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NINE MILE POINT UNIT 1

ANNUAL ENVIRONMENTAL OPERATING REPORT

I. INTRODUCTION

This report is submitted in accordance with Appendix B to DPR-63, Docket No. 50-220.

II. DESCRIPTION

The required sample collection and analysis schedule for NMP#1 is listed in Tables 1 and 2.

The sample collections for the radiological program are performed by two groups. Ecological Analysts Incorporated (EAI) performs much of the environmental sampling. EAI is presently performing the Nine Mile Point Aquatic Ecology Study at the Site. The staff required by EAI to perform this study is used to perform the terrestrial sampling required for the site Radiological Environmental Monitoring Program (REMP). In-plant and remaining terrestrial sampling is performed jointly by the JAFNPP and NMPNS Staffs.

1. Sample Collection Methodology

A. Lake Water

The two indicator stations are the respective inlet canals at JAFNPP and NMPNS. These samples are composited using continuously running pumps which discharge into large collection tanks. These tanks are emptied weekly and an aliquot is saved for the monthly composite.

The control station sample is collected from the City of Oswego water intake. Grab samples are drawn from the intake prior to treatment and are composited in a large sample bottle.

Quarterly composite samples are made up from aliquots of monthly samples.

B. Air Particulate/Iodine

The air sampling stations are located in two rings surrounding the site. The on-site locations ring the area around the plant inside the site boundary. The on-site sampling network is composed of nine stations.

The off-site air monitoring locations range 6 to 17 miles from the site and are composed of six stations. Air monitoring locations are shown on Figures 1 and 3.

The air particulate glass fiber filters are approximately two inches in diameter and are placed in sample holders in the intake line of a vacuum sampler. Directly down stream

II. DESCRIPTION (continued)

1. Sample Collection Methodology (continued)

B. Air Particulate/Iodine (continued)

from the particulate filters is a 2 x 1 charcoal cartridge used to absorb airborne radioiodine. The samplers run continuously and the charcoal cartridges and particulate filters are changed on a weekly basis.

The particulate filters are composited on a monthly basis by location (two off-sites, two on-site) after being counted for gross beta activity.

C. Milk

Milk samples are collected in polyethylene bottles from the bulk storage tank at each sampled farm. Before the sample is drawn, the tank contents are agitated from 3 to 5 minutes to assure a homogenous mixture of milk and butterfat. Three gallons are collected during the first week of each month from each of the locations. The samples are frozen and shipped to the analytical contractor within 36 hours of collection in insulated shipping containers. The milk sampling locations are found on Figure 5. (See Table 19 for identification of locations sampled)

D. Meat, Poultry and Eggs

Semi-annually one kilogram of meat is collected from locations within a 10 mile radius of the site. Weekly phone calls are made to the local butcher to determine availability of slaughtered live stock from within the sampling area. Whenever possible, meat samples are collected from locations previously used. (See Figure 4.)

Semi-annually one kilogram of poultry and one kilogram of eggs are collected from each of three locations within a ten mile radius of the site. Attempts are made to collect poultry and eggs at the same time as the meat samples. The poultry and eggs are frozen and shipped in insulated containers. Whenever possible, samples are obtained from previously sampled farms. (See Figure 4.)

E. Human Food Crops

Human food crops are collected during the late summer harvest season at locations previously sampled, if available. One kilogram each, of two types of fruits and/or vegetables from each of the three locations within a ten mile radius of the site are collected. The types of fruits and vegetables sampled depends upon what is locally available at the time of collection. Attempts are made to collect at least one broadleaf type vegetable from each location. The fruits and vegetables are chilled prior to shipping and shipped fresh in insulated containers. (See Figure 4.)

II. DESCRIPTION (continued)

1. Sample Collection Methodology (continued)

F. Soil Samples

Soil samples were not collected in 1981.

Soil samples are required to be collected every three years and analyzed for Sr-90 and GSA. Samples were collected in 1980.

G. Fish Samples

Available fish species are removed from the Nine Mile Point Aquatic Ecology Study monitoring collections during the spring and fall collection periods. Samples are collected from two of four possible on-site sample transects and one off-site sample transect (See Figure 1). Available species are selected under the following guidelines:

1. 0.5 to 1 kilogram of edible portion only of a maximum of three species per location.

2. Samples composed of more than one kilogram of single species from the same location are divided into samples of 1 kilogram each prior to shipping. A maximum of three samples per species per location are used. Weight of samples are the edible portions only.

Selected fish samples are frozen immediately after collection and segregated by species and location. Samples are shipped frozen within two weeks in insulated containers.

H. Shoreline Sediments

One kilogram of shoreline sediment sample is collected at one on-site location and one off-site location. Sediment samples are collected from shoreline locations that are frequently washed by the surf. Samples are collected semi-annually, placed in plastic bags, sealed and shipped for analysis in insulated containers.

I. Cladophora

Cladophora samples are collected in the spring and summer season from two on-site locations and one off-site location. Cladophora is collected from natural substrates. The Cladophora is scraped from the substrates into sample containers, labeled, frozen and shipped in insulated containers for off-site analysis.

II. DESCRIPTION (continued)

1. Sample Collection Methodology (continued)

J. TLD (direct radiation)

Thermoluminescent dosimeters (TLD's) are used to measure direct radiation in the JAF/NMP-1 environment. TLD's are placed at locations using four types of selection criteria. TLD's are classified as either on-site, off-site, special interest areas, or control locations. On-site TLD's are located within the site property boundary and are arranged in a ring around the generating facilities (Figure 3). Off-site TLD's are located outside of the site property boundary and are arranged in a ring approximately 7-11 miles out from the site. Special interest TLD's are located at high population locations such as industrial sites, schools, etc. Control TLD's are located outside of the 10 mile radius of the site. These TLD's are positioned to the east, west, and south of the site up to 20 miles away.

Each TLD is made up of two $CaSO_4$ dosimeters sealed in a polyethylene package to insure dosimeter integrity against the weather. The TLD packages are further protected by placement in plexiglass "birdhouses" or by tape sealing to supporting surfaces. The dosimeters are collected, replaced and evaluated on a quarterly basis.

K. Special Samples

Special Environmental Radiological Samples were also analyzed. Several additional sample media were collected during the 1981 sample period to help in evaluating and interpreting the milk data which was compiled in 1981.

The following additional sample media were collected during 1981:

1. Pasture Soil - Soil samples were collected three times during 1981 from each of the milk sample locations. Each sample was analyzed for gamma emitters using gamma spectral analysis.

2. Pasture Grass - Pasture grass was collected four times in 1981, during the pasture season, in conjunction with the pasture soil collections. Each sample was analyzed for gamma emitters using gamma spectral analysis.

3. Fodder Crops - Samples of fodder crops including hay, corn silage and grain were collected during 1981. Fodder crop samples were collected at each of the milk sample locations. The specific type of sample collected was dependent upon which types of feed were used by each farm.

II. DESCRIPTION (continued)

1. Sample Collection Methodology (continued)

K. Special Samples (continued)

3. Fodder Crop (continued)

Collections were made so-that a sample was obtained from each harvest series for hay and corn silage or from each new shipment of grain received by the farm. The collection program was designed to sample the supplementary diet of dairy herds at the milk sample locations. Each sample was analyzed for gamma emitters using gamma spectral analysis.

4. Surface Water - Water samples were collected from the milk herd water sources at each of the farms used as milk sample locations. Four such collections were made during 1981. Each sample was analyzed for gamma emitters using gamma spectral analysis. In addition to the farm samples, surface water samples were collected from the general drainage pattern of the land area in a southeast direction from the site. Two such surface water collections were made during 1981. Each sample was analyzed for gamma emitters using gamma spectral analysis.

2. Analysis Performed

The environmental radiological surveillance sample analyses are performed by Radiation Management Corporation (RMC) and the Site Enviornmental Laboratory. The following samples were analyzed at the site:

- Air particulate filter (gross beta)
- Air particulate filter (gamma spectral analysis)
- Airborne radioiodine (gamma spectral analysis)
- Lake water (gamma spectral analysis)

The remainder of the samples analyses, as outlined in Tables 1 and 2 in this section, are performed by Radiation Management Corporation.

3. Changes to the 1981 Sample Program

A. The F on-site environmental monitoring station was moved approximately 500 feet to the west of the original location. The new location is at the west corner of the entrance road to the

II. DESCRIPTION (continued)

3. Changes to the 1981 Sample Program (continued)

A. Continued
Energy Information Center and Lake Road (Figure 3). The F on-site enviornmental monitor was required to be moved because the monitor location created a hazardous condition. The power line to the monitor was not of an adequate height where the line crossed County Route 1A. In addition, the monitor was located on a 115 KV transmission pole, which required the relocation of the monitor because of electrical transmission safety reasons. The relocation was implemented on September 21, 1981, with a monitor down time of approximately two hours.

B. The G on-site environmental monitoring station was moved approximately 900 feet directly west of its original location. The new location is near the base of the site meteorological tower (Figure 3). The G on-site monitor relocation was required to allow for safe and easy access to the monitor during the winter months. Due to the original off road location of the G on-site monitoring station winter maintenance for the monitor was often difficult and at times impossible. The relocation was implemented on November 19, 1981 with a monitor down time of approximately 5 hours.

C. On January 1, 1981, thirteen additional TLD locations were added to the program. The new TLD locations were added to establish a more comprehensive program with TLD's placed in approximate 22.5 degree sectors both on-site and off-site where applicable and at special interest areas. Special interest areas included industrial facilities employing large numbers of personnel, public schools, towns, etc. These new TLD locations are described on Table 14 and are designated as locations 50-61 and 65. TLD locations are illustrated on Figures 1 and 3.

D. Milk sample location number 7 was added to the milk sampling program in October of 1981. The new milk sampling location is located in an ESE direction (110 degrees) at a distance of approximately 5.2 miles from the site. The addition of sample location number 7 brings the total number of milk sample locations to six for the 1981 sample program.

E. Early in 1981 the owner of the farm designated as location number 13 in the 1980 Annual Environmental Operating Report sold his dairy herd and is no longer producing milk on a commercial basis. Prior to selling the herd, this farm was the control sample location for the 1980 milk sample program.

As a result of the loss of location number 13 as the control milk sample location, a replacement farm was added. The new control sample location is approximately 15 miles SW (225 degrees) of the site and is identified as location number 40 on this report.

II. DESCRIPTION (continued)

3. Changes to the 1981 Sample Program (continued)

F. Milk sample location 25 was deleted from the milk sample survey effective August 15, 1981. Early in 1980, the owner of location 25 sold his milk herd and was no longer producing milk on a commercial basis. The owner did retain a single cow, however, for his personal use. Milk samples were obtained from this single cow throughout 1980. Attempts were made to sample this location in May and June of 1981, but milk was not available since the single cow at this location was dry. Samples were acquired on July 7 and August 3 only. Samples were not available during the second half of the two months. Shortly after the August 3 collection, a milk cow was no longer available at this farm and the location was deleted.

4. Exceptions to the 1981 Sample Program

A. Meat samples were collected at only two of the three required sampling locations during the spring sampling period. Weekly calls to the local slaughterhouses beginning on April 29, 1981 and continuing until June 5, 1981, resulted in two on-site samples and one control (off-site) sample. A fourth sample was collected during the spring sampling period (in lieu of the unobtainable third on-site sample) which was located outside the 10 mile radius requirement for on-site sampling. A third on-site sample was collected on July 9, 1981, which was outside the spring sampling period.

The difficulty in obtaining the required number of samples may be attributed to several factors. First, the number of animals raised for meat and located within the 10 mile radius of the plant is not extensive. Secondly, butchering of animals is not always performed at the local meat market. Third, and most significant, is the fact that the vast majority of meat is butchered in the fall so animals can graze on pasture for the summer to economically increase the meat yield.

The collection of spring meat samples has historically been a difficult sample medium to obtain due to seasonal unavailability.

B. Environmental radiation monitoring station I on-site was inoperable January 12, 1981 (1100 hours) to January 15, 1981 (1000 hours). Malfunction of monitor was due to technician error.

C. Environmental radiation monitoring stations H and I on-sites were inoperable from March 9, 1981 (1245 hours) to March 12, 1980 (1200 hours) due to loss of electrical supply power. The circuit breaker in the supply line trasformer was defective.

D. Environmental radiation monitor G on-site was inoperable from July 4, 1981 (0800 hours) to July 6, 1981 (1500 hours) because of an electronic failure.

II. DESCRIPTION (continued)

4. Exceptions to the 1981 Sample Program (continued)

E. Environmental monitoring station I on-site was inoperable from August 3, 1981 (1430 hours) to August 6, 1981 (1530 hours) due to electrical problems. The cause of the electrical problems was suspected to be the result of a lightning strike.

F. Environmental radiation monitor D_2 on-site was inoperable from August 8, 1981 (1730 hours) to August 14, 1981 (1300 hours) due to monitor failure.

G. Environmental radiation monitor G on-site was inoperable from September 10, 1981 (1000 hours) to September 17, 1981 (1415 hours) due to monitor failure.

III. EVALUATION OF ENVIRONMENTAL DATA

The results of the 1981 Radiological Environmental Monitoring Program (REMP) must be put into perspective considering the natural processes of the environment and the past radiological data. Several factors must be realized in order to effectively evaluate and interpret the data.

There are three separate groups of radionuclides that were detected in the environment during 1981. A few of these radionuclides could possibly fall into two of the three groups. The first of these groups is naturally occurring radionuclides. It must be realized that the environment contains a broad inventory of naturally occurring radioactive materials and radiation sources. Background radiation as a function of primordial radioactive elements and cosmic radiation of solar origin offers a constant exposure to the environment and man. These radionuclides, such as Th-232, Ra-226, Be-7 and especially K-40 account for a majority of the annual per capita background dose.

A second group of radionuclides that were detected are a result of the detonation of thermonuclear devices in the earth's upper atmosphere. The detonation frequency during the early 1950's produced a significant inventory of radionuclides found in the lower atmosphere as well as ecological systems. A ban was placed on weapons testing in 1963 which greatly reduced the inventory through the decay of short lived radionuclides, deposition, and the removal (by natural processes) of radionuclides from the food chain such as by the process of sedimentation. Since 1963, several atmospheric weapons tests have been conducted by the People's Republic of China. In each case, the usual radionuclides associated with nuclear detonations were detected several months afterwards and then after a peak detection period, diminished to a point where most could not be detected. The last such weapons test was conducted in October of 1980. The resulting fallout or deposition from this test has influenced the background radiation in the vicinity of the site and is very evident in many of the sample medias analyzed during 1981. Calculations of the resulting doses to man from fallout related radionuclides in the environment show that the contribution from such nuclides in some cases (such as Sr-90 or Cs-137) is significant and second in intensity only to natural background radiation. Quantities of Nb-95, Zr-95, Ce-141, Ce-144, Ru-106, Ru-103, La-140, Cs-137, Mn-54 and Co-60 were detected at concentrations that indicated a weapons test origin.

The third group of radionuclides detected in the environment during 1981 were those that could be related to operations at the site. These select radionuclides were detected in a few of the sample medias collected and at very low concentrations. Many of these radionuclides are a by-product of both nuclear detonations and the operation of light water reactors thus, making a distinction between the two sources difficult if not impossible under the circumstances. Radionuclides falling into this category (as applicable to the Nine Mile Point Environmental Program) include Cs-137, Mn-54 and Co-60. The dose to man as a result of these radionuclides is small and much less than the radiation exposure from naturally occurring sources of radiation and from fallout.

III. EVALUATION OF ENVIRONMENTAL DATA (continued)

Thus, a number of factors must be considered in the course of radiological data evaluation and interpretation. The evaluation and interpretation is made at several levels including trend analysis, dose to man, effectiveness of plant effluent controls, etc. An attempt has been made not only to report the data collected during 1981, but also to assess the significance of the radionuclides detected in the environment as compared to natural radiation sources. It is important to note that detected concentrations of radionuclides that are possibly related to operations at the site are very small and are not an indication of environmental significance.

The 1970 per capita dose rate (Eisenbud) was determined to be 209 mrem per year. This average dose includes such exposure sources as natural, occupational, weapons testing, consumer products, medical, etc. The 1970 per capita dose rate due to natural sources was 130 mrem per year. Of this dose, approximately 20 mrem per year is received by the gonads and other soft tissues and an additional 15 mrem per year is received by the bone tissue for a 70 Kg (155 lb) man. These doses (ie. 20 mrem and 15 mrem) are the result of just K-40 alone, a naturally occurring relatively high energy beta emitter (1.3 Mev). The 1970 per capita dose rate due to the nuclear fuel cycle is 0.0028 mrem per year.

A. Aquatic Program

Tables 3 through 8 demonstrate the analytical results for the aquatic media sampled during the 1981 sampling program. Aquatic samples were collected at four possible indicator locations. The locations (on-site transect designations) used for on-site sampling are NMPW (01), NMPP (02), JAF (03), and NMPE (04) (See Figure 1). Due to the unavailability of various sample media, on-site samples were collected from combinations of the above listed locations. NMPW and NMPP were combined into location NMPP. NMPE and JAF were combined into location JAF. Off-site samples were collected at the Oswego Harbor area or further west and therefore served as control locations.

1. Cladophora - Table 3

The species glomerata is the dominant species of Cladophora in collections in the NMP vicinity. Cladophora is a long filamentous algae attached by a holdfast to rocks and other submerged substrates. Colonization and propagation of Cladophora extends out to a depth of 20 feet. The long, growing strands of Cladophora in water 5 feet deep or less are constantly being broken off by wave activity. Maximum growth usually occurs in water about 10-15 feet deep, but this will vary, depending upon turbidity. Growth of Cladophora begins in late May, reaches a peak in late June or early July, and declines during the warmer summer period of late July and early August. As temperatures drop, a secondary peak may occur in late August. Growth ceases in September due to decreasing light and temperature.

III. EVALUATION OF ENVIRONMENTAL DATA (continued)

A. Aquatic Program (continued)

1. Cladophora (continued)

Two collections were made for Cladophora samples in 1981. This first collection was made in July. The availability of this sample media is somewhat limited in July due to colder lake water temperatures. Collections were made at an off-site (00) or control location and at two indicator locations; NMPP (02) and JAF (03). Gamma spectral analysis yielded several detectable radionuclides at the control location (Oswego Harbor area) and indicator locations for the spring collection.

Ce-144 was detected at the NMPP and the JAF locations at concentrations of 0.8 pCi/g wet and 2.3 pCi/g-wet respectively. Ce-144 was not detected at the control location (<0.38 pCi/g wet). Ce-144 is not related to normal site operation but is a result of the October 1980 Chinese weapons test. In addition to Ce-144, other weapons testing radionuclides were detected such as Zr-95, Nb-95, Ce-141, Ru-103, and Ru-106. These radionuclides, as noted for Ce-144, are a result of weapons testing and are not related to plant operations. These radionuclides were detected shortly after the October 1980 detonation and most were still being detected, in lower concentrations, at the close of 1981 in air particulate samples (off-site and on-site locations). Zr-95 was detected at all three locations (JAF, NMP, and control) at concentrations of 4.2 pCi/g-wet, 1.2 pCi/g-wet, and 0.62 pCi/g-wet respectively. Nb-95 was detected at all three sample locations (NMP, JAF and control) at concentrations of 2.3 pCi/g-wet, 7.8 pCi/g-wet, and 1.0 pCi/g-wet. Ce-141 was only detected at the JAF location (0.2 pCi/g-wet). Ru-103 was detected at 0.14 pCi/g-wet and 0.09 pCi/g-wet at the JAF and control location respectively. Ru-106 was detected at the JAF location only (0.7 pCi/g-wet).

Three naturally occurring radionuclides, K-40, Be-7 and Ra-226 were detected at varying concentrations. K-40 was detected at both indicator (NMP and JAF) and the control location (13.0 pCi/g-wet, 21.0 pCi/g-wet, and 14.0 pCi/g-wet respectively). Be-7 was detected at the NMPP and JAF location only at 0.7 pci/g-wet and 1.70 pCi/g-wet. Be-7 was not detected at the control location (<0.6 pCi/g-wet). Ra-226 was detected only at the control location at a concentration of 0.19 pCi/g-wet.

Three activation and fission product radionuclides were detected at varying concentrations. Mn-54 was detected at the NMPP and the JAF locations (0.06 pCi/g-wet and 0.12 pCi/g-wet respectively). Mn-54 was not detected at the control location (<0.06 pCi/g-wet). Co-60 was detected at the NMPP and JAF locations also (0.48 pCi/g-wet and 0.44 pCi/g-wet respectively). Co-60 was not detected at the control location (<0.06 pCi/g-wet). Cs-137 was detected at all locations including the control location. The NMPP and JAF locations showed Cs-137 concentrations of 0.1 pCi/g-wet and 0.20 pCi/g-wet respectively. The control location showed a Cs-137 concentration of 0.08 pCi/g-wet or approximately the same as the NMPP location but less than the JAF location. A

III. EVALUATION OF ENVIRONMENTAL DATA (continued)

A. Aquatic Program (continued)

1. Cladophora (continued)

majority of Mn-54 and Co-60 detected at the NMPP and JAF locations is an indication of operations at the site since no positive concentrations were made at the control location. Cs-137 detection at the NMPP and JAF locations is most probably due to weapons testing and to a more limited extent, operations at the site. Cs-137 concentrations at the control location and NMPP location were approximately the same (NMPP location slightly higher). The JAF location showed a concentration slightly less than three times the control concentration. A similar pattern was noted for the concentrations of the other radionuclides associated with weapons testing (ie, Ce-144, Zr-95, Nb-95, Ce-141, Ru-103, and Ru-106), and also for naturally occurring radionuclides such as Be-7 and K-40. This pattern appears to be a result of the general location of the control and indicator sampling locations. It appears that the control location is situated such that Cladophora growing here is not influenced by water from the Oswego River. Naturally occurring and weapons testing radionuclides would be in a higher concentration in the river system as a result of the extensive drainage basin. The outlet for the Oswego River extends well beyond the shoreline because of the breakwater system. As the river "plume" enters the lake it is moved in a easterly direction because of the west to east longshore current. Mixing of the river plume and the lake longshore current is minimal until they reach the Nine Mile Point promontory. This observation has been noted during air flights over the general area. The control location is just east of the Oswego River breakwater (on the shoreline) and is not influenced by the river current. Since a large portion of nutrients used by Cladophora is extracted from the surrounding water, a lower concentration of naturally occurring and weapons testing radionuclides would be noted in the control samples while higher concentration would be expected in the samples collected at the Nine Mile Point promontory where mixing of the river plume and longshore currents effect the shoreline. A portion of the Cs-137 detected is a result of weapons testing. Therefore, assuming the cesium detections following the general increasing pattern noted for the other weapons testing and naturally occurring radionuclides, the higher value noted at the JAF location may very well be biased. It is, therefore, reasonable to conclude that a significant portion of the increase noted at the JAF location for Cs-137 is a result of the location of the sample stations and the action of the longshore current.

A second collection for Cladophora was obtained in the month of August. Collections were made at the same locations as the July collection (ie, the NMPP, JAF, and control locations). In particular, the control sample was obtained at the same location as the July control sample was obtained.

III. EVALUATION OF ENVIRONMENTAL DATA (continued)

A. Aquatic Program (continued)

1. Cladophora (continued)

As noted in the July samples, several radionuclides were detected in the August samples that are a result of the October 1980 nuclear weapons test by the People's Republic of China. Notable exceptions were Ce-141, Ru-103 and Ru-106. Ce-144 was detected at the JAF location (0.8 pCi/g-wet) but not at the NMPP (<1.0 pCi/g-wet) or the control location (<0.40 pCi/g-wet). Zr-95 was detected at all three sample locations. Zr-95 was detected at the JAF location at a concentration of 2.2 pCi/g-wet, at the NMPP location at a concentration of 3.1 pCi/g-wet, and at the control location at 0.3 pCi/g-wet. Nb-95 was detected at the JAF and NMPP locations at similar concentrations (5.8 pCi/g-wet and 5.5 pCi/g-wet respectively). Nb-95 was detected at the control location at 0.55 pCi/g-wet. Several naturally occurring radionuclides were detected and included K-40 and Be-7. K-40 was detected at both the JAF and NMPP locations at 28.0 pCi/g-wet and 23.0 pCi/g-wet respectively. K-40 was detected at the control location at 19.0 pCi/g-wet. Be-7 was also detected at all three sample locations. Detected concentrations at the JAF and NMPP locations were 3.1 pCi/g-wet and 2.9 pCi/g-wet respectively. Be-7 at the control location was measured at a concentration of 0.9 pCi/g-wet. Both K-40 and Be-7 are naturally occurring radionuclides that are found in many environmental samples.

In addition to naturally occurring and weapons testing radionuclides, several radionuclides were detected that are partially or totally traceable to operations at the site. These included Cs-134, Co-58, Mn-54, Co-60, and Cs-137. Cs-134 was detected at the JAF location (0.10 pCi/g-wet) but not at the NMPP (<0.1 pCi/g-wet) or the control location (<0.07 pCi/g-wet). Co-58 was detected at the JAF location (0.15 pCi/g-wet) but not at the NMPP (<0.1 pCi/g-wet) or the control location (<0.07 pCi/g-wet). Mn-54 was detected at the JAF location (0.23 pCi/g-wet) but not at the NMPP (<0.1 pCi/g-wet) or the control location (<0.06 pCi/g-wet). Co-60 was detected at the JAF location (1.1 pCi/g-wet) and the NMPP location (0.20 pCi/g-wet), but not at the control location (<0.1 pCi/g-wet). Finally, Cs-137 was detected at the JAF location (0.85 pCi/g-wet), the NMPP location (0.28 pCi/g-wet) and at the control location (0.13 pCi/g-wet).

The presence of Ce-144, Zr-95, Nb-95, Ce-141, and to an extent, Cs-137 is due to weapons testing as noted in the discussion section for the July sample collection. Ru-103 and Ru-106, also weapons test products, were not detected in the August collection. A similar pattern was noted in the air particulate data for both on-site and off-site locations. This pattern is discussed in more detail in the monthly air particulate data discussion. A concentration trend of increasing levels from the control location to the NMPP and JAF locations was noted for the August samples as for the July samples. This pattern is a result of the location of the control sample and the Oswego River plume as discussed previously.

III. EVALUATION OF ENVIRONMENTAL DATA (continued)

A. Aquatic Program (continued)

1. Cladophora (continued)

The activation and fission product radionuclides detected in the August samples included Cs-134, Cs-137, Co-58, Co-60, and Mn-54. The presence of Cs-134 is a result of operations at the site since it was not detected at the control location and the production of Cs-134 during weapons testing is minimal. Co-58, Co-60, and Mn-54 are also for the most part due to operations at the site. A small portion is undoubtedly due to weapons testing but this portion is probably unmeasurable using the existing procedures and counting time used for the analysis of Cladophora samples. Cs-137 was detected at both indicator and control locations as noted above, As was noted in the July collection for Cs-137, the concentrations were lowest at the control location, higher at the NMPP location and highest at the JAF location. The increased concentrations noted at the NMPP and JAF locations are not due entirely to operations at the site but are due in part to the control location and the Oswego River plume as noted previously.

The significance of the detected radionuclides is very limited considering the bioaccumulation factor, and any possible dose to man. The bioaccumulation factor for aquatic plants in fresh water is 1,300 - 600,000 for manganese, 300 - 30,000 for cobalt, 80 - 4,000 for cesium, and 200 - 35,000 for cerium, zirconium, niobium, and ruthenium. Cladophora, therefore, has a great tendency to accumulate these elements thereby exaggerating the relationship that these elements have to higher tropic levels and man. A dose to man assessment is difficult to make since Cladophora is not a human food source. For the purpose of illustration and comparison of hypothetical doses attributed to the intake of fission and activation product radionuclides, the following doses can be projected.

Radionuclide	Whole Body Dose (mrem)	GI Tract Dose (mrem)
Ce-144	0.0044	6.8068
Zr-95	0.0019	2.2131
Nb-95	0.0011	2.8642
Ce-141	0.0001	0.1092
Ru-103	0.0010	0.0688
Ru-106	0.0273	3.4070
Cs-134	2.0007	0.0511
Co-58	0.0215	0.0410
Mn-54	0.0133	0.0420
Co-60	0.3123	0.5866
Cs-137	0.6246	0.0265

III. EVALUATION OF ENVIRONMENTAL DATA (continued)

A. Aquatic Program (continued)

1. Cladophora (continued)

The projected annual doses are based on a maximum consumption rate of 26 kg per year of Cladophora (an amount equal to the maximum annual consumption of green leafy vegetables). Doses were based on the highest annual mean per location, where applicable and for a child (most practical sensitive age group). The hypothetic dose due to weapons testing radionuclides is far greater than radionuclides due partially to operations at the site especially when considering the critical organ dose. As noted above, the doses are hypothetical because man does not consume Cladophora.

Radionuclides that are a result of weapons testing (ie, cerium, ruthenium, zironium, and niobium) were not detected in 1980 Cladophora samples (June and August collections). This is understandable because the last major weapons test was in 1976. 1979 Cladophora data showed positive concentrations of Ce-144 in the June samples only. Positive concentrations were noted at both indicator locations. Review of the 1978 data for general periphyton samples (Cladophora is a genus of periphyton) showed concentrations of Zr-95, Nb-95, Ru-106, and Ce-144. These concentrations were noted at indicator as well as control locations and are undoubtedly due to the 1976 weapons test. Cs-134 was not detected in 1980 but was detected in 1979 and 1978. Concentrations for these years (1979 and 1978) were lower than concentrations detected in 1981. Mn-54 was detected in 1980, 1979, and 1978, but at generally lower concentrations. Co-58 was detected in 1981 and was not detected in 1980, 1979 or 1978. Co-60 was detected for all years reviewed (1978-1981). Co-60 concentrations for 1981 were higher than the proceeding three years. Cs-137 was detected in 1978-1981 at varying concentrations. Concentrations detected in 1981 were higher than concentrations for 1978-1980.

2. Dam Shoreline Sediment - Table 4

Shoreline sediment samples were collected twice during 1981. Collections were made in July and October at one off-site or control location and at one indicator location (NMPP-02). The type of sediment preferred is fine grain sediment, however, because of lake shoreline dynamics, fine sediment is not always available which necessitates the use of sandy sediments. Comparable sediment types were acquired at both locations.

Several radionuclides were detected in sediment samples using gamma spectral analysis. These ranged from naturally occurring primordial radionuclides to man-made radionuclides. K-40 was detected at both the control location (11.0 pCi/g-dry) and the indicator location (13.0 pCi/g-dry) for the July collection. For the October collection period, K-40 was detected at the control location at a concentration of 8.1 pCi/g-dry. K-40 was

III. EVALUATION OF ENVIRONMENTAL DATA (continued)

A. Aquatic Program (continued)

2. Dam Shoreline Sediment (continued)

also detected at the NMPP location at a concentration of 17.0 pCi/g-dry. Ra-226 was detected during the July collection at a concentration of 0.20 pCi/g-dry for the control location and 0.33 pCi/g-dry at the NMPP location. For the October collection period, Ra-226 was detected at a concentration of 0.19 pCi/g-dry at the control location and 0.50 pCi/g-dry at the NMPP location. Th-232 was detected during the July collection period at a concentration of 0.20 pCi/g-dry at the control location and 0.40 pCi/g-dry at the NMPP location. For the October collection, Th-232 was detected at a concentration of 0.20 pCi/g-dry and 0.50 pCi/g-dry at the NMPP location. Two man-made radionuclides, Cs-137 and Sr-90, were detected in one sample collected during 1981 at the NMPP location. Samples collected in July showed a Cs-137 concentration of 0.11 pCi/g-dry at the NMPP location and a LLD result at the control location of <0.05 pCi/g-dry. Cs-137 was not detected in the October samples at either the control or NMPP locations. Sr-90 was also detected at the NMP location during the October collection period. The concentration detected was 0.006 pCi/g-dry. Sr-90 was not detected in any other samples (control or NMP locations) for July or October but showed LLD values that ranged from 0.003 - 0.008 pCi/g-dry.

K-40, Ra-226 and Th-232 are naturally occurring radionuclides of primordial origin. Detected concentrations were noted in all samples and were highly variable. The variability of the concentrations is due to the difference in the natural distribution of these three radionuclides, the variability of influences on each separate location (ie, longshore currents, mouths of river systems, etc) and the shoreline dynamics. The detection of Cs-137 and Sr-90, although man made in origin, is also influenced by these factors. Cs-137 was found at the NMPP location during July at a very low concentration, slightly above background detectable levels. Sr-90 was detected once during the October collection at the NMPP location. The concentration detected was just slightly above detectable levels. The presence of Cs-137 and Sr-90 in these instances is not believed to be a result of operations at the site since both Cs-137 and Sr-90 had been detected intermittently in the past at both the control and NMPP locations. During 1980, Cs-137 was detected at both the control and NMPP locations with the NMPP location slightly higher than the control concentration. Sr-90 during the same time period (1980) was detected at the control location and NMPP location with the control location concentration approximately twice the NMPP concentration. During 1979, shoreline sediment samples showed Cs-137 concentrations at both the control and the NMPP location. The control location had the higher concentration. Sr-90 during 1979 was detected at the control location only at a concentration of four times the lowest level of detection for the NMPP location. Based on the intermittent observed concentrations for Cs-137 and Sr-90

III. EVALUATION OF ENVIRONMENTAL DATA (continued)

A. Aquatic Program (continued)

2. Dam Shoreline Sediment (continued)

in the past sampling years and for 1981, it can be concluded that the detected quantities are a result of previous weapons testing.

