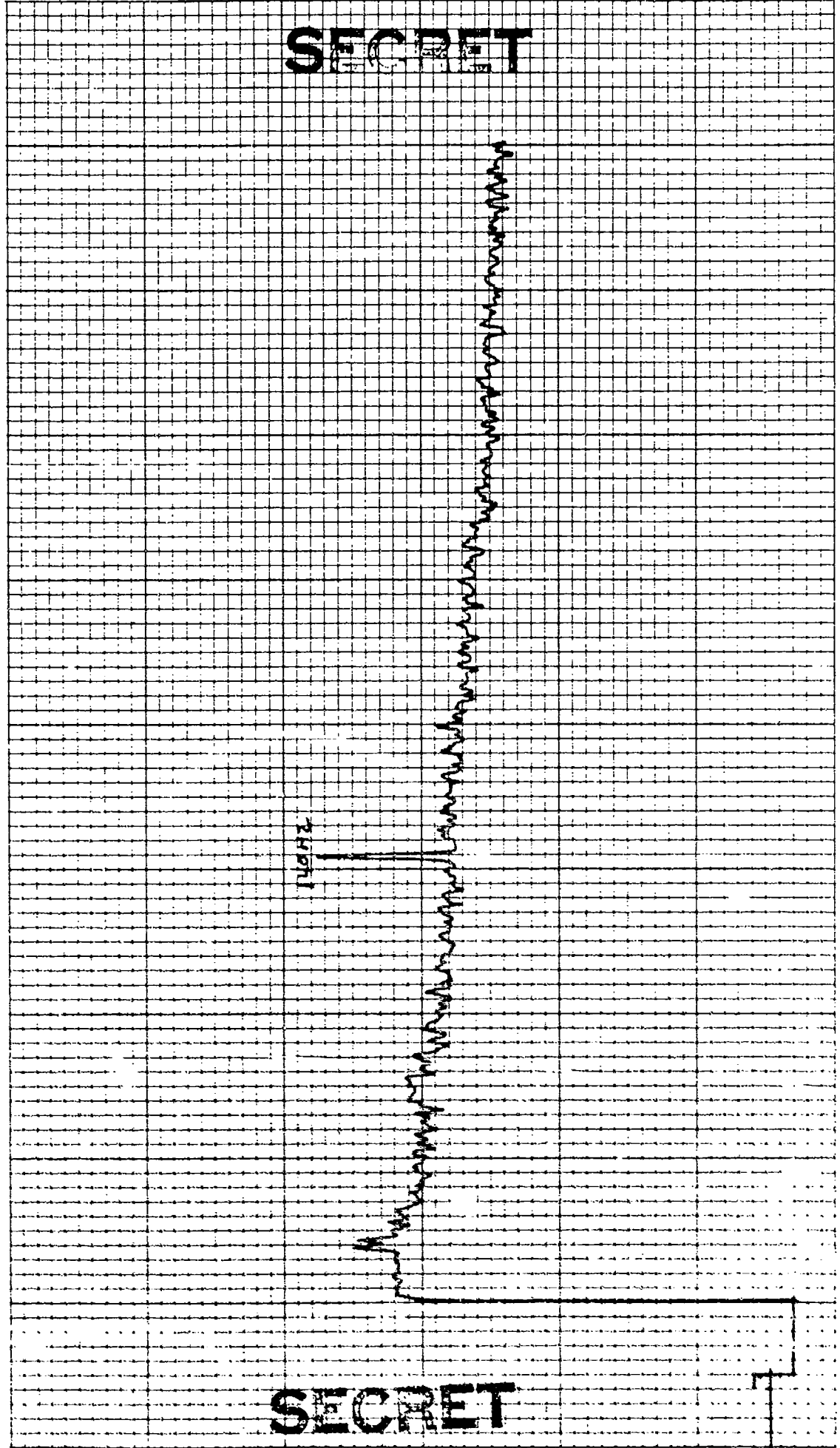
207

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
 438 DEG. AZ STEERING

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

INDE X3575



17 166

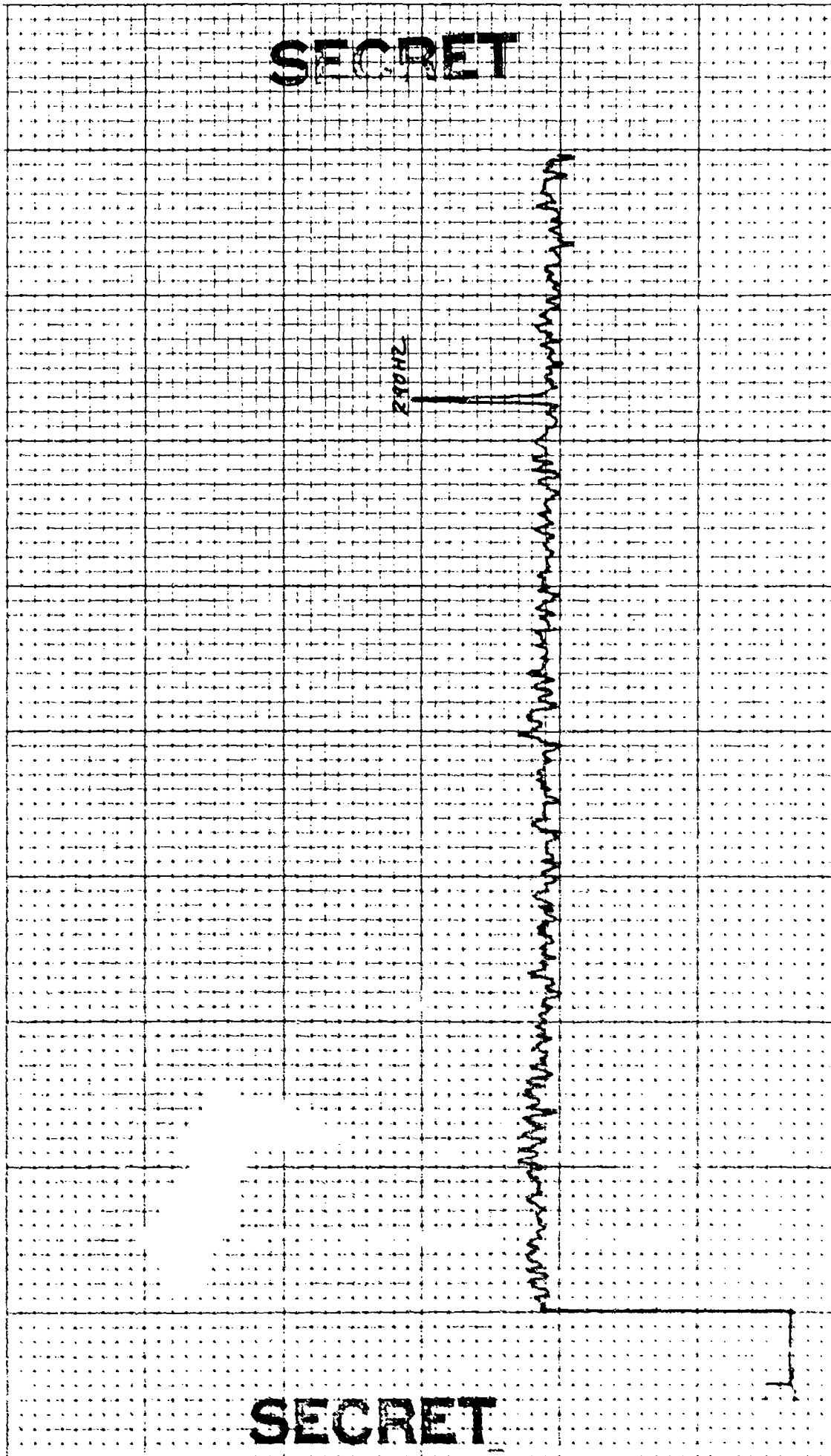
CONTROL: 2-7 -0734 (16)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
 16 ELEMENTS

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



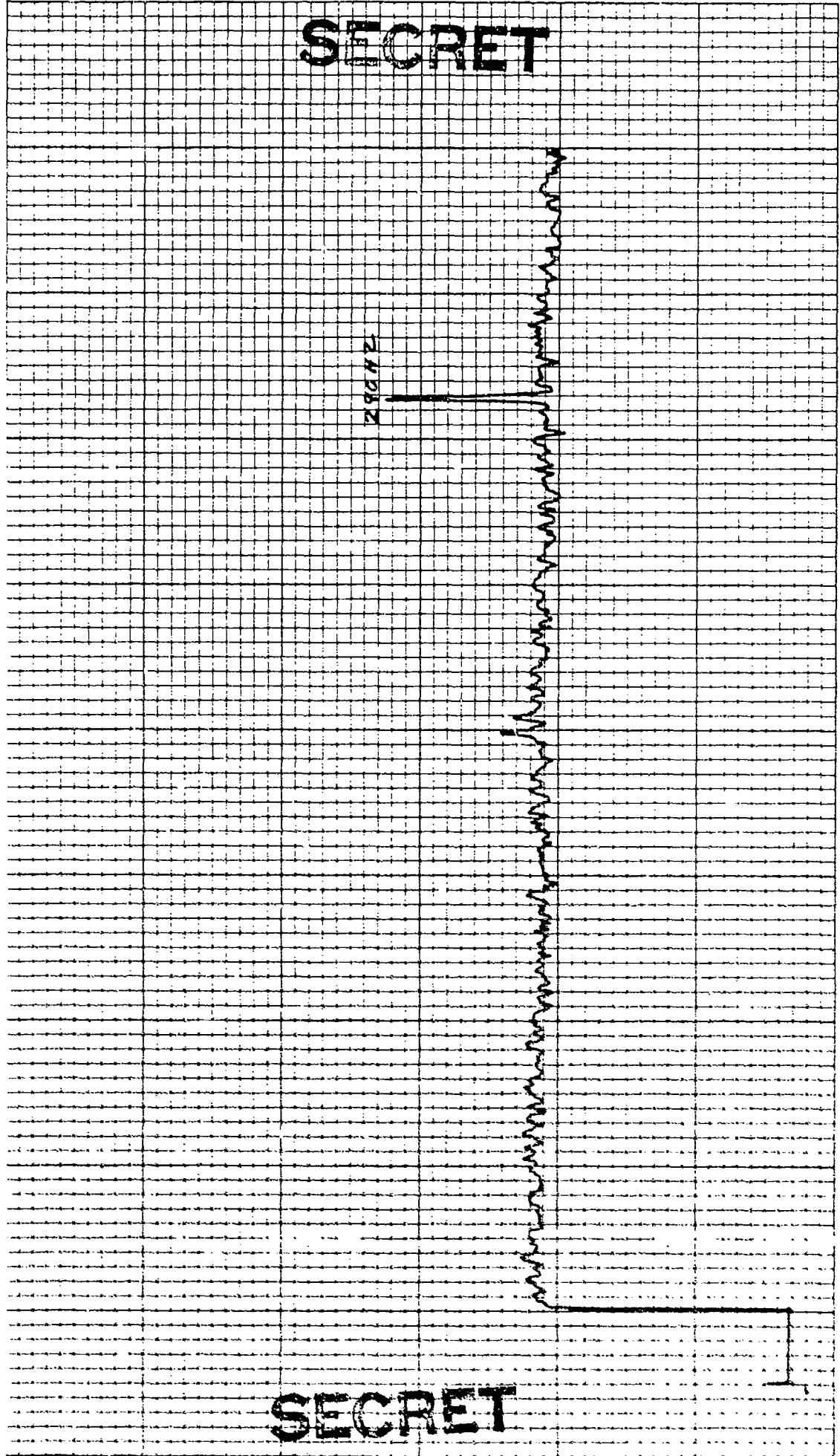
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CONTROL: 2.7 - 0934 (16)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16
DATE TIME: 2.7.77 - 0934 Z
ANALYSIS BANDWIDTH: 1/10HZ
+10 DEG. AZ STEERING

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



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REEL: F14 INDE X3575

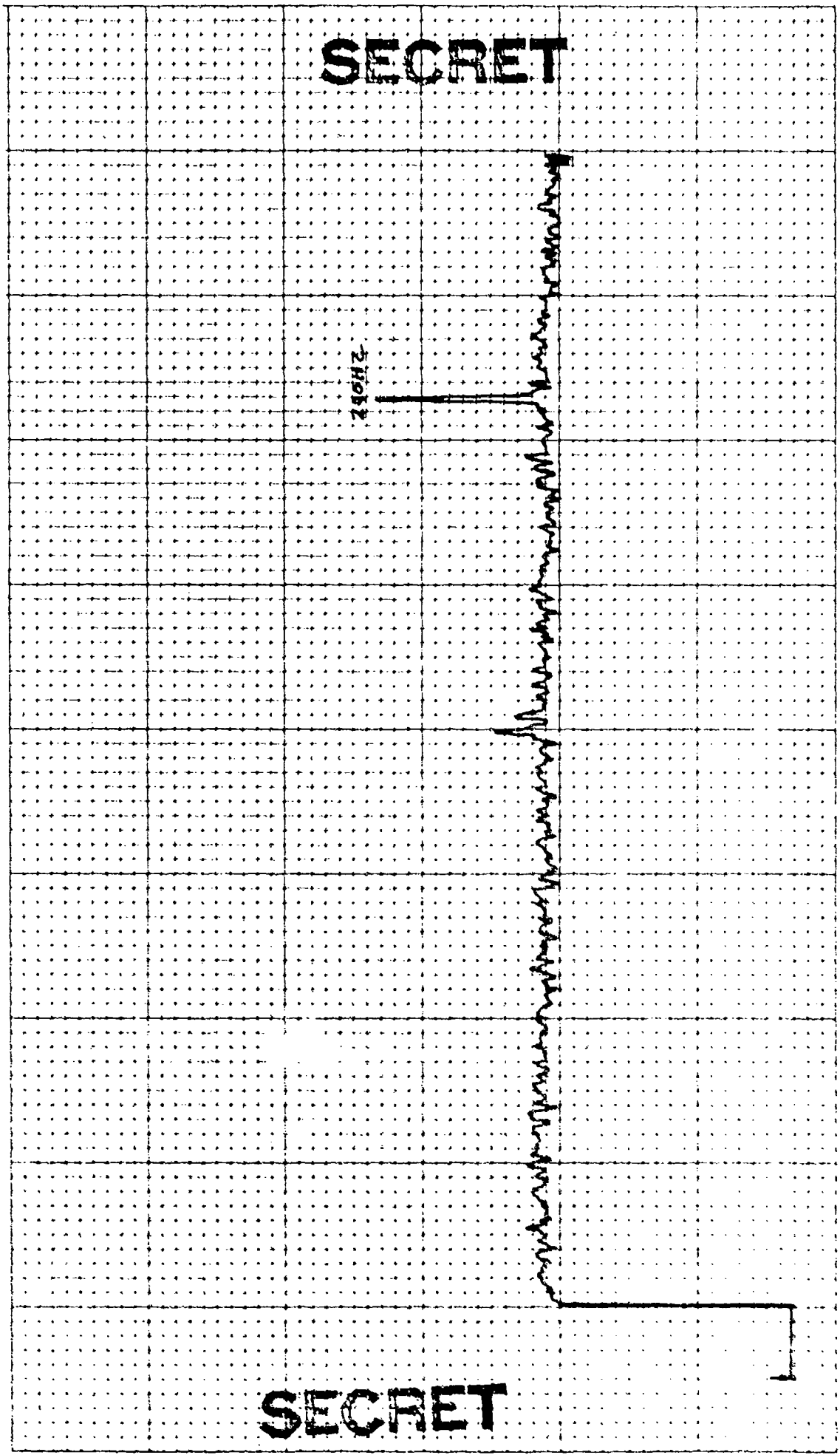
INTEGRATION TIME 320 SECS

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



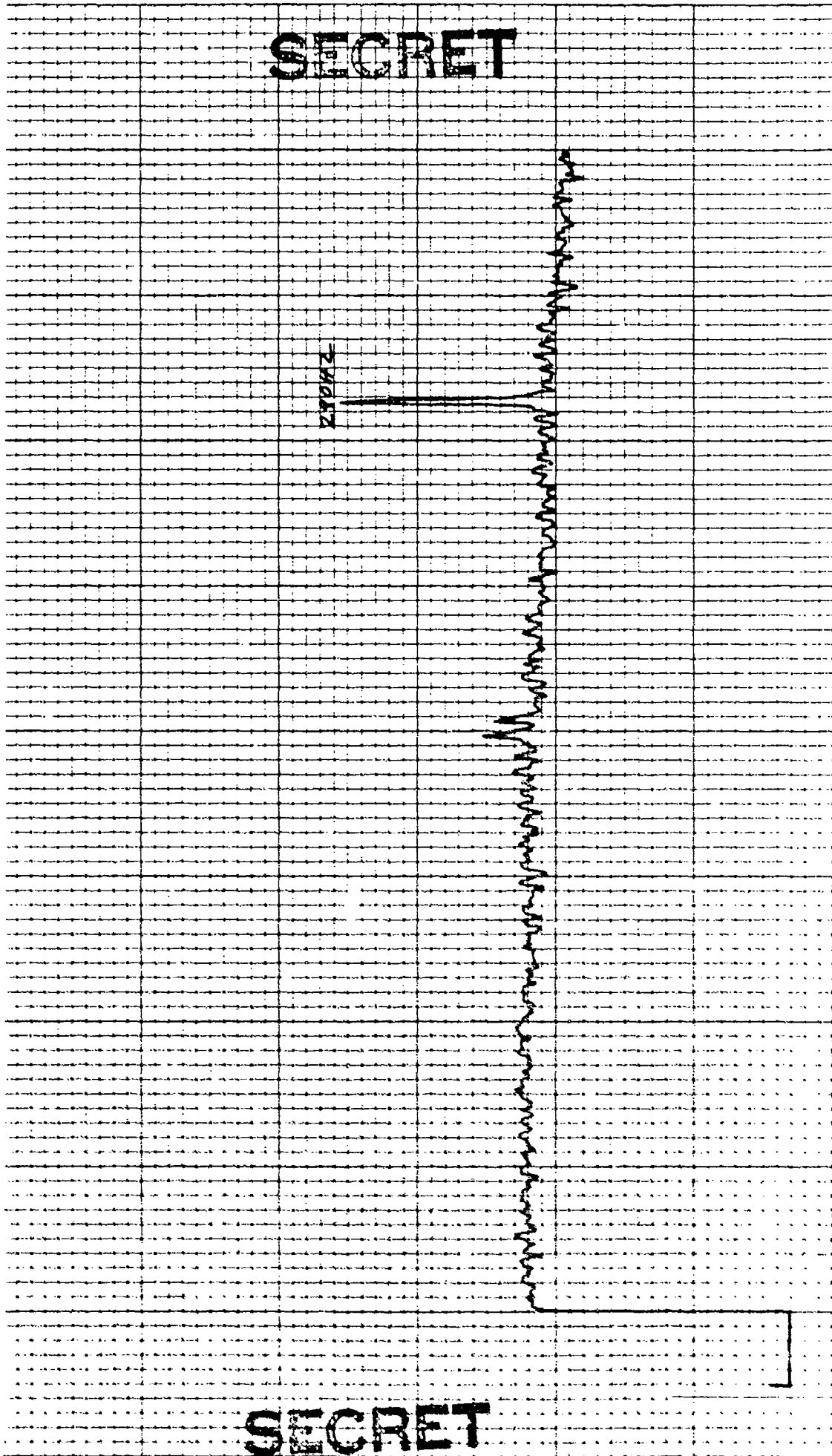
CONTROL: 2-7-0834 (16)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
16 ELEMENTS

DATE OF ANALYSIS: - - - -
1-16

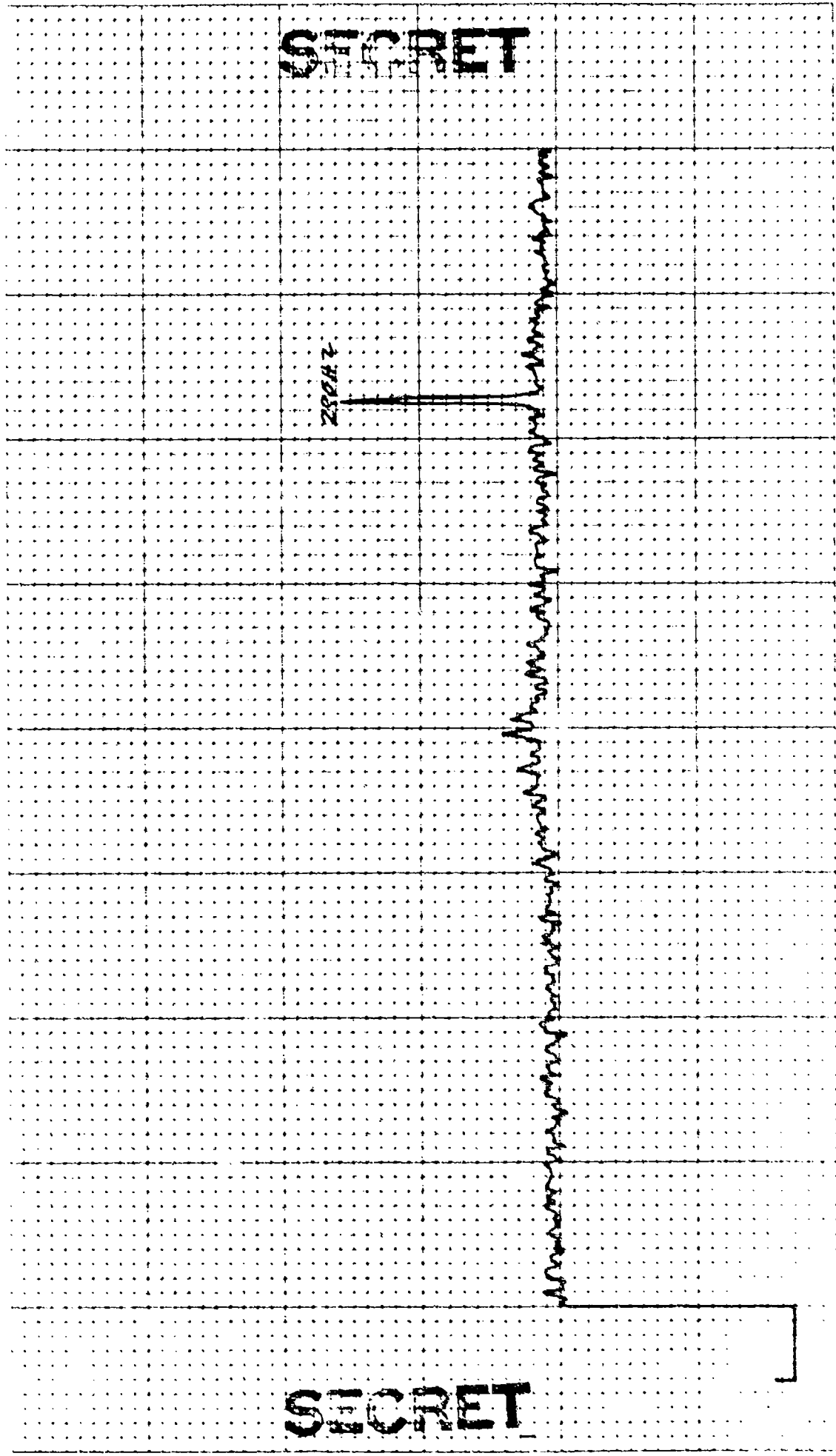
DATE/TIME: 2-7-77 - 0834 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
+222 DEG. AZ STEERING

REEL: F14 INDE X3575

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



CONTROL: 2-7-77-0934 (16) DATE OF ANALYSIS: 1-16 REEL: F/4 INDE XB75
 BEAMFORMED SPECTRUM(ELEMENTS))
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77-0934 Z INTEGRATION TIME 320 SECS ATTEN: -1 DB
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTC: HANNING
16 ELEMENTS +2Y DEG. AZ STEERING



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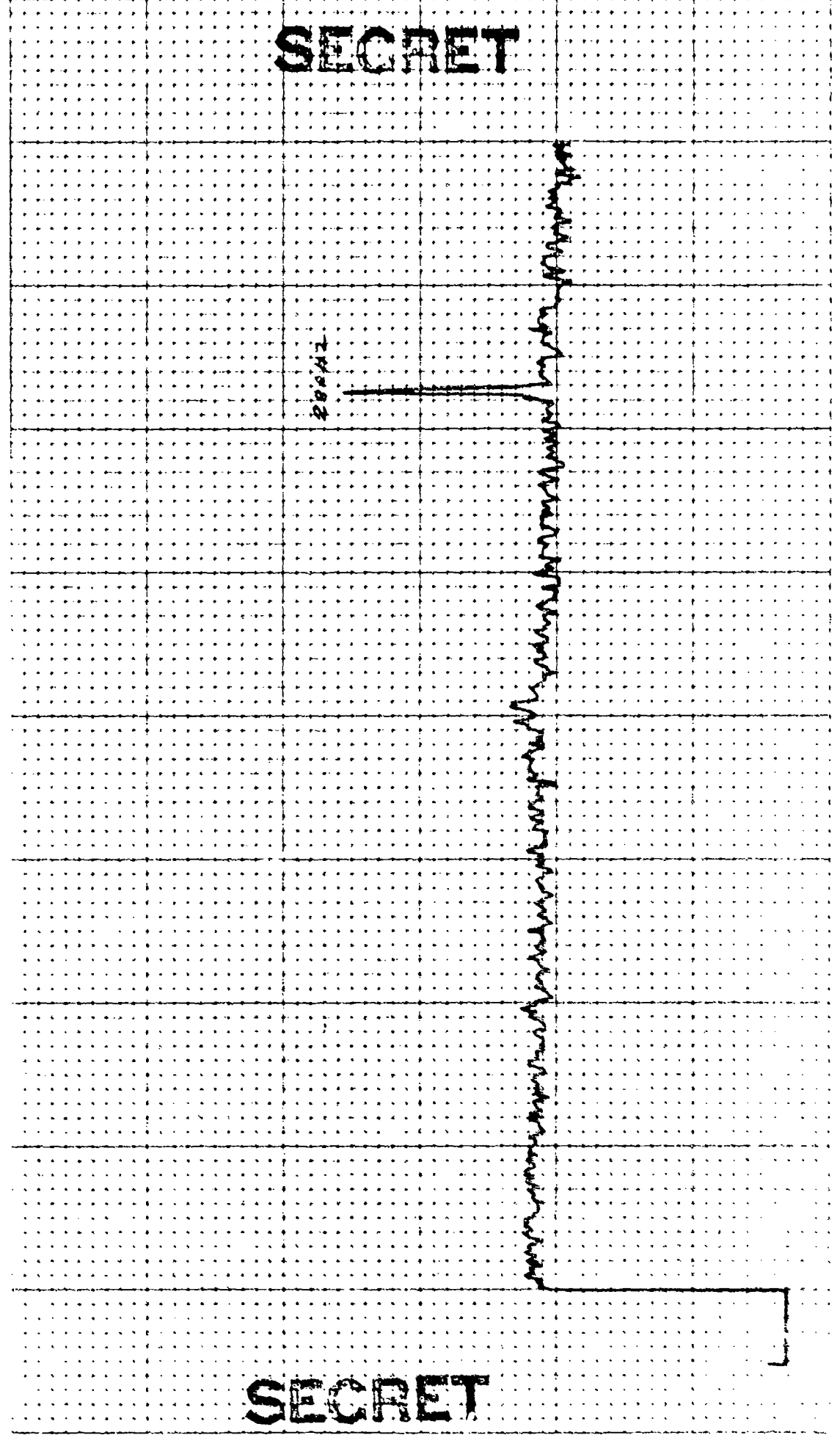
SECRET

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

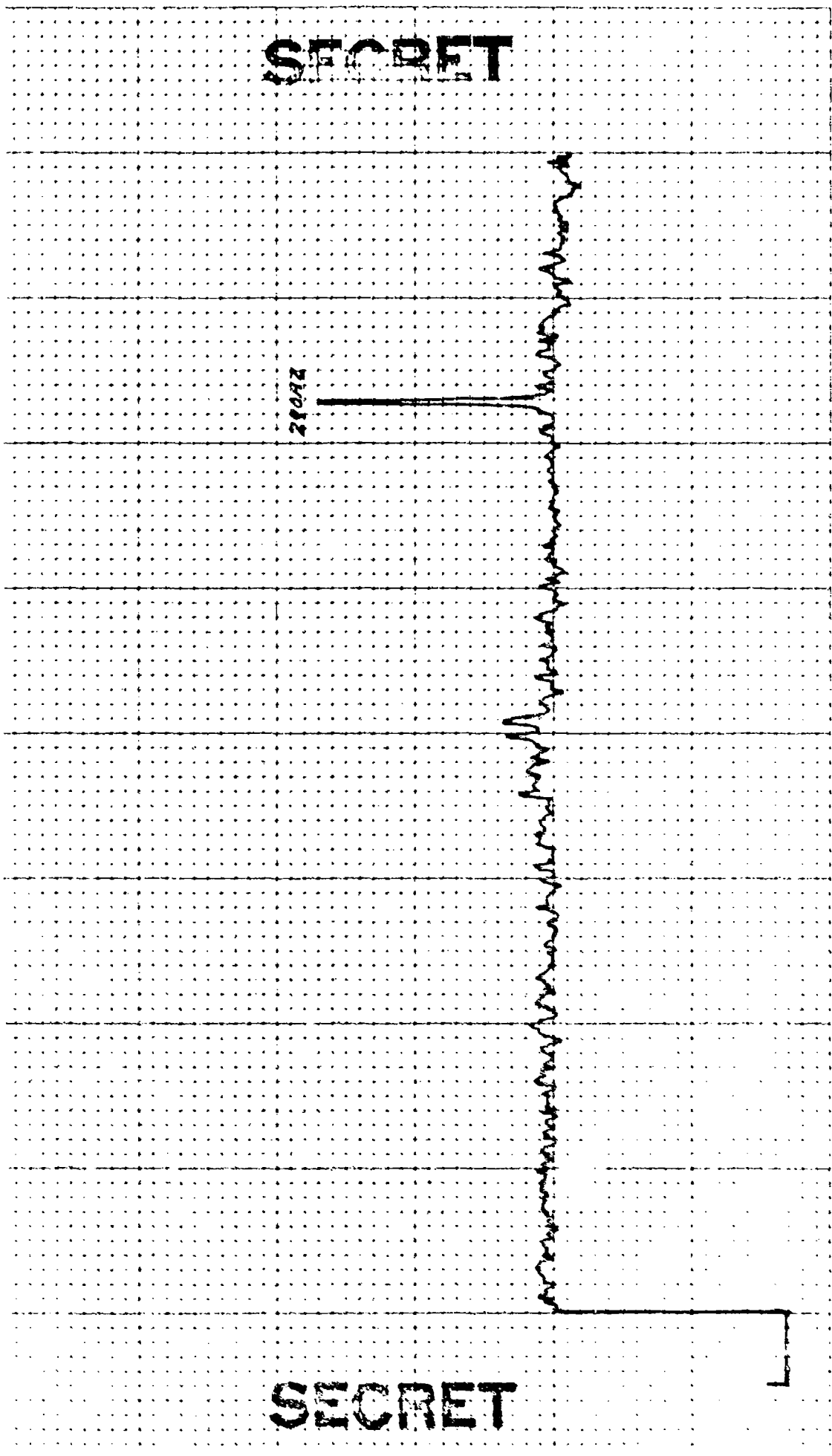
INDE X3375
 ATTN: -// DB



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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: 1/10 HZ FILTER WIG: HANNING
16 ELEMENTS 437 DEG. AZ STEERING

