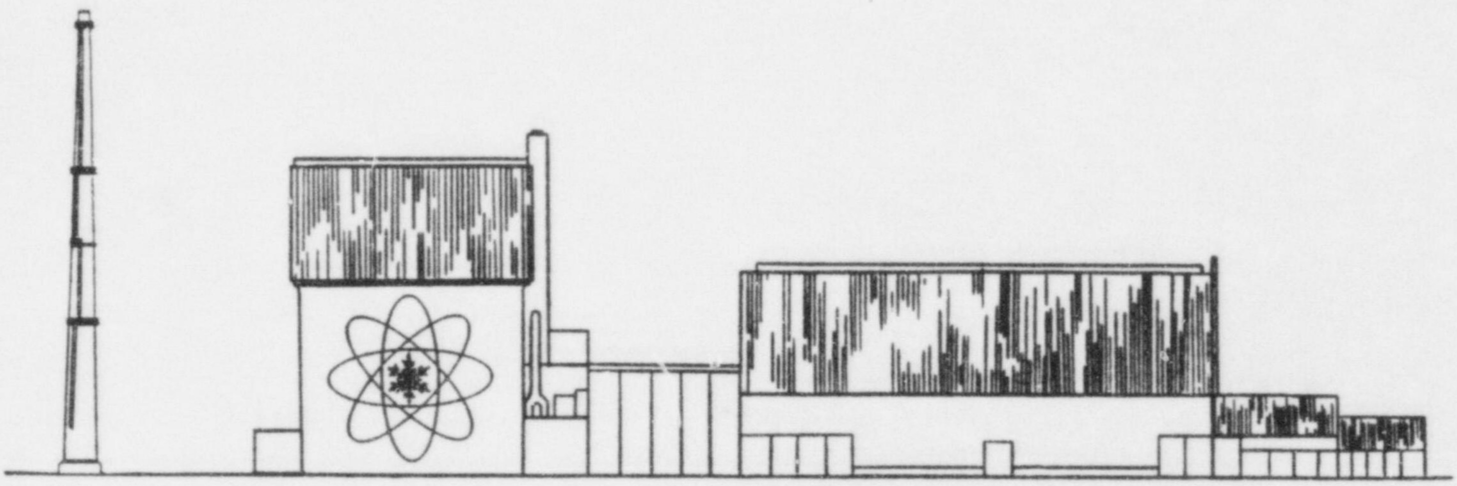
1985

RADIOLOGICAL ENVIRONMENTAL SURVEILLANCE REPORT

JANUARY 1, 1985 through DECEMBER 31, 1985



JAMES A. FITZPATRICK NUCLEAR POWER PLANT

OPERATING LICENSE NO. DPR- 59
DOCKET NO. 50- 333

NEW YORK POWER AUTHORITY

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NEW YORK POWER AUTHORITY

ANNUAL ENVIRONMENTAL OPERATING REPORT

PART B: RADIOLOGICAL REPORT

JANUARY 1, 1985 - DECEMBER 31, 1985

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

FACILITY OPERATING LICENSE DPR-59

DOCKET NUMBER 50-333

TABLE OF CONTENTS

LIST OF TABLES

LIST OF TABLES
(continued)

LIST OF FIGURES

LIST OF FIGURES
(continued)

I

INTRODUCTION

I-A INTRODUCTION

The New York Power Authority (NYPA) is the owner and licensee of the James A. FitzPatrick Nuclear Power Plant (JAFNPP) which is located on the eastern portion of the Nine Mile Point promontory approximately one-half mile due east of the Niagara Mohawk Power Corporation (NMPC) Nine Mile Point Nuclear Power Station (NMPNPS). The NMPNPS Unit #1 is located on the western portion of the site and is a boiling water reactor with a design capacity of 620 MWe. The NMPNPS has been in commercial operation since the fall of 1969. Located between the JAFNPP and NMPNPS, Nine Mile Point Unit #2 is under construction. NMPNPS Unit #2 will have generation capacity of 1,100 MWe and is expected to be completed in 1986. The JAFNPP is a boiling water reactor with a power output of 810 MWe (net). Initial fuel loading of the reactor core was completed in November of 1974. Initial criticality was achieved in late November, 1974 and commercial operation began in July of 1975.

The site is located on the southern shore of Lake Ontario in Oswego County, New York, approximately seven miles northeast of the city of Oswego, New York. Syracuse, New York is the largest metropolitan center in the area and is located 40 miles to the south of the site. The area consists of partially wooded land and shoreline. The land adjacent to the site is used mainly for recreational and residential purposes. For many miles to the west, east and south the country is characterized by rolling terrain rising gently up from the lake, composed mainly of glacial deposits. Approximately 34 percent of the land area in Oswego County is devoted to farming.

The Radiological Environmental Monitoring Program for the FitzPatrick Plant is a site program with responsibility for the program shared by the Power Authority and Niagara Mohawk. Similar Technical Specifications for radiological monitoring of the environment allows for majority of the sampling and analysis to be a joint undertaking. Data generated by the program is shared by the two facilities with review and publication of the data undertaken through each organization.

This report is submitted in accordance with Section 7.3.d of the Radiological Effluent Technical Specifications (RETS) to DPR-59, Docket 50-333.

This environmental report fulfills the requirements of both the Environmental Technical Specifications (ETS), which were in effect during the reporting period of January 1, 1985 through June 30, 1985, and the RETS which were in effect during the reporting period of July 1, 1985 through December 31, 1985.

I-B PROGRAM OBJECTIVES

The objectives of the Radiological Environmental Monitoring Program are as follows:

1. To determine and evaluate the effects of plant operation on the environs and to verify the effectiveness of the controls on radioactive material sources.

2. To monitor and evaluate natural radiation levels in the environs of the JAFNPP site.

3. To meet the requirements of applicable state and federal regulatory guides and limits.

4. To provide information by which the general public can evaluate the environmental aspects of nuclear power using data which is factual and unbiased.

II

PROGRAM IMPLEMENTATION AND DESIGN

II PROGRAM IMPLEMENTATION AND DESIGN

To achieve the objectives listed in Section I-B, sampling and analysis are performed as outlined in Tables I, II, and III in this section.

The sample collections for the radiological program are accomplished by a dedicated site environmental staff from both the James A. FitzPatrick Plant and the Nine Mile Point Station. The site staff is assisted by a contracted environmental engineering company, Ecological Analysts, Inc.(EA).

1. SAMPLE COLLECTION METHODOLOGY

A. Lake Water (surface water)

The indicator stations for the reporting period of January 1, 1985 through June 30, 1985 were the respective inlet canals at JAFNPP and NMPNPS. These samples are composited using continuously running pumps which discharge into large holding tanks.

The control station sample for the reporting period of January 1, 1985 through June 30, 1985 was collected from the city of Oswego water intake. The sample is drawn from the intake prior to treatment and is composited in a large sample bottle.

The indicator station for the remainder of the reporting period July 1, 1985 through December 31, 1985 is the inlet canal at JAFNPP.

The control station sample for the remainder of the reporting perriod July 1, 1985 through December 31, 1985 is collected from the Oswego Steam Station intake. This sample is composited using an interval sampler which discharges into a large plastic carboy.

B. Air Particulate/Iodine

The air sampling stations are located in two rings surrounding the site. The onsite locations ring the terrestrial area around the plants inside the site boundary.

The onsite sampling network is composed of nine stations. The offsite air monitoring locations range six to 17 miles from the site and are composed of six stations. Air monitoring locations are shown on Figure 2 of Section VII.

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.

The particulate filters during the reporting period of January 1, 1985 through June 30, 1985 were composited on a monthly basis by location (offsite, onsite) after being counted individually for gross beta activity.

The particulate filters during the reporting period of July 1, 1985 through December 31, 1985 are composited on a monthly basis by station (R1, R2, etc.) after being counted individually for gross beta activity.

C. Milk

During the 1985 grazing season, milk was collected from seven locations. Six of these locations are considered indicator samples and the seventh is used as a control sample. 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 homogeneous mixture of milk and butterfat.

During the first two months of the 1985 grazing season the milk samples were composited. Two gallons were collected during the first week of each month from each of the farms. An additional one gallon was collected from each farm at mid month to make up the second half of the monthly composite. The complete composite was made up from one gallon collected during the first week of the month and one gallon from the mid month collection.

During the remainder of the 1985 grazing season the milk samples were collected twice per month, but were not composited. The samples are chilled and shipped to the analytical contractor routinely within 36 hours of collection in insulated shipping containers. The milk sampling locations are found on Figure 4 of Section VII.

D. Meat, Poultry and Eggs

Semiannually one kilogram of meat is collected from locations within a 10 mile radius of the site. Periodic phone calls are made to the local slaughter houses to determine availability of slaughtered livestock from within the sampling area. Whenever possible meat samples are collected from locations previously used. Attempts are made to collect a control sample located outside the 10 mile radius, with each series of collections.

Semiannually one kilogram of poultry and one kilogram of eggs are collected from each of three locations within a 10 mile radius of the site. Attempts are made to collect poultry and eggs at the same time as the meat samples. The poultry and eggs are frozen and shipped in insulated containers. Whenever possible samples are obtained from previously sampled farms. Attempts are made to collect a control sample located outside the 10 mile radius, with each series of collections (see Section VII, Figure 5).

E. Food Products

One kilogram samples of three different kinds of broad leaf vegetation(edible or inedible) are collected during the late summer harvest season. Sample collections are performed at the site boundary in two different locations. The broad leaf vegetation is chilled prior to shipping and shipped fresh in insulated containers. Attempts are made to collect control samples located 9-20 miles distant for each type of sample (see Section VII, Figure 3).

F. Soil Samples

Soil samples were required once every three years under the old Environmental Technical Specifications. Soil samples are not required with implementation of the new Technical Specifications. Samples were collected, however, during 1983. Soil samples were taken at each of the 15 air monitoring stations at that time.

G. Fish Samples

Available fish species are removed from the Nine Mile Point Aquatic Ecology Study monitoring collections during the spring and fall collection periods. Samples are collected from a combination of the four onsite sample transects and one offsite sample transect (see Section VII, Figure 1). Available species are selected under the following guidelines:

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

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

Selected fish samples are frozen immediately after collection and segregated by species and location. Samples are shipped frozen in insulated containers for analysis.

H. GAMMARUS

GAMMARUS (fresh water shrimp) samples are collected by EA personnel during the spring and fall season from two onsite locations and from one offsite location. Natural and artificial substrates are used to collect samples. The GAMMARUS samples are removed from the sampling gear, frozen and shipped to the analytical contractor in insulated shipping containers.

I. Mollusks

During the spring and fall seasons at two onsite locations and one offsite location benthic samples are collected. The mollusks are collected by divers and sorted. The tissue is removed from the shell, frozen and shipped for analysis in insulated containers.

J. Bottom Sediments

One kilogram of bottom sediment sample is collected at two onsite locations and one offsite location. Samples are collected at the same time and location as the mollusk samples, where possible, by a diver. The samples are placed in plastic bags, sealed and shipped for analysis in insulated containers.

K. Periphyton

Periphyton (fresh water algae) samples are collected in the spring and fall seasons from two onsite locations and one offsite location. Periphyton is collected from natural substrates. The periphyton is scraped from the substrates into vials, labeled, frozen and shipped in insulated containers for offsite analysis.

L. Shoreline Sediments

One kilogram of shoreline sediment is collected at one area of existing or potential recreational value and from one area beyond the influence of the site. The samples are placed in plastic bags, sealed and shipped for analysis in insulated containers.

M. TLD (direct radiation)

Thermoluminescent dosimeters (TLD's) are used to measure direct radiation in the JAF/NMP-1 environment. The TLD stations are placed around the site using a two zone distribution. The first group of TLD's is located within the site boundary and are called "onsite" TLD's. The second set of TLD stations is the "offsite" stations, located at the offsite air monitoring stations and in areas of special interest such as population centers. Also included in the offsite group are the field control TLD's. A total of 45 TLD stations were used for the first two quarters of the 1985 TLD program. A total of 36 TLD stations were utilized for the last two quarters of the 1985 TLD program.

TLD's used during 1985 were rectangular Teflon wafers impregnated with 25 percent $CaSO^4$:Dy phosphor. These were sealed in a polyethylene package to insure dosimeter integrity. The TLD packages are further protected by placement in plastic holders, or by tape sealing to supporting surfaces. The dosimeters are collected, replaced and evaluated on a quarterly basis.

N. Land Use Census

A land use census is conducted during the beginning of the grazing season to determine the utilization of land within a distance of five miles from the site. The land use census usually consists of two types of census. A milk animal census is conducted to identify all milk animals within a distance of five miles from the site. This census is conducted by using road surveys, contacting local agricultural authorities, post cards, and investigating references from other owners.

A second type of census is a residence census. This census is conducted in order to identify the closest residence in each of the 22½ degree meteorological sectors. A residence, for the purpose of this census, is a residence that is occupied on a part time basis (such as a summer camp) or on a full time, year round basis. For the residence census, several of the meteorological sectors are over Lake Ontario because the site is located at the shoreline. No residences are located in these sectors. There are only eight sectors over land where residences are located within five miles.

O. Interlaboratory Comparison Program

An interlaboratory comparison program is conducted with reference samples originating from the Environmental Protection Agency (EPA). As required by the Technical Specifications, participation in this program includes media for which environmental samples are routinely collected and for which intercomparison samples are available.

2. ANALYSIS PERFORMED

The analysis of the environmental samples is performed by Teledyne Isotopes (TI) and the James A. FitzPatrick Environmental Counting Laboratory (JAFECL). The following samples are analyzed at the JAFECL:

Air Particulate Filter - gross beta (weekly)

Air Particulate Filter Composites - gamma spectral analysis (monthly)

Airborne Radioiodine - gamma spectral analysis (weekly)

Surface Water Composites - gamma spectral analysis (monthly)

Special Samples (soil, etc.) - gamma spectral analysis (as collected)

The remainder of the sample analysis as outlined in Tables I, II, and III in this section is performed by TI.

3. CHANGES TO THE 1985 SAMPLE PROGRAM

A. A number of changes were made to the JAF Radiological Environmental Monitoring Program (REMP) during 1985. These changes were made as a result of implementation of the new Radiological Effluent Technical Specifications (RETS), Amendment No. 93, Docket No. 50-333. The RETS were implemented on July 1, 1985 and were in effect during the reporting period of July 1, 1985 through December 31, 1985. The RETS replaced the old Environmental Technical Specifications (ETS), Amendment No. 73. The ETS were in effect during the reporting period of January 1, 1985 through June 30, 1985(see Tables I, II, and III).

The following are a list of changes made to the REMP during 1985 as a result of the RETS Implementation:

1. Periphyton, Mollusk, GAMMARUS, and Bottom Sediment sample collections were discontinued after July 1, 1985.

2. Strontium-89 and Strontium-90 analyses of Fish samples were discontinued after July 1, 1985.

3. Strontium-89 and Strontium-90 analyses of Lake Water were discontinued after July 1, 1985.

4. The control sample location for water sampling was changed during 1985 as a result of the new Technical Specifications effective July 1, 1985. The new Technical Specifications required that a control sample location be established that utilizes surface water from Lake Ontario. Since the indicator location (the FitzPatrick facility intake canal) utilizes Lake Ontario surface water, the control location was established as Niagara Mohawk Power Corporation's Oswego Steam Station intake canal. The previous control location (Oswego City Water Treatment System) was deleted as a control sample. Samples are still obtained intermittently, however, to monitor the city of Oswego drinking water supply.

5. Continuous Radiation Monitoring and Soil sample collections were no longer required after July 1, 1985, but may be continued at the discretion of the site.

6. Four of the fifteen air sampling stations were relocated during the end of 1984 to meet the requirements of the new Technical Specifications effective January 1, 1985 for NMPNPS and effective July 1, 1985 for JAFNPP. The new specifications required that three air sampling stations be located in three different 22½ degree meteorological sectors of highest calculated site average deposition values. The three stations (R-1, R-2, and R-3) were located at approximate sector mid point and near the site boundary, where possible.

The new specifications also required that a fourth air sampling station (R-4) be relocated in the vicinity of a year round community having the highest calculated site average deposition value (D/Q). A fifth air sampling station (R-5) is required to be a control sampling station. The existing control air sampling station met the requirements of the new specification so that the relocation of the control station was not required.

The relocation of the four air sampling stations affects the sampling locations for the weekly gross beta determinations of the weekly air particulate filters, the monthly composite of air particulate filters for gamma analysis and the weekly iodine 131 determinations from the charcoal cartridges.

In addition, the new Technical Specifications effective July 1, 1985 required that the monthly air particulate samples analyzed for gamma emitters be composites of weekly samples by station. Thus, the weekly air particulate filters are composited to form a monthly sample for each designated station. Previously, the monthly composite samples were comprised of two locations to form one onsite composite and one offsite composite from a total of fifteen air sampling stations.

7. Meat, Poultry, and Egg sample collections were no longer required after July 1, 1985, but may be continued at the discretion of the site.

8. Human Food Crop sample collections were replaced by Site Boundary Vegetation sample collections as of July 1, 1985. However, Human Food Crop samples may continue to be collected at the discretion of the site.

9. Strontium-90 analysis of Milk samples is no longer required after July 1, 1985. However, optional samples may be collected intermittently at select locations and analyzed for Sr-90 at the discretion of the site.

10. The new Technical Specifications deleted the previous requirement to composite milk once per month during the grazing season. The new specification requires that milk be collected twice per month for the months of April through December. In conjunction with bimonthly sampling, the new specification requires that samples be analyzed for I-131 in January through March in the event I-131 is detected in November through December of the previous year.

11. The milch census was changed slightly during 1985 as a result of the new Technical Specifications effective July 1, 1985. The previous Technical Specifications required a milch (milk animal) census conducted twice per year within ten miles of the site. The new specification required a milk animal census conducted once per year within five miles of the site. The milk animal census within ten miles was retained since it exceeded the requirements of the new specification. This census was conducted once once during 1985. As a result of the new specification, however, an additional census was conducted once during 1985 to identify the nearest residence in each of the sixteen 22½ degree meteorological sectors out to a distance of five miles. This data has been evaluated and is presented in Table 21 of the report.

12. Several environmental TLD locations were deleted and several added to the overall program during 1985. The new Technical Specifications, effective July 1, 1985, required that TLDs be placed at the site boundary in each of the sixteen 22½ degree meteorological sectors. In addition, TLDs were required to be placed at locations four to five miles from the site in each of the 22½ degree land based meteorological sectors. TLDs were also required to be located in special interest areas and control areas. Most of the special interest and control TLDs were already in place, as required by the previous Technical Specifications.

    Program TLD numbers 75-101 were added during the first quarter of 1985, 102 during the third quarter, 103 during the second quarter, and TLD numbers 43-46, 48, 50, 61 and 65 were deleted during the third quarter of 1985.

TABLE I*

SAMPLE COLLECTION AND ANALYSIS

SITE RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

A. LAKE PROGRAM[1]

MEDIA	ANALYSIS	FREQUENCY[4]	LOCATION[2]	
1. Fish	GeLi, ^{89}Sr & ^{90}Sr	2/yr	2 onsite	1 offsite
2. Mollusks	GeLi, ^{89}Sr & ^{90}Sr	2/yr	2 onsite	1 offsite
3. Gammarus	GeLi, ^{89}Sr & ^{90}Sr	2/yr	2 onsite	1 offsite
4. Bottom Sediments	GeLi, ^{90}Sr	2/yr	2 onsite	1 offsite
5. Periphyton	GeLi	2/yr	2 onsite	1 offsite
6. Lake Water	GB, GSA or GeLi ^{3}H, ^{89}Sr, ^{90}Sr	M Comp. Qtr. Comp.	3[3]	

Notes:

(1) Program continued for at least three years after the startup of James A. Fitzpatrick Nuclear Power Plant.
(2) Onsite locations samples collected in the vicinity of discharges, offsite samples collected at a distance of at least five miles from site.
(3) The three lake water samples to include Nine Mile Point Unit 1 intake water, James A. Fitzpatrick intake water, and Oswego City water.
(4) Samples of items 1 through 5 collected in spring and fall when available.
* These Environmental Technical Specifications were effective during the reporting period of January 1, 1985 through June 30, 1985 only.

TABLE II*

SAMPLE COLLECTION AND ANALYSIS

SITE RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

B. LAND PROGRAM(1)

	MEDIA	ANALYSIS	FREQUENCY	NO. OF LOCATIONS	LOCATIONS
1.	Air Particulates	GB GSA	W M Comp.(6)	At least 10	9 onsite 6 offsite
2.	Soil	GSA, ^{90}Sr	Every 3 years	15	9 onsite 6 offsite
3.	TLD	Gamma Dose	Qtr.	20	14 onsite 6 offsite
4.	Radiation Monitors	Gamma Dose	C	10	9 onsite 1 offsite
5.	Airborne - I^{131}	GSA	W	At least 10	9 onsite 6 offsite
6.	Milk	I	M	4(7)	(8)
		GSA, ^{90}Sr	M Comp.		
7.	Human Food Crops	GSA, ^{131}I	A	3	(8)
8.	Meat, Poultry, Eggs	GSA Edible Portion	SA 3	(8)	

Notes: (Cont.)

(6) Onsite samples counted together, offsite counted together, any high count samples counted separately.
(7) Frequency applied only during grazing season.
(8) Samples to be collected from farms within a 10-mile radius having the highest potential concentrations of radionuclides.
* These Environmental Technical Specifications were effective during the reporting period of January 1, 1985 through June 30, 1985 only.

Abbreviations:

M Comp. - Monthly composite of weekly or bi-weekly samples
GB - Gross beta analysis
GeLi - Gamma spectral analysis on a GeLi system (quantitative)
GSA - Gamma spectral analysis on a NaI system (quantitative)

A - Annually
W - Weekly
M - Monthly
C - Continuous

BW - Bi-weekly (alternate wks.)
Qtr. - Quarterly
SA - Semiannually

TABLE III*

OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

Exposure Pathway and/or Sample	Number of Samples[a] and Locations	Sampling and Collection Frequency[a]	Type and Frequency of Analysis
AIRBORNE			
Radioiodine and Particulates	Samples from 5 locations: a. 3 samples from offsite locations in different sectors of the highest calculated site average D/Q (based on all licensed site reactors). b. 1 sample from the vicinity of a community having the highest calculated site average D/Q (based on all licensed site reactors). c. 1 sample from a control location 9 to 20 miles distant and in the least prevalent wind direction[d].	Continuous sample operation with sample collection weekly or as required by dust loading, whichever is more frequent.	Radioiodine Canisters: Analyze weekly for I-131. Particulate Samples: Gross beta radioactivity following filter change[b] composite (by location) for gamma isotopic quarterly (as a minimum).
Direct Radiation[e]	32 stations with two or more dosimeters placed as follows: An inner ring of stations in the general area of th site boundary and an outer ring in the 4 to 5 mile range from the site with a station in each of the land based sectors of each ring. There are 16 land based sectors in the inner ring, and 8 land based sectors in the outer ring. The balance of the stations (8) are placed in special interest areas such as population centers, nearby residences, schools, and in 2 or 3 areas to serve as control stations.	Quarterly	Gamma dose monthly or quarterly.

TABLE III (CONTINUED)

Exposure Pathway and/or Sample	Number of Samples[a] and Locations	Sampling and Collection Frequency	Type and Frequency of Analysis
WATERBORNE			
Surface[f]	a. 1 sample upstream. b. 1 sample from the site's most downstream cooling water intake[d].	Composite sample over one month period[g].	Gamma isotopic analysis monthly. Composite for Tritium analysis quarterly[c].
Sediment from Shoreline	1 sample from a downstream area with existing or potential recreational value.	Twice per year.	Gamma isotopic analysis semiannually[c].
INGESTION			
Milk	a. Samples from milch animals in 3 locations within 3.5 miles distant having the higheat calculated site average D/Q. If there are none, then 1 sample from milch animals in each of 3 areas 3.5 to 5.0 miles distant having the highest calculated site average D/Q (based on all licensed site reactors)[h]. b. 1 sample from milch animals at a control location (9 to 20 miles distant and in a less prevalent wind direction)[d].	Twice per month, April through December (samples will be collected in January through March if I-131 is detected in November and December of the preceding year).	Gamma isotopic and I-131 analysis twice per month when milch animals are on pasture (April through December); monthly (January through March), if required[c].

TABLE III (CONTINUED)

Exposure Pathway and/or Sample	Number of Samples[a] and Locations	Sampling and Collection Frequency[a]	Type and Frequency of Analysis
Fish	a. 1 sample of each of 2 commercially or recreationally important species in the vicinity of a site discharge point.	Twice per year.	Gamma isotopic[c] analysis of edible portions.
	b. 1 sample of each of 2 species (same as in a. above or of a species with similar feeding habits) from an area at least 5 miles distant from the site[d].		
Food Products	a. Samples of 3 different kinds of broad leaf vegetation (edible or inedible) grown nearest each of two different off-site locations of highest calculated annual average ground level D/Q if milk sampling is not performed (based on all licensed site reactors).	Monthly when available (May through October).	Gamma isotopic[c] analysis. (Isotopic to include I-131.)
	b. 1 sample of each of the similar broad leaf vegetation grown 9-20 miles distant in the least prevalent wind direction in milk sampling is not performed.	Monthly when available (May through October).	Gamma isotopic[c] analysis. (Isotopic to include I-131.)
	c. In lieu of the garden census as specified in 6.2, samples of at least 3 different kinds of broad leaf vegetation (edible or inedible) may be performed at the site boundary in each of 2 different direction sectors with the highest calculated D/Qs.	Once, during harvest season.	Gamma isotopic[c] analysis. (Isotopic to include I-131.)
	1 sample each of 3 similar broad leaf varieties of vegetation grown 9-20 miles distant in the least prevalent wind direction sector[d].		

NOTES FOR TABLE III

(a) It is recognized that, at times, it may not be possible or practical to obtain samples of the media of choice at the most desired location or time. In these instances suitable alternative media and locations may be chosen for the particular pathway in question. Actual locations (distance and directions) from the site shall be provided in the Annual Radiological Environmental Operating Report. Calculated site averaged D/Q values and meteorological parameters are based on historical data (specified in the ODCM) for all licensed site reactors.

(b) Particulate sample filters should be analyzed for gross beta 24 hours or more after sampling to allow for radon and thoron daughter decay. If gross beta activity in air is greater than 10 times a historical yearly mean of control samples, gamma isotopic analysis shall be performed on the individual samples.

(c) Gamma isotopic analysis means the identification and quantification of gamma emitting radionuclides that may be attributable to the effluents from the plant.

(d) The purpose of these samples is to obtain background information. If it is not practical to establish control locations in accordance with the distance and wind direction criteria, other sites which provide valid background data may be substituted.

(e) One or more instruments, such as a pressurized ion chamber, for measuring and recording dose rate continuously may be used in place of, or in addition to, integrating dosimeters. For the purpose of this table, a thermoluminescent dosimeter may be considered to be one phosphor and two or more phosphors in a pocket may be considered as two or more dosimeters. Film badges shall not be used for measuring direct radiation.

(f) The "upstream sample" shall be taken at a distance beyond significant influence of the discharge. The "downstream sample" shall be taken in an area beyond, but near, the mixing zone, if practical.

(g) Composite samples should be collected with equipment (or equivalent) which is capable of collecting an aliquoit at time intervals which are very short (e.g., hourly) relative to the compositing period (e.g., monthly) in order to assure that a representative sample is obtained.

(h) A milk sampling location, as required in Table 6.1-1 is defined as a location having at least 10 milking cows present at a designated milk sample location. It has been found from past experience, and as a result of conferring with local farmers, that a minimum of 10 milking cows is necessary to guarantee an adequate supply of milk twice per month for analytical purposes. Locations with less than 10 milking cows are usually utilized for breeding purposes which eliminates a stable supply of milk for samples as a result of suckling calves and periods when the adult animals are dry. In the event that 3 milk sample locations cannot meet the requirement for 10 milking cows, then a sample location having less than 10 milking cows can be used if an adequate supply of milk can reasonably and reliably be obtained based on communications with the farmer.

* Table III Radiological Effluent Technical Specifications were effective during the reporting period of July 1, 1985 through December 31, 1985 only.

III

SAMPLE SUMMARIES

III SAMPLE SUMMARIES

All sample data is summarized in table form. The tables are titled "Radiological Monitoring Program Annual Summary" and use the following format:

A. Sample medium.

B. Type and number of analyses performed.

C. LLD (Lower Limits of Detection). This wording indicates that inclusive data is based on 4.66 sigma of background.

D. The mean and range of the positive measured values of the indicator locations.

E. The mean, range, and location of the highest indicator annual mean.

F. The mean and range of the positive measured values of the control locations.

G. The number of nonroutine reports sent to the Nuclear Regulatory Commission.

NOTE: Only positive measured values are used in statistical calculations. The use of LLD's in these calculations would result in means being biased high.

RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY
JAMES A. FITZPATRICK NUCLEAR POWER PLANT DOCKET NO. 50-333
OSWEGO COUNTY, STATE OF NEW YORK JANUARY - DECEMBER 1985

Medium (Units)	Type and Number of Analyses	LLD(a)	Indicator Locations: Mean (f) Range	Locations (b) of Highest Annual Mean: Location	& Mean(f) Range	Control Location: Mean (f) Range	Number of Nonroutine Reports*
Periphyton (pCi/g -wet)	GSA (3) Cs-137	N/A	0.46 (1/2) 0.46-0.46	JAF 0.6@5°	0.46 (1/1) 0.46-0.46	0.052 (1/1) 0.052-0.052	0
	Cs-134	N/A	<LLD		<LLD	<LLD	0
	I-131	N/A	<LLD		<LLD	<LLD	0
	Co-60	N/A	0.26 (1/2) 0.26-0.26	JAF 0.6@55°	0.26 (1/1) 0.26-0.26	<LLD	1(g)
Mollusk (pCi/g-wet)	GSA (3) Mn-54	N/A	0.070 (1/2) 0.070-0.070	NMP 0.3@275°	0.070 (1/1) 0.070-0.070	<LLD	0
	Co-60	N/A	0.035 (2/2) 0.030-0.040	JAF 0.6@55°	0.040 (1/1) 0.040-0.040	<LLD	0
	Cs-137	N/A	<LLD		<LLD	<LLD	0
	Sr-90	N/A	0.010 (1/2) 0.010-0.010	NMP 0.3@275°	0.010 (1/1) 0.010-0.010	0.003 (1/1) 0.003-0.003	0

RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY

JAMES A. FITZPATRICK NUCLEAR POWER PLANT DOCKET NO. 50-333

OSWEGO COUNTY, STATE OF NEW YORK JANUARY - DECEMBER 1985

Medium (Units)	Type and Number of Analyses	LLD(a)	Indicator Locations: Mean (f) Range	Locations (b) of Highest Annual Mean: Location	Mean(f) Range	Control Location: Mean (f) Range	Number of Nonroutine Reports*
Gammarus (pCi/g-wet)	GSA (3) Cs-134	N/A	<LLD		<LLD	<LLD	0
	Cs-137	N/A	<LLD		<LLD	<LLD	0
	Sr-90	N/A	(h)		(h)	(h)	0
Bottom Sediment (pCi/g-wet)	GSA (3) Cs-134	N/A	<LLD		<LLD	<LLD	0
	Cs-137	N/A	0.20 (2/2) 0.20-0.20	JAF (j) 0.6@55°	0.20 (1/1) 0.20-0.20	<LLD	0
	Co-60	N/A	<LLD		<LLD	<LLD	0
	Sr-90	N/A	0.002 (2/2) 0.002-0.003	NMP 0.3@275°	0.003 (1/1) 0.003-0.003	0.002 (1/1) 0.002-0.002	0

RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY
JAMES A. FITZPATRICK NUCLEAR POWER PLANT DOCKET NO. 50-333
OSWEGO COUNTY, STATE OF NEW YORK JANUARY - DECEMBER 1985

Medium (Units)	Type and Number of Analyses	LLD(a)	Indicator Locations: Mean (f) Range	Locations (b) of Highest Annual Mean: Location & Mean(f) Range	Control Location: Mean (f) Range	Number of Nonroutine Reports*
Shoreline Sediment (pCi/g-dry)	GSA (2)	0.15	<LLD	<LLD	<LLD	0
	Cs-134	0.18	<LLD	<LLD	<LLD	0
	Cs-137	N/A	<LLD	<LLD	<LLD	0
	Co-60	N/A	<LLD	<LLD	<LLD	0
	Sr-90	N/A	(e)	(e)	(e)	0
Fish (pCi/g-wet)	GSA (18)					
	Mn-54	0.13	<LLD	<LLD	<LLD	0
	Fe-59	0.26	<LLD	<LLD	<LLD	0
	Co-58	0.13	<LLD	<LLD	<LLD	0
	Co-60	0.13	<LLD	<LLD	<LLD	0
	Zn-65	0.26	<LLD	<LLD	<LLD	0
	Cs-134	0.13	<LLD	<LLD	<LLD	0
	Cs-137	0.15	0.030 (12/12) 0.018-0.045	NMP 0.3@275° 0.030 (6/6) 0.021-0.045	0.034 (6/6) 0.026-0.047	0
	Sr-89(9)	N/A	<LLD	<LLD	<LLD	0
	Sr-90(9)	N/A	<LLD	<LLD	0.0014 (1/6) 0.0014-0.0014	0

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OSWEGO COUNTY, STATE OF NEW YORK JANUARY - DECEMBER 1985

Medium (Units)	Type and Number of Analyses	LLD(a)	Indicator Locations: Mean (f) Range	Locations (b) of Highest Annual Mean: Location & Mean(f) Range	Control Location: Mean (f) Range	Number of Nonroutine Reports*
Circulating Water (pCi/liter)	G.B. (18)	4	3.4 (11/12) 2.5-4.5	NMP: 0.3@305° 3.6 (6/6) 3.1-4.5	3.0 (4/6) 1.9-4.1	0
	H-3 (10)	3000	530 (4/6) 250-1200	JAF 0.5@70° 530 (4/4) 250-1200	288 (4/4) (1) 230-430	0
	GSA (30)					
	Mn-54	15	<LLD	<LLD	<LLD	0
	Fe-59	30	<LLD	<LLD	<LLD	0
	Co-58	15	<LLD	<LLD	<LLD	0
	Co-60	15	<LLD	<LLD	<LLD	0
	Zn-65	30	<LLD	<LLD	<LLD	0
	Zr-95	15	<LLD	<LLD	<LLD	0
	Nb-95	15	<LLD	<LLD	<LLD	0
	I-131	N/A	<LLD	<LLD	<LLD	0
	Cs-134	15	<LLD	<LLD	<LLD	0
	Cs-137	18	<LLD	<LLD	<LLD	0
	Ba/La-140	15	<LLD	<LLD	<LLD	0
	Sr-89(6)	N/A	<LLD	<LLD	<LLD	0
	Sr-90(6)	N/A	<LLD	<LLD	<LLD	0

RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY
JAMES A. FITZPATRICK NUCLEAR POWER PLANT DOCKET NO. 50-333
OSWEGO COUNTY, STATE OF NEW YORK JANUARY - DECEMBER 1985

Medium (Units)	Type and Number of Analyses	LLD(a)	Indicator Locations: Mean (f) Range	Locations (b) of Highest Annual Mean: Location & Mean(f) Range	Control Location: Mean (f) Range	Number of Nonroutine Reports*
				02-on?	Which location? R5?	
Air Particulates	G.B.(777)	0.01	0.021 (725/725) 0.001-0.044	R2:Off- 1.1@104° 0.023 (52/52) 0.013-0.039	0.024 (52/52) 0.013-0.043	0
	GSA(42):					
	I-131(777)	0.07	<LLD	<LLD	<LLD	0
	Cs-134	0.05	<LLD	<LLD	<LLD	0
	Cs-137	0.06	<LLD	<LLD	<LLD	0
TLD (mrem per standard month)	Gamma Dose(160)	N/A	5.82 (95/95) (c) 3.95-12.65	#85 0.2@294° 11.22 (2/2)(k) 9.8-12.65	5.67 (12/12) 5.22-6.15	0
Env. Rad. Monitor (mR/hr)	Gamma(d) Dose(128)	N/A	0.020(115/115) 0.010-0.200	H-On 0.8@71 0.040 (13/13) 0.010-0.200	0.018 (13/13) 0.010-0.060	0
Milk (pCi/liter)	GSA (98)					
	Cs-134	15	<LLD	<LLD	<LLD	0
	Cs-137	18	<LLD	<LLD	<LLD	0
	Ba/La-140	15	<LLD	<LLD	<LLD	0
	I-131(98)	1	<LLD	<LLD	<LLD	0
	(e) Sr-90(14)	N/A	2.1 (12/12) 0.8-4.4	9.0@95° 3.0 (2/2) 1.5-4.4	2.1 (2/2) 2.0-2.1	0

RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY
JAMES A. FITZPATRICK NUCLEAR POWER PLANT DOCKET NO. 50-333
OSWEGO COUNTY, STATE OF NEW YO'. JANUARY - DECEMBER 1985

Medium (Units)	Type and Number of Analyses	LLD(a)	Indicator Locations: Mean (f) Range	Locations (b) of Highest Annual Mean: Location & Mean(f) Range	Control Location: Mean (f) Range	Number of Nonroutine Reports*
Eggs (pCi/g-wet)	GSA(4)	N/A	<LLD	<LLD	<LLD	0
Poultry (pCi/g-wet)	GSA(4)	N/A	<LLD	<LLD	<LLD	0
Meat (pCi/g-wet)	GSA(3)	N/A	<LLD	<LLD	<LLD	0
Food Products (pCi/g-wet)	GSA(9) I-131	0.06	<LLD	<LLD	<LLD	0
Inedible Vegetation	Cs-134	0.06	<LLD	<LLD	<LLD	0
	Cs-137	0.08	0.14 (3/6) 0.04-0.26	0.9@106° 0.26 (1/3) 0.26-0.26	<LLD	0
	Co-60	N/A	0.06 (1/6) 0.06-0.06	0.9@75° 0.06 (1/3) 0.06-0.06	<LLD	0

ANNUAL SUMMARY TABLE NOTES

N/A = Not applicable

(f) = Fraction of detectable measurement to total measurement

(a) = LLD values as required by the Radiological Effluent Technical Specifications effective July 1, 1985. LLD values are not a technical specification during the reporting period of January 1, 1985 through June 30, 1985.

(b) = Location is distance in miles, and direction in compass degrees.

(c) = Indicators TLD locations are: #3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 15, 19, 23, 24, 25, and 26 for reporting period January 1, 1985 through June 30, 1985. Indicator TLD locations are: #7, 23, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 15, 18, 56, and 58 for reporting period July 1, 1985 through December 31, 1985. Control TLD's are all TLD's located beyond the influence of the site (#8, 14, 49) for reporting period January 1, 1985 through December 31, 1985.

(d) = Based on monthly chart readings.

(e) = Sr-90 analysis no longer required after July 1, 1985 with implementation of new Radiological Effluent Technical Specifications.

* = Nonroutine reports are based on Environmental Technical Specification requirements.

(g) = Indicator Co-60 exceeded control Co-60 by greater than ten times.

(h) = Insufficient sample for Sr-90 analysis.

(i) = Indicator samples from environmental stations D1 onsite, D2 onsite, E onsite, F onsite, G onsite, H onsite, I onsite, J onsite, K onsite, R1 offsite, R2 offsite, R3 offsite, R4 offsite, and G offsite. Control samples are samples from R5 offsite environmental station.

(j) = The NMP(02) location had the same concentration for Cs-137 in Bottom Sediment as JAF(03).

(k) = This dose is not representative of doses to a member of the public since this area is located near the north shoreline which is in close proximity to the generating facility and is not accessible to members of the public (see Section V.4-TLD's).

IV

ANALYTICAL RESULTS

IV ANALYTICAL RESULTS

Environmental Sample Data

Environmental sample data is summarized by tables. Tables are provided for select sample media and contain data based on actual values obtained over the year. These values are comprised of both positive values and LLD values where applicable.

TABLE 1

CONCENTRATIONS OF GAMMA EMITTERS IN PERIPHYTON SAMPLES

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

COLLECTION SITE	NUCLIDES FOUND	JULY 1985
FitzPatrick (03)	Be-7	10.9±1.1
	K-40	3.45±0.40
	Mn-54	<0.05
	Co-58	<0.03
	Fe-59	<0.07
	Co-60	0.26±0.04
	Zn-65	<0.06
	Cs-134	0.06±0.04
	Cs-137	0.46±0.05
	Ra-226	<0.67
	Th-228	0.28±0.06
	Others	<LLD
Nine Mile Point (02)	Be-7	1.46±0.68
	K-40	<1.20
	Mn-54	<0.05
	Co-58	<0.05
	Fe-59	<0.13
	Co-60	<0.07
	Zn-65	<0.08
	Cs-134	<0.06
	Cs-137	<0.08
	Ra-226	<1.30
	Th-228	<0.12
	Others	<LLD
Oswego (Control - 00)	Be-7	3.08±0.43
	K-40	1.73±0.41
	Mn-54	<0.02
	Co-58	<0.04
	Fe-59	<0.08
	Co-60	<0.02
	Zn-65	<0.04
	Cs-134	<0.02
	Cs-137	0.05±0.02
	Ra-226	<0.43
	Th-228	<0.06
	Others	<LLD

TABLE 2

CONCENTRATIONS OF STRONTIUM-90 AND GAMMA EMITTERS IN BOTTOM SEDIMENT AND SHORELINE SEDIMENT SAMPLES

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

COLLECTION SITE	COLLECTION DATE		GAMMA EMITTERS					
		Sr-90	K-40	Co-60	Cs-134	Cs-137	Ra-226	OTHERS
FitzPatrick (03) Bottom Sediment	06/25/85	0.002±0.0004	10.4±1.7	<0.130	<0.088	0.20±0.10	<1.1	<LLD
Nine Mile Point (02) Bottom Sediment	06/25/85	0.003±0.001	11.1±1.2	<0.083	<0.065	0.20±0.09	<1.1	<LLD
Oswego (Control - 00) Bottom Sediment	06/25/85	0.002±0.001	7.6±1.1	<0.059	<0.080	<0.10	<1.5	<LLD

TABLE 2
(CONTINUED)
CONCENTRATIONS OF STRONTIUM - 90 AND GAMMA EMITTERS IN BOTTOM SEDIMENT
AND SHORELINE SEDIMENT SAMPLES

Results in Units of pCi/g (drz) - 2 Sigma

COLLECTION SITE*	COLLECTION DATE	Sr-90	GAMMA EMITTERS K-40	Co-60	Cs-134	Cs-137	Ra-226	OTHERS
Sunset Beach Shoreline Sediment	11/12/85	(a)	13.5±1.5	<0.05	<0.08	<0.17	<2.1	Th-28 0.92±0.10 All Others <LLD
Lang's Beach (Control) Shoreline Sediment	11/12/85	(a)	15.4±1.5	<0.08	<0.07	<0.06	<1.2	Th-228 0.56±0.18 All Others <LLD

* Corresponds to sample locations voted on Figure 1 Section VII
(a) Sr-90 analysis no longer required by new Technical Specifications (July 1, 1985)

TABLE 3

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

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

COLLECTION SITE	COLLECTION DATE	Sr-89	Sr-90	GAMMA EMITTERS									
				K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137	Ra-226	OTHERS
FitzPatrick (03)	06/21/85	<0.007	<0.002	0.44±0.21	<0.04	<0.02	<0.03	0.04±0.02	<0.04	<0.03	<0.02	<0.51	<LLD
Nine Mile Point (02)	06/18/85	<0.009	0.010±0.002	0.33±0.15	0.07±0.02	<0.01	<0.04	0.03±0.01	<0.03	<0.05	<0.02	<0.43	<LLD
Oswego (Control - 00)	06/17/85	<0.010	0.003±0.002	0.55±0.19	<0.02	<0.02	<0.04	<0.02	<0.05	<0.02	<0.02	<0.40	<LLD

TABLE 4

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

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

COLLECTION SITE	COLLECTION DATE	Sr-89	Sr-90	GAMMA EMITTERS Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137	OTHERS
FitzPatrick (03)	06/25/85 to 07/12/85	*	*	<0.35	<0.38	<0.81	<0.42	<0.71	<0.39	<0.37	<LLD
Nine Mile Point (02)	06/25/85 to 07/12/85	*	*	<2.0	<2.0	<4.2	<2.1	<4.4	<1.9	<2.2	<LLD
Oswego Control - 00)	06/25/85 to 07/12/85	*	*	<0.19	<0.20	<0.49	<0.22	<0.50	<0.21	<0.20	K-40 7.63±1.98 ALL OTHERS <LLD

* Insufficient sample for Sr-89 and Sr-90 analysis.

TABLE 5

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

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

SAMPLE DATE	SAMPLE TYPE	Sr-89	Sr-90	GAMMA EMITTERS K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137	OTHERS
						FITZPATRICK						
June 1985	Brown Trout #1	<0.003	<0.001	3.8±0.4	<0.021	<0.023	<0.059	<0.022	<0.045	<0.024	0.044±0.021	ALL<LLD
	Brown Trout #2	<0.003	<0.001	3.1±0.3	<0.008	<0.009	<0.023	<0.008	<0.019	<0.009	0.032±0.007	ALL<LLD
	Lake Trout	<0.003	<0.001	2.9±0.3	<0.008	<0.010	<0.024	<0.008	<0.020	<0.009	0.033±0.008	ALL<LLD
October 1985	Chinook Salmon	*	*	3.2±0.3	<0.012	<0.014	<0.068	<0.031	<0.052	<0.012	0.025±0.008	ALL<LLD
	Brown Trout	*	*	3.0±0.3	<0.005	<0.006	<0.014	<0.005	<0.012	<0.005	0.018±0.005	ALL<LLD
	Small Mouth Bass	*	*	2.7±0.3	<0.007	<0.010	<0.026	<0.008	<0.018	<0.008	0.035±0.007	ALL<LLD
						NINE MILE POINT						
July 1985	Brown Trout #1	<0.002	<0.002	2.8±0.3	<0.006	<0.007	<0.017	<0.007	<0.015	<0.007	0.025±0.006	ALL<LLD
	Brown Trout #2	<0.003	<0.002	3.1±0.3	<0.005	<0.005	<0.014	<0.005	<0.013	<0.005	0.028±0.005	ALL<LLD
	Lake Trout	<0.003	<0.002	3.0±0.3	<0.005	<0.005	<0.013	<0.006	<0.011	<0.005	0.036±0.006	ALL<LLD
October 1985	Chinook Salmon	*	*	3.4±0.3	<0.007	<0.009	<0.024	<0.008	<0.018	<0.008	0.023±0.007	ALL<LLD
	Brown Trout	*	*	3.5±0.4	<0.008	<0.008	<0.020	<0.009	<0.018	<0.008	0.021±0.009	ALL<LLD
	Small Mouth Bass	*	*	3.6±0.4	<0.007	<0.007	<0.018	<0.007	<0.018	<0.007	0.045±0.008	ALL<LLD
CONTROL						OSWEGO						
June 1985	Brown Trout #1	<0.002	<0.001	3.0±0.3	<0.005	<0.005	<0.014	<0.005	<0.012	<0.005	0.026±0.005	ALL<LLD
	Brown Trout #2	<0.003	<0.001	5.0±0.5	<0.021	<0.025	<0.054	<0.026	<0.047	<0.021	0.047±0.021	ALL<LLD
	Lake Trout	<0.003	0.0014± 0.0005	2.9±0.3	<0.005	<0.006	<0.015	<0.005	<0.012	<0.005	0.035±0.006	ALL<LLD
October 1985	Chinook Salmon	*	*	3.4±0.3	<0.008	<0.009	<0.024	<0.009	<0.020	<0.008	0.033±0.008	ALL<LLD
	Brown Trout	*	*	3.6±0.4	<0.007	<0.007	<0.020	<0.007	<0.016	<0.007	0.026±0.007	ALL<LLD
	Small Mouth Bass	*	*	3.1±0.3	<0.009	<0.011	<0.031	<0.009	<0.023	<0.010	0.034±0.009	ALL<LLD

* Sr-89 and Sr-90 analysis no longer required with implementation of new Radiological Effluent Technical Specifications (July 1, 1985).

TABLE 6

CONCENTRATIONS OF BETA EMITTERS IN LAKE WATER SAMPLES - 1985

Results in Units of pCi/l $\pm$ 2 sigma

Station Code	January	February	March	April	May	June
JAF Inlet	2.5±1.3	4.0±1.6	2.8±1.8	<2.0	2.7±0.9	3.3±1.7
NMP Inlet	3.6±1.4	4.1±1.7	3.1±1.8	4.5±1.8	3.1±0.9	3.3±1.7
Raw City Water (control)	1.9±1.3	4.1±1.6	<3.0	<2.4	2.7±0.9	3.3±1.6

TABLE 7

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

Results in Units of pCi/l $\pm$ 2 sigma

STATION CODE	PERIOD	DATE	TRITIUM	Sr-89	Sr-90
JAF INLET	First Quarter	01/02/85 to 03/30/85	320 $\pm$ 80	<0.90	
	Second Quarter	04/01/85 to 07/01/85	350 $\pm$ 110	<1.7	<0.84
	Third Quarter	07/01/85 to 09/30/85	1200 $\pm$ 100	----	------
	Fourth Quarter	09/30/85 to 12/30/85	250 $\pm$ 90	----	------
NMP INLET	First Quarter	12/31/84 to 04/01/85	<210	<1.6	<0.93
	Second Quarter	04/01/85 to 07/01/85	<100	<2.0	<0.82
RAW CITY WATER (Control)	First Quarter	12/31/84 to 04/01/85	240 $\pm$ 80	<1.8	<0.63
	Second Quarter	04/01/85 to 07/01/85	430 $\pm$ 70	<2.0	<0.77
OSWEGO STEAM STATION (control)	Third Quarter	07/01/85 to 10/01/85	250 $\pm$ 40	----	----
	Fourth Quarter	10/01/85 to 12/31/85	230 $\pm$ 70	----	----

NOTE: Sr-89 and Sr-90 analyses are no longer required since implementation of the new Technical Specifications (RETS) which became effective July 1, 1985. In addition, the Raw City Water Control location was replaced by the Oswego Steam Station location to meet the requirements of the new RETS.

TABLE 8

CONCENTRATIONS OF GAMMA EMITTERS IN LAKE WATER SAMPLES - 1985

Results in Units of pCi/l±2 sigma

Station Code	Nuclide	January	February	March	April	May	June
OSWEGO CITY WATER (00, CONTROL)	Ra-226	<18.7	15.0±9.0	21.5±10.8	<18.7	<20.3	<19.2
	Cs-134	<0.88	<1.11	<1.02	<1.04	<1.14	<1.22
	Cs-137	<0.94	<1.02	<1.00	<1.14	<1/14	<1.10
	Zr-95	<2.61	<3.06	<2.95	<2.77	<3.97	<4.21
	Nb-95	<1.71	<1.78	<1.69	<1.71	<1.50	<2.80
	Co-58	<1.18	<1.25	<1.39	<0.94	<1.48	<1.47
	Mn-54	<0.92	<1.19	<1.11	<0.97	<1.09	<1.06
	Fe-59	<1.35	<1.70	<1.33	<1.73	<2.31	<2.41
	Co-60	<0.82	<1.27	<1.33	<1.25	<1.23	<1.05
	K-40	9.4±6.3	8.6±6.6	<12.3	7.9±5.8	<13.6	7.1±5.0
NINE MILE POINT (02, INLET)	Ra-226	<20.1	21.4±9.0	18.4±10.5	<18.2	19.6±9.7	13.4±7.6
	Cs-134	<0.94	<1.03	<1.16	<0.93	<1.17	<1.08
	Cs-137	<1.13	<1.17	<1.05	<0.95	<1.20	<1.15
	Zr-95	<3.55	<2.96	<3.08	<2.84	<3.42	<3.76
	Nb-95	<1.87	<1.76	<1.67	<1.52	<2.17	<2.53
	Co-58	<1.25	<1.16	<1.48	<1.22	<1.39	<1.61
	Mn-54	<1.03	<1.28	<1.14	<1.12	<1.19	<1.18
	Fe-59	<2.11	<1.94	<1.80	<1.92	<2.04	<1.99
	Co-60	<1.28	<1.55	<1.42	<1.56	<1.42	<1.22
	K-40	13.7±7.5	<12.3	<7.60	<13.9	<14.0	<12.6
FITZPATRICK (03, INLET)	Ra-226	<18.3	21.0±8.7	16.0±9.0	<17.0	23.7±9.0	<19.8
	Cs-134	<1.00	<1.14	<1.12	<1.26	<1.08	<0.96
	Cs-137	<1.05	<1.04	<1.15	<1.07	<1.12	<1.15
	Zr-95	<3.21	<3.18	<3.63	<2.77	<3.37	<3.72
	Nb-95	<1.70	<1.74	<2.27	<1.74	<2.76	<2.07
	Co-58	<1.22	<1.29	<1.35	<1.12	<1.47	<1.29
	Mn-54	<0.99	<1.11	<1.08	<0.85	<1.05	<1.14
	Fe-59	<1.76	<2.02	<2.04	<2.10	<1.91	<2.04
	Co-60	<1.34	<1.16	<1.08	<1.43	<1.29	<1.28
	K-40	<12.9	9.4±6.9	13.0±7.4	<13.2	7.8±6.4	<11.8

TABLE 8 (Continued)

CONCENTRATIONS OF GAMMA EMITTERS IN LAKE WATER SAMPLES - 1985

Results in Units of pCi/l ± 2 sigma

Station Code	Nuclide	July	August	September	October	November	December
OSWEGO STEAM STATION* (CONTROL)	Ra-226	15.3±6.2	22.0±11.2	14.0±4.8	20.3±9.8	<19.2	<20.6
	Cs-134	<0.75	<1.12	<0.48	<1.16	<0.95	<1.11
	Cs-137	<0.72	<1.04	<0.48	<1.15	<1.04	<1.40
	Zr-95	<2.32	<2.70	<1.58	<2.75	<2.60	<2.85
	Nb-95	<1.36	<1.73	<1.03	<1.95	<1.32	<1.57
	Co-58	<0.95	<1.12	<0.65	<1.35	<0.90	<1.24
	Mn-54	<0.74	<1.20	<0.55	<0.99	<1.03	<1.15
	Fe-59	<1.42	<1.18	<0.84	<2.21	<2.03	<2.06
	Co-60	<0.83	<0.99	<0.54	<1.45	<1.17	<1.22
	K-40	13.6±5.5	<16.8	7.1±3.2	<16.3	<15.6	<20.9
FITZPATRICK (03, INLET)	Ra-226	<18.5	<18.1	23.8±10.4	15.0±8.4	18.7±13.9	27.4±14.5
	Cs-134	<0.89	<1.17	<1.02	<0.91	<1.48	<1.14
	Cs-137	<1.13	<1.19	<1.17	<1.07	<1.61	<1.04
	Zr-95	<2.87	<3.05	<2.57	<2.61	<4.97	<2.70
	Nb-95	<1.41	<1.98	<1.77	<1.42	<2.12	<1.79
	CO-58	<1.12	<1.57	<1.12	<1.28	<1.39	<1.37
	Mn-54	<1.02	<1.25	<1.01	<0.64	<1.41	<1.17
	Fe-59	<1.61	<2.21	<2.44	<1.67	<2.13	<1.42
	Co-60	<1.22	<1.22	<1.57	<1.35	<1.76	<1.22
	K-40	<14.8	<12.5	<13.8	9.8±6.9	<20.1	<16.9

* The Raw City Water Control loation was replaced by the Oswego Steam Station location to meet the requirements of the new RETS which were implemented on July 1, 1985.

TABLE 9

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

LOCATION

WEEK END DATE	R5-OFF	R1-OFF	R2-OFF .010 - .040	R3-OFF	R4-OFF	G--OFF
85/01/08	0.025±0.005	0.027±0.004	0.023±0.004	0.021±0.003	0.021±0.004	0.030±0.005
85/01/15	0.025±0.004	0.017±0.003	0.036±0.005	0.022±0.003	0.022±0.003	0.019±0.003
85/01/23	0.028±0.004	0.012±0.002	0.017±0.002	0.028±0.004	0.030±0.004	0.022±0.004
85/02/29	0.022±0.005	0.014±0.003	0.021±0.003	0.018±0.003	0.020±0.003	0.014±0.002
85/02/05	0.026±0.004	0.012±0.003	0.028±0.005	0.029±0.005	0.030±0.004	0.017±0.003
85/02/11	0.022±0.004	0.014±0.003	0.023±0.003	0.016±0.003	0.022±0.003	0.030±0.006
85/02/19	0.024±0.003	0.013±0.002	0.026±0.003	0.013±0.002	0.023±0.003	0.022±0.003
85/02/26	0.021±0.003	0.009±0.003	0.027±0.003	0.017±0.003	0.025±0.003	0.023±0.004
85/03/05	0.026±0.004	0.019±0.003	0.022±0.003	0.024±0.003	0.024±0.003	0.026±0.004
85/03/12	0.029±0.004	0.024±0.004	0.023±0.003	0.024±0.003	0.044±0.005	0.026±0.004
85/03/19	0.016±0.003	0.021±0.003	0.018±0.003	0.016±0.003	0.021±0.004	0.023±0.004
85/03/25	0.027±0.004	0.025±0.004	0.024±0.004	0.023±0.004	0.028±0.004	0.024±0.004
85/04/02	0.016±0.003	0.018±0.003	0.017±0.003	0.016±0.003	0.016±0.003	0.017±0.003
85/04/09	0.021±0.003	0.022±0.003	0.019±0.003	0.019±0.003	0.015±0.003	0.022±0.004
85/04/06	0.028±0.004	0.030±0.004	0.030±0.004	0.029±0.004	0.031±0.004	0.036±0.005
85/04/23	0.029±0.004	0.031±0.004	0.031±0.004	0.034±0.004	0.028±0.004	0.029±0.004
85/04/30	0.019±0.004	0.022±0.003	0.022±0.003	0.024±0.003	0.018±0.003	0.021±0.004
85/05/07	0.022±0.004	0.016±0.003	0.016±0.003	0.018±0.003	0.016±0.003	0.017±0.004
85/05/14	0.028±0.004	0.024±0.003	0.024±0.003	0.025±0.003	0.023±0.003	0.027±0.004
85/05/21	0.019±0.003	0.014±0.002	0.018±0.003	0.019±0.003	0.015±0.003	0.019±0.003
85/05/29	0.029±0.004	0.027±0.003	0.030±0.003	0.027±0.003	0.027±0.003	0.029±0.004
85/06/4	0.018±0.004	0.021±0.003	0.021±0.003	0.023±0.003	0.021±0.003	0.019±0.003
85/06/11	0.016±0.003	0.018±0.003	0.015±0.003	0.016±0.003	0.013±0.003	0.016±0.003
85/06/18	0.018±0.003	0.015±0.003	0.018±0.003	0.016±0.003	0.015±0.003	0.015±0.003
85/06/24	0.021±0.004	0.025±0.004	0.024±0.004	0.024±0.003	0.024±0.004	0.028±0.004
85/07/02	0.013±0.003	0.013±0.002	0.013±0.002	0.011±0.002	0.011±0.002	0.014±0.003
85/07/09	0.031±0.004	0.031±0.003	0.030±0.004	0.020±0.003	0.028±0.003	0.029±0.004
85/07/17	0.027±0.004	0.022±0.003	0.026±0.004	0.028±0.004	0.028±0.003	0.023±0.003
85/07/23	0.022±0.004	0.023±0.003	0.022±0.003	0.021±0.003	0.020±0.003	0.018±0.003
85/07/30	0.022±0.004	0.019±0.003	0.021±0.003	0.025±0.003	0.021±0.003	0.019±0.003
85/08/06	0.034±0.004	0.039±0.004	0.038±0.004	0.041±0.004	0.043±0.004	0.038±0.004
85/08/13	0.027±0.003	0.025±0.003	0.027±0.003	0.025±0.003	0.025±0.003	0.026±0.004
85/08/20	0.031±0.003	0.031±0.003	0.028±0.003	0.030±0.003	0.030±0.003	0.030±0.004
85/08/27	0.021±0.003	0.017±0.003	0.016±0.003	0.017±0.002	0.018±0.003	0.019±0.003
85/09/04	0.030±0.003	0.039±0.003	0.034±0.003	0.036±0.003	0.033±0.003	0.034±0.003
85/09/10	0.029±0.003	0.029±0.003	0.031±0.004	0.031±0.003	0.030±0.004	0.030±0.004
85/09/17	0.021±0.003	0.022±0.003	0.024±0.003	0.027±0.003	0.026±0.003	0.028±0.003
85/09/24	0.043±0.004	0.036±0.003	0.040±0.004	0.038±0.004	0.033±0.004	0.037±0.004
85/10/1	0.030±0.003	0.025±0.003	0.028±0.003	0.029±0.003	0.026±0.003	0.031±0.004
85/10/08	0.019±0.003	0.023±0.003	0.021±0.003	0.022±0.003	0.021±0.003	0.028±0.003
85/10/16	0.020±0.002	0.022±0.003	0.024±0.003	0.025±0.003	0.024±0.003	0.023±0.003
85/10/22	0.023±0.003	0.023±0.003	0.022±0.003	0.025±0.003	0.021±0.003	0.022±0.003
85/10/29	0.019±0.003	0.017±0.002	0.017±0.003	0.020±0.003	0.018±0.003	0.020±0.003
85/11/05	0.013±0.003	0.016±0.003	0.012±0.002	0.012±0.002	0.011±0.002	0.015±0.003
85/11/12	0.014±0.003	0.011±0.002	0.010±0.002	0.013±0.002	0.014±0.003	0.015±0.003
85/11/19	0.024±0.003	0.020±0.003	0.032±0.007	0.019±0.003	0.018±0.003	0.028±0.006
85/11/26	0.027±0.004	0.028±0.003	0.025±0.003	0.031±0.003	0.026±0.003	0.028±0.004
85/12/03	0.018±0.003	0.019±0.003	0.021±0.003	0.021±0.003	0.019±0.003	0.020±0.003
85/12/10	0.027±0.003	0.026±0.003	0.029±0.004	0.028±0.004	0.026±0.003	0.022±0.004
85/12/17	0.024±0.003	0.026±0.003	0.023±0.003	0.021±0.003	0.025±0.003	0.028±0.004
85/12/23	0.024±0.003	0.026±0.003	0.035±0.005	0.021±0.003	0.026±0.004	0.027±0.004
85/12/30	0.018±0.003	0.023±0.003	0.023±0.003	0.019±0.003	0.024±0.003	0.024±0.003