The detected concentrations of Cs-137 and Sr-90 for 1981 were significantly less than concentrations detected for 1980 and 1979. A general decreasing trend has been observed for weapons testing radionuclides for sample medias since the early 1970's. The detected concentrations for K-40, Ra-226, and Th-232 for 1981 are approximately the same as concentrations noted during 1980 and 1979, as one would expect.

The impact of shoreline sediment with respect to a dose to man can be illustrated by a whole body dose. A projected dose as a result of Cs-137 concentrations in sediment would have to be compared to a beach area that is routinely used by bathers. Assuming sediment to have a mass of 40 kg/m^2-dry and an average residence time on the shoreline of 47 hours per year for a bather, the annual dose from surface contamination (2.5 cm depth) at the NMPP site from a Cs-137 concentration of 0.11 pCi/g-dry would be 0.0009 mrem/year. This dose is illustrative only and is not an accurate dose in this particular situation because the NMPP location is not a beach area frequented by bathers. The above hypothetical projected dose is incredibly small when compared to the average annual natural background dose of 130 mrem per year to man (Eisenbud). A similar illustrative dose can not be made for Sr-90 since Sr-90 is a beta emitter.

3. Fish - Table 5A, 5B

A total of 22 fish samples were collected from Lake Ontario in 1981. Samples were collected in the spring season (May 1981) and the fall season (November 1981). Collections were made utilizing gill nets at one off-site location greater than five miles from the site (Oswego Harbor area) and at two on-site locations (in the vicinity of the Nine Mile Point Unit #1 (02) and the James A. FitzPatrick (03) generating facilities). The Oswego Harbor samples served as control samples while the NMP (02) and JAF (03) samples served as indicator samples. Samples were analyzed for gamma emitters, Sr-89 and Sr-90. Data is presented in the analytical results section of the report.

Analysis of the 1981 samples indicated detectable concentrations of radionuclides related in part or totally to plant operations. Small detectable concentrations of Cs-137, Co-58, Co-60 and Mn-54 were found in two separate fish species. Sr-89 and Sr-90 were detected in two separate fish species as well.

III. EVALUATION OF ENVIRONMENTAL DATA (continued)

A. Aquatic Program (continued)

3. Fish (continued)

Spring fish collections were comprised of two separate species and nine individual samples. The two species represented two different feeding types. White sucker is considered a bottom feeder ingesting both plant and animal matter. Lake trout are highly predacious and feed on significant quantities of smaller fish such as smelt, alewife and other smaller predacious species.

Cs-137 was detected in all on-site and off-site samples for both species. On-site samples showed Cs-137 concentrations to be slightly greater than control levels for some samples and slightly less than control levels for other samples. The concentrations detected are not statistically different from the control result and are therefore considered background.

Co-58 was detected in two on-site samples for white sucker and one lake trout sample. White sucker samples showed detectable concentrations of Co-58 at the NMP and FitzPatrick sample locations. On-site results for this species ranged from 0.045 to 0.047 pCi/g-wet. The lake trout sample showing a detectable Co-58 concentration was collected at the NMP location. Collections at the FitzPatrick location showed no detectable Co-58. The detected concentration was 0.04 pCi/g-wet. Samples were recounted that showed detectable concentrations of Co-58. Recount sample results were in close agreement with initial sample results.

Co-60 was detected in three of the on-site samples and not in the control samples. White sucker samples showed Co-60 detected in two of the three samples, ranging from 0.11 to 0.12 pCi/g-wet. Detectable concentrations occurred at the NMP and FitzPatrick sites. Lake trout samples showed Co-60 in only one of the six samples. Co-60 was detected at the NMP site at a concentration of 0.06 pCi/g-wet. Samples that showed detectable Co-60 concentrations were recounted. Recount sample results were in close agreement with the initial sample results.

Mn-54 was detected in only two of the nine samples collected. Detectable concentrations were noted for white sucker only at the NMP and FitzPatrick locations. The results ranged from 0.014 pCi/g-wet to 0.018 pCi/g-wet. Samples showing positive Mn-54 concentrations were recounted. Recount sample results were in close agreement with the initial sample results. The detected concentrations of Mn-54 were only slightly above the lower limits of detection.

Sr-89 was detected in five of the nine samples collected. Two of these results were noted in the three control samples. The remaining three samples that showed positive results were collected at the NMP and FitzPatrick locations and noted in the white sucker and lake trout samples. Of the positive results, only one sample showed a concentration greater than control results.

III. EVALUATION OF ENVIRONMENTAL DATA (continued)

A. Aquatic Program (continued)

3. Fish (continued)

This detected concentration (0.025 pCi/g-wet) was only slightly above the control result. All positive results are considered to be representative of normal background Sr-89 concentrations in fish. Background levels are a result of past weapons testing in this case.

Sr-90 was not detected in any of the nine samples collected at either the on-site or off-site locations.

K-40 was detected in all of the spring samples collected. K-40 is a naturally occurring radionuclide and is not related to power plant operation. Detectable concentrations of K-40 ranged from 2.9 to 3.4 pCi/g-wet.

In addition to the May sample collections, samples were collected on July 16 to further investigate the results of the spring collection. White sucker samples were taken at the NMP and FitzPatrick sites as well as at a location less than one mile to the west of NMP and less than one mile to the east of the FitzPatrick location. The species white sucker was collected since these fish are relatively sedentary and are bottom feeders. Results showed positive concentrations of Cs-137 and Cs-134. Co-58, Co-60 and Mn-54 were not detected in the July samples as in the May sample collections. Samples collected at the NMP and Fitz-Patrick locations showed concentrations of Cs-137 ranging from 0.056 and 0.087 pCi/kg-wet. A control sample was not selected for these samples but by comparing these levels to the control sample for white sucker from the May samples, it can be seen that the detectable Cs-137 concentrations are just slightly above back-ground. The other samples (ie, the samples located less than one mile to the east and west of the power facilities) showed positive concentrations of Cs-137 and Cs-134. For these samples, Cs-137 was slightly above background while the Cs-134 concentrations were just at the threshold of detectability. Cs-134 is related to power plant operation and is not associated with weapons testing fallout. A significant portion of the detectable Cs-137, however, is due to weapons testing fallout.

In addition to Cs-134 and Cs-137, K-40 was detected in all of the July samples. Detectable concentrations ranged from 2.9 pCi/g-wet to 3.3 pCi/g-wet.

Fall sample collections were comprised of two separate species and nine individual samples. Six samples of white sucker and three samples of lake trout were taken at a combination of two on-site locations (NMP and FitzPatrick) and one off-site location (Oswego Harbor area). Samples were collected by gill nets in October.

3. Fish (continued)

Cs-137 was detected in all nine samples including the three control samples. On-site samples for both white sucker and lake trout showed concentrations just slightly above background levels. Concentrations ranged from 0.044 pCi/g-wet to 0.10 pCi/g-wet for on-site samples. Of the six on-site samples, five were above the control values while one sample was less than the control result. A significant portion of the Cs-137 detected in the on-site samples is considered to be the result of past weapons testing fallout.

K-40 was detected in all samples and ranged from 2.4 pCi/g-wet to 4.0 pCi/g-wet for both on-site and off-site samples.

No other gamma emitting radionuclides were detected in any of the fall samples.

Sr-89 concentrations for the fall samples were all less than minimum detectable level. Sr-89 was not detected in any of the on-site or off-site samples. Sr-90 was detected in only two of the nine samples collected. A detectable concentration was noted at the NMP site and one at the FitzPatrick site. Both of the positive results were below the control sample limit of detection and are not significant. Concentrations were 0.004 pCi/g-wet (NMP) and 0.002 pCi/g-wet (FitzPatrick) respectively.

Review of past data indicates that 1981 mean detectable concentrations of Sr-89 are slightly higher than the mean concentration from 1978-1980 but below the mean values for years prior to 1978. Sr-89 for the second half of 1981 was not detectable and is therefore the same as LLD results for 1979-1980. Sr-90 mean data results indicate that concentrations in 1981 are lower than the mean concentrations for 1969-1980. A general decline in detectable Sr-89 and Sr-90 results is most probably due to the result of the incorporation of these radionuclides with organic and inorganic substances through ecological cycling.

Cs-137 concentrations have remained fairly consistent with the mean results for 1980 and have decreased significantly when compared to years prior to 1980. As noted above for Sr-89 and Sr-90, the general decreasing trend is most probably due to ecological cycling. A significant portion of Cs-137 detected in fish is due to weapons testing fallout and the general downward trend will continue until an equilibrium is reached.

Lake Ontario fish are considered an important food source by many people therefore placing fish in the human food chain. Based on the importance of fish in the local diet, a reasonable estimate of dose to man can be calculated. Assuming that the average adult consumes 6.9 kg of fish per year and the fish consumed contains an average Cs-137 concentration of 0.053 pCi/g-wet for lake trout

III. EVALUATION OF ENVIRONMENTAL DATA (continued)

A. Aquatic Program (continued)

3. Fish (continued)

caught during the spring and fall collection period, the dose to the whole body would be 0.026 mrem per year. This dose is based on the average concentration of off-site and on-site samples. The yearly dose based on the consumption of the on-site samples (0.051 pCi/g-wet) is 0.025 mrem per year. The yearly dose based on the consumption of on-site samples is less than the dose due to consumption of fish collected from on-site and off-site locations. The Cs-137 dose associated with the consumption of white sucker based on 6.9 kg consumed per year and 0.05 pCi/g-wet is 0.025 mrem. This dose is based on consumption of on-site samples and off-site samples for the spring and fall collection periods and the effect on the whole body. The dose due to the consumption of on-site samples only is 0.03 mrem per year based on an average Cs-137 concentration of 0.61 pCi/g-wet.

Assuming the same conditions of ingestion, the average dose to the whole body from Co-58, Co-60, and Mn-54 for a two-month detection period is:

Co-58 (0.036 pCi/g-wet) = 0.00001 mrem/year
Co-60 (0.073 pCi/g-wet) = 0.00007 mrem/year
Mn-54 - not detected

The above doses are based on consumption of lake trout. Using the concentrations detected in white sucker and the same above ingestion criteria, the average dose to the whole body from Co-58, Co-60 and Mn-54 by consuming white sucker is:

Co-58 (0.046 pCi/g-wet) = 0.00001 mrem/year
Co-60 (0.115 pCi/g-wet) = 0.0001 mrem/year
Mn-54 (0.016 pCi/g-wet) = 0.000003 mrem/year

Fish samples collected in July to supplement samples collected in May showed concentrations of Cs-137 and Cs-134. Using the above dose calculation criteria and an exposure period of three months for Cs-134 and twelve months for Cs-137 (unadjusted for background), doses are:

Cs-137 (0.078 pCi/g-wet) = 0.038 mrem/year
Cs-134 (0.006 pCi/g-wet) = 0.0003 mrem/year

In summary, the whole body dose observed due to the consumption of fish is minute and of little significance. The total dose for Cs-137 (excluding background), Cs-134, Co-58, Co-60 and Mn-54, was calculated to be 0.02 mrem if white sucker was consumed. This species of fish is very rarely consumed and the total dose is more illustrative than factual. The total whole body dose due to the consumption of lake trout is 0.0004 mrem per year. Note that doses were calculated based on durations of detections (ie, the number of months a radionuclide was detected).

III. EVALUATION OF ENVIRONMENTAL DATA (continued)

A. Aquatic Program (continued)

3. Fish (continued)

White Sucker:	Radionuclide	Duration of Detection	Dose (mrem/year)
	Cs-137	12 months	0.01921 -
	Cs-134	3 months	0.00198
	Co-58	2 months	0.00009
	Co-60	2 months	0.00062
	Mn-54	2 months	0.00002
	Sr-89	6 months	0.00012
	Sr-90	6 months	0.01431

Lake Trout:	Radionuclide	Duration of Detection	Dose (mrem/year)
	Cs-137	12 months	0 (< bkg)
	Cs-134	-----	0 (not detected)
	Co-58	2 months	0.00008
	Co-60	2 months	0.00033
	Mn-54	-----	0 (not detected)
	Sr-89	6 months	0.00002 (= bkg)
	Sr-90	6 months	0.02567

To illustrate the insignificance of the highest whole body dose received from the radionuclides detected, exclusive of K-40, a dose of 0.02 mrem (consumption of white sucker) is equal to an increase in dose due to cosmic radiation from travelling to a location 100 meters (328.1 feet) higher in altitude and remaining there for 3.6 days.

As noted above, the concentration of Cs-137 and Sr-90 are consistent with levels measured in 1978, 1979, and 1980. The analysis results for fish samples collected in 1981 show no long term buildup of plant related nuclides such as Co-60, Co-58, Cs-134 and Mn-54.

4. Lake Water - Tables 6, 7, and 8

Lake water samples are analyzed for gross beta activity, tritium, strontium-89, strontium-90, and gamma emitters.

The analytical results for the 1981 lake water sample program showed no evidence of plant related isotope buildup in the lake water in the vicinity of the site. The gross beta activity for the Nine Mile Point Unit #1 and FitzPatrick inlet canals was slightly less than the mean 1980 canal results and significantly less than the mean result for years prior to 1980. The mean gross beta activity during 1981 for the control samples was slightly higher than the mean 1980 result but less than the mean for years prior to 1980. Only eight of the twenty-four canal samples were slightly greater than control values during 1981 (ie, most monthly canal results were less than control values). This fluctuation is due to the

4. Lake Water (continued)

natural variation of naturally occurring isotopes. The reduction in gross beta activity since 1974 is primarily the result of improved analytical procedures and equipment and not changes in plant operation. There were no significant changes or trends in gross beta activity on a monthly basis for 1981.

Tritium is a naturally occurring radioactive isotope of hydrogen which is produced in the upper atmosphere by cosmic radiation as well as a product of reactor operation. The analysis of lake water and canal water samples for the 1981 sample period showed no abnormalities with respect to the levels of tritium measured in lake water. The level of tritium has remained constant since 1974 with only slight variations. It should be noted that the reported tritium concentration for the second quarter, raw city water sample (OSWP), is the average value of the tritium analysis performed on each of the three monthly composite samples collected during the second quarter. The averaged results were 300 pCi/l (April), 326 pCi/l (May) and 357 pCi/l (June). The analysis of monthly composite samples for tritium was instituted as a result of the cross contamination of the original quarterly composite sample (second quarter 1981). The analysis of lake water monthly composite samples was performed from April 1981 to September 1981 in conjunction with the analysis of routine quarter composite samples. All the monthly and quarterly samples were at the background level. The fact that tritium is naturally occurring accounts for the background level in the lake varying slightly from year to year.

Strontium-90 activity was detected in 11 of the 12 quarterly samples required by the plant's Technical Specifications. Both on-site and off-site sample locations showed measurable levels of Sr-90, ranging in concentration from 0.5 pCi/l to 1.0 pCi/l. The highest Sr-90 concentration of 1.0 pCi/l was detected in the NMP-1 inlet canal. This concentration was just slightly higher than the highest control location concentration of 0.9 pCi/l detected during the same month. As indicated throughout this report, Sr-90 concentrations can be attributed to atmospheric testing. Overall Sr-90 levels have decreased slightly from 1977. 1981 results for Sr-90 at both the control and indicator locations decreased from 1980 results.

Sr-89 was detected in only one indicator sample for 1981. The detected concentration of 0.8 pCi/l was at a concentration level of approximately the control LLD concentrations (1.0 pCi/l). This detection is insignificant and it is noted that Sr-89 has been detected at control locations in previous years. For 1980, Sr-89 at

III. EVALUATION OF ENVIRONMENTAL DATA (continued)

A. Aquatic Program (continued)

4. Lake Water (continued)

control locations was as high as 1.4 pCi/l and 1.3 pCi/l. The presence of Sr-89 in the lake water samples is not considered to be significant and is not attributed to the operation of the site.

Gamma spectral analyses were performed on 36 monthly composite samples required by the Technical Specifications. Indicator samples were collected from the inlet canals at NMP #1 and the FitzPatrick facilities. The control location samples were collected at the City of Oswego water treatment plant and consisted of raw water prior to treatment.

Co-60 was detected in three of the twenty-four samples and one of the twelve control samples. The average concentration observed for the indicator samples was 2.1 pCi/l and 1.4 pCi/l for the control sample positive detection. The presence of Co-60 in lake water samples is not typical especially for the raw city water. The detectable concentrations of Co-60 are due to the fluctuation of instrument background. Background samples are routinely analyzed with each monthly sample set to account for contribution of instrument background to sample activity. Due to the variable nature of background concentrations, low fluctuation in intensity encountered during analysis will result in small contributions of background radiation to sample activity if the background levels increase during sample analysis. Cs-137 was detected in one of the indicator samples during the month of July at the NMP#1 inlet canal. The concentration detected was 2.3 pCi/l of Cs-137. This concentration is probably due to the radwaste activities during early July and the recirculation of a portion of the discharge water into the inlet canal (condenser inlet tempering). Normally, inlet tempering does not occur during July but during July of 1981 the NMP#1 facility was in a refueling outage started in March. The tempering gate had not been adjusted since March as a result of plant shutdown for refueling. The gate was adjusted during startup on July 9. Since inlet canal water is not utilized as drinking water, there are no dose consequences to man. No other radionuclides were detected.

B. Terrestrial Program

Tables 9 through 23 depict the analytical results of the terrestrial samples collected for the 1981 reporting period.

1. Air Particulate Gross Beta - Tables 9 and 10

Air particulate gross beta results for the six off-site and nine on-site sample locations are contained in the analytical results section of the report. The samples were collected on a weekly

III. EVALUATION OF ENVIRONMENTAL DATA (continued)

B. Terrestrial Program (continued)

1. Air Particulate Gross Beta (continued)

basis and were counted after twenty-four hours to allow for the decay of short half-life naturally occurring radionuclides. No significant levels of gross beta activity were observed for the 310 off-site samples or the 468 on-site samples. The average yearly off-site concentration was 0.165 pCi/m^3. The average yearly on-site concentration was 0.151 pCi/m^3. The on-site concentration was slightly lower probably because of the difference of air flow rates of four of the nine on-site monitoring stations. Review of yearly mean results per station shows that all on-site and off-site stations had means at approximately the same concentrations. A slight decrease of the annual mean was noted for H, I, J, and K on-site stations and is noted above.

Review of air particulate gross beta results on a weekly basis shows that a significant increase occurred at all on-site and off-site stations near the beginning of April and peaked near the end of May and into early June. Concentrations for both on-site and off-site stations decreased in mid-June, increased again in early July and fell off sharply in mid-August. As noted above, on-site and off-site stations showed identical trends. Gross beta concentrations remained generally less than 0.1 pCi/m^3 for the remainder of the year for both on-site and off-site locations. The increases and decreases in gross beta activity can be attributed to changes in the concentrations of the naturally occurring radionuclides found in the biosphere. The concentrations of naturally occurring nuclides in the lower levels of the atmosphere directly above the terrestrial portions of the earth are affected by time related processes such as wind direction, snow cover, soil temperature and soil moisture content. A significant portion of the increased gross beta activity during the spring and summer is the increase of naturally occurring radionuclides in the immediate vicinity above ground elevation. During the spring, surface ground soil becomes unfrozen and has a lower moisture content therefore allowing for the emanation of radon and thoron and especially the production of alpha and beta decay daughter products. During the summer months, the dry soils allow for dispersion of particulate matter into the atmosphere where radon/thoron daughter products have become attached to dust particles and the particles are themselves radioactive by minute quantities of the daughter products.

In 1981, the increase in gross beta activity can also be partially attributed to the large amount of fallout detected during the spring and summer months. (See air particulate composites, Section 2.) The concentrations of weapons testing radionuclides detected by gamma spectral analysis showed a similar trend as

III. EVALUATION OF ENVIRONMENTAL DATA (continued)

B. Terrestrial Program (continued)

1. Air Particulate Gross Beta (continued)

noted for gross beta concentrations. Concentrations of gamma emitters increased early in 1981 and peaked in the months of April and May. In addition, an increase was noted again in the month of July. This pattern noted for gamma emitters was noted for beta emitters as observed above. Therefore, it appears that the detected weapons testing radionuclides are in part responsible for the trends noted for gross beta results. However, it must be noted that air particulate gross beta results do generally increase during the summer months every year.

2. Monthly Air Particulate Composites - Table 11

Weekly air particulate samples were composited monthly by location into two on-site composites and two off-site composites. On-site composites include B-1 (stations D1, D2, E, F, and G) and B2 (stations H, I, J, and K). Off-site composites include A-1 (stations C, D1 and D2) and A2 (stations E, F and G).

The results for the composite samples analyzed during the 1981 sample program showed positive results for Nb-95, Zr-95, Ce-141, Ce-144, Ru-106, Ru-103, Cs-137, La-140, Co-60, Mn-54, Ba-140, and in addition, several naturally occurring radionuclides (K-40, Be-7, and Ra-226). The total number of radionuclides detected during the year was fourteen. Of the fourteen detected, ten are considered to be directly related to fallout. The fallout is a result of an atmospheric nuclear test conducted by the People's Republic of China, in October of 1980. Measurable concentrations of Nb-95, Zr-95, Ce-141, Ce-144, Ru-106, Ru-103, Cs-137, La-140, Co-60, and Mn-54 were detected at both the off-site and on-site environmental air monitoring stations. Each of these radionuclides showed a similar distribution over the year with peak concentrations occuring in April and May.

As can be observed from the data (Table 11) there was an increase noted in the early part of the year (January and February). Several of these radionuclides were noted as early as November and December of 1980 at low concentrations (cerium, ruthenium, niobium, and zirconium). These radionuclides, as noted above, reached a peak in April and May and showed relatively sharp decreases afterwards. December 1981 composites showed radionuclides that were produced (by the detonation) in relatively large quantities (comparatively speaking) and/or radionuclides with longer half lives. Thus Cs-137, Nb-95 and Ce-144 were still being detected in small quantities.

The general increase for detected nuclides is able to be put into perspective by comparing the maximum concentrations observed during 1981 to the previous years average concentrations. Where

III. EVALUATION OF ENVIRONMENTAL DATA (continued)

B. Terrestrial Program (continued)

2. Monthly Air Particulate Composites (continued)

no detectable concentrations were made for 1980, the average LLD value was used. Comparisons are made as percent increases.

Percent Increase in Radionuclide Concentration (b)

Radionuclide	Composite Sample A-1	B-2	A-2	B-1
Nb-95	7086.0%	7288.7%	6241.9%	7526.6%
Zr-95	3280.4	4290.9	3163.4	3931.0
Ce-141	1173.1	1068.4	964.1	1629.6
Ce-144	1645.5	2442.4	1452.2	2765.5
Ru-106 *	1394.3	615.9	351.8	485.1
Ru-103	1948.5	2228.3	1759.2	2717.1
Cs-137	371.4	548.4	411.8	681.8
La-140 *	313.6	872.1	286.3	894.5
Co-60	135.6	197.7	104.3	116.3
Mn-54	208.3	267.9	202.5	397.9
Ba-140*	7.2	(a)	(a)	(a)

* - Not Detected in 1980
(a) - Not detected in composite during 1981
(b) - 1981 maximum/1980 mean

Nb-95, Zr-95, Ce-141, Ce-144, Ru-106, Ru-103 and La-140 are directly related to the October 1980 weapons test and were not detected in 1980 prior to October. Several of these radionuclides were detected shortly after October while others were not detected until later on (early 1981). The difference in times of detection (ie, month of the year) is due to the particulate diameter size. The different sized particules have different deposition rates out of the upper atmosphere.

Nb-95 was first detected in November of 1980 and reached a peak of 0.013 pCi/m^3 in December 1980 (B-1 composite). During 1981, Nb-95 peaked at a concentration of 0.134 pCi/m^3 in the A-2 off-site composite. By December of 1981, Nb-95 was detected a greatly reduced concentrations. The smallest concentration was detected at 0.00038 pCi/m^3.

Zr-95 was detected first during the month of November during 1980 in the B-2 (on-site), A-2 (off-site), and the B-1 (on-site) composite samples. Zr-95 reached a peak of 0.0639 pCi/m^3 during the month of April (1981) in the A-2 (off-site) composite sample. By year end (1981), Zr-95 was not detected in any of the composite samples. October was the last month during 1981 that Zr-95 was detected. The detected concentration was small (0.00076 (pCi/m^3). Zr-95 was not detected after October whereas Nb-95 was detected at year end. This observation appears to be independent of the half-life for Nb-95 (3-5 days) and Zr-95 (64 days), but appears to be dependent upon other parameters such as production rate or particle size.

III. EVALUATION OF ENVIRONMENTAL DATA (continued)

B. Terrestrial Program (continued)

2. Monthly Air Particulate Composites (continued)

Ce-141 was first noted in November 1980 in all four composite samples. Ce-141 reached a peak of 0.0188 pCi/m^3 at the A-2 (off-site) composite during the month of April 1981. By December of 1981, Ce-141 was not detected in any of the composite samples. Ce-141 was last detected in August of 1981 in the B-2 (on-site) composite sample. The quantity detected was very small (0.00044 pCi/m^3).

Ce-144 was first detected in the month of December 1980 at a concentration of 0.0044 pCi/m^3 in the A-2 (off-site) composite sample. Ce-144 reached a peak concentration of 0.070 pCi/m^3 in the A-2 (off-site) composite sample during May. By year end of 1981, Ce-144 was still detected in all composite samples. The maximum concentration detected during this month was 0.00114 pCi/m^3. The half-life for Ce-141 and Ce-144 is 32.5 days and 284.4 days respectively.

Ru-106 was not detected in October - December of 1980. Ru-106 was first detected in January of 1981 in the B-2 (on-site) composite. The detected quantity was 0.00234 pCi/m^3. The peak concentration was attained during the month of May 1981 in the A-1 (off-site) composite sample. The concentration detected was 0.025 pCi/m^3. Ru-106 was detected only once during December of 1981 in the A-2 (off-site) composite sample. The concentration detected was 0.003 pCi/m^3.

A second isotope of ruthenium, Ru-103, was also detected as a result of the October 1980 weapons test. Ru-103 was first detected in November of 1980 in all composite samples. Ru-103 reached a peak of 0.02846 pCi/m^3 during the month of April 1981 in the A-2 (off-site) composite sample. The maximum detected concentration decreased significantly after April to a minimum concentration of 0.00033 pCi/m^3 in September in the B-1 (on-site) composite sample. Ru-103 was not detected in any of the other composite samples during September nor was it detected in October - December of 1981. The half-life for the detected isotopes of ruthenium are 367 days (Ru-106) and 39.6 days (Ru-103) respectively.

La-140 was not detected in 1980 but was detected during the month of January 1981 only. La-140 was detected in both on-site and off-site composite samples. The detected concentrations ranged from 0.01862 pCi/m^3 to 0.04911 pCi/m^3. The detection of La-140 is a result of the October 1980 weapons test. The rather short half-life may account for that fact that La-140 was not detected in any of the remaining months of 1981 (February - December).

III. EVALUATION OF ENVIRONMENTAL DATA (continued)

B. Terrestrial Program (continued)

2. Monthly Air Particulate Composites (continued)

Several radionuclides were detected which are fallout related and possibly, in part, related to operations at the site. These radionuclides include Cs-137, Mn-54, Co-60, and Ba-140. The general trend of concentrations discussed above for the fallout radionuclides is also evident for Cs-137, Mn-54, and to a limited extent, for Co-60.

Cs-137 was not detected in air particulate composite samples during the last three months of 1980. Cs-137 was detected, however, at various times during the year (1980). The average off-site detectable Cs-137 concentration was 0.00156 pCi/m^3 for 1980 (detected in four of twenty-four samples).. The average on-site detectable concentration was 0.00109 pCi/m^3 (detected in seven of twenty-four samples).

During 1981, Cs-137 was detected in all on-site and off-site composite samples for practically all months. On-site sample results showed Cs-137 concentrations in twenty-three of the twenty-four composite samples. Concentrations were first detected in January at 0.00045 pCi/m^3 and 0.00051 pCi/m^3. Concentrations peaked in the month of May at concentrations of 0.00342 pCi/m^3 and 0.00453 pCi/m^3. A secondary peak and leveling off was noted in July, followed by a sharp decrease immediately afterwards. By year end (December), Cs-137 in on-site composites showed only one detection (of a possible two) at a concentration of 0.00018 pCi/m3.

During 1981, off-site composite samples showed positive results of Cs-137 in twenty of the twenty-four samples. Concentrations were first noted in January in one of the two samples at a concentration of 0.00061 pCi/m^3. Concentrations peaked in May of the year at 0.00391 pCi/m^3 and 0.00416 pCi/m^3 respectively. A secondary peak and leveling off was noted in July, followed by a sharp decrease immediately afterwards. By year end (December), Cs-137 was detected in only one of the two composite samples (0.00038 pCi/m^3).

Mn-54 was not detected during the last three months of 1980. Mn-54 was only detected once during 1980. During 1981, Mn-54 was first detected in February in on-site composite samples at low concentrations (0.00028 pCi/m^3 and 0.00039 pCi/m^3). Peak concentrations were attained in May of the year (0.00142 pCi/m^3 and 0.00191 pCi/m^3), with a small secondary peak or leveling off in July. Mn-54 was not detected after August at either of the

2. Monthly Air Particulate Composites (continued)

on-site composites. Off-site composite samples showed a similar pattern. Mn-54 was first detected in January and February at low concentrations (0.00028 pCi/m^3 and 0.00042 pCi/m^3). Peak concentrations were detected in May for both composite samples (0.00147 pCi/m^3 and 0.00158 pCi/m^3). A secondary peak was noted in July for one of the composite samples, followed by a sharp decrease. Mn-54 was not detected after August of the year except for one detection in November (0.00018 pCi/m^3).

Co-60 was not detected during the last three months of 1980. Co-60 was only detected once during the entire year (1980) at a low concentration. During 1981, Co-60 was first detected in January in the on-site composite samples (0.00051 and 0.00053 pCi/m^3). Concentrations were first made in February and March in off-site composite samples (0.00078 and 0.00088 pCi/m^3). Peak concentrations were attained in May of the year with the highest concentration at 0.00173 pCi/m^3. Detected concentrations dropped off sharply afterward. Co-60 was detected only sporaticly after the peak detection period for the remainder of the year. Concentrations were noted at very low concentrations. A secondary peak was not noted for Co-60 due to the low concentrations detected. This is because the peak concentrations detected in May were not much higher than the instrumentations' lower limit of detection.

Ba-140 was not detected in any of the off-site or on-site composite samples during 1980. During 1981, Ba-140 was detected in the B-2 on-site composite during the month of October. Ba-140 was not detected in any of the other monthly composite samples for 1981. The detected quantity was very small (0.00101 pCi/m^3) and was below the LLD values for other monthly composite samples. The concentration detected is probably a result of operations at the site since Ba-140 has a relatively short half-life (12.8 days). Therefore, it is probably not related to the 1980 weapons test because of the short half-life and the one detection in October.

The detectable concentrations of Cs-137, Mn-54, and Co-60 are due, for the most part, to weapons testing. As noted above, Cs-137, Mn-54 and Co-60 followed a trend similar to the fallout related radionuclides (Nb-95, Zr-95, etc.). In both cases, a peak concentration period was observed in May with a general secondary peak in July and a sharp decrease immediately afterwards. Co-60 did not show a secondary peak in July, as noted above, but this was due to the overall low concentrations observed throughout the year. A small portion of the concentrations for Cs-137, Mn-54 and Co-60 may be site related since one concentration was noted in 1980 for Co-60 and Mn-54 and several were noted for Cs-137.

III. EVALUATION OF ENVIRONMENTAL DATA (continued)

B. Terrestrial Program (continued)

2. Monthly Air Particulate Composites (continued)

Several naturally occurring radionuclides were detected in the on-site and off-site air particulate composites. These radionuclides are routinely found on an intermittent basis in composite samples and have origins that are either primordial or cosmic.

K-40 was detected in all on-site and off-site composite samples during 1981. K-40 ranged from 0.00294 pCi/m^3 to 0.01273 pCi/m^3 in the off-site composite samples. K-40 was detected in on-site composite samples and ranged from 0.0024 pCi/m^3 to 0.0059 pCi/m^3.

Be-7 was detected in all on-site and off-site composite samples during 1981. Be-7 was detected in off-site composites and ranged from 0.0715 pCi/m^3 to 0.1432 pCi/m^3. On-site particulate composite samples showed Be-7 ranging from 0.0514 pCi/m^3 to 0.123 pCi/m^3.

Ra-226 was only detected twice during 1981. One detection was made in September in the A-1 off-site particulate composite. The concentration detected was 0.0066 pCi/m^3. The other was noted in November in the B-2 on-site composite. Here the detected concentration was 0.0028 pCi/m^3.

