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

LEVEL III

FINAL REPORT OF BEARING STAKE TESTS
JANUARY THRU MARCH 1976

9 JANUARY 1979

DDC FILE COPY

PREPARED FOR
NAVAL AIR DEVELOPMENT CENTER
WARMINSTER, PENNSYLVANIA

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



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

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HORIZONTAL LINE ARRAY
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FINAL REPORT OF BEARING STAKE TESTS

JANUARY THRU MARCH 1977

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

9 JANUARY 1979

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Proprietary Info.; / Feb '79 . Other
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Classification Reviewed & Approved
By

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

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VOLUME

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

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TABLE OF CONTENTS

SECTION

- 1.0 Tabular Summary of Signal and SNR Measurements
Summary of Data Point Noise Plots

- 2.0 Data Point 4 2-7-77 1019Z (Single Element Data)
Noise Spectral Density Calculations
Omni Signal Levels vs. Element Position Number Plots
Omni ALIU Plots

- 3.0 Data Point 4 2-7-77 1019Z (16 Element Beamformed Data)
FRAZ Recording
Signal Level and SNR Calculations
Signal Gain and Array Gain Calculations
Beamformed ALIU Plots

- 4.0 Data Point 4 2-7-77 1019Z (32 Element Beamformed Data)
Signal Level and SNR Calculations
Signal Gain and Array Gain Calculations
Beamformed ALIU Plots

- 5.0 Data Point 4 2-7-77 1019Z (51 Element Beamformed Data)
Signal Level and SNR Calculations
Signal Gain and Array Gain Calculations
Beamformed ALIU Plots

- 6.0 Data Point 5 2-7-77 1549Z (Single Element Data)
Noise Spectral Density Calculations
Omni Signal Levels vs. Element Position Number Plots
Omni ALIU Plots

- 7.0 Data Point 5 2-7-77 1549Z (16 Element Beamformed Data)
FRAZ Recording
Signal Level and SNR Calculations
Signal Gain and Array Gain Calculations
Beamformed ALIU Plots

- 8.0 Data Point 5 2-7-77 1549Z (32 Element Beamformed Data)
Signal Level and SNR Calculations
Signal Gain and Array Gain Calculations
Beamformed ALIU Plots

- 9.0 Data Point 5 2-7-77 1549Z (51 Element Beamformed Data)
Signal Level and SNR Calculations
Signal Gain and Array Gain Calculations
Beamformed ALIU Data

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

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

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

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

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NOTE ALI Plot Scales for Beamformed and

Omni Data are NOT the same.

SNR comparisons cannot be taken directly
from plot comparisons.

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SUMMARY OF DATA (CONTINUED)

• OMNI NOISE LEVELS

			DATA POINT 1
19 JANUARY 1977			
290 Hz	+64.6	dBre μ Pa/1 Hz	
295 Hz	+64.2	dBre μ Pa/1 Hz	
19 JANUARY 1977			DATA POINT 2
290 Hz	+64.7	dBre μ Pa/1 Hz	
295 Hz	+65.4	dBre μ Pa/1 Hz	
7 FEBRUARY 1977			DATA POINT 3
140 Hz	+74.5	dBre μ Pa/1 Hz	
290 Hz	+67.5	dBre μ Pa/1 Hz	
7 FEBRUARY 1977			DATA POINT 4
140 Hz	+73.3	dBre μ Pa/1 Hz	
290 Hz	+65.6	dBre μ Pa/1 Hz	
7 FEBRUARY 1977			DATA POINT 5
140 Hz	+76.6	dBre μ Pa/1 Hz	
290 Hz	+68.4	dBre μ Pa/1 Hz	

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

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• OMNI NOISE LEVELS

16 MARCH 1977

140 Hz
290 Hz

+72.0
+65.5

DATA POINT 12

dBrePa/1 Hz
dBrePa/1 Hz

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O M N I

OPERATIONAL DATA	AVE. SIGNAL LEVEL DBV	AVE. NOISE LEVEL DBV	BAND WIDTH CORRECT-TIME	BAND WIDTH CORRECT-TIME	ARRAY SENSITIVITY	AP CORRECT-TIME	SNR	LINAR PROBABILITY CORRECT-TIME	CORRECTED SNR
1 DATE: 1-17-77 TIME: 1551Z RANGE: 910M 280HZ DEPTH: 1600FM 280HZ	-487 -533	-567 -571	-10 -10	+15 +15	+0 +0	+100 +100	7.0 7.8	-4.6 -5.0	+2.2 -2.0
2 DATE: 1-17-77 TIME: 1600Z RANGE: 910M 280HZ DEPTH: 1600FM 280HZ	-515 -512	-566 -559	-10 -10	+15 +15	+0 +0	+100 +100	5.0 4.7	-5.2 -5.4	-1.2 -1.7
3 DATE: 2-7-77 TIME: 0319Z RANGE: 1750M 140HZ DEPTH: 1900FM 280HZ	-325 -316	-457 -487	-10 -10	+10 +10	+12 +0	+100 +100	13.2 10.1	-4.2 -4.3	9.0 5.6
4 DATE: 2-7-77 TIME: 0119Z RANGE: 1750M 140HZ DEPTH: 1900FM 280HZ	-344 -316	-469 -506	-10 -10	+10 +10	+12 +0	+100 +100	12.5 11.0	-4.2 -4.2	8.3 6.8
5 DATE: 2-7-77 TIME: 1549Z RANGE: 1100M 140HZ DEPTH: 1900FM 280HZ	-300 -331	-435 -478	-10 -10	+10 +10	+12 +0	+100 +100	13.5 14.7	-4.2 -4.2	9.3 7.5
6 DATE: 2-7-77 TIME: 2030Z RANGE: 700M 140HZ DEPTH: 1900FM 280HZ	-347 -230	-452 -473	-10 -10	+10 +10	+12 +0	+100 +100	18.5 24.3	-4.0 -4.0	13.5 20.3

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O M N I

DATA	OPERATIONAL DATA	AVG SIGNAL LEVEL DBV	AVG NOISE LEVEL DBV	BANDWIDTH CONVERSION	BANDWIDTH CONVERSION	AREA SENSITIVITY	AP'S SENSITIVITY	SNR	LINEAR PRACTICAL SNR	CORRECTED SNR
7	DATE: 2-15-77 TIME: 0202Z RANGE: 28 NM 140 MZ DEPTH: 1800 FM 280 MZ	-16.0	-80.1	-1.8	+1.0	+1.2	+100	39.1	-4.0	30.1
8	DATE: 2-15-77 TIME: 1501Z RANGE: 28 NM 140 MZ DEPTH: 2800 FM 280 MZ	-15.2	-84.6	-1.8	+1.0	+1.2	+100	39.4	-4.0	35.4
9	DATE: 2-15-77 TIME: 2312Z RANGE: 72 NM 140 MZ DEPTH: 2800 FM 280 MZ	-12.5	-81.0	-1.8	+1.0	+1.2	+100	36.6	-4.0	32.6
10	DATE: 2-15-77 TIME: 0433Z RANGE: 122 NM 140 MZ DEPTH: 2800 FM 280 MZ	-38.0	-51.6	-1.1	+1.0	+1.2	+100	13.7	-4.2	9.4
11	DATE: 2-15-77 TIME: 0935Z RANGE: 122 NM 140 MZ DEPTH: 2800 FM 280 MZ	-41.5	-54.0	-1.1	+1.0	+1.2	+100	12.5	-4.2	8.3
12	DATE: 2-15-77 TIME: 1148Z RANGE: 122 NM 140 MZ DEPTH: 2800 FM 280 MZ	-38.6	-50.7	-1.1	+1.0	+1.2	+100	12.1	-4.2	7.9

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16 ELEMENT ARRAY

OPERATIONAL DATA	SIGNAL MEASURE		BASIC		ATE		JTK		I+G		MOISE		MCR		FRENCH		BANK		BAND		MULTI		M/F		IMAGE		QTL		
	LEVEL	DRY	PARAL.	ATM	CHAMBER	DATE	TIME	LEVEL	DB	DB	DB	DB	DB	DB	DB	DB	DB	DB	DB	DB	DB	DB	DB	DB	DB	DB		DB	ANGLE
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	
1	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146
2	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175
3	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204
4	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233
5	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262
6	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291

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SECRET

16

ELEMENT

ARRAY

OPERATIONAL DATA	SIGNAL LEVEL DBY	ACQUISITION	BEAM CHANNEL ATTEN	BTC	A+E	J+K	I+5	MISE DBV	ACQUISITION	BEAM CHANNEL ATTEN	BEAM CHANNEL ATTEN	BEAM CHANNEL ATTEN	ARMY TUNING	ARMY TUNING	SMR H-F	LINEAR RANGE	CONDUCTED SMR	STIEFR-ANGLE	QTL	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	T	U
7																				
DATE: 2-8-77 TIME: 0202Z																				
RANGE: 28 NM 180 HR	-22.8	+10	+24	+2	24	+1.2	-41.4	-65.4	+10	+24	+2	+2	+12	+100	43.6	-4.0	39.8	-21.5	47.8	
DEPTH: 1800 FT 280 HR	-26.6	+10	+24	+0	24	-2.6	-47.8	-71.8	+10	+24	+0	+0	+0	+100	45.2	-4.0	42.0	-21.5	46.0	
DATE: 3-5-77 TIME: 1501Z																				
RANGE: 22 NM 180 HR	-22.1	+10	+18	+2	26	+5.9	-37.1	-61.6	+10	+18	+2	+7	+12	+100	37.5	-4.0	35.7	+30.0	39.7	
DEPTH: 2800 FT 280 HR	-27.8	+10	+18	+0	28	+6.2	-45.6	-72.6	+10	+18	+0	+8	+10	+100	51.8	-4.0	48.6	+30.0	52.6	
DATE: 3-5-77 TIME: 212Z																				
RANGE: 72 NM 180 HR	-23.5	+10	+12	+1	22	-0.5	-36.7	-62.7	+10	+12	+1	+1	+10	+100	36.2	-4.0	32.3	+51.5	36.3	
DEPTH: 2800 FT 280 HR	-27.3	+10	+12	+0	22	+8.7	-43.2	-66.2	+10	+12	+0	+6	+10	+100	51.9	-4.0	48.5	+51.5	52.5	
DATE: 3-5-77 TIME: 0633Z																				
RANGE: 128 NM 180 HR	-16.8	+10	+12	+2	22	+5.2	-23.6	-45.6	+10	+12	+2	+2	+10	+100	28.8	-4.0	35.0	+61.0	28.0	
DEPTH: 2800 FT 280 HR	-35.8	+10	+12	+0	22	-13.8	-37.4	-58.4	+10	+12	+0	+8	+10	+100	23.6	-4.0	20.4	+61.0	24.4	
DATE: 3-16-77 TIME: 0933Z																				
RANGE: 122 NM 180 HR	-26.0	+10	+18	+2	28	-1.1	-28.2	-51.2	+10	+18	+2	+2	+10	+100	27.4	-4.0	23.6	+63.0	27.6	
DEPTH: 2800 FT 280 HR	-45.4	+10	+18	+0	28	-13.4	-36.2	-54.2	+10	+18	+0	+8	+10	+100	18.8	-4.1	15.5	+62.0	18.6	
DATE: 3-16-77 TIME: 1142Z																				
RANGE: 122 NM 180 HR	-22.8	+10	+18	+2	28	+5.2	-27.1	-55.1	+10	+18	+2	+2	+10	+100	32.3	-4.0	28.5	+64.0	22.5	
DEPTH: 2800 FT 280 HR	-39.9	+10	+18	+0	28	-11.4	-29.8	-57.8	+10	+18	+0	+8	+10	+100	17.9	-4.2	14.3	+64.0	18.7	

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32

ELEMENT

ARRAY

P T A F	OPERATIONAL DATA	SIGNAL PROCESSOR BEAM											MOUNT	MOUNT	MOUNT	MOUNT							
		SIGNAL LEVEL COPY	CAL CORR-TIME	BEAM ATTN	BEAM CORR-TIME	B+C	A+E	J+K	I+G	WAVE LEVEL DB	ANGLE CAL CORR-TIME	BEAM CORR-TIME					BEAM CORR-TIME	BEAM CORR-TIME	BEAM CORR-TIME	BEAM CORR-TIME	BEAM CORR-TIME	BEAM CORR-TIME	
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	
1	DATE 1-15-77 TIME 1530Z	-57.2																					
	RANGE 1500M	0.0																					
	BEZJA 1500FM																						
2	DATE 1-15-77 TIME 1600Z	-55.0																					
	RANGE 1500M	0.0																					
	BEZJA 1500FM																						
3	DATE 2-7-77 TIME 0110Z	-52.0																					
	RANGE 1500M	0.0																					
	BEZJA 1500FM																						
4	DATE 2-7-77 TIME 2040Z	-58.2																					
	RANGE 1500M	0.0																					
	BEZJA 1500FM																						
5	DATE 2-7-77 TIME 2050Z	-51.2																					
	RANGE 1500M	0.0																					
	BEZJA 1500FM																						
6	DATE 2-7-77 TIME 2070Z	-59.0																					
	RANGE 1500M	0.0																					
	BEZJA 1500FM																						

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32

ELEMENT

ARRAY

OPERATIONAL DATA	SIGNAL LEVEL DBV	ACTUAL CAL. TIME	TEMP. CORR. ATTY	STAND. CORR. TIME	TEMP. CORR. TIME	B+C	A+E	J+K	I+B	AVG LEVEL DBV	NOISE CAL. TIME	ATTA	CONCAC CORR. TIME	CONCAC CORR. TIME	SAW- WITH CORR. TIME	ARMY/NAVY/AFS	SMR H-F	SMR FREQ. BAND	SMR ANGLE	Q+L
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
7 DATE 2/21 TIME 0242	-25	24	20	18	15	12	10	8	7	6	5	4	3	2	1	0	1	2	3	4
RANGE 200M	25	20	15	10	8	5	3	2	1	0	1	2	3	4	5	6	7	8	9	10
DEPTH 1000M	30	25	20	15	12	10	8	7	6	5	4	3	2	1	0	1	2	3	4	5
DATE 2/21 TIME 1518	-27	26	22	19	16	13	11	9	8	7	6	5	4	3	2	1	0	1	2	3
RANGE 200M	27	22	17	12	10	8	6	5	4	3	2	1	0	1	2	3	4	5	6	7
DEPTH 200M	32	27	22	17	14	11	9	8	7	6	5	4	3	2	1	0	1	2	3	4
DATE 2/27 TIME 1412	-21	20	18	16	14	12	10	8	7	6	5	4	3	2	1	0	1	2	3	4
RANGE 120M	21	18	15	12	10	8	6	5	4	3	2	1	0	1	2	3	4	5	6	7
DEPTH 100M	26	21	16	12	9	7	5	4	3	2	1	0	1	2	3	4	5	6	7	8
DATE 2/27 TIME 0638	-18	17	15	13	11	9	7	6	5	4	3	2	1	0	1	0	1	2	3	4
RANGE 100M	18	15	12	9	7	5	4	3	2	1	0	1	2	3	4	5	6	7	8	9
DEPTH 200M	23	18	14	10	7	5	3	2	1	0	1	2	3	4	5	6	7	8	9	10
DATE 2/27 TIME 0452	-20	19	17	15	13	11	9	7	6	5	4	3	2	1	0	1	2	3	4	5
RANGE 120M	20	17	14	11	9	7	5	4	3	2	1	0	1	2	3	4	5	6	7	8
DEPTH 200M	25	20	16	12	9	7	5	4	3	2	1	0	1	2	3	4	5	6	7	8
DATE 2/27 TIME 1908	-18	17	15	13	11	9	7	6	5	4	3	2	1	0	1	0	1	2	3	4
RANGE 120M	18	15	12	9	7	5	4	3	2	1	0	1	2	3	4	5	6	7	8	9
DEPTH 200M	23	18	14	10	7	5	3	2	1	0	1	2	3	4	5	6	7	8	9	10

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ELEMENT ARRAY

MAX.

OPERATIONAL DATA	SIGNAL CAL. LOSS	SIGNAL CAL. LOSS	ATTN	B-C	ATE	JTX	IT+5	NOISE LOSS	CAL. LOSS	WIDE LOSS	BAND LOSS	READY LOSS	M/F LOSS	SAR LOSS	PASSAGE LOSS	STEEPNESS LOSS	GTL																	
	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								
DATE: 1-18-77 TIME: 1500H																																		
RANGE: 0.10M, 200 MZ	-204	NA	0	0	-204	0	-437	-437	NA	-20	-20	-20	-20	-20	-20	-20	15.3	-9.2	-9.2	-9.2	14.9	-58°												
DEPTH: 1500PH, 250 MZ	-371	NA	0	0	-371	0	-487	-487	NA	-18	-18	-18	-18	-18	-18	-18	16	-4.8	-4.8	-4.8	2.5	-58°												
DATE: 2-1-77 TIME: 1500H																																		
RANGE: 0.10M, 200 MZ	-57.8	MZ	+24	0	-250	+34	-384	-384	0	-18	-18	-18	-18	-18	-18	-18	14.4	-4.2	-4.2	-4.2	17.0	-58.5°												
DEPTH: 1500PH, 250 MZ	-62	MZ	+34	0	-322	+34	-384	-384	0	-18	-18	-18	-18	-18	-18	-18	7.2	-4.8	-4.8	-4.8	3.2	-58.5°												
DATE: 2-1-77 TIME: 1500H																																		
RANGE: 0.10M, 200 MZ	-375	NA	-30	0	-375	0	-440	-440	-656	-22	-22	-22	-22	-22	-22	-22	20.7	-4.0	-4.0	-4.0	29.5	-35°												
DEPTH: 1500PH, 250 MZ	-471	NA	-30	0	-471	0	-532	-532	-712	-30	-30	-30	-30	-30	-30	-30	25.8	-4.0	-4.0	-4.0	37.6	-35°												
DATE: 2-1-77 TIME: 1500H																																		
RANGE: 0.10M, 200 MZ	-474	NA	+30	0	-474	0	-532	-532	-712	-30	-30	-30	-30	-30	-30	-30	21.2	-4.0	-4.0	-4.0	29.5	-35°												
DEPTH: 1500PH, 250 MZ	-514	NA	+30	0	-514	0	-594	-594	-774	-30	-30	-30	-30	-30	-30	-30	18.5	-4.0	-4.0	-4.0	25.7	-35°												
DATE: 2-1-77 TIME: 1500H																																		
RANGE: 0.10M, 200 MZ	-302	NA	+30	0	-302	0	-438	-438	-642	-30	-30	-30	-30	-30	-30	-30	20.0	-4.0	-4.0	-4.0	28.2	-35°												
DEPTH: 1500PH, 250 MZ	-418	NA	+30	0	-418	0	-522	-522	-712	-30	-30	-30	-30	-30	-30	-30	25.4	-4.0	-4.0	-4.0	32.2	-35°												
DATE: 2-1-77 TIME: 2000H																																		
RANGE: 0.10M, 200 MZ	-508	NA	+30	0	-508	0	-612	-612	-828	-30	-30	-30	-30	-30	-30	-30	38.0	-4.0	-4.0	-4.0	50.2	-17°												
DEPTH: 1500PH, 250 MZ	-541	NA	+30	0	-541	0	-654	-654	-882	-30	-30	-30	-30	-30	-30	-30	35.7	-4.0	-4.0	-4.0	47.5	-17°												

SECRET

OPERATIONAL DATA	SECRET			MAX.			ELEMENT			ARRAY			SECRET							
	SIGNAL LEVEL DBV	MCPI-32 CAL. COARSE-TUN	BEAM-ATTN. CORRECT-TUN	B+C	A+E	J+R	I+5	ADISE LEVEL DBV	MCPI-32 CAL. COARSE-TUN	BEAM-ATTN. CORRECT-TUN	BAND-WIDTH CORRECT-TUN	BAND-WIDTH CORRECT-TUN	ARRAY-FUNCTIVITY	APZ CORRECT-TUN	SUR N-F	IMAGE PHASES-CORRECT-TUN	CORRECT-DB SUR	STRENGTH ASSESS	Q+L	
	A	B	C	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
7 DATE: 2-8-77 TIME: 0222Z RANGE: 2200M 140 HZ DEPTH: 2800 FM 280 HZ	-23.8	+10	+30	+40	18.7	+40	-25.5	-26.5	+10	+30	+2	-1.8	+10	+12	+100	44.2	-4.0	40.4	-21.5	44.4
8 DATE: 2-15-77 TIME: 1501Z RANGE: 2200M 140 HZ DEPTH: 2800 FM 280 HZ	-24.0	+10	+30	+40	16.0	+40	-33.4	-27.4	+10	+30	+2	-1.8	+10	+8	+100	38.4	-4.0	40.8	-21.5	42.2
9 DATE: 2-15-77 TIME: 2022Z RANGE: 2200M 140 HZ DEPTH: 2800 FM 280 HZ	-26.3	+10	+30	+40	-20.2	+40	-33.1	-27.1	+10	+30	+2	-1.8	+10	+8	+100	13.1	-4.2	41.7	-21.5	13.9
10 DATE: 2-15-77 TIME: 0222Z RANGE: 2200M 140 HZ DEPTH: 2800 FM 280 HZ	-21.8	+10	+30	+40	16.2	+40	-20.2	-25.2	+10	+30	+2	-1.8	+10	+12	+100	48.4	-4.0	41.6	+51.5	46.6
11 DATE: 2-15-77 TIME: 0832Z RANGE: 2200M 140 HZ DEPTH: 2800 FM 280 HZ	-21.6	+10	+30	+40	12.4	+34	-20.4	-24.4	+10	+30	+2	-1.8	+10	+8	+100	33.2	-4.0	40.1	+51.5	34.1
12 DATE: 2-15-77 TIME: 1432Z RANGE: 2200M 140 HZ DEPTH: 2800 FM 280 HZ	-23.6	+10	+30	+40	10.4	+34	-23.2	-27.2	+10	+30	+2	-1.8	+10	+8	+100	25.2	-4.0	42.1	+61	26.1
13 DATE: 2-15-77 TIME: 1432Z RANGE: 2200M 140 HZ DEPTH: 2800 FM 280 HZ	-23.6	+10	+30	+40	10.4	+34	-23.2	-27.2	+10	+30	+2	-1.8	+10	+8	+100	25.2	-4.0	42.1	+61	26.1

SECRET

UNCLASSIFIED

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

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

FREQUENCY 140 HZ

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

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

BANDWIDTH CONVERSION TO 1 HZ BAND +8.2

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

UNCLASSIFIED

UNCLASSIFIED

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

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

FREQUENCY 290 HZ

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

-50.6

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

-(6-8) -42.6

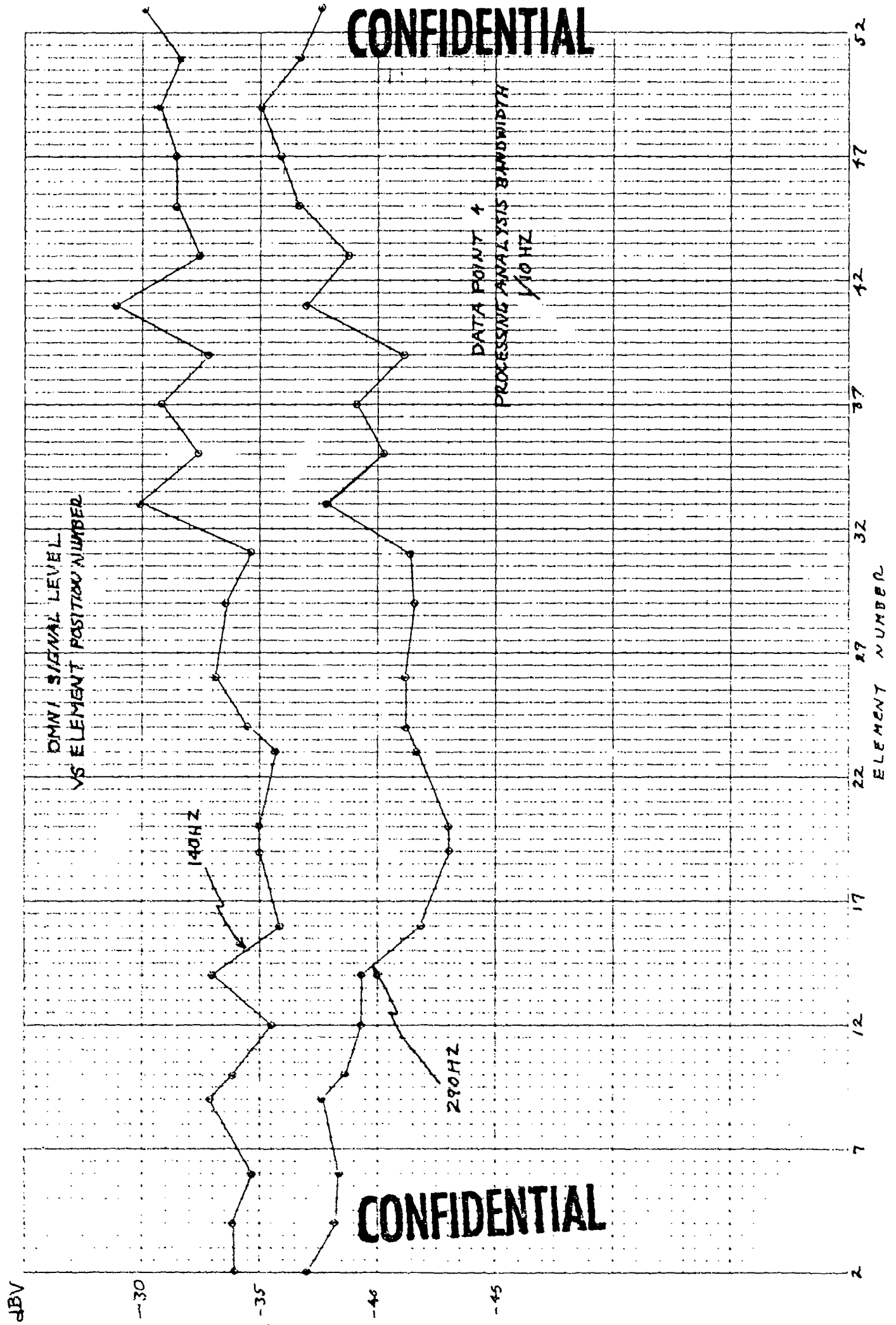
BANDWIDTH CONVERSION TO 1 HZ BAND

+8.2 -34.9

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

+100 +65.6

UNCLASSIFIED



CONFIDENTIAL

CONFIDENTIAL

46 0703

KOE 10/19/77 TO THE 10/19/77

CONTROL: 2-7 - 1019 (/) REEL: F15 INDEX 1955

DATE OF ANALYSIS:

OMNI SP. CTM (ELEMENT 2)

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

1 ELEMENT

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

ANALYSIS BANDWIDTH: 1/10HZ

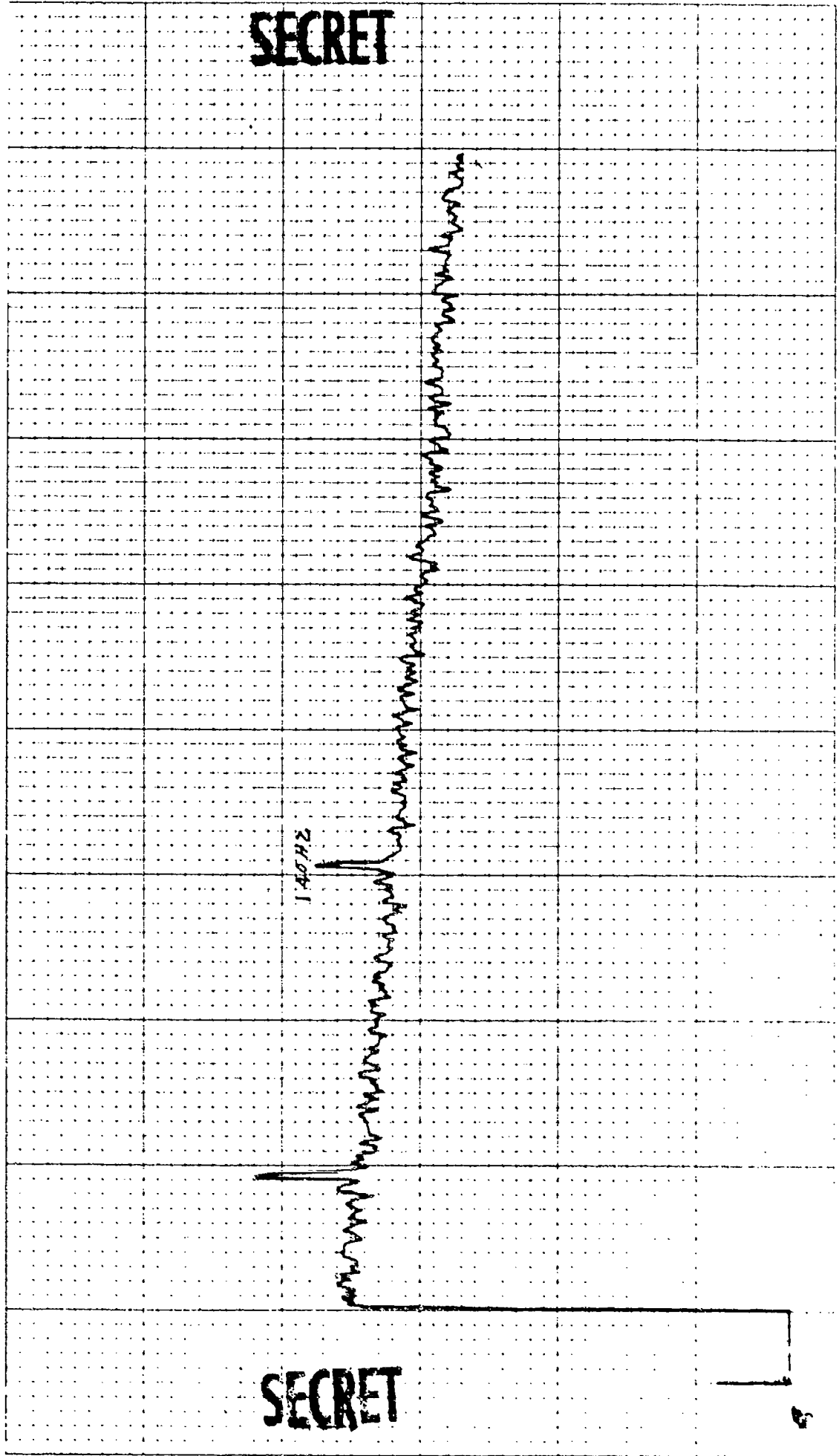
DEC AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

AFTEN: DB

WTG: HANNING



46 0703

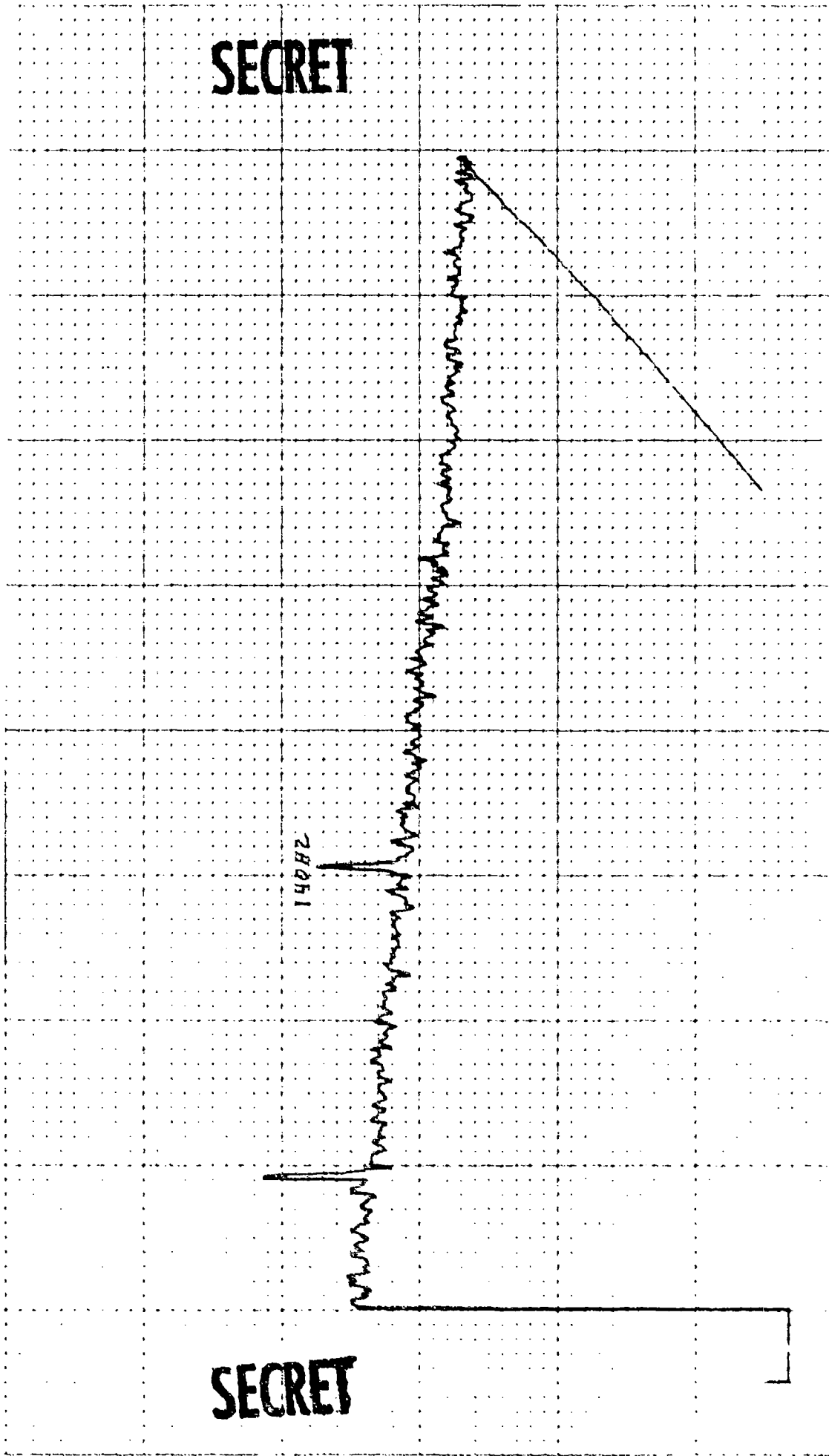
REF: 2-7-77-1019

REEL: F15 INDEX: 1955

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

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

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER WTG: HANNING



SECRET

SECRET

46 0703

REF ID: A66100

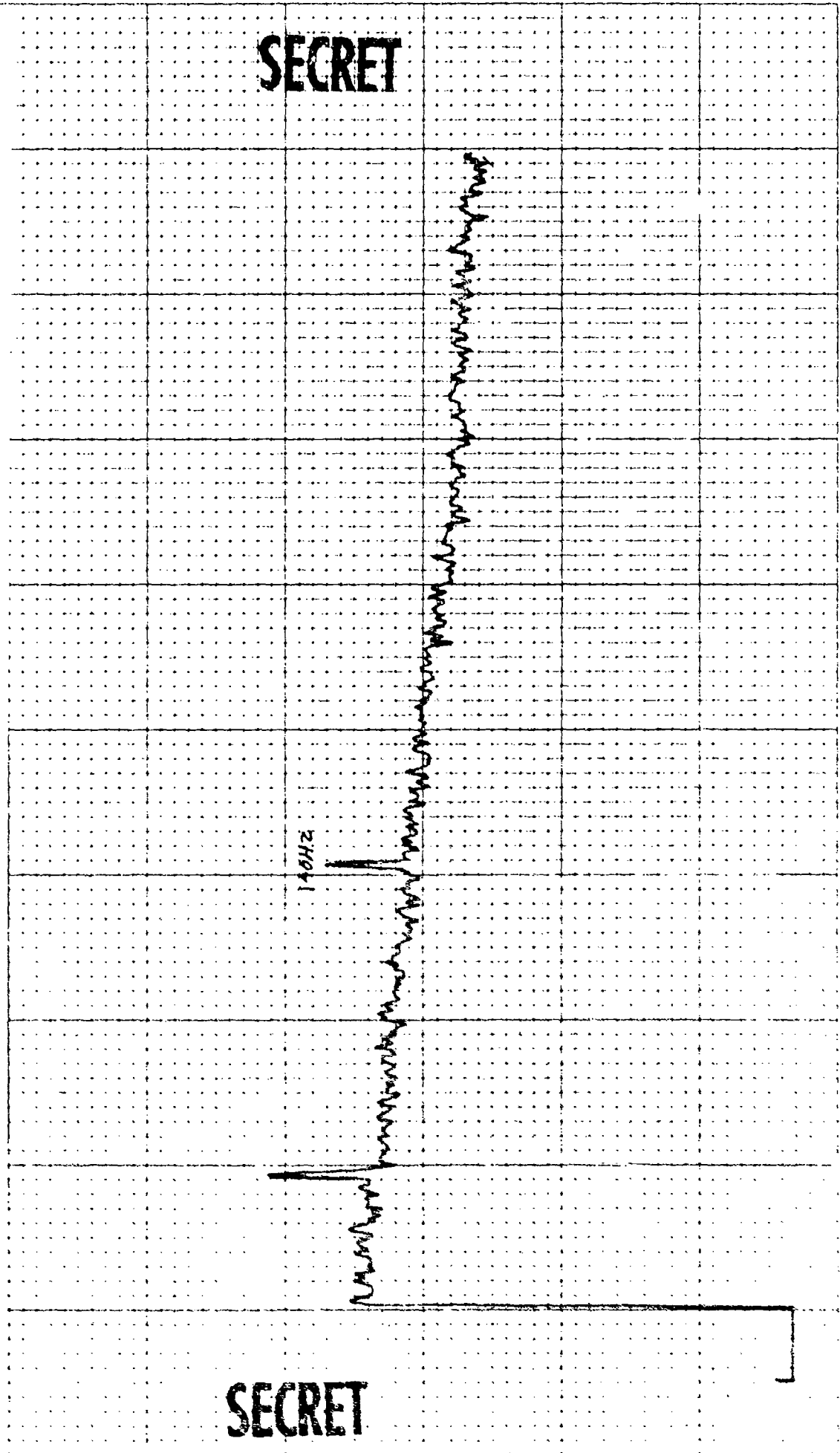
CONTROL: 2-7 -1019 (3)
OMNI SPECTRUM (ELEMENT 6)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2777 -1019 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEC AZ STEERING

REEL: F15 INDEX/955

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



160HZ

SECRET

SECRET

46 0703

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

DATE OF ANALYSIS:

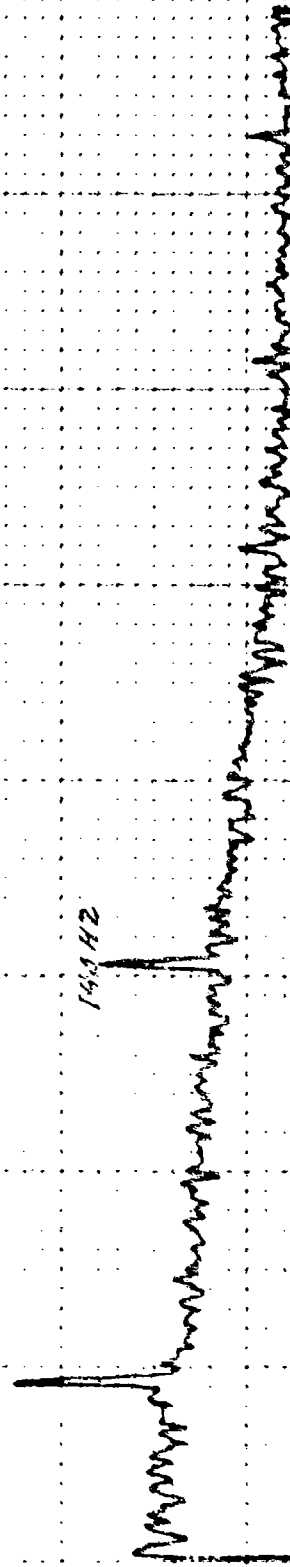
DATE/TIME: 2-7-77 - 1019 Z

ANALYSIS BANDWIDTH: F/10H?
DEG. AZ STEERING

PEEL: F/S

INDEX/1955

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



SECRET

SECRET

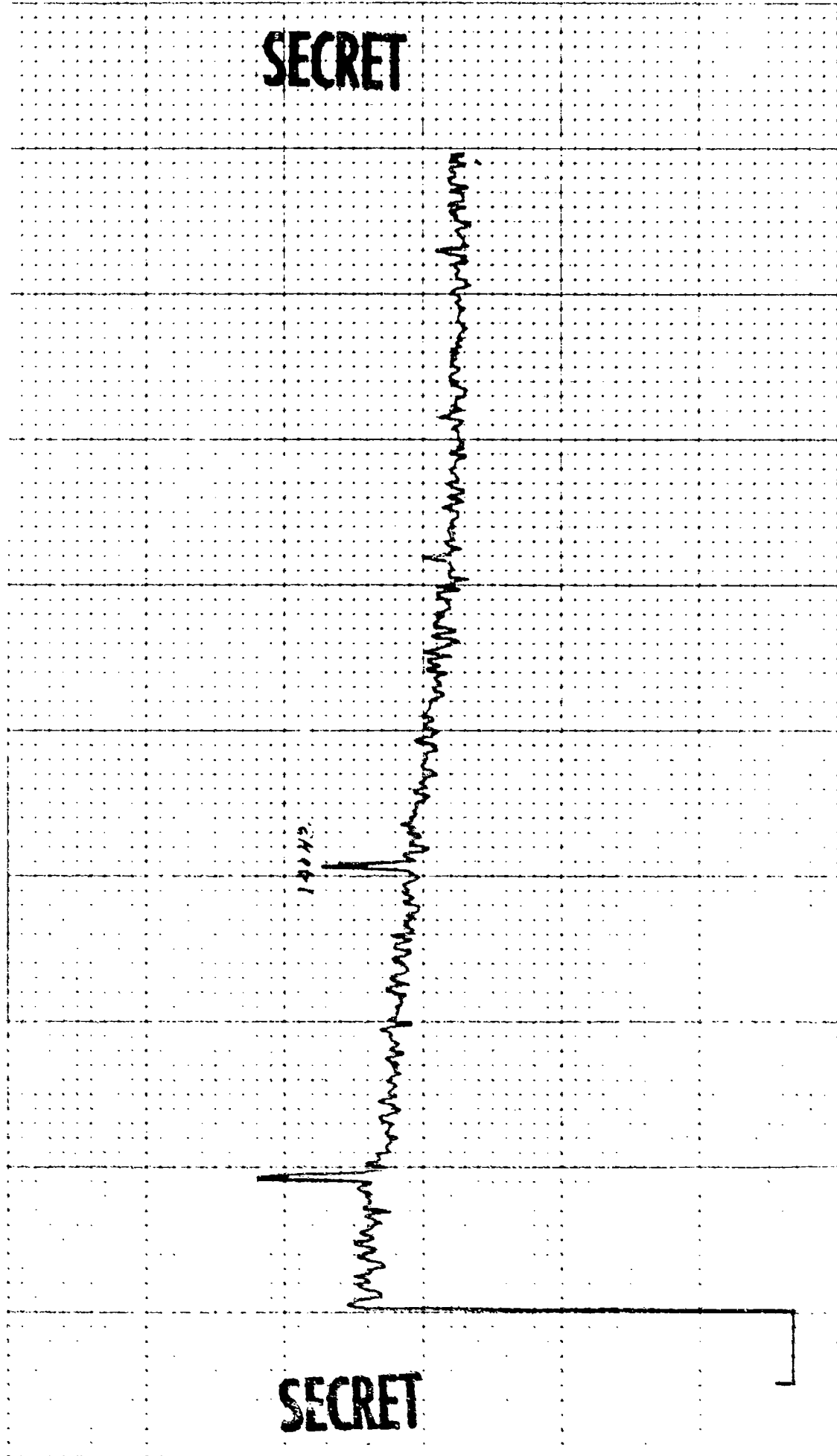
46 0703

KOE 2-7-77 1019 10

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

INTEGRATION TIME 320 SECS ATTN: DB
 FILTER WTG: HANNING

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



SECRET

SECRET

46 0703

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

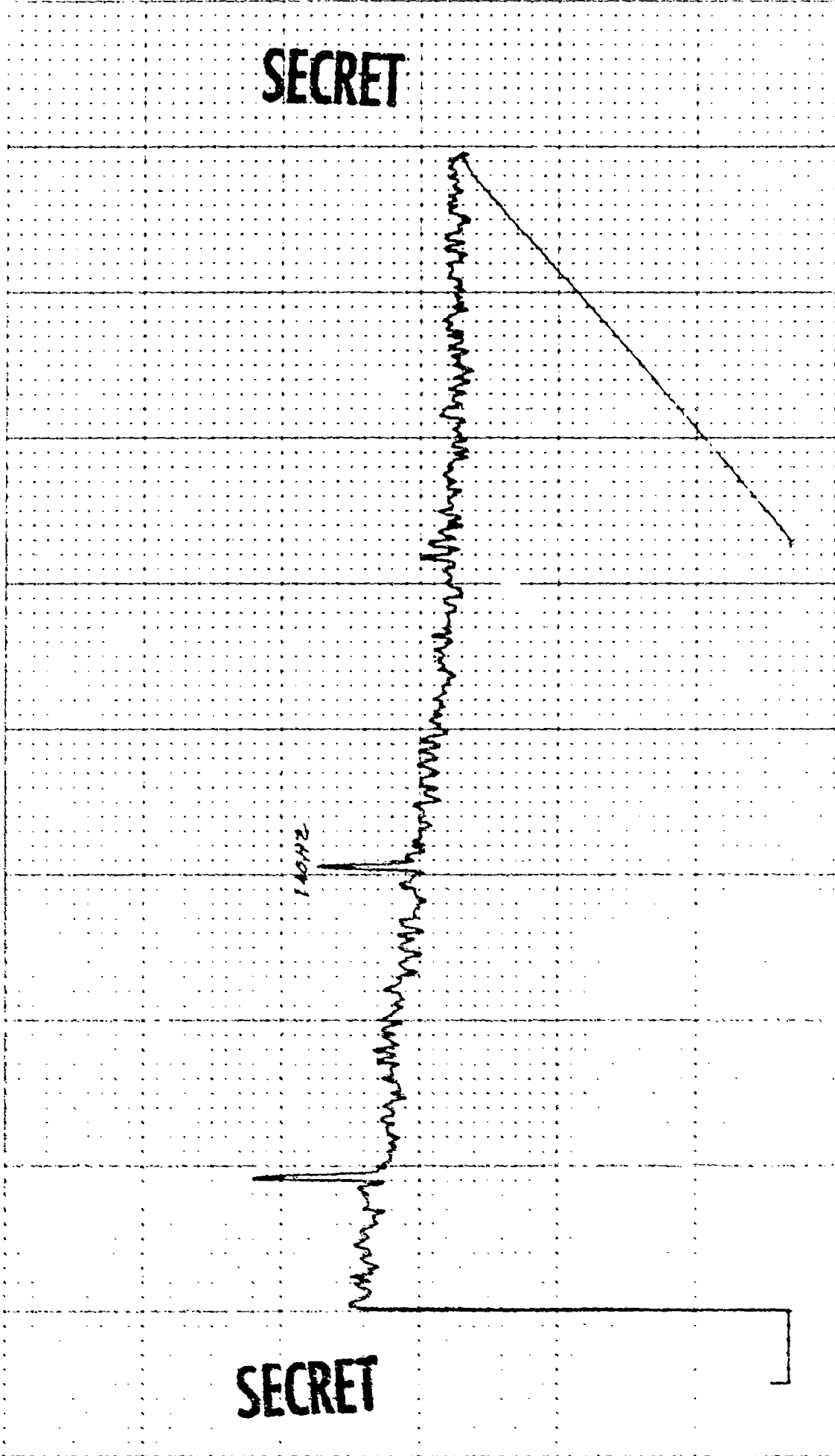
DATE OF ANALYSIS:

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

REEL: F/S

INDEX/965

INTEGRATION TIME 320 SECS
FILTER ATTN: DB
WTC: HANNING



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

46 0703

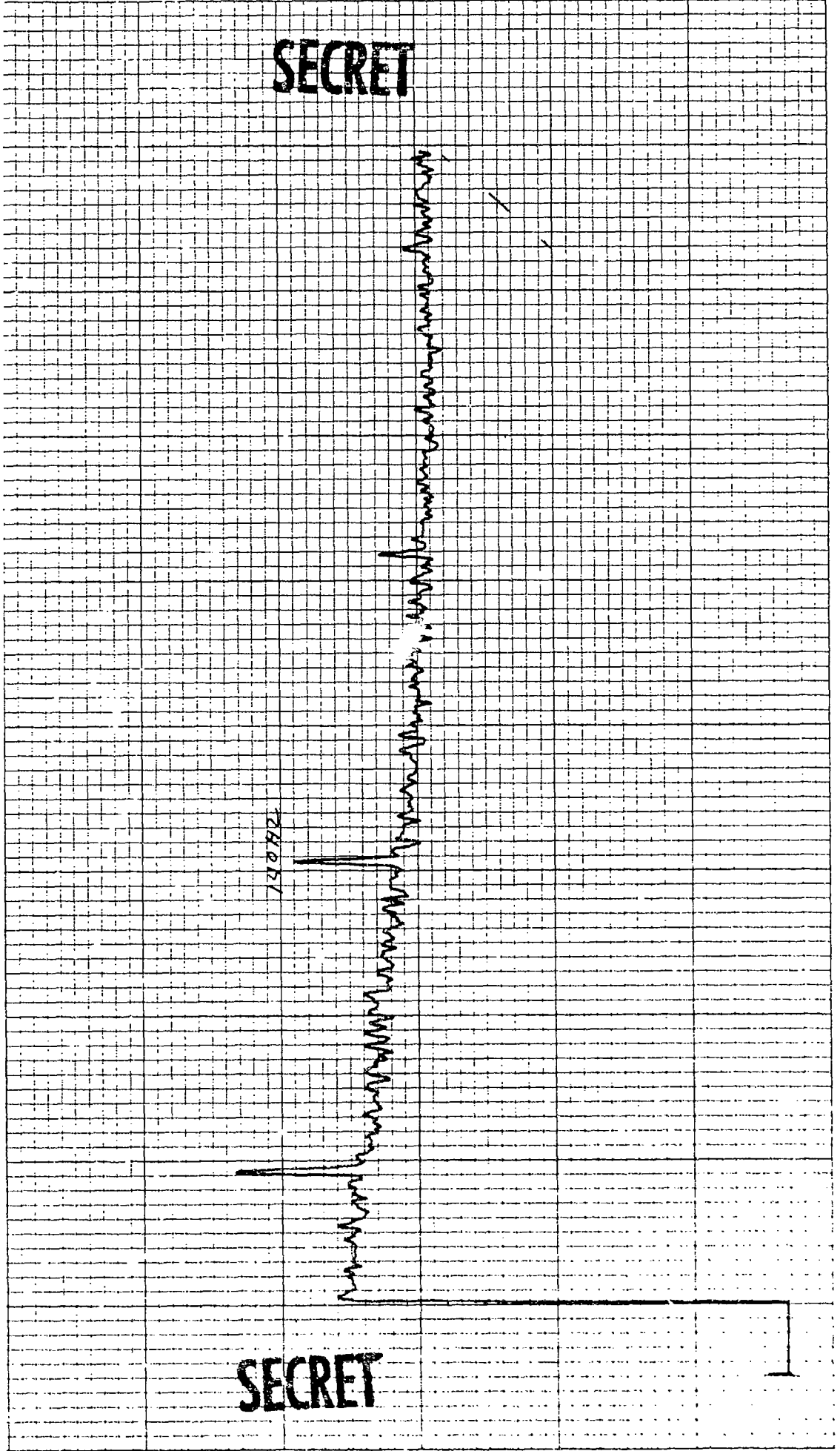
CONTROL: 2-7-1019 (7)
OMNI SPECTRUM (ELEMENT 14)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F/S INDEX: 1955

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



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46 0703

R0E 10.4.10 TO THE INCH. 10.4.10 BY MES
PROGRAM & SERVIC 00 10.4.10

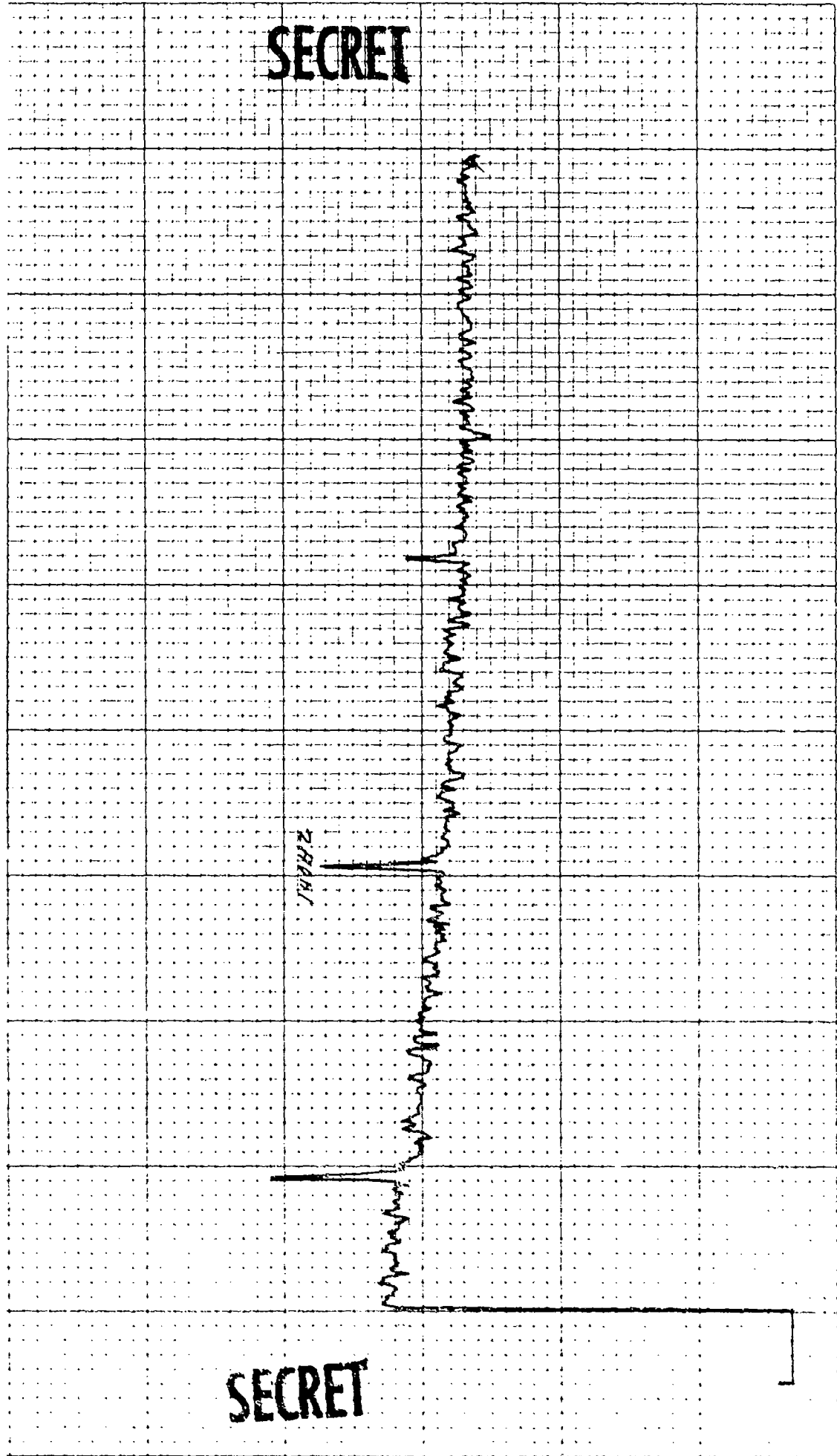
CONTROL: 2-7 - 1019 (0) DATE OF ANALYSIS: REEL: F/S INDEX / 955

OMNI SPECTRUM (ELEMENT / 6) DATE/TIME: 2-7-77 - 1019 Z

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

CENTER FREQ: 150 HZ — DEC AZ STEERING FILTER WTG: HANNING

1 ELEMENT



SECRET

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46 0703

REF ID: A66101

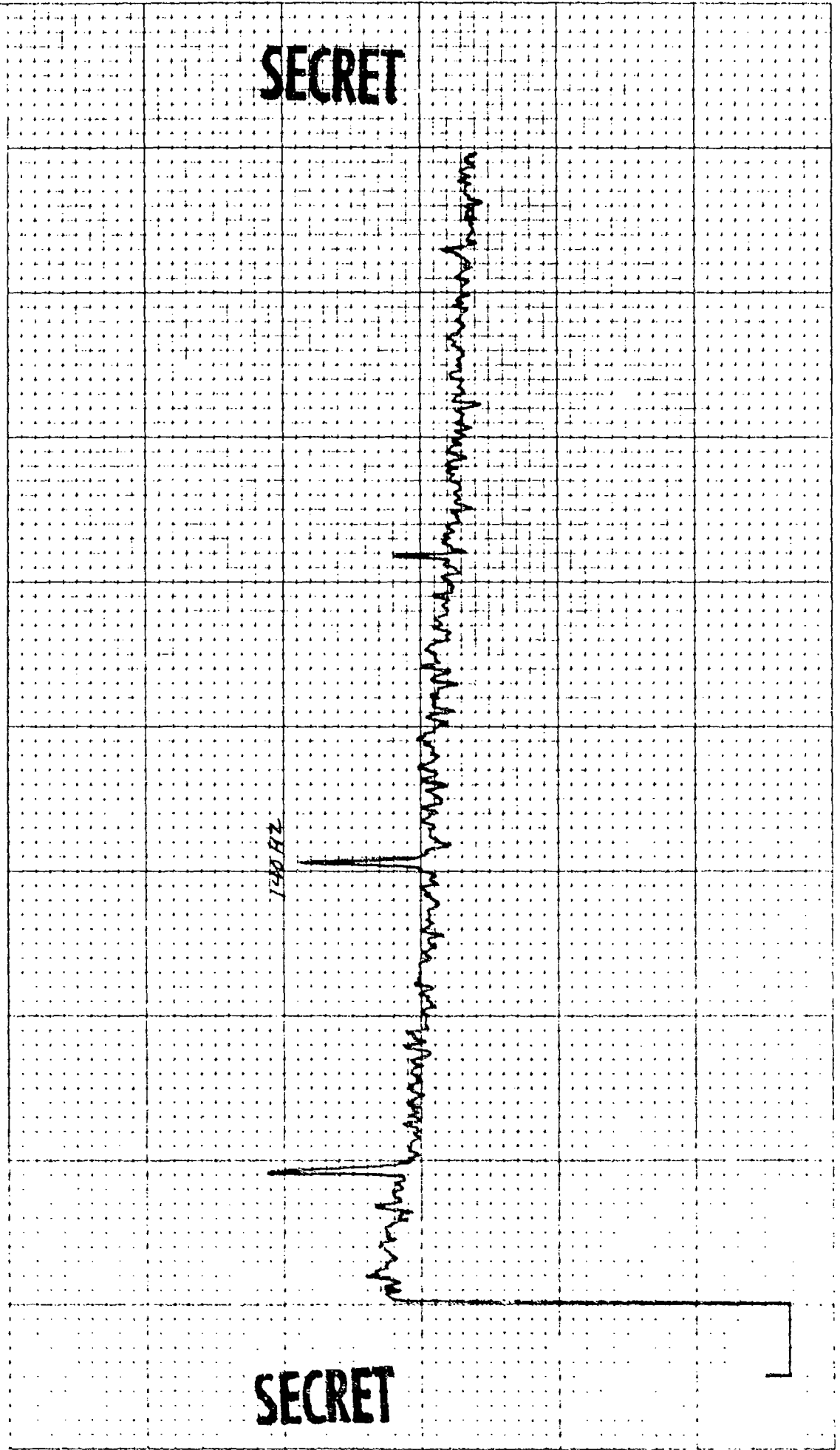
CONTROL: 2-7 -1019 (9)
OMNI SPECTRUM(ELEMENT 19)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F15 INDEX/1955

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



46 0703

KOE VOX TO TIME INCHES
WEIFFEL & ESSER CO. MADE IN U.S.A.

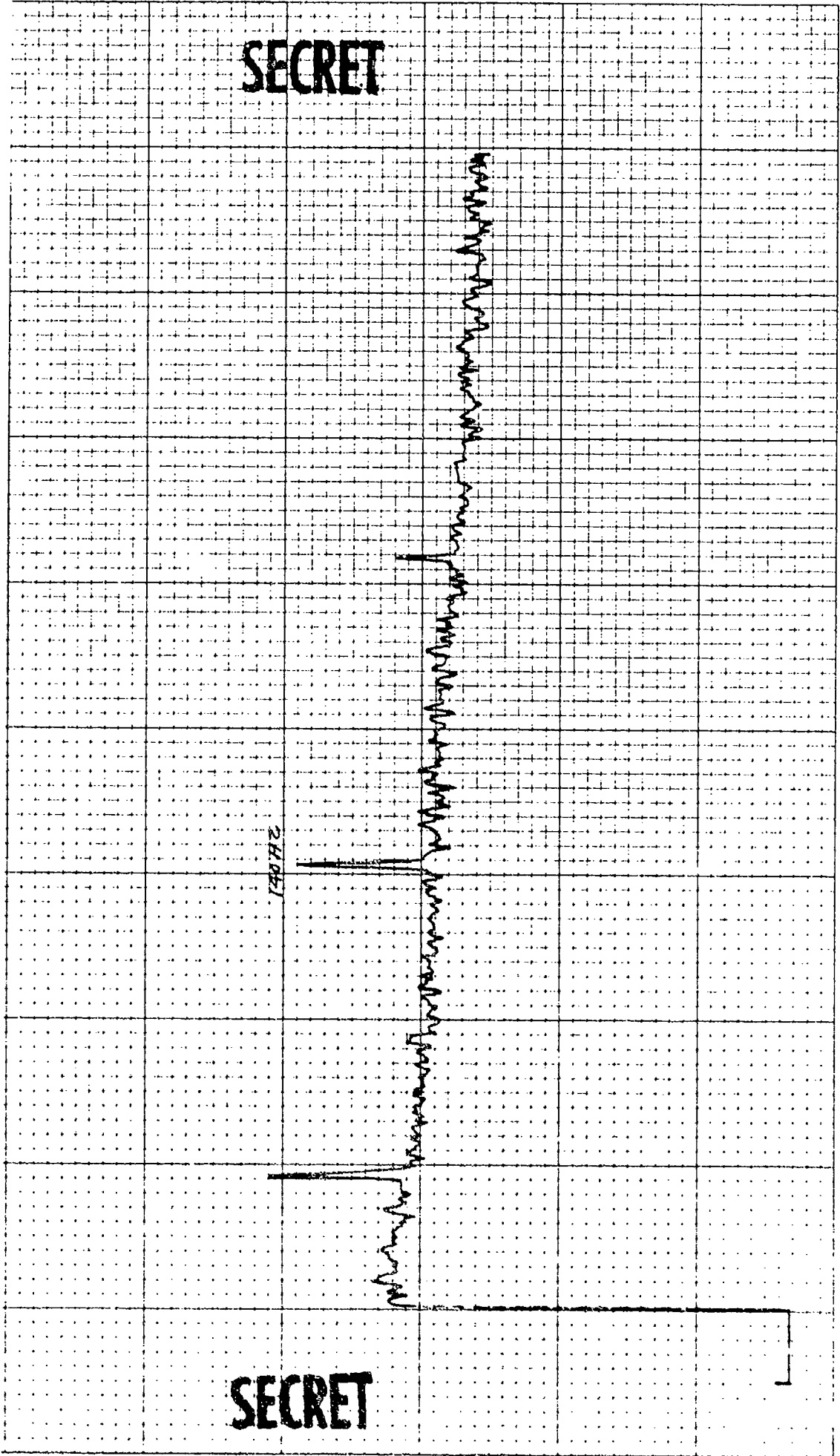
CONTROL: 2-7 - 1019 (10)
OMNI SPECTRUM (ELEMENT 20)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F-5 INDEX: 1955

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



KOE 10 X 10 TO THE INCH
PEUFFEL & ESSER CO.

46 0703

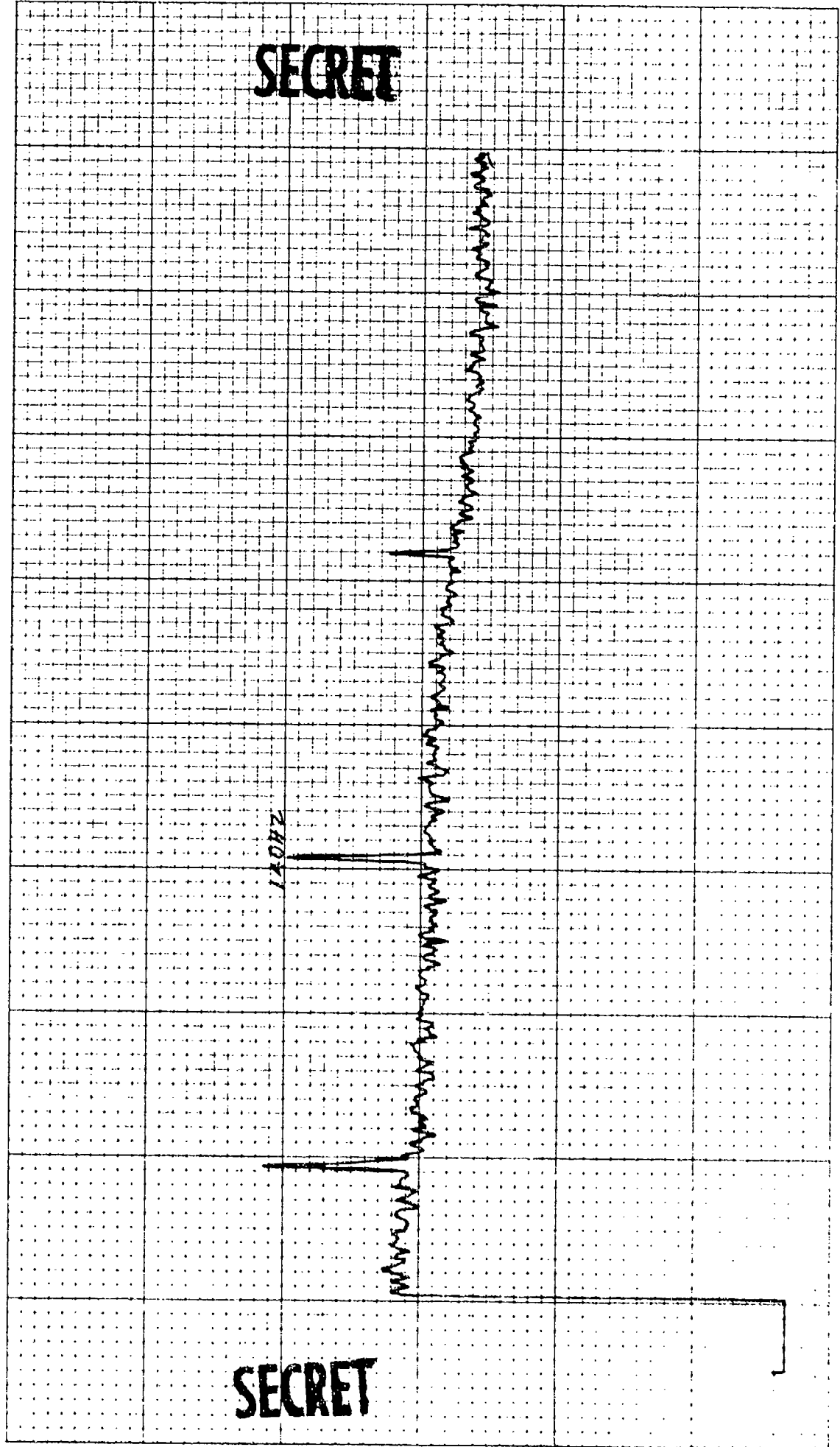
CONTROL: 2-7 - 1019 (11)
OMNI SPECTRUM (ELEMENT 23)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F/S INDEX/955

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING



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NOTE: REFERENCE TO THE INSTRUMENT IS IN THE INDEX

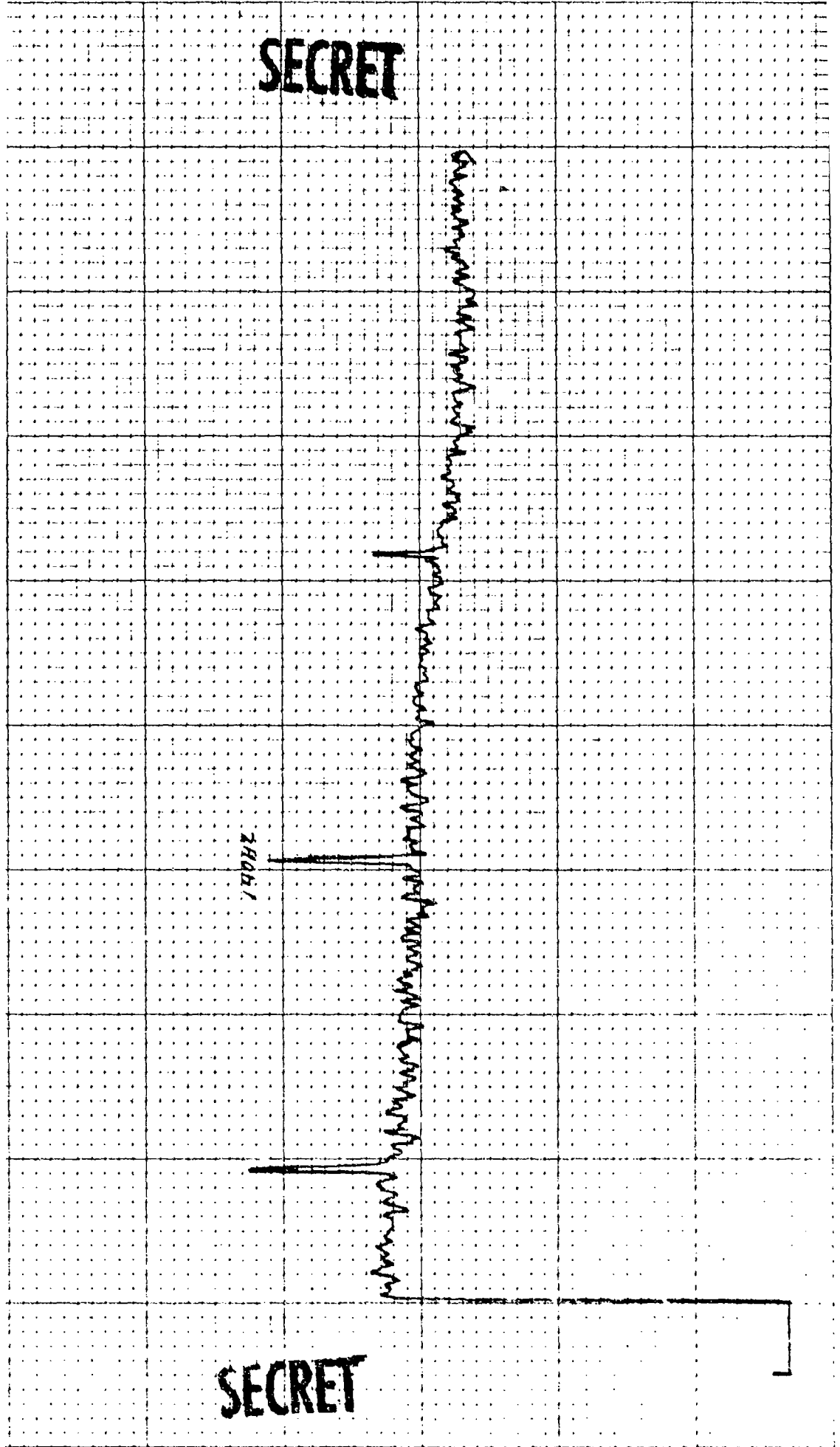
CONTROL: 2-7 -1019 (12)
OMNI SPECTRUM (ELEMENT 24)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F15 INDEX: 1955

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING



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

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

DATE OF ANALYSIS:

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

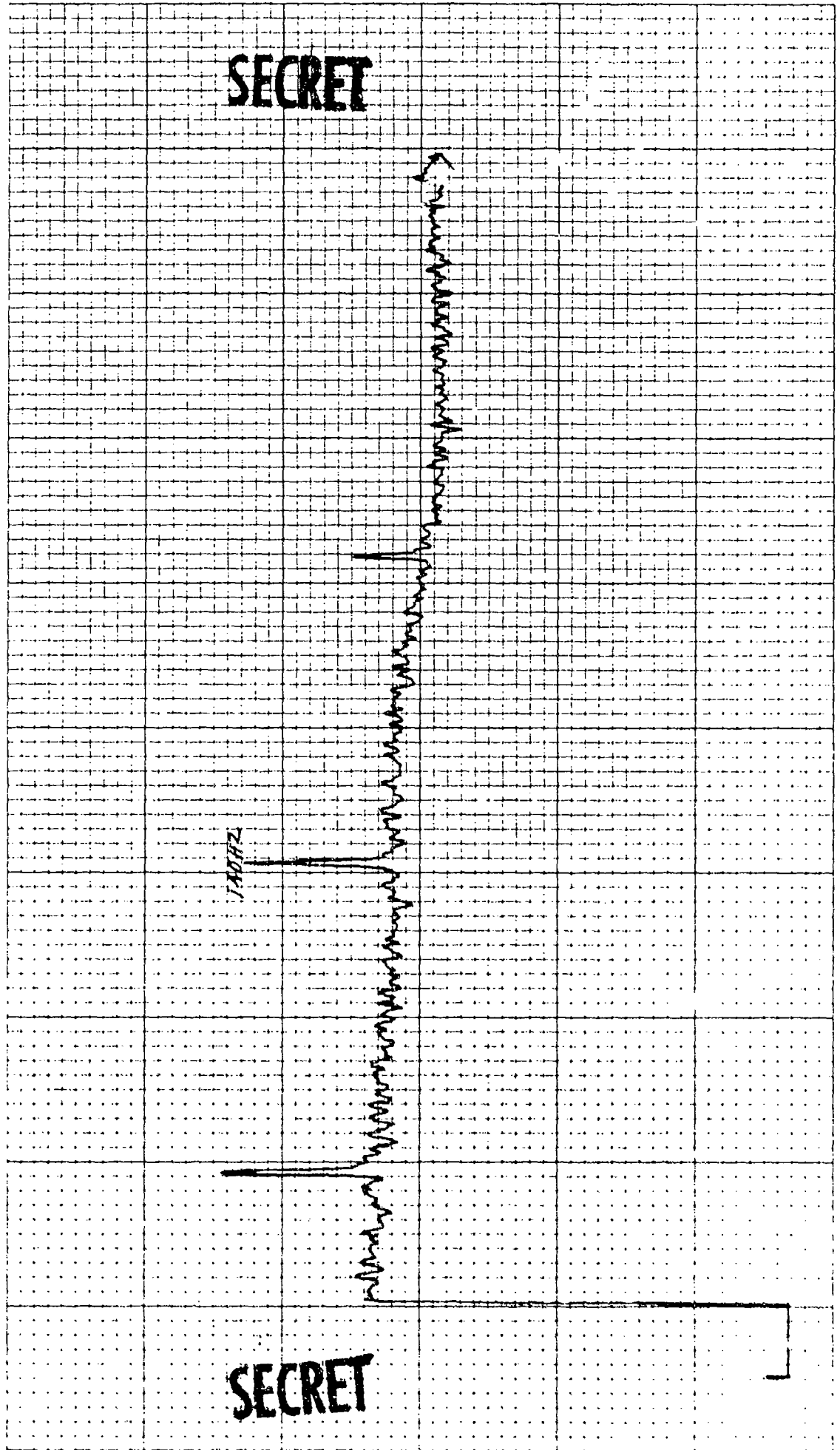
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: F/5

INDEX: 1955

INTEGRATION TIME 320 SECS
FILTER WTC: HANNING

ATTEN: DB



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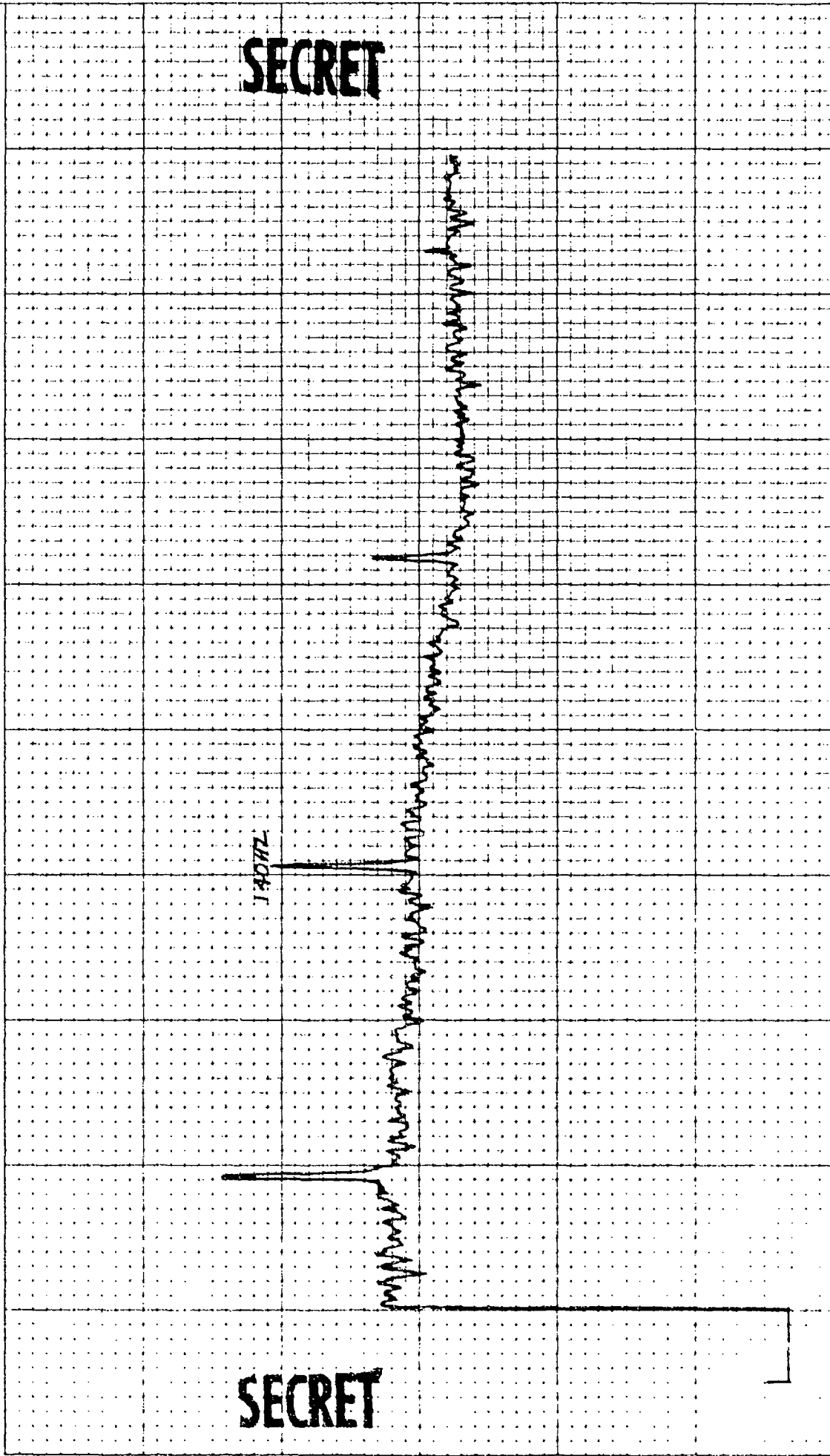
46 0703

KOE 1/2 INCH TO THE INCH
PAPER 4 ESSOR 25 1/2 INCHES

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

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

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



46 0703

REF ID: A61004

CONTROL: 2.7 -1019 (15)
OMNI SPECTRUM (ELEMENT 31)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

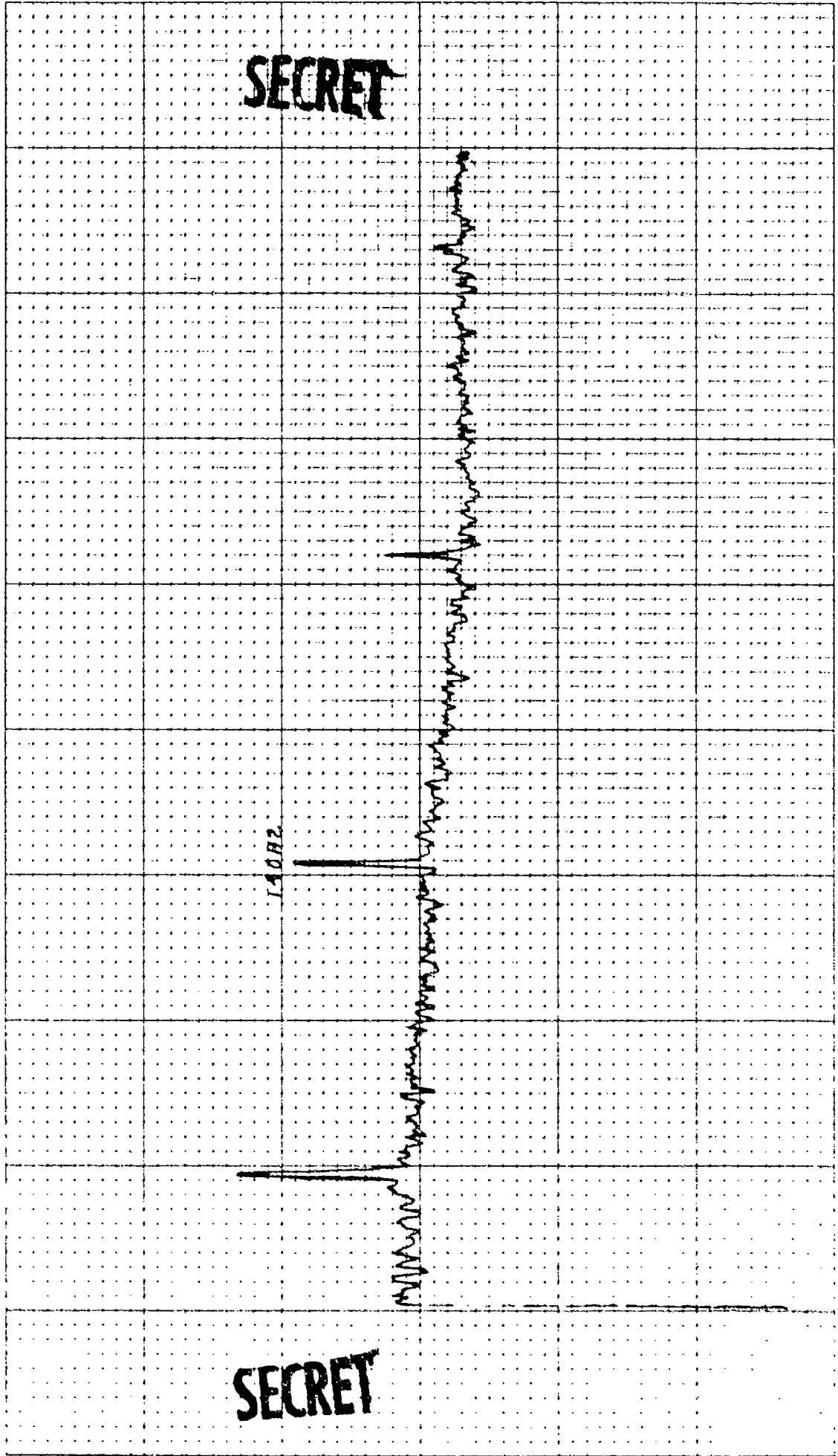
ANALYSIS BANDWIDTH: 1/10HZ
1 DEC AZ STEERING

REEL: F15

INDEX: 1855

INTEGRATION TIME 320 SECS
FILTER WTG: HANNING

ATTEN: DB



KOE 10 X 10 TO THE INCH
P. J. HESSER CO. MADE IN U.S.A.

46 0703

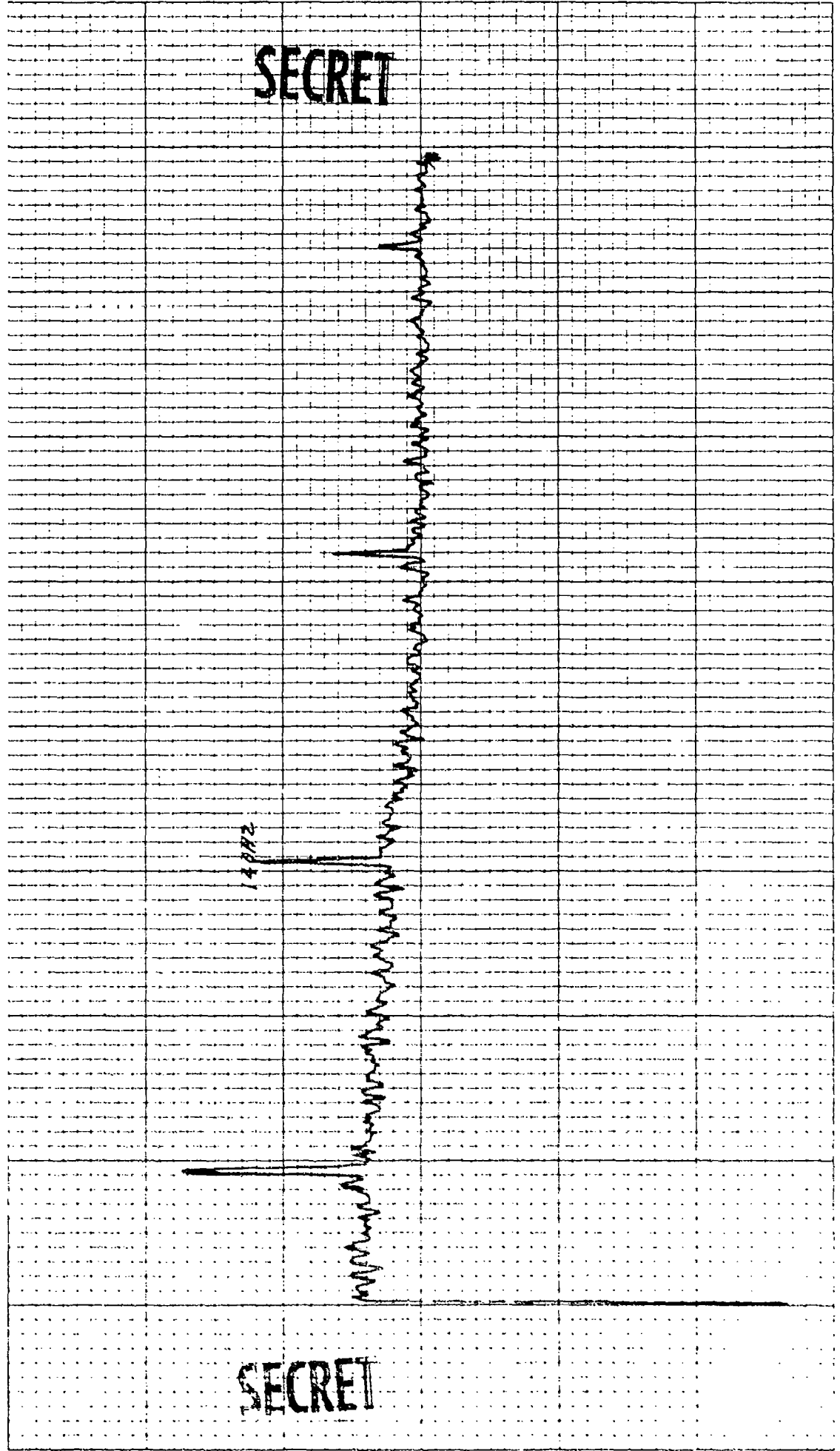
CONTROL: 2-7 - 1019 (16)
OMNI SPECTRUM (ELEMENT 33)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F/S INDEX 1015

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



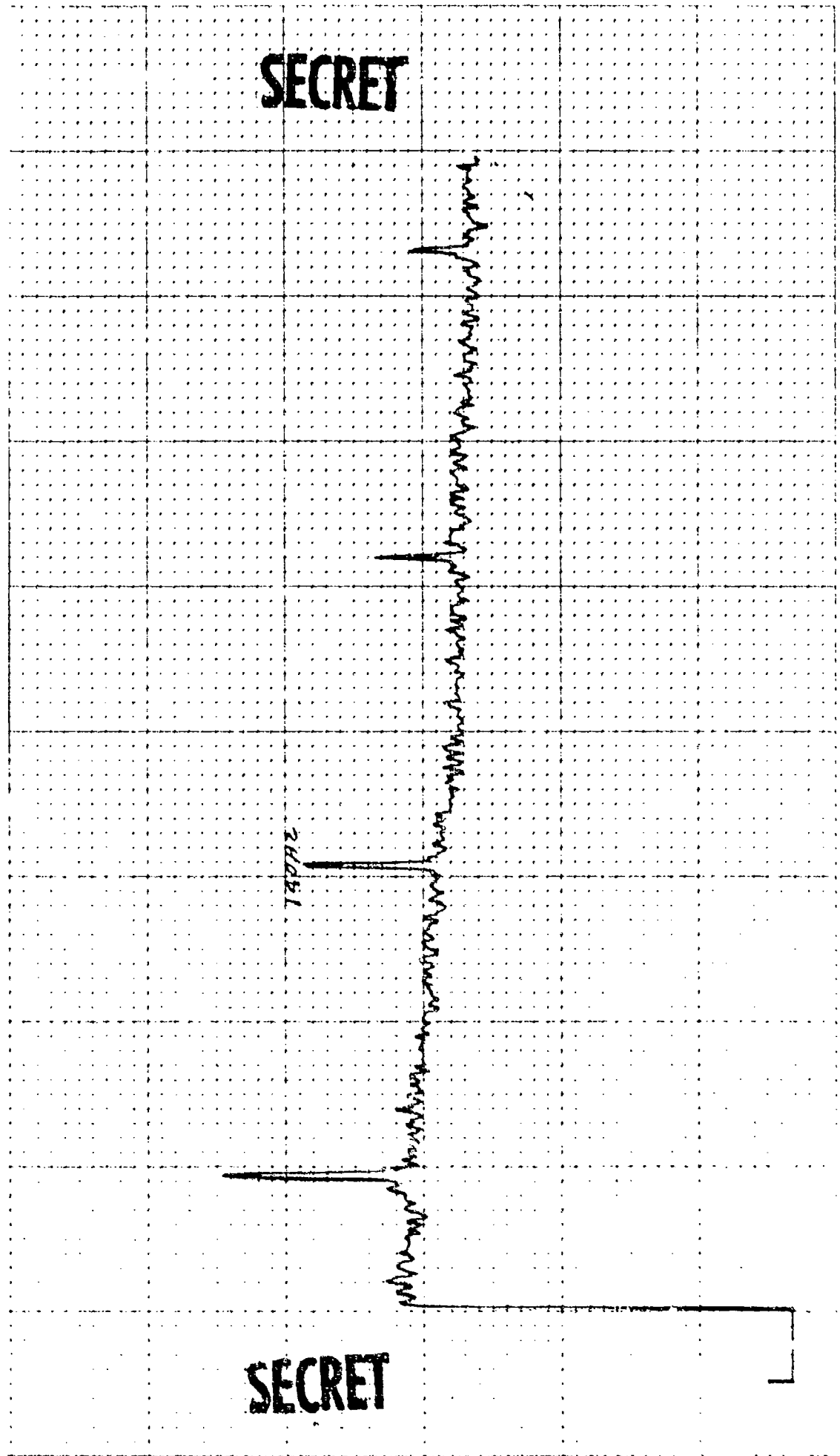
46 0703

McE 2400 2400 2400 2400

CONTROL: 2-7 - 1019 (17) DATE OF ANALYSIS: REEL: F/5 INDEX: 955
 OMNI SPECTRUM (ELEMENT 35)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 I ELEMENT

INTEGRATION TIME 320 SECS ATTEN: DB
 FILTER WTC: HANNING

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



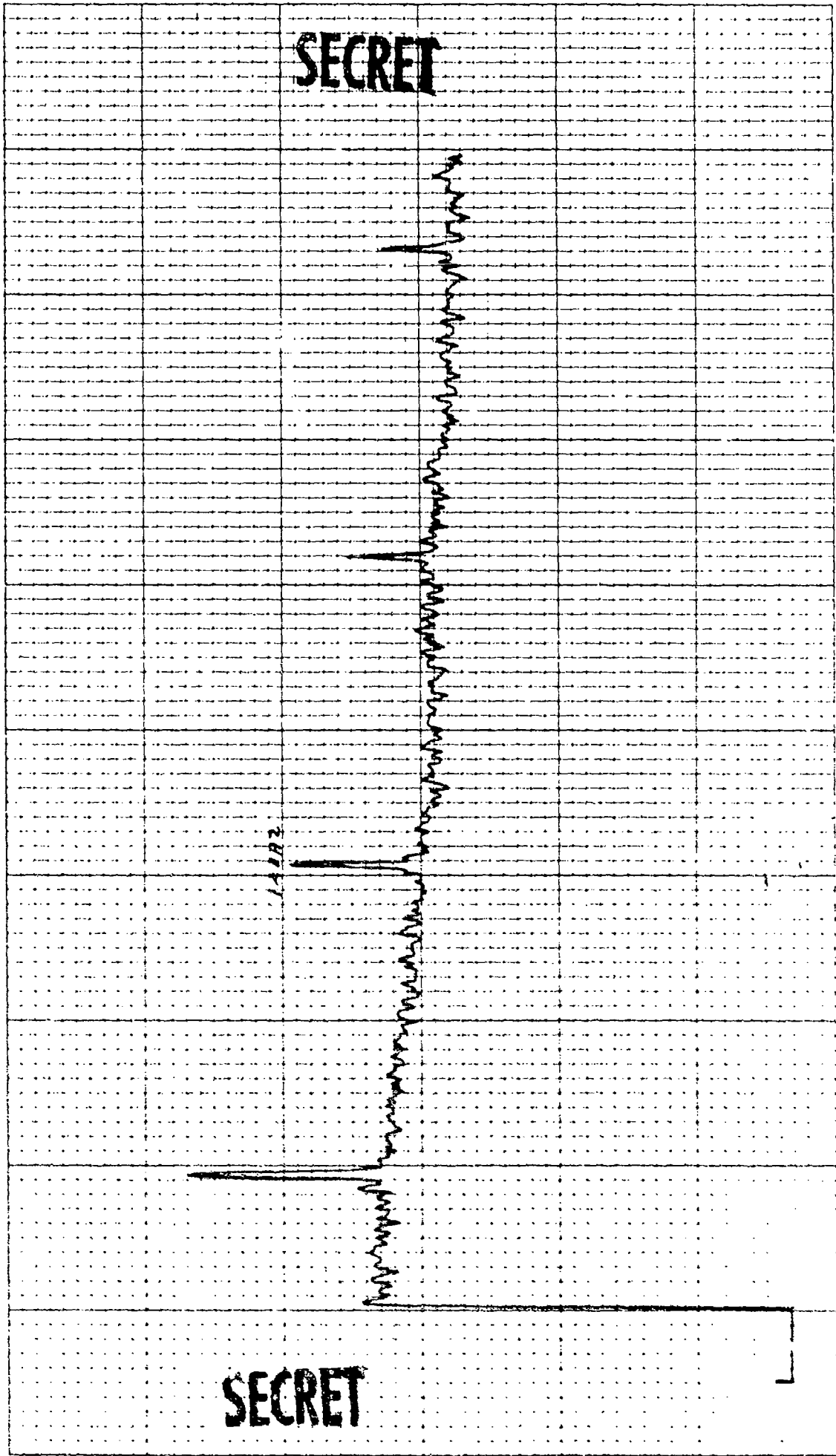
SECRET

SECRET

46 0703

REF: [Illegible]

CONTROL: 2-7 -1019 (18) DATE OF ANALYSIS: REEL: F15 INDEX 1953
 OMNI SPECTRUM (ELEMENT 37)
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 -1019 Z INTEGRATION TIME 320 SECS ATTEN: DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 I ELEMENT _____ DEC AZ STEERING



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MOE W. G. ...

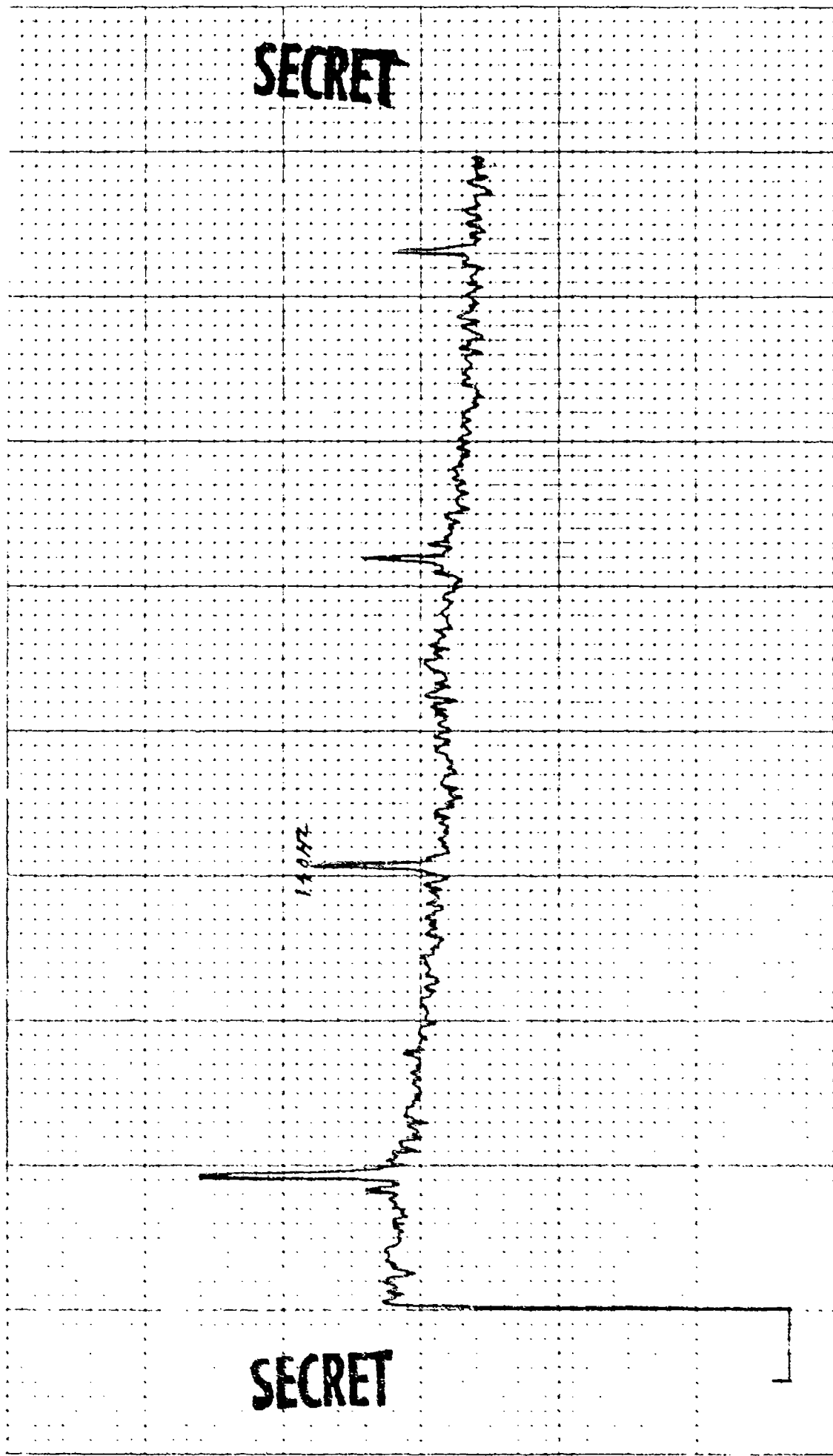
CONTROL: 2.7 - 1019 (19)
OMNI SPECTRUM (ELEMENT 39)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F/5 INDEY 1355

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



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K-E 46 0703 0703 0703 0703

REEL: E/S INDEX: 855

DATE OF ANALYSIS:

CONTROL: 2-7-1019 (20)

OMNI SPECTRUM (ELEMENT 41)

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

I ELEMENT

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

ANALYSIS BANDWIDTH: 1/10 HZ

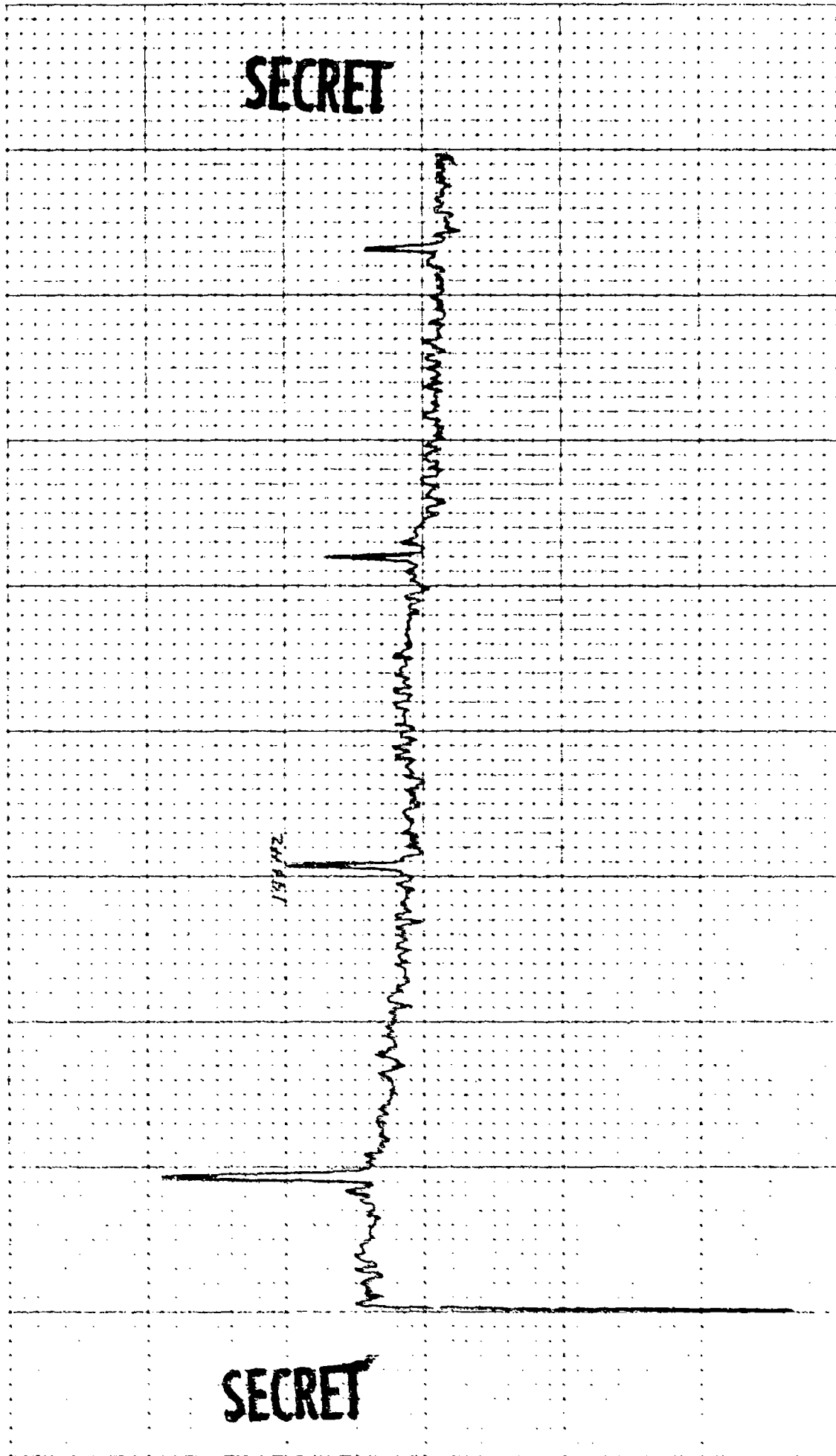
_____ DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

ATTEN: DB

WTC: HANNING



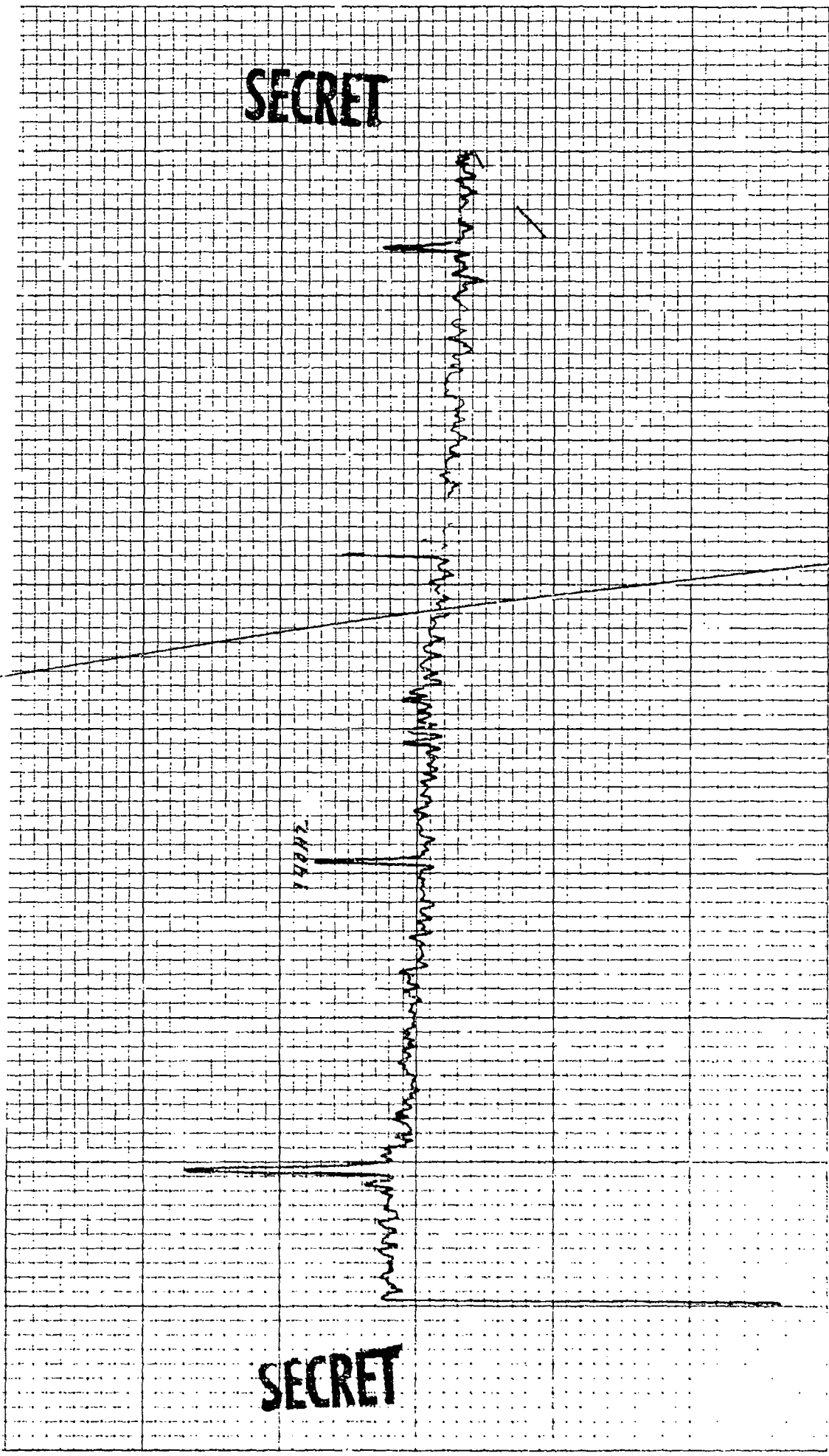
CONTROL: 2-9-1019 (24)
OMNI SPECTRUM (ELEMENT 43)
EXERCISE: BEARING STAKE
CENTER FREQ: 156 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F15 INDEX: 1955

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



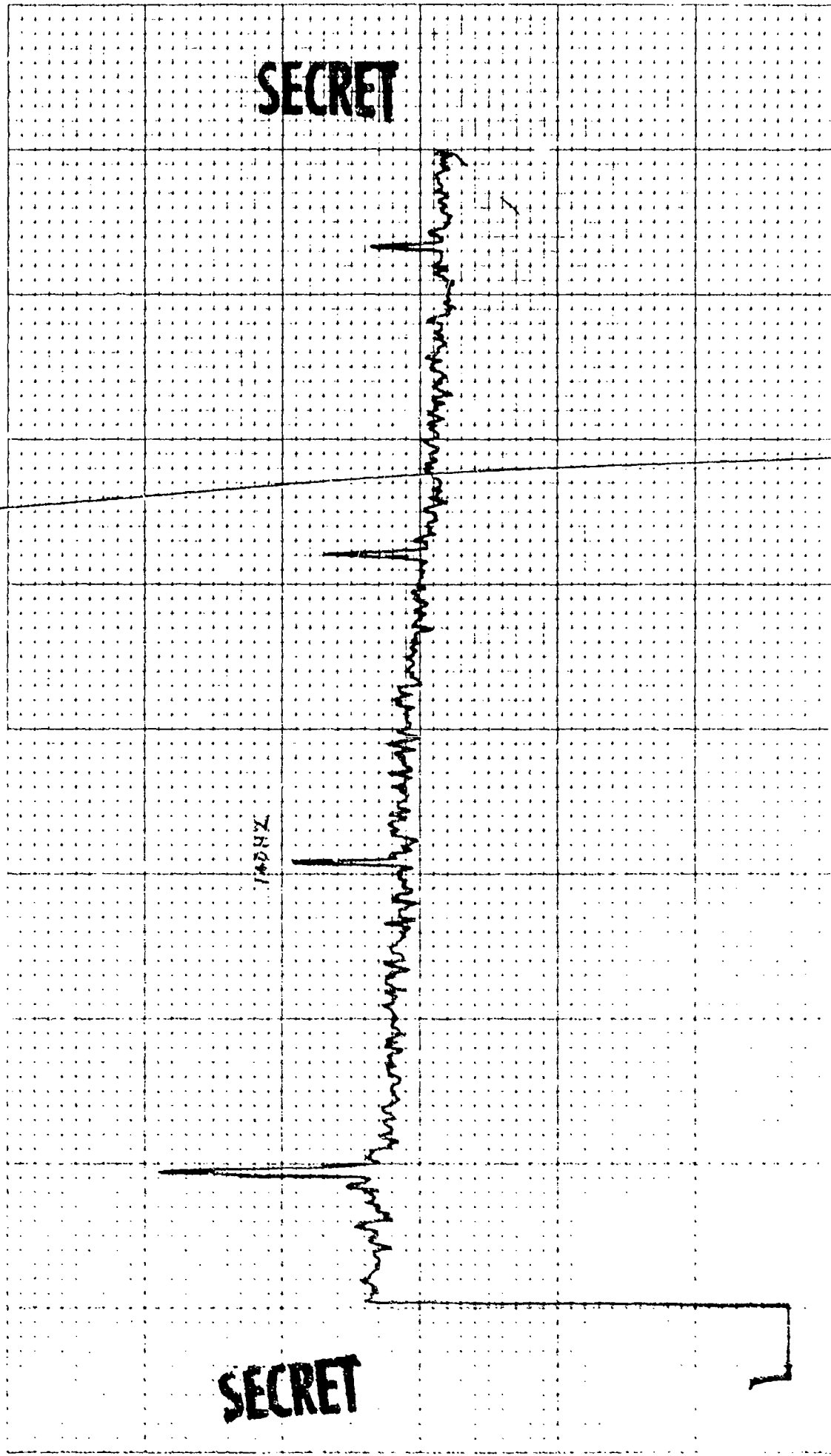
46 0703

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

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

REEL: F15
 INDEX 1955

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



45 0703

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

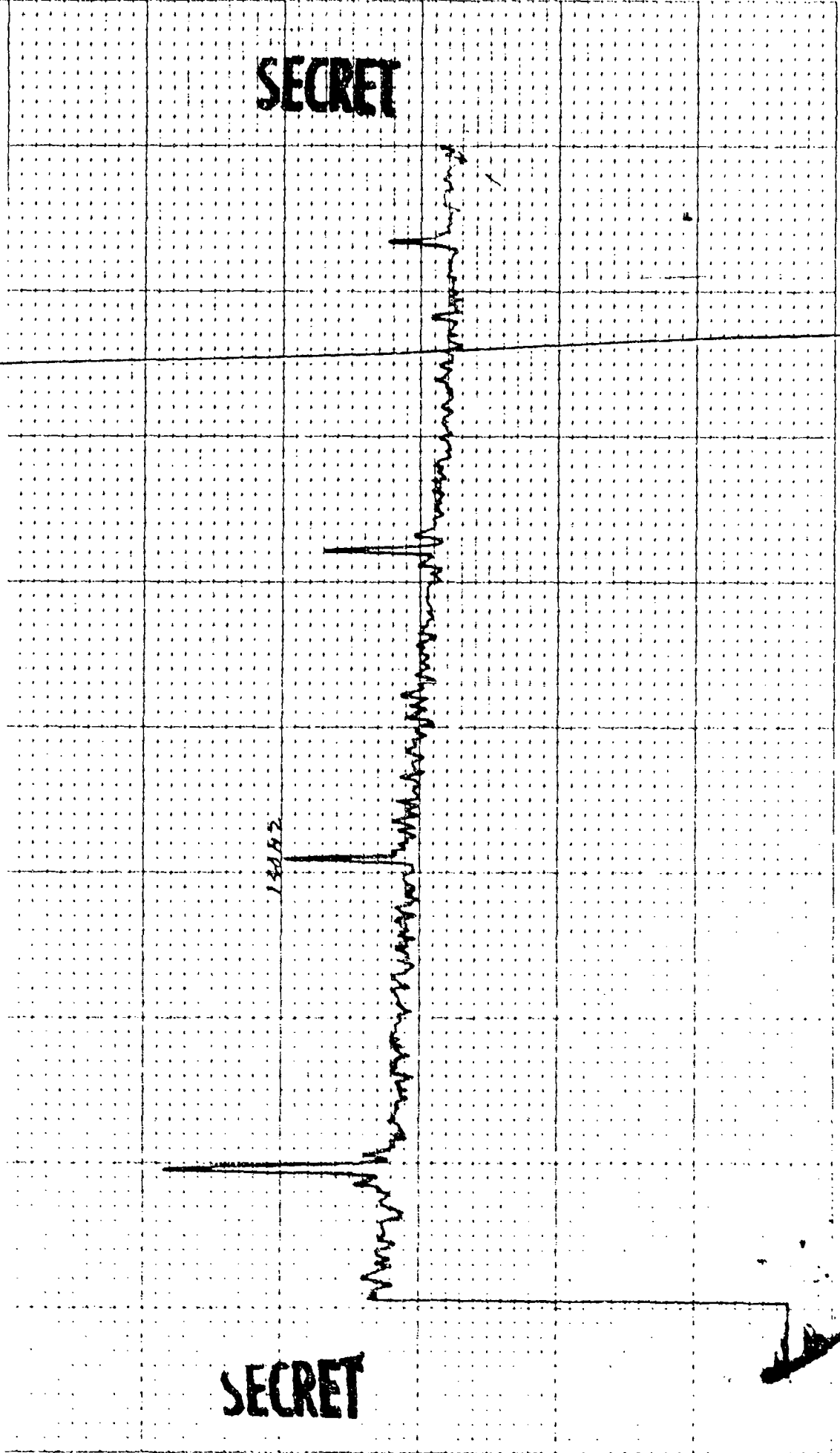
DATE OF ANALYSIS:

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

ANALYSIS BANDWIDTH: 1/10HZ
— DEC AZ STEERING

REEL: F15 INDEX: 855

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



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46 0703

46 0703

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

DATE OF ANALYSIS:

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

ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: F15

INDEX: 1955

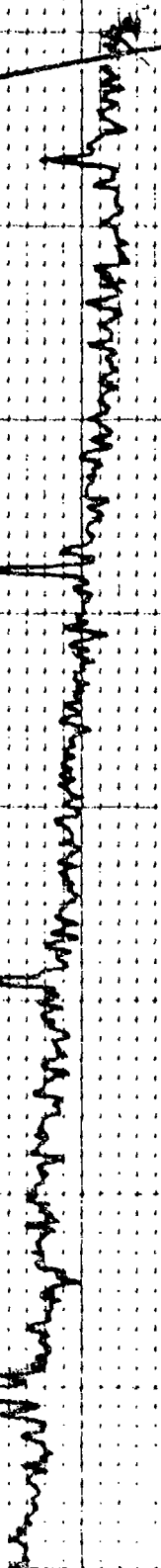
INTEGRATION TIME 320 SECS
FILTER

ATTEN: — DB
WTC: HANNING

SECRET

SECRET

2001



46 0703

NOTE: SEE TO THE RIGHT OF THIS PAGE FOR THE ANALYSIS

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

DATE OF ANALYSIS:

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

ANALYSIS BANDWIDTH: 1/10HZ
_____ DEG AZ STEERING

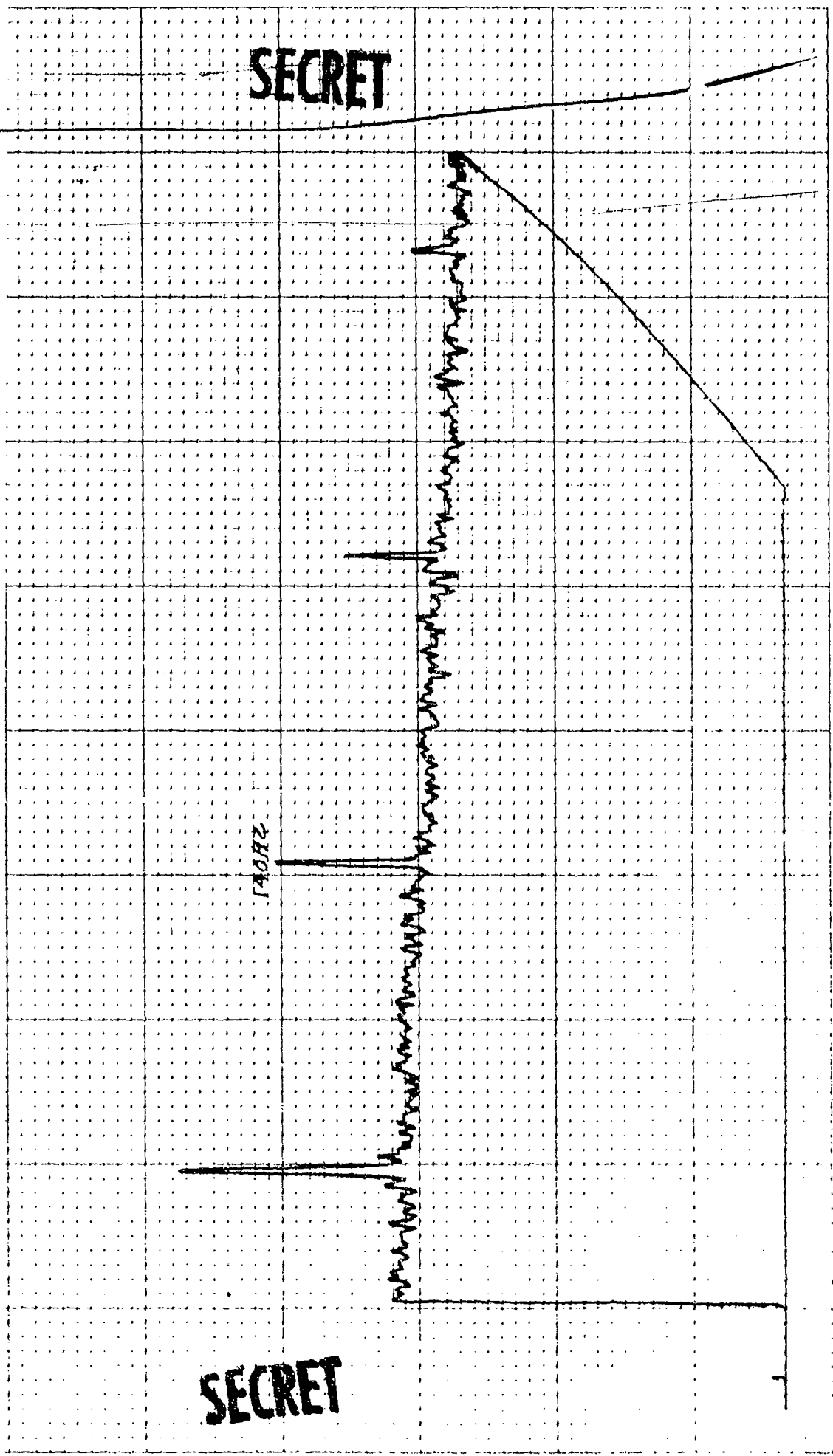
REEL: F15 INDEX: 1955

INTEGRATION TIME 320 SECS
FILTER WTG: HANNING

140RZ

SECRET

SECRET



46 0703

REF ID: A66670

INDEX: 85

REEL: F/5

DATE OF ANALYSIS:

CONTROL: 2-7 -1019 (26)

OMNI SPECTRUM (ELEMENT 53)

EXERCISE: BEARING STAKE

CENTER FREQ: 154 HZ

1 ELEMENT

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

ANALYSIS BANDWIDTH: 1/10 HZ

— DEG AZ STEERING

INTEGRATION TIME 320 SECS

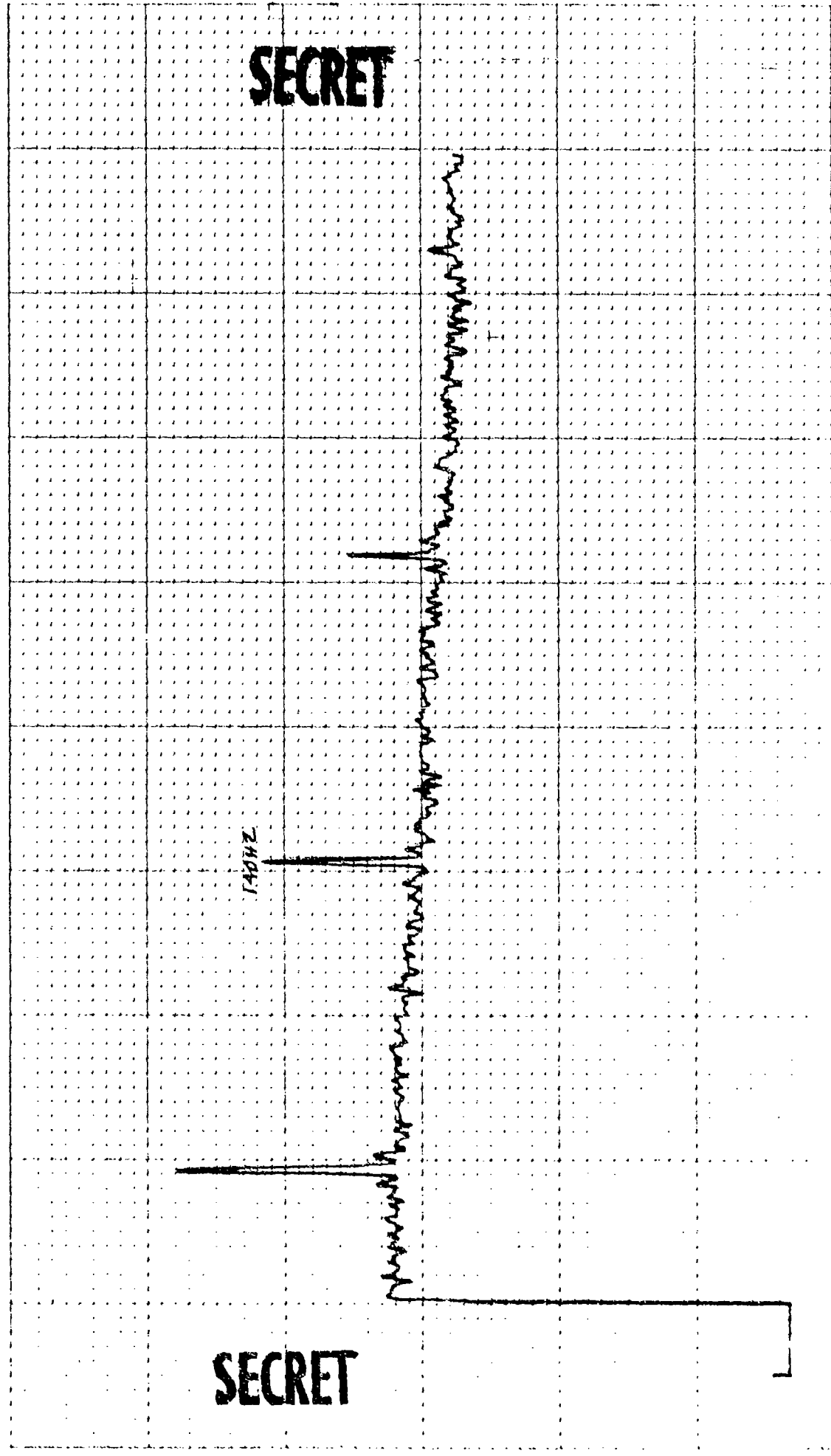
FILTER WTG: HANNING

ATTEN: — DB

SECRET

1400HZ

SECRET



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

46 0703

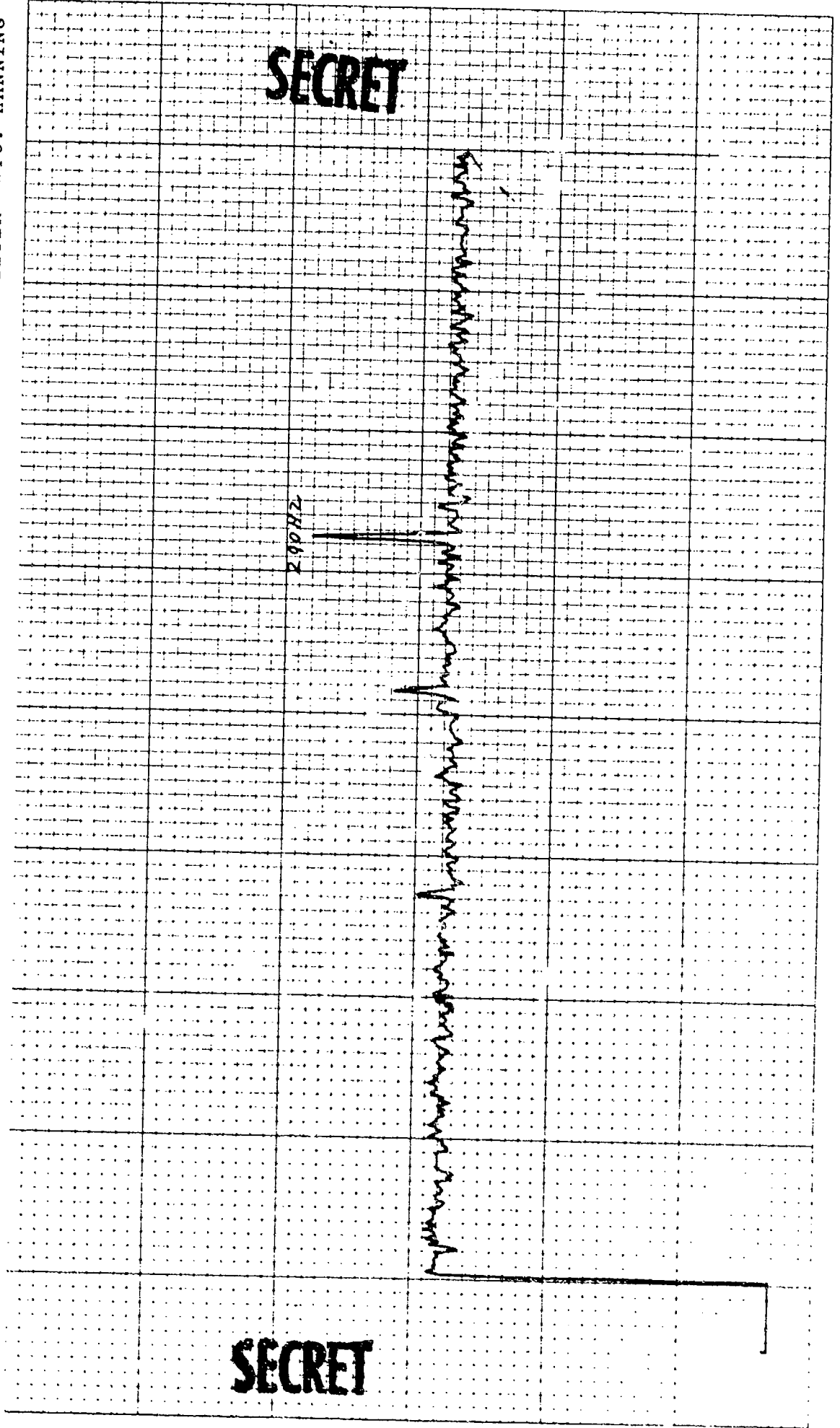
CONTROL: 2-7 - 1019 (27)
OMNI SPECTRUM (ELEMENT 2)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F15 INDEX/1957

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



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46 0703

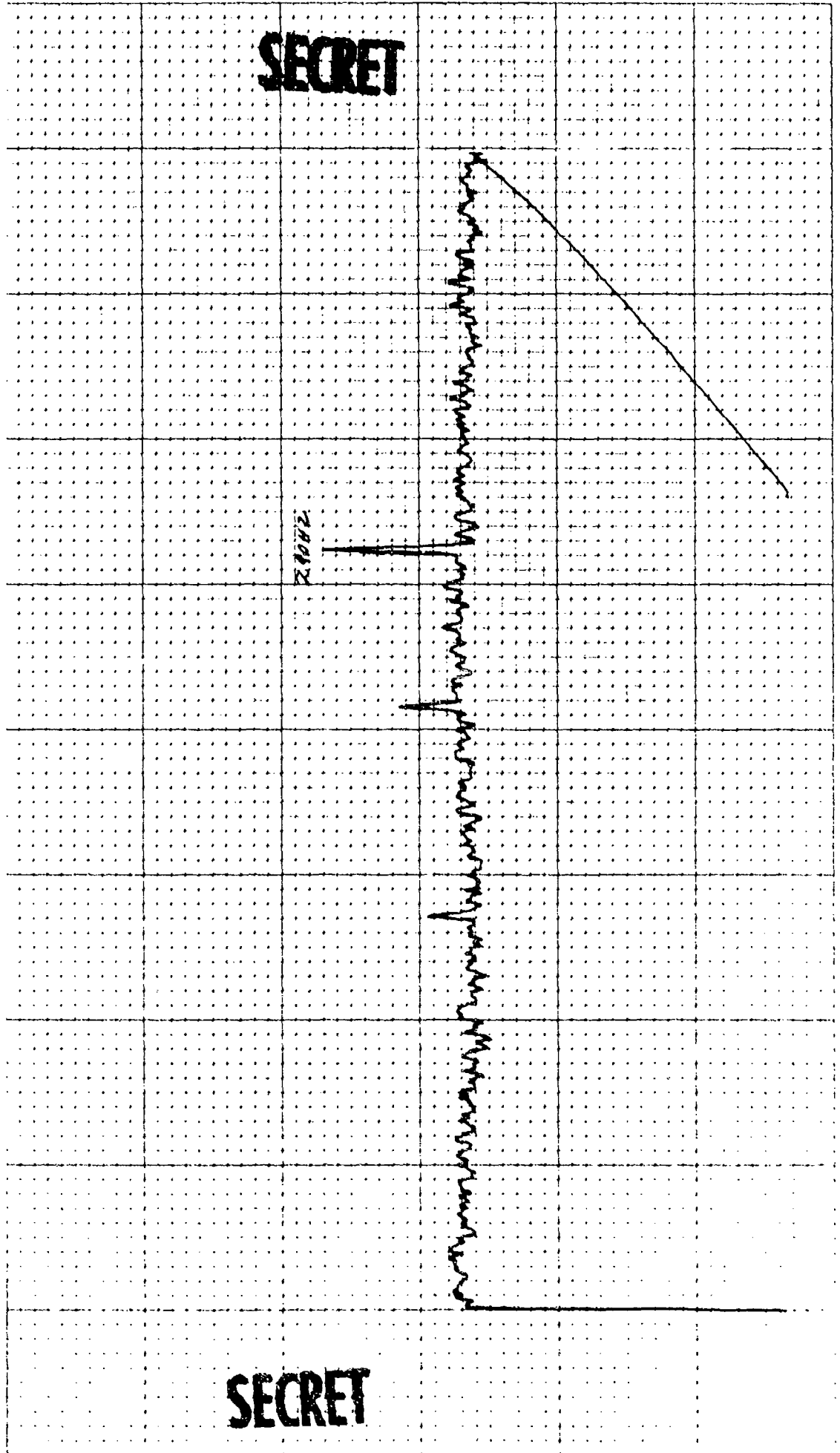
CONTROL: 2.7 - 1019 (20)
OMNI SPECTRUM (ELEMENT 4)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F15 INDEX 1955

INTEGRATION TIME 320 SECS
FILTER
ATTEN: DB
WTG: HANNING



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46 0703

KOE 27 APR 1955 8:24 AM

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

DATE OF ANALYSIS:

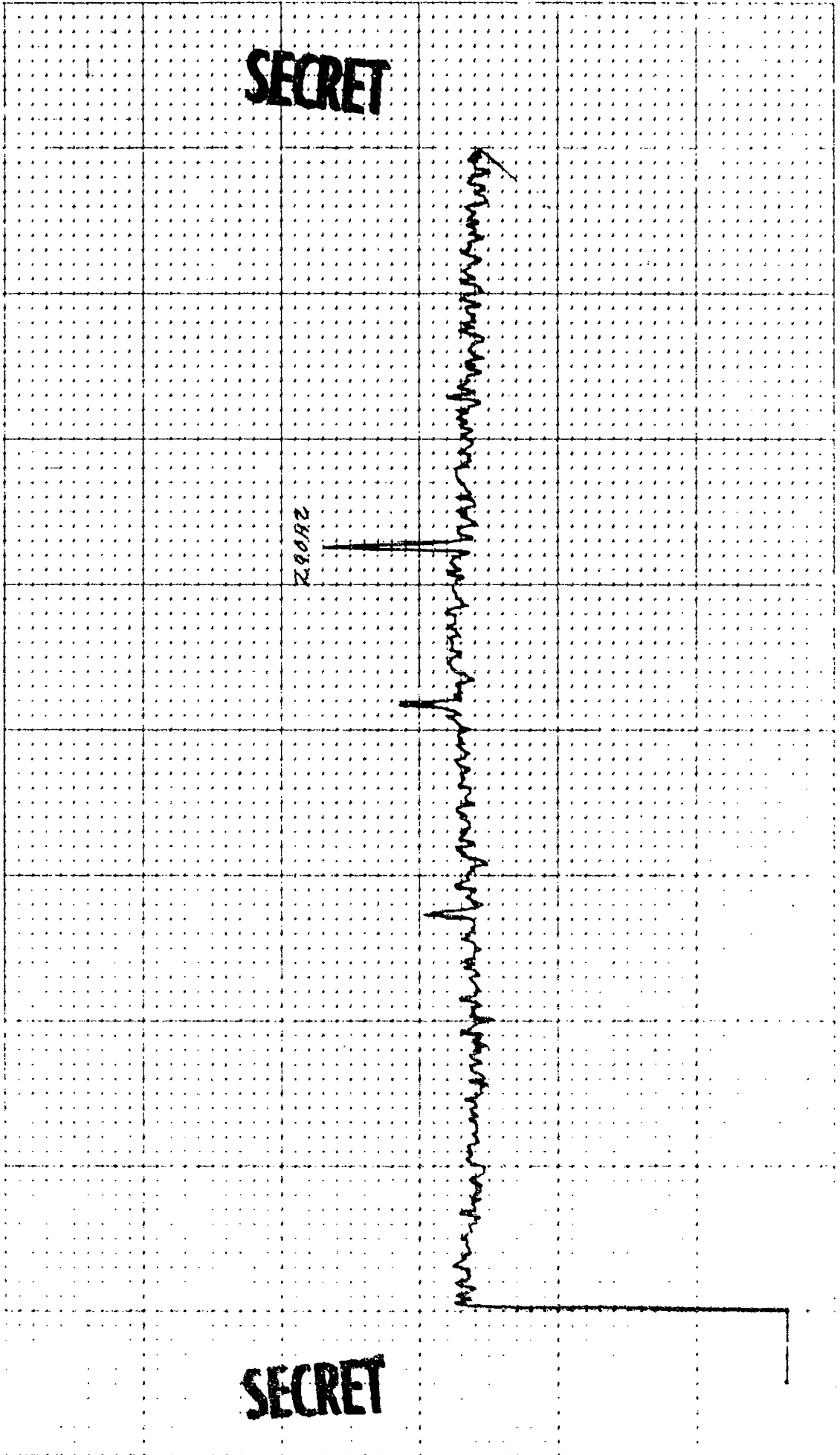
DATE/TIME: 2-7-77 - 1019 Z

ANALYSIS BANDWIDTH: 1/10HZ
_____ DEG AZ STEERING

REEL: F/S

INDEX: 1855

INTEGRATION TIME 320 SECS
FILTER WTC: HANNING



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

46 0703

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

DATE OF ANALYSIS:

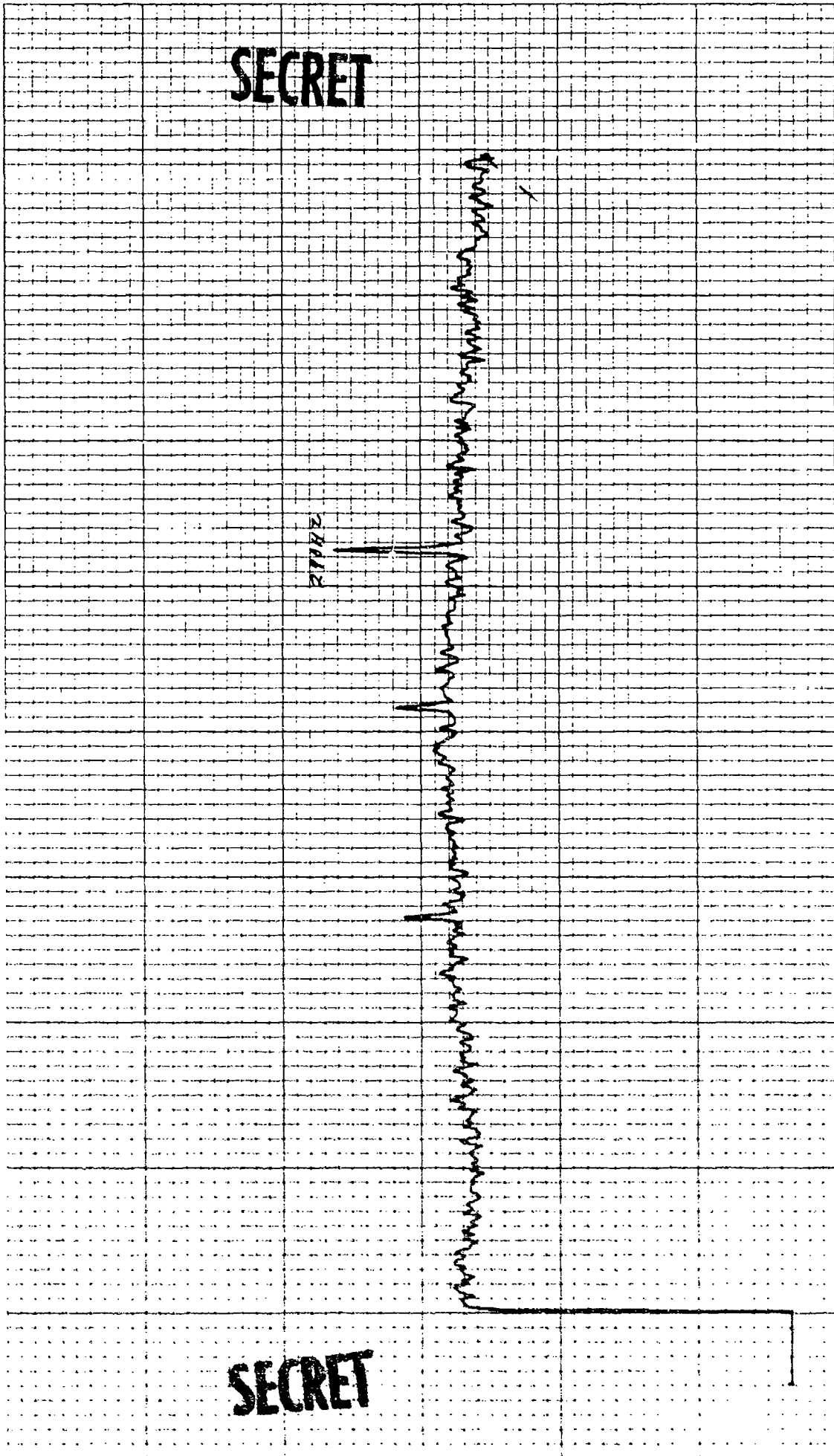
DATE/TIME: 2-7-77 - 1019 Z

ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F/5

INDEX: J437

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



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

46 0703

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

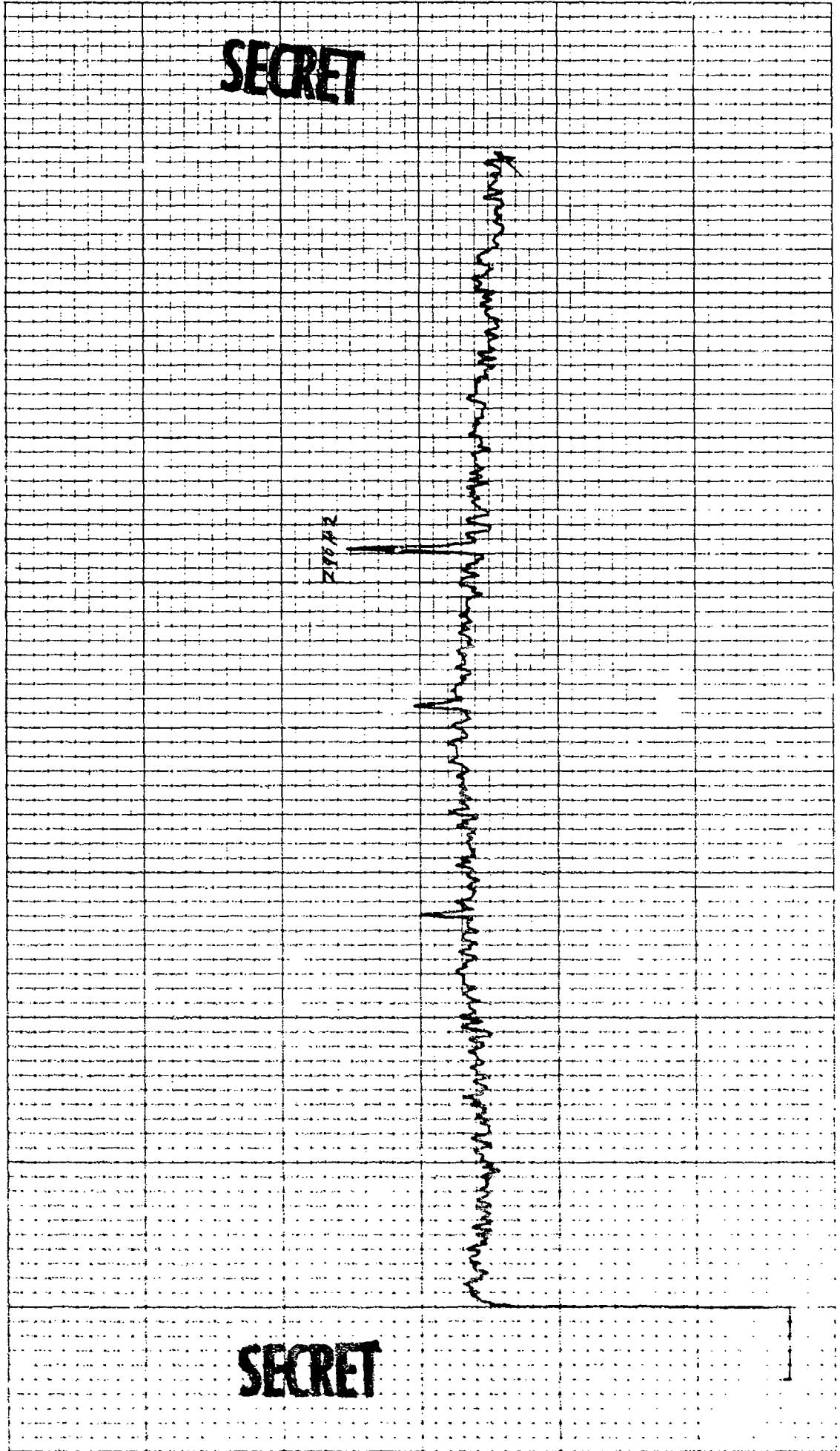
DATE OF ANALYSIS:

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

REEL: F/S

INDEX: 1955

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER
WTG: HANNING



46 0703

KOE 19 X 19 TO THE INCH • 2 1/2 INCHES
REDFIELD & LINDSEY CO. BOSTON, MASS.

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

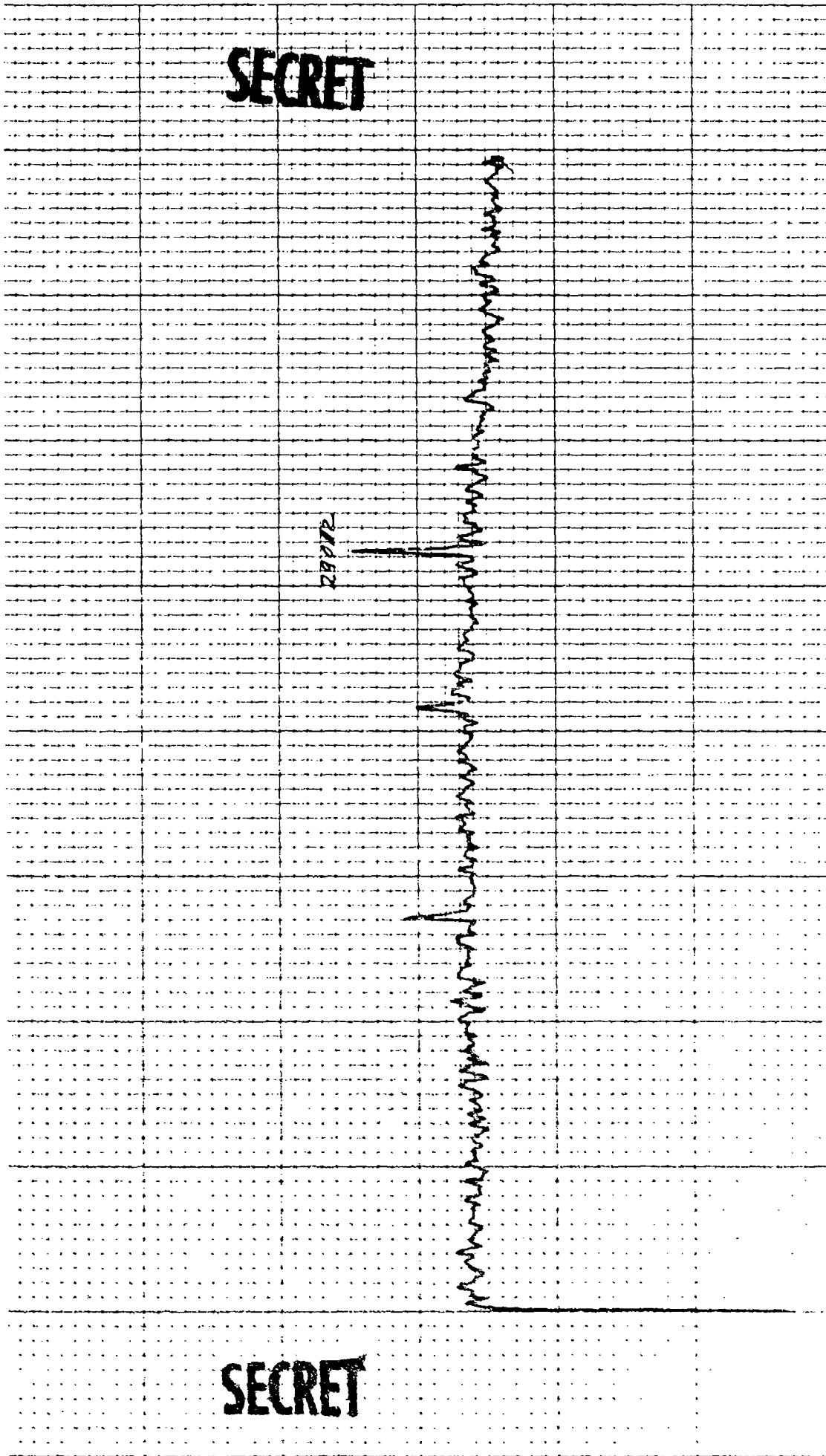
DATE OF ANALYSIS:

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

REEL: F15

INTEGRATION TIME 320 SECS
FILTER
ATTEN: DB
WTC: HANNING

INDEX 1955



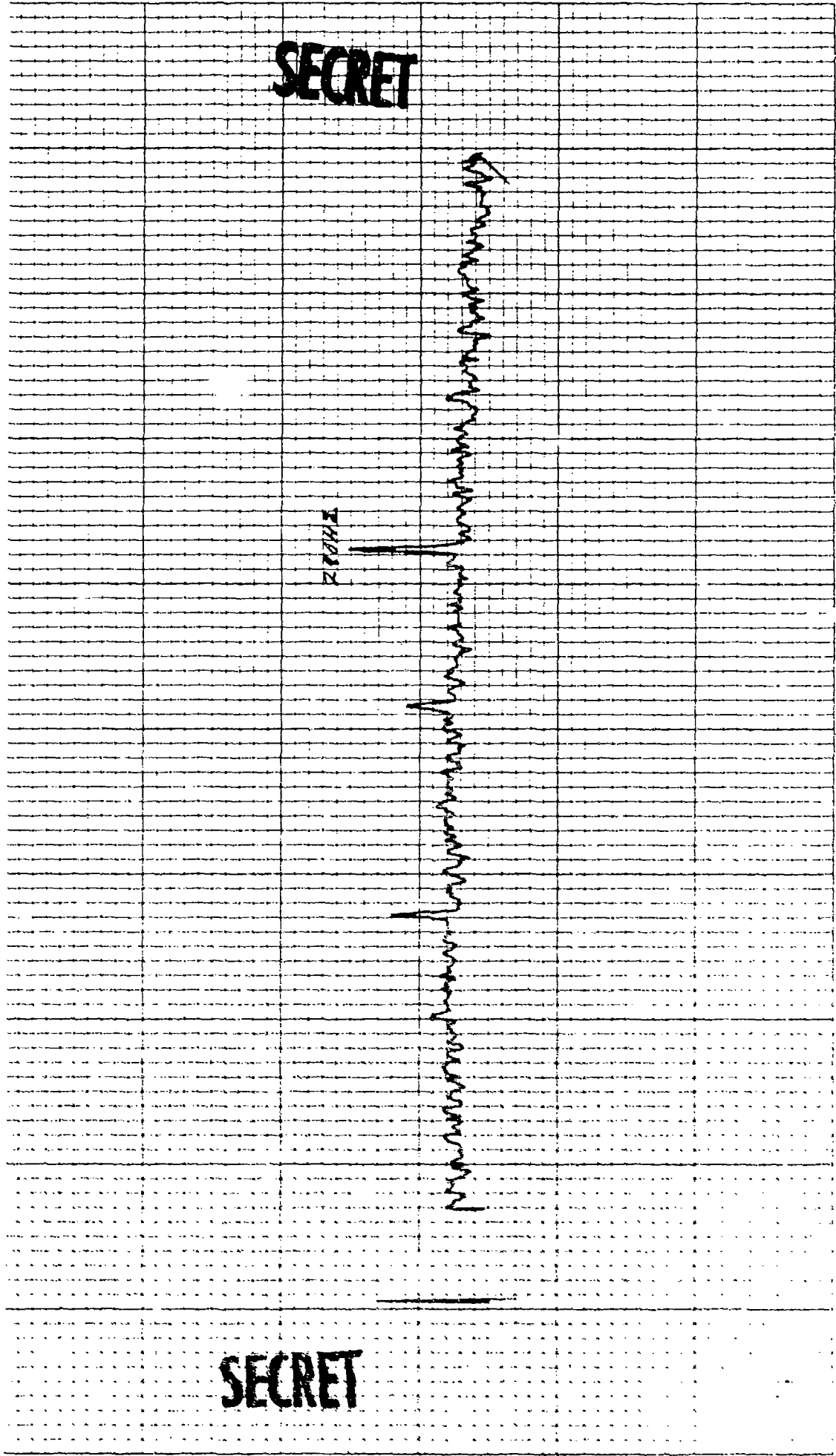
CONTROL: 2.7 - 1019 (33)
OMNI SPECTRUM (ELEMENT 14)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: FAS INDEX/955

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



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MOZ 5412 1019 (JY) 16

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

DATE OF ANALYSIS:

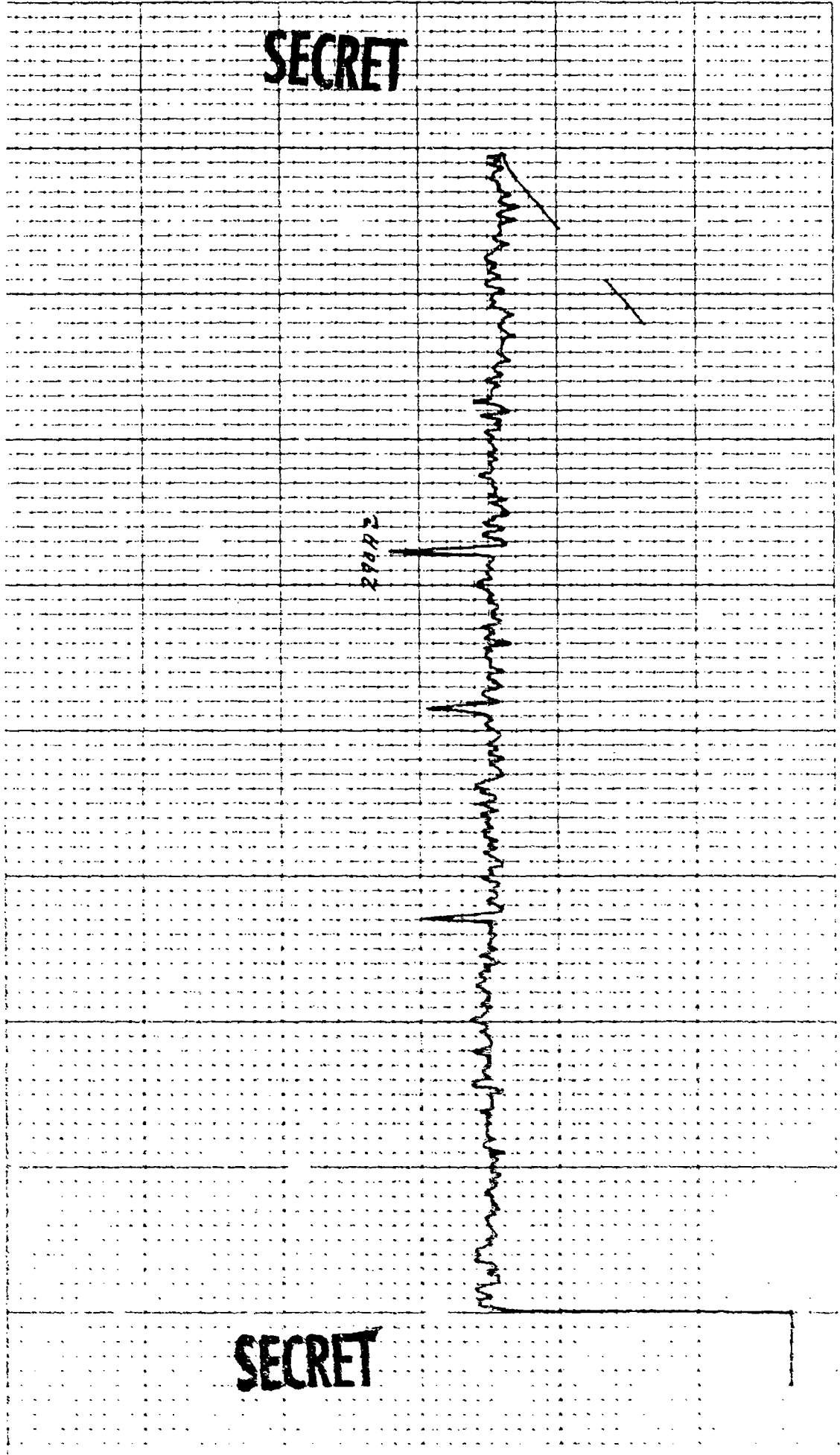
DATE/TIME: 2-7-77 - 1019 Z

ANALYSIS BANDWIDTH: 1/10 HZ
DEG AZ STEERING

REEL: F/S

INDEX: 955

INTEGRATION TIME 320 SECS
FILTER
ATTN: DB
WTC: HANNING



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45 0703

REEL: F/5 INDEX: 955

DATE OF ANALYSIS:

CONTROL: 2-7 -1019 (35)

OMNI SPECTRUM/ELEMENT 19

EXERCISE: BEARING STAKE

CENTER FREQ: 280 HZ

1 ELEMENT

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

ANALYSIS BANDWIDTH: 1/10 HZ

 DEC AZ SLEEPING

INTEGRATION TIME 320 SECS AIIEN: DB
FILTER WIG: HANNING

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28003

[Handwritten scribbles and illegible text]

45 0703

REF ID: A66888

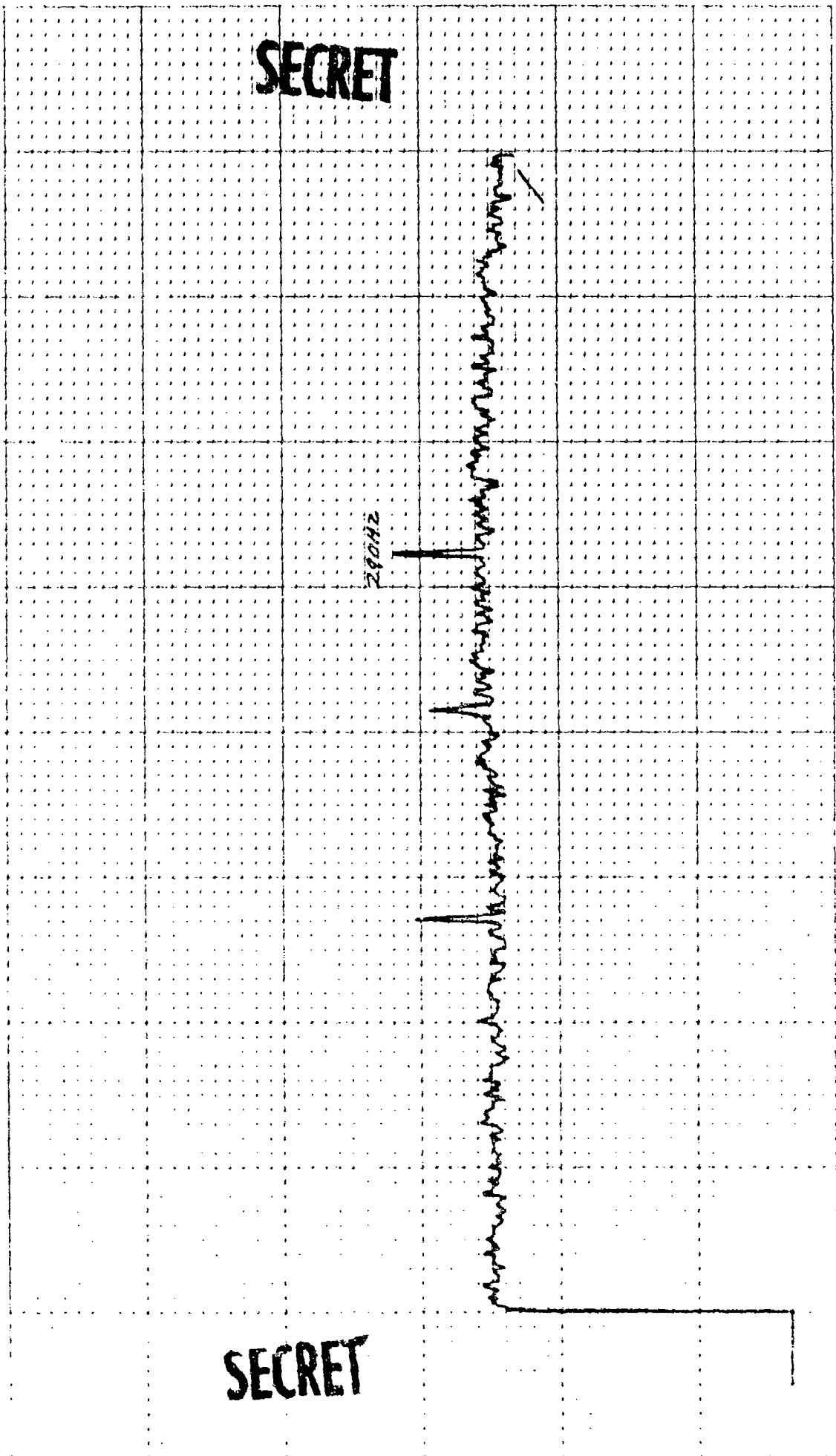
REEL: F-5 INDEX: 1855

DATE OF ANALYSIS:

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

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

INTEGRATION TIME 320 SECS
FILTER
ATTN: DB
WTG: HANNING



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KOE 10 X 10 TO THE INCHES 4 10 PICHES
HEIFERL & ESSER CO. MADE IN U.S.A.

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INDEX / 955

REEL: F/5

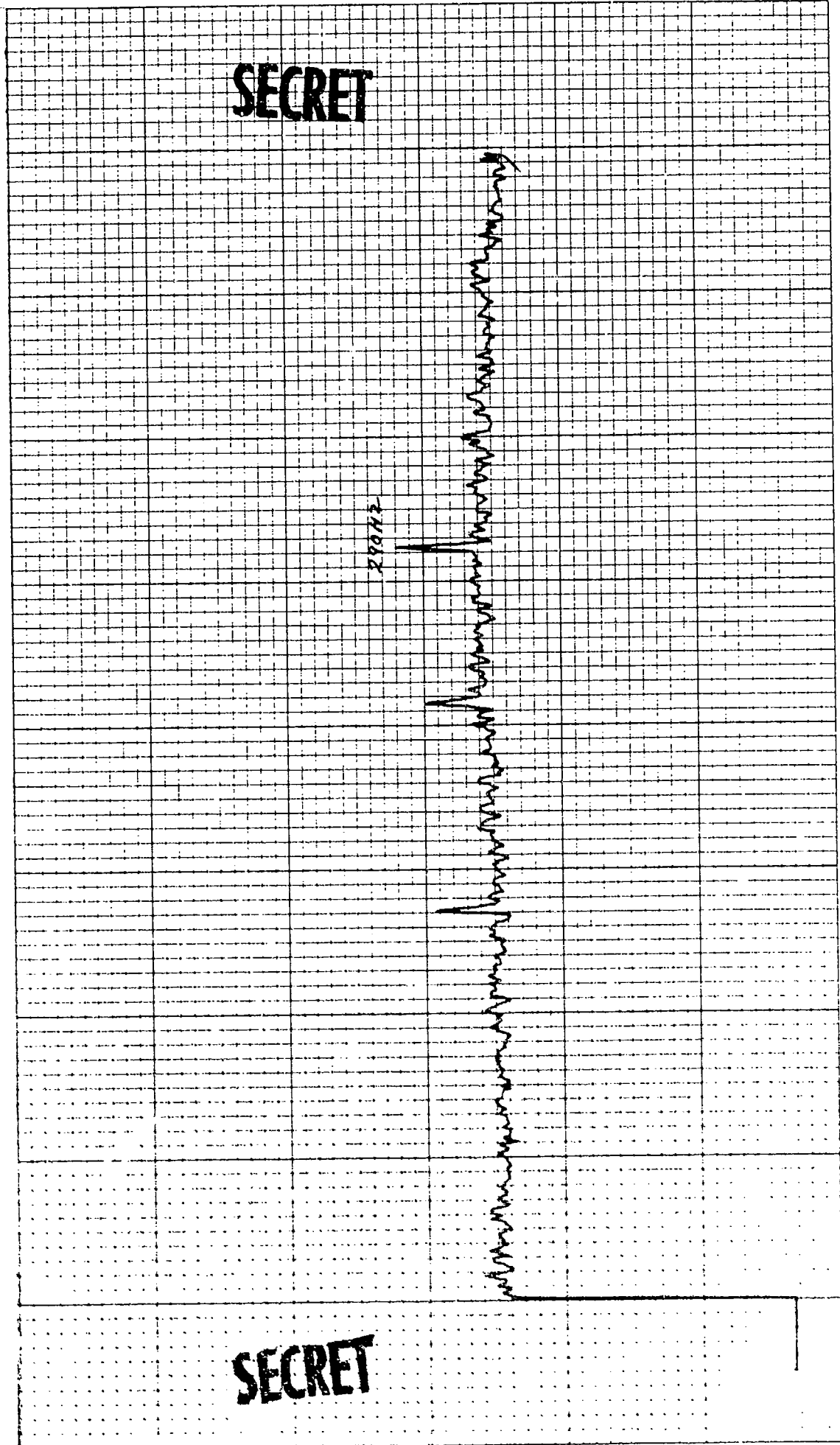
DATE OF ANALYSIS:

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

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

ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER WTG: HANNING



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

46 0703

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

DATE OF ANALYSIS:

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

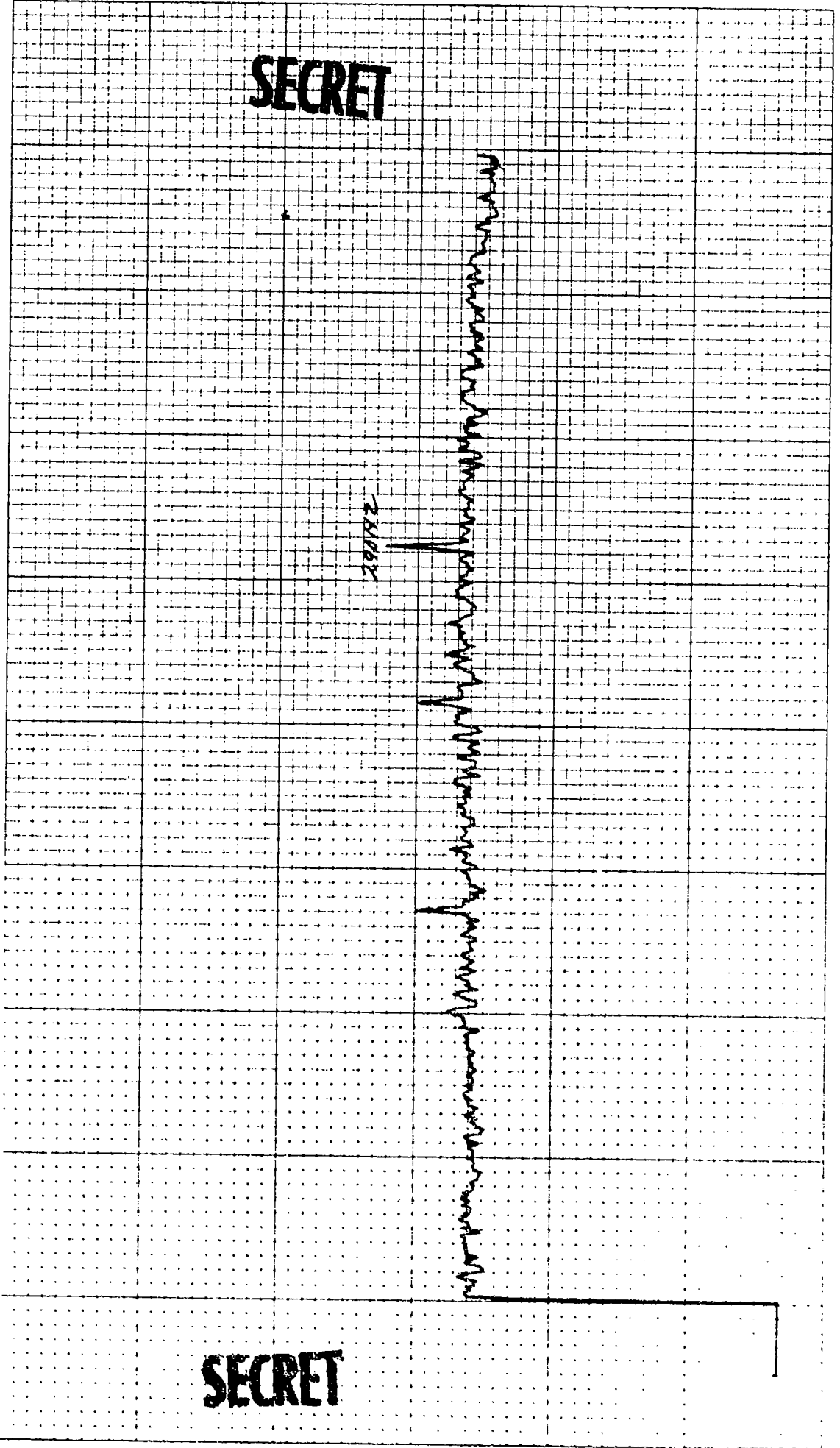
ANALYSIS BANDWIDTH: 1/10HZ
_____ DEG AZ STEERING

REEL: F/5

INDEX: 1955

INTEGRATION TIME 320 SECS
FILTER WTC: HANNING

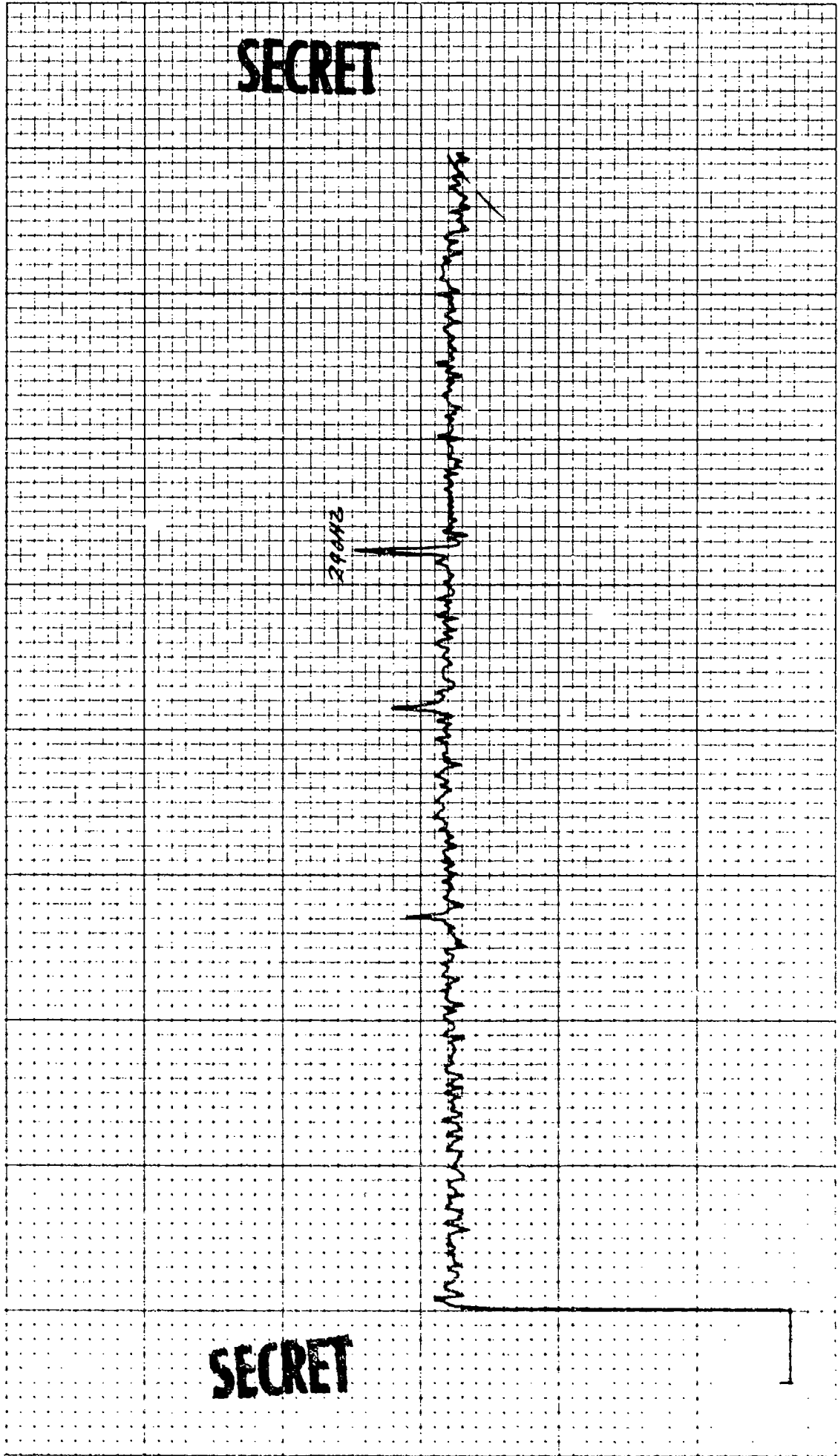
ATTEN: DB



KOE 1/2 IN TO THE INCH
WEL-FEEL & TESTER CO. WASH. D.C.

46 0703

CONTROL: 2-7 -1019 (39) DATE OF ANALYSIS: REEL: F/S INDEX 1955
OMNI SPECTRUM (ELEMENT 26)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: DB
1 ELEMENT ——— DEG AZ STEERING FILTER WTC: HANNING



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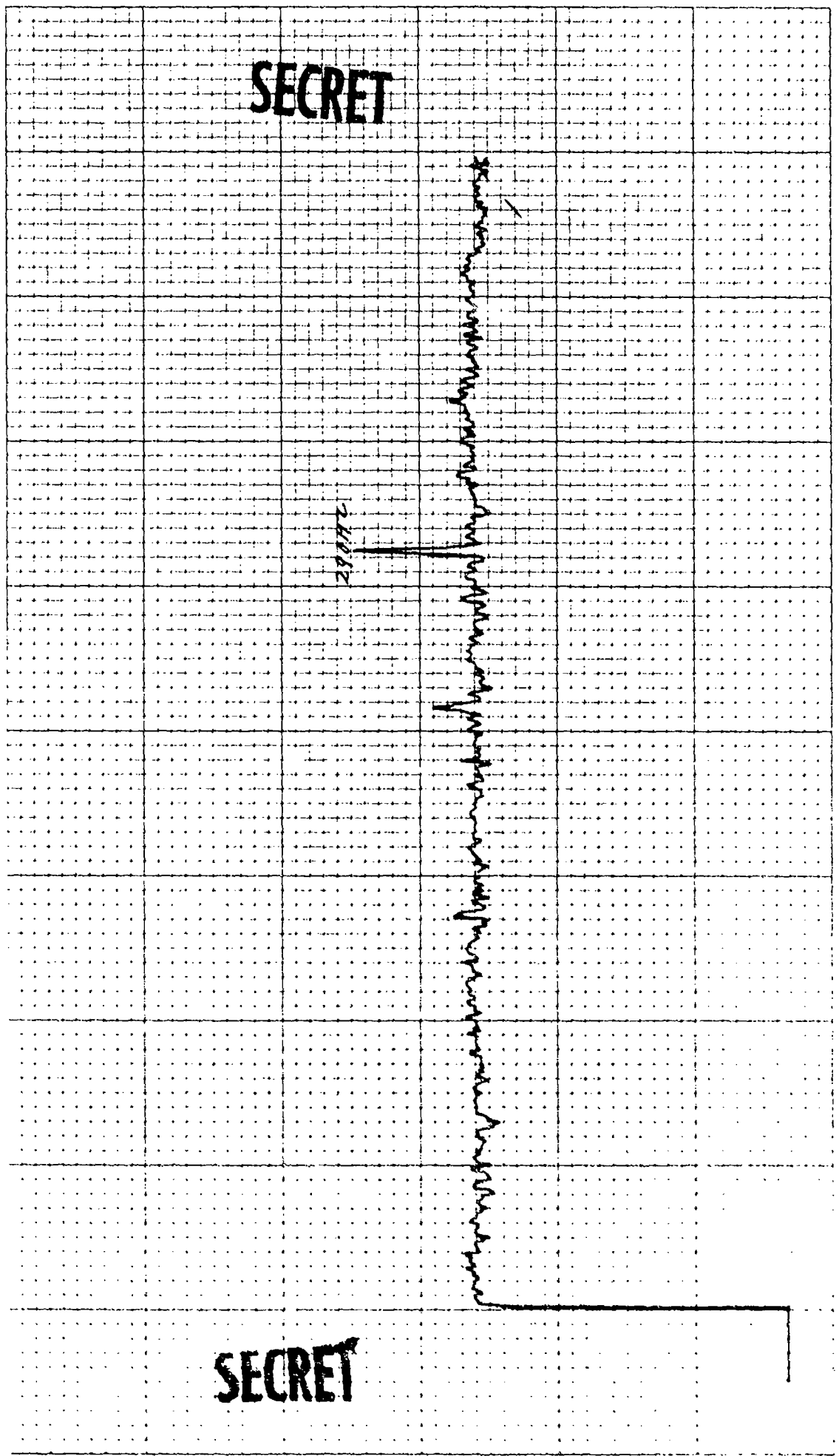
46 0703

K-Σ 12.16 TO TIME 12.14.00
REUTEL 085848 00 0000 0000

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

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

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



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

46 0703

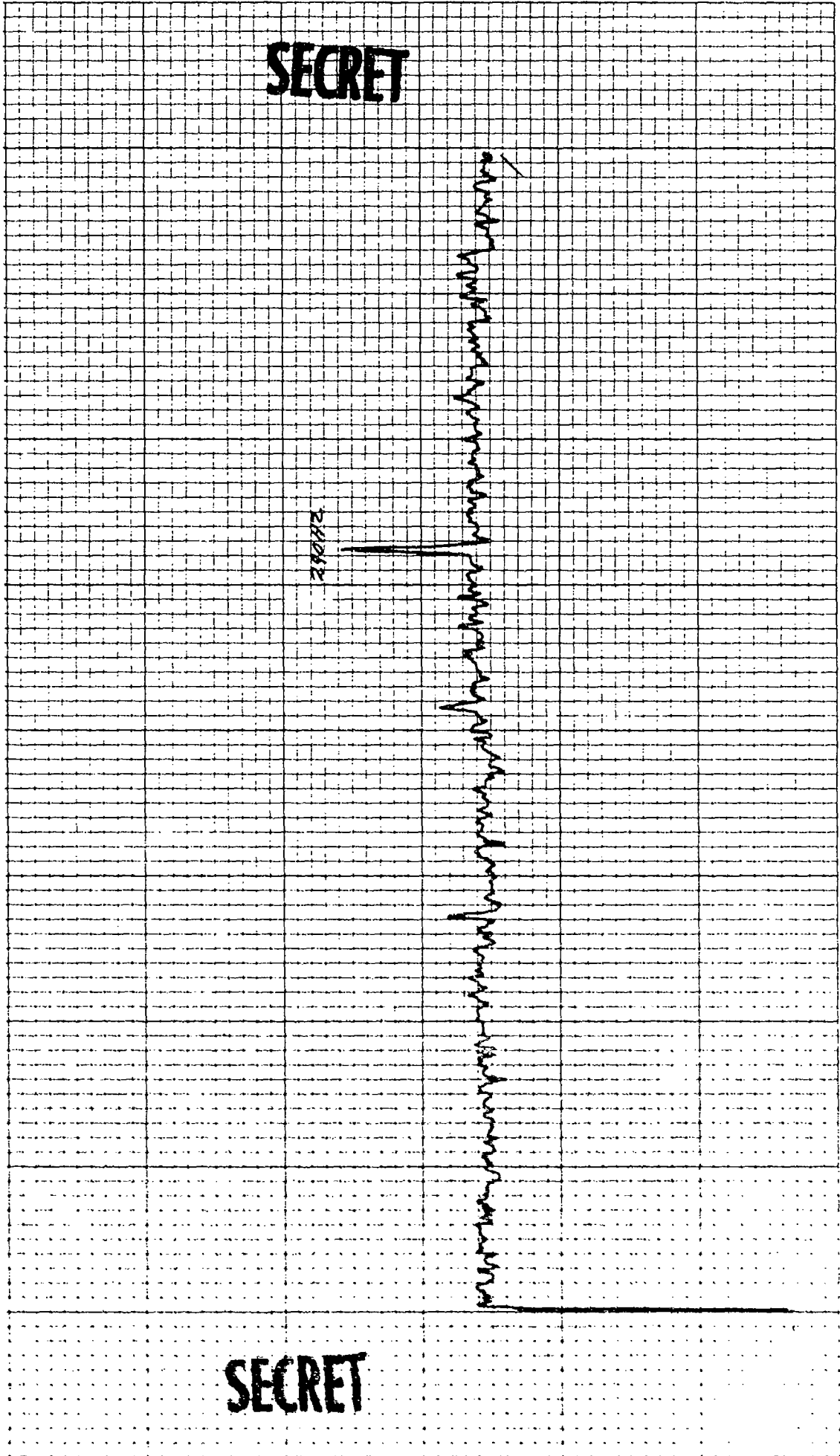
CONTROL: 2-7 - 1019 (41)
OMNI SPECTRUM (ELEMENT 31)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F45 INDEX 1055

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER WTG: HANNING



KOE 10 X 10 TO THE INCH. 7 1/2 X 10 INCHES
PERUPEL & FESSER CO. MADE IN U.S.A.

46 0703

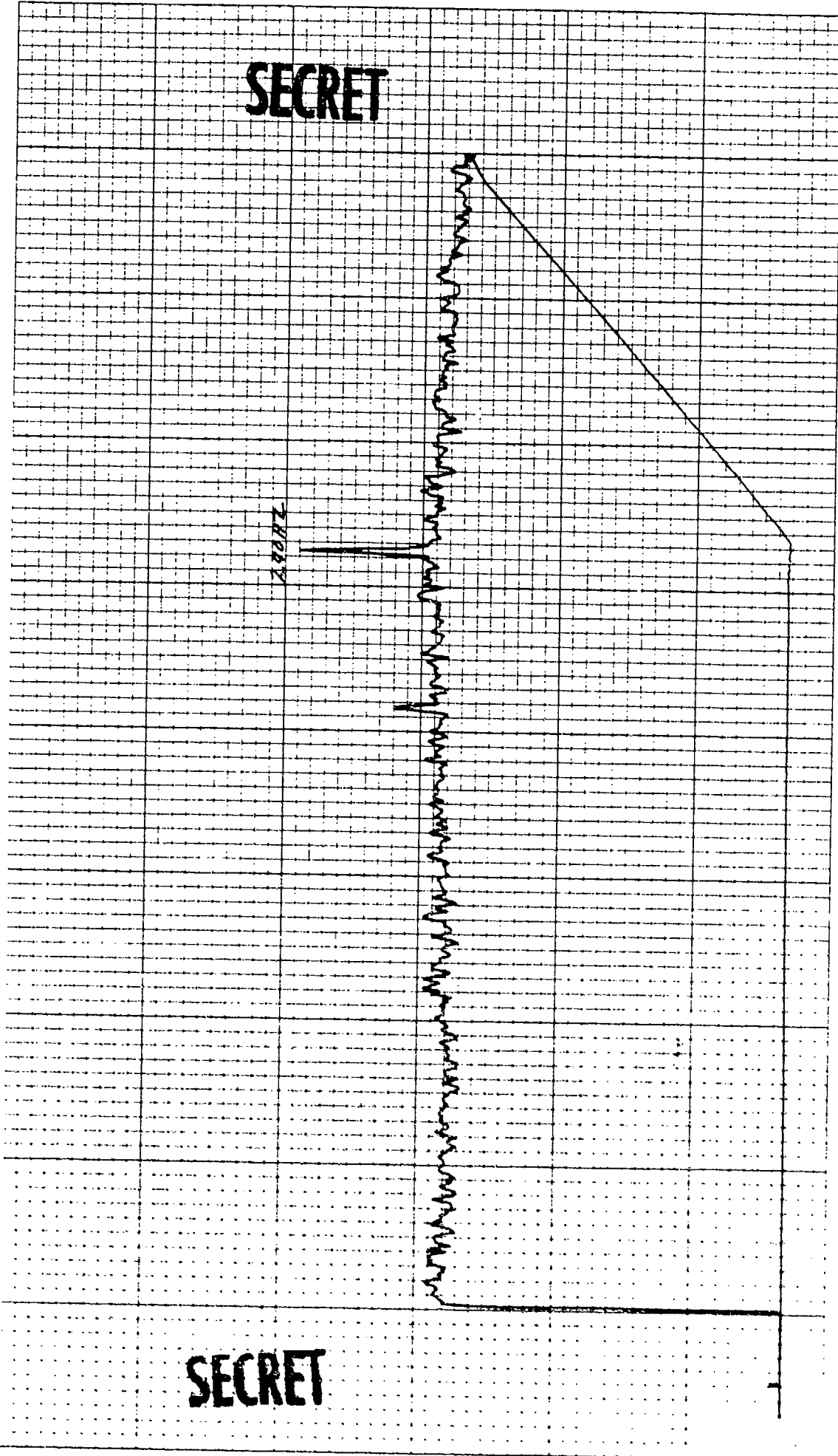
CONTROL: 2-7-1019 (42)
OMNI SPECTRUM (ELEMENT 33)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F/5 INDEX: 1155

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



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

46 0703

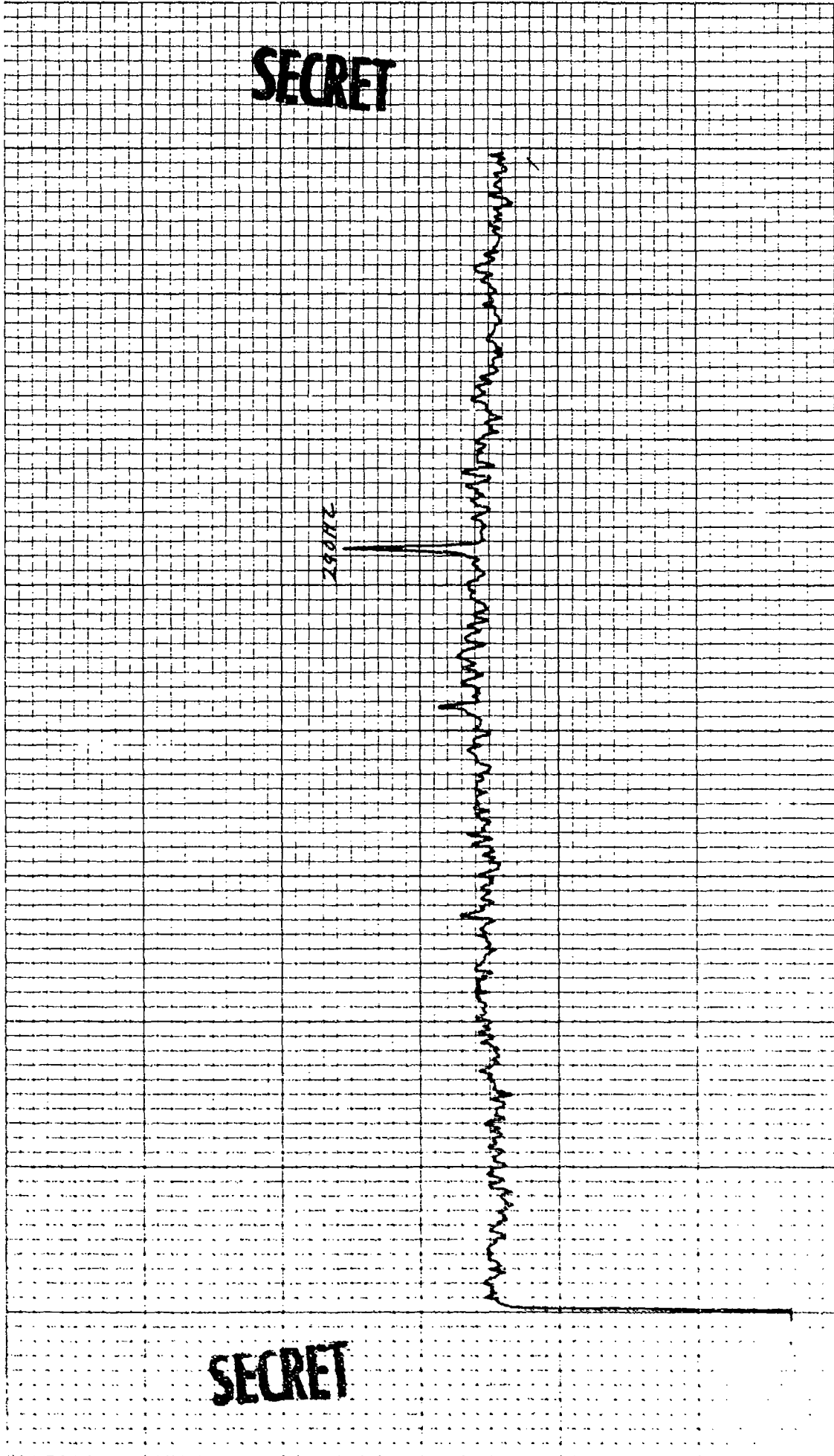
CONTROL: 2-7 -1019 (43)
OMNI SPECTRUM (ELEMENT 35)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F15 INDEX 1955

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING



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K&E W. 414 W. TO THE INCH. CO. WASH. D.C.

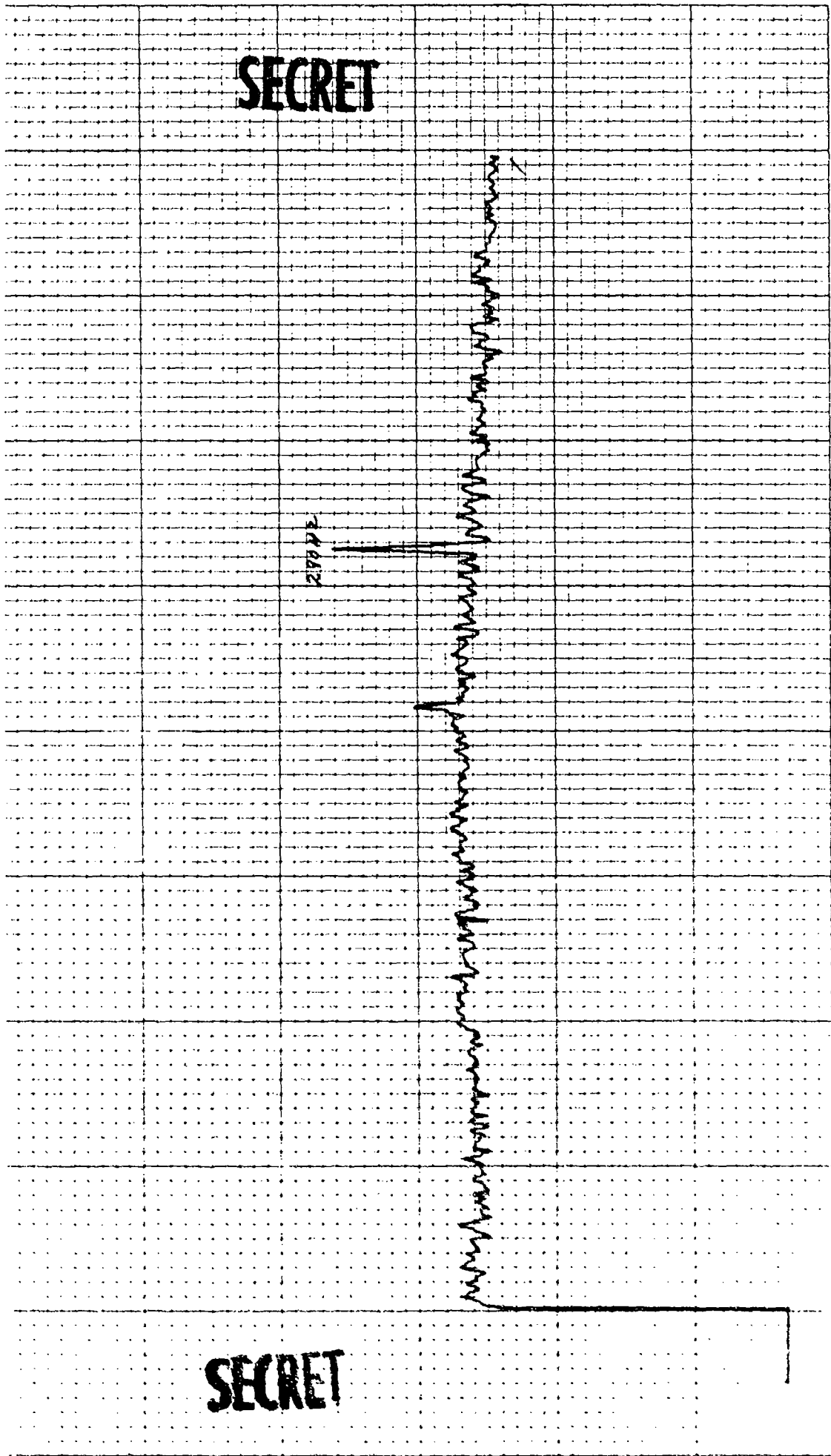
CONTROL: 2-7-1019 (44)
OMNI SPECTRUM (ELEMENT 32)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F/S INDEX 1955

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



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KOE 10.8 IN TO THE INCH
NEUTRAL GRADE CO

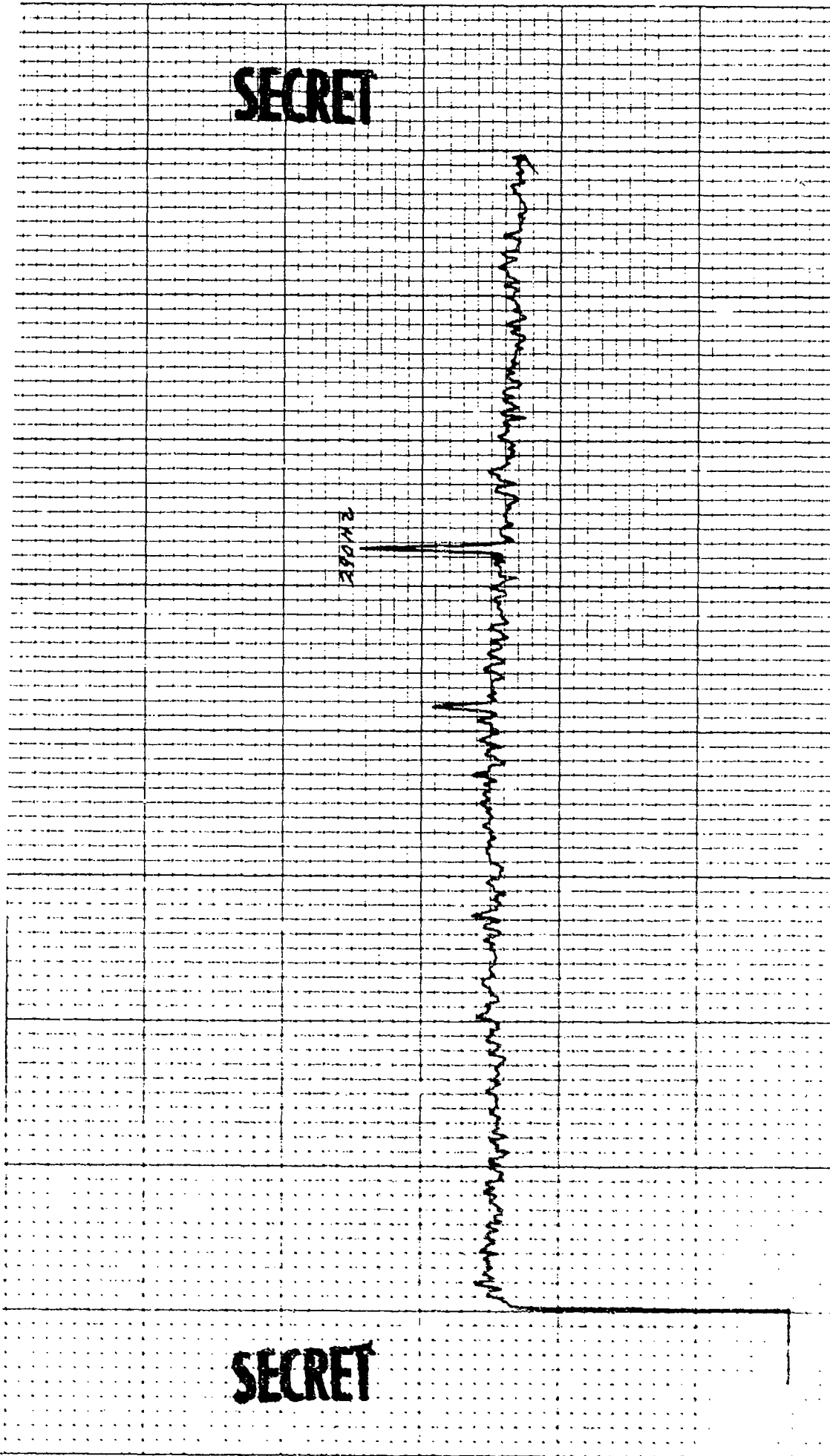
DATE OF ANALYSIS:

REEL: F/5 INDEX: 1955

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

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

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



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

46 0703

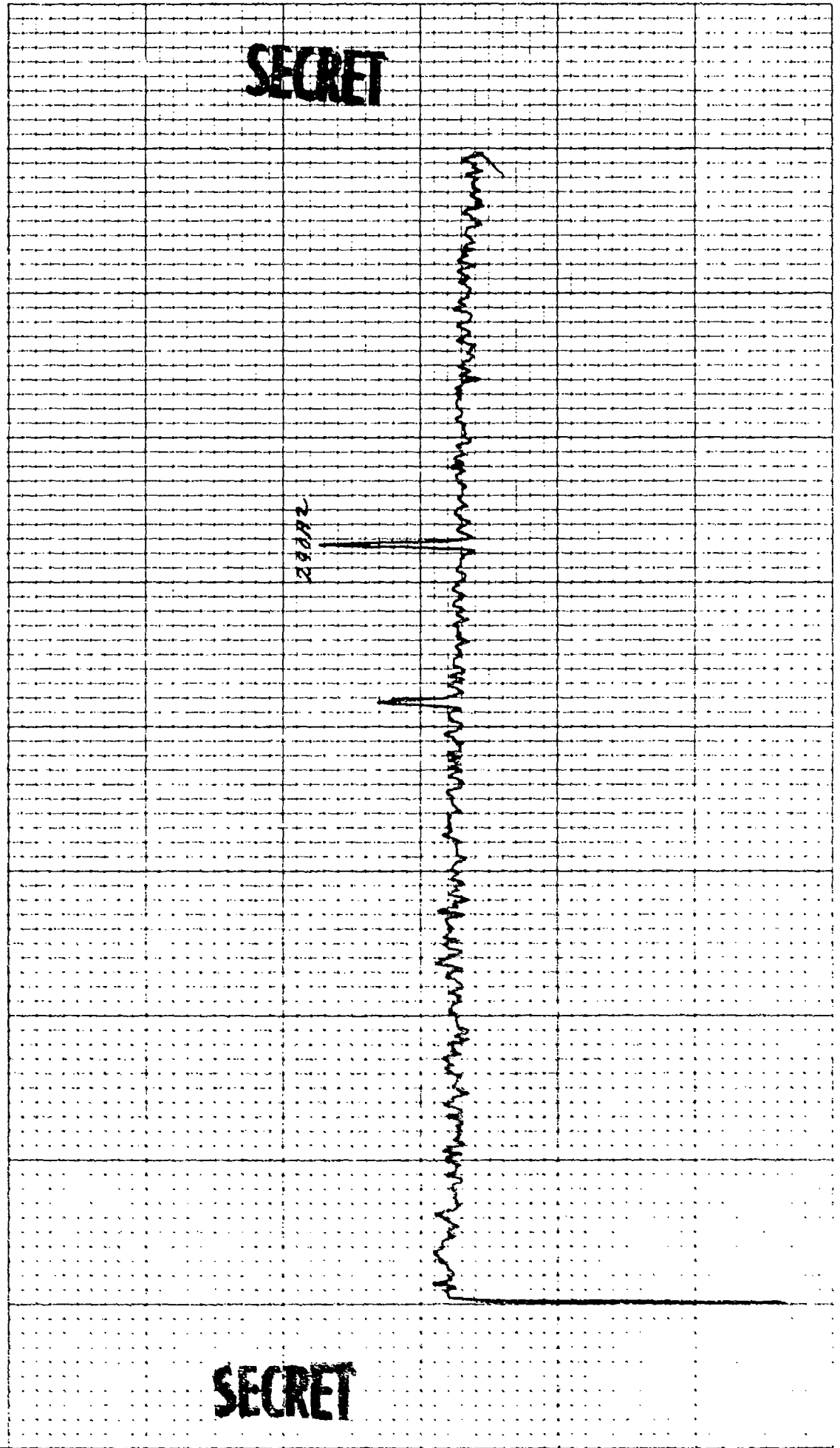
CONTROL: 2-7 -1019 (46)
OMNI SPECTRUM(ELEMENT 41)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F/5 INDEX 1955

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



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REF ID: A6 10 16 TO THE DIRECTOR, NSA, 25 MAR 1955

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

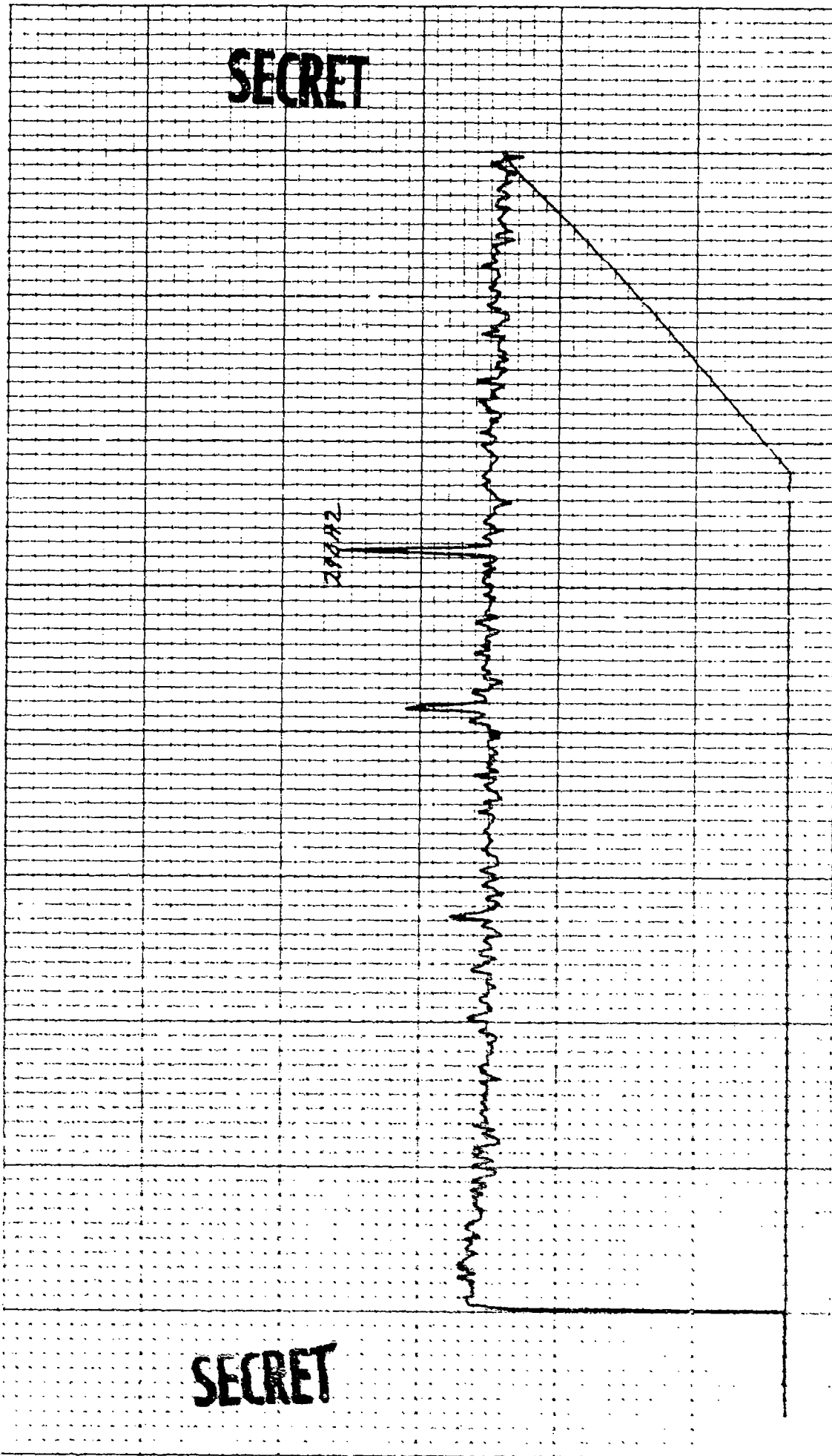
DATE OF ANALYSIS:

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

REEL: F/5

INDEX 1955

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



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REF ID: A66070

REEL: F/5 INDEX 1955

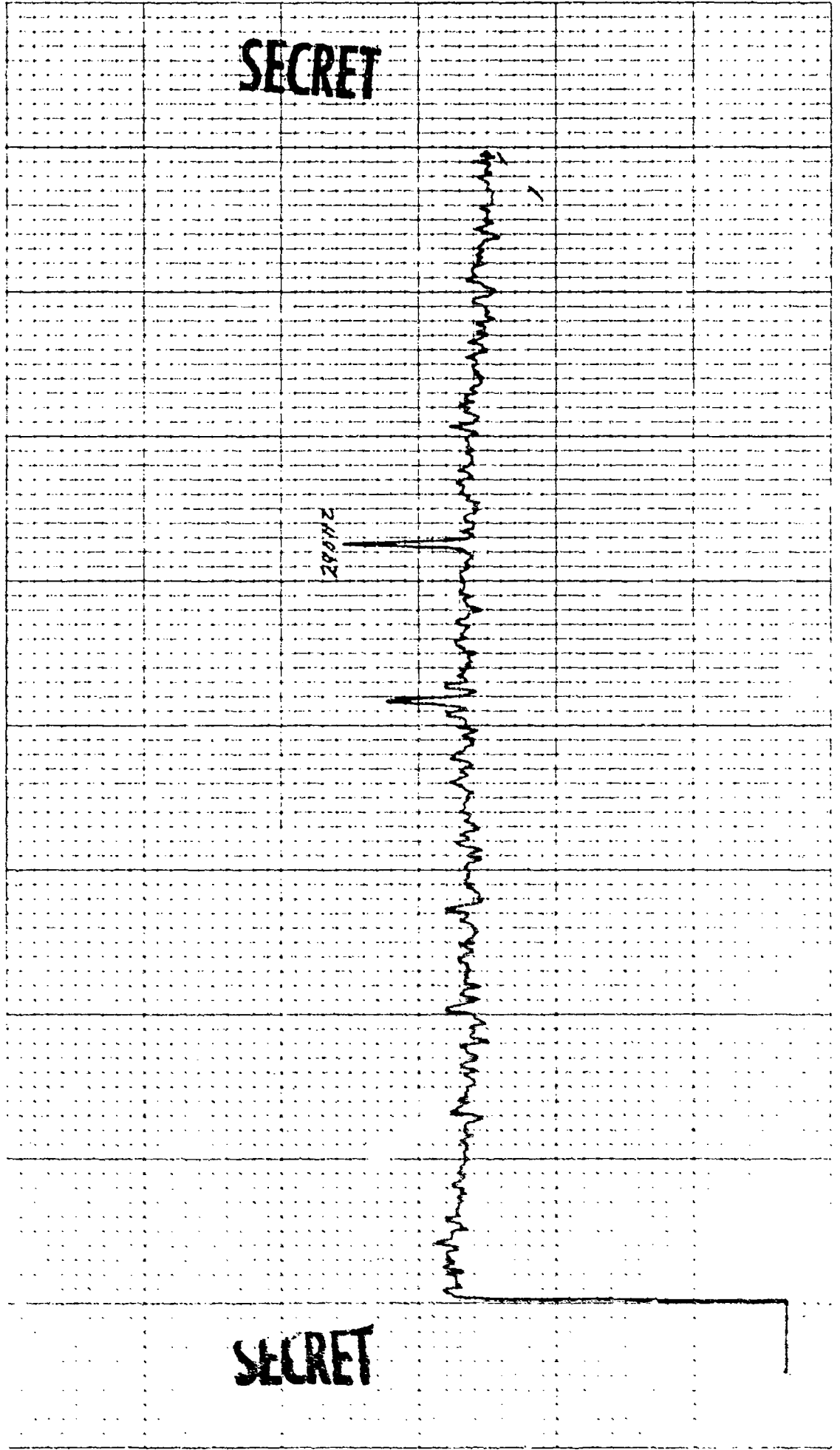
DATE OF ANALYSIS:

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

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

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

DEG AZ STEERING



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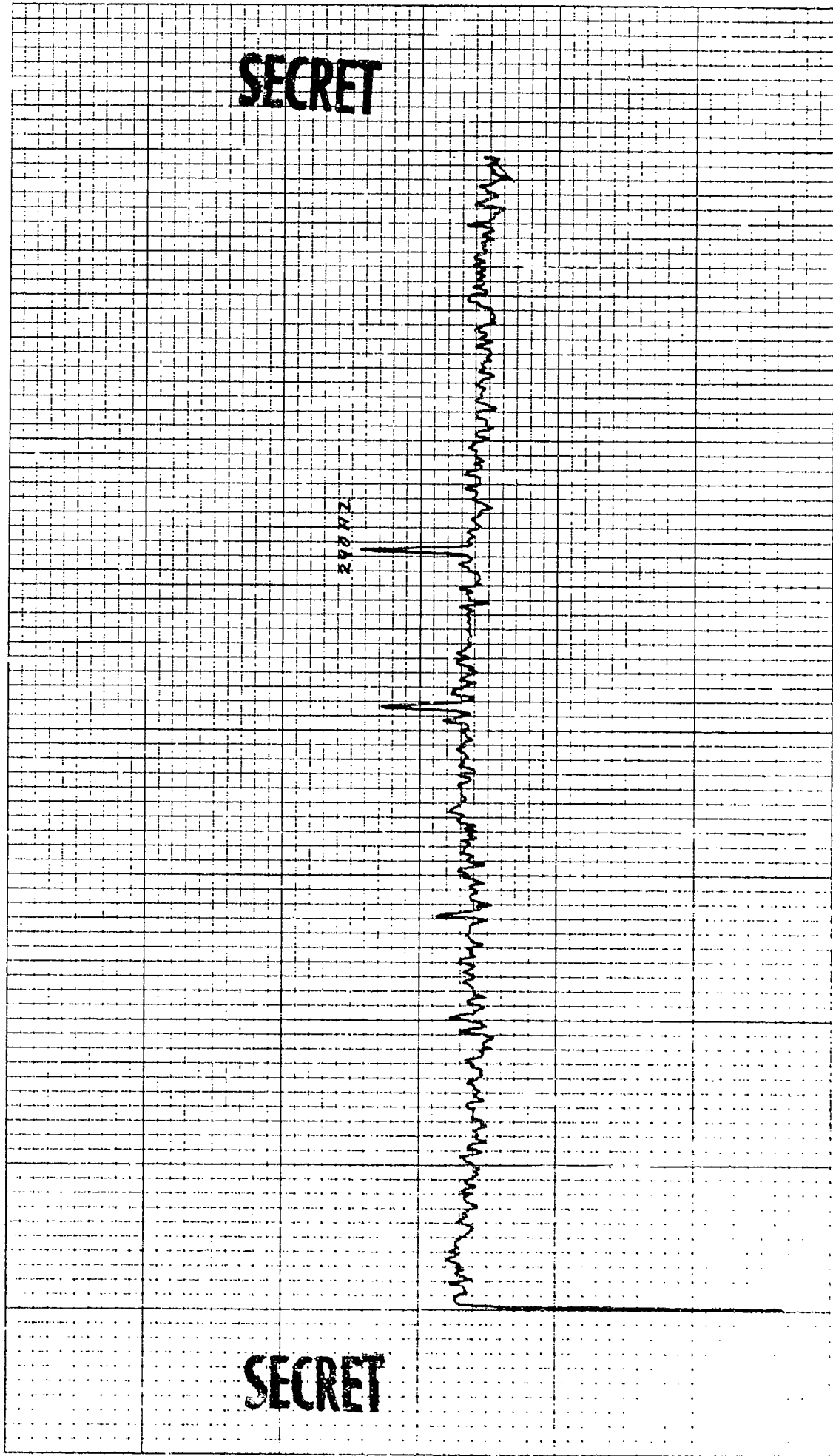
SECRET

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

DATE OF ANALYSIS:

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

REEL: F/S INDEX 1955
INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTC WTC: HANNING



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REF 2019 TO THE PAGES 1000

INDEX 1955

REEL: F/S

DATE OF ANALYSIS:

CONTROL: 2-7 - 1019 (50)

OMNI SPECTRUM (ELEMENT 49)

EXERCISE: BEARING STAKE

CENTER FREQ: 200 HZ

I ELEMENT

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

ANALYSIS BANDWIDTH: 1/10HZ

DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

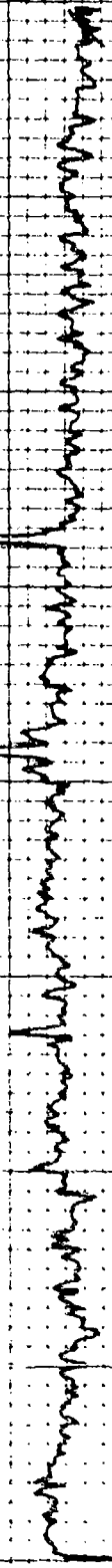
ATTEN: DB

WTG: HANNING

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2019Z



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K02 10001 10001 10001 10001

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

DATE OF ANALYSIS:

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

REEL: F15

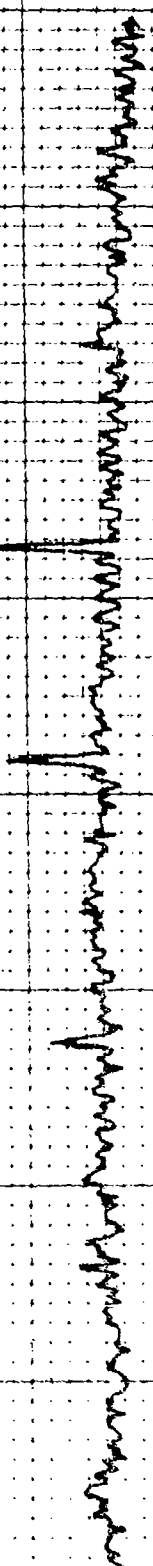
INDEX 1955

INTEGRATION TIME 320 SECS
FILTER
ATTN: DB
WTG: HANNING

SECRET

SECRET

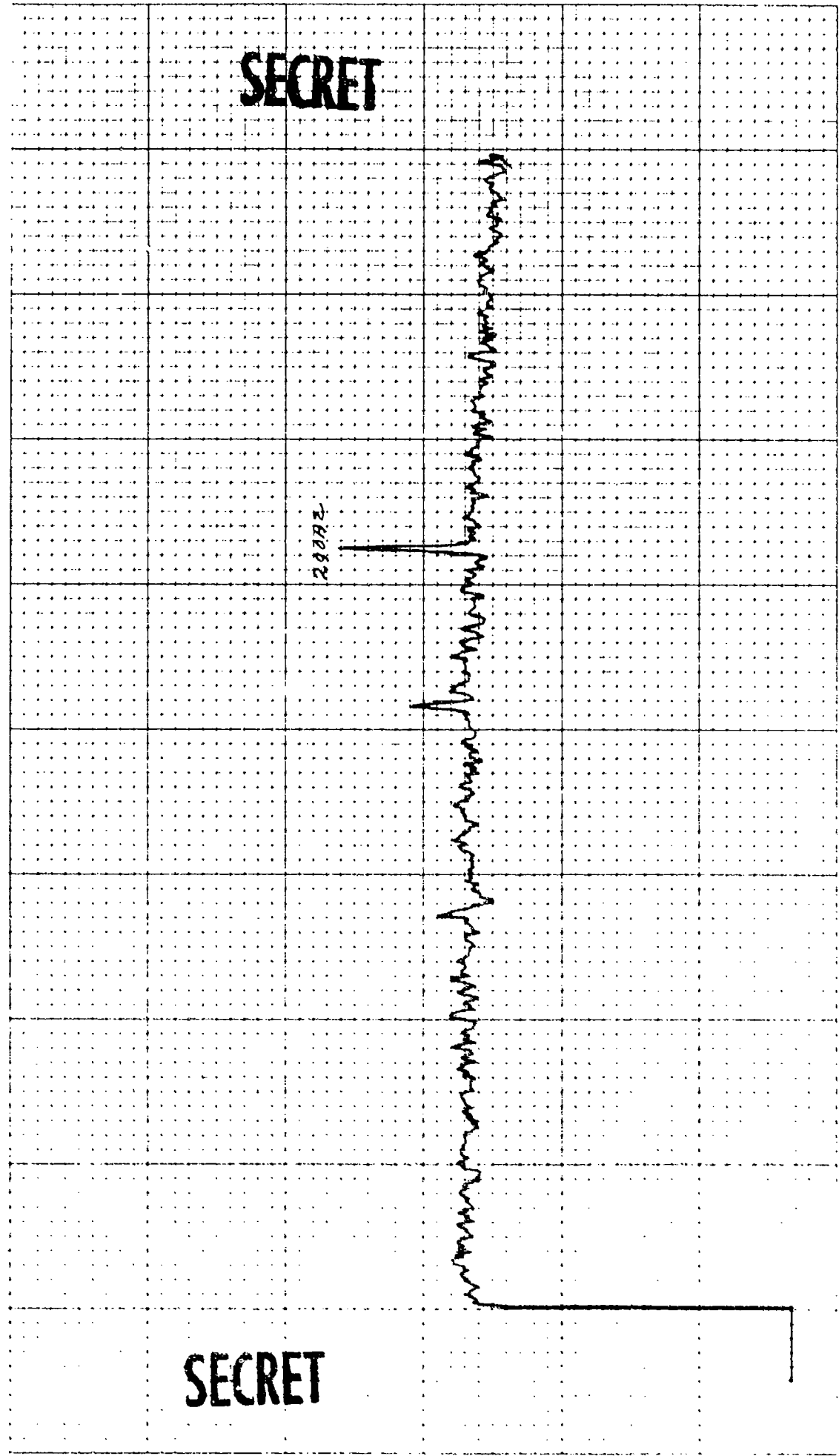
2100Z

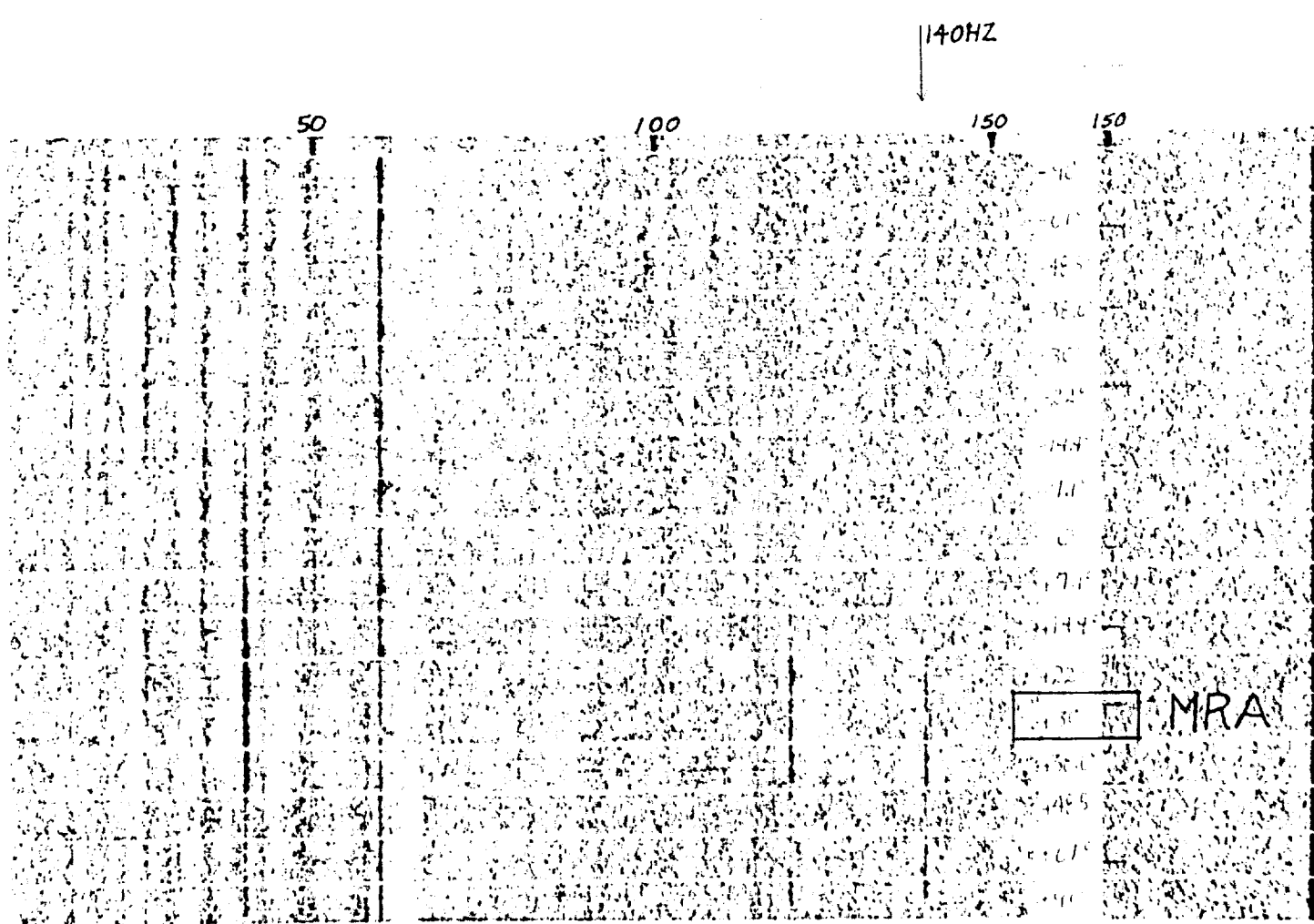


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1000 1000 1000 1000

CONTROL: 2-7 -1019 (52) REEL: F/5 INDEX: 1955
 OMNI SPECTRUM/ELEMENT 53)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 HZ
 1 ELEMENT
 DATE OF ANALYSIS:
 DATE/TIME: 2-7-77 -1019 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 --- DEC AZ STEERING
 INTEGRATION TIME 320 SECS ATTN: - DB
 FILTER WTG: HANNING





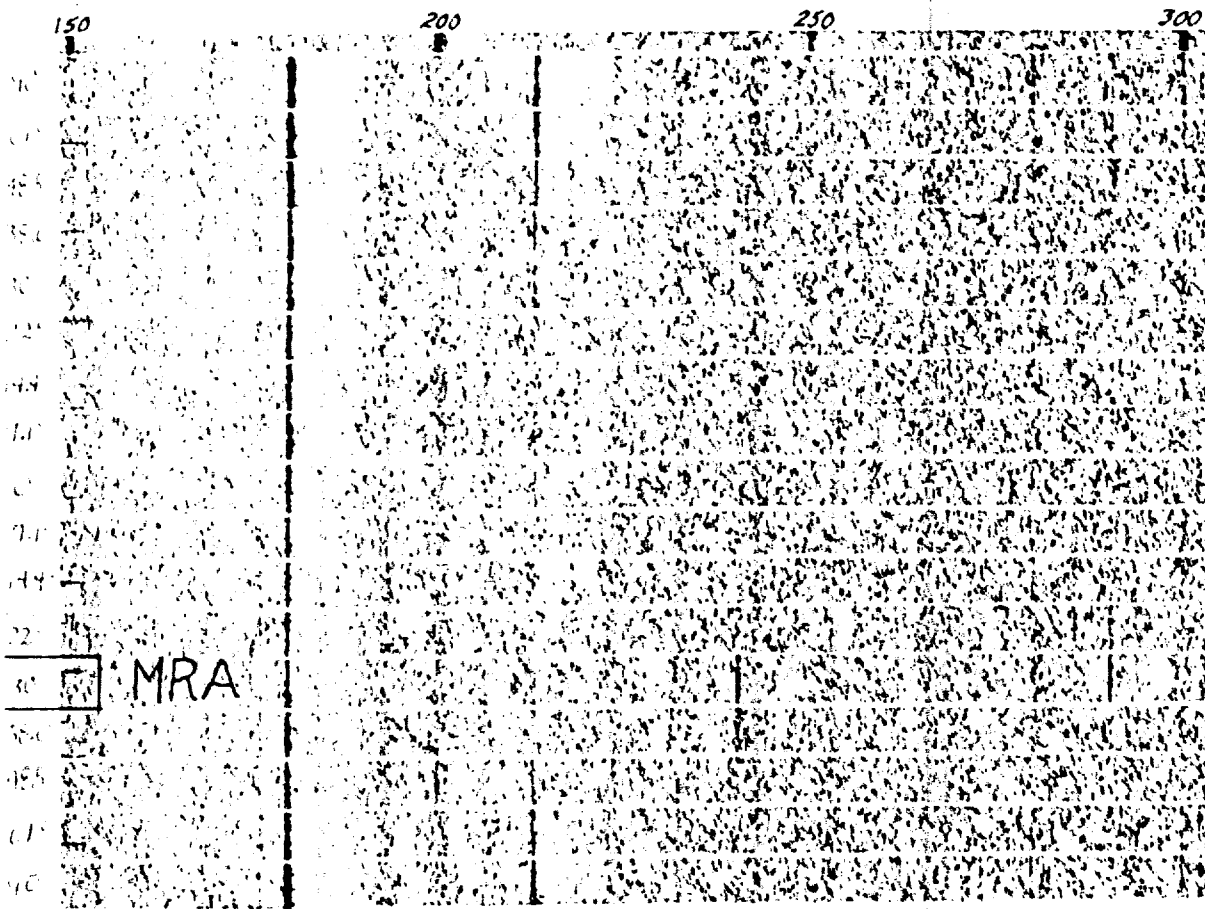
CONTROL NUMBER 10 92 44 DP4
 NUMBER OF ELEMENTS 16
 FREQUENCY BAND 10 TO 100 HZ
 RANGE 159 N.M.