* PUMP NOT OPERATIONAL

TABLE 10

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

WEEK END DATE	LOCATION D1-ON	D2-ON	E--ON	F--ON	G--ON	H--ON	I--ON	J--ON	K--ON
85/01/07	0.027±0.004	0.029±0.005	0.025±0.004	0.020±0.004	0.024±0.004	0.023±0.004	0.015±0.003	0.034±0.005	0.021±0.004
85/01/14	0.024±0.004	0.019±0.003	0.020±0.003	0.022±0.003	0.021±0.003	0.029±0.016	0.007±0.002	0.018±0.003	0.017±0.003
85/01/23	0.019±0.003	0.024±0.004	0.028±0.006	0.022±0.003	0.019±0.003	0.001±0.001	0.005±0.002	0.030±0.005	0.022±0.003
85/01/28	0.013±0.003	0.020±0.004	0.019±0.003	0.016±0.003	0.008±0.003	0.018±0.004	0.006±0.003	0.015±0.003	0.017±0.003
85/02/04	0.026±0.004	0.034±0.005	0.028±0.003	0.023±0.004	0.021±0.003	0.021±0.003	0.006±0.002	0.028±0.004	0.017±0.003
85/02/11	0.026±0.003	0.034±0.004	0.026±0.003	0.027±0.004	0.023±0.003	0.022±0.003	0.015±0.003	0.022±0.003	0.025±0.003
85/02/19	0.024±0.003	0.029±0.004	0.023±0.003	0.021±0.003	0.026±0.003	0.020±0.003	0.021±0.003	0.023±0.003	0.020±0.003
85/02/25	0.021±0.003	0.015±0.003	0.031±0.004	0.022±0.004	0.016±0.003	0.019±0.003	0.005±0.002	0.010±0.002	0.014±0.003
85/03/05	0.026±0.003	0.020±0.003	0.023±0.003	0.022±0.003	0.024±0.003	0.021±0.003	0.008±0.002	0.018±0.003	0.020±0.003
85/03/11	0.021±0.003	0.020±0.003	0.019±0.004	0.024±0.003	0.020±0.003	0.020±0.003	0.005±0.002	0.024±0.003	0.024±0.003
85/03/18	0.016±0.003	0.020±0.003	0.017±0.003	0.017±0.003	0.017±0.003	0.014±0.003	0.007±0.002	0.017±0.003	0.017±0.003
85/03/25	0.021±0.003	0.025±0.004	0.030±0.004	0.023±0.003	0.022±0.003	0.026±0.003	0.011±0.002	0.021±0.003	0.019±0.003
85/04/01	0.017±0.003	0.023±0.004	0.017±0.003	0.018±0.003	0.018±0.003	0.020±0.003	0.015±0.002	0.014±0.002	0.014±0.003
85/04/08	0.016±0.002	0.016±0.003	0.016±0.003	0.016±0.003	0.015±0.003	0.016±0.003	0.012±0.002	0.017±0.003	0.013±0.006
85/04/15	0.030±0.003	0.028±0.004	0.032±0.003	0.033±0.004	0.033±0.004	0.026±0.003	0.028±0.003	0.029±0.003	0.031±0.004
85/04/22	0.028±0.003	0.037±0.010	0.030±0.004	0.032±0.004	0.026±0.003	0.024±0.003	0.026±0.003	0.023±0.003	0.020±0.003
85/04/29	0.019±0.003	0.019±0.003	0.020±0.003	0.021±0.003	0.017±0.003	0.022±0.003	0.017±0.003	0.019±0.003	0.016±0.003
85/05/06	0.021±0.003	0.021±0.003	0.021±0.003	0.019±0.003	0.019±0.003	0.019±0.003	0.013±0.002	0.020±0.003	0.021±0.003
85/05/13	0.020±0.003	0.026±0.004	0.026±0.003	0.024±0.003	0.026±0.003	0.020±0.003	0.027±0.003	0.028±0.004	0.022±0.003
85/05/20	0.015±0.005	0.019±0.003	0.016±0.003	0.017±0.003	0.017±0.003	0.014±0.003	0.015±0.003	0.016±0.002	0.013±0.002
85/05/28	0.02[illegible]±0.003	0.022±0.003	0.020±0.003	0.022±0.003	0.010±0.003	0.019±0.003	0.006±0.002	0.020±0.002	0.023±0.003
85/06/03	0.022±0.003	0.020±0.004	0.019±0.003	0.021±0.003	0.015±0.003	0.019±0.003	0.020±0.004	0.017±0.003	0.018±0.003
85/06/10	0.022±0.003	0.020±0.003	0.018±0.003	0.019±0.003	0.016±0.003	0.016±0.003	0.017±0.003	0.008±0.002	0.019±0.003
85/06/17	0.017±0.003	0.020±0.003	0.015±0.002	0.016±0.003	0.016±0.003	0.016±0.003	0.010±0.003	0.013±0.003	0.016±0.003
85/06/24	0.027±0.003	0.028±0.004	0.026±0.003	0.029±0.003	0.029±0.004	0.029±0.003	0.021±0.004	0.020±0.003	0.024±0.003
85/07/02	0.016±0.002	0.017±0.003	0.015±0.002	0.013±0.002	0.012±0.002	0.013±0.002	0.015±0.003	0.013±0.002	0.008±0.002
85/07/08	0.020±0.003	0.027±0.005	0.024±0.003	0.024±0.003	0.022±0.003	0.022±0.003	0.014±0.003	0.022±0.003	0.022±0.003
85/07/16	0.021±0.003	0.022±0.004	0.023±0.003	0.026±0.003	0.023±0.003	0.021±0.003	*	0.017±0.003	0.020±0.003
85/07/22	0.021±0.003	0.021±0.005	0.022±0.003	0.023±0.003	0.021±0.004	0.016±0.003	0.010±0.003	0.017±0.003	0.021±0.003
85/07/29	0.019±0.003	0.023±0.004	0.019±0.003	0.020±0.003	0.020±0.003	0.011±0.002	0.013±0.003	0.009±0.002	0.009±0.002
85/08/05	0.023±0.003	0.023±0.004	0.023±0.003	0.026±0.003	0.020±0.003	0.022±0.003	0.015±0.003	0.009±0.002	0.014±0.003
85/08/12	0.026±0.005	0.025±0.004	0.025±0.004	0.029±0.004	0.024±0.004	0.023±0.003	0.013±0.003	0.008±0.003	0.022±0.003
85/08/19	0.028±0.003	0.033±0.004	0.030±0.003	0.027±0.003	0.020±0.003	0.030±0.003	0.017±0.003	0.006±0.002	0.018±0.003
85/08/26	0.021±0.003	0.020±0.004	0.020±0.003	0.020±0.003	0.014±0.003	0.017±0.003	0.014±0.003	0.011±0.002	0.004±0.002
85/09/03	0.019±0.002	0.025±0.004	0.023±0.003	0.025±0.003	0.023±0.003	0.012±0.002	0.017±0.003	0.008±0.002	0.015±0.003
85/09/09	0.031±0.004	0.016±0.003	0.030±0.004	0.033±0.004	0.026±0.004	0.016±0.003	0.022±0.004	0.010±0.002	0.013±0.002
85/09/16	0.020±0.003	0.019±0.003	0.022±0.003	0.022±0.003	0.022±0.003	0.015±0.003	0.015±0.003	0.006±0.002	0.019±0.003
85/09/23	0.037±0.004	0.039±0.006	0.036±0.004	0.038±0.004	0.031±0.003	0.039±0.004	0.021±0.003	0.018±0.002	0.028±0.003
85/09/30	0.029±0.003	0.024±0.004	0.025±0.003	0.026±0.003	0.025±0.003	0.022±0.003	0.021±0.003	0.012±0.002	0.020±0.002
85/10/07	0.022±0.003	0.024±0.004	0.023±0.003	0.021±0.003	0.020±0.003	0.025±0.003	0.016±0.002	0.020±0.003	0.016±0.002
85/10/15	0.020±0.003	0.020±0.003	0.024±0.003	0.026±0.003	0.023±0.003	0.025±0.003	0.021±0.003	0.024±0.003	0.024±0.003
85/10/21	0.006±0.002	0.025±0.004	0.021±0.003	0.024±0.003	0.019±0.003	0.021±0.003	0.023±0.003	0.020±0.003	0.008±0.002
85/10/28	0.020±0.003	0.019±0.004	0.020±0.003	0.019±0.003	0.014±0.003	0.020±0.003	0.016±0.003	0.00[illegible]±0.002	0.019±0.002
85/11/04	0.013±0.002	0.023±0.004	0.013±0.003	0.014±0.003	0.009±0.002	0.011±0.002	0.014±0.002	0.008±0.002	0.015±0.002
85/11/12	0.013±0.002	0.013±0.003	0.012±0.002	0.013±0.002	0.015±0.003	0.010±0.002	0.011±0.002	0.006±0.002	0.012±0.002
85/11/19	0.016±0.002	0.021±0.003	0.022±0.003	0.018±0.002	0.005±0.004	0.019±0.003	0.022±0.003	0.013±0.003	0.019±0.002
85/11/25	*	0.025±0.005	0.029±0.004	0.030±0.004	0.030±0.004	0.020±0.004	0.026±0.003	0.027±0.003	0.026±0.003
85/12/02	0.017±0.002	0.018±0.004	0.018±0.003	0.019±0.003	0.022±0.003	0.019±0.003	0.016±0.002	0.016±0.003	0.016±0.002
85/12/09	0.026±0.003	0.024±0.004	0.026±0.004	0.029±0.004	0.019±0.003	0.027±0.003	0.029±0.003	*	0.023±0.003
85/12/16	0.019±0.003	0.022±0.004	0.025±0.003	0.022±0.003	0.017±0.003	0.017±0.003	0.018±0.003	0.016±0.003	0.021±0.003
85/12/23	0.018±0.003	0.020±0.004	0.022±0.003	0.025±0.004	0.010±0.003	0.021±0.003	0.024±0.003	0.026±0.004	0.023±0.003
85/12/30	0.016±0.003	0.025±0.004	0.019±0.003	0.026±0.004	0.012±0.002	0.006±0.002	0.009±0.002	0.020±0.004	0.021±0.003

* PUMP NOT OPERATIONAL

TABLE 11

CONCENTRATIONS OF GAMMA EMITTERS IN MONTHLY COMPOSITES
OF JAF AIR PARTICULATE SAMPLES
1985
Results in Units of 10^{-3} pCi/m^3 ± 2 sigma

Nuclides	January	February	March	April	May	June
OFFSITE COMPOSITE						
Ce-144	<1.49	<2.36	<1.74	<1.62	<1.19	<1.41
Ce-141	<0.55	<0.74	<0.60	<0.55	<0.41	<0.58
Be-7	99.0 ± 7.4	101 ± 10.2	147 ± 10.6	159 ± 8.7	136 ± 7.4	132 ± 7.9
Ru-103	<0.46	<0.56	<0.49	<0.40	<0.29	<0.36
Cs-134	<0.32	<0.38	<0.32	<0.25	<0.24	<0.25
Cs-137	<0.33	<0.42	<0.37	<0.30	<0.22	<0.27
Zr-95	<0.87	<1.35	<0.99	<0.86	<0.64	<0.79
Nb-95	<0.38	<0.75	<0.49	<0.35	<0.42	<0.38
Co-58	<0.40	<0.39	<0.42	<0.34	<0.21	<0.32
Mn-54	<0.30	<0.56	<0.34	<0.31	<0.23	<0.30
Co-60	<0.49	<0.26	<0.52	<0.40	<0.24	<0.38
K-40	3.3 ± 2.7	5.4 ± 3.8	6.1 ± 3.8	<4.8	2.9 ± 1.8	4.0 ± 2.2
Ra-226	<5.84	<9.0	<6.8	<6.1	<4.6	<5.2
ONSITE COMPOSITE						
Ce-144	<1.19	<1.40	<0.98	<0.96	<0.76	<0.83
Ce-141	<0.44	<0.50	<0.45	<0.83	<0.29	<0.39
Be-7	92.0 ± 6.2	102 ± 8.4	125 ± 7.9	128 ± 6.1	118 ± 5.4	105 ± 5.9
Ru-103	<0.32	<0.45	<0.26	<0.23	<0.20	<0.22
Cs-134	<0.27	<0.22	<0.17	<0.16	<0.14	<0.14
Cs-137	<0.30	<0.30	<0.16	<0.17	<0.16	<0.17
Zr-95	<0.72	<0.75	<0.58	<0.47	<0.35	<0.42
Nb-95	<0.37	<0.36	<0.34	<0.20	<0.24	<0.21
Co-58	<0.33	<0.36	<0.20	<0.22	<0.15	<0.20
Mn-54	<0.32	<0.20	<0.20	<0.19	<0.16	<0.15
Co-60	<0.35	<0.32	<0.29	<0.24	<0.19	<0.27
K-40	3.6 ± 2.3	<4.7	<4.9	<2.6	2.0 ± 1.2	<3.6
Ra-226	<4.8	<5.7	<4.4	<4.1	<3.2	<3.6

TABLE 11 (cont)

CONCENTRATIONS OF GAMMA EMITTERS IN MONTHLY COMPOSITES
OF JAF AIR PARTICULATE SAMPLES
1985
Results in Units of 10^{-3} pCi/m³ ± 2 sigma

Nuclides	July	August	September	October	November	December
			R1 OFFSITE COMPOSITE*			
Ce-144	<6.80	<3.89	<5.54	<4.55	<4.04	<5.51
Ce-141	<2.69	<1.62	<1.65	<1.87	<1.50	<1.64
Be-7	155 ± 24.8	130 ± 19.9	142 ± 21.4	95.3 ± 18.3	73.9 ± 14.8	108 ± 19.4
Ru-103	<1.72	<1.56	<1.37	<1.35	<1.16	<1.57
Cs-134	<1.72	<0.78	<1.32	<0.90	<1.06	<1.60
Cs-137	<1.92	<1.25	<1.25	<1.20	<1.20	<1.53
Zr-95	<5.34	<2.49	<2.75	<3.29	<3.60	<3.80
Nb-95	<2.34	<1.78	<2.15	<2.06	<1.79	<1.65
Co-58	<2.00	<1.51	<1.32	<0.84	<0.70	<0.86
Mn-54	<1.23	<1.29	<1.20	<1.27	<0.73	<1.23
Co-60	<2.17	<1.79	<1.93	<1.65	<1.14	<0.88
K-40	<22.9	<17.8	<17.6	<23.1	<13.9	<17.9
Ra-226	<25.7	<19.8	<24.0	<22.6	<14.9	<22.6
			R2 OFFSITE COMPOSITE*			
Ce-144	<7.32	<5.28	<6.49	<5.73	<4.80	<7.44
Ce-141	<2.27	<1.85	<2.42	<1.89	<2.12	<2.62
Be-7	157 ± 25.9	122 ± 20.1	152 ± 23.7	100 ± 18.7	83.8 ± 18.8	107 ± 22.4
Ru-103	<1.89	<1.39	<1.47	<1.34	<2.01	<2.32
Cs-134	<1.83	<1.23	<0.97	<0.80	<1.36	<0.98
Cs-137	<1.44	<1.20	<1.43	<1.32	<1.09	<1.73
Zr-95	<4.88	<3.39	<3.14	<4.24	<3.38	<4.24
Nb-95	<2.23	<1.52	<1.96	<1.46	<1.11	<1.48
Co-58	<2.06	<1.29	<1.65	<1.29	<1.99	<2.18
Mn-54	<1.65	<1.20	<1.62	<0.81	<1.49	<0.98
Co-60	<1.85	<2.08	<1.39	<1.28	<1.80	<1.57
K-40	<31.9	<19.1	<34.8	<25.4	<25.2	<25.4
Ra-226	<30.6	<18.2	<25.1	<21.7	<22.0	<26.3

* Monthly Air Particulates Composite designations were changed to comply with the new RETS requirements which became effective on July 1, 1985.

TABLE 11 (cont.)

CONCENTRATIONS OF GAMMA EMITTERS IN MONTHLY COMPOSITES
OF JAF AIR PARTICULATE SAMPLES
1985

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

Nuclides	July	August	September	October	November	December
			R3 OFFSITE COMPOSITE*			
Ce-144	<7.20	<4.46	<5.83	<5.64	<5.51	<7.42
Ce-141	<2.47	<1.74	<1.78	<2.10	<1.93	<2.56
Be-7	140 ± 25.1	110 ± 19.8	123 ± 20.7	108 ± 19.8	93.7 ± 17.4	93.8 ± 20.1
Ru-103	<2.04	<1.37	<1.10	<1.80	<1.91	<1.98
Cs-134	<1.68	<1.05	<1.44	<1.24	<1.26	<1.10
Cs-137	<1.81	<1.23	<1.64	<1.36	<1.32	<1.94
Zr-95	<4.11	<2.62	<3.29	<3.91	<3.13	<4.07
Nb-95	<2.66	<1.34	<1.74	<1.50	<1.50	<2.03
Co-58	<1.80	<1.78	<1.12	<1.33	<0.98	<1.13
Mn-54	<1.71	<1.07	<1.32	<1.56	<1.18	<1.87
Co-60	<1.58	<1.32	<1.36	<1.90	<1.86	<2.78
K-40	<31.3	<24.8	13.7 ± 11.1	<26.7	<21.2	<30.7
Ra-226	<29.6	<18.0	<20.3	<23.8	<17.9	<26.0
			R4 OFFSITE COMPOSITE*			
Ce-144	<5.93	<4.46	<5.80	<5.19	<4.78	<6.40
Ce-141	<2.53	<1.84	<1.55	<2.05	<1.75	<2.23
Be-7	127 ± 23.4	115 ± 19.5	125 ± 21.8	99.9 ± 19.4	79.7 ± 16.4	139 ± 23.8
Ru-103	<1.75	<1.65	<1.51	<1.46	<1.16	<1.93
Cs-134	<1.31	<0.97	<1.10	<0.99	<1.01	<1.44
Cs-137	<1.63	<1.65	<1.48	<1.74	<0.59	<1.96
Zr-95	<3.94	<2.73	<2.52	<4.88	<2.67	<3.74
Nb-95	<0.90	<1.56	<2.03	<2.21	<1.37	<1.86
Co-58	<1.73	<0.83	<1.21	<1.12	<1.14	<1.64
Mn-54	<1.16	<1.11	<1.43	<1.40	<0.96	<1.44
Co-60	<1.51	<1.58	<1.46	<0.91	<0.76	<1.03
K-40	<30.0	<22.8	<15.0	<28.9	<23.9	<14.8
Ra-226	<26.2	<16.7	<22.5	<21.0	<17.8	<25.5

* Monthly Air Particulate Composite designations were changed to comply with the new RETS requirements which became effective on July 1, 1985.

TABLE 11 (cont.)

CONCENTRATIONS OF GAMMA EMITTERS IN MONTHLY COMPOSITES
OF JAF AIR PARTICULATE SAMPLES
1985
Results in Units of 10^{-3} pCi/m^3 ± 2 sigma

Nuclides	July	August	September	October	November	December
R5 OFFSITE COMPOSITE*(CONTROL)						
Ce-144	<8.45	<4.06	<6.05	<5.30	<4.87	<7.28
Ce-141	<3.17	<2.05	<1.84	<1.71	<1.97	<2.40
Be-7	139 ± 28.6	125 ± 21.4	164 ± 23.6	91.4 ± 17.6	82.1 ± 17.0	119 ± 21.7
Ru-103	<2.54	<2.21	<1.38	<1.19	<1.65	<1.78
Cs-134	<1.63	<1.31	<1.32	<1.34	<1.12	<1.23
Cs-137	<2.36	<1.27	<1.74	<0.92	<0.98	<1.42
Zr-95	<5.94	<3.78	<4.03	<2.52	<3.32	<4.16
Nb-95	<2.47	<1.37	<1.51	<2.21	<2.04	<2.28
Co-58	<1.89	<1.27	<0.69	<1.48	<1.58	<2.00
Mn-54	<2.00	<1.66	<1.25	<1.29	<0.88	<1.49
Co-60	<2.24	<1.44	<2.69	<1.87	<1.38	<1.86
K-40	25.4 ± 19.0	<28.6	<14.7	<17.7	<27.8	13.0 ± 11.5
Ra-226	<32.1	14.0 ± 11.6	<21.2	<21.5	<19.2	<25.5
G OFFSITE COMPOSITE*						
Ce-144	<8.14	<6.49	<8.10	<7.09	<6.40	<13.0
Ce-141	<2.79	<2.46	<2.76	<2.64	<2.37	<3.66
Be-7	171 ± 28.6	120 ± 22.0	137 ± 24.9	103 ± 22.4	116 ± 22.3	113 ± 25.0
Ru-103	<2.97	<2.31	<1.90	<2.80	<1.34	<3.31
Cs-134	<1.96	<1.33	<1.67	<2.05	<1.63	<1.89
Cs-137	<1.88	<1.31	<1.62	<1.47	<1.01	<1.57
Zr-95	<4.79	<5.11	<4.19	<5.08	<2.92	<3.01
Nb-95	<1.81	<2.89	<1.80	<1.97	<2.58	<2.33
Co-58	<2.99	<1.57	<1.84	<1.50	<1.14	<2.71
Mn-54	<2.05	<1.16	<2.24	<1.07	<1.90	<1.56
Co-60	<2.28	<1.81	<2.68	<1.22	<2.37	<2.52
K-40	<38.0	<27.7	<21.2	<25.9	<33.5	<39.3
Ra-226	<28.6	<25.4	<31.2	<26.9	<24.6	<34.0

* Monthly Air Particulate Composite designations were changed to comply with the new RETS requirements which became effective on July 1, 1985.

TABLE 11 (cont.)

CONCENTRATIONS OF GAMMA EMITTERS IN MONTHLY COMPOSITES
OF JAF AIR PARTICULATE SAMPLES
1985

Results in Units of 10^{-3} pCi/m³ ± 2 sigma

Nuclides	July	August	September	October	November	December
D1 ONSITE COMPOSITE						
Ce-144	<6.30	<4.54	<6.74	<5.61	<4.67	<9.26
Ce-141	<2.32	<1.83	<2.29	<1.93	<1.73	<2.77
Be-7	120 ± 22.1	115 ± 20.1	143 ± 24.0	99.7 ± 19.5	74.6 ± 15.8	83.7 ± 1.79
Ru-103	<1.92	<1.37	<2.18	<0.86	<1.44	<1.59
Cs-134	<1.51	<1.26	<1.42	<1.30	<0.91	<1.45
Cs-137	<1.68	<1.56	<1.96	<1.78	<1.04	<1.63
Zr-95	<4.54	<2.56	<4.06	<3.54	<2.53	<4.06
Nb-95	<2.78	<0.70	<2.69	<1.87	<1.84	<2.17
Co-58	<1.09	<0.87	<1.82	<1.44	<1.05	<1.38
Mn-54	<1.36	<1.21	<1.91	<2.02	<1.19	<1.39
Co-60	<1.91	<2.14	<2.90	<1.87	<1.72	<1.43
K-40	<27.5	<26.9	27.2 ± 17.9	11.6 ± 10.4	<24.0	<23.9
Ra-226	<31.2	<20.7	<27.1	<20.5	<19.1	<29.1
D2 ONSITE COMPOSITE						
Ce-144	<12.1	<7.03	<9.61	<9.62	<6.85	<9.34
Ce-141	<3.83	<2.57	<3.45	<2.58	<2.76	<2.54
Be-7	109 ± 28.0	113 ± 23.2	108 ± 26.1	113 ± 27.7	46.6 ± 18.3	108 ± 26.1
Ru-103	<3.59	<1.66	<3.00	<2.25	<2.58	<2.44
Cs-134	<2.81	<1.68	<2.32	<2.09	<1.65	<2.49
Cs-137	<2.95	<1.75	<3.02	<2.60	<1.71	<2.19
Zr-95	<7.14	<2.55	<6.41	<3.71	<4.11	<4.87
Nb-95	<3.37	<2.41	<3.38	<3.00	<2.77	<3.48
Co-58	<2.96	<1.73	<2.19	<2.52	<1.97	<2.77
Mn-54	<2.61	<1.70	<2.81	<2.28	<1.84	<2.49
Co-60	<2.40	<2.74	<1.61	<2.59	<1.70	<2.61
K-40	<49.0	<35.4	<40.5	28.8 ± 23.3	<28.4	31.9 ± 23.6
Ra-226	<43.2	<28.4	<37.9	<38.4	<30.3	<37.9

TABLE 11 (cont.)

CONCENTRATIONS OF GAMMA EMITTERS IN MONTHLY COMPOSITES
OF JAF AIR PARTICULATE SAMPLES
1985

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

Nuclides	July	August	September	October	November	December
			E ONSITE COMPOSITE			
Ce-144	<6.26	<5.57	<6.04	<5.33	<4.62	<9.81
Ce-141	<2.38	<2.03	<2.14	<2.06	<1.77	<2.93
Be-7	133 ± 24.2	128 ± 23.1	165 ± 24.9	90.5 ± 19.5	97.3 ± 18.6	95.0 ± 19.3
Ru-103	<2.02	<2.46	<1.30	<1.78	<1.37	<2.36
Cs-134	<1.61	<1.68	<1.26	<1.41	<1.04	<1.48
Cs-137	<1.35	<1.60	<1.57	<1.31	<1.11	<1.31
Zr-95	<4.72	<3.95	<2.03	<3.74	<4.13	<5.56
Nb-95	<0.93	<1.87	<1.85	<1.99	<2.03	<1.65
Co-58	<1.96	<1.76	<1.38	<1.28	<1.97	<1.49
Mn-54	<1.84	<1.63	<1.77	<1.64	<1.07	<1.64
Co-60	<1.58	<2.11	<2.46	<1.88	<1.46	<2.42
K-40	<30.2	<20.9	<27.2	13.1 ± 12.3	<15.4	<25.7
Ra-226	<26.5	<22.7	<26.7	<24.8	<20.4	<32.7
			F ONSITE COMPOSITE			
Ce-144	<5.90	<5.56	<7.10	<6.24	<5.74	<7.69
Ce-141	<2.33	<2.20	<2.29	<1.78	<1.74	<2.24
Be-7	122 ± 22.5	116 ± 20.7	147 ± 23.6	97.3 ± 20.6	87.7 ± 16.8	92.3 ± 22.4
Ru-103	<1.63	<2.08	<2.04	<1.64	<1.56	<2.04
Cs-134	<1.46	<1.09	<1.58	<1.52	<1.21	<2.23
Cs-137	<1.27	<1.47	<1.90	<1.90	<1.06	<2.07
Zr-95	<2.16	<3.82	<3.17	<4.71	<2.89	<2.44
Nb-95	<2.20	<1.86	<1.98	<1.44	<1.12	<0.92
Co-58	<1.26	<0.61	<0.96	<1.31	<1.39	<1.66
Mn-54	<1.59	<1.48	<1.07	<2.06	<1.31	<1.49
Co-60	<0.94	<1.34	<1.72	<1.93	<1.76	<2.38
K-40	<28.8	<26.4	<38.0	<23.6	<18.6	22.5 ± 16.3
Ra-226	<23.1	<20.0	<25.9	<21.0	<17.6	<28.2

TABLE 11 (cont.)

CONCENTRATIONS OF GAMMA EMITTERS IN MONTHLY COMPOSITES
OF JAF AIR PARTICULATE SAMPLES
1985

Results in Units of 10^{-3} pCi/m^3 $\pm$ 2 sigma

Nuclides	July	August	September	October	November	December
G ONSITE COMPOSITE						
Ce-144	<8.60	<6.46	<6.47	<6.59	<5.34	<6.90
Ce-141	<3.31	<2.35	<2.23	<2.18	<1.95	<1.98
Be-7	122 ± 26.7	129 ± 24.1	113 ± 20.5	88.5 ± 19.4	69.9 ± 17.9	77.6 ± 16.8
Ru-103	<3.28	<2.20	<2.02	<1.77	<2.26	<1.93
Cs-134	<2.01	<1.40	<1.56	<1.45	<1.38	<0.91
Cs-137	<2.38	<1.65	<2.17	<1.39	<1.46	<1.14
Zr-95	<3.60	<3.85	<3.56	<4.23	<2.58	<2.69
Nb-95	<2.01	<2.49	<1.88	<1.78	<1.71	<2.16
Co-58	<2.00	<2.49	<1.56	<2.16	<2.01	<1.59
Mn-54	<1.54	<1.50	<2.11	<0.92	<1.04	<1.65
Co-60	<1.40	<1.68	<1.44	<1.46	<1.66	<1.33
K-40	<34.9	30.1 ± 17.9	22.3 ± 16.3	<24.5	<32.1	<26.5
Ra-226	<34.5	<25.6	<24.7	<27.2	<24.6	<23.8
H ONSITE COMPOSITE						
Ce-144	<5.74	<4.28	<6.84	<4.66	<4.68	<7.45
Ce-141	<2.26	<2.30	<2.02	<1.48	<2.18	<9.18
Be-7	113 ± 21.9	75.2 ± 16.1	125 ± 23.7	89.5 ± 15.8	78.7 ± 17.3	80.8 ± 30.4
Ru-103	<1.99	<1.54	<1.62	<1.12	<1.62	<7.14
Cs-134	<1.63	<1.02	<1.59	<1.22	<1.10	<1.55
Cs-137	<1.77	<1.25	<2.08	<1.20	<1.28	<1.18
Zr-95	<3.80	<4.18	<5.18	<2.66	<2.92	<8.61
Nb-95	<2.12	<2.13	<2.18	<0.76	<1.06	<9.06
Co-58	<1.48	<1.69	<1.85	<0.97	<1.40	<3.67
Mn-54	<0.64	<0.98	<1.81	<1.07	<1.29	<1.55
Co-60	<2.50	<1.52	<2.22	<1.73	<2.06	<0.98
K-40	<34.5	<26.1	<22.7	<16.7	<19.9	<22.5
Ra-226	<26.8	<19.1	<25.8	<20.9	<19.6	<21.9

TABLE 11 (cont.)

CONCENTRATIONS OF GAMMA EMITTERS IN MONTHLY COMPOSITES
OF JAF AIR PARTICULATE SAMPLES
1985

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

Nuclides	July	August	September	October	November	December
			I ONSITE COMPOSITE			
Ce-144	<9.31	<5.65	<7.29	<6.59	<5.05	<7.92
Ce-141	<3.97	<2.19	<2.68	<2.10	<2.04	<2.63
Be-7	78.5 ± 25.1	53.0 ± 17.0	93.0 ± 20.7	92.2 ± 17.2	78.2 ± 16.7	84.8 ± 18.1
Ru-103	<3.08	<2.23	<2.23	<1.57	<1.85	<1.36
Cs-134	<2.34	<1.25	<2.31	<0.95	<1.16	<1.34
Cs-137	<3.70	<1.36	<1.56	<1.18	<1.31	<1.40
Zr-95	<8.53	<4.14	<4.45	<3.59	<3.20	<2.41
Nb-95	<3.17	<1.63	<2.53	<1.66	<2.11	<1.97
Co-58	<2.36	<1.29	<1.95	<1.49	<1.29	<1.16
Mn-54	<2.90	<1.49	<1.59	<1.23	<1.53	<1.81
Co-60	<3.30	<1.63	<2.54	<1.96	<1.09	<1.38
K-40	34.0 ± 25.4	<30.5	<43.0	<16.1	<16.3	<27.4
Ra-226	<42.4	<21.8	<33.0	<21.8	<19.8	<29.0
			J ONSITE COMPOSITE			
Ce-144	<6.27	<3.99	<4.47	<4.61	<4.26	<8.39
Ce-141	<2.52	<1.84	<1.51	<1.80	<1.94	<2.55
Be-7	96.9 ± 20.7	44.3 ± 13.1	66.5 ± 14.6	71.5 ± 15.2	55.0 ± 14.1	62.1 ± 18.3
Ru-103	<1.87	<1.68	<1.18	<1.72	<1.43	<1.90
Cs-134	<1.62	<0.98	<1.59	<1.15	<0.94	<1.64
Cs-137	<1.30	<1.42	<1.24	<0.79	<0.92	<1.80
Zr-95	<4.58	<4.54	<2.43	<3.60	<3.16	<3.59
Nb-95	<2.03	<1.94	<1.11	<1.28	<2.29	<1.91
Co-58	<2.20	<1.77	<1.31	<1.29	<1.14	<1.49
Mn-54	<1.90	<1.24	<1.41	<1.04	<0.96	<1.73
Co-60	<1.52	<2.26	<0.87	<1.68	<1.99	<1.24
K-40	<29.0	<21.2	<19.8	<12.6	8.50 ± 8.49	<32.1
Ra-226	<26.2	<17.5	<20.5	<17.5	<21.3	24.1 ± 14.0

TABLE 11 (cont.)