Dose to man calculations can be made using inhalation rates and air concentrations based on air sample results for radionuclides originating from all sources. Using the average adult inhalation rate of 8000 m^3 per year (667 m^3 per standard month) and the mean concentration measured at the on-site sample stations, the following yearly doses can be calculated.

Nuclide	Concentration 10^{-3} m^3	No. Months Detected	Origin	Dose * (mrem/year)
Co-60	0.58	10	Fallout/Plant	0.00288
Mn-54	0.88	9	Fallout	0.00092
Cs-137	1.36	12	Fallout/Plant	0.00010
b-95	37.96	12	Fallout	0.01916
Zr-95	21.94	9	Fallout	0.02909
Ce-141	9.24	6	Fallout	0.00167
Ce-144	17.96	12	Fallout	0.13966
Ru-106	9.30	8	Fallout	0.05803
Ru-103	12.60	9	Fallout	0.00477
La-140	46.62	1	Fallout	0.00053
Ba-140	1.01	1	Fallout/Plant	0.00011

Total Dose - 0.25692
Fallout Dose - 0.25383
Fallout/Plant Dose - 0.00309

* Dose to the lung

III. EVALUATION OF ENVIRONMENTAL DATA (continued)

B. Terrestrial Program (continued)

2. Monthly Air Particulate Composites (continued)

The table above illustrates that the average dose received by an adult from inhalation of air in the vicinity of the site is approximately one quarter of one mrem per year. Of this average yearly dose, the dose received from radionuclides that are possibly site related is approximately one percent of this dose. This one percent is actually a significant overestimate because these radionuclides (i.e. possibly site related) where shown to correspond to similar peak trends in concentrations that were noted for fallout related nuclides. Thus the dose received from radionuclides possibly related to operations at the site is minute and insiginificant.

3. Airborne Radioiodine (I-131) - Tables 12 and 13

The results of I-131 (charcoal cartridges) sampling and analyses are presented in the analytical results section of the report.

During the 1981 sampling program, I-131 was not detected in any of the 312 weekly samples collected from six off-site sampling stations. I-131 was detected in five of the 468 weekly samples collected from the nine on-site sampling stations. Four of the five detectable concentrations were made at H on-site monitoring station and the remaining detection was observed at the I on-site monitoring station.

Observed on-site detected concentrations ranged from a minimum of 0.016 pCi/m^3 to a maximum of 0.042 pCi/m^3 with a mean of 0.029 pCi/m^3. These observed values, however, are minimal since LLD values for on-site samples ranged from <0.004 pCi/m^3 to <0.063 pCi/m^3. It can be seen that the observed values fall between LLD values and are therefore within the range of the lower limit of detection. Off-site LLD values for I-131 ranged from 0.009 pCi/m^3 to 0.043 pCi/m^3. As noted above no I-131 detectable concentrations were observed at off-site stations.

An accurate dose estimate due to inhalation of airborne I-131 is difficult to make since there are no residential areas in the immediate vicinity of H on-site or I on-site stations. It is notable that the H on-site and I on-site stations are well within the site boundary or controlled area. However, for the purpose of illustration and perspective, if the average airborne concentration is 0.029 pCi/m^3 and the period of detection is five weeks, a man would receive a dose of 0.03 mrem/year based on 8,000 m^3 inhaled per year. The critical organ for this example is the thyroid. This dose assumes that the residence time is 840 hours or five full weeks at this location. The dose is very minimal and can be compared to an increase in the whole body dose due to cosmic radiation. A similar dose would be received by residence at a location 100 meters (328.1 feet) higher in altitude for 5.5 days. The end result of the 1981 I-131 sampling effort shows no significant impact due to operations at the site. During 1981, I-131 was not detected in any other sample media such as milk or green leafy vegetables.

III. EVALUATION OF ENVIRONMENTAL DATA (continued)

B. Terrestrial Program (continued)

4. TLD (Environmental Dosimetry) - Table 14

TLD's are collected once per quarter during the sample year. The TLD results are an average of four independent readings at each location and are reported in mrem per standard month. Each location has two TLD's with each TLD containing two distinct calcium sulfate dosimeters. In 1981, TLD's for the most part were collected on April 1, 1981, July 1, 1981, October 1, 1981 and December 30, 1981.

TLD results are organized into three groups for reporting purposes. The groups are on-site TLD's (defined as TLD's immediately surrounding the individual facilities and are located at points of interest), environmental station TLD's (a ring of TLD's surrounding the generating facilities as a group), and off-site TLD's (TLD's located off the site property and ranging up to 20 miles from the site).

A net dose at the environmental station TLD's can be calculated simply by subtracting quarterly off-site doses from quarterly on-site environmental station doses. Environmental station TLD's are arranged in a concentric circle and range in distance from the individual facilities from 1,500 to 2,000 feet. The net dose per quarter and per annual mean is as follows:

Quarter	Net Environmental Station Dose (mrem)
1	0.53
2	0.41
3	0.90
4	0.18
TOTAL	2.02

The annual site property boundary dose for 1981 cannot be determined from the net environmental station dose since the property boundary extends out to approximately 0.75 miles from the site. A general estimate can be made based on two available TLD's located at the site boundary. The net quarterly and net total annual dose can be calculated for these two locations (TLD numbers 19 and 15) east and west of the site. This calculation is conservative since it represents the shortest distance to populated areas.

Quarter	Net Site Boundary Dose (mrem)
1	0
2	-0.16
3	-0.15
4	-0.50
TOTAL	-0.81

III. EVALUATION OF ENVIRONMENTAL DATA (continued)

B. Terrestrial Program (continued)

4. TLD (Environmental Dosimetry) (continued)

As observed, the site boundary dose based on two available TLD locations is less than the average off-site dose. This is probably due to the difference in ground dose rates which are indicative of variable concentrations of naturally occurring radionuclides in soil and rock such as radium, uranium, thorium, and potassium. The difference could also result from statistical variation in the TLD readings, as the site boundary dose is based on a population of only eight individual readings per quarter.

TLD numbers 31 and 39 are located within the Nine Mile Point #1 restricted area near the radwaste facility and are influenced by the close proximity to the building. TLD numbers 27 through 30 and 47 are located within the restricted area of the James A. FitzPatrick radwaste facility and are influenced by the buildings. TLD number 59 is located near the restricted area of the FitzPatrick Plant stack and is influenced by the proximity to this structure. TLD number 3 is located at the construction site of Nine Mile Point #2. This TLD is subject to radiography at the Unit #2 site and to a smaller extent the FitzPatrick facility.

TLD doses remained fairly consistent for most TLD locations each quarter. All off-site locations remained relatively constant. On-site doses remained relatively constant except for TLD's located near radwaste facilities which were affected by the frequency of shipment processing and shipments. These TLD's include numbers 27, 28, 29, 30, and 47. TLD number 3 at the Unit #2 construction site decreased slightly in the fourth quarter. This was most probably due to the frequency of radiography.

The results of 1981 showed no impact from direct radiation measured outside the site boundary.

5. Radiation Monitors - Table 15

Environmental radiation monitors are located in 10 of the 15 air monitoring environmental stations. Each of the on-site environmental monitoring stations contains a radiation monitor and, in addition, the C off-site monitoring station contains a similar monitor. The radiation monitors consist of a GM detector with an associated power supply, chart recorder, and trip unit. The monitor has an operating and recording range from 0.01 to 100 mrem/hr. Each radiation monitor has a small radioactive source mounted inside the detector casing to produce an on-scale reading. The design intent of the monitors is to detect possible dose rates resulting from plume releases from the plant. The monitors are not considered to be capable of high senstivity environmental monitoring and do not detect minute fluctuation

III. EVALUATION OF ENVIRONMENTAL DATA (continued)

B. Terrestrial Program (continued)

5. Radiation Monitors (continued)

in levels of background radiation. Because of the relatively poor sensitivity of the monitors (environmentally speaking) no comparisons are made between the radiation monitor readings and the readings from environmental TLD's.

6. Milk - Tables 16, 17, and 18

Milk samples were collected from a combination of seven farms during the 1981 grazing season (May through December 1981). One of the six farm locations, number 25, was only sampled during two of the eight sample months during the year. Samples were available at this location only during July and August because the single cow at the farm was dry during the other available sampling months. Starting in September and through December, this farm location no longer had a milk cow available for sampling. A seventh location (number 7) was available starting in October and was sampled through December. Sample location descriptions are included below.

Location No.	Direction from Site	Distance from Site (miles)
4	ESE	7.5
40	SW	15.0
14	ESE	9.0
16	SSW	6.0
25	ESE	1.5
12	SSE	7.0
7	ESE	5.2

Milk samples were collected from each of the locations in the first half of the month and analyzed for I-131, gamma emitters and strontium-90. I-131, gamma isotopic, and strontium-90 results are found in the analytical results section.

The gamma spectral analyses of the monthly composite samples showed K-40 to be the most abundant radionuclide detected in the milk samples collected in 1981. K-40 was detected in every sample analyzed and ranged in concentration from 1100 to 2500 pCi/l at the indicator stations and 1300 to 1500 pCi/l at the control station. K-40 is a naturally occurring nuclide and is found in many of the environmental medias sampled.

Cs-137 was the second most abundant radionuclide detected in the 1981 milk samples. Cs-137 was measured in 14 of the 45 monthly composite samples analyzed. Cs-137 was detected in milk samples at all locations sporadically throughout the year except at location number 14. Cs-137 was detected at the control location

6. Milk (continued)

once during the year at a concentration of 3.9 pCi/1. Cesium concentrations ranged from 3.5 pCi/1 to 29.0 pCi/1 for all samples with an annual mean of 8.2 pCi/1. Cesium was detected at a higher frequency at locations 12, 25, and 16. The maximum concentration of 29.0 pCi/1 was detected at location number 25 during July. Annual means for the detection of Cs-137 at all stations are presented below:

Location No.	Annual Mean (Cs-137)
4	6.1 pCi/1
40 (control)	3.9 pCi/1
14	Not Detected
16	5.2 pCi/1
25	24.2 pCi/1
12	6.6 pCi/1
7	4.4 pCi/1

Annual mean Cs-137 values for each sampling location are variable but quantitatively the values are not significant when the magnitude of these minute concentrations are concerned. A portion of the Cs-137 detected in milk samples is due to deposition of Cs-137 from past atmospheric nuclear testing.

Evaluation of Cs-137 concentrations in pasture soil, pasture grass, hay, grain, and silage does not show a correlation as to why certain locations show a slightly higher Cs-137 concentration than other locations. Pasture soil samples were collected at the six milk sample locations (numbers 4, 40, 14, 16, 25, and 12) in June, July and September of 1981. Cs-137 was detected in all soil samples as expected. Cesium was noted in the control location as well. Locations number 4 and 16 showed slightly higher soil Cs-137 concentrations than the other locations sampled. Milk sampled from these locations, however, showed Cs-137 concentrations that were lower than the mean for location number 4 and of an average concentration for location number 16. In addition to Cs-137 in pasture soil samples, Cs-137 has been detected in the past at a control environmental station location. These soil samples were collected and reported in 1975, 1977, and 1980. Annual mean Cs-137 concentrations in soil at the control location ranged from 1.07 to 1.20 pCi/g-dry. Minimum and maximum ranges for individual samples at this location ranged from 0.41 pCi/g-dry to 2.90 pCi/g-dry. These values are above the values detected at the milk sampling locations. Based on the pasture soil data available, it can be noted that there is no distinct correlation between cesium in milk and cesium in pasture soils.

B. Terrestrial Program (continued)

6. Milk (continued)

Other related data was available from the milk locations that can be used to assess cesium in milk. Pasture grass was collected in June, July, August, September, and October, 1981. Cs-137 was not detected in any of the samples from the seven milk sample locations (numbers 4, 40, 14, 16, 25, 12, and 7), except from location number 40. This location was the control location. The concentration detected was very small (0.0742 pCi/g-wet, and was probably due to plant uptake. Hay samples were collected twice during 1981. A first cut was collected in June-July and a second cut was collected in September-October. Cs-137 was not detected in any samples except for one sample at location number 4. The concentration detected here was 0.358 pCi/g-wet. This detection does not account for milk cesium levels since locations number 12 and 16 had higher milk cesium levels for June-July whereas cesium was not detected in hay samples for this period. The detected concentration was a very minute quantity and was detected at a level comparible to the instrument's lower level of detection. Grain samples were collected in June and analyzed. Cesium was not detected in grain from any of the locations' samples (numbers 4, 40, 16, 14, 25, and 12). Grain, however, is not a good indicator of regional Cs-137 levels since it usually has a midwest origin. Corn silage was sampled in October at all milk locations except location number 25. Cesium was not detected in corn silage at any of the sampled locations (numbers 4, 14, 16, 12 and 7, except for location 40 which was the control location. The concentration detected was very small (0.097 pCi/g-wet) and was probably due to plant uptake or fallout deposition. In addition to soil and fodder samples, the milk herd water sources were sampled and analyzed. The analysis of milk herd water sources showed no positive detections of Cs-137.

Cs-137 concentrations in milk are variable and were detected at very low levels. A portion is due to weapons testing from previous years. This is exemplified by the detection of 3.9 pCi/l of Cs-137 in the control sample. Results for gamma emitters in milk are presented in the analytical results section of the report.

Examination of previous Cs-137 concentrations in milk samples shows that the annual mean for the indicator locations has decreased slightly from previous years. The annual mean for 1981 was 8.6 pCi/l (positive cesium concentrations). The annual means for 1980 and 1979 (indicator stations) were 9.5 pCi/l and 9.4 pCi/l respectively.

No other radionuclides were detected in milk samples using gamma spectral analysis.

III. EVALUATION OF ENVIRONMENTAL DATA (continued)

B. Terrestrial Program (continued)

6. Milk (continued)

Strontium-90 was detected in each of the milk samples collected in 1981. The mean yearly concentration for the control location was approximately the same as the mean concentration for the indicator locations (4.3 pCi/1 and 4.8 pCi/1 respectively). Sr-90 results for the indicator locations ranged from 1.1 pCi/1 to 12.0 pCi/1. Sr-90 results for the control location ranged from 2.7 pCi/1 to 6.6 pCi/1.

The mean yearly Sr-90 concentration for the indicator locations (4.8 pCi/1) is consistent for data noted in 1980 - 1979. This mean is slightly higher than the 1980 mean for the indicator locations (4.1 pCi/1) but is well within distribution variability for this fallout related radionuclide. It is interesting to note that the control annual mean for 1980 was 4.2 or approximately the same as the indicator mean. The annual mean concentration for the indicator locations during 1979 was 5.5 pCi/1. This average is greater than the 1981 annual mean. The control annual mean result was 4.8 pCi/1 during 1979.

Sr-90 concentrations as observed in control and indicator milk samples during 1981 are not a result of operations at the site but are a result of weapons testing. Sr-90 concentrations in milk are well documented (NCRP-45 and NCRP-52) and reached a high of 28 pCi/1 in 1963. Sr-90 concentrations of 7.0-10.0 pCi/1 were noted in the 1970's. Strontium concentrations have been noted in other sample medias during 1981 for both indicator and control samples.

I-131 was not detected during 1981 in any of the indicator or control samples. All 1981 I-131 results are reported as lower limits of detection.

The significance of Cs-137 and Sr-90 in milk samples can be determined by calculating the annual dose to man as a result of milk consumption. Assuming the maximum milk consumption rate of 400 liters per year for a teenager and a Cs-137 concentration of 8.2 pCi/1 (the maximum annual mean of positive concentrations for all locations), the dose to a teenager would be 0.49 mrem per year to the liver and 0.17 mrem per year to the whole body. Doses to the liver and whole body based on a Cs-137 concentration of 8.6 pCi/1 (the annual mean of all indicator locations) is 0.51 mrem per year and 0.18 mrem per year respectively. The annual dose based on an annual control sample concentration of 3.9 pCi/1 yields a liver dose of 0.23 mrem per year and a whole body dose of 0.08 mrem per year. The calculated doses are conservative because the consumption rate (400 liter per year) is a maximum rate.

III. EVALUATION OF ENVIRONMENTAL DATA (continued)

B. Terrestrial Program (continued)

6. Milk (continued)

The dose as a result of Cs-137 in milk from the indicator locations is small and is not significantly more than the dose as a result of consumption of milk from the control location. Assuming the above calculations to be representative, the increase in dose between consumption of indicator and control sample milk is 0.28 mrem per year to the liver and 0.10 mrem per year to the whole body. This total dose is comparable to the increase in dose per year (cosmic radiation) as a result of moving to a residence 19 meters (62.3 feet) higher in altitude and remaining there for one year.

Doses resulting from Sr-90 concentrations in milk can also be calculated for a teenager and a milk consumption rate of 400 liters per year. Using an annual average indicator Sr-90 concentration of 4.8 pCi/l, the resulting dose to the bone is 15.9 mrem per year and 3.9 mrem per year to the whole body. Using the same criteria the annual Sr-90 dose resulting from the consumption of milk from the control location (4.3 pCi/l) would be 14.2 mrem to the bone and 3.5 mrem to the whole body. Based on indicator and control dose estimates, it can be concluded that there is no significant difference between the two. It should be noted that dose estimates due to Sr-90 intake are conservative since the most sensitive age group is used (teenagers) and a maximum milk consumption rate of 400 liters per year is utilized.

7. Milch Animal Census - Table 19

The milch animal census is an estimation of the number of cows or goats within the 10 mile radius of the Nine Mile Point site. A census is conducted twice per year, once in the spring and once in the summer. The census is conducted by sending questionnaires to previous milch animal owners and also by road surveys to locate any possible new owners. Questionnaires not responded to are followed up by telephone calls.

The number of milch animals located within the 10 mile radius of the site was estimated to be 998 cows and 8 goats for the 1981 spring census. No new locations were found since the summer 1980 census. The number of cows increased by 103 and the number of goats increased by 3 with respect to the 1980 summer census.

The 1981 summer census showed a total of 986 cows and 10 goats (estimated). This represents a decrease of 12 cows and an increase of 2 goats with respect to the 1981 spring census. As a result of the summer 1981 census, a new milk location (number 7) was added to the sample program.

III. EVALUATION OF ENVIRONMENTAL DATA (continued)

B. Terrestrial Program (continued)

8. Human Food Products - Table 20

Human food product samples were comprised of meat, eggs, poultry, fruits and vegetables. Collections for meat, poultry, and eggs were made in the spring and fall seasons. Samples of produce included vegetables and fruit with an attempt to sample at least one green leafy vegetable from each location. The collection of produce was performed in late summer or early fall. Three indicator locations were sampled for each type of media collected, in addition, a control location was sampled during each collection period. Indicator samples were collected within a 10 mile radius of the site in areas which would have a high potential for demonstrating possible effects of site operations. The ultimate factor controlling sample locations was the availability of required samples. Attempts were made to maintain prior sample locations where possible.

Meat samples collected during the spring were obtained at two off-site locations (one extra sample) and three on-site locations. Because of the difficulty of obtaining meat samples within a 10 mile radius of the site during the springtime, the third indicator meat sample was collected approximately 30 days after the initial meat sample collection period. The collection of spring meat samples has historically been a difficult sample medium to obtain due to seasonal unavailability (See Section II.4., Exceptions to the 1981 program).

Spring meat samples showed detectable K-40 in all samples. K-40 concentrations ranged from 1.7 pCi/g-wet to 2.7 pCi/g-wet and is a naturally occurring radionuclide. Three of the five meat samples collected showed detectable concentrations of Cs-137. Two of the three positive concentrations were made in control samples. Cs-137 concentrations ranged from 0.017 pCi/g-wet to 0.070 pCi/g-wet. Cs-137 was detected in control and indicator locations for pasture soil during 1981 (0.189 to 0.968 pCi/g-dry), in one pasture grass sample (0.07 pCi/g-wet), and in one hay sample (0.36 pCi/g-wet). The Cs-137 measured in meat is the result of atmospheric fallout from weapons testing and has been detected in similar concentrations in previous years. The mean concentration of Cs-137 in meat samples for the indicator locations during 1978 - 1980 ranged from 0.009 to 0.07 pCi/g-wet. The mean Cs-137 concentration during 1981 for the indicator locations was 0.07 pCi/g-wet. Based on the positive Cs-137 concentrations at the control locations and the variability of Cs-137 concentrations detected over the previous years, it is considered that Cs-137 detections in meat samples are not site related.

III. EVALUATION OF ENVIRONMENTAL DATA (continued)

B. Terrestrial Program (continued)

8. Human Food Products (continued)

Meat samples collected in the fall of the year also showed detectable concentrations of K-40 and Cs-137. K-40 was detected in all samples collected and ranged from 2.4 pCi/g-wet to 3.1 pCi/g-wet. Cs-137 was detected in all three indicator samples but not in the control sample. Cs-137 concentrations ranged from 0.023 pCi/g-wet to 0.030 pCi/g-wet. Although Cs-137 was not detected at the control location during the fall of 1981, it has been detected at the control location in previous seasons. During the spring collections, Cs-137 was detected at the control location at 0.017 pCi/g-wet and 0.024 pCi/g-wet which is approximately the same concentrations as the fall indicator samples. Again, based on the concentrations of Cs-137 at the control locations and the inherent variability of Cs-137 as detectable concentrations, there is no reason to suspect plant related Cs-137.

No other radionuclides were detected in meat samples using gamma spectral analysis.

The detection of Cs-137 in meat at control and indicator locations is an indication of cesium production from weapons testing. A dose estimate can be made for indicator and control sample data based on Cs-137 concentrations detected in spring and fall samples. Based on an average Cs-137 concentration during 1981 of 0.038 pCi/g-wet at the indicator locations and a consumption rate of 110 kg (meat) per year, the dose to the liver is 0.46 mrem and 0.30 mrem to the whole body. Using the same criteria and the average Cs-137 concentration of 0.02 pCi/g-wet at the control locations, the dose to the liver would be 0.24 mrem and 0.16 mrem to the whole body. As observed, the whole body and liver dose difference between the indicator and control locations is not significant. Dose estimates made here are conservative since the maximum consumption rate of meat was utilized and the most sensitive organs to radionuclide uptake were exemplified.

Egg samples collected during the spring and fall showed measurable concentrations of K-40 at all locations. K-40 ranged from 0.8 pCi/g-wet to 1.2 pCi/g-wet. No other radionuclides were detected in the egg samples analyzed by gamma spectral analysis.

Poultry samples taken during the spring collection were obtained from three locations within a 10 mile radius of the site and one location outside of the 10 mile radius. One of the indicator samples was invalidated during the analysis process and it was necessary to recollect an additional indicator sample. This particular sample contained measurable concentrations of Mn-54,

Co-58, and Co-60. The detected concentrations were low and appeared to be the result of laboratory contamination during the processing stage. The presence of Co-58 and the absence of Cs-137 strongly suggested contamination. Poultry samples (two) were recollected from the same location and from the same approximate age group. No radionuclides, with the exception of K-40, were detected. It was, therefore, determined that the detected concentrations of Mn-54, Co-58 and Co-60 were due to contamination, and no further samples were required. Samples collected at this location during the fall season showed concentrations of K-40 only.

K-40 was detected in all poultry samples obtained during the spring. K-40 concentrations ranged from 2.6 pCi/g-wet to 3.3 pCi/g-wet. The control sample showed a concentration of 3.1 pCi/g-wet. No other radionuclides were detected for the spring samples. Samples obtained during the fall at three indicator locations and one control location showed positive concentrations of K-40 ranging from 2.9 pCi/g-wet to 3.5 pCi/g-wet. K-40 was detected at a concentration of 2.9 pCi/g-wet at the control location. No other radionuclides were detected in the fall samples.

Dose estimations were not made for poultry since no radionuclides were detected with the exception of K-40 which is naturally occurring.

Fruits and vegetables were obtained during the harvest season. Collections were made during September at three indicator locations and one control location. A successful attempt was made to collect one broadleaf and one non-broadleaf fruit or vegetable at each location. Non-broadleaf samples of tomatoes as well as broadleaf vegetables were originally collected on September 9. The broadleaf samples however were invalidated since they were not analyzed for I-131 within one half-life or eight days of collection. Broadleaf vegetables were recollected on September 22 and successfully analyzed within eight days of collection.

K-40 was detected in all broadleaf and non-broadleaf vegetables and fruits. Broadleaf vegetables (Swiss chard and cabbage) showed concentrations of K-40 ranging from 1.8 pCi/g-wet to 5.8 pCi/g-wet. The control location showed a K-40 concentration of 5.8 pCi/g-wet. Non-broadleaf fruits (tomatoes) also showed detectable concentrations of K-40 ranging from 1.9 pCi/g-wet to 2.7 pCi/g-wet. The control location showed a K-40 concentration of 2.6 pCi/g-wet.

Be-7 was detected for one of the broadleaf samples collected. Be-7 was detected at a concentration of 0.33 pCi/g-wet. The positive result was made at the control location. Be-7 is a naturally occurring radionuclide which is a result of the interaction between cosmic radiation and the upper atmosphere.

III. EVALUATION OF ENVIRONMENTAL DATA (continued)

B. Terrestrial Program (continued)

8. Human Food Products (continued)

No other radionuclides were detected in the 1981 collection of fruits or vegetables.

Dose estimates were not performed for fruits or vegetables since no other radionuclides with the exception of K-40 and Be-7 were detected.

9. Special Studies - Tables 21, 22, and 23

Since 1974, the detection of Cs-137 in milk samples analyzed for the radiological environmental monitoring program has been common. The specific source of the Cs-137 is not known as there are several possible source terms for this particular radionuclide. Cs-137 is a small component of plant effluents and is also a major fallout nuclide from the detonation of thermonuclear devices in the atmosphere. Because Cs-137 has a half-life of 30.2 years it remains a detectable component of environmental sample media for many years. It is estimated that about 34 million curies (34 Megacuries) of Cs-137 have been produced in the atmosphere due to weapons testing. Cs-137 is present in many of the sample medias collected for the environmental monitoring program. In the environment, cesium behaves much like potassium with regard to metabolism and elements found in living tissue.

To better understand the levels of Cs-137 in the local environment, a group of farm related samples has been collected over the past several years. These samples were chosen because of their role in the milk pathway which is important in the dose to man concept. In 1981, samples of pasture soil, pasture grass, surface water, milk herd water, fodder crops and sediment were collected. The samples were analyzed using gamma spectral analysis which would show the presence of gamma emitting radionuclides.

A total of 22 soil and sediment samples were collected in 1981. The majority of these samples were collected at routine milk sampling locations to increase the data base at these sample points and to aid in identifying possible correlations between plant operation and Cs-137 in local milk samples, should they exist.

A total of seven radionuclides were detected in the soil/sediment samples collected. Ra-226 is a naturally occurring radionuclide and was detected in all but one of the 22 samples analyzed. The concentrations for Ra-226 ranged from a maximum of 3.69 pCi/g-dry to a minimum of 1.41 pCi/g-dry in a marsh sediment sample. Be-7, a second naturally occurring nuclide, was detected in 2 of the 22 samples. Ce-144 and Nb-95 are fallout nuclides which

were detected in two of the samples. A stream sediment sample contained both Ce-144 and Nb-95 and the second sample, a pasture soil sample, contained of the two, only Nb-95.

A detectable level of Co-60 was found in one soil sample of the 22 collected. The presence of this radionuclide is considered to be the result of instrument background. The variability of the Co-60 background will at times result in a positive detection near the LLD level. In this particular sample, the detected level of Co-60 is just at the mean LLD value for the other 22 samples analyzed.

Twenty of the 22 soil and sediment samples analyzed contained measurable concentrations of Cs-137. The levels for Cs-137 ranged from a maximum of 1.32 pCi/g-dry to a minimum of 0.25 pCi/g-dry. The maximum value was detected in a marsh sediment sample with the high concentration theoretically resulting from the leaching of Cs-137 from the surrounding watershed during periods of precipitation and spring runoff.

The mean concentration of the indicator station for pasture soil samples was 0.59 pCi/g-dry while the control mean for the pasture soil samples was equal to 0.36 pCi/g-dry. The concentration of cesium in soils in many cases is dependent upon the clay content of the soil in which the cesium is deposited. This can account for general differences of Cs-137 concentrations from location to location. The samples collected in 1981 show a higher mean value for the indicator station than for the control stations, though not significantly higher based on the fact that soil types can influence Cs-137 concentration in soil. For purposes of illustration a comparison can be made to other soil samples collected in 1980. Pasture soil samples collected in 1980 showed a control sample result of 1.2 pCi/g-dry. This control sample result was significantly greater (43%) than the average of all indicator locations and approximately twice the minimum indicator sample result for Cs-137 in 1980. Another illustration envolves Cs-137 results for soil samples obtained at a control environmental station. Soil samples were collected here in 1975, 1977, and 1980. Mean Cs-137 concentrations in soil at this location ranged from 1.07 to 1.20 pCi/g-dry. Minimum and maximum ranges for individual samples ranged from 0.41 pCi/g-dry to 2.90 pCi/g-dry.

In conjunction with soil samples, fodder crops and pasture grass samples were also collected in 1981. A total of 53 such samples were collected from the routine milk sample locations and analyzed for gamma emitters. Three naturally occurring radionuclides were detected. K-40 was detected in each of the 53 samples and ranged in concentration from 2.99 pCi/g-wet to 25.7 pCi/g-wet. Ra-226

was detected in 14 of the 53 samples collected and ranged in concentration from 1.60 pCi/g-wet to 8.45 pCi/g-wet. Be-7 was detected in 27 of the 53 samples and ranged in concentration from 0.76 pCi/g-wet to 5.78 pCi/g-wet.

Three fallout nuclides were detected in fodder and pasture grass at the routine milk sample locations. Ce-144 was detected in 12 of the 53 samples and ranged from 0.21 pCi/g-wet to 3.08 pCi/g-wet. Nb-95 was detected in 17 of the 53 samples and ranged from 0.20 pCi/g-wet to 1.94 pCi/g-wet. Detectable concentrations of Ce-144 and Nb-95 did not seem to have a higher frequency of occurrence in specific medias or at specific times of the year.

A third fallout radionuclide detected in fodder crops and pasture soil samples was Cs-137. Cs-137 was detected in 2 of the 53 samples collected. One detection was made in a hay sample from location 4 (0.36 pCi/g-wet). The concentration detected was very small and was at the lower level of detection for hay samples. Cs-137 was not detected in any of the other farm locations. The second detection of Cs-137 was noted in corn silage (0.10 pCi/g-wet) at location 40. Location 40 is the control farm location.

Co-60 was detected in 4 of the 53 fodder and pasture grass samples collected. Each of the 4 instances of detection were noted at different farm locations. The presence of Co-60 is considered to be instrument background and not due to the operations at the site. The random detection of Co-60 in both temporal and spatial parameters shows a lack of a definite trend or pattern. Routine instrument background checks have intermittently shown Co-60 concentrations. Co-60 was not detected in milk samples.

The third series of samples collected for the special studies were surface waters. These collections included samples from the milk herd water sources at each of the routine milk sample locations and samples from the general drainage pattern of the land surrounding the site. A total of 48 samples were analyzed from a combination of water sources.

The milk herd water sources were collected from the major water supply used by the dairy herd at each farm at the time of collection. This sampling methodology would allow for direct correlation of Cs-137 concentrations detected in the monthly milk samples with the concentrations of Cs-137 detected in the appropriate water supply. Cs-137 was not detected in any of the 48 samples analyzed. Two naturally occurring radionuclides (K-40 and Ra-226) were detected in the samples.

III. EVALUATION OF ENVIRONMENTAL DATA (continued)

B. Terrestrial Program (continued)

9. Special Studies (continued)

Concentrations of Ra-226 ranged from a minimum of 13.5 pCi/l to a maximum of 161.0 pCi/l (control location well sample). Co-60 was the only radionuclide detected which is not naturally occurring. The presence of Co-60 is considered to be the result of instrument background as indicated above for soil and fodder crops. It should be noted that a series of samples collected in June and two samples collected in both July and August were contaminated in the laboratory at the time of analysis and the results are not presented in this report. The four samples showing the levels of contamination were those found to have been prepared and analyzed as a batch. An investigation into the possible source of the contamination was conducted and the source was determined to be material in the counting laboratory. To assure that the radionuclides detected in the contaminated samples were not in part due to contamination in the environment, a series of follow-up water collections were made in each of the three months of October, November and December. As noted on Table 22, no site related radionuclides were detected in these follow-up samples.

C. Conclusion

The Radiological Environmental Monitoring Program (REMP) was established to detect and assess any possible impact to the environment surrounding the Nine Mile Point area resulting from operations at the site.

Samples representing higher trophic levels, such as fish and meat were reviewed closely to assess any impact to the general environment or to man. In addition, the data was reviewed for any possible historical trophic level bio-accumulation trends. Little or no impact could be determined resulting from radionuclide deposition considering all sources (natural, weapons testing, etc.), although an increase in dose was noted as a result of weapons testing fallout. This increase in dose resulted from the October 1980 weapons test conducted by the People's Republic of China.