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

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290HZ
295HZ



OPERATION NUMBER 175

TAPE COUNT 1955

SECRET

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

DATE 1-1-77

SAN-XXX-78-0129

WIDTH 12 INCHES
2000 FPS

EXERCISE: HEARING STATE

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CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 4

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

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

NOISE LEVEL

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

SIGNAL-NOISE-RATIO

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

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CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 4

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

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

NOISE LEVEL

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

SIGNAL-NOISE-RATIO

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

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DATA POINT 4

SIGNAL GAIN

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

ARRAY GAIN

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

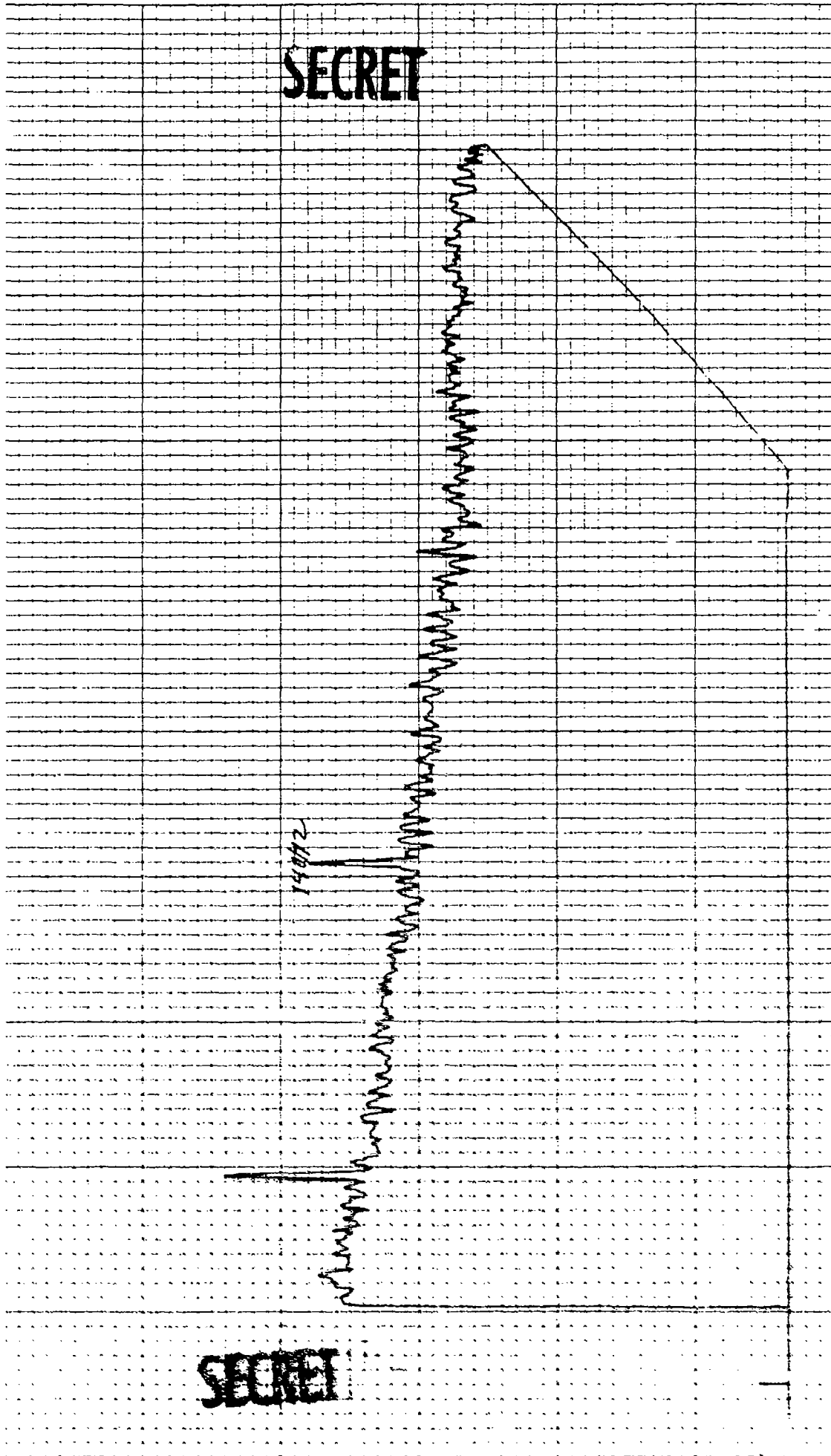
Best Available Copy

CONFIDENTIAL

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

DATE OF ANALYSIS: -- / -- / --
1 / 1 / 6
DATE/TIME: Z77-77-1 / Z
ANALYSIS BANDWIDTH: 1/10HZ
*ZC DEG. AZ STEERING

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



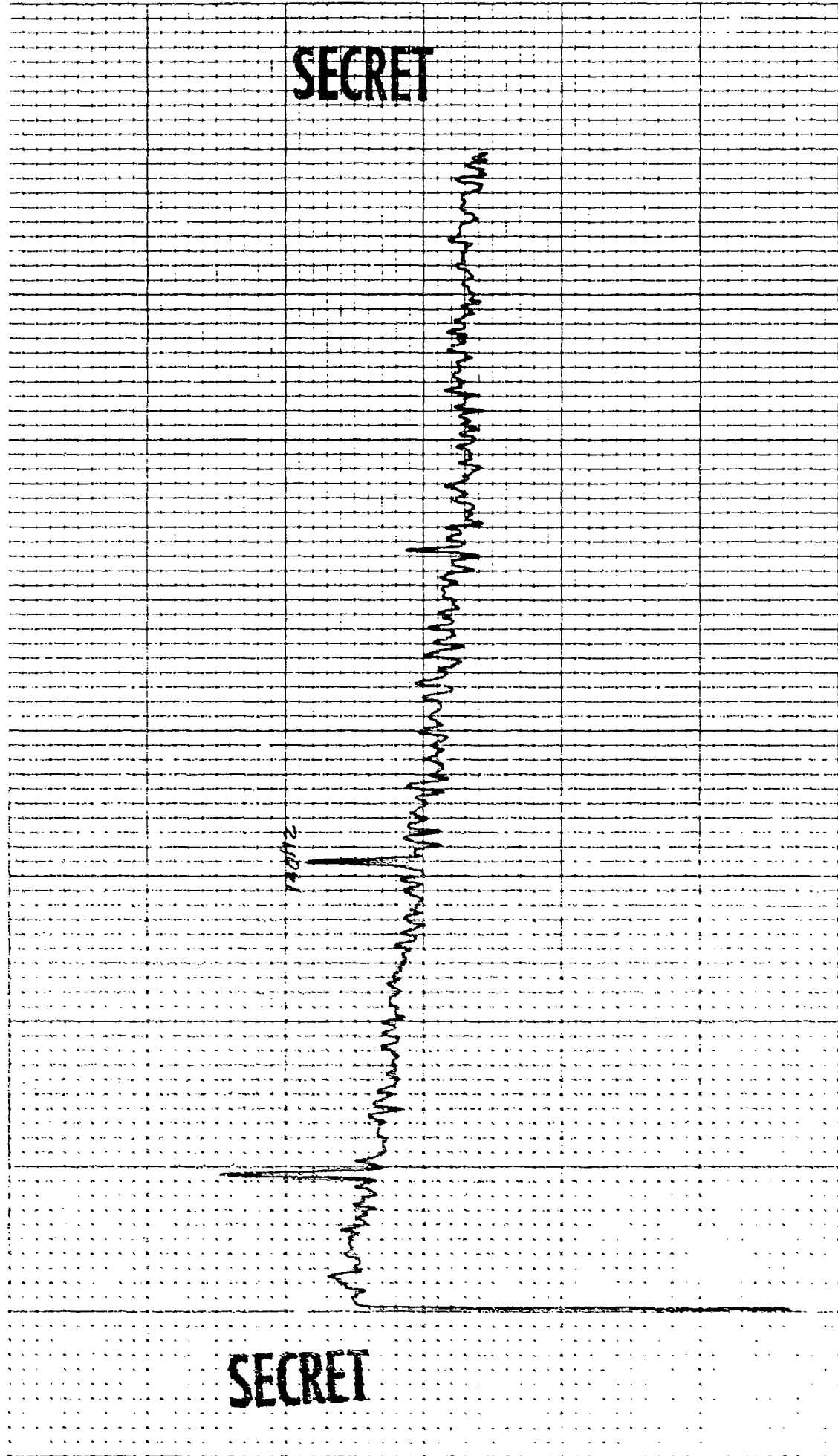
SECRET

SECRET

46 0703

KOE

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



SECRET

SECRET

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

46 0703

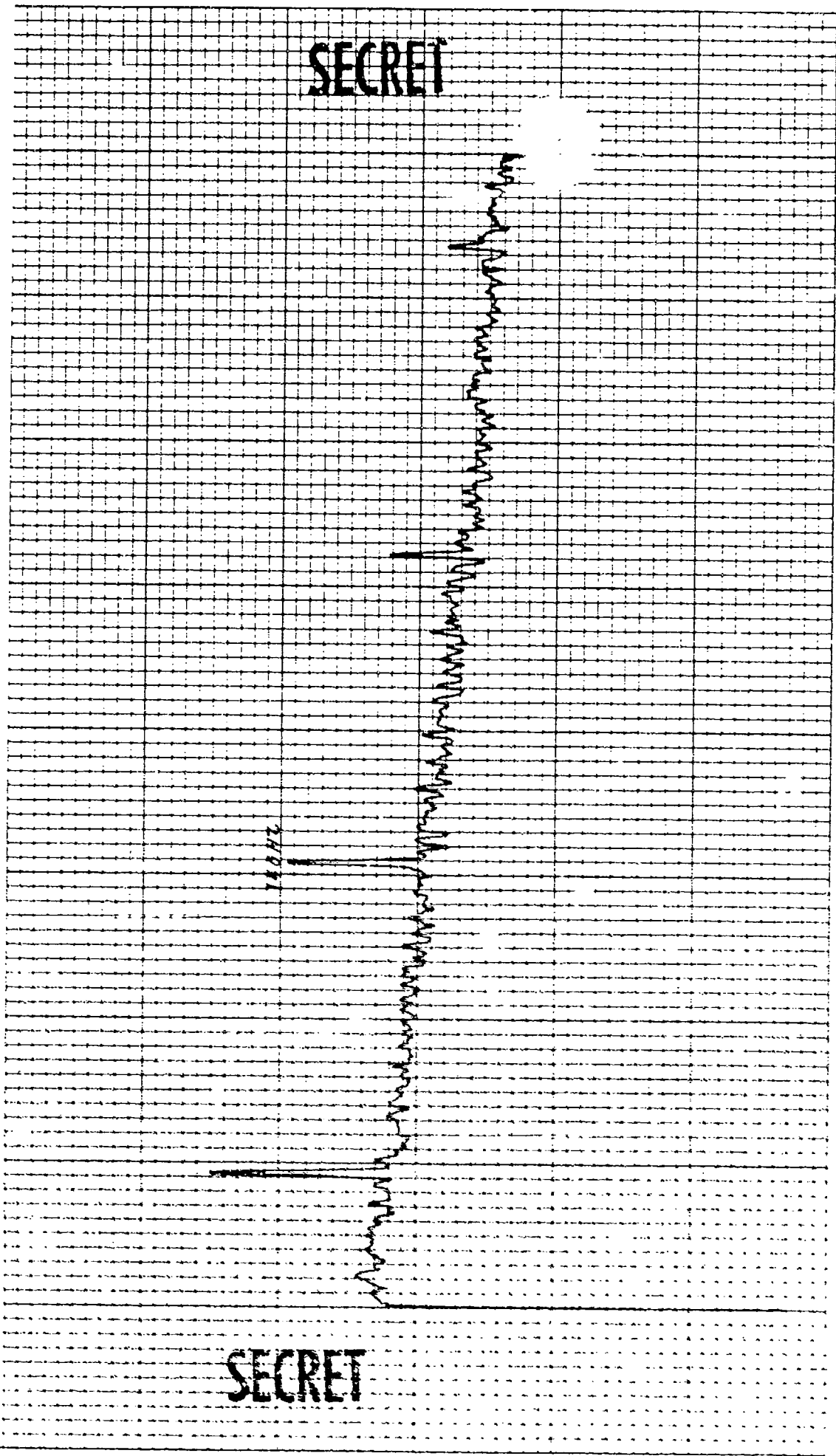
6 0703

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

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

REEL: F15
INDE X 1955

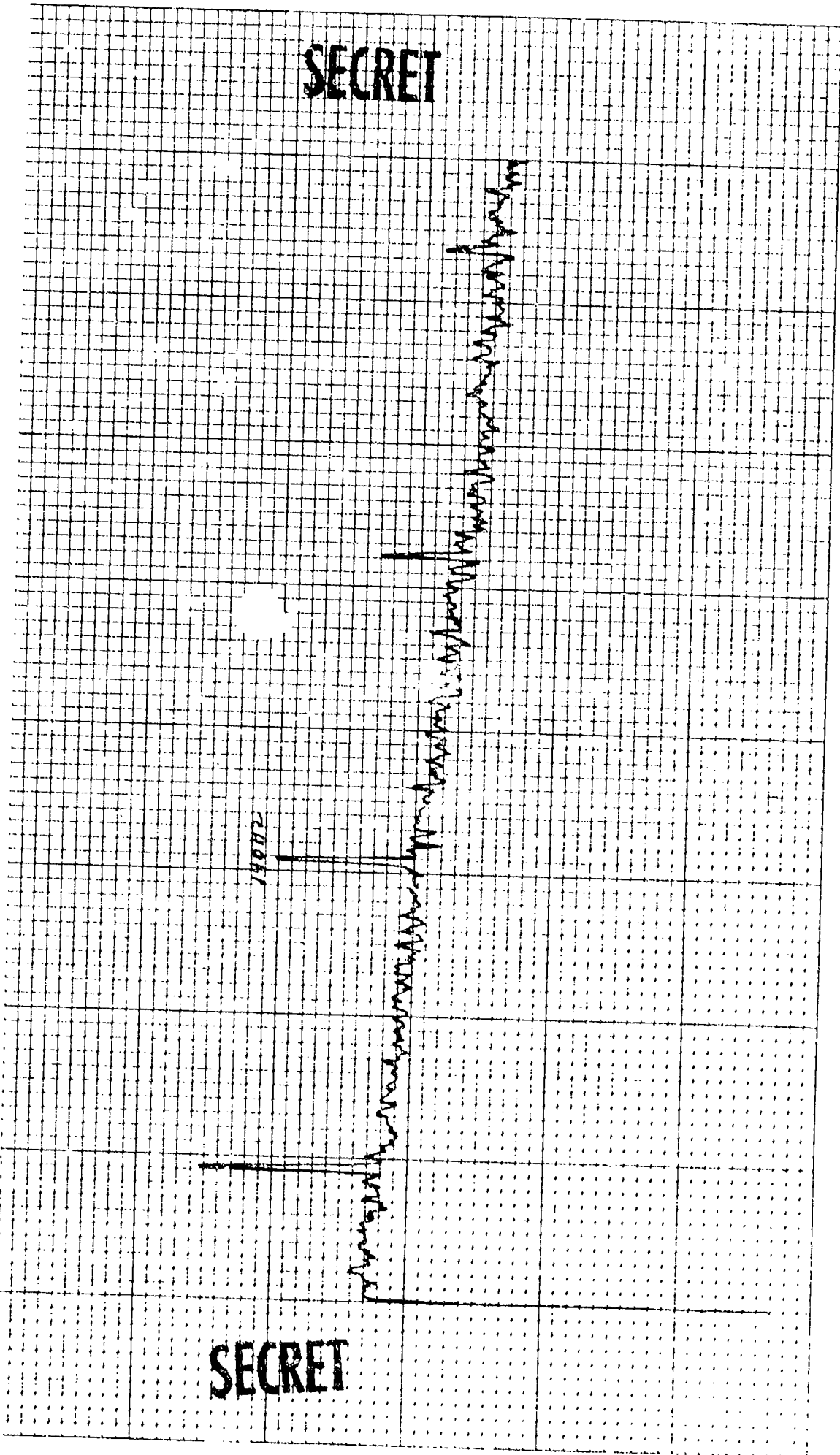
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING



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

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

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



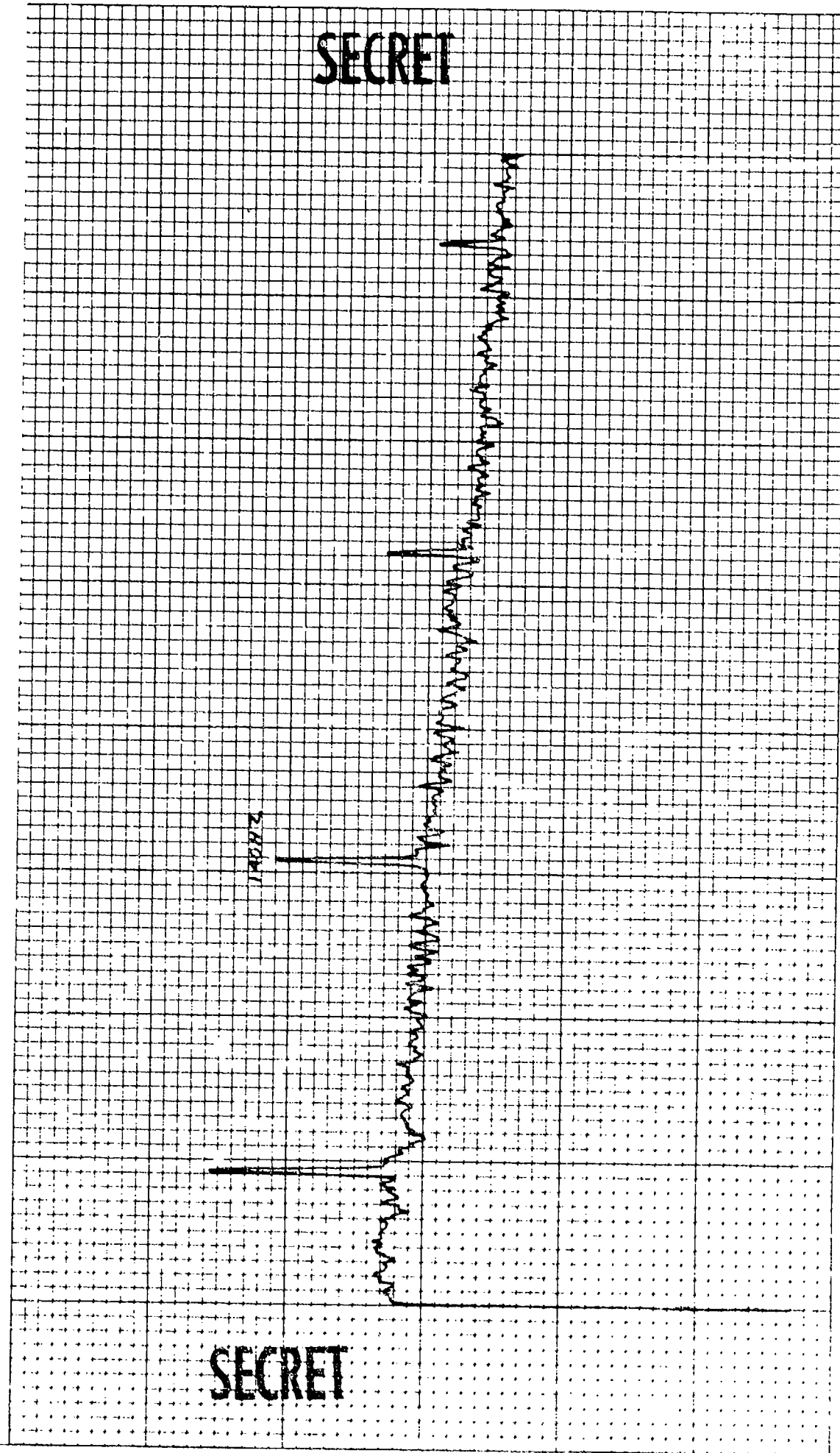
KOE 10 X 10 TO THE INCH * 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

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

REEL: F/5 INDE X 1955

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



SECRET

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

46 0703

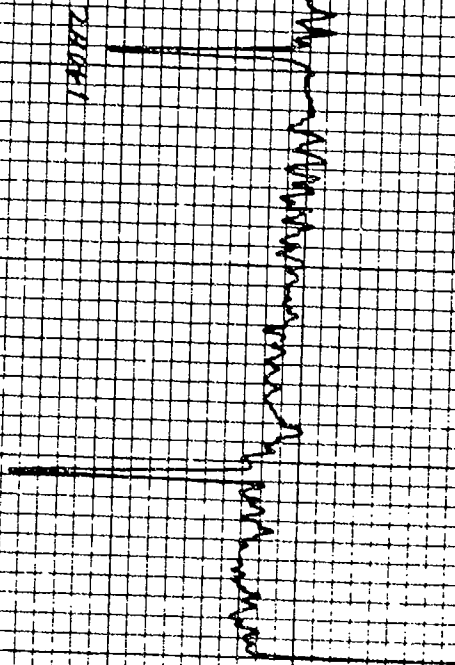
CONTROL: 2-7 -1019 (16)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

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

REEL: F/5
INTEGRATION TIME 320 SECS
FILTER

INDE X/955

ATTEN: -10 DB
WTC: HANNING



SECRET

SECRET

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

46 0703

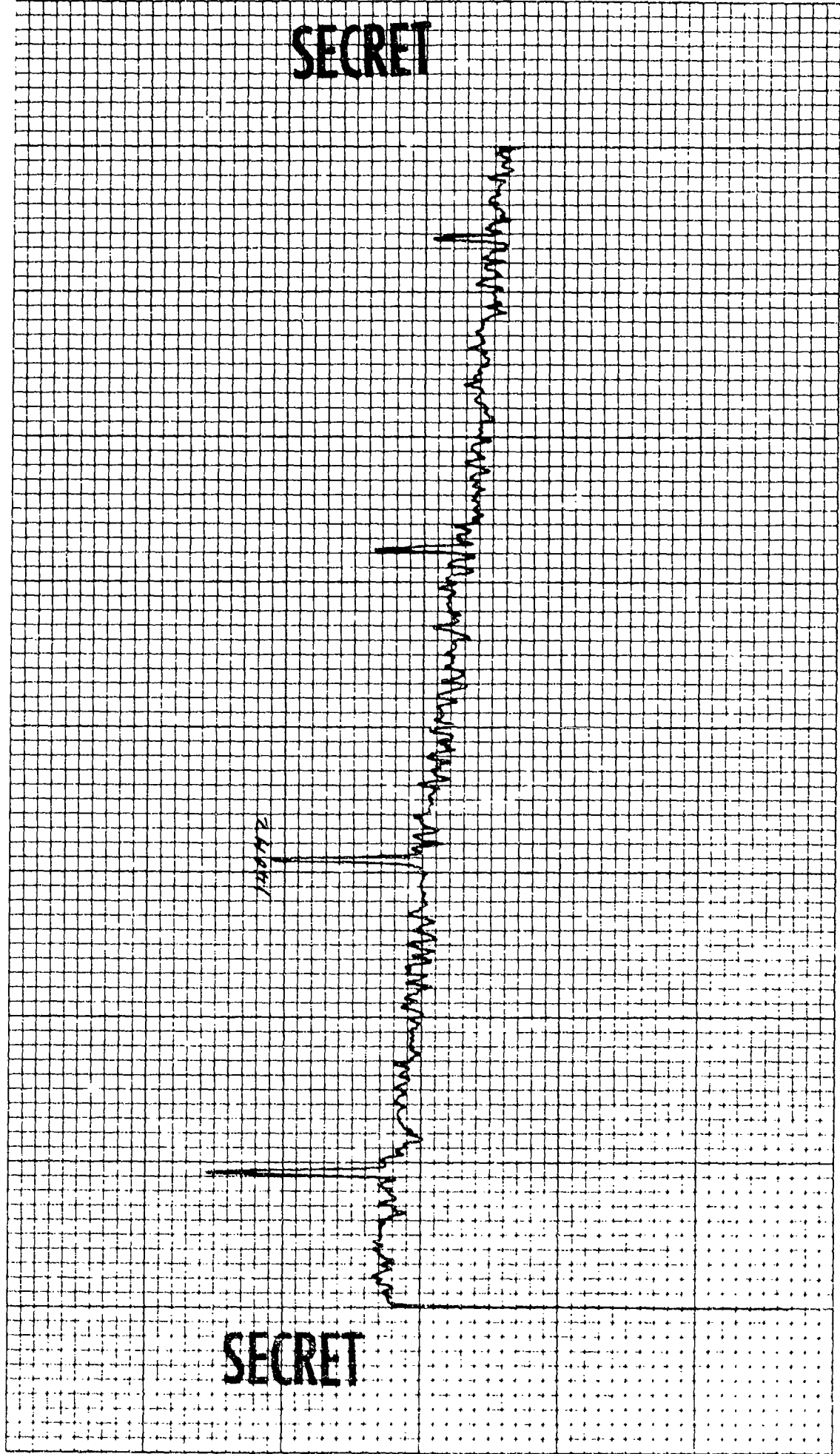
CONTROL: 2-7 - 1019 (16)
BEAMFORMED SPECTRUM (ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16)

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

REEL: F15 INDE X1955

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



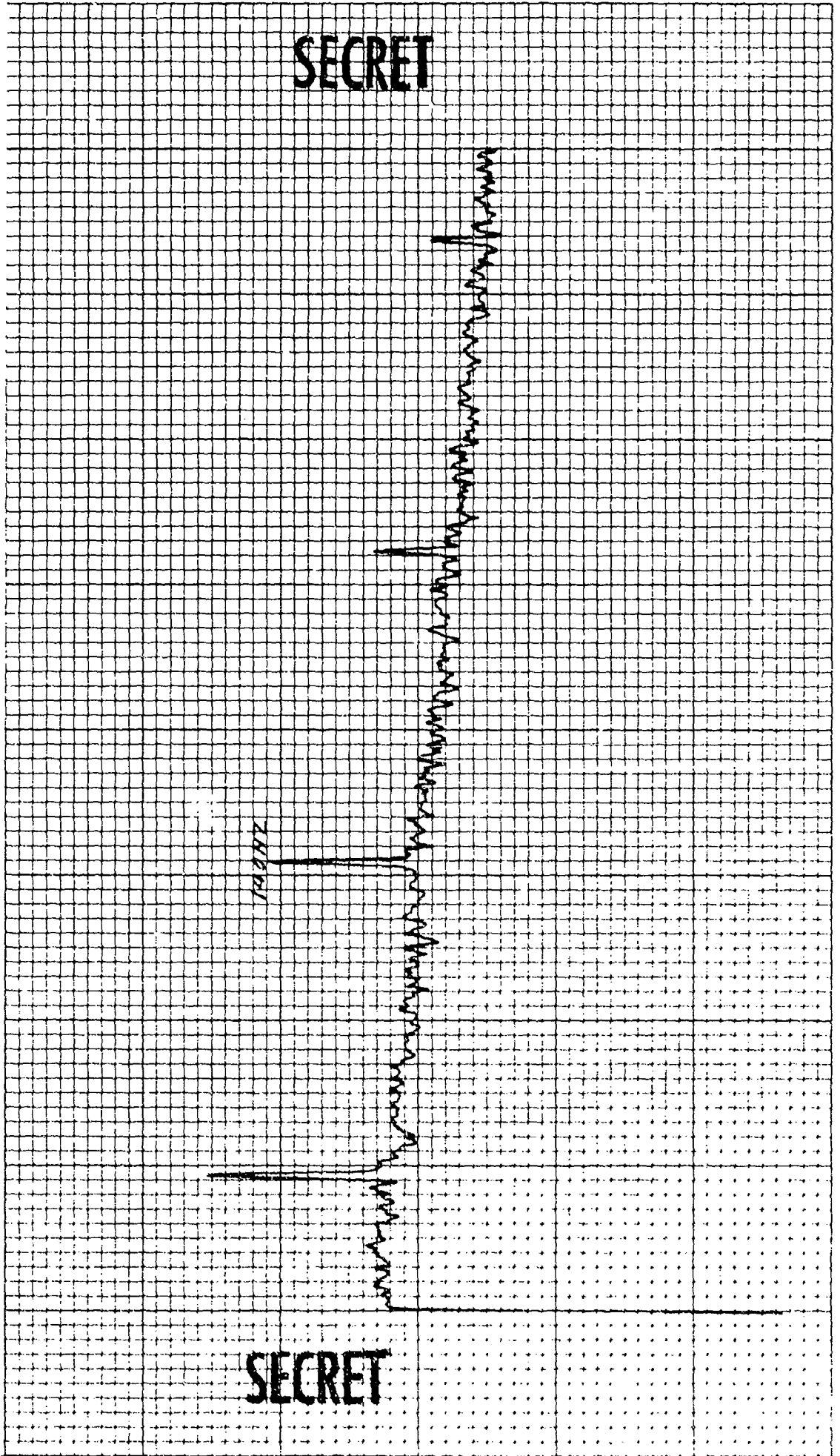
SECRET

SECRET

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

46 0703

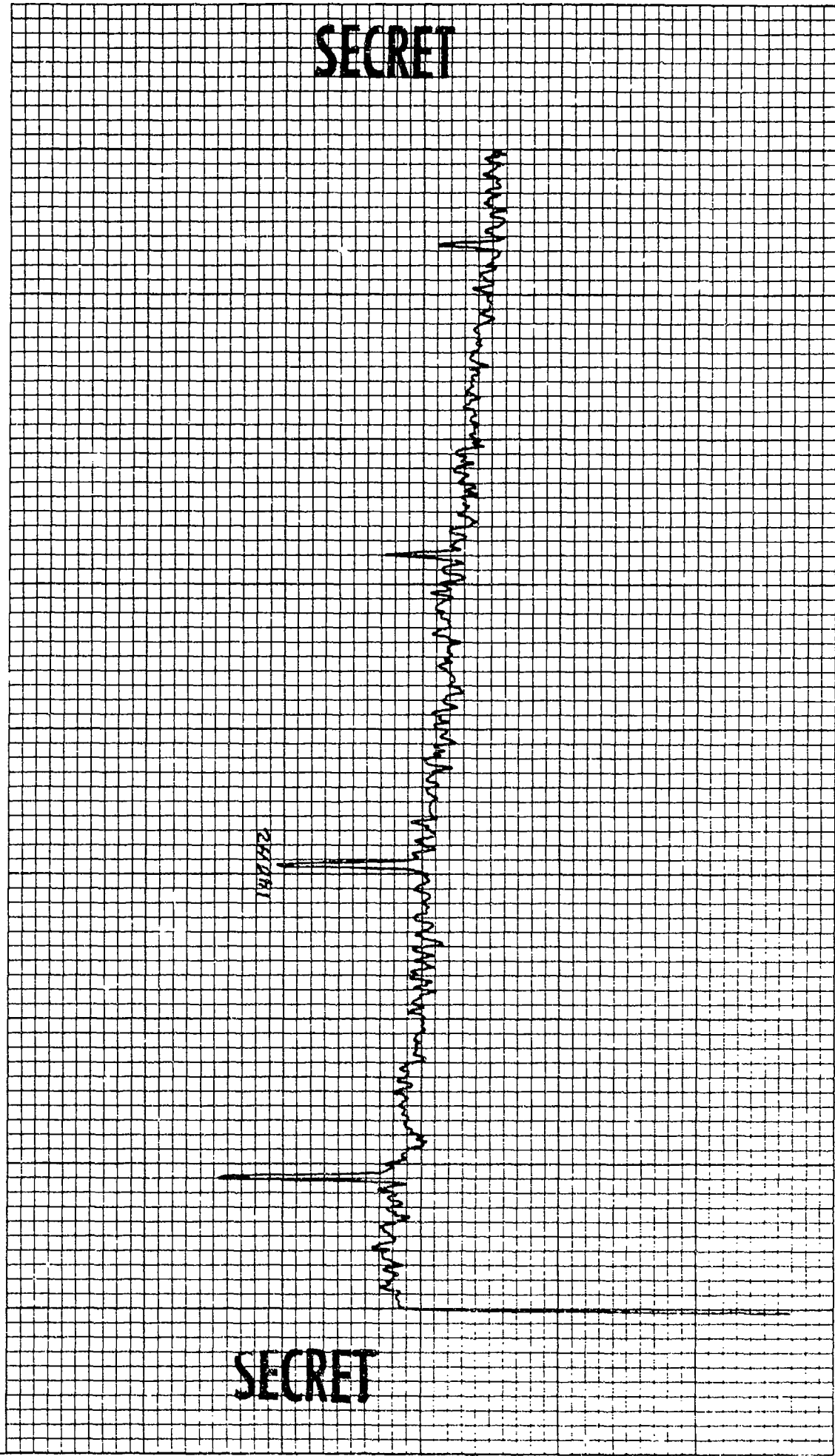
CONTROL: 2-7 -1019 (16) DATE OF ANALYSIS: 1-16 REEL: F15 INDEX: 1855
BEAMFORMED SPECTRUM (ELEMENTS) INTEGRATION TIME 320 SECS ATTN: -18 DB
EXERCISE: BEARING STAKE FILTER WTG: HANNING
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
16 ELEMENTS +32 DEG. AZ STEERING



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

46 0703

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



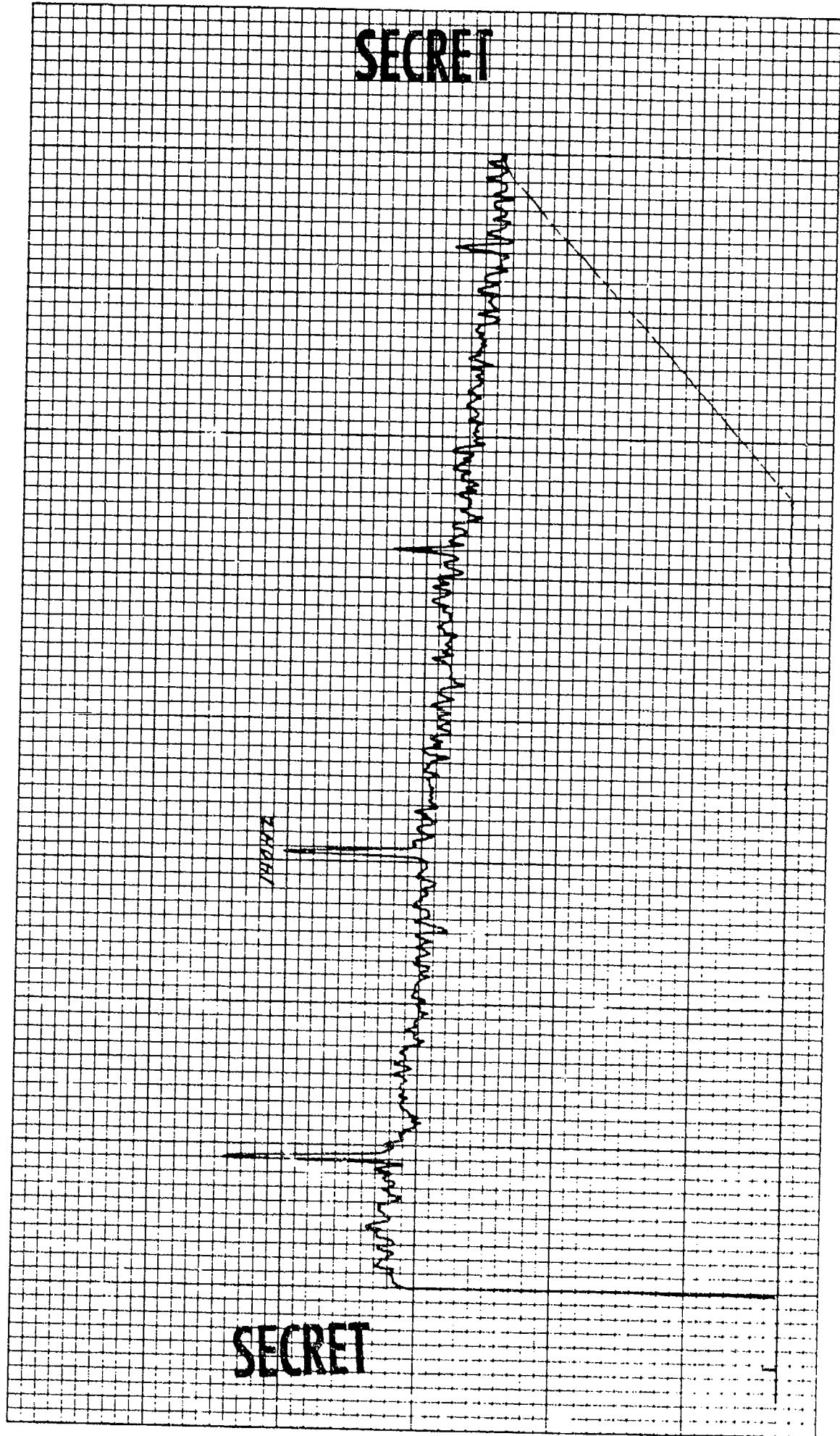
KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

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

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

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



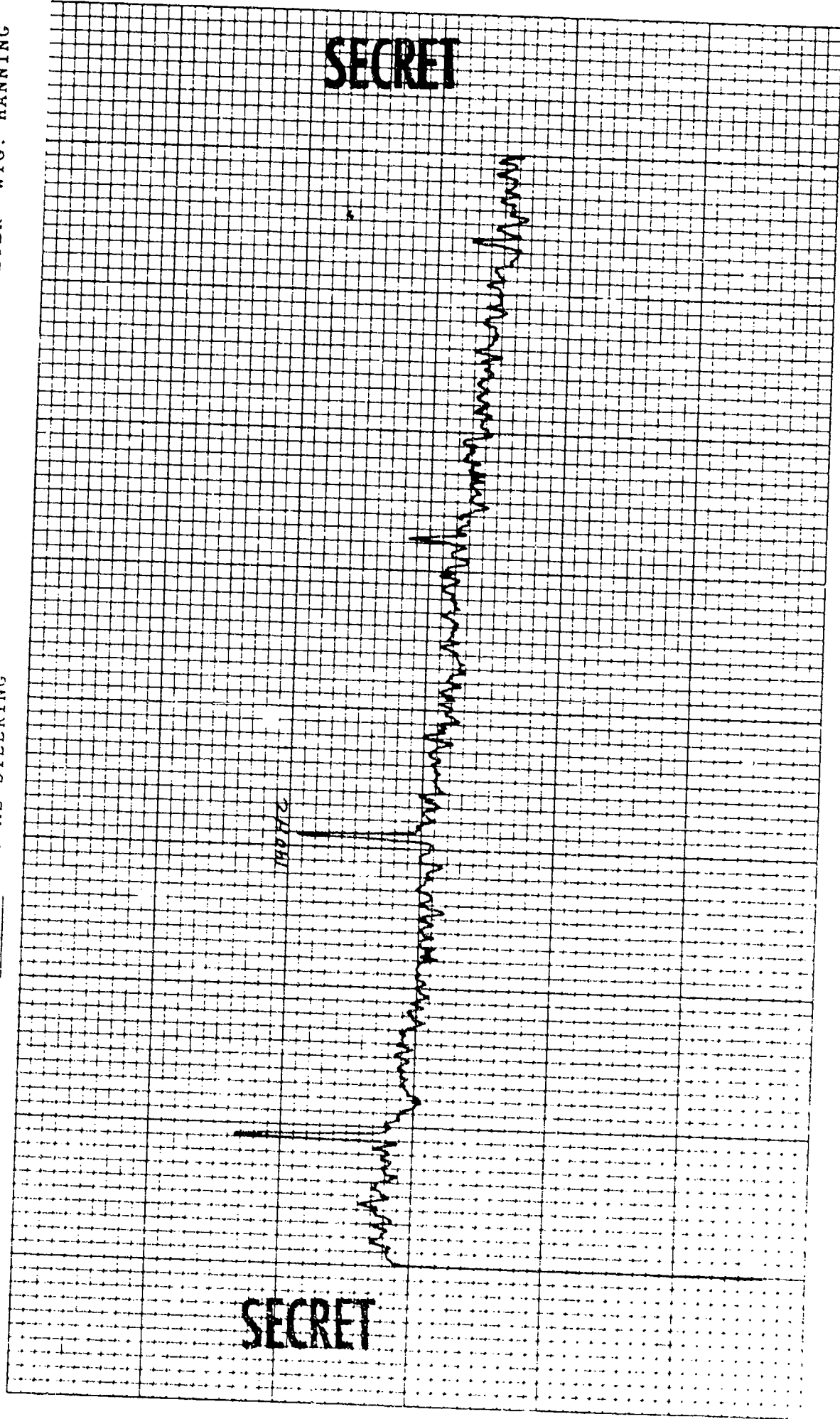
KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

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

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

REEL: F15 INDE X/955
INTEGRATION TIME 320 SECS ATTN: -10 DB
FILTER WTG: HANNING



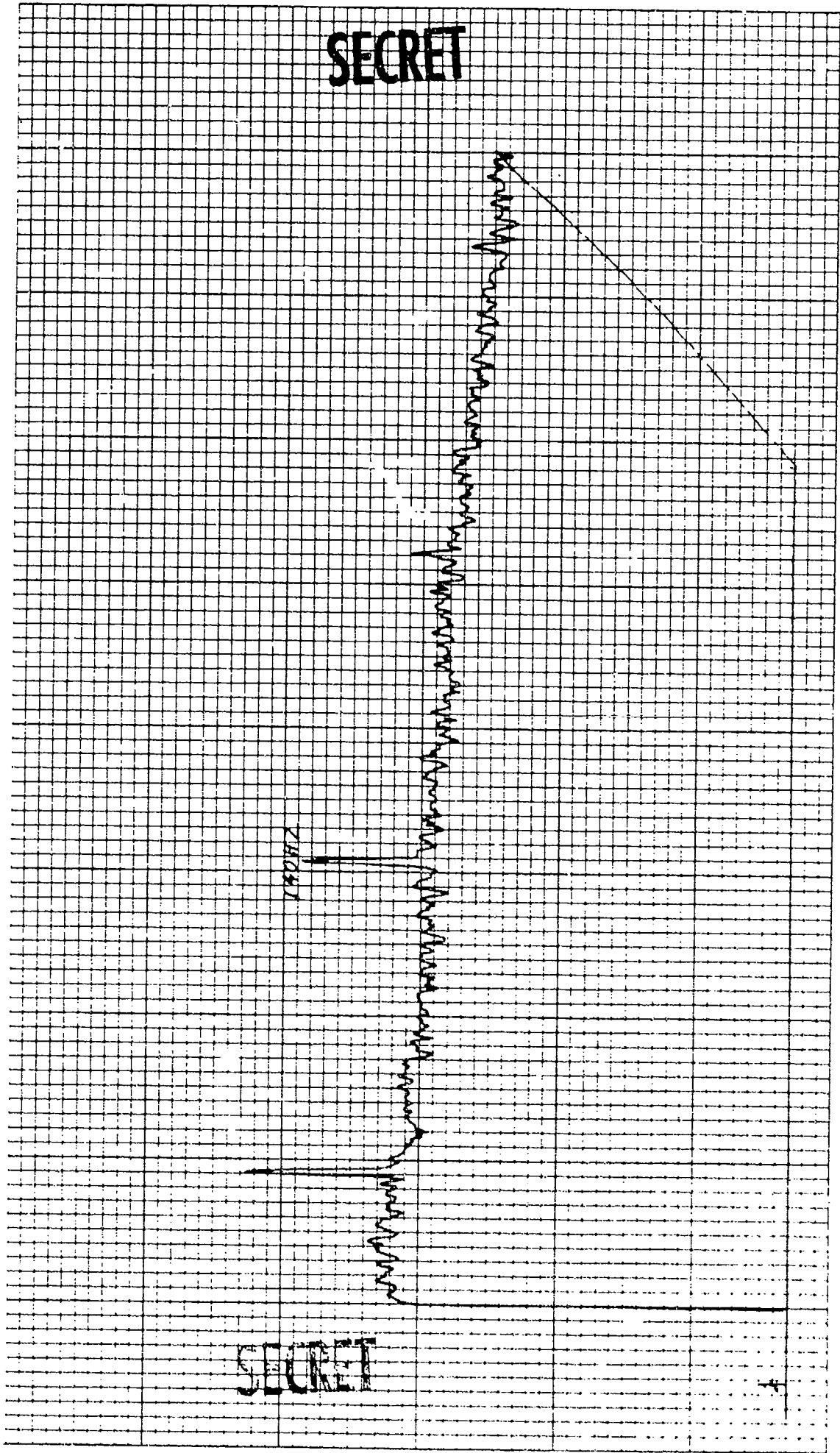
KOE 18 X 18 TO TIME (INCHES) X 18 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

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

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

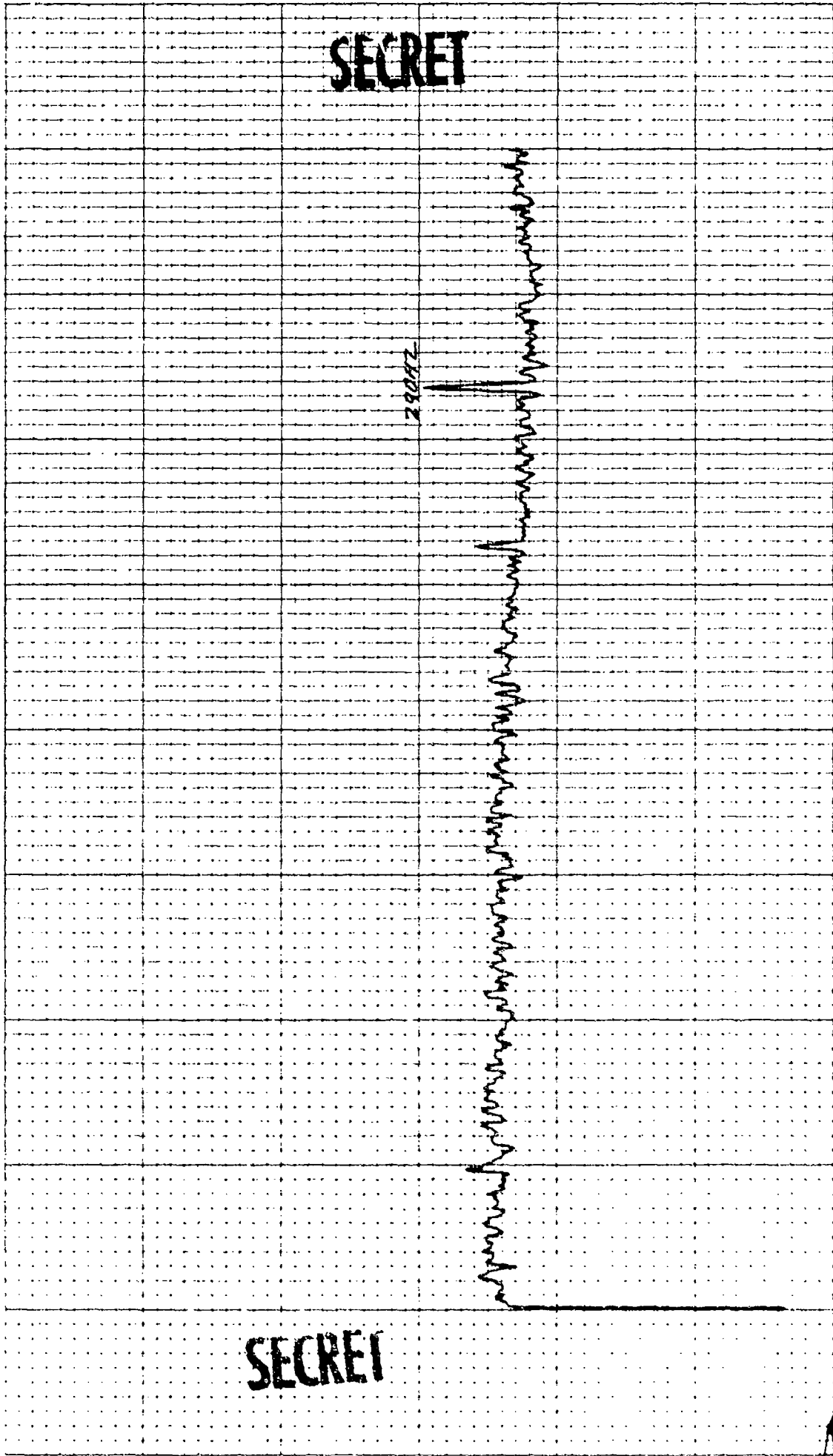
REEL: F/5
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING
ATTEN: -10 DB
INDE X/955



KOS
DATE: 1-16-77
TIME: 10:00 AM
BY: [illegible]

46 0703

CONTROL: 2-7 -1019 (16) DATE OF ANALYSIS: 1-16
BEAMFORMED SPECTRUM(ELEMENTS) REEL: F15 INDE X/1955
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTEN: -18 DB
CENTER FREQ: 270 HZ FILTER WTG: HANNING
16 ELEMENTS +20 DEG. AZ STEERING



KOE 10.7.70 TO THE DIRECTOR, ...

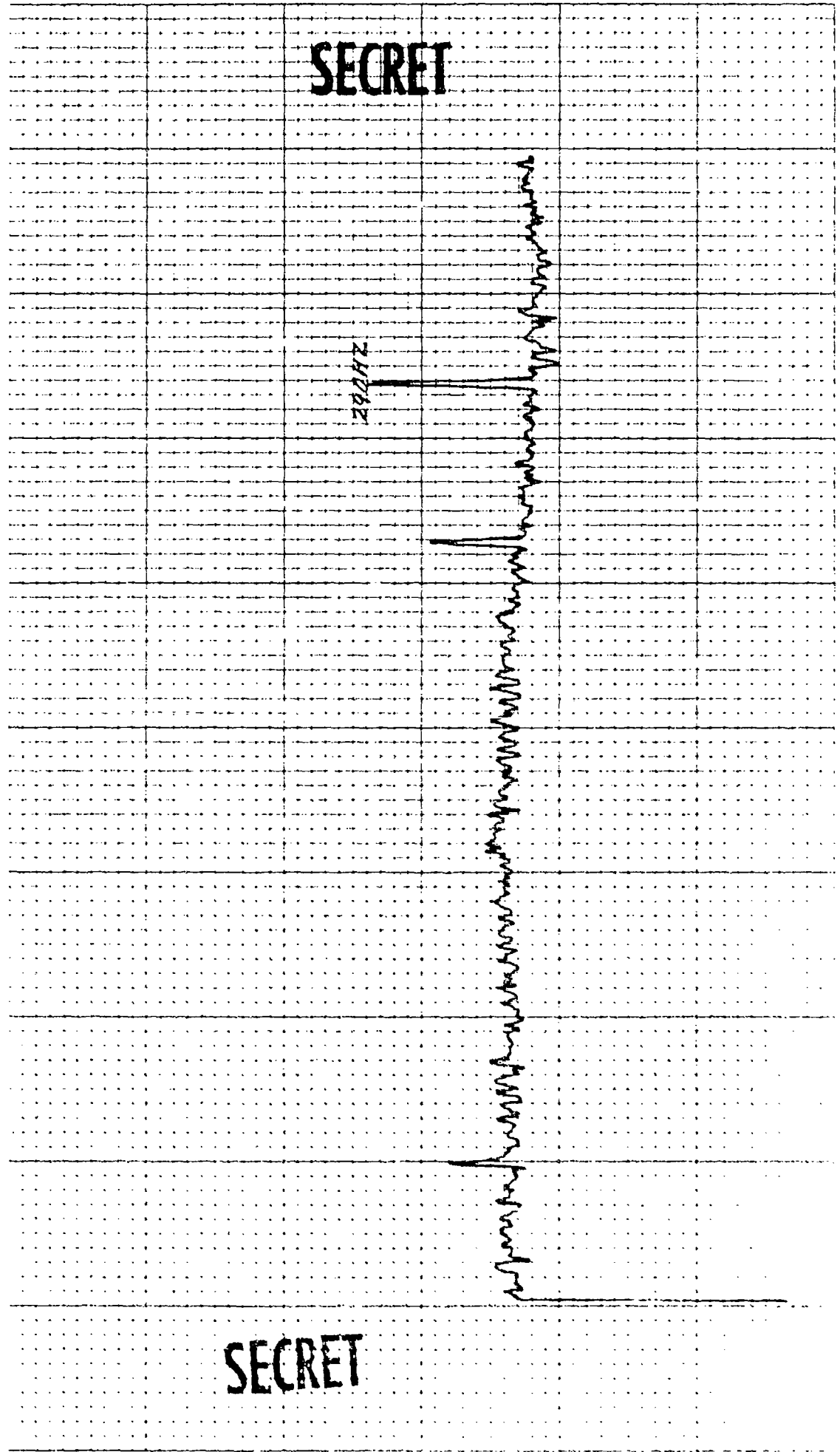
46 0703

16

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

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

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



46 0703

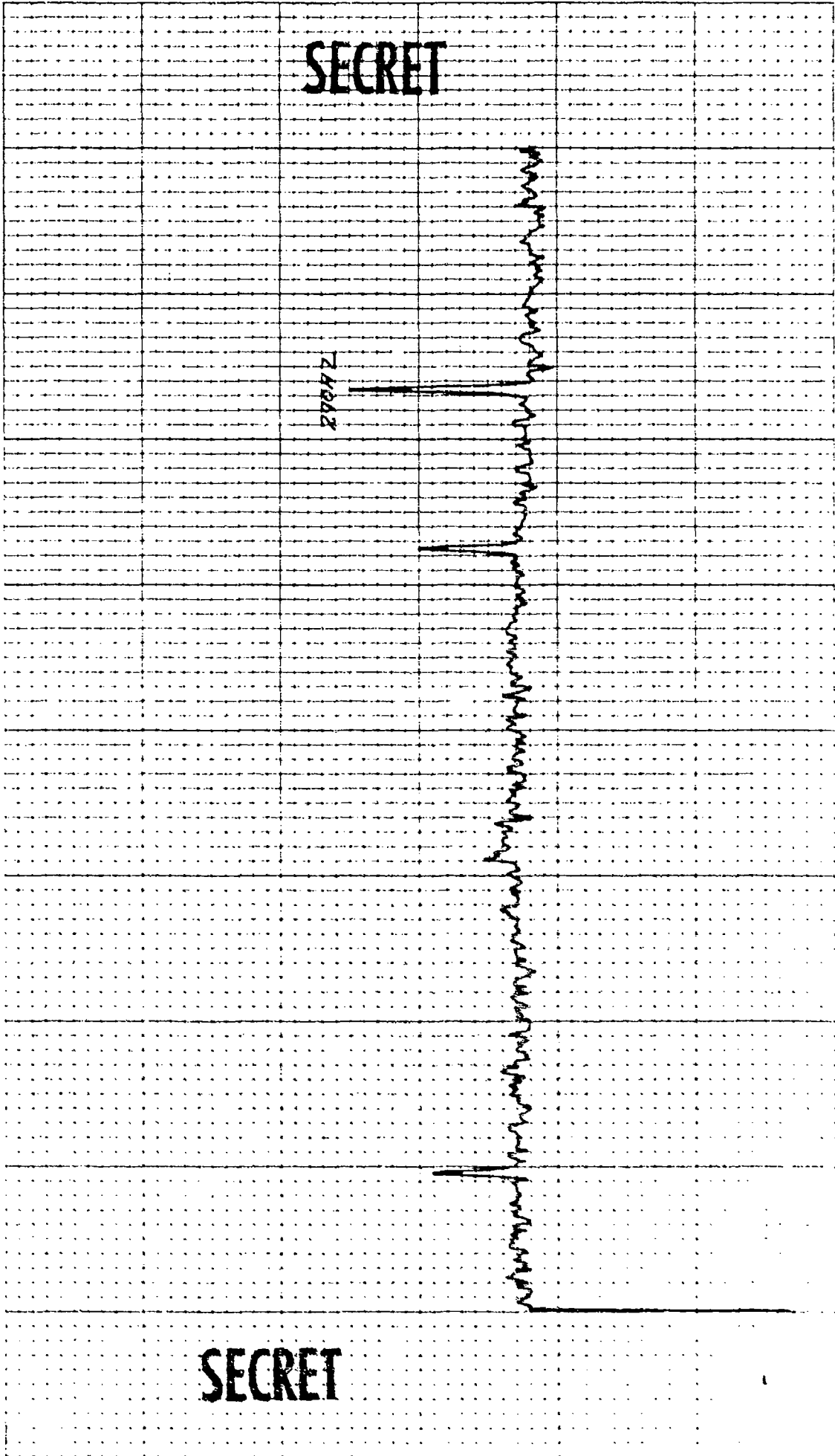
KGE 270110Z FEB 77

CONTROL: 27 - 1019 (1/6) DATE OF ANALYSIS: / - /
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 27-77 - 1019 Z
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ
 CENTER FREQ: 270 HZ + 24 DEG. AZ STEERING
 /6 ELEMENTS

REEL: F/5

INDE X 1955

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



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46 0703

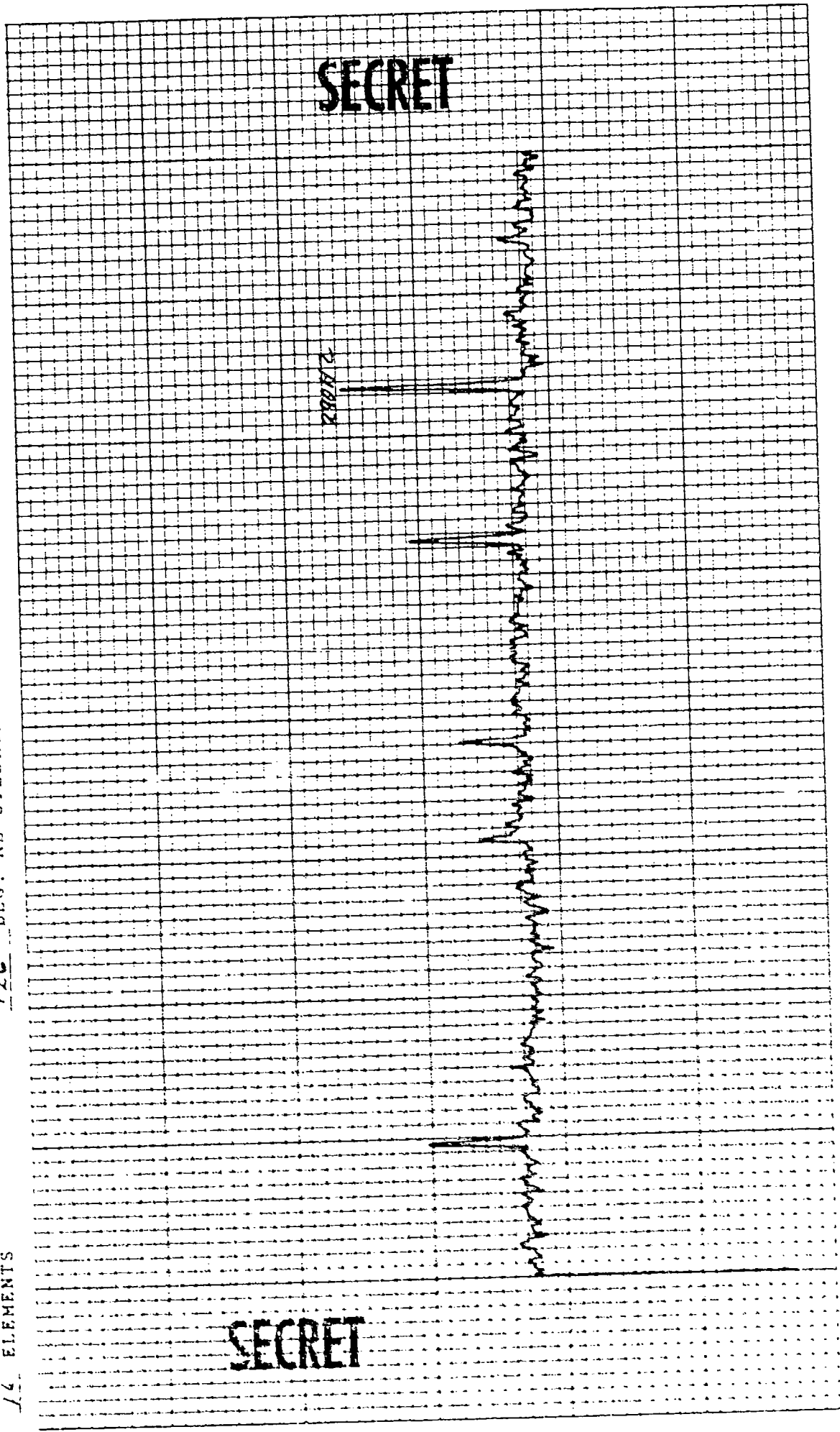
KOE 10 X 10 TO THE INCHES
WEINER & PAGER CO. MADE IN U.S.A.

REEL: F15 INDE X/1955

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

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

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



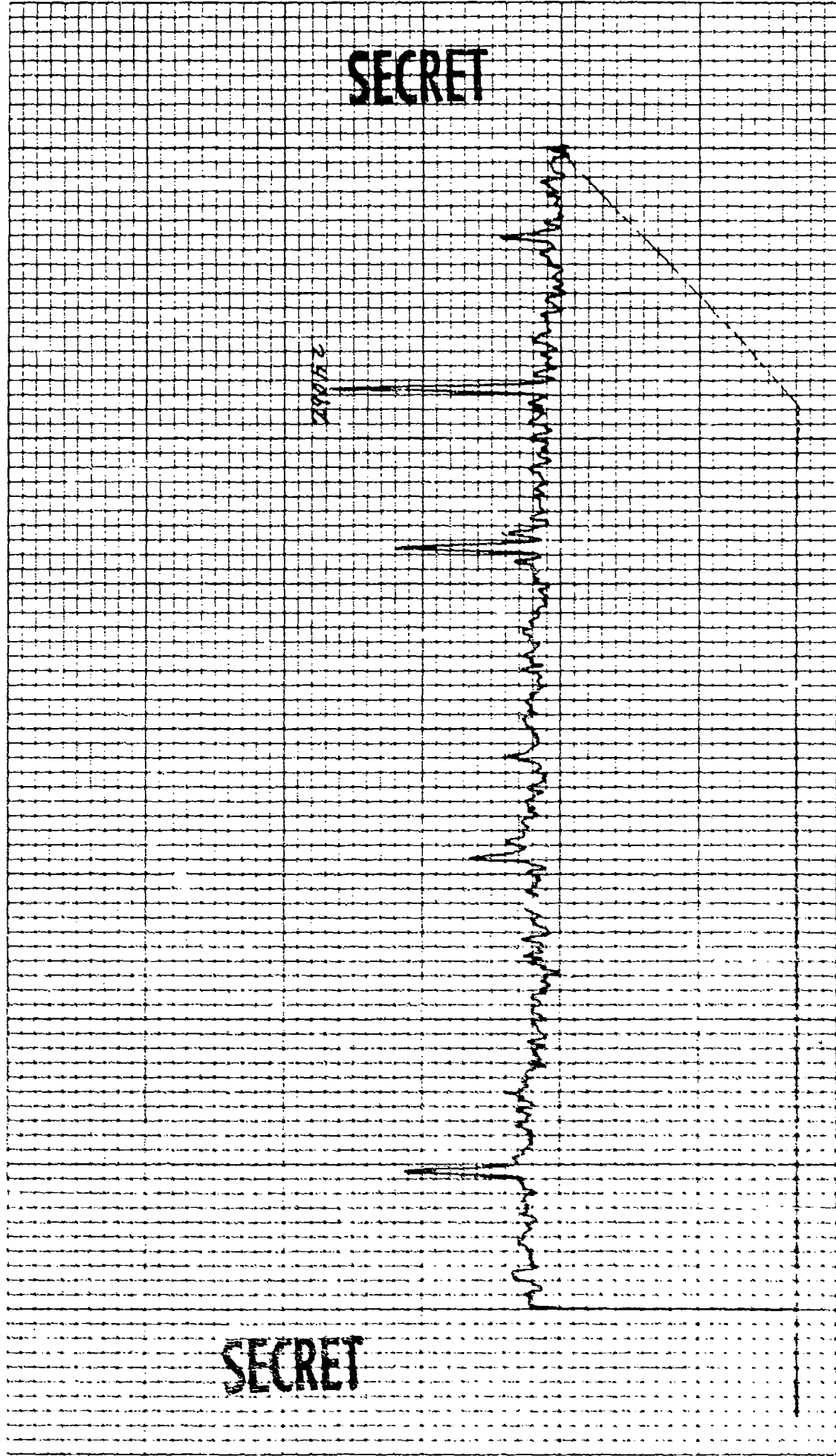
SECRET

SECRET

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

46 0703

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



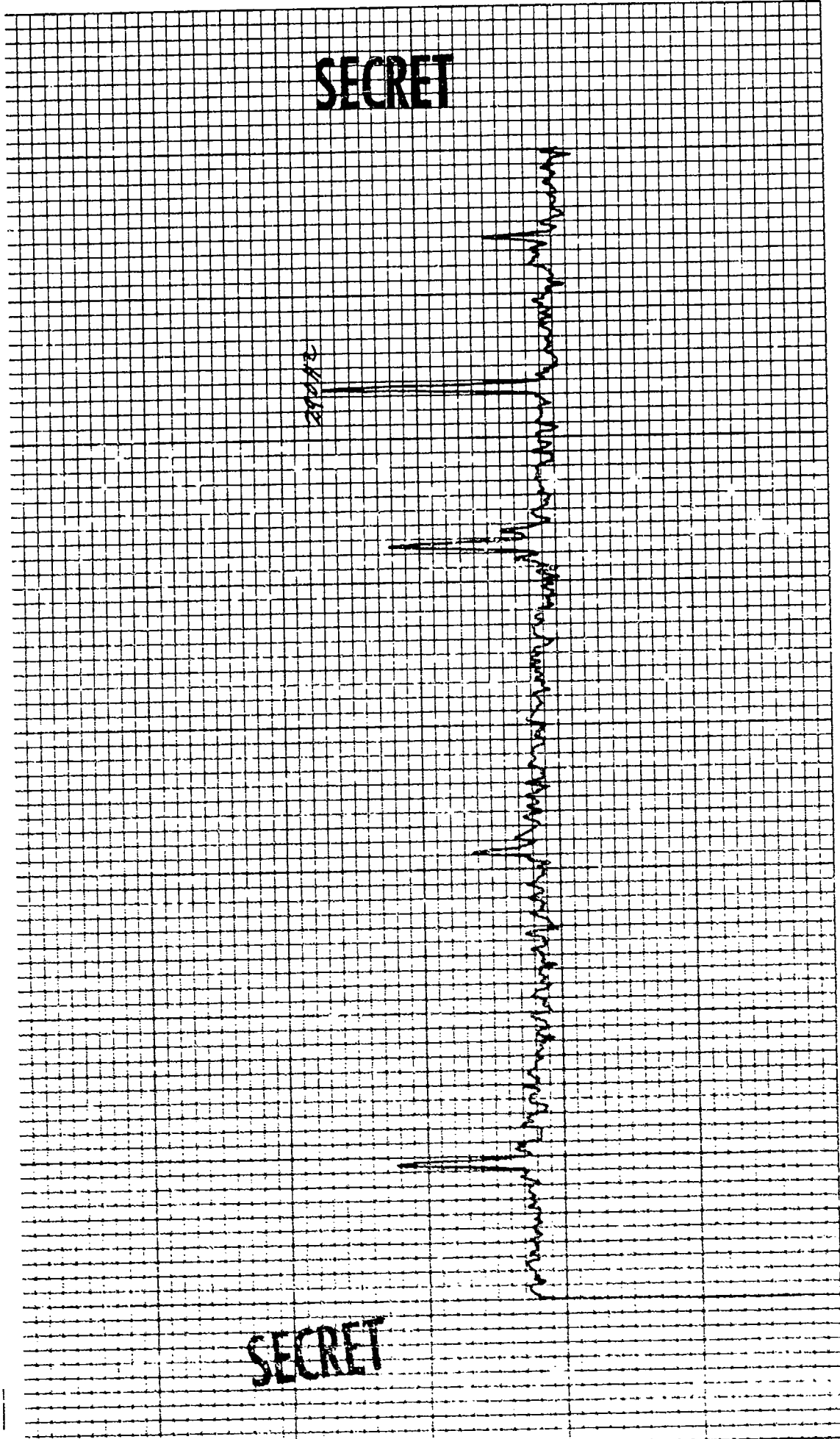
CONTROL: 2-7 - 1019 (16)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
 16 ELEMENTS

DATE OF ANALYSIS: 1-16

INTEGRATION TIME 320 SECS
 FILTER WIG: HANNING

REEL: F15 INDE X 1955

ATTEN: -10 DB



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

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

DATE OF ANALYSIS: 1-16-77

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

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

REEL: F/5

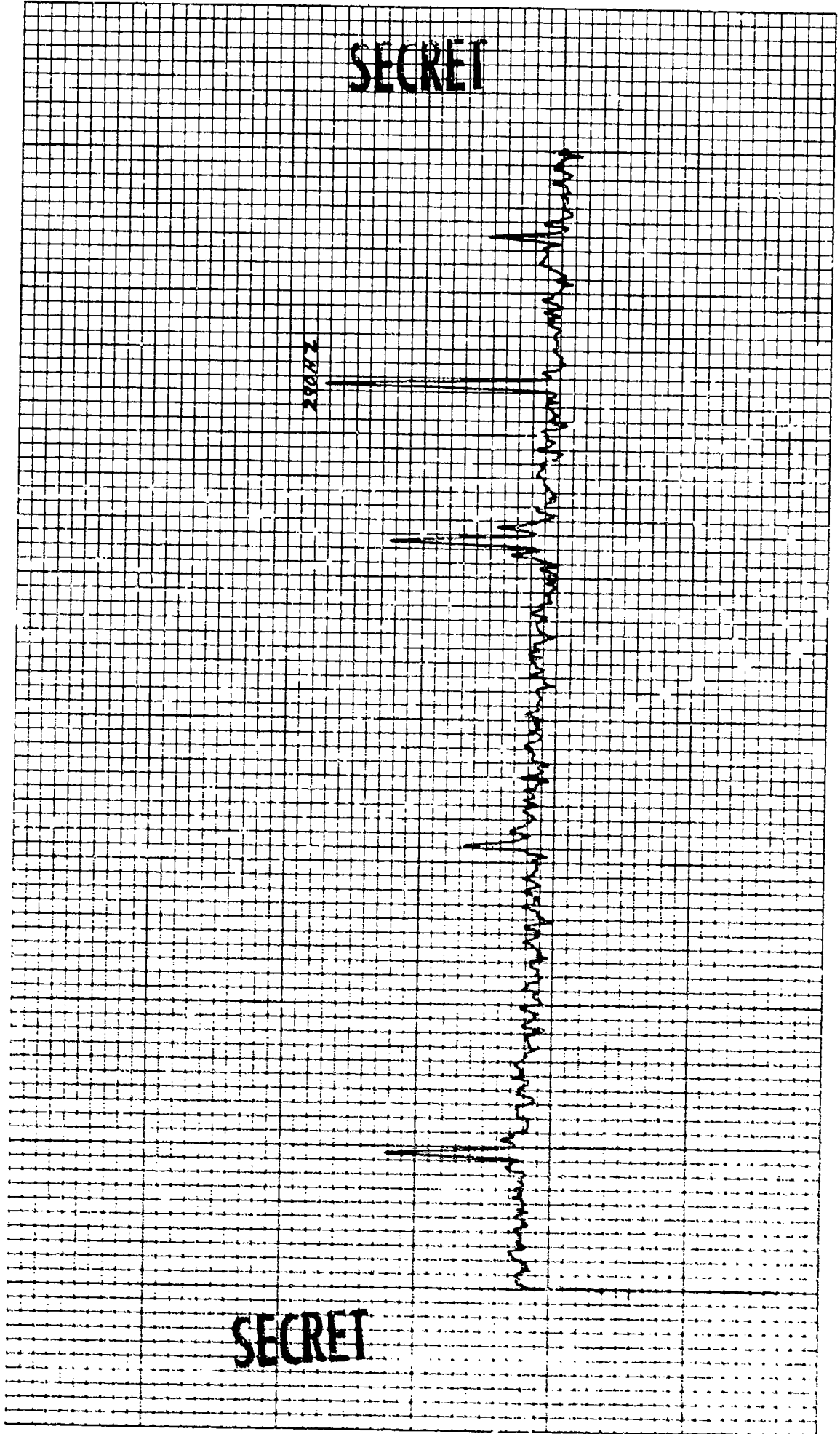
INDEX 1955

INTEGRATION TIME 320 SECS

ATTEN: 18 DB

FILTER

WTG: HANNING



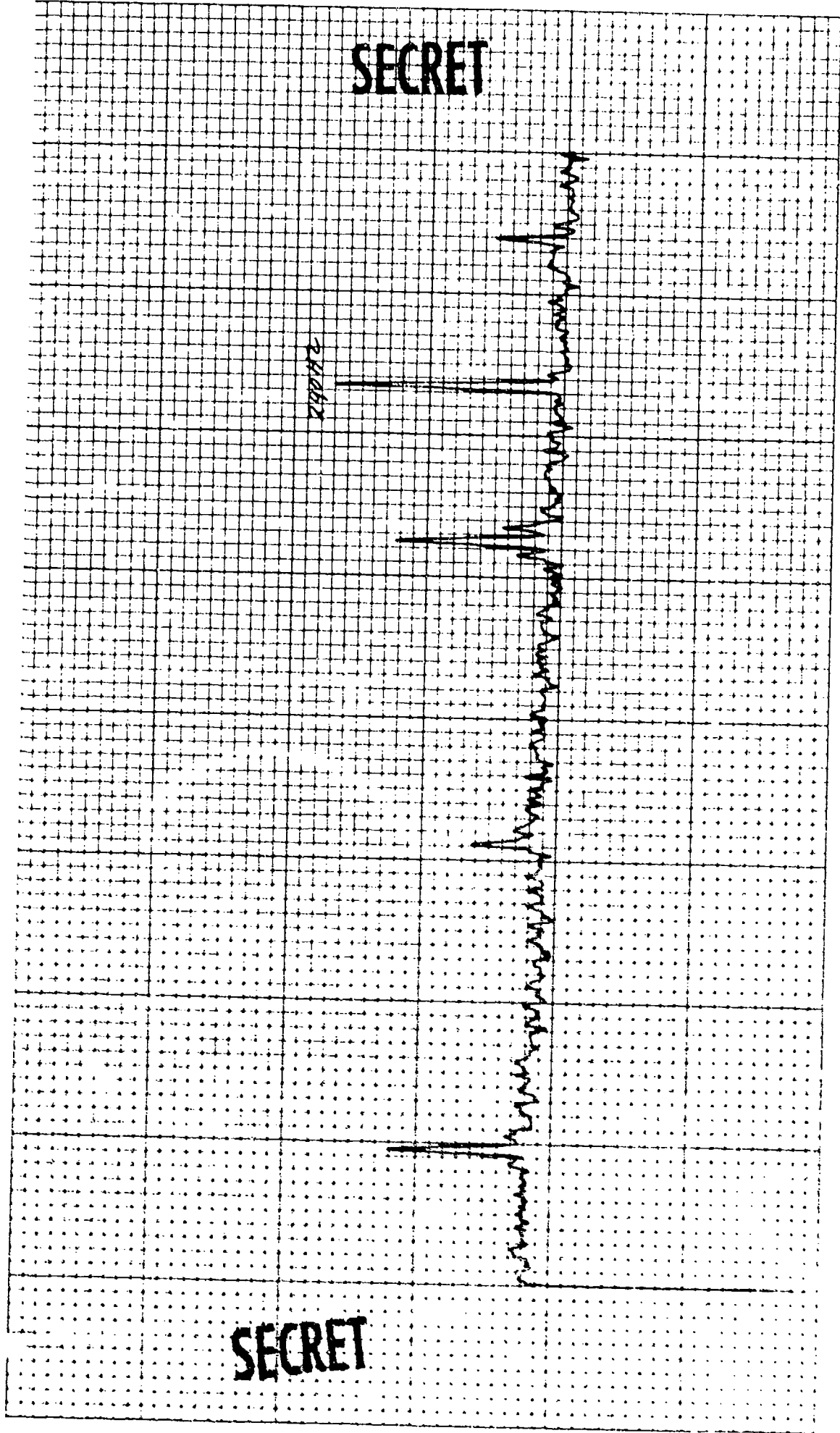
KOE 16.4 IS TO THE INCH. 2 IS INCHES
REDFIELD WESSEX CO. 4040 2111

46 0703

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

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

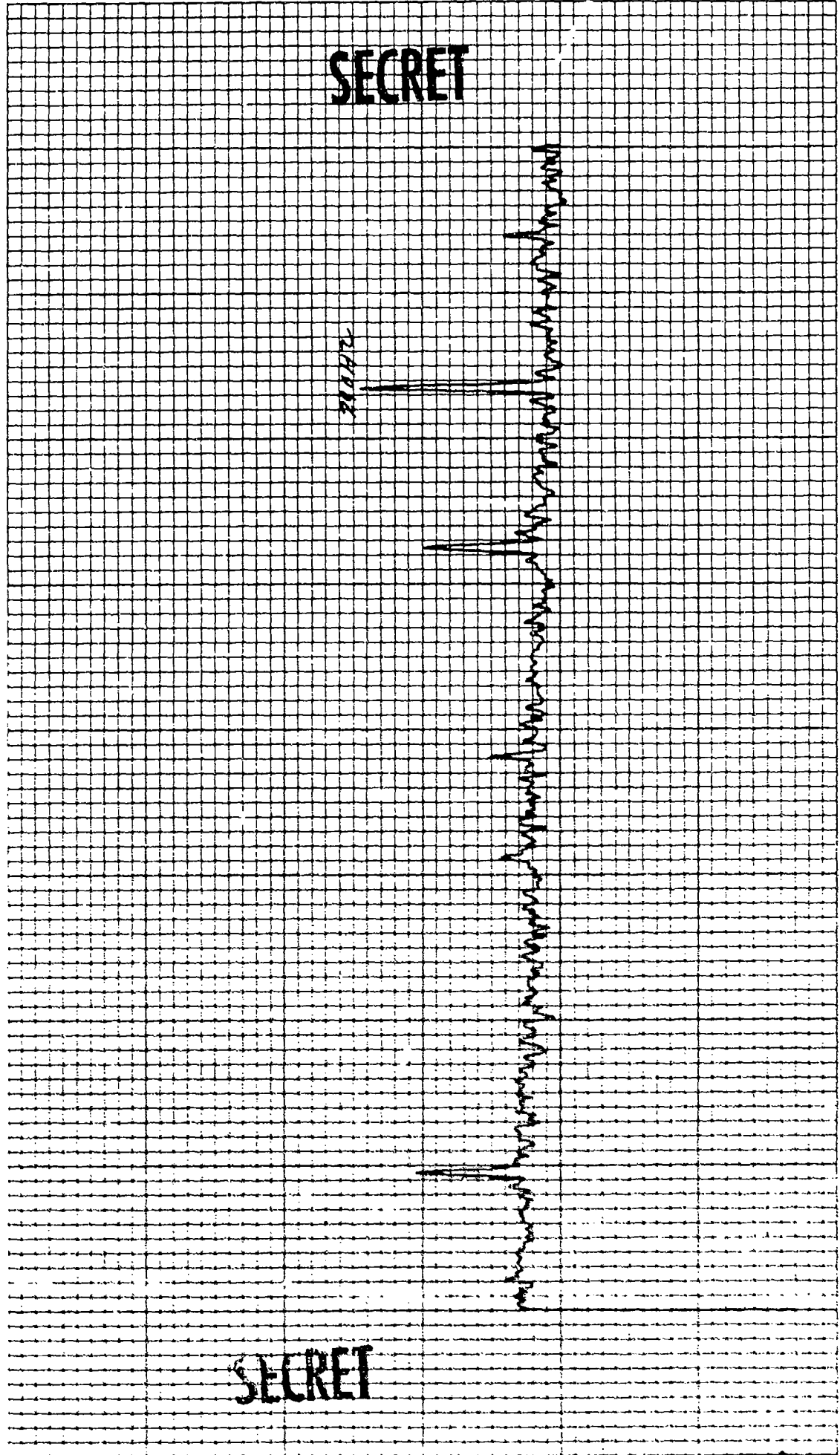
REEL: F15
 INTEGRATION TIME 320 SECS
 FILTER WTC: HANNING
 ATTN: -10 DB
 INDE X 1955



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

46 0703

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



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SECRET

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KOE 2312 THE MEMPHIS

REEL: F/5 INDE X/1955

INTEGATION TIME 320 SECS

ATTEN: -/0 DB
FILTER WIG: HANNING

DATE OF ANALYSIS: 1-76

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

ANALYSIS BANDWIDTH: 1/10HZ

+34 DEG. AZ STEERING

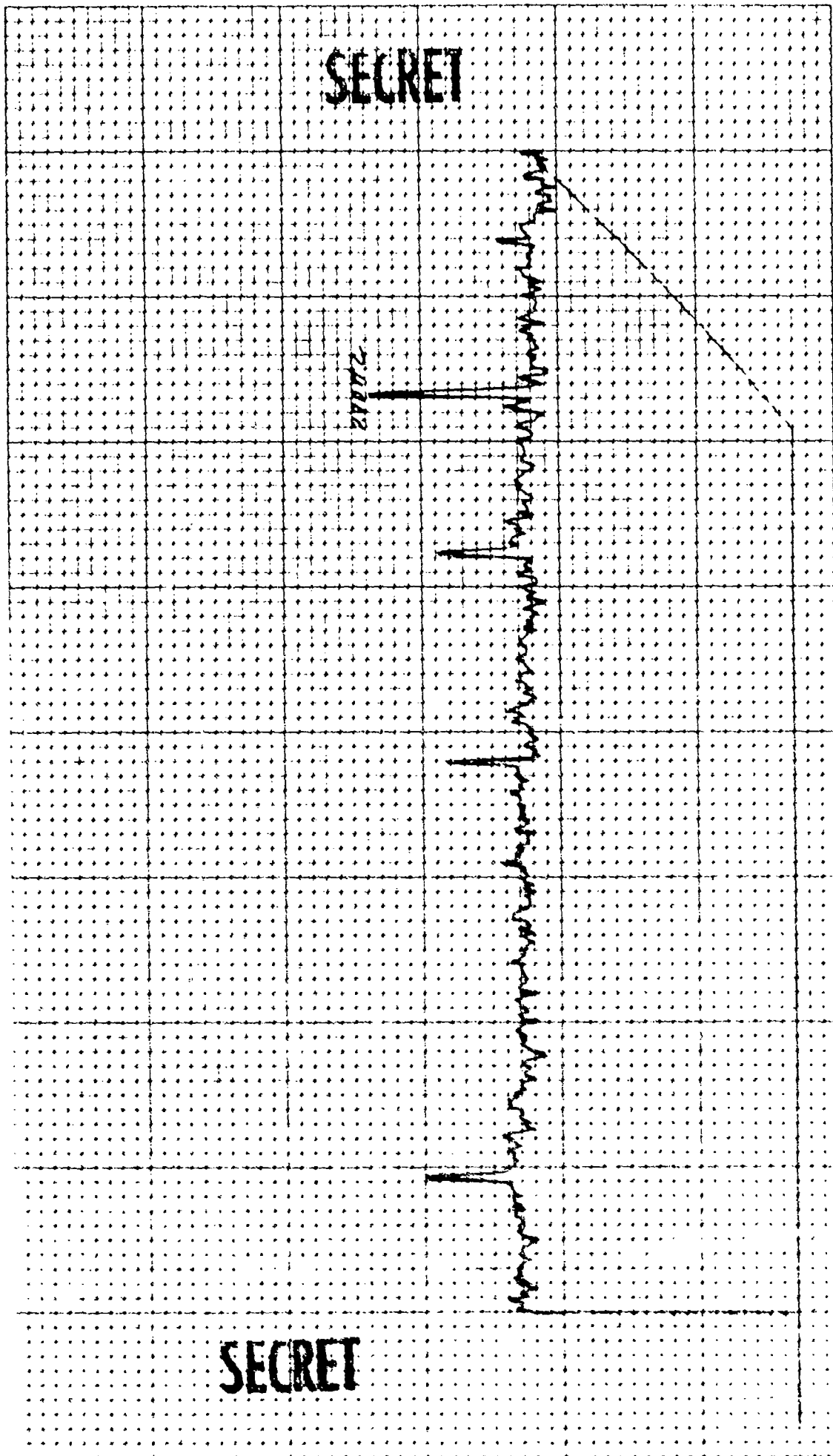
CONTROL: 27 -1019 (16)

BEAMFORMED SPECTRUM ELEMENTS

EXERCISE: BEARING STAKE

CENTREP FREQ: 270 HZ

ELEMENTS



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KOE 10 X 10 TO THE 10CM 7 X 10 INCHES
PERFECT PRESSED CO. MADE IN U.S.A.

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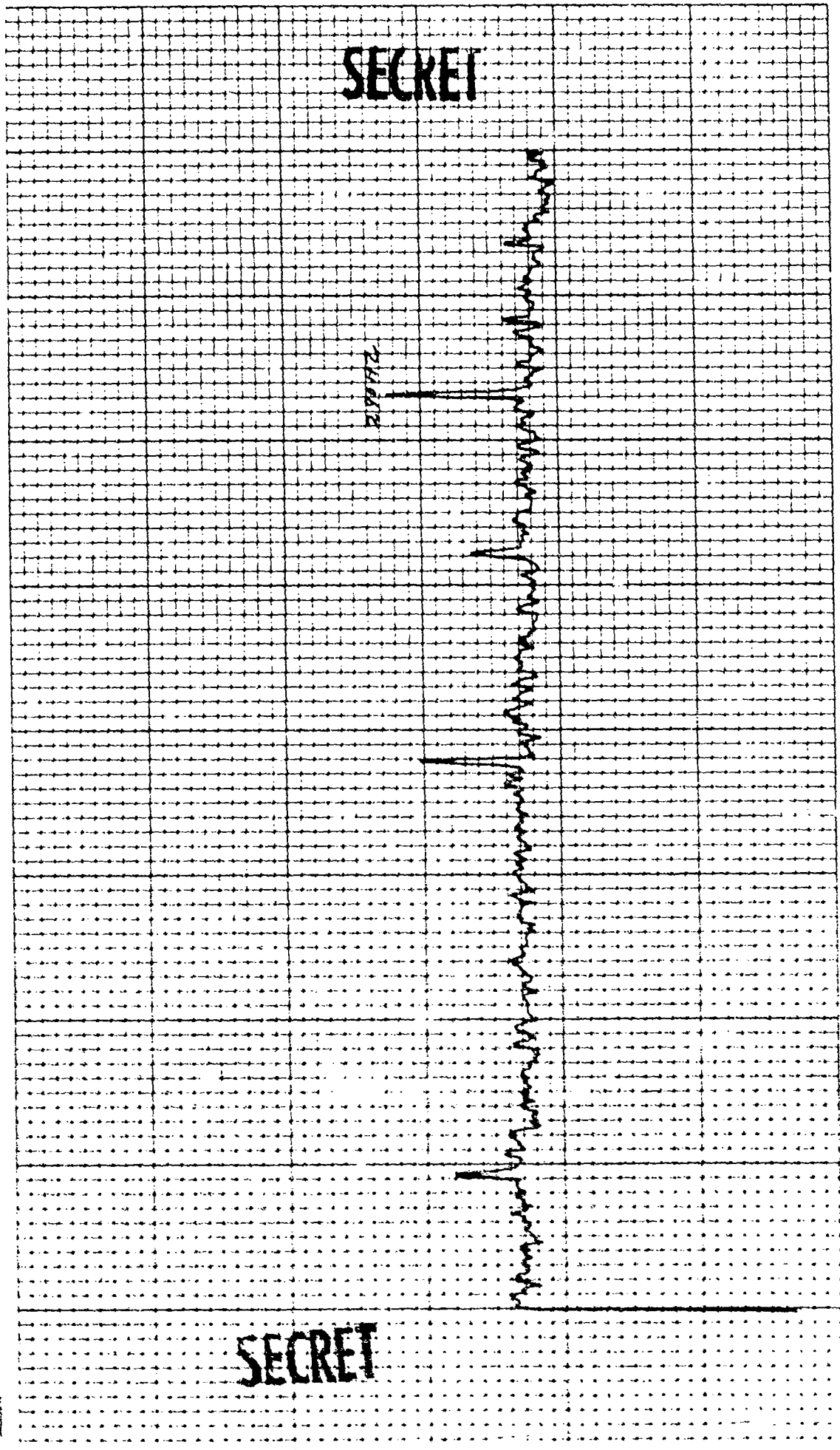
CONTROL: 2-7 -1019 (16)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS

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

DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 17/10HZ
+36 DEC. AZ STEERING

REEL: F/S
INDEX 1955

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



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

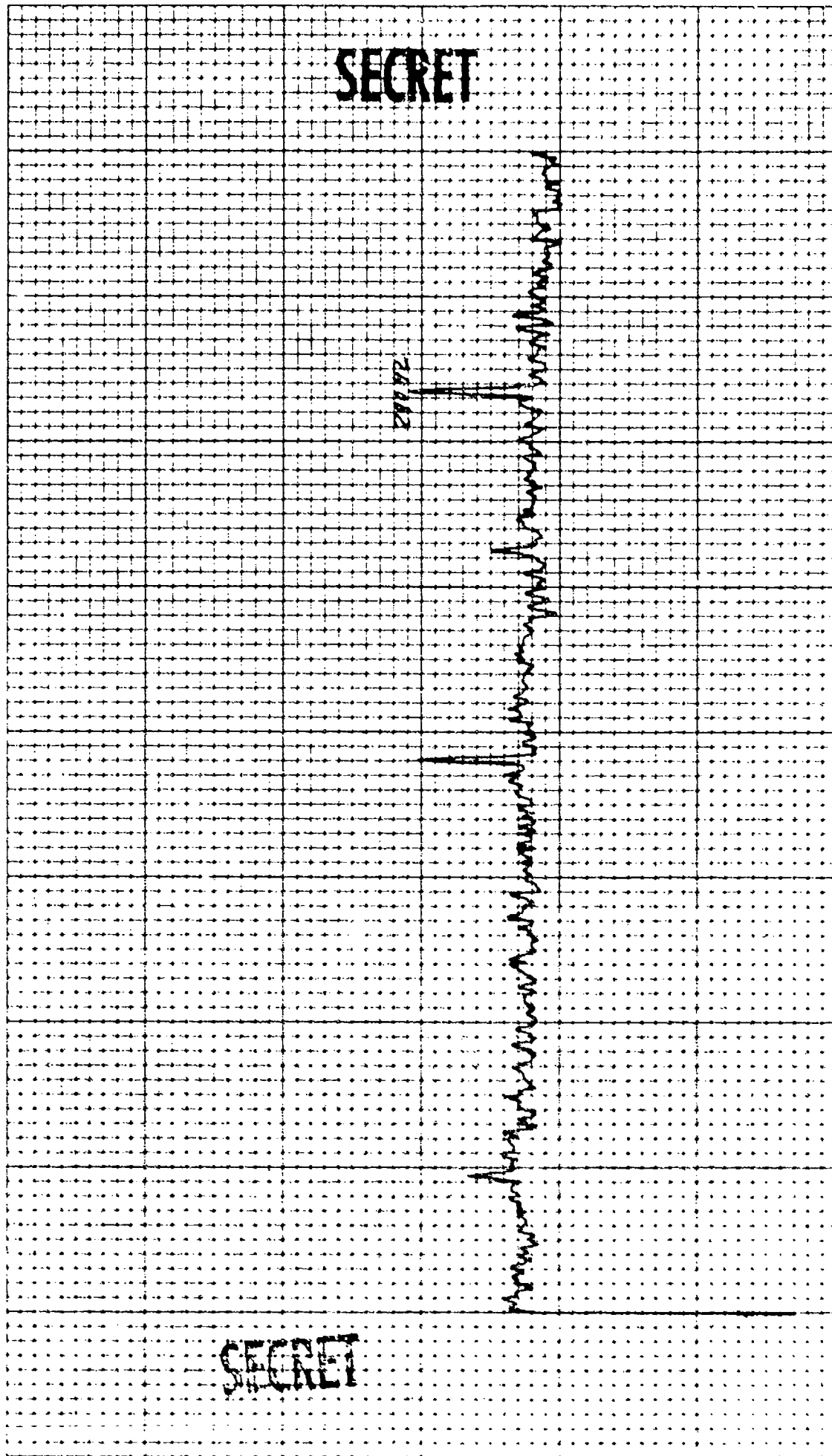
46 0703

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

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

REEL: F/5
INDE X/955

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



K-E 10 X 10 TO THE INCH. 2 1/2 INCHES
HEUFFEL & PAPER CO. MADE IN U.S.A.

46 0703

CONTROL: 2-7 - 1019 (16)
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: _____
EXERCISE: BEAKING STAKE / - / C REEL: FIS INDE X / 955
CENTER FREQ: 270 KHZ ANALYSIS BANDWIDTH: 1 / 10 HZ INTEGRATION TIME 320 SECS ATTEN: -10 DB
16 ELEMENTS +40 DEC. AZ STEERING FILTIER WTG: HANNING

SECRET

SECRET



CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 4

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

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

NOISE LEVEL

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

SIGNAL-NOISE-RATIO

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

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SIGNAL LEVEL AND SNR

CALCULATIONS

ATA POINT 4

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

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

NOISE LEVEL

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

SIGNAL-NOISE-RATIO

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

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DATA POINT 4

SIGNAL GAIN

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

ARRAY GAIN

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

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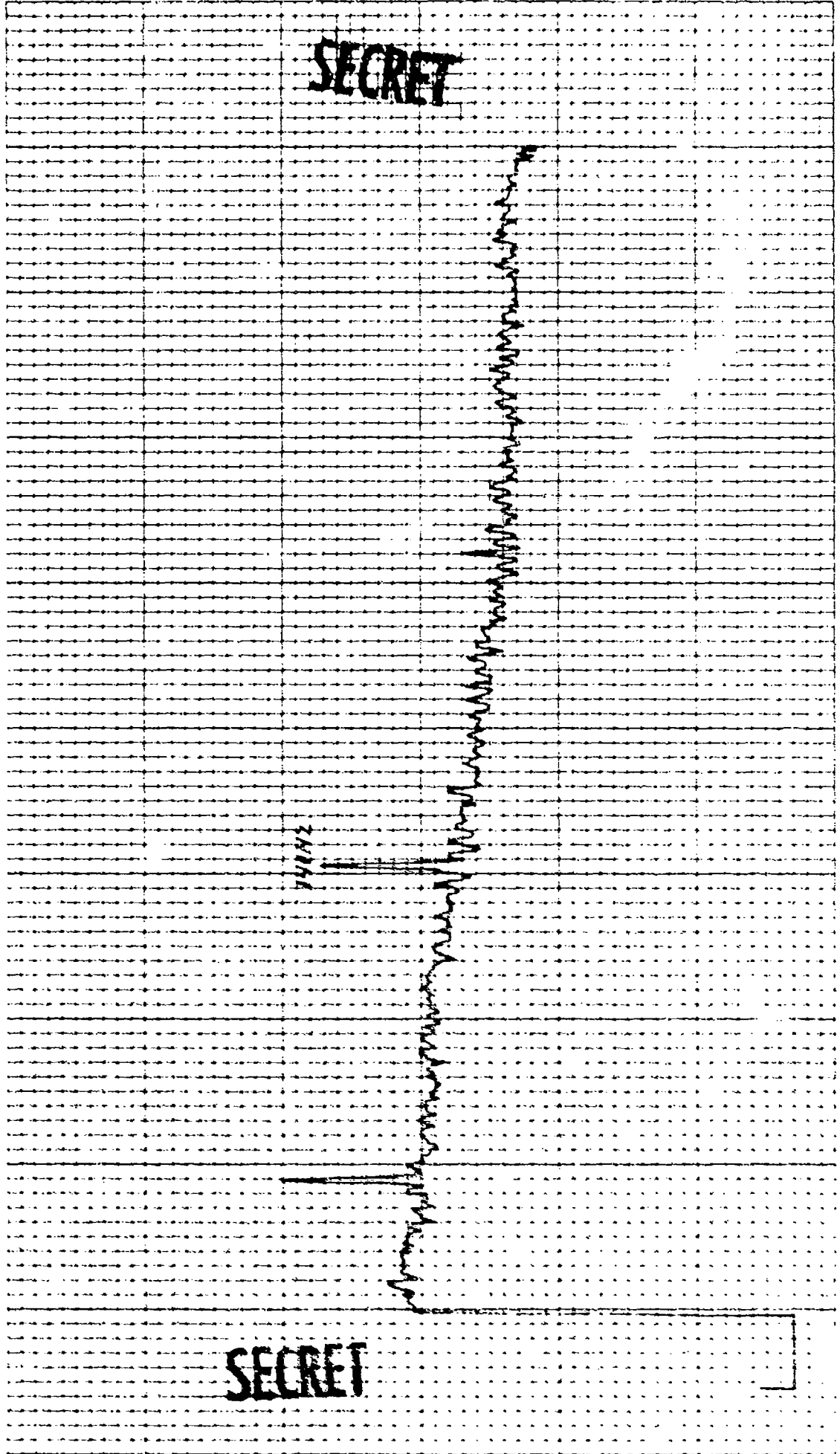
46 0703

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

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

REEL: F75
INDE X/955

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

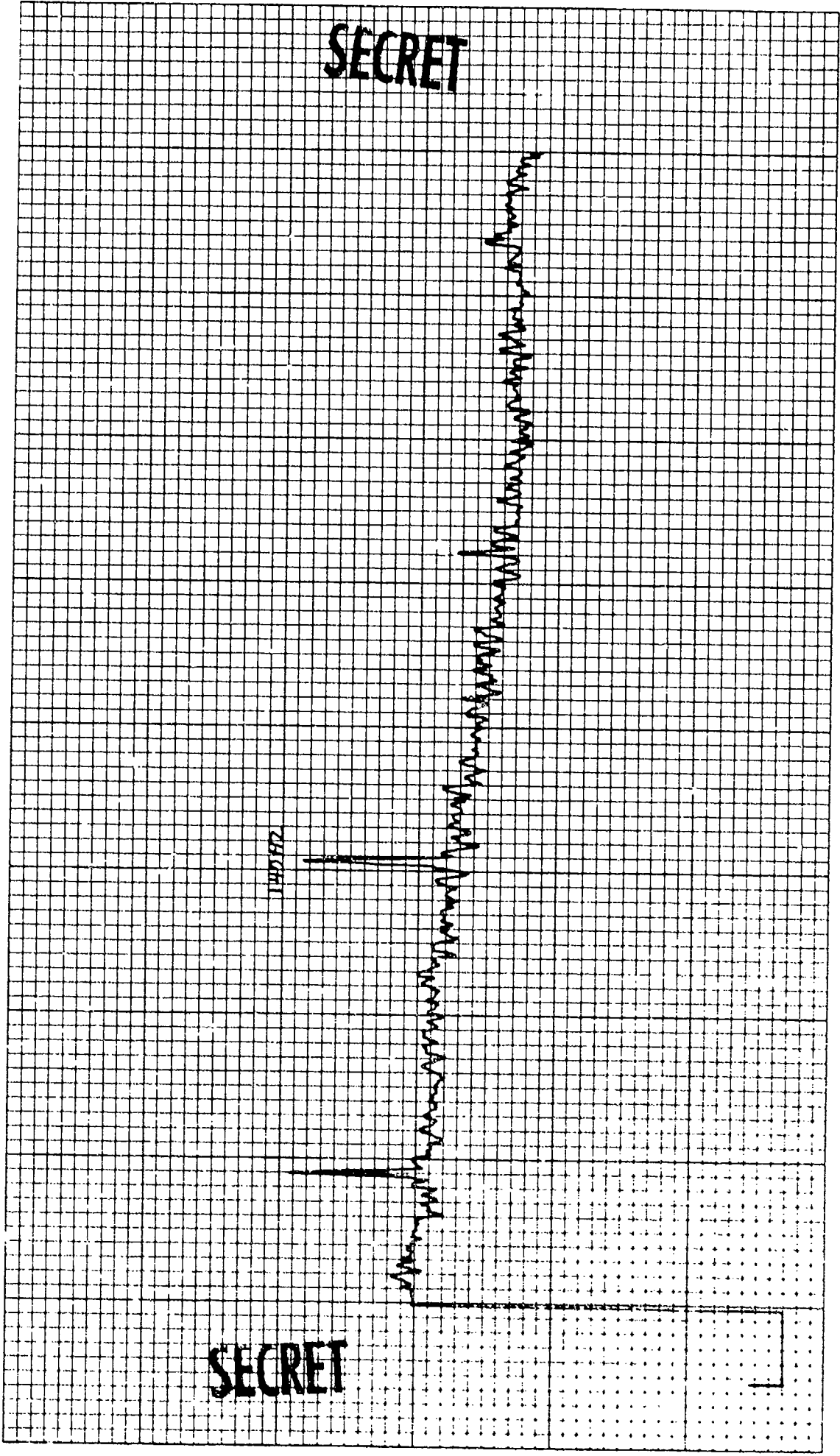


CONTROL: 2-7 -1019 (32)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 32 ELEMENTS

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

REEL: F15
 INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

INDEX 1955



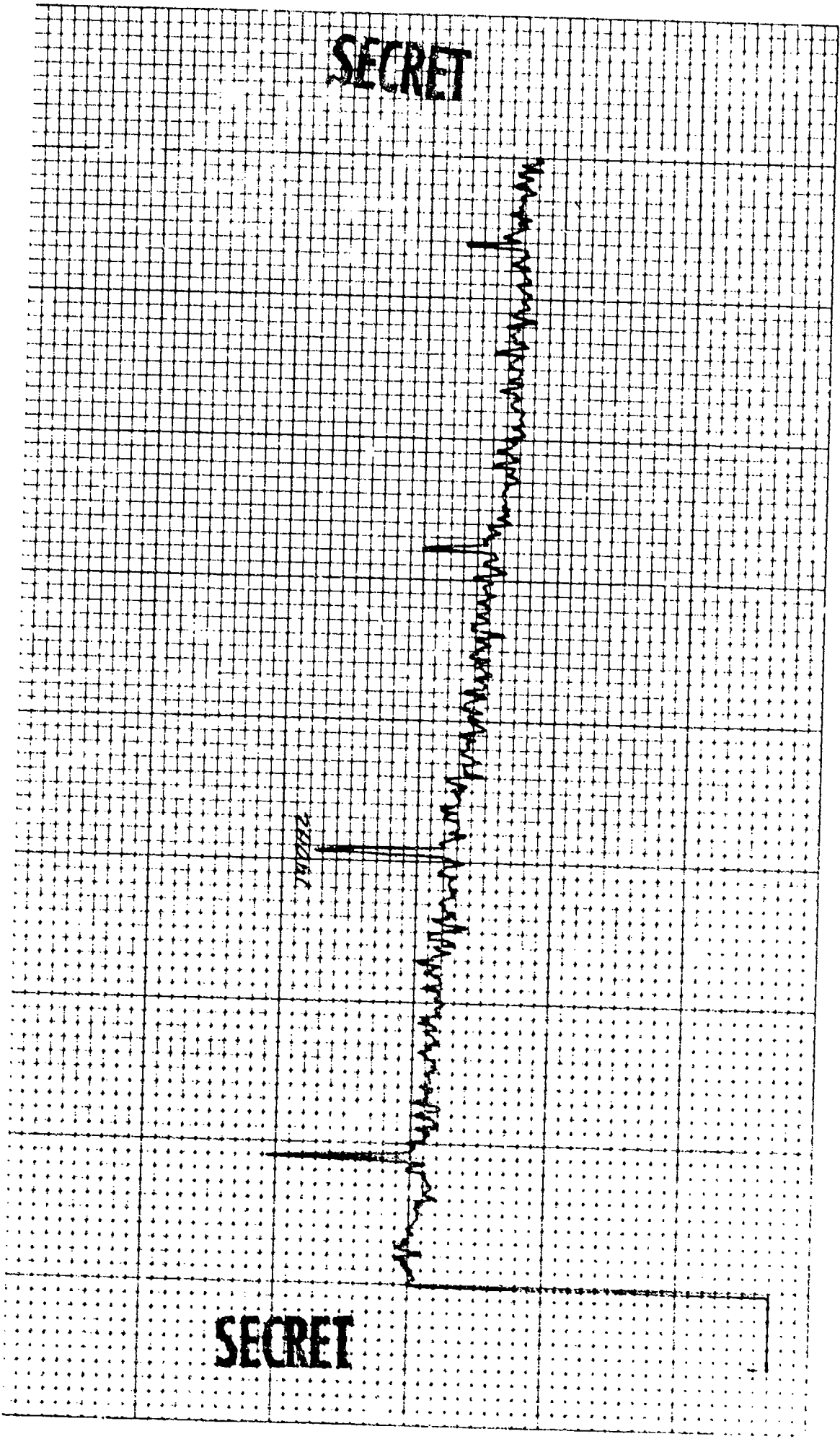
K-E 10.16 10 THE INCHES 7 10 INCHES
PREFLEX & ESSER CO MADE IN U.S.A.

46 0703

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

DATE OF ANALYSIS: 1-26-77
DATE/TIME: 2-7-77 1015
ANALYSIS BANDWIDTH: 1/10 HZ
+20 DEG. AZ STEERING

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



SECRET

SECRET

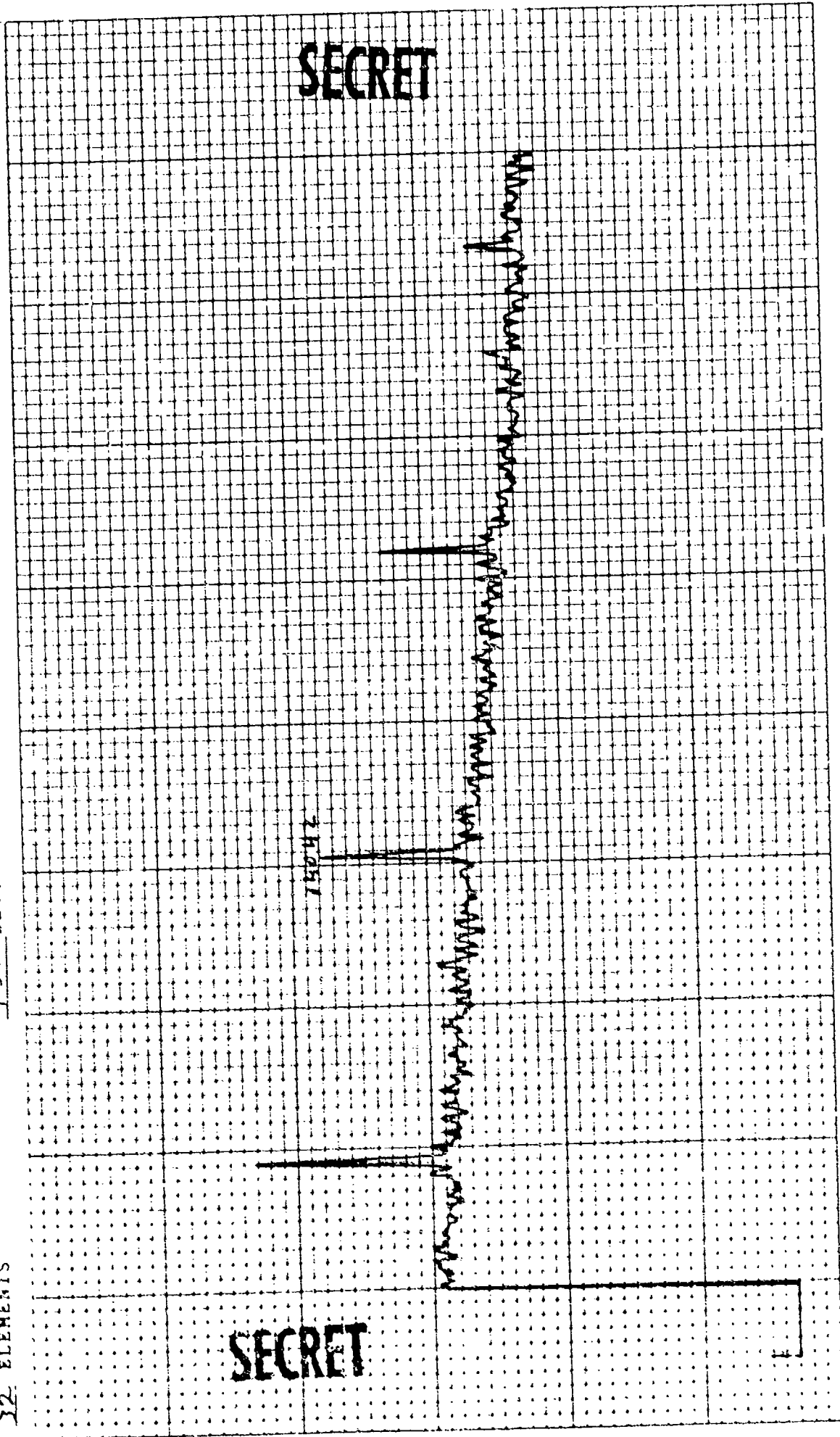
46 0703

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

REEL: F15 INDEX X/1955

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

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



46 0705

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

REEL: F/S INDE X/1955

REEL: F/S

DATE OF ANALYSIS: 1-26-77

CONTROL: 2-7-1019 (32)

BEAMFORMED SPECTRUM (ELEMENTS)

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

32 ELEMENTS

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

ANALYSIS BANDWIDTH: 1,10 HZ

121 DEG. AZ STEERING

INTEGRATION TIME 320 SECS

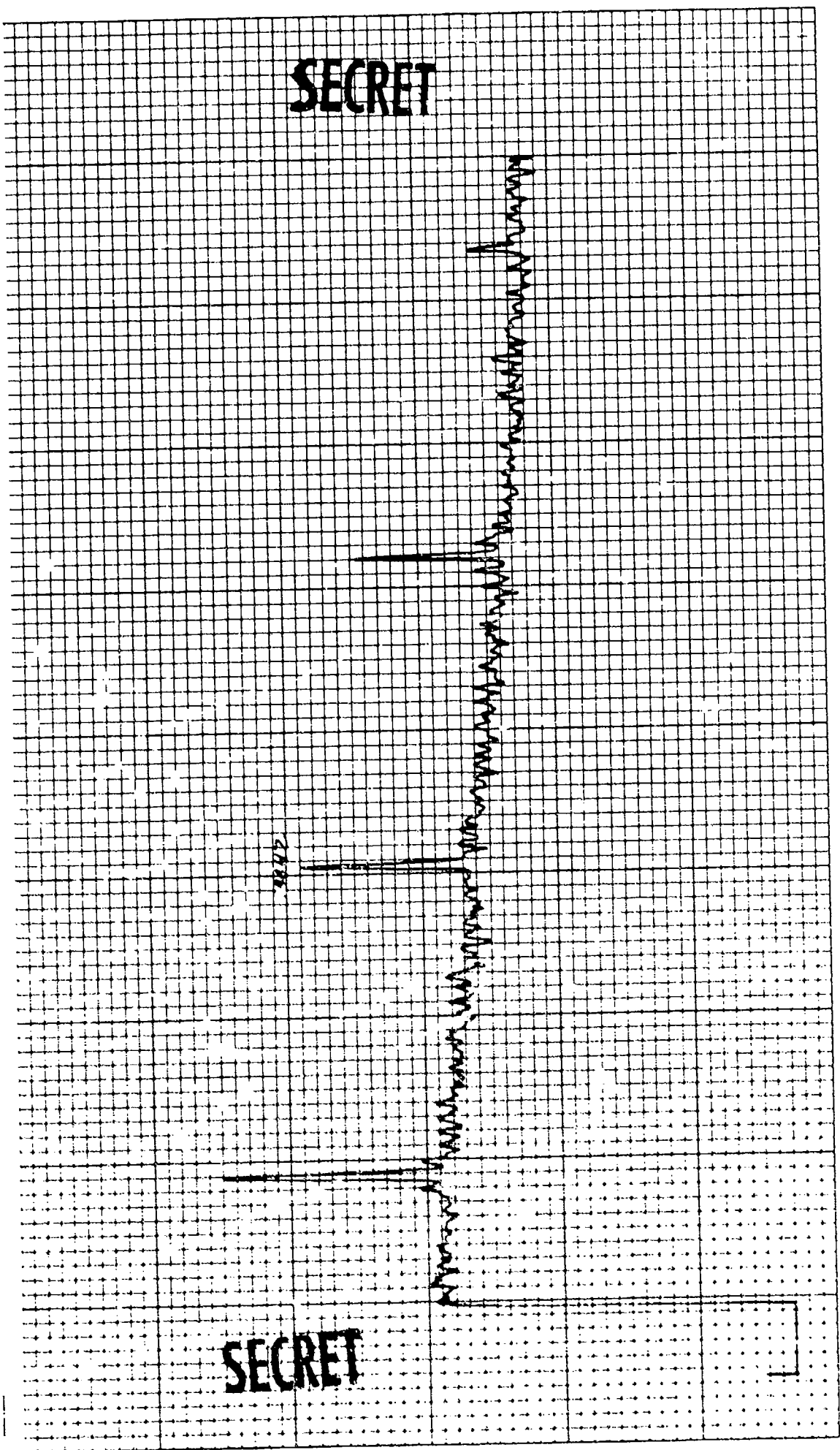
FILTER

ATTEN: 34 DB

WTC: HANNING

SECRET

SECRET



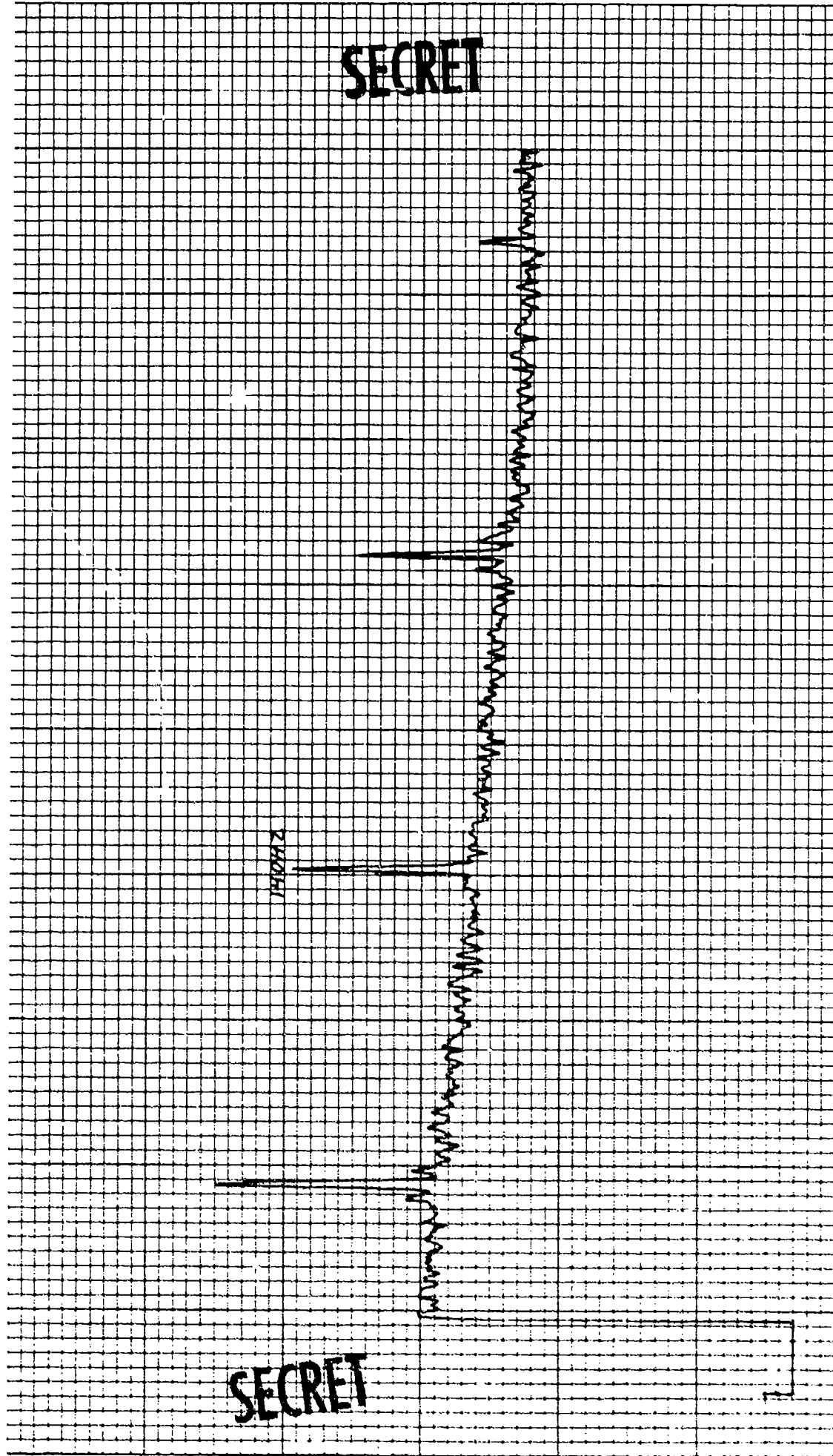
KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
ALUPPEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 27 -1019 (32)
BEAMFORMED SPECTRUM(ELEMENTS 1-26 & 29-34)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS
DATE OF ANALYSIS: - - - -
DATE/TIME: 2-7-77 -1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
+3/-5 DEG. AZ STEERING

REEL: F15 INDE X/1955

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



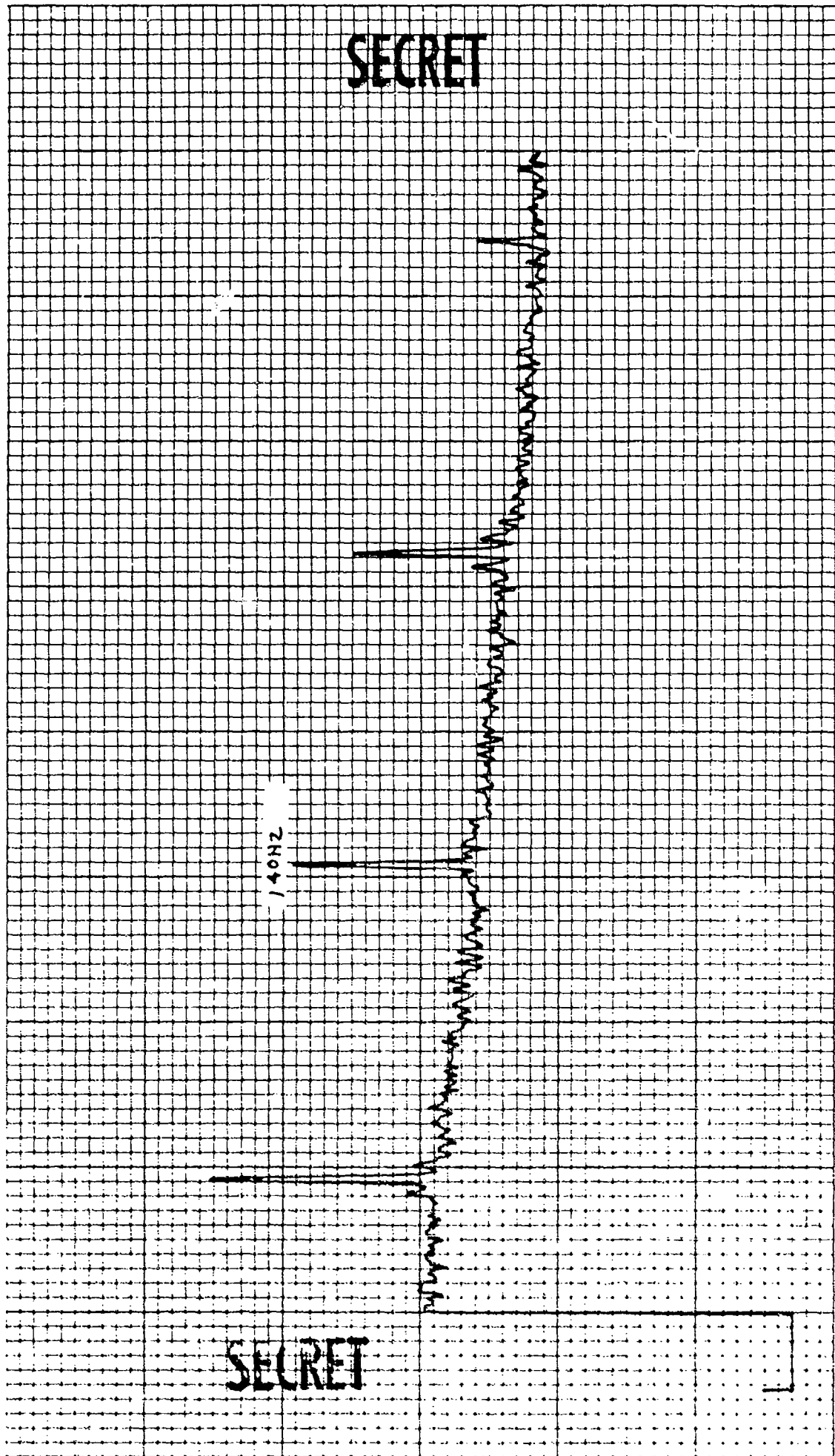
MSE 10 X 10 TO THE INCH • 2 X 10 INCHES
NEUPFEL & ESSER CO. MADE IN U.S.A.

46 0703

3-326

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

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



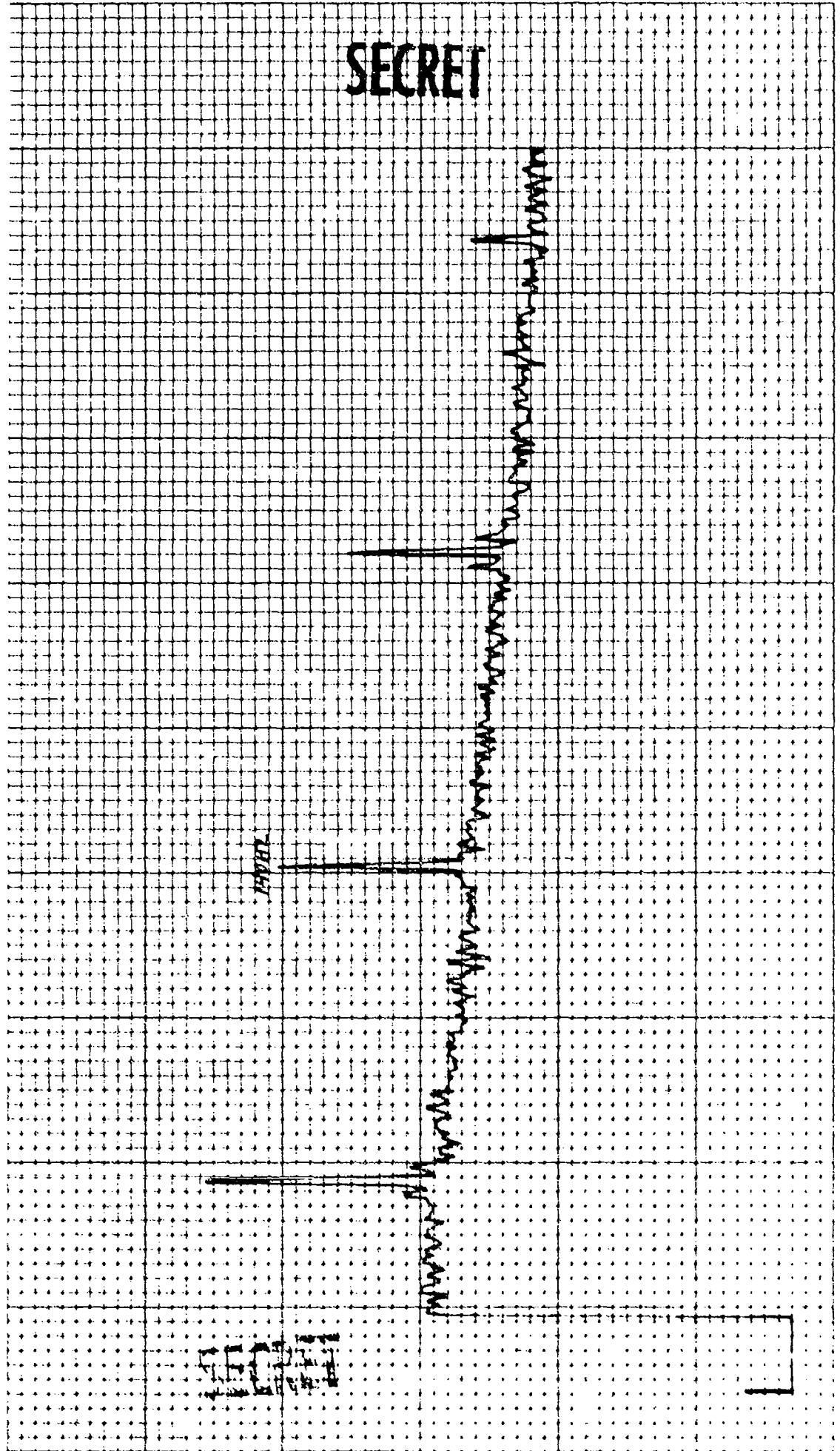
46 0703

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

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

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

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



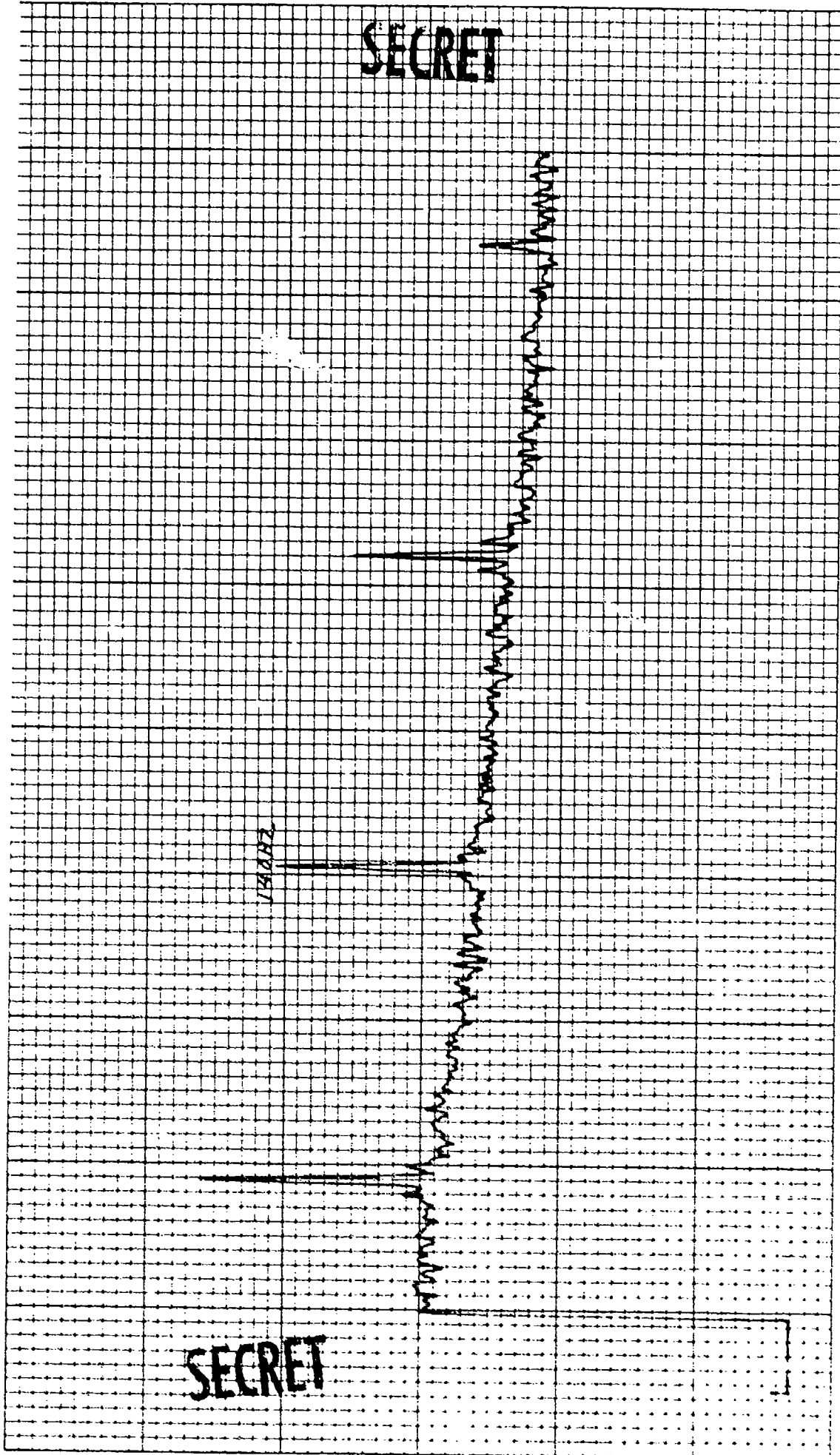
KOE 10 X 10 TO THE INCH .7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

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

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

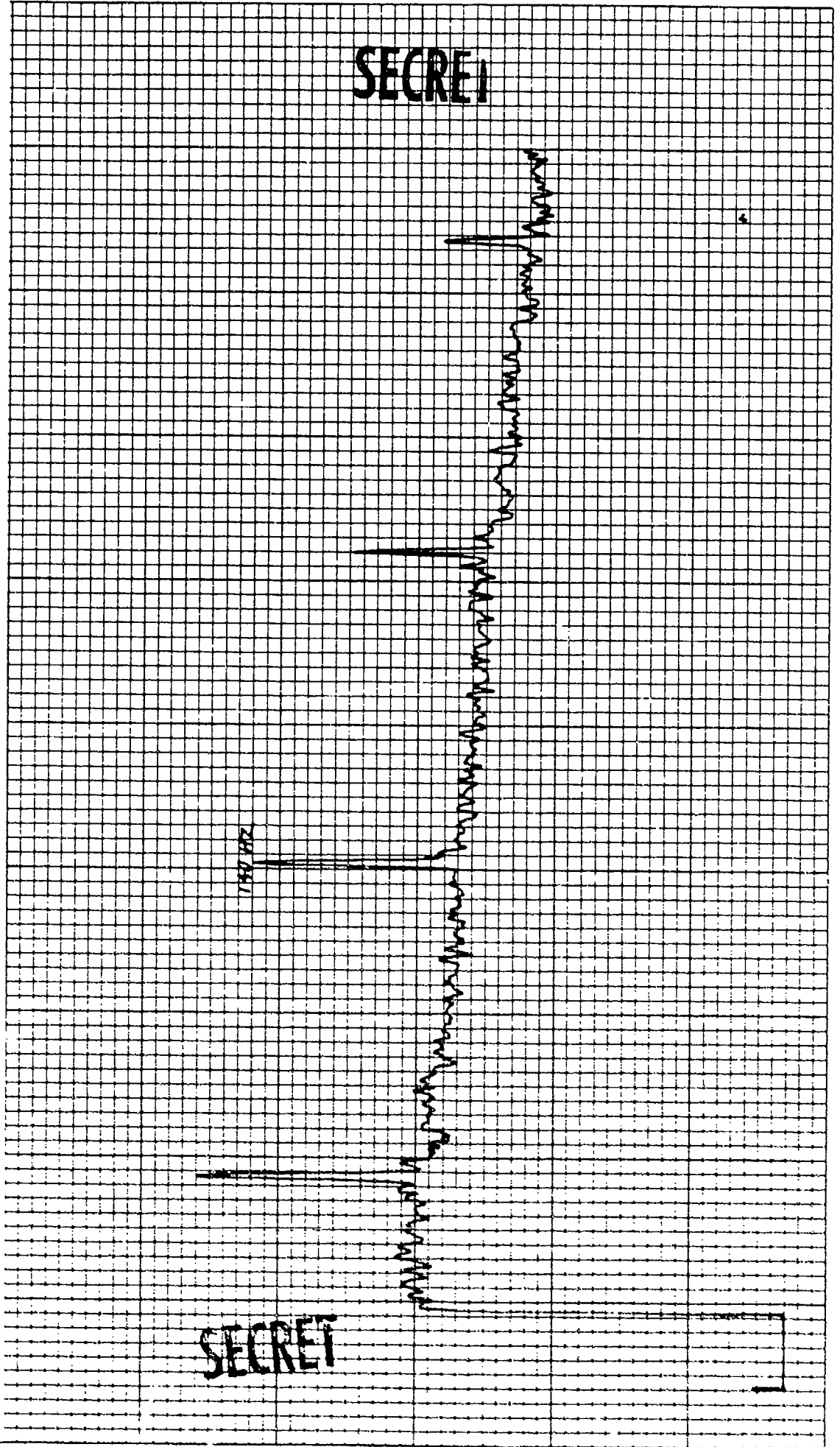
REEL: F15 INDE X1955
INTEGRATION TIME 320 SECS ATTN: -24DB
FILTER WTG: HANNING



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

46 0703

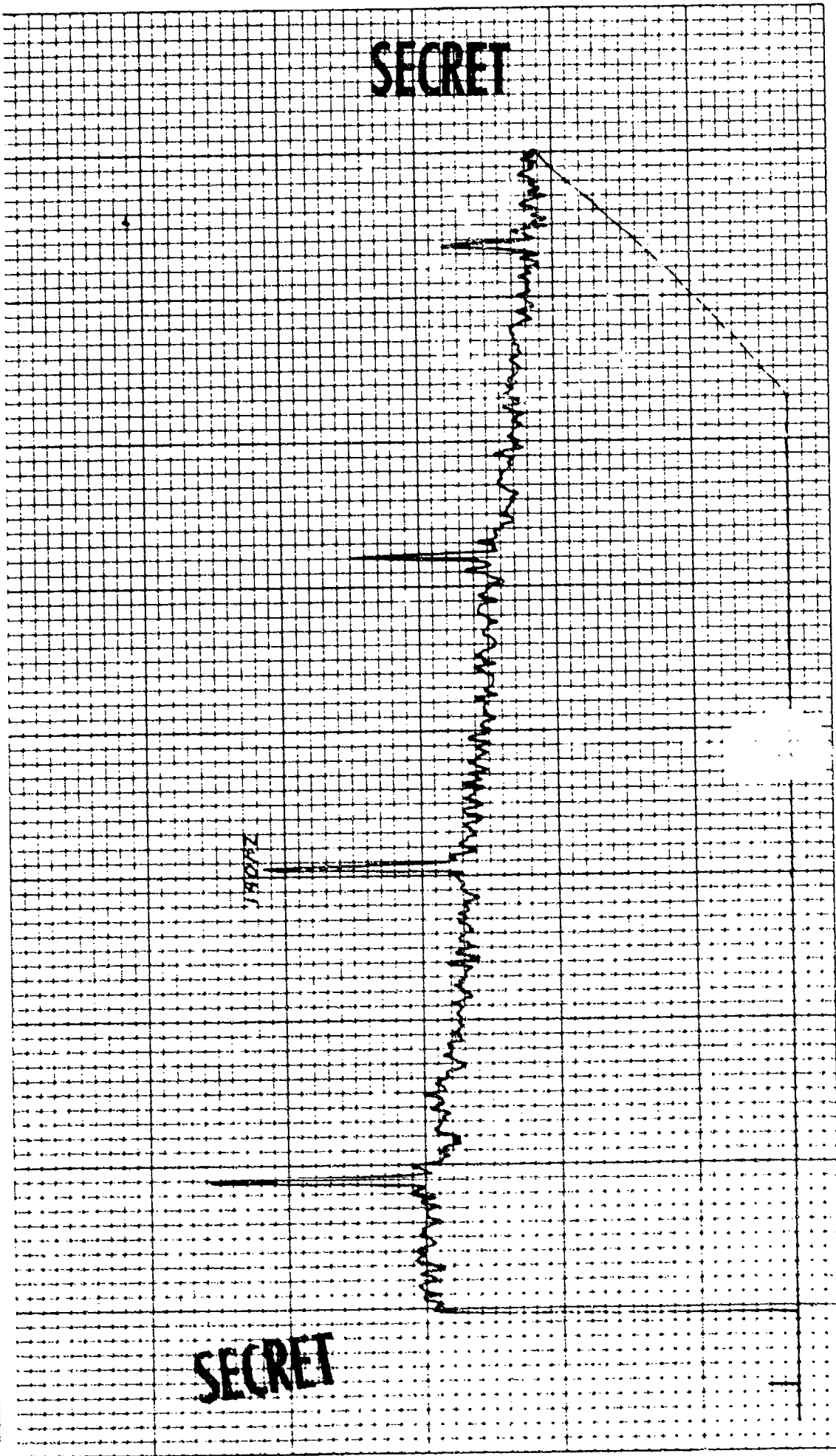
CONTROL: 2-7-1019 (J2) DATE OF ANALYSIS: 1-26-64 29-J4)
BEAMFORMED SPECTRUM(ELEMENTS) REEL: F15 INDE X 1955
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: -24 DB
CENTER FREQ: 150 HZ FILTER WTC: HANNING
32 ELEMENTS DEG. AZ STEERING



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

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

INDE X 1955



SECRET

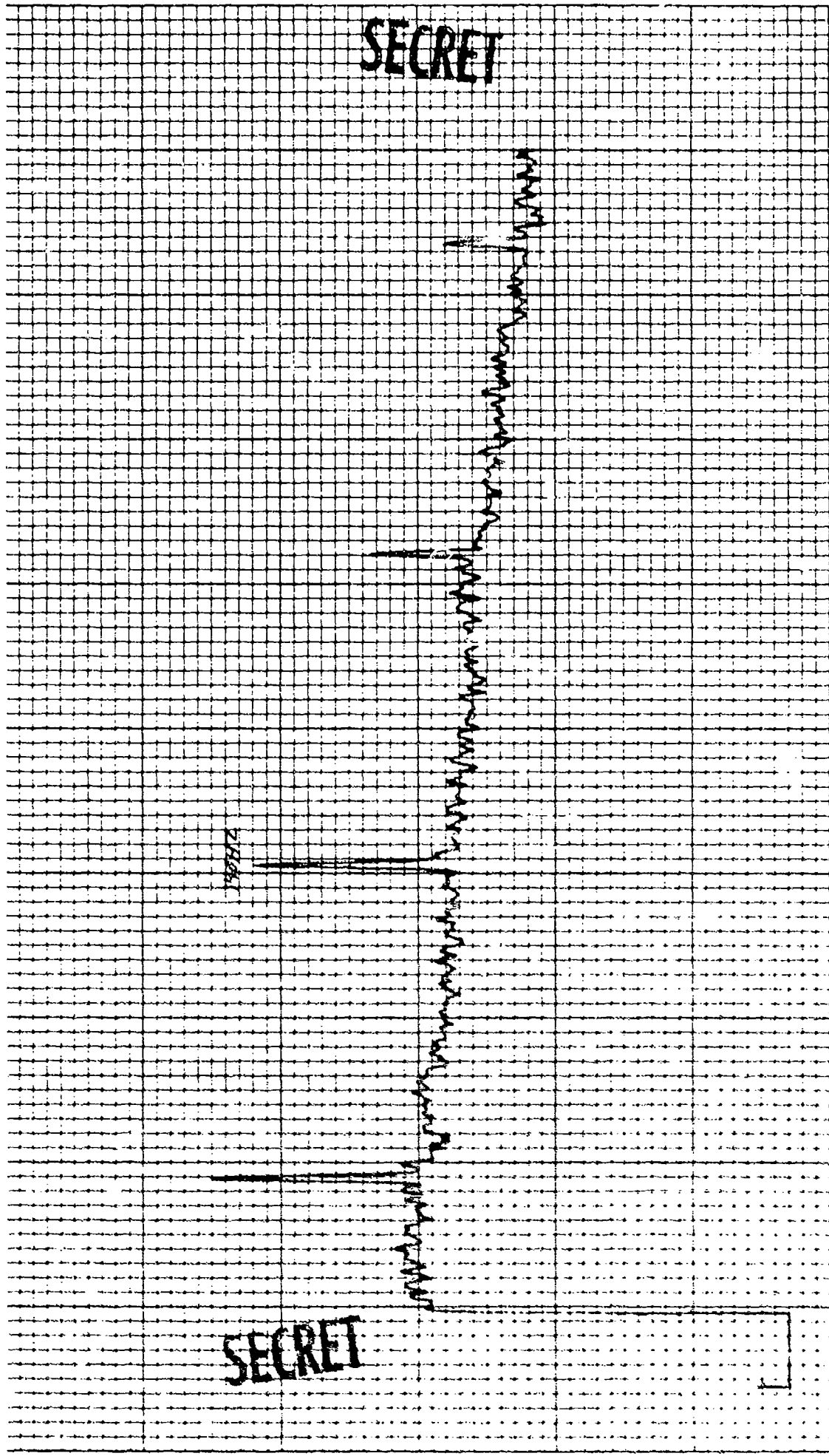
SECRET

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

46 0703

CONTROL: 27 - 1019 (32) DATE OF ANALYSIS: 1 - 26 89-34
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS

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

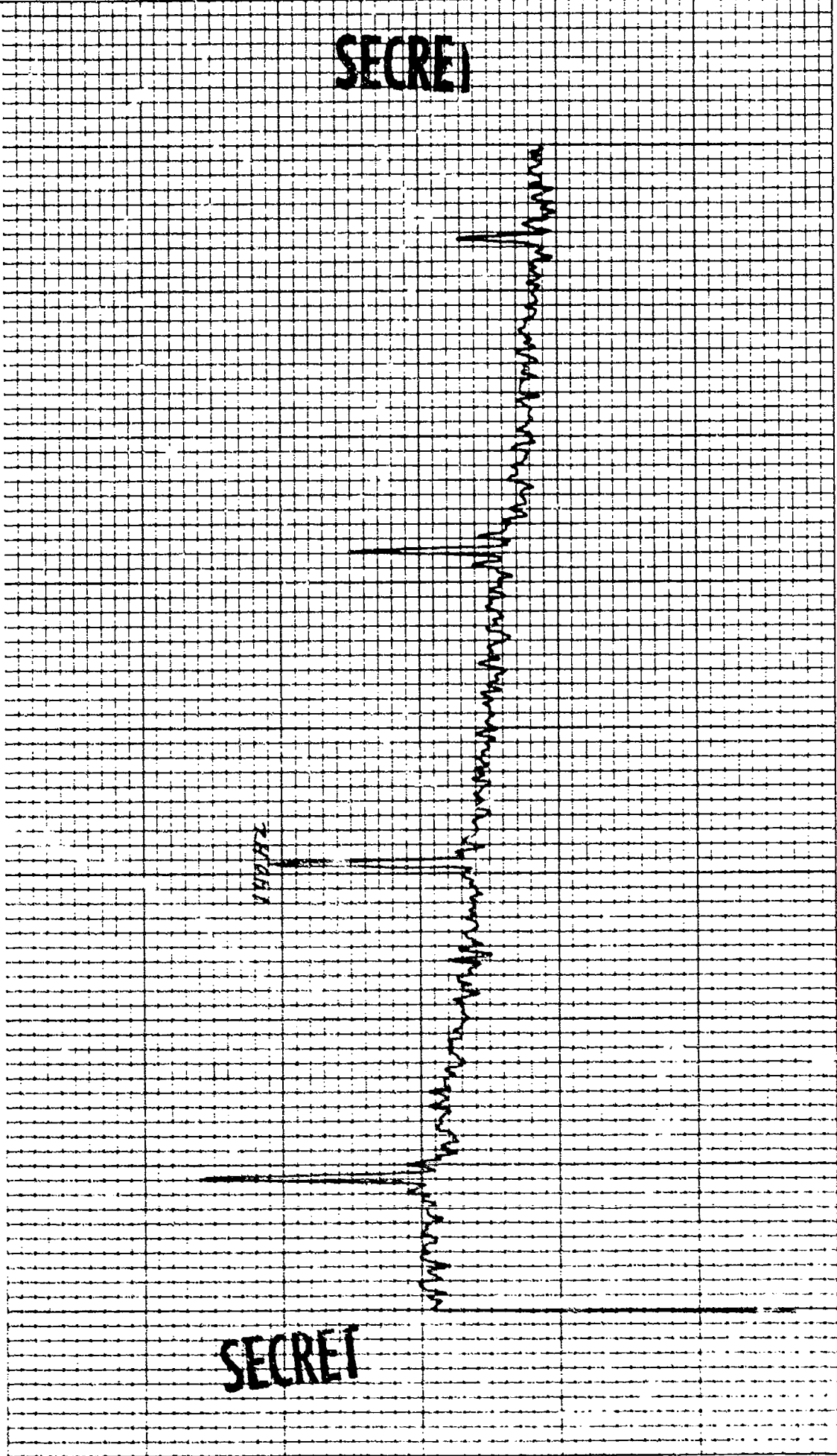


KOE 10 X 10 TO THE INCHES
REUPTEL & TESSIB CO. MADE IN U.S.A.

46 0703

5-270

CONTROL: 2.7 - 1019 (F2) DATE OF ANALYSIS: 1-26-49 REEL: F15 INDE X 1955
 BEAMFORMED SPECTRUM(ELEMENTS 29-34)
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: -1YDB
 CENTER FREQ: 150 HZ +34 DEG. AZ STEERING FILTER WTG: HANNING
32 ELEMENTS



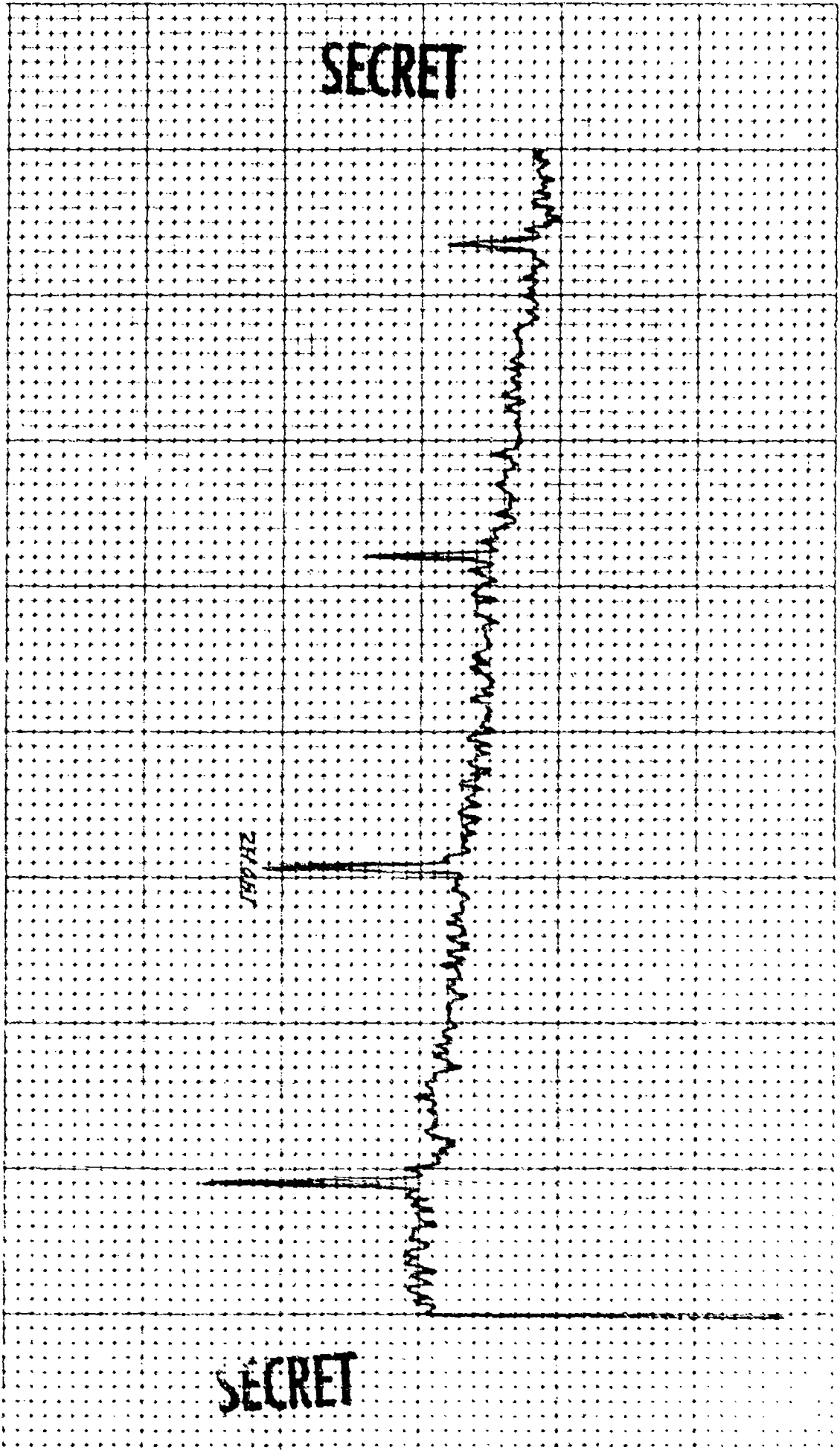
SECRET

SECRET

45 0703

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

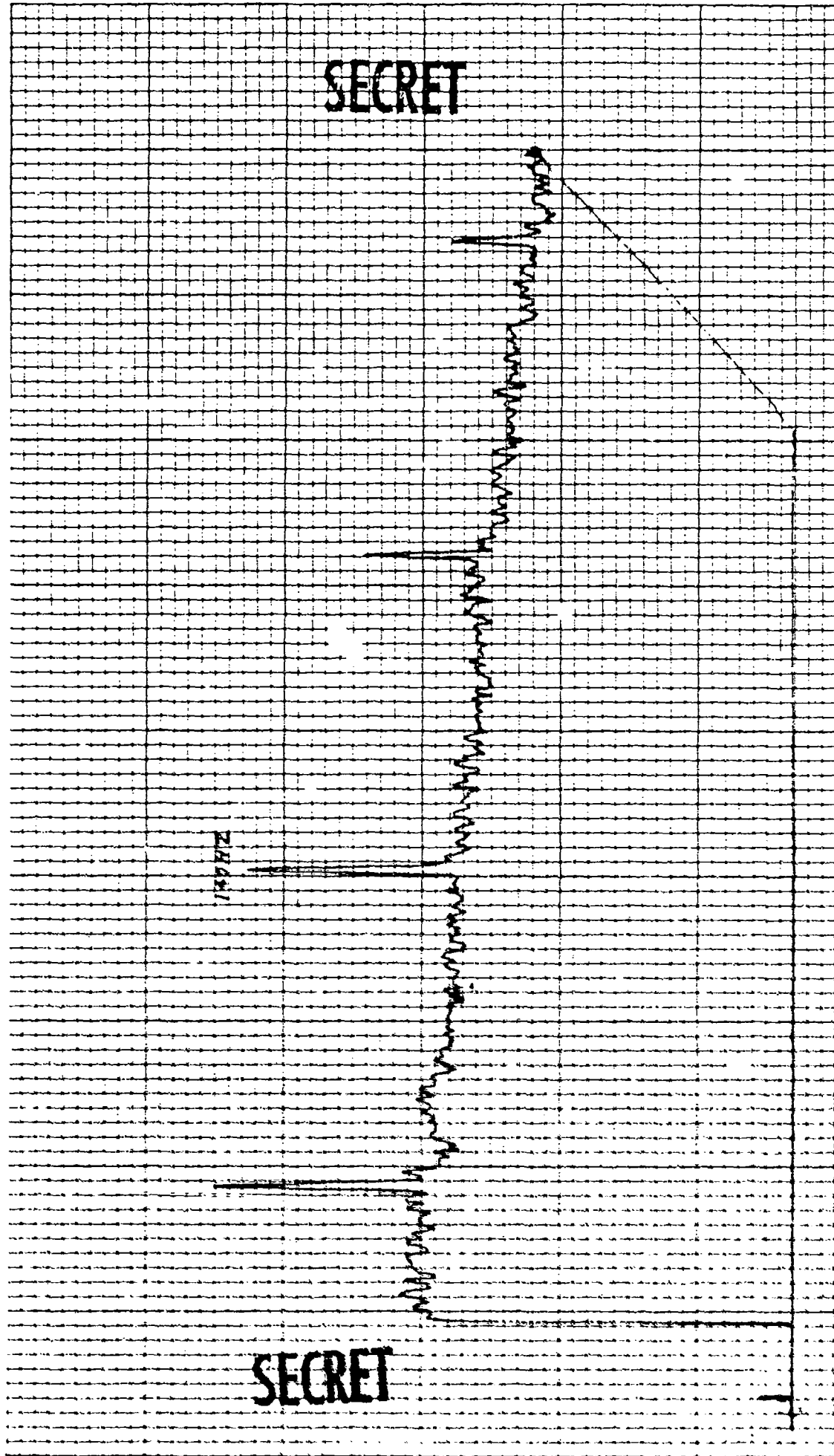
CONTROL: 27 -1019 (72)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAGE
 CENTER FREQ: 150 HZ
 72 ELEMENTS
 DATE OF ANALYSIS: 1-26-72
 DATE/TIME: 07-27-1019 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 +7C DEG. AZ STEERING
 PEEL: F5
 INTEGRATION TIME 320 SECS
 FILTER WTC: HANNING
 ATTN: -28DB
 INDE X 1955



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

46 0703

CONTROL: 1019 - 5/ (DPV) DATE OF ANALYSIS: REEL: F15 INDE X 1955
 BEAMFORMED SPECTRUM (ELEMENTS) 1-16 ✓ 29-3Y)
 EXERCISE: BEARING STAKE DATE/TIME: 2:27 - 1019 Z INTEGRATION TIME 320 SECS ATTN: 2 1/2 DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
 32 ELEMENTS 32.5 DEG. AZ STEERING



SECRET

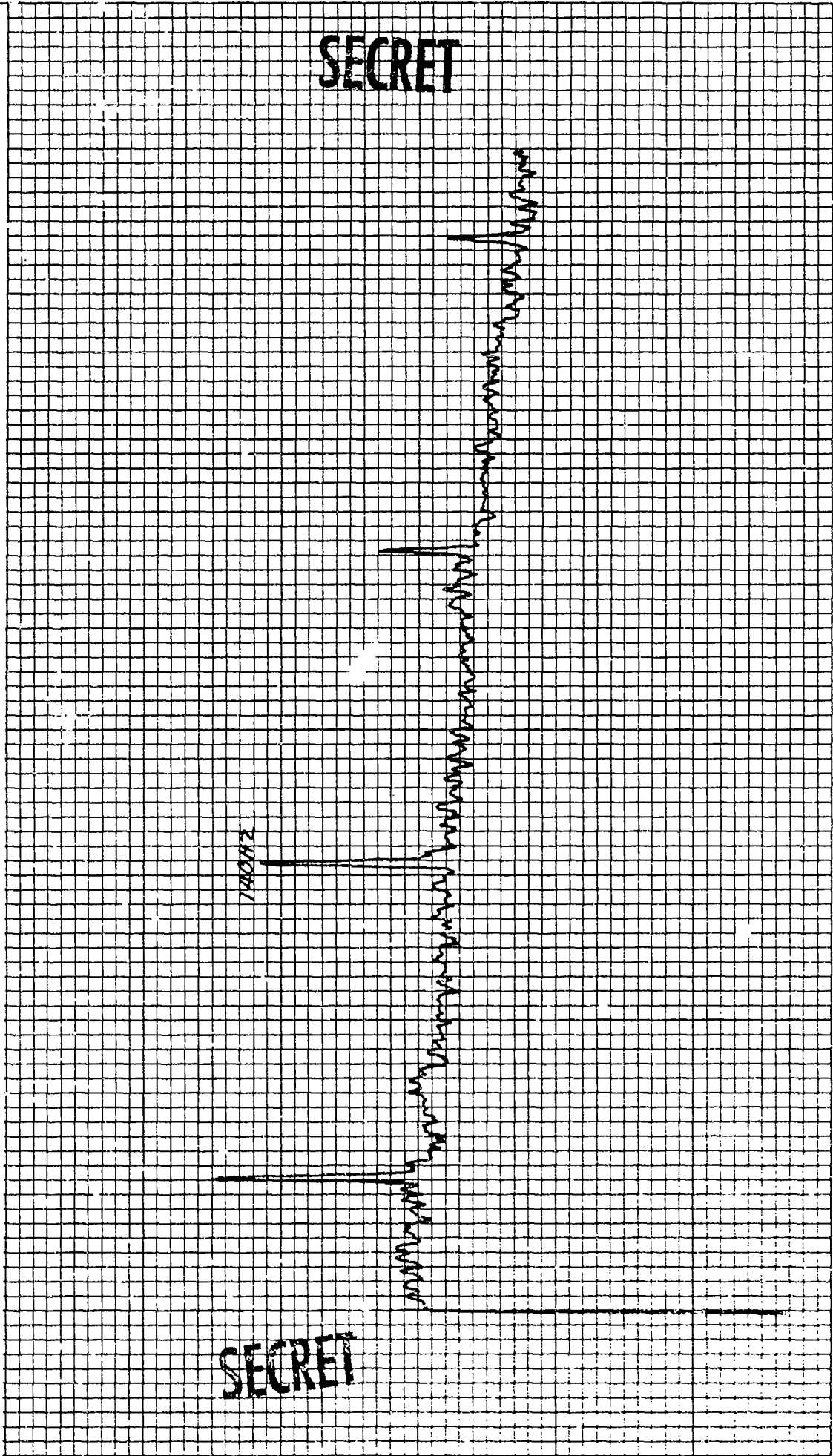
SECRET

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

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

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

INDE X1955



SECRET

SECRET

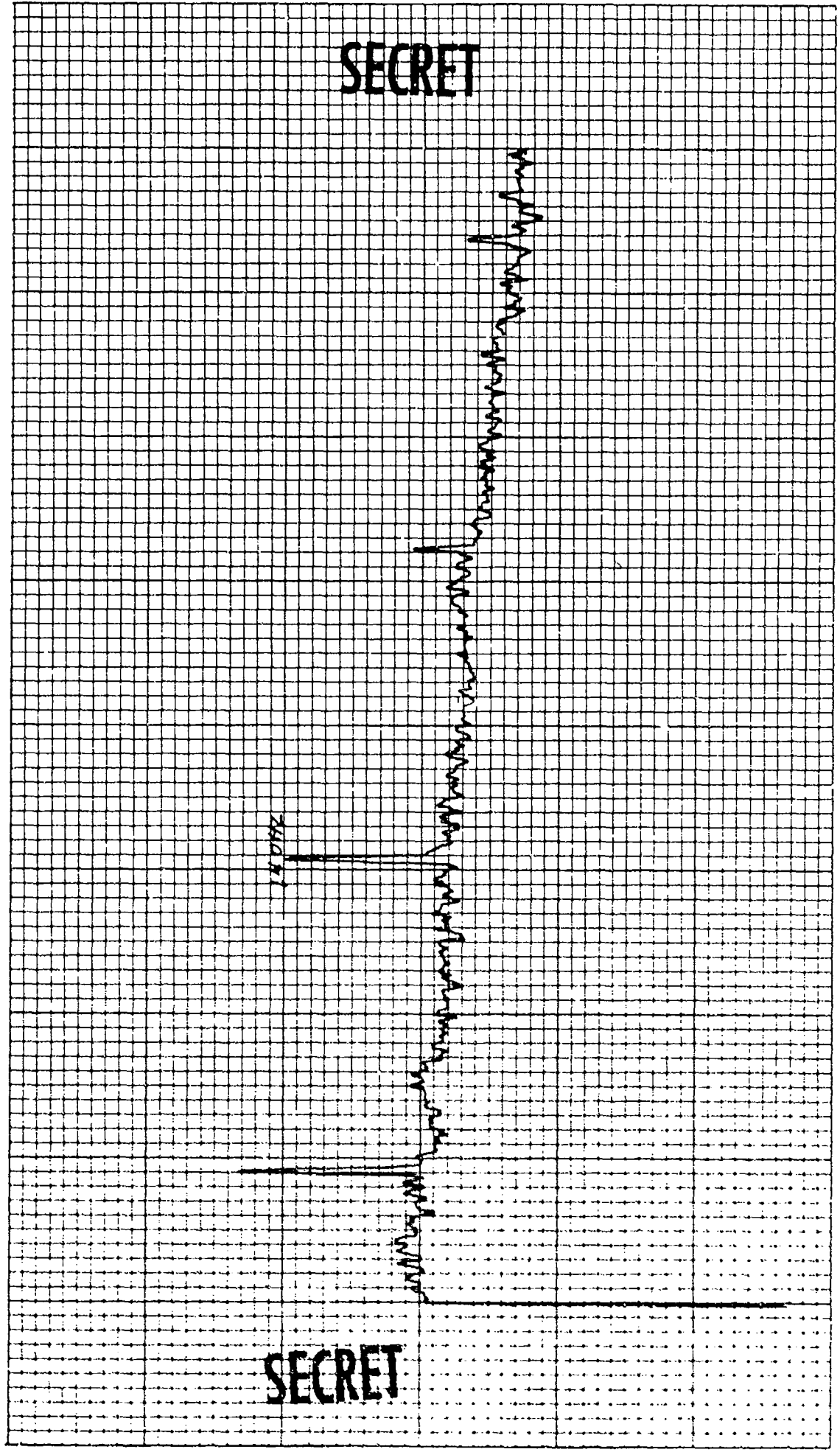
9-5-77

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

46 0703

11-37b

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



SECRET

SECRET

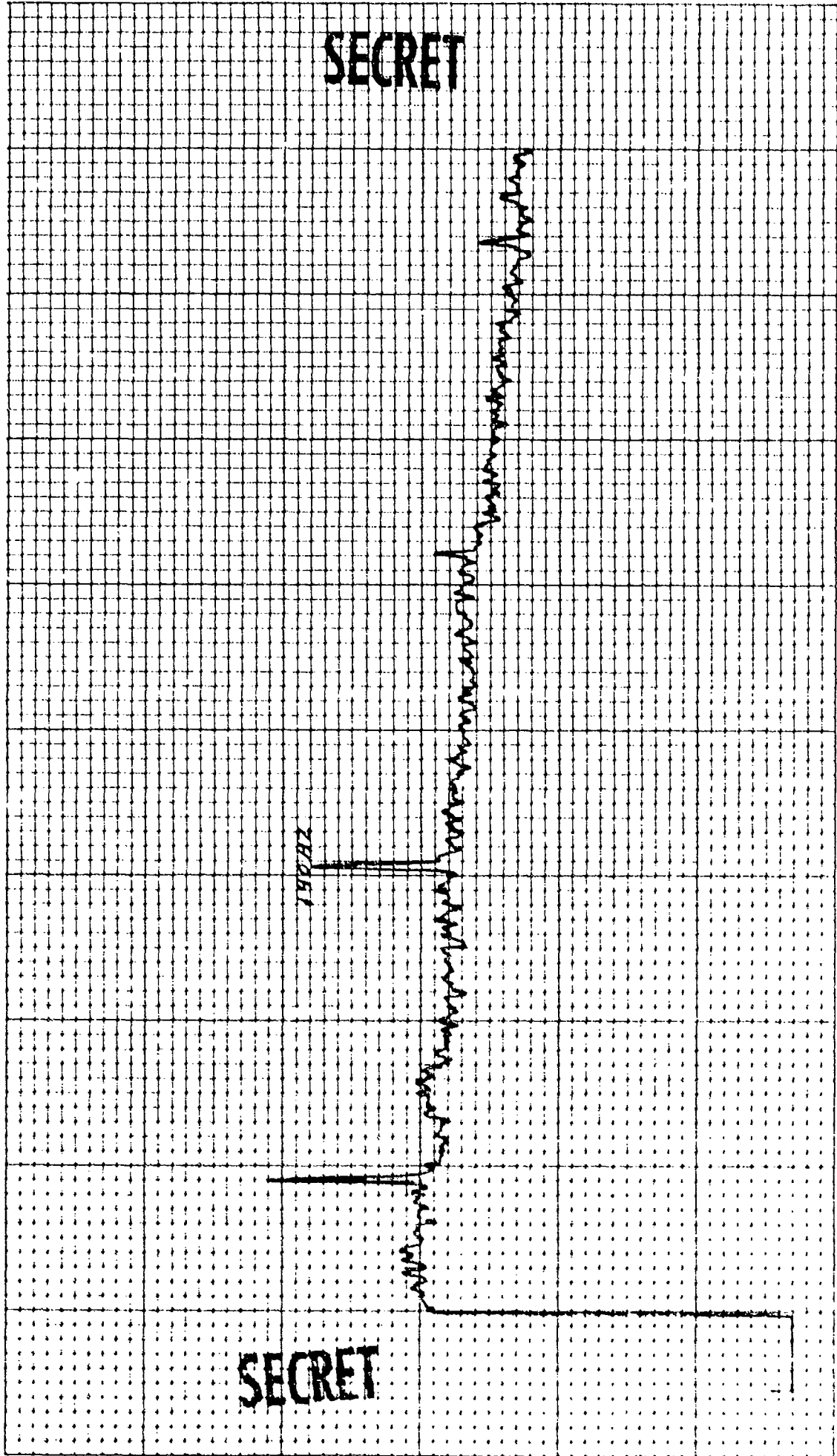
CONTROL: 2-7 -1019 (J2)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEAR: 1G STAKE
 CENTER FREQ: 150 HZ
 J2 ELEMENTS

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

INTEGRATION TIME 320 SECS
 FILTER WIG: HANNING

REEL: F15 INDE X 1955

ANALYSIS BANDWIDTH: 1/10HZ
 742 DEG. AZ STEERING



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

46 0703

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

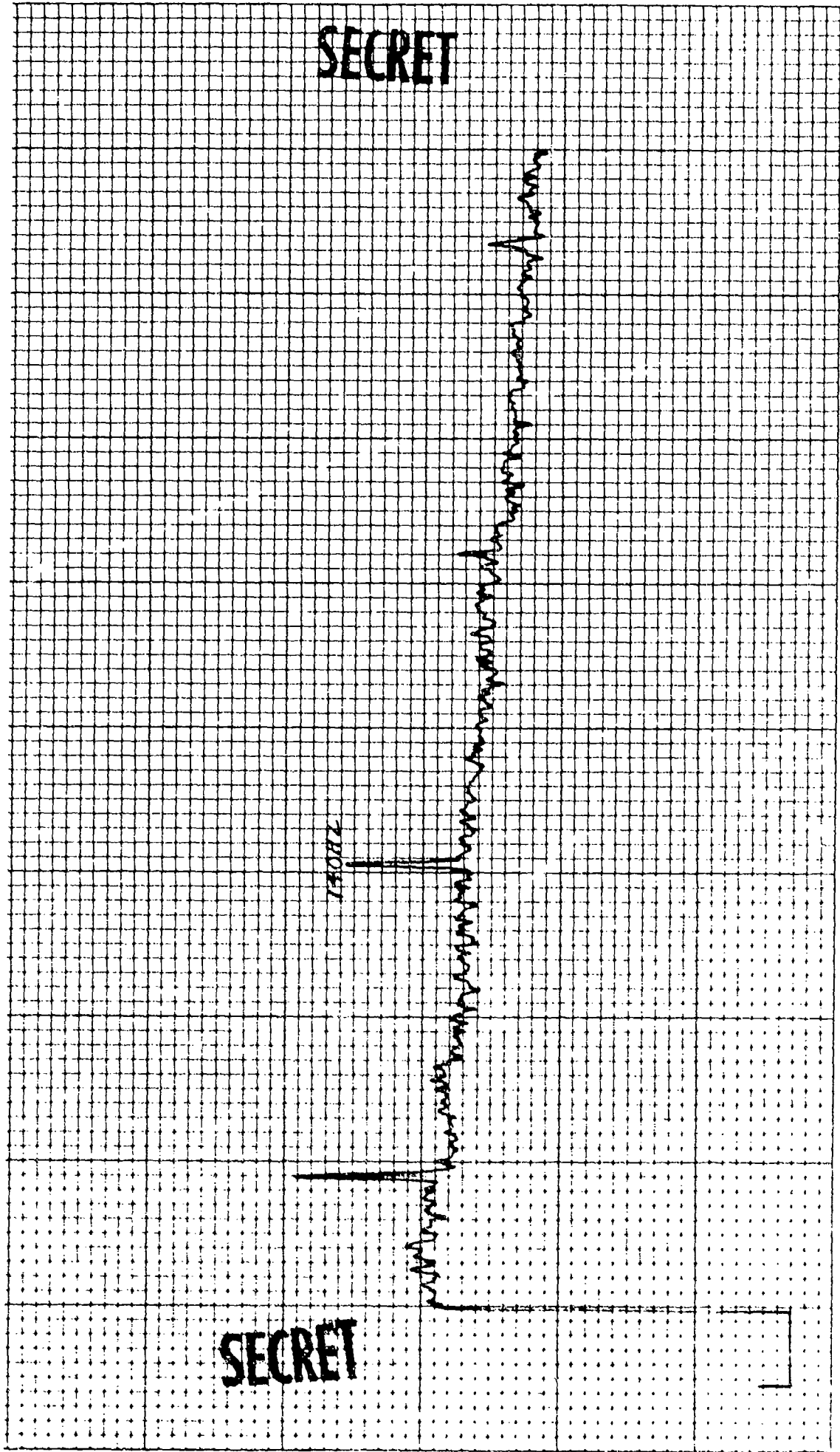
DATE OF ANALYSIS: -- -- --
1- 26 & 29-34)

INTEGRATION TIME 320 SECS
FILTER WTG: HANNING

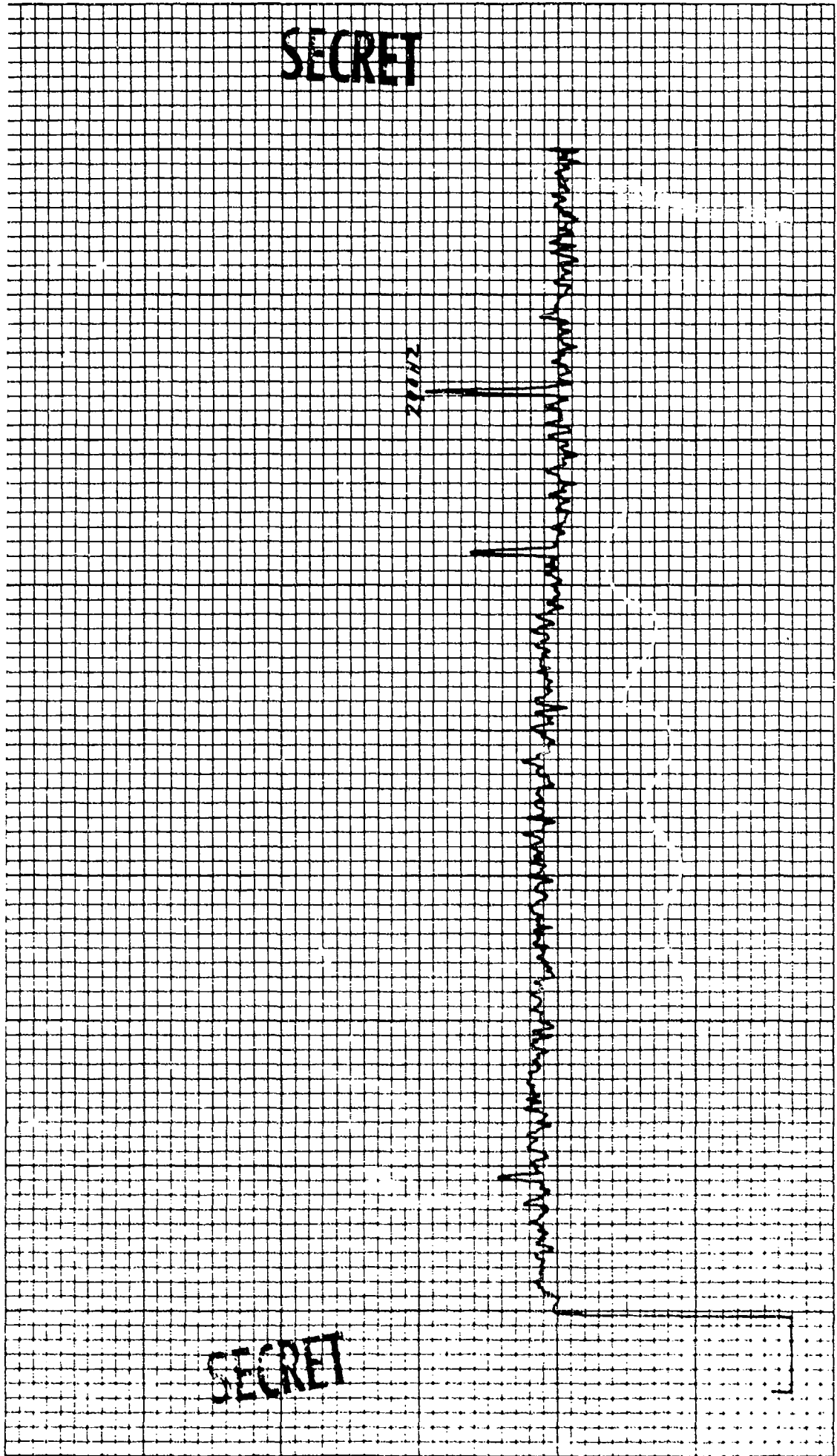
REEL: F15 INDE X 1955

ATTEN: 24 DB

ANALYSIS BANDWIDTH: 1/10HZ
+ 44 DEG. AZ STEERING



CONTROL: 27 - 10.9 (32) DATE OF ANALYSIS: - - REEL: F/5 INDE X/855
BEAMFORMED SPECTRUM (ELEMENTS) 1-26 4 29-34) INTEGRATION TIME 320 SECS ATTN: -24 DB
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1019 Z FILTER WTG: HANNING
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10 HZ
32 ELEMENTS 424 DEG. AZ STEERING



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

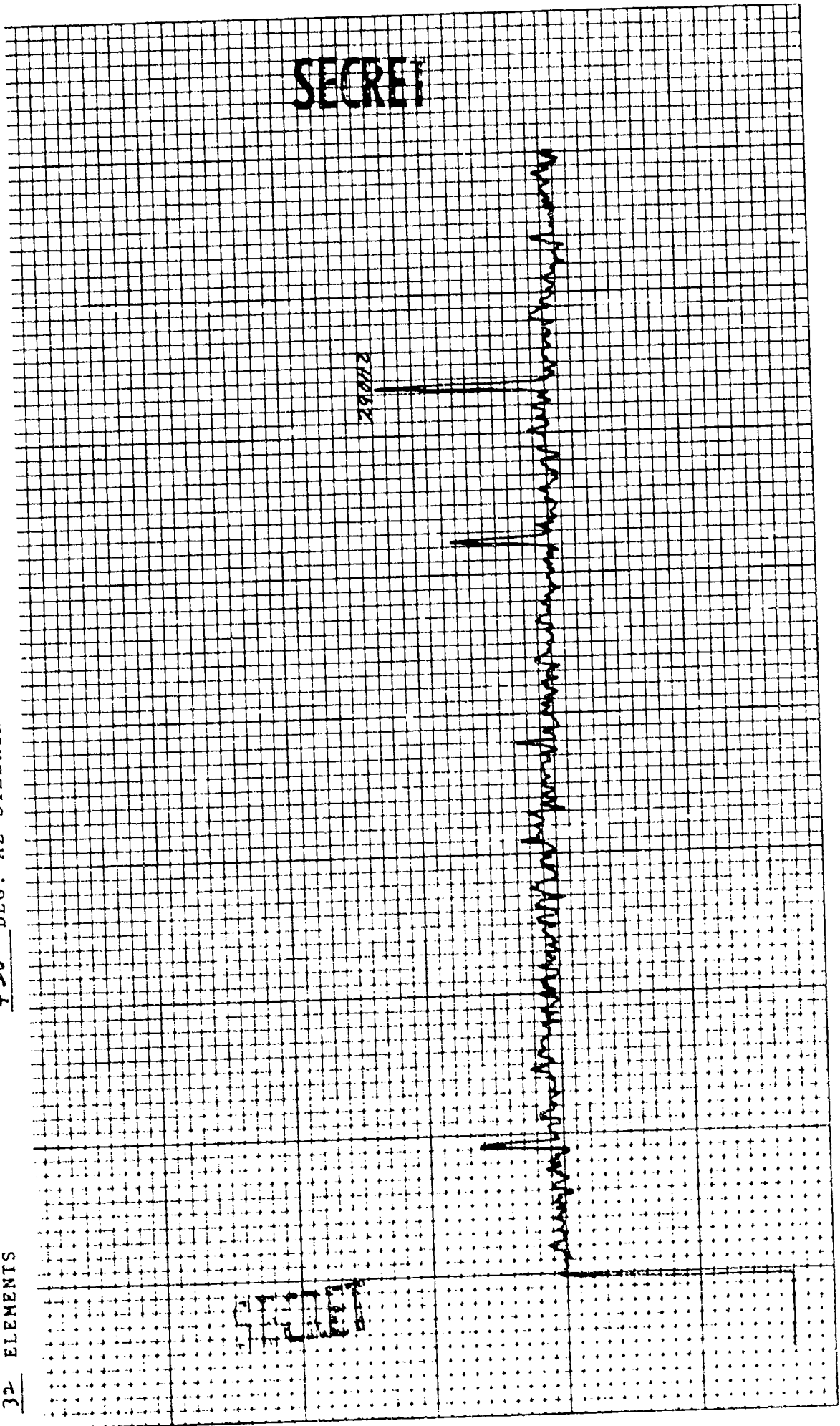
46 0703

REEL: F15 INDE X1P53

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

DATE OF ANALYSIS: 1-26 8 21-34
DATE/TIME: 2-7-77 -1019 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+26 DEG. AZ STEERING

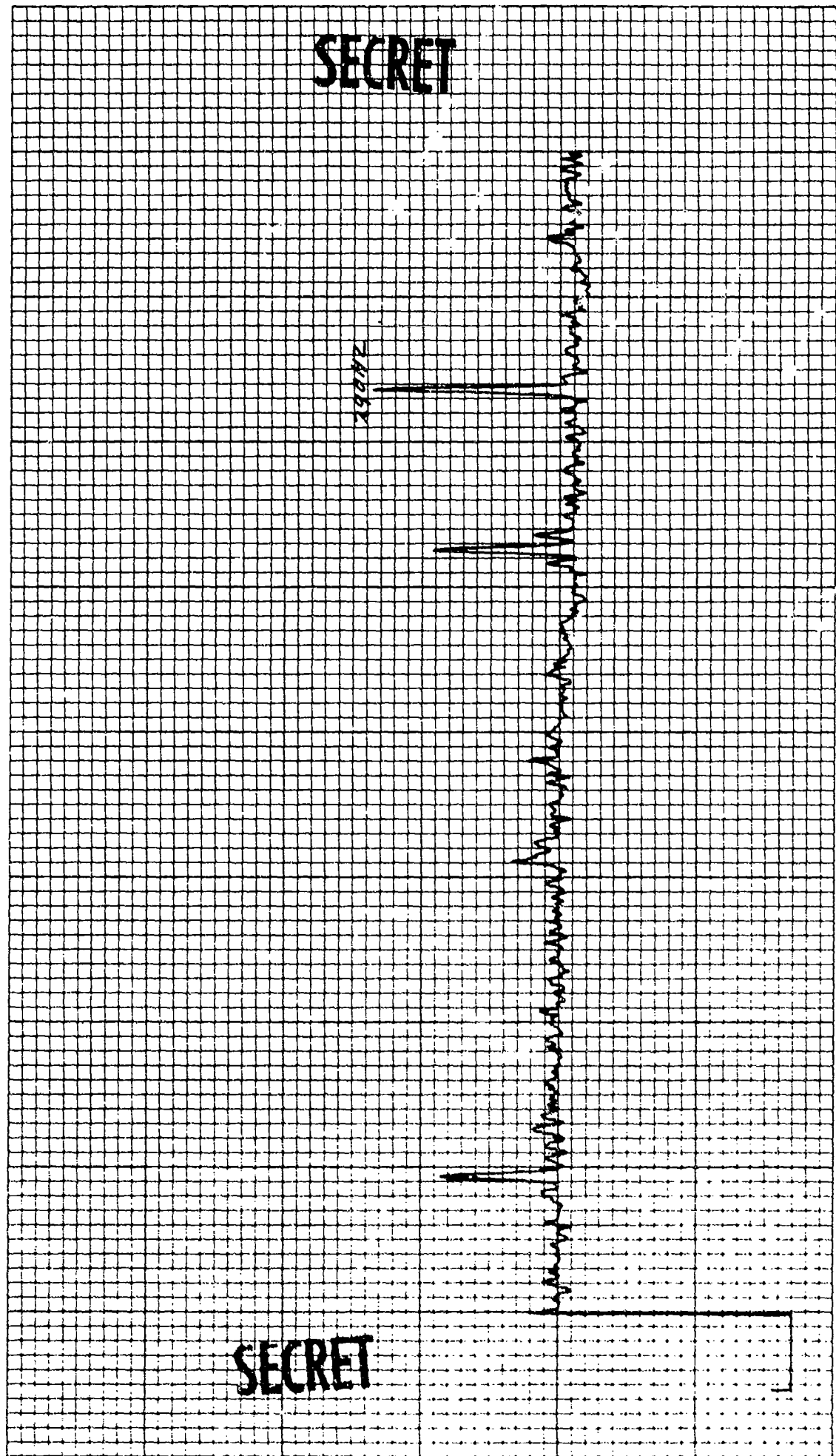
INTEGRATION TIME 320 SECS
ATTEN: -24 DB
FILTER WTG: HANNING



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

46 0703

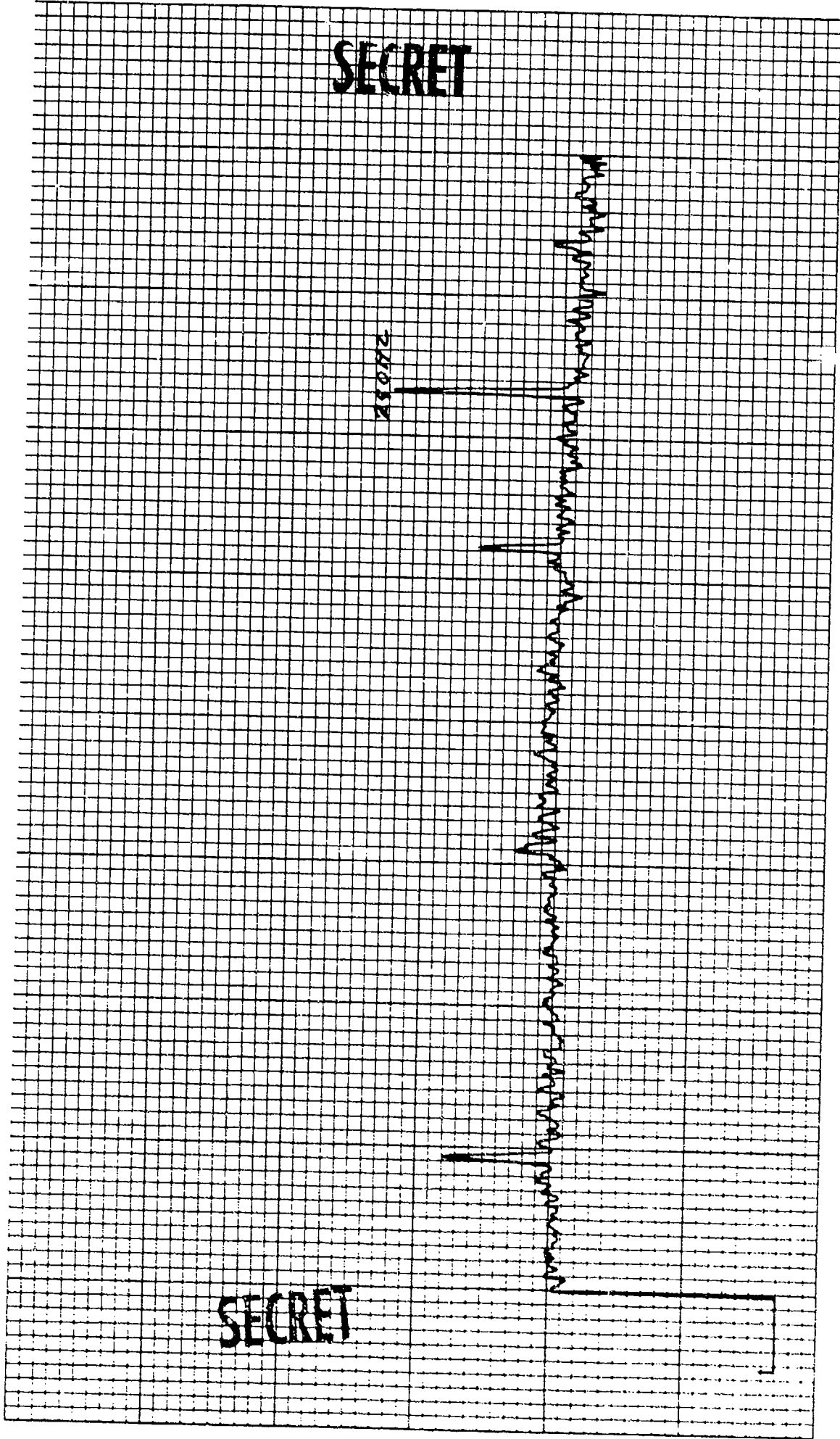
CONTROL: 2-7 - 1019 (32) DATE OF ANALYSIS: 1-26-77
BEAMFORMED SPECTRUM (ELEMENTS) 1-26-77-34 REEL: F15 INDE X/1955
EXERCISE: BEARING STAKE DATE/TIME: 9-7-77 - 1019 Z INTEGRATION TIME 320 SECS ATTN: -24DB
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
32 ELEMENTS +20 DEG. AZ STEERING



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

46 0703

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

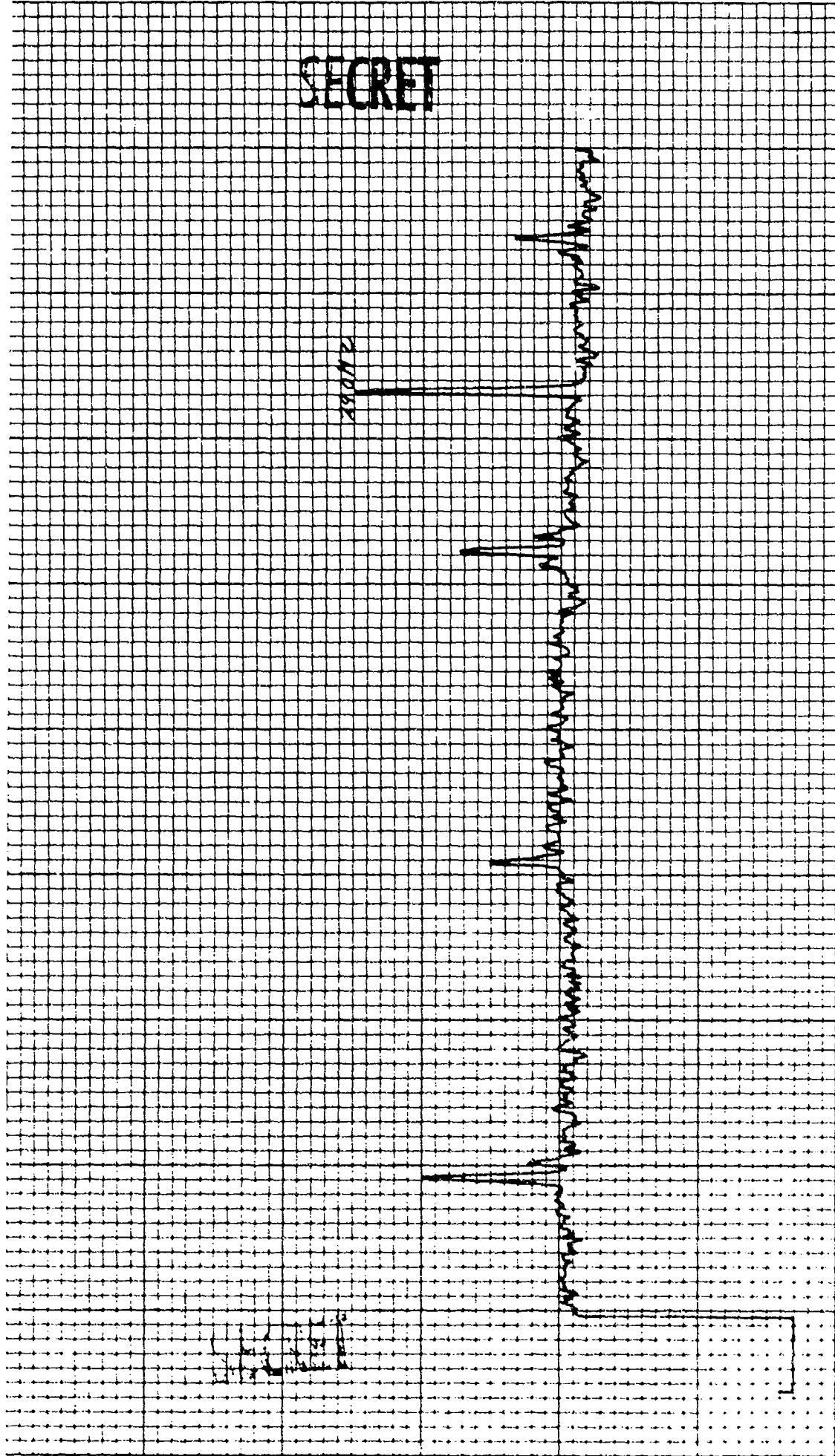


2-321

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

46 0703

CONTROL: 2.7 - 1019 (32) DATE OF ANALYSIS: 1-26-77 REEL: F15 INDEX: 1953
BEAMFORMED SPECTRUM (ELEMENTS) 29-34 INTEGRATION TIME 320 SECS ATTEN: -2 VDB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 270 HZ 431 DEG. AZ STEERING

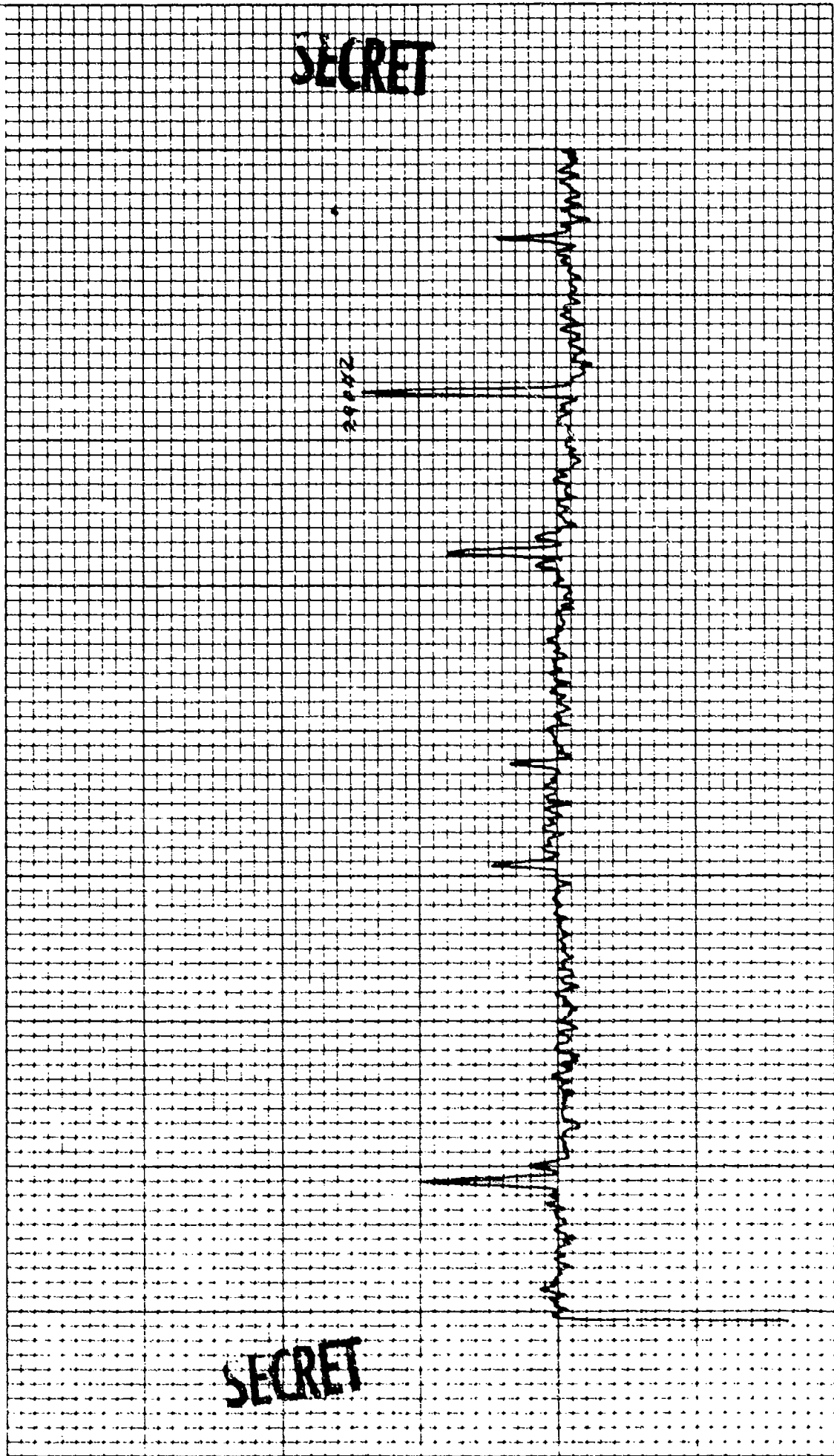


KOE 20 X 10 TO THE INCH 0.7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

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

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

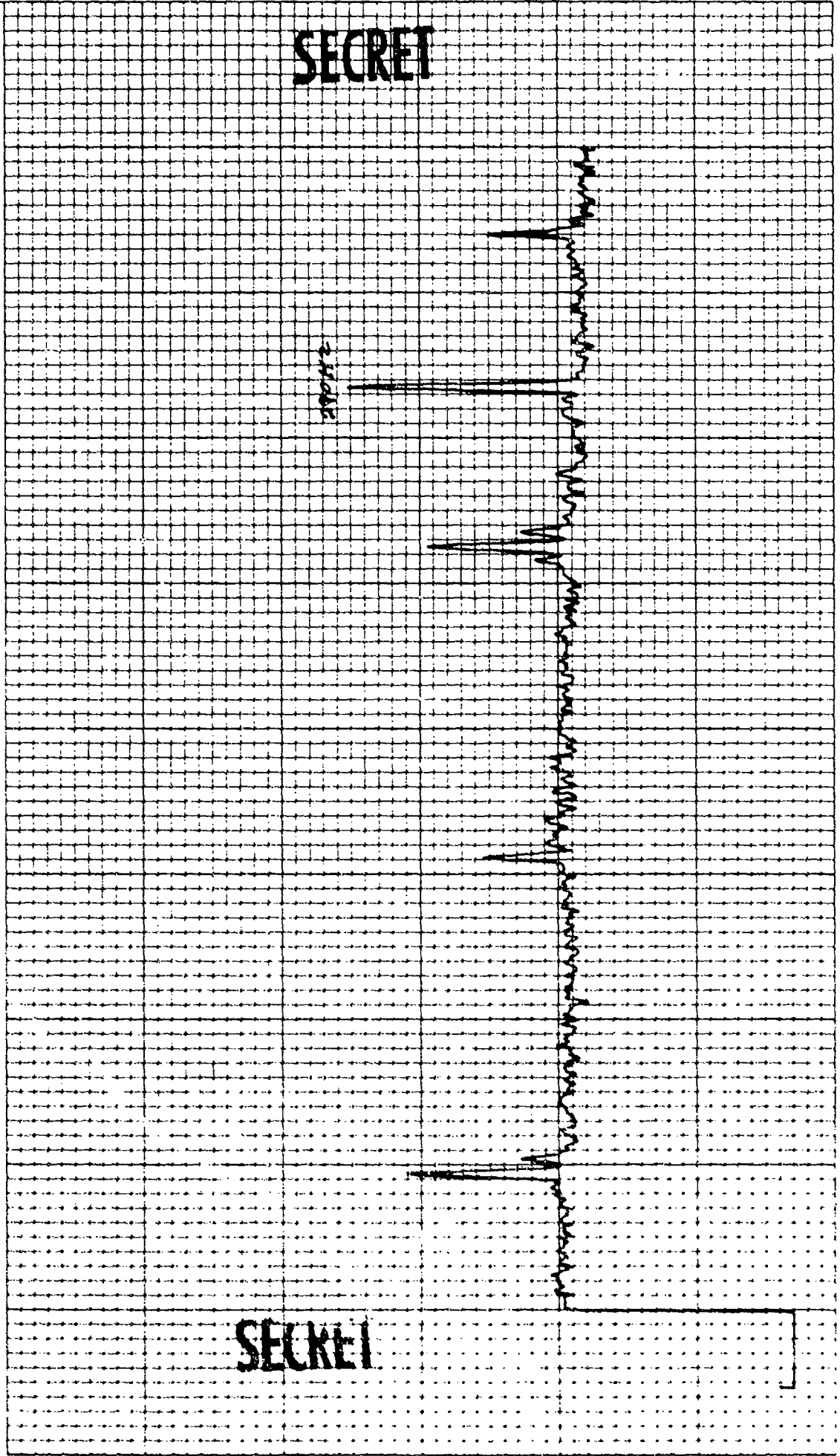


K-E 10 X 10 TO THE INCHES
MILITARY & FEDERAL CO. MADE IN U.S.A.

46 0703

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

REEL: F15 INDE X/955



SECRET

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

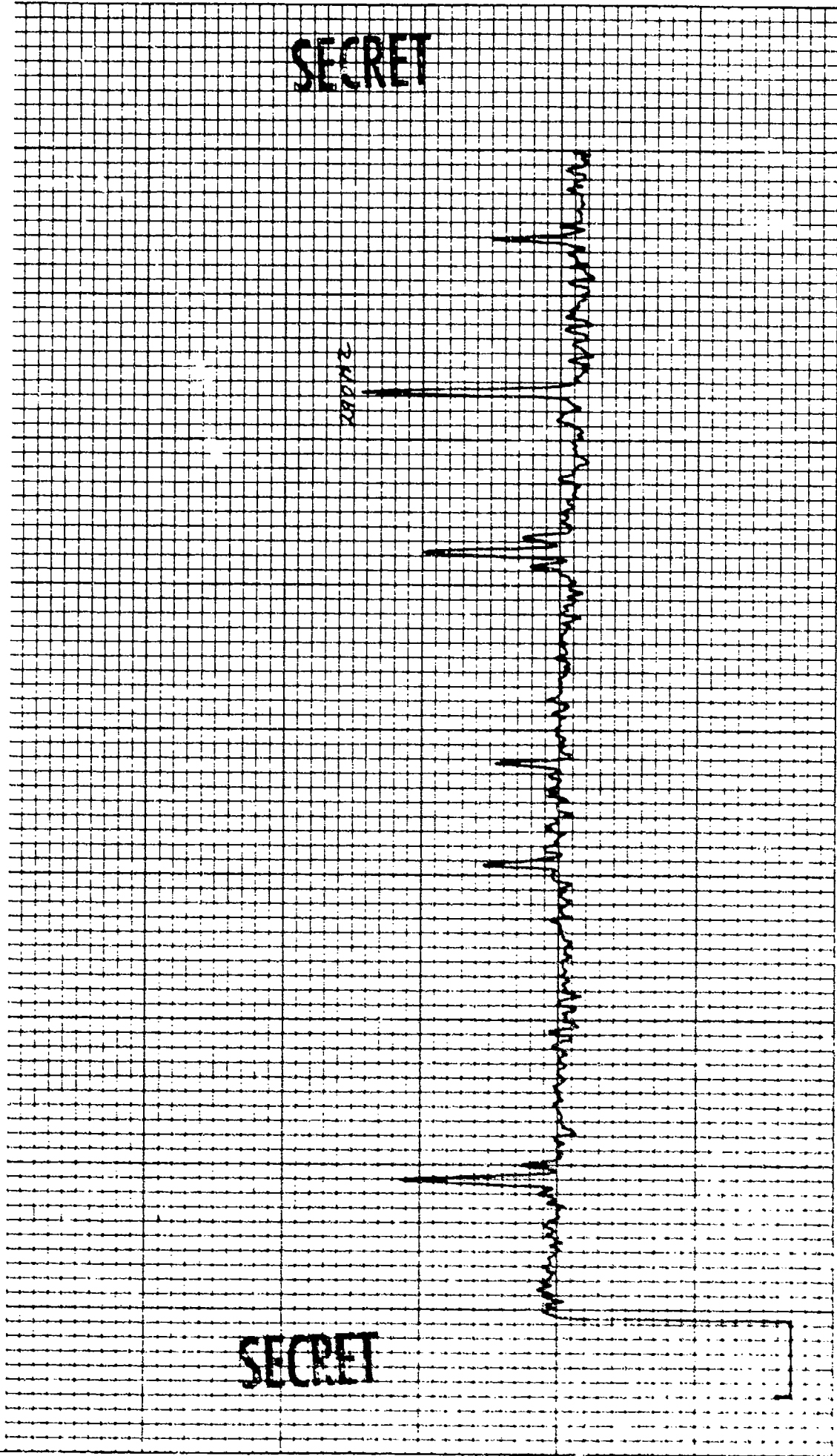
46 0703

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

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

REEL: F/5
INDE X/255

INTEGRATION TIME 320 SECS
FILTER WTG: HANNING



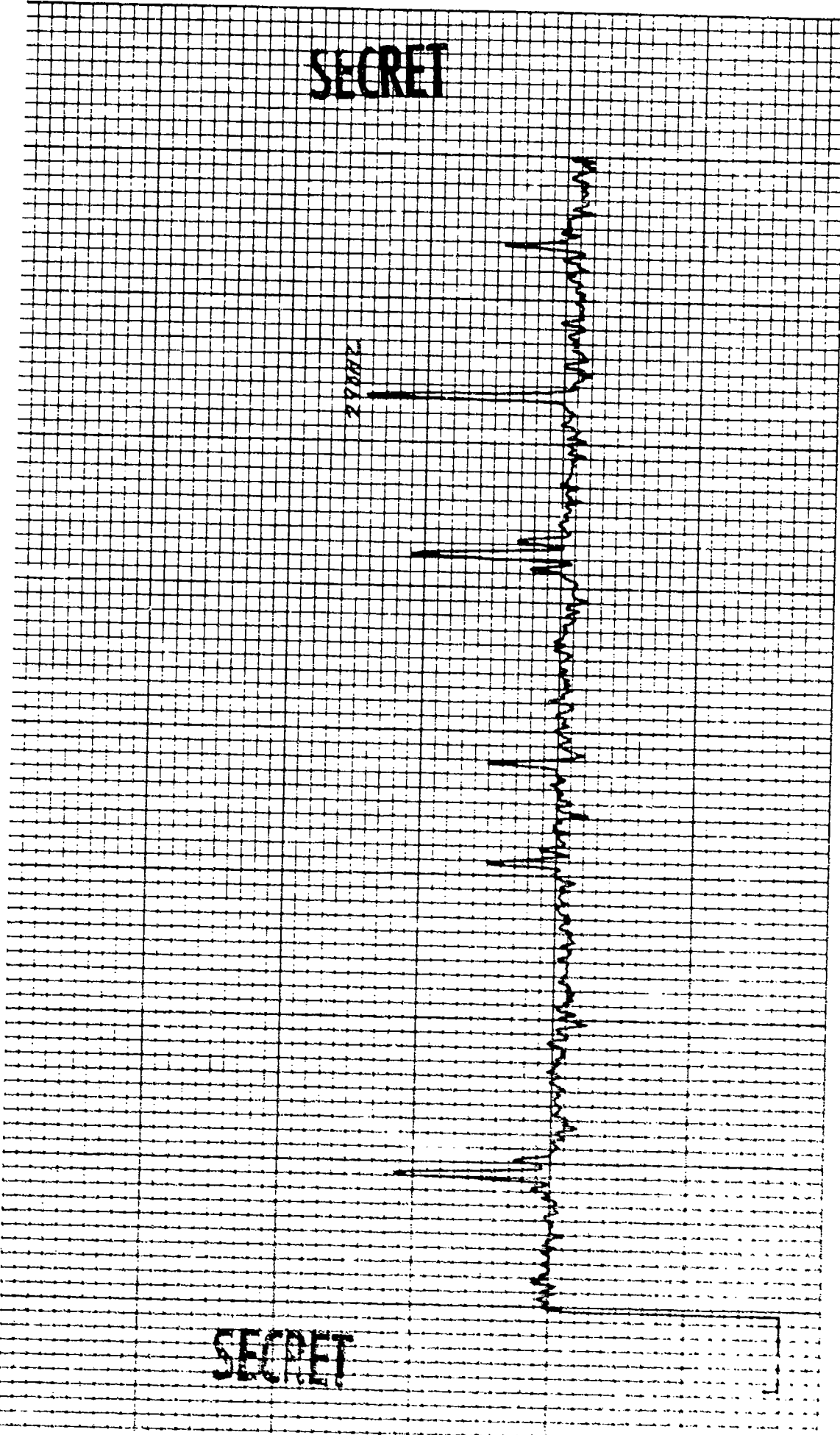
KOE 10 X 10 TO THE INCH .7 X 10 INCHES
HEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

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

DATE OF ANALYSIS: 1-26-77 09-24
DATE/TIME: 0-7-77 -1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
433 DEG. AZ STEERING

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



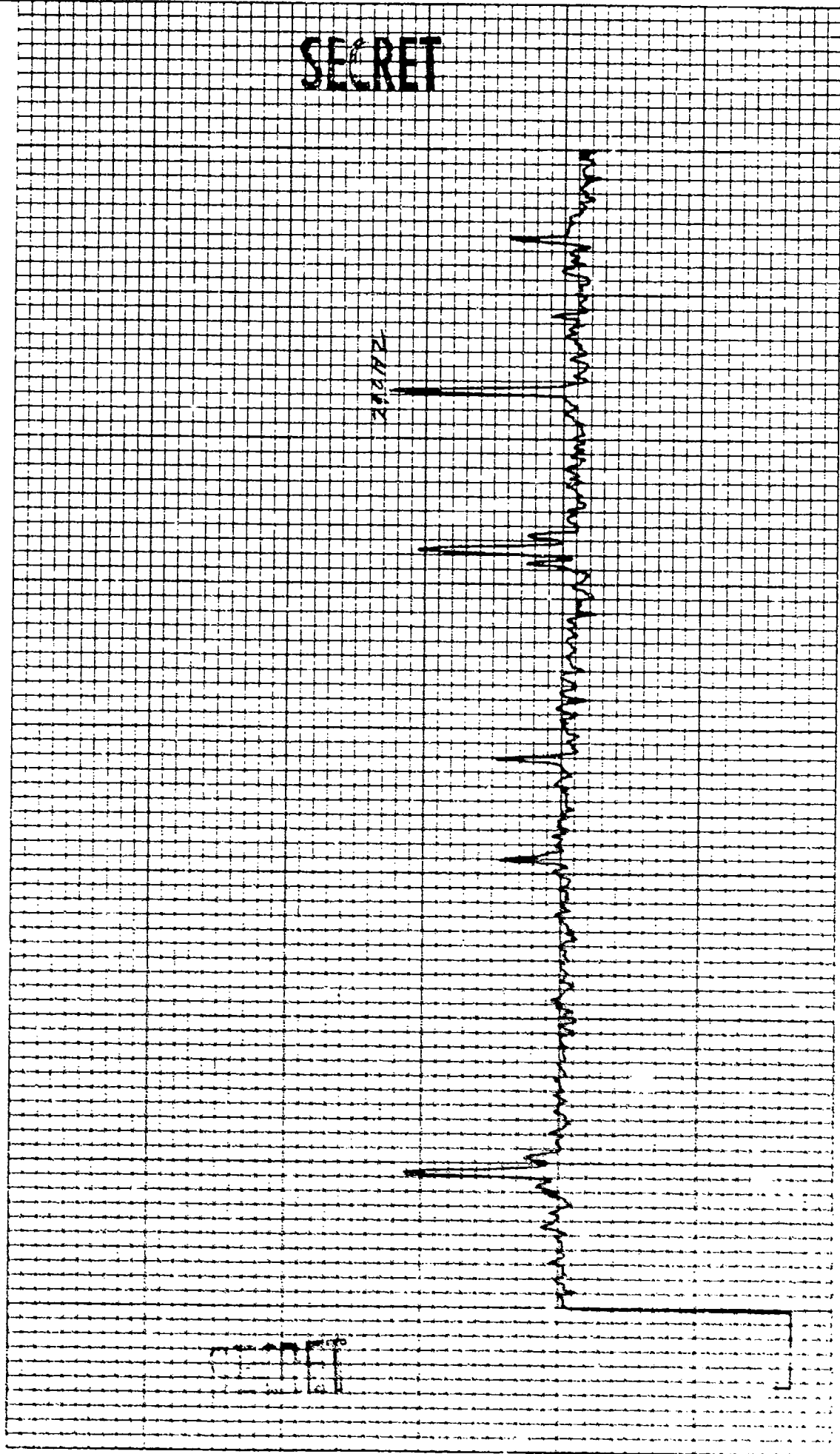
SECRET

SECRET

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

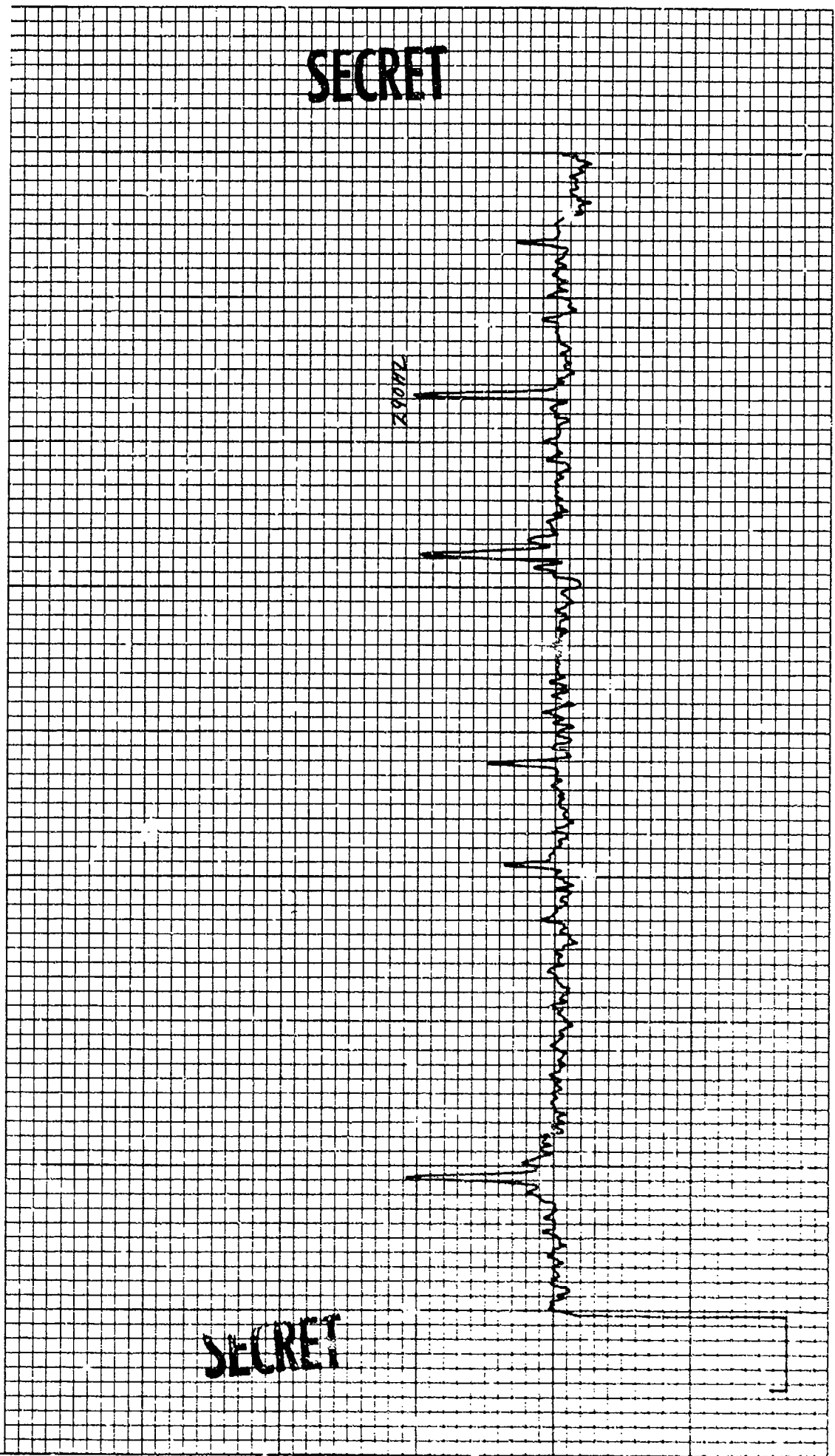
46 0703

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



CONTROL: 2-7 -1019 (32)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32- ELEMENTS
DATE OF ANALYSIS: 1-26-77
DATE/TIME: 2-7-77 -1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
+35 DEG. AZ STEERING

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



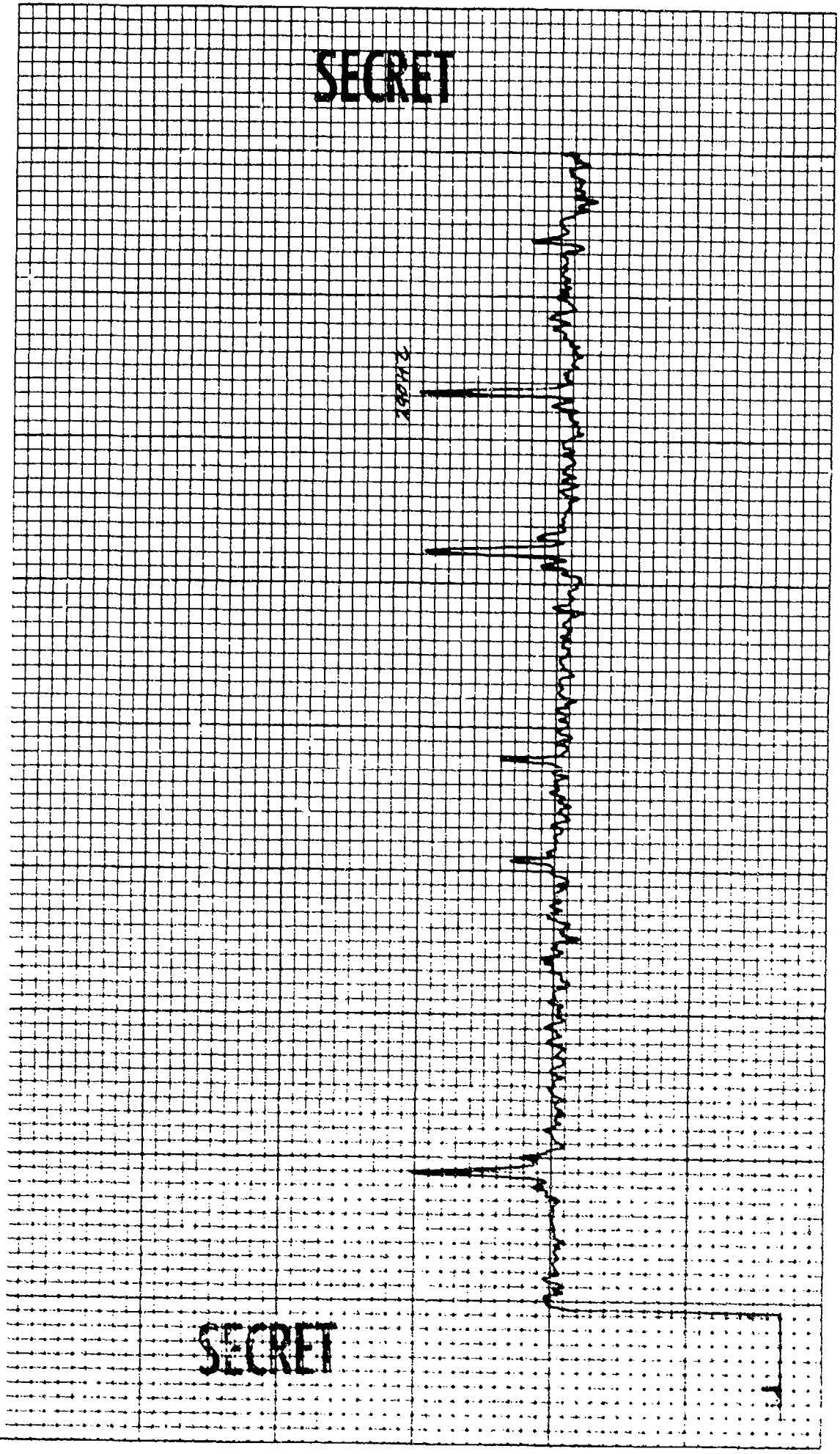
SECRET

SECRET

KEY 10 X 10 TO THE INCH 1.7 X 10 INCHES
REUTEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2-7 - 1019 (32) DATE OF ANALYSIS: 1-26-77 REEL: F15 INDE X 1953
 BEAMFORMED SPECTRUM(ELEMENTS))
 EXERCISE: BEARING STAKE)
 CENTER FREQ: 270 HZ)
32 ELEMENTS)
 DATE/TIME: 2-7-77 - 1019 Z INTEGRATION TIME 320 SECS ATTN: -24 DB
 ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
135.5 DEG. AZ STEERING



SECRET

SECRET

46 0703

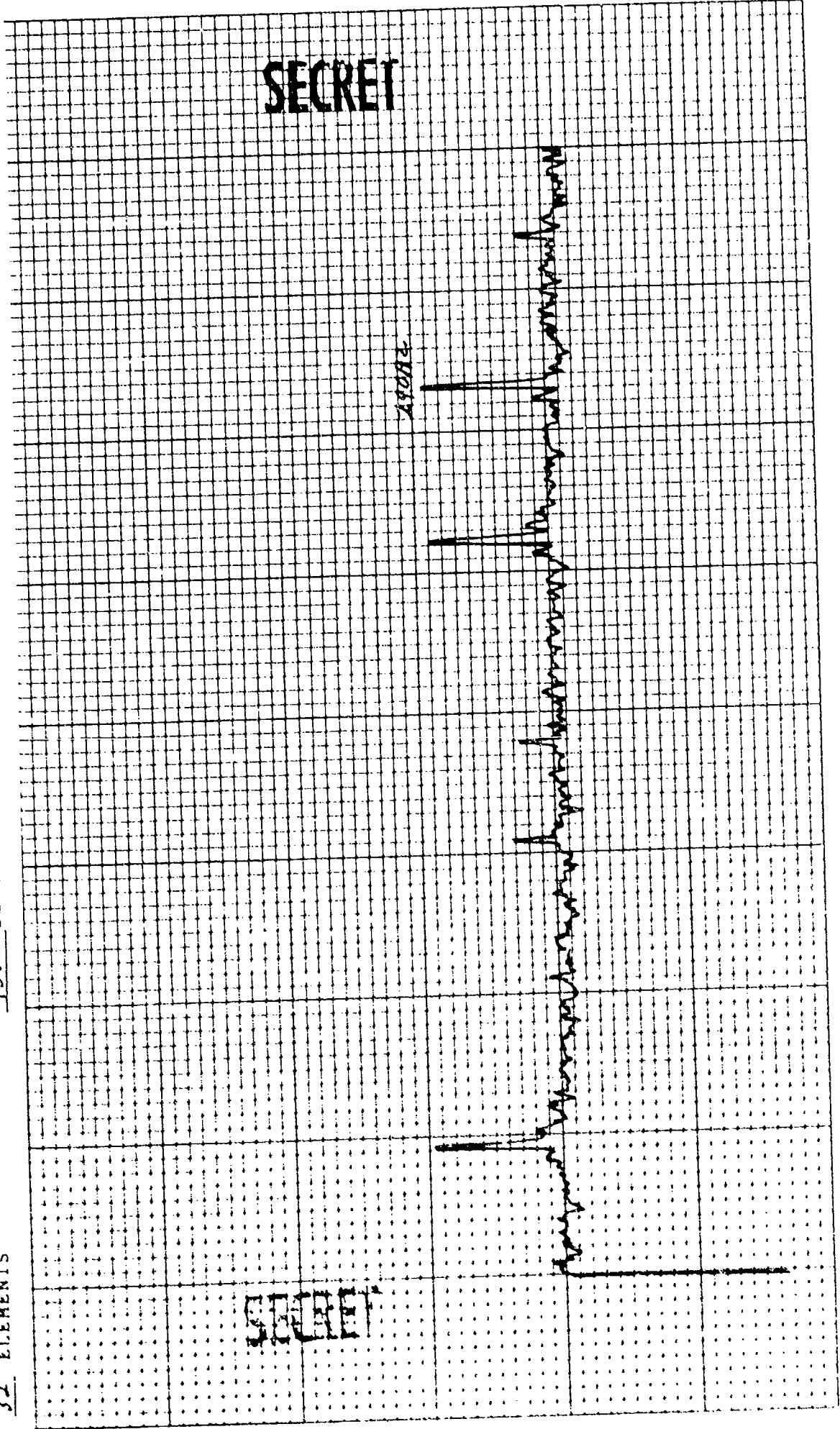
K-E 10 X 10 TO THE INCHES
HUFFEL & ESSER CO. MADE IN U.S.A.