CONCENTRATIONS OF GAMMA EMITTERS IN MONTHLY COMPOSITES
OF JAF AIR PARTICULATE SAMPLES
1985

Results in Units of 10^{-3} pCi/m^3 $\pm$ 2 sigma

Nuclides	July	August	September	October	November	December
			K ONSITE COMPOSITE			
Ce-144	<6.47	<4.43	<5.92	<5.44	<2.37	<5.14
Ce-141	<2.70	<2.14	<1.76	<1.84	<0.92	<1.71
Be-7	100 $\pm$ 21.4	88.6 $\pm$ 19.5	85.8 $\pm$ 17.3	91.7 $\pm$ 16.7	48.6 $\pm$ 8.70	103 $\pm$ 19.7
Ru-103	<2.47	<1.25	<1.64	<1.04	<0.74	<1.65
Cs-134	<1.48	<1.31	<1.53	<1.39	<0.44	<1.15
Cs-137	<1.62	<0.90	<1.39	<1.50	<0.58	<1.24
Zr-95	<3.83	<3.85	<2.18	<2.78	<1.45	<2.99
Nb-95	<2.36	<1.84	<1.82	<1.82	<0.76	<1.89
Co-58	<2.01	<1.71	<1.21	<1.34	<0.63	<1.44
Mn-54	<1.74	<1.39	<1.60	<1.20	<0.48	<1.53
Co-60	<1.61	<1.63	<1.21	<1.92	<0.53	<0.94
K-40	<28.4	<28.0	<21.5	<16.6	<11.2	<22.3
Ra-226	<25.0	<20.0	<21.0	<22.3	<8.72	<19.9

TABLE 12

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

LOCATION

WEEK END DATE	R5-OFF	R1-OFF	R2-OFF	R3-OFF	R4-OFF	G-OFF
85/01/08	<0.025	<0.024	<0.031	<0.020	<0.034	<0.024
85/01/15	<0.024	<0.019	<0.025	<0.013	<0.024	<0.020
85/01/23	<0.030	<0.015	<0.018	<0.027	<0.025	<0.025
85/02/29	<0.041	<0.024	<0.017	<0.020	<0.017	<0.014
85/02/05	<0.023	<0.016	<0.026	<0.014	<0.020	<0.014
85/02/11	<0.013	<0.018	<0.014	<0.015	<0.011	<0.033
85/02/19	<0.008	<0.018	<0.010	<0.011	<0.009	<0.015
85/02/26	<0.015	<0.008	<0.017	<0.022	<0.019	<0.012
85/03/05	<0.017	<0.012	<0.016	<0.015	<0.012	<0.024
85/03/12	<0.017	<0.013	<0.010	<0.014	<0.014	<0.015
85/03/19	<0.010	<0.011	<0.018	<0.012	<0.012	<0.030
85/03/25	<0.012	<0.010	<0.014	<0.013	<0.015	<0.009
85/04/02	<0.010	<0.011	<0.015	<0.015	<0.012	<0.015
85/04/07	<0.013	<0.013	<0.009	<0.011	<0.015	<0.018
85/04/06	<0.012	<0.009	<0.013	<0.010	<0.011	<0.011
85/04/23	<0.017	<0.010	<0.014	<0.017	<0.010	<0.012
85/04/30	<0.015	<0.013	<0.006	<0.014	<0.010	<0.010
85/05/07	<0.018	<0.015	<0.013	<0.007	<0.012	<0.016
85/05/14	<0.009	<0.004	<0.012	<0.012	<0.004	<0.017
85/05/21	<0.014	<0.011	<0.011	<0.007	<0.015	<0.014
85/05/29	<0.008	<0.009	<0.013	<0.008	<0.013	<0.016
85/06/4	<0.015	<0.012	<0.007	<0.007	<0.016	<0.013
85/06/11	<0.013	<0.011	<0.010	<0.008	<0.011	<0.014
85/06/18	<0.014	<0.014	<0.016	<0.017	<0.012	<0.013
85/06/24	<0.013	<0.013	<0.014	<0.011	<0.012	<0.013
85/07/02	<0.041	<0.047	<0.044	<0.055	<0.048	<0.062
85/07/09	<0.058	<0.055	<0.037	<0.038	<0.046	<0.069
85/07/17	<0.013	<0.011	<0.012	<0.012	<0.007	<0.017
85/07/23	<0.018	<0.007	<0.015	<0.009	<0.010	<0.010
85/07/30	<0.015	<0.010	<0.011	<0.012	<0.010	<0.011
85/08/06	<0.012	<0.008	<0.010	<0.012	<0.010	<0.008
85/08/13	<0.015	<0.012	<0.005	<0.012	<0.007	<0.013
85/08/20	<0.006	<0.011	<0.008	<0.007	<0.008	<0.011
85/08/27	<0.015	<0.007	<0.010	<0.008	<0.011	<0.019
85/09/04	<0.008	<0.005	<0.010	<0.007	<0.009	<0.009
85/09/10	<0.007	<0.008	<0.008	<0.015	<0.019	<0.014
85/09/17	<0.009	<0.011	<0.010	<0.012	<0.011	<0.015
85/09/24	<0.015	<0.008	<0.013	<0.011	<0.010	<0.018
85/10/1	<0.009	<0.010	<0.011	<0.012	<0.011	<0.015
85/10/08	<0.008	<0.009	<0.008	<0.016	<0.010	<0.013
85/10/16	<0.009	<0.009	<0.006	<0.018	<0.010	<0.010
85/10/22	<0.008	<0.009	<0.012	<0.011	<0.011	<0.018
85/10/29	<0.006	<0.005	<0.010	<0.004	<0.010	<0.013
85/11/05	<0.010	<0.011	<0.007	<0.010	<0.011	<0.010
85/11/12	<0.012	<0.008	<0.009	<0.010	<0.008	<0.011
85/11/19	<0.008	<0.007	<0.026	<0.010	<0.008	<0.021
85/11/26	<0.011	<0.011	<0.007	<0.004	<0.010	<0.011
85/12/03	<0.010	<0.012	<0.010	<0.014	<0.008	<0.012
85/12/10	<0.013	<0.014	<0.011	<0.014	<0.011	<0.013
85/12/17	<0.008	<0.010	<0.018	<0.007	<0.012	<0.012
85/12/23	<0.015	<0.011	<0.017	<0.011	<0.012	<0.018
85/12/30	<0.005	<0.010	<0.011	<0.007	<0.012	<0.012

* PUMP NOT OPERATIONAL

TABLE 13

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

WEEK END DATE	LOCATION D1-ON	D2-ON	E--ON	F--ON	G--ON	H--ON	I--ON	J--ON	K--ON
85/01/07	<0.025	<0.033	<0.023	<0.019	<0.032	<0.028	<0.018	<0.036	<0.029
85/01/14	<0.031	<0.032	<0.022	<0.023	<0.023	<0.039	<0.021	<0.025	<0.018
85/01/23	<0.021	<0.022	<0.041	<0.022	<0.023	<0.011	<0.015	<0.058	<0.009
85/01/28	<0.019	<0.029	<0.021	<0.019	<0.021	<0.027	<0.025	<0.022	<0.017
85/02/04	<0.019	<0.027	<0.012	<0.019	<0.017	<0.011	<0.028	<0.024	<0.014
85/02/11	<0.014	<0.023	<0.012	<0.016	<0.015	<0.011	<0.014	<0.015	<0.013
85/02/19	<0.013	<0.019	<0.010	<0.011	<0.009	<0.014	<0.011	<0.011	<0.011
85/02/25	<0.009	<0.017	<0.011	<0.019	<0.013	<0.015	<0.018	<0.012	<0.014
85/03/05	<0.015	<0.015	<0.018	<0.018	<0.013	<0.015	<0.015	<0.014	<0.016
85/03/11	<0.013	<0.010	<0.016	<0.016	<0.007	<0.013	<0.013	<0.013	<0.013
85/03/18	<0.064	<0.014	<0.011	<0.010	<0.008	<0.012	<0.009	<0.013	<0.013
85/03/25	<0.012	<0.010	<0.017	<0.013	<0.008	<0.012	<0.010	<0.012	<0.013
85/04/01	<0.009	<0.019	<0.010	<0.017	<0.012	<0.011	<0.011	<0.009	<0.013
85/04/08	<0.010	<0.016	<0.012	<0.012	<0.011	<0.011	<0.007	<0.010	<0.051
85/04/15	<0.006	<0.010	<0.009	<0.008	<0.007	<0.013	<0.007	<0.008	<0.011
85/04/22	<0.013	<0.065	<0.013	<0.014	<0.014	<0.008	<0.012	<0.010	<0.013
85/04/29	<0.006	<0.013	<0.009	<0.009	<0.013	<0.012	<0.011	<0.010	<0.015
85/05/06	<0.007	<0.015	<0.013	<0.010	<0.010	<0.011	<0.011	<0.010	<0.014
85/05/13	<0.009	<0.019	<0.009	<0.012	<0.013	<0.006	<0.013	<0.013	<0.013
85/05/20	<0.034	<0.011	<0.009	<0.011	<0.012	<0.009	<0.009	<0.008	<0.009
85/05/28	<0.012	<0.012	<0.012	<0.009	<0.015	<0.009	<0.015	<0.007	<0.009
85/06/03	<0.011	<0.011	<0.011	<0.011	<0.014	<0.014	<0.017	<0.006	<0.011
85/06/10	<0.010	<0.016	<0.008	<0.011	<0.010	<0.009	<0.013	<0.008	<0.014
85/06/17	<0.008	<0.007	<0.010	<0.009	<0.011	<0.015	<0.015	<0.010	<0.007
85/06/24	<0.013	<0.016	<0.007	<0.008	<0.013	<0.013	<0.012	<0.007	<0.009
85/07/02	<0.043	<0.045	<0.040	<0.030	<0.045	<0.036	<0.047	<0.023	<0.033
85/07/08	<0.023	<0.058	<0.033	<0.049	<0.039	<0.052	<0.068	<0.051	<0.052
85/07/16	<0.011	<0.010	<0.010	<0.010	<0.014	<0.010	*	<0.009	<0.005
85/07/22	<0.009	<0.020	<0.013	<0.010	<0.016	<0.014	<0.014	<0.012	<0.014
85/07/29	<0.013	<0.011	<0.012	<0.010	<0.015	<0.014	<0.009	<0.009	<0.007
85/08/05	<0.014	<0.015	<0.013	<0.007	<0.014	<0.008	<0.011	<0.013	<0.013
85/08/12	<0.022	<0.011	<0.008	<0.014	<0.017	<0.010	<0.013	<0.016	<0.009
85/08/19	<0.009	<0.014	<0.011	<0.010	<0.018	<0.012	<0.009	<0.021	<0.008
85/08/26	<0.013	<0.020	<0.010	<0.011	<0.016	<0.011	<0.013	<0.006	<0.012
85/09/03	<0.009	<0.006	<0.006	<0.011	<0.011	<0.012	<0.010	<0.010	<0.009
85/09/09	<0.017	<0.014	<0.015	<0.014	<0.017	<0.013	<0.020	<0.010	<0.012
85/09/16	<0.010	<0.013	<0.013	<0.010	<0.014	<0.011	<0.016	<0.010	<0.012
85/09/23	<0.013	<0.016	<0.016	<0.016	<0.006	<0.011	<0.016	<0.007	<0.006
85/09/30	<0.010	<0.020	<0.007	<0.005	<0.009	<0.012	<0.011	<0.010	<0.007
85/10/07	<0.009	<0.015	<0.009	<0.008	<0.012	<0.011	<0.011	<0.006	<0.009
85/10/15	<0.012	<0.013	<0.010	<0.012	<0.006	<0.012	<0.008	<0.008	<0.010
85/10/21	<0.010	<0.017	<0.008	<0.010	<0.007	<0.013	<0.009	<0.011	<0.016
85/10/28	<0.012	<0.016	<0.006	<0.011	<0.013	<0.012	<0.009	<0.009	<0.007
85/11/04	<0.007	<0.020	<0.011	<0.012	<0.010	<0.008	<0.012	<0.004	<0.010
85/11/12	<0.010	<0.010	<0.009	<0.009	<0.016	<0.007	<0.004	<0.005	<0.004
85/11/19	<0.013	<0.011	<0.007	<0.011	<0.021	<0.012	<0.008	<0.014	<0.007
85/11/25	*	<0.019	<0.013	<0.013	<0.010	<0.013	<0.008	<0.009	<0.007
85/12/02	<0.008	<0.018	<0.011	<0.007	<0.011	<0.011	<0.007	<0.009	<0.008
85/12/09	<0.011	<0.016	<0.016	<0.010	<0.009	<0.008	<0.012	*	<0.010
85/12/16	<0.010	<0.013	<0.011	<0.012	<0.009	<0.010	<0.011	<0.015	<0.012
85/12/23	<0.013	<0.015	<0.016	<0.010	<0.010	<0.009	<0.010	<0.012	<0.011
85/12/30	<0.016	<0.014	<0.005	<0.007	<0.010	<0.007	<0.013	<0.015	<0.012

* PUMP NOT OPERATIONAL

TABLE 14

DIRECT RADIATION MEASUREMENT RESULTS (1985)

Results in Units of mrem/Std. Month ± 2 Sigma

STATION NUMBER	LOCATION	JANUARY THROUGH MARCH	APRIL THROUGH JUNE	JULY THROUGH SEPTEMBER	OCTOBER THROUGH DECEMBER	LOCATION (DIRECTION AND DISTANCE)(3)
3	D1 on Site	9.4±1.2	5.8±0.2	12.2±1.2	14.7±1.9	0.2 miles @ 69°
4	D2 on Site	6.6±0.9	5.6±0.4	6.1±0.4	5.7±0.1	0.4 miles @ 140°
5	E on Site	6.3±0.8	5.2±0.6	5.7±0.5	5.2±0.3	0.4 miles @ 175°
6	F on Site	5.7±0.4	4.7±0.2	5.2±0.9	4.7±0.7	0.5 miles @ 210°
7*	G on Site	5.7±0.6	4.4±0.1	6.4±0.4	5.4±0.7	0.7 miles @ 250°
8*	R-5 off-site-Control	6.3±0.9	5.4±0.4	7.7±0.5	5.4±0.4	16.4 miles @ 42°
9	D1 off Site	5.5±0.6	4.8±0.2	6.6±0.2	5.1±0.4	11.4 miles @ 80°
10	D2 off Site	5.6±0.5	5.0±0.2	6.5±0.3	4.7±0.4	9.0 miles @ 117°
11	E off Site	4.8±0.8	4.7±0.1	6.4±0.8	4.6±0.2	7.2 miles @ 160°
12	F off Site	5.5±0.7	4.7±0.2	6.3±0.4	5.1±0.5	7.7 miles @ 190°
13	G off Site	5.8±0.9	4.8±0.4	6.4±0.3	4.8±0.4	5.3 miles @ 225°
14*	DeMass Rd, SW Oswego-Control	6.1±1.1	4.7±0.3	6.8±0.4	5.0±0.2	12.6 miles @ 226°
15*	Pole 66, W. Boundary-Bible Camp	5.2±1.1	3.9±0.1	6.0±0.7	4.7±0.4	0.9 miles @ 237°
18*	Energy Info. Center-Lamp Post, SW	5.8±1.0	5.0±0.2	7.0±0.3	5.3±0.3	0.4 miles @ 265°
19	East Boundary-JAF, Pole 9	6.4±1.2	5.2±0.4	6.3±0.5	4.7±0.2	1.3 miles @ 81°
23*	H on Site	7.4±1.4	5.2±0.4	8.4±0.9	7.4±0.5	0.8 miles @ 70°
24	I on Site	6.2±0.6	4.8±0.2	7.5±0.3	5.0±0.3	0.8 miles @ 98°
25	J on Site	6.3±0.6	4.7±0.3	6.2±0.5	4.6±0.4	0.9 miles @ 110°
26	K on Site	6.0±0.6	5.6±0.1	5.9±0.4	4.6±0.3	0.5 miles @ 132°
27	N. Fence, N. of Switchyard, JAF	15.3±4.4	8.6±1.0	21.6±5.5	26.1±6.2	0.4 miles @ 60°
28	N. Light Pole, N. of Screenhouse, JAF	22.7±8.4	13.3±3.2	28.2±7.8	33.9±12.4	0.5 miles @ 68°
29	N. Fence, N. of W. Side Screenhouse, JAF	33.6±11.3	32.7±8.1	45.2±8.3	55.2±14.1	0.5 miles @ 65°
30	N. Fence (NW) JAF	12.0±2.5	6.5±0.7	17.6±2.8	20.1±3.6	0.4 miles @ 57°
31	N. Fence (NW) NMP-1	8.9±1.2	7.6±0.8	10.2±2.4	7.8±1.2	0.2 miles @ 276°
39	N. Fence, Rad. Waste-NMP-1	12.9±3.6	12.3±1.3	14.6±2.2	11.4±2.2	0.2 miles @ 292°

TABLE 14 CONTINUED

DIRECT RADIATION MEASUREMENT RESULTS (1985)

Results in Units of mrem/Std. Month ± 2 Sigma

STATION NUMBER	LOCATION	JANUARY THROUGH MARCH	APRIL THROUGH JUNE	JULY THROUGH SEPTEMBER	OCTOBER THROUGH DECEMBER	LOCATION (DIRECTION AND DISTANCE)(3)
47	N. Fence, NE, JAF	(1)	7.3±1.0	15.4±1.8	14.7±2.2	0.6 miles @ 69°
49*	Phoenix, NY-Control	5.4±0.6	4.5±0.2	6.4±0.4	4.4±0.4	19.8 miles @ 170°
51	Liberty & Bronson Sts., E of OSS	5.6±0.6	4.9±0.2	6.4±0.3	5.2±0.5	7.4 miles @ 233°
52	East 12th & Cayuga Sts., Osw. School	5.4±0.3	4.7±0.2	6.1±0.4	4.2±0.2	5.8 miles @ 227°
53	Broadwell & Chestnut Sts.-Fulton H.S.	5.6±0.5	6.2±0.4	6.8±0.8	4.7±0.3	13.7 miles @ 183°
54	Liberty St. & Co. Rt.16-Mexico H.S.	5.4±1.4	4.7±0.2	6.0±0.2	4.4±0.3	9.3 miles @ 115°
55	Gas Substation Co.Rt.5-Pulaski	5.2±0.3	5.1±0.3	6.1±0.3	5.4±0.8	13.0 miles @ 75°
56*	Rt.104-New Haven SCH.(SE Corner)	5.3±0.5	5.3±0.5	6.5±0.4	5.2±0.6	5.3 miles @ 123°
58*	Co. Rt.1A-ALCAN(E. of Entrance Rd.)	5.3±0.6	5.0±0.4	6.6±0.5	4.3±0.3	3.1 miles @ 220°
59	Environmental Lab-JAF	14.5±2.2	6.2±0.6	8.4±0.8	7.9±1.5	0.5 miles @ 95°
75*	Unit 2, N. Fence, N. of Reactor Bldg.	6.7±0.4	4.8±0.5	7.0±0.4	5.2±0.4	0.1 miles @ 5°
76*	Unit 2, N. Fence, N. of Change House	8.8±3.0	5.0±0.6	7.0±0.4	5.4±0.6	0.1 miles @ 25°
77*	Unit 2, N. Fence, N. of Pipe Bldg.	10.1±2.1	6.1±0.4	7.7±1.4	6.2±0.4	0.2 miles @ 45°
78*	JAF, E. of E. Old Lay Down Area	6.1±0.9	5.0±0.4	7.2±0.2	5.2±0.3	1.0 miles @ 90°
79*	Co. Rt.29, Pole #63, 0.2mi. S. of Lake Rd.	5.4±0.9	4.1±0.2	6.4±0.4	4.0±0.2	1.1 miles @ 115°
80*	Co. Rt.29, Pole #54, 0.7mi. S.of Lake Rd.	5.6±0.8	4.6±0.2	6.8±0.4	5.2±0.6	1.4 miles @ 133°
81*	Miner Rd., Pole #16, 0.5mi. W. of Rt. 29	5.2±0.4	4.2±0.3	6.2±0.4	(1)	1.6 miles @ 159°
82*	Miner Rd., Pole #1½, 1.1mi. W. of Rt.29	5.2±0.5	4.4±0.2	6.2±0.6	4.4±0.2	1.6 miles @ 181°
83*	Lakeview Rd., Tree 0.45 mi. N. of Miner Rd.	5.2±0.7	4.4±0.3	6.2±0.6	4.2±0.3	1.2 miles @ 200°
84*	Lakeview Rd., N., Pole #6117, 200ft. N. of Lake Rd.	5.0±0.7	4.3±0.2	6.2±0.5	4.2±0.4	1.1 miles @ 225°
85*	Unit 1, N. Fence, N. of W. Side of Screen House	12.2±3.4	9.4±0.9	12.6±3.4	9.8±2.0	0.2 miles @ 294°
86*	Unit 2, N. Fence, N. of W. Side of Screen House	7.2±1.1	5.1±0.5	7.0±0.4	7.9±1.8	0.1 miles @ 315°
87*	Unit 2, N. Fence, N. of E. Side of Screen House	8.1±1.8	5.4±0.8	8.0±0.6	5.2±0.8	0.1 miles @ 341°
88*	Demster Beach Rd., Pole #35, 0.6mi. N. of Rt.1.	5.6±0.4	4.7±0.1	(1)	(1)	4.8 miles @ 97°

TABLE 14 CONTINUED

DIRECT RADIATION MEASUREMENT RESULTS (1985)

Results in Units of mrem/Std. Month ± 2 Sigma

STATION NUMBER	LOCATION	JANUARY THROUGH MARCH	APRIL THROUGH JUNE	JULY THROUGH SEPTEMBER	OCTOBER THROUGH DECEMBER	LOCATION (DIRECTION AND DISTANCE)(3)
89*	Leavitt Rd., Pole #16, 0.4mi. S. of Rt. 1	5.2±1.1	4.4±0.3	7.1±0.2	4.3±0.4	4.1 miles @ 111°
90*	Rt. 104, Pole #300, 150ft. E. of Keefe Rd.	5.4±0.8	4.0±0.1	6.0±0.6	4.4±0.3	4.2 miles @ 135°
91*	Rt. 51A, Pole #59, 0.8mi. W. of Rt. 51	5.2±0.6	4.1±0.3	4.9±0.3	4.2±0.3	4.8 miles @ 156°
92*	Maiden Lane Rd., Power Pole, 0.6mi., S. of Rt. 104	5.9±0.6	5.0±0.1	5.8±0.4	4.6±0.2	4.4 miles @ 183°
93*	Rt.53, Pole 1-1, 120ft. S. of Rt. 104	5.6±0.9	4.4±0.2	5.8±0.2	5.5±0.8	4.4 miles @ 205°
94*	Rt.1, Pole #82, 250ft. E. of Kocher Rd.	5.2±0.3	4.1±0.1	6.0±0.4	4.2±0.4	4.7 miles @ 223°
95*	Lakeshore Camp Site, from Alcan W. Access Rd. Pole #21, 1.2mi. N. of Rt.1	5.3±0.4	4.1±0.1	5.8±0.4	4.1±0.3	4.1 miles @ 237°
96*	Creamery Rd., 0.3mi. S. of Middle Rd. Pole 1½	5.1±0.6	4.5±0.5	6.3±0.4	5.2±0.3	3.6 miles @ 199°
97*	Rt.29, Pole #50, 200ft. N. of Miner Rd.	5.4±0.6	4.4±0.1	6.4±1.0	4.6±0.2	1.8 miles @ 143°
98*	Lake Rd., Pole #145, o.15mi. of Rt. 29	5.8±1.1	4.8±0.2	6.8±0.4	4.6±0.2	1.2 miles @ 101°
99	NMP Rd., 0.4mi. N. of Lake Rd., ENV. Station R1 off-site	5.6±1.1	5.2±0.2	6.8±0.6	5.0±0.4	1.8 miles @ 88°
100	Rt. 29 and Lake Rd., Env. Sta. R2 offsite	5.2±0.4	4.6±0.3	6.6±0.2	5.2±0.8	1.1 miles @ 104°
101	Rt. 29, 0.7mi. S. of Lake Rd., Env. Station R	36.0±0.7	4.3±0.4	6.4±0.6	4.8±0.4	1.5 miles @ 132°
102	EOF/Env. Lab, Oswego Co. Airport (Fulton Airport, Rt. 176)	(2)	(2)	6.3±0.8	4.8±0.5	1.9 miles @ 175°
103	EIC, East Garage Rd., Lamp Post R3 offsite	(2)	6.8±0.4	(1)	4.7±0.2	0.4 miles @ 267°

(1) TLD lost in field.
(2) TLD not established during that quarterly period.
(3) Direction and distance based on NMP-2 Reactor Centerline and Sixteen 22.5° sector grid.
* Technical Specification location.

TABLE 15

CONTINUOUS RADIATION MONITORS* (GM)

mR/hr

FIRST HALF

LOCATION	PERIOD: 1985		mR/hr MIN.	MAX.	AVG.
G Offsite**	12/27/84	to 1/24/85	0.010	0.030	0.015
	1/24	to 2/22	0.010	0.016	0.012
	2/22	to 3/21	0.010	0.016	0.012
	3/21	to 4/17	0.010	0.016	0.012
	4/17	to 5/16	0.010	0.030	0.018
	5/16	to 6/11	0.010	0.021	0.012
	6/11	to 7/10	0.010	0.020	0.012
D_1 Onsite	12/26/84	to 1/23/85	0.013	0.043	0.020
	1/23	to 2/21	0.012	0.093	0.025
	2/21	to 3/21	0.010	0.020	0.013
	3/21	to 4/17	0.012	0.021	0.012
	4/17	to 5/15	0.010	0.023	0.013
	5/15	to 6/12	0.010	0.020	0.013
	6/12	to 7/10	0.010	0.045	0.025
D_2 Onsite	12/26/84	to 1/23/85	0.012	0.046	0.016
	1/23	to 2/21	0.011	0.062	0.015
	2/21	to 3/21	0.013	0.023	0.015
	3/21	to 4/17	0.011	0.023	0.016
	4/17	to 5/16	0.012	0.022	0.016
	5/16	to 6/12	0.011	0.022	0.015
	6/12	to 7/10	0.010	0.023	0.010
E Onsite	12/26/84	to 1/23/85	0.010	0.046	0.018
	1/23	to 2/21	0.012	0.062	0.017
	2/21	to 3/21	0.010	0.022	0.016
	3/21	to 4/17	0.010	0.022	0.017
	4/17	to 5/16	0.010	0.022	0.015
	5/16	to 6/12	0.010	0.022	0.016
	6/12	to 7/10	0.013	0.023	0.017
F Onsite	12/26/84	to 1/23/85	0.013	0.072	0.023
	1/23	to 2/21	0.011	0.050	0.018
	2/21	to 3/21	0.010	0.025	0.017
	3/21	to 4/17	0.010	0.030	0.018
	4/17	to 5/16	0.010	0.032	0.021
	5/16	to 6/12	0.015	0.033	0.020
	6/12	to 7/10	0.015	0.033	0.025

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

** Monitor located at G offsite station after 01/08/85 because former monitoring station moved to meet air sampling requirements of the new Technical Spec fications effective 1/1/85.

TABLE 15 (cont.)

CONTINUOUS RADIATION MONITORS* (GM)

mR/hr

SECOND HALF

LOCATION	PERIOD: 1985	MIN. (mR/hr)	MAX. (mR/hr)	AVG. (mR/hr)
G Offsite**	07/10/85 to 08/06/85	0.010	0.021	0.012
	08/06 to 09/04	0.010	0.057	0.012
	09/04 to 10/03	0.011	0.060	0.040
	10/03 to 11/01	0.010	0.050	0.040
	11/01 to 11/27	0.015	0.034	0.022
	11/27 to 12/20	0.010	0.026	0.014
D_1 Onsite	07/10/85 to 08/09/85	0.010	0.045	0.023
	08/09 to 09/06	0.012	0.048	0.023
	09/06 to 10/03	0.010	0.060	0.020
	10/03 to 10/31	0.012	0.050	0.020
	10/31 to 11/27	0.010	0.050	0.016
	11/27 to 12/20	0.010	0.035	0.019
D_2 Onsite	07/10/85 to 08/09/85	0.011	0.023	0.016
	08/09 to 09/06	0.010	0.028	0.018
	09/06 to 10/03	0.013	0.050	0.019
	10/03 to 10/31	0.012	0.028	0.015
	10/31 to 11/27	0.011	0.026	0.016
	11/27 to 12/20	0.011	0.024	0.015
E Onsite	07/10/85 to 08/09/85	0.010	0.023	0.017
	08/09 to 09/06	0.010	0.021	0.013
	09/06 to 10/03	0.010	0.074	0.023
	10/03 to 11/01	0.010	0.023	0.013
	11/01 to 11/27	0.010	0.022	0.014
	11/27 to 12/20	0.010	0.022	0.013
F Onsite	07/10/85 to 08/09/85	0.015	0.035	0.024
	08/09 to 09/06	0.017	0.038	0.023
	09/06 to 10/03	0.014	0.032	0.022
	10/03 to 11/01	0.013	0.049	0.020
	11/01 to 11/27	0.012	0.042	0.022
	11/27 to 12/21	0.012	0.031	0.019

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

** Monitor located at G offsite station after 01/08/85 because former monitoring station moved to meet air sampling requirements of the new Technical Specifications effective 1/1/85.

TABLE 15 (cont.)

CONTINUOUS RADIATION MONITORS* (GM)

mR/hr

FIRST HALF

LOCATION	PERIOD: 1985		MIN. (mR/hr)	MAX. (mR/hr)	AVG. (mR/hr)
G Onsite	12/26/84	to 1/23/85	0.010	0.046	0.018
	1/23	to 2/21	0.010	0.030	0.012
	2/21	to 3/21	0.013	0.028	0.020
	3/21	to 4/17	0.013	0.034	0.020
	4/17	to 5/16	0.015	0.033	0.020
	5/16	to 6/12	0.013	0.040	0.022
	6/12	to 7/10	0.012	0.033	0.021
H Onsite	12/26/84	to 1/23/85	0.010	0.058	0.020
	1/23	to 2/21	0.010	0.043	0.017
	2/21	to 3/21	0.010	0.090	0.022
	3/21	to 4/17	0.012	0.090	0.030
	4/17	to 5/16	0.015	0.180	0.060
	5/16	to 6/12	0.015	0.180	0.050
	6/12	to 7/10	0.010	0.090	0.030
I Onsite	12/26/84	to 1/23/85	0.010	0.040	0.018
	1/23	to 2/21	0.013	0.061	0.018
	2/21	to 3/21	0.015	0.030	0.020
	3/21	to 4/17	0.012	0.025	0.018
	4/17	to 5/16	0.011	0.030	0.016
	5/16	to 6/12	0.012	0.028	0.018
	6/12	to 7/10	0.013	0.030	0.019
J Onsite	12/26/84	to 1/23/85	0.010	0.030	0.012
	1/23	to 2/21	0.010	0.021	0.012
	2/21	to 3/21	0.010	0.013	0.012
	3/21	to 4/17	0.011	0.016	0.012
	4/17	to 5/16	0.010	0.019	0.014
	5/16	to 6/12	0.010	0.018	0.013
	6/12	to 7/10	0.010	0.042	0.022
K Onsite	12/26/84	to 1/[illegible]/85	0.012	0.053	0.019
	1/23	to 2/[illegible]	0.010	0.016	0.012
	2/21	to 3/21	0.010	0.031	0.018
	3/21	to 4/17	0.010	0.032	0.020
	4/17	to 5/16	0.010	0.035	0.018
	5/16	to 6/12	0.013	0.036	0.020
	6/12	to 7/10	0.011	0.030	0.018

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

TABLE 15 (cont.)

CONTINUOUS RADIATION MONITORS* (GM)

mR/hr

SECOND HALF

LOCATION	PERIOD: 1985	MIN. (mR/hr)	MAX. (mR/hr)	AVG. (mR/hr)
G Onsite	07/10/85 to 08/07/85	0.012	0.032	0.020
	08/07 to 09/06	0.012	0.034	0.017
	09/06 to 10/03	0.010	0.030	0.017
	10/03 to 11/01	0.010	0.031	0.015
	11/01 to 11/27	0.010	0.022	0.013
	11/27 to 12/20	0.010	0.024	0.013
H Onsite	07/10/85 to 08/09/85	0.012	0.195	0.040
	08/09 to 09/06	0.013	0.200	0.080
	09/06 to 10/03	0.010	0.170	0.055
	10/03 to 10/31	0.010	0.100	0.045
	10/31 to 11/27	0.014	0.110	0.040
	11/27 to 12/20	0.013	0.061	0.030
I Onsite	07/10/85 to 08/09/85	0.010	0.026	0.019
	08/09 to 09/06	0.010	0.025	0.014
	09/06 to 10/03	0.013	0.050	0.019
	10/03 to 10/31	0.012	0.039	0.019
	10/31 to 11/27	0.012	0.030	0.019
	11/27 to 12/20	0.010	0.028	0.016
J Onsite	07/10/85 to 08/09/85	0.025	0.048	0.032
	08/09 to 09/06	0.010	0.049	0.031
	09/06 to 10/03	0.010	0.045	0.028
	10/03 to 10/31	0.020	0.048	0.029
	10/31 to 11/27	0.010	0.055	0.023
	11/27 to 12/20	0.010	0.085	0.015
K Onsite	07/10/85 to 08/09/85	0.010	0.034	0.019
	08/09 to 09/06	0.011	0.027	0.016
	09/06 to 10/03	0.010	0.030	0.015
	10/03 to 10/31	0.010	0.026	0.013
	10/31 to 11/27	0.010	0.023	0.013
	11/27 to 12/20	0.010	0.023	0.013

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

TABLE 16

CONCENTRATIONS OF IODINE-131 IN MILK

Results in Units of pCi/l ± 2 sigma

Station*	05/06/85	06/03/85	07/08/85(a)	07/22/85	08/05/85	08/19/85	09/09/85	09/23/85
16	<0.18	<0.44	<0.22	<0.15	<0.44	<0.39	<0.38	<0.20
4	<0.18	<0.20	<0.20	<0.16	<0.29	<0.23	<0.17	<0.49
7	<0.23	<0.27	<0.24	<0.15	<0.39	<0.28	<0.22	<0.24
40 (Control)	<0.21	<0.18	<0.27	<0.14	<0.25	<0.22	<0.31	<0.21
50	<0.22	<0.25	<0.27	<0.19	<0.27	<0.26	<0.37	<0.22
55	<0.27	<0.26	<0.33	<0.19	<0.40	<0.28	<0.27	<0.25
60	<0.29	<0.35	<0.38	<0.21	<0.41	<0.28	<0.25	<0.27

* Corresponds to sample locations listed on Figure 4, Section VII.
(a) I-131 analysis required twice per month due to implementation of new RETS (July 1, 1985)

TABLE 16
(Continued)
CONCENTRATIONS OF IODINE- 131 IN MILK

Results in Units of pCi/l ± 2 sigma

Station*	10/07/85	10/21/85	11/04/85	11/18/85	12/02/85	12/16/85
16	<0.42	<0.27	<0.21	<0.39	<0.22	<0.21
4	<0.22	<0.34	<0.21	<0.30	<0.21	<0.22
7	<0.25	<0.29	<0.23	<0.32	<0.40	<0.21
40 (Control)	<0.44	<0.29	<0.43	<0.29	<0.20	<0.20
50	<0.25	<0.35	<0.19	<0.20	<0.24	<0.26
55	<0.38	<0.32	<0.26	<0.22	<0.25	<0.25
60	<0.20	<0.35	<0.45	<0.28	<0.24	<0.18

* Corresponds to sample locations listed on Figure 4, Section VII.