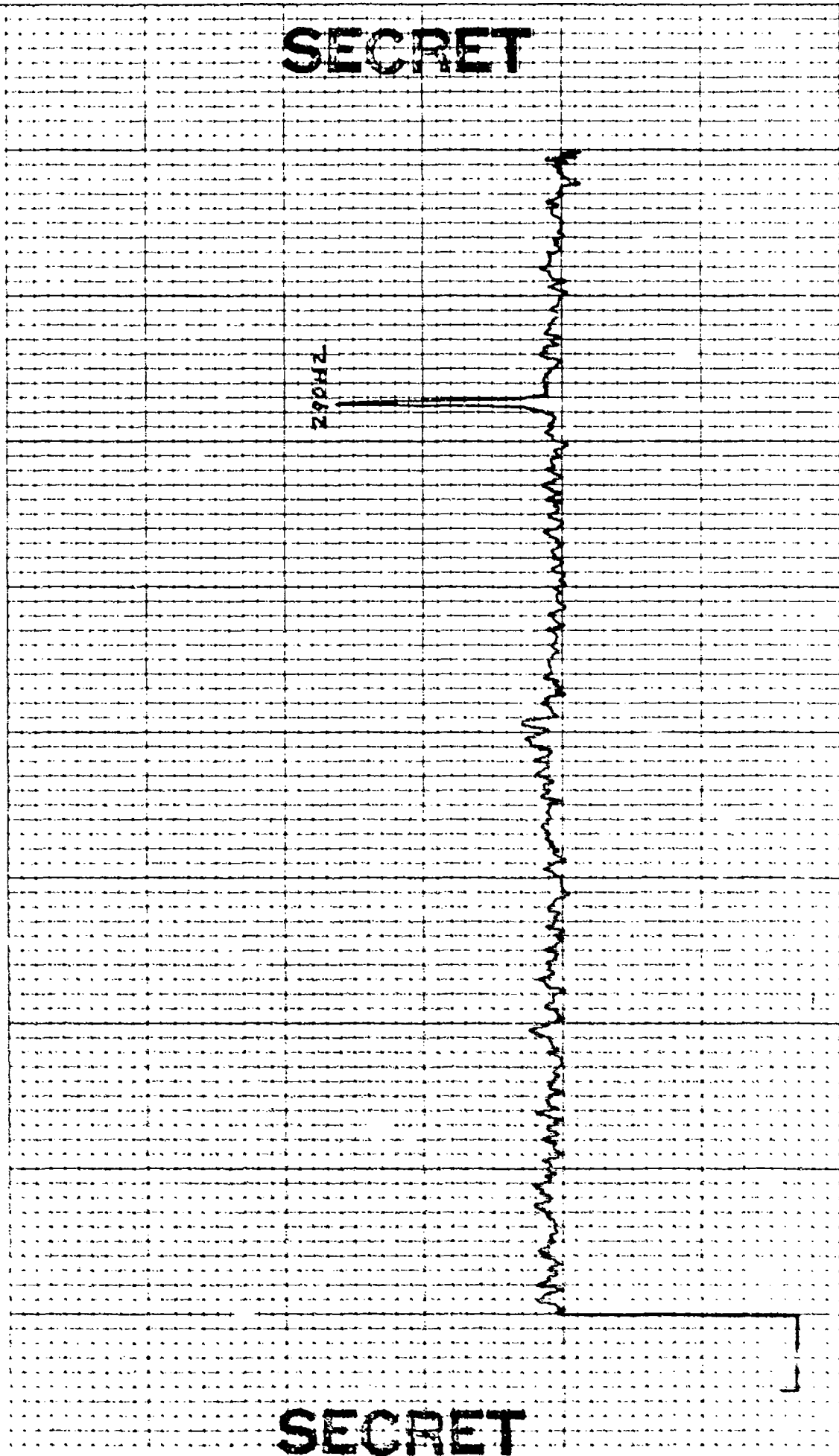


CONTROL: 2-7 -0934 (16)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
 16 ELEMENTS

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

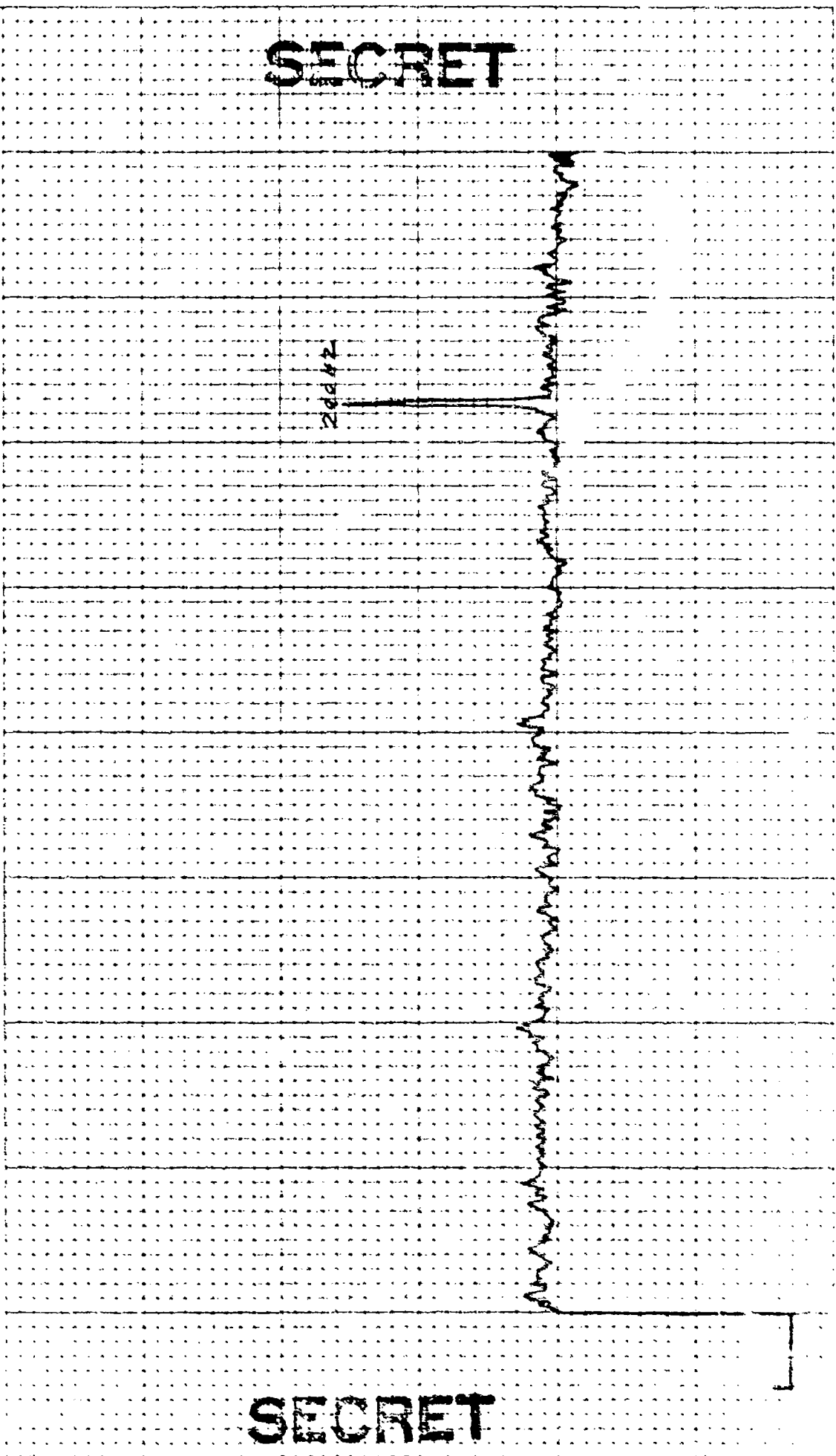
REEL: F1Y
 INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

INDE X3575



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

REEL: F14 INDE X3575
 INTEGRATION TIME 320 SECS ATTEN: -/0 DB
 FILTER WTC: HANNING



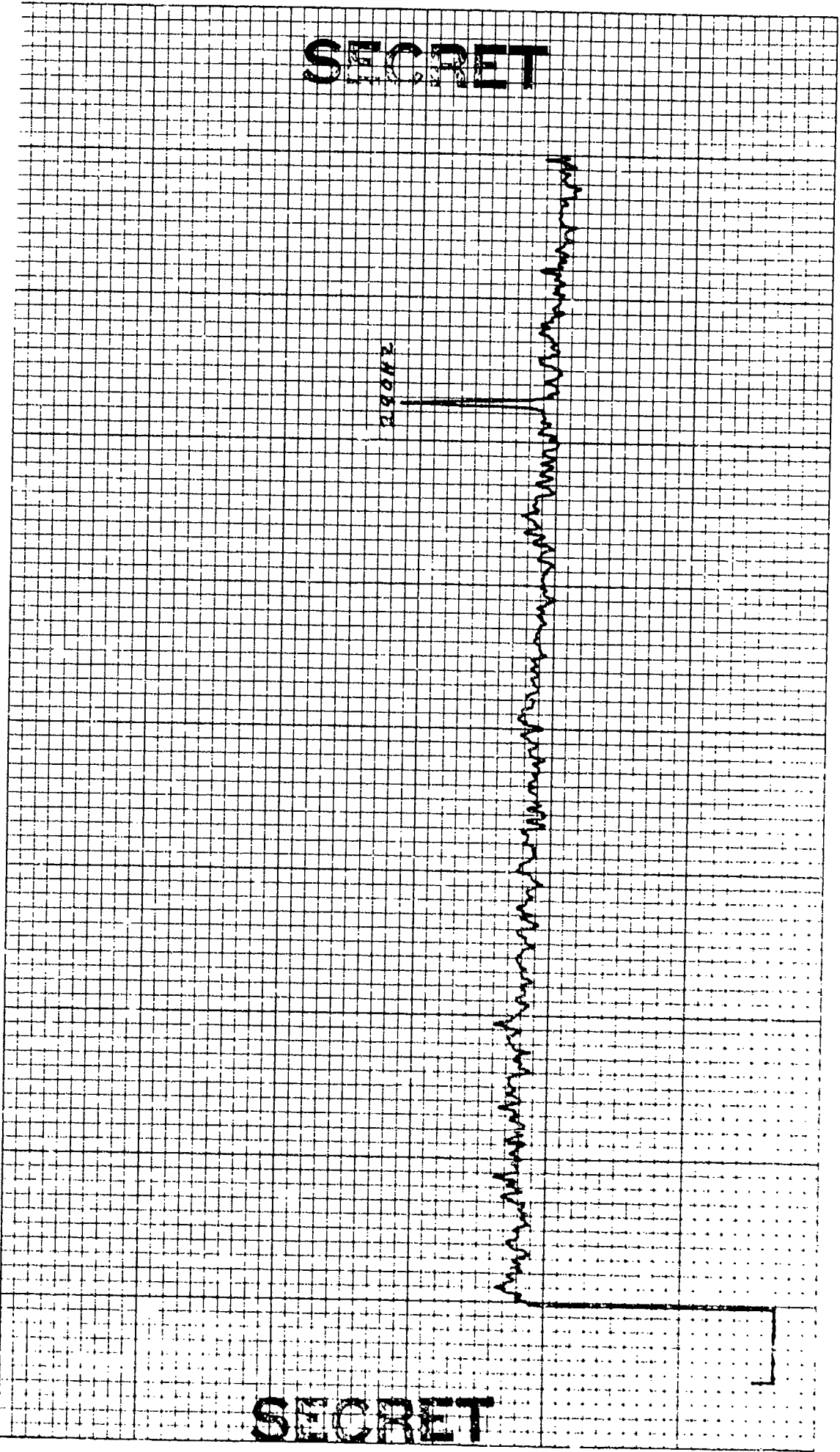
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CONTROL: 2-7 -0934 (1/2)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAYE
CENTER FREQ: 270 HZ
16 ELEMENTS

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

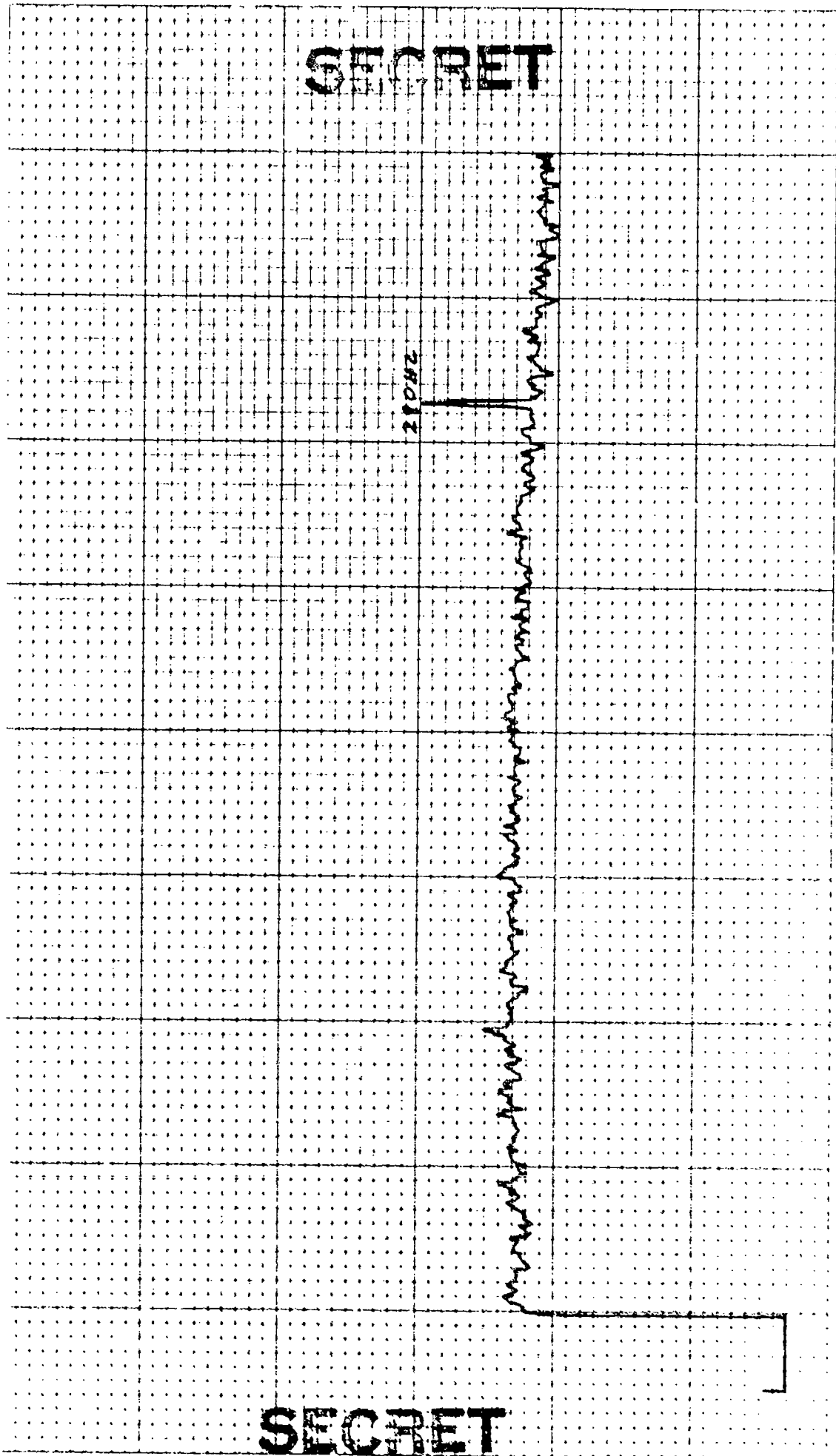
REEL: 514 INDE XJS 75
INTEGRATION TIME 320 SECS
ATTEN: -18 DB
FILTER WTG: HANNING



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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



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16 1/16

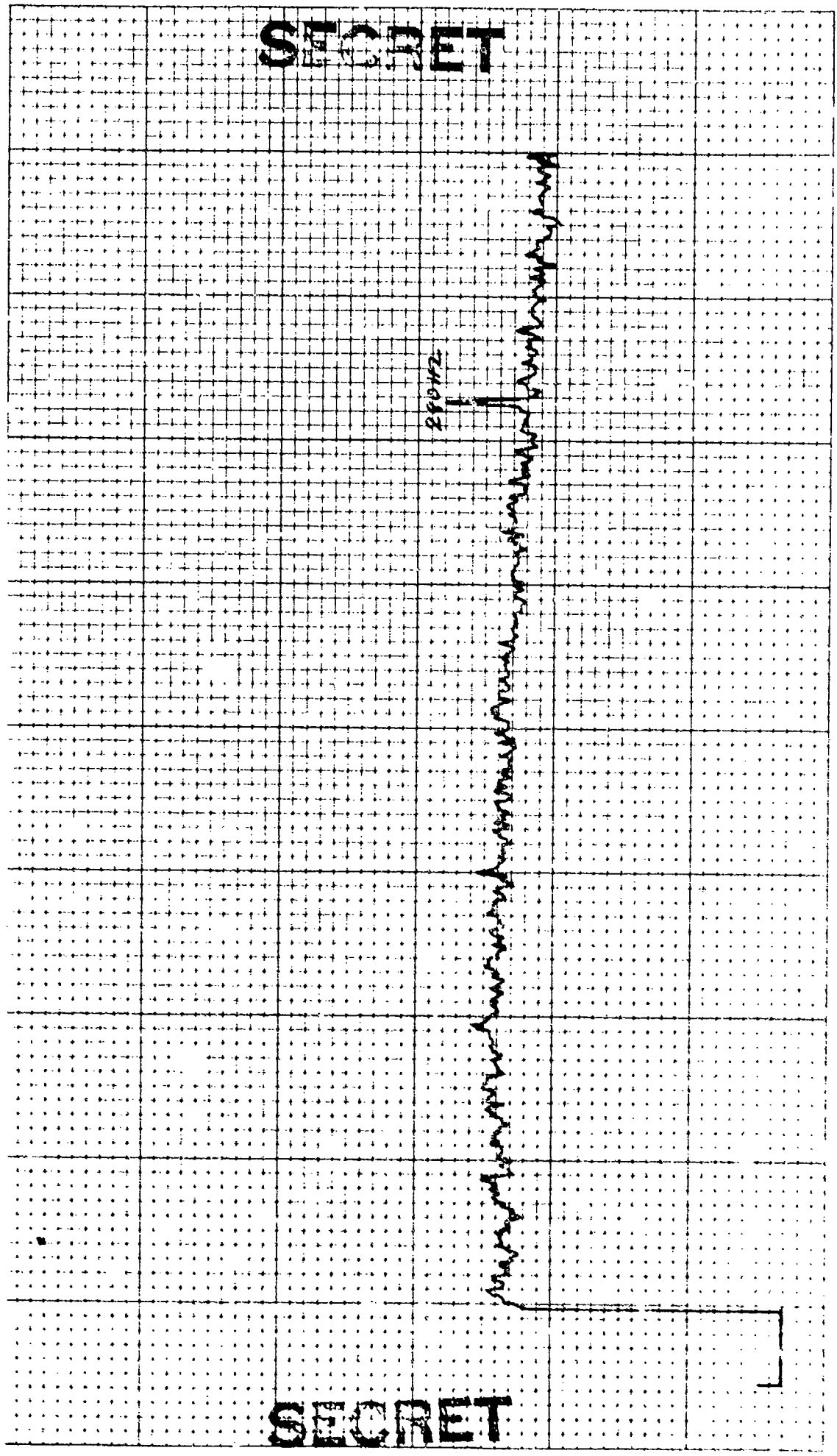
CONTROL: 2-7 -0824 (16) DATE OF ANALYSIS: 1-16 REEL: F/4 INDE X3575

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

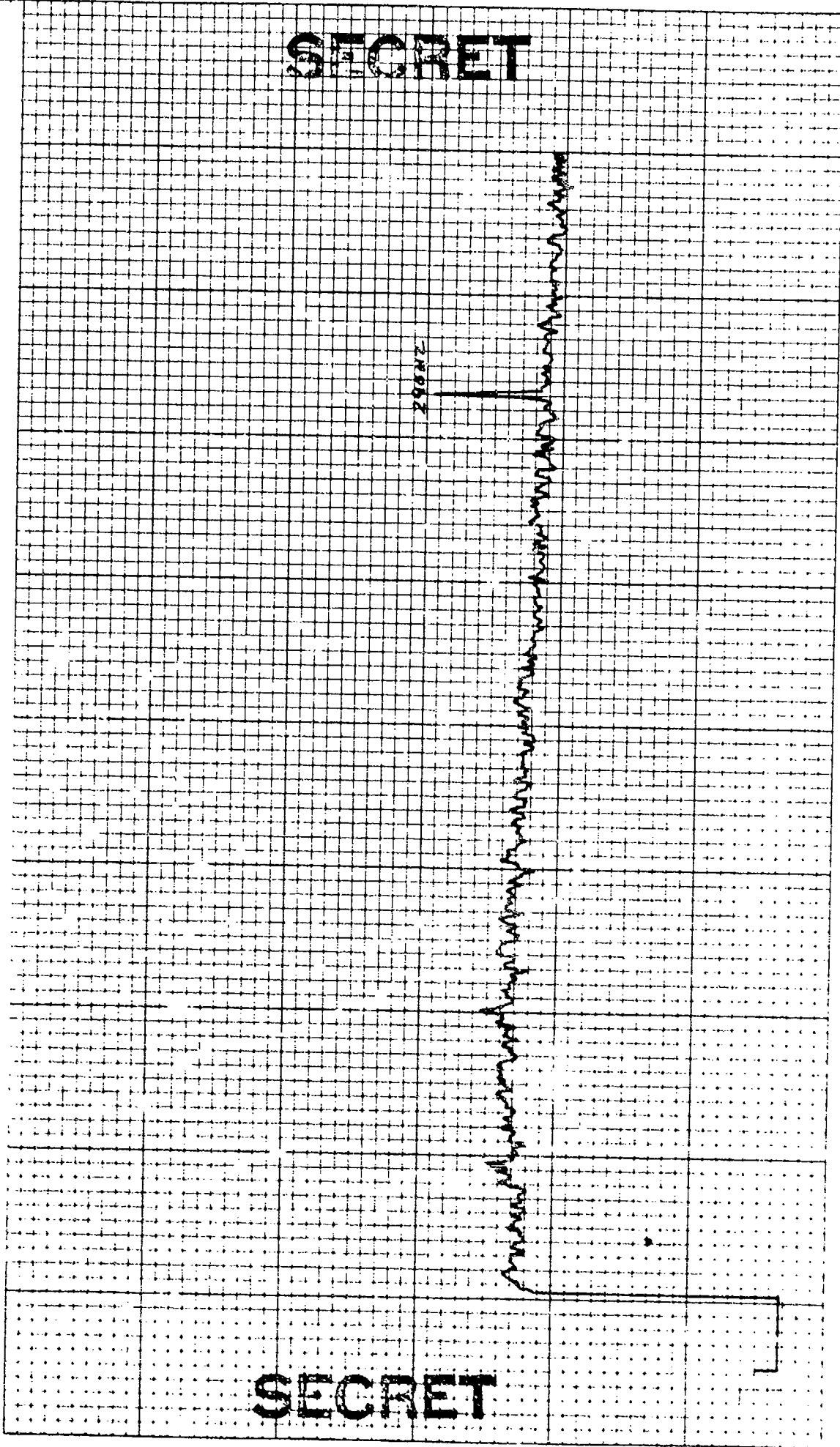


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CONTRCL: 2-7 -0934 (16)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
14 ELEMENTS

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



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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>	

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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>- 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>

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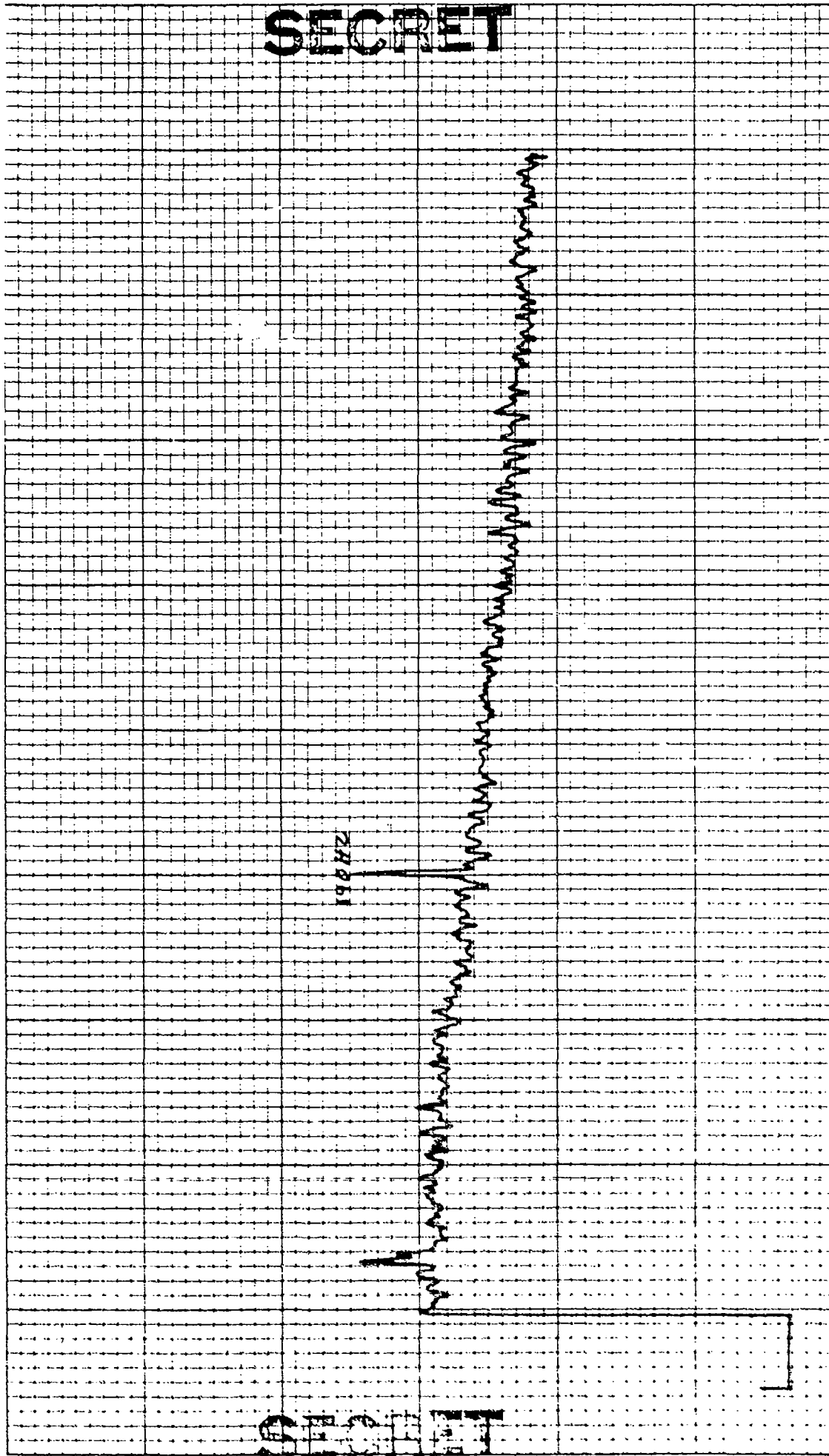
815

