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2nd
Report On The

PRE-OPERATIONAL ENVIRONMENTAL SURVEY IN THE VICINITY OF THE CONSOLIDATED EDISON THORIUM REACTOR

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DIVISION OF ENVIRONMENTAL HEALTH SERVICES

NEW YORK STATE DEPARTMENT OF HEALTH

HERMAN E. HILLEBOE, M. D.

COMMISSIONER

JUNE - 1962

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Report #2 On The Pre-Operational Environmental Survey In The Vicinity Of The Consolidated Edison Thorium Reactor

Division of Environmental Health Services
New York State Department of Health
Herman E. Hilleboe, M.D.
Commissioner

June 1962

Dr. Meredith H. Thompson
Assistant Commissioner
Division of Environmental Health Services
84 Holland Avenue
Albany 8, New York

Re: Pre-Environmental Survey
Village of Buchanan, Westchester County

Dear Dr. Thompson:

This is the second report on the pre-environmental survey in the vicinity of the Consolidated Edison Thorium Reactor located in the Village of Buchanan, Westchester County. Modifications in the original sampling schedules and analyses are explained and sampling results are brought up to date.

This will be the last report prior to operation of the reactor. The data presented will be of use in evaluating operational procedures.

Mr. Kelleher, Senior Sanitary Engineer, Bureau of Radiological Health Services, directed the preparation of this report. Fieldwork was carried out by representatives of the New York State Conservation Department and Local Health Departments.

Very truly yours,

Sherwood Davies, P.E.
Director, Bureau of
Radiological Health Services

ACKNOWLEDGMENTS

This survey was undertaken through the cooperation of the following state departments and local health departments and their representatives:

State Health Department - Bureau of Radiological Health Services

Mr. William Kelleher, Senior Sanitary Engineer
Mr. William Hicks, Assistant Sanitary Engineer
Mr. C. Fred Zipprich, Assistant Sanitary Engineer

Westchester County Health Department

Mr. Richard McLaughlin, Director, Division of Environmental Sanitation
Mr. Calvin Weber, Sanitary Engineer
Mr. E. Hempel, Radiological Technician

Rockland County Health Department

Mr. George O'Keefe, Director, Division of Environmental Sanitation
Mr. Donald Grosso, Assistant Director, Division of Environmental Sanitation
Mr. J.M. Jones, Sanitary Inspector

Dutchess County Health Department

Mr. Henry Koralick, Director, Division of Environmental Sanitation

Middletown District Office

Mr. Matthias Schleifer, District Sanitary Engineer

Division of Laboratories and Research

Mr. Wallace Sanderson, Assistant Director
Mr. Irving Sax, Associate Research Scientist

New York State Conservation Department, Poughkeepsie District Office

Mr. Kenneth F. Wick, District Fisheries Manager
Mr. Eli L. Dietsch, Conservation Biologist

New York State Conservation Department, Marine Fisheries Division

Mr. Harry Udell, Marine Fisheries Sanitarian

Representatives of private industry and public water supply operators have also contributed their time and effort in the collection of samples. The cooperation of the following individuals has been appreciated:

Mr. Clifford J. Konnerth, Union Carbide Nuclear Company, for the collection of air samples.

ACKNOWLEDGMENTS (CON'T)

Mr. Percy Clemmons, Health Physicist, United Nuclear Company, for the collection of air samples.

Mr. John M. Massey, Principal Sewage Plant Operator, Sing Sing Prison, for the collection of Hudson River water samples.

Mr. A.E. Schomberg, Plant Manager of Standard Brands, Inc., for assistance in establishing Hudson River water sampling station and arranging for collection of samples.

Mr. John Hayes, Acting Water Superintendent, Peekskill Water Department, for assistance in establishing and maintaining air and fallout stations.

Mr. William Nelson, Consolidated Edison Company, for arranging for collection of well water samples by Consolidated Edison Personnel.

TABLE OF CONTENTS

	Page
LETTER OF TRANSMITTAL	II
ACKNOWLEDGEMENTS	III - IV
Introduction	1
Description of survey	1 - 3
Discussion of Results	3 - 4
Explanation of units used	5
Tables of results	
TABLE I - AIR (Weekly Samples)	7 - 14
TABLE II - FALLOUT	15 - 17
TABLE III - VEGETATION	18 - 24
TABLE IV - WATER	25 - 33
TABLE V - HUDSON RIVER WATER U.S.P.H.S. AT POUGHKEEPSIE	34 - 35
MAP 1 - MILK	36
TABLE VI - MILK	37 - 38
Graphs of results	
FIGURE I - AIR, FALLOUT, VEGETATION, AND WATER BY THREE MONTH PERIODS	40 - 41
FIGURE II - GROSS BETA ACTIVITY OF PARTICULATES IN AIR	41
FIGURE III - BETA BONE SEEKER ACTIVITY ALBANY TREATED WATER	42
FIGURE IV - GROSS BETA ACTIVITY HUDSON RIVER AT POUGHKEEPSIE	42
FIGURE V - FALLOUT - BETA BONE SEEKER ACTIVITY	43
FIGURE VI - FALLOUT - Sr-89	43
FIGURE VII - FALLOUT - Sr-90	44
FIGURE VIII - MILK - BETA BONE SEEKER ACTIVITY	45
Appendix	

Introduction

The pre-operational environmental survey in the vicinity of the Consolidated Edison Thorium Reactor site has continued in a somewhat modified form since the issuance of the first summarizing report in November, 1959. The reactor will be in operation in mid 1962. It is therefore appropriate to present the data obtained since the last report and to indicate which phases of the survey were changed.

The nuclear reactor is a pressurized water plant with a 585,000 kilowatt gross thermal output. Accidental or routine releases from this operation may increase existing radiation levels in the environment. Results from this survey will permit an evaluation of the extent to which such release occurs.

Description of Survey

Sampling stations are located within a 25 mile radius of the reactor site. For a detailed location and description of the stations with the numbering system used, please refer to the maps and appendix in the first report, November, 1959.

Air Samples

Analysis of the data contained in the previous report indicates there was no significant differences among the five air sampling stations. Therefore, in November 1959, the number of stations was reduced to three. These stations utilize 1 cubic foot per minute positive displacement air pumps with a 2 inch diameter glass fiber filter changed on a weekly basis. The specific locations are shown on Map #1 (First Report) and results are given in terms of micro-microcuries per cubic meter. Since several days elapse between sampling and counting, the results are indicative of long-lived beta activity in the air.

Fallout

The original six fallout sampling stations were reduced to two in November 1959 and to one in October 1960. In November 1960 the analysis performed on the remaining station was changed from beta bone seekers to specific examinations for Sr-89 and Sr-90. All fallout samples collected in the State had a similar change in analysis at that time. It is felt that one fallout station for pre-operational purposes gives an adequate representation for the site and the specific analysis yields more useful information regarding the more hazardous isotopes than was given previously. Results are given as micro-microcuries per square foot per day. Sample locations are shown on Map #2 (First Report) Statewide fallout results are given in Figures #V, VI, and VII.

Rabbit Thyroids

No rabbit thyroids were collected for analysis since the first report.

Soil Samples

Soil samples were collected from 16 stations in Westchester County in September 1960, May 1961, October 1961 and April 1962 and delivered to Albany for later analysis. All soil sampling stations were discontinued in June 1962.

Vegetation

Vegetation samples were collected from 8 stations a month on a staggered basis utilizing a total of 32 stations. The type of vegetation sample varied because of season and area. The beta bone-seeker analysis was performed and results reported as micro-microcuries per gram.

Water Samples

The water sampling program was curtailed to two ground supplies and 13 surface supplies. In November 1960, the analysis performed was changed from beta bone seekers to gross beta. The locations are shown on Map #5 (First Report). The United States Public Health Service has continued taking samples

from the Hudson River (at Poughkeepsie) and these results are reported. The units of measurement are micro-microcuries per milliliter.

The beta bone seeker analysis is performed on Albany water samples and, for comparison purposes, results are shown in Figure #III.

Milk Samples

Four milk sampling stations were established (see Map #1) with one station at Willowby Farms, discontinued in July 1961 when the farm ceased to operate. Samples were taken on a monthly basis beginning in June 1959 and the samples analyzed for Beta Bone Seekers. Monthly results are shown in Table VI and Westchester County averages on a monthly basis are plotted in Figure VIII.

Hudson River Samples - Algae, Fish and Mud

In May 1962 samples of algae, bottom mud and fish were taken from the Hudson River at various locations in the vicinity of the Consolidated Edison Thorium Reactor. Gamma scans were made on all of these samples in a Nuclear Data 512 - Channel Analyzer. This instrument utilizes a 3"x 3" NaI cyrstal, has a range of 0 - 2.56 Mev and an energy scale of 10 Kev per channel. The sample volume analyzed was 2.0 liters for each mud sample. Algae and fish sample volumes were much less than 2.0 liters. For a 2.0 liter sample the efficiency of the analyzer is about 10%.

The gamma scans resulting from analysis are presented in the appendix. The pertinent information regarding each sample is listed on each scan.

Discussion of Results

The results as plotted in Figures I - VII clearly indicate that the dominant factor during the period covered by this report was the series of nuclear weapons tests started in September 1961. Air, vegetation and surface water test results increased sharply at approximately the same time. Ground water results do not extend into the testing period. However, they are not expected to show the same rise as was apparent with the surface waters. Fallout results cover the period

to June 1961. They do not show the effect of the bomb tests.

It is further noted that the gross beta in air data plotted in Figure II is similar to that of Albany which is plotted on the same graph. This may also be said for the fallout results plotted in Figures V, VI, and VII, which show Consolidated Edison stations and the average of statewide sampling stations plotted on the same graphs.

The fact that the results and trends coincide rather closely between the sites selected for sampling in this survey and other statewide stations is of considerable interest. The next report in the series will include results from samples taken after the reactor is in operation. The data may then be analyzed for differences in trends and results. In this manner, it should be possible to evaluate the effects of any future nuclear weapons tests. If nuclear testing should cease, then the great body of data obtained in previous periods when there was no testing can be compared with future results to determine how the operations at the Consolidated Edison Thorium Reactor effect natural radiation levels in the environment.

Explanation of Units Used

Maximum allowable concentrations according to state and federal regulations are frequently expressed in terms of microcuries times 10 to some negative exponent, i.e. 7×10^{-8} uc/ml. In order to reduce the possible error in reporting and transcribing results, the more convenient unit micro-microcuries was adopted. The term picocurie (pc), which equals a micro-microcurie has recently come into use and will eventually replace the micro-microcurie. The units used for reporting results are listed as follows:

Air - uuc/m^3 - micro-microcuries per cubic meter of air

Fallout - uuc/$ft.^2$/day - micro-microcuries per square foot of area per day.

Vegetation - uuc/gm - micro-microcuries per gram of dry vegetation (dried at 103° C)

Water - uuc/ml - micro-microcuries per milliliter of water

Mud, Plankton, Fish - uuc/gm - micro-microcuries per gram of dry solids (dried at 103° C)

The results reported in all tables are at the time of counting. The difference in time (ΔTime) between collection and counting has been reported.

TABLE of RESULTS

TABLE I

AIR

(Weekly Air Samples)

Sampling Station	Collection Period Start	Stop	Δ Time (Days)	Gross Beta uuc/M^3
2003	8/4/59	8/11/59	20	0.8
Tomkins Cove,	8/11	8/18	13	0.6
Rockland County	8/18	8/25	8	0.3
	8/25	9/1	12	0.25
	9/1	9/8	11	0.30
	9/8	9/15	7	0.33
	9/15	9/22	6	0.25
	9/22	9/29	6	0.19
	9/29	10/6	13	0.09
	10/6	10/13	9	0.09
	10/13	10/20	17	0.13
	10/20	10/27	10	0.10
	10/27	11/4	23	0.09
	11/4	11/6	21	0.30
	11/10	11/17	17	0.11
		- DISCONTINUED -		
1307	7/30/59	8/6/59	22	0.9
Ossining	8/6	8/14	17	0.6
Westchester Co.	8/14	8/20	13	0.4
	8/20	8/27	10	0.3
	8/27	9/3	10	0.16
	9/3	9/10	9	0.27
	9/10	9/17	8	0.25
	9/17	9/25	10	0.20
	9/28	10/3	11	0.10
	10/3	10/8	14	0.07
	10/8	10/15	7	0.10
	10/15	10/22	29	0.11
	10/22	10/29	22	0.10
	10/29	11/5	15	0.08
	11/5	11/12	15	0.08
	11/12	11/19	21	0.09
	11/19	11/27	22	0.07
		- DISCONTINUED -		
1105	7/24/59	7/30	29	0.60
Peekskill,	7/30	8/6	22	0.90
Westchester Co.	8/6	8/14	17	0.50
	8/14	8/30	3	0.10
	8/27	9/3	10	0.15
	9/3	9/10	9	0.28
	9/10	9/17	8	0.28
	9/17	9/25	10	0.20
	9/28	10/3	11	0.10
	10/3	10/8	14	0.07
	10/8	10/15	7	0.10
	10/15	10/22	29	0.12
	10/22	10/29	22	0.10
	10/29	11/5	22	0.07

Table I (cont.)

Sampling Station	Collection Period Start	Stop	ΔTime (Days)	Gross Beta uuc/M³
Peekskill, Westchester Co. (contd)	11/5	11/13	14	0.07
	11/13	11/19	21	0.09
	11/19	11/27	21	0.08
	11/27	12/3	15	0.08
	12/3	12/10	12	0.07
	12/10	12/17	9	0.09
	12/17	12/23	16	0.06
	12/23	12/30	14	0.08
	12/30	1/7/60	6	0.11
	1/7/60	1/14	7	0.07
	1/14	1/21	23	0.07
	1/21	1/28	18	0.06
	1/28	2/4	11	0.07
	2/4	2/11	12	0.09
	2/11	2/18	8	0.08
	2/18	2/25	13	0.18
	2/25	3/7	8	0.09
	3/7	3/10	11	0.15
	3/10	3/17	10	0.09
	3/17	3/24	7	0.11
	3/24	3/31	11	0.13
	3/31	4/8	11	0.05
	4/8	4/14	20	0.12
	4/14	4/21	19	0.15
	4/21	4/28	14	0.10
	4/28	5/5	12	0.15
	5/5	5/12	20	0.16
	5/12	5/19	15	0.15
	5/19	5/27	11	0.11
	5/27	6/2	12	0.13
	6/2	6/9	18	0.17
	6/9	6/16	14	0.18
	6/16	6/23	12	0.11
	6/23	7/1	17	0.12
	7/1	7/7	11	0.06
	7/7	7/15	19	0.14
	7/15	7/21	21	0.14
	7/21	7/28	19	0.10
	7/28	8/4	14	0.12
	8/4	8/11	21	0.06
	8/11	8/18	19	0.06
	8/18	8/25	15	0.09
	8/25	9/1	11	0.08
	9/1	9/8	8	0.07
	9/8	9/15	18	0.06
	9/15	9/22	15	0.05
	9/22	9/30	17	0.04
	9/30	10/6	13	0.04
	10/6	10/13	6	0.06
	10/13	10/20	22	0.08
	10/20	10/27	13	0.04
	10/27	11/3	11	0.04
	11/3	11/9	14	0.02

Table I (cont.)

Sampling Station	Collection Period Start	Stop	ΔTime (Days)	Gross Beta uuc/M^3
Peekskill,	11/9	11/17	16	0.03
Westchester Co.	11/17	11/25	12	0.06
(contd)	11/25	12/1	14	0.06
	12/1	12/8	11	0.06
	12/8	12/15	22	0.05
	12/15	12/22	15	0.05
	12/22	12/29	20	0.05
	12/29	1/5	13	0.04
	1/5/61	1/12	11	0.06
	1/12	1/19	9	0.05
	1/19	1/26	20	0.05
	1/26	2/2	15	0.04
	2/2	2/10	11	0.06
	2/10	2/16	25	0.06
	2/16	2/23	18	0.05
	2/23	3/2	21	0.05
	3/2	3/9	28	0.05
	3/9	3/16	34	0.05
	3/16	3/23	26	0.08
	3/23	3/30	19	0.07
	3/30	4/6	20	0.04
	4/6	4/13	13	0.04
	4/13	4/20	20	0.04
	4/20	4/27	19	0.12
	4/27	5/4	12	0.08
	5/4	5/11	7	0.09
	5/11	5/18	19	0.07
	5/18	5/25	22	0.14
	5/25	6/1	15	0.14
	6/1	6/8	11	0.13
	6/8	6/15	21	0.07
	6/15	6/22	20	0.16
	6/22	6/29	13	0.11
	6/29	7/6	8	0.11
	7/6	7/13	12	0.11
	7/13	7/20	22	0.05
	7/20	7/27	15	0.06
	7/27	8/3	15	0.01
	8/3	8/10	19	0.07
	8/10	8/17	12	0.06
	8/17	8/24	12	0.05
	8/24	8/31	87	0.05
	8/31	9/7	5	0.05
	9/7	9/14	57	0.06
	9/14	9/21	5	12.9
	9/21	9/28	4	15.4
	9/28	10/5	111	1.23
	10/5	10/13	18	13.5
	10/13	10/19	4	5.8
	10/19	10/26	4	7.6
	10/26	11/2	29	2.4
	11/2	11/9	28	4.4
	11/9	11/16	18	9.7

Table I (cont.)

Sampling Station	Collection Period Start	Stop	ΔTime (Days)	Gross Beta uuc/M³
Peekskill,	11/16	11/22	26	3.6
Westchester Co.	11/22	11/30	26	2.8
(contd)	11/30	12/7	41	5.0
	12/7	12/14	19	1.5
	12/14	12/21	12	2.6
	12/21	12/28	17	3.3
	12/28	1/4	20	4.9
	1/4/62	1/11	20	6.4
	1/11	1/18	15	5.0
	1/18	1/25	7	7.3
	2/8	2/15	22	6.1
	2/15	2/21	19	5.2
	2/21	3/1	18	3.1
	3/1	3/8	12	3.8
	3/8	3/15	7	2.4
	3/15	3/22	25	4.4
	3/22	3/29	22	4.7
	3/29	4/5	18	6.1
	4/9	4/12	21	6.1
7501	7/27/59	8/3/59	25	0.70
N.D.A. Pawling	8/3	8/27	12	0.50
Dutchess County	8/27	9/8	11	0.22
	9/8	9/14	8	0.21
	9/14	10/5	9	0.13
	10/5	10/13	9	0.08
	10/13	10/26	11	0.12
	10/26	11/3	17	0.10
	11/3	11/16	24	0.76
	11/16	11/23	10	0.08
	11/23	11/30	18	0.08
	11/30	12/7	11	0.08
	12/7	12/14	12	0.05
	12/14	12/28	11	0.07
	12/28	1/4/60	9	0.08
	1/4/60	1/19/60	2	0.07
	1/25	2/17	9	0.07
	2/17	2/23	10	0.10
	2/23	3/2	13	0.07
	3/2	3/8	9	0.08
	3/8	3/15	12	0.09
	3/15	3/22	9	0.09
	3/22	3/29	6	0.11
	3/29	4/6	23	0.05
	4/6	4/12	17	0.14
	4/12	4/19	16	0.16
	4/19	4/26	16	0.14
	4/27	4/28	14	0.04
	4/28	4/29	13	0.05
	4/29	4/30	12	0.05
	4/30	5/2	10	0.06
	5/2	5/3	9	0.06
	5/3	5/4	8	0.08
	5/2	5/17	17	0.12

Table I (cont.)

Sampling Station	Collection Period Start	Stop	Δ Time (Days)	Gross Beta mc/M³
N.D.A. Rawling	5/17	5/23	11	0.12
Dutchess County	5/23	6/6	8	0.05
(contd)	6/6	6/20	27	0.15
	6/20	6/24	23	0.10
	6/27	7/12	17	0.10
	7/12	7/19	10	0.11
	7/19	8/4	14	0.09
	8/4	8/22	16	0.05
	8/22	9/7	26	0.06
	9/7	9/13	20	0.06
	9/13	9/20	21	0.06
	9/20	9/27	20	0.04
	9/27	10/4	19	0.03
	10/4	10/11	8	0.04
	10/11	10/18	14	0.07
	10/18	10/27	13	0.04
	10/27	11/4	17	0.03
	11/4	11/11	12	0.01
	11/11	11/18	17	0.05
	11/18	11/28	9	0.05
	11/28	12/6	13	0.05
	12/6	12/22	15	0.04
	12/22	3/7/61	20	0.03
	3/7/61	3/28	21	0.06
	3/28	5/1	15	0.05
	5/1	5/11	13	0.08
	5/11	5/23	14	0.09
	5/23	6/1	15	0.12
	6/1	6/7	12	0.14
	6/7	6/20	22	0.08
	6/20	6/28	14	0.08
	6/28	7/10	18	0.10
	7/10	7/26	16	0.05
	7/26	8/4	14	<0.01
	9/4	9/12	59	0.19
	9/12	9/28	8	7.0
	9/28	10/20	4	2.0
	10/20	10/25	5	5.9
	10/27	10/31	4	2.9
	10/31	11/1	12	2.9
	11/1	11/2	11	.70
	11/2	11/3	0	0.55
	11/3	11/6	29	5.7
	11/6	11/7	29	4.8
	11/7	11/8	28	4.6
	11/8	11/9	27	3.0
	11/9	11/10	27	0.85
	11/10	11/13	25	6.6
	11/13	11/14	23	8.7
	11/16	11/17	22	12.2
	11/17	11/21	17	3.8
	11/21	11/22	16	11.1
	11/22	11/24	14	2.1

Table I (cont.)

