

NIAGARA MOHAWK POWER CORPORATION

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April 30, 1984

Dr. Thomas E. Murley
Regional Administrator
United States Nuclear Regulatory Commission
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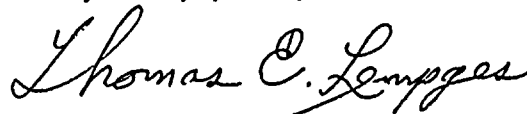
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RE: Nine Mile Point Nuclear Station Unit #1
Facility Operating License DPR-63
Docket No. 50-220

Dear Dr. Murley:

In accordance with the Environmental Technical Specifications for Nine Mile Point Unit #1 (Appendix B. Section 4.6.1.a), we are enclosing the Annual Radiological Environmental Operating Report for the period January 1983 through December 1983.

Very truly yours,



Thomas E. Lempges
Vice President
Nuclear Generation

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NIAGARA MOHAWK POWER CORPORATION

ANNUAL ENVIRONMENTAL OPERATING REPORT

PART B - RADIOLOGICAL REPORT

January 1, 1983 - December 31, 1983

for

NINE MILE POINT NUCLEAR STATION UNIT #1

Facility Operating License DPR-63

Docket Number 50-220

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NINE MILE POINT UNIT 1
ANNUAL ENVIRONMENTAL OPERATING REPORT

I. INTRODUCTION

This report is submitted in accordance with Appendix B, Section 4.6.1.a to DPR-63, Docket No. 50-220.

II. DESCRIPTION

The required sample collection and analysis schedule for NMP #1 is listed in Table 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 canal sampling and remaining terrestrial sampling is performed jointly by the NMPNS and JAFNPP staffs.

1. Sample Collection Methodology

A. Lake Water

The two indicator stations are the respective inlet canals at NMPNS and JAFNPP. These samples are composited using sampling equipment which discharges 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 container.

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 six to seventeen miles from the site and are composed of six stations. Air monitoring locations are shown on Figures 1 and 3.

II. DESCRIPTION (Continued)

1. Sample Collection Methodology (Continued)

B. Air Particulate/Iodine (Continued)

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 from the particulate filter is a 2 x 1 inch charcoal cartridge used to absorb airborne radioiodine. The samplers run continuously and the charcoal cartridges and particulate filters are changed on a weekly basis, or as required by dust loading.

The particulate filters are composited for gamma analyses on a monthly basis by location (two off-site, 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 three to five minutes to assure a homogenous mixture of milk and butterfat. Three gallons are collected during the first half of each month from each of the locations within ten miles of the site and from a control location. The samples are frozen and shipped to the analytical contractor within thirty-six 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 ten 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 samples for poultry and eggs are frozen and shipped in insulated containers. Whenever possible, samples are obtained from previously sampled locations. Control samples are also obtained for meat, eggs, and poultry. (See Figure 4.)

II. DESCRIPTION (Continued)

1. Sample Collection Methodology (Continued)

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. Control samples are also obtained. (See Figure 4.)

F. Soil Samples

Soil samples are required to be collected every three years at the air monitoring locations and are analyzed for Sr-90 and GSA. Soil samples were collected in 1983. Thus, 9 on-site samples and 6 off-site samples were obtained. The C off-site location, located approximately 17 miles from the site, is the control location.

G. Fish Samples

Available fish species are obtained from collections during the spring and fall. 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. Samples of 0.5 to 1 kilogram of edible portions only for a maximum of three species per location.
2. When independent species are not available at all three sample locations, a species may be divided into two samples for each location. This procedure may be accomplished provided that a sufficient sample size is available for the species in question at all three locations.

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

H. Shoreline Sediment

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.

II. DESCRIPTION (Continued)

1. Sample Collection Methodology (Continued)

I. Cladophora

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

J. TLD (direct radiation)

Thermoluminescent dosimeters (TLD's) are used to measure direct radiation in the JAF/NMP-1 environment. TLD's are placed in 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 an approximate 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.

TLDs used during the first three quarters of 1983 were composed of CaSO_4 chips (two chips per dosimeter) and were sealed in polyethylene packages to ensure dosimeter integrity. Two dosimeters (four chips) were placed at each location. TLDs used during the fourth quarter of 1983 were composed of rectangular teflon wafers impregnated with 25% CaSO_4 : Dy Phosphor. These were also placed in polyethylene packages to ensure dosimeter integrity. TLD packages were placed in plastic holders or were affixed to supporting surfaces by tape sealing. TLDs were collected, replaced and evaluated on a quarterly basis.

K. Special Samples

Special samples of shoreline sediment were collected during March of 1983 to help in evaluating samples collected during the fall of 1982 and samples collected during the spring and fall of 1983. These samples (March 1983) were collected at the normal indicator and control locations.

No other special samples were collected during 1983 for the Radiological Environmental Monitoring Program.

II. DESCRIPTION (Continued)

2. Analyses Performed

The Radiological Environmental Monitoring Program (REMP) samples were analyzed by Radiation Management Corporation, Teledyne Isotopes, and by the Site Environmental Laboratory during 1983. The following samples were analyzed by the site:

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

The remainder of the sample analyses, as outlined in Table 1 and 2, were analyzed by Radiation Management Corporation (January-June) and by Teledyne Isotopes (July-December).

3. Changes to the 1983 Sample Program

A. In January of 1983, Radiation Management Corporation (the site's analytical contractor) was purchased by Teledyne Isotopes of Westwood, New Jersey. The Radiation Management Corporation facility continued to analyze environmental samples for the site under contract from Teledyne Isotopes. Starting in approximately July of 1983, all operations were transferred from Radiation Management Corporation's facility to Teledyne Isotope's Westwood, New Jersey facility. Effective July, all environmental radiological samples were analyzed by either Teledyne Isotopes or the site Environmental Laboratory. The transition from the Radiation Management Corporation facility to the Teledyne Isotope facility proceeded well with minimal difficulties.

B. Milk sample location 14, located ESE from the site at 9.8 miles, was deleted from the milk sampling program in June of 1983. Milk has been collected from this location for many years in the past. However, several other milk sampling locations had been located, as a result of milch animal censuses conducted during 1982, that demonstrated greater radionuclide deposition potentials. Since location 14 had a low potential for deposition, as determined by D/Q values, this location was deleted.

Milk sample locations 50, 55 and 60 were added to the milk sampling program at the initiation of the milk sampling season (May). These locations were added as a result of the milch animal censuses conducted during 1982. These locations demonstrated average potentials for radionuclide deposition, as determined by D/Q values.

II. DESCRIPTION (Continued)

3. Changes to the 1983 Sample Program (Continued)

Milk sample location 60 was deleted after May of 1983. This location, as noted above, was added to the program in May. Upon review of all the new and old milk sample locations in May, the two locations with the lowest D/Q values were deleted. These locations were location 60 and location 14 (noted above).

4. Exceptions to the 1983 Sample Program

A. Environmental Radiation Monitors

1. Environmental radiation monitor at F on-site station was inoperable from 1000-1200 hours on January 13, 1983 because of transmission line work.
2. Environmental radiation monitor at C off-site station was inoperable March 29, 1983 (0930 hours) to April 7, 1983 (1010 hours) because of an electronic failure.
3. Environmental radiation monitor at F on-site station was inoperable from May 25, 1983 (1145 hours) to May 25, 1983 (2040 hours) because of an electronic failure.
4. Environmental radiation monitor at F on-site station was inoperable from June 30, 1983 (1600 hours) to July 5, 1983 (1500 hours) because of damage caused to the station when it was struck by an automobile.
5. Environmental radiation monitor at I on-site station was inoperable from July 22, 1983 (0845 hours) to July 26, 1983 (1010 hours) because of damage caused to the station when it was hit by lightning.
6. Environmental radiation monitor at G on-site station was inoperable from July 26, 1983 (1328 hours) to August 3, 1983 (1505 hours) because of an electronic failure.
7. Environmental radiation monitor at H on-site station was inoperable from August 22, 1983 (1430 hours) to August 25, 1983 (0800 hours) because the monitor had inadvertently been left off during a routine inspection on August 22. The monitor was turned on during the next scheduled routine inspection on August 25.
8. Environmental radiation monitor at I on-site station was inoperable from August 24, 1983 (0940 hours) to August 25, 1983 (1445 hours) because of an electronic failure.

II. DESCRIPTION (Continued)

4. Exceptions to the 1983 Sample Program (Continued)

9. Environmental radiation monitor at C off-site station was inoperable from September 1, 1983 (0725 hours) to September 13, 1983 (0922 hours) because of an electronic failure. The spare radiation monitor was not available because it was being used in I on-site environmental station, thus twelve days elapsed before the station could be returned to service.
10. Environmental radiation monitor at I on-site station was inoperable from December 5, 1983 (1000 hours) to December 16, 1983 (1320 hours) because of an electronic failure.
11. Environmental radiation monitor at I on-site station was inoperable from December 27, 1983 (1005 hours) to December 29, 1983 (1025 hours) because the monitor was inadvertently left in the zero position on the trip check adjust knob. In this position, the monitor was inoperable. The monitor was returned to service during the next scheduled routine inspection on December 29, 1983.

B. Environmental Air Sampling Equipment

1. Environmental air sample equipment at F on-site station was inoperable from 1000-1200 hours on January 13, 1983 because of transmission line work.
2. Environmental air sample equipment at D2 on-site station was inoperable from January 17, 1983 (1406 hours) to January 20, 1983 (1310 hours) because of a mechanical failure with the vacuum pump.
3. Environmental air sample equipment at D1 on-site station was inoperable from April 7, 1983 (1420 hours) to April 7, 1983 (1620 hours) because of a defective vacuum pump and fuse.
4. Environmental air sample equipment at J on-site station was inoperable from April 15, 1983 (0400 hours) to April 18, 1983 (1320 hours) because of an electrical problem with the vacuum pump.
5. Environmental air sample equipment at K on-site station was inoperable from June 6, 1983 (0810 hours) to June 6, 1983 (1320 hours) because of a defective vacuum pump.
6. Environmental air sample equipment at I on-site station was inoperable from June 13, 1983 (0900 hours) to June 13, 1983 (1340 hours) because of a defective vacuum pump.

II. DESCRIPTION (Continued)

4. Exceptions to the 1983 Sample Program (Continued)

7. Environmental air sample equipment at G off-site station was inoperable from June 14, 1983 (1130 hours) to June 15, 1983 (1530 hours) because of a blown fuse.
8. Environmental air sample equipment at J on-site station was inoperable from June 16, 1983 (1100 hours) to June 20, 1983 (1350 hours) because of a defective vacuum pump.
9. Environmental air sample equipment at F on-site station was inoperable from June 30, 1983 (1600 hours) to July 5, 1983 (1340 hours) because of damage caused to the station when it was struck by an automobile.
10. Environmental air sample equipment at D1 off-site station was inoperable from July 19, 1983 (0820 hours) to July 20, 1983 (1046 hours) because of a defective vacuum pump.
11. Environmental air sample equipment at I on-site station was inoperable from July 22, 1983 (0845 hours) to July 25, 1983 (1330 hours) because of damage caused to the station when it was hit by lighting.
12. Environmental air sample equipment at G on-site station was inoperable from July 26, 1983 (0800 hours) to July 26, 1983 (1335 hours) because of a defective vacuum pump.
13. Environmental air sample equipment at G off-site station was inoperable from September 13, 1983 (1059 hours) to September 13, 1983 (1315 hours) because of a defective vacuum pump.
14. Environmental air sample equipment at H on-site station was inoperable from September 21, 1983 (0414 hours) to September 22, 1983 (1041 hours) because of a defective vacuum pump.
15. Environmental air sample equipment at J on-site station was inoperable from September 26, 1983 (1335 hours) to September 30, 1983 (1040 hours) because of a defective fuse.
16. Environmental air sample equipment at J on-site station was inoperable from September 30, 1983 (1910 hours) to October 3, 1983 (1025 hours) because of a defective fuse.
17. Environmental air sample equipment at J on-site station was inoperable from October 5, 1983 (0950 hours) to October 5, 1983 (1707 hours) because of a defective vacuum pump.

II. DESCRIPTION (Continued)

4. Exceptions to the 1983 Sample Program (Continued)

18. Environmental air sample equipment at H on-site station was inoperable from December 1, 1983 (1000 hours) to December 5, 1983 (1000 hours) because the vacuum pump was inadvertently left in the off position during a routine inspection on December 1. The vacuum pump was returned to service on December 5 during the subsequent routine inspection.

C. Environmental Thermoluminescent Dosimeters (TLD)

1. TLD number 6 was vandalized during the third quarter of 1983 (June 30, 1983 - September 30, 1983) and no results were available.
2. TLD number 24 was vandalized during the third quarter of 1983 (June 30, 1983 - September 30, 1983) and no results were available.
3. TLD number 48 was vandalized during the third quarter of 1983 (June 30, 1983 - September 29, 1983) and no results were available.
4. TLD number 61 was vandalized during the third quarter of 1983 (June 30, 1983 - September 29, 1983) and no results were available.
5. TLD number 51 was vandalized during the third quarter of 1983 (June 29, 1983 - September 29, 1983) and the fourth quarter of 1983 (September 29, 1983 - January 5, 1984) and no results were available. TLD number 51 will be relocated during 1984 as a result of the continued vandalism.

D. Radiological Fish Sample Data

1. One of the three fish samples collected at the Nine Mile Point location for Sr-89 and Sr-90 analysis was lost in laboratory processing while performing the strontium procedure. Since the Environmental Technical Specifications require one sample at this location and three were collected (two extra), this is not a violation of the specifications.

III. EVALUATION OF ENVIRONMENTAL DATA

The results of the 1983 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.

III. EVALUATION OF ENVIRONMENTAL DATA (cont.)

There are three separate groups of radionuclides that were detected in the environment during 1983. 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 elements. 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 in 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 was 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 typical in air particulate samples during 1981 and have a weapons test origin.

The third group of radionuclides detected in the environment during 1983 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 1983 Nine Mile Point Environmental Program) include Cs-137, Cs-134, I-131, Mn-54, La-140, and Co-60. The dose to man as a result of these radionuclides is small and significantly less than the radiation exposure from naturally occurring sources of radiation and from fallout.

III. EVALUATION OF ENVIRONMENTAL DATA (cont.)

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, etc. An attempt has been made not only to report the data collected during 1983, 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. In regards to these very small quantities, it will be further noted that at such minute concentrations the assessment of the significance of detected radionuclides is very difficult. Therefore, concentrations in one sample that are two times the concentration of another, for example, are not significant overall. Moreover, concentrations at such low levels may show a particular radionuclide in one sample and yet not in another.

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.

Background gamma radiation around the Nine Mile Point Site, as a result of radionuclides in the atmosphere and the ground, accounts for approximately 60 mrem per year. This dose is a result of radionuclides of cosmic origin (as for example Be-7), of a primordial origin (as Ra-226, K-40, and Th-232) and to a much smaller extent of a man-made origin from weapons testing. A dose of 60 mrem per year, as a background dose, is significantly greater than any possible doses as a result of operations at the site.

A. Aquatic Program

Tables 3 through 8 demonstrate the analytical results for the aquatic media sampled during the 1983 sampling program. Aquatic samples were collected at four possible indicator locations. The locations (on-site transect designations) used for on-site sampling were NMPW (01), NMPP (02), JAF (03), and NMPE (04) (see Figure 1). Because of the unavailability of various sample media, on-site samples were collected from combinations of the above listed locations, when required. 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 to the west (or east) and therefore served as control locations.

III. EVALUATION OF ENVIRONMENTAL DATA (cont.)

A. 1. Cladophora - Table 3

The species glomerata is the dominant species of Cladophora in collections in the vicinity of Nine Mile Point. 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 five feet deep or less are constantly being broken off by wave activity. Maximum growth usually occurs in water approximately ten to fifteen 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 then declines during the warmer summer months of July and August. As the lake temperature drops after August, a secondary peak in growth may occur during this time. Growth ceases in the fall months as a result of decreasing photoperiod and lake temperature.

Two collections were made for Cladophora samples in 1983. The first collection was made in June followed by a collection in August. The availability of Cladophora is limited in June because of the cool lake temperatures. Whereas, during August, an abundance of Cladophora is available in the near shore zone. Collections were made at an off-site (06) or control location and at two on-site or indicator locations. The indicator locations were in the proximity of the Nine Mile Point (NMPP-02) and the James A. FitzPatrick (JAF-03) facilities. The control location was located just east of the Oswego Harbor area.

Spring collections made in June showed detectable radionuclides that were a result of naturally occurring sources, weapons testing and possibly plant related operations. K-40 and Be-7 are naturally occurring and were noted in both the indicator locations and the control location. K-40 ranged in concentration from 3.52 pCi/g (wet) to 6.07 pCi/g (wet). Be-7 ranged from 0.52 pCi/g (wet) to 0.67 pCi/g (wet). The concentrations detected for K-40 and Be-7 were approximately the same as concentrations noted during 1982. A third naturally occurring radionuclide detected in the June samples was Th-228. This radionuclide was detected at the NMP location only and was found at a concentration of 0.05 pCi/g (wet).

Cs-137 was detected at all three locations during the June collections. Concentrations at the indicator locations were slightly greater than the control location. Cs-137 at the NMP location showed a concentration of 0.06 pCi/g (wet) and at the JAF location showed a concentration of 0.04 pCi/g (wet). Cs-137 in Cladophora samples, for the most part, is considered to be a result of past weapons testing based on 1983 data and historical data. Cs-137 was detected at the control location at 0.03 pCi/g(wet) which was slightly less than the Cs-137 concentrations detected in the indicator samples.

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

A. 1. Cladophora - Table 3 (cont.)

A portion of the Cs-137 detected at the indicator locations may be a result of operations of the site. Cs-137 at the control sample location is a result of past weapons testing.

Co-60 was detected at the NMP location during June at a concentration of 0.09 pCi/g (wet) and at the JAF location at a concentration of 0.08 pCi/g (wet). Co-60 was not detected at the control location. Although Co-60 has been detected at the control location in the past, it has not been detected since 1979. During 1979, Co-60 was detected at a concentration of 0.01 pCi/g (wet) and was a result of weapons testing during years prior to 1979. Co-60 detected at the NMP and JAF locations during June of 1983, however, was a result of operations at the site.

A third fission product radionuclide detected, in addition to Cs-137 and Co-60, was Mn-54. Mn-54 was detected at the NMP and JAF locations at concentrations of 0.02 pCi/g (wet) and 0.01 pCi/g (wet) respectively. Mn-54 was not detected at the control location. The absence of Mn-54 at the control location and presence at the indicator locations is indicative of operations at the site. Mn-54 has not been detected at the control location since 1979 when sampling for Cladophora was initiated.

No other radionuclides were detected in the June 1983 samples using gamma spectral analysis.

Samples collected during August also showed detected concentrations of K-40 and Be-7. K-40 was detected at all three sample locations and ranged in concentration from 2.08 pCi/g (wet) to 3.12 pCi/g (wet). Be-7 was detected at all three locations and ranged in concentration from 0.37 pCi/g (wet) to 0.65 pCi/g (wet). Historically, Be-7 has been noted as appearing in some samples and not in others because of the minute concentrations detected. Th-228 was detected only at the NMP location at the concentration of 0.02 pCi/g (wet).

Cs-137 was detected only at the NMP and JAF locations at concentrations of 0.04 pCi/g (wet) and 0.03 pCi/g (wet) respectively. The detected concentrations are very small and are above the lower limit of detection for the August control sample. As noted above for Co-60, it is difficult to assess the presence of Cs-137 at the NMP and JAF locations and not at the control location because of the minute quantities detected. Cs-137 in Cladophora samples has historically been attributed to past weapons testing, however, a portion of the Cs-137 detected in the August samples can be attributed to operations at the site.

III. EVALUATION OF ENVIRONMENTAL DATA (Continued).

A. 1. Cladophora - Table 3 (cont.)

Co-60 was detected at the NMP and JAF locations during August at concentrations of 0.09 pCi/g (wet) and 0.11 pCi/g (wet) respectively. Co-60 was not detected at the control location. As noted above, Co-60 has been detected at the control location in the past but not since 1979. The 1979 detected concentration was a result of past weapons testing. Co-60 detected during August 1983, however, was a result of operations at the site.

Mn-54 was also detected at the NMP and JAF locations at concentrations of 0.02 pCi/g (wet) and 0.04 pCi/g (wet) respectively. Mn-54 was not detected at the control sample location. Mn-54 at the NMP and JAF locations is indicative of operations at the site.

Samples collected during 1981 showed detectable concentrations of many weapons testing radionuclides. These included cerium, zirconium, niobium, ruthenium, and cesium. The presence of the radionuclides was attributed to the 1980 Chinese nuclear weapons test. The half-life of these radionuclides range from 33 days to 365 days with the exception of cesium (Cs-137 has a 30 year half-life). During 1983, these weapons testing radionuclides were not detected with the exception of Cs-137. This observation is consistent with observations in 1982. The absence of these radionuclides is attributed to nuclear decay and ecological cycling.

Review of past environmental data shows that the concentrations of naturally occurring K-40 and Be-7 have fluctuated greatly. K-40 at all locations has ranged from 2.1 pCi/g (wet) to 28.0 pCi/g (wet). Be-7 at all locations have ranged from 0.05 pCi/g (wet) to 3.00 pCi/g (wet). Different years showed different peak concentrations for the two radionuclides. Cs-137 since 1979 at the indicator locations has been variable. The annual mean concentration in 1979 (0.15 pCi/g-wet) was higher than 1980 (0.02 pCi/g-wet). 1981 (0.36 pCi/g-wet) was greater than the preceding year. The annual mean for the indicator samples during 1982 was 0.015 pCi/g (wet) which represented a decrease when compared to 1981. During 1983, Cs-137 at the indicator locations averaged 0.04 pCi/g (wet). This represented an increase over the 1982 concentration. Cs-137 at the control location has also been variable. The 1979-1981 annual means for Cs-137 were 0.03 pCi/g, 0.02 pCi/g, and 0.10 pCi/g (wet) respectively. Fluctuations in the Cs-137 concentrations is a result of past weapons testing. An example of this is the October 1980 Chinese weapons test. The 1981 mean concentration increased at both indicator and control locations as a result of this test. The 1982 annual mean was 0.007 pCi/g-wet which represented a decrease. During 1983, Cs-137 was detected at 0.03 pCi/g (wet). This was an increase when compared to 1982.

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

A. 1. Cladophora - Table 3 (cont.)

Co-60 during 1979-1982 at the indicator locations averaged 0.16, 0.02, 0.55 and 0.02 pCi/g (wet) respectively. During 1983, Co-60 averaged 0.09 pCi/g (wet) which was a general decrease when compared to 1979-1982. Co-60 at the control location was detected only once during 1979. During 1983, Co-60 was not detected at the control location. Mn-54 during 1979-1982 at the indicator locations averaged, in pCi/g (wet), 0.12, 0.04, 0.14 and not detected, respectively. During 1983, Mn-54 averaged 0.02 pCi/g (wet) which was a decrease. Mn-54 at the control location was not detected during 1979-1982, nor was it detected during 1983.

The significance of the detected radionuclides in Cladophora samples during 1983 is very small. This sample media has a high bioaccumulation factor for most radionuclides and the results of the analyses can be used, for the most part, in a qualitative sense only. Thus, Cladophora does not reflect the concentrations of radionuclides in the environment in which it grows. As an example, the bioaccumulation factor for Cs-137 is 80-4,000 for this sample media.

A dose assessment to man is difficult to make since Cladophora is not a human food source. For the purpose of illustration, a comparison of hypothetical doses can be calculated on the basis of an assumption that Cladophora is an important food source. In this case, Cladophora is assumed to be consumed by an adult at an annual rate equal to green leafy vegetables, i.e. 64 kg/year (Regulatory Guide 1.109). A conservative assumption can also be made that the mean Cs-137 concentration for 1983 at the indicator locations minus the mean control location concentration is a result of operations at the site. Further, it is assumed that positive Co-60 and Mn-54 concentrations are a result of operations at the site.

Maximum whole body and critical organ doses to an adult are as follows:

<u>Radionuclide</u>	<u>Whole Body Dose*</u>	<u>Critical Organ Dose*</u>
Cs-137	0.046	0.070 (liver)
Co-60	0.027	0.232 (GI tract)
Mn-54	0.001	0.018 (GI tract)

The projected doses are based on maximum consumption rates and radionuclide concentrations of 0.01 pCi/g (wet) for Cs-137, 0.09 pCi/g (wet) for Co-60 and 0.02 pCi/g (wet) for Mn-54. The doses are very small and can be put into perspective by making a comparison to the natural background dose as a result of increases in altitude and cosmic radiation.

*Dose in mrem per year.

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

A. 1. Cladophora - Table 3 (cont.)

The combined whole body dose as a result of Cs-137, Co-60, and Mn-54 is 0.074 mrem per year. This is equal to the whole body dose as a result of residing at a location 100 meters (328 feet) higher in altitude for 13.5 days.

A. 2. Dam Shoreline Sediment - Table 4

Shoreline sediment samples were collected twice during 1983. Collections were made in May and November at one off-site or control location and at one indicator location (NMPP-02). In addition, an additional set of samples was collected in March, 1983, in an attempt to help evaluate the November 1982 and May and November 1983 sample results for Cs-137. The results of these extra samples collected at the control location and indicator location are included on Table 4.

Several radionuclides were detected in sediment samples using gamma spectral analysis. These radionuclides ranged from naturally occurring primordial radionuclides to man-made radionuclides. K-40 was detected at both the control location and indicator location for both collection periods during 1983. K-40 ranged in concentration from 12.0 pCi/g (dry) to 15.3 pCi/g (dry) at the control location and 9.7 pCi/g (dry) to 15.2 pCi/g (dry) at the indicator location.

Ra-226, Th-232 and Th-228, in addition to K-40, were also detected and are also naturally occurring radionuclides. Ra-226 was detected at both indicator and control locations at concentrations that are representative of normal background level fluctuations. Ra-226 ranged in concentration from 0.21 pCi/g (dry) to 1.02 pCi/g (dry) at the indicator location and 0.33 pCi/g (dry) to 1.21 pCi/g (dry) at the control location. Th-232 ranged from 0.31 pCi/g (dry) at the indicator location to 0.31 pCi/g (dry) at the control location (analyzed in the March samples only). Th-228 ranged from 0.36 pCi/g (dry) to 0.55 pCi/g (dry) at the indication locations and 0.60 pCi/g (dry) to 0.62 pCi/g (dry) at the control location (analyzed in the May and November samples only).

Cs-137 was detected in three of the six samples collected during the year. Cs-137 was detected in three of the indicator samples and none of the control samples. The concentrations detected were small and are for the most part indicative of operations at the site. Cs-137 was detected in both of the indicator samples (i.e., May and November) at concentrations of 0.85 pCi/g (dry) and 1.81 pCi/g (dry), respectively. Cs-137 was also detected in the extra indicator sample collected during March at a concentration of 0.16 pCi/g (dry). As noted above, Cs-137 was not detected in any of the control samples, although Cs-137 has been routinely observed in the past in control samples.

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

A. 2. Dam Shoreline Sediment - Table 4 (cont.)

Co-60 was detected in two of the three indicator samples collected. Co-60 was detected at 0.14 pCi/g (dry) in the May sample and at 0.36 pCi/g (dry) in the November sample. Co-60 was not detected in the extra sample collected in March. The control location samples showed no detectable Co-60. Co-60 has not been noted in previous years at the control location. Co-60 detected during 1983 is a result of operations at the site.

Cs-134 was detected in one of the indicator samples during November at 0.09 pCi/g (dry). Cs-134 was not detected in any of the control samples. Previous shoreline sediment samples have not shown Cs-134 at either the indicator or control locations. Cs-134 in the November indicator sample is a result of operations at the site.

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

The 1983 samples were analyzed for Sr-90 and showed detectable concentrations in one of the four required samples. Sr-90 was detected in the sample from the indicator location. The indicator sample (collected in November) showed a Sr-90 concentration of 0.022 pCi/g (dry). Sr-90 has been detected intermittently in the past at the control location and indicator location. During 1979, Sr-90 at the control location was detected at a concentration of 0.04 pCi/g (dry) and during 1980 it was detected at concentrations of 0.015 pCi/g (dry) and 0.010 pCi/g (dry). Sr-90 levels detected during these years are approximately the same as or greater than the concentration detected at the indicator location during 1983 (0.022 pCi/g - dry). Sr-90 is considered to be representative of background levels as a result of weapons testing and is not considered to be representative of site operations because of historical control sample data and the variability of minute Sr-90 concentrations. Sr-90 was not detected in the extra control sample collected in March. The extra indicator sample collected in March was lost during the laboratory analysis of Sr-90.

Evaluation of historical data (1979-1982) shows that Cs-137 has ranged from 0.22 pCi/g (dry) in 1979 to 0.07 pCi/g (dry) in 1980 at the control location. Cs-137 at the indicator location has ranged from 0.01 pCi/g (dry) in 1982 to 0.80 pCi/g (dry) in 1982. 1983 results ranged from 0.16 pCi/g (dry) to 1.81 pCi/g (dry) at the indicator location. Cs-137 was not detected at the control location. Overall, the control location results have decreased since 1979, while the indicator results have increased starting with the one 1982 sample of 0.80 pCi/g (dry).

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

A. 2. Dam Shoreline Sediment - Table 4 (cont.)

The evaluation of past Co-60 data indicates that Co-60 has not been detected in the past at either indicator or control locations since 1979 with the exception of one sample from the indicator location in 1982 (0.16 pCi/g-dry). Results from 1983 show that Co-60 was detected in both of the required indicator samples (0.14 and 0.36 pCi/g-dry). Co-60 has not been detected in any of the control samples from 1979-1983. It appears that Co-60 concentrations at the indicator location are increasing (from not previously detected).

Evaluation of Sr-90 historical data since 1979 shows that concentrations have generally decreased at the control location from a maximum of 0.04 pCi/g (dry) in 1979 to not detected in 1981 and 0.0043 pCi/g (dry) in 1982. Sr-90 at the indicator location has generally remained the same from 1979-1981 but showed an increase in 1982. The increase, as noted above, is consistent with past control sample data (1980) and may not necessarily demonstrate an increasing trend. During 1983, Sr-90 at the control location was not detected. Sr-90 at the indicator location showed a concentration that is approximately equal to that of 1982.

Samples collected during November 1982 showed levels of Cs-137 (0.80 pCi/g - dry) that indicated an increased concentration of this radionuclide in comparison to previous years (1979-1981). In addition, Co-60 was detected in the November 1982 sample at a low concentration (0.16 pCi/g-dry). Co-60 had not been detected previous to the November 1982 sample. In view of the increase in Cs-137 concentrations and the appearance of Co-60 in shoreline sediment samples from the NMP location, extra samples were collected in March 1983. These samples showed no positive detection of Co-60 and the Cs-137 concentration was less than the November 1982 concentration (0.16 pCi/g-dry). Subsequent samples collected in May and November 1983, which were the normal Technical Specification samples, showed Co-60 to be detected again. Co-60 in May 1983 was detected at a concentration similar to the November 1982 concentration (0.14 pCi/g-dry). The November 1983 sample showed an increase in the Co-60 concentration to 0.36 pCi/g (dry). The May and November 1983 samples showed Cs-137 concentrations of 0.85 pCi/g (dry) and 1.81 pCi/g (dry), respectively. These samples demonstrated an increase in the Cs-137 concentration up to 1.81 pCi/g (dry). In addition to Cs-137 and Co-60, Cs-134 was detected in the November 1983 indicator sample. Cs-134 had not been detected previous to 1983 in either control or indicator samples. Cs-134 was detected at 0.09 pCi/g (dry). These concentrations, although greater than previous concentrations at this location, have no significant dose consequences to members of the public in regards to 10 CFR 50, Appendix I. An assessment of Co-60, Cs-134, and Cs-137 in shoreline sediment samples is included at the end of this section.