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

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

SECRET

SECRET

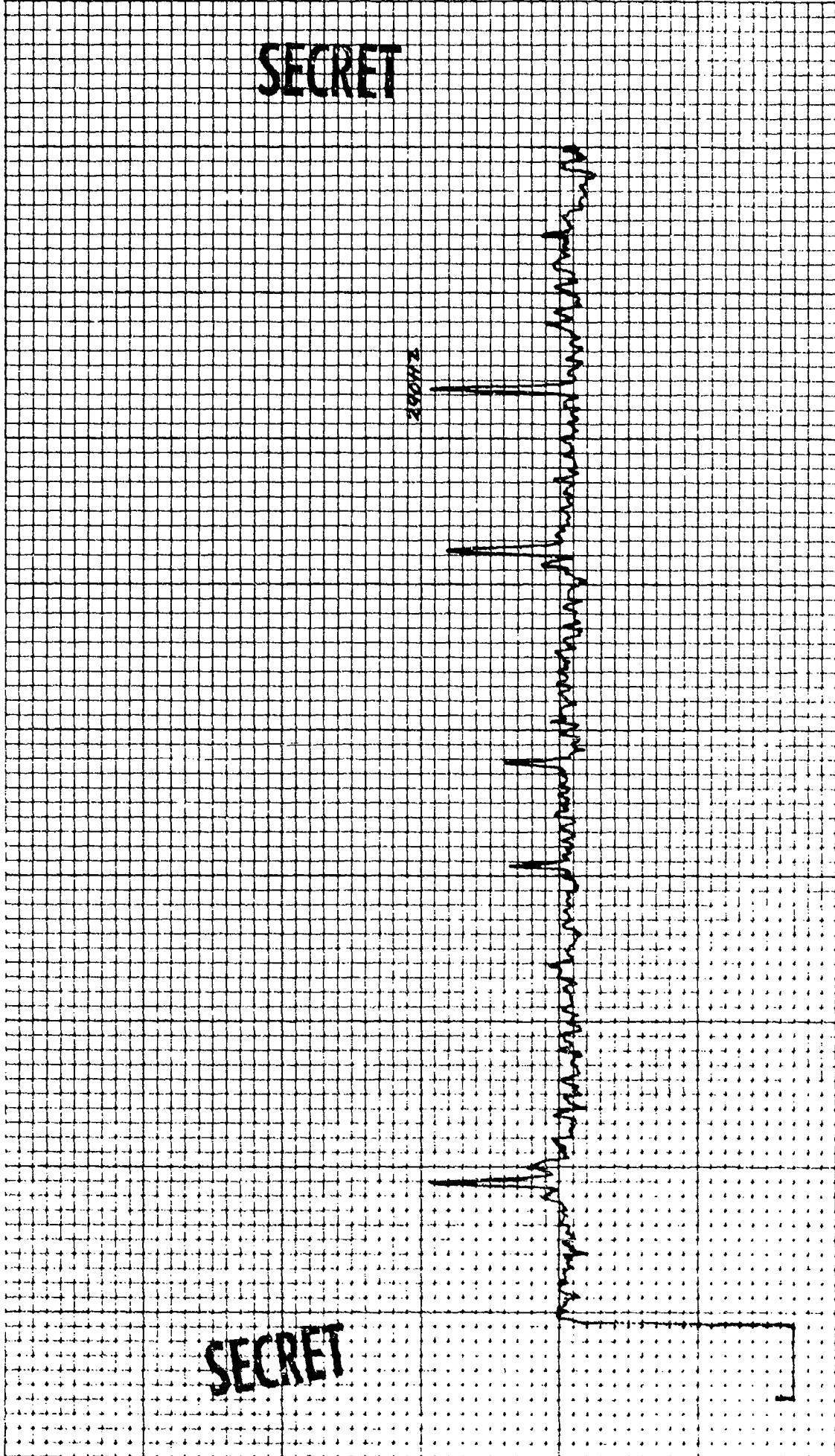


KOE 10 X 10 TO THE INCH 8.7 X 10 INCHES
RELAYED & ESSER CD 3404 4 1974

46 0703

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

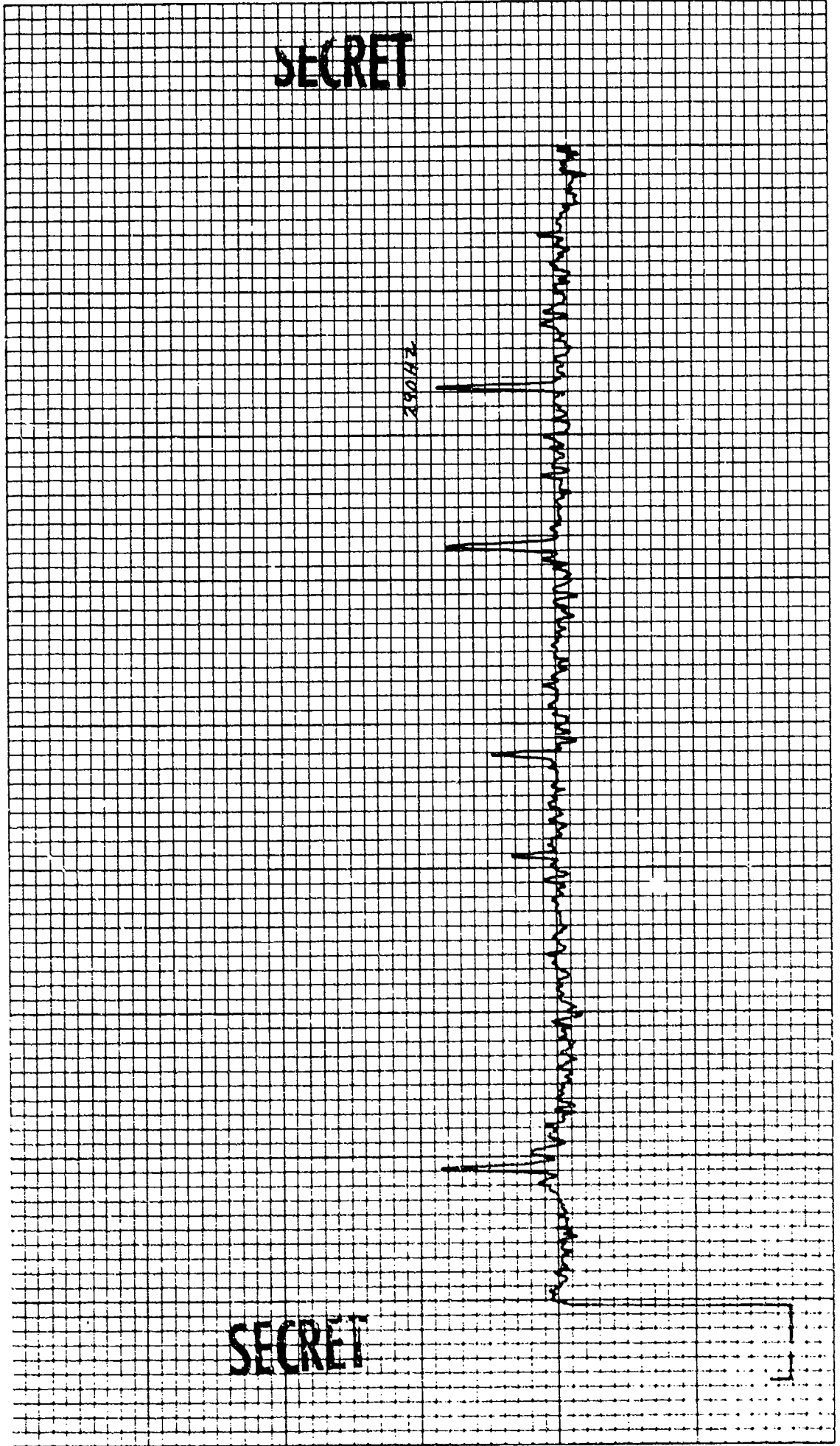
REEL: F15 INDE X 455
INTEGRATION TIME 320 SECS ATTN: 24 DB
FILTER WTG: HANNING



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

46 0703

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



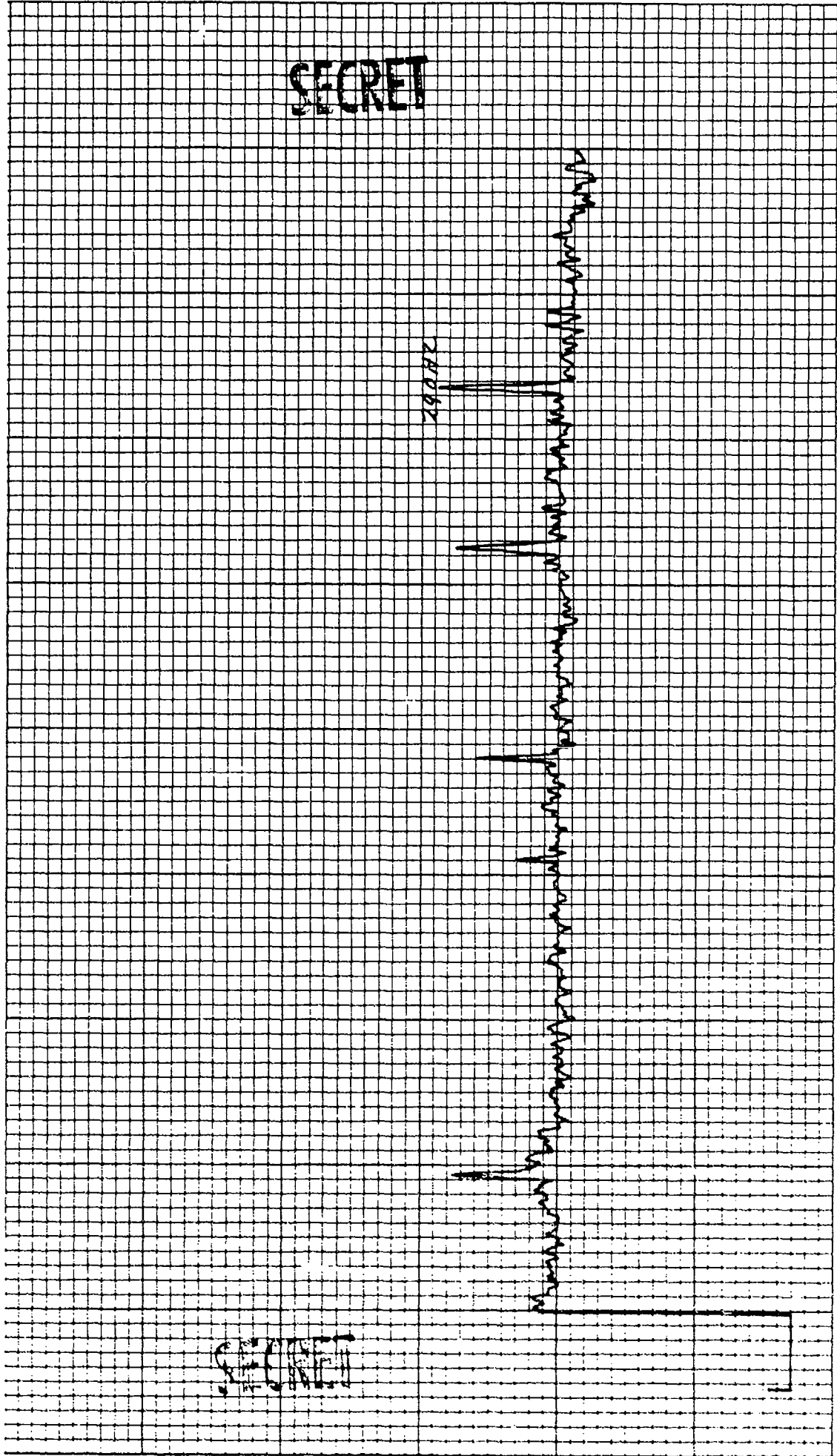
H₀Σ 10 X 10 TO THE INCH: 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

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

REEL: F15 INDE X 1955

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



17-11

46 0703

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

REEL: F/S INDE X 1955

INTEGRATION TIME 320 SECS

FILTER 2K DB
WTG: HANNING

DATE OF ANALYSIS:

1-26-77

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

ANALYSIS BANDWIDTH: 1/10HZ

+40 DEG. AZ STEERING

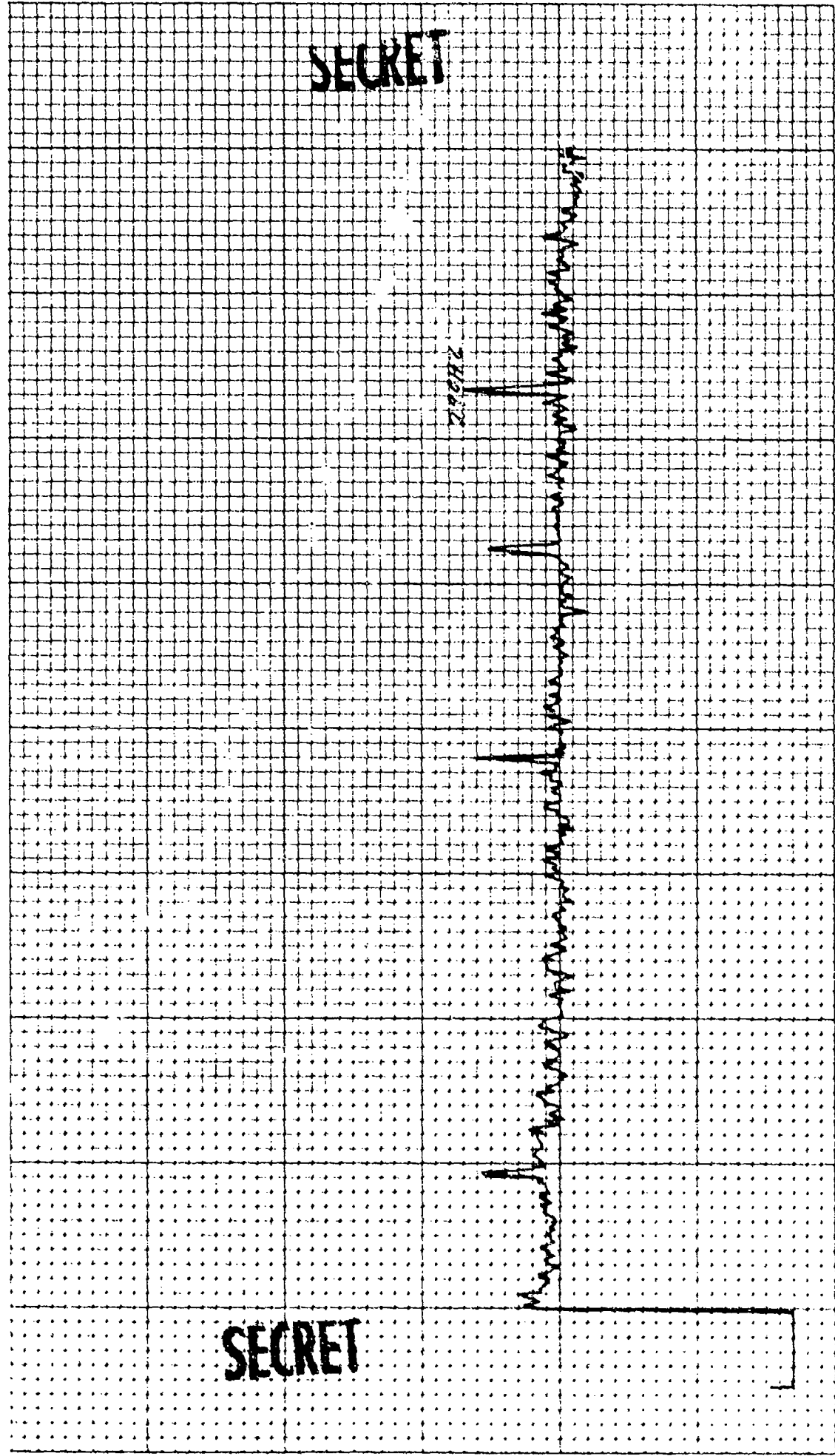
CONTROL: 2-7 -1019 (72)

BEAMFORMED SPECTRUM (ELEMENTS)

EXERCISE: BEARING STAYE

CENTER FREQ: 270 HZ

72 ELEMENTS



SECRET

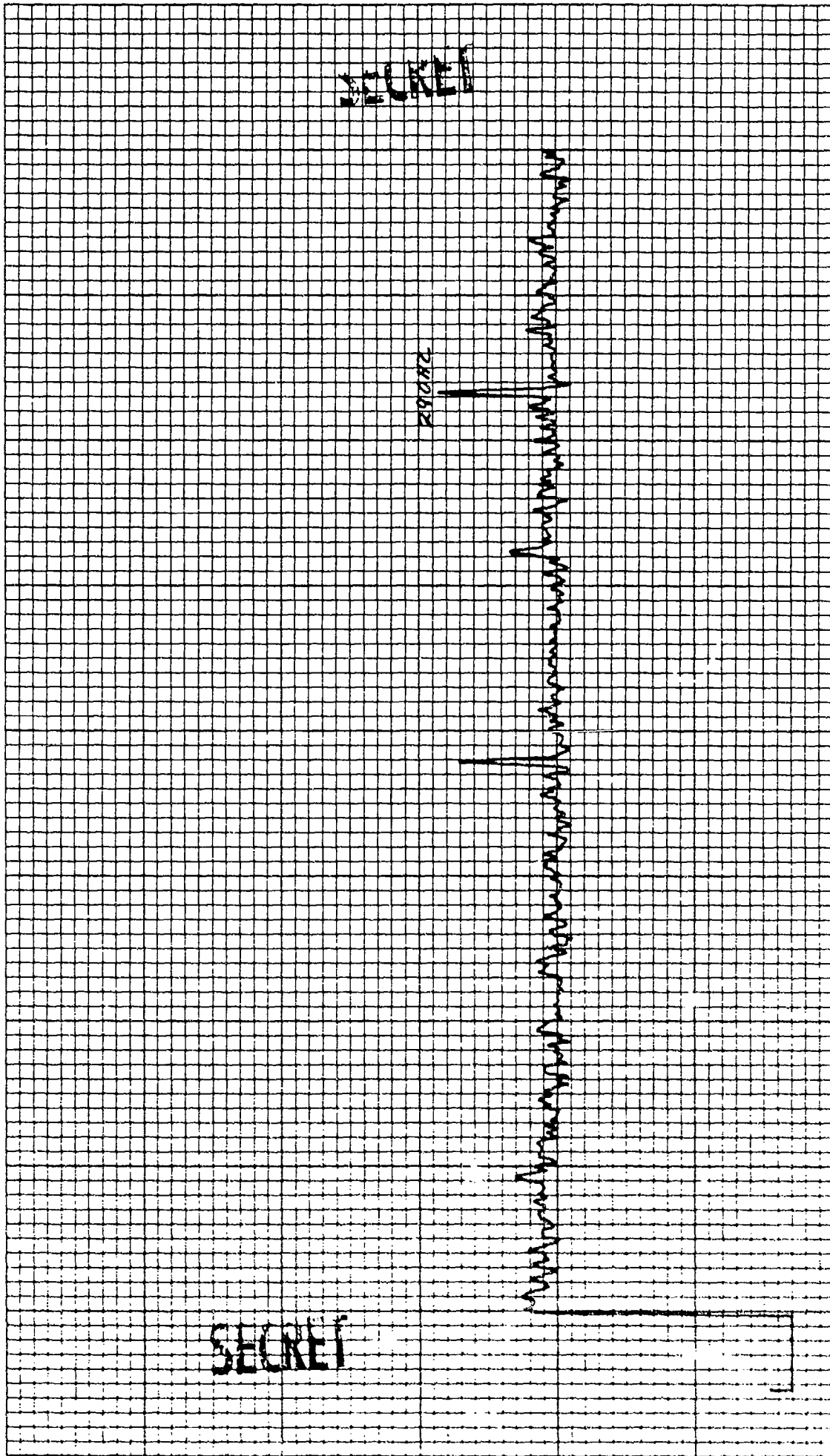
SECRET

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

46 0703

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

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

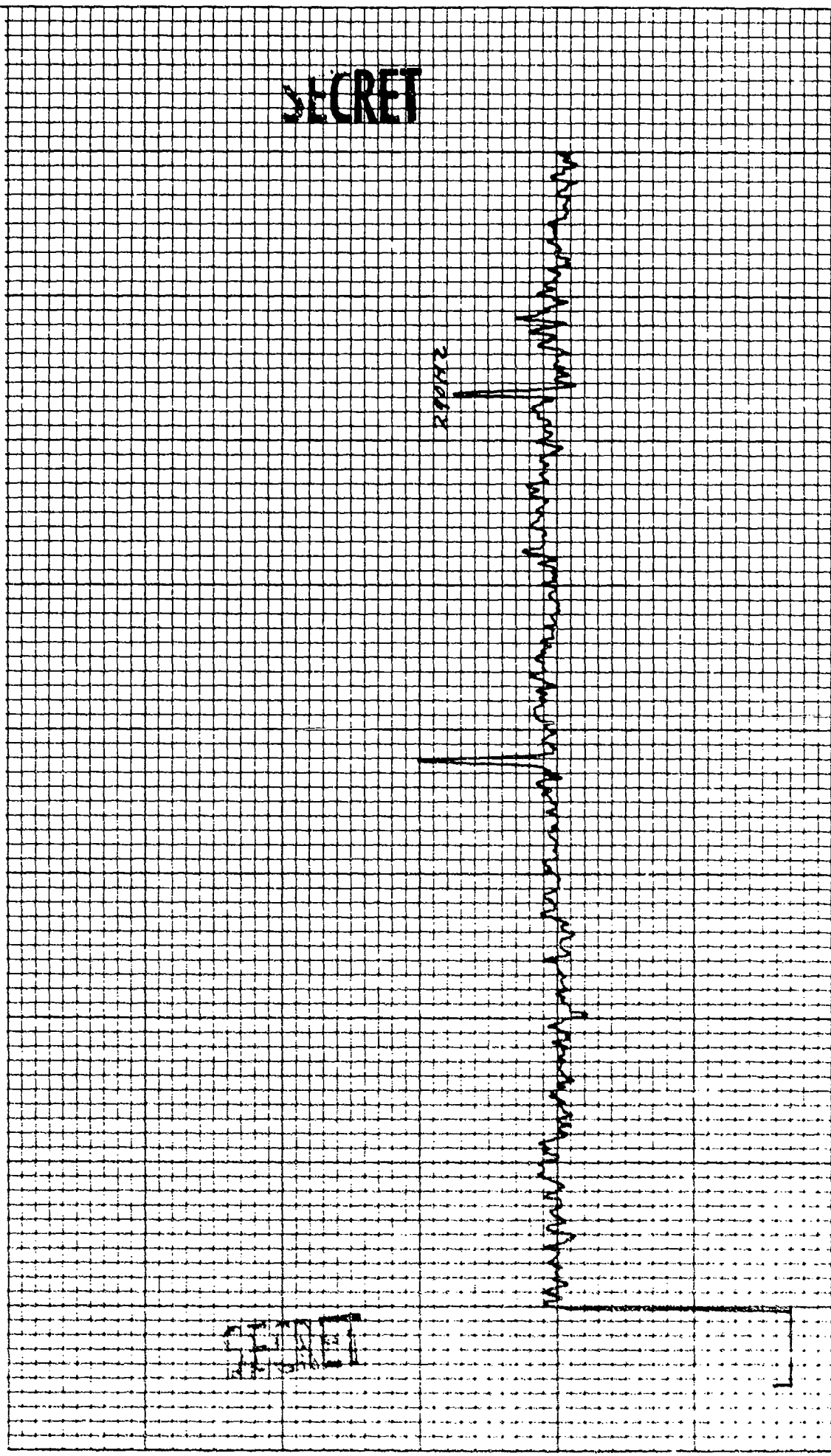


K.E 10 X 10 TO THE INCH 0.7 X 10 INCHES
HEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2-7 - 1019 (32) DATE OF ANALYSIS: 1-26-77 39-34
BEAMFORMED SPECTRUM(ELEMENTS) 32 ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
ANALYSIS BANDWIDTH: 1710HZ
444 DEG. AZ STEERING

REEL: F15 INDE X1955
INTEGRATION TIME 320 SECS ATTEN: -28 DB
FILTER WTG: HANNING



CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 4

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 51

SIGNAL LEVEL

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

NOISE LEVEL

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

SIGNAL-NOISE-RATIO

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

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 4

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 51

SIGNAL LEVEL

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

NOISE LEVEL

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

SIGNAL-NOISE-RATIO

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

CONFIDENTIAL

CONFIDENTIAL

DATA POINT 4

SIGNAL GAIN

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

ARRAY GAIN

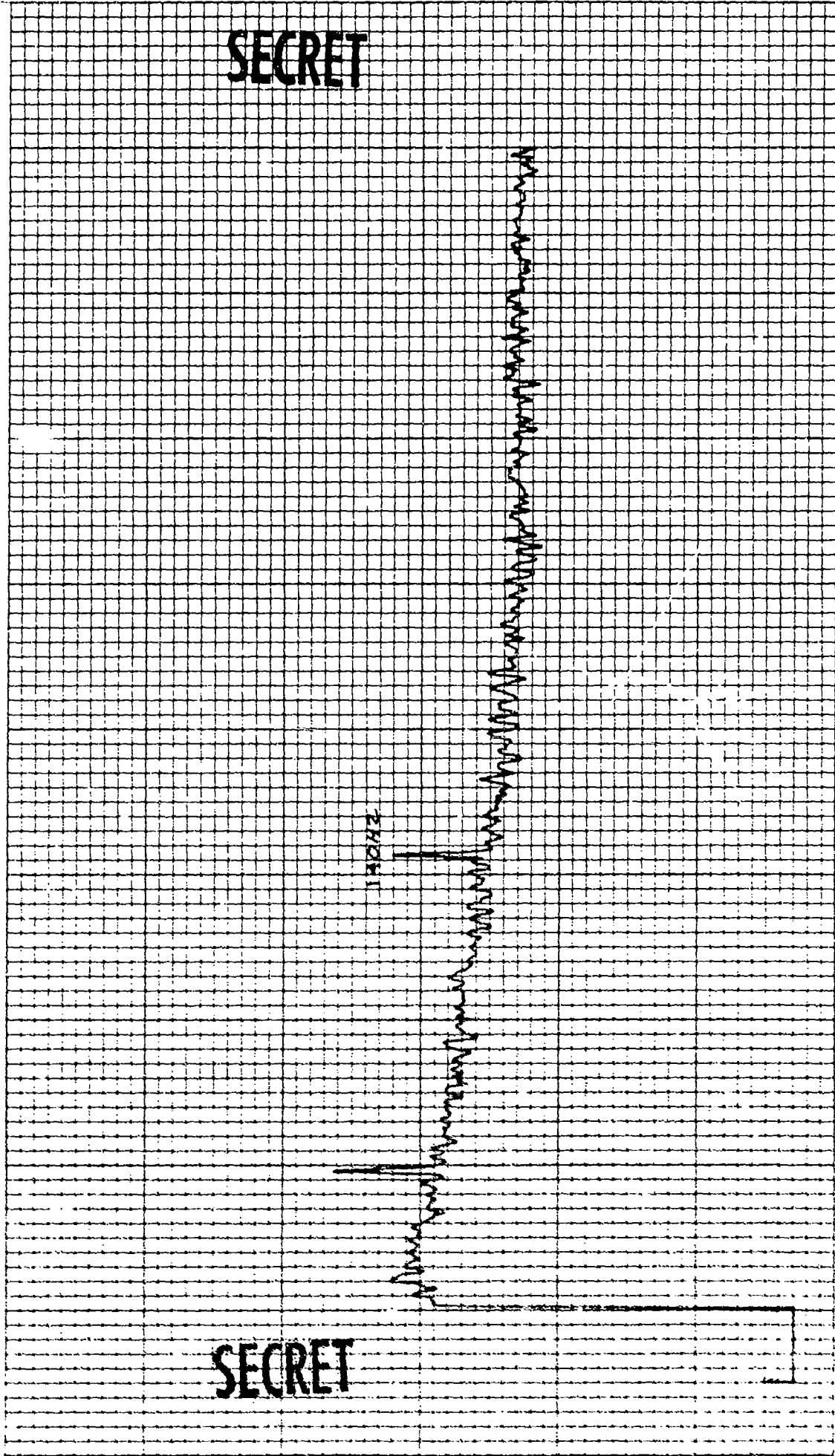
MRA SNR	<u>17.6</u>	<u>16.3</u>	<u> </u>
MEAN OMNI SNR	<u>8.3</u>	<u>6.5</u>	<u> </u>
ARRAY GAIN	<u>9.3</u>	<u>9.8</u>	<u> </u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>14.8</u>	<u>17.1</u>	<u> </u>
DIFFERENCE	<u>- 5.5</u>	<u>- 7.3</u>	<u> </u>

CONFIDENTIAL

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

46 0703

CONTROL: Z-7 - 1017 (S1) DATE OF ANALYSIS: REEL: F15 INDE X 1955
BEAMFORMED SPECTRUM(ELEMENTS) 1-26889-34
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTEN: -30DB
CENTER FREQ: 150 HZ 122 DEG. AZ STEERING FILTER WTC: HANNING
S1 ELEMENTS

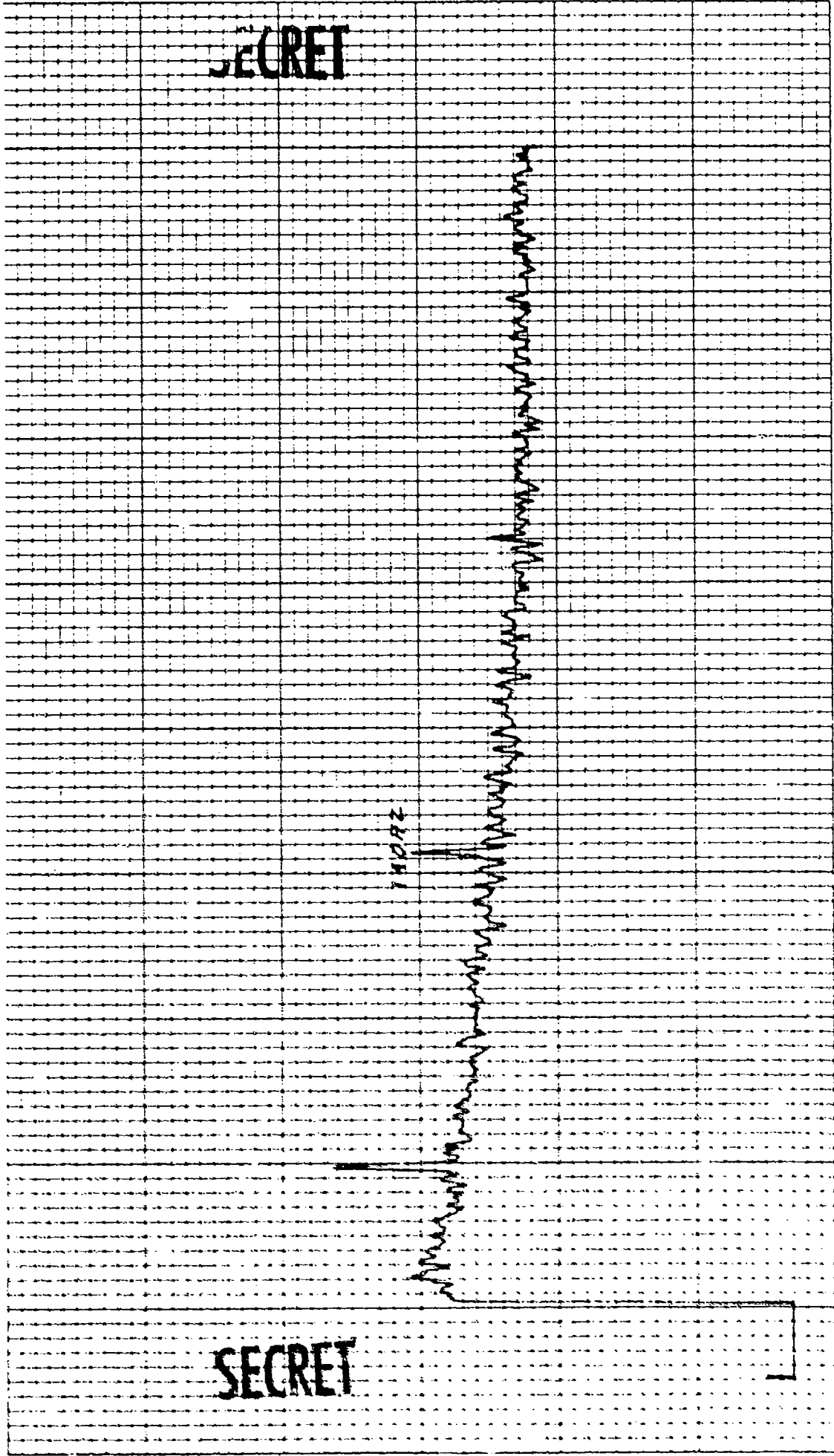


46 0703

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

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

REEL: F15 INDE X1855



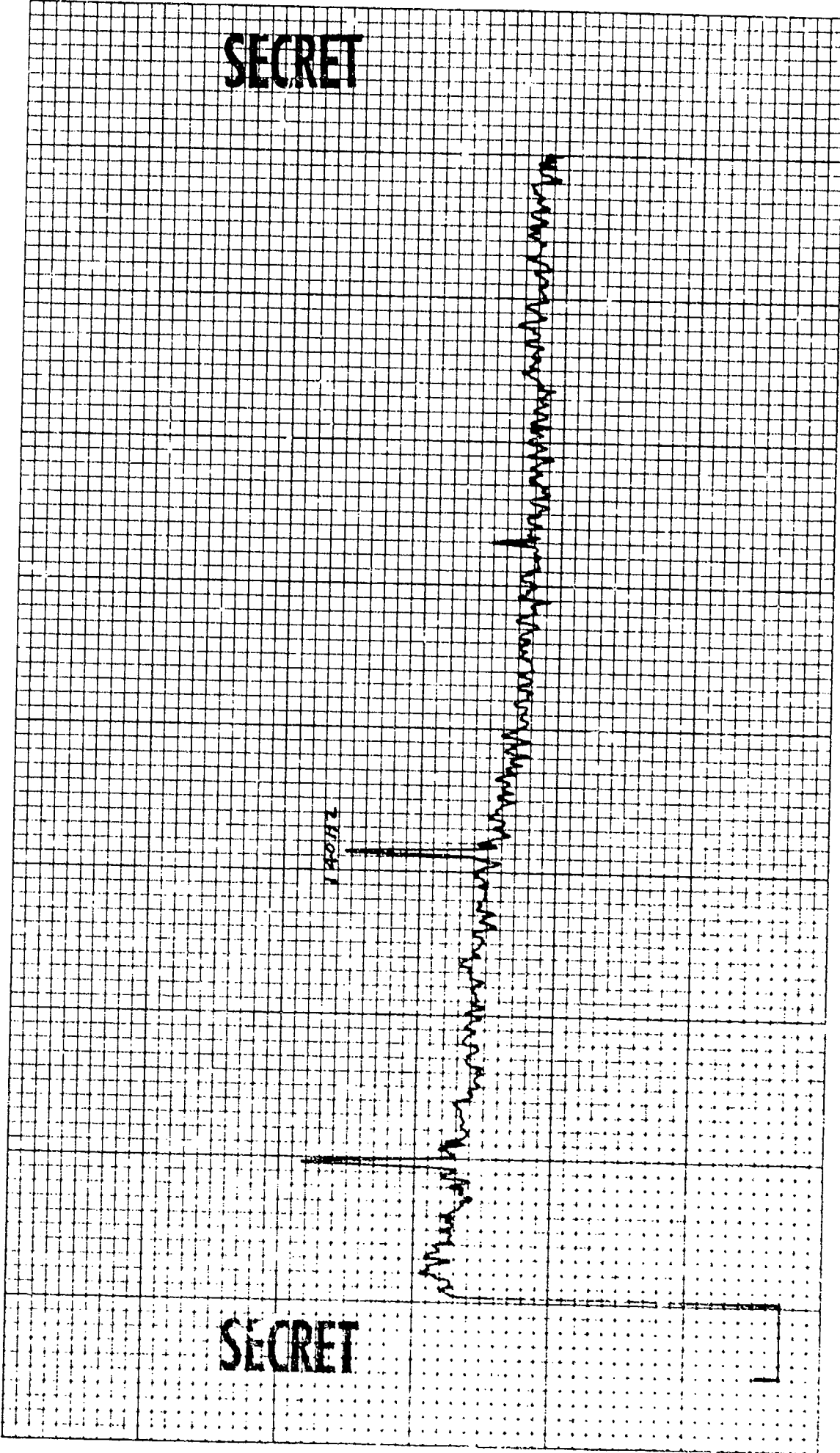
SECRET

SECRET

CONTROL: 2-7 - 1019 (51)
 BEAMFORMED SPECTRUM (ELEMENTS 1-26 829-83)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 51 ELEMENTS

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

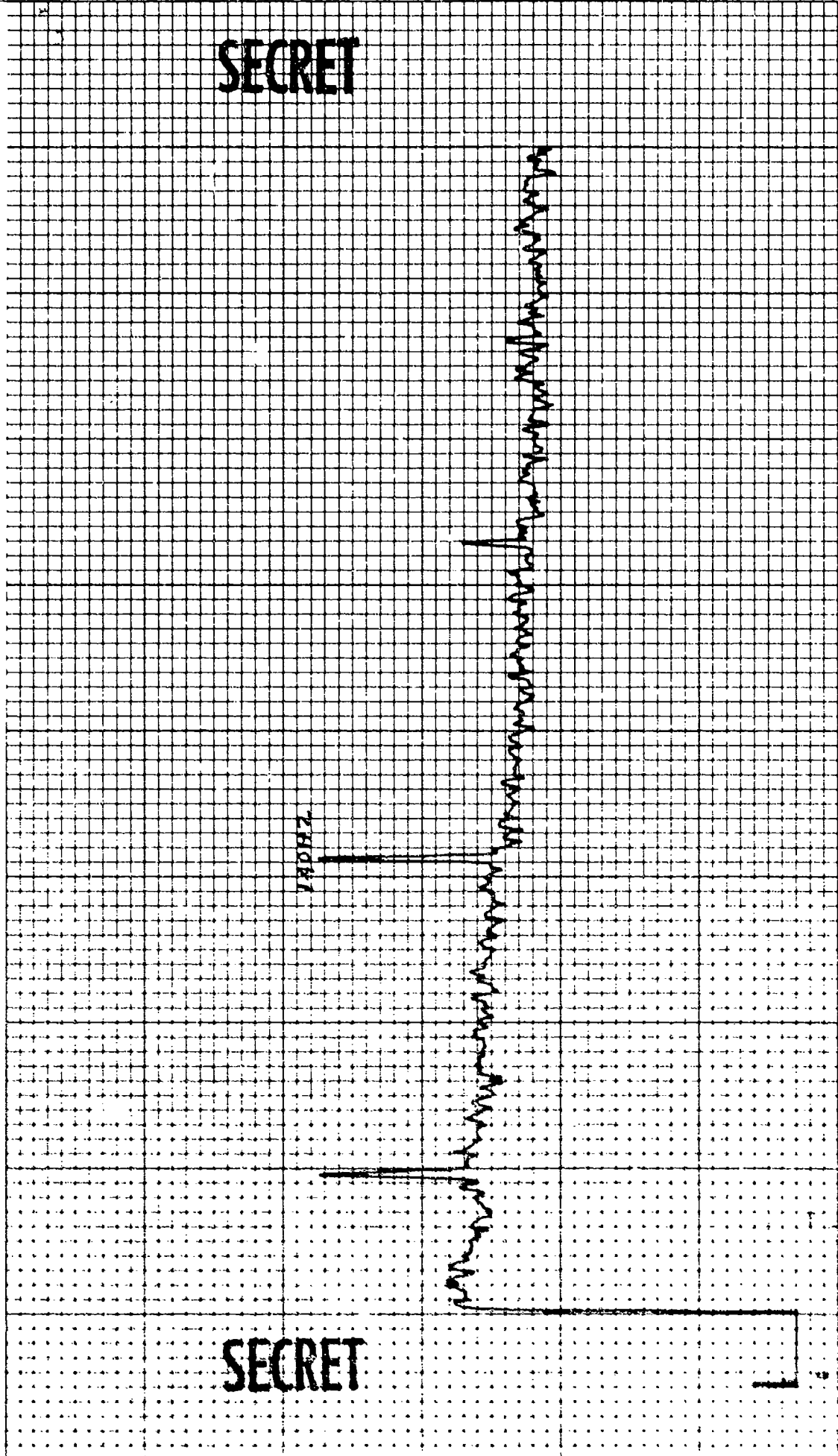
REEL: F15 INDE X/855
 INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING
 ATTN: -30DB



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

46 0703

CONTROL: 2.7 - 1019 (51) DATE OF ANALYSIS: 1-26-53 REEL: F15 INDE X/1955
BEAMFORMED SPECTRUM (ELEMENTS) 1-26-53 INTEGRATION TIME 320 SECS ATTEN: -70DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1710HZ FILTER WTG: HANNING
CENTER FREQ: 150 HZ 51 ELEMENTS +20 DEG. AZ STEERING



SECRET

SECRET

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

46 0703

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

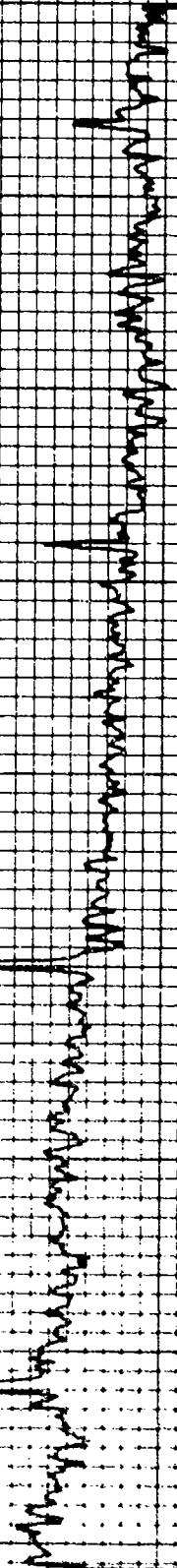
DATE OF ANALYSIS: 1-26-53
DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
+29 DEG. AZ STEERING

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

SECRET

SECRET

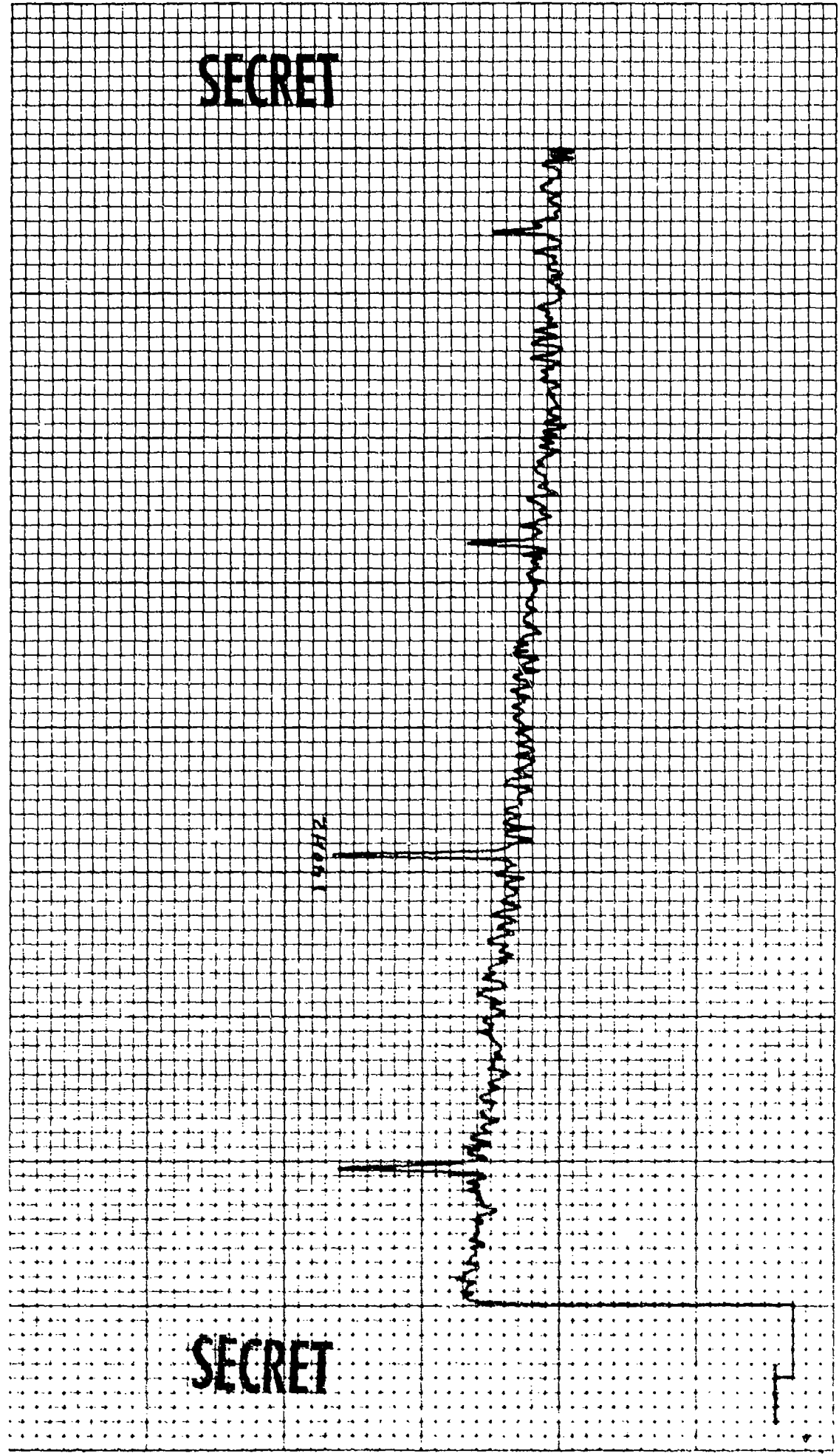
1019Z



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

46 0703

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



SECRET

SECRET

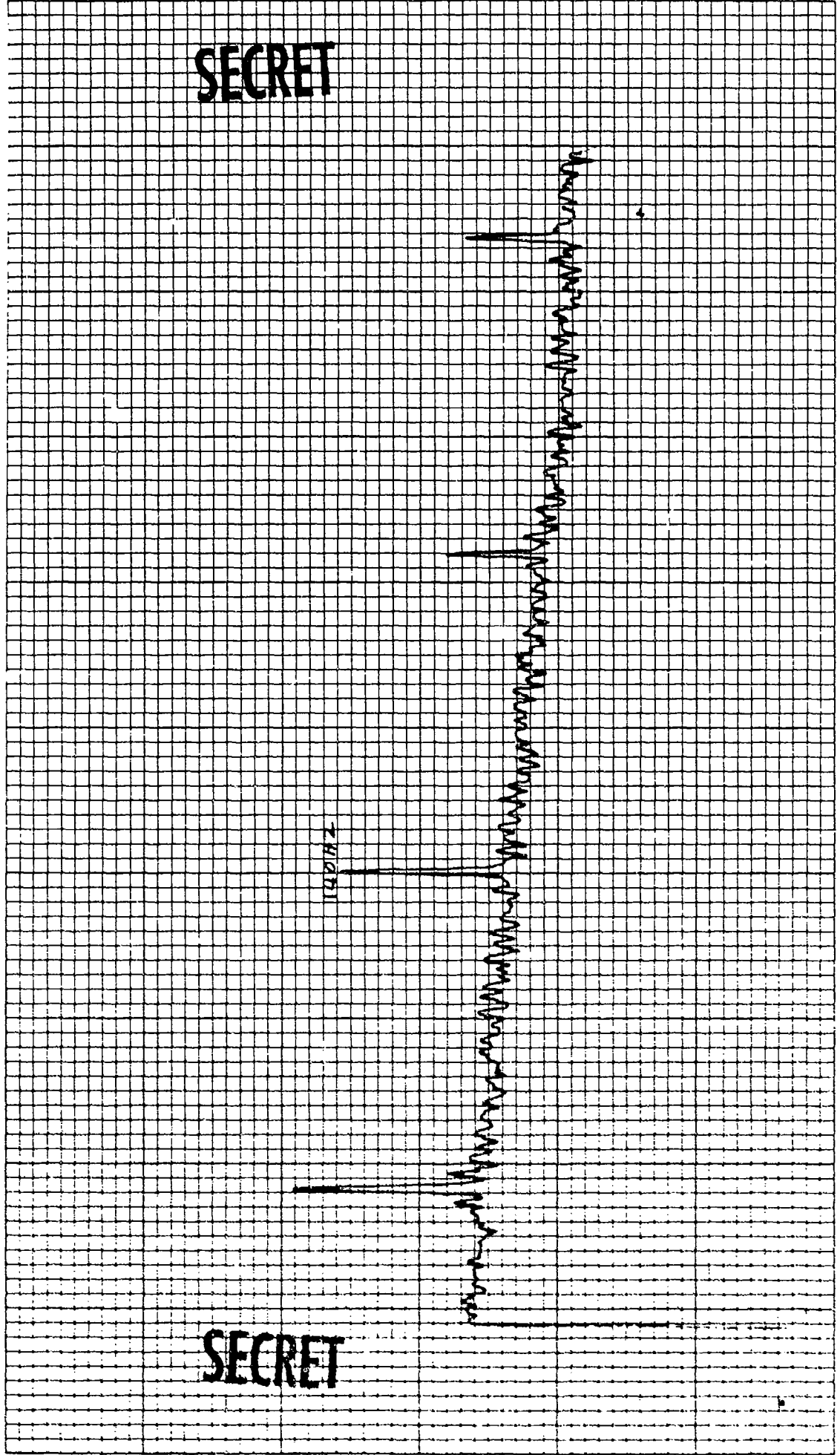
KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

4 27
518 100 111

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

REEL: F15 INDE X 1955

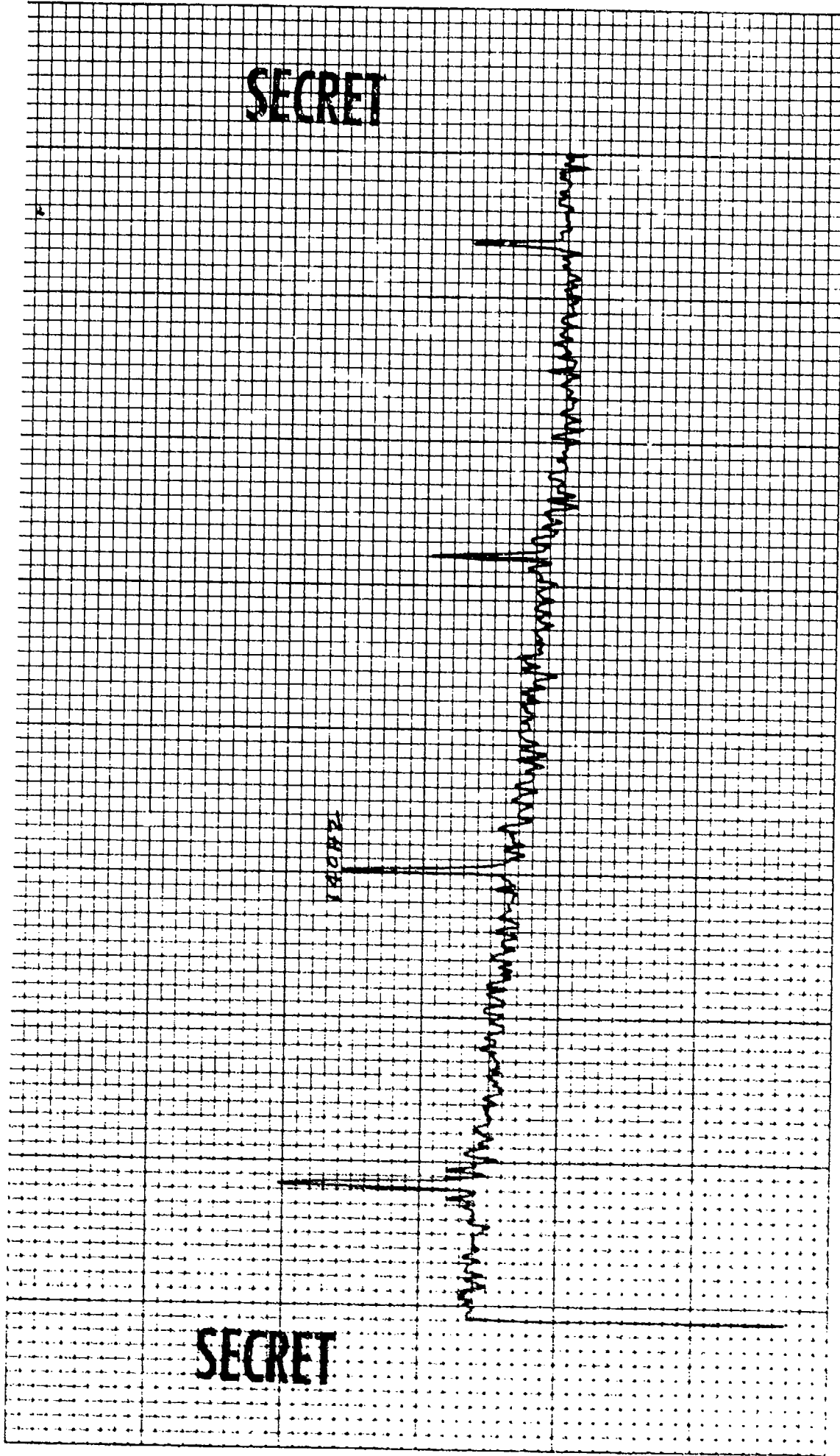


K+E 10 X 10 TO THE INCH 1.7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

DPV → 31
146
SIE

CONTROL: 2-7 -1019 (51)
BEAMFORMED SPECTRUM(ELEMENTS) 1-26428-53
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
61 ELEMENTS
DATE OF ANALYSIS: ---
DATE/TIME: 2-7-77 -1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
+31.5 DEG. AZ STEERING
REEL: F/S
INDE X/955
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING
ATTEN: -30 DB



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

46 0703

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

DATE OF ANALYSIS: - - - - -

1-26-79-53

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

ANALYSIS BANDWIDTH: 1/10HZ

732 DEG. AZ STEERING

REEL: F15

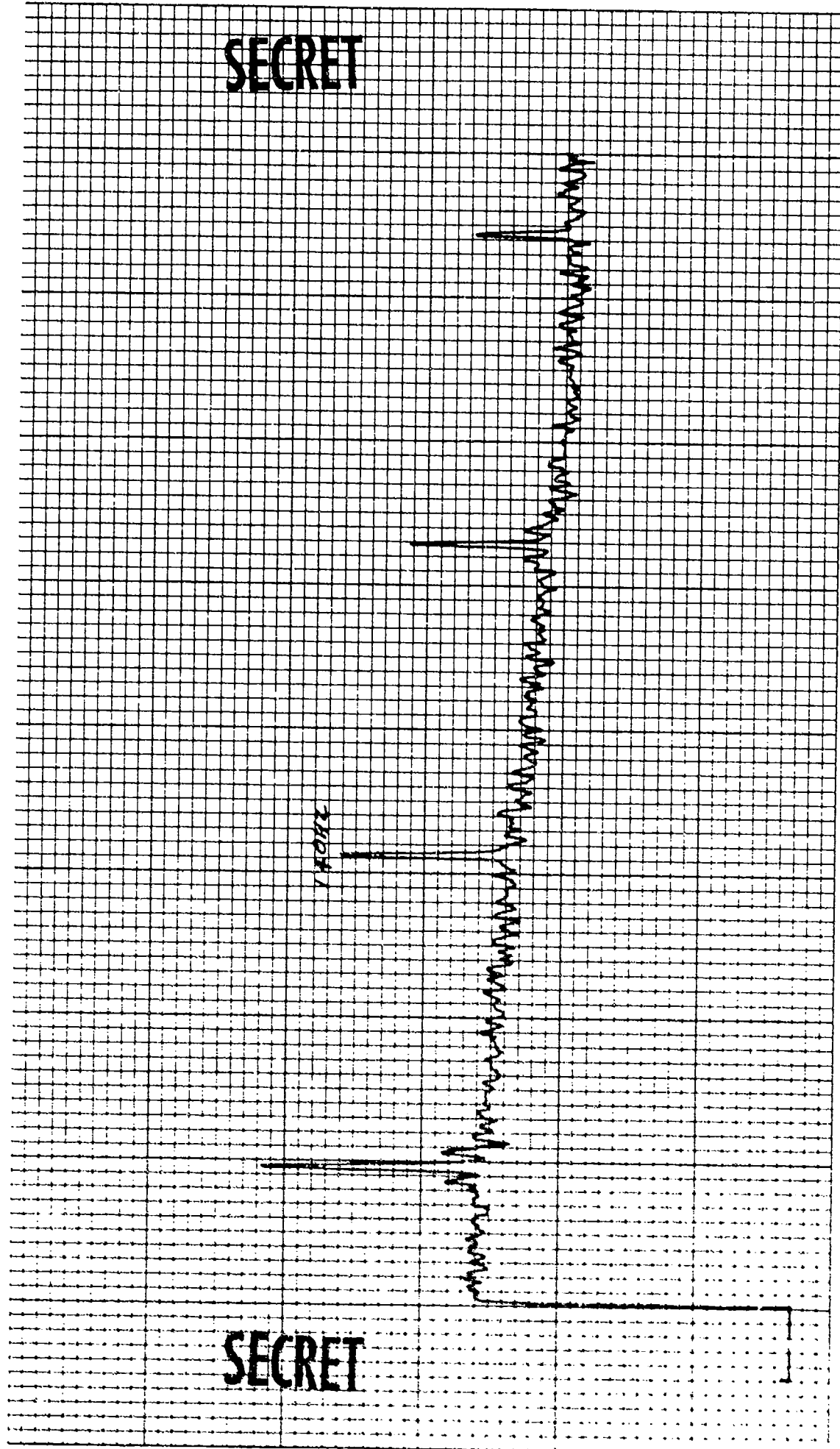
INDE X1955

INTEGRATION TIME 320 SECS

FILTER

ATTEN: -30 DB

WTG: HANNING

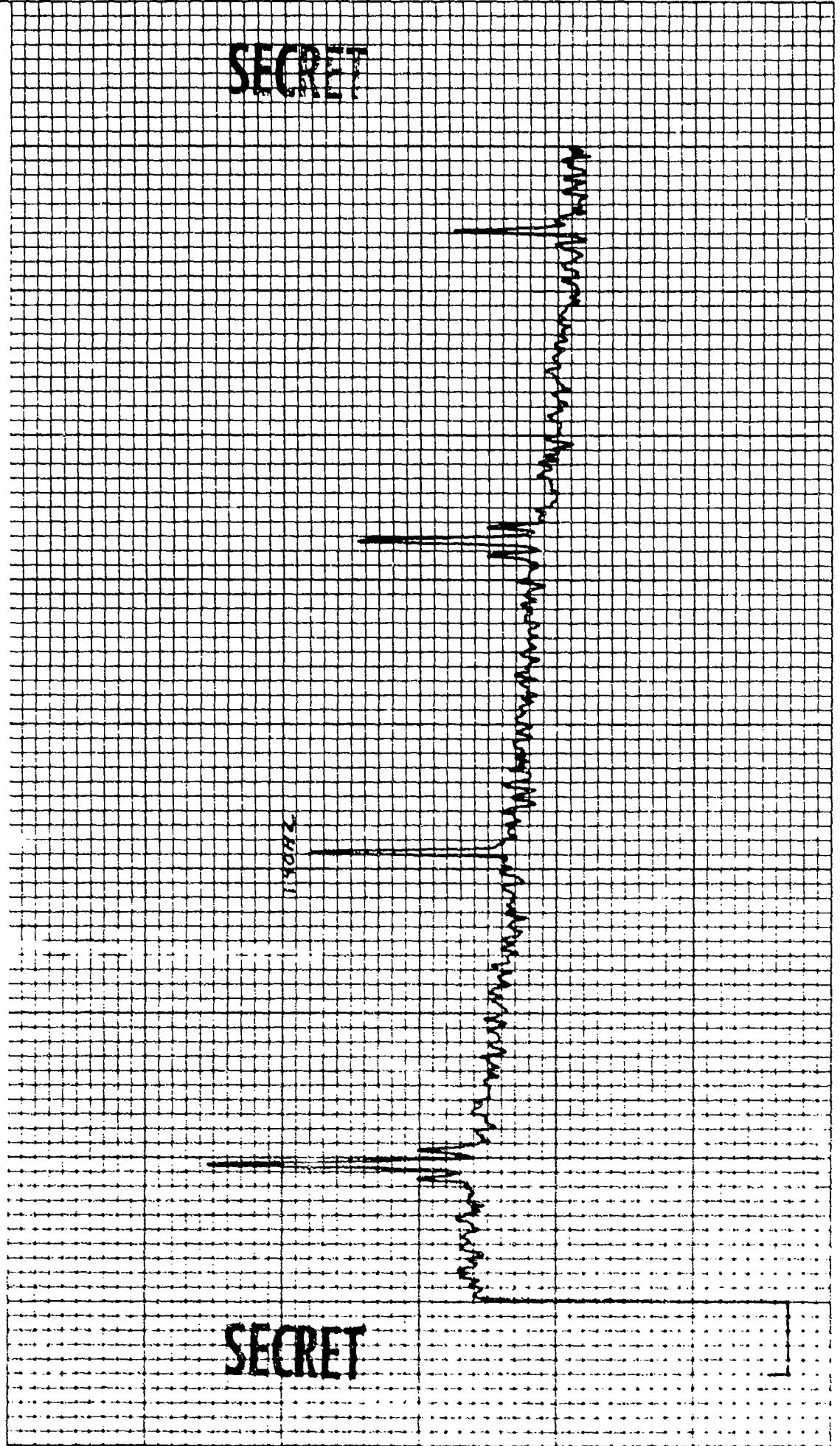


K-E 18 X 10 TO THE INCH .7 X 10 INCHES
KLUYTEL & LESSER CO. MADE IN U.S.A.

46 0703

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

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



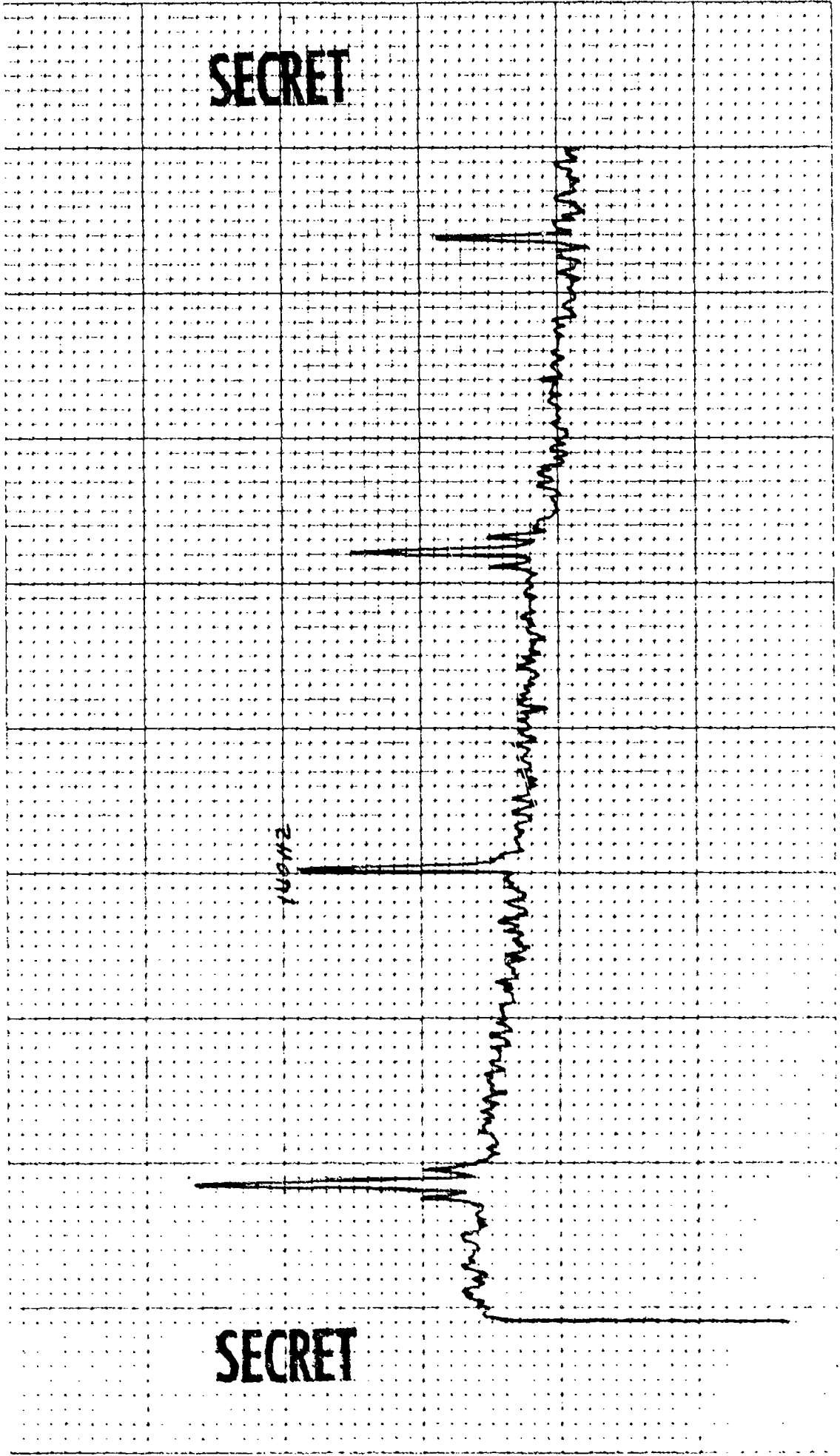
KOE BEARING TO THE INCH: 200-000000

46 0703

149
1.5 = 27

CONTROL: 2.7 - 1019 (5/) DATE OF ANALYSIS: ~ - -
 BEAMFORMED SPECTRUM(ELEMENTS) 1-26 & 29-53
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1019 Z
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
 6/ ELEMENTS +35 DEG. AZ STEERING

REEL: F/S INDE X1955
 INTEGRATION TIME 320 SECS ATTEN: 30 DB
 FILTER WIG: HANNING



MSE 10 X 10 TO THE INCHES 100 INCHES

46 0703

3 P 4

146 E
S 1 E # 75

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

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

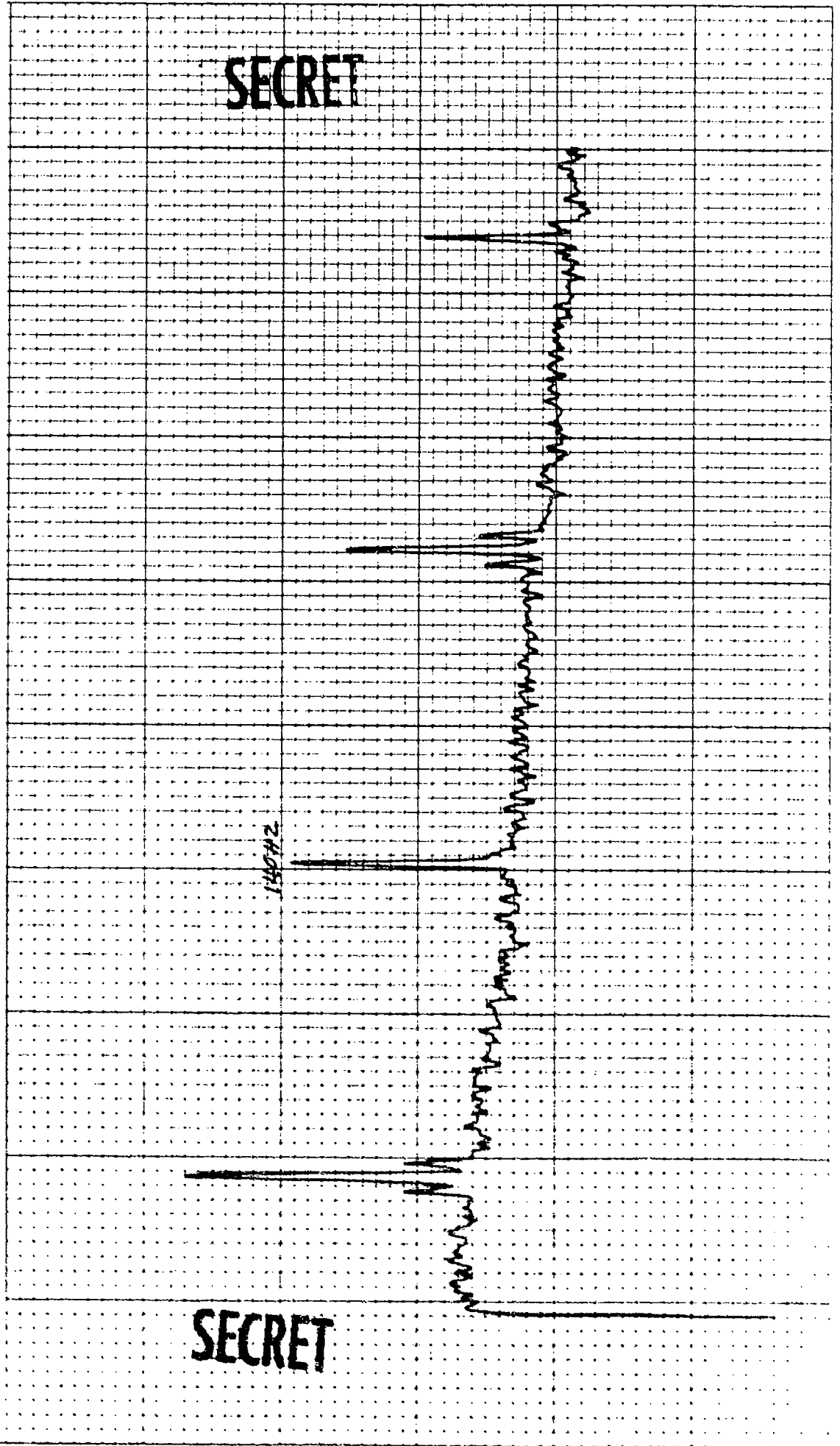
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 -1019 Z

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

51 ELEMENTS 435.5 DEG. AZ STEERING

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

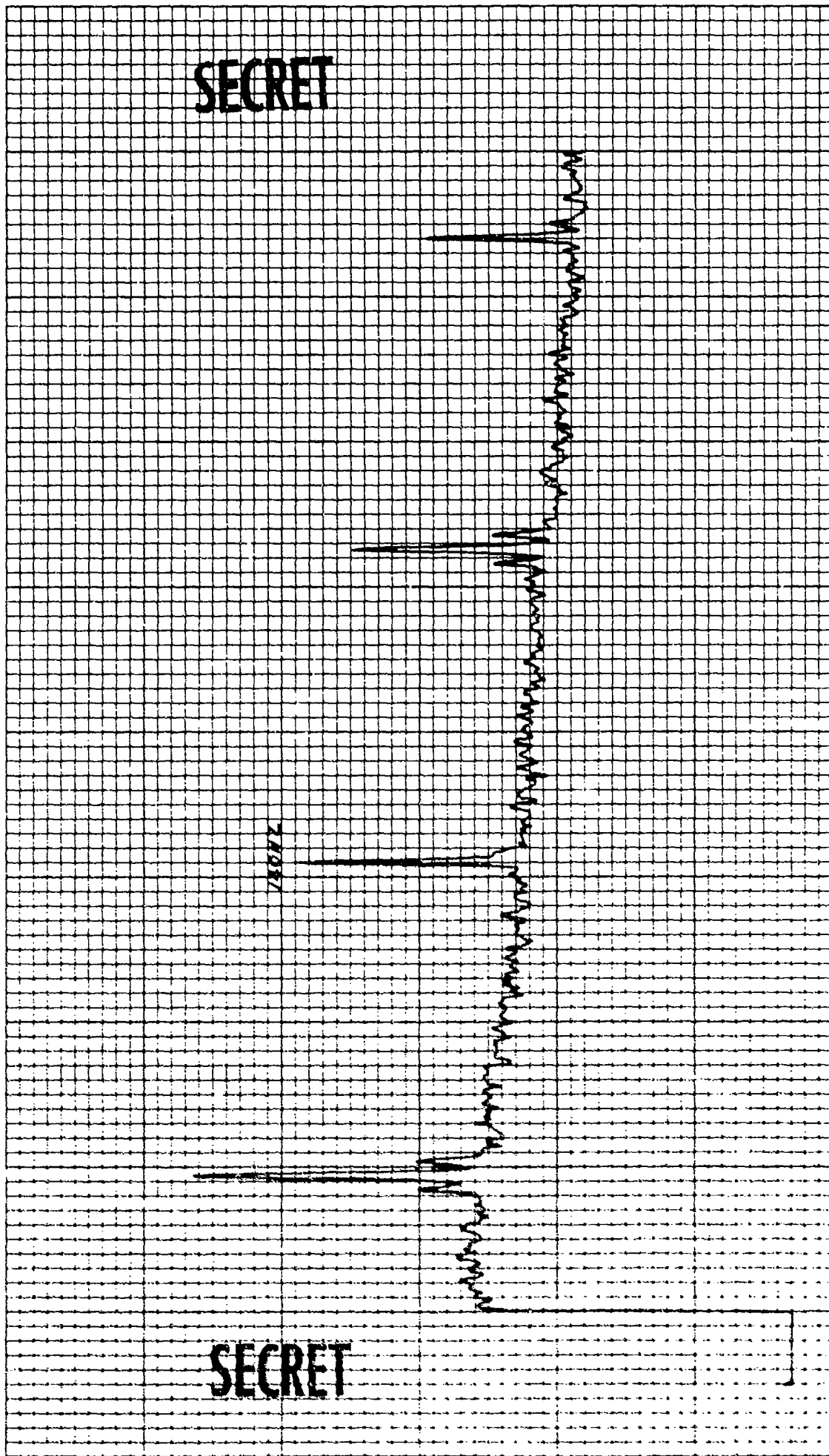
INDE X1955 FILTER WTG: HANNING



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

46 0703

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

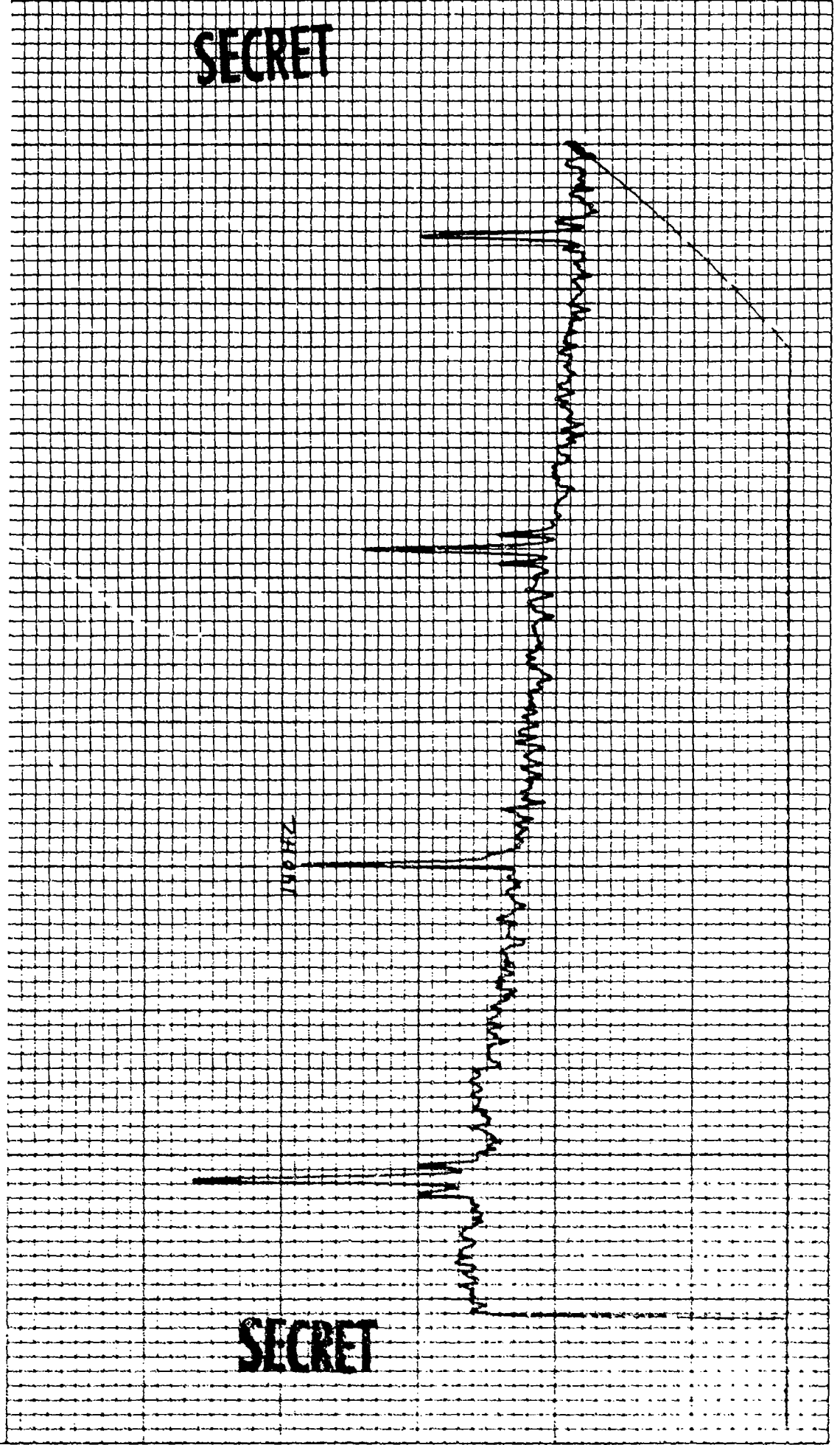


KSE 10 X 10 TO THE INCH .7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

24
4
148 51E

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



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

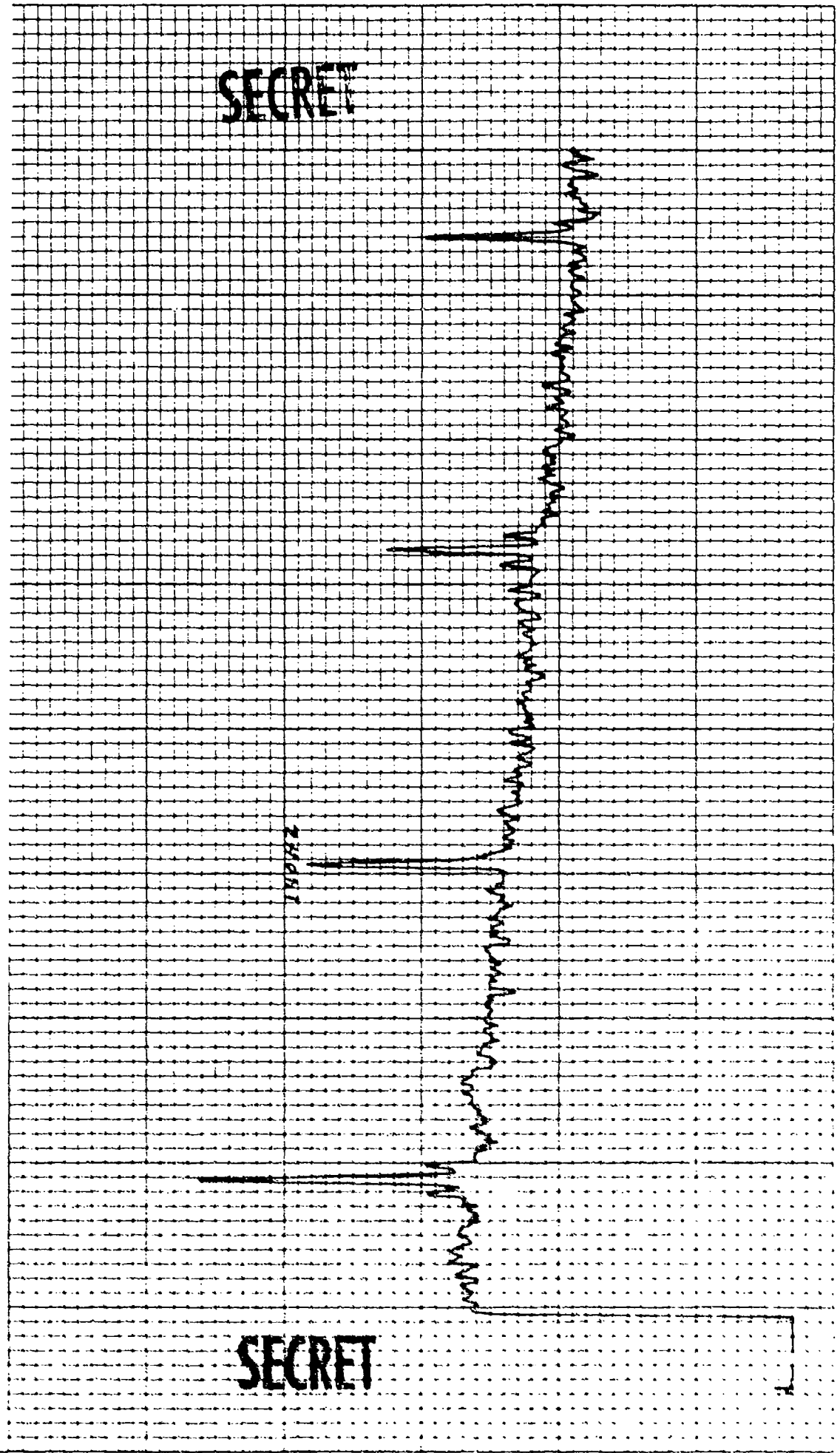
46 0703

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

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

REEL: F/S
INDE X/1955

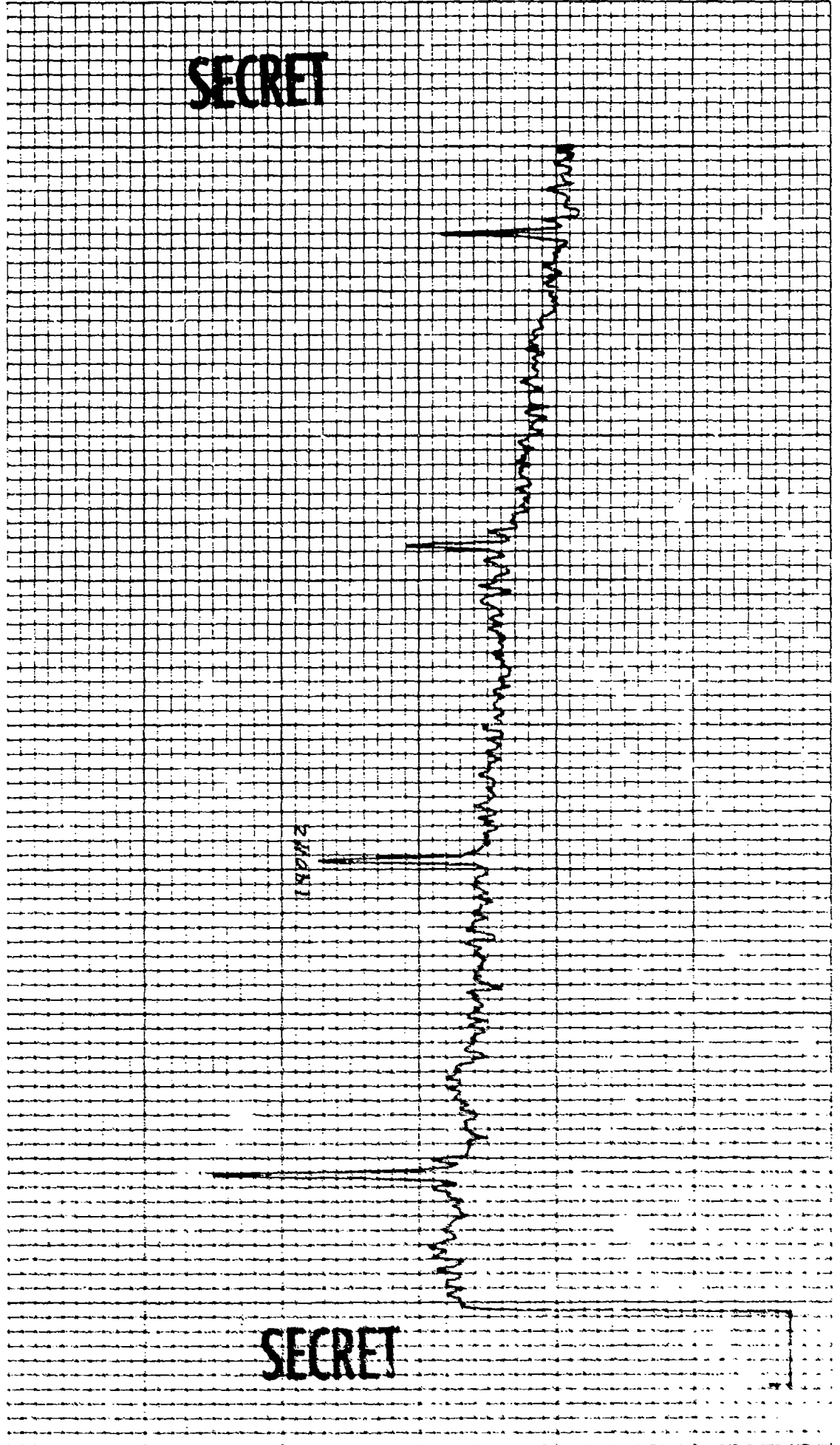
INTEGRATION TIME 320 SECS
ATTEN: -50 DB
FILTER WTG: HANNING



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

46 0703

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

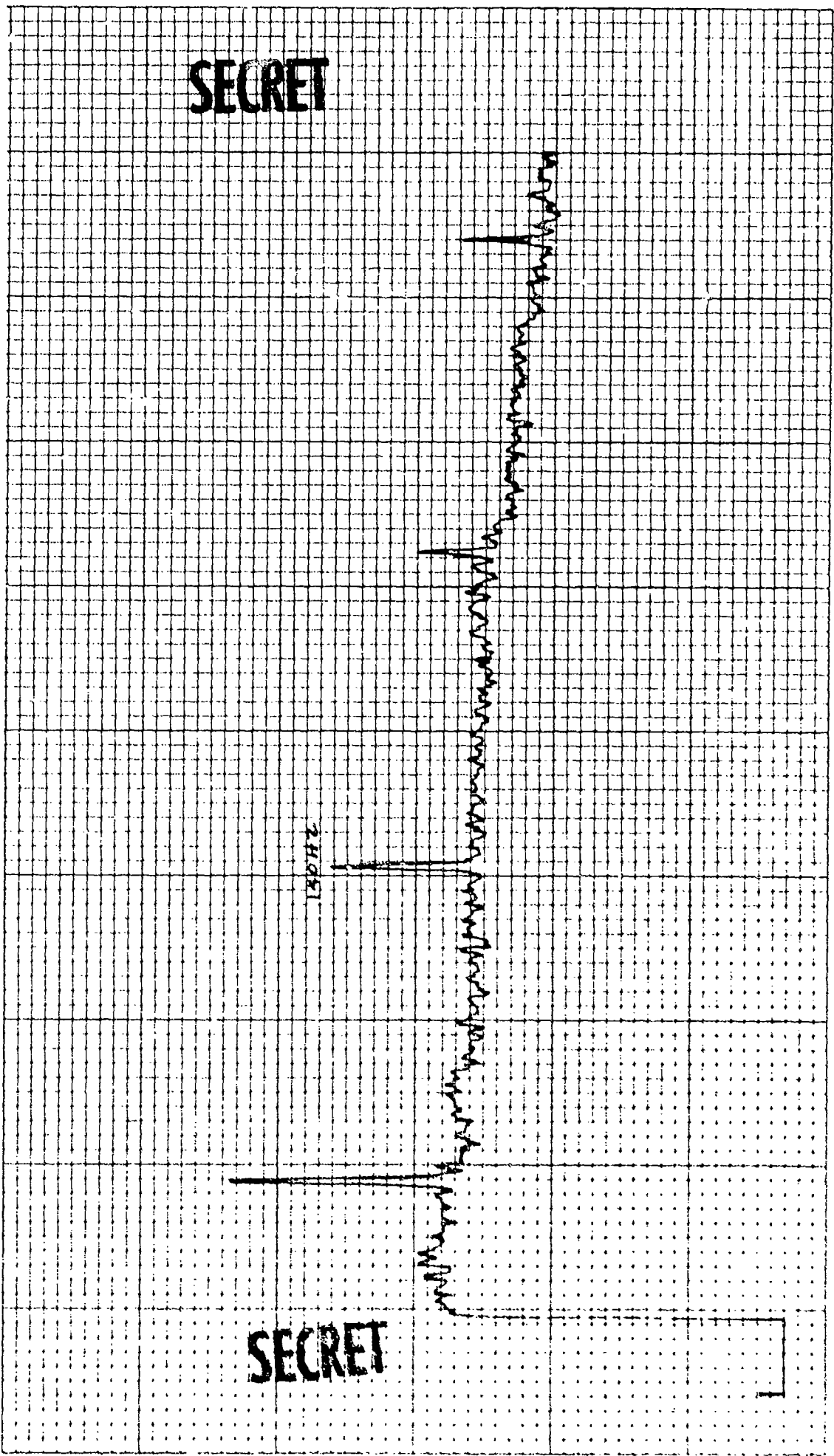


CONTROL: 2-7 -1019 (51)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 5/ ELEMENTS

DATE OF ANALYSIS: 1-26 4 29-53
 DATE/TIME: 2-7-77 - 1019 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 742 DEG. AZ STEERING

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

INDE X/955
 ATTEN: -30 DB



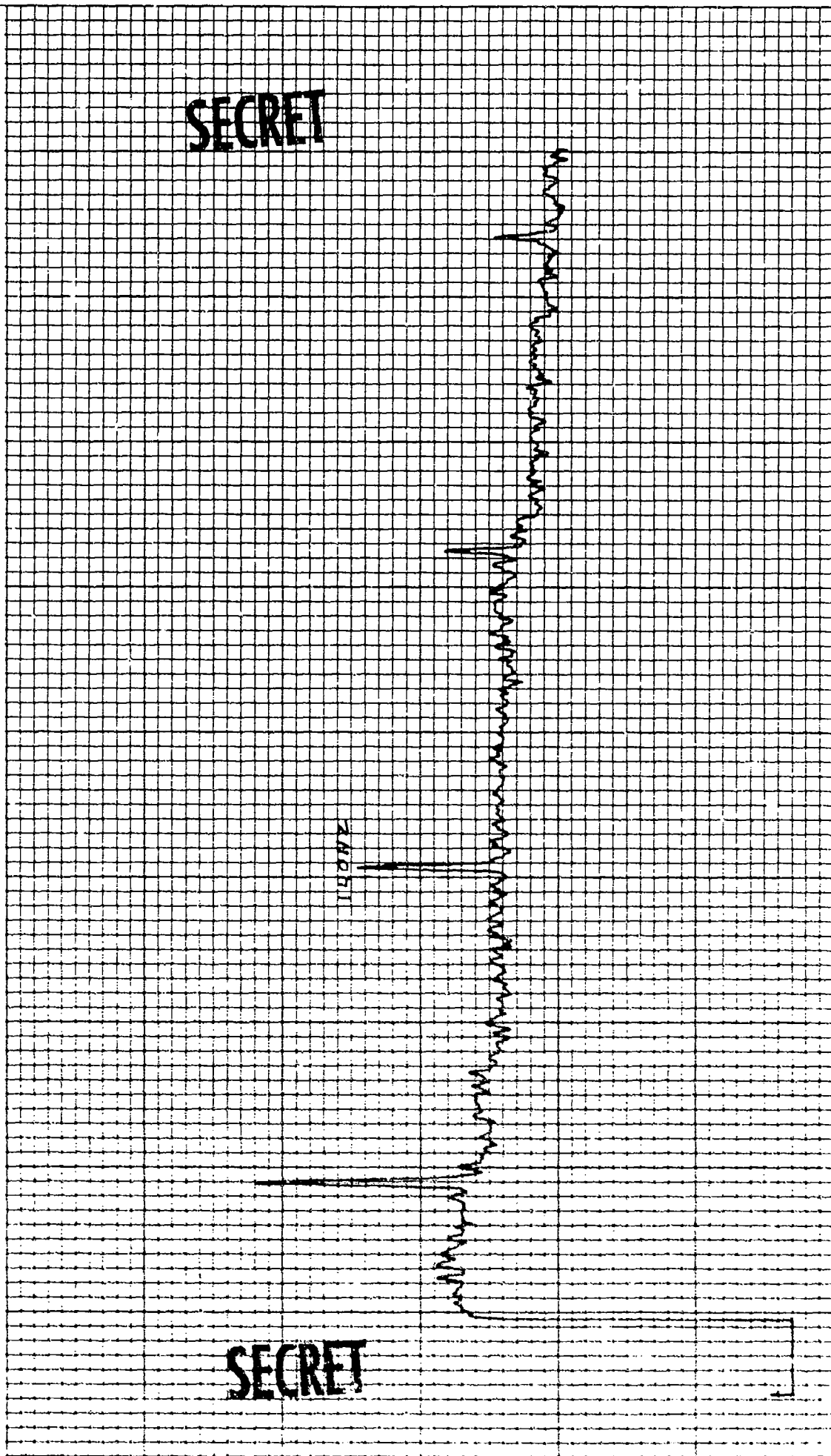
SECRET

SECRET

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

46 0703

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



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

46 0703

CONTROL: 2-7 -1019 (5/) REEL: F15 INDE X1955
BEAMFORMED SPECTRUM (ELEMENTS) 1-268 28-53
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: -30 DB
CENTER FREQ: 270 HZ FILTER WTG: HANNING
5/ ELEMENTS + 22 DEG. AZ STEERING

DATE OF ANALYSIS: - - - - -

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

ANALYSIS BANDWIDTH: 1/10HZ

+ 22 DEG. AZ STEERING

SECRET

SECRET

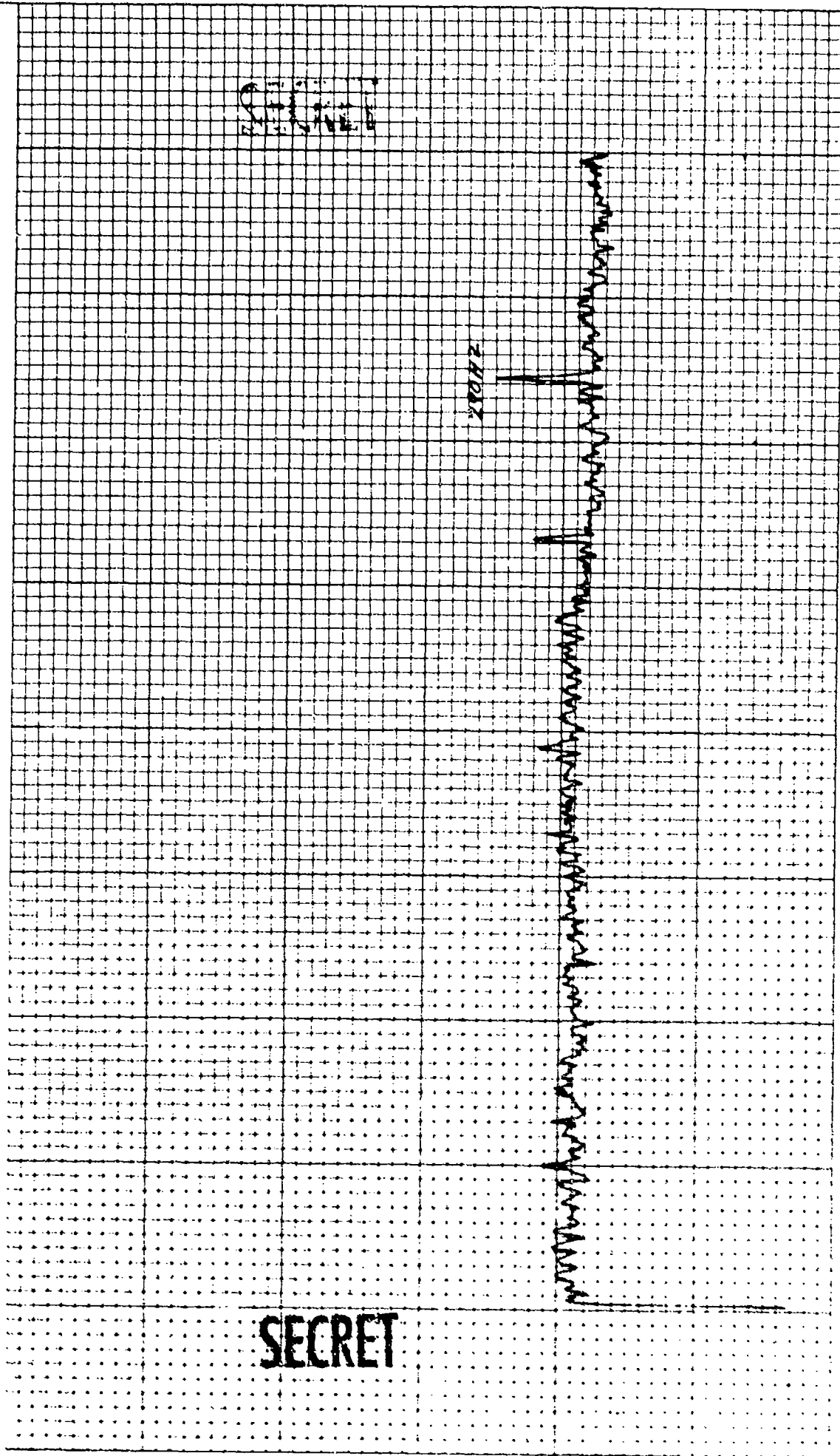
2800 Hz



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

46 0703

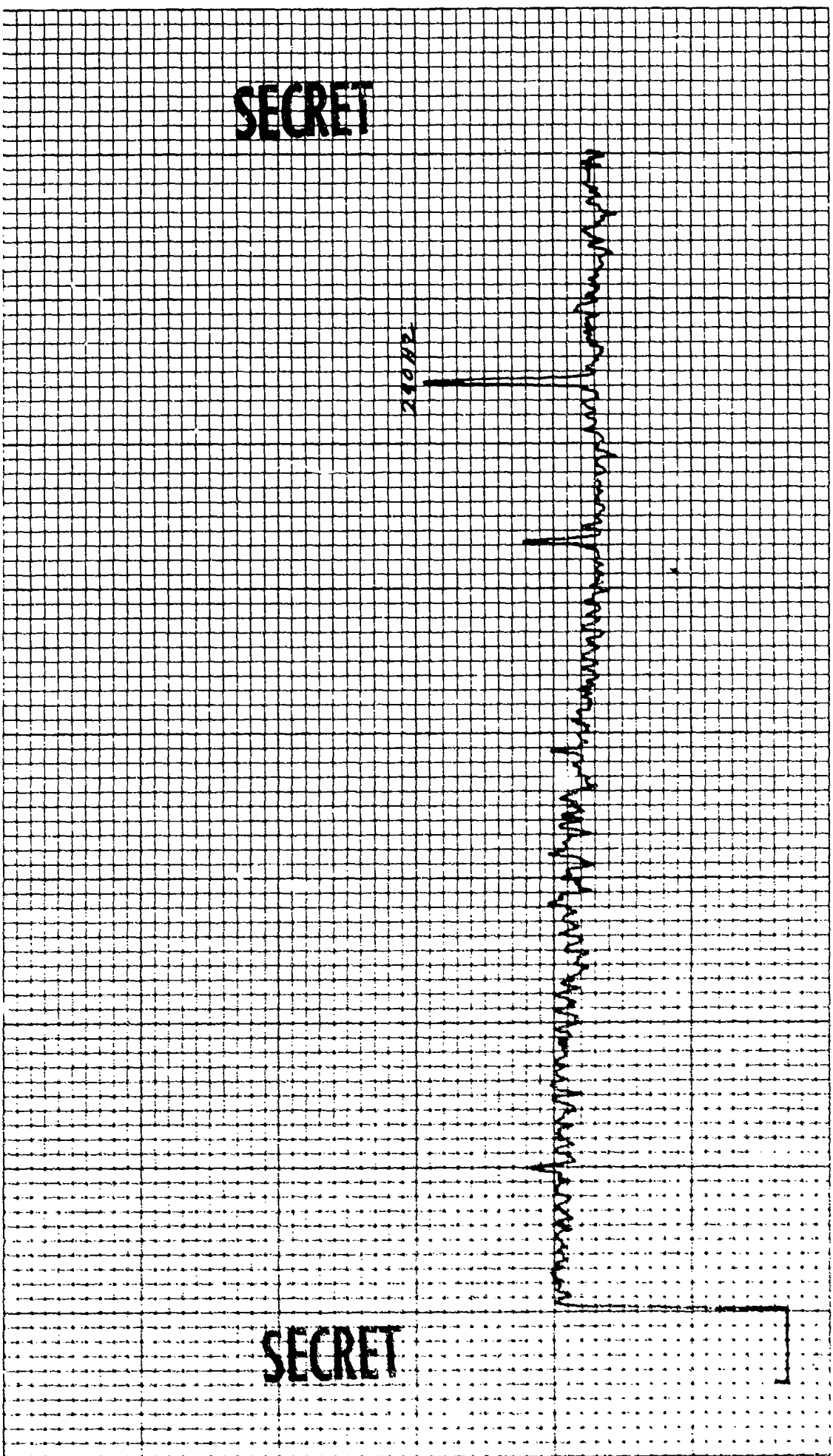
CONTROL: 2.7 - 1019 (51) DATE OF ANALYSIS: 1-26-53 REEL: F15 INDE X1958
BEAMFORMED SPECTRUM (ELEMENTS) 2.7-77-1019 Z INTEGRATION TIME 320 SECS ATTEN: -30 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 270 HZ 24 DEG. AZ STEERING



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

46 0703

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



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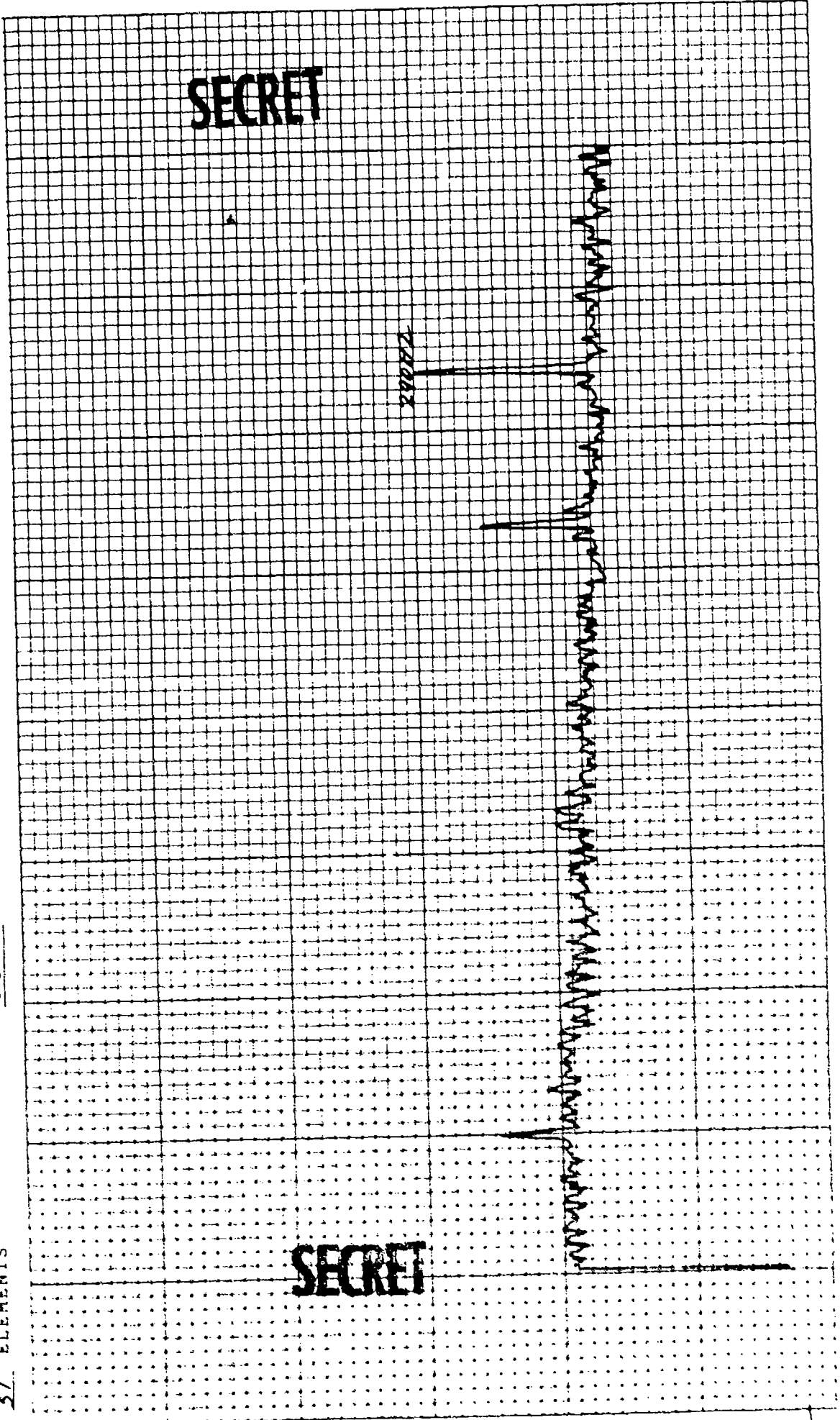
KOE 10 X 10 TO THE INCH - 7 X 10 INCHES
MULTIPLE OF FEASER CO. MADE IN U.S.A.

46 0703

REEL: F/5 INDE X/955

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

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



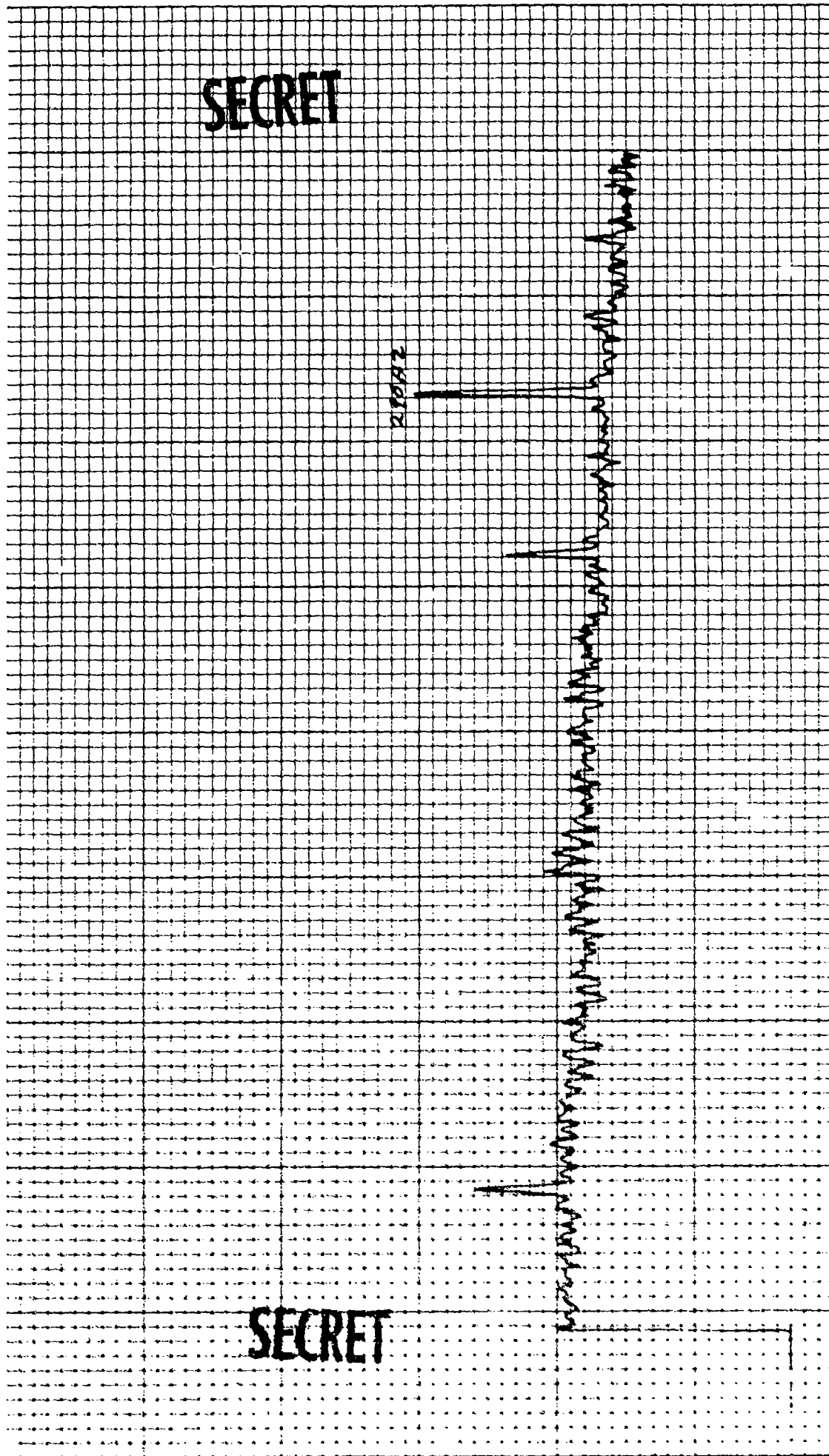
KOE 10 X 10 TO THE INCH - 1 X 10 INCHES
HELVETIA & ESSER CO. MADE IN U.S.A.

46 0703

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

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

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



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

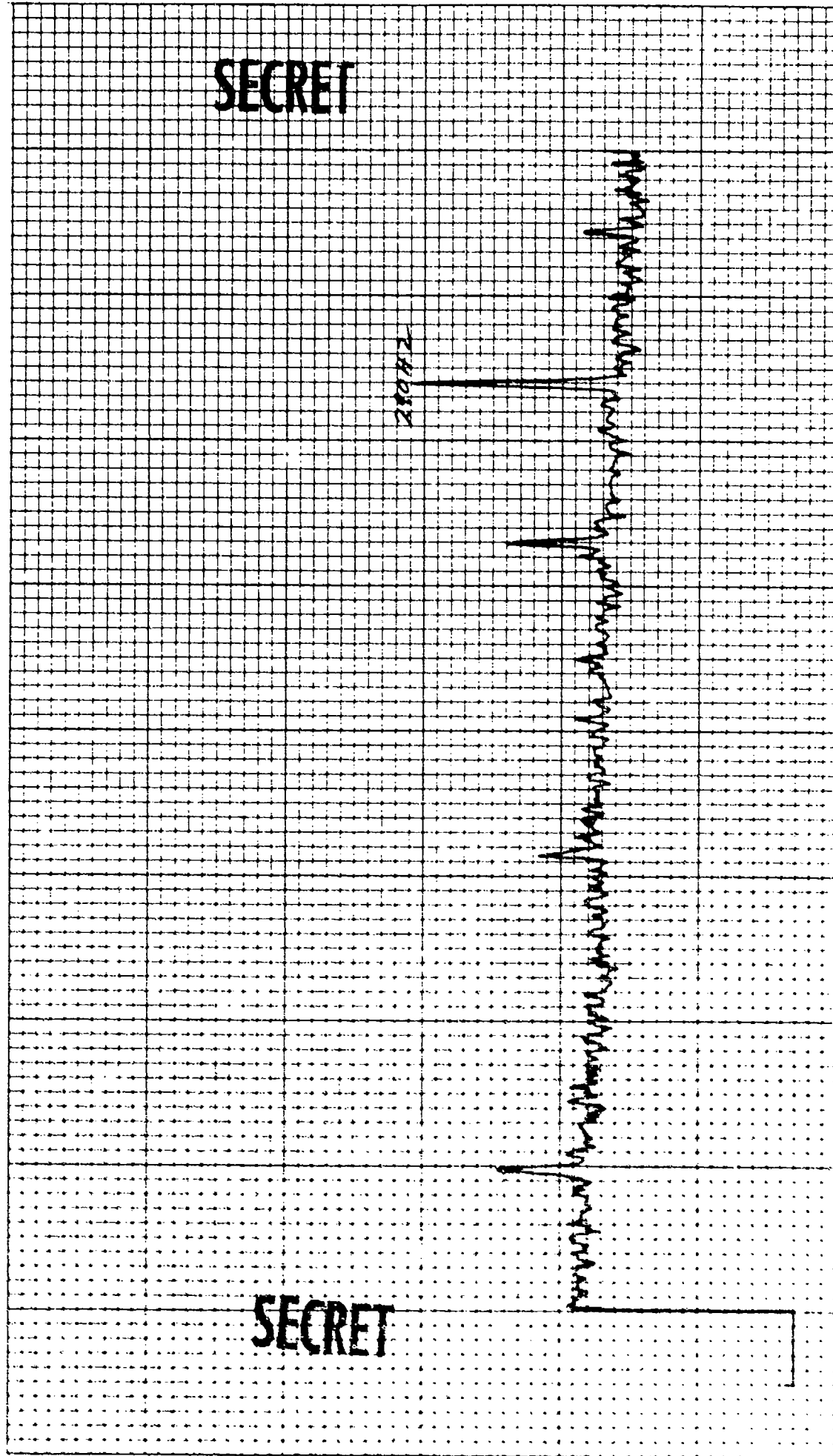
46 0703

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

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

REPL: F/S
INDE X/1955

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



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

46 0703

D 28
230 515 284

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

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

REEL: 45

INDE X 1855

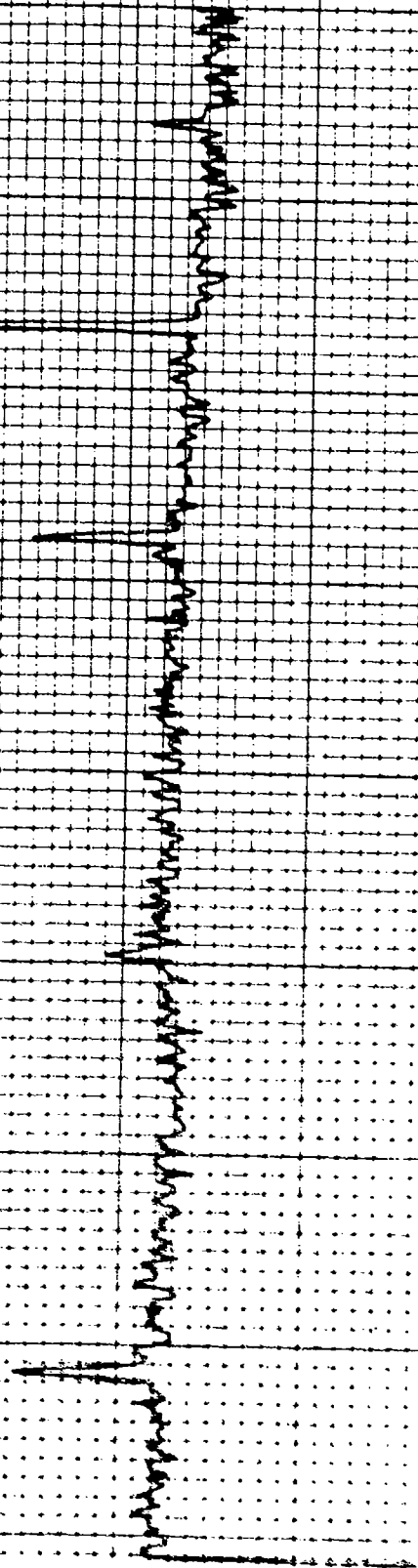
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING

ATTEN: -70 DB

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28072



KOE 12 1/2 TO THE INCREMENT

46 0703

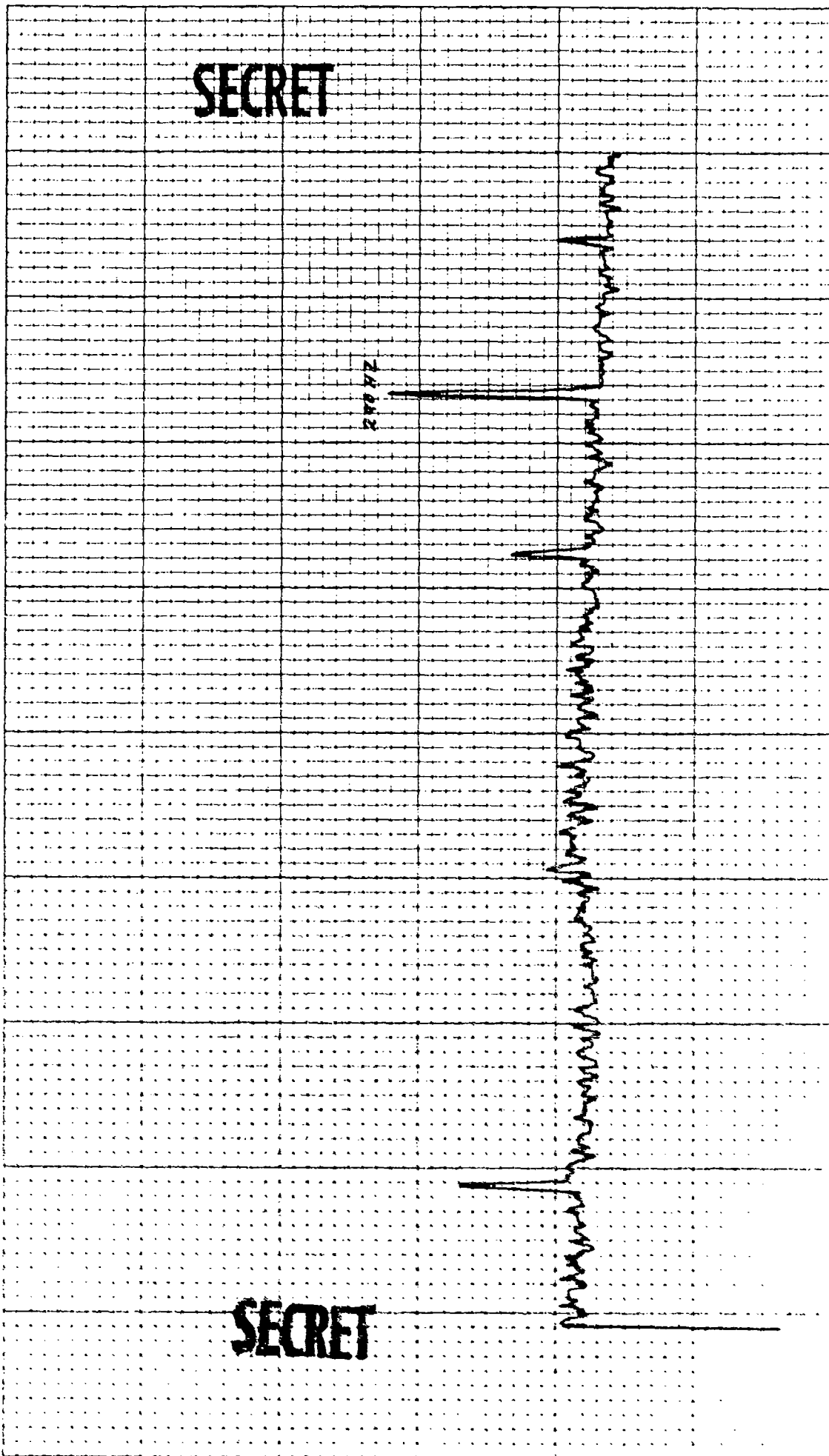
CONTROL: 1019 - 51 (DPV)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 270 HZ
 51 ELEMENTS

DATE OF ANALYSIS: _____
 1-26-53

INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

REEL: F15 INDE X 1955

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



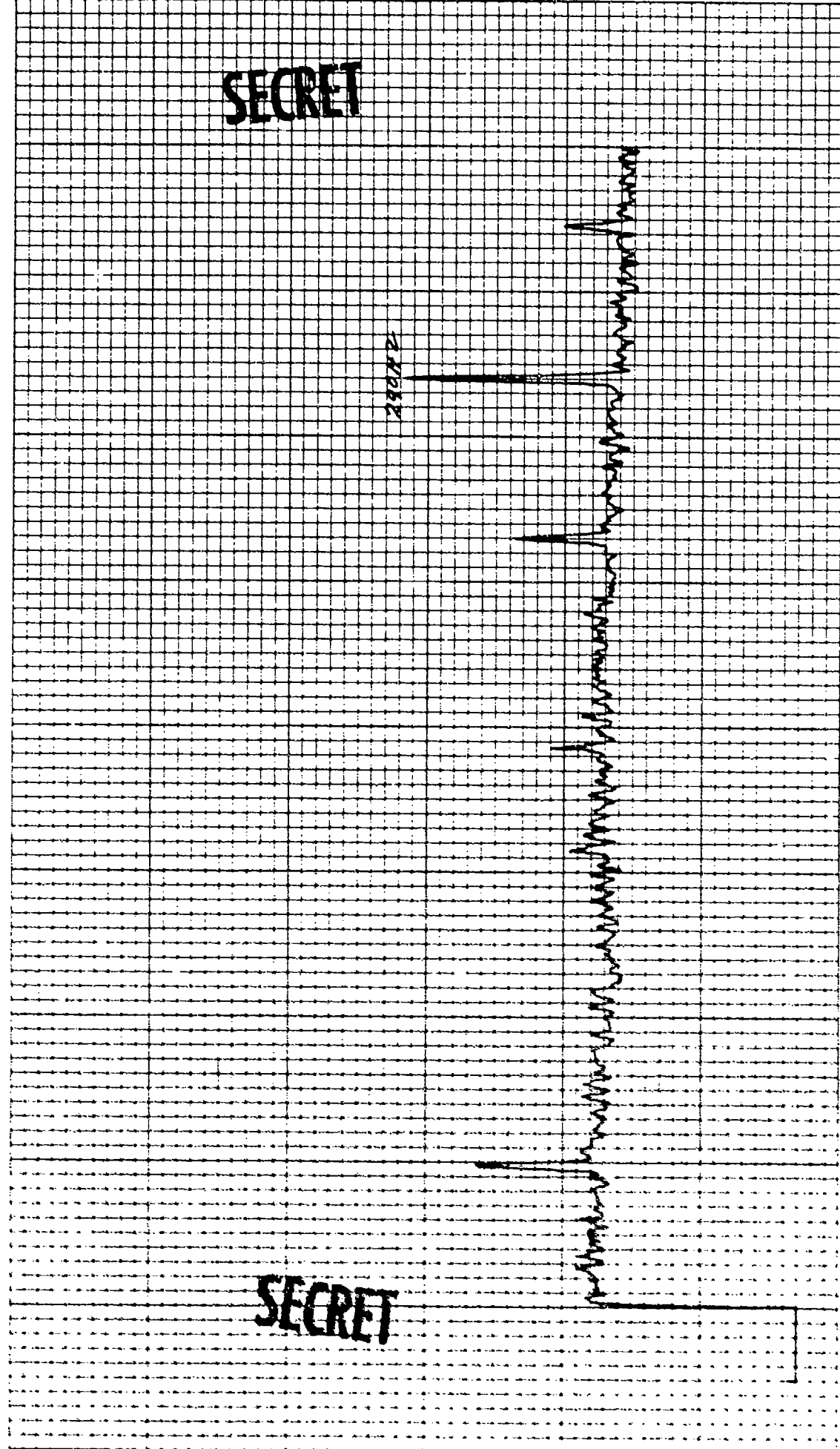
KOE 10 X 10 TO THE INC. 14.7 X 10 DIMENES
KELVIN P. L. & ENGINEER CO. 8144 10 11

46 0703

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

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

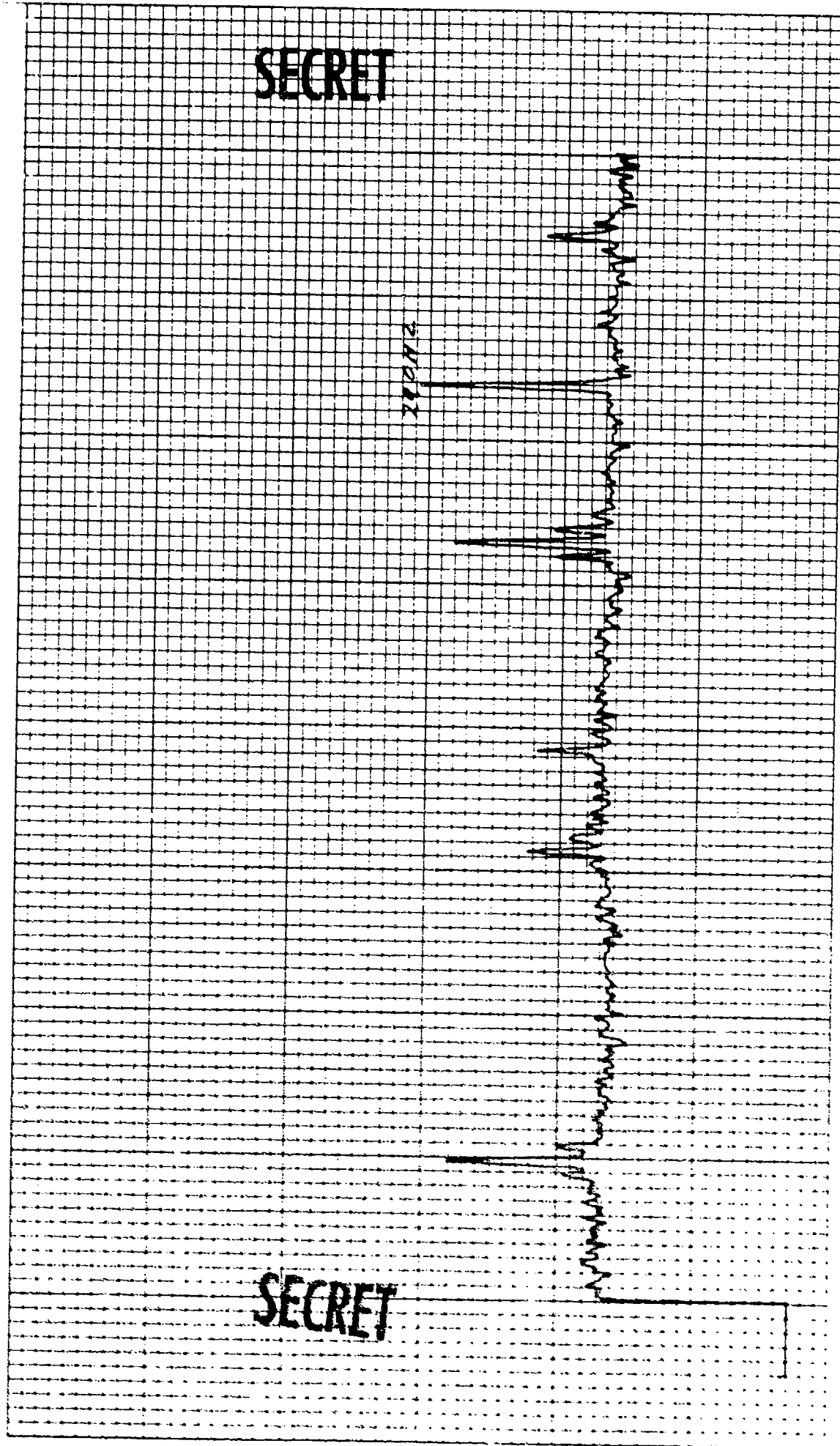
REEL: F15
INDE X1955
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTER WTC: HANNING



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

46 0703

CONTROL: 2-7 -1019 (51)
BEAMFORMED SPECTRUM (ELEMENTS) 1-26 29-53)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
5/ ELEMENTS
DATE OF ANALYSIS: -- -- --
DATE/TIME: 2-7-77 -1019 2
ANALYSIS BANDWIDTH: 1/10HZ
Y34 DEG. AZ STEERING
REEL: F15 INDE X 1255
INTEGRATION TIME 320 SECS ATTN: -30 DB
FILTER WTC: HANNING

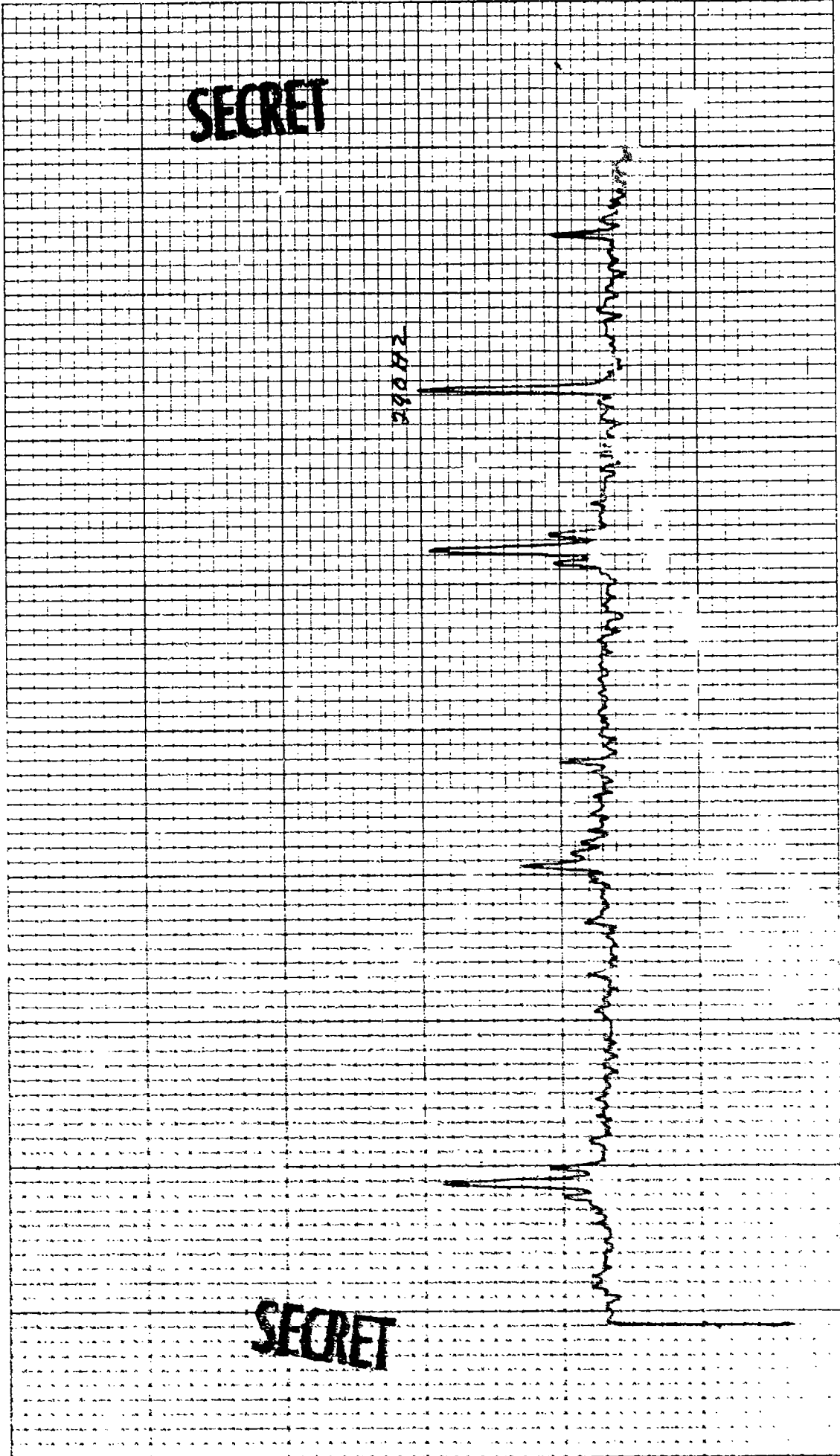


MSE 10 X 10 TO THE INCHES : 1 TO INCHES
MELFEL A PAPER CO. MADE IN U.S.A.

46 0703

DP 11
S 1 2
1 2 3 4 5

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



10 X 10 TO THE INCHES 2.10 INCHES

46 0703

2PM

510
515 # 36

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

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

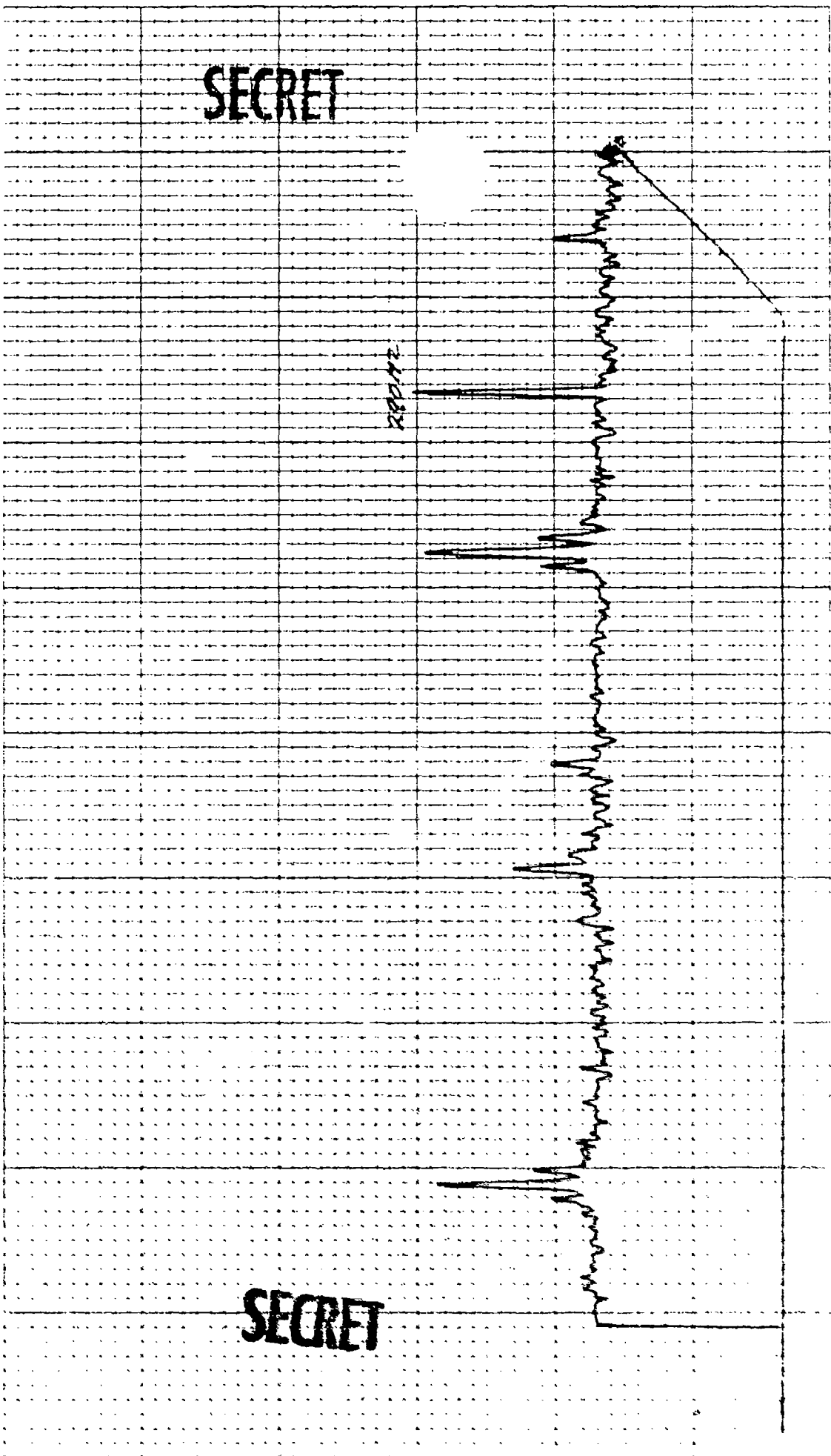
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING

CENTER FREQ: 270 HZ #35.5 DEG. AZ STEERING

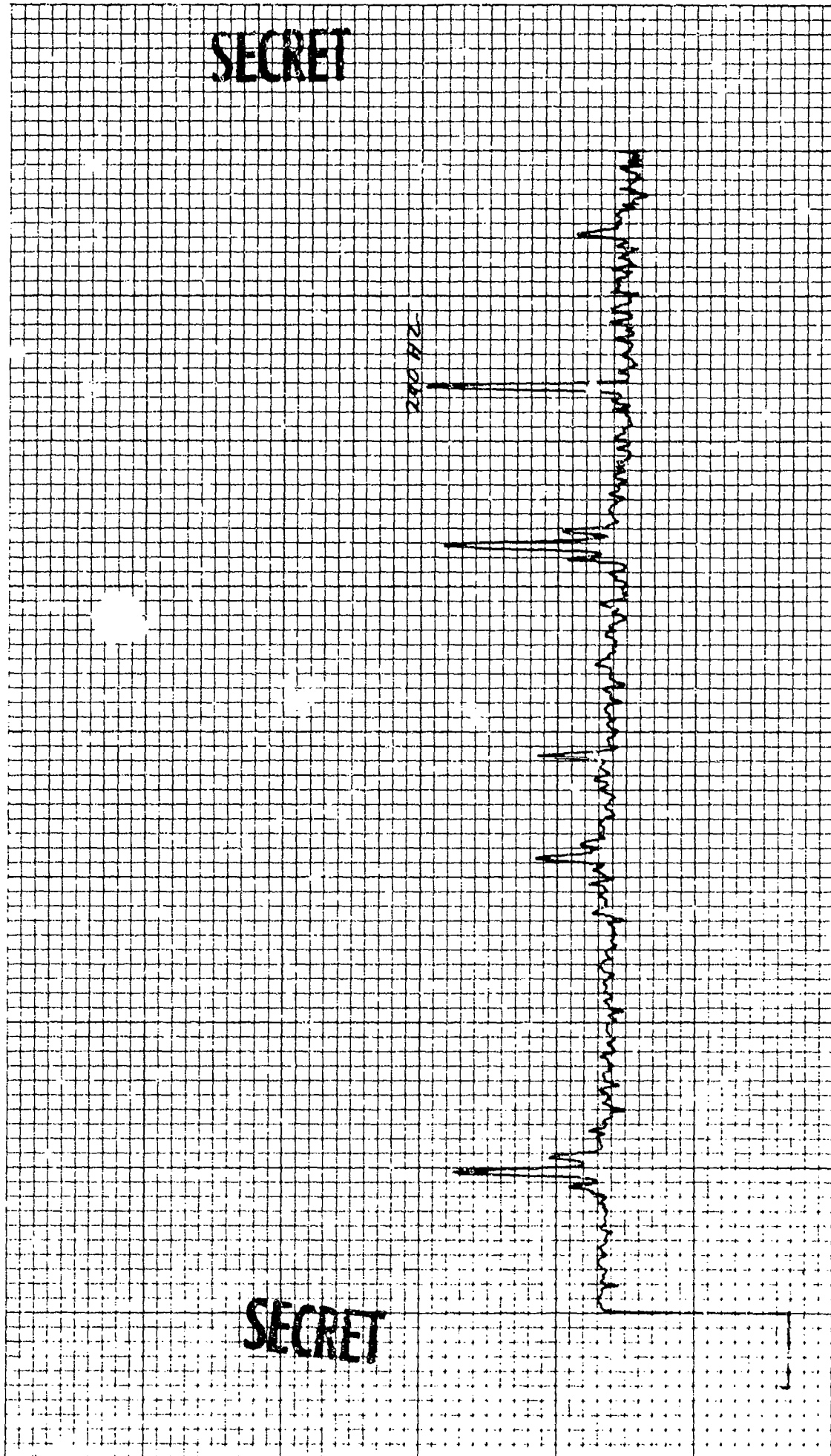
6/ ELEMENTS

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



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

46 0703

DP 4

LE 70

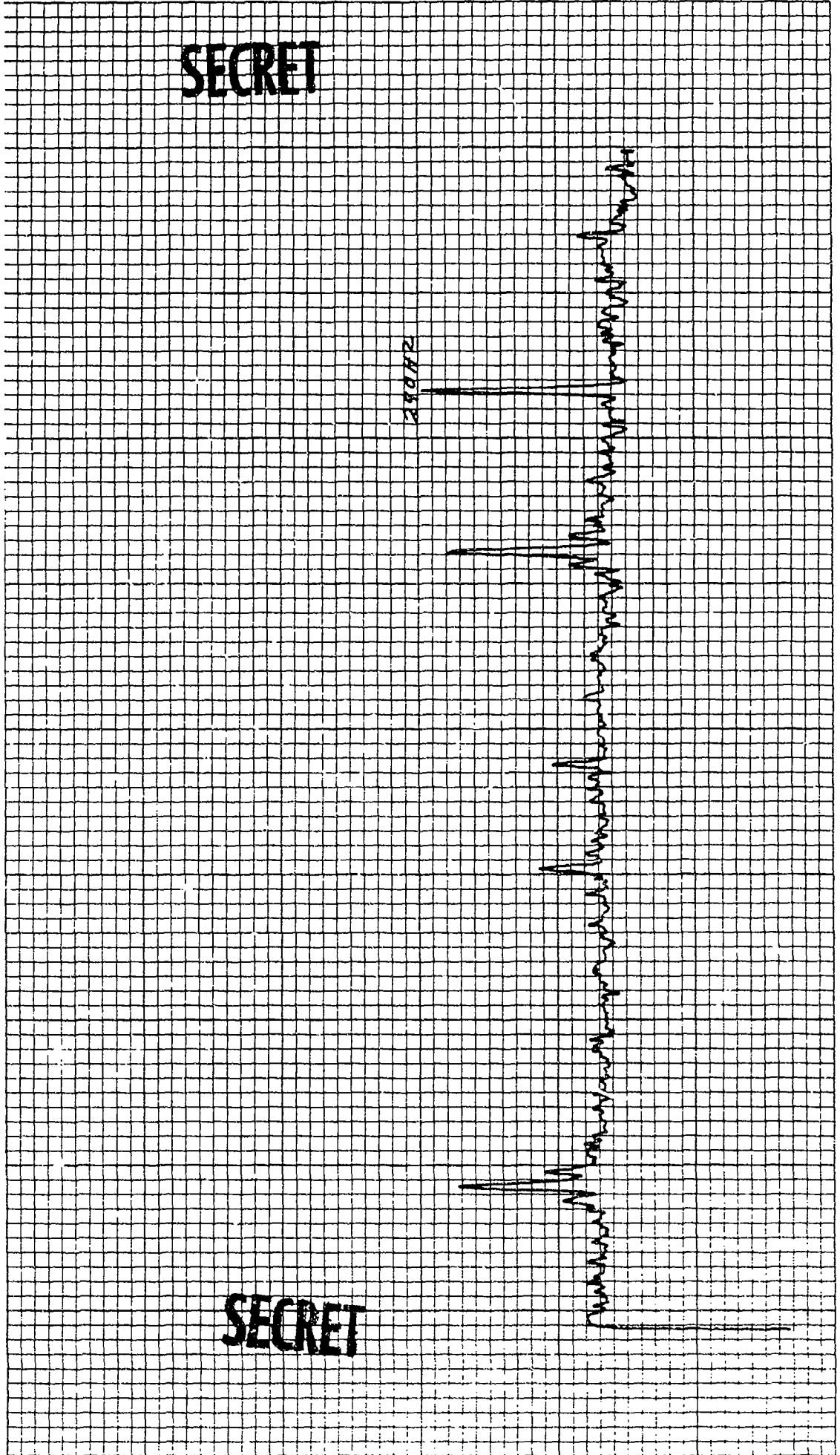
201 51E

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

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

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

46 0703

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

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

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

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270HZ



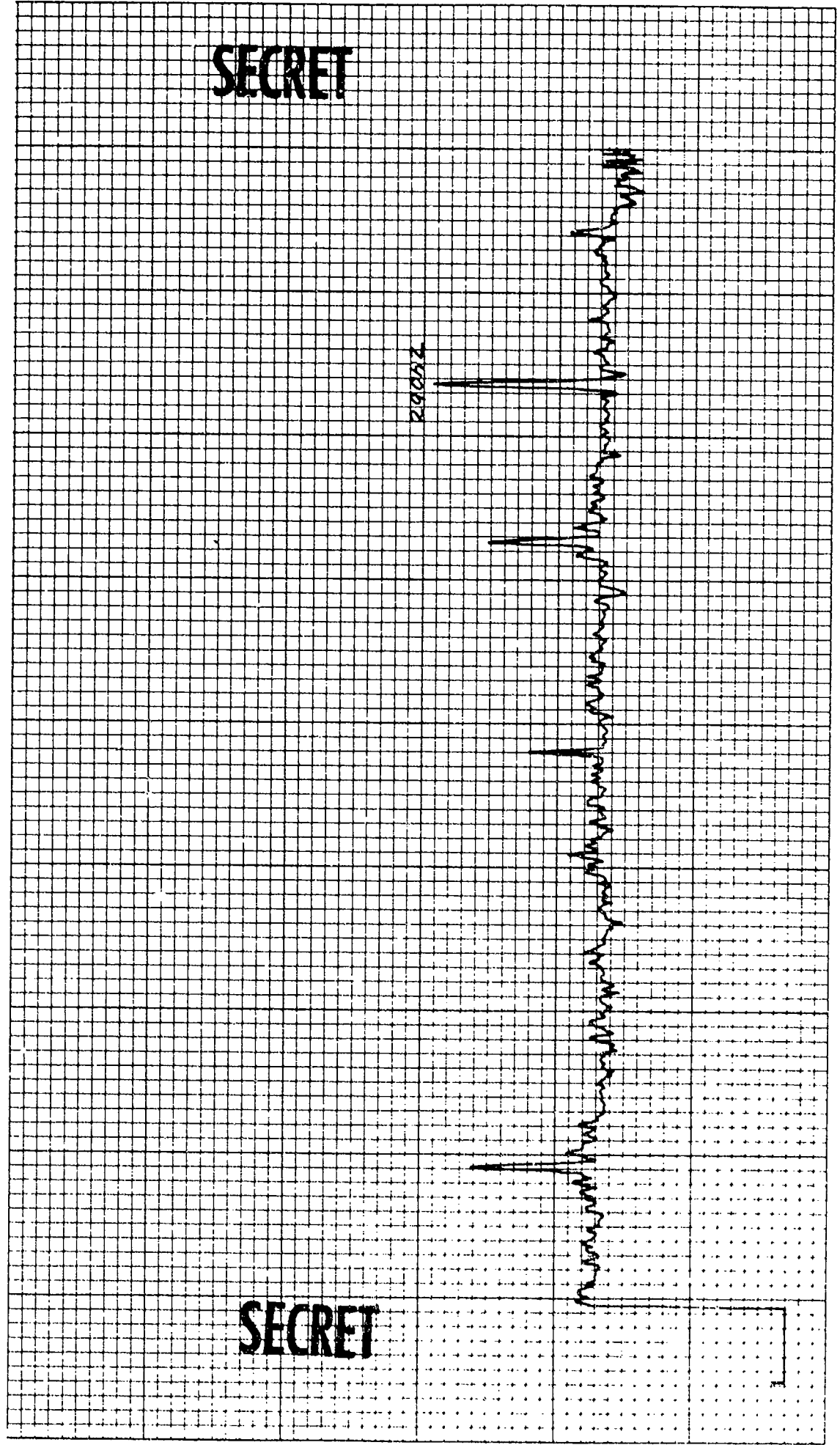
K•E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

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

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

REEL: F15
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING
INDE X1255
ATTEN: -20 DB



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

46 0703

REEL: F15 INDE X1955

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

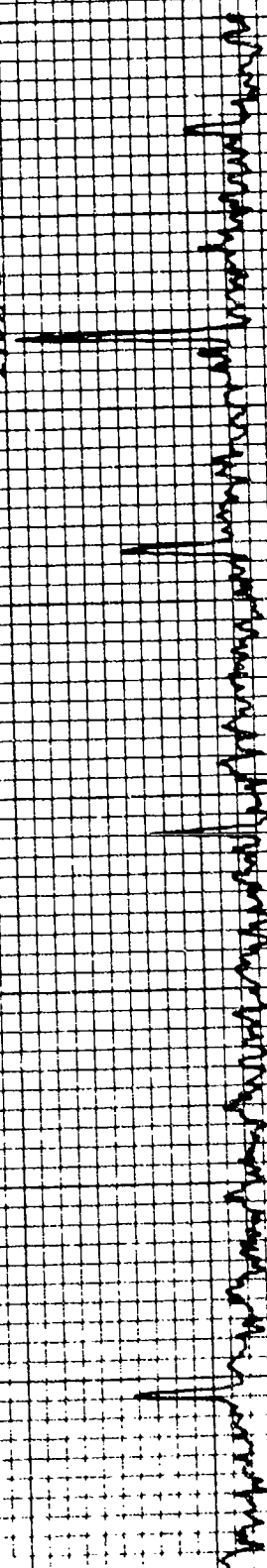
DATE OF ANALYSIS: 1-26-53
DATE/TIME: 2-7-77 -1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
+42 DEG. AZ STEERING

INTEGRATION TIME 320 SECS
FILTER WTG: HANNING

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270 HZ



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

46 0703

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

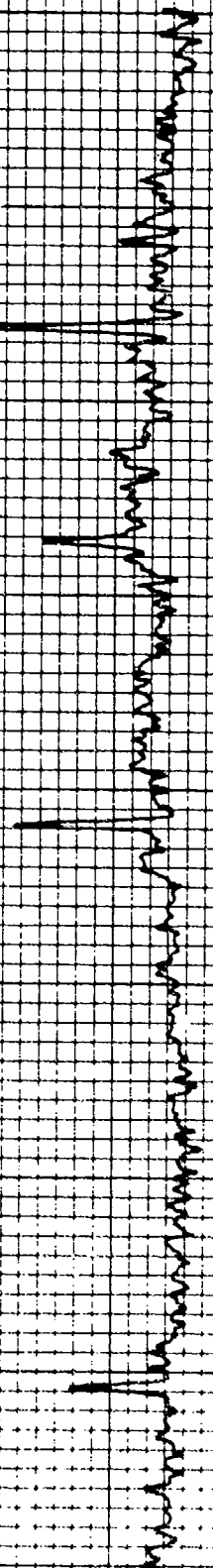
DATE OF ANALYSIS: 1-26 & 28-53
DATE/TIME: 2-7-77 - 1019 Z
ANALYSIS BANDWIDTH: 1/10HZ
+44 DEG. AZ STEERING

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

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20092



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

DATA POINT 5

DATE 2-7-77

TIME 1549Z

FREQUENCY 140 HZ

UNCLASSIFIED

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

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

BANDWIDTH CONVERSION TO 1 HZ BAND +82

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

UNCLASSIFIED

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

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

FREQUENCY 290 HZ

INDICATED NOISE LEVEL $\frac{\text{dBV}}{\text{ABW}}$ -47.8

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

BANDWIDTH CONVERSION TO 1 HZ BAND +8.2

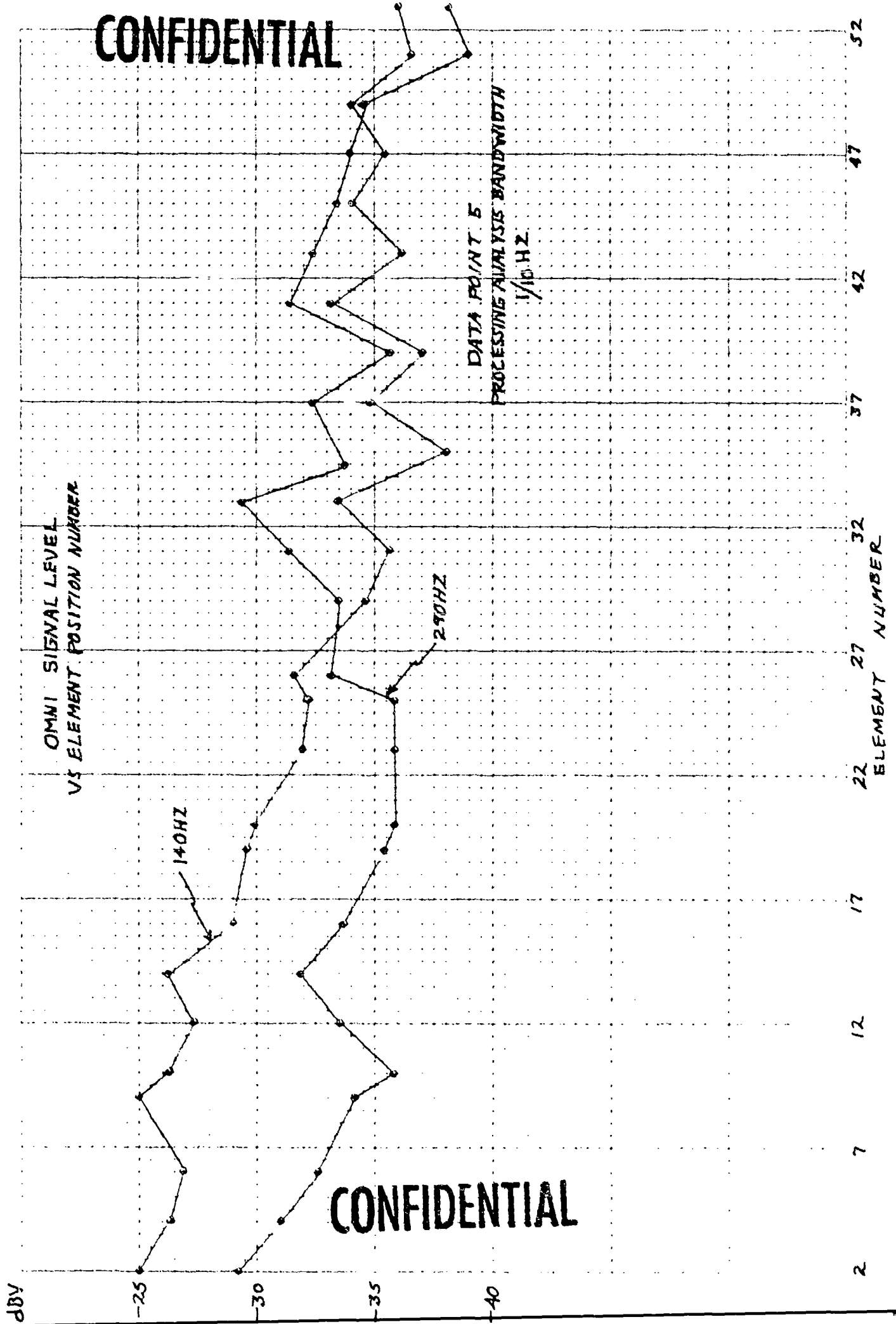
CONVERSION TO $\text{dBre}\mu\text{Pa}/\text{1HZ}$ +100

UNCLASSIFIED

UNCLASSIFIED

46 0703

MOE 2500 2000 1000 500 250 125 62.5 31.25 15.625 7.8125 3.90625 1.953125 0.9765625



46 0703

REF ID: A66666

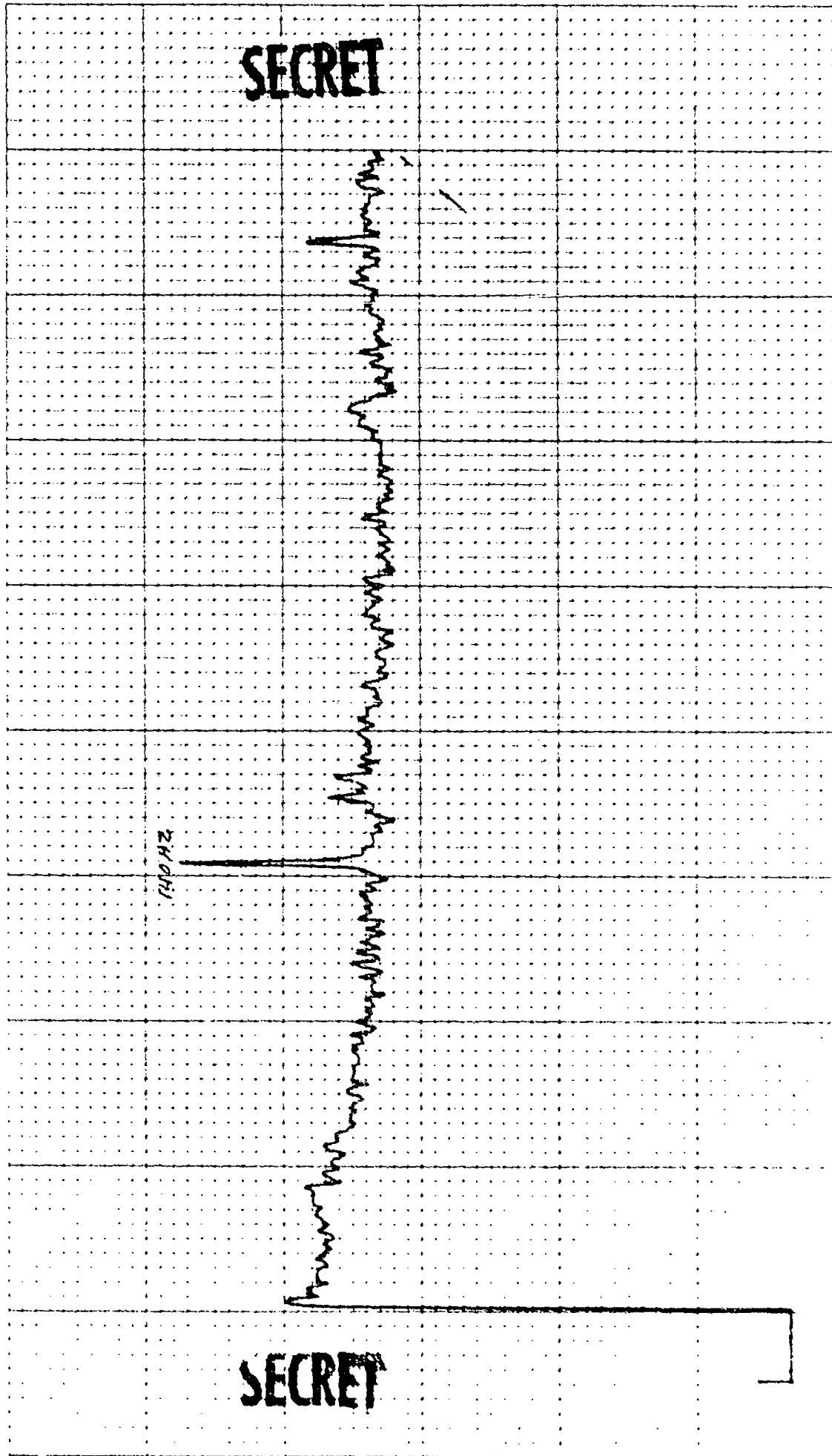
REEL: F/1 INDEX 3050

DATE OF ANALYSIS:

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

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING

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

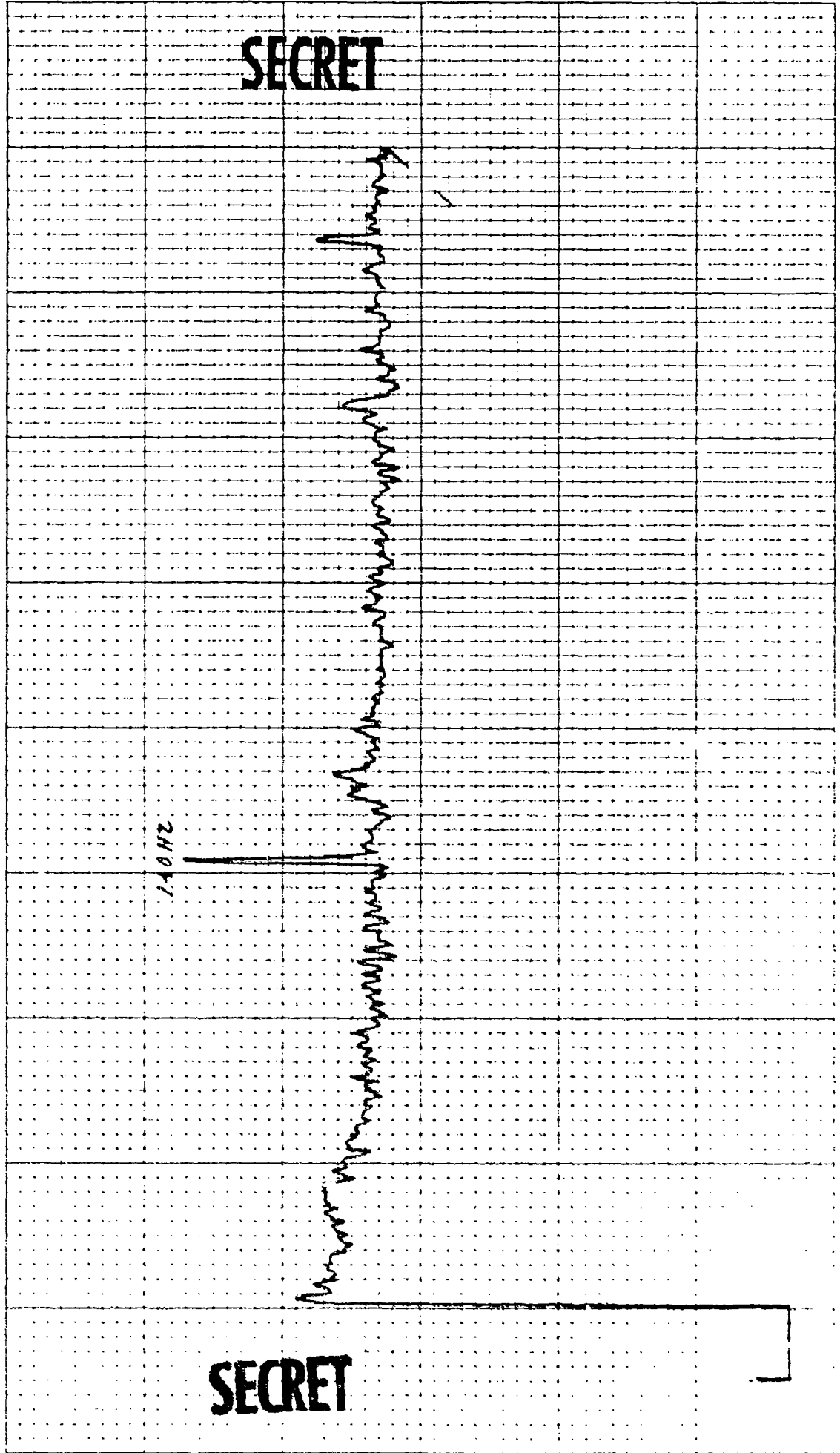


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46 0703

REF 103 TO THE DIRECTOR, NSA

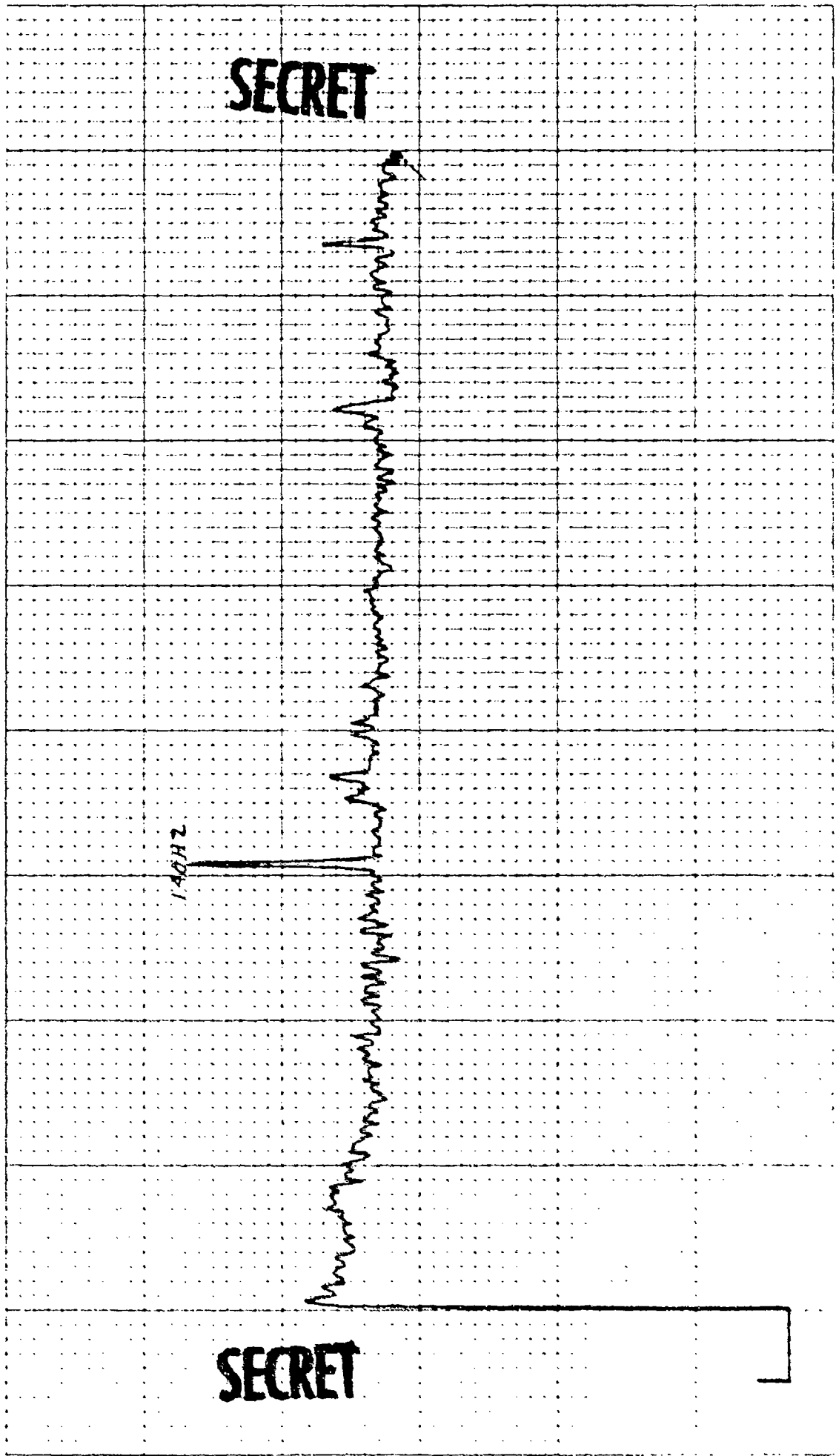
CONTROL: 2-7 -1549 (2) DATE OF ANALYSIS: REEL: F19 INDEX 3050
OMNI SPECTRUM (ELEMENT 4)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT
INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING
DATE/TIME: 2-7-77 -1549 Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ STEERING



46 0703

NOE 2-7-77 1549Z

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



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46 0703

REF ID: A66666

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

DATE OF ANALYSIS:

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

ANALYSIS BANDWIDTH: 1/16.0 Z

— DEG AZ STEERING

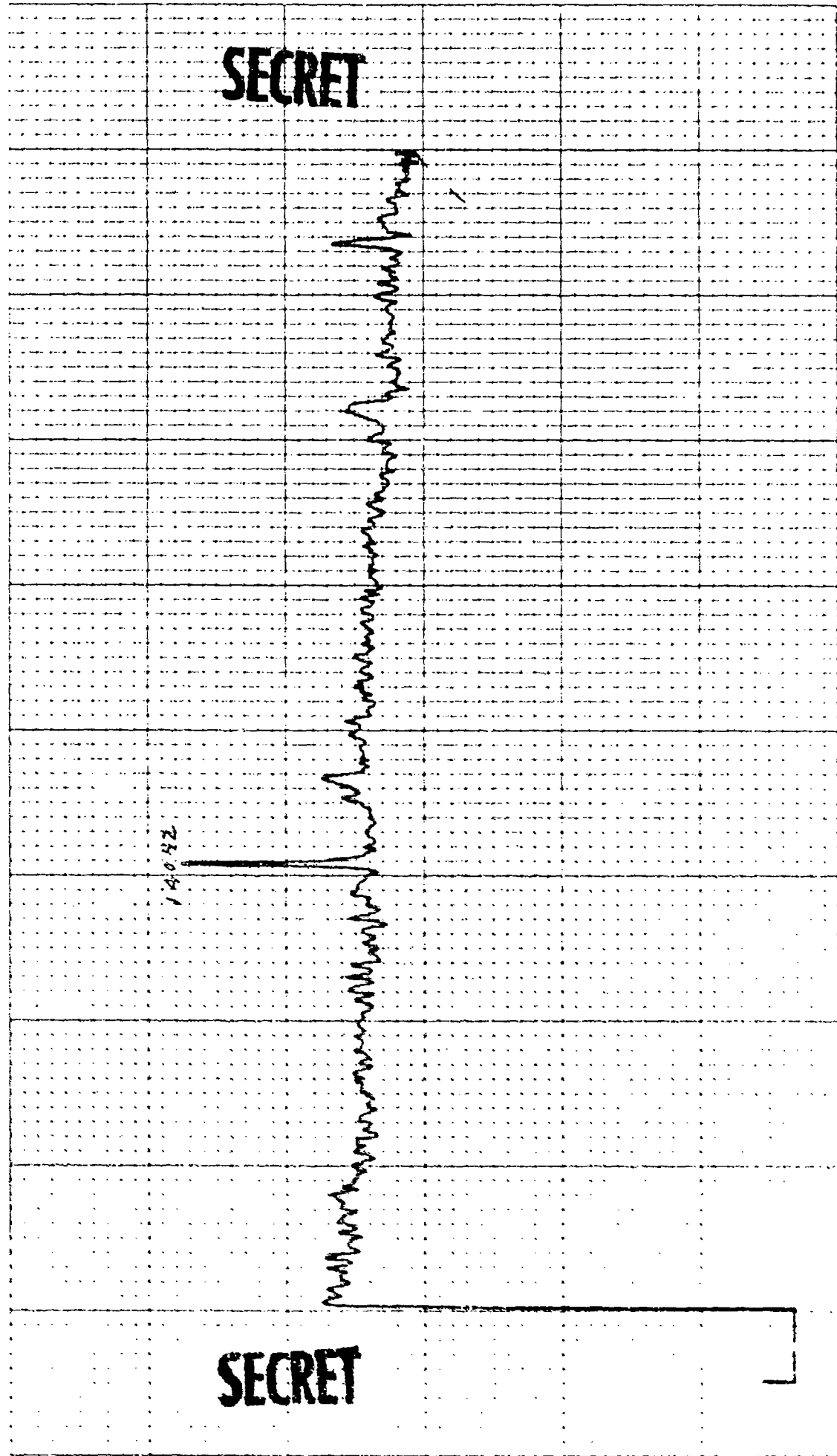
REEL: F19

INDEX: J. R.

INTEGRATION TIME 320 SECS

ATTEN: — DB

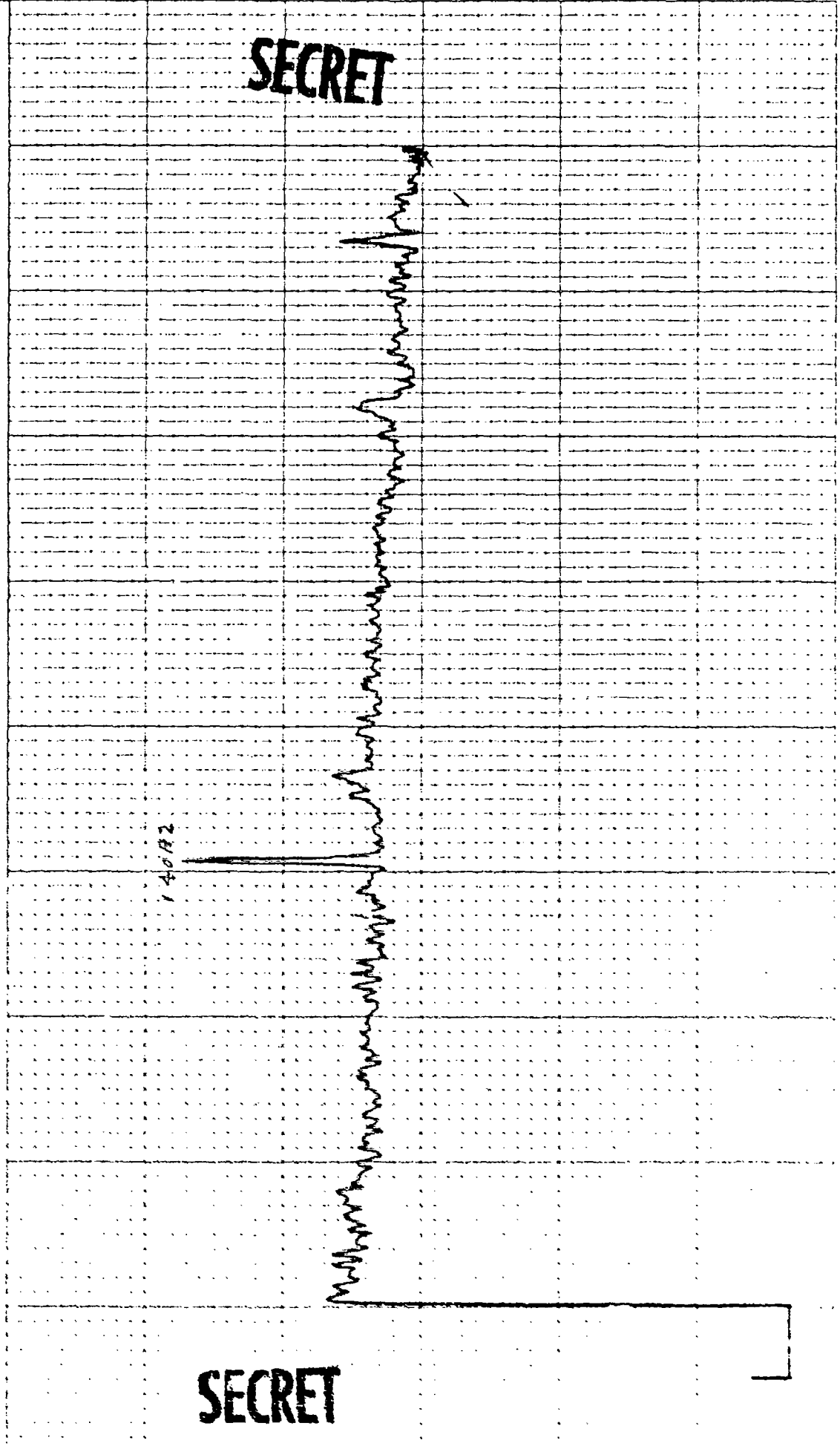
FILTER WTC: HANNING



46 0703

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

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



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

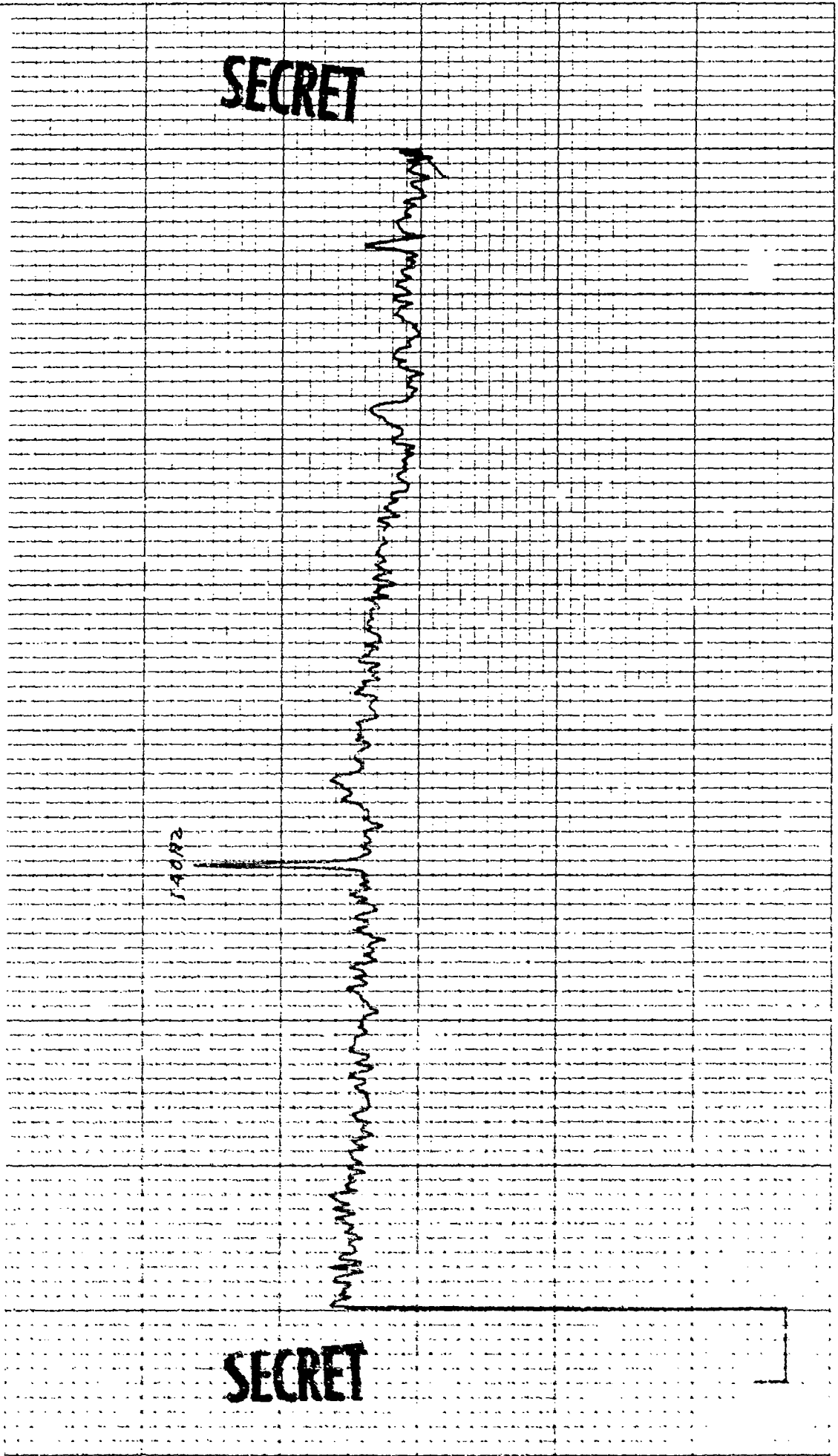
DATE OF ANALYSIS:

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

ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

REEL: F19 INDEX: 3050

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



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46 0703

REF: 2-7-77

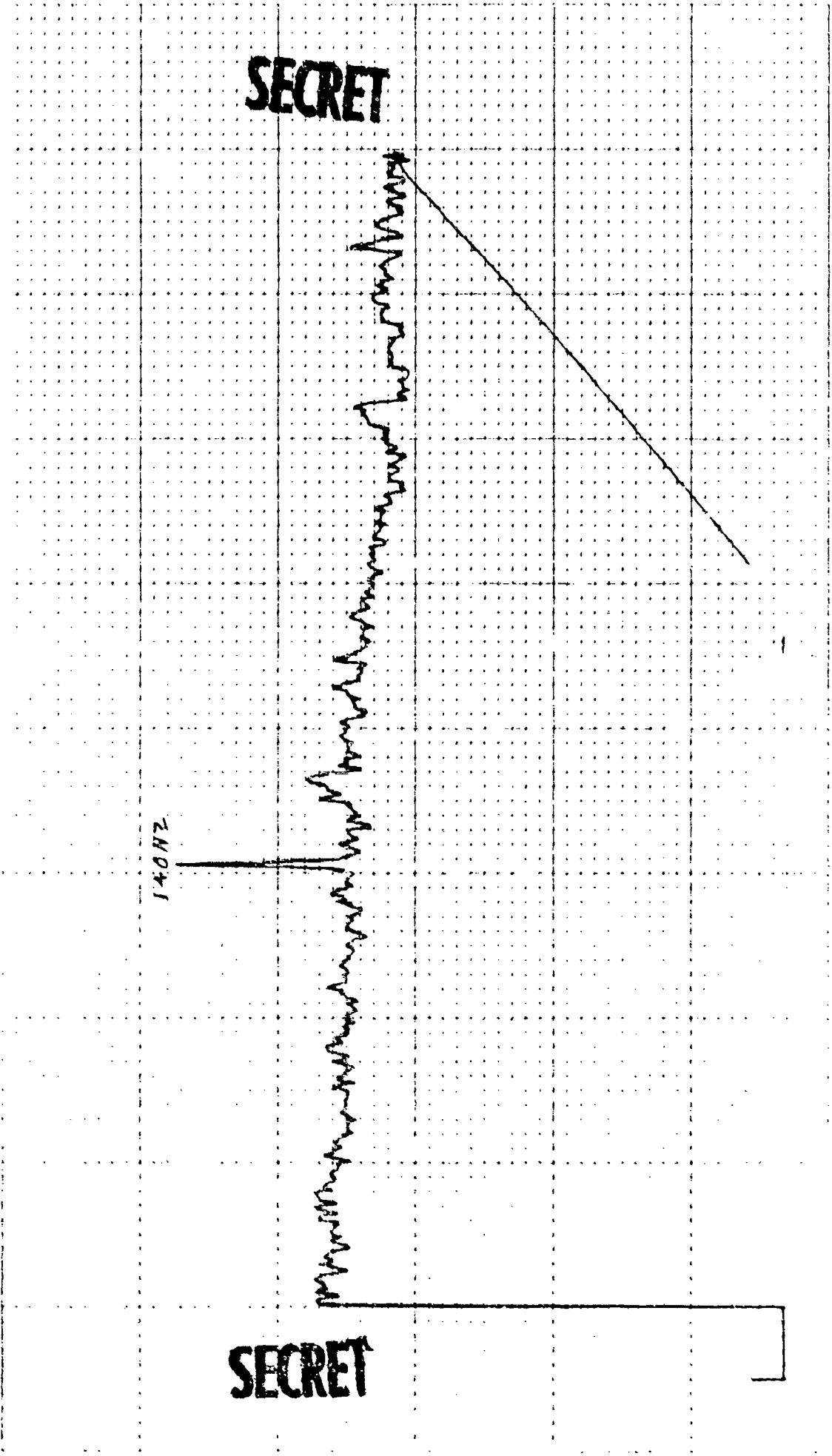
CONTROL: 2-7 - 1544 (7) DATE OF ANALYSIS: REEL: F/9 INDEX: J-5

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

EXERCISE: BEARING STAKE ANALYTIC BANDWIDTH: 1/10HZ

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

1 ELEMENT FILTER WIG: HANNING



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REF: 14-00000 TO THE INCH: 1/1000

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

OMNI SPECTRUM (ELEMENT 16)

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

I ELEMENT

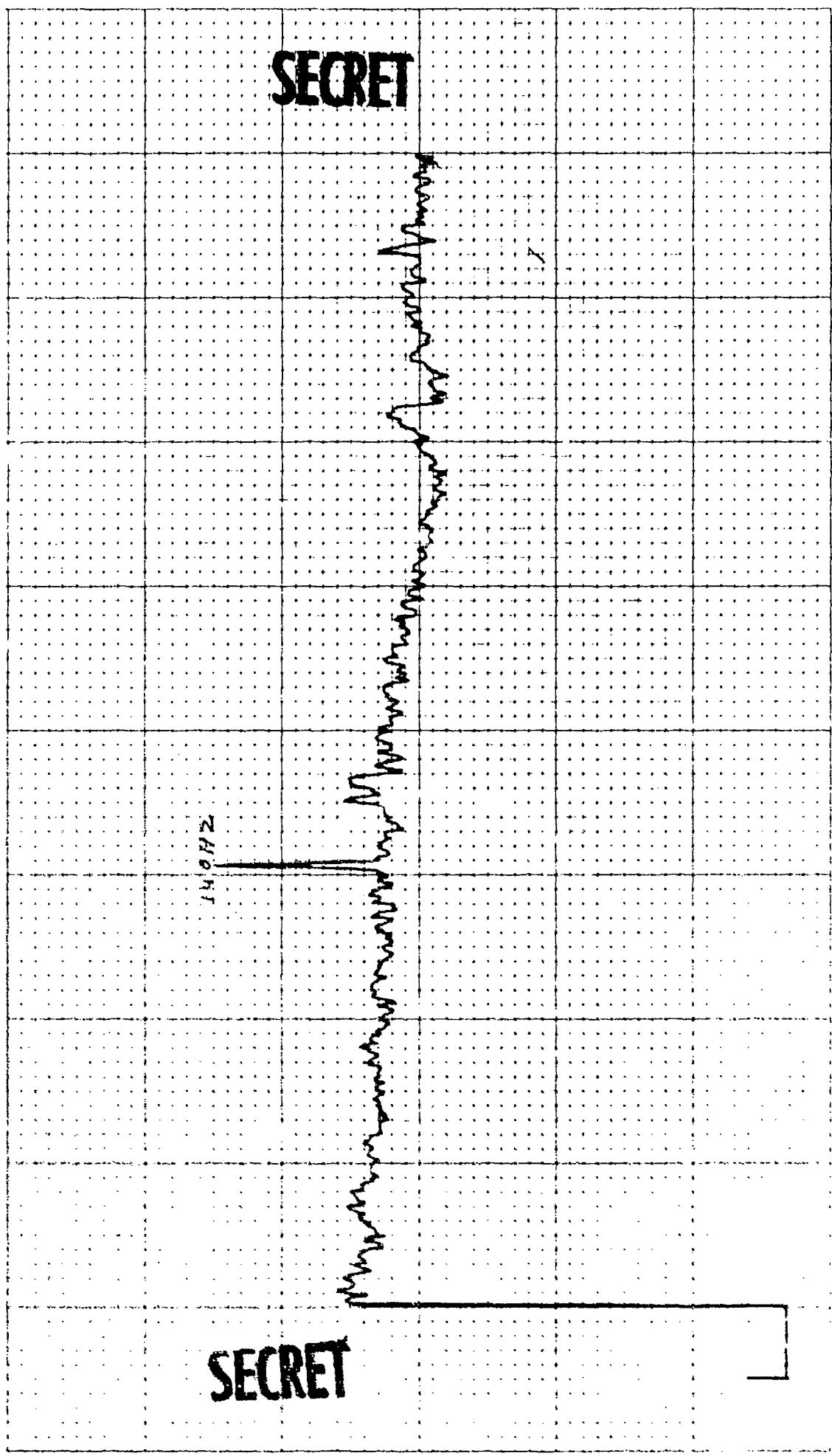
INTEGRA ION TIME 320 SECS ATTEN: - DB

FILTER WIG: HANNING

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

ANALYSIS BANDWIDTH: 1/10HZ

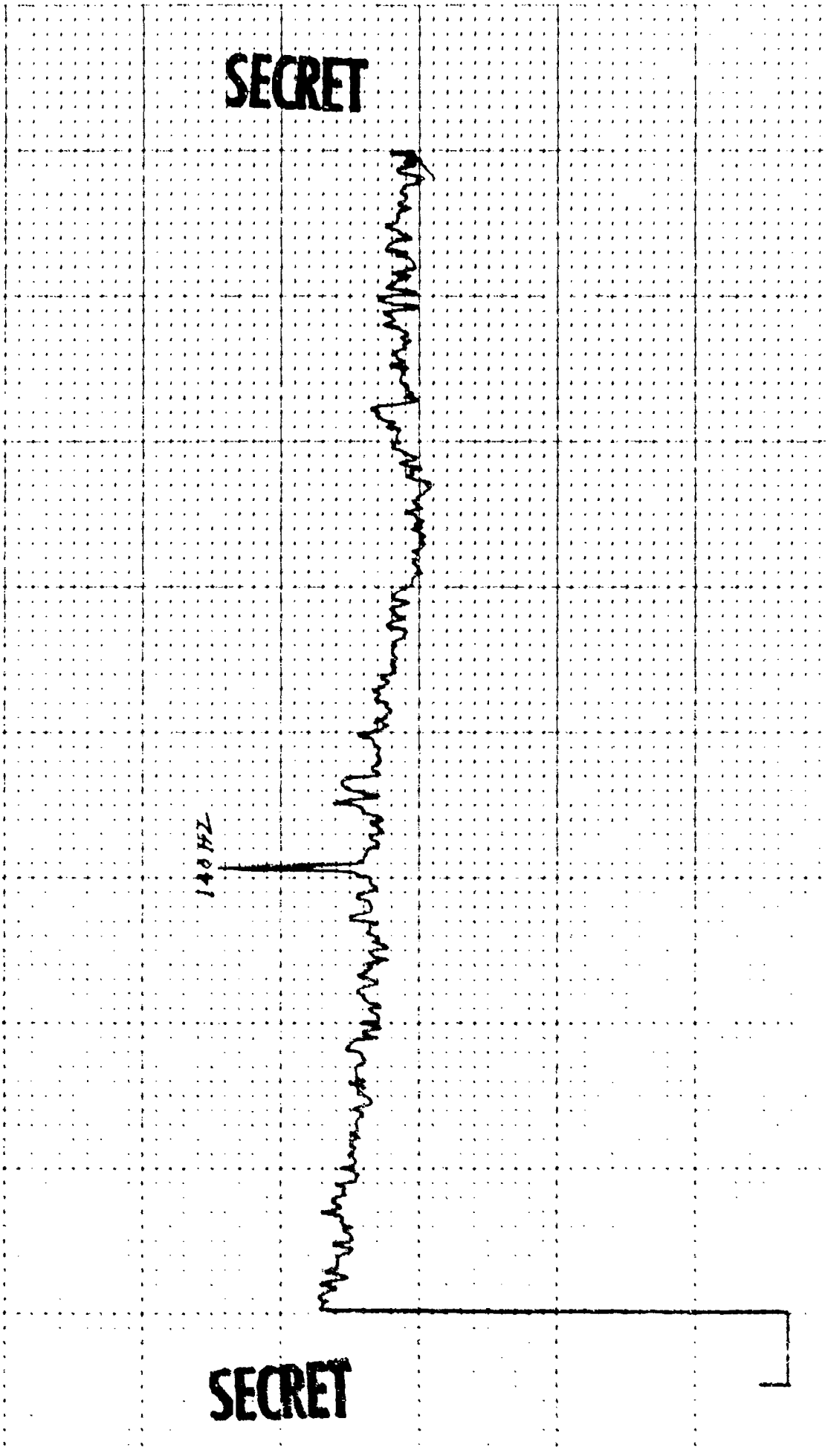
DEG AZ STEERING



45 0703

K-E 27-1549 (9)

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



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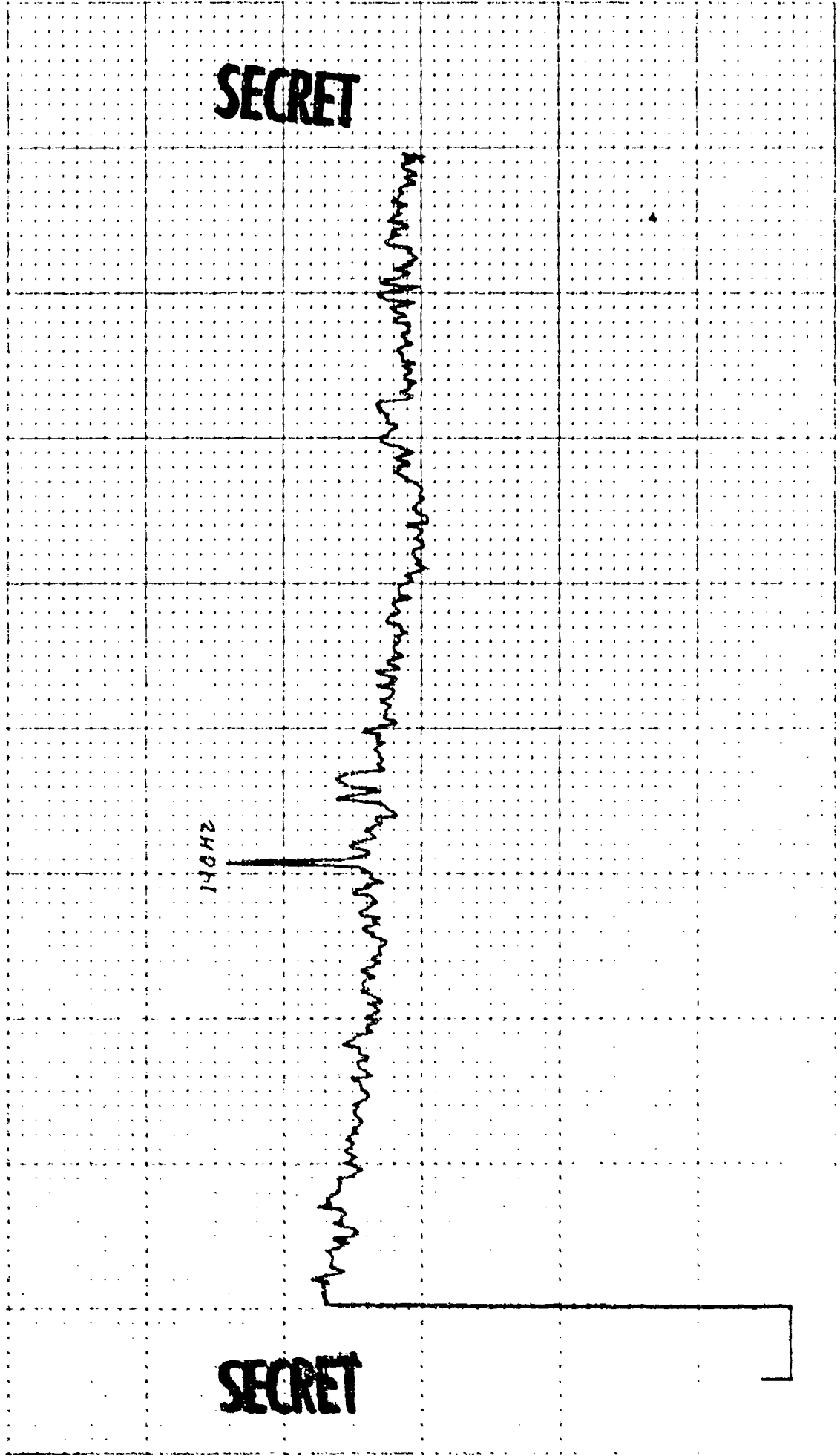
46 0703

KOE 2-7-77 1549Z

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

INTEGRATION TIME 320 SECS ATTEN: DB
 FILTER WTG: HANNING

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



46 0703

KOE 2-7-77

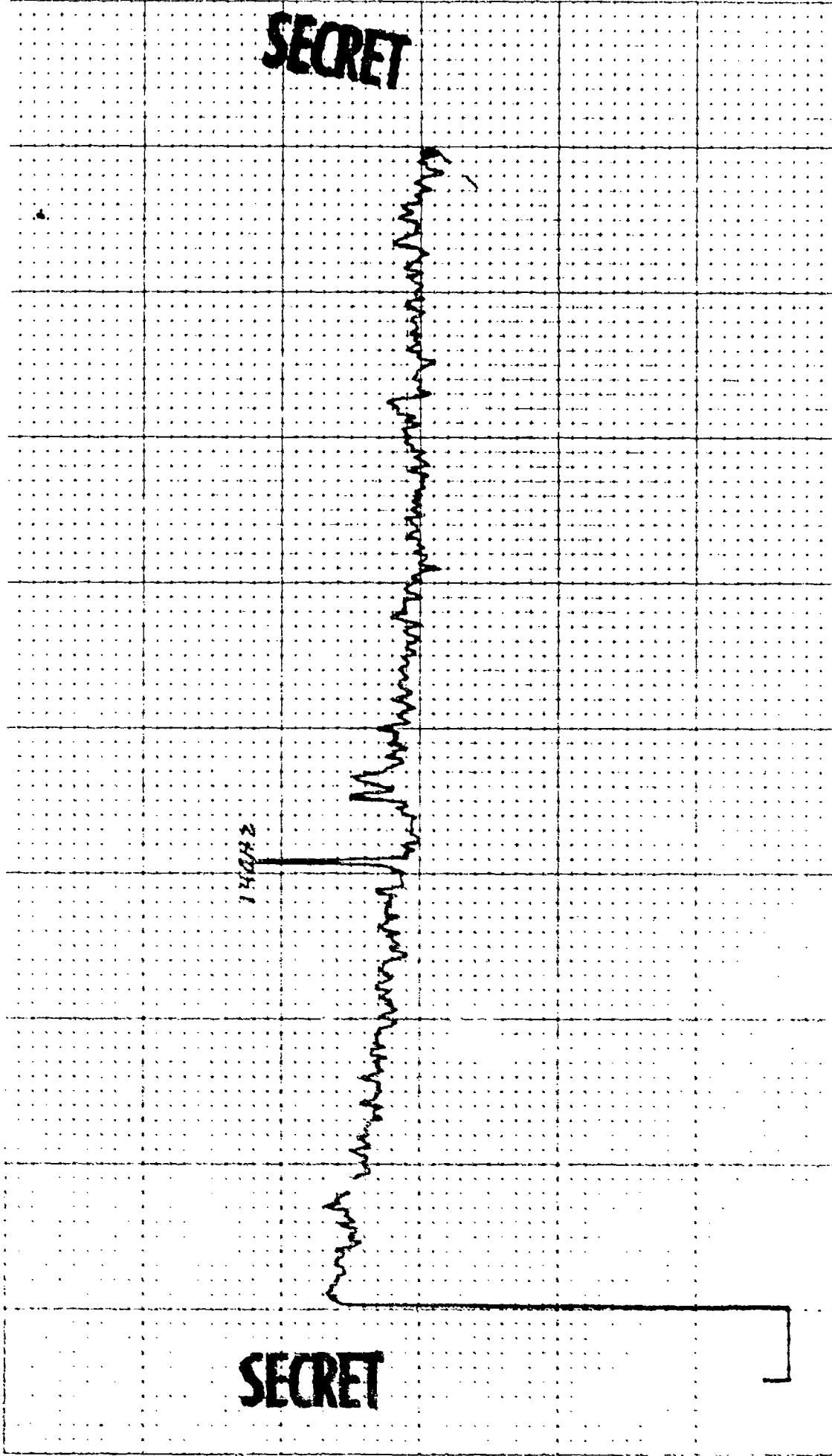
CONTROL: 2-7 - 1544 (11)
OMNI SPECTRUM (ELEMENT 23)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F11 INDEX 305

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER WTG: HANNING



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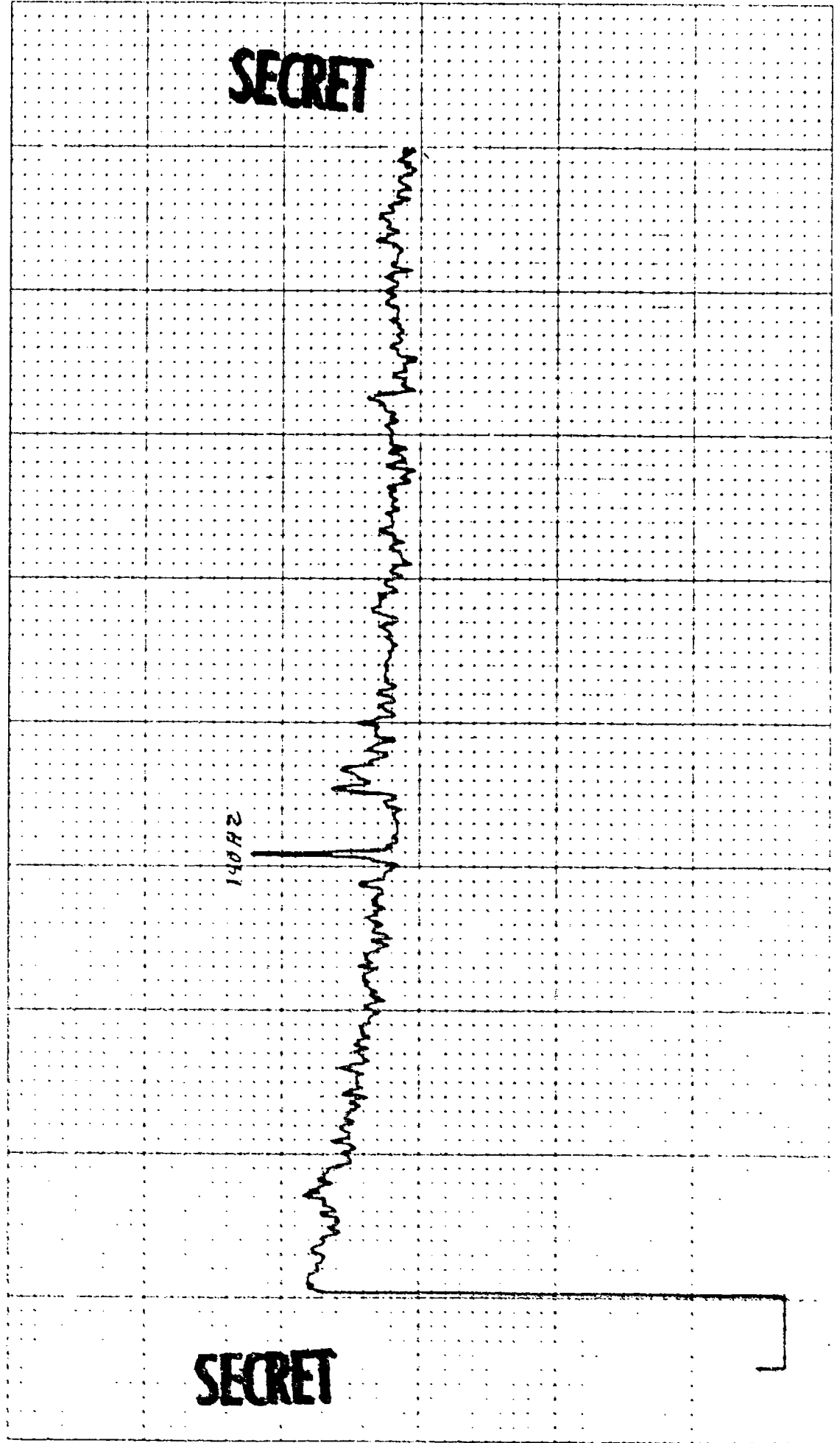
SECRET

46 0703

REF ID: A66887

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

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



46 0703

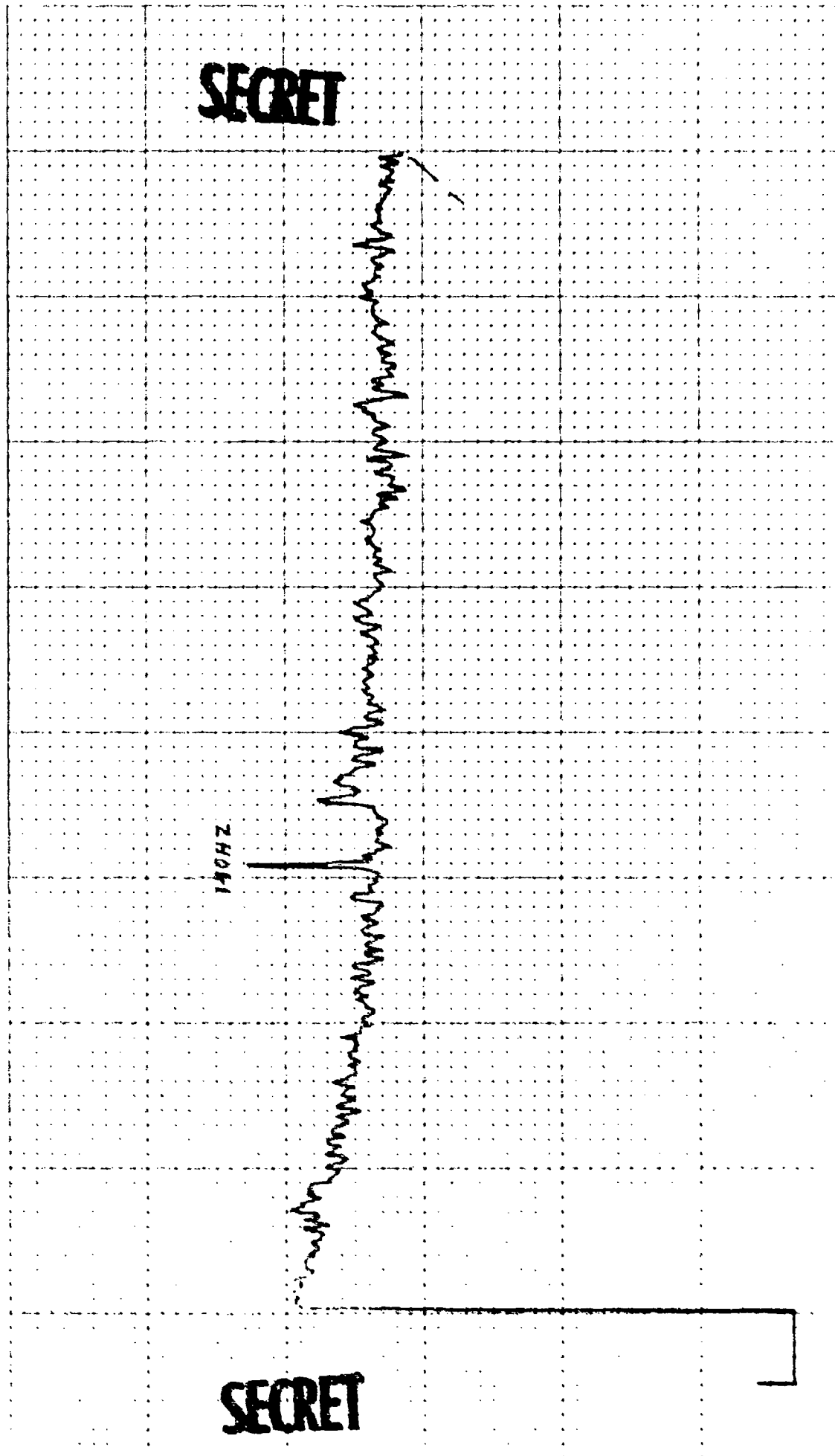
KOE 21 411 2 0000 00 00

CONTROL: 1549 - 5/ (DPS)
OMNI SPECTRUM (ELEMENT 26)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

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

REEL: F19
INDEX 3050

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



46 0703

REF ID: A66703

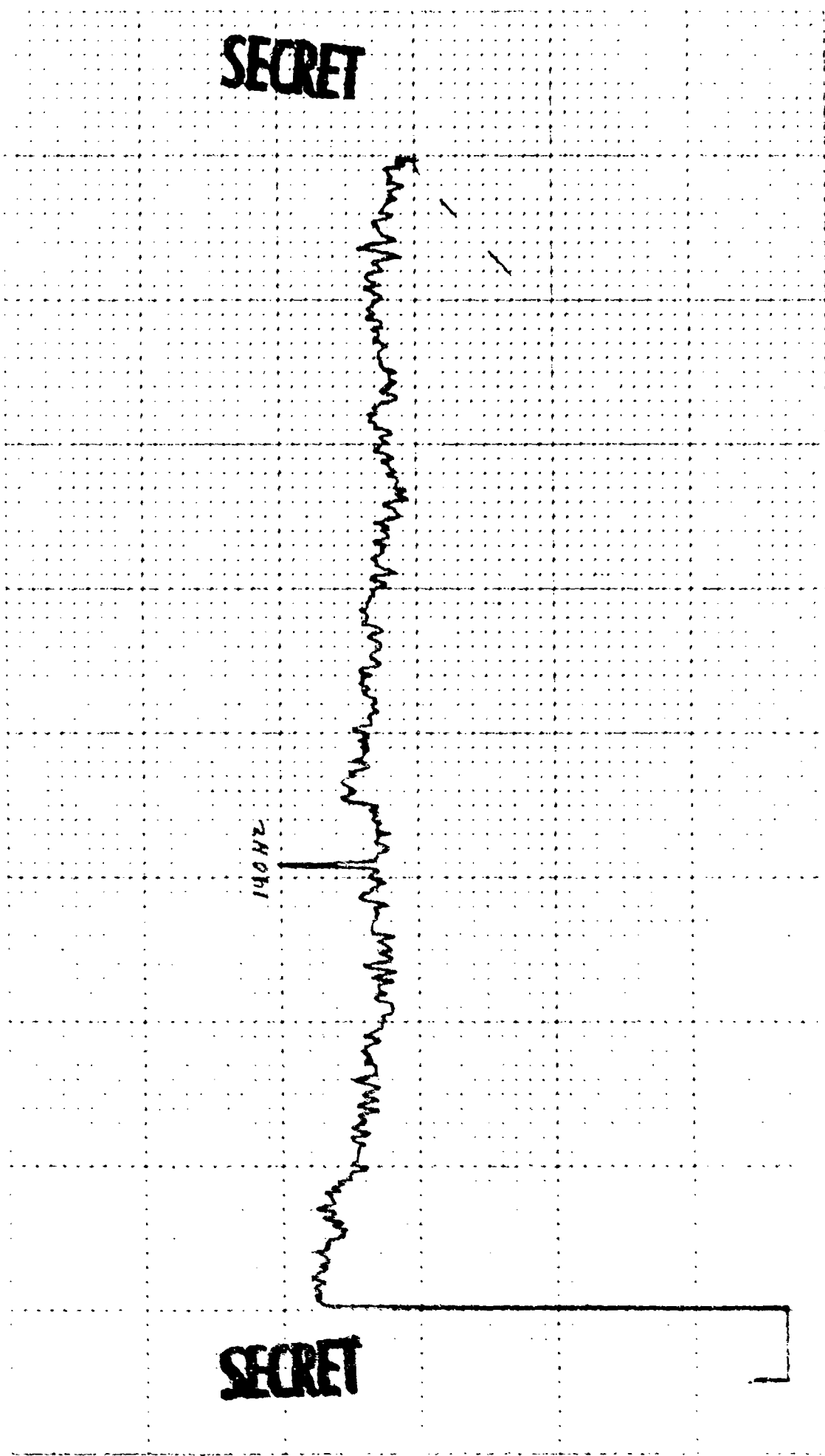
CONTROL: 2-7 - 1549 (14)
OMNI SPECTRUM (ELEMENT 29)
EXERCISE: BEARING STAVE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

PEEL: F/1 INDEX 3058

INTEGRATION TIME 320 SECS ATTEN: DB
FILTER WIG: HANNING



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10-E 27-72 2000-2000-2000

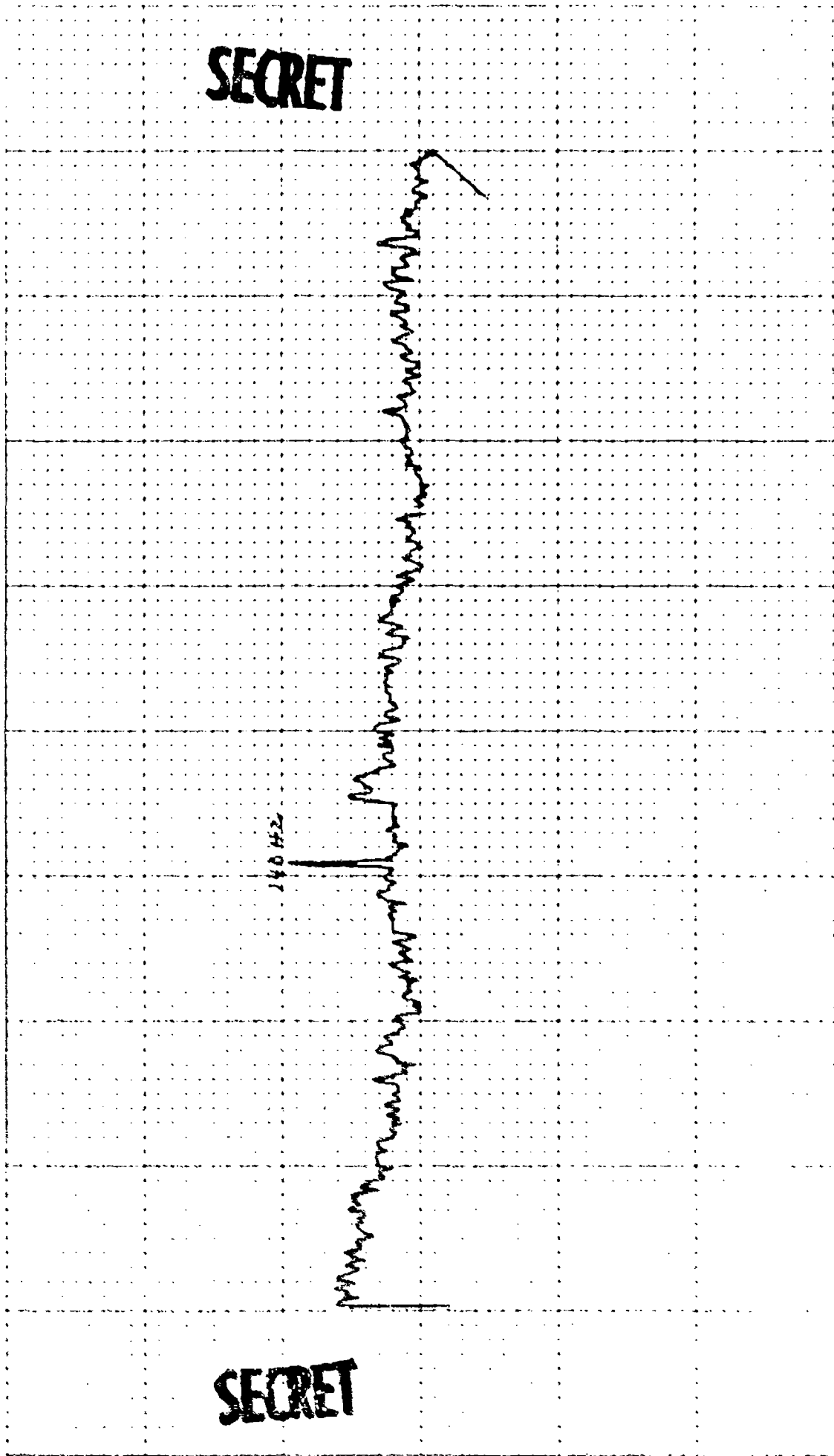
CONTROL: 27 - 1549 (15) DATE OF ANALYSIS: REEL: F19 INDEX: J050

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

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

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

1 ELEMENT



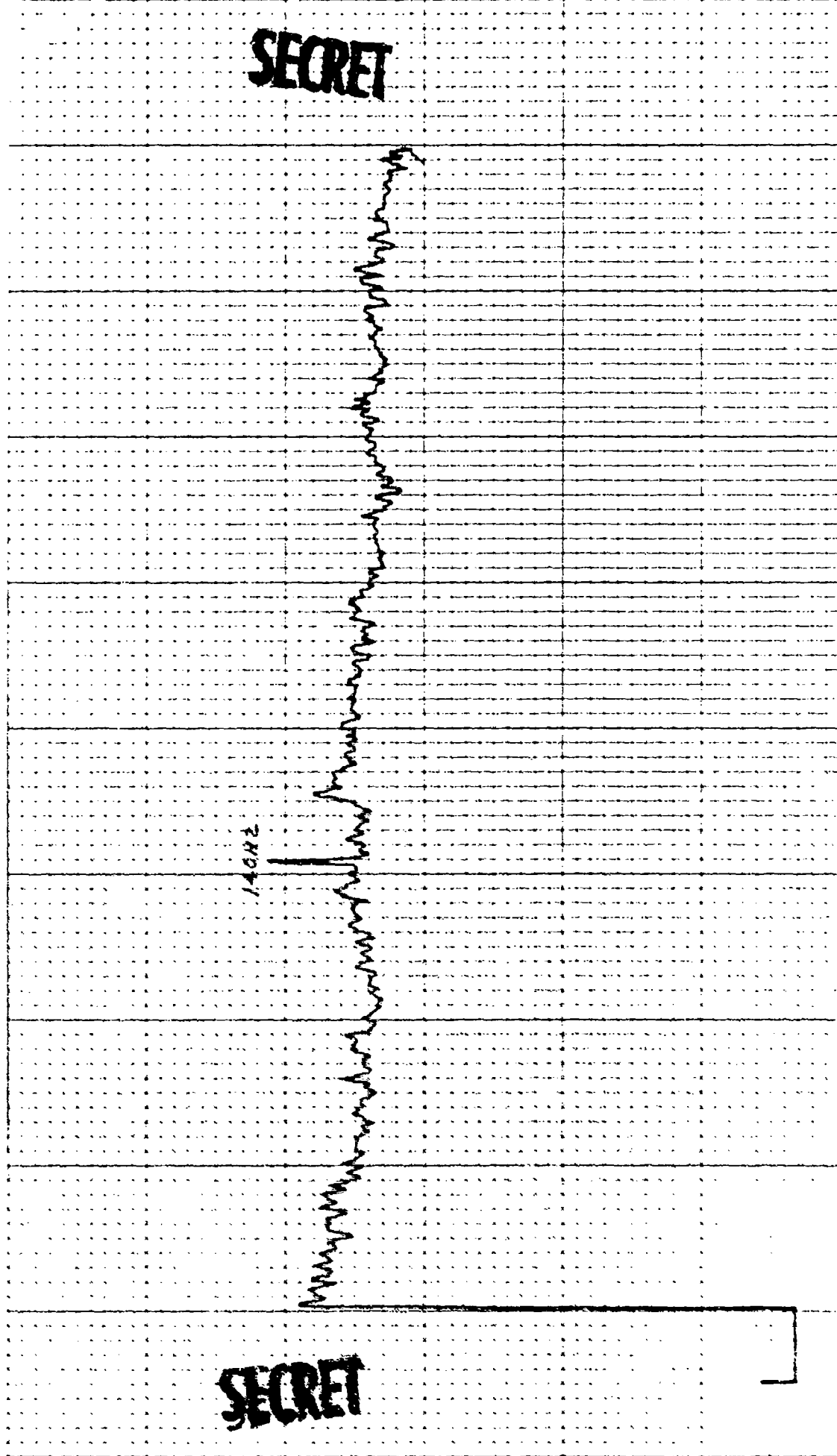
46 0703

10E 1549 (16) 27

CONTROL: 2-7 -1549 (16) DATE OF ANALYSIS: REEL: F19 INDEX 305C
 OMNI SPECTRUM (ELEMENT 7J)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 1 ELEMENT

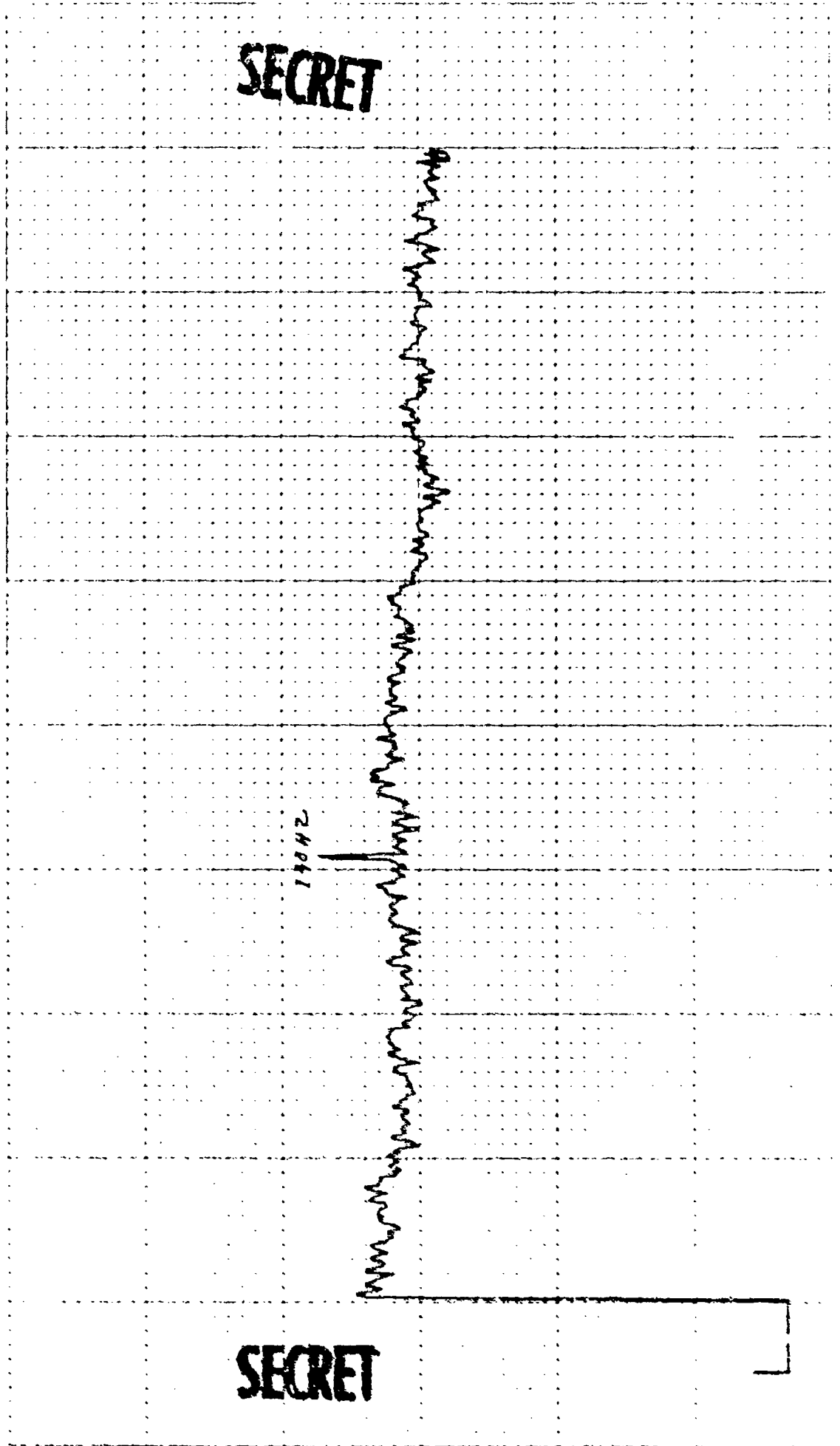
INTEGRATION TIME 320 SECS ATTEN: - DB
 FILTER WTG: HANNING

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



46 0703

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



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

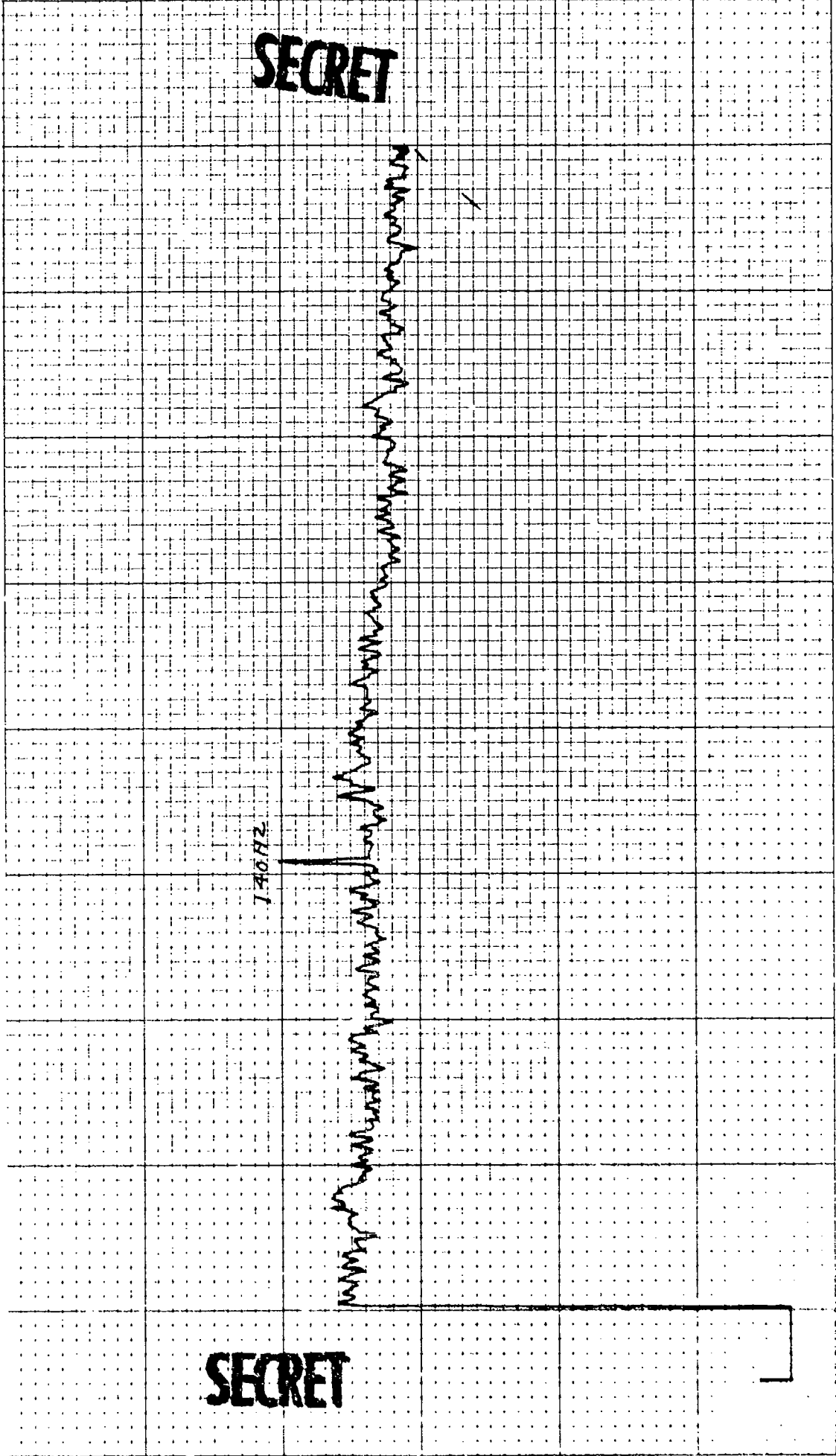
46 0703

REEL: F19 INDEX 3050

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

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING

CONTROL: 2-7 - 1549 (16)
OMNI SPECTRUM (ELEMENT 37)
EXERCISE: BEARING SLAKE
CENTER FREQ: 150 HZ
1 ELEMENT



46 0703

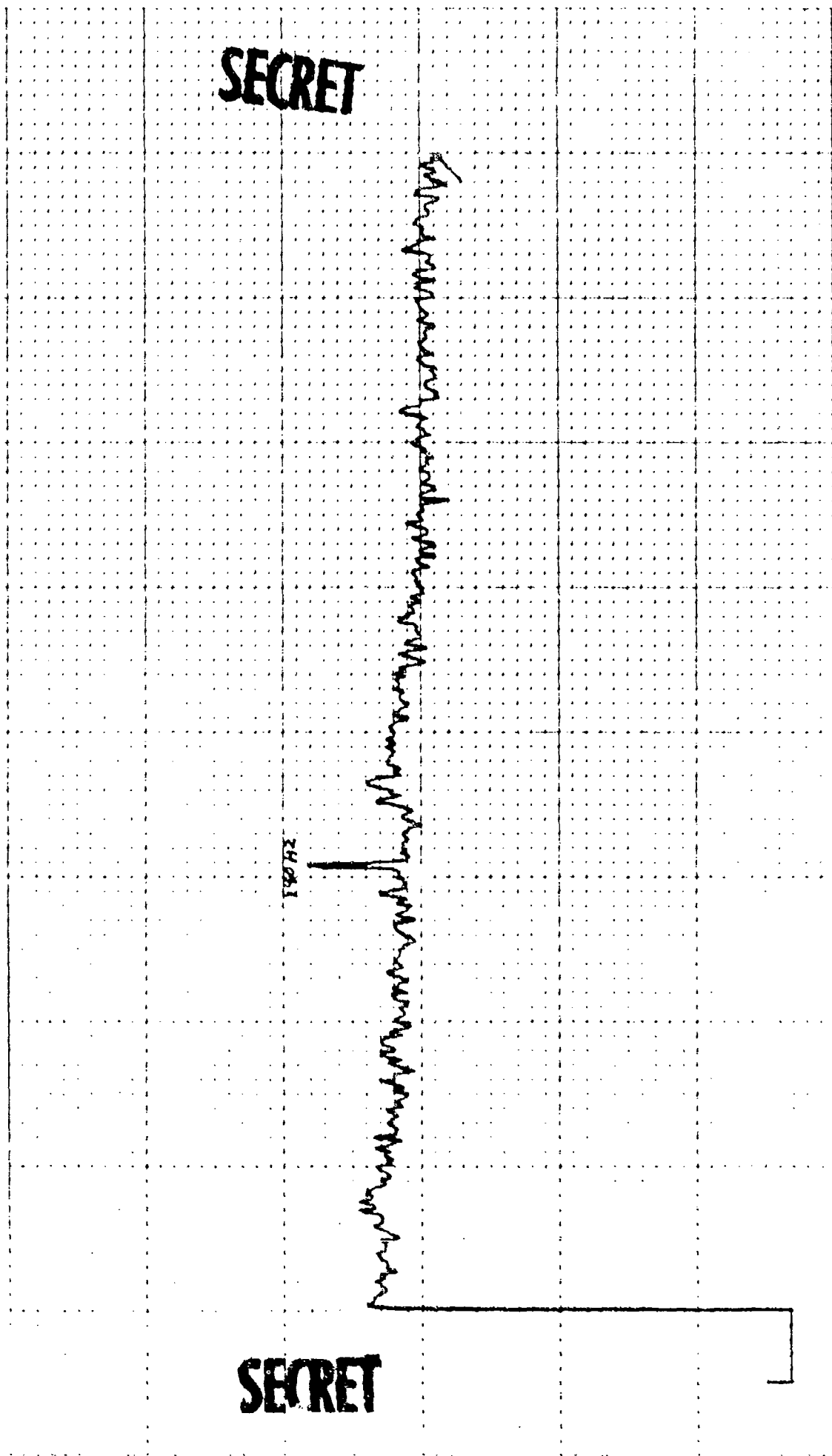
KOE 11/10/54

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

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

REEL: F19 INDEX 3050

INTEGPAATION TIME 320 SECS
 FILIER WIG: HANNING



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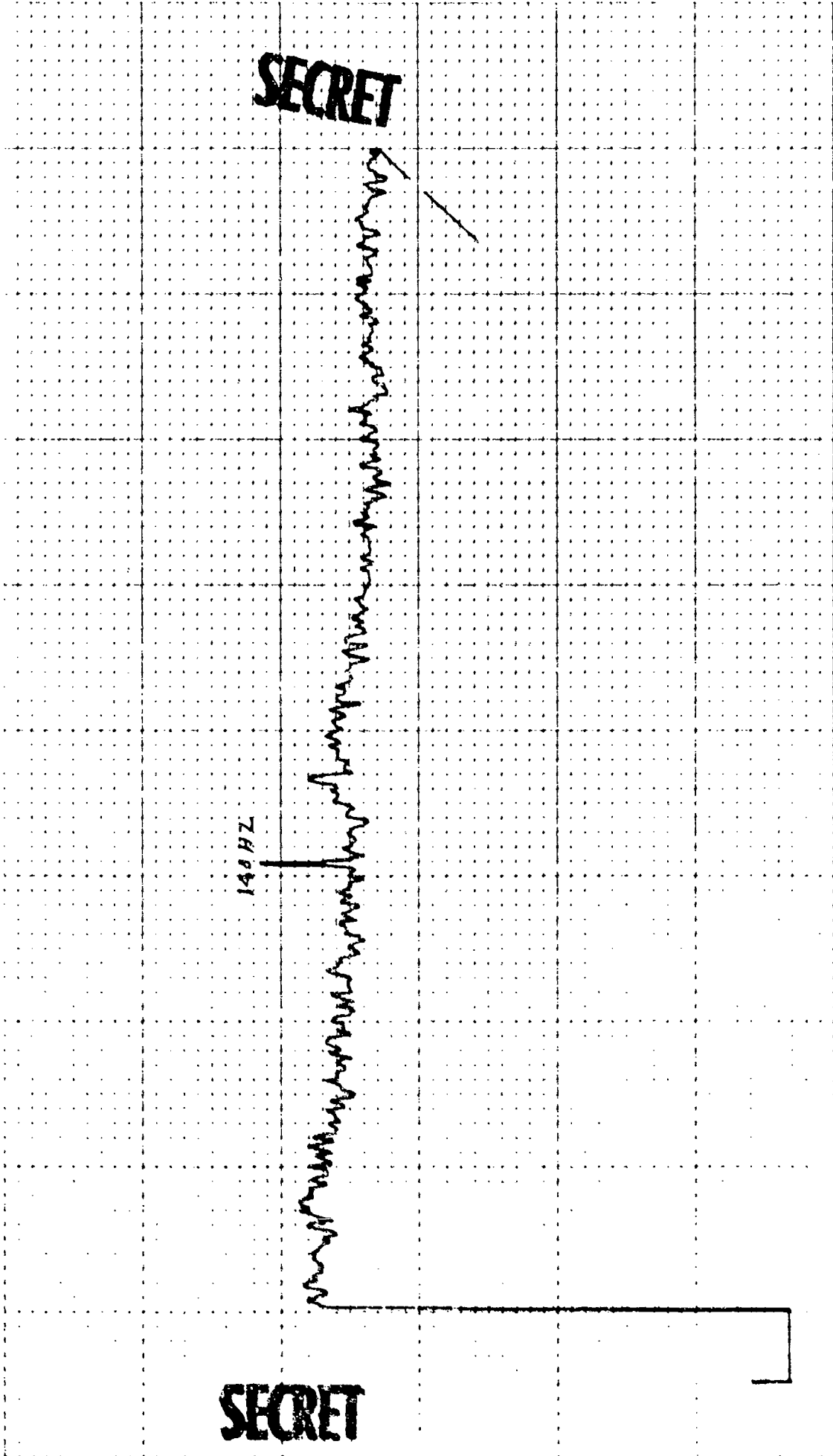
MSE of the State of...

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

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

REEL: F19 INDEX 3050

INTEGRATION TIME 320 SECS ATTN: DB
 FILTER WIG: HANNING



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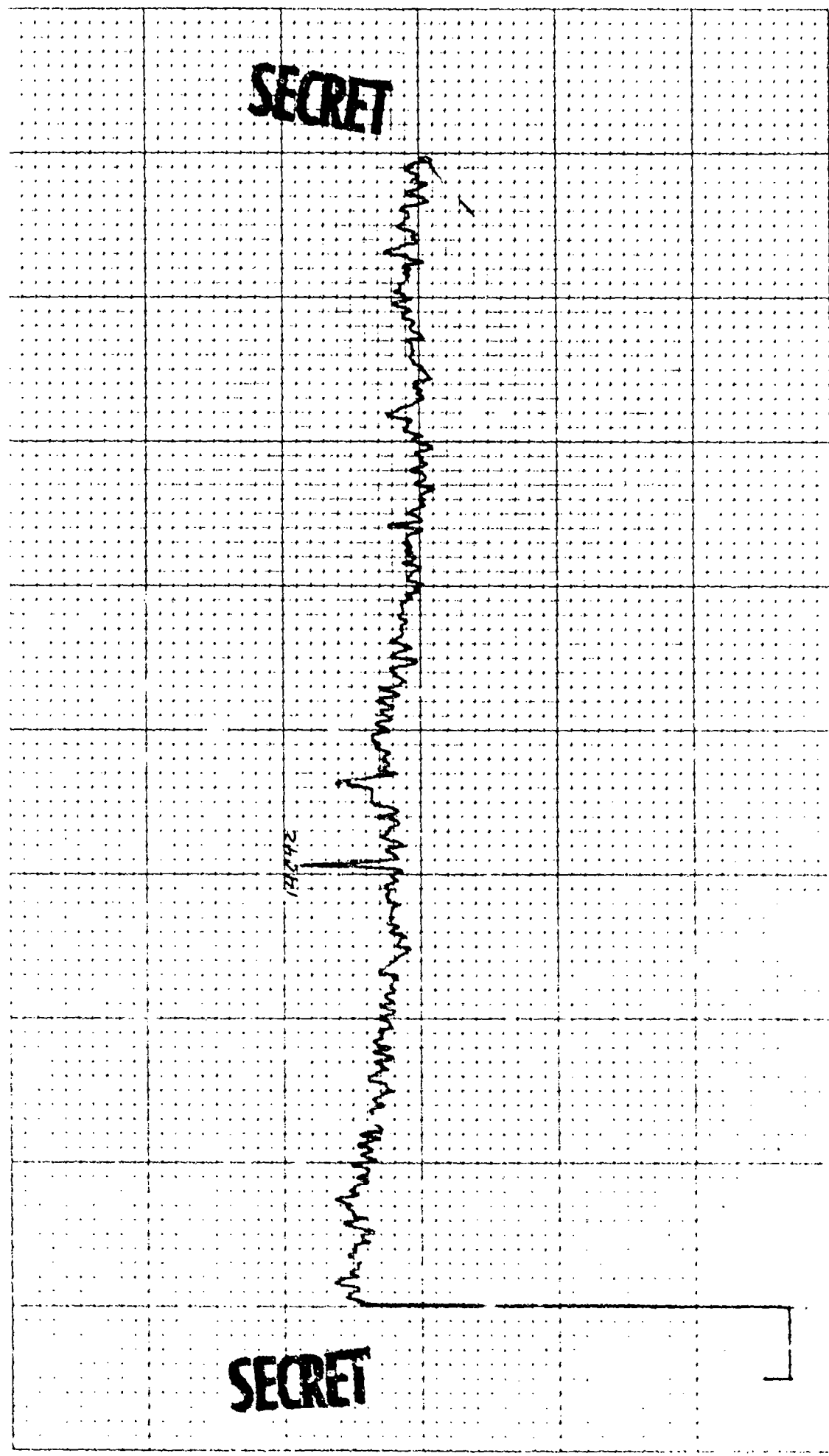
45 0703

McE 4.000 TO THE 10000 5.000 10.000

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

DATE OF ANALYSIS:
DATE/TIME: 2-7-77 -1514 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEC AZ STEERING

REEL: F19 INDEX: J050
INTEGRATION TIME 320 SECS ATTN: - DB
FILTER WTC: HANNING



46 0703

KOE 2-7-77 TO THE INCHES
PERFECTION & ESSER CO. 2-7-77

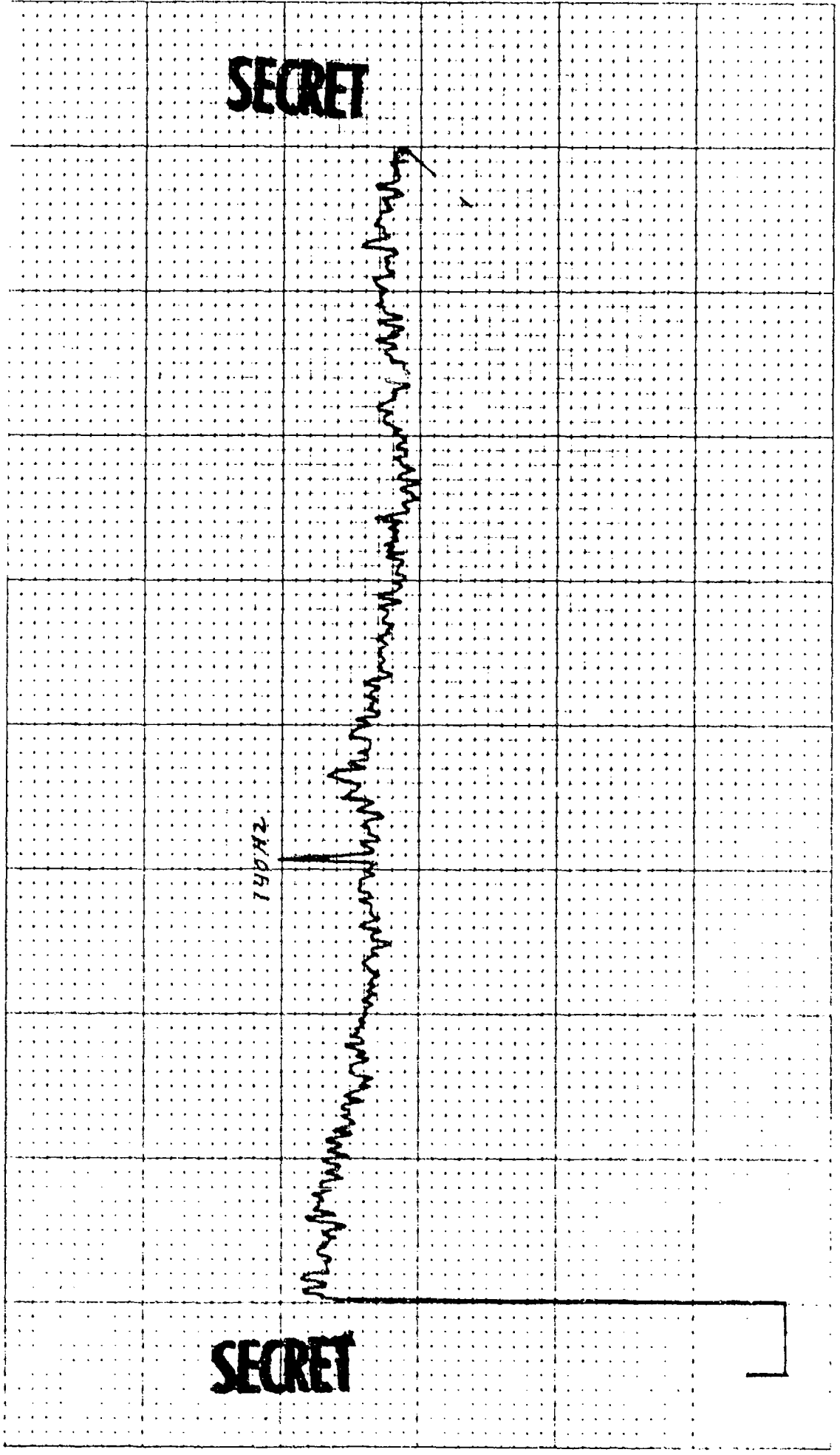
CONTROL: 2-7 -1549 (22)
OMNI SPECTRUM (ELEMENT 45)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F19 INDEX J050

INTEGRATION TIME 320 SECS
FILTER WTG: HANNING



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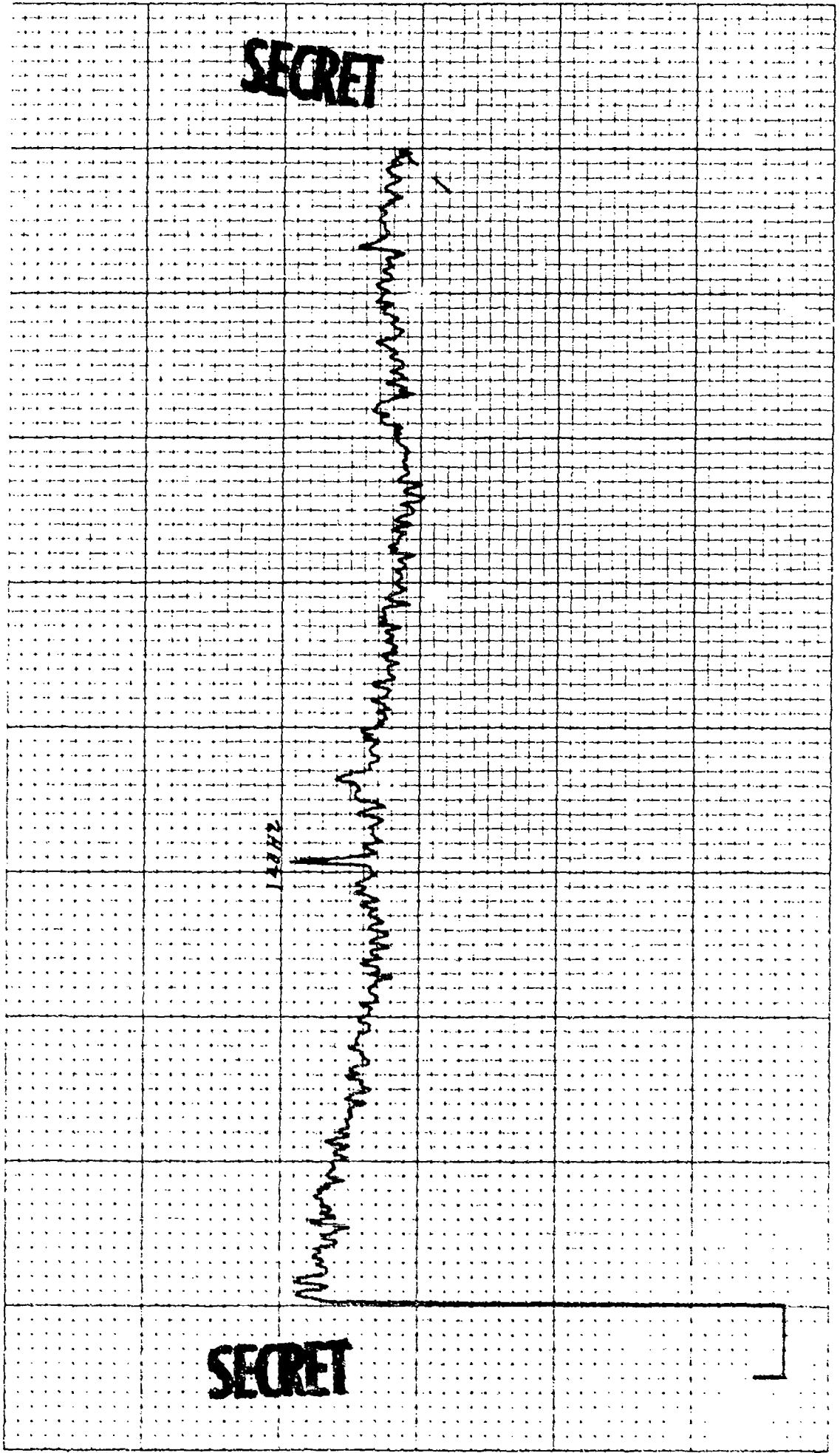
SECRET

2-7-77

46 0703

KOE 1/2 INCH TO THE INCH
PENTEL SYSTEM CO. 404 5th St. N.E.