Sampling Station	Collection Period Start	Stop	Δ Time (Days)	Gross Beta mμc/M³
N.D.A. Pawling Dutchess County (contd)	11/28	11/29	33	1.3
	11/29	11/30	26	2.8
	11/30	12/4	14	5.9
	12/4	12/5	21	6.3
	12/5	12/6	20	6.8
	12/6	12/7	26	6.6
	12/7	12/13	20	1.9
	12/13	12/14	19	1.7
	12/14	12/15	18	3.5
	12/15	12/18	15	2.1
	12/18	12/19	17	0.92
	12/19	12/20	15	1.3
	12/20	12/26	22	3.1
	12/26	12/29	19	4.9
	12/29	1/3	14	4.3
	1/3/62	1/8	9	5.4
	1/8	1/16	17	3.5
	1/16	1/23	9	5.4
	1/23	1/29	13	5.6
	1/29	2/6	15	4.4
	2/6	3/6	10	3.2
	3/6	3/13	8	2.2
	3/13	3/20	12	4.7
	3/20	3/27	9	5.7
	3/27	4/3	17	5.0
	4/3	4/10	23	5.7
4401 Union Carbide, Tuxedo, Orange County	7/20/59	8/11	20	0.60
	8/11	8/17	14	0.60
	8/17	8/28	11	0.30
	8/28	8/31	8	0.26
	9/14	9/21	7	0.23
	9/21	9/28	17	0.20
	9/28	10/5	9	0.09
	10/5	10/12	10	0.11
	10/12	10/19	10	0.11
	10/19	10/26	32	0.09
	10/26	11/2	18	0.13
	11/2	11/9	16	0.08
	11/9	11/16	24	0.08
	11/16	11/23	10	0.11
	11/23	11/30	18	0.09
	11/30	12/7	11	0.09
	12/7	12/14	8	0.07
	12/14	/21	8	0.10
	12/21	12/30	14	0.17
	12/30	1/4/60	9	0.11
	1/4/60	1/11	7	0.09
	1/11	1/18	19	0.08
	1/18	1/25	15	0.04
	1/25	2/1	14	0.09
	2/1	2/9	14	0.08
	2/9	2/15	11	0.09
	2/15	2/23	10	0.13

Table I (cont.)

Sampling Station	Collection Period Start	Stop	Δ Time (Days)	Gross Beta uuc/M³
4401	2/23	2/29	9	0.05
Union Carbide,	2/29	3/7	11	0.25
Tuxedo, Orange	3/7	3/14	7	0.12
County	3/14	3/21	6	0.11
(contd)	3/21	3/28	6	0.14
	3/28	4/4	15	0.06
	4/4	4/11	18	0.10
	4/11	4/18	22	0.15
	4/25	5/9	23	0.15
	5/9	5/16	18	0.13
	5/16	5/23	15	0.15
	5/23	5/31	7	0.16
	5/31	6/6	8	0.14
	6/6	6/13	14	0.22
	6/20	6/27	8	0.14
	7/5	7/11	18	0.14
	7/11	7/18	11	0.13
	7/18	7/25	17	0.13
	8/1	8/8	25	0.09
	8/8	8/15	22	0.01
	8/15	8/22	16	0.07
	8/23	8/30	13	0.07
	8/30	9/6	20	0.07
	9/6	9/13	20	0.08
	9/26	10/3	16	0.05
	10/3	10/11	8	0.05
	10/11	10/17	15	0.10
	10/17	10/24	11	0.05
	10/24	10/31	14	0.05
	10/31	11/9	14	0.02
	11/9	11/14	14	0.03
	11/14	11/21	16	0.06
	11/21	11/28	9	0.05
	11/28	12/5	14	0.0[illegible]
	12/5	12/13	16	0.05
	12/13	12/19	18	0.05
	12/19	12/28	21	0.04
	12/28	1/3	15	0.03
	1/3/61	1/9	14	0.06
	1/9	1/16	12	0.04
	1/16	1/23	9	0.03
	1/23	1/30	15	0.07
	1/30	2/6	11	0.03
	2/6	2/13	13	0.05
	2/13	2/20	21	0.05
	2/20	2/27	37	0.06
	2/27	3/5	32	0.07
	3/6	3/13	37	0.05
	3/13	3/20	29	0.07
	3/20	3/27	22	0.06
	3/27	4/3	33	0.07
	4/3	4/11	15	0.03

Table I (cont.)

Sampling Stations	Collection Period Start	Stop	Time (Days)	Gross Beta mc/M^3
4401	4/11	4/20	19	0.04
Union Carbide,	4/20	4/25	21	0.13
Tuxedo, Orange	4/25	5/4	12	0.07
County	5/4	5/8	10	0.10
(contd)	5/8	5/22	15	0.10
	5/22	5/31	16	0.13
	5/31	6/5	14	0.11
	6/5	6/12	24	0.08
	6/12	6/19	21	0.14
	6/19	6/29	15	0.11
	6/29	7/3	11	0.12
	7/3	7/10	32	0.08
	7/10	7/17	25	0.07
	7/17	7/24	18	0.07
	7/24	7/31	18	0.06
	7/31	8/7	15	0.05
	8/7	8/14	15	0.07
	8/14	8/23	21	0.06
	8/23	8/28	16	0.03
	8/28	9/5	10	0.06
	9/5	9/11	4	0.07
	9/11	9/18	3	9.5
	9/18	9/26	10	10.2
	9/26	10/2	4	9.6
	10/2	10/9	22	5.9
	10/9	10/26	48	2.7
	10/26	10/30	34	2.0
	10/30	11/6	37	3.2
	11/6	11/13	25	5.0
	11/13	11/20	36	4.8
	11/20	11/27	29	3.5
	11/27	12/4	22	2.1
	12/4	12/11	22	1.8
	12/11	12/18	15	2.6
	12/18	12/26	22	2.2
	12/26	1/2	15	4.4
	1/2 /62	1/8	15	6.3
	1/8	1/15	18	4.8
	1/15	1/22	7	5.9
	1/22	1/29	15	5.5
	1/29	2/5	27	3.7
	2/5	2/12	22	4.9
	2/12	2/19	15	5.5
	2/19	2/26	14	4.4
	2/26	3/5	17	6.0
	3/5	3/12	8	2.4
	3/12	3/19	25	3.2
	3/19	3/26	25	6.0
	3/26	4/2	21	4.3
	4/2	4/9	24	5.6

TABLE II

FALLOUT

Sampling Station	Collection Period Start	Stop	Time (Days)	Beta Bone Seekers uuc/ft²/day
1103 Camp Smith	9/17/59	10/3/59	26	2
	10/3	10/15	22	3
	10/15	10/29	29	10
	10/29	11/13	32	5
	11/13	11/19	26	5
	- DISCONTINUED -			
1307 Ossining	9/17/59	10/3/59	26	2
	10/3	10/15	22	5
	10/15	10/29	29	4
	10/29	11/12	33	3
	11/12	11/19	26	2
	- DISCONTINUED -			
2002 Stony Point	9/29/59	10/14/59	23	2
	10/14	10/28	30	2
	10/28	11/16	29	3
	11/16	11/23	29	1
	- DISCONTINUED-			
4301 Echo Lake	9/27/59	10/9/59	20	0.8
	10/9	10/23	28	2
	10/23	11/5	35	3
	10/30	11/13	43	1
	- DISCONTINUED -			
2202 Haverstraw	9/29/59	10/14/59	23	2.0
	10/14	10/28	30	2.0
	10/28	11/16	29	2.0
	11/16	11/23	29	1.0
	11/23	11/30	26	1.0
	11/30	12/7	37	6.0
	12/7	12/14	30	5.0
	12/14	12/21	12	2.0
	12/21	12/28	5	1.0
	12/28	1/4/60	29	4.0
	1/11/60	1/26	11	3.0
	1/11	1/18	22	1.0
	1/18	1/25	15	2.0
	1/23	1/29	46	11.0
	1/25	2/2	17	2.0
	2/2	2/8	15	2.0
	2/8	2/15	38	6.0
	2/15	2/23	15	7.0
	2/29	3/7	14	1.0
	3/7	3/15	16	<1.0
	3/28	4/4	15	8.0
	4/4	4/11	18	9.0
	4/11	4/19	21	4.8
	4/25	5/2	30	4.7

Table II (cont.)

FALLOUT

Sampling Station	Collection Period Start	Collection Period Stop	Δ Time (Days)	Beta Bone Seekers uuc/ft^2/day
	5/2	5/9	23	1.9
	5/9	5/18	23	5.7
	5/18	5/24	18	19.6
	5/23	5/31	15	3.3
	5/31	6/7	20	4.3
	6/6	6/13	17	3.9
	6/13	6/20	27	17.4
	6/20	6/27	32	1.1
	6/27	7/5	29	3.3
	7/5	7/11	57	< 0.1
	7/11	7/18	31	5.4
	7/18	7/25	24	2.2
	7/25	8/1	23	1.7
	8/1	8/8	24	1.4
	8/8	8/16	22	3.7
	8/16	8/22	18	0.9
	8/22	9/2	94	1.6
	9/19	9/26	70	1.6
	9/24	9/31	14	0.7
		- DISCONTINUED -		
1105	9/17/59	10/3/59	26	3.0
Peekskill, Camp Field	10/3	10/15	22	5.0
	10/15	10/29	29	4.0
	10/29	11/13	32	6.0
	11/13	11/19	26	4.0
	11/19	11/27	25	4.0
	11/27	12/3	23	5.0
	12/3	12/10	16	5.0
	12/17	12/23	26	1.0
	12/23	12/30	22	7.0
	12/30	1/7/60	26	5.0
	1/7/60	1/14	23	3.0
	1/14	1/21	19	3.0
	1/21	1/28	18	2.0
	1/28	2/4	15	0.2
	2/4	2/11	19	15.0
	2/11	2/18	12	1.0
	2/18	2/25	12	9.0
	2/24	3/7	8	19.0
	3/7	3/10	11	0.1
	3/10	3/17	14	2.0
	3/17	3/24	18	2.0
	3/24	3/31	19	8.0
	3/31	4/7	12	6.0
	3/31	4/7	22	4.0
	4/7	4/14	15	2.0
	4/14	4/21	19	3.3

Table II (cont.)

FALLOUT

Sampling Station	Collection Time Start	Stop	Δ Time (Days)	Beta Bone Seekers uuc/ft^2/day
1105	4/21	4/28	14	6.1
	4/28	5/6	26	3.6
	5/6	5/12	20	3.8
	5/12	5/19	15	4.8
	5/19	5/27	16	20.4
	5/27	6/2	25	3.2
	6/2	6/9	18	2.3
	6/9	6/16	19	6.8
	6/16	6/23	20	14.1
	6/23	7/1	33	2.8
	7/1	7/7	27	1.7
	7/7	7/15	27	4.6
	7/15	7/21	21	9.5
	7/21	7/28	27	8.4
	7/28	8/4	33	4.0
	8/4	8/11	27	3.3
	8/11	8/18	25	1.1
	8/18	8/25	22	2.7
	8/25	9/1	25	0.1
	9/1	9/8	18	0.6
	9/8	9/15	26	0.3
	9/15	9/22	74	1.6
	9/22	9/30	17	0.4
	10/6	10/13	19	0.5
	10/13	10/20	25	4.8

Sampling Station	Collection Period Start	Stop	Δ Time (Days)	Sr^{89} uuc/ft^2/day	Sr^{90} uuc/ft^2/day
Peekskill, Camp Field	10/27/60	11/25/60	*	< .002	.144
	11/25	12/15	*	< .002	.106
	12/15	1/26/61	*	< .002	.159
	1/26/61	3/2	*	< .002	.183
	3/2	3/23	*	.014	.735
	3/23	4/27	*	.030	.864
	4/27	6/1	*	.210	1.57
	6/1	6/8	*	.050	.370
	6/8	6/29	*	1.823	12.448

* Results corrected for delay from time of counting to mid-point of collection period.

TABLE III

VEGETATION

Westchester County

Sample #	Date Collected	Stime	Type Vegetation	Beta Bone Seeker uuc /gm
1001	2/6/60	307	Hemlock	11.8
So. Shore	6/10/60	91	Planton	6.2
Bleakly Ave.	10/28/60	17	Mullen	3.0
Pond	2/16/61	35	Hemlock Needles	3.4
	2/16/61	35	Hemlock Sticks	8.7
	6/6/61	33	Mixed Grasses	4.7
	10/5/61	140	Mixed Grasses	5.21
1002	3/14/60	186	Laurel	6.2
Cedar Hill	7/14/60	55	Planton	5.9
Cemetery	11/9/60	19	Broad Leaf Weed	3.6
	3/16/61	34	Myrtle	3.7
1101	5/17/60	115	Violet Leaves	4.1
Depew Park	9/7/60	19	Plankton	4.7
Pond	1/9/61	27	Hemlock Sticks	6.2
	5/9/61	28	Mixed Grass	4.5
	9/13/61	142	Mixed Grass	3.14
	1/3/62	76	Laurel Branches	13.7
	1/3/62	76	Laurel Leaves	47.45
1102	4/4/60	148	Hemlock	18.6
Petersen Pond	8/11/60	46	Plankton	4.5
	12/8/60	21	Fern	13.4
	4/12/61	34	Fern	12.6
	8/9/61	109	Mixed Grass	2.3
	12/5/61	97	Mixed grass	110.9
1103	4/14/60	155	Mullen Leaves	15.4
Camp Smith	8/11/60	46	Mullen	9.9
	12/8/60	21	Mullen	3.1
	4/12/61	34	Mullen	6.4
	8/9/61	74	Mixed Grass	3.0
	12/6/61	96	Mixed Grass	92.78
1104	5/17/60	118	Planton	7.9
Furnace Brook	9/7/60	19	Plankton	13.1
Pond	1/19/61	27	Hemlock	2.9
	5/9/61	28	Mixed Grass	3.3
	9/3/61	145	Mixed Grass	1.08
	1/3/62	68	Hemlock leaves	17.1
	1/3/62	75	Hemlock Sticks	30.9

Table III (cont.)

VEGETATION

Westchester County

Sample #	Date Collected	Δ Time	Type Vegetation	Beta Bone Seeker uuc/g
1105	2/18/60	305	Laurel	23.0
Peekskill Filter	6/10/60	87	Plankton	4.2
Plant-C p Field	10/20/60	20	Plankton	5.3
	2/16/61	56	Hemlock Needles	2.0
	2/16/61	56	Hemlock Sticks	3.8
	6/8/61	28	Mixed Grass	5.4
	10/5/61	144	Mixed Grass	6.28
1201	2/16/60	306	Cedar	14.7
Travis Pond	6/10/60	88	Laurel	8.8
	10/20/60	25	Holley	3.8
	2/16/61	28	Laurel	2.8
	2/16/61	38	Laurel Sticks	9.6
	6/6/61	30	Mixed Grass	2.9
1202	3/14/60	182	Spruce Tree	8.9
Furnace Dock Rd.	7/14/60	60	Planton	8.1
& Maple Ave.	11/9/60	21	Fern	4.0
	3/16/61	34	Fern	4.5
	9/13/61			1.08
	11/9/61	115	Mixed Grass	34.52
1301	3/14/60	186	Laurel	13.7
Mohegan Lake	7/14/60	56	Plankton	10.1
	11/9/60	80	Laurel	4.5
	3/16/61	34	Laurel	4.6
	3/16/61	34	Laurel	6.6
	11/9/61	131	Mixed Grass	23.64
1302	5/16/60	114	Laurel	8.4
Sarnoff Res.	9/6/60	35	Laurel	8.1
	1/19/61	27	Laurel	4.7
	5/20/61	37	Mixed Grass	3.9
	9/13/61	153	Mixed Grass	5.01
	1/2/62	77	Hemlock Leaves	20.17
	1/2/62	77	Hemlock Sticks	38.14
1303	4/14/60	155	Skunk Cabbage	1.1
Newbury Pond	8/11/60	36	Fern	4.6
	12/8/60	21	Fern	8.9
	4/12/61	34	Hemlock	3.4
	4/12/61	34	Hemlock Sticks	16.0
	8/ /61			3.2
	12/5/61	91	Mixed Grass	3.93

Table III (cont.)

VEGETATION

Westchester County

Sample #	Date Collected	Δ Time	Type Vegetation	Beta Bone Seeker uuc/gm
1304 Lake Mohansic	3/16/60	184	Laurel	6.9
	7/19/60	50	Plankton	13.7
	11/7/60	21	Fern	8.4
	3/15/61	35	Fern	9.3
	11/8/61	116	Mixed Grass	23.10
1305 Croton Reservoir	2/18/60	304	Mullen	17.9
	6/9/60	89	Mullen	3.2
	10/19/60	21	Fern	7.3
	2/15/61	26	Spruce Needles	1.6
	2/15/61	26	Spruce Sticks	2.1
	6/8/61	28	Mixed Grass	5.1
	10/5/61	144	Mixed Grass	9.17
1306 Lake Osceola	2/16/60	278	Plankton	sample rotted
	6/13/60	85	Bordeau	4.1
	10/19/60	26	Plankton	4.2
	2/15/61	36	Hemlock Needles	2.0
	6/8/61	28	Mixed grass	3.7
1307 Indian Brook Reservoir	2/16/60	306	Red Pine	12.8
	6/10/60	88	Plankton	4.4
	10/20/60	20	Aconite	2.4
	2/16/61	35	Pine Needles	0.9
	2/16/61	35	Pine Sticks	1.7
	6/6/61	30	Mixed Grass	0.9
	10/4/61	165	Mixed Grass	0.94
1308 Shrub Oak Wells	4/14/60	155	Mullen	20.3
	8/11/60	36	Plankton	19.8
	12/7/60	22	Mullen	5.5
	4/12/60	34	Dandelion	5.0
	8/10/61	73	Mixed Grass	3.8
	12/6/61	96	Mixed Grass	144.5
1309 Sparkle Lake	5/18/60	117	Plankton	4.0
	9/6/60	20	Plankton	6.1
	1/18/61	28	Fir	4.7
	1/18/61	28	Fir (sticks)	18.0
	5/5/61	32	Mixed Grass	3.0
	9/12/61	146	Mixed Grass	5.12
	1/2/62	77	Cedar branches	39.38
	1/2/62	77	Cedar leaves	43.98
1310 Echo Lake	3/15/60	185	Laurel	13.2
	7/13/60	55	Plankton	5.9
	11/7/60	21	Mullen	5.1
	3/15/61	35	Laurel	8.4
	3/15/61	35	Laurel	7.3
	11/8/61	116	Mixed Grass	20.73

Table III (cont.)

VEGETATION

Westchester County

Sample #	Date Collected	Time	Type Vegetation	Beta Bone Seeker mc/gm
1401	4/13/60	156	Mullen	10.2
Amawalk Reservoir	8/16/60	41	Plankton	6.3
	12/7/60	22	Mullen	5.1
	4/11/61	35	Mullen	8.0
	8/8/61			2.3
	12/5/61	97	Mixed Grass	167.0
1402	3/15/60	210	Laurel	9.6
Croton Lake	7/13/60	55	Planton	9.3
	11/7/60	21	Bordeaux	4.8
	3/15/61	35	Laurel	3.6
	3/15/61	35	Laurel	2.9
	9/13/61			5.01
	11/8/61	118	Mixed Grass	26.24
1403	4/13/60	147	Laurel	12.7
Mt. Kisco	8/10/60	37	Laurel	6.0
Country Club	12/7/60	22	Holley	9.7
	4/11/61	35	Planton	3.8
	8/8/61			4.0
	12/5/61	91	Mixed Grass	87.15
1404	3/13/60	183	Pacasandra	5.6
Briarcliff Manor	8/10/60	37	Pacasandra	5.8
	12/7/60	22	Pacasandra	7.3
	4/12/61	34	Pacasandra	4.8
	8/9/61	74	Mixed Grass	4.5
	12/4/61	90	Mixed Grass	80.77
1405	3/15/60	181	Spruce	13.7
Lake Purdy	7/13/60	55	Plankton	7.3
	11/5/60	23	Plankton	4.0
	3/15/61	34	Spruce	12.6
	11/13/61	111	Mixed Grass	45.78
1406	2/16/60	306	Tree	15.2
Lake Katonah	6/6/60	92	Plankton	7.6
	10/19/60	26	Fern	42.7
	2/15/61	26	Spruce Sticks	3.0
	2/15/61	26	Spruce Needles	10.2
	6/5/61	31	Mixed Grass	4.0
	10/2/61	157	Mixed Grass	13.44
1407	5/16/60	116	Fern	5.7
Mathews Hill	9/2/60	24	Bordeaux	2.1
Pond	1/18/61	30	Hemlock	4.3
	1/18/61	28	Hemlock	13.4
	5/5/61	32	Mixed Grass	7.3
	9/12/61	146	Mixed Grass	8.83
	1/2/62	89	Hemlock Leaves	36.08

Table III (cont.)