TABLE 17
CONCENTRATIONS OF GAMMA EMITTERS IN MILK

(MONTHLY COMPOSITE SAMPLES)[a]
Results in Units of pCi/l ± 2 sigma

STATION*	NUCLIDES	05/06/85 to 05/20/85	06/03/85 to 06/17/85	07/08/85[a]	07/22/85	08/05/85	08/19/85	09/09/85	09/23/85	$\bar{x}$
No. 16	K-40	1180+120	1400+140	1270+130	1440+140	824+82	1320+130	1310+130	1320+130	
	Cs-134	<9.8	<4.3	<7.8	<4.2	<7.9	<4.3	<8.1	<3.9	
	Cs-137	<8.7	<5.6	<7.6	<5.2	<7.9	<4.8	<7.9	<4.5	6.53
	La/Ba-140	<14.0	<6.4	<8.6	<5.9	<7.7	<5.0	<9.7	<5.7	
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	
No. 4	K-40	1220+120	1220+126	1430+140	1310+130	1380+140	1220+120	1350+140	1350+140	
	Cs-134	<6.1	<4.0	<5.5	<4.3	<5.9	<7.4	<5.2	<3.9	
	Cs-137	<6.7	<4.2	<6.5	<4.9	<6.3	<7.8	<6.0	<4.3	5.84
	La/Ba-140	<8.1	<6.9	<7.3	<6.4	<13.0	<10.0	<7.6	<5.6	
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	
No. 7	K-40	1320+130	1310+130	1240+120	1350+140	1120+110	1310+130	1220+120	1230+120	
	Cs-134	<6.6	<5.4	<5.6	<4.4	<5.5	<4.1	<5.6	<4.2	
	Cs-137	<7.8	<5.5	<6.9	<4.1	<6.3	<4.0	<6.4	<4.3	5.66
	La/Ba-140	<9.6	<8.9	<8.0	<5.3	<12.0	<5.7	<9.7	<6.1	
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	
No. 40 (Control)	K-40	1450+150	1360+140	1470+150	1370+140	1130+110	1430+140	1320+130	1410+140	
	Cs-134	<6.4	<4.4	<5.2	<3.9	<7.6	<5.5	<5.4	<3.9	
	Cs-137	<5.7	<4.1	<5.1	<3.9	<6.8	<5.5	<5.5	<4.3	
	La/Ba-140	<8.9	<6.3	<6.5	<6.1	<7.3	<7.1	<6.5	<5.3	
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	

* Corresponds to sample locations noted on Figure 4, Section VII.

(a) Composite samples for May and June only. Starting with July, GSA required twice per month as a result of new RETS implementation, July 1, 1985.

TABLE 17 (cont.)
CONCENTRATIONS OF GAMMA EMITTERS IN MILK

(MONTHLY COMPOSITE SAMPLES)[(a)]
Results in Units of pCi/l ± 2 sigma

STATION*	NUCLIDES	05/06/85 to 05/20/85	06/03/85 to 06/17/85	07/08/85[(a)]	07/22/85	08/05/85	08/19/85	09/09/85	09/23/85	
No. 50	K-40	1110±110	1330±130	1140±110	1270±130	1150±120	1260±130	1510±150	1260±130	
	Cs-134	<7.6	<4.4	<6.2	<6.2	<5.7	<5.8	<6.2	<6.2	
	Cs-137	<6.9	<4.4	<6.2	<6.3	<5.7	<5.8	<6.0	<5.7	5.88
	La/Ba-140	<6.7	<6.1	<8.7	<8.2	<7.3	<7.9	<8.9	<7.6	
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	
No. 55	K-40	1400±140	1370±140	1520±150	1380±140	1450±150	1290±130	1320±130	1400±140	
	Cs-134	<4.4	<4.3	<3.8	<4.2	<7.2	<4.3	<4.5	<4.5	
	Cs-137	<4.4	<4.3	<3.9	<4.4	<6.7	<4.6	<4.0	<4.8	4.64
	La/Ba-140	<7.4	<5.8	<5.0	<5.3	<6.4	<6.2	<5.4	<6.3	
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	
No. 60	K-40	1370±140	1360±140	1410±140	1480±150	1520±150	1460±150	1380±140	1390±140	
	Cs-134	<4.7	<4.6	<4.5	<4.1	<4.2	<4.0	<4.2	<4.4	
	Cs-137	<4.8	<4.5	<4.1	<4.5	<4.4	<4.1	<4.6	<4.4	4.42
	La/Ba-140	<5.7	<7.0	<5.2	<6.1	<4.1	<5.8	<5.1	<6.1	
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	

* Corresponds to sample locations noted on Figure 4, Section VII.

(a) Composite samples for May and June only. Starting with July, GSA required twice per month as a result of new RETS implementation, July 1, 1985.

TABLE 17 (cont.)
CONCENTRATIONS OF GAMMA EMITTERS IN MILK
Results in Units of pCi/l ± 2 sigma

STATION*	NUCLIDES	10/07/85	10/21/85	11/04/85	11/18/85	12/02/85	12/16/85
No. 16	K-40	1350+140	1170+120	1360+140	1280+130	1100+110	1470+150
	Cs-134	<4.3	<5.9	<5.6	<6.3	<6.7	<4.1
	Cs-137	<4.4	<6.0	<5.4	<6.2	<6.5	<3.9
	La/Ba-140	<5.1	<8.7	<4.7	<7.7	<7.3	<4.4
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
No. 4	K-40	1430+140	1290+130	1390+140	1440+140	1270+130	1490+150
	Cs-134	<4.1	<8.0	<7.7	<4.6	<4.9	<8.0
	Cs-137	<4.2	<7.0	<7.8	<4.3	<5.1	<7.9
	La/Ba-140	<5.6	<10.0	<6.9	<6.5	<5.4	<8.1
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
No. 7	K-40	1290+130	1290+130	1250+130	1340+130	1350+140	1440+140
	Cs-134	<5.4	<4.5	<5.7	<4.4	<5.1	<5.9
	Cs-137	<5.3	<4.7	<5.8	<4.3	<6.0	<6.0
	La/Ba-140	<6.3	<6.0	<5.7	<5.6	<6.6	<6.2
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
No. 40 (Control)	K-40	1330+130	1370+140	1290+130	1350+130	1400+140	1370+140
	Cs-134	<7.6	<5.8	<4.1	<4.3	<5.0	<7.6
	Cs-137	<7.0	<6.0	<4.2	<4.2	<4.6	<6.9
	La/Ba-140	<8.8	<7.5	<4.0	<7.7	<5.1	<8.7
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD

* Corresponds to sample locations noted on Figure 4, Section VII.

TABLE 17 (cont.)
CONCENTRATIONS OF GAMMA EMITTERS IN MILK
Results in Units of pCi/l ± 2 sigma

STATION*	NUCLIDES	10/07/85	10/21/85	11/04/85	11/18/85	12/02/85	12/16/85
No. 50	K-40	1300±130	1290±130	1270±130	1280±130	1110±110	1300±130
	Cs-134	<7.9	<4.3	<6.2	<6.2	<5.3	<8.8
	Cs-137	<7.5	<4.1	<7.1	<5.6	<5.3	<8.7
	La/Ba-140	<9.3	<6.1	<7.7	<7.3	<6.6	<6.2
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
No. 55	K-40	1300±130	1270±130	1390±140	1390±140	1460±150	1300±130
	Cs-134	<5.4	<6.3	<6.3	<4.5	<3.6	<6.4
	Cs-137	<6.1	<6.0	<6.4	<4.6	<3.5	<6.4
	La/Ba-140	<8.1	<6.6	<7.1	<5.7	<4.4	<7.9
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD
No. 60	K-40	1280±130	1320±130	1270±130	1300±130	1290±130	1340±130
	Cs-134	<6.0	<4.6	<4.1	<4.0	<3.8	<4.0
	Cs-137	<5.9	<4.4	<4.2	<4.5	<3.8	<4.1
	La/Ba-140	<8.5	<5.0	<4.1	<6.0	<3.6	<4.0
	Others	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD

* Corresponds to sample locations noted on Figure 4, Section VII.

TABLE 18

CONCENTRATIONS OF STRONTIUM-90 IN MILK

Results in Units of pCi/l ± 2 sigma

Station*	May (Composite)	June (Composite)	July(a)	August
16	2.2 ± 0.5	0.9 ± 0.5	3.4 ± 0.8	3.0 ± 1.2
4	2.2 ± 0.7	0.9 ± 0.4	4.2 ± 0.8	1.0 ± 0.4
7	3.0 ± 0.6	0.8 ± 0.4	1.9 ± 0.8	2.4 ± 0.6
40 (Control)	2.1 ± 0.4	2.0 ± 0.6	3.3 ± 0.8	2.2 ± 1.1
50	2.1 ± 0.7	3.2 ± 0.5	1.9 ± 0.3	1.6 ± 0.6
55	4.4 ± 0.7	1.5 ± 0.3	(b)	(b)
60	2.6 ± 0.7	1.1 ± 0.5	(b)	(b)

Station*	September	October	November	December
16	2.6 ± 0.5	2.1 ± 1.1	2.2 ± 0.5	0.4 ± 0.2
4	2.0 ± 0.6	2.5 ± 0.5	1.9 ± 0.5	2.4 ± 1.0
7	2.6 ± 0.9	2.4 ± 0.4	2.3 ± 0.5	2.2 ± 0.6
40 (Control)	1.5 ± 0.8	2.0 ± 0.5	1.7 ± 0.5	2.4 ± 0.6
50	3.3 ± 0.7	1.7 ± 0.4	2.0 ± 0.9	1.3 ± 0.5
55	(b)	(b)	(b)	(b)
60	(b)	(b)	(b)	(b)

* Corresponds to sample locations listed on Figure 4, Section VII.

(a) Sr-90 analysis no longer required by new RETS after July 1, 1985. However, Sr-90 analysis was performed for July thru December on stations 4, 7, 16, 40 and 50.

(b) Sr-90 analysis not performed at this location.

TABLE19
MILCH ANIMAL CENSUS
SPRING 1985

TOWN OR AREA(a)	NUMBER OF CENSUS MAP(1)	DEGREES	DISTANCE	NUMBER OF MILCH ANIMALS
Scriba	1(b)	220°	3.0 miles	None
	16*	190°	5.2	44C
	2	195°	8.0	ND
	3	190°	4.5	2C
	6(b)	62°	2.2	1C
	26(b)	115°	1.6	None
New Haven	8	130°	9.2	33C
	9	95°	5.2	42C
	4*	113°	7.8	78C
	45	125°	8.0	None
	10(b)	130°	2.6	33C
	5	146°	7.2	45C
	11	130°	8.5	40C
	7*	107°	5.5	69C
	48	141°	2.9	None
Mexico	12	107°	11.5	70C
	13	114°	11.2	2C
	14	120°	9.8	70C
	15	100°	10.8	37C
	17	115°	10.2	43C
	18	110°	10.0	48C
	19	132°	10.5	42C
	20	123°	11.2	None
	60*	90°	9.5	35C
	50*	95°	8.2	150C
	55*	95°	9.0	54C
	21	112°	10.5	75C
	49***	88°	7.9	1G(2)
Richland	22	85°	10.2	40C
	23	92°	10.5	75C
Oswego	24	214°	8.8	None
Hannibal	40**	220°	15.2	30C
Volney	25	182°	9.5	None
			TOTALS:	1158 Cows 1 Goat

C = Cows
G = Goats
* = Milk sample location
** = Milk sample control location
*** = new location
ND = Did not wish to participate in the survey
(1) = References Figure 4
(2) = Goat is <u>not</u> currently producing milk.
None= No cows or goats at that location. Location was a previous location with cows or goats.
(a) = Census performed out to a distance of approximately ten miles.
(b) = Location within three miles.

TABLE 20

CONCENTRATIONS OF GAMMA EMITTERS IN VARIOUS FOOD PRODUCTS

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

COLLECTION SITE	SAMPLE DATE	DESCRIPTION	Be-7	K-40	Co-60	Cs-134	Cs-137	Others
A	5-3-85	Eggs	<0.28	0.94±0.24	<0.006	<0.020	<0.014	<LLD
B	6-5-85	Eggs	<0.20	1.29±0.31	<0.021	<0.021	<0.024	<LLD
C	5-20-85	Eggs	<0.26	1.29±0.33	<0.015	<0.021	<0.017	<LLD
D (control)	5-14-85	Eggs	<0.17	1.03±0.23	<0.018	<0.013	<0.013	<LLD
A	5-3-85	Poultry	<0.38	3.37±0.51	<0.022	<0.027	<0.024	<LLD
B	6-5-85	Poultry	<0.20	3.45±0.40	<0.023	<0.020	<0.022	<LLD
C	5-20-85	Poultry	<0.41	2.20±0.39	<0.029	<0.030	<0.032	<LLD
D (control)	5-14-85	Poultry	<0.26	2.44±0.46	<0.020	<0.021	<0.024	<LLD
E	4-29-85	Beef	<0.26	2.34±0.36	<0.015	<0.019	<0.013	<LLD
G	6-3-85	Beef	<0.25	3.19±0.42	<0.020	<0.026	<0.027	<LLD
H (control)	5-10-85	Beef	<0.26	3.23±0.42	<0.018	<0.020	<0.017	<LLD

TABLE 20
(continued)
CONCENTRATIONS OF GAMMA EMITTERS IN VARIOUS FOOD PRODUCTS

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

COLLECTION SITE	SAMPLE DATE	DESCRIPTION	Be-7	K-40	Co-60	Cs-134	Cs-137	Others
A	10-30-85	Eggs	<0.23	0.95±0.25	<0.016	<0.020	<0.013	<LLD
B	12-06-85	Eggs	<0.17	1.15±0.32	<0.023	<0.015	<0.024	<LLD
F	12-10-85	Eggs	<0.13	1.40±0.34	<0.021	<0.022	<0.022	<LLD
D (control)	11-19-85	Eggs	<0.33	0.83±0.28	<0.019	<0.021	<0.021	<LLD
A	10-30-85	Poultry	<0.20	2.98±0.45	<0.021	<0.013	<0.019	<LLD
B	12-06-85	Poultry	<0.22	3.17±0.58	<0.029	<0.029	<0.028	<LLD
F	12-10-85	Poultry	<0.16	3.03±0.44	<0.020	<0.017	<0.021	<LLD
D (control)	11-19-85	Poultry	<0.38	3.02±0.50	<0.033	<0.026	<0.032	<LLD
I	11-04-85	Beef	<0.22	2.36±0.36	<0.016	<0.016	<0.023	<LLD
J	11-29-85	Beef	<0.19	2.61±0.45	<0.021	<0.024	<0.030	<LLD
B	12-18-85	Beef	<0.15	2.61±0.45	<0.021	<0.017	<0.024	<LLD
H (control)	11-29-85	Beef	<0.21	2.70±0.27	<0.022	<0.023	<0.017	<LLD

TABLE 20
(continued)
CONCENTRATIONS OF GAMMA EMITTERS IN VARIOUS FOOD PRODUCTS

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

COLLECTION SITE	SAMPLE DATE	DESCRIPTION	Be-7	K-40	I-131	Cs-134	Cs-137	Others
N	9-16-85	Cabbage	<0.150	2.05±0.26	<0.021	<0.019	<0.015	<LLD
O	9-16-85	Beet Greens	<0.230	3.52±0.35	<0.032	<0.027	0.047±0.021	<LLD
P	9-16-85	Collard Greens	<0.160	4.37±0.44	<0.021	<0.017	<0.017	<LLD
Q	9-16-85	Tomatoes	<0.078	1.14±0.13	<0.013	<0.008	<0.009	<LLD
R	9-18-85	Tomatoes	<0.150	2.34±0.27	<0.023	<0.017	<0.018	<LLD
S	0-16-85	Tomatoes	<0.084	1.65±0.17	<0.013	<0.010	<0.010	<LLD
M (control)	9-16-85	Swiss Chard	<0.290	3.37±0.41	<0.047	<0.033	<0.033	<LLD
M (control)	9-16-85	Tomatoes	<0.092	2.31±0.23	<0.014	<0.011	<0.011	<LLD

TABLE 20
(continued)
CONCENTRATIONS OF GAMMA EMITTERS IN VARIOUS FOOD PRODUCTS

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

COLLECTION SITE	SAMPLE DATE	DESCRIPTION	Be-7	K-40	I-131	Cs-134	Cs-137	Others
K	9-16-85	Wild Grape Leaves	1.68±0.29	3.83±0.38	<0.053	<0.024	<0.032	<LLD
K	9-16-85	Oak Leaves	1.21±0.33	4.11±0.55	<0.059	<0.041	0.259±0.040	<LLD
K	9-16-85	Maple Leaves	1.69±0.29	3.57±0.40	<0.045	<0.026	<0.032	<LLD
L	9-04-85	Wild Grape Leaves	0.74±0.13	4.29±0.43	<0.019	<0.014	<0.016	<LLD
L	9-05-85	Oak Leaves	1.42±0.24	3.51±0.40	<0.040	<0.025	0.183±0.031	<LLD
L	9-05-85	Maple Leaves	0.80±0.21	2.79±0.37	<0.037	<0.027	0.043±0.022	<LLD
M (control)	9-16-85	Wild Grape Leaves	2.52±0.33	2.21±0.37	<0.058	<0.039	<0.037	<LLD
M (control)	9-16-85	Oak Leaves	1.22±0.18	2.77±0.30	<0.027	<0.015	<0.020	<LLD
M (control)	9-16-85	Maple Leaves	1.69±0.29	3.85±0.42	<0.048	<0.021	<0.023	<LLD

TABLE 21

1986 RESIDENCE CENSUS

LOCATION	MAP DESIGNATION[(a)]	METEOROLOGICAL SECTOR	DEGREES	DISTANCE
*		N	-	-
*		NNE	-	-
*		NE	-	-
*		ENE	-	-
Sunset Bay	A	E	80°	1.4 miles
Lake Road	B	ESE	102°	1.1 miles
County Route 29	C	SE	130°	1.4 miles
Miner Road	D	SSE	163°	1.6 miles
Miner Road	E	S	170°	1.6 miles
Lakeview Road	F	SSW	203°	1.2 miles
Lakeview Road	G	SW	228°	1.1 miles
Bible Camp Retreat	H	WSW	238°	0.9 miles
*		W	-	-
*		WNW	-	-
*		NW	-	-
*		NNW	-	-

* This meteorological sector is over Lake Ontario. There are no residences within three miles.

(a) See Figure 3, Section VII.

TABLE 22

ENVIRONMENTAL SAMPLE LOCATIONS

SAMPLE MEDIUM	MAP DESIGNATION	FIGURE NUMBER	LOCATION DESCRIPTION	DEGREES AND DISTANCE
Shoreline Sediment	05*	Figure 1	Sunset Bay	80° at 1.5 miles
	06	Figure 1	Langs Beach, Control	230° at 5.8 miles
Fish	02*	Figure 1	Nine Mile Point Transect	315° at 0.3 miles
	03*	Figure 1	FitzPatrick Transect	55° at 0.6 miles
	00*	Figure 1	Oswego Transect	235° at 6.2 miles
Surface Water	03*	Figure 1	FitzPatrick Inlet	70° at 0.5 miles
	08*	Figure 1	Oswego Steam Station	235° at 7.6 miles
	09*	Figure 1	Nine Mile Point #1 Inlet	305° at 0.3 miles
	10*	Figure 1	Oswego City Water	240° at 7.8 miles
Air Radioiodine and Particulates	R-1*	Figure 1	R-1 Station, Nine Mile Point Road	88° at 1.8 miles
	R-2*	Figure 1	R-2 Station, Lake Road	104° at 1.1 miles
	R-3*	Figure 1	R-3 Station, Co. Rt. 29	132° at 1.5 miles
	R-4*	Figure 1	R-4 Station, Co. Rt. 29	143° at 1.8 miles
	R-5*	Figure 1	R-5 Station, Montario Point Road	42° at 16.4 miles
	D1*	Figure 2	D1 Onsite Station, Onsite	67° at 0.2 miles
	D2*	Figure 2	D2 Onsite Station, Onsite	140° at 0.4 miles
	E*	Figure 2	E Onsite Station, Onsite	175° at 0.4 miles
	F*	Figure 2	F Onsite Station, Onsite	210° at 0.5 miles
	G*	Figure 2	G Onsite Station, Onsite	250° at 0.7 miles
	H*	Figure 2	H Onsite Station, Onsite	71° at 0.8 miles
	I*	Figure 2	I Onsite Station, Onsite	98° at 0.8 miles
	J*	Figure 2	J Onsite Station, Onsite	110° at 0.9 miles
	K*	Figure 2	K Onsite Station, Onsite	132° at 0.5 miles
	G*	Figure 1	G Offsite Station, St. Paul St.	225° at 5.3 miles

*Technical Specification location

TABLE 22
(continued)
ENVIRONMENTAL SAMPLE LOCATIONS

SAMPLE MEDIUM	MAP DESIGNATION	FIGURE NUMBER	LOCATION DESCRIPTION	DEGREES AND DISTANCE
Thermo-luminescent Dosimeters (TLDs)	3*	Figure 2	D1 Onsite Station	69° at 0.2 miles
	4*	Figure 2	D2 Onsite Station	140° at 0.4 miles
	5*	Figure 2	E Onsite Station	175° at 0.4 miles
	6*	Figure 2	F Onsite Station	210° at 0.5 miles
	7*	Figure 2	G Onsite Station	250° at 0.7 miles
	8*	Figure 1	R-5 Offsite Station	42° at 16.4 miles
	9*	Figure 1	D1 Offsite Location	80° at 11.4 miles
	10*	Figure 1	D2 Offsite Location	117° at 9.0 miles
	11*	Figure 1	E Offsite Location	160° at 7.2 miles
	12*	Figure 1	F Offsite Location	190° at 7.7 miles
	13*	Figure 1	G Offsite Location	225° at 5.3 miles
	14*	Figure 1	SW Oswego - Control	226° at 12.6 miles
	15*	Figure 2	West Site Boundary	237° at 0.9 miles
	18*	Figure 2	Energy Information Center	265° at 0.4 miles
	19	Figure 2	East Site Boundary	81° at 1.3 miles
	23*	Figure 2	H Onsite Station, Onsite	70° at 0.8 miles
	24*	Figure 2	I Onsite Station, Onsite	[illegible]° at 0.8 miles
	25*	Figure 2	J Onsite Station, Onsite	1[illegible] at 0.9 miles
	26*	Figure 2	K Onsite Station, Onsite	132° at 0.5 miles
	27	Figure 2	North Fence, JAFNPP	60° at 0.4 miles
	28	Figure 2	North Fence, JAFNPP	68° at 0.5 miles
	29	Figure 2	North Fence, JAFNPP	65° at 0.5 miles
	30	Figure 2	North Fence, JAFNPP	57° at 0.4 miles
	31	Figure 2	North Fence, NMP-1	276° at 0.2 miles
	39	Figure 2	North Fence, NMP-1	292° at 0.2 miles
	47	Figure 2	North Fence, JAFNPP	69° at 0.6 miles
	49*	Figure 1	Phoenix, N.Y. - Control	170° at 19.8 miles
	51	Figure 1	Oswego Steam Station, East	233° at 7.4 miles
	52	Figure 1	Oswego Elementary School, East	227° at 5.8 miles
	53	Figure 1	Fulton High School	183° at 13.7 miles
	54	Figure 1	Mexico High School	115° at 9.3 miles
	55	Figure 1	Pulaski Gas Substation, Rt. 5	75° at 13.0 miles

*Technical Specification location

TABLE 22
(continued)
ENVIRONMENTAL SAMPLE LOCATIONS

SAMPLE MEDIUM	MAP DESIGNATION	FIGURE NUMBER	LOCATION DESCRIPTION	DEGREES AND DISTANCE
Thermo-luminescent Dosimeters (TLDs)	56*	Figure 1	New Haven Elementary School	123° at 5.3 miles
	58*	Figure 1	Co. Rt. 1 and Alcan	220° at 3.1 miles
	59	Figure 2	Environmental Lab, JAFNPP	95° at 0.5 miles
	75	Figure 2	North Fence, NMP-2	5° at 0.1 miles
	76*	Figure 2	North Fence, NMP-2	25° at 0.1 miles
	77*	Figure 2	North Fence, NMP-2	45° at 0.2 miles
	78*	Figure 2	East Boundary, JAFNPP	90° at 1.0 miles
	79*	Figure 2	County Route 29	115° at 1.1 miles
	80*	Figure 2	County Route 29	133° at 1.4 miles
	81*	Figure 2	Miner Road	159° at 1.6 miles
	82*	Figure 2	Miner Road	181° at 1.6 miles
	83*	Figure 2	Lakeview Road	200° at 1.2 miles
	84*	Figure 2	Lakeview Road	225° at 1.1 miles
	85*	Figure 2	North Fence, NMP-1	294° at 0.2 miles
	86*	Figure 2	North Fence, NMP-1	315° at 0.1 miles
	87*	Figure 2	North Fence, NMP-1	341° at 0.1 miles
	88*	Figure 1	Dempster Beach Road	97° at 4.8 miles
	89*	Figure 1	Leavitt Road	111° at 4.1 miles
	90*	Figure 1	Route 104 and Keefe Road	135° at 4.2 miles
	91*	Figure 1	County Route 51A	156° at 4.8 miles
	92*	Figure 1	Maiden Lane Road	183° at 4.4 miles
	93*	Figure 1	County Route 53	205° at 4.4 miles
	94*	Figure 1	Co. Rt. 1 and Kocher Road	223° at 4.7 miles
	95*	Figure 1	Lakeshore Camp Site	237° at 4.1 miles
	96*	Figure 1	Creamery Road	199° at 3.6 miles
	97*	Figure 2	County Route 29	143° at 1.8 miles
	98*	Figure 1	Lake Road	101° at 1.2 miles
	99*	Figure 2	Nine Mile Point Road	88° at 1.8 miles
	100	Figure 2	Co. Rt. 29 and Lake Road	104° at 1.1 miles
	101	Figure 2	County Route 29	132° at 1.5 miles
	102	Figure 1	Oswego County Airport	175° at 11.9 miles
	103	Figure 2	Energy Information Center, East	267° at 0.4 miles

*Technical Specification location

TABLE 22
(continued)
ENVIRONMENTAL SAMPLE LOCATIONS

SAMPLE MEDIUM	MAP DESIGNATION	FIGURE NUMBER	LOCATION DESCRIPTION	DEGREES AND DISTANCE
Cows Milk	7*	Figure 4	Indicator Location	107° at 5.5 miles
	16*	Figure 4	Indicator Location	190° at 5.9 miles
	50*	Figure 4	Indicator Location	93° at 8.2 miles
	55*	Figure 4	Indicator Location	95° at 9.0 miles
	60	Figure 4	Indicator Location	90° at 9.5 miles
	4	Figure 4	Indicator Location	113° at 7.8 miles
	40*	Figure 4	Control Location	223° at 15.0 miles
Food Products	A*	Figure 5	Indicator Location	198° at 3.6 miles
	B*	Figure 5	Indicator Location	192° at 1.9 miles
	C*	Figure 5	Indicator Location	164° at 2.3 miles
	D*	Figure 5	Indicator Location	235° at 12.1 miles
	E*	Figure 5	Indicator Location	123° at 7.6 miles
	F*	Figure 5	Indicator Location	153° at 8.1 miles
	G*	Figure 5	Indicator Location	91° at 9.3 miles
	H*	Figure 5	Indicator Location	225° at 21.1 miles
	I*	Figure 5	Indicator Location	130° at 1.8 miles
	J*	Figure 5	Indicator Location	106° at 1.9 miles
	K*	Figure 2	Indicator Location	106° at 0.9 miles
	L*	Figure 2	Indicator Location	82° at 0.8 miles
	M*	Figure 3	Control Location	223° at 2.2 miles
	N*	Figure 3	Indicator Location	122° at 2.3 miles
	O*	Figure 3	Indicator Location	96° at 1.8 miles
	P*	Figure 3	Indicator Location	101° at 1.9 miles
	Q*	Figure 3	Indicator Location	123° at 2.2 miles
	R*	Figure 3	Indicator Location	114° at 1.5 miles
	S*	Figure 3	Indicator Location	143° at 1.9 miles

*Technical Specification location

V

DATA SUMMARIES AND CONCLUSIONS

V DATA SUMMARIES AND CONCLUSIONS

The results of the 1985 Radiological Environmental Monitoring Program are evaluated considering the natural processes of the environment and the aggregate of past data. A number of factors are considered in the course of this radiological data evaluation and interpretation. The interpretation of data can be made at several levels including trend analysis, population dose, risk estimates to the general population based on environmental concentrations, effectiveness of plant effluent controls and specific research areas, among others. An attempt has been made in this report not only to report the data collected during the 1985 sample program but also to assess the significance of the radionuclides detected in the environment. It is important to note that detection of an isotope is not of itself an indication of its environmental significance. Evaluation of the impact of the radionuclide in terms of potential increased dose to man, in relation to natural background, is necessary.

There are three separate groups of radionuclides that were detected in the environment during 1985. 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-228, Ra-226, Be-7 and especially K-40, account for a majority of the annual per capita background dose.

A second group of radionuclides was detected as 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, e.g. 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 media analyzed during 1981. Calculations of the resulting dose 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 1985 were those that could be related to operations at the site. These select radionuclides were detected in a few of the sample media 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. 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.

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 1985, 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.

In Section V each sample medium is discussed. Concentrations of radionuclides detected and exposure to man are presented and scrutinized.

Section VI, titled HISTORICAL DATA, contains sample statistics from previous environmental sampling. The process of determining the impact (or lack of impact) of plant operation on the environment includes the scrutiny of past analytical data, a tool by which trends are discerned. The interpretation of historical data in this report is done to a limited degree. Because of the constant change in analytical sensitivities, as state-of-the-art detection capabilities improve, data comparisons become difficult. For example, minimum detection capabilities for the 1969 and 1974 analyses of environmental samples would be considered anomalous by 1985 standards.

LAKE PROGRAM

Tables 1 through 8 list the 1985 analytical results for the aquatic/lake water media sampled during the 1985 sampling program. Aquatic samples were obtained at a combination of four onsite locations. The transect designations used for the onsite sampling locations are NMPW (01), NMPP (02), JAF (03) and NMPE (04). Due to limited availability of certain required sample media, samples could not be obtained consistently at each of the same onsite transects sampled for other media. Offsite samples were collected in the vicinity of the Oswego Harbor (offsite - 00).

1. PERIPHYTON SAMPLES - TABLE 1

Periphyton is a common fresh water algae found throughout the Great Lakes and in almost all underwater aquatic systems. Periphyton in its simplest form is a single celled organism which colonizes the natural and artificial substrates found in the shore and near shore waters. Colonies of periphyton can be found from the shore zone to water depths which can be sufficiently penetrated by sunlight to support photosynthesis. Periphyton is dependent on sunlight and inorganic materials found in the lake to support life therefore putting it in the classification of a primary producer. Periphyton in its simplest form is the slimy coating which is found on most underwater surfaces and has a brown to green coloration. This organism is used as an indicator organism to help evaluate the possible effects of plant operation on the local aquatic environment on the lowest level of the food chain.

The collection and analysis of periphyton samples was performed once during the 1985 sample program. The new Technical Specifications implemented on July 1, 1985 deleted the requirement for any further collection and analysis of periphyton after July 1, 1985.