CONTROL: 2-7 -1549 (23) DATE OF ANALYSIS: REEL: F19 INDEX J052
 OMNI SPECTRUM (ELEMENT 47)
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 -1541 Z INTEGRATION TIME 320 SECS ATTN: DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 1 ELEMENT — DEG AZ STEERING



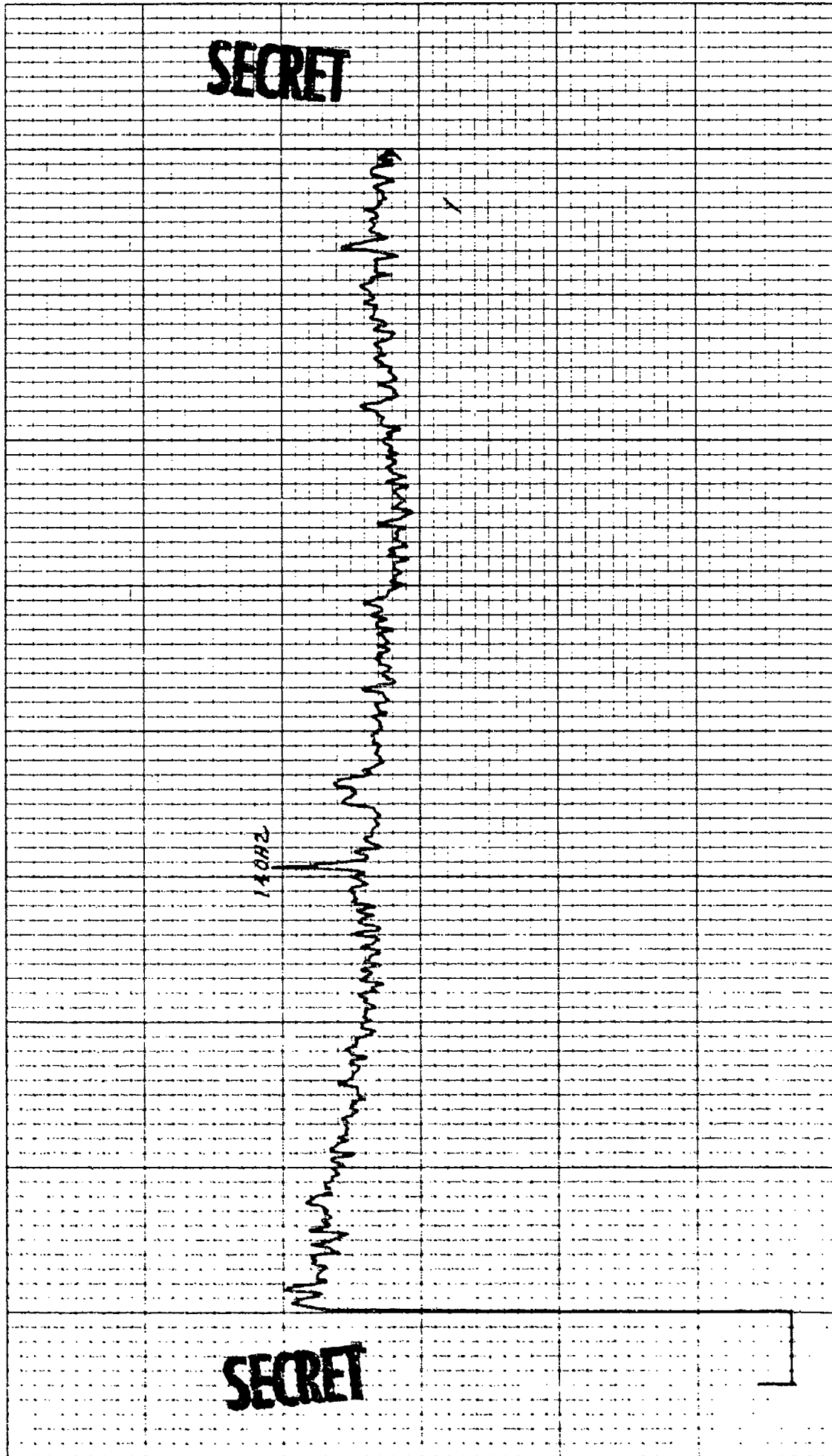
SECRET

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

46 0703

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



46 0703

REF ID: A66703

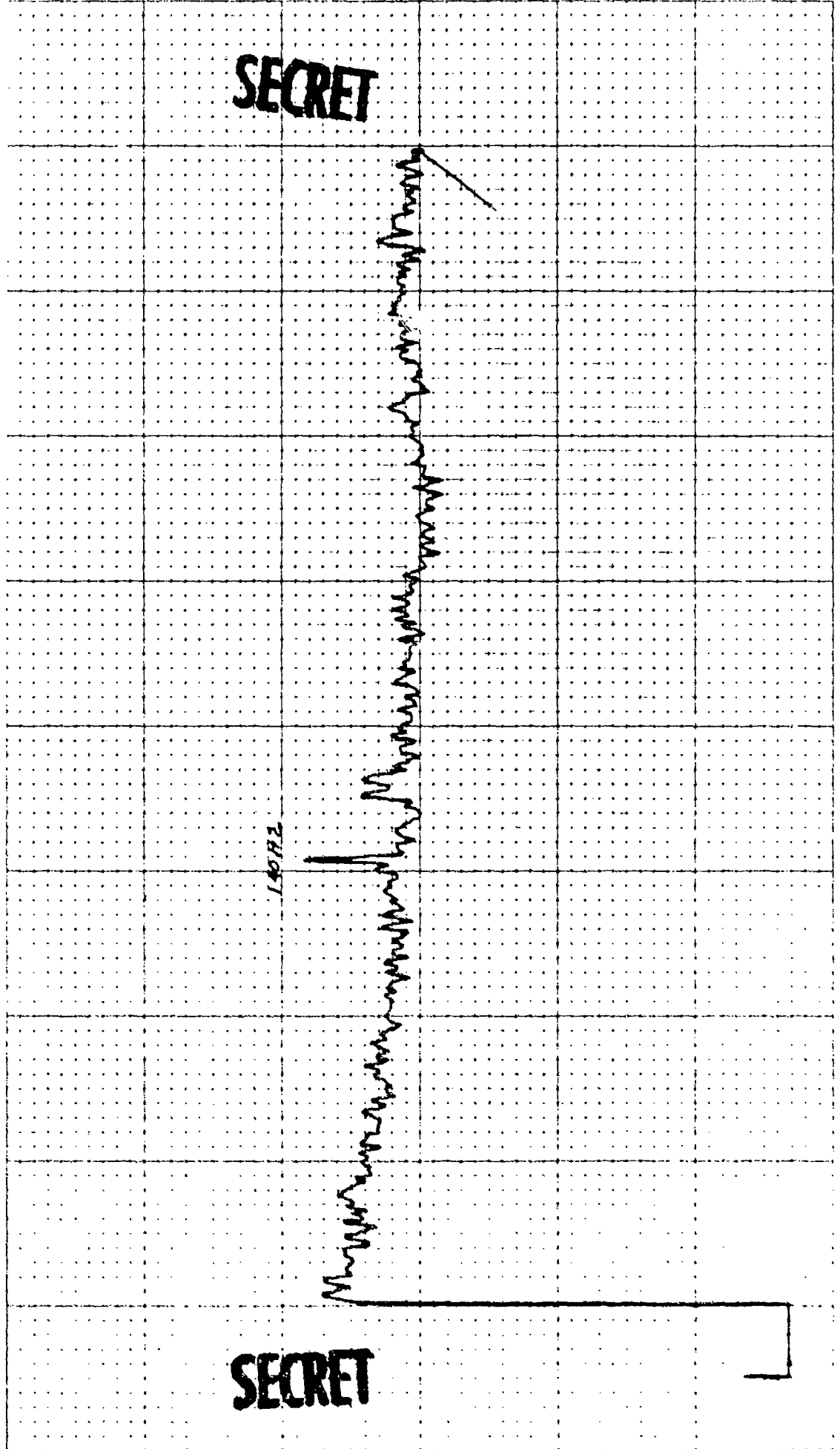
CONTROL: 2.7 - 1549 (25)
OMNI SPECTRUM (ELEMENT 51)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: Fig INDEX: 3050

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING



46 0703

REF ID: A66000

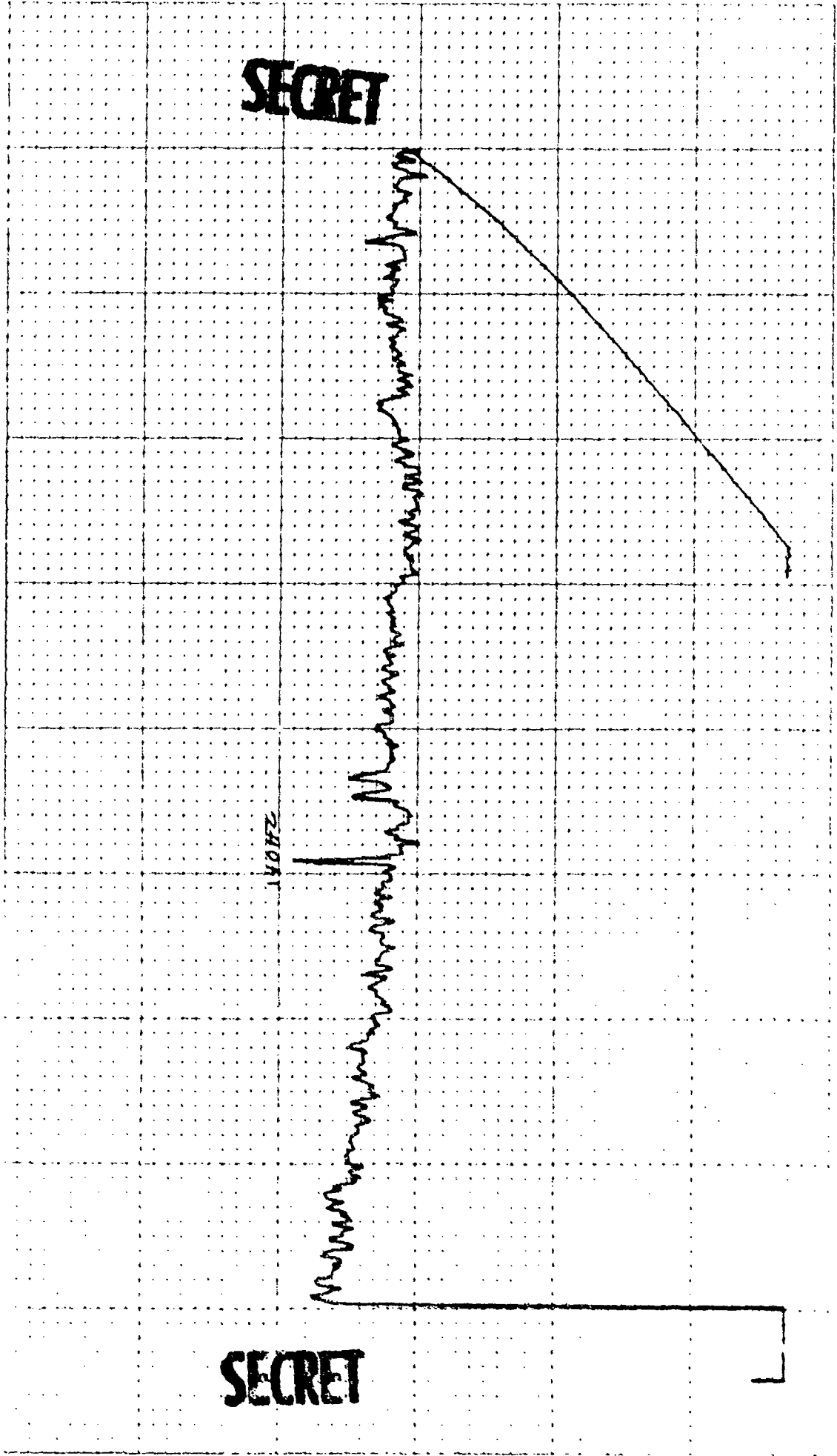
CONTROL: 2.7 - 1549 (26)
OMNI SPECTRUM (ELEMENT 53)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F/1 INDEX J-5

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



46 0703

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

DATE OF ANALYSIS:

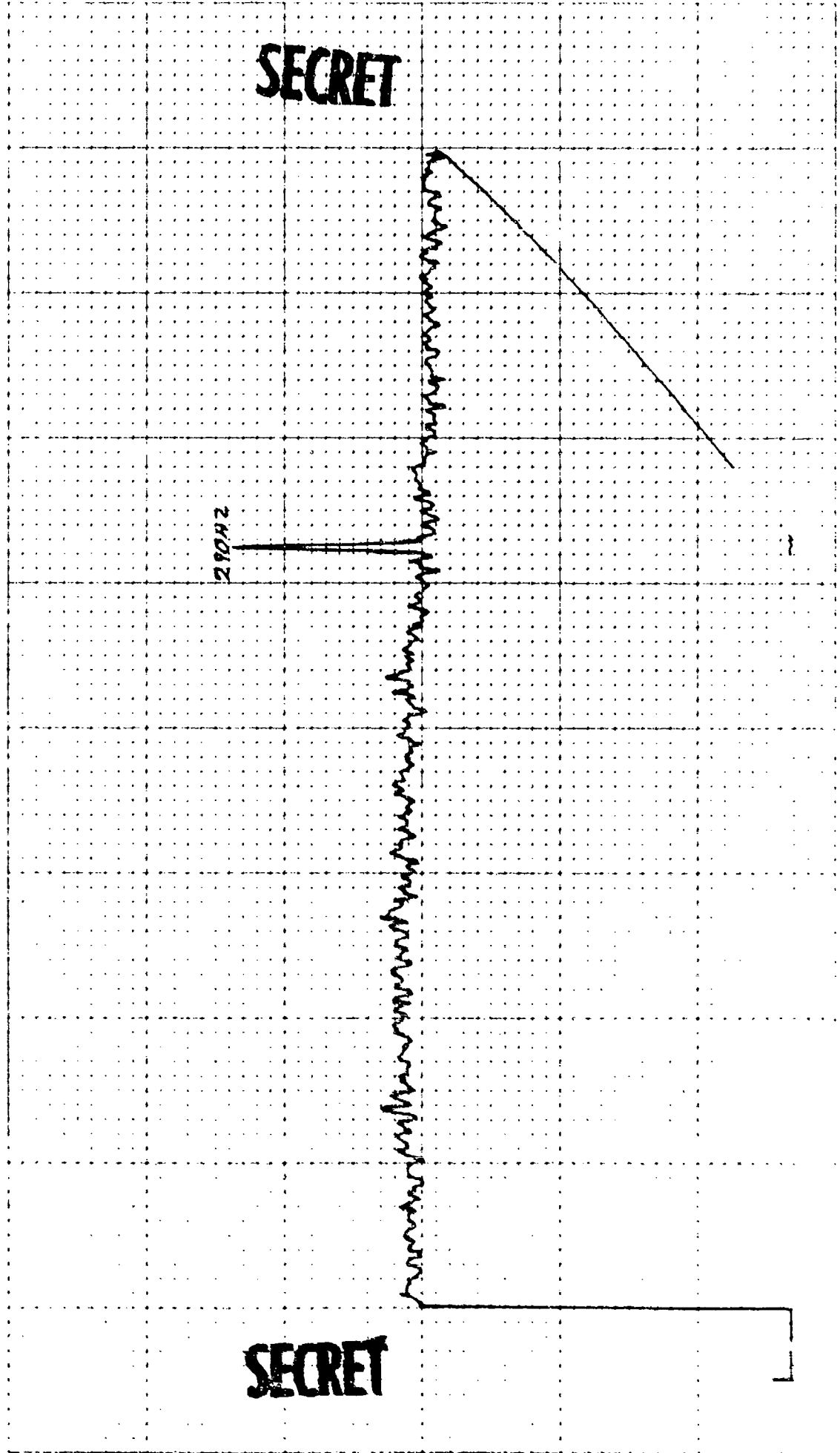
DATE/TIME: 2-7-77 -1549 Z

ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

REEL: F19

INDEX 3050

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER WTG: HANNING



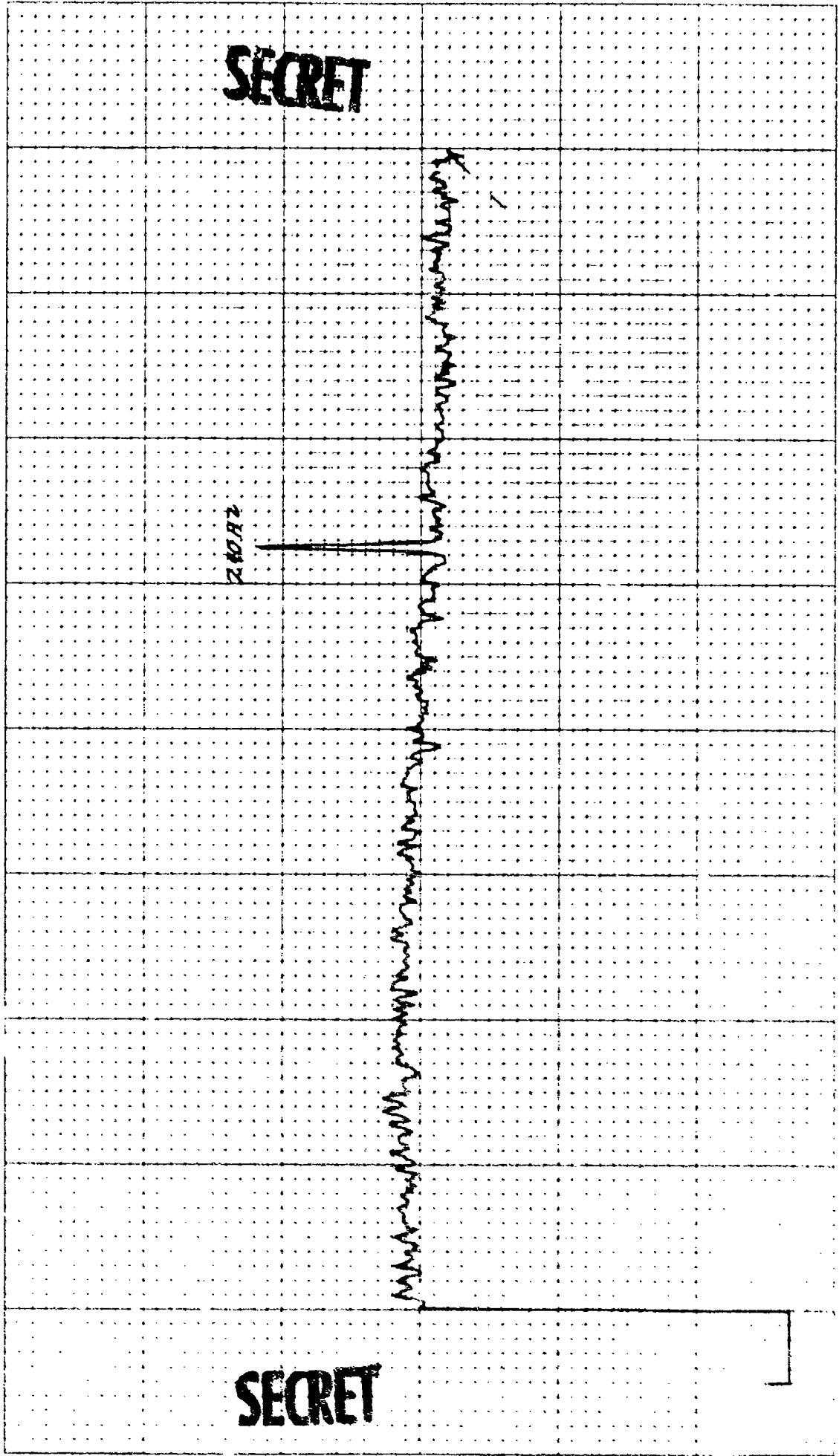
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CONTROL: 2-7 -1549 (20) DATE OF ANALYSIS: REEL: F.9 INDEX 3050
 OMNI SPECTRUM (ELEMENT 4)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ INTEGRATION TIME 320 SECS ATTN: DB
 I ELEMENT FILTER WIG: HANNING
 ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING



SECRET

280 HZ

SECRET

46 0703

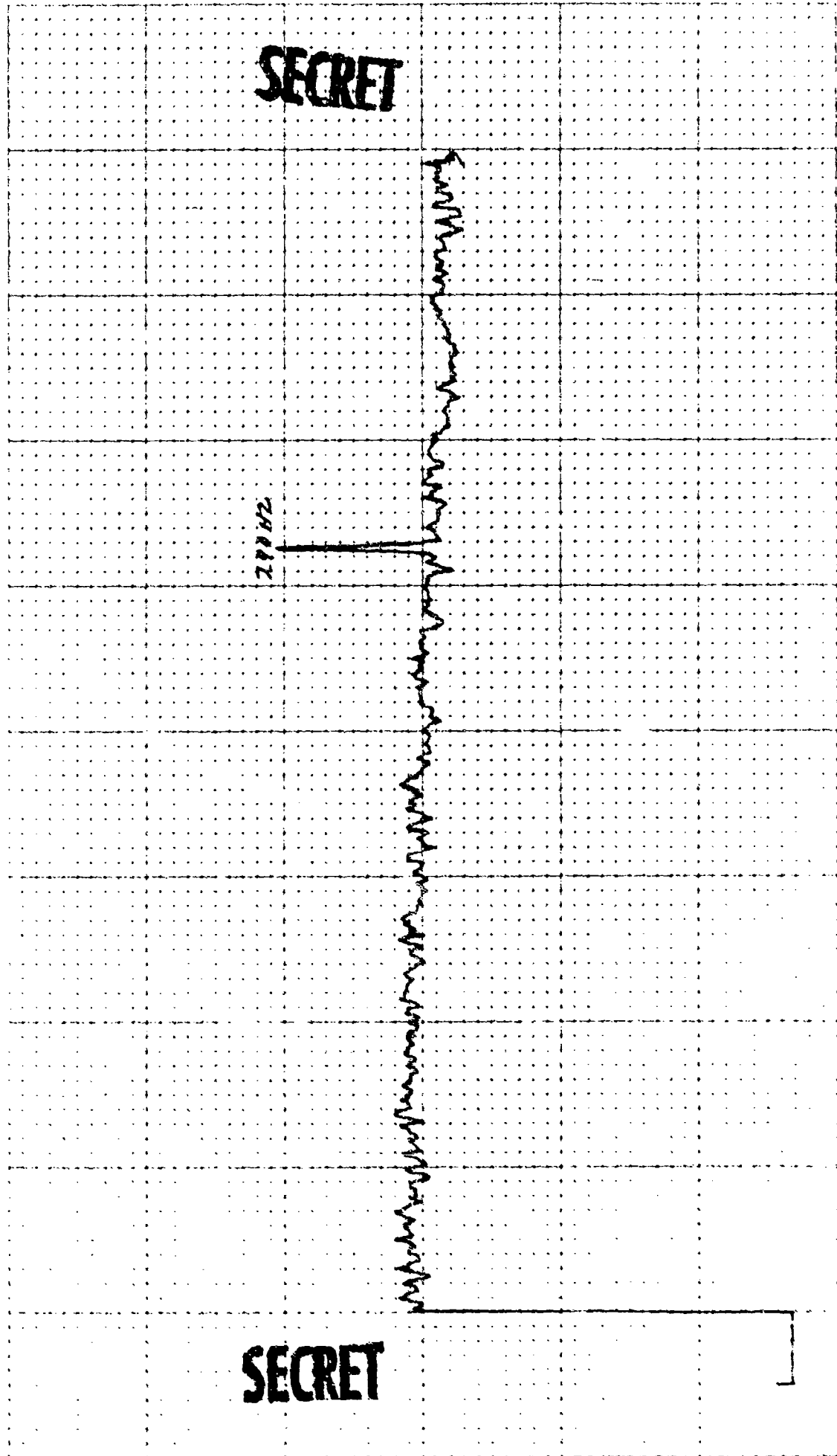
ME 2-7-77 1548 (29)

CONTROL: 2-7-1548 (29)
 OMNI SPECTRUM (ELEMENT 6)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
 1 ELEMENT

DATE OF ANALYSIS:
 DATE/TIME: 2-7-77 1548 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 DEC AZ STEERING

REEL: F19 INDEX 3050

INTEGRATION TIME 320 SECS
 FILTER WTC: HANNING
 ATTN: DB



46 0703

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

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

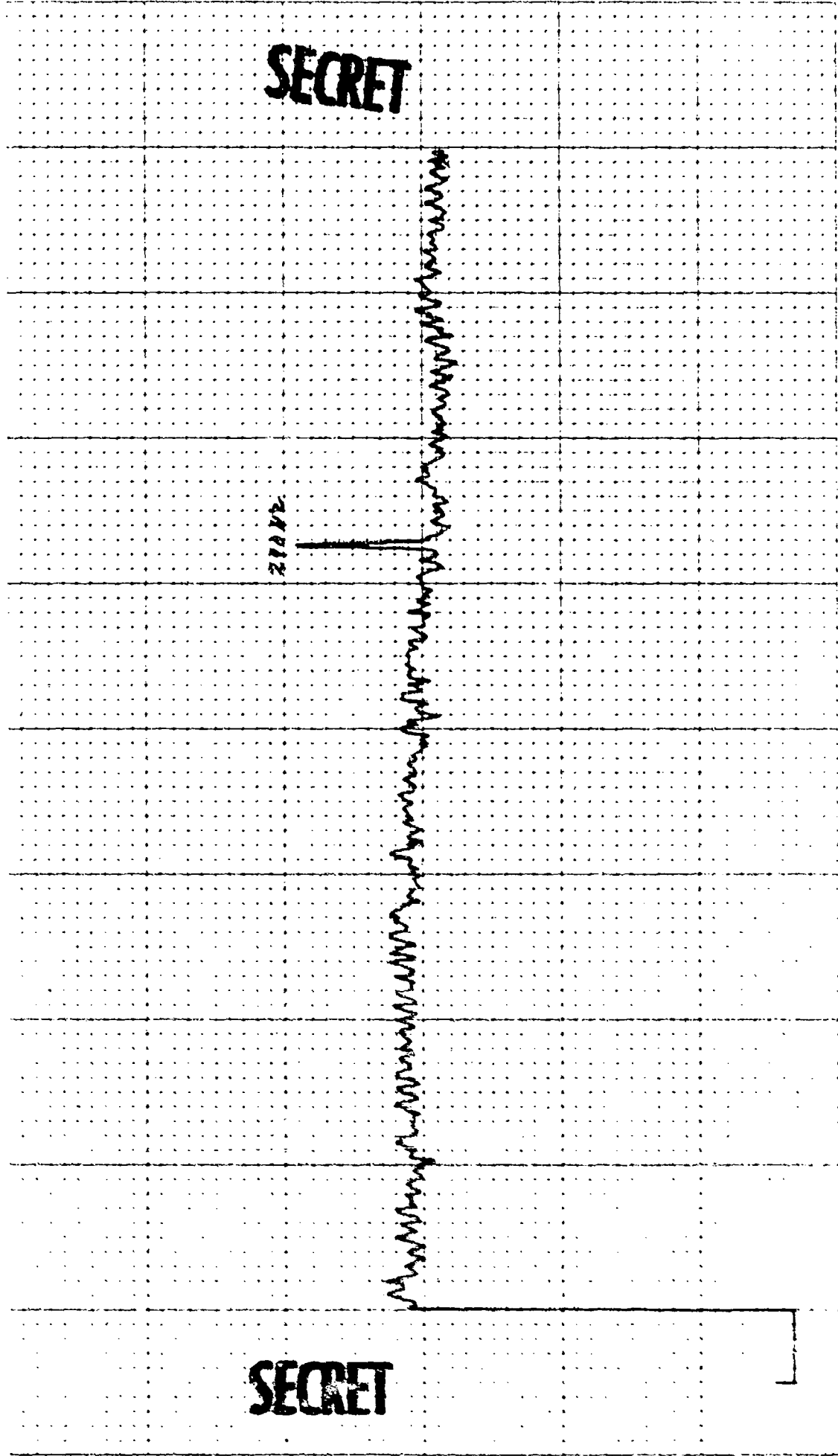
DATE OF ANALYSIS:

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

ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

REEL: F19 INDEX 3050

INTEGRATION TIME 320 SECS ATTN: DB
FILTER MTG: HANNING



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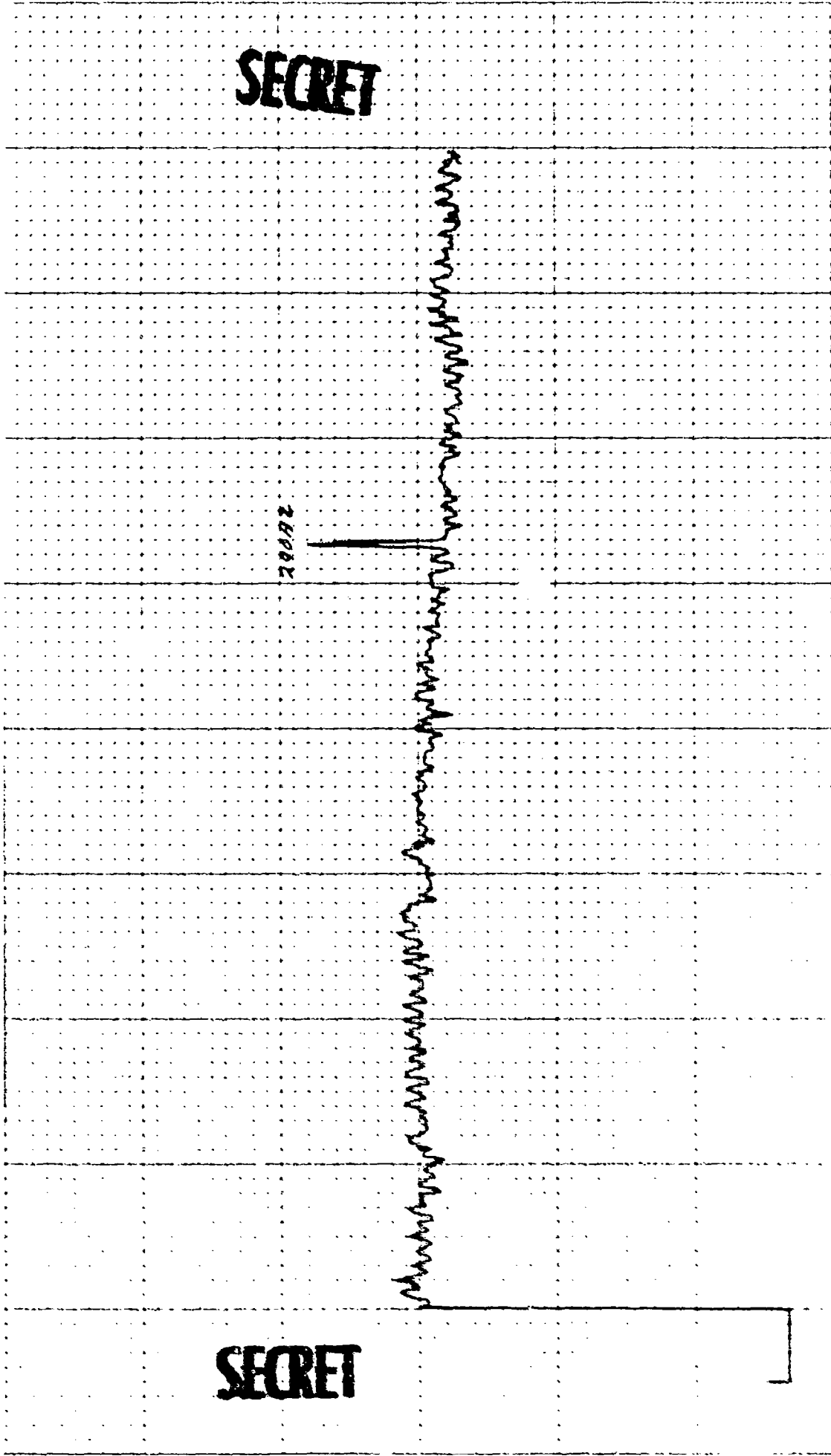
CONTROL: 2-7-1597 (21)
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F19 INDEX 3050

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



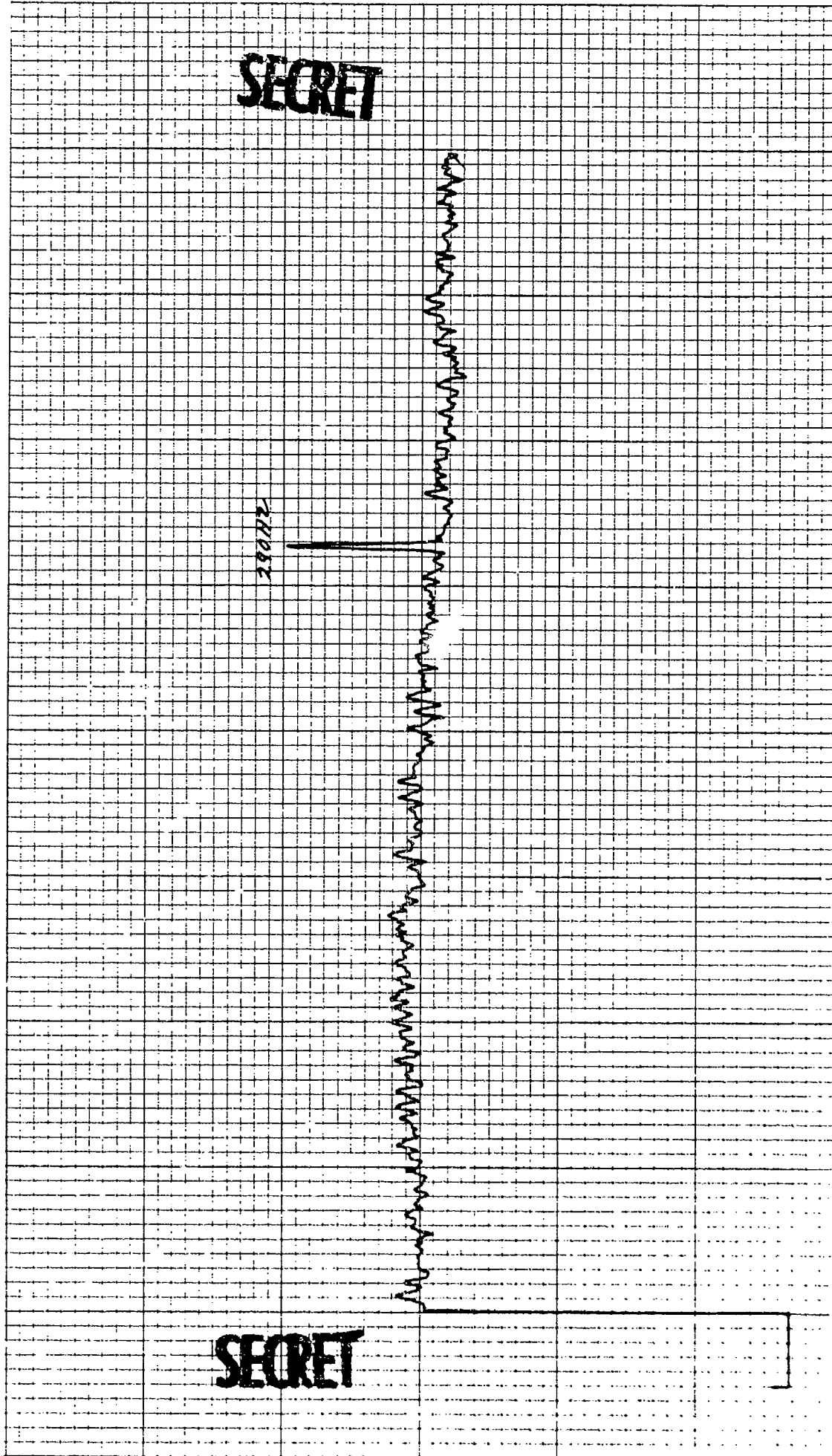
CONTROL: 2-7 -1549 (32)
OMNI SPECTRUM (ELEMENT 12)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F19 INDEX 3050

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



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MSE 2-7-77 1549 (33)

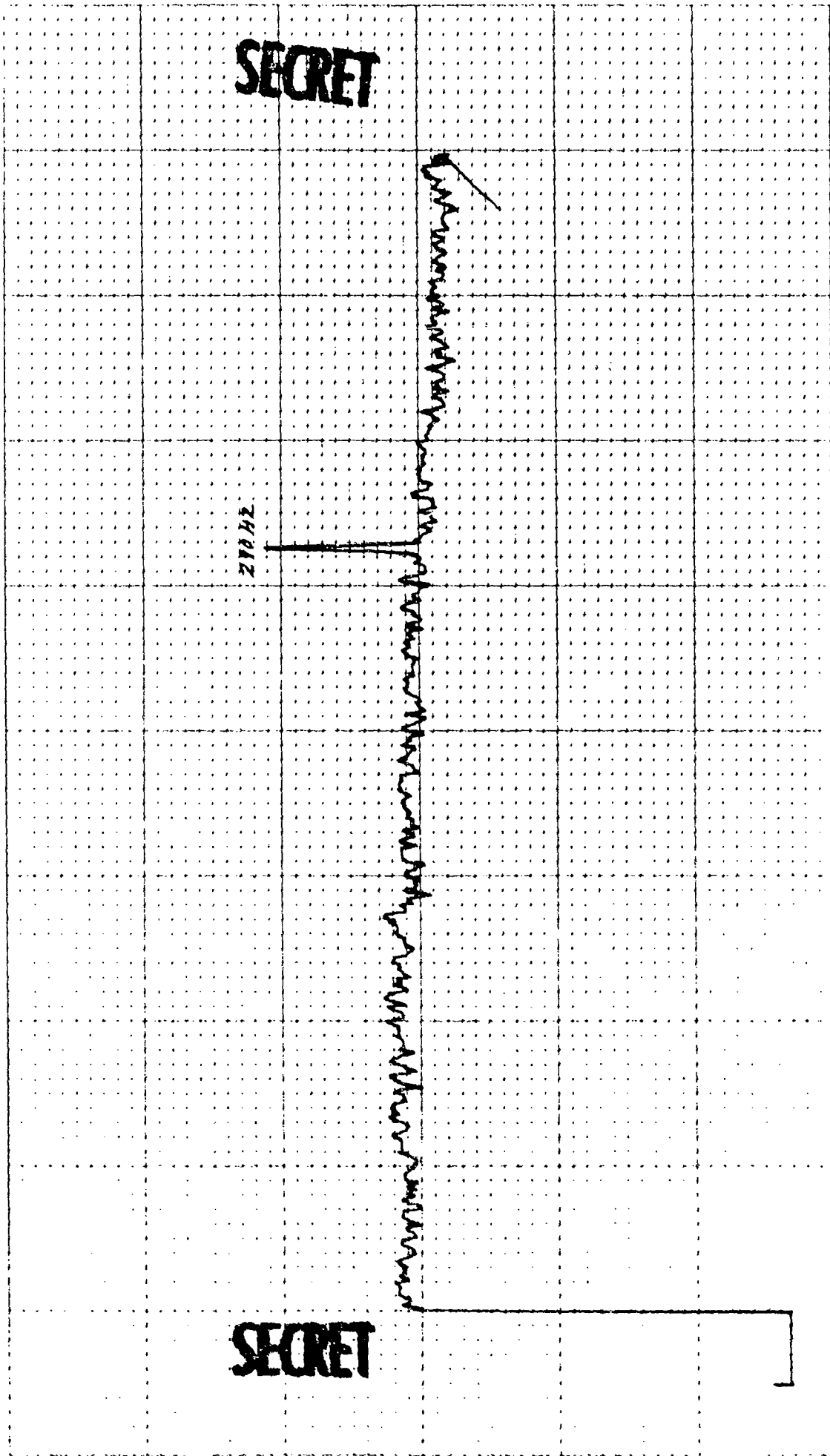
REEL: 519 INDEX 2050

DATE OF ANALYSIS:

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

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

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



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200 HZ

SECRET

46 0703

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

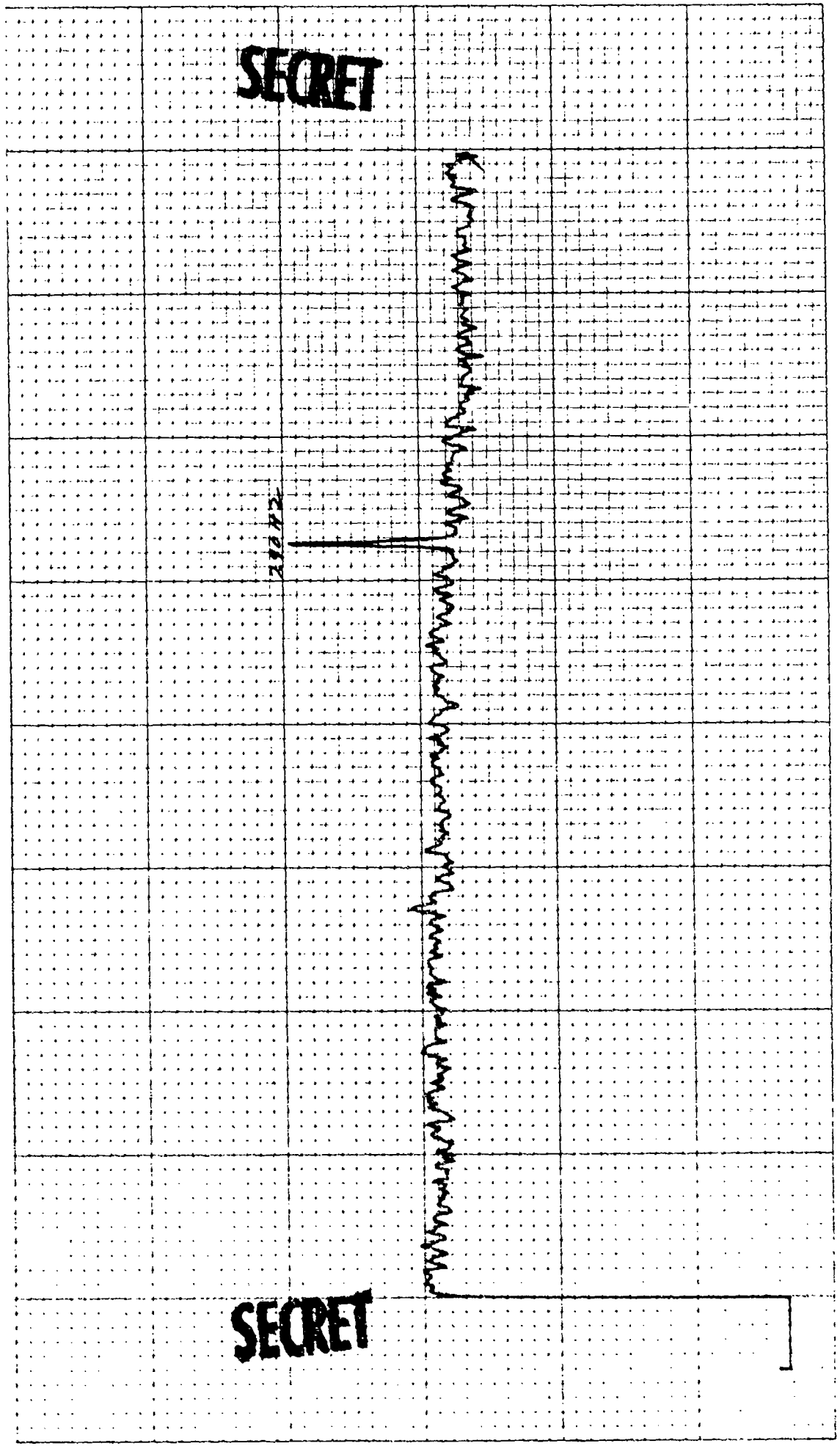
REEL: Flg INDEX 3050

DATE OF ANALYSIS:

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

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

INTEGRATION TIME 320 SECS
FILTER ATTN: DB
WTG: HANNING



KOE 12.4 IN TO THE INCH
PENFEL & ESSER CO

46 0703

DATE OF ANALYSIS:

REEL: F19 INDEX 3050

CONTROL: 2-7 -1549 (35)
OMNI SPECTRUM (ELEMENT 19)

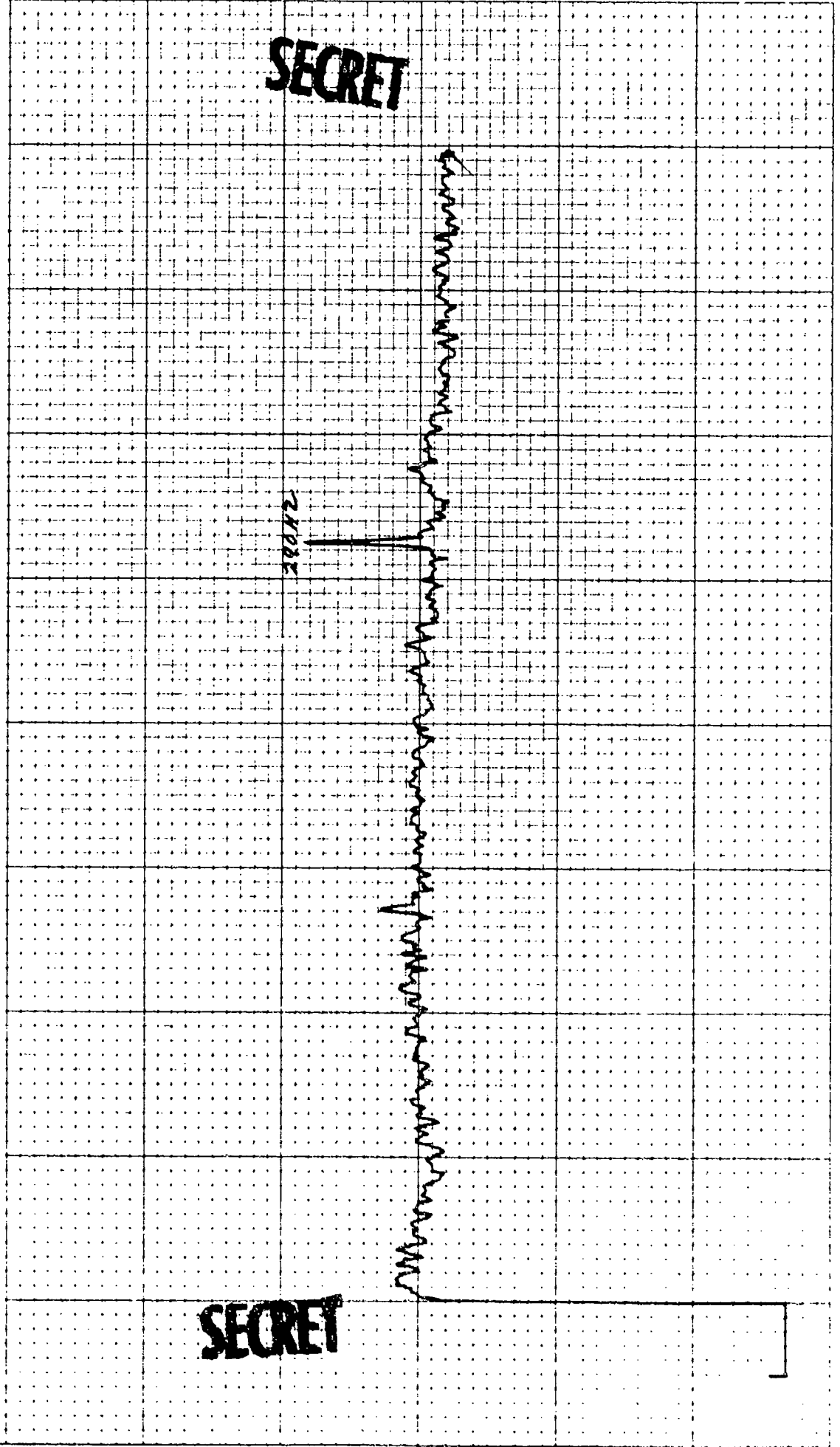
EXERCISE: BEARING STAKE

1 ELEMENT

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

— DEG AZ STEERING

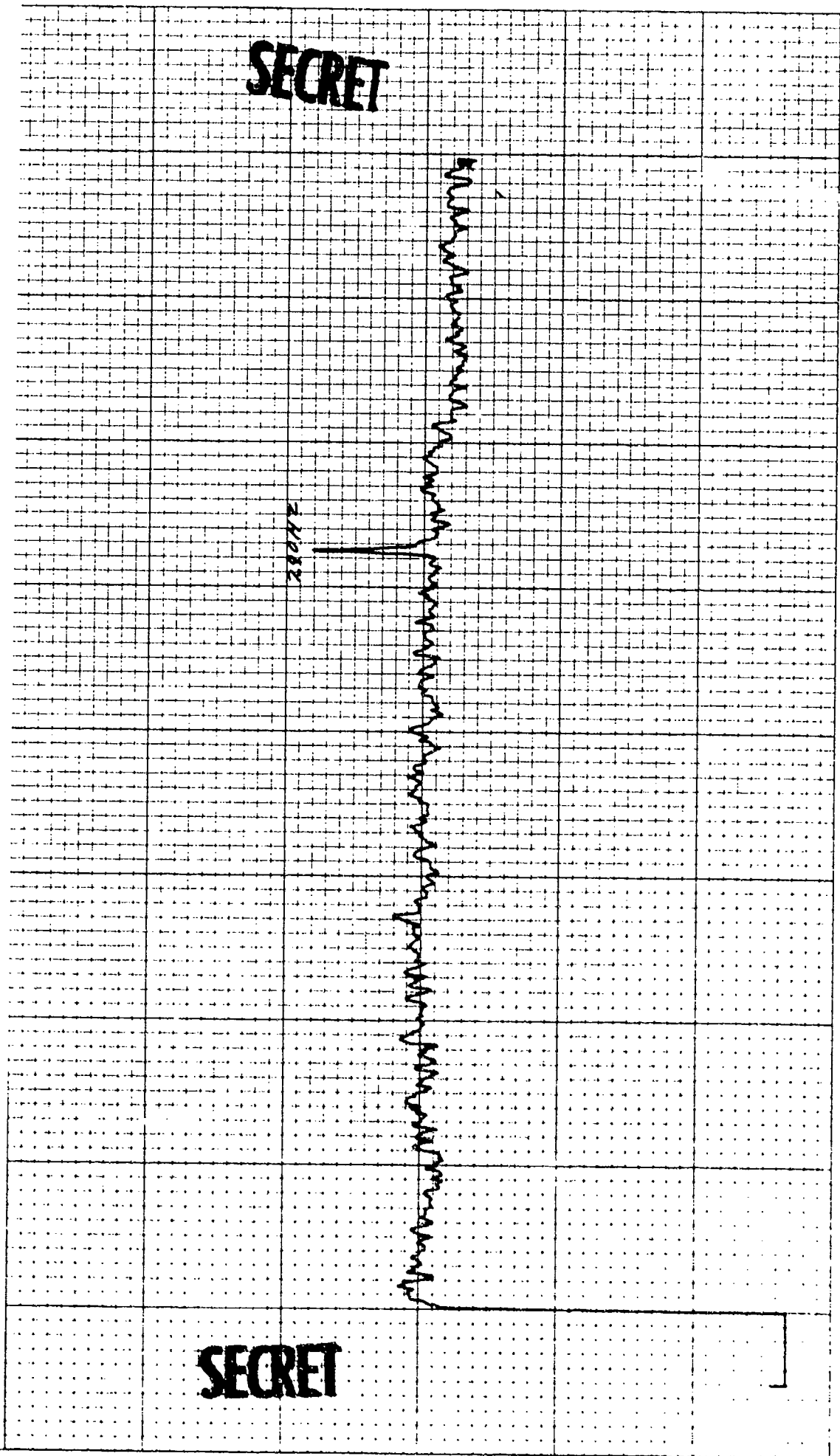
INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



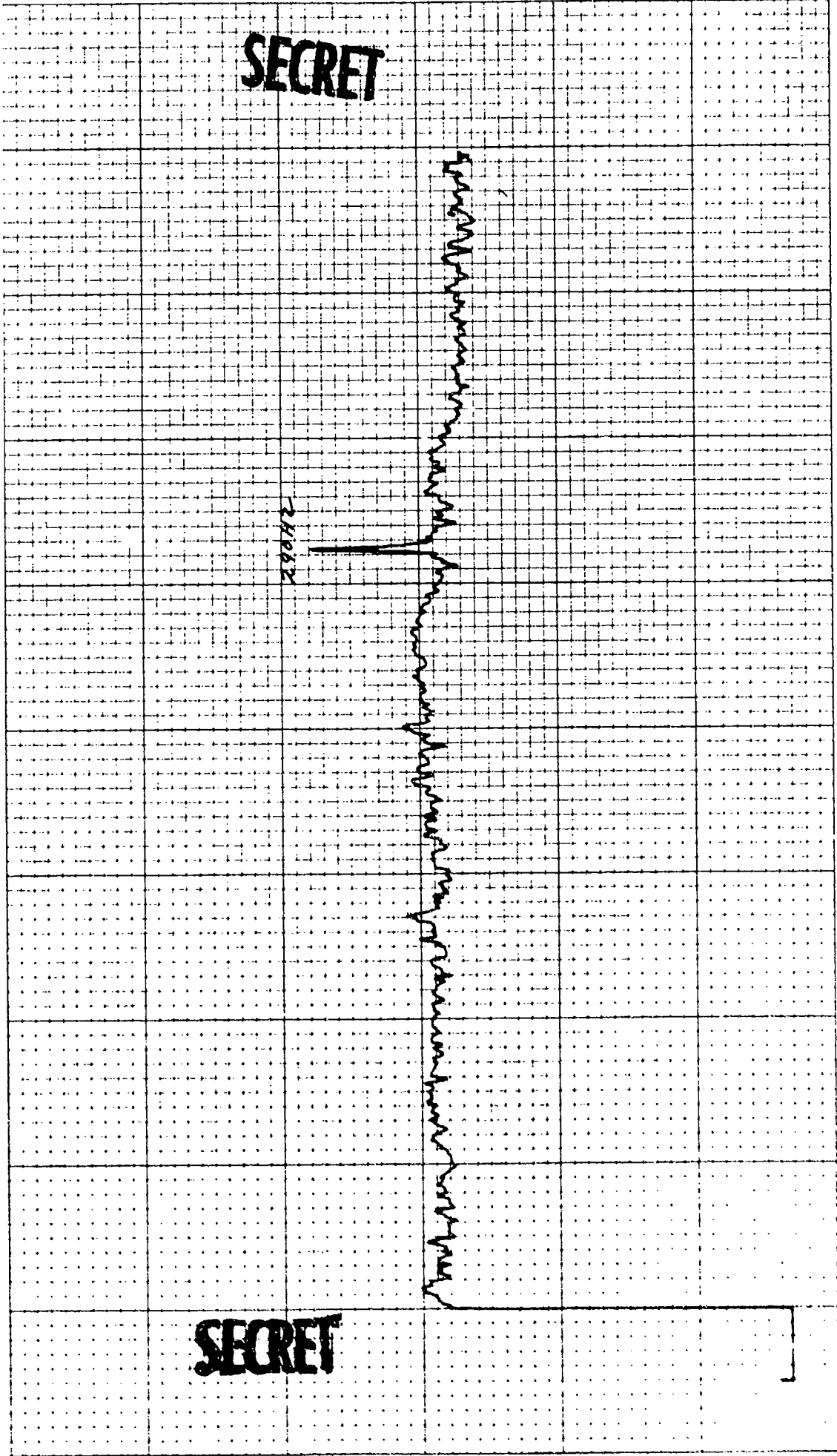
KOE 10 X 10 TO THE INCH • 2 1/2 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

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



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



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

46 0703

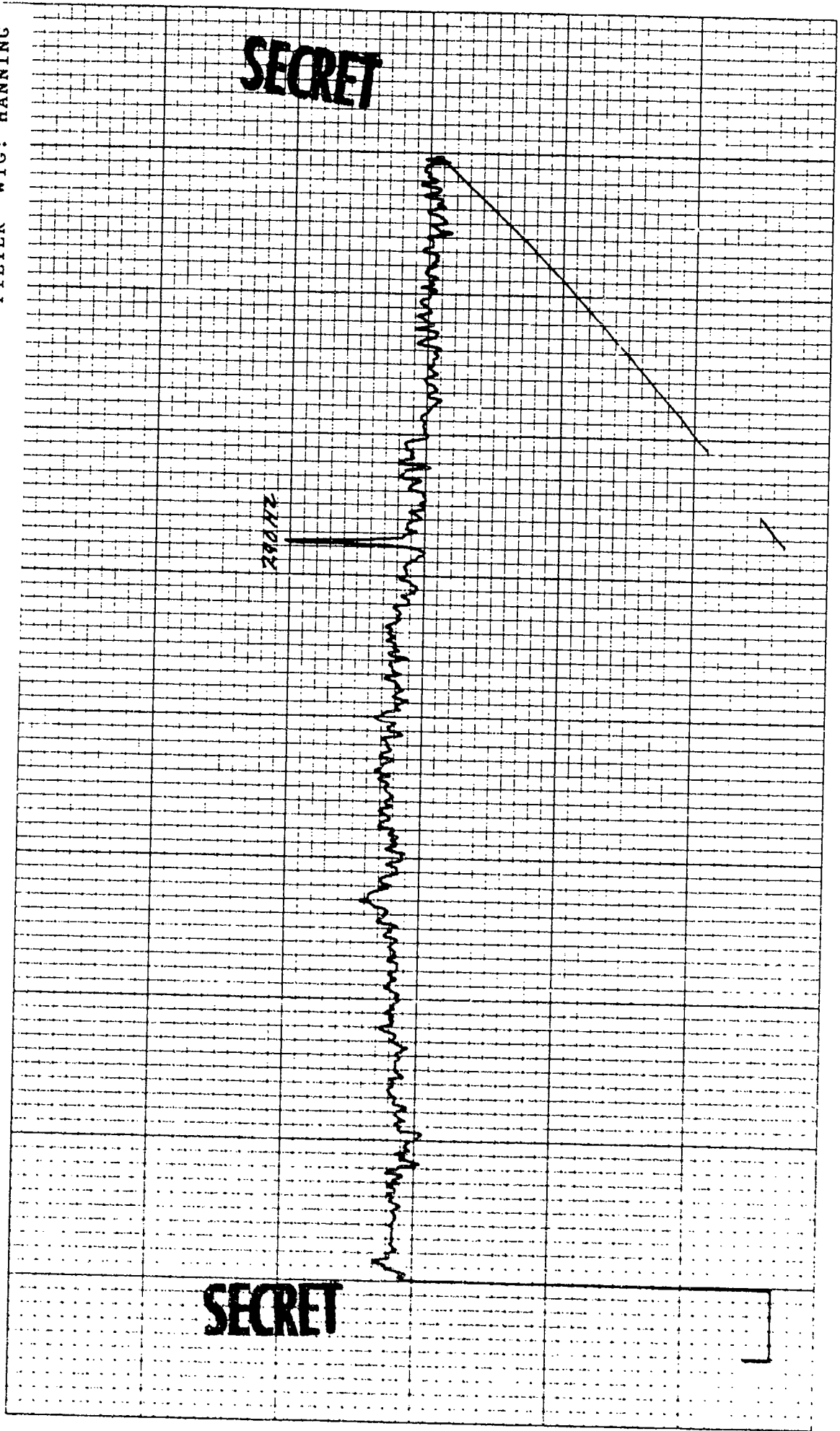
CONTROL: 2-7 -1549 (39)
OMNI SPECTRUM (ELEMENT 26)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F19 INDEX 3050

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



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

46 0703

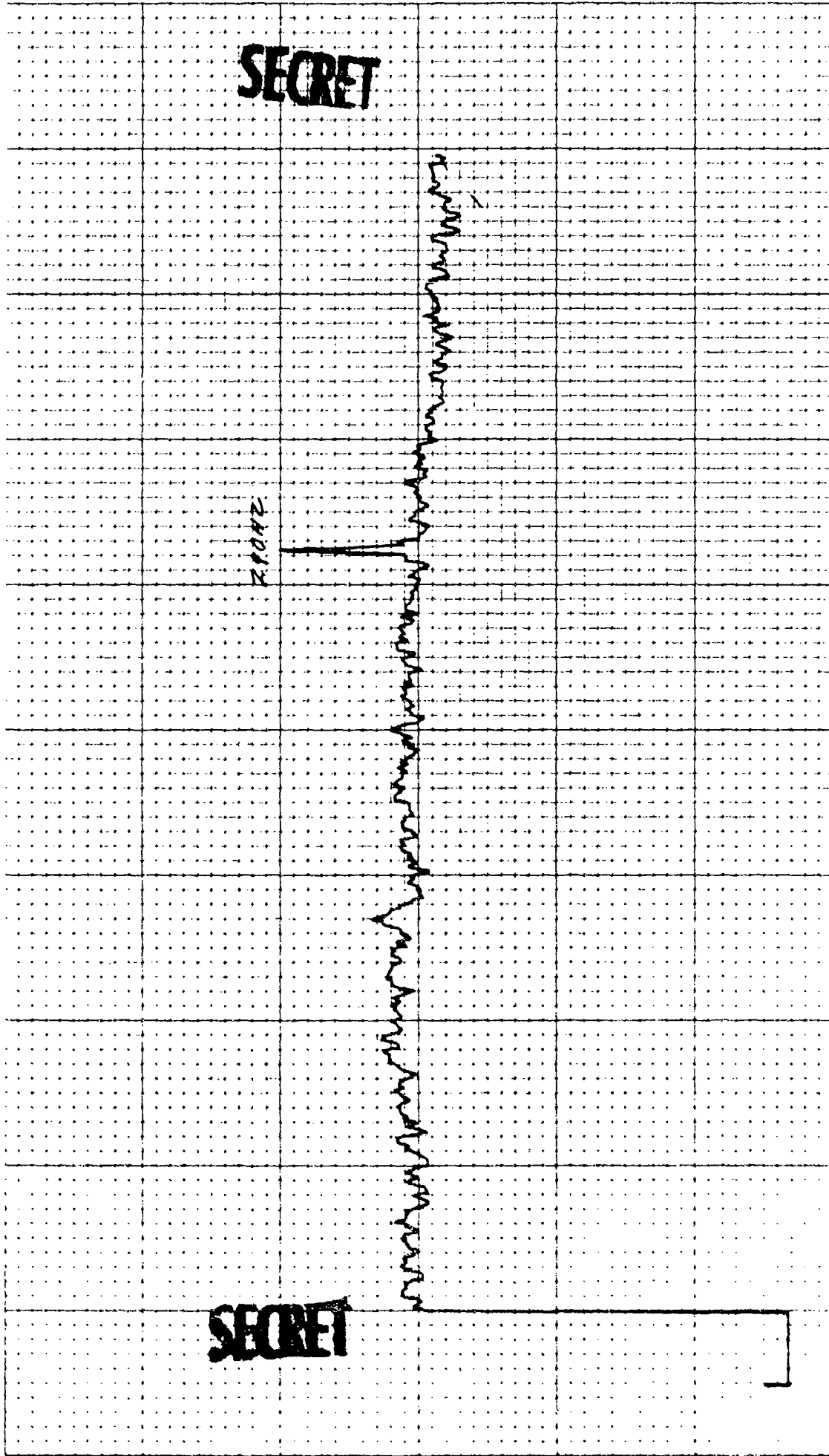
CONTROL: 2.7 -1549 (40)
OMNI SPECTRUM(ELEMENT 29)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F19 INDEX 3050

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

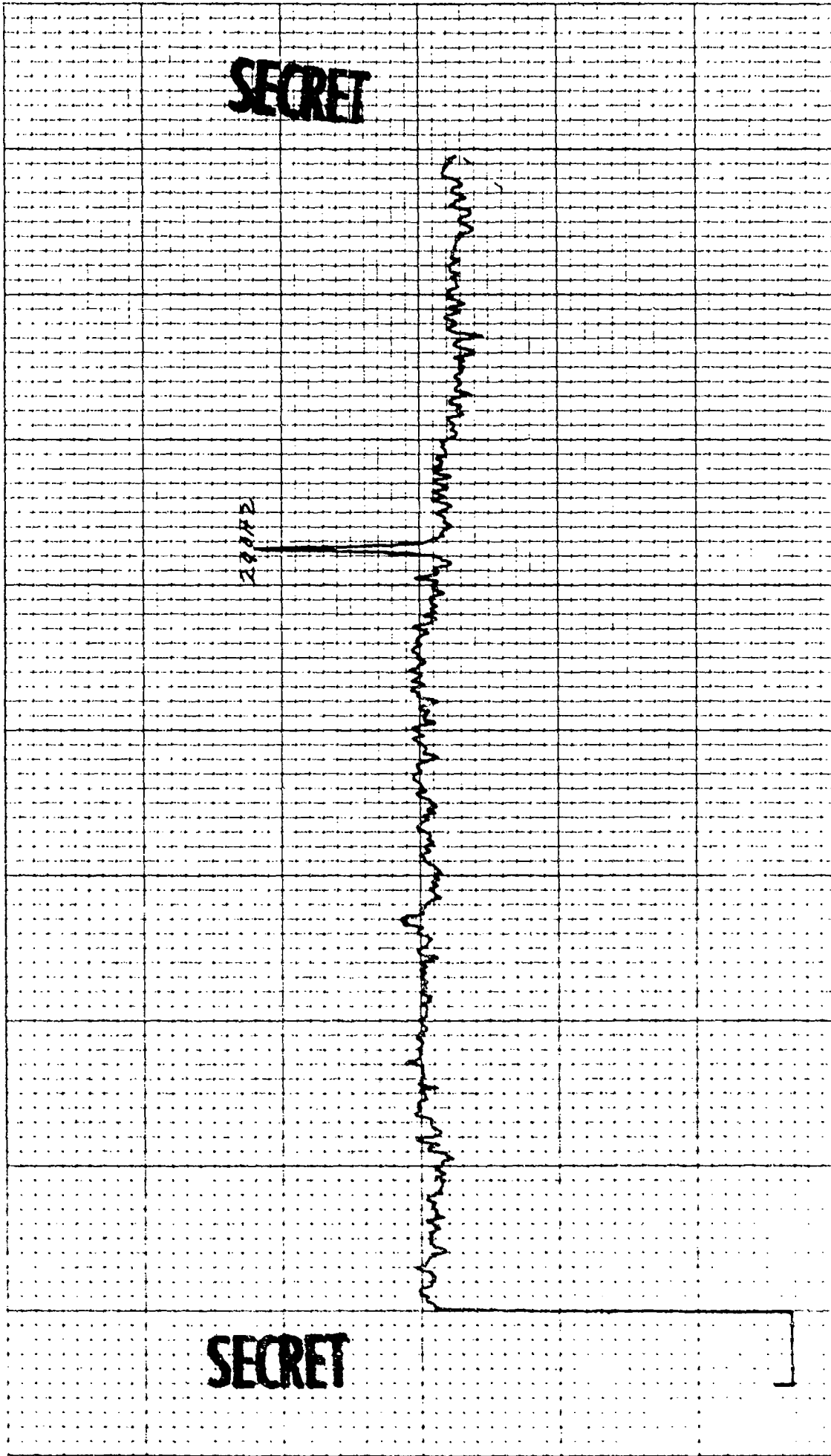


46 0703

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

CONTROL: 2-7 -1549 (4/) DATE OF ANALYSIS: REEL: F/9 INDEX: 3050
 OMNI SPECTRUM (ELEMENT 3/)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
 1 ELEMENT

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



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46 0703

DATE OF ANALYSIS:

REEL: F19 INDEX 3050

CONTROL: 2-7 -1549 (42)

OMNI SPECTRUM (ELEMENT 33)

EXERCISE: BEARING STAKE

CENTER FREQ: 280 HZ

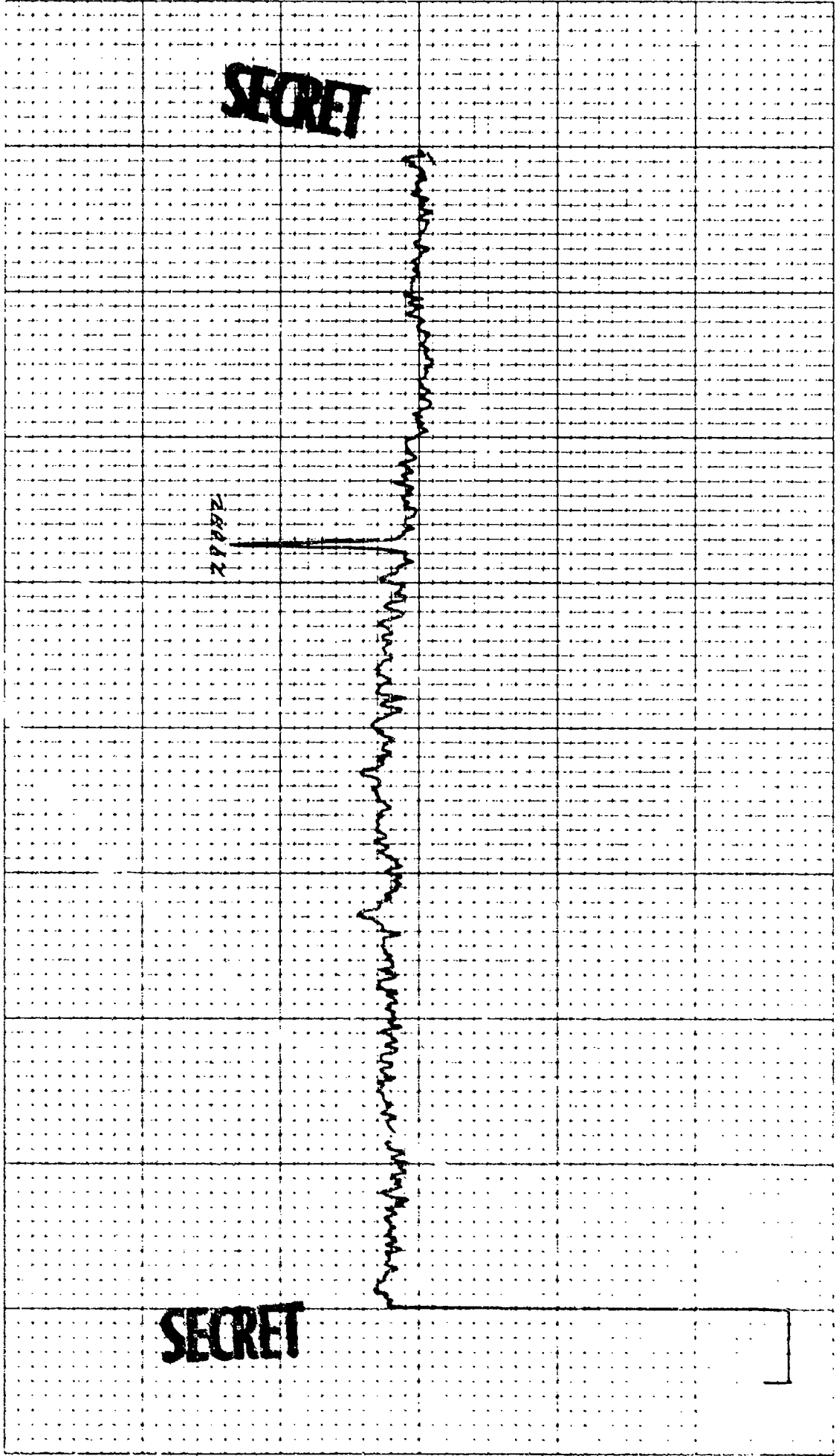
1 ELEMENT

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

ANALYSIS BANDWIDTH: 1/10 HZ

DEC AZ STEERING

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING



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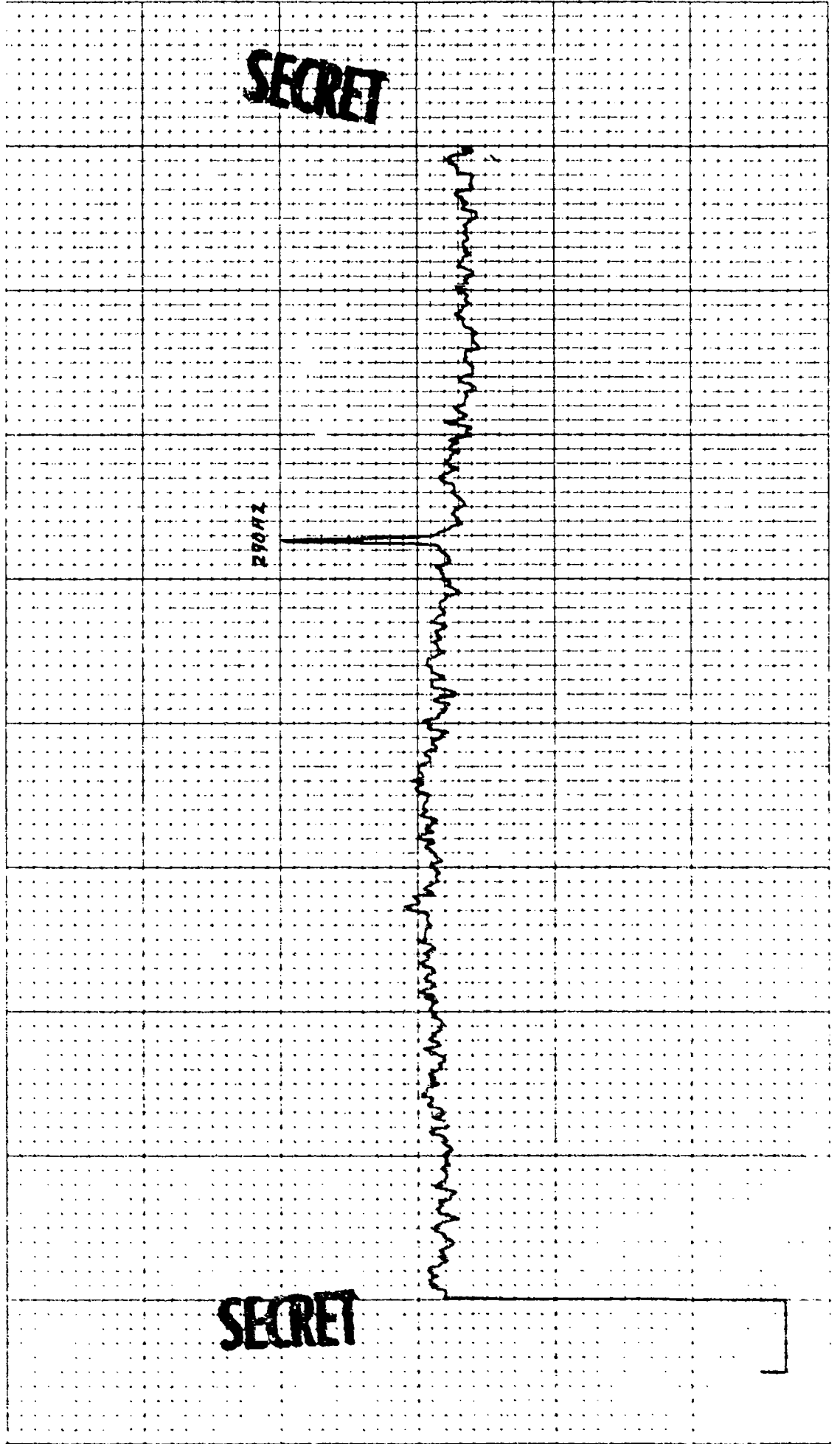
SECRET

46 C703

REF: 27 APR 72 TO THE DIRECTOR, NSA, WASH DC

CONTROL: 1549 - 51 (DPS) DATE OF ANALYSIS: REEL: F19 INDEX 3050
 OMNI SPECTRUM (ELEMENT 35)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 1 ELEMENT

DATE/TIME: 2-7-72 - 1549 Z INTEGRATION TIME 320 SECS ATTN: - DB
 ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 — — DEG AZ STEERING



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

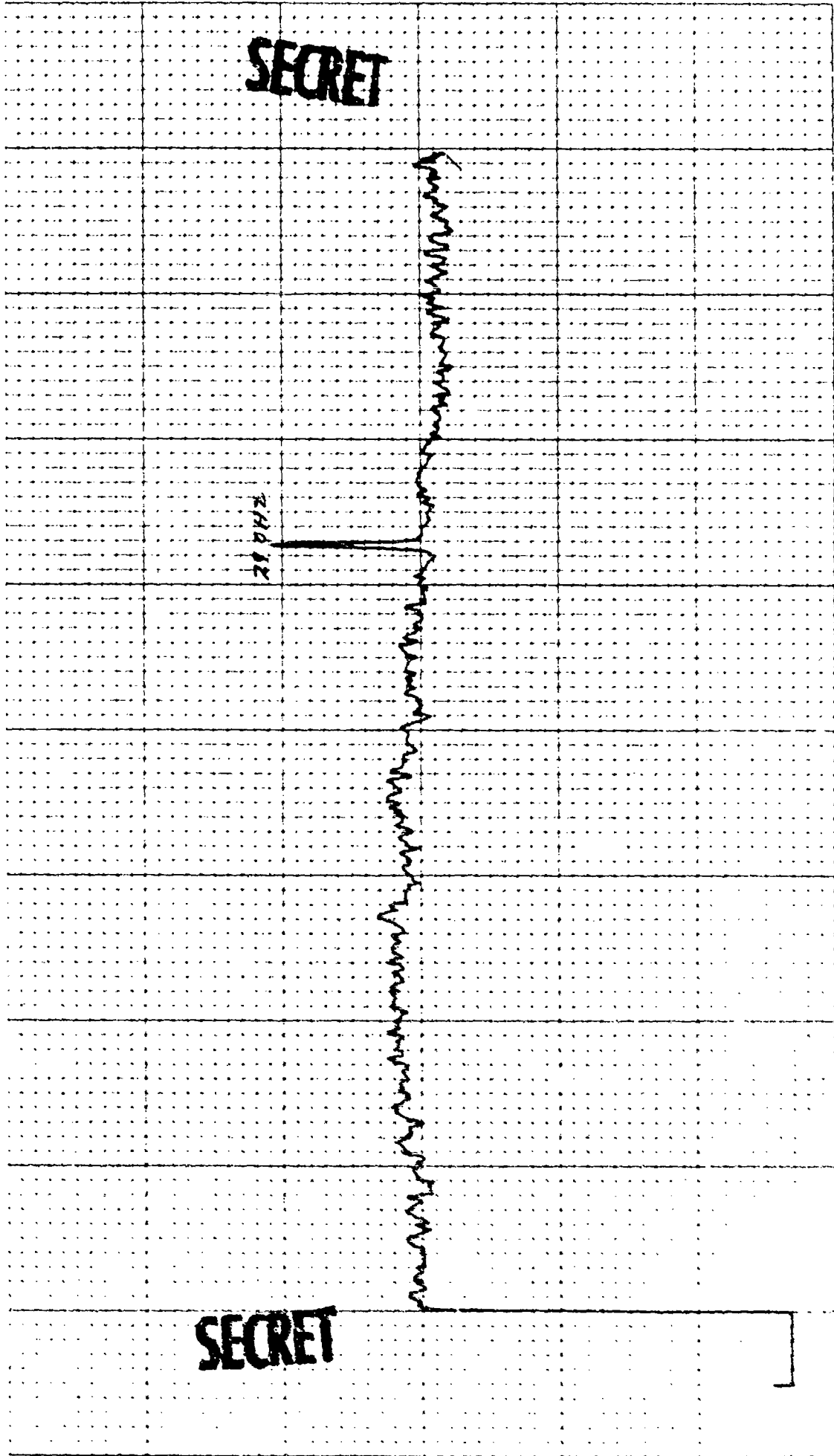
REEL: F11 INDEX J650

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

DATE OF ANALYSIS:

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

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



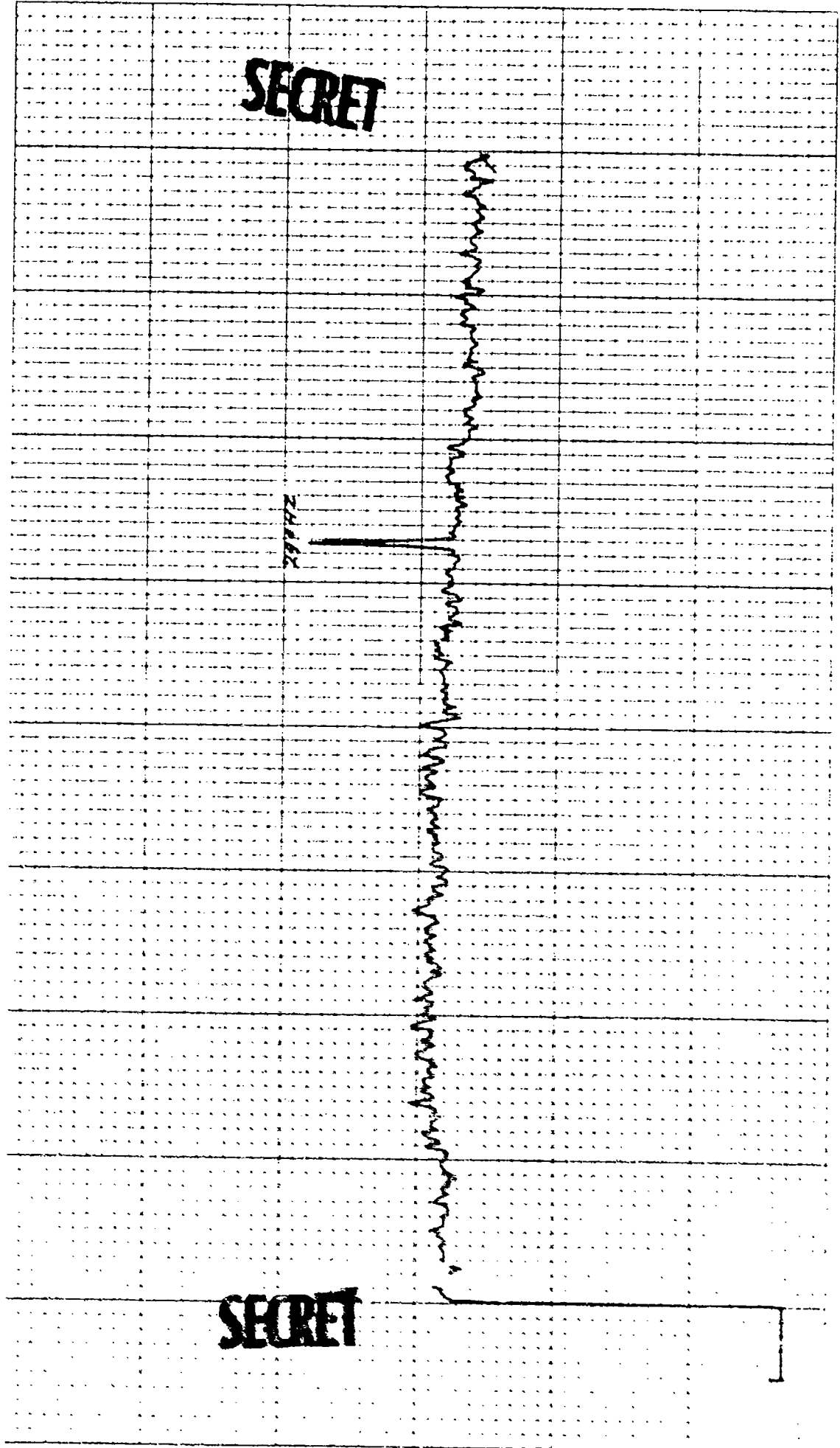
46 0703

REF ID: A66000

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

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

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



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

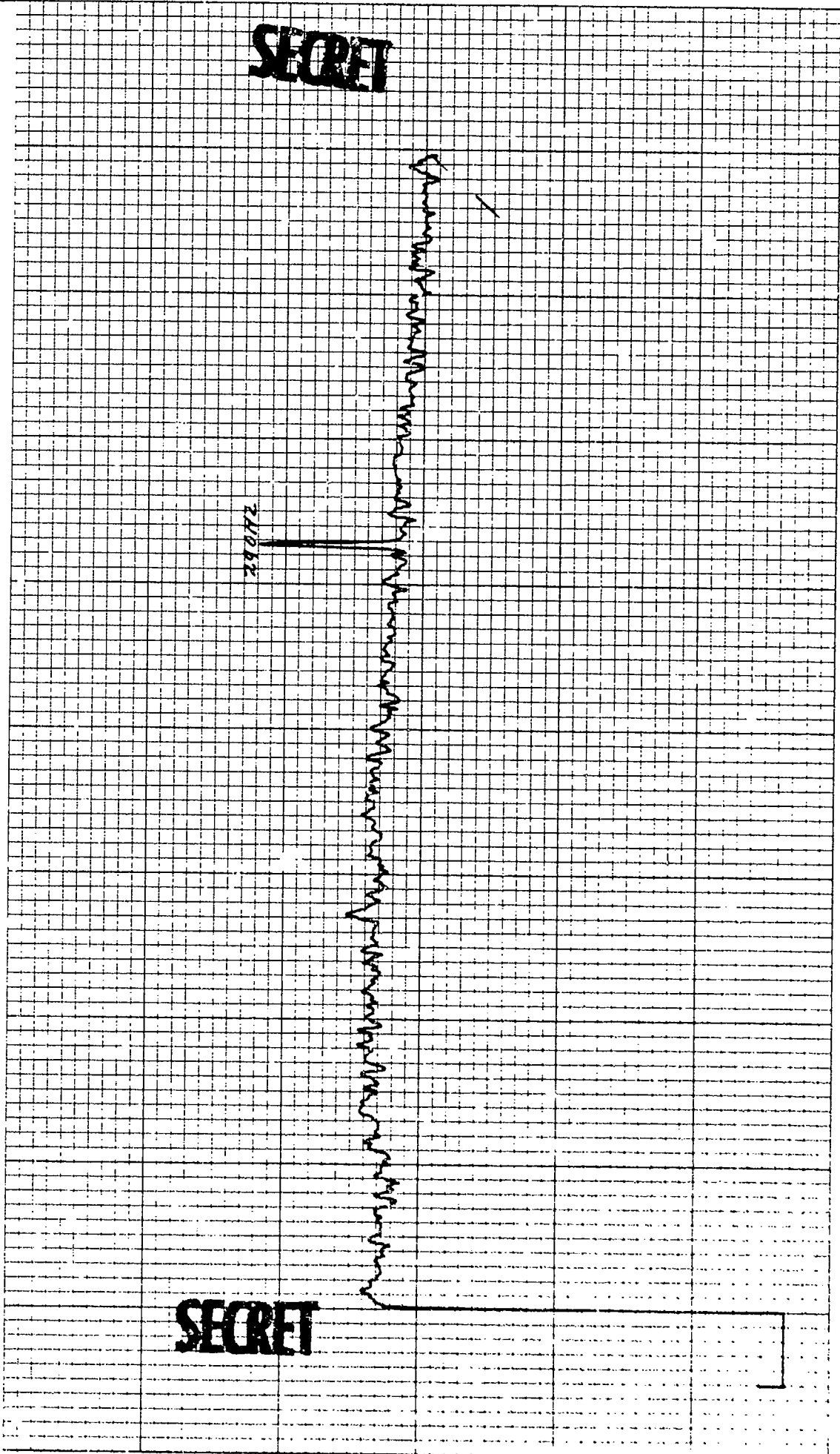
DATE OF ANALYSIS:

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

REEL: F19

INDEX 3052

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



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280 Hz

SECRET

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

46 0703

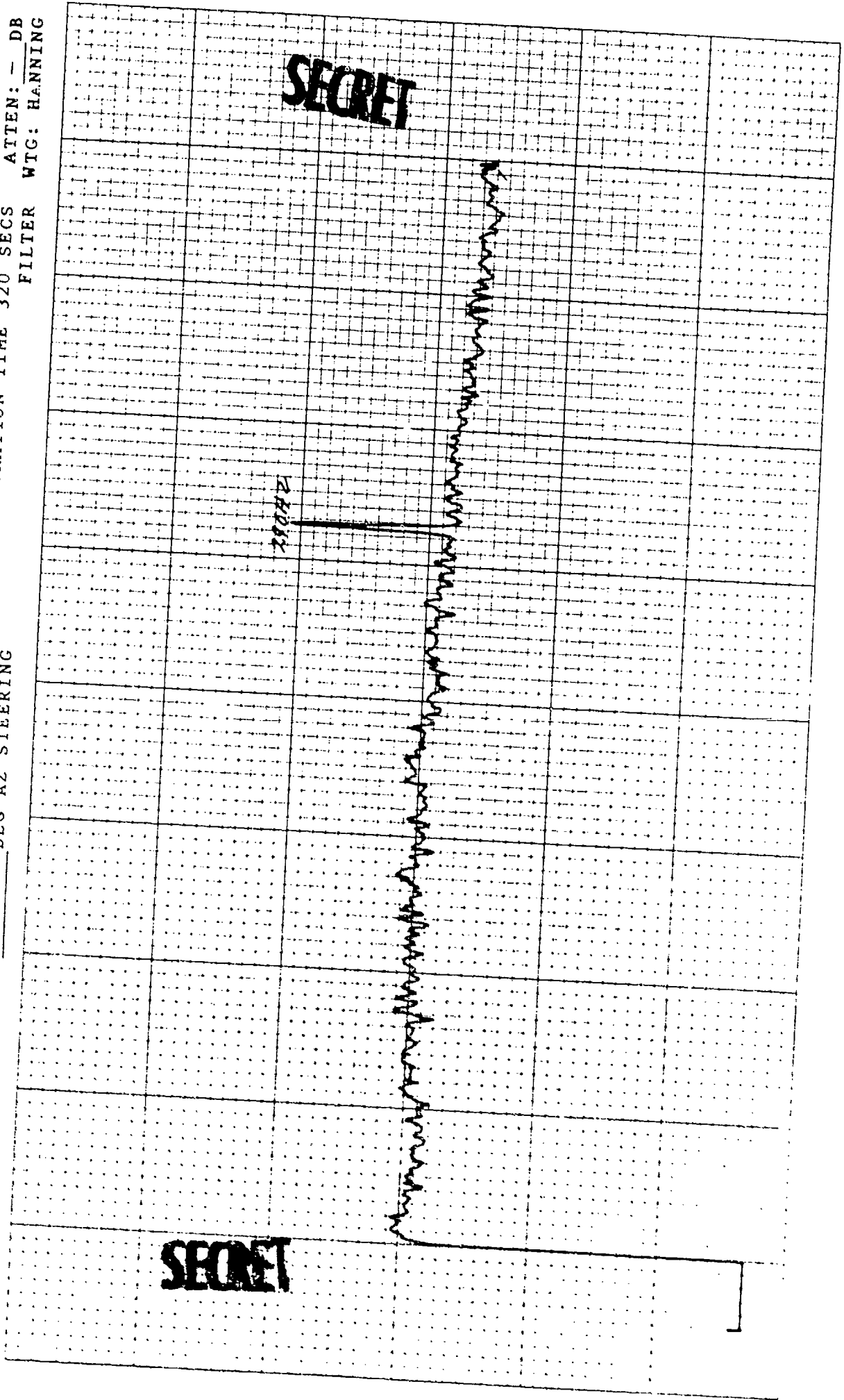
CONTROL: 2-7-1649 (47)
OMNI SPECTRUM (ELEMENT 43)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F19
INDEX 3050

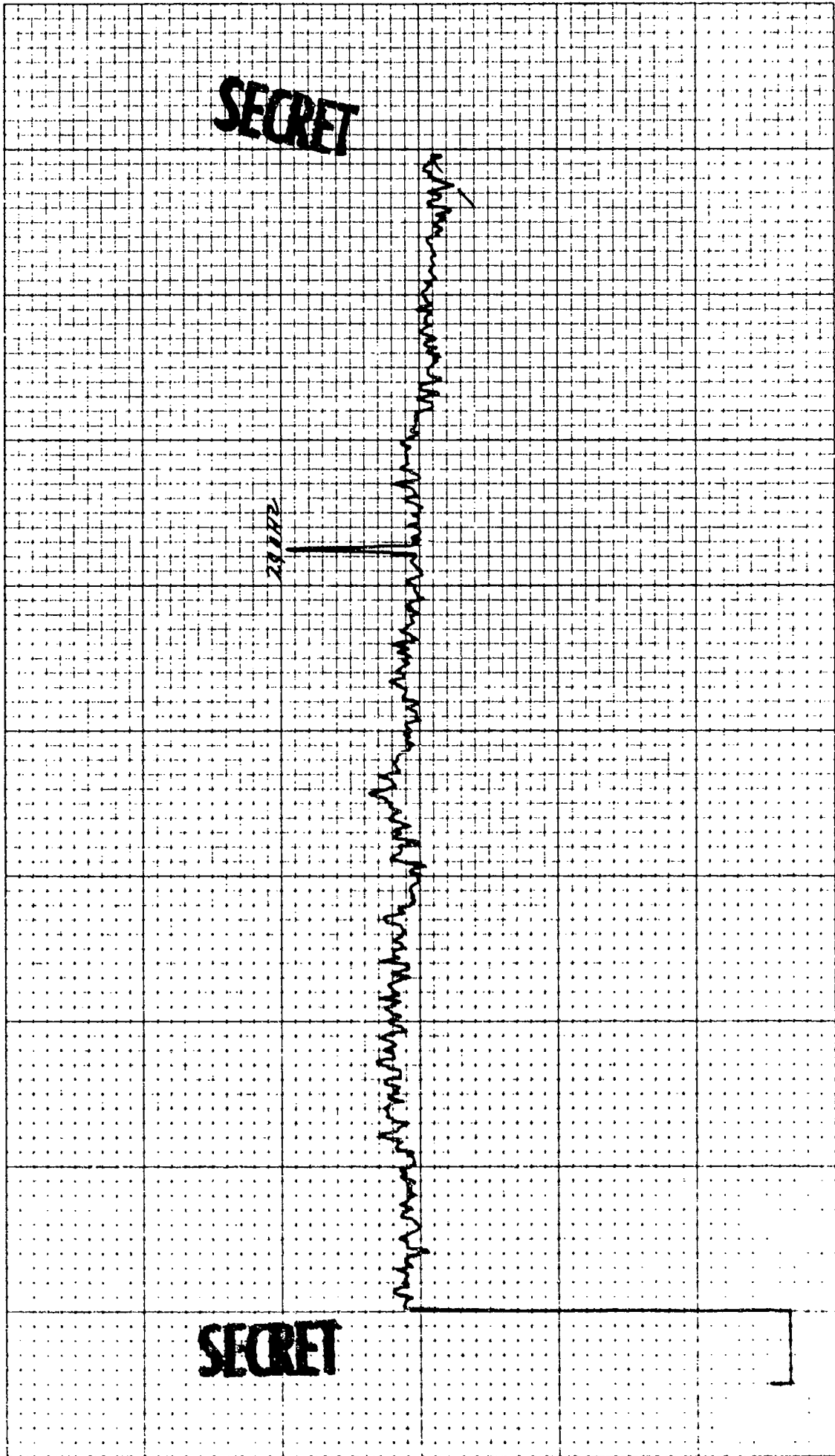
INTEGRATION TIME 320 SECS
FILTER _____
ATTN: _____ DB
WTG: HANNING



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SECRET

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



SECRET

K02 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0793

CONTROL: 2.7 - 1599 (51)
OMNI SPECTRUM (ELEMENT 51)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

DATE OF ANALYSIS:

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

REEL: F19

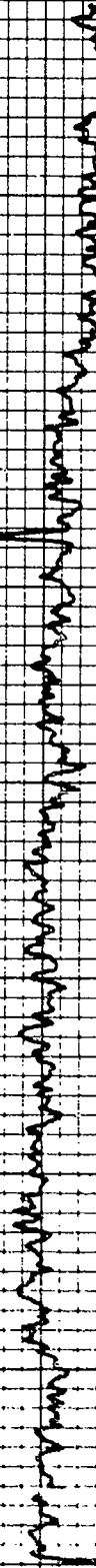
INDEX: J050

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

SECRET

SECRET

298 Hz



46 0703

WE HAVE TO USE THE SPECTRUM ANALYZER

REEL: F19 INDEX 3060

DATE OF ANALYSIS:

CONTROL: 2-7-1549 (52)

OMNI SPECTRUM (ELEMENT 53)

EXERCISE: BEARING STAKE

CENTER FREQ: 200 HZ

1 ELEMENT

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

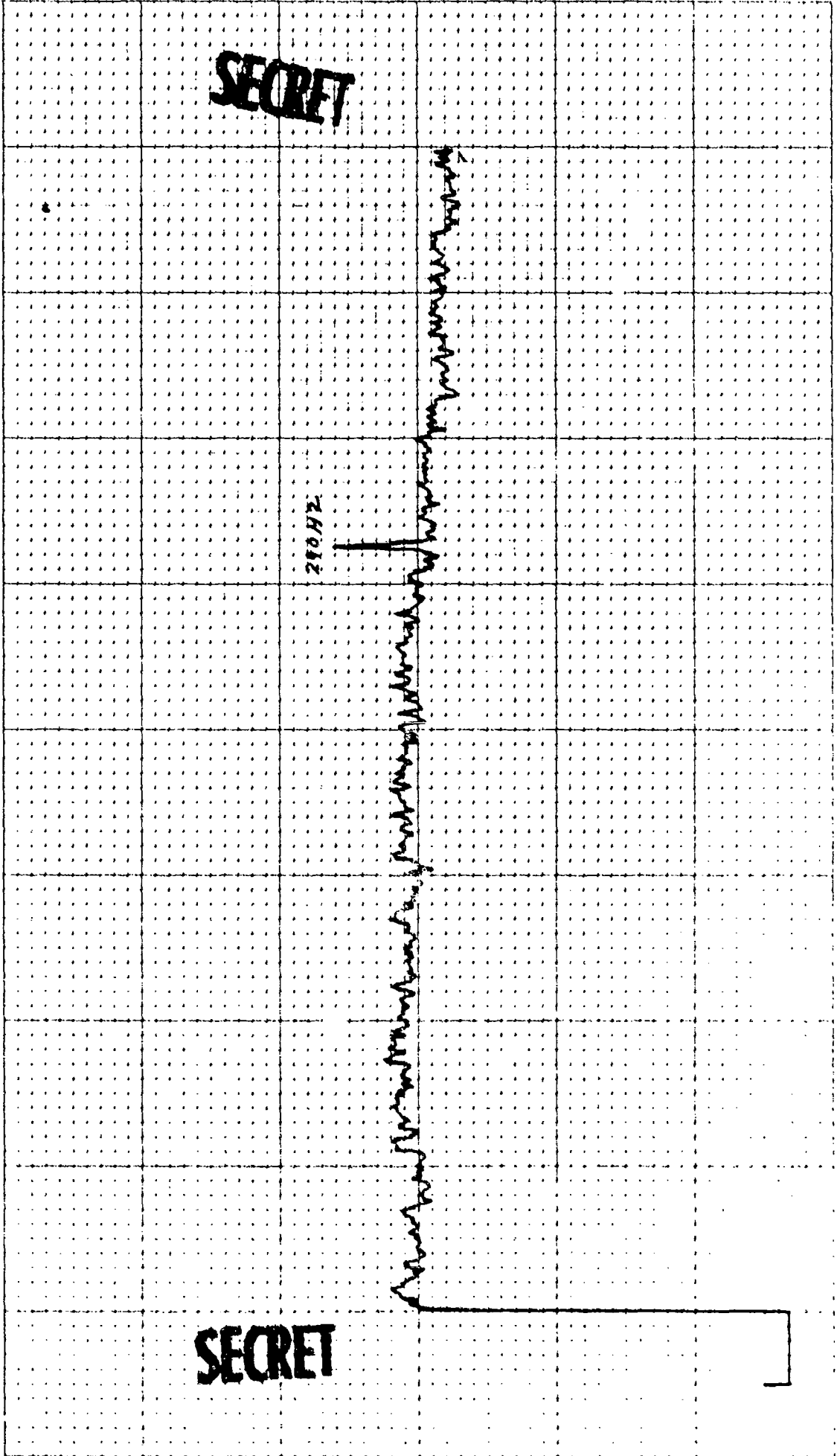
ANALYSIS BANDWIDTH: 1/10 HZ

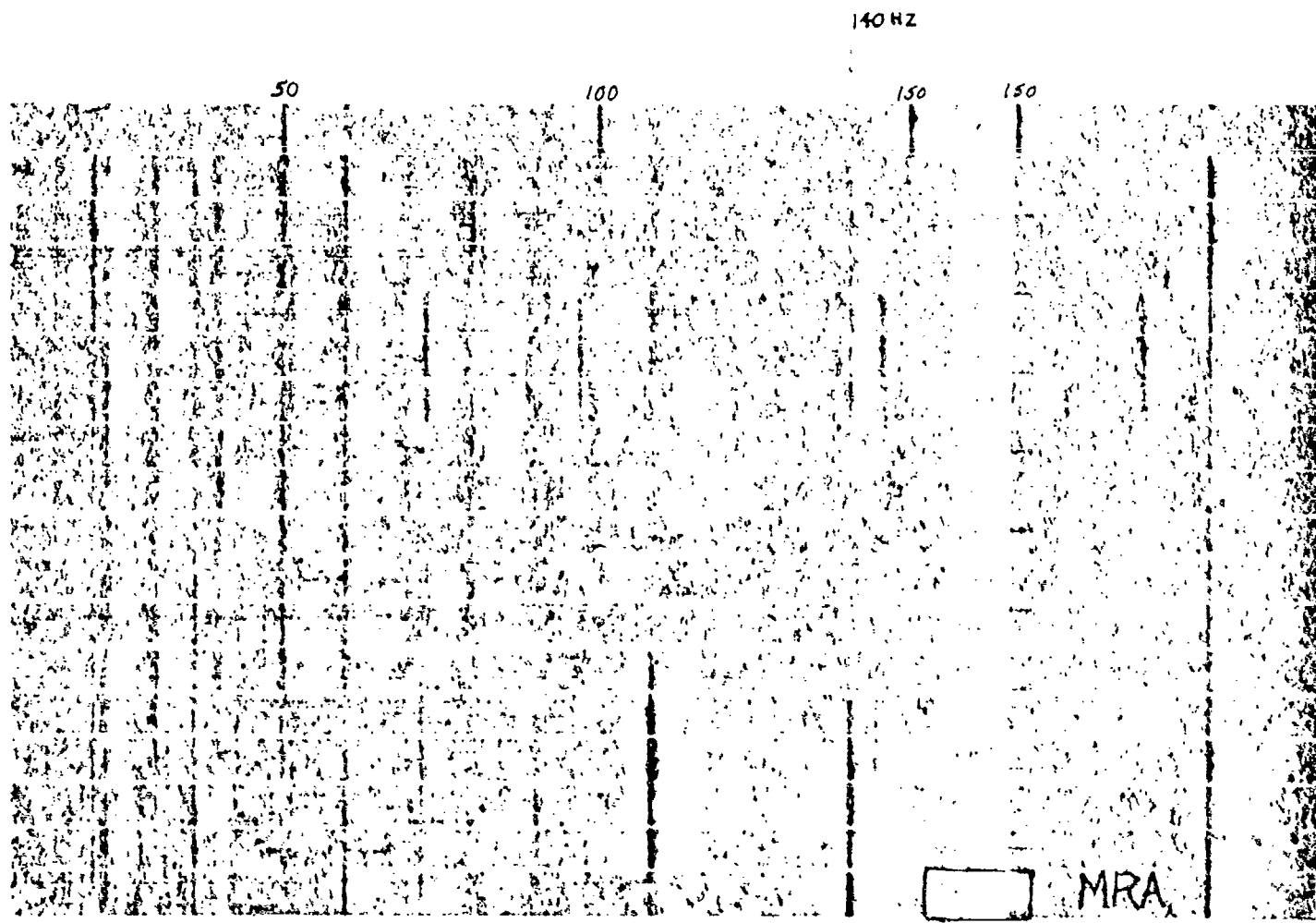
 DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER ATTN: DB

WTG: HANNING





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

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

1

140 HZ

SECRET

290 HZ 295 HZ

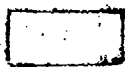
150

150

200

250

300



MRA

HISTOGRAM
TAPE REEL NUMBER

TAPE COUNT

SECRET

ANALYSIS BAND WIDTH HZ
WATER DEPTH FMS

ELEMENT NUMBERS

DATE SAN-XXX-78-0132

EXERCISE: BEARING STAKE

13
D
E

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 5

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

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

NOISE LEVEL

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

SIGNAL-NOISE-RATIO

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

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 5

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

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

NOISE LEVEL

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

SIGNAL-NOISE-RATIO

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

CONFIDENTIAL

CONFIDENTIAL

DATA POINT 5

SIGNAL GAIN

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

ARRAY GAIN

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

CONFIDENTIAL

46 0703

REF ID: A66776

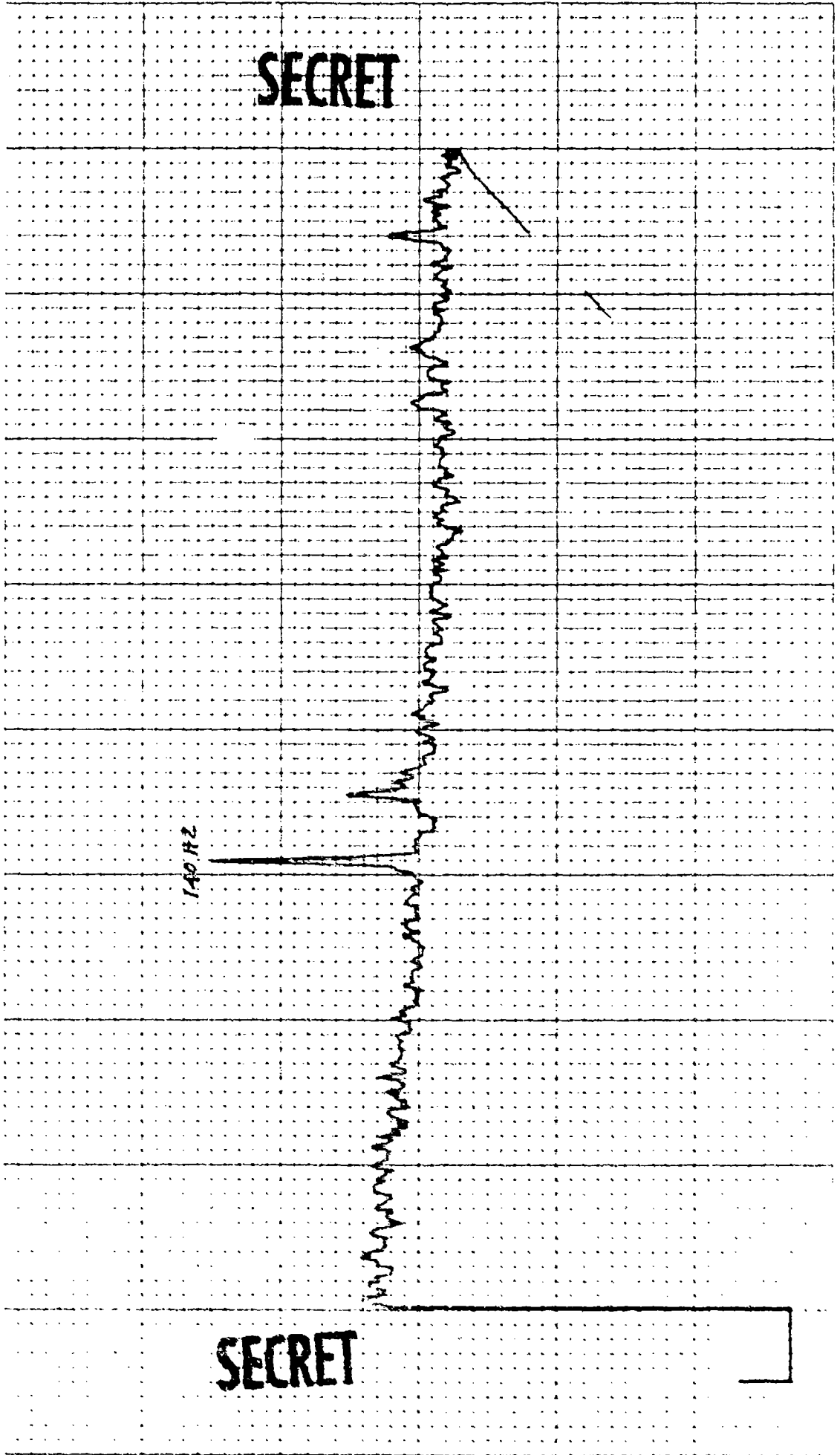
CONTROL: 1549 - 16 (DP5)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16

DATE/TIME: 2-7-77 - 1549 Z
 ANALYSIS BANDWIDTH: 1710HZ
+ 28 DEG. AZ STEERING

REEL: F19 INDE X 3650

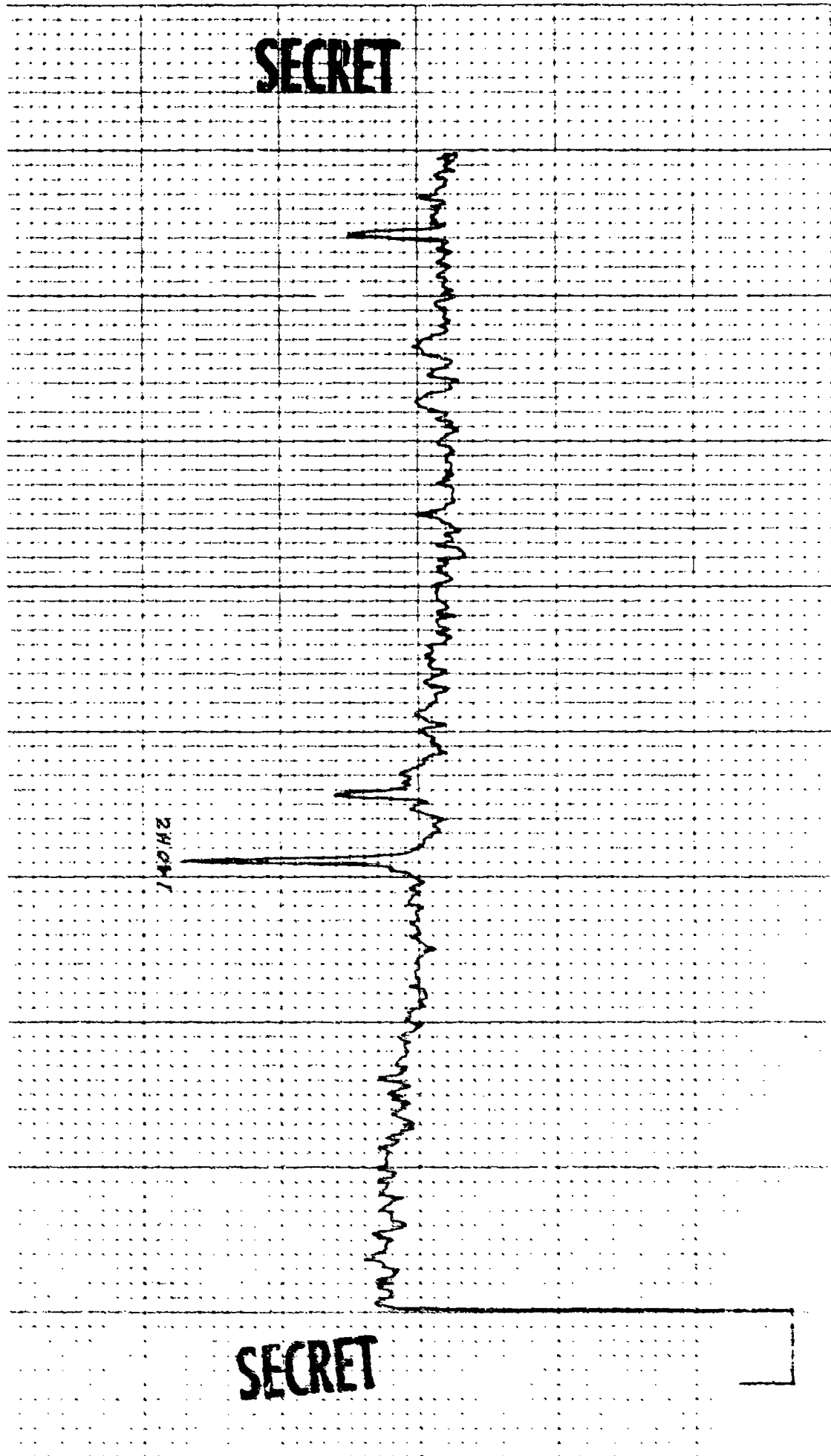
INTEGRATION TIME 320 SECS ATTN: -70 DB
 FILTER WTC: HANNING



46 0703

KSE 1549 TO THE 16 (D05)

CONTROL: 1549 - 16 (D05) REEL: F19 INDE X3050
 BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: - - -
 EXERCISE: BEAKING STAKE / - / C
 CENTER FREQ: 150 HZ DATE/TIME: 2-7-77 - 1549 Z
 16 ELEMENTS ANALYSIS BANDWIDTH: 1/10HZ
 + 30 DEC. AZ STEERING INTEGRATION TIME 320 SECS ATTEN: 70 DB
 FILTER WTC: HANNING



SECRET

SECRET

45 0702

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

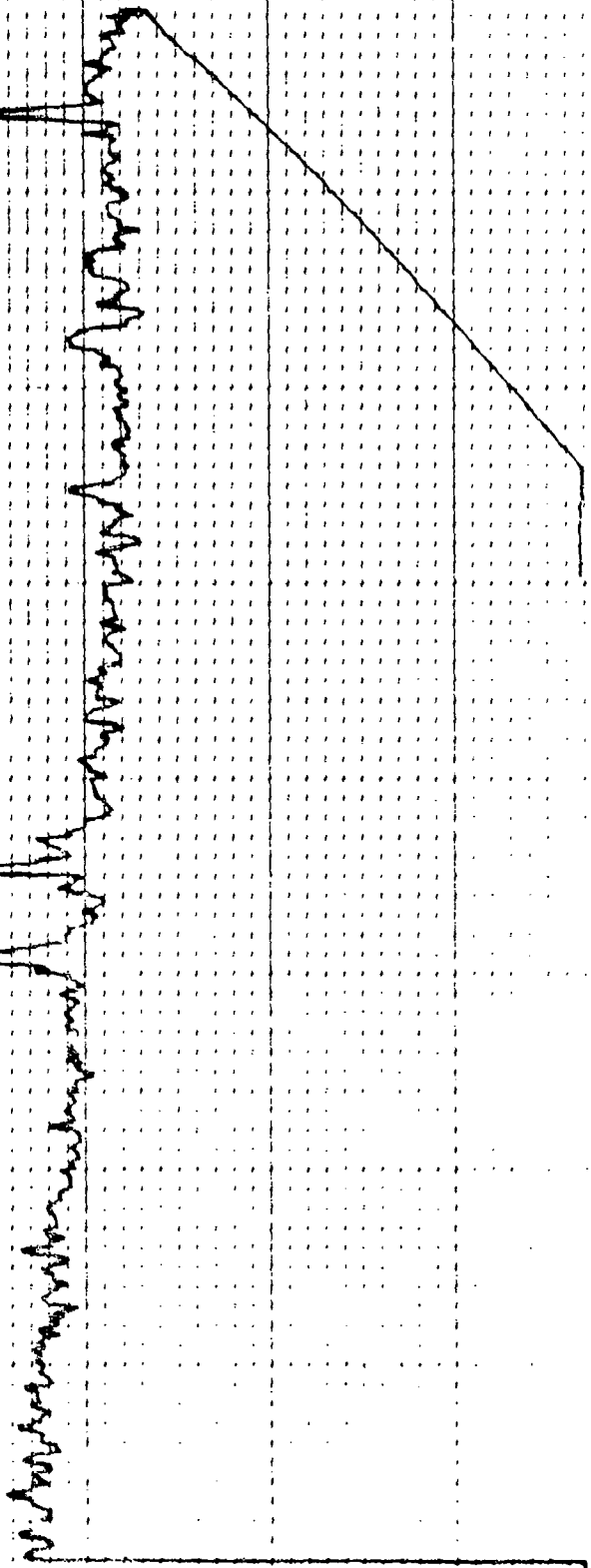
REEL: F/9

INDEX: 13050

150HZ

SECRET

SECRET

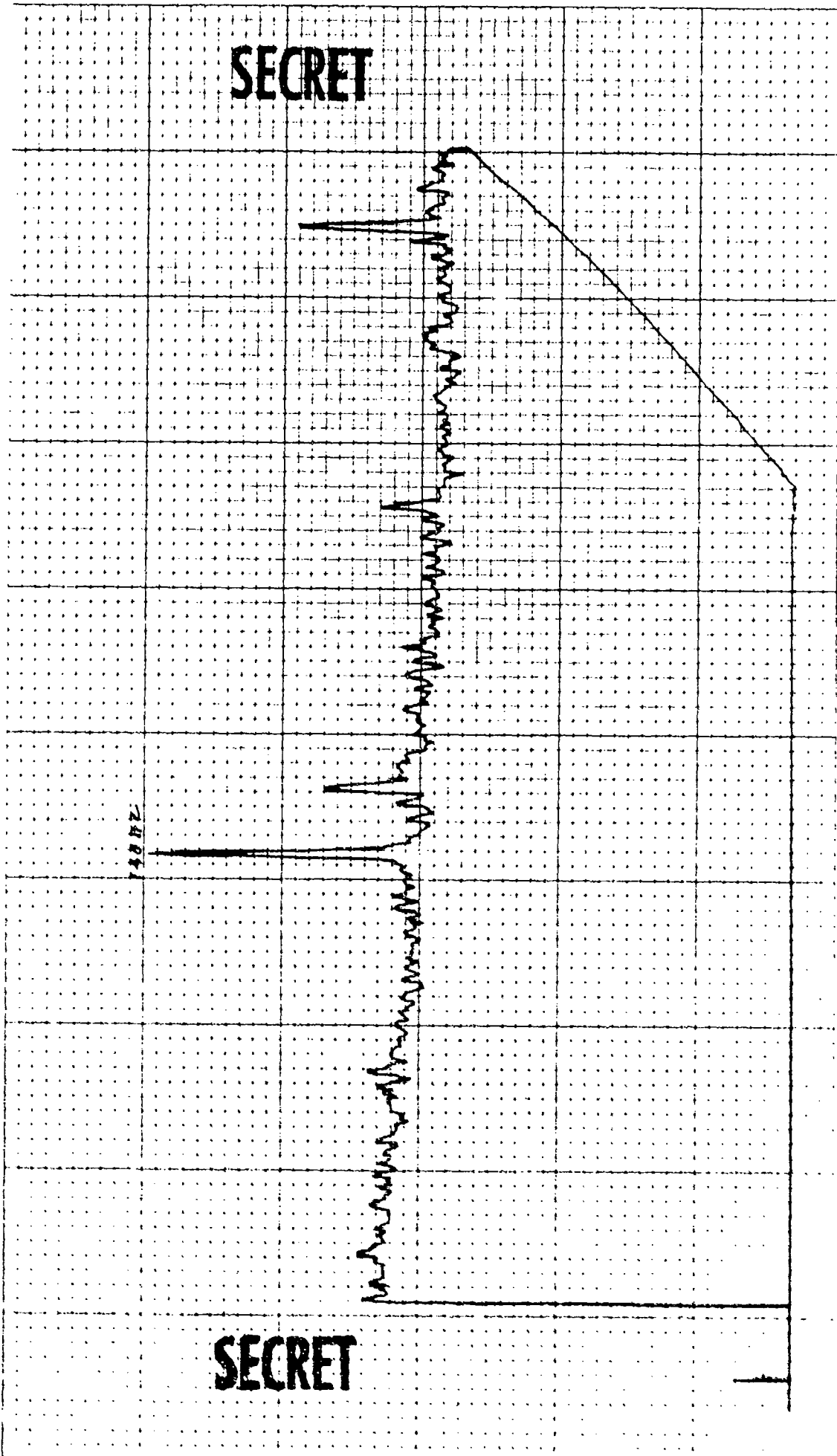


+

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

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

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



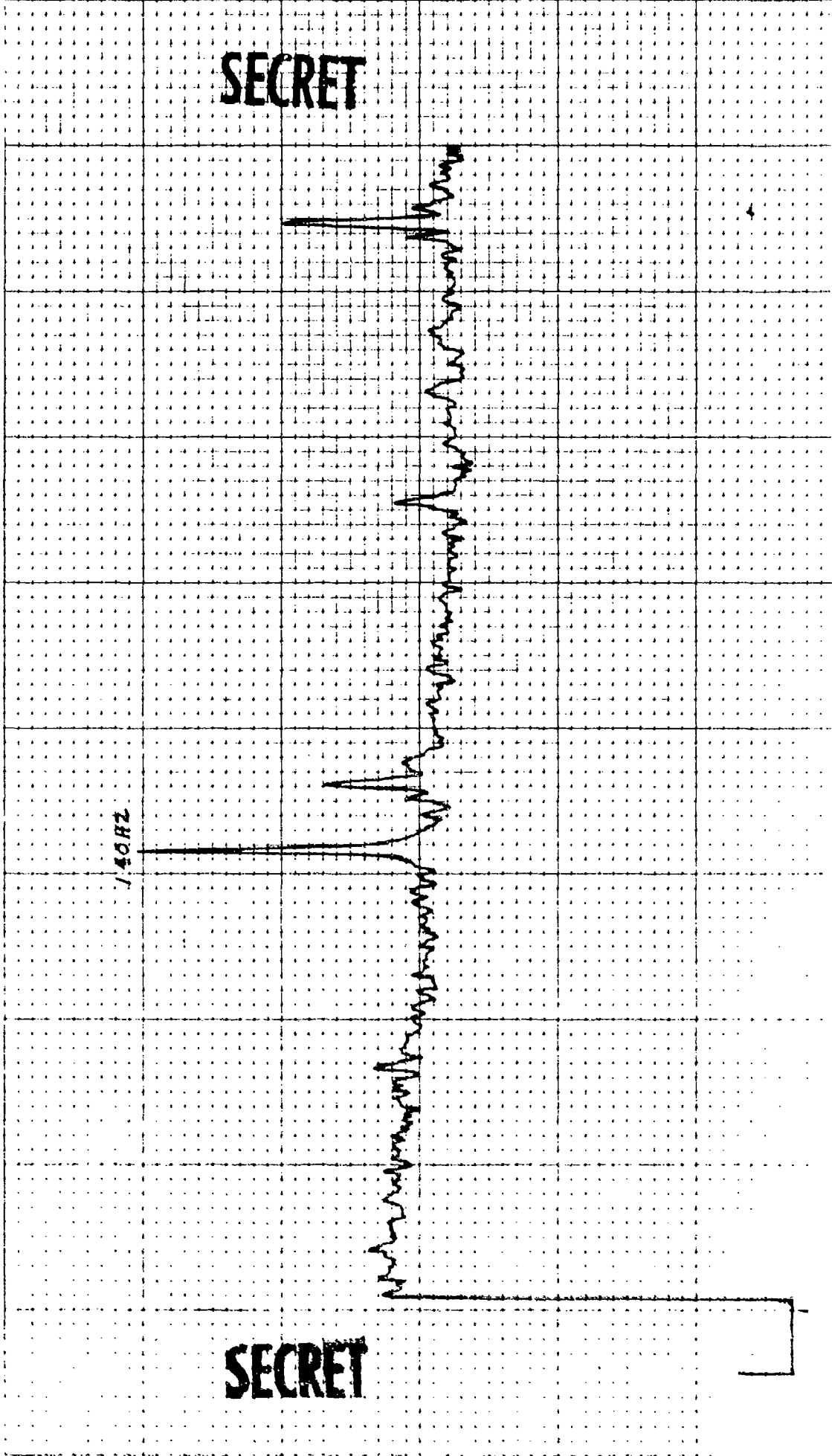
SECRET

SECRET

46 0703

CONTROL: 1549 - 16 (DBS) DATE OF ANALYSIS: - - - -
 BEAMFORMED SPECTRUM (ELEMENTS) / - / 6)
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
 16 ELEMENTS +36 DEG. AZ STEERING

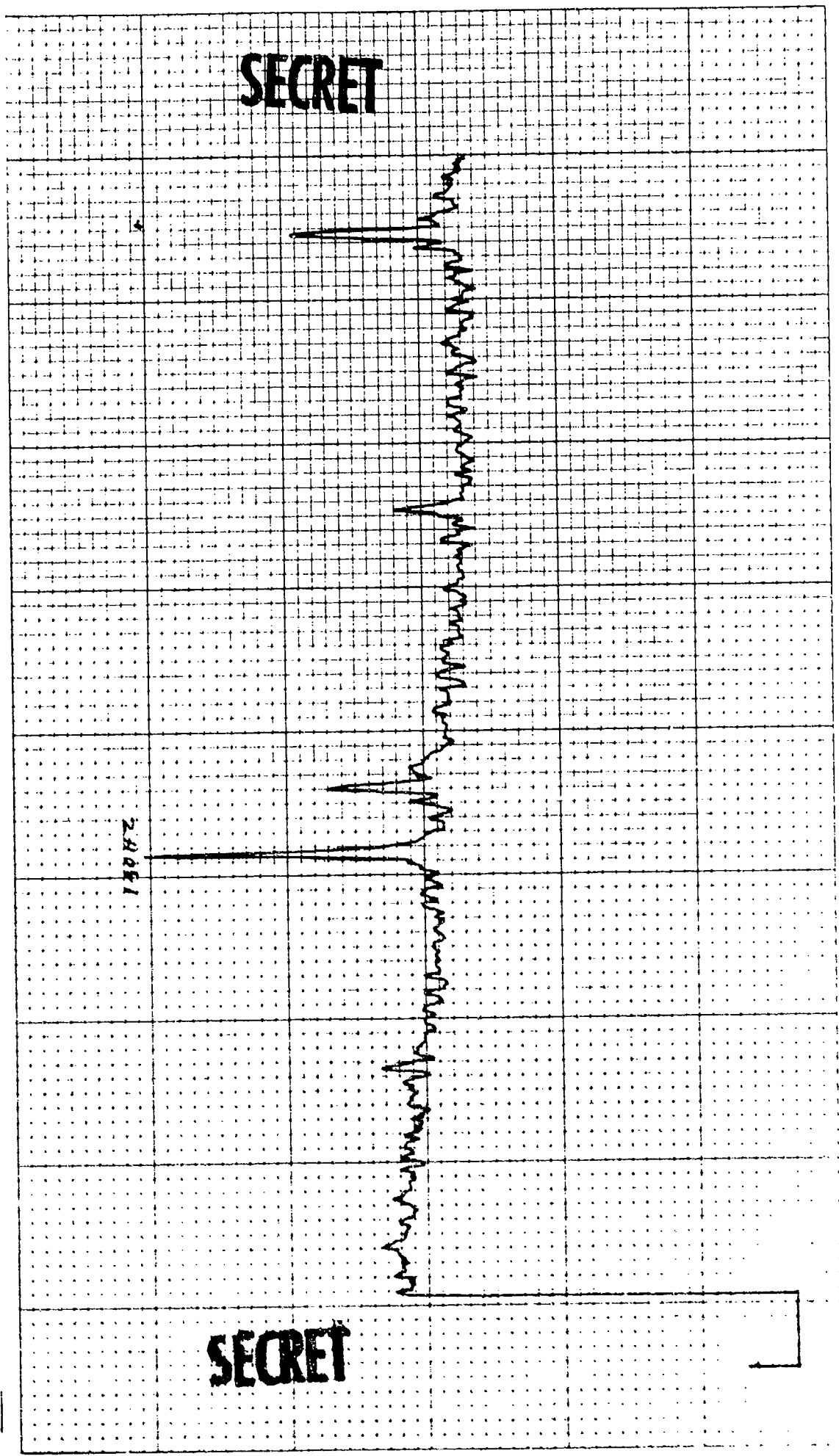
REEL: F19 INDE X3050
 INTEGRATION TIME 320 SECS ATTN: -18 DB
 FILTER WTC: HANNING



H.O.E. IS A 10 TO THE INCHES
REEL & ESTER CO. 2004 2 10

46 0703

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



SECRET

SECRET

KOE 19.7.15 TO THE INCHES 2.3 INCHES
SP. 11111 & 11111

46 0703

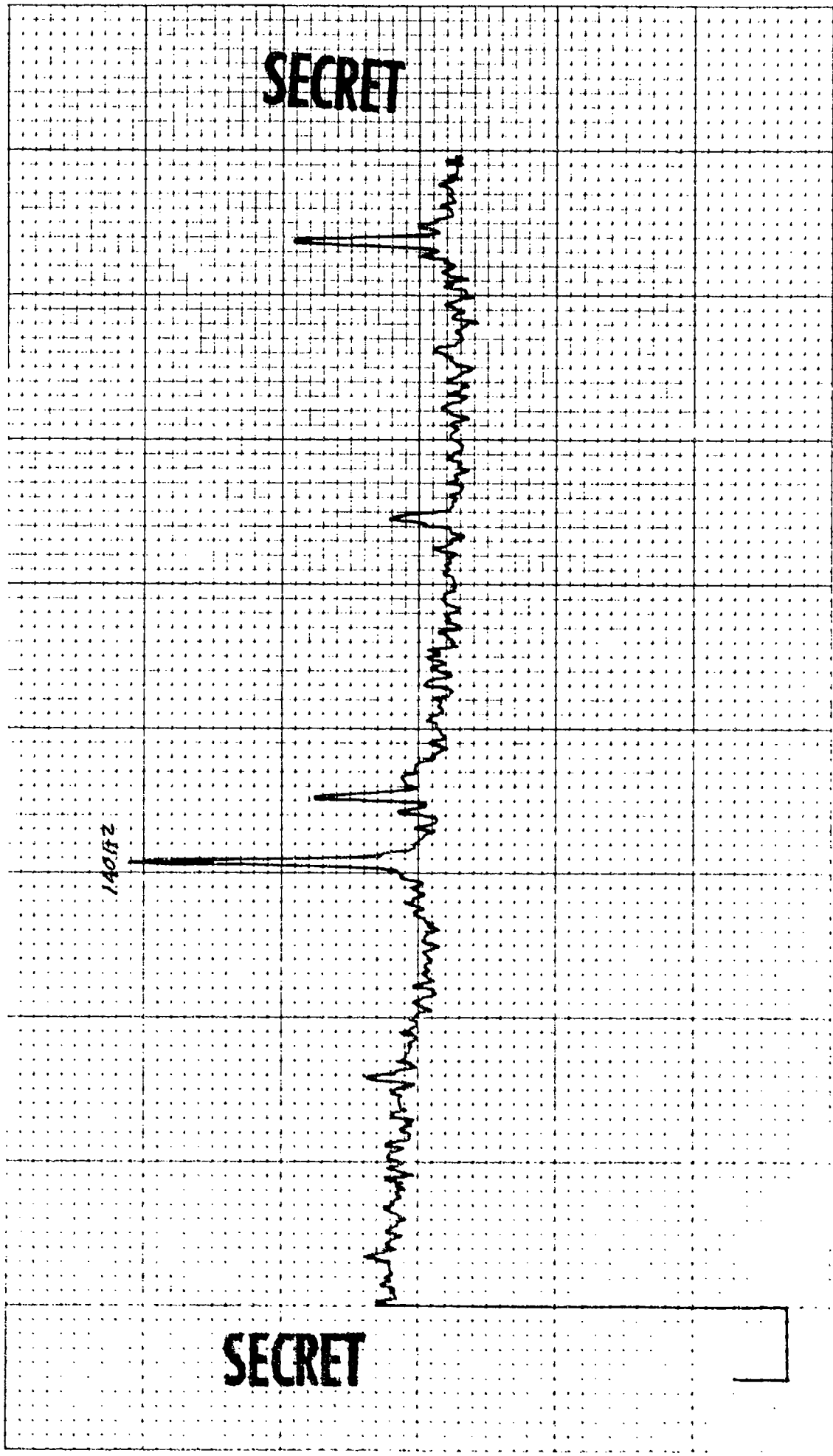
CONTROL: 1549 - 16 (DPS)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
16 ELEMENTS

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

REEL: F-19 INDE X3050

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

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



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

46 0703

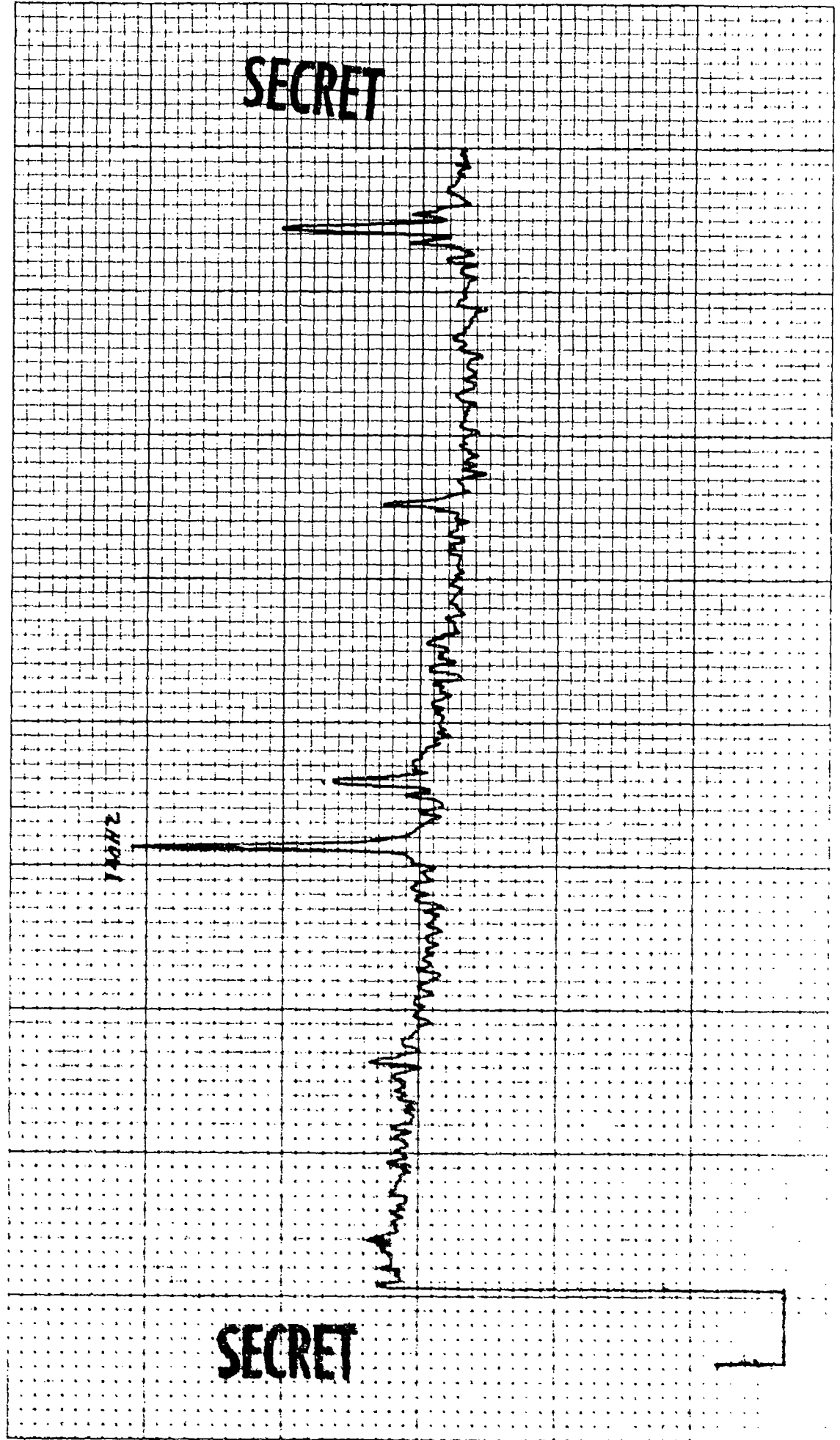
CONTROL: 1549 - 51 (PP5)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
/C ELEMENTS

DATE OF ANALYSIS: 1 - 16

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

REEL: F19
INDE X3050

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



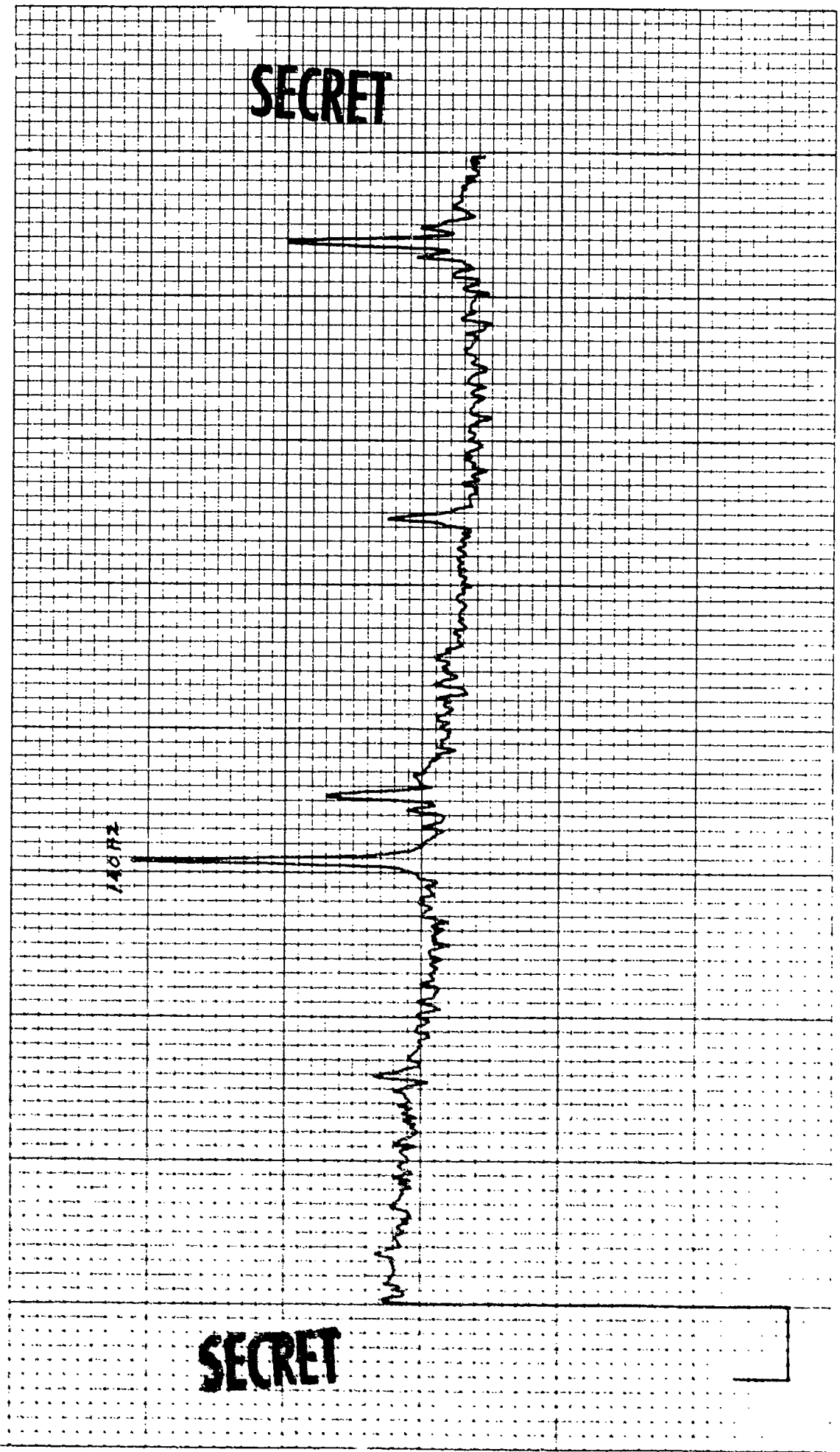
KOE 10 X 10 TO THE INCH 7.4 10 INCHES
MEUFEL & ESSER CO. MADE IN U.S.A.

46 0703

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

DATE OF ANALYSIS: -- -- --
1-16)
DATE/TIME: 2-7-77 -1549 Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 4/ DEG. AZ STEERING

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

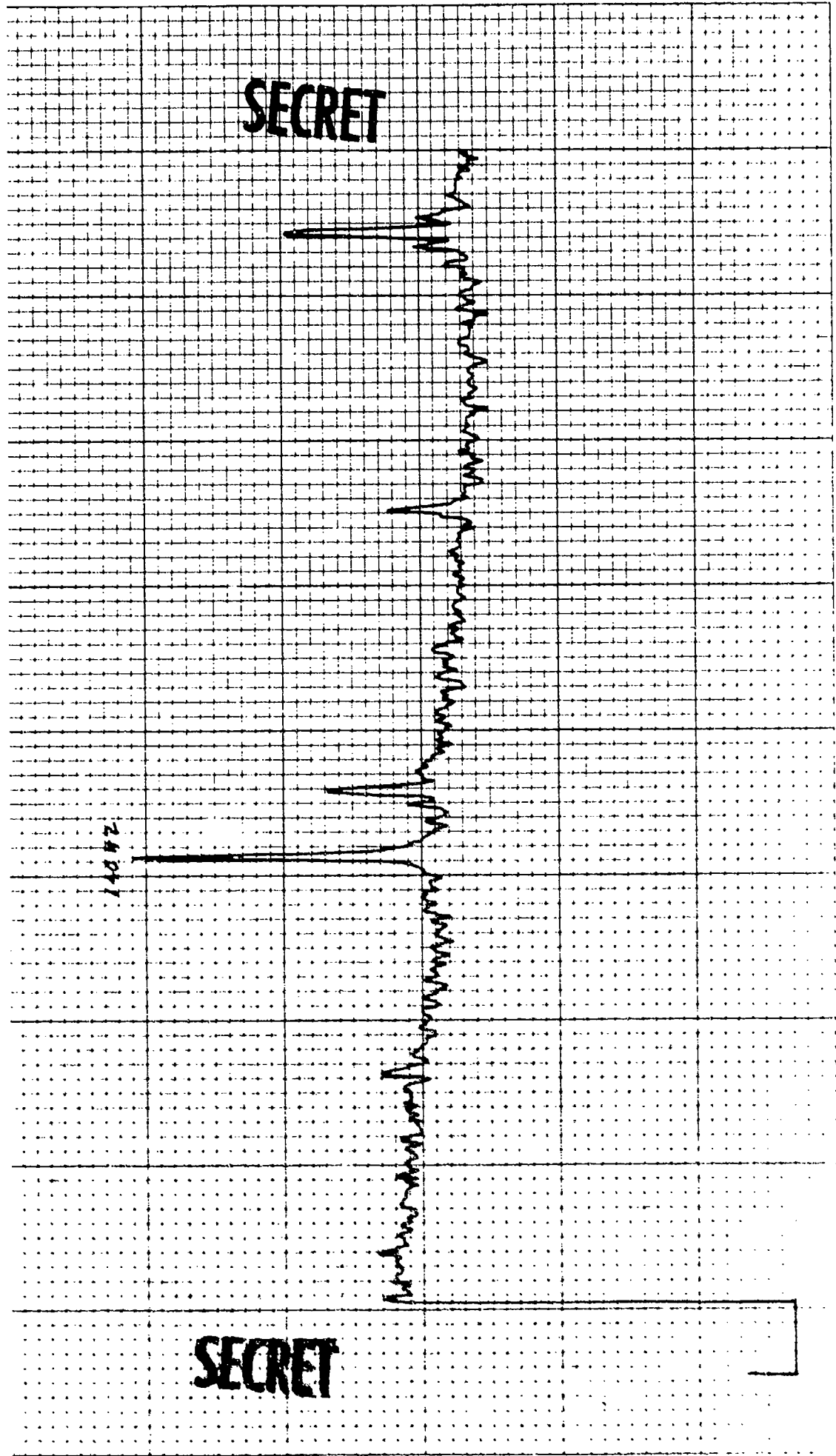


SECRET

46 0703

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

CONTROL: 1549 - 16 (DP5) DATE OF ANALYSIS: 1 - 16 REEL: F19 INDE X3050
 BEAMPFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTN: -10 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1710HZ FILTER WTG: HANNING
 CENTER FREQ: 150 HZ 16 ELEMENTS 42 DEG. AZ STEERING



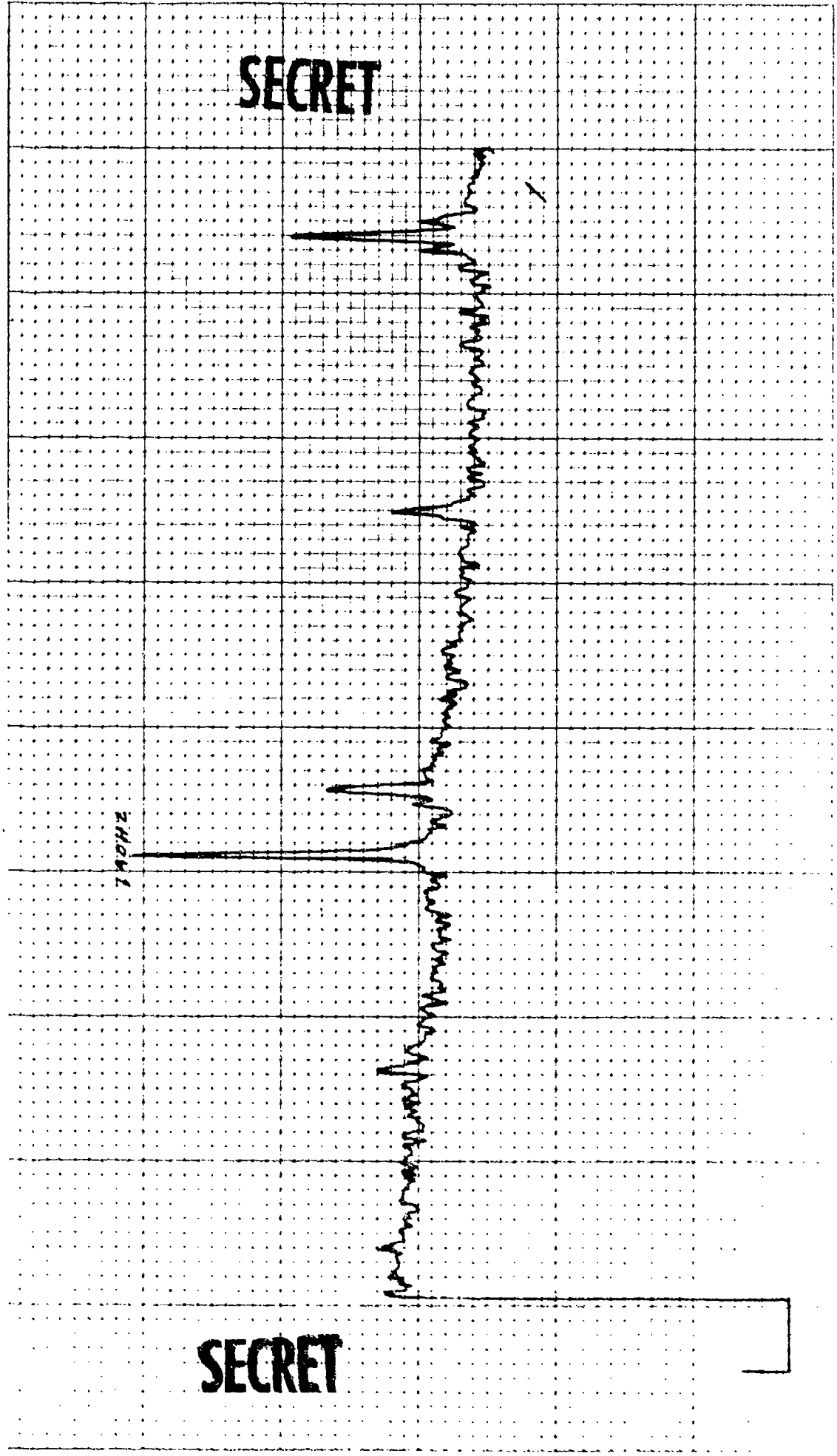
K-E 12.400 TO THE INCH. 200. 0.0. 0.0. 0.0.

46 0703

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

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

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



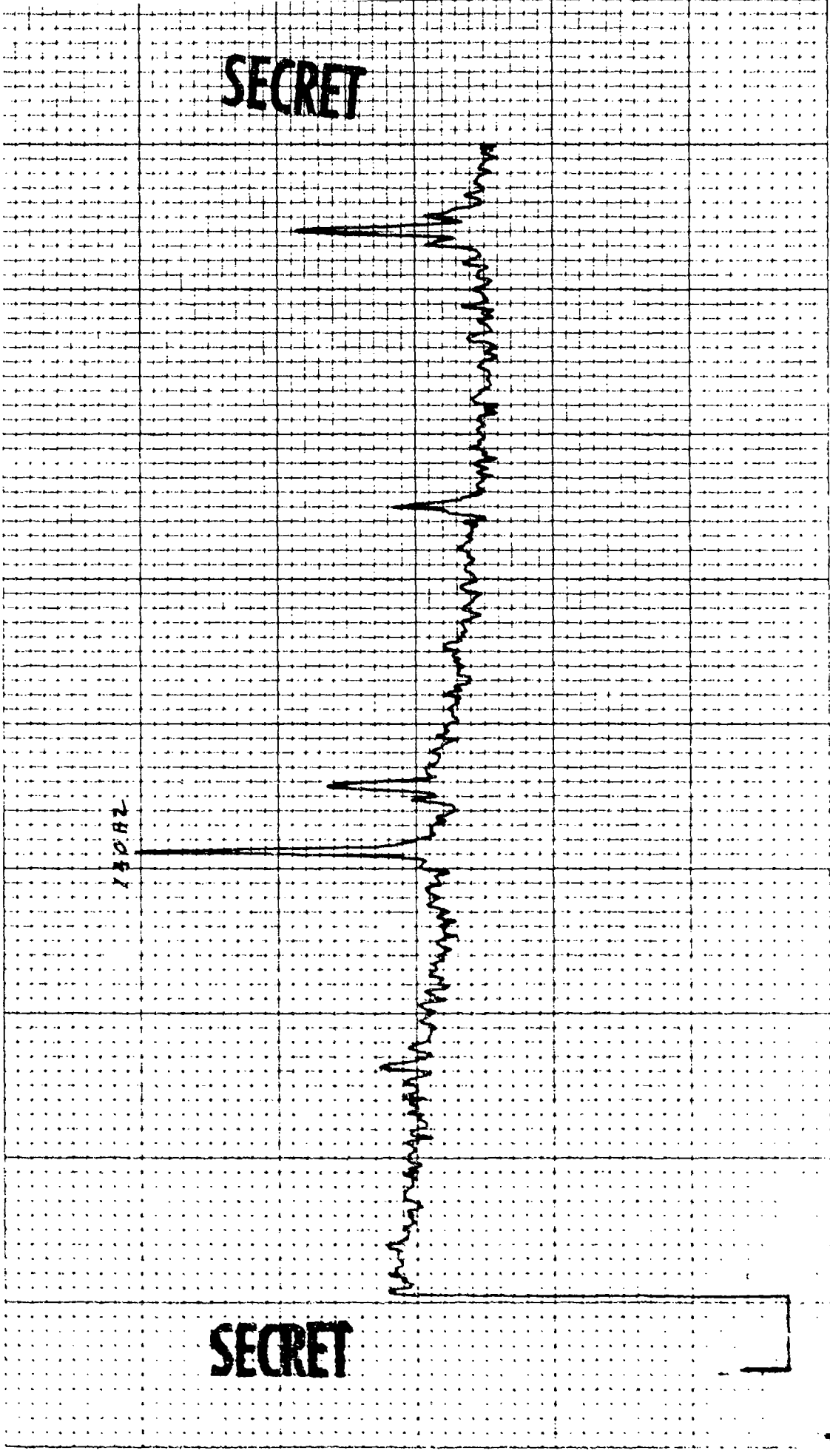
K-E 10.4 TO THE INCHES 7.10 INCHES
PEPPER & BASSER CO. MADE IN U.S.A.

46 0703

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

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

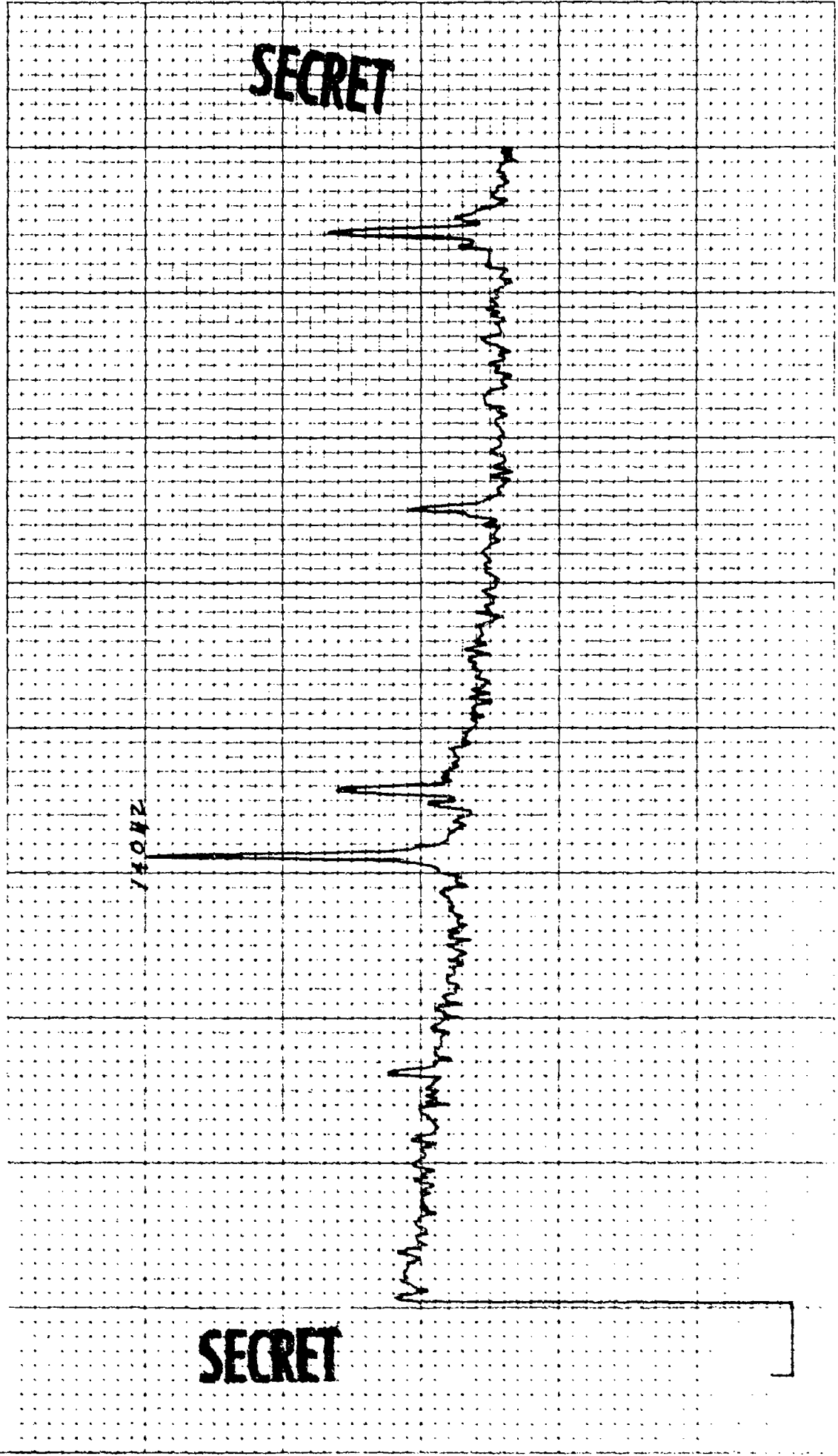
REEL: F19 INDE X3052
INTEGRATION TIME 320 SECS ATTN: -18 DB
FILTER WTC: HANNING



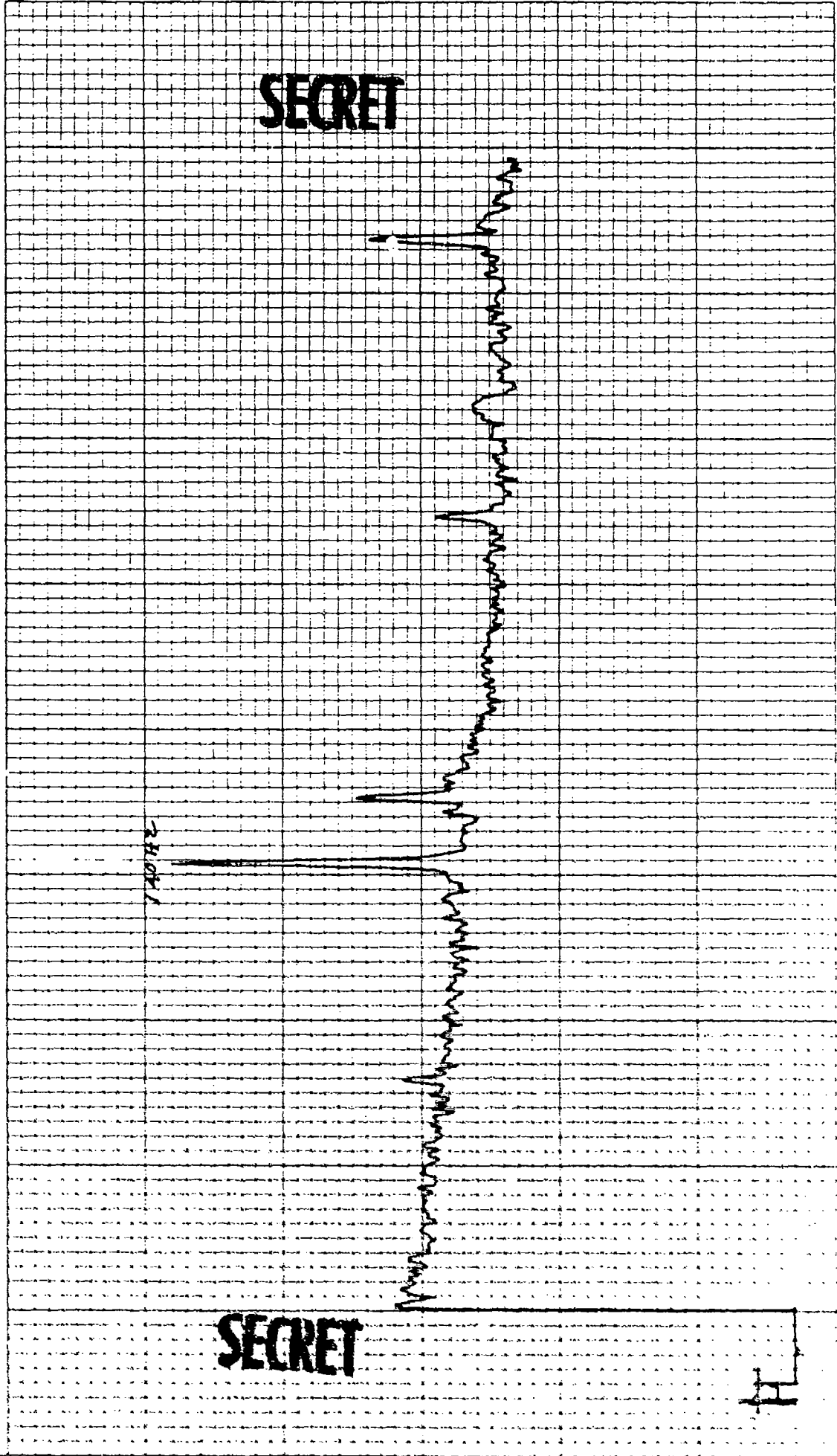
NOE 10.5.16 TO THE BOMBERS 2.1.1968

46 0703

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



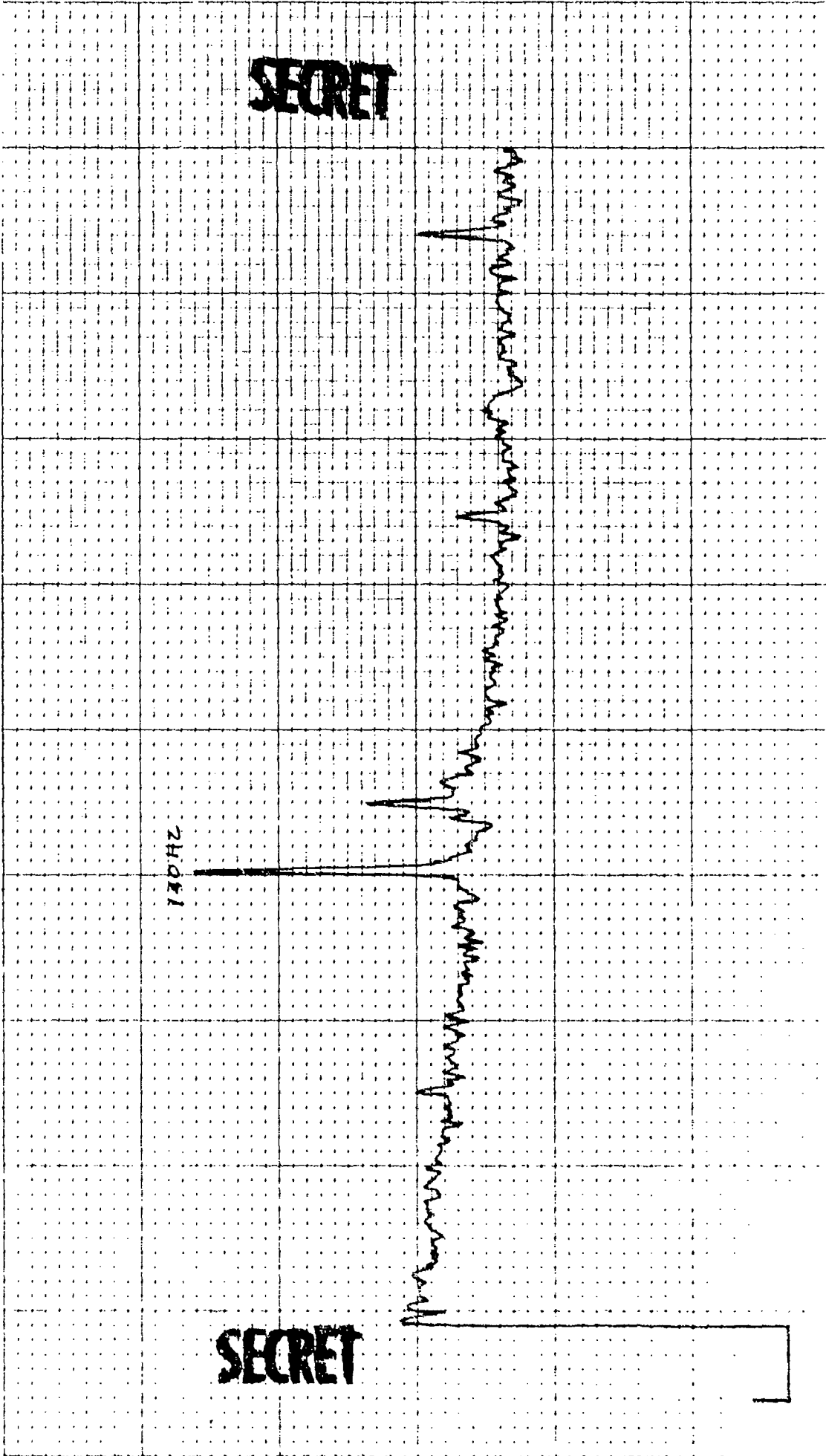
CONTROL: 1549 - 16 (DPS) DATE OF ANALYSIS: 1-16 REEL: Fig INDE X 7050
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTEN: -10 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 150 HZ +52 DEG. AZ STEERING



SECRET

11

CONTROL: 1549-16 (0P5) DATE OF ANALYSIS: 1-16 REEL: F19 INDE X 3050
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTN: -18 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 CENTER FREQ: 150 HZ 156 DEG. AZ STEERING



SECRET

SECRET

46 0703

KOE 10 X 10 TO THE INCH
REAR END PRESSURE CO. 10 X 10

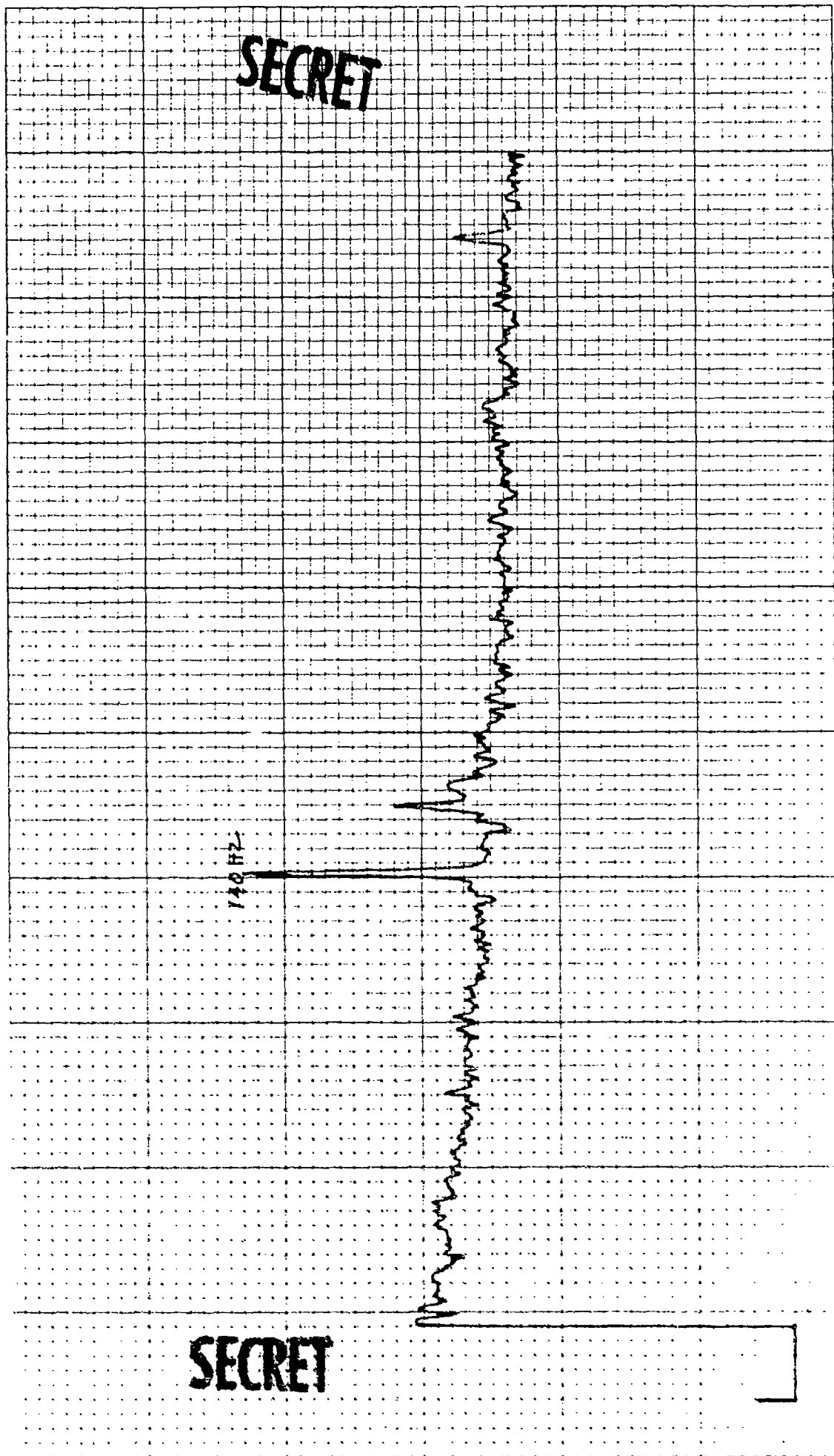
33-100

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

DATE OF ANALYSIS: 1-16
 DATE/TIME: 2-7-77 - 1549 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
+58 DEG. AZ STEERING

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

INDE X 2050



46 0703

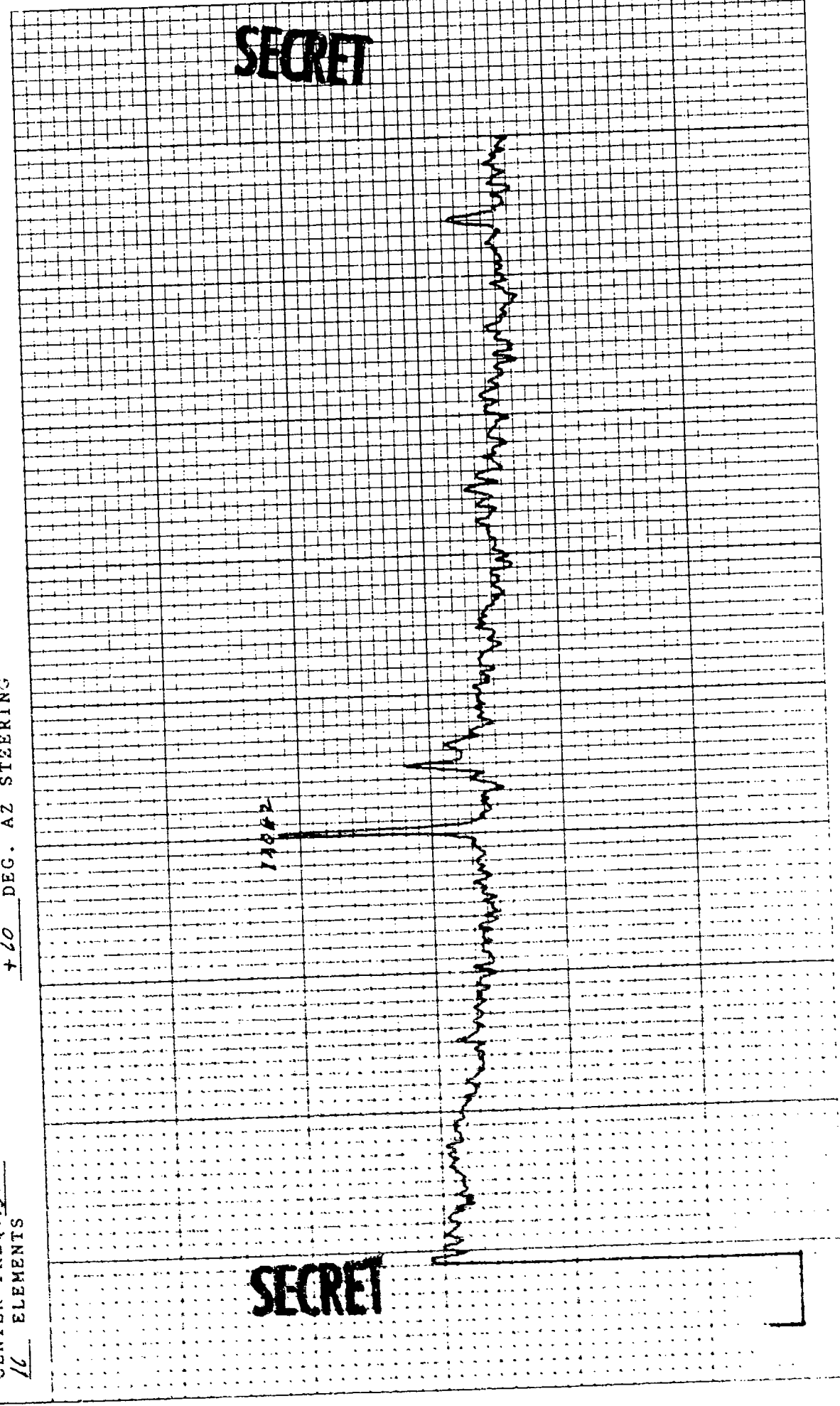
KOE 10 X 10 TO THE INCHES
KODAK SAFETY FILM

INDE X205P
ATTEN: -18 DB
WTG: HANNING

REEL: F19
INTEGRATION TIME 320 SECS
FILTER

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

CONTROL: 1549-16 (015)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
/6 ELEMENTS



SECRET

SECRET

46 0703

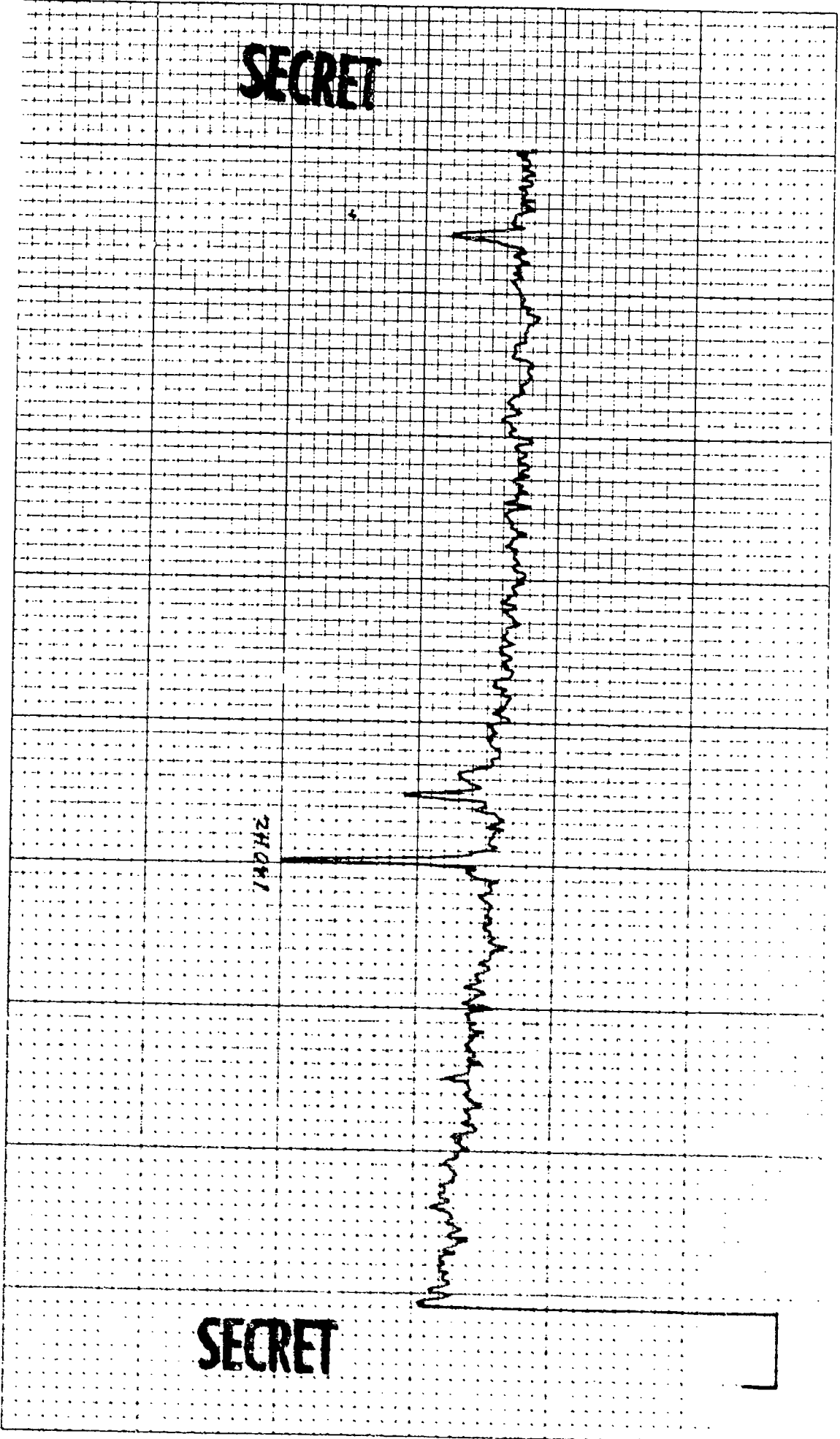
KOE 1549 TO THE BY H...
1549-168

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

DATE OF ANALYSIS: 1-16

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

ANALYSIS BANDWIDTH: 1/10HZ
+12 DEG. AZ STEERING



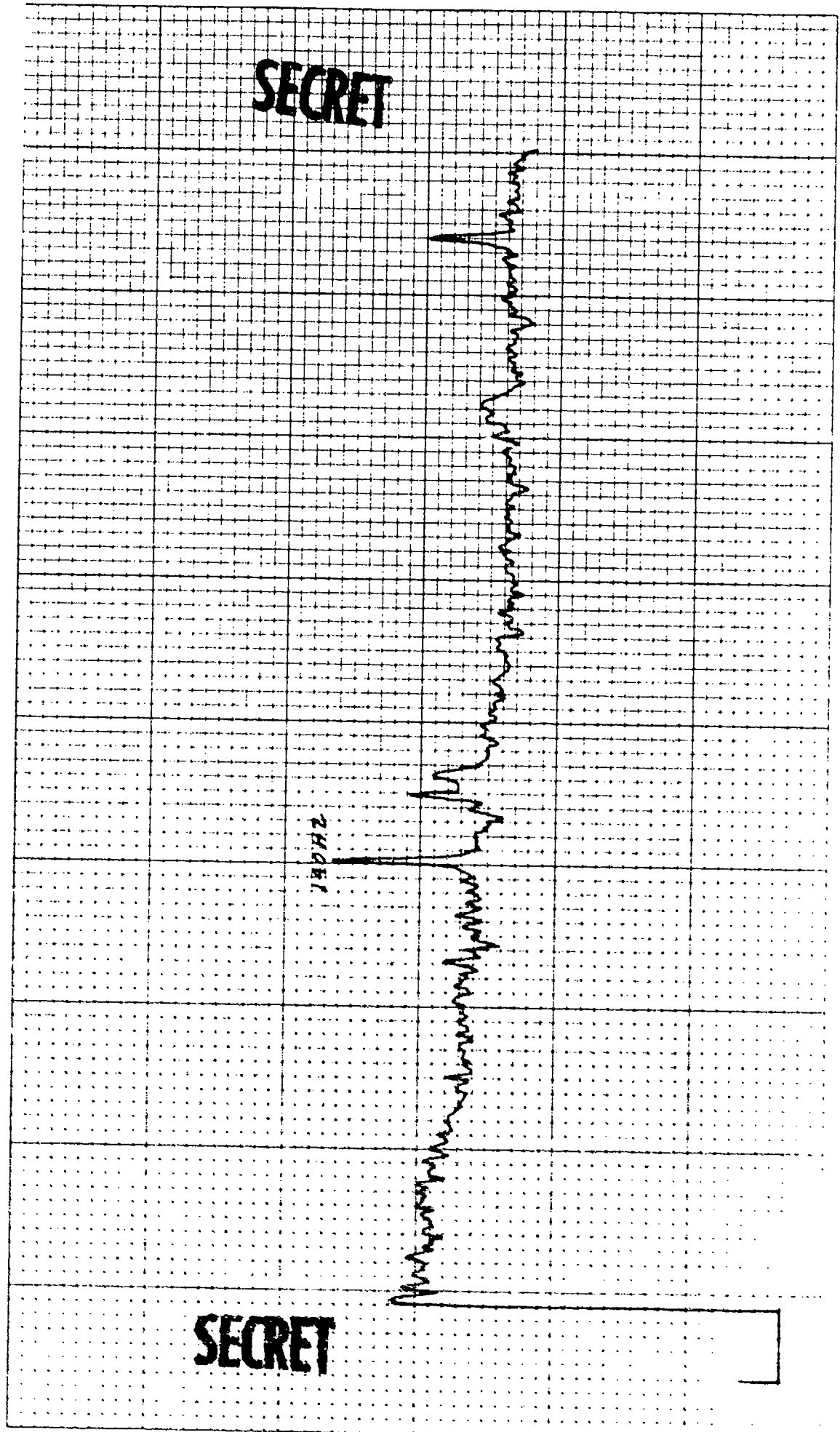
10-E 15 X 16 TO THE INCH - 2 1/2 INCHES
PAPER WEIGHT CO. 500 2 1/2

46 0703

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

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

REEL: F19 INDE X 3090
INTEGRATION TIME 320 SECS ATTEN: -18 DB
FILTER WTG: HANNING



SECRET

SECRET

46 0703

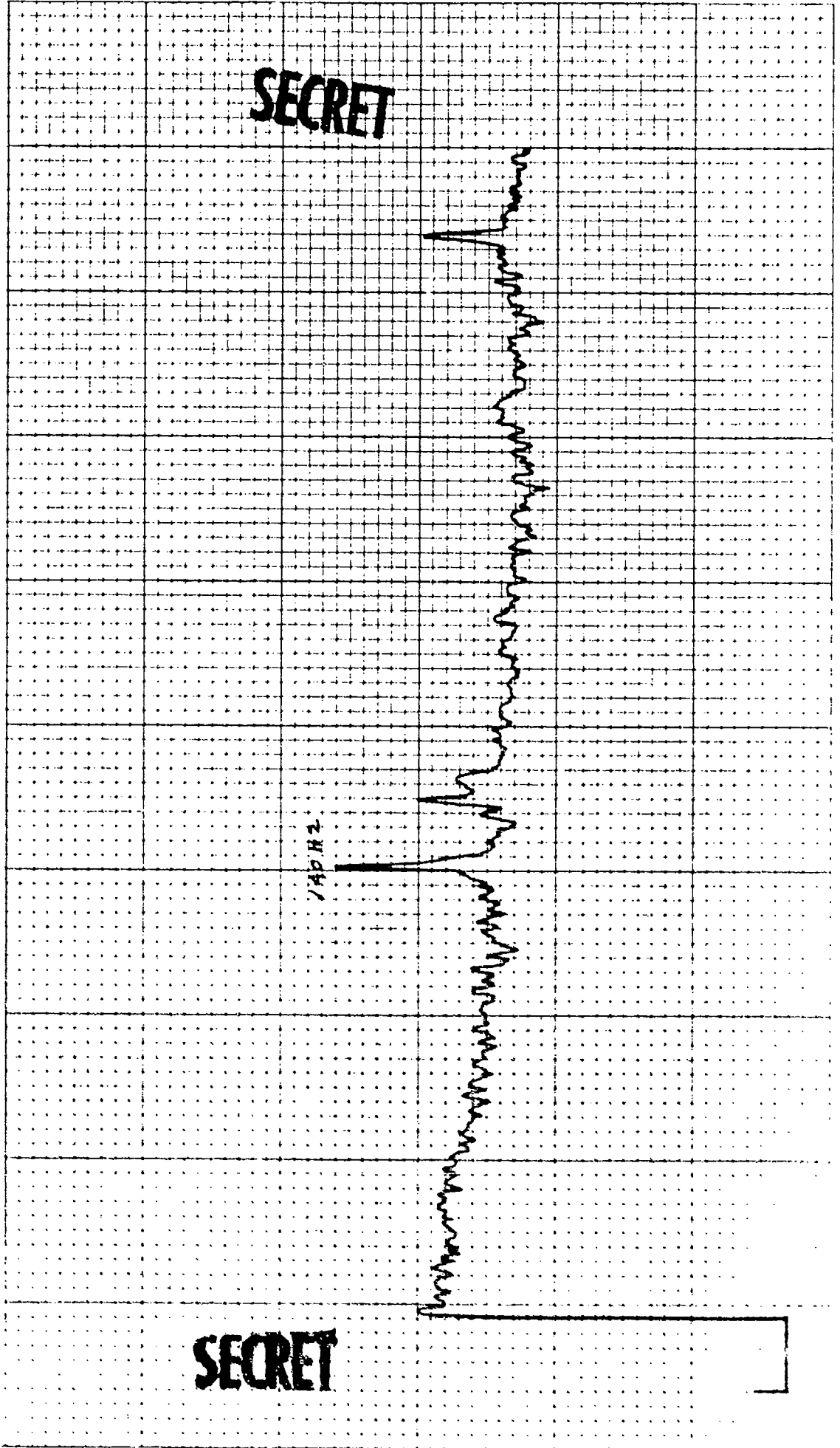
K-E 1549 TO THE DEGREE OF 16

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

REEL: F19

INDE X 305P

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



SECRET

SECRET

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

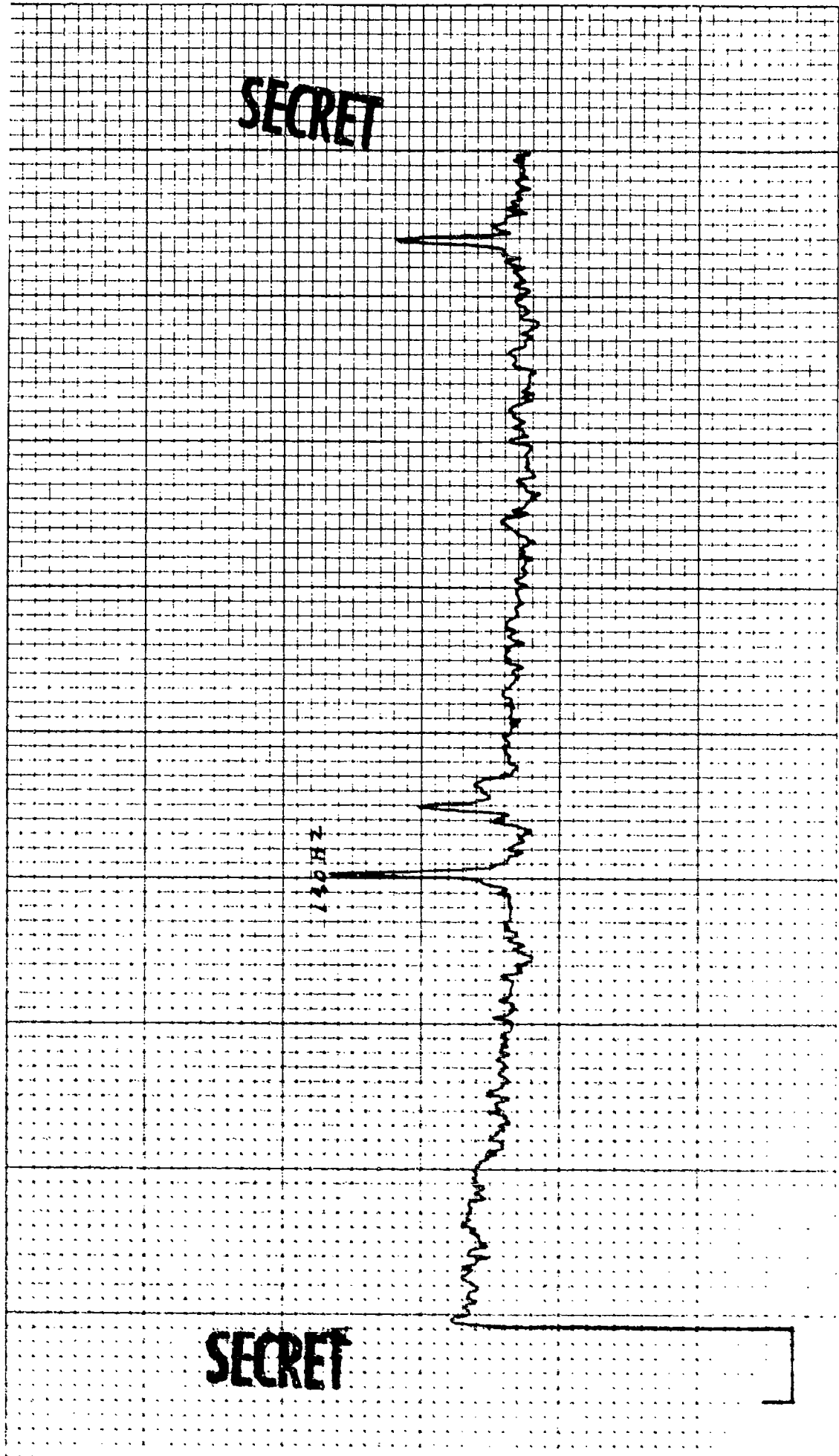
46 0703

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

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

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

INDE X 2050



SECRET

SECRET

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

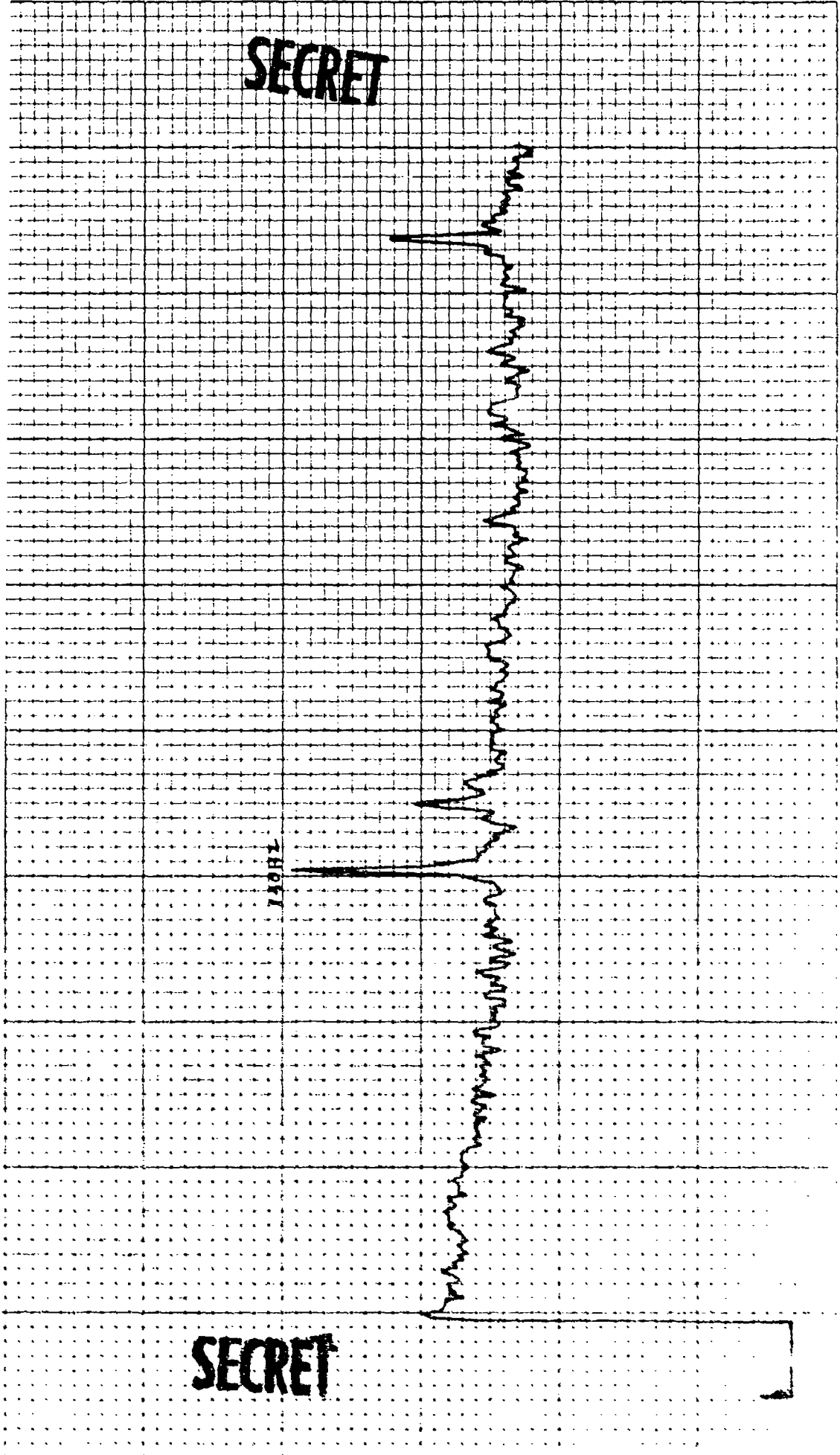
46 0703

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

DATE OF ANALYSIS: 1-16

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

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



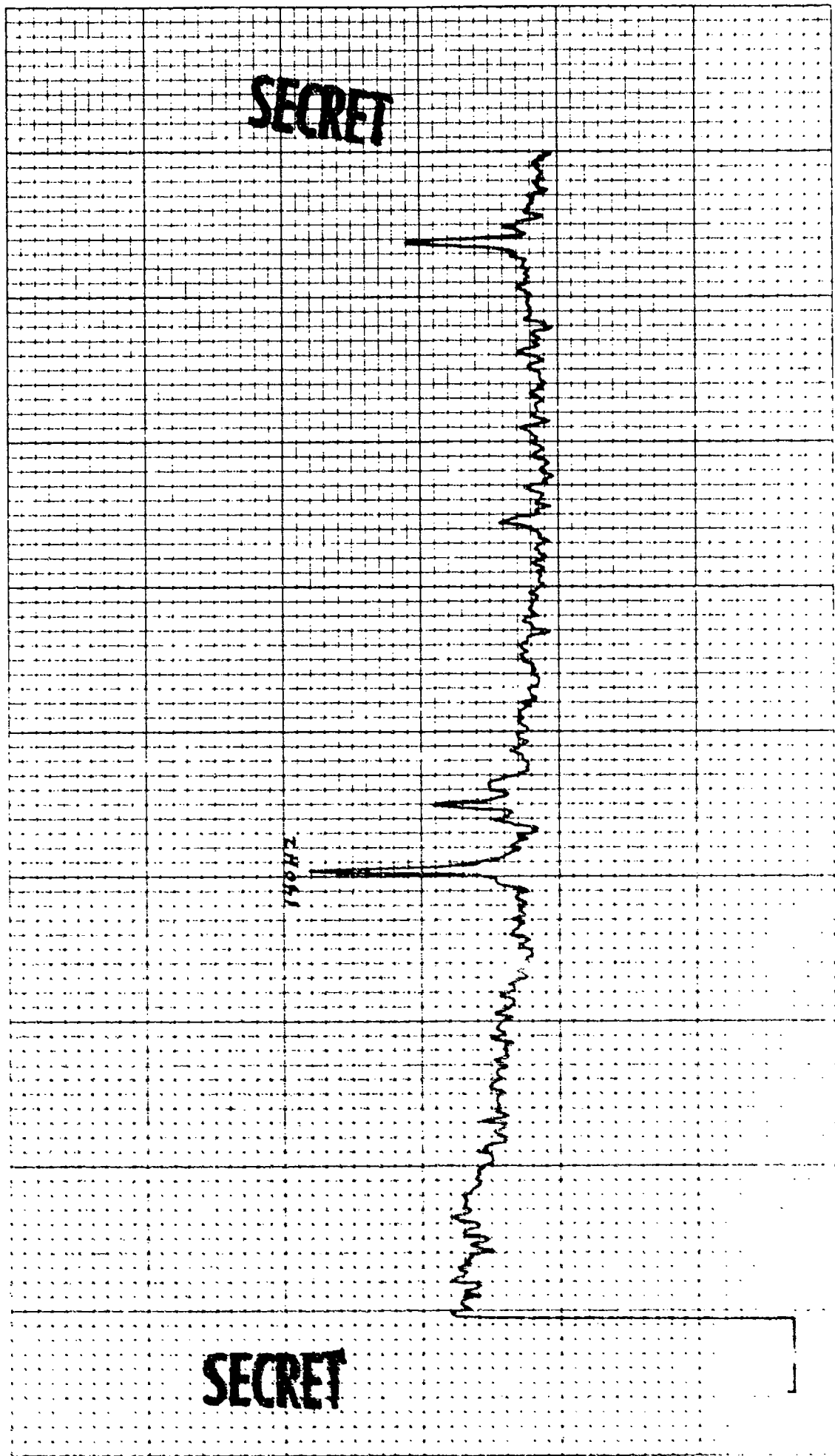
KOE 1549 TO THE BUREAU OF AERONAUTICS

46 0703

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

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

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



46 0703

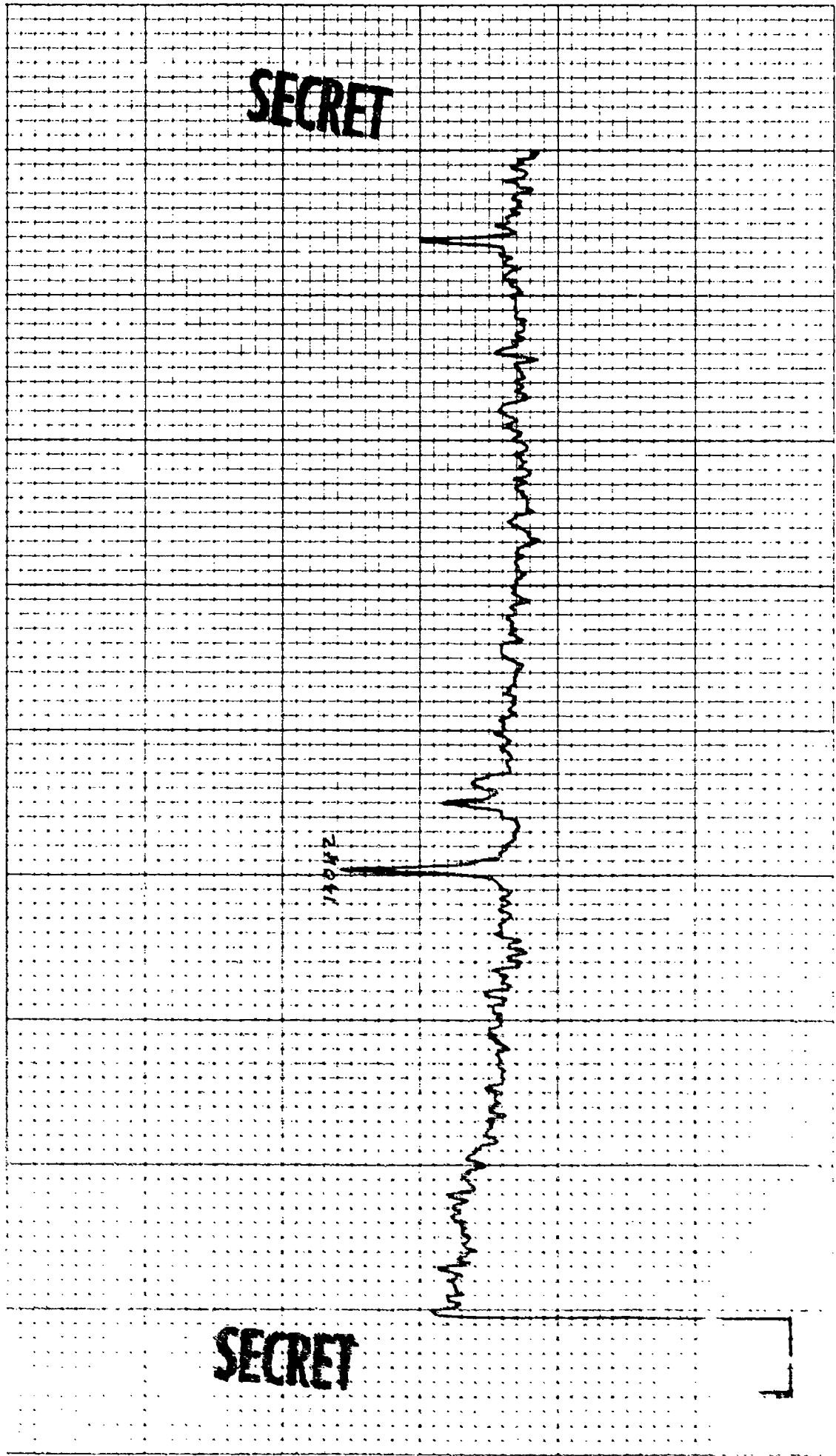
K0E 1549-16 (196)

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

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

REEL: F19
INTEGRATION TIME 320 SECS
FILTER

INDE X 305
ATTEN: -6 DB
WTG: HANNING



46 0703

KOE 1544 - 16 (DPS)

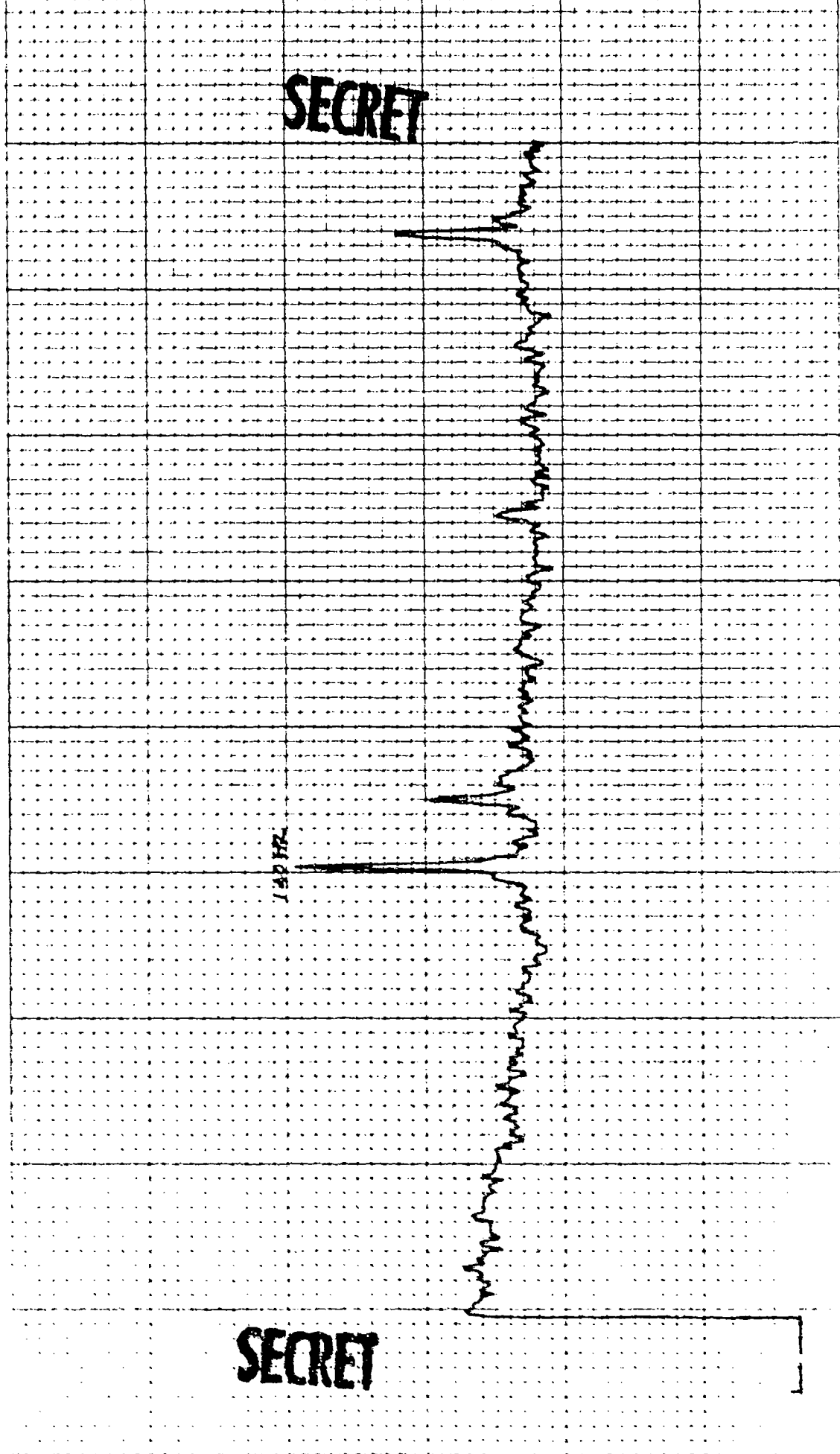
CONTROL: 1544 - 16 (DPS) DATE OF ANALYSIS: 1-16 REEL: F19 INDE X 3050

BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 27-77 - 1509 Z INTEGRATION TIME 320 SECS ATTEN: -10 DB

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

CENTER FREQ: 150 HZ + 76 DEG. AZ STEERING

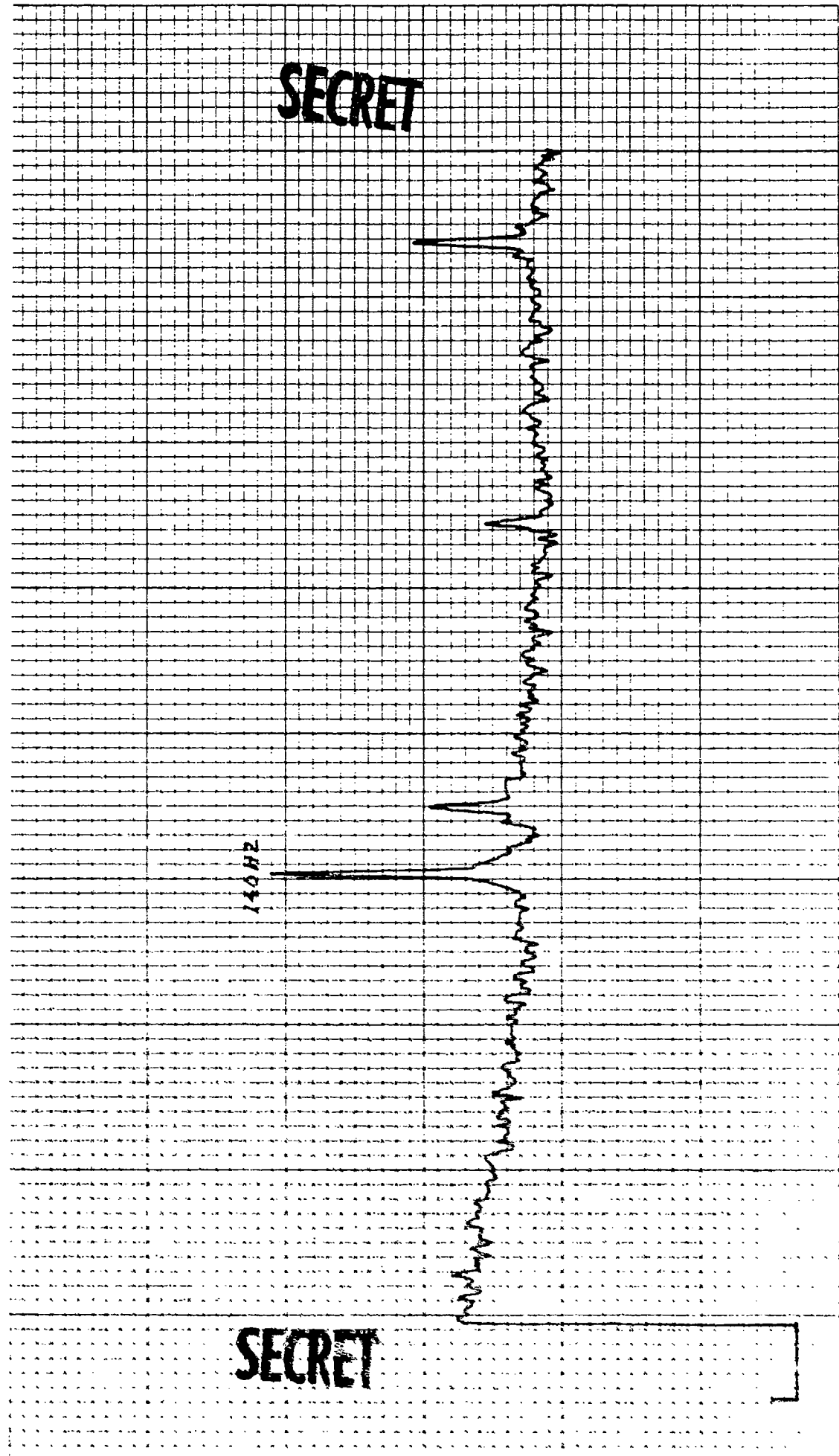
16 ELEMENTS



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

46 0703

CONTROL: 1549 - 16 (D15)
 BEAMFORMED SPECTRUM (ELEMENTS) / - / C REEL: F19 INDE X3050
 EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: -18 DB
 CENTER FREQ: 150 HZ FILTER WTG: HANNING
 16 ELEMENTS DATE OF ANALYSIS: - - - -
 DATE/TIME: 2-7-77 - 1549 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 + 78 DEG. AZ STEERING



SECRET

46 0703

REF ID: A610 TO THE DIRECTOR, NSA

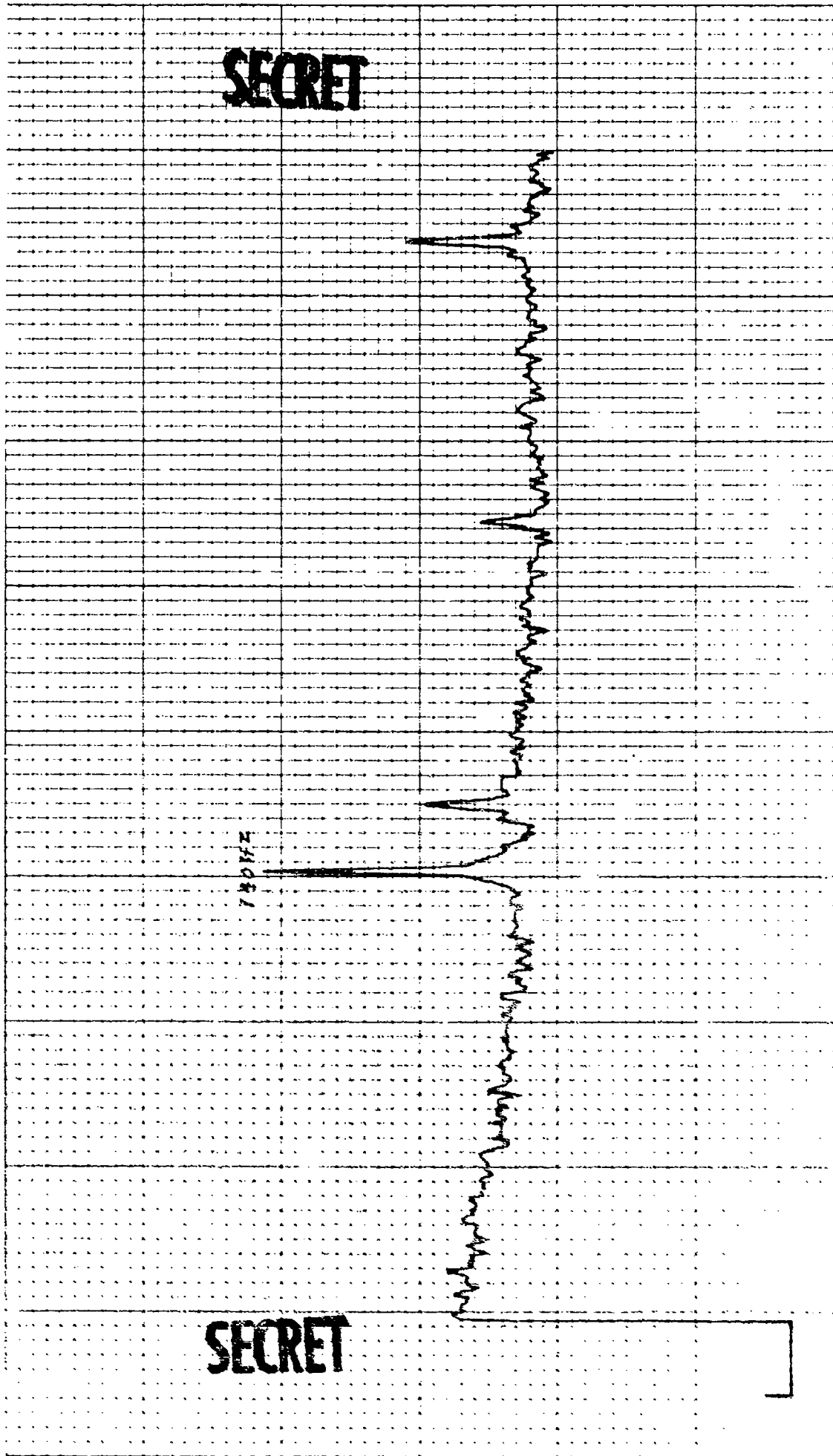
CONTROL: 1549 - 16 (DPS) DATE OF ANALYSIS: 1-16 REEL: F19 INDE X 350

BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 27-77 - 1549Z INTEGRATION TIME 320 SECS ATTN: -18 DB

EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1710HZ FILTER WTC: HANNING

CENTER FREQ: 150 HZ +80 DEG. AZ STEERING

16 ELEMENTS



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SECRET

REF ID: A66000

46 0703

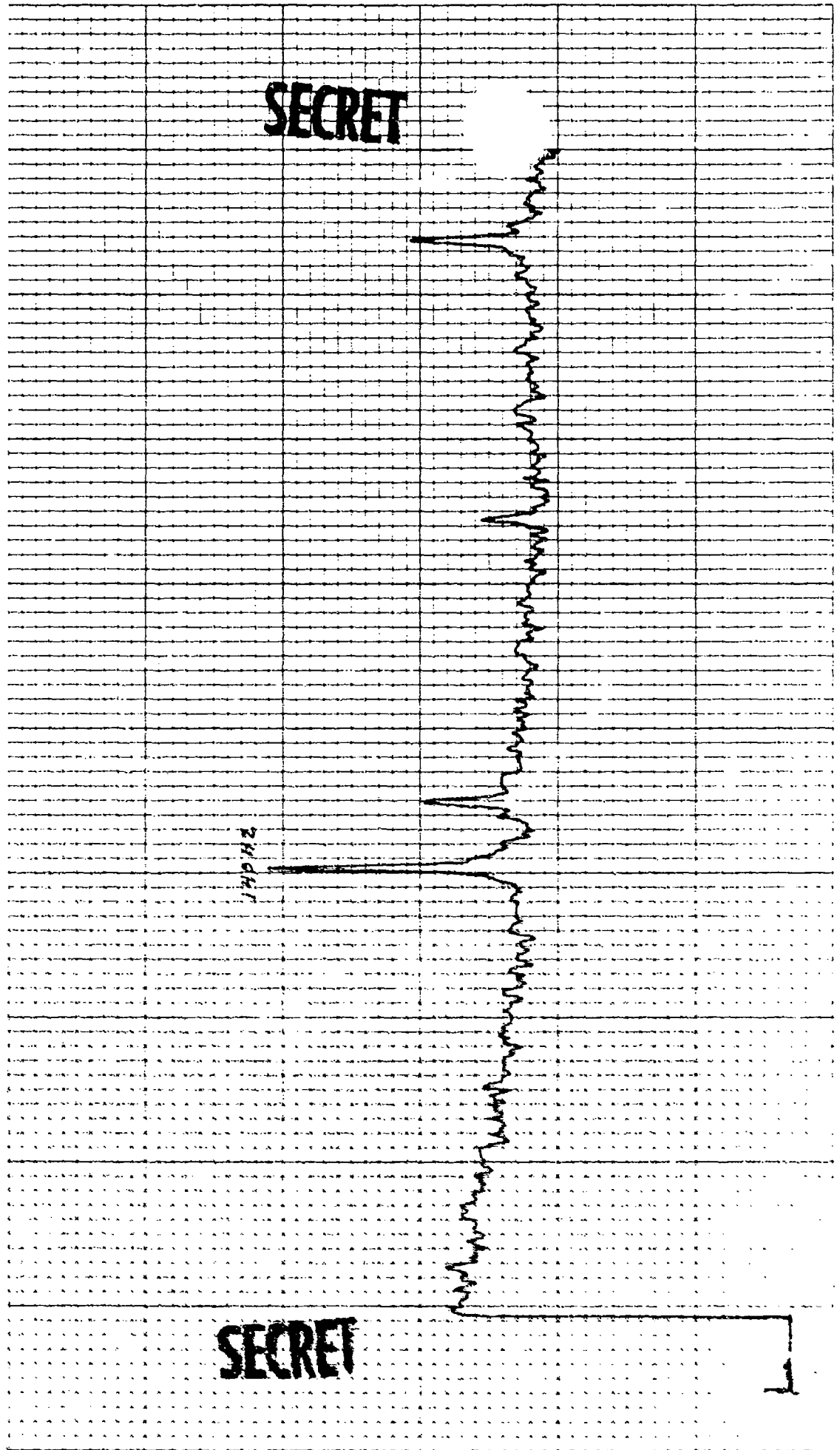
CONTROL: 1549 - 16 (DPS) DATE OF ANALYSIS: 1 - 16 REEL: F19 INDE X 3050

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

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

CENTER FREQ: 150 HZ + 82 DEG. AZ STEERING

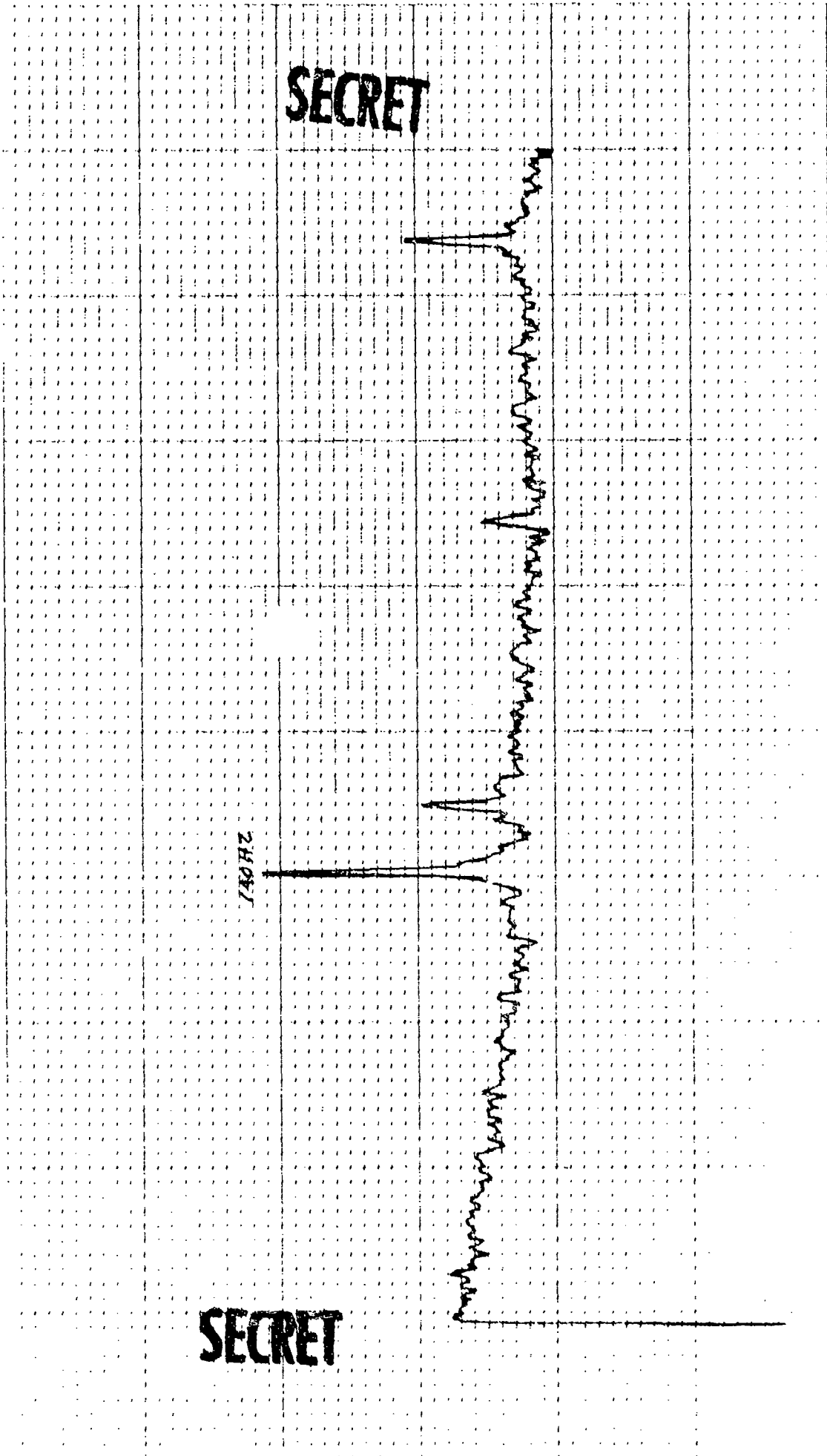
16 ELEMENTS



SECRET

SECRET

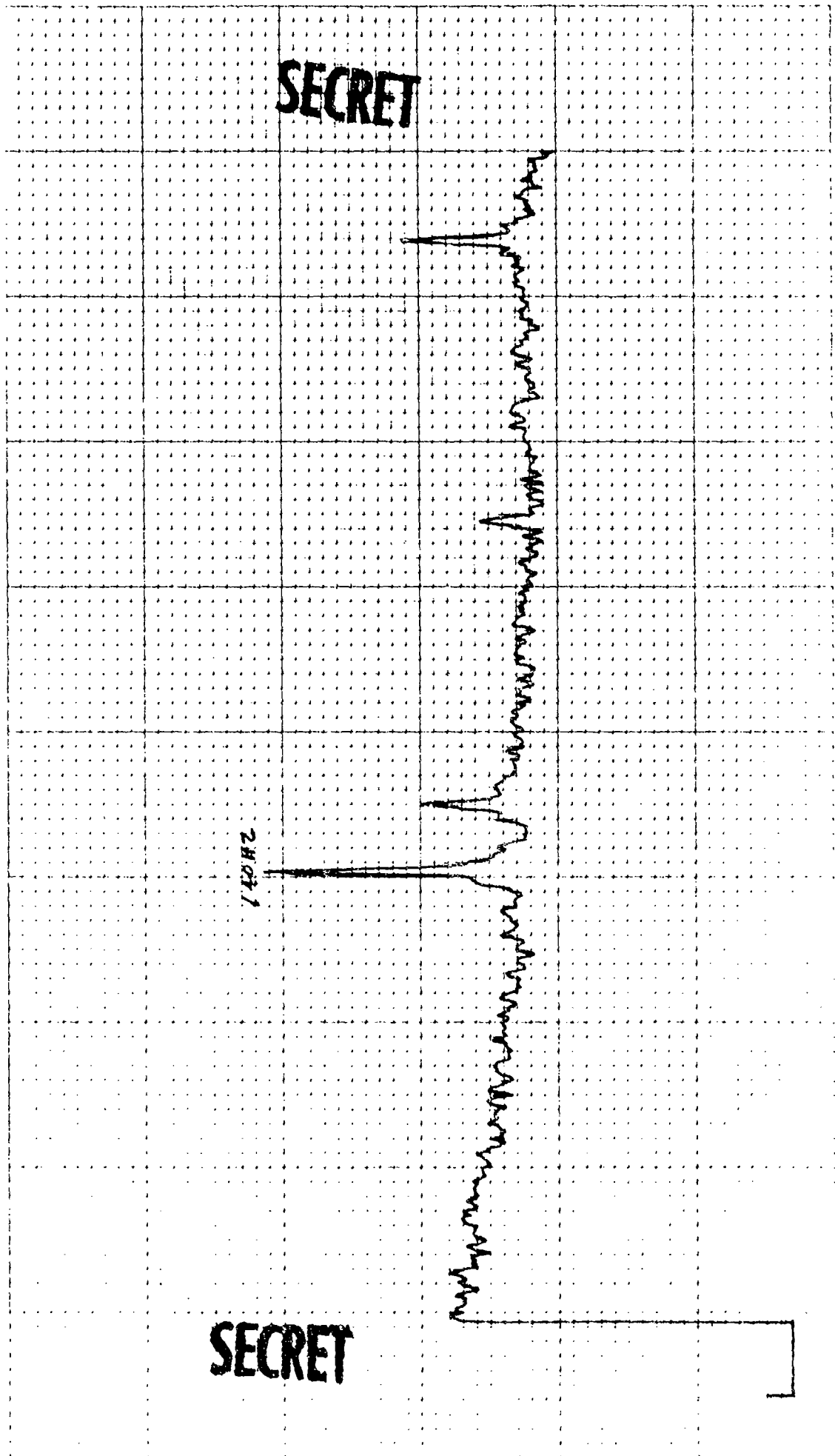
CONTROL: 1549 - 16 (DPS) REEL: F19 INDE X 3050
 BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-16
 EXERCISE: BEARING STAKE DATE/TIME: 27-77 - 1549 Z INTEGRATION TIME 320 SECS ATTEN: -10 DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 17/10 HZ FILTER WTC: HANNING
16 ELEMENTS 404 DEG. AZ STEERING



45 0703

K-2

CONTROL: 1549 - 16 (DPS) DATE OF ANALYSIS: 1-16 REEL: F19 INDE X 3050
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-7-77 1549Z INTEGRATION TIME 320 SECS ATTEN: -19 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 150 HZ ±86 DEG. AZ STEERING



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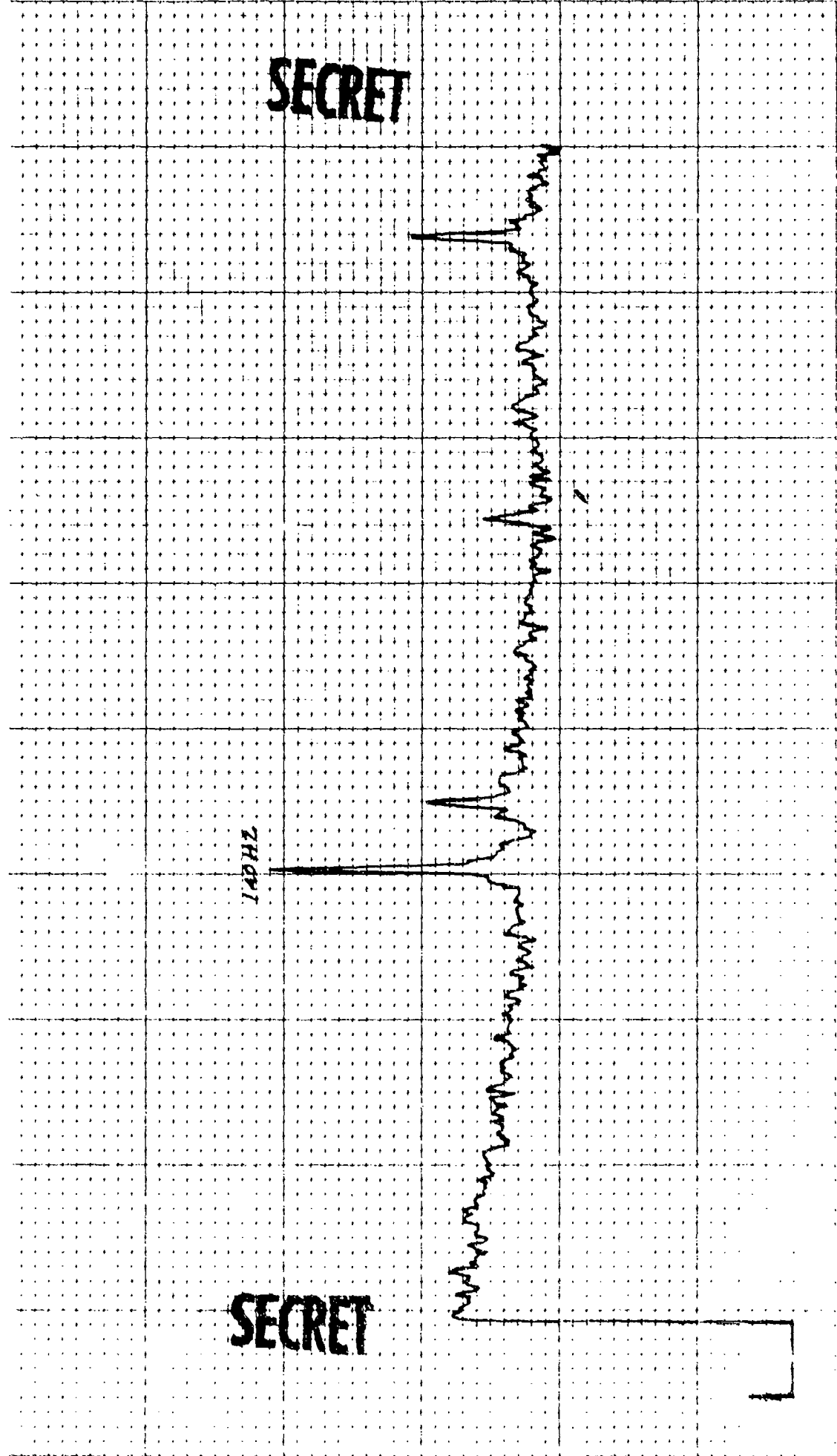
SECRET

MOE VE... TO THE INCHES... 46 0703

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

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

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



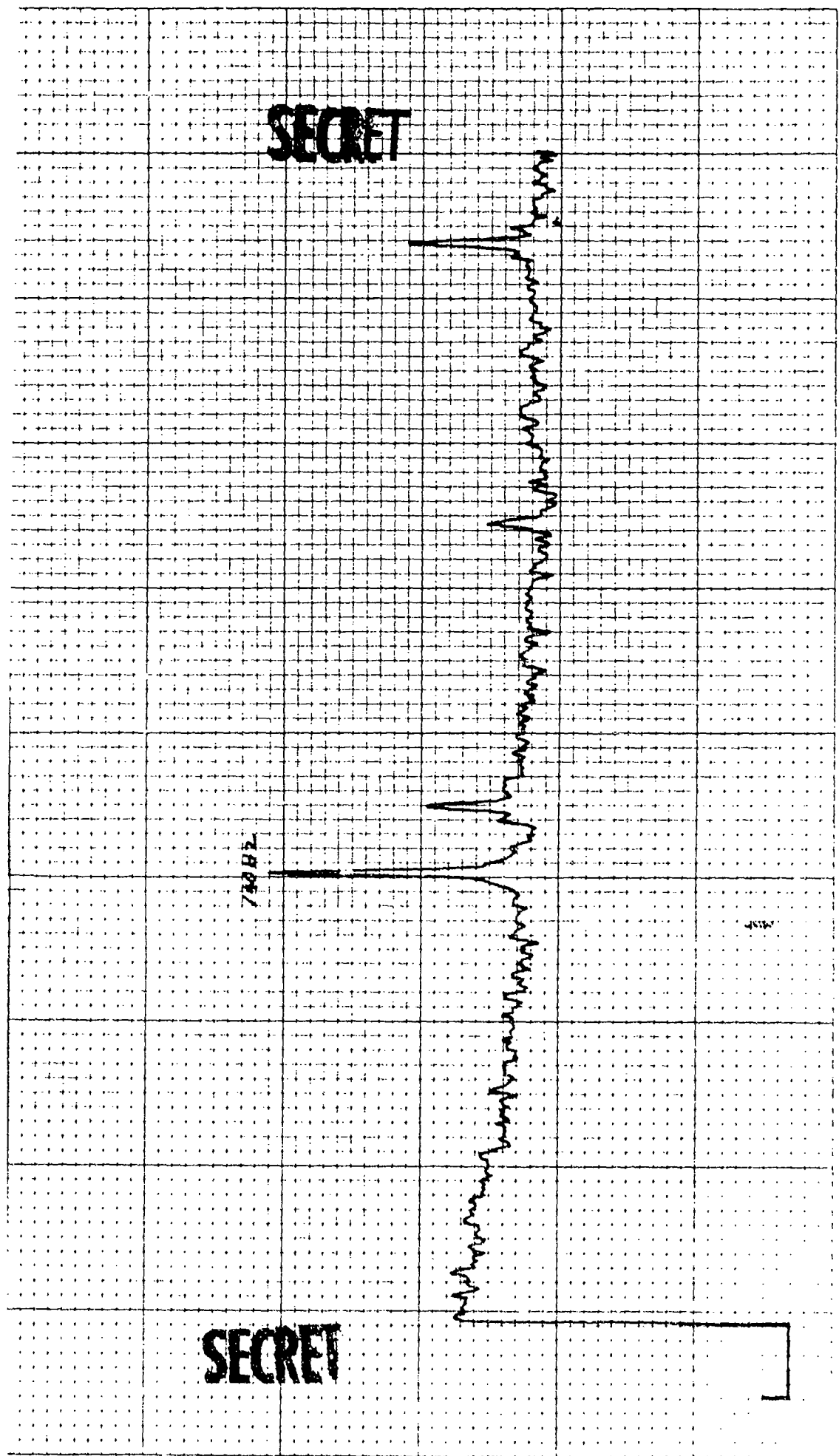
SECRET

SECRET

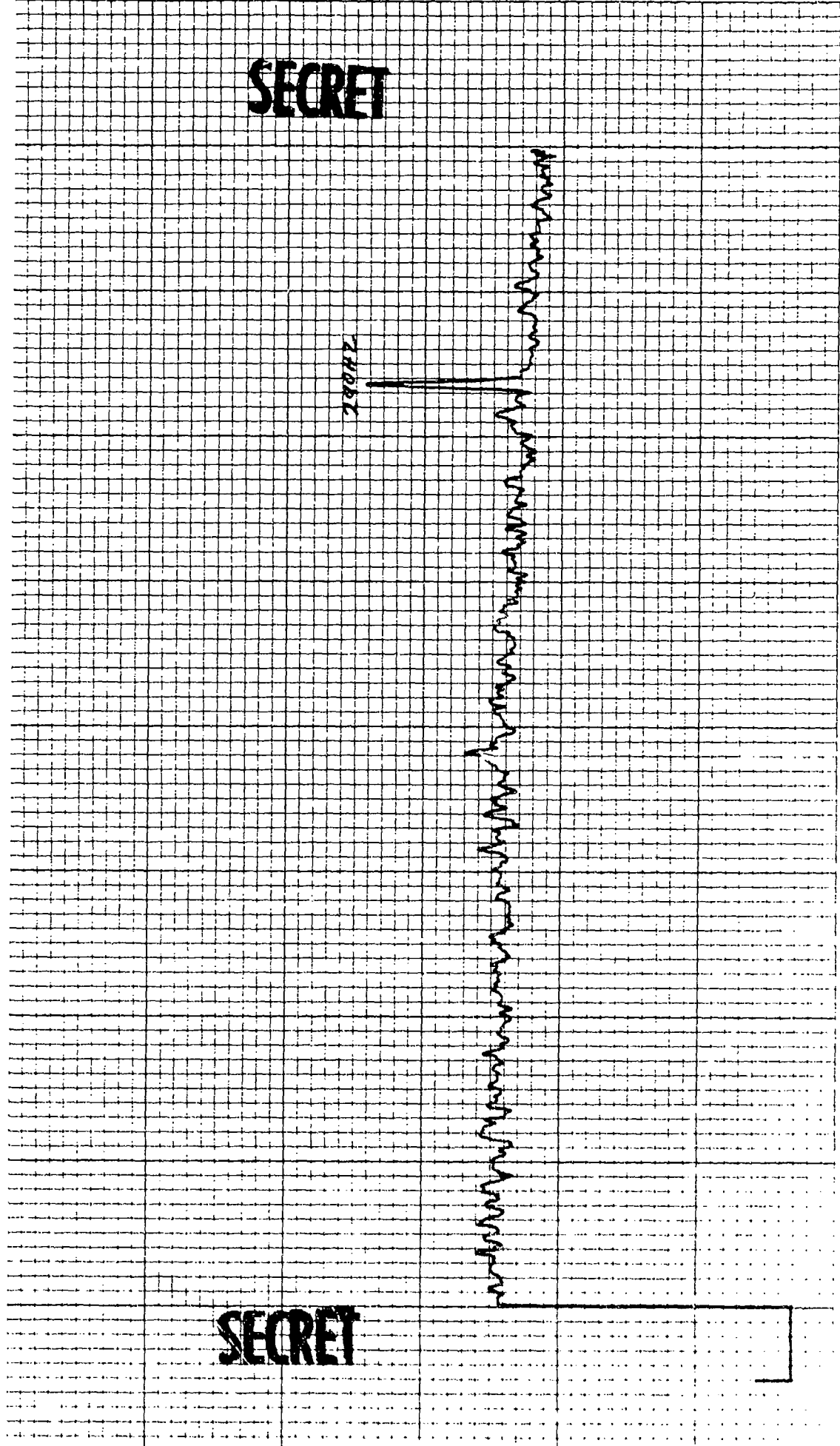
KOE 10/19/76 TO THE INCH. 21. 10. 1976
DEUFFER & FESSER CO. WASHINGTON, D.C.

46 0703

CONTROL: 1549 - 16 (DPS) DATE OF ANALYSIS: 1 - 16
BEAMFORMED SPECTRUM (ELEMENTS) REEL: F19 INDE X 2050
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTEN: -70 DB
CENTER FREQ: 150 HZ FILTER WTG: HANNING
16 ELEMENTS +90 DEG. AZ STEERING ANALYSIS BANDWIDTH: 1/10 HZ



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



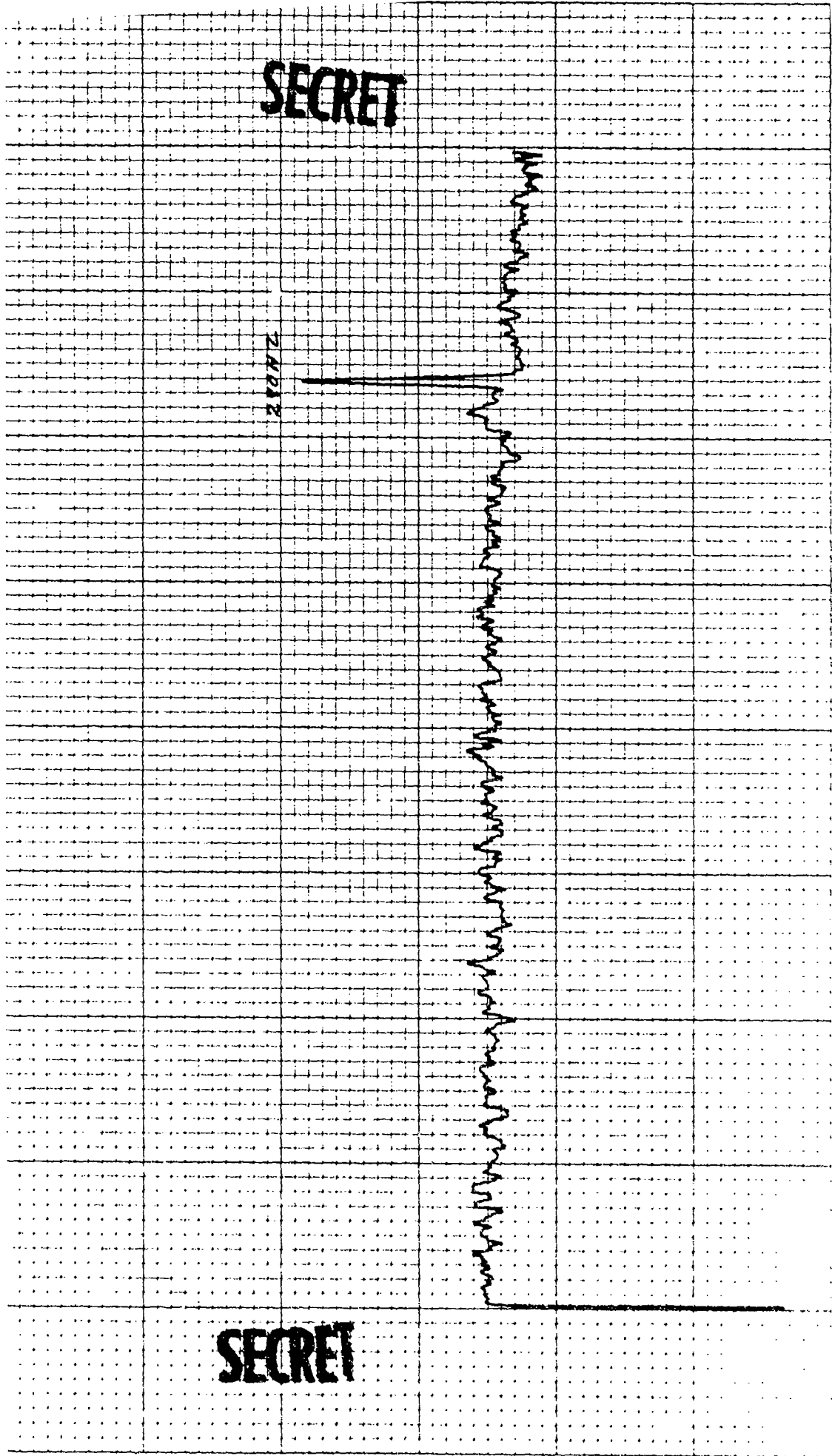
KOE 10 X 10 TO THE INCH • 1/10 INCHES
PEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

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

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

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



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

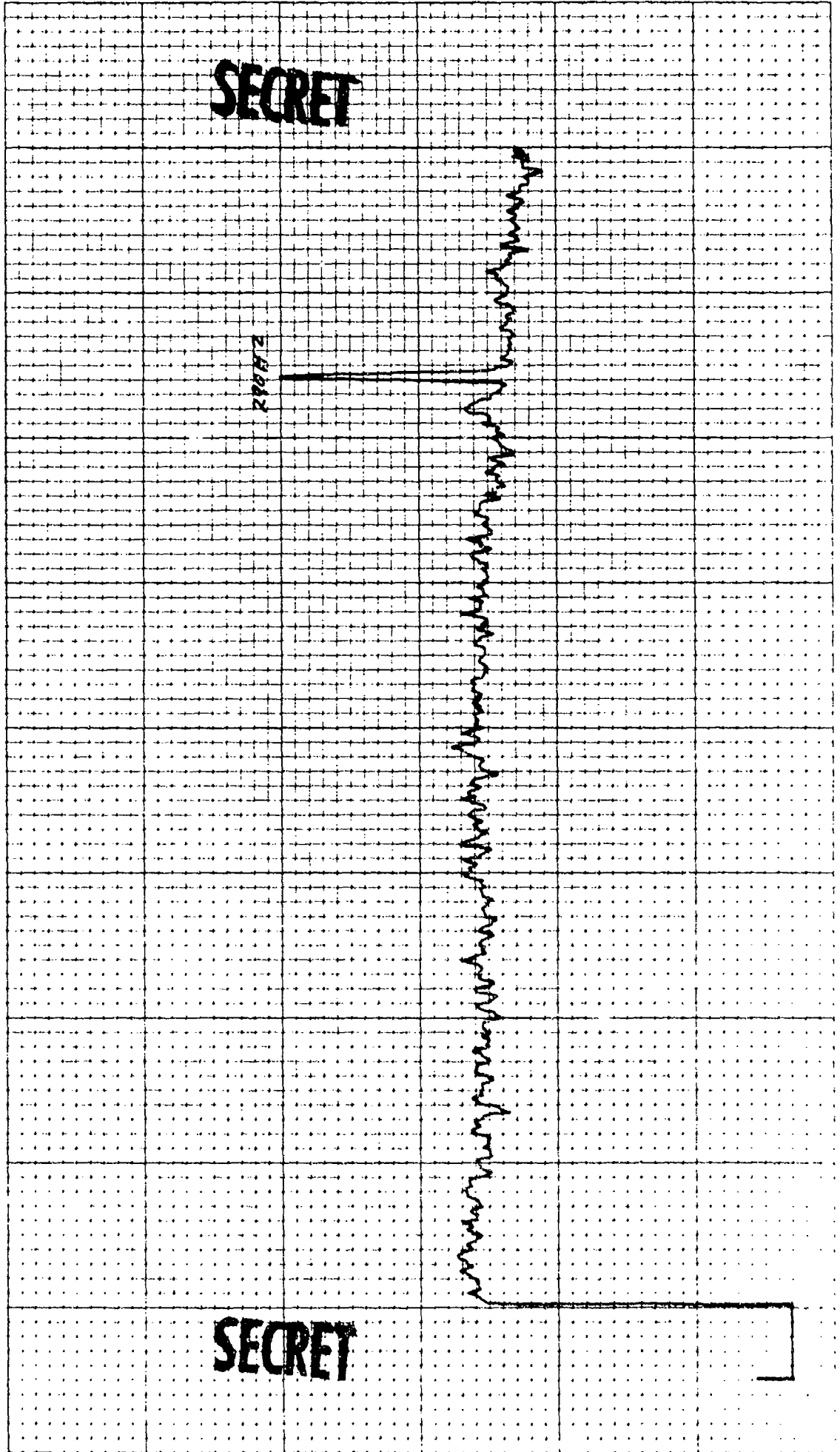
46 0703

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

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

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

INDE X 3065



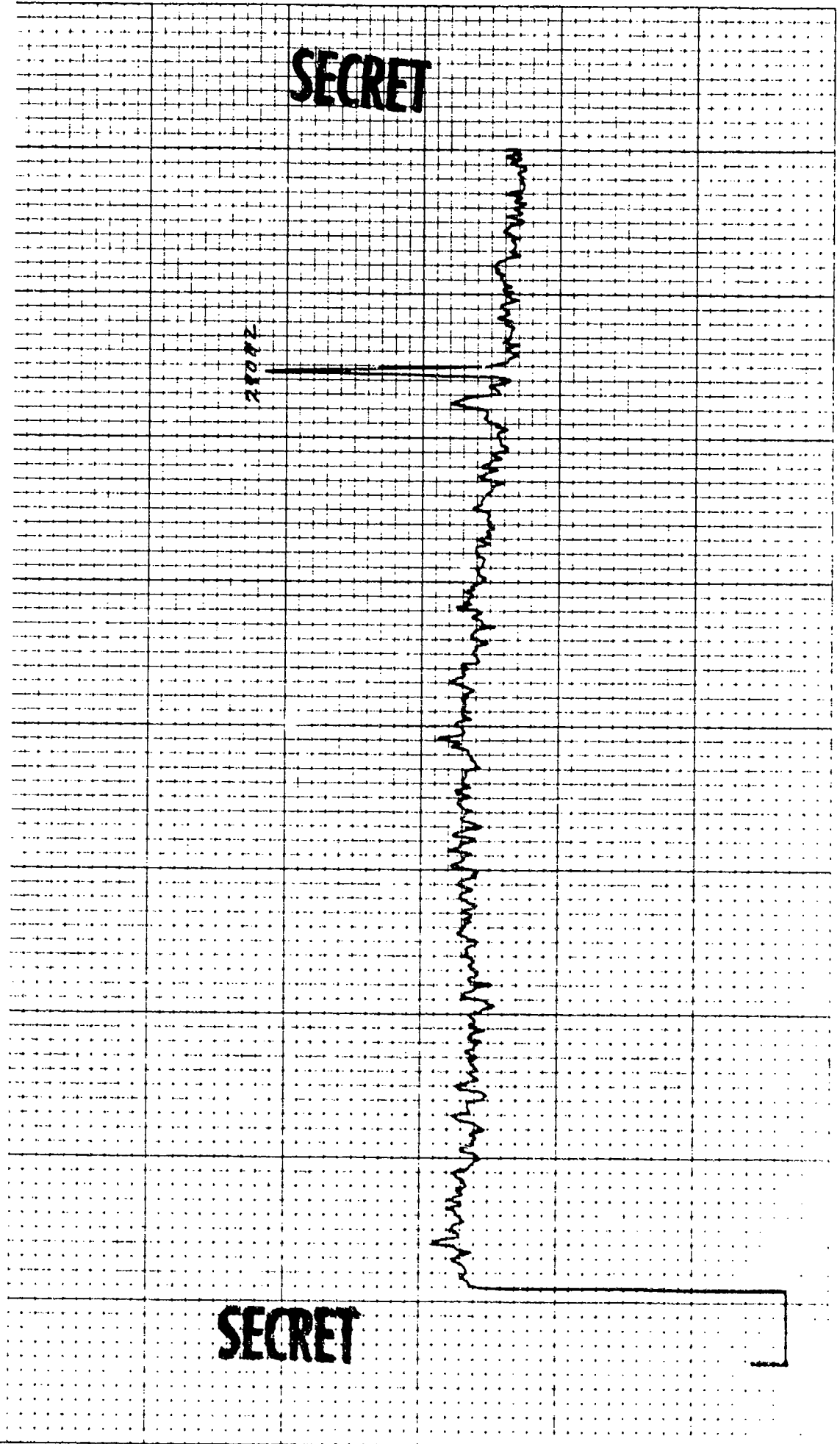
KOE 10 X 10 TO THE INCH • 1 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

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

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

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



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

46 0703

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

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

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

SECRET

2800HZ

SECRET



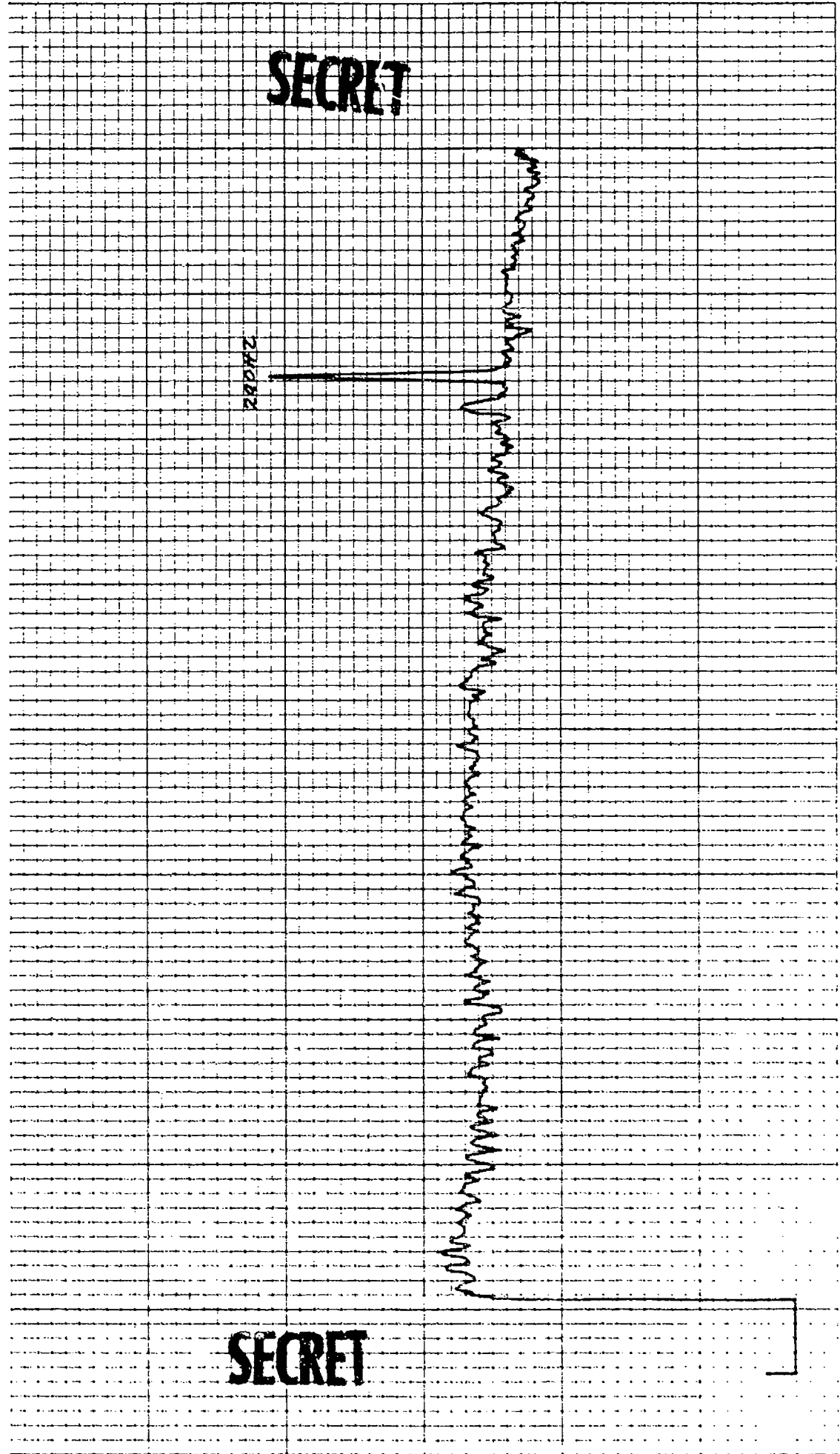
MSE 10 X 10 TO TIME INCHES 1 X 10 INCHES
KEU/PFL & PSE/ER CO MADE IN U.S.A.