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
 1/6 DEG. AZ STEERING

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

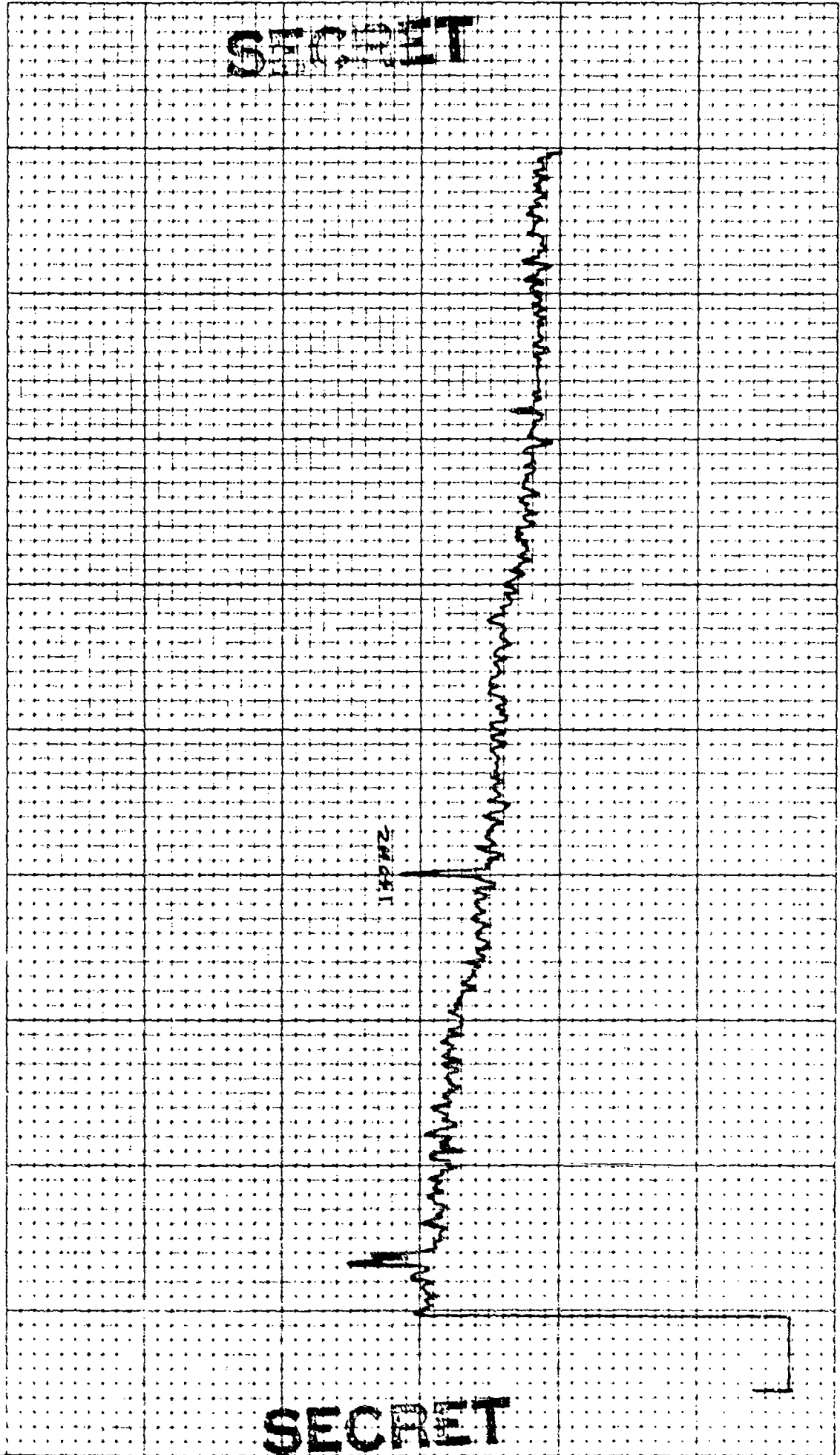


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1-26-77

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



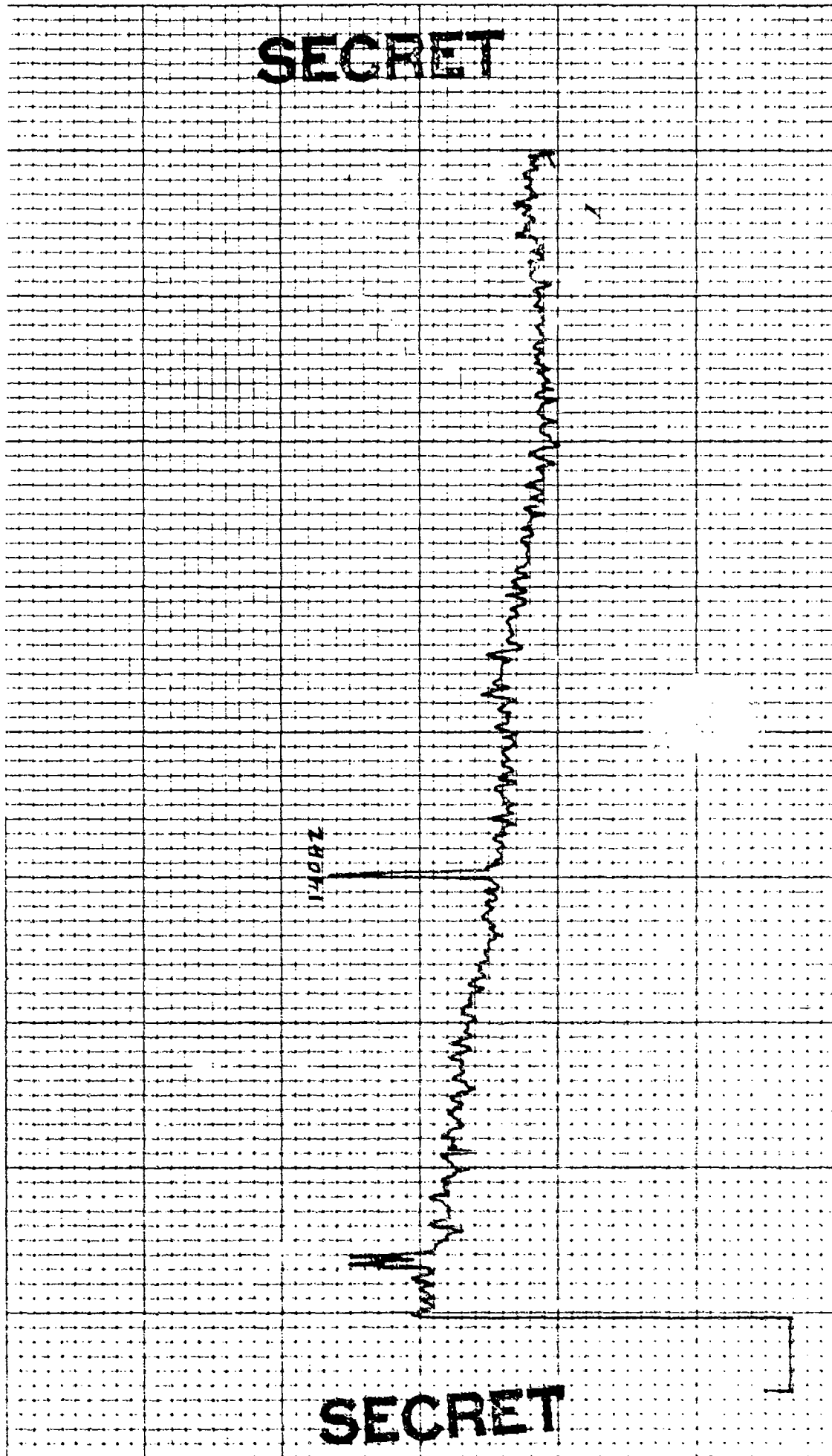
CONTROL: 27 -0934 (32) REEL: F/4 INDE XJ57C

BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: 1-26-77 29-34

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

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

32 ELEMENTS 120 DEG. AZ STEERING



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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

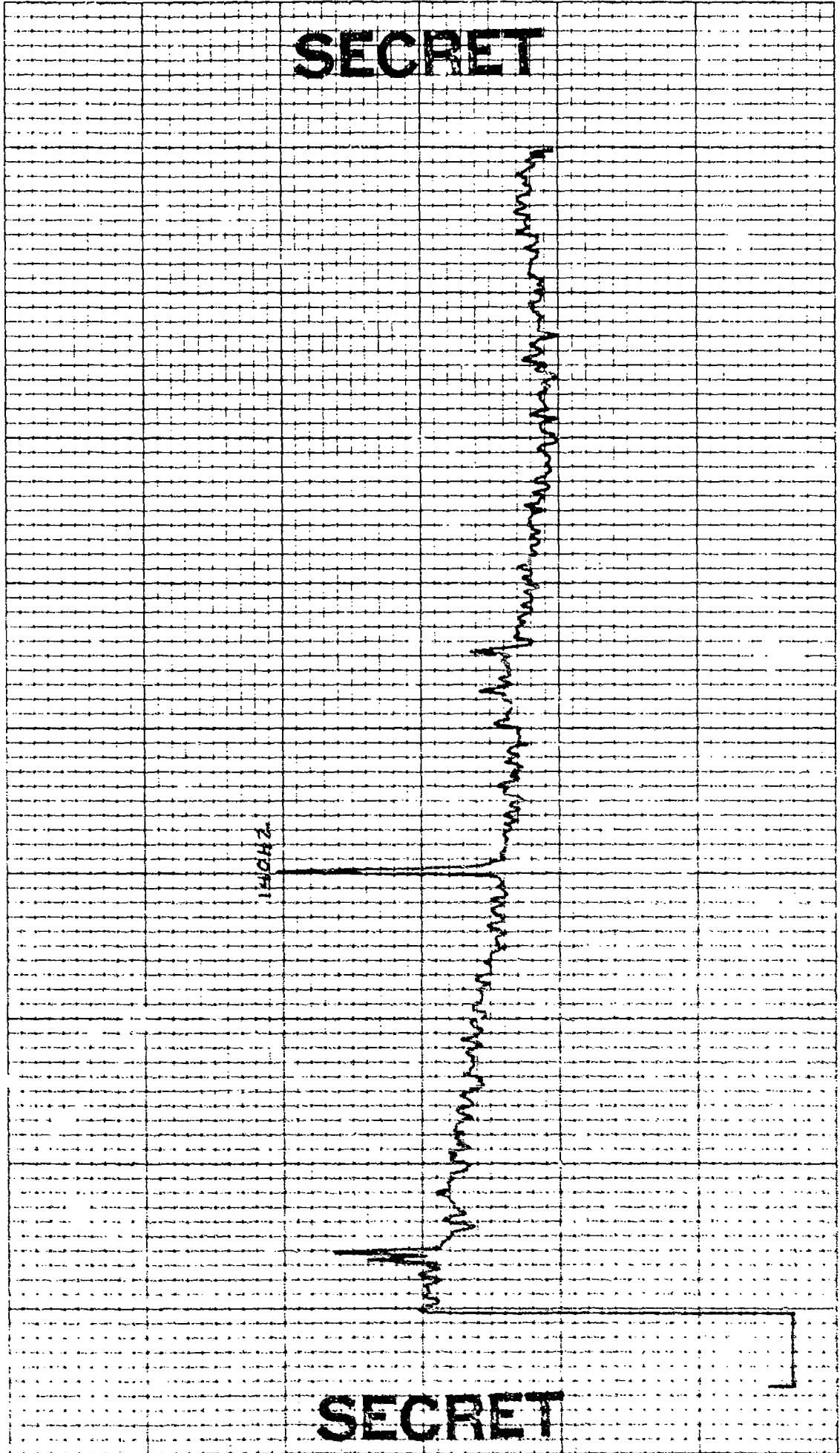
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ

32 ELEMENTS 422 DEG. AZ STEERING

REEL: F14 INDE X3575

INTEGRATION TIME 320 SECS ATTN: -24 DB

FILTER WTC: HANNING



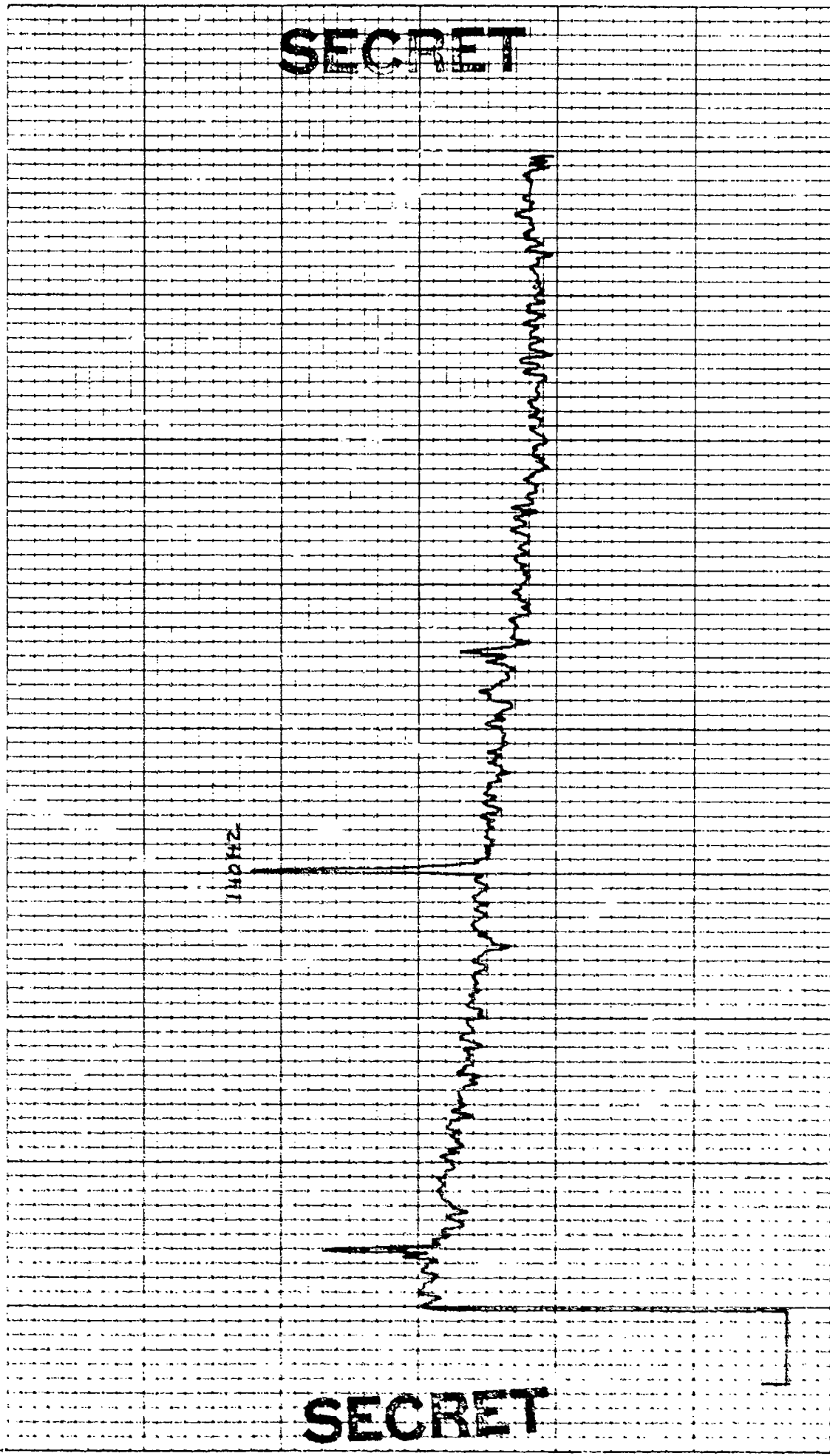
CONTROL: 27 - 0934 (J2) DATE OF ANALYSIS: - - - - - REEL: F14 INDE X3575

BEAMFORMED SPECTRUM (ELEMENTS) 1-26 & 29-34

EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 0934Z INTEGRATION TIME 320 SECS ATTEN: -24 DB

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

32 ELEMENTS 124 DEG. AZ STEERING



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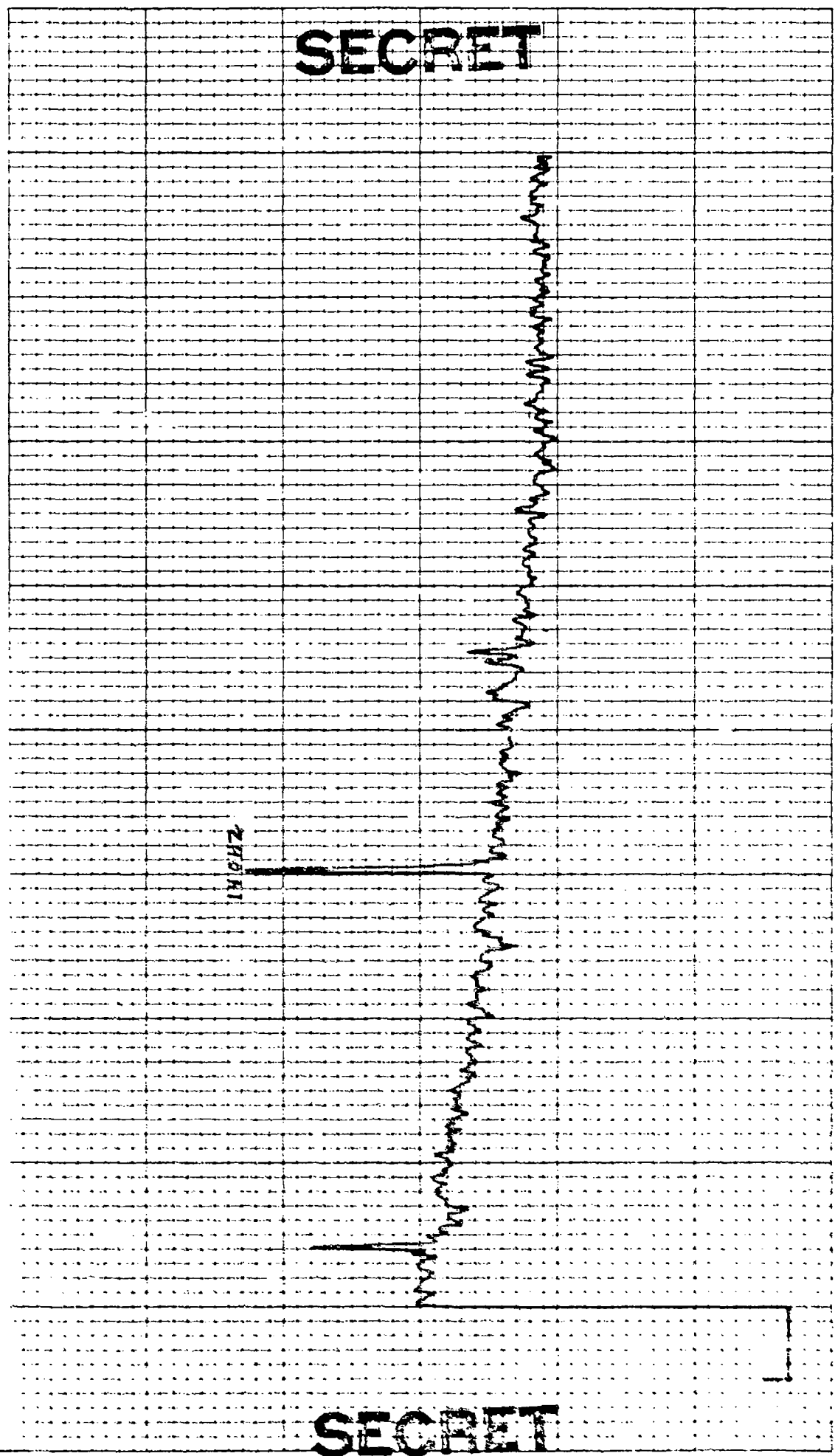
4

33

CONTROL: 2-7 -0934 (12)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
12 ELEMENTS

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

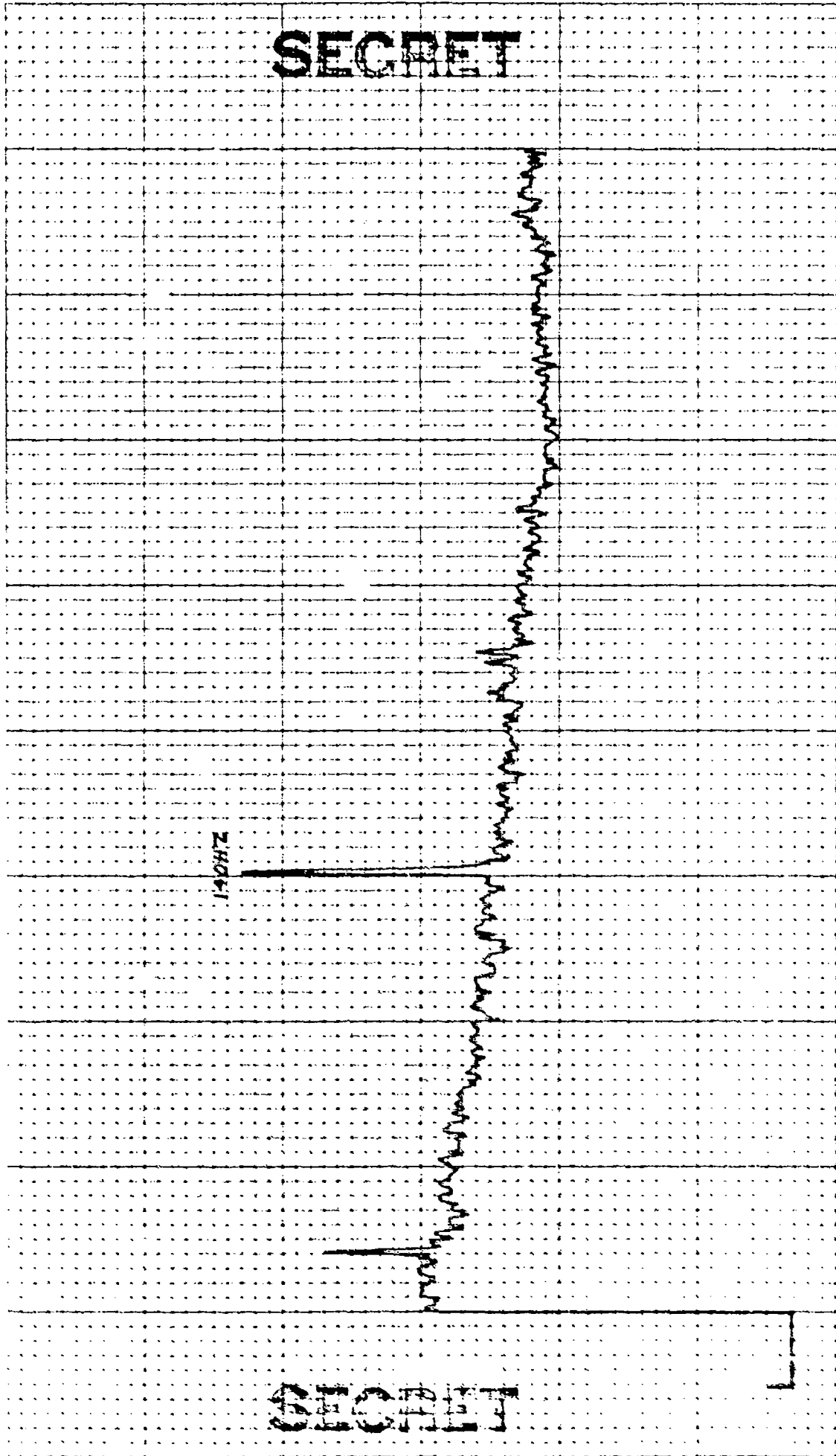
REEL: F14 INDE X3579
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING
ATTEN: -24 DB



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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
 CENTER FREQ: 150 MZ ANALYSIS BANDWIDTH: 1/10HZ
12 ELEMENTS +25.5 DEG. AZ STEERING FILTER WIC: HANNING ATTN: 24 DB INTEGRATION TIME 320 SECS



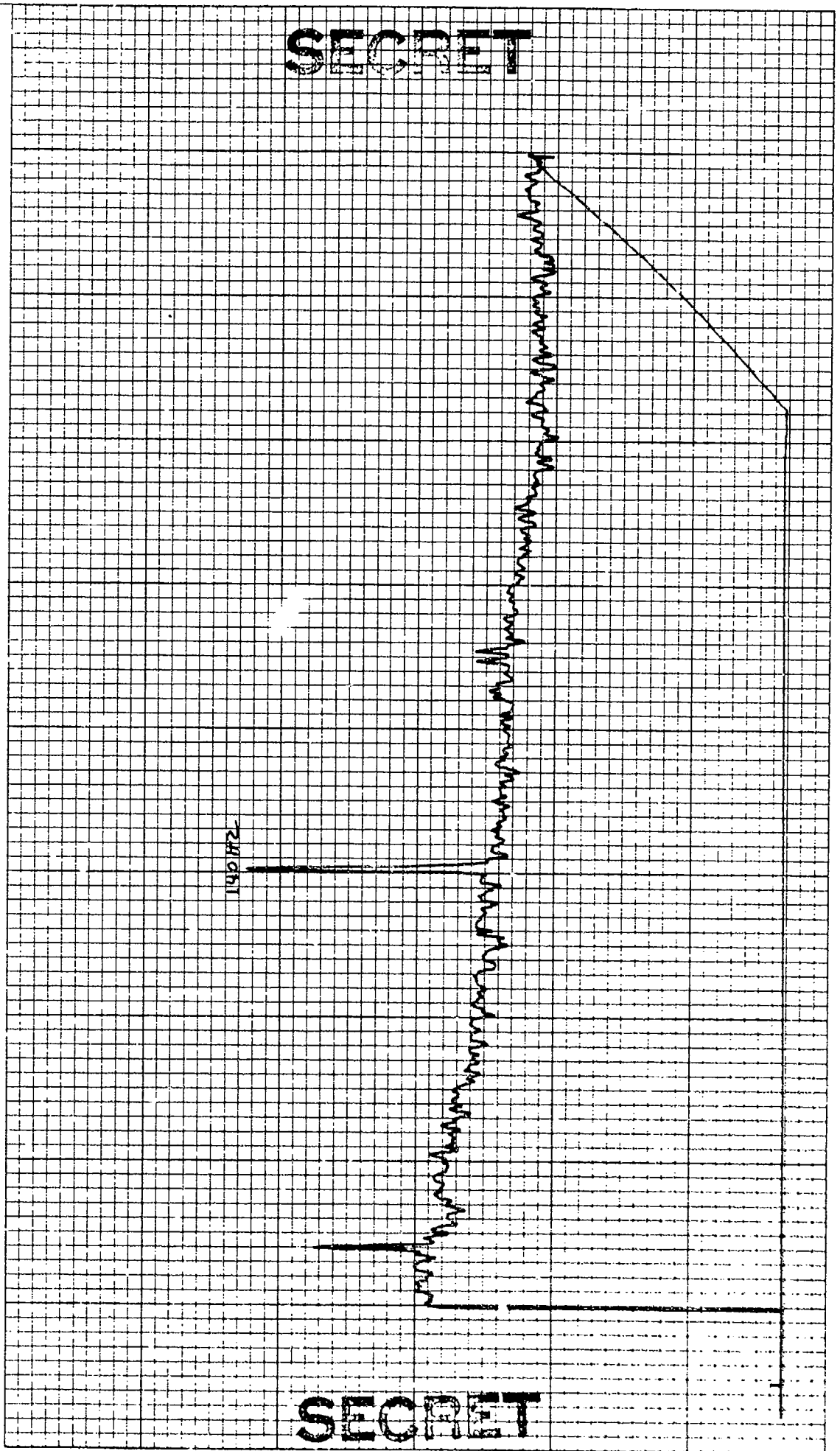
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CONTROL: 27 -0934 (32-)
 BEAMFORMED SPECTRUM(ELEMENTS 1-26 & 28-34)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 32 ELEMENTS

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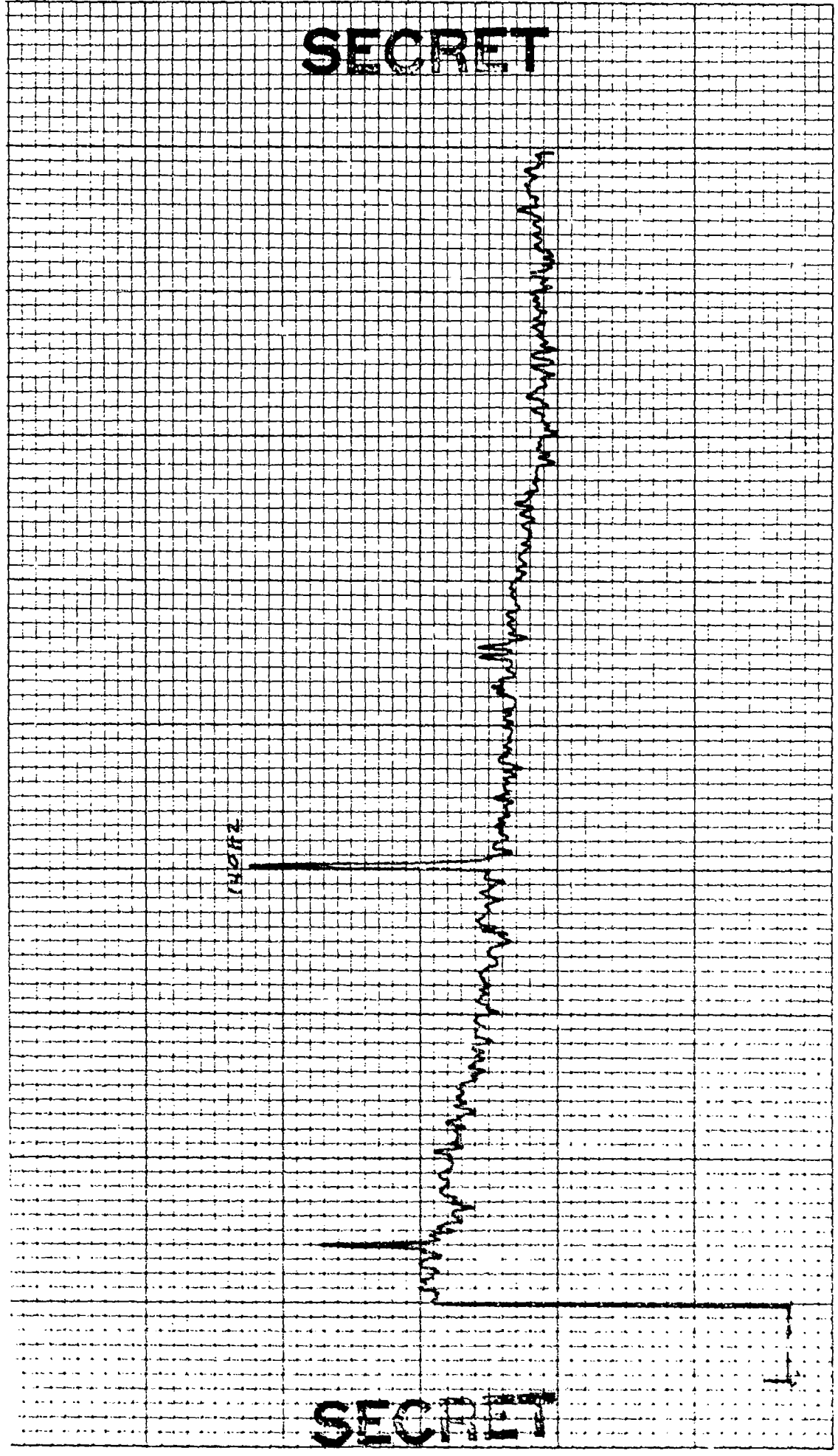
CONTROL: 2-7 -0834 (32) DATE OF ANALYSIS: 1-26-77 28-34 REEL: F14 INDE X1575