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

A. 2. Dam Shoreline Sediment - Table 4 (cont.)

The source of the elevated Co-60, Cs-134 and Cs-137 concentrations is believed to be liquid effluents from the site. Site liquid effluents during 1982 and 1983 were well within Technical Specification limits, although the quantities of Co-60, Cs-137 and Cs-134 did increase during the first three quarters of 1983. Other potential sources of radionuclides in liquid effluents are the sewage treatment facility effluent and the storm sewer drainage which accepts its most significant drainage from building foundation sumps, roof drainage, and roadway drainage. Grab samples are obtained weekly from the storm sewer drainage system and from the sewage treatment plant effluent which both discharge at points near the NMPC shoreline sediment sample location. Review of weekly data showed no detectable concentrations of Co-60, Cs-137 or Cs-134 from the end of 1982 through 1983.

The presence of Co-60, Cs-137, and Cs-134 in other aquatic sample media shows no similar trends, as observed in shoreline sediment. Algae or Cladophora results for 1983 generally showed lower concentrations of these radionuclides when detected. In addition, fish sample results showed no detectable Co-60 nor Cs-134. Cs-137 was detected in indicator fish sample as well as control samples with no significant differences between the two. It appears, therefore, that the increased concentrations of Cs-137, Co-60 and Cs-134 are specific to shoreline sediment and not other aquatic sample medias.

Shoreline sediment samples will continue to be collected and analyzed as required by the Environmental Technical Specifications. These samples may be supplemented with additional samples, if necessary, in an effort to further assess any possible impacts.

The impact of the 1983 shoreline sediment sample results is minimal and can be evaluated by projecting a dose to man using standard Regulatory Guide 1.109 methodology. The critical pathway, in this case, is direct radiation to the whole body. The presence of Co-60, Cs-134 and Cs-137 is a result of operations at the site. Although the shoreline area is controlled by NMPC personnel, a dose may be calculated assuming that the area in question is utilized as a beach area. Assuming that a teenager spends 67 hours per year at the beach area or shoreline (Regulatory Guide 1.109), and the sediment has a mass of 40 kg/m² (dry) to a depth of 2.5 cm, then the associated dose to the whole body in mrem per year can be calculated.

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

A. 2. Dam Shoreline Sediment - Table 4 (cont.)

Further assumptions must be made and include: no radiological decay of the detected radionuclides, the shore width factor is 0.3 (Regulatory Guide 1.109) and that the Co-60, Cs-134 and Cs-137 concentrations detected are constant for one year and are a result of site operations. Whole body and skin doses are as follows.

<u>Radionuclide</u>	<u>Whole Body Dose*</u>	<u>Skin Dose*</u>
Co-60	0.00005	0.00006
Cs-134	0.00001	0.00002
Cs-137	0.00005	0.00006

*Dose in mrem per year

The average radionuclide values used here are 0.25 pCi/g (dry) for Co-60, 0.09 pCi/g (dry) for Cs-134 and 0.94 pCi/g (dry) for Cs-137. The whole body dose from Co-60 is 0.00005 mrem per year, 0.00001 mrem per year from Cs-134, and 0.00005 mrem per year from Cs-137 or a total whole body dose of 0.00011. Sr-90 was not evaluated since the whole body dose from this beta emitter is insignificant.

A whole body dose of 0.00011 mrem per year is very small and can be compared to the whole body dose from natural background radiation in the area surrounding the site. The natural background dose as a result of parameters such as cosmic radiation and naturally occurring radionuclides in the atmosphere and the ground, has been demonstrated by environmental dosimeters (TLDs) to be approximately 5 mrem per month or 60 mrem per year. The calculated dose of 0.00011 mrem per year as a result of Co-60, Cs-134 and Cs-137 in shoreline sediment is conservative in the sense that it is a high dose estimate. Even in view of this conservatism, this dose is extremely small and is 0.000002 of the annual natural background dose of 60 mrem per year.

A. 3. Fish - Table 5A, 5B

A total of 18 fish samples were analyzed as a result of collections in the spring season (May 1983) and in the fall season (October 1983). 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. Table 5A shows results in units of pCi/g (wet) for purposes of data evaluation. Table 5B shows results in units of pCi/kg (dry), as required by the Technical Specifications.

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

A. 3. Fish - Table 5A, 5B (cont.)

Analysis of the spring 1983 fish samples indicated detectable concentrations of radionuclides related to past weapons testing and natural origins (naturally occurring). Small detectable concentrations of Cs-137 were found in all fish samples (including control samples). Sr-89 and Sr-90 were not detected in control or indicator samples. Spring fish collections were comprised of two separate species and nine individual samples. The two species represented one feeding type. Lake trout and brown trout are highly predacious and feed on significant quantities of smaller fish such as smelt, alewife, and other smaller predacious species. Because of the limited availability of species present in the catches, no bottom feeding species were collected in the spring samples.

Cs-137 was detected in all on-site and off-site samples collected during the spring for both species collected. 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 average indicator Cs-137 concentration was less than the average control concentration. The concentrations detected, however, are not significantly different from the control results and are therefore considered to be representative of background concentrations. Cs-137 in lake trout samples ranged from 0.033 to 0.056 pCi/g (wet) for the indicator samples. Cs-137 in the control samples ranged from 0.049 to 0.057 pCi/g (wet) for lake trout. Cs-137 in brown trout samples ranged from 0.042 to 0.046 pCi/g (wet) at the indicator locations. Cs-137 in the control sample was 0.046 pCi/g (wet) (one sample collected).

Sr-89 and Sr-90 were not detected in the 1983 spring fish samples. Sr-89 and Sr-90 have routinely been detected in previous years.

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 operations. Detectable concentrations of K-40 in the indicator samples (lake trout and brown trout) ranged from 2.9 to 3.8 pCi/g (wet) and 3.0 to 3.1 pCi/g (wet) for the control samples. No other radionuclides were detected in the spring fish samples.

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

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

A. 3. Fish - Table 5A, 5B (cont.)

Cs-137 was detected in all nine samples including the three control samples. Control samples showed an average Cs-137 concentration that was greater than the indicator sample mean from the on-site locations. The detected concentrations were not significantly different from one another because of the extremely small quantities detected. Cs-137 in lake trout samples at the indicator locations ranged from 0.038 to 0.055 pCi/g (wet) and 0.041 to 0.044 pCi/g (wet) at the control location. Brown trout samples from the indicator locations ranged from 0.041 to 0.050 pCi/g (wet). The associated control sample was 0.057 pCi/g (wet).

Sr-89 and Sr-90 concentrations for the fall samples were all less than the minimum detectable level. Sr-89 and Sr-90 were not detected at any of the on-site or off-site sample locations. The October 1983 brown trout sample from the NMP(02) location was lost during the laboratory analysis for Sr-89 and Sr-90.

K-40 was detected in all of the fall samples collected. Detectable concentrations of K-40 in the indicator samples (lake trout and brown trout) ranged from 2.7 to 3.9 pCi/g (wet) and 2.8 to 3.8 pCi/g (wet) for the control samples. No other radionuclides were detected in the fall fish samples.

Review of past environmental data indicates that the Sr-89 concentrations have decreased steadily since 1976 for both indicator and control locations. The indicator sample mean results have decreased significantly since 1976. These results range from an annual mean of 0.27 pCi/g (wet) in 1976 to 0.0035 pCi/g (wet) in 1982. Control sample results have also decreased significantly from 0.24 pCi/g (wet) in 1976 to 0.0040 pCi/g (wet) in 1982. During 1983, Sr-89 was not detected in indicator or control samples. Sr-90 annual mean indicator sample results have decreased from 0.28 pCi/g (wet) in 1976 to a low of 0.0034 pCi/g (wet) in 1982. 1981 and 1982 mean sample results are approximately the same. Control sample results have decreased as well, from 0.25 pCi/g (wet) in 1976 to 0.0063 pCi/g (wet) in 1982. Sr-90 was not detected in 1981, however, the LLD level and the 1982 detected level are approximately equal. Sr-90, during 1983, was not detected in any of the samples collected at the indicator or control locations. The general decline in detectable Sr-89 and Sr-90 results is most probably a result of the incorporation of these radionuclides with organic and inorganic substances through ecological cycling. In addition, Sr-89 has a relatively short half-life of 52 days.

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

A. 3. Fish - Table 5A, 5B (cont.)

The mean 1983 Cs-137 concentration has decreased slightly from 1982 for the indicator samples and significantly from 1980 through 1976 results. Concentrations for these samples decreased from a level of 1.4 pCi/g (wet) in 1976 to a level of 0.045 pCi/g (wet) in 1983. Control sample results have also decreased from a level of 0.12 pCi/g (wet) in 1976 to a level of 0.046 pCi/g (wet) in 1982. Results from 1979 to 1983 have remained fairly consistent for control samples. The 1983 control sample mean was 0.049 pCi/g (wet).

As noted for Sr-89 and Sr-90 above, the general decreasing trend for Cs-137 is most probably a result of ecological cycling. A significant portion of Cs-137 detected since 1976 in fish is a result of weapons testing fallout, and the general downward trend in concentrations will continue as a function of ecological cycling and nuclear decay.

Lake Ontario fish are considered an important food source by many. Therefore, fish is an integral part of the human food chain. Based on the importance of fish in the local diet, a reasonable conservative estimate of dose to man can be calculated. Assuming that the average adult consumes 6.9 kg of fish per year (Regulatory Guide 1.109) and the fish consumed contains an average Cs-137 concentration of 0.045 pCi/g (wet) (annual mean result of indicator samples for 1983), the whole body dose received would be 0.022 mrem per year. The critical organ in this case is the liver which would receive a calculated dose of 0.034 mrem per year. No doses are calculated here for Sr-89 and Sr-90 since these radioisotopes of strontium were not detected during 1983. The Cs-137 whole body and critical organ doses are conservative calculated doses associated with consuming fish from the Nine Mile Point area (indicator samples).

Conservative whole body and critical organ doses can be calculated for the consumption of fish from the control location as well. In this case the consumption rate is assumed to remain the same (6.9 kg per year) but the average annual Cs-137 concentration for the control samples is 0.049 pCi/g (wet). The calculated Cs-137 whole body dose is 0.024 mrem per year and the associated dose to the liver is 0.037 mrem per year. No doses for Sr-89 or Sr-90 are calculated here because, as noted above, these radioisotopes of strontium were not detected during 1983.

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

A. 3. Fish - Table 5A, 5B (cont.)

Calculated doses as a result of fish consumption (lake trout and brown trout) at the indicator and control locations are presented below.

Indicator		Control	
	Whole Body*	Critical Organ*	Whole Body* Critical Organ*
Cs-137	0.022	0.034 (liver)	0.024 0.037 (liver)
Sr-89	**	** (bone)	** ** (bone)
Sr-90	**	** (bone)	** ** (bone)

* Doses in mrem per year. Consumption assumed for all months.

** No calculated dose since this radionuclide was not detected.

In summary, the whole body and critical organ doses observed as a result of consumption of fish is small. Doses received from the consumption of indicator and control sample fish are approximately the same. The dose from control sample fish is slightly higher. Doses from both sample groups are considered background doses.

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

1983 lake water samples were analyzed monthly for gross beta and gamma emitters (using gamma spectral analysis). Sr-89, Sr-90, and tritium analyses were performed quarterly. Quarterly samples (i.e., Sr-89, Sr-90, and tritium) were composites of monthly samples.

The analytical results for the 1983 lake water sample program showed no evidence of plant related radionuclide buildup in the lake water in the vicinity of the site. Indicator samples were collected from the inlet canals at the Nine Mile Point Unit #1 and James A. FitzPatrick facilities. The control location samples were collected at the City of Oswego water treatment plant and consisted of raw lake water prior to treatment.

The 1983 gross beta annual mean activity for the Nine Mile Point Unit #1 and the James A. FitzPatrick inlet canal (2.8 pCi/liter) was approximately the same as the 1982 mean inlet canal result (2.7 pCi/liter), and was less than the annual mean results for the years prior to 1981. The Nine Mile Point Unit #1 canal samples were greater than the control samples for 7 of the 12 monthly samples analyzed and ranged from 0.6 pCi/liter to 7.9 pCi/liter. The James A. Fitzpatrick canal samples were greater than the control samples for 6 of the 12 monthly samples and ranged from 0.6 pCi/liter to 4.2 pCi/liter. The control sample results ranged from 0.8 pCi/liter to 3.5 pCi/liter.

III. EVALUATION OF ENVIRONMENTAL DATA (Continued).

A. 4. Lake Water - Tables 6, 7, and 8 (cont.)

The fluctuation in the gross beta canal sample results is due to the natural variation in the concentration of naturally occurring radionuclides. A slight increase in the gross beta activity was noted in the Nine Mile Point inlet canal samples for June. This result was 7.9 pCi/liter.

A significant reduction in gross beta concentrations is noted when reviewing inlet canal gross beta results since 1974. The reduction in gross beta activity is primarily the result of improved analytical procedures and equipment and not necessarily to changes in plant operations. Although the past elevated gross beta concentrations may be due in part to past weapons testing, it is difficult to determine what portion was due to improved instrumentation and what part was due to weapons testing. There were no significant changes or trends in gross beta activity on a monthly basis for 1983.

Gamma spectral analysis was performed on 36 monthly composite samples required by the Environmental Technical Specifications. Only one radionuclide was detected in the inlet canal and city water samples. This radionuclide was naturally occurring.

K-40 was detected intermittently in both intake canals and the raw city water supply. K-40 was detected in 3 of the 12 monthly inlet canal samples at Nine Mile Point Unit 1 and ranged from 6.7 to 16.5 pCi/liter. The James A. FitzPatrick inlet canal samples showed K-40 detected in 1 of the 12 monthly samples. This concentration was noted in December and was 9.6 pCi/liter. K-40 in the Oswego city water supply was detected only once, during June, at a concentration of 13.2 pCi/liter.

Quarterly samples for Sr-89 analysis were composites of the monthly samples. Sr-89 was not detected in any of the quarterly canal samples or the raw city water samples during 1983. Sr-89 ranged from < 0.6 to < 2.0 pCi/liter at the indicator locations (NMP and JAF) and <0.8 to <2.0 pCi/liter at the control location (raw city water).

Quarterly samples for Sr-90 analysis were composites of the monthly samples as noted for the Sr-89 analysis. Sr-90 was detected in 10 of the 12 quarterly samples for 1983 and was found at all three locations. At the City of Oswego water treatment plant or control location, Sr-90 ranged from 0.8 pCi/liter to 1.0 pCi/liter with a mean of 0.9 pCi/liter. Sr-90 in the Nine Mile Point inlet canal samples ranged from 0.7 pCi/liter to 1.1 pCi/liter and showed a mean of 0.9 pCi/liter. The James A. FitzPatrick inlet canal samples showed

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

A. 4. Lake Water - Tables 6, 7, and 8 (cont.)

Sr-90 ranging from 0.6 pCi/liter to 1.0 pCi/liter and a mean value of 0.8 pCi/liter. As demonstrated, the control location showed a mean result of 0.9 pCi/liter which is a result of natural variation in the distribution of Sr-90. Sr-90, as detected in the 1983 water samples, is considered to be background Sr-90 as a result of past weapons testing.

Tritium samples, as noted above for Sr-89 and Sr-90, are quarterly samples that are a composite of the appropriate monthly samples. Tritium was detected in all samples taken at all three locations. The City of Oswego water treatment plant showed tritium concentrations ranging from 230 pCi/liter to 280 pCi/liter with a mean of 250 pCi/liter. Tritium concentrations for the James A. FitzPatrick inlet canal ranged from 249 pCi/liter to 560 pCi/liter and showed a mean concentration of 347 pCi/liter. Inlet canal samples taken at Nine Mile Point showed tritium concentrations ranging from 190 pCi/liter to 410 pCi/liter. The annual mean concentration was 288 pCi/liter.

Evaluation of past environmental data shows that gross beta concentrations in water samples have decreased significantly since 1977 at both the indicator sample locations (inlet canals) and at the control location (Oswego City water). As noted previously, however, the decrease is primarily a result of more superior analytical instrumentation. Since 1978, gross beta levels have remained relatively constant at both indicator and control locations. Indicator annual means ranged from 15.8 pCi/liter in 1977 to 41.8 pCi/liter in 1976. For the period of 1978 through 1981, annual means ranged from 2.98 pCi/liter (1981) to 4.53 pCi/liter (1978). The indicator annual mean for 1983 was 2.8 pCi/liter. Control sample annual means were also relatively high during 1975 to 1977. During these years, the concentrations ranged from 45.33 pCi/liter (1975) to 10.9 pCi/liter (1977). Data from 1974 for the control location was deleted from this comparison because of questionable results. For the period 1978 through 1981, annual mean gross beta concentrations ranged from 2.42 pCi/liter (1982) to 3.55 pCi/liter (1978). The control annual mean for 1983 was 2.3 pCi/liter.

Review of previous data for Sr-89 and Sr-90 demonstrates that results have been variable since 1975. Sr-89 for the indicator samples has ranged from not detected (1976, 1977, and 1979) to 0.78 pCi/liter (1981) and has been relatively consistent when detected. At the control locations, Sr-89 ranged from not detected (1975-1978 and 1981) to 1.4 pCi/liter (1980). During 1983, Sr-89 showed an annual mean of <1.6 pCi/liter (LLD) at the control location and <1.5 (LLD) pCi/liter at the indicator

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

A. 4. Lake Water - Tables 6, 7, and 8 (cont.)

locations. Sr-90 annual means have remained relatively consistent at both indicator and control sample locations since 1975. Mean results for the indicator samples ranged from not detected (1975 and 1976) to 1.00 pCi/liter (1977 and 1980). Mean results at the control sample location ranged from not detected (1975 - 1978) to 1.10 pCi/liter (1980).

The annual mean Sr-90 results during 1983 for the indicator samples and control samples were <0.8 (LLD) pCi/liter and <0.9 (LLD) pCi/liter, respectively.

Previous annual mean results for tritium at the indicator sample location has decreased slightly since 1976. Sample results were available since 1974 through 1982 and showed a peak value of 4,620 pCi/liter (1982) and a minimum value of 194 pCi/liter (1982). The annual mean tritium result at the indicator locations for 1983 was 317 pCi/liter. The indicated peak value of 4,620 pCi/liter during 1982 is a result of liquid waste discharges during reverse flow mode (of the inlet and discharge canals) and tempering gate maintenance. This occurrence was explained in detail in the 1982 Annual Environmental Operating Report, Part B. The result is not an accurate indication of tritium levels in lake water as demonstrated by the JAF inlet canal results.

Mean tritium results at the control location have decrease slightly since 1976, as was noted above for the indicator samples. Mean annual results were available for 1974 through 1982. These results showed that tritium at the control location ranged from not detected (1974) to 652 pCi/liter (1976). 1979 through 1982 mean results were consistent. The annual mean tritium concentration for 1983 at the control location was 250 pCi/liter.

The impact, as expressed by a dose to man, is not assessed here because the primary pathway in this case is drinking water. The nearest source for drinking water is the City of Oswego water treatment plant which is the control location for the sampling program. The results of the control location are consistent with previous years' results and are representative of normal background radionuclide concentrations in lake water and regional drinking water.

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

B. Terrestrial Program

Tables 9 through 21 represent the analytical results for the terrestrial samples collected for the 1983 reporting period.

1. Air Particulate Gross Beta - Tables 9 and 10

Tables 9 and 10 contain the weekly air particulate gross beta results for the six off-site and nine on-site sample locations. The samples were counted at a minimum of twenty-four hours after collection to allow for the decay of naturally occurring radionuclides with short half-lives. A total of 312 off-site and 468 on-site samples were collected and analyzed during 1983. No significant levels of gross beta activity were observed in any of the samples. The off-site or control mean concentration for 1983 was 0.024 pCi/m^3 while the indicator or on-site sample mean was equal to 0.023 pCi/m^3 . As noted, the on-site annual mean is about four percent lower than the off-site mean for the same period. This difference in mean concentration has been exhibited in the past nine years with the exception of 1977 when a higher annual mean gross beta activity was observed for the on-site sampling stations. In these eight years, the control stations' annual mean ranged from a minimum difference of 4.2 percent higher than the indicator stations, observed in 1983; to a maximum difference of 28.6 percent higher, observed in 1978. The difference in off-site and on-site weekly and monthly mean values for gross beta could be the result of a combination of the many natural processes which can affect environmental concentrations. The most significant parameter that could possibly contribute to a depressed or lower concentration for the on-site stations would be location. The close proximity of on-site sampling stations to the lakeshore (Lake Ontario) would account for lower concentrations of naturally occurring radionuclides being collected on the sample filters. Surface winds from off the lake would contain less particulate matter and airborne gases than surface winds from adjacent land areas. The major component of gross beta concentrations are potassium-40 and decay or daughter products of uranium and thorium. The concentrations of these nuclides in the ground level atmosphere are dependent upon the local geology and its chemical constituents. Thus, surface wind over land areas have a potential for containing higher concentrations of naturally occurring radionuclides.

The observed small increases and decreases in general gross beta activity can be attributed to changes in the environment. As discussed above, the concentration of the naturally occurring radionuclides in the lower limits of the atmosphere directly

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

B. 1. Air Particulate Gross Beta - Tables 9 and 10 (cont.)

above land areas are affected by time related processes such as wind direction, snow cover, soil temperature and soil moisture content. Little change was noted in gross beta activity which corresponded with weapons testing as has been observed in past years. Review of air particulate gross beta concentrations shows that no significant increases in concentration occurred during 1983.

In general, the gross beta activity in air particulate samples has decreased significantly. The mean 1983 concentration for both off-site and on-site is 6.6 times lower than the mean concentration detected in 1981 and 1.3 times lower than 1982. This reduction in activity is directly attributable to the increased activity detected in 1981 as a result of fallout from an atmospheric nuclear test (i.e., the October 1980 Chinese Weapons Test) and subsequent return to background levels in 1983. The trend of gross beta activity in the environment is that of reduced concentrations. The mean 1983 concentration was the lowest level of gross beta activity observed since 1974, which is the extent of the review period. This general decrease is the result of the reduction of atmospheric nuclear testing in recent years in comparison to the 1960's when such testing was conducted on a more frequent basis.

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 (on-site stations D1, D2, E, F, and G) and B-2 (on-site stations H, I, J, and K). Off-site composites include A-1 (off-site stations C, D1 and D2) and A2 (off-site stations E, F, and G).

The results for the composite samples analyzed during the 1983 sample program showed positive results for Ra-226, K-40, Be-7, Co-60, Cs-137, and La-140. All six of these radionuclides were detected in the on-site composites and five of the six were detected in the off-site composites (La-140 was not detected in off-site composite samples).

Ra-226, K-40 and Be-7 are naturally occurring. Co-60, and Cs-137 are typically a result of weapons testing or operations at the site or a combination of both. La-140 is a result of operations at the site based on the relatively short half-life. The total number of radionuclides detected in 1983 was significantly less than 1981. This decrease was a result of the decay and deposition of weapons testing radionuclides. Concentrations of Zr-95, Ce-141, Nb-95, Ce-144, Mn-54, Ru-103, Ru-106 and Ba-140 were not detected in 1983 as they had been in 1981.

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

B. 2. Monthly Air Particulate Composites - Table 11 (cont.)

Ra-226, K-40 and Be-7 were detected at varying concentrations in both on-site and off-site composites. Ra-226 was detected in 9 of the 48 composite samples. 1983 concentrations ranged from 0.0021 - 0.0127 pCi/m³. K-40 was detected in 27 of the 48 composite samples. Concentrations ranged from 0.0024-0.0065 pCi/m³. The third naturally occurring radionuclide detected was Be-7. Be-7 was detected in all monthly composite samples and ranged in concentration from 0.0685-0.161 pCi/m³. Concentrations of Ra-226, K-40, and Be-7 during 1983 were consistent with concentrations detected in previous years.

Co-60 was detected in 5 of the 24 on-site composite samples and ranged from 0.00026-0.00173 pCi/m³. The presence of Co-60 has been noted in the past and can be a result of weapons testing, contamination during handling and operations at the site. The maximum on-site Co-60 concentration noted was 0.00173 which was 6.6 times the smallest concentration detected. The maximum concentration detected was noted in the December 1983 composite sample. Co-60 was detected in 1 of the 24 off-site composite samples at a concentration of 0.00074 pCi/m³ (December 1983).

Co-60 in the on-site and off-site composite samples is most probably a result of contamination during handling and possibly operations at the site. The December samples, especially, are suspected to be a result of contamination during the preparation process. After reviewing the December 1983 composite samples, a set of on-site and off-site particulate filters were prepared by the technician performing the environmental routine. These filters were then composited and counted at the environmental laboratory. The composited filters showed that Co-60 was present on unused filters. The concentration detected was 0.00307 pCi/m³. The concentration was obtained by using a standard composite sample volume for the number of filters composited and a standard count time. This concentration was 1.8 times the concentration of the December maximum composite sample. The contamination was traced to the preparation process where the technician had prepared the individual filters on a table top covered with plastic. Since the location was in proximity to a restricted area access, it is felt that small amounts of Co-60 were attracted to the plastic and subsequently transferred to the filters being prepared on the plastic. The technician and subsequent replacement technician were instructed on how and where to prepare the particulate filters. Although conclusive proof cannot be provided that Co-60 in the December samples is a result of contamination during handling, the data indicates that a significant portion, if not all of the Co-60 detected was a result of contamination. Subsequent monthly composite samples starting during March 1984 will provide more information as to the source of Co-60.

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

B. 2. Monthly Air Particulate Composites - Table 11 (cont.)

Cs-137 was detected in 2 of the 24 on-site filter composite samples at concentrations of 0.00020 and 0.00028 pCi/m³. The off-site filter composites showed Cs-137 was detected only once at a concentration of 0.00018 pCi/m³. In all cases, the concentrations detected were small and may be a result of weapons testing fallout, contamination during handling (as noted above for Co-60), operations at the site or a combination of any of the three. The off-site concentration (0.00018 pCi/m³) was detected in March 1983 while the on-site concentrations were detected in March and April 1983 (0.00020 and 0.00028 pCi/m³). Although the data is not conclusive, it appears that the detected Cs-137 concentrations may be a result of operations at the site.

La-140 was detected only once during 1983 (April) in an on-site filter composite at a concentration of 0.00113 pCi/m³. La-140 can be an effluent from power reactors or weapons testing. Because of the relatively short half-life of 40.22 hours, La-140 in this case is attributable to operations at the site.

No other radionuclides were detected in on-site or off-site air particulate composite samples during 1983 using gamma spectral analysis.

The location, concentration range and mean, and frequency of occurrence of each radionuclide detected during 1983 is included below.

<u>Radionuclide</u>	<u>Location</u>	<u>Range*</u>	<u>Mean*</u>	<u>Frequency**</u>
Ra-226	off-site	0.00645-0.01270	0.00982	3
Ra-226	on-site	0.00210-0.00529	0.00318	6
K-40	off-site	0.00310-0.00649	0.00444	13
K-40	on-site	0.00242-0.00486	0.00338	14
Be-7	off-site	0.07350-0.16100	0.11290	24
Be-7	on-site	0.06850-0.14700	0.09750	24
Co-60	off-site	0.00074	0.00074	1
Co-60	on-site	0.00026-0.00173	0.00068	5
Cs-137	off-site	0.00018	0.00018	1
Cs-137	on-site	0.00020-0.00028	0.00024	2
La-140	off-site	ND	ND	0
La-140	on-site	0.00113	0.00113	1

ND- not detected

* - results in units of pCi/m³

** - frequency is number of times detected

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

B. 2. Monthly Air Particulate Composites - Table 11 (Cont.)

Historically, the naturally occurring radionuclides Ra-226, K-40 and Be-7 have shown fluctuations that are representative of natural changing conditions. No significant trends were noted, as one would expect.

Co-60 has fluctuated in the past primarily as a result of previous weapons testing. Co-60 average concentrations at the on-site and off-site locations from 1977 to 1978 decreased from approximately 0.0175 to 0.0015 pCi/m³. Average concentrations decreased significantly during 1979 and increased in 1980 from approximately 0.0007 to 0.0016 pCi/m³ respectively. 1981 and 1982 average Co-60 concentrations decreased to 0.0007 and 0.0005 pCi/m³. Average off-site and on-site concentrations were approximately equal. The 1983 on-site average Co-60 concentration was 0.0007 pCi/m³ or slightly greater than the 1982 concentration. The 1983 average off-site mean Co-60 concentration was 0.0007 pCi/m³ which also was slightly greater than 1982 results. As noted previously, however, a portion of the Co-60 detected during 1983 was attributed to contamination during handling of the unused filters.

Historically, Cs-137 has been variable during the past. During 1977, both on-site and off-site Cs-137 average concentrations were approximately equal and averaged 0.0039 pCi/m³. Cs-137 average concentrations at on-site and off-site locations decreased during 1978 and 1979 to 0.0017 and 0.0013 pCi/m³ respectively. Average concentrations during 1980 and 1981 were approximately equal at off-site and on-site locations and decreased slightly in 1980 and increased slightly in 1981 from 1979. The 1980 and 1981 average concentrations were 0.0012 and 0.0015 pCi/m³ respectively. The mean 1982 concentration for Cs-137 decreased to 0.0004 pCi/m³. The 1983 mean Cs-137 concentration for the on-site and off-site composite samples were 0.0002 and 0.0002 pCi/m³ which was a reduction from 1982 results.

La-140 has been detected intermittently during previous sampling years. La-140 was detected in 1978 (as Ba/La-140) at average concentrations of 0.0023 (on-site) and 0.0047 (off-site) pCi/m³. La-140 was not detected again until 1981 where it was found at a concentration of 0.0186 pCi/m³ (off-site) and 0.0466 pCi/m³ (on-site). No positive results for La-140 were noted during 1982. La-140 during 1983 was detected only once in an on-site composite at 0.00113 pCi/m³. Based on the small amount of data available, La-140 has decreased significantly since 1981 and 1978.

Assessment of the presence of fission product radionuclides in air particulate composite samples can be depicted by calculating doses to man as a result of inhalation.

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

B. 2. Monthly Air Particulate Composites - Table 11 (cont.)

Using the average child inhalation rate of 3,700 m³ per year or 308.3 m³ per standard month (Regulatory Guide 1.109) and the maximum mean concentration measured at the on-site or off-site sample stations, the following annual lung and whole body doses can be calculated.

<u>Nuclide</u>	<u>Concentration</u> (pCi/m ³)	<u>No. Months</u> <u>Detected</u>	<u>Possible</u> <u>Origin</u>	<u>Dose</u> (mrem/year)
Co-60	0.00068	5	Plant/Fallout	0.002002 (Lung)
Co-60	0.00068	5	Plant/Fallout	0.000006 (Whole Body)
Cs-137	0.00024	2	Plant/Fallout	0.000004 (Lung)
Cs-137	0.00024	2	Plant/Fallout	0.000005 (Whole Body)
La-140	0.00113	1	Plant	0.000017 (Lung)
La-140	0.00113	1	Plant	<0.000001(Whole Body)

Total Lung Dose - 0.002023 mrem/yr.

Total Whole Body Dose - <0.000012 mrem/yr.