The collection of periphyton started on June 25, 1985 and completed on July 8, 1985, fulfills the requirements of the old Environmental Technical Specifications which were in effect during the reporting period of January 1, 1985 through June 30, 1985.

The gamma spectral analysis of periphyton samples showed detectable concentrations of Be-7, K-40, Co-60, Cs-134, Cs-137, and Th-228. The six radionuclides detected in periphyton samples can be attributed to several sources. Each of the radionuclides detected can be placed in one of three groups. The first group of radionuclides is the result of plant operation. The second group of radionuclides is naturally occurring and is found in many living organisms as noted throughout this report. The third group of radionuclides is the result of past atmospheric nuclear weapons testing. Radionuclides with relatively long half-lives which fall into this third group are the result of atmospheric tests conducted over the past decades. The only fallout related radionuclide detected in 1985 periphyton samples was Cs-137. Cs-137 requires special consideration as this radioisotope of cesium is a common constituent of the background radiation due to fallout but can also be attributed to the operation of the plant. In 1981 six fallout radionuclides were detected in the periphyton samples. Of the six radionuclides detected in 1981, two, Ce-144 and Cs-137, were detected in 1982, and one, Cs-137, was detected in the 1984-85 samples. The other fallout radionuclides were not detected in 1982-85 because of their short half-lives (3.5 days to 368 days) which resulted in their decaying away to concentrations below that of the lower limits of detection (LLD) and as a result of ecological cycling.

The plant related radionuclides detected in the periphyton samples were Co-60, Cs-134, and Cs-137. The maximum detectable concentration for plant related radionuclides was 0.26 pCi/g (wet) for Co-60, 0.06 pCi/g (wet) for Cs-134, and 0.46 pCi/g (wet) for Cs-137. Cs-137 was detected in both the control (offsite) sample and one of the two indicator (onsite) samples with the maximum concentration, as noted above, present in the indicator sample.

Three naturally occurring radionuclides were detected in the 1985 samples. K-40 was detected in one of the onsite samples and one offsite. Be-7 was detected in two onsite samples and one offsite sample. Th-228 was detected in one of the onsite samples. The concentration of the naturally occurring radionuclides was consistent with levels detected in previous years' samples.

A dose to man calculation from the level of activity found in lake periphyton samples in the vicinity of the plant is difficult to make as periphyton is not directly in the human food chain. To best determine the resulting dose to man from the activity found in periphyton samples, calculations were made based on concentrations found in fish samples as fish represent the upper level of the food chain in which periphyton is a primary producer. Dose to man calculations based on concentrations found in fish and consumption rates are contained in Section V.5.

Cs-134 and Co-60 have historically (1978-1983) been detected in periphyton samples in varying concentrations. The Cs-137 detected in the 1985 samples were trace and are attributed to both plant effluents and past weapons testing. A review of past data shows Cs-137 concentrations in the control periphyton samples decreased slightly since 1984, whereas the Cs-137 concentration in the indicator location increased slightly. Graphs depicting concentrations of Cs-137, Co-60, and Ce-144 are presented in Section VII.

2. BOTTOM SEDIMENT - TABLE 2

Bottom sediment samples were collected once during the 1985 sampling program. Gamma spectral analyses and Sr-90 analyses were performed on each of the three samples and the results are presented in Table 2. Samples were collected in June in 1985 with the Oswego Harbor area (transect [00]) serving as the control location, Nine Mile Point Plant (transect [02]) and the FitzPatrick Plant (transect [03]) serving as the indicator or onsite sample locations.

Sr-90 was detected in each of the three 1985 samples. Cs-137 was detected in two of the three samples collected in 1985, which included two onsite samples and one offsite sample.

The presence of Cs-137 in the lake bottom sediment can be attributed to the accumulation of fallout in the aquatic environment as a result of the detonation of nuclear devices in the atmosphere, and to plant liquid effluents. The Cs-137 concentration for both indicator locations was 0.20 pCi/g (dry). The LLD for the control location for Cs-137 was less than 0.10 pCi/g (dry). Cs-137 has been routinely detected at the control location in past years (1977-1984).

Co-60 was detected in two of the four indicator samples collected in 1984. Positive detections of Co-60 ranged from a minimum of 0.12 pCi/g (dry) to a maximum of 0.17 pCi/g (dry). The detected levels of Co-60 are relatively the same as the concentrations detected in 1983 when the minimum concentration was 0.10 pCi/g (dry) and the maximum value was 0.16 pCi/g (dry). The detection of Co-60 in sediment can be attributed to the operation of the plant. Co-60 was not detected in the control samples collected in 1984. The levels of Co-60 detected in the onsite samples are very small, and are near the lower limits of detection.

Strontium-90 was detected in all of the three Bottom Sediment samples collected in 1985. The presence of Sr-90 at the control and indicator locations is considered to be the result of weapons fallout. Sr-90 was also detected at both control and indicator sample locations during 1978, 1979, 1980, 1981, 1983, and 1984, which is evidence that Sr-90 is attributable to weapons testing fallout. The mean 1985 control concentration for Sr-90 was 0.002 pCi/g (dry). The mean 1985 indicator concentration for Sr-90 was 0.003 pCi/g (dry). Variations in Sr-90 concentrations can be influenced by several factors including sediment type and chemical make-up. The presence of Sr-90 in many of the other control samples supports the fact that Sr-90 is ubiquitous throughout the environment.

The dose to man from bottom sediment is not of concern and cannot be directly calculated. Bottom sediment is not accessible to man and the radioactivity found in the sediment is shielded by the overlaying water column. To illustrate the impact of radioactivity in sediment samples with respect to the dose to man concept, the assumption can be made that at some future time bottom sediment could be introduced into the shoreline sediment through re-suspension and deposition. Assuming that the density of the sediment is 40 kg/m^2 (dry) and using the maximum residence time on the shore of 67 hours per year for a teenager, the annual dose rate from a maximum indicator sample Cs-137 concentration of 0.20 pCi/g (dry) is calculated to be 0.0023 mrem per year whole body dose. The contribution to the total whole body dose due to Sr-90 would be infinitesimal due to the fact that Sr-90 decays by a beta emission and has no associated strong gamma energy.

A review of past Cs-137 data illustrates that the mean concentration values for the indicator stations have dropped significantly from 1976 to 1979 with the general trend downward continuing from 1979 through 1982. The 1984 mean concentration of Cs-137 was slightly higher than the 1983 value, and the 1985 mean concentration was five times less than the 1984 mean concentration. Historical trends of concentrations of Cs-137 and Co-60 are presented in graphic form in Section VII.

As a result of the new Technical Specifications being implemented on July 1, 1985 the second Bottom Sediment sample collections were replaced with Shoreline Sediment sample collections.

Shoreline sediment samples were collected once during 1985 on November 12, 1985. Collections were made at one indicator location (Sunset Beach), and to one control location (Lang's Beach). The results of these samples collected at the control location and indicator location are presented in Table 2.

Only two radionuclides were detected in sediment samples using gamma spectral analysis. These two radionuclides were naturally occurring K-40 and Th-228. K-40 was detected at both the indicator and control locations, and ranged from 13.5 pCi/g (dry) at the indicator location to 15.4 pCi/g (dry) at the control location. Th-228 was also detected at both the indicator and control locations, and ranged from 0.56 pCi/g (dry) at the control location to 0.92 pCi/g (dry) at the indicator location.

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

No dose to man assessment can be made due to the fact that no man-made radionuclides were detected in the 1985 shoreline sediment samples.

No historical data exists to compare the new shoreline sediment indicator sample with previous results, since this new Technical Specification location was just initiated in 1985.

3. MOLLUSK SAMPLES - TABLE 3

A total of three mollusk samples were collected in 1985 from a total of three general locations. Each sample was analyzed for gamma emitters using gamma spectral analysis and for Sr-90 using chemical separations and beta particle analysis. The results of the 1985 samples are presented on Table 3. As in past years the effort to collect mollusk samples of sufficient size has been of limited success in terms of sample volume collected. The collections in 1985 were productive and resulted in sample volumes in the one kilogram range which in some cases resulted in good sensitivities for the gamma spectral analysis, in particular for the indicator samples. Mollusk samples were successfully collected at the offsite (00) or control location and at the Nine Mile Point Plant (02) transect and the FitzPatrick (03) transect, for the indicator samples.

The results of the isotopic analysis of mollusk tissue detected the presence of four radionuclides. The nuclides detected consisted of one naturally occurring radionuclides (K-40) two plant related radionuclides (Mn-54, Co-60), and one radionuclide related to fallout from atmospheric nuclear testing (Sr-90). Detectable concentrations of Sr-90 were measured at two of three locations (one at the indicator location and the control location). The presence of Sr-90 in all the mollusk samples collected for the sample year was observed in 1979, 1980, 1981, 1982, 1983, and 1984. The 1985 Sr-90 concentrations ranged from 0.003 pCi/g (wet) at the control location to 0.010 pCi/g (wet) at the indicator location. As in other sample media the presence of Sr-90 is considered to be the result of fallout from atmospheric nuclear testing. This determination is based on the fact that Sr-90 is consistently detected in control samples in previous years as noted above. Mn-54 was detected in one of the two indicator samples collected in 1985. Co-60 was detected in both of th indicator (onsite) samples. The presence of Mn-54 and Co-60 in mollusk tissue can be attributed to the operation of the plant. The Mn-54 and Co-60 were not detected at the control (offsite) location.

The concentration of Mn-54 detected at one of the indicator locations was 0.07 pCi/g (wet). Co-60 concentrations ranged from a maximum of 0.04 pCi/g (wet) to a minimum of 0.03 pCi/g (wet).

The relatively high frequency for the detection of Co-60 and particularly Mn-54 in mollusk samples can be attributed to the phenomenon of bioaccumulation or concentration factors. The level of an element in a particular organism relative to the level or concentration of the same element in the organism's environment is known as the concentration factor. Fresh water mollusk have an extremely high concentration factor of 300,000 (mean) for Mn-54 and 32,408 (mean) for Co-60*. Such high concentration factors would result in a rapid accumulation of manganese and cobalt activity in mollusk that are indigenous to the off shore area of the site.

Fresh water mollusk found in the vicinity of the site are not consumed by humans and are not a major component or level in the food chain if for no other reason other than the small population due to the unfavorable physical makeup of the lake bottom in the area. Because these fresh water mollusk are not considered edible there is no dose to man from the presence of the Mn-54, and Co-60 concentrations. As in past years an estimate can be made using substituted parameters for the purpose of putting into perspective the possible significance of Mn-54, and Co-60 concentrations detected in the mollusk samples. Using the maximum individual consumption of seafood of 5.0 kg/year for an adult, the dose resulting from ingestion of mollusks would be 0.0003 mrem/year to the whole body and 0.0049 mrem/year to the gastrointestinal tract for the maximum Mn-54 concentration of 0.07 pCi/g (wet). The dose resulting from the Co-60 concentration of 0.04 pCi/g (wet) would be 0.0009 mrem/year to the whole body and 0.0080 mrem/year to the gastrointestinal tract. The total maximum dose that would be received from the consumption of 5.0 kg of fresh water mollusk would be 0.0012 mrem to the whole body and 0.0129 mrem to the gastrointestinal tract. This calculated dose is extremely small and as noted above in reality would be equal to no dose, because of the zero consumption rate.

The concentrations of Mn-54 and Co-60 have shown a significant decline since 1976 when both radionuclides were detected at their maximum level. The concentration of Mn-54 detected in the 1985 samples shows a slight decrease from the 1984 values. The Co-60 concentration in the indicator samples showed a small increase from the levels detected in 1984. Co-60 concentrations in mollusk samples have remained relatively constant since 1977. Sr-90 concentrations in mollusk samples have remained stable since 1978 after a peak in 1976, with a slight decrease in the 1985 samples. Graphs of previous mollusk sample results for Mn-54, Co-60 and Sr-90 are presented in Section VII. Also found in Section VII is a physical description of the lake bottom in the vicinity of the site for reference to the suitability of the area for mollusk habitat.

The implementation of the new Technical Specifications on July 1, 1985 deleted the requirements for any further sample collections of mollusk tissue.

* Eisenbud (1973)

4. GAMMARUS - TABLE 4

GAMMARUS samples were collected once during the 1985 sample period in conjunction with mollusk, periphyton and bottom sediment. GAMMARUS are benthic or demersal dwelling organisms found in the general vicinity of the site and throughout Lake Ontario. GAMMARUS are sampled as an indicator organism whose major predator is the local fish population. GAMMARUS are generally found in periphyton and cladophora growth areas and are limited in their territorial ranges. Samples were collected at the control (00) location and at the NMPP (02) and JAF (03) transects. Sample collections were made over a two week period (or longer) in order to collect sufficient quantities of sample for acceptable analyses.

The collection of GAMMARUS in the spring of 1985 (June 25, 1985 through July 12, 1985) yielded sample weights of only 13.7 g, 1.1 g, and 5.8 g respectively for the Oswego, NMPP, and JAF transects. It should be noted that GAMMARUS are normally less than 10 mm in size and require a large number to obtain a biomass of one gram of sample. The spring collection of GAMMARUS is also usually impeded by the cold lake water temperatures resulting in few GAMMARUS inhabiting the shoreline shallows.

These small sample weights were insufficient for Sr-89 and Sr-90 analysis, and yielded high analytical sensitivities for gamma spectral analysis. The JAF sample resulted in sensitivities of less than 0.42 pCi/g (wet) for Co-60 and less than 0.37 pCi/g (wet) for Cs-137. The NMPP sample resulted in sensitivities of less than 2.1 pCi/g (wet) for Co-60 and less than 2.2 pCi/g (wet) for Cs-137. The control sample (Oswego) resulted in sensitivities of less than 0.22 pCi/g (wet) for Co-60 and less than 0.20 pCi/g (wet) for Cs-137.

K-40 was the only radionuclide detected (naturally occurring) in the 1985 GAMMARUS samples. K-40 was detected only at the control location at a concentration of 7.63 pCi/g (wet).

No other radionuclides, besides K-40, were detected in any of the GAMMARUS samples.

The absence of plant related radionuclides in GAMMARUS samples collected in 1985, and the lack of detectable concentrations from the previous years of 1980, 1981 (second collection only), and 1982 indicate that the presence of these nuclides in GAMMARUS organisms is not routine nor chronic. The dose to man as a direct result of concentrations of cobalt and cesium would be zero as GAMMARUS is not consumed by man. The importance of the activity in these organisms is only significant with respect to the passage of any radionuclides through the food chain to a trophic level which may impact man.

Previous GAMMARUS data (Cs-137) is presented in Section VI, HISTORICAL DATA.

The implementation of the new Technical Specifications on July 1, 1985 deleted the requirements of any further sample collections of GAMMARUS.

5. FISH - TABLE 5

A total of 18 fish samples were collected in the spring season (June 1985) and in the fall season (October 1985). Collections were made utilizing gill nets at one offsite location greater than five miles from the site (Oswego Harbor area), and at two onsite locations in the vicinity of the Nine Mile Point Unit #1 (02), and the James A. FitzPatrick (03) generating facilities. The Oswego Harbor samples served as control samples while the NMP (02) and JAF (03) samples served as indicator samples. Samples were analyzed for gamma emitters, Sr-89, and Sr-90. Data is presented in the ANALYTICAL RESULTS section of the report on Table 5.

Analysis of the 1985 fish samples contained 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). Detectable concentrations of K-40, a naturally occurring radionuclide, were also found in all fish samples collected for the 1985 program.

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 feeder species were collected in the spring samples.

Cs-137 was detected in all onsite and offsite samples for both species collected. Onsite samples showed Cs-137 concentrations to be slightly greater than control levels for some samples and slightly less than control levels for other samples. The concentrations detected are not significantly different from the control results and are therefore considered background. Cs-137 in lake trout samples ranged from 0.033 to 0.036 pCi/g (wet) and averaged 0.034 pCi/g (wet) for the indicator samples. Cs-137 in the control sample was 0.035 pCi/g (wet) for lake trout. Cs-137 in brown trout samples ranged from 0.025 to 0.044 pCi/g (wet) and averaged 0.032 pCi/g (wet) for the indicator samples. Cs-137 in the control samples ranged from 0.026 to 0.047 pCi/g (wet) and averaged 0.036 pCi/g (wet).

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 2.8 to 3.8 pCi/g (wet) and 2.9 to 5.0 pCi/g (wet) for the control samples. No other radionuclides were detected in any of the spring fish samples.

Fall sample collections were comprised of three separate species and nine individual samples. Three samples of brown trout, three samples of smallmouth bass, and three samples of chinook salmon were collected at a combination of two onsite sample locations (NMP and JAF) and one offsite sample location (Oswego Harbor area). Samples were collected by gill net in October.

Cs-137 was detected in all nine samples including the three control samples. The detected concentrations were not significantly different from one another because of the extremely small quantities detected. Cs-137 in brown trout samples at the indicator locations ranged from 0.018 to 0.021 pCi/g (wet) and averaged 0.020 pCi/g (wet). The one brown trout sample from the control location had a Cs-137 concentration of 0.026 pCi/g (wet). Cs-137 in smallmouth bass samples at the indicator locations ranged from 0.035 to 0.045 pCi/g (wet) and averaged 0.040 pCi/g (wet). The one smallmouth bass sample from the control location had a Cs-137 concentration of 0.034 pCi/g (wet). Cs-137 in the chinook salmon samples at the indicator locations ranged from 0.023 to 0.025 pCi/g (wet) and averaged 0.024 pCi/g (wet). The one chinook salmon sample from the control location had a Cs-137 concentration of 0.033 pCi/g (wet).

K-40 was detected in all of the fall fish samples collected. Detectable concentrations of K-40 in the indicator samples (brown trout, smallmouth bass, and chinook salmon) ranged from 2.7 to 3.6 pCi/g (wet) and 3.1 to 3.6 pCi/g (wet) for the control samples. No other radionuclides were detected in any of the fall fish samples.

Sr-89 concentrations for the spring fish samples were all less than the minimum detectable level for both indicator and control fish samples. Sr-90 concentrations for the spring indicator fish samples were also all less than the minimum detectable level. Sr-90 concentrations for the spring control fish samples were less than the minimum detectable level in only two of the three samples. A Sr-90 concentration of 0.0014 pCi/g (wet) was detected in the spring control lake trout sample. This concentration is very low, and is at the LLD value of the indicator samples.

With the implementation of the new Technical Specifications on July 1, 1985, Sr-89 and Sr-90 analysis of fish samples is no longer a required analysis.

Review of past environmental data indicates that the Sr-89 and Sr-90 concentrations have decreased steadily since 1976 for both the indicator and control locations to the present 1985 LLD levels. A general decline in detectable Sr-89 and Sr-90 results is most probably due to the result of the incorporation of these radionuclides with organic and inorganic substances through ecological cycling. In addition, Sr-89 has a relatively short half-life of 52 days.

The mean 1985 Cs-137 concentrations have decreased slightly from 1981 for the indicator samples and significantly from 1980 to 1976. Concentrations for these samples decreased from a level of 1.4 pCi/g (wet) in 1976 to a level of 0.030 pCi/g (wet) in 1985. Control sample results have also decreased from a level of 0.12 pCi/g (wet) in 1976 to a level of 0.034 pCi/g (wet) in 1985. Results from 1979 to 1985 have remained fairly consistent.

As noted for Sr-89 and Sr-90 above, the general decreasing trend for Cs-137 is mos+ probably a result of ecological cycling. A significant portion of Cs-137 detected since 1976 in fish is a result for 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 estimate of dose to man can be calculated. Assuming that the adult consumes 21.0 kg of fish per year (Regulatory Guide 1.109, maximum exposed age group) and the fish consumed contains an average Cs-137 concentration of 0.030 pCi/g (wet) (annual mean result of indicator samples for 1985), the whole body dose received would be 0.045 mrem per year. The critical organ in this case is the liver which would receive a calculated dose of 0.069 mrem per year. No doses are calculated here for Sr-89 and Sr-90 since these radioisotopes of strontium were not detected during 1985. 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 (21.0 kg per year) but the average annual Cs-137 mean concentration for the control samples is 0.034 pCi/g (wet). The calculated Cs-137 whole body dose is 0.051 mrem per year and the associated dose to the liver is 0.078 mrem per year. The average annual Sr-90 mean concentration for the control samples is 0.0014 pCi/g (wet). The calculated Sr-90 whole body dose is 0.055 mrem/yr and the associated dose to the bone is 0.223 mrem/year.

No doses are calculated for Sr-89 since it was not detected during 1985.

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 with the dose from control samples being slightly higher. Doses from both sample groups are considered in the range of background exposure rates.

Graphs of past Cs-137 and Sr-90 concentration can be found in Section VII.

6. LAKE WATER AND SURFACE WATER - TABLES 6, 7, AND 8

For the reporting period of January 1, 1985 through June 30, 1985 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 1985 (first half) 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.

With the implementation of the new Technical Specifications on July 1, 1985 surface water samples were collected and analyzed for the remainder of the reporting period of July 1, 1985 through December 31, 1985. The surface water samples were analyzed monthly for gamma emitters (using gamma spectral analysis) only. Tritium analyses only were performed quarterly. Quarterly samples were composites of monthly samples.

The analytical results for the 1985 (second half) surface water samples also showed no evidence of plant related radionuclide build-up. The indicator samples were collected from the inlet canal of the James A. FitzPatrick facility. The control location samples were collected at the inlet canal of Niagara Mohawk's Oswego Steam Station.

During the first half of the 1985 reporting period gross beta analysis of monthly composites, and Sr-89 and Sr-90 analyses of quarterly composites (first and second quarter only) were performed.

The gross beta annual mean activity for the indicator sample locations, Nine Mile Point Unit #1 and the James A. FitzPatrick inlet canals (3.36 pCi/liter), was slightly lower than the 1984 mean inlet canal results (3.98 pCi/liter). The Nine Mile Point Unit #1 canal samples were greater than the control samples for four of the six monthly samples analyzed and ranged from 3.10 pCi/liter to 4.5 pCi/liter. The James A. FitzPatrick canal samples were greater than the control samples for two of the six monthly samples analyzed and ranged from less than 2.0 pCi/liter to 4.00 pCi/liter. The control sample results ranged from less than 2.4 pCi/liter to 4.10 pCi/liter. The fluctuation in the gross beta canal sample results is due to the natural variation in concentration of naturally occurring radionuclides.

A reduction in gross beta activity since 1974 is primarily the result of improved analytical procedures and equipment and not necessarily to changes in plant operations. Although the past elevated gross beta concentration 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 1985. (See historical data graphs Section VII.)

Quarterly samples for Sr-89 analysis were composites of the monthly samples. Sr-89 was not detected in any of the water samples taken from the City of Oswego water treatment plant, the James A. FitzPatrick inlet canal, or the Nine Mile Point inlet canal. The lower limit of detection values for the City of Oswego water treatment plant canal samples (control location) ranged from less than 1.8 pCi/liter to less than 2.0 pCi/liter (LLD). The lower limit of detection values for the indicator (James A. FitzPatrick inlet canal and Nine Mile Point inlet canal) locations ranged from less than 1.6 pCi/liter to less than 2.0 pCi/liter (LLD).

Quarterly samples for Sr-90 analysis were composites of the monthly samples. Sr-90 was not detected in any of the water samples taken from the city of Oswego water treatment plant, the James A. FitzPatrick inlet canal, or the Nine Mile Point inlet canal. The lower limit of detection values for the City of Oswego water treatment plant canal samples (control location) ranged from less than 0.63 pCi/liter to less than 0.77 pCi/liter (LLD). The lower limit of detection values for the indicator (James A. FitzPatrick inlet canal and Nine Mile Point inlet canal) locations ranged from less than 0.82 pCi/liter to less than 0.93 pCi/liter (LLD).

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 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 1984, annual means ranged from 2.73 pCi/liter (1982) to 4.53 pCi/liter (1978). The indicator annual mean for 1985 was 3.36 pCi/liter. Control annual means also were relatively high during 1975 to 1977. During these years, the concentrations ranged form 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 1984, annual mean gross beta concentration ranged from 2.42 pCi/liter (1982) to 3.55 pCi/liter (1978). The control annual mean for 1985 was 3.00 pCi/liter.

Review of previous data for Sr-89 demonstrates that results have been variable since 1975. Sr-89 for the indicator samples has ranged from not detected (1976, 1977, 1979, 1983, 1984, and 1985) to 0.78 pCi/liter (1981) and has been at relatively constant levels when detected. At the control locations, Sr-89 ranged from not detected (1975-1978, 1981, 1983, 1984, and 1985) to 1.4 pCi/liter (1980).

During 1985, Sr-89 showed an annual mean of less than 1.9 pCi/liter (LLD) at the control location and less than 1.8 pCi/liter (LLD) at the indicator location. 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, 1976, and 1985) to 1.08 pCi/liter (1982). Mean results at the control sample location ranged from not detected (1975-1978, and 1985) to 2.04 pCi/liter (1982). During 1985, Sr-90 showed an annual mean of less than 0.70 pCi/liter (LLD) at the control location and less than 0.87 pCi/liter (LLD) at the indicator locations.

Gamma spectral analysis was performed on 18 monthly composite samples required by the Environmental Technical Specifications (January-June, 1985), and it was performed on 12 monthly composite samples required by the new Radiological Effluent Technical Specifications (July-December, 1985). Two radionuclides were detected in the inlet canal samples during 1985. Both these radionuclides are naturally occurring and not plant related.

K-40, a naturally occurring radionuclide, was detected intermittently in both intake canals, the raw city water supply, and the Oswego Steam Station inlet canal. K-40 was detected in four of the 12 monthly inlet canal samples at the James A. FitzPatrick inlet canal and ranged from 7.8 to 13.0 pCi/liter. The Nine Mile Point Unit# 1 inlet canal samples (January-June, 1985) showed K-40 detected in only one of the six monthly samples at a concentration of 13.7 pCi/liter. K-40 in the Oswego city water supply was detected in four of the six monthly samples (January-June, 1985) and ranged from 7.1 to 9.4 pCi/liter. The Oswego Steam Station inlet canal samples (July-December, 1985) showed K-40 detected in two of the six monthly samples. The concentrations ranged from 7.1 to 13.6 pCi/liter.

Ra-226, also naturally occurring, was detected intermittently in both intake canals, the raw city water supply, and the Oswego Steam Station inlet canal. Ra-226 was detected in eight of the 12 monthly inlet canal samples at the James A. FitzPatrick inlet canal, and ranged from 15.0 to 27.4 pCi/liter. The Nine Mile Point Unit# 1 inlet canal samples (January-June, 1985) showed Ra-226 detected in four of the six monthly samples. The concentrations ranged from 13.4 to 21.4 pCi/liter. Ra-226 in the Oswego city water supply was detected in two of the six monthly samples (January-June, 1985), and ranged from 15.0 to 21.5 pCi/liter. The Oswego Steam Station inlet canal samples (July-December, 1985), showed Ra-226 detected in four of the six monthly samples. The concentrations ranged from 14.0 to 22.0 pCi/liter.

Tritium samples are quarterly samples that were a composite of the appropriate monthly samples. Tritium was detected in samples taken at all four locations. The Oswego raw city water showed tritium concentrations ranging from 240 pCi/liter to 430 pCi/liter with a mean of 305 pCi/liter. Tritium Concentrations for the James A.

FitzPatrick inlet canal ranged from 250 pCi/liter to 1200 pCi/liter and showed a mean concentration of 530 pCi/liter. Inlet canal samples taken at Nine Mile Point Unit# 1 showed tritium concentrations ranging from less than 100 pCi/liter. The Oswego Steam Station inlet canal showed tritium results which ranged from 230 pCi/liter to 250 pCi/liter with a mean of 240 pCi/liter.

The FitzPatrick inlet canal showed one result of 1200 pCi/liter (third quarter) which was greater than any of the other indicator or control quarterly results. The elevated third quarter sample result was verified by reanalysis of another portion of the sample, and by an independent laboratory analysis. Upon further investigation, it was determined that all of the monthly samples that were used to composite the quarterly sample showed elevated tritium results. These results for the months of July through September 1985 were 940, 870, and 1500 pCi/liter, respectively. It appears, therefore, that all three months showed tritium results that were higher than what would normally be expected. The fourth quarter FitzPatrick inlet canal sample result was normal (250 pCi/liter).

A plausible reason for the higher than normal third quarter tritium result for the FitzPatrick inlet canal is not known at this time. The discharge sample for the FitzPatrick facility for the same quarter is considered normal (280 pCi/liter). In addition, the Nine Mile Point Unit# 1 inlet canal sample is also considered normal (270 pCi/liter). It should be noted that this data is not included in Table 7. Liquid wastewater tank discharges from the site during the third quarter of 1985 were well within the Technical Specification limits. No discharges were made from the Nine Mile Point Unit# 1 facility. The FitzPatrick facility discharged only 0.000427 Curies during the third quarter of 1985.

Possible reasons for the anomalous third quarter result includes mishandling of the sample compositing tanks and contamination at the collection point which is located within the FitzPatrick facility. It is possible that the intake sample result was actually the discharge sample result. This confusion may have occurred through misidentification of compositing tanks or mislabeling of sample containers during shipment. Contamination may have also occurred, although the feasibility of this possible reason is limited since the sampling area is outside of any radiation areas.

Mean tritium results at the control location (Oswego Steam Station) can not be evaluated with regard to historical data since sampling was only initiated at this location in 1985. Some idea of the variability of control sample data can be obtained, however, by review of previous data from the city of Oswego drinking water samples. The drinking water samples are not likely to be affected by the station because of the effects of the distance, lake currents, and the discharge of the Oswego River. Therefore, this previous sample data represents acceptable control sample data for evaluation purposes.

Mean annual tritium results from previous city water samples from 1976 to 1984 show that the tritium concentrations have steadily decreased. The maximum annual average was found in 1976 (652 pCi/liter) and the minimum in 1982 (165 pCi/liter). The 1985 mean tritium result for the Oswego Steam Station (240 pCi/liter) was greater the results from the city water location for the last several years (1982-1984). These results ranged from 165 pCi/liter to 250 pCi/liter. The 1985 city water annual mean result increased also, and was noted at 305 pCi/liter.

The impact, as expressed as a dose to man, can not be evaluated because no plant related radionuclides were detected in surface water samples with exception of tritium. Plant related radionuclides were not found in the optional drinking water samples either.

Tritium results during 1985 were variable. The one elevated quarterly result from the FitzPatrick inlet canal is not considered to be representative of actual tritium concentrations because the discharge canal tritium results were normal. With the exception of this one anomalous result from the FitzPatrick inlet canal, the results noted during 1985 are representative of normal background tritium results in surface water. Any impact associated with the fluctuation of tritium levels are considered to be background and are not considered to be a result of operations at the site.

TERRESTRIAL PROGRAM

Tables 9 through 20 represent the analytical results for the terrestrial samples collected for the 1985 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 offsite and nine onsite sample locations. These fifteen environmental air sampling stations were required by the old Environmental Technical Specifications during the reporting period of January 1, 1985 through June 30, 1985. The new Technical Specifications were implemented on July 1, 1985 and only required five of the six offsite stations to be required locations. These five stations (R1, R2, R3, R4, and R5) were the new Technical Specification locations during the reporting period of July 1, 1985 through December 31, 1985. For the case of reporting purposes, and since all fifteen stations are the same type of sample medium, results of all fifteen station are evaluated.

The samples are counted at a minimum of twenty-four hours after collection to allow for the decay of naturally occurring radionuclides with short halflives. A total of 312 offsite and 465 onsite samples were collected and analyzed during 1985. No significant levels of gross beta activity were observed in any of the samples. The offsite or control mean concentration for 1985 was 0.023 pCi/m^3 while the indicator or onsite sample mean was equal to 0.020 pCi/m^3. As noted, the onsite mean is about 13.0 percent lower than the offsite mean for the same sample period. This difference in mean concentration has been exhibited in the past 11 years with the exception of 1977 when a higher annual mean gross beta activity was observed for the onsite sampling stations. In these 11 years, the control stations' annual mean ranged from a minimum difference of 5.0 percent higher than the indicator observed in 1984 to a maximum difference of 28.6 percent higher, observed in 1978. The difference in offsite and onsite 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 onsite stations would be location. The close proximity of onsite sampling stations to the lakeshore (Lake Ontario) would account for lower concentrations of naturally occurring radionuclides being collected on the sampling media. 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 decay or daughter products of uranium and thorium and potassium-40. The concentrations of these nuclides in the ground level atmosphere are dependent upon the local geology and its chemical constituents. Thus surface winds of terrestrial origin have a potential for containing higher concentrations of naturally occurring radionuclides.