Any possible impact as a result of site operations is extremely minimal when compared to background or weapons testing. It has been demonstrated that almost all environmental samples contain traces of radionuclides which are a result of weapons testing or naturally occurring sources (primordial and/or cosmic related). Doses to man because of natural sources alone (naturally occurring radionuclides in the soil and lower atmosphere in Oswego County) account for approximately 60 mrem per year as demonstrated by control environmental TLD's. Possible doses due to site operations is less than 1% of this particular natural exposure.

Therefore, as determined by review of the data presented herein, no impact due to operations at the Nine Mile Point Nuclear Station was detected that would effect the health and safety of the public.

REFERENCES

1. U.S. Nuclear Regulatory Commission Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluent for the Purpose of Evaluating Compliance with 10CFR Part 50, Appendix I", March 1976 (Revision 0).

2. U.S. Nuclear Regulatory Commission Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluent for the Purpose of Evaluating Compliance With 10 CFR Part 50, Appendix I", October 1977 (Revision 1).

3. Eichholz, G. Environmental Aspects of Nuclear Power, First Edition, Ann Arbor Science Publishers, Inc., Ann Arbor, Michigan, 1976.

4. National Council on Radiation Protection and Measurements (NRCP), Environmental Radiation Measurements, NCRP Report No. 50, 1976.

5. National Council on Radiation Protection and Measurements (NCRP), Natural Background Radiation in the United States, NCRP Report No. 45, 1975.

6. National Council on Radiation Protection and Measurements (NCRP), Cesium-137 from the Environment to Man: Metabolism and Dose, NCRP Report No. 52, 1977.

7. National Council on Radiation Protection and Measurements (NCRP), Radiation Exposure from Consumer Products and Miscellaneous Sources, NCRP Report No. 56, 1977.

8. U.S. Nuclear Regulatory Commission Regulatory Guide 4.8, "Environmental Technical Specifications for Nuclear Power Plants", December, 1975.

9. U.S. Nuclear Regulatory Commission Branch Technical Position to Regulatory Guide 4.8, "An Acceptable Radiological Environmental Monitoring Program", November, 1979.

10. Eisenbud, Merrill, Environmental Radioactivity, Second Edition, Academic Press, New York, NY 1973.

11. Francis, C.W., Radiostrontium Movement in Soils and Uptake in Plants. Environmental Sciences Division, Oak Ridge National Laboratory, U.S. Department of Energy, 1978.

12. Thomas, C.W. et al., Radioactive Fallout from Chinese Nuclear Weapons Test, September 26, 1976. (BNWL-2164) Battelle, Pacific Northwest Laboratories, U.S. ERDA, 1979.

13. Pochin, Edward E., Estimated Population Exposure from Nuclear Power Production and other Radiation Sources, Nuclear Energy Agency, Organization for Economic Co-Operation and Development, 1976.

14. International Commission on Radiological Protection (ICRP), Radionuclide Release into the Environment; Assessment of Doses to Man, ICRP Publication 29, 1979.

15. Glasstone, Samuel and Jordan, Walter H., Nuclear Power and Its Environmental Effects, First Edition, American Nuclear Society, La Grange Park, Ill., 1980.

Sample Summaries

Environmental sample data is summarized by tables. Tables are provided for select sample media and contain data summaries based on quarterly mean values. Mean values are comprised of both positive and LLD values where applicable. These tables are entitled "Environmental Sample Summary".

ENVIRONMENTAL SAMPLE SUMMARY

Medium/Sample	Location	Nuclide	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Water		pCi/l				
Monthly Composite (1981)	Raw City Water (Control)	Mn-54	<1.5	<1.3	<1.2	<1.0
		Co-60	<2.0	<1.5	<1.7	<1.6
		Cs-134	<1.4	<1.2	<1.1	<1.3
		Cs-137	<1.3	<1.2	<1.3	<1.1
		Others	<LLD	<LLD	<LLD	<LLD
		Gross Beta	4.8	2.2	2.1	2.6

ENVIRONMENTAL SAMPLE SUMMARY

Medium/Sample	Location	Nuclide	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Water		pCi/l				
Monthly Composite (1981)	NMP Inlet	Mn-54	<1.4	<1.5	<1.5	<1.1
		Co-60	<1.9	<1.8	<1.7	<1.5
		Cs-134	<1.1	<1.2	<1.3	<1.1
		Cs-137	<1.3	<1.3	<1.7	<1.1
		Others	<LLD	<LLD	<LLD	<LLD
		Gross Beta	4.1	3.1	3.3	2.4
	JAF Inlet	Mn-54	<1.4	<1.3	<1.6	<1.0
		Co-60	<1.6	<1.5	<2.0	<1.5
		Cs-134	<1.3	<1.0	<1.2	<1.1
		Cs-137	<1.3	<1.1	<1.3	<1.1
		Others	<LLD	<LLD	<LLD	<LLD
		Gross Beta	3.7	3.0	2.0	2.4

ENVIRONMENTAL SAMPLE SUMMARY

Medium/Sample	Location	Nuclide	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
AIRBORNE						
Particulate Filters	On Sites	Gross Beta pCi/m³				
	D_1		0.164	0.320	0.138	0.037
	D_2		0.158	0.311	0.129	0.038
	E		0.163	0.329	0.133	0.040
	F		0.159	0.328	0.135	0.037
	G		0.167	0.311	0.140	0.038
	H		0.108	0.285	0.122	0.032
	I		0.152	0.241	0.126	0.037
	J		0.129	0.246	0.128	0.028
	K		0.116	0.254	0.127	0.029
	Off Sites					
	C		0.147	0.312	0.130	0.037
	D_1		0.151	0.313	0.136	0.034
	D_2		0.162	0.338	0.138	0.036
	E		0.165	0.339	0.151	0.037
	F		0.160	0.339	0.150	0.039
	G		0.158	0.322	0.133	0.037

ENVIRONMENTAL SAMPLE SUMMARY

Medium/Sample	Location	Nuclide	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
AIRBORNE						
Charcoal Cartridge	On Sites	I-131 pCi/m³				
	D_1		<0.027	<0.030	<0.031	<0.027
	D_2		<0.022	<0.024	<0.030	<0.021
	E		<0.019	<0.022	<0.022	<0.019
	F		<0.029	<0.030	<0.033	<0.027
	G		<0.024	<0.025	<0.027	<0.022
	H		<0.025	.0.026	0.018	<0.014
	I		.0.026	<0.028	<0.024	<0.026
	J		<0.023	<0.024	<0.025	<0.022
	K		<0.020	<0.021	<0.023	<0.022
	Off Sites					
	C		<0.024	<0.024	<0.028	<0.018
	D_1		<0.025	<0.023	<0.022	<0.018
	D_2		<0.023	<0.024	<0.028	<0.022
	E		<0.027	<0.026	<0.030	<0.022
	F		<0.021	<0.018	<0.020	<0.014
	G		<0.027	<0.021	<0.024	<0.021

ENVIRONMENTAL SAMPLE SUMMARY

Medium/Sample	Location	Nuclide	1st Quarter	2nd. Quarter	3rd Quarter	4th Quarter
TLD	On Sites	Direct Radiation mRem/std. mo.	13.78	16.56	13.83	12.99
	On Site Environmental Stations		5.41	5.57	4.74	5.26
	Off Sites		4.88	5.16	3.84	5.08

ENVIRONMENTAL SAMPLE SUMMARY

Medium/Sample	Location (Map #*)	Nuclide pCi/l	Q-1	Q-2	Q-3	Q-4
Ingestion						
Milk	4	Cs-134	NS	<3.8	<4.3	<4.2
		K-40	NS	1500	1400	1733
		Cs-137	NS	<5.2	<6.0	<5.7
		Sr-90	NS	6.09	3.67	3.55
		Ba-140	NS	<40	<37	<48
		La-140	NS	<7.4	<6.5	<10.7
	40	Cs-134	NS	<3.4	<3.7	<4.3
		K-40	NS	1450	1433	1367
		Cs-137	NS	<4.4	<4.9	<5.1
		Sr-90	NS	4.82	4.40	3.77
		Ba-140	NS	<33	<36	<46
		La-140	NS	<8.0	<6.6	<8.8
	14	Cs-134	NS	<4.0	<3.7	<3.7
		K-40	NS	1400	1300	1433
		Cs-137	NS	<5.6	<4.9	<4.6
		Sr-90	NS	7.48	3.78	2.21
		Ba-140	NS	<44	<37	<43
		La-140	NS	<9.9	<7.0	<8.0
	16	Cs-134	NS	<3.2	<3.6	<3.3
		K-40	NS	1300	1400	1567
		Cs-137	NS	<5.2	<5.1	<5.5
		Sr-90	NS	7.13	4.93	5.41
		Ba-140	NS	<36	<33	<35
		La-140	NS	<7.0	<6.2	<5.9
	25	Cs-134	NS	NA	<4.3(a)	NA
		K-40	NS	NA	1400	NA
		Cs-137	NS	NA	24.0	NA
		Sr-90	NS	NA	3.78	NA
		Ba-140	NS	NA	<35	NA
		La-140	NS	NA	<9.6	NA
	12	Cs-134	NS	<3.0	<3.2	<3.7
		K-40	NS	1450	1300	1733
		Cs-137	NS	<6.0	<5.7	<5.4
		Sr-90	NS	4.17	6.33	3.64
		Ba-140	NS	<33	<29	<41
		La-140	NS	<6.8	<4.6	<4.8

NS - not sampled (not part of grazing season)
NA - samples not available from farm location
(a) - samples available on 7/20/81 and 8/3/81 only

ENVIRONMENTAL SAMPLE SUMMARY

Medium/Sample	Location (Map #*)	Nuclide pCi/l	Q-1	Q-2	Q-3	Q-4
Ingestion						
Milk	7	Cs-134	-	-	-(b)	<3.4
		K-40	-	-	-	1300
		Cs-137	-	-	-	<4.8
		Sr-90	-	-	-	4.26
		Bala-140	-	-	-	-
		Ba-140	-	-	-	<4.0
		La-140	-	-	-	<7.7

(b) - sampling started in 10/81 at this location

ENVIRONMENTAL SAMPLE SUMMARY

Medium/Sample	Location (map #)	Nuclide pCi/l	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Milk	4	I-131	NS	<0.166	<0.211	<0.153
	40	I-131	NS	<0.186	<0.201	<0.134
	14	I-131	NS	<0.197	<0.204	<0.157
	16	I-131	NS	<0.189	<0.200	<0.134
	25	I-131	NS	NA	<0.176(a)	NA
	12	I-131	NS	<0.180	<0.208	<0.163
	7	I-131	NS	NS	NS	<0.129(b)

NA = Sample Not Available
NS = Not Sampled
(a) = Only Two Sample Dates Available -- 07/20/81 and 08/03/81
(b) = Sampling Initiated at Location 7 on 10/05/81

TABLE 1

SAMPLE COLLECTION AND ANALYSIS

SITE RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

A. AQUATIC PROGRAM

	MEDIA	ANALYSIS	FREQUENCY	LOCATIONS (1)	
1.	Fish	GSA, Sr-89 & Sr-90	2/yr	2 Onsite	1 Offsite
2.	Cladophora	GSA	In Season	2 Onsite	1 Offsite
3.	Lake Water	GSA H-3, Sr-89, Sr-90	M Comp. Qtr. Comp.	3(2)	
4.	Sediment	GSA	Semi-Annual	Dam Shoreline	1 Offsite

NOTES:

(1) Onsite samples collected in the vicinity of discharges, offsite samples collected at a distance of at least five miles from site.

(2) The three lake water samples to include Nine Mile Point Unit 1 intake water, James A. Fitzpatrick intake water, and Oswego city raw water.

TABLE 2

SAMPLE COLLECTION AND ANALYSIS

SITE RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

B. TERRESTRIAL PROGRAM

	MEDIA	ANALYSIS	FREQUENCY	NO. OF LOCATIONS	LOCATIONS
1.	Air Particulates	GB GSA	W M·Comp (4)	At least 10	7 Onsite 6 Offsite
2.	Soil	GSA, Sr-90	Every 3 years	13	7 Onsite 6 Offsite
3.	TLD	Gamma Dose	Qtr.	20	14 Onsite 6 Offsite
4.	Radiation Monitors	Gamma Dose	C	At least 7	7 Onsite 1 Offsite
5.	Airborne - I-131	GSA	W	At least 10	7 Onsite 6 Offsite
6.	Milk	I GSA, Sr-90	M(5) M	4(5)	(6)
7.	Human Food Crops	GSA, I-131	A	3	(6)
8.	Meat, Poultry, Eggs	GSA Edible Portions	SA	3	(6)

NOTES: (Cont.)

(4) Onsite samples counted as two composites: Offsite samples counted as two composites; any high gross beta count samples counted separately (not included in composite).
(5) Frequency applied only during grazing season.
(6) Samples to be collected from locations (where available) within a 10-mile radius having the highest potential concentrations of radionuclides.

TABLE 5

CONCENTRATIONS OF GAMMA EMITTERS IN CLADOPHORA SAMPLES

Results in Units of pCi/g(wet) ± 2 sigma

COLLECTION SITE	NUCLIDES FOUND	JULY 1981	AUGUST 1981
Fitzpatrick	Be-7	1.7±0.7	3.1±0.7
	K-40	21±2	28±3
	Mn-54	0.12±0.05	0.23±0.06
	Co-58	<0.09	0.15±0.07
	Fe-59	<0.2	<0.3
	Co-60	0.44±0.07	1.1±0.1
	Zn-65	<0.2	<0.2
	Zr-95	4.2±0.4	2.2±0.2
	Nb-95	7.8±0.8	5.8±0.6
	Ru-103	0.14±0.09	<0.2
	Ru-106	0.7±0.4	<0.8
	Cs-134	<0.08	0.10±0.04
	Cs-137	0.20±0.05	0.85±0.09
	Ce-141	0.2±0.1	<0.1
	Ce-144	2.3±0.3	0.8±0.2
	Ra-226	<0.2	<0.2
	Others	All<LLD	All<LLD
Nine Mile Point	Be-7	0.7±0.4	2.9±1.2
	K-40	13±1	23±2
	Mn-54	0.06±0.04	<0.1
	Co-58	<0.05	<0.1
	Fe-59	<0.1	<0.4
	Co-60	0.48±0.06	0.20±0.09
	Zn-65	<0.1	<0.3
	Zr-95	1.2±0.1	3.1±0.3
	Nb-95	2.3±0.2	5.5±0.6
	Cs-134	<0.05	<0.1
	Cs-137	0.10±0.03	0.28±0.09
	Ce-144	0.8±0.2	<1.0
	Ra-226	<0.1	<0.3
	Th-232	<0.2	<0.4
	Others	All<LLD	All<LLD

TABLE 3 (cont.)

CONCENTRATIONS OF GAMMA EMITTERS IN CLADOPHORA SAMPLES

Results in Units of pCi/g(wet) ± 2 sigma

COLLECTION SITE	NUCLIDES FOUND	JULY 1981	AUGUST 1981
Oswego	Be-7	<0.6	0.9±0.5
	K-40	14±1	19±2
	Mn-54	<0.06	<0.06
	Co-58	<0.07	<0.07
	Fe-59	<0.2	<0.2
	Co-60	<0.06	<0.1
	Zn-65	<0.1	<0.2
	Zr-95	0.62±0.09	0.3±0.1
	Nb-95	1.0±0.1	0.55±0.08
	Ru-103	0.09±0.05	<0.09
	Cs-134	<0.06	<0.07
	Cs-137	0.08±0.04	0.13±0.05
	Ra-226	0.19±0.07	<0.1
	Others	All<LLD	All<LLD

TABLE 4

CONCENTRATIONS OF Sr-90 AND GAMMA EMITTERS IN SHORELINE SEDIMENT SAMPLES

Results in Units of pCi/g(dry) ± 2 sigma

COLLECTION CODE	COLLECTION DATE	GAMMA EMITTERS									
		Sr-90	Be-7	K-40	Co-60	Nb-95	Cs-134	Cs-137	Ra-226	Th-232	Others
Nine Mile Point	7-06-81	<0.008	<0.5	13±1	<0.06	<0.08	<0.06	0.11±0.05	0.33±0.09	0.4±0.2	All<LLD
	10-20-81	0.006±0.004	<0.5	17±2	<0.06	<0.08	<0.04	<0.04	0.5±0.1	0.5±0.1	All<LLD
North Sterling	7-08-81	<0.006	<0.4	11±1	<0.06	<0.06	<0.04	<0.05	0.20±0.06	0.20±0.08	All<LLD
	10-20-81	<0.003	<0.5	8.1±1.0	<0.07	<0.07	<0.05	<0.05	0.19±0.07	0.2±0.1	All<LLD

Table 5A

CONCENTRATIONS OF STRONTIUM-89 AND -90 AND GAMMA EMITTERS IN FISH SAMPLES

Results in Units of pCi/g(wet) ± 2 sigma

SAMPLE DATE	SAMPLE TYPE	Sr-89	Sr-90	GAMMA EMITTERS K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137	Others
					FITZPATRICK (03)							
May 1981	Lake Trout #1	<0.008	<0.002	3.0±0.3	<0.01	<0.02	<0.04	<0.01	<0.03	<0.008	0.036±0.009	All<LLD
	Lake Trout #2	0.004±0.004	<0.002	3.1±0.3	<0.01	<0.02	<0.05	<0.02	<0.03	<0.01	0.05±0.01	All<LLD
	White Sucker	<0.008	<0.003	3.4±0.3	0.018±0.006	0.047±0.009	<0.03	0.12±0.01	<0.03	<0.007	0.036±0.007	All<LLD
July 1981	White Sucker	(1)	(1)	2.9±0.3	<0.009	<0.01	<0.02	<0.01	<0.02	<0.009	0.056±0.007	All<LLD
October 1981	Lake Trout	<0.006	<0.003	3.1±0.3	<0.009	<0.01	<0.03	<0.01	<0.03	<0.007	0.044±0.007	All<LLD
	White Sucker #1	<0.01	<0.003	4.0±0.4	<0.009	<0.01	<0.03	<0.009	<0.02	<0.008	0.074±0.007	All<LLD
	White Sucker #2	<0.008	0.002±0.001	3.7±0.4	<0.01	<0.01	<0.03	<0.01	<0.03	<0.009	0.055±0.008	All<LLD
					NINE MILE POINT (02)							
May 1981	Lake Trout #1	<0.006	<0.002	3.1±0.3	<0.009	<0.01	<0.04	<0.01	<0.02	<0.007	0.061±0.007	All<LLD
	Lake Trout #2	0.025±0.004	<0.002	2.9±0.3	<0.01	0.04±0.01	<0.04	0.06±0.01	<0.03	<0.01	0.043±0.008	All<LLD
	White Sucker	0.004±0.004	<0.002	3.4±0.3	0.014±0.005	0.045±0.008	<0.03	0.11±0.01	<0.02	<0.006	0.027±0.005	All<LLD
July 1981	White Sucker(NMPH)	(1)	(1)	3.3±0.3	<0.007	<0.008	<0.02	<0.01	<0.02	0.009±0.004	0.079±0.008	All<LLD
	White Sucker(NMPP)	(1)	(1)	3.3±0.3	<0.008	<0.009	<0.02	<0.007	<0.02	<0.07	0.087±0.009	All<LLD
	White Sucker(NMPE)	(1)	(1)	3.0±0.3	<0.007	<0.007	<0.02	<0.009	<0.02	0.010±0.003	0.091±0.009	All<LLD
October 1981	Lake Trout	<0.009	0.004±0.003	4.0±0.4	<0.01	<0.01	<0.03	<0.02	<0.03	<0.01	0.068±0.009	All<LLD
	White Sucker #1	<0.005	<0.002	3.7±0.4	<0.007	<0.009	<0.03	<0.01	<0.02	<0.007	0.10±0.01	All<LLD
	White Sucker #2	<0.02	<0.006	3.6±0.4	<0.01	<0.01	<0.03	<0.01	<0.03	<0.01	0.072±0.009	All<LLD
					OSWEGO (00)							
May 1981	White Sucker	<0.009	<0.003	3.2±0.3	<0.007	<0.009	<0.03	<0.01	<0.02	<0.006	0.028±0.005	All<LLD
October 1981	Lake Trout	<0.02	<0.007	2.4±0.2	<0.01	<0.01	<0.02	<0.01	<0.03	<0.009	0.058±0.009	All<LLD
	White Sucker #1	<0.007	<0.003	3.3±0.3	<0.007	<0.007	<0.02	<0.01	<0.02	<0.006	0.028±0.005	All<LLD
	White Sucker #2	<0.006	<0.002	3.1±0.3	<0.008	<0.009	<0.02	<0.009	<0.02	<0.008	0.030±0.006	All<LLD
					RICE CREEK							
May 1981	Lake Trout #1	0.014±0.006	<0.003	3.0±0.3	<0.01	<0.02	<0.05	<0.01	<0.03	<0.01	0.062±0.008	All<LLD
	Lake Trout #2	0.015±0.009	<0.004	3.1±0.3	<0.01	<0.02	<0.04	<0.02	<0.03	<0.01	0.052±0.009	All<LLD

(1) Sr-89 and -90 analyses were not required.

TABLE 5B

Concentrations of Strontium-89 & 90 & Gamma Emitters in Fish Samples
Results in Units of pCi/kg (dry)

Sample Date	Sample Type	Sr-89	Sr-90	GAMMA EMITTERS K-40	Mn-54	Co-58	Co-60	Cs-134	Cs-137	Others
				FITZPATRICK						
May 1981	Lake Trout #1	< 27.6	< 6.9	9840.0±984.0	< 32.5	< 49.2	< 42.6	< 27.6	118.1±29.5	< LLD
	Lake Trout #2	12.8±10.7	< 6.2	9269.0±926.9	< 35.9	< 50.8	< 53.8	< 29.9	158.5±29.9	< LLD
	White Sucker	< 38.6	< 14.0	16592.0±1659.2	87.8±28.3	229.4±42.9	585.6±58.6	< 36.1	175.7±32.7	< LLD
October 1981	Lake Trout	< 18.8	< 8.7	10571.0±1057.1	< 29.3	< 32.7	< 40.9	< 24.9	150.0±24.6	< LLD
	White Sucker #1	< 49.4	< 15.0	20360.0±2036.0	< 44.8	< 50.9	< 47.3	< 42.2	376.7±37.7	< LLD
	White Sucker #2	< 40.8	11.9±7.4	19684.0±1968.4	< 53.2	< 63.8	< 53.2	< 48.9	292.6±44.7	< LLD
				NINE MILE POINT						
May 1981	Lake Trout #1	< 18.9	< 5.4	9610.0±961.0	< 27.3	< 40.3	< 34.1	< 21.7	189.1±21.4	< LLD
	Lake Trout #2	75.2±11.7	< 7.2	8729.0±872.9	< 36.1	105.4±36.1	192.6±39.1	< 28.6	129.4±25.3	< LLD
	White Sucker	19.6±17.8	< 10.8	16830.0±1683.0	69.3±23.3	222.8±37.1	544.4±54.4	< 29.2	133.6±22.3	< LLD
October 1981	Lake Trout	< 26.7	11.2±7.8	12400.0±1240.0	< 87.6	< 40.3	< 116.8	< 29.4	210.8±27.9	< LLD
	White Sucker #1	< 24.2	< 11.0	17390.0±1739.0	< 34.8	< 43.2	< 44.6	< 32.4	470.0±47.0	< LLD
	White Sucker #2	< 84.5	< 29.5	17784.0±1778.4	< 49.4	< 59.3	< 59.3	< 47.9	355.7±42.0	< LLD

TABLE 5B (Continued)

Concentrations of Strontium-89 & 90 & Gamma Emitters in Fish Samples
Results in Units of pCi/kg (dry)

Sample Date	Sample Type	Sr-89	Sr-90	K-40	GAMMA EMITTERS Mn-54	Co-58	Co-60	Cs-134	Cs-137	Others
					OSWEGO					
May 1981	White Sucker	< 48.1	< 16.6	16960.0±1696.0	< 37.6	< 48.8	< 58.3	< 30.7	148.4±28.1	< LLD
October 1981	Lake Trout	< 69.7	< 27.6	10080.0±1008.0	< 46.2	< 46.2	< 50.4	< 39.5	243.6±35.7	< LLD
	White Sucker #1	< 39.3	< 16.5	18909.0±1890.9	< 39.0	< 37.8	< 63.0	< 33.2	160.4±30.4	< LLD
	White Sucker #2	< 34.3	< 14.4	18662.0±1866.2	< 48.2	< 53.6	< 53.0	< 47.6	180.6±35.5	< LLD
					RICE CREEK					
May 1981	Lake Trout #1	47.3±20.3	< 8.5	9990.0±999.0	< 40.0	< 56.6	< 40.0	< 36.6	206.5±28.0	< LLD
	Lake Trout #2	< 47.1	< 11.3	9610.0±961.0	< 37.2	< 49.6	< 52.7	< 30.4	161.2±28.5	< LLD

TABLE 5B

Concentrations of Strontium-89 & 90 & Gamma Emitters in Fish Samples
Results in Units of pCi/kg (dry) ± 2 sigma

Sample Type	Sr-89	Sr-90	K-40	GAMMA EMITTERS Mn-54	Co-58	Co-60	Cs-134	Cs-137
FITZPATRICK								
Lake Trout #1	< 27.6	< 6.9	9840.0±984.0	< 32.5	< 49.2	< 42.6	< 27.6	118.1±29.5
Lake Trout #2	12.8±10.7	< 6.2	9269.0±926.9	< 35.9	< 50.8	< 53.8	< 29.9	158.5±29.9
White Sucker	< 38.6	< 14.0	16592.0±1659.2	87.8±28.3	229.4±42.9	585.6±58.6	< 36.1	175.7±32.7
Lake Trout	< 18.8	< 8.7	10571.0±1057.1	< 29.3	< 32.7	< 40.9	< 24.9	150.0±24.6
White Sucker #1	< 49.4	< 15.0	20360.0±2036.0	< 44.8	< 50.9	< 47.3	< 42.2	376.7±37.7
White Sucker #2	< 40.8	11.9±7.4	19684.0±1968.4	< 53.2	< 63.8	< 53.2	< 48.9	292.6±44.7
NINE MILE POINT								
Lake Trout #1	< 18.9	< 5.4	9610.0±961.0	< 27.3	< 40.3	< 34.1	< 21.7	189.1±21.4
Lake Trout #2	75.2±11.7	< 7.2	8729.0±872.9	< 36.1	105.4±36.1	192.6±39.1	< 28.6	129.4±25.3
White Sucker	19.6±17.8	< 10.8	16830.0±1683.0	69.3±23.3	222.8±37.1	544.4±54.4	< 29.2	133.6±22.3
Lake Trout	< 26.7	11.2±7.8	12400.0±1240.0	< 87.6	< 40.3	< 116.8	< 29.4	210.8±27.9
White Sucker #1	< 24.2	< 11.0	17390.0±1739.0	< 34.8	< 43.2	< 44.6	< 32.4	470.0±47.0
White Sucker #2	< 84.5	< 29.5	17784.0±1778.4	< 49.4	< 59.3	< 59.3	< 47.9	355.7±42.0

TABLE 5B (Continued)

Concentrations of Strontium-89 & 90 & Gamma Emitters in Fish Samples
Results in Units of pCi/kg (dry) ± 2 sigma

Sample Type	Sr-89	Sr-90	GAMMA EMITTERS K-40	Mn-54	Co-58	Co-60	Cs-134	Cs-137
OSWEGO								
White Sucker	< 48.1	< 16.6	16960.0±1696.0	< 37.6	< 48.8	< 58.3	< 30.7	148.4±28.1
Lake Trout	< 69.7	< 27.6	10080.0±1008.0	< 46.2	< 46.2	< 50.4	< 39.5	243.6±35.7
White Sucker #1	< 39.3	< 16.5	18909.0±1890.9	< 39.0	< 37.8	< 63.0	< 33.2	160.4±30.4
White Sucker #2	< 34.3	< 14.4	18662.0±1866.2	< 48.2	< 53.6	< 53.0	< 47.6	180.6±35.5
RICE CREEK								
Lake Trout #1	47.3±20.3	< 8.5	9990.0±999.0	< 40.0	< 56.6	< 40.0	< 36.6	206.5±28.0
Lake Trout #2	< 47.1	< 11.3	9610.0±961.0	< 37.2	< 49.6	< 52.7	< 30.4	161.2±28.5

TABLE 6

CONCENTRATIONS OF BETA EMITTERS IN LAKE WATER SAMPLES

Results in Units of pCi/l ± 2 sigma

Station Code	January	February	March	April	May	June
JAF Inlet	2.6±1.0	4.0±1.4	4.4±1.4	5.1±1.7	2.7±0.7	1.2±0.7
NMP Inlet	4.4±1.1	4.6±1.4	3.2±1.3	5.4±1.7	2.3±0.7	1.5±0.7
Raw City Water (control)	4.3±1.1	5.8±1.4	4.4±1.4	3.7±1.6	<0.88	<2.0

Station Code	July	August	September	October	November	December
JAF Inlet	1.9±0.7	1.9±0.7	2.2±0.7	2.2±0.5	2.6±0.3	2.3±0.4
NMP Inlet	4.4±0.8	2.0±0.7	3.4±0.7	2.8±0.5	2.3±0.3	2.1±0.4
Raw City Water (control)	2.0±0.7	1.9±0.7	2.5±0.7	2.8±0.5	2.6±0.3	2.4±0.4

TABLE 7

CONCENTRATIONS OF TRITIUM AND STRONTIUM-89 AND 90 IN LAKE WATER (QUARTER COMPOSITE SAMPLES)

Results in Units of pCi/l ± 2 sigma

STATION CODE	PERIOD	DATE	TRITIUM	Sr-89	Sr-90
JAF INLET	First Quarter	12/30/80 to 03/31/81	223 ± 84	<2.2	<0.9
	Second Quarter	03/31/81 to 06/30/81	315 ± 120	<1.0	0.8 ± 0.3
	Third Quarter	06/30/81 to 09/30/81	388 ± 130	<1.0	0.6 ± 0.3
	Fourth Quarter	09/30/81 to 12/31/81	212 ± 140	<1.1	<0.7
NMP INLET	First Quarter	12/31/80 to 03/31/81	189 ± 97	<1.8	1.0 ± 0.5
	Second Quarter	03/31/81 to 06/30/81	298 ± 120	0.8 ± 0.7	0.7 ± 0.4
	Third Quarter	06/30/81 to 09/30/81	<228	<1.0	0.8 ± 0.3
	Fourth Quarter	09/30/81 to 12/31/81	183 ± 140	<2.8	<1.8
RAW CITY WATER (CONTROL)	First Quarter	12/31/80 to 03/31/81	211 ± 84	<2.4	0.9 ± 0.6
	Second Quarter	03/31/81 to 06/30/81	328 ± 140	<1.0	0.8 ± 0.3
	Third Quarter	06/30/81 to 09/30/81	284 ± 130	<1.2	0.5 ± 0.4
	Fourth Quarter	09/30/81 to 12/31/81	282 ± 120	<1.5	0.6 ± 0.6

TABLE 8
CONCENTRATIONS OF GAMMA EMITTERS IN LAKE WATER SAMPLES
Results in Units of pCi/l ± 2 sigma

Station Code	Nuclide	January	February	March	April	May	June
JAF INLET	Co-60	<1.9	<1.0	<2.0	<2.1	<1.3	<1.2
	Mn-54	<1.3	<1.5	<1.4	<1.4	<1.0	<1.4
	Cs-137	<1.2	<1.5	<1.3	<1.4	<0.9	<1.0
	Cs-134	<1.3	<1.3	<1.2	<1.3	<0.8	<1.0
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
9 MILE INLET	Co-60	<1.9	<1.8	<2.1	2.5±0.6	1.7±0.7	<1.2
	Mn-54	<1.3	<1.4	<1.6	<1.8	<1.4	<1.2
	Cs-137	<1.2	<1.4	<1.4	<2.0	<1.0	<1.0
	Cs-134	<1.0	<1.1	<1.3	<1.5	<1.0	<1.0
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
OSWP (CONTROL)	Co-60	<2.1	<1.8	<2.1	<1.9	1.4±0.8	<1.1
	Mn-54	<1.3	<1.5	<1.7	<1.7	<1.1	<1.1
	Cs-137	<1.1	<1.6	<1.2	<1.7	<0.8	<1.0
	Cs-134	<1.4	<1.4	<1.3	<1.5	<1.0	<1.0
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD

Station Code	Nuclide	July	August	September	October	November	December
JAF INLET	Co-60	<1.7	<2.2	<2.0	<1.4	<1.5	<1.6
	Mn-54	<1.7	<1.6	<1.4	<1.1	<1.1	<0.9
	Cs-137	<1.2	<1.3	<1.3	<1.0	<1.1	<1.2
	Cs-134	<1.2	<1.3	<1.0	<1.1	<0.9	<1.3
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
9 MILE INLET	Co-60	<1.2	<2.0	<2.2	<1.7	<1.3	<1.4
	Mn-54	<1.6	<1.4	<1.6	<0.9	<1.1	<1.2
	Cs-137	2.3±0.8	<1.3	<1.6	<1.3	<1.0	<1.0
	Cs-134	<1.3	<1.2	<1.5	<0.9	<1.1	<1.2
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
OSWP (CONTROL)	Co-60	<1.8	<2.2	<1.0	<1.6	<1.8	<1.3
	Mn-54	<1.1	<1.6	<0.8	<1.0	<1.1	<1.0
	Cs-137	<1.4	<1.7	<0.7	<1.1	<1.2	<1.1
	Cs-134	<1.4	<1.4	<0.6	<1.6	<1.1	<1.2
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD

TABLE 9

NMP/JAF SITE
ENVIRONMENTAL AIRBORNE PARTICULATE SAMPLES - OFF SITE STATIONS
GROSS BETA ACTIVITY pCi/m^3 ± 2 Sigma

WEEK END DATE	LOCATION						
	C--OFF	D1-OFF	D2-OFF	E--OFF	F--OFF	G--OFF	
01/01/06	0.079±0.006	0.088±0.006	0.082±0.006	0.085±0.006	0.084±0.006	0.082±0.006	
01/01/13	0.084±0.006	0.084±0.006	0.090±0.006	0.089±0.006	0.056±0.005	0.108±0.008	
01/01/20	0.137±0.008	0.139±0.009	0.165±0.009	0.179±0.009	0.133±0.007	0.194±0.011	
01/01/27	0.154±0.009	0.140±0.008	0.143±0.008	0.135±0.008	0.129±0.008	0.187±0.010	
01/02/04	0.083±0.006	0.069±0.005	0.077±0.006	0.110±0.007	0.093±0.006	0.131±0.007	
01/02/10	0.119±0.008	0.110±0.008	0.125±0.008	0.120±0.008	0.267±0.011	0.115±0.009	
01/02/18	0.167±0.009	0.163±0.009	0.174±0.009	0.158±0.009	0.118±0.006	0.205±0.010	
01/02/24	0.157±0.010	0.139±0.009	0.130±0.009	0.130±0.009	0.129±0.008	0.114±0.008	
01/03/03	0.099±0.007	0.101±0.007	0.095±0.007	0.096±0.007	0.096±0.006	0.059±0.006	
01/03/10	0.125±0.008	0.113±0.008	0.117±0.008	0.116±0.008	0.110±0.007	0.107±0.009	
01/03/17	0.190±0.010	0.216±0.010	0.222±0.010	0.219±0.011	0.233±0.009	0.109±0.011	
01/03/24	0.183±0.010	0.194±0.010	0.200±0.010	0.194±0.010	0.109±0.009	0.171±0.011	
01/03/31	0.337±0.013	0.401±0.013	0.470±0.015	0.500±0.016	0.452±0.013	0.392±0.015	
01/04/07	0.395±0.014	0.429±0.014	0.390±0.014	0.443±0.015	0.392±0.013	0.427±0.015	
01/04/14	0.299±0.012	0.295±0.012	0.304±0.013	0.374±0.014	0.394±0.013	0.304±0.012	
01/04/21	0.338±0.013	0.372±0.013	0.411±0.015	0.367±0.014	0.301±0.012	0.300±0.013	
01/04/28	0.275±0.012	0.315±0.012	0.347±0.013	0.330±0.013	0.300±0.012	0.334±0.012	
01/05/05	0.370±0.013	0.459±0.014	0.467±0.015	0.519±0.016	0.530±0.014	0.484±0.014	
01/05/12	0.292±0.012	0.344±0.012	0.355±0.013	0.343±0.013	0.360±0.012	0.365±0.012	
01/05/19	0.330±0.014	0.277±0.010	0.312±0.013	0.312±0.013	0.288±0.011	0.343±0.013	
01/05/27	0.494±0.015	0.507±0.015	0.535±0.016	0.549±0.016	0.427±0.013	0.438±0.013	
01/06/02	0.420±0.017	0.175±0.011	0.457±0.018	0.364±0.015	0.417±0.014	0.327±0.013	
01/06/10	0.260±0.012	*	0.274±0.012	0.248±0.011	0.264±0.010	0.242±0.010	
01/06/16	0.200±0.012	0.191±0.011	0.167±0.011	0.191±0.012	0.199±0.010	0.176±0.010	
01/06/23	0.169±0.010	0.160±0.009	0.163±0.010	0.153±0.010	0.138±0.008	0.140±0.008	
01/06/30	0.204±0.011	0.230±0.011	0.209±0.011	0.209±0.012	0.236±0.010	0.212±0.010	
01/07/07	0.197±0.011	0.244±0.011	0.239±0.012	0.229±0.012	0.215±0.010	0.108±0.009	
01/07/14	0.268±0.013	0.299±0.012	0.303±0.013	0.295±0.013	0.276±0.011	0.277±0.012	
01/07/21	0.149±0.010	0.120±0.008	0.143±0.009	0.149±0.010	0.152±0.008	0.160±0.009	
01/07/28	0.176±0.010	0.161±0.009	0.191±0.010	0.194±0.011	0.160±0.008	0.197±0.010	
01/08/04	0.284±0.013	0.307±0.012	0.205±0.012	0.437±0.016	0.511±0.015	0.292±0.012	
01/08/11	0.083±0.008	0.091±0.007	0.091±0.007	0.102±0.008	0.094±0.006	0.089±0.007	
01/08/18	0.076±0.007	0.071±0.006	0.071±0.007	0.077±0.007	0.072±0.005	0.069±0.006	
01/08/25	0.108±0.008	0.117±0.008	0.114±0.008	0.121±0.009	0.110±0.007	0.093±0.007	
01/09/01	0.112±0.009	0.113±0.008	0.110±0.009	0.122±0.009	0.123±0.007	0.121±0.008	
01/09/09	0.056±0.006	0.054±0.005	0.047±0.005	0.047±0.005	0.047±0.004	0.039±0.005	
01/09/15	0.109±0.009	0.113±0.009	0.117±0.009	0.117±0.010	0.120±0.008	*	
01/09/22	0.040±0.005	0.042±0.005	0.039±0.005	0.039±0.006	0.036±0.004	0.040±0.006	
01/09/29	0.031±0.005	0.031±0.005	0.035±0.005	0.031±0.005	0.030±0.004	0.033±0.005	
01/10/07	0.034±0.005	0.027±0.004	0.032±0.005	0.032±0.005	0.032±0.004	0.033±0.005	
01/10/14	0.062±0.006	0.042±0.005	0.057±0.006	0.061±0.007	0.085±0.006	0.057±0.006	
01/10/20	0.031±0.005	0.032±0.005	0.041±0.006	0.041±0.006	0.038±0.004	0.044±0.006	
01/10/27	0.026±0.005	0.022±0.004	0.022±0.005	0.026±0.005	0.024±0.004	0.030±0.005	
01/11/03	0.052±0.006	0.052±0.006	0.049±0.006	0.053±0.006	0.049±0.005	0.048±0.006	
01/11/10	0.041±0.005	0.050±0.005	0.051±0.005	0.047±0.006	0.049±0.004	0.040±0.005	
01/11/17	0.046±0.004	0.043±0.004	0.046±0.005	0.050±0.006	0.042±0.004	0.050±0.007	
01/11/24	0.030±0.004	0.021±0.004	0.019±0.004	0.021±0.004	0.023±0.003	0.026±0.004	
01/12/01	0.020±0.004	0.028±0.004	0.029±0.004	0.030±0.005	0.033±0.004	0.031±0.005	
01/12/08	0.046±0.004	0.042±0.004	0.039±0.005	0.040±0.005	0.045±0.004	0.034±0.005	
01/12/15	0.020±0.003	0.024±0.004	0.019±0.004	0.016±0.004	0.016±0.003	0.017±0.004	
01/12/22	0.024±0.004	0.024±0.004	0.025±0.005	0.029±0.005	0.022±0.004	0.024±0.004	
01/12/29	0.039±0.004	0.040±0.005	0.037±0.005	0.039±0.006	0.041±0.004	0.042±0.005	

* PUMP NOT OPERATIONAL

TABLE 10

NMP/JAF SITE
ENVIRONMENTAL AIRBORNE PARTICULATE SAMPLES - ON SITE STATIONS
GROSS BETA ACTIVITY pCi/m^3 ± 2 Sigma

LOCATION

WEEK END DATE	D1-ON	D2-ON	E--ON	F--ON	G--ON	H--ON	I--ON	J--ON	K--ON
01/01/05	0.079±0.006	0.078±0.006	0.019±0.003	0.074±0.006	0.080±0.006	0.076±0.005	0.083±0.006	0.026±0.004	0.034±0.004
01/01/12	0.080±0.006	0.087±0.006	0.094±0.006	0.091±0.007	0.086±0.006	0.073±0.006	0.158±0.009	0.034±0.004	0.052±0.005
01/01/19	0.108±0.007	0.121±0.008	0.119±0.007	0.122±0.008	0.127±0.008	0.069±0.006	0.110±0.007	0.084±0.006	0.085±0.006
01/01/26	0.132±0.009	0.131±0.008	0.118±0.007	0.134±0.008	0.119±0.008	0.125±0.008	0.145±0.009	0.120±0.007	0.116±0.007
01/02/02	0.110±0.009	0.129±0.008	0.234±0.010	0.111±0.008	0.132±0.008	0.019±0.003	0.133±0.008	0.144±0.008	0.081±0.006
01/02/09	0.112±0.008	0.130±0.008	0.125±0.007	0.139±0.009	0.133±0.008	0.104±0.005	0.115±0.007	0.123±0.007	0.078±0.005
01/02/17	0.167±0.009	0.210±0.010	0.102±0.009	0.162±0.009	0.202±0.011	0.176±0.009	0.144±0.007	0.161±0.008	0.101±0.005
01/02/23	0.140±0.010	0.137±0.009	0.130±0.008	0.121±0.010	0.126±0.009	0.103±0.006	0.064±0.005	0.099±0.008	0.084±0.006
01/03/02	0.103±0.008	0.112±0.007	0.113±0.007	0.120±0.008	0.133±0.009	0.052±0.004	0.119±0.007	0.102±0.007	0.126±0.006
01/03/09	0.125±0.010	0.108±0.007	0.117±0.007	0.120±0.008	0.133±0.008	0.009±0.002	0.087±0.006	0.112±0.007	0.111±0.007
01/03/16	0.211±0.011	0.219±0.010	0.200±0.009	0.215±0.011	0.209±0.010	0.102±0.011	0.287±0.015	0.201±0.009	0.101±0.007
01/03/23	0.275±0.012	0.178±0.010	0.204±0.009	0.204±0.011	0.218±0.010	0.101±0.008	0.093±0.007	0.010±0.003	0.099±0.006
01/03/30	0.435±0.016	0.410±0.016	0.458±0.014	0.450±0.016	0.390±0.014	0.318±0.011	0.433±0.015	0.459±0.014	0.441±0.014
01/04/06	0.411±0.015	0.400±0.015	0.432±0.013	0.406±0.015	0.448±0.014	0.425±0.014	0.405±0.015	0.028±0.004	0.456±0.014
01/04/13	0.364±0.015	0.372±0.014	0.360±0.013	0.417±0.016	0.300±0.014	0.347±0.013	0.187±0.010	0.280±0.011	0.064±0.005
01/04/20	0.353±0.014	0.360±0.013	0.340±0.012	0.365±0.014	0.351±0.013	0.369±0.013	0.122±0.008	0.342±0.013	0.367±0.012
01/04/27	0.275±0.013	0.267±0.011	0.252±0.010	0.285±0.013	0.275±0.011	0.231±0.010	0.221±0.011	0.249±0.011	0.202±0.009
01/05/04	0.500±0.017	0.484±0.014	0.512±0.014	0.528±0.017	0.496±0.015	0.064±0.006	0.113±0.009	0.319±0.012	0.026±0.004
01/05/11	0.409±0.015	0.373±0.013	0.400±0.013	0.415±0.015	0.342±0.013	0.505±0.016	0.478±0.016	0.414±0.013	0.490±0.014
01/05/18	0.294±0.013	0.274±0.011	0.293±0.011	0.217±0.011	0.200±0.012	0.266±0.011	0.294±0.013	0.267±0.011	0.298±0.011
01/05/26	0.429±0.015	0.394±0.013	0.494±0.014	0.451±0.015	0.379±0.013	0.450±0.014	0.444±0.015	0.430±0.014	0.502±0.014
01/06/01	0.298±0.014	0.277±0.013	0.340±0.015	0.316±0.015	0.270±0.013	0.281±0.012	0.321±0.015	0.281±0.013	0.353±0.013
01/06/09	0.262±0.013	0.259±0.011	0.270±0.011	0.260±0.012	0.251±0.011	0.236±0.009	0.241±0.011	0.266±0.011	0.031±0.004
01/06/15	0.214±0.014	0.198±0.012	0.187±0.010	0.193±0.012	0.204±0.012	0.149±0.008	0.008±0.005	0.130±0.010	0.150±0.008
01/06/22	0.205±0.012	0.233±0.011	0.246±0.011	0.239±0.013	0.223±0.011	0.231±0.009	0.165±0.011	0.016±0.004	0.236±0.010
01/06/29	0.143±0.010	0.140±0.009	0.130±0.008	0.157±0.010	0.143±0.009	0.139±0.007	0.134±0.008	0.140±0.009	0.121±0.007
01/07/06	0.214±0.012	0.214±0.011	0.225±0.010	0.231±0.012	0.207±0.011	0.104±0.008	0.195±0.010	0.216±0.011	0.229±0.010
01/07/13	0.313±0.015	0.295±0.013	0.326±0.013	0.310±0.015	0.310±0.014	0.287±0.010	0.329±0.012	0.328±0.014	0.300±0.011
01/07/20	0.208±0.013	0.222±0.013	0.216±0.010	0.202±0.012	0.226±0.012	0.170±0.008	0.219±0.011	0.200±0.011	0.149±0.008
01/07/27	0.132±0.010	0.126±0.009	0.127±0.008	0.133±0.010	0.132±0.009	0.115±0.006	0.101±0.007	0.126±0.008	0.123±0.007
01/08/03	0.254±0.013	0.251±0.011	0.284±0.012	0.237±0.012	0.292±0.013	0.250±0.009	0.224±0.011	0.248±0.011	0.161±0.008
01/08/10	0.114±0.009	0.106±0.007	0.108±0.007	0.110±0.009	0.115±0.008	0.096±0.006	0.131±0.010	0.105±0.008	0.099±0.006
01/08/17	0.060±0.007	0.065±0.006	0.061±0.006	0.062±0.007	0.033±0.005	0.040±0.004	0.060±0.005	0.004±0.003	0.064±0.005
01/08/24	0.124±0.009	0.078±0.007	0.131±0.008	0.127±0.010	0.115±0.008	0.121±0.007	0.121±0.007	0.156±0.010	0.149±0.009
01/08/31	0.120±0.010	0.100±0.007	0.093±0.007	0.099±0.009	0.140±0.009	0.117±0.007	0.103±0.007	0.112±0.009	0.134±0.008
01/09/08	0.060±0.006	0.059±0.005	0.054±0.005	0.050±0.006	0.052±0.005	0.031±0.003	0.056±0.005	0.004±0.003	0.059±0.005
01/09/14	0.006±0.009	0.080±0.007	0.021±0.004	0.087±0.009	0.093±0.008	0.008±0.006	0.023±0.003	0.085±0.008	0.008±0.007
01/09/21	0.037±0.006	0.020±0.008	0.045±0.005	0.046±0.007	0.044±0.006	0.030±0.004	0.032±0.005	0.039±0.005	0.042±0.005
01/09/28	0.061±0.007	0.047±0.005	0.043±0.005	0.045±0.006	0.048±0.006	0.043±0.004	0.046±0.006	0.039±0.005	0.053±0.006
01/10/05	0.041±0.006	0.040±0.005	0.045±0.005	0.039±0.006	0.045±0.006	0.041±0.004	0.047±0.006	0.029±0.005	0.032±0.004
01/10/13	0.058±0.006	0.064±0.006	0.065±0.005	0.065±0.007	0.058±0.006	0.049±0.004	0.068±0.007	0.055±0.006	0.067±0.006
01/10/19	0.046±0.007	0.050±0.006	0.053±0.006	0.050±0.007	0.047±0.006	0.036±0.004	0.050±0.007	0.048±0.006	0.048±0.005
01/10/26	0.032±0.005	0.037±0.005	0.031±0.004	0.028±0.005	0.037±0.005	0.026±0.003	0.034±0.005	0.025±0.004	0.008±0.003
01/11/02	0.069±0.007	0.056±0.006	0.073±0.006	0.067±0.007	0.060±0.006	0.053±0.004	0.072±0.007	0.053±0.006	0.016±0.003
01/11/09	0.042±0.006	0.043±0.006	0.048±0.005	0.044±0.006	0.049±0.006	0.040±0.004	0.038±0.006	0.010±0.007	0.038±0.009
01/11/16	0.046±0.006	0.049±0.006	0.051±0.006	0.054±0.007	0.054±0.006	0.047±0.004	0.051±0.006	0.020±0.003	0.054±0.005
01/11/23	0.020±0.005	0.020±0.004	0.018±0.004	0.008±0.006	0.020±0.004	0.015±0.003	0.016±0.004	0.017±0.003	0.017±0.004
01/11/30	0.019±0.004	0.020±0.004	0.020±0.004	0.018±0.004	0.014±0.003	0.019±0.003	0.016±0.005	0.012±0.003	0.011±0.003
01/12/07	0.029±0.005	0.028±0.005	0.029±0.004	0.028±0.005	0.030±0.004	0.018±0.003	0.018±0.004	0.025±0.003	0.028±0.004
01/12/14	0.010±0.004	0.020±0.004	0.021±0.003	0.019±0.004	0.020±0.004	0.018±0.003	0.013±0.004	0.013±0.003	0.015±0.003
01/12/21	0.021±0.005	0.019±0.004	0.020±0.004	0.018±0.004	0.017±0.004	0.015±0.003	0.017±0.005	0.014±0.003	0.014±0.004
01/12/28	0.042±0.006	0.043±0.006	0.040±0.005	0.037±0.006	0.045±0.006	0.041±0.004	0.039±0.006	0.038±0.005	0.032±0.005

TABLE II

CONCENTRATIONS OF GAMMA EMITTERS IN MONTHLY COMPOSITES OF NNP AIR PARTICULATE SAMPLES

Results in Units of 10^{-3} pCi/m^3 ± 2 sigma

NUCLIDES	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE
			OFF-SITE COMPSITE: A-1			
Co-60	< 0.52	0.78 ± 0.18	1.17 ± 0.17	< 0.86	1.62 ± 0.30	< 0.82
Mn-54	0.28 ± 0.09	< 0.48	0.76 ± 0.16	1.37 ± 0.25	1.47 ± 0.22	0.68 ± 0.26
Cs-134	< 0.46	< 0.52	< 0.63	< 0.93	< 0.84	< 0.71
Cs-137	0.61 ± 0.17	0.80 ± 0.16	1.21 ± 0.16	2.58 ± 0.26	3.91 ± 0.34	1.92 ± 0.24
Nb-95	20.89 ± 0.63	43.90 ± 1.04	66.09 ± 1.01	122.90 ± 1.52	131.80 ± 1.51	48.56 ± 1.03
Zr-95	14.95 ± 0.79	21.60 ± 1.02	33.92 ± 1.06	62.00 ± 1.63	59.05 ± 1.53	21.24 ± 1.10
Ce-141	11.48 ± 0.35	12.23 ± 0.43	13.45 ± 0.35	18.33 ± 0.46	12.09 ± 0.43	3.40 ± 0.29
Ce-144	7.46 ± 0.83	12.06 ± 0.82	23.86 ± 0.90	53.67 ± 1.44	62.22 ± 1.44	30.86 ± 1.10
Ru-106	< 4.39	7.15 ± 1.44	10.59 ± 1.88	15.76 ± 2.70	25.03 ± 2.64	13.17 ± 1.78
Ru-103	13.65 ± 0.45	14.97 ± 0.57	18.84 ± 0.54	26.53 ± 0.95	23.41 ± 0.71	6.48 ± 0.47
Be-7	86.73 ± 3.31	74.24 ± 3.48	82.35 ± 4.55	112.20 ± 5.17	143.20 ± 4.70	84.54 ± 3.80
K-40	5.26 ± 1.68	< 5.28	< 5.51	12.73 ± 3.13	7.57 ± 1.68	< 8.92
La-140	18.62 ± 5.12	LLD	LLD	LLD	LLD	LLD
			ON-SITE COMPOSITE: B-2			
Co-60	0.51 ± 0.13	0.60 ± 0.12	0.52 ± 0.11	0.71 ± 0.14	1.73 ± 0.22	0.38 ± 0.11
Mn-54	< 0.38	0.28 ± 0.09	0.71 ± 0.11	1.24 ± 0.15	1.42 ± 0.15	1.29 ± 0.18
Cs-134	< 0.36	< 0.33	< 0.44	< 0.61	< 0.64	< 0.48
Cs-137	0.45 ± 0.11	0.68 ± 0.12	0.89 ± 0.11	2.38 ± 0.23	3.42 ± 0.21	1.81 ± 0.19
Nb-95	20.87 ± 0.54	36.14 ± 0.76	53.73 ± 0.74	100.40 ± 1.21	103.50 ± 1.10	41.19 ± 0.76
Zr-95	12.76 ± 0.63	16.60 ± 0.69	27.67 ± 0.77	47.22 ± 1.22	45.62 ± 1.09	17.95 ± 0.78
Ce-141	8.08 ± 0.25	9.56 ± 0.30	9.22 ± 0.24	12.52 ± 0.34	9.82 ± 0.32	3.14 ± 0.25
Ce-144	4.60 ± 0.45	8.94 ± 0.58	17.05 ± 0.61	38.91 ± 1.01	52.95 ± 1.10	24.67 ± 0.77
Ru-106	2.34 ± 0.82	3.99 ± 0.91	4.54 ± 0.90	11.25 ± 1.65	19.40 ± 2.03	9.41 ± 1.41
Ru-103	10.44 ± 0.45	12.93 ± 0.42	14.40 ± 0.38	20.48 ± 0.56	17.65 ± 0.40	5.44 ± 0.32
Be-7	62.73 ± 2.41	66.11 ± 2.54	52.82 ± 2.13	83.27 ± 3.46	105.20 ± 3.45	62.51 ± 2.51
K-40	< 4.18	< 3.59	2.62 ± 0.80	< 4.49	5.90 ± 1.61	< 4.80
La-140	49.11 ± 11.65	LLD	LLD	LLD	LLD	LLD
Ba-140	LLD	LLD	LLD	LLD	LLD	LLD

TABLE II (Continued)

CONCENTRATIONS OF GAMMA EMITTERS IN MONTHLY COMPOSITES OF NNP AIR PARTICULATE SAMPLES

Results in Units of 10^{-3} pCi/m^3 ± 2 sigma

NUCLIDES	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
			OFF-SITE COMPSITE: A-1			
Co-60	0.90 ± 0.32	0.53 ± 0.33	< 0.72	0.27 ± 0.22	< 0.46	< 0.37
Mn-54	1.23 ± 0.34	0.46 ± 0.25	< 0.52	< 0.28	0.18 ± 0.19	< 0.40
Cs-134	< 0.48	< 0.43	< 0.48	< 0.25	< 0.24	< 0.32
Cs-137	2.66 ± 0.41	1.10 ± 0.36	0.81 ± 0.33	< 0.39	< 0.34	0.38 ± 0.20
Nb-95	36.30 ± 1.58	11.80 ± 1.13	3.56 ± 0.67	1.23 ± 0.48	0.82 ± 0.31	0.47 ± 0.24
Zr-95	14.10 ± 1.47	4.12 ± 1.08	2.33 ± 1.05	< 0.96	< 0.65	< 0.92
Ce-141	< 1.42	< 0.50	< 0.64	< 0.53	< 0.35	< 0.43
Ce-144	29.50 ± 1.74	12.40 ± 1.47	3.71 ± 1.07	2.26 ± 0.67	1.87 ± 0.94	0.93 ± 0.54
Ru-106	11.60 ± 2.99	5.98 ± 3.07	< 4.54	< 2.74	< 2.85	< 3.01
Ru-103	4.51 ± 0.88	1.39 ± 0.55	< 0.67	< 0.48	< 0.33	< 0.36
Be-7	122.00 ± 7.29	126.00 ± 8.23	92.30 ± 6.93	83.60 ± 5.76	71.50 ± 4.98	77.00 ± 5.42
K-40	< 3.48	< 8.13	< 6.27	5.21 ± 2.70	< 4.19	4.49 ± 2.51
La-140	LLD	LLD	LLD	LLD	LLD	LLD
			ON-SITE COMPOSITE: B-2			
Co-60	0.28 ± 0.16	0.47 ± 0.29	< 0.49	0.51 ± 0.20	0.60 ± 0.25	0.43 ± 0.20
Mn-54	0.90 ± 0.22	0.57 ± 0.24	< 0.33	< 0.24	< 0.24	< 0.30
Cs-134	< 0.34	< 0.34	< 0.28	< 0.20	< 0.20	< 0.22
Cs-137	1.93 ± 0.26	0.84 ± 0.22	0.41 ± 0.18	0.30 ± 0.11	0.34 ± 0.22	0.18 ± 0.12
Nb-95	37.70 ± 1.27	10.90 ± 0.90	2.78 ± 0.48	0.86 ± 0.26	0.68 ± 0.26	0.45 ± 0.24
Zr-95	15.20 ± 1.21	3.76 ± 0.73	1.43 ± 0.60	< 0.54	< 0.70	< 0.66
Ce-141	1.55 ± 0.28	0.44 ± 0.26	< 0.42	< 0.35	< 0.31	< 0.34
Ce-144	30.30 ± 1.40	10.10 ± 0.93	3.75 ± 0.70	1.33 ± 0.44	0.78 ± 0.52	0.56 ± 0.40
Ru-106	14.20 ± 2.53	3.59 ± 1.79	< 3.07	< 2.00	< 2.32	< 2.35
Ru-103	4.12 ± 0.50	0.47 ± 0.27	< 0.42	< 0.29	< 0.26	< 0.30
Be-7	111.00 ± 5.52	99.00 ± 5.77	75.20 ± 4.65	66.90 ± 4.13	63.70 ± 4.32	51.40 ± 3.96
K-40	< 2.58	< 4.33	< 4.73	< 3.16	2.40 ± 1.85	4.40 ± 2.09
La-140	LLD	LLD	LLD	LLD	LLD	LLD
Ba-140	LLD	LLD	LLD	1.01 ± 0.82	LLD	LLD

TABLE II (Continued)

CONCENTRATIONS OF GAMMA EMITTERS IN MONTHLY COMPOSITES OF NNP
AIR PARTICULATE SAMPLES

Results in Units of 10^{-3} pCi/m^3 ± 2 sigma

NUCLIDES	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE
			OFF-SITE COMPSITE: A-2			
Co-60	< 0.63	< 0.56	0.88 ± 0.16	0.77 ± 0.19	< 1.45	0.54 ± 0.15
Mn-54	< 0.40	0.42 ± 0.14	0.79 ± 0.13	1.35 ± 0.20	1.58 ± 0.59	1.39 ± 0.20
Cs-134	< 0.48	< 0.56	< 0.66	< 0.91	< 2.62	< 0.70
Cs-137	< 0.54	0.69 ± 0.15	1.23 ± 0.16	2.91 ± 0.28	4.16 ± 0.83	2.65 ± 0.23
Nb-95	22.52 ± 0.66	54.70 ± 1.12	68.69 ± 1.04	129.90 ± 1.52	134.20 ± 4.46	53.25 ± 1.01
Zr-95	16.11 ± 0.85	28.29 ± 1.13	36.73 ± 1.11	63.87 ± 1.53	60.94 ± 4.31	23.45 ± 1.04
Ce-141	11.98 ± 0.34	13.98 ± 0.44	13.93 ± 0.37	18.81 ± 0.45	13.12 ± 1.21	3.45 ± 0.31
Ce-144	7.15 ± 0.75	12.37 ± 0.95	21.71 ± 0.87	55.51 ± 1.41	69.95 ± 4.40	34.70 ± 1.07
Ru-106	< 4.81	< 6.09	10.69 ± 1.63	17.97 ± 2.65	24.14 ± 6.55	15.49 ± 2.03
Ru-103	13.55 ± 0.46	15.94 ± 0.64	20.13 ± 0.56	28.46 ± 0.72	20.22 ± 1.96	7.09 ± 0.46
Be-7	88.78 ± 3.18	85.93 ± 3.58	84.19 ± 3.33	115.40 ± 4.51	136.10 ± 13.17	89.05 ± 3.48
K-40	3.46 ± 1.30	7.69 ± 2.77	< 0.54	7.72 ± 2.67	< 25.04	4.60 ± 2.11
La-140	20.92 ± 5.36	LLD	LLD	LLD	LLD	LLD
			ON-SITE COMPOSITE: B-1			
Co-60	0.53 ± 0.12	0.74 ± 0.14	0.70 ± 0.15	0.36 ± 0.10	0.96 ± 0.15	0.85 ± 0.17
Mn-54	< 0.28	0.39 ± 0.10	0.39 ± 0.09	1.20 ± 0.16	1.91 ± 0.17	0.83 ± 0.13
Cs-134	< 0.30	< 0.45	< 0.47	< 0.68	< 0.63	< 0.50
Cs-137	0.51 ± 0.09	0.88 ± 0.14	0.93 ± 0.13	2.93 ± 0.24	4.53 ± 0.25	2.52 ± 0.19
Nb-95	18.40 ± 0.45	65.96 ± 1.00	62.03 ± 0.77	127.20 ± 1.27	120.90 ± 1.10	51.16 ± 0.85
Zr-95	12.07 ± 0.54	30.60 ± 0.94	31.96 ± 0.80	56.98 ± 1.20	54.37 ± 1.05	21.31 ± 0.80
Ce-141	10.41 ± 0.25	14.16 ± 0.36	12.25 ± 0.26	17.65 ± 0.37	11.85 ± 0.29	3.78 ± 0.25
Ce-144	5.45 ± 0.46	15.84 ± 0.67	20.52 ± 0.66	51.51 ± 1.08	62.48 ± 1.08	32.74 ± 0.87
Ru-106	< 3.30	4.01 ± 0.98	7.25 ± 1.12	17.01 ± 2.02	19.58 ± 1.72	11.75 ± 1.43
Ru-103	12.37 ± 0.48	16.05 ± 0.56	17.47 ± 0.41	26.89 ± 0.59	20.54 ± 0.53	7.67 ± 0.38
Be-7	82.46 ± 2.42	82.63 ± 2.98	67.27 ± 2.47	103.20 ± 3.82	118.50 ± 3.16	76.72 ± 2.93
K-40	< 4.34	< 4.13	< 0.41	< 3.36	4.24 ± 1.24	< 5.20
La-140	44.14 ± 8.51	LLD	LLD	LLD	LLD	LLD
Sb-124	< 0.77	< 1.05	< 0.66	< 0.75	< 0.96	< 1.19

TABLE II (Continued)

CONCENTRATIONS OF GAMMA EMITTERS IN MONTHLY COMPOSITES OF NNP
AIR PARTICULATE SAMPLES

Results in Units of 10^{-3} pCi/m^3 ± 2 sigma

NUCLIDES	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
			OFF-SITE COMPSITE: A-2			
C-60	< 0.38	< 0.63	< 0.63	< 0.29	< 0.48	0.74 ± 0.31
Mn-54	0.99 ± 26	0.69 ± 0.27	< 0.51	< 0.28	< 0.30	< 0.36
Cs-134	< 0.44	< 0.39	< 0.48	< 0.26	< 0.30	< 0.31
Cs-137	2.88 ± 0.39	1.28 ± 0.34	0.80 ± 0.34	0.30 ± 0.16	0.32 ± 0.22	< 0.40
Nb-95	38.60 ± 1.57	11.80 ± 1.07	2.82 ± 0.69	1.12 ± 0.38	0.78 ± 0.30	0.66 ± 0.42
Zr-95	14.50 ± 1.42	4.03 ± 1.08	1.63 ± 0.94	< 0.87	< 0.79	< 0.90
Ce-141	< 1.53	< 0.70	< 0.65	< 0.45	< 0.39	< 0.47
Ce-144	29.80 ± 1.65	10.70 ± 1.18	3.13 ± 0.93	2.02 ± 0.59	1.44 ± 0.58	1.01 ± 0.64
Ru-106	12.00 ± 2.81	5.51 ± 3.37	< 0.50	< 2.88	< 2.91	3.02 ± 1.77
Ru-103	4.74 ± 0.62	0.83 ± 0.44	< 0.64	< 0.40	< 0.37	< 0.46
Be-7	132.00 ± 7.35	109.00 ± 7.33	86.30 ± 6.32	79.40 ± 5.37	76.05 ± 5.41	75.70 ± 5.60
K-40	< 3.37	< 5.00	< 6.97	2.94 ± 1.94	5.83 ± 2.67	3.17 ± 2.41
La-140	LLD	LLD	LLD	LLD	LLD	LLD
			ON-SITE COMPOSITE: B-1			
Co-60	0.34 ± 0.16	0.49 ± 0.23	< 0.48	0.25 ± 0.13	0.50 ± 0.21	0.35 ± 0.18
Mn-54	0.92 ± 0.23	0.33 ± 0.16	< 0.34	< 0.17	< 0.17	< 0.25
Cs-134	< 0.36	< 0.31	< 0.30	< 0.16	< 0.22	< 0.24
Cs-137	2.44 ± 0.32	1.37 ± 0.27	0.68 ± 0.24	0.24 ± 0.13	0.33 ± 0.18	< 0.26
Nb-95	39.50 ± 1.34	11.20 ± 0.86	3.22 ± 0.50	1.25 ± 0.30	0.64 ± 0.25	0.38 ± 0.19
Zr-95	15.50 ± 1.24	3.61 ± 0.78	2.62 ± 0.79	0.76 ± 0.39	< 0.57	< 0.69
Ce-141	< 1.49	< 0.55	< 0.48	< 0.32	< 0.30	< 0.34
Ce-144	30.40 ± 1.39	10.90 ± 1.13	3.73 ± 0.74	1.26 ± 0.45	1.03 ± 0.42	1.14 ± 0.46
Ru-106	13.60 ± 2.47	5.47 ± 1.76	< 3.35	< 1.79	1.32 ± 1.22	< 2.24
Ru-103	< 4.72	< 0.65	0.33 ± 0.23	< 0.27	< 0.25	< 0.28
Be-7	123.00 ± 5.94	107.00 ± 5.88	91.70 ± 5.56	75.60 ± 4.39	76.90 ± 4.92	65.30 ± 4.24
K-40	< 3.19	< 4.09	< 4.65	< 2.74	< 3.62	< 3.47
La-140	LLD	LLD	LLD	LLD	LLD	LLD
Sb-124	< 0.54	< 1.01	< 0.98	< 0.52	< 0.88	< 0.41