The table above illustrates that the lung dose received by a child from inhalation of air in the vicinity of the site (actually within the site boundary) is approximately 0.002 of one mrem for 1983. This dose is extremely small and can be compared to the total lung dose to individuals residing in homes utilizing natural gas for cooking. A resultant total lung dose of 11 mrem per year has been calculated as a result of naturally occurring radon gas and radon gas decay products in the natural gas (NCRP Report No. 56). The whole body dose received is approximately 0.000012 mrem for 1983. This dose is insignificant.

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

During the 1983 sampling program, airborne radioiodine was not detected in any of the 312 weekly samples collected from the six off-site sampling stations. I-131 has been detected in the past at the off-site stations. During 1976, the mean off-site I-131 concentration averaged 0.604 pCi/m³. 1977 showed an I-131 concentration that decreased to 0.323 pCi/m³ and for 1978 the concentrations decreased by a factor of ten to 0.032 pCi/m³. During 1979, 1980 and 1981, I-131 was not detected. I-131 was detected once during 1982 at a concentration of 0.039 pCi/m³. As noted above, I-131 was not detected in the off-site sample stations during 1983.

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

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

I-131 was detected four times during 1983 in the on-site sampling stations. The concentrations ranged from 0.022 to 0.035 pCi/m³ and averaged 0.028 pCi/m³. The detected concentrations were found during the weeks of 1/24/83, 5/30/83, 6/6/83, and 12/12/83. The 1983 mean concentration was slightly greater than the mean concentration found during 1982 (0.016 pCi/m³). I-131 was detected at a mean concentration of 0.328 and 0.309 pCi/m³ during 1976 and 1977. The average concentration decreased to 0.041 pCi/m³ during 1978 and was not detected during 1979. The 1980-1982 average concentrations were 0.013, 0.029, and 0.016 pCi/m³ which were reductions in view of previous I-131 concentrations. For the most part, I-131 in on-site and off-site samples was a result of I-131 from weapons testing. A small portion of the concentrations detected was a result of operations of the site. The concentrations detected during 1983 at the on-site sample stations were a result of operations at the site.

The I-131 concentrations detected in on-site samples during 1983 are presented below. The spacial distribution of the I-131 concentrations show that all four of the results were found at the H on-site environmental air monitoring station. This station is located 0.80 miles at 71° from the NMP-2 reactor centerline (center of the on-site environmental grid map) and is well within the site boundary.

The impact of I-131 concentrations at the H on-site environmental station can be assessed by projecting a maximum organ dose (thyroid) and whole body dose to the critical individual. The projected doses are very conservative because the assumption is made that the critical individual is located at H on-site station, which is well within the site boundary and that the individual is at that location for a full week for each week that I-131 was detected. The critical individual, in this case, would be a child. Using standard Regulatory Guide 1.109 methodology and an inhalation rate of 3700 m³ per year, the thyroid and whole body doses are calculated below.

<u>Sample End Date</u>	<u>On-Site Sample Station</u>	<u>Concentration I-131, pCi/m³</u>	<u>Dose (mrem for 1983) Thyroid/Whole Body</u>
01/31/83	H	0.022	0.006872/0.000012
06/06/83	H	0.032	0.009996/0.000017
06/13/83	H	0.035	0.010933/0.000018
12/19/83	H	0.023	0.007184/0.000012
		Total	- 0.034985/0.000059

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

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

As noted previously, the projected doses are conservative since the critical individual (child) is assumed to reside at H on-site air monitoring station. Figure 3 shows the location of H on-site station and depicts this location as well within the site boundary. A more realistic location, where members of the public would reside, would be outside of the site boundary at which point the I-131 concentration would be less. A maximum exposure time of 168 hours per week is also conservative from the point of view of the residency time.

The calculated total dose for the above mentioned critical individual would be 0.035 mrem to the thyroid and 0.000059 mrem to the whole body assuming a seven day sample period and an inhalation rate of 3700 m³ per year (Regulatory Guide 1.109). The resulting calculated whole body dose due to on-site I-131 concentrations is extremely small and can be compared to a similar dose from natural or background radiation that an individual could receive as a result of changing elevation. An individual residing one meter (3.28 feet) higher in altitude for a period of 25.8 hours would receive an additional radiation dose of 0.000059 mrem which is equal to the total calculated dose to the whole body from environmental I-131 concentrations.

The associated critical organ or thyroid dose for a child was shown to be 0.035 mrem for 1983 as a result of inhalation of I-131. The adult thyroid dose, using the same criteria, is 0.026 mrem for 1983. These doses are small and can be put into perspective by comparing these doses to the dose to the thyroid as a result of inhalation of naturally occurring Be-7 in air. Be-7 is produced primarily in the upper atmosphere as a result of the interactions of cosmic rays from outer space with atmospheric argon, oxygen and nitrogen. The average Be-7 concentration detected during 1983 was 0.1052 pCi/m³. Assuming an inhalation rate of 8000 m³ per year for an adult, the 1983 annual thyroid dose would be 0.488 mrem per year. The adult thyroid dose as a result of the inhalation of I-131 is only 5.3 percent of the dose as a result of the inhalation of naturally occurring Be-7 near the Nine Mile Point site.

The end result of the 1983 I-131 sampling effort showed no significant impact due to operations at the site. During 1983, I-131 was not detected in any other environmental sample media including milk and green leafy vegetables.

B. 4. TLD (Environmental Dosimeter) - Table 14

TLD's were collected and read once per quarter during the 1983 sample year. The TLD results are an average of four independent readings at each location and are reported in mrem per standard month. In 1983, TLD's for the most part were collected on March 31, 1983, July 30, 1983, September 30, 1983 and January 6, 1984.

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

B. 4. TLD (Environmental Dosimeter) - Table 14 (cont.)

TLD results are organized into four groups for evaluation purposes. The groups are on-site TLD's (defined as TLD's in the immediate proximity of the individual facilities at points of interest), environmental station TLD's (a ring of TLD's surrounding the generating facilities as a group), off-site TLD's (TLD's located off the site property or controlled area at off-site environmental stations or points of interest), and control TLD's which are located beyond any influence of the site.

A net dose at the environmental station TLD's located on-site can be calculated simply by subtracting the mean standard monthly off-site doses from the mean standard monthly 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 mean standard month for each quarter is as follows:

<u>Quarter</u>	<u>Net Environmental Station Dose**</u>
1	0.47
2	0.58
3	0.36
4	0.98

The annual site property boundary dose for 1983 cannot be determined from the net environmental station dose since the property boundary extends out to approximately 0.75 miles from the site (i.e., beyond the concentric circle of environmental station TLD's). A general estimate can be made based on two available TLD's located at the site boundary. The net dose per standard month for each quarter 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.

<u>Quarter</u>	<u>Net Site Property Boundary Dose**</u>
1	-0.32
2	+0.37
3	-0.30
4	-0.3

As observed, the site boundary dose based on two available TLD locations is less than the average off-site dose with the exception of the second quarter. The negative net doses are 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.

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

B. 4. TLD (Environmental Dosimeter) - Table 14 (cont.)

On-site TLD results remained fairly consistent during 1983. The results for on-site TLD's were slightly above off-site background results except for TLD's located in close proximity to the generating facilities or radwaste facilities. TLD's located near radwaste facilities, for the most part, showed variable results as a result of radwaste processing and shipments. TLD numbers 31 and 39 are located near the NMP-1 radwaste facilities and showed variable results. TLD numbers 27, 28, 29, 30, and 47 are located near the JAF radwaste facilities and also showed variable results as a result of radwaste processing and shipments. TLD's located near the generating facilities showed results slightly greater than off-site TLD results. These TLD's included numbers 23, 48, 61, and 4. TLD #3 is located near the Unit 2 construction site and construction pipefitting facilities. This TLD showed variable results that were up to two times normal background levels. This TLD was affected by the NMP-1 and JAF generating facilities (when operable) and radiography at the construction site. Radiography is a common practice at construction sites in order to determine the quality of equipment welds such as pipes. TLD's located in areas near radiography work will show fluctuating doses as the amount of radiography performed is not consistent. TLD #59 results were variable as a result of the operating mode of the JAF facility. This TLD is located near the JAF facility stack which primarily releases condenser air ejector gases.

Off-site TLD results remained fairly consistent for most TLD locations each quarter. A slight increase in natural background radiation levels was noted for off-site TLD's in the first and second quarters of the year. This trend was also observed in the control TLD's. This is a result of increased emission rates for radon and thoron gases emanating from the ground. The emission rates are related to ground moisture content and other natural parameters.

TLD results for 1983 showed no detectable impact from direct radiation measured outside the site boundary.

*Location numbers 5, 6, 7, 23, 24, 25 and 26

**Dose in mrem per standard month.

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

B. 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 site. The monitors are not considered to be capable of high sensitivity environmental monitoring and do not detect minute fluctuation in levels of background radiation. Because of the relatively low sensitivity of the monitors (environmentally speaking) no comparisons are made between the radiation monitor readings and the readings from environmental TLD's.

B. 6. Milk - Tables 16, 17, and 18

Milk samples were collected from a combination of eight farms during the 1983 grazing season and the following months of November and December. The grazing season is considered to be May through October. In addition, data is available for two additional farms for the month of May 1983 only. These two locations were deleted in June. During 1983, three sample locations were added to the milk sample program and two locations were deleted. The additions and deletions are detailed in Section II.3.B (Changes to the 1983 Sample Program). Sample location descriptions are listed below.

<u>Location No.</u>	<u>Direction from Site</u>	<u>Distance from Site (miles)</u>
4	ESE	7.7
40	SW	15.3
14	ESE	9.8
16	S	5.2
5	SSE	7.2
7	ESE	5.5
45	SE	8.1
50	E	8.2
55	E	9.0
60	E	9.5

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

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

B. 6. Milk - Tables 16, 17, and 18 (Cont.)

The gamma spectral analysis of the monthly composite samples showed K-40 to be the most abundant radionuclide detected in the milk samples collected in 1983. K-40 was detected in every sample analyzed and ranged in concentration from 879 pCi/liter to 1,700 pCi/liter at the indicator locations and 923 pCi/liter to 1,520 pCi/liter at the control location. K-40 is a naturally occurring radionuclide and is found in many of the environmental medias sampled.

Cs-137 was the only other radionuclide detected in the 1983 milk samples. Cs-137 was measured in 3 of the 66 monthly samples analyzed. Cs-137 was detected in milk samples at location #5 in August, #16 in July, and #45 in June. Cs-137 was not detected at location number 40 which is designated as the control location. Cesium concentrations ranged from 3.3 pCi/liter to 10.9 pCi/liter for all samples with a mean of 7.2 pCi/liter. Cs-137 was not detected at any one particular sample location on a consistent basis, nor was it detected consistently at other locations during any particular month. The detection of Cs-137 at any particular location was random. Cs-137 was detected, however, during the consecutive months of June, July, and August.

A maximum concentration of 10.9 pCi/liter was detected at location number 16 during July. Annual results for the detection of Cs-137 at all locations are presented below.

<u>Location No.</u>	<u>Annual Cs-137 Results</u>
4	ND
40 (control)	ND
14**	ND
16	10.9 pCi/liter*
5	7.3 pCi/liter*
7	ND
45	3.3 pCi/liter*
50	ND
55	ND
60**	ND

ND - Not detected during 1983 sample collection period.

* - Detected only once during 1983.

** - Only 1 monthly sample obtained for 1983 (location deleted in June 1983)

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

B. 6. Milk - Tables 16, 17, and 18 (Cont.)

The annual Cs-137 values for each sampling location are variable but quantitatively the values are only slightly different from one another especially when the magnitude of these minute concentrations is considered. Location number 16 had an annual result slightly higher than the other locations. Location number 40 (control location) showed no detectable Cs-137 during 1983 or during 1982. During 1981, however, location number 40 showed an annual mean Cs-137 concentration of 3.9 pCi/liter, and in 1980 the control location showed a Cs-137 concentration of 4.5 pCi/liter.

A significant portion of the Cs-137 detected in 1980 and 1981 was a result of past weapons testing. For these years, the detonation of a nuclear device in October 1980 by the Chinese contributed significantly to the measured Cs-137 concentrations. During 1983, however, Cs-137 in milk is most probably a result of operations at the site. The impact, in any case, is extremely small.

During 1982 and 1981, pasture grass was collected and analyzed from the milk sample locations in order to help evaluate cesium in milk for those years. Pasture grass samples were not collected during 1983 since a sufficient amount of data had been collected during 1981 and 1982 to evaluate any possible relationship.

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

Sr-90 was detected in all of the milk samples collected during 1983. Sr-90 was detected at indicator sample locations for all months sampled and at the control sample location for all months sampled. The mean Sr-90 concentration for the control location was 2.6 pCi/liter. The mean for all indicator locations (within 10 miles of the site) was 3.0 pCi/liter. The control and indicator sample means are similar. Sr-90 results for the indicator locations ranged from 0.9 pCi/liter to 5.5 pCi/liter. Control sample results ranged from 1.5 pCi/liter to 3.5 pCi/liter. The detection of Sr-90 in indicator and control locations at similar concentrations is indicative of background Sr-90 as a result of past weapons testing.

Milk samples were collected and analyzed monthly for I-131. I-131 was not detected during 1983 in any of the indicator or control samples. All 1983 I-131 milk results are reported as lower limits of detection (LLD). The LLD results ranged from < 0.1 pCi/liter to < 0.5 pCi/liter for all milk samples.

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

B. 6. Milk - Tables 16, 17, and 18 (Cont.)

The presence of Cs-137 and Sr-90 in milk samples has been observed in many major urban areas during previous years. During the years when atmospheric weapons testing was common and subsequent to those years (i.e. 1958-1972), Cs-137 and Sr-90 were detected in milk samples at concentrations that were representative of the frequency of testing (NCRP Report No. 45). In the New York area, Cs-137 ranged from 60 pCi/liter in 1958 to a peak of 147 pCi/liter in 1963, to a concentration of 8 pCi/liter in 1972. Sr-90 demonstrated a similar trend. In 1958, Sr-90 was measured at a concentration of 6 pCi/liter and a peak concentration of 28 pCi/liter was measured in 1963. Sr-90 decreased to 8 pCi/liter in 1972.

Evaluation of previous Cs-137 data shows that Cs-137 has been detected in environmental milk samples at both indicator and control locations. Mean Cs-137 concentrations for 1978-1981 have remained fairly consistent and ranged from 8.6-9.9 pCi/liter at the indicator locations. The 1982 indicator mean was 5.7 pCi/liter which showed a slight decrease when compared to 1978-1981. Cs-137 in milk during 1983 yielded a mean of 7.2 pCi/liter which was slightly greater than the 1982 mean but was less than the 1978-1981 mean range. During 1983, however, Cs-137 was detected in only 3 of the 66 samples, while in 1982, Cs-137 was detected in 10 of the 54 samples analyzed. At the control location, Cs-137 has remained fairly consistent for all years from 1978-1982 except for 1979 and 1982. For these years, this radionuclide was not detected. Cs-137 ranged from 3.9-5.8 pCi/liter during 1978-1982. Cs-137 was not detected at the control location during 1983. The absence of Cs-137 during 1983 is a result of a 3 year time interval since the last weapons test.

Historical data for Sr-90 indicates that this radionuclide was detected in most indicator and control samples at approximate equal concentrations. Sr-90 at the indicator locations ranged from 4.0-5.9 pCi/liter during 1978-1982. The 1983 indicator mean was inconsistent with this range and showed a concentration of 3.0 pCi/liter, which was less than the 1978-1982 range. At the control location, Sr-90 ranged from 3.1-5.9 pCi/liter during 1978-1982. The 1983 annual mean was 2.6 pCi/liter or slightly less than the 1978-1982 range. The general trend in milk Sr-90 concentrations is a gradual reduction as a result of infrequent weapons tests.

The impact as a result of Cs-137 in 1983 milk samples can be assessed by calculating conservative doses to man from the consumption of milk with detectable quantities of Cs-137. For the purposes of a calculated dose, the 1983 mean indicator sample Cs-137 concentration is used (7.2 pCi/liter).

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

B. 6. Milk - Tables 16, 17, and 18 (Cont.)

Assuming a consumption rate of 330 liters (87.18 gallons) per year for an infant (Regulatory Guide 1.109 maximum exposed individual), the whole body dose would be 0.026 mrem and the critical organ dose would be 0.363 mrem to the liver. The calculated doses are based on 3 months of consumption (3 months of detectable Cs-137 sample results). Since Cs-137 was not detected at the control location in 1983, a dose calculation cannot be performed. For a limited comparative purpose, the calculated dose to an infant as a result of consuming milk from the control location during 1981 would be 0.005 mrem whole body dose and 0.072 mrem critical organ dose (dose to the liver). The annual mean Cs-137 concentration for the 1981 control location was 4.3 pCi/liter (Cs-137 was only detected in one of the eight monthly samples during 1981).

The calculated dose to an adult can be determined assuming a consumption rate of 110 liters (29.06 gallons) per year (Regulatory Guide 1.109) and a mean Cs-137 concentration of 7.2 pCi/liter for the indicator locations. The resultant doses are 0.014 mrem to the whole body and 0.022 mrem to the liver (critical organ). The calculated doses are based on 3 months of consumption. As noted above, Cs-137 was not detected at the control location, therefore no whole body or critical organ dose can be calculated.

For the purpose of illustration, the significance of the above doses can be brought into perspective by comparison to background doses due to cosmic radiation with changes in altitude. Assuming the above calculated whole body dose, as a result of the consumption of milk, is 0.026 mrem to an infant and is totally a result of plant operations at the site, a comparison can be made to the incremental increase in dose due to cosmic radiation at sea level. A dose of 0.026 mrem whole body is equal to residing at a location 100 meters (328 feet) higher in altitude for 4.7 days.

An additional comparison can be made to naturally occurring K-40. K-40 has been noted in almost all environmental samples at significant levels. A 70 kg adult weighs approximately 154 pounds and contains approximately 0.1 microcuries of K-40 as a result of normal life functions (inhalation, consumption, etc.). The dose to the bone tissue is about 20 mrem per year as a result of the internal deposited K-40. For comparison purposes, an adult bone dose can be calculated that results from the consumption of milk from the 1983 indicator locations. The mean Cs-137 concentration of 7.2 pCi/liter is used. The resulting bone dose is 0.016 mrem per year (an average milk Cs-137 concentration of 7.2 pCi/liter is applied over 3 months of the year). This dose is 0.0008 of the bone dose as a result of naturally occurring K-40 in a 154 pound adult.

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

B. 6. Milk - Tables 16, 17, and 18 (Cont.)

The impact, if any, as a result of Sr-90 in milk, due to plant operation is extremely small since the mean result of the indicator results and the control results are approximately equal considering fluctuations in the background levels. The levels of Sr-90 detected in indicator as well as control samples are considered to be representative of background concentrations. In this regard, the resultant calculated doses would be approximately equal.

Iodine-131 was not detected in the monthly milk samples analyzed for the 1983 program. No doses to man have been calculated because of the lack of detectable I-131.

B. 7. Milch Animal Census - Table 19

The milch animal census is an estimation of the number of cows and goats within a ten 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 by telephone calls.

The number of milch animals located within the ten mile radius of the site was estimated to be 1,213 cows and 0 goats for the spring 1983 census. No new locations were found since the summer 1982 census. The number of cows increased by 72 and the number of goats decreased by 3 with respect to the 1982 summer census.

The 1983 summer census showed a total of 1,145 cows and 2 goats. This represents a decrease of 68 cows and an increase of 2 goats with respect to the spring 1983 census. One milch animal location was added as a result of this census when compared to the spring 1983 census.

B. 8. Human Food Products - Table 20

Human food product samples during 1983 were comprised of meat, eggs, poultry, and produce. Collections for meat, poultry, and eggs were made in the spring and fall seasons. Samples of produce included vegetables and/or fruit with an attempt to sample at least one green leafy vegetable from each location. The collection of produce was performed in late summer.

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

B. 8. Human Food Products - Table 20 (Cont.)

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 ten mile radius of the site in areas which would have a high potential for demonstrating possible effects of site operations. Control samples were obtained from areas greater than ten miles from the site, preferably in a least prevalent wind direction. The ultimate factor controlling sample locations was the availability of required samples. Attempts were made to maintain prior sample locations were possible.

Spring meat collections were obtained at one control location (greater than ten miles from the site) and at three indicator locations (less than ten miles from the site). Spring meat collections showed detectable concentrations of K-40 in all samples. K-40 concentrations ranged from 2.3 pCi/g (wet) to 2.9 pCi/g (wet). K-40 is a naturally occurring radionuclide. One of the four spring meat samples showed detectable concentrations of Cs-137. The positive concentration was in one of the indicator samples. Cs-137 was detected at a concentration of 0.023 pCi/g (wet). Cs-137 was not detected in the control sample.

Cs-137 was detected in many environmental samples and was most prevalent in meat and fish, with respect to all the sample medias collected. Cs-137 in meat samples has typically been a result of past weapons testing. Cesium is incorporated into meat tissue from feed sources. The concentration detected in the spring meat sample was a very low concentration and thus could be detected in some samples and not in others. By review of the 1981 spring meat sample data, it is noted that Cs-137 appeared in the control samples (0.017 pCi/g [wet] and 0.024 pCi/g [wet]). Cs-137 was also found in the control sample during 1980 (0.01 pCi/g [wet]).

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

Fall meat collections were made at one control and at three indicator sample locations. The fall samples showed detectable concentrations of K-40 in all samples. K-40 concentrations ranged from 2.4 pCi/g (wet) to 3.4 pCi/g (wet). K-40 is naturally occurring.

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

B. 8. Human Food Products - Table 20 (Cont.)

Cs-137 was detected in three of the four fall meat samples. The three positive results were all indicator samples (less than ten miles from the site). The three results showed small concentrations of Cs-137 that were approximately at the lower limit of detection (LLD). The results were 0.044 pCi/g (wet), 0.014 pCi/g (wet) and 0.023 pCi/g (wet) as compared to the control sample result of <0.006 pCi/g (wet). These results are very small concentrations and, as noted above for the spring samples, are comparable to concentrations detected at control location during 1981 with the exception of one sample. The 1981 samples showed control Cs-137 concentrations of 0.017 and 0.024 pCi/g (wet) respectively. The impact of these small concentrations is discussed below.

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

The detection of Cs-137 in meat samples has been noted for all years since 1978 for indicator samples and since 1980 for control samples (control samples were not collected prior to 1980). Prior to 1978, Cs-137 was not detected as a result of the limited sensitivity of the analyses. The detected concentrations since 1978 at the indicator locations have been fairly consistent. These samples ranged from 0.022 to 0.038 pCi/g (wet). At the control locations, Cs-137 ranged from 0.010 to 0.020 pCi/g (wet). The indicator sample annual mean results have been slightly higher than the control sample annual mean results.

The detection of Cs-137 in meat at control and indicator sample locations during 1978-1981 is an indication of cesium production from weapons testing. During 1982 and 1983, Cs-137 was not detected at the control sample location although Cs-137 has been detected in the past at control sample locations (1981, for example). The detection of Cs-137 in meat samples during 1983 is most probably a result of operations of the site although a small portion of this may be the a result of weapons testing. In any event, the concentrations detected are very small and the impact or dose to man is insignificant. An average annual dose to man can be calculated as a result of meat consumption from within 10 miles of the site (indicator sample results).

The average annual Cs-137 concentration in meat during 1983 in the indication samples is 0.026 pCi/g (wet). A dose can be calculated to the critical organ and the whole body using standard Regulatory Guide 1.109 methodology. The critical organ is the liver of an adult. The consumption rate is 110 kg per year and is the maximum rate in lieu of site specific data as recommended by Regulatory Guide 1.109. The critical organ or

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

B. 8. Human Food Products - Table 20 (Cont.)

liver dose as a result of consuming meat from within 10 miles of the site, as represented by the indicator sample results, would be 0.312 mrem per year. The whole body dose would be 0.204 mrem per year. A critical organ dose of 0.312 mrem per year is small and can be compared to the dose to the critical organ as a result of consuming naturally occurring K-40 in foods and water. The critical organs, in this case, are the gonads and other soft tissues which receive a dose of approximate 20 mrem per year for a standard 155 pound man. An additional dose comparison can be made considering bone tissue. The dose to the bone of an adult as a result of consuming meat with a Cs-137 concentration equal to the 1983 annual mean indicator sample concentration of 0.026 pCi/g (wet) is 0.228 mrem per year. A dose to the bone can also be calculated based on the 1983 annual mean K-40 concentration of 2.8 pCi/g (wet). This dose, as adapted from NCRP Report 42, assumes the quality factor for the absorbed dose in mrad and the dose equivalent in mrem is 1 for gamma doses. The bone dose as a result of K-40 would be 44.8 mrem per year. The bone dose, as a result of Cs-137 in meat, is 0.005 of the bone dose from naturally occurring K-40 in the 1983 meat samples.

The dose to the critical organ of an adult is small and as demonstrated above is minor compared to doses as a result of naturally occurring K-40. The whole body dose received from the consumption of meat with a Cs-137 concentration of 0.026 pCi/g (wet) was calculated above as 0.204 mrem per year. This dose can also be put into perspective by comparing this dose to the dose received from cosmic radiation with changes in altitude. A whole body dose of 0.204 mrem is based on meat consumption for one year and is comparable to the increase in dose received when an individual moves to an altitude of 10.2 meters (33.4 feet) higher for the same time period (i.e., one year).

Egg samples were collected in the spring (May 1983) and in the fall (November 1983). Samples were collected at three indicator locations (within ten miles of the site) and at one control location (greater than ten miles from the site). The only radionuclide detected during 1983 in egg samples was K-40. K-40 was detected in the spring samples at concentrations that ranged from 0.8 pCi/g to 1.2 pCi/g (wet). The fall samples showed K-40 concentrations that ranged from 1.0 pCi/g to 1.1 pCi/g (wet). For both the spring and fall samples, the control samples had the lowest K-40 concentrations.

Poultry samples were taken during the spring (May 1983) and during the fall (November 1983) at three indicator locations and one control location. K-40 was detected in all spring and fall samples for both indicator and control results. K-40 in the spring samples ranged from 1.7 pCi/g to 2.9 pCi/g (wet). The control sample had the lower concentration (1.7 pCi/g-wet). K-40 in the fall samples ranged from 3.1 pCi/g to 3.3 pCi/g (wet). The control sample showed a concentration of 3.3 pCi/g (wet).

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

B 8. Human Food Products - Table 20 (Cont.)

Cs-137 was detected in one of the spring indicator poultry samples during 1983. The concentration detected was very small and was approximately at the lower limit of detection (LLD) level for the other spring poultry samples. The detected Cs-137 concentration was 0.018 pCi/g (wet). The LLD levels for the other samples ranged from <0.010 pCi/g (wet) to <0.018 pCi/g (wet). Historically, the control samples for poultry have not demonstrated detectable concentrations of Cs-137. Although this sample is an indicator sample (i.e., within ten miles of the site), it is difficult to assess whether the detected cesium is plant related or a minute background cesium concentration. In regards to background Cs-137, poultry can be compared to beef (meat) samples in the sense that Cs-137 can become incorporated in tissue through the ingestion pathway. Thus, poultry have the potential to ingest Cs-137 through the purchased feed they consume (possible weapons testing source) but conversely they also have the potential to incorporate Cs-137 through ingestion of local deposition (plant related source). In any event, the impact as assessed by a dose to man, is insignificant.

Cs-137 has been routinely observed in poultry samples from indicator locations in the past. Mean annual Cs-137 concentrations during 1978-1982 yielded concentrations of 0.012, 0.012, 0.09, not detected and 0.03 pCi/g (wet) respectively. The 1983 concentration of 0.018 pCi/g (wet) is a reduction when compared to 1982 and is comparable to the average concentration for 1978-1982. Cs-137 has not been detected in control samples from 1978-1982, nor previous to 1978. Historical data indicates that Cs-137 in poultry samples collected during 1983 may be a result of operations at the site.

The impact, as a result of consumption of poultry, can be assessed by projecting a whole body and critical organ dose to an adult. A maximum, and therefore very conservative dose, can be calculated based on the one positive detection of Cs-137. Assuming a Cs-137 concentration of 0.018 pCi/g (wet), and a consumption rate of 110 kg per year (Regulatory Guide 1.109), a conservative dose to man can be calculated. The adult whole body dose is 0.071 mrem per year and the adult critical organ dose is 0.108 mrem per year to the liver. These doses were calculated for a six month period since Cs-137 was detected only during the first half of the year.

As noted in the assessment of the meat sample data, these doses are small when compared to an annual dose of 20 mrem per year to the critical organs (the gonads and other soft tissues in this case) as a result of naturally occurring K-40 in the environment. The critical organ dose as a result of consumption of poultry containing 0.018 pCi/g (wet) of Cs-137 is 0.108 mrem for 1983.

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

B. 8. Human Food Products - Table 20 (cont.)

This dose is 0.005 of the dose to the critical organs as a result of naturally occurring K-40 in the environment. A comparison of the whole body dose calculated for poultry containing 0.018 pCi/g (wet) of Cs-137 and doses from natural conditions can also be performed. The whole body dose was calculated previously as 0.071 mrem for 1983. Using the increase in dose as a result of incremental increases in altitude from cosmic radiation, a Cs-137 dose of 0.071 mrem is equal to residing at a location 3.6 meters (11.8 feet) higher in altitude for one year.

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 accomplished to collect one broadleaf and one non-broadleaf fruit or vegetable at each location. Broadleaf vegetables of Swiss chard and cabbage and non-broadleaf fruits and vegetables of tomatoes, cucumbers, squash, and zucchini were collected.

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 to 4.6 pCi/g (wet). Non-broadleaf fruits and vegetables (tomatoes, etc.) showed concentrations of K-40 ranging from 1.2 pCi/g to 2.3 pCi/g (wet). Be-7 was not detected in any of the fruit and vegetable samples collected during 1983. This naturally occurring radionuclide had been detected during 1982 and intermittently prior to 1982.

No other radionuclides were detected in the 1983 collection of fruits and vegetables.

Review of past environmental data indicates that K-40 has been consistently detected in food crop samples. K-40 concentrations have fluctuated from one sample to another but the annual ranges have remained relatively consistent from year to year. Be-7 has been detected occasionally during the past on leafy vegetables (1978 through 1982).

Dose estimates are not performed here for fruits and/or vegetables since no other radionuclides with the exception of naturally occurring K-40 were detected.

B. 9. Soil - Table 21

Soil samples are collected every three years as required by the Environmental Technical Specifications. Soil samples were collected during 1983 at the nine on-site air monitoring stations and at the six off-site air monitoring stations. Samples were collected during 1977 and 1980 using this same criteria. Limited sampling for soil was also conducted during 1974 at select on-site locations.

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

B. 9. Soil - Table 21 (cont.)

Soil sample results for 1983 included several radionuclides that are naturally occurring. These radionuclides included K-40, Ra-226, and Th-228. K-40 concentrations were highly variable as a result of the different soil types at different sample locations. K-40 concentrations during 1983 for on-site and off-site locations ranged from 7.2-19.4 pCi/g (dry). On-site and off-site concentration ranges were approximately equal. K-40 was detected at all sample locations. Ra-226 was detected in five of the nine on-site sample locations and three of the six off-site locations. Ra-226 ranged from 1.13-2.15 pCi/g (dry) for on-site and off-site samples. On-site and off-site ranges were approximately equal. Th-228 was detected in all on-site and off-site samples. Concentrations for on-site and off-site samples ranged from 0.52-0.94 pCi/g (dry).