46 0703

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

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

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



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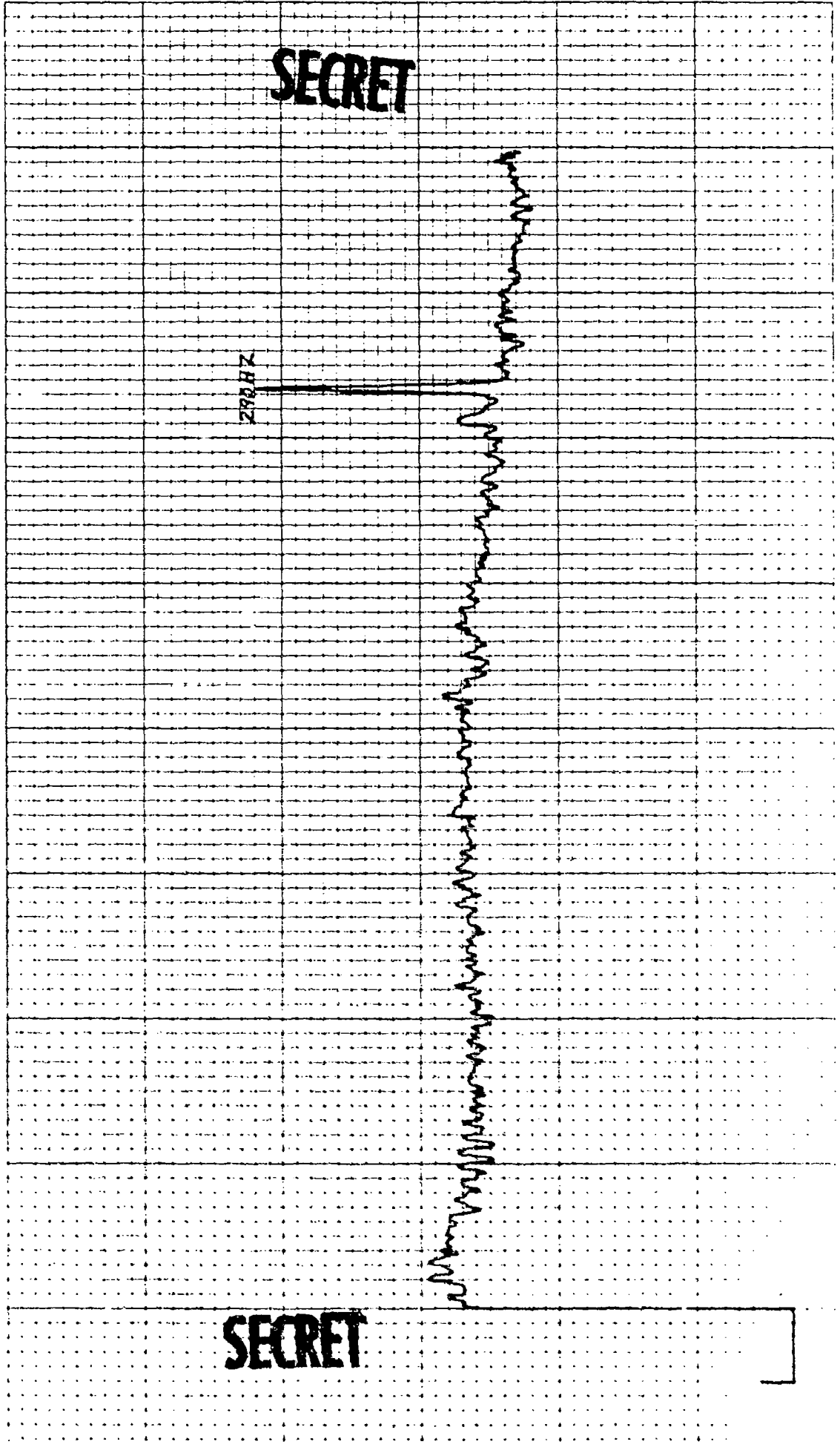
102 10.7 Hz TO THE INCHES 200 HZ PER INCH

46 0703

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

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

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



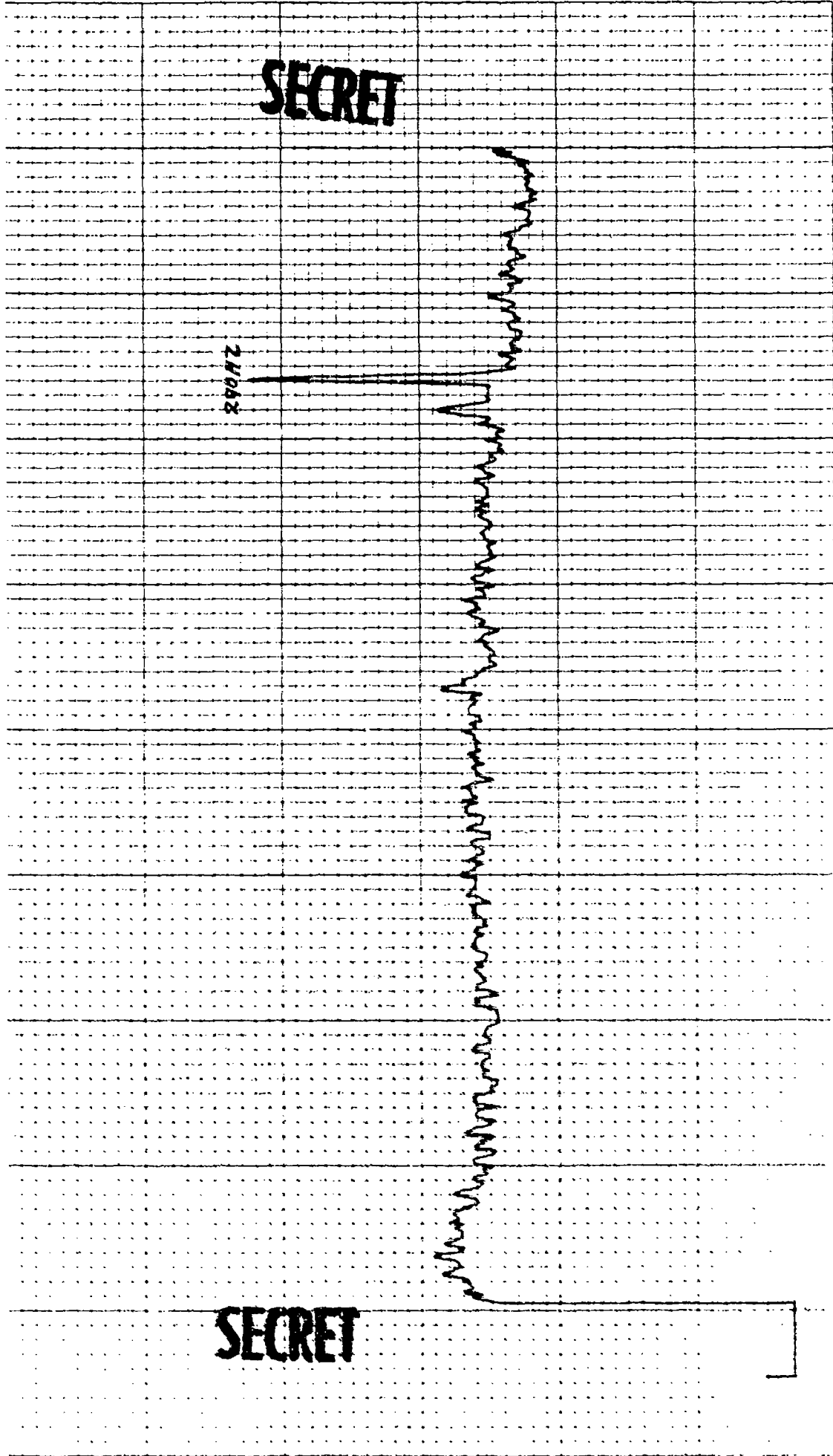
SECRET

SECRET

KOE BEARING TO THE INCHES. 2000000000

46 0703

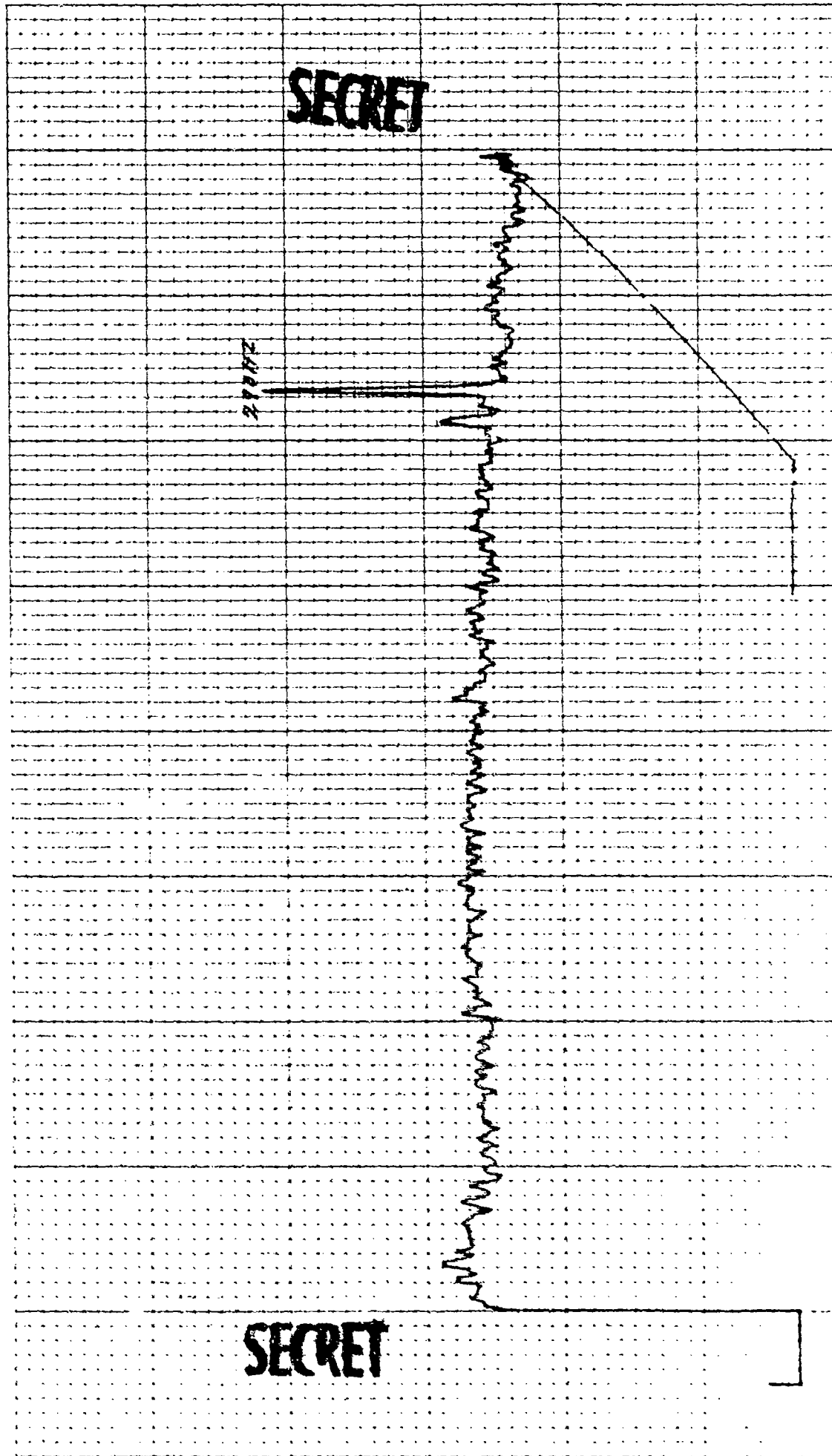
CONTROL: 1544 - 51 (DPS) DATE OF ANALYSIS: _____ REEL: F19 INDE X 3060
BEAMFORMED SPECTRUM (ELEMENTS) 1 - 16 INTEGRATION TIME 320 SECS ATTEN: /P DB
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549Z FILTER WTG: HANNING
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ
/6 ELEMENTS + 40 DEG. AZ STEERING



46 0703

K-5 1549 TO THE DEPT. OF DEFENSE

CONTROL: 1549 - 16 (DP5) REEL: F19 INDE X3050
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-16
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTN: -18 DB
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
16 ELEMENTS +41 DEG. AZ STEERING



KOE 103 10 VOLTS PER DIV. 2.5 SEC PER DIV.
RESEARCH & DESIGN CO. WASH. D.C.

46 0703

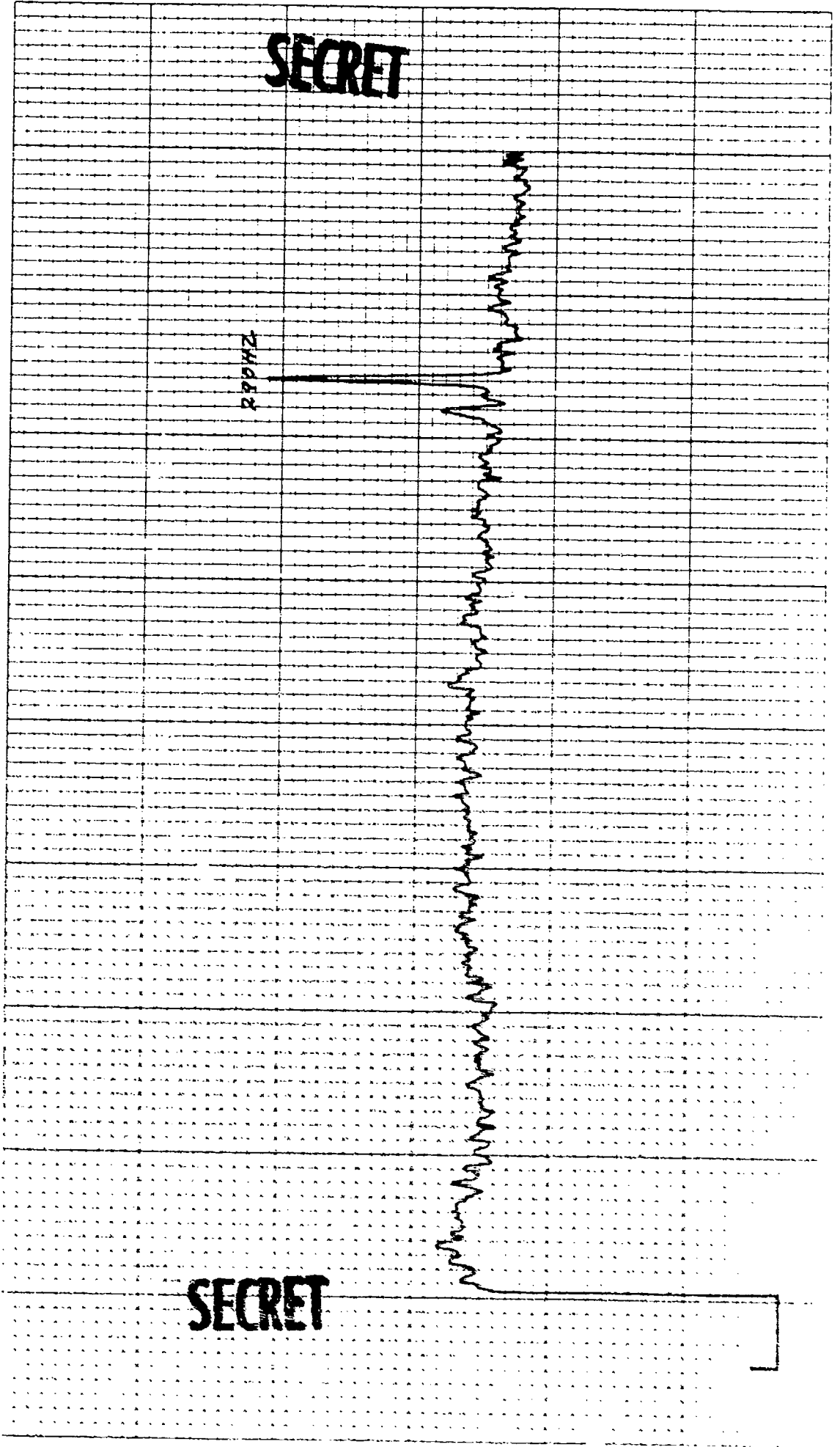
CONTROL: 1549 - 16 (DP5)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-76

REEL: F19 INDEX X 3050

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

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

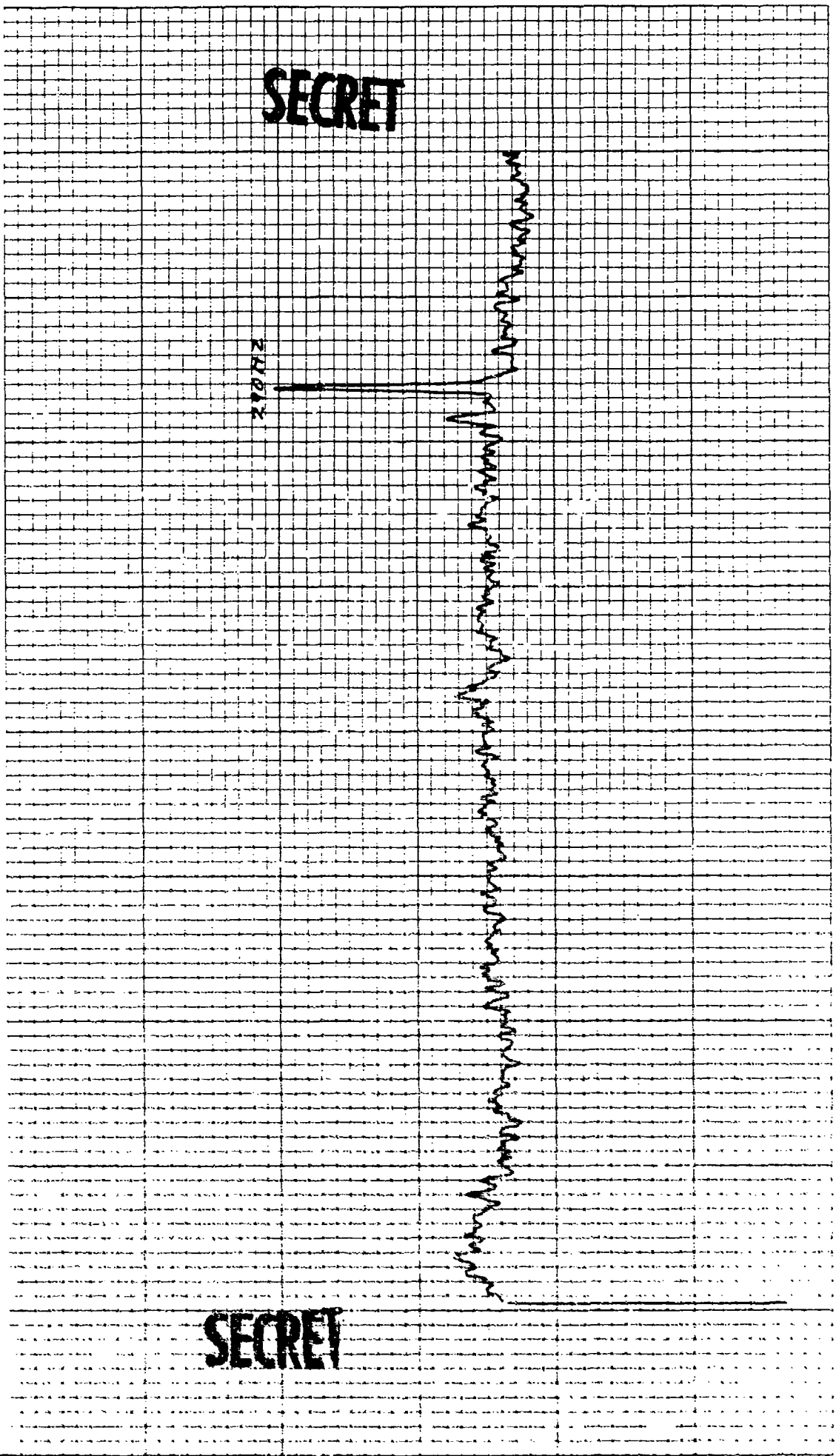


SECRET

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

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

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



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SECRET

46 0703

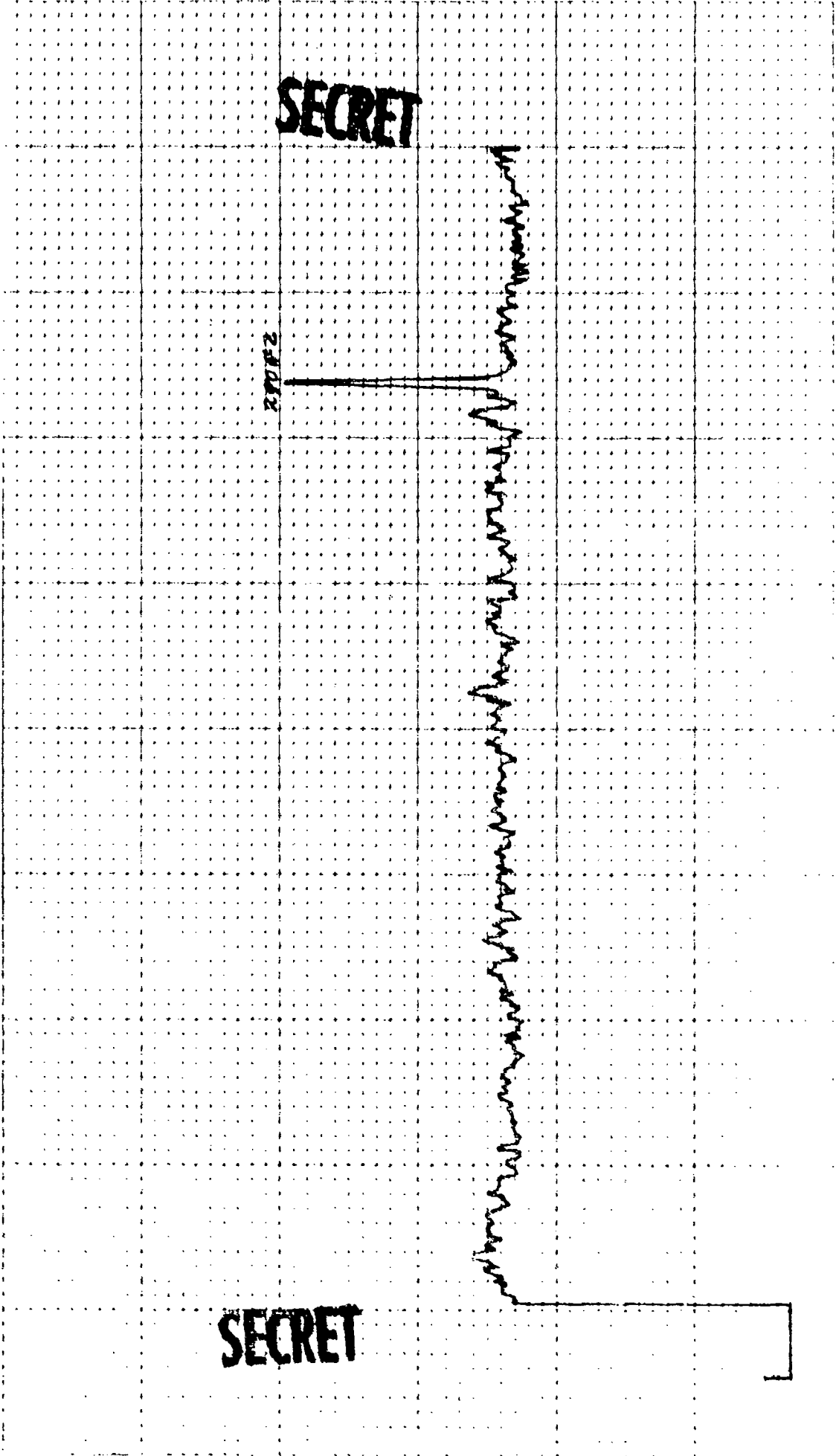
CONTROL: 1599 - 16 (205)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 HZ
10 ELEMENTS

DATE OF ANALYSIS: 1 - 16

REEL: F19 INDE X3050

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

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



SECRET

SECRET

45 0703

K-E 2700 2000 1000 0000

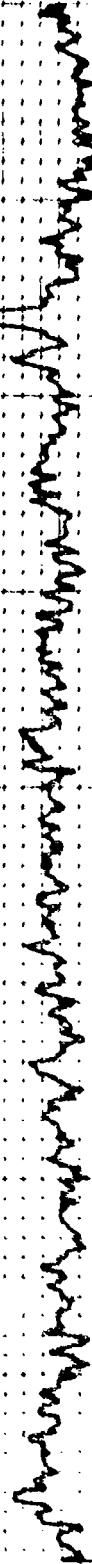
CONTROL: 1549 - 16 (DPS) DATE OF ANALYSIS: - - - -
 BEAMFORMED SPECTRUM (ELEMENTS) / - - / 6
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z
 CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1/10 HZ
 16 ELEMENTS + 48 DEG. AZ STEERING

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

SECRET

SECRET

290 HZ



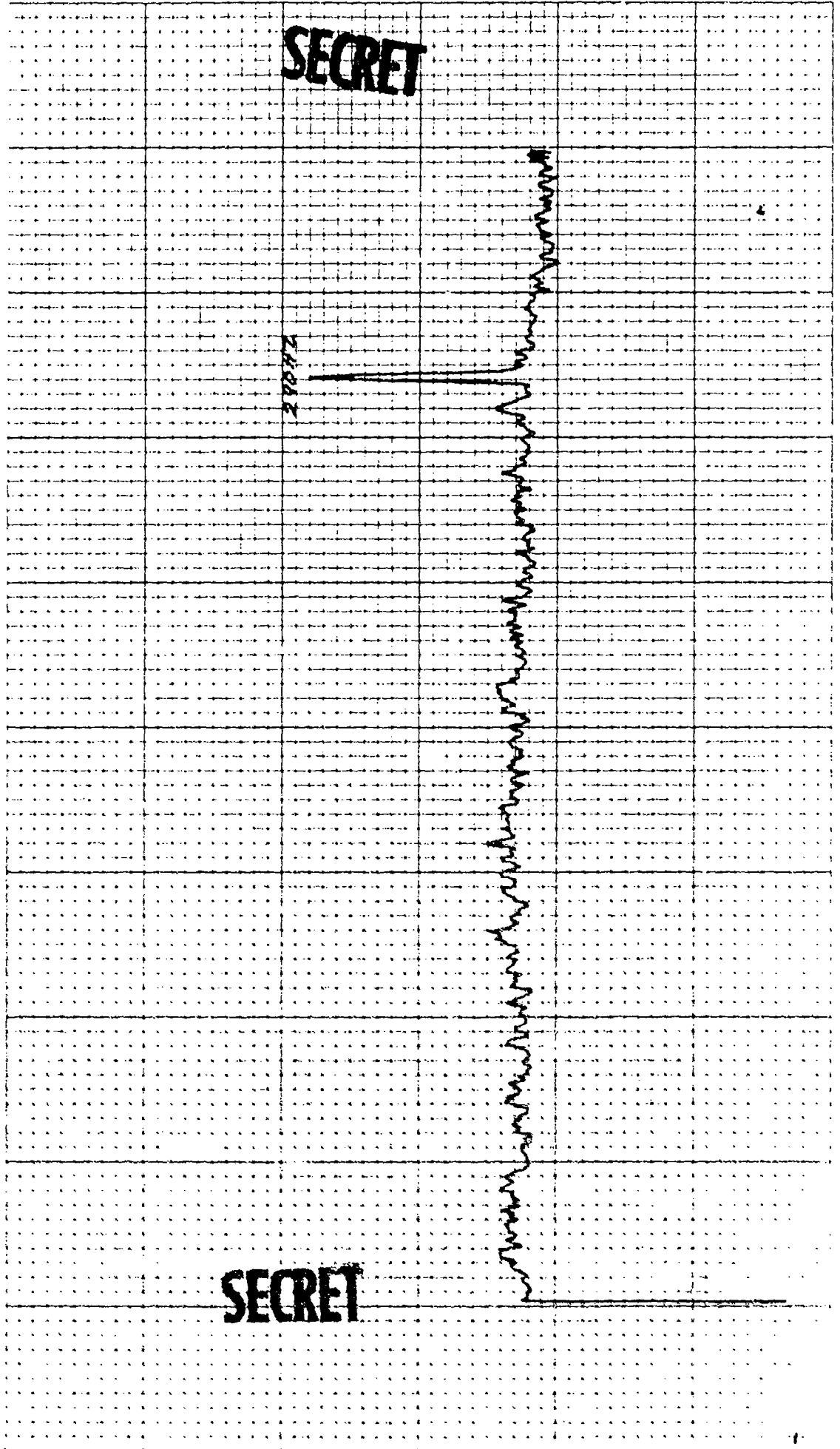
K&E 10.5 IS TO THE DIGIT...
20/10/77

46 0703

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

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

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



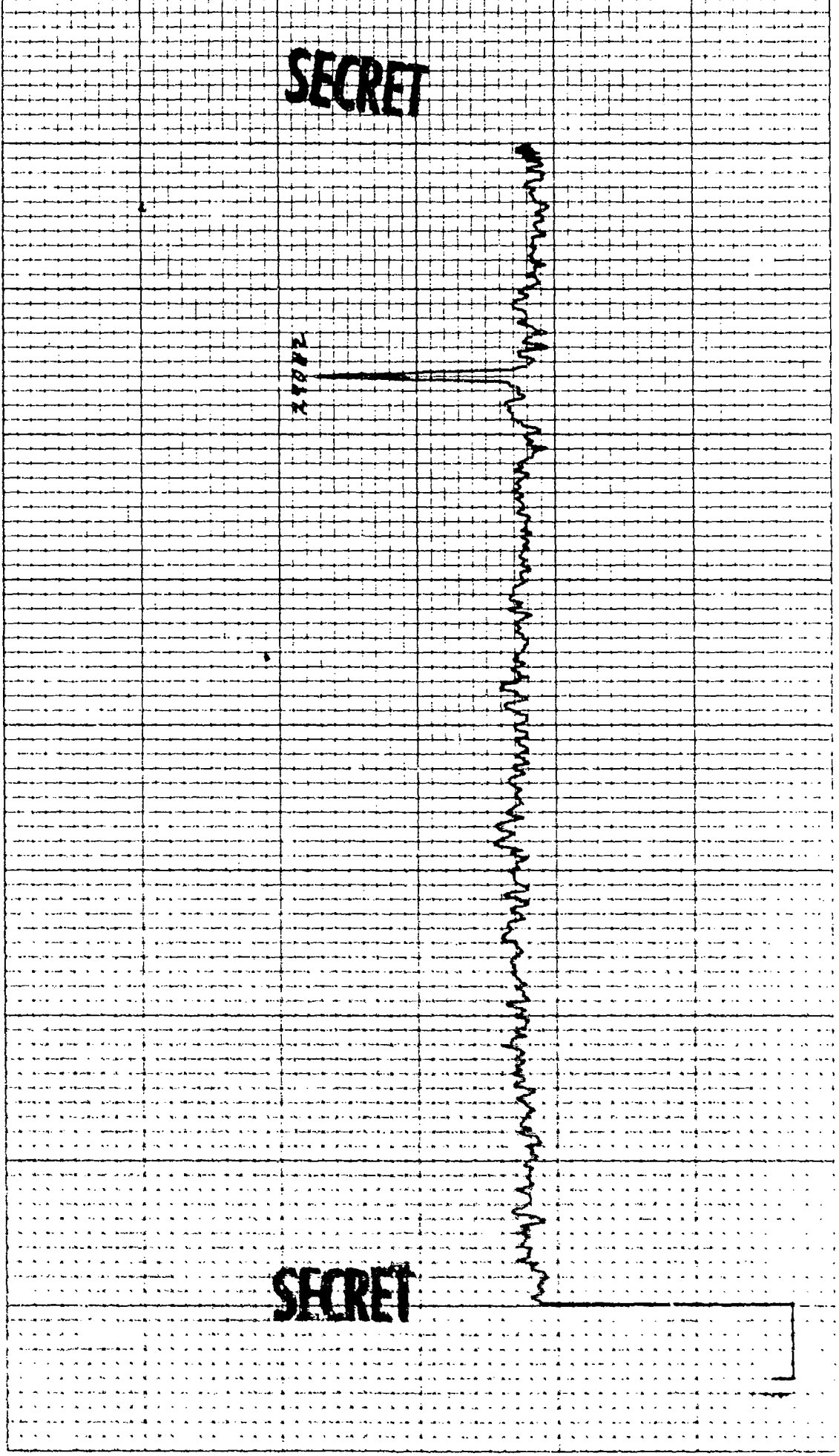
SECRET

SECRET

46 0703

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

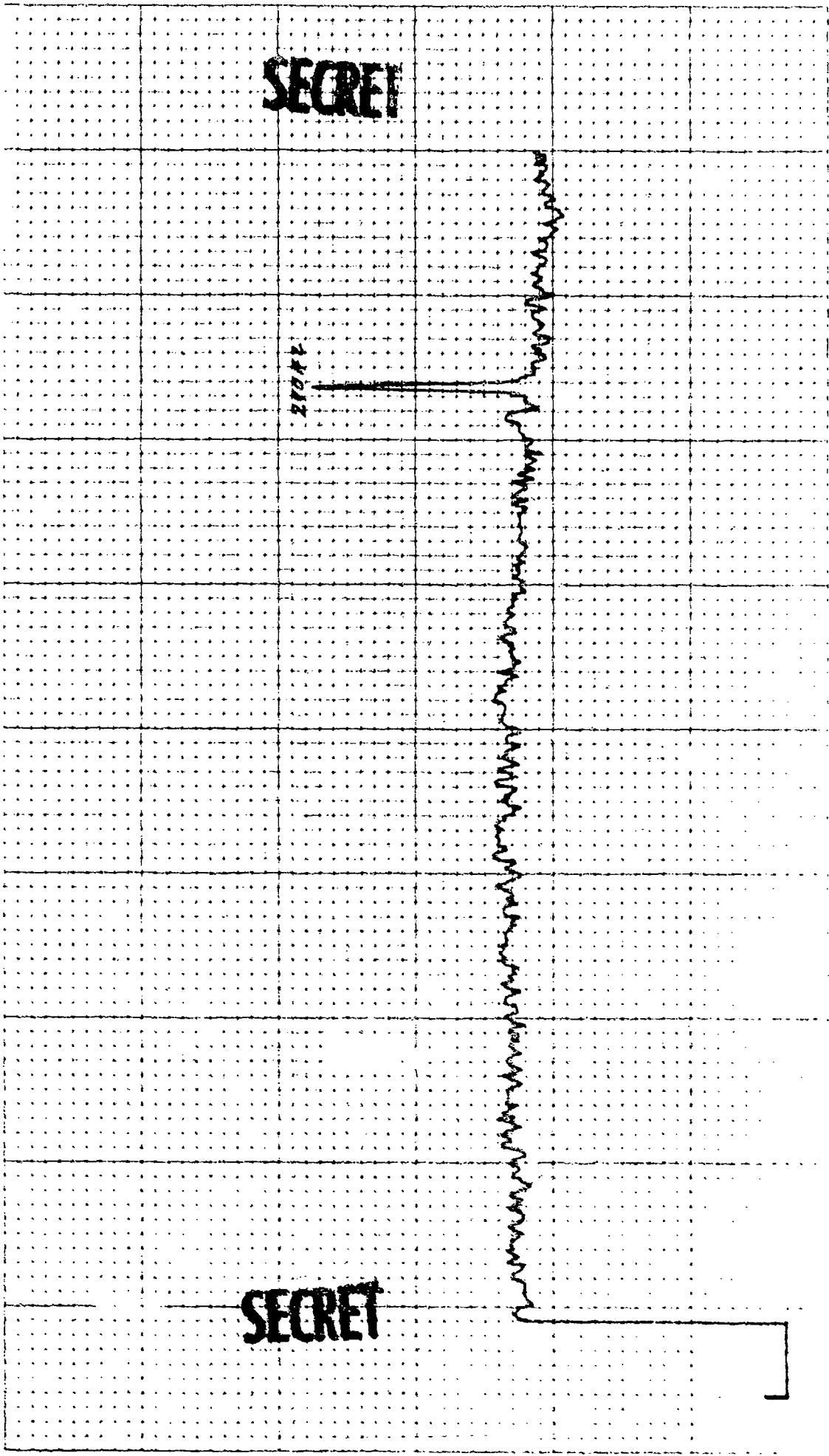
CONTROL: 1549 - 16 (206) DATE OF ANALYSIS: 1-16 REEL: F19 INDE X 3050
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTEN: -18 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 CENTER FREQ: 280 HZ + 52 DEG. AZ STEERING



46 0703

K-E 5400 1000 1000 1000 1000

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

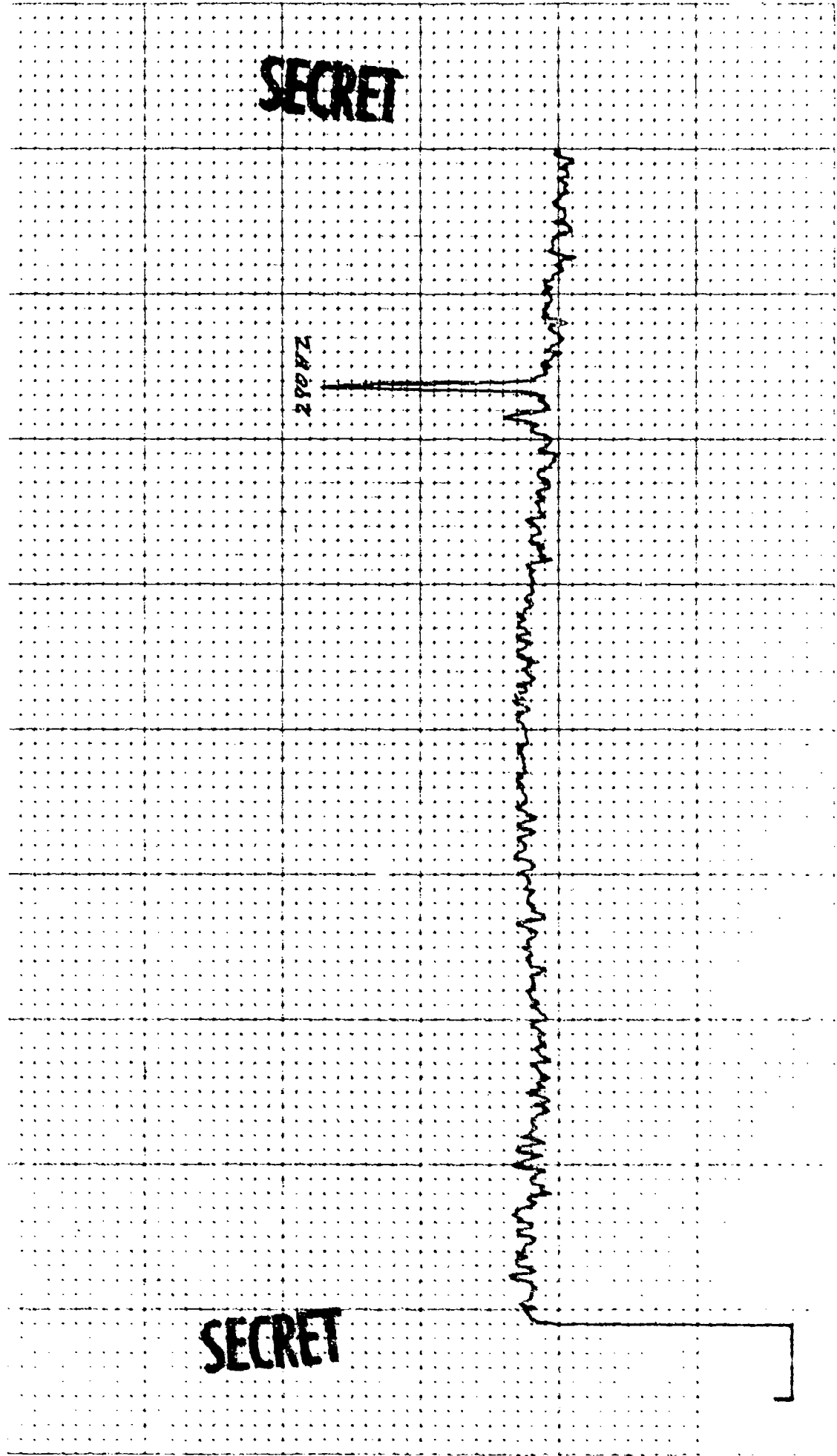


46 0703

CONTROL: 1549 - 16 (DP5) DATE OF ANALYSIS: - -
BEAMFORMED SPECTRUM (ELEMENTS) 1-16
EXERCISE: BEARING STAKE DATE/TIME: 27-77 - 1549Z
CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 17 10HZ
16 ELEMENTS 56 DEG. AZ STEERING

REEL: F19 INDE X 3050

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



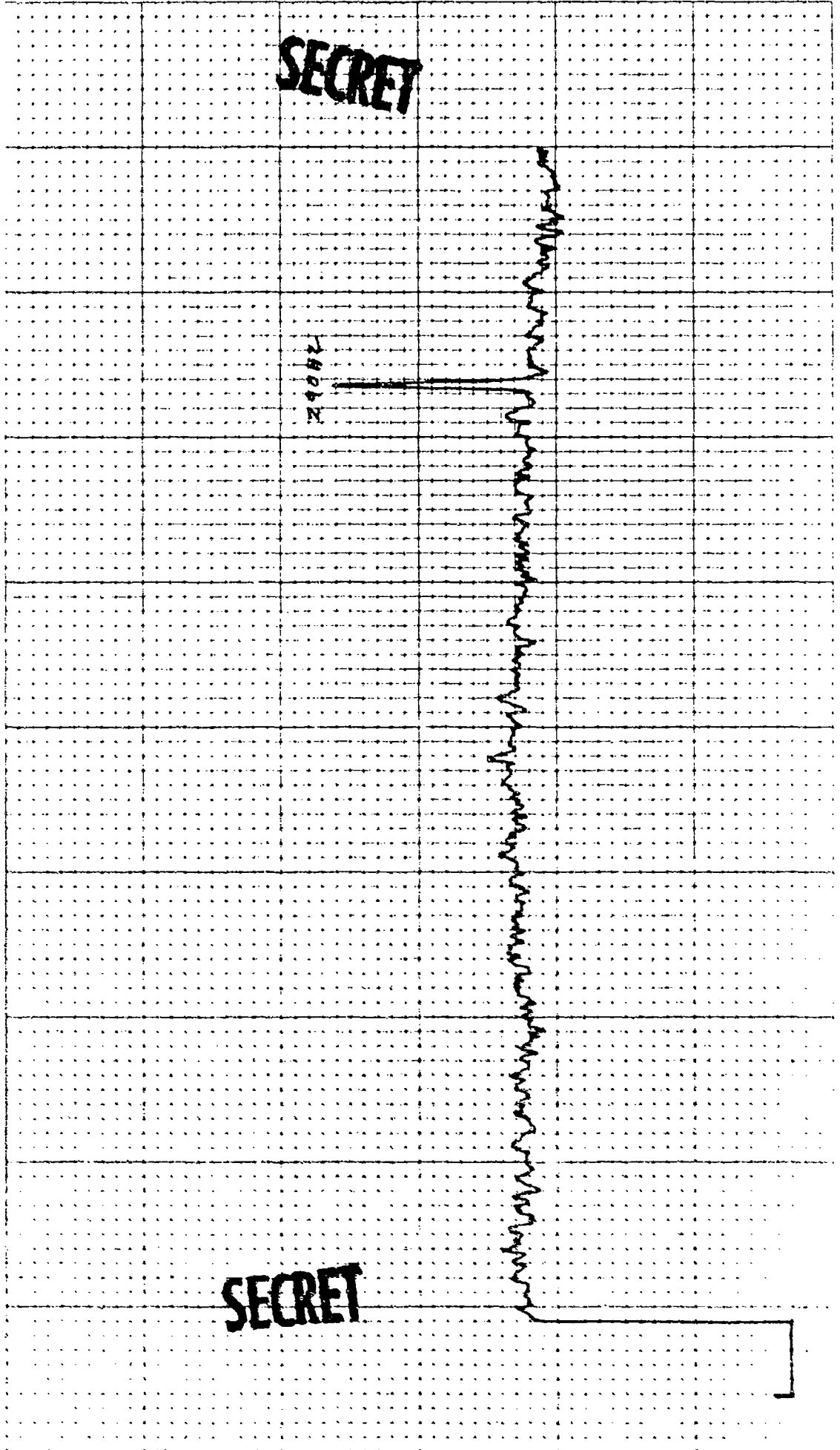
SECRET

SECRET

46 0703

REF ID: A60100

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



46 0703

MOE 1549-16 (DPS)

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

BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTN: -18 DB

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

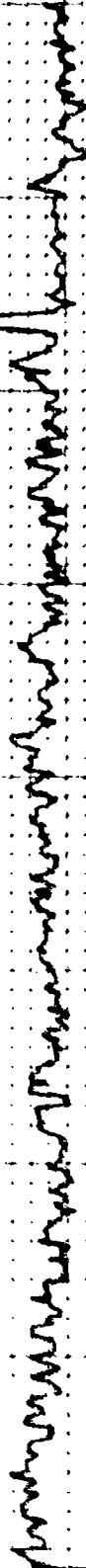
CENTER FREQ: 200 HZ +10 DEG. AZ STEERING

16 ELEMENTS

SECRET

SECRET

290 Hz



46 0703

KOE 2000 2000 2000 2000

CONTROL: 1549 - 16 (DP5)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
16 ELEMENTS

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

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

SECRET

SECRET

2100Z



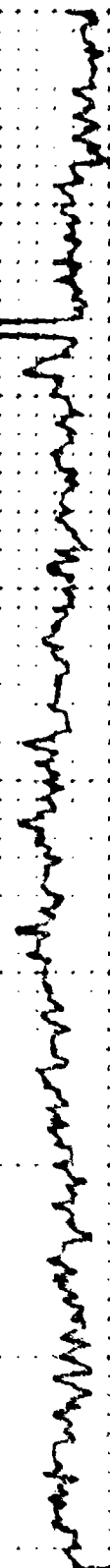
45 0703

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

SECRET

SECRET

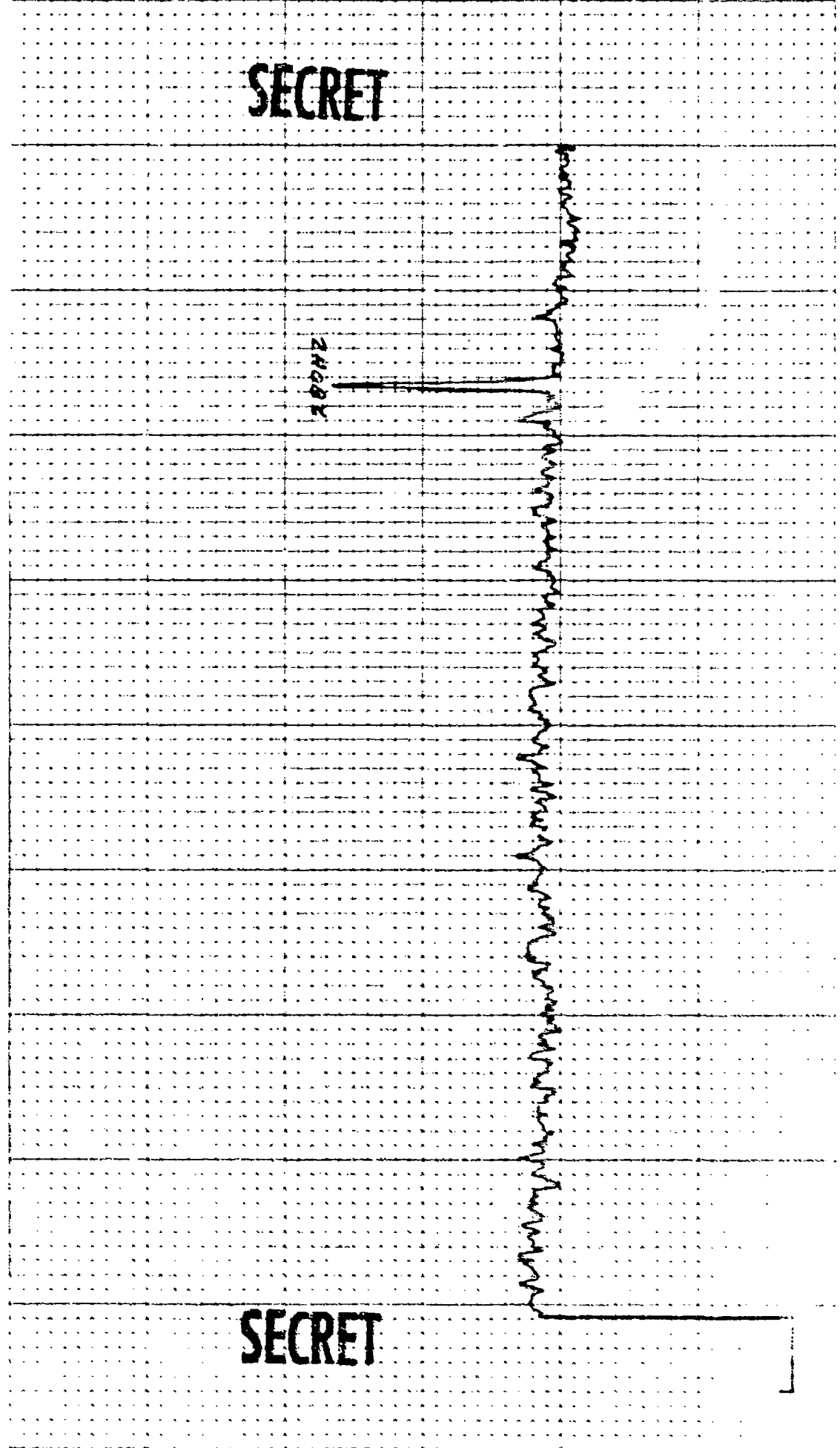
280HZ



46 0703

KOE

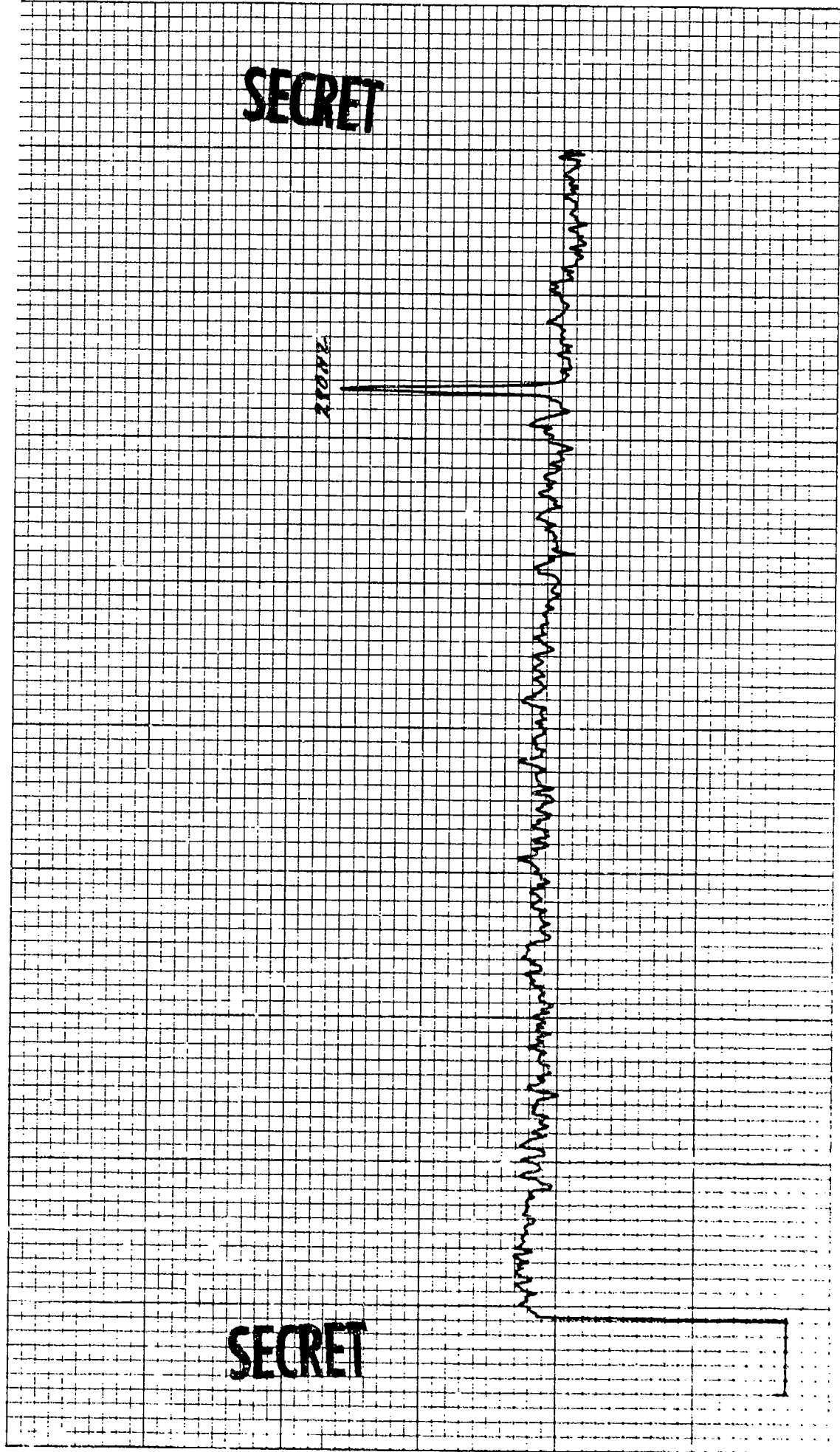
CONTROL: 1549 - 16 (DP5) DATE OF ANALYSIS: 1-16 REEL: F19 INDE X3050
BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-2-77 - 1549 Z INTEGRATION TIME 320 SECS ATTN: 78 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1710HZ FILTER WTC: HANNING
CENTER FREQ: 280 HZ 16 DEG. AZ STEERING



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

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

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



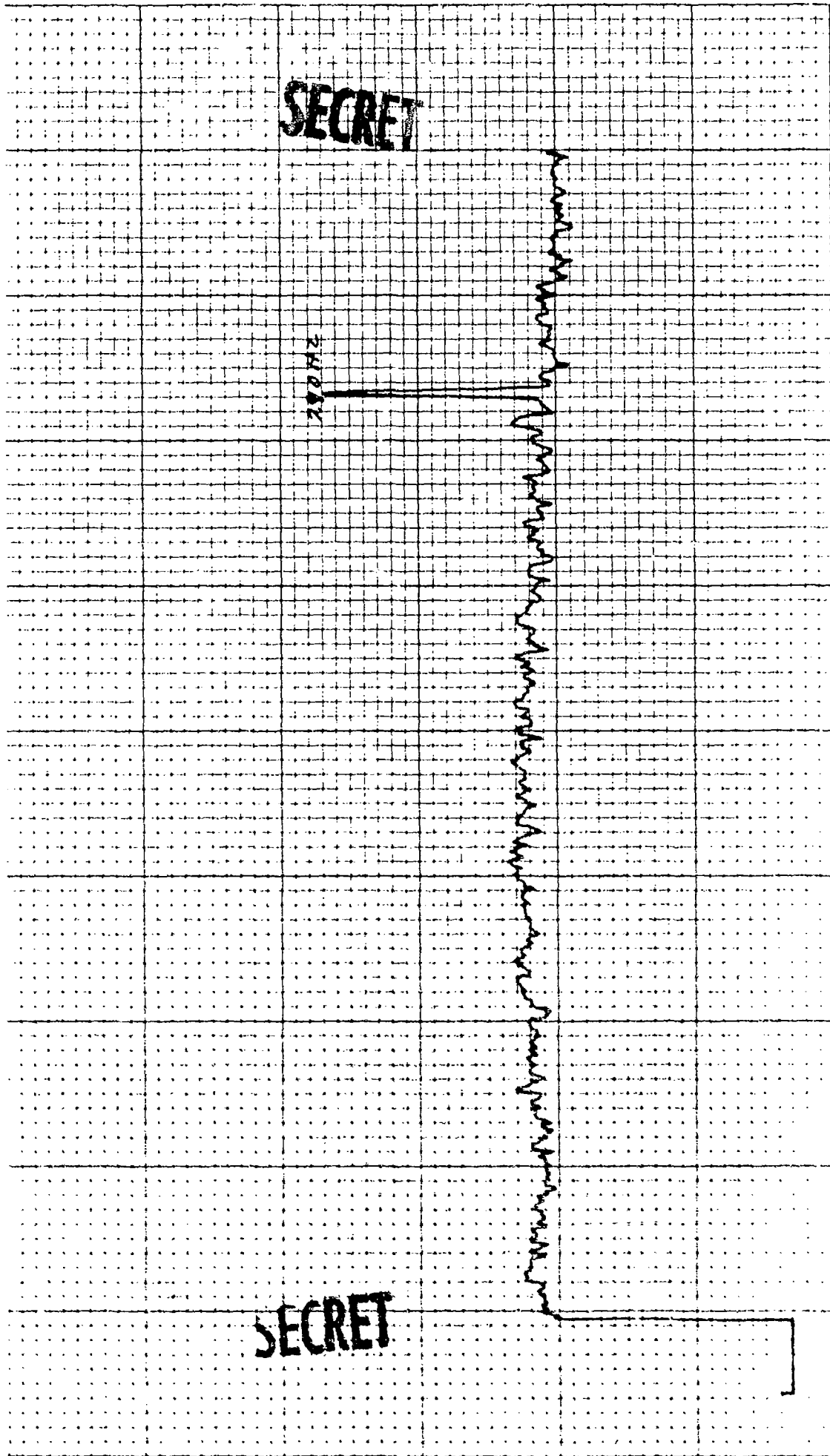
KOE 10.7.10 TO THE DIRECTOR, NSA
PERFORMED SPECTRUM ELEMENTS

46 0703

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

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

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



46 0703

K-Σ 1/16 (0.0625) TO THE INCHES

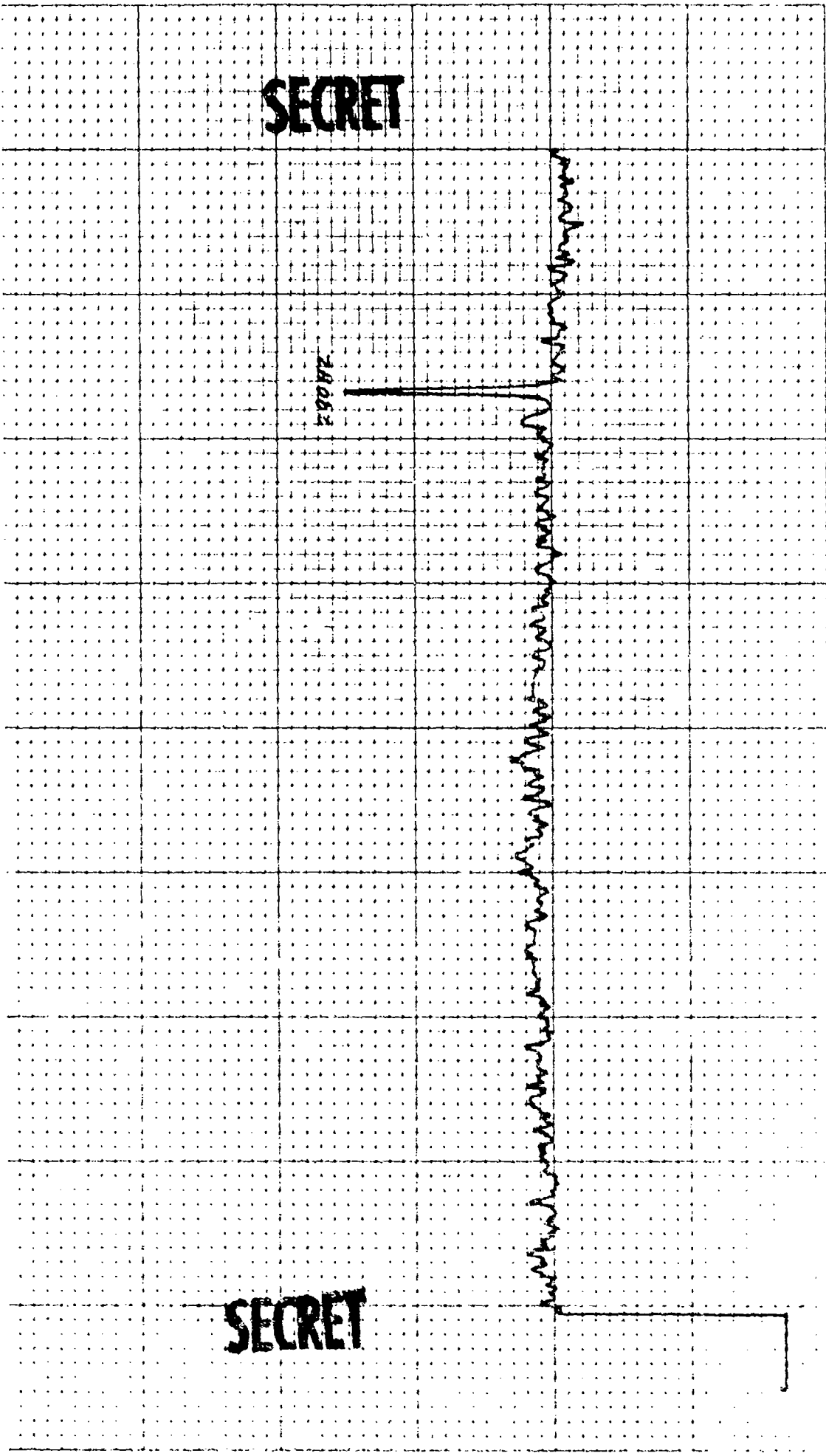
CONTROL: 1549 - 16 (0.0625) DATE OF ANALYSIS: 1-1-77

BEAMFORMED SPECTRUM (ELEMENTS) REEL: F/1 INDE X 3050

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

CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WIG: HANNING

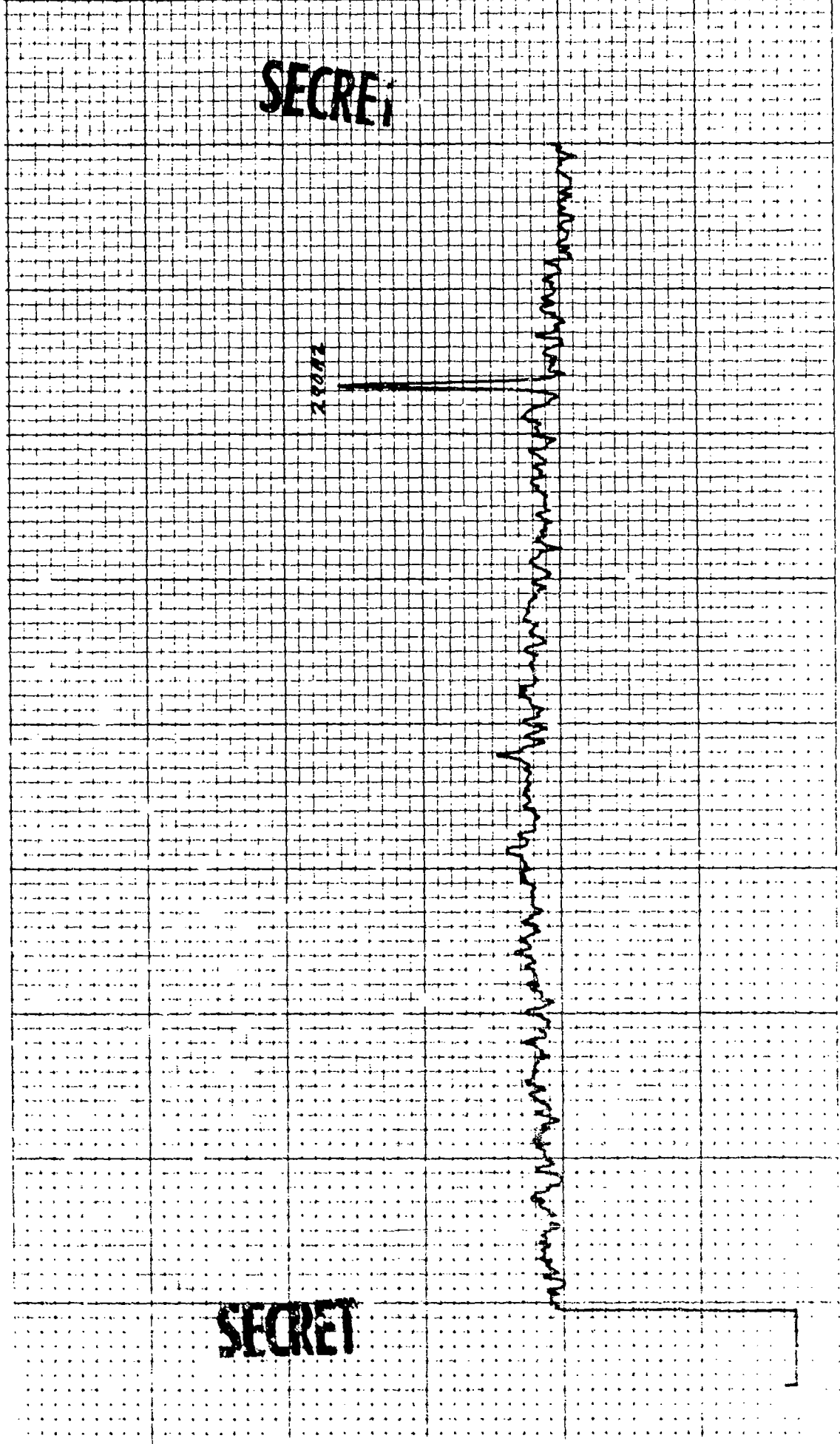
16 ELEMENTS + 72 DEG. AZ STEERING



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

46 0703

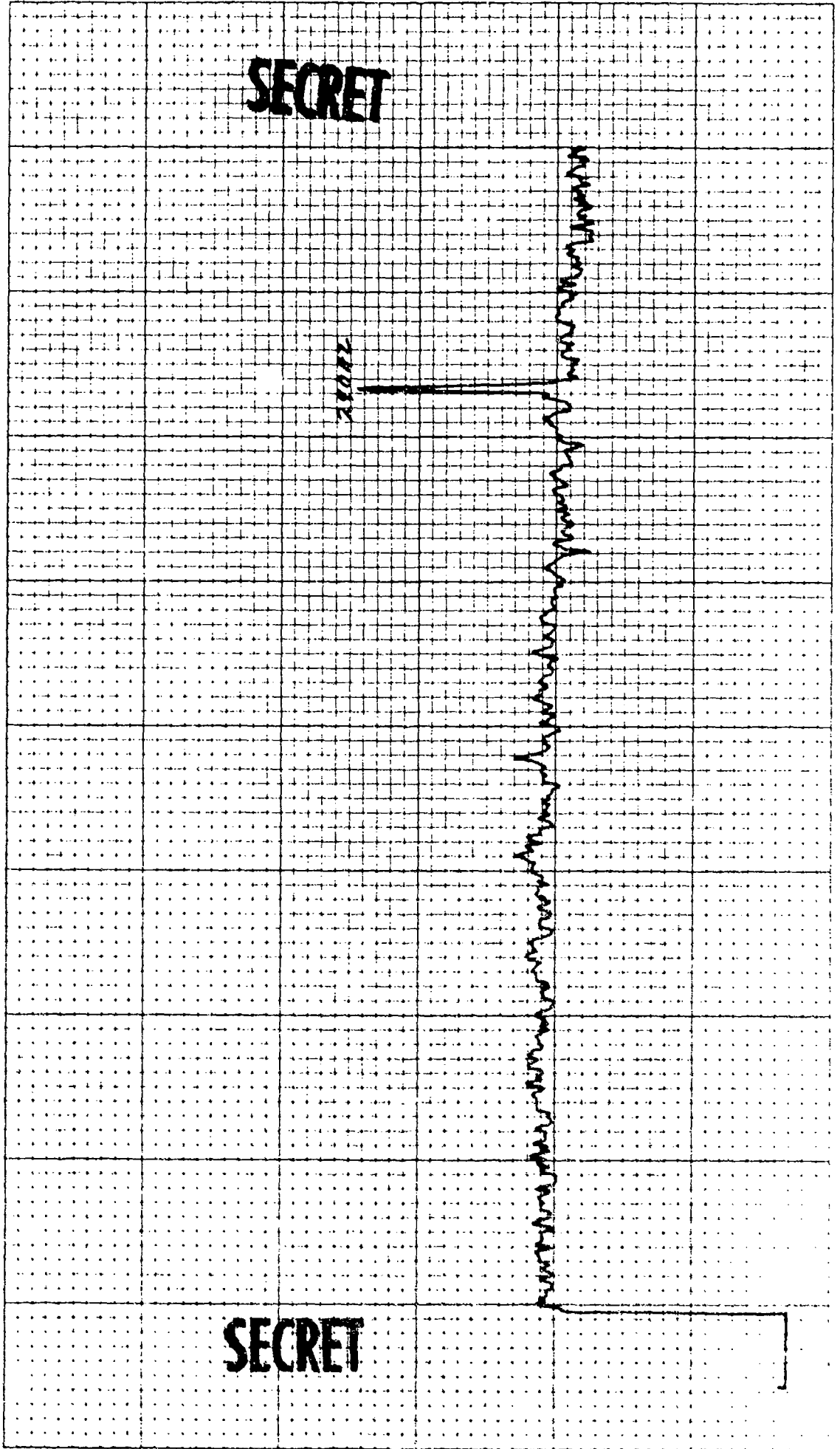
CONTROL: 1549 - 16 (DP5) DATE OF ANALYSIS: 1-16 REEL: 7/6 INDE X 3050
 BEAMPFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-7-77 - 1547 INTEGRATION TIME 320 SECS ATTN: -10 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 CENTER FREQ: 200 HZ +74 DEG. AZ STEERING



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

46 0703

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

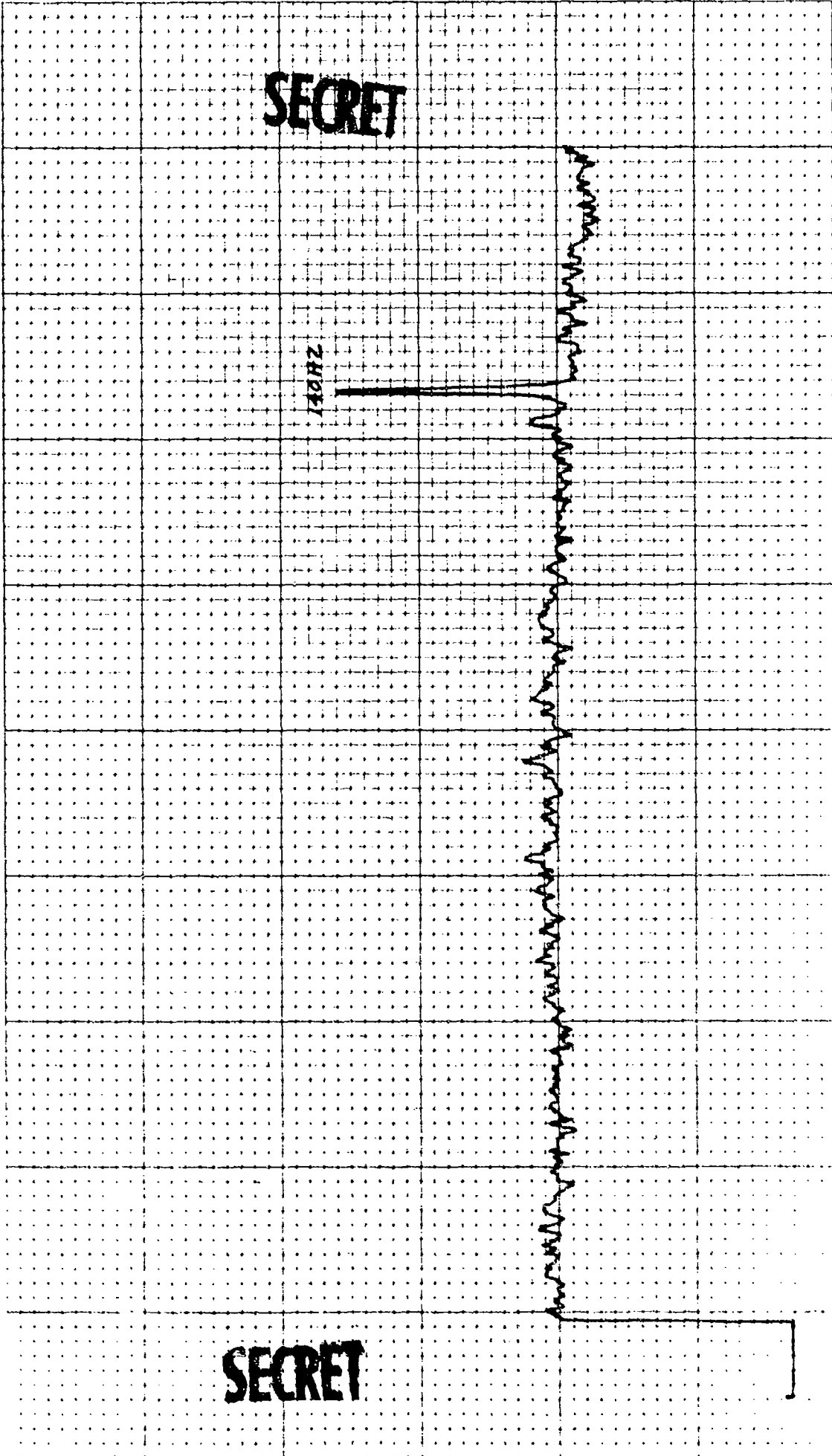


KOE 10.4 IN TO THE INCHES
PER INCH & INCHES OF 10.4 INCHES

46 0703

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

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



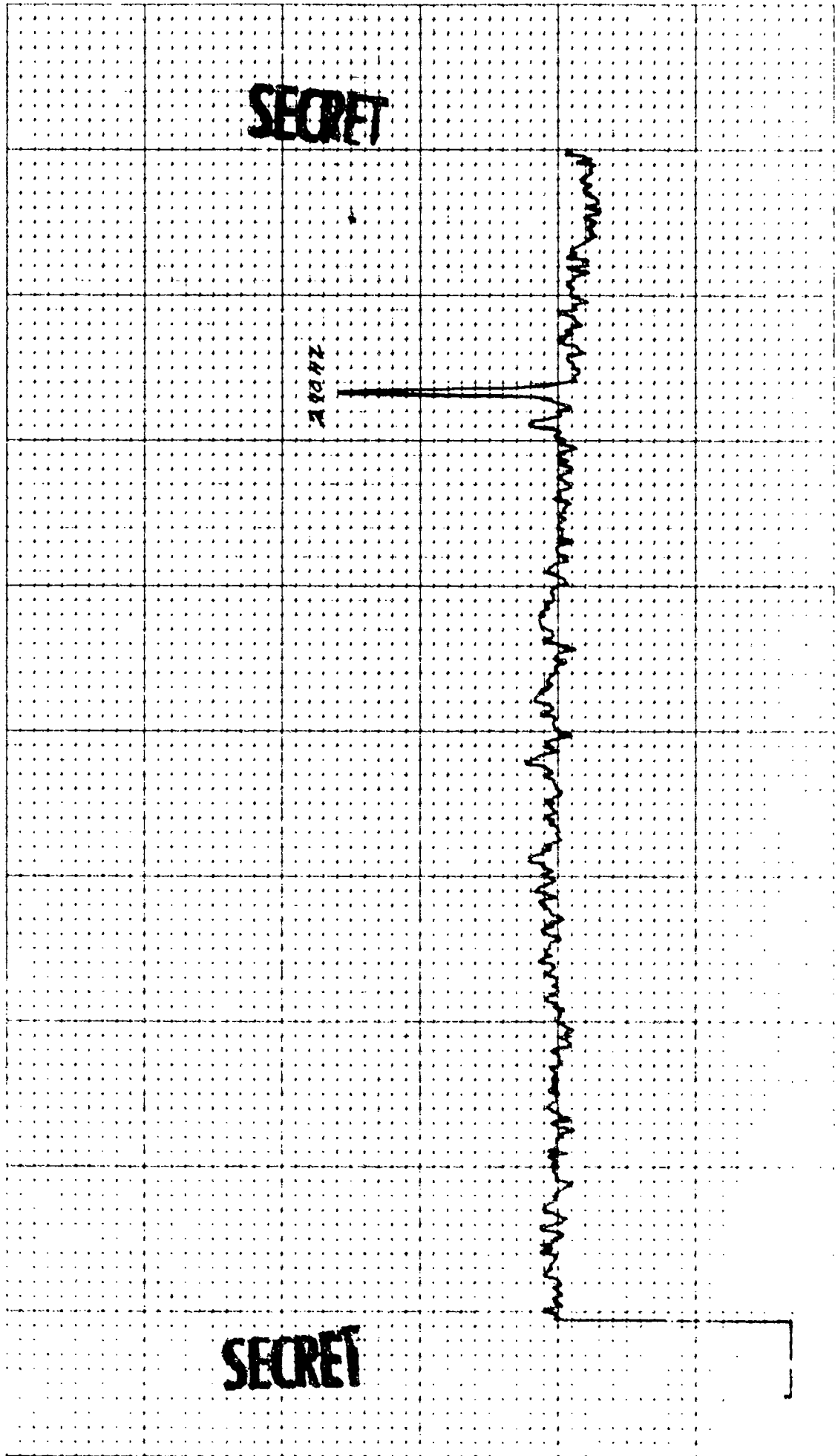
45 0703

MOE 3160 10 THE 1000 2 1000

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

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

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



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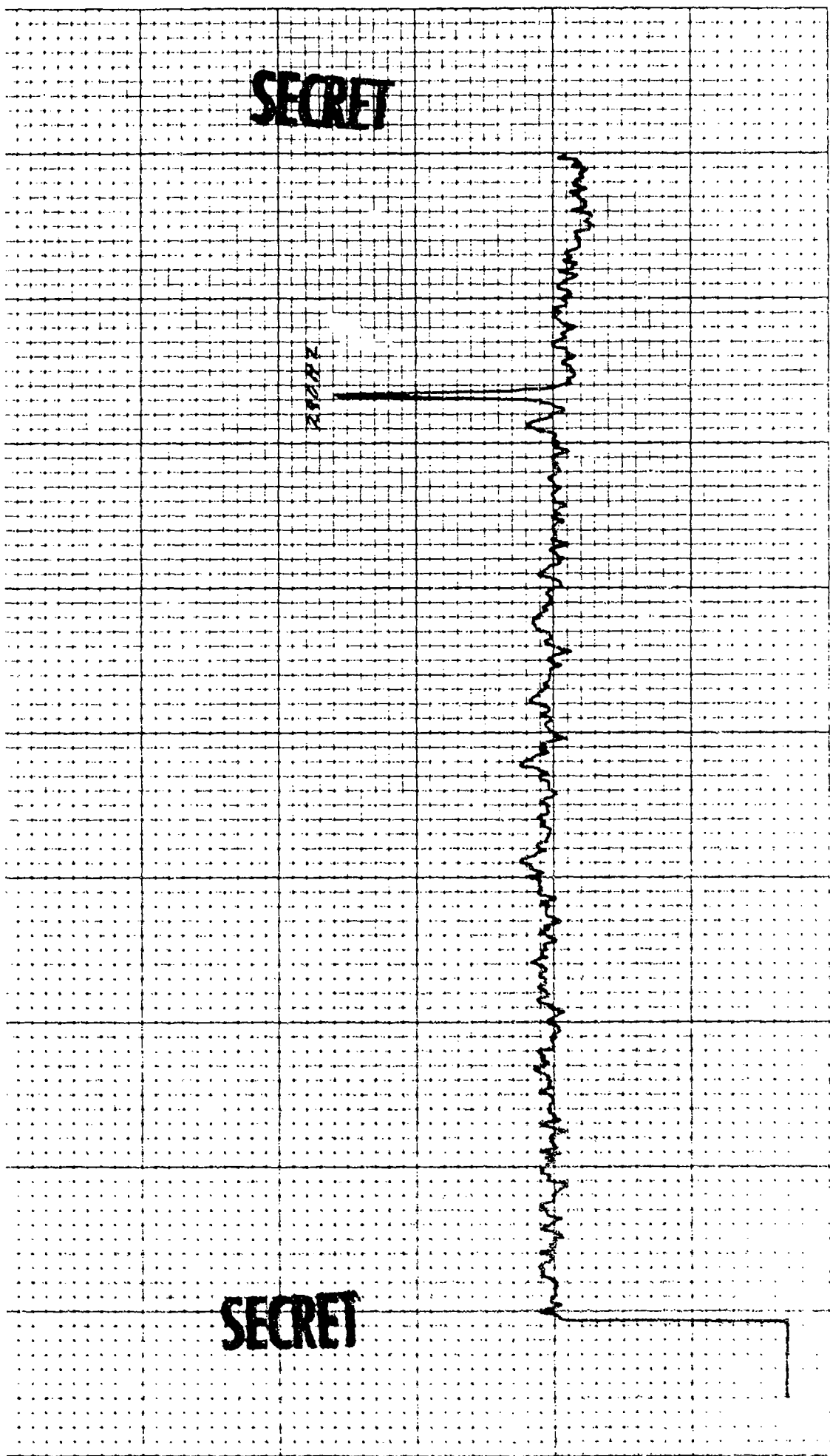
KOE 10 X 10 TO THE (PACMAN) 10 INCHES
PERFECT & FASTER CO. MADE IN U.S.A.

46 0703

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

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

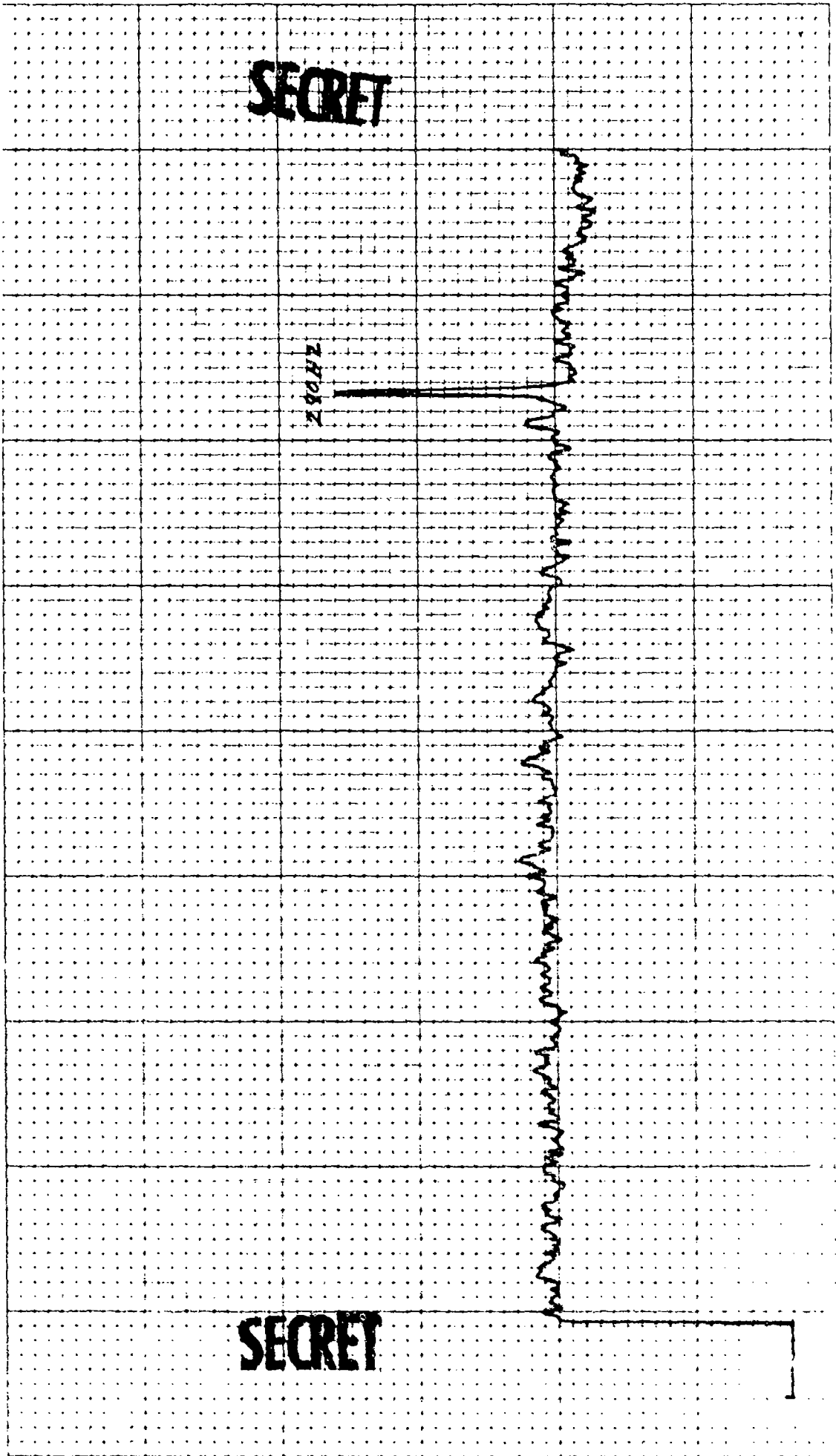
REEL: F19 INDE X 3050
INTEGRATION TIME 320 SECS ATTN: -10 DB
FILTER WTC: HANNING



46 0703

K-E 1549 - 16 (DP5)

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

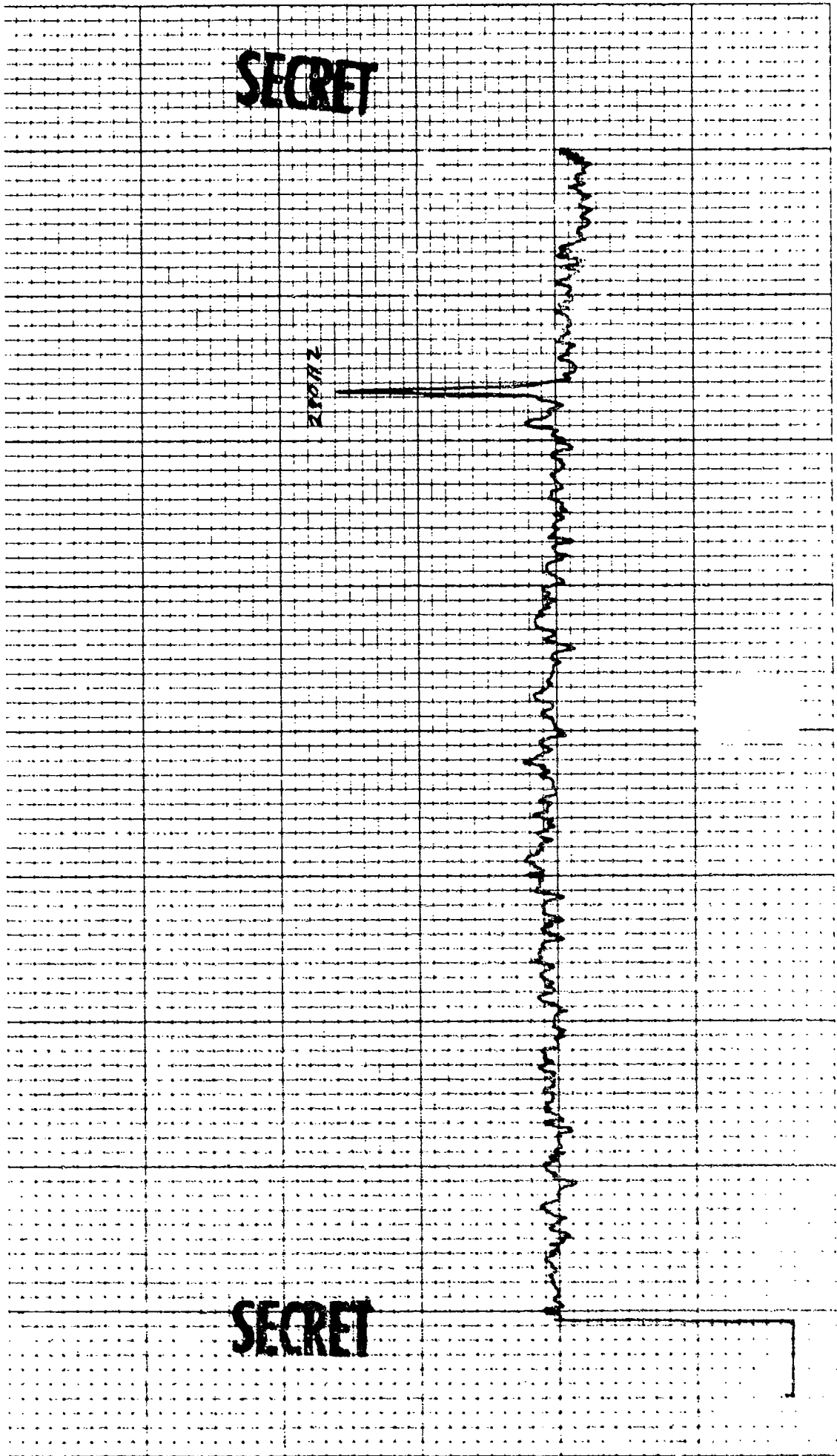


46 0703

KOE 10 X 10 TO THE INCHES 1/2 X 1/2

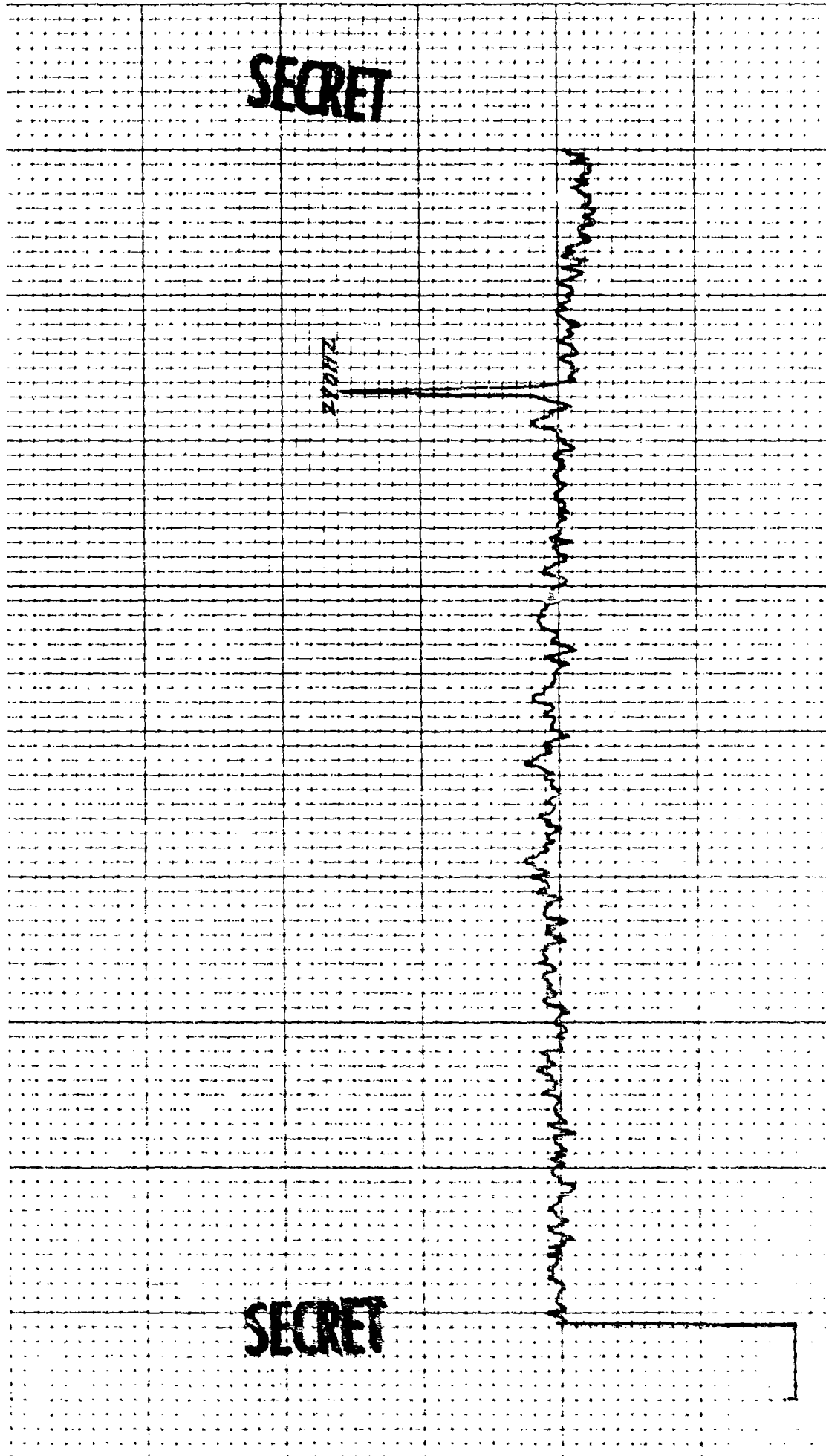
CONTROL: 1549 - 16 (DP5) DATE OF ANALYSIS: - - - -
 BEAMFORMED SPECTRUM (ELEMENTS) / - / 6)
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ
 16 ELEMENTS +86 DEG. AZ STEERING

REEL: F/9 INDE X 3050
 INTEGRATION TIME 320 SECS ATTN: -18 DB
 FILTER WTG: HANNING



CONTROL: 1549 - 16 (SP5) DATE OF ANALYSIS: -- -- --
BEAMFORMED SPECTRUM (ELEMENTS) 1 - 16)
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ
16 ELEMENTS +00 DEG. AZ STEERING

REEL: F19 INDE X 3050
INTEGRATION TIME 320 SECS ATTEN: 70 DB
FILTER WTC: HANNING

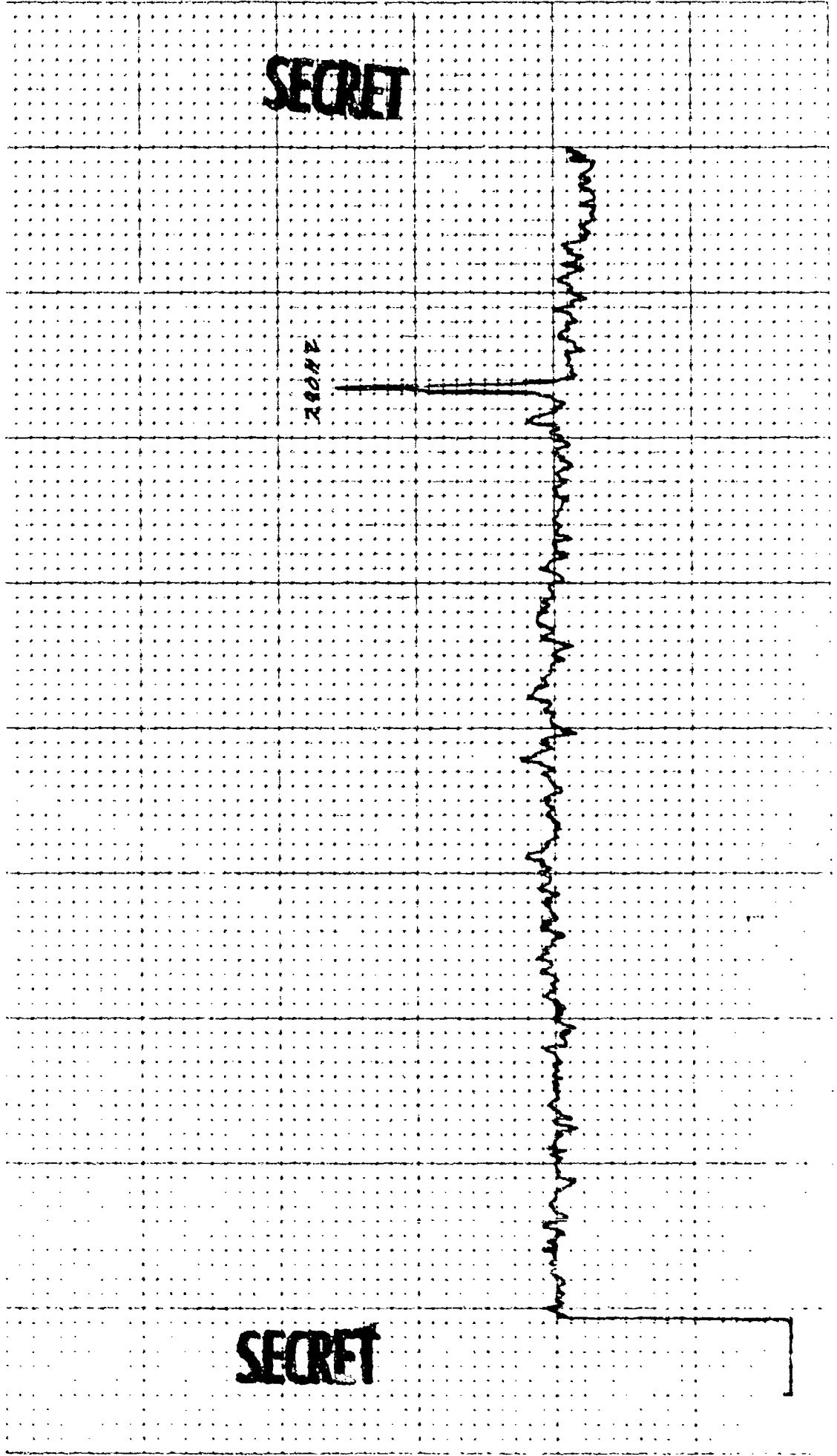


KOE WAVE TO THE DEPT. OF DEFENSE

46 0703

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

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



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CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 5

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

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

NOISE LEVEL

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

SIGNAL-NOISE-RATIO

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

CONFIDENTIAL

Best Available Copy

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 5

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-41.2</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-31.2	
BEAMFORMER GAIN	<u>+24</u>	-7.2	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	-6.4	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-65.9</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-55.9	
BEAMFORMER GAIN	<u>+24</u>	-31.9	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-7.2</u>	
SIGNAL LEVEL FOR SNR	<u>-31.9</u>	24.7	
PROCESSOR CORRECTION	<u>-4.0</u>	20.7	
MRA CORRECTION	<u>+ .8</u>	21.5	SNR 1/2 HZ BAND
BANDWIDTH CORRECTION	<u>-8.2</u>	13.3	SNR 1 HZ BAND

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DATA POINT 5

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-30.0</u>	<u>-33.1</u>	<u> </u>
MRA SIGNAL LEVEL	<u>+ 2.9</u>	<u>- 6.4</u>	<u> </u>
ARRAY SIGNAL GAIN	<u>+32.9</u>	<u>+26.7</u>	<u> </u>
20 LOG <u>32</u>	<u>30.1</u>	<u>30.1</u>	<u> </u>
# of elements			
DIFFERENCE	<u>+ 2.8</u>	<u>- 3.4</u>	<u> </u>

ARRAY GAIN

MRA SNR	<u>25.7</u>	<u>25.5</u>	<u> </u>
MEAN OMNI SNR	<u>9.3</u>	<u>10.5</u>	<u> </u>
ARRAY GAIN	<u>16.4</u>	<u>15.0</u>	<u> </u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>12.2</u>	<u>14.6</u>	<u> </u>
DIFFERENCE	<u>+ 4.2</u>	<u>+ .4</u>	<u> </u>

CONFIDENTIAL

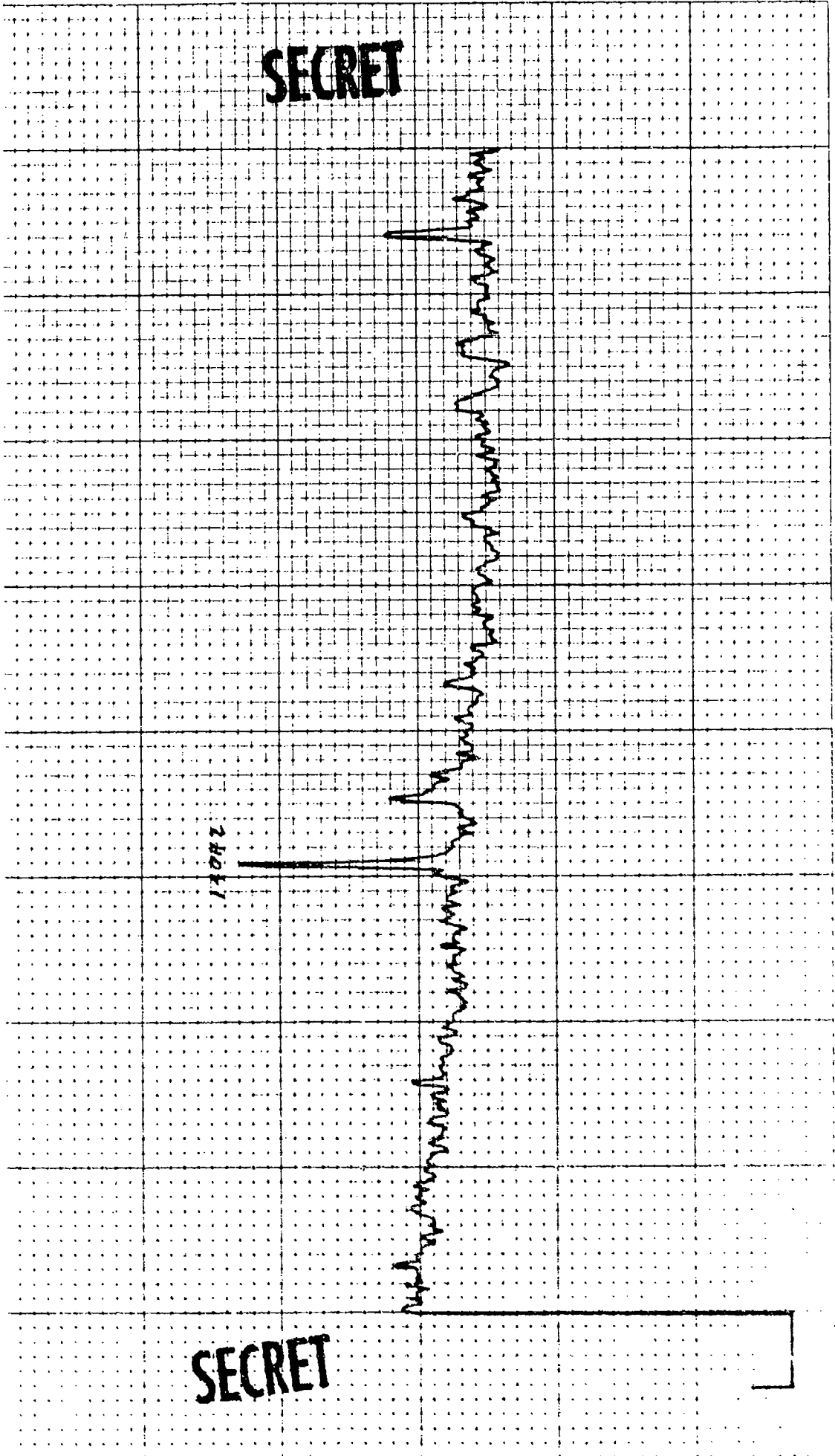
46 0703

KOE DE PIRE TO THE INCHES...

CONTROL: 1549 - J2 (2P5) DATE OF ANALYSIS: 1-26-77 REEL: F19 INDE X 3050
 BEAMFORMED SPECTRUM (ELEMENTS 29-34)
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 -1549 Z INTEGRATION TIME 320 SECS ATTN: -24 DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
32 ELEMENTS + 34 DEG. AZ STEERING

SECRET

SECRET



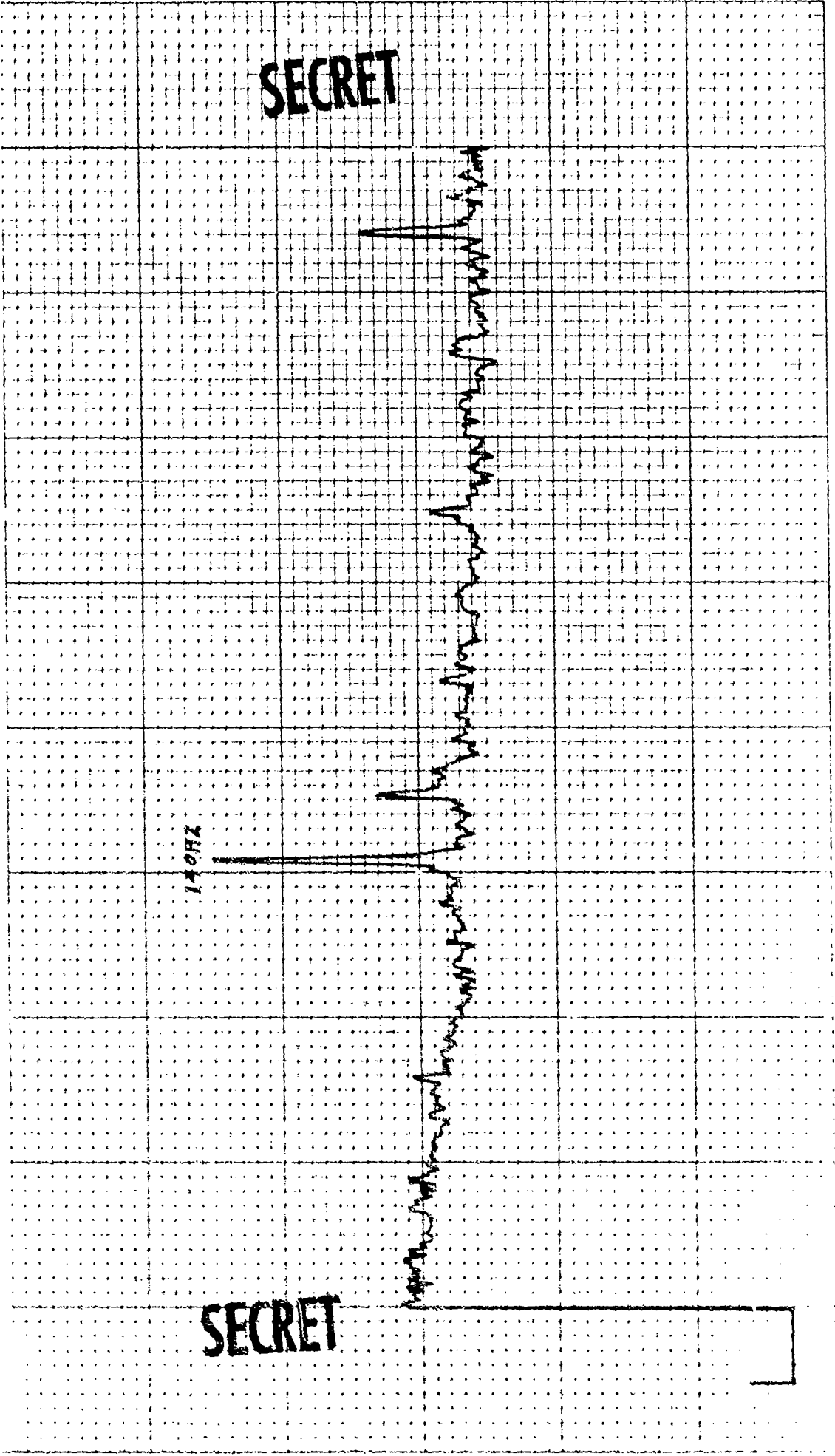
46 0703

REF ID: A6 0703

CONTROL: 1549 - 32 (DPS) DATE OF ANALYSIS: -- -- --
 BEAMFORMEL SPECTRUM(ELEMENTS) 1-26 @ 29-34)
 EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTEN: -24DB
 CENTER FREQ: 150 HZ FILTER WTG: HANNING
 32 ELEMENTS +36 DEG. AZ STEERING ANALYSIS BANDWIDTH: 1/10HZ

REEL: F19

INDE X 3050



SECRET

SECRET

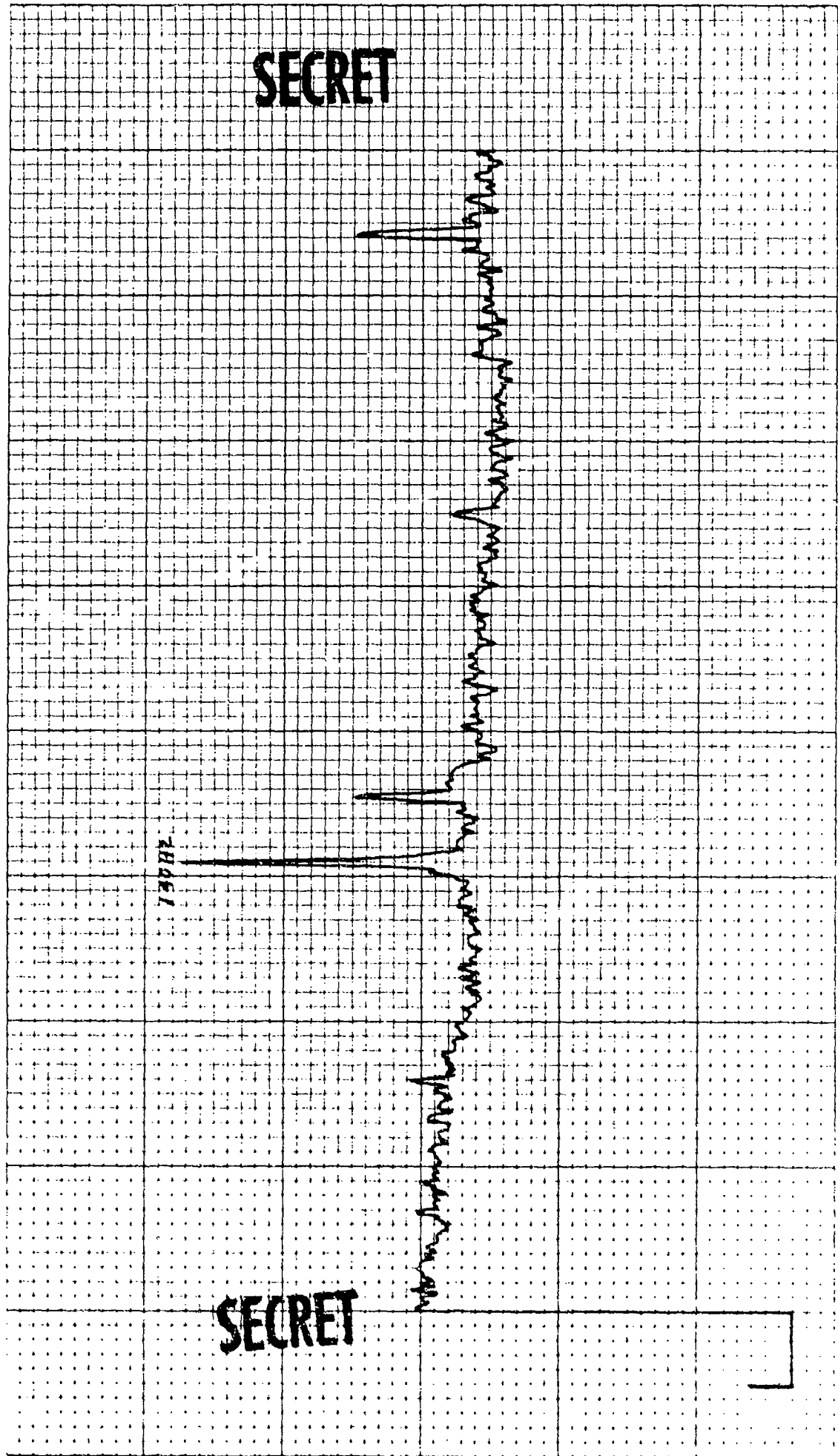
46 0703

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

CONTROL: 1549 - 32 (205)
 BEAMFORMED SPECTRUM (ELEMENTS) 1-26 4 29-34)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 32 ELEMENTS

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

REEL: F19
 INTEGRATION TIME 320 SECS
 FILTER WTC: HANNING
 INDE X3050
 ATTN: -2YDB



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SECRET

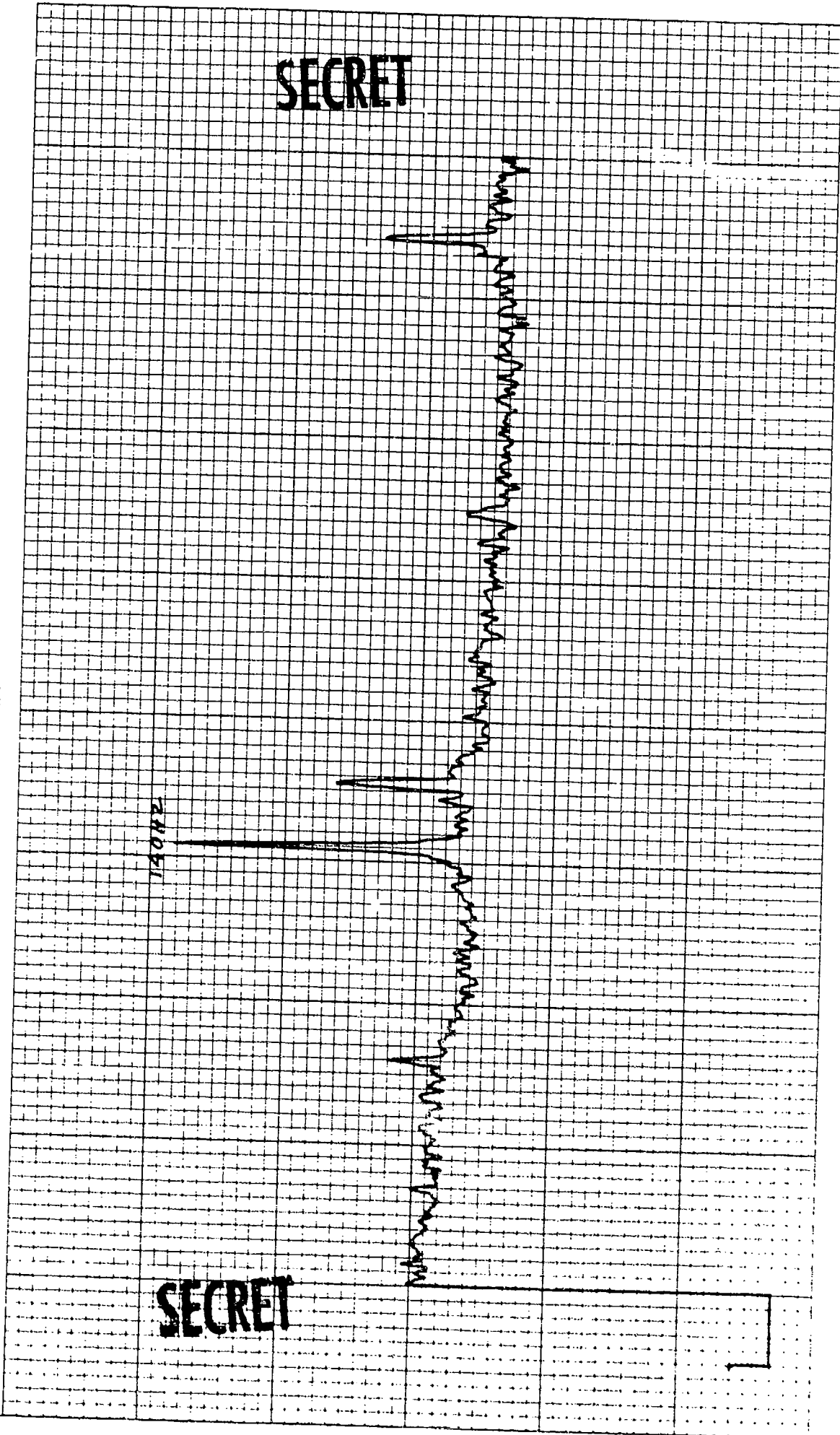
KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
NEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 1549 - 3λ (DP5)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
3λ ELEMENTS

DATE OF ANALYSIS: 1-26-77
DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 40 DEG. AZ STEERING

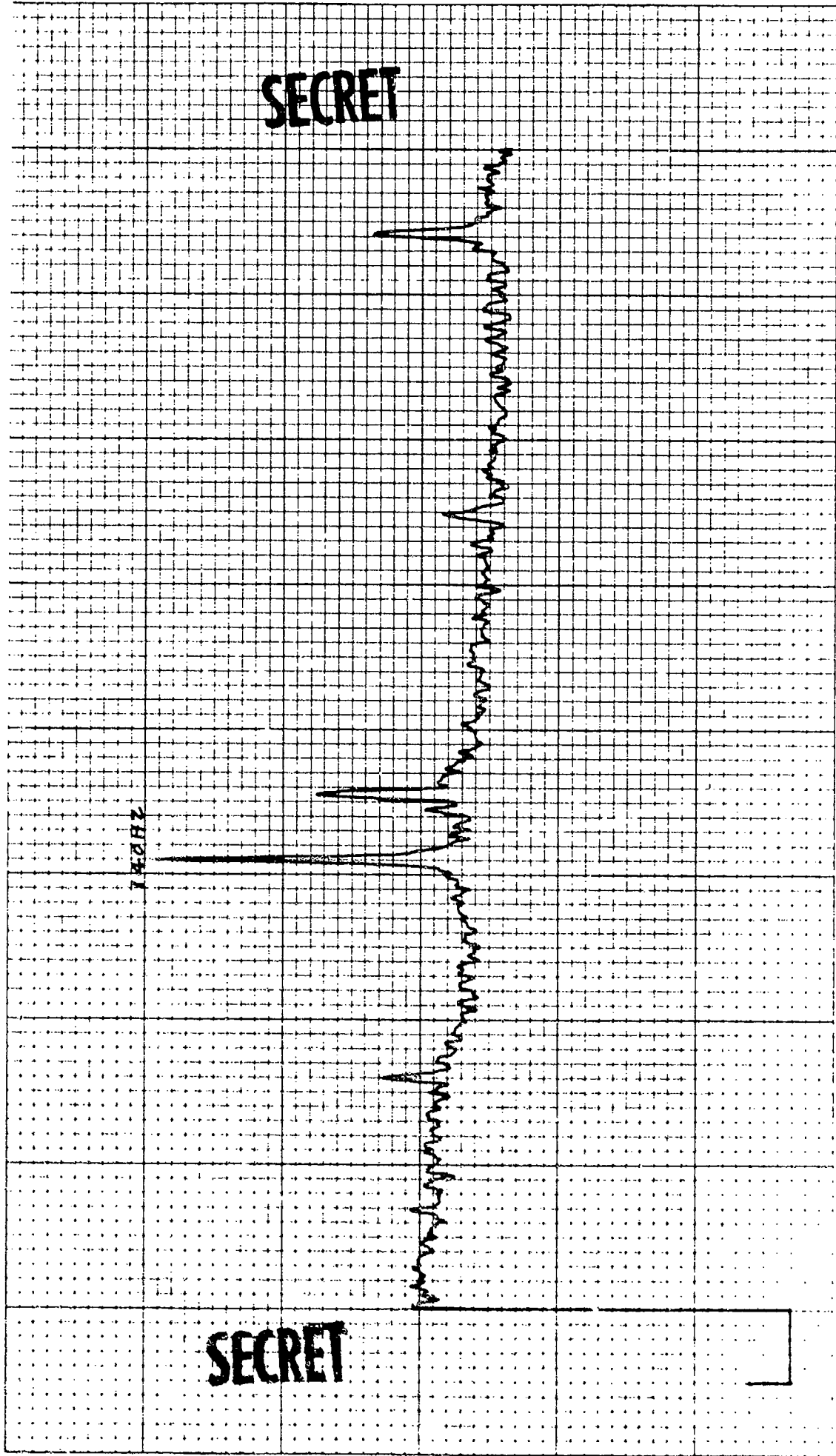
REEL: F19
INDE X3050
INTEGRATION TIME 320 SECS
ATTEN: -24 DB
FILTER
WTG: HANNING



KOE 10 X 16 TO THE INCHES
PEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 1549 - 32 (205) DATE OF ANALYSIS: 1-26-77 REEL: F19 INDE X 3050
 BEAMFORMED SPECTRUM (ELEMENTS) 29-34 INTEGRATION TIME 320 SECS ATTN: -24 DB
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z FILTER WTC: HANNING
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
32 ELEMENTS +42 DEG. AZ STEERING



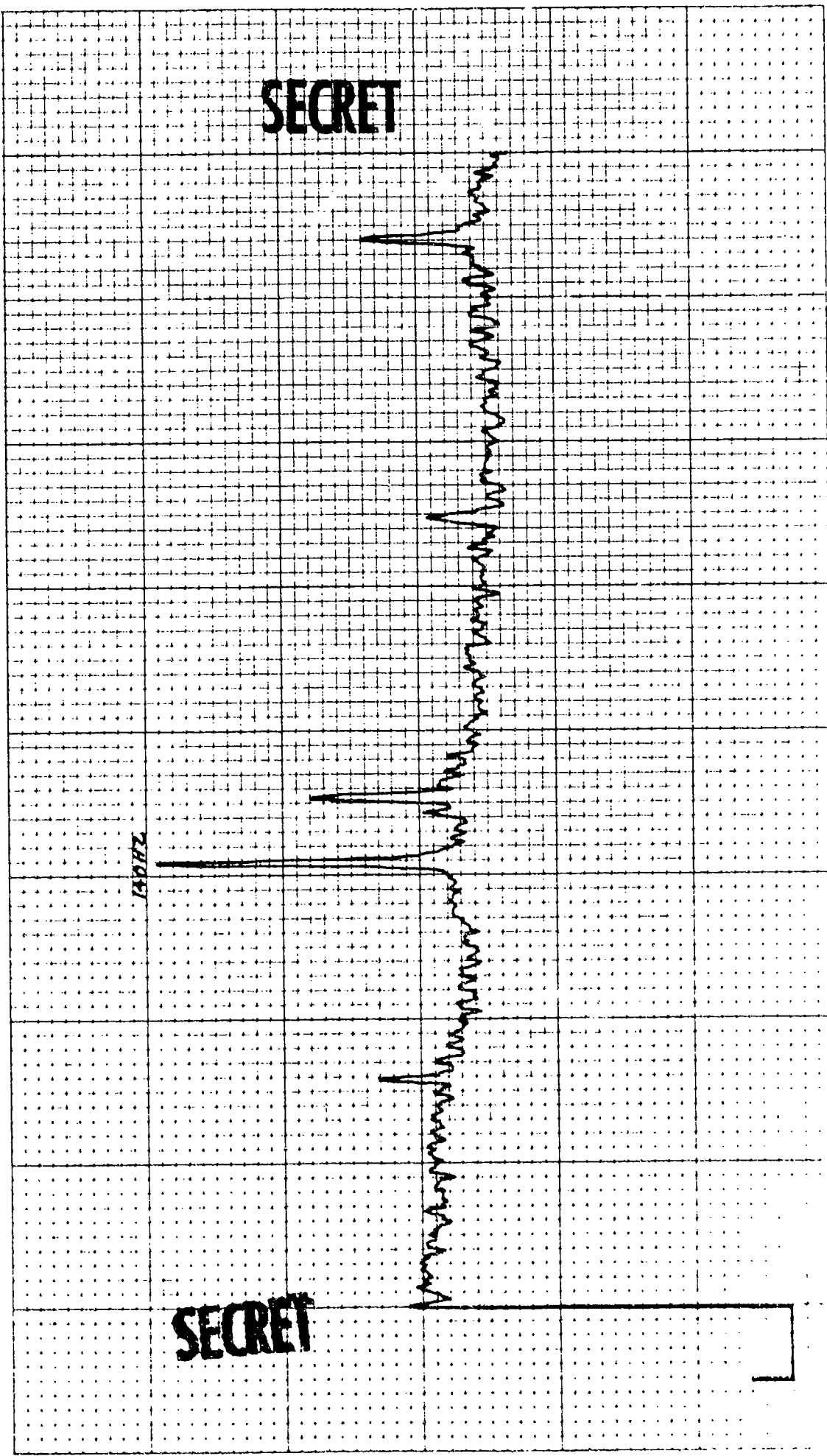
KOE 10 X 10 TO THE INCHES
PEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 1549 - 51 (DP5)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS

DATE OF ANALYSIS: _____
1-26-77
DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+43 DEG. AZ STEERING

REEL: F19 INDE X3060
INTEGRATION TIME 320 SECS ATTN: 24 DB
FILTER WIG WIG: HANNING

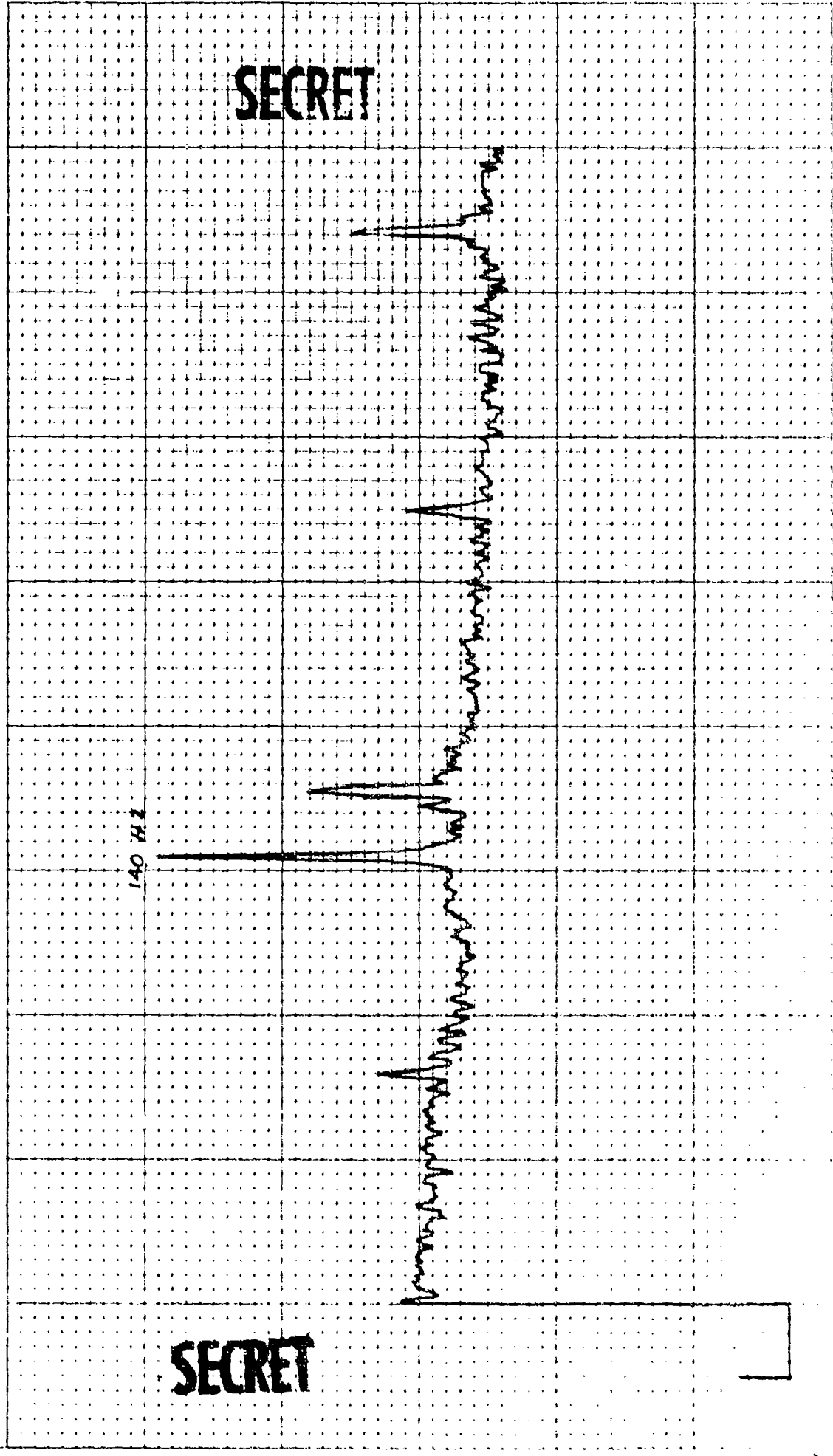


46 0703

KOE 20.4 IN TO THE INCH: 20.4 INCHES

CONTROL: 1549 - 32 (DPS) DATE OF ANALYSIS: - - - -
 BEAMFORMED SPECTRUM (ELEMENTS) 1-26-82 29-3Y
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
 32 ELEMENTS + 44 DEG. AZ STEERING

REEL: F19 INDE X 3050
 INTEGRATION TIME 320 SECS ATTEN: -2V DB
 FILTER WTG: HANNING



15

46 0703

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

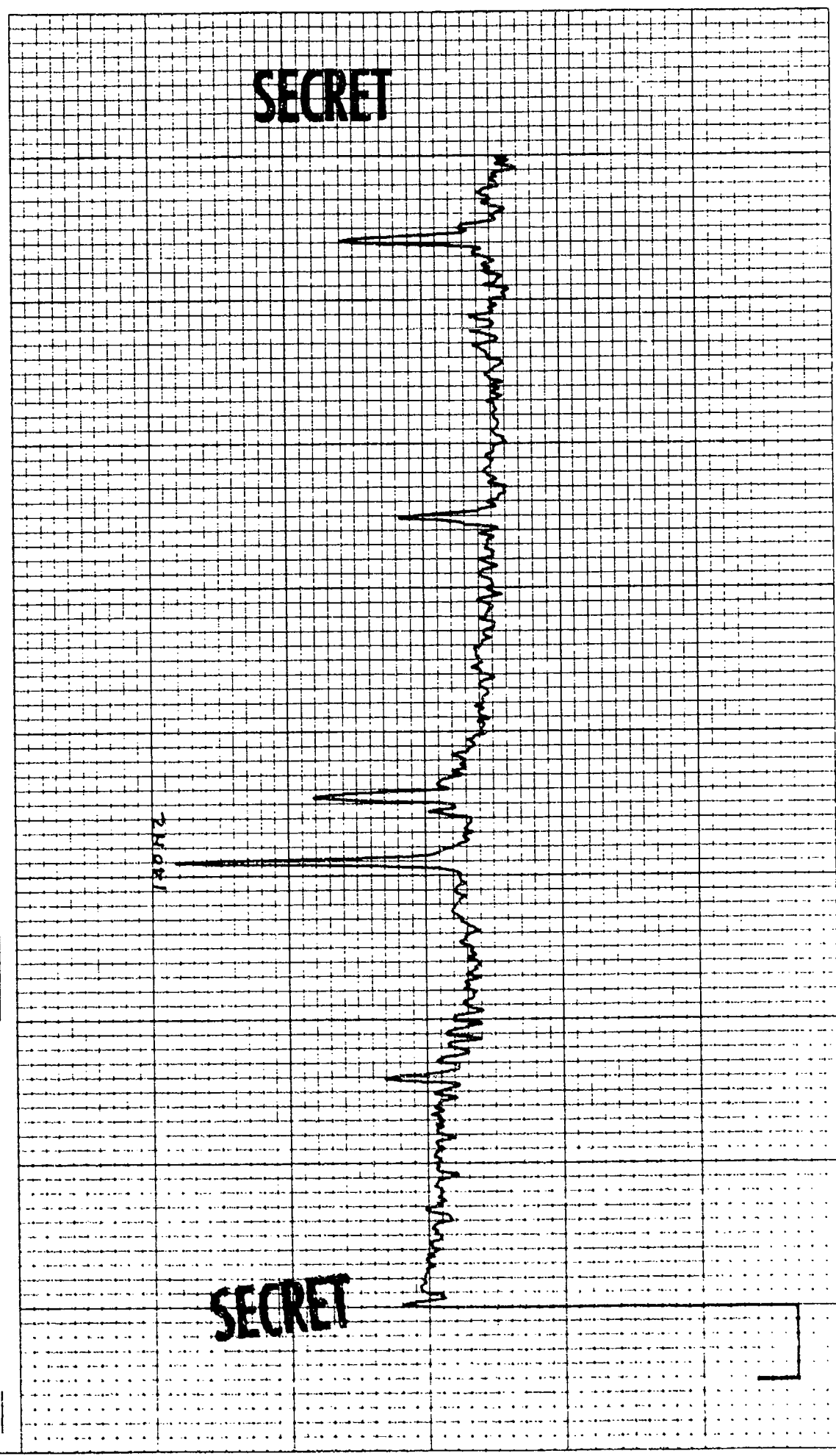
7-306

CONTROL: 1549 - 32 (DPS) DATE OF ANALYSIS: -- -- --
 BEAMFORMED SPECTRUM(ELEMENTS) 1-26 4 29-34
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
 32 ELEMENTS + 46 DEG. AZ STEERING

REEL: F19

INDE X 3050

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



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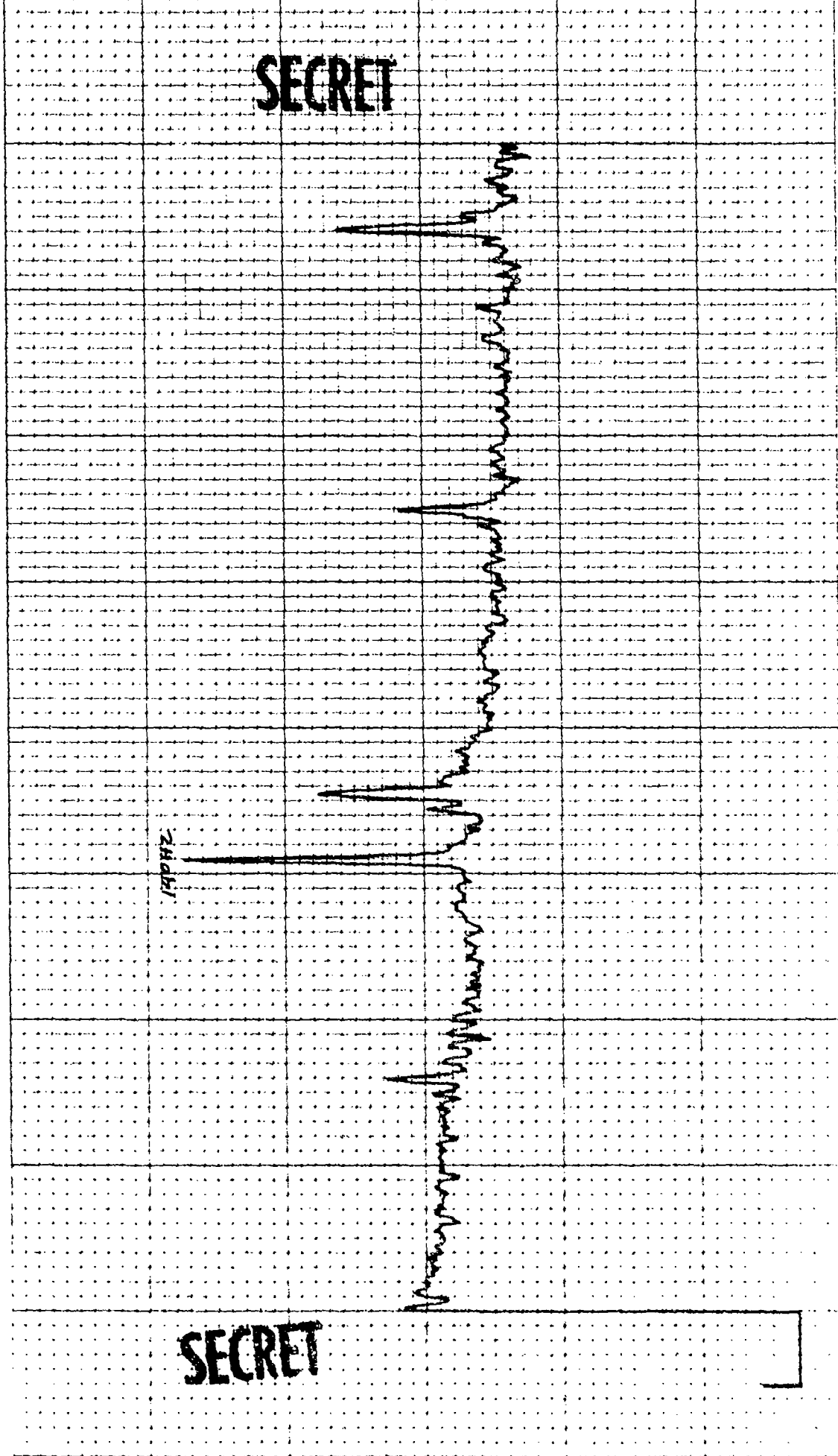
SECRET

46 0703

KSE 15.4 MG TO THE INCH (0.25 INCHES)
WEIGHT WASSER CO. MADE IN U.S.A.

CONTROL: 1549 - 32 (DP5) DATE OF ANALYSIS: 1-26-77
 BEAMFORMED SPECTRUM(ELEMENTS) 29-34)
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
 32 ELEMENTS 440 DEG. AZ STEERING

REEL: F19 INDE X 3050
 INTEGRATION TIME 320 SECS ATTEN: -24 DB
 FILTER WTG: HANNING

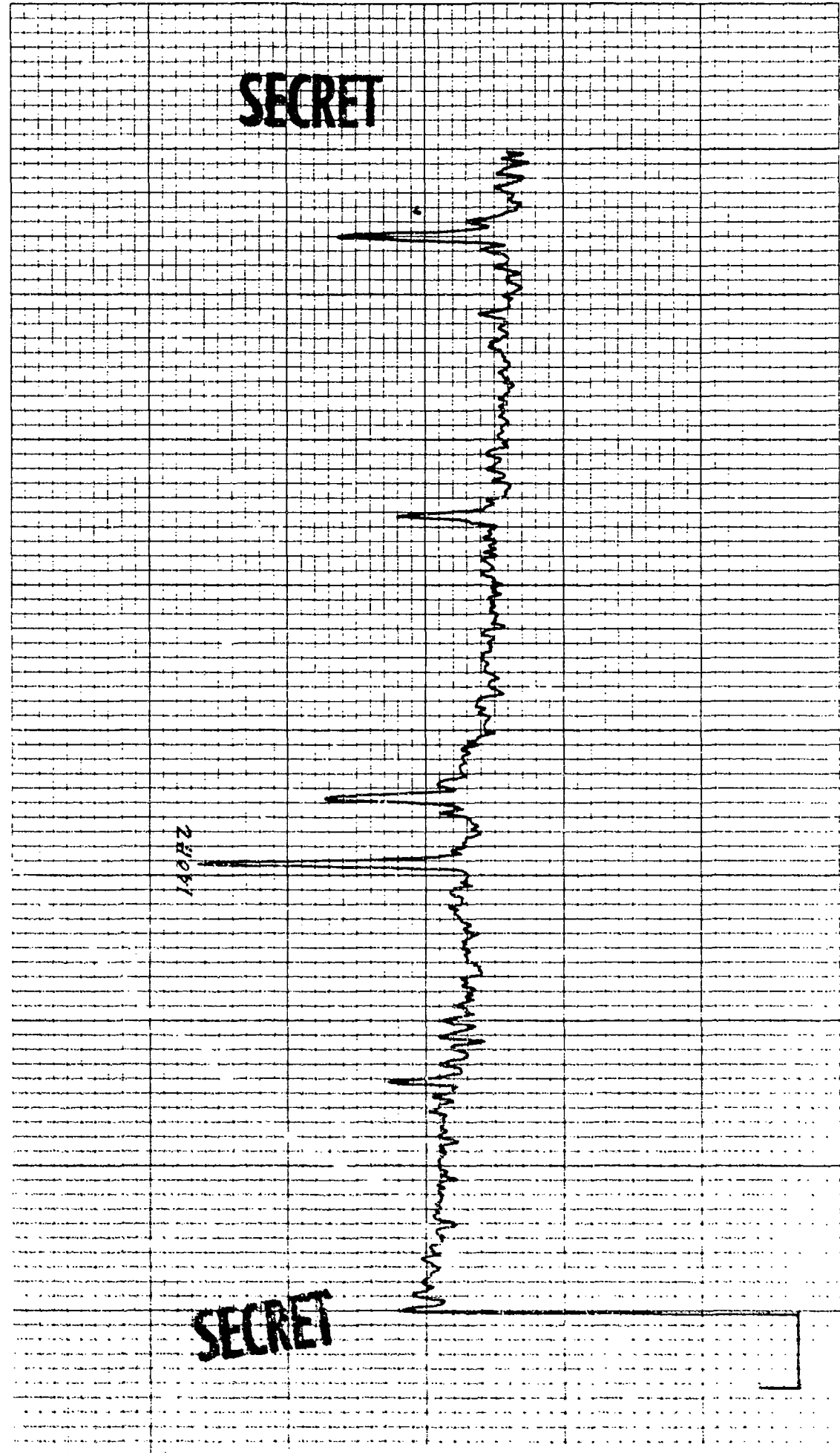


CONTROL: 1549 - 32 (DP5) DATE OF ANALYSIS: 1-26-77 1549 Z REEL: F11 INDE X3050

BEAMFORMED SPECTRUM (ELEMENTS) ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: -24 DB

EXERCISE: BEARING STAKE +49 DEG. 1.4 STEERING FILTER WTG: HANNING

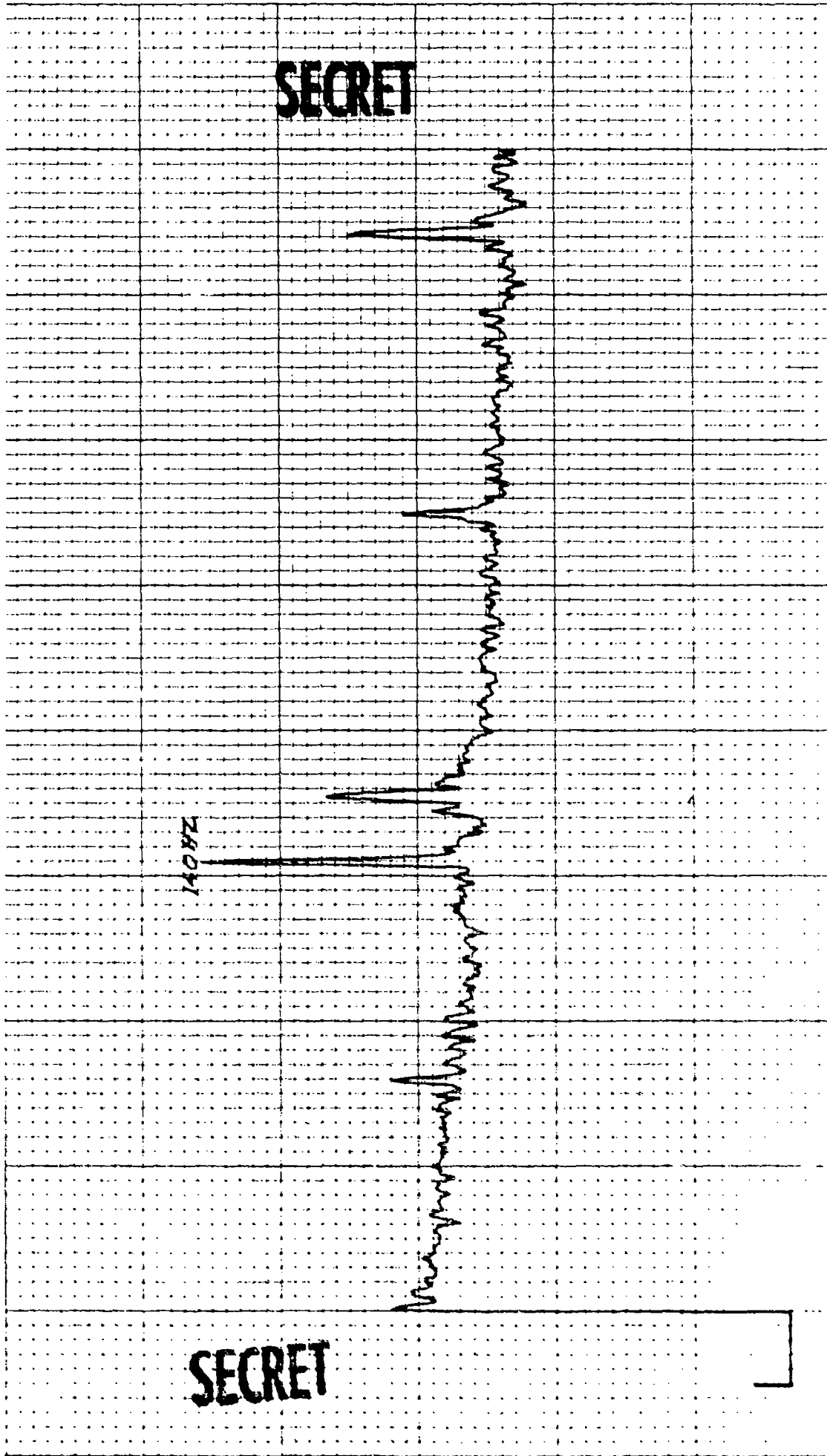
CENTER FREQ: 150 HZ 32 ELEMENTS



WSE 107 TO THE WCHS. 107-107-107
MERRILL & ASSOC. CO. 107-107-107

46 0703

CONTROL: 1549 - 32 (MPS) DATE OF ANALYSIS: REEL: F19 INDE X 3050
BEAMFORMED SPECTRUM (ELEMENTS) 1-20-77 29-34
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTN: -24 DB
CENTR FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
32 ELEMENTS + 50 DEG. AZ STEERING



SECRET

SECRET

46 0703

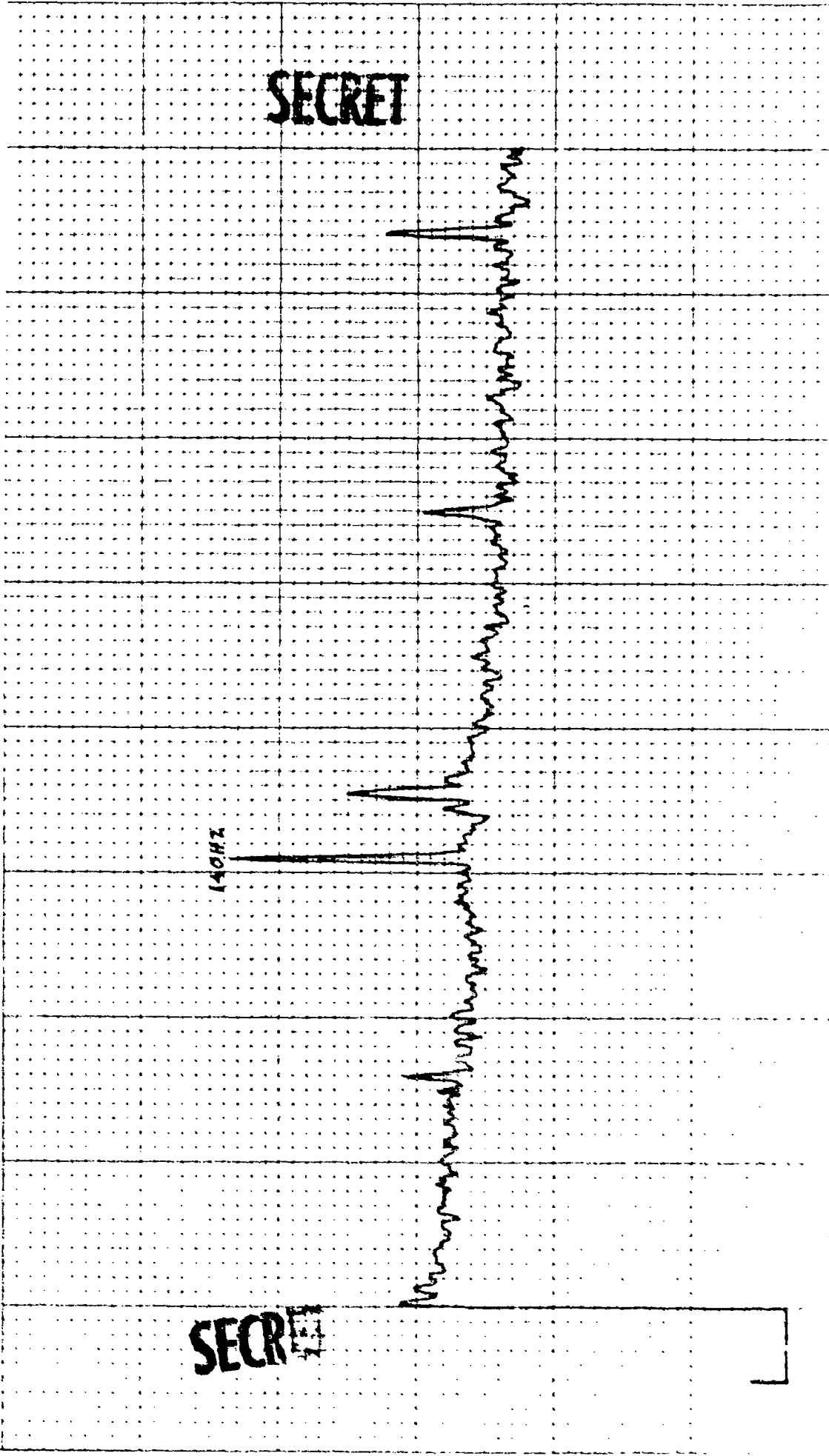
CONTROL: 1549 - 32 (D05)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 32 ELEMENTS

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

REEL: F19
 INTEGRATION TIME 320 SECS
 FILTER WTC: HANNING

DATE/TIME: 2-7-77 - 1540 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 +52 DEG. AZ STEERING

INDE X 3050



SECRET

46 0703

KSE 1549 TO THE DEPT OF DEFENSE

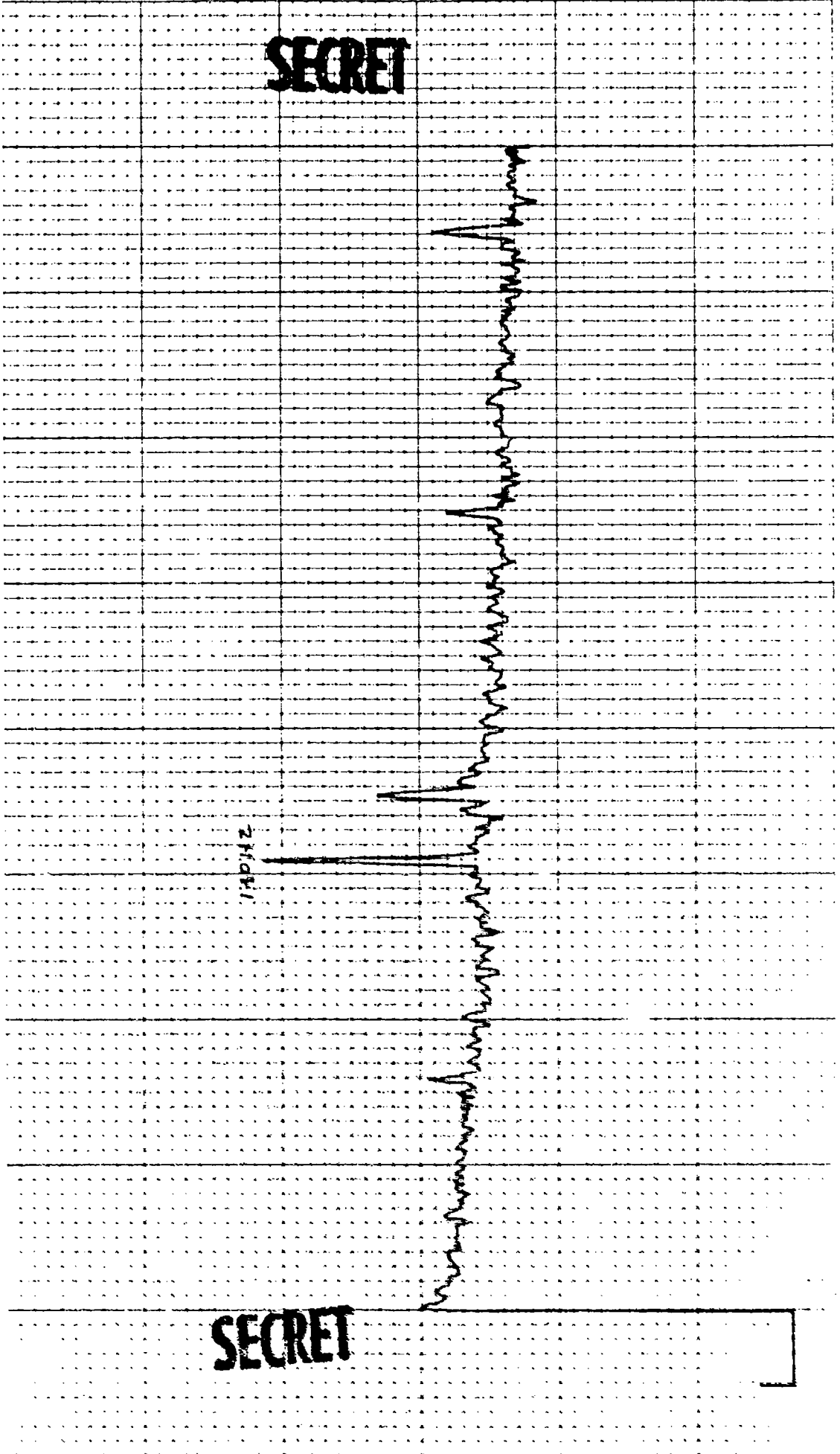
CONTROL: 1549 - 32 (DP5) DATE OF ANALYSIS: REEL: F/9 INDE X 3050

BEAMFORMED SPECTRUM(ELEMENTS) 1 - 26 & 28-34 INTEGRATION TIME 320 SECS ATTEN: -24DB

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

CENTER FREQ: 154 HZ ANALYSIS BANDWIDTH: 1/10HZ 154 DEG. AZ STEERING

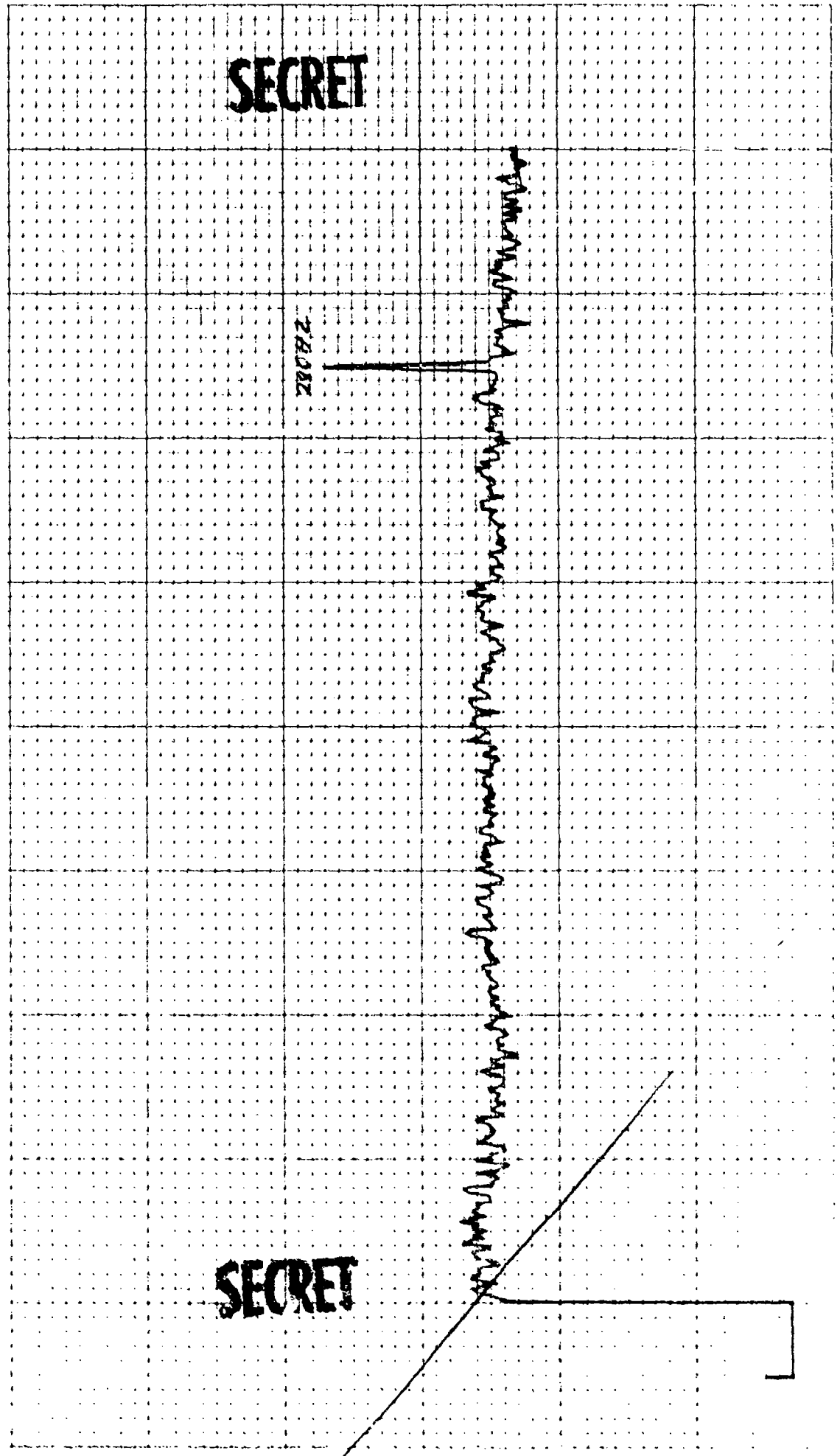
32 ELEMENTS



46 0703

CONTROL: 1549 - 32 (DP5) DATE OF ANALYSIS: - - - -
 BEAMPFORMED SPECTRUM (ELEMENTS) 1-26-82 29-34)
 EXERCISE: BEARING STAKE DATE/TIME: 27-77 - 1549 Z
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ
 32 ELEMENTS +34 DEG. AZ STEERING

REEL: F19 INDE X 3050
 INTEGRATION TIME 320 SECS ATTEN: -24 DB
 FILTER WTG: HANNING



SECRET

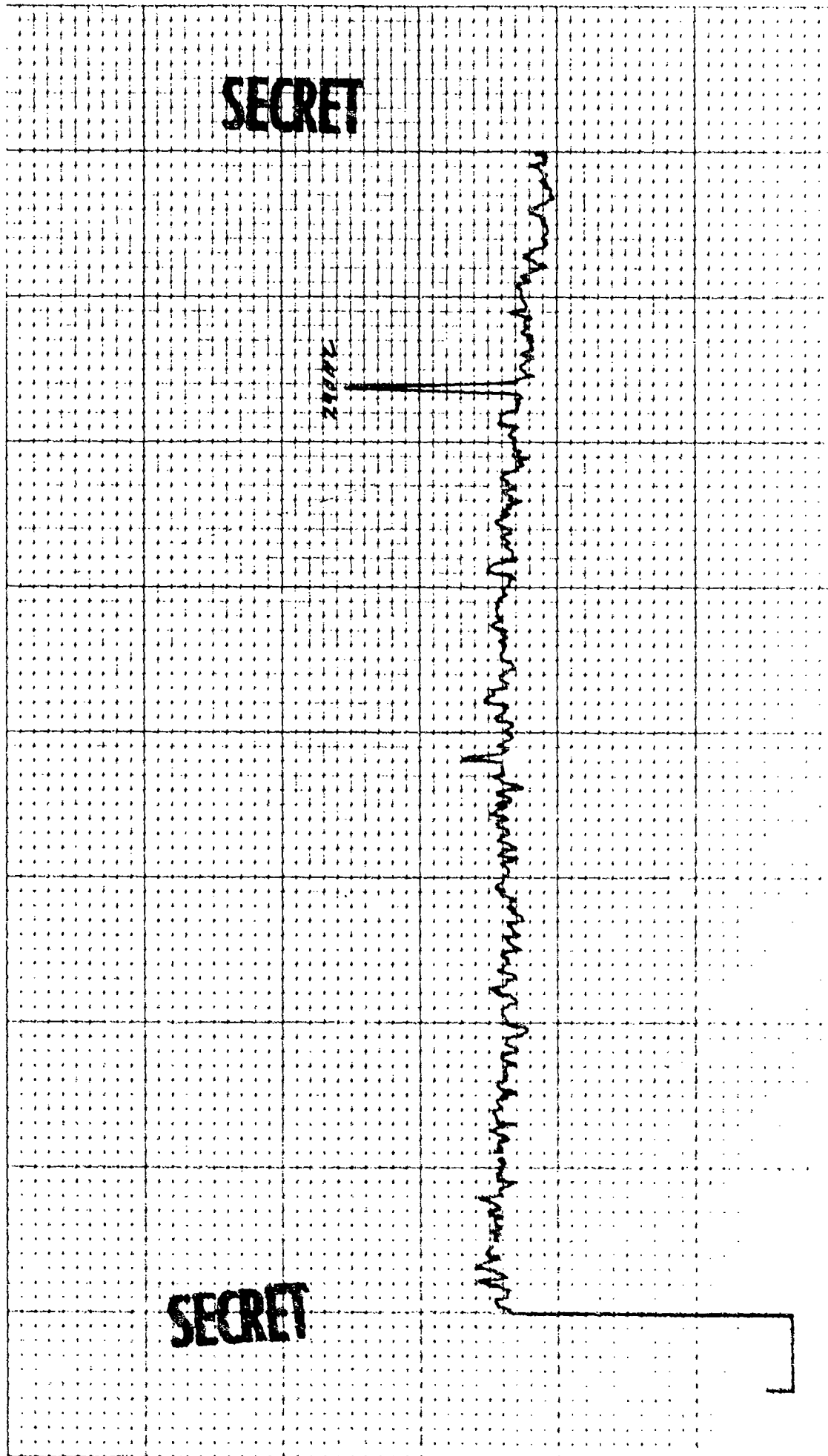
SECRET

46 0703

KOE 12 11 1977

CONTROL: 1549 - 32 (DPS) DATE OF ANALYSIS: -- -- --
 BEAMFORMED SPECTRUM (ELEMENTS) 1-26 & 29-34
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ
 32 ELEMENTS 436 DEG. AZ STEERING

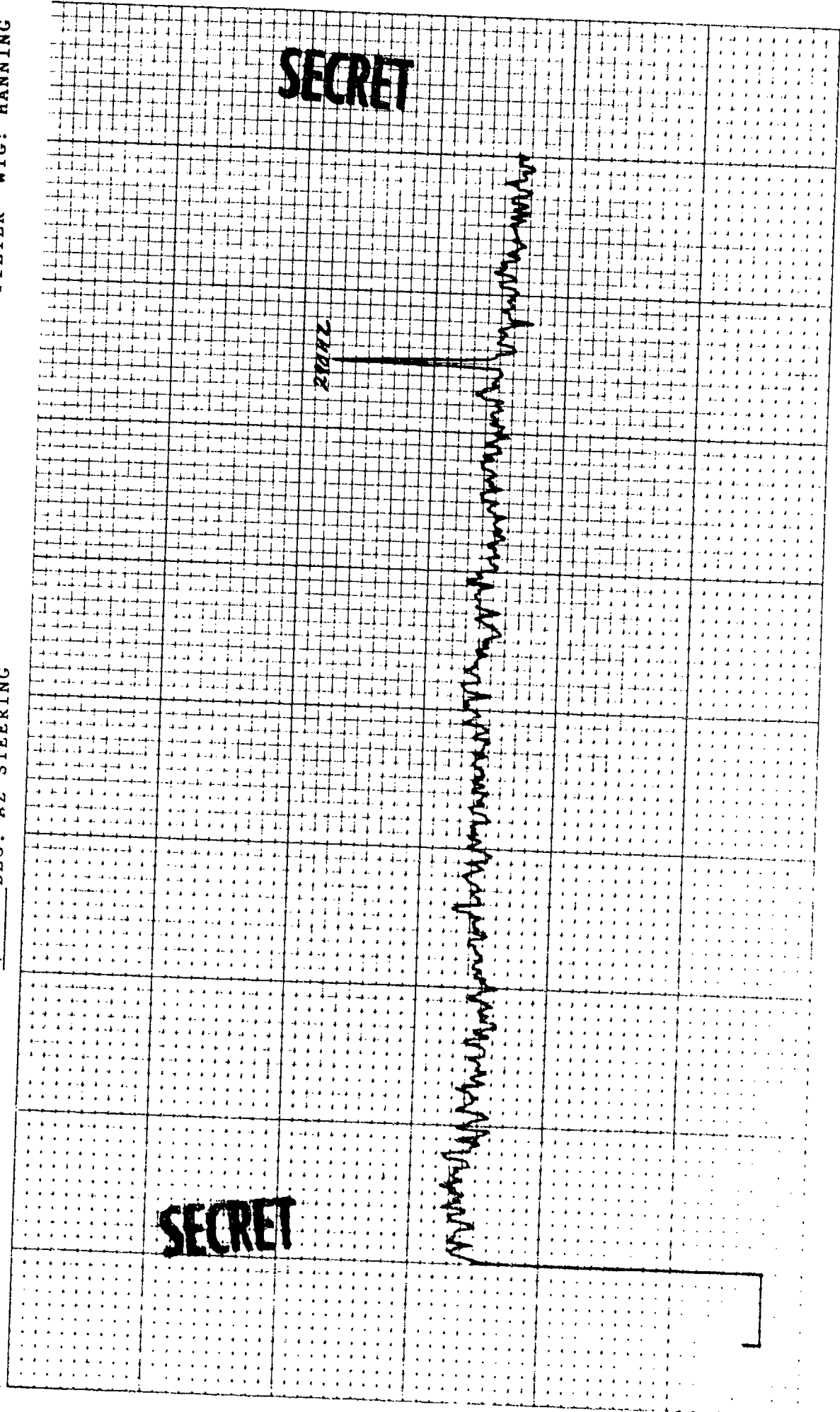
REEL: F/9 INDE X 3050
 INTEGRATION TIME 320 SECS ATTEN: 24 DB
 FILTER WTG: HANNING



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

46 0703

CONTROL: 1549-32 (185) DATE OF ANALYSIS: 1-26-77 REEL: F19 INDE: XJ050
 BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTN: -34 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
 CENTER FREQ: 200 HZ 32 DEG. AZ STEERING



SECRET

SECRET

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

46 0703

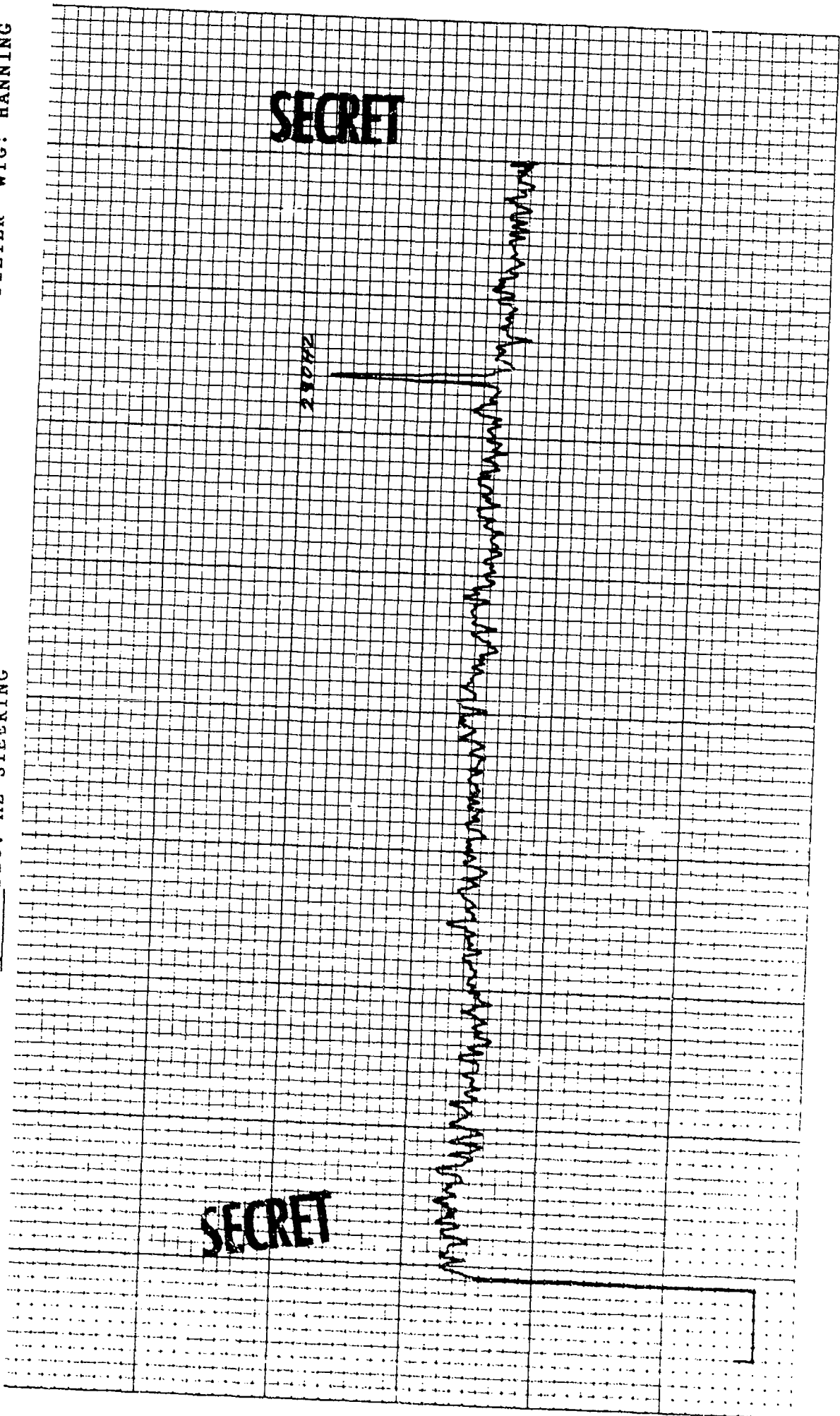
CONTROL: 1549 - 32 (DP5)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
32 ELEMENTS

DATE OF ANALYSIS: ---
1-26-77 29-34
DATE/TIME: 2-7-77 - 1549Z
ANALYSIS BANDWIDTH: 1/10HZ
40 DEG. AZ STEERING

REEL: F19 INDE X308
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING
ATTEN: -24DB

SECRET

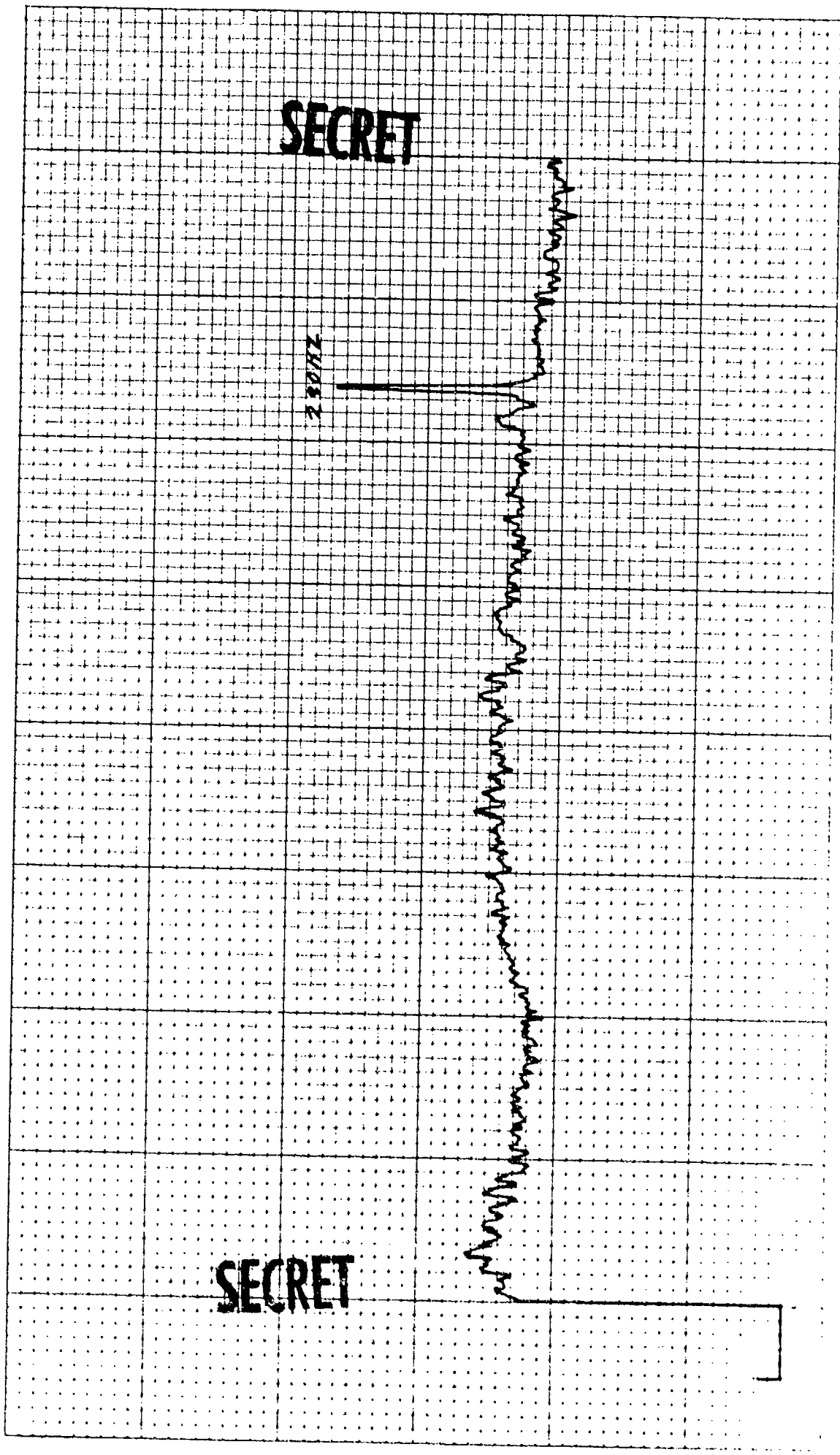
SECRET



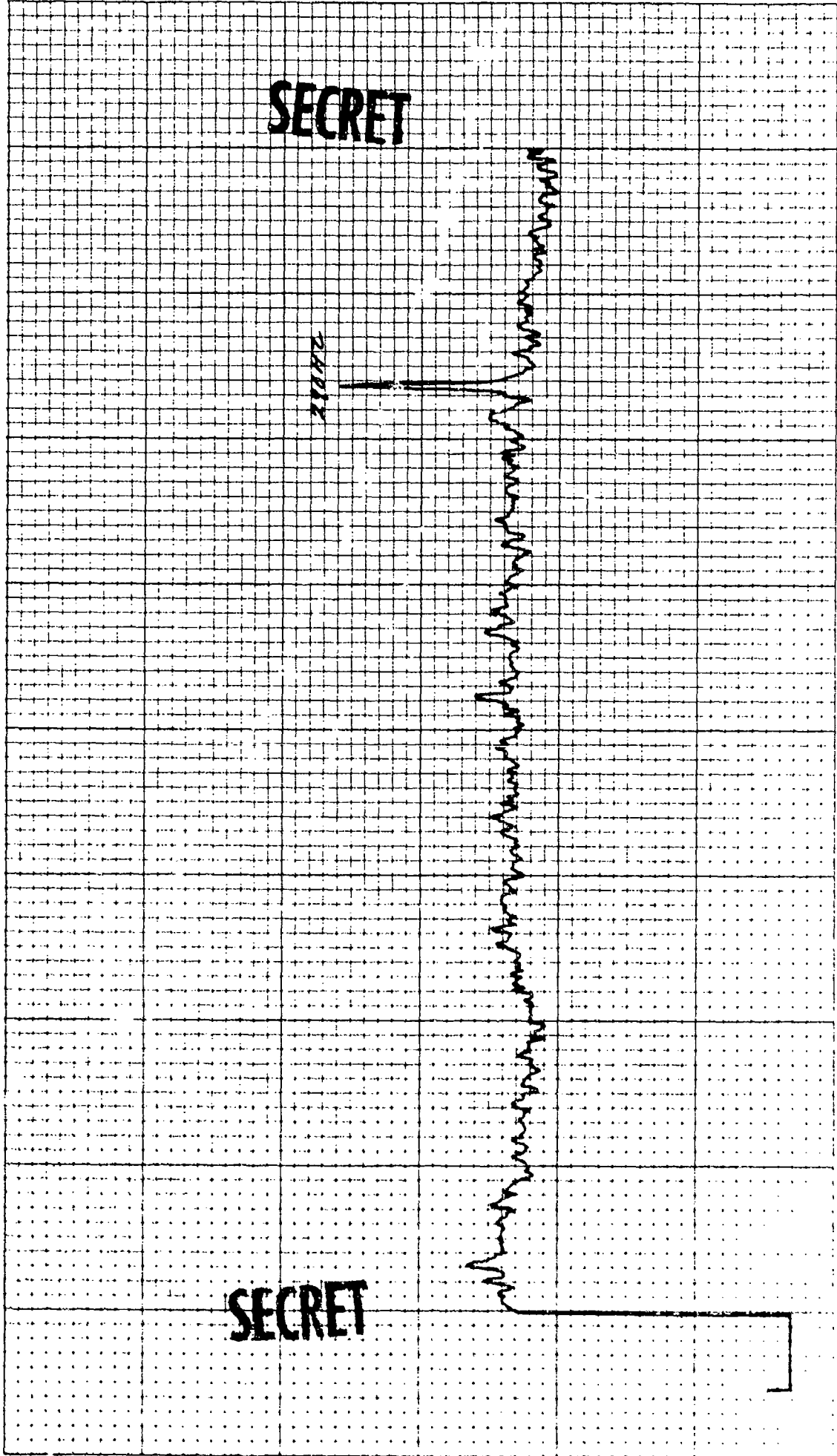
KOE 12.5 TO THE INCHES
REUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 1549-32 (DP5) DATE OF ANALYSIS: 1-26-77 REEL: F19 INDE X 3050
 BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTN: -24 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 CENTER FREQ: 280 HZ +42 DEG. AZ STEERING



CONTROL: 1549 - 32 (DPS) DATE OF ANALYSIS: 1-26-77 REEL: F19 INDE X3050
 BEAMFORMED SPECTRUM (ELEMENTS) 29-34)
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTN: -34 DB
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
32 ELEMENTS * 43 DEG. AZ STEERING



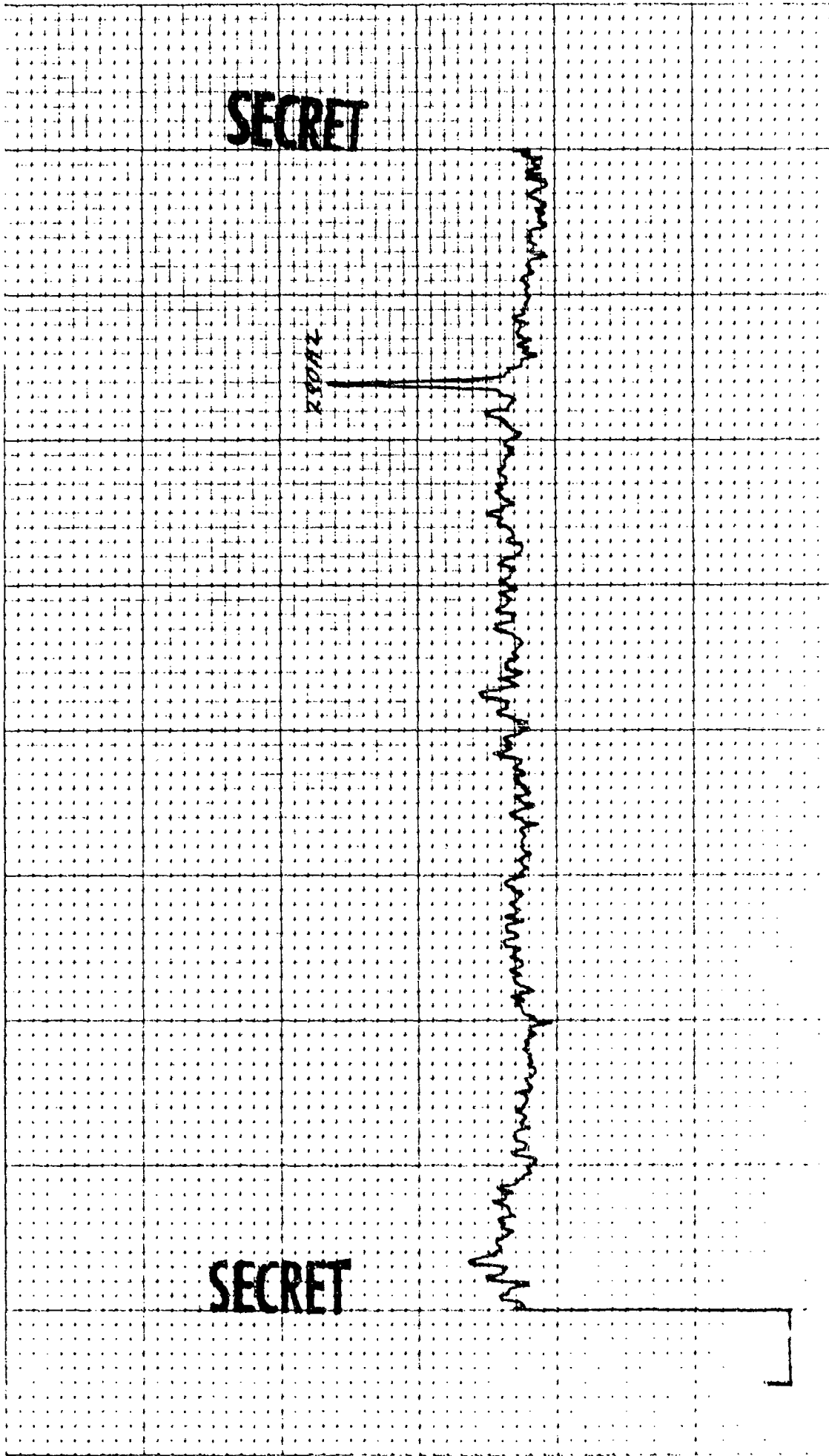
CONTROL: 1549 - 32 (DPS) DATE OF ANALYSIS: 1-26-28-34 REEL: F19 INDEX: Jsp

BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTN: -2Y DB

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

CENTER FREQ: 280 HZ + 44 DEG. AZ STEERING

32 ELEMENTS



KOE 10 X 10 TO THE INCH • 7 1/2 INCHES
PEPPER & LESSER CO. MADE IN U.S.A.

46 0703

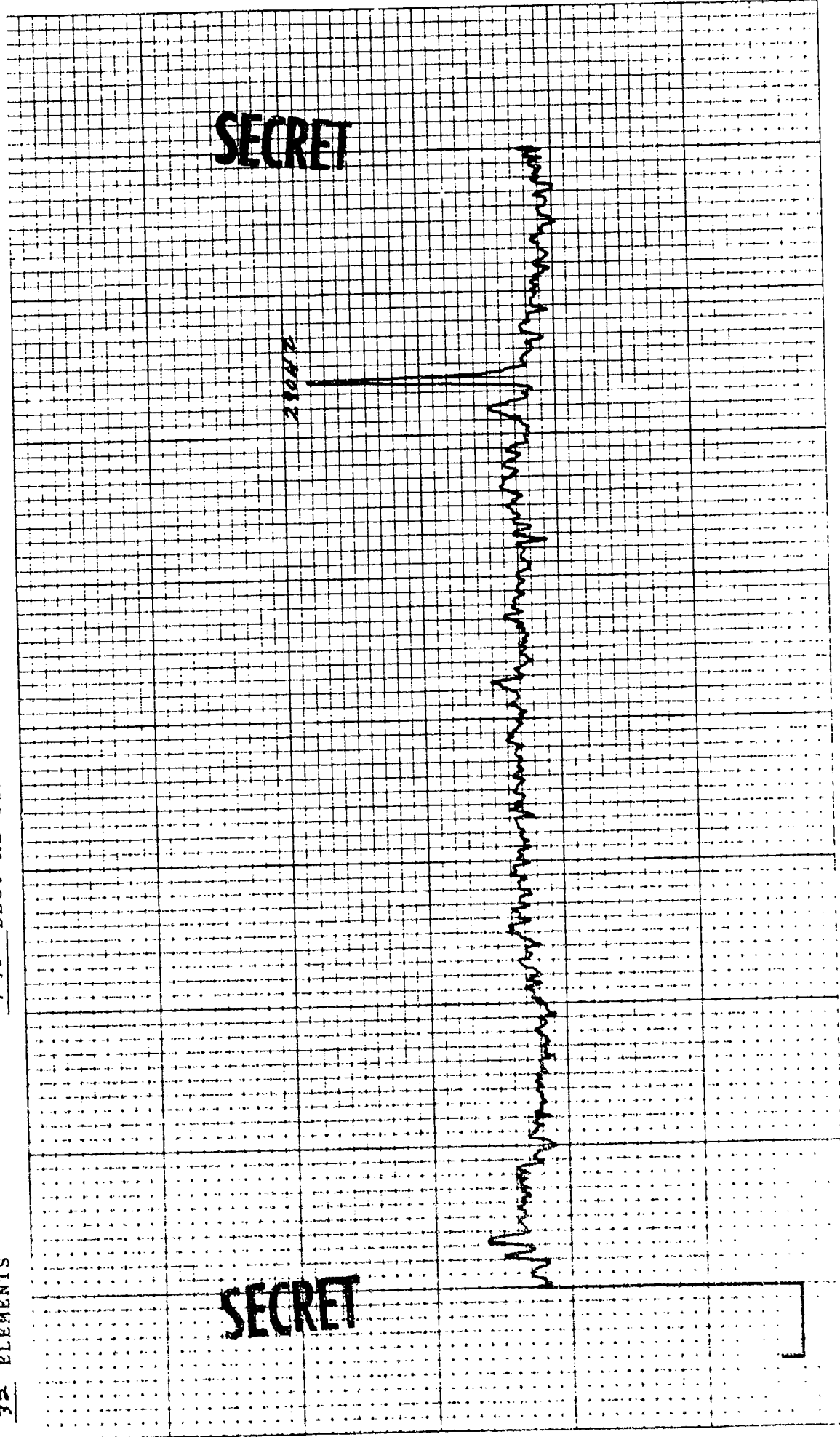
INDE X3050

REEL: F19

DATE OF ANALYSIS: 1-26-82
DATE/TIME: 2-7-77 - 1549Z
ANALYSIS BANDWIDTH: 1/10HZ
+46 DEG. AZ STEERING

CONTROL: 1549 - 32 (DPS)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
32 ELEMENTS

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



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

46 0703

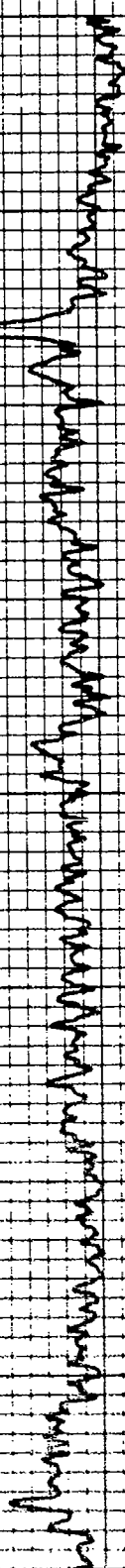
CONTROL: 1541 - 32 (DPS) DATE OF ANALYSIS: -- -- --
BEAMFORMED SPECTRUM (ELEMENTS) 1-26-77-34
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z
CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1/10 HZ
3> ELEMENTS +40 DEG. AZ STEERING

REEL: F/9 INDE X305

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

SECRET

SECRET



46 0703

CONTROL: 1549 - 51 (005)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

DATE OF ANALYSIS:

1-26 # 29-53

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

ANALYSIS BANDWIDTH: 1/10HZ

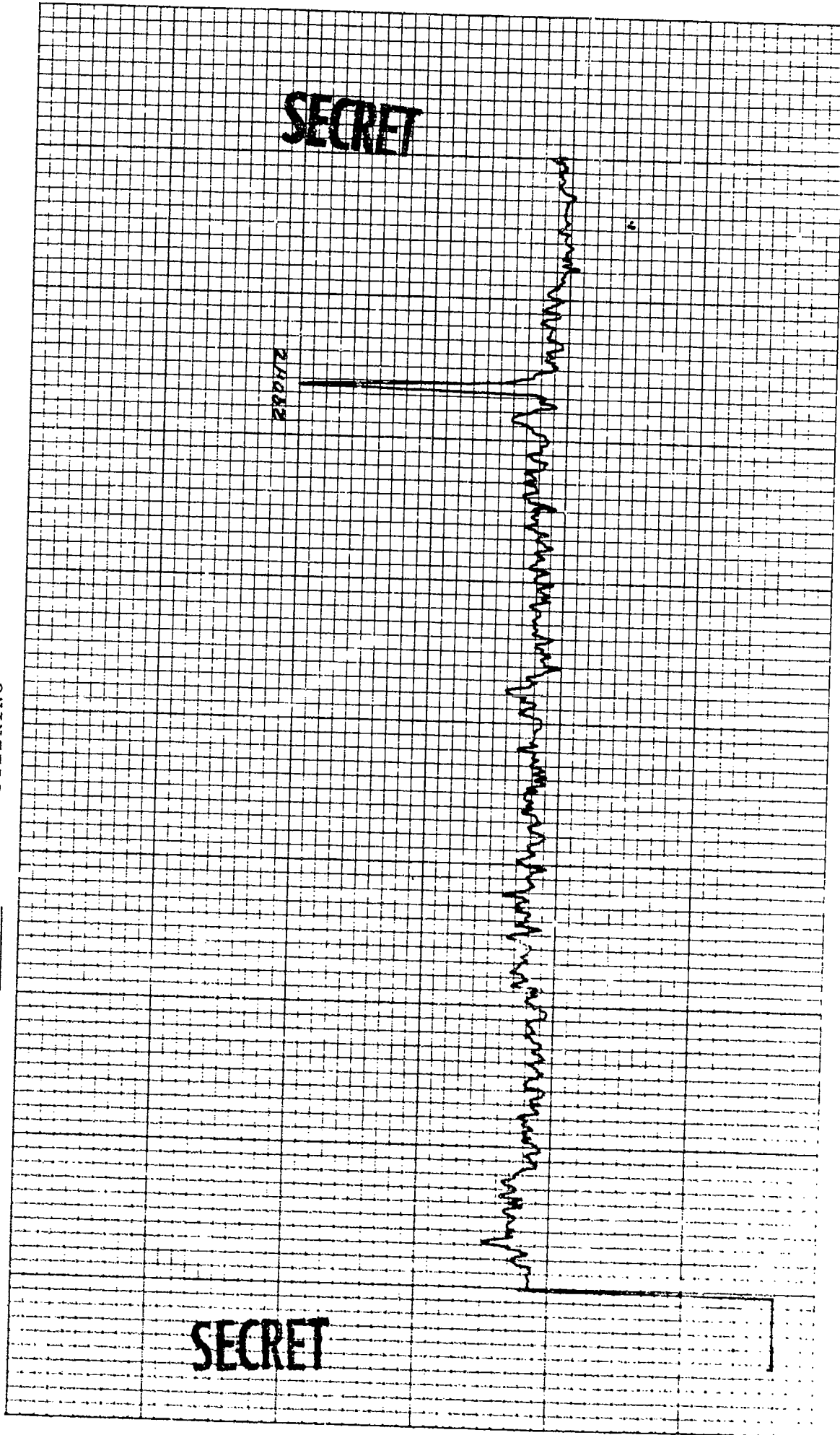
+49 DEG. AZ STEERING

REEL: F19 INDE X3050

INTEGRATION TIME 320 SECS

FILTER

ATTEN: 24 DB
WTG: HANNING

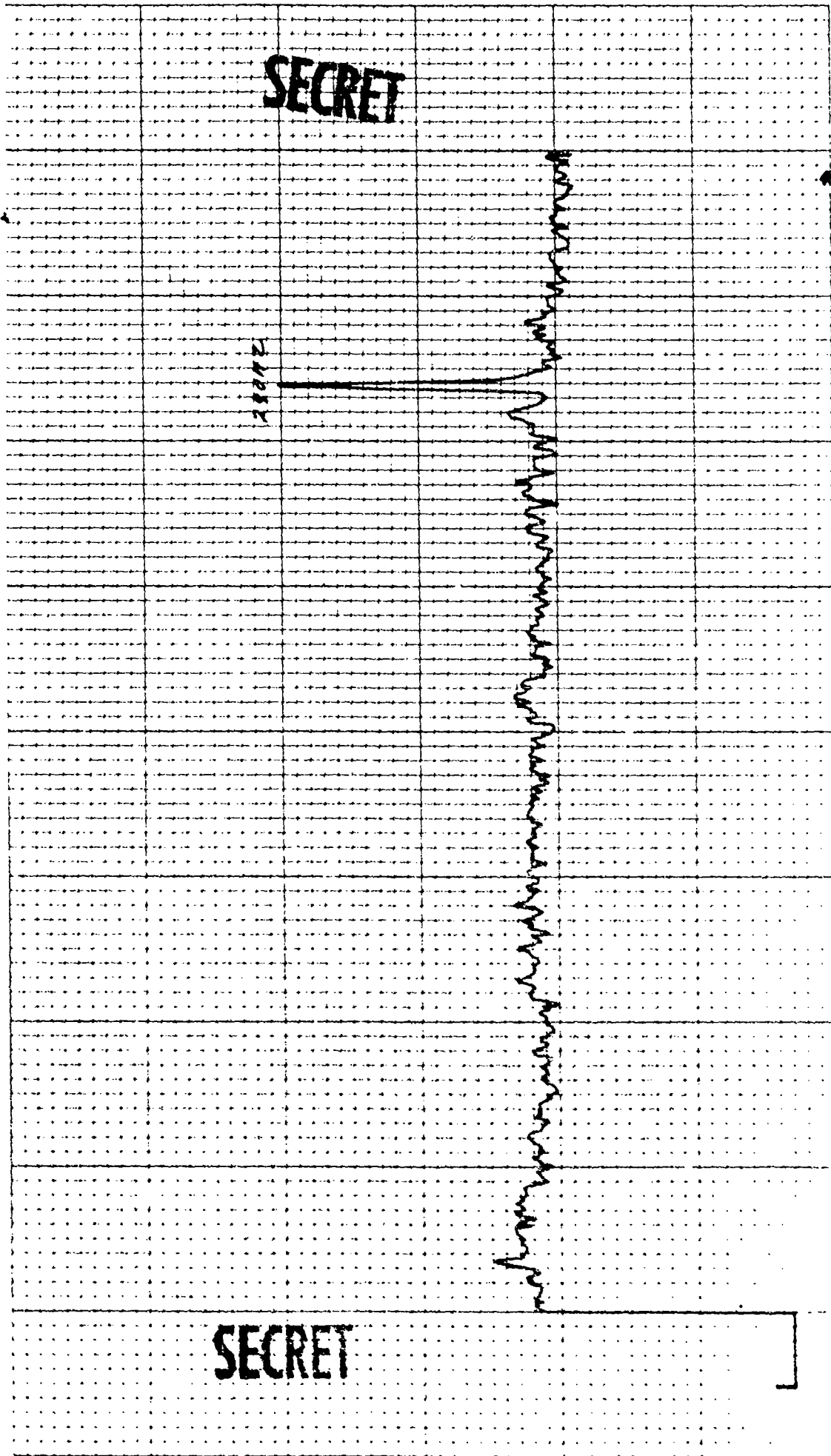


KOE 10 X 10 TO THE INCHES
REFLECTOR BEARING STAKE

46 0703

CONTROL: 1549 - 32 (DPS) DATE OF ANALYSIS: - - -
BEAMFORMED SPECTRUM (ELEMENTS) / - 26 4 28-34)
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ
32 ELEMENTS + 50 DEG. AZ STEERING

REEL: F19 INDE X 3050
INTEGRATION TIME 320 SECS ATTN: -2YDB
FILTER WTC: HANNING



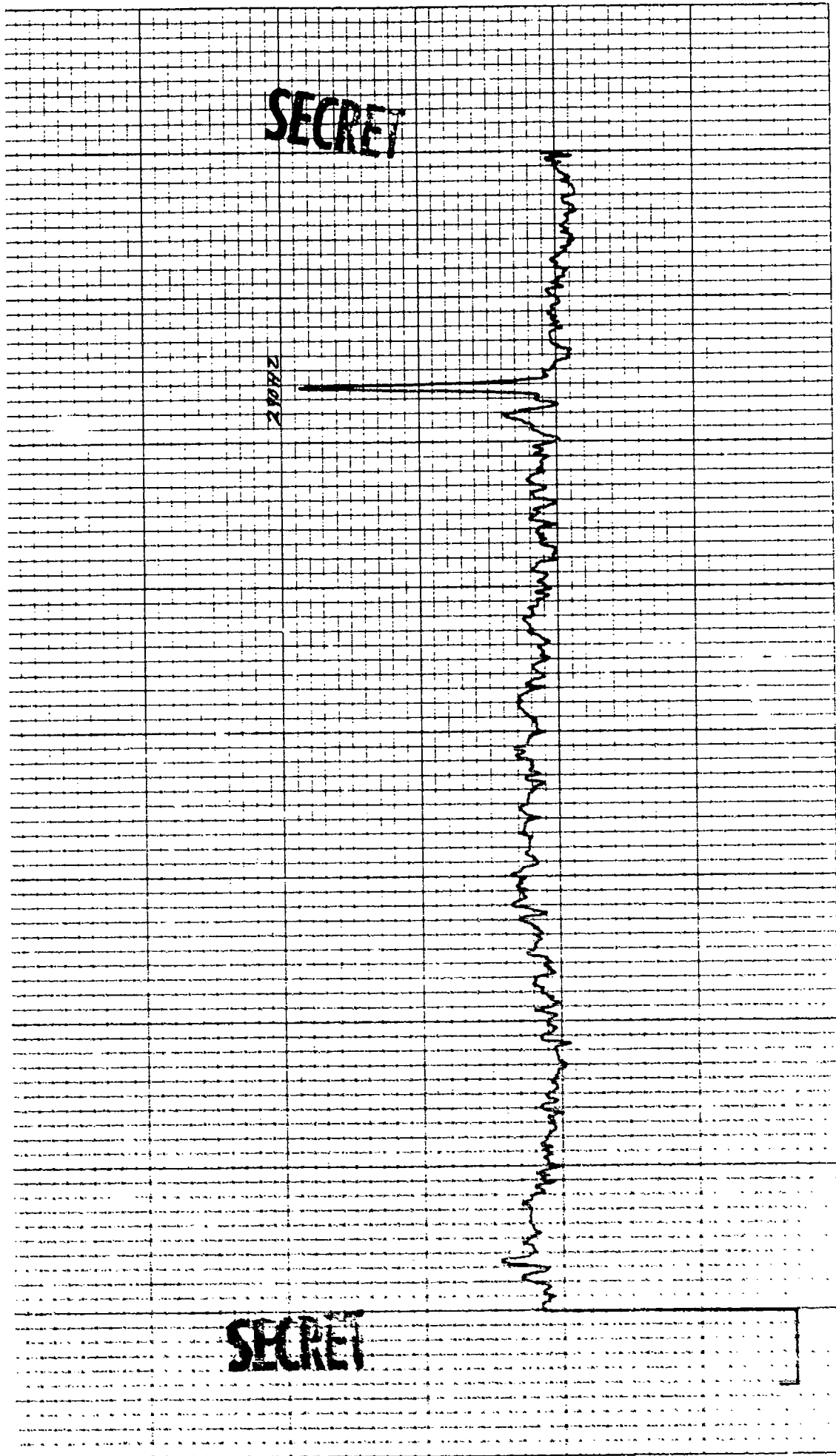
KOE 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 1549 - 72 (DP5)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-77 29-37
INTEGRATION TIME 320 SECS
ATTEN: -24 DB
FILTER WTG: HANNING

REEL: F19 INDE X3050
ANALYSIS BANDWIDTH: 1/10HZ
+52 DEG. AZ STEERING



46 0703

KOE 15.415 TO THE DEPT. OF DEFENSE

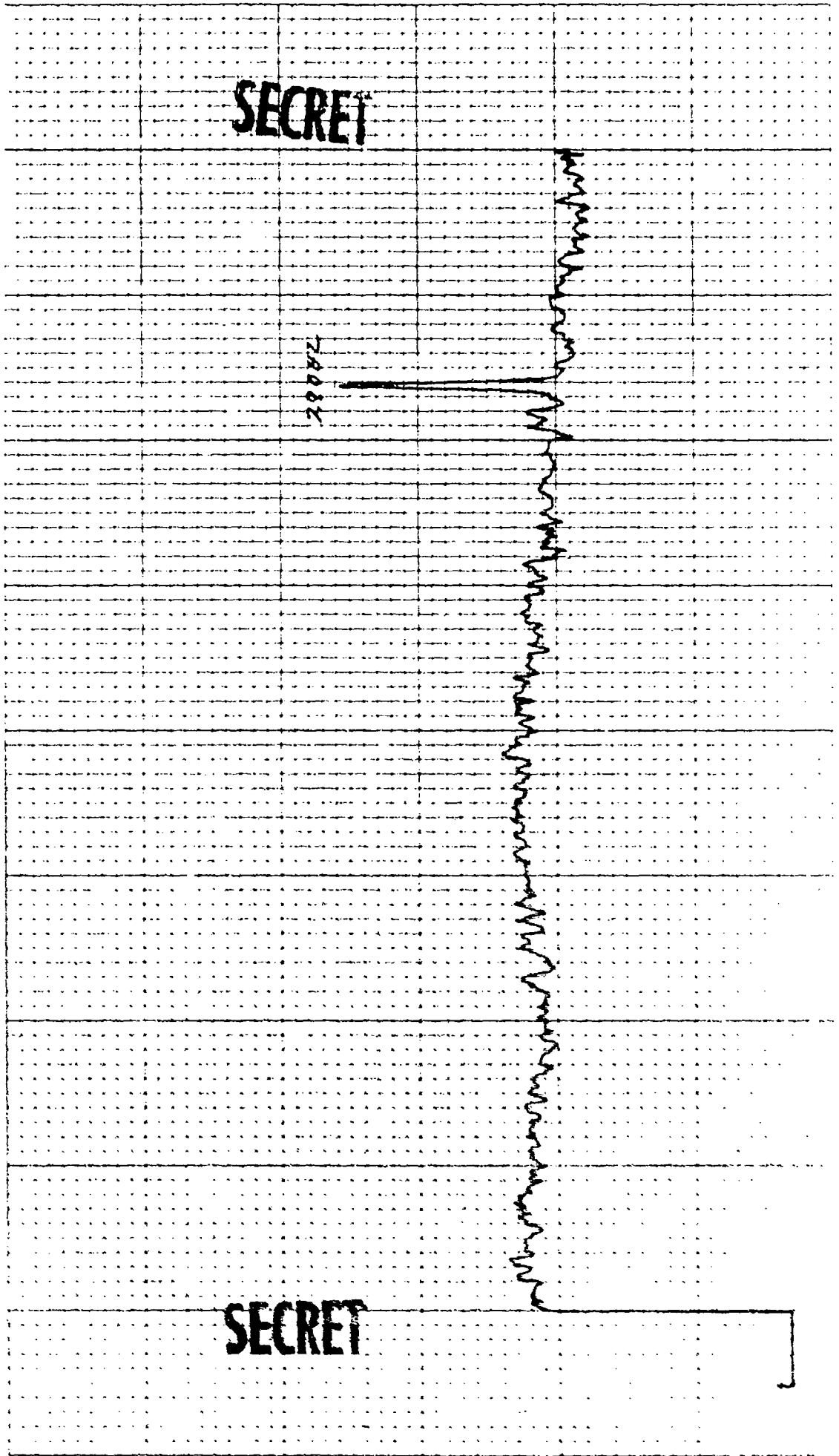
CONTROL: 1549 - 32 (DPS) DATE OF ANALYSIS: 1-26-77 (21-34) REEL: F19 INDE X 3050

BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-7-77 - 1649 Z INTEGRATION TIME 3.0 SECS ATTN: -2V DB

EXERCISE: B' ARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING

CENTER FREQ: 200 HZ +5V DEG. AZ STEERING

32 ELEMENTS



KOE VEHICLE TO TIME INCHES

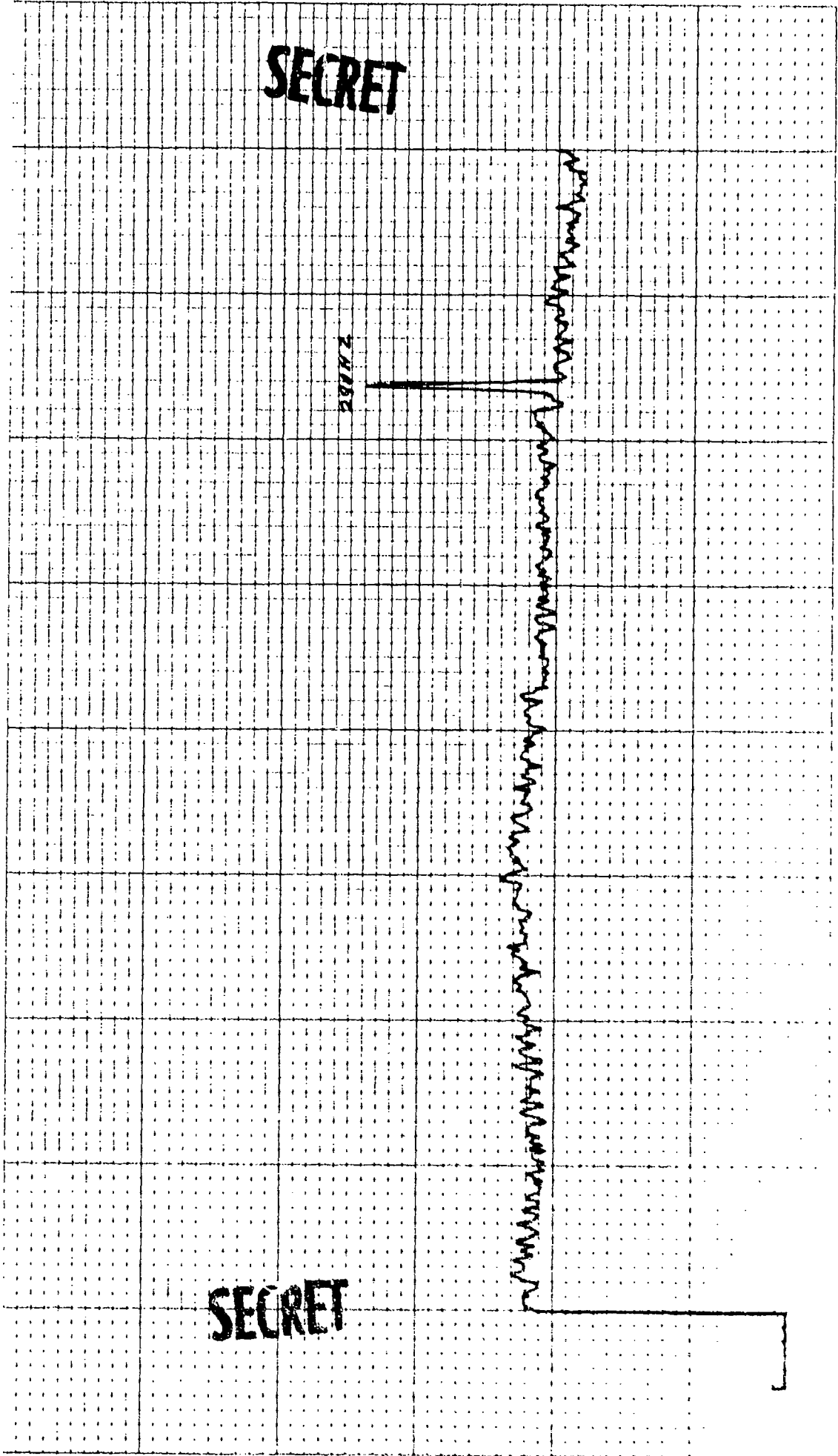
46 0703

CONTROL: 1549 - 32 (DPS)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
 32 ELEMENTS

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

REEL: F19
 INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

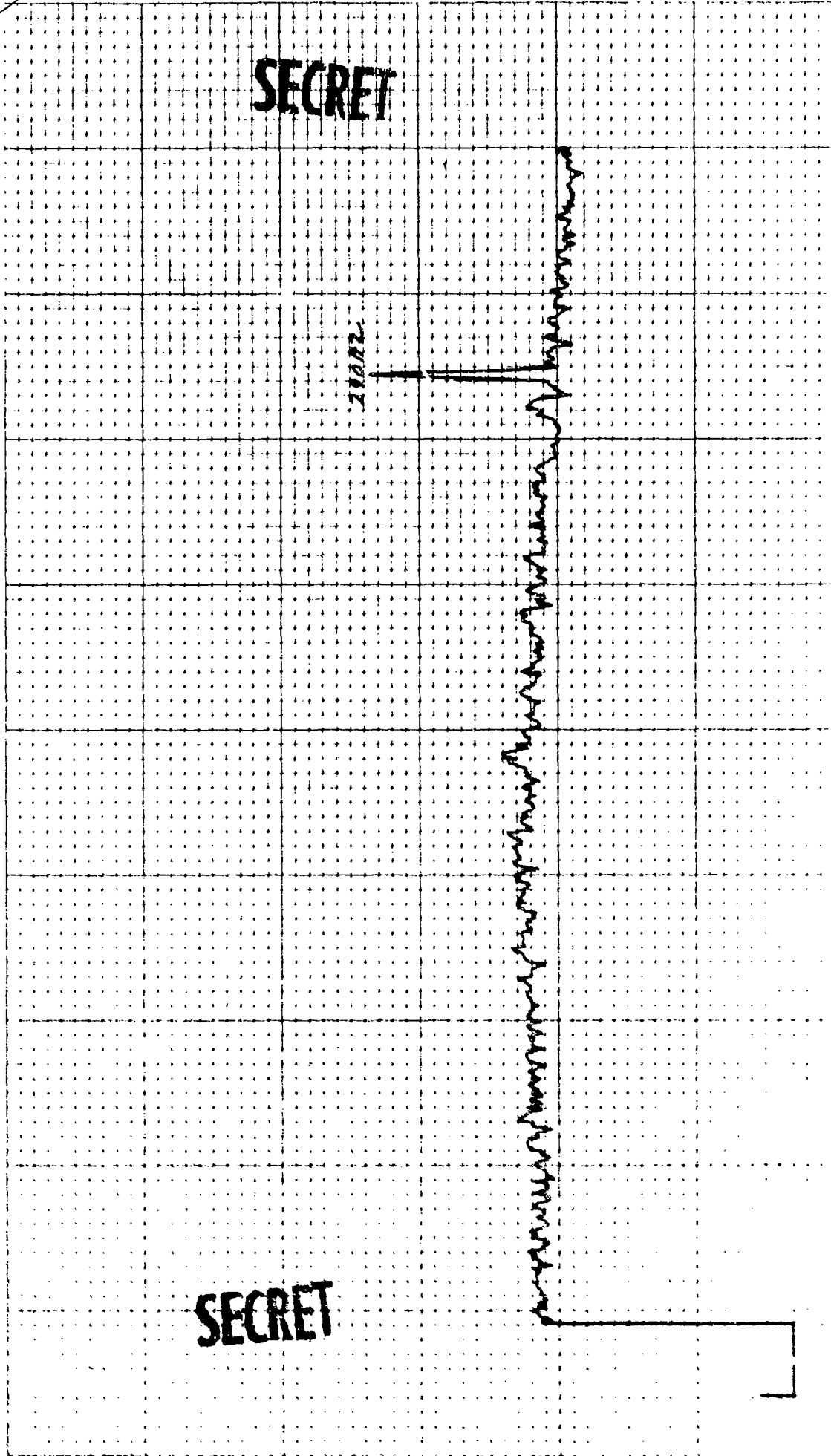
INDE X3050



46 0703

NOE 19 11 19 10 THE DRUMS 10 11 19 10

CONTROL: 1549 - 32 (DPS) DATE OF ANALYSIS: - - - - - REEL: F/9 INDE X3650
 BEAMFORMED SPECTRUM(ELEMENTS) 1-26 9 29 -34
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTN:-14 DB
 CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
32 ELEMENTS 158 DEG. AZ STEERING

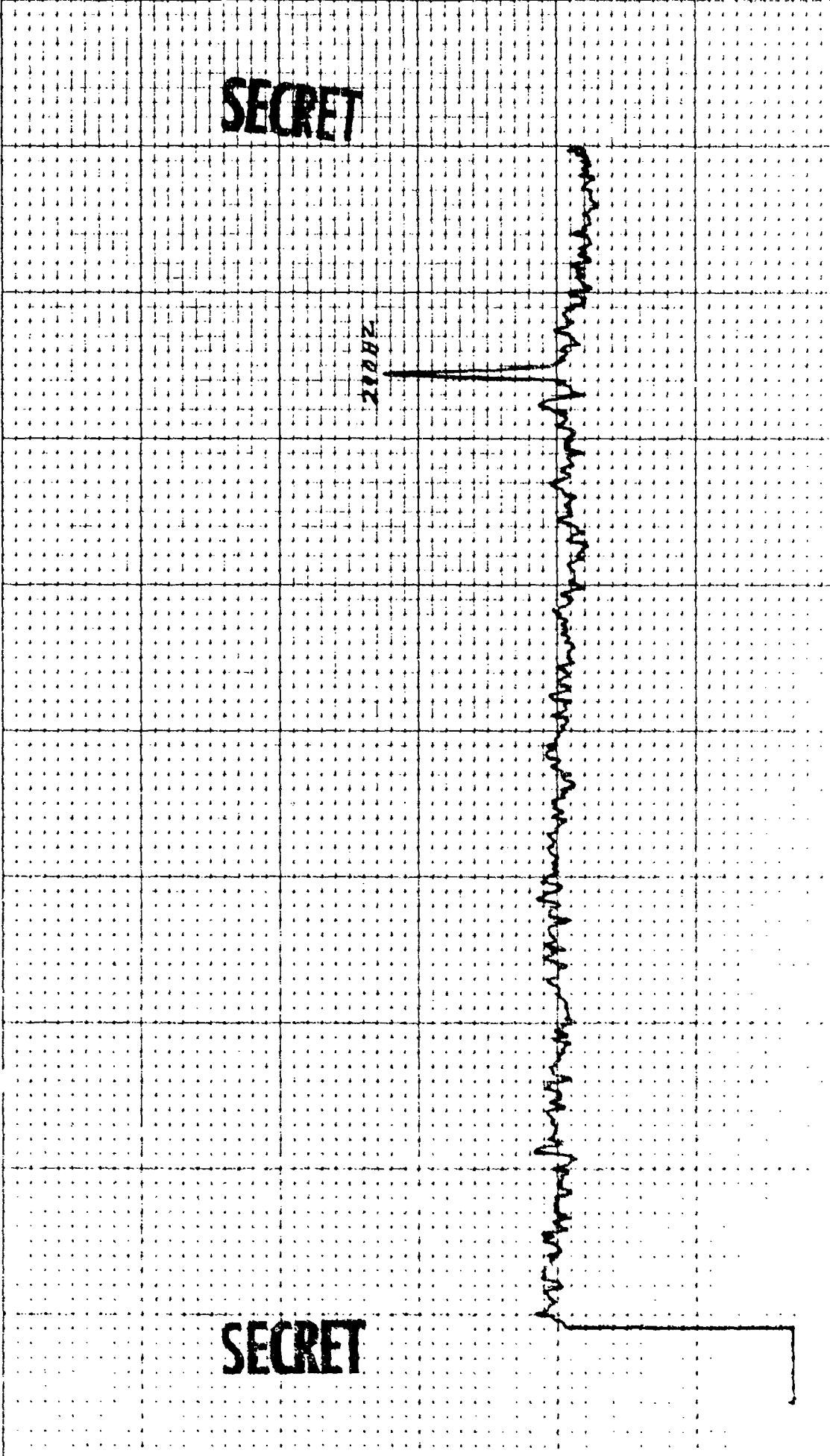


46 0703

REF ID: A66888

CONTROL: 1549 - 32 (DBS) DATE OF ANALYSIS: - - - -
 BEAMPFORMED SPECTRUM (ELEMENTS) 1-26 & 29-34
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z
 CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1/10HZ
 32 ELEMENTS +60 DEG. AZ STEERING

REEL: F19 INDE X3050
 INTEGRATION TIME 320 SECS ATTN: -2Y DB
 FILTER WTC: HANNING



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CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 5

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 51

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-36.2</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-26.2	
BEAMFORMER GAIN	<u>+30</u>	+3.8	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	+4.0	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-64.2</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-54.2	
BEAMFORMER GAIN	<u>+30</u>	-24.2	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+3.8</u>	
SIGNAL LEVEL FOR SNR	<u>-24.2</u>	28.0	
PROCESSOR CORRECTION	<u>-4.0</u>	24.0	
MRA CORRECTION	<u>+ .2</u>	24.2	SNR 1/2 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	16.0	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 5

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 51

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-43.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-33.8	
BEAMFORMER GAIN	<u>+20</u>	-3.8	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	-3.0	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-69.2</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-59.2	
BEAMFORMER GAIN	<u>+30</u>	-29.2	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>-3.8</u>	
SIGNAL LEVEL FOR SNR	<u>-29.2</u>	25.4	
PROCESSOR CORRECTION	<u>-4.0</u>	21.4	
MRA CORRECTION	<u>+ .8</u>	22.2	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	16.0	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

DATA POINT 5

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-30.0</u>	<u>-33.1</u>	_____
MRA SIGNAL LEVEL	<u>+4.0</u>	<u>-3.0</u>	_____
ARRAY SIGNAL GAIN	<u>34.0</u>	<u>30.1</u>	_____
20 LOG <u>51</u> # of elements	<u>34.0</u>	<u>34.1</u>	_____
DIFFERENCE	<u>0</u>	<u>-4.0</u>	_____

ARRAY GAIN

MRA SNR	<u>24.2</u>	<u>22.2</u>	_____
MEAN OMNI SNR	<u>9.3</u>	<u>10.5</u>	_____
ARRAY GAIN	<u>14.9</u>	<u>11.7</u>	_____
THEORETICAL AZMUTH GAIN (at MRA)	<u>14.2</u>	<u>16.3</u>	_____
DIFFERENCE	<u>+ .7</u>	<u>- 4.6</u>	_____

CONFIDENTIAL

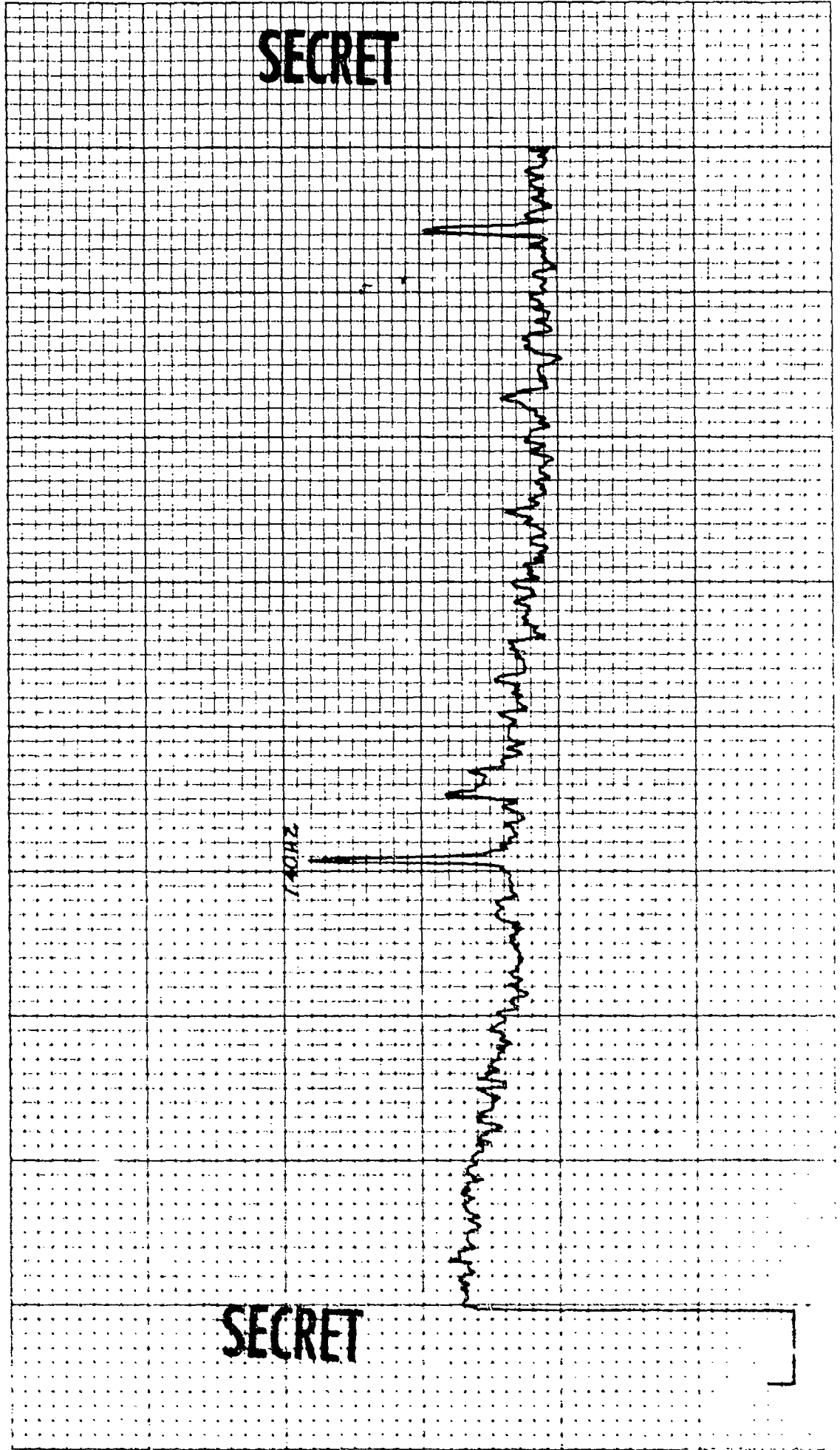
H•E 16 X 10 TO THE INCHES
PUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 1549-51 (DPS)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING 'TAKE
CENTER FREQ: 150 .2
51 ELEMENTS

DATE OF ANALYSIS: 1-26 / 29-53
DATE/TIME: 2:7-77 - 1549Z
ANALYSIS BANDWIDTH: 1/10 HZ
+32 DEG. AZ STEERING

REEL: F11 INDE X3650
INTEGRATION TIME 320 SECS ATTN: -30 DB
FILTER WTG: HANNING



KOE 10 X 10 TO THE INCHES
PUFFEL & TOWER CO. MADE IN U.S.A.