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

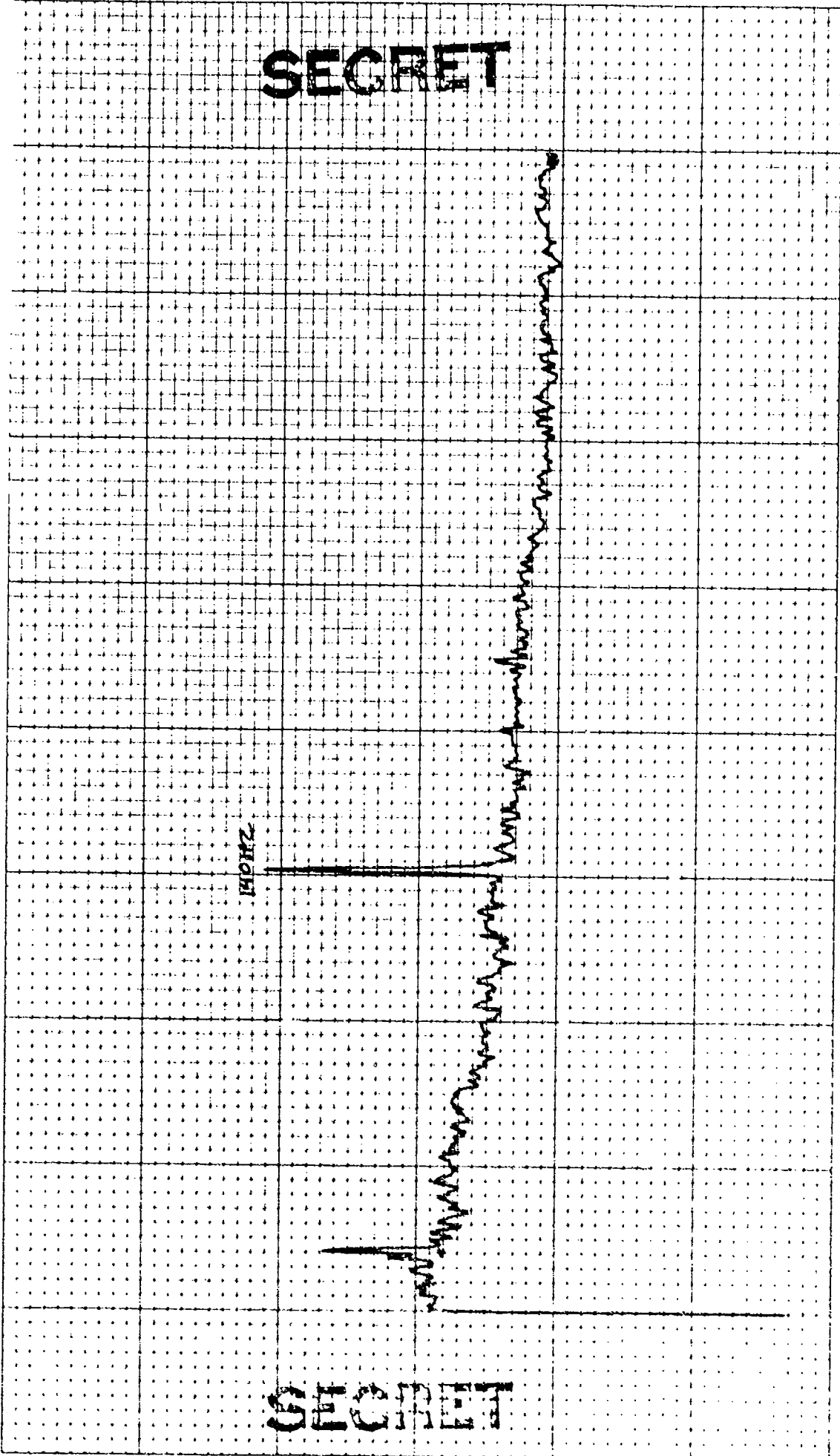
CENTER FREQ: 150 HZ DATE/TIME: 27-27 - 0834Z

32 ELEMENTS ANALYSIS BANDWIDTH: 1/10HZ

INTEGRATION TIME 320 SECS ATTN: -2YDB

FILTER WTC: HANNING

420 DEG. AZ STEERING



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CONTROL: 27 - 0934 (J2) DATE OF ANALYSIS: - - - -

BEAMFORMED SPECTRUM (ELEMENTS) 1-26 & 2834

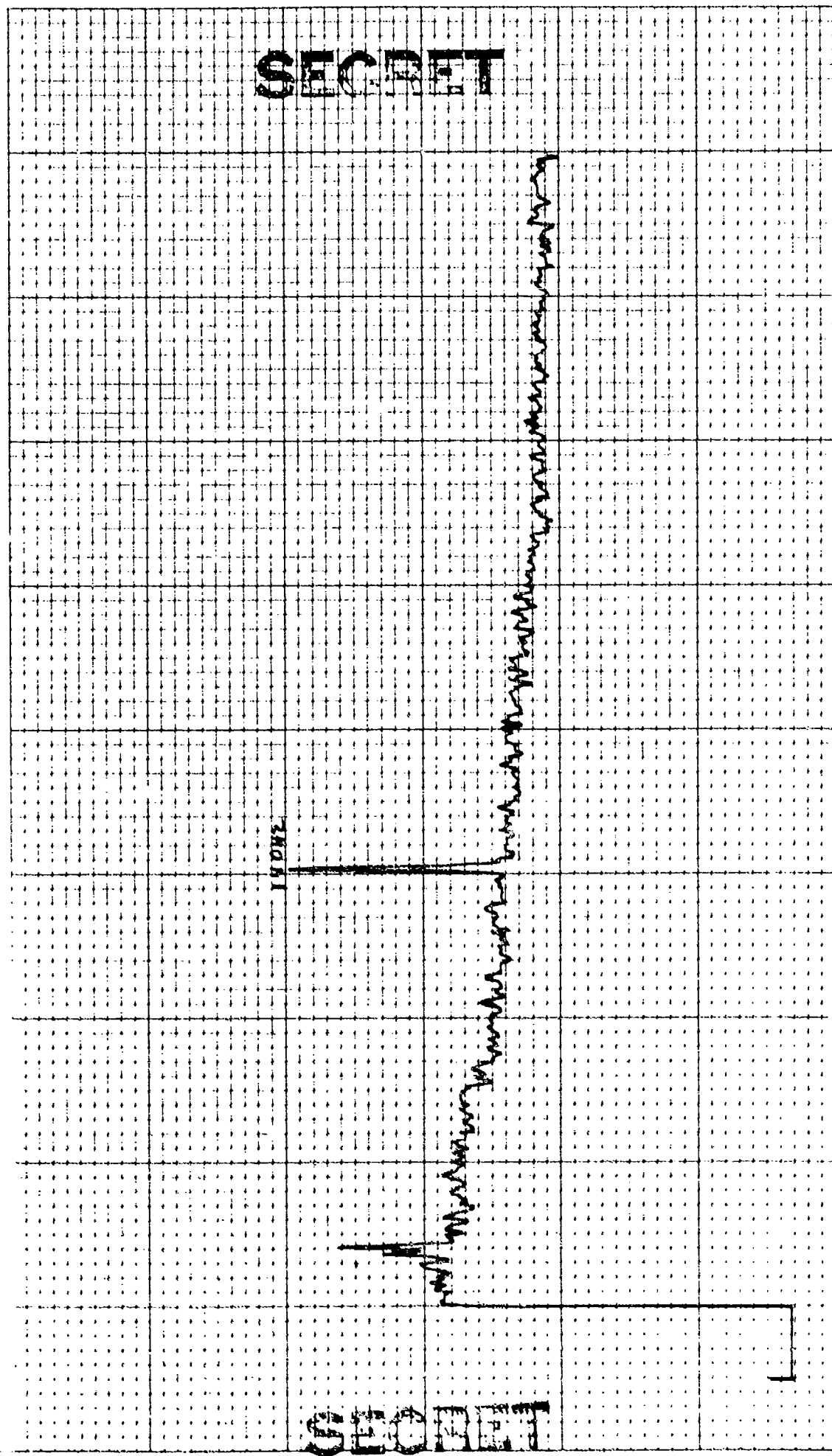
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 0934Z

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

32 ELEMENTS +30 DEG. AZ STEERING

REEL: F14 INTEGRATION TIME 320 SECS ATEN: -24DB

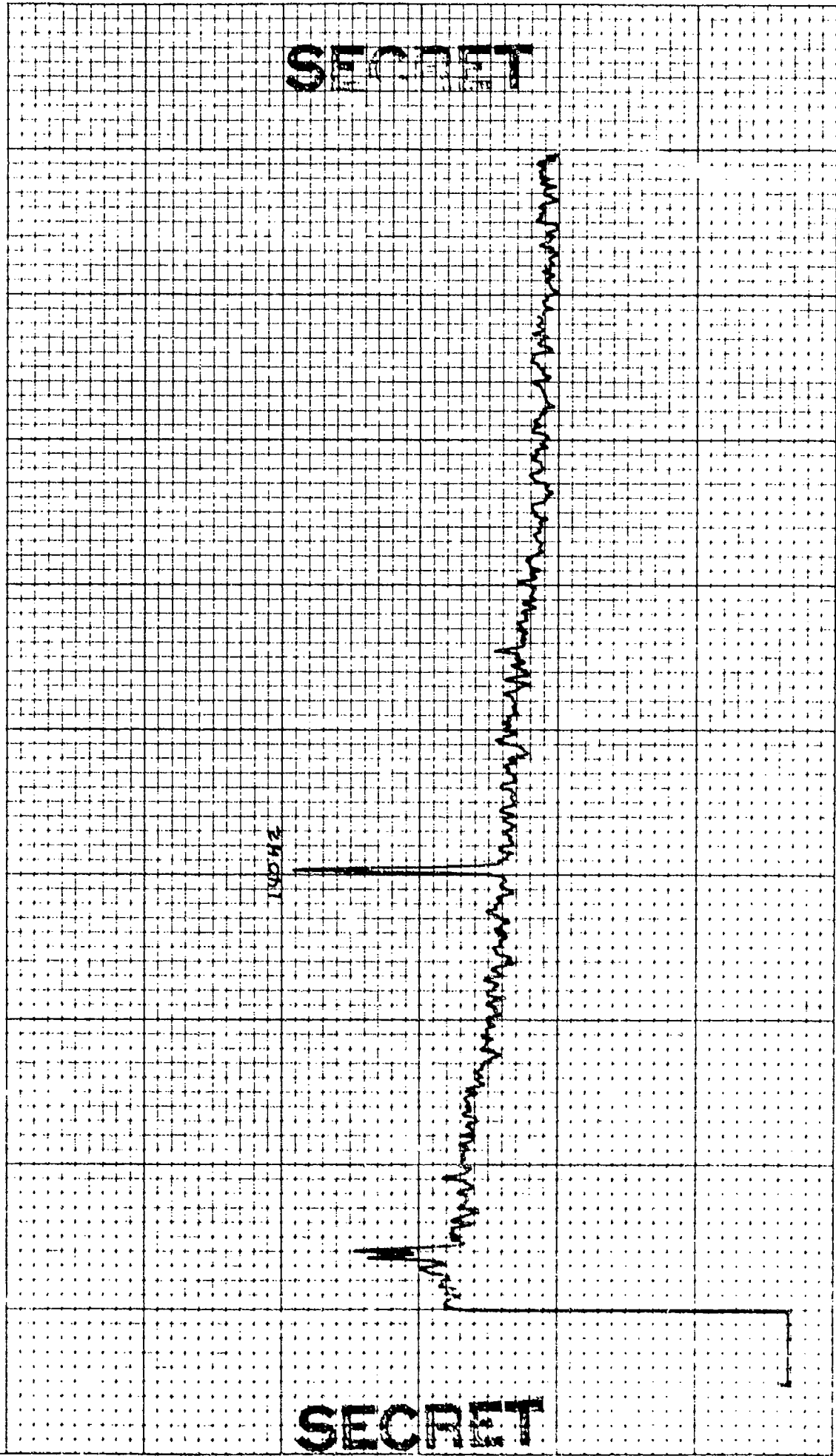
INDE X3575 FILTER WTG: HANNING



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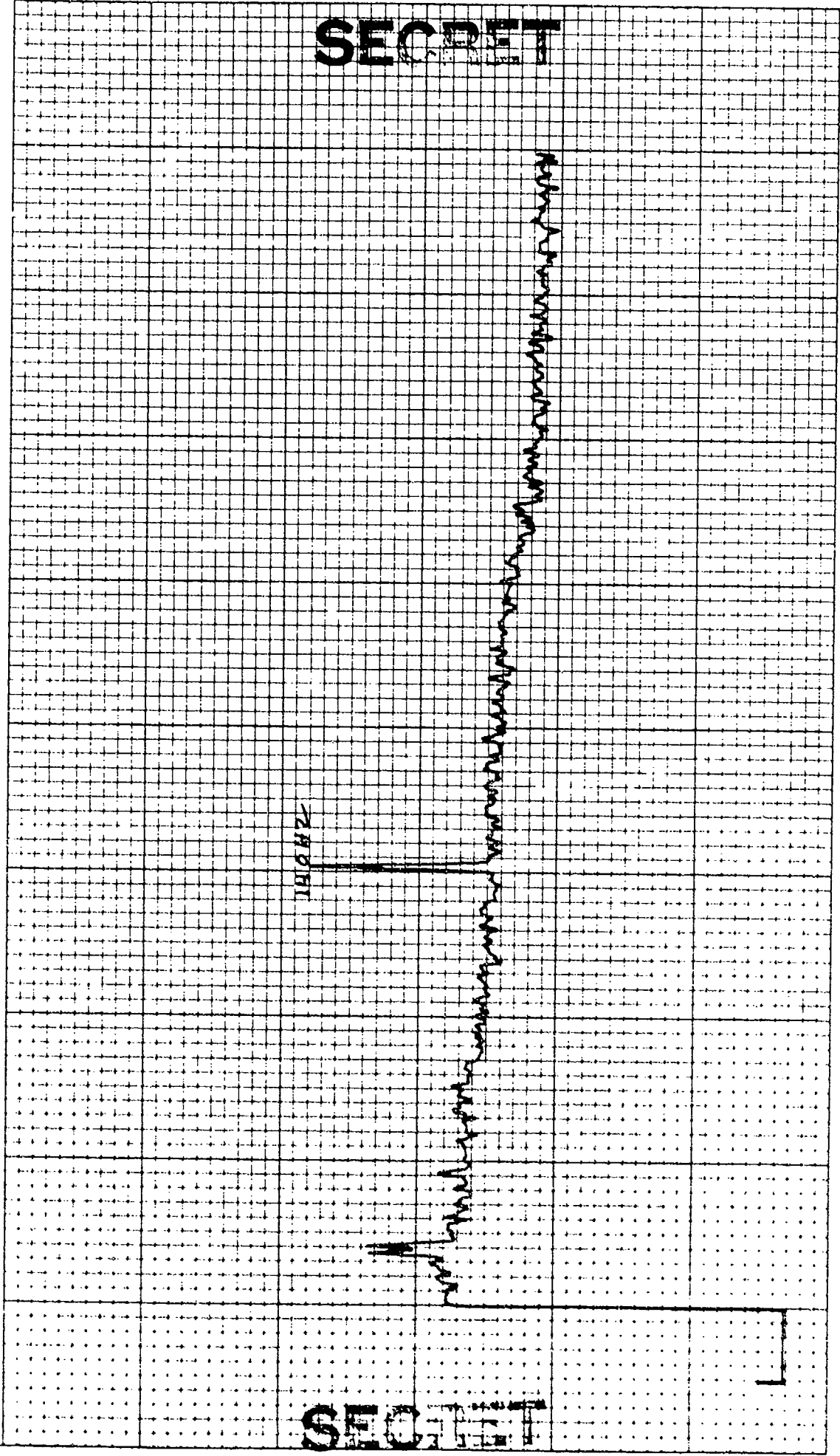
CONTROL: 27 -0934 (12) REEL: F/4 INDE X325
BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: - - -
EXERCISE: BEARING STAKE 1-26 29-34
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
32 ELEMENTS +32 DEG. AZ STEERING
INTEGRATION TIME 320 SECS FILTER WTG: HANNING
ATTEN:-2Y DB



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CONTROL: 27-0834 (32)
BEAMFORMED 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 WTG: HANNING



1/10 HZ

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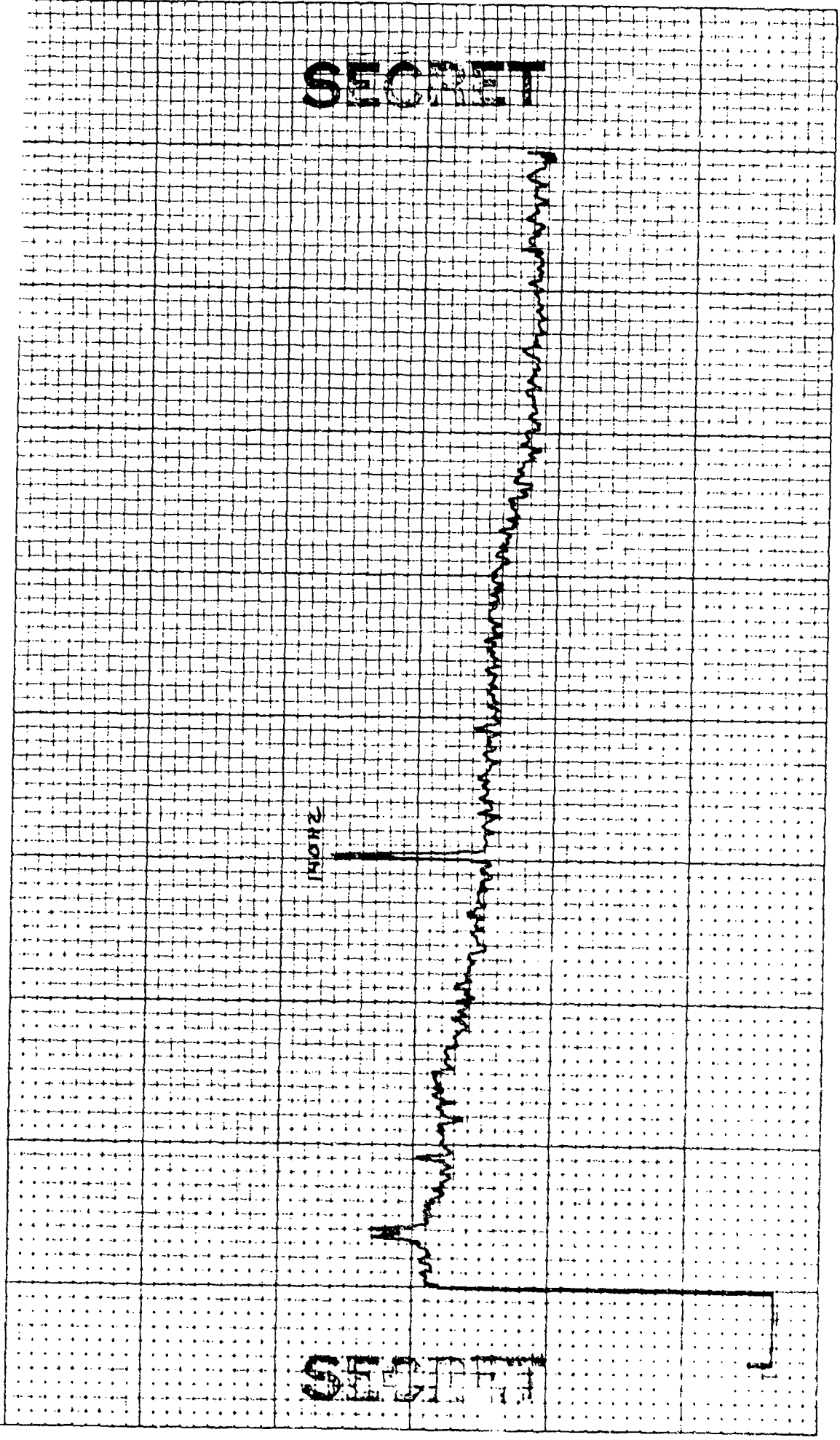
SECRET

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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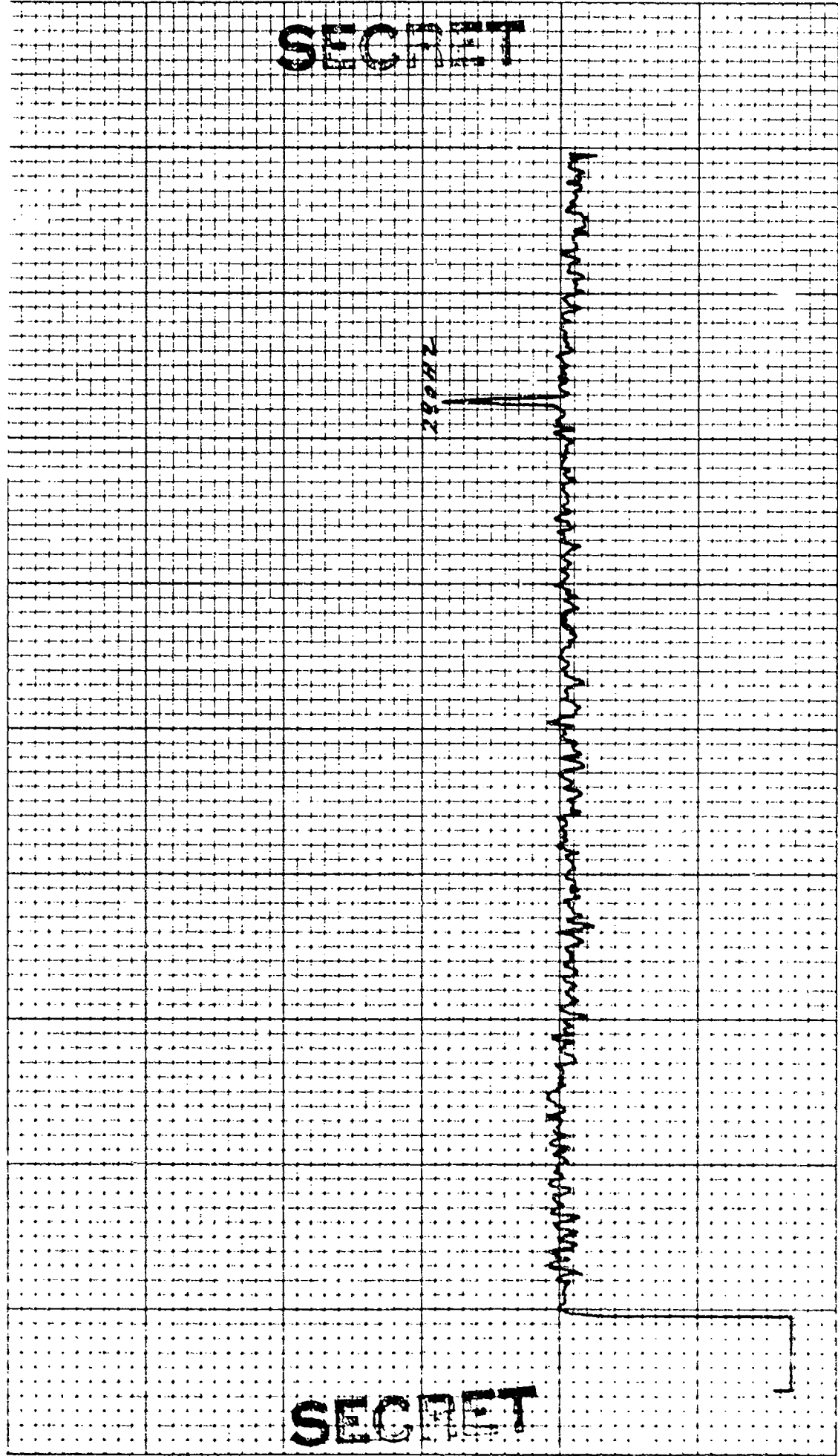
SECRET

CONTROL: 2.7 - 0934 (32)
 BEAMPFORMED 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

INDE X3575
 ATTN:-2Y DB

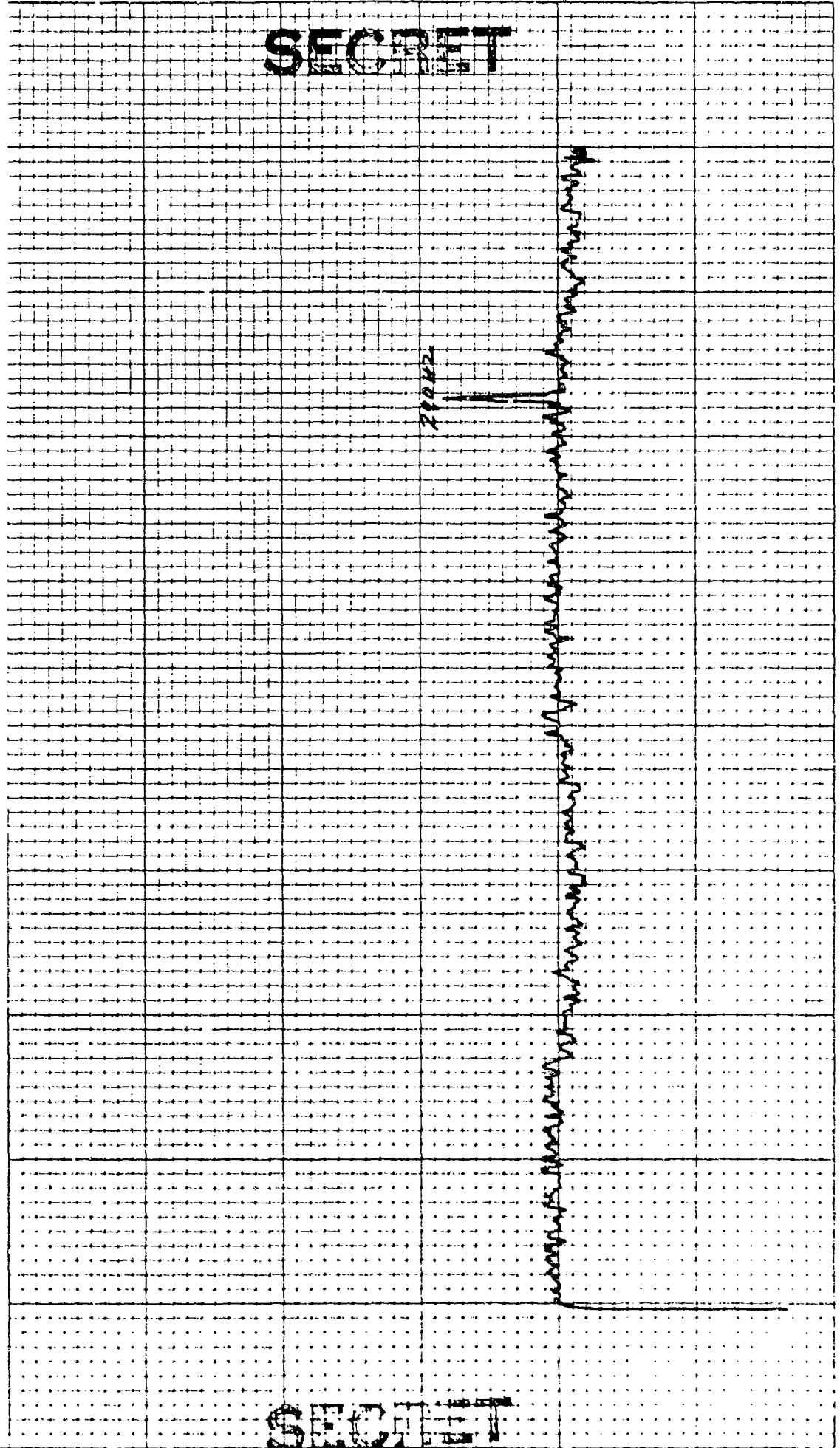


CONTROL: 27 -0934(32)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
 32- ELEMENTS

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

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

INDE X3575
 ATTN: 2V DB



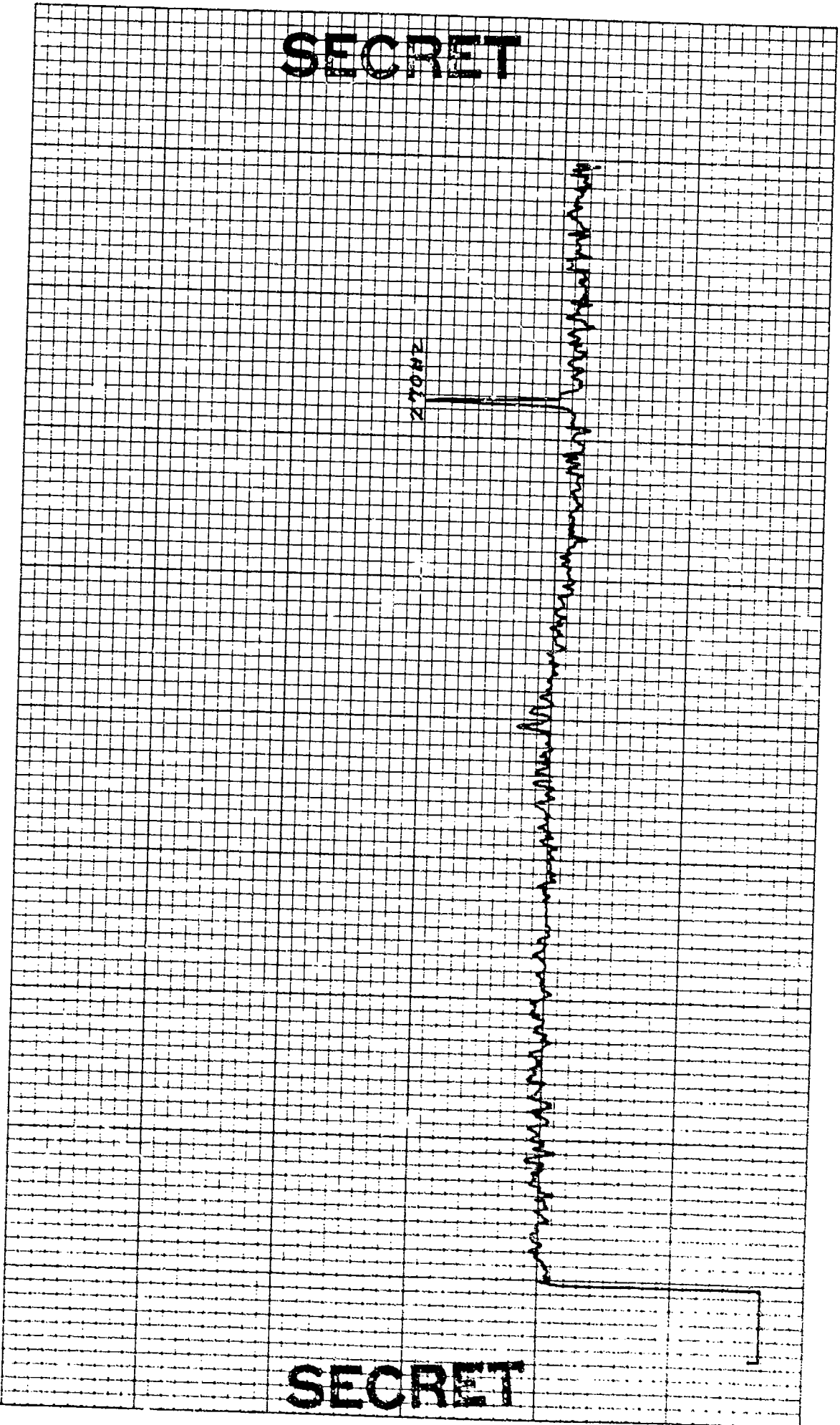
TO: 7H.7
DATE: 1/26/77
BY: [unclear]

