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Annual Report Radioactivity Results 1963

ERRATA SHEET

1. Pages 11, 12, 13 and 14.

   Albany - Milk - Under sampling frequency for I-131, Cs-137, Ba-La-140 and Zr-Nb-95, only D (daily grab sample) should appear.

2. Pages 11, 12, 13, 14, 15 and 16.

   New York City - Milk - Under sampling frequency, the designation A (weekly composite of daily grab samples) must be clarified at this station. The procedure is to collect one daily milk sample representing the total milk supply for that day and analyze it once a week.

3. Page 13.

   Clarkstown - Milk - Under sampling frequency, the blank space should replaced with M (monthly grab sample).

4. Page 13.

   Massena - Milk - Under sampling frequency, the A should be replace with B (bi-monthly composite of daily grab sample - a two week composite.

5. Page 14.

   Middleburg - Milk - Under sampling frequency, the M should be replace with A (weekly composite of daily grab samples).

6. Pages 15 and 16.

   Albany - Milk - Under sampling frequency, for Strontium 90, Strontium 89 only A (weekly composite of daily grab samples) should appear.

7. Page 17.

   Ossining - Water - Under sampling frequency, the designation A needs clarification at this station. The procedure is to collect hourly grab samples for one week and the analysis of this weekly composite is then mad at the Division of Laboratories and Research.

8. Page 27.

   Key - The designation for B is given as "bi-weekly composite of daily grab samples." This should read "bi-monthly composite of daily grab samples. A two week composite of daily grab samples is th schedule intended.

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12/15/64

State of New York
Department of Health
Albany, New York

October 6, 1964

TO : THE COMMISSIONER
DEPUTY ASSOCIATE ASSISTANT, COUNTY AND CITY HEALTH COMMISSIONERS
REGIONAL HEALTH DIRECTORS AND DISTRICT HEALTH OFFICERS
DIRECTORS OF BUREAUS, STAFF OFFICES, HOSPITALS AND APPROVED LABORATORIES

FROM : DR. THOMPSON

SUBJECT: ANNUAL REPORT RADIOACTIVITY RESULTS - 1963

# SUMMARY OF ENVIRONMENTAL RADIOACTIVITY IN NEW YORK STATE 1963

## Introduction

The Health Department of the State of New York has done extensive sampling and analysis of environmental vectors for the measurement of radioactivity since 1955 and the present report gives the data collected from this program for the year 1963.

The location of sampling stations, and the subsequent sampling and analyses, are for two purposes; namely, general surveillance and specific monitoring of nuclear facilities. The general surveillance stations are located to give a picture of the state-wide fallout from such sources as bomb testing, while the monitoring stations are located to indicate possible changes due to specific nuclear installations, such as reactors and fuel reprocessing plants. Although a majority of our stations have been located for the specific monitoring concept, when there are no releases at specific installations the interchange of results is easily possible.

The Test Ban Treaty, involving the United States, Great Britain and Russia, which was initialed July 25, 1963, signed August 5, 1963, and ratified by the United States Senate, September 24, 1963, brought to an end the atmospheric testing programs of the signatories. A review of the atmospheric test shot schedules shows that the actual cessation was some months earlier. For practical purposes, the year 1963 was essentially one of no additions of radionuclides from nuclear weapons testing in the atmosphere.

In 1963, the maximum results occurred in the general period of May-August, with certain exceptions as indicated in the tabular results. The monthly averages in this report, as well as the yearly averages for individual stations, were obtained from an arithmetic addition and division of the analytical results by the number of samples obtained for all the stations involved in a particular environmental vector for the month as shown. A similar procedure was followed for the yearly average at individual stations.

The increase in radionuclide content of practically all vectors analyzed during the spring-summer period shows a greater transfer from stratosphere to troposphere in the temperature zone during this season of the year. The theory of Stewart (1957) based on the studies of Brewer (1949) and Dobsen (1956), explains the spring increase (probably extended into summer) on the basis of air entering the stratosphere in the tropical regions. There it has been heated and, therefore, rises to great heights; moves toward the poles, and then sinks into the troposphere at the polar regions. From the troposphere it is dispersed in the lower atmosphere and is washed out in rain or settles through the atmosphere. A second theory, based on the work of Shelton (1959), explains the late winter-early spring increase in fallout on the basis of a known discontinuity in the tropopause at the temperate regions. The increased turbulence in the vicinity of this "break" in the tropopause is thought to cause an increased transport from stratosphere to troposphere in these regions. Thus, there is an increase in radionuclides in our environmental vectors from previously injected contaminants residing in the stratosphere.

The collection of the samples is handled by the various local offices of the state, county and city health departments and, in many instances, by private industry which has been very active and cooperative in our surveillance programs.

Air

For determination of the total radionuclide content of the air vector, as expressed by pc/M$^3$ of gross beta activity, there were five sampling stations operating in 1963 on a weekly collection schedule. Approximately 1 cfm of air was drawn continuously through a filter paper of 2" diameter for a weekly period and the filter was then sent to the laboratory for analysis. The air results (tabulations on page 9) increased in April and June, reflecting the stratospheric-tropospheric interchange, and then show a gradual decrease to the end of the year. The suspended radioactive material in the air is becoming less active with time and there is a decrease from the maximum values in April and June.

Fallout

There were four fallout stations operating in 1963. Collections were made on a weekly exposure basis using a polyethylene container with an exposure area of 0.101 $ft^2$ and a depth of approximately 9" from the rim. Exposure was accomplished by removing the screw-type top, exposing the container for 7 days, replacing the top and sending the entire unit to the Division of Laboratories and Research for analysis. The results of these analyses are given on page 10.

The spring-summer increase in fallout results for both Sr-89 and Sr-90 during 1963, is indicative of the increased stratospheric-tropospheric transport of radionuclides injected into the upper air during previous test series. The Sr-90 ($T_{\frac{1}{2}}$ = 27.7y) would still be detectable. Although Sr-89 ($T_{\frac{1}{2}}$ = 50.5 days) is classed as a short-lived radionuclide, Sr-89 could be detected nearly one year after release on the basis of half-life.

Milk

Twelve milk sampling stations were operated in the State for the milk vector analyses. Sampling schedules varied from daily collection of grab samples (and daily analysis) through daily collection of a grab sample and compositing on a weekly basis (with weekly analysis). The least frequent collection was a monthly grab sample (with monthly analysis). Samples are 2 liters in size for analysis in the Marinelli-type configuration used in the gamma spectrometer at the Division of Laboratories and Research. Sr-89 and Sr-90 are analyzed by separation of the radionuclide and beta counting.

The cessation of testing in 1963, is directly reflected in the <20 pc/l value for the average results of I-131 in milk during the entire period. This short-lived radionuclide ($T_{\frac{1}{2}}$ = 8.08 days) is a direct indicator of fresh fission products. It was not present in average amounts above the limit of sensitivity of our present analytical procedure (20 pc/l). Also, there were no indications of any local contamination of milk with I-131 from sources such as reactors or laboratories.

The analyses of milk show that amounts of both Cs-137 ($T_{\frac{1}{2}}$ = 26.6y) and Sr-90 ($T_{\frac{1}{2}}$ = 27.7y) have increased during 1963, as would be expected in view of the longer half-lives and the increased probability of accumulation of both of these radionuclides in soil and vegetation for eventual distribution to the cow and transfer to the milk. In general, the increase in radionuclides in milk in the spring, with exception of I-131 which has decayed out, can be attributed to the placing of cows in pasture, the increase in the stratospheric-tropospheric interchange and the increased amounts of the long-lived radionuclides in the cows' environment due to accumulation with little decrease due to decay.

The Federal Radiation Council radiation protection guides for I-131, Sr-89 and Sr-90 are given as follows:

| Nuclide | Critical Organ | Intake Levels, pc/day | | |
|---|---|---|---|---|
| | | Range I | Range II | Range III |
| I-131 | Thyroid | 0-10 | 10-100 | 100-1000 |
| Sr-90 | Bone and bone marrow | 0-20 | 20-200 | 200-2000 |
| Sr-89 | Bone and bone marrow | 0-200 | 200-2000 | 2000-20,000 |

The upper limits of Range II are considered an acceptable health risk for large general population groups for a lifetime and, therefore, the following intakes over the period of year are given:

I-131 --- 100 pc/day or 36,500 pc for 12 month period
Sr-90 --- 200 pc/day or 73,000 pc for 12 month period
Sr-89 --- 2,000 pc/day or 730,000 pc for 12 month period

The reported results are well within these recommended limits.

## Water

Twenty-six water sampling stations were operated from which samples were collected and analyzed. The frequency of collection varied from continuous sampling with a weekly analysis of the composite to a monthly grab sample with individual analysis. The analysis at these stations included gross beta, I-131, Cs-137, Ba-La-140 and Zr-Nb-95. The results did not show a distinct seasonal trend, as did some other vectors. This can be explained by increased stream flows causing scouring of bottom deposits, possible reconcentration of radionuclides in living organisms and then a "sluffing off" of the organisms and possible change in settling rates due to variations in temperature.

Individual gross beta analysis were evaluated and when compared to the 100 pc/l value for Sr-90, further analysis was indicated. In every case, a half-life determination or Sr-90 analysis confirmed that Sr-90 was not present, and that the analytical value was well within acceptable limits.

The Sr-89 and Sr-90 results in water were indicative of the spring stratospheric-tropospheric transfer with Sr-90 increase a little later than that of the Sr-89. The results were, however, much below the acceptable limits of intake for both the radionuclides.