VEGETATION

Westchester County

Sample #	Date Collected	Δ Time	Type Vegetation	Beta Bone Seeker uμc/gm
1408	5/16/60	119	Plankton	6.4
Byram Lake	9/2/60	24	Dockin	5.9
	1/18/61	28	Pine	13.0
	1/18/61	28	Pine	2.4
	5/8/61	29	Mixed Grass	7.3
	9/12/61	154	Mixed Grass	3.33
	1/2/62	77	Juniper Branches	55.34
	1/2/62	89	Juniper Leaves	56.34
1409	5/16/60	119	Fern	2.0
Wipperwill Lake	9/2/60	24	Fern	9.5
	1/8/61	28	Hemlock Sticks	28.2
	1/8/61	28	Hemlock	8.7
	5/8/61	39	Mixed Grass	4.3
	9/12/61	153	Mixed Grass	2.70
	1/2/62	77	Hemlock Leaves	43.16
	1/2/62	77	Hemlock Branches	69.22
1410	4/19/60	146	Hemlock	20.6
Waccabuc Lake	8/10/60	37	Fern	8.6
	12/7/60	22	Fern	7.0
	4/11/61	35	Fern	8.8
	8/8/61			3.6
	12/5/61	95	Mixed Grass	91.32
1411	3/15/60	181	Spruce	13.7
Ward Pond	7/15/60	109	Plankton	13.9
Ridge Reservoir	11/7/60	21	Broadleaf Weed	1.9
	3/61		White Pine	1.5
	3/61		White Pine	7.8
	11/13/61	108	Mixed Grass	28.60
1412	2/16/60	306	Laurel	7.6
Blue Heron Lake	6/9/60	89	Fern	4.3
	10/19/60	21	Fern	3.2
	2/15/61	36	Laurel	3.5
	2/15/61	36	Laurel Sticks	3.7
	6/5/61	31	Mixed Grass	6.9
	10/2/61	147	Mixed Grass	7.16

Table III (cont.)

VEGETATION

Rockland County

Sample #	Date Collected	Time	Type Vegetation	Beta Bone Seeker uuc/gm
2101	7/22/60	172	Laurel	8.8
	10/11/60	20	Laurel	10.9
	1/5/61		Laurel	5.9
	7/7/61	63	Laurel	1.6
	8/17/61	78	Laurel	2.1
	9/6/61	173	Maple Leaves	1.22
	11/10/61	157	Laurel	28.37
	1/12/62	94	Laurel	33.84
	1/12/62	94	Laurel	40.72
	3/16/62	45		40.24
	3/16/62	45		42.23
2201	7/22/60	172	Laurel	9.4
	10/11/60	20	Laurel	5.3
	1/5/61		Laurel	6.0
	4/18/61	29	Laurel	8.7
	7/7/61	63	Laurel	8.1
	8/17/61	78	Laurel	5.9
	9/6/61	177	Fern	2.37
	11/10/61	154	Laurel	13.29
	1/12/62	81	Laurel	57.17
	2/9/62	66		69.81
	3/16/62	45	Laurel	53.14
	3/16/62	45	Laurel	76.30
2302	7/22/60	172	Laurel	12.7
	10/11/60	20	Laurel	1.4
	1/6/61	17	Mixed Grass	1.2
	4/11/61	35	Laurel	3.3
	7/7/61	66	Laurel	0.9
	10/2/61	151	Laurel	3.41
	11/10/61	127		8.76
	1/12/62	82	Laurel	48.43
	2/9/62	66		40.41
	3/16/62	18	Rhoden	64.81

VEGETATION

Orange County

Sample #	Date Collected	Time	Type Vegetation	Beta Bone Seeker uuc/gm
4302	9/7/60	174	Laurel	6.28
	10/18/60	133	Laurel	2.81
	11/15/60	105	Laurel	2.44
	12/21/60	69	Laurel	5.85

Table III (cont.)

VEGETATION

Putnam County

Sample #	Date Collected	Time	Type Vegetation	Beta Bone Seeker uuc/
3401	9/20/60	161	Plankton	8.1
	10/18/60	133	Plankton	26.9
	11/15/60	105	Plankton	13.7

TABLE IV

WATER

Westchester County

Sampling Station	Date Collected	Time Days	Gross Beta uuc/ml	Beta Bone Seekers uuc/ml
1001	1/29/60	21		0.001
Bleakley Avenue	2/16/60	10		0.003
Pond	3/14/60	13		0.003
	4/14/60	21		0.003
	5/12/60	22		0.002
	6/10/60	20		0.002
	7/14/60	20		0.002
	8/11/60	27		0.002
	9/7/60	19		0.001
	10/20/60	15		0.002
	11/9/60	19	0.002	
	12/8/60	21	0.005	
	1/19/61	13	0.004	
	2/16/61	25	0.002	
	3/16/61	34	0.006	
	4/12/61	27	0.002	
	4/14/61	25	0.001	
	5/9/61	15		0.003
	5/24/61	23		0.006
	6/6/61	13		0.005
	6/8/61	11		0.016
	7/11/61	34	0.002	
	8/9/61	20	0.003	
	9/13/61	33	0.005	
	10/5/61	55	0.008	
	11/9/61	54	0.004	
	12/7/61	-	0.005	
	1/3/62	-	0.005	
	2/21/62	44	0.005	
1104	2/16/60	10		0.002
Furnace Brook Pond	3/14/60	13		0.002
	4/14/60	21		0.002
	5/17/60	17		0.001
	6/10/60	20		0.002
	7/14/60	20		0.001
	8/11/60	28		0.002
	9/7/60	32		0.002
	10/20/60	15		0.001
	11/9/60	19	0.001	
	12/8/60	21	0.003	
	1/19/61	13	0.001	
	2/16/61	12	0.001	
	3/16/61	34	0.002	
	4/12/61	27	0.001	
	5/9/61	15	0.001	
	6/6/61	13	0.002	

Table IV (cont.)

WATER

Westchester County

Sampling Station	Date Collected	Time Days	Gross Beta uuc/ml	Beta Bone Seekers uuc/ml
1104 Furnace Brook Pond	7/11/61	17	0.002	
	8/9/61	21	0.002	
	9/13/61	69	0.006	
	10/4/61	55	0.003	
	11/9/61	49	0.006	
	12/5/61	52	0.017	
	1/3/62	-	0.012	
	2/21/62	44	0.010	
1105	2/16/60	10		0.002
	3/14/60	13		0.002
	4/14/60	21		0.002
	5/17/60	17		0.001
	6/10/60	20		0.001
	8/11/60	27		0.001
	11/9/60	19	< 0.001	
	12/8/60	21	0.003	
	2/16/61	12	0.002	
	3/16/61	34	0.001	
	4/12/61	34	0.001	
	5/11/61	13	0.001	
	6/8/61	11	0.003	
	7/13/61	29	0.002	
	8/10/61	73	0.001	
	9/13/61	-	0.002	
	10/5/61	55	0.002	
	11/9/61	-	0.004	
	11/22/61	-	0.006	
	12/7/61	-	0.007	
	1/3/62	54	0.008	
	3/22/62	22	0.011	
1301	2/16/60	10		0.004
	3/14/60	17		0.002
	3/14/60	21		0.004
	5/17/60	17		0.002
	6/10/60	20		0.005
	7/14/60	20		0.003
	8/11/60	27		0.003
	9/6/60	25		0.003
	10/20/60	15		0.002
	11/9/60	19	0.002	
	12/8/60	21	0.005	

Table IV (cont.)

WATER

Westchester County

Sampling Station	Date Collected	Time Days	Gross Beta uuc/ml	Beta Bone Seekers uuc/ml
1301	1/19/61	13	0.002	
	2/16/61	-	0.005	
	3/16/61	34	0.003	
	4/12/61	27	0.003	
	5/10/61	14	0.002	
	6/8/61	11	0.004	
	7/13/61	15	0.002	
	8/10/61	34	<0.001	
	9/13/61	69	0.002	
	10/3/61	58	0.004	
	11/9/61	47	0.005	
	12/6/61	-	0.011	
	1/3/62	-	0.017	
	2/21/62	44	0.012	
1305	2/16/60	10		0.003
	4/13/60	22		0.003
	5/16/60	18		0.001
	6/9/60	21		0.002
	7/13/60	31		0.003
	8/10/60	28		0.001
	9/6/60	20		0.001
	10/19/60	16		0.001
	11/7/60	21	0.006	
	12/7/60	22	0.003	
	1/19/61	13	<0.001	
	2/15/61	13	<0.001	
	3/15/61	34	0.003	
	4/12/61	-	<0.001	
	5/10/61	14	0.002	
	6/8/61	28	0.001	
	7/11/61	17	0.001	
	8/10/61	26	0.001	
	9/13/61	58	0.002	
	10/5/61	55	0.001	
	11/8/61	55	0.003	
	12/6/61	-	0.004	
	1/2/62	28	0.002	
	2/22/62	42	0.001	

Table IV (cont.)

WATER

Westchester County

Sampling Station	Date Collected	Time Days	Gross Beta uuc/ml	Beta Bone Seekers uuc/ml
1307	2/26/60	10		0.002
	2/17/60	14		0.004
	3/14/60	13		0.002
	4/14/60	21		0.002
	6/10/60	20		0.002
	7/14/60	20		0.001
	9/7/60	24		0.002
	11/9/60	19	0.002	
	12/8/60	21	0.003	
	1/19/61	13	0.006	
	2/16/61	12	0.008	
	3/16/61	34	0.003	
	4/12/61	27	0.001	
	5/8/61	29	0.005	
	6/6/61	30	0.002	
	7/11/61	-	0.004	
	8/8/61	21	0.004	
	9/13/61	69	0.004	
	10/4/61	55	0.002	
	11/9/61	54	0.007	
	12/5/61	44	0.010	
	1/3/62	57	0.011	
	2/21/62	59	0.023	
	3/22/62	22	0.011	
1401	7/17/59	27		0.018
	2/16/60	10		0.003
	3/15/60	12		0.003
	4/13/60	22		0.003
	5/14/60	20		0.001
	6/9/60	21		0.002
	7/13/60	21		0.003
	8/10/60	29		0.002
	9/6/60	24		0.002
	10/19/60	16		0.001
	11/7/60	21	0.002	
	12/7/60	22	0.014	
	1/18/61	14	0.001	
	3/15/61	35	0.002	
	4/11/61	28	0.006	
	5/5/61	19	0.002	
	6/6/61	13	0.003	
	7/11/61	31	0.004	
	8/8/61	14	0.003	
	9/12/61	34	0.003	
	10/2/61	58	0.001	
	11/13/61	43	0.005	
	1/2/62	30	0.026	

Table IV (cont.)

WATER

Westchester County

Sampling Station	Date Collected	Time Days	Gross Beta uuc/ml	Beta Bone Seekers uuc/ml
1408	2/16/60	10		0.006
	3/15/60	12		0.004
	4/13/60	22		0.003
	5/26/60	8		0.002
	6/9/60	21		0.002
	7/13/60	21		0.002
	8/10/60	28		0.003
	9/2/60	29		0.003
	10/19/60	16		0.003
	11/7/60	28	0.001	
	12/7/60	22	0.004	
	1/18/61	14	0.001	
	2/15/61	13	0.002	
	3/15/61	34	0.008	
	4/11/61	28	0.002	
	5/8/61	16	0.001	
	6/5/61	44	0.003	
	7/12/61	14	0.001	
	8/8/61	21	0.004	
	9/12/61	59	0.003	
	10/2/61	58	0.011	
	11/13/61	35	0.020	
	12/5/61	-	0.050	
	1/2/62	28	0.004	
	2/21/62	59	0.012	
1410 Lake Macabuc	2/16/60	10		0.005
	3/15/60	12		0.003
	4/13/60	22		0.003
	5/16/60	18		0.001
	6/9/60	21		0.002
	7/13/60	21		0.002
	9/2/60	24		0.001
	10/19/60	16		0.001
	11/7/60	21	0.004	
	12/7/60	22	0.003	
	1/18/61	14	0.002	
	2/15/61	13	0.002	
	3/15/61	35	0.002	
	4/11/61	28	0.004	
	5/5/61	32	0.002	
	6/5/61	44	0.004	
	7/12/61	30	0.004	
	8/8/61	21	0.003	
	9/12/61	34	0.002	
	10/2/61	58	0.003	
	11/13/61	30	0.006	
	1/2/62	63	0.006	
	2/22/62	43	0.001	

Table IV (cont.)

WATER

Rockland County

Sampling Station	Date Collected	Time Days	Gross Beta uuc/ml	Beta Bone Seekers uuc/ml
2410 Welfare Home Well, Spring Valley G*	7-13-60	20		0.001
	8-11-60	20		0.002
	9-17-60	27		0.002
	10-11-60	10		0.001
	11-25-60	12		0.001
	6-2-61	34		0.001
2411 Lake Deforest at Congers Hackensack	7-12-60	17		0.001
	8-11-60	18		0.002
	9-14-60	27		0.001
	10-11-60	10		0.002
	11-28-60	5		0.001
	1-6-61	20	0.010	
	2-3-61	18		0.002
	4-21-61	27		0.002
	6-2-61	34		0.003
	7-7-61	21	0.001	
	8-17-61	27	0.001	
	9-6-61	40	0.002	
	10-2-61	50	0.002	
2412 G* Fulle W.S.		DISCONTINUED		
2413 Sebago Lake	2-28-61	23		0.001
2313 G* Hillside Estates		DISCONTINUED		
2314 G* Conger Realty Corp.		DISCONTINUED		
2315 Breakneck Lake		DISCONTINUED		
2316 Lake Welch	2-28-61	23		0.002
2317 Rockland Lake		DISCONTINUED		
2318 Lake Lucille		DISCONTINUED		

Table IV (cont.)

WATER

Rockland County

Sampling Station	Date Collected	Time Days	Gross Beta uuc/ml	Beta Bone Seekers uuc/ml
2319 Congers Lake	7-12-60	24		0.002
	8-11-60	18		0.003
	9-14-60	27		0.003
	10-11-60	10		0.003
	11-25-60	12		0.002
	1-6-61	20		0.003
	2-3-61	18		0.002
	6-2-61	34		0.002
	7-7-61	21	0.004	
	8-17-61	27		<0.001
	9-6-61	55	0.002	
	10-2-61	50	0.003	
	11-21-61	25		0.003
2213 G* Garnerville Holding Co. Well		DISCONTINUED		
2310 Letchworth Village Res	7-13-60	16		<0.001
	8-4-60	18		0.002
	9-14-60	27		0.006
	10-11-60	10		0.002
	11-25-60	20		0.001
	1-5-61	21	0.001	
	2-14-61	9	0.005	
	4-21-61	18		0.001
	6-2-61	34		0.001
	7-7-61	21	0.001	
	8-17-61	27	<0.001	
	9-6-61	55	0.001	
	10-2-61	50	0.003	
2311 G* Wells near Lake Lucille & Hackensack Water Co.		DISCONTINUED		
2312 G* Summit Pk. Lab. Wells Spring Valley W.W.		DISCONTINUED		

Table IV (cont.)

WATER

Rockland County

Sampling Station	Date Collected	Time Days	Gross Beta uuc/ml	Beta Bone Seekers uuc/ml
2110 Iona Island G*	7-13-60	21		0.001
	8-11-60	18		0.001
	9-14-60	27		0.002
	10-11-60	10		0.001
	11-25-60	20		0.001
	1-5-61	21		0.001
	1-14-61	7		0.002
	4-21-61	25		0.001
	6-2-61	34		0.001
	7-7-61	21	0.001	
	8-17-61	19	<0.001	
	9-6-61	40	<0.001	
	10-2-61	50	0.003	
2210 G* N.Y. Water Service Well at Thiells PWS		DISCONTINUED		
2211 G* N.Y.S. Water Service Well at Garnerville		DISCONTINUED		
2212 N.Y. Water Service Reservoir at Rt. 210		DISCONTINUED		
4210 Lake Quaensboro	1-17-61	15		0.001
4310 Echo Lake		DISCONTINUED		
4311 Highland Falls	12-27-60	22		0.001
	1-27-61	19		0.001
	4-4-61	22		0.002
	5-2-61	22		0.001
	5-31-61	16		0.001
	7-5-61	9		0.001
	7-31-61	29		0.002
4312 Silver Mine Lake		DISCONTINUED		
4313 Summit Lake	28-61	23		0.002
4314 Lake Tiorati		DISCONTINUED		

Table IV (cont.)

WATER

Rockland County

Sampling Station	Date Collected	Time Days	Gross Beta uuc/ml	Beta Bone Seekers uuc/ml
4315 Alec Meadow Res.		DISCONTINUED		
4410 G* Harriman W.S.	DISCONTINUED-CANNOT FIND IN BOOK			
4411 Cromwell Lake-Woodbury Tn.		DISCONTINUED		
4412 Lake Stahahe	2-28-61	37		0.005
4413 G* Skyline Trails		DISCONTINUED		

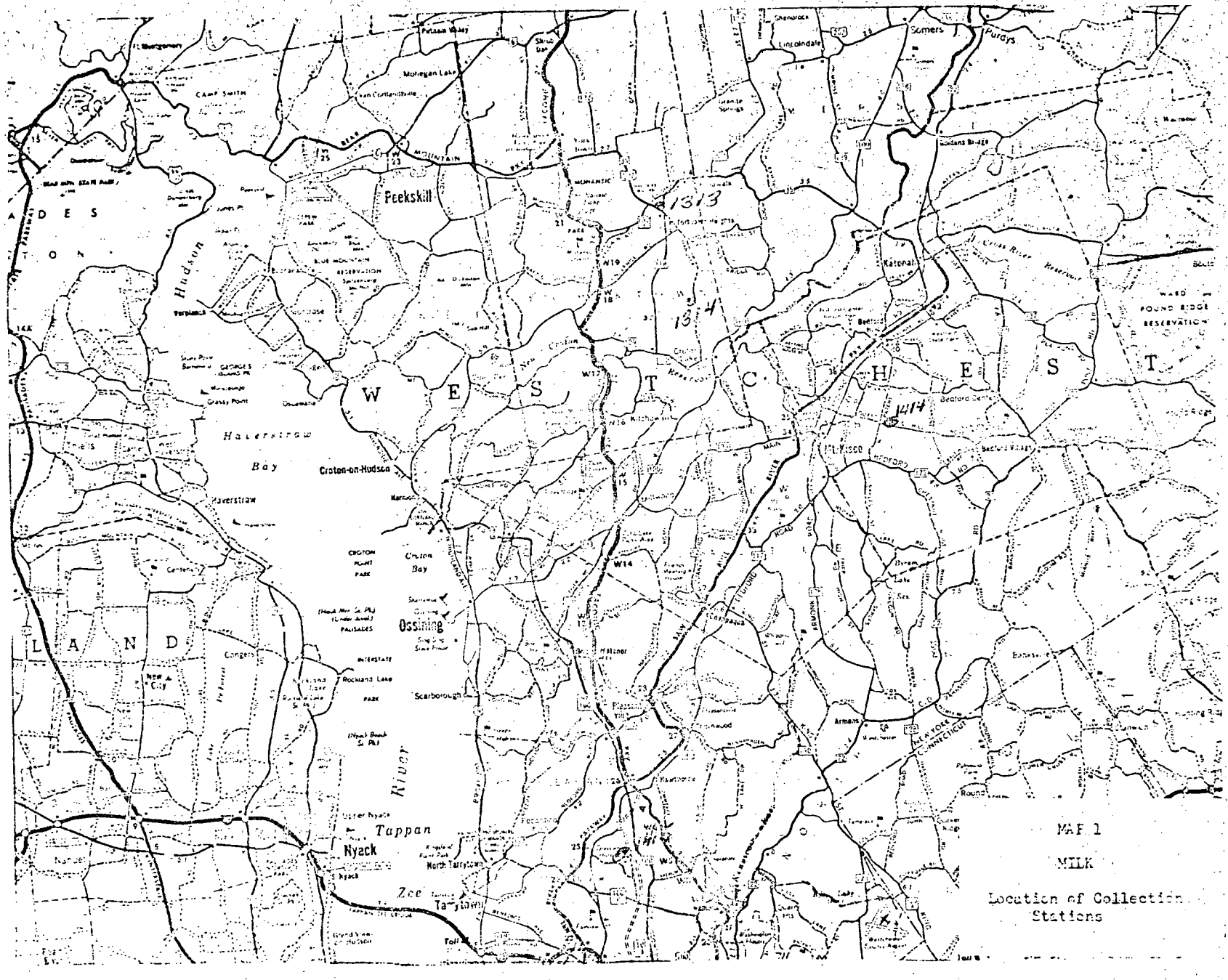
TABLE V

Hudson River Water Results Reported by
U.S.P.H.S. and I.B.M. Plant, Poughkeepsie

Date Sampled	Time Days	Gross B - uuc/ml Suspended	Dissolved	Total
10-21-59	9	0.000	0.000	0.000
10-26	11	0.000	0.010	0.010
11-4	9	0.000	0.000	0.000
11-11	7	0.000	0.000	0.000
11-18	21	0.055	0.000	0.055
11-25	16	0.000	0.000	0.000
12-9	22	0.006	0.000	0.006
12-16	29	0.000	0.000	0.000
12-23	22	0.000	0.000	0.000
12-30	15	0.000	0.007	0.007
1-6-60	13	0.003	0.042	0.045
1-13	9	0.000	0.011	0.011
1-20	21	0.031	0.010	0.041
2-3	—	0.000	0.000	0.000
2-10	14	0.000	0.002	0.002
2-17	—	0.000	0.000	0.000
2-24	12	0.000	0.000	0.000
3-9	12	0.000	0.000	0.000
3-16	23	0.000	0.000	0.000
3-23	—	0.000	0.000	0.000
3-30	—	0.000	0.000	0.000
4-13	7	0.001	0.006	0.007
4-20	—	0.000	0.000	0.000
4-27	12	0.000	0.000	0.000
5-2	—	0.000	0.000	0.000
5-11	15	0.000	0.000	0.000
5-18	—	0.000	0.000	0.000
6-1	—	0.000	0.000	0.000
6-8	—	0.000	0.000	0.000
6-15	9	0.001	0.002	0.003
6-22	—	0.000	0.000	0.000
6-29	—	0.000	0.000	0.000
7-13	21	0.000	0.004	0.004
8-10	14	0.000	0.000	0.000
8-17	27	0.000	0.003	0.003
8-24	20	0.000	0.004	0.004
8-31	23	0.000	0.000	0.000
9-13	14	0.000	0.000	0.000
9-28	16	0.000	0.000	0.000
10-12	20	0.000	0.001	0.001
10-19	33	0.000	0.003	0.003
11-30	12	0.000	0.000	0.000
12-14	29	0.000	0.003	0.003
12-28	21	0.000	0.000	0.000

TABLE V (cont.)