TABLE 12

NMP/JAF SITE
ENVIRONMENTAL CHARCOAL CARTRIDGE SAMPLES - OFF SITE STATIONS
I-131 ACTIVITY pCi/m^3 ± 2 sigma

WEEK END DATE	LOCATION						
	C--OFF	D1-OFF	D2-OFF	E--OFF	F--OFF	G--OFF	
01/01/06							
01/01/13	<0.025	<0.026	<0.031	<0.033	<0.028	<0.032	
01/01/20	<0.031	<0.034	<0.029	<0.030	<0.030	<0.032	
01/01/27	<0.030	<0.030	<0.024	<0.030	<0.024	<0.036	
01/02/04	<0.024	<0.027	<0.023	<0.031	<0.023	<0.033	
01/02/10	<0.018	<0.020	<0.018	<0.020	<0.014	<0.011	
01/02/18	<0.024	<0.023	<0.020	<0.032	<0.018	<0.027	
01/02/24	<0.023	<0.029	<0.020	<0.024	<0.018	<0.020	
01/03/03	<0.026	<0.027	<0.021	<0.033	<0.017	<0.026	
01/03/10	<0.023	<0.024	<0.024	<0.021	<0.022	<0.025	
01/03/17	<0.018	<0.019	<0.011	<0.024	<0.020	<0.033	
01/03/24	<0.024	<0.019	<0.025	<0.032	<0.017	<0.020	
01/03/31	<0.026	<0.019	<0.026	<0.019	<0.022	<0.027	
01/04/07	<0.023	<0.024	<0.032	<0.029	<0.023	<0.030	
01/04/14	<0.023	<0.020	<0.020	<0.021	<0.025	<0.024	
01/04/21	<0.018	<0.024	<0.023	<0.027	<0.017	<0.010	
01/04/28	<0.028	<0.019	<0.019	<0.026	<0.016	<0.020	
01/05/05	<0.034	<0.023	<0.027	<0.027	<0.014	<0.023	
01/05/12	<0.018	<0.024	<0.021	<0.015	<0.013	<0.019	
01/05/19	<0.014	<0.016	<0.024	<0.032	<0.012	<0.021	
01/05/27	<0.025	<0.043	<0.029	<0.022	<0.019	<0.021	
01/06/02	<0.023	<0.019	<0.022	<0.025	<0.015	<0.018	
01/06/10	<0.031	<0.031	<0.029	<0.026	<0.017	<0.023	
01/06/16	<0.022	<0.019	<0.023	<0.032	<0.023	<0.017	
01/06/23	<0.030	<0.022	<0.016	<0.025	<0.021	<0.025	
01/06/30	<0.023	<0.023	<0.025	<0.029	<0.021	<0.017	
01/07/07	<0.026	<0.021	<0.031	<0.033	<0.021	<0.018	
01/07/14	<0.028	<0.026	<0.026	<0.033	<0.019	<0.022	
01/07/21	<0.031	<0.027	<0.026	<0.036	<0.020	<0.022	
01/07/28	<0.032	<0.026	<0.030	<0.033	<0.020	<0.030	
01/08/04	<0.026	<0.020	<0.029	<0.029	<0.016	<0.020	
01/08/11	<0.032	<0.020	<0.024	<0.031	<0.016	<0.023	
01/08/18	<0.029	<0.016	<0.022	<0.016	<0.017	<0.024	
01/08/25	<0.026	<0.028	<0.020	<0.033	<0.022	<0.019	
01/09/01	<0.029	<0.027	<0.041	<0.032	<0.021	<0.023	
01/09/09	<0.041	<0.017	<0.029	<0.037	<0.023	<0.024	
01/09/15	<0.020	<0.013	<0.022	<0.022	<0.016	<0.021	
01/09/22	<0.023	<0.022	<0.031	<0.026	<0.021	<0.032	
01/09/29	<0.027	<0.025	<0.029	<0.024	<0.020	<0.023	
01/10/07	<0.021	<0.024	<0.031	<0.032	<0.015	<0.030	
01/10/14	<0.030	<0.028	<0.027	<0.026	<0.019	<0.020	
01/10/20	<0.027	<0.020	<0.023	<0.018	<0.014	<0.026	
01/10/27	<0.027	<0.023	<0.020	<0.024	<0.012	<0.023	
01/11/03	<0.015	<0.024	<0.020	<0.024	<0.011	<0.028	
01/11/10	<0.014	<0.015	<0.021	<0.023	<0.016	<0.019	
01/11/17	<0.017	<0.017	<0.024	<0.018	<0.009	<0.015	
01/11/24	<0.020	<0.015	<0.020	<0.024	<0.015	<0.015	
01/12/01	<0.014	<0.015	<0.019	<0.021	<0.012	<0.023	
01/12/08	<0.015	<0.019	<0.019	<0.027	<0.012	<0.021	
01/12/15	<0.011	<0.009	<0.019	<0.020	<0.015	<0.023	
01/12/22	<0.013	<0.014	<0.021	<0.023	<0.013	<0.018	
01/12/29	<0.016	<0.013	<0.010	<0.023	<0.013	<0.020	
	<0.010	<0.021		<0.021	<0.016	<0.016	

TABLE 3

NMP/JAF SITE
ENVIRONMENTAL CHARCOAL CARTRIDGE SAMPLES - ON SITE STATIONS
I-131 ACTIVITY pCi/m^3 ± 2 sigma

WEEK END DATE	LOCATION								
	D1-ON	D2-ON	E--ON	F--ON	G--ON	H--ON	I--ON	J--ON	K--ON
01/01/05	<0.027	<0.027	<0.018	<0.033	<0.031	<0.024	<0.030	<0.023	<0.028
01/01/12	<0.031	<0.025	<0.020	<0.020	<0.024	<0.026	<0.035	<0.025	<0.034
01/01/19	<0.030	<0.026	<0.022	<0.035	<0.027	<0.026	<0.033	<0.031	<0.026
01/01/26	<0.025	<0.020	<0.031	<0.032	<0.033	<0.031	<0.028	<0.030	<0.029
01/02/02	<0.022	<0.019	<0.017	<0.030	<0.020	<0.026	<0.027	<0.022	<0.012
01/02/09	<0.032	<0.021	<0.020	<0.020	<0.023	<0.018	0.022±0.007	<0.018	<0.016
01/02/17	<0.022	<0.009	<0.004	<0.019	<0.017	<0.025	<0.021	<0.016	<0.017
01/02/23	<0.036	<0.025	<0.019	<0.037	<0.027	<0.013	<0.019	<0.030	<0.017
01/03/02	<0.028	<0.019	<0.015	<0.019	<0.020	<0.016	<0.017	<0.019	<0.011
01/03/09	<0.028	<0.018	<0.020	<0.024	<0.018	<0.017	<0.016	<0.024	<0.009
01/03/16	<0.019	<0.019	<0.022	<0.035	<0.014	<0.063	<0.028	<0.021	<0.023
01/03/23	<0.026	<0.025	<0.020	<0.023	<0.025	<0.014	<0.032	<0.024	<0.020
01/03/30	<0.021	<0.028	<0.023	<0.033	<0.029	<0.021	<0.024	<0.023	<0.022
01/04/06	<0.027	<0.028	<0.018	<0.034	<0.019	<0.019	<0.023	<0.023	<0.022
01/04/13	<0.042	<0.022	<0.024	<0.034	<0.024	0.035±0.013	<0.032	<0.025	<0.026
01/04/20	<0.025	<0.027	<0.021	<0.023	<0.023	<0.027	<0.025	<0.026	<0.018
01/04/27	<0.028	<0.025	<0.024	<0.029	<0.027	0.042±0.010	<0.027	<0.029	<0.022
01/05/04	<0.022	<0.022	<0.017	<0.023	<0.023	<0.035	<0.041	<0.019	<0.023
01/05/11	<0.020	<0.021	<0.028	<0.020	<0.020	<0.021	<0.022	<0.020	<0.023
01/05/18	<0.029	<0.023	<0.013	<0.035	<0.024	<0.024	<0.040	<0.019	<0.015
01/05/26	<0.033	<0.027	<0.021	<0.026	<0.013	<0.026	<0.034	<0.022	<0.021
01/06/01	<0.036	<0.024	<0.037	<0.037	<0.031	<0.025	<0.016	<0.028	<0.021
01/06/09	<0.030	<0.026	<0.016	<0.018	<0.029	<0.021	<0.038	<0.012	<0.020
01/06/15	<0.033	<0.024	<0.025	<0.037	<0.023	<0.018	<0.015	<0.031	<0.021
01/06/22	<0.029	<0.019	<0.024	<0.020	<0.034	<0.024	<0.029	<0.023	<0.016
01/06/29	<0.027	<0.028	<0.024	<0.038	<0.034	<0.022	<0.024	<0.030	<0.027
01/07/06	<0.028	<0.032	<0.028	<0.030	<0.029	0.028±0.010	<0.021	<0.013	<0.025
01/07/13	<0.040	<0.029	<0.019	<0.036	<0.034	<0.015	<0.028	<0.018	<0.019
01/07/20	<0.030	<0.036	<0.027	<0.032	<0.036	<0.016	<0.025	<0.022	<0.022
01/07/27	<0.032	<0.019	<0.027	<0.033	<0.023	<0.020	<0.029	<0.022	<0.020
01/08/03	<0.042	<0.034	<0.020	<0.035	<0.034	0.016±0.006	<0.024	<0.021	<0.025
01/08/10	<0.032	<0.026	<0.023	<0.037	<0.031	<0.012	<0.019	<0.027	<0.022
01/08/17	<0.022	<0.024	<0.017	<0.026	<0.018	<0.018	<0.018	<0.027	<0.022
01/08/24	<0.029	<0.027	<0.020	<0.037	<0.028	<0.015	<0.022	<0.041	<0.030
01/08/31	<0.044	<0.027	<0.026	<0.038	<0.031	<0.016	<0.017	<0.029	<0.020
01/09/08	<0.021	<0.023	<0.017	<0.024	<0.020	<0.019	<0.021	<0.021	<0.021
01/09/14	<0.026	<0.024	<0.029	<0.034	<0.025	<0.012	<0.022	<0.029	<0.022
01/09/21	<0.034	<0.062	<0.023	<0.043	<0.025	<0.021	<0.038	<0.026	<0.019
01/09/28	<0.027	<0.024	<0.014	<0.023	<0.020	<0.014	<0.030	<0.027	<0.030
01/10/05	<0.030	<0.020	<0.020	<0.036	<0.024	<0.017	<0.030	<0.027	<0.018
01/10/13	<0.029	<0.021	<0.032	<0.028	<0.029	<0.017	<0.037	<0.027	<0.027
01/10/19	<0.026	<0.029	<0.024	<0.030	<0.024	<0.016	<0.023	<0.027	<0.020
01/10/26	<0.033	<0.019	<0.014	<0.029	<0.028	<0.010	<0.023	<0.014	<0.016
01/11/02	<0.013	<0.021	<0.010	<0.026	<0.022	<0.014	<0.025	<0.062	<0.016
01/11/09	<0.029	<0.023	<0.017	<0.025	<0.020	<0.013	<0.020	<0.012	<0.045
01/11/16	<0.028	<0.025	<0.024	<0.030	<0.014	<0.011	<0.024	<0.014	<0.017
01/11/23	<0.029	<0.010	<0.019	<0.045	<0.018	<0.010	<0.026	<0.015	<0.018
01/11/30	<0.016	<0.020	<0.025	<0.021	<0.023	<0.011	<0.010	<0.019	<0.020
01/12/07	<0.030	<0.018	<0.007	<0.013	<0.017	<0.016	<0.024	<0.017	<0.016
01/12/14	<0.028	<0.015	<0.016	<0.021	<0.025	<0.012	<0.032	<0.015	<0.015
01/12/21	<0.026	<0.028	<0.015	<0.025	<0.023	<0.017	<0.030	<0.015	<0.030
01/12/28	<0.031	<0.022	<0.017	<0.020	<0.024				<0.025

TABLE 14

DIRECT RADIATION MEASUREMENTS - QUARTERLY RESULTS

STATION NUMBER	LOCATION	JANUARY to APRIL	APRIL to JULY	JULY to OCTOBER	OCTOBER to DECEMBER
3	D1 on Site	11.78±0.66	11.66±1.04	10.47±1.06	6.69±0.64
4	D2 on Site	5.64±0.56	5.72±0.25	5.14±0.53	5.77±0.66
5	E on Site	4.68±0.46	5.19±0.72	4.75±0.64	5.20±0.16
6	F on Site	4.84±0.42	4.80±0.71	4.09±0.50	5.04±0.23
7	G on Site	4.54±0.41	4.94±0.30	4.51±0.48	4.32±0.29
8	C off Site	5.48±0.48	5.48±0.61	4.49±0.34	5.94±0.12
9	D1 off Site	4.61±0.39	4.97±0.49	4.02±0.70	4.91±0.06
10	D2 off Site	4.12±0.57	4.88±0.11	3.87±0.46	4.57±0.82
11	E off Site	4.25±0.70	4.92±0.22	3.56±0.30	4.35±0.57
12	F off Site	4.39±0.28	5.07±0.42	3.78±0.63	5.31±0.82
13	G off Site	4.85±0.30	4.74±0.40	3.91±0.91	5.35±0.70
14	DeMass Rd, SW Oswego	5.09±0.46	5.08±0.57	3.76±0.34	5.07±0.56
15	Pole 66, W. Bound-Bible Camp	4.19±0.52	4.47±0.31	3.24±0.53	4.17±0.33
18	Prog. Cen. Picnic Area	4.74±0.69	(1)	(1)	5.07±0.50
19	Pole 9, E. Bound	5.56±0.44	5.52±1.06	4.14±0.70	4.98±0.47
23	H on Site	6.88±0.27	7.54±0.90	5.81±0.91	6.25±1.41
24	I on Site	5.82±0.12	5.77±0.21	5.02±0.97	5.16±0.48
25	J on Site	5.26±0.54	5.40±0.48	4.25±0.31	5.06±0.66
26	K on Site	5.63±1.29	5.21±0.92	4.39±0.41	5.25±0.19
27	Nor. Fence-NNW Sector; JAF	17.61±0.96	16.85±0.46	13.93±1.44	9.83±0.66
28	Light Pole (E) JAF	42.16±2.05	40.41±6.32	38.47±2.40	33.11±2.66
29	N. Fence (E) JAF	52.72±3.41	62.22±2.56	69.46±11.48	79.01±3.58
30	N. Fence (NW) JAF	14.66±0.88	14.92±1.54	13.10±2.21	8.18±0.98
31	N. Fence (NW) NMP-1	14.55±0.82	13.09±1.51	13.14±1.91	(1)
39	East Fence, Rad. Waste-NMP-1	21.62±1.72	25.02±1.82	17.11±2.71	25.97±0.74
43	.9 mi Rt. 3 from Rt. 104B	4.56±0.69	5.88±0.37	3.85±0.30	5.29±0.36
44	Cor. Rt.3 and Kelly Drive	4.76±0.11	5.29±0.31	3.61±0.21	4.89±0.17
45	Cor. Rt 64 and Rt. 35	4.47±0.66	5.34±0.27	3.46±1.11	5.03±0.43
46	Cor. Rt. 176 and Black Creek Rd.	4.45±0.46	5.31±0.45	(1)	4.92±0.72
47	NE Shoreline (JAF)	21.19±2.53	46.80±2.13	11.48±0.92	15.13±0.47
48	.36 mi (N) on Access Rd. (JAF)	6.28±0.24	7.45±0.56	6.33±1.28	5.69±0.53
49	Phoenix, NY Control	4.52±0.88	4.57±0.50	3.49±0.31	4.75±0.19
50	Lake Rd. West of J On-Site	5.35±0.26	5.41±0.53	4.38±0.94	5.17±0.62
51	Oswego Steam Sta. N End of W Fence	5.45±1.70	4.72±0.36	3.74±0.52	4.69±0.72
52	East 11th St. Fitzhugh Park Sch.	5.23±0.26	5.64±0.24	4.47±0.71	5.63±0.99
53	Broadwell & Chestnut St. - Fulton H.S.	4.47±0.19	5.32±0.57	4.23±0.60	4.90±0.35
54	Liberty St. & Co. Rt. 16 - Mexico H.S.	4.43±0.34	5.19±0.86	3.74±0.54	5.11±0.47
55	Hinnman Rd. & Co. Rt. 5 - Pulaski H.S.	4.39±0.44	5.50±.87	3.68±0.41	4.85±0.34

Results in mR/standard month.

TABLE 14 (cont.)

DIRECT RADIATION MEASUREMENTS - QUARTERLY RESULTS

STATION NUMBER	LOCATION	JANUARY to APRIL	APRIL to JULY	JULY to OCTOBER	OCTOBER to DECEMBER
56	Rt. 104 - New Haven H.S. (SE Corner)	5.36±0.39	5.31±0.86	3.86±0.39	5.17±0.43
57	Co. Rt. 29 & Miner Rd. (SE) - Lycoming, NY	5.26±0.78	4.86±0.45	3.72±0.53	4.93±0.36
58	Co. Rt. 1 - ALCAN (S of Entrance Rd.)	5.12±0.30	5.27±0.40	3.55±0.52	4.99±1.05
59	Environmental Lab - JAF	24.73±1.40	32.46±2.94	34.41±2.15	17.38±1.10
60	S. Shore (Fish Point) Little Sodus Bay, NY	6.63±0.52	5.59±0.05	4.44±0.92	6.04±0.36
61	700' N of #48 (On Access Rd.) - JAF	8.79±0.39	10.35±0.33	6.28±0.37	6.47±1.33
65	Dutch Ridge Rd. & Kerfien Rd. (SE)	5.48±0.36	4.70±0.21	3.51±0.65	(1)
		9.04±19.71	10.34±24.72	8.48±24.08	8.73±24.71

(1) TLDs lost.

Results in mR/standard month.

TABLE 15

CONTINUOUS RADIATION MONITORS* (GM)

mR/hr

FIRST HALF

LOCATION	PERIOD	mR/hr MIN.	mR/hr MAX.	mR/hr AVG.
C Off Site	January	0.01	0.03	0.016
	February	0.01	0.03	0.015
	March	0.01	0.028	0.018
	April	0.015	0.025	0.02
	May	0.01	0.04	0.02
	June	0.01	0.029	0.02
D_1 On Site	January	0.01	0.018	0.02
	February	0.01	0.041	0.019
	March	0.01	0.04	0.022
	April	0.01	0.72	0.021
	May	0.01	0.053	0.022
	June	0.01	0.09	0.025
D_2 On Site	January	0.01	0.08	0.015
	February	0.01	0.033	0.015
	March	0.01	0.08	0.012
	April	0.01	0.033	0.013
	May	0.01	0.082	0.013
	June	0.01	0.09	0.012
E On Site	January	0.01	0.06	0.015
	February	0.01	0.069	0.015
	March	0.01	0.06	0.018
	April	0.012	0.039	0.018
	May	0.012	0.075	0.018
	June	0.013	0.06	0.02
F On Site	January	0.01	0.03	0.012
	February	0.01	0.05	0.023
	March	0.012	0.04	0.018
	April	0.012	0.04	0.019
	May	0.013	0.042	0.019
	June	0.014	0.059	0.019

*Detectors are 'bugged' to insure on scale readings.

TABLE 15 (cont.)

CONTINUOUS RADIATION MONITORS* (GM)

mR/hr

SECOND HALF

LOCATION	PERIOD	mR/hr MIN.	mR/hr MAX.	mR/hr AVG.
G On Site	July	0.01	0.04	0.011
	August	0.01	0.06	0.02
	September	0.01	0.06	0.02
	October	0.011	0.078	0.015
	November	0.011	0.039	0.016
	December	0.01	0.022	0.018
H On Site	July	0.022	0.07	0.03
	August	0.02	0.085	0.03
	September	0.01	0.07	0.035
	October	0.017	0.06	0.026
	November	0.01	0.048	0.03
	December	0.02	0.047	0.03
I On Site	July	0.01	0.08	0.02
	August	0.01	0.09	0.015
	September	0.01	0.09	0.015
	October	0.01	0.04	0.013
	November	0.01	0.04	0.012
	December	0.01	0.022	0.014
J On Site	July	0.01	0.08	0.02
	August	0.01	0.09	0.018
	September	0.01	0.06	0.015
	October	0.01	0.053	0.015
	November	0.01	0.025	0.012
	December	0.01	0.022	0.012
K On Site	July	0.01	0.07	0.018
	August	0.01	0.085	0.015
	September	0.01	0.06	0.018
	October	0.01	0.09	0.012
	November	0.01	0.03	0.012
	December	0.01	0.025	0.013

*Detectors are 'bugged' to insure on scale readings.

TABLE 15 (cont.)

CONTINUOUS RADIATION MONITORS* (GM)

mR/hr

SECOND HALF

LOCATION	PERIOD	mR/hr MIN.	mR/hr MAX.	mR/hr AVG.
C Off Site	July	0.01	0.04	0.02
	August	0.01	0.025	0.015
	September	0.01	0.06	0.015
	October	0.01	0.04	0.013
	November	0.01	0.025	0.013
	December	0.01	0.02	0.015
D_1 On Site	July	0.01	0.07	0.025
	August	0.01	0.07	0.025
	September	0.01	0.08	0.02
	October	0.01	0.09	0.07
	November	0.01	0.041	0.012
	December	0.01	0.05	0.012
D_2 On Site	July	0.01	0.09	0.012
	August	0.01	0.08	0.02
	September	0.015	0.08	0.02
	October	0.012	0.075	0.02
	November	0.012	0.055	0.016
	December	0.01	0.025	0.018
E On Site	July	0.015	0.098	0.02
	August	0.015	0.055	0.02
	September	0.01	0.08	0.02
	October	0.012	0.098	0.016
	November	0.011	0.049	0.015
	December	0.01	0.025	0.018
F On Site	July	0.01	0.04	0.018
	August	0.01	0.04	0.017
	September	0.01	0.07	0.02
	October	0.01	0.073	0.02
	November	0.01	0.05	0.015
	December	0.01	0.02	0.013

*Detectors are 'bugged' to insure on scale readings.

TABLE 15 (cont.)

CONTINUOUS RADIATION MONITORS* (GM)

mR/hr

FIRST HALF

LOCATION	PERIOD	mR/hr MIN.	mR/hr MAX.	mR/hr AVG.
G On Site	January	0.01	0.048	0.012
	February	0.01	0.023	0.012
	March	0.01	0.035	0.012
	April	0.01	0.032	0.012
	May	0.01	0.023	0.012
	June	0.01	0.032	0.012
H On Site	January	0.02	0.048	0.03
	February	0.022	0.06	0.031
	March	0.025	0.06	0.031
	April	0.027	0.058	0.037
	May	0.026	0.08	0.04
	June	0.023	0.089	0.038
I On Site	January	0.01	0.025	0.011
	February	0.01	0.05	0.011
	March	0.01	0.06	0.012
	April	0.01	0.04	0.013
	May	0.01	0.093	0.014
	June	0.01	0.094	0.015
J On Site	January	0.01	0.032	0.015
	February	0.01	0.042	0.014
	March	0.01	0.05	0.015
	April	0.01	0.058	0.015
	May	0.01	0.06	0.016
	June	0.01	0.09	0.015
K On Site	January	0.01	0.05	0.018
	February	0.01	0.031	0.016
	March	0.01	0.035	0.015
	April	0.01	0.048	0.015
	May	0.01	0.04	0.013
	June	0.01	0.099	0.015

*Detectors are 'bugged' to insure on scale readings.

TABLE 16

CONCENTRATIONS OF IODINE-131* IN MILK

Results in Units of pCi/l ± 2 sigma

STATION	5-04-81	6-01-81	7-06-81	8-03-81	9-01-81	10-05-81	11-02-81	12-07-81
4	<0.1	<0.2	<0.2	<0.1	<0.3	<0.2	<0.2	<0.09
14	<0.2	<0.2	<0.2	<0.1	<0.3	<0.2	<0.2	<0.09
16	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.2	<0.1
25	(1)	(1)	<0.2(2)	<0.1	(3)	-	-	-
12	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1
40 (Control)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.08	<0.2	<0.09
7	-	-	-	-	-	<0.1	<0.2	<0.1

* Iodine-131 results are corrected for decay to the sampling stop date.
\- No result because the sampling station was not in operation.
(1) No sample was obtained because the cow was dry.
(2) Sample date was 7-20-81.
(3) Dairy operations were discontinued in August.

TABLE 17

CONCENTRATIONS OF GAMMA EMITTERS IN MILK (MONTHLY SAMPLES)

Results in Units of pCi/l ± 2 sigma

STATION	NUCLIDES	5-04-81	6-01-81	7-06-81	8-03-81	9-01-81	10-05-81	11-02-81	12-07-81
4	K-40	1600±160	1400±140	1500±150	1400±140	1300±130	1400±140	1300±130	2500±250
	Cs-134	<3.5	<4.0	<4.6	<4.7	<3.5	<3.6	<4.1	<4.9
	Cs-137	<4.6	<5.8	<6.4	6.1±3.2	<5.4	<4.8	<5.9	<6.3
	Ba-140	<38	<41	<41	<36	<33	<26	<43	<75
	La-140	<6.5	<8.4	<7.7	<6.3	<5.5	<7.1	<11	<14
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
14	K-40	1400±140	1400±140	1300±130	1400±140	1200±120	1400±140	1400±140	1500±150
	Cs-134	<3.6	<4.3	<3.3	<3.7	<4.0	<4.2	<2.6	<4.4
	Cs-137	<4.1	<7.0	<4.1	<4.8	<5.7	<4.7	<3.7	<5.5
	Ba-140	<46	<41	<39	<26	<46	<36	<33	<59
	La-140	<9.8	<10	<8.3	<4.4	<8.4	<7.1	<6.2	<10
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
12	K-40	1400±140	1500±150	1400±140	1200±120	1300±130	1600±160	1500±150	2100±210
	Cs-134	<2.9	<3.2	<3.4	<3.4	<2.8	<4.8	<3.1	<3.2
	Cs-137	<4.2	<7.7	6.9±3.4	7.0±4.2	<3.2	8.5±5.0	<3.6	4.1±2.8
	Ba-140	<31	<35	<34	<25	<27	<42	<32	<48
	La-140	<5.5	<5.0	<5.7	<3.6	*	<2.8	<3.4	<8.2
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
16	K-40	1300±130	1300±130	1100±110	1300±130	1800±180	1400±140	1500±150	1800±180
	Cs-134	<2.5	<3.8	<2.7	<3.6	<4.6	<3.1	<3.2	<3.5
	Cs-137	4.8±2.8	<5.7	4.4±2.5	5.6±3.3	<5.4	<4.5	6.1±3.4	<5.9
	Ba-140	<44	<29	<30	<24	<44	<30	<35	<40
	La-140	<8.6	<5.5	<6.2	<5.4	<6.9	<6.6	<5.5	<5.5
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD

TABLE 17 (cont.)

CONCENTRATIONS OF GAMMA EMITTERS IN MILK (MONTHLY SAMPLES)

Results in Units of pCi/l ± 2 sigma

STATION	NUCLIDES	5-04-81	6-01-81	7-06-81	8-03-81	9-01-81	10-05-81	11-02-81	12-07-81
40	K-40	1400±140	1500±150	1400±140	1500±150	1400±140	1300±130	1500±150	1500±150
	Cs-134	<3.5	<3.3	<4.2	<3.4	<3.5	<3.9	<4.3	<4.7
	Cs-137	3.9±2.7	<5.0	<5.9	<4.6	<4.3	<5.5	<5.4	<4.7
	Ba-140	<36	<30	<44	<29	<35	<51	<1300(1)	<45
	La-140	<8.0	*	<8.3	<3.4	<8.2	<10	<200(1)	<8.9
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
25	K-40			1500±150(3)	1300±130				
	Cs-134			<4.4	<4.2				
	Cs-137			29±5	20±5				
	Ba-140	(2)	(2)	<40	<30	(4)	-	-	-
	La-140			<12	<7.2				
	Others			<LLD	<LLD				
7	K-40						1300±130(5)	1300±130	1300±130
	Cs-134						<3.0	<4.0	<3.1
	Cs-137						3.5±2.4	<5.5	5.3±2.8
	Ba-140	-	-	-	-	-	<29	<39	<51
	La-140						<2.5	<9.5	<11
	Others						<LLD	<LLD	<LLD

* Indicates that no LLD was calculated for that nuclide.
\- No results because the sampling station was not in operation.
(1) High LLD due to long decay period.
(2) No sample was obtained because the cow was dry.
(3) Sample date was 7-20-81.
(4) Dairy operations were discontinued in August.
(5) Sampling began at location 7 on 10-05-81.

TABLE 18

CONCENTRATIONS OF STRONTIUM-90 IN MILK (MONTHLY SAMPLE)

Results in Units of pCi/l ± 2 sigma

STATION	6-04-81	6-01-81	7-06-81	8-03-81
4	7.6±4.8	4.6±1.3	3.3±1.1	2.7±0.7
14	2.8±0.9	12±2	3.3±0.8	4.2±0.7
16	4.3±1.7	10±2	3.9±0.8	2.0±0.6
25	(1)	(1)	1.1±0.6(2)	6.5±0.9
12	4.9±1.5	3.4±1.4	6.5±1.2	4.1±0.7
40	5.5±1.4	4.2±1.7	3.9±0.9	2.7±0.8
7	-	-	-	-

STATION	9-01-81	10-05-81	11-02-81	12-07-81
4	5.0±1.4	2.7±0.9	3.7±0.7	4.3±1.1
14	3.9±1.2	2.5±0.8	1.6±1.0	2.5±1.4
16	8.9±2.2	5.1±1.0	6.1±0.9	5.0±1.3
25	(3)	-	-	-
12	8.4±1.9	3.8±1.4	4.2±2.4	3.0±0.9
40	6.6±4.3	3.2±1.0	4.3±0.8	3.9±1.0
7	-	4.1±1.3(4)	3.8±0.8	5.0±2.8

- No results because the sampling station was not in operation.
(1) No sample was obtained because the cow was dry.
(2) Sample date was 7-20-81.
(3) Dairy operations were discontinued in August.
(4) Sampling began at location 7 on 10-05-81

TABLE 19

MILCH ANIMAL CENSUS

SPRING 1981

TOWN	NO. ON MAP	NO. OF MILCH ANIMALS
New Haven	1	31C
	2	45C
	4*	71C
	3	29C
	12*	45C
	5	40C
	7*	45C
Mexico	6	60C
	8	2C
	14*	65C
	9	1G
	10	33C
	11	42C
	13	49C
	15	44C
	17	5C
	18	40C
	19	150C
	20	34C
Richland	21	58C
Hannibal	32	5C
	40**	34C
Scriba	16*	39C
	23	2C
	24	1G
	26	6G
	25*	1C
	27	1C
	28	2C
	33	1C
Volney	29	25C
	Totals	998 Cows
		8 Goats

C = Cows; G = Goats
* = Milk Sample Locations
** = Milk Sample Control Location

TABLE 19 (cont.)