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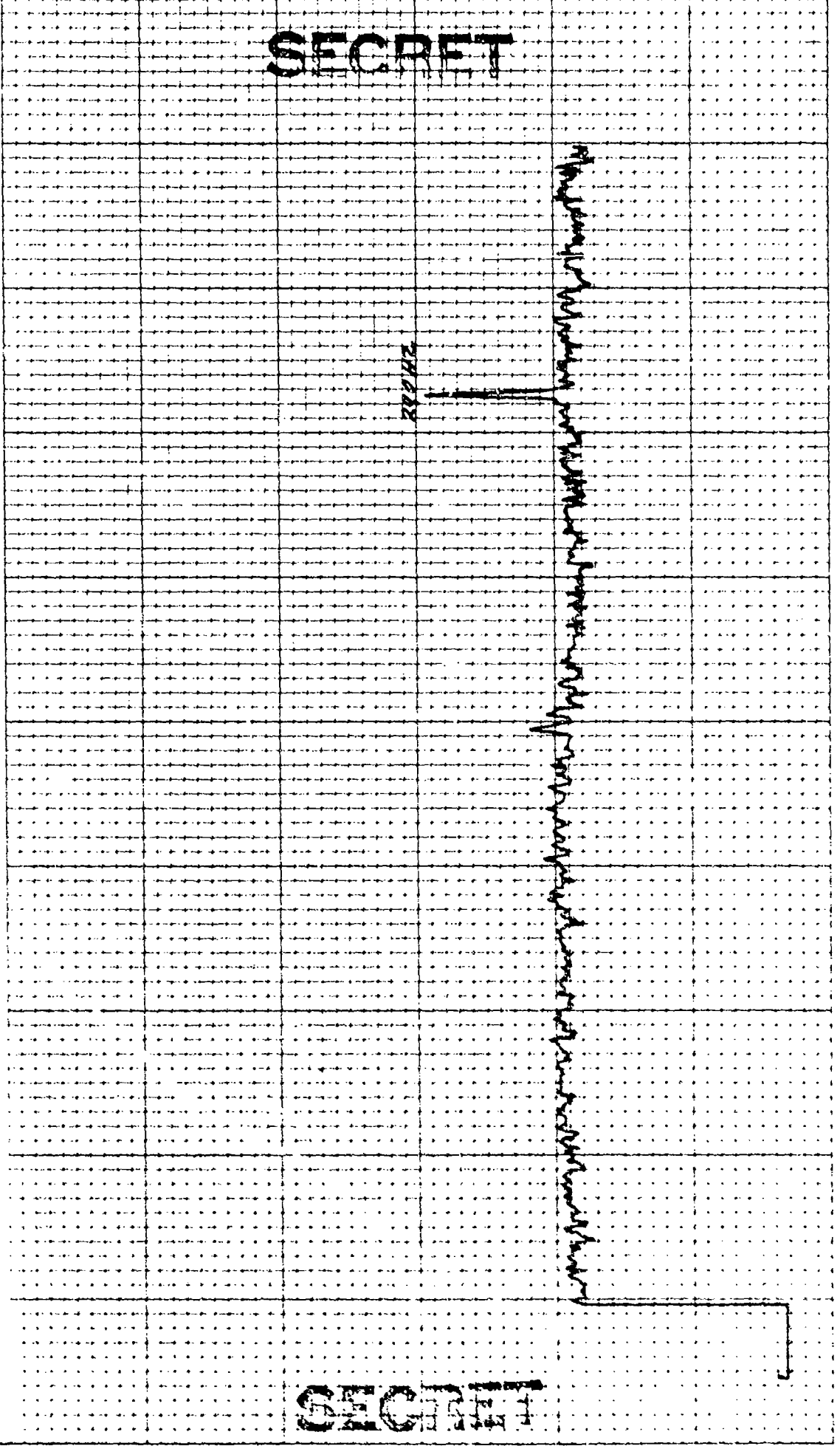
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CONTROL: 2-7 -0134 (32)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
 32 ELEMENTS

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

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

INDE X3575
 ATTER: 27 DB



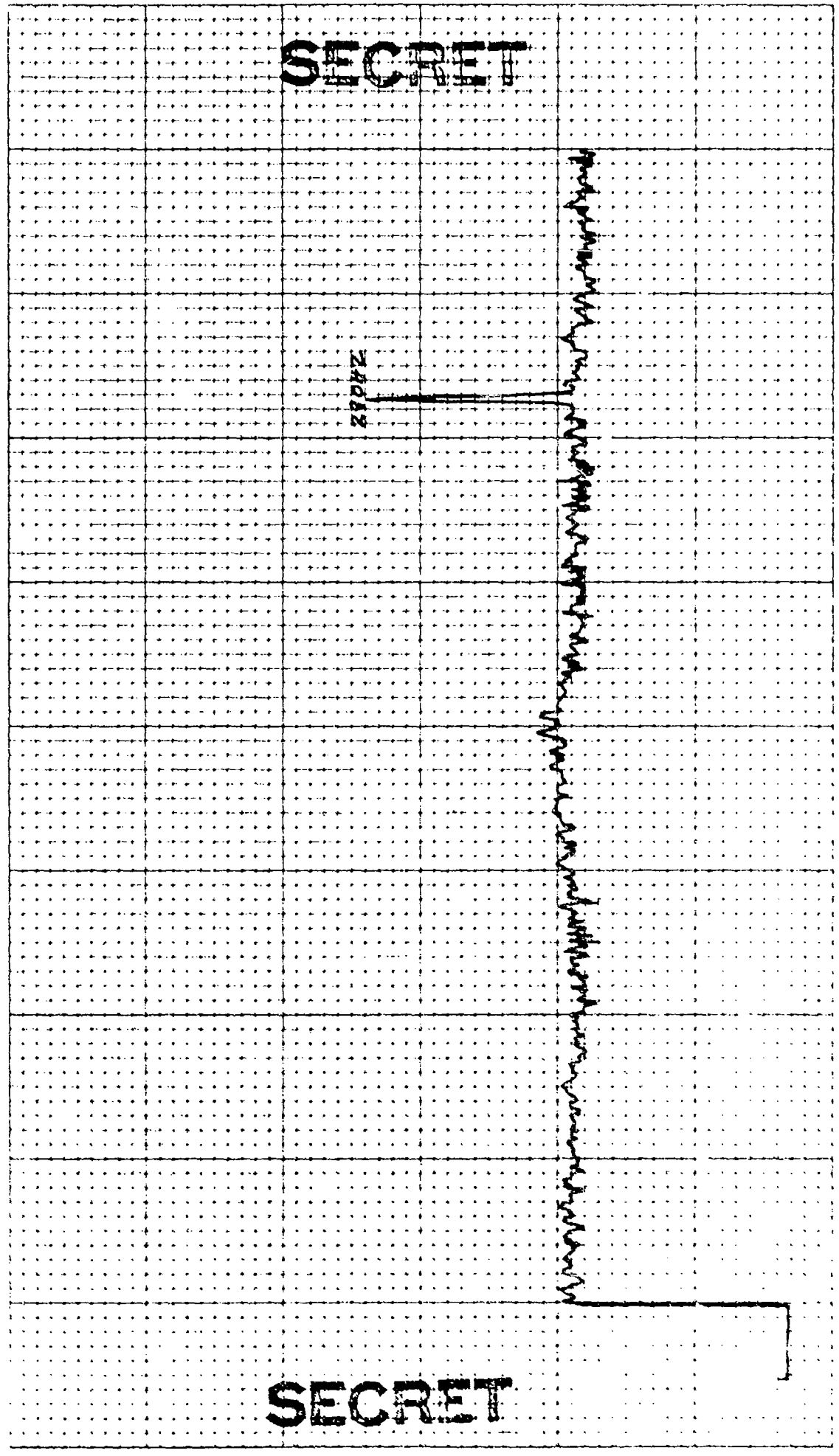
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270 HZ

Handwritten notes and a signature along the right edge of the plot area.

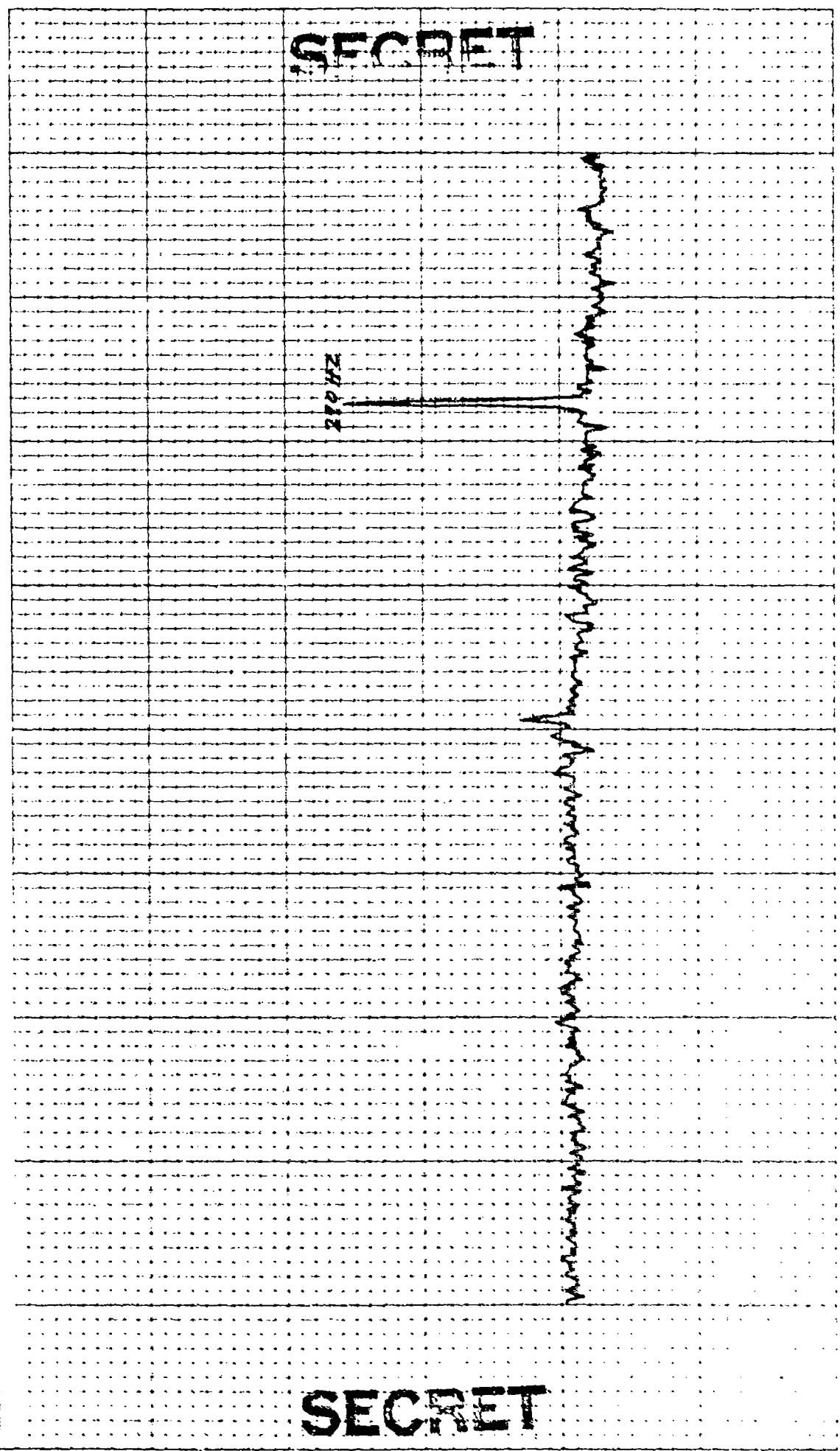
CONTROL: 2-7 -0934 (32) DATE OF ANALYSIS: 1-26-54 REEL: F44 INDE X3575
 BEAMFORMED SPECTRUM (ELEMENTS))
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 -0934 Z INTEGRATION TIME 320 SECS ATTN: 24 DB
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
32 ELEMENTS +24 DEG. AZ STEERING



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CONTROL: 27-0934 (72) DATE OF ANALYSIS: - - - - REEL: F14 INDE X3275
 BEAMFORMED SPECTRUM(ELEMENTS) 1-264 29-34
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 0114Z INTEGRATION TIME 320 SECS ATTEN: -24 DB
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1710HZ FILTER WTC: HANNING
72 ELEMENTS 4.5 DEG. AZ STEERING



26-380

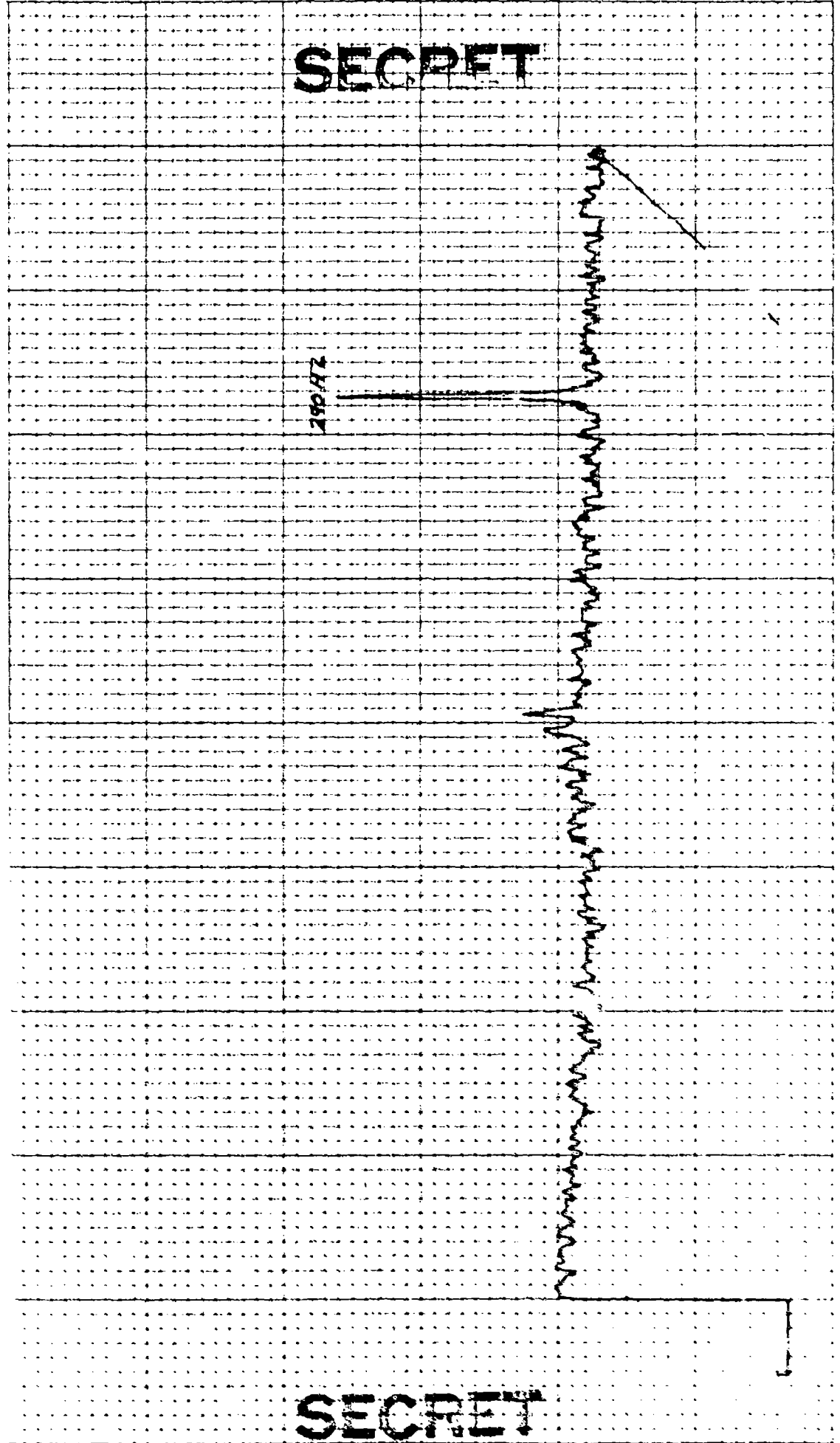
40 003

REEL: F/Y INDE XJ575

INTEGRATION TIME 320 SECS ATTEN: 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

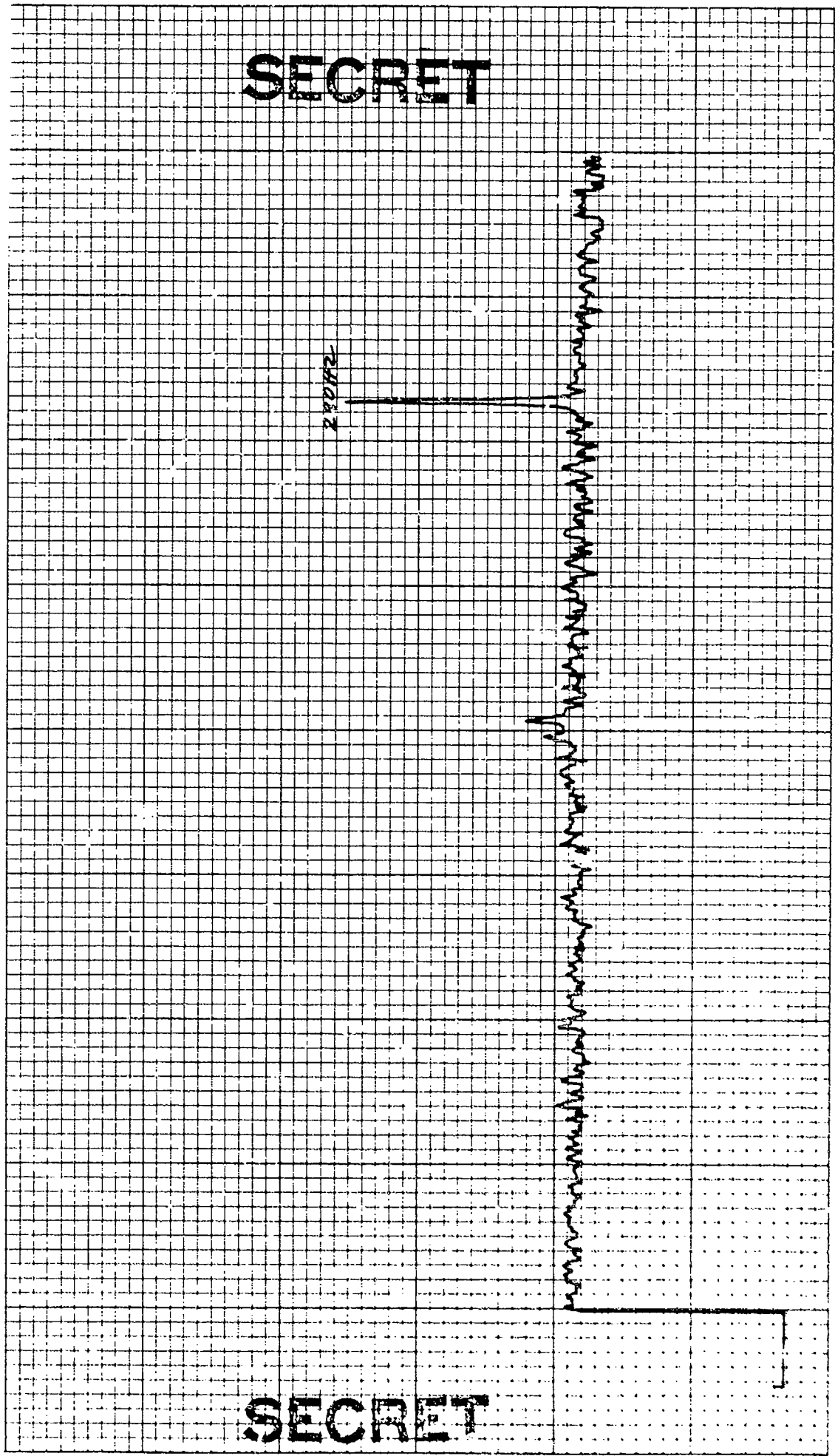
CONTROL: 0914 - 5/ (0913)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
22 ELEMENTS



1-298

CONTROL: 2-2 -0934 (32) DATE OF ANALYSIS: - - - -
 BEAMFORMED SPECTRUM(ELEMENTS) 1-26 & 28-34
 EXERCISE: BEARING SIAKE DATE/TIME: 2-7-77 -0034 Z
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ
 32 ELEMENTS +26 DEG. AZ STEERING

REEL: F14 INDE X3573
 INTEGRATION TIME 320 SECS ATTEN: -2Y DB
 FILTER WTG: HANNING



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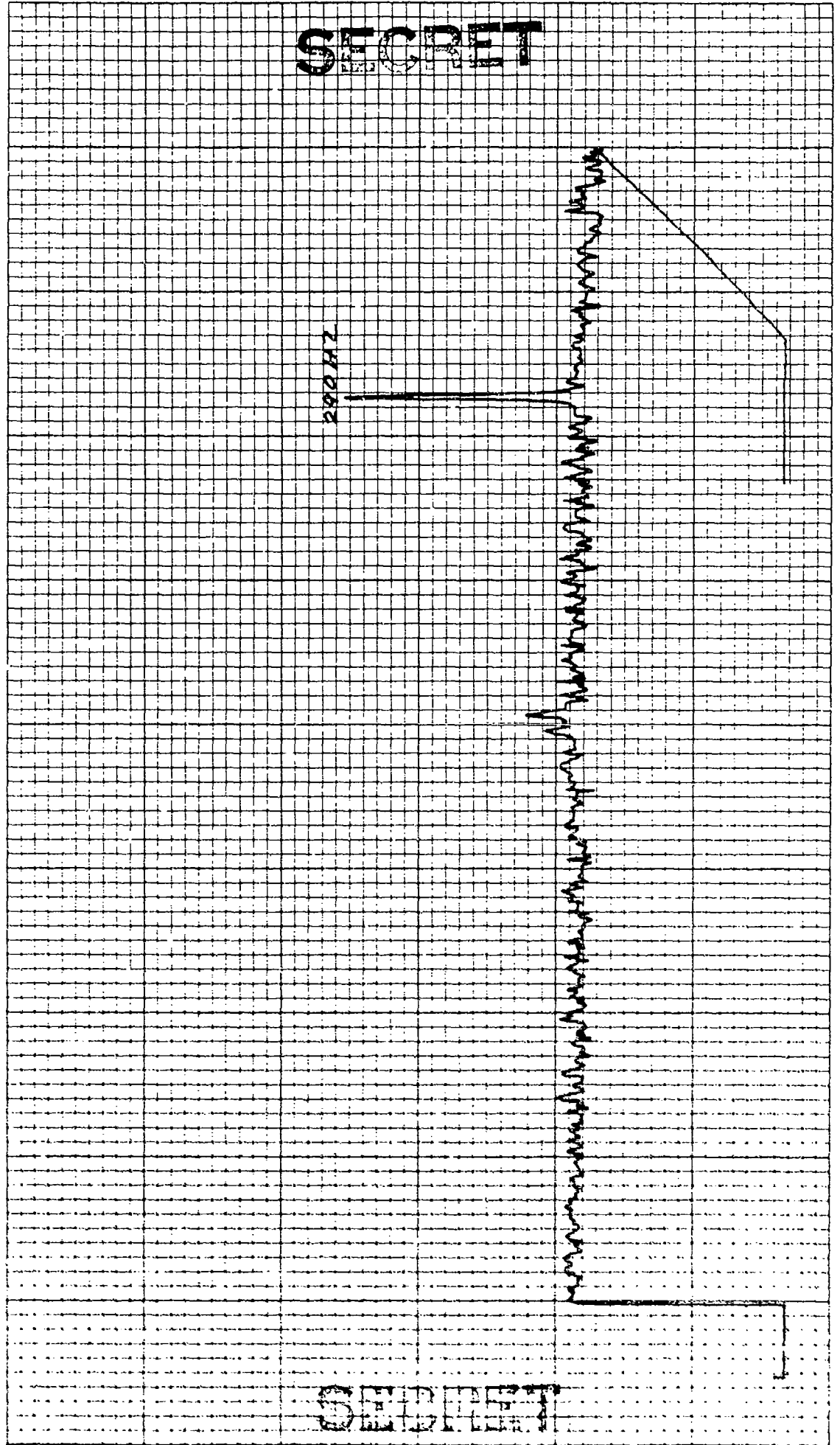
CONTROL: 2-7 -0934 (32) DATE OF ANALYSIS: 1-26 429.34

BEAMFORMING SPECTRUM(ELEMENTS) REEL: F/4 INDE X5575

EXERCISE BEARING STAKE INTEGRATION TIME 320 SECS ATEN:-2Y DB

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

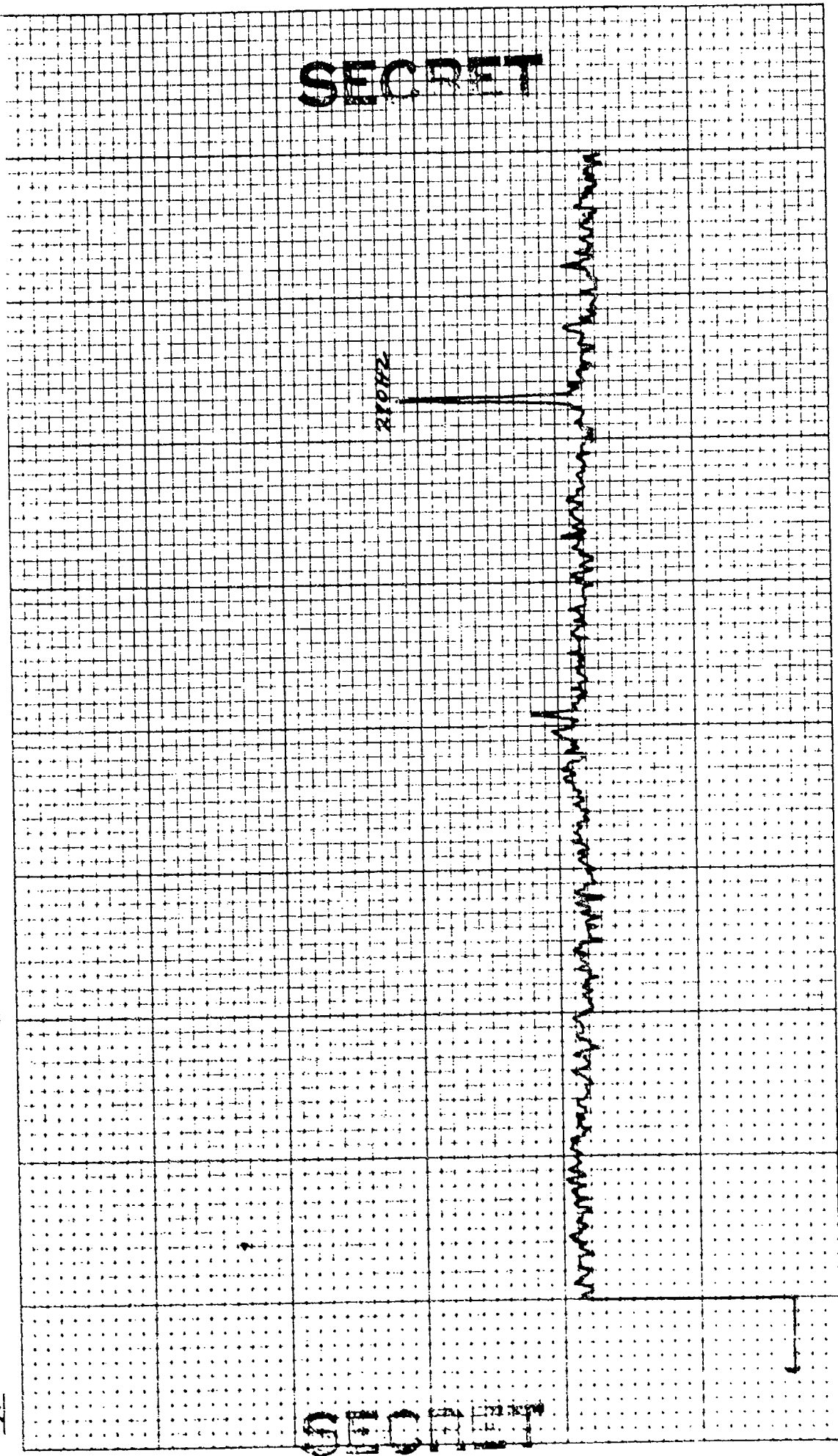
32 ELEMENTS 726 DEG. AZ STEERING



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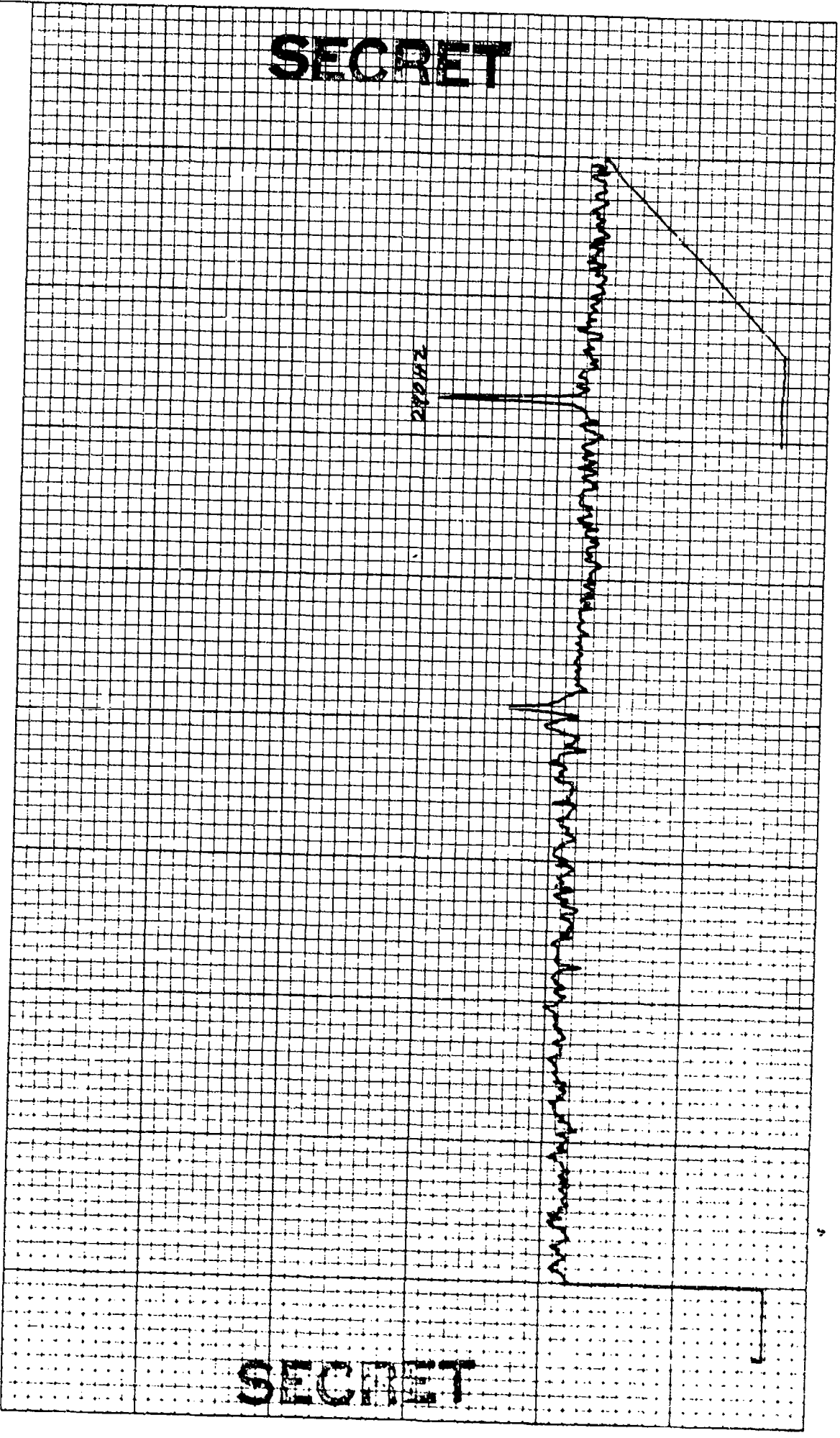
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CONTROL: 27-0934 (22)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
 72 ELEMENTS