Cs-137 was detected in seven of the nine on-site samples and six of the six off-site samples. On-site samples ranged from 0.07-1.19 pCi/g (dry) and averaged 0.42 pCi/g (dry). Off-site samples ranged from 0.20-1.46 pCi/g (dry) and averaged 0.67 pCi/g (dry). The off-site range and average concentration was higher than the on-site range and average concentration. The highest concentration detected for Cs-137 during 1983 was at the C off-site location which is considered a control location. This variability of Cs-137 in the 1983 samples is a result of the natural variation in distribution for this radionuclide. Several ecological processes such as vegetation cover, terrain, erosion, etc. can affect the distribution of Cs-137. Cs-137 in soil samples is a result of previous weapons testing. Any possible Cs-137 in on-site samples as a result of operations at the site would not be able to be measured because of the natural variability of the concentrations. The fact that the off-site mean is slightly greater than the on-site mean indicates that any possible Cs-137 concentration as a result of operations at the site is insignificant.

Historically, Cs-137 concentrations in on-site samples has decreased significantly since 1974, 1977 and 1980. Mean Cs-137 concentrations for these years were 1.02, 1.03 and 1.26 pCi/g (dry). The 1983 on-site mean was 0.42 pCi/g (dry). 1977 and 1980 off-site mean concentrations were also significantly greater than the 1983 off-site sample mean concentration (off-site samples were not collected during 1974). Mean concentrations for the off-site locations during 1977 and 1980 were 1.17 and 1.20 pCi/g (dry) respectively. The 1983 mean off-site Cs-137 concentration was 0.67 pCi/g (dry). The significant reductions in the on-site and off-site mean Cs-137 concentrations are probably a result of radiological decay of Cs-137, the reduced frequency of nuclear weapons testing, and redistribution of Cs-137 by vegetation.

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

B. 9. Soil - Table 20 (cont.)

No other radionuclides were detected in the 1983 soil samples using gamma spectral analysis.

Sr-90 was detected in seven of the nine on-site samples and six of the six off-site samples during 1983. Mean on-site and off-site concentrations for Sr-90 were equal and showed a result of 0.18 pCi/g (dry). On-site samples ranged 0.03-0.47 pCi/g (dry) and off-site samples ranged from 0.10-0.32 pCi/g (dry). Sr-90 in 1983 soil samples is a result of previous weapons testing. The 1983 sample results support this fact. Variability in Sr-90 concentrations is a result of the natural variation in the distribution process, as was noted above for soil Cs-137 concentrations.

Historically, Sr-90 concentrations have been variable as a result of the distribution processes. The 1974 mean on-site concentration was 0.27 pCi/g (dry). Subsequent years showed a general reduction in Sr-90 concentrations. During 1977, the on-site concentration was 0.40 pCi/g (dry) which was a slight increase compared to 1974. The mean on-site concentration during 1980 showed a significant decrease to 0.07 pCi/g (dry). The 1983 on-site mean, as noted previously, was 0.18 pCi/g (dry) which represented a slight increase from 1980. Off-site mean concentrations showed similar historical trends. Off-site results for 1974 were not available. Off-site results for 1977 and 1980 showed mean concentrations of 0.21 and 0.06 pCi/g (dry). The 1983 mean off-site concentration was 0.18 pCi/g (dry) which was an increase in regards to 1980.

C. Conclusion

The Radiological Environmental Monitoring Program (REMP) was established to detect and evaluate 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 evaluate any impact to the general environment or to man. In addition, the data was reviewed for any possible historical trophic level bioaccumulation trends. Little or no impact could be determined resulting from radionuclide deposition considering all sources (natural, weapons testing, etc.). In regards to doses as a result of man-made radionuclides, a significant portion of the doses received by a member of the public was from past nuclear weapons testing. Doses as a result of naturally occurring radionuclides, such as K-40, contributed a major portion of the total annual dose to members of the public.

III. EVALUATION OF ENVIRONMENTAL DATA (Continued)

C. Conclusion (Cont.)

Any possible impact as a result of site operations is extremely minimal when compared to the impact from natural background levels 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). Whole body doses to man as a result of natural sources (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 a small fraction 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.

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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 positive or LLD values where applicable. These tables are entitled "Environmental Sample Summary".

ENVIRONMENTAL SAMPLE SUMMARY (1983)

<u>Medium/Sample</u>	<u>Location</u>	<u>Radionuclide</u>	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>
Cladophora	Oswego 6.2 mi. @ 235° (control)	Be-7	NS	0.52	0.37	NS
		K-40		6.00	3.12	
		Co-60		<0.01	<0.01	
		Cs-137		0.03	<0.01	
		Mn-54		<0.01	<0.01	
		Th-228		<0.03	<0.01	
		Others		<LLD	<LLD	
Cladophora	NMP 0.3 mi. @ 275°	Be-7	NS	0.57	0.65	NS
		K-40		6.07	2.08	
		Co-60		0.09	0.09	
		Cs-137		0.06	0.04	
		Mn-54		0.02	0.02	
		Th-228		0.05	0.02	
		Others		<LLD	<LLD	
Cladophora	JAF 0.7 mi. @ 68°	Be-7	NS	0.67	0.58	NS
		K-40		3.52	2.98	
		Co-60		0.08	0.11	
		Cs-137		0.04	0.03	
		Mn-54		0.01	0.04	
		Th-228		<0.01	<0.01	
		Others		<LLD	<LLD	

NS - Samples not collected during the first and fourth quarters of the year.
Results in units of pCi/g (wet)

ENVIRONMENTAL SAMPLE SUMMARY (1983)

<u>Medium/Sample</u>	<u>Location</u>	<u>Radionuclide</u>	<u>1st Quarter*</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>
Dam Shoreline Sediment	Lang's Beach Control 5.8 mi @ 230°	K-40	12.0	15.3	NS	14.1
		Ra-226	0.33	1.21		1.21
		Th-228	0.31(1)	0.62		0.60
		Sr-90	<0.008	<0.001		<0.002
		Co-60	<0.06	<0.02		<0.05
		Cs-137	<0.05	<0.02		<0.05
		Others	<LLD	<LLD		<LLD
Dam Shoreline Sediment	NMP 0.3 mi @ 275°	K-40	9.7	15.2	NS	13.0
		Ra-226	0.21	1.02		<0.92
		Th-228	0.31 (1)	0.55		0.38
		Sr-90	(2)	<0.002		0.022
		Co-60	<0.07	0.14		0.36
		Cs-137	0.16	0.85		1.81
		Others	<LLD	<LLD		<LLD

* - Not Environmental Technical Specification sample. Extra sample for evaluation purposes.

(1) - Result for Th-232.

(2) - Sample lost during laboratory analysis.

NS - No samples collected during the third quarter of the year.

Results in units of pCi/g (dry)

ENVIRONMENTAL SAMPLE SUMMARY (1983)

<u>Medium/Sample</u>	<u>Location</u>	<u>Radionuclide</u>	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>
Fish (Brown trout)	Oswego (control) 6.3 mi @ 235°	Sr-89	NS	<0.027	NS	<0.006
		Sr-90		<0.001		<0.002
		Cs-137		0.046		0.057
		K-40		3.1		3.8
		Others		<LLD		<LLD
Fish (Lake Trout #1)	Oswego	Sr-89	NS	<0.031	NS	<0.004
		Sr-90		<0.002		<0.002
		Cs-137		0.057		0.041
		K-40		3.0		2.8
		Others		<LLD		<LLD
Fish (Lake Trout #2)	Oswego	Sr-89	NS	<0.033	NS	<0.004
		Sr-90		<0.002		<0.002
		Cs-137		0.049		0.044
		K-40		3.0		3.1
		Others		<LLD		<LLD
Fish (Brown Trout)	NMP 0.3 mi @ 315°	Sr-89	NS	<0.099	NS	*
		Sr-90		<0.003		*
		Cs-137		0.046		0.041
		K-40		3.2		3.9
		Others		<LLD		<LLD
Fish (Lake Trout #1)	NMP	Sr-89	NS	<0.052	NS	<0.002
		Sr-90		<0.002		<0.001
		Cs-137		0.056		0.038
		K-40		3.3		3.0
		Others		<LLD		<LLD

NS - No sample collected during the first and third quarters of the year.

* - Sample lost during laboratory analysis.

Results in units of pCi/g (wet).

ENVIRONMENTAL SAMPLE SUMMARY (1983) (cont.)

<u>Medium/Sample</u>	<u>Location</u>	<u>Radionuclide</u>	<u>1st. Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>
Fish (cont.) (Lake Trout #2)	NMP	Sr-89	NS	<0.066	NS	<0.001
		Sr-90		<0.003		<0.001
		Cs-137		0.033		0.047
		K-40		2.9		3.3
		Others		<LLD		<LLD
Fish (Brown Trout)	JAF 0.6 mi @ 55°	Sr-89	NS	<0.084	NS	<0.002
		Sr-90		<0.003		<0.001
		Cs-137		0.042		0.050
		K-40		3.1		3.7
		Others		<LLD		<LLD
Fish (Lake Trout #1)	JAF	Sr-89	NS	<0.033	NS	<0.003
		Sr-90		<0.002		<0.001
		Cs-137		0.038		0.055
		K-40		3.1		3.2
		Others		<LLD		<LLD
Fish (Lake Trout #2)	JAF	Sr-89	NS	<0.095	NS	<0.002
		Sr-90		<0.003		<0.001
		Cs-137		0.051		0.039
		K-40		3.8		2.7
		Others		<LLD		<LLD

NS - No sample collected during the first and third quarters of the year.
Results in units of pCi/g (wet).

ENVIRONMENTAL SAMPLE SUMMARY (1983)

<u>Medium/Sample</u>	<u>Location</u>	<u>Radionuclide</u>	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>
Fish (Brown trout)	Oswego (control) 6.3 mi @ 235°	Sr-89	NS	<79.6	NS	<18.2
		Sr-90		<3.2		<5.4
		Cs-137		135.7		182.4
		K-40		9,145		12,096
		Others		<LLD		<LLD
Fish (Lake Trout #1)	Oswego	Sr-89	NS	<85.6	NS	<11.4
		Sr-90		<4.7		<5.7
		Cs-137		157.3		122.1
		K-40		8,280		8,490
		Others		<LLD		<LLD
Fish (Lake Trout #2)	Oswego	Sr-89	NS	<92.1	NS	<12.9
		Sr-90		<5.3		<7.2
		Cs-137		136.7		133.2
		K-40		8,370		9,180
		Others		<LLD		<LLD
Fish (Brown Trout)	NMP 0.3 mi @ 315°	Sr-89	NS	<273.2	NS	*
		Sr-90		<7.4		*
		Cs-137		127.0		130.6
		K-40		8,832		12,576
		Others		<LLD		<LLD
Fish (Lake Trout #1)	NMP	Sr-89	NS	<158.1	NS	<6.0
		Sr-90		<6.4		<2.4
		Cs-137		170.2		112.8
		K-40		10,032		9,030
		Others		<LLD		<LLD

NS - No sample collected during the first and third quarters of the year.

* - Sample lost during laboratory analysis.

Results in units of pCi/kg (dry).

ENVIRONMENTAL SAMPLE SUMMARY (1983) (cont.)

<u>Medium/Sample</u>	<u>Location</u>	<u>Radionuclide</u>	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>
Fish (cont.) (Lake Trout #2)	NMP	Sr-89	NS	<225.7	NS	<0.5
		Sr-90		<9.9		<2.2
		Cs-137		112.9		141.6
		K-40		9,918		9,780
		Others		<LLD		<LLD
Fish (Brown Trout)	JAF 0.6 mi @ 55°	Sr-89	NS	<252.8	NS	<6.1
		Sr-90		<8.4		<2.2
		Cs-137		126.4		160.0
		K-40		9,331		11,680
		Others		<LLD		<LLD
Fish (Lake Trout #1)	JAF	Sr-89	NS	<91.4	NS	<6.1
		Sr-90		<4.7		<3.6
		Cs-137		105.3		165.9
		K-40		8,587		9,630
		Others		<LLD		<LLD
Fish (Lake Trout #2)	JAF	Sr-89	NS	<261.2	NS	<6.6
		Sr-90		<6.9		<2.3
		Cs-137		140.2		117.3
		K-40		10,450		7,950
		Others		<LLD		<LLD

NS - No sample collected during the first and third quarters of the year.
Results in units of pCi/kg (dry)

ENVIRONMENTAL SAMPLE SUMMARY (1983)

<u>Medium/Sample</u>	<u>Location</u>	<u>Radionuclide*</u>	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>
Monthly Water Composite	Oswego City Water (control) 7.8 mi @ 240°	K-40	<15.3	<12.6	<13.6	<15.0
		Cs-137	<1.24	<1.00	<1.17	<1.19
		Co-60	<1.62	<1.19	<1.29	<1.45
		Gross Beta	1.6	2.1	2.8	<2.7
	NMP Inlet 0.3 mi @ 305°	K-40	<15.1	<11.9	<12.7	<17.6
		Cs-137	<1.20	<1.09	<1.08	<1.19
		Co-60	<1.60	<1.28	<1.43	<1.35
		Gross Beta	1.9	3.8	3.1	<3.1
	JAF Inlet 0.5 mi @ 70°	K-40	<15.4	<13.1	<14.4	<14.8
		Cs-137	<1.24	<1.03	<1.09	<1.19
		Co-60	<1.33	<1.18	<1.28	<1.59
		Gross Beta	1.7	2.9	3.2	<2.6

Results in units of pCi/liter.

* - All other results for gamma spectral analysis were less than LLD.

ENVIRONMENTAL SAMPLE SUMMARY (1983)

<u>Medium/Sample</u>	<u>Location</u>	<u>Radionuclide</u>	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>
Quarterly Water Composite	Raw City Water (control) 7.8 mi @ 240°	Tritium	239	230	280	250
		Sr-89	<0.8	<2.0	<2.0	<1.4
		Sr-90	1.0	<0.9	0.9	0.8
	NMP Inlet 0.3 mi @ 305°	Tritium	260	410	290	190
		Sr-89	<1.1	<2.0	<1.0	<1.6
		Sr-90	1.0	0.7	<0.7	1.1
	JAF Inlet 0.5 mi @ 70°	Tritium	249	260	560	320
		Sr-89	<0.6	<2.0	<2.0	<1.4
		Sr-90	0.8	1.0	0.6	0.6

Results in units of pCi/liter.

ENVIRONMENTAL SAMPLE SUMMARY (1983)

<u>Medium/Sample</u>	<u>Location No.</u>	<u>Location</u>	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>
Airborne	D1 on-site	0.2 mi @ 69°	0.021	0.020	0.028	0.025
Particulate	D2	0.4 mi @ 140°	0.024	0.020	0.031	0.028
Filters	E	0.4 mi @ 175°	0.023	0.020	0.029	0.026
(Gross Beta)	F	0.5 mi @ 210°	0.024	0.018	0.030	0.024
	G	0.7 mi @ 250°	0.022	0.018	0.027	0.028
	H	0.8 mi @ 71°	0.021	0.020	0.027	0.023
	I	0.8 mi @ 98°	0.020	0.016	0.026	0.023
	J	0.9 mi @ 110°	0.021	0.019	0.027	0.025
	K	0.5 mi @ 132°	0.022	0.016	0.024	0.023
Airborne	C off-site	16.4 mi @ 42°	0.023	0.019	0.030	0.022
Particulate	D1	11.2 mi @ 80°	0.022	0.018	0.030	0.023
Filters	D2	9.0 mi @ 117°	0.023	0.018	0.029	0.024
(Gross Beta)	E	6.5 mi @ 166°	0.022	0.019	0.031	0.024
	F	7.7 mi @ 190°	0.022	0.019	0.031	0.024
	G	5.3 mi @ 225°	0.023	0.021	0.026	0.029

Results in units of pCi/m³.

ENVIRONMENTAL SAMPLE SUMMARY (1983)

<u>Medium/Sample</u>	<u>Location</u>	<u>Radionuclide</u>	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>
Air Particulate Filter Composite Isotopic	A-1(a) (off-site)	Be-7	101.5	114.1	129.3	102.9
		Ra-226	<4.81	<6.45	<8.94	<8.22
		K-40	<4.41	<4.00	<5.16	<6.35
		Cs-137	<0.29	<0.32	<0.38	<0.55
		Co-60	<0.40	<0.37	<0.48	<0.77
		Mn-54	<0.30	<0.27	<0.33	<0.49
		Ce-144	<1.22	<1.18	<1.70	<2.02
		Nb-95	<0.41	<0.34	<0.49	<0.71
		Ru-106	<2.50	<2.45	<3.17	<4.18
		Others	<LLD	<LLD	<LLD	<LLD
	B-2(b) (on-site)	Be-7	81.3	92.5	96.5	87.8
		Ra-226	<3.64	<3.32	<5.14	<5.27
		K-40	3.52	2.71	<4.22	<5.65
		Cs-137	<0.26	<0.25	<0.29	<0.38
		Co-60	<0.29	<0.36	<0.37	<0.90
		Mn-54	<0.22	<0.27	<0.30	<0.41
		Ce-144	<0.89	<0.94	<1.29	<1.36
		Nb-95	<0.31	<0.32	<0.37	<0.40
		Ru-106	<1.90	<1.82	<2.58	<3.12
		Others	<LLD	<LLD	<LLD	<LLD

Results in units of 10^{-3} pCi/m³

- (a) A-1 monthly composite comprised of stations: C off-site (16.4 mi. @ 42°), D1 off-site (11.2 mi @ 80°) and D2 off-site (9.0 mi. @ 117°).
- (b) B-2 monthly composite comprised of stations: H on-site (0.8 mi. @ 71°), I on-site (0.8 mi. @ 98°), J on-site (0.9 mi. @ 110°) and K on-site (0.5 mi. @ 132°).

ENVIRONMENTAL SAMPLE SUMMARY (1983) (cont.)

<u>Medium/Sample</u>	<u>Location</u>	<u>Radionuclide</u>	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>
Air Particulate Filter Composite Isotopic (cont.)	A-2(c) (off-site)	Be-7	103.8	110.6	131.3	109.9
		Ra-226	<4.76	<5.64	<5.92	<7.07
		K-40	<4.32	<4.21	<6.13	<5.02
		Cs-137	<0.31	<0.30	<0.38	<0.44
		Co-60	<0.34	<0.36	<0.44	<0.55
		Mn-54	<0.28	<0.23	<0.32	<0.44
		Ce-144	<1.25	<1.18	<1.54	<1.70
		Nb-95	<0.37	<0.38	<0.46	<0.63
		Ru-106	<2.35	<2.48	<2.73	<3.42
		Others	<LLD	<LLD	<LLD	<LLD
		Be-7	98.9	111.4	124.7	86.7
		Ra-226	<2.98	<3.91	<4.99	<5.22
		K-40	3.71	<3.43	<3.80	<4.67
		Cs-137	<0.25	<0.30	<0.28	<0.32
		Co-60	<0.26	<0.29	<0.28	<0.43
	B-1(d) (on-site)	Mn-54	<0.19	<0.20	<0.22	<0.34
		Ce-144	<0.86	<0.93	<1.16	<1.26
		Nb-95	<0.28	<0.31	<0.28	<0.44
		Ru-106	<1.86	<1.71	<2.04	<2.74
		Others	<LLD	<LLD	<LLD	<LLD

Results in units of 10^{-3} pCi/m³

- (c) A-2 monthly composite comprised of stations: E off-site (6.5 mi. @ 166°), F off-site (7.7 mi @ 190°) and G off-site (5.3 mi. @ 225°).
- (d) B-1 monthly composite comprised of stations: D1 on-site (0.2 mi. @ 69°), D2 on-site (0.4 mi. @ 140°), E on-site (0.4 mi @ 175°), F on-site (0.5 mi. @ 210°) and G on-site (0.7 mi. @ 250°).

ENVIRONMENTAL SAMPLE SUMMARY (1983)

<u>Medium/Sample</u>	<u>Location No.</u>	<u>Location</u>	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>
Airborne	D1 on-site	0.2 mi @ 69°	<0.016	<0.016	<0.016	<0.021
Charcoal	D2	0.4 mi @ 140°	<0.026	<0.024	<0.021	<0.031
Cartridges	E	0.4 mi @ 175°	<0.022	<0.019	<0.020	<0.023
(I-131)	F	0.5 mi @ 210°	<0.030	<0.022	<0.015	<0.018
	G	0.7 mi @ 250°	<0.024	<0.022	<0.018	<0.022
	H	0.8 mi @ 71°	<0.022	<0.022	<0.020	<0.024
	I	0.8 mi @ 98°	<0.017	<0.018	<0.017	<0.022
	J	0.9 mi @ 110°	<0.020	<0.024	<0.017	<0.021
	K	0.5 mi @ 132°	<0.021	<0.015	<0.015	<0.020
Airborne	C off-site	16.4 mi @ 42°	<0.019	<0.014	<0.015	<0.020
Charcoal	D1	11.2 mi @ 80°	<0.020	<0.016	<0.017	<0.018
Cartridges	D2	9.0 mi @ 117°	<0.018	<0.015	<0.015	<0.020
(I-131)	E	6.5 mi @ 166°	<0.020	<0.018	<0.016	<0.020
	F	7.7 mi @ 190°	<0.019	<0.016	<0.014	<0.019
	G	5.3 mi @ 225°	<0.017	<0.025	<0.016	<0.019

Results in units of pCi/m³.

ENVIRONMENTAL SAMPLE SUMMARY (1983)

<u>Medium/Sample</u>	<u>Location No.</u>	<u>Location</u>	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>
Direct Radiation Environmental TLD	3	0.2 mi @ 69°	38.58	32.36	20.42	53.3
	4	0.4 mi @ 140°	20.96	17.83	17.12	23.2
	5	0.4 mi @ 175°	17.10	18.36	16.31	20.6
	6	0.5 mi @ 210°	15.68	15.36	(1)	17.8
	7	0.7 mi @ 250°	16.58	17.55	15.94	20.2
	8	16.0 mi @ 42°	21.22	20.43	17.40	19.8
	9	11.4 mi @ 80°	18.03	15.90	13.96	17.6
	10	9.0 mi @ 117°	17.53	14.97	15.61	18.4
	11	7.2 mi @ 160°	16.16	16.74	16.07	17.1
	12	7.7 mi @ 190°	16.70	13.90	15.66	17.5
	13	5.3 mi @ 225°	17.08	16.53	15.27	18.6
	14	12.8 mi @ 225°	17.50	16.34	14.86	18.4
	15	0.9 mi @ 238°	15.72	16.23	13.27	15.5
	18	0.5 mi @ 268°	16.32	17.02	16.64	21.8
	19	1.3 mi @ 81°	17.66	20.41	15.47	17.9
	23	0.8 mi @ 71°	26.86	22.34	17.86	27.6
	24	0.8 mi @ 98°	19.73	19.27	(1)	20.1
	25	0.9 mi @ 110°	18.08	19.46	15.23	20.8
	26	0.5 mi @ 132°	18.89	20.15	15.23	19.2
	27	0.4 mi @ 60°	62.70	47.18	32.61	69.9
	28	0.5 mi @ 68°	140.84	123.22	79.22	170.6
	29	0.5 mi @ 57°	223.90	174.22	100.52	237.1
	30	0.4 mi @ 57°	47.95	41.45	27.72	60.6
	31	0.2 mi @ 290°	64.02	54.36	53.98	69.7
	39	0.1 mi @ 292°	173.74	37.88	38.84	52.5
	43	9.4 mi @ 88°	18.00	19.62	16.08	17.4
	44	12.6 mi @ 64°	18.48	17.92	16.20	19.1
	45	7.6 mi @ 130°	18.39	19.64	16.30	21.2
	46	7.9 mi @ 178°	17.21	17.65	15.36	19.2
	47	0.6 mi @ 69°	135.71	51.35	26.51	55.1
	48	0.8 mi @ 92°	23.81	20.26	(1)	23.9
	49	20.0 mi @ 165°	16.67	17.98	14.12	15.8
	50	0.7 mi @ 115°	(1)	19.38	14.58	18.0
	51	7.5 mi @ 233°	18.37	17.24	(1)	(1)

ENVIRONMENTAL SAMPLE SUMMARY (1983) (cont.)

<u>Medium/Sample</u>	<u>Location No.</u>	<u>Location</u>	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>
Direct Radiation	52	5.8 mi @ 227°	16.82	14.74	15.20	18.9
Environmental TLD	53	13.7 mi @ 183°	17.90	17.19	16.78	18.7
(continued)	54	9.3 mi @ 115°	15.65	16.76	14.40	16.1
	55	13.7 mi @ 75°	17.12	16.64	14.04	16.2
	56	5.4 mi @ 120°	18.03	18.46	15.60	20.2
	57	1.9 mi @ 145°	17.27	17.23	12.74	17.2
	58	3.2 mi @ 220°	16.18	18.52	15.54	19.5
	59	0.5 mi @ 95°	60.97	45.12	28.19	101.3
	60	21.0 mi @ 225°	20.17	18.54	15.62	15.6
	61	0.8 mi @ 83°	31.35	25.42	(1)	32.0
	65	7.8 mi @ 198°	17.18	16.35	15.04	16.0

Results in average mrem per quarter.

(1) TLD lost (vandalism)

ENVIRONMENTAL SAMPLE SUMMARY (1983)

<u>Medium/Sample</u>	<u>Location</u>	<u>Dose Rate</u>	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>
Continuous Radiation Monitors	C off-site 16.4 mi @ 42°	MIN	0.010	0.010	0.010	0.010
		MAX.	0.032	0.043	0.040	0.031
		AVE.	0.015	0.022	0.015	0.017
	D1 on-site 0.2 mi @ 69°		0.011	0.011	0.010	0.012
			0.057	0.036	0.024	0.057
			0.018	0.019	0.017	0.022
	D2 on-site 0.4 mi @ 140°		0.010	0.010	0.011	0.012
			0.063	0.030	0.023	0.050
			0.015	0.013	0.015	0.016
	E on-site 0.4 mi @ 175°		0.010	0.010	0.012	0.012
			0.097	0.032	0.028	0.052
			0.017	0.015	0.018	0.016
	F on-site 0.5 mi @ 210°		0.011	0.014	0.014	0.014
			0.035	0.069	0.041	0.047
			0.017	0.025	0.022	0.023
	G on-site 0.7 mi @ 250°		0.012	0.015	0.016	0.014
			0.053	0.044	0.042	0.046
			0.020	0.023	0.023	0.019
	H on-site 0.8 mi @ 71°		0.012	0.013	0.015	0.014
			0.075	0.042	0.107	0.075
			0.021	0.020	0.024	0.024
	I on-site 0.8 mi @ 98°		0.013	0.017	0.010	0.010
			0.064	0.057	0.032	0.031
			0.022	0.027	0.020	0.016

ENVIRONMENTAL SAMPLE SUMMARY (1983) (cont.)

<u>Medium/Sample</u>	<u>Location</u>	<u>Dose Rate</u>	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>
Continuous Radiation Monitors (cont.)	J on-site 0.9 mi @ 110°	MIN.	0.010	0.010	0.010	0.010
		MAX.	0.056	0.049	0.043	0.054
		AVE.	0.015	0.015	0.013	0.014
	K on-site 0.5 mi @ 132°		0.010	0.012	0.010	0.010
			0.040	0.032	0.031	0.038
			0.016	0.018	0.018	0.015

Results in units of mrem per hour.

ENVIRONMENTAL SAMPLE SUMMARY (1983)

<u>Medium/Sample</u>	<u>Location</u>	<u>Radionuclide</u>	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>
Milk	4 7.7 mi @ 113°	I-131	NS	<0.2	<0.3	<0.2
	40 - control 15.3 mi @ 220°	I-131	NS	<0.2	<0.2	<0.2
	14 9.8 mi @ 120°	I-131	NS	<0.2	*	*
	16 5.2 mi @ 190°	I-131	NS	<0.2	<0.2	<0.2
	5 7.2 mi @ 146°	I-131	NS	<0.2	<0.2	<0.3
	7 5.5 mi @ 107°	I-131	NS	<0.2	<0.2	<0.3
	45 8.0 mi @ 125°	I-131	NS	<0.2	<0.3	<0.2
	50 8.2 mi @ 95°	I-131	NS	<0.2	<0.2	<0.3
	55 9.0 mi @ 95°	I-131	NS	<0.3	<0.2	<0.3
	60 9.5 mi @ 90°	I-131	NS	<0.3	*	*

NS - Milk samples not collected during the first quarter (not the local grazing season)

* - Location discontinued for the remainder of 1983.

Results in units of pCi/liter.

ENVIRONMENTAL SAMPLE SUMMARY (1983)

<u>Medium/Sample</u>	<u>Location</u>	<u>Radionuclide</u>	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>
Milk	4 7.7 mi @ 113°	Sr-90	NS	2.6	2.5	2.8
		Cs-137		<4.6	<6.1	<4.9
		K-40		1350	1293	984
		Others		<LLD	<LLD	<LLD
	40 15.3 mi @ 220° (control)	Sr-90	NS	<3.0	3.0	1.9
		Cs-137		<4.3	<6.2	<6.1
		K-40		1350	1420	1184
		Others		<LLD	<LLD	<LLD
	14 9.8 mi @ 120°	Sr-90	NS	2.1	*	*
		Cs-137		<3.9	*	*
		K-40		1400	*	*
		Others		<LLD	*	*
	16 5.2 mi @ 190°	Sr-90	NS	4.8	4.5	3.0
		Cs-137		<5.2	<8.2	<5.9
		K-40		1400	1340	1266
		Others		<LLD	<LLD	<LLD
	5 7.2 mi @ 146°	Sr-90	NS	3.1	2.7	2.6
		Cs-137		<5.4	<7.3	<5.9
		K-40		1250	1343	1237
		Others		<LLD	<LLD	<LLD
	7 5.5 mi @ 107°	Sr-90	NS	3.4	3.1	2.3
		Cs-137		<4.6	<6.5	<5.2
		K-40		1300	1477	1370
		Others		<LLD	<LLD	<LLD
	45 8.0 mi @ 125°	Sr-90	NS	4.2	3.6	3.0
		Cs-137		<4.0	<5.1	<5.5
		K-40		1300	1240	1317
		Others		<LLD	<LLD	<LLD

NS - Milk samples not collected during the first quarter (not the local grazing season)

* - Location discontinued for the remainder of 1983.

Results in units of pCi/liter.

ENVIRONMENTAL SAMPLE SUMMARY (1983)

<u>Medium/Sample</u>	<u>Location</u>	<u>Radionuclide</u>	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>
Milk	50 8.2 mi @ 95°	Sr-90	NS	2.0	2.0	1.7
		Cs-137		<4.4	<5.4	<4.7
		K-40		1500	1323	1420
		Others		<LLD	<LLD	<LLD
	55 9.0 mi @ 95°	Sr-90	NS	3.1	3.9	3.1
		Cs-137		<4.2	<6.3	<5.9
		K-40		1400	1357	1135
		Others		<LLD	<LLD	<LLD
	60 9.5 mi @ 90°	Sr-90	NS	3.1	*	*
		Cs-137		<3.7		
		K-40		1400		
		Others		<LLD		

NS - Milk samples not collected during the first quarter (not the local grazing season)

* - Location discontinued for the remainder of 1983.

Results in units of pCi/liter.

ENVIRONMENTAL SAMPLE SUMMARY (1983)

<u>Medium/Sample</u>	<u>Location</u>	<u>Radionuclide</u>	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>
Beef	H - control 14.7 mi @ 225°	K-40 Cs-137 Others	NS	2.6 <0.014 <LLD	NS	NS
Beef	E 7.9 mi @ 120°	K-40 Cs-137 Others	NS	2.9 <0.017 <LLD	NS	NS
Beef	F 8.0 mi @ 215°	K-40 Cs-137 Others	NS	2.5 0.023, <LLD	NS	NS
Beef	G 3.3 mi @ 202°	K-40 Cs-137 Others	NS	2.3 <0.018 <LLD	NS	NS
Beef	H - control 14.7 mi @ 225°	K-40 Cs-137 Others	NS	NS	NS	3.2 <0.006 <LLD
Beef	I 1.8 mi @ 146°	K-40 Cs-137 Others	NS	NS	NS	2.9 <0.044 <LLD
Beef	J 2.8 mi @ 130°	K-40 Cs-137 Others	NS	NS	NS	2.4 0.014 <LLD
Beef	K 3.2 mi @ 115°	K-40 Cs-137 Others	NS	NS	NS	3.4 0.023 <LLD

NOTE: NS -Sample not collected during that quarter.
Results in units of pCi/g (wet).