The observed increases and decreases in general gross beta activity can be attributed to changes experienced in the biosphere. As discussed above, the concentrations of the naturally occurring radionuclides in the lower limits of the atmosphere directly above the terrestrial portion of the earth are affected by time related processes such as wind direction, snow cover, soil temperature and soil moisture content. Very little change was noted in gross beta activity which corresponded with seasonal changes as has been observed in past years.

In general, gross beta activity in air samples has decreased significantly. The mean 1985 concentration for both offsite and onsite is seven times lower than the mean concentration detected in 1981. This overall reduction in activity is directly attributable to the increased activity detected in 1981 as a result of fallout from an atmospheric nuclear test and subsequent return to background levels in 1983-85. The trend of gross beta activity in the environment is that of reduced concentrations. The mean 1985 concentration (0.020 pCi/m^3) was the lowest level of gross beta activity observed since sampling for the FitzPatrick program began in 1974.

The general decrease of gross beta activity since 1974 could be the result of the reduction of atmospheric nuclear testing in recent years in comparison to the 1960's when such testing was prolific.

Graphs of air particulate gross beta concentrations on a weekly and yearly basis can be found in Section VII.

2. MONTHLY PARTICULATE COMPOSITES - TABLE 11

The air particulate filters collected weekly from each of the 15 air sampling stations were composited monthly by location (onsite/offsite) during the reporting period of January 1, 1985 through June 30, 1985. With implementation of the new Technical Specifications on July 1, 1985 the air particulate filters collected weekly are composited monthly by station. Only five Technical Specification locations (R1, R2, R3, R4, and R5) were required during the reporting period of July 1, 1985 through December 31, 1985. Each composite is analyzed for gamma emitters using gamma spectral analysis. As noted in Section V1, all fifteen stations will be evaluated.

The results of the 12 monthly samples (onsite/offsite) for the reporting period of January 1, 1985 through June 30, 1985 showed positive detections for only two radionuclides. Both of the radionuclides detected are naturally occurring (Be-7 and K-40). Be-7 was detected in each of the six monthly offsite composites (January-June, 1985), and ranged from 0.091 pCi/m^3 to 0.159 pCi/m^3. K-40 was detected in five of the six monthly offsite composites, and ranged from 0.0029 pCi/m^3 to 0.0061 pCi/m^3. Be-7 was also detected in each of the six monthly onsite composites (January-June, 1985), and ranged from 0.092 pCi/m^3 to 0.128 pCi/m^3. K-40 was detected in three of the six monthly onsite composites, and ranged from 0.0020 pCi/m^3 to 0.0038 pCi/m^3. No other radionuclides were detected in any of the onsite or offsite composites during the first half of 1985 (January-June).

The results of the 30 monthly samples (Technical Specification locations-R1, R2, R3, R4, and R5) for the reporting period of July 1, 1985 through December 31, 1985 showed positive detections for Be-7 K-40, and Ra-226. All three of these radionuclides are naturally occurring. Be-7 was detected in each of the 24 monthly indicator composites (R1, R2, R3, and R4). The concentrations of Be-7 for the indicator samples ranged from 0.074 pCi/m^3 to 0.157 pCi/m^3. Be-7 was also detected in each of the six monthly control composites (R5), and ranged from 0.082 pCi/m^3 to 0.164 pCi/m^3. K-40 was detected in only one of the 24 monthly indicator samples (July - December, 1985) at a concentration of 0.014 pCi/m^3. K-40 was detected in two of the six monthly control samples (July-December, 1985), and ranged from 0.013 pCi/m^3 to 0.025 pCi/m^3. Ra-226 was not detected in any of the 24 monthly indicator samples (R1, R2, R3, and R4), but was detected once at the control location (R5) at a concentration of 0.014 pCi/m^3. No other naturally occurring or plant related radionuclides were detected.

The other sample locations not required by the Technical Specifications include D1 onsite, D2 onsite, E onsite, F onsite, G onsite, H onsite, I onsite, J onsite, K onsite and G offsite. As noted above, only naturally occurring radionuclides (Be-7, K-40 and Ra-226) were detected at these locations during July - December, 1985. The results of all monthly composite samples are included on Table 11.

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.

Co-60 average concentrations at the onsite or indicator and offsite or control locations from 1977 to 1978 decreased from approximately 0.0175 to 0.0015 pCi/m^3. Average concentrations decreased significantly during 1979 and increased in 1980 from approximately 0.0007 to 0.0016 pCi/m^3 respectively. 1981 and 1982 average Co-60 concentrations decreased to 0.0007 and 0.0005 pCi/m^3. Average indicator and control concentrations were approximately equal during 1977 to 1982. The 1983 indicator average Co-60 concentration was 0.0007 pCi/m^3 or slightly greater than the 1982 concentration. The 1983 average control and indicator mean Co-60 concentration was 0.0007 pCi/m^3 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. Co-60 during 1984 averaged 0.00079 pCi/m^3 at the control stations and 0.00123 pCi/m^3 at the indicator stations. However, the 1984 Co-60 positive results were a result of contamination during handling and not a result of operations at the site. The general reduction in previous indicator and control Co-60 concentrations (1981 - 1984) was a result of nuclear decay and ecological cycling of Co-60 initially produced by the 1980 Chinese weapons test. Co-60 was not detected during 1985 in air particulate samples.

Historically, Cs-137 has been variable during the past and has been present in air particulate samples since 1977 and prior to 1977. During 1977, both onsite or indicator and offsite or control Cs-137 average concentrations were approximately equal and averaged 0.0039 pCi/m^3. Cs-137 average concentrations at indicator and control locations decreased during 1978 and 1979 to 0.0017 and 0.0013 pCi/m^3 respectively. Average concentrations during 1980 and 1981 were approximately equal at control and indicator locations. Cs-137 during 1980 was approximately equal to 1979 and increased slightly in 1981 from 1979. The 1980 and 1981 average concentrations were 0.0013 and 0.0015 pCi/m^3 respectively. The mean 1982 concentration for Cs-137 decreased to 0.0004 pCi/m^3. The 1983 mean Cs-137 concentration for the indicator and control composite samples were 0.0002 and 0.0002 pCi/m^3 which was a reduction from 1982 results. Cs-137 was not detected during 1984 in any of the indicator or control air particulate composite samples. As noted above for the average annual Co-60 results, the reduction in Cs-137 results is attributed to nuclear decay and ecological cycling of Cs-137 initially produced by the 1980 Chinese weapons test. Cs-137 was not detected during 1985 in air particulate samples.

Prior to 1983 and 1984, several radionuclides were detected that were associated with the 1980 Chinese weapons test and other weapons tests prior to 1980. These radionuclides were not detected during 1984 and 1985 as a result of nuclear decay and ecological cycling. These include Zr-95, Ce-141, Nb-95, Ce-144, Mn-54, Ru-103, Ru-106 and Ba-140. In addition, La-140 was detected once during 1983 and infrequently during 1978 and 1981. La-140 was not detected during 1984 and 1985.

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. Since no fission product radionuclides were detected in air particulate samples during 1985, no doses can be calculated. It is assumed that there is not significant dose impact from inhalation as a result of operations at the site during 1985.

Graphic representations of air particulate composite Co-60 and Cs-137 concentrations are presented in Section VII.

3. AIRBORNE RADIOIODINE (I-131) - TABLES 12 AND 13

The results for Iodine-131 (charcoal cartridge) sampling and analyses are presented in Table 12 (Offsite) and Table 13 (Onsite).

During the 1985 sampling program airborne radioiodine was not detected in any of the 312 weekly samples collected from the six offsite sampling stations. In the 2,183 weekly offsite I-131 samples collected in 1979 through 1985, I-131 was only detected once (June 16, 1982). Offsite I-131 detections were also made in 1977 and 1978.

I-131 was also not detected in any of the 465 onsite samples analyzed in 1985. I-131, however, has been detected in the past at the onsite sample locations. In the 3,270 weekly onsite I-131 samples collected in 1979 through 1985, I-131 was detected in only 22 samples.

The end result of the 1985 I-131 sampling effort showed no significant impact due to the operation of the plant. Also during 1985, I-131 was not detected in any other environmental sample media including milk, green leafy vegetables, and site boundary vegetation (inedible).

Since I-131 was not detected in any of the onsite or offsite environmental stations, no doses can be calculated to members of the public using this sample medium.

As noted in Sections V.1 and V.2, all fifteen environmental air sampling stations were evaluated for the entire year of 1985.

4. TLD (ENVIRONMENTAL DOSIMETRY) - TABLE 14

TLD's were collected once per quarter during the sample year. For the reporting period of January 1, 1985 through June 30, 1985 (first and second quarter), TLDs were collected on approximately March 28, 1985 and June 27, 1985. The TLD results are an average of four independent readings at each location and are reported in mrem per standard month.

For the reporting period of January - June, 1985, TLD results are organized into three groups for reporting purposes. The groups are onsite 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), and offsite TLD's (TLD's located off the site property or controlled area and ranging up to 20 miles from the site).

A net dose at the environmental station TLD's can be calculated simply by subtracting the mean standard month offsite doses from the mean standard month onsite 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:

Quarter	Net Environmental Station Dose**
1	+ 0.73
2	- 0.04

The annual site property boundary dose for 1985 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.

Quarter	Net Site Property Boundary Dose**
1	+ 0.34
2	+ 0.34

*Location numbers 5, 6, 7, 23, 24, 25, and 26.
**Dose in mrem per standard month.

As observed, the site boundary dose based on two available TLD locations was more than the average offsite dose for each of the two quarters in 1985. This is probably due to the difference in ground dose rates which are indicative of variable concentrations of naturally occurring radionuclides in soil and rock such as radium, uranium, thorium, and potassium. The difference could also result from statistical variation in the TLD readings, as the site boundary dose is based on a population of only eight individual readings per quarter (two TLD's).

TLD numbers 31 and 39 are located within the Nine Mile Point #1 restricted area near the radwaste facility and are influenced by the close proximity to the building. TLD numbers 27 through 30 and 47 are located within the restricted area of the James A. FitzPatrick radwaste facility and are influenced by the radwaste buildings. TLD number 59 is located near the restricted area of the FitzPatrick Plant stack and is influenced by the proximity to this structure. TLD numbers 3 and 4 are located at the construction site of Nine Mile Point #2. TLD's are subject to radiography at the Unit #2 site and to a much lesser extent the FitzPatrick facility.

Offsite TLD results remained fairly consistent for most TLD locations each quarter. Any slight variations in natural background radiation levels that were observed are most probably a result of increasing or decreasing emission rates for radon and thoron gases emanating from the ground. These emission rates are related to ground moisture content and other natural parameters.

Onsite TLD results remained fairly consistent except for TLD's located near radwaste facilities which may be affected by the frequency of radwaste processing and shipment. In addition, these onsite TLDs may have been affected by the Hydrogen Water Chemistry Test Program conducted at the James A. FitzPatrick facility during the months of September and October, 1985 (third and fourth quarters). These TLD's include numbers 23, 24, 27, 28, 29, 30, and 47 at the James A. FitzPatrick facility and number 39 at the Nine Mile Point #1 facility. TLD numbers 3, 4, and 41 are located at the Nine Mile Point #2 facility and were affected by the frequency of 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. It should be noted that no inconsistent readings were observed for any of the offsite TLDs as a result of the Hydrogen Water Chemistry Test Program.

For the reporting period of July 1, 1985 through December 31, 1985 (third and fourth quarters), the new Technical Specifications implemented on July 1, 1985 required some changes to the TLD program. During the second half of 1985, TLDs were collected on approximately September 27, 1985 and January 3, 1986.

The new Technical Specifications require that two TLDs be placed at each Technical Specification location, and four independent readings per TLD be performed for a total of eight readings.

TLD results (third and fourth quarter results) are evaluated by organizing environmental TLDs into five different groups. These groups include: (1) onsite TLDs (TLDs within the site boundary not required by the Technical Specifications), (2) site boundary TLDs, one in each of the sixteen 22½ degree meteorological sectors, (3) a ring of TLDs four to five miles from the site in each of the land based 22½ degree meteorological sectors, (4) special interest TLDs (in areas of high population density), and (5) control TLDs in areas beyond any influence of the generating facilities. Special interest TLDs are located at or near large industrial sites, schools, or proximal towns or communities. Control TLDs are located to the southwest, south and east-northeast of the site at distances of 12.8 to 19.8 miles from the site.

Onsite TLDs were evaluated in the preceding paragraphs. Additional onsite TLDs are located near the onsite Energy Information Center and the environmental laboratory. These TLDs include numbers 18, 103, and 59. TLD number 103 is a new TLD and was established in the second quarter of 1985. Therefore, no previous results for this TLD exist, although results were consistent with control TLD results and ranged from 4.7 to 6.8 mrem per standard month. TLD number 18 results during 1985 were fairly consistent and were within the range of control TLD data. Results were consistent and ranged from 5.0 to 7.0 mrem per standard month. TLD number 59 is located near the FitzPatrick facility Stack and showed 1985 results slightly above control TLD results. The proximity of this TLD to the FitzPatrick Stack and the Reactor Building accounted for the slight increase in results. Results were consistent with previous years results and ranged from 6.2 to 14.5 mrem per standard month.

It should be noted that the JAF environmental lab was moved from its onsite location to an offsite location during July, 1985. TLD number 102 was placed at the new offsite environmental lab at that time. However, TLD number 59 remained at its previous location for the remainder of 1985 (third and fourth quarters).

Site boundary TLDs are located in the approximate area of the site boundary, one in each of the sixteen 22½ degree meteorological sectors. These TLDs include numbers 75, 76, 77, 23, 78, 79, 80, 81, 82, 83, 84, 7, 18, 85, 86, and 87. TLD numbers 78, 79, 80, 81, 82, 83, 84, 7, and 18 showed results that were consistent with control TLD results, and ranged from 4.1 to 7.2 mrem per standard month. TLD numbers 75, 76, 77, 23, 85, 86 and 87 showed results that ranged up to twice the results of control TLDs. These results ranged from 4.8 to 12.6 mrem per standard month. This latter group of TLDs are located near the Lake shoreline (approximately 100 feet from the shoreline) but are also located in close proximity of the Reactor Building and Radwaste facilities of FitzPatrick. TLD number 78 was slightly greater than the other site boundary TLDs not affected by facility reactor buildings or radwaste buildings. This TLD is located closer to the FitzPatrick facility and is at least 500 feet within the site boundary or site property.

A net site boundary dose can be estimated from available TLD results and control TLD results. TLD results from TLDs located near the site boundary in sectors facing the land occupied by members of the public (excluding TLDs near the generating facilities and facing Lake Ontario) are compared to control TLD results. The site boundary TLDs include numbers 78, 79, 80, 81, 82, 83, 84, 7 and 18. Control TLDs include numbers 8, 14 and 49. Net site boundary doses for third and fourth quarters in mrem per standard month are as follows.

Quarter	Net Site Property Boundary Dose*
3	- 0.5
4	- 0.2

*Dose in mrem per standard month.

Site boundary TLD numbers 75, 76, 77, 23, 85, 86 and 87 were excluded from the net site boundary dose calculation since these TLDs are not representative of doses received where a member of the public may be located. These areas are near the north shoreline which are in close proximity to the generating facilities and are not accessible to members of the public.

The third group of environmental TLDs are those TLDs located four to five miles from the site in each of the land based 22½ degree meteorological sectors. At this distance, TLDs are not present in eight of the sixteen meteorological sectors over Lake Ontario.

Results for this group of TLDs during 1985 fluctuated slightly as a result of changing naturally occurring conditions and the different concentrations of naturally occurring radionuclides in the ground at the different locations. These TLDs included numbers 88, 89, 90, 91, 92, 93, 94 and 95. Results fluctuated from 4.0 to 7.1 mrem per standard month. These results are consistent with control TLD results during 1985. Results during 1985 cannot be compared to previous yearly results since this group of TLDs was established in 1985. The 1985 results, however, were consistent with other offsite TLD results noted in previous years.

The fourth group of environmental TLDs re those TLDs located beyond the site boundary and at special interest areas such as industrial sites, schools, nearby communities, towns, offsite air sampling stations, the closest residence to the site and the offsite environmental laboratory. This group of TLDs include numbers 9, 10, 11, 12, 13, 15, 19, 51, 52, 53, 54, 55, 56, 58, 96, 97, 98, 99, 100, 101, and 103 and ranged from 3.9 to 6.8 mrem per standard month. All the TLD results from this group were within the variation noted for the control TLDs. Results during 1985 for TLDs established during previous years were consistent with results noted for those years.

The fifth group of TLDs include those TLDs considered as control TLDs. These TLDs include numbers 8, 14, and 49. Results for 1985 ranged from 4.4 to 7.7 mrem per standard month. Results from 1985 were consistent with previous years results. A slight increase was noted in the third quarter of 1985. This trend was also noted in the other groups of TLDs evaluated during 1985 and has also been noted in previous years.

Overall, TLD results for 1985 showed no significant impact from direct radiation measured outside the site boundary.

5. RADIATION MONITORS - TABLE 15

Environmental radiation monitors are located in 10 of the 15 air monitoring environmental stations. Each of the onsite environmental monitoring stations contains a radiation monitor and, in addition, the G offsite 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.

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*The radiation monitor was located previously at D1 offsite environmental station (1/1/85 - 1/15/85). D1 offsite environmental station was moved to meet the requirements of the new Radiological Effluent Technical Specifications effective January 1, 1985 for NMPNPS and July 1, 1985 for JAFNPP. The radiation monitor was relocated at G offsite environmental station on January 15, 1985.

6. MILK - TABLES 16, 17, AND 18

Milk samples were collected from a total of six indicator locations (within 10 miles of the site), and one control location (beyond 10 miles from the site) during 1985. No new locations were added nor were any locations deleted when compared to the latter half of 1984. Sample location descriptions for all milk sample locations utilized during 1985 are listed below.

Location No.	Direction from Site	Distance from Site (miles)
7	ESE	5.5
16	S	5.9
50	E	8.2
55	E	9.0
60	E	9.5
4	ESE	7.8
40 (Control)	SW	15.2

During the first two months of the 1985 grazing season (May and June), the milk samples were composited. This was done to fulfill the requirements of the old Environmental Technical Specifications.

May and June milk samples were collected from each of the locations in the first half of the month and analyzed for I-131. At approximately mid month, a second milk collection was made at the same locations. The second collection was composited with an equal aliquot from each location sampled during the first collection. The composite samples were analyzed for gamma emitters and Sr-90. I-131, gamma isotopic, and Sr-90 results are found in the analytical results section, Tables 16, 17 and 18 respectively.

The gamma spectral analysis of the monthly milk composites for May and June showed K-40 to be the most abundant radionuclide detected. K-40 was detected in every sample analyzed and ranged in concentration from 1,430 pCi/liter to 1,170 pCi/liter at the indicator locations and 1,450 pCi/liter to 1,360 pCi/liter at the control location. K-40 is a naturally occurring radionuclide and is found in many of the environmental medias sampled.

Sr-90 was also detected in each of the milk sample composites collected in May and June, 1985. The mean Sr-90 concentration for the control location was 2.1 pCi/liter. The mean for all indicator locations (within 10 miles of the site) was 2.1 pCi/liter. The control and indicator sample means are the same. Sr-90 results for the indicator locations ranged from 0.8 pCi/liter to 4.4 pCi/liter. Control sample results ranged from 2.0 pCi/liter to 2.1 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 sample composites for the months of May and June, 1985 were also analyzed for I-131. Iodine-131 was not detected in any of the indicator or control samples during May and June, 1985.

No other radionuclides were detected in milk samples during 1985 using gamma spectral analysis.

On July 1, 1985, the new Radiological Effluent Technical Specifications were implemented for the James A. FitzPatrick Nuclear Power Plant. The new Technical Specifications require that three locations be sampled for milk within 5.0 miles of the site. During the remainder of 1985 (July through December), there were no milk sample locations within 5.0 miles of the site. The locations that were sampled are located from 5.5 to 9.5 miles from the site (see above table). The only Technical Specification location during 1985 (July - December) was the control location which is located 15.0 miles to the southwest from the site (location #40).

During the remainder of 1985 (July - December), milk samples were collected at each of the six indicator locations and the control location in the first half and the second half of each month. Samples were collected during the months of July through December, 1985. For each sample, analyses were performed for gamma emitters (analysis by Ge(Li) detector) and I-131 using a resin extraction. Sample analysis results for gamma emitters are found on Table 17 and for I-131 on Table 16. Sr-90 analysis is no longer required by the new Technical Specifications.

The gamma spectral analyses of the bimonthly samples (July - December) showed K-40 to be the most abundant radionuclide detected in the milk samples collected in 1985. K-40 was detected in every sample analyzed and ranged in concentration from 824 pCi/liter to 1,520 pCi/liter at the indicator locations and 1,130 pCi/liter to 1,470 pCi/liter at the control location. K-40 is a naturally occurring radionuclide and is found in many of the environmental media sampled.

Cs-137 was not detected in any of the indicator or control samples during 1985. Contrary to the absence of Cs-137 in milk during 1984 and 1985, Cs-137 has been detected in milk samples since 1969. LLD values for Cs-137 ranged from 3.5 - 7.9 pCi/liter during 1985. It should be noted that the two generating facilities were, for the most part, at full capacity during the 1984 and 1985 grazing season and Cs-137 was not detected in milk samples. Cs-137 was detected in milk during 1983, however, at a concentration of 5.1 pCi/liter (detected only once). This observation may indicate that the source of the Cs-137 during the more recent years of 1981 - 1983 was the October 1980 Chinese Weapons Test.

Milk samples were collected (July - December, 1985) and analyzed twice per month for I-131. Iodine-131 was not detected during 1985 in any of the indicator or control samples. All 1985 I-131 milk results are reported as Lower Limits of Detection (LLD). The LLD results ranged from less than 0.10 pCi/liter to less than 0.49 pCi/liter for all milk samples.

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

Examination of previous Cs-137 levels in milk samples shows that the annual mean for the indicator samples has decreased steadily since 1974. 1976 did show a decrease (7.8 pCi/liter) that was less than 1975 and 1977 (1975 was 20.6 pCi/liter and 1977 was 17.1 pCi/liter). 1974 through 1981 showed Cs-137 concentrations ranging from 26.1 pCi/liter in 1974 to 7.57 pCi/liter in 1981. The indicator mean for 1985 was less than 5.9 pCi/liter. Previous Cs-137 concentrations at the control location is only available from 1978 to 1983. Concentrations range from 3.73 pCi/liter in 1979 to 7.0 pCi/liter in 1981. The mean control result for 1985 was less than 5.7 pCi/liter (LLD result).

Previous Sr-90 data from the indicator locations shows that the annual mean Sr-90 concentrations have decreased slightly since 1974. Sr-90 ranged from 2.1 pCi/liter in 1985 to 7.16 pCi/liter in 1976. The 1985 annual mean for Sr-90 was 2.1 pCi/liter, which shows a slight decrease from the 1984 annual mean for Sr-90 of 2.34 pCi/liter. Strontium-90 concentrations at the control location are only available since 1978. The annual mean concentration ranged from 1.91 pCi/liter in 1983 to 5.88 pCi/liter in 1978. The 1985 annual mean for Sr-90 (control location) was 2.1 pCi/liter, and shows a slight decrease from the 1984 annual mean for Sr-90 of 2.14 pCi/liter.

The impact as a result of Cs-137 in 1985 milk samples is insignificant since no Cs-137 was detected during the 1985 milk sampling program.

The impact, as a result of Sr-90 in milk, due to plant operation, is extremely small if any 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 is considered to be representative of background concentrations. In this regard, the resultant calculated doses would be approximately equal.

Iodine-131 was not detected in any of the milk samples analyzed for the 1985 program. No doses to man have been calculated due to the lack of positive detection. The detection of I-131 in milk samples has not been routine in the past. In past sampling programs, I-131 has been detected in milk samples in conjunction with fresh fallout from atmospheric nuclear testing.

Graphs of yearly milk sample results for Cs-137, Sr-90 and I-131, along with monthly (1985) Cs-137 results by station, are presented in Section VII.

7. LAND USE CENSUS - TABLES 19 AND 21

A land use census was conducted during 1985 to identify within a distance of five miles the location of all milk animals (cows and goats) and the location of the nearest residence in each of the sixteen 22½ degree meteorological sectors. The milch animal census (milk animal) was actually conducted out to a distance of ten miles in order to provide a more comprehensive census.

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 once per year in the spring. The census is conducted by sending questionnaires to previous milk animal owners and also by road surveys to locate any possible new owners. In the event questionnaires are not answered, then the owners are contacted by telephone or in person. The local agricultural agency was also contacted.

The number of milch animals located within the ten mile radius of the site was estimated to be 1,158 cows and one (1) goat for the spring 1985 census. One new location with milk animals was found since the summer 1984 census (#49). The number of cows increased by 62 and the number of goats remained the same with respect to the 1984 summer census.

The residence census was conducted during the late summer to identify the nearest residence in each of the sixteen 22½ degree meteorological sectors within a distance of five miles from the site. At this distance, some of the meteorological sectors are over water. These sectors include: N, NNE, NE, ENE, W, WNW, NW and NNW. There are no residences in these sectors. The results of the 1985 residence census showing the applicable sectors, degrees and distance of each of the nearest residences are found on Table 21.

8. HUMAN FOOD PRODUCTS - TABLE 20

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

Meat

Spring meat collections were made at one offsite location (greater than 10 miles from the site) and at two onsite locations (less than 10 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 3.2 pCi/g (wet). K-40 is a naturally occurring radionuclide. Cs-137 was not detected in any of the spring meat samples (indicators and control).

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

With the implementation of the new Technical Specifications on July 1, 1985, the fall meat, egg and poultry sample collections were no longer required. However, these sample media were collected and analyzed to demonstrate the insignificant environmental impact of continued site operations.

Fall meat collections were made at one offsite and at three onsite 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 2.7 pCi/g (wet). Cs-137 was not detected in any of the fall meat samples.

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

In the past, the detection of Cs-137 in meat samples has been noted for all years since 1978 for indicator samples and since 1980 for control locations (control samples were not collected prior to 1980). The detected concentrations since 1978 at the indicator locations have been fairly consistent. These samples ranged from 0.021 to 0.039 pCi/g (wet). At the control locations, Cs-137 ranged from 0.01 to 0.021 pCi/g (wet). The indicator sample annual mean results have been slightly higher than the control sample annual mean results.

The historical detection of Cs-137 in meat at control and indicator sample locations is an indication of cesium production from weapons testing. During 1985, Cs-137 was not detected at the control sample locations or the indicator locations. However, Cs-137 has been detected at the control sample locations (1980 - 1981) and the indicator sample locations (1978 - 1984), in the past.

Dose estimates are not performed here for meat samples since no radionuclides with the exception of naturally occurring K-40 were detected.

Eggs

Egg samples were collected in the spring (May 3-20, June 5, 1985) and in the fall (October 30, November 19, December 6-20 1985). Samples were collected at three onsite locations (within 10 miles of the site) and at one offsite location (greater than 10 miles from the site). The only radionuclide detected during 1985 in egg samples was K-40. K-40 was detected in the spring samples at concentrations that ranged from 0.9 pCi/g to 1.3 pCi/g (wet). The fall samples showed K-40 concentrations that ranged from 0.8 pCi/g to 1.4 pCi/g (wet).

Poultry

Poultry samples were taken during the spring (May 3-20, June 5, 1985) and during the fall (October 30, November 19, December 6-20, 1985) at three onsite locations and one offsite location. The only radionuclide detected during 1985 in poultry samples was K-40. K-40 was detected in the spring samples at concentrations that ranged from 2.2 to 3.4 pCi/g (wet). The fall samples showed K-40 concentrations that ranged from 3.0 to 3.2 pCi/g (wet).

Fruits and Vegetables

With the implementation of the new Technical Specifications on July 1, 1985 fruit and vegetable collections from nearby gardens (old Technical Specification locations) were replaced by site boundary vegetation Technical Specification locations (see Section V.9). However, fruits and vegetables were collected in the late summer harvest season of 1985 to illustrate the insignificant environmental impact to man from ingestion of these sample media.

Fruits and vegetable samples were collected from six indicator locations (nearby gardens) and one control location (15.0 miles distant from the site). Garden vegetables were comprised of cabbage, beet greens, collard greens, and swiss chard which are all considered broad-leaf vegetation. Fruit samples consisted of tomatoes (non-broadleaf).

K-40 was detected in all broadleaf and non-broadleaf vegetables and fruits. Broadleaf vegetables (Swiss chard, collard greens, beet greens and cabbage) showed concentrations of K-40 ranging from 2.05 pCi/g to 4.37 pCi/g (wet). Non-broadleaf fruits (tomatoes) showed concentrations of K-40 ranging from 1.14 pCi/g to 2.34 pCi/g (wet). Be-7 was not detected in the vegetable samples collected during 1985. This naturally occurring radionuclide was detected in a swiss chard sample (broad-leaf vegetable) from the control location during 1984.

Cs-137 was detected in one of the broad-leaf vegetable samples from an indicator location (O location). The sample consisted of beet greens. The Cs-137 concentration was 0.047 pCi/g (wet) which was greater than the lower limit of detection for the other broad-leaf and non broad-leaf samples. The lower limit of detection for the other samples ranged from 0.009 to 0.033 pCi/g (wet). Two other proximal locations, one within 1000 feet and the other at approximately 3000 feet from location O, showed no detectable Cs-137. Cs-137 was not detected at the control location nor at any of the other indicator locations.

No other radionuclides were detected in the 1985 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, and 1984).

Cs-137 has been detected intermittently during the years of 1976-1985 at the indicator locations and during the years of 1980-1985 at the control locations (control samples were not obtained prior to 1980). Review of indicator sample results from 1976-1985 showed that Cs-137 was not detected during 1976-1978 and 1981-1984. During 1979 and 1980, Cs-137 in fruits and/or vegetables showed annual mean concentrations of 0.004 and 0.036 pCi/g (wet) respectively. Cs-137 was found at one indicator location during 1985 at a concentration of 0.047 pCi/g (wet). Control samples during 1980-1985 showed Cs-137 detected only during 1980 at a concentration of 0.02 pCi/g (wet). Cs-137 detected during the past at both indicator and control locations is indicative of weapons testing.

The impact of detectable Cs-137 in food product samples can be evaluated by calculating a dose to the maximum exposed individual as a result of consumption. Using standard methodology from NRC Regulatory Guide 1.109, the maximum exposed organ is the bone tissue of a child. The maximum whole body dose would be to an adult. The Cs-137 concentration is 0.047 pCi/g (wet) and is assumed to be a result of operations at the site. The consumption rate is assumed to be a maximum consumption rate of 26 kg per year for a child and 64 kg per year for an adult. The calculated doses are 0.40 mrem per year to a child's bone tissue (maximum organ dose) and 0.21 mrem per year to the whole body of an adult. The child's whole body dose would be 0.06 mrem per year.

A maximum organ dose of 0.40 mrem per year and whole body dose of 0.21 mrem per year are small when compared to doses from non man-made sources. A maximum organ dose of 0.40 mrem is small when compared to a dose of 20 mrem per year to the gonads and other soft tissues of an adult from naturally occurring K-40. A maximum whole body dose of 0.21 mrem per year can be compared to the increase in dose from increasing altitude. As one proceeds from one altitude to another, the dose rate will increase slightly as a result of solar radiation. A whole body dose of 0.21 mrem per year is equivalent to proceeding from one area to another of 100 meters (328 feet) higher in altitude and remaining at that altitude for 38 days.

An occasion, such as moving to a location 100 meters higher in altitude, is a common occurrence. Any dose that may be received as a result of such an occurrence is considered small and insignificant.

9. SITE BOUNDARY VEGETATION - TABLE 20

The implementation of the new Radiological Effluent Technical Specifications on July 1, 1985 require that samples of three different kinds of broad-leaf vegetation (edible or inedible) be collected at the site boundary in two areas of highest D/Q (deposition factor) for a total of six samples. The control location was represented by samples of three similar broad-leaf varieties grown 9-20 miles distant in a least prevalent wind direction. The three broad-leaf varieties were comprised of wild grape leaves, oak leaves, and maple leaves (all non-edible). The site boundary and control vegetation samples were collected during the late summer harvest season.

Two naturally occurring radionuclides (K-40 and Be-7) were detected in the 1985 samples. K-40 was detected in all the broad-leaf vegetation samples collected in September, 1985. The site boundary vegetation samples (indicators) showed concentrations of K-40 ranging from 2.79 pCi/g (wet) to 4.29 pCi/g (wet). The control samples showed concentrations of K-40 ranging from 2.21 pCi/g (wet) to 3.85 pCi/g (wet).