Gamma Background

In 1960 and 1961, measurements of the penetrating external background radiation were made at multiple sites in New York State by scientists from the Health and Safety Laboratory of the Atomic Energy Commission. The measurements were made with 20 liter air ionization chambers. In 1963, another series of measurements was made at the same locations with a pressurized ionization chamber and a 256 channel gamma ray spectrometer utilizing a 5" by 3" NaI(Tl) crystal for separating the natural and fallout gamma components. The cosmic ray component was determined from the pressure-altitude and a previous calibration of the pressurized ionization chamber to this component at several altitudes. These data are shown on pages 25 - 27. The difference between the total dose and the natural gamma and cosmic dose for the 1963 measurements is due to gamma emitting fallout. We wish to express our appreciation to the AEC and particularly to Messrs. W. Lowder and W. Condon for the valuable data they collected and for their assistance during and after the survey.

Conclusion

With the moratorium on testing in force, fresh fission products (as indicated by I-131) are no longer a component in general fallout. The long-lived components of fission products (as indicated by Cs-137 and Sr-90) are accumulating in soil, vegetation and, to a lesser extent, in water so that an increase is noted in milk. The stratospheric-tropospheric interchange with seasons is clearly indicated in fallout. The levels of radioactivity in 1963 in New York State as a result of weapons testing or industrial sources are well within the guides established by the Federal Radiation Council for normal peace-time operations.

Average precipitation data for Albany, New York City and Syracuse show that there does not seem to be a direct correlation between periods of highest precipitation and highest radionuclide values in 1963, even in the fallout component.

## 1963 Average Results
(All Stations)

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Air-(pc/M$^3$) | 7.3 | 7.9 | 6.5 | 9.3 | 7.3 | 9.0 | 6.3 | 5.1 | 2.7 | 2.5 | 1.2 | 1.1 |
| Milk-(pc/l) | | | | | | | | | | | | |
| I-131 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 |
| Cs-137 | 64 | 73 | 50 | 39 | 39 | 112 | 138 | 126 | 106 | 102 | 126 | 135 |
| Ba-La-140 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 |
| Zr-Nb-95 | --- | <20 | <20 | <20 | <20 | <20 | <20 | <20 | --- | --- | --- | --- |
| Sr-90 | 8 | 7 | 7 | 8 | 14 | 28 | 31 | 25 | 21 | 21 | 23 | 20 |
| Sr-89 | 6 | 5 | 4 | 8 | 46 | 86 | 80 | 47 | 28 | 18 | 12 | 8 |
| Fallout-(pc/ft$^2$/day) | | | | | | | | | | | | |
| Sr-90 | <3 | <3 | <3 | 8 | 8 | 7 | 8 | 8 | <3 | <3 | <3 | <3 |
| Sr-89 | <3 | <3 | 23 | 62 | 63 | 35 | 29 | 19 | 5 | <3 | <3 | <3 |
| Water-(pc/l) | | | | | | | | | | | | |
| Gross Beta | 23 | 21 | 37 | 27 | 22 | 18 | 30 | 26 | 17 | 16 | 15 | 15 |
| I-131 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 |
| Cs-137 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 |
| Ba-La-140 | <20 | <20 | 21 | <20 | 20 | <20 | 20 | <20 | <20 | <20 | <20 | <20 |
| Zr-Nb-95 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 |
| Sr-89 | 3 | 4 | 6 | 12 | 7 | 6 | 3 | 6 | 6 | 8 | 3 | <3 |
| Sr-90 | <3 | <3 | <3 | <3 | <3 | 3 | 4 | 3 | 3 | 4 | 4 | 3 |

## Rainfall in Inches

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Albany (Albany County Airport) | 2.38 | 1.84 | 3.45 | 1.14 | 1.90 | 2.94 | 1.20 | 2.49 | 2.69 | 0.20 | 4.15 | 1.86 |
| | | Total = 26.24 | | | | | | (Normal Total = 35.08) | | | | |
| New York City (Central Park) | 1.93 | 2.55 | 3.61 | 1.27 | 2.16 | 2.72 | 2.19 | 3.21 | 3.95 | 0.14 | 8.34 | 2.31 |
| | | Total = 34.38 | | | | | | (Normal Total = 42.37) | | | | |
| Syracuse (Hancock Field) | 1.85 | 2.05 | 2.79 | 2.22 | 2.84 | 2.49 | 1.21 | 3.59 | 0.85 | 0.21 | 5.65 | 2.06 |
| | | Total = 27.81 | | | | | | (Normal Total = 37.60) | | | | |

## Averages at Sampling Points
1963

Air Samples - pc/$M^3$

| | |
|---|---|
| Albany | 5.0 |
| Ithaca | 5.6 |
| Pawling | 4.3 |
| Peekskill | 5.7 |
| Tuxedo | 5.8 |

Milk Samples - pc/l

| | I-131 | Cs-137 | Ba-La-140 | Zr-Nb-95 | Sr-90 | Sr-89 |
|---|---|---|---|---|---|---|
| Albany | <20 | 85 | <20 | <20 | 17 | 26 |
| Bedford | <20 | 125 | <20 | <20 | 23 | 47 |
| Buffalo | <20 | 83 | <20 | <20 | 14 | 26 |
| Clarkstown | <20 | 52 | <20 | <20 | 11 | 15 |
| Newburgh | <20 | 88 | <20 | <20 | 20 | 31 |
| New York City | <20 | 97 | <20 | <20 | 21 | 39 |
| Massena | <20 | 154 | <20 | <20 | 21 | 32 |
| Mt. Pleasant | <20 | 80 | <20 | <20 | 12 | 20 |
| Middleburg | <20 | 96 | <20 | <20 | 23 | 35 |
| Oyster Bay | <20 | 100 | <20 | <20 | 18 | 26 |
| Syracuse | <20 | 75 | <20 | <20 | 16 | 31 |
| Yorktown | <20 | 94 | <20 | <20 | 18 | 27 |

Fallout Samples - pc/$ft^2$/day

| | Sr-89 | Sr-90 |
|---|---|---|
| Albany | 19 | 5.5 |
| Ithaca | 25 | 5.1 |
| Peekskill | 13 | 3.4 |
| Syracuse | 25 | 4.3 |

## Averages at Sampling Points
1963

(con't)

Water - pc/l

| | Gross Beta |
|---|---|
| Akron | 16 |
| Rome | 15 |
| Watertown | 21 |
| Glenmont | 33 |
| Ossining | 48 |
| Peekskill | 40 |
| Waterford | 21 |
| Cohoes | 20 |
| Schenectady | 27 |
| Niagara Falls - East Branch | 17 |
| Niagara Falls - West Branch | 8 |
| Geneva | 5* |
| Watervliet | 17 |
| Bedford | 17 |
| Peekskill | 22 |
| Yorktown | 9 |
| Ossining - Indian Brook | 33 |
| Clarkstown - Congers Lake | 35 |
| Clarkstown - Lake De Forest | 24 |
| Hillburn | 30** |
| Haverstraw | 10 |
| Ramapo | 19 |
| Stony Point | 5 |
| Highland Falls | 15 |

| | Sr-89 | Sr-90 |
|---|---|---|
| Albany (finished) | 5 | <3 |
| Cohoes (finished) | 10 | 5 |
| Geneva | <3 | <3 |
| New York City | 6 | <3 |

* Only 2 monthly samples
** Only 1 monthly sample

## Air

Gross Beta - pc/M$^3$

| Station | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Samp. Freq. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Albany | Ave | 5.1 | 6.2 | 5.8 | 7.6 | 7.8 | 7.8 | 6.5 | 4.8 | 3.0 | 3.0 | 1.1 | 1.0 | D |
| | Max | 22 | 9 | 11 | 15 | 18 | 15 | 10 | 9 | 6 | 8 | 2 | 1 | |
| | Min | 1 | 3 | 1 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | <1 | <1 | |
| Ithaca | Ave | 9.0 | 9.2 | 6.7 | 7.3 | 7.6 | 8.8 | 5.7 | 5.3 | 3.2 | 2.5# | 1.0# | 1.0# | W |
| | Max | 10 | 13 | 11 | 12 | 11 | 12 | 7 | 8 | 4 | 3 | 1 | 1 | |
| | Min | 7 | 7 | 4 | 1.4 | 2 | 6 | 4 | 3 | 3 | 2 | 1 | <1 | |
| Pawling | Ave | * | * | * | * | 6.5# | 11# | 5.8 | 4.8 | 2.0 | 2.0 | 1.3 | 1# | W |
| | Max | * | * | * | * | 7 | 11 | 9 | 8 | 2 | 2 | 2 | 1 | |
| | Min | * | * | * | * | 6 | 11 | 4 | 3 | 2 | 2 | <1 | 1 | |
| Peekskill | Ave | 8.0 | 8.0 | 6.8 | 10.8 | 6.2 | 9.0 | 6.8 | 5.5 | 3.2 | 2.5# | 1.2 | 1.0 | W |
| | Max | 10 | 10 | 9 | 13 | 8 | 13 | 9 | 8 | 4 | 3 | 2 | 1 | |
| | Min | 6 | 5 | 5 | 8 | 5 | 6 | 7 | 3 | 2 | 2 | <1 | 1 | |
| Tuxedo | Ave | 7.2 | 8.2 | 6.8 | 11.3 | 8.5 | 8.5 | 6.5 | 5.3 | 2.0# | 2.5# | 1.2 | 1.3 | W |
| | Max | 10 | 10 | 11 | 15 | 10 | 10 | 9 | 9 | 2 | 3 | 2 | 2 | |
| | Min | 5 | 6 | 4 | 9 | 6 | 6 | 5 | 3 | 2 | 2 | <1 | 1 | |