ENVIRONMENTAL SAMPLE SUMMARY (1983)

<u>Medium/Sample</u>	<u>Location</u>	<u>Radionuclide</u>	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>
Eggs	D - control 12.6 mi @ 234°	K-40	NS	0.8	NS	1.0
		Cs-137		<0.019		<0.008
		Others		<LLD		<LLD
Eggs	A 3.7 mi @ 195°	K-40	NS	0.9	NS	1.1
		Cs-137		<0.016		<0.005
		Others		<LLD		<LLD
Eggs	B 2.3 mi @ 185°	K-40	NS	1.2	NS	1.1
		Cs-137		<0.024		<0.006
		Others		<LLD		<LLD
Eggs	C 2.3 mi @ 170°	K-40	NS	1.1	NS	1.1
		Cs-137		<0.016		<0.007
		Others		<LLD		<LLD

NOTE: NS - Sample not collected during that quarter.
Results in units of pCi/g (wet).

ENVIRONMENTAL SAMPLE SUMMARY (1983)

<u>Medium/Sample</u>	<u>Location</u>	<u>Radionuclide</u>	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>
Chicken	D- control 12.6 mi @ 234°	K-40	NS	1.7	NS	3.3
		Cs-137		<0.010		<0.007
		Others		<LLD		<LLD
Chicken	A 3.7 mi @ 195°	K-40	NS	2.9	NS	3.1
		Cs-137		<0.015		<0.009
		Others		<LLD		<LLD
Chicken	B 2.3 mi @ 185°	K-40	NS	2.8	NS	3.2
		Cs-137		<0.018		<0.007
		Others		<LLD		<LLD
Chicken	C 2.3 mi @ 170°	K-40	NS	2.8	NS	3.1
		Cs-137		0.018		<0.008
		Others		<LLD		<LLD

NOTE: NS -Sample not collected during that quarter.
Results in units of pCi/g (wet).

ENVIRONMENTAL SAMPLE SUMMARY (1983)

<u>Medium/Sample</u>	<u>Location</u>	<u>Radionuclide</u>	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>
Cabbage (leafy)	M-control 15.2 mi @ 222°	K-40	NS	NS	2.9	NS
		Be-7			<0.09	
		I-131			<0.01	
		Cs-137			<0.013	
		Others			<LLD	
Swiss Chard (leafy)	I 1.8 mi @ 146°	K-40	NS	NS	3.7	NS
		Be-7			<0.08	
		I-131			<0.01	
		Cs-137			<0.010	
		Others			<LLD	
Swiss Chard (leafy)	L 1.7 mi @ 162°	K-40	NS	NS	4.6	NS
		Be-7			<0.13	
		I-131			<0.02	
		Cs-137			<0.016	
		Others			<LLD	
Cabbage (leafy)	N 2.0 mi @ 110°	K-40	NS	NS	1.8	NS
		Be-7			<0.09	
		I-131			<0.01	
		Cs-137			<0.013	
		Others			<LLD	
Zucchini	M - control 15.2 mi @ 222°	K-40	NS	NS	1.2	NS
		Be-7			<0.06	
		I-131			<0.01	
		Cs-137			<0.007	
		Others			<LLD	
Tomatoes	I 1.8 mi @ 146°	K-40	NS	NS	2.3	NS
		Be-7			<0.04	
		I-131			<0.01	
		Cs-137			<0.006	
		Others			<LLD	

ENVIRONMENTAL SAMPLE SUMMARY (1983) (cont.)

<u>Medium/Sample</u>	<u>Location</u>	<u>Radionuclide</u>	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>
Cucumbers	L 1.7 mi @ 162°	K-40	NS	NS	1.6	NS
		Be-7			<0.05	
		I-131			<0.01	
		Cs-137			<0.010	
		Others			<LLD	
Squash	N 2.0 mi @ 110°	K-40	NS	NS	1.6	NS
		Be-7			<0.11	
		I-131			<0.02	
		Cs-137			<0.014	
		Others			<LLD	

NOTE: NS - Sample not collected during that quarter.
Results in units of pCi/g (wet).

DATA TABLES - 1983

TABLE I

SAMPLE COLLECTION AND ANALYSIS

SITE RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

A. AQUATIC PROGRAM

<u>MEDIA</u>	<u>ANALYSIS</u>	<u>FREQUENCY</u>	<u>LOCATIONS (1)</u>	
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 ANALYSISSITE RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAMB. TERRESTRIAL PROGRAM

<u>MEDIA</u>	<u>ANALYSIS</u>	<u>FREQUENCY</u>	<u>NO. OF LOCATIONS</u>	<u>LOCATIONS</u>
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-131 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 3
CONCENTRATIONS OF GAMMA EMITTERS IN CLADOPHORA SAMPLES - 1983

Results in units of pCi/g (wet) \pm 2 sigma

Collection Site	Nuclides Found	June 1983	August 1983
Nine Mile Point	Be-7	0.57 \pm 0.14	0.65 \pm 0.07
	K-40	6.07 \pm 0.61	2.08 \pm 0.21
	Mn-54	0.02 \pm 0.01	0.02 \pm 0.01
	Co-58	<0.02	<0.01
	Fe-59	<0.04	<0.02
	Co-60	0.09 \pm 0.01	0.09 \pm 0.01
	Zn-65	<0.03	<0.01
	Zr-95	<0.02	<0.01
	Ru-103	<0.02	<0.01
	Cs-134	<0.01	<0.01
	Cs-137	0.06 \pm 0.01	0.04 \pm 0.01
	Ce-141	<0.04	<0.02
	Ce-144	<0.09	<0.04
	Ra-226	<0.2	<0.10
	Th-228	0.05 \pm 0.01	0.02 \pm 0.01
	Others	<LLD	<LLD
J. A. FitzPatrick	Be-7	0.67 \pm 0.07	0.58 \pm 0.11
	K-40	3.52 \pm 0.35	2.98 \pm 0.30
	Mn-54	0.013 \pm 0.005	0.04 \pm 0.01
	Co-58	<0.01	<0.01
	Fe-59	<0.02	<0.03
	Co-60	0.08 \pm 0.01	0.11 \pm 0.01
	Zn-65	<0.01	<0.02
	Zr-95	<0.01	<0.01
	Ru-103	<0.01	<0.01
	Cs-134	<0.01	<0.01
	Cs-137	0.04 \pm 0.01	0.031 \pm 0.004
	Ce-141	<0.02	<0.03
	Ce-144	<0.04	<0.06
	Ra-226	<0.1	<0.14
	Th-228	<0.01	<0.01
	Others	<LLD	<LLD

TABLE 3 (cont.)

CONCENTRATIONS OF GAMMA EMITTERS IN CLADOPHORA SAMPLES - 1983

Results in units of pCi/g (wet) \pm 2 sigma

Collection Site	Nuclides Found	June 1983	August 1983
Oswego	Be-7	0.52+0.16	0.37+0.09
	K-40	6.00+0.60	3.12+0.31
	Mn-54	<0.01	<0.01
	Co-58	<0.02	<0.01
	Fe-59	<0.05	<0.03
	Co-60	<0.01	<0.01
	Zn-65	<0.03	<0.02
	Zr-95	<0.02	<0.01
	Ru-103	<0.03	<0.01
	Cs-134	<0.01	<0.01
	Cs-137	0.03+0.01	<0.01
	Ce-141	<0.06	<0.02
	Ce-144	<0.1	<0.04
	Ra-226	<0.3	<0.11
	Th-228	<0.03	<0.01
	Others	<LLD	<LLD

TABLE 4

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

Results in units of pCi/g (dry) \pm 2 sigma

Sample Location	Collection Date	Sr-90	Be-7	K-40	Co-60	Cs-134	Cs-137	Ra-226	Th-228	Others
NINE MILE POINT	3/10/83*	(2)	<0.35	9.7 \pm 1.0	<0.07	<0.03	0.16 \pm 0.04	0.21 \pm 0.06	0.31 \pm 0.09(1)	<LLD
	5/20/83	<0.002	<0.05	15.2 \pm 1.5	0.14 \pm 0.02	<0.02	0.85 \pm 0.08	1.02 \pm 0.27	0.55 \pm 0.06	<LLD
	11/22/83	0.022 \pm 0.002	<0.68	13.0 \pm 1.3	0.36 \pm 0.05	0.09 \pm 0.04	1.81 \pm 0.18	<0.92	0.38 \pm 0.05	<LLD
LANGS BEACH CONTROL	3/10/83*	<0.008	<0.40	12.0 \pm 1.2	<0.06	<0.05	<0.05	0.33 \pm 0.08	0.31 \pm 0.10(1)	<LLD
	5/20/83	<0.001	<0.50	15.3 \pm 1.5	<0.02	<0.02	<0.02	1.21 \pm 0.32	0.62 \pm 0.06	<LLD
	11/22/83	<0.002	<0.69	14.1 \pm 1.4	<0.05	<0.06	<0.05	1.21 \pm 0.69	0.60 \pm 0.06	<LLD

*Not Environmental Technical Specification samples. Extra samples for evaluation purposes.

(1) Result for Th-232

(2) Sample lost during laboratory analysis.

TABLE 5A
CONCENTRATIONS OF STRONTIUM-89 & 90 AND GAMMA EMITTERS IN FISH SAMPLES
Results in Units of pCi/g (wet) \pm 2 sigma

Sample Date	Sample Type	Sr-89	Sr-90	K-40	GAMMA EMITTERS			Co-60	Zn-65	Cs-134	Cs-137	Others
					Hn-54	Co-58	Fe-59					
FITZPATRICK												
May 1983	Brown Trout	<0.084	<0.003	3.1±0.3	<0.017	<0.027	<0.092	<0.020	<0.049	<0.015	0.042±0.013	<LLD
	Lake Trout #1	<0.033	<0.002	3.1±0.3	<0.016	<0.027	<0.084	<0.019	<0.045	<0.013	0.038±0.015	<LLD
	Lake Trout #2	<0.095	<0.003	3.8±0.4	<0.022	<0.034	<0.100	<0.030	<0.050	<0.018	0.051±0.014	<LLD
October 1983	Brown Trout	<0.002	<0.001	3.7±0.4	<0.005	<0.007	<0.018	<0.005	<0.013	<0.005	0.050±0.006	<LLD
	Lake Trout #1	<0.003	<0.001	3.2±0.3	<0.006	<0.007	<0.022	<0.007	<0.015	<0.006	0.055±0.007	<LLD
	Lake Trout #2	<0.002	<0.001	2.7±0.3	<0.007	<0.008	<0.020	<0.008	<0.014	<0.007	0.039±0.008	<LLD
NINE MILE POINT												
May 1983	Brown Trout	<0.099	<0.003	3.2±0.3	<0.020	<0.035	<0.100	<0.019	<0.047	<0.019	0.046±0.015	<LLD
	Lake Trout #1	<0.052	<0.002	3.3±0.3	<0.018	<0.030	<0.089	<0.025	<0.041	<0.015	0.056±0.011	<LLD
	Lake Trout #2	<0.066	<0.003	2.9±0.3	<0.014	<0.024	<0.083	<0.018	<0.042	<0.013	0.033±0.010	<LLD
October 1983	Brown Trout	*	*	3.9±0.4	<0.006	<0.007	<0.019	<0.006	<0.014	<0.005	0.041±0.006	<LLD
	Lake Trout #1	<0.002	<0.001	3.0±0.3	<0.006	<0.006	<0.016	<0.006	<0.015	<0.006	0.038±0.007	<LLD
	Lake Trout #2	<0.001	<0.001	3.3±0.3	<0.009	<0.010	<0.025	<0.009	<0.022	<0.010	0.047±0.009	<LLD
OSWEGO (CONTROL)												
May 1983	Brown Trout	<0.027	<0.001	3.1±0.3	<0.016	<0.026	<0.083	<0.021	<0.040	<0.014	0.046±0.010	<LLD
	Lake Trout #1	<0.031	<0.002	3.0±0.3	<0.018	<0.029	<0.073	<0.016	<0.044	<0.016	0.057±0.015	<LLD
	Lake Trout #2	<0.033	<0.002	3.0±0.3	<0.013	<0.019	<0.060	<0.016	<0.035	<0.012	0.049±0.010	<LLD
October 1983	Brown Trout	<0.006	<0.002	3.8±0.4	<0.007	<0.009	<0.025	<0.007	<0.017	<0.007	0.057±0.007	<LLD
	Lake Trout #1	<0.004	<0.002	2.8±0.3	<0.007	<0.008	<0.023	<0.007	<0.017	<0.007	0.041±0.006	<LLD
	Lake Trout #2	<0.004	<0.002	3.1±0.3	<0.008	<0.010	<0.029	<0.008	<0.020	<0.009	0.044±0.008	<LLD

*Sample lost during analysis.

Sr-89 results are corrected for decay to sample stop date.

TABLE 5B

CONCENTRATIONS OF STRONTIUM-89 & 90 AND GAMMA EMITTERS IN FISH SAMPLES
Results in Units of pCi/kg (dry) \pm 2 sigma

Sample Date	Sample Type	Sr-89*	Sr-90	K-40	GAMMA EMITTERS		Co-60	Cs-134 \ Cs-137	Others	
					Mn-54					
OSWEGO (CONTROL) 00										
May 1983	Brown Trout	<79.6	<3.2	9,145+914	<47.2		<62.0	<41.3	135.7+29.5	<LLD
	Lake Trout #1	<85.6	<4.7	8,280+828	<49.7		<44.2	<44.2	157.3+41.4	<LLD
	Lake Trout #2	<92.1	<5.3	8,370+837	<36.3		<44.6	<33.5	136.7+27.9	<LLD
October 1983	Brown Trout	<18.2	<5.4	12,096+1,216	<22.4		<21.1	<23.0	182.4+22.4	<LLD
	Lake Trout #1	<11.4	<5.7	8,490+840	<19.5		<19.8	<20.1	122.1+18.6	<LLD
	Lake Trout #2	<12.9	<7.2	9,180+930	<24.3		<23.7	<26.4	133.2+23.4	<LLD
NINE MILE POINT 02										
May 1983	Brown Trout	<273.2	<7.4	8,832+883	<55.2		<52.4	<52.4	127.0+41.4	<LLD
	Lake Trout #1	<158.1	<6.4	10,032+1,003	<54.7		<76.0	<45.6	170.2+33.4	<LLD
	Lake Trout #2	<225.7	<9.9	9,918+992	<47.9		<61.6	<44.5	112.9+34.2	<LLD
October 1983	Brown Trout	*	*	12,576+1,248	<17.9		<18.2	<17.3	130.6+18.2	<LLD
	Lake Trout #1	<6.0	<2.4	9,030+900	<16.8		<18.0	<18.0	112.8+21.3	<LLD
	Lake Trout #2	<0.5	<2.2	9,780+990	<26.7		<28.2	<29.7	141.6+26.7	<LLD
J. A. FITZPATRICK 03										
May 1983	Brown Trout	<252.8	<8.4	9,331+933	<51.2		<60.2	<45.2	126.4+39.1	<LLD
	Lake Trout #1	<91.4	<4.7	8,587+859	<44.3		<52.6	<36.0	105.3+41.6	<LLD
	Lake Trout #2	<261.2	<6.9	10,450+1,045	<60.5		<82.5	<49.5	140.2+38.5	<LLD
October 1983	Brown Trout	<6.1	<2.2	11,680+1,184	<16.0		<16.6	<16.6	160.0+18.0	<LLD
	Lake Trout #1	<8.1	<3.6	9,630+960	<18.3		<19.8	<19.2	165.9+21.6	<LLD
	Lake Trout #2	<6.6	<2.3	7,950+810	<19.8		<23.7	<21.6	117.3+24.9	<LLD

Sr-89 results are corrected for decay to sample stop date.

*Sample lost during analysis for Strontium 89 and Strontium 90.

TABLE 6
CONCENTRATIONS OF BETA EMITTERS IN LAKE WATER SAMPLES - 1983
Results in Units of pCi/l \pm 2 sigma

Station code	January	February	March	April	May	June
JAF Inlet	0.6 \pm 0.5	1.8 \pm 0.6	2.6 \pm 0.7	2.7 \pm 0.6	2.9 \pm 0.7	3.1 \pm 1.3
NMP Inlet	0.6 \pm 0.5	2.5 \pm 0.7	2.5 \pm 0.6	0.6 \pm 0.4	2.9 \pm 0.7	7.9 \pm 1.7
Raw City Water (control)	0.8 \pm 0.6	2.1 \pm 0.6	1.8 \pm 0.6	1.5 \pm 0.5	2.6 \pm 0.7	2.3 \pm 1.2
Station code	July	August	September	October	November	December
JAF Inlet	2.2 \pm 1.2	3.2 \pm 0.5	4.2 \pm 1.9	<2.6	3.1 \pm 1.8	<2.0
NMP Inlet	3.5 \pm 1.3	2.9 \pm 1.2	3.0 \pm 1.8	<2.6	3.3 \pm 1.8	3.5 \pm 1.7
Raw City Water (control)	2.4 \pm 1.2	2.6 \pm 1.2	3.5 \pm 1.8	2.7 \pm 1.8	3.3 \pm 1.9	<2.0

TABLE 7

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

Results in Units of pCi/l \pm 2 sigma

STATION CODE	PERIOD	DATE	TRITIUM	SR-89	SR-90
JAF INLET	First Quarter	1/3/83 - 3/31/83	249 \pm 130	<0.6	0.8 \pm 0.3
	Second Quarter	3/31/83 - 6/30/83	260 \pm 140	<2.0	1.0 \pm 0.5
	Third Quarter	6/30/83 - 9/30/83	560 \pm 80	<2.0	0.6 \pm 0.3
	Fourth Quarter	9/30/83 - 1/4/84	320 \pm 70	<1.4	0.6 \pm 0.3
NMP INLET	First Quarter	12/30/82- 3/31/83	260 \pm 130	<1.1	1.0 \pm 0.4
	Second Quarter	3/31/83 - 6/30/83	410 \pm 140	<2.0	0.7 \pm 0.4
	Third Quarter	6/30/83 - 9/30/83	290 \pm 90	<1.0	<0.7
	Fourth Quarter	9/30/83 - 12/28/83	190 \pm 90	<1.6	1.1 \pm 0.4
RAW CITY WATER (CONTROL)	First Quarter	12/30/82- 3/31/83	239 \pm 130	<0.8	1.0 \pm 0.3
	Second Quarter	3/31/83 - 6/30/83	230 \pm 140	<2.0	<0.9
	Third Quarter	6/30/83 - 9/30/83	280 \pm 70	<2.0	0.9 \pm 0.4
	Fourth Quarter	9/30/83 - 12/28/83	250 \pm 80	<1.4	0.8 \pm 0.4

TABLE 8

CONCENTRATIONS OF GAMMA EMITTERS IN LAKE WATER SAMPLES - 1983

Results in Units of pCi/l \pm 2 sigma

Station Code	Nuclide	January	February	March	April	May	June
OSWEGO CITY WATER (00, CONTROL)	Ce-144	<5.46	<5.33	<5.40	<4.93	<5.08	<5.40
	Cs-134	<0.97	<0.99	<1.15	<0.97	<0.85	<0.99
	Cs-137	<1.18	<1.10	<1.45	<1.15	<0.90	<0.94
	Zr-95	<3.03	<3.21	<4.03	<3.30	<3.18	<4.54
	Nb-95	<1.97	<2.03	<1.97	<1.90	<2.05	<3.35
	Co-58	<1.30	<1.54	<1.72	<1.33	<1.46	<1.68
	Mn-54	<1.01	<1.22	<1.30	<1.11	<1.07	<0.88
	Fe-59	<2.52	<1.98	<2.32	<2.39	<1.56	<1.51
	Co-60	<1.58	<1.52	<1.75	<1.45	<1.02	<1.09
	K-40	<13.3	<17.1	<15.5	<11.7	<12.9	13.2 \pm 7.3
NINE MILE POINT (02, INLET)	Ce-144	<5.15	<5.15	<6.02	<5.88	<4.73	<5.36
	Cs-134	<1.10	<0.90	<1.05	<1.07	<0.94	<1.06
	Cs-137	<1.23	<1.10	<1.27	<1.22	<0.96	<1.10
	Zr-95	<3.18	<3.84	<4.15	<3.51	<3.24	<4.34
	Nb-95	<1.94	<1.91	<2.23	<1.83	<2.37	<4.27
	Co-58	<1.29	<1.75	<1.62	<1.42	<1.43	<1.80
	Mn-54	<1.35	<1.19	<1.23	<1.26	<1.16	<1.26
	Fe-59	<2.43	<2.05	<2.21	<1.93	<1.86	<2.32
	Co-60	<1.64	<1.48	<1.67	<1.39	<1.14	<1.32
	K-40	<16.4	<15.0	<14.0	16.5 \pm 8.7	<12.6	6.7 \pm 6.2
FITZPATRICK (03, INLET)	Ce-144	<5.39	<5.15	<5.47	<5.12	<5.39	<5.03
	Cs-134	<1.05	<1.17	<1.18	<1.01	<1.03	<0.90
	Cs-137	<1.11	<1.28	<1.34	<1.12	<1.08	<0.88
	Zr-95	<2.93	<3.36	<3.34	<3.23	<2.86	<2.94
	Nb-95	<1.68	<2.36	<2.00	<1.27	<2.11	<1.98
	Co-58	<1.02	<1.36	<1.35	<1.19	<1.33	<1.38
	Mn-54	<1.22	<1.09	<1.12	<1.09	<1.01	<1.23
	Fe-59	<1.74	<2.32	<2.00	<2.49	<1.86	<1.75
	Co-60	<1.25	<1.29	<1.46	<1.08	<1.33	<1.14
	K-40	<18.2	<14.5	<13.5	<12.3	<11.3	<15.8

TABLE 8 (Cont'd)
CONCENTRATIONS OF GAMMA EMITTERS IN LAKE WATER SAMPLES - 1983

Results in Units of pCi/l \pm 2 sigma

Station Code	Nuclide	July	August	September	October	November	December
OSWEGO CITY WATER (00, CONTROL)	Ce-144	<5.66	<4.79	<5.22	<4.39	<6.34	<5.65
	Cs-134	<1.05	<0.88	<1.09	<0.84	<1.53	<0.94
	Cs-137	<1.11	<1.32	<1.08	<0.88	<1.62	<1.08
	Zr-95	<3.08	<2.97	<3.80	<3.28	<4.51	<2.96
	Nb-95	<1.75	<1.51	<1.79	<1.53	<2.47	<2.13
	Co-58	<1.40	<1.17	<1.34	<1.49	<1.88	<1.15
	Mn-54	<1.03	<1.03	<1.02	<0.99	<1.72	<1.15
	Fe-59	<1.74	<1.90	<2.11	<2.16	<3.11	<2.02
	Co-60	<1.20	<1.52	<1.16	<1.12	<1.95	<1.27
	K-40	<14.0	<10.7	<16.0	<10.9	<20.6	<13.6
NINE MILE POINT (02, INLET)	Ce-144	<4.50	<5.79	<5.41	<6.55	<5.99	<5.18
	Cs-134	<0.95	<1.11	<0.94	<1.43	<1.08	<0.95
	Cs-137	<1.14	<1.06	<1.03	<1.32	<1.30	<0.96
	Zr-95	<3.09	<4.02	<3.70	<5.05	<3.82	<3.51
	Nb-95	<1.65	<2.47	<1.67	<3.63	<2.23	<1.71
	Co-58	<1.18	<1.81	<1.44	<2.35	<1.70	<1.45
	Mn-54	<1.18	<1.10	<1.18	<1.47	<1.31	<0.93
	Fe-59	<1.95	<2.27	<1.99	<3.03	<2.91	<2.40
	Co-60	<1.56	<1.32	<1.42	<1.26	<1.76	<1.02
	K-40	<12.9	<11.7	13.6 \pm 7.8	<21.2	<18.8	<12.8
FITZPATRICK (03, INLET)	Ce-144	<4.79	<5.56	<4.77	<6.70	<6.08	<5.37
	Cs-134	<0.86	<1.18	<1.06	<1.40	<1.16	<1.10
	Cs-137	<1.01	<1.22	<1.03	<1.36	<1.22	<1.00
	Zr-95	<2.88	<4.11	<3.96	<4.73	<3.36	<2.70
	Nb-95	<1.83	<2.59	<2.70	<3.33	<1.99	<2.02
	Co-58	<1.30	<2.04	<1.52	<1.89	<1.54	<1.16
	Mn-54	<1.06	<1.40	<1.20	<1.30	<1.38	<1.09
	Fe-59	<2.03	<2.51	<1.73	<2.87	<3.09	<1.72
	Co-60	<1.05	<1.52	<1.28	<1.57	<2.00	<1.20
	K-40	<10.7	<17.9	<14.6	<14.4	<20.4	9.6 \pm 6.4

TABLE 9
 NRP/JAF SITE
 ENVIRONMENTAL AIRBORNE PARTICULATE SAMPLES - OFF SITE STATIONS
 GROSS BETA ACTIVITY $\mu\text{Ci}/\text{m}^3 \pm 2 \text{ Sigma}$

WEEK END DATE	C--OFF	D1-OFF	D2-OFF	E--OFF	F--OFF	G--OFF
83/01/11	0.022+0.003	0.022+0.004	0.022+0.003	0.024+0.004	0.019+0.003	0.024+0.004
83/01/19	0.019+0.003	0.021+0.003	0.022+0.003	0.020+0.003	0.018+0.003	0.019+0.003
83/01/25	0.021+0.004	0.021+0.004	0.020+0.003	0.017+0.003	0.018+0.003	0.021+0.004
83/02/01	0.028+0.004	0.021+0.003	0.026+0.004	0.025+0.004	0.024+0.004	0.023+0.004
83/02/08	0.015+0.003	0.016+0.003	0.019+0.003	0.018+0.003	0.017+0.003	0.020+0.003
83/02/15	0.025+0.004	0.024+0.004	0.027+0.004	0.025+0.004	0.028+0.004	0.025+0.004
83/02/23	0.040+0.004	0.040+0.004	0.041+0.004	0.035+0.004	0.040+0.004	0.040+0.004
83/03/01	0.024+0.004	0.022+0.004	0.025+0.004	0.021+0.004	0.026+0.004	0.022+0.004
83/03/08	0.022+0.004	0.019+0.003	0.020+0.003	0.022+0.004	0.023+0.004	0.021+0.003
83/03/15	0.014+0.003	0.016+0.003	0.019+0.003	0.018+0.003	0.017+0.003	0.019+0.003
83/03/22	0.015+0.003	0.017+0.003	0.016+0.003	0.014+0.003	0.011+0.003	0.014+0.003
83/03/29	0.028+0.004	0.021+0.003	0.026+0.004	0.025+0.004	0.024+0.003	0.023+0.003
83/04/05	0.023+0.004	0.022+0.004	0.020+0.003	0.018+0.003	0.021+0.003	0.022+0.003
83/04/12	0.007+0.002	0.010+0.003	0.007+0.002	0.011+0.003	0.010+0.002	0.011+0.003
83/04/19	0.012+0.003	0.015+0.003	0.015+0.003	0.013+0.003	0.011+0.003	0.013+0.003
83/04/26	0.010+0.003	0.009+0.003	0.010+0.003	0.011+0.003	0.013+0.003	0.012+0.003
83/05/03	0.026+0.004	0.020+0.003	0.019+0.003	0.021+0.004	0.021+0.003	0.018+0.003
83/05/11	0.018+0.003	0.019+0.003	0.018+0.003	0.024+0.004	0.025+0.003	0.019+0.003
83/05/17	0.014+0.003	0.013+0.003	0.013+0.003	0.015+0.003	0.018+0.003	0.011+0.003
83/05/24	0.019+0.003	0.018+0.003	0.019+0.003	0.020+0.004	0.016+0.003	0.019+0.003
83/06/01	0.012+0.002	0.010+0.002	0.011+0.002	0.013+0.002	0.010+0.002	0.012+0.002
83/06/07	0.014+0.003	0.012+0.003	0.014+0.003	0.011+0.003	0.015+0.003	0.012+0.003
83/06/14	0.033+0.004	0.033+0.004	0.031+0.003	0.030+0.004	0.032+0.003	0.030+0.003
83/06/21	0.039+0.004	0.033+0.003	0.032+0.003	0.034+0.004	0.034+0.003	0.056+0.013
83/06/28	0.025+0.003	0.023+0.003	0.025+0.003	0.026+0.003	0.022+0.003	0.040+0.005
83/07/06	0.019+0.002	0.020+0.003	0.021+0.003	0.020+0.003	0.018+0.003	0.022+0.003
83/07/12	0.018+0.003	0.025+0.004	0.022+0.003	0.025+0.004	0.033+0.004	0.021+0.003
83/07/22	0.036+0.004	0.034+0.004	0.032+0.004	0.030+0.004	0.030+0.004	0.022+0.003
83/07/27	0.025+0.003	0.028+0.004	0.028+0.003	0.030+0.003	0.030+0.003	0.027+0.003
83/08/02	0.028+0.004	0.028+0.004	0.022+0.003	0.026+0.004	0.027+0.004	0.024+0.003
83/08/09	0.025+0.003	0.023+0.003	0.025+0.003	0.024+0.003	0.024+0.003	0.026+0.003
83/08/16	0.019+0.003	0.017+0.003	0.017+0.003	0.020+0.003	0.024+0.003	0.018+0.003
83/08/23	0.037+0.004	0.035+0.004	0.037+0.004	0.032+0.004	0.035+0.004	0.034+0.004
83/08/31	0.041+0.004	0.031+0.004	0.037+0.003	0.045+0.004	0.038+0.003	0.035+0.003
83/09/07	0.041+0.004	0.042+0.005	0.039+0.004	0.043+0.004	0.048+0.004	0.044+0.004
83/09/13	0.030+0.004	0.034+0.004	0.030+0.004	0.029+0.004	0.027+0.004	0.010+0.003
83/09/20	0.028+0.003	0.024+0.003	0.020+0.003	0.026+0.003	0.026+0.003	0.020+0.003
83/09/27	0.025+0.003	0.032+0.004	0.029+0.003	0.029+0.003	0.026+0.003	0.032+0.004
83/10/04	0.036+0.004	0.033+0.004	0.037+0.004	0.040+0.004	0.036+0.004	0.031+0.004
83/10/13	0.022+0.003	0.021+0.003	0.022+0.003	0.022+0.003	0.023+0.003	0.029+0.004
83/10/18	0.013+0.003	0.014+0.003	0.021+0.004	0.023+0.004	0.021+0.004	0.016+0.004
83/10/25	0.022+0.003	0.019+0.003	0.021+0.003	0.017+0.003	0.021+0.003	0.016+0.003
83/11/01	0.017+0.003	0.017+0.003	0.019+0.003	0.020+0.003	0.021+0.003	0.020+0.003
83/11/08	0.018+0.003	0.017+0.003	0.016+0.003	0.020+0.003	0.018+0.003	0.022+0.003
83/11/15	0.033+0.004	0.031+0.004	0.033+0.004	0.032+0.004	0.031+0.004	0.038+0.004
83/11/22	0.019+0.001	0.021+0.001	0.019+0.001	0.021+0.001	0.022+0.001	0.024+0.001
83/11/29	0.018+0.003	0.023+0.003	0.022+0.003	0.021+0.003	0.024+0.003	0.024+0.003
83/12/06	0.021+0.003	0.022+0.003	0.020+0.003	0.019+0.003	0.019+0.003	0.018+0.003
83/12/13	0.026+0.003	0.025+0.003	0.028+0.003	0.028+0.003	0.026+0.003	0.025+0.003
83/12/20	0.021+0.001	0.023+0.001	0.023+0.001	0.022+0.001	0.026+0.001	0.023+0.001
83/12/28	0.029+0.001	0.031+0.001	0.033+0.002	0.032+0.002	0.031+0.002	0.030+0.002
84/01/04	0.032+0.002	0.033+0.002	0.034+0.002	0.036+0.002	0.034+0.002	0.085+0.002