Date Sampled	Δ Time Days	Gross B - uuc/ml Suspended	Dissolved	Total
1-11-61	16	0.000	0.001	0.001
1-31	16	0.000	0.000	0.000
2-15	15	0.000	0.000	0.000
3-1	21	0.000	0.000	0.000
3-15	12	0.003	0.000	0.003
3-29	14	0.000	0.000	0.000
4-12	15	0.000	0.000	0.000
4-26	19	0.000	0.000	0.000
5-10	15	0.000	0.000	0.000
6-61				0.003
7-61				0.000
8-61				0.006
9-61				0.010
10-61				0.080



MAP 1

MILK

Location of Collection Stations

Table VI

MILK

Westchester County

Station	Date Collected	Δ Time Days	Beta Bone Seekers uuc/kg
Yorktown	6/30/59	7	114.0
Willowby	10/21	7	43.5
Farm	1/11/60		48.8
Station 1313	4/6	14	25.9
	5/10	8	39.2
	6/7	8	32.0
	7/12	10	27.9
	8/2	22	28.3
	9/6	8	29.4
	10/4	14	31.4
	11/2	80	34.2
	1/10/61	37	39.2
	2/15	9	48.2
	3/29	12	37.2
	4/11	13	33.5
	5/1	32	37.0
	6/1	11	40.7
		Discontinued	
Yorktown	8/7/61	22	18.6
Hanover Hill	9/12	14	29.1
Farm	10/4	39	47.4
Station 1314	11/13	57	65.6
	12/6		60.0
	1/2/62		35.3
	2/21	10	53.9
	3/20	76	28.8
Mt. Kisco	6/30/59	7	146
Guard Hill	10/21	7	20.1
Farm	1/11/60		65.1
Station 1414	4/5	15	33.7
	5/11	7	25.1
	6/7	8	41.5
	7/12	38	18.7
	8/2	22	24.7
	9/6	8	29.5
	10/4	13	26.8
	11/2	80	41.7
	12/20	37	44.4
	1/10/61	11	23.4
	2/15		28.8
	3/29	12	28.0
	4/11	13	13.9
	5/1	4	31.9
	6/1	12	20.9
	8/7	22	28.7

Table VI (cont.)

MILK

Westchester County

Station	Date Collected	Δ Time Days	Beta Bone Seekers uuc/kg
Mt. Kisco	9/12	28	34.3
Guard Hill	10/4	44	52.5
Farm	11/13	57	74.2
Station 1414	12/6		31.3
contd.	1/2/62		26.6
	2/21/62		29.08
Mt. Pleasant	6/30/59	7	57
Grasslands	10/21	6	16.3
Farm	1/11/60		40.6
Station 1415	4/5	15	23.0
	5/10	8	20.3
	6/7	8	13.2
	7/12	37	17.5
	8/2	22	17.1
	9/6	8	21.5
	10/4	13	14.9
	11/1	76	29.0
	1/10/61	43	35.3
	2/14	10	29.4
	4/11	13	16.4
	5/1	4	27.7
	6/1	12	16.8
	7/10	67	10.6
	8/8	21	19.3
	9/12	16	18.7
	10/5	38	36.6
	11/13	57	23.5
	12/17	34	28.0
	1/3/62	36	33.8
	2/21	18	27.9
	3/20	75	21.5

GRAPHS of RESULTS

FIGURE I

AIR, VEGETATION, WATER, AND FALLOUT
GROSS · BETA, BETA · BONE · SEEKERS, Sr^{89} AND Sr^{90}
BY · THREE · MONTH · PERIODS · FROM · AUGUST, 1959

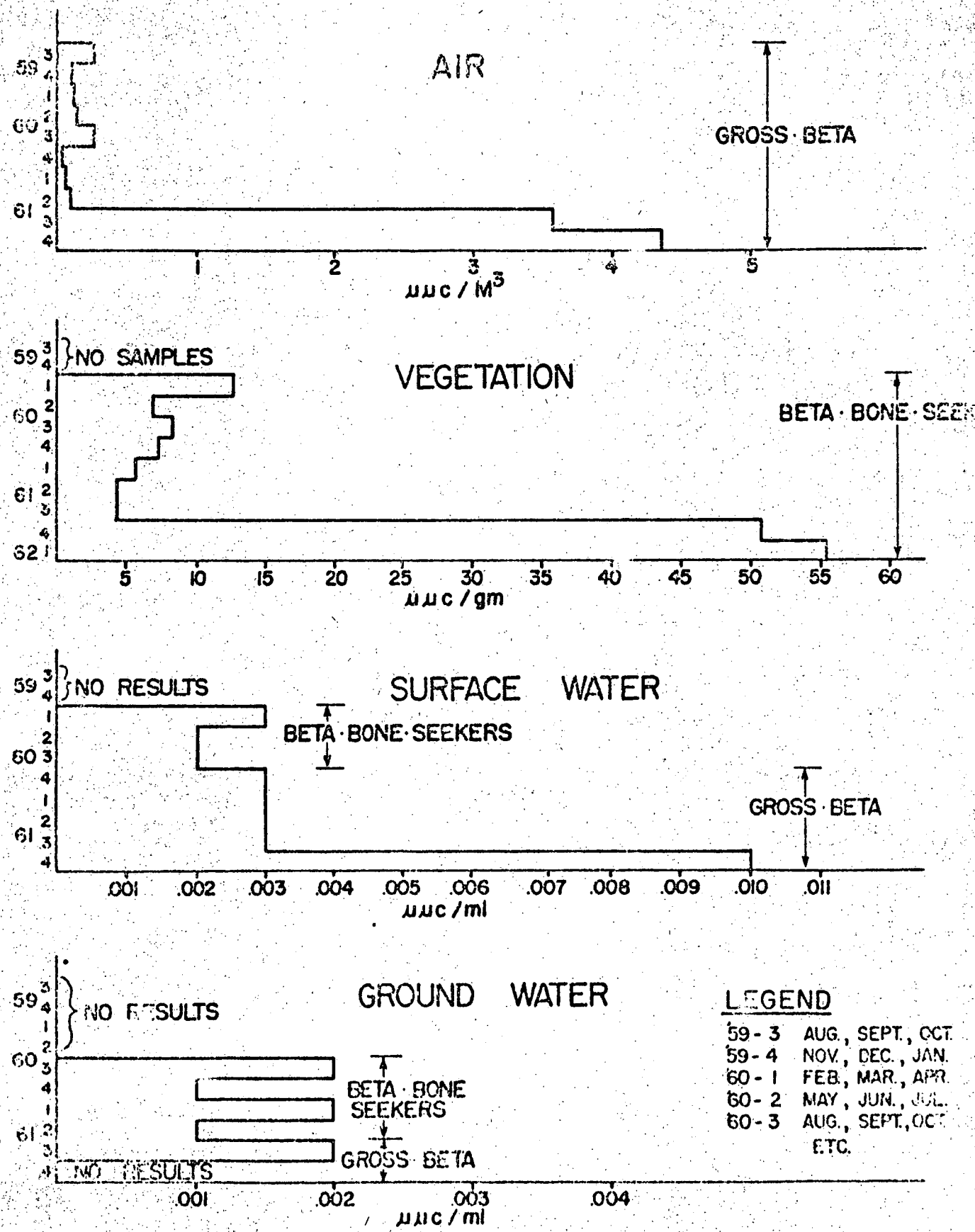


FIGURE I (CONTINUED)

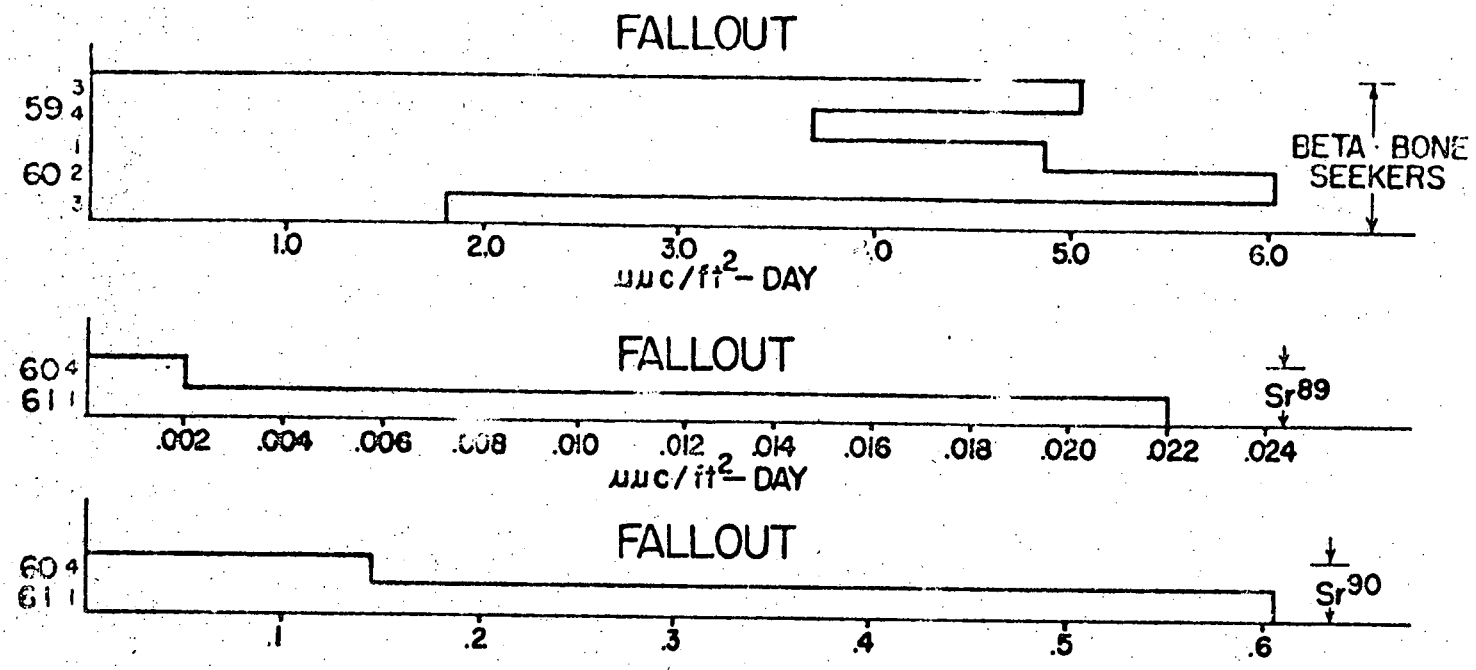


FIGURE II

GROSS · BETA · ACTIVITY · OF PARTICULATES · IN · AIR

μμc / M³

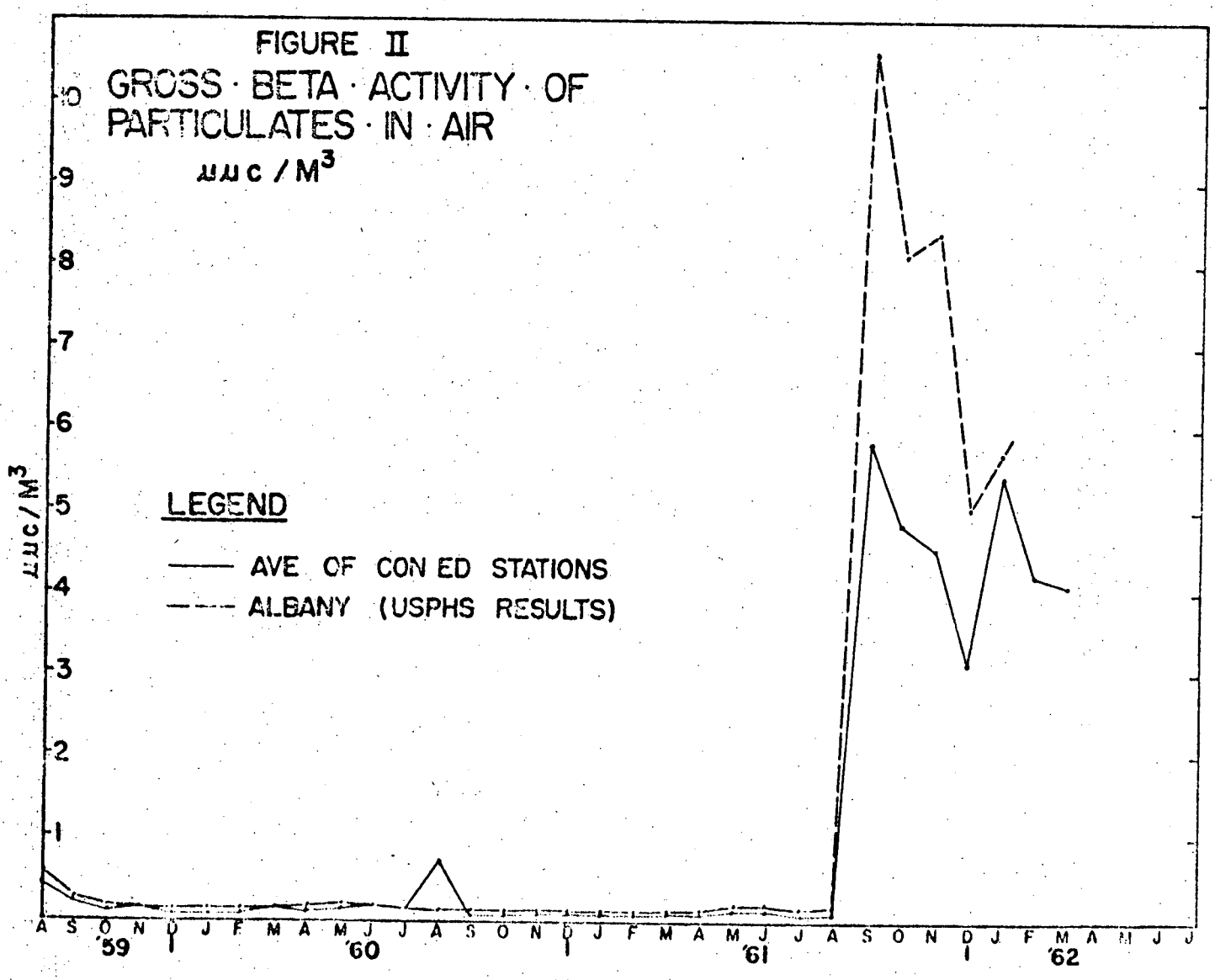
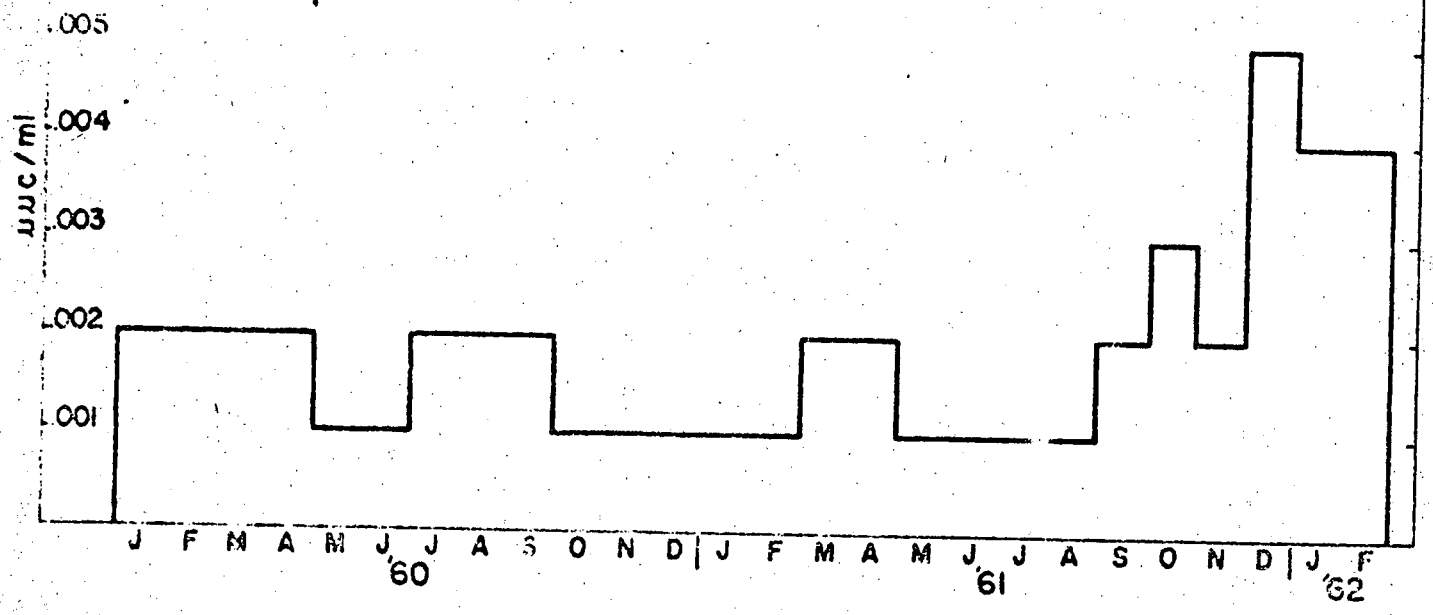


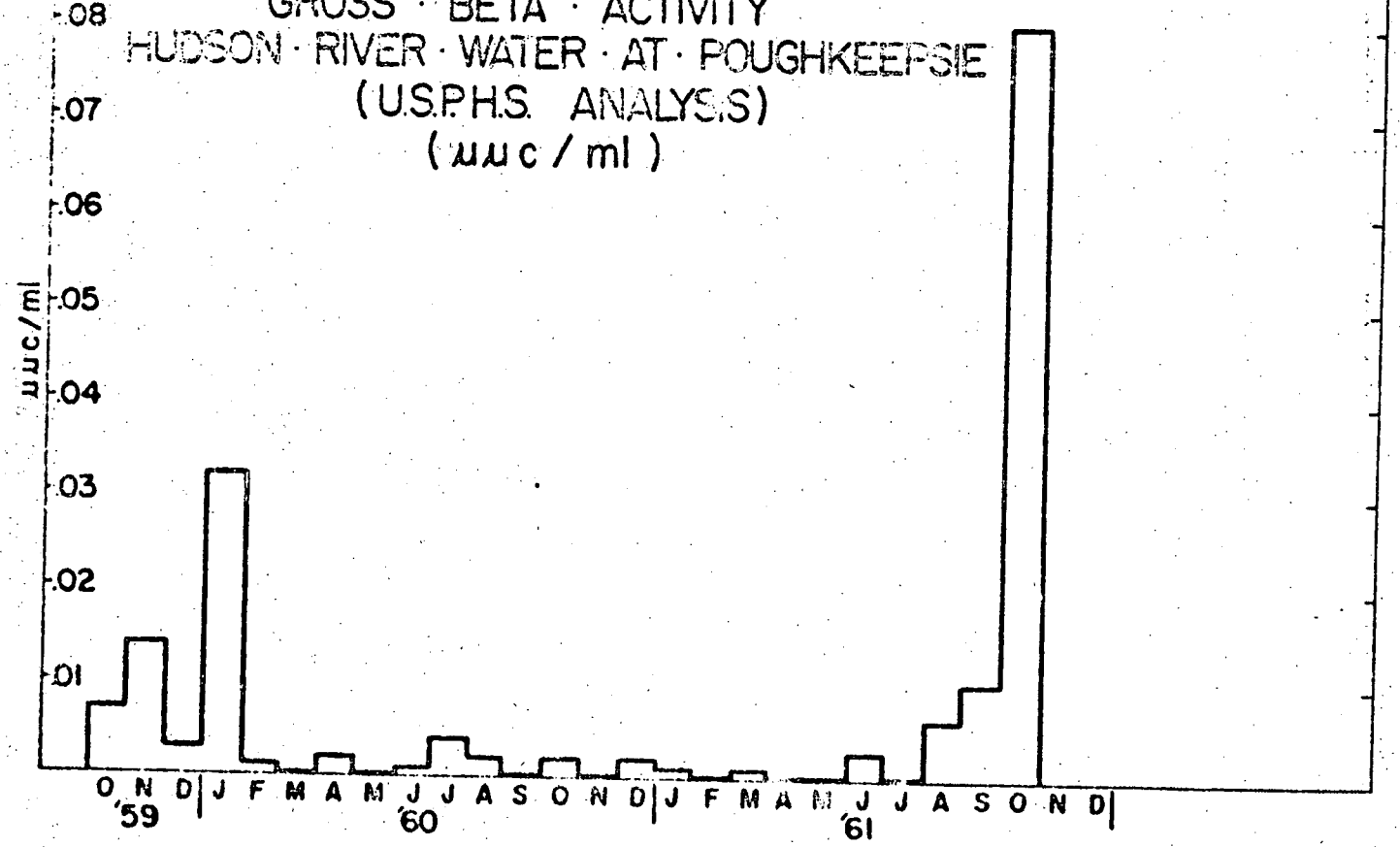
FIGURE III

BETA · BONE · SEEKER · ACTIVITY
ALBANY · TREATED · WATER
(μμc / ml)