# Partial Schedule of Samples

# Fallout

pc/ft$^2$/day

| Station | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Samp. Freq. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Strontium-89** | | | | | | | | | | | | | | |
| Albany | Ave | <3 | <3 | <3 | 89 | 68 | 20 | 17 | 20 | 6 | <3 | <3 | <3 | W |
| | Max | <3 | <3 | <3 | 126 | 120 | 44 | 28 | 39 | 18 | <3 | <3 | <3 | |
| | Min | <3 | <3 | <3 | 12 | 46 | 6 | <3 | <3 | <3 | <3 | <3 | <3 | |
| Ithaca | Ave | <3 | <3 | 71 | 41 | 72 | 32 | 45 | 20 | 5 | <3 | <3 | <3 | W |
| | Max | <3 | <3 | 140 | 80 | 97 | 64 | 74 | 29 | 15 | <3 | <3 | <3 | |
| | Min | <3 | <3 | <3 | 12 | 40 | 11 | 17 | 10 | <3 | <3 | <3 | <3 | |
| Peekskill | Ave | <3 | <3 | 17 | 12 | 40 | 38 | 17 | 13 | 7 | 3 | <3 | <3 | W |
| | Max | <3 | <3 | 35 | 34 | 94 | 94 | 40 | 46 | 26 | 7 | <3 | <3 | |
| | Min | <3 | <3 | <3 | <3 | 11 | 20 | <3 | <3 | <3 | <3 | <3 | <3 | |
| Syracuse | Ave | <3 | <3 | <3 | 105 | 70 | 50 | 37 | 24 | <3 | <3 | <3 | <3 | W |
| | Max | <3 | <3 | <3 | 155 | 193 | 82 | 61 | 64 | <3 | <3 | <3 | <3 | |
| | Min | <3 | <3 | <3 | 30 | 11 | 16 | 13 | <3 | <3 | <3 | <3 | <3 | |
| **Strontium-90** | | | | | | | | | | | | | | |
| Albany | Ave | <3 | <3 | <3 | 20 | 9 | 7 | 8 | 8 | <3 | <3 | <3 | <3 | W |
| | Max | <3 | <3 | <3 | 33 | 18 | 11 | 10 | 11 | <3 | <3 | <3 | <3 | |
| | Min | <3 | <3 | <3 | 6 | <3 | <3 | 4 | <3 | <3 | <3 | <3 | <3 | |
| Ithaca | Ave | <3 | <3 | 4 | 6 | 12 | 6 | 10 | 9 | 4 | <3 | <3 | <3 | W |
| | Max | <3 | <3 | 7 | 14 | 15 | 7 | 19 | 13 | 8 | <3 | <3 | <3 | |
| | Min | <3 | <3 | <3 | <3 | 5 | 4 | <3 | 6 | <3 | <3 | <3 | <3 | |
| Peekskill | Ave | <3 | 4 | 3 | <3 | 6 | 4 | 4 | 8 | <3 | <3 | <3 | <3 | W |
| | Max | <3 | 10 | 7 | 5 | 7 | 6 | 11 | 14 | <3 | <3 | <3 | <3 | |
| | Min | <3 | <3 | <3 | <3 | 3 | <3 | <3 | <3 | <3 | <3 | <3 | <3 | |
| Syracuse | Ave | <3 | <3 | <3 | 5 | 6 | 9 | 9 | 8 | <3 | <3 | 4 | <3 | W |
| | Max | <3 | <3 | <3 | 8 | 10 | 15 | 14 | 31 | <3 | <3 | 9 | <3 | |
| | Min | <3 | <3 | <3 | <3 | <3 | <3 | 5 | <3 | <3 | <3 | <3 | <3 | |

## Milk

Concentration - pc/l

| Station | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Samp. Freq. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Iodine-131 | | | | | | | |
| Albany | Ave | All | less | than | 20 | | | | | | | | | A |
| | Max | 28 | <20 | <20 | <20 | <20 | 28 | 25 | 43 | 42 | <20 | <20 | <20 | & |
| | Min | All | less | than | 20 | | | | | | | | | D |
| Bedford | | <20 | * | <20 | <20 | <20 | <20 | <20 | * | <20 | <20 | <20 | <20 | M |
| Buffalo | Ave | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | A |
| | Max | 28 | <20 | <20 | <20 | <20 | <20 | 21 | <20 | <20 | <20 | <20 | <20 | |
| | Min | All | less | than | 20 | | | | | | | | | |
| Clarkstown | | | <20 | <20 | 22 | <20 | <20 | * | 25 | <20 | <20 | <20 | * | M |
| Newburgh | Ave | All | less | than | 20 | | | | | | | | | A |
| | Max | All | less | than | 20 | | | | | | | | | |
| | Min | All | less | than | 20 | | | | | | | | | |
| NY City | Ave | <20 | <20 | 21 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | A |
| | Max | <20 | <20 | 38 | 31 | 32 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | |
| | Min | All | less | than | 20 | | | | | | | | | |
| Massena | Ave | All | less | than | 20 | | | | | | | | | |
| | Max | 21 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | B |
| | Min | All | less | than | 20 | | | | | | | | | |
| Mt. Pleasant | | <20 | <20 | <20 | 31 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | M |
| Middleburg | Ave | * | * | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | A |
| | Max | * | * | <20 | <20 | 47 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | |
| | Min | * | * | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | |
| Oyster Bay | | All | less | than | 20 | | | | | | | | | M |
| Syracuse | Ave | <20 | <20 | <20 | <20 | 22 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | A |
| | Max | 24 | <20 | <20 | 22 | 43 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | |
| | Min | All | less | than | 20 | | | | | | | | | |
| Yorktown | | All | less | than | 20 | | | | | | | | | M |

## Milk

Concentration - pc/l

con't

| Station | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Samp. Freq. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Cs-137 | | | | | | | |
| Albany | Ave | 58 | 63 | 41 | 48 | 51 | 92 | 101 | 133 | 103 | 99 | 112 | 120 | A |
| | Max | 83 | 77 | 71 | 71 | 75 | 122 | 177 | 156 | 164 | 148 | 144 | 151 | & |
| | Min | 34 | 56 | <20 | <20 | <20 | 60 | 54 | 85 | 28 | 26 | 62 | 84 | D |
| Bedford | | 69 | * | 44 | 58 | 91 | 169 | 209 | * | 123 | 150 | 164 | 172 | M |
| Buffalo | Ave | 69 | 91 | 67 | 35 | 76 | 86 | 105 | 89 | 93 | 79 | 102 | 106 | A |
| | Max | 101 | 137 | 74 | 54 | 98 | 90 | 187 | 112 | 112 | 89 | 140 | 126 | |
| | Min | 39 | 64 | 54 | <20 | 57 | 75 | 57 | 65 | 84 | 67 | 81 | 92 | |
| Clarkstown | | * | 36 | 37 | <20 | 30 | 26 | * | 68 | 72 | 67 | 120 | * | M |
| Newburgh | Ave | 55 | 66 | 58 | 29 | 79 | 107 | 125 | 137 | 84 | 91 | 98 | 122 | A |
| | Max | 64 | 78 | 84 | 51 | 91 | 131 | 160 | 149 | 92 | 123 | 130 | 131 | |
| | Min | 39 | 54 | 33 | <20 | 61 | 92 | 94 | 105 | 72 | 64 | 64 | 115 | |
| NY City | Ave | 67 | 63 | 61 | <20 | 65 | 135 | 119 | 126 | 126 | 117 | 122 | 153 | A |
| | Max | 80 | 73 | 94 | <20 | 91 | 180 | 149 | 167 | 134 | 138 | 168 | 175 | |
| | Min | 56 | 56 | 25 | <20 | 33 | 104 | 68 | 58 | 110 | 104 | 67 | 135 | |
| Massena | Ave | 114 | 137 | 97 | 73 | 79 | 160 | 224 | 226 | 193 | 150 | 205 | 187 | B |
| | Max | 127 | 150 | 129 | 77 | 83 | 190 | 229 | 266 | 212 | 158 | 231 | 212 | |
| | Min | 105 | 125 | 53 | 69 | 75 | 130 | 118 | 185 | 174 | 142 | 180 | 163 | |
| Mt. Pleasant | | <20 | 78 | 20 | 26 | 54 | 129 | 114 | 117 | 94 | 94 | 103 | 121 | M |
| Middleburg | Ave | * | * | 58 | 52 | 65 | 94 | 133 | 139 | 85 | 83 | 119 | 127 | A |
| | Max | * | * | 64 | 83 | 95 | 125 | 153 | 149 | 104 | 93 | 133 | 142 | |
| | Min | * | * | 52 | <20 | 31 | 71 | 109 | 129 | 79 | 77 | 92 | 116 | |
| Oyster Bay | | 75 | 82 | <20 | 45 | 64 | 100 | 132 | 124 | 130 | 123 | 155 | 157 | M |
| Syracuse | Ave | 55 | 50 | 36 | <20 | 51 | 95 | 88 | 110 | 85 | 80 | 111 | 123 | A |
| | Max | 64 | 86 | 73 | 40 | 99 | 115 | 110 | 145 | 90 | 87 | 136 | 141 | |
| | Min | 50 | 21 | <20 | <20 | <20 | 73 | 62 | 90 | 78 | 73 | 90 | 104 | |
| Yorktown | | 59 | 66 | 62 | 46 | 90 | 154 | 172 | 113 | 83 | 87 | 99 | 95 | M |