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

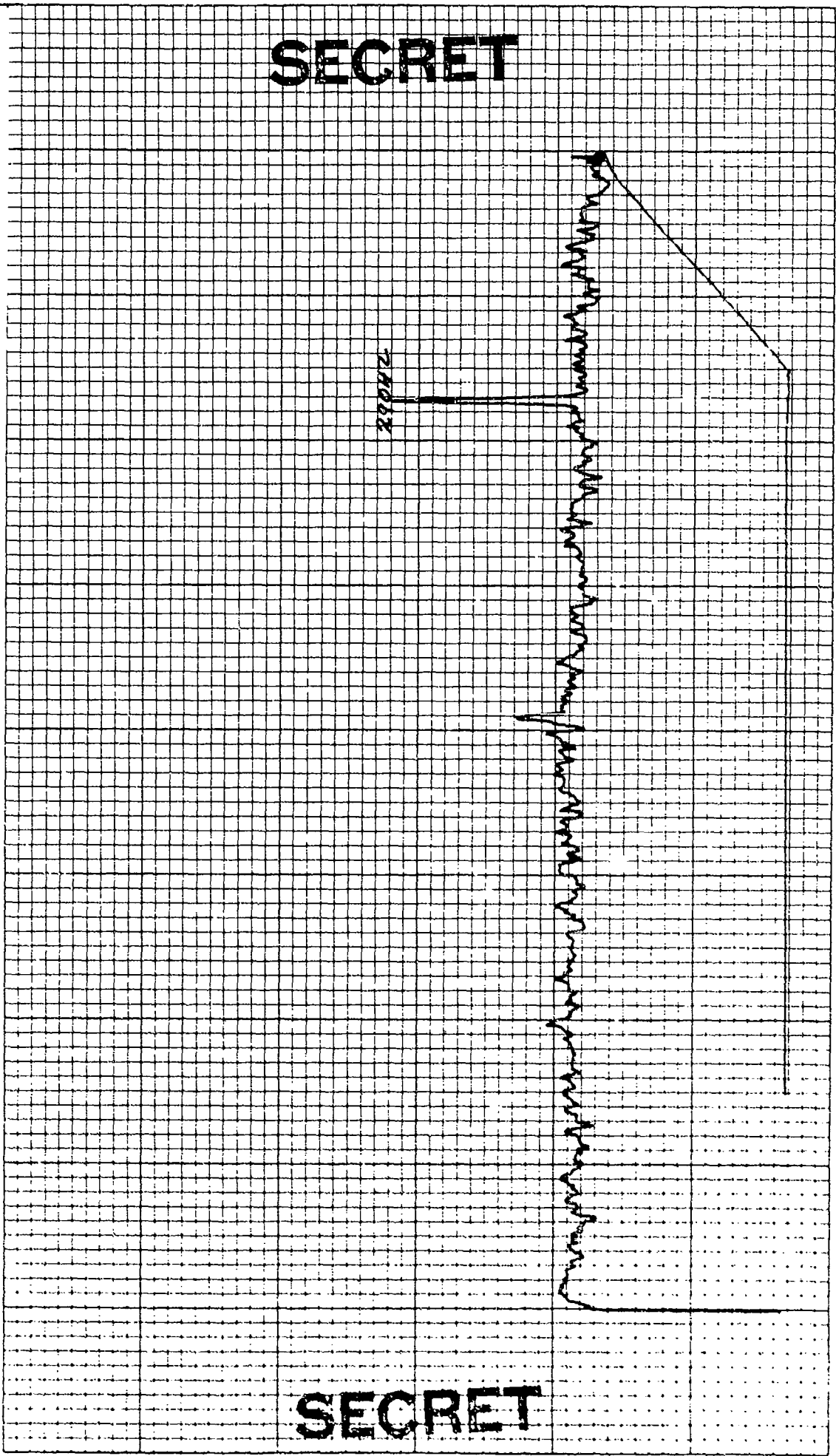
INDE X3575
 ATTN: ->V DB



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CONTROL: 2-7 -0134 (32) REEL: F14 INDE X3575
BPAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: 1-26-54
EXERCISE: BEARING STAKE DATE/TIME: 2-7-72 - 0934Z
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ
32 ELEMENTS +32 DEG. AZ STEERING
INTEGRATION TIME 320 SECS ATTN:-2Y DB
FILTER WTG: HANNING



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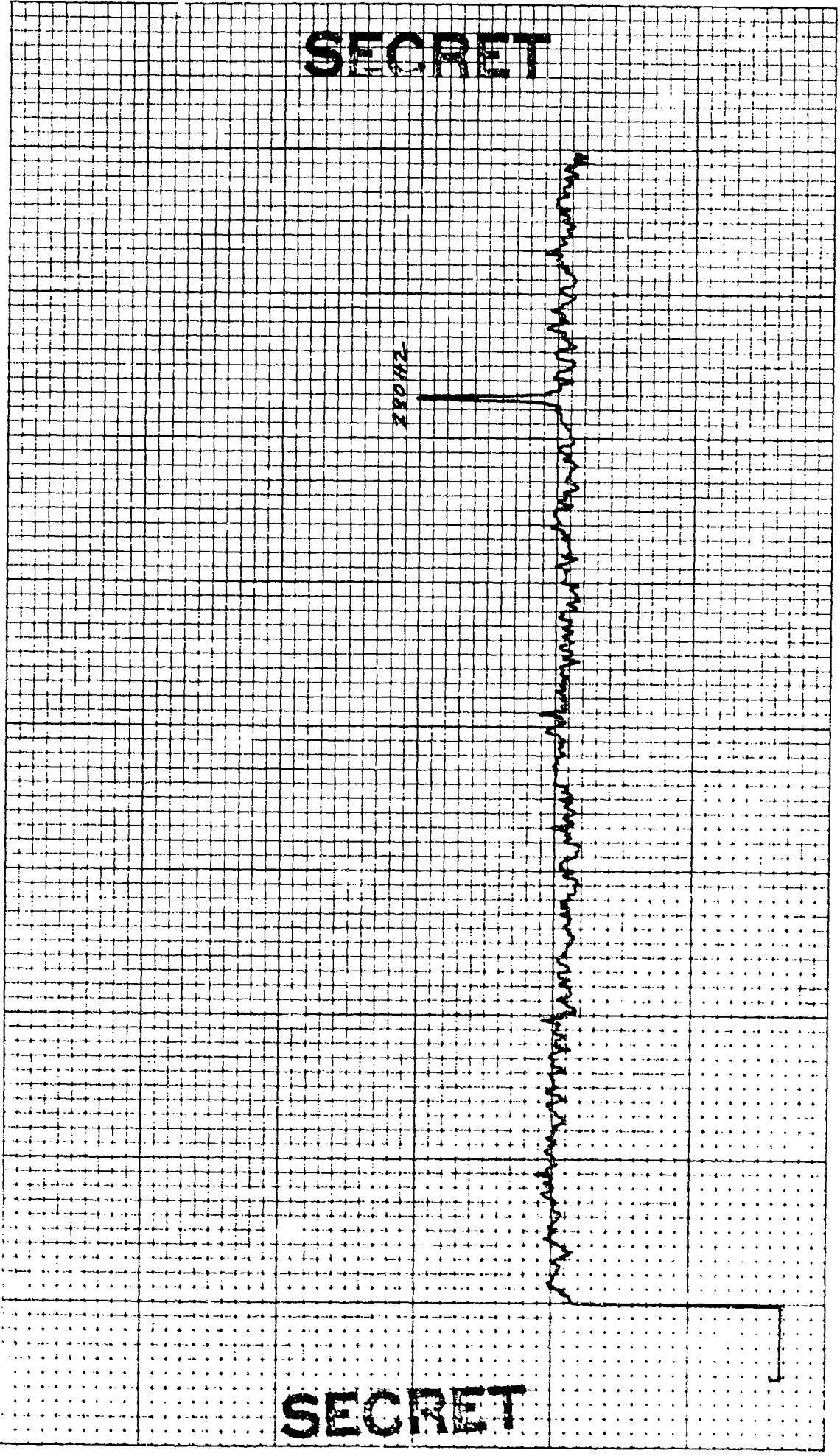
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CONTROL: 2-7 -0974 (22)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
 32 ELEMENTS

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



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10-320

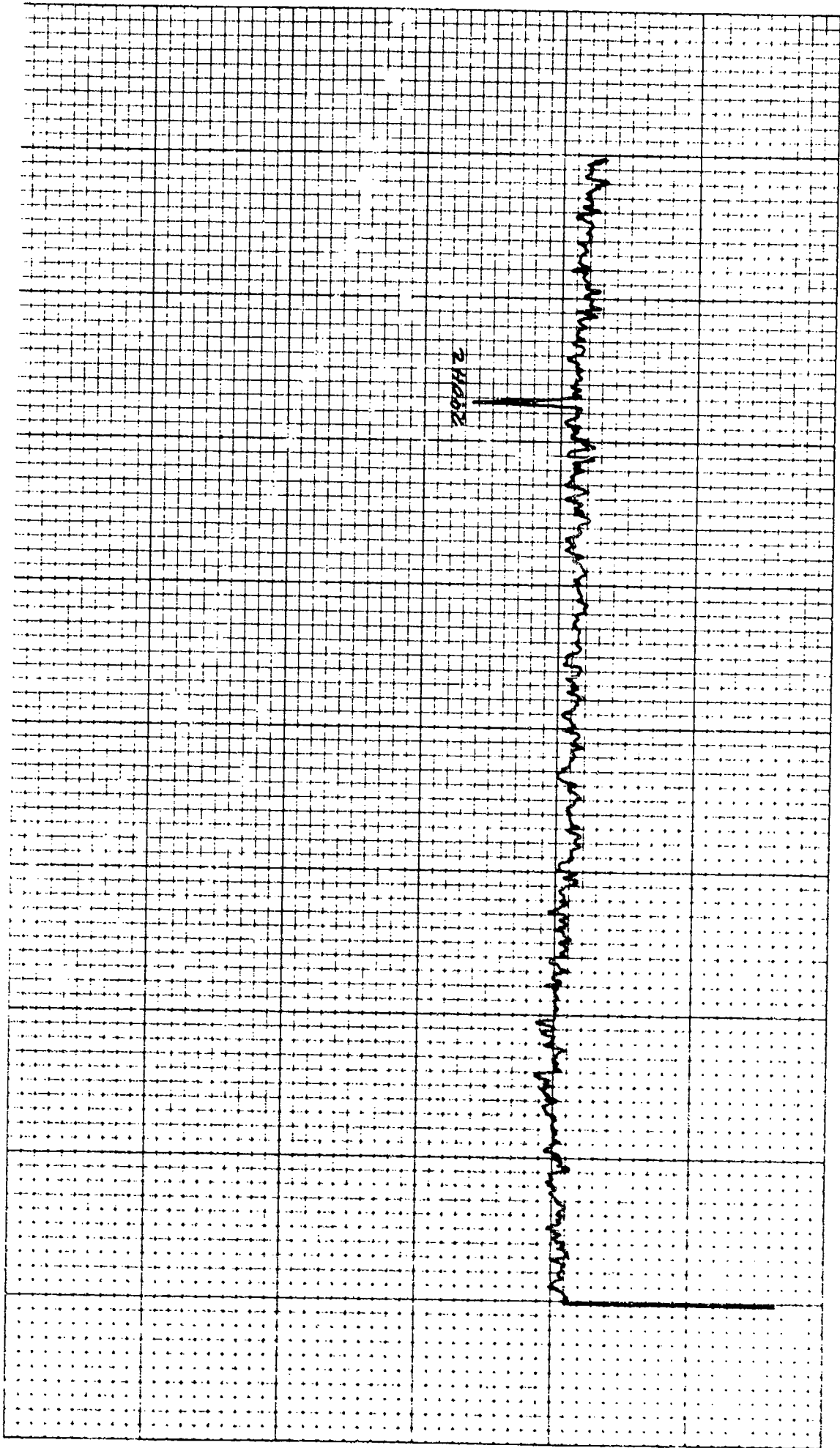
CONTROL: 2-7 -093Y (32)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
 32 ELEMENTS

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

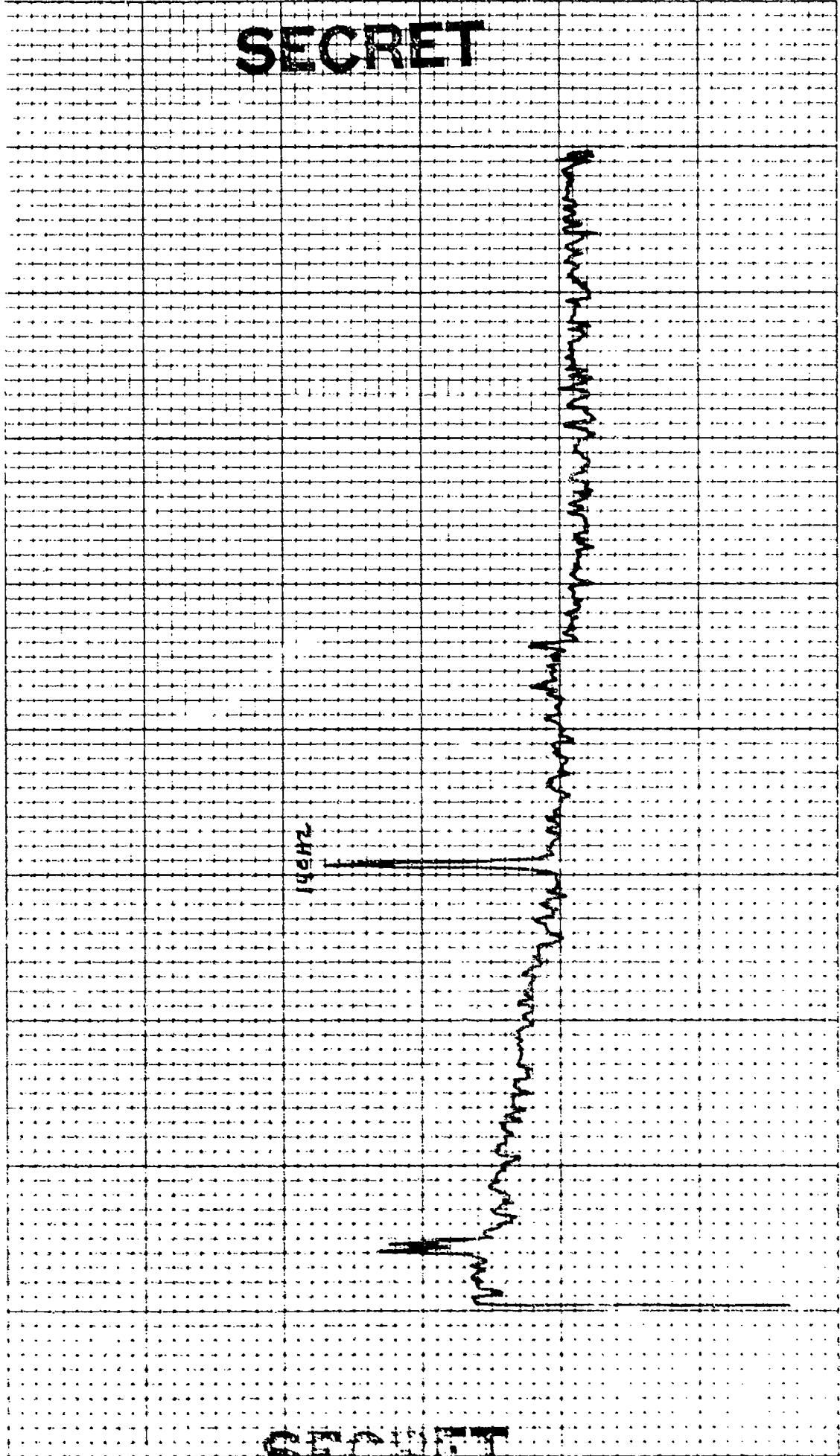
MRA SNR	<u>24.5</u>	<u>22.6</u>	<u> </u>
MEAN OMNI SNR	<u>9.0</u>	<u>8.85.6</u>	<u> </u>
ARRAY GAIN	<u>15.5</u>	<u>16.8</u> 17.0	<u> </u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>15.1</u>	<u>17.2</u>	<u> </u>
DIFFERENCE	<u>+ .4</u>	<u>- .4</u>	<u> </u>

CONFIDENTIAL

4 103

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



SECRET

11-516

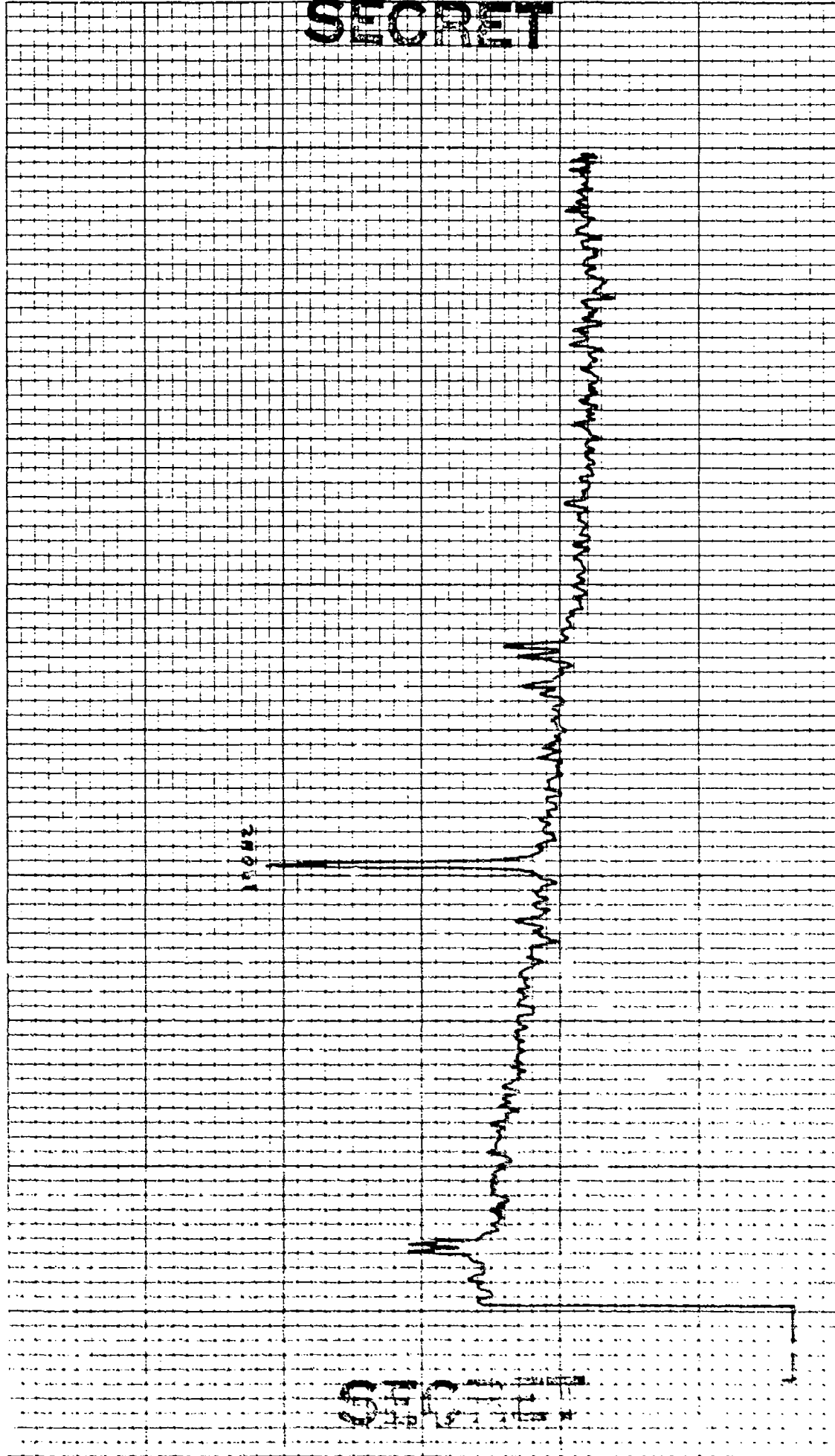
CONTROL: 27 - 0834 (51) DATE OF ANALYSIS: - - - REEL: F/Y INDE X3572

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

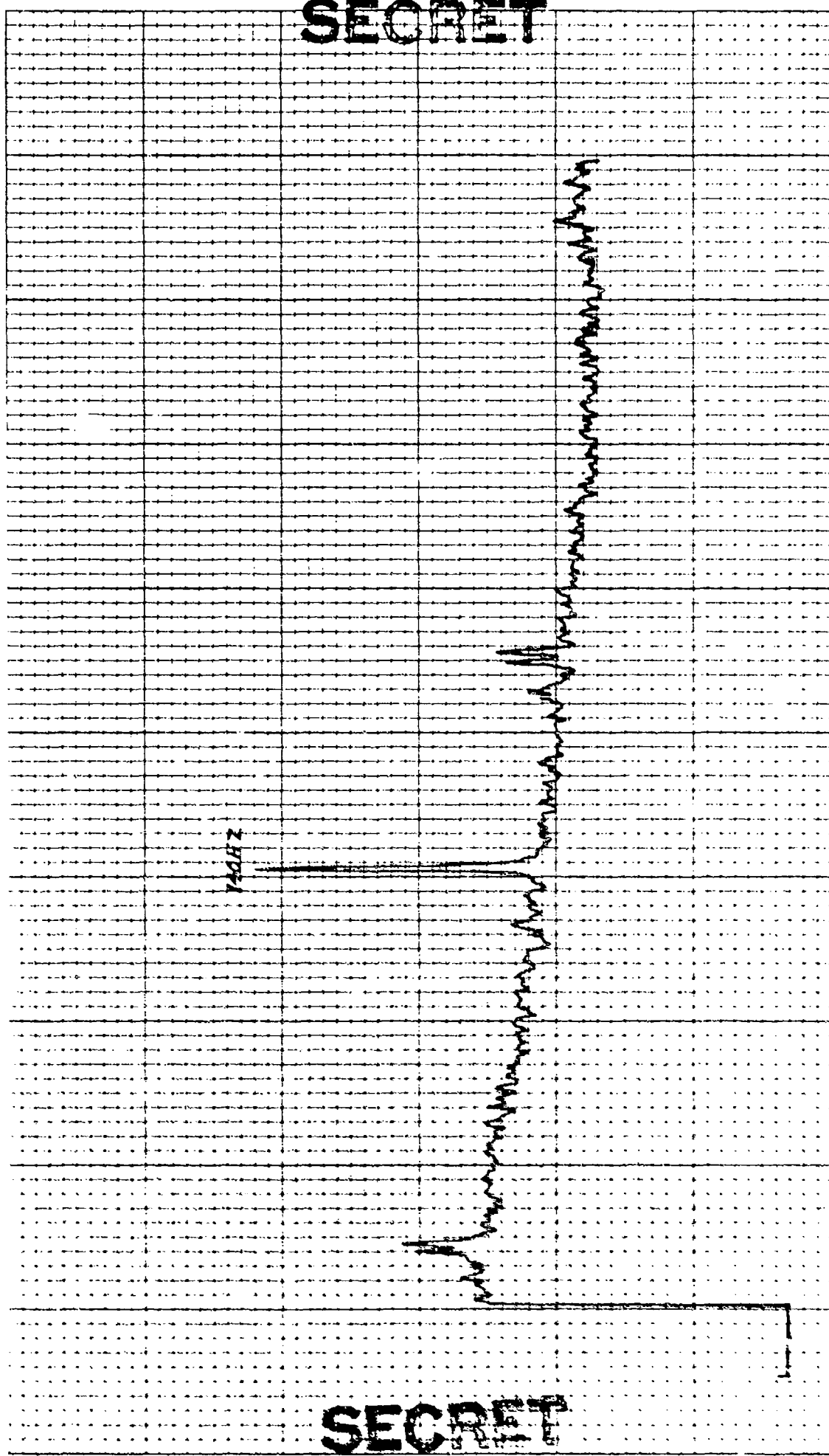


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CONTROL: 0934 - 51 (293) DATE OF ANALYSIS: _____
BEAMFORMED SPECTRUM (ELEMENTS) 1 - 26 @ 29 - 63
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 0934 Z
CENTER FRFQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ
51 ELEMENTS + 25 DEG. AZ STEERING

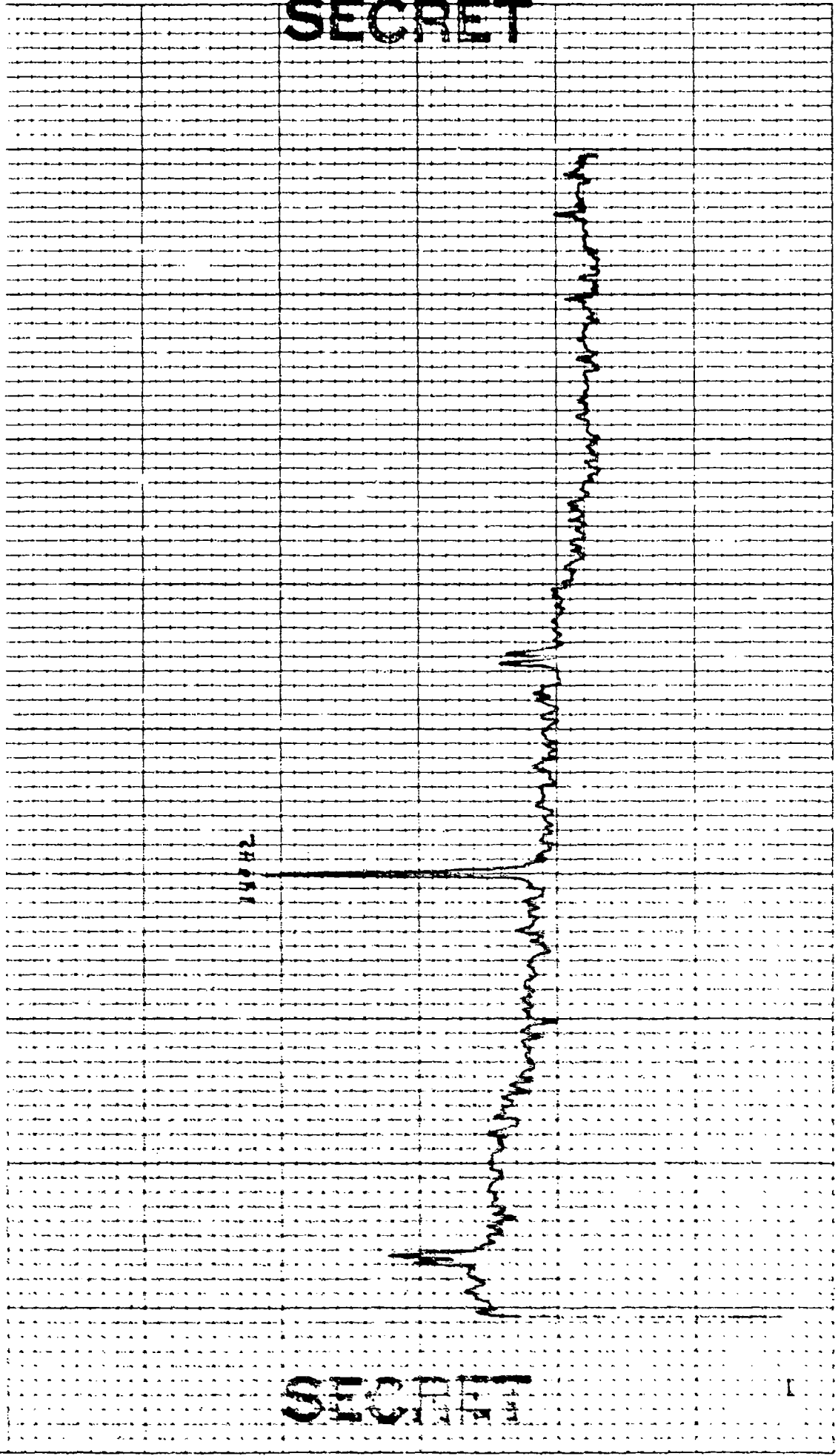
REEL: F14 INDE X 3575
INTEGRATION TIME 320 SECS ATTEN: 30 DB
FILTER WTC: HANNING