FIGUR E IV

GROSS · BETA · ACTIVITY
HUDSON · RIVER · WATER · AT · POUGHKEEPSIE
(U.S.P.H.S. ANALYSIS)
(μμc / ml)



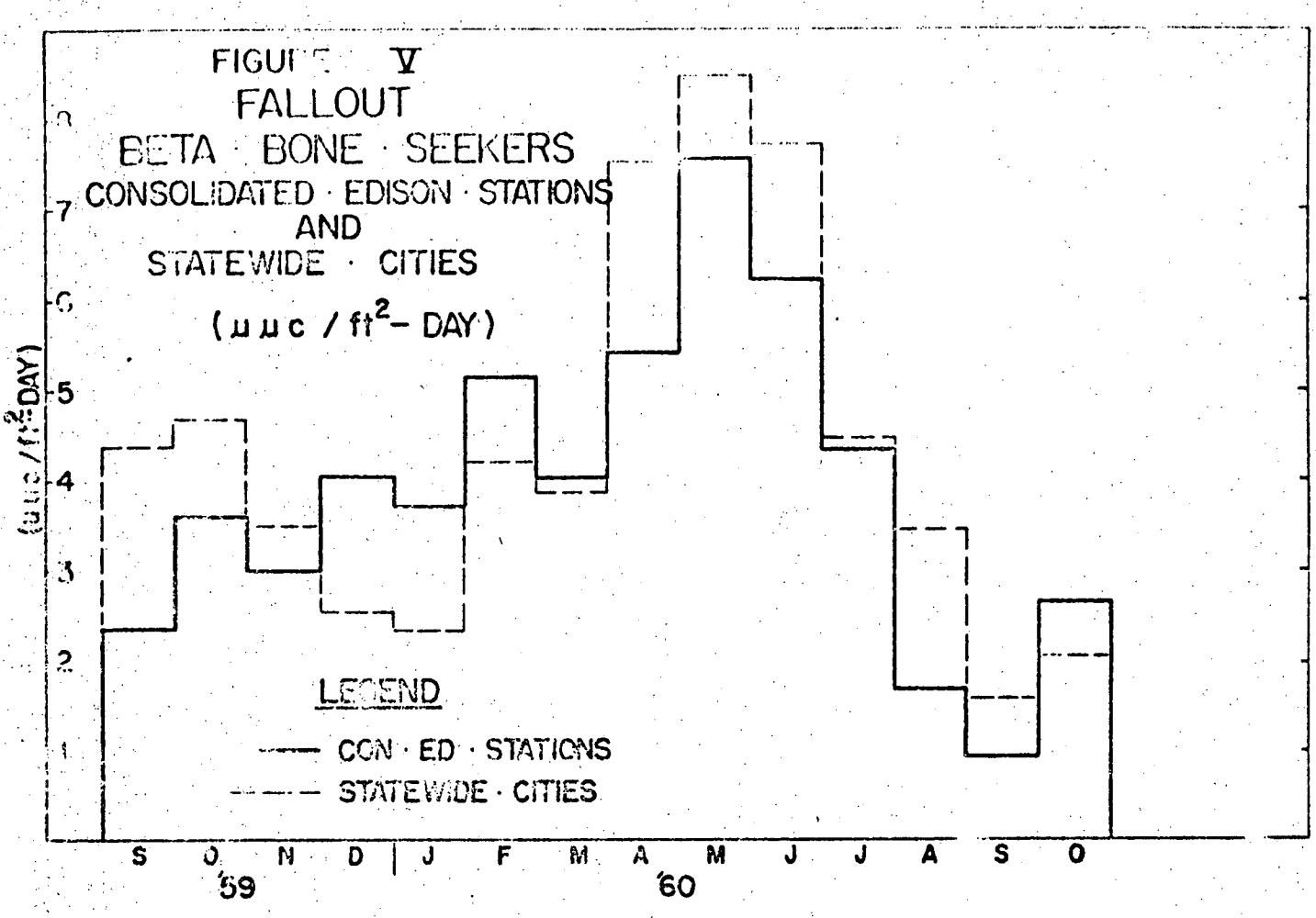


FIGURE V
FALLOUT
BETA · BONE · SEEKERS
CONSOLIDATED · EDISON · STATIONS
AND
STATEWIDE · CITIES
(μμc / ft² – DAY)
(μμc / ft² DAY)
7
6
5
4
3
2
1
LEGEND
CON · ED · STATIONS
STATEWIDE · CITIES
S O N D J F M A M J J A S O
'59
'60

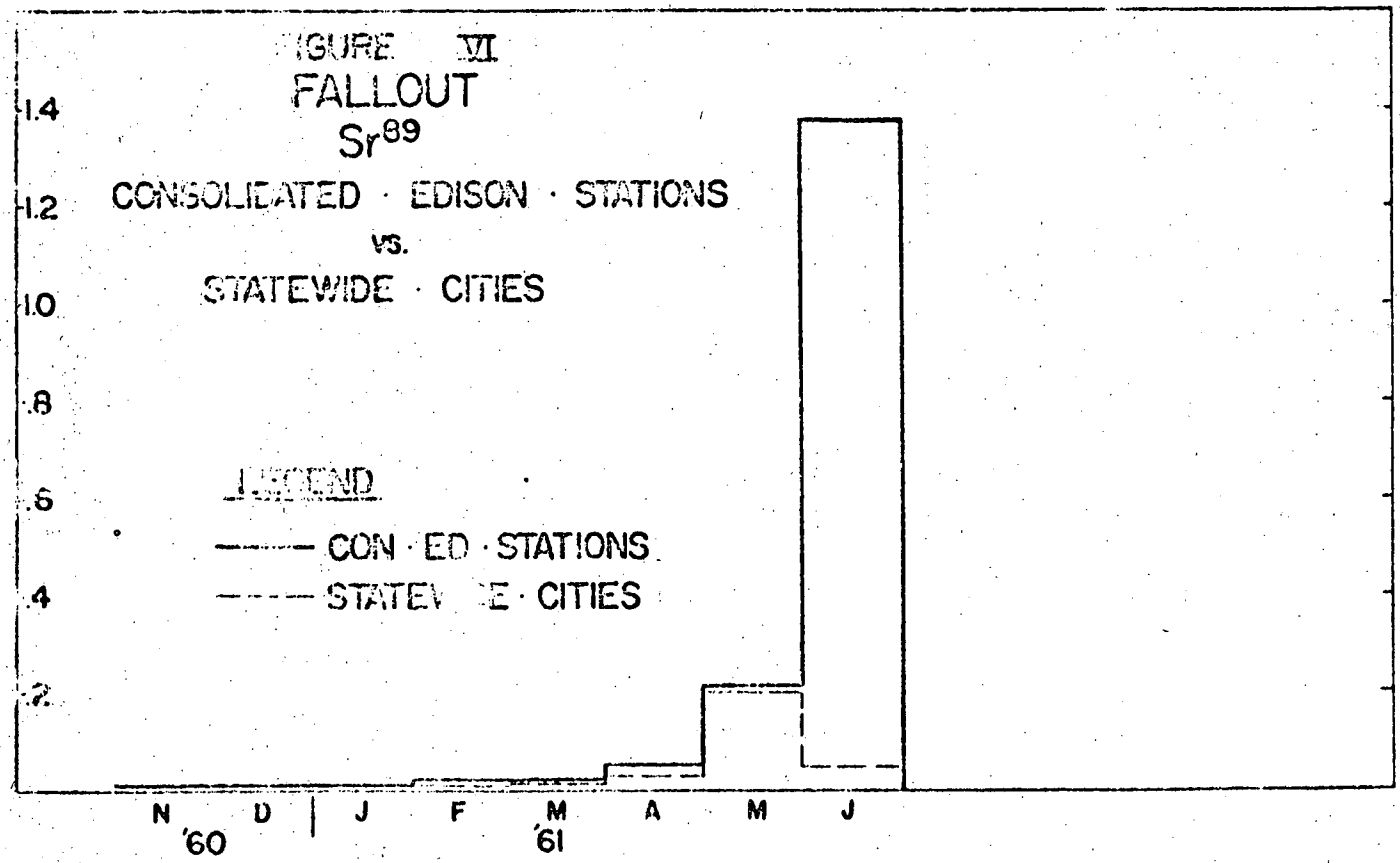


FIGURE VI
FALLOUT
Sr89
CONSOLIDATED · EDISON · STATIONS
vs.
STATEWIDE · CITIES
1.4
1.2
1.0
.8
.6
.4
.2
LEGEND
CON · ED · STATIONS
STATEWIDE · CITIES
N D J F M A M J
'60
'61

FIGURE VII

FALLOUT

Sr^{90}

CONSOLIDATED EDISON STATIONS

VS.

STATEWIDE CITIES

($\mu\mu c / ft^2$ – DAY)

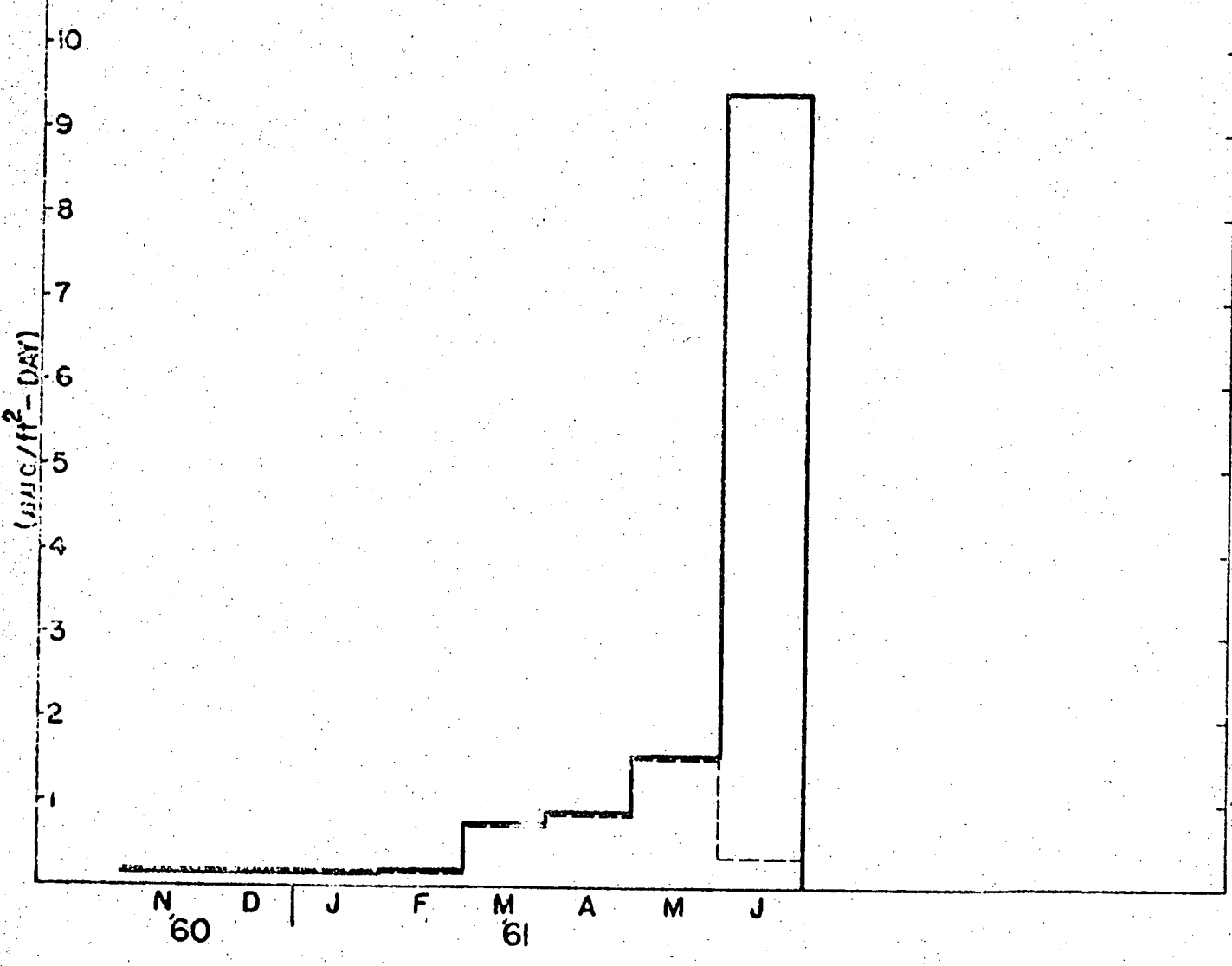
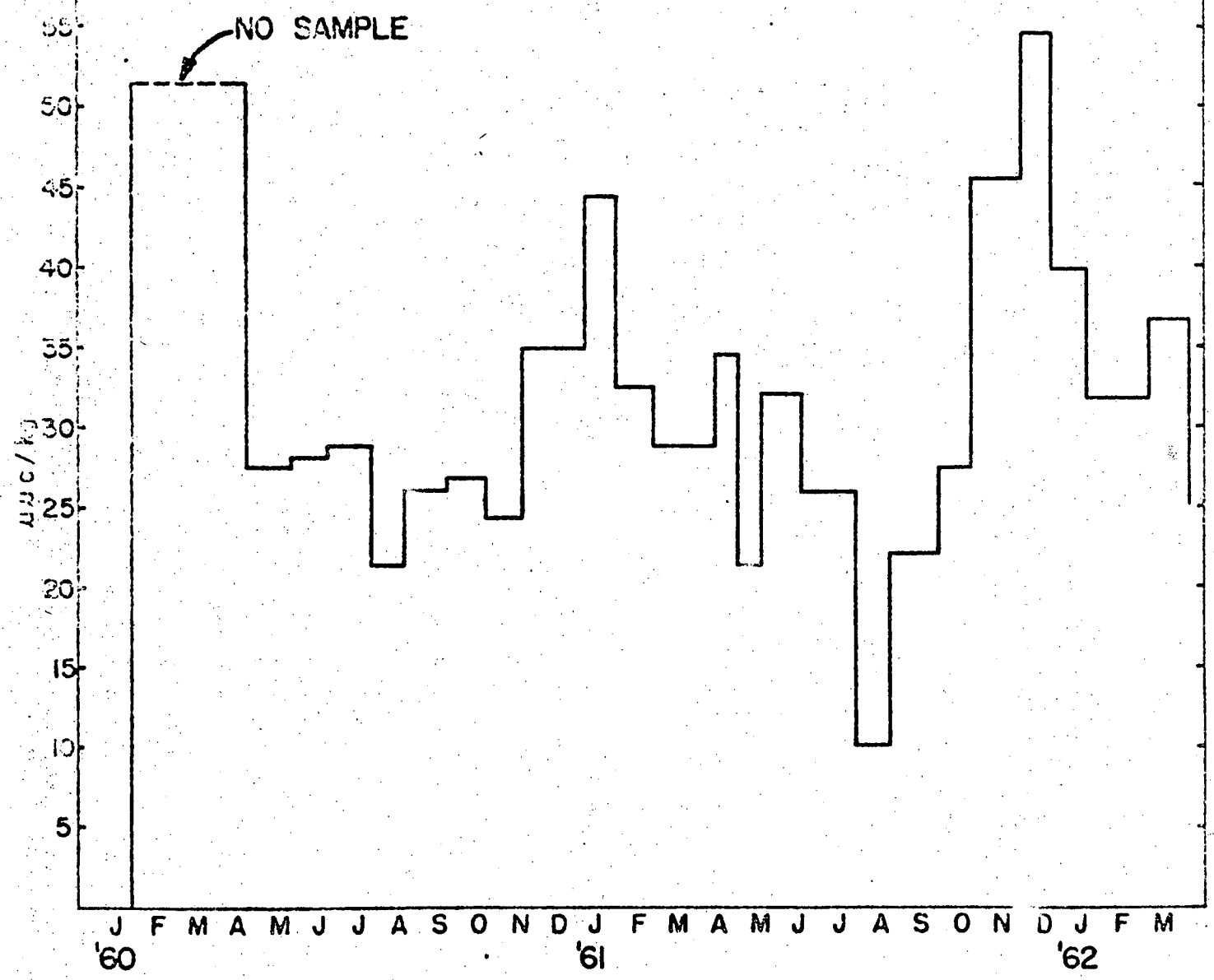