## Milk

Concentration - pc/l

con't

| Station | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Samp. Freq. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Ba-La-140 | | | | | | | | |
| Albany | Ave | All | are | less | than | 20 | | | | | | | | A |
| | Max | <20 | <20 | 78 | 69 | 49 | 38 | <20 | <20 | <20 | <20 | <20 | <20 | & |
| | Min | All | are | less | than | 20 | | | | | | | | D |
| Bedford | | <20 | 20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | M |
| Buffalo | Ave | All | are | less | than | 20 | | | | | | | | |
| | Max | <20 | <20 | 24 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | A |
| | Min | All | are | less | than | 20 | | | | | | | | |
| Clarkstown | | All | are | less | than | 20 | | | | | | | | |
| Newburgh | Ave | <20 | <20 | <20 | <20 | 24 | <20 | 20 | <20 | <20 | <20 | <20 | <20 | A |
| | Max | <20 | <20 | <20 | <20 | 65 | <20 | 50 | <20 | <20 | <20 | <20 | <20 | |
| | Min | All | are | less | than | 20 | | | | | | | | |
| NY City | Ave | All | are | less | than | 20 | | | | | | | | |
| | Max | <20 | <20 | <20 | <20 | 20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | A |
| | Min | All | are | less | than | 20 | | | | | | | | |
| Massena | Ave | All | are | less | than | 20 | | | | | | | | A |
| | Max | <20 | <20 | 31 | <20 | 33 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | |
| | Min | All | are | less | than | 20 | | | | | | | | |
| Mt. Pleasant | | All | are | less | than | 20 | | | | | | | | M |
| Middleburg | Ave | * | * | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | A |
| | Max | * | * | 29 | <20 | <20 | 27 | <20 | <20 | <20 | <20 | <20 | <20 | |
| | Min | * | * | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | |
| Oyster Bay | | <20 | <20 | <20 | 34 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | M |
| Syracuse | Ave | All | are | less | than | 20 | | | | | | | | |
| | Max | 20 | <20 | <20 | <20 | 64 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | A |
| | Min | All | are | less | than | 20 | | | | | | | | |
| Yorktown | | All | are | less | than | 20 | | | | | | | | M |

Milk

Concentration - pc/l

con't.

| Station | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Samp. Freq. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Zr-Nb-95 | | | | | | | |
| Albany | Ave | * | * | 21 | <20 | <20 | <20 | <20 | <20 | * | * | * | * | A |
| | Max | * | * | 87 | 41 | 44 | 67 | 54 | <20 | * | * | * | * | & |
| | Min | * | * | <20 | <20 | <20 | <20 | <20 | <20 | * | * | * | * | D |
| Bedford | | * | <20 | * | <20 | <20 | * | * | * | * | * | * | * | M |
| Buffalo | Ave | * | * | <20 | <20 | <20 | <20 | <20 | * | * | * | * | * | A |
| | Max | * | * | 39 | 36 | <20 | <20 | <20 | * | * | * | * | * | |
| | Min | * | * | <20 | <20 | <20 | <20 | <20 | * | * | * | * | * | |
| Clarkstown | | * | * | <20 | <20 | <20 | <20 | * | * | * | * | * | * | M |
| Newburgh | Ave | * | * | <20 | <20 | <20 | <20 | <20 | * | * | * | * | * | A |
| | Max | * | * | 22 | <20 | <20 | <20 | <20 | * | * | * | * | * | |
| | Min | * | * | <20 | <20 | <20 | <20 | <20 | * | * | * | * | * | |
| NY City | Ave | * | * | * | <20 | 22 | 22 | <20 | * | * | * | * | * | A |
| | Max | * | * | * | <20 | 36 | 46 | <20 | * | * | * | * | * | |
| | Min | * | * | * | <20 | <20 | <20 | <20 | * | * | * | * | * | |
| Massena | Ave | * | * | <20 | <20 | <20 | <20 | * | * | * | * | * | * | B |
| | Max | * | * | 21 | <20 | <20 | <20 | * | * | * | * | * | * | |
| | Min | * | * | <20 | <20 | <20 | <20 | * | * | * | * | * | * | |
| Mt. Pleasant | | * | * | 26 | <20 | * | * | <20 | * | * | * | * | * | M |
| Middleburgh | Ave | * | * | <20 | <20 | <20 | <20 | <20 | * | * | * | * | * | M |
| | Max | * | * | <20 | <20 | <20 | <20 | <20 | * | * | * | * | * | |
| | Min | * | * | <20 | <20 | <20 | <20 | <20 | * | * | * | * | * | |
| Oyster Bay | | * | * | * | <20 | <20 | <20 | <20 | * | * | * | * | * | M |
| Syracuse | Ave | * | * | <20 | <20 | <20 | <20 | <20 | * | * | * | * | * | A |
| | Max | * | * | <20 | <20 | 53 | <20 | <20 | * | * | * | * | * | |
| | Min | * | * | <20 | <20 | <20 | <20 | <20 | * | * | * | * | * | |
| Yorktown | | * | * | <20 | <20 | * | <20 | * | * | * | * | * | * | M |

Milk

Concentration - pc/l

con't.

| Station | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Samp. Freq. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Strontium-90 | | | | | | | |
| Albany | Ave | 5 | 6 | 7 | 8 | 12 | 21 | 26 | 30 | 26 | 21 | 21 | 18 | A |
| | Max | 8 | 9 | 9 | 11 | 20 | 32 | 29 | 34 | 35 | 23 | 25 | 22 | & |
| | Min | 3 | 3 | 6 | 4 | <3 | 9 | 24 | 24 | 19 | 19 | 17 | 14 | D |
| Bedford | | 9 | * | <3 | 6 | 18 | 42 | 54 | * | 20 | 35 | 28 | 19 | M |
| Buffalo | Ave | 8 | 8 | 8 | 9 | 13 | 24 | 14 | 20 | 18 | 13 | 15 | 12 | A |
| | Max | 11 | 11 | 11 | 11 | 15 | 31 | 19 | 24 | 25 | 15 | 16 | 15 | |
| | Min | 3 | 6 | 7 | 6 | 12 | 14 | 7 | 17 | 10 | 10 | 13 | 9 | |
| Clarkstown | | * | 3 | <3 | 4 | 4 | 34 | * | 13 | 12 | 13 | 15 | * | M |
| Newburgh | Ave | 8 | 6 | 6 | 8 | 20 | 30 | 34 | 38 | 27 | 20 | 22 | 22 | A |
| | Max | 10 | 9 | 9 | 9 | 25 | 37 | 46 | 49 | 33 | 22 | 27 | 26 | |
| | Min | 7 | 3 | 4 | 6 | 14 | 22 | 21 | 26 | 18 | 17 | 17 | 18 | |
| NY City | Ave | 9 | 9 | 9 | 9 | 20 | 34 | 27 | 32 | 31 | 25 | 24 | 25 | A |
| | Max | 12 | 13 | 10 | 9 | 35 | 59 | 38 | 39 | 42 | 30 | 26 | 30 | |
| | Min | 3 | 7 | 4 | 7 | 11 | 17 | 18 | 25 | 20 | 21 | 21 | 21 | |
| Massena | Ave | 12 | 13 | 9 | 12 | 12 | 15 | 40 | 30 | 22 | 29 | 34 | 29 | B |
| | Max | 14 | 16 | 11 | 19 | 13 | 29 | 49 | 36 | 32 | 32 | 38 | 30 | |
| | Min | 11 | 11 | 7 | 8 | 12 | <3 | 31 | 25 | 12 | 27 | 29 | 28 | |
| Mt. Pleasant | | 5 | 6 | 5 | 6 | 7 | 16 | 20 | 21 | 7 | 18 | 16 | 13 | M |
| Middleburg | Ave | * | * | 8 | 6 | 15 | 34 | 41 | 29 | 29 | 25 | 25 | 21 | A |
| | Max | * | * | 9 | 7 | 24 | 61 | 55 | 38 | 40 | 32 | 29 | 26 | |
| | Min | * | * | 7 | 6 | 8 | 17 | 32 | 16 | 13 | 16 | 21 | 17 | |
| Oyster Bay | | 12 | 13 | 7 | 8 | 16 | 24 | 27 | 5 | 32 | 8 | 33 | 27 | M |
| Syracuse | Ave | 6 | 5 | 6 | 7 | 14 | 26 | 26 | 20 | 21 | 20 | 23 | 18 | A |
| | Max | 8 | 7 | 7 | 9 | 26 | 32 | 42 | 33 | 30 | 23 | 42 | 20 | |
| | Min | 4 | 3 | 4 | 5 | 4 | 22 | 18 | 14 | 14 | 17 | 13 | 17 | |
| Yorktown | | 10 | 3 | 10 | 10 | 22 | 32 | 27 | 32 | 11 | 22 | 17 | 19 | M |

Milk

Concentration - pc/l

con't.