SECRET

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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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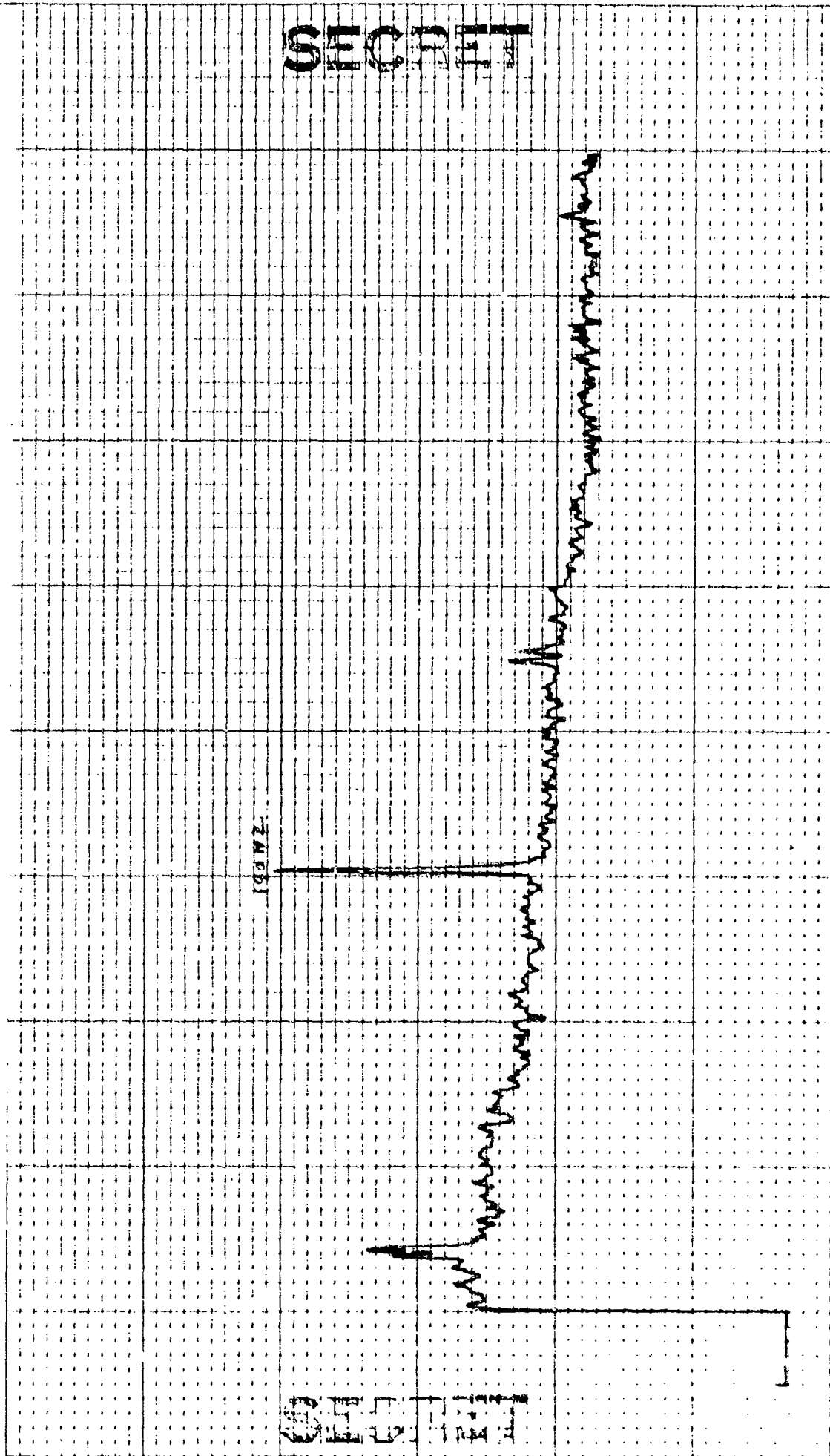
9/5-1

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

REEL: 519
 INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

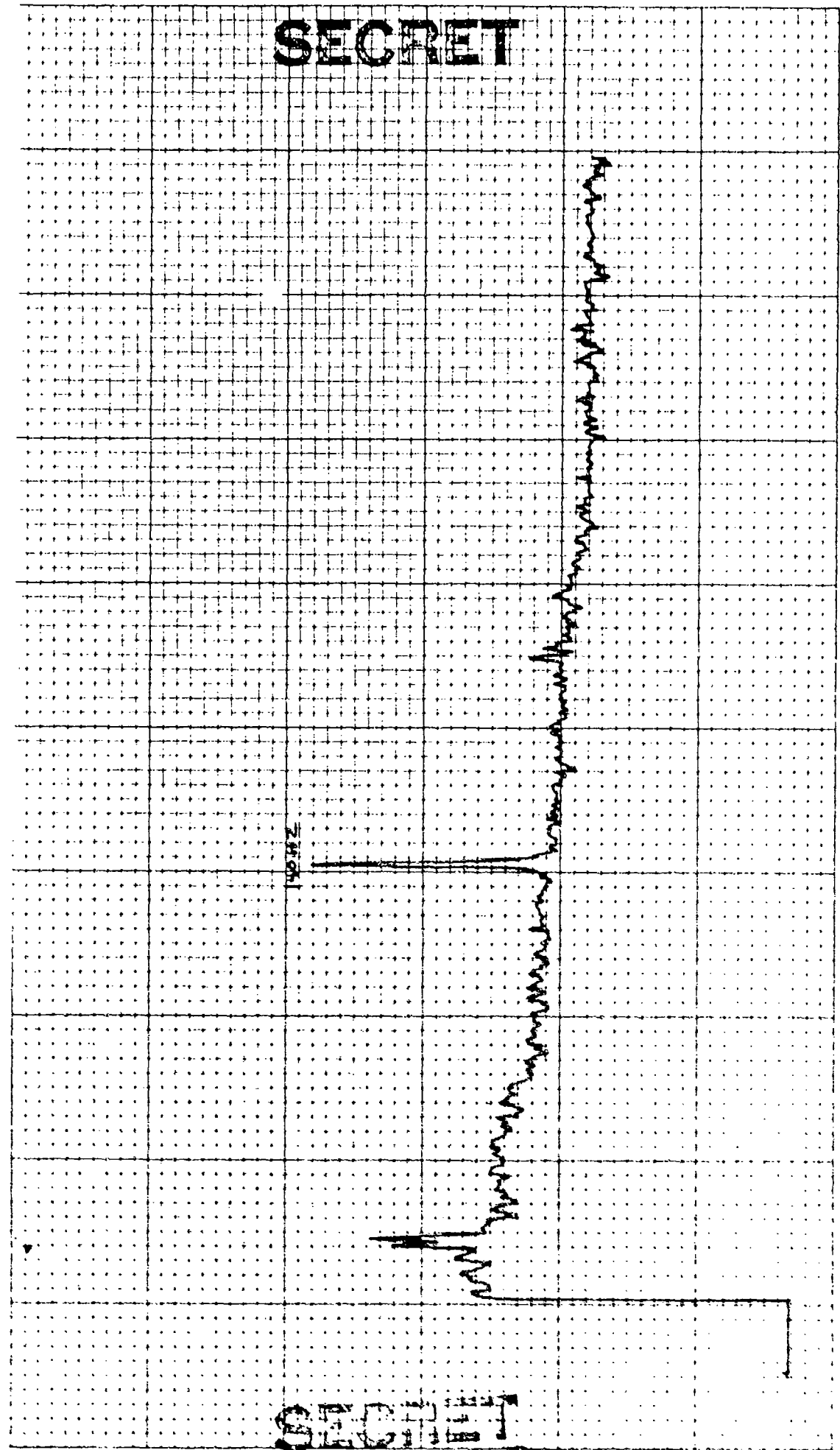
INDE X3575



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



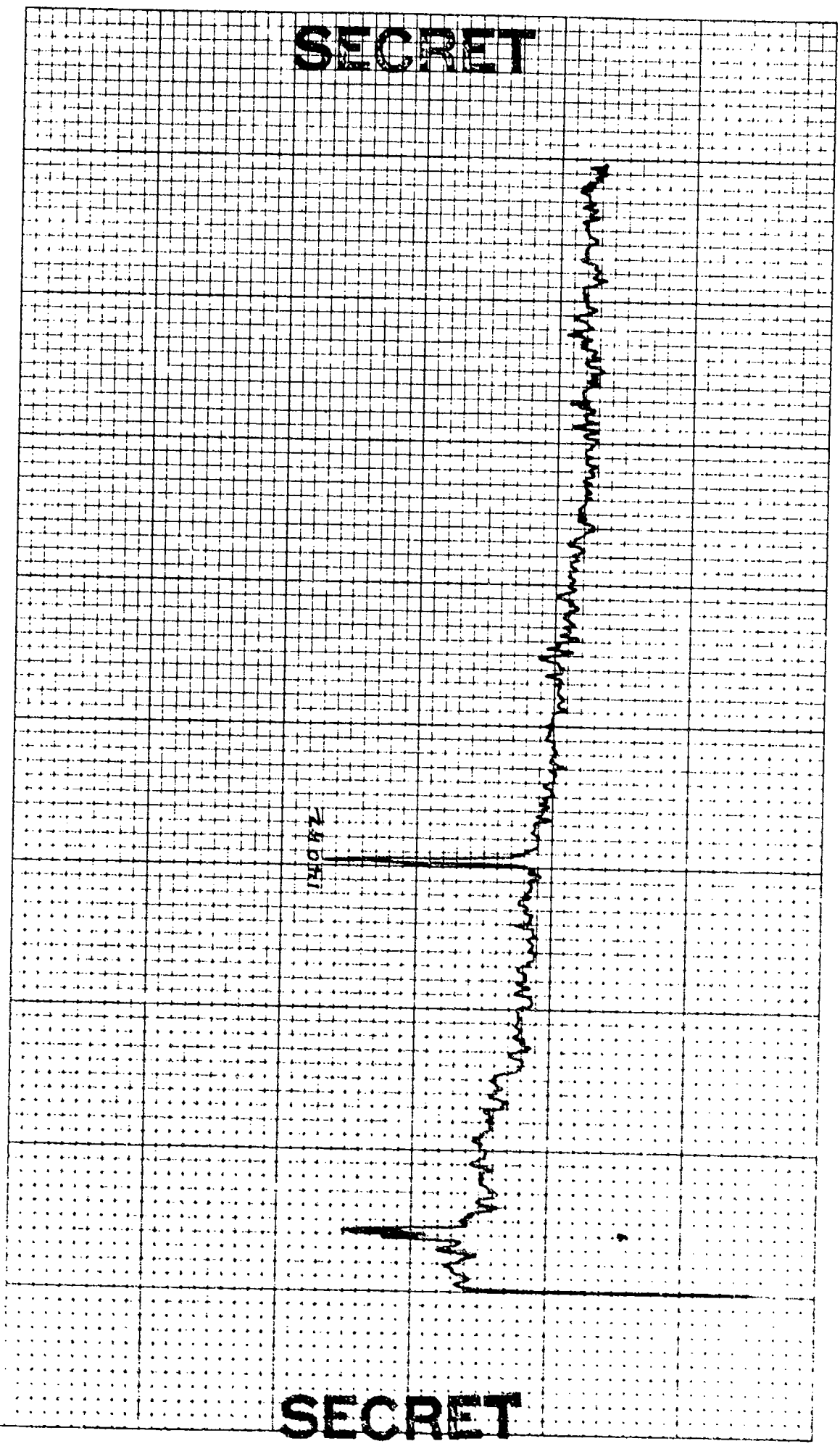
SECRET

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E 1 TO: 5CH: 4 '03

CONTROL: 2-7 -0934 (61)
BEAMFORMED SPECTRUM (ZL) 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
FILTER WTG: HANNING
ATTEN: -30 DB



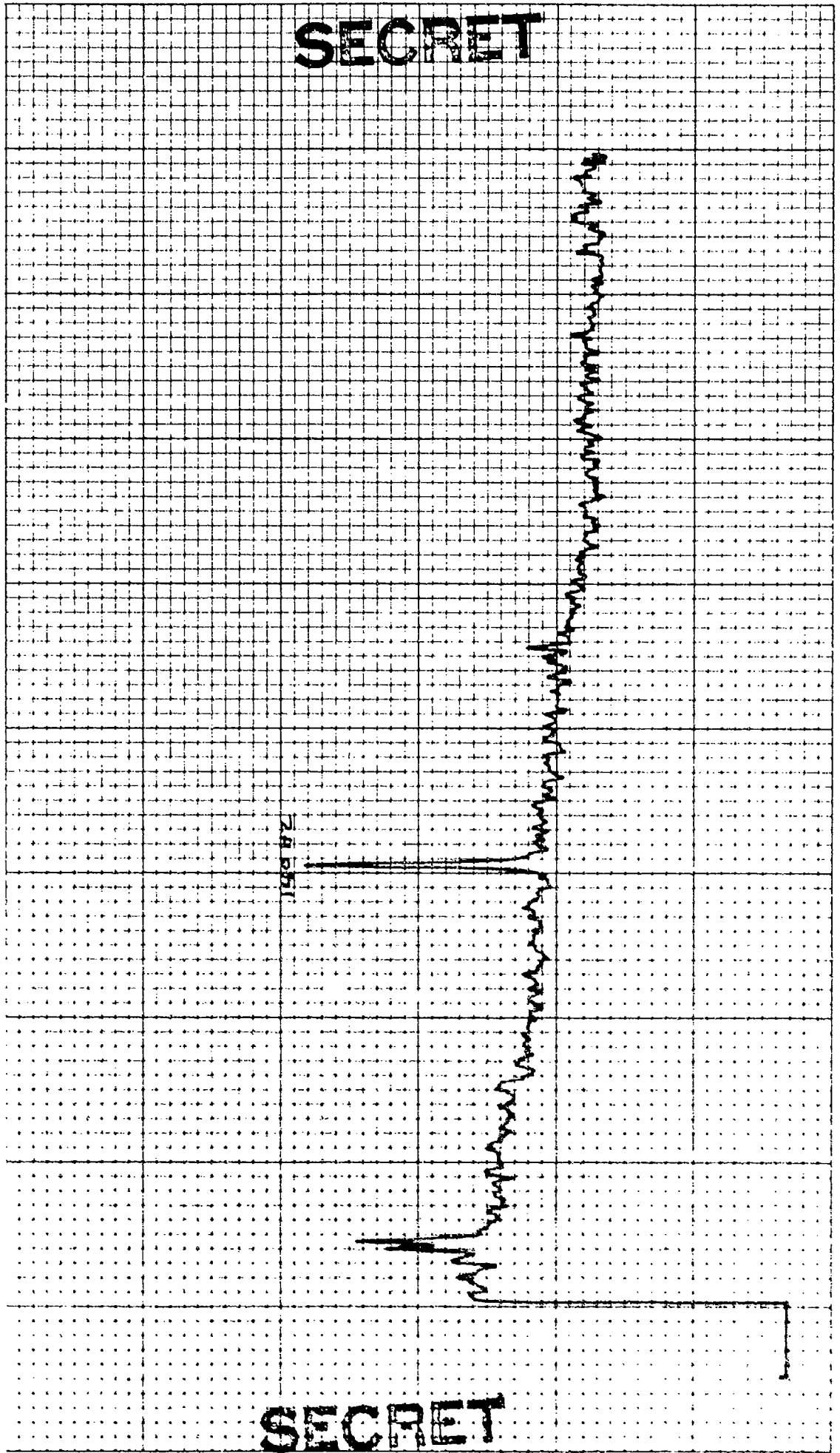
CONTROL: 2-7 -0934 (51)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 51 ELEMENTS

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

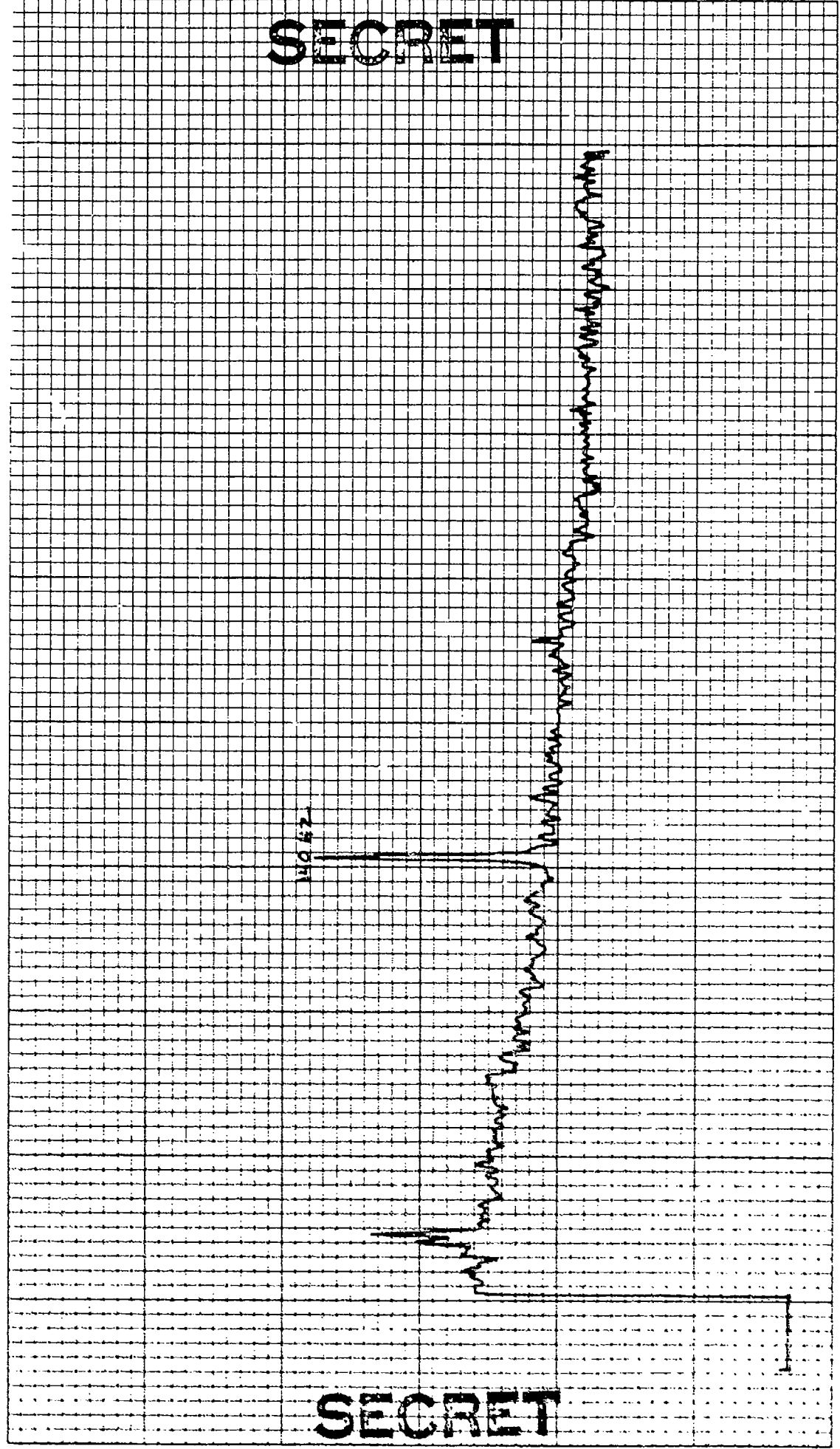
CONTROL: 2-7 - 0934 (51) REEL: F14 INDE X3575

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

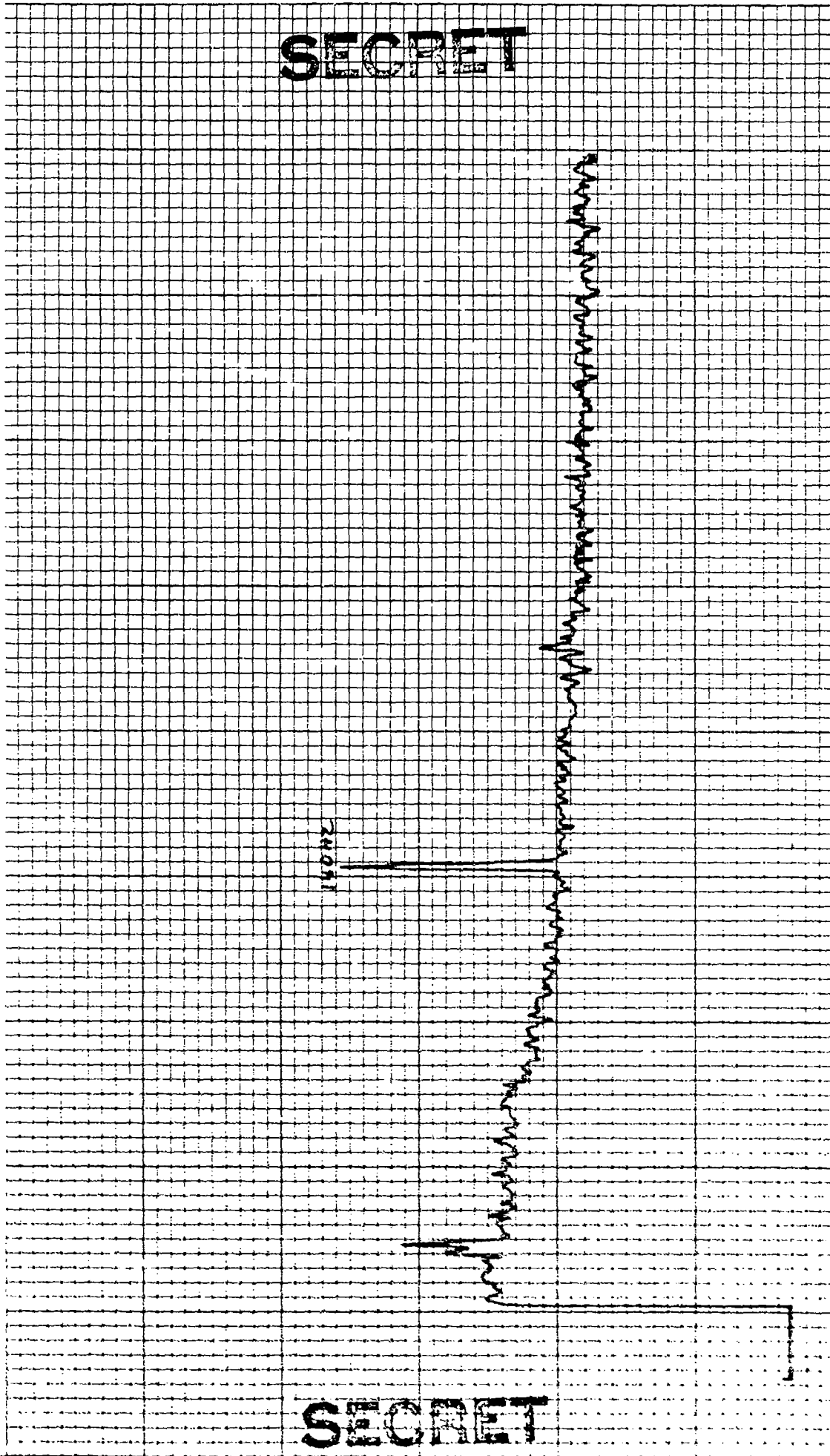
CH+7
, MAG

NCHET

4 03

01-01/6

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



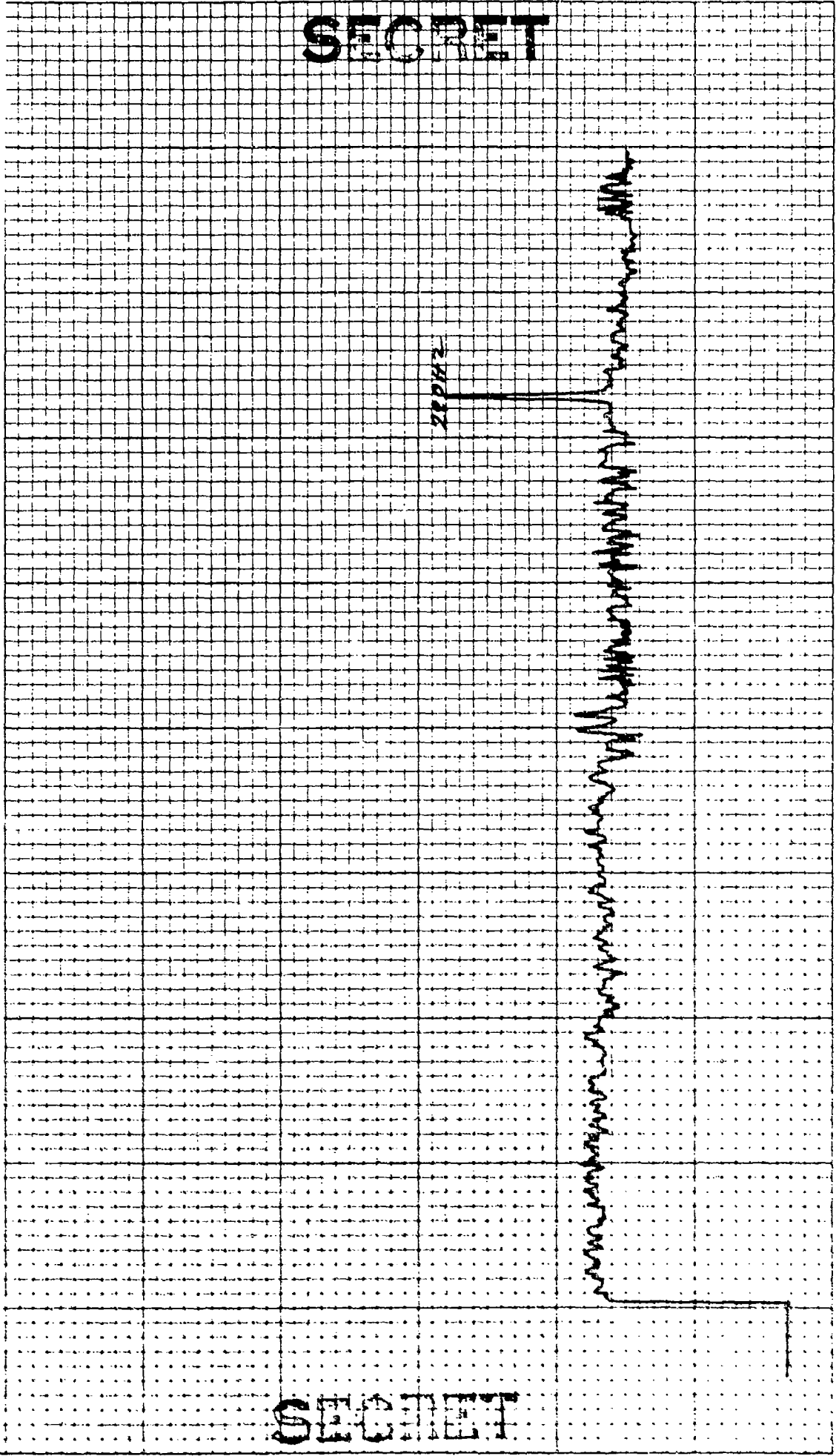
4 03

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 WTG: HANNING

INDE X3575
 ATTN: -30 DB



SECRET

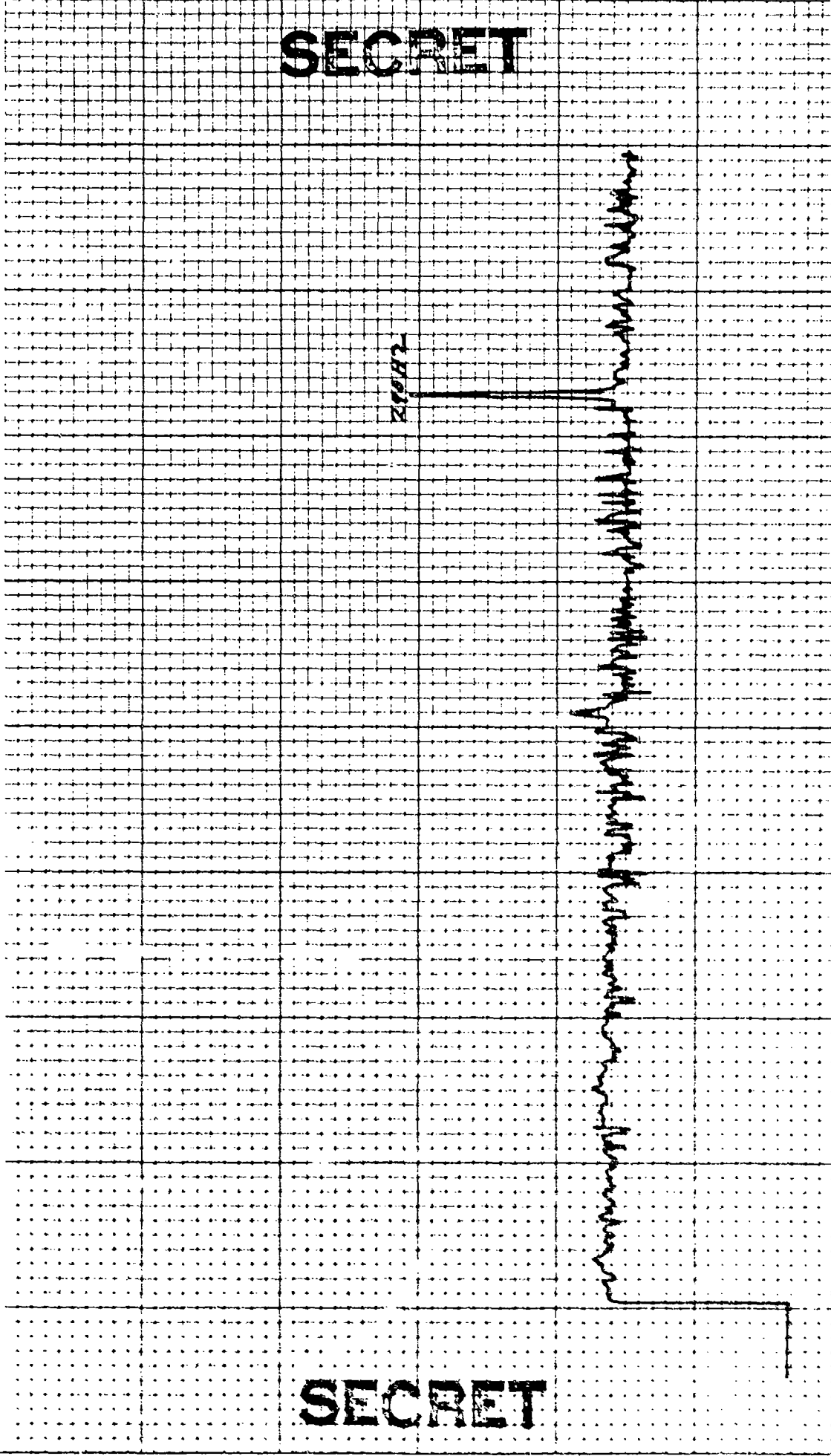
SECRET

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

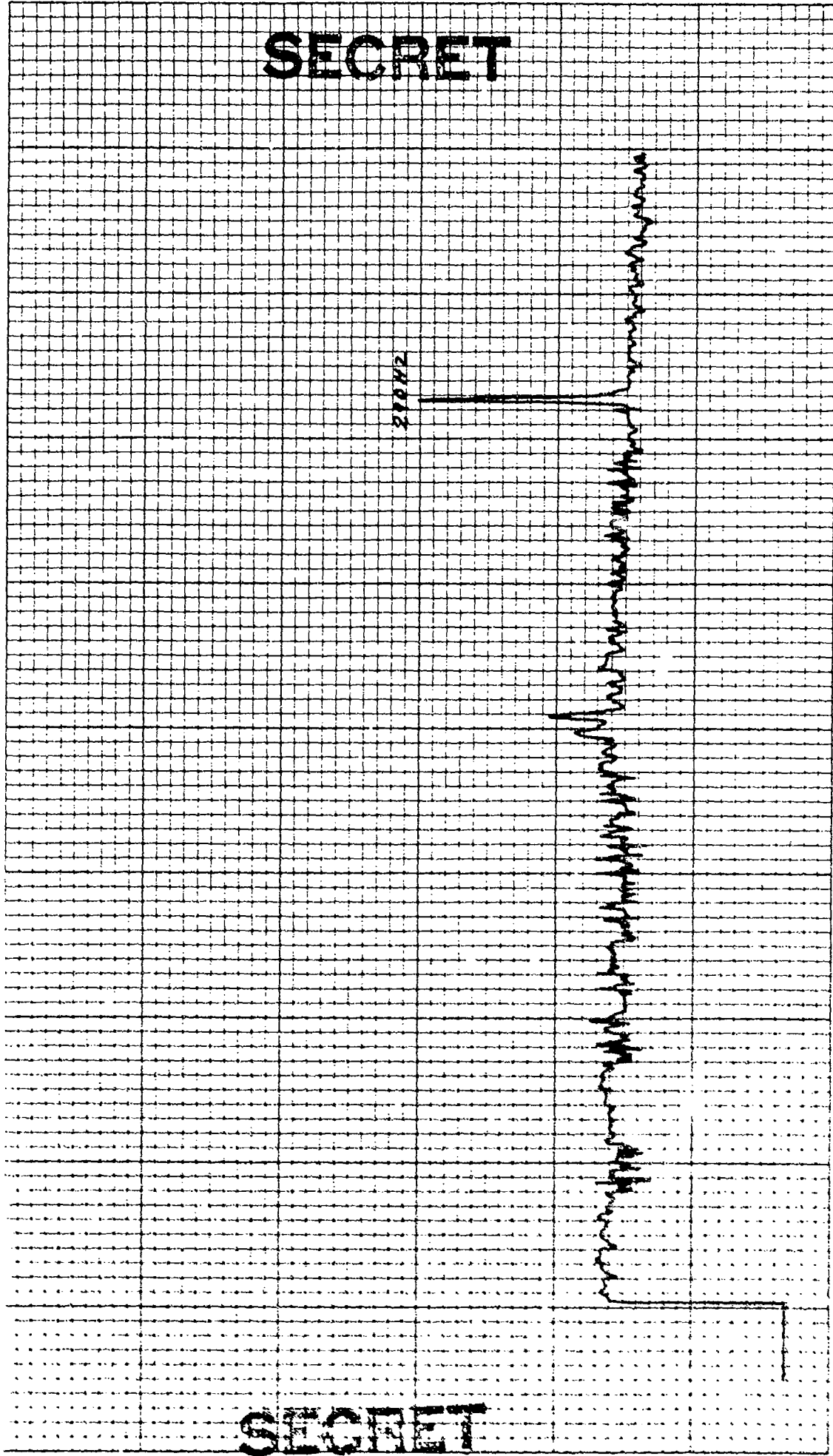
REEL: F14
 INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