46 0703

CONTROL: 1549 - 5/ (DPS)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
5/ ELEMENTS

DATE OF ANALYSIS: 1-26-53

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

ANALYSIS BANDWIDTH: 1/10HZ
+ 34 DEG. AZ STEERING

REEL: F19

INTEGRATION TIME 320 SECS
FILTER

INDE X 050

ATTEN: -30 DB
WTG: HANNING

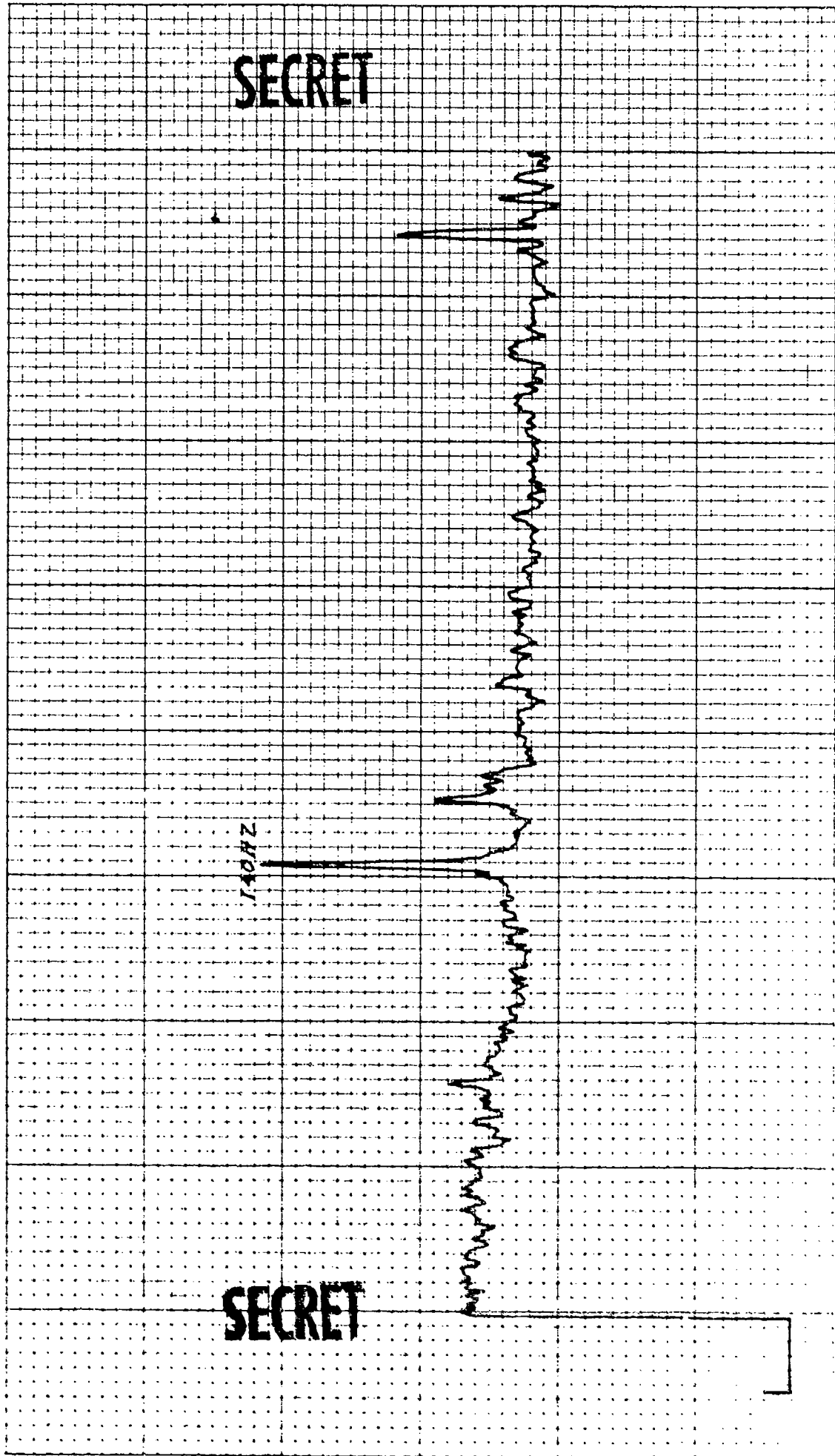
SECRET

1.40HZ

SECRET



CONTROL: 1549 - 51 (205) DATE OF ANALYSIS: INDE X350
 BEAMFORMED SPECTRUM (ELEMENTS) 1-26-82 29-53
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: -30 DB
 51 ELEMENTS 736 DEG. AZ STEERING FILTER WTG: HANNING



46 0703

REF ID: A66493

REEL: F/1 INDE X3050

INTEGRATION TIME 320 SECS

FILTER WTG: HANNING

DATE OF ANALYSIS: 1-26-53

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

ANALYSIS BANDWIDTH: 1/10HZ

+ 30 DEG. AZ STEERING

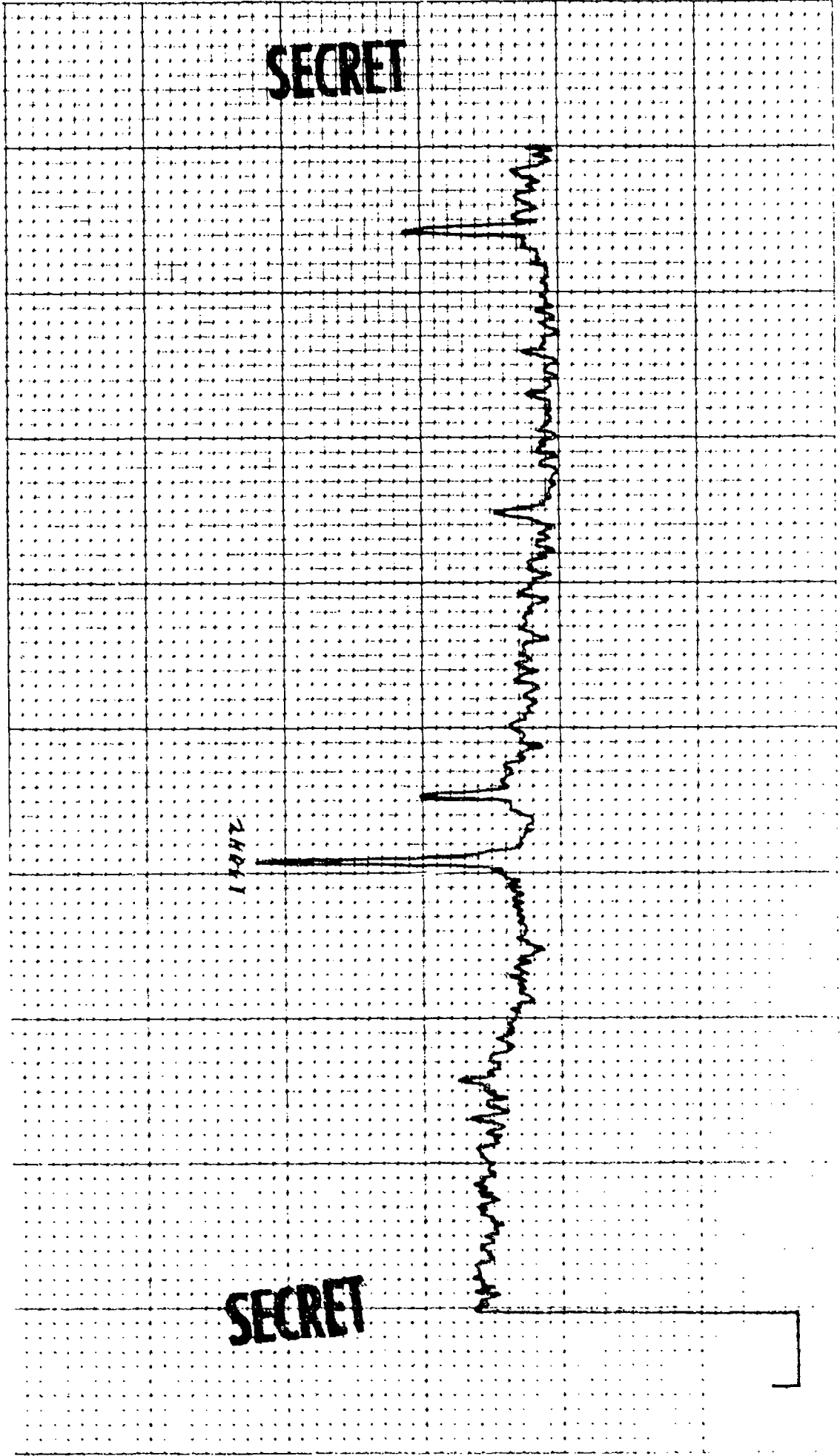
CONTROL: 1549 - 5/ (DPS)

BEAMFORMED SPECTRUM (ELEMENTS)

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

5/ ELEMENTS



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SECRET

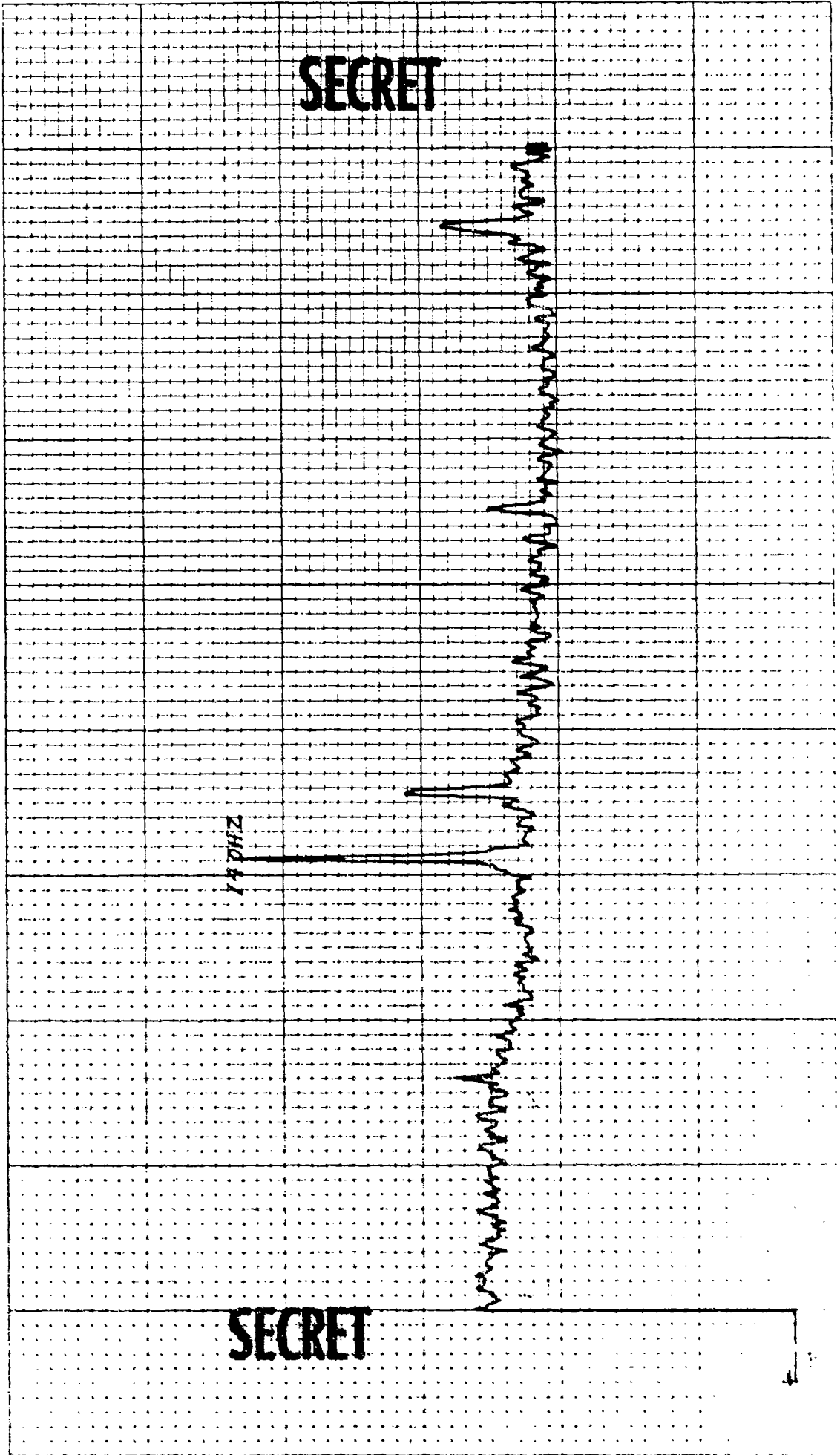
KOE JO. 8. 10 TO THE INCH. 1. 10 INCHES
PIPERL & PAPER TO 2004 8. 10. 1

46 0703

CONTROL: 1549 - 51 (DP5)
BEAMFORMED SPECTRUM (ELEMENTS) 1-26 4 28-53
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
51 ELEMENTS

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

REEL: F19 INDE X3050
INTEGRATION TIME 320 SECS ATTN: 30 DB
FILTER WTG: HANNING



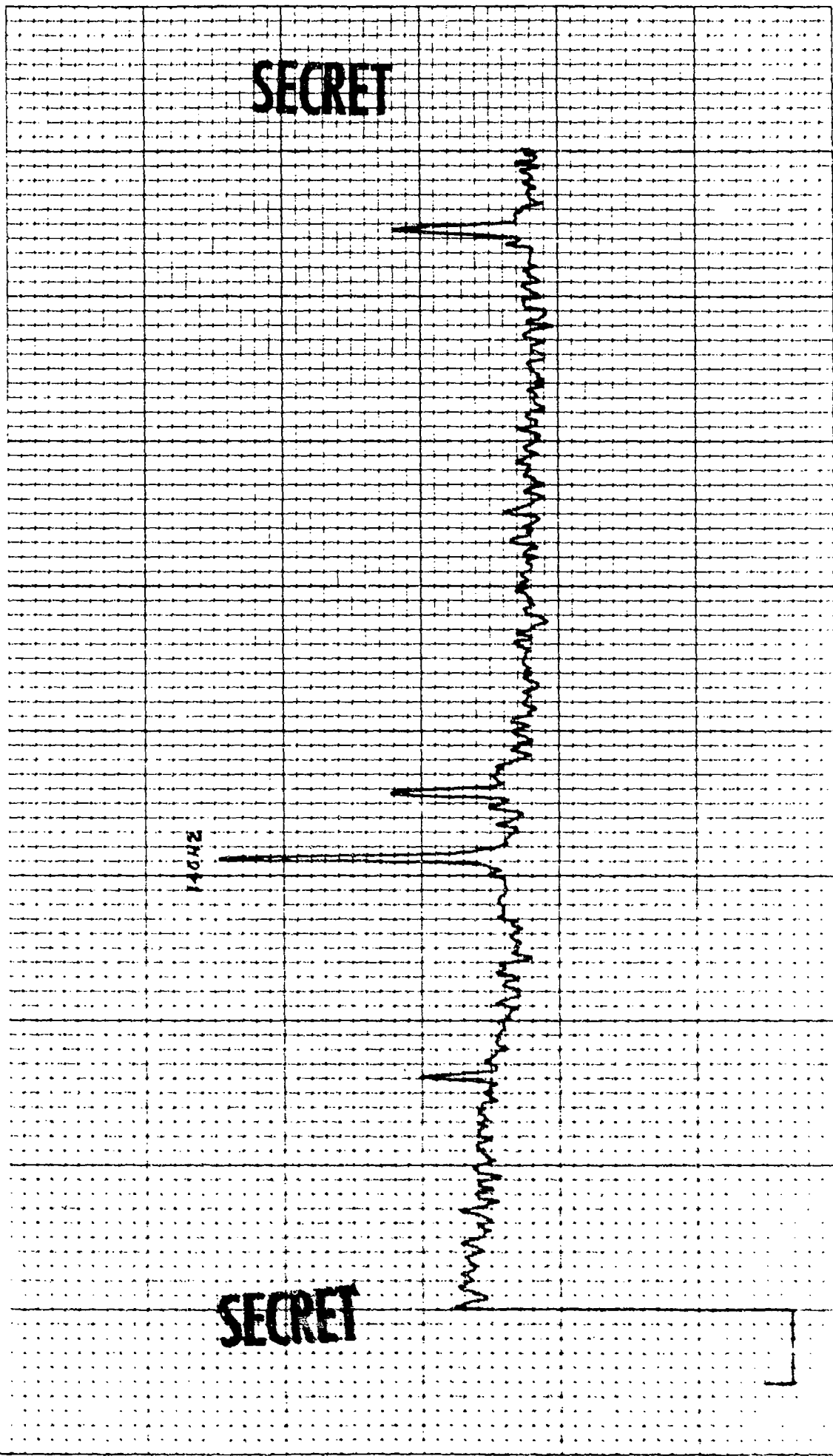
K-2 10 X 10 TO THE INCH 2 X 10 CM NET

46 0703

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

DATE OF ANALYSIS: _____
DATE/TIME: 1-26 12 29-53
ANALYSIS BANDWIDTH: 1/10HZ
4.42 DEG. AZ STEERING

REEL: F19 INDE X 2050
INTEGRATION TIME 320 SECS ATTN: 30 DB
FILTER WTC: HANNING



SECRET

SECRET

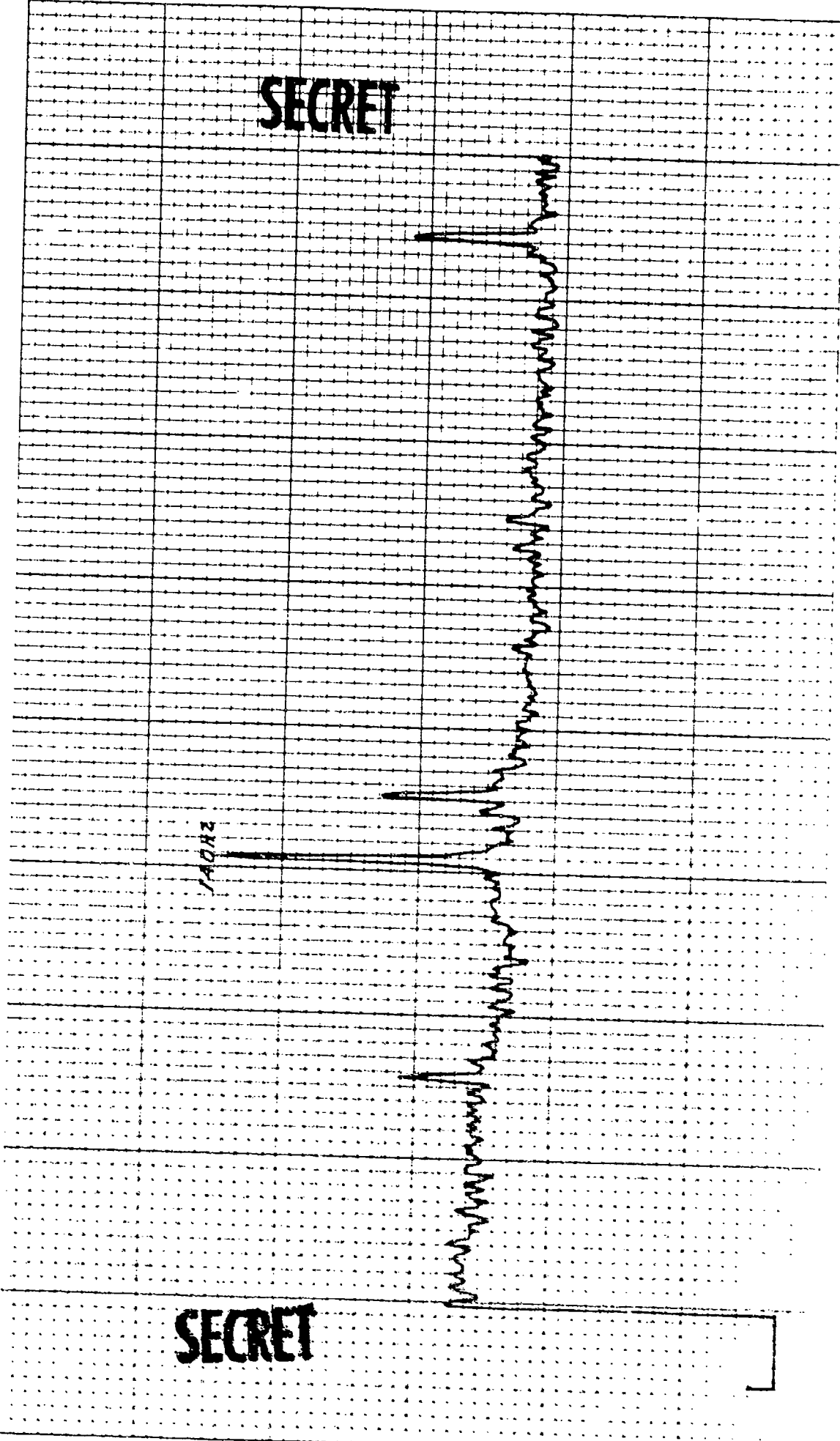
KOE 10.4 TO THE INCHES 2 TO INCHES
REUSEL & PAPER 10 1/2 INCHES

46 0703

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

DATE OF ANALYSIS: 1-26-53
DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10HZ
+43 DEG. AZ STEERING

REEL: F19 INDE X3059
INTEGRATION TIME 320 SECS ATTN: -30 DB
FILTER WTG: HANNING



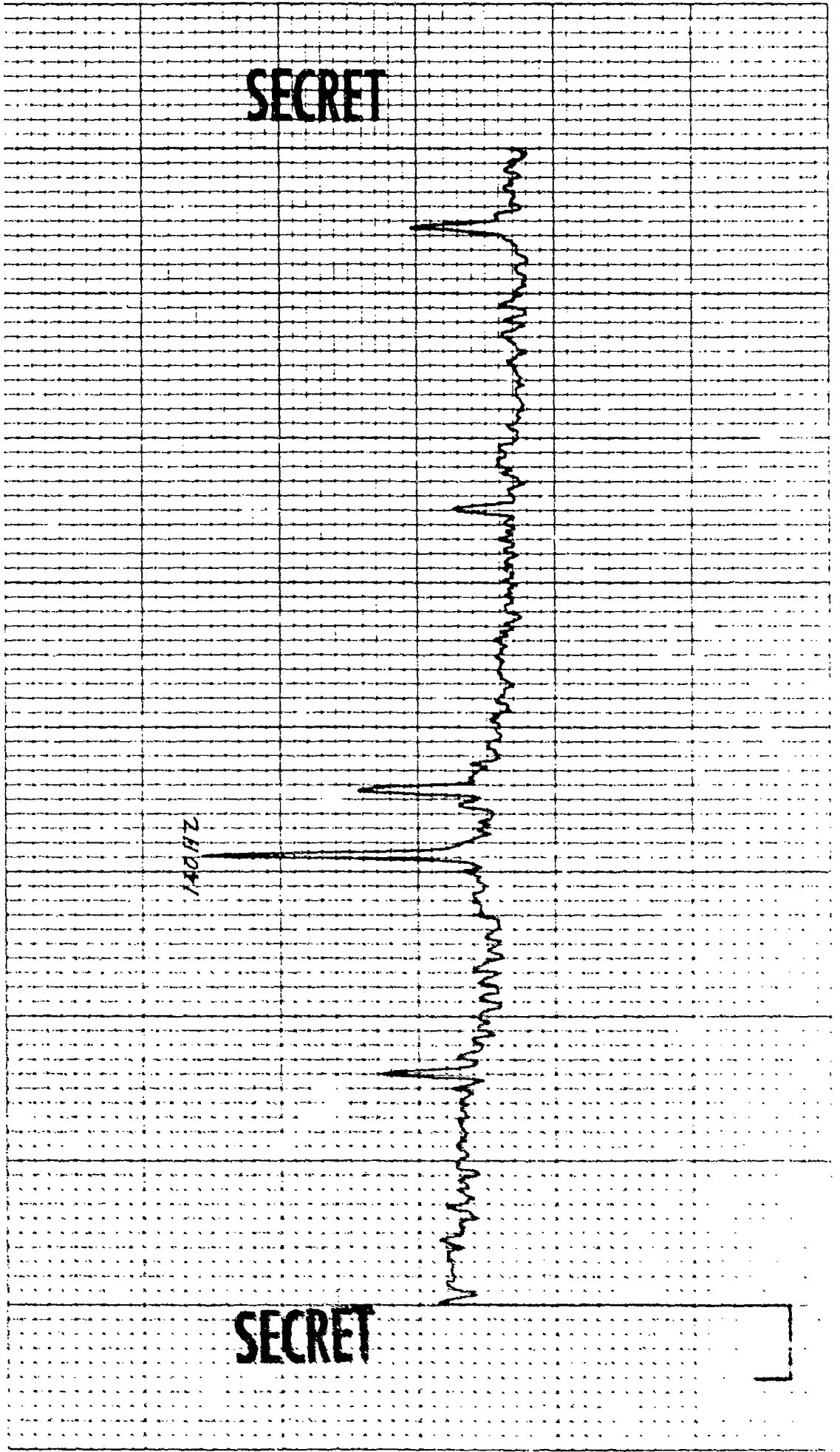
SECRET

SECRET

KOE 10 X 10 TO THE INCH. 1 TO 10 HZ
NEUFEL & PASTER CO. MADE IN U.S.A.

46 0703

CONTROL: 1509 - 51 (D95) DATE OF ANALYSIS: REEL: F19 INDE X 300
 BEAMFORMED SPECTRUM (ELEMENTS) 1-26229-53 INTEGRATION TIME 320 SECS ATTEN: 30 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 CENTER FREQ: 150 HZ 44 DEG. AZ STEERING



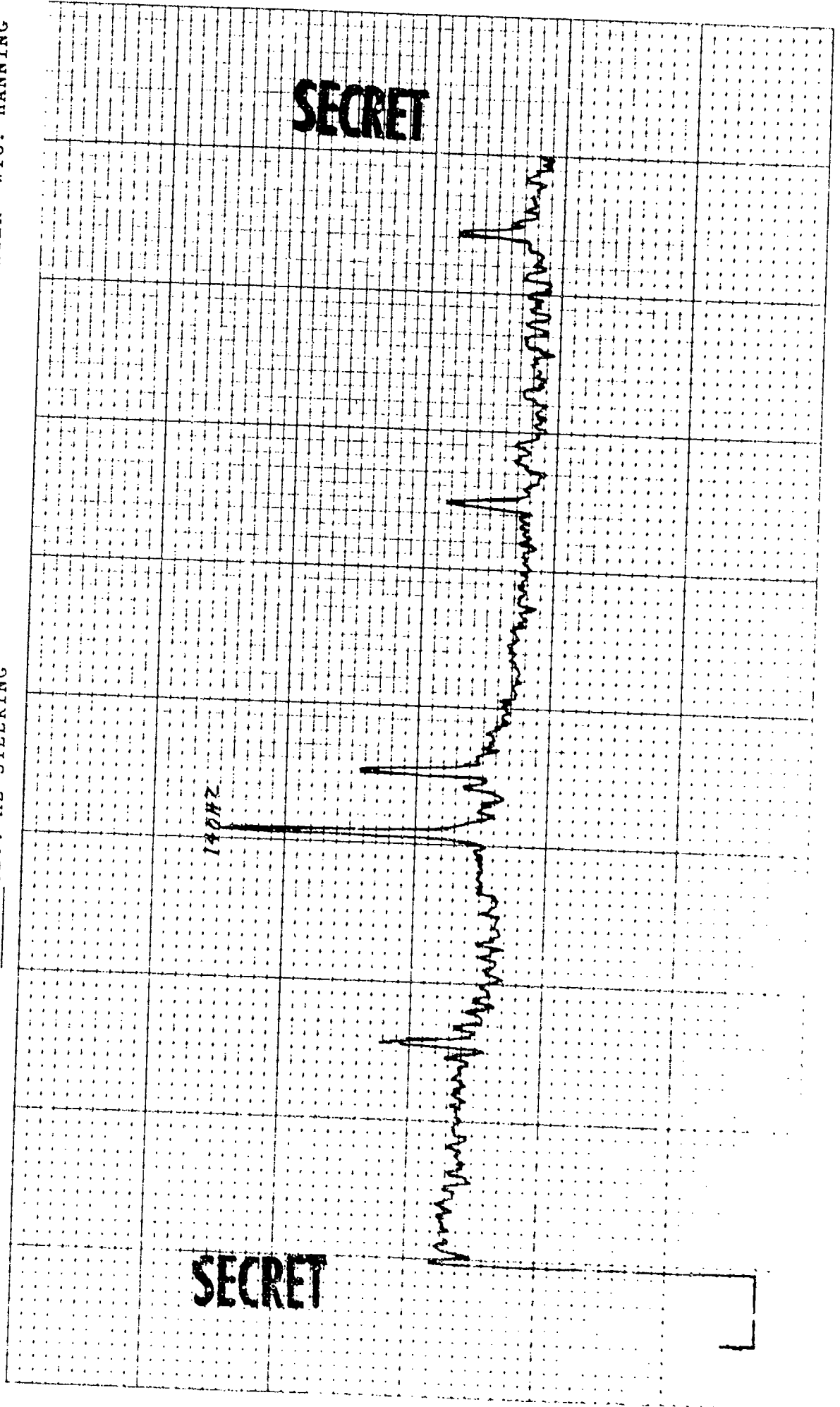
SECRET

SECRET

REF ID: A66888

46 0703

CONTROL: 1549-51 (DPS) DATE OF ANALYSIS: 1-26-77 REEL: F19 INDE X350
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTN: 30 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1710HZ FILTER WTG: HANNING
 CENTER FREQ: 150 HZ 45 DEG. AZ STEERING



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SECRET

14-E 20 4110 TO THE INSTRUMENTS

46 0703

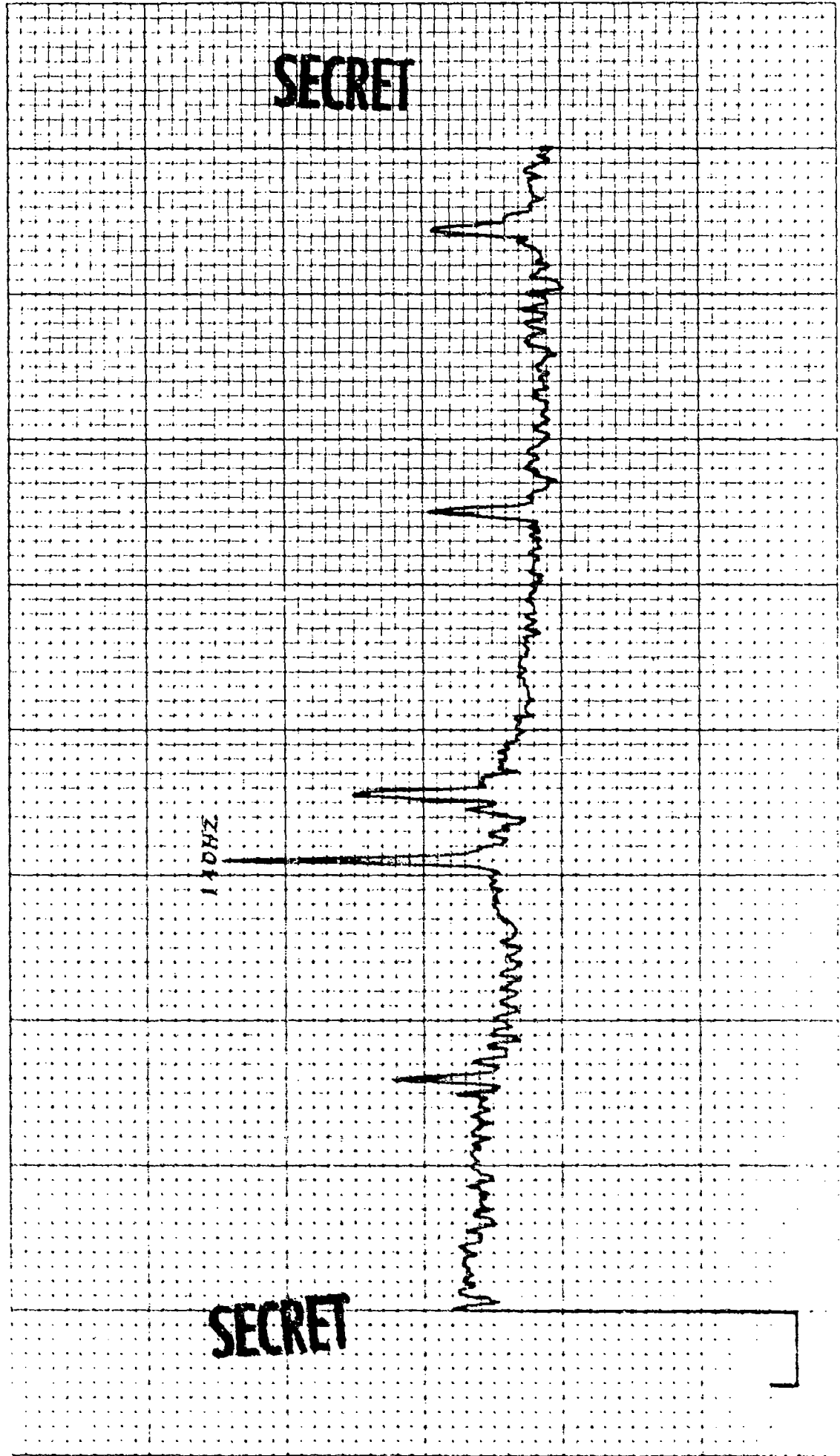
CONTROL: 1549 - 5/ (DPS)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 5/ ELEMENTS

DATE OF ANALYSIS: ~ - - -
 1-26-53 28-53

INTEGRATION TIME 320 SECS
 FILTER
 WTC: HANNING

REEL: F19
 INDE X3050

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



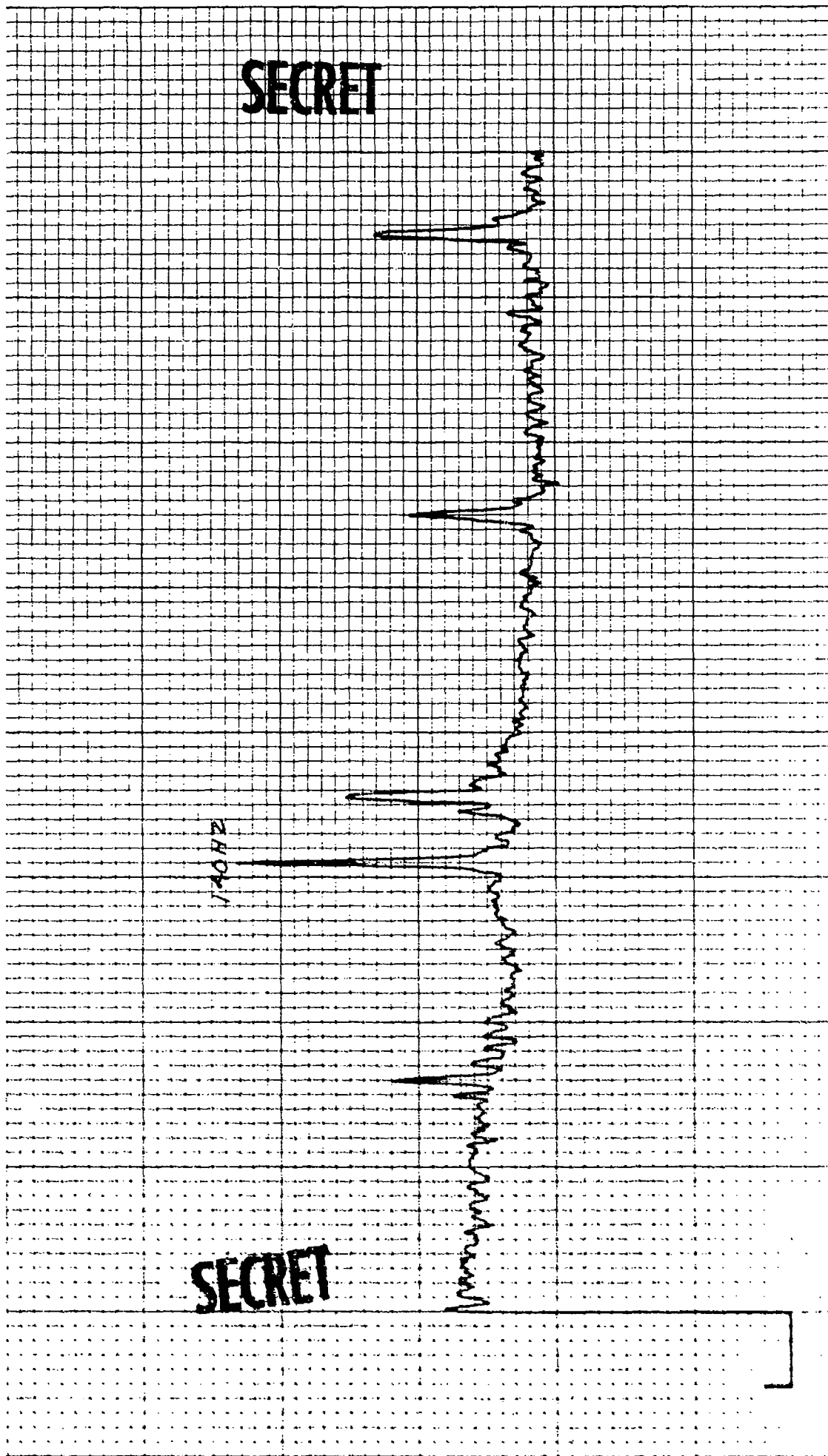
SECRET

46 0703

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

CONTROL: 1549 - 51 (DPS) DATE OF ANALYSIS: - - - -
 BEAMFORMED SPECTRUM (ELEMENTS) 1-26 & 29-53)
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
 51 ELEMENTS +48 DEG. AZ STEERING

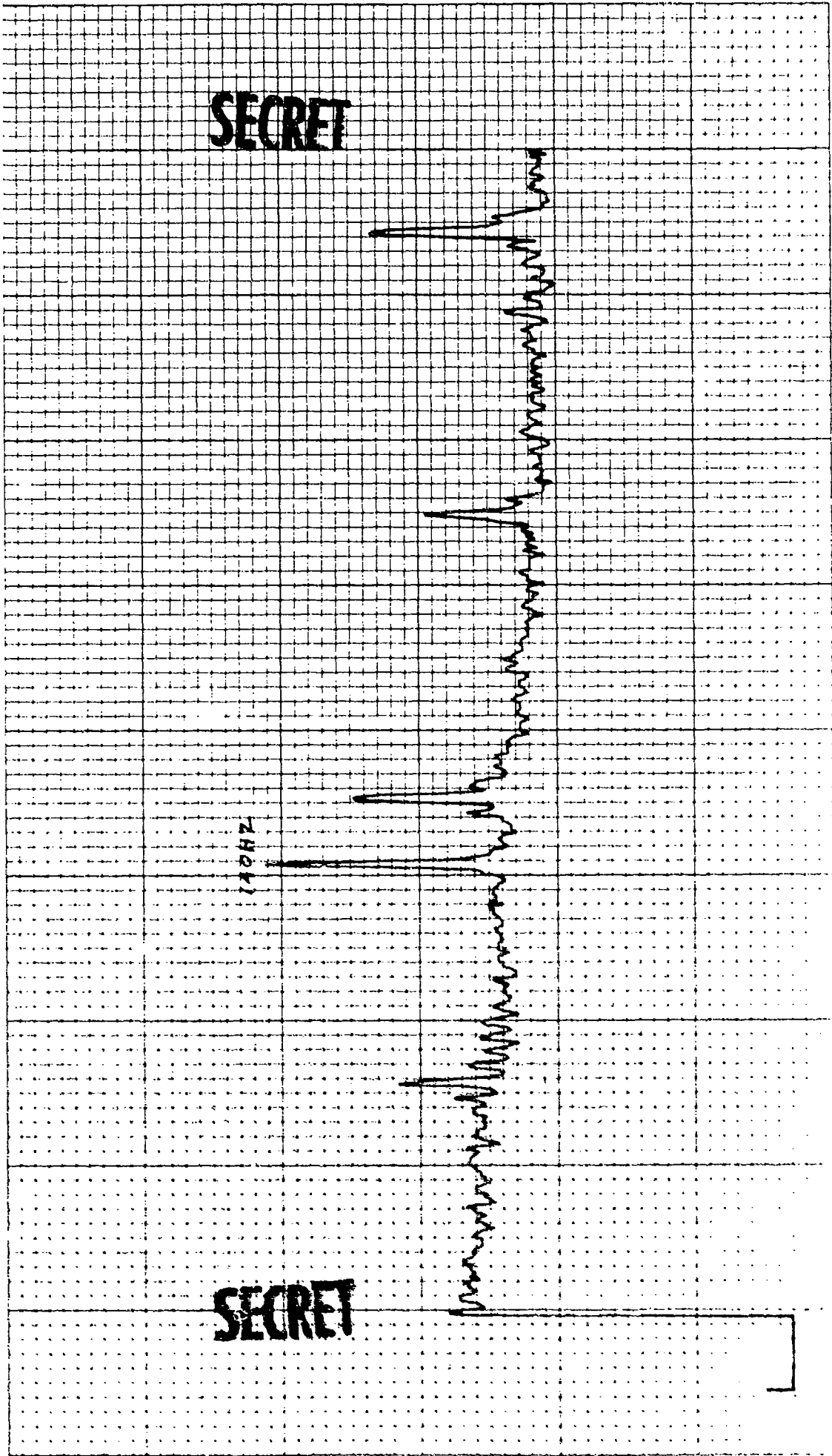
REEL: F19 INDE X3650
 INTEGRATION TIME 320 SECS ATTEN: -30 DB
 FILTER WTG: HANNING



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

DATE OF ANALYSIS: - - - - -
1-26-53
DATE/TIME: 2777-1549 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+49 DEG. AZ STEERING

REEL: F19 INDE X165
INTEGRATION TIME 320 SECS ATTEN: -30 DB
FILTER WTG: HANNING



KOE 10 X 16 TO THE INCHES
SECUREL & PAPER CO. MADE IN U.S.A.

46 0703

CONTROL: 1549 - 51 (DRS) DATE OF ANALYSIS: ---

BEAMFORMED SPECTRUM(ELEMENTS) 1-26 @ 29-53

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

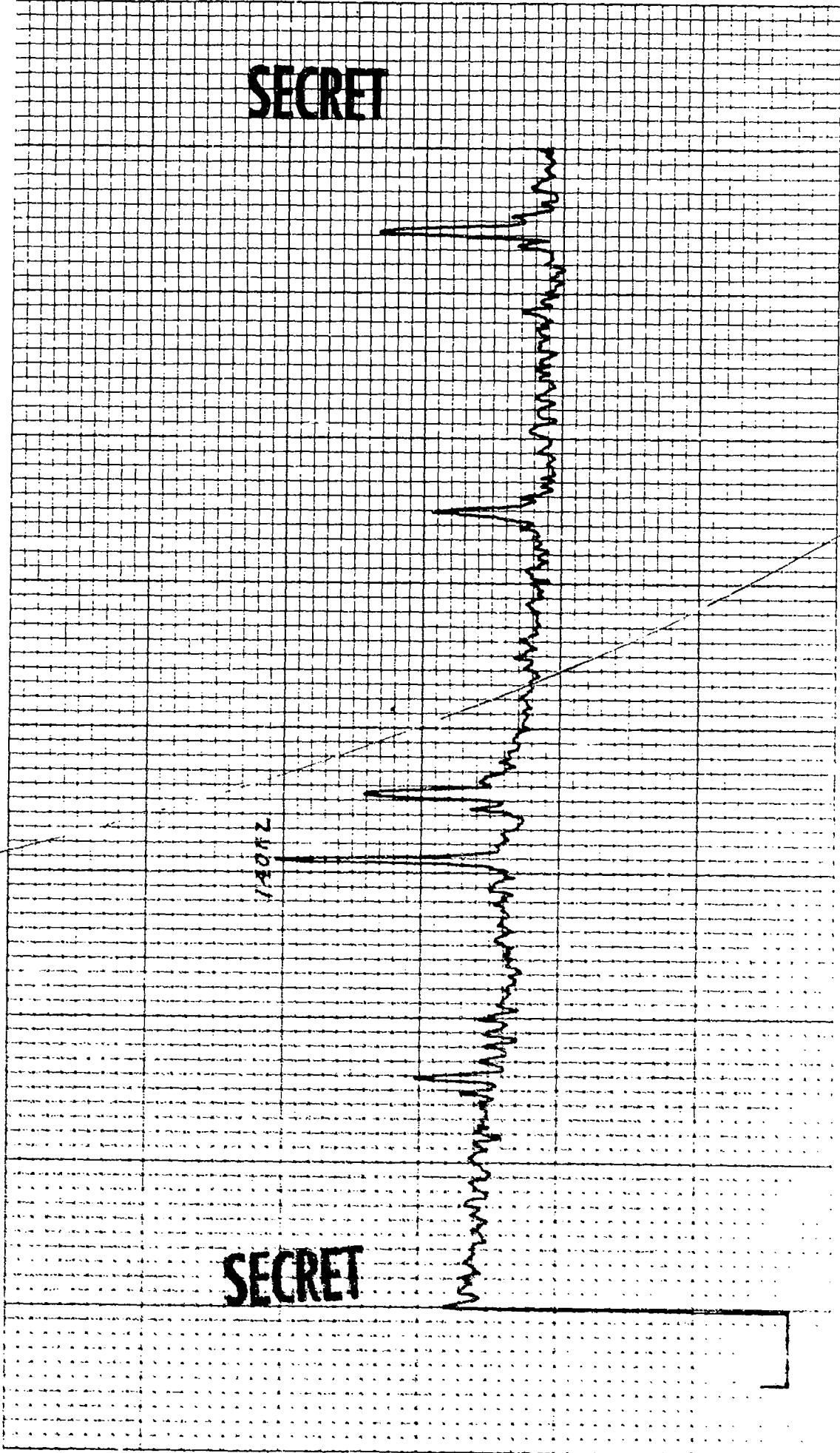
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ

51 ELEMENTS +50 DEG. AZ STEERING

REEL: F19 INDE X3050

INTEGRATION TIME 320 SECS ATTEN: -30 DB

FILTER WTG: HANNING



SECRET

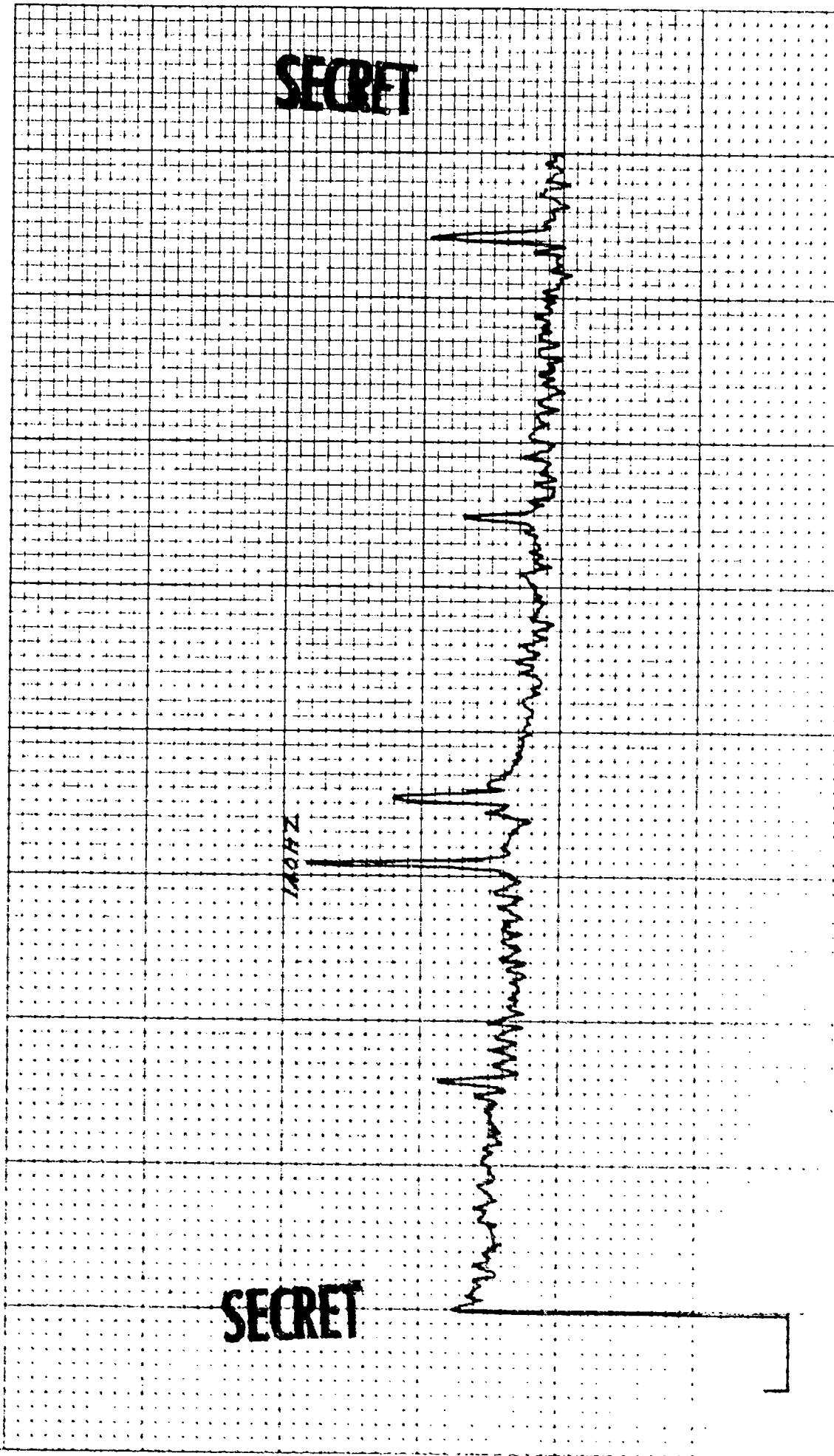
SECRET

H*E SERIAL & TRACK NO. 46 0703

CONTROL: 1549 - 51 (DP5)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
51 ELEMENTS

DATE OF ANALYSIS: 1-26-53
DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+52 DEG. AZ STEERING

REEL: F19
INDE X3658
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTER WTG: HANNING



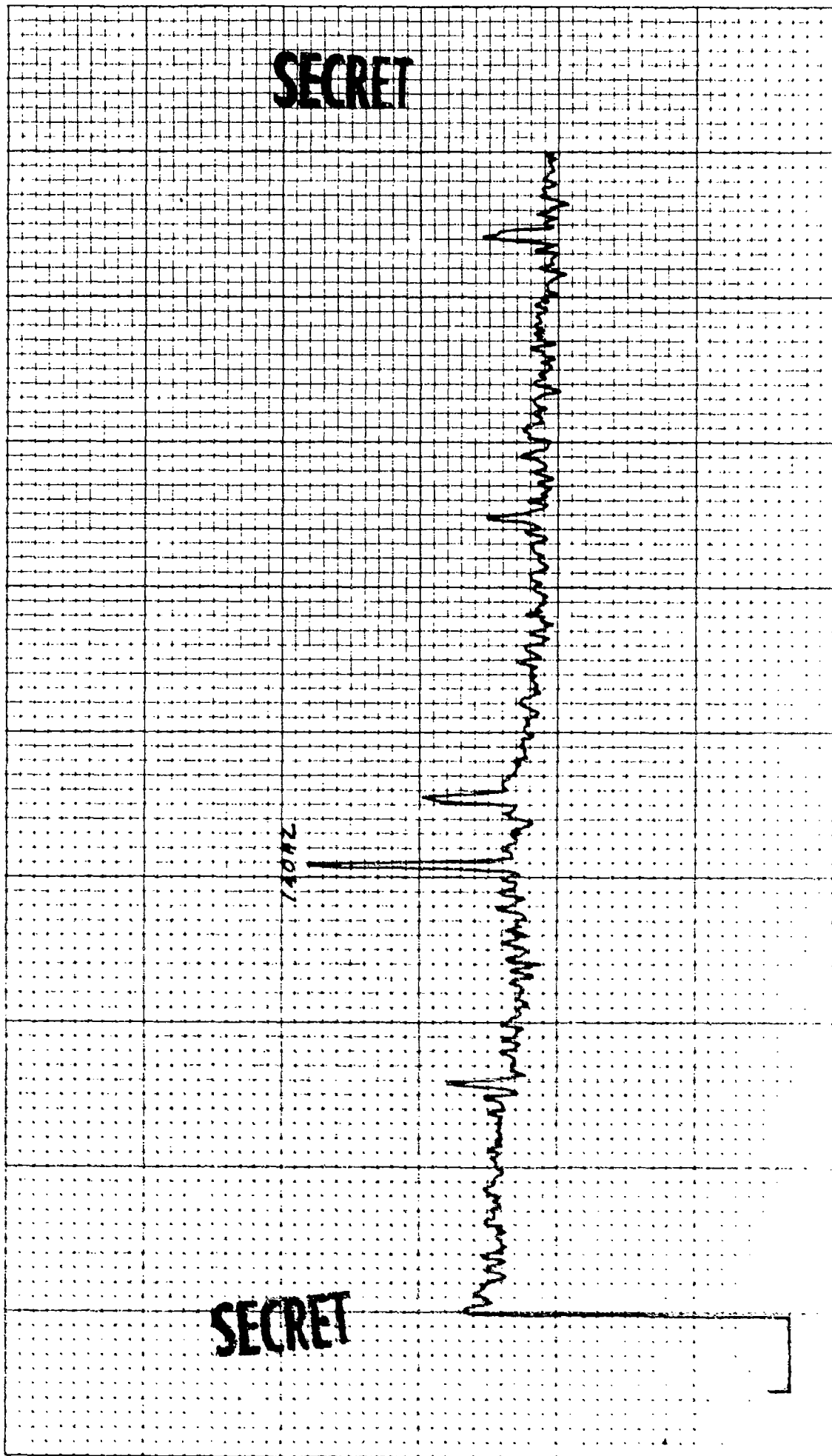
SECRET

SECRET

KOE IS X 16 TO THE INCHES. 2.5 CM PER INCH
REFLECTOR & PAPER 70 4000 4000

46 0703

CONTROL: 1549 - 5/ (DPS) DATE OF ANALYSIS: ---
BEAMFORMED SPECTRUM (ELEMENTS) 1-208 29-53
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ
CENTER FREQ: 150 HZ +54 DEG. AZ STEERING
REEL: F19 INTEGRATION TIME 320 SECS ATTEN: -30 DB
5/ ELEMENTS FILTER WTG: HANNING
INDE X3050



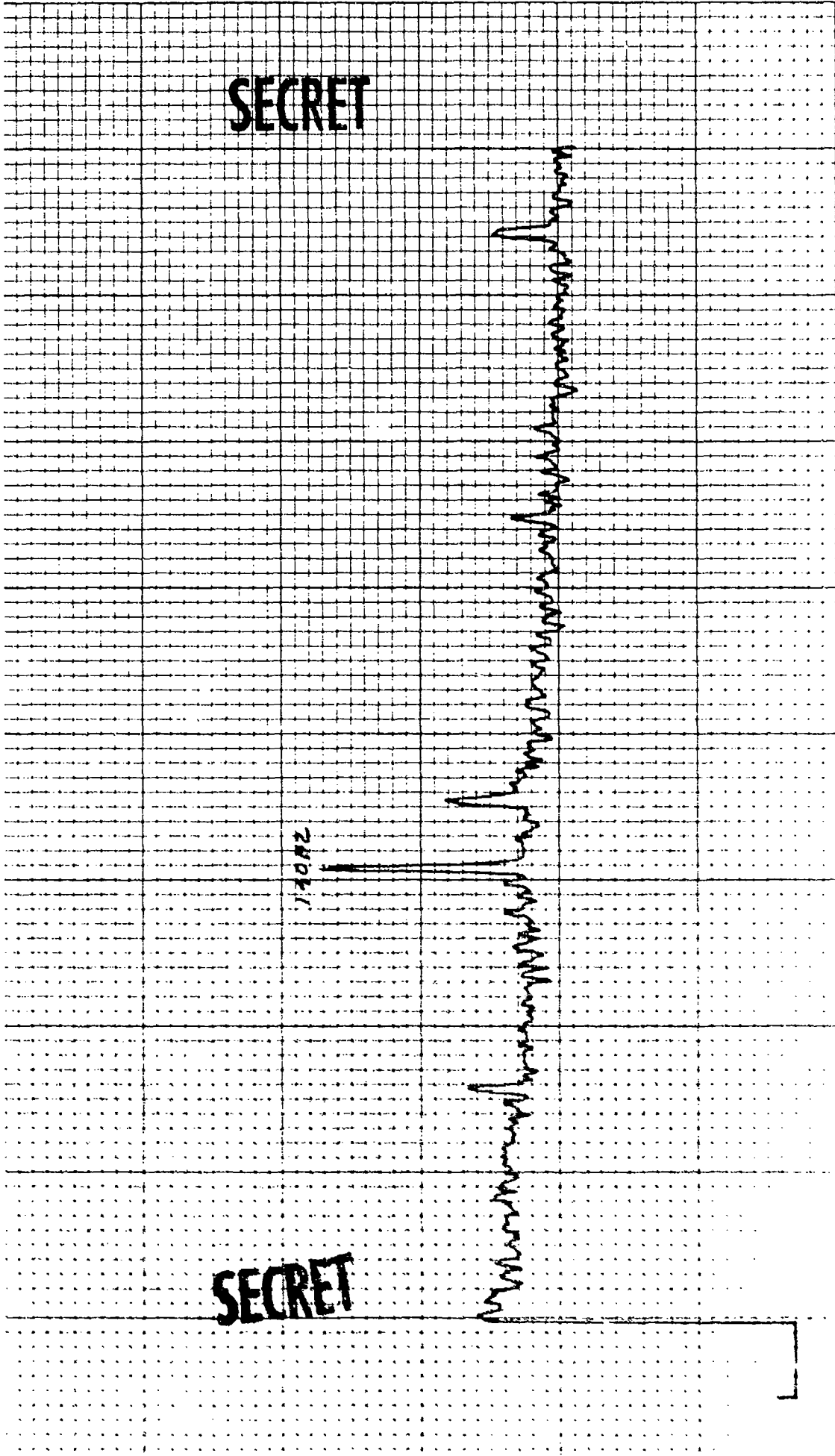
10 X 10 TO THE INCHES
PER INCH & CENTER FOR 4000 & 1000

46 0703

CONTROL: 1599 - 5/ (DPS)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
5/ ELEMENTS

DATE OF ANALYSIS: -- -- --
1-26-53
DATE/TIME: 27-27 -1541 Z
ANALYSIS BANDWIDTH: 1/10HZ
+56 DEG. AZ STEERING

REEL: F/9 INDE X 3450
INTEGRATION TIME 320 SECS ATTN: -30 DB
FILTER WTC: HANNING



46 0703

K-E 10.1 TO THE INCHES / 1000000

CONTROL: 1549 - 51 (DPS) DATE OF ANALYSIS: - - - -

BEAMFORMED SPECTRUM (ELEMENTS) 1-26 & 29-53

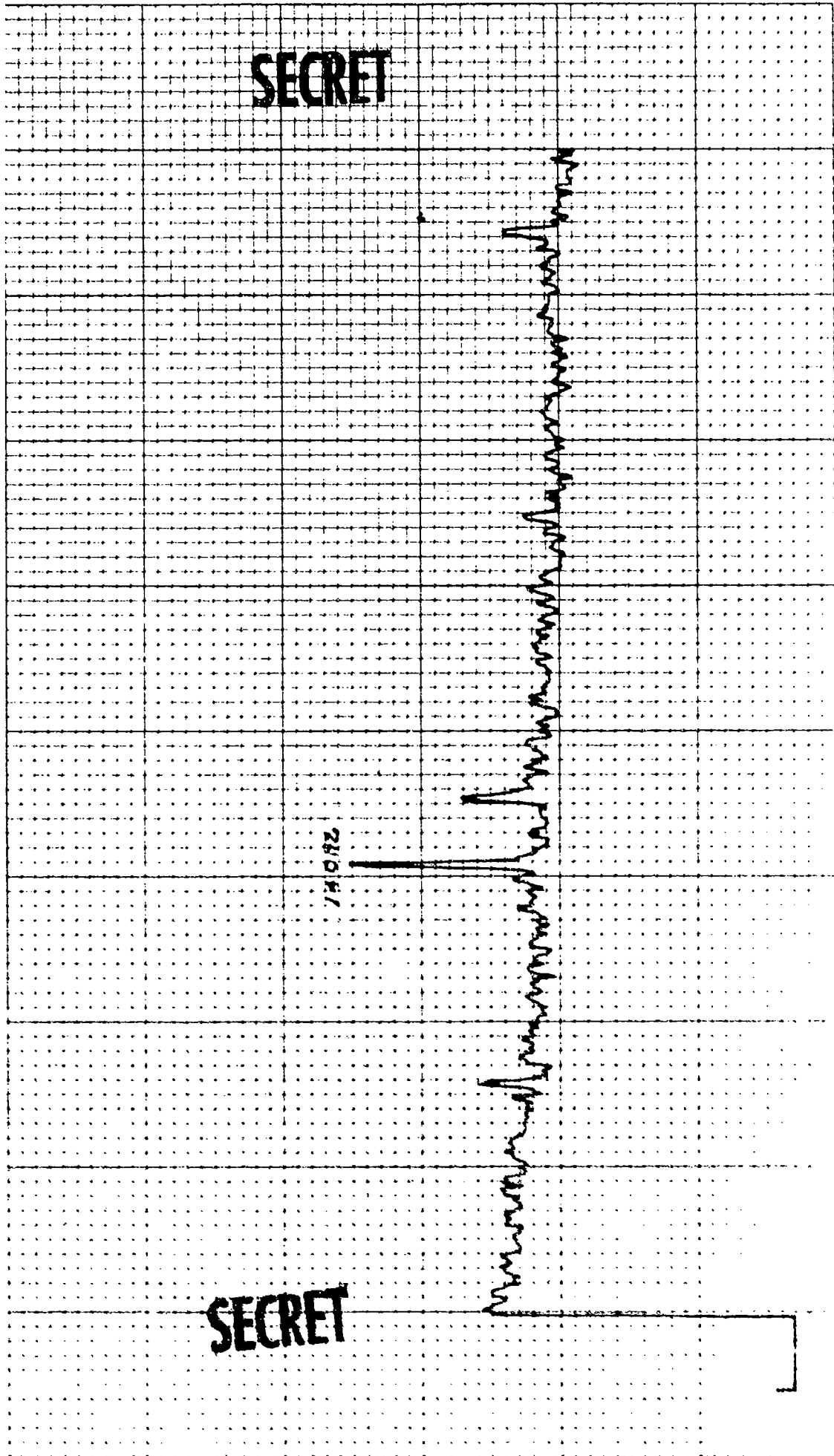
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z

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

51 ELEMENTS +50 DEG. AZ STEERING

REEL: F/1 INTEGRATION TIME 320 SECS FILTER WTC: HANNING

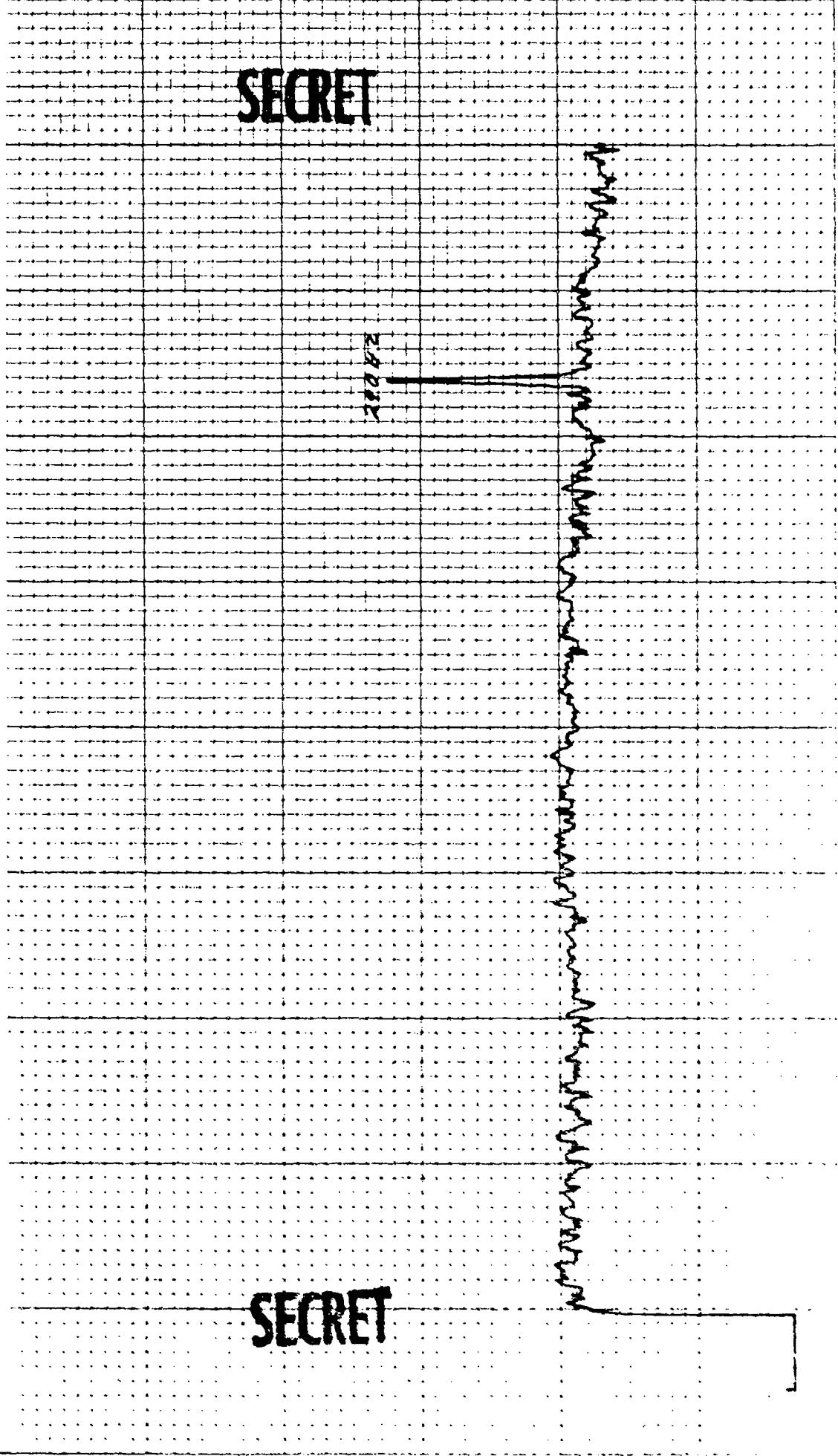
INDE X300 ATTEN: 30 DB



46 0703

K-2 19 511 10 1116 10 1116 10 1116

CONTROL: 1549 - 51 (DPS) DATE OF ANALYSIS: REEL: F19 INDE X3062
 BEAMFORMED SPECTRUM(ELEMENTS) /-26 d 29-53 INTEGRATION TIME 320 SECS ATTEN: -30 DB
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z FILTER WTG: HANNING
 CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1/10HZ +32 DEG. AZ STEERING



K-E 15X16 TO THE DIRECTOR, NSA, WASH, DC

46 0703

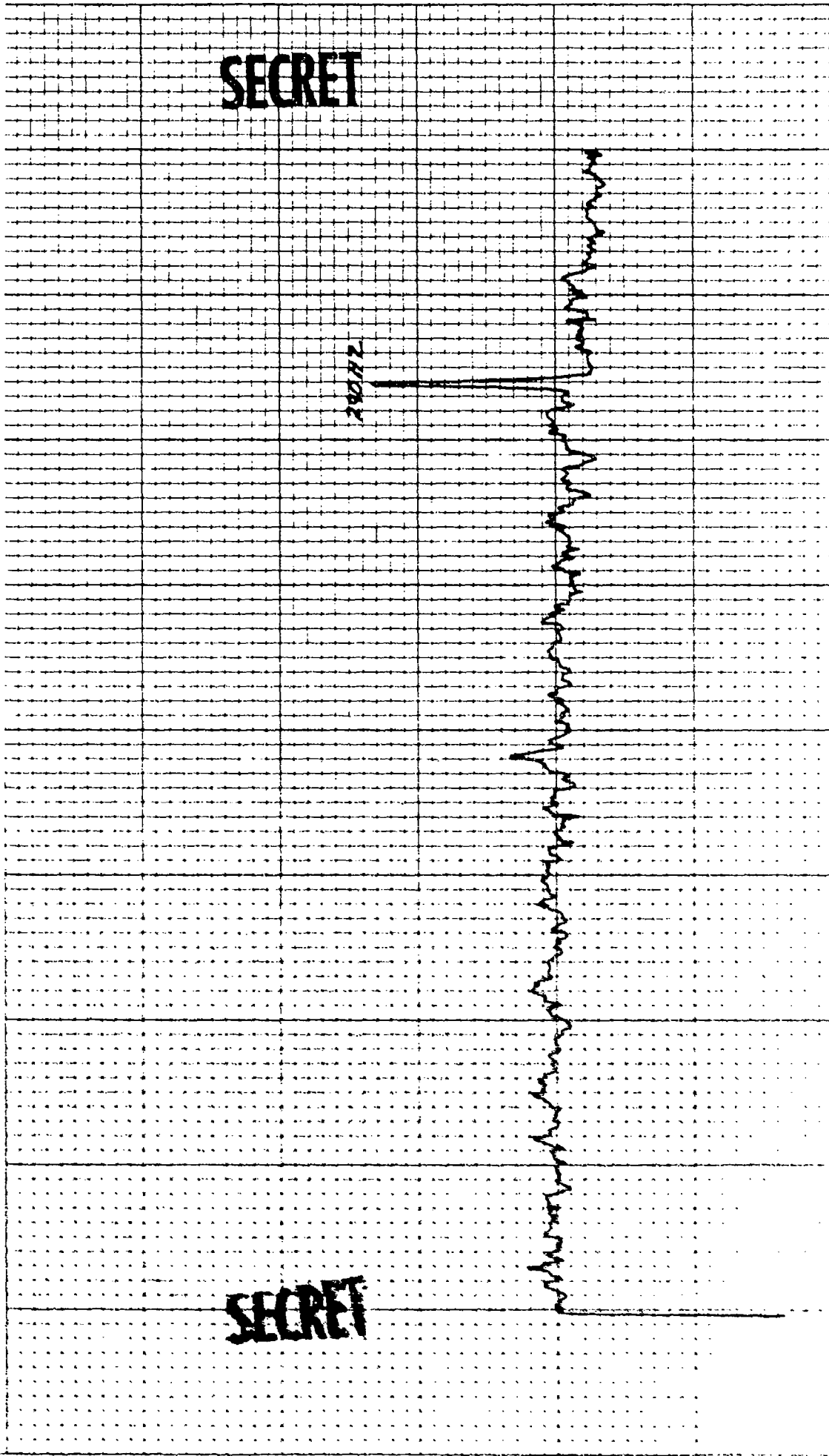
CONTROL: 1549 - 5/ (DPS) DATE OF ANALYSIS: 1-26-53 REEL: F19 INDE X3050

BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-7-77 - /549Z INTEGRATION TIME 320 SECS ATTN: -30 DB

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

CENTER FREQ: 2500 HZ +34 DEG. AZ STEERING

5/ ELEMENTS



SECRET

SECRET

K-E 10.2.10 TO THE DIRECTOR, 2.15.10 WMS
PERIODIC REPORT TO DIRECTOR

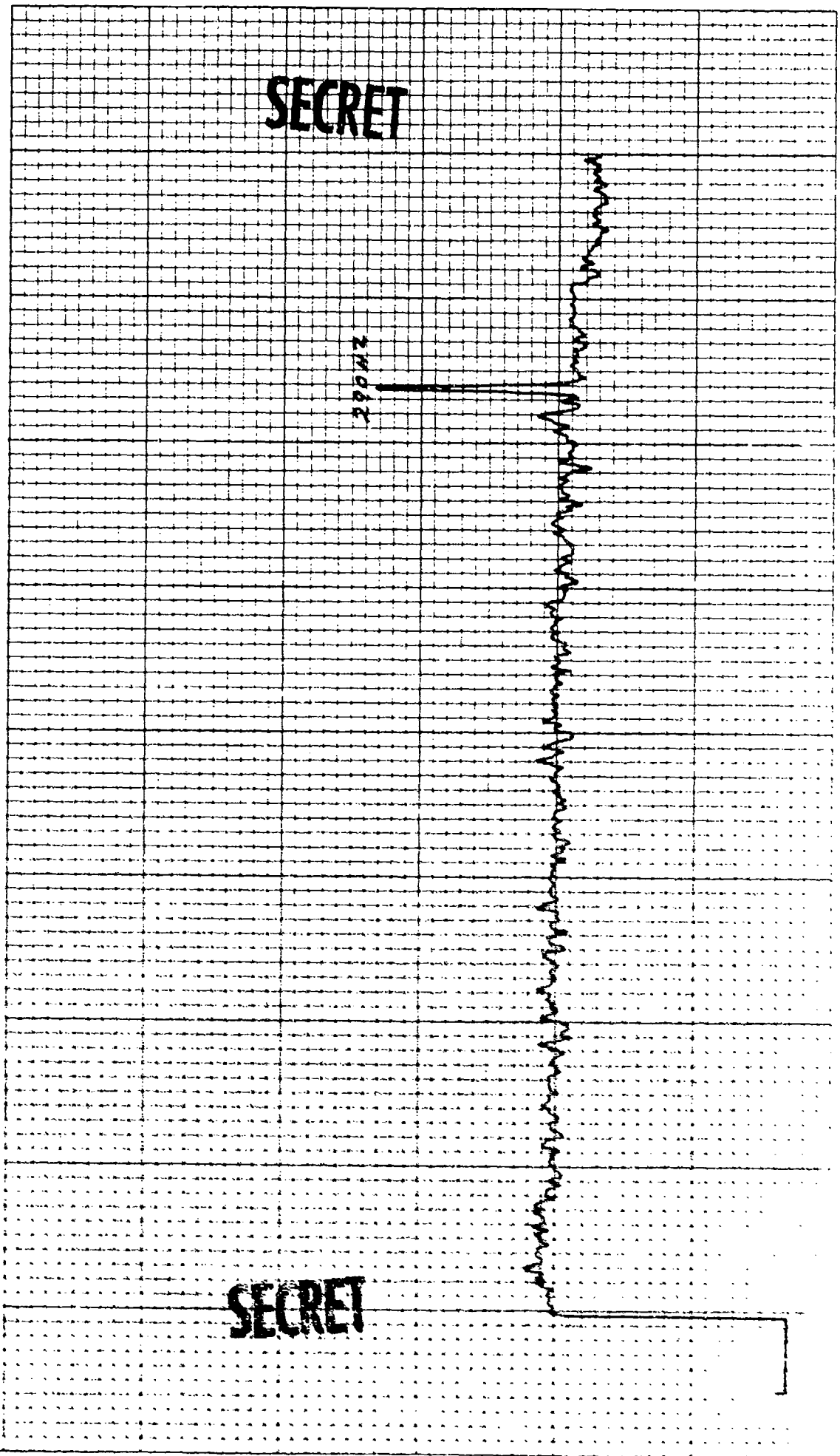
46 0703

CONTROL: 1549 - 51 (DP5)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
 51 ELEMENTS

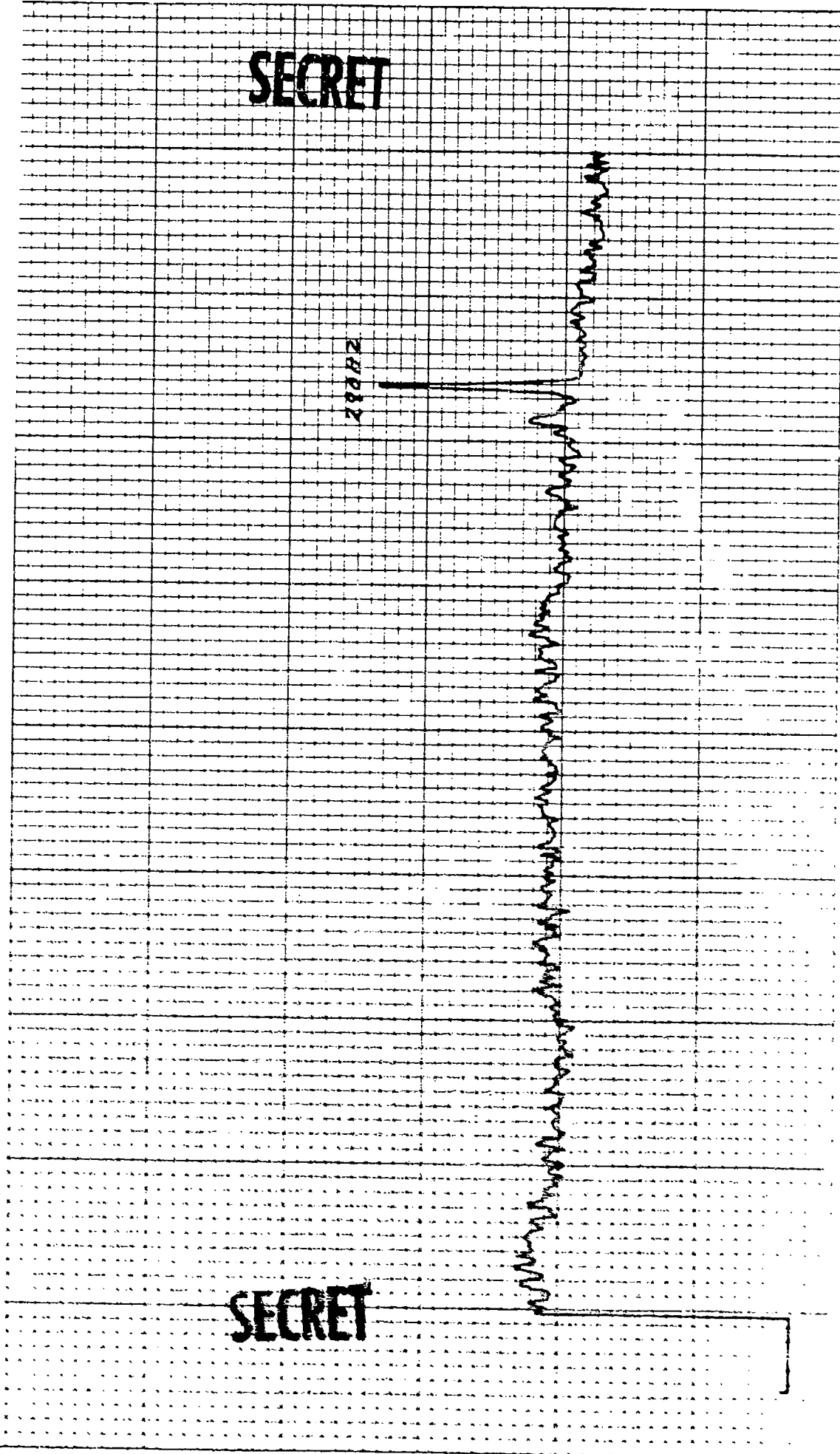
DATE OF ANALYSIS: - - - - -
 1-26-53

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

REEL: Fig INDE X3050
 INTEGRATION TIME 320 SECS ATTN: -30 DB
 FILTER WTG: HANNING



CONTROL: 1549 - 5/ (2P5) DATE OF ANALYSIS: REEL: F19 INDE X3050
 BEAMFORMED SPECTRUM (ELEMENTS) 1-260 29-53 INTEGRATION TIME 320 SECS ATTN: -30 DB
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z FILTER WTC: HANNING
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ
5/ ELEMENTS 4 30 DEG. AZ STEERING



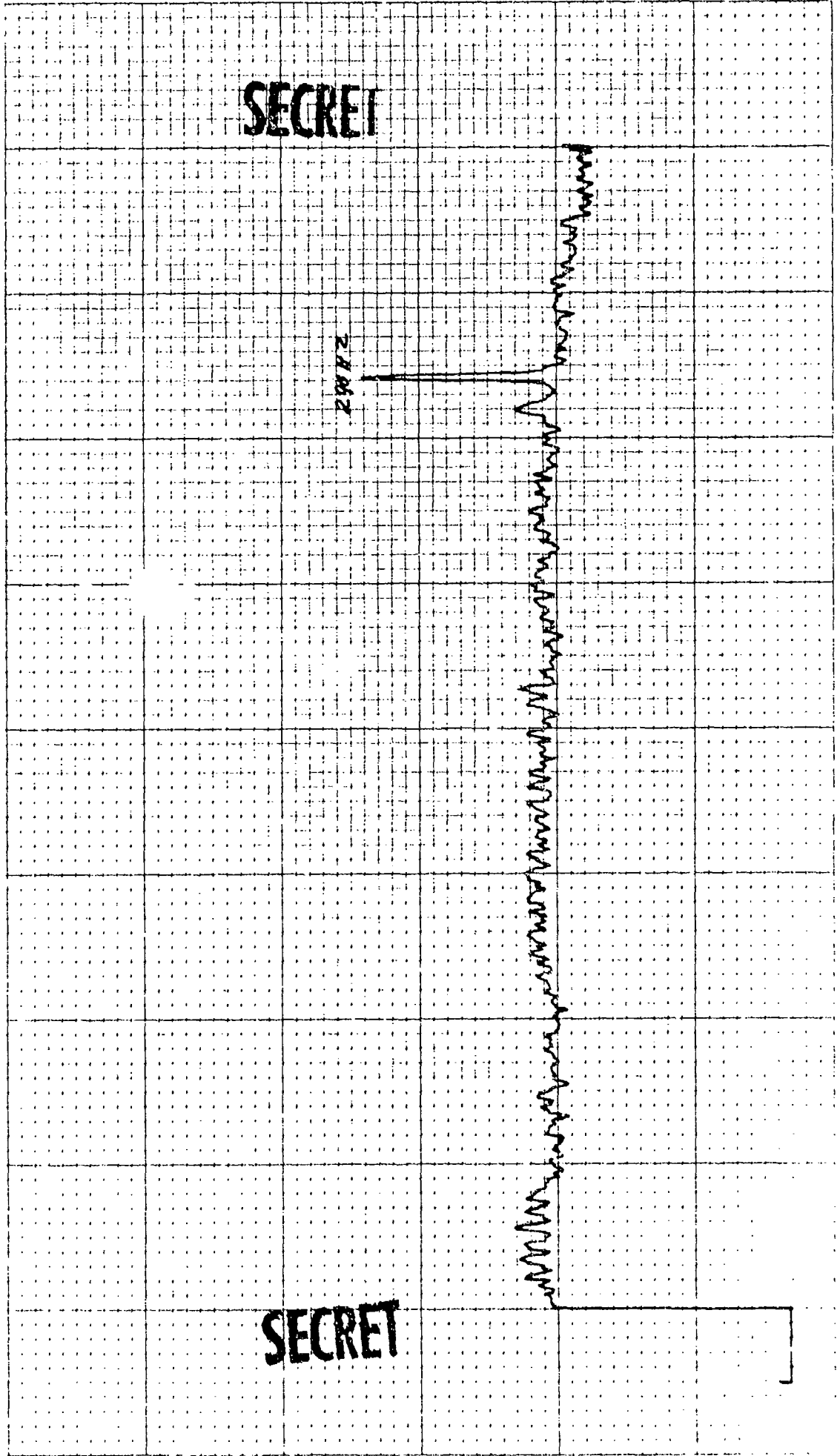
SECRET

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KOE 12/15 TO THE INCH. 1/15, 1977
PEPPER & ESSER CO. JULY 1977

46 0703

CONTROL: 1549 - 51 (DPS) DATE OF ANALYSIS: - - REFL: F19 INDE X3050
BEAMFORMED SPECTRUM (ELEMENTS) 1-268 29-50)
EXERCISE: BEAKING STAKE DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTN: -30 DB
CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
51 ELEMENTS +42 DEG. AZ STEERING



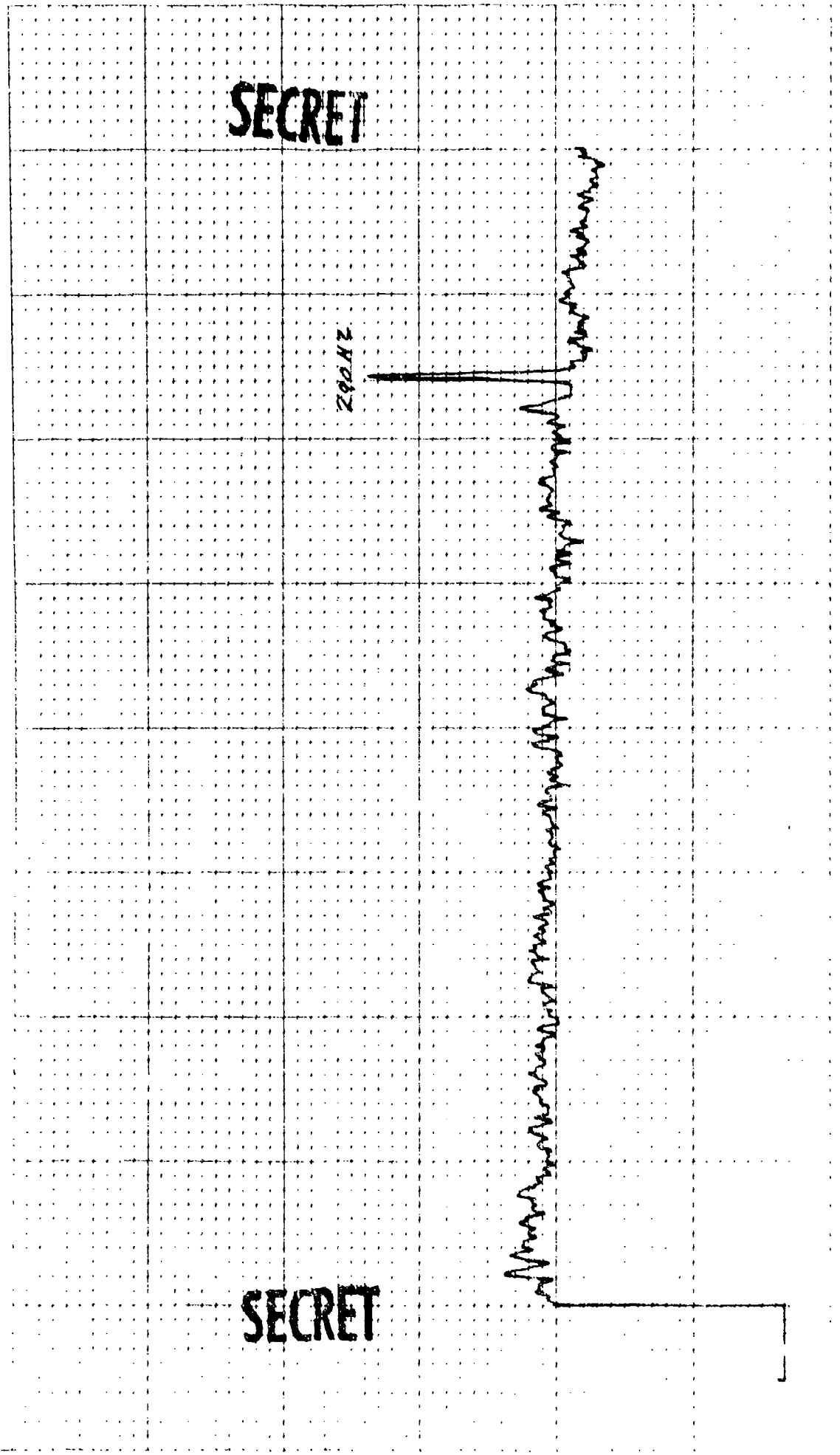
46 0703

CONTROL: 1549 - 51 (285)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
 51 ELEMENTS

DATE OF ANALYSIS: 1-26-53
 DATE/TIME: 2-7-77 -1549 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 +40 DEG. AZ STEERING

REEL: F19
 INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

INDE X3650



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290MHz

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

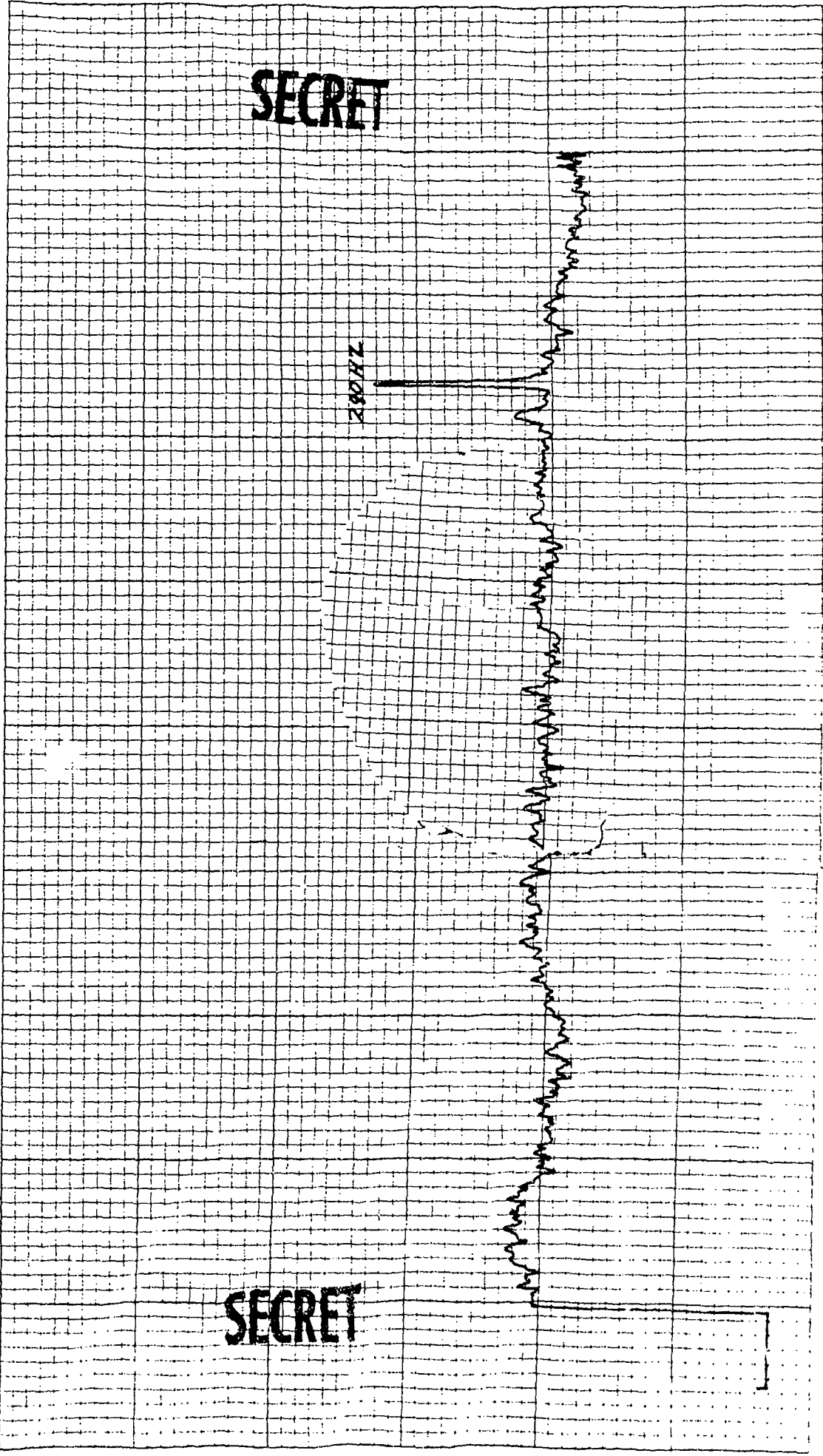
46 0703

CONTROL: 1549 - 51 (295)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 260 HZ
51 ELEMENTS

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

REEL: F79
INTEGRATION TIME 320 SECS
FILTER
ATTEN: -30 DB
WTG: HANNING

INDE X328



K-Σ 16 X 16 TO THE INCHS. A 16 INCHES
REIFFEL & LESSER CO. MADE IN U.S.A.

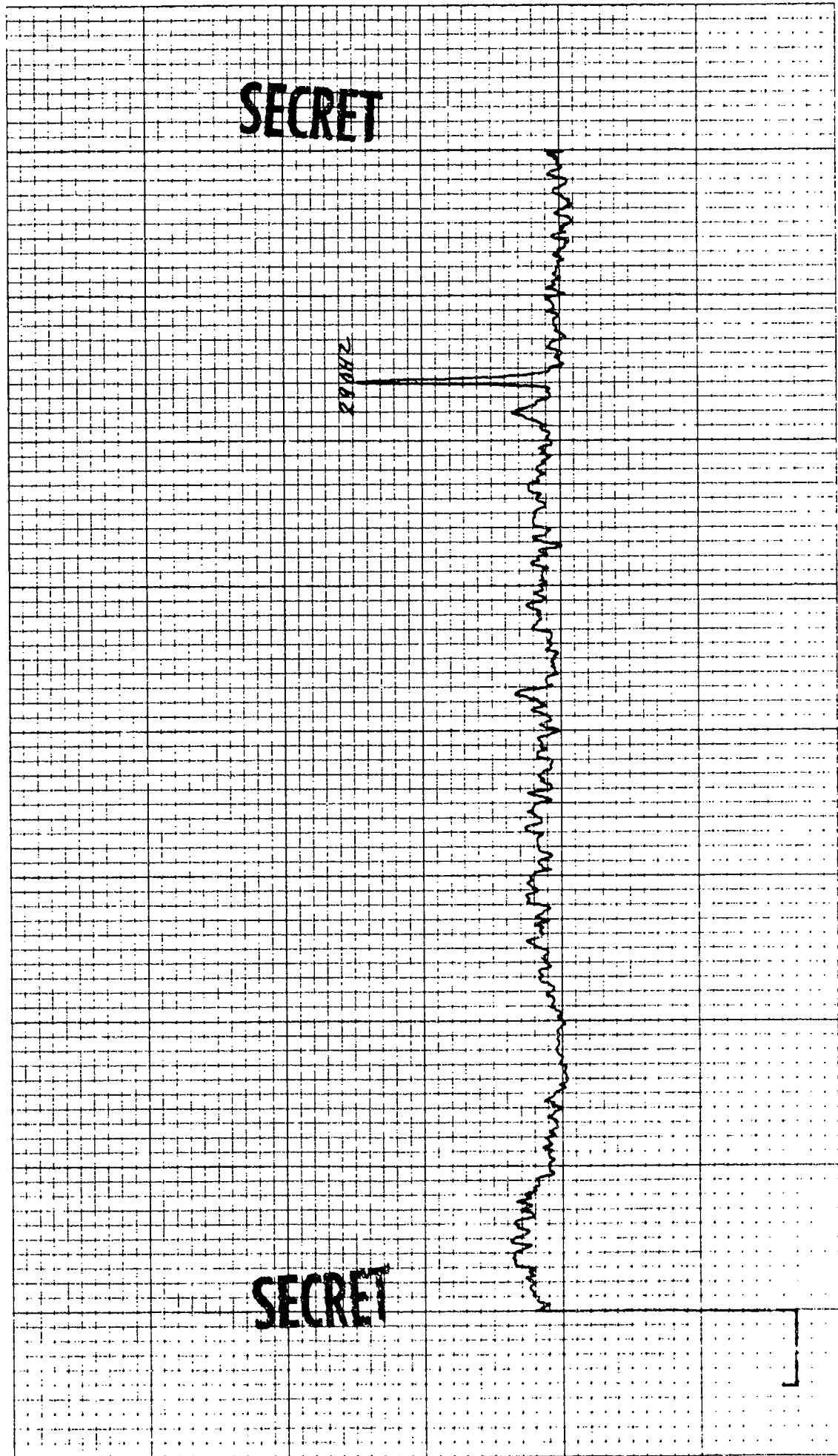
46 0703

CONTROL: 1549 - 51 (DP5)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
51 ELEMENTS

DATE OF ANALYSIS: -- -- --
1-268 29-53

DATE/TIME: 2-7-72 - 1549 Z
ANALYSIS BANDWIDTH: 1/10HZ
+44 DEG. AZ STEERING

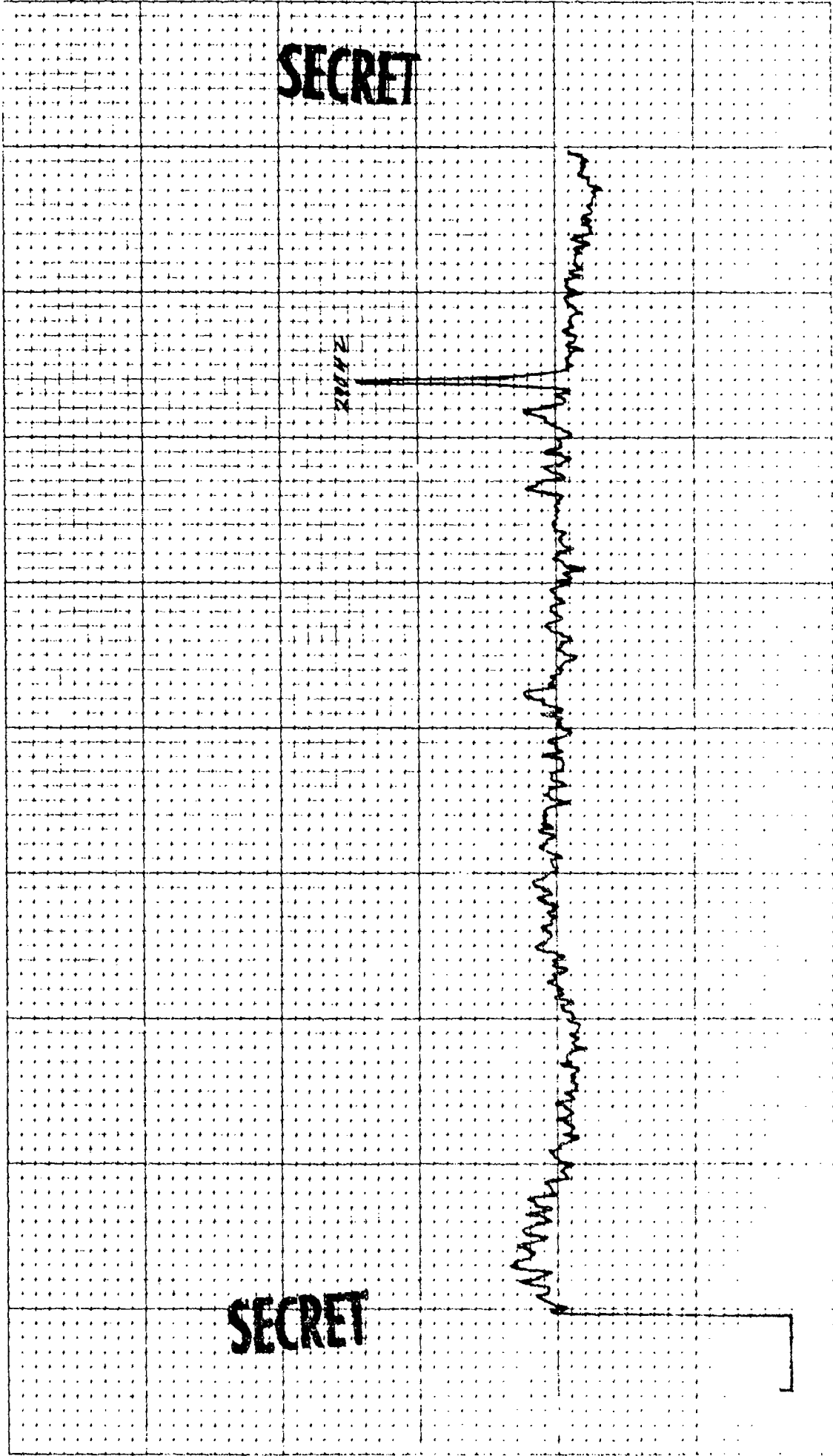
REEL: FI1 INDE X 3050
INTEGRATION TIME 320 SECS ATTEN: -30 DB
FILTER WTG: HANNING



K02 12.1 TO THE INCHES
PEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 1549 - 51 (DPS) DATE OF ANALYSIS: REEL: 519 INDE X305
BEAMFORMED SPECTRUM (ELEMENTS) 1-26 & 29-53 INTEGRATION TIME 320 SECS ATTN: -30 DB
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549Z FILTER WTC: HANNING
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ
51 ELEMENTS +45 DEG. AZ STEERING

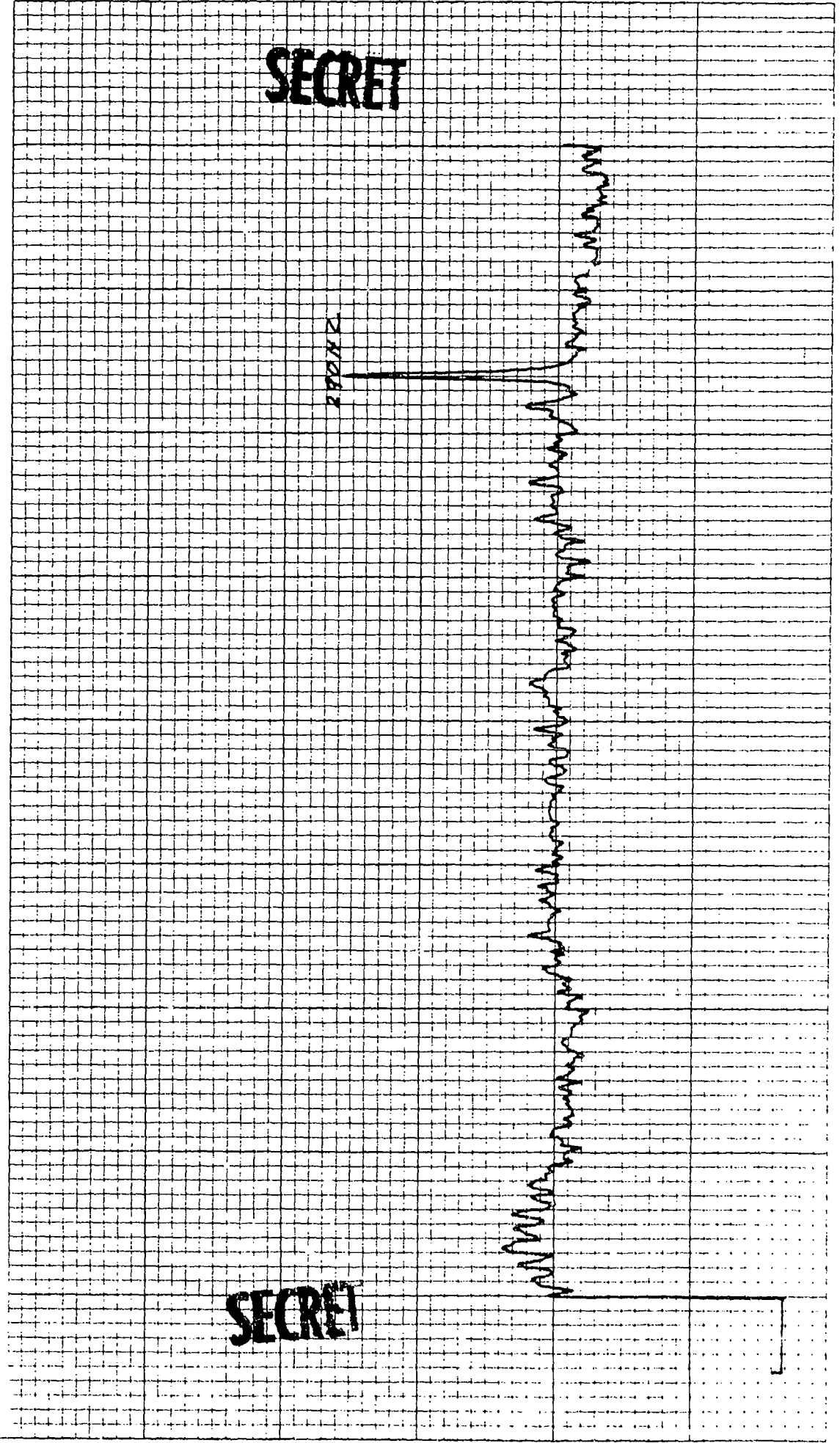


K₀Σ 10 X 10 TO THE INCH • 7 X 10 IN LINES
KEUFFEL & ESSER CO MADE IN U.S.A.

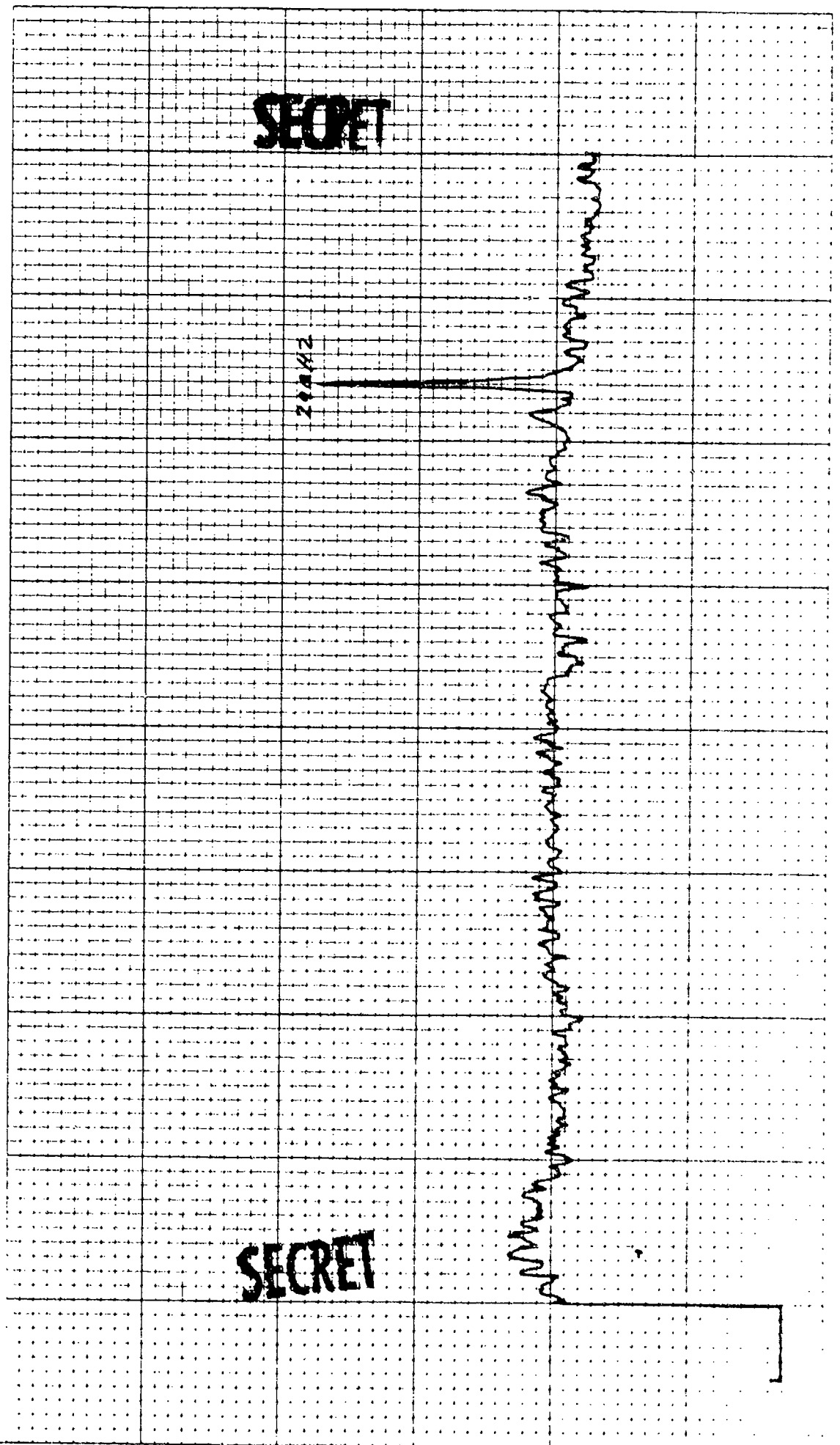
46 0703

CONTROL: 1549 - 5/ (DPS) DATE OF ANALYSIS: ---
BEAMFORMED SPECTRUM (ELEMENTS) 1-36829-53
EXERCISE: BEARING STAKE
CENTER FREQ: 250 HZ
5/ ELEMENTS
INTEGRATION TIME 320 SECS ATTEN: -30 DB
REEL: F19 FILTER WTC: HANNING
INDE XJ050

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



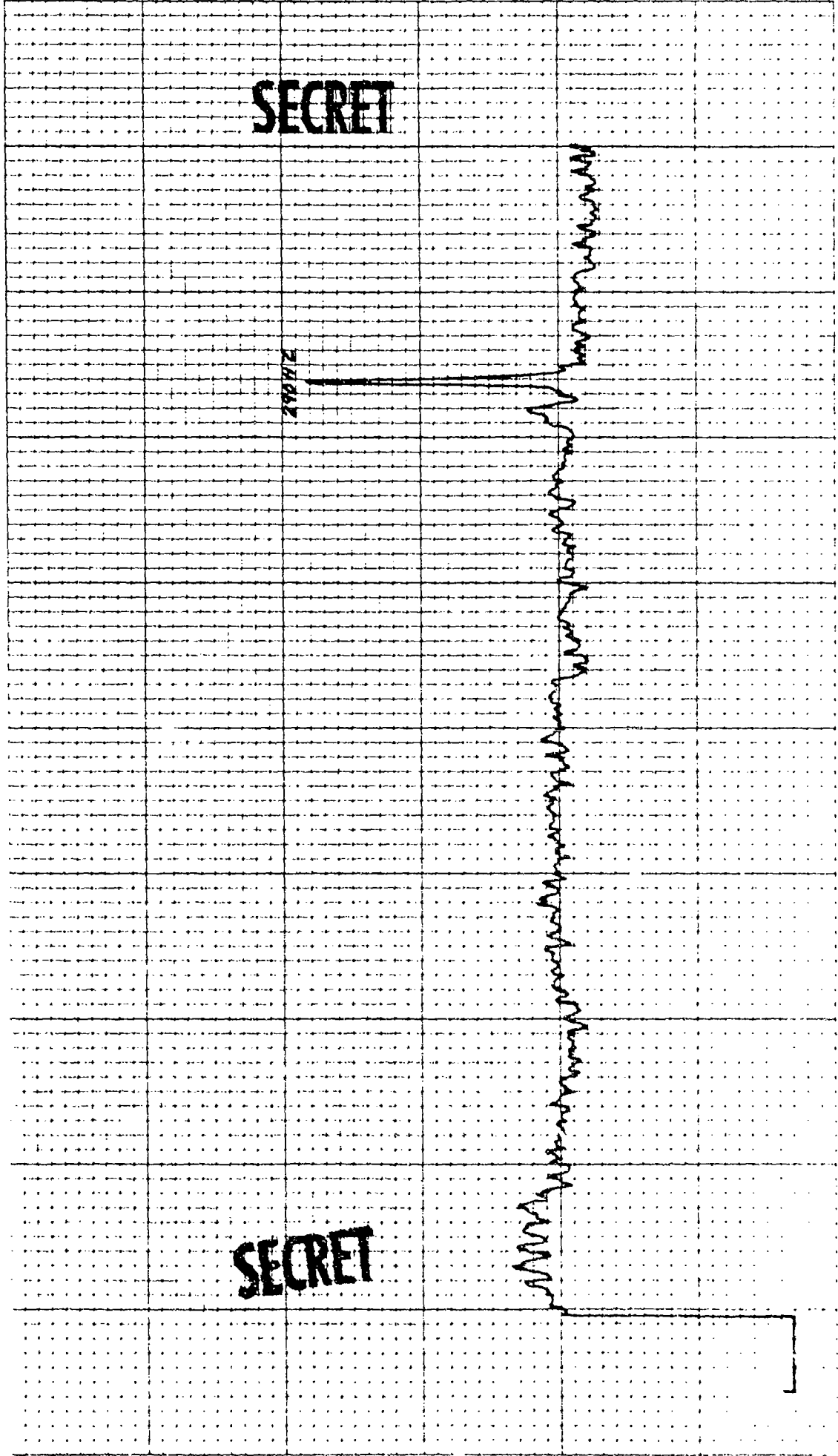
CONTROL: 1549 - 51 (DPS) REEL: F19 INDE X3050
 BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: 1-26-29-53
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTN: -3 DB
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTC WTC: HANNING
51 ELEMENTS 148 DEG. AZ STEERING



KOE 16.4 IN TO THE INCH. 2.5 POINTS.
REUPPEL & ESSER CO. MILWAUKEE, WIS.

46 0703

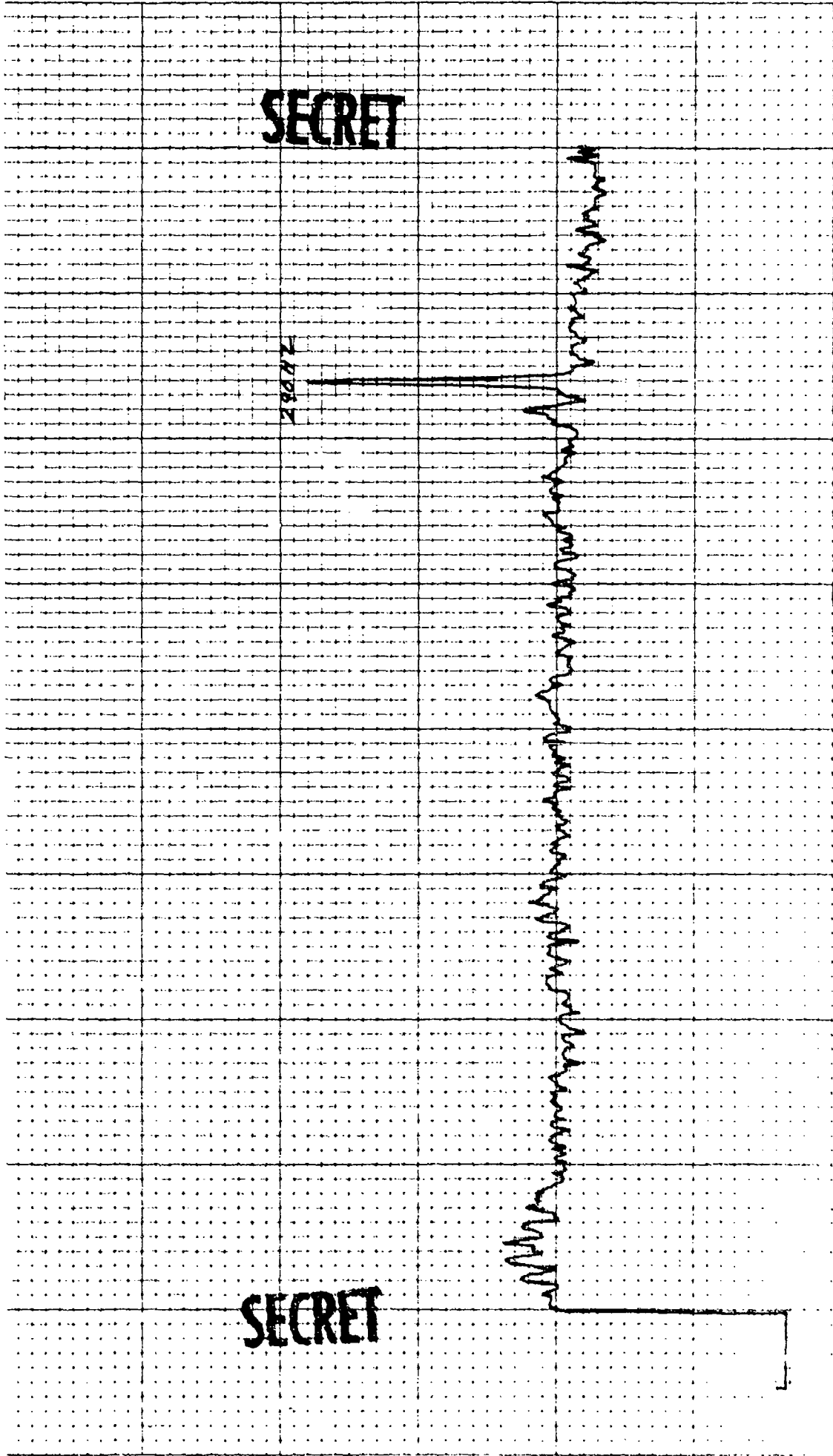
CONTROL: 1549 - 51 (DPS) DATE OF ANALYSIS: _____ REEL: F19 INDE X J060
BEAMFORMED SPECTRUM(ELEMENTS) 1 - 26 @ 20 - 53 INTEGRATION TIME 320 SECS ATTEN: 30 DB
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 1549 Z FILTER WTG: HANNING
CENTER FREQ: 270 HZ ANALYSIS BANDWIDTH: 1/10HZ +49 DEG. AZ STEERING



KOE 10.4 TO THE INCH
PENFELL & ESSER CO. NEW YORK

46 0703

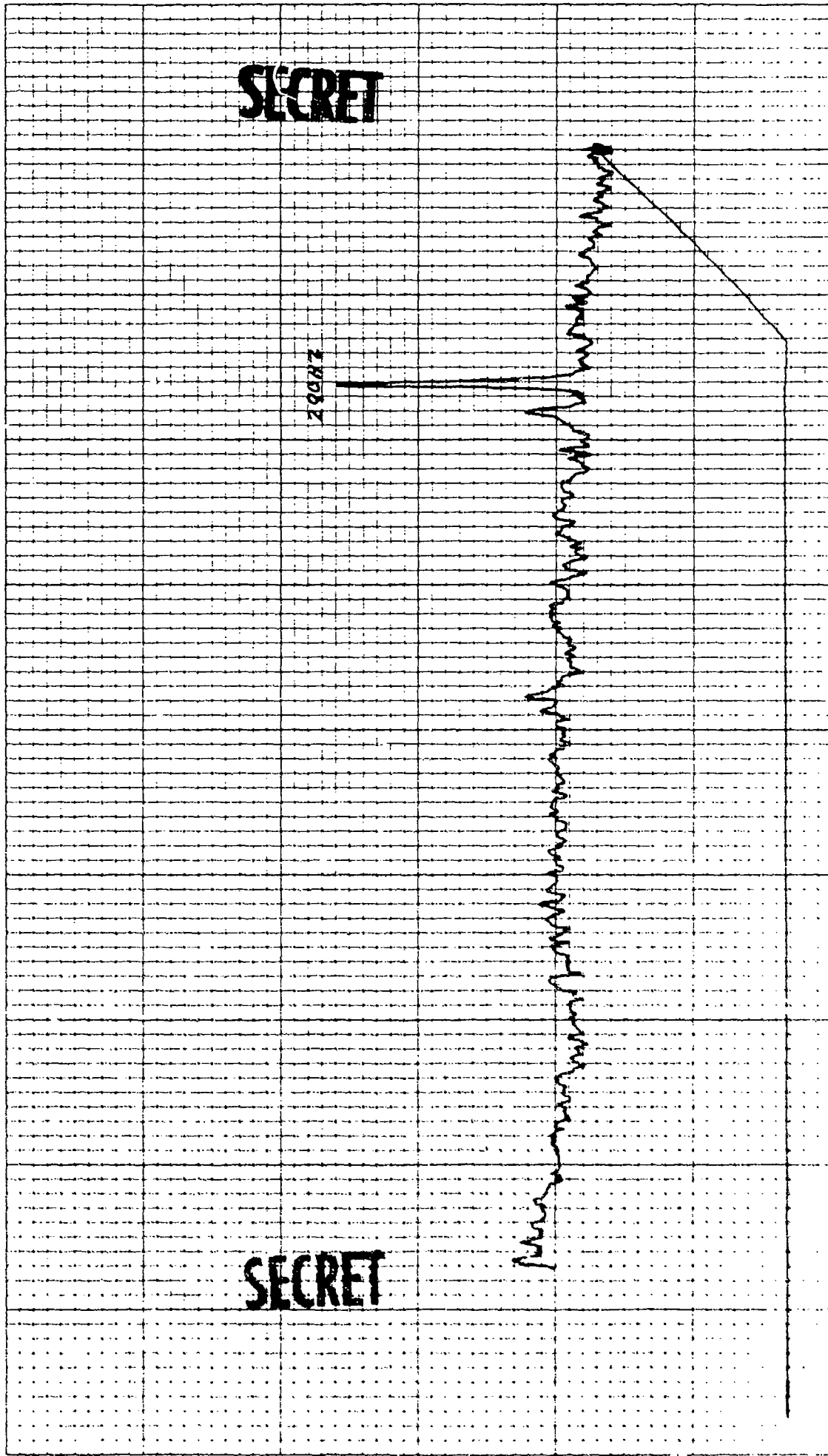
CONTROL: 1549 - 51 (DP5) DATE OF ANALYSIS: 1-26-53 REEL: 51 INDE XJ650
 BEAMFORMED SPECTRUM (ELEMENTS) DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTN: -30 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 CENTER FREQ: 200 HZ +50 DEG. AZ STEERING



KOE 10 X 10 TO THE INCHES / A TO THE METS
REUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 1549 - 5/ (005) REEL: F19 INDE X350
BEAMFORMED SPECTRUM (ELEMENTS) DATE OF ANALYSIS: . . .
EXERCISE: BEARING STAKE /- 26 & 29-53
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: -30 DB
5/ ELEMENTS + 52 DEG. AZ STEERING FILTER WTC: HANNING



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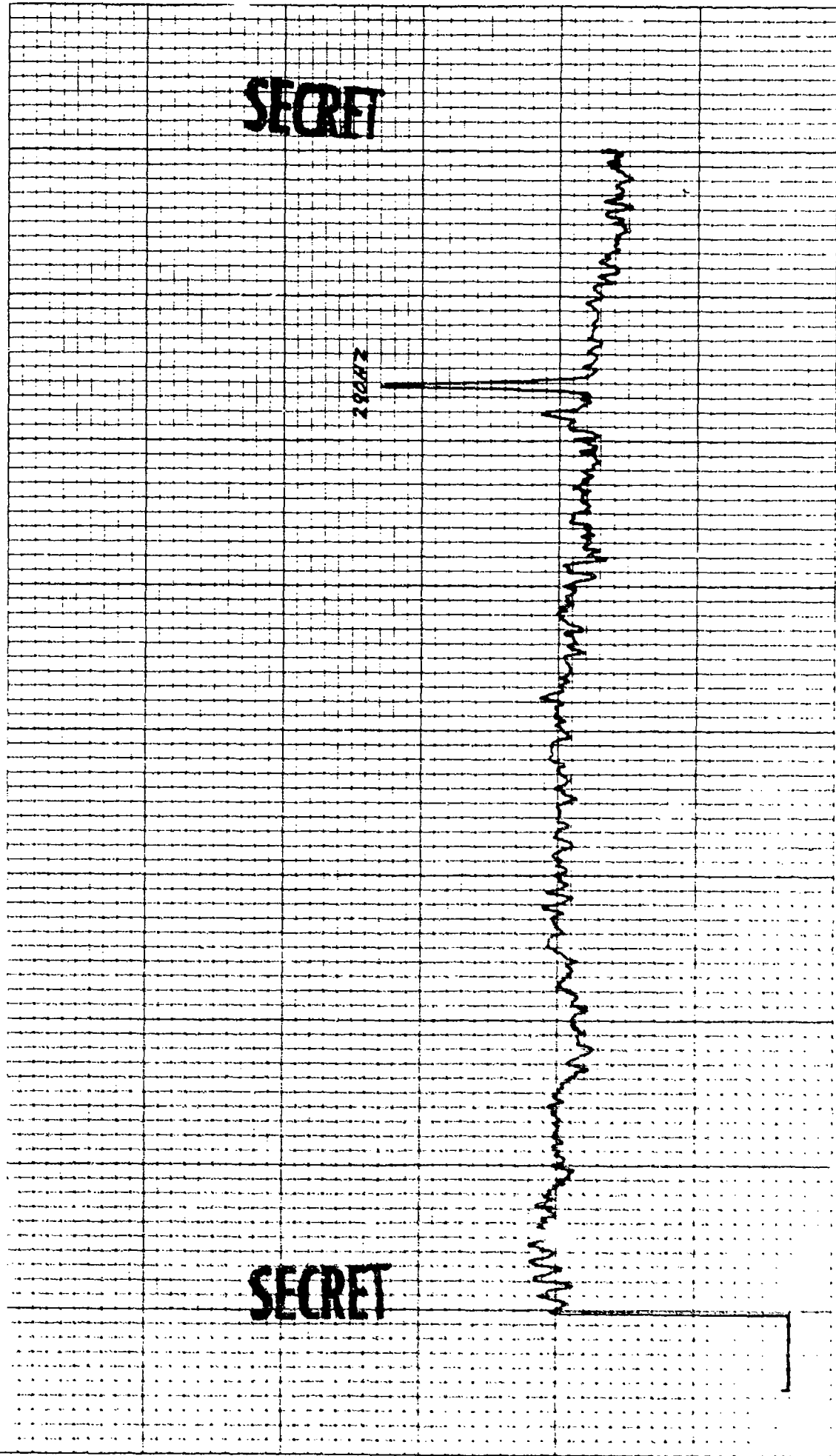
KOE 10 X 10 TO THE INCH. 1.5 INCHES.
REDFIELD BESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 1549 - 51 (DBS)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
51 ELEMENTS

DATE OF ANALYSIS: - - - - -
1-26 & 28-53)
DATE/TIME: 2-7-77 -1549 Z
ANALYSIS BANDWIDTH: 1/10HZ
+54 DEG. AZ STEERING

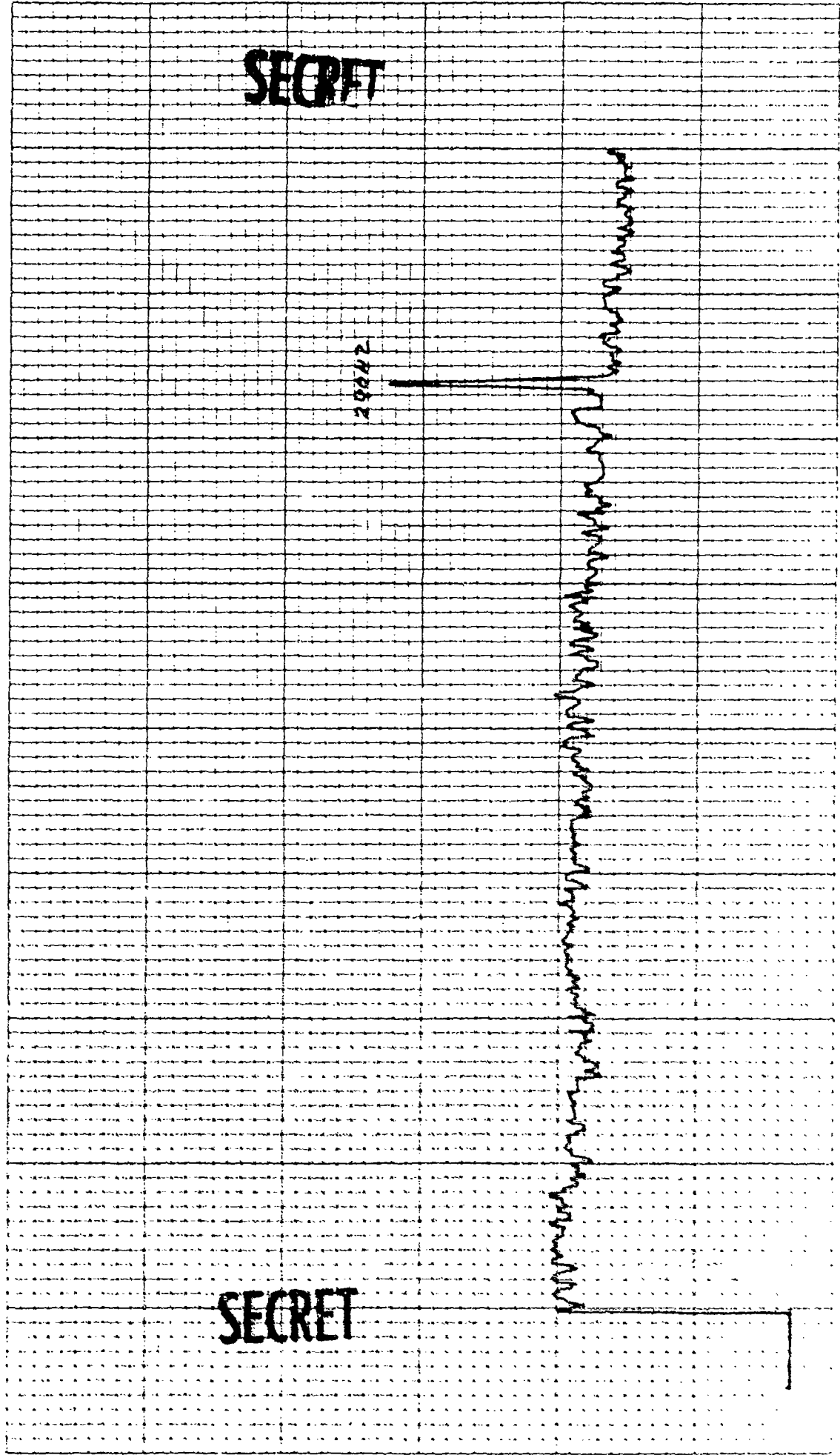
REEL: F19 INDE X 355
INTEGRATION TIME 320 SECS ATTEN:-30 DB
FILTER WTC: HANNING



10 X 10 TO THE INCHES 1 TO THE FEET
RECEIVED AT RESEARCH CO. WASH. D.C.

46 0703

CONTROL: 1549 - 51 (DPS) DATE OF ANALYSIS: 1-26-53 REEL: F19 INDE X 3051
BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 2-7-77 - 1549 Z INTEGRATION TIME 320 SECS ATTEN: -30 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
CENTER FREQ: 280 HZ 756 DEG. AZ STEERING



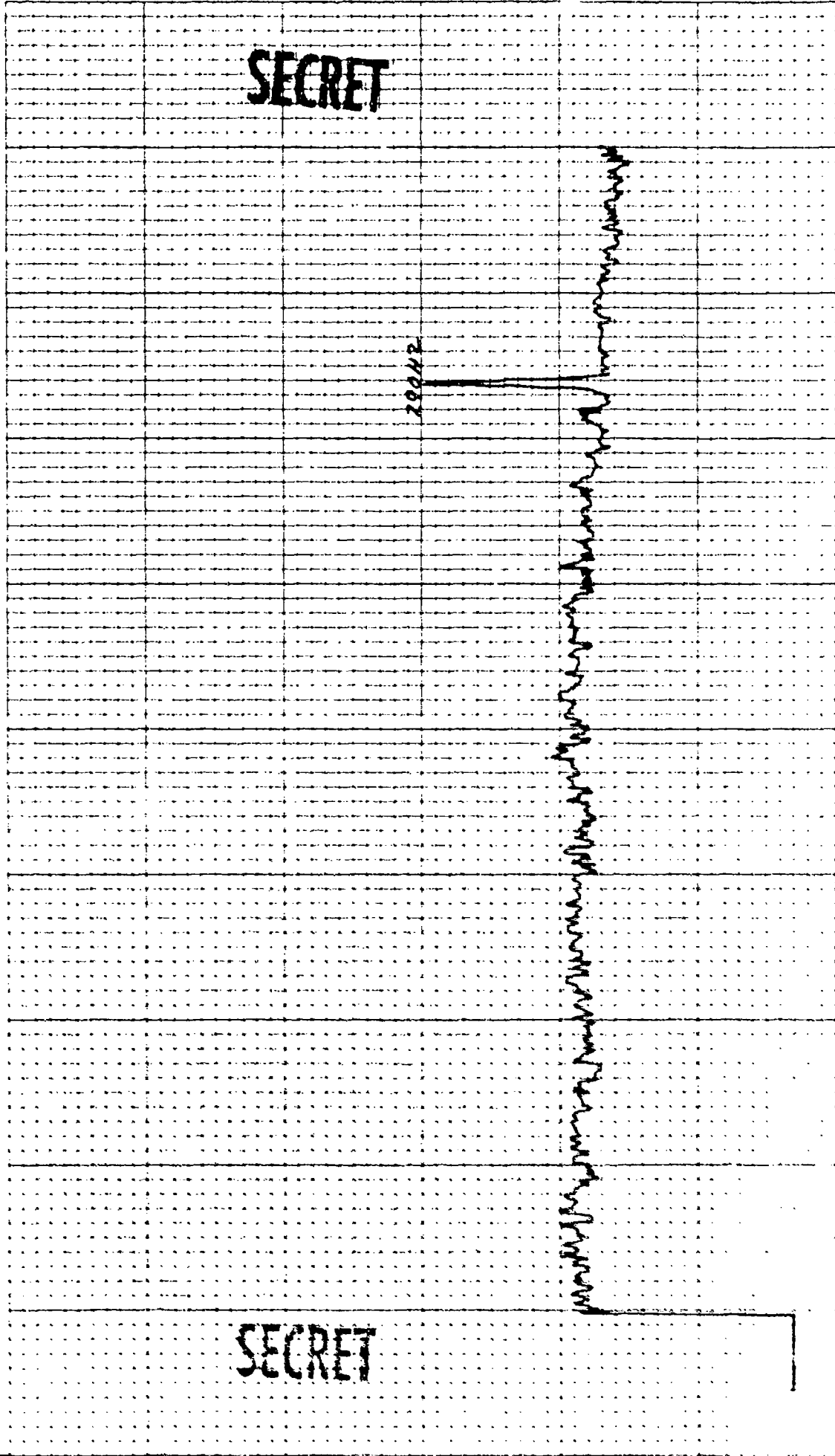
KOE 32110 TO THE OTHER 21000000

46 0703

CONTROL: 1549 - 5/ (DP5)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
5/ ELEMENTS

DATE OF ANALYSIS: - - - -
1-26 @ 29-53)
DATE/TIME: 2-7-77 - 1549 Z
ANALYSIS BANDWIDTH: 1/10HZ
+58 DEG. AZ STEERING

REEL: F19
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING
INDE XJ50
ATTEN: -30 DB



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

DATA POINT 6 DATE 2-7-77 TIME 2033Z

FREQUENCY 140 HZ

INDICATED NOISE LEVEL $\frac{\mu V}{ABW}$

-44.2

SYSTEM SENSITIVITY $\frac{dB}{\mu B}$

-(-12) = -32.2

BANDWIDTH CONVERSION TO 1 HZ BAND

+8.2 = 24.0

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

+100 = +76

UNCLASSIFIED

UNCLASSIFIED

UNCLASSIFIED

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

DATA POINT: 6 DATE 2-7-77 TIME 2033Z

FREQUENCY 290 HZ

INDICATED NOISE LEVEL $\frac{\mu V}{ABW}$ -47.3

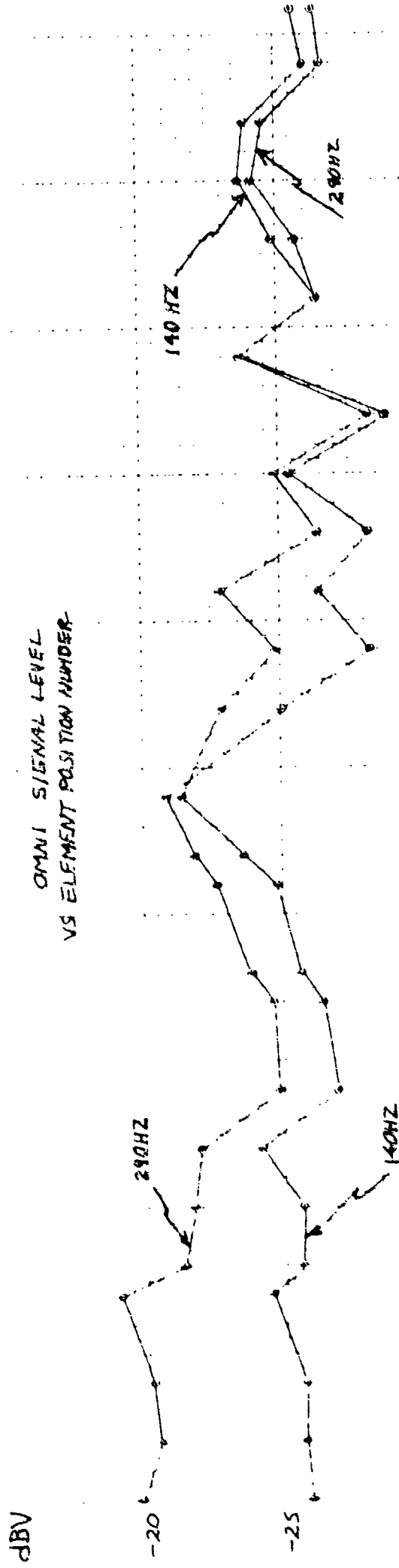
SYSTEM SENSITIVITY dB/ μB -(-8)

BANDWIDTH CONVERSION TO 1 HZ BAND +8.2

CONVERSION TO dBre $\mu Pa/1HZ$ +100 +68.9

UNCLASSIFIED

46, 0703



CONFIDENTIAL

DATA POINT G
PROCESSING ANALYSIS BANDWIDTH
1/10HZ

dBV

-20

-25

-30

-35

CONFIDENTIAL

52

47

42

37

32

27

22

17

12

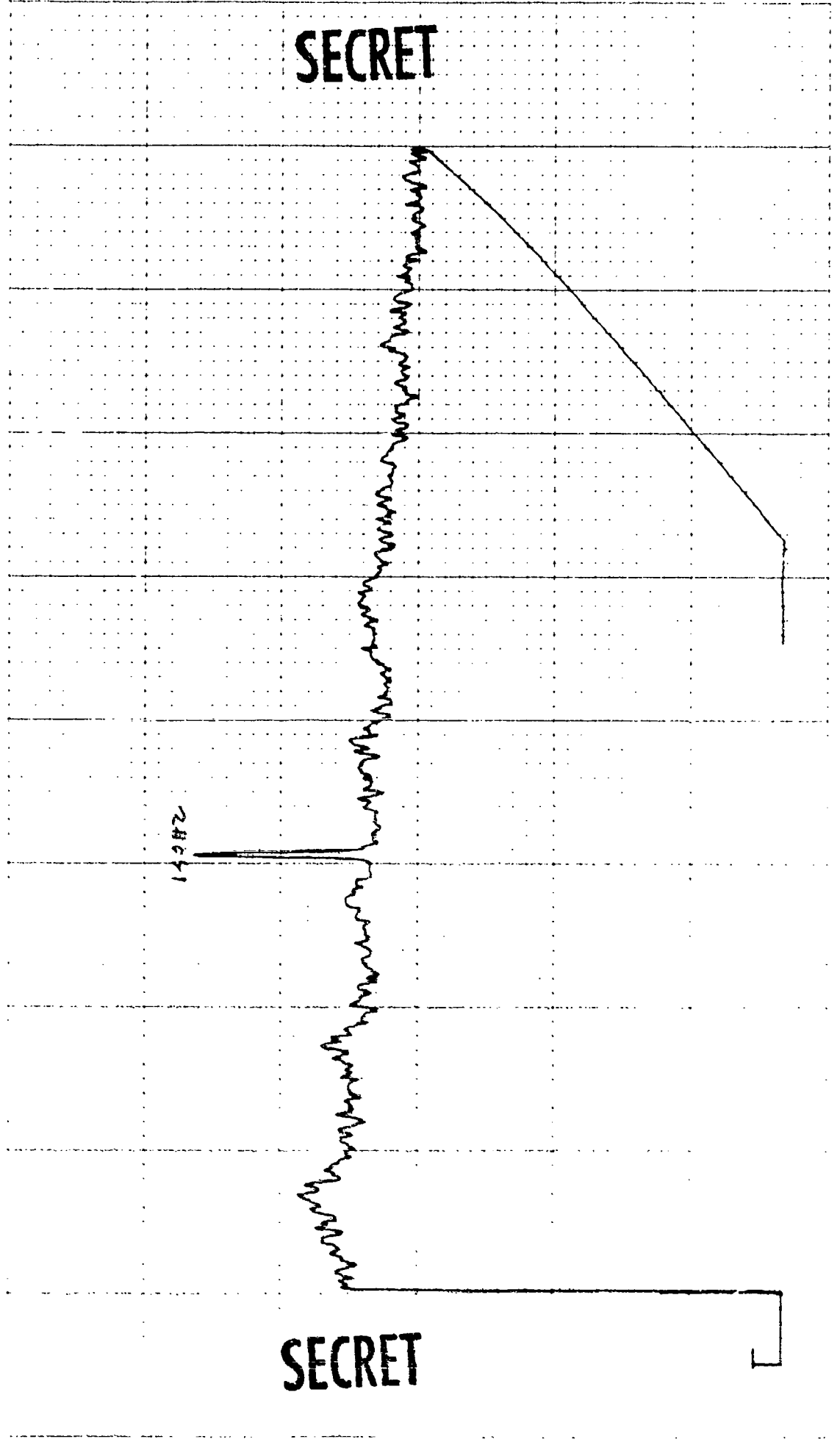
7

2

ELEMENT NUMBER

46 0703

CONTROL: 2-7 - 2033 (27) DATE OF ANALYSIS: RFEL: F23 INDEX 3320
 OMNI SPECTRUM (ELEMENT 2) DATE/TIME: 2-7-77 - 2033 Z
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: DB
 CENTER FREQ: 150 HZ _____ DEG AZ STEERING FILTER WTC: HANNING



46 0/03

102 54 111 24 108 00

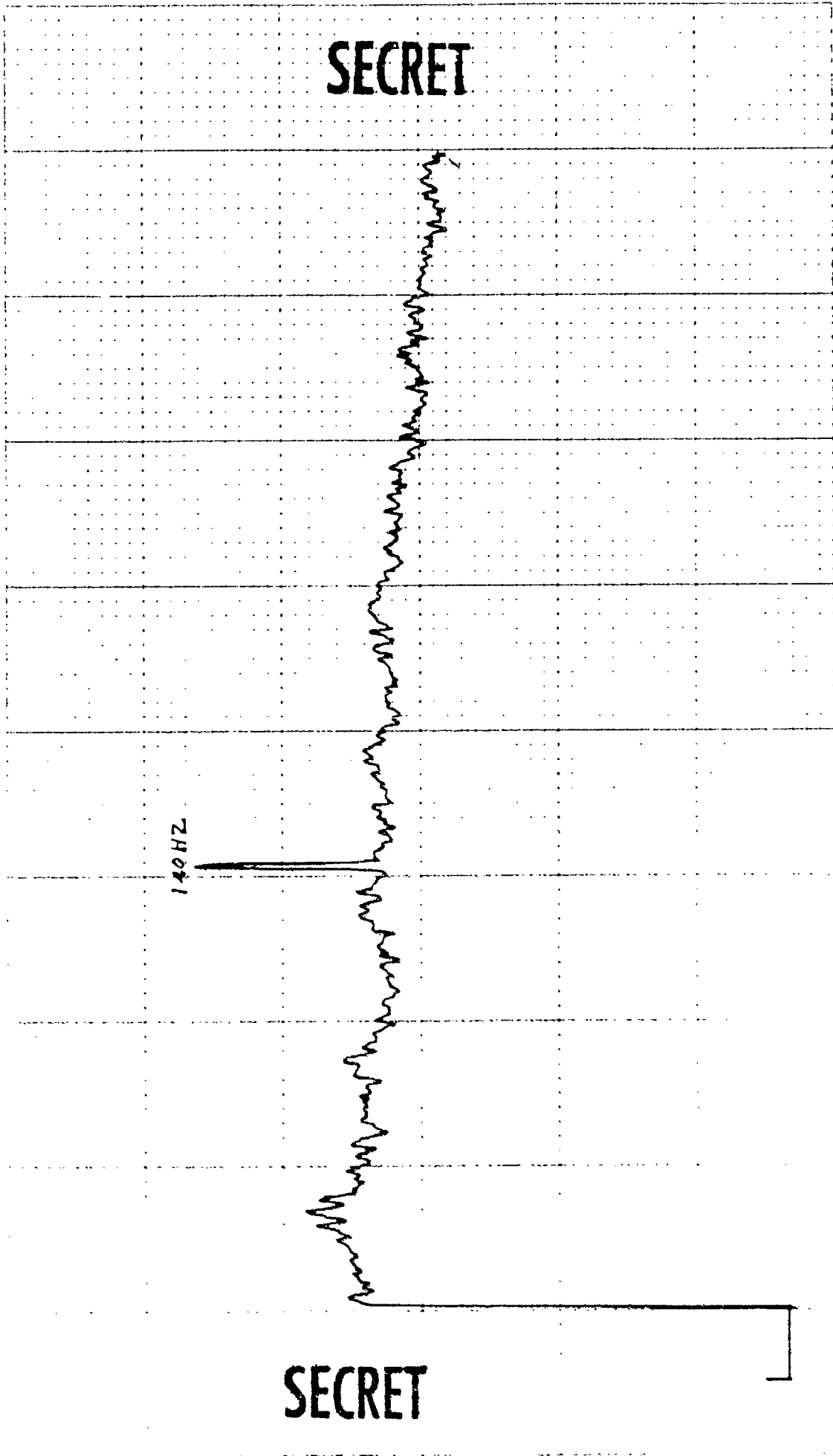
CONTROL: 2-7 -2033 (28)
 OMNI SPECTRUM (ELEMENT 4)
 EXERCISE: BEARING, STAFF
 CENTER FREQ: 150 HZ
 1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 ——— DEG AZ STEERING

REEL: F23 INDEX 3320

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



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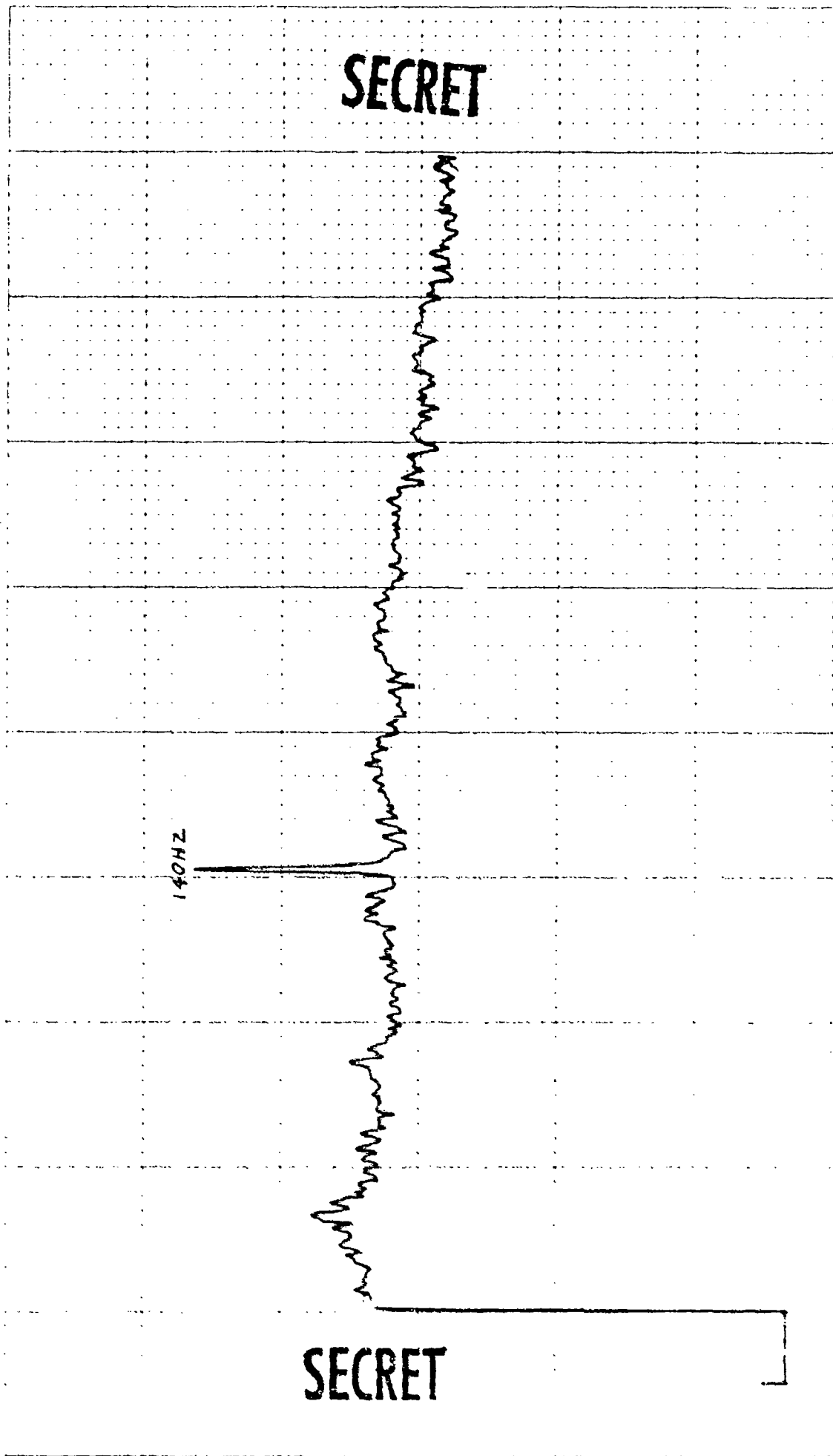
46 0703

CONTROL: 2033 - 51 (P06)
 OMNI SPECTRUM(ELEMENT 6)
 EXERCISE: BEAKING STAKE
 CENTER FREQ: 150 HZ
 1 ELEMENT

DATE OF ANALYSIS:
 DATE/TIME: 2-7-77 - 2033 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 DEG AZ STEERING

REEL: F23 INDEX 3320

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



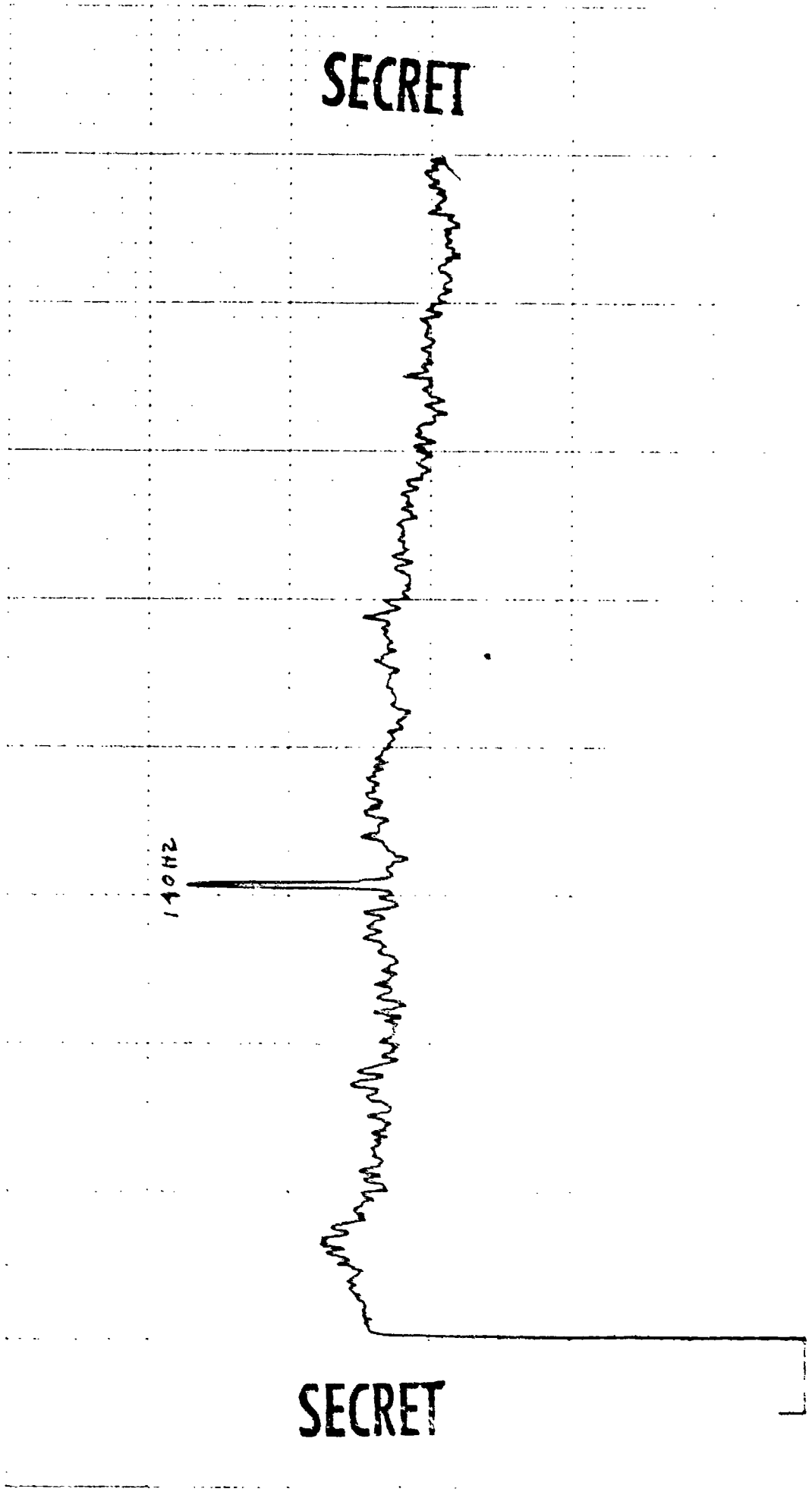
46 0703

CONTROL: 2-7 -2999 (30)
 OMNI SPECTRUM(ELEMENT 9)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 1 ELEMENT

DATE OF ANALYSIS:
 DATE/TIME: 2-7-77 -2033 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 DEG AZ STEERING

REEL: F23 INDEX 3320

INTEGRATION TIME 320 SECS ATTN: DB
 FILTER WTG: HANNING



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46 0703

(02) 4600 0703 0000

CONTROL: 2-7 - 2033 (31)
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

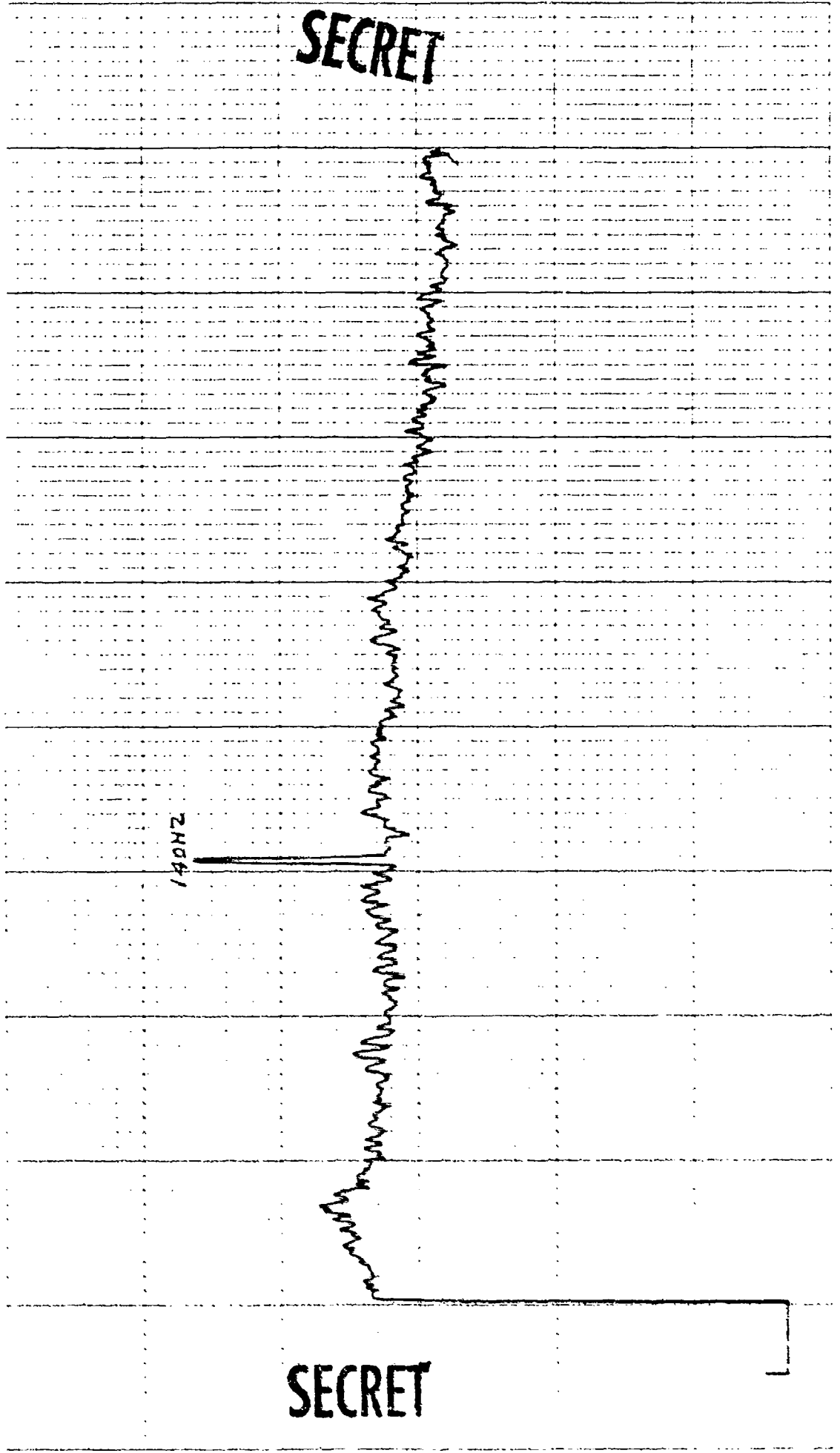
DATE/TIME: 2-7-77 - 2033 Z

ANALYSIS BANDWIDTH: 1/10HZ

_____ DEG AZ STEERING

REEL: F23 INDEX 3324

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



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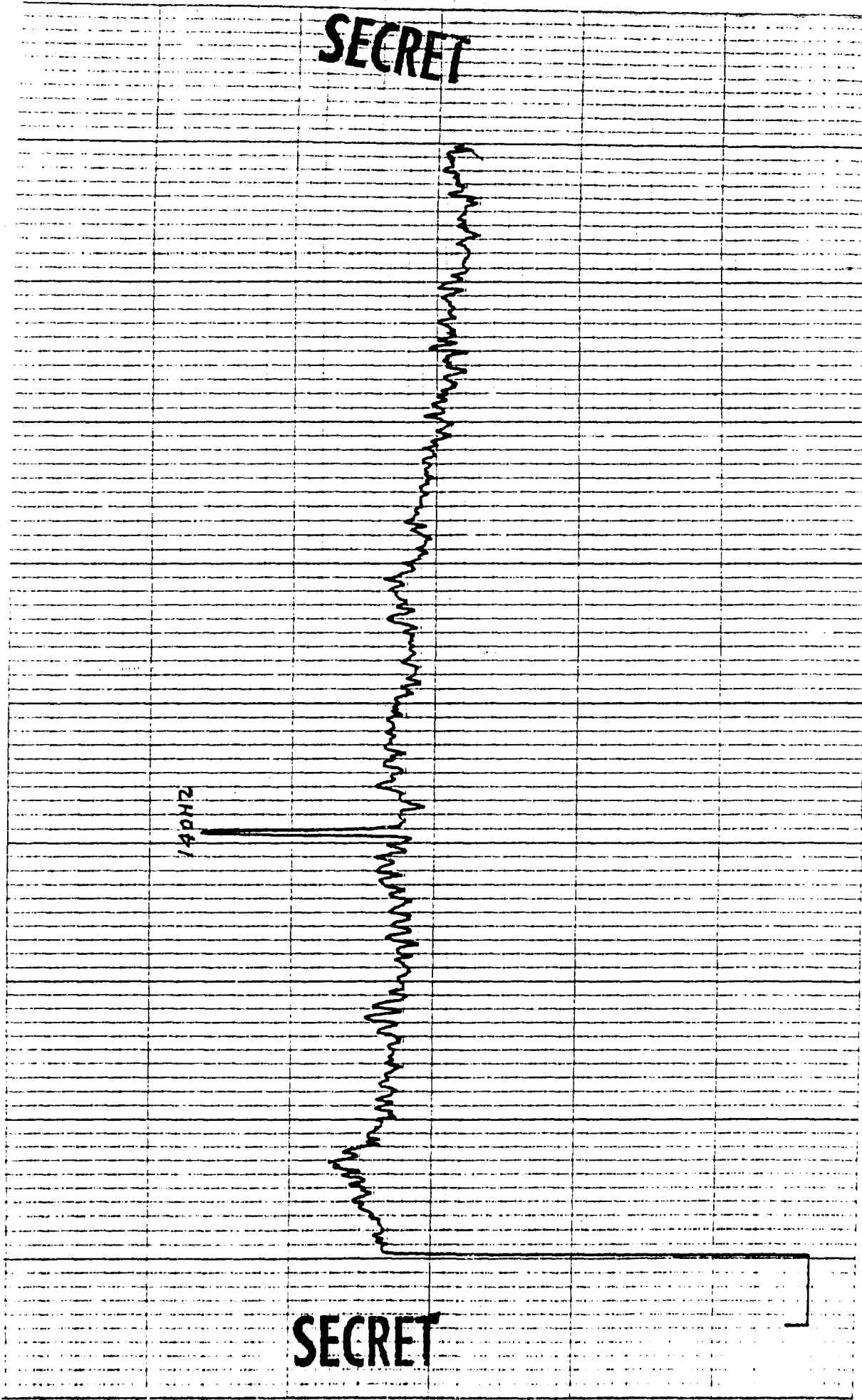
CONTROL: 2-7 - 2032 (31)
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER WTC: HANNING

REEL: F23 INDEX 3324



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CONTROL: 2-7-2033 (32)
OMNI SPECTRUM (ELEMENT 12)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

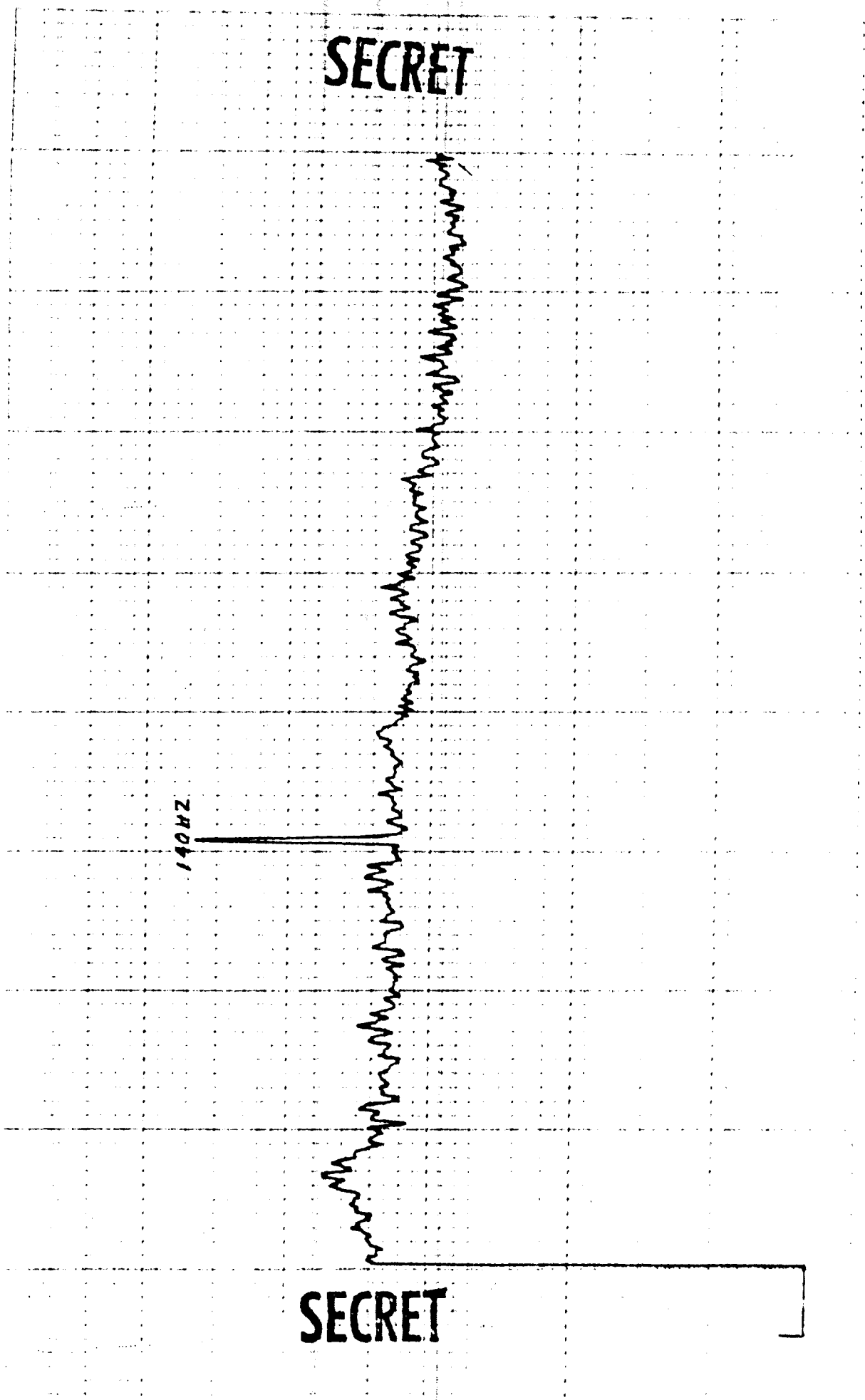
DATE/TIME: 2-7-77 - 2033 Z

ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F23

INDEX 3320

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



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CONTROL: 2-7 -2033 (33)
OMNI SPECTRUM (ELEMENT 14)
EXERCISE: BEARING STAGE
CENTER FREQ: 150 MZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

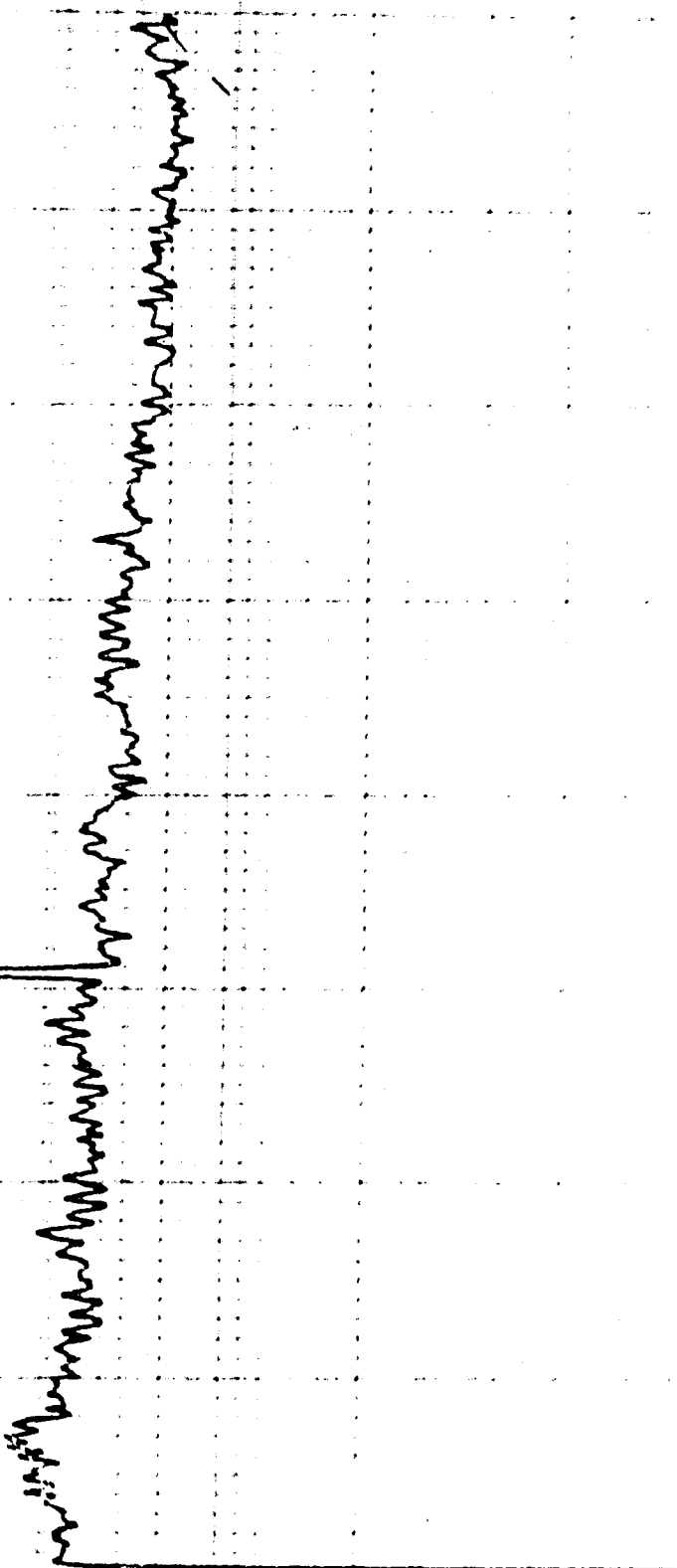
PEEL: F23 INDEX 3320

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

140HZ

SECRET

SECRET



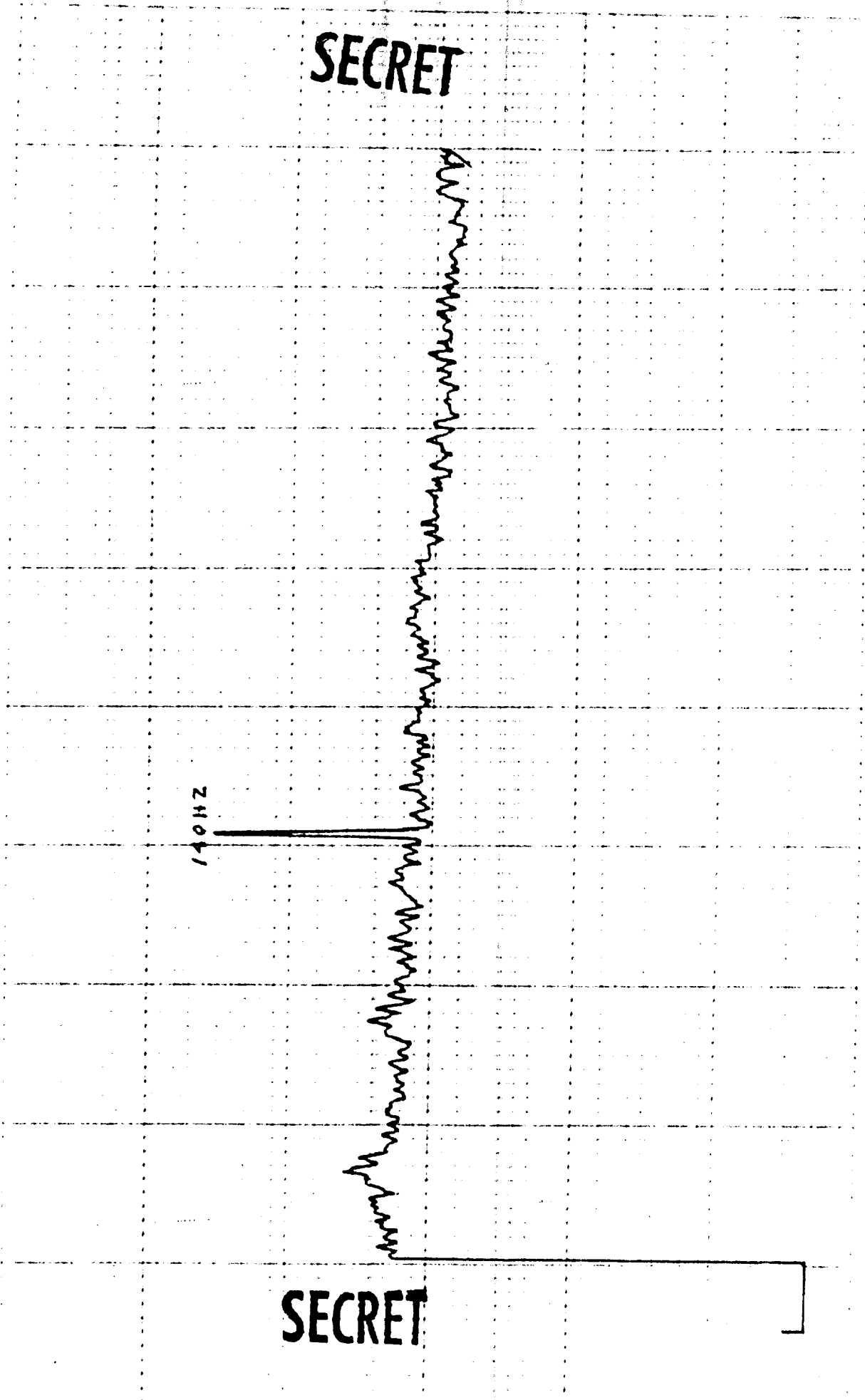
CONTROL: 2-7 - 2033 (34)
OMNI SPECTRUM (ELEMENT 16)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F23 INDEX J320

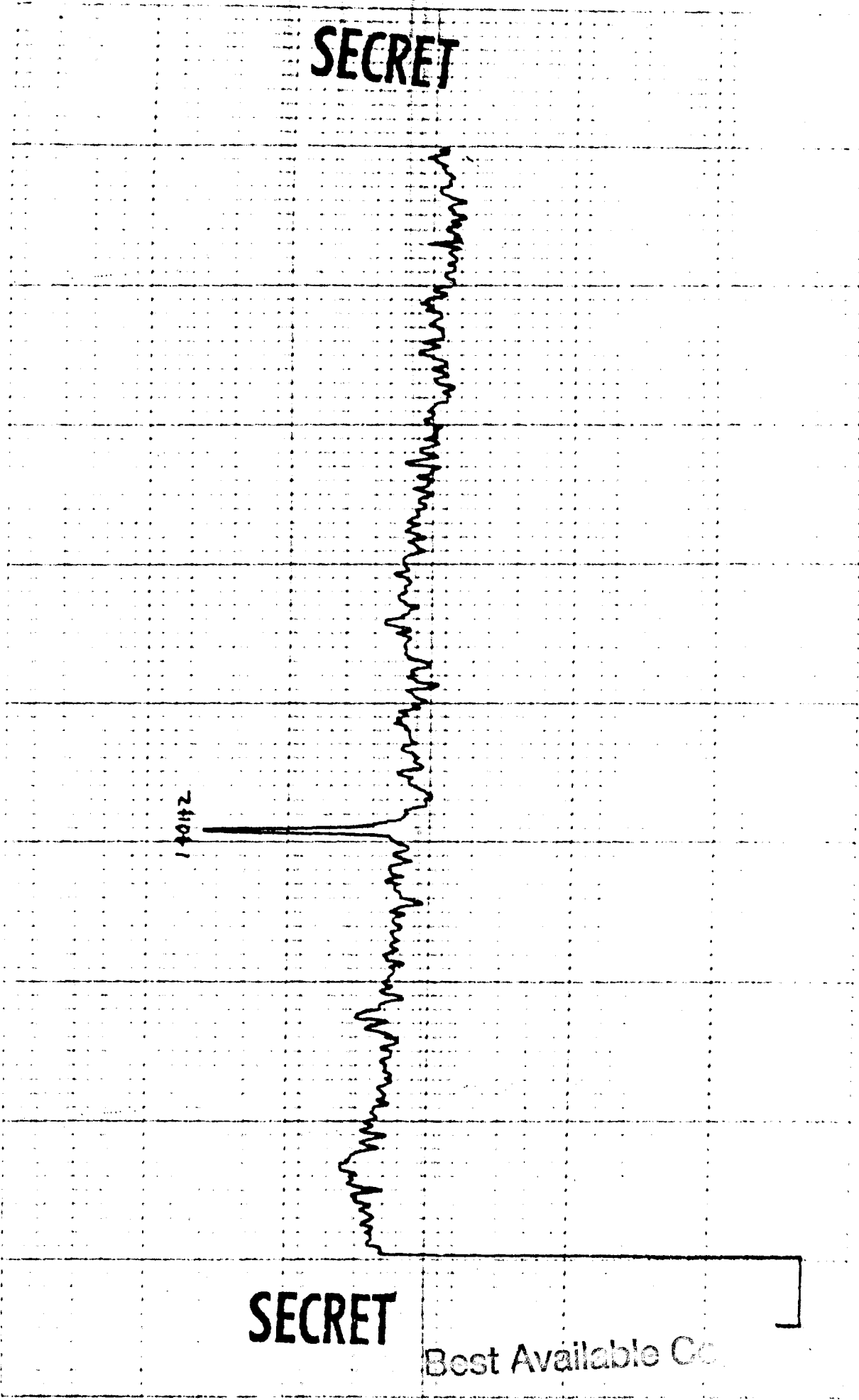
INTEGRATION TIME 320 SECS
ATTEN: - DB
FILTER WTC: HANNING



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CONTROL: 27-2037 (35) DATE OF ANALYSIS: REEL: F23 INDEX: 3326
 OMNI SPECTRUM (ELEMENT 19)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ INTEGRATION TIME 320 SECS ATTN: - DB
 I ELEMENT FILTER WTC: HANNING
 ANALYSIS BANDWIDTH: 1/10 HZ DEG AZ STEERING



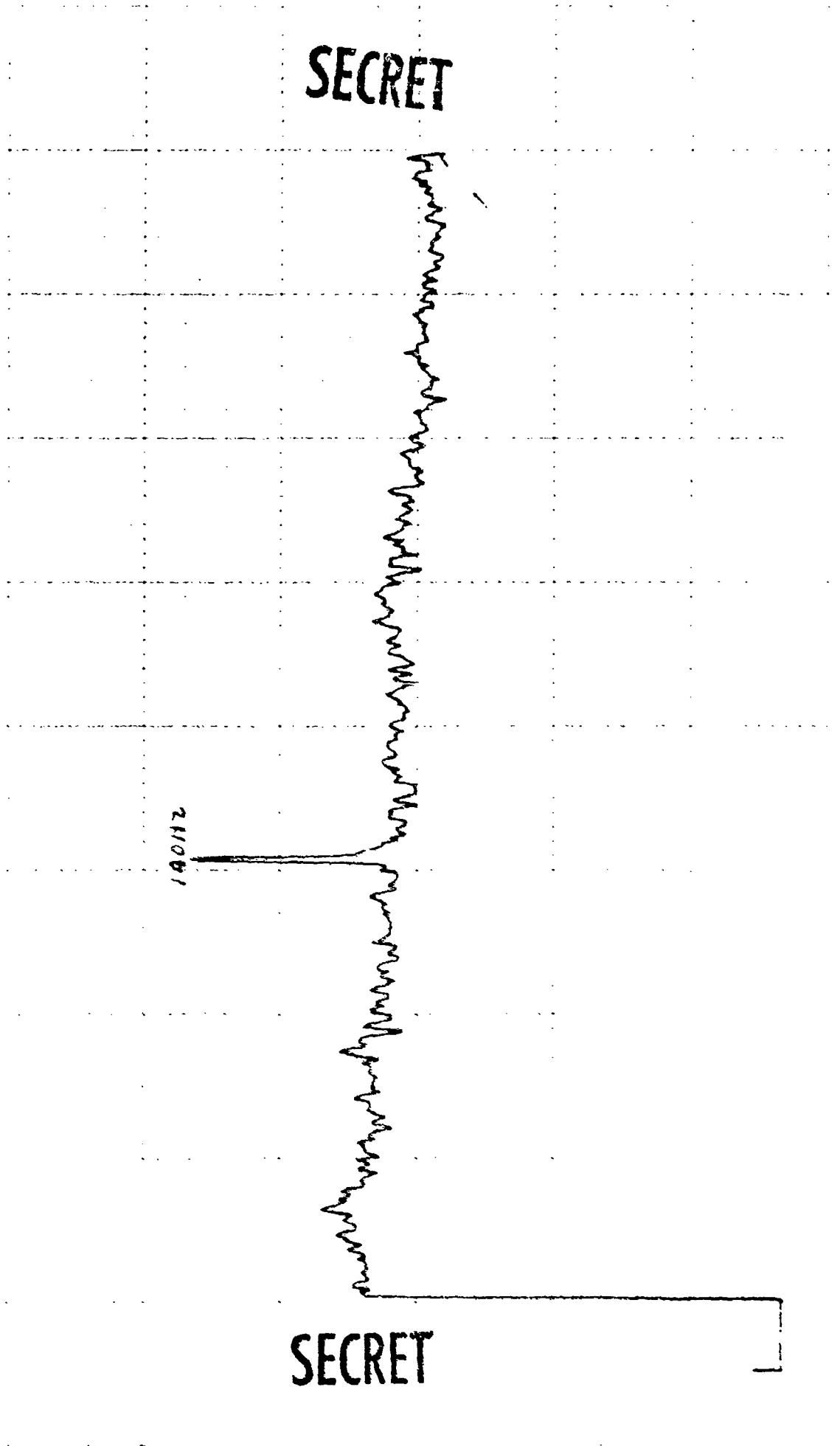
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Best Available Co

46 0703

152 0000 0000

CONTROL: 2-7 -2033 (36) DATE OF ANALYSIS: REEL: F23 INDEX J22
 OMNI SPECTRUM (ELEMENT 20) DATE/TIME: 2-7-77 -2033 Z
 EXERCISE BEARING STAKE ANALYSIS BANDWIDTH: 1/1007 INTEGRATION TIME 320 SECS ATTEN: - DB
 CENTER FREQ: 150.87 DEG AZ BEARING FILTER WIG: HANNING
 1 ELEMENT



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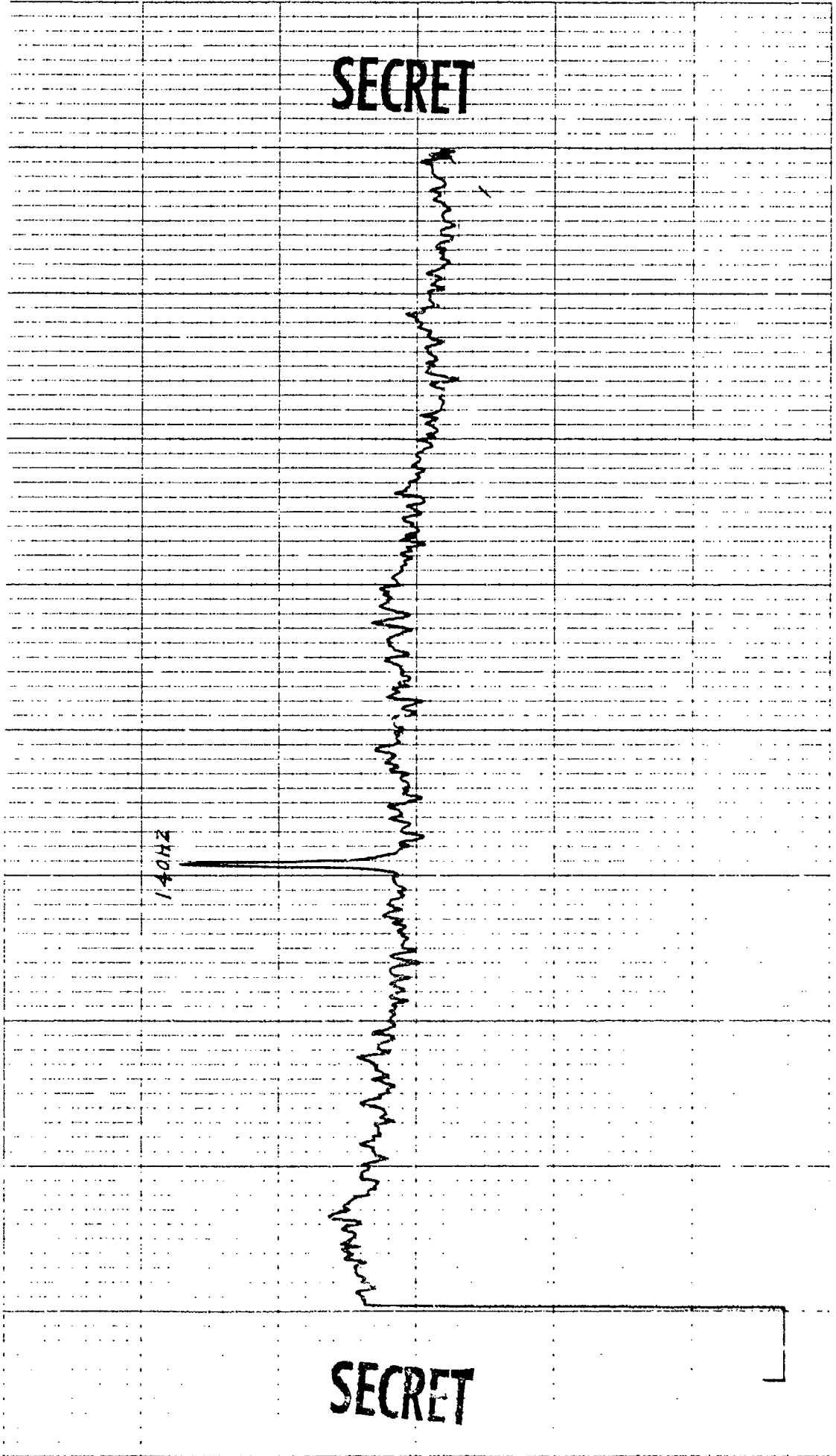
CONTROL: 2-7 -2033 (37)
OMNI SPECTRUM (ELEMENT 23)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ STEERING

REEL: F23 INDEX 3320

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



46 0703

10-2 1000 1000 1000 1000

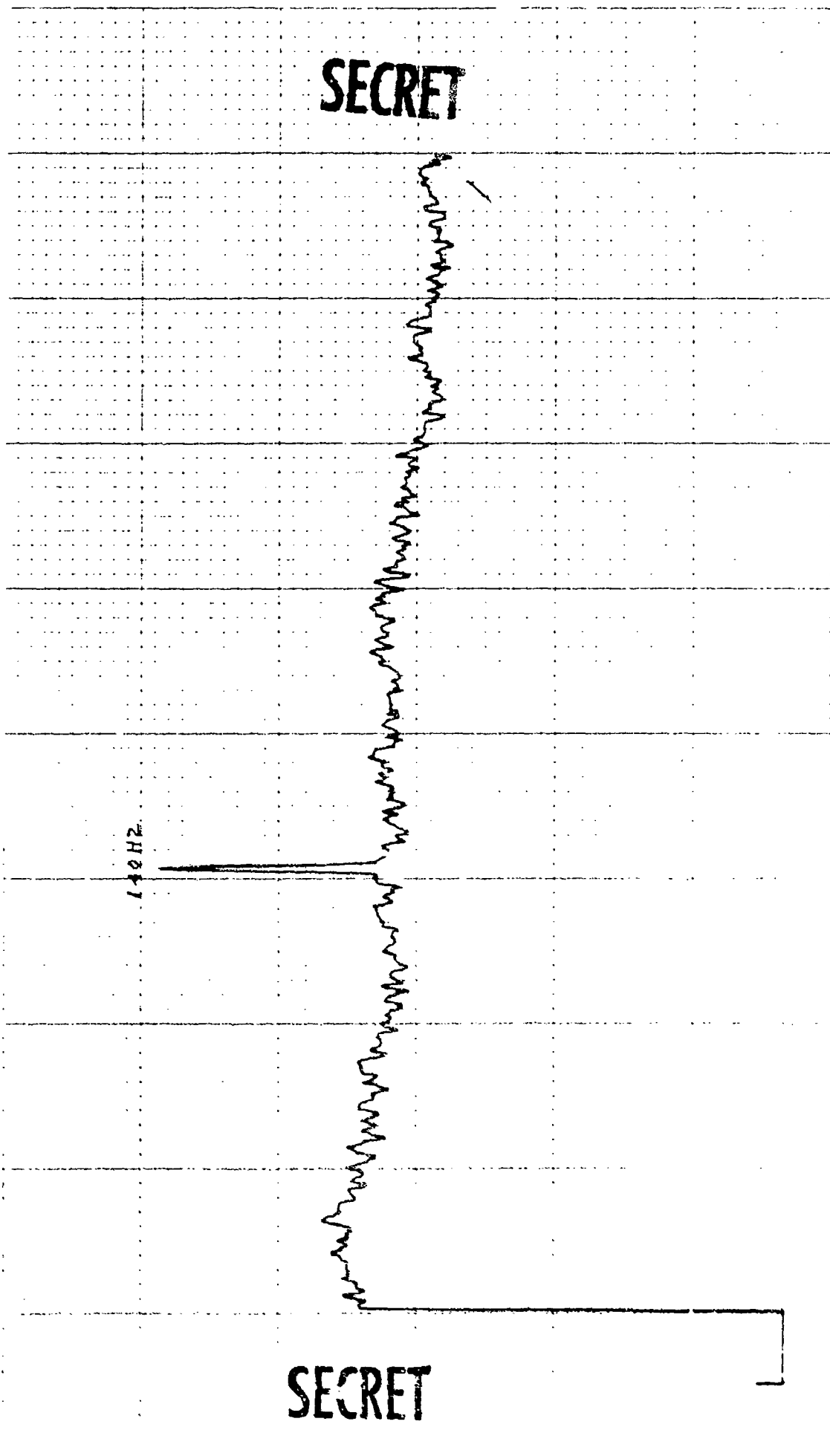
CONTROL: 2-7 - 2033 (38)
OMNI SPECTRUM (ELEMENT 24)
EXERCISE: BEAKING STAKE
CENTER FREQ: 150 HZ
: ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

REEL: F23 INDEX 3320

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



46 0700

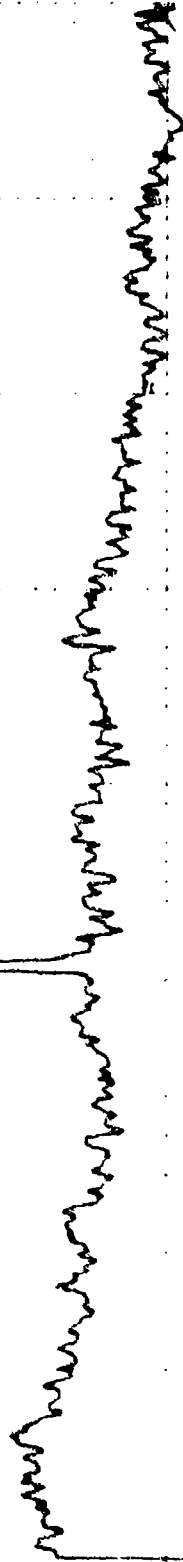
CONTROL: 2.7 - 2033 (39) REEL: F23 INDEX 3320
OMNI SPECTRUM ELEMENT 26
EXERCISE: BEARING STAFF
CENTER FREQ: 150 HZ
ELEMENT

DATE OF ANALYSIS:
DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS: BANDWIDTH: 1710HZ INTEGRATION TIME 320 SECS ATTEN: - DB
- DEG AZ STEERING FILTER WTG: HANNING

140HZ

SECRET

SECRET



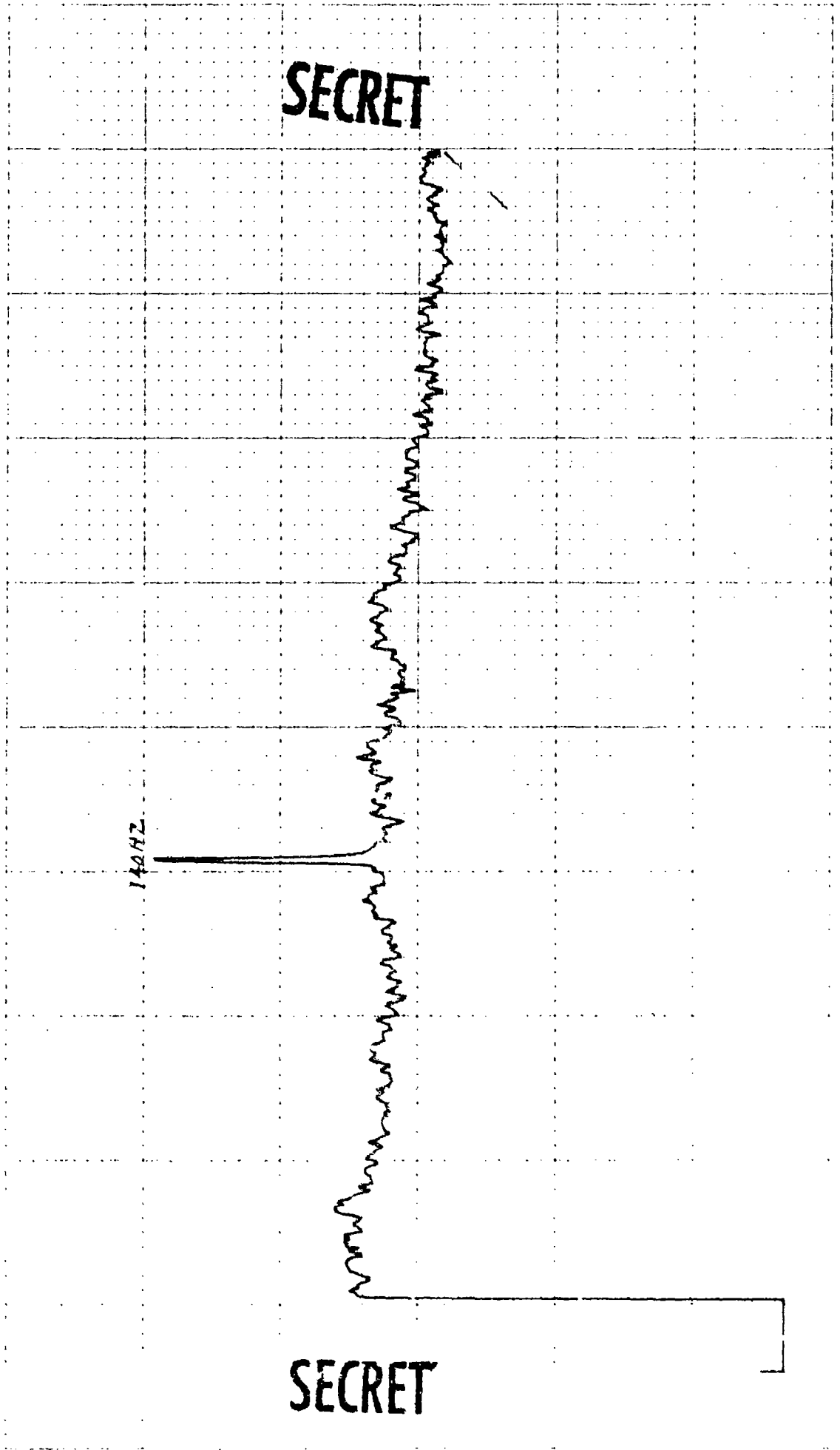
46 0703

REEL: F23 INDE.: 3320

DATE OF ANALYSIS:
DATE/TIME: 2-7-77 - 2033Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

CONTROL: 2-7-2033 (40)
OMNI SPECTRUM (ELEMENT 29)
EXERCISE: BEAKING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

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



4C 0703

192. 40 700 5000 Hz

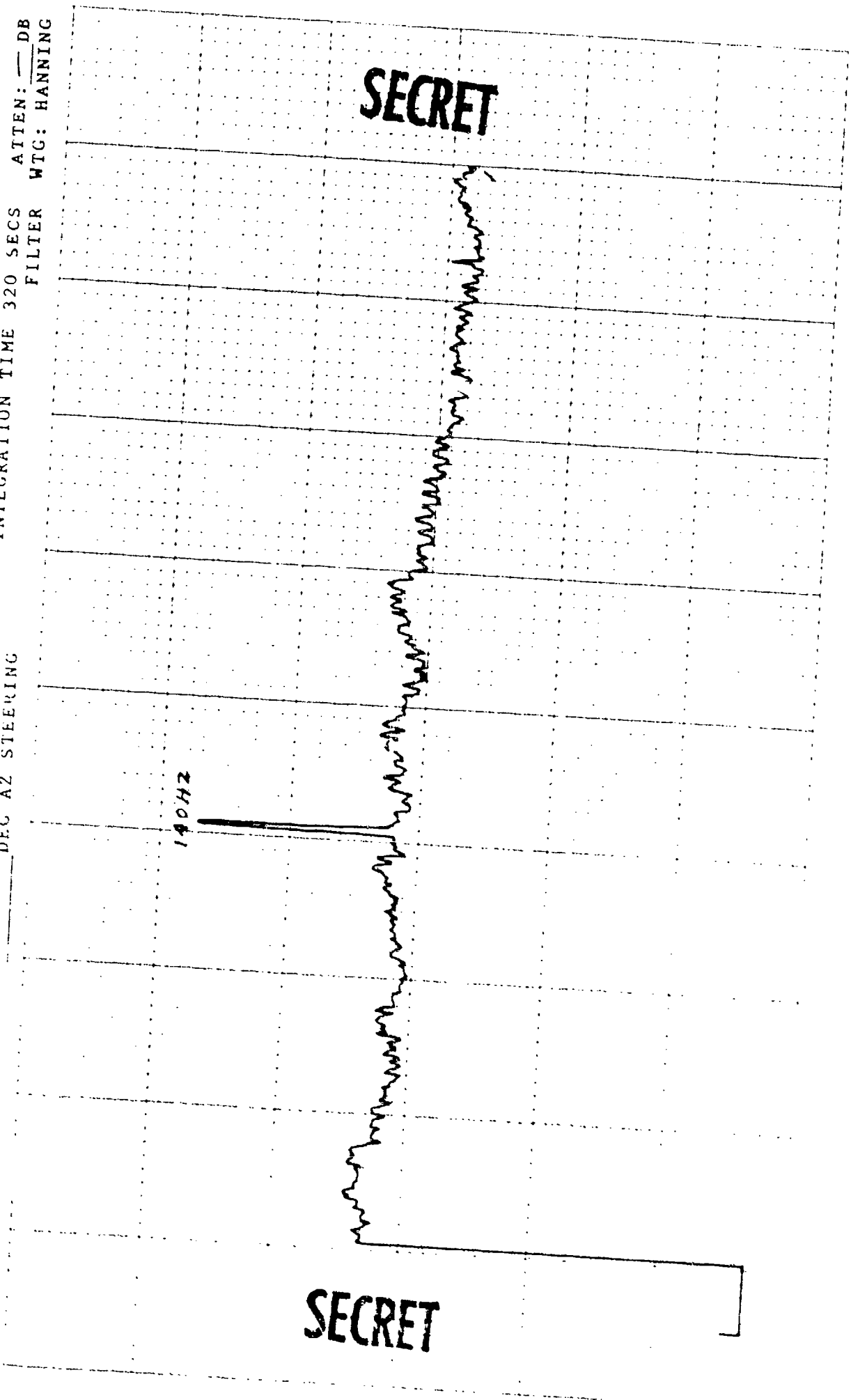
CONTROL: 2.7 - 2037 (41)
OMNI SPECTRUM (ELEMENT 31)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: F23 INDEX J320

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



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46 0703

CONTROL: 2.7 - 2033 (42)
OMNI SPECTRUM (ELEMENT 33)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEC AZ STEERING

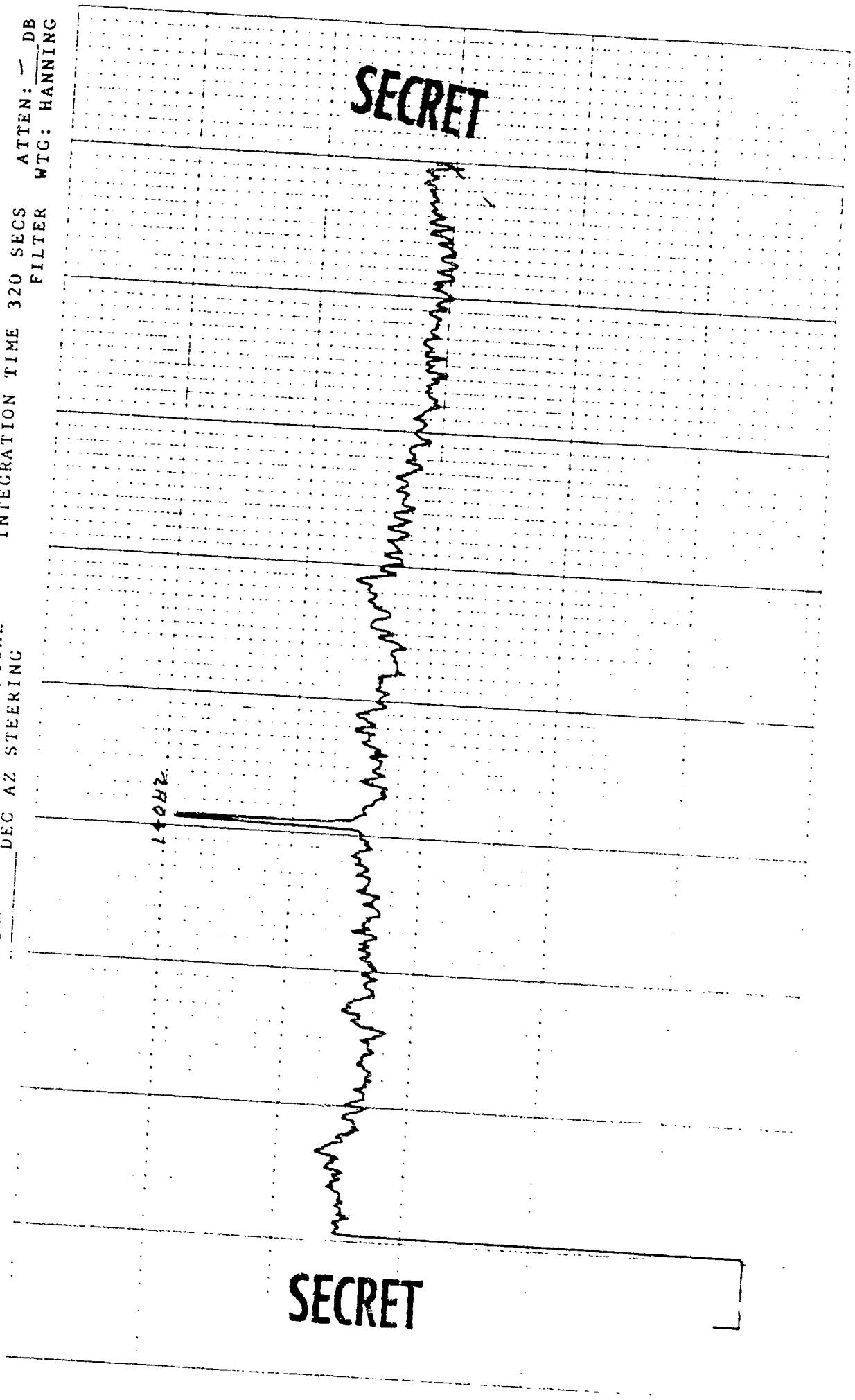
REEL: F23 INDEX 333

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

150 HZ

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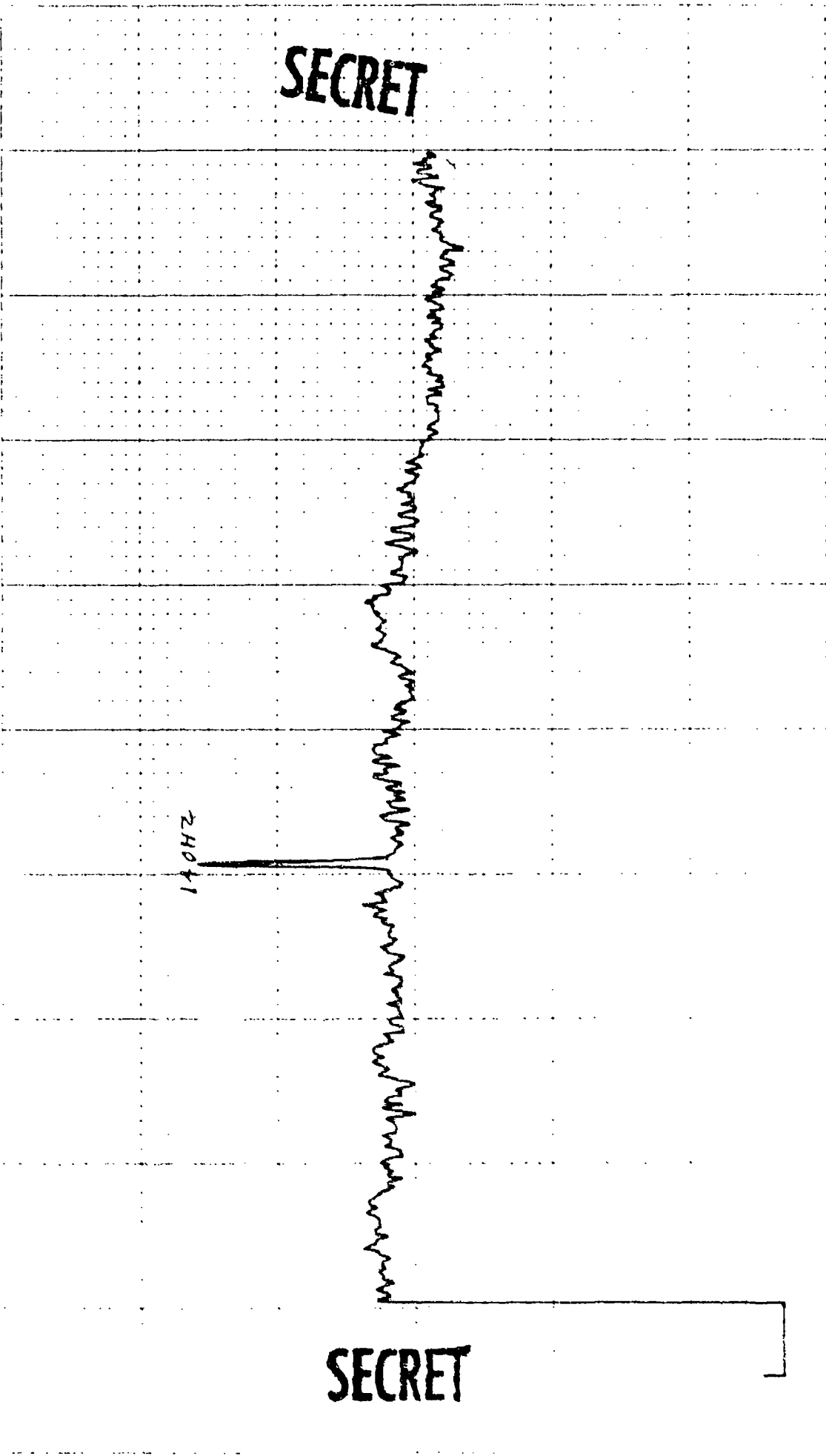
CONTROL: 2-7 -2013 (47)
OMNI SPECTRUM(ELEMENT 35)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -2013 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

REEL: F23 INDEX3320

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTC: HANNING



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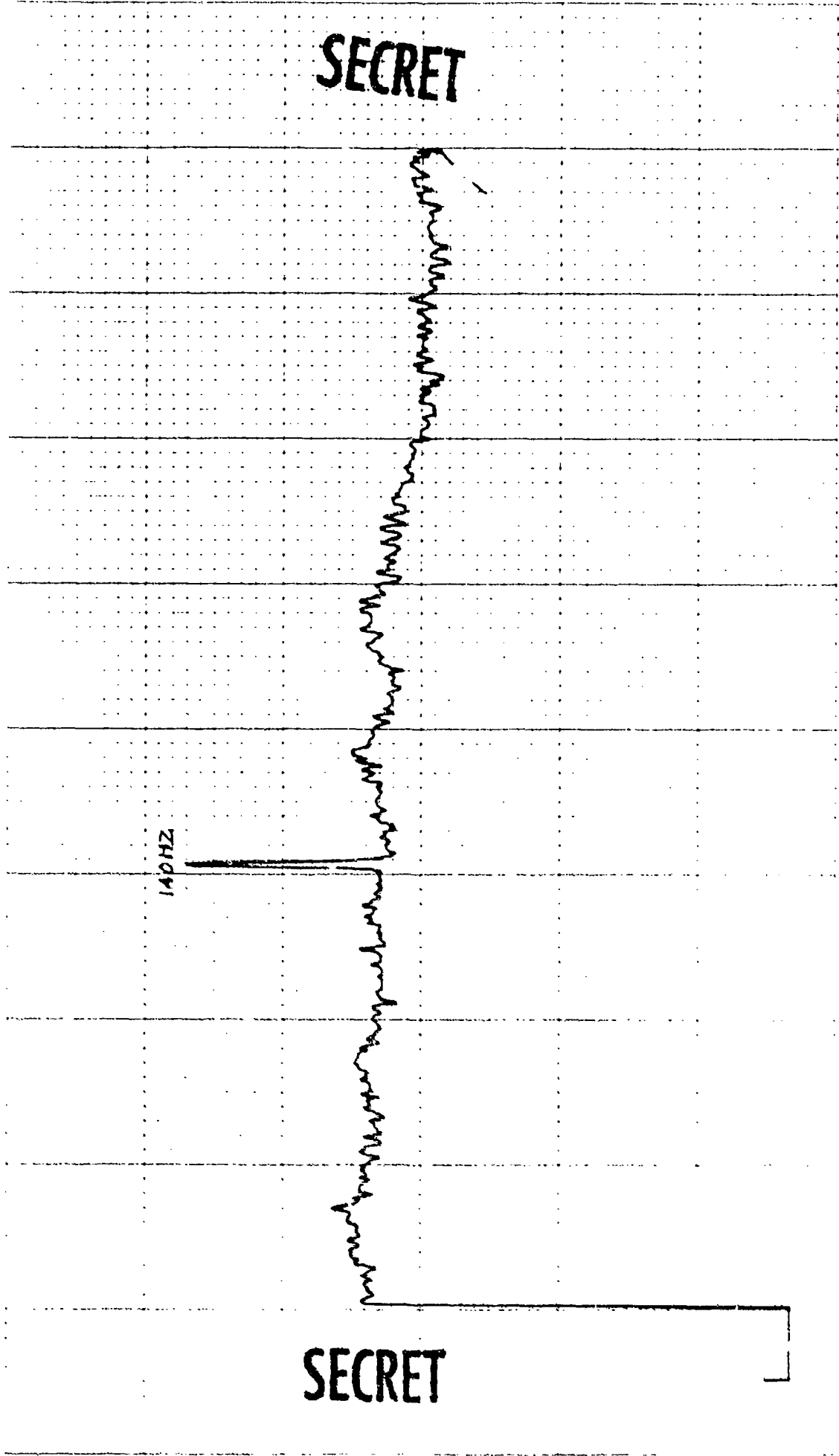
CONTROL: 2-7 - 2039 (44)
OMNI SPECTRUM (ELEMENT 37)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2039 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: F23 INDEX 332

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



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16-2 1400 101400 0000 1 000

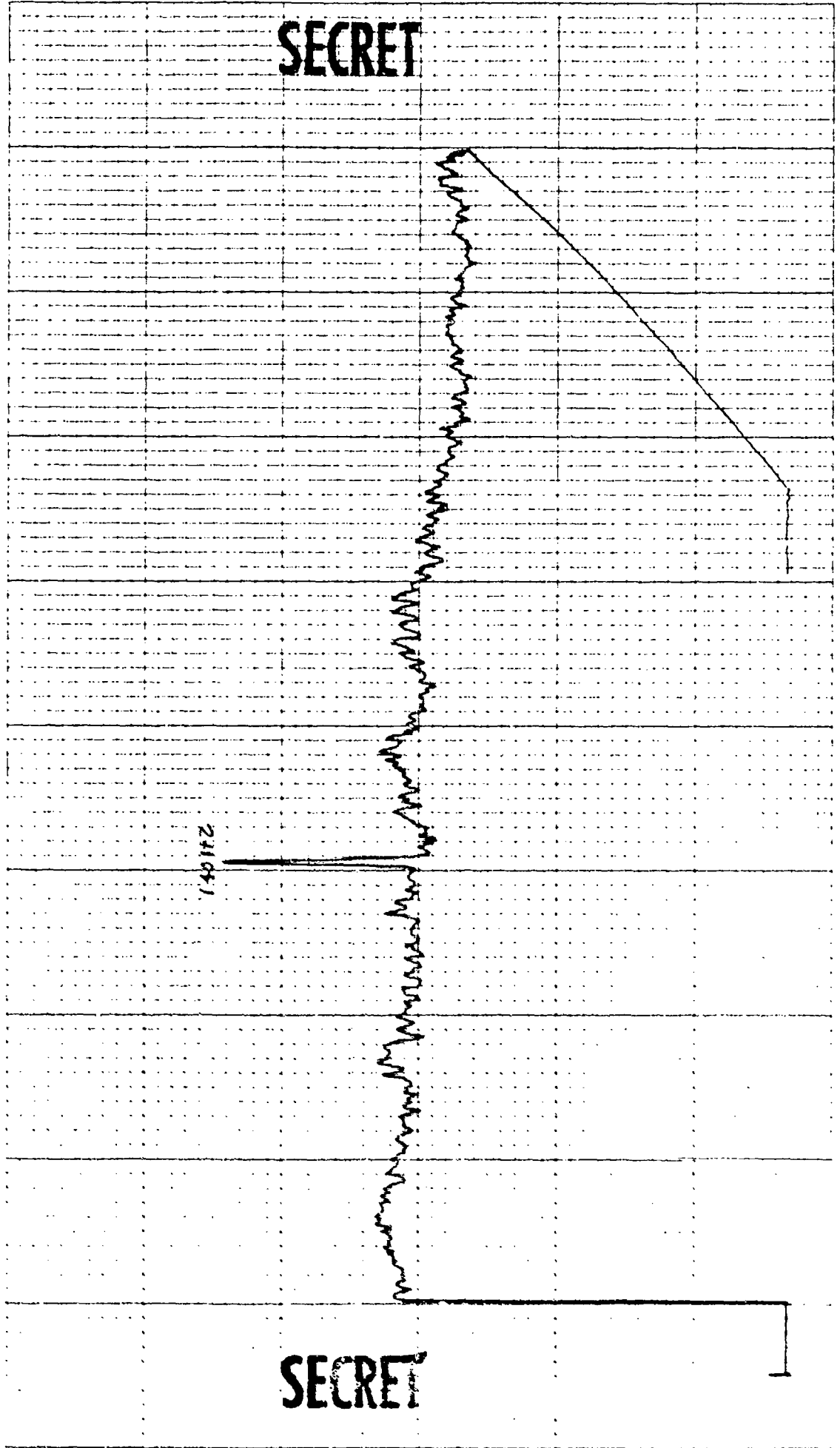
CONTROL: 2-7 - 2033 (45)
OMNI SPECTRUM (ELEMENT 39)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 KHZ
I ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
_____ DEG AZ STEERING

REEL: F23 INDEX 3320

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



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10E 1000 TO 1000 0000 0000 0000

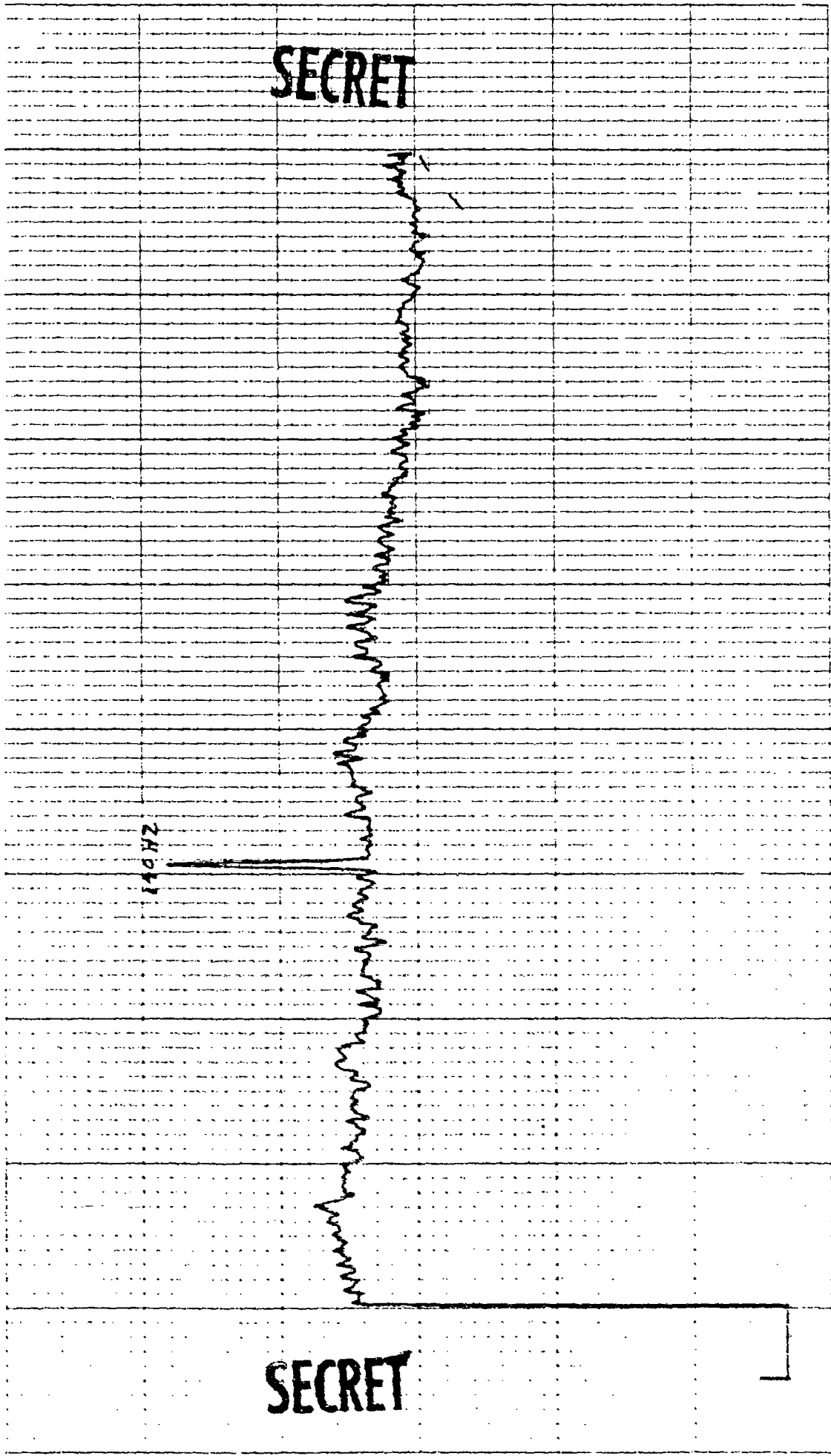
REEL: F23 INDEX 332

DATE OF ANALYSIS:

CONTROL: 2-7 - 2073 (46)
OMNI SPECTRUM(ELEMENT 41)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE/TIME: 2-7-77 - 2037 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEC AZ STEERING

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

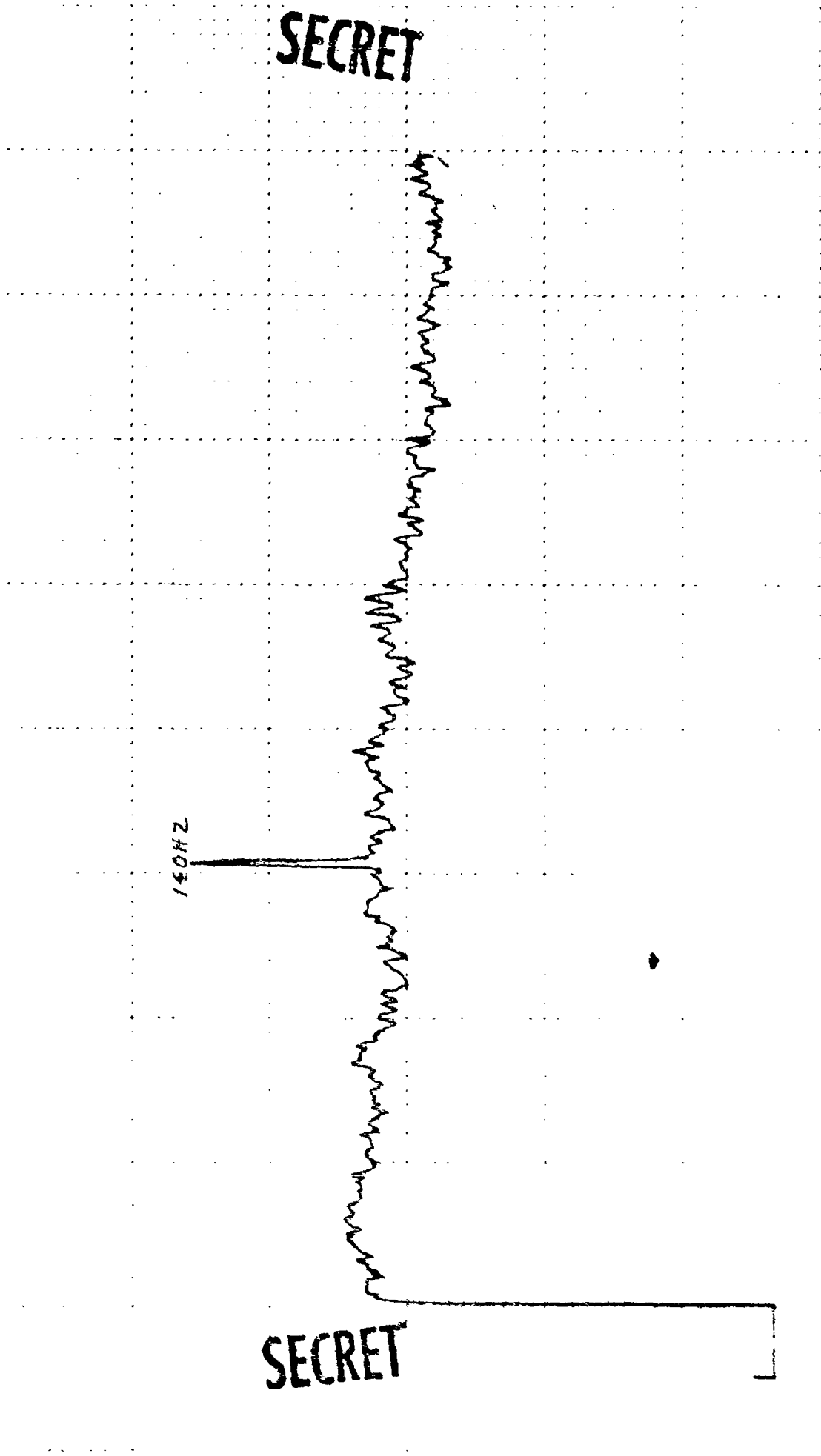


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CONTROL: 27-2023 (47) DATE OF ANALYSIS: PEEL: F23 INDEX 3720
 OMSI SPECTRUM/ELEMENT 93)
 EXERCISE: BEARING STAYE
 CENTER FREQ: 150 HZ
 BANDWIDTH: 1000Z
 FILTER WTG: HANNING
 INTEGRATION TIME 320 SECS
 ATTEN: - DB
 DEC AT: SLEEPING



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CONTROL: 2-7 - 2073 (40)
OMNI SPECTRUM (ELEMENT 45)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

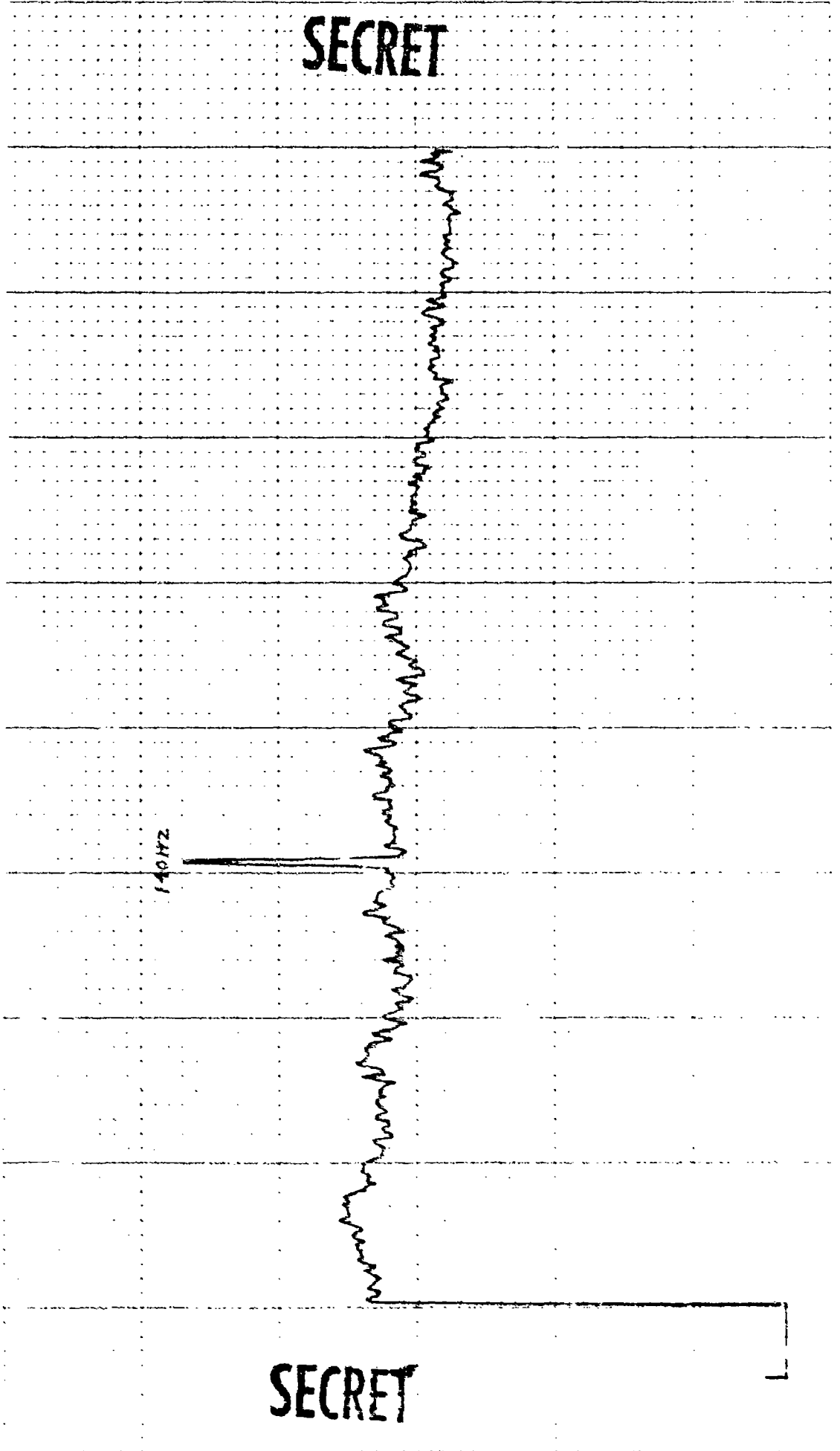
DATE OF ANALYSIS:

DATE/TIME: 2-7-73 - 2073 Z
ANALYSIS BANDWIDTH: 1/10HZ
..... DEG AZ STEERING

REEL: F23

INDEX 3320

INTEGRATION TIME 320 SECS ATTN: DB
 FILTER WTC: HANNING



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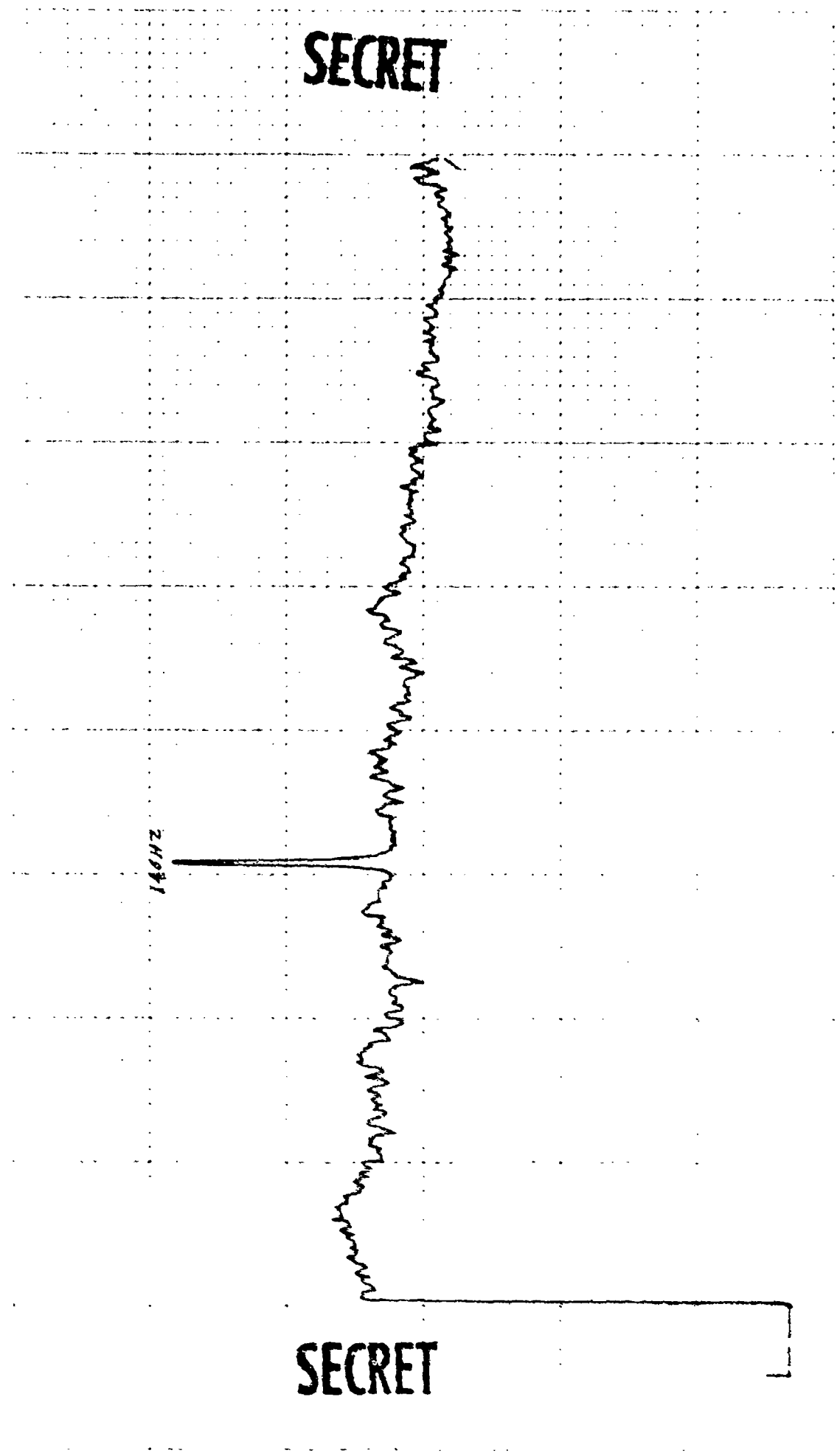
CONTROL: 2-7 - 2033 (49)
OMNI SPECTRUM (ELEMENT 47)
PACIFIC SEABEAKING STAFF
CENTER FREQ: 150 MZ
ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 /
ANALYSIS BANDWIDTH: 1/10H /
DEC. AZ. SERRING

REEL: F23 INDEX: 3720

INTEGRATION TIME 320 SECS ATTN: DB
FILTER WTG: HANNING



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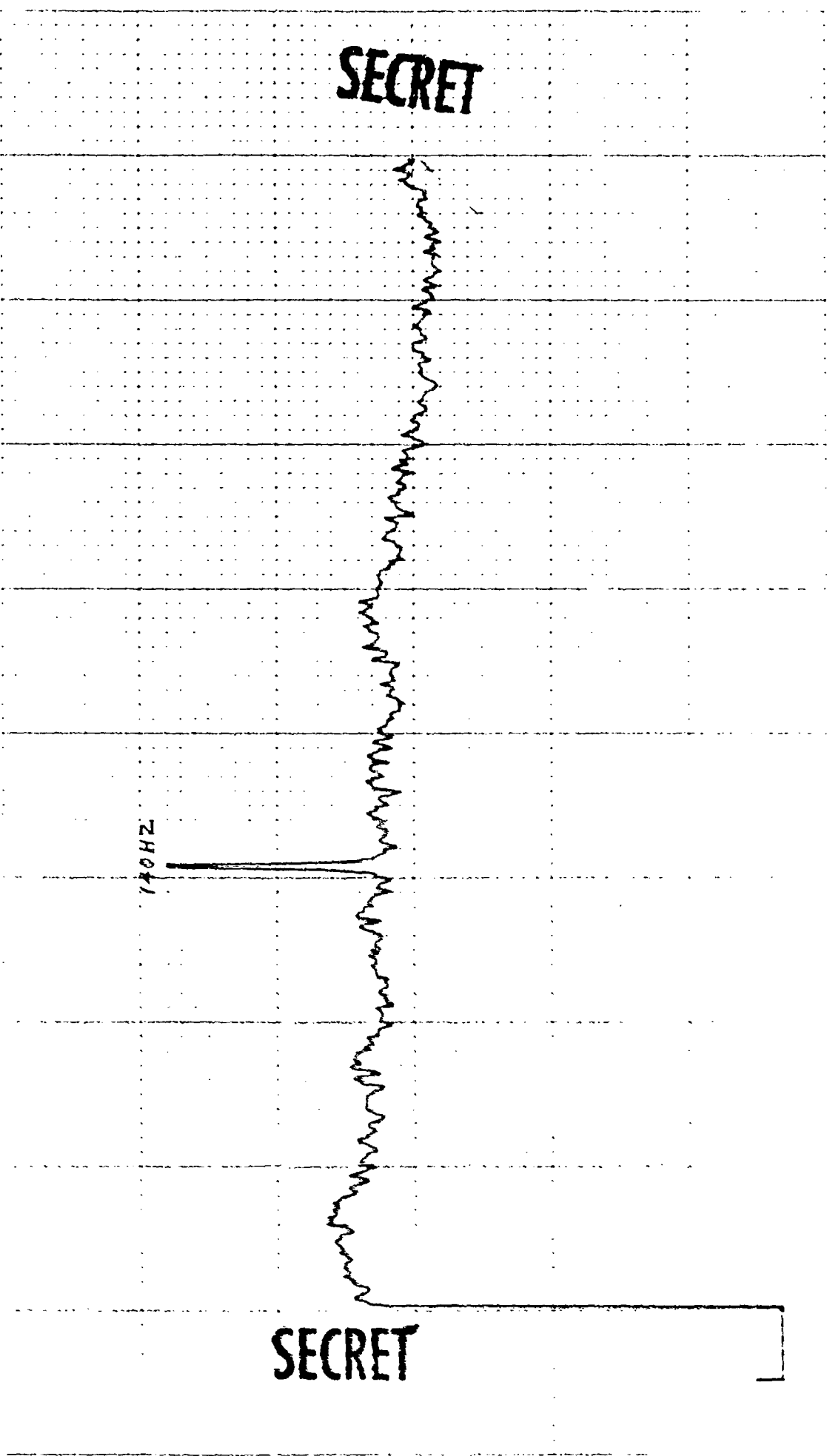
CONTROL: 2.7 - 2033 (50)
OMNI SPECTRUM (ELEMENT 49)
EXERCISE: BEARING STAB.
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: 523 INDEX: 3320

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



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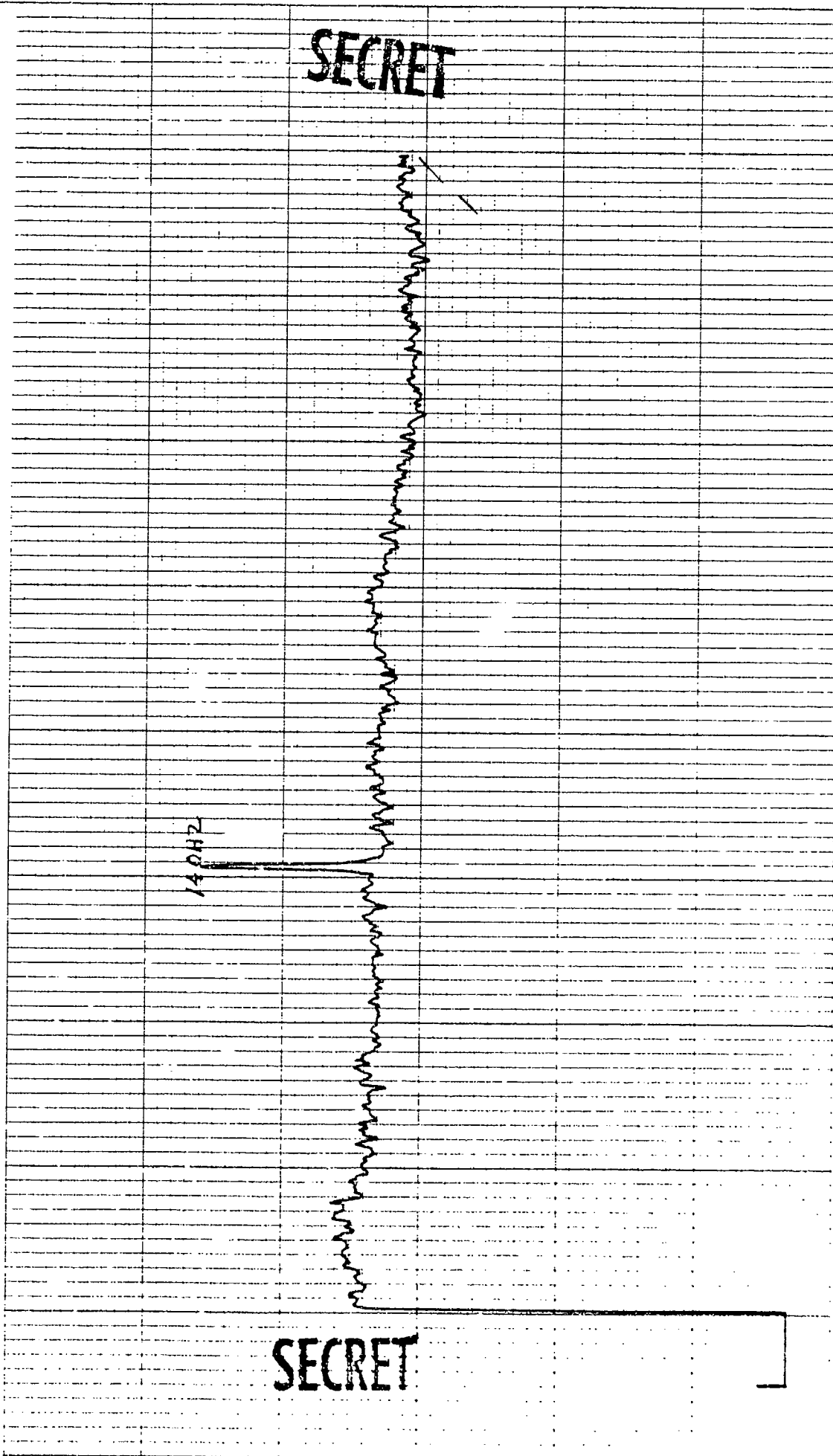
CONTROL: 2-7 - 2033 (51)
CMI SPECTRUM (ELEMENT 51)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEC AZ STEERING

REEL: F23 INDEX 332g

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



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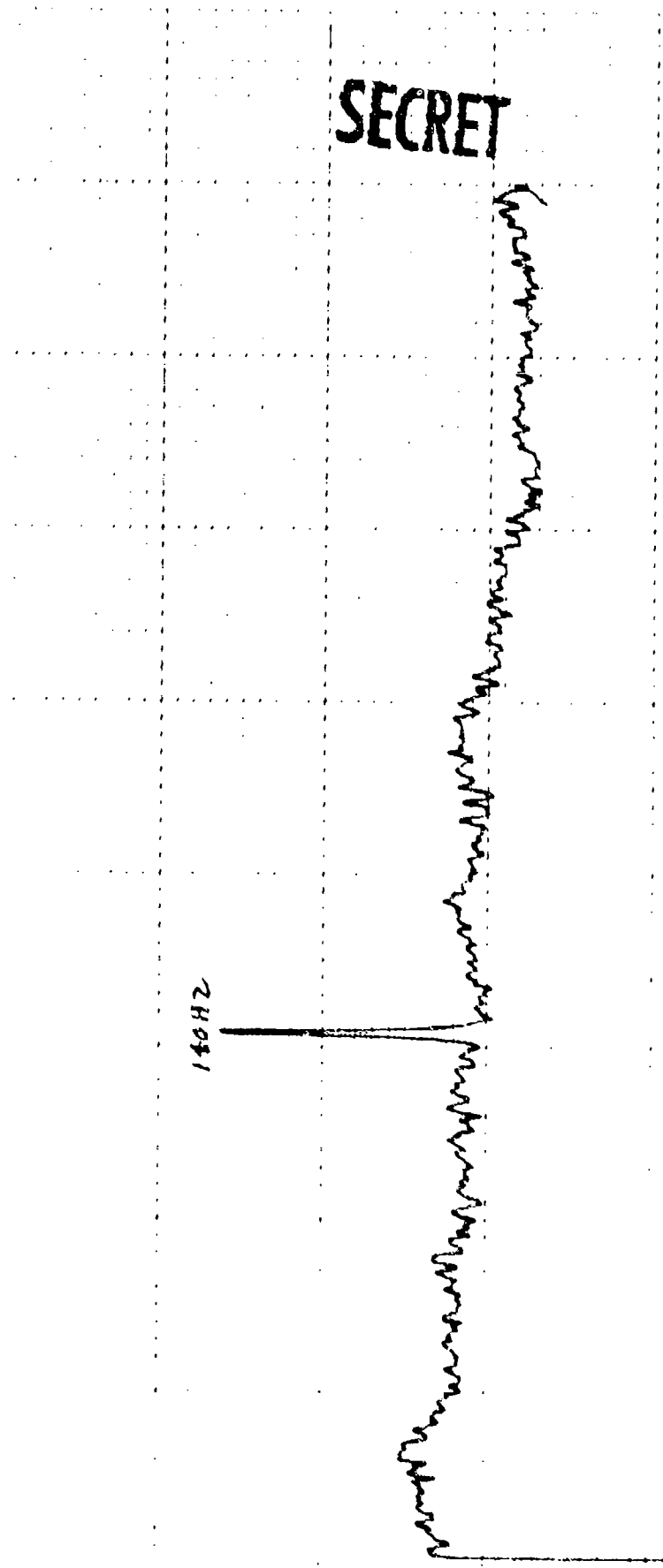
CONTROL: 2-7-2003 (52)
OMNI SPECTRUM (ELEMENT 53)
EXCEPT WRAPPING STAYE
CENTER FREQ: 150 MHz
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 100HZ
RES AZ STEERING

PEEL: F23 INDEX: 3300

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER MIG: HANNING



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CONTROL: 2-7-2033 (1)
OMNI SPECTRUM (ELEMENT 2)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
ELEMENT

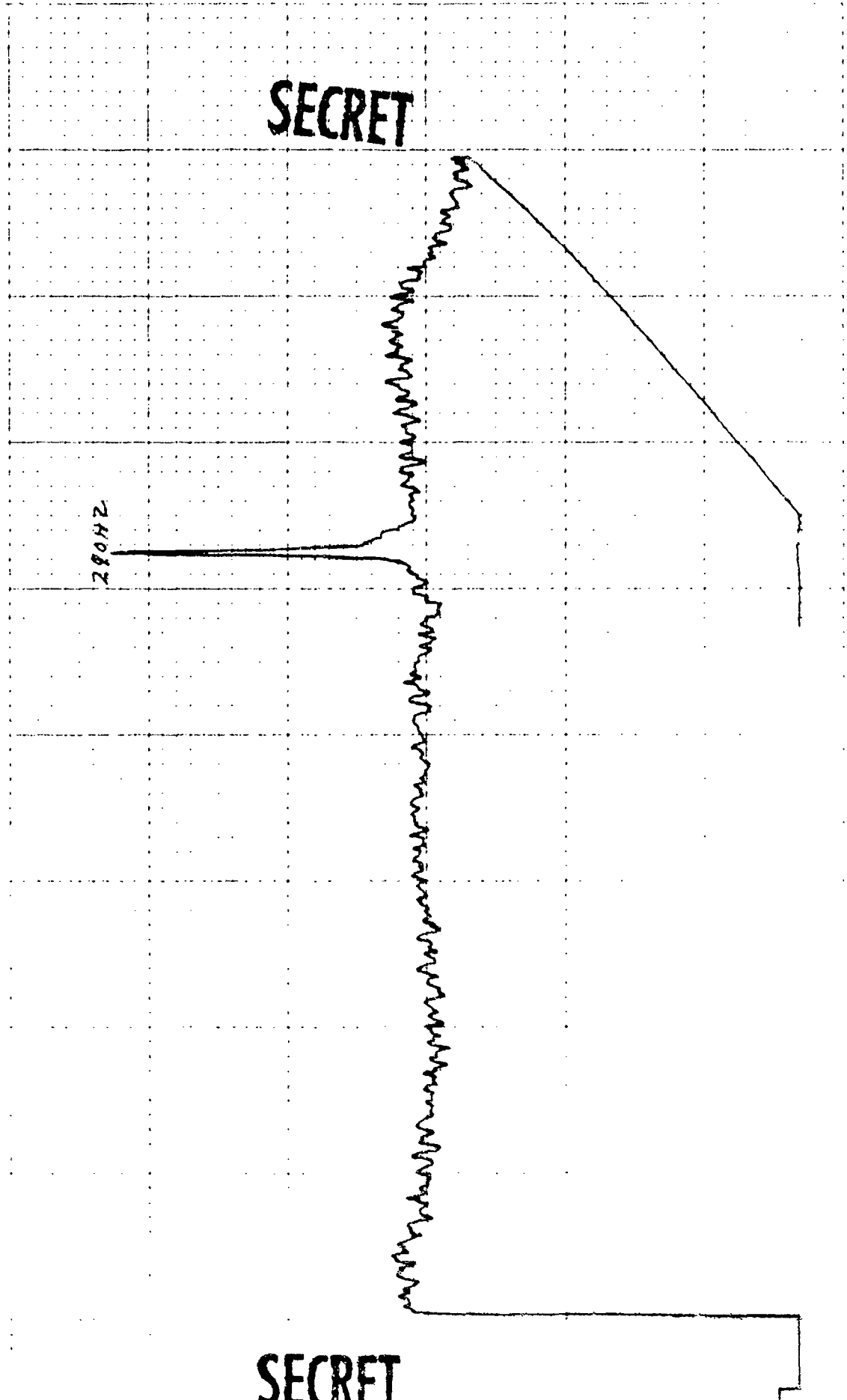
DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10 HZ
DEC AZ STEERING

REEL: F23

INDEX: 332

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER
WTG: HANNING



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INDEX 3320

REEL: F 23

DATE OF ANALYSIS:

CONTROL: 2-7-2033 (2)

OMNI SPECTRUM (ELEMENT 4)

EXERCISE: BEARING STAKE

CENTER FREQ: 280 HZ

1 ELEMENT

DATE/TIME: 2-7-77 - 2033 Z

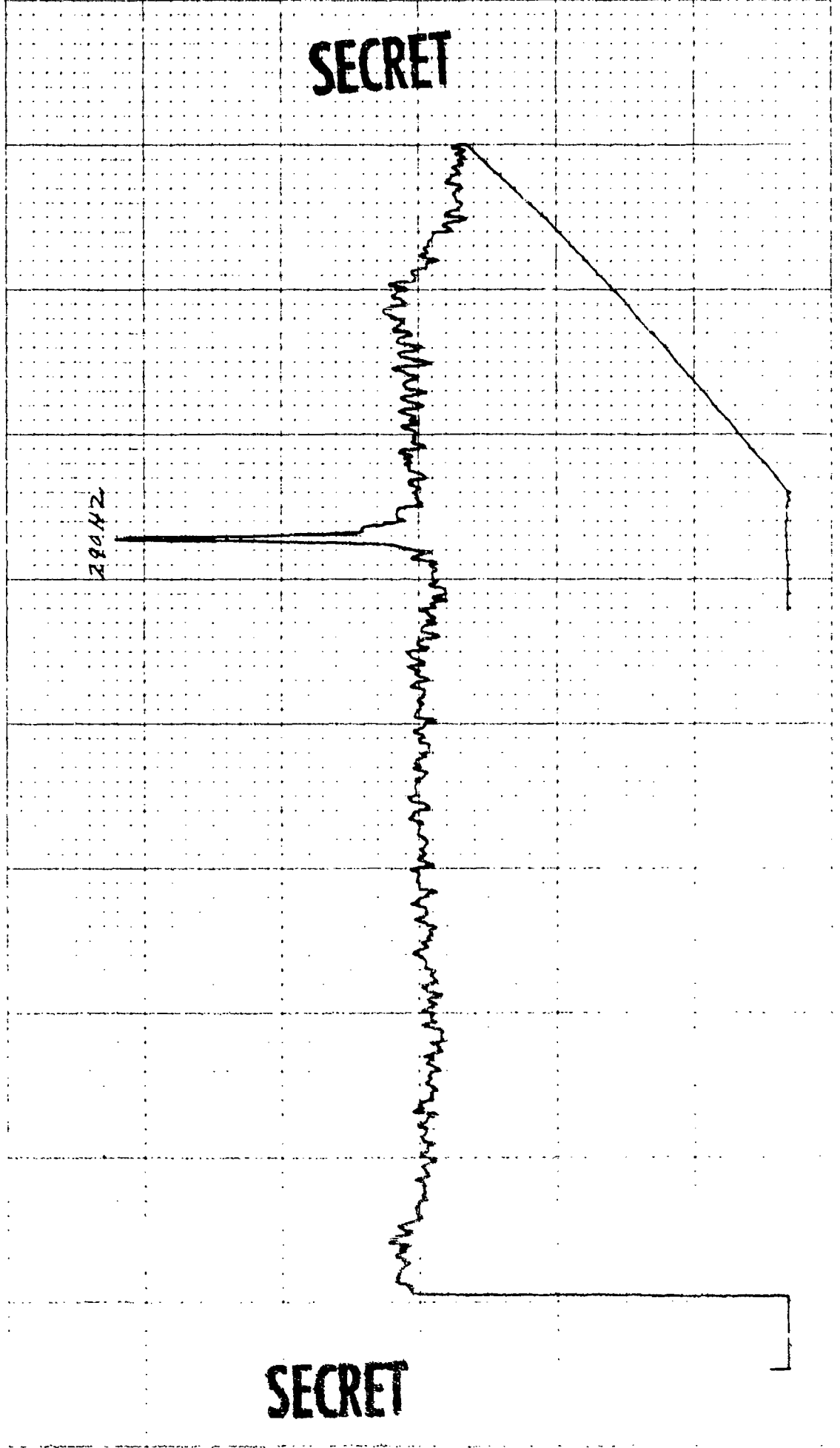
ANALYSIS BANDWIDTH: 1/10 HZ

 DEC AZ STEERING

INTEGRATION TIME 320 SECS

ATTEN: - DB

FILTER WTG: HANNING



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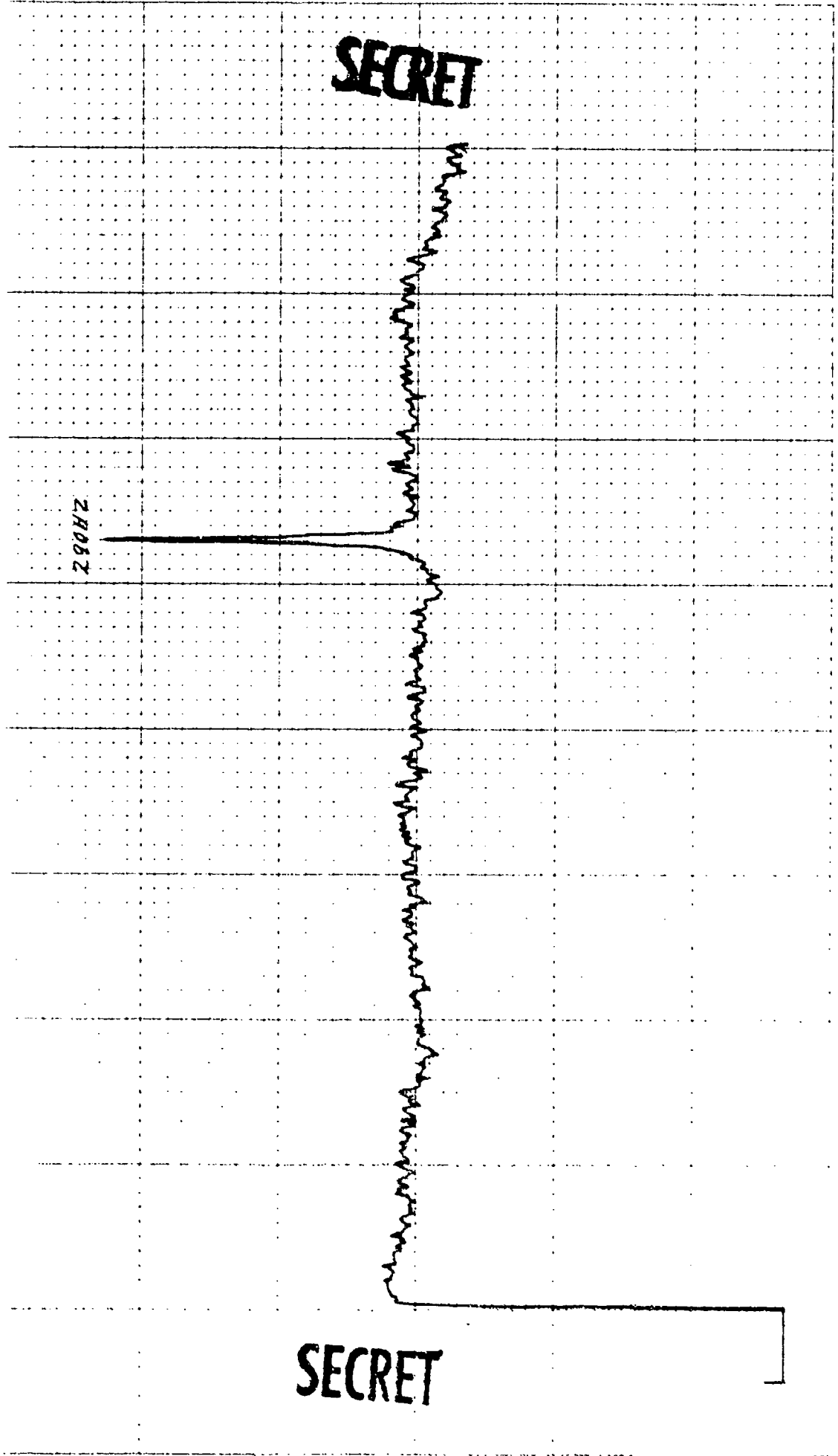
CONTROL: 2-7 - 2033 (4)
OMNI SPECTRUM (ELEMENT 9)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10 HZ
 DEC AZ STEERING

REEL: F23 INDEX 3320

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



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REF: [unclear]

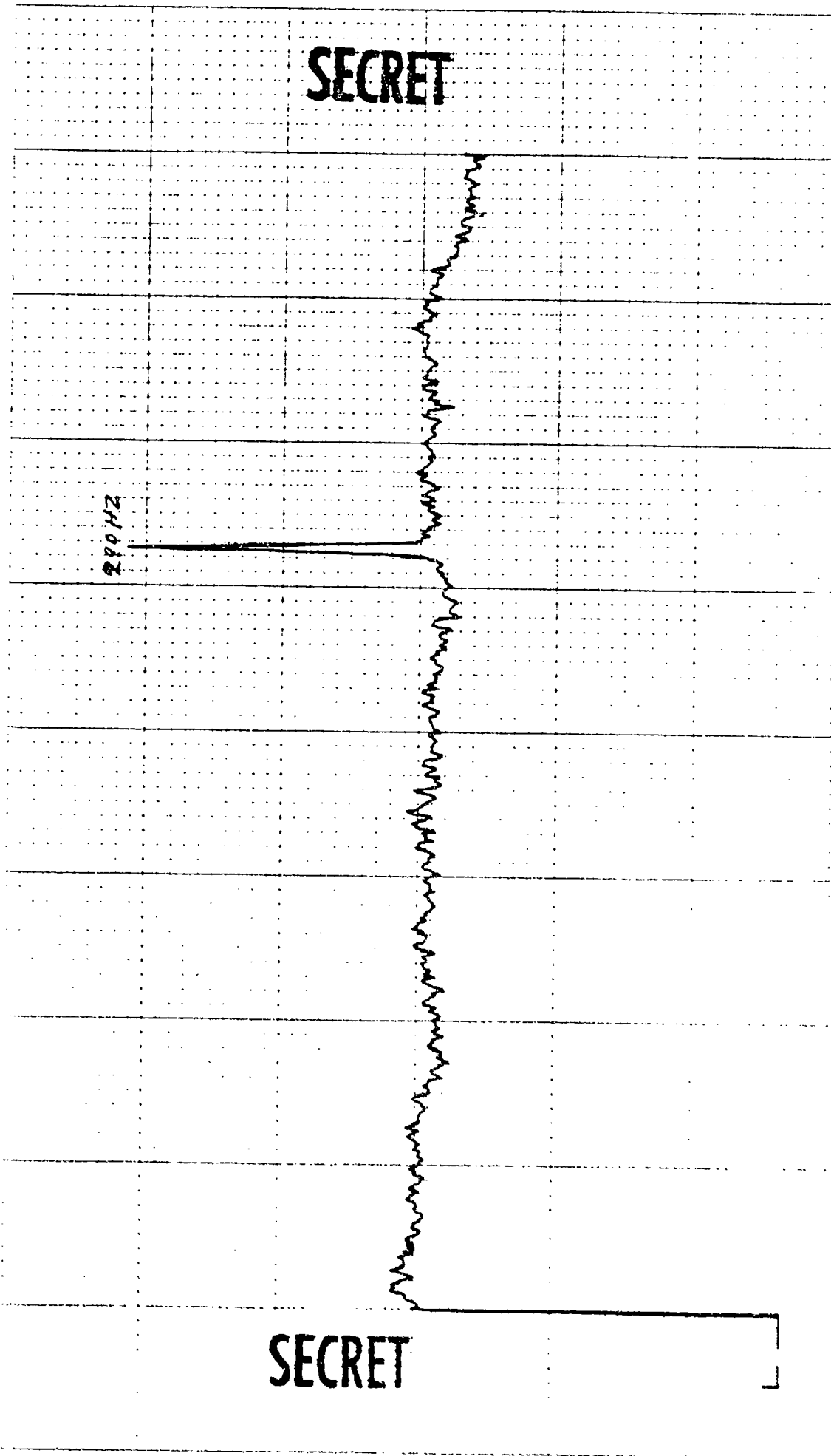
CONTROL: 27 - 2037 (S)
OMNI SPECTRUM (ELEMENT 10)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 27-77 - 2037Z
ANALYSIS BANDWIDTH: 1710 HZ
_____ DEG AZ STEERING

REEL: F23 INDEX: 3326

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



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CONTROL: 2-7 - 2033 (6)
OMNI SPECTRUM (ELEMENT 12)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

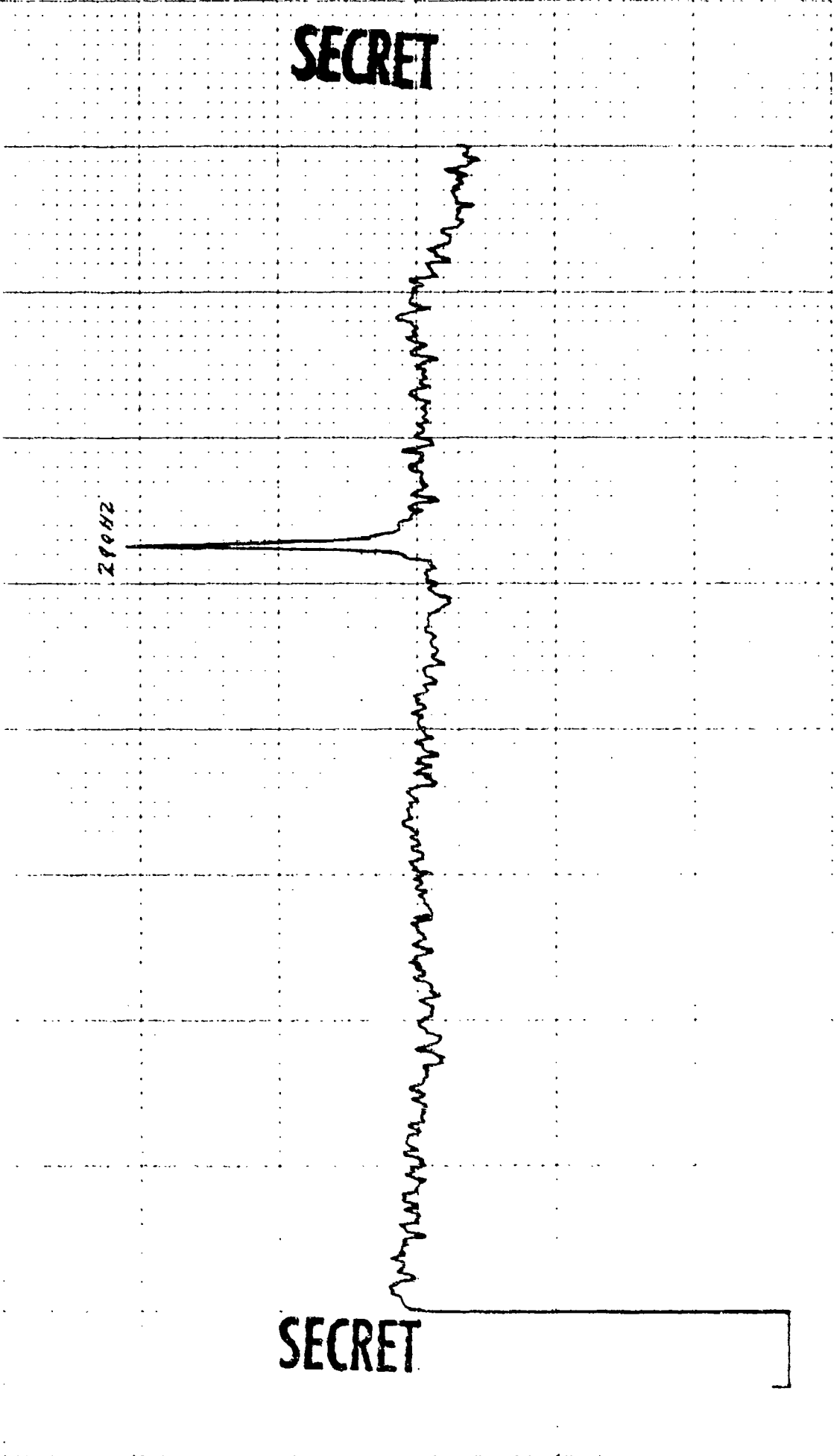
DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

REEL: F23

INDEX: J320

INTEGRATION TIME 320 SECS
FILTER WTG: HANNING
ATTEN: DB



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CONTROL: 2033 - 51 (DPL)
OMNI SPECTRUM (ELEMENT 14)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

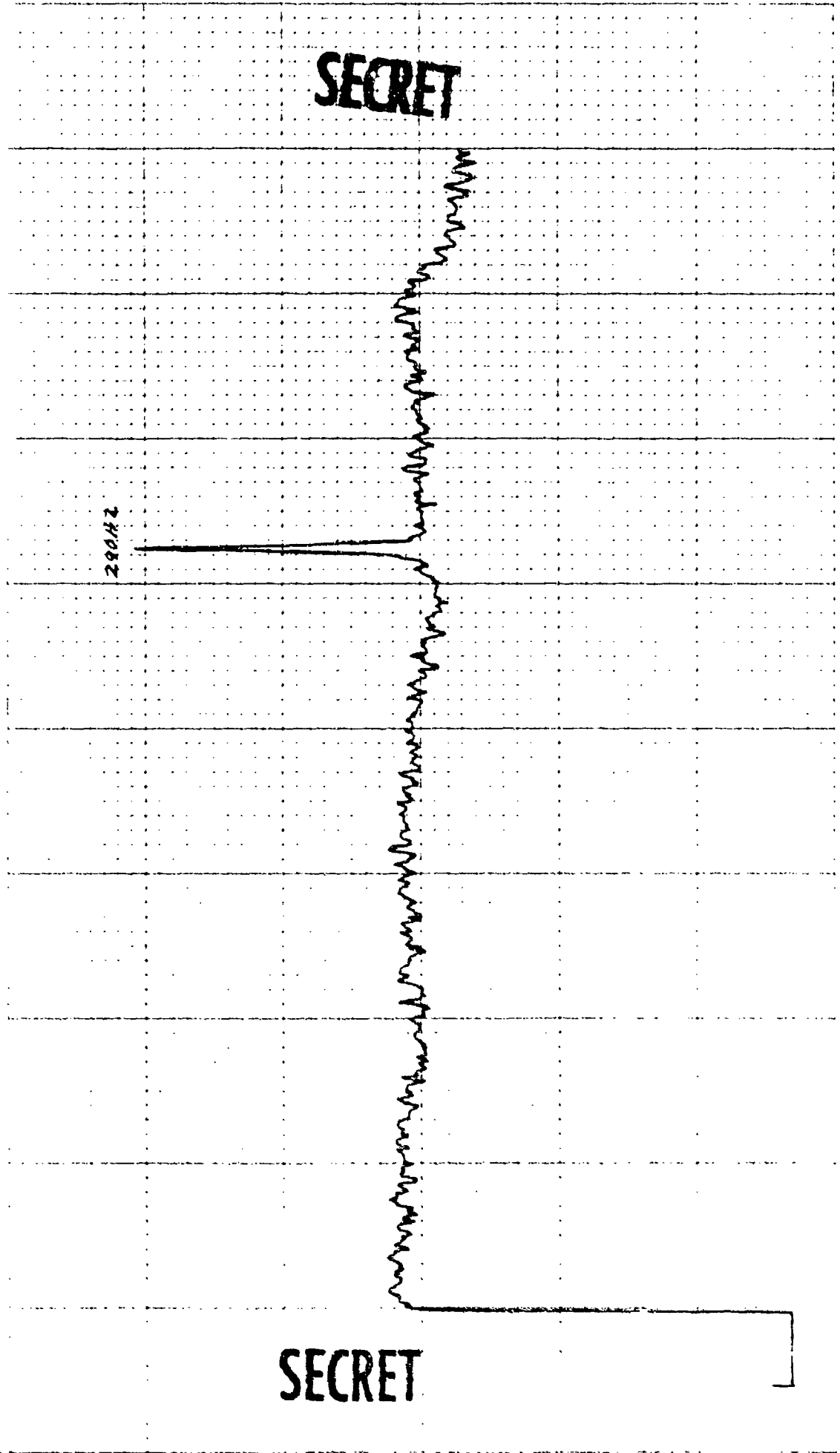
DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z

ANALYSIS BANDWIDTH: 1/10HZ
- DEC AZ STEERING

REEL: 723 INDEX 3320

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



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16-2: PLANT TO THE INS. M. L. P. M. S.