| Station | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Samp. Freq. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Strontium-89 | | | | | | | | | | | | | | |
| Albany | Ave | 5 | 4 | <3 | 3 | 40 | 74 | 69 | 49 | 30 | 18 | 13 | 9 | D |
| | Max | 9 | 5 | <3 | 5 | 87 | 91 | 75 | 61 | 40 | 22 | 15 | 14 | & |
| | Min | 3 | <3 | <3 | <3 | 4 | 51 | 62 | 33 | 24 | 16 | 12 | 5 | A |
| Bedford | | 9 | * | 5 | 8 | 58 | 158 | 139 | * | 26 | 42 | 20 | 9 | M |
| Buffalo | Ave | 5 | 6 | 4 | 5 | 30 | 56 | 45 | 33 | 27 | 27 | 11 | 12 | A |
| | Max | 6 | 6 | 5 | 11 | 47 | 71 | 54 | 44 | 55 | 35 | 15 | 24 | |
| | Min | 5 | 4 | 3 | <3 | 6 | 49 | 37 | 27 | 12 | 19 | 8 | 7 | |
| Clarkstown | | * | <3 | 4 | 7 | 4 | 79 | * | 16 | 13 | 8 | 4 | * | M |
| Newburgh | Ave | 5 | 7 | 4 | 14 | 72 | 81 | 76 | 58 | 27 | 18 | 6 | 11 | A |
| | Max | 6 | 17 | 5 | 32 | 90 | 109 | 92 | 90 | 31 | 30 | 17 | 33 | |
| | Min | 5 | 3 | 3 | 5 | 38 | 60 | 72 | 45 | 22 | 11 | <3 | <3 | |
| NY City | Ave | 6 | 4 | 3 | 6 | 87 | 113 | 90 | 80 | 30 | 20 | 18 | 8 | A |
| | Max | 11 | 5 | 6 | 15 | 141 | 145 | 108 | 89 | 45 | 27 | 21 | 14 | |
| | Min | 7 | <3 | <3 | 4 | 20 | 36 | 46 | 72 | 21 | 5 | 16 | <3 | |
| Massena | Ave | 7 | 7 | 7 | 4 | 36 | 76 | 106 | 49 | 44 | 16 | 19 | 7 | B |
| | Max | 10 | 8 | 8 | 6 | 64 | 117 | 122 | 53 | 64 | 22 | 32 | 10 | |
| | Min | 5 | 5 | 5 | <3 | 8 | 35 | 91 | 46 | 23 | 10 | 6 | 3 | |
| Mt. Pleasant | | 5 | <3 | <3 | 9 | 22 | 52 | 88 | 40 | 15 | <3 | <3 | <3 | M |
| Middleburg | Ave | * | * | <3 | 6 | 44 | 89 | 67 | 63 | 32 | 25 | 14 | 9 | A |
| | Max | * | * | 3 | 10 | 91 | 109 | 86 | 70 | 47 | 32 | 20 | 13 | |
| | Min | * | * | <3 | <3 | 10 | 69 | 50 | 51 | 25 | 17 | 18 | <3 | |
| Oyster Bay | | 14 | 4 | 6 | 7 | 26 | 76 | 57 | 61 | 32 | 17 | <3 | 7 | M |
| Syracuse | Ave | 6 | 5 | 3 | 5 | 66 | 91 | 84 | 41 | 30 | 19 | 17 | 8 | A |
| | Max | 7 | 6 | 5 | 6 | 132 | 108 | 72 | 49 | 43 | 20 | 29 | 12 | |
| | Min | 5 | 5 | <3 | 3 | 6 | 74 | 46 | 32 | 18 | 18 | 5 | <3 | |
| Yorktown | | <3 | 9 | 8 | 22 | 73 | 84 | 57 | 28 | 24 | <3 | 14 | <3 | M |

## Water

Concentration - pc/l

| Station | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Samp. Freq. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gross Beta | | | | | | | | | | | | | | |
| Akron (Murder Ck.) | Ave | * | * | * | 18 | 19 | 13 | 18 | 14 | * | 14 | 13 | 21 | B |
| | Max | * | * | * | 20 | 22 | 18 | 19 | 15 | * | 14 | 14 | 26 | |
| | Min | * | * | * | 15 | 16 | <6 | 17 | 12 | * | 13 | 12 | 16 | |
| Bedford (Byram L.) | | 6 | 9 | 12 | 34 | 6 | 6 | 30 | 23 | 15 | 31 | 18 | 8 | M |
| Clarkstown (Congers L.) | | 16 | 65 | 42 | 23 | 62 | 27 | 42 | 35 | 27 | 15 | 33 | * | M |
| Clarkstown (Lake DeForest) | | 19 | 20 | 90 | 16 | 41 | 9 | 24 | 19 | 15 | 13 | <3 | * | M |
| Cohoes (Mohawk R.) | Ave | 27 | 7 | 47 | 23 | 20 | 18 | 72 | 38 | 15 | 33 | 13 | 26 | C |
| | Max | 37 | 14 | 130 | 34 | 28 | 24 | 167 | 81 | 23 | 39 | 17 | 40 | |
| | Min | 7 | <3 | 6 | 11 | <6 | 12 | 6 | 17 | 12 | 27 | 10 | 12 | |
| Geneva (Seneca L.) | Ave | * | * | 3 | * | * | * | * | 8 | * | * | * | * | B |
| | Max | * | * | 3 | * | * | * | * | 8 | * | * | * | * | |
| | Min | * | * | 3 | * | * | * | * | 8 | * | * | * | * | |
| Glenmont (Hudson R.) | Ave | 20 | 29 | 112 | 62 | 12 | 58 | 21 | 22 | 14 | 16 | 13 | 17 | A |
| | Max | 24 | 60 | 210 | 120 | 18 | 160 | 25 | 26 | 18 | 19 | 15 | 26 | |
| | Min | 11 | <6 | <60 | 15 | 6 | 22 | 14 | 17 | 10 | 14 | 11 | 12 | |
| Haverstraw (Letchworth V. Res.) | | 6 | 3 | 9 | 6 | 14 | 14 | 17 | 10 | 6 | * | 10 | * | M |
| Highland Falls (Meadow Brook) | | * | 9 | 8 | 16 | 10 | 26 | 49 | 28 | 4 | 6 | 4 | 5 | M |
| Hillburn | | * | * | * | 30 | * | * | * | * | * | * | * | * | M |
| Niagara Falls (East Branch) | | * | 3 | 70 | 11 | 16 | 16 | * | * | 6 | 9 | 7 | * | M |
| Niagara Falls (West Branch) | | * | 3 | 17 | <6 | 8 | 11 | * | * | 5 | 9 | 5 | * | M |
| Ossining (Hudson R.) | Ave | <60 | <6 | <60 | 44 | 22 | 25 | 43 | 91 | 68 | 69 | 53 | 30 | A |
| | Max | <60 | <6 | <60 | <60 | 30 | 38 | 72 | 98 | 72 | 121 | 95 | 44 | |
| | Min | <60 | <6 | <60 | 28 | 6 | <6 | 20 | 83 | 62 | 12 | <6 | 16 | |
| Ossining (Indian Bk.Res.) | | 42 | 29 | 28 | 12 | <60 | 36 | 79 | 26 | 13 | 12 | 28 | * | M |

## Water

Concentration - pc/l

con't.

| Station | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Samp. Freq. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Gross Beta | | | | | | | |
| Oswego (Lake Ontario) | Ave | 6 | 7 | 14 | 8 | 8 | 7 | 9 | 13 | 4 | 6 | 7 | 6 | W |
| | Max | * | 10 | 31 | 14 | 13 | 10 | 16 | 17 | 5 | 9 | 7 | 7 | |
| | Min | * | 4 | 4 | 3 | <3 | <6 | 4 | 8 | <3 | 3 | 6 | 3 | |
| Pawling (Pond at United Nuclear | | | | 23 | 32 | 19 | 9 | 54 | 49 | 14 | 22 | 25 | 18 | M |
| Peekskill (Camp Field Res.) | | 29 | 51 | 53 | 8 | 10 | 15 | 20 | 20 | 12 | 12 | 21 | 11 | M |
| Peekskill (Hudson R.) | Ave | 47 | <60 | 60 | 40 | 11 | 20 | 49 | 60 | 75 | 14 | 21 | 23 | C |
| | Max | 65 | <60 | 60 | 60 | 15 | 40 | 62 | 95 | 77 | 31 | 40 | 48 | |
| | Min | <30 | <60 | <60 | 21 | 8 | 6 | 23 | <3 | 72 | 6 | 3 | 6 | |
| Ramapo (Spring Valley) | | * | <3 | 14 | * | 52 | 25 | <6 | 34 | 8 | 12 | 17 | * | M |
| Rome (Fish Ck.) | Ave | 12 | 6 | 11 | 18 | 30 | 15 | 18 | 15 | 12 | 8 | 15 | 16 | B |
| | Max | 12 | 6 | 11 | 21 | 34 | 21 | 18 | 15 | 13 | 10 | 17 | 22 | |
| | Min | 12 | 6 | 11 | 13 | 25 | 11 | 18 | 14 | 10 | 5 | 10 | 11 | |
| Schenectady (G.E. Plant) | Ave | 16 | 85 | 67 | 47 | 19 | 9 | 14 | 16 | 13 | 12 | 10 | 13 | C |
| | Max | 42 | 170 | 90 | 60 | 27 | 12 | 18 | 18 | 15 | 13 | 12 | 15 | |
| | Min | 6 | 11 | <60 | 21 | 10 | <6 | 10 | 17 | 12 | 10 | 7 | 9 | |
| Stony Point (Iona Island) | | <3 | 4 | 3 | * | <6 | 11 | 11 | 4 | <3 | 3 | <3 | * | M |
| Tuxedo (Indian Kill) | | | | 24 | 8 | | | 36 | 25 | | 15 | 18 | 15 | M |
| Waterford (Hudson R.) | Ave | 22 | 21 | 60 | 52 | 10 | 13 | 20 | 20 | 12 | 12 | 9 | 10 | A |
| | Max | 33 | <60 | 90 | 90 | 13 | 24 | 24 | 30 | 15 | 13 | 10 | 12 | |
| | Min | 15 | <6 | 30 | 14 | 6 | <6 | 17 | 10 | 10 | 11 | 8 | 9 | |
| Watertown (Black R.) | Ave | 31 | 10 | 24 | 31 | 32 | 13 | 15 | 28 | 15 | 17 | 15 | 17 | B |
| | Max | 38 | 10 | 37 | 36 | 41 | 14 | 16 | 34 | 17 | 17 | 15 | 17 | |
| | Min | 23 | 9 | 10 | 26 | 22 | 11 | 14 | 21 | 13 | 17 | 15 | 16 | |
| Watervliet (French Mills Res.) | Ave | 26 | 7 | 15 | 71 | 11 | 14 | 14 | 16 | 9 | 9 | 8 | 9 | A |
| | Max | 53 | 14 | 23 | 210 | 14 | 17 | 15 | 16 | 10 | 10 | 12 | 10 | |
| | Min | 9 | 4 | 4 | 13 | 10 | 11 | 12 | 15 | 8 | 8 | 6 | 7 | |
| Yorktown (Croton Res.) | | 9 | 5 | 3 | 8 | 8 | 6 | 36 | 21 | 9 | 16 | 14 | 9 | M |