T- 10
NR. SITE
ENVIRONMENTAL AIRBORNE PARTICULATE SAMPLES - ON SITE STATIONS
GROSS BETA ACTIVITY pCi/m³ ± 2 Sigma

WEEK END DATE	LOCATION								
	D1-ON	D2-ON	E--ON	F--ON	G--ON	H--ON	I--ON	J--ON	K--ON
83/01/10	0.022+0.003	0.027+0.004	0.021+0.004	0.021+0.004	0.024+0.005	0.020+0.003	0.023+0.003	0.023+0.003	0.022+0.003
83/01/17	0.015+0.003	0.016+0.003	0.018+0.003	0.021+0.004	0.017+0.004	0.016+0.003	0.018+0.003	0.021+0.003	0.013+0.003
83/01/24	0.021+0.003	0.027+0.007	0.023+0.004	0.024+0.005	0.023+0.005	0.021+0.004	0.021+0.003	0.018+0.003	0.021+0.003
83/01/31	0.021+0.003	0.024+0.004	0.025+0.004	0.024+0.005	0.023+0.005	0.027+0.004	0.023+0.003	0.026+0.005	0.017+0.003
83/02/07	0.017+0.003	0.019+0.004	0.020+0.004	0.022+0.005	0.018+0.004	0.026+0.004	0.015+0.003	0.016+0.003	0.018+0.003
83/02/14	0.020+0.003	0.028+0.005	0.023+0.004	0.020+0.005	0.022+0.005	0.021+0.004	0.019+0.003	0.023+0.003	0.021+0.004
83/02/22	0.031+0.003	0.039+0.005	0.041+0.005	0.044+0.006	0.040+0.004	0.027+0.003	0.028+0.003	0.024+0.003	0.058+0.007
83/02/28	0.024+0.004	0.023+0.005	0.029+0.005	0.028+0.006	0.020+0.004	0.021+0.004	0.021+0.004	0.018+0.004	0.022+0.004
83/03/07	0.024+0.003	0.026+0.005	0.023+0.004	0.024+0.005	0.024+0.004	0.022+0.004	0.017+0.003	0.024+0.004	0.024+0.005
83/03/14	0.014+0.003	0.014+0.003	0.014+0.003	0.013+0.004	0.013+0.003	0.013+0.003	0.014+0.003	0.013+0.003	0.013+0.003
83/03/21	0.015+0.003	0.021+0.004	0.018+0.004	0.015+0.005	0.015+0.003	0.017+0.003	0.014+0.003	0.014+0.003	0.011+0.003
83/03/28	0.023+0.004	0.027+0.004	0.029+0.004	0.032+0.005	0.027+0.004	0.025+0.004	0.024+0.003	0.027+0.003	0.026+0.004
83/04/04	0.025+0.004	0.023+0.004	0.020+0.004	0.026+0.005	0.022+0.004	0.020+0.003	0.020+0.003	0.026+0.003	0.021+0.003
83/04/11	0.015+0.003	0.012+0.003	0.011+0.003	0.008+0.003	0.011+0.003	0.015+0.003	0.007+0.002	0.007+0.002	0.009+0.002
83/04/18	0.010+0.003	0.013+0.004	0.014+0.003	0.015+0.004	0.015+0.004	0.010+0.003	0.014+0.003	0.025+0.009	0.011+0.003
83/04/25	0.015+0.003	0.018+0.004	0.013+0.003	0.015+0.004	0.012+0.003	0.016+0.003	0.014+0.003	0.015+0.003	0.014+0.003
83/05/02	0.020+0.003	0.019+0.004	0.021+0.004	0.019+0.004	0.019+0.004	0.023+0.004	0.020+0.003	0.016+0.004	0.018+0.003
83/05/09	0.019+0.003	0.016+0.004	0.018+0.003	0.014+0.002	0.017+0.004	0.025+0.004	0.016+0.003	0.016+0.003	0.014+0.003
83/05/16	0.013+0.003	0.016+0.004	0.015+0.004	0.012+0.003	0.012+0.004	0.011+0.003	0.012+0.003	0.013+0.003	0.012+0.003
83/05/23	0.024+0.004	0.022+0.004	0.022+0.004	0.016+0.004	0.023+0.005	0.023+0.004	0.019+0.003	0.017+0.003	0.018+0.003
83/05/31	0.014+0.002	0.013+0.003	0.012+0.002	0.014+0.003	0.011+0.003	0.016+0.003	0.013+0.002	0.012+0.002	0.010+0.002
83/06/06	0.014+0.003	0.016+0.004	0.016+0.003	0.015+0.003	0.013+0.003	0.019+0.003	0.014+0.003	0.013+0.002	0.011+0.002
83/06/13	0.025+0.003	0.025+0.004	0.026+0.003	0.028+0.004	0.028+0.004	0.027+0.003	0.025+0.003	0.021+0.003	0.022+0.003
83/06/20	0.039+0.004	0.048+0.006	0.045+0.005	0.037+0.004	0.029+0.004	0.033+0.004	0.014+0.002	0.053+0.005	0.028+0.003
83/06/27	0.027+0.003	0.025+0.004	0.025+0.004	0.025+0.004	0.021+0.004	0.023+0.003	0.023+0.003	0.019+0.004	0.020+0.003
83/07/05	0.020+0.003	0.022+0.003	0.024+0.003	0.019+0.005	0.022+0.003	0.022+0.003	0.016+0.002	0.020+0.004	0.015+0.002
83/07/11	0.018+0.003	0.021+0.004	0.020+0.003	0.022+0.003	0.024+0.004	0.018+0.003	0.018+0.003	0.015+0.003	0.017+0.003
83/07/18	0.025+0.004	0.028+0.005	0.029+0.004	0.031+0.004	0.032+0.005	0.030+0.004	0.015+0.003	0.023+0.004	0.027+0.004
83/07/26	0.026+0.003	0.027+0.004	0.025+0.003	0.028+0.003	0.023+0.003	0.025+0.003	0.034+0.005	0.022+0.003	0.022+0.003
83/08/01	0.029+0.004	0.032+0.005	0.028+0.004	0.029+0.004	0.024+0.004	0.029+0.004	0.008+0.002	0.030+0.003	0.022+0.003
83/08/8	0.026+0.003	0.029+0.004	0.026+0.003	0.026+0.003	0.018+0.003	0.026+0.003	0.027+0.003	0.025+0.003	0.028+0.003
83/08/15	0.015+0.003	0.017+0.003	0.021+0.003	0.021+0.003	0.018+0.003	0.015+0.003	0.017+0.003	0.018+0.003	0.018+0.003
83/08/22	0.034+0.004	0.040+0.005	0.031+0.004	0.031+0.003	0.032+0.004	0.033+0.004	0.024+0.003	0.030+0.003	0.031+0.003
83/08/29	0.031+0.003	0.030+0.004	0.033+0.004	0.037+0.003	0.033+0.004	0.017+0.003	0.025+0.003	0.031+0.003	0.013+0.002
83/09/6	0.045+0.004	0.052+0.005	0.051+0.004	0.051+0.004	0.042+0.004	0.050+0.004	0.054+0.004	0.045+0.004	0.042+0.003
83/09/12	0.030+0.004	0.034+0.005	0.030+0.004	0.028+0.003	0.026+0.004	0.030+0.004	0.030+0.004	0.027+0.004	0.022+0.003
83/09/19	0.021+0.003	0.024+0.004	0.023+0.004	0.026+0.003	0.017+0.003	0.022+0.003	0.020+0.003	0.021+0.003	0.018+0.003
83/09/26	0.026+0.003	0.026+0.004	0.023+0.004	0.026+0.003	0.026+0.004	0.020+0.003	0.027+0.003	0.030+0.003	0.021+0.003
83/10/3	0.036+0.004	0.041+0.005	0.035+0.004	0.038+0.004	0.035+0.004	0.035+0.004	0.035+0.004	0.031+0.002	0.034+0.003
83/10/11	0.027+0.003	0.033+0.004	0.028+0.003	0.030+0.003	0.027+0.003	0.014+0.003	0.022+0.003	0.029+0.003	0.022+0.003
83/10/17	0.017+0.003	0.017+0.004	0.015+0.003	0.021+0.004	0.015+0.003	0.017+0.003	0.015+0.003	0.013+0.003	0.016+0.003
83/10/24	0.023+0.003	0.023+0.004	0.022+0.004	0.023+0.003	0.023+0.003	0.020+0.003	0.013+0.002	0.023+0.003	0.022+0.003
83/10/31	0.020+0.003	0.018+0.004	0.019+0.003	0.019+0.003	0.022+0.003	0.018+0.003	0.021+0.004	0.019+0.003	0.015+0.003
83/11/07	0.016+0.003	0.018+0.004	0.019+0.003	0.015+0.003	0.016+0.003	0.018+0.003	0.017+0.003	0.013+0.002	0.014+0.002
83/11/14	0.031+0.004	0.041+0.005	0.034+0.004	0.030+0.004	0.035+0.004	0.024+0.004	0.027+0.004	0.034+0.004	0.032+0.004
83/11/21	0.027+0.001	0.027+0.002	0.037+0.002	0.035+0.002	0.031+0.002	0.020+0.001	0.021+0.001	0.032+0.002	0.021+0.001
83/11/28	0.024+0.003	0.023+0.004	0.027+0.004	0.023+0.003	0.029+0.004	0.021+0.003	0.015+0.002	0.024+0.003	0.027+0.003
83/12/5	0.018+0.003	0.021+0.004	0.022+0.003	0.018+0.003	0.019+0.003	0.024+0.006	0.020+0.003	0.018+0.003	0.017+0.003
83/12/12	0.027+0.003	0.030+0.004	0.031+0.004	0.032+0.004	0.020+0.003	0.026+0.004	0.029+0.004	0.027+0.004	0.023+0.003
83/12/19	0.016+0.001	0.022+0.002	0.002+0.001	0.019+0.001	0.062+0.002	0.029+0.002	0.018+0.001	0.019+0.001	0.020+0.002
83/12/27	0.028+0.001	0.046+0.002	0.033+0.002	0.027+0.001	0.014+0.001	0.030+0.002	0.043+0.002	0.030+0.002	0.031+0.002
84/01/3	0.051+0.003	0.043+0.002	0.045+0.002	0.026+0.001	0.046+0.002	0.044+0.002	0.038+0.002	0.043+0.002	0.033+0.002

TABLE 11

CONCENTRATIONS OF GAMMA EMITTERS IN MONTHLY COMPOSITES OF NMP
AIR PARTICULATE SAMPLES - 1983

Results in units of 10^{-3} pCi/m³ \pm 2 sigma

Nuclides	January	February	March	April	May	June
<u>OFF-SITE COMPOSITE: A-1</u>						
Co-60	<0.38	<0.50	<0.31	<0.42	<0.31	<0.38
Mn-54	<0.29	<0.36	<0.24	<0.32	<0.22	<0.27
Cs-134	<0.26	<0.32	<0.22	<0.23	<0.24	<0.29
Cs-137	<0.34	<0.36	0.18 \pm 0.12	<0.30	<0.22	<0.43
Nb-95	<0.47	<0.45	<0.32	<0.34	<0.33	<0.34
Zr-95	<0.79	<0.93	<0.64	<0.79	<0.53	<0.69
Ce-141	<0.44	<0.46	<0.35	<0.38	<0.38	<0.55
Ce-144	<1.22	<1.35	<1.10	<1.10	<0.98	<1.47
Ru-106	<2.49	<2.94	<2.07	<2.55	<1.95	<2.86
Ru-103	<0.36	<0.44	<0.30	<0.28	<0.30	<0.44
Be-7	73.5 \pm 4.9	122.0 \pm 6.6	109.0 \pm 5.2	85.2 \pm 5.3	96.1 \pm 5.5	161.0 \pm 7.6
K-40	<4.52	<5.15	<3.57 \pm 3.46	<4.20	3.35 \pm 2.02	4.45 \pm 2.21
La-140	<1.26	<1.28	<0.98	<0.86	<0.77	<1.15
Ra-226	<4.80	<5.35	<4.29	<4.60	<4.46	10.30 \pm 4.85
<u>ON-SITE COMPOSITE: B-2</u>						
Co-60	<0.32	<0.34	<0.21	<0.32	0.26 \pm 0.15	0.51 \pm 0.20
Mn-54	<0.25	<0.24	<0.18	<0.23	<0.35	<0.24
Cs-134	<0.23	<0.24	<0.16	<0.24	<0.18	<0.20
Cs-137	<0.28	<0.28	<0.21	<0.28	<0.21	<0.27
Nb-95	<0.28	<0.34	<0.31	<0.36	<0.24	<0.36
Zr-95	<0.57	<0.60	<0.55	<0.57	<0.46	<0.62
Ce-141	<0.32	<0.36	<0.33	<0.36	<0.29	<0.42
Ce-144	<0.87	<1.01	<0.79	<0.95	<0.80	<1.07
Ru-106	<1.95	<2.18	<1.58	<2.09	<1.68	<1.68
Ru-103	<0.24	<0.28	<0.26	<0.34	<0.23	<0.29
Be-7	68.5 \pm 4.0	96.4 \pm 4.8	79.0 \pm 4.0	71.3 \pm 4.4	84.2 \pm 4.4	122.0 \pm 5.8
K-40	3.48 \pm 1.96	3.86 \pm 2.03	3.21 \pm 1.63	3.13 \pm 2.10	2.59 \pm 1.98	2.42 \pm 1.21
La-140	<0.76	<1.04	<1.27	1.13 \pm 0.66	<0.99	<1.16
Ra-226	<3.57	<4.18	<3.16	2.53 \pm 1.52	<3.25	4.17 \pm 1.86

TABLE 11 (Continued)

CONCENTRATIONS OF GAMMA EMITTERS IN MONTHLY COMPOSITES OF NMP
AIR PARTICULATE SAMPLES - 1983

Results in units of 10^{-3} pCi/m³ \pm 2 sigma

Nuclides	July	August	September	October	November	December
<u>OFF-SITE COMPOSITE: A-1</u>						
Co-60	<0.56	<0.56	<0.31	<0.62	<0.78	<0.90
Mn-54	<0.31	<0.39	<0.29	<0.39	<0.56	<0.51
Cs-134	<0.35	<0.42	<0.28	<0.34	<0.50	<0.45
Cs-137	<0.39	<0.42	<0.34	<0.51	<0.58	<0.55
Nb-95	<0.58	<0.50	<0.40	<0.65	<0.64	<0.83
Zr-95	<0.92	<1.00	<0.84	<1.20	<1.33	<1.32
Ce-141	<0.75	<0.59	<0.54	<0.63	<0.68	<0.79
Ce-144	<1.89	<1.66	<1.54	<1.86	<2.20	<2.00
Ru-106	<2.96	<3.73	<2.81	<3.88	<4.19	<4.46
Ru-103	<0.51	<0.48	<0.44	<0.51	<0.60	<0.63
Be-7	136.0 \pm 10.5	147.0 \pm 10.1	105.0 \pm 7.8	89.0 \pm 8.2	96.8 \pm 8.6	123.0 \pm 9.6
K-40	<6.07	3.69 \pm 3.21	<5.71	<7.14	4.74 \pm 3.51	<7.18
La-140	<1.91	<1.18	<1.05	<1.75	<1.50	<1.69
Ra-226	12.70 \pm 8.39	<7.69	<6.43	<8.03	<8.42	<8.20
<u>ON-SITE COMPOSITE: B-2</u>						
Co-60	<0.29	<0.48	0.34 \pm 0.21	<0.22	<0.74	1.73 \pm 0.41
Mn-54	<0.26	<0.29	<0.36	<0.35	<0.50	<0.37
Cs-134	<0.22	<0.24	<0.26	<0.29	<0.41	<0.29
Cs-137	<0.31	<0.31	<0.26	<0.35	<0.50	<0.30
Nb-95	<0.35	<0.36	<0.39	<0.29	<0.46	<0.45
Zr-95	<0.86	<0.70	<0.71	<0.67	<1.04	<0.88
Ce-141	<0.57	<0.42	<0.42	<0.47	<0.46	<0.45
Ce-144	<1.37	<1.32	<1.17	<1.31	<1.58	<1.18
Ru-106	<2.66	<2.66	<2.43	<2.77	<3.69	<2.90
Ru-103	<0.48	<0.34	<0.37	<0.36	<0.57	<0.40
Be-7	111.0 \pm 8.0	90.3 \pm 6.7	88.2 \pm 5.9	72.8 \pm 6.0	87.7 \pm 6.9	103.0 \pm 5.3
K-40	4.86 \pm 2.79	<4.40	<3.39	<5.04	<7.49	<4.41
La-140	<1.86	<0.73	<1.05	<0.87	<2.07	<1.61
Ra-226	<5.23	<5.28	<4.91	<5.09	<5.95	<4.76

TABLE 11 (Continued)

CONCENTRATIONS OF GAMMA EMITTERS IN MONTHLY COMPOSITES OF NMP
AIR PARTICULATE SAMPLES - 1983

Results in units of 10^{-3} pCi/m³ \pm 2 sigma

Nuclides	January	February	March	April	May	June
<u>OFF-SITE COMPOSITE: A-2</u>						
Co-60	<0.34	<0.41	<0.26	<0.41	<0.34	<0.34
Mn-54	<0.30	<0.32	<0.23	<0.25	<0.21	<0.22
Cs-134	<0.28	<0.27	<0.23	<0.26	<0.22	<0.28
Cs-137	<0.33	<0.35	<0.24	<0.33	<0.27	<0.31
Nb-95	<0.39	<0.43	<0.28	<0.40	<0.30	<0.43
Zr-95	<0.84	<0.94	<0.58	<0.75	<0.56	<0.74
Ce-141	<0.44	<0.52	<0.36	<0.43	<0.36	<0.54
Ce-144	<1.25	<1.41	<1.09	<1.16	<1.01	<1.38
Ru-106	<2.43	<2.63	<1.99	<2.90	<1.77	<2.78
Ru-103	<0.35	<0.44	<0.28	<0.33	<0.30	<0.36
Be-7	78.5+5.1	131.0+6.4	102.0+4.9	85.8+5.1	93.0+5.2	153.0+8.2
K-40	4.34+2.47	<5.52	3.10+1.73	3.70+2.25	<3.87	5.07+2.70
La-140	<1.43	<1.03	<0.98	<0.94	<0.68	<1.30
Ra-226	<4.67	<5.39	<4.22	<4.95	6.45+3.14	<5.52
<u>ON-SITE COMPOSITE: B-1</u>						
Co-60	<0.23	<0.33	<0.23	<0.34	<0.26	<0.26
Mn-54	<0.16	<0.24	<0.16	<0.23	<0.19	<0.19
Cs-134	<0.20	<0.26	<0.16	<0.23	<0.15	<0.18
Cs-137	<0.28	<0.28	0.20+0.12	0.28+0.19	<0.36	<0.26
Nb-95	<0.31	<0.32	<0.21	<0.38	<0.24	<0.30
Zr-95	<0.49	<0.55	<0.50	<0.61	<0.43	<0.57
Ce-141	<0.32	<0.37	<0.32	<0.36	<0.31	<0.39
Ce-144	<0.88	<0.99	<0.71	<1.04	<0.79	<0.96
Ru-106	<1.71	<2.30	<1.56	<2.10	<1.38	<1.66
Ru-103	<0.26	<0.27	<0.26	<0.30	<0.21	<0.24
Be-7	80.8+4.3	111.0+5.3	105.0+4.9	83.1+4.4	104.0+4.7	147.0+6.5
K-40	4.82+3.18	3.35+1.75	2.96+1.50	<4.08	2.42+1.36	3.79+1.84
La-140	<0.78	<1.02	<1.08	<0.97	<0.60	<1.00
Ra-226	2.51+1.67	<4.33	2.10+1.27	<3.95	2.50+1.59	5.29+2.29

TABLE 11 (Continued)

CONCENTRATIONS OF GAMMA EMITTERS IN MONTHLY COMPOSITES OF NMP
AIR PARTICULATE SAMPLES - 1983

Results in units of 10^{-3} pCi/m³ \pm 2 sigma

Nuclides	July	August	September	October	November	December
<u>OFF-SITE COMPOSITE: A-2</u>						
Co-60	<0.56	<0.26	<0.51	<0.31	<0.61	0.74+0.40
Mn-54	<0.37	<0.24	<0.36	<0.42	<0.49	<0.42
Cs-134	<0.36	<0.21	<0.31	<0.35	<0.34	<0.31
Cs-137	<0.52	<0.28	<0.33	<0.38	<0.51	<0.43
Nb-95	<0.59	<0.34	<0.45	<0.62	<0.52	<0.74
Zr-95	<1.08	<0.54	<0.73	<1.00	<1.14	<1.39
Ce-141	<0.67	<0.38	<0.54	<0.63	<0.62	<0.90
Ce-144	<1.74	<1.22	<1.65	<1.67	<1.90	<1.54
Ru-106	<3.56	<2.02	<2.60	<3.58	<3.95	<2.72
Ru-103	<0.45	<0.29	<0.38	<0.48	<0.55	<0.63
Be-7	139.0+10.1	142.0+6.3	113.0+8.0	96.3+8.2	97.5+8.1	136.0+10.1
K-40	<6.13	6.49+2.33	5.78+2.94	5.63+3.79	<5.67	3.76+2.62
La-140	<2.09	<0.40	<1.08	<1.77	<1.29	<3.11
Ra-226	<6.83	<4.74	<6.20	<7.54	<7.45	<6.21
<u>ON-SITE COMPOSITE: B-1</u>						
Co-60	<0.24	<0.40	<0.20	<0.34	<0.41	0.54+0.25
Mn-54	<0.15	<0.28	<0.24	<0.30	<0.38	<0.34
Cs-134	<0.26	<0.26	<0.21	<0.26	<0.34	<0.18
Cs-137	<0.37	<0.22	<0.24	<0.24	<0.40	<0.31
Nb-95	<0.30	<0.24	<0.30	<0.37	<0.56	<0.40
Zr-95	<0.76	<0.84	<0.54	<0.75	<0.84	<0.75
Ce-141	<0.56	<0.43	<0.38	<0.37	<0.50	<0.54
Ce-144	<1.38	<1.11	<1.00	<1.16	<1.52	<1.10
Ru-106	<2.61	<1.72	<1.79	<2.55	<3.62	<2.06
Ru-103	<0.41	<0.33	<0.25	<0.32	<0.44	<0.53
Be-7	147.0+9.2	121.0+7.53	106.0+6.2	94.4+6.5	88.1+6.5	77.7+6.5
K-40	3.05+2.29	<4.32	<4.02	3.46+2.33	<6.34	<4.22
La-140	<1.61	<0.88	<0.96	<0.77	<1.44	<3.49
Ra-226	5.76	<4.83	<4.39	<5.28	<6.07	<4.31

TABLE 12
NHP/JAF SITE
ENVIRONMENTAL CHARCOAL CARTRIDGE SAMPLES - OFF SITE STATIONS
I-131 ACTIVITY pCi/m³ \pm 2 sigma

WEEK END DATE	C--OFF	D1-OFF	D2-OFF	E--OFF	F--OFF	G--OFF
83/01/11	(0.014	(0.022	(0.016	(0.015	(0.017	(0.013
83/01/19	(0.014	(0.015	(0.009	(0.018	(0.018	(0.014
83/01/25	(0.022	(0.020	(0.022	(0.018	(0.022	(0.013
83/02/01	(0.015	(0.017	(0.020	(0.024	(0.016	(0.016
83/02/08	(0.015	(0.019	(0.017	(0.019	(0.019	(0.012
83/02/15	(0.021	(0.013	(0.023	(0.017	(0.022	(0.019
83/02/23	(0.015	(0.020	(0.019	(0.021	(0.016	(0.018
83/03/01	(0.028	(0.036	(0.020	(0.020	(0.013	(0.028
83/03/08	(0.011	(0.021	(0.016	(0.023	(0.017	(0.018
83/03/15	(0.020	(0.023	(0.026	(0.019	(0.021	(0.015
83/03/22	(0.021	(0.019	(0.017	(0.018	(0.024	(0.015
83/03/29	(0.021	(0.017	(0.009	(0.018	(0.018	(0.019
83/04/05	(0.029	(0.018	(0.019	(0.029	(0.025	(0.028
83/04/12	(0.020	(0.023	(0.022	(0.018	(0.016	(0.017
83/04/19	(0.016	(0.020	(0.016	(0.020	(0.022	(0.017
83/04/26	(0.012	(0.013	(0.014	(0.020	(0.020	(0.022
83/05/03	(0.010	(0.015	(0.015	(0.022	(0.020	(0.018
83/05/11	(0.015	(0.013	(0.015	(0.019	(0.019	(0.014
83/05/17	(0.013	(0.015	(0.016	(0.015	(0.019	(0.013
83/05/24	(0.013	(0.019	(0.019	(0.019	(0.021	(0.013
83/06/01	(0.007	(0.012	(0.009	(0.015	(0.015	(0.014
83/06/07	(0.011	(0.016	(0.019	(0.019	(0.009	(0.017
83/06/14	(0.019	(0.018	(0.011	(0.016	(0.011	(0.015
83/06/21	(0.012	(0.015	(0.011	(0.018	(0.017	(0.115
83/06/28	(0.019	(0.016	(0.011	(0.019	(0.005	(0.029
83/07/06	(0.011	(0.014	(0.012	(0.014	(0.018	(0.014
83/07/12	(0.015	(0.020	(0.007	(0.017	(0.017	(0.017
83/07/22	(0.011	(0.018	(0.019	(0.016	(0.017	(0.012
83/07/27	(0.022	(0.012	(0.012	(0.017	(0.005	(0.006
83/08/02	(0.014	(0.017	(0.018	(0.015	(0.017	(0.015
83/08/9	(0.011	(0.013	(0.016	(0.011	(0.006	(0.015
83/08/16	(0.014	(0.015	(0.016	(0.019	(0.010	(0.014
83/08/23	(0.016	(0.014	(0.012	(0.016	(0.006	(0.016
83/08/31	(0.016	(0.019	(0.012	(0.016	(0.011	(0.017
83/09/7	(0.017	(0.026	(0.022	(0.018	(0.018	(0.018
83/09/13	(0.013	(0.021	(0.017	(0.015	(0.021	(0.020
83/09/20	(0.018	(0.017	(0.021	(0.016	(0.019	(0.021
83/09/27	(0.012	(0.014	(0.015	(0.012	(0.016	(0.020
83/10/4	(0.019	(0.020	(0.006	(0.017	(0.014	(0.023
83/10/13	(0.014	(0.016	(0.016	(0.013	(0.015	(0.020
83/10/18	(0.025	(0.025	(0.020	(0.024	(0.020	(0.029
83/10/25	(0.015	(0.019	(0.024	(0.013	(0.016	(0.014
83/11/1	(0.026	(0.021	(0.018	(0.018	(0.015	(0.012
83/11/08	(0.016	(0.012	(0.017	(0.017	(0.016	(0.017
83/11/15	(0.018	(0.020	(0.018	(0.026	(0.020	(0.023
83/11/22	(0.022	(0.019	(0.022	(0.022	(0.019	(0.020
83/11/29	(0.022	(0.015	(0.017	(0.019	(0.028	(0.023
83/12/6	(0.016	(0.014	(0.017	(0.022	(0.024	(0.020
83/12/13	(0.024	(0.013	(0.019	(0.017	(0.015	(0.018
83/12/20	(0.017	(0.020	(0.022	(0.019	(0.021	(0.018
83/12/28	(0.020	(0.019	(0.027	(0.021	(0.019	(0.017
84/01/4	(0.018	(0.023	(0.021	(0.022	(0.024	(0.020



TAP 13
NMP, INC. SITE
ENVIRONMENTAL CHARCOAL CARTRIDGE SAMPLES - ON SITE STATIONS
I-131 ACTIVITY $\mu\text{Ci}/\text{m}^3 \pm 2 \text{ sigma}$