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
ATTEN: 20 DB
FILTER WTG: HANNING



SECRET

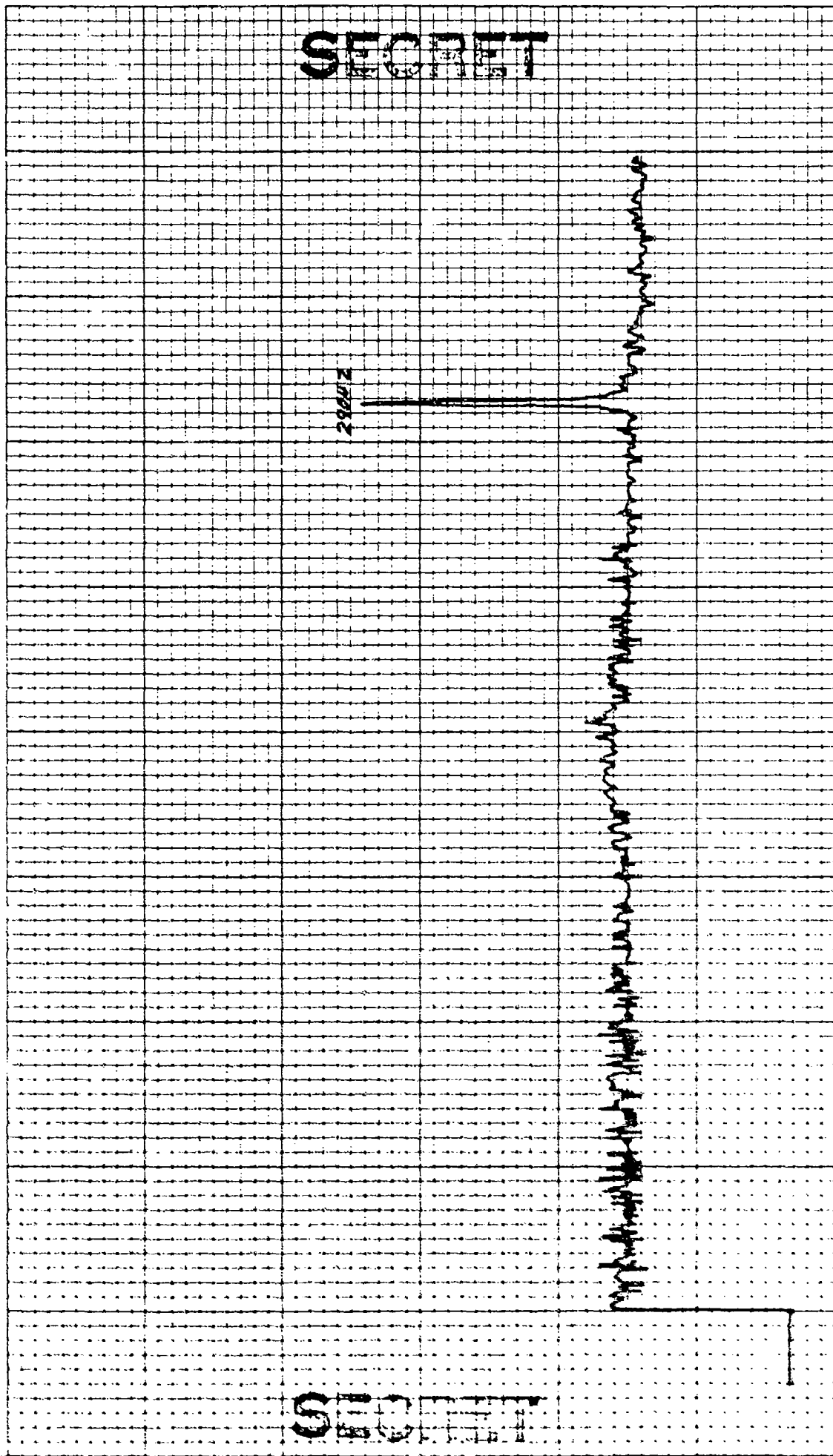
SECRET

7 03

E 1 TO 21 1000 1000

CONTROL: 0934 - 61 (093) DATE OF ANALYSIS: _____
 BEAMFORMED SPECTRUM(ELEMENTS) 1-26 29-53)
 EXERCISE: BEAKING STAKE DATE/TIME: 27-77 - 0934 Z
 CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ
 51 ELEMENTS +27 DEG. AZ STEERING

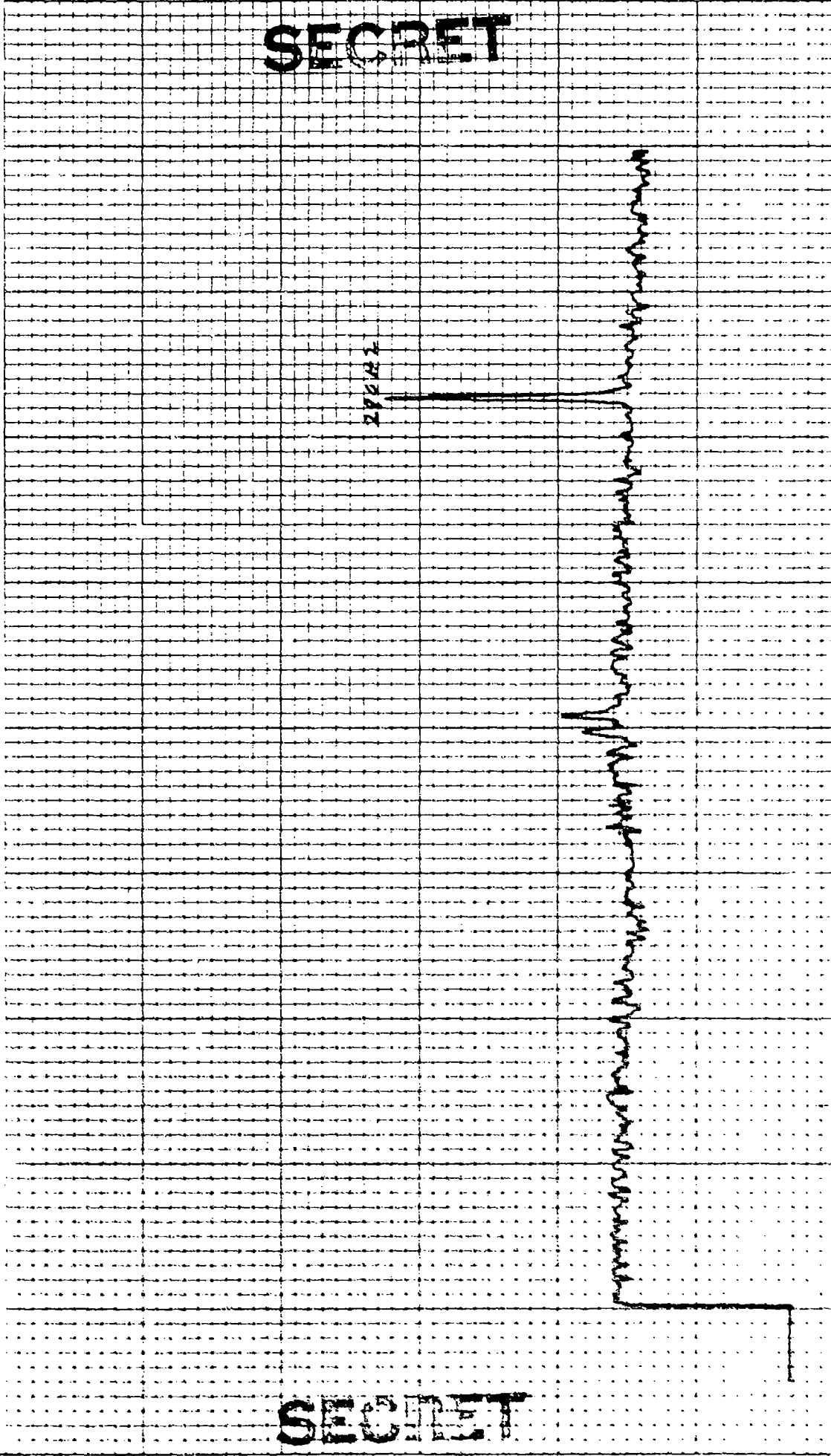
REEL: F/4 INDE X 3575
 INTEGRATION TIME 320 SECS ATTEN: 30 DB
 FILTER WTG: HANNING



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

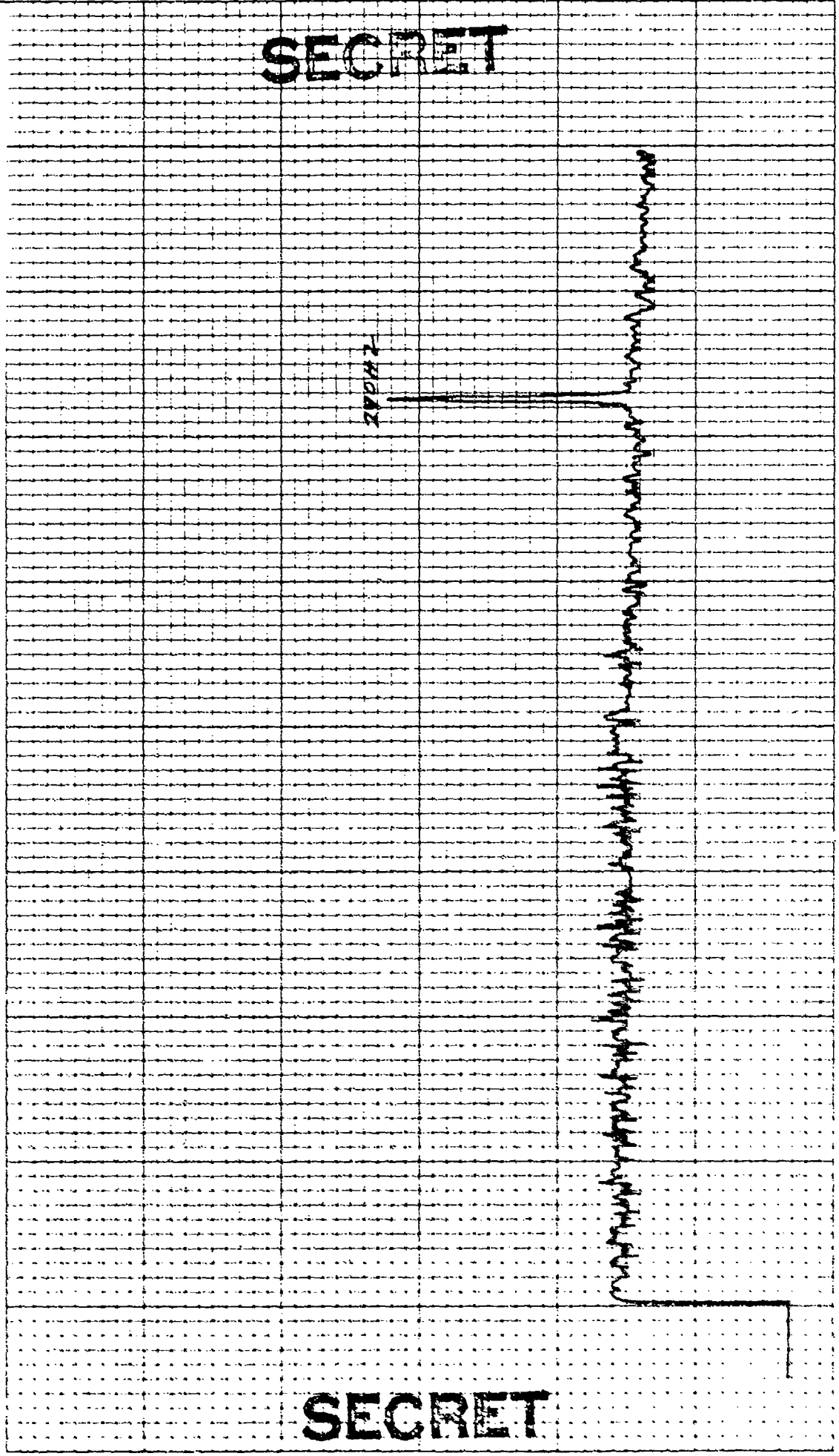
DATE OF ANALYSIS: - - -
 DATE/TIME: 1-26 21-53
 ANALYSIS BANDWIDTH: 1/10HZ
 126 DEG. AZ STEERING

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
 5/ ELEMENTS 100 DEG. AZ STEERING

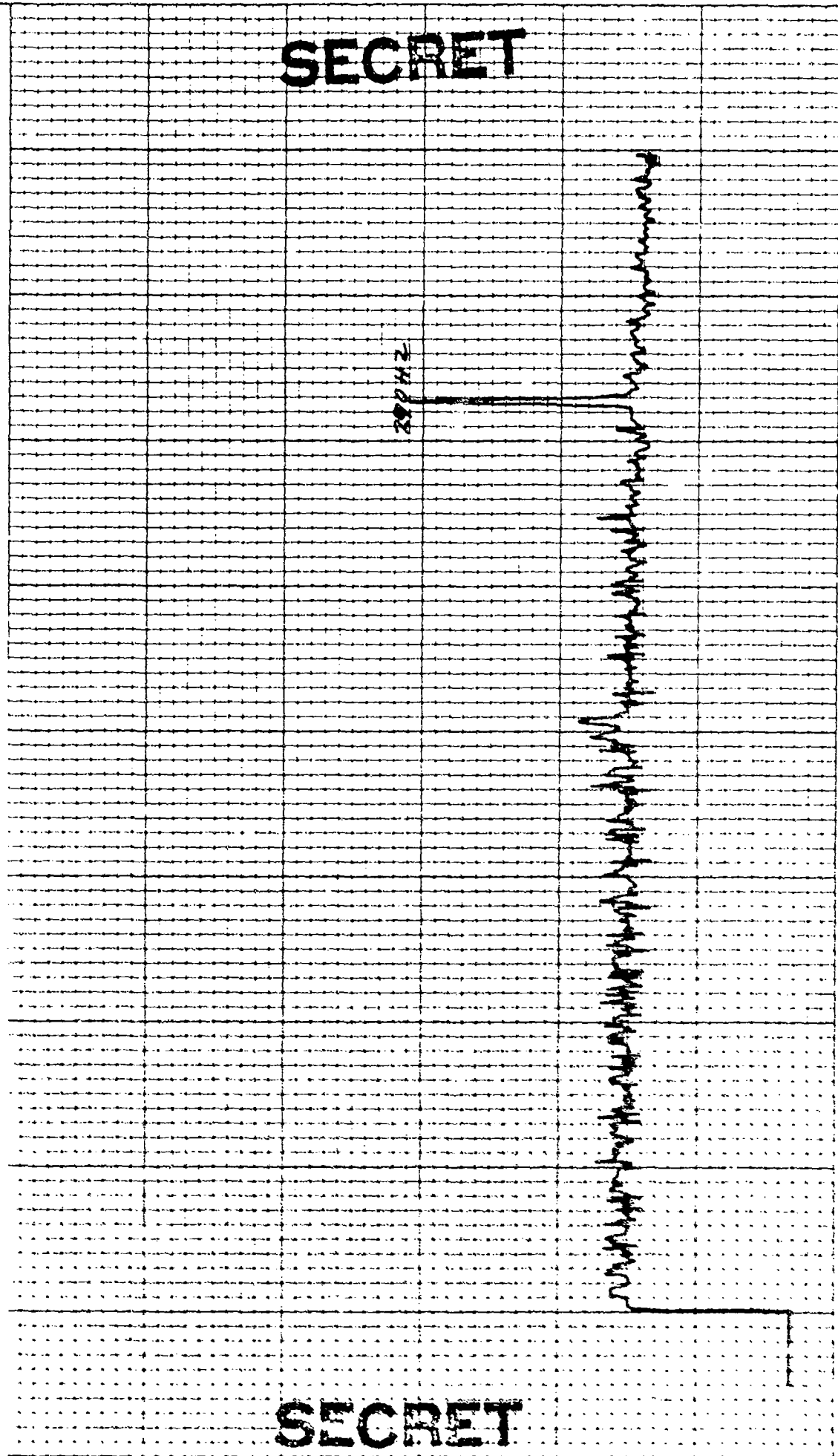


4 03

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

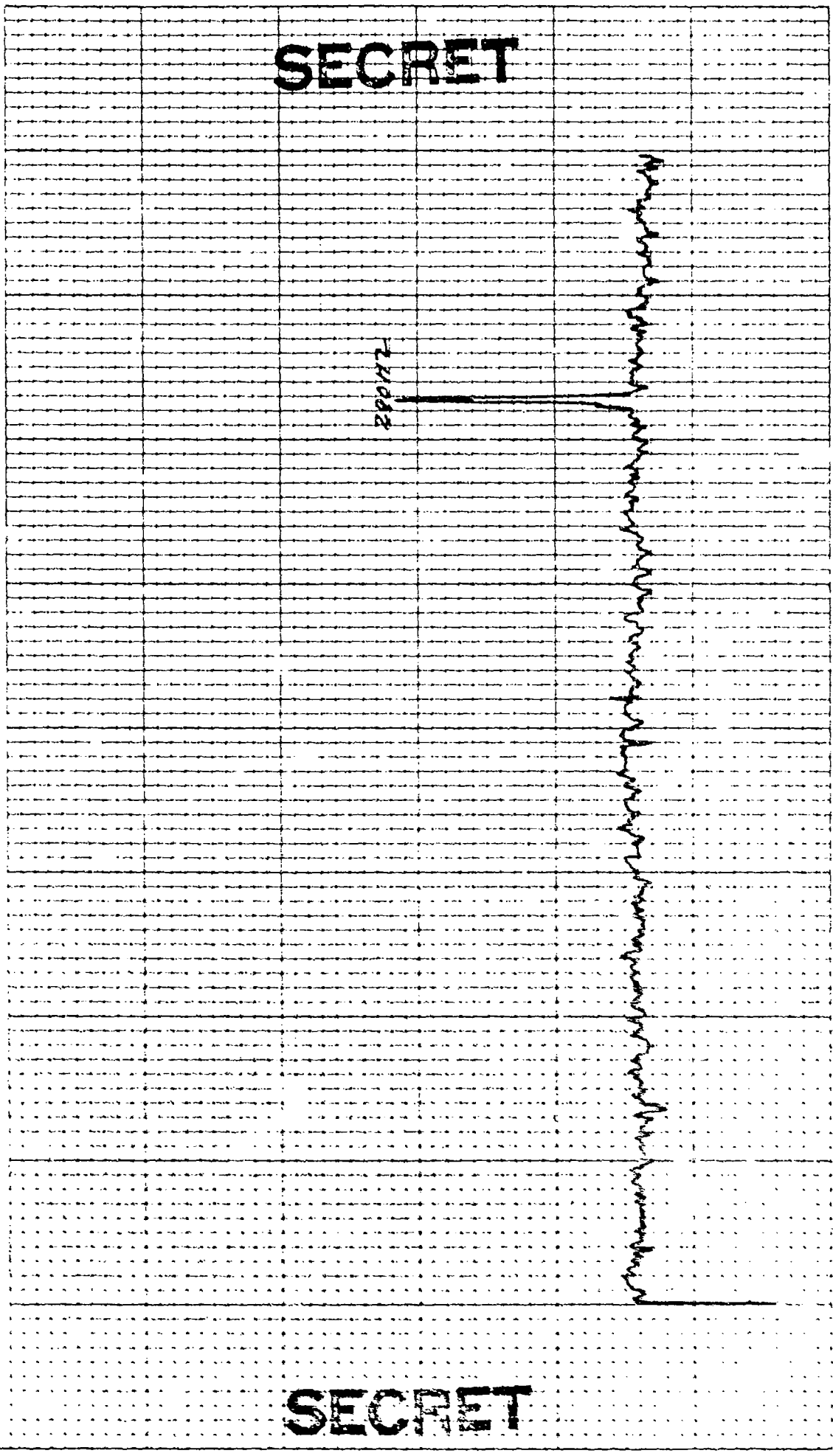
CONTROL: 2.7 - 0924 (51) REEL: F/4 INDE X3075

BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-26-50 29-50

EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 0924 Z INTEGRATION TIME 320 SECS ATTN: -30 DB

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

51 ELEMENTS T70 DEG. AZ STEERING



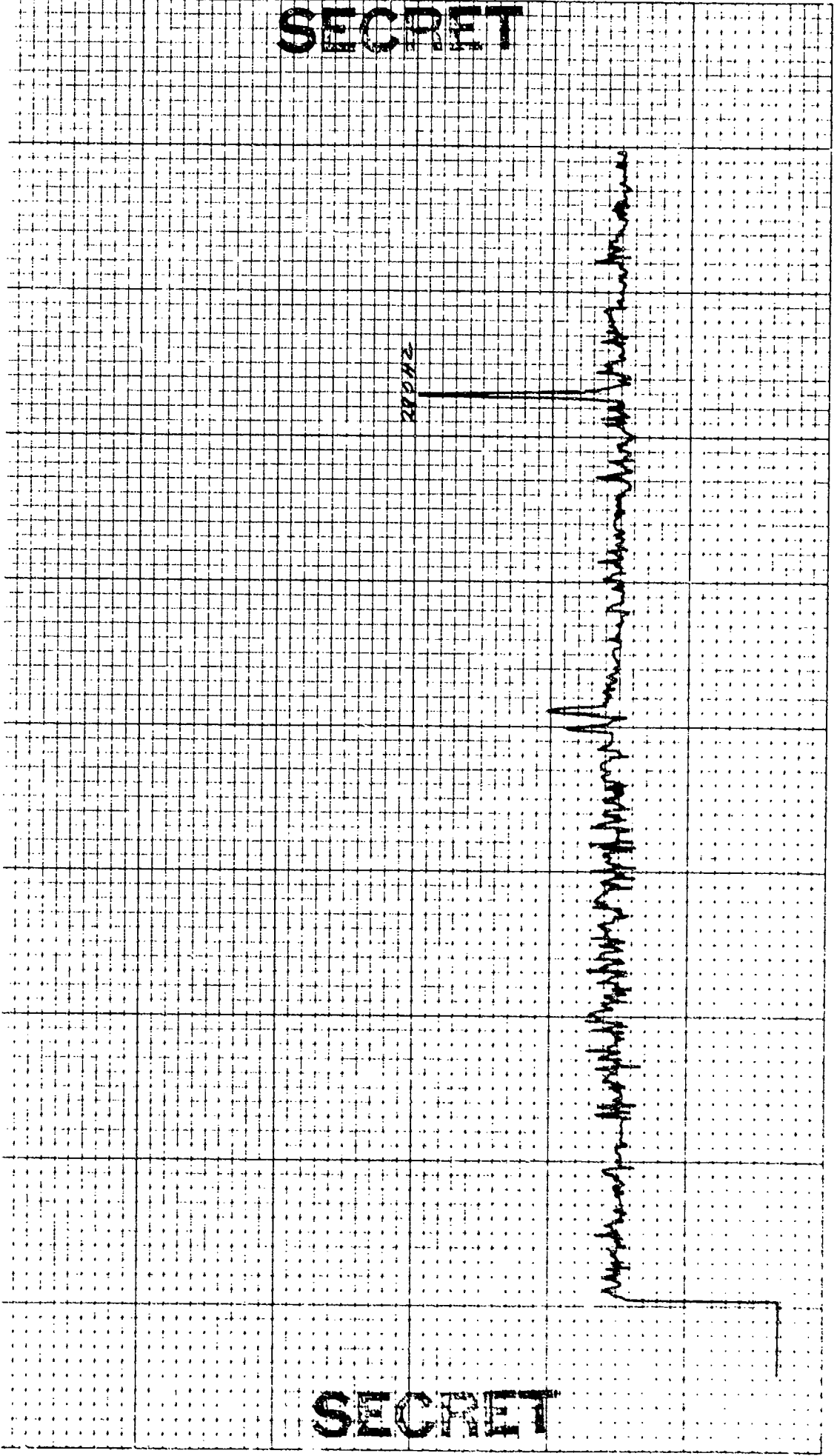
6-516

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

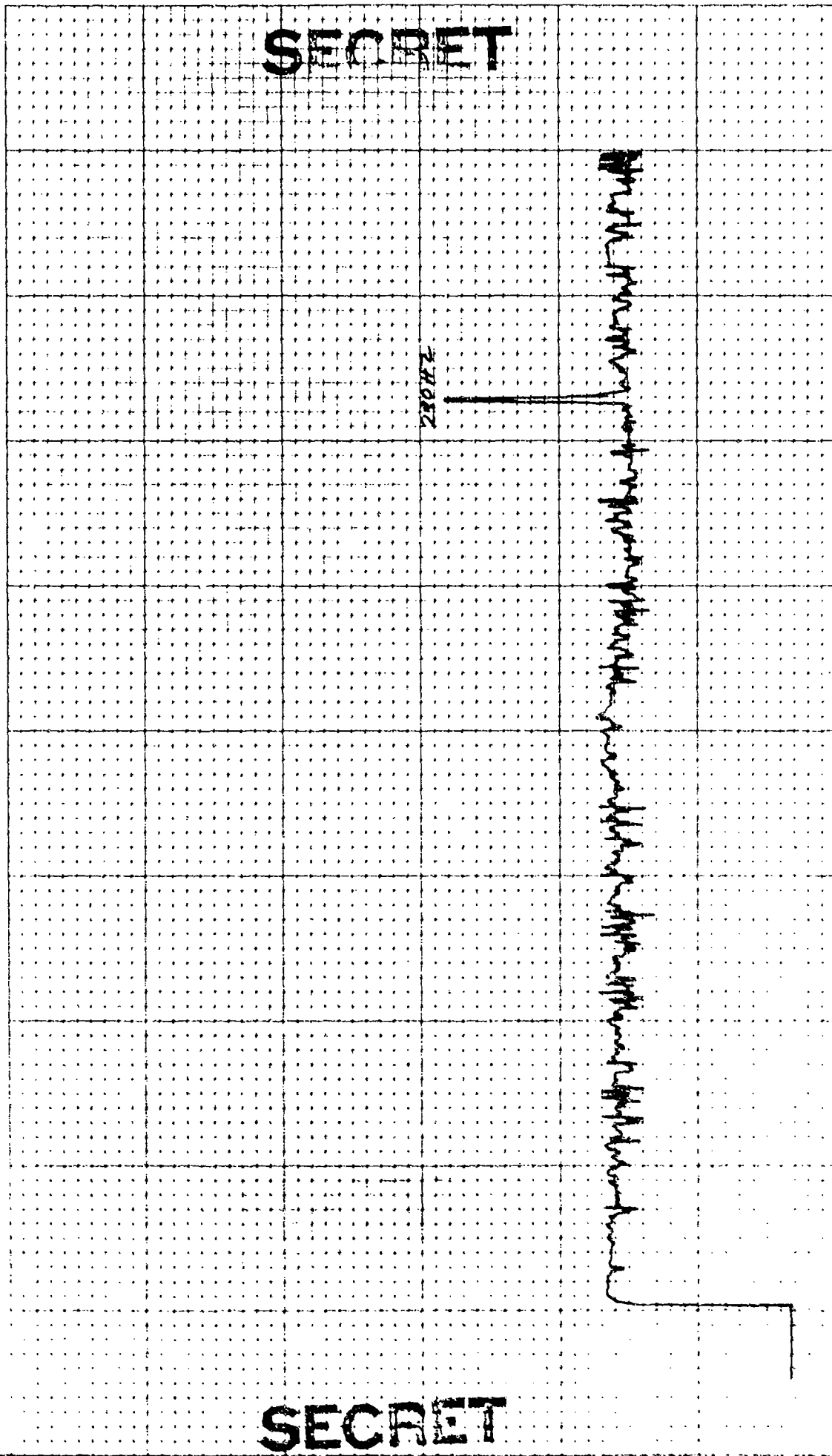


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Handwritten note:
 Spectrum from the plot of the bearing stake exercise
 shows a single peak at 290 HZ.

CONTROL: 27 - 0934 (51) DATE OF ANALYSIS: - - REEL: F14 INDE X5573
 BEAMFORMED SPECTRUM (ELEMENTS 1-26 / 29-53) INTEGRATION TIME 320 SECS ATTN: -30 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTC: HANNING
 CENTER FREQ: 270 HZ Y34 DEC. AZ STEERING



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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