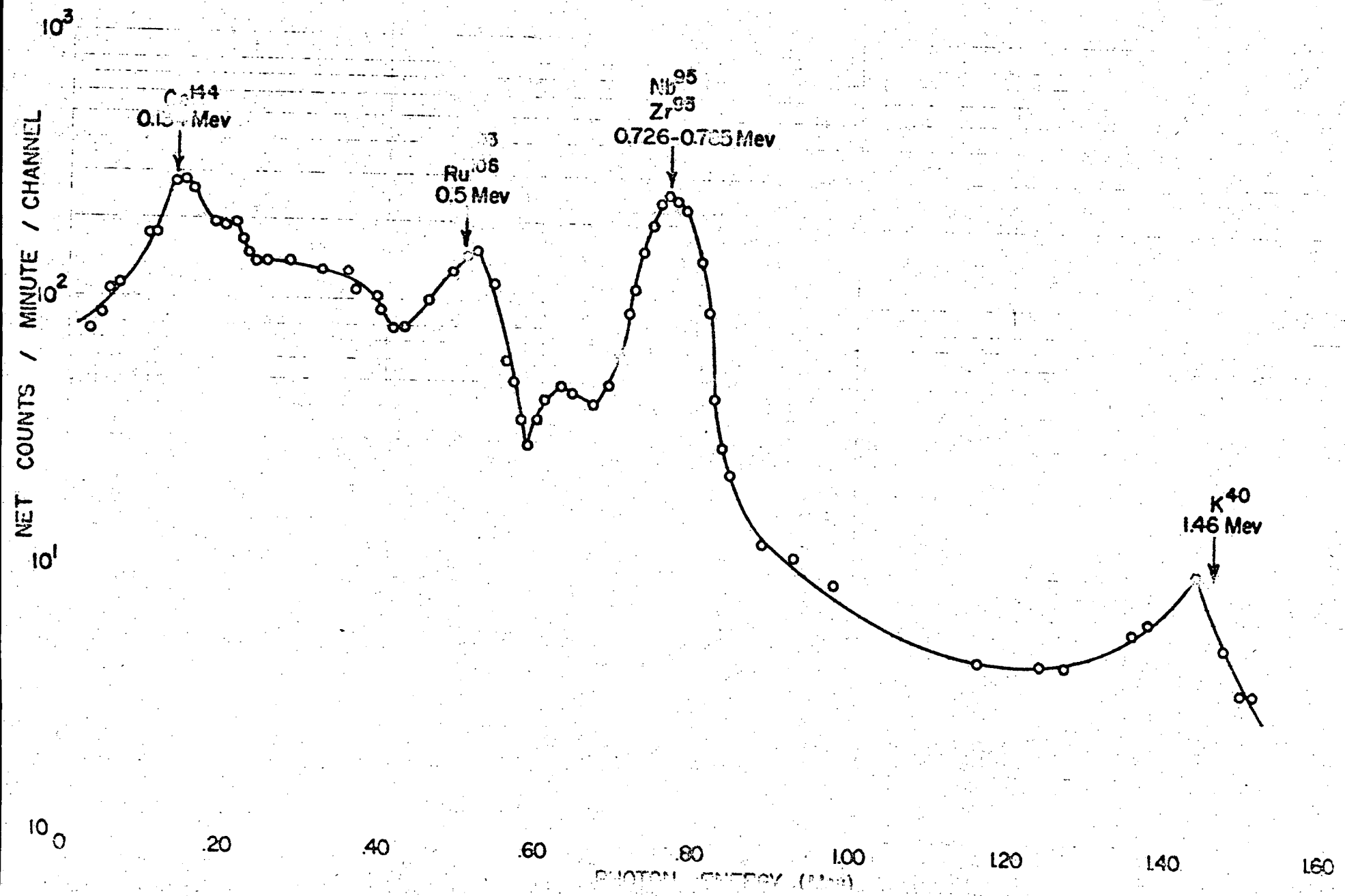
FIGURE VIII

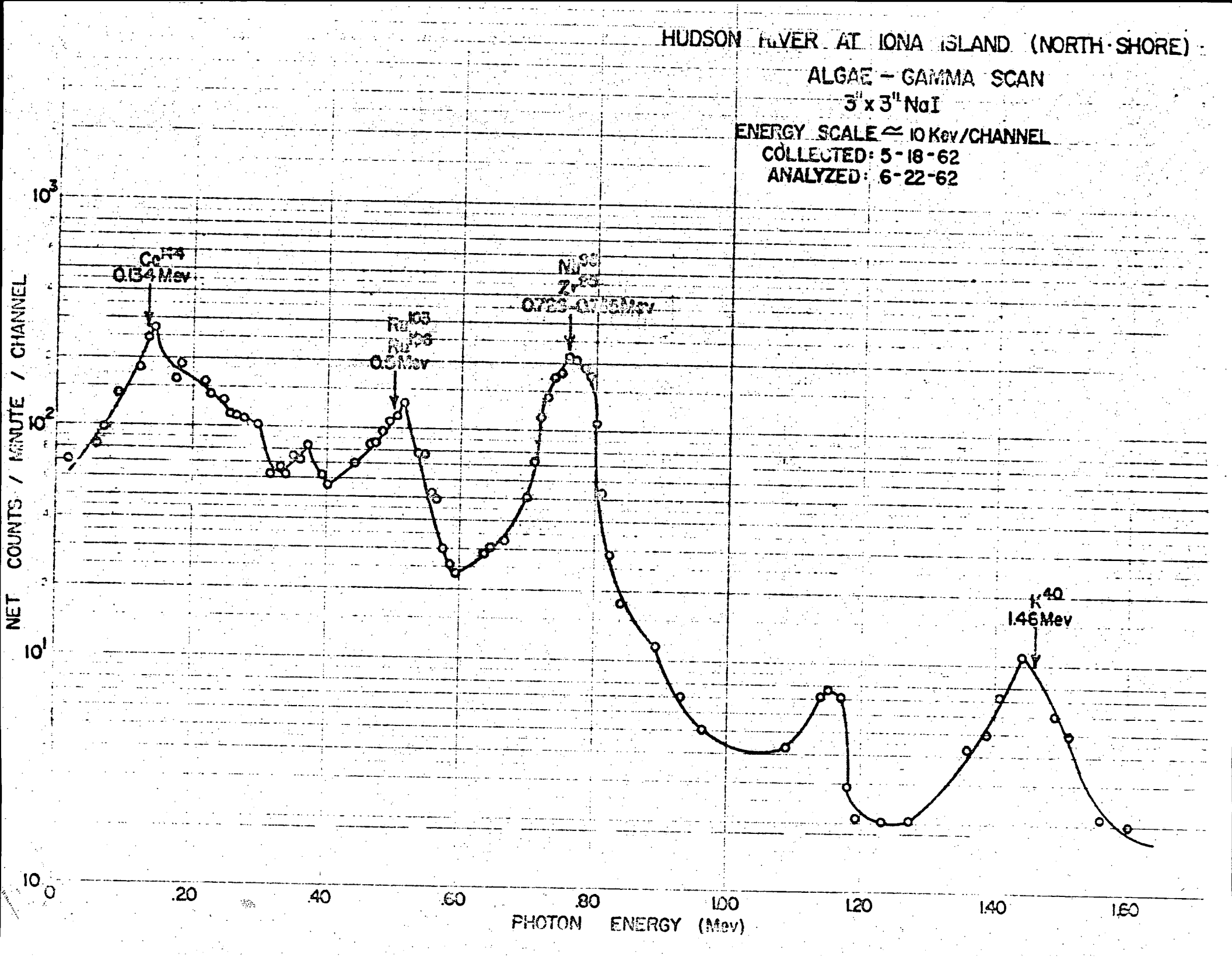
BETA · BONE · SEEKER · ACTIVITY
WESTCHESTER · COUNTY · MILK
(μμc / kg)



APPENDIX

HUDSON RIVER AT GREEN'S COVE
ALGAE — GAMMA SCAN
3" x 3" NaI
ENERGY SCALE ≃ 10 Kev/CHANNEL
COLLECTED: 5-16-62
ANALYZED: 6-22-62




HUDSON RIVER AT IONA ISLAND (NORTH SHORE)
ALGAE – GAMMA SCAN
3" x 3" NaI
ENERGY SCALE ≃ 10 Kev/CHANNEL
COLLECTED: 5-18-62
ANALYZED: 6-22-62
Co^134
0.134 Mev
Ru^103
Ru^106
0.5 Mev
Nb^95
Zr^95
0.725-0.755 Mev
K^40
1.46 Mev
NET COUNTS / MINUTE / CHANNEL
10^3
10^2
10^1
10^0
0
.20
.40
.60
.80
1.00
1.20
1.40
1.60
PHOTON ENERGY (Mev)

HUDSON RIVER AT TAPPAN ZEE (WEST SIDE)