All samples for which results are given for Gross Beta were also analyzed for I-131, Cs-137, Ba-La-140, and Zr-Nb-95. All were found to be less than 20 pc/l unless listed below.

| Station | Month | Isotope | Ave | Max | Min |
|---|---|---|---|---|---|
| Rome (Fish Creek) | March | (Ba-La-140) | 30 | 30 | 30 |
| Glenmont (Hudson River) | April | (Ba-La-140) | 21 | 22 | <20 |
| Ossining (Hudson River) | April | (Cs-137) | 24 | 28 | <20 |
| | February | (Ba-La-140) | 20 | 21 | <20 |
| | November | (I-131) | 33 | 41 | <20 |
| Peekskill (Hudson River) | April | (Cs-137) | 27 | 35 | <20 |
| | March | (Ba-La-140) | 23 | 27 | <20 |
| | July | (Ba-La-140) | 25 | 41 | <20 |
| Waterford (Hudson River | May | (I-131) | 23 | 27 | <20 |
| | May | (Ba-La-140) | 23 | 25 | <20 |
| Schoes (Mohawk River) | March | (Ba-La-140) | 30 | 53 | <20 |
| | July | (Ba-La-140) | 20 | 25 | <20 |
| Schenectady (G.E. Plant) | July | (Cs-137) | 20 | 25 | <20 |
| | May | (Ba-La-140) | 41 | 63 | <20 |
| | June | (Ba-La-140) | 23 | 33 | <20 |
| Geneva (Seneca Lake) | May | (I-131 | 20 | 23 | <20 |
| Watervliet (French Mills Res.) | May | (I-131) | 24 | 34 | <20 |
| | March | (Ba-La-140) | 20 | 22 | <20 |
| | May | (Ba-La-140) | 23 | 37 | <20 |
| | June | (Ba-La-140) | 20 | 25 | <20 |
| | July | (Ba-La-140) | 37 | 55 | <20 |
| | November | (Cs-137) | 29 | 38 | <20 |

WATER

con't.

| Station | Month | Isotope | Only one sample per month collected |
|---|---|---|---|
| Peekskill (Camp Field Res) | February | (Ba-La-140) | 34 |
| Clarkstown (Congers Lake) | March | (I-131) | 21 |
| | March | (Ba-La-140) | 32 |
| Clarkstown (Lake DeForest) | January | (Cs-137) | 28 |
| Haverstraw (Letchworth V. Res) | January | (Cs-137) | 21 |

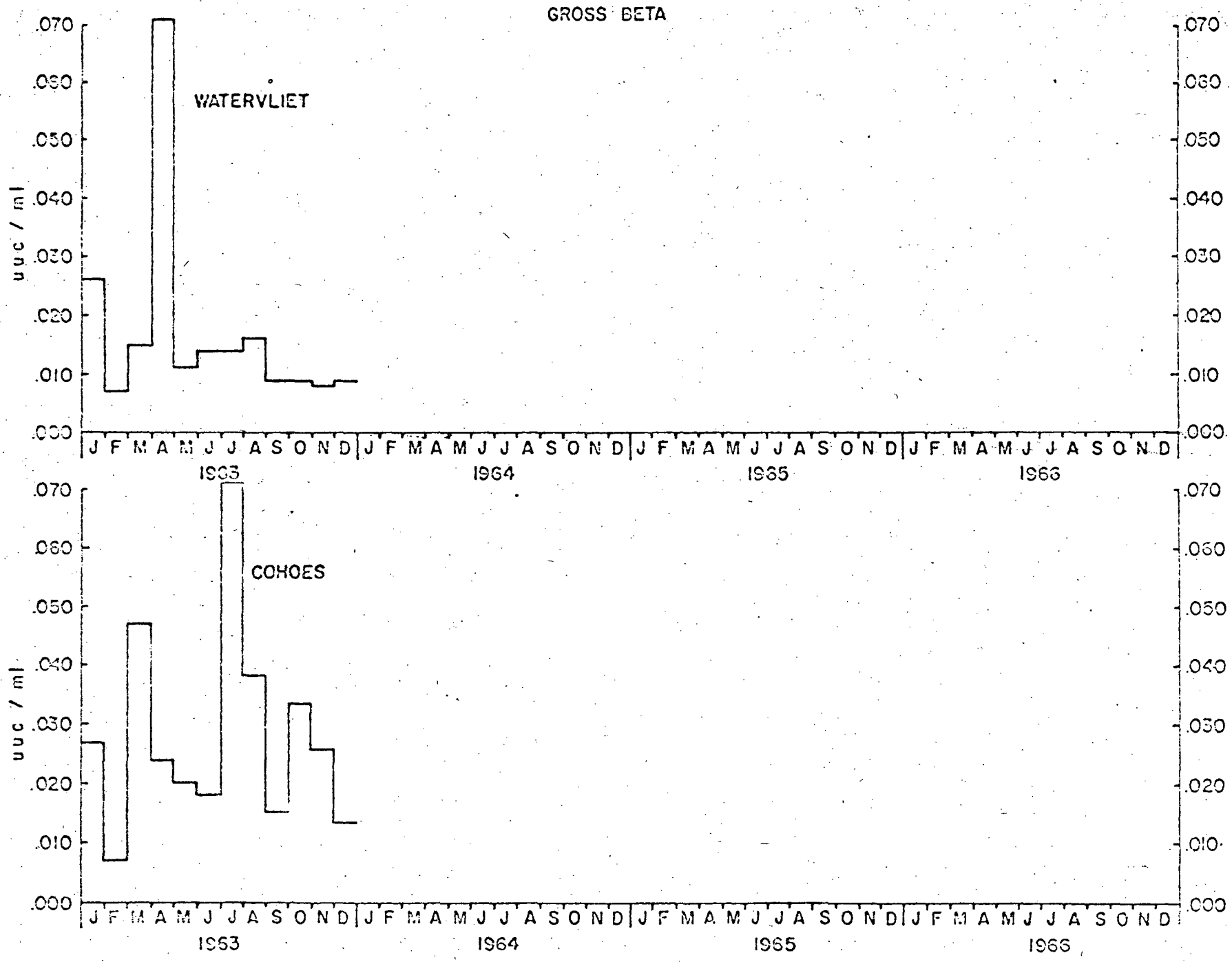
*Not Sampled.