WEEK END DATE	LOCATION								
	D1-ON	D2-ON	E--ON	F--ON	G--ON	H--ON	I--ON	J--ON	K--ON
83/01/10	<0.017	<0.019	<0.017	<0.023	<0.019	<0.023	<0.013	<0.013	<0.011
83/01/17	<0.012	<0.024	<0.025	<0.030	<0.026	<0.014	<0.017	<0.018	<0.011
83/01/24	<0.021	<0.047	<0.020	<0.026	<0.029	<0.019	<0.018	<0.023	<0.017
83/01/31	<0.010	<0.016	<0.023	<0.026	<0.036	0.022+0.015	<0.018	<0.020	<0.022
83/02/07	<0.014	<0.020	<0.023	<0.038	<0.029	<0.027	<0.024	<0.020	<0.021
83/02/14	<0.017	<0.021	<0.021	<0.026	<0.029	<0.019	<0.010	<0.023	<0.025
83/02/22	<0.018	<0.033	<0.027	<0.031	<0.016	<0.023	<0.016	<0.020	<0.045
83/02/28	<0.015	<0.028	<0.026	<0.034	<0.027	<0.038	<0.020	<0.021	<0.021
83/03/07	<0.017	<0.033	<0.018	<0.032	<0.023	<0.021	<0.021	<0.025	<0.033
83/03/14	<0.018	<0.018	<0.019	<0.027	<0.016	<0.017	<0.016	<0.020	<0.018
83/03/21	<0.018	<0.026	<0.027	<0.022	<0.020	<0.023	<0.017	<0.022	<0.011
83/03/28	<0.020	<0.029	<0.018	<0.035	<0.015	<0.014	<0.022	<0.018	<0.019
83/04/04	<0.015	<0.024	<0.019	<0.038	<0.034	<0.023	<0.015	<0.016	<0.015
83/04/11	<0.029	<0.024	<0.019	<0.031	<0.016	<0.016	<0.013	<0.016	<0.020
83/04/18	<0.021	<0.025	<0.016	<0.029	<0.015	<0.019	<0.018	<0.068	<0.011
83/04/25	<0.010	<0.030	<0.018	<0.020	<0.020	<0.022	<0.020	<0.022	<0.018
83/05/02	<0.009	<0.021	<0.018	<0.022	<0.027	<0.019	<0.017	<0.026	<0.012
83/05/09	<0.014	<0.021	<0.014	<0.019	<0.023	<0.019	<0.019	<0.017	<0.015
83/05/16	<0.017	<0.025	<0.021	<0.020	<0.023	<0.020	<0.020	<0.018	<0.013
83/05/23	<0.015	<0.021	<0.032	<0.015	<0.019	<0.020	<0.019	<0.015	<0.015
83/05/31	<0.016	<0.024	<0.015	<0.017	<0.030	<0.022	<0.018	<0.019	<0.014
83/06/06	<0.014	<0.023	<0.023	<0.014	<0.030	0.032+0.017	<0.023	<0.020	<0.011
83/06/13	<0.017	<0.021	<0.017	<0.016	<0.020	0.035+0.016	<0.019	<0.012	<0.015
83/06/20	<0.017	<0.031	<0.029	<0.017	<0.027	<0.019	<0.021	<0.031	<0.018
83/06/27	<0.017	<0.029	<0.012	<0.028	<0.017	<0.022	<0.013	<0.027	<0.024
83/07/05	<0.012	<0.016	<0.011	<0.044	<0.019	<0.021	<0.011	<0.028	<0.011
83/07/11	<0.018	<0.013	<0.028	<0.016	<0.027	<0.024	<0.011	<0.018	<0.017
83/07/18	<0.009	<0.019	<0.016	<0.010	<0.020	<0.023	<0.015	<0.018	<0.014
83/07/26	<0.013	<0.019	<0.023	<0.013	<0.014	<0.021	<0.031	<0.012	<0.013
83/08/01	<0.019	<0.013	<0.024	<0.014	<0.024	<0.018	<0.016	<0.017	<0.018
83/08/8	<0.016	<0.026	<0.017	<0.014	<0.008	<0.020	<0.010	<0.017	<0.017
83/08/15	<0.012	<0.015	<0.019	<0.016	<0.019	<0.015	<0.012	<0.015	<0.014
83/08/22	<0.014	<0.025	<0.017	<0.015	<0.007	<0.016	<0.016	<0.015	<0.019
83/08/29	<0.015	<0.014	<0.018	<0.015	<0.018	<0.013	<0.014	<0.010	<0.015
83/09/6	<0.014	<0.016	<0.013	<0.014	<0.017	<0.008	<0.014	<0.014	<0.011
83/09/12	<0.017	<0.024	<0.018	<0.019	<0.019	<0.028	<0.022	<0.021	<0.011
83/09/19	<0.023	<0.031	<0.030	<0.022	<0.025	<0.025	<0.026	<0.021	<0.016
83/09/26	<0.022	<0.028	<0.019	<0.016	<0.016	<0.025	<0.016	<0.015	<0.011
83/10/3	<0.019	<0.024	<0.025	<0.016	<0.022	<0.022	<0.018	<0.023	<0.018
83/10/11	<0.021	<0.030	<0.016	<0.013	<0.006	<0.022	<0.023	<0.025	<0.015
83/10/17	<0.025	<0.037	<0.022	<0.026	<0.025	<0.029	<0.019	<0.020	<0.027
83/10/24	<0.017	<0.036	<0.025	<0.017	<0.016	<0.014	<0.024	<0.018	<0.018
83/10/31	<0.021	<0.025	<0.018	<0.019	<0.024	<0.017	<0.028	<0.012	<0.018
83/11/07	<0.014	<0.022	<0.017	<0.019	<0.021	<0.018	<0.018	<0.013	<0.019
83/11/14	<0.023	<0.034	<0.026	<0.023	<0.021	<0.020	<0.019	<0.023	<0.017
83/11/21	<0.020	<0.030	<0.029	<0.029	<0.032	<0.024	<0.025	<0.025	<0.020
83/11/28	<0.017	<0.023	<0.024	<0.017	<0.016	<0.014	<0.020	<0.011	<0.021
83/12/5	<0.023	<0.032	<0.023	<0.018	<0.024	<0.070	<0.019	<0.022	<0.017
83/12/12	<0.017	<0.035	<0.020	<0.017	<0.024	<0.019	<0.020	<0.022	<0.012
83/12/19	<0.019	<0.030	<0.024	<0.015	<0.018	0.023+0.013	<0.019	<0.023	<0.023
83/12/27	<0.019	<0.026	<0.026	<0.019	<0.026	<0.020	<0.030	<0.026	<0.025
84/01/3	<0.040	<0.041	<0.025	<0.010	<0.028	<0.026	<0.025	<0.032	<0.024

TABLE 14

DIRECT RADIATION MEASUREMENTS - QUARTERLY RESULTS (1983)

Results in Units of mrem/Std. Month \pm 2 Sigma

STATION NUMBER	LOCATION	JANUARY THROUGH MARCH	APRIL THROUGH JUNE	JULY THROUGH SEPTEMBER	OCTOBER THROUGH DECEMBER	LOCATION (DIRECTION AND (DISTANCE))*
3	D1 on Site	12.89 \pm 1.88	10.81 \pm 0.66	6.75 \pm 0.84	16.5 \pm 1.0	0.25 miles @ 69°
4	D2 on Site	7.00 \pm 1.23	5.96 \pm 0.43	5.66 \pm 0.98	7.2 \pm 0.5	0.40 miles @ 140°
5	E on Site	5.71 \pm 0.61	6.13 \pm 1.31	5.39 \pm 0.64	6.4 \pm 0.6	0.40 miles @ 175°
6	F on Site	5.30 \pm 0.51	5.08 \pm 0.17	(I)	5.6 \pm 0.3	0.50 miles @ 210°
7	G on Site	5.60 \pm 0.52	5.80 \pm 0.53	5.27 \pm 0.44	6.3 \pm 0.2	0.70 miles @ 250°
8	C off Site	7.17 \pm 0.56	6.82 \pm 1.11	5.75 \pm 0.37	6.1 \pm 0.4	16.00 miles @ 42°
9	D1 off Site	6.09 \pm 0.89	5.31 \pm 0.48	4.61 \pm 0.82	5.5 \pm 0.1	11.40 miles @ 80°
10	D2 off Site	5.92 \pm 0.26	5.00 \pm 0.72	5.16 \pm 0.40	5.7 \pm 0.4	9.00 miles @ 117°
11	E off Site	5.46 \pm 0.45	5.59 \pm 0.99	5.31 \pm 0.75	5.3 \pm 0.3	7.20 miles @ 160°
12	F off Site	5.64 \pm 0.34	4.64 \pm 0.72	5.17 \pm 0.17	5.4 \pm 0.2	7.70 miles @ 190°
13	G off Site	5.77 \pm 0.41	5.52 \pm 0.26	5.05 \pm 0.37	5.8 \pm 0.3	5.30 miles @ 225°
14	DeMass Rd, SW Oswego-Control	5.85 \pm 0.49	5.34 \pm 0.54	4.86 \pm 0.69	5.7 \pm 0.2	12.80 miles @ 225°
15	Pole 66, W. Boundary-Bible Camp	5.31 \pm 1.00	5.36 \pm 0.61	4.38 \pm 0.32	4.9 \pm 0.2	0.90 miles @ 238°
18	Progress Center-Picnic Area	5.51 \pm 0.62	5.62 \pm 0.56	5.50 \pm 0.90	6.8 \pm 0.3	0.50 miles @ 268°
19	East Boundary-JAF, Pole 9	5.83 \pm 0.33	6.82 \pm 0.25	5.11 \pm 0.66	5.6 \pm 0.7	1.30 miles @ 81°
23	H on Site	8.97 \pm 0.70	7.46 \pm 1.31	5.90 \pm 0.19	8.5 \pm 0.6	0.80 miles @ 71°
24	I on Site	6.59 \pm 1.08	6.44 \pm 0.98	(I)	6.2 \pm 0.6	0.80 miles @ 98°
25	J on Site	6.04 \pm 0.21	6.50 \pm 1.33	5.41 \pm 0.16	6.4 \pm 0.3	0.90 miles @ 110°
26	K on Site	6.31 \pm 0.31	6.73 \pm 0.26	5.03 \pm 0.62	6.0 \pm 0.4	0.50 miles @ 132°
27	Nor. Fence-NNW Sector, JAF	20.95 \pm 2.23	15.76 \pm 2.55	10.78 \pm 0.76	21.5 \pm 2.2	0.40 miles @ 60°
28	Light Pole (E) JAF	47.05 \pm 5.10	41.17 \pm 1.93	26.18 \pm 3.56	52.4 \pm 4.3	0.50 miles @ 68°
29	Nor. Fence (E) JAF	74.80 \pm 11.44	58.20 \pm 10.58	33.21 \pm 2.21	72.8 \pm 3.9	0.50 miles @ 65°
30	Nor. Fence (NW) JAF	16.02 \pm 0.74	13.85 \pm 2.35	9.16 \pm 0.47	18.6 \pm 1.2	0.40 miles @ 57°
31	Nor. Fence (NW) NMP-1	21.39 \pm 2.05	17.96 \pm 1.64	17.65 \pm 1.28	21.6 \pm 0.5	0.20 miles @ 290°
39	East Fence, Rad. Waste-NMP-1	58.04 \pm 5.78	12.65 \pm 1.76	12.83 \pm 0.79	16.3 \pm 0.4	0.10 miles @ 292°
43	.9 mi Rt. 3 from Rt. 104B	6.01 \pm 1.30	6.55 \pm 0.39	5.32 \pm 0.60	5.4 \pm 0.3	9.40 miles @ 88°
44	Cor. Rt 3 and Kelly Drive	6.17 \pm 0.53	5.99 \pm 1.15	5.35 \pm 0.26	5.9 \pm 0.2	12.60 miles @ 64°

TABLE 14

DIRECT RADIATION MEASUREMENTS - QUARTERLY RESULTS (1983)

Results in Units of mrem/Std. Month \pm 2 Sigma

STATION NUMBER	LOCATION	JANUARY THROUGH MARCH	APRIL THROUGH JUNE	JULY THROUGH SEPTEMBER	OCTOBER THROUGH DECEMBER	LOCATION (DIRECTION AND (DISTANCE))*
45	Cor. Rt 64 and Rt. 35	6.14 \pm 0.36	6.56 \pm 1.12	5.39 \pm 0.54	6.6 \pm 0.5	7.60 miles @ 130°
46	Cor. Rt 176 and Black Creek Rd.	5.75 \pm 0.19	5.90 \pm 0.75	5.08 \pm 0.47	6.0 \pm 0.7	7.90 miles @ 178°
47	NE Shoreline (JAF)	45.33 \pm 9.97	17.15 \pm 1.57	8.76 \pm 1.14	16.9 \pm 0.7	0.60 miles @ 69°
48	.36 mi (N) on Access Rd. (JAF)	7.95 \pm 0.74	6.77 \pm 0.17	(1)	7.3 \pm 0.3	0.80 miles @ 92°
49	Phoenix, NY-Control	5.82 \pm 0.57	5.70 \pm 0.57	4.99 \pm 0.44	4.9 \pm 0.2	20.00 miles @ 165°
50	Lake Rd. West of J On-Site	(1)	6.48 \pm 0.65	4.82 \pm 0.44	5.6 \pm 0.3	0.70 miles @ 115°
51	Oswego Steam Sta. N End of W Fence	6.14 \pm 0.22	5.76 \pm 0.18	(1)	(1)	7.50 miles @ 233°
52	East 111th St. Fitzhugh Park Sch.	5.62 \pm 0.57	4.93 \pm 1.39	5.02 \pm 0.30	5.9 \pm 0.4	5.80 miles @ 227°
53	Broadwell & Chestnut Sts-Fulton H.S.	5.98 \pm 0.30	5.74 \pm 0.36	5.54 \pm 0.05	5.8 \pm 0.1	13.70 miles @ 183°
54	Liberty St. & Co. Rt. 16-Mexico H.S.	5.23 \pm 0.35	5.60 \pm 0.23	4.76 \pm 0.31	5.0 \pm 0.2	9.30 miles @ 115°
55	Hinnmann Rd. & Co. Rt. 5-Pulaski H.S.	5.72 \pm 0.26	5.56 \pm 0.38	4.64 \pm 0.71	5.0 \pm 0.2	13.70 miles @ 75°
56	Rt. 104 - New Haven H.S. (SE Corner)	6.02 \pm 0.08	6.17 \pm 1.43	5.15 \pm 0.44	6.3 \pm 0.3	5.40 miles @ 120°
57	Co. Rt. 29 & Miner Rd. (SE)-Lycoming, NY	5.77 \pm 0.51	5.76 \pm 0.21	4.21 \pm 0.52	5.3 \pm 0.3	1.90 miles @ 145°
58	Co. Rt. 1 - ALCAN (S of Entrance Rd.)	5.41 \pm 0.26	6.18 \pm 0.77	5.13 \pm 0.59	6.0 \pm 0.2	3.20 miles @ 220°
59	Environmental Lab - JAF	20.37 \pm 3.17	15.07 \pm 3.57	9.32 \pm 1.46	31.1 \pm 3.4	0.50 miles @ 95°
60	S. Shore (Fish Point) Little Sodus Bay, NY	6.74 \pm 0.32	6.19 \pm 0.14	5.16 \pm 0.51	4.8 \pm 0.1	21.00 miles @ 225°
61	700' N of #48 (On Access Rd.)-JAF	10.47 \pm 0.75	8.49 \pm 0.34	(1)	9.9 \pm 0.8	0.80 miles @ 83°
65	Dutch Ridge Rd. & Kerfien Rd. (SE)	5.74 \pm 0.26	5.46 \pm 0.58	4.97 \pm 0.85	4.7 \pm 0.1	7.80 miles @ 198°

(1) TLDs lost

* Direction and distance based on NMP-2 Reactor Centerline

TABLE 15

CONTINUOUS RADIATION MONITORS* (GM)

mR/hr

FIRST HALF

mR/hr

<u>LOCATION</u>	<u>PERIOD 1983</u>	<u>MIN.</u>	<u>MAX.</u>	<u>AVG.</u>
C Offsite	01/05 to 02/01	0.010	0.050	0.015
	02/01 to 03/01	0.010	0.020	0.015
	03/01 to 03/29	0.010	0.025	0.015
	03/29 to 04/26	0.010	0.080	0.030
	04/26 to 05/24	0.010	0.025	0.018
	05/24 to 06/28	0.010	0.023	0.018
D ₁ Onsite	01/06 to 02/03	0.010	0.045	0.015
	02/03 to 03/03	0.010	0.052	0.020
	03/03 to 03/29	0.013	0.075	0.020
	03/29 to 04/28	0.010	0.050	0.022
	04/28 to 05/27	0.012	0.032	0.023
	05/27 to 06/27	0.010	0.027	0.011
D ₂ Onsite	01/06 to 02/03	0.010	0.050	0.015
	02/03 to 03/03	0.010	0.043	0.018
	03/03 to 03/29	0.010	0.095	0.012
	03/29 to 04/28	0.010	0.038	0.013
	04/28 to 05/27	0.010	0.025	0.012
	05/27 to 06/27	0.010	0.028	0.013
E Onsite	01/06 to 02/03	0.010	0.19	0.020
	02/03 to 03/03	0.010	0.050	0.018
	03/03 to 03/29	0.010	0.052	0.013
	03/29 to 04/28	0.010	0.030	0.015
	04/28 to 05/27	0.010	0.042	0.015
	05/27 to 06/27	0.011	0.025	0.015
F Onsite	01/06 to 02/03	0.010	0.030	0.018
	02/03 to 03/03	0.010	0.024	0.018
	03/03 to 03/29	0.012	0.050	0.015
	03/29 to 04/28	0.010	0.078	0.018
	04/28 to 05/27	0.020	0.090	0.033
	05/27 to 06/27	0.012	0.040	0.023

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

TABLE 15 (Cont'd)

CONTINUOUS RADIATION MONITORS* (GM)

mR/hr

SECOND HALF

mR/hr

<u>LOCATION</u>	<u>PERIOD 1983</u>	<u>MIN.</u>	<u>MAX.</u>	<u>AVG.</u>
C Offsite	06/28 to 07/27	0.010	0.032	0.018
	07/27 to 08/26	0.010	0.042	0.015
	08/26 to 09/27	0.010	0.045	0.013
	09/27 to 10/21	0.010	0.035	0.015
	10/21 to 11/15	0.010	0.040	0.020
	11/15 to 12/13	0.012	0.025	0.018
	12/13 to 01/10	0.010	0.025	0.015
D ₁ Onsite	06/27 to 07/26	0.010	0.018	0.012
	07/26 to 08/25	0.010	0.025	0.018
	08/25 to 09/23	0.010	0.030	0.020
	09/23 to 10/20	0.010	0.042	0.020
	10/20 to 11/14	0.012	0.060	0.023
	11/14 to 12/12	0.016	0.060	0.025
	12/12 to 01/09	0.011	0.065	0.018
D ₂ Onsite	06/27 to 07/26	0.010	0.020	0.013
	07/26 to 08/25	0.012	0.022	0.015
	08/25 to 09/23	0.012	0.028	0.018
	09/23 to 10/20	0.013	0.028	0.020
	10/20 to 11/14	0.012	0.060	0.015
	11/14 to 12/12	0.011	0.060	0.015
	12/12 to 01/09	0.010	0.050	0.015
E Onsite	06/27 to 07/26	0.013	0.035	0.018
	07/26 to 08/25	0.012	0.025	0.018
	08/25 to 09/23	0.012	0.025	0.018
	09/23 to 10/20	0.012	0.025	0.018
	10/20 to 11/14	0.013	0.026	0.015
	11/14 to 12/12	0.012	0.070	0.015
	12/12 to 01/09	0.010	0.085	0.015
F Onsite	06/27 to 07/26	0.010	0.035	0.022
	07/26 to 08/25	0.015	0.048	0.022
	08/25 to 09/23	0.018	0.040	0.022
	09/23 to 10/20	0.015	0.035	0.025
	10/20 to 11/14	0.015	0.032	0.025
	11/14 to 12/12	0.015	0.060	0.023
	12/12 to 01/09	0.012	0.060	0.018

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

TABLE 15 (Cont'd)

CONTINUOUS RADIATION MONITORS* (GM)

mR/hr

FIRST HALF

mR/hr

<u>LOCATION</u>	<u>PERIOD 1983</u>	<u>MIN.</u>	<u>MAX.</u>	<u>AVG.</u>
G Onsite	01/06 to 02/03	0.012	0.033	0.021
	02/03 to 03/03	0.012	0.065	0.020
	03/03 to 03/29	0.013	0.060	0.020
	03/29 to 04/28	0.015	0.047	0.020
	04/28 to 05/27	0.015	0.045	0.025
	05/27 to 06/27	0.015	0.040	0.024
H Onsite	01/06 to 02/03	0.012	0.13	0.020
	02/03 to 03/03	0.012	0.045	0.023
	03/03 to 03/29	0.012	0.050	0.020
	03/29 to 04/28	0.013	0.040	0.020
	04/28 to 05/27	0.012	0.045	0.020
	05/27 to 06/27	0.015	0.040	0.020
I Onsite	01/06 to 02/03	0.013	0.072	0.018
	02/03 to 03/03	0.012	0.039	0.022
	03/03 to 03/29	0.015	0.080	0.025
	03/29 to 04/28	0.020	0.060	0.028
	04/28 to 05/27	0.013	0.073	0.025
	05/27 to 06/27	0.018	0.039	0.028
J Onsite	01/06 to 02/03	0.010	0.065	0.013
	02/03 to 03/03	0.010	0.051	0.018
	03/03 to 03/29	0.010	0.052	0.013
	03/29 to 04/28	0.010	0.042	0.013
	04/28 to 05/27	0.010	0.062	0.018
	05/27 to 06/27	0.010	0.042	0.015
K Onsite	01/06 to 02/03	0.010	0.023	0.012
	02/03 to 03/03	0.010	0.039	0.018
	03/03 to 03/29	0.011	0.059	0.018
	03/29 to 04/28	0.013	0.032	0.018
	04/28 to 05/27	0.010	0.035	0.018
	05/27 to 06/27	0.012	0.030	0.018

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

TABLE 15 (Cont'd)

CONTINUOUS RADIATION MONITORS* (GM)

mR/hr

SECOND HALF

mR/hr

<u>LOCATION</u>	<u>PERIOD 1983</u>	<u>MIN.</u>	<u>MAX.</u>	<u>AVG.</u>
G Onsite	06/27 to 07/26	0.018	0.038	0.025
	07/26 to 08/25	0.016	0.049	0.023
	08/25 to 09/23	0.013	0.038	0.022
	09/23 to 10/20	0.015	0.032	0.020
	10/20 to 11/14	0.015	0.035	0.021
	11/14 to 12/12	0.015	0.060	0.019
	12/12 to 01/09	0.010	0.055	0.015
H Onsite	06/27 to 07/26	0.012	0.062	0.025
	07/26 to 08/25	0.018	0.13	0.024
	08/25 to 09/23	0.015	0.13	0.022
	09/23 to 10/20	0.015	0.080	0.025
	10/20 to 11/14	0.015	0.090	0.025
	11/14 to 12/12	0.015	0.080	0.025
	12/12 to 01/09	0.010	0.050	0.020
I Onsite	06/27 to 07/26	0.010	0.038	0.028
	07/26 to 08/25	0.010	0.030	0.020
	08/25 to 09/23	0.010	0.028	0.013
	09/23 to 10/20	0.010	0.030	0.015
	10/20 to 11/14	0.010	0.030	0.015
	11/14 to 12/12	0.012	0.040	0.020
	12/12 to 01/09	0.010	0.025	0.015
J Onsite	06/27 to 07/26	0.010	0.025	0.013
	07/26 to 08/25	0.010	0.025	0.013
	08/25 to 09/23	0.010	0.080	0.013
	09/23 to 10/20	0.010	0.020	0.015
	10/20 to 11/14	0.010	0.10	0.015
	11/14 to 12/12	0.010	0.040	0.013
	12/12 to 01/09	0.010	0.055	0.012
K Onsite	06/27 to 07/26	0.012	0.038	0.018
	07/26 to 08/25	0.010	0.028	0.018
	08/25 to 09/23	0.010	0.026	0.018
	09/23 to 10/20	0.012	0.052	0.018
	10/20 to 11/14	0.010	0.030	0.015
	11/14 to 12/12	0.010	0.030	0.016
	12/12 to 01/09	0.010	0.040	0.012

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

TABLE 16

CONCENTRATIONS OF IODINE - 131* IN MILK
Results in Units of pCi/l \pm 2 Sigma

Station	5-9-83	6-6-83	7-4-83	8-1-83	9-12-83	10-10-83	11-8-83	12-5-83
40	<0.1	<0.3	<0.2	<0.3	<0.2	<0.3	<0.2	<0.2
4	<0.3	<0.2	<0.1	<0.3	<0.4	<0.3	<0.2	<0.2
14	<0.2	(1)	(1)	(1)	(1)	(1)	(1)	(1)
5	<0.3	<0.2	<0.1	<0.3	<0.2	<0.5	<0.2	<0.3
16	<0.1	<0.2	<0.2	<0.2	<0.3	<0.3	<0.1	<0.3
7	<0.3	<0.2	<0.2	<0.3	<0.2	<0.3	<0.2	<0.4
45	<0.2	<0.3	<0.2	<0.3	<0.3	<0.3	<0.2	<0.2
50	<0.2	<0.2	<0.2	<0.3	<0.2	<0.4	<0.3	<0.2
55	<0.4	<0.2	<0.1	<0.4	<0.2	<0.3	<0.2	<0.3
60	<0.3	(1)	(1)	(1)	(1)	(1)	(1)	(1)

* Iodine-131 results are corrected for decay to the sampling stop date.
(1) Sample station discontinued (not required by Technical Specifications)

TABLE 17

CONCENTRATIONS OF GAMMA EMITTERS IN MILK (MONTHLY SAMPLES)
Results in units of pCi/liter \pm 2 sigma

Station	Nuclides	5-9-83	6-6-83	7-4-83	8-1-83	9-12-83	10-10-83	11-8-83	12-5-83
40	K-40	1400 \pm 140	1300 \pm 130	1450 \pm 150	1520 \pm 150	1290 \pm 130	923 \pm 92	1290 \pm 130	1340 \pm 130
	Cs-134	<3.4	<4.0	<6.0	<7.0	<5.3	<7.2	<4.4	<4.8
	Cs-137	<3.6	<5.0	<6.0	<7.0	<5.5	<7.3	<5.7	<5.3
	Ba-140	<67.0	<44.0	<10.0	<10.0	<6.9	<11.0(a)	<5.1(a)	<4.5(a)
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
4	K-40	1400 \pm 140	1300 \pm 130	1120 \pm 110	1380 \pm 140	1380 \pm 140	879 \pm 88	882 \pm 88	1190 \pm 200
	Cs-134	<3.6	<3.2	<7.0	<7.0	<4.4	<3.9	<4.0	<6.4
	Cs-137	<4.9	<4.4	<6.0	<7.0	<5.2	<4.2	<4.7	<5.9
	Ba-140	<81.0	<37.0	<20.0	<9.0	<6.1	<5.8(a)	<5.5(a)	<7.2(a)
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
14	K-40	1400 \pm 140	*	*	*	*	*	*	*
	Cs-134	<3.0							
	Cs-137	<3.9							
	Ba-140	<59.0							
	Others	<LLD							
5	K-40	1400 \pm 140	1100 \pm 110	1130 \pm 110	1360 \pm 140	1540 \pm 150	1450 \pm 150	1310 \pm 130	951 \pm 97
	Cs-134	<3.7	<3.7	<5.0	<4.0	<7.8	<4.2	<4.0	<7.2
	Cs-137	<4.8	<5.9	<6.0	7.3 \pm 4.0	<8.6	<5.7	<4.3	<7.6
	Ba-140	<72.0	<34.0	<10.0	<6.0	<9.6	<4.8(a)	<12.0 (a)	<8.5(a)
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
16	K-40	1500 \pm 150	1300 \pm 130	1420 \pm 140	1290 \pm 130	1310 \pm 130	949 \pm 95	1550 \pm 160	1300 \pm 130
	Cs-134	<4.6	<3.3	<8.0	<7.0	<5.0	<4.6	<6.7	<5.6
	Cs-137	<5.3	<5.1	10.9 \pm 6.1	<8.0	<5.6	<5.3	<6.3	<6.0
	Ba-140	<85.0	<35.0	<20.0	<10.0	<7.5	<7.1(a)	<8.3(a)	<5.4(a)
	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/liter \pm 2 sigma

Station	Nuclides	5-9-83	6-6-83	7-4-83	8-1-83	9-12-83	10-10-83	11-8-83	12-5-83
7	K-40	1300 \pm 130	1300 \pm 130	1670 \pm 170	1330 \pm 130	1430 \pm 140	1600 \pm 160	1120 \pm 110	1390 \pm 140
	Cs-134	<3.3	<2.8	<8.0	<5.0	<6.4	<3.9	<6.4	<4.1
	Cs-137	<4.4	<4.9	<7.0	<6.0	<6.5	<4.4	<6.5	<4.6
	Ba-140	<57.0	<53.0	<20.0	<6.0	<7.8	<5.7(a)	<7.4(a)	<4.8(a)
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
45	K-40	1300 \pm 130	1300 \pm 130	1200 \pm 120	1320 \pm 130	1200 \pm 120	1610 \pm 160	1030 \pm 100	1310 \pm 130
	Cs-134	<4.0	<3.0	<4.0	<5.0	<3.9	<6.4	<3.9	<4.3
	Cs-137	<4.6	3.3 \pm 2.3	<6.0	<5.0	<4.3	<6.8	<4.0	<5.8
	Ba-140	<93.0	<29.0	<10.0	<7.0	<5.2	<8.4(a)	<5.2(a)	<3.7(a)
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
50	K-40	1500 \pm 150	1500 \pm 150	1240 \pm 120	1170 \pm 120	1560 \pm 160	1700 \pm 170	1210 \pm 120	1350 \pm 140
	Cs-134	<3.3	<3.7	<5.0	<5.0	<4.8	<4.4	<4.4	<4.4
	Cs-137	<4.2	<4.7	<6.0	<5.0	<5.1	<4.9	<4.5	<4.8
	Ba-140	<62.0	<36.0	<2.0	<8.0	<6.2	<4.7(a)	<4.5(a)	<5.0(a)
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
55	K-40	1400 \pm 140	1400 \pm 140	1370 \pm 140	1330 \pm 130	1370 \pm 860	1200 \pm 120	914 \pm 91	1290 \pm 130
	Cs-134	<3.5	<2.9	<4.0	<7.0	<6.5	<6.6	<4.0	<6.4
	Cs-137	<4.7	<3.6	<5.0	<7.0	<6.8	<6.5	<4.5	<6.7
	Ba-140	<75.0	<30.0	<10.0	<10.0	<8.1	<7.1(a)	<5.5(a)	<6.4(a)
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
60	K-40	1400 \pm 140	*	*	*	*	*	*	*
	Cs-134	<3.1							
	Cs-137	<3.7							
	Ba-140	<56.0							
	Others	<LLD							

* - Location discontinued for the remainder of 1983.

(a) - Represents Ba/La-140.

TABLE 18
CONCENTRATIONS OF STRONTIUM - 90 IN MILK (MONTHLY SAMPLES)

Results in units of pCi/liter \pm 2 sigma

Station	5-9-83	6-6-83	7-4-83	8-1-83
(control) 40	3.0 \pm 0.9	3.0 \pm 0.8	3.5 \pm 0.8	2.3 \pm 0.4
4	2.4 \pm 0.6	2.8 \pm 1.0	2.2 \pm 0.5	2.2 \pm 0.4
14	2.1 \pm 0.7	*	*	*
5	3.3 \pm 0.7	2.9 \pm 0.5	0.9 \pm 0.3	4.2 \pm 0.5
16	4.0 \pm 0.6	5.5 \pm 1.0	4.0 \pm 1.0	5.4 \pm 0.5
7	2.2 \pm 0.4	4.5 \pm 1.0	3.8 \pm 0.5	2.4 \pm 0.4
45	4.3 \pm 0.7	4.0 \pm 1.3	3.5 \pm 0.7	3.0 \pm 0.5
50	1.8 \pm 0.6	2.3 \pm 1.1	1.3 \pm 0.4	2.3 \pm 0.4
55	2.7 \pm 0.7	3.5 \pm 0.8	4.7 \pm 0.7	2.8 \pm 0.4
60	3.1 \pm 0.8	*	*	*

Station	9-12-83	10-10-83	11-7-83	12-5-83
(control) 40	3.1 \pm 0.6	1.5 \pm 0.8	2.0 \pm 0.5	2.3 \pm 0.6
4	3.1 \pm 0.6	2.5 \pm 0.7	3.0 \pm 0.7	2.9 \pm 0.6
14	*	*	*	*
5	3.0 \pm 0.6	2.6 \pm 0.9	2.4 \pm 0.5	2.9 \pm 0.5
16	4.0 \pm 0.8	2.0 \pm 0.9	2.8 \pm 0.8	4.1 \pm 0.6
7	3.1 \pm 0.5	2.2 \pm 0.7	2.1 \pm 0.5	2.7 \pm 0.5
45	4.2 \pm 0.8	4.1 \pm 0.7	2.3 \pm 0.5	2.7 \pm 0.4
50	2.4 \pm 0.5	1.4 \pm 0.8	1.6 \pm 0.5	2.2 \pm 0.5
55	4.1 \pm 0.6	4.9 \pm 0.8	2.2 \pm 0.5	2.3 \pm 0.5
60	*	*	*	*

* - Location discontinued for the remainder of 1983.