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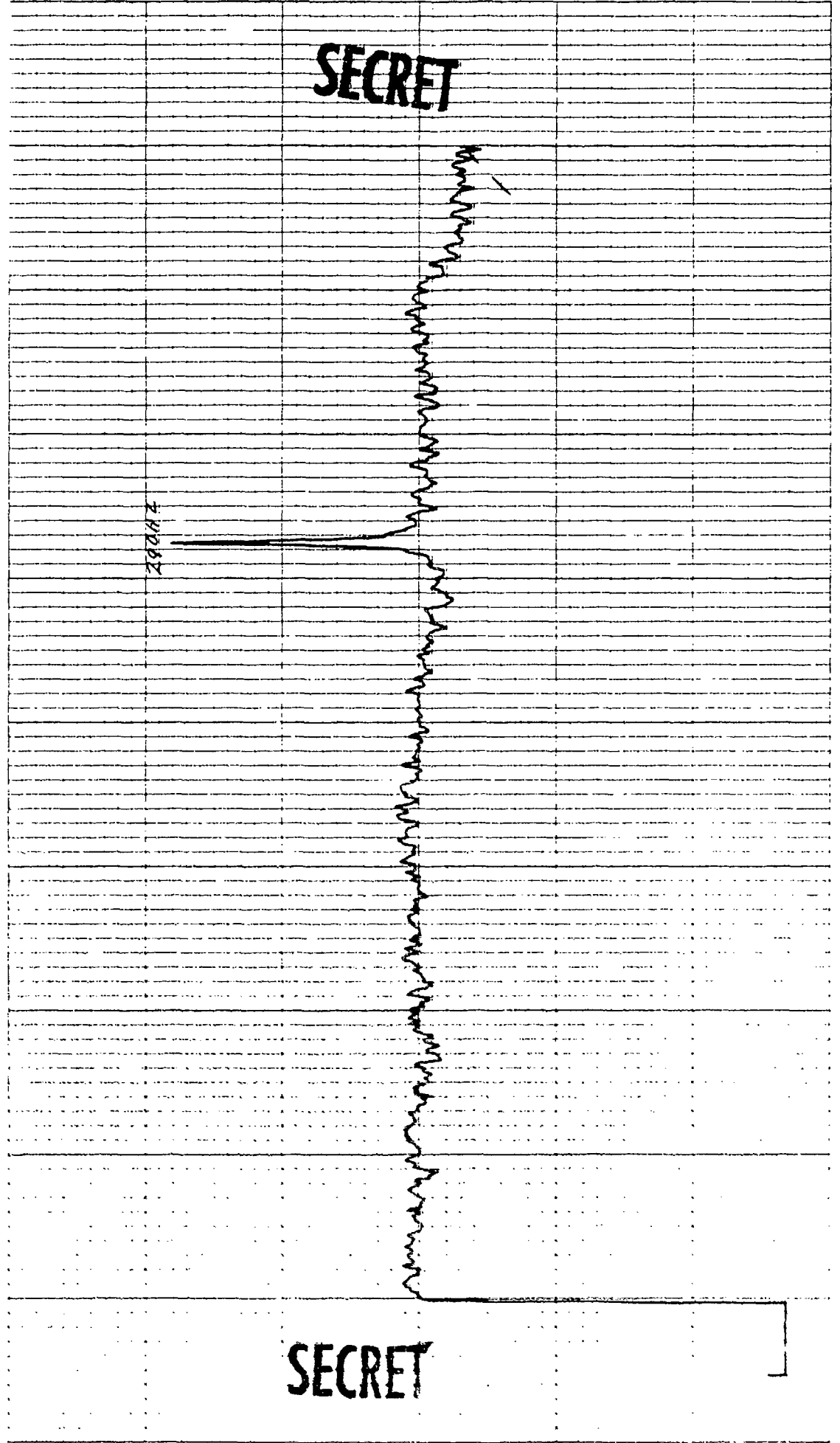
CONTROL: 27-2033 (8)
OMNI SPECTRUM (ELEMENT 16)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 27-77 -2033 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F23 INDEX 3320

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



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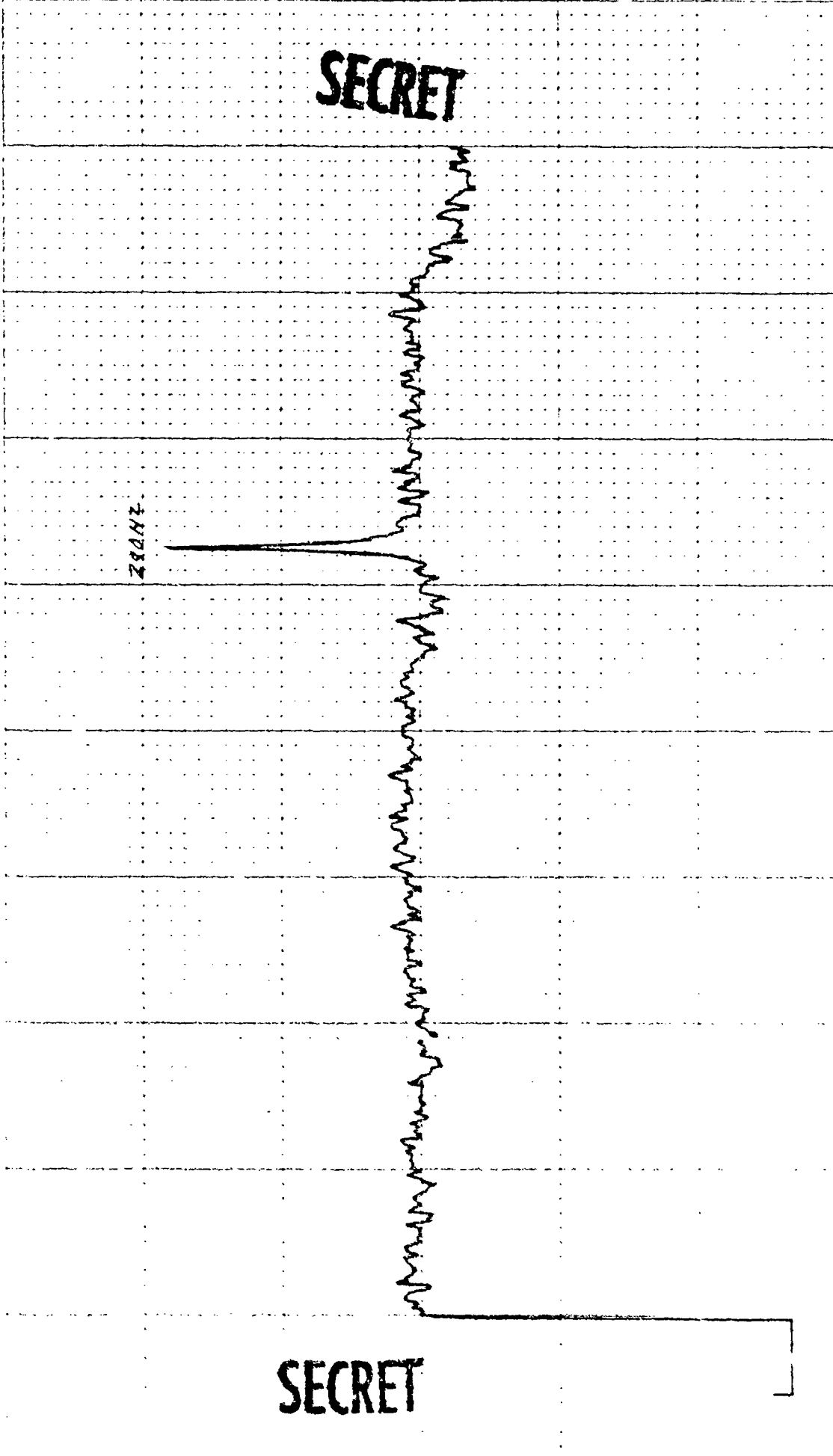
CONTROL: 2-7 -2037 (9)
OMNI SPECTRUM(ELEMENT 19)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -2037Z
ANALYSIS BANDWIDTH: 1/10HZ
_____ DEG AZ STEERING

REEL: F23 INDEX: 3320

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



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INDEX 3324

REEL: F23

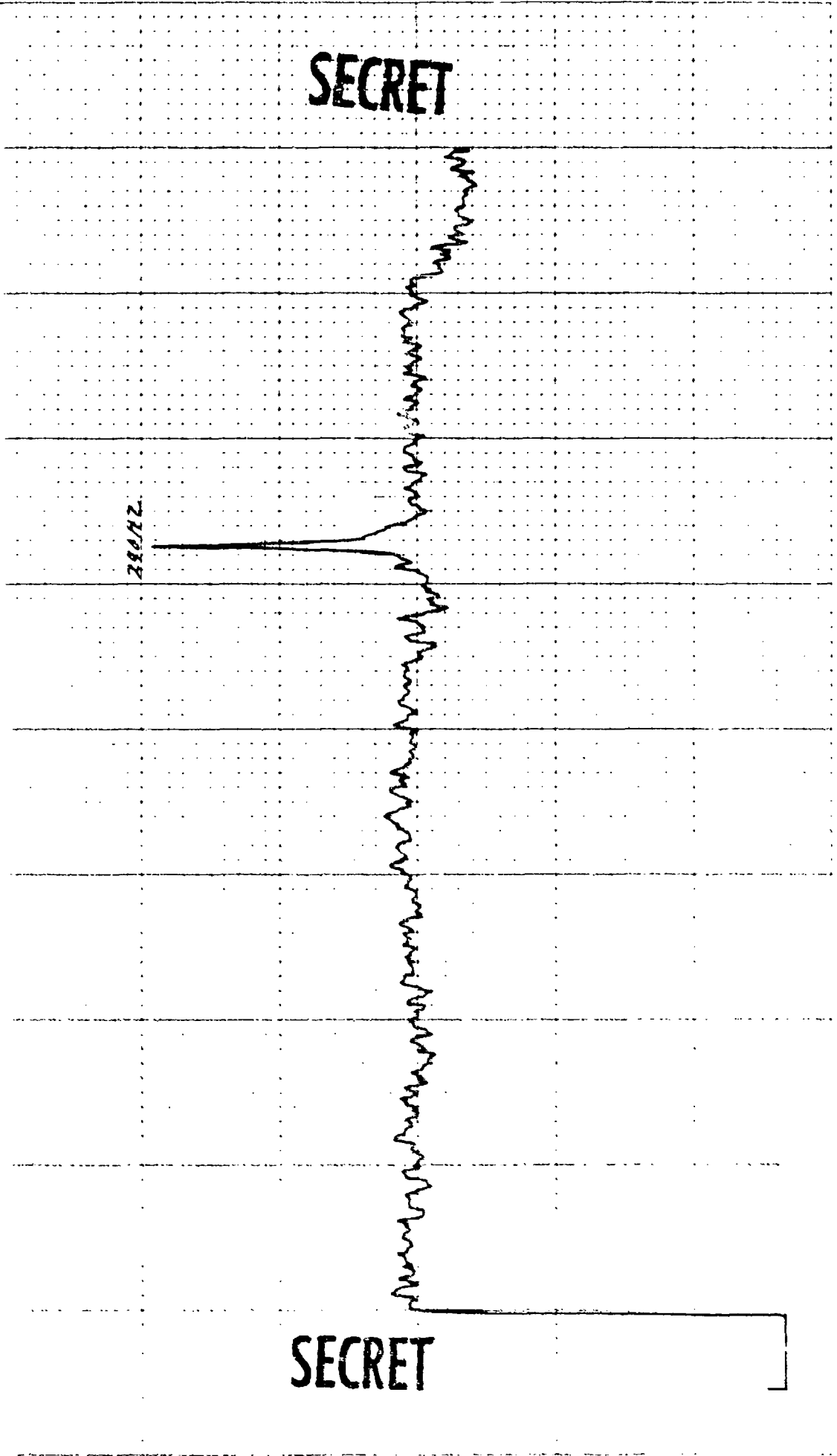
DATE OF ANALYSIS:

CONTROL: 2.7 - 2033 (10)

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER WTG: HANNING

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

OMNI SPECTRUM (ELEMENT 20)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT



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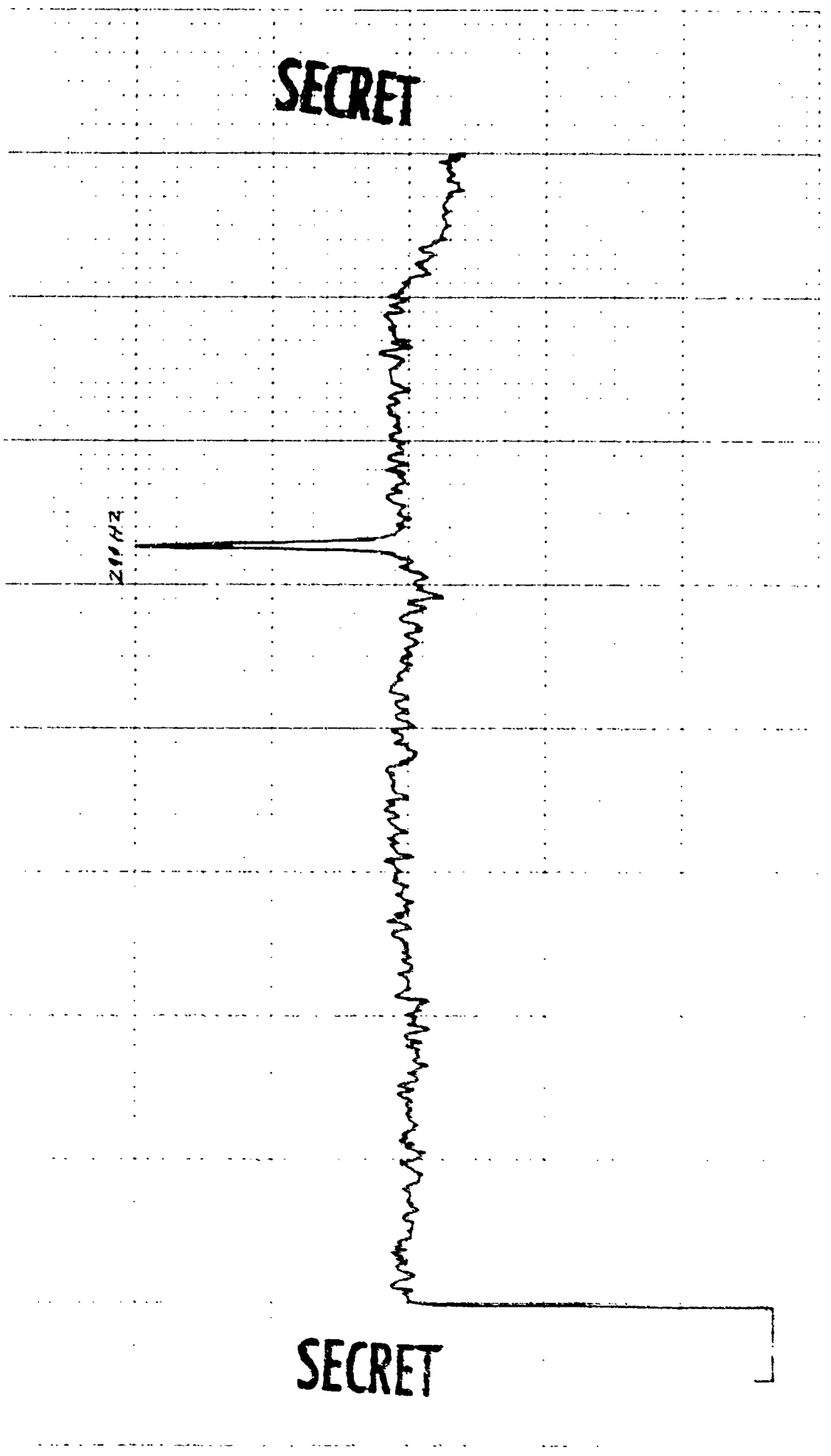
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REEL: F23 INDEX 3320

DATE OF ANALYSIS:
DATE/TIME: 2-7-77 -2033Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

CONTROL: 2-7-2033 (11)
OMNI SPECTRUM (ELEMENT 23)
EXERCISE: BEARING, STAFF
CENTER FREQ: 280 HZ
1 ELEMENT

INTEGRATION TIME 320 SECS
FILTER WTC: HANNING
ATTEN: DB



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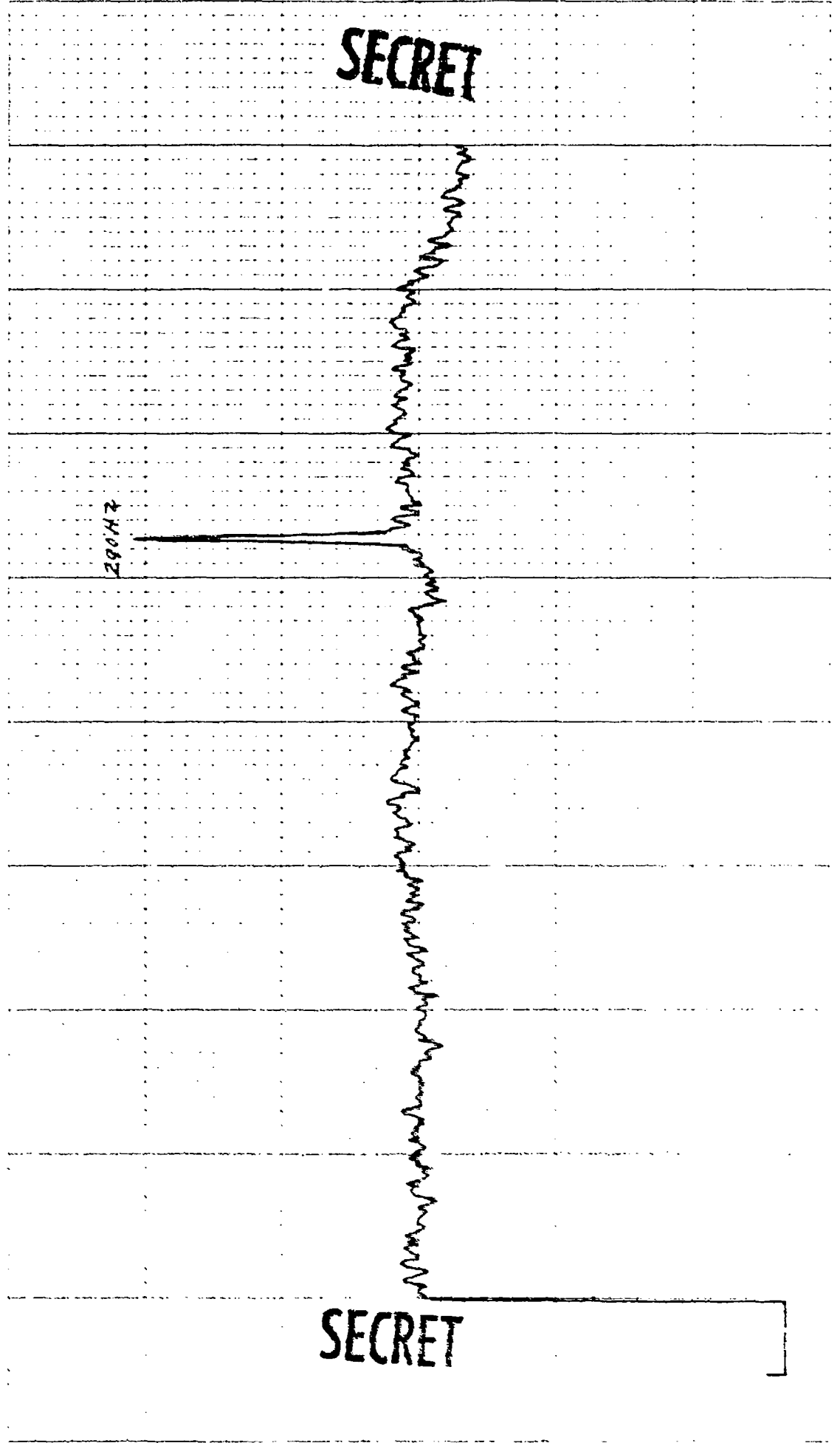
46 0703

CONTROL: 2-7 - 2033 (12)
 OMNI SPECTRUM (ELEMENT 24)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 HZ
 1 ELEMENT

DATE OF ANALYSIS:
 DATE/TIME: 2-7-77 - 2033 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 --- DEG AZ STEERING

REEL: F23 INDEX 3320

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



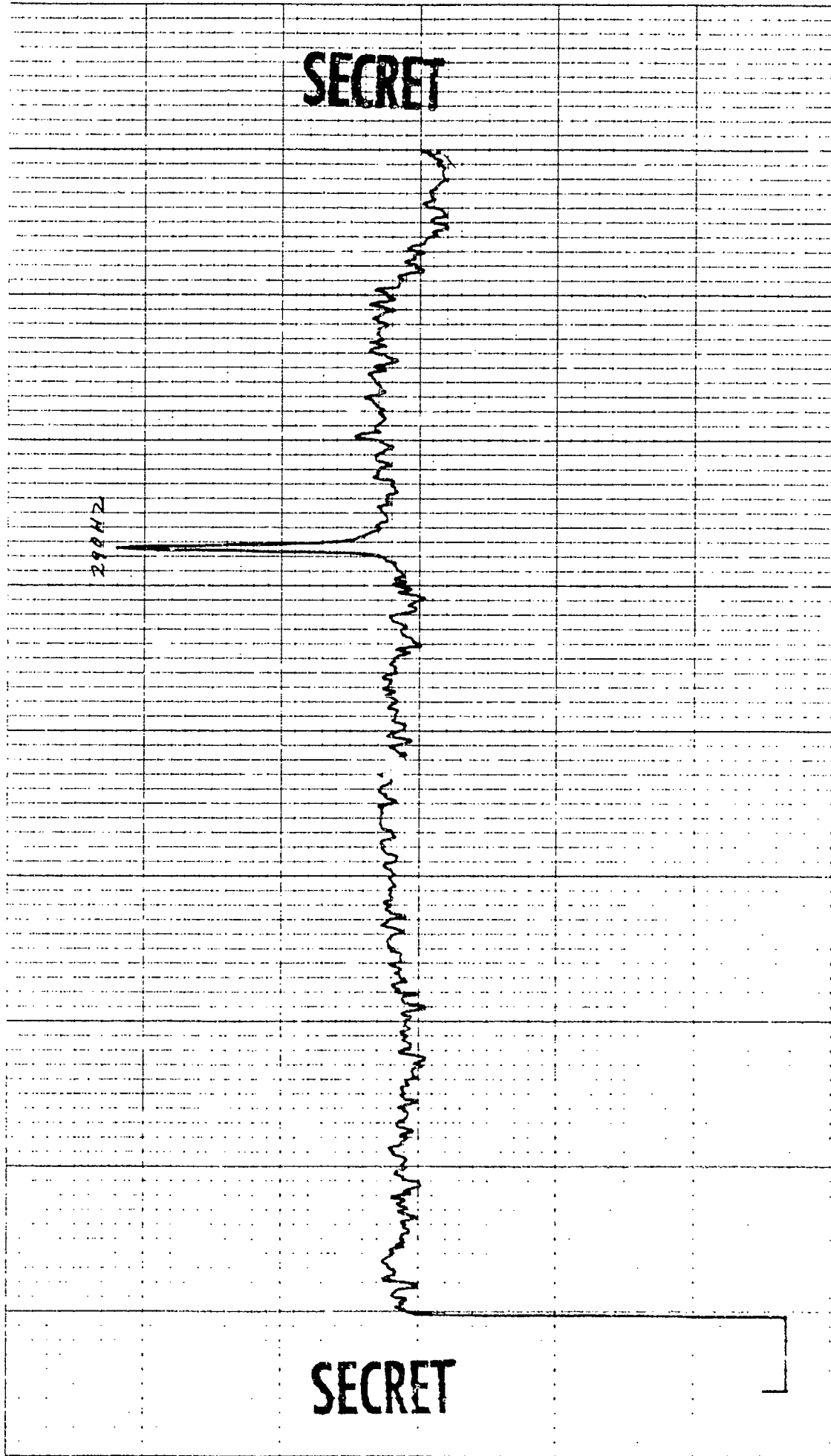
CONTROL: 2-7 -2032 (13)
OMNI SPECTRUM(ELEMENT 26)
EXERCISE: BCHARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

REEL: F23 INDEX 3320

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



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REEL: F23 INDEX 3320

DATE OF ANALYSIS:

CONTROL: 27-2033 (14)

OMNI SPECTRUM (ELEMENT 2Y)

EXERCISE: BEARING STAKE

CENTER FREQ: 280 HZ

I ELEMENT

DATE/TIME: 2-7-77 - 2033Z

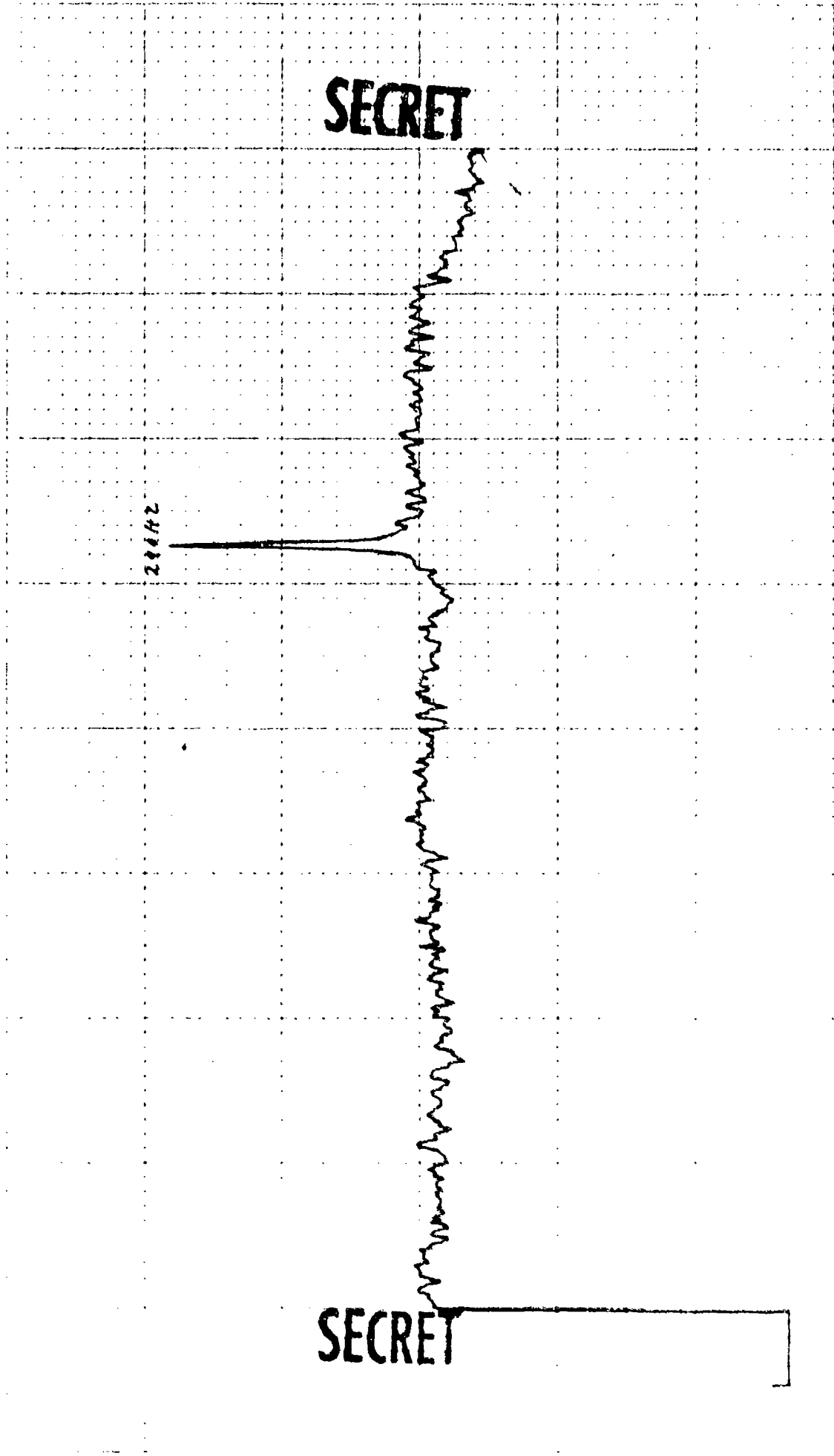
ANALYSIS BANDWIDTH: 1/10HZ

--- DEC AZ STEERING

INTEGRATION TIME 320 SECS

FILTER WTC: HANNING

ATTEN: - DB



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CONTROL: 2-7 - 2033 (15)
OMNI SPECTRUM (ELEMENT 3 /)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
1 ELEMENT

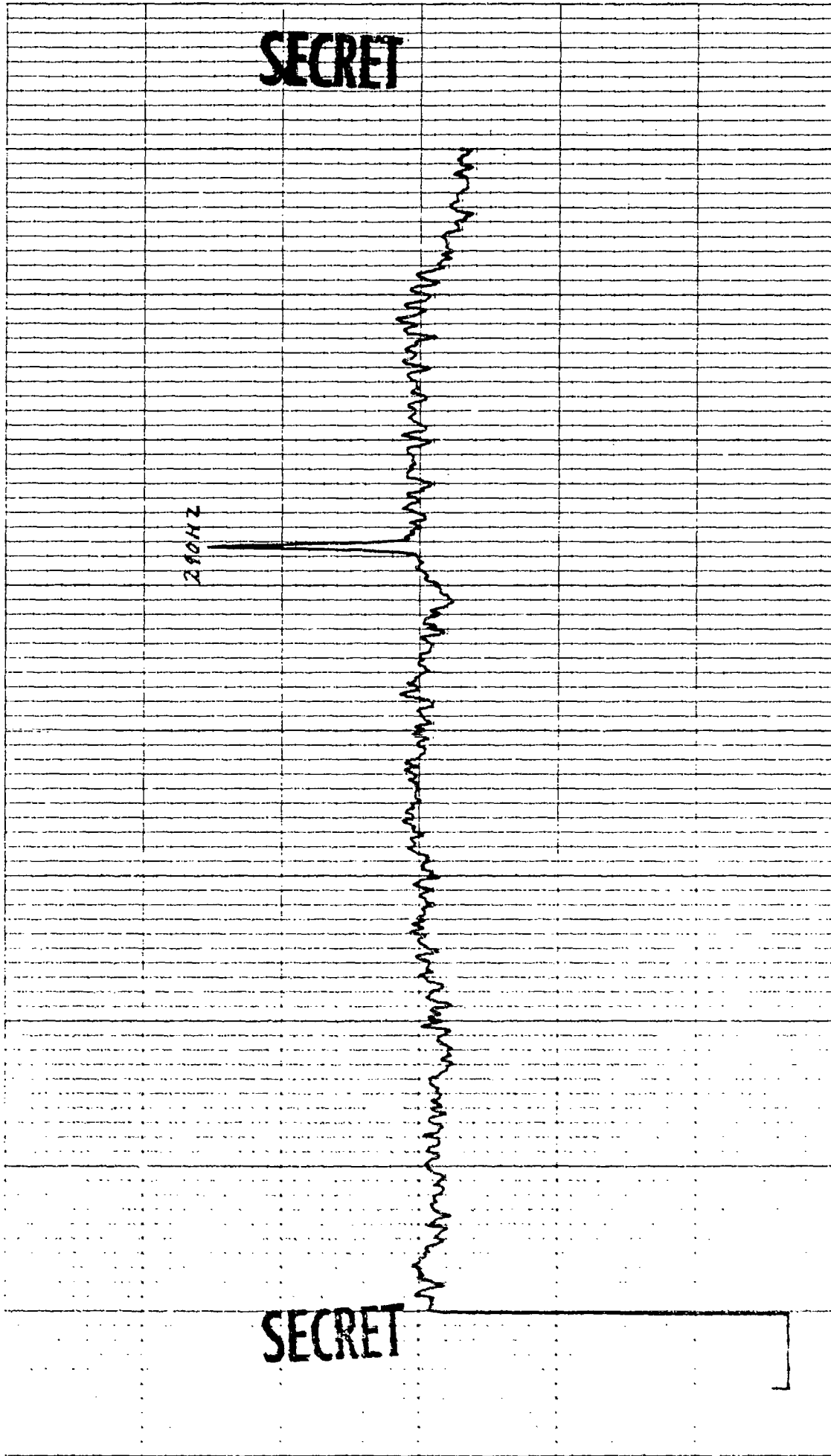
DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1 / 10HZ
DEC AZ STEERING

REEL: F23

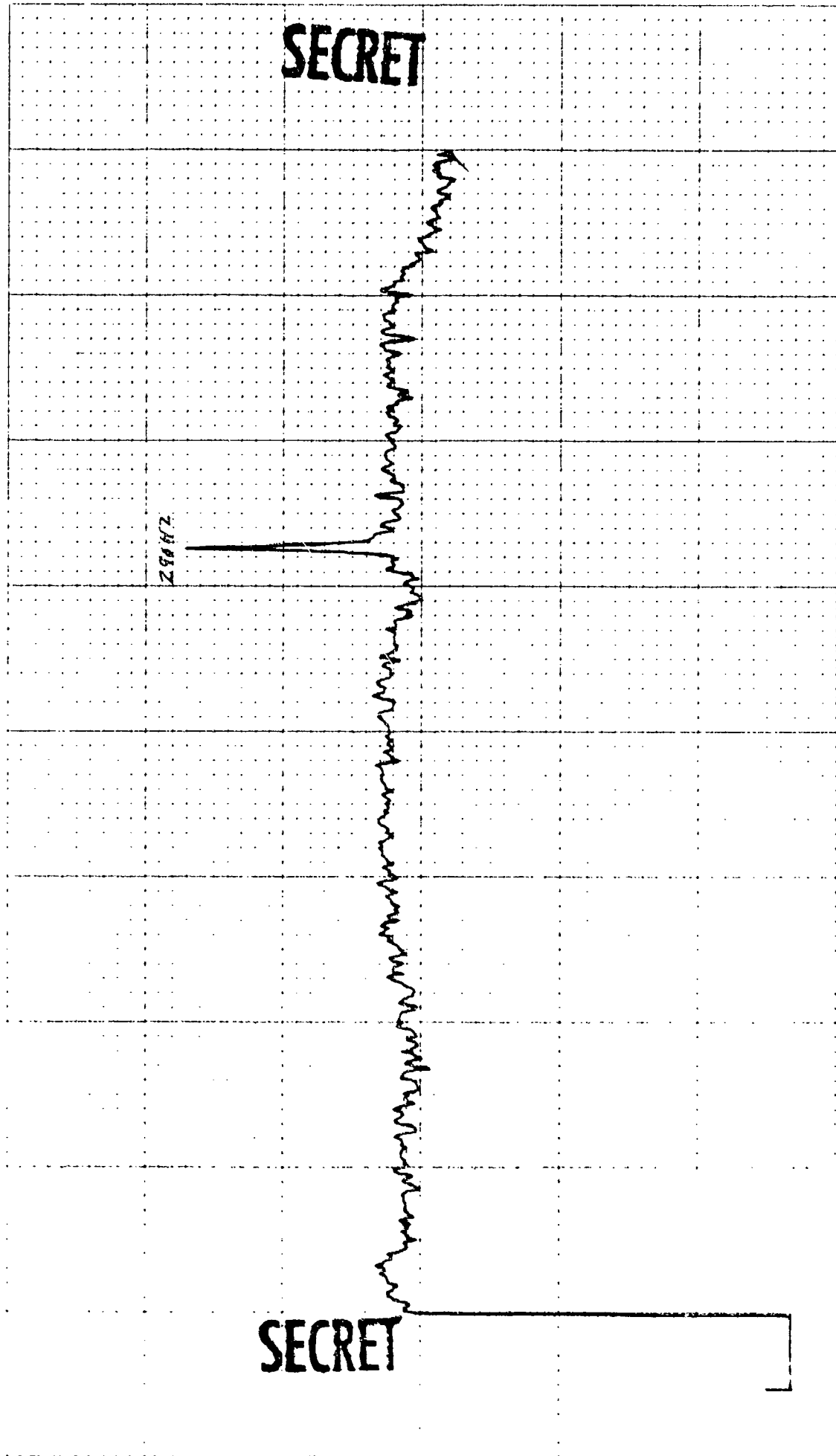
INDEX 3220

INTEGRATION TIME 320 SECS
ATTEN: DB
FILTER WTG: HANNING



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CONTROL: 2-7 -2073 (16) DATE OF ANALYSIS: REEL: F23 INDEX 332
 OMNI SPECTRUM (ELEMENT 23)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10 HZ INTEGRATION TIME 320 SECS ATTN: - DB
 1 ELEMENT - DEC AZ STEERING FILTER WTG: HANNING



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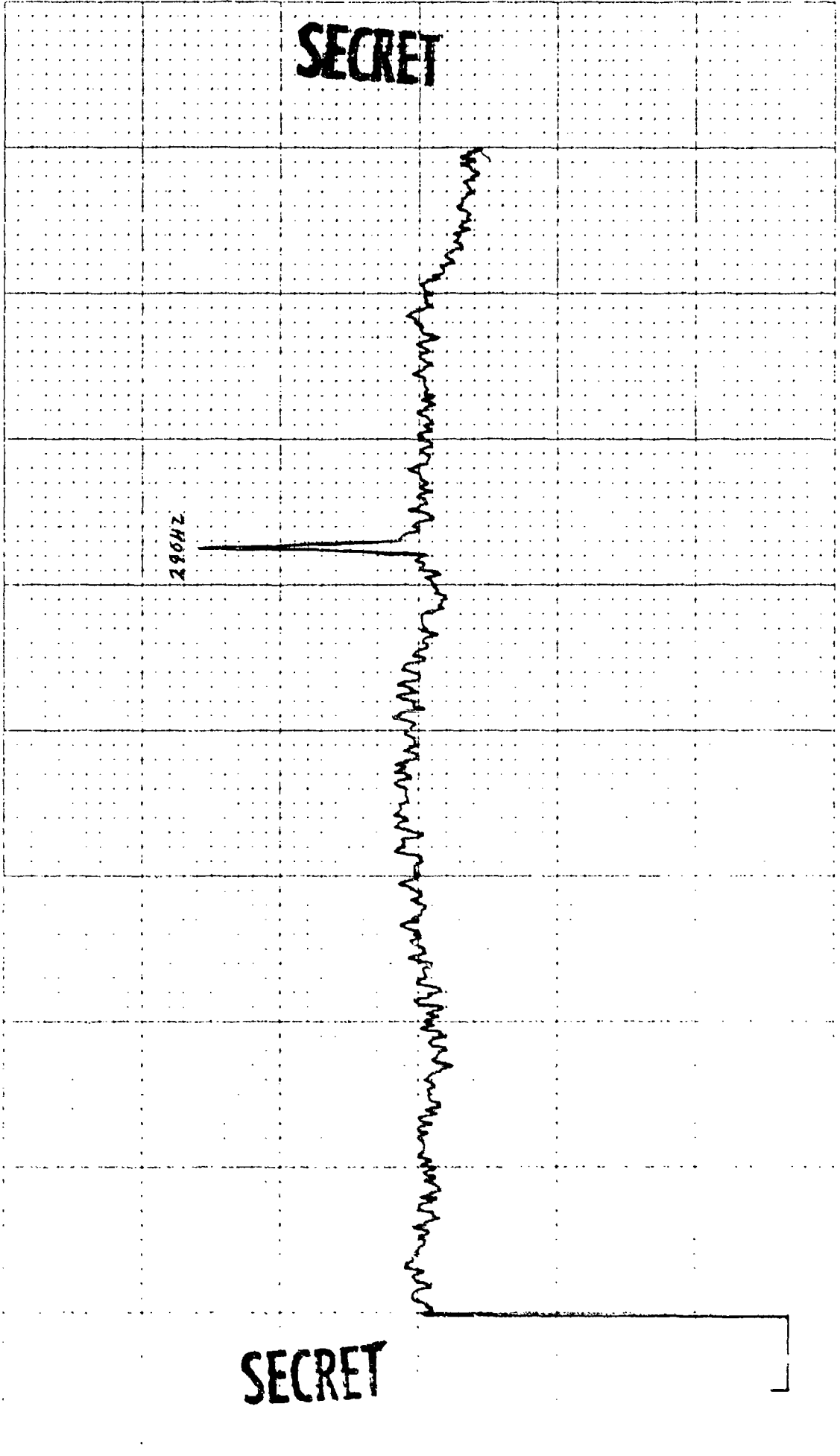
CONTROL: 2-7 - 2033 (17)
OMNI SPECTRUM (ELEMENT 35)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10 HZ
— DEG AZ STEERING

REEL: F23 INDEX 3320

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



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REF ID: A66549

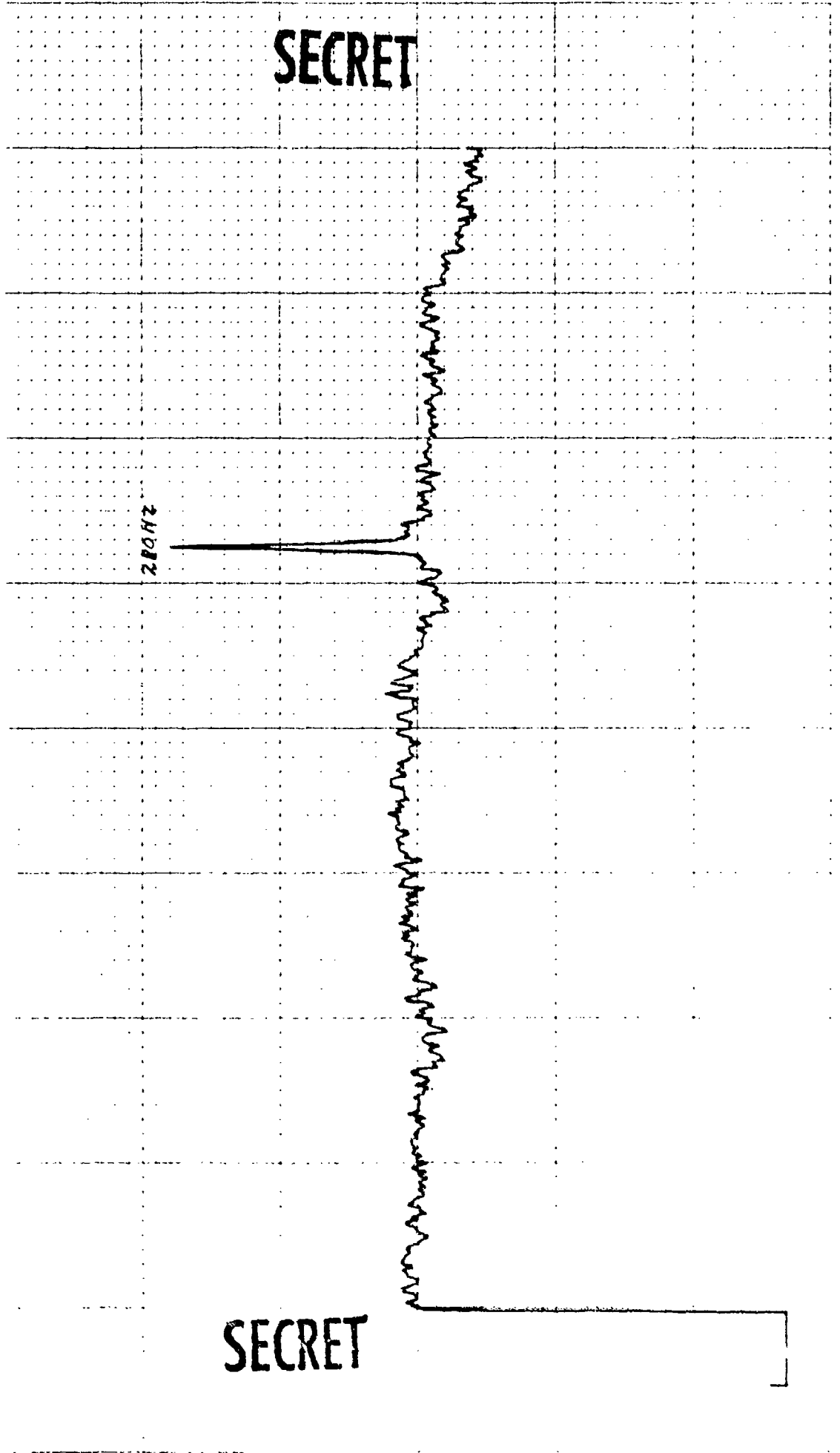
CONTROL: 2-7 -2037 (18)
OMNI SPECTRUM (ELEMENT 37)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

REEL: F23 INDEX: 3324

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



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CONTROL: 2.7 - 2073 (19)
OMNI SPECTRUM (ELEMENT 39)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z

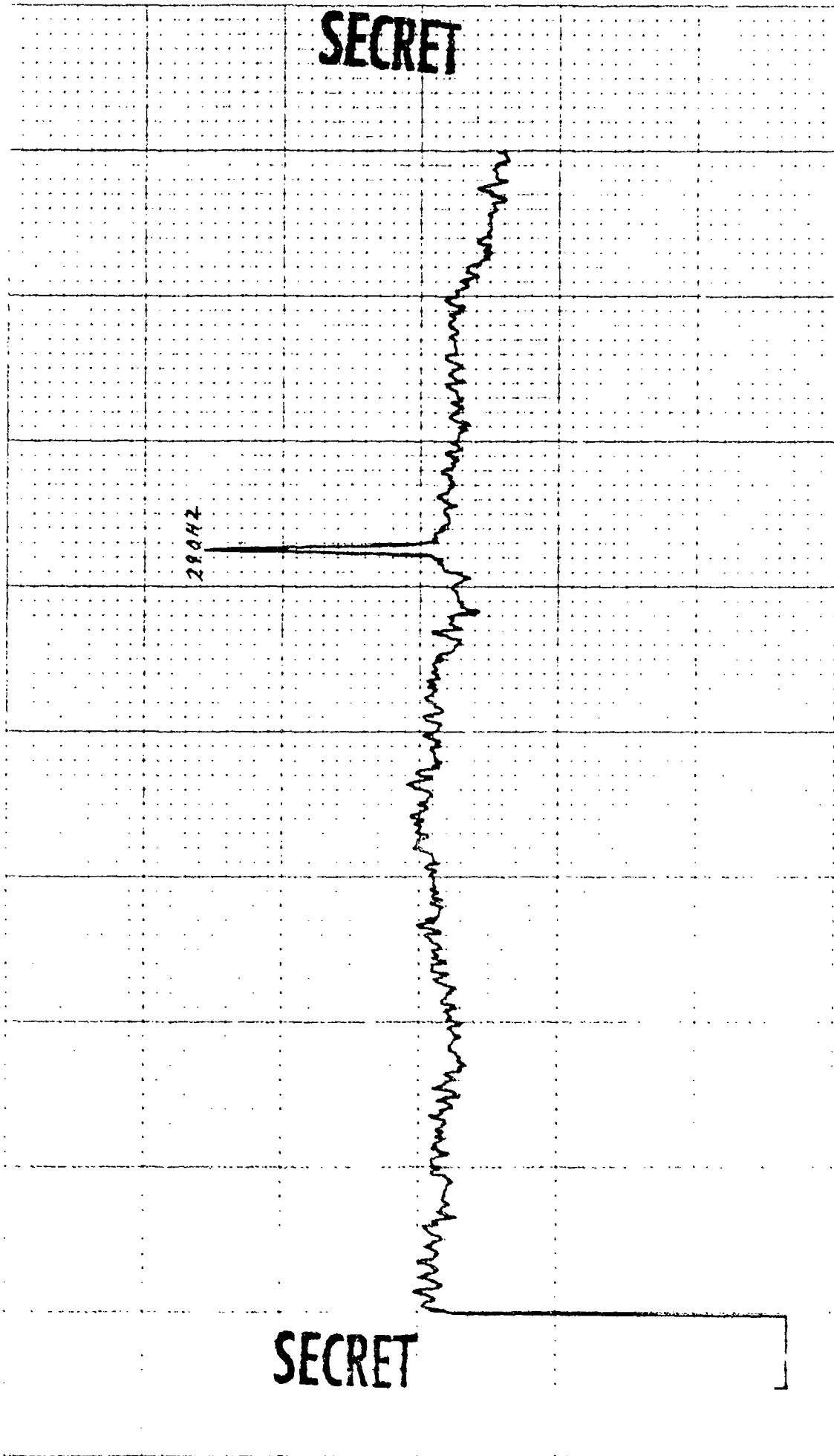
ANALYSIS BANDWIDTH: 1/10 HZ
 DEG AZ STEERING

REEL: F23

INDEX: J320

INTEGRATION TIME 320 SECS
FILTER WTC: HANNING

ATTEN: - DB



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CONTROL: 2-7 -2033 (20)
OMNI SPECTRUM (ELEMENT 41)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

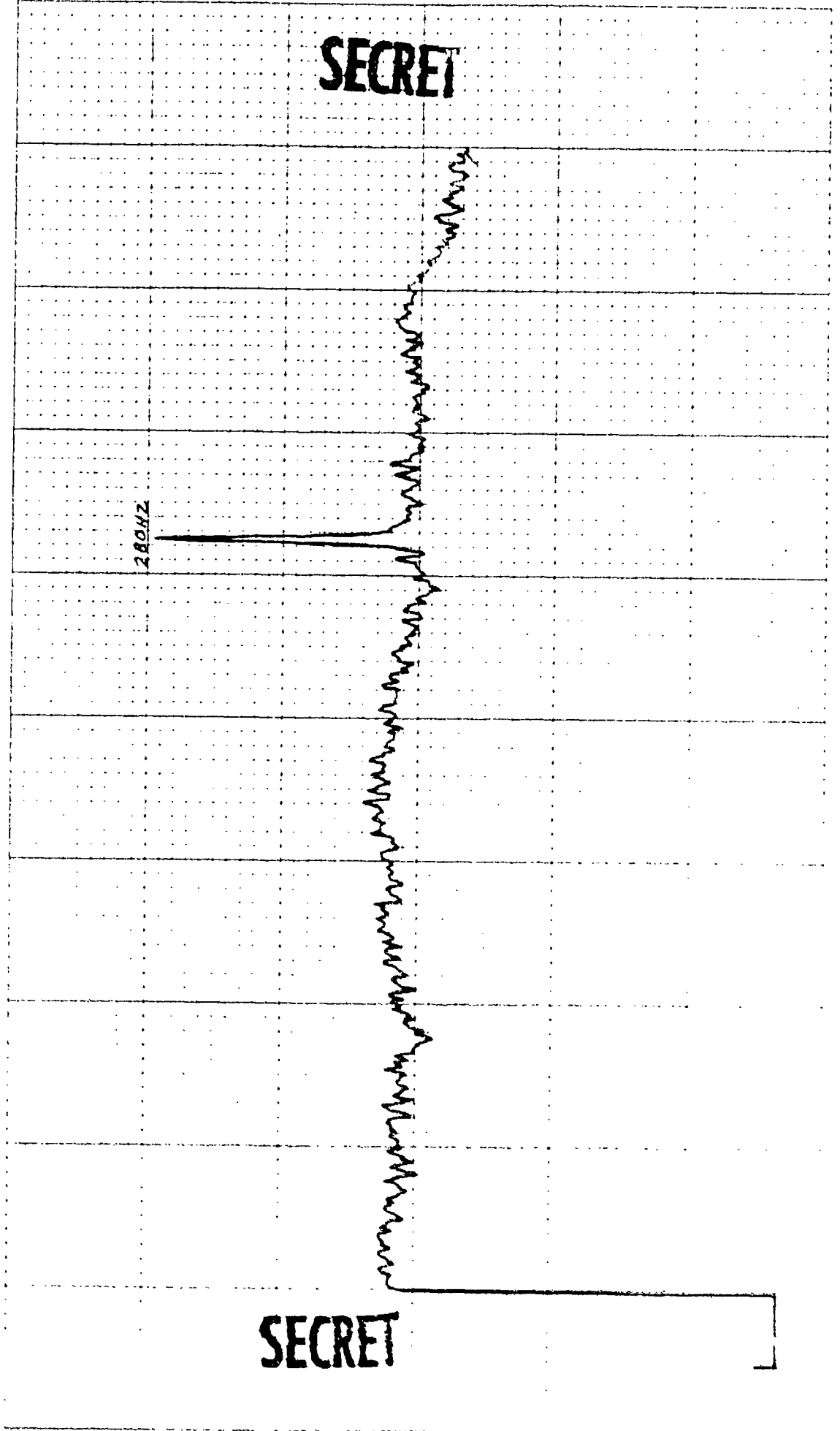
DATE OF ANALYSIS:

DATE/TIME: 2-7-77 -2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

INDEX: J320

REEL: F23

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



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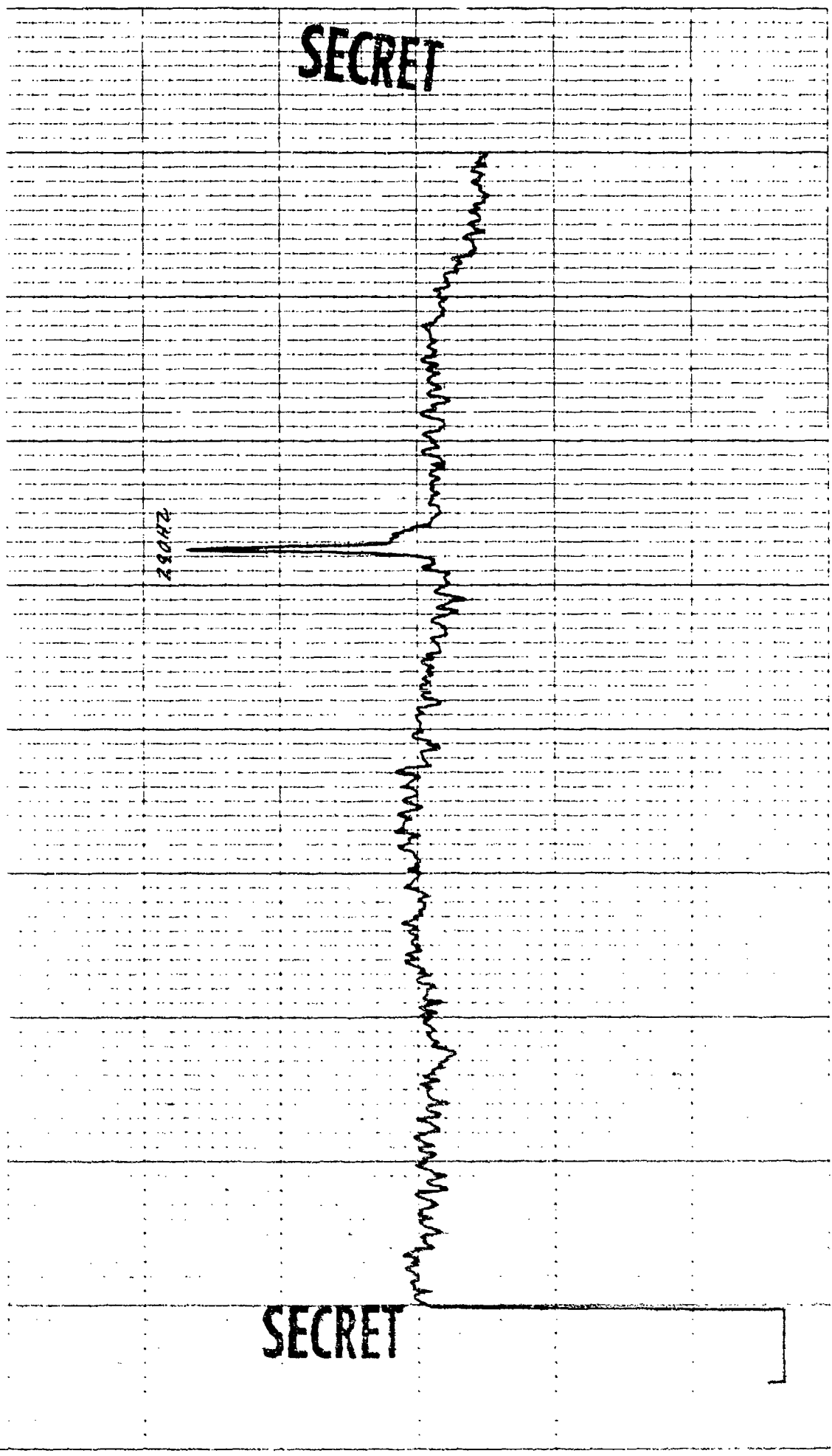
10-2 10-11 10-12 10-13 10-14 10-15 10-16 10-17 10-18 10-19 10-20 10-21 10-22 10-23 10-24 10-25 10-26 10-27 10-28 10-29 10-30 10-31 11-1 11-2 11-3 11-4 11-5 11-6 11-7 11-8 11-9 11-10 11-11 11-12 11-13 11-14 11-15 11-16 11-17 11-18 11-19 11-20 11-21 11-22 11-23 11-24 11-25 11-26 11-27 11-28 11-29 11-30 12-1 12-2 12-3 12-4 12-5 12-6 12-7 12-8 12-9 12-10 12-11 12-12 12-13 12-14 12-15 12-16 12-17 12-18 12-19 12-20 12-21 12-22 12-23 12-24 12-25 12-26 12-27 12-28 12-29 12-30 12-31 1977

CONTROL: 2-7 - 2033 (21)
 OMNI SPECTRUM (ELEMENT 43)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
 I ELEMENT

DATE OF ANALYSIS:
 DATE/TIME: 2-7-77 - 2033 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 _____ DEG AZ STEERING

REEL: F23 INDEX: 220

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



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INDEX 3320

REEL: F23

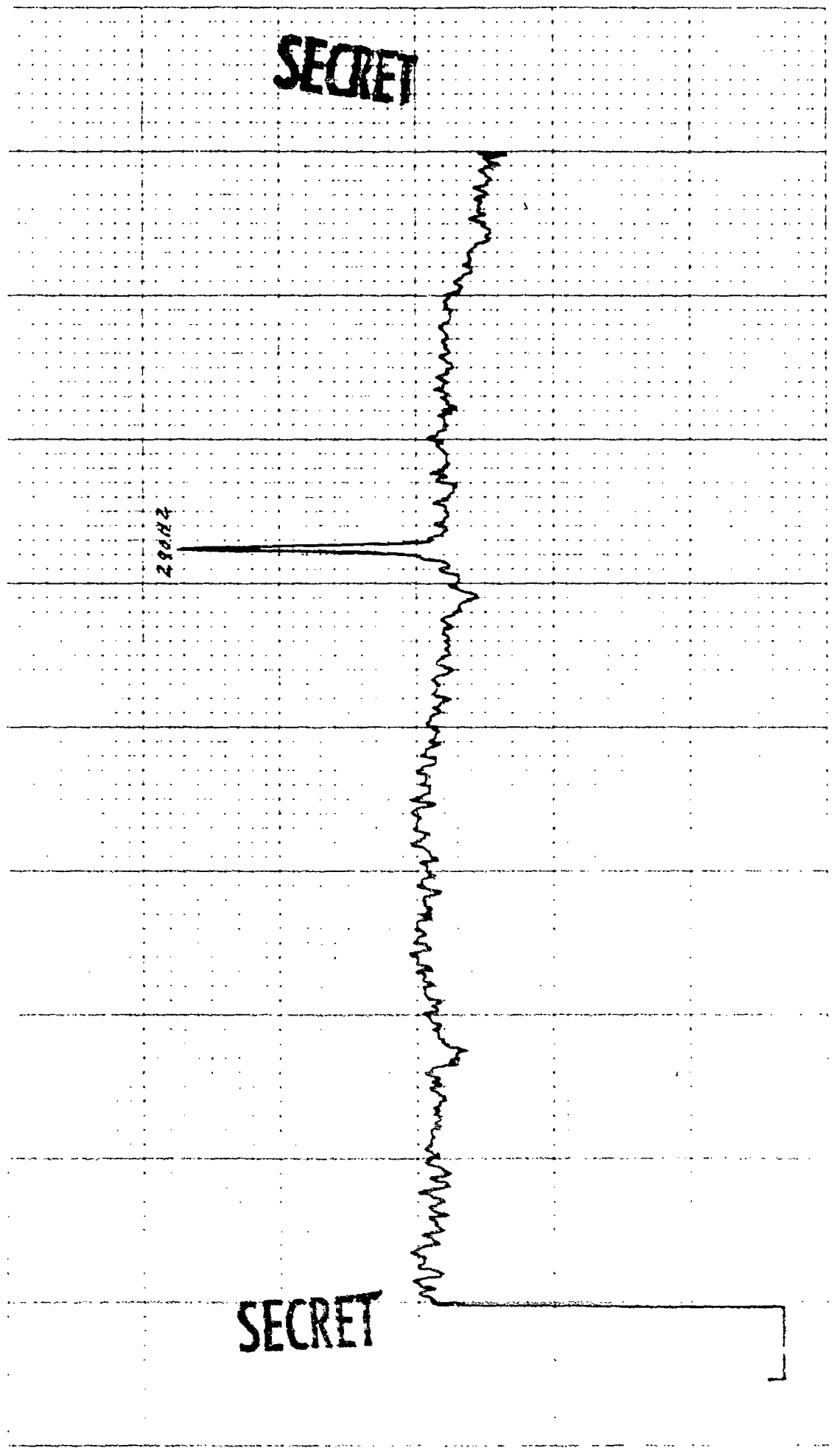
DATE OF ANALYSIS:

CONTROL: 2-7 -2033 (22)

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

DATE/TIME: 2-7-77 -2033Z
ANALYSIS BANDWIDTH: 1/10HZ
_____ DEG AZ STEERING

OMNI SPECTRUM(ELEMENT 45)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT



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INDEX 3320

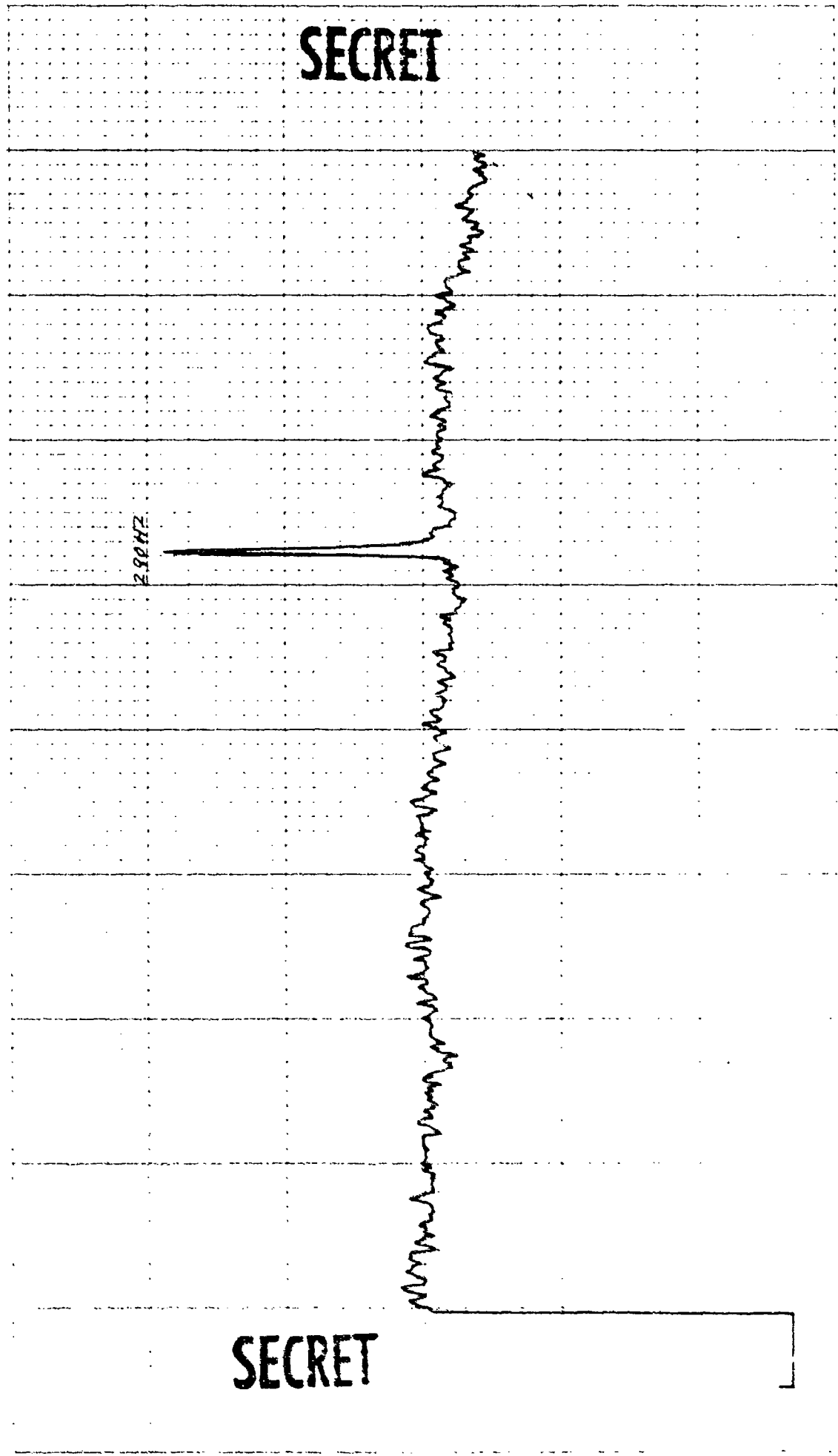
REEL: F23

DATE OF ANALYSIS:

CONTROL: 2-7 - 2033 (23)
OMNI SPECTRUM (ELEMENT 47)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
1 ELEMENT

DATE/TIME: 2-7-77 - 2033Z
ANALYSIS BANDWIDTH: 1/10 HZ
— — — — — DEG AZ STEERING

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



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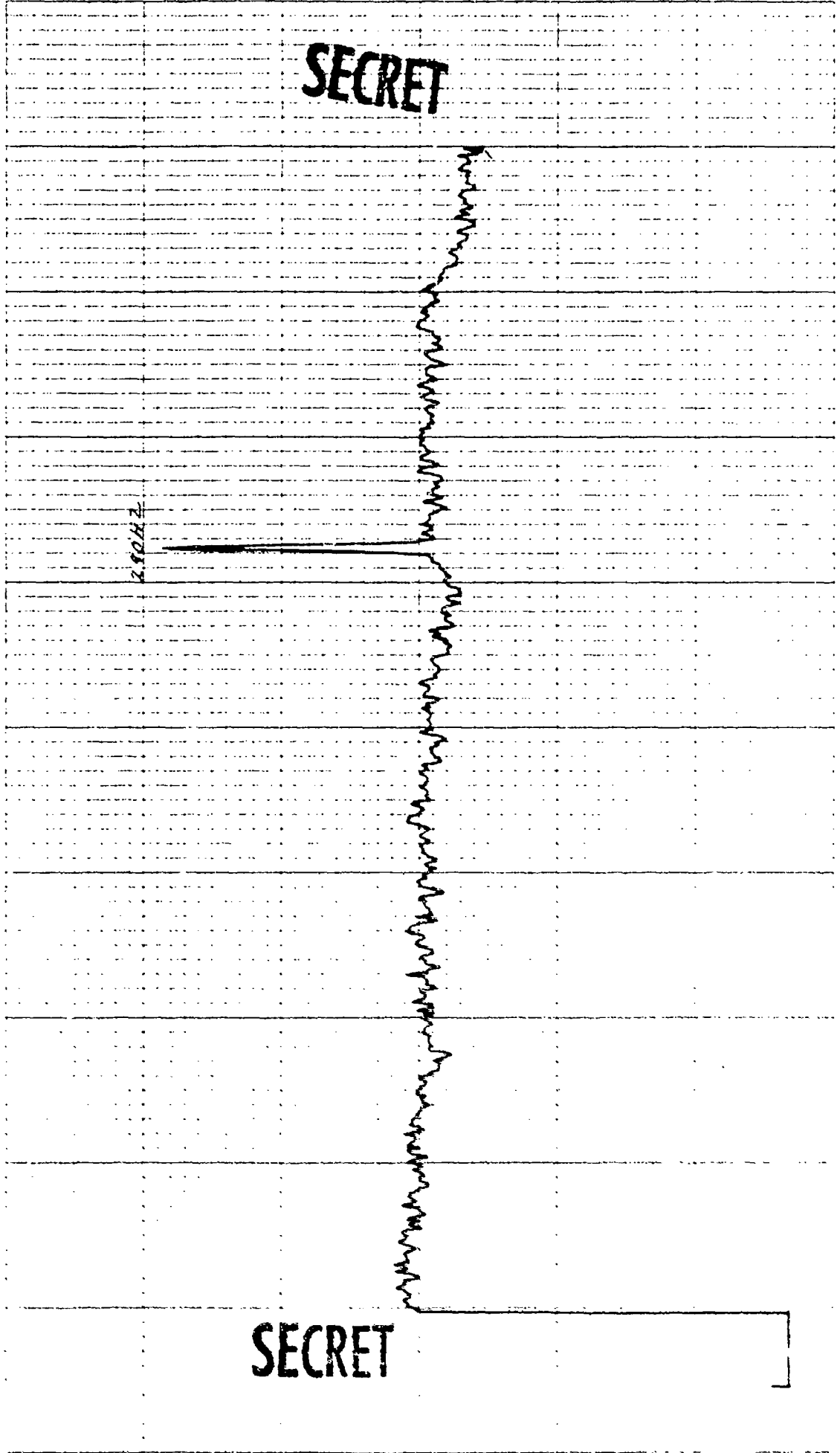
CONTROL: 2.7 - 2.877 (24)
OMNI SPECTRUM (ELEMENT 49)
EXERCISE: BEARING STAKE
CENTER FREQ: 2.80 HZ
1 ELEMENT

DATE OF ANALYSIS:

DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING

REEL: F23 INDEX 3320

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



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INDEX JJ20

REEL: F23

DATE OF ANALYSIS:

CONTROL: 2-7 - 2000 (25)

OMNI SPECTRUM (ELEMENT 5)

EXERCISE: BEARING STAKE

CENTER FREQ: 200 HZ

1 ELEMENT

DATE/TIME: 2-7-77 - 2033 Z

ANALYSIS BANDWIDTH: 1/10 HZ

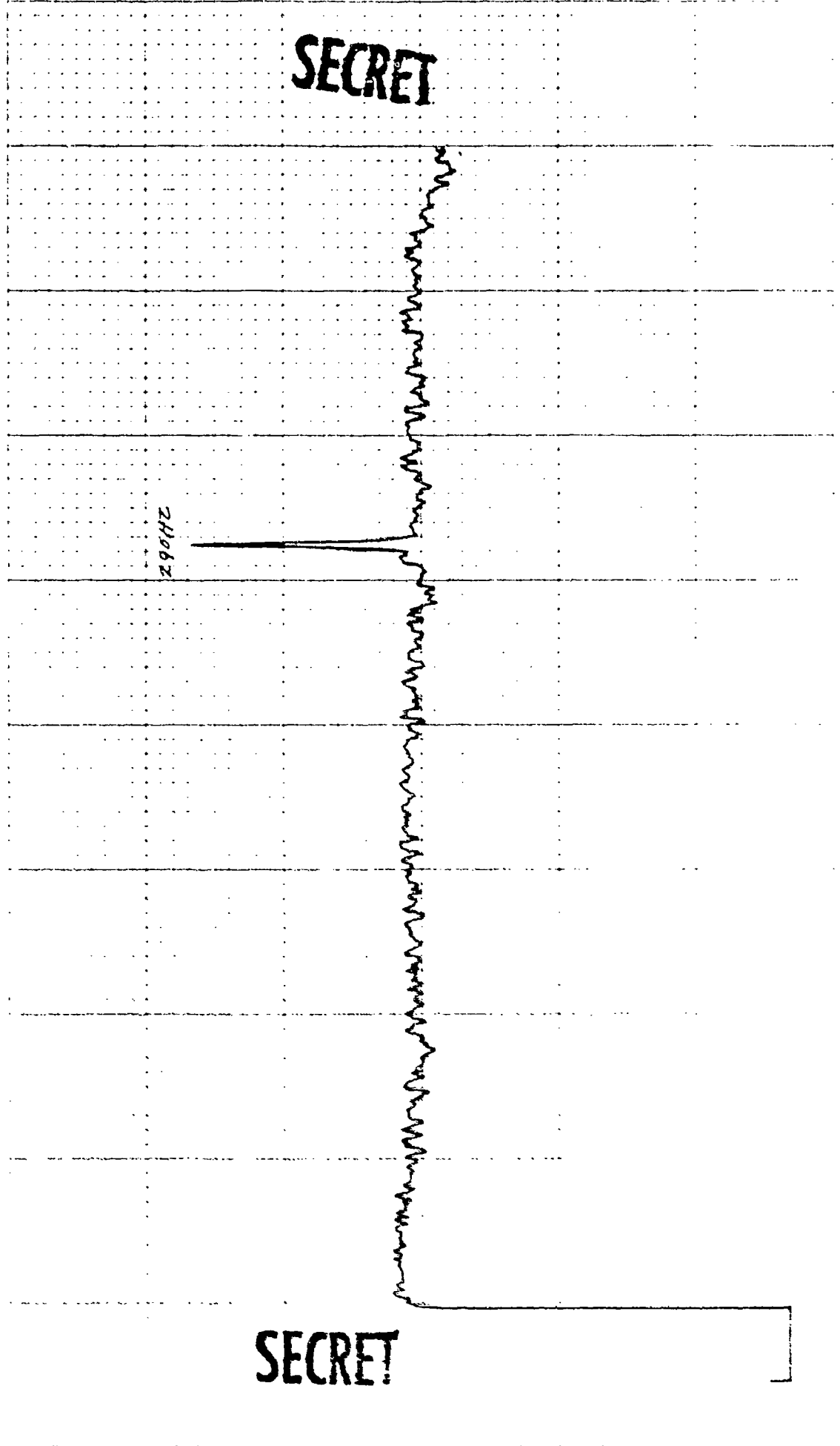
DEG AZ STEERING

INTEGRATION TIME 320 SECS

FILTER

ATTEN: - DB

WTG: HANNING



SECRET

SECRET

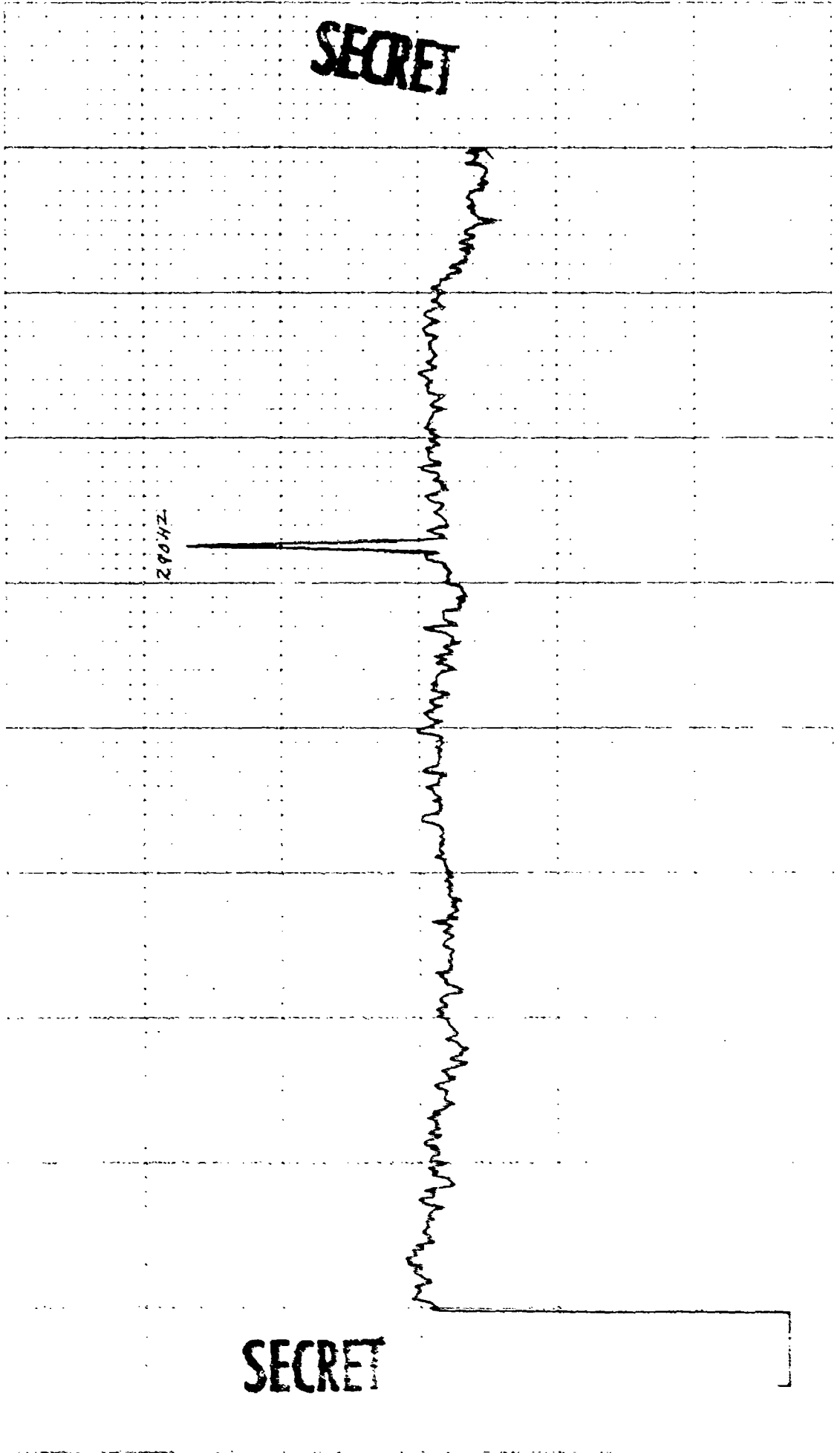
46 0703

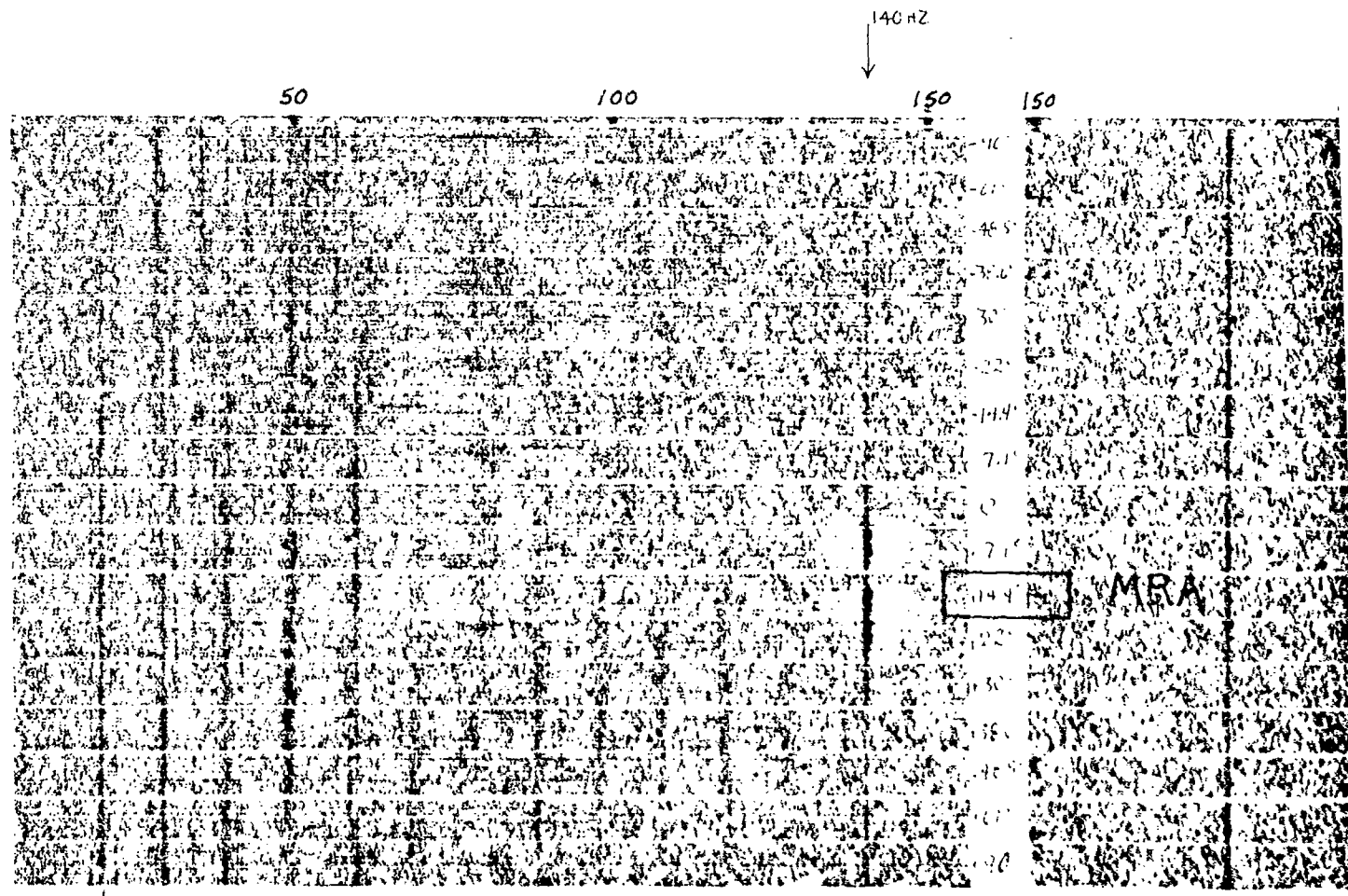
CONTROL: 2-7 -2033 (2C)
 OMNI SPECTRUM(ELEMENT 53)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
 1 ELEMENT

DATE OF ANALYSIS:
 DATE/TIME: 2-7-77 -2033 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 DEG AZ STEERING

REEL: F23 INDEX 3320

INTEGRATION TIME 320 SECS ATTN: DB
 FILTER WTG: HANNING



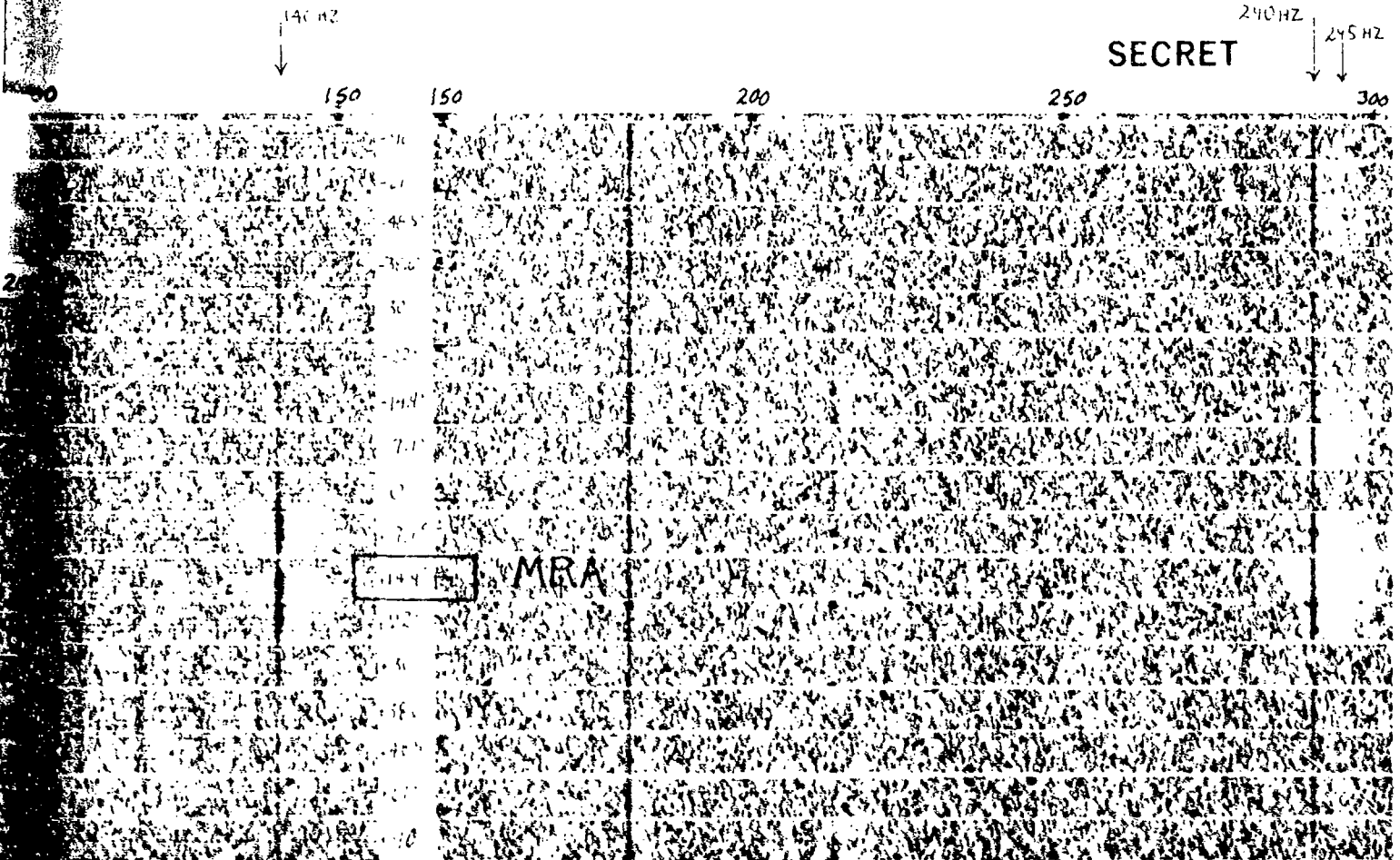


CONTROL NUMBER 20732-49-DPC
 NUMBER OF ELEMENTS 10
 FREQUENCY BAND 10 TO 300 HZ
 RANGE 70 N.M.

H I S T O R Y
 TAPE REEL NUMBER 123
 ANALYSIS BAND WIDTH 20 HZ
 WATER DEPTH 200 FMS

FILE
 DATE
 EXEC

SECRET
240 HZ
245 HZ
150 200 250 300



H I S T O R Y
 TAPE REEL NUMBER 1-2-5
 ANALYSIS BAND WIDTH 2.2 Hz
 WATER DEPTH 200 FMS

SECRET
 TAPE COUNT 1000
 ELEMENT NUMBERS 1-2-3-4-5
 DATE 1-2-5 SAN-XXX-78-0136
 EXERCISE: BEARING STAKE

ELEMENT
 DATE
 EXERCISE

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 6

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-28.7</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-18.7	
BEAMFORMER GAIN	<u>+18</u>	- .7	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	- .5	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-56.7</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-46.7	
BEAMFORMER GAIN	<u>+18</u>	-28.7	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>- .5</u>	
SIGNAL LEVEL FOR SNR	<u>-28.7</u>	28.2	
PROCESSOR CORRECTION	<u>-4.0</u>	24.2	
MRA CORRECTION	<u>+ .2</u>	24	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	15.8	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 6

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-25.3</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-15.5	
BEAMFORMER GAIN	<u>+18</u>	+2.5	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .6</u>	+3.1	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-62.6</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-52.6	
BEAMFORMER GAIN	<u>+18</u>	-34.8	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+3.1</u>	
SIGNAL LEVEL FOR SNR	<u>-34.6</u>	37.7	
PROCESSOR CORRECTION	<u>-4.0</u>	33.7	
MRA CORRECTION	<u>+ .6</u>	34.3	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	26.1	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

DATA POINT 6

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-24.7</u>	<u>-23.0</u>	<u> </u>
MRA SIGNAL LEVEL	<u>- .5</u>	<u>+ 3.1</u>	<u> </u>
ARRAY SIGNAL GAIN	<u>24.2</u>	<u>19.9</u>	<u> </u>
20 LOG <u>16</u>	<u>24</u>	<u>24</u>	<u> </u>
# of elements			
DIFFERENCE	<u>+ .2</u>	<u>-4.1</u>	<u> </u>

ARRAY GAIN

MRA SNR	<u>24.0</u>	<u>34.3</u>	<u> </u>
MEAN OMNI SNR	<u>15.4</u>	<u>19.9</u>	<u> </u>
ARRAY GAIN	<u>8.6</u>	<u>14.4</u>	<u> </u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>10.4</u>	<u>12.5</u>	<u> </u>
DIFFERENCE	<u>-1.8</u>	<u>+ 1.9</u>	<u> </u>

CONFIDENTIAL

46 0703

16E BEARING STAKE 150 HZ

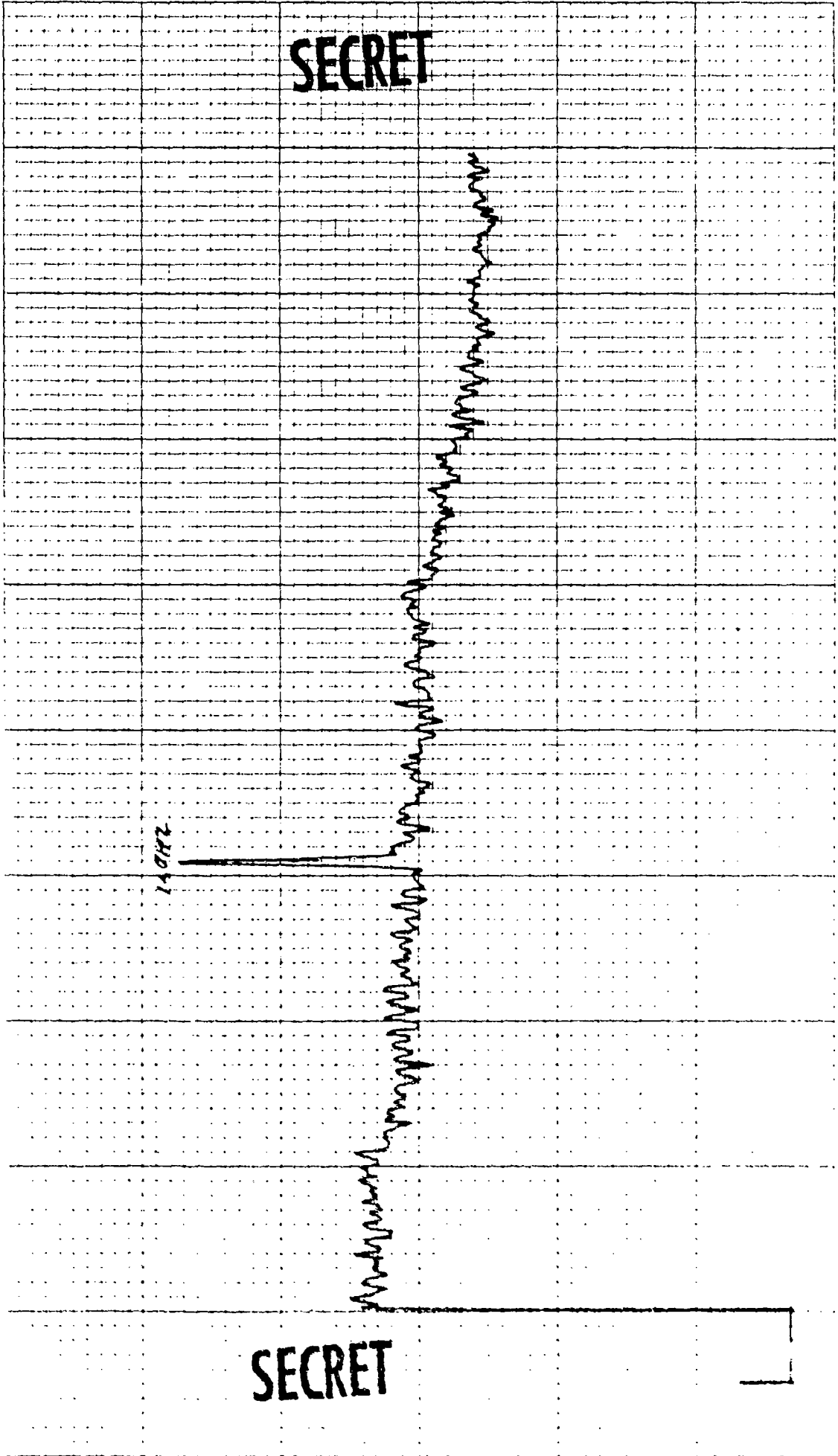
CONTROL: 2033 - 16 (206) DATE OF ANALYSIS: - - - - - INDEX X 300

BEAMFORMED SPECTRUM(ELEMENTS) / - / 6 REEL: C 13

EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033 Z INTEGRATION TIME 320 SECS ATTEN: - 8 DB

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

16 ELEMENTS * 2 DEG. AZ STEERING



46 0703

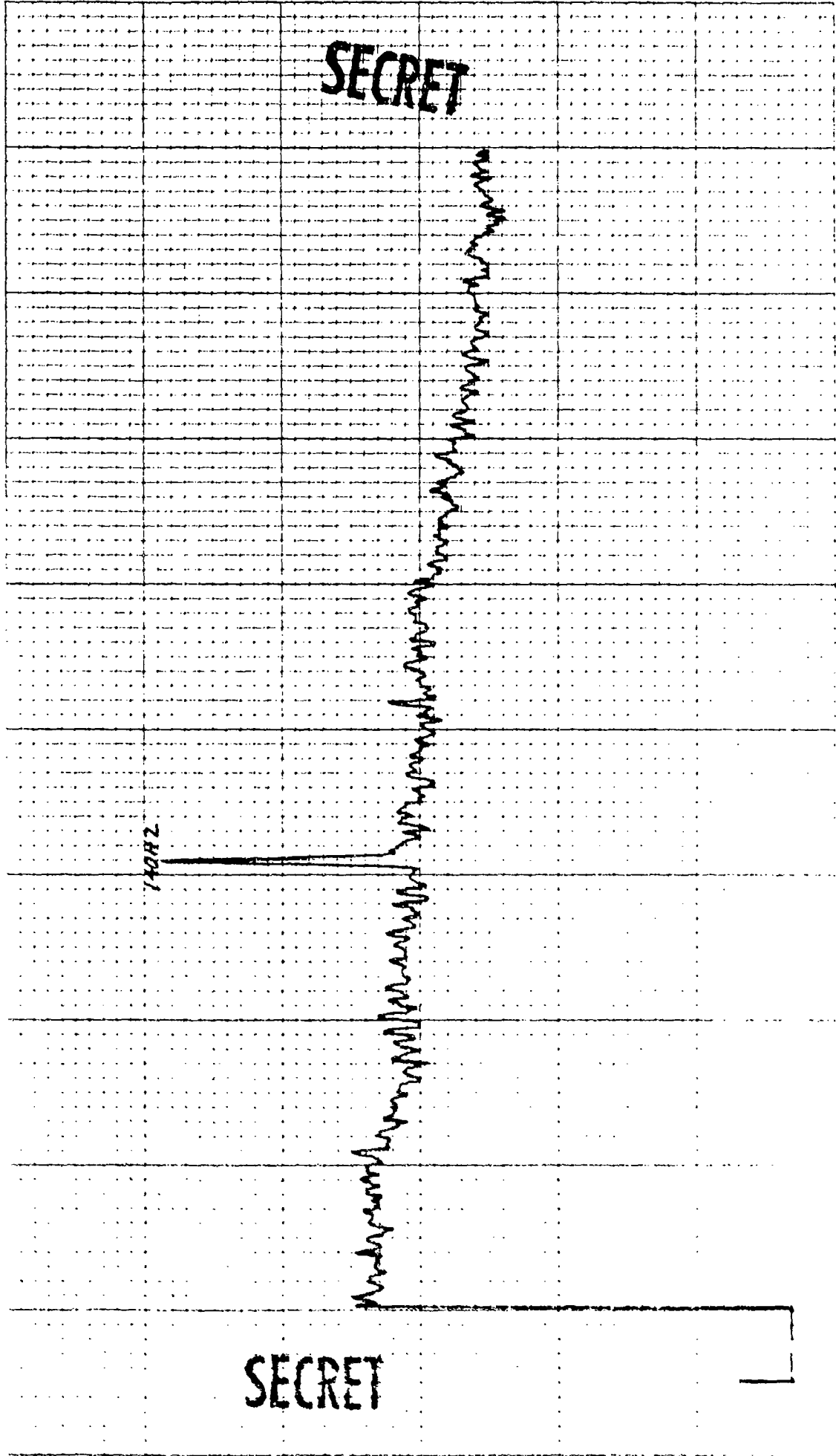
K-E 2-7-77 TO THE 1000 Hz

CONTROL: 2033 - /6 (DP6)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
/6 ELEMENTS

DATE OF ANALYSIS: - - - -
/ - /6
DATE/TIME: 2-7-77 - 2033Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 4 DEC. AZ STEERING

REEL: F23
INTEGRATION TIME 320 SECS
FILTER
ATTEN: -78 DB
WTG: HANNING

INDE X3000



SECRET

46 0703

REF 19 2 19 TO THE Hqs. 2 1 19 19 19

CONTROL: 2032 - 16 (DBL) DATE OF ANALYSIS: - - - -

BEAMFORMED SPECTRUM(ELEMENTS) / - / 6

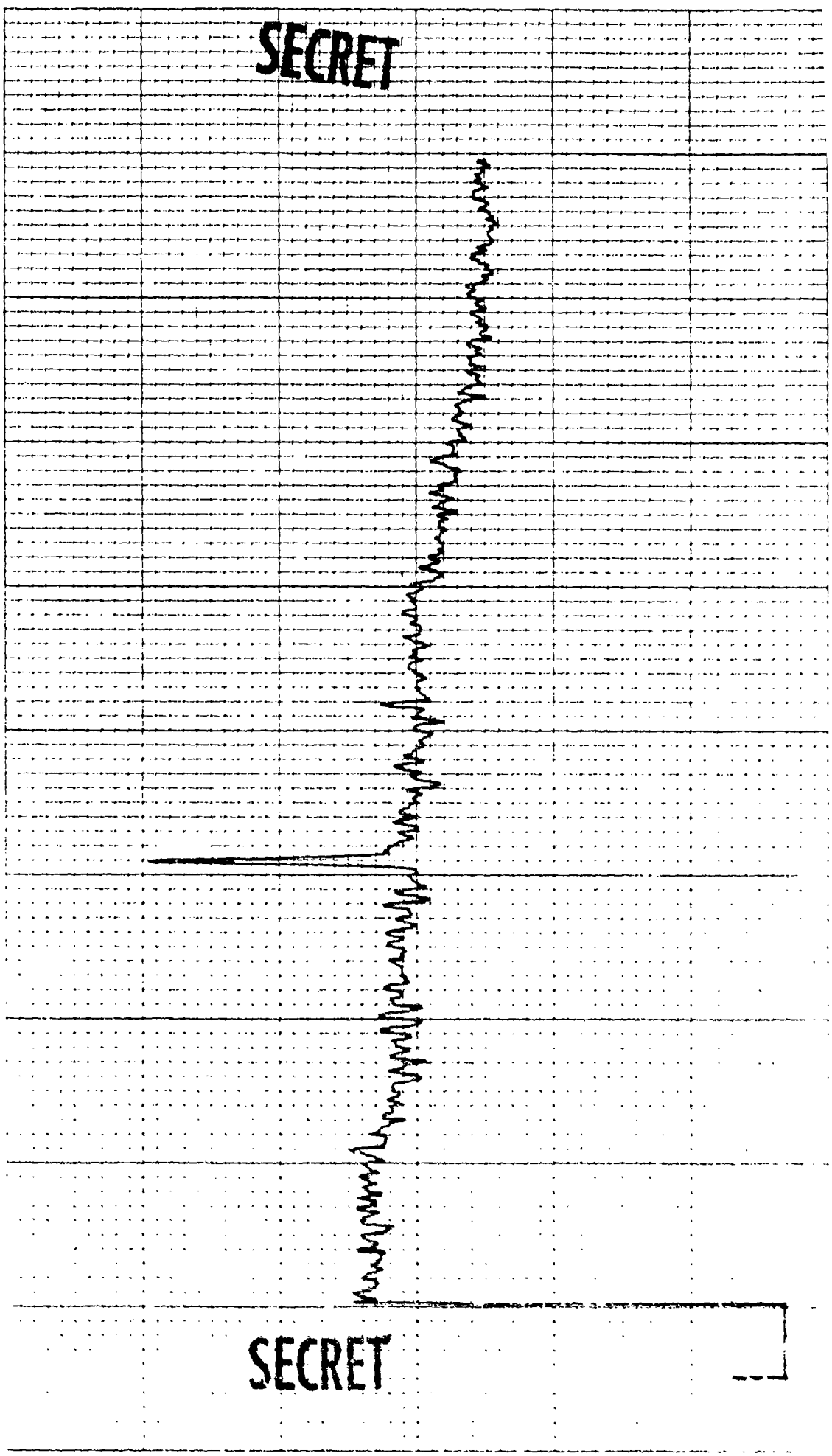
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033Z

CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1710HZ

16 ELEMENTS + 6 DEG. AZ STEERING

REEL: F33 INTEGRATION TIME 320 SECS ATTN: -8 DB

INDE X 3000 FILTER WTC: HANNING

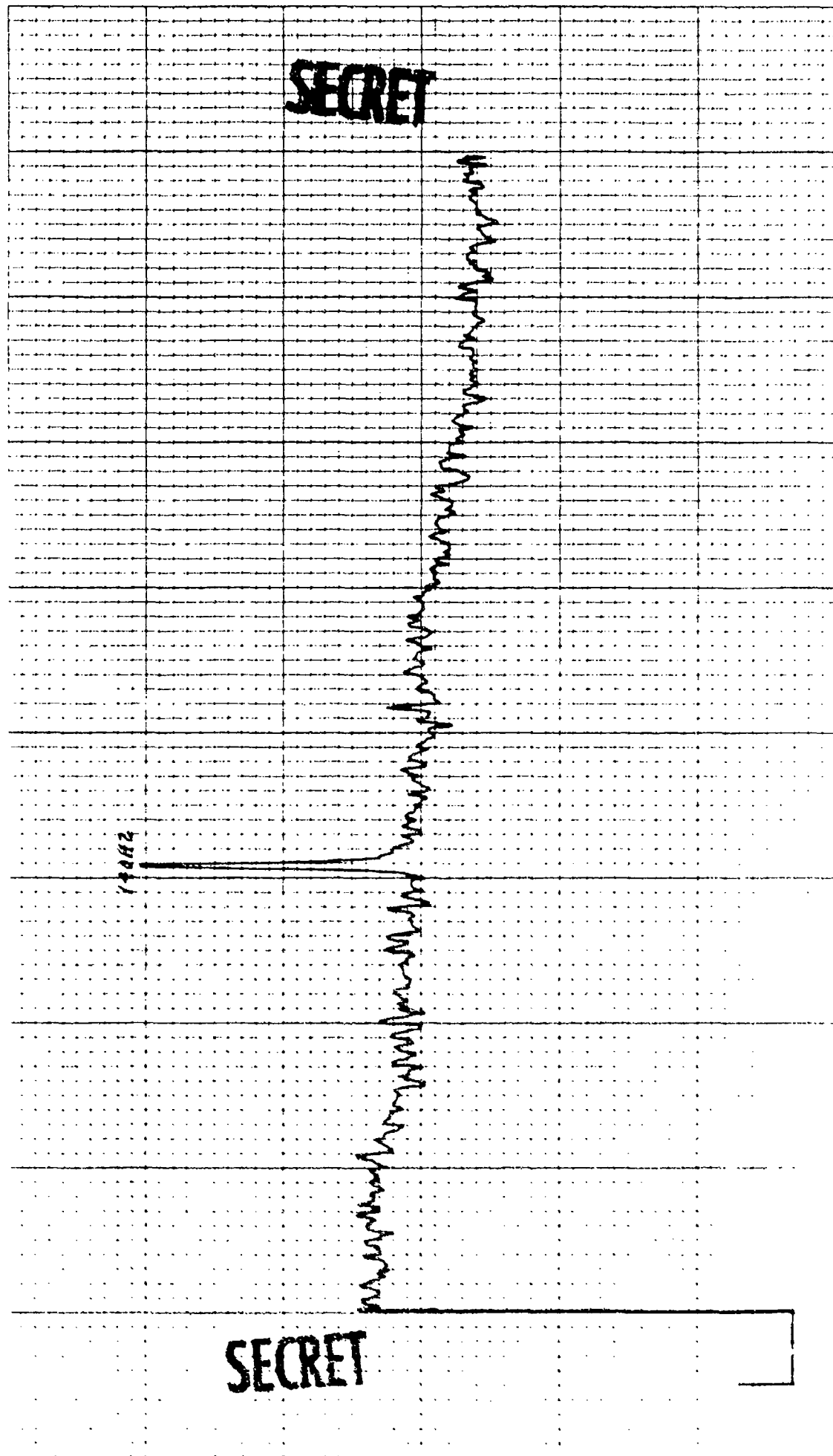


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REF ID: A66486

CONTROL: 2033 - 10 (DPC) DATE OF ANALYSIS: -- -- --
 BEAMFORMED SPECTRUM (ELEMENTS) / - / -
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033 Z
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 17/10HZ
 /C ELEMENTS + 0 DEG. AZ STEERING

REEL: F23 INDE X3000
 INTEGRATION TIME 320 SECS ATTN: -10 DB
 FILTER WTC: HANNING



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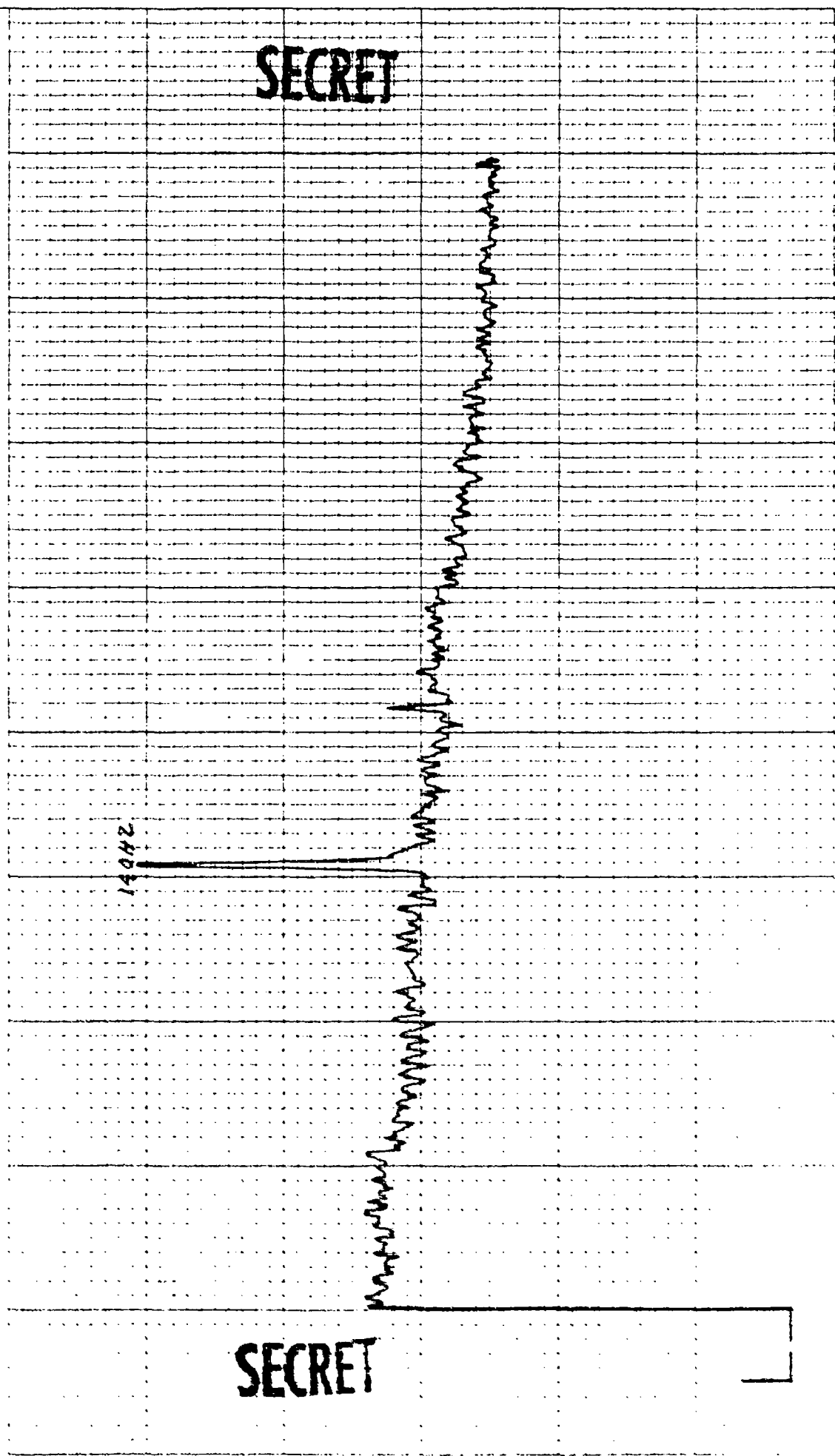
10-2 2033 2033 2033 2033 2033

CONTROL: 2033 - 16 (2033) DATE OF ANALYSIS: - - - - -
 BEAMFORMED SPECTRUM (ELEMENTS) / - /
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033Z
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ
 16 ELEMENTS + 10 DEG. AZ STEERING

INDE X 3000

REEL: F13

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

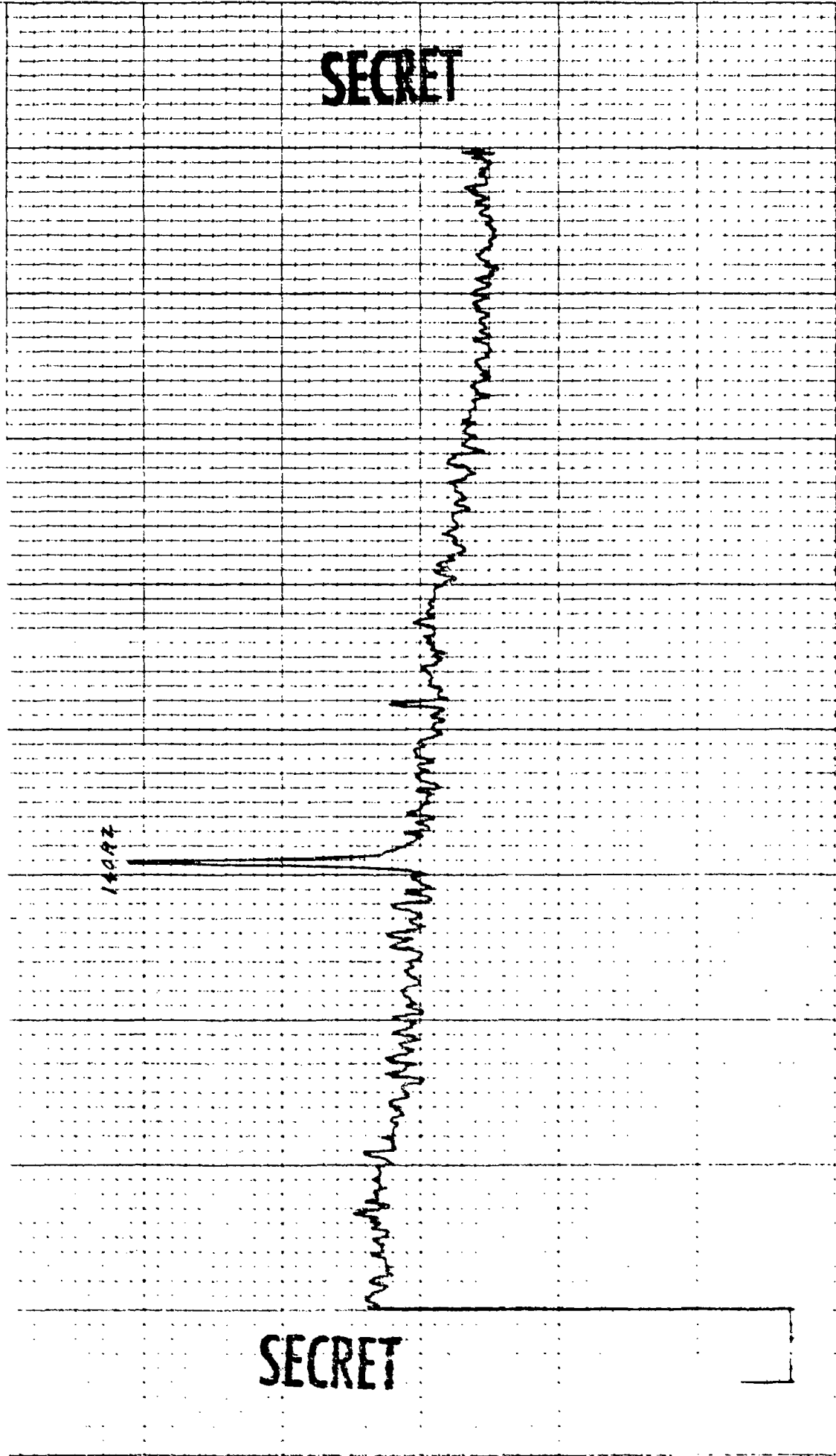


46 0703

1000 2000 3000 4000 5000 6000 7000 8000 9000 10000

CONTROL: 2073 - 16 (DPL) DATE OF ANALYSIS:
 BEAMFORMED SPECTRUM(ELEMENTS) 1-16
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033 Z
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1710HZ
16 ELEMENTS 4// DEG. AZ STEERING

REEL: F23 INDE X 3220
 INTEGRATION TIME 320 SECS ATTN: -18 DB
 FILTER WTG: HANNING



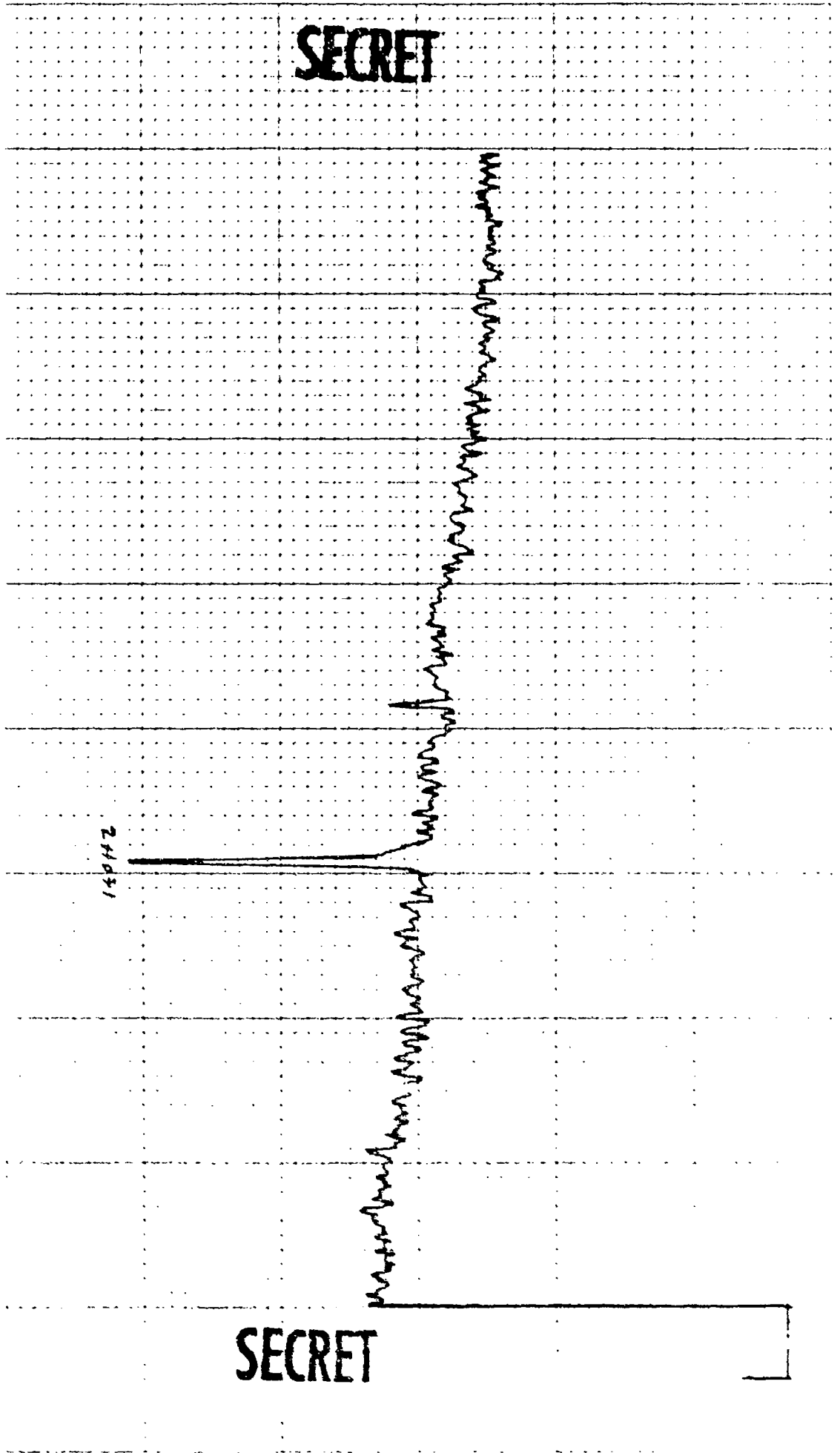
46 0703

K-2 1160 13000000 11000000

CONTROL: 2033 - /6 (206)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
/6 ELEMENTS

DATE OF ANALYSIS: - - -
/ - /6
DATE/TIME: 2-7-77 - 2033Z
ANALYSIS BANDWIDTH: 1/10HZ
+12 DEG. AZ STEERING

REEL: 1-13 INDE X 3000
INTEGRATION TIME 320 SECS ATTEN: -/8 DB
FILTER WTC: HANNING



46 0703

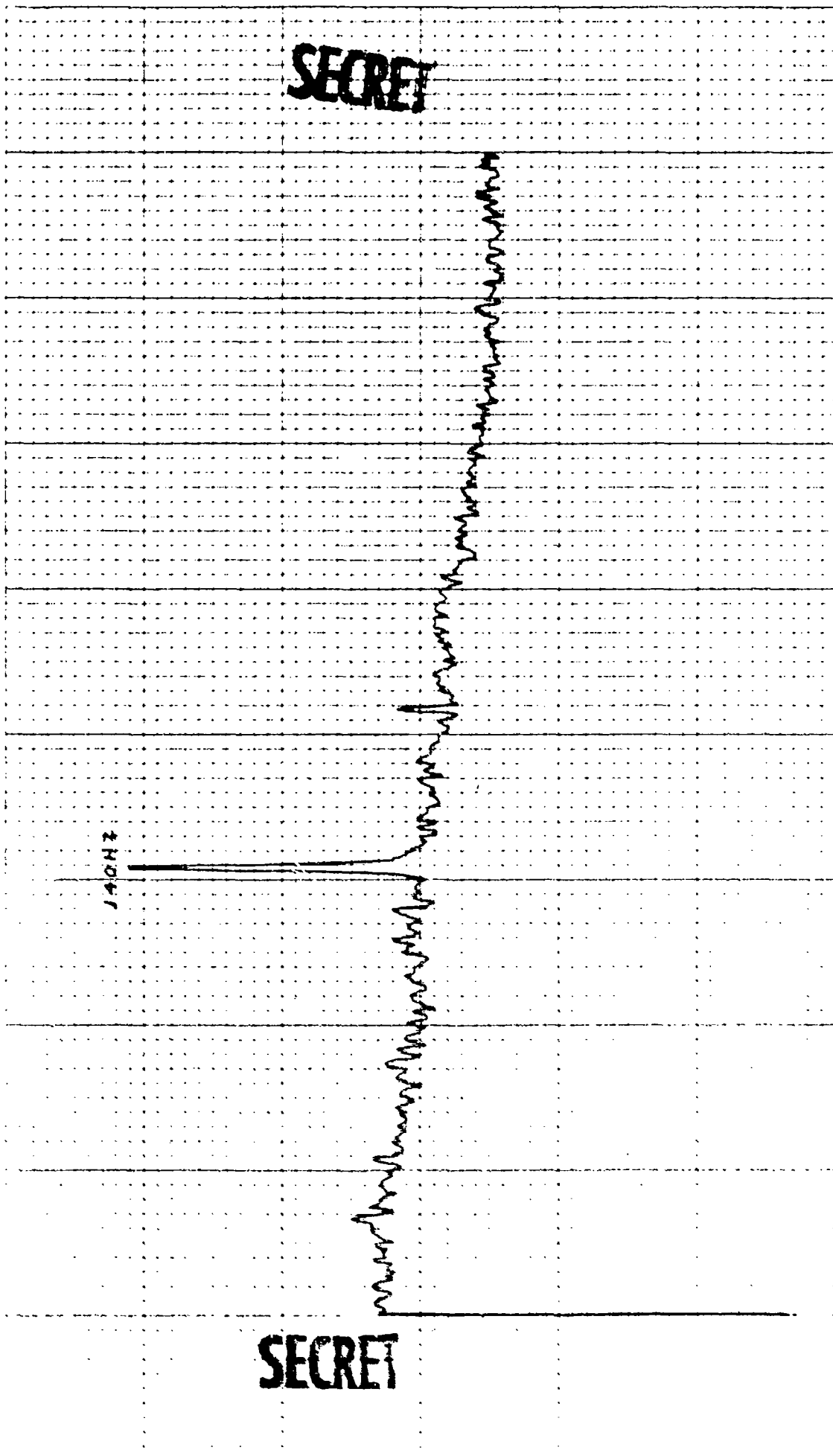
CONTROL: 2033 - 51 (DPC) REEL: F23 INDE X 2000

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

EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: /8 DB

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

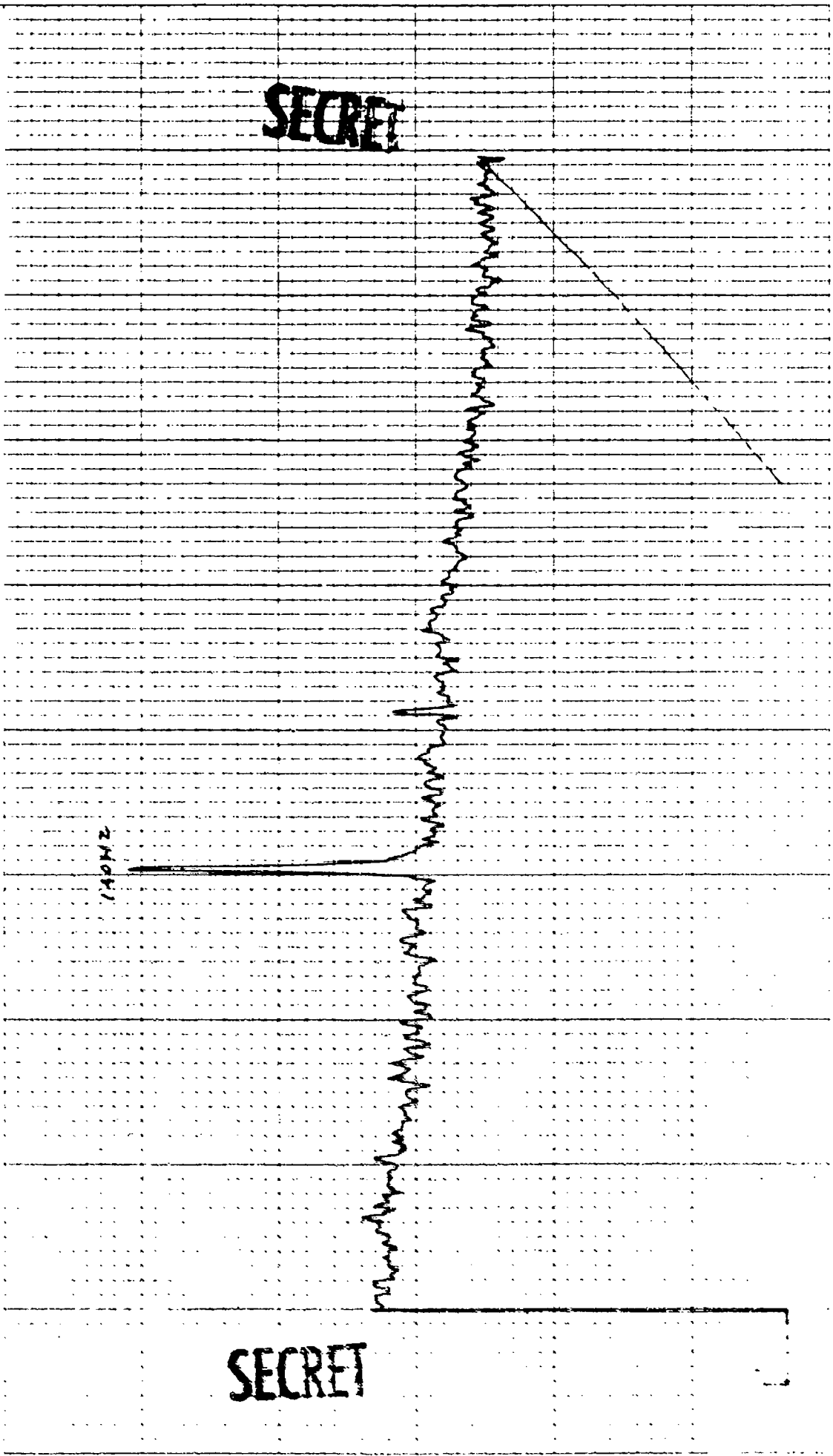
16 ELEMENTS +13 DEG. AZ STEERING



46 0703

CONTROL: 2033 - 16 (DPG) DATE OF ANALYSIS: / - /
 BEAMFORMED SPECTRUM (ELEMENTS) INTEGRATION TIME 320 SECS ATTN: -18 DB
 EXERCISE: BEARING STAKE FILTER WTC: HANNING
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ
 16 ELEMENTS 474 DEG. AZ STEERING

REEL: F23 INDE X3000

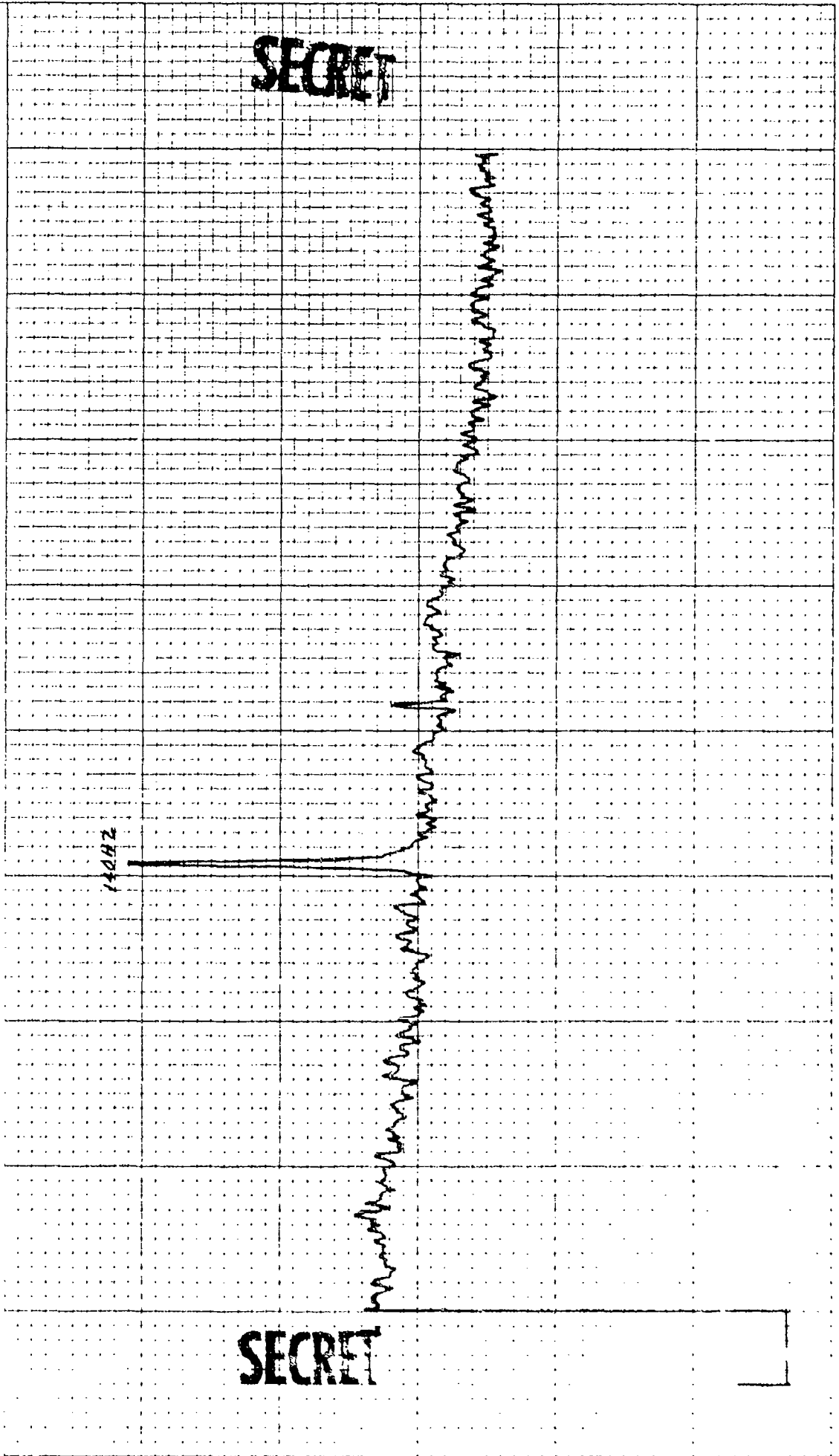


SECRET

CONTROL: 2033 - 16 (DPL)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

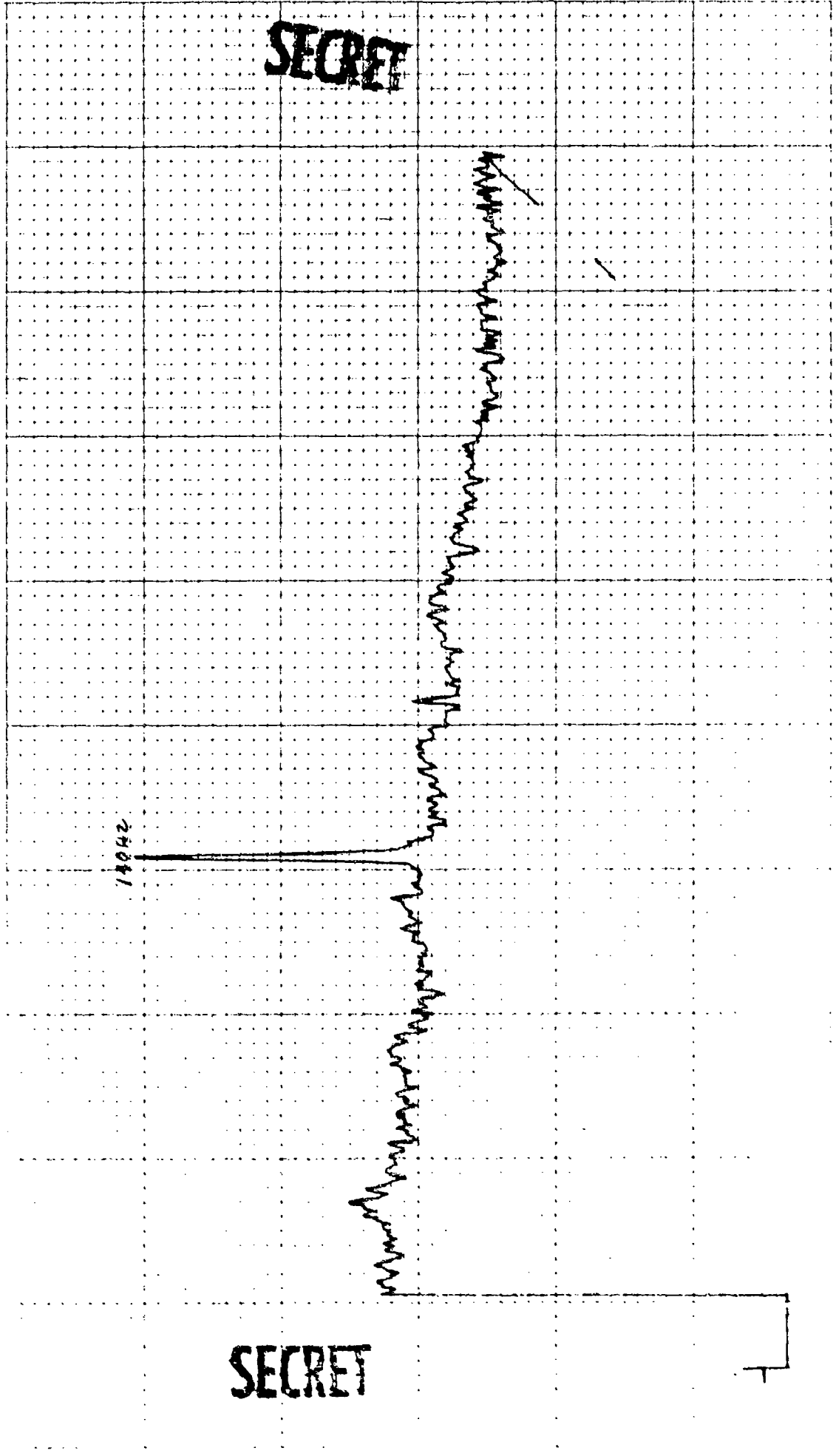
DATE OF ANALYSIS: - - - -
/ - /
DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
715 DEG. AZ STEERING

REEL: F23
INDE X100e
INTEGRATION TIME 320 SECS
ATTEN: -18 DB
FILTER
WTG: HANNING



46 0703

CONTROL: 2033-1C (DPC) DATE OF ANALYSIS: REEL: F23 INDE X 1000
 BEAMFORMED SPECTRUM(ELEMENTS) / - / C
 EXERCISE: BEARING STAKE DATE/TIME: 27-77 - 2033Z INTEGRATION TIME 320 SECS ATTEN: -10 DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 /C ELEMENTS DEG. AZ STEERING



SECRET

SECRET

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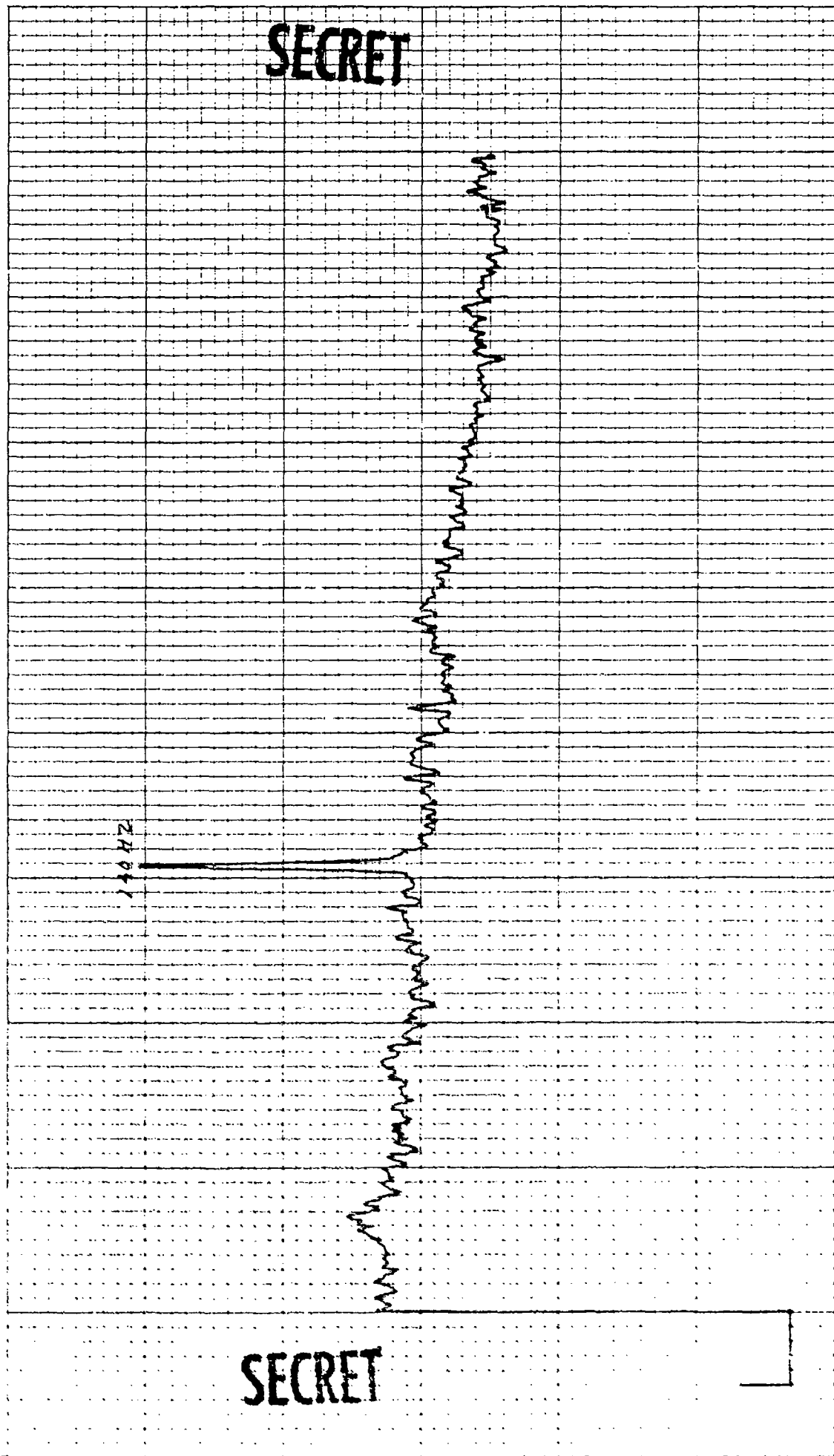
REF: 14-00000-00000-00000

REEL: F23 INDE X3000
ATTEN: -78 DB
WTG: HANNING

INTEGRATION TIME 320 SECS
FILTER

DATE OF ANALYSIS: 1-16
DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10 HZ
17 DEG. AZ STEERING

CONTROL: 2033 - 16 (2036)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

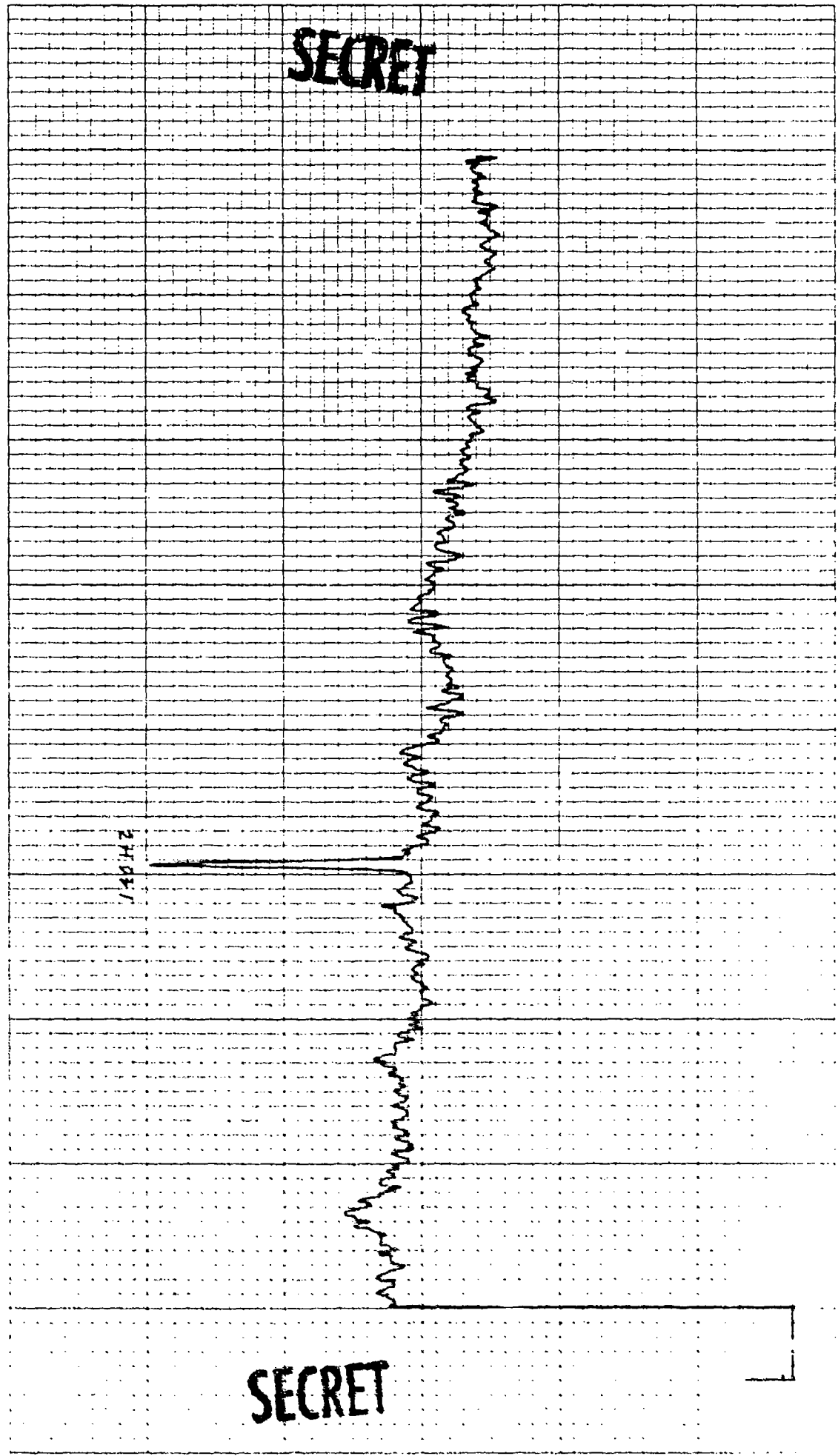


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REF: 2033 - /C (DPL)

CONTROL: 2033 - /C (DPL) DATE OF ANALYSIS: -- -- --
 BEAMFORMED SPECTRUM(ELEMENTS) /- /C
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-7 - 2033 Z
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
 /C ELEMENTS +18 DEG. AZ STEERING

REEL: F33 INDE X 3000
 INTEGRATION TIME 320 SECS ATTN: -10 DB
 FILTER WTG: HANNING



KSE BEARING STAKE 1000 Hz

46 0703

CONTROL: 2033 - 16 (206)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 16 ELEMENTS

DATE OF ANALYSIS: - - - - -
 / - / C)

REEL: F23

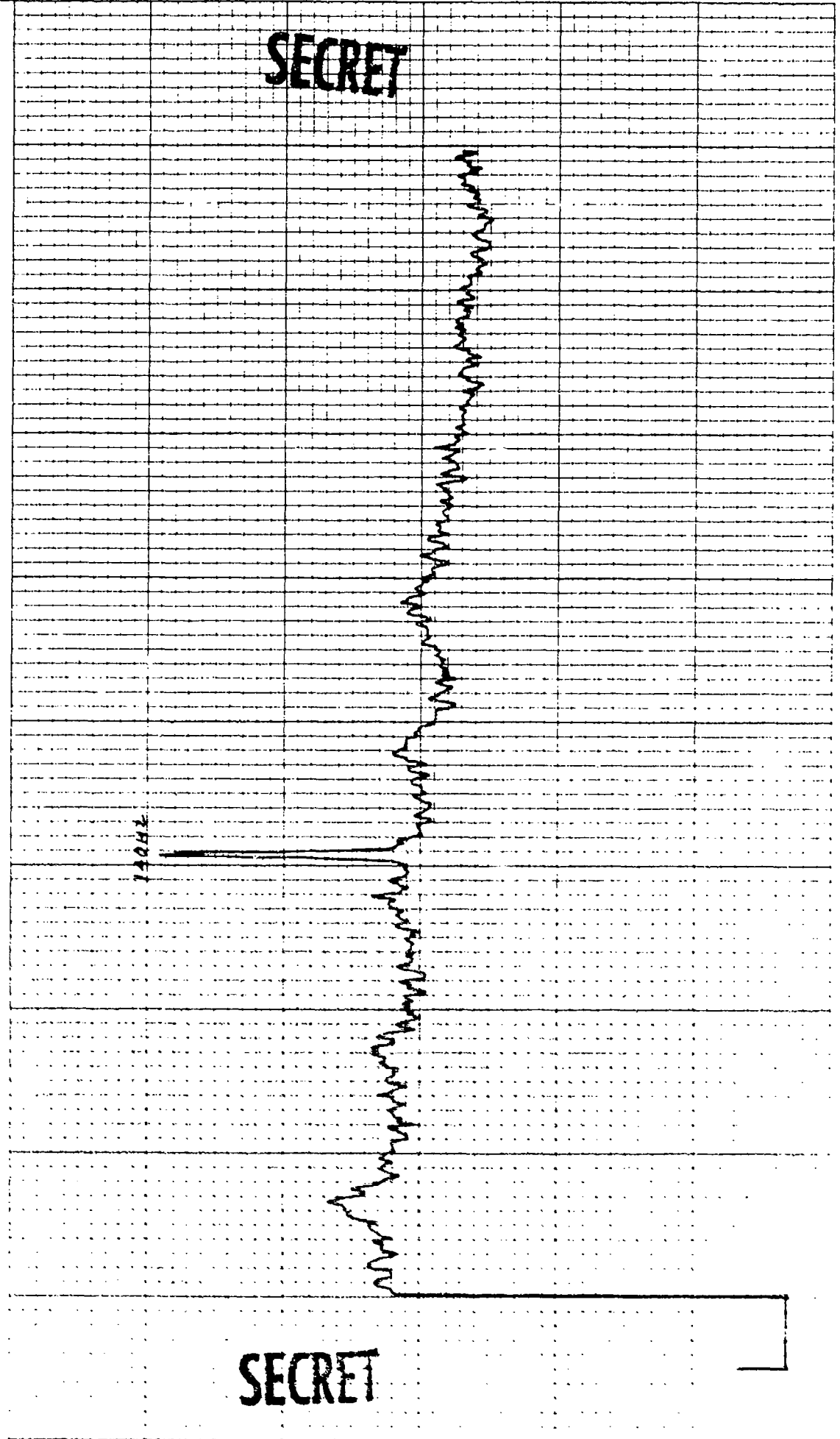
INTEGRATION TIME 320 SECS

ATTEN: -18 DB

FILTER WTG: HANNING

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

INDE X3000



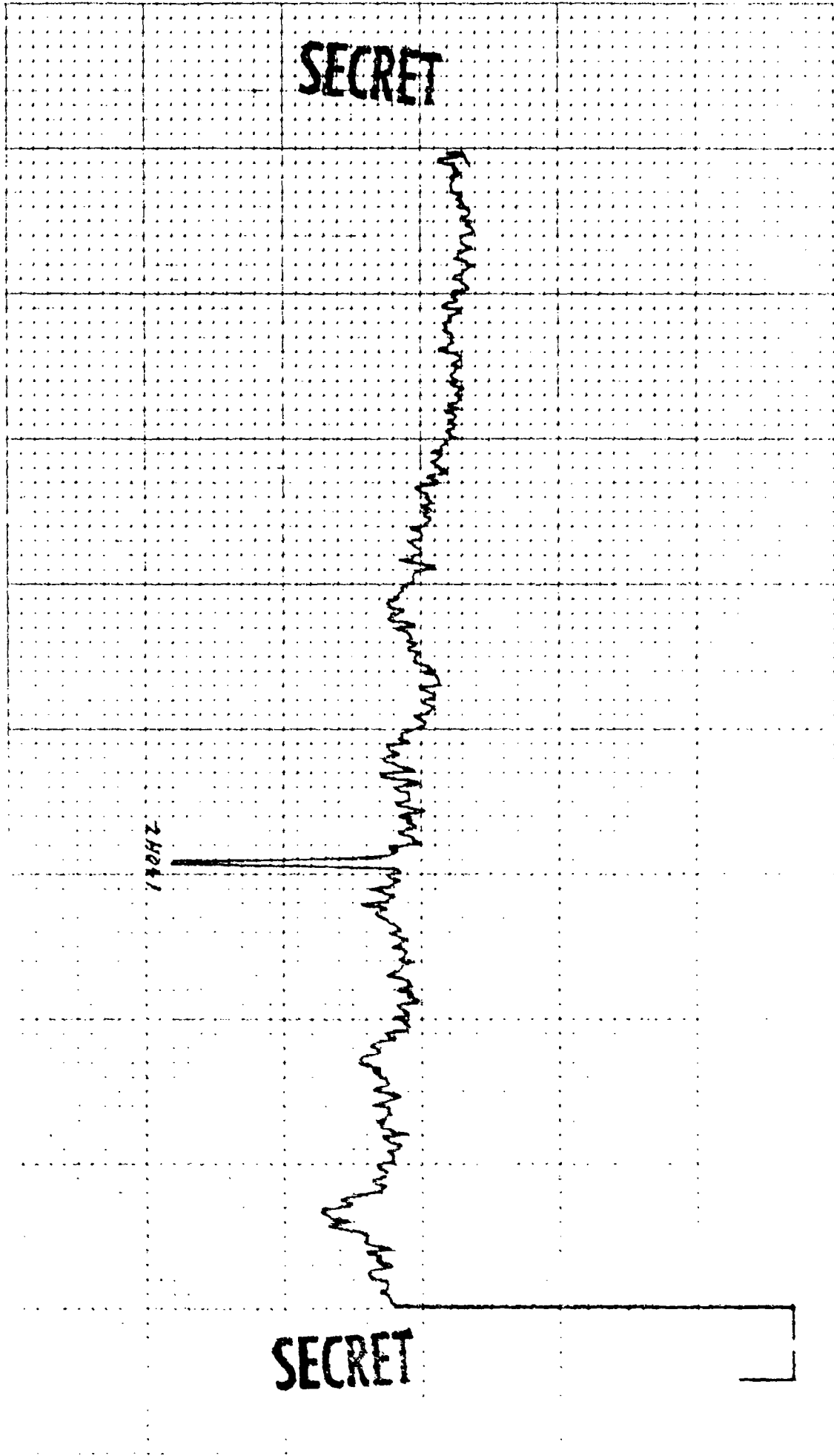
46 0703

K-2 2-7-77 02 100

CONTROL: 2033 - 12 (DPG) DATE OF ANALYSIS: - - - -
BEAMFORMED SPECTRUM(ELEMENT:) / - /
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033 Z
CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
/2 ELEMENTS + 22 DEG. AZ STEERING

REEL: F23 INDE X3000

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



46 0703

INDE X 3000

REEL: F23

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

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

DATE/TIME: 2-7-77 - 2033 Z

ANALYSIS BANDWIDTH: 1/10HZ

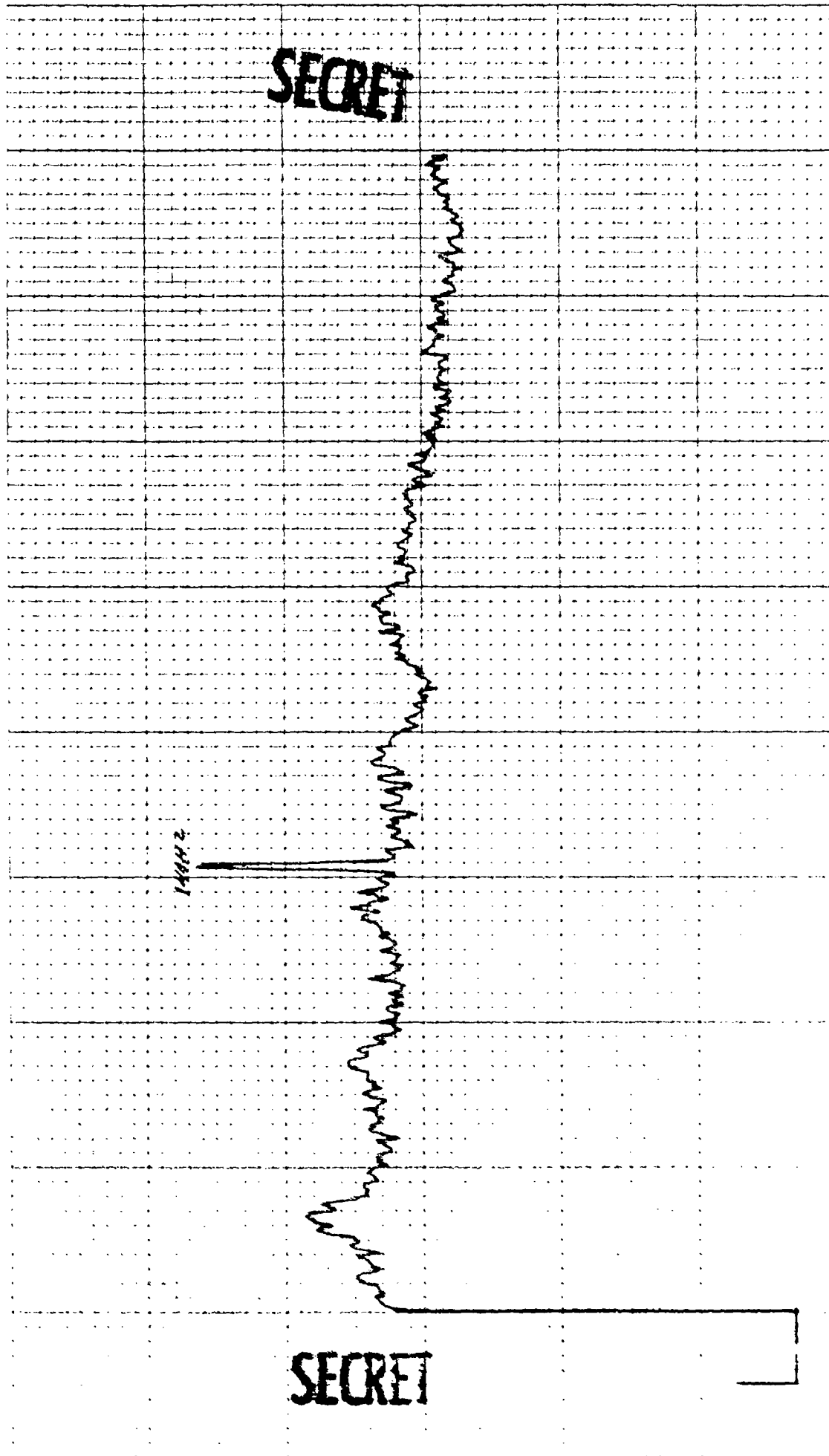
+ 24 DEG. AZ STEERING

CONTROL: 2033 - /c (DPC)
BEAMFORMED SPECTRUM (ELEMENTS)

EXERCISE: BEARING STAKE

CENTER FREQ: 150 HZ

/c ELEMENTS



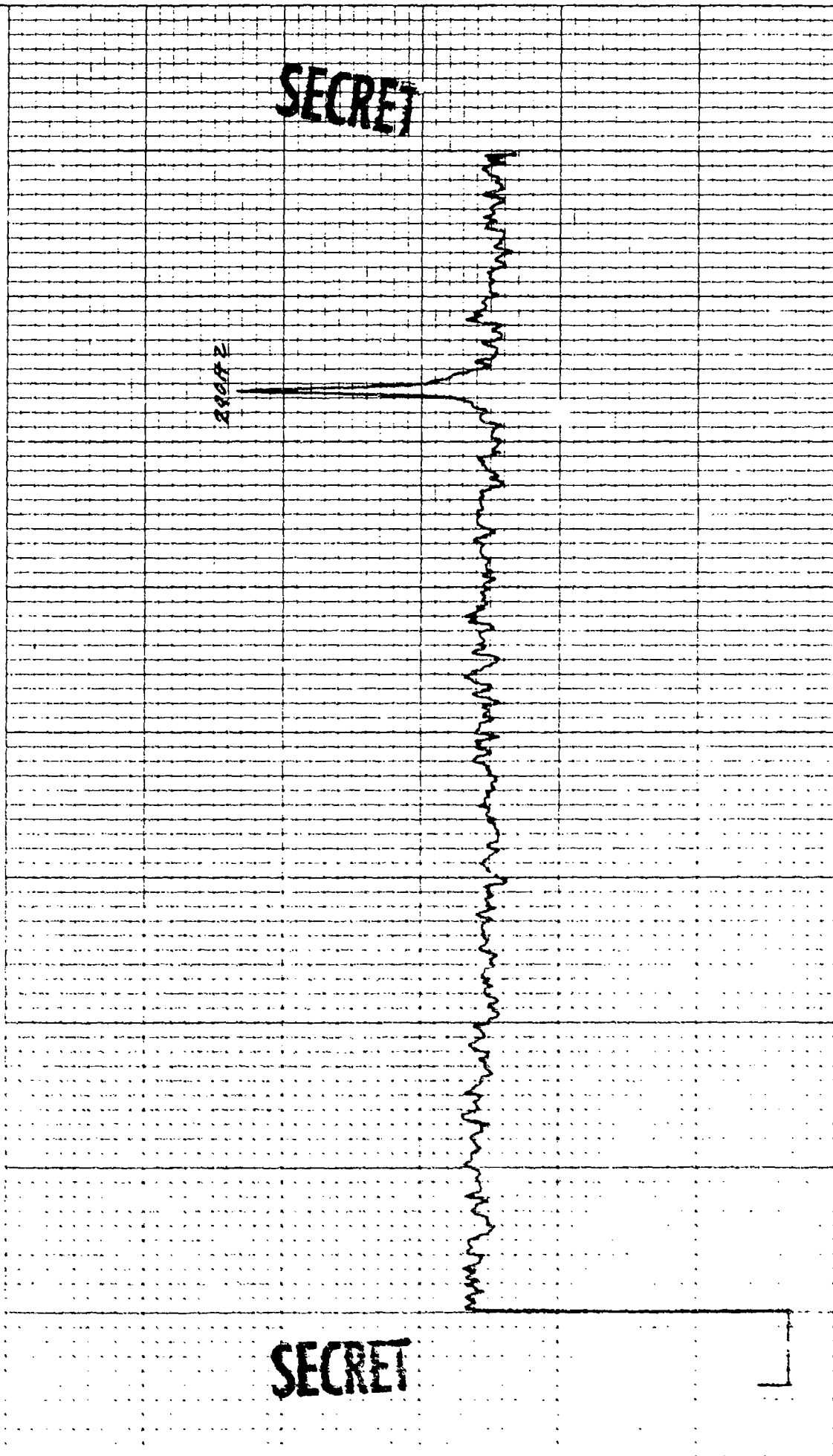
46 0703

CONTROL: 2073 - 16 (206)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 210 HZ
16 ELEMENTS

DATE OF ANALYSIS: -- -- --
DATE/TIME: 2-7-77 - 2073 Z
ANALYSIS BANDWIDTH: 1710 HZ
* 2 DEG. AZ STEERING

REEL: F23
INDE X3000

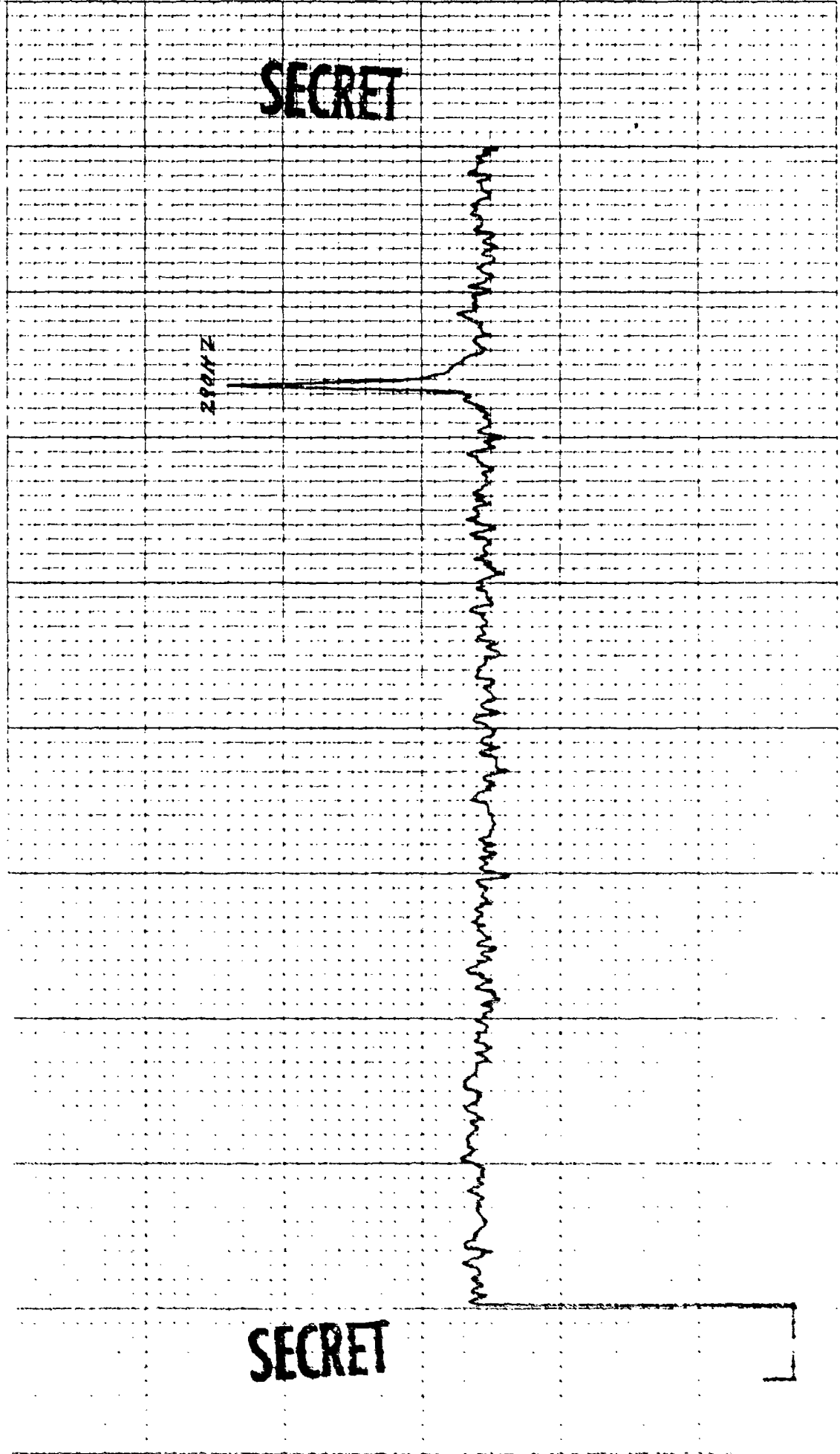
INTEGRATION TIME 320 SECS
ATTEN: 70 DB
FILTER WTG: HANNING



SECRET

46 0703

CONTROL: 2033-16 (DPL) DATE OF ANALYSIS: - - - - REEL: F23 INDE X3000
 BEAMFORMED SPECTRUM(ELEMENTS) 1-16
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1710HZ INTEGRATION TIME 320 SECS ATTN: -18 DB
 CENTER FREQ: 200 MZ 4 DEG. AZ STEERING FILTER WTC: HANNING
16 ELEMENTS



46 0703

CONTROL: 2077 - 16 (DP6)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-16

DATE/TIME: 2-7-77 - 2073Z

ANALYSIS BANDWIDTH: 1/10HZ

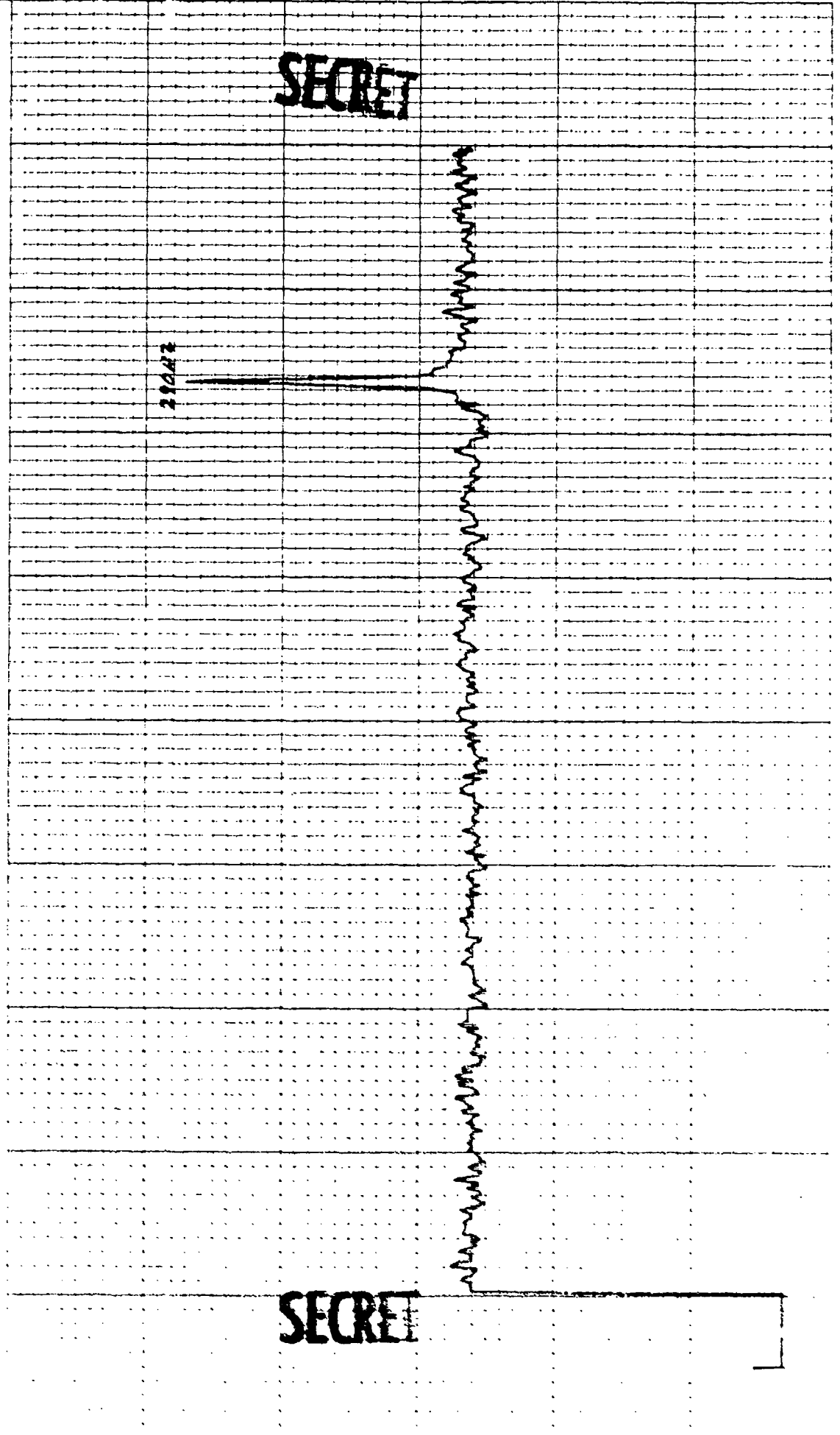
16 DEG. AZ STEERING

REEL: F23 INDE X3000

INTEGRATION TIME 320 SECS

FILTER WTG: HANNING

ATTEN: -10 DB

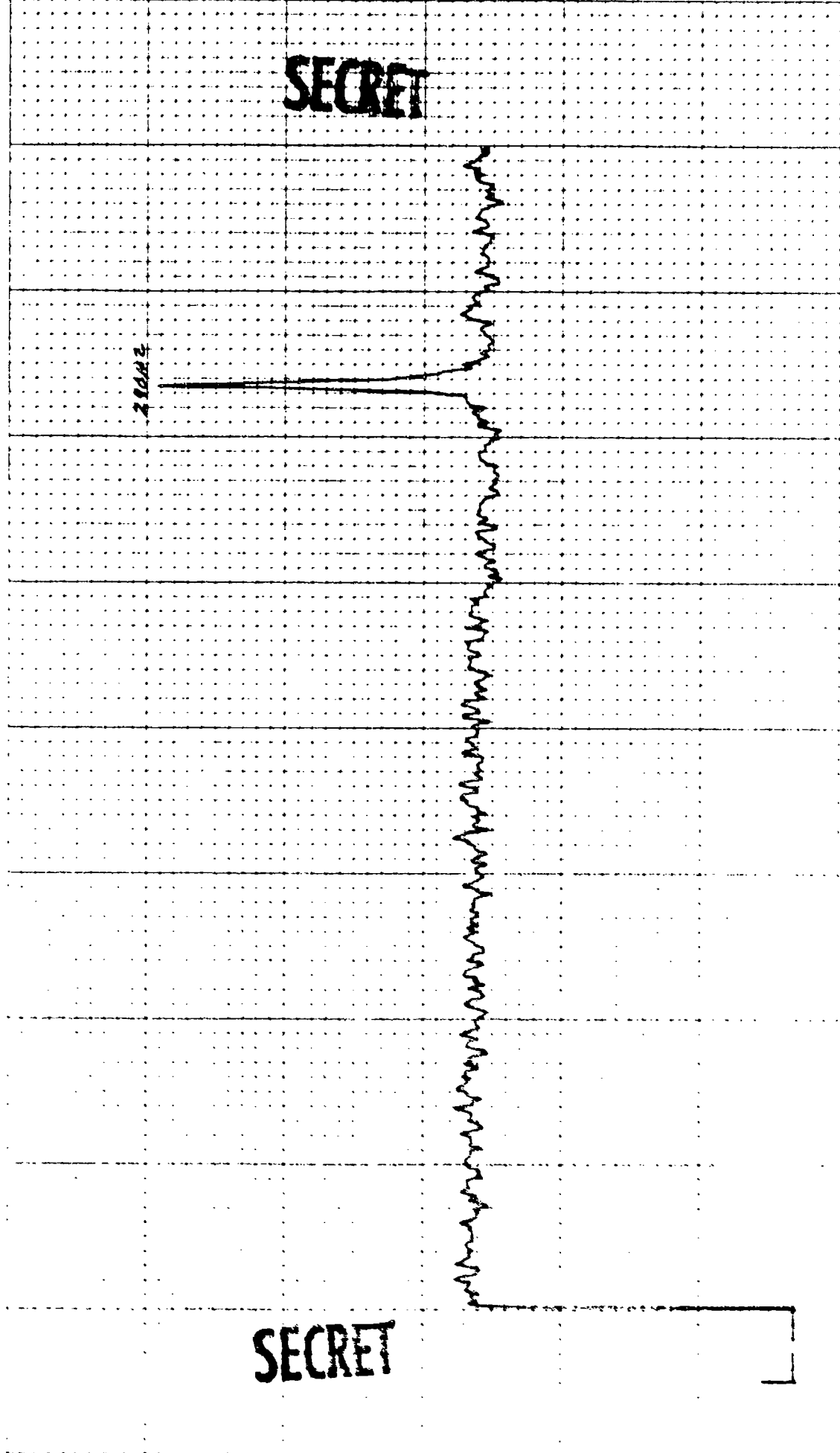


46 0703

CONTROL: 2033 - 16 (2P6) DATE OF ANALYSIS: - - - - -
 BEAMFORMED SPECTRUM(ELEMENTS) /- /6
 EXERCISE: BEARING STAFF DATE/TIME: 2-7-77 - 2033Z
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ
 16 ELEMENTS + 8 DEG. AZ STEERING

REEL: F23 INDE X3000

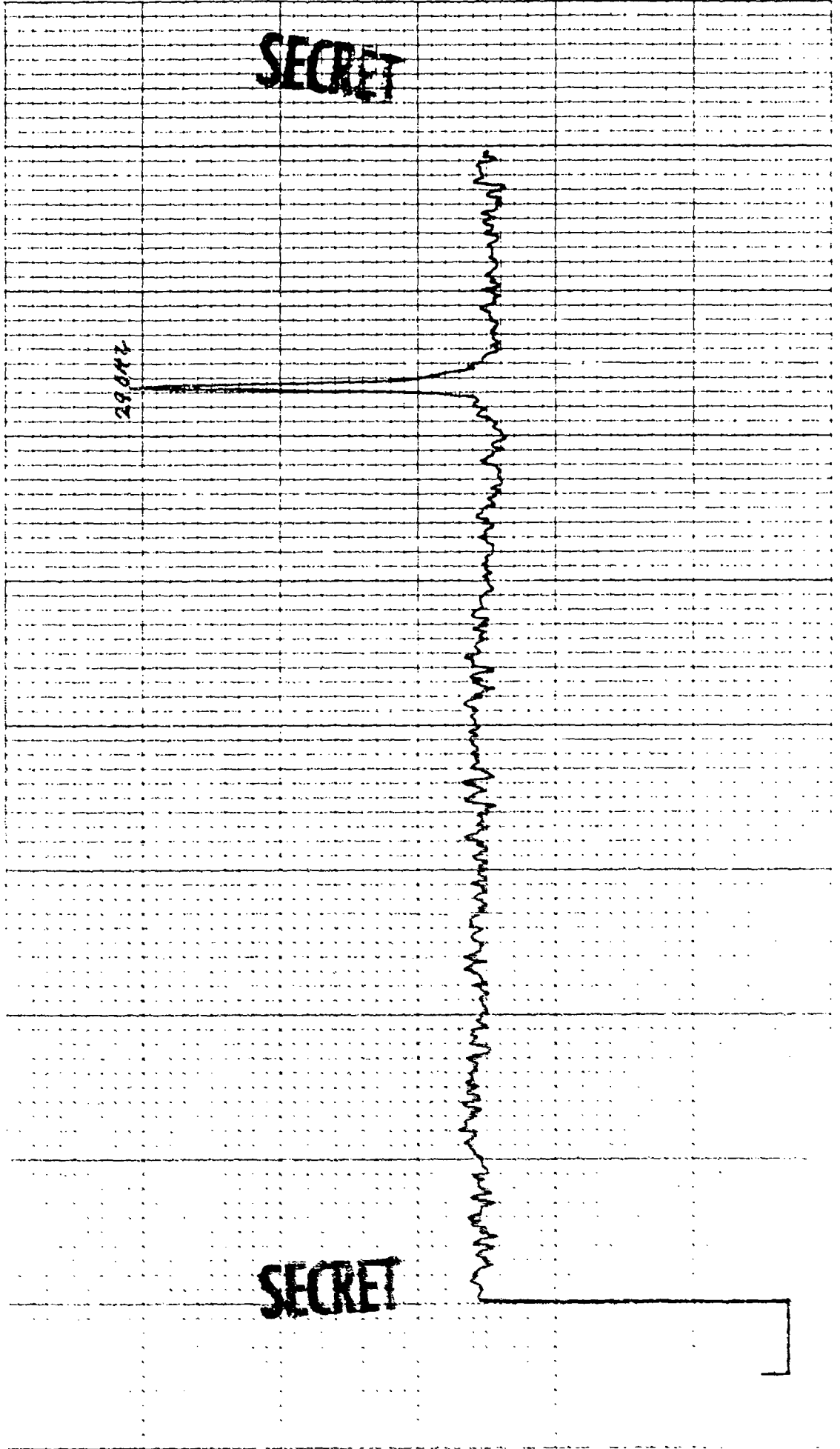
INTEGRATION TIME 320 SECS ATTN: -18 DB
 FILTER WTC: HANNING



46 0703

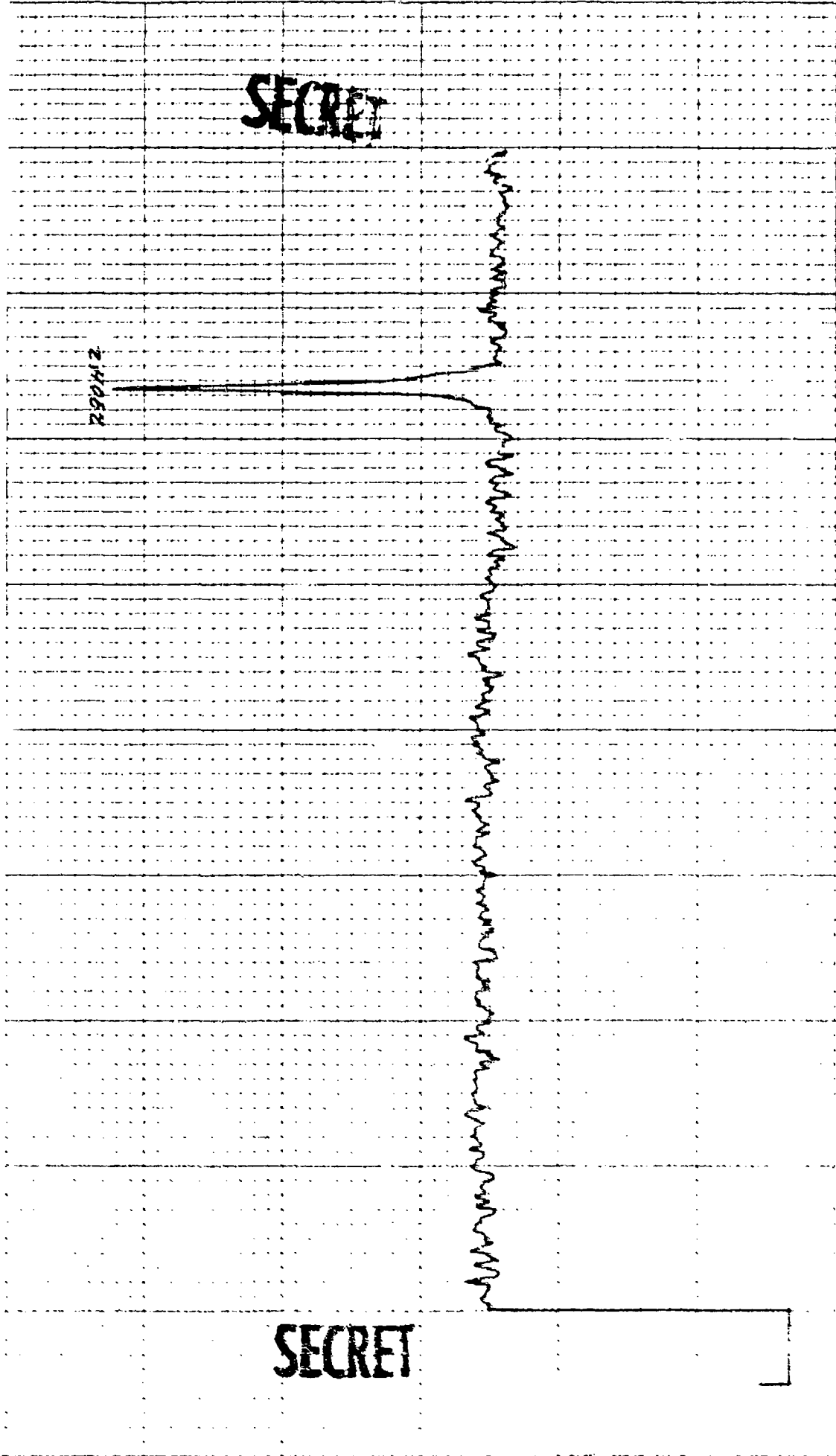
CONTROL: 2033 - 16 (DPC) DATE OF ANALYSIS: - - - - -
 BEAMFORMED SPECTRUM (ELEMENTS) / - / 6
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033 Z
 CENTER FREQ: 210 MHz ANALYSIS BANDWIDTH: 1/10 HZ
 16 ELEMENTS 410 DEG. AZ STEERING

REEL: F23 INDE X 3000
 INTEGRATION TIME 320 SECS ATTN: -18 DB
 FILTER WIG: HANNING



46 0703

CONTROL: 2033 - 16 (2066) DATE OF ANALYSIS: 1-76 REEL: F23 INDE XJ000
BEAMFORMED SPECTRUM(ELEMENTS) INTEGRATION TIME 320 SECS ATTEN: 70 DB
EXEFCISE: BEARING STAKE FILTER WTC: HANNING
CENTER FREQ: 2000 HZ
16 ELEMENTS 4// DEG. AZ STEERING



SECRET

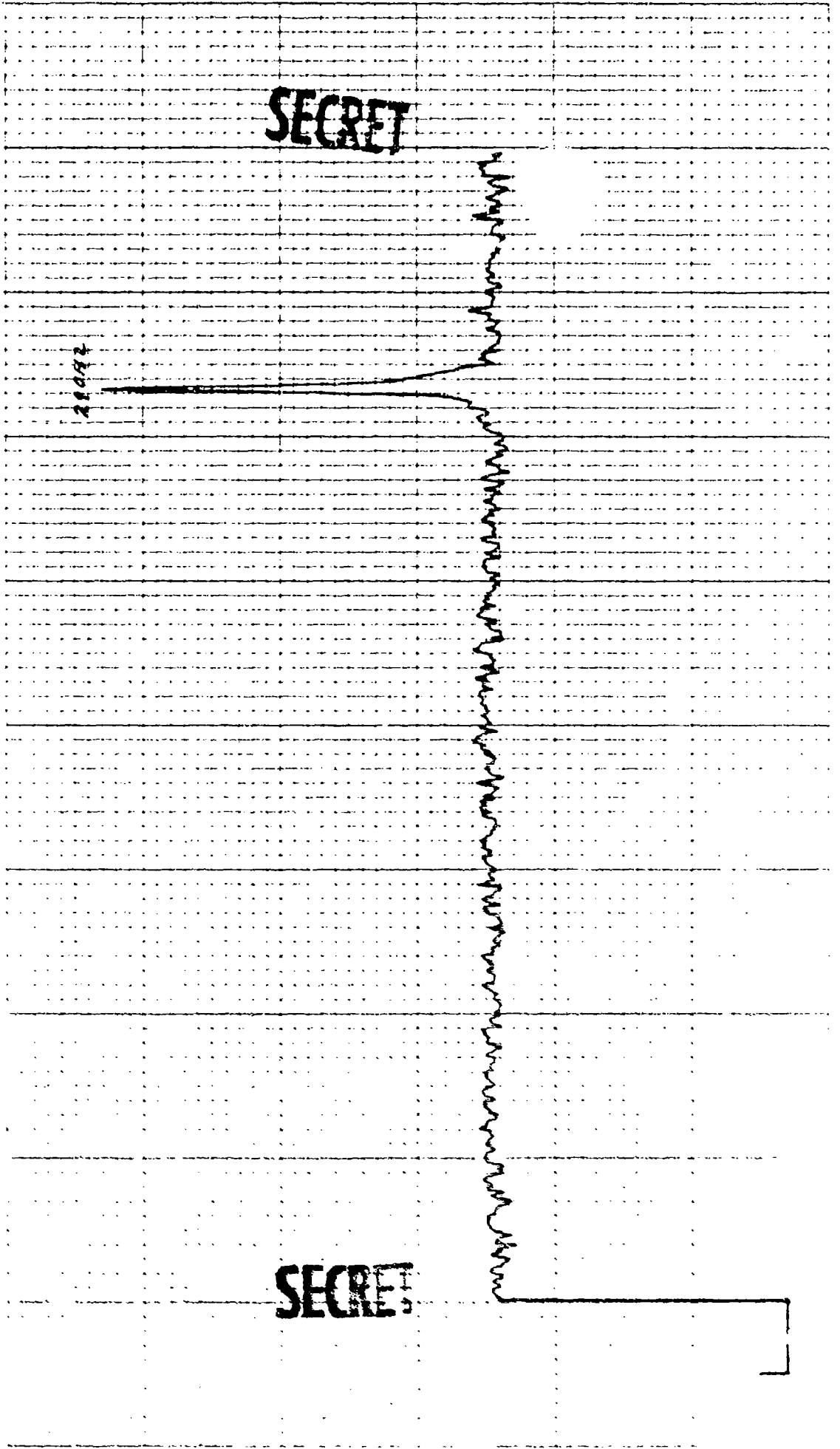
46 0703

FILE 2033-16 (DPC)

CONTROL: 2033 - 16 (DPC)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
16 ELEMENTS

DATE OF ANALYSIS: /-16
DATE/TIME: 2-7-77 - 2033Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 12 DEG. AZ STEERING

REEL: F13 INDE X 7000
INTEGRATION TIME 320 SECS
ATTEN: -10 DB
FILTER WTG: HANNING



SECRET

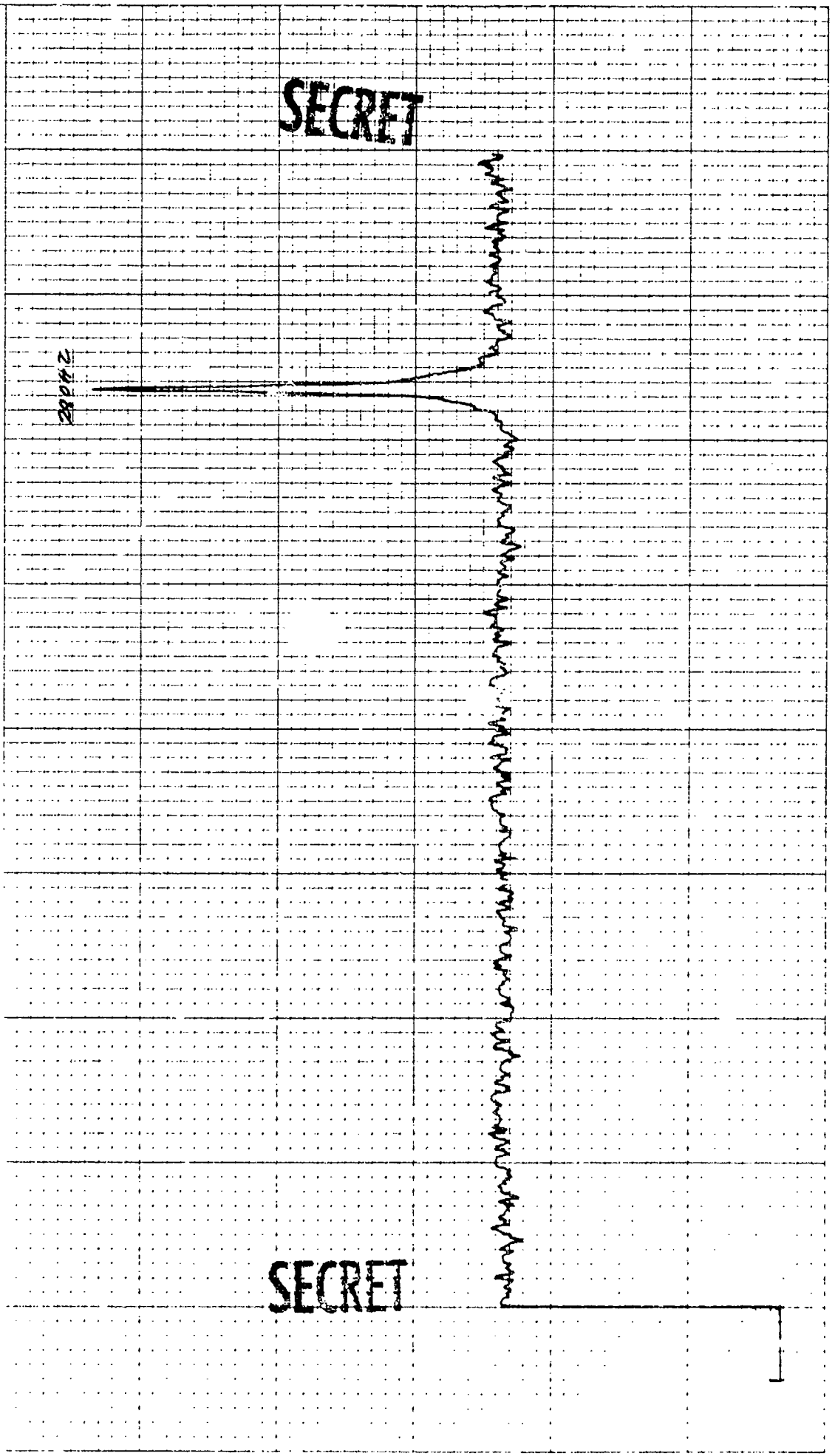
SECRET

46 0703

DATE: 2-7-77

CONTROL: 2033 - 16 (DP6) DATE OF ANALYSIS: - - - - -
 BEAMFORMED SPECTRUM (ELEMENTS) / - / 6
 EXERCISE: BEARING STAGE DATE/TIME: 2-7-77 - 2033Z
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ
 16 ELEMENTS + 13 DEG. AZ STEERING

REEL: F23 INDE X Jccc
 INTEGRATION TIME 320 SECS ATTEN: -18 DB
 FILTER WTC: HANNING



46 0703

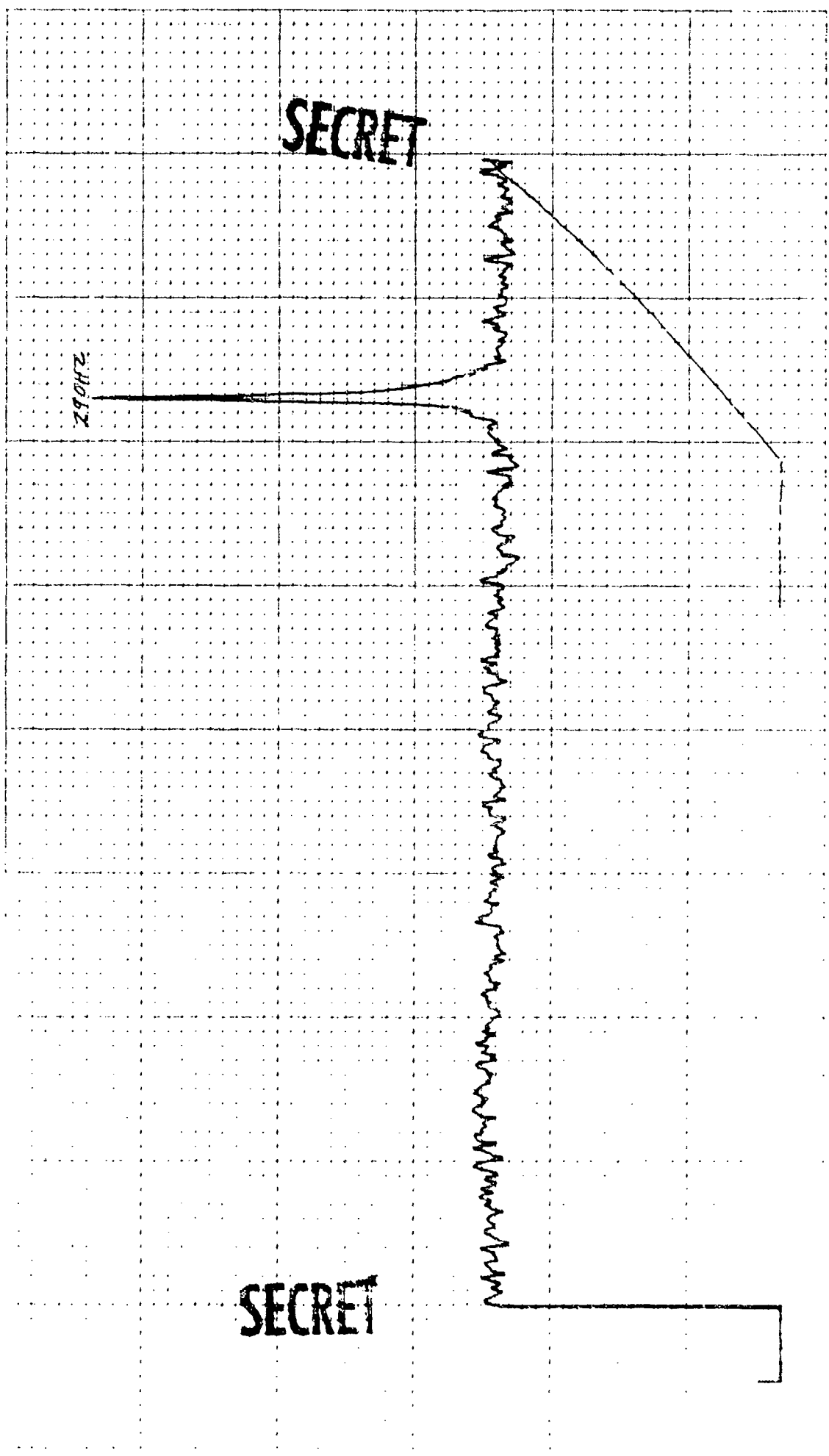
CONTROL: 2033 - 16 (186)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 HZ
 16 ELEMENTS

DATE OF ANALYSIS: - - - -
 / - /

DATE/TIME: 2-7-77 - 2033 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 +14 DEG. AZ STEERING

REEL: F-23 INDE X3000

INTEGRATION TIME 320 SECS ATTEN: -14 DB
 FILTER WTC. HANNING



SECRET

SECRET

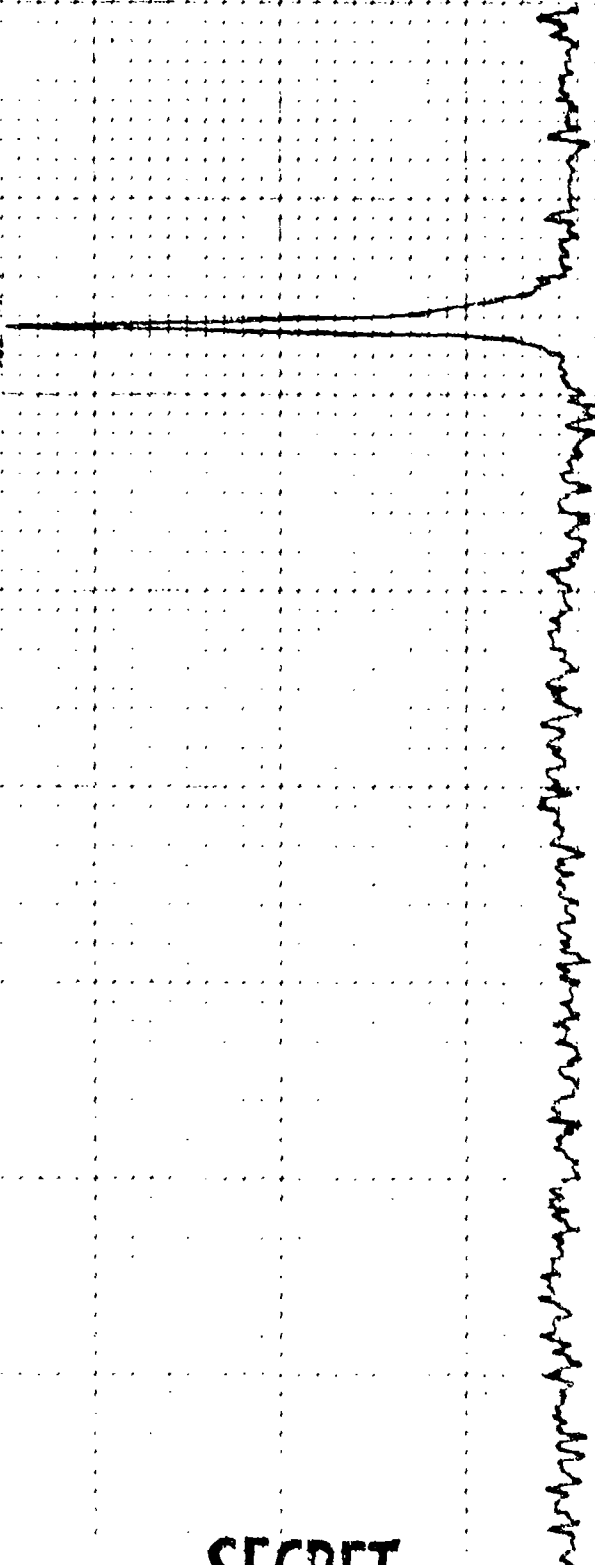
46 0703

CONTROL: 2033-16 (OPG)
BEAMFORMED SPECTRUM/ELEMENTS
EXERCISE: BEARING STAYE
CENTER FREQ: 200 HZ
16 ELEMENTS

DATE OF ANALYSIS: 1-6
DATE/TIME: 2-7-77 - 2032Z
ANALYSIS BANDWIDTH: 1/10HZ
+15 DEG. AZ STEERING

REEL: F23 INDE K3000
INTEGRATION TIME 320 SECS ATTN: 1/0 DB
FILTER WTC: HANNING

200HZ



SECRET

SECRET

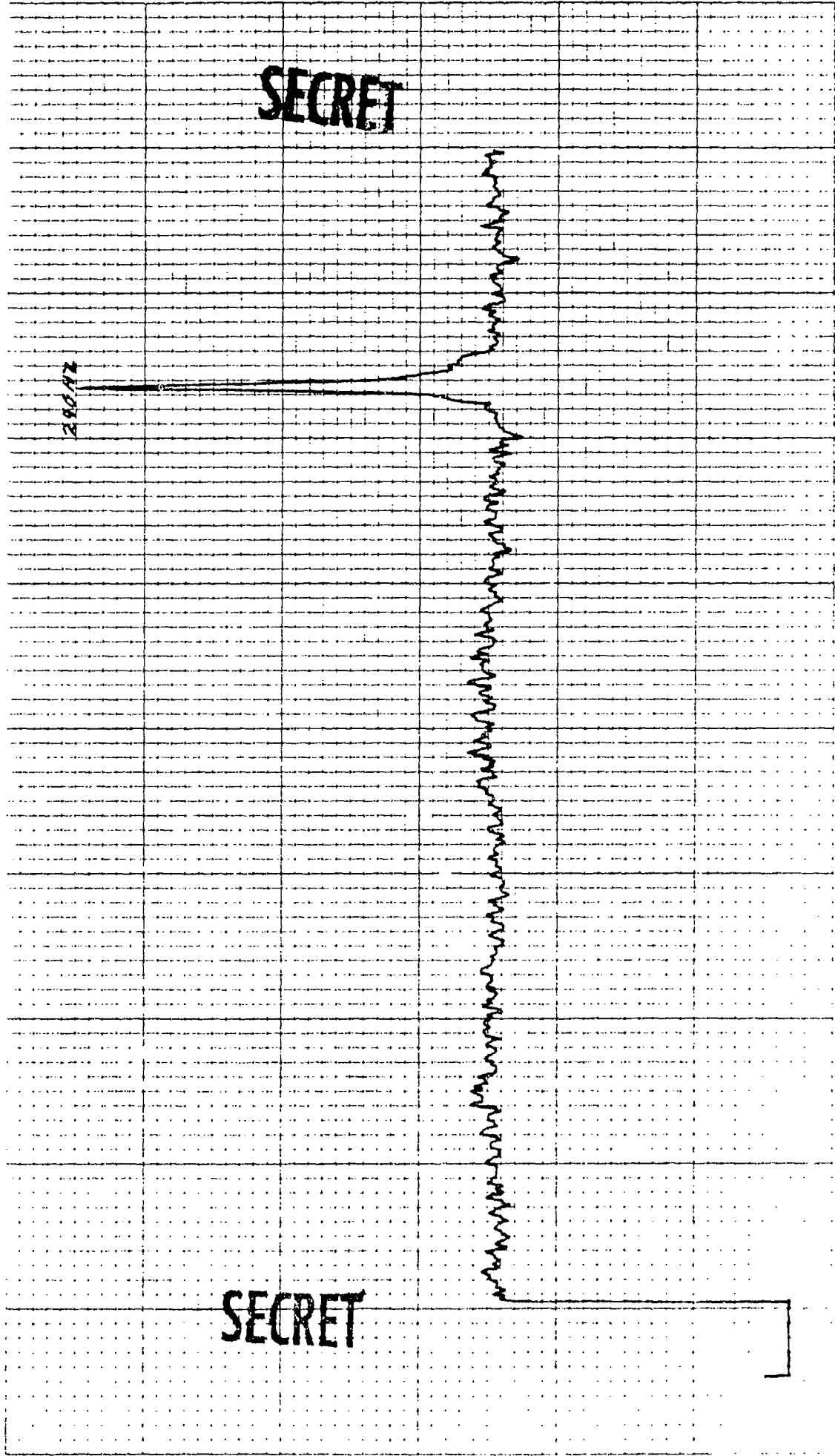
10 X 10 TO THE INCH
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 0703

CONTROL: 2033 - 51 (DPC)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS

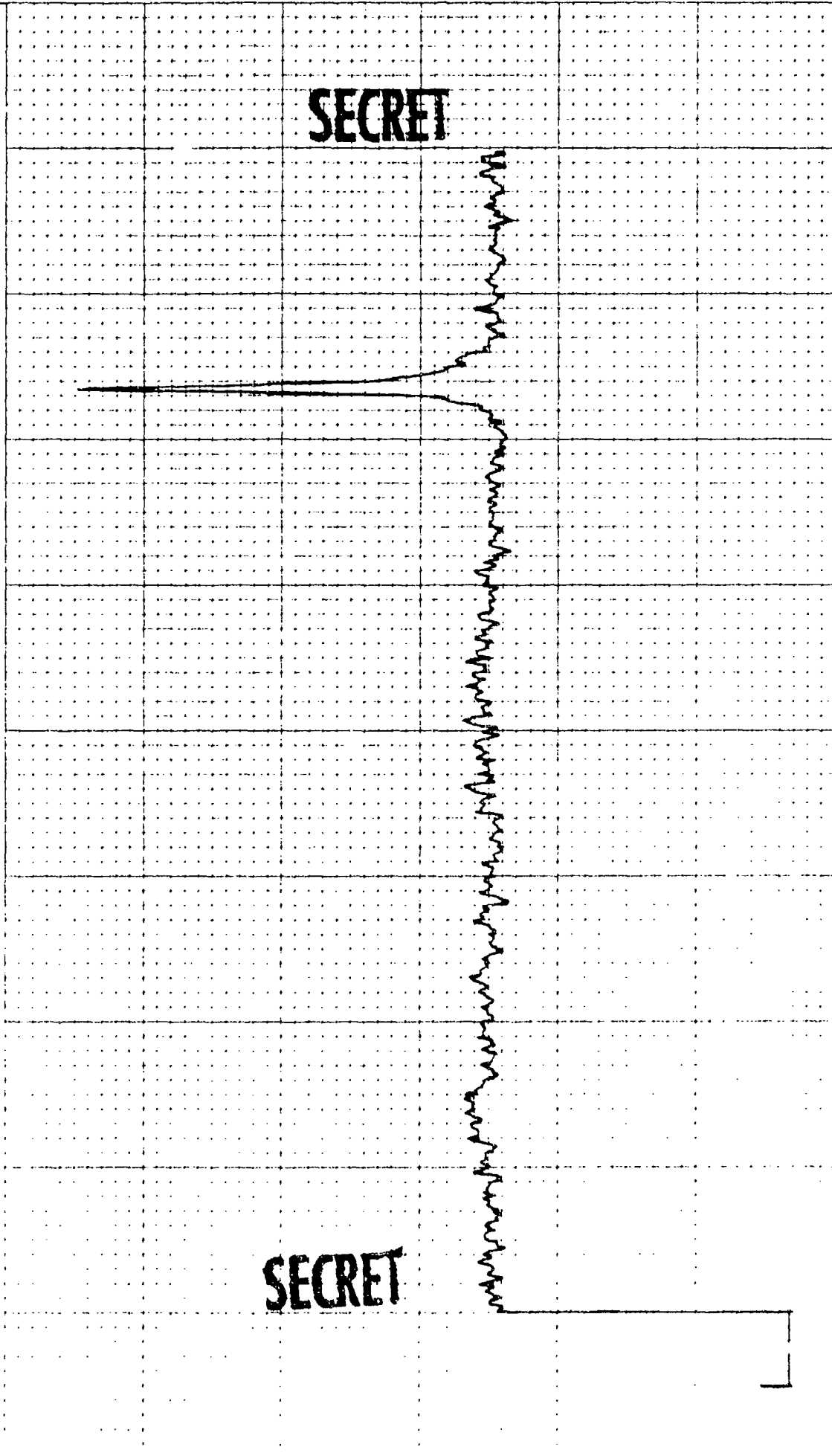
DATE OF ANALYSIS: 1-76
DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+16 DEG. AZ STEERING

REEL: F23 INDE X3000
INTEGRATION TIME 320 SECS ATTN: 18 DB
FILTER WTC: HANNING



46 0703

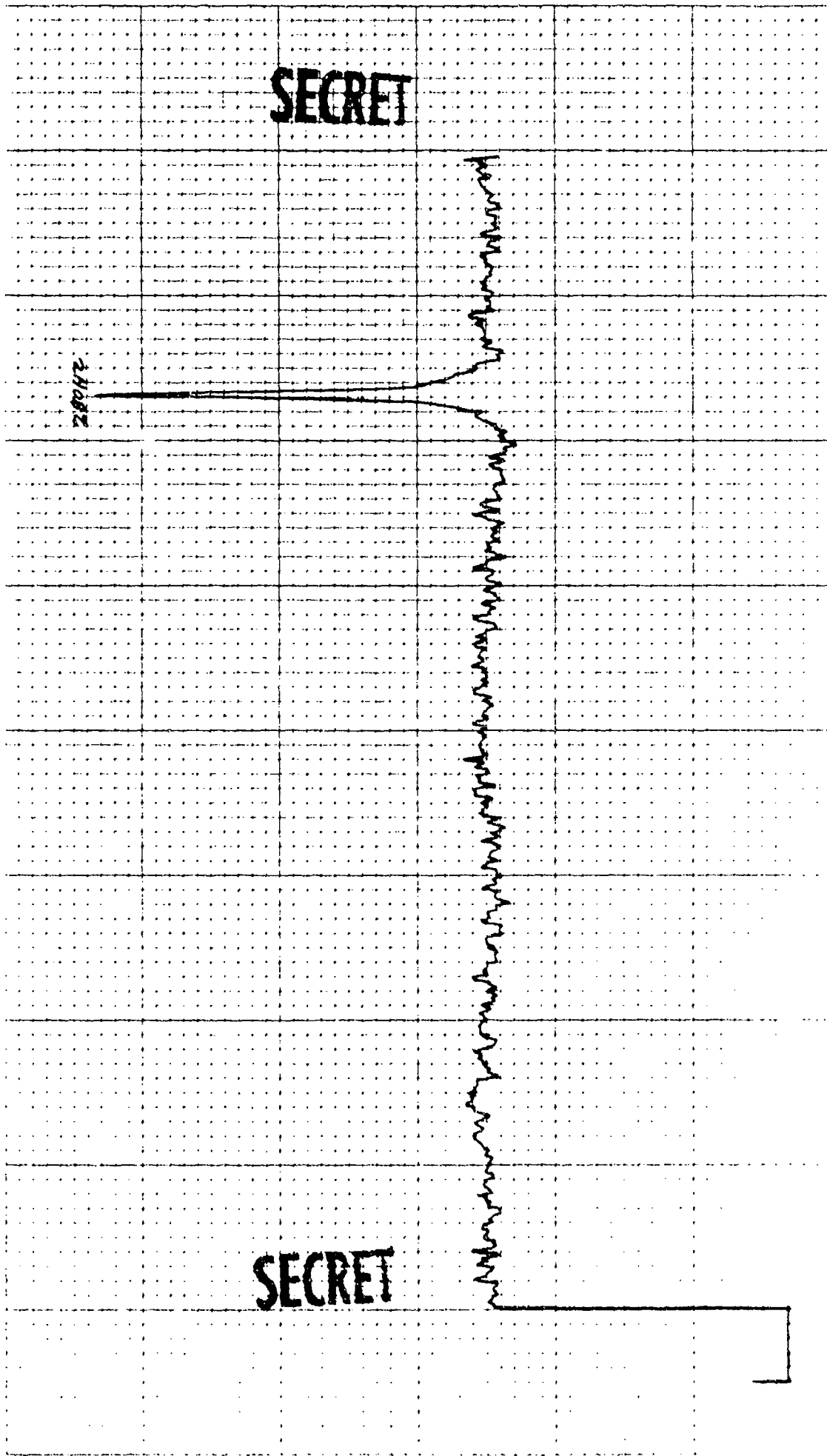
CONTROL: 2033 - 16 (DPC) REEL: F23 INDE X3000
BEAMFORMED SPECTRUM(ELEMENTS) DATE OF ANALYSIS: - - -
EXERCISE: BEARING STAKE / - / 2
CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1/10HZ
/ 6 ELEMENTS f17 DEG. AZ STEERING FILTER WTG: HANNING ATTN: -18 DB
INTEGRATION TIME 320 SECS