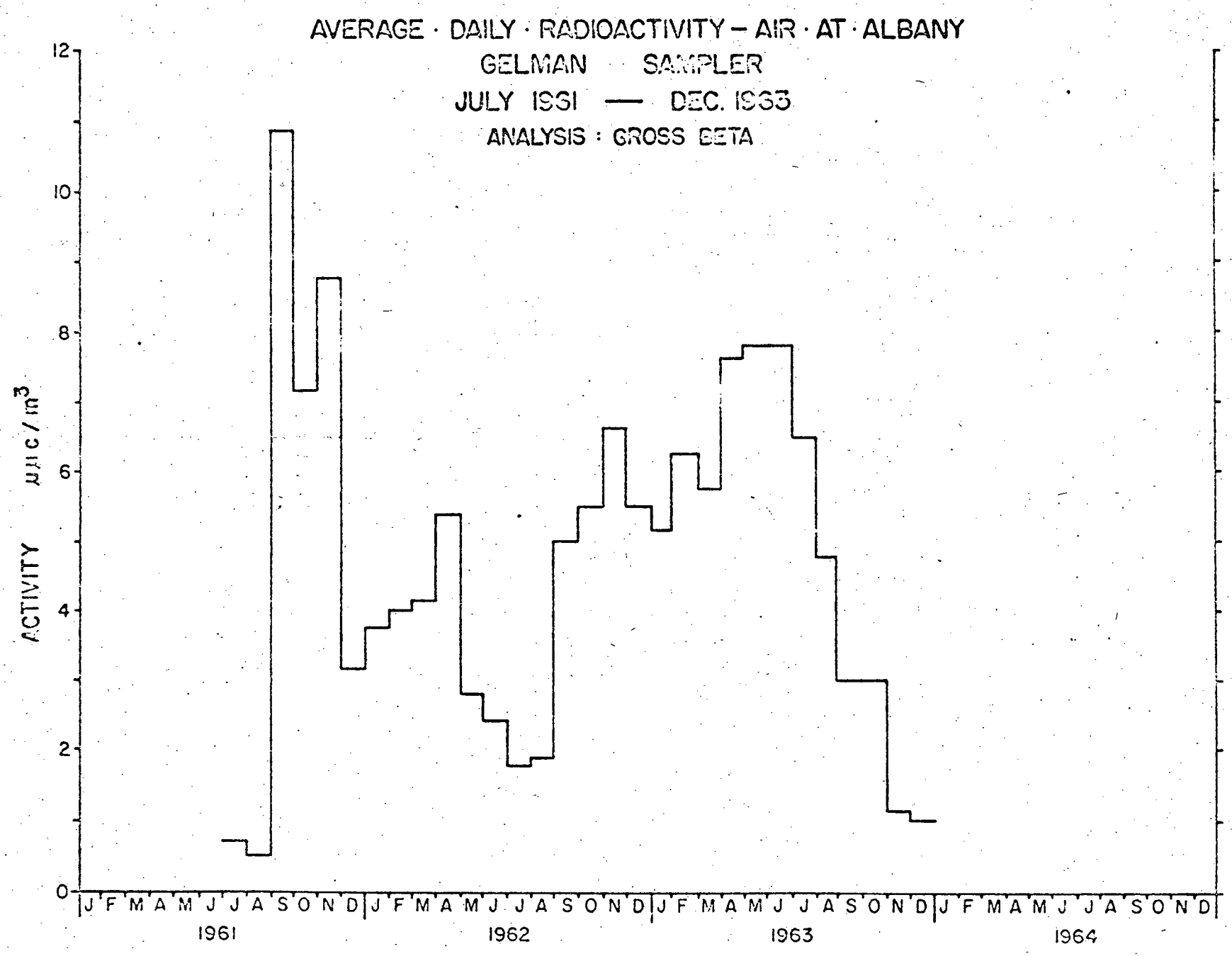
WATER

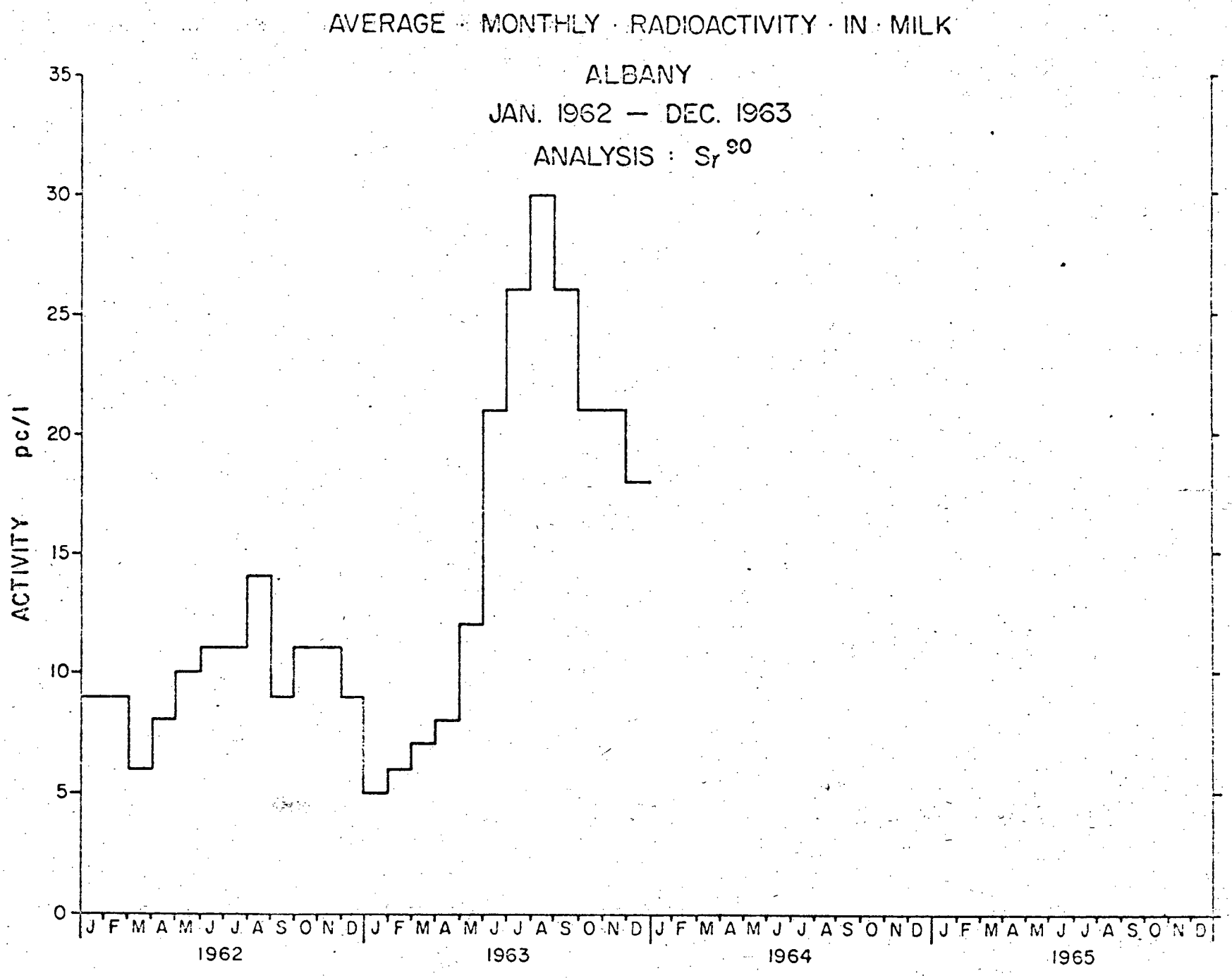
Concentrations in pc/l

| Station | Jan | Feb | Mar | Apr | May | June | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Strontium-89 | | | | | | | | | | | | |
| Albany | 4 | <3 | 4 | 10 | 6 | 4 | <3 | 5 | 5 | 7 | 5 | <3 |
| Cohoes | 5 | 7 | 11 | 25 | 10 | 13 | 6 | 10 | 12 | 15 | 4 | <3 |
| Geneva | 3 | 4 | 3 | 5 | <3 | <3 | <3 | <3 | <3 | 3 | <3 | <3 |
| New York City | <3 | 4 | 8 | 7 | 10 | 6 | 4 | 8 | 7 | 9 | <3 | <3 |
| Average | 3 | 4 | 6 | 12 | 7 | 6 | 3 | 6 | 6 | 8 | 3 | <3 |
| Strontium-90 | | | | | | | | | | | | |
| Albany | <3 | <3 | <3 | <3 | <3 | <3 | <3 | <3 | <3 | <3 | <3 | 3 |
| Cohoes | <3 | <3 | 3 | <3 | 4 | 5 | 7 | 7 | 6 | 9 | 9 | 6 |
| Geneva | <3 | <3 | <3 | <3 | <3 | <3 | <3 | <3 | <3 | <3 | <3 | <3 |
| New York City | <3 | <3 | <3 | <3 | <3 | 3 | 4 | <3 | <3 | <3 | <3 | <3 |
| Average | <3 | <3 | <3 | <3 | <3 | 3 | 4 | 3 | 3 | 4 | 4 | 3 |

RAW WATER SUPPLIES FOR COHOES AND WATERVLIET
GROSS BETA




AVERAGE · DAILY · RADIOACTIVITY – AIR · AT · ALBANY
GELMAN SAMPLER
JULY 1961 — DEC. 1963
ANALYSIS : GROSS BETA
ACTIVITY μμc/m³
0
2
4
6
8
10
12
J F M A M J J A S O N D
1961
1962
1963
1964