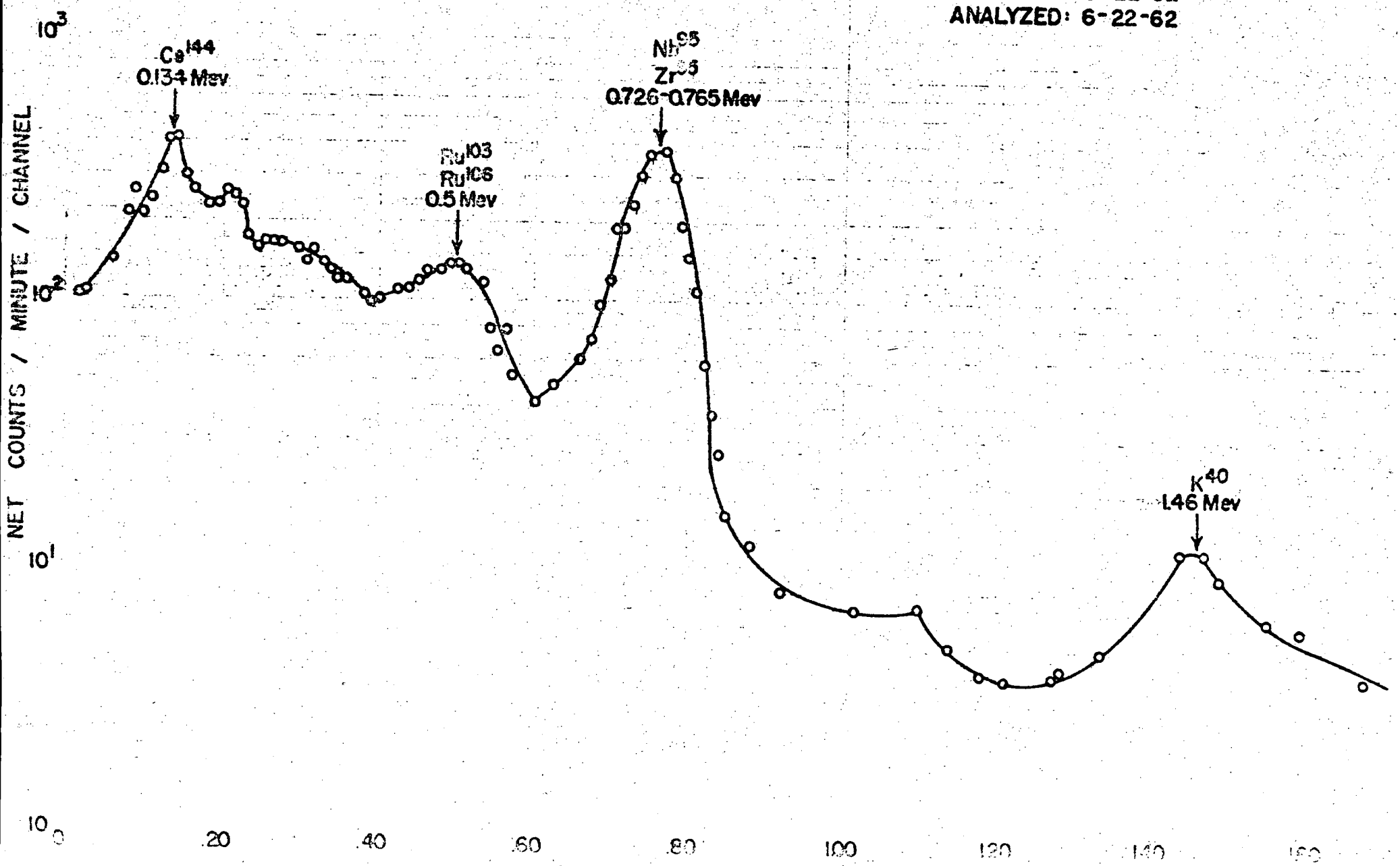
ALGAE — GAMMA SCAN

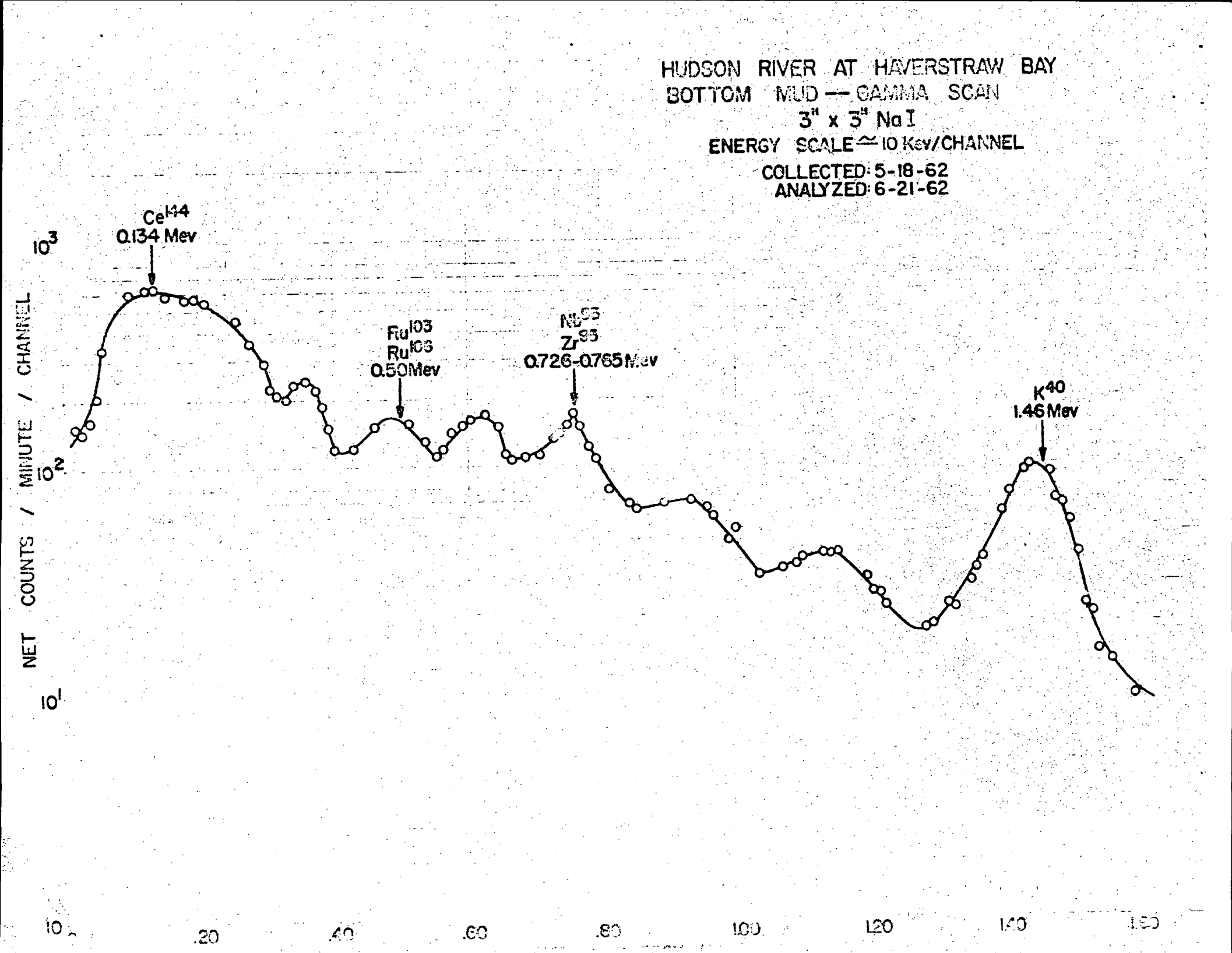
3" x 3" NaI

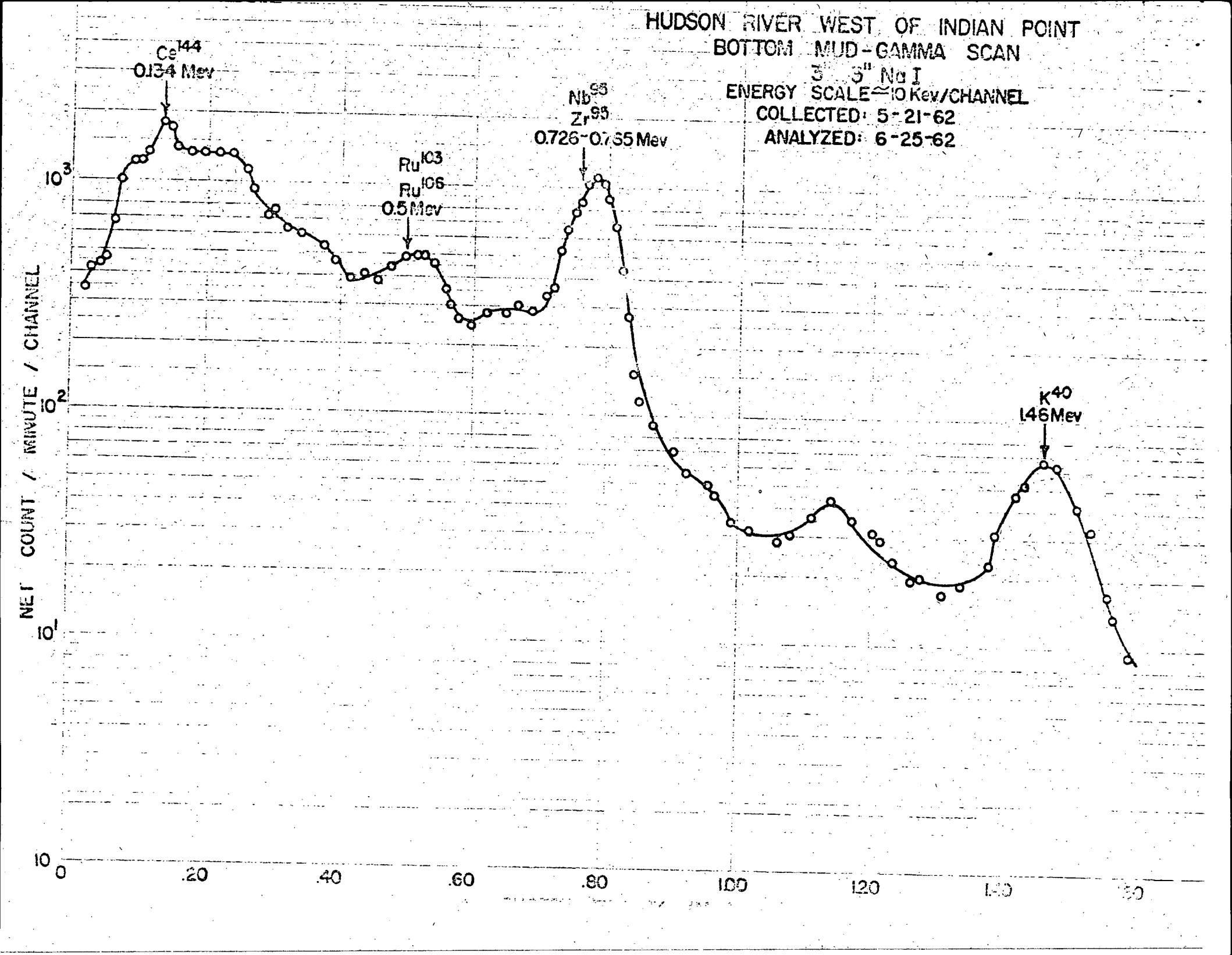
ENERGY SCALE ≃ 10 Kev / CHANNEL

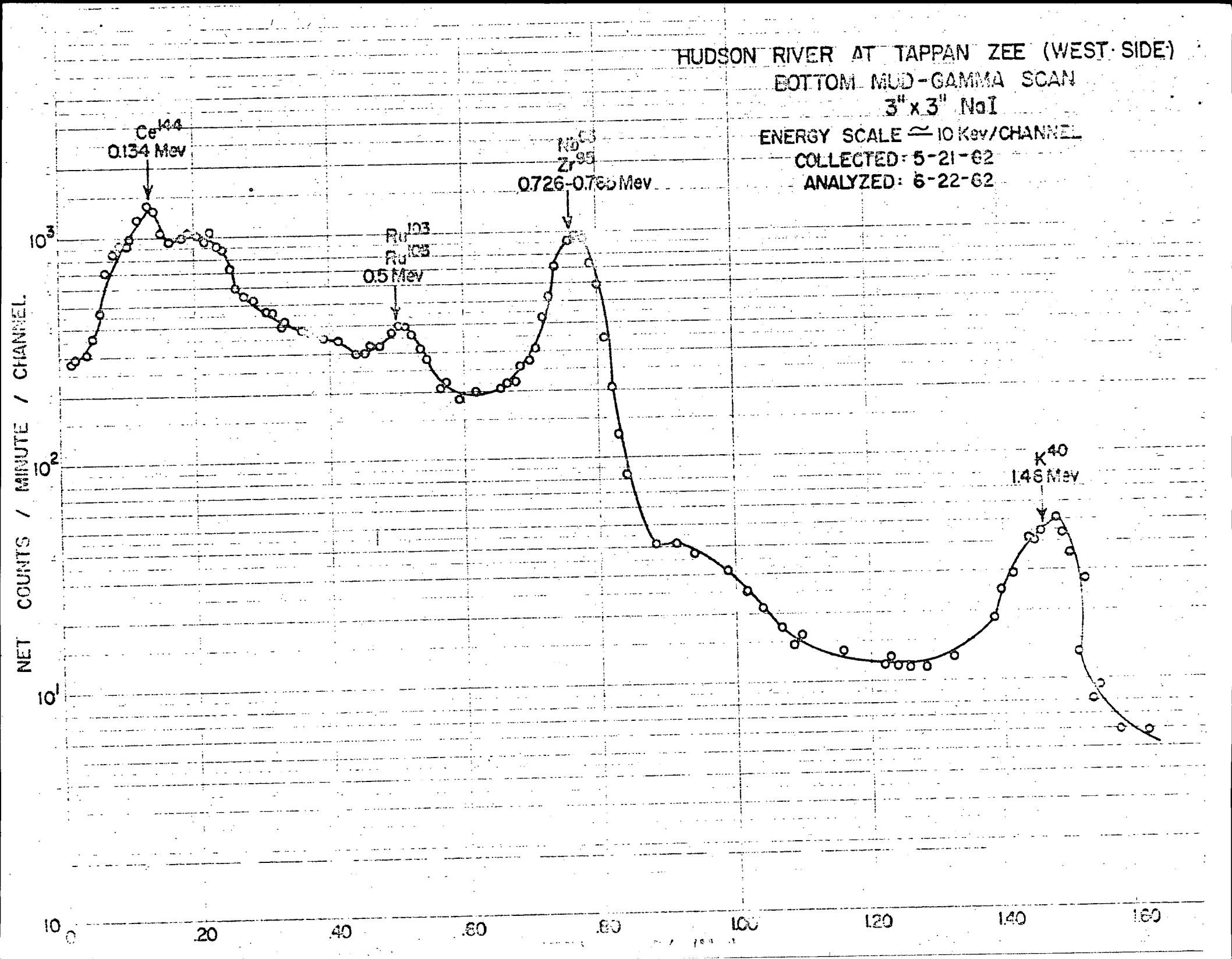
COLLECTED: 5-22-62

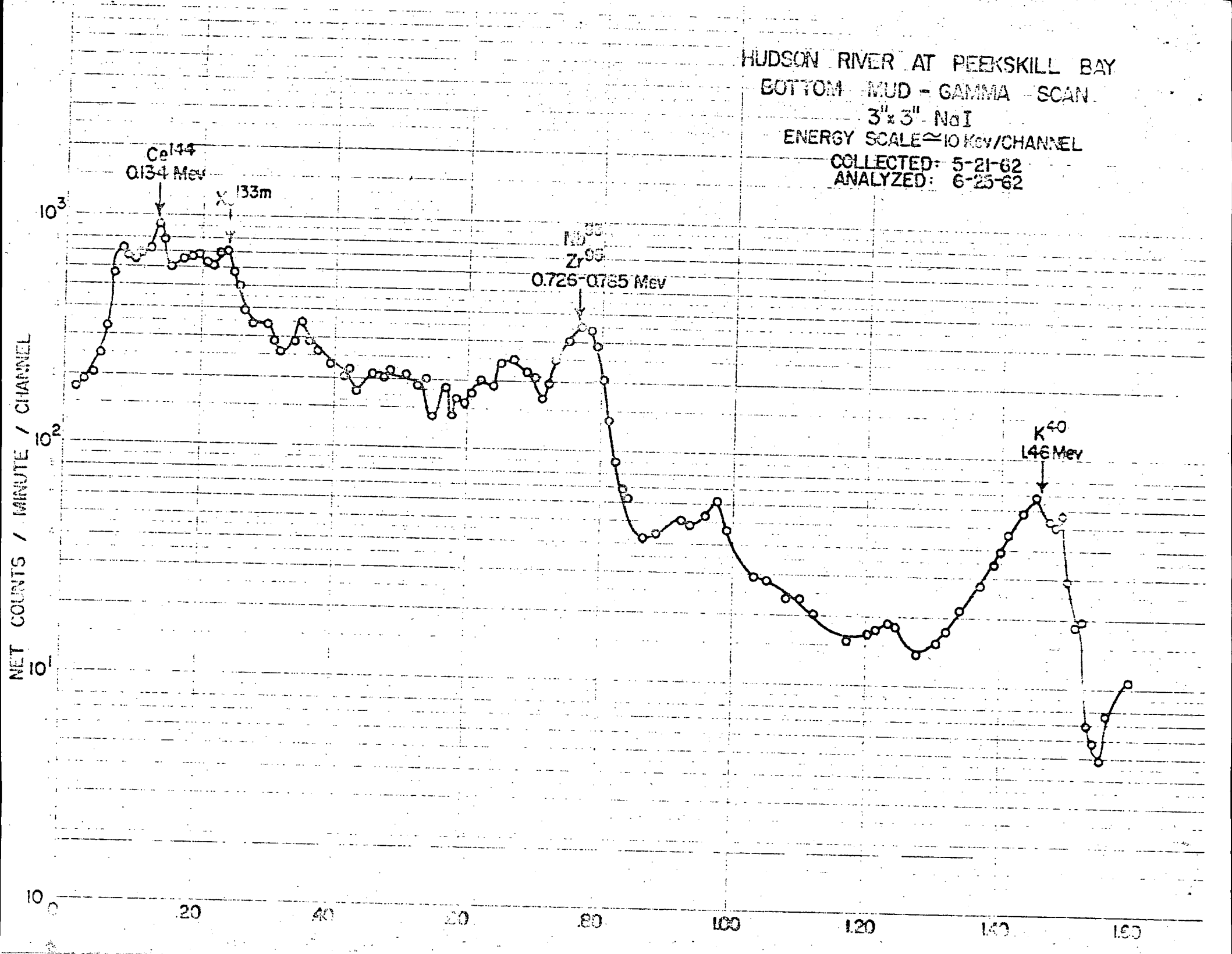
ANALYZED: 6-22-62

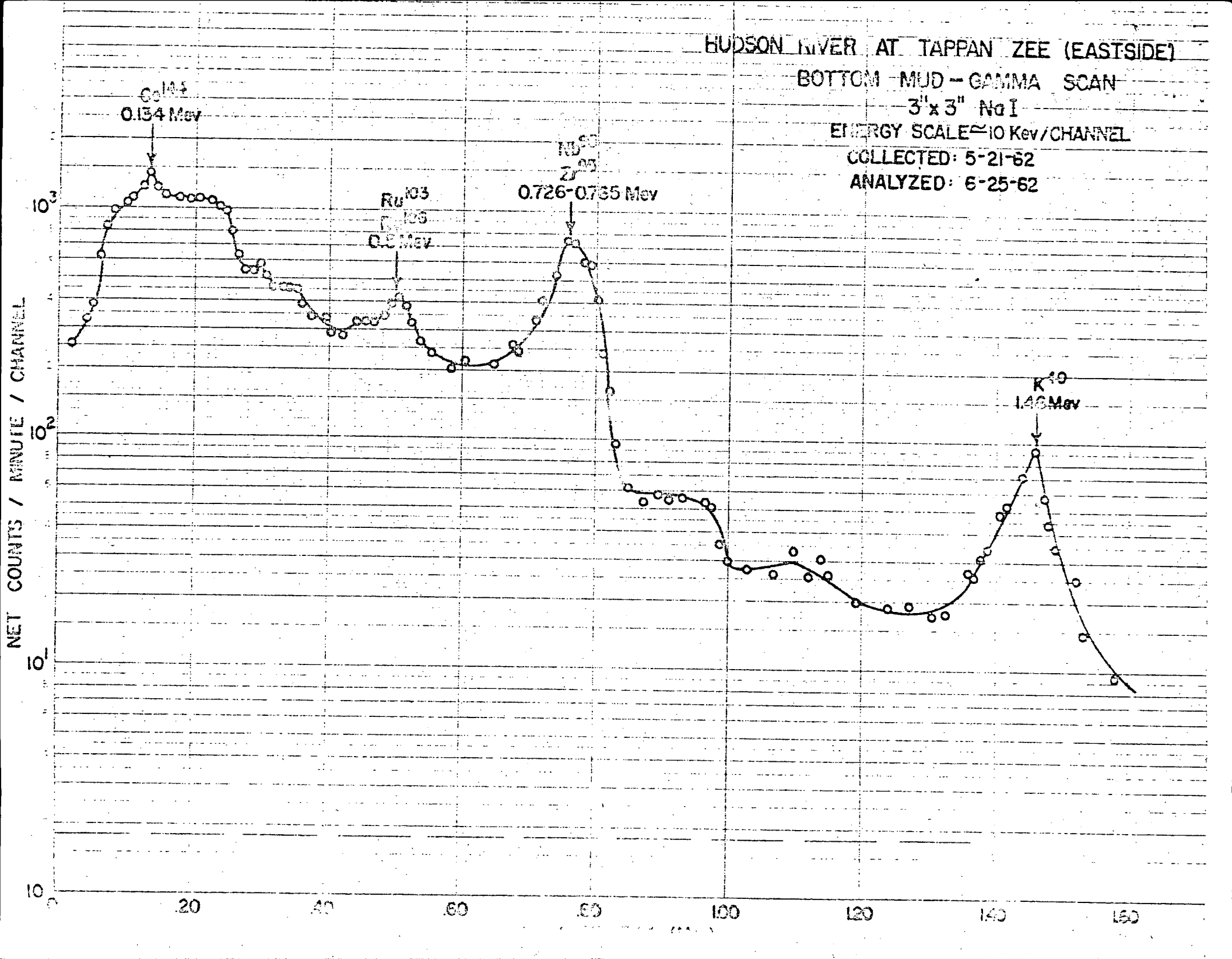


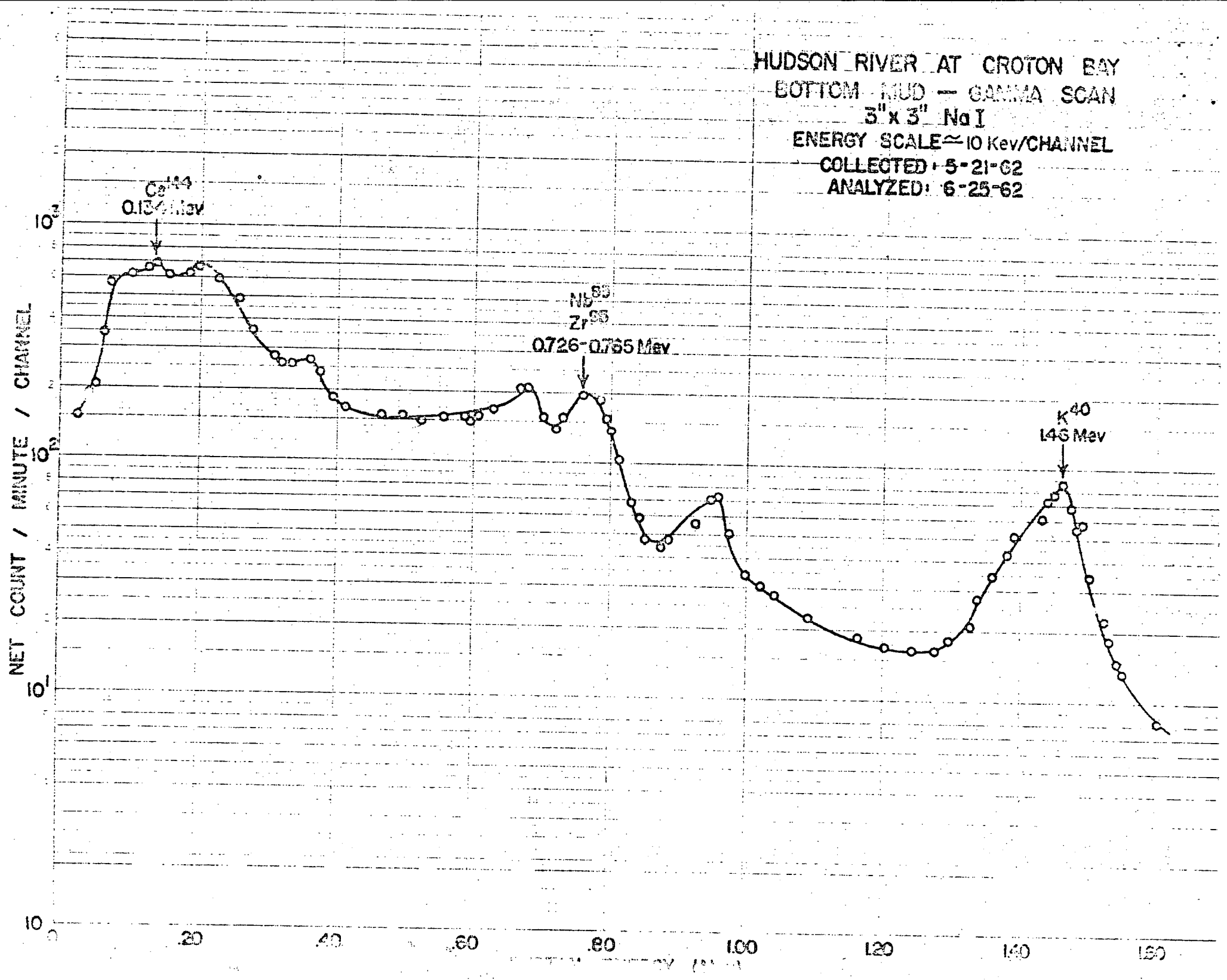

HUDSON RIVER AT HAVERSTRAW BAY
BOTTOM MUD — GAMMA SCAN
3" x 3" NaI
ENERGY SCALE ≃ 10 Kev/CHANNEL
COLLECTED: 5-18-62
ANALYZED: 6-21-62
Ce144
0.134 Mev
Ru103
Ru106
0.50Mev
Nb95
Zr95
0.726-0.765Mev
K40
1.46Mev
NET COUNTS / MINUTE / CHANNEL
10^3
10^2
10^1
10
.20
.40
.60
.80
1.00
1.20
1.40
1.60

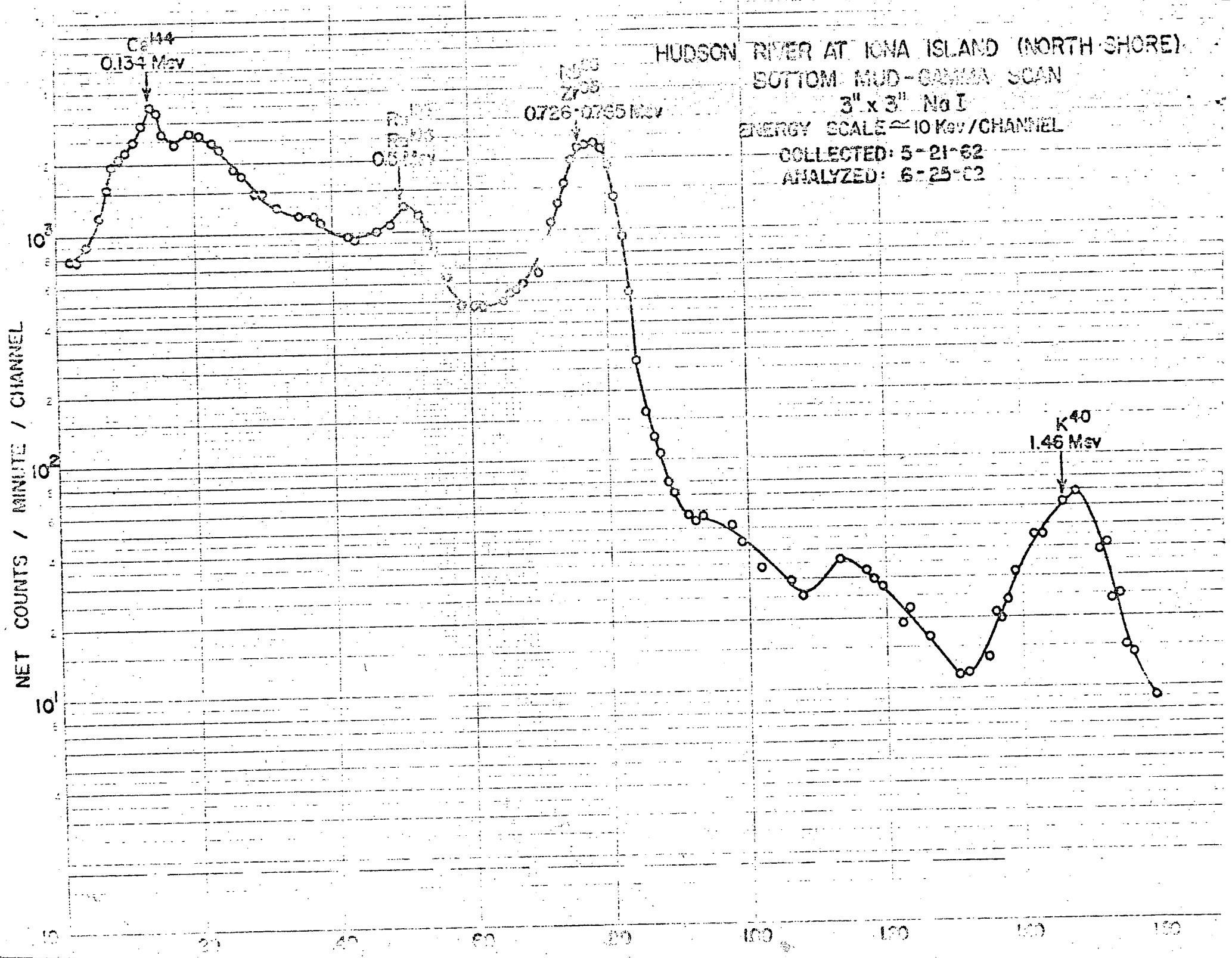

HUDSON RIVER WEST OF INDIAN POINT
BOTTOM MUD-GAMMA SCAN
3" 3" NaI
ENERGY SCALE≃10 Kev/CHANNEL
COLLECTED: 5-21-62
ANALYZED: 6-25-62
Ce144
0.134 Mev
Ru103
Ru106
0.5 Mev
Nb95
Zr95
0.726-0.755 Mev
K40
1.46 Mev
NET COUNT / MINUTE / CHANNEL
10³
10²
10¹
10⁰
0
.20
.40
.60
.80
1.00
1.20
1.40
1.60

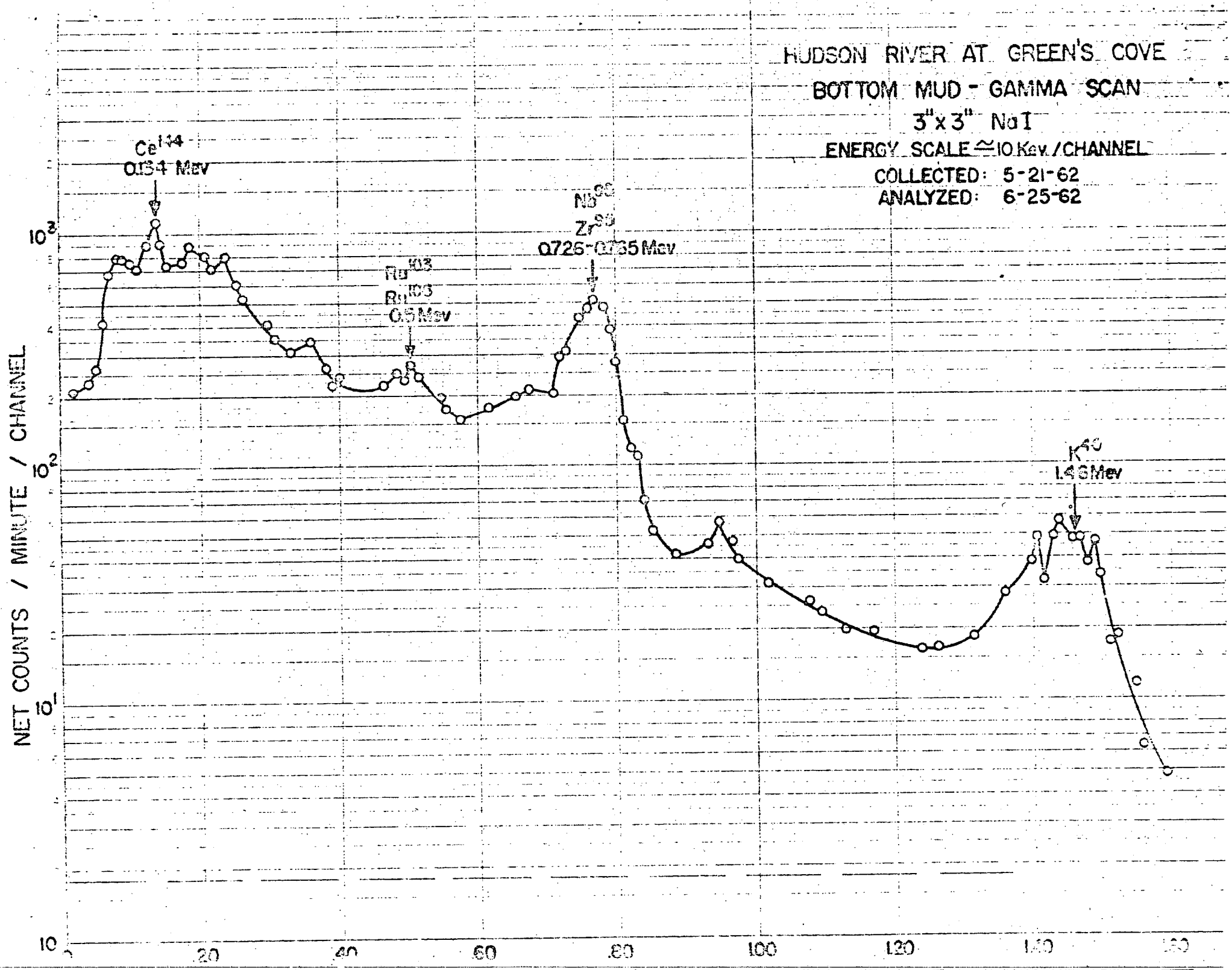

HUDSON RIVER AT TAPPAN ZEE (WEST SIDE)
BOTTOM MUD-GAMMA SCAN
3" x 3" NaI
ENERGY SCALE ≃ 10 Kev/CHANNEL
COLLECTED: 5-21-62
ANALYZED: 6-22-62
Ce144
0.134 Mev
Ru103
Ru106
0.5 Mev
Nb95
Zr95
0.726-0.765 Mev
K40
1.46 Mev
NET COUNTS / MINUTE / CHANNEL
10^3
10^2
10^1
10
0
.20
.40
.60
.80
1.00
1.20
1.40
1.60

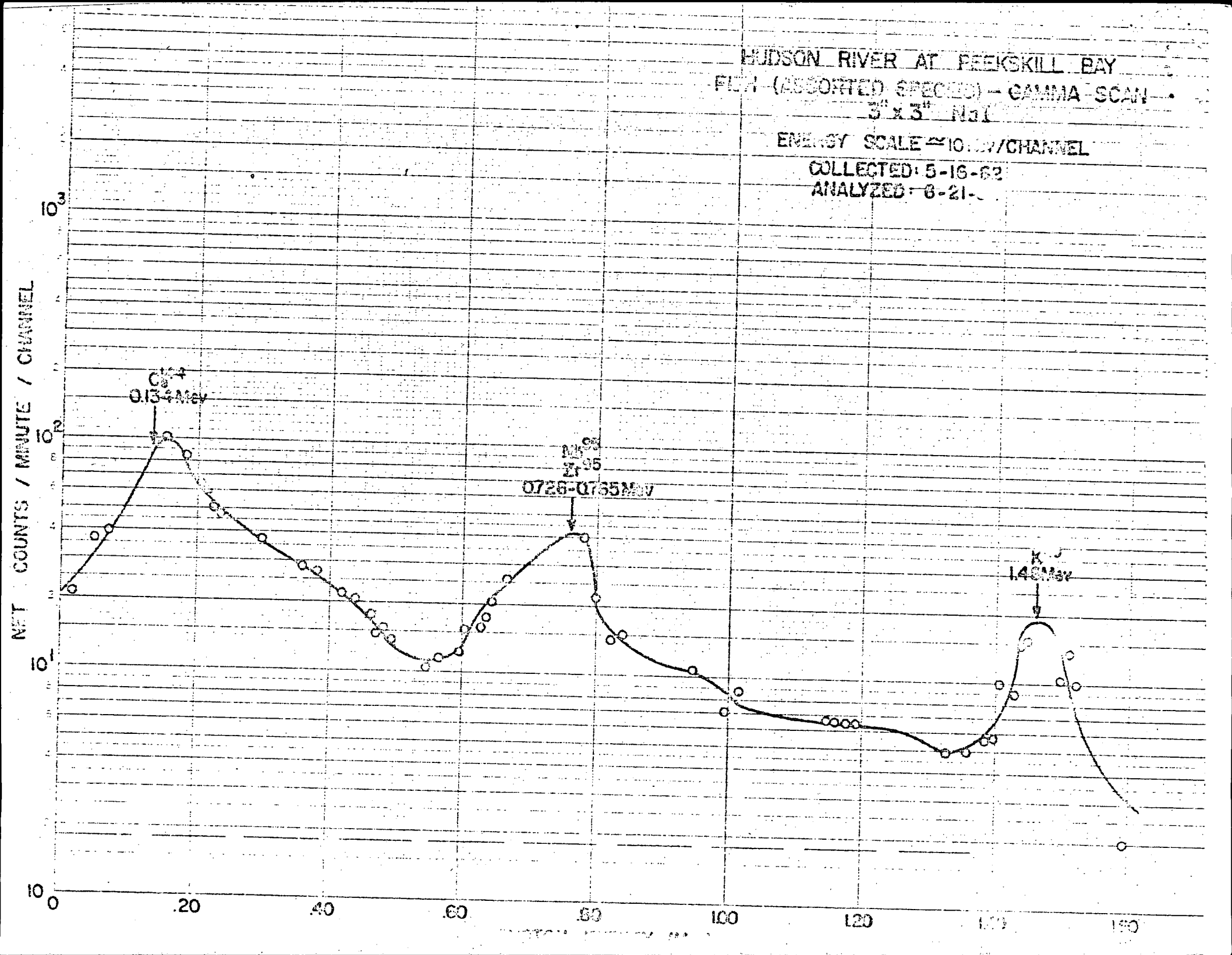

HUDSON RIVER AT PEEKSKILL BAY
BOTTOM MUD - GAMMA SCAN
3" x 3" NaI
ENERGY SCALE ≃ 10 Kev/CHANNEL
COLLECTED: 5-21-62
ANALYZED: 6-25-62
Ce144
0.134 Mev
Xe133m
Nb95
Zr95
0.726-0.765 Mev
K40
1.46 Mev
NET COUNTS / MINUTE / CHANNEL
10^3
10^2
10^1
10
0
20
40
60
80
100
120
140
160