MILCH ANIMAL CENSUS

SUMMER 1981

TOWN	NO. ON MAP	NO. OF MILCH ANIMALS
New Haven	1	27C
	2	45C
	4*	78C
	3	29C
	12*	40C
	5	38C
	7*	50C
Mexico	6	60C
	8	2C
	14*	65C
	9	2G
	10	30C
	11	42C
	13	45C
	15	43C
	17	5C
	18	40C
	19	150C
	20	30C
Richland	21	62C
Hannibal	40*	34C
Scriba	22	1G
	16*	39C
	24	1G
	26	6G
	25**	0
	27	1C
	28	1C
Volney	29	30C
	Totals	986 Cows
		10 Goats

C = Cows; G = Goats
* = Milk Sample Locations
** = Milk Sample Control Location

TABLE 20

CONCENTRATIONS OF GAMMA EMITTERS IN VARIOUS FOOD PRODUCTS

Results in Units of pCi/g(wet) ± 2 sigma

COLLECTION SITE	SAMPLE DATE	DESCRIPTION	Be-7	K-40	Mn-54	Co-58	Co-60	I-131	Cs-134	Cs-137	Ce-141	Ra-226	Others
P (Control)	4-29-81	Beef	<0.2	2.4±0.2	<0.02	<0.02	<0.01	<2.4	<0.01	0.017±0.006	<0.06	<0.02	All<LLD
P (Control)	5-20-81	Beef	<0.2	2.4±0.2	<0.02	<0.02	<0.02	<0.6	<0.01	0.024±0.009	<0.05	<0.03	All<LLD
H	5-20-81	Beef	<0.2	2.7±0.3	<0.02	<0.02	<0.02	<0.5	<0.01	<0.01	<0.05	<0.03	All<LLD
B	5-26-81	Eggs	<0.09	0.8±0.1	<0.008	<0.009	<0.01	<0.1	<0.007	<0.007	<0.02	<0.01	All<LLD
S	5-28-81	Eggs	<0.1	1.2±0.1	<0.009	<0.01	<0.01	<0.1	<0.007	<0.008	<0.02	<0.02	All<LLD
S	5-28-81	Chicken	<0.1	2.6±0.3	<0.009	<0.01	<0.01	<0.2	<0.008	<0.009	<0.02	<0.02	All<LLD
A	5-28-81	Eggs	<0.07	1.0±0.1	<0.006	<0.007	<0.007	<0.1	<0.005	<0.006	<0.02	<0.01	All<LLD
A	6-03-81	Chicken	<0.1	2.7±0.3	<0.008	<0.01	<0.01	<0.1	<0.008	<0.009	<0.03	<0.02	All<LLD
I	6-01-81	Beef	<0.1	1.7±0.2	<0.01	<0.01	<0.01	<0.2	<0.009	<0.01	<0.03	<0.02	All<LLD
C (Control)	6-05-81	Chicken	<0.2	3.1±0.3	<0.02	<0.02	<0.02	<0.1	<0.01	<0.02	<0.03	<0.03	All<LLD
C (Control)	6-05-81	Eggs	<0.1	1.1±0.2	<0.01	<0.01	<0.01	<0.09	<0.01	<0.01	<0.03	<0.02	All<LLD
J	7-09-81	Beef	<0.1	2.4±0.2	<0.01	<0.01	<0.01	<0.06	<0.01	0.07±0.01	<0.02	<0.02	All<LLD
B	7-17-81	Chicken	<0.08	3.3±0.3	<0.008	<0.009	<0.01	<0.02	<0.008	<0.009	<0.02	<0.02	All<LLD
B	7-17-81	Chicken	<0.08	3.0±0.3	<0.009	<0.009	<0.01	<0.02	<0.009	<0.009	<0.01	<0.02	All<LLD
H	9-09-81	Tomatoes	<0.05	1.9±0.2	<0.004	<0.005	<0.007	<0.03	<0.004	<0.005	<0.009	<0.009	All<LLD
X	9-09-81	Cabbage	<0.4	1.8±0.6	<0.04	<0.04	<0.04	<0.08	<0.04	<0.04	<0.08	<0.09	All<LLD
N	9-09-81	Tomatoes	<0.05	2.7±0.3	<0.005	<0.006	<0.005	<0.04	<0.005	<0.005	<0.01	<0.01	All<LLD
R	9-09-81	Tomatoes	<0.03	2.6±0.3	<0.004	<0.004	<0.004	<0.02	<0.003	<0.003	<0.009	<0.006	All<LLD
C (Control)	9-09-81	Tomatoes	<0.04	2.6±0.3	<0.004	<0.005	<0.006	<0.03	<0.004	<0.004	<0.006	<0.008	All<LLD

TABLE 20 (cont.)

CONCENTRATIONS OF GAMMA EMITTERS IN VARIOUS FOOD PRODUCTS

Results in Units of pCi/g(wet) ± 2 sigma

COLLECTION SITE	SAMPLE DATE	DESCRIPTION	Be-7	K-40	Mn-54	Co-58	Co-60	I-131	Cs-134	Cs-137	Ce-141	Ra-226	Others
C (Control)	9-22-81	Swiss Chard	0.33±0.08	5.8±0.6	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.02	<0.02	All<LLD
F	9-22-81	Cabbage	<0.08	2.3±0.2	<0.009	<0.009	<0.02	<0.02	<0.008	<0.009	<0.02	<0.02	All<LLD
R	9-22-81	Cabbage	<0.09	1.9±0.2	<0.01	<0.01	<0.01	<0.02	<0.009	<0.01	<0.02	<0.02	All<LLD
X	9-22-81	Cabbage	<0.07	2.3±0.2	<0.009	<0.009	<0.01	<0.01	<0.008	<0.009	<0.01	<0.02	All<LLD
D (Control)	11-06-81	Beef	<0.1	2.4±0.2	<0.01	<0.01	<0.01	<0.3	<0.008	<0.009	<0.02	<0.02	All<LLD
C (Control)	11-09-81	Eggs	<0.1	1.1±0.1	<0.01	<0.01	<0.02	<0.1	<0.009	<0.01	<0.02	<0.02	All<LLD
C (Control)	11-09-81	Chicken	<0.2	2.9±0.3	<0.01	<0.02	<0.01	<0.2	<0.01	<0.01	<0.04	<0.03	All<LLD
B	11-10-81	Eggs	<0.1	1.1±0.2	<0.01	<0.02	<0.01	<0.1	<0.01	<0.01	<0.03	<0.02	All<LLD
B	11-10-81	Chicken	<0.2	3.5±0.4	<0.02	<0.02	<0.02	<0.2	<0.01	<0.02	<0.04	<0.03	All<LLD
G	11-11-81	Beef	<0.2	3.1±0.3	<0.01	<0.02	<0.02	<0.3	<0.01	0.023±0.009	<0.03	<0.02	All<LLD
L	11-11-81	Chicken	<0.1	3.0±0.3	<0.009	<0.01	<0.01	<0.2	<0.008	<0.009	<0.03	<0.02	All<LLD
D	11-11-81	Eggs	<0.09	0.9±0.2	<0.01	<0.01	<0.01	<0.01	<0.009	<0.01	<0.02	<0.02	All<LLD
E	11-12-81	Beef	<0.2	2.8±0.3	<0.01	<0.02	<0.01	<0.2	<0.01	0.03±0.01	<0.04	<0.03	All<LLD
R	11-18-81	Beef	<0.2	3.0±0.3	<0.01	<0.02	<0.01	<0.1	<0.01	0.03±0.01	<0.03	<0.03	All<LLD
S	11-20-81	Chicken	<0.1	3.4±0.3	<0.01	<0.01	<0.02	<0.06	<0.01	<0.01	<0.02	<0.02	All<LLD
S	11-20-81	Eggs	<0.09	1.1±0.1	<0.009	<0.009	<0.01	<0.04	<0.008	<0.009	<0.03	<0.02	All<LLD

TABLE 21

CONCENTRATION OF GAMMA EMITTERS IN FODDER CROPS AND PASTURE GRASS

Results in Units of pCi/g (wet)

Station Code*	Sample Type	Sample Date	Ra-226	Be-7	Cs-134	Ru-106	Cs-137	Nb-95	Co-58	Mn-54	Co-60	K-40	Ce-144	Others
4	Grain	06/23/81	<1.76	1.77±0.6	<0.11	<0.92	<0.12	<0.19	<0.14	<0.12	<0.13	6.44±0.7	<0.50	<LLD
	Grass	06/26/81	<1.02	1.46±0.4	<0.10	<0.90	<0.12	0.44±0.1	<0.13	<0.12	<0.13	6.17±0.7	0.50±0.1	<LLD
	Hay	06/26/81	5.41±1.8	<4.76	<0.36	<4.10	0.36±0.1	0.72±0.2	<0.55	<0.44	<0.67	10.4 ±2.3	<1.98	<LLD
	Grass	07/30/81	<4.26	4.42±1.7	<0.24	<2.50	<0.27	0.49±0.3	<0.38	<0.34	0.78±0.3	6.99±3.2	<1.57	<LLD
	Grass	08/25/81	<2.41	3.79±1.3	<0.14	<1.42	<0.15	<0.49	<0.22	<0.16	<0.18	5.27±1.5	0.59±0.3	<LLD
	Hay	09/24/81	<5.98	<4.40	<0.33	<3.64	<0.37	<0.82	<0.49	<0.43	<0.61	11.2 ±3.8	<1.77	<LLD
	Grass	09/24/81	2.11±0.9	5.22±1.7	<0.12	<0.72	<0.13	<0.47	<0.18	<0.11	<0.12	6.42±1.4	<0.57	<LLD
	Grass	10/27/81	<2.09	1.92±1.0	<0.10	<1.30	<0.11	<0.35	<0.18	<0.14	<0.14	3.23±1.1	<0.64	<LLD
	Hay Silage	10/27/81	1.68±0.9	<1.79	<0.13	<1.30	<0.12	0.24±0.2	<0.18	<0.12	<0.18	5.10±1.5	<0.68	<LLD
	Corn Silage	10/27/81	<2.70	3.08±1.6	<0.16	<1.51	<0.14	<0.36	<0.21	<0.16	<0.18	2.99±1.3	3.08±1.6	<LLD
7	Hay Silage	10/27/81	<2.57	<2.2	<0.17	<1.33	<0.18	<0.48	<0.24	<0.18	<0.20	6.55±1.8	0.65±0.3	<LLD
	Corn Silage	10/27/81	3.21±1.1	1.85±1.0	<0.13	<0.14	<0.13	<0.38	<0.17	<0.12	<0.17	4.49±1.4	1.85±1.0	<LLD
	Grass	10/27/81	<2.01	<2.2	<0.17	<1.33	<0.18	<0.48	<0.24	<0.18	<0.20	3.70±1.2	<0.55	<LLD
12	Grain	06/23/81	<2.00	<1.05	<0.11	<1.08	<0.13	<0.15	<0.14	<0.14	<0.18	10.4 ±0.9	<0.51	<LLD
	Grass	06/23/81	<2.00	<1.49	<0.11	<1.25	<0.14	0.56±0.1	<0.15	<0.13	<0.18	6.47±0.7	0.61±0.1	<LLD
	Hay	06/23/81	7.24±1.7	<5.99	<0.50	<4.86	<0.64	0.85±0.3	<0.68	<0.57	1.64±0.3	13.3 ±2.4	<2.07	<LLD
	Grass	07/30/81	<3.02	1.58±1.0	<0.16	<1.73	<0.19	0.50±0.2	<0.23	<0.20	<0.25	3.03±1.4	<0.83	<LLD
	Grass	08/25/81	<1.78	<2.01	<0.10	<0.10	<0.13	<0.38	<0.20	<0.12	<0.13	6.49±1.5	<0.53	<LLD
	Hay	09/24/81	4.45±2.5	<3.76	<0.24	<2.63	<0.30	<0.67	<0.43	<0.31	<0.45	17.2 ±3.7	<1.40	<LLD
	Grass	09/24/81	<1.73	3.56±1.4	<0.10	<0.93	<0.08	<0.26	<0.20	<0.11	<0.12	8.11±1.5	<0.48	<LLD
	Grass	10/28/81	2.16±1.4	<3.12	<0.15	<1.15	<0.15	<0.47	<0.20	<0.15	<0.16	4.46±1.5	<0.72	<LLD
	Corn Silage	10/28/81	1.75±0.9	1.75±1.1	<0.10	<0.97	<0.11	<0.27	<0.13	<0.12	<0.14	3.92±1.1	1.75±1.1	<LLD
14	Grain	06/26/81	1.60±0.5	<1.13	<0.11	<0.92	<0.11	<0.18	<0.16	<0.12	<0.16	7.35±0.8	<0.48	<LLD
	Grass	06/26/81	<0.90	0.76±0.2	<0.06	<0.57	<0.08	0.20±0.1	<0.09	<0.07	<0.09	6.97±0.5	0.21±0.06	<LLD
	Hay	06/26/81	8.45±2.4	3.62±1.1	<0.45	<4.26	<0.54	0.60±0.2	<0.60	<0.51	<0.61	12.3 ±2.6	<2.17	<LLD
	Grass	07/30/81	<3.61	4.41±1.5	<0.19	<1.94	<0.24	<0.48	<0.24	<0.25	<0.31	6.16±2.3	1.24±0.6	<LLD
	Grass	08/25/81	<1.78	2.74±1.0	<0.09	<1.03	<0.12	<0.34	<0.16	<0.11	<0.13	4.97±1.21	<0.50	<LLD
	Hay	09/24/81	<6.27	<4.3	<0.32	<3.34	<0.34	<0.68	<0.44	<0.35	<0.52	22.10±4.7	<1.68	<LLD
	Grass	09/24/81	<1.51	5.78±1.4	<0.07	<0.78	<0.09	0.24±0.2	<0.14	<0.10	<0.13	6.55±1.3	<0.42	<LLD
	Grass	10/27/81	1.88±1.3	1.36±0.8	<0.08	<0.88	<0.09	<0.27	<0.14	<0.12	<0.12	4.99±1.2	<0.47	<LLD
	Corn Silage	10/27/81	<2.38	<2.04	<0.12	<1.13	<0.12	<0.32	<0.16	<0.12	<0.18	3.29±1.3	<2.04	<LLD

*Corresponds to sample locations on Figure 6.

TABLE 21 (cont.)

CONCENTRATION OF GAMMA EMITTERS IN FODDER CROPS AND PASTURE GRASS

Results in Units of pCi/g (wet)

Station Code*	Sample Type	Sample Date	Ra-226	Be-7	Cs-134	Ru-106	Cs-137	Nb-95	Co-58	Mn-54	Co-60	K-40	Ce-144	Others
16	Grain	06/23/81	<1.71	<0.85	<0.11	<0.94	<0.10	<0.13	<0.11	<0.10	<0.14	9.26±0.9	<0.43	<LLD
	Grass	06/23/81	<3.12	2.10±0.5	<0.20	<2.00	<0.19	0.69±0.1	<0.23	<0.23	<0.26	9.31±1.2	0.92±0.2	<LLD
	Hay	06/23/81	<6.48	<3.37	<0.37	<3.58	<0.41	<0.64	<0.34	<0.44	<0.67	7.76±1.8	<1.78	<LLD
	Grass	07/30/81	<4.77	3.52±1.6	<0.31	<2.87	<0.35	0.62±0.3	<0.40	<0.31	<0.47	6.11±2.5	1.46±0.6	<LLD
	Grass	08/25/81	<2.31	<2.36	<0.14	<1.46	<0.13	<0.53	<0.21	<0.16	<0.21	8.26±1.8	<0.63	<LLD
	Hay	09/24/81	<6.95	<4.54	<0.41	<4.52	<0.45	<0.84	<0.60	<0.48	0.69±0.3	25.7 ±5.1	<1.94	<LLD
	Grass	09/24/81	<1.81	2.44±1.1	<0.10	<0.92	<0.11	<0.37	<0.19	<0.12	<0.12	5.61±1.3	<0.52	<LLD
	Grass	10/28/81	<1.87	5.70±1.5	<0.11	<0.88	<0.14	<0.39	<0.16	<0.12	<0.17	4.55±1.3	<0.59	<LLD
	Corn Silage	10/28/81	<2.17	<1.92	<0.12	<1.11	<0.13	1.94±0.1	<0.18	<0.14	<0.15	4.43±1.4	<0.59	<LLD
25	Grass	07/31/81	6.83±3.6	3.69±2.3	<0.33	<3.45	<0.36	0.49±0.3	<0.38	<0.34	0.28±0.2	6.99±3.2	<1.57	<LLD
	Hay	07/31/81	<9.12	<4.05	<0.52	<4.97	<0.62	<0.55	<0.63	<0.59	<0.76	10.5 ±4.3	<2.18	<LLD
	Grain	07/31/81	<1.97	<0.94	<0.11	<0.99	<0.12	<0.12	<0.11	<0.12	<0.17	7.60±1.6	<0.48	<LLD
	Grass	08/25/81	<2.01	2.61±1.4	<0.11	<1.21	<0.14	<0.43	<0.19	<0.14	<0.17	4.56±1.3	<0.62	<LLD
40 (Control)	Grain	06/26/81	1.86±0.4	<1.14	<0.11	<1.04	<0.12	<0.18	<0.15	<0.13	<0.17	7.96±0.8	<0.46	<LLD
	Grass	06/26/81	<1.61	2.11±0.5	<0.09	<0.95	0.07±0.02	0.52±0.1	<0.12	<0.11	<0.11	4.13±0.6	0.65±0.1	<LLD
	Hay	06/26/81	<7.78	<5.36	<0.48	<4.24	<0.48	1.06±0.3	<0.60	<0.56	<0.65	20.0 ±2.7	<2.21	<LLD
	Grass	07/30/81	<3.65	1.69±1.0	<0.22	<2.04	<0.21	0.46±0.3	<0.24	<0.20	<0.36	5.62±2.2	<0.93	<LLD
	Grass	08/25/81	<2.00	<2.42	<0.11	<0.12	<0.13	<0.47	<0.22	<0.13	<0.17	6.31±1.5	<0.62	<LLD
	Hay	09/24/81	4.41±2.4	<3.61	<0.30	<2.70	<0.28	<0.55	<0.39	<0.25	<0.38	14.5 ±3.7	<1.36	<LLD
	Grass	09/24/81	<1.58	1.85±6.9	<0.08	<0.79	<0.09	<0.28	<0.13	<0.10	<0.14	<3.89±1.0	<0.45	<LLD
	Grass	10/28/81	<1.61	3.85±1.1	<0.10	<0.89	<0.10	<0.28	<0.16	<0.09	<0.11	4.43±1.1	<0.47	<LLD
	Corn Silage	10/28/81	<2.11	<1.58	<0.13	<1.22	0.10±1.2	<0.30	<0.17	<0.11	<0.16	3.71±1.2	<1.58	<LLD

*Corresponds to sample locations on Figure 6

TABLE 22

CONCENTRATION OF GAMMA EMITTERS IN SURFACE WATER SAMPLES

Reported in Units of pCi/l

Station Code**	Sample Type	Sample Date	Ra-226	Be-7	Cs-134	Ru-106	Cs-137	Nb-95	Co-58	Mn-54	Co-60	K-40	Others
25*	Well	04/06/81	91.8±17.4	<21.0	<2.34	<20.0	<2.40	<2.58	<2.50	<2.35	<2.71	<30.33	<LLD
25*	Well	04/06/81	<126.6	<70.0	<5.30	<56.1	<6.04	<11.56	<7.03	<6.17	<8.46	<76.51	<LLD
25*	Pasture Stream	04/06/81	<130.5	<67.5	<5.54	<55.0	<6.18	<10.45	<8.38	<5.74	<7.77	<76.50	<LLD
25*	Pasture Stream	04/06/81	79.0±12.6	<18.2	<2.16	<21.0	<2.48	<2.12	<2.17	<2.52	<4.34	<35.83	<LLD
16*	Pond Water	08/25/81	<27.3	<18.9	<1.46	<13.3	<1.62	<3.63	<2.35	<1.81	<2.28	<21.2	<LLD
25*	Pasture Stream	08/25/81	<24.9	<17.4	<1.49	<13.5	<1.62	<3.14	<1.93	<1.73	<1.98	<23.6	<LLD
12*	Barn/Spring	08/25/81	<26.1	<18.7	<1.42	<1.4	<2.98	<2.04	<2.04	<1.71	<2.01	<17.8	<LLD
40* (Control)	Barn/Well	08/19/81	<27.7	<21.9	<1.50	<15.7	<1.85	<3.38	<2.21	<1.95	<2.34	<22.4	<LLD
16*	Barn/Pond	10/27/81	17.6± 9.2	<9.9	<0.99	<8.4	<0.96	<1.31	<1.09	<0.89	<1.12	10.8 ± 6.3	<LLD
4*	Barn/Spring	10/27/81	13.2± 8.3	<7.5	<1.05	<10.1	<1.00	<1.12	<0.95	<1.16	<1.10	<15.3	<LLD
14*	Barn/Spring	10/27/81	23.4± 1.1	<10.9	<1.08	<9.7	<0.94	<1.52	<1.05	<0.98	<1.00	<14.0	<LLD
12*	Barn/Spring	10/27/81	13.5±10.1	<10.6	<0.96	<9.0	<1.29	<1.62	<1.16	<1.20	<1.62	<10.8	<LLD
7*	Barn/Spring	10/27/81	13.6±10.6	<8.7	<0.91	<9.2	<0.91	<1.25	<0.87	<1.05	<1.80	<15.7	<LLD
40*	Barn/Well	10/28/81	16.0± 8.0	<9.0	<0.98	<9.0	<1.11	<1.28	<1.07	<0.82	<1.28	<14.0	<LLD
70	Stream	10/30/81	16.7± 9.3	<12.1	<1.00	<10.2	<1.31	<1.64	<1.22	<0.98	<1.18	<12.5	<LLD
71	Stream	10/30/81	14.9± 8.4	<11.4	<1.09	<11.4	<0.94	<1.51	<1.12	<1.10	<1.28	<14.4	<LLD
72	Stream	10/30/81	<20.1	<12.0	<1.14	<9.5	<1.16	<1.35	<1.12	<1.08	<1.38	<12.5	<LLD
73	Stream	10/30/81	16.6± 9.0	<11.7	<1.15	<9.9	<1.17	<1.89	<1.30	<0.93	1.71±0.9	<12.5	<LLD
74	Stream	10/30/81	<21.2	<12.2	<0.96	<10.8	<1.11	<1.61	<1.27	<1.14	<1.38	<14.4	<LLD
75	Stream	10/30/81	15.6± 8.1	<10.0	<0.99	<11.0	<0.98	<1.60	<1.49	<1.00	<1.47	14.4 ± 9.6	<LLD
76	Stream	10/30/81	<21.2	<10.8	<0.93	<11.3	<1.18	<1.50	<1.27	<1.11	<1.23	<15.3	<LLD
77	Marsh	10/30/81	<21.1	<10.3	<1.08	<10.5	<1.49	<1.42	<1.27	<1.15	1.40±0.9	<18.7	<LLD
78	Stream	10/30/81	<19.8	<10.6	<0.99	<8.5	<1.05	<1.64	<1.12	<0.99	<1.18	<14.9	<LLD
79	Stream	10/30/81	<21.4	<12.2	<1.15	<12.3	<1.22	<1.53	<1.20	<1.24	<1.38	<14.0	<LLD
80	Pond Water	11/25/81	74.8±34.6	<26.8	<3.05	<27.9	<3.17	<2.99	<3.10	<3.59	<4.83	11.5 ±15.8	<LLD
81	Stream Water	11/25/81	<77.7	<27.7	<2.79	<32.7	<3.32	<3.61	<2.83	<3.71	<3.73	<45.2	<LLD
82	Stream Water	11/25/81	<75.6	<29.4	<3.33	<30.1	<3.29	<3.53	<3.29	<3.63	<8.76	<41.1	<LLD
83	Stream Water	11/25/81	73.8±31.2	<26.6	<2.84	<31.7	<3.52	<3.33	<3.17	<3.22	<5.27	<44.6	<LLD
84	Stream Water	11/25/81	59.9±31.9	<28.9	<3.24	<31.4	<3.96	<3.13	<3.17	<3.46	<6.55	<38.5	<LLD
85 (Control)	Pond Water	11/25/81	75.0±36.6	<28.5	<3.19	<31.5	<3.86	<3.55	<3.52	<3.15	<7.27	<42.3	<LLD
86 (Control)	Pond Water	11/25/81	66.0±34.6	<30.5	<3.17	<30.7	<3.71	<3.46	<3.14	<3.52	<4.68	<40.4	<LLD
87 (Control)	Pond Water	11/25/81	78.5±63.2	<26.6	<3.22	<31.6	<3.35	<3.56	<3.49	<3.06	<5.23	18.4 ±15.2	<LLD
77 (1)	Marsh Water	12/04/81	<115.0	<36.9	<4.39	<44.6	<5.84	<4.85	<5.00	<5.05	<5.99	<55.4	<LLD
77 (2)	Marsh Water	12/04/81	<108.0	<38.5	<4.15	<35.2	<4.49	<4.49	<3.87	<5.31	<4.46	<65.5	<LLD
16*	Stream	12/15/81	<100.0	<54.1	<4.36	<53.4	<4.32	<6.46	<4.60	<3.81	<6.36	31.7 ±27.8	<LLD
16*	Barn/Pond	12/15/81	78.8±44.7	<55.5	<4.46	<43.6	<4.41	<7.05	<4.78	<5.35	<5.12	<51.5	<LLD
40* (Control)	Barn/Well	12/15/81	161. ±91.1	<48.9	<4.53	<45.0	<5.07	<7.15	<5.59	<4.48	<6.03	26.6 ±25.2	<LLD
40* (Control)	Pond Water	12/15/81	<110.0	<42.7	<4.02	<45.7	<4.13	<5.68	<4.28	<4.19	<5.47	54.7 ±35.9	<LLD
4*	Barn/Spring	12/16/81	<109.0	<40.2	<4.12	<47.7	<4.91	<6.08	<4.05	<4.58	<5.66	<60.6	<LLD
4*	Pasture Stream	12/16/81	<116.0	<49.1	<4.29	<45.0	<5.14	<7.89	<5.62	<5.46	<6.20	<55.4	<LLD
12*	Barn/Spring	12/16/81	77.8±44.7	<54.6	<4.46	<43.5	<4.46	<6.87	<4.71	<5.34	<5.12	<51.5	<LLD
12*	Pond Water	12/16/81	<122.0	<36.8	<4.26	<46.6	<3.94	<4.09	<4.58	<4.16	<6.46	<57.2	<LLD
14*	Barn/Spring	12/16/81	<117.0	<44.7	<4.02	<47.8	<4.99	<7.15	<6.42	<4.35	<6.02	<47.4	<LLD
14*	Pond Water	12/16/81	<102.0	<50.1	<4.17	<38.2	<4.99	<7.18	<4.92	<4.62	<5.51	<55.4	<LLD
4*	Pond Water	12/17/81	<107.0	<35.2	<4.48	<28.1	<3.94	<3.38	<3.42	<4.44	<4.67	<58.9	<LLD
7*	Barn/Spring	12/17/81	<118.0	<53.4	<5.12	<49.1	<5.22	<6.80	<6.50	<5.77	<4.92	<60.7	<LLD
7*	Pond Water	12/17/81	82.7±45.5	<33.7	<3.82	<32.5	<4.66	<4.12	<3.43	<4.35	<5.90	33.7 ±24.8	<LLD
25*	Pasture Stream	12/18/81	<119.0	<53.7	<4.40	<46.7	<5.07	<6.60	<6.06	<4.47	<6.35	<57.2	<LLD

*Milk sample locations

**Corresponds to sample locations on Figure 6.

TABLE 23

CONCENTRATION OF GAMMA EMITTERS IN SOIL AND SEDIMENT SAMPLES

Reported in Units of pCi/g (dry)

Station Code**	Sample Type	Sample Date	Ra-226	Be-7	Cs-134	Ru-106	Cs-137	Nb-95	Co-58	Mn-54	Co-60	K-40	Ce-144	Others
25*	Pasture Soil #1	04/06/81	2.56±0.5	<0.78	<0.07	<0.70	<0.08	<0.14	<0.08	<0.07	<0.10	11.5±0.6	<0.35	<LLD
25*	Pasture Soil #2	04/06/81	1.77±0.3	<0.77	<0.07	<0.73	<0.07	<0.12	<0.10	<0.08	<0.10	10.5±0.6	<0.33	<LLD
16*	Pasture Soil	06/23/81	2.20±0.3	<0.63	<0.07	<0.61	0.66±0.1	<0.09	<0.08	<0.08	<0.10	13.6±0.7	<0.31	<LLD
12*	Pasture Soil	06/23/81	2.25±0.4	<0.62	<0.06	<0.55	0.48±0.1	<0.09	<0.07	<0.07	<0.08	11.5±0.8	<0.31	<LLD
4*	Pasture Soil	06/26/81	1.66±0.3	<0.77	<0.07	<0.65	0.70±0.1	<0.13	<0.09	<0.07	<0.09	11.4±0.6	<0.34	<LLD
14*	Pasture Soil	06/26/81	1.58±0.3	<0.73	<0.06	<0.69	0.35±0.1	<0.13	<0.09	<0.08	<0.08	12.7±0.7	<0.34	<LLD
40* (Control)	Pasture Soil	06/26/81	2.09±0.3	<0.72	<0.06	<0.64	0.48±0.1	<0.11	<0.09	<0.07	<0.09	12.1±0.7	<0.31	<LLD
16*	Pasture Soil	07/30/81	2.28±0.7	<0.83	<0.07	<0.72	0.83±0.1	<0.15	<0.11	<0.08	<0.09	12.4±1.3	<0.37	<LLD
4*	Pasture Soil	07/30/81	2.54±0.8	<0.85	<0.07	<0.71	0.57±0.1	<0.12	<0.10	<0.07	<0.09	13.8±1.4	<0.35	<LLD
14*	Pasture Soil	07/30/81	1.60±0.6	<0.70	<0.06	<0.55	0.41±0.1	<0.11	<0.08	<0.07	<0.08	11.2±1.2	<0.30	<LLD
12*	Pasture Soil	07/30/81	2.24±0.8	<0.91	<0.08	<0.80	0.41±0.1	<0.14	<0.10	<0.08	<0.10	11.3±1.4	<0.37	<LLD
40* (Control)	Pasture Soil	07/30/81	<1.42	<0.76	<0.08	<0.79	0.25±0.1	<0.12	<0.10	<0.09	<0.11	10.7±1.3	<0.36	<LLD
25*	Pasture Soil	07/31/81	2.00±0.8	<0.91	<0.08	<0.83	0.88±0.1	<0.17	<0.12	<0.10	<0.11	11.5±1.3	<0.42	<LLD
4*	Pasture Soil	09/24/81	1.70±0.6	<1.34	<0.07	<0.66	0.97±0.1	<0.29	<0.11	<0.08	0.94±0.1	12.7±1.4	<0.39	<LLD
16*	Pasture Soil	09/24/81	1.79±0.6	<1.40	<0.07	<0.73	0.72±0.1	<0.29	<0.12	<0.08	<0.07	10.9±1.3	<0.38	<LLD
12*	Pasture Soil	09/24/81	2.15±0.6	<1.04	<0.05	<0.53	0.19±0.1	0.19±0.1	<0.10	<0.06	<0.07	10.6±1.1	<0.30	<LLD
14*	Pasture Soil	09/24/81	1.79±0.6	<0.99	<0.05	<0.56	0.49±0.1	<0.22	<0.10	<0.06	<0.06	12.4±1.2	<0.30	<LLD
40* (Control)	Pasture Soil	09/24/81	1.58±0.5	<0.93	<0.04	<0.44	0.34±0.1	<0.17	<0.08	<0.05	<0.05	11.9±1.1	<0.26	<LLD
3	Marsh Sediment	12/04/81	1.41±0.5	<0.73	<0.06	<0.43	1.32±0.1	<0.08	<0.06	<0.06	<0.06	13.1±1.1	<0.29	<LLD
25*	Stream Sediment #1	12/04/81	3.00±0.8	0.90±0.4	<0.07	<0.81	0.82±0.1	0.27±0.1	<0.07	<0.08	<0.07	11.0±1.4	0.40±0.2	<LLD
25*	Stream Sediment #2	12/14/81	2.47±0.7	<0.95	<0.07	<0.63	0.81±0.1	<0.16	<0.09	<0.07	<0.08	11.4±1.3	<0.35	<LLD
4*	Pond Sediment	12/17/81	3.69±1.9	5.08±1.6	<0.27	<2.67	0.56±0.2	<0.34	<0.23	<0.25	<0.32	21.8±4.2	<1.08	<LLD

*Milk sample locations

**Corresponds to sample locations on Figure 6

TABLE 24

CANAL WATER DATA

MONTHLY COMPOSITE ANALYSIS

	INLET CANAL			DISCHARGE CANAL		
MONTH (1981)	pH	DISSOLVED SOLIDS PPM	SUSPENDED SOLIDS PPM	pH	DISSOLVED SOLIDS PPM	SUSPENDED SOLIDS PPM
January	7.4	244	2.0	7.8	254	3.3
February	7.4	250	4.7	7.5	267	5.7
March	7.1	220	2.7	7.3	232	3.3
April	7.6	198	3.3	7.6	213	4.7
May	7.6	201	6.7	7.6	204	13.7
June	7.5	188	5.3	7.6	196	9.0
July	7.0	172	1.0	7.1	203	4.0
August	7.2	233	1.0	7.3	230	0.7
September	7.2	152	3.7	7.1	161	5.7
October	7.4	178	5.3	7.5	177	5.7
November	7.9	200	2.0	7.8	210	4.0
December	6.4	206	4.7	6.5	228	2.3