TABLE 19
MILCH ANIMAL CENSUS
SPRING 1983

<u>TOWN</u>	<u>NUMBER ON CENSUS MAP(1)</u>	<u>NUMBER OF MILCH ANIMALS</u>
Scriba	1	None ***
	16*	39C
	2	30C
	3	1C
	6	1C
New Haven	8	30C
	9	40C
	4*	75C
	45*	22C
	10	28C
	5*	45C
	11	40C
	7*	54C
Mexico	12	70C
	13	2C
	14*	65C
	15	35C
	17	43C
	18	46C
	19	41C
	20	7C
	60*	40C
	50*	150C
	55*	51C
	21	78C
Richland	22	40C
	23	65C
Oswego	24	31C
Hannibal	40**	34C
Volney	25	10C
TOTALS		1213 Cows 0 Goats

C = Cows
G = Goats
* = Milk sample location
** = Milk sample control location
*** = Previous 1982 location
(1) = References Figure 5

TABLE 19 (Continued)
MILCH ANIMAL CENSUS
SUMMER 1983

<u>TOWN</u>	<u>NUMBER ON CENSUS MAP(1)</u>	<u>NUMBER OF MILCH ANIMALS</u>
Scriba	1	2G
	16*	39C
	2	NA
	3	1C
	6	1C
	26	1C
New Haven	8	30C
	9	40C
	4*	65C
	45*	23C
	10	27C
	5*	45C
	11	35C
	7*	53C
Mexico	12	66C
	13	2C
	14	60C
	15	33C
	17	43C
	18	47C
	19	42C
	20	None***
	60*	40C
	50*	150C
	55*	52C
	21	78C
Richland	22	58C
	23	70C
Oswego	24	None***
Hannibal	40**	34C
Volney	25	10C
TOTALS		1145 Cows 2 Goats

C = Cows
 G = Goats
 * = Milk sample location
 ** = Milk sample control location
 *** = Previous 1983 location
 NA = Did not wish to participate in the survey
 (1) = References Figure 5

TABLE 20

CONCENTRATIONS OF GAMMA EMITTERS IN VARIOUS FOOD PRODUCTS

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

COLLECTION SITE	SAMPLE DATE	DESCRIPTION	Be-7	K-40	I-131	Cs-134	Cs-137	Others
A	5-10-83	Eggs	<0.31	0.9 \pm 0.2	(1)	<0.018	<0.016	<LLD
B	5-19-83	Eggs	<0.40	1.2 \pm 0.3	<3.6	<0.022	<0.024	<LLD
C	6-3-83	Eggs	<0.22	1.1 \pm 0.2	<0.7	<0.014	<0.016	<LLD
D (control)	5-10-83	Eggs	<0.37	0.8 \pm 0.4	(1)	<0.018	<0.019	<LLD
A	5-10-83	Poultry	<0.25	2.9 \pm 0.3	(1)	<0.015	<0.015	<LLD
B	5-19-83	Poultry	<0.31	2.8 \pm 0.3	<2.8	<0.016	<0.018	<LLD
C	6-3-83	Poultry	<0.15	2.8 \pm 0.3	<0.5	<0.010	0.018 \pm 0.008	<LLD
D (control)	5-10-83	Poultry	<0.18	1.7 \pm 0.2	(1)	<0.010	<0.010	<LLD
E	6-2-83	Beef	<0.24	2.9 \pm 0.3	<0.7	<0.015	<0.017	<LLD
F	5-25-83	Beef	<0.30	2.5 \pm 0.3	<1.6	<0.019	0.023 \pm 0.013	<LLD
G	5-25-83	Beef	<0.20	2.3 \pm 0.3	<1.1	<0.015	<0.018	<LLD
H (control)	5-18-83	Beef	<0.22	2.6 \pm 0.3	<1.7	<0.014	<0.014	<LLD

(1) I-131 not in the radionuclide library.

TABLE 20 (Continued)

CONCENTRATIONS OF GAMMA EMITTERS IN VARIOUS FOOD PRODUCTS

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

COLLECTION SITE	SAMPLE DATE	DESCRIPTION	Be-7	K-40	I-131	Cs-134	Cs-137	Others
A	11-30-83	Eggs	<0.04	1.1 \pm 0.1	<0.02	<0.005	<0.005	<LLD
B	11-8-83	Eggs	<0.07	1.1 \pm 0.1	<0.12	<0.005	<0.006	<LLD
C	11-7-83	Eggs	<0.08	1.1 \pm 0.1	<0.15	<0.006	<0.007	<LLD
D (control)	11-1-83	Eggs	<0.11	1.0 \pm 0.1	<0.34	<0.008	<0.008	<LLD
A	11-30-83	Poultry	<0.07	3.1 \pm 0.3	<0.03	<0.009	<0.009	<LLD
B	11-8-83	Poultry	<0.08	3.2 \pm 0.3	<0.12	<0.007	<0.007	<LLD
C	11-7-83	Poultry	<0.09	3.1 \pm 0.3	<0.16	<0.008	<0.008	<LLD
D (control)	11-1-83	Poultry	<0.09	3.3 \pm 0.3	<0.25	<0.007	<0.007	<LLD
I	11-8-83	Beef	<0.06	2.9 \pm 0.3	<0.10	<0.005	0.044 \pm 0.006	<LLD
J	12-2-83	Beef	<0.04	2.4 \pm 0.2	<0.01	<0.005	0.014 \pm 0.004	<LLD
K	11-18-83	Beef	<0.08	3.4 \pm 0.3	<0.07	<0.009	0.023 \pm 0.007	<LLD
H (control)	11-11-83	Beef	<0.05	3.2 \pm 0.3	<0.08	<0.005	<0.006	<LLD

TABLE 20 (Continued)

CONCENTRATIONS OF GAMMA EMITTERS IN VARIOUS FOOD PRODUCTS

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

COLLECTION SITE	SAMPLE DATE	DESCRIPTION	Be-7	K-40	I-131	Cs-134	Cs-137	Others
I	9-26-83	Swiss Chard	<0.08	3.7 ± 0.4	<0.01	<0.008	<0.010	<LLD
I	9-26-83	Tomatoes	<0.04	2.3 ± 0.2	<0.01	<0.006	<0.006	<LLD
L	9-26-83	Swiss Chard	<0.13	4.6 ± 0.5	<0.02	<0.016	<0.016	<LLD
L	9-25-83	Cucumbers	<0.05	1.6 ± 0.2	<0.01	<0.007	<0.010	<LLD
N	9-26-83	Cabbage	<0.09	1.8 ± 0.2	<0.01	<0.011	<0.013	<LLD
N	9-26-83	Squash	<0.11	1.6 ± 0.2	<0.02	<0.014	<0.014	<LLD
M(control)	9-26-83	Cabbage	<0.09	2.9 ± 0.3	<0.01	<0.012	<0.013	<LLD
M(control)	9-26-83	Zucchini	<0.06	1.2 ± 0.1	<0.01	<0.007	<0.007	<LLD

TABLE 21

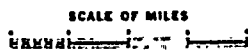
CONCENTRATIONS OF STRONTIUM-90 AND GAMMA EMITTERS IN SOIL

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

SAMPLE * LOCATION	SAMPLE DATE	Sr-90	K-40	Cs-137	Ra-226	Th-228	Others
D-1 ONSITE	11-10-83	<0.04	13.6 \pm 1.4	<0.04	<0.71	0.54 \pm 0.05	ALL<LLD
D-2 ONSITE	11-10-83	<0.04	16.3 \pm 1.6	0.10 \pm 0.04	1.19 \pm 0.53	0.73 \pm 0.07	ALL<LLD
E ONSITE	11-10-83	0.41 \pm 0.04	7.2 \pm 0.9	0.60 \pm 0.06	<0.99	0.52 \pm 0.10	ALL<LLD
F ONSITE	11-10-83	0.05 \pm 0.02	10.1 \pm 1.0	<0.04	1.22 \pm 0.34	0.70 \pm 0.07	ALL<LLD
G ONSITE	11-10-83	0.03 \pm 0.02	13.9 \pm 1.4	0.09 \pm 0.02	1.13 \pm 0.30	0.67 \pm 0.07	ALL<LLD
H ONSITE	11-10-83	0.03 \pm 0.02	19.4 \pm 1.9	0.07 \pm 0.02	1.52 \pm 0.37	0.94 \pm 0.09	ALL<LLD
I ONSITE	11-10-83	0.11 \pm 0.02	11.6 \pm 1.2	0.25 \pm 0.05	<0.90	0.60 \pm 0.06	ALL<LLD
J ONSITE	11-10-83	0.47 \pm 0.05	13.3 \pm 1.3	1.19 \pm 0.81	<0.84	0.59 \pm 0.06	ALL<LLD
K ONSITE	11-10-83	0.17 \pm 0.03	11.3 \pm 1.1	0.62 \pm 0.07	2.15 \pm 0.85	0.92 \pm 0.07	ALL<LLD
C OFFSITE	11-9-83	0.13 \pm 0.04	18.1 \pm 1.8	1.46 \pm 0.15	1.77 \pm 0.84	0.94 \pm 0.09	ALL<LLD
D-1 OFFSITE	11-9-83	0.17 \pm 0.03	9.0 \pm 0.9	0.20 \pm 0.04	1.30 \pm 0.70	0.83 \pm 0.08	ALL<LLD
D-2 OFFSITE	11-9-83	0.27 \pm 0.06	10.4 \pm 1.0	0.66 \pm 0.07	1.35 \pm 0.71	0.59 \pm 0.06	ALL<LLD
E OFFSITE	11-9-83	0.32 \pm 0.04	10.3 \pm 1.3	1.03 \pm 0.12	<1.40	0.55 \pm 0.08	ALL<LLD
F OFFSITE	11-9-83	0.11 \pm 0.03	12.3 \pm 1.2	0.45 \pm 0.06	<0.96	0.72 \pm 0.06	ALL<LLD
G OFFSITE	11-9-83	0.10 \pm 0.03	14.8 \pm 1.5	0.20 \pm 0.06	<1.10	0.70 \pm 0.07	ALL<LLD

* Sample locations were at each air monitoring station

FIGURE 1
OFF SITE ENVIRONMENTAL STATION
AND
TLD LOCATIONS

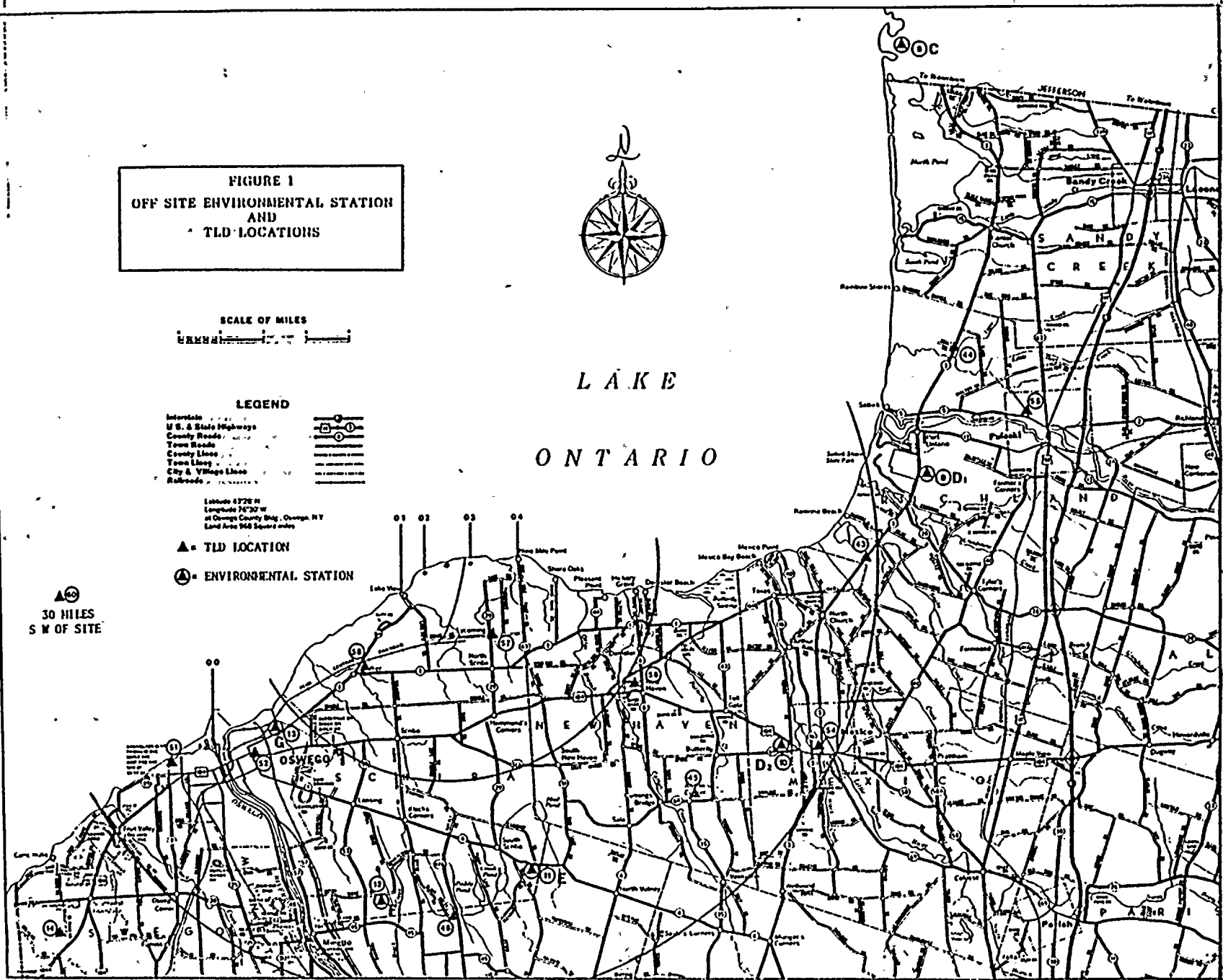


- LEGEND**
- Interstate
 - U.S. & State Highways
 - County Roads
 - Town Roads
 - County Lines
 - Town Lines
 - City & Village Lines
 - Railroads

Latitude 43°28' N
 Longitude 76°30' W
 at Oswego County Shg., Oswego, NY
 Land Area 144 Square miles

- ▲ TLD LOCATION
- ⊙ ENVIRONMENTAL STATION

30 MILES
 S W OF SITE



116

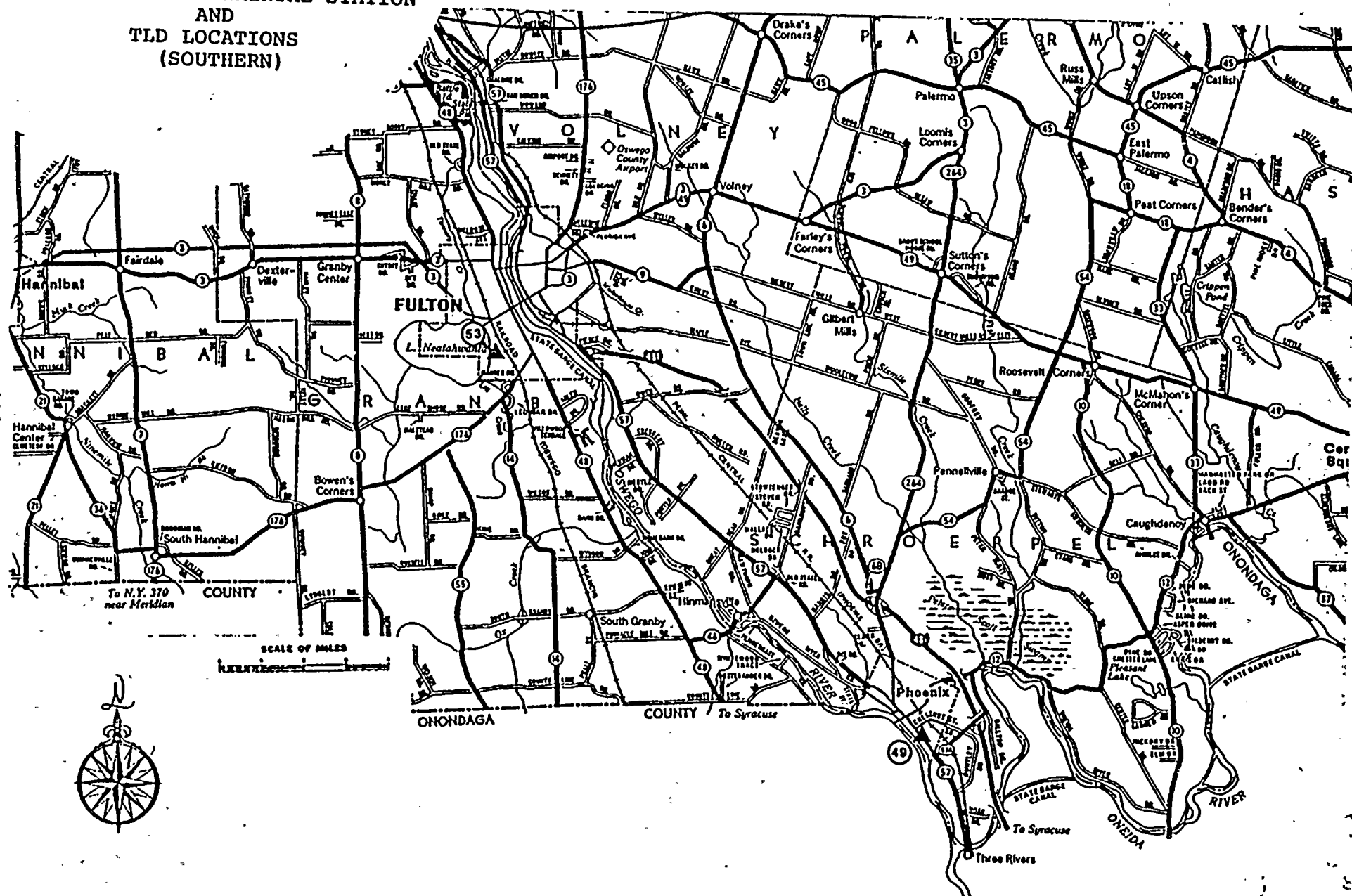


Figure 2
OFF-SITE MONITORING
STATION LOCATIONS

● MONITOR STATION

1 0 5
MILES

LAKE ONTARIO

OSWEGO

SITE

PULASKI

MEXICO

LAKE ONTARIO

+N 1,284,000

+N 1,282,000

PROPERTY LINE

0 800 1600
SCALE-Feet

NINE MILE POINT
NUCLEAR STATION

JAMES A. FITZPATRICK
NUCLEAR POWER
PLANT

LAKEVIEW

● EXISTING MONITORING STATIONS

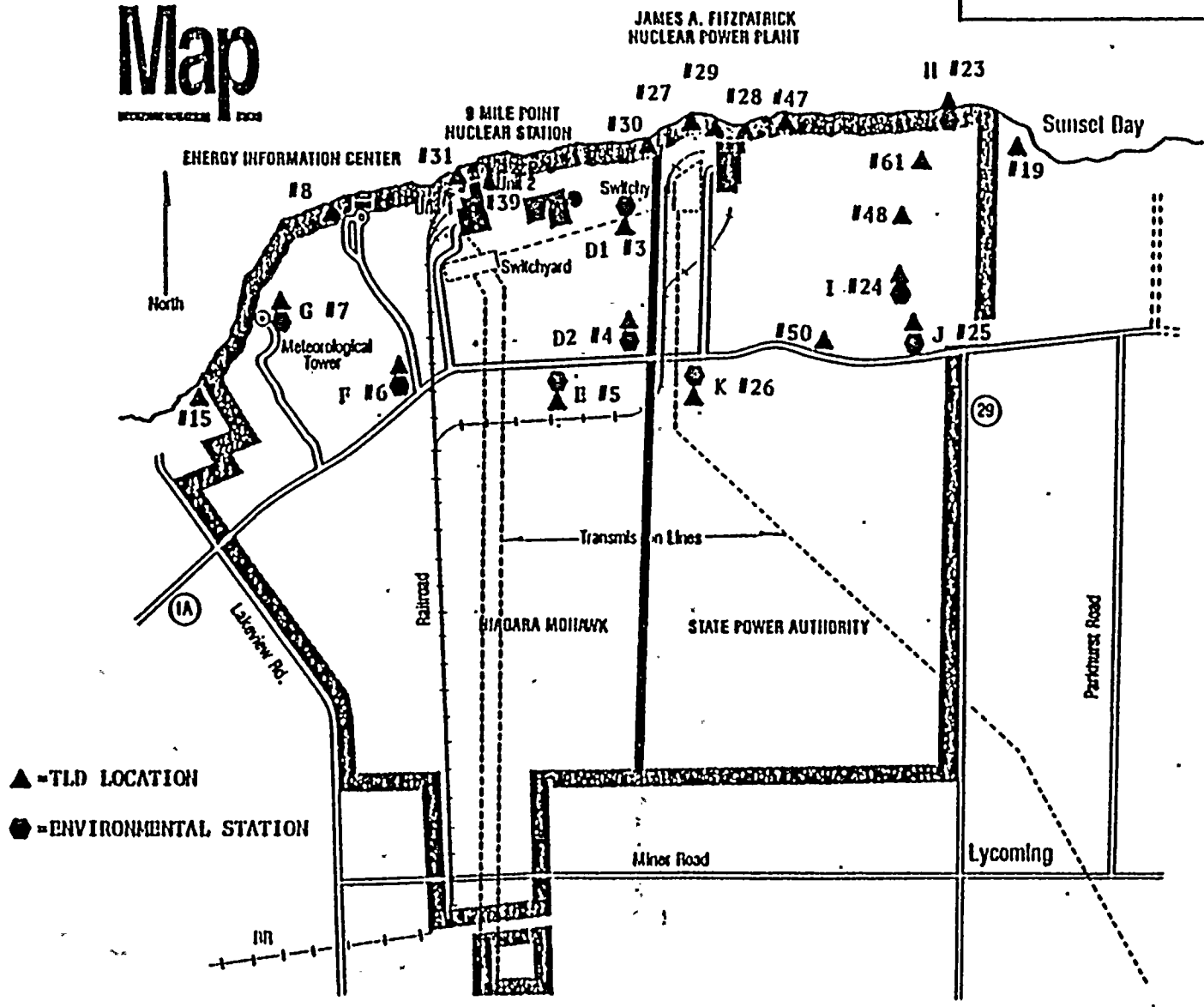
ON-SITE RADIOLOGICAL MONITORING
STATIONS

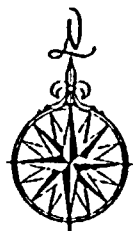
MONITORING STATIONS LOCATED AT
2000 FT. RADII FROM STACKS

Site Map

LAKE ONTARIO

FIGURE 3
ON SITE ENVIRONMENTAL STATION
AND
TLD LOCATIONS





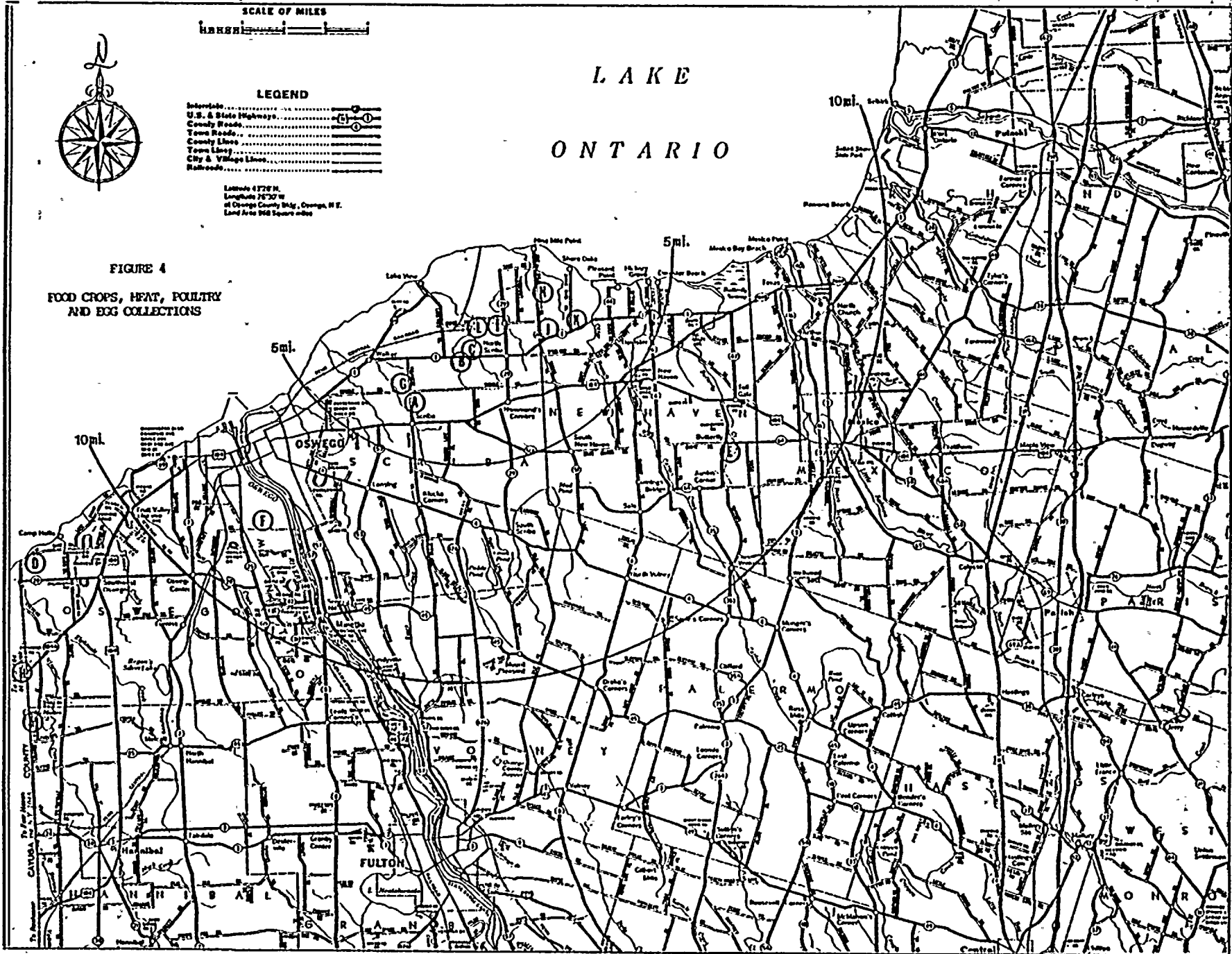
SCALE OF MILES
0 5 10

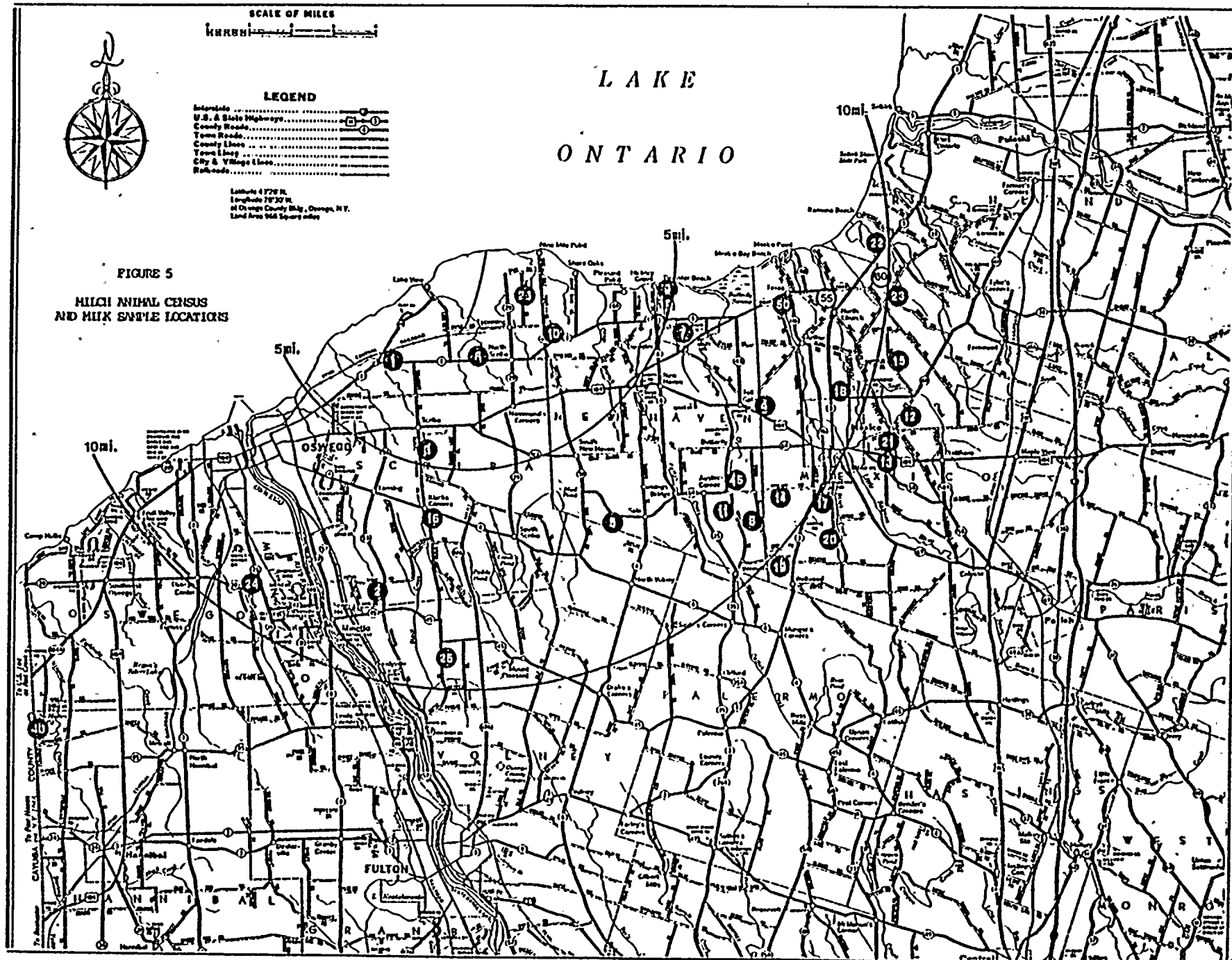
LEGEND
 Interstate
 U.S. & State Highways
 County Roads
 Town Roads
 County Lines
 Town Lines
 City & Village Lines
 Railroads

Latitude 42°20' N.
 Longitude 76°30' W.
 of Oswego County Bldg., Oswego, N.Y.
 Land Area 968 Square miles

LAKE ONTARIO

FIGURE 4
FOOD CROPS, MEAT, POULTRY
AND EGG COLLECTIONS





A detailed map of New York State showing its geographical features, neighboring states and provinces, and major cities. The map includes Lake Ontario, Lake Erie, and the Niagara River. Key regions like the Adirondack Forest Preserve and the Catskill Forest Preserve are marked. Neighboring areas include Canada to the north, Vermont to the northeast, Massachusetts to the east, Connecticut to the southeast, New Jersey to the south, and Pennsylvania to the southwest. Major cities such as Albany, Binghamton, and New York City are labeled. A specific 'SITE' is marked in the western part of the state near Lake Ontario.

NIAGARA MOHAWK POWER CORPORATION

NIAGARA  MOHAWK

300 ERIE BOULEVARD, WEST
SYRACUSE, N. Y. 13202

April 30, 1984

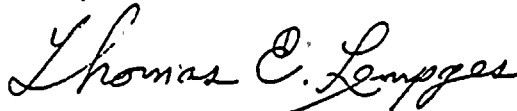
Dr. Thomas E. Murley
Regional Administrator
United States Nuclear Regulatory Commission
Region I
631 Park Avenue
King of Prussia, PA 19406

RE: Nine Mile Point Nuclear Station Unit #1
Facility Operating License DPR-63
Docket No. 50-220

Dear Dr. Murley:

In accordance with the Environmental Technical Specifications for Nine Mile Point Unit #1 (Appendix B, Section 4.6.1.a), we are enclosing the Annual Radiological Environmental Operating Report for the period January 1983 through December 1983.

Very truly yours,



Thomas E. Lempges
Vice President
Nuclear Generation

TEL/HJF/10
Encl. 2 copies
cc: Director, Office of NRR (17 copies)

FILED
11

1963
1964
1965