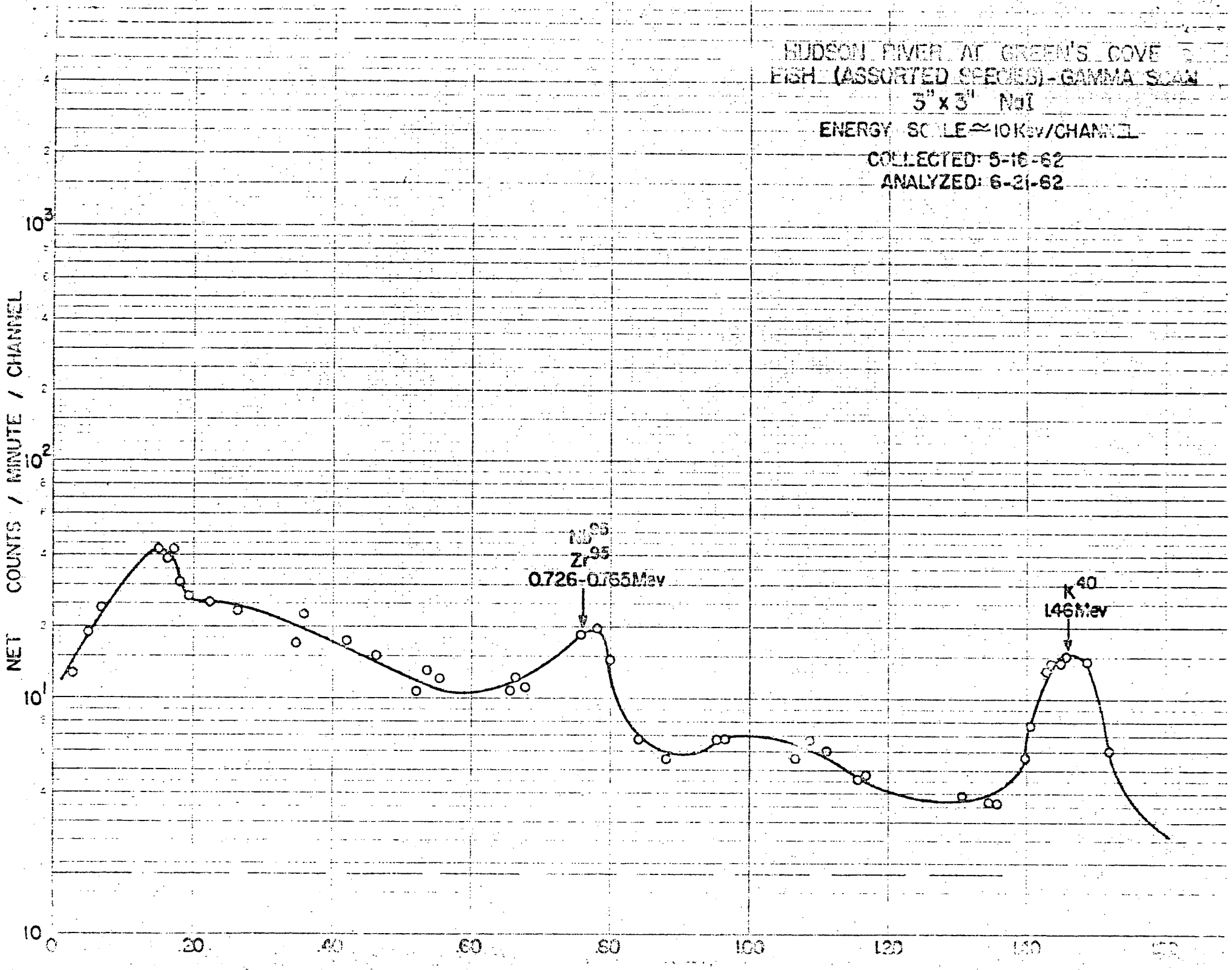

HUDSON RIVER AT TAPPAN ZEE (EASTSIDE)
BOTTOM MUD – GAMMA SCAN
3"x 3" NaI
ENERGY SCALE ≃ 10 Kev/CHANNEL
COLLECTED: 5-21-62
ANALYZED: 6-25-62
Co
0.134 Mev
Ru
0.726-0.735 Mev
K
1.46 Mev
NET COUNTS / MINUTE / CHANNEL
10
10²
10³
20
40
60
80
100
120
140
160

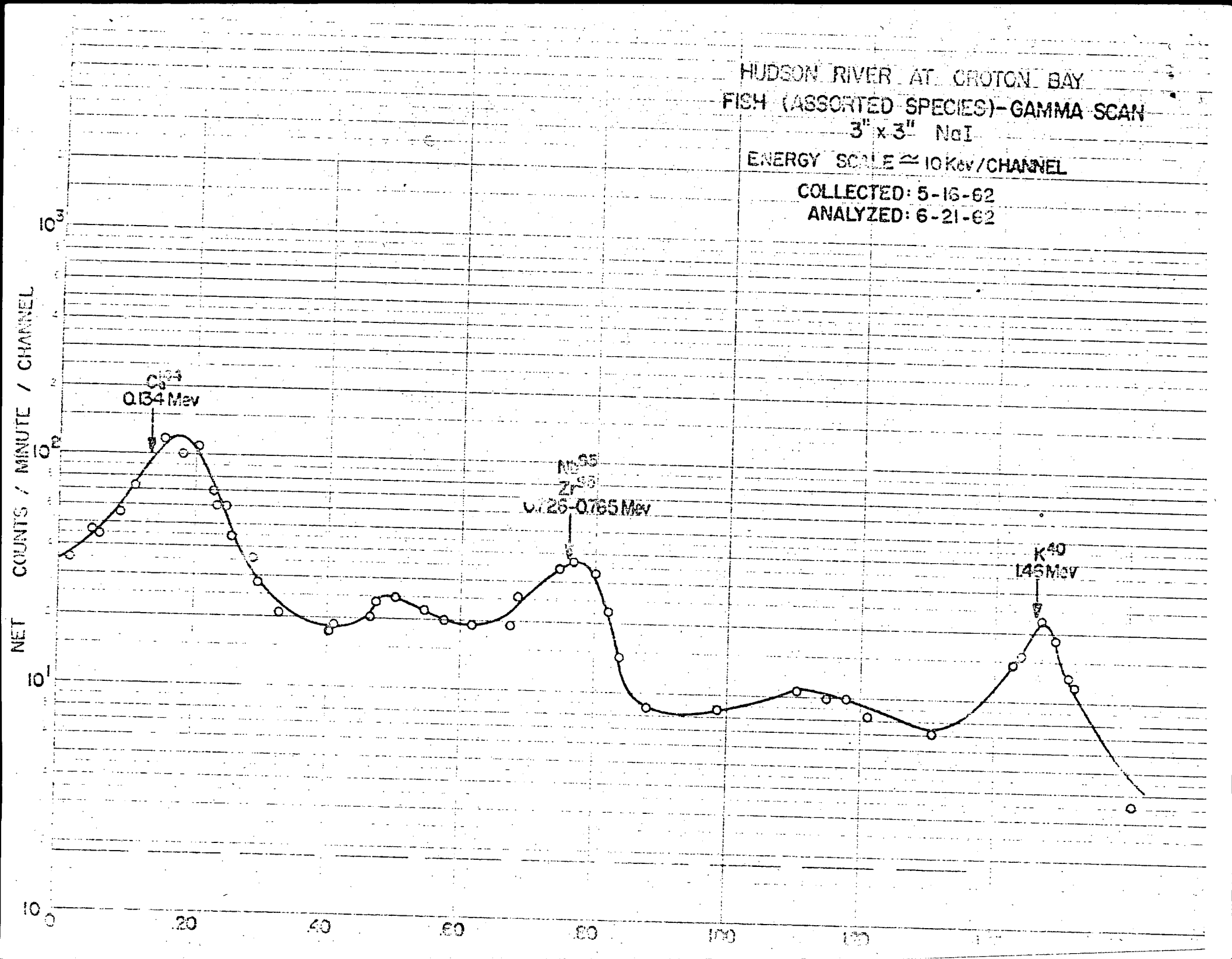

HUDSON RIVER AT CROTON BAY
BOTTOM MUD — GAMMA SCAN
3" x 3" NaI
ENERGY SCALE ≃ 10 Kev/CHANNEL
COLLECTED: 5-21-62
ANALYZED: 6-25-62
Cs144
0.134 Mev
Nb95
Zr95
0.726-0.765 Mev
K40
1.46 Mev
NET COUNT / MINUTE / CHANNEL
10
10¹
10²
10³
.20
.40
.60
.80
1.00
1.20
1.40
1.60

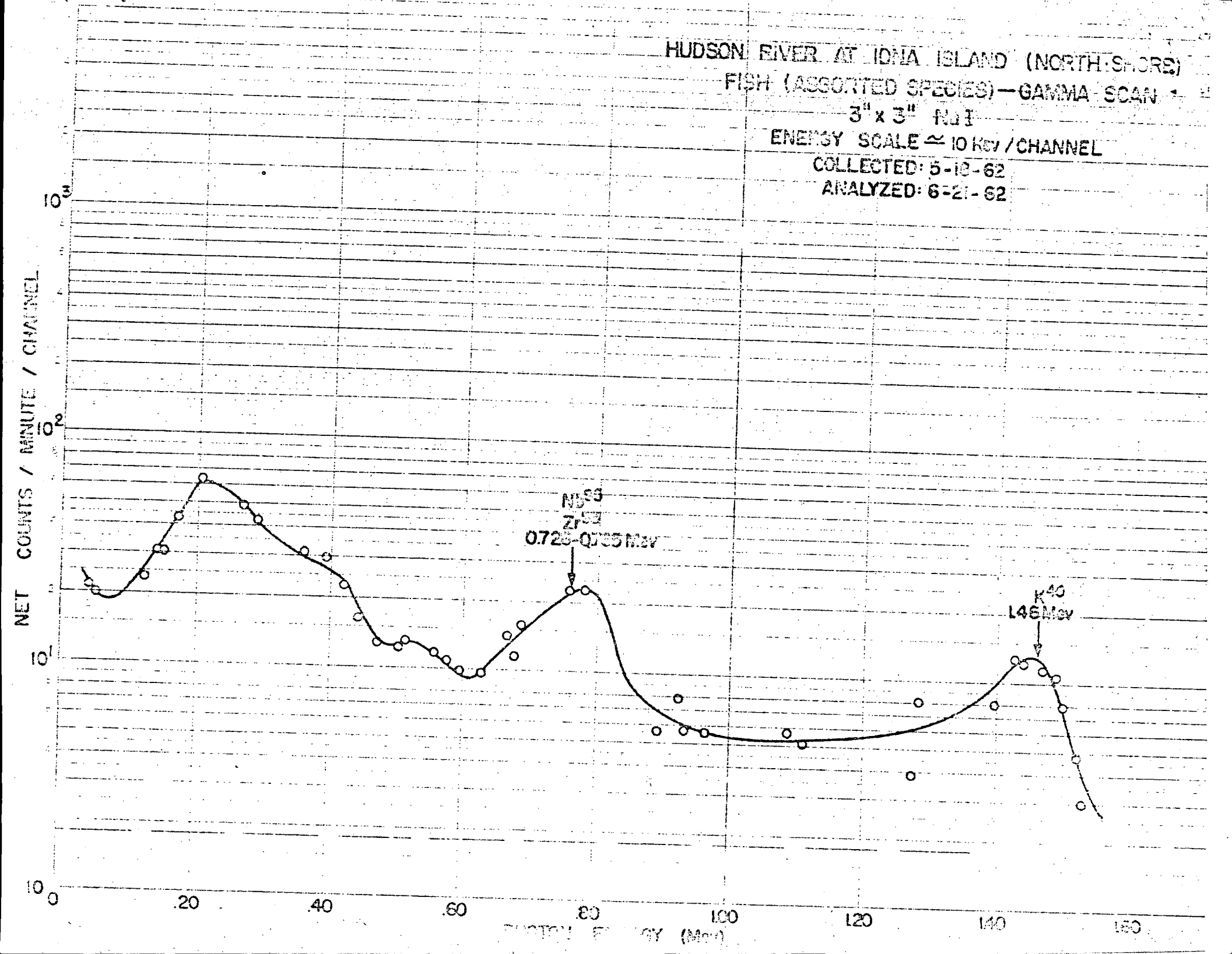

HUDSON RIVER AT IONA ISLAND (NORTH SHORE)
BOTTOM MUD - GAMMA SCAN
3" x 3" NaI
ENERGY SCALE ≃ 10 Kev / CHANNEL
COLLECTED: 5-21-62
ANALYZED: 6-25-62
Ce144
0.134 Mev
0.726-0.765 Mev
K40
1.46 Mev
NET COUNTS / MINUTE / CHANNEL
10
20
40
60
80
100
120
140
160

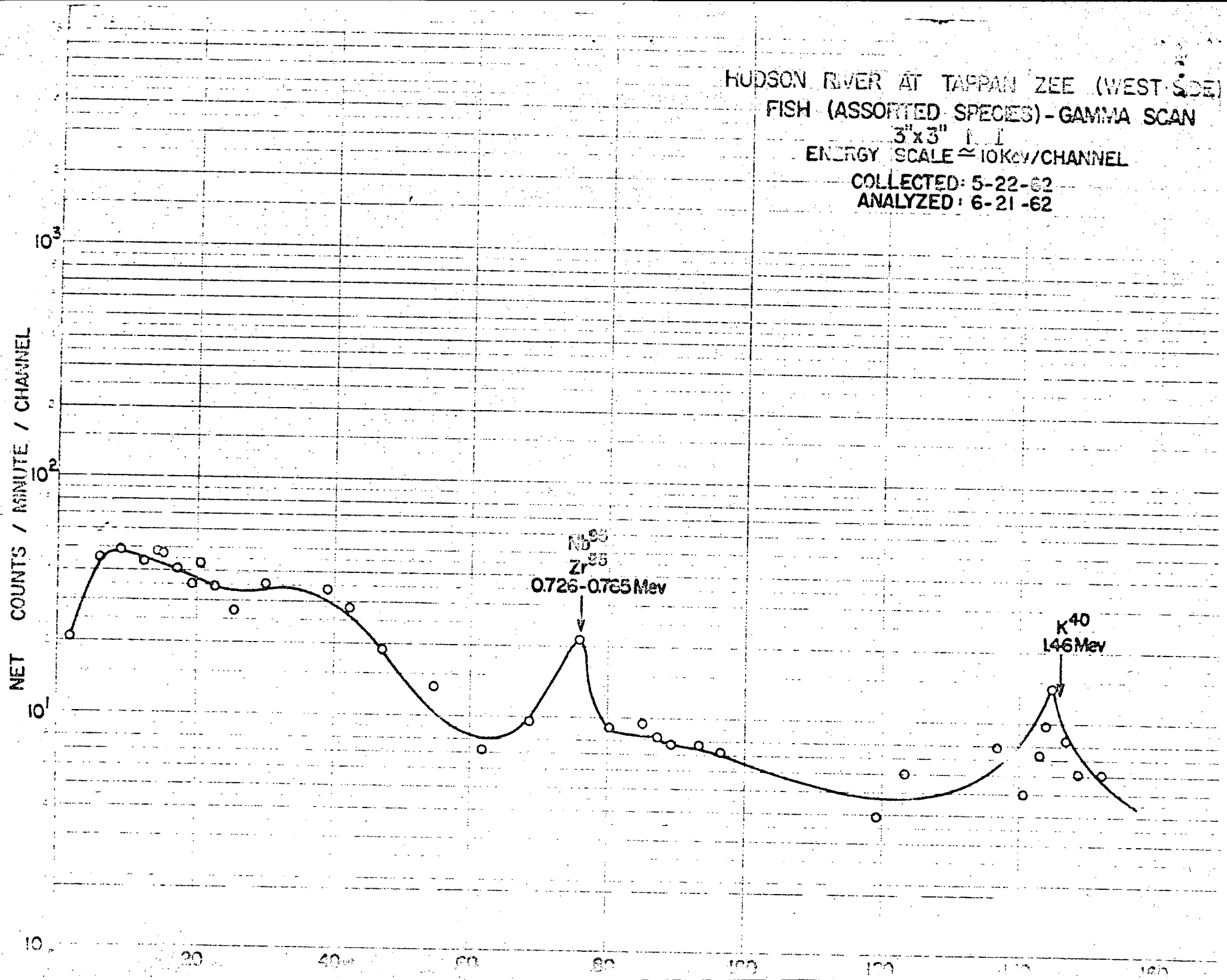

HUDSON RIVER AT GREEN'S COVE
BOTTOM MUD - GAMMA SCAN
3"x3" NaI
ENERGY SCALE ≅ 10 Kev./CHANNEL
COLLECTED: 5-21-62
ANALYZED: 6-25-62
Ce144
0.134 Mev
Ru103
Rh103
0.5 Mev
Nb95
Zr95
0.726-0.735 Mev
K40
1.46 Mev
NET COUNTS / MINUTE / CHANNEL
10
10²
10³
20
40
60
80
100
120
140
160


HUDSON RIVER AT PEEKSKILL BAY
FISH (ASSORTED SPECIES) – GAMMA SCAN
3" x 3" NaI
ENERGY SCALE ≃ 10 KEV/CHANNEL
COLLECTED: 5-16-62
ANALYZED: 6-21-
NET COUNTS / MINUTE / CHANNEL
0.13+ Mev
0726-0765 Mev
1.46 Mev
10^3
10^2
10^1
10^0
0
.20
.40
.60
.80
1.00
1.20


HUDSON RIVER AT GREEN'S COVE
FISH (ASSORTED SPECIES)-GAMMA SCAN
3"x3" NaI
ENERGY SCALE ≃ 10 Kev/CHANNEL
COLLECTED: 5-16-62
ANALYZED: 6-21-62
NET COUNTS / MINUTE / CHANNEL
10^3
10^2
10^1
10
0
20
40
60
80
100
120
140
160
Nb^{95}
Zr^{95}
0.726-0.765Mev
K^{40}
1.46Mev


HUDSON RIVER AT CROTON BAY
FISH (ASSORTED SPECIES)-GAMMA SCAN
3" x 3" NaI
ENERGY SCALE ≃ 10 Kev/CHANNEL
COLLECTED: 5-16-62
ANALYZED: 6-21-62
NET COUNTS / MINUTE / CHANNEL
10^3
10^2
10^1
10^0
Cs^{134}
0.134 Mev
Nb^{95}
Zr^{95}
0.725-0.765 Mev
K^{40}
1.46 Mev
0
20
40
60
80
100
120


HUDSON RIVER AT IONA ISLAND (NORTH SHORE)
FISH (ASSORTED SPECIES)—GAMMA SCAN
3" x 3" NaI
ENERGY SCALE ≃ 10 Kev / CHANNEL
COLLECTED: 5-18-62
ANALYZED: 6-21-62
NET COUNTS / MINUTE / CHANNEL
10^3
10^2
10^1
10^0
Nb95
Zr95
0.725-0.755 Mev
K40
1.46 Mev
0
.20
.40
.60
.80
1.00
1.20
1.40
1.60


HUDSON RIVER AT TAPPAN ZEE (WEST SIDE)
FISH (ASSORTED SPECIES) - GAMMA SCAN
3"x3"
ENERGY SCALE ≃ 10Kev/CHANNEL
COLLECTED: 5-22-62
ANALYZED: 6-21-62
NET COUNTS / MINUTE / CHANNEL
10^3
10^2
10^1
10
20
40
60
80
100
120
140
160
Nb^{95}
Zr^{95}
0.726-0.765 Mev
K^{40}
1.46 Mev

17-4 A