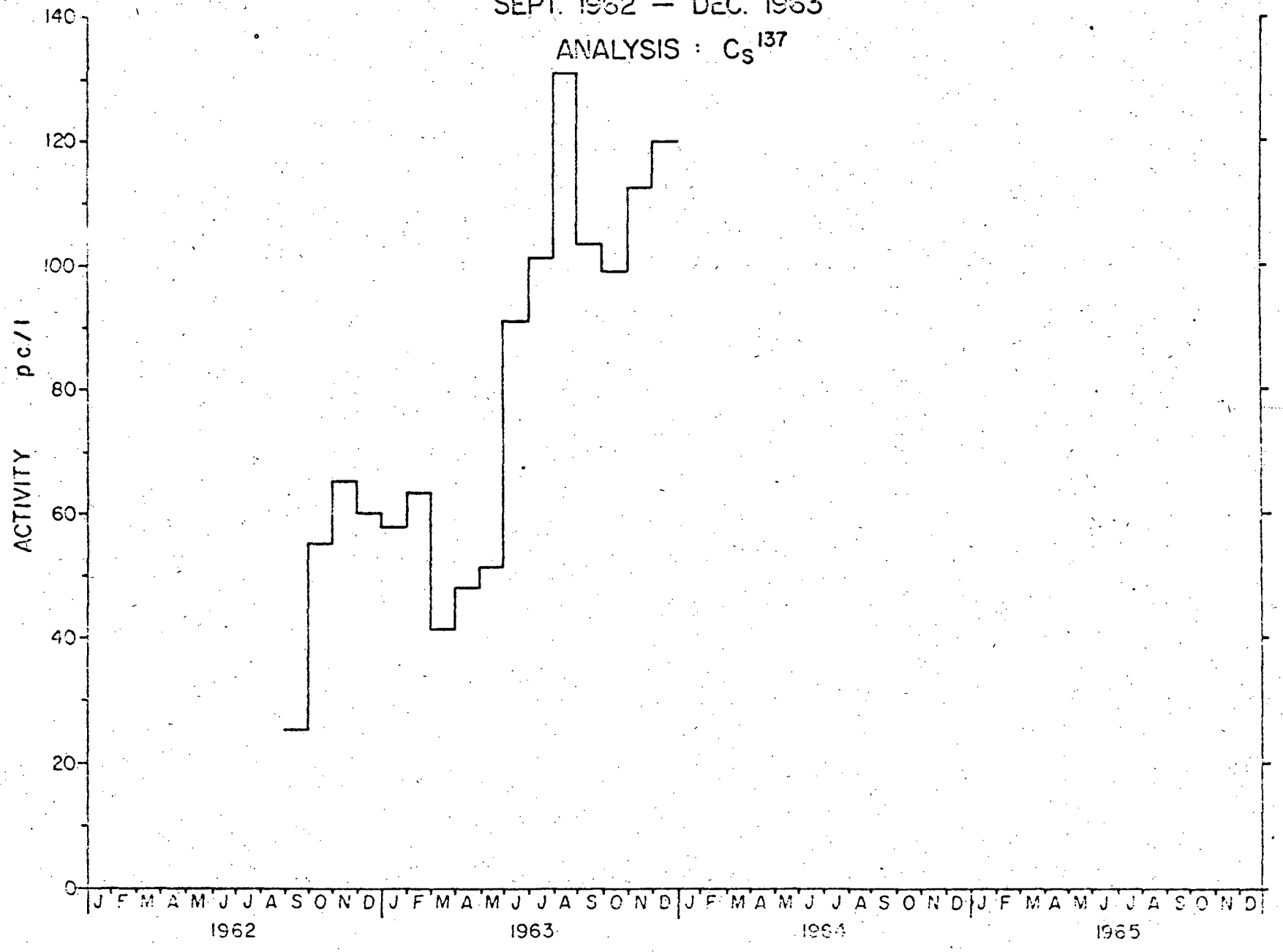

AVERAGE · MONTHLY · RADIOACTIVITY · IN · MILK
ALBANY
JAN. 1962 — DEC. 1963
ANALYSIS : $Sr^{90}$
ACTIVITY pc/l
35
30
25
20
15
10
5
0
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1962
1963
1964
1965

AVERAGE · MONTHLY · RADIOACTIVITY · IN · MILK

ALBANY

SEPT. 1962 — DEC. 1963

ANALYSIS : $Cs^{137}$



Gamma Background
Total Dose Rates
(ur/hr)

| Location | 1963 Total | 1963 Natural Gamma + Cosmic | 1961 Total | 1960 Total |
|---|---|---|---|---|
| Middletown | 14.7 | 10.9 | ---- | 11.3 |
| | 13.6 | 10.1 | ---- | 10.6 |
| Beacon | 14.6 | 9.7 | ---- | 12.3 |
| | 14.5 | 10.7 | ---- | 11.5 |
| | 13.8 | 10.5 | ---- | 11.0 |
| Poughkeepsie | 15.1 | 12.0 | ---- | 11.6 |
| | 15.3 | ---- | ---- | ---- |
| | 13.9 | 10.5 | ---- | 9.6 |
| | 13.9 | 10.5 | ---- | ---- |
| Hudson Falls | 13.9 | 9.2 | ---- | 9.4 |
| | 13.4 | 9.2 | ---- | ---- |
| Glens Falls | 14.2 | 10.3 | ---- | 10.1 |
| | 13.4 | 9.6 | ---- | 8.8 |
| | 14.2 | 10.2 | ---- | 9.5 |
| Saratoga Springs | 13.6 | 8.0 | ---- | 8.7 |
| | 15.6 | 8.2 | ---- | 8.8 |
| Amsterdam | 14.1 | 9.5 | ---- | 10.2 |
| | 13.1 | 9.6 | ---- | ---- |
| | 14.2 | ---- | ---- | 11.7 |
| | 15.5 | 9.3 | ---- | 11.1 |
| | 14.0 | 9.4 | ---- | ---- |
| Johnstown | 14.1 | 9.7 | ---- | ---- |
| | 13.4 | 9.7 | ---- | ---- |
| Cortland | 15.7 | ---- | ---- | 10.5 |
| | 14.4 | 9.9 | ---- | 10.3 |
| Ithaca | 14.6 | ---- | ---- | ---- |
| | 13.6 | 9.8 | ---- | ---- |
| | 13.7 | 10.2 | ---- | ---- |
| Elmira | 14.2 | 10.4 | 8.3 | ---- |
| | 13.8 | 11.0 | 9.1 | ---- |
| | 14.1 | ---- | ---- | ---- |
| Waverly | 13.7 | 10.0 | 8.4 | ---- |
| | 14.6 | ---- | ---- | ---- |
| Corning | 13.3 | ---- | ---- | ---- |
| | 13.3 | ---- | 9.5 | ---- |
| Bath | 13.1 | 9.8 | 8.5 | ---- |
| | 13.4 | ---- | ---- | ---- |
| | 13.4 | ---- | ---- | ---- |
| Hornell | 14.1 | 10.5 | 9.9 | ---- |
| | 12.6 | ---- | ---- | ---- |
| Wellsville | 12.8 | ---- | ---- | ---- |
| | 12.0 | ---- | 9.0 | ---- |
| | 12.0 | ---- | 9.0 | ---- |
| | 13.0 | 10.1 | ---- | ---- |

Gamma Background
Total Dose Rates
(ur/hr)

(Cont'd)

| Location | 1963 Total | 1963 Natural Gamma + Cosmic | 1961 Total | 1960 Total |
|---|---|---|---|---|
| Olean | 13.6 | ---- | 9.0 | ---- |
| | 15.7 | ---- | 11.5 | ---- |
| | 13.3 | 9.9 | ---- | ---- |
| | 13.8 | 9.4 | ---- | ---- |
| Salamanca | 12.8 | 9.5 | 8.9 | ---- |
| | 13.0 | ---- | 8.8 | ---- |
| Jamestown | 13.6 | ---- | 9.6 | ---- |
| | 13.6 | ---- | ---- | ---- |
| | 13.6 | ---- | ---- | ---- |
| | 14.2 | 10.1 | 8.7 | ---- |
| Fredonia | 13.0 | 9.7 | 9.1 | ---- |
| | 13.5 | ---- | ---- | ---- |
| | 13.0 | 9.5 | 8.2 | ---- |
| Medina | 12.9 | 9.3 | ---- | ---- |
| | 12.8 | ---- | ---- | ---- |
| | 12.4 | ---- | ---- | ---- |
| Dansville | 12.8 | ---- | 9.2 | ---- |
| | 12.8 | 9.1 | 8.5 | ---- |
| | 12.3 | 8.6 | 7.8 | ---- |
| Pen Yan | 12.5 | ---- | ---- | ---- |
| | 14.6 | 11.5 | ---- | ---- |
| Geneva | 15.0 | 11.5 | ---- | ---- |
| | 14.2 | ---- | ---- | ---- |
| | 15.9 | 10.3 | 8.8 | ---- |
| | 13.7 | 10.1 | 9.2 | ---- |
| Seneca Falls | 12.9 | 9.5 | 9.0 | ---- |
| | 13.4 | ---- | ---- | ---- |
| | 14.5 | 11.1 | 9.0 | ---- |
| Auburn | 12.8 | ---- | ---- | ---- |
| | 12.8 | 8.8 | 9.0 | ---- |
| | 12.6 | 8.8 | 9.3 | ---- |
| | 12.5 | 8.1 | 8.2 | ---- |
| Fulton | 12.6 | 8.9 | ---- | ---- |
| | 12.3 | 8.8 | ---- | ---- |
| | 13.1 | ---- | ---- | ---- |
| | 12.7 | ---- | ---- | ---- |
| Theresa | 14.8 | 11.0 | ---- | ---- |
| | 15.1 | 11.7 | ---- | ---- |
| Gouverneur | 13.6 | ---- | ---- | ---- |
| | 13.4 | 9.4 | ---- | ---- |
| Ogdensburg | 12.8 | ---- | ---- | ---- |
| | 13.5 | 10.3 | ---- | ---- |
| | 11.8 | ---- | ---- | ---- |

Gamma Background
Total Dose Rates
(ur/hr)

(Cont'd)

| Location | 1963 Total | 1963 Natural Gamma + Cosmic | 1961 Total | 1960 Total |
|---|---|---|---|---|
| Malone | 11.8 | ---- | ---- | ---- |
| | 12.5 | 8.3 | ---- | ---- |
| Plattsburg | 13.0 | ---- | ---- | ---- |
| | 12.8 | ---- | ---- | ---- |
| Saranac Lake | 13.2 | ---- | ---- | ---- |
| Typper Lake | 14.3 | 8.8 | ---- | ---- |
| Albany | 13.4 | 9.8 | ---- | ---- |
| Guilderland | 15.9 | ---- | ---- | ---- |

KEY

pc = picocurie = one millionth of a millionth of a curie.
$M^3$ = cubic meter or approximately 35.3 cubic ft.
l = liter or approximately 1.1 quart.
Samp. Freq. = Sampling frequency.
D = daily grab sample
W = weekly grab sample
A = weekly composite of daily grab samples
B = bi-weekly composite of daily grab samples
M = monthly grab sample
C = continuous bleed-off analyzed weekly