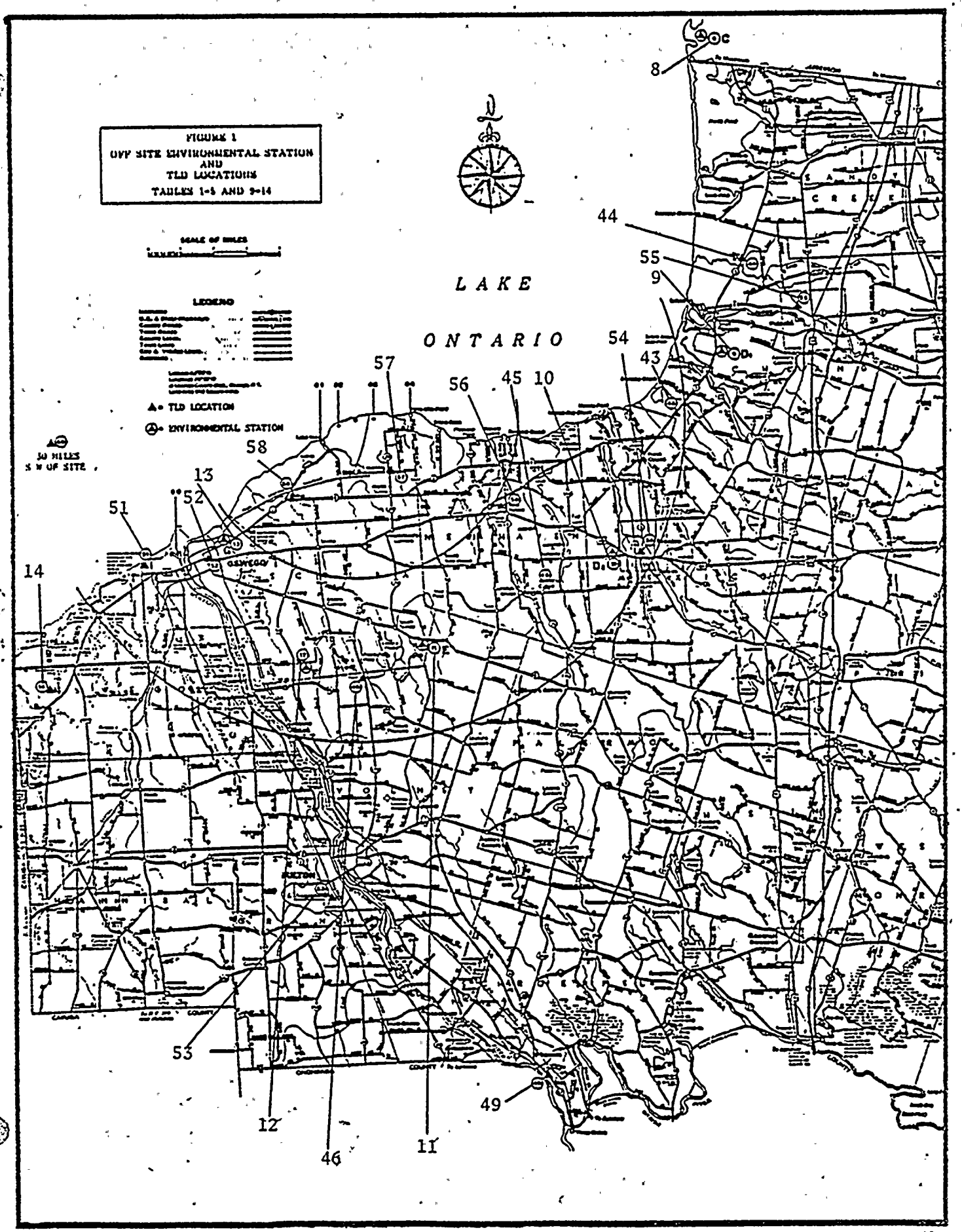
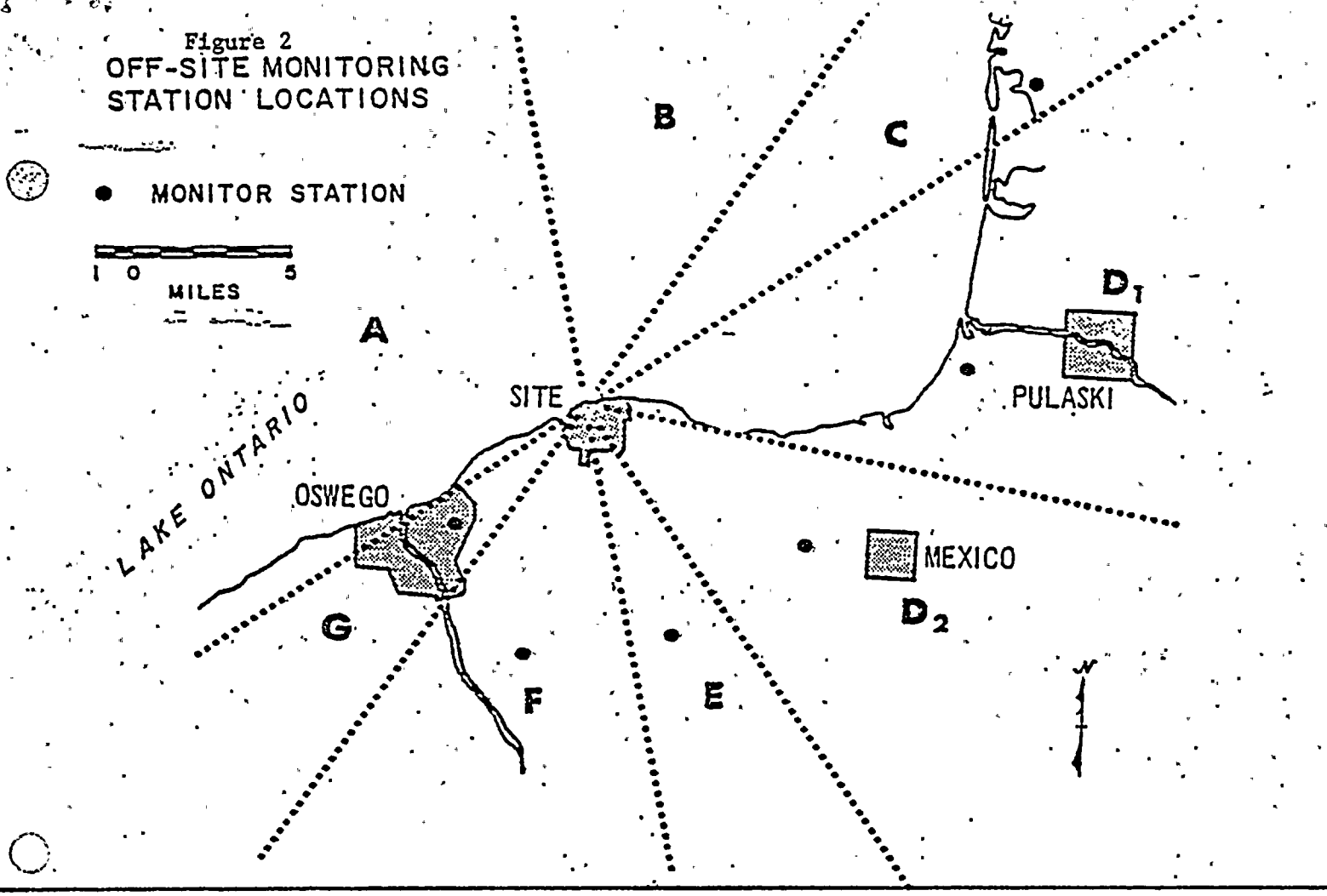
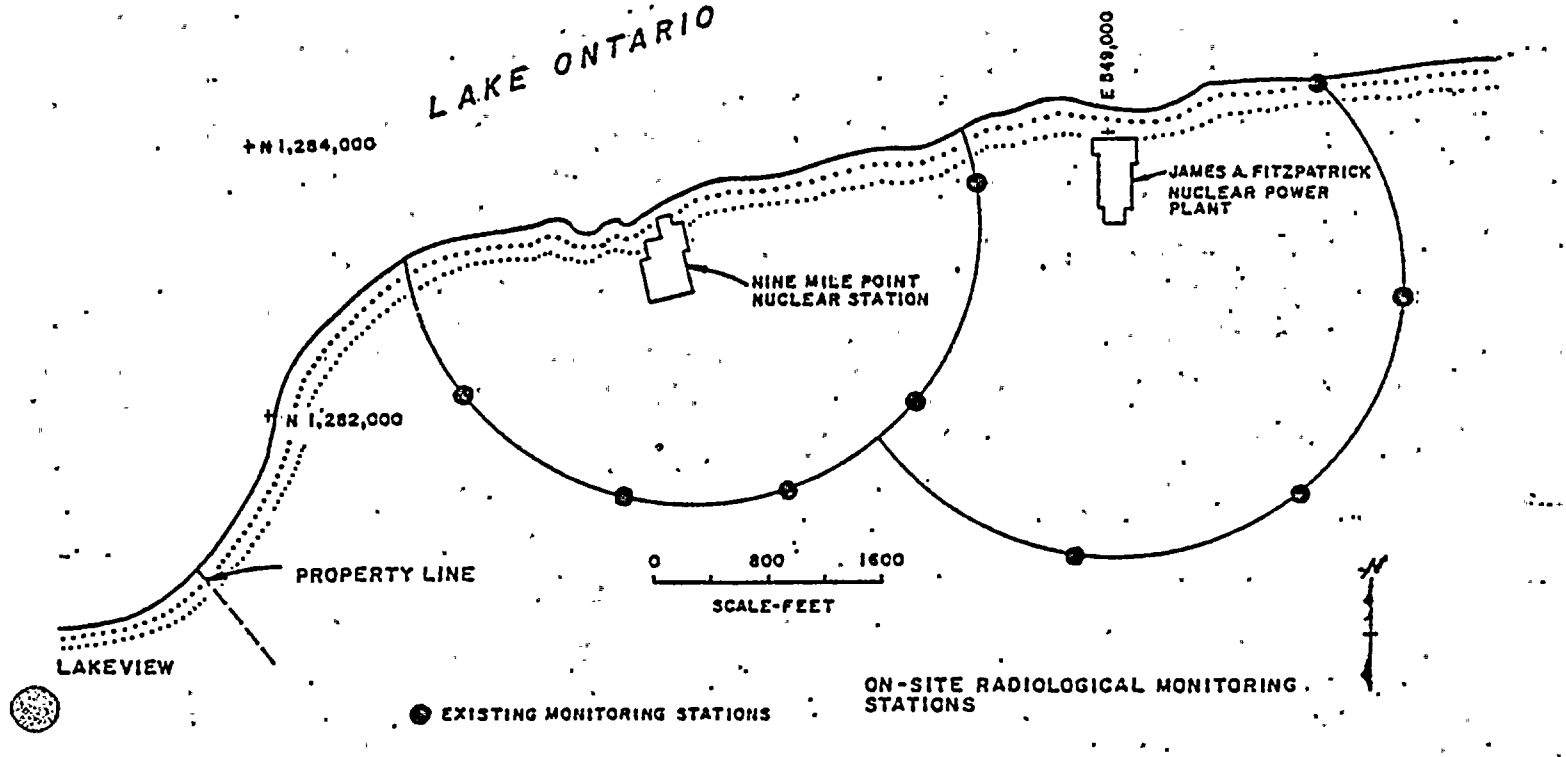


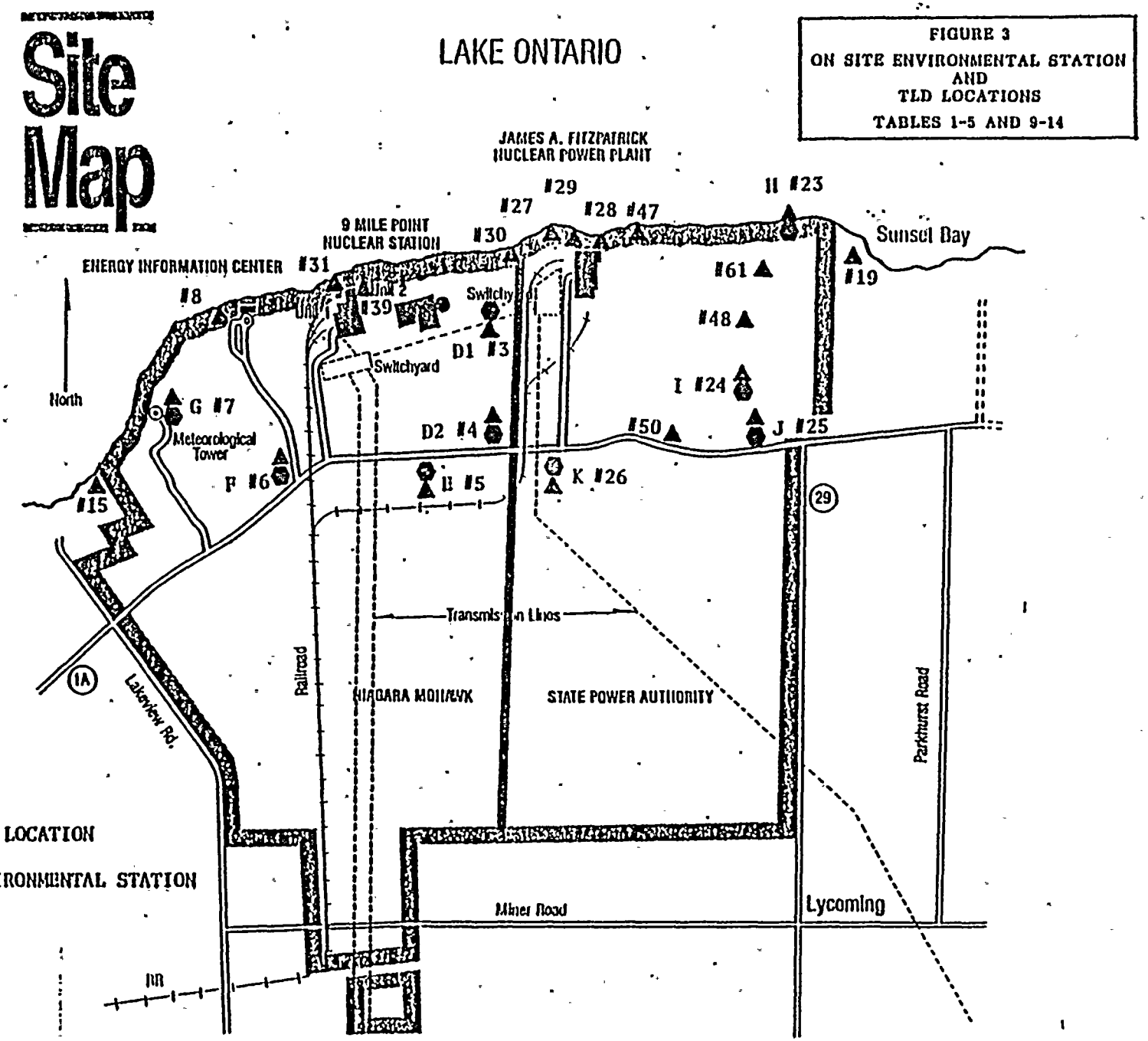
FIGURE 1
OFF SITE ENVIRONMENTAL STATION
AND
TLD LOCATIONS
TABLES 1-5 AND 9-14
SCALE OF MILES
LEGEND
TLD LOCATION
ENVIRONMENTAL STATION
30 MILES
S W OF SITE
LAKE
ONTARIO
OSWEGO
8
44
55
9
54
43
57
56
45
10
58
13
52
51
14
53
12
46
11
49

Figure 2
OFF-SITE MONITORING STATION LOCATIONS





MONITORING STATIONS LOCATED AT 2,000 FT. RADII FROM STACKS


Site Map
LAKE ONTARIO
FIGURE 3
ON SITE ENVIRONMENTAL STATION
AND
TLD LOCATIONS
TABLES 1-5 AND 9-14
JAMES A. FITZPATRICK
NUCLEAR POWER PLANT
9 MILE POINT
NUCLEAR STATION
ENERGY INFORMATION CENTER
Unit 1
Unit 2
Switchyard
Switchyard
Meteorological Tower
North
Sunset Bay
Transmission Lines
Railroad
NIAGARA MOHAWK
STATE POWER AUTHORITY
Lakeview Rd.
Parkhurst Road
Miner Road
Lycoming
▲=TLD LOCATION
⬢=ENVIRONMENTAL STATION
#8
#15
#19
#23
#24
#25
#26
#27
#28
#29
#30
#31
#39
#47
#48
#50
#61
G #7
F #6
E #5
D1 #3
D2 #4
I
J
K
II
(29)
(1A)
RR

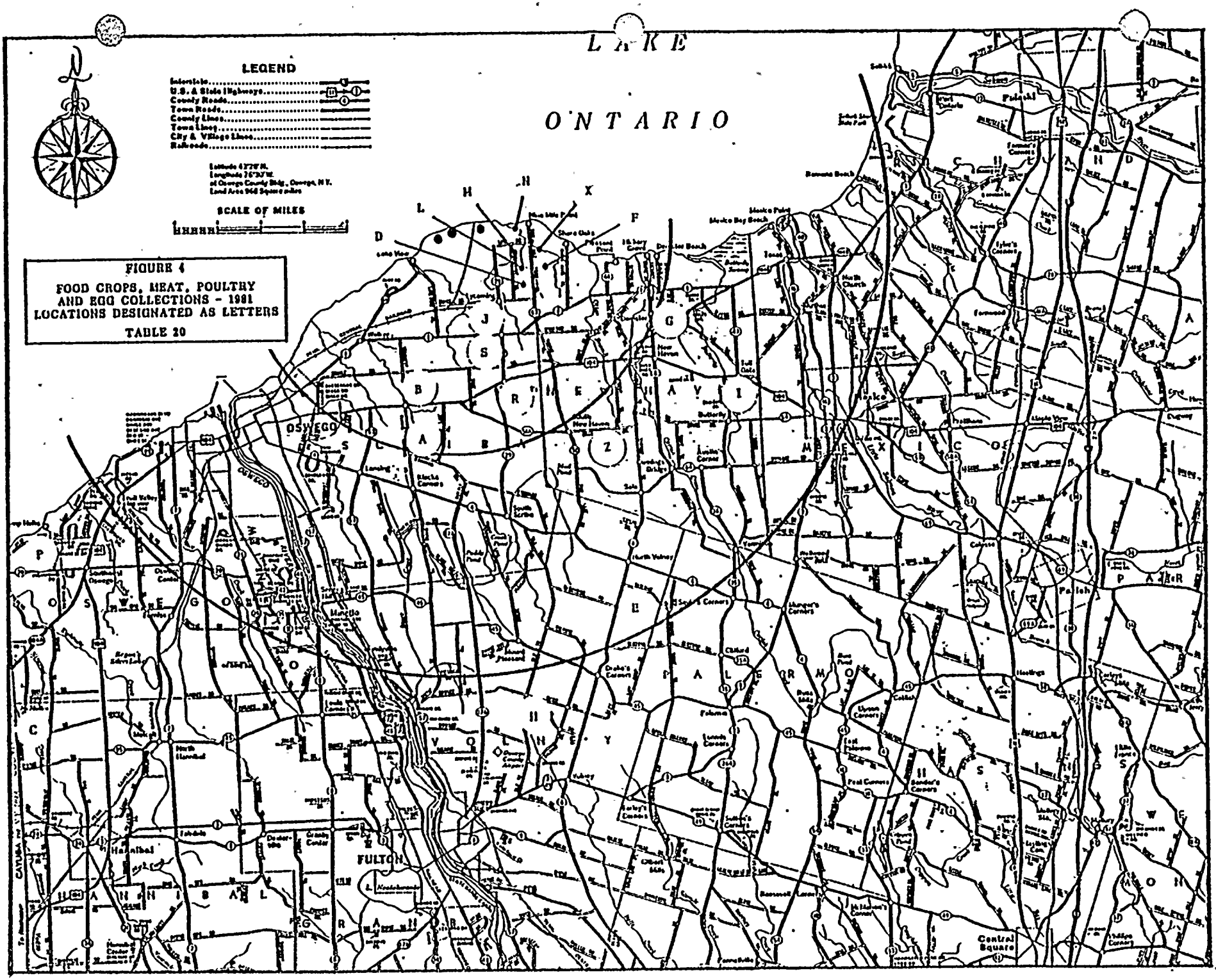
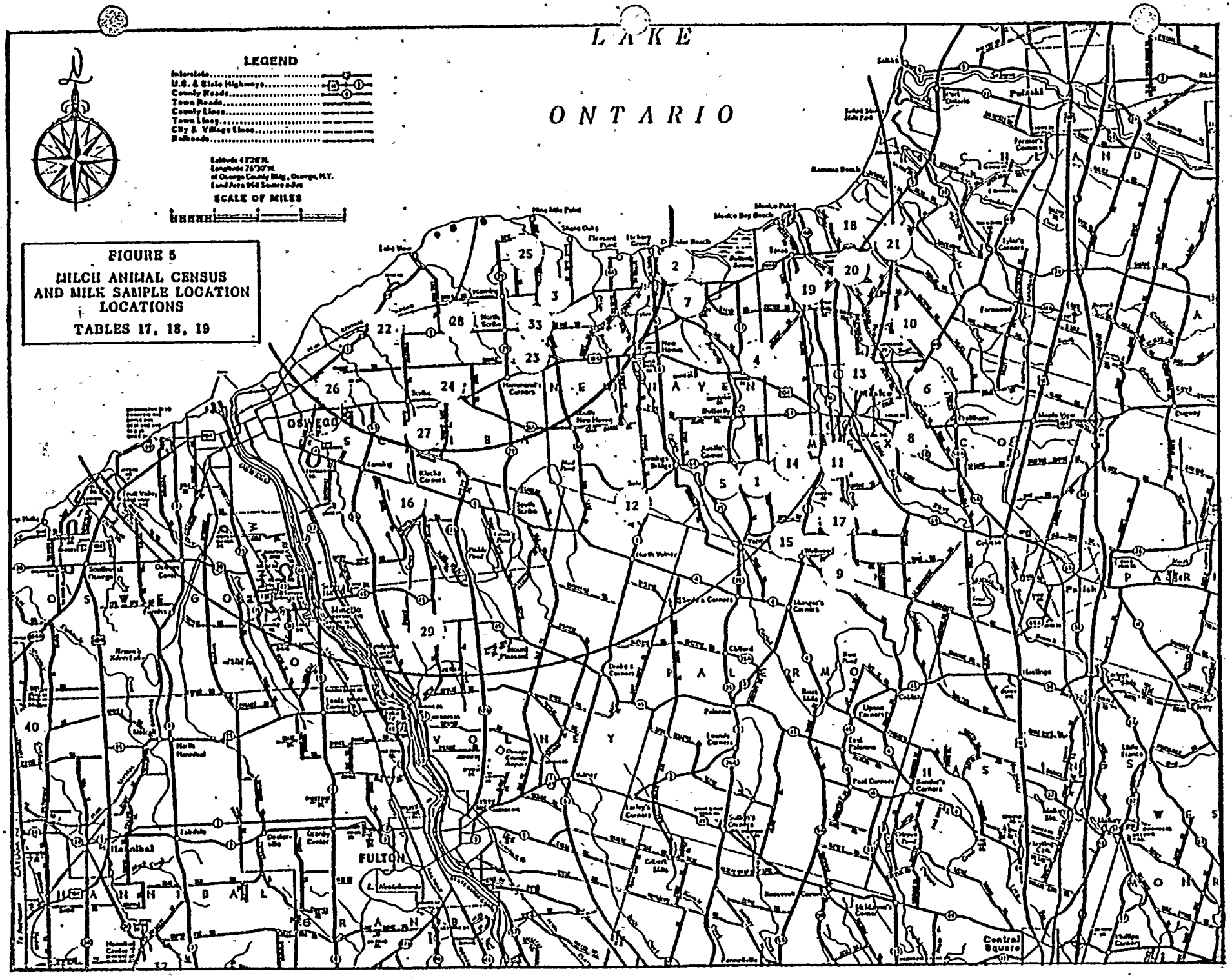


FIGURE 4

FOOD CROPS, MEAT, POULTRY AND EGG COLLECTIONS - 1981
LOCATIONS DESIGNATED AS LETTERS

TABLE 20


LAKE
ONTARIO
LEGEND
Interstate
U.S. & State Highways
County Roads
Town Roads
County Lines
Town Lines
City & Village Lines
Railroads
Latitude 43°28' N.
Longitude 76°29' W.
at Oswego County Bldg., Oswego, N.Y.
Land Area 968 Square Miles
SCALE OF MILES
FIGURE 5
MILCH ANIMAL CENSUS AND MILK SAMPLE LOCATION LOCATIONS
TABLES 17, 18, 19
OSWEGO
FULTON
Central Square

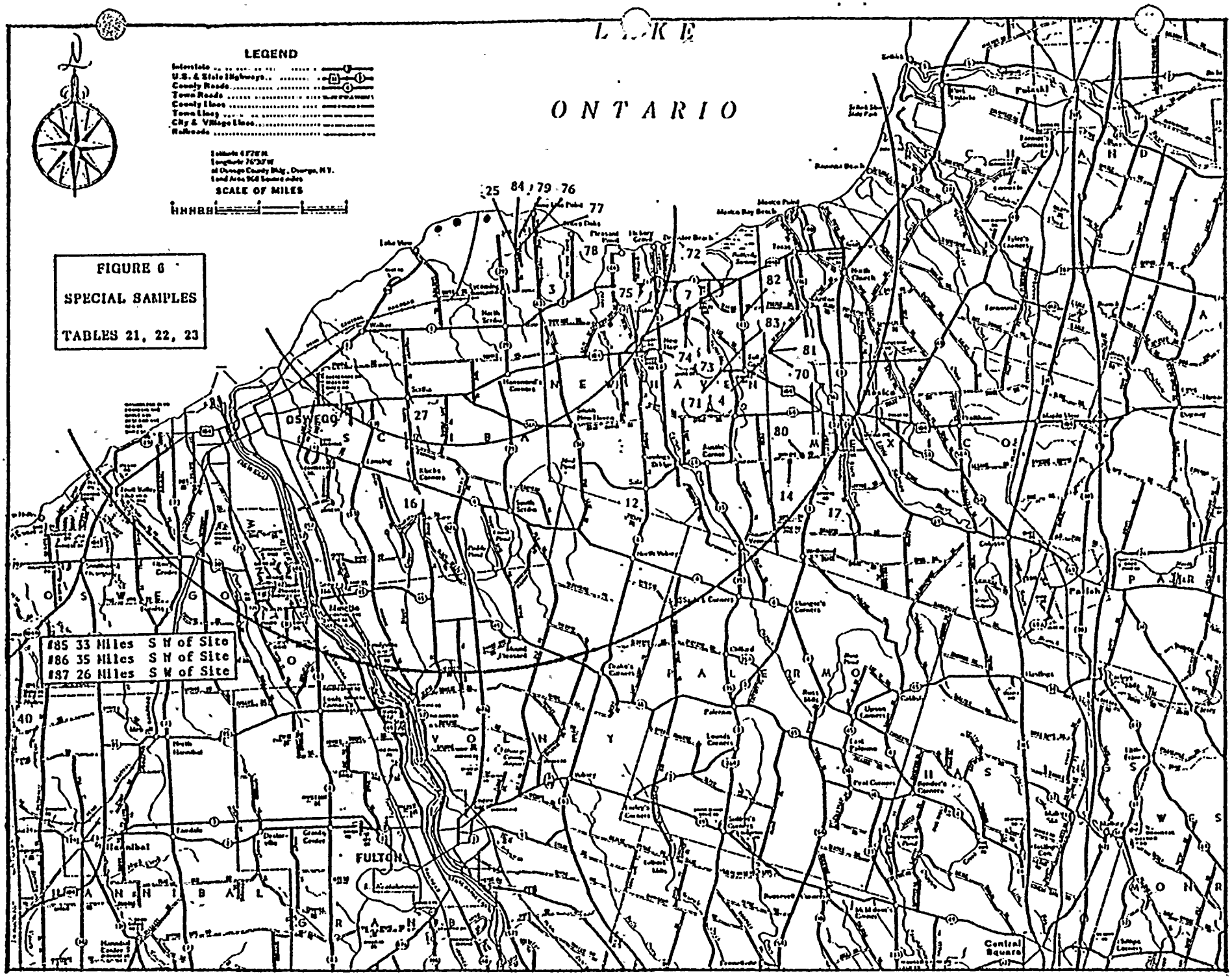
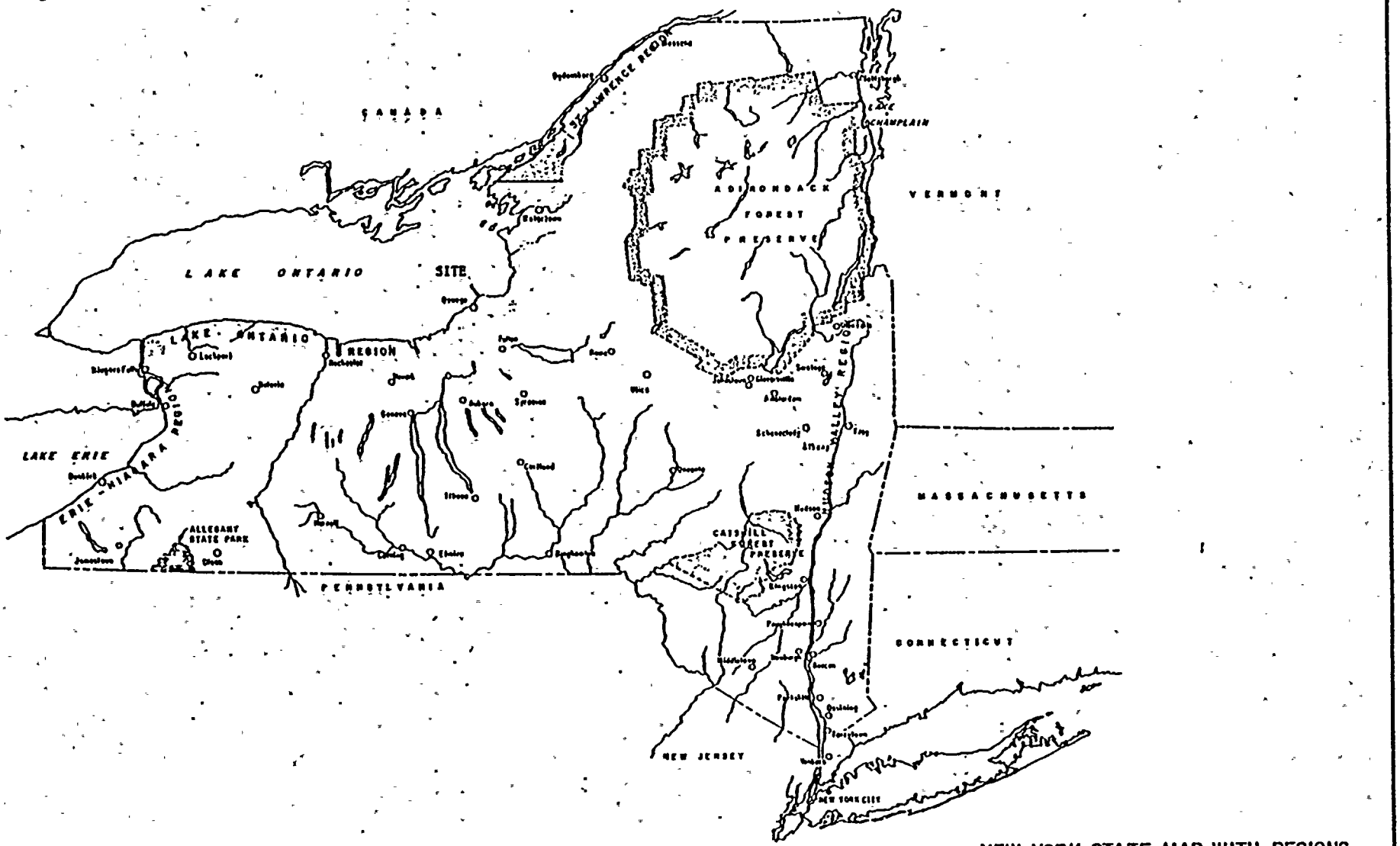

LAKE
ONTARIO
LEGEND
Interstate
U.S. & State Highways
County Roads
Town Roads
County Lines
Town Lines
City & Village Lines
Railroads
SCALE OF MILES
FIGURE 6
SPECIAL SAMPLES
TABLES 21, 22, 23
#85 33 Miles S W of Site
#86 35 Miles S W of Site
#87 26 Miles S W of Site
OSWEGO
FULTON
Central Square
Hannibal

FIGURE 7



NEW YORK STATE MAP WITH REGIONS