46 0703

REF ID: A66888

CONTROL: 2033 - 16 (DPL) DATE OF ANALYSIS: 1-16 REEL: F33 INDE X3000
BEAMFORMED SPECTRUM (ELEMENTS))
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033 Z INTEGRATION TIME 320 SECS ATTN: 70 DB
CENTER FREQ: 250 HZ ANALYSIS BANDWIDTH: 1/10 HZ FILTER WTG: HANNING
16 ELEMENTS 118 DEG. AZ STEERING



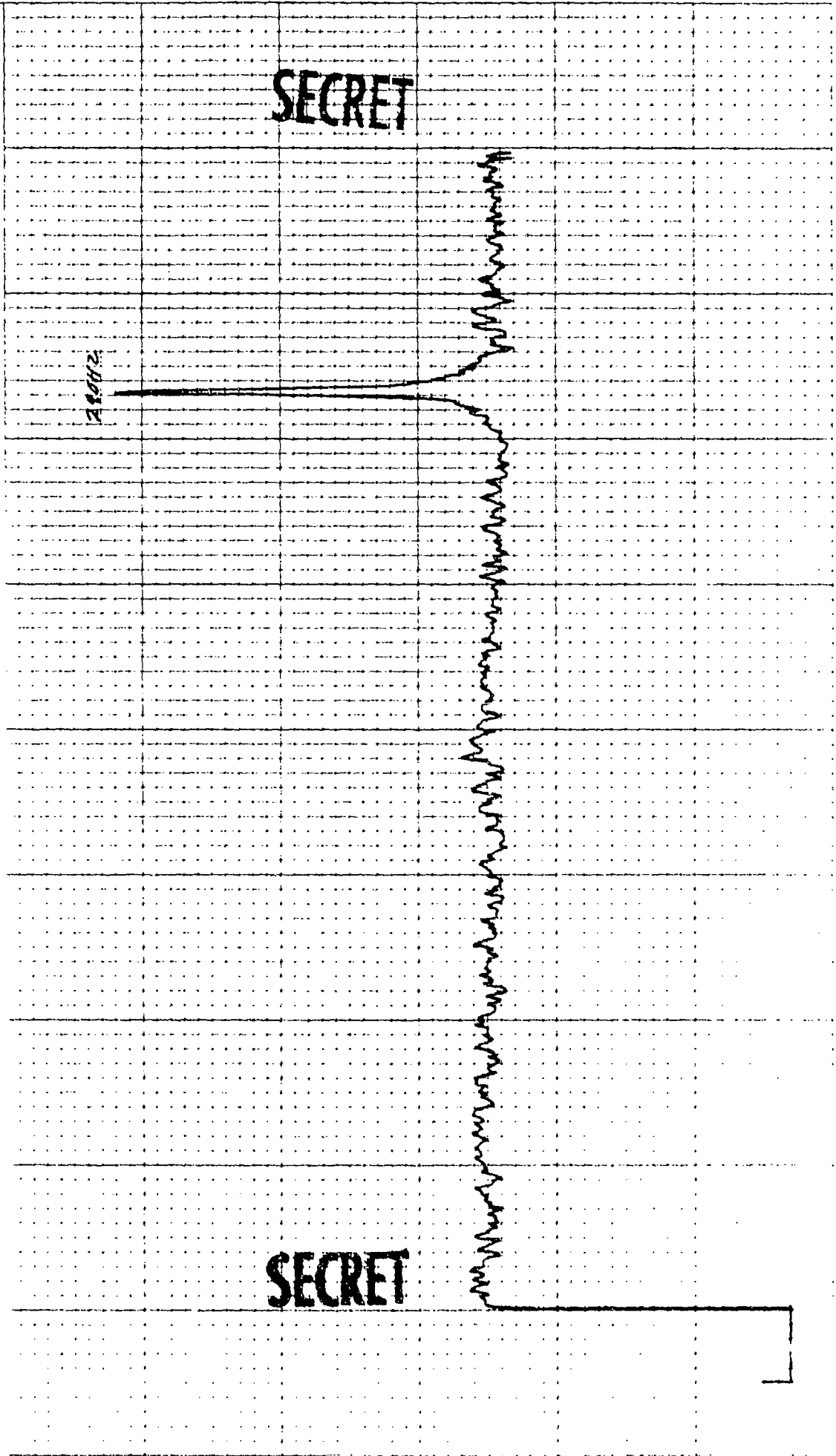
46 0703

REF ID: A66858

CONTROL: 2033 - /C (DPL)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
/C ELEMENTS

DATE OF ANALYSIS: - - - -
/ - / C)
DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 20 DEC. AZ STEERING

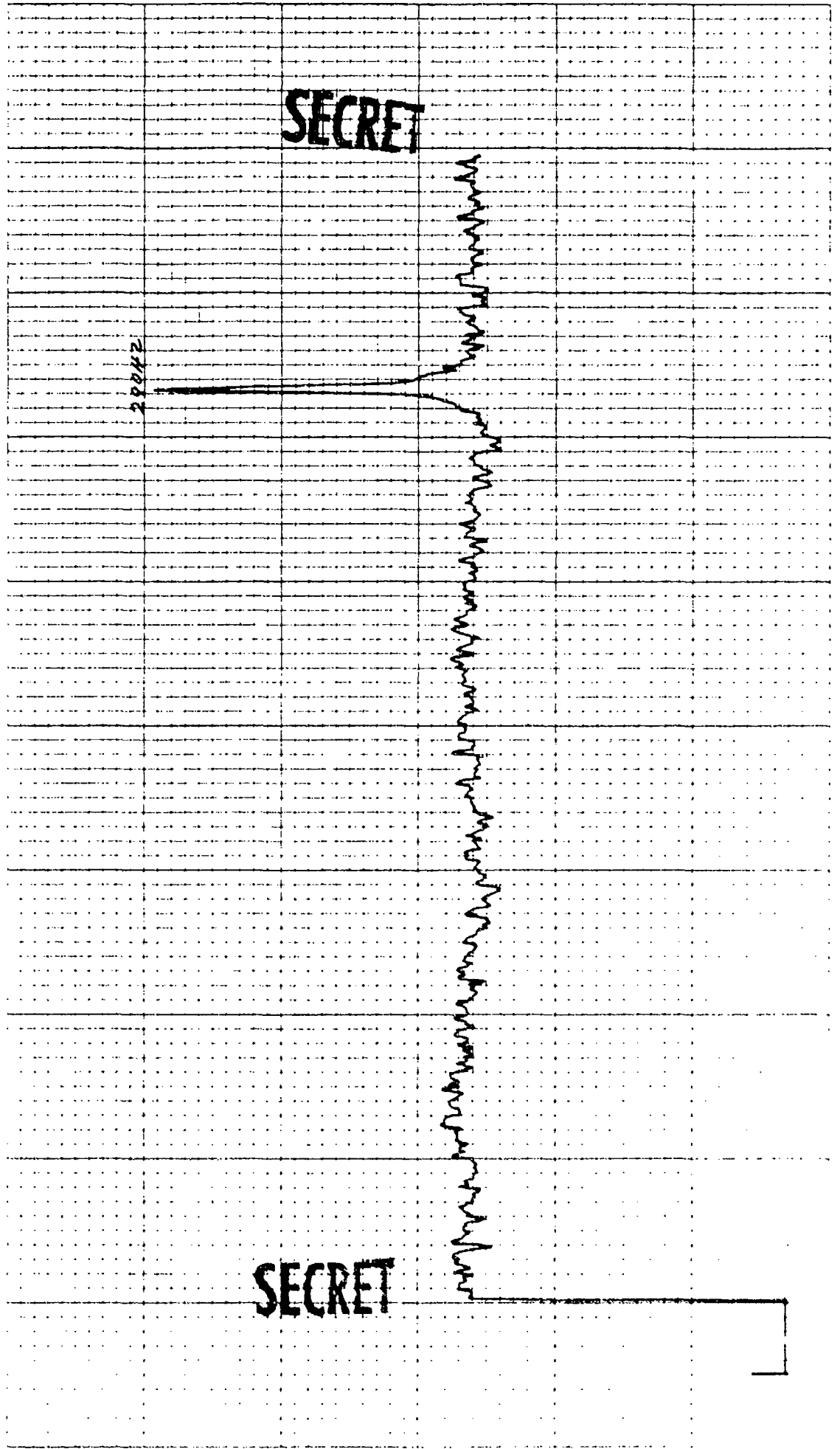
REEL: F23
INDE X300
INTEGRATION TIME 320 SECS
ATTEN: 7/ DB
FILTER WTC: HANNING



46 0703

FORM 5419 10 APR 66 USE PREVIOUS EDITIONS

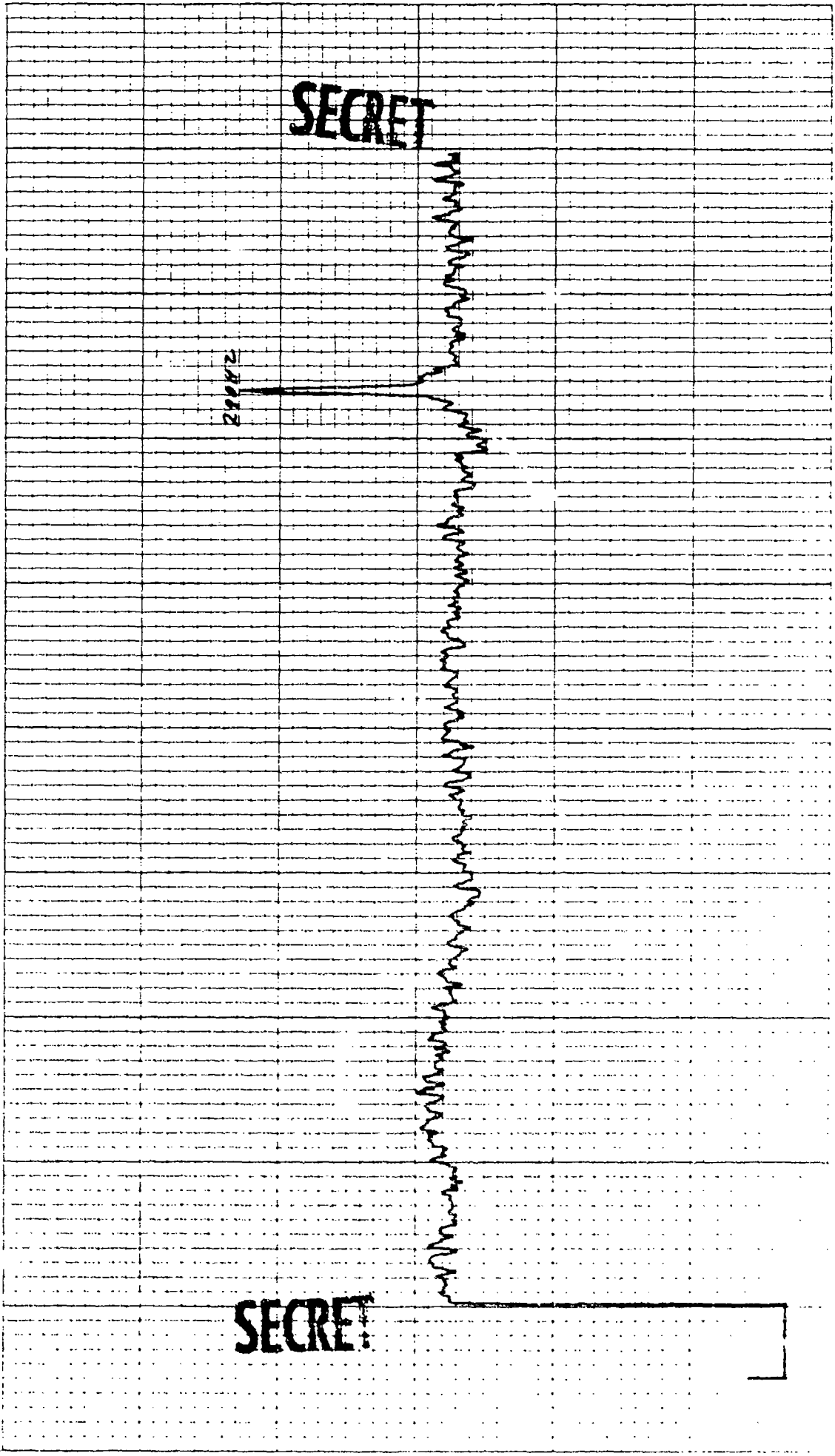
CONTROL: 2033 - 16 (DP6) DATE OF ANALYSIS: 1-16 REEL: F23 INDE X 3000
BEAMFORMED SPECTRUM(ELEMENTS) DATE/TIME: 27-72 - 2037 Z INTEGRATION TIME 320 SECS ATTN: 18 DB
EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1710HZ FILTER WTG: HANNING
CENTER FREQ: 200 HZ 7.2 DEG. AZ STEERING



1605 IN X TO THE INCH • 2 1/2 INCHES
MCGRAW HILL INSTRUMENT CO. MANUFACTURED

46 0703

CONTROL: 2037-16 (DPC) DATE OF ANALYSIS: 1-16
BEAMFORMED SPECTRUM (ELEMENTS) REEL: F23 INDE X 3000
EXERCISE: BEARING STAKE INTEGRATION TIME 320 SECS ATTN: -10 DB
CENTER FREQ: 280 HZ FILTER WTG: HANNING
16 ELEMENTS +24 DEG. AZ STEERING



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SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 6

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-29.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-19.8	
BEAMFORMER GAIN	<u>+24</u>	+ 4.2	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	+ 4.4	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-60.3</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-50.3	
BEAMFORMER GAIN	<u>+24</u>	-26.3	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+4.4</u>	
SIGNAL LEVEL FOR SNR	<u>-26.3</u>	30.7	
PROCESSOR CORRECTION	<u>-4.0</u>	26.7	
MRA CORRECTION	<u>+ .2</u>	26.9	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	18.7	SNR 1 HZ BAND

CONFIDENTIAL

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SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 6

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-29.2</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-19.2	
BEAMFORMER GAIN	<u>+24</u>	+4.8	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	+5.6	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-65.5</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-55.5	
BEAMFORMER GAIN	<u>+24</u>	-31.5	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+5.6</u>	
SIGNAL LEVEL FOR SNR	<u>-31.5</u>	37.1	
PROCESSOR CORRECTION	<u>-4.0</u>	33.1	
MRA CORRECTION	<u>+ .8</u>	33.9	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	25.7	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

DATA POINT 6

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-24.7</u>	<u>-23.0</u>	<u> </u>
MRA SIGNAL LEVEL	<u>+ 4.4</u>	<u>+ 5.6</u>	<u> </u>
ARRAY SIGNAL GAIN	<u>29.1</u>	<u>28.6</u>	<u> </u>
20 LOG <u>32</u>	<u>30.1</u>	<u>30.1</u>	<u> </u>
# of elements			
DIFFERENCE	<u>-1.0</u>	<u>-1.5</u>	<u> </u>

ARRAY GAIN

MRA SNR	<u>26.9</u>	<u>33.9</u>	<u> </u>
MEAN OMNI SNR	<u>15.4</u>	<u>19.9</u>	<u> </u>
ARRAY GAIN	<u>11.5</u>	<u>14.0</u>	<u> </u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>13.5</u>	<u>15.3</u>	<u> </u>
DIFFERENCE	<u>-2.0</u>	<u>-1.3</u>	<u> </u>

CONFIDENTIAL

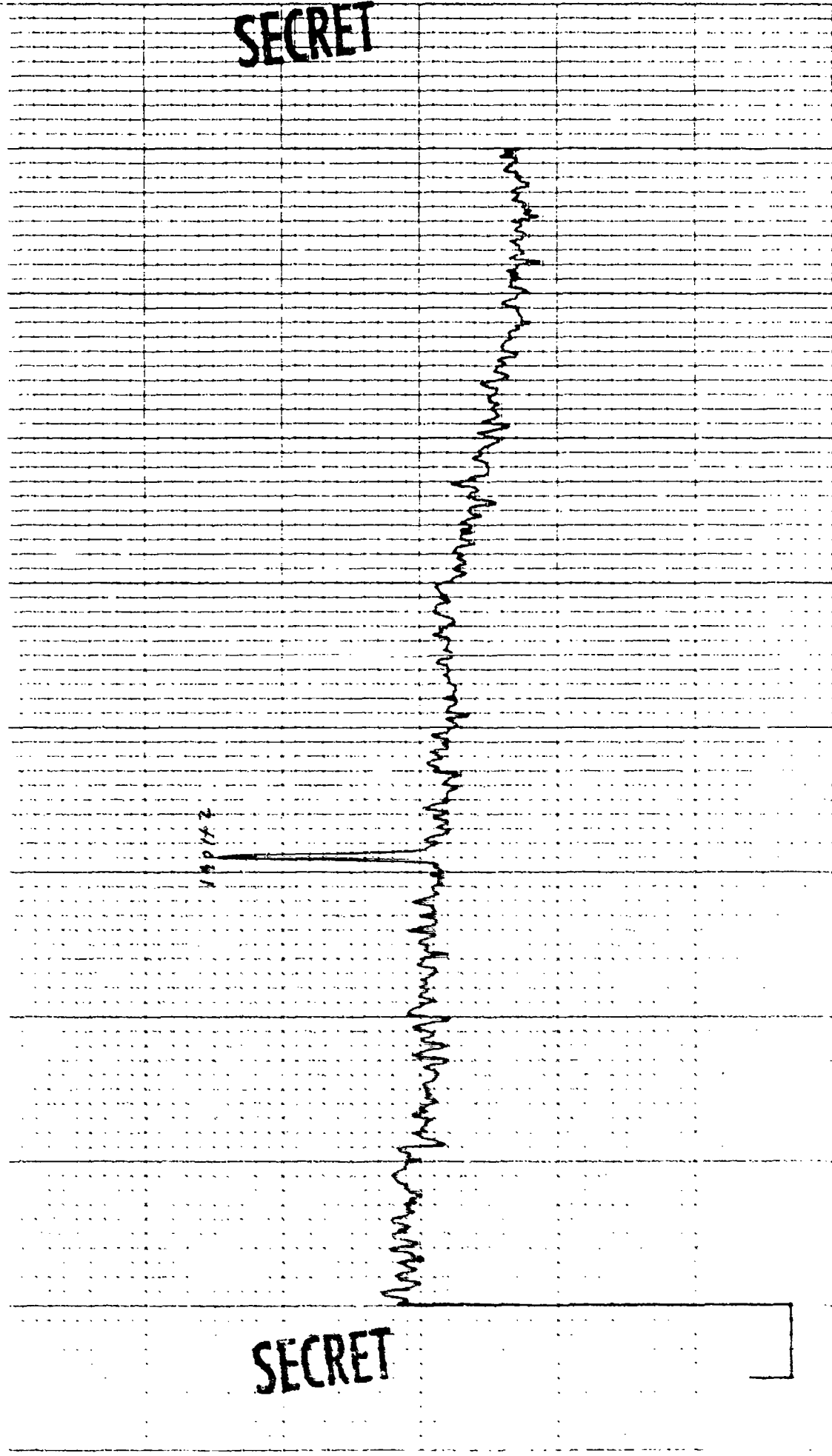
46 0703

1002 25001 10000 10000 10000

CONTROL: 2033 - 32 (DPL)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-77
DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 4 DEG. AZ STEERING

REEL: F23 INDE X 3000
INTEGRATION TIME 320 SECS ATTN: -2Y DB
FILTER WTG: HANNING



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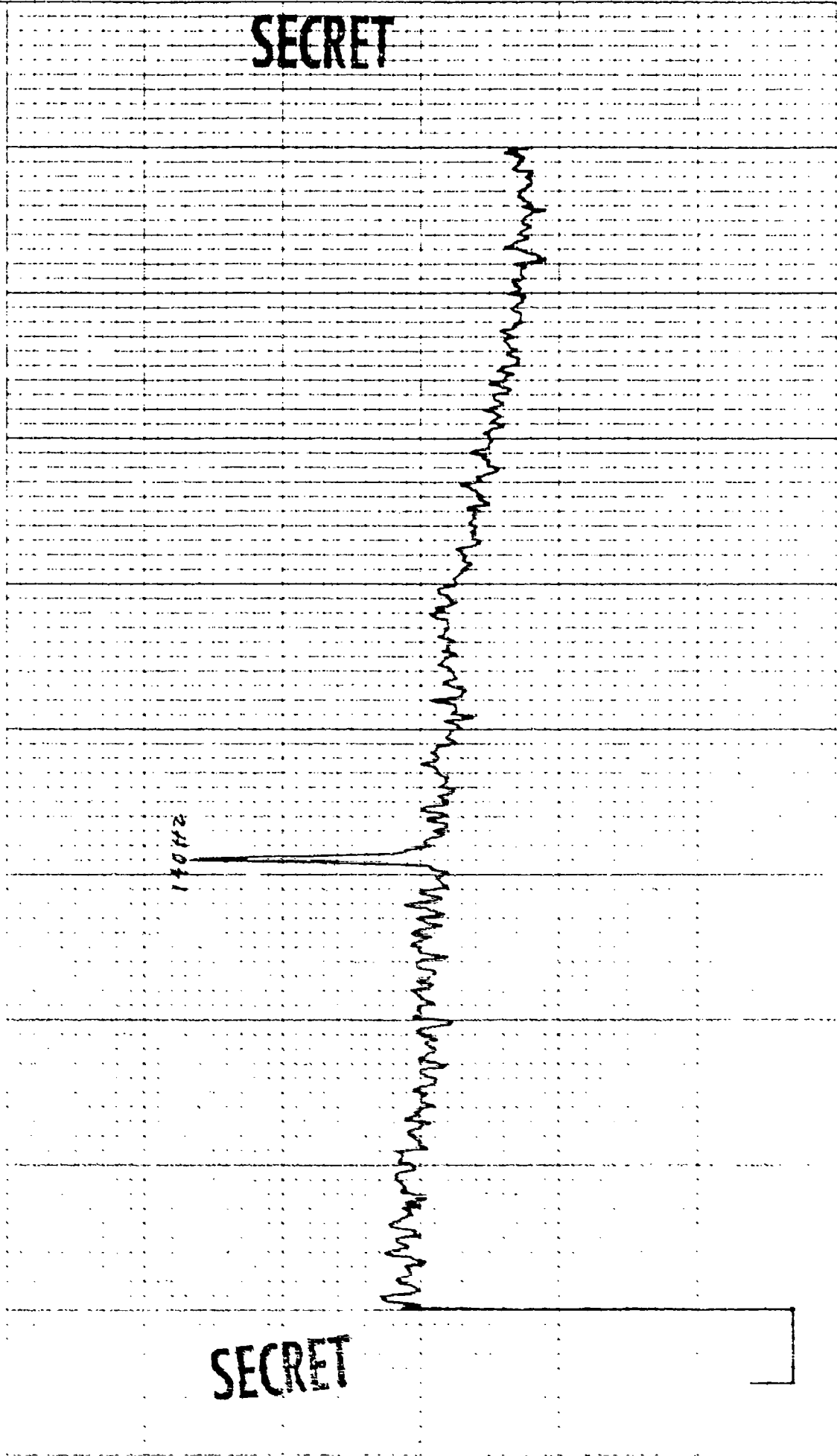
46 0703

CONTROL: 2033 - 32 (DPC)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150. HZ
 32 ELEMENTS

DATE OF ANALYSIS: 7-26-77
 DATE/TIME: 2-7-77 - 2033 Z
 ANALYSIS BANDWIDTH: 1710HZ
 76 DEG. AZ STEERING

REEL: F33
 INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

INDEX 300



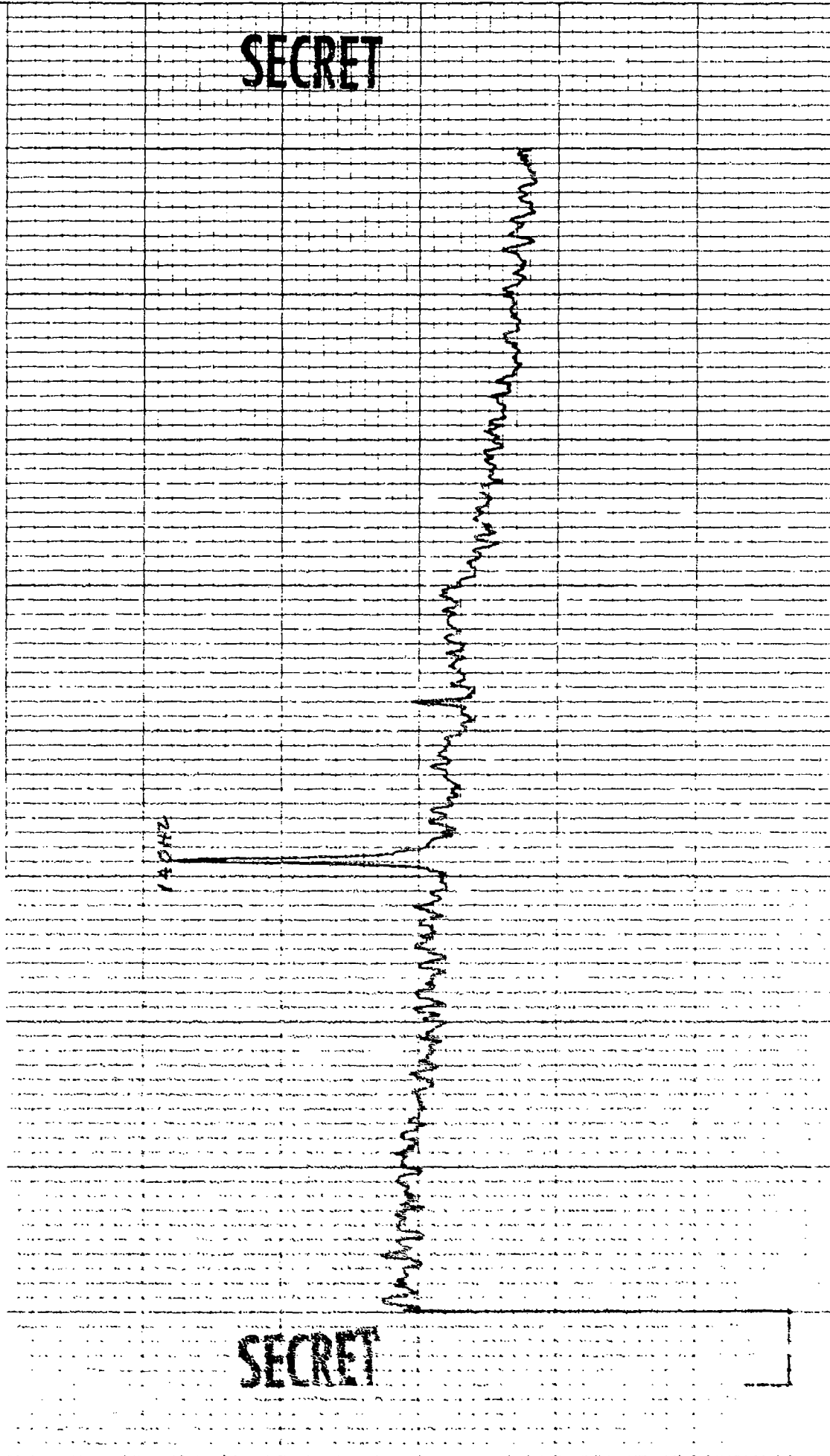
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CONTROL: 2073 - 30 (DPG)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS

DATE OF ANALYSIS: - - -
1-26 8 29-34)
DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 8 DEG. AZ STEERING

REEL: F23 INDE X 3000
INTEGRATION TIME 320 SECS ATTEN: -2Y DB
FILTER WTG: HANNING

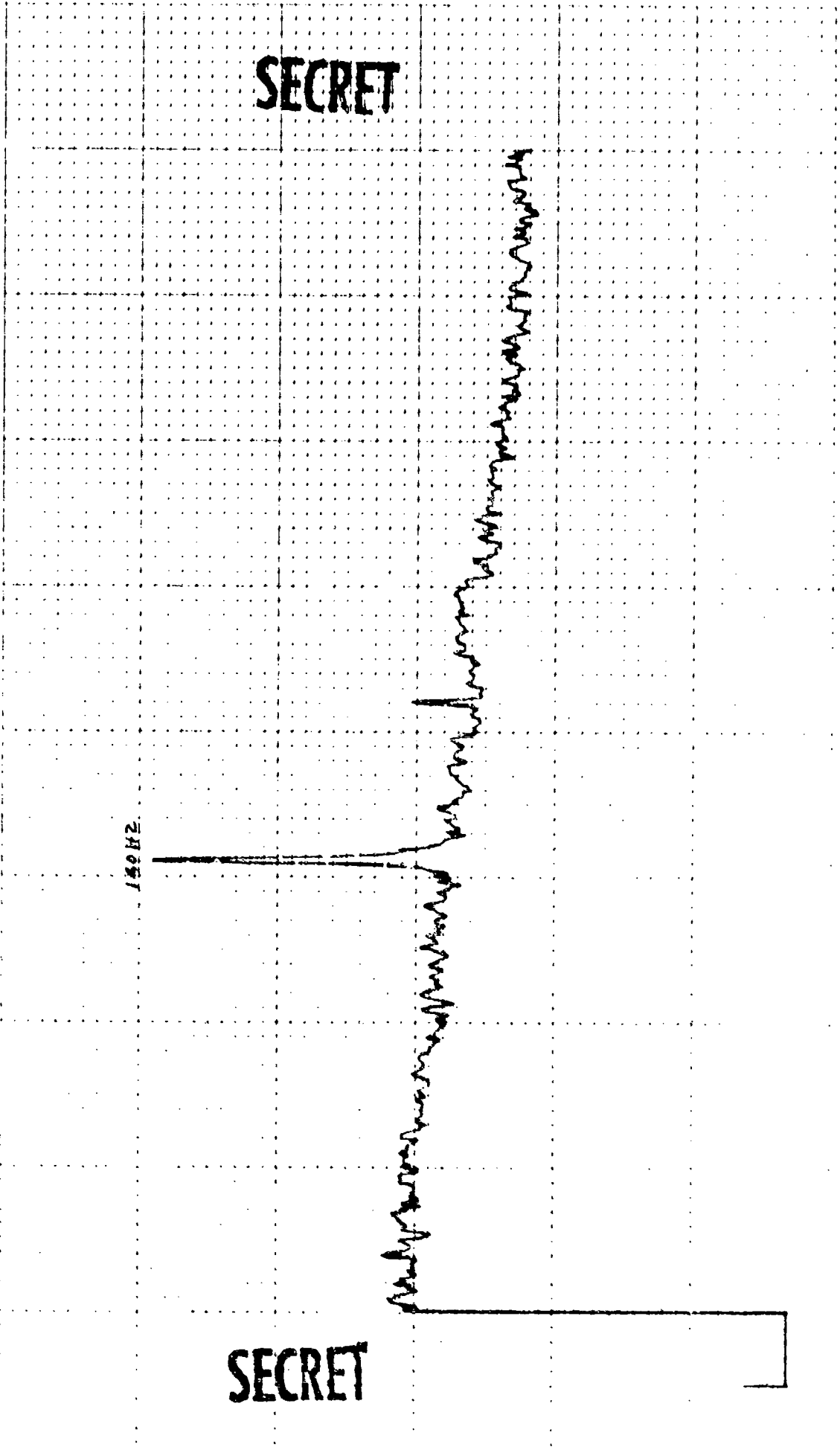


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CONTROL: 2033-32 (DPG) REEL: F23 INDE X 100c
 BEAMFORMED SPECTRUM/ELEMENTS DATE OF ANALYSIS: 1-26-68 09-3Y
 EXERCISE: BEARING STAKE DATE/TIME: 2-777 -2033 Z INTEGRATION TIME 320 SECS ATTEN: -24 DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1710HZ FILTER WTG: HANNING
 32 ELEMENTS F10 DEG. AZ STEERING



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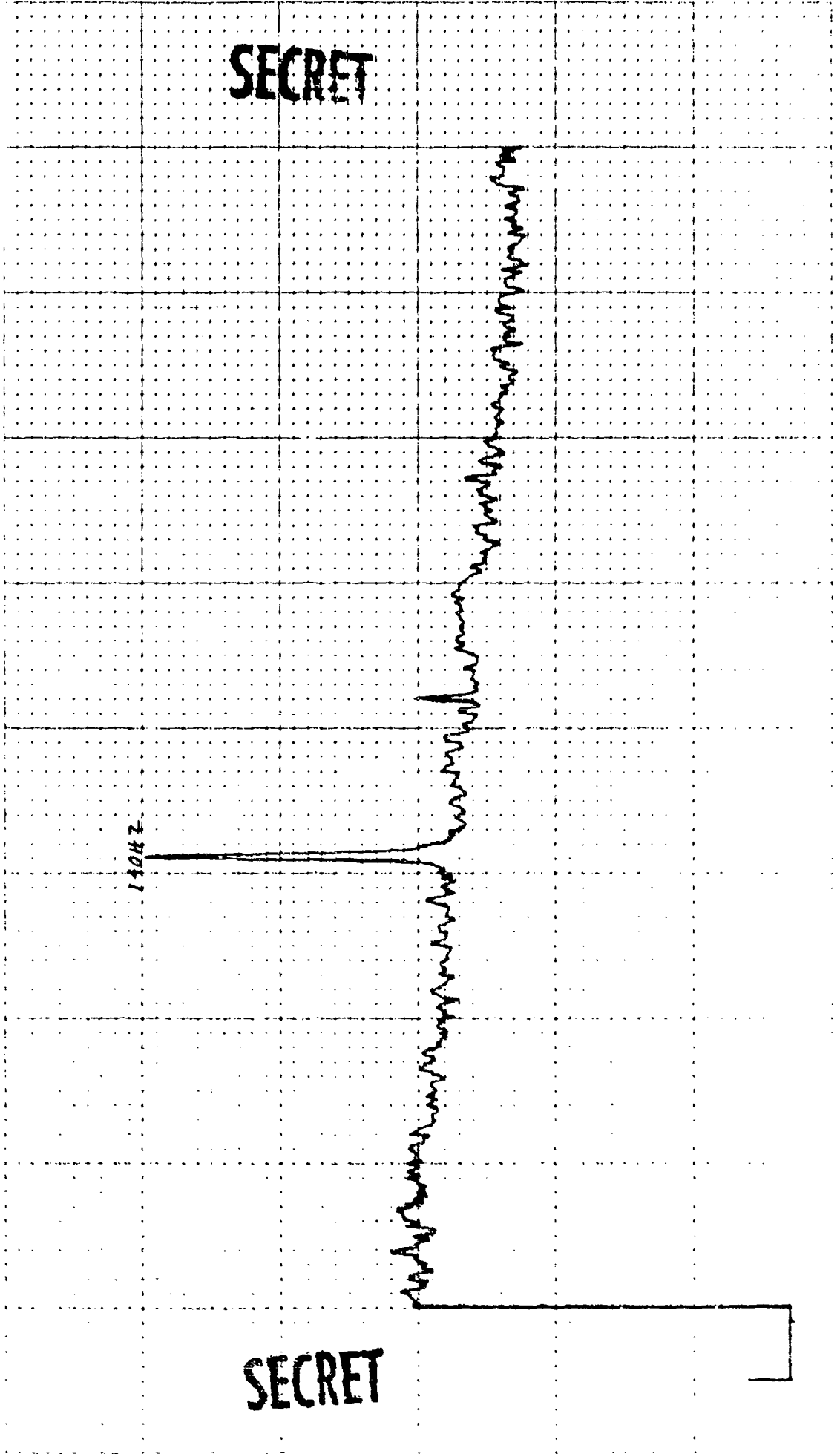
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46 0703

CONTROL: 2033 - 32 (DPG) DATE OF ANALYSIS: 1-26-77
 BEAMFORMED SPECTRUM (ELEMENTS) /-26-77-34
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033 Z
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10 HZ
 32 ELEMENTS 112 DEG. AZ STEERING

KEEL: F23 INDE X 3000

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

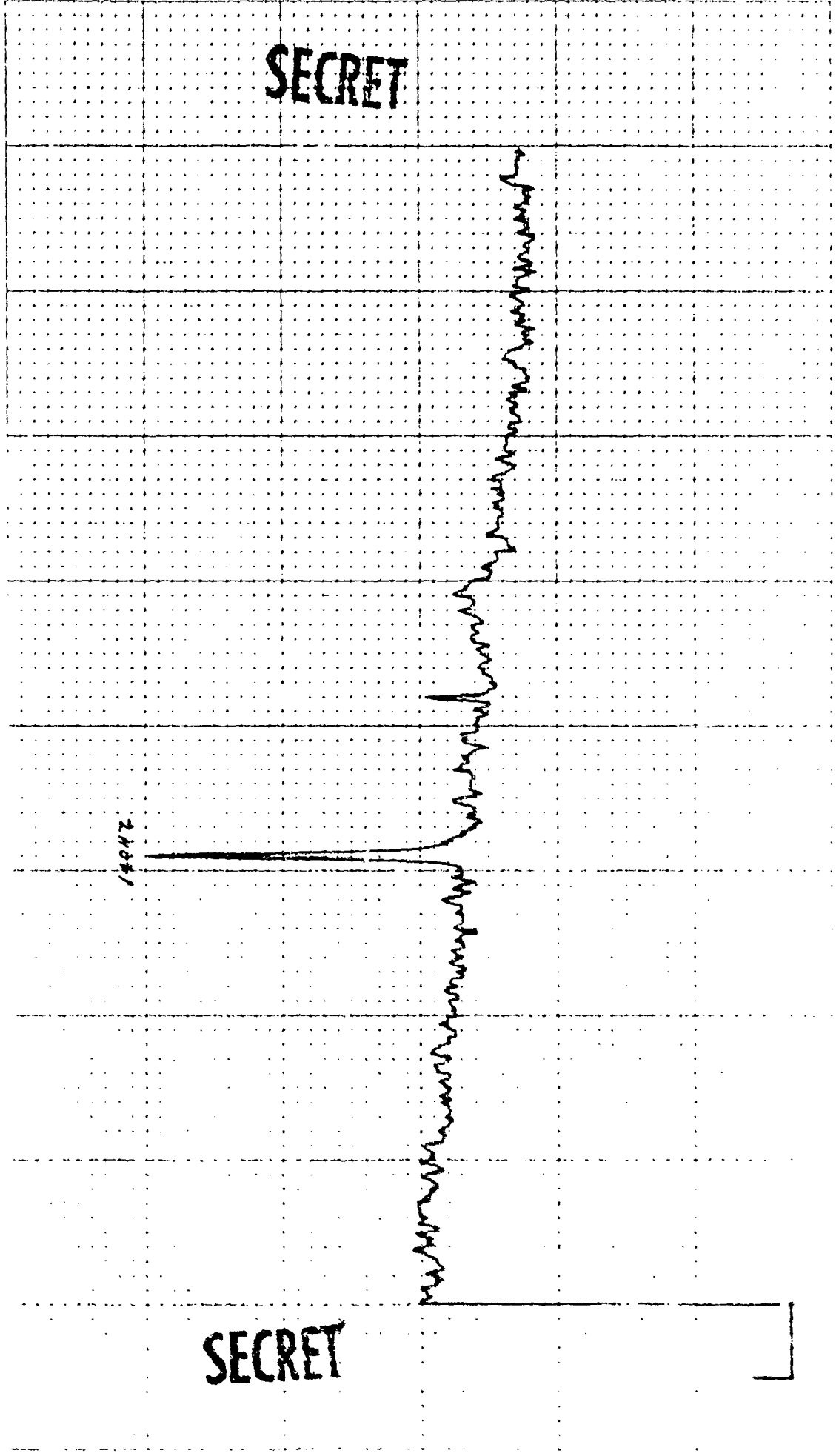


46 0703

REF ID: A66903

CONTROL: 2033 - 51 (DPC) DATE OF ANALYSIS: _____
 BEAMPFORMED SPECTRUM (ELEMENTS) 1-76 # 27-34
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033 Z
 CENTER FREQ: 150 MHz ANALYSIS BANDWIDTH: 1/10HZ
 32 ELEMENTS 4/3 DEG. AZ STEERING

REEL: F23 INDE X 3000
 INTEGRATION TIME 320 SECS ATTEN: 24 DB
 FILTER WIG: HANNING



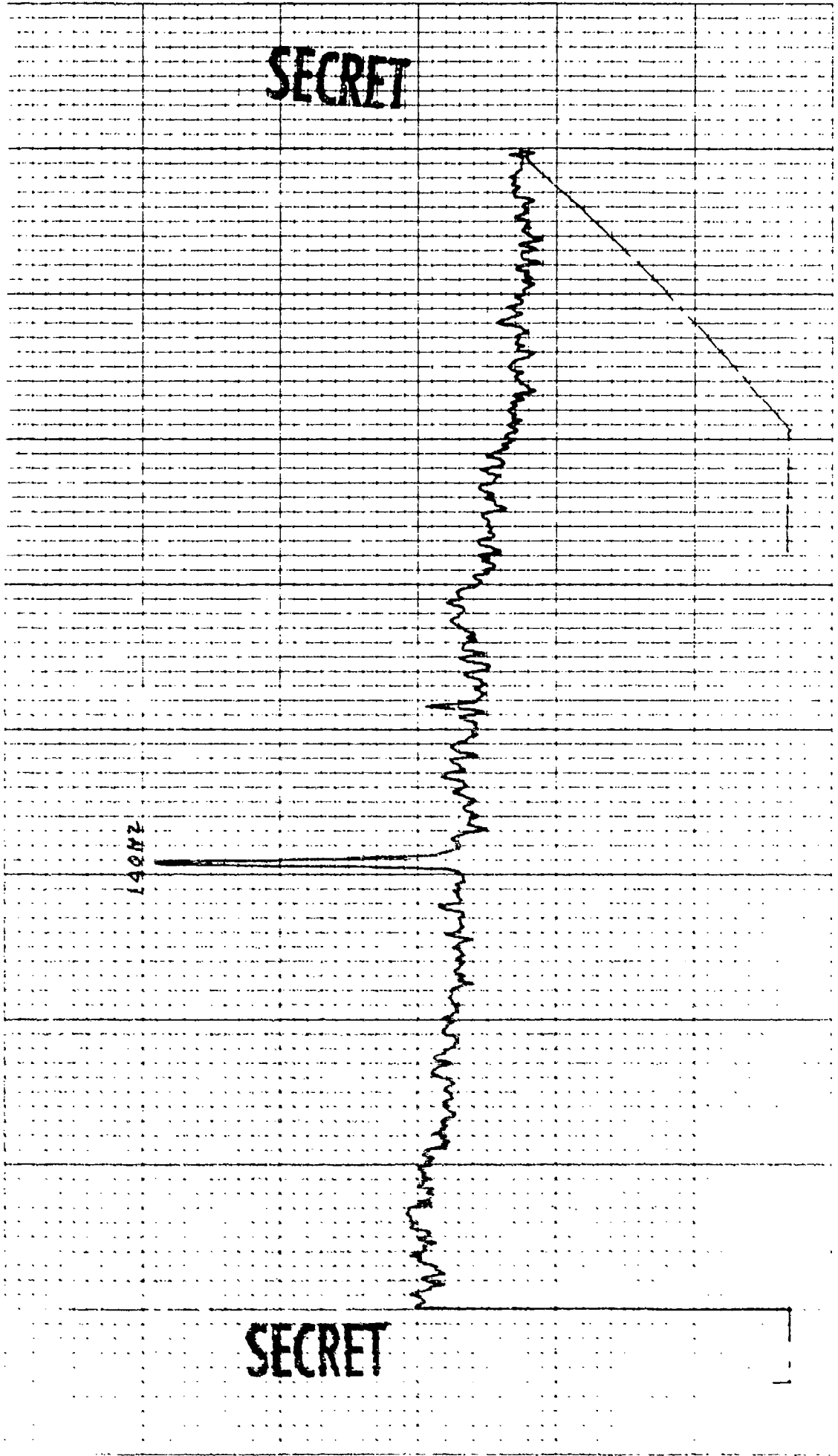
46 0703

(S) 2033-72 (DP6)

CONTROL: 2033 - 72 (DP6)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 32 ELEMENTS

DATE OF ANALYSIS: 1-36-77
 DATE/TIME: 2-7-77 - 2033 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 14 DEC. AZ STEERING

REEL: F33 INDE X 300
 INTEGRATION TIME 320 SECS ATTN: -34 DB
 FILTER WTG: HANNING



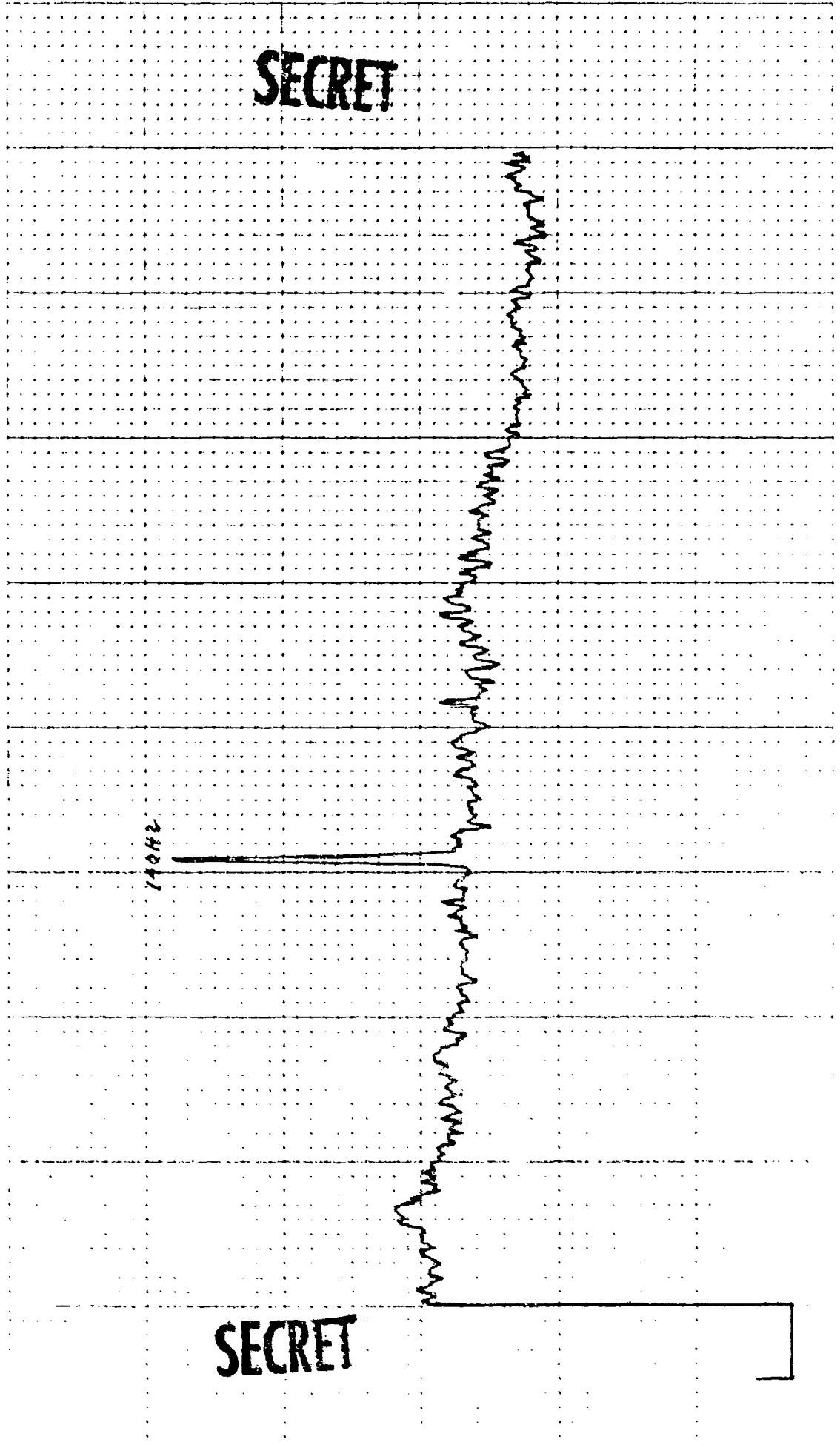
46 0703

CONTROL: 2073 - 72 (006)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS

DATE OF ANALYSIS: 7-26 & 29-34)
DATE/TIME: 27-77 - 2033Z
ANALYSIS BANDWIDTH: 1/10HZ
1/4 DEG. AZ STEERING

REEL: F23
INTEGRATION TIME 320 SECS
FILTER WTG: HANNING

INDE X 3000
ATTEN: -24 DB



46 0703

CONTROL: 2033 - 32 (2PG)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS

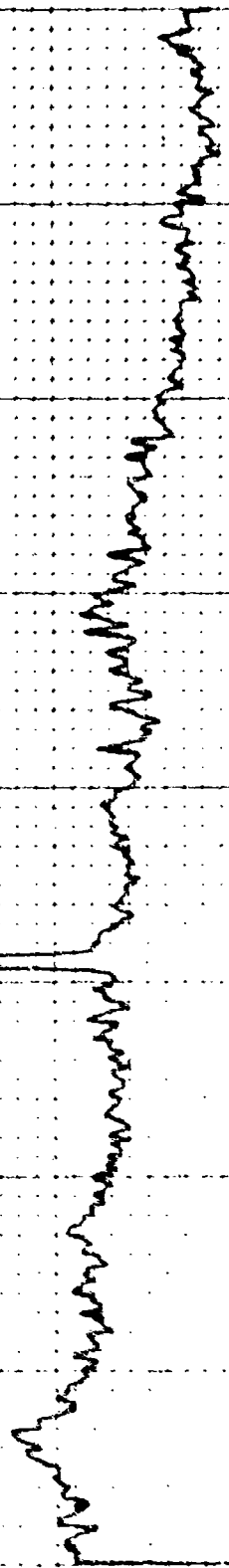
DATE OF ANALYSIS: -
1-26-79 JV
DATE/TIME: 2-7-77 - 2033Z
ANALYSIS BANDWIDTH: 1/10HZ
+17 DEG. AZ STEERING

REEL: F23
INTEGRATION TIME 320 SECS
FILTER WTC: HANNING

INDE X 2000

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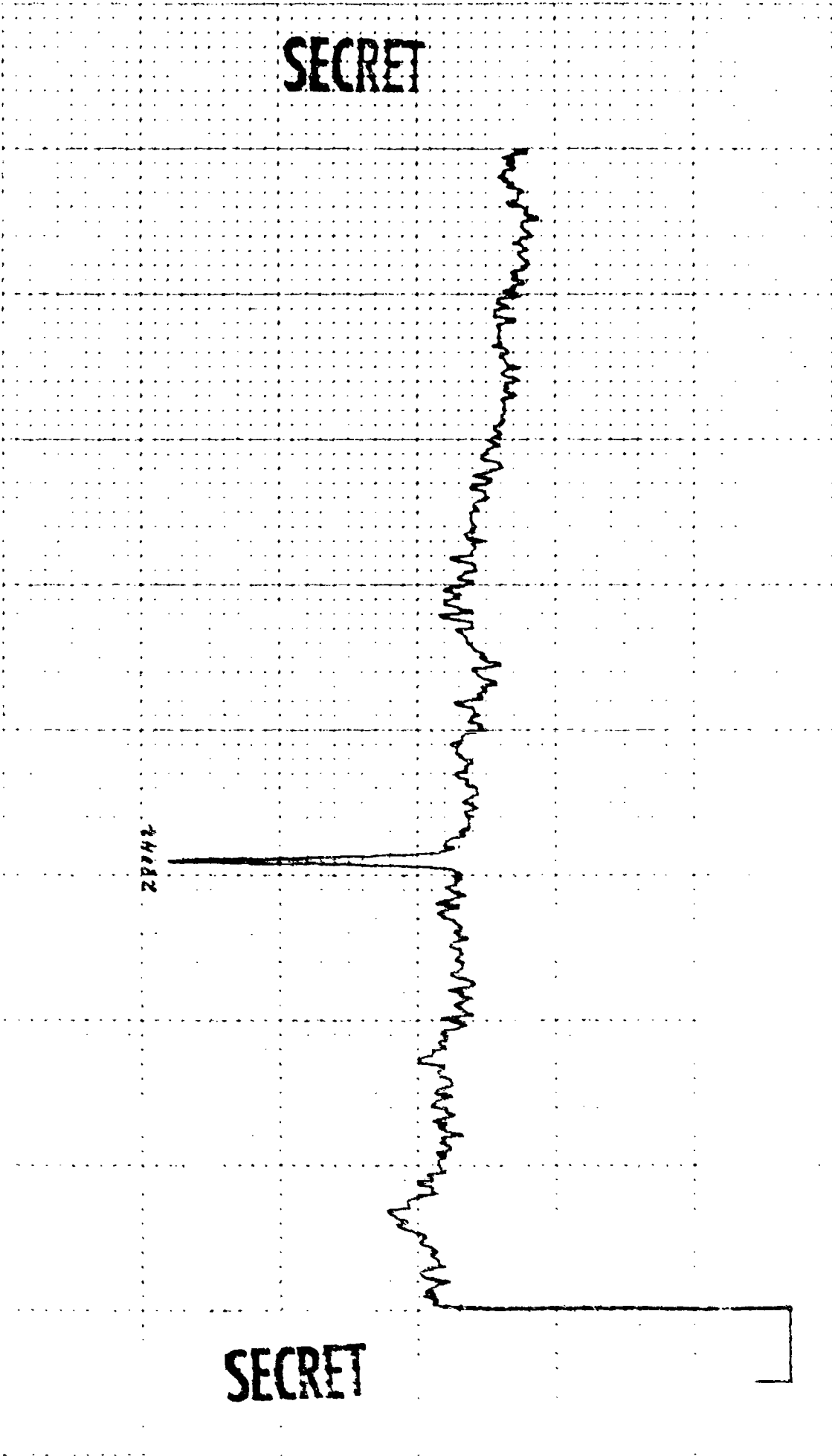


46 0703

CONTROL: 2033 - 32 (206)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAVE
 CENTER FREQ: 150 HZ
 22 ELEMENTS

DATE OF ANALYSIS: 1-26-79-34
 DATE/TIME: 2-7-77 - 2033 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 418 DEG. AZ STEERING

REEL: F23 INDE X 300
 INTEGRATION TIME 320 SECS ATTN: -2Y DB
 FILTER WTC: HANNING

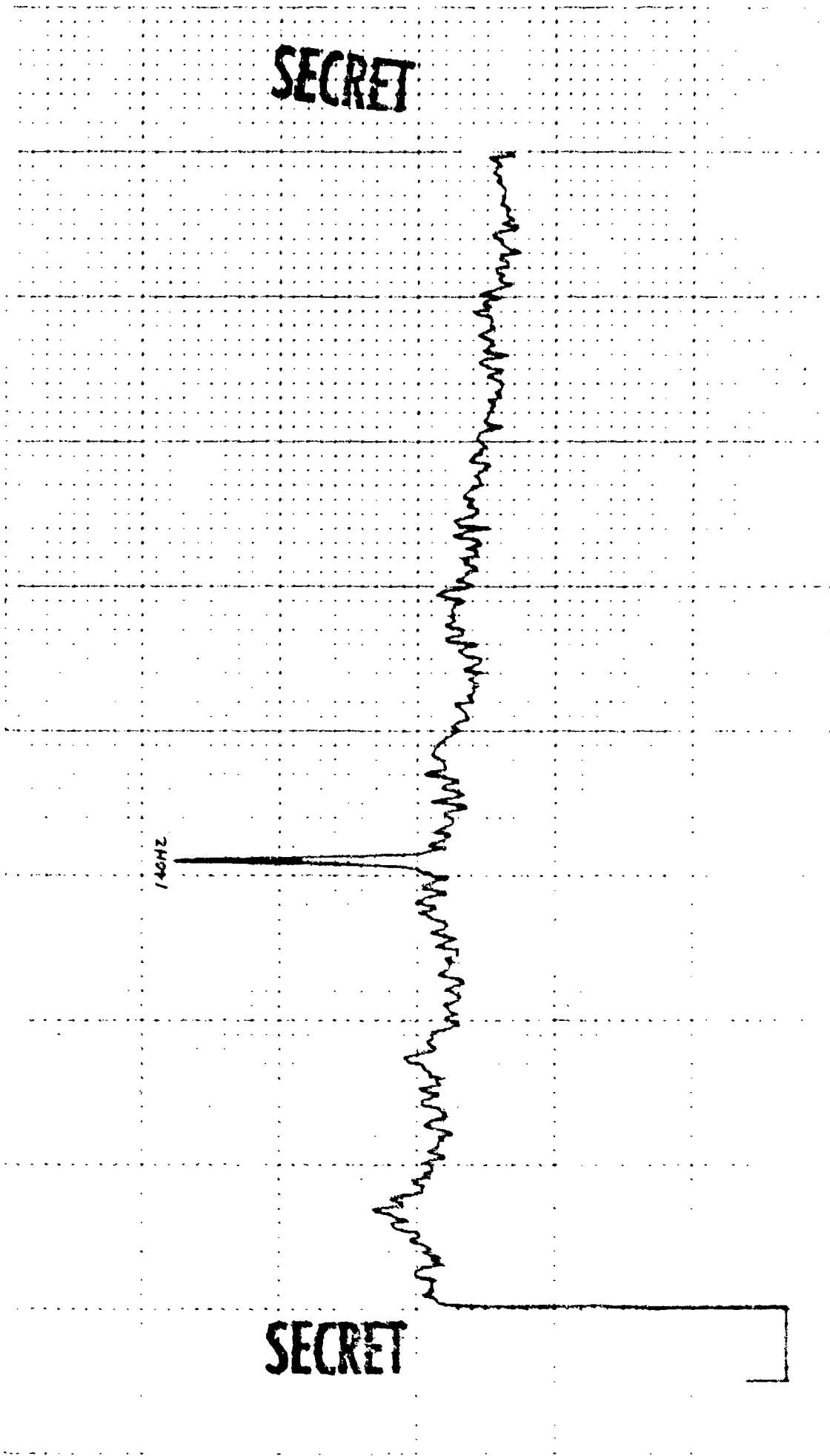


46 0703

CONTROL: 2033 - 32 (LAC)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAFF
CENTER FREQ: 150 MHz
32 ELEMENTS

DATE OF ANALYSIS: 1-26-84
DATE/TIME: 2-2-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
720 DEG. AZ STEERING

REEL: E23
INDE X 300
INTEGRATION TIME 320 SECS
ATTEN: -2Y DB
FIITPP WTC: HANNING



SECRET

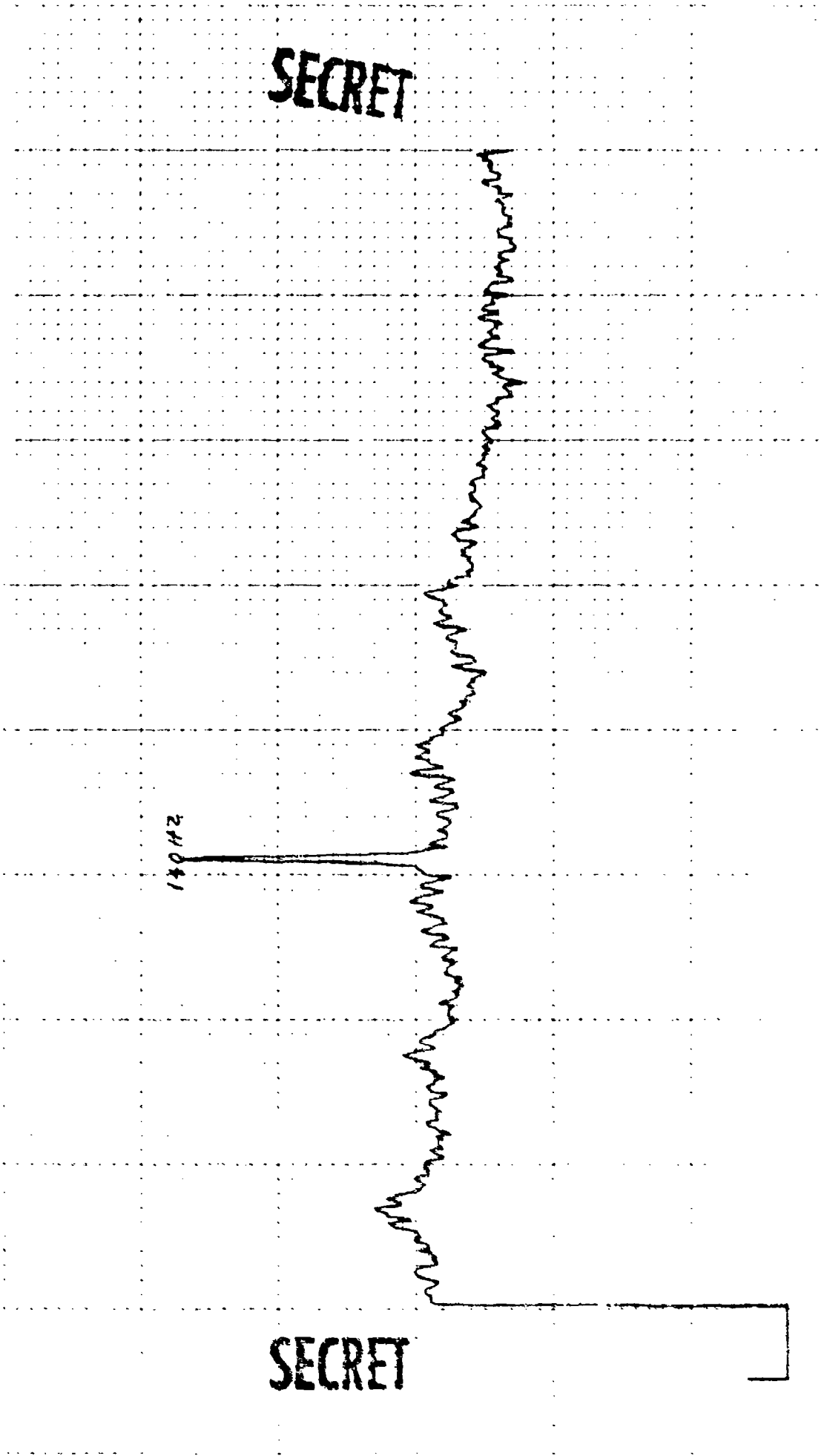
SECRET

46 0703

CONTROL: 2073 - 33 (2066)
BEAMFORMED SPECIPUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 158 HZ
32 ELEMENTS

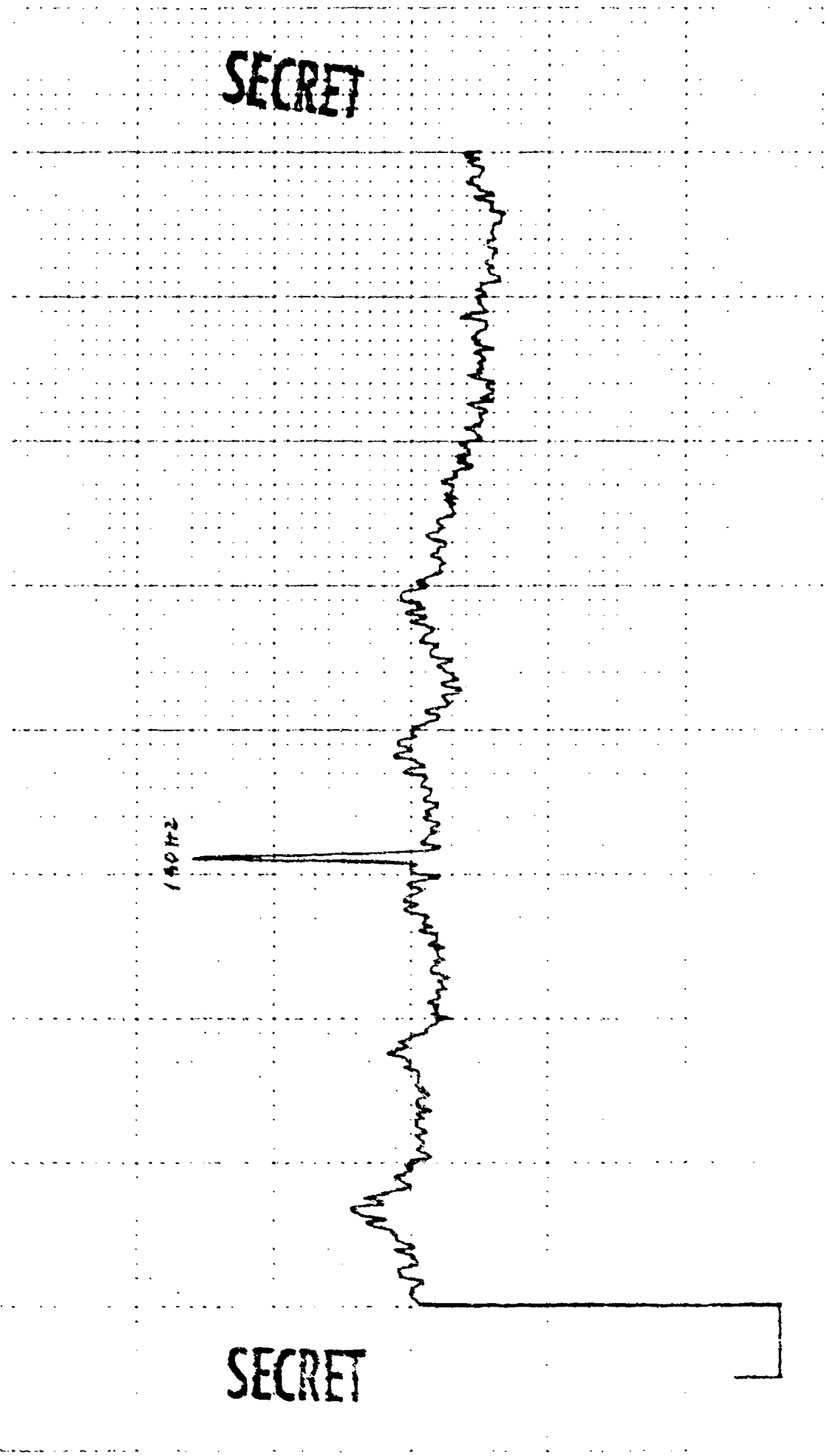
DATE OF ANALYSIS: 7-26 8 29 14
DATE/TIME: 3 7-17 -2073 Z
ANALYSIS BANDWIDTH: 1/100HZ
P 22 DEG. AZ STEERING

REEL: F33
INTEGRATION TIME 320 SECS
ATTEN: -2Y DB
FILTRV WTC: HANNING



46 0703

CONTROL: 2077 - 22 (DPG) DATE OF ANALYSIS: 7-26-74 INDE X 300
 BEAMFORMED SPECTRUM/ELEMENTS /-26 28-34 REEL: F23
 EXERCISE: BEARING STAFF DATE/TIME: 27-27 - 2077 Z INTEGRATION TIME 320 SECS ATTEN: -27 DB
 CENTER FREQ: 150 MZ ANALYSIS BANDWIDTH: 1/10MZ FILTER WTC: HANNING
 22 ELEMENTS 734 DEG. AZ STEERING

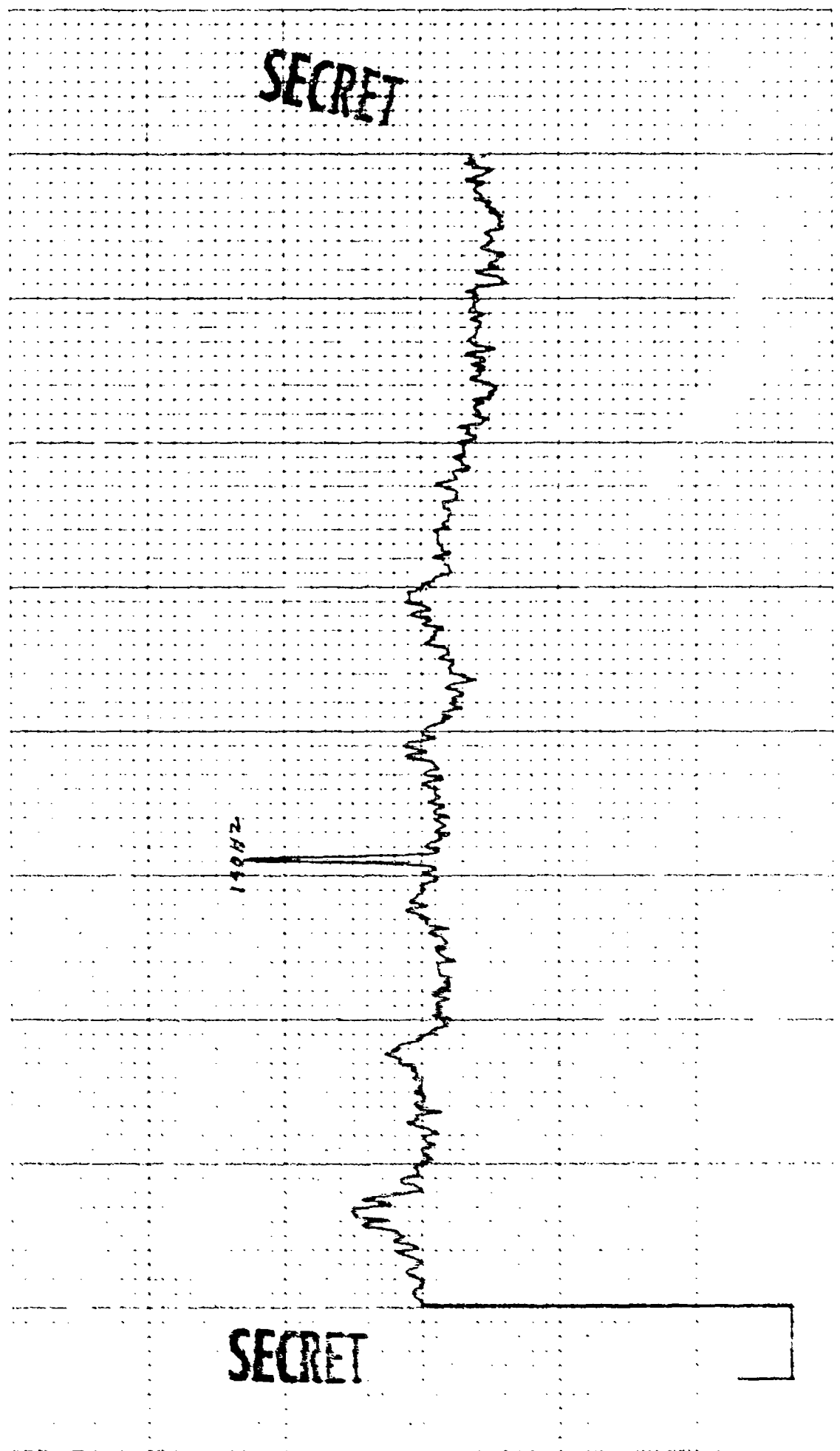


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46 0703

CONTROL: 2033 - 32 (206)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAFF
 CENTER FREQ: 150 HZ
 32 ELEMENTS
 DATE OF ANALYSIS: 17 26 8 28 34
 DATE/TIME: 2-7-77 - 2033Z
 ANALYSIS BANDWIDTH: 1/10HZ
 +20 DEG. AZ STEERING
 REEL: F23
 INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING
 INDE X 2000
 ATTEN: -29 DB



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46 0703

CONTROL: 2033 - 32 (3PG)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
 32 ELEMENTS

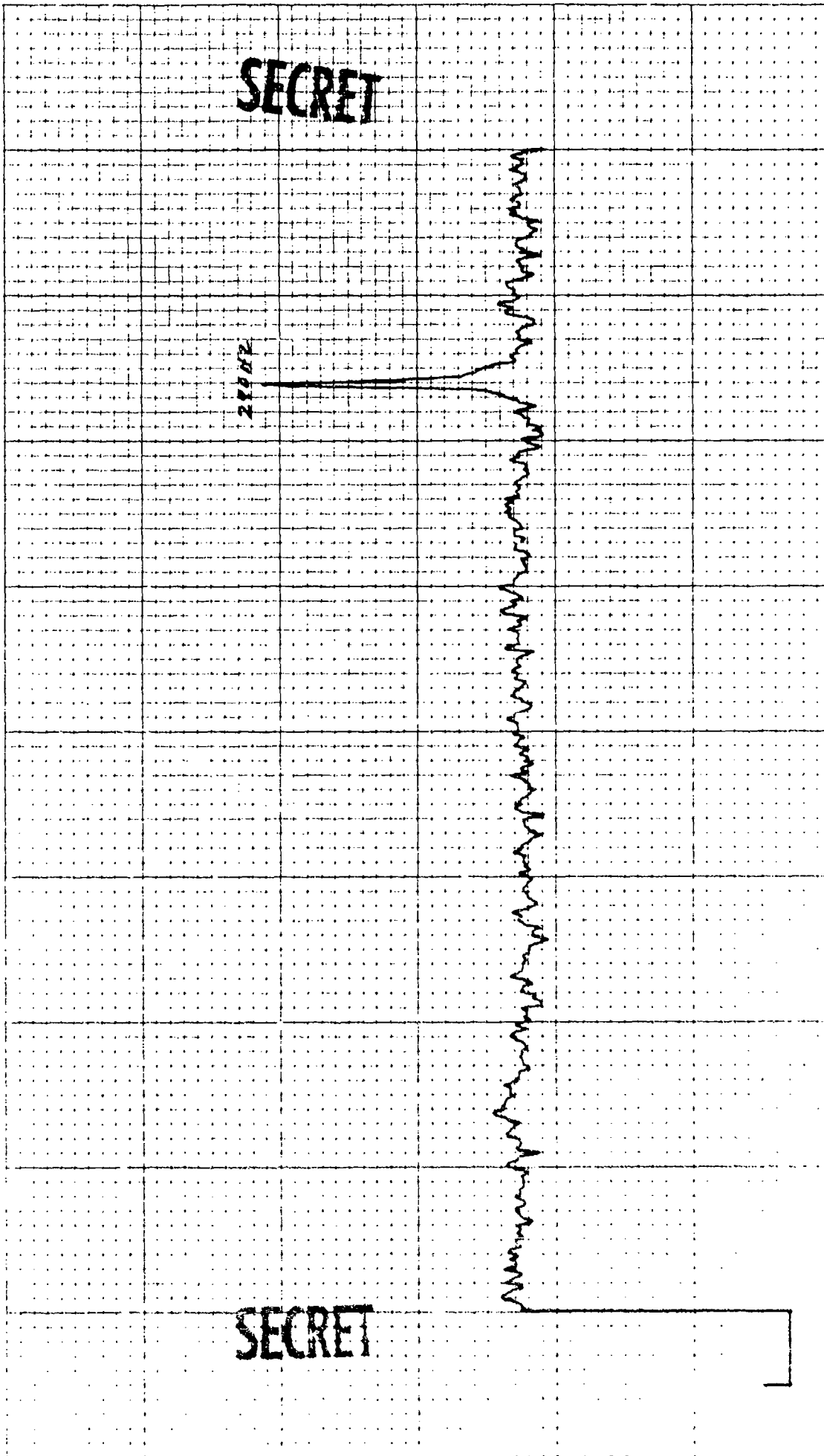
DATE OF ANALYSIS: - - - -
 1-26-77 21-34

INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

REEL: F23 INDE X3000

ANALYSIS BANDWIDTH: 1/10HZ
 +4 DEG. AZ STEERING

ATTEN: -24 DB



46 0703

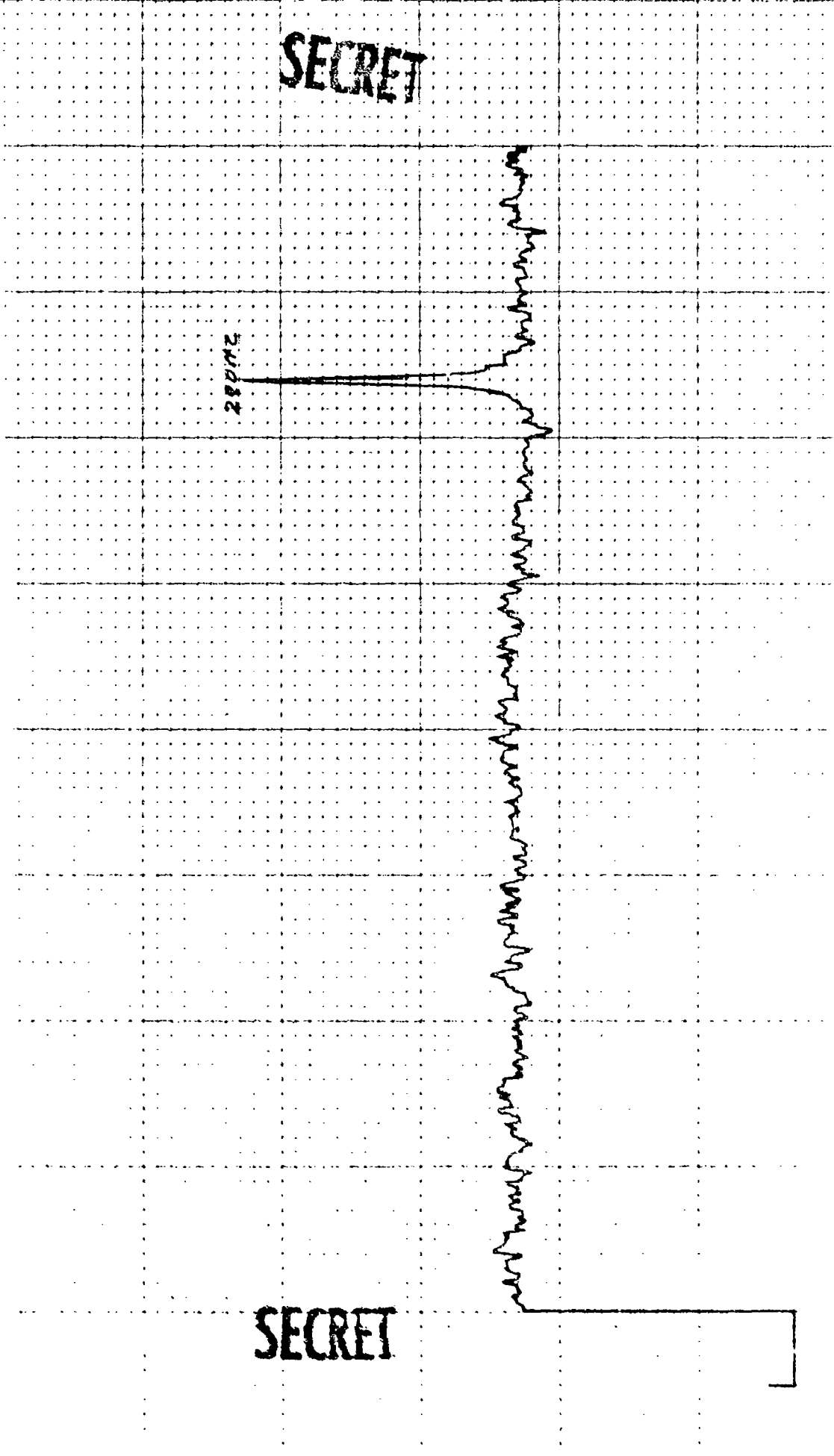
CONTROL: 2033 - 32 (DPC)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 HZ
 32 ELEMENTS

DATE OF ANALYSIS: - - -
 1-26-77 21-34)
 DATE/TIME: 2-7-77 - 2033 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 + 6 DEG. AZ STEERING

REEL: F23

INDE X3000

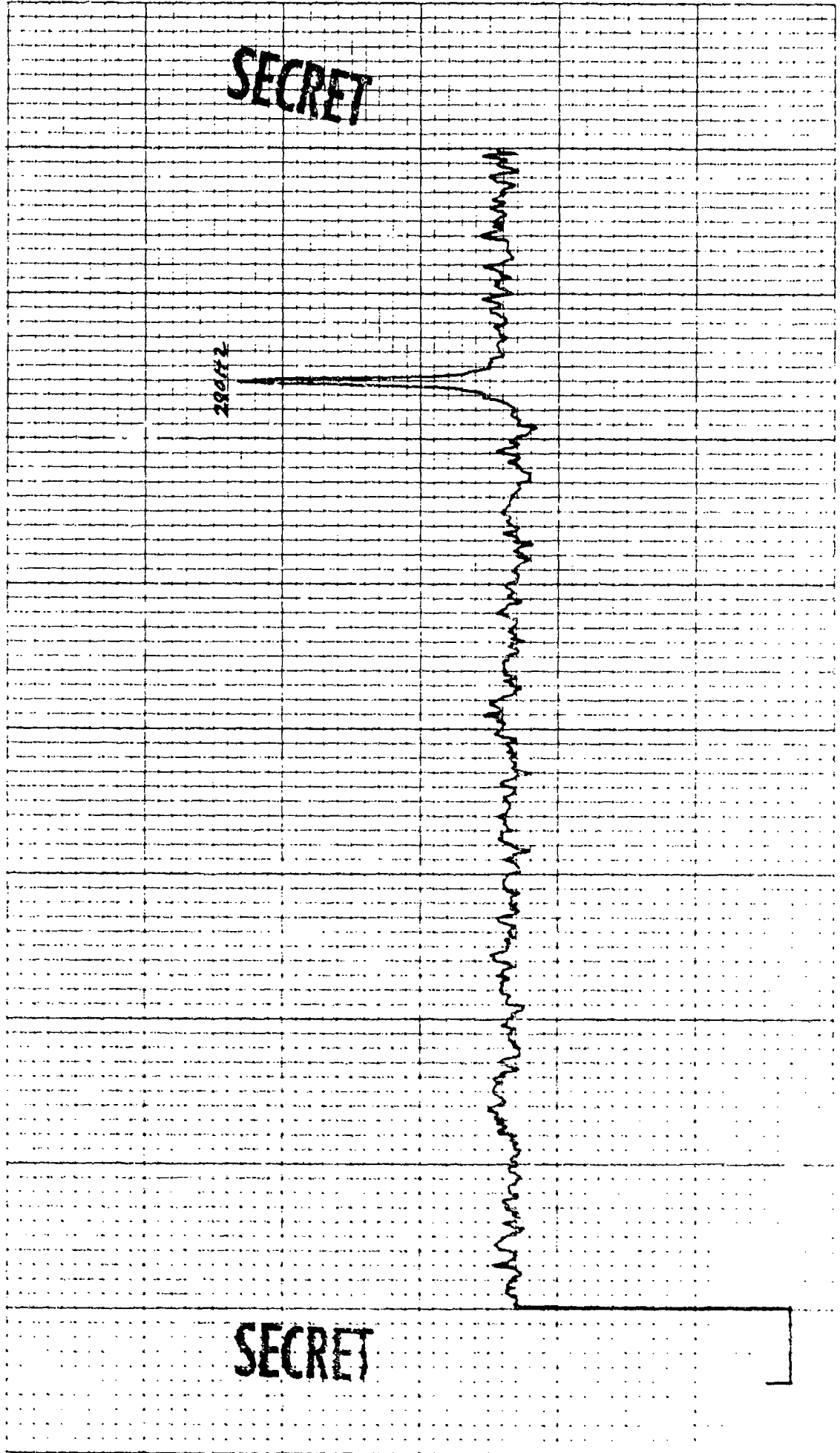
INTEGRATION TIME 320 SECS
 FILTER WTC: HANNING



46 0703

(COPY BEARING TO THE INDEX IS 46 0703)

CONTROL: 2033-32 (DPI) DATE OF ANALYSIS: - - REEL: F23 INDE X3000
 BEAMFORMED SPECTRUM(ELEMENTS) / - 288 28-34)
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033 Z INTEGRATION TIME 320 SECS ATTEN: -24 DB
 CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER WTG: HANNING
32 ELEMENTS +8 DEG. AZ STEERING

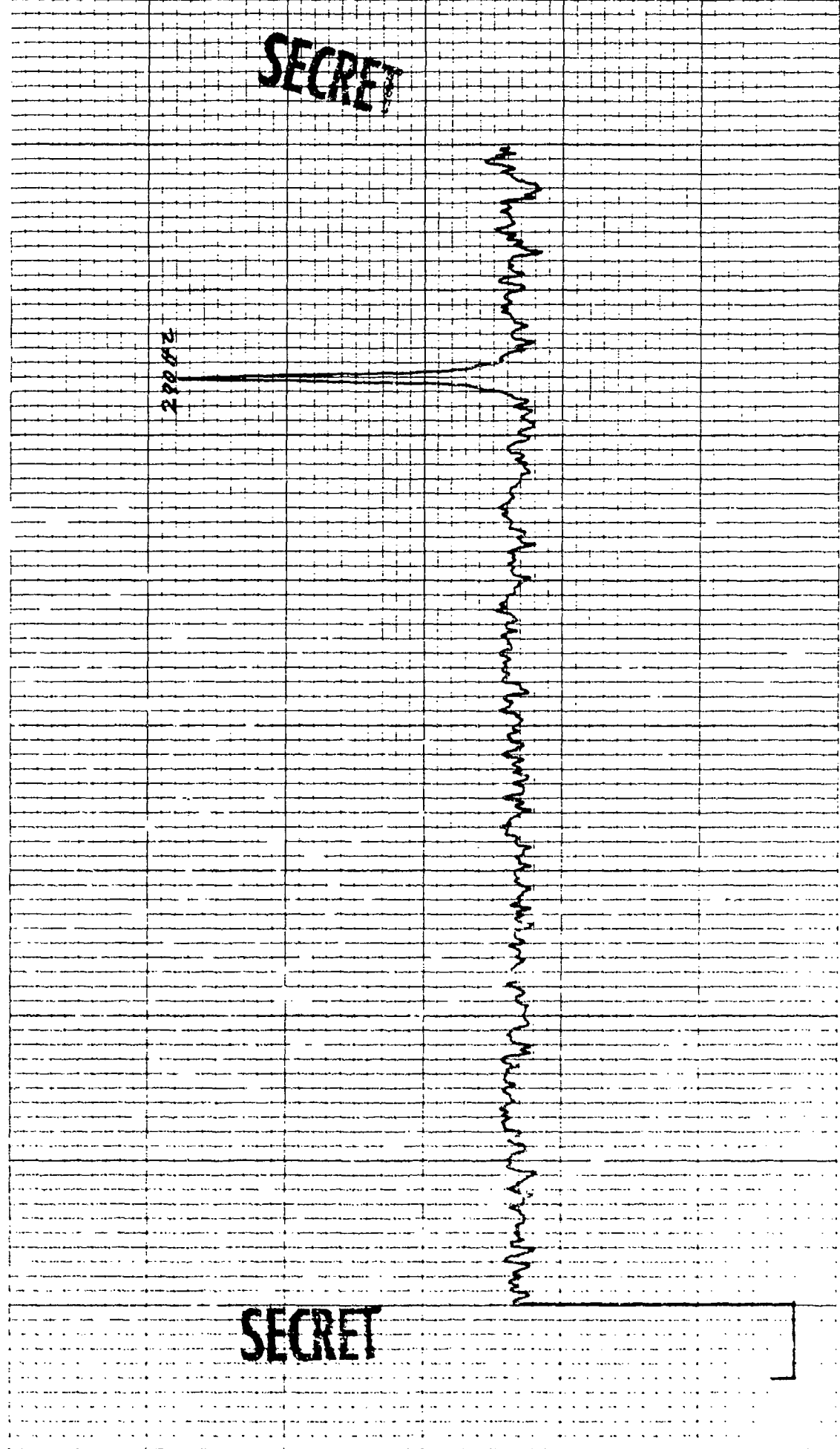


10X 10 TO THE INCHES

46 0703

CONTROL: 2033 - 32 (DPA) DATE OF ANALYSIS: -- -- --
 BEAMFORMED SPECTRUM(ELEMENTS) 1-26-89-34)
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033Z
 CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 1/10HZ
 32 ELEMENTS TIC DEG. AZ STEERING

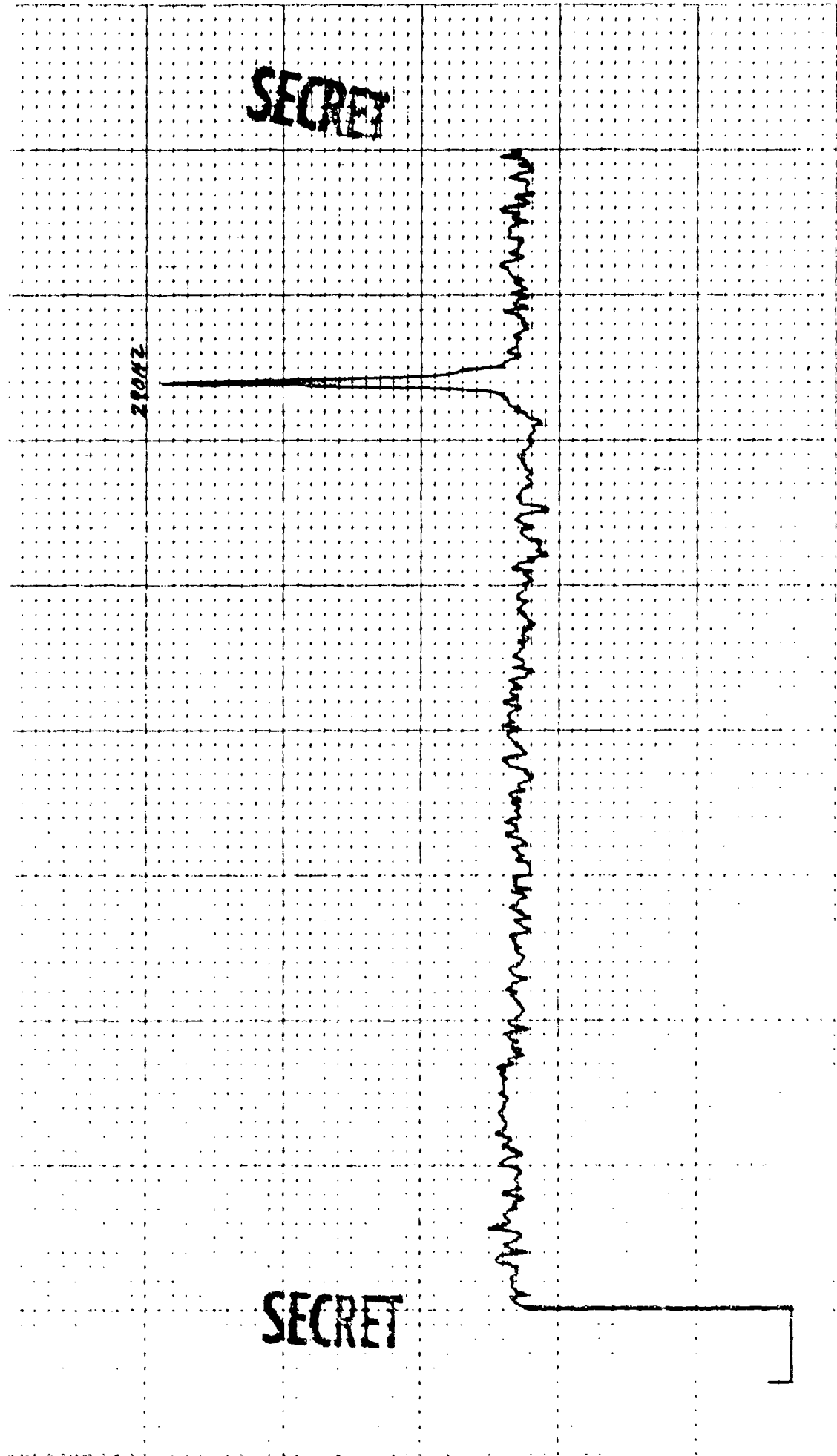
REEL: F.3 INDE X3200
 INTEGRATION TIME 320 SECS ATTN: -29 DB
 FILTER WTG: HANNING



46 0703

NOE 2300 2300 2300 2300

CONTROL: 2033 - 32 (DPC) DATE OF ANALYSIS: 1 - 26 8 29-34 REEL: F23 INDE X3000
BEAMFORMED SPECTRUM(ELEMENTS) ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: -24 DB
EXERCISE: BEARING STAKE * 12 DEC. AZ STEERING FILTER WTG: HANNING
CENTER FREQ: 2800 HZ * 12 DEC. AZ STEERING



46 0703

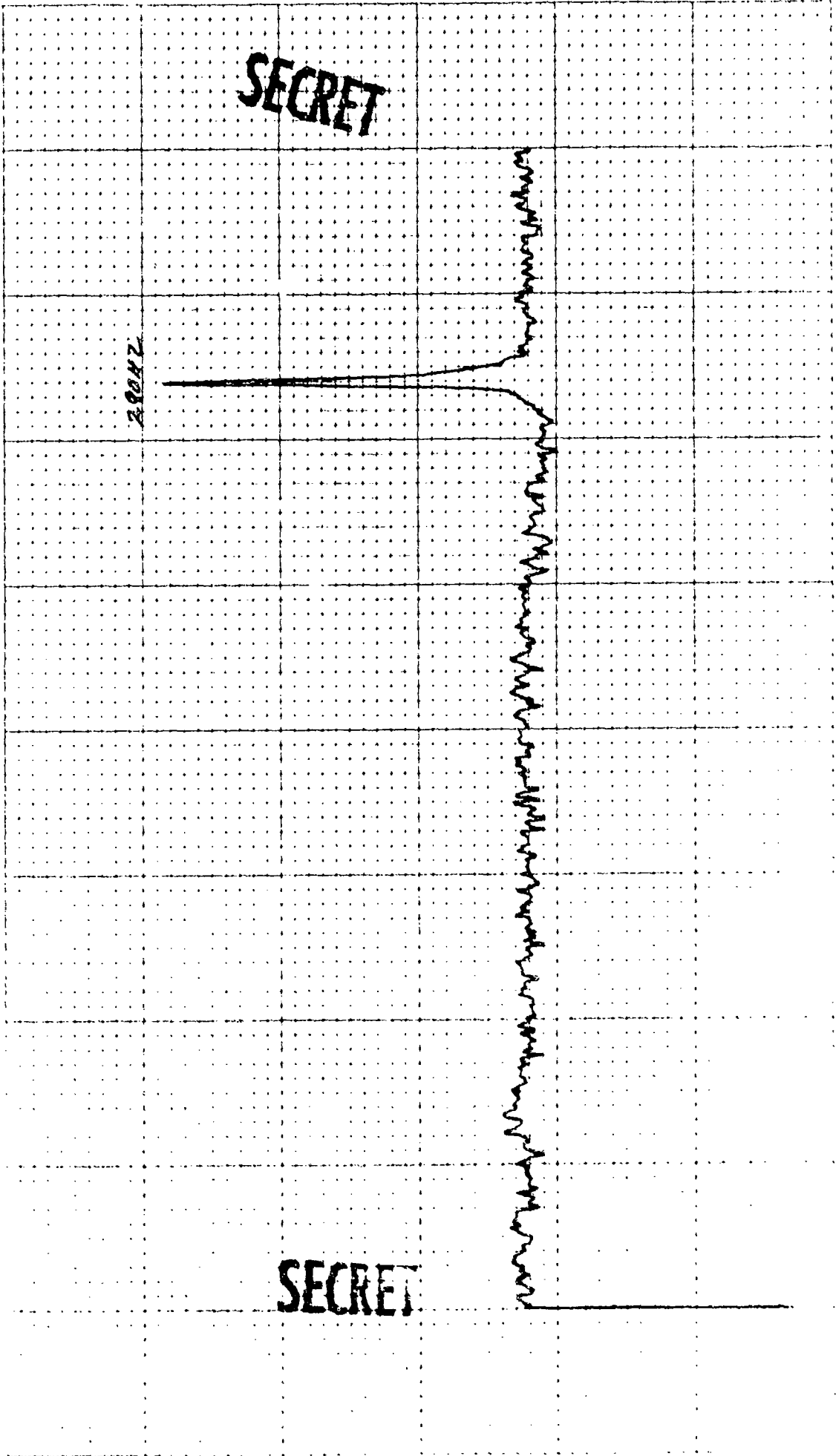
CONTROL: 2073 - 32 (206)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
 JA ELEMENTS

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

REEL: F23 INDE X3000

INTEGRATION TIME 320 SECS
 FILTER WTC: HANNING

DATE/TIME: 2-7-77 - 2073 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 +13 DEG. AZ STEERING



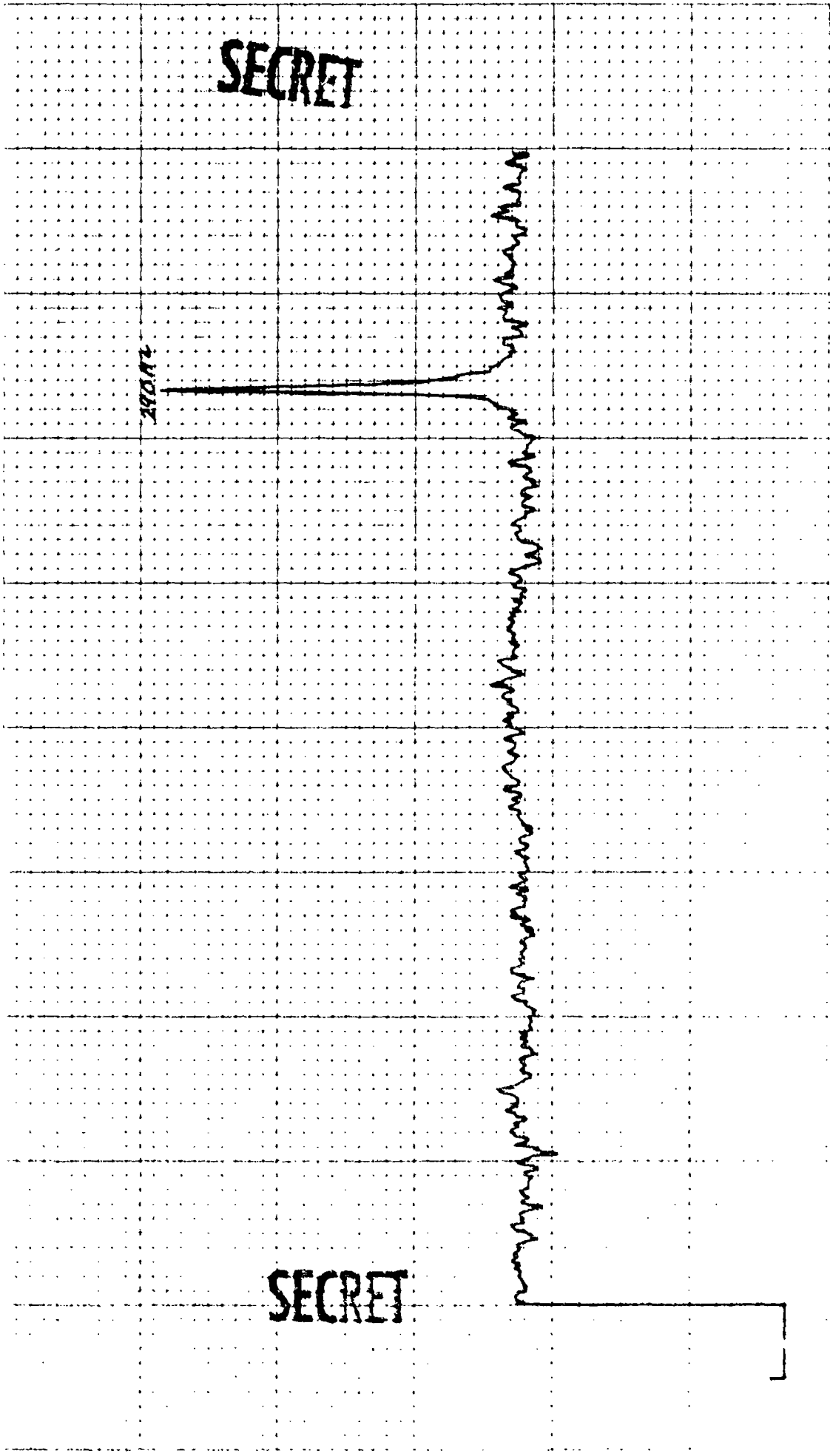
46 0703

CONTROL: 2033-32 (P06)
 BEAMPFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 HZ
 32 ELEMENTS

DATE OF ANALYSIS: 1-26/79-34
 DATE/TIME: 2-7-77 - 2033Z
 ANALYSIS BANDWIDTH: 1/10HZ
 1/4 DEG. AZ STEERING

REEL: F23
 INTEGRATION TIME 320 SECS
 FILTFR WTC: HANNING

INDE X 100



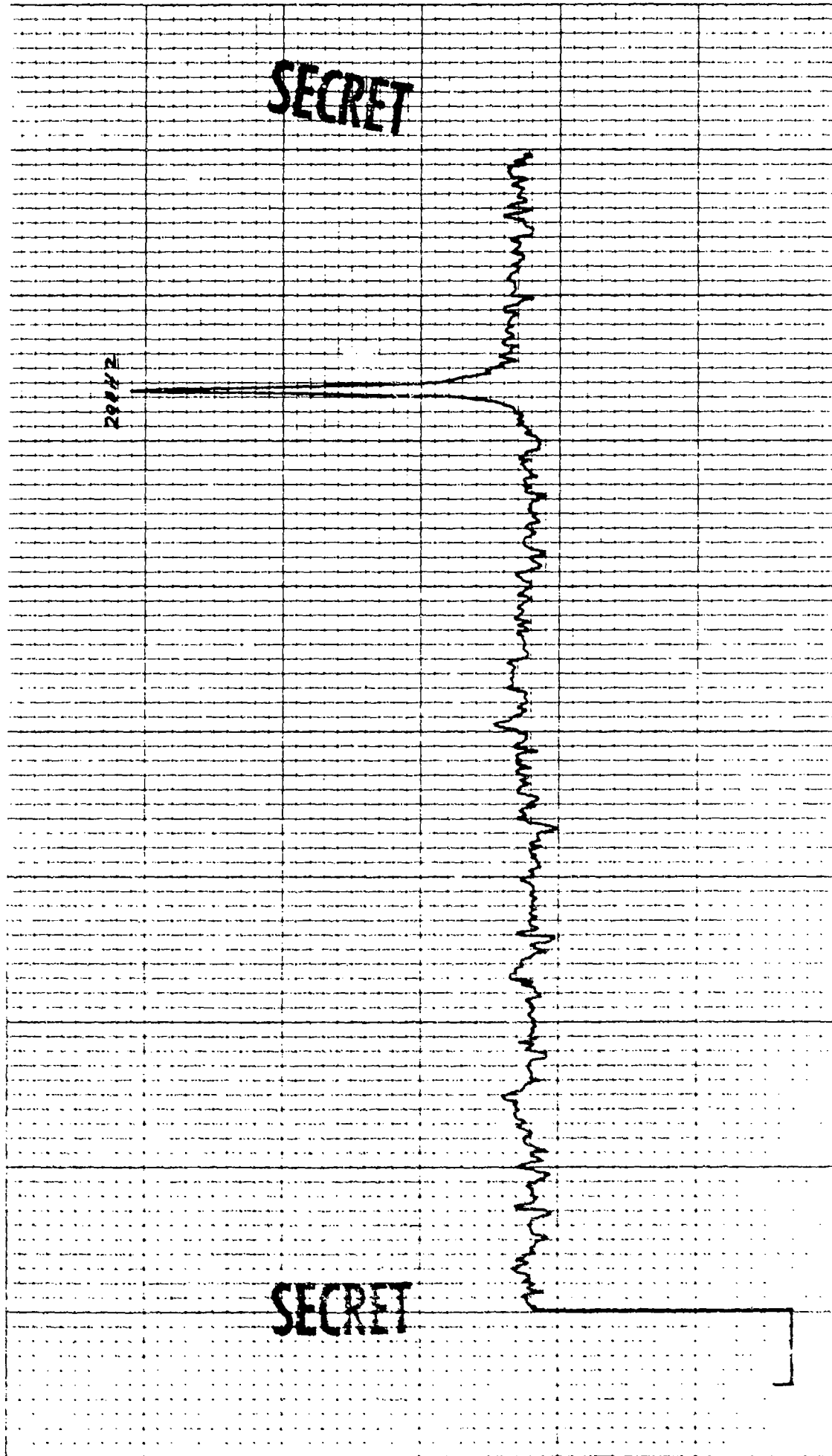
162E 30 X 10 TO THE INCHES 2 1/2 IN. DIA. 1000
REDFIELD & LEECH CO. WASHINGTON, D.C.

46 0703

CONTROL: 2073 - 32 (DPL)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
32 ELEMENTS

DATE OF ANALYSIS: -- -- --
1-26-77
DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+ 16 DEG. AZ STEERING

REEL: F23 INDE X 1000
INTEGRATION TIME 320 SECS ATTEN: 24 DB
FILTER WTG: HANNING



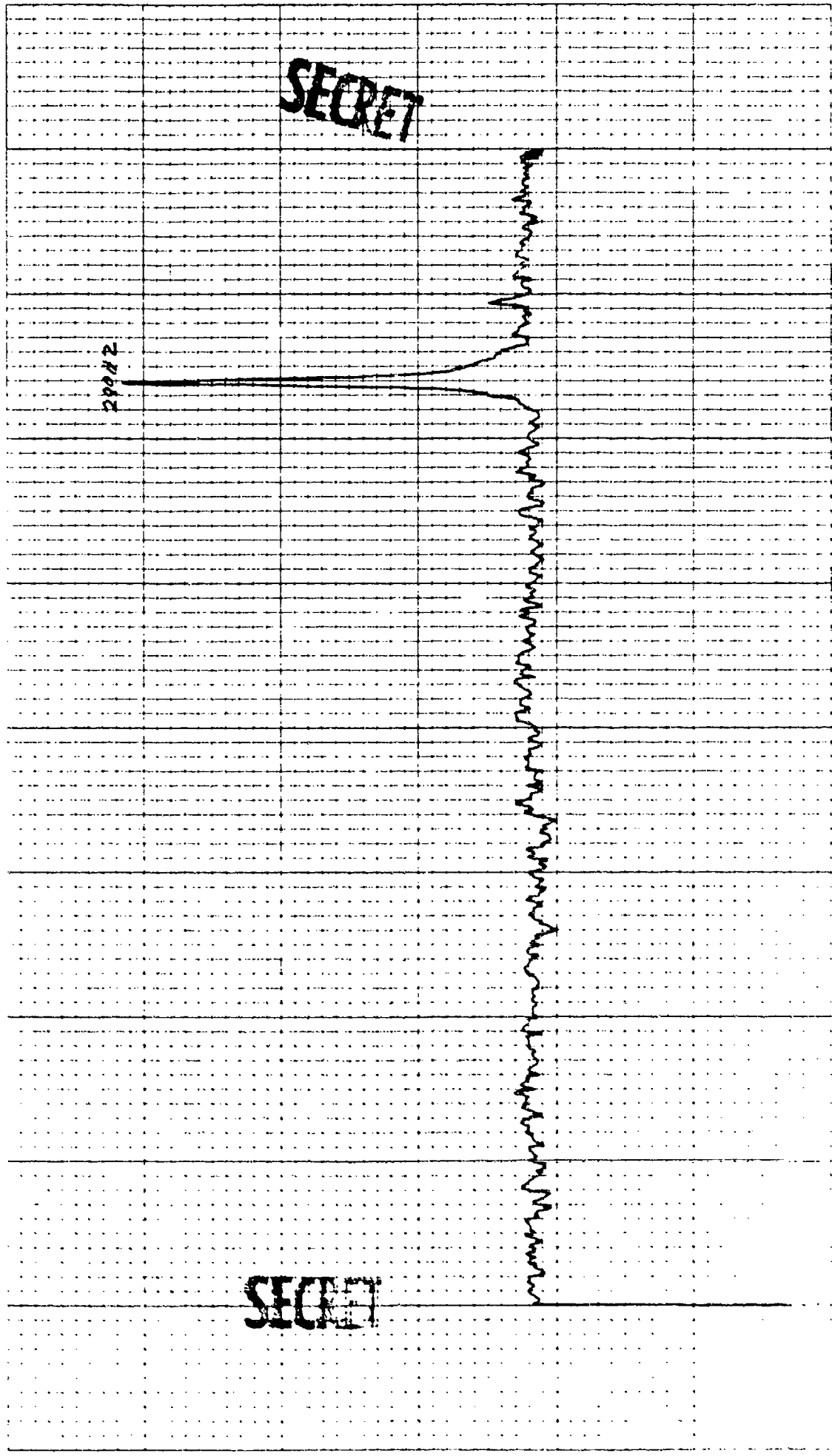
46 0703

REF ID: A16 10 108 0000

CONTROL: 2033 - 5/ (DPC)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

DATE OF ANALYSIS: _____
1-26-84 29-34)
DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
+17 DEG. AZ STEERING

REEL: F23 INDE X J000
INTEGRATION TIME 320 SECS ATTN: 24 DB
FILTER WTG: HANNING

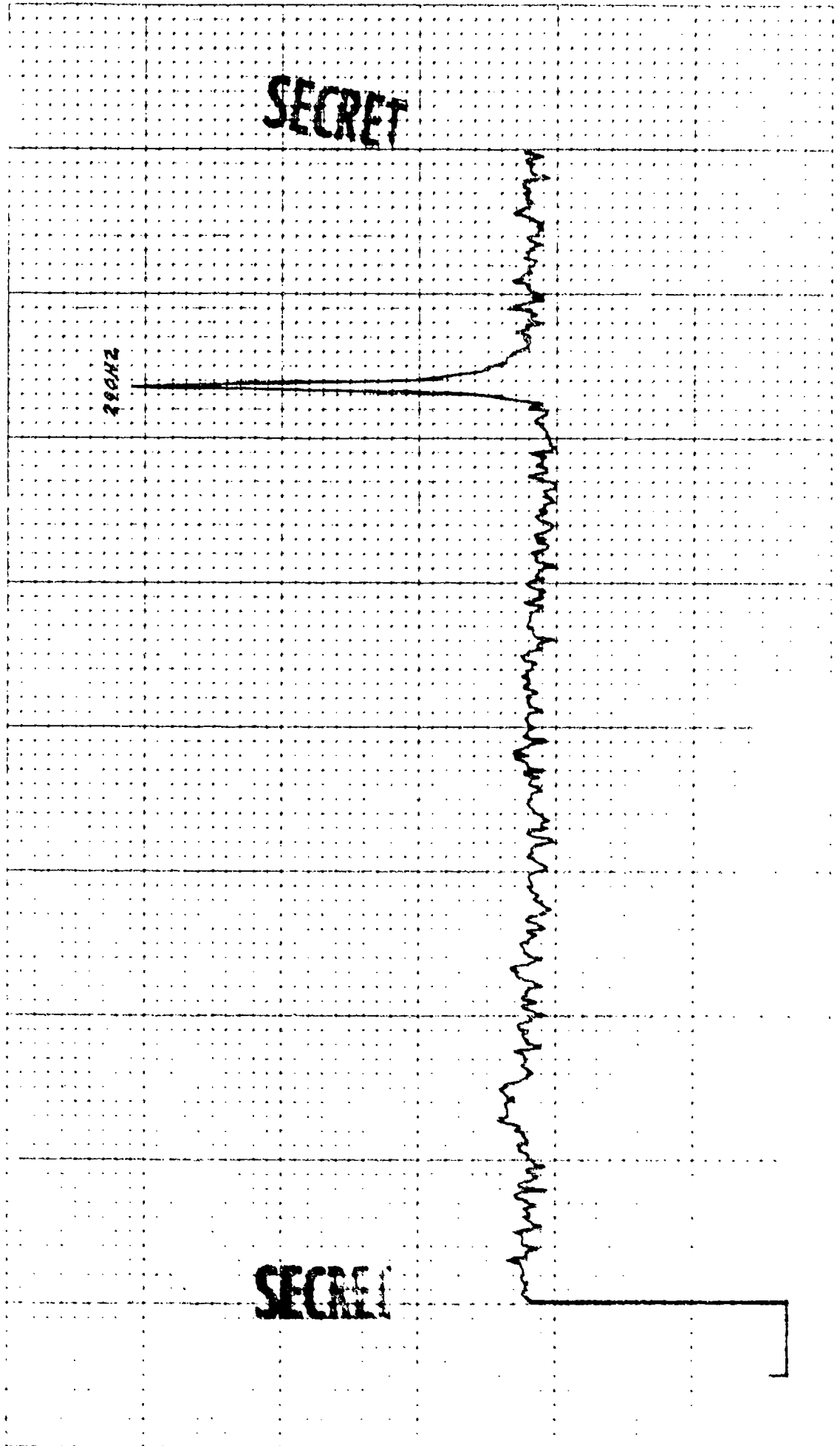


46 0703

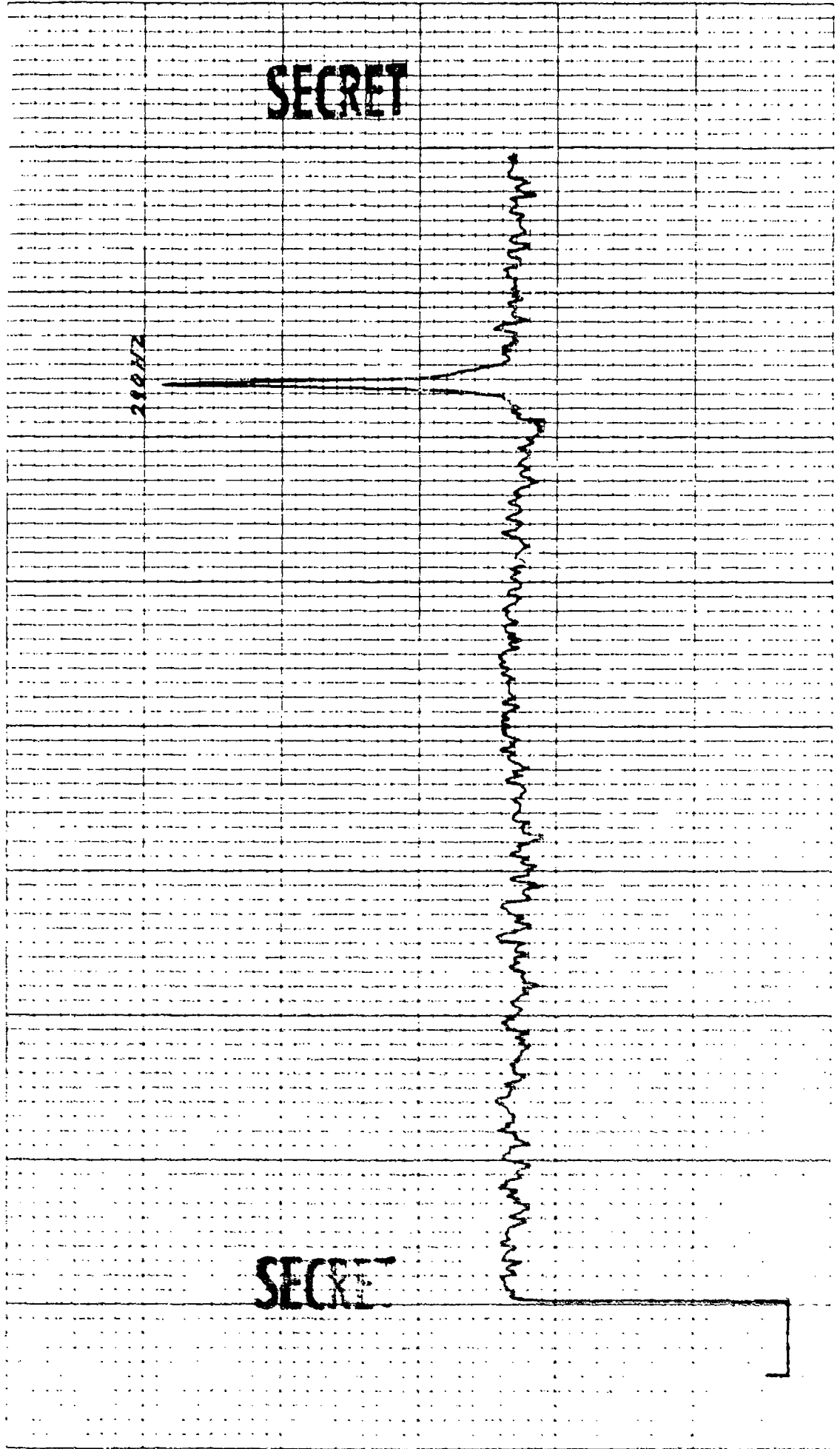
CONTROL: 2073 - 32 (DPL)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
32 ELEMENTS

DATE OF ANALYSIS: 1-26-77
DATE/TIME: 2-7-77 - 2073 Z
ANALYSIS BANDWIDTH: 1/10HZ
+18 DEG. AZ STEERING

REEL: FA3 INDE X3000
INTEGRATION TIME 320 SECS ATTN: -24 DB
FILTFR WTC: HANNING



CONTROL: 2073-32 (DPG) DATE OF ANALYSIS: 1-26-77 - 2073 Z REEL: F-23 INDE X1000
 BEAMFORMED SPECTRUM(ELEMENTS) 29-34)
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTEN: -24 DB
 CENTER FREQ: 280 HZ + 20 DEG. AZ STEERING FILTER WTC: HANNING



46 0703

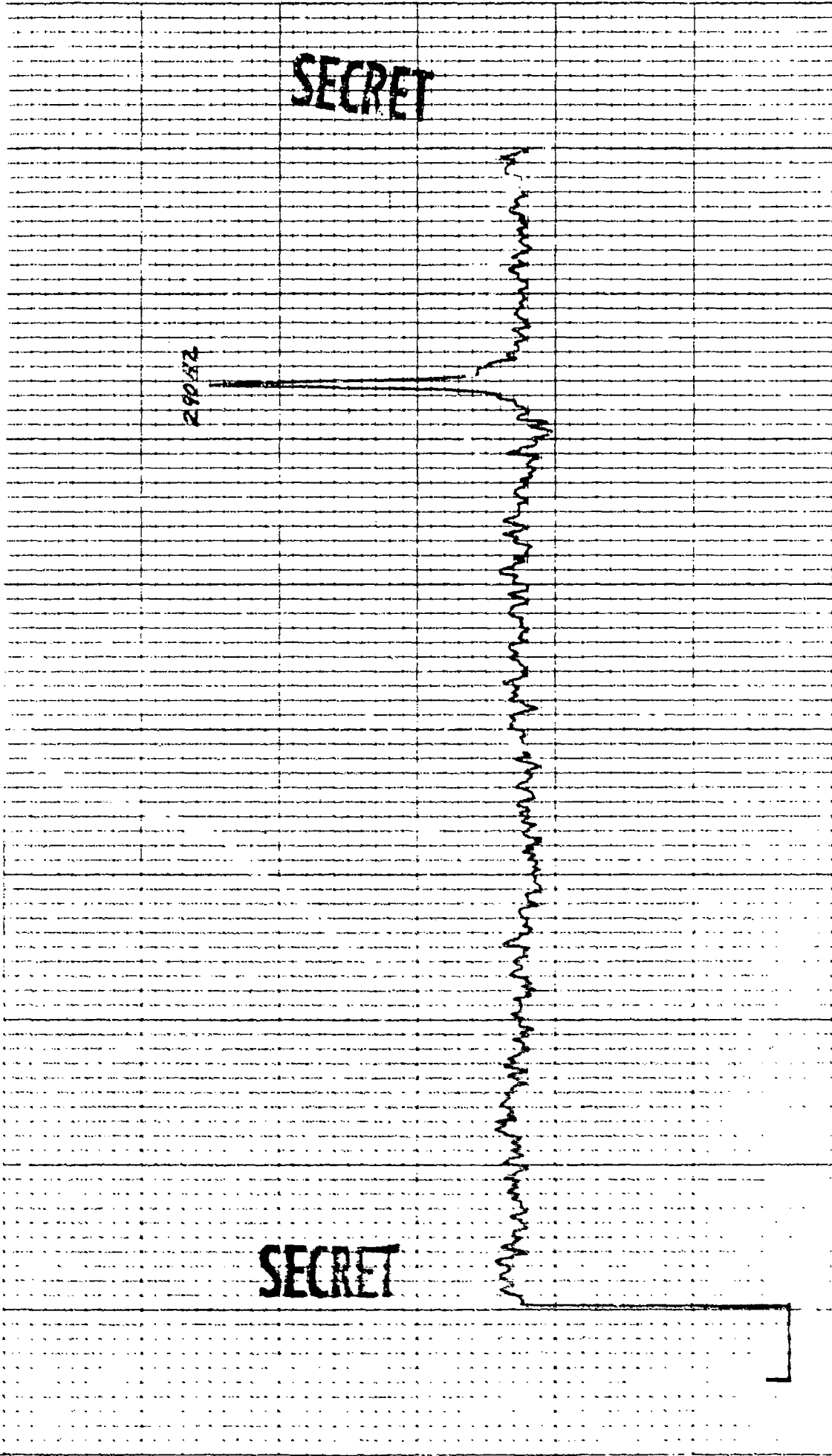
CONTROL: 2033 - 32 (D06)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 HZ
 72 ELEMENTS

DATE OF ANALYSIS: -- -- --
 / - 26 8 22-34

DATE/TIME: 2-7-77 - 2033 Z
 ANALYSIS BANDWIDTH: 1/10 HZ
 + 22 DEG. AZ STEERING

REEL: F23 INDE X3000

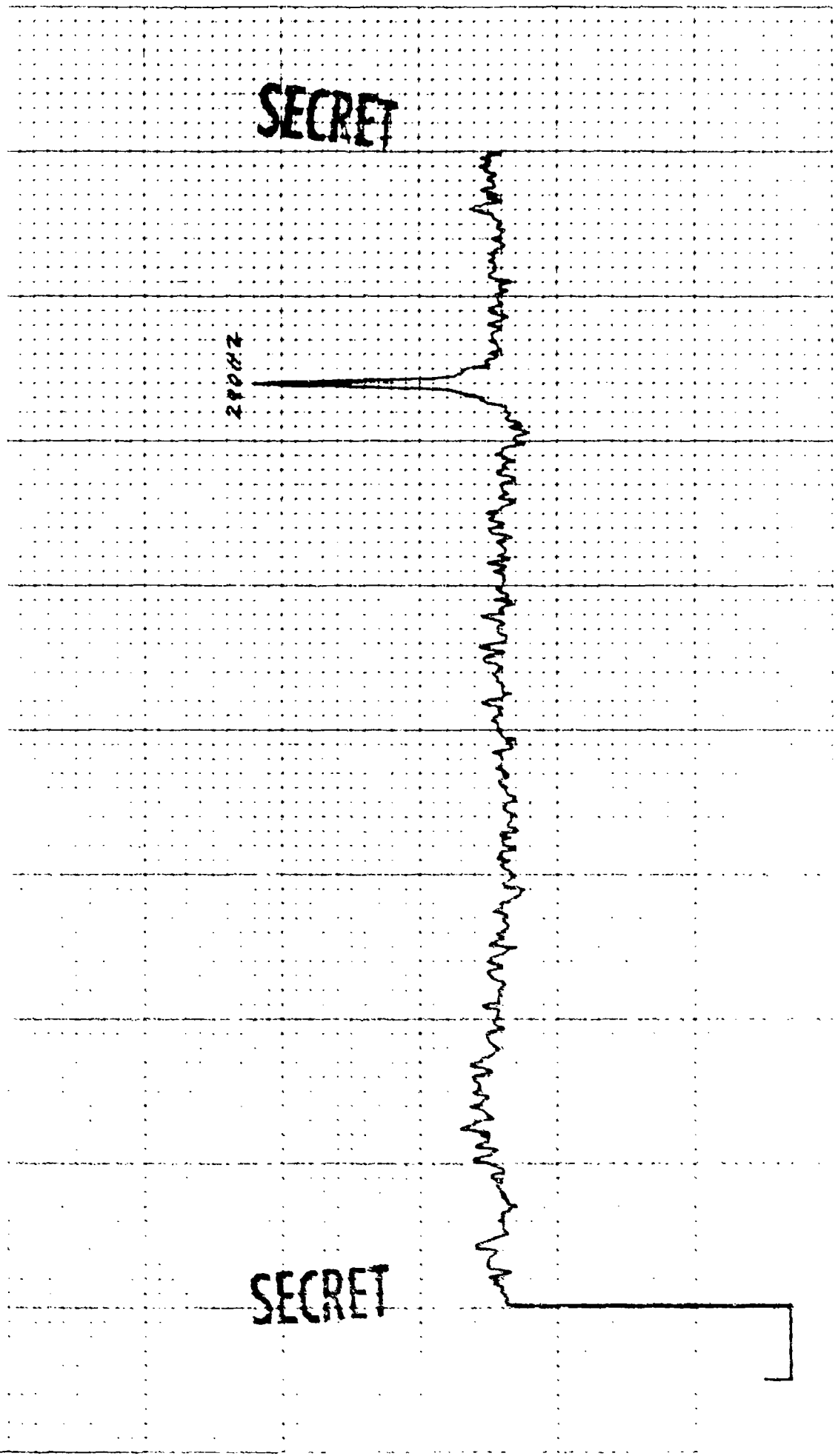
INTEGRATION TIME 320 SECS ATTN: -24 DB
 FILTER WTC: HANNING



46 0703

CONTROL: 2033 - 32 (DP6) DATE OF ANALYSIS: - - - -
 BEAMFORMED SPECTRUM(ELEMENTS) /- 20 8 29 - 34)
 EXERCISE: BEARING STAFF DATE/TIME: 2-7-77 - 2033Z
 CENTER FREQ: 180 HZ ANALYSIS BANDWIDTH: 1/10HZ
 32 ELEMENTS 4 2Y DEG. AZ STEERING

REEL: F33 INDE X3000
 INTEGRATION TIME 320 SECS ATTN: -2Y DB
 FILTER WTC: HANNING

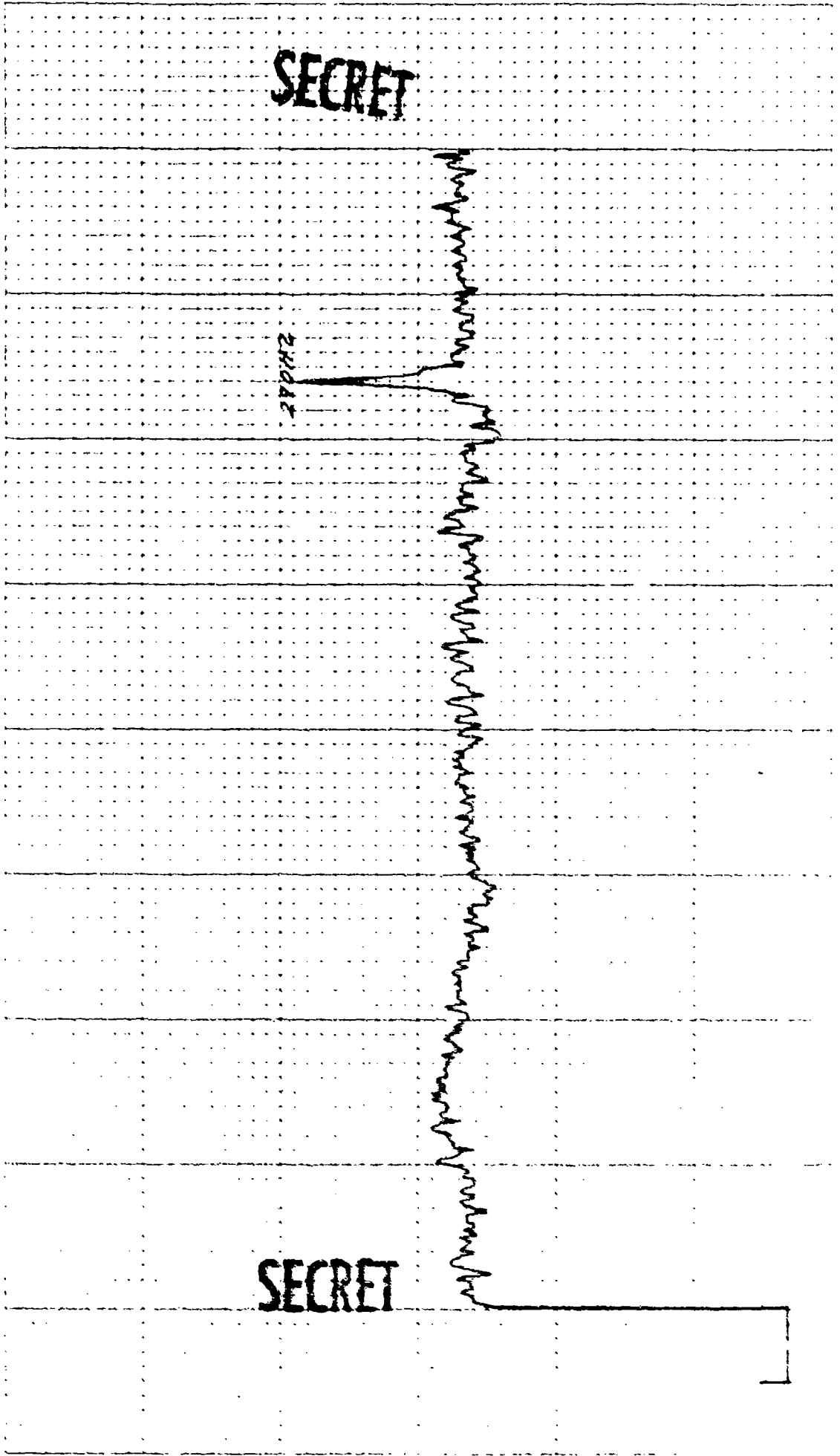


46 0703

CONTROL: 2037 - 32 (006)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 HZ
 32 ELEMENTS

DATE OF ANALYSIS: 1-26-89 (89-34)
 DATE/TIME: 2-7-77 - 2033Z
 ANALYSIS BANDWIDTH: 1/10HZ
 + 26 DEG. AZ STEERING

REEL: F23 INDE X 3000
 INTEGRATION TIME 320 SECS ATTEN: -24 DB
 FILTER WTG: HANNING



CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 6

FREQUENCY 140 HZ

NUMBER OF ELEMENTS 51

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-32.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-22.8	
BEAMFORMER GAIN	<u>+30</u>	+7.2	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .2</u>	+7.4	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-66.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	-56.8	
BEAMFORMER GAIN	<u>+30</u>	-26.8	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+7.2</u>	
SIGNAL LEVEL FOR SNR	<u>-26.8</u>	34	
PROCESSOR CORRECTION	<u>-4.0</u>	30	
MRA CORRECTION	<u>+ .2</u>	30.2	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	22	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 6

FREQUENCY 290 HZ

NUMBER OF ELEMENTS 51

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-34.1</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-24.1</u>	
BEAMFORMER GAIN	<u>+30</u>	<u>+5.9</u>	SIG. LEVEL FOR SNR CALCULATION
MRA CORRECTION	<u>+ .8</u>	<u>+6.7</u>	SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED		<u>-69.8</u>	
MCPS-32 CAL. CORRECTION	<u>+10</u>	<u>-59.8</u>	
BEAMFORMER GAIN	<u>+30</u>	<u>-29.8</u>	NOISE LEVEL FOR SNR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR		<u>+5.9</u>	
SIGNAL LEVEL FOR SNR	<u>-29.8</u>	<u>35.7</u>	
PROCESSOR CORRECTION	<u>-4.0</u>	<u>31.7</u>	
MRA CORRECTION	<u>+ .8</u>	<u>32.5</u>	SNR 1/10 HZ BAND
BANDWIDTH CONVERSION	<u>-8.2</u>	<u>24.3</u>	SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL

DATA POINT 6

SIGNAL GAIN

	<u>140 HZ</u>	<u>290HZ</u>	<u>295HZ</u>
MEAN OMNI SIGNAL LEVEL	<u>-24.7</u>	<u>-23.0</u>	<u> </u>
MRA SIGNAL LEVEL	<u>+ 7.4</u>	<u>+ 6.7</u>	<u> </u>
ARRAY SIGNAL GAIN	<u>32.1</u>	<u>29.7</u>	<u> </u>
20 LOG <u>5/</u>	<u>34.1</u>	<u>34.1</u>	<u> </u>
# of elements			
DIFFERENCE	<u>- 2.0</u>	<u>- 4.4</u>	<u> </u>

ARRAY GAIN

MRA SNR	<u>30.2</u>	<u>32.5</u>	<u> </u>
MEAN OMNI SNR	<u>15.4</u>	<u>19.9</u>	<u> </u>
ARRAY GAIN	<u>14.8</u>	<u>12.6</u>	<u> </u>
THEORETICAL AZMUTH GAIN (at MRA)	<u>15.5</u>	<u>17.5</u>	<u> </u>
DIFFERENCE	<u>- .7</u>	<u>- 4.9</u>	<u> </u>

CONFIDENTIAL

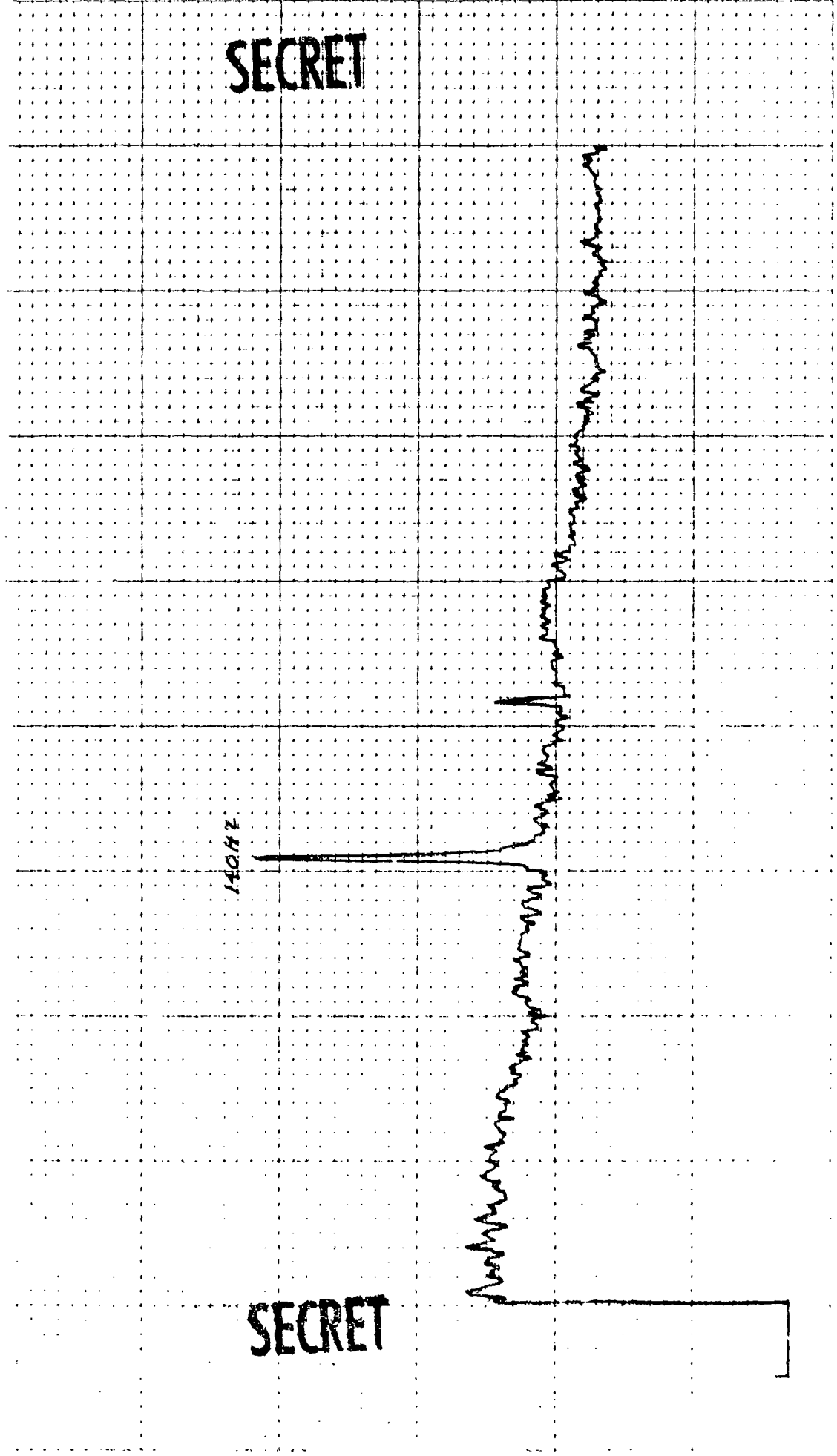
46 0703

CONTROL: 2033 - 51 (DPC) DATE OF ANALYSIS: -- -- --
 BEAMFORMED SPECTRUM(ELEMENTS) 1-26 8 21-53
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033 Z
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
 51 ELEMENTS 8 DEG. AZ STEERING

INDE X 3000

REEL: F23

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



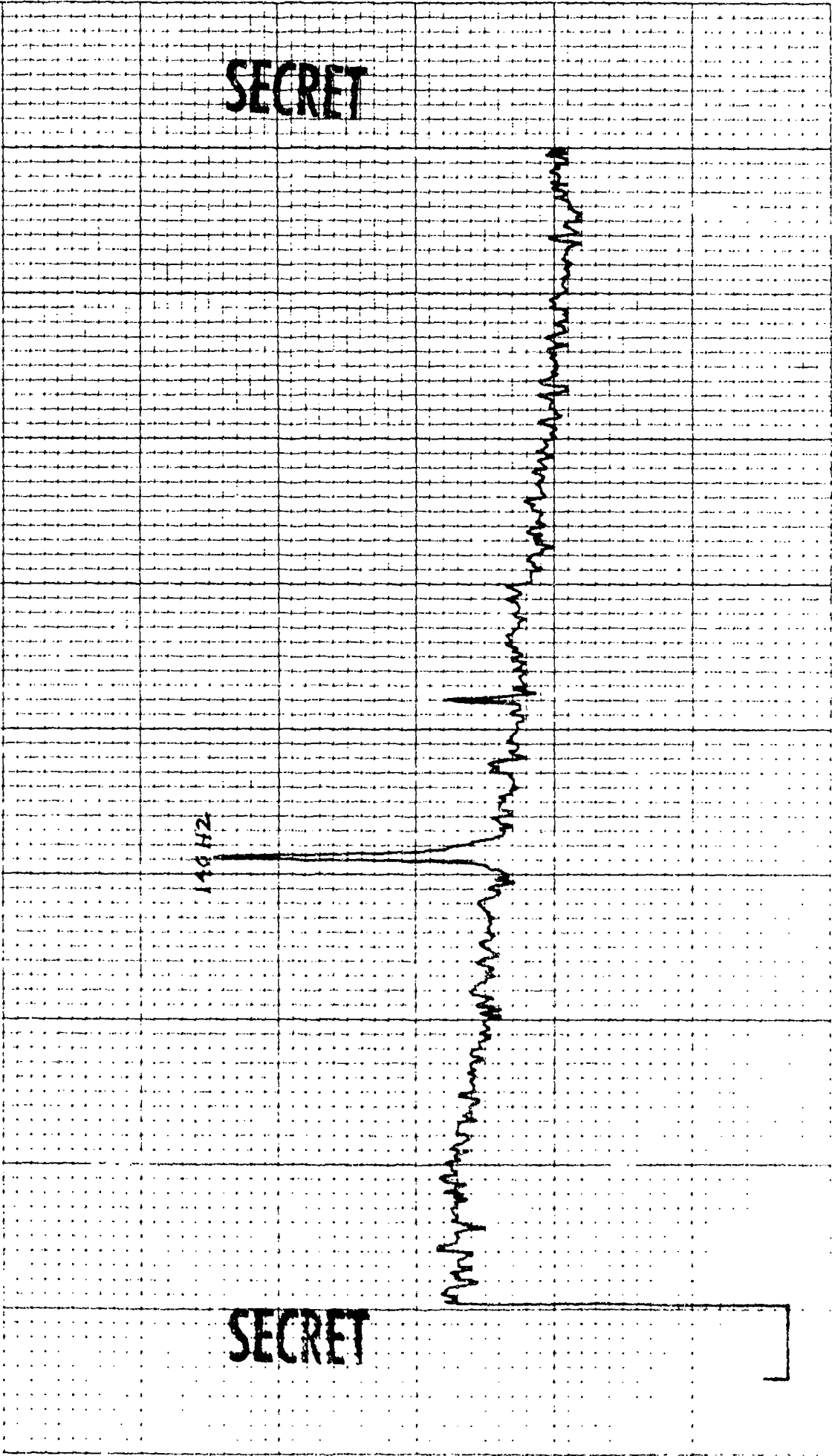
SECRET

SECRET

46 0703

REC'D BY THE ENGINEERING CO. 1-26-53

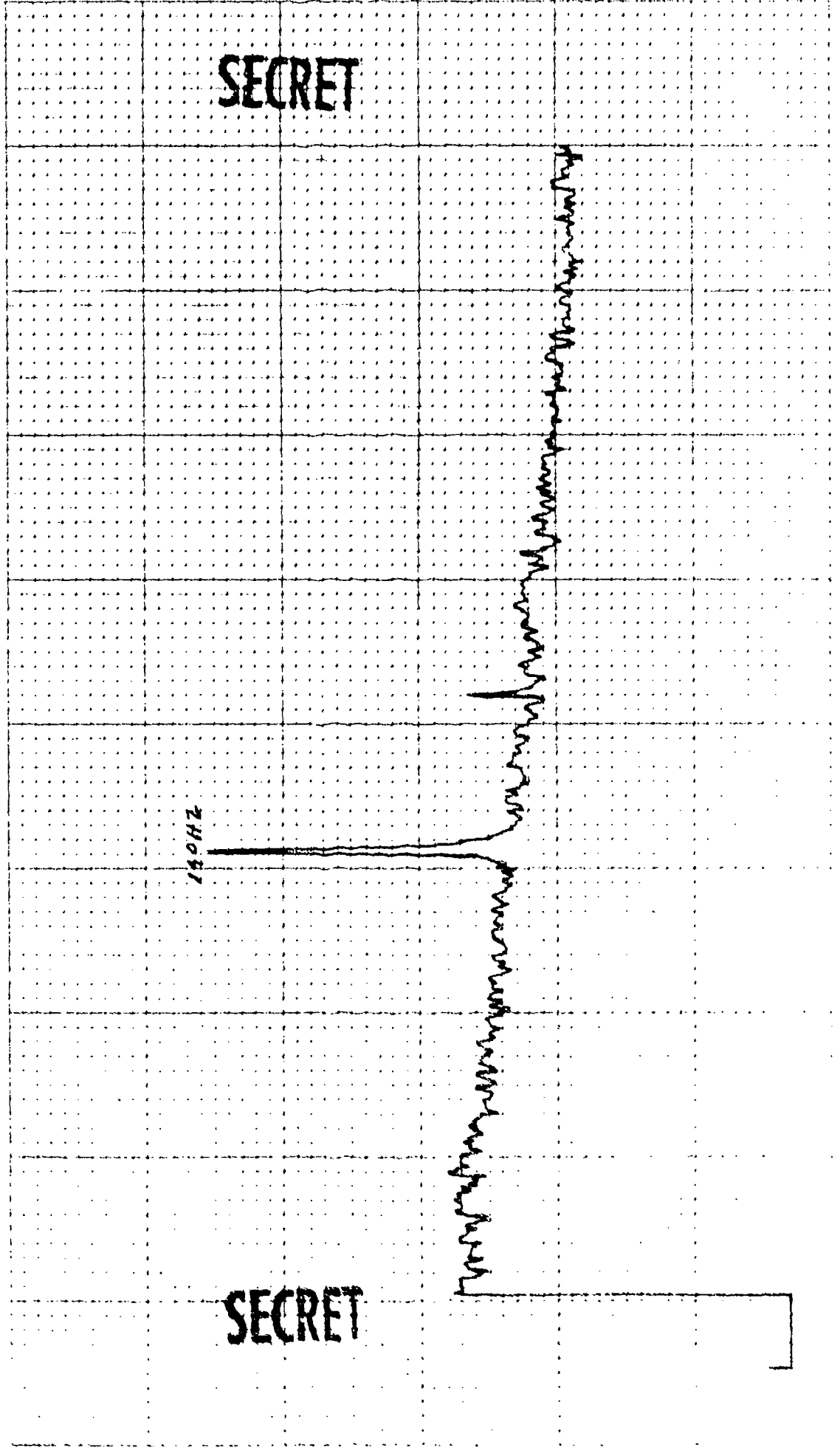
CONTROL: 2033-51 (DP6) DATE OF ANALYSIS: 1-26-53 REEL: F23 INDE X 3000
 BEAMFORMED SPECTRUM(ELEMENTS))
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033Z INTEGRATION TIME 320 SECS ATTN: -30 DB
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1710HZ FILTER WTG: HANNING
51 ELEMENTS +10 DEG. AZ STEERING



46 0703

KEY BEARING STAKE

CONTROL: 2033 - 51 (206) DATE OF ANALYSIS: - - REEL: F23 INDE X J00c
 BEAMFORMED SPECTRUM(ELEMENTS) 1-264 28-53)
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ INTEGRATION TIME 320 SECS ATTN: -30 DB
 CENTER FREQ: 150 HZ +12 DEG. AZ STEERING FILTRP WTG: HANNING
51 ELEMENTS



SECRET

SECRET

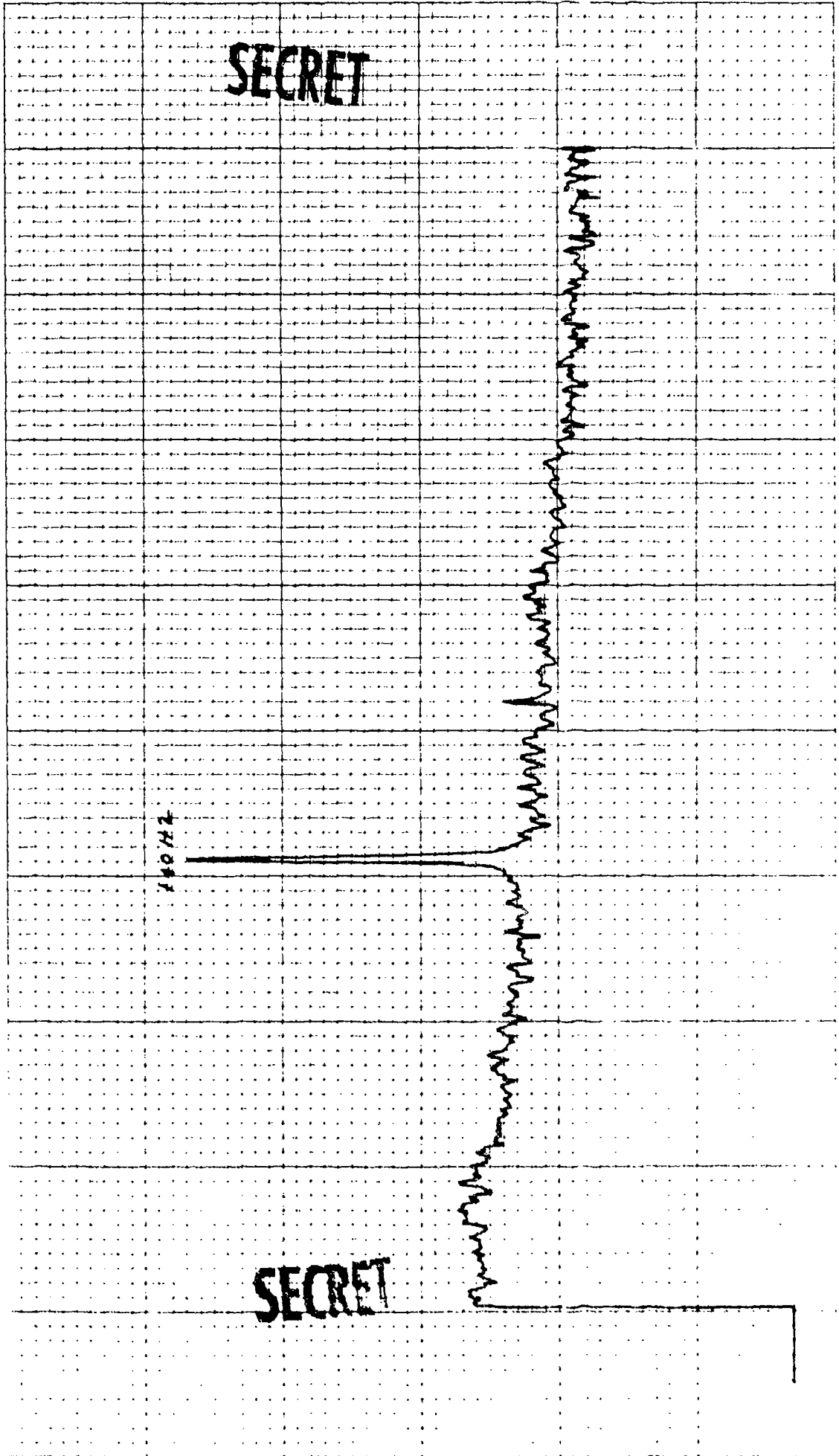
10-2 IN TO THE INCHS. 2.5 CM PER INCH.
REFLECT & ENERGY. 2.5 CM PER INCH.

46 0703

CONTROL: 2033 - 51 (D6)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
B/ ELEMENTS

DATE OF ANALYSIS: - - - -
1-26 & 28-53
DATE/TIME: 2-7-77 - 2033Z
ANALYSIS BANDWIDTH: 1/10HZ
+ 14 DEG. AZ STEERING

REEL: F23 INDE X3000
INTEGRATION TIME 320 SECS ATTEN: -30 DB
FILTER WTG: HANNING

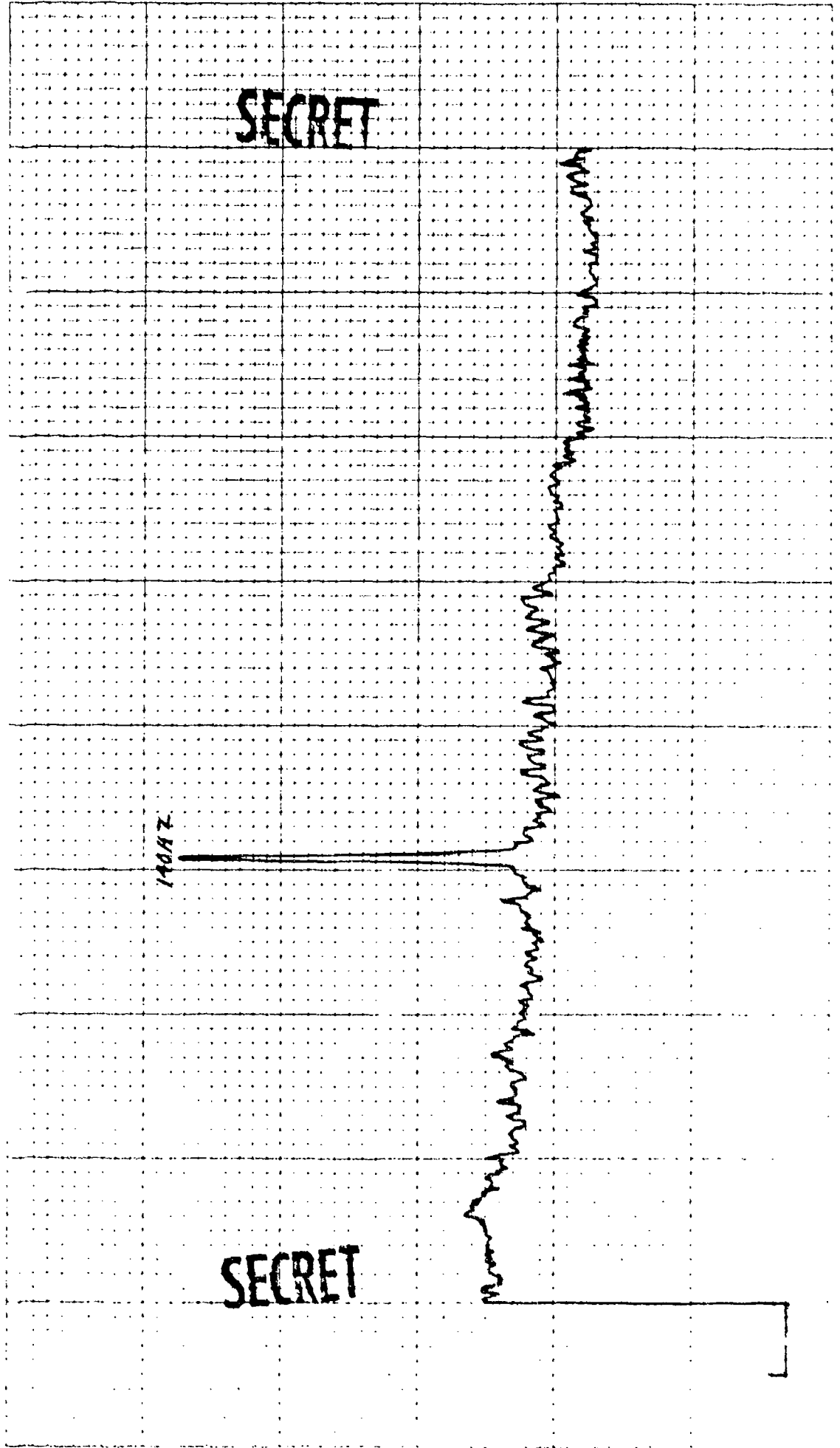


46 0703

CONTROL: 2033 - 5/ (DPC)
 BEAMPFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 5/ ELEMENTS

DATE OF ANALYSIS: _____
 1-26-77 29-53
 DATE/TIME: 2-7-77 - 2033 Z
 ANALYSIS BANDWIDTH: 1/10HZ
 4/5 DEG. AZ STEERING

REEL: F23 INDE X 3000
 INTEGRATION TIME 320 SECS ATTEN: 30 DB
 FILTER WTC: HANNING

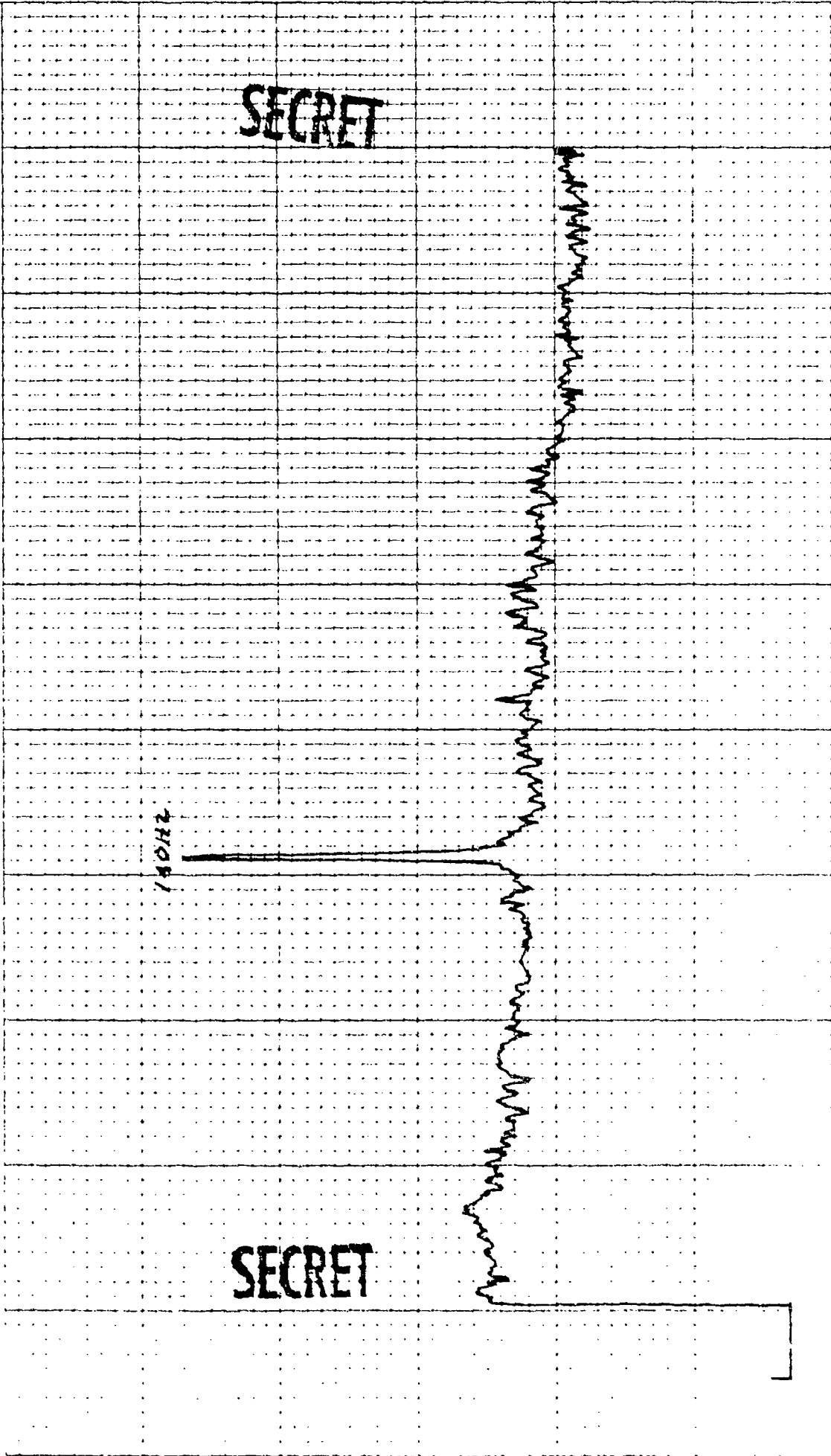


46 0703

CONTROL: 2033 - 51 (DPL)
BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
51 ELEMENTS

DATE OF ANALYSIS: -- -- --
1-26-8 20-53
DATE/TIME: 2-7-77 - 2033Z
ANALYSIS BANDWIDTH: 1710HZ
+ 16 DEG. AZ STEERING

INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTFR WTC: HANNING
REEL: F23
INDE X3000



CONTROL: 2033 - 51 (206)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 51 ELEMENTS

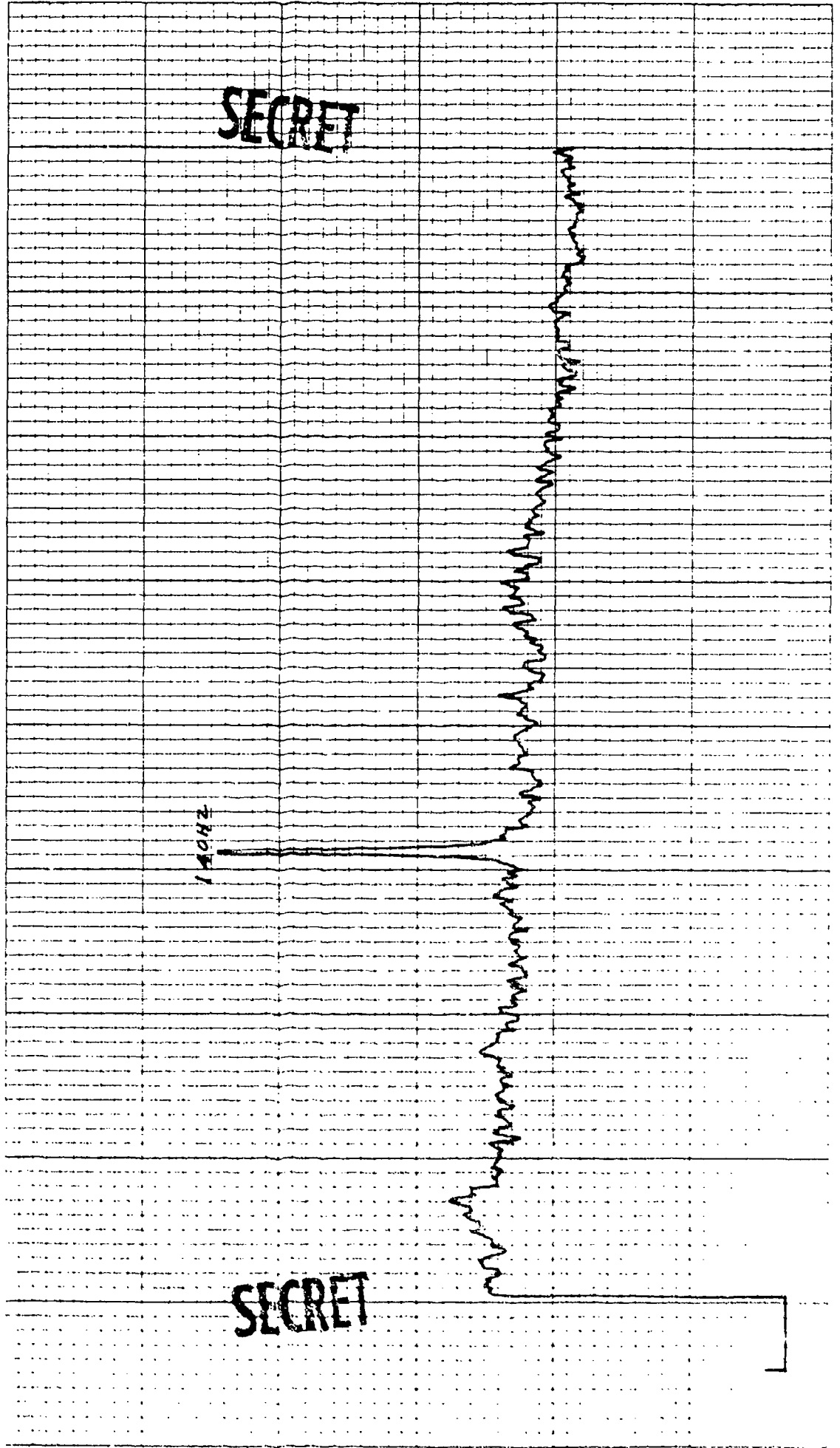
DATE OF ANALYSIS: - - - -
 1-26-89 09-53

INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

REEL: F23 INDE X 3000

ATTEN: -90 DB

ANALYSIS BANDWIDTH: 1/10 HZ
 + 18 DEG. AZ STEERING

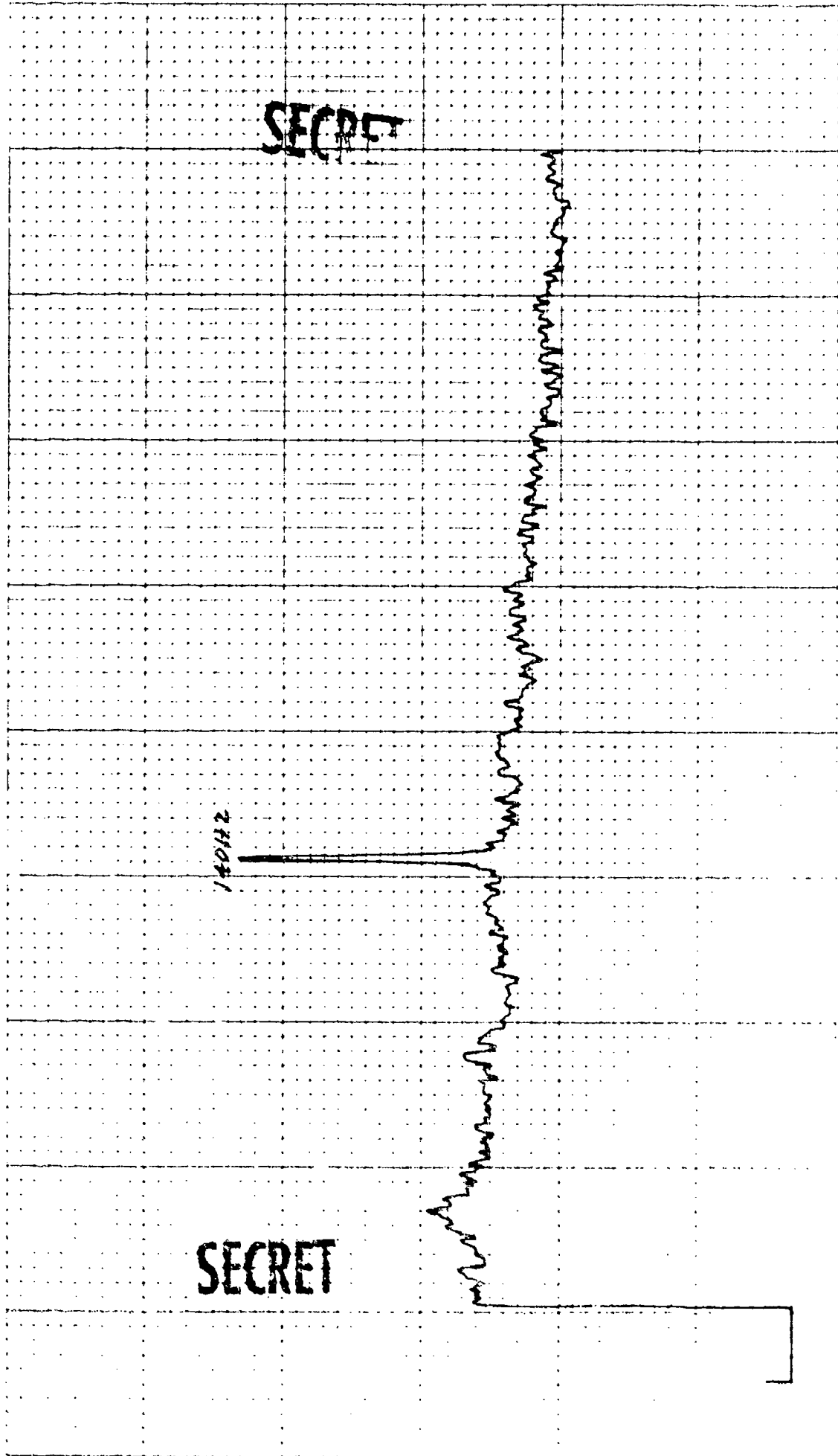


SECRET

SECRET

CONTROL: 2033-51 (DPG) DATE OF ANALYSIS:
 BEAMFORMED SPECTRUM (ELEMENTS) 1-26829-53
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
51 ELEMENTS
 ANALYSIS BANDWIDTH: 1/10 HZ
 + 20 DEG. AZ STEERING

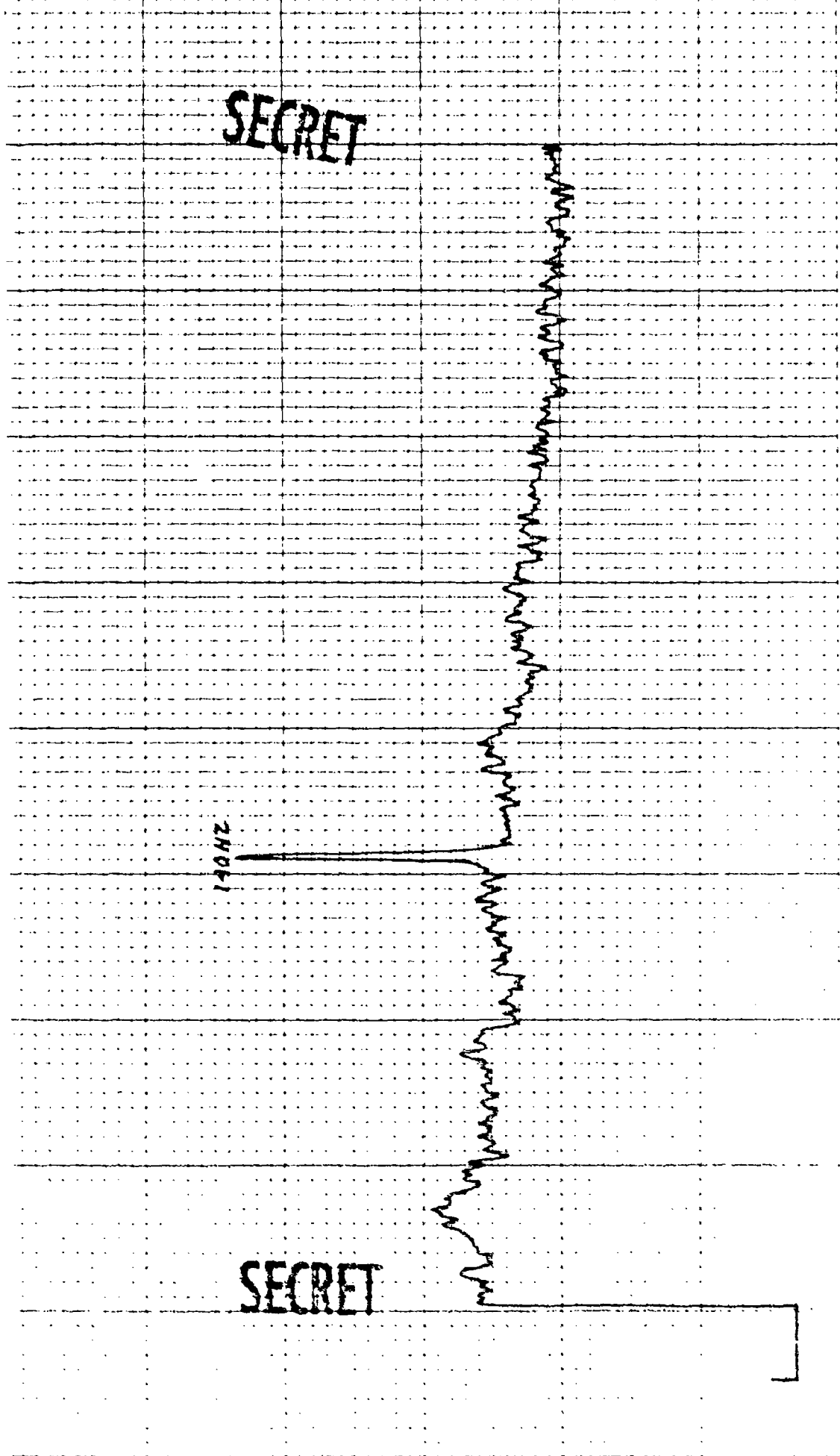
REEL: F23 INDE X 3000
 INTEGRATION TIME 320 SECS ATTEN: -30 DB
 FILTFR WTC: HANNING



46 0703

10E 2033-51 (DPG)

CONTROL: 2033 - 51 (DPG) DATE OF ANALYSIS: REEL: F23 INDE X3000
 BEAMFORMED SPECTRUM(ELEMENTS) 1-26 8 28 -53 INTEGRATION TIME 320 SECS ATTEN: -30 DB
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033Z FILTER WTC: HANNING
 CENTER FREQ: 150 HZ ANALYSIS BANDWIDTH: 1/10HZ
5/ ELEMENTS T22 DEG. AZ STEERING

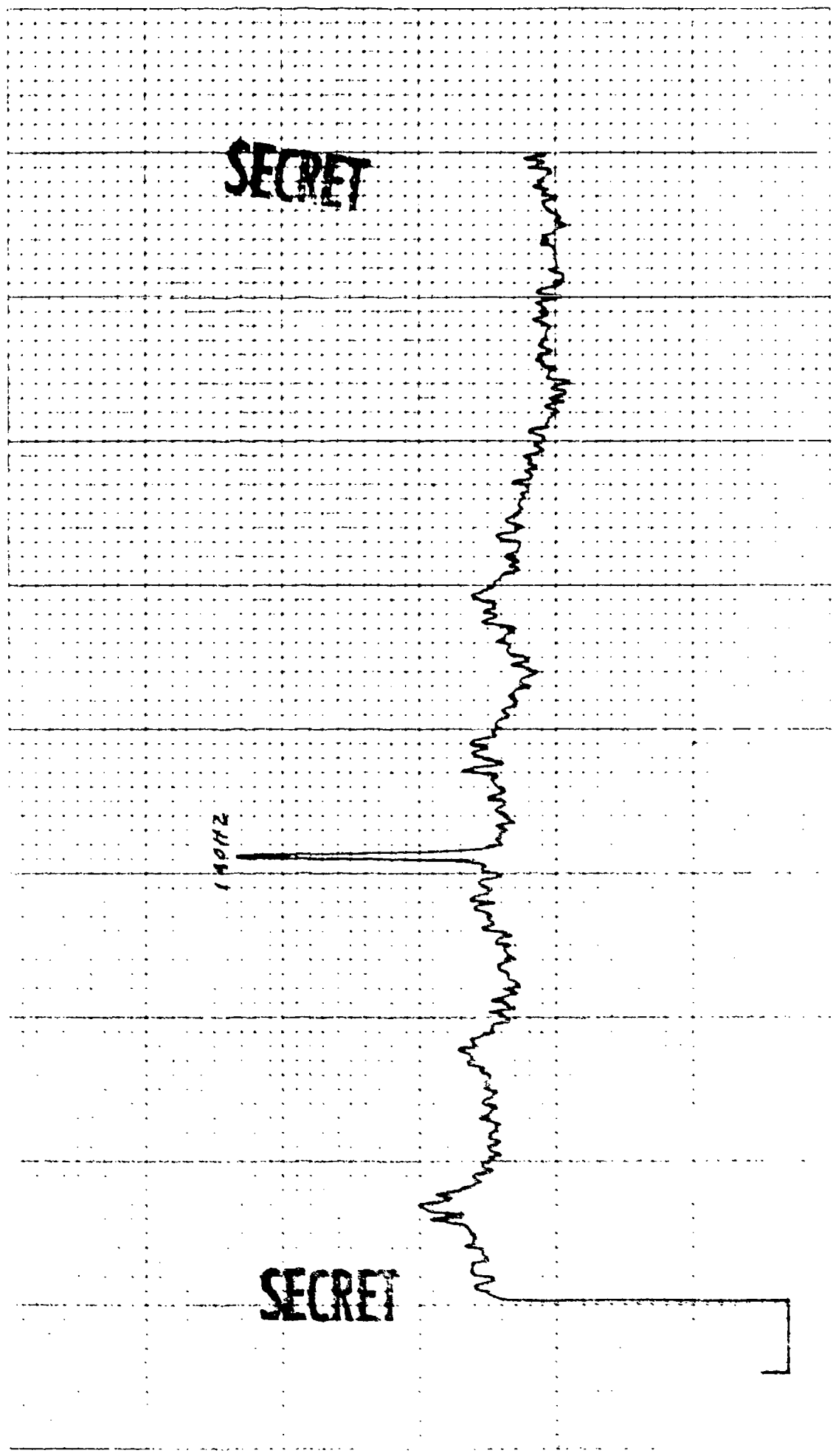


46 0703

CONTROL: 2033-51 (D06)
 BEAMFORMED SPECTRUM(ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 150 HZ
 51. ELEMENTS

DATE OF ANALYSIS: - - -
 1-26-89-53)
 DATE/TIME: 2-7-77-2033Z
 ANALYSIS BANDWIDTH: 17/10HZ
 + 24 DEG. AZ STEERING

REEL: F23 INDE X3000
 INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

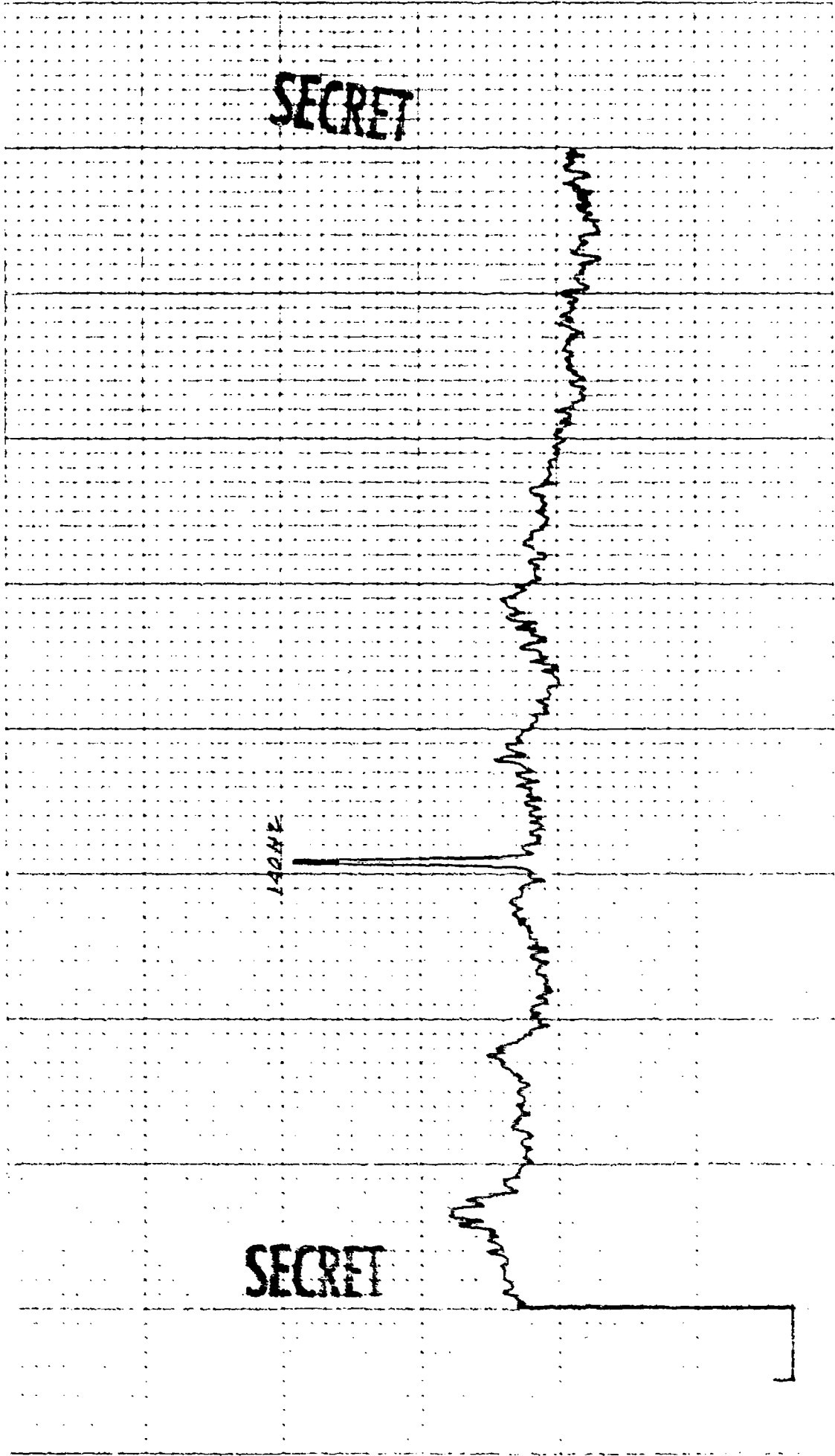


46 0703

CONTROL: 2033 - 51 (DPC)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
51 ELEMENTS

DATE OF ANALYSIS: - - -
1-26-89-53
DATE/TIME: 2-7-77 - 2033Z
ANALYSIS BANDWIDTH: 1/10HZ
726 DEG. AZ STEERING

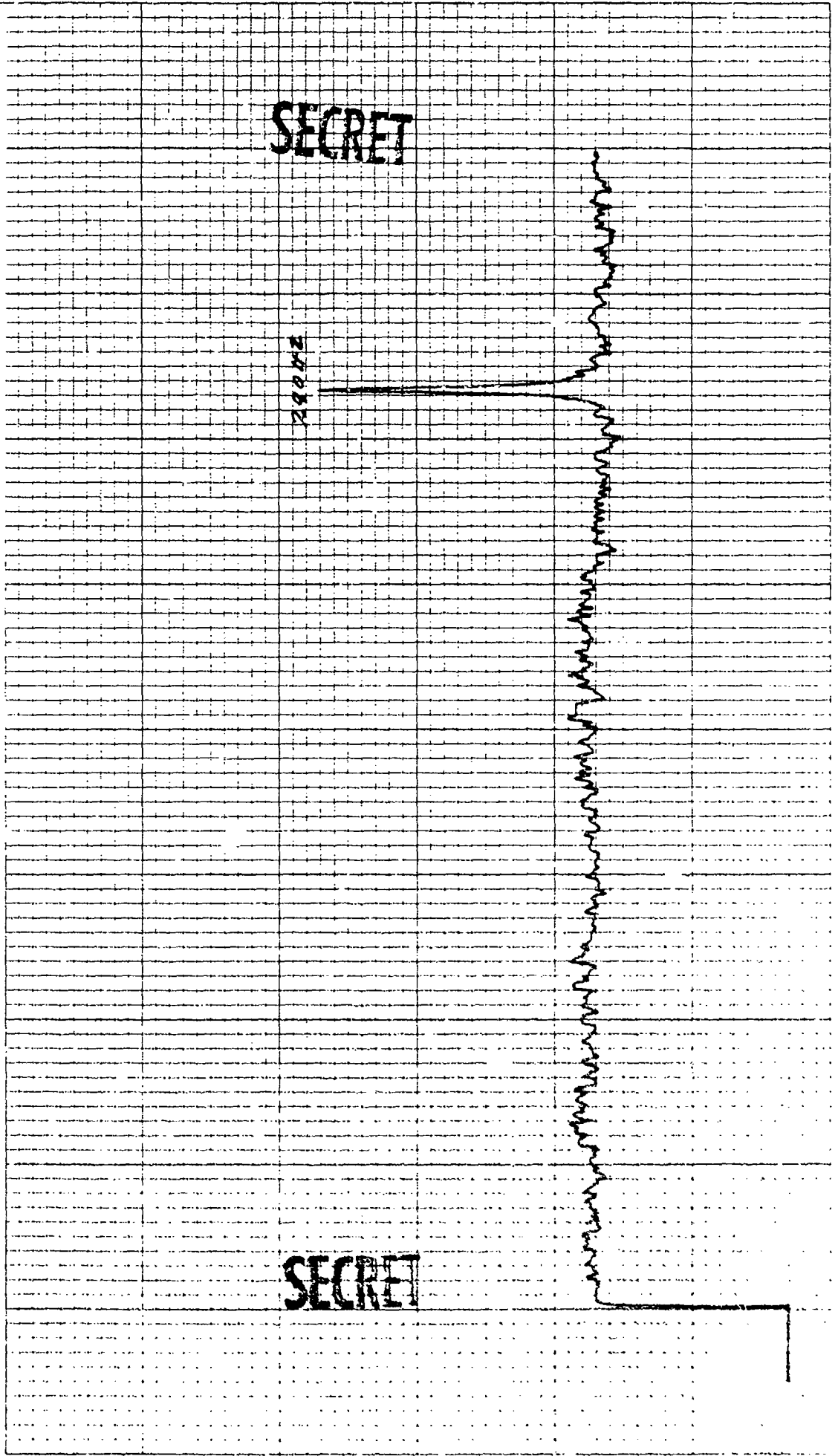
REEL: F23 INDE X 3000
INTEGRATION TIME 320 SECS ATTEN: -20 DB
FILTER WTG: HANNING



CONTROL: 2033-51 (DP6) DATE OF ANALYSIS: -- -- --
BEAMFORMED SPECTRUM (ELEMENTS) /-268 28-53)
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033Z
CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ
51 ELEMENTS +8 DEG. AZ STEERING

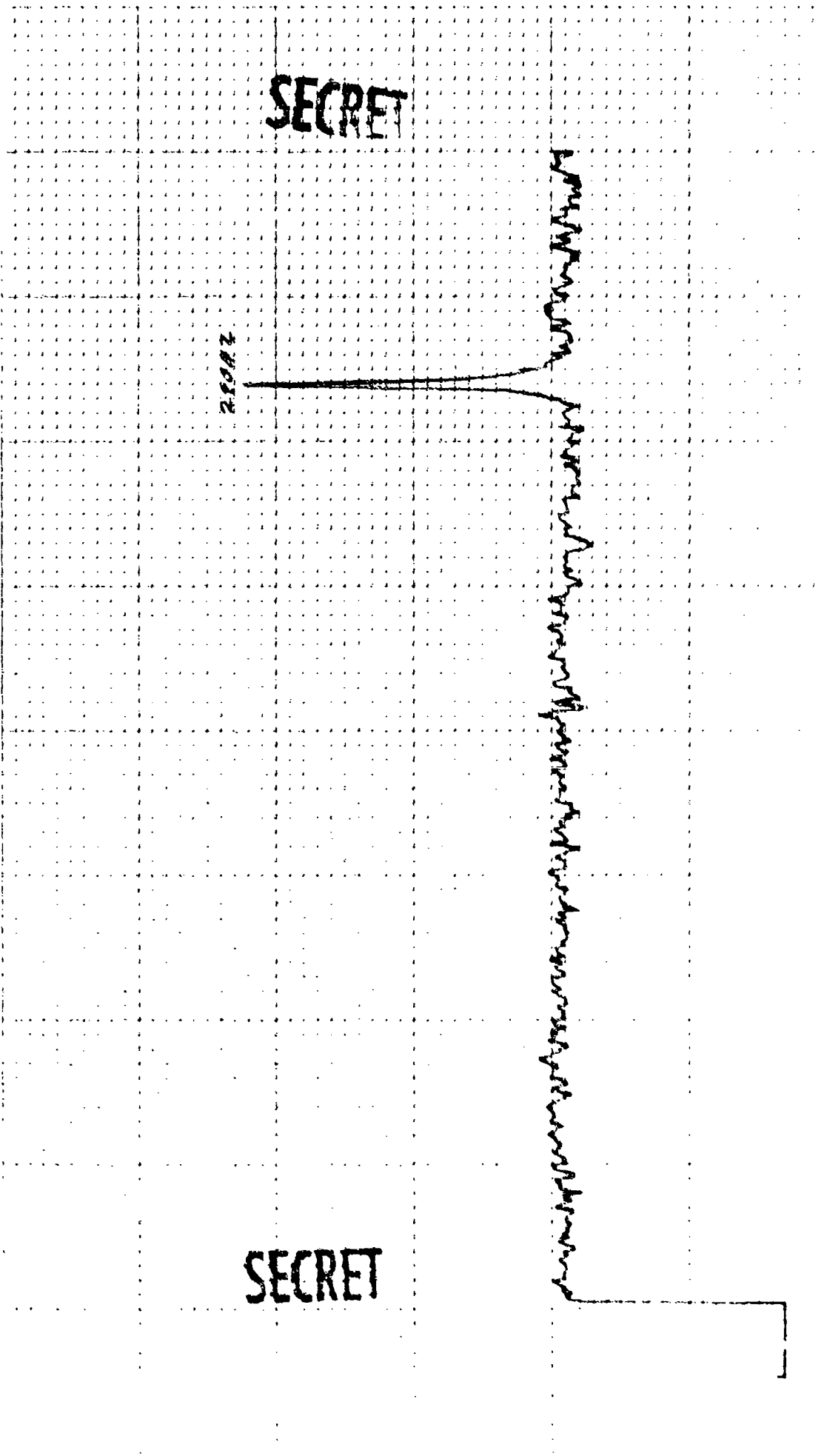
REEL: F23 INDE X 7000

INTEGRATION TIME 320 SECS ATTN: -30 DB
FILTER W/G: HANNING



46 0703

CONTROL: 2037 - 51 (086)
 BEAMFORMED SPECTRUM/ELEMENTS 1-26 8 28-53
 EXERCISE: BEARING STAKE
 CENTER FREQ: 200 HZ
 51 ELEMENTS
 DATE OF ANALYSIS: - - -
 DATE/TIME: 2-7-77 - 2033Z
 ANALYSIS BANDWIDTH: 1/10HZ
 F: 10 DEG. AZ STEERING
 REEL: F33 INDE X3000
 INTEGRATION TIME 320 SECS ATTEN: -30 DB
 FILTER WTC: HANNING

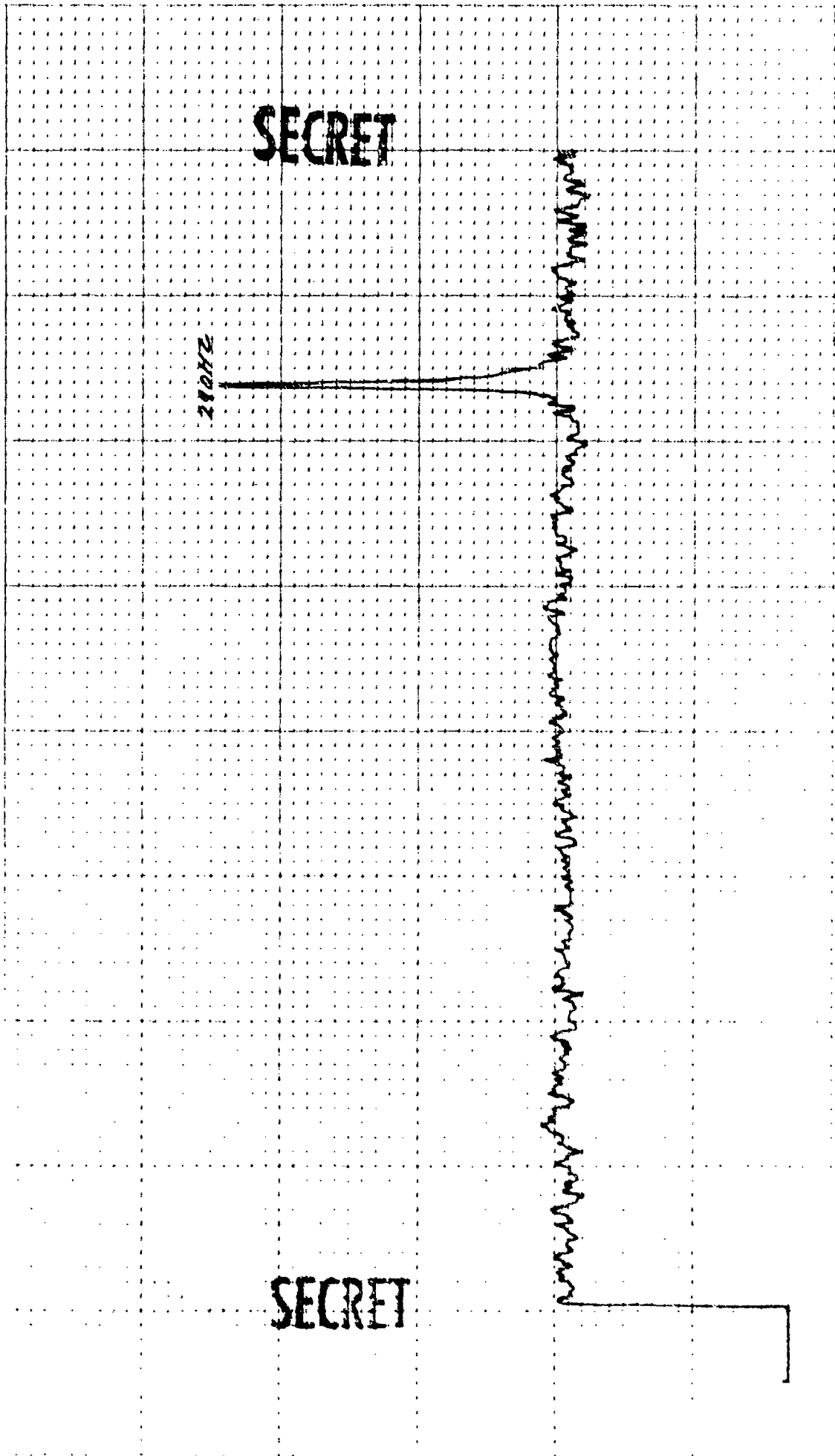


This is a spectral plot showing a single peak at 2100 Hz. The plot is labeled 'SECRET' at the top and bottom. The x-axis is labeled '2100 HZ'. The peak is clearly defined against the background.

46 0703

CONTROL: 2033 - 51 (DPG) DATE OF ANALYSIS: - - -
BEAMFORMED SPECTRUM (ELEMENTS) 1-268 00-53
EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033 Z
CENTER FREQ: 200 HZ ANALYSIS BANDWIDTH: 17/10HZ
51 ELEMENTS F-12 DEG. AZ STEERING

REEL: F23 INDE X3000
INTEGRATION TIME 320 SECS ATTEN: -30 DB
FILTER WTG: HANNING

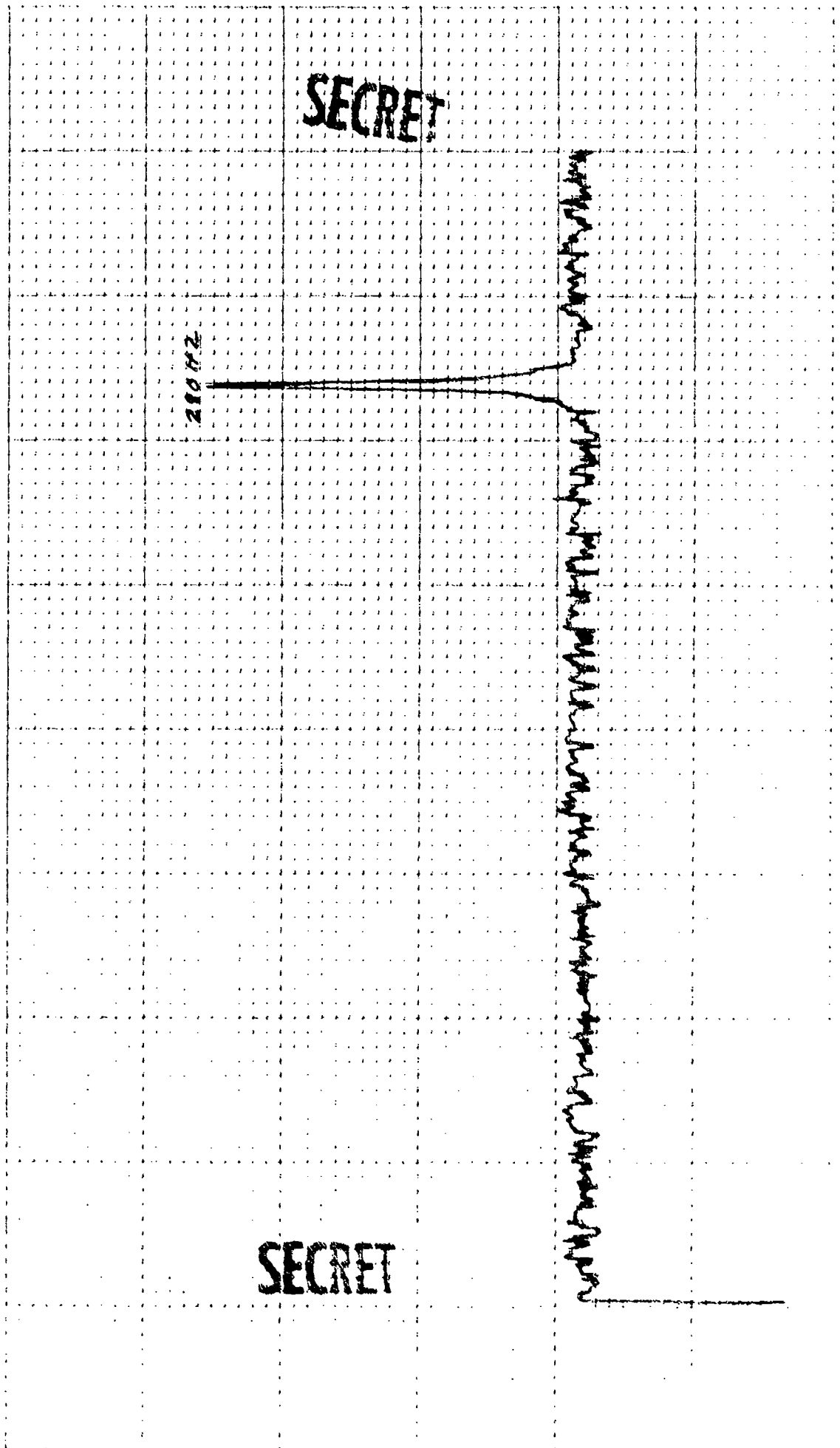


46 0703

CONTROL: 2033 - 51 (DPC)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
51 ELEMENTS

DATE OF ANALYSIS: 1-26-88-53
DATE/TIME: 2-7-77-2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
1/4 DEG. AZ STEERING

REEL: F-3
INDE X1000
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTER WTC: HANNING



SECRET

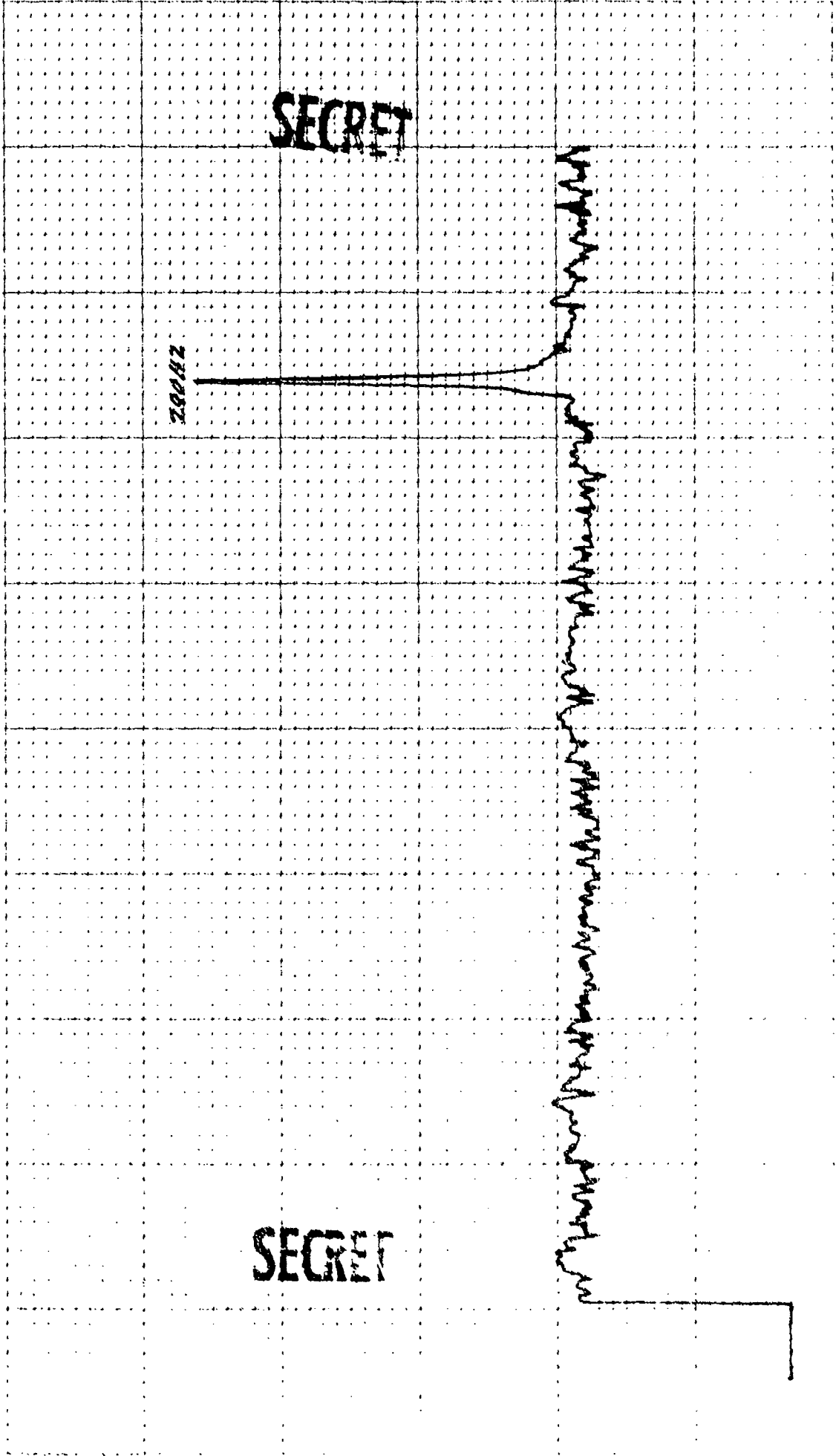
SECRET

Handwritten note: 280 HZ peak is at 280 HZ

46 0703

CONTROL: 2033-51 (006) DATE OF ANALYSIS: 1-26-84
BEAMFORMED SPECTRUM(ELEMENTS) 04-53
EXERCISE: BEARING STAKE
CENTER FREQ: 200 HZ
51 ELEMENTS
+ 16 DEG. AZ STEERING

REEL: F33 INDE X3000
INTEGRATION TIME 320 SECS ATTN: -30 DB
FILTER WTC: HANNING



SECRET

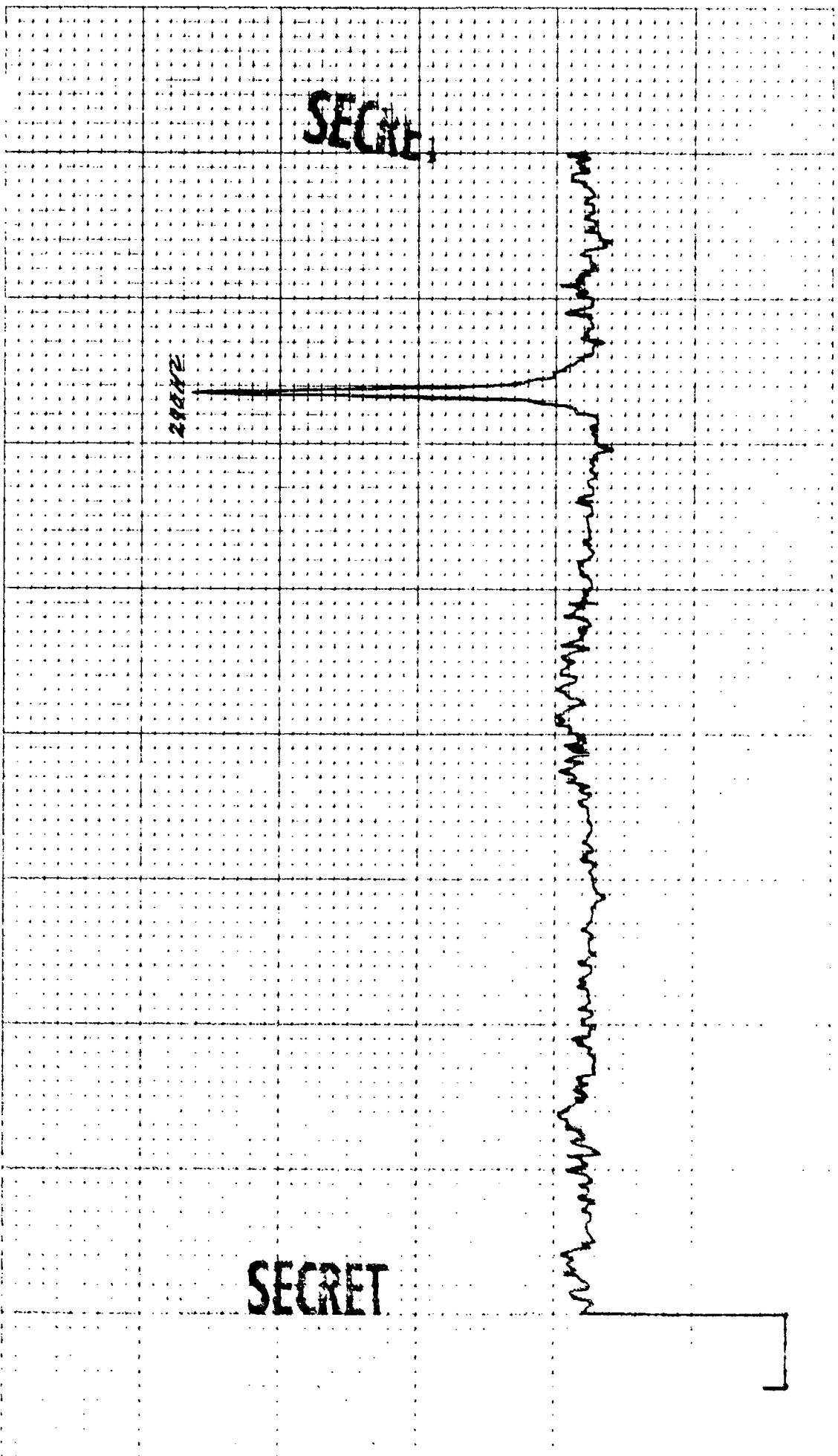
SECRET

200HZ

46 0703

REF: 2-7-77 2-7-77 2-7-77

CONTROL: 2033-51 (DP6) DATE OF ANALYSIS: REEL: F23 INDE X3000
 BEAMFORMED SPECTRUM (ELEMENTS) 1-264 29-53
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033Z INTEGRATION TIME 320 SECS ATTN: -30 DB
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ FILTER: WTG: HANNING
51 ELEMENTS +17 DEG. AZ STEERING

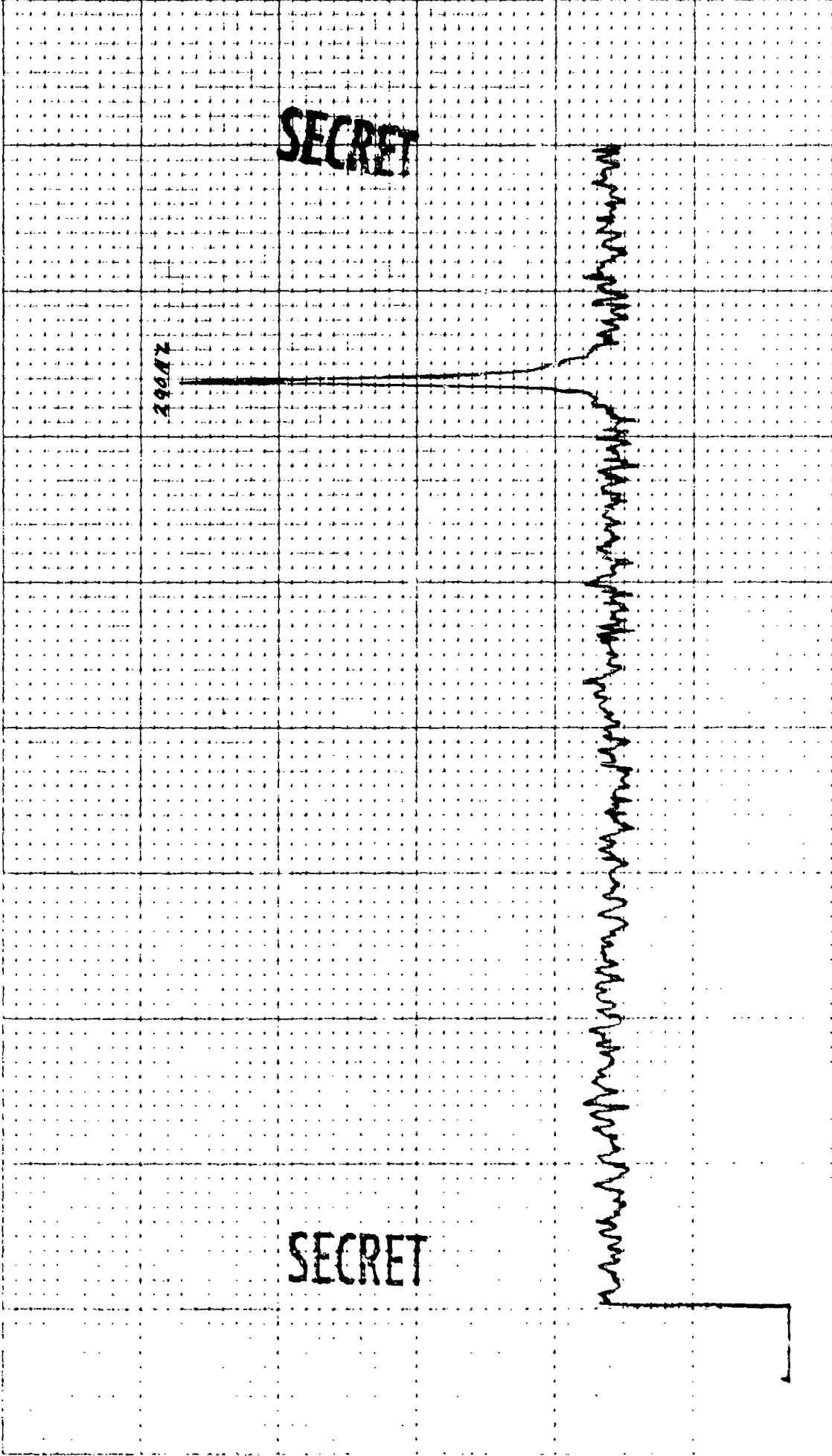


46 0703

REF ID: A66010 TO THE DIRECTOR, NSA

CONTROL: 2033 - 51 (DP6)
BEAMFORMED SPECTRUM(ELEMENTS 1-26 of 29-53)
EXERCISE: BEARING STAKE
CENTER FREQ: 220 HZ
61 ELEMENTS
DATE OF ANALYSIS: _____
DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10HZ
+18 DEC. AZ STEERING

REEL: F23 INDE X3000
INTEGRATION TIME 320 SECS
ATTEN: 30 DB
FILTER WTG: HANNING



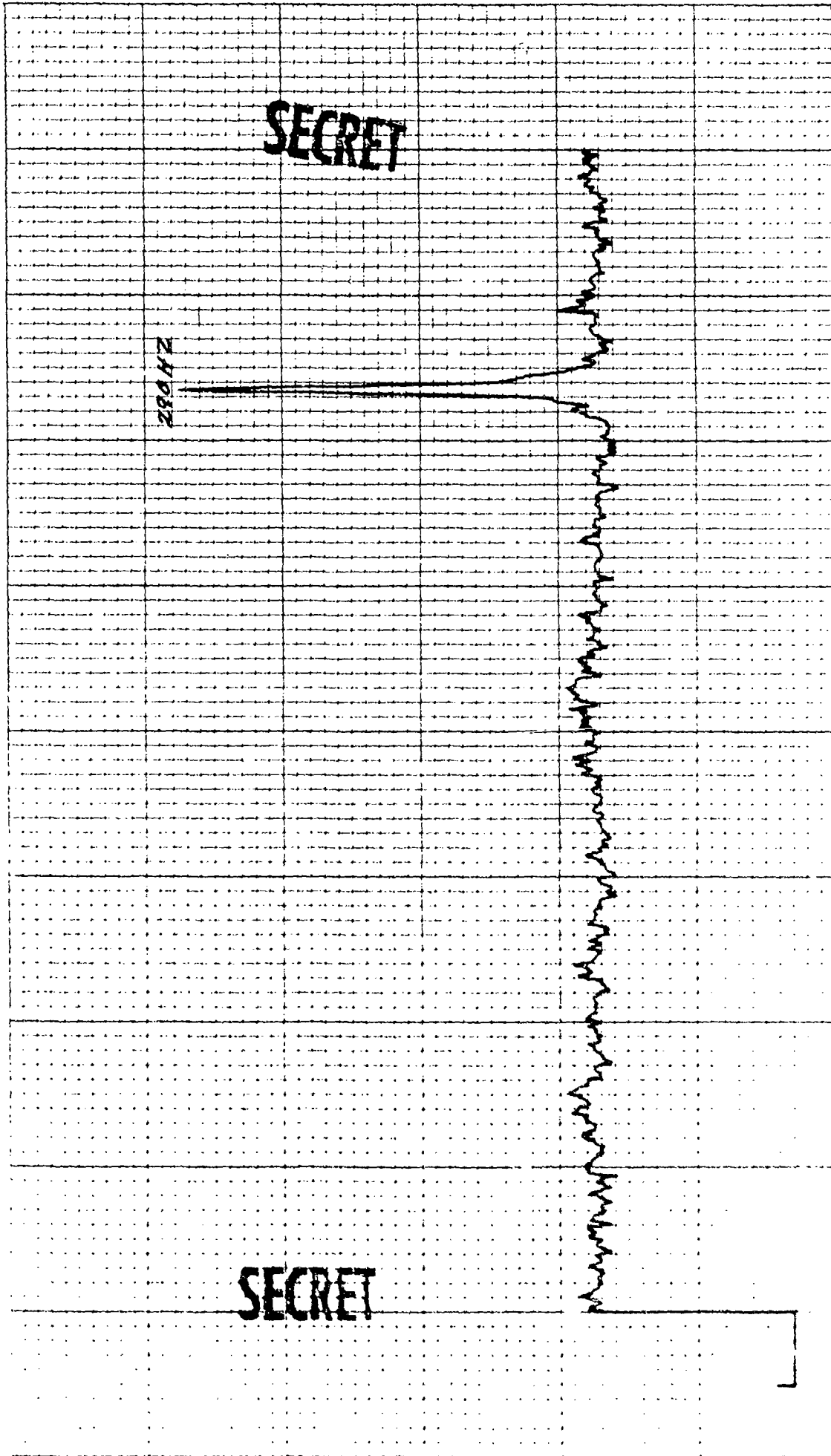
SECRET

SECRET

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FOR THE RECORD

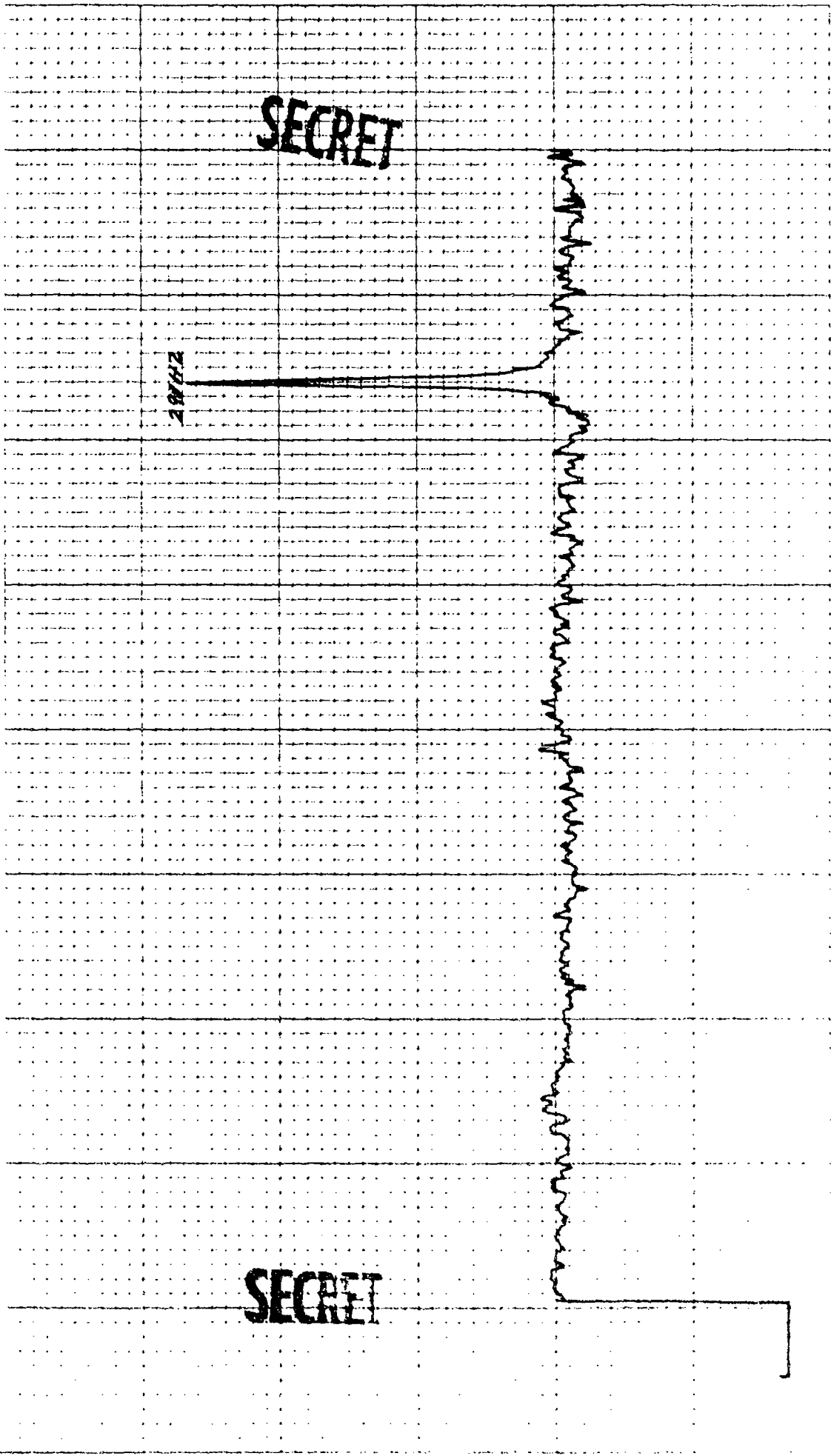
CONTROL: 2033 - 51 (DPG) DATE OF ANALYSIS: REEL: F23 INDE X300C
 BEAMFORMED SPECTRUM(ELEMENTS) 1-26 9 29-53
 EXERCISE: BEARING STAKE DATE/TIME: 2-7-77 - 2033Z INTEGRATION TIME 320 SECS ATTEN: -30 DB
 CENTER FREQ: 280 HZ ANALYSIS BANDWIDTH: 1/10HZ FIITFR WTC: HANNING
 51 ELEMENTS + 19 DEG. AZ STEERING



46 0703

REF: 165000 TO THE DIRECTOR, 1-26-77

CONTROL: 2033 - 51 (001) DATE OF ANALYSIS: 1-26-77 REEL: F23 INDE X3000
 BEAMPORMED SPECTRUM(ELEMENTS) DATE/TIME: 27-77 -2033 Z INTEGRATION TIME 320 SECS ATEN: -30 DB
 EXERCISE: BEARING STAKE ANALYSIS BANDWIDTH: 1/10HZ FILTER WTC: HANNING
 CENTER FREQ: 280 HZ + 20 DEG. AZ STEERING



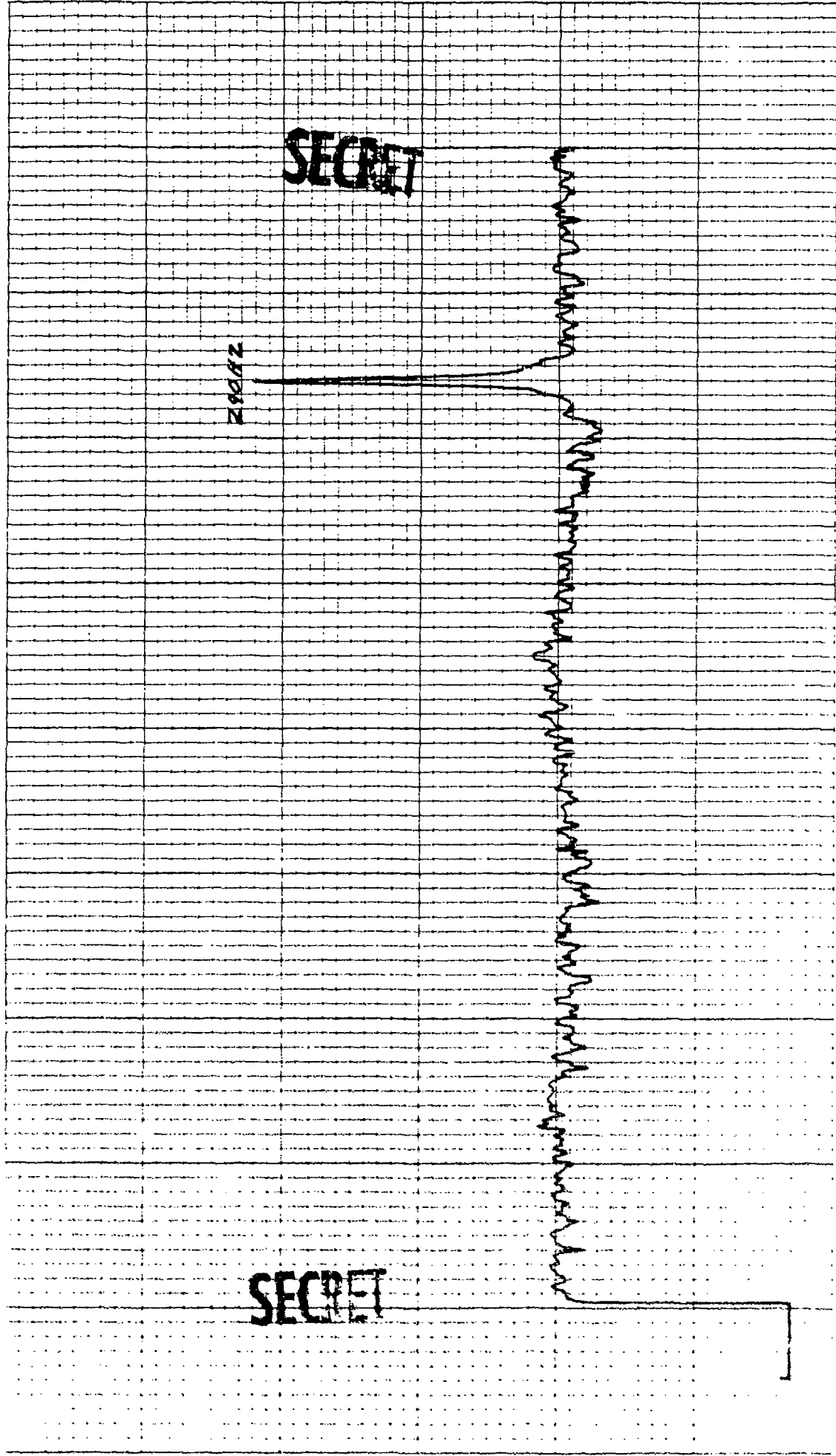
10 X 10 TO THE INFR. & TO THE VIB.
REUFFEL & LESSEA CO. MADE IN U.S.A.

46 0703

CONTROL: 2033 - 51 (206)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 250 HZ
51 ELEMENTS

DATE OF ANALYSIS: 1-26-53
DATE/TIME: 2-7-77 - 2033Z
ANALYSIS BANDWIDTH: 1/10HZ
+22 DEG. AZ STEERING

REEL: F-3
INDE X 3000
INTEGRATION TIME 320 SECS
ATTEN: -30 DB
FILTFR WTG: HANNING



SECRET

SECRET

46 0703

160E 2000 2000 2000 2000 2000

CONTROL: 2033 - 5/ (DPL)
 BEAMFORMED SPECTRUM (ELEMENTS)
 EXERCISE: BEARING STAKE
 CENTER FREQ: 280 HZ
 5/ ELEMENTS

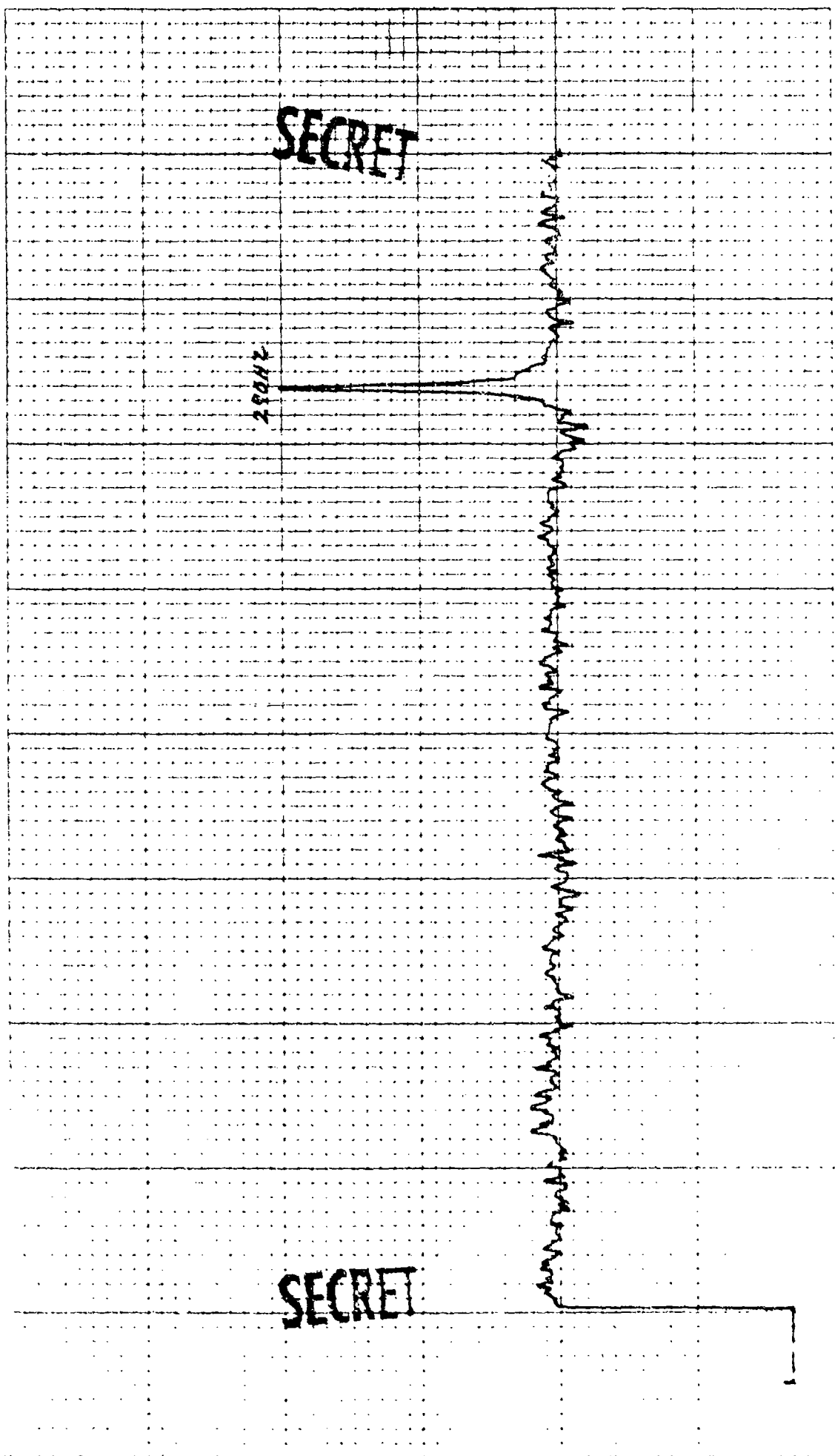
DATE OF ANALYSIS: - - - - -
 1-26-89-53

INTEGRATION TIME 320 SECS
 FILTER WTG: HANNING

ATTEN: -20 DB

REEL: F23 INDE X 3000

ANALYSIS BANDWIDTH: 1/10 HZ
 24 DEG. AZ STEERING

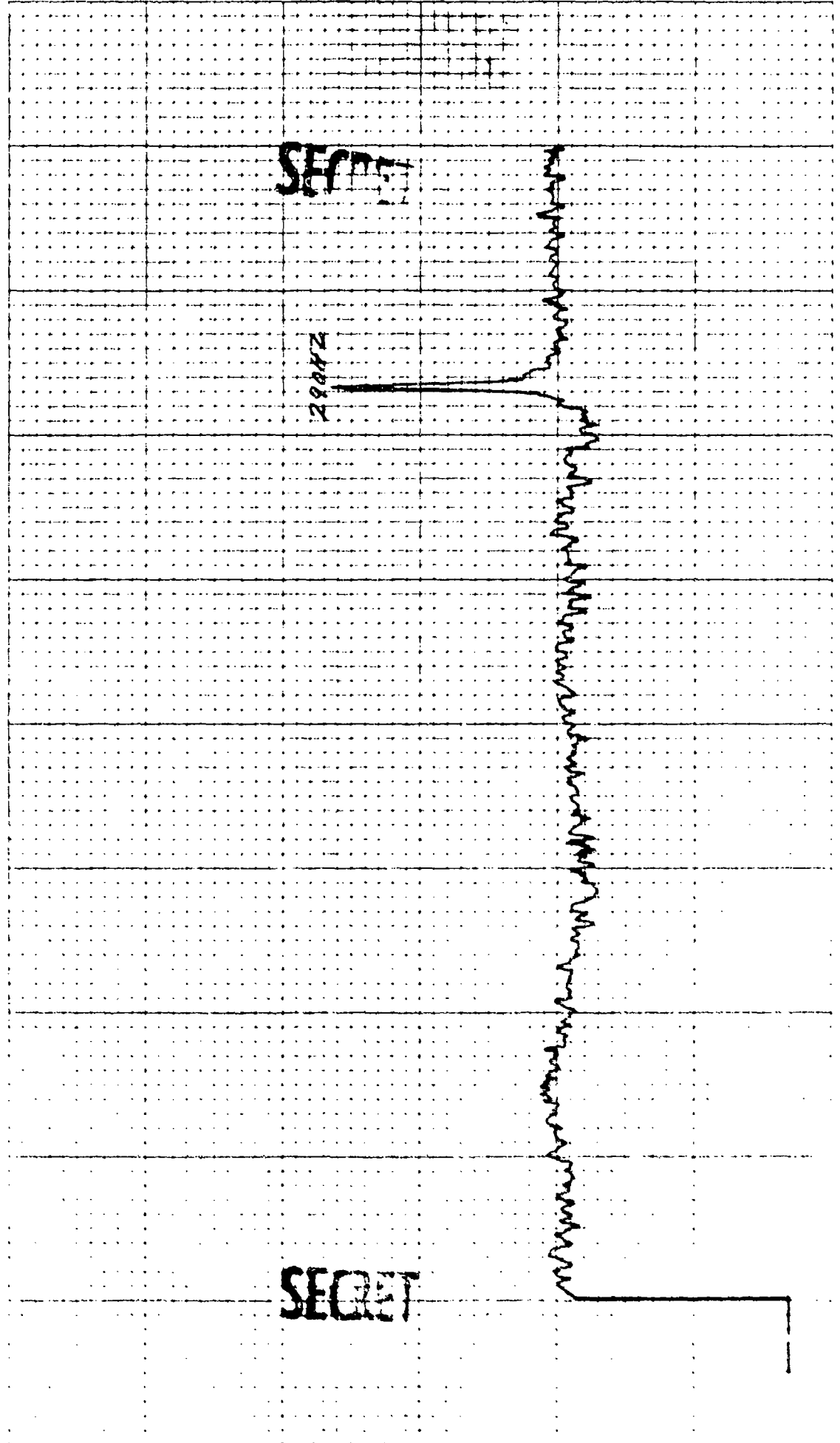


46 0703

CONTROL: 2033 - 51 (D86)
BEAMFORMED SPECTRUM (ELEMENTS)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
51 ELEMENTS

DATE OF ANALYSIS: - - -
1 - 26 8 89 - 53)
DATE/TIME: 2-7-77 - 2033 Z
ANALYSIS BANDWIDTH: 1/10 HZ
+ 26 DEG. AZ STEERING

REEL: F23 INDE X3000
INTEGRATION TIME 320 SECS ATTN: 30 DB
FILTER WTG: HANNING





DEPARTMENT OF THE NAVY

OFFICE OF NAVAL RESEARCH
875 NORTH RANDOLPH STREET
SUITE 1425
ARLINGTON VA 22203-1995

IN REPLY REFER TO:

5510/1
Ser 321OA/011/06
31 Jan 06

MEMORANDUM FOR DISTRIBUTION LIST

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

Ref: (a) SECNAVINST 5510.36

Encl: (1) List of DECLASSIFIED LRAPP Documents

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

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

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

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

A handwritten signature in black ink, appearing to read "B. Link", is positioned above the typed name.

BRIAN LINK
By direction

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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> ADB115967	U
Unavailable	Watrous, B. A.	PARKA I OCEANOGRAPHIC DATA COMPENDIUM	Naval Ocean R&D Activity	781101		U
Unavailable	Dunbar, B., et al.	LAMBDA PROCESSING LABORATORY AND ENGINEERING SUPPORT, FINAL REPORT 1 JANUARY 1977 - 31 OCTOBER 1978	Texas Instruments, Inc.	781129	ND	U
Unavailable	Blumen, L. S., et al.	ASTRAL MODEL. VOLUME 2: SOFTWARE IMPLEMENTATION	Science Applications, Inc.	790101	ADA956122	U
Unavailable	Spofford, C. W.	ASTRAL MODEL. VOLUME 1: TECHNICAL DESCRIPTION	Science Applications, Inc.	790101	ADA956124	U
Unavailable	Townsend, R., et al.	SELF-TENSIONING ACOUSTICAL HORIZONTAL LINE ARRAY (SPRAY) DATA ANALYSIS. FINAL REPORT OF BEARING STAKE TESTS JANUARY THRU MARCH 1977. VOLUME IA. OVERALL PROGRAM PERFORMANCE RESULTS WITH TEST RESULTS SUMMARY	Sanders Associates, Inc.	790101	ADC017573	U
Unavailable	Unavailable	SELF-TENSIONING ACOUSTICAL HORIZONTAL LINE ARRAY (SPRAY) DATA ANALYSIS. FINAL REPORT OF BEARING STAKE TESTS JANUARY THRU MARCH 1977. VOLUME IB. DETAILED DESCRIPTION. TEST RESULTS	Sanders Associates, Inc.	790101	ADC017574	U
Unavailable	Unavailable	SELF-TENSIONING ACOUSTICAL HORIZONTAL LINE ARRAY (SPRAY) DATA ANALYSIS. FINAL REPORT OF BEARING STAKE TESTS JANUARY THRU MARCH 1977. VOLUME II. DATA ANALYSIS FACILITY AND DATA REDUCTION METHODOLOGY	Sanders Associates, Inc.	790109	ADC017575	U
Unavailable	Unavailable	SELF-TENSIONING ACOUSTICAL HORIZONTAL LINE ARRAY (SPRAY) DATA ANALYSIS. FINAL REPORT OF BEARING STAKE TESTS JANUARY THRU MARCH 1977. VOLUME IIIA. DATA POINTS 1, 2 AND 3 RAW DATA	Sanders Associates, Inc.	790109	ADC017576	U
Unavailable	Unavailable	SELF-TENSIONING ACOUSTICAL HORIZONTAL LINE ARRAY (SPRAY) DATA ANALYSIS. FINAL REPORT OF BEARING STAKE TESTS JANUARY THRU MARCH 1977. VOLUME IIIB. DATA POINTS 4, 5 AND 6 RAW DATA	Sanders Associates, Inc.	790109	ADC017577	U
Unavailable	Unavailable	SELF-TENSIONING ACOUSTICAL HORIZONTAL LINE ARRAY (SPRAY) DATA ANALYSIS. FINAL REPORT OF BEARING STAKE TESTS JANUARY THRU MARCH 1977. VOLUME IVA. DATA POINTS 7, 8 AND 9 RAW DATA	Sanders Associates, Inc.	790109	ADC017578	U