Be-7 was also detected in all the broad-leaf vegetation samples. The site boundary samples (indicators) showed concentrations of Be-7 ranging from 0.74 pCi/g (wet) to 1.69 pCi/g (wet). The control samples showed concentrations of Be-7 ranging from 1.22 pCi/g (wet) to 2.52 pCi/g (wet). Both Be-7 and K-40 are naturally occurring radionuclides.

Cs-137 was detected in three of the six indicator vegetation samples (oak and maple leaves). The Cs-137 concentrations ranged from 0.043 pCi/g (wet) to 0.259 pCi/g (wet), with a mean Cs-137 concentration of 0.162 pCi/g (wet). Although past weapons testing is a common source of Cs-137 in the environment no Cs-137 was detected in the control samples.

No other radionuclides were detected in the 1985 Technical Specification vegetation samples.

The vegetation samples collected during 1985 at the site boundary are not consumed by humans. Because this vegetation is not considered edible there is no dose to man from the presence of Cs-137.

A more realistic dose to man concept was evaluated in the previous section (Section V.8, fruits and vegetables). The dose assessment from the consumption of fruits and vegetables from nearby gardens (within 3 miles of the site) was demonstrated to be insignificant.

No historical evaluation is performed since the site boundary vegetation sampling was initiated in 1985, and there is no previous data for comparison.

10. ENVIRONMENTAL SAMPLE LOCATIONS - TABLE 21

Table 22 contains the locations of the environmental samples presented in the data tables of Section IV. The locations are given in degrees and distance in miles from the Nine Mile Point Nuclear Station Unit# 2 reactor centerline (middle site reactor). Table 22 also gives the figure (map) number as well as the map designation for each sample location by samplc medium type.

11. INTERLABORATORY COMPARISON PROGRAM - SECTION VIII

Section 6.3.a of the Radiological Effluent Technical Specifications for the James A. FitzPatrick Nuclear Power Plant requires that a summary of the results obtained as part of an interlaboratory comparison program be included in the Annual Radiological Environmental Operating Report. Presently, the only NRC approved interlaboratory comparison program is the USEPA Cross Check Program. Section VIII shows the results of the EPA's reference results and the licensee's results in tabular form. Some of the EPA reference samples have been analyzed by the site. Other EPA reference samples have been analyzed by a vendor who normally analyzes those types of sample media for the site. Participation in the EPA Cross Check Program includes sample media for which environmental samples are routinely collected, and for which intercomparison samples are available from the EPA.

CONCLUSION

The Radiological Environmental Monitoring Program is conducted each year to determine the radiological impact of the James A. FitzPatrick Nuclear Power Plant on the local environment. As demonstrated by the analytical results of the 1985 program, the major radiological impact on the environment was the result of fallout from atmospheric nuclear testing.

Levels of natural background and the associated fluctuation in intensity are much more significant in terms of dose to man (normal background in the vicinity of the site is equal to 60 mrem/yr) than radiation levels in the environment associated with the operation of the plant.

Using the data presented in this report, and earlier reports as a basis, it can be concluded that no appreciable radiological environmental impact has resulted from the operation of the James A. FitzPatrick Nuclear Power Plant.

EXCEPTIONS TO THE PROGRAM

1. The air sampling pump at the H onsite environmental sampling station was inoperable from January 8, 1985 (1035 hours) to January 14, 1985 (1250 hours). Inoperability was due to transmission line electrical problems.

2. Environmental radiation monitor G offsite was inoperable from January 17, 1985 (0220 hours) to January 18, 1985 (1310 hours). Inoperability was caused by an electrical malfunction.

3. The air sampling pump at the J onsite environmental sampling station was inoperable from January 17, 1985 (1300 hours) to January 23, 1985 (1030 hours). Inoperability was caused by a blown fuse.

4. The air sampling pump at the E onsite environmental sampling station was inoperable from January 17, 1985 (1100 hours) to January 23, 1985 (0930 hours). Inoperability was due to an environmental technician's failure to restart the air sampling pump after environmental station maintenance.

5. The air sampling pump at D1 offsite (R1) environmental sampling station was inoperable from January 28, 1985 (1405 hours) to January 31, 1985 (0910 hours). Inoperability was caused by a blown fuse.

6. The air sampling pump at the J onsite environmental sampling station was inoperable from February 20, 1985 (0506 hours) to February 21, 1985 (1455 hours). Inoperability was caused by a blown fuse.

7. The air sampling pump at the E onsite environmental sampling station was inoperable from March 7. 1985 (1310 hours) to March 11, 1985 (1050 hours). Inoperability was due to an environmental technician's failure to restart the air sampling pump after environmental station maintenance.

8. The air sampling pump at the K onsite environmental sampling station was inoperable from April 5, 1985 (1524 hours) to April 8. 1985 (1600 hours). Inoperability was caused by a power failure to the station due to a tree falling against the station power line resulting in the power line being shorted out.

9. The air sampling pump at D2 onsite environmental sampling station was inoperable from April 15, 1985 (2126 hours) to April 17, 1985 (1031 hours). Inoperability was caused by pump mechanical problems.

10. The air sampling pump at D2 onsite environmental sampling station was inoperable from April 17, 1985 (1542 hours) to April 22, 1985 (1030 hours). Inoperability was caused by a blown fuse.

11. The air sampling pump at the J onsite environmental sampling station was inoperable from May 10, 1985 (1947 hours) to May 13, 1985 (0922 hours). Inoperability was caused by a blown fuse.

12. The air sampling pump at the D1 onsite environmental sampling station was inoperable from May 15, 1985 (2128 hours) to May 20, 1985 (0955 hours). Inoperability was caused by a blown fuse.

13. The air sampling pump at J onsite environmental sampling station was inoperable from May 21, 1985 (2227 hours) to May 24, 1985 (0835 hours). Inoperability was caused by a blown fuse.

14. The air sampling pump at the J onsite environmental sampling station was inoperable from June 16, 1985 (0035 hours) to June 17, 1985 (1011 hours). Inoperability was caused by a blown fuse.

15. Meat samples were collected at only two of the three required sampling locations during the spring sampling period. Weekly calls to the local slaughterhouses beginning on April 23, 1985 and continuing until June 5, 1985, resulted in two onsite samples and one control (offsite) sample.

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

    The collection of meat samples has historically (1979 and 1981) been a difficult sample medium to obtain due to seasonal unavailability.

16. The air sampling pump at the R2 offsite environmental sampling station was inoperable from October 3, 1985 (0800 hours) to October 4, 1985 (0830 hours). Inoperability was the result of de-energizing the pump for electrical repair, circuit box upgrade, and wiring change.

17. The air sampling pump at the R3 offsite environmental sampling station was inoperable from October 16, 1985 (0821 hours) to October 16, 1985 (1503 hours). Inoperability was the result of de-energizing the pump for circuit box upgrade and wiring change.

18. The air sampling pump at the R4 offsite environmental sampling station was inoperable from October 17, 1985 (0812 hours) to October 17, 1985 (1442 hours). Inoperability was the result of de-energizing the pump for circuit box upgrade and wiring change.

19. The air sampling pump at the R1 offsite environmental sampling station was inoperable from October 18, 1985 (0750 hours) to October 18, 1985 (1437 hours). Inoperability was the result of de-energizing the pump for circuit box upgrade and wiring change.

20. The air sampling pump at the R5 offsite environmental sampling station was inoperable from October 29, 1985 (0914 hours) to October 30, 1985 (1345 hours). Inoperability was the result of de-energizing the pump for circuit box upgrade and wiring change.

21. The air sampling pump at the R2 offsite environmental sampling station was inoperable from November 17, 1985 (1105 hours) to November 19, 1985 (1243 hours). Inoperability was caused by an electrical malfunction.

22. The air sampling pump at the R2 offsite environmental sampling station was inoperable from December 17, 1985 (0820 hours) to December 17, 1985 (1255 hours). Inoperability was caused by an electrical malfunction.

23. The spring collection of GAMMARUS did not contain sufficient quantities for Sr-89 and Sr-90 analysis as required by Table 4.3.1, Appendix B of the James A. FitzPatrick Nuclear Power Plant Environmental Technical Specification, which were in effect at the time of the sample collection. As required by plant procedures, three attempts were made to obtain sufficient quantities of GAMMARUS for analysis. The unavailability of GAMMARUS is most probably due to the unseasonable cold temperature of Lake Ontario and the delay of the spring lake turnover. Few GAMMARUS were inhabiting the shoreline shallows during the spring sampling season. The collection of GAMMARUS in sufficient quantities has historically (1982 and 1984) been a difficult sample medium to obtain due to seasonal unavailability.

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VI

HISTORICAL DATA

VI HISTORICAL DATA

Sample Statistics from Previous Environmental Sampling

The mean, standard deviation, minimum value, maximum value, and range, were calculated for selected sample mediums and isotopes.

Special Considerations:

1. Sample data listed as 1969 was taken from the NINE MILE POINT, PREOPERATION SURVEY, 1969 and ENVIRONMENTAL MONITORING REPORT FOR NIAGARA MOHAWK POWER CORPORATION NINE MILE POINT NUCLEAR STATION, NOVEMBER, 1970.

2. Sample data listed as 1974 was taken from the NINE MILE POINT NUCLEAR STATION, ENVIRONMENTAL OPERATING REPORT. The 1974 data is pre-operational to the James A. FitzPatrick Nuclear Power Plant, which started commercial operation in November, 1974.

3. Sample data listed as 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, and 1984 was taken from the respective environmental operating reports for Nine Mile Point Nuclear Station and James A. FitzPatrick Nuclear Power Plant.

4. Only measured values were used for statistical calculations.

HISTORICAL ENVIRONMENTAL SAMPLE DATA

CONTROL

Periphyton Cs-137 pCi/g (wet)	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	0.05	ONLY	ONE	DATA	POINT
1984	0.09	ONLY	ONE	DATA	POINT
1983	0.10	0.06	0.14	0.06	0.08
1982	0.05	0.01	0.06	0.04	0.02
1981	0.19	0.07	0.24	0.14	0.10
1980	0.03	0.01	0.04	0.02	0.02
1979	0.07	0.08	0.13	0.02	0.11
1978	0.04	0.03	0.063	0.023	0.04
1977	<MDL	---	---	---	---
1976	5.00	ONLY	ONE	DATA	POINT
1974	0.10	0.02	0.12	0.09	0.03
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

INDICATOR

Periphyton Cs-137 pCi/g (wet)	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	0.46	ONLY	ONE	DATA	POINT
1984	0.27	0.04	0.31	0.21	0.10
1983	0.35	0.23	0.69	0.17	0.52
1982	0.14	0.16	0.38	0.05	0.33
1981	6.24	6.75	16.00	0.47	15.53
1980	0.09	0.05	0.15	0.04	0.11
1979	0.36	0.55	1.10	0.08	1.02
1978	0.11	0.06	0.19	0.05	0.14
1977	0.42	0.56	1.40	0.09	1.31
1976	2.60	1.38	4.10	1.40	2.70
1974	5.18	3.73	8.44	1.72	6.72
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

HISTORICAL ENVIRONMENTAL SAMPLE DATA

CONTROL

Mollusks Sr-89 pCi/g (wet)	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	<LLD	---	---	---	---
1984	<LLD	---	---	---	---
1983	<LLD	---	---	---	---
1982	<LLD	---	---	---	---
1981	<LLD	---	---	---	---
1980	<LLD	---	---	---	---
1979	<LLD	---	---	---	---
1978	0.02	ONLY	ONE	DATA	POINT
1977	<MDL	---	---	---	---
1976	NO DATA	---	---	---	---
1974	NO DATA	---	---	---	---
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

INDICATOR

Mollusks Sr-89 pCi/g (wet)	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	<LLD	---	---	---	---
1984	<LLD	---	---	---	---
1983	<LLD	---	---	---	---
1982	<LLD	---	---	---	---
1981	<LLD	---	---	---	---
1980	<LLD	---	---	---	---
1979	0.04	0.03	0.07	0.01	0.06
1978	0.05	0.03	0.07	0.03	0.04
1977	<MDL	---	---	---	---
1976	0.42	ONLY	ONE	DATA	POINT
1974	<MDL	---	---	---	---
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

HISTORICAL ENVIRONMENTAL SAMPLE DATA

CONTROL

Mollusks Sr-90 pCi/g (wet)	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	0.003	ONLY	ONE	DATA	POINT
1984	0.020	0.016	0.031	0.009	0.022
1983	0.035	0.007	0.04	0.03	0.01
1982	0.03	0.01	0.04	0.02	0.02
1981	0.046	0.008	0.052	0.040	0.012
1980	0.07	0.06	0.11	0.03	0.08
1979	0.07	0.05	0.10	0.02	0.08
1978	0.14	0.02	0.15	0.12	0.03
1977	0.23	0.21	0.38	0.08	0.30
1976	NO DATA	---	---	---	---
1974	NO DATA	---	---	---	---
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

INDICATOR

Mollusks Sr-90 pCi/g (wet)	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	0.010	ONLY	ONE	DATA	POINT
1984	0.061	0.049	0.130	0.026	0.104
1983	0.11	0.03	0.14	0.07	0.07
1982	0.10	0.02	0.12	0.07	0.05
1981	0.094	0.060	0.132	0.005	0.127
1980	0.11	0.03	0.14	0.07	0.07
1979	0.10	0.04	0.17	0.05	0.12
1978	0.14	0.03	0.18	0.10	0.08
1977	0.10	0.02	0.11	0.07	0.04
1976	0.51	ONLY	ONE	DATA	POINT
1974	0.32	ONLY	ONE	DATA	POINT
1969 (PRE-OPERATIONL)	0.12	0.17	0.24	0.01	0.23

HISTORICAL ENVIRONMENTAL SAMPLE DATA

CONTROL

Mollusks Cs-137 pCi/g (wet)	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	<LLD	---	---	---	---
1984	<LLD	---	---	---	---
1983	<LLD	---	---	---	---
1982	<LLD	---	---	---	---
1981	<LLD	---	---	---	---
1980	<LLD	---	---	---	---
1979	<LLD	---	---	---	---
1978	<MDL	---	---	---	---
1977	<MDL	---	---	---	---
1976	NO DATA	---	---	---	---
1974	NO DATA	---	---	---	---
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

INDICATOR

Mollusks Cs-137 pCi/g (wet)	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	<LLD	---	---	---	---
1984	0.022	ONLY	ONE	DATA	POINT
1983	<LLD	---	---	---	---
1982	<LLD	---	---	---	---
1981	0.061	ONLY	ONE	DATA	POINT
1980	<LLD	---	---	---	---
1979	<LLD	---	---	---	---
1978	0.99	0.80	2.10	0.24	1.86
1977	<MDL	---	---	---	---
1976	0.18	ONLY	ONE	DATA	POINT
1974	0.26	ONLY	ONE	DATA	POINT
1969 (PRE-OPERATIONL)	0.08	ONLY	ONE	DATA	POINT

HISTORICAL ENVIRONMENTAL SAMPLE DATA

CONTROL

Bottom Sediment Sr-90 pCi/g (wet)	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	0.002	ONLY	ONE	DATA	POINT
1984	0.047	0.040	0.075	0.019	0.056
1983	0.14	ONLY	ONE	DATA	POINT
1982	<LLD	---	---	---	---
1981	0.027	0.007	0.032	0.022	0.01
1980	0.12	ONLY	ONE	DATA	POINT
1979	0.02	ONLY	ONE	DATA	POINT
1978	0.05	0.01	0.06	0.04	0.02
1977	<MDL	---	---	---	---
1976	<MDL	---	---	---	---
1974	<MDL	---	---	---	---
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

INDICATOR

Bottom Sediment Sr-90 pCi/g (wet)	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	0.003	0.001	0.003	0.002	0.001
1984	0.038	0.042	0.100	0.011	0.089
1983	0.05	ONLY	ONE	DATA	POINT
1982	0.037	0.03	0.06	0.013	0.047
1981	0.011	0.007	0.02	0.005	0.015
1980	0.01	0.003	0.015	0.011	0.004
1979	0.02	0.20	0.05	0.01	0.04
1978	0.015	ONLY	ONE	DATA	POINT
1977	<MDL	---	---	---	---
1976	0.04	0.00	0.04	0.04	0.00
1974	<MDL	---	---	---	---
1969 (PRE-OPERATIONL)	0.08	ONLY	ONE	DATA	POINT

HISTORICAL ENVIRONMENTAL SAMPLE DATA

CONTROL

Bottom Sediment Cs-137 pCi/g (dry)	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	<LLD	---	---	---	---
1984	0.42	ONLY	ONE	DATA	POINT
1983	0.24	0.08	0.29	0.18	0.11
1982	0.52	0.33	0.75	0.29	0.46
1981	0.26	0.23	0.42	0.10	0.32
1980	0.43	0.2	0.57	0.29	0.28
1979	0.47	0.10	0.54	0.40	0.14
1978	0.61	0.15	0.71	0.50	0.21
1977	0.68	0.08	0.73	0.62	0.11
1976	<MDL	---	---	---	---
1974	0.11	ONLY	ONE	DATA	POINT
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

INDICATOR

Bottom Sediment Cs-137 pCi/g (dry)	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	0.20	0.00	0.20	0.20	0.00
1984	0.49	0.53	1.08	0.04	1.04
1983	0.33	0.11	0.43	0.18	0.25
1982	0.20	0.11	0.30	0.05	0.25
1981	0.23	0.04	0.27	0.19	0.08
1980	0.34	0.40	0.94	0.12	0.82
1979	0.44	0.45	1.00	0.13	0.87
1978	0.99	0.80	2.10	0.24	1.86
1977	2.27	1.90	4.10	0.31	3.79
1976	2.45	0.64	2.90	2.00	0.90
1974	0.40	0.26	0.58	0.21	0.37
1969 (PRE-OPERATIONL)	0.38	0.09	0.44	0.31	0.13

HISTORICAL ENVIRONMENTAL SAMPLE DATA

CONTROL

GAMMARUS Cs-137 pCi/g (wet)	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	<LLD	---	---	---	---
1984	<LLD	---	---	---	---
1983	<LLD	---	---	---	---
1982	<LLD	---	---	---	---
1981	<LLD	---	---	---	---
1980	<LLD	---	---	---	---
1979	0.05	0.04	0.08	0.02	0.06
1978	0.028	ONLY	ONE	DATA	POINT
1977	<MDL	---	---	---	---
1976	NO DATA	---	---	---	---
1974	NO DATA	---	---	---	---
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

INDICATOR

GAMMARUS Cs-137 pCi/g (wet)	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	<LLD	---	---	---	---
1984	<LLD	---	---	---	---
1983	0.21	0.21	0.36	0.06	0.30
1982	<LLD	---	---	---	---
1981	4.7	4.67	8.0	1.4	6.6
1980	<LLD	---	---	---	---
1979	0.06	0.02	0.07	0.04	0.03
1978	0.05	0.00	0.05	0.05	0.00
1977	<MDL	---	---	---	---
1976	NO DATA	---	---	---	---
1974	0.21	ONLY	ONE	DATA	POINT
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

HISTORICAL ENVIRONMENTAL SAMPLE DATA

CONTROL

Fish Samples Sr-89 pCi/g (wet)	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	<LLD	---	---	---	---
1984	<LLD	---	---	---	---
1983	<LLD	---	---	---	---
1982	0.004	0.001	0.005	0.003	0.002
1981	0.015	0.001	0.015	0.014	0.001
1980	<LLD	---	---	---	---
1979	0.07	0.04	0.09	0.04	0.05
1978	<MDL	---	---	---	---
1977	0.04	0.01	0.05	0.03	0.02
1976	0.24	0.08	0.33	0.19	0.14
1974	<MDL	---	---	---	---
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

INDICATOR

Fish Samples Sr-89 pCi/g (wet)	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	<LLD	---	---	---	---
1984	<LLD	---	---	---	---
1983	<LLD	---	---	---	---
1982	0.004	0.001	0.004	0.003	0.001
1981	0.061	0.021	0.10	0.027	0.073
1980	<LLD	---	---	---	---
1979	<LLD	---	---	---	---
1978	0.01	0.001	0.015	0.014	0.001
1977	0.07	0.05	0.24	0.03	0.21
1976	0.27	0.15	0.41	0.12	0.29
1974	<MDL	---	---	---	---
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

HISTORICAL ENVIRONMENTAL SAMPLE DATA

CONTROL

Fish Samples Sr-90 pCi/g (wet)	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	0.001	ONLY	ONE	DATA	POINT
1984	<LLD	---	---	---	---
1983	<LLD	---	---	---	---
1982	0.006	0.006	0.013	0.002	0.011
1981	<LLD	---	---	---	---
1980	0.005	0.002	0.007	0.002	0.005
1979	0.018	0.012	0.033	0.008	0.025
1978	0.010	0.004	0.015	0.004	0.011
1977	0.07	0.03	0.14	0.02	0.12
1976	0.25	0.27	0.81	0.05	0.76
1974	0.07	0.02	0.09	0.04	0.05
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

INDICATOR

Fish Samples Sr-90 pCi/g (wet)	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	<LLD	---	---	---	---
1984	<LLD	---	---	---	---
1983	<LLD	---	---	---	---
1982	0.003	0.001	0.005	0.002	0.003
1981	0.002	ONLY	ONE	DATA	POINT
1980	0.006	0.005	0.013	0.003	0.010
1979	0.019	0.01	0.04	0.01	0.03
1978	0.013	0.006	0.025	0.004	0.021
1977	0.07	0.05	0.24	0.03	0.21
1976	0.28	0.48	2.20	0.05	2.15
1974	0.23	0.69	2.30	0.01	2.29
1969 (PRE-OPERATIONL)	0.23	0.17	0.51	0.30	0.21

HISTORICAL ENVIRONMENTAL SAMPLE DATA

CONTROL

Fish Samples Cs-137 pCi/g (wet)	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	0.034	0.008	0.047	0.026	0.021
1984	0.032	0.009	0.038	0.015	0.023
1983	0.050	0.009	0.060	0.040	0.020
1982	0.047	0.009	0.055	0.027	0.028
1981	0.043	0.016	0.062	0.028	0.034
1980	0.059	0.032	0.110	0.029	0.081
1979	0.04	0.01	0.06	0.03	0.03
1978	0.09	0.05	0.20	0.04	0.16
1977	0.13	ONLY	ONE	DATA	POINT
1976	0.12	ONLY	ONE	DATA	POINT
1974	0.43	0.37	0.94	0.09	0.85
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

INDICATOR

Fish Samples Cs-137 pCi/g (wet)	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	0.030	0.009	0.045	0.018	0.027
1984	0.043	0.008	0.061	0.033	0.028
1983	0.050	0.009	0.060	0.030	0.030
1982	0.050	0.008	0.064	0.034	0.030
1981	0.061	0.021	0.10	0.027	0.073
1980	0.061	0.029	0.100	0.030	0.070
1979	0.10	0.14	0.55	0.02	0.53
1978	0.08	0.02	0.10	0.03	0.07
1977	0.29	0.21	0.79	0.13	0.66
1976	1.4	1.67	3.90	0.50	3.40
1974	0.57	0.82	4.40	0.08	4.32
1969 (PRE-OPERATIONL)	0.06	0.04	0.13	0.01	0.12

HISTORICAL ENVIRONMENTAL SAMPLE DATA

CONTROL

Lake Water Gross Beta pCi/l	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	3.00	0.93	4.10	1.90	2.20
1984	3.41	0.85	5.20	2.40	2.80
1983	2.98	1.74	7.92	1.47	6.45
1982	2.4	0.43	3.2	1.8	1.4
1981	3.24	1.27	5.8	1.9	3.9
1980	2.60	0.50	3.48	1.87	1.61
1979	3.05	0.85	4.80	2.10	2.70
1978	3.55	1.58	6.10	0.50	5.60
1977	10.9	14.5	49.3	2.50	46.8
1976	42.48	50.62	189.00	4.90	184.10
1974	4.85	0.07	4.90	4.80	0.10
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

INDICATOR

Lake Water Gross Beta pCi/l	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	3.36	0.63	4.50	2.50	2.00
1984	3.98	0.98	5.90	2.20	3.70
1983	3.34	1.59	7.90	0.57	7.33
1982	2.7	0.73	4.7	1.3	3.4
1981	2.98	1.19	5.4	1.2	4.2
1980	3.10	0.63	5.10	2.35	2.75
1979	3.24	1.06	6.30	2.00	4.30
1978	4.53	2.62	11.10	0.60	10.50
1977	15.80	21.00	87.00	1.00	86.00
1976	41.76	55.23	192.00	1.10	190.90
1974	31.71	20.22	60.00	6.30	53.70
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

HISTORICAL ENVIRONMENTAL SAMPLE DATA

CONTROL

Lake Water Sr-89 pCi/l	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	<LLD	---	---	---	---
1984	<LLD	---	---	---	---
1983	<LLD	---	---	---	---
1982	<LLD	---	---	---	---
1981	<LLD	---	---	---	---
1980	1.4	0.07	1.4	1.3	0.1
1979	0.70	0.14	0.80	0.60	0.20
1978	<MDL	---	---	---	---
1977	<MDL	---	---	---	---
1976	<MDL	---	---	---	---
1974	NO DATA	---	---	---	---
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

INDICATOR

Lake Water Sr-89 pCi/l	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	<LLD	---	---	---	---
1984	<LLD	---	---	---	---
1983	<LLD	---	---	---	---
1982	0.61	ONLY	ONE	DATA	POINT
1981	0.78	ONLY	ONE	DATA	POINT
1980	0.70	ONLY	ONE	DATA	POINT
1979	<LLD	---	---	---	---
1978	0.70	0.10	0.80	0.60	0.20
1977	<MDL	---	---	---	---
1976	<MDL	---	---	---	---
1974	NO DATA	---	---	---	---
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

HISTORICAL ENVIRONMENTAL SAMPLE DATA

CONTROL

Lake Water Sr-90 pCi/l	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	<LLD	---	---	---	---
1984	0.72	ONLY	ONE	DATA	POINT
1983	0.89	0.08	0.97	0.82	0.15
1982	2.04	2.18	5.30	0.75	4.55
1981	0.68	0.176	0.868	0.484	0.384
1980	1.10	0.00	1.10	1.10	0.00
1979	0.80	0.26	1.10	0.60	0.50
1978	<MDL	---	---	---	---
1977	<MDL	---	---	---	---
1976	<MDL	---	---	---	---
1974	NO DATA	---	---	---	---
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

INDICATOR

Lake Water Sr-90 pCi/l	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	<LLD	---	---	---	---
1984	0.88	0.31	1.30	0.80	0.50
1983	0.83	0.21	1.10	0.60	0.50
1982	1.08	0.88	3.07	0.40	2.67
1981	0.74	0.08	0.805	0.597	0.208
1980	1.00	0.20	1.20	0.80	0.40
1979	0.84	0.34	1.30	0.40	0.90
1978	0.80	0.30	1.10	0.40	0.70
1977	1.00	ONLY	ONE	DATA	POINT
1976	<MDL	---	---	---	---
1974	NO DATA	---	---	---	---
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

HISTORICAL ENVIRONMENTAL SAMPLE DATA

CONTROL

Lake Water Tritium pCi/l	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	287.5	95.4	430	23	200
1984	205	21.2	220	190	30
1983	250.0	21.8	280	230	50
1982	165.0	94.7	307	112	195
1981	293.3	49.3	357	211	146
1980	257.3	38.5	290	211	79
1979	258.7	73.7	308	174	134
1978	303.8	127.5	490	215	275
1977	407.5	97.4	530	300	230
1976	651.7	251.0	929	440	489
1974	<MDL	---	---	---	---
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

INDICATOR

Lake Water Tritium pCi/l	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	530.0	448.6	1200	250	950
1984	282	98.1	370	110	260
1983	317.0	116.9	560	190	370
1982	641.0	891.1	2780	194	2586
1981	258.3	76.9	388	183	205
1980	263.0	95.4	457	150	307
1979	234.0	40.7	286	176	110
1978	389.4	119.9	560	253	307
1977	450.0	67.2	530	380	150
1976	513.0	250.3	889	297	592
1974	440.0	84.9	500	380	120
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

HISTORICAL ENVIRONMENTAL SAMPLE DATA

CONTROL

Air Particulate Gross Beta pCi/m^3	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	0.024	0.006	0.043	0.013	0.030
1984	0.026	0.007	0.051	0.013	0.039
1983	0.024	0.009	0.085	0.007	0.078
1982	0.033	0.012	0.078	0.011	0.067
1981	0.165	0.135	0.549	0.016	0.533
1980	0.056	0.04	0.291	0.009	0.282
1979	0.077	0.086	0.703	0.010	0.693
1978	0.14	0.13	0.66	0.01	0.650
1977	0.07	0.03	0.140	0.016	0.124
1976	0.051	0.031	0.240	0.004	0.236
1974	0.121	0.104	0.808	0.001	0.807
1969 (PRE-OPERATIONL)	0.334	0.097	0.540	0.130	0.410

INDICATOR

Air Particulate Gross Beta pCi/m^3	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	0.021	0.006	0.044	0.001	0.043
1984	0.025	0.008	0.058	0.000	0.058
1983	0.023	0.009	0.062	0.003	0.059
1982	0.031	0.012	0.113	0.001	0.112
1981	0.151	0.128	0.528	0.004	0.524
1980	0.045	0.03	0.207	0.002	0.205
1979	0.058	0.06	0.271	0.001	0.270
1978	0.10	0.09	0.34	0.01	0.33
1977	0.106	0.07	0.326	0.002	0.324
1976	0.047	0.032	0.191	0.002	0.189
1974	0.111	0.114	0.855	0.003	0.852
1969 (PRE-OPERATIONL)	0.320	0.090	0.520	0.130	0.390

HISTORICAL ENVIRONMENTAL SAMPLE DATA

CONTROL

Environ. TLD's Quarterly Reading mrem/Standard Month Offsite*	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	5.21	0.47	6.30	3.95	2.35
1984	5.87	1.00	8.20	3.90	4.30
1983	5.54	0.364	7.17	4.21	2.96
1982	5.12	0.691	6.95	3.79	3.16
1981	4.72	0.685	6.63	3.24	3.39
1980	4.57	0.614	6.06	3.12	2.94
1979	REPORTED	AS	MREM/QTR	PRIOR TO	1980
1978					
1977					
1976					
1974					
1969 (PRE-OPERATIONL)					

INDICATOR

Environ. TLD's Quarterly Reading mrem/Standard Month Onsite Monitors*	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	5.65	0.79	7.35	4.45	2.90
1984	6.42	1.26	9.90	4.60	5.30
1983	6.23	0.91	8.97	5.03	3.94
1982	5.82	1.24	9.13	3.87	5.26
1981	5.24	0.73	7.45	4.09	3.36
1980	DATA	NOT	COMPARABLE	DUE TO	CHANGES
1979	IN TLD	LOCATIONS			
1978					
1977					
1976					
1974					
1969 (PRE-OPERATIONL)					

*See Clarification on Environmental Sample Statistical Analysis Table, Section III.

HISTORICAL ENVIRONMENTAL SAMPLE DATA

CONTROL

Milk Samples Sr-90 pCi/l	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	2.05	0.07	2.10	2.00	0.01
1984	2.14	0.61	2.90	1.30	1.60
1983	1.91	0.50	2.60	1.00	1.60
1982	2.96	1.20	4.20	0.93	3.28
1981	4.85	1.91	8.00	2.41	5.59
1980	3.33	0.9	4.3	1.8	2.5
1979	4.44	1.33	5.80	1.70	4.10
1978	5.88	2.04	9.00	3.00	6.00
1977	NO DATA	---	---	---	---
1976	NO DATA	---	---	---	---
1974	NO DATA	---	---	---	---
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

INDICATOR

Milk Samples Sr-90 pCi/l	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	2.08	1.11	4.40	0.08	3.60
1984	2.34	1.19	7.60	0.80	6.80
1983	2.81	0.80	5.05	1.00	4.05
1982	4.60	2.29	9.76	0.76	9.00
1981	4.60	2.45	10.70	1.12	9.58
1980	4.3	2.6	11.0	1.1	9.9
1979	4.84	2.12	9.00	0.70	8.30
1978	5.93	1.81	10.00	2.50	7.50
1977	6.07	3.50	15.00	2.00	13.00
1976	7.16	3.41	14.80	1.50	13.30
1974	5.66	2.89	14.00	1.00	13.00
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

HISTORICAL ENVIRONMENTAL SAMPLE DATA

CONTROL

Milk Samples Cs-137 pCi/l	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	<LLD	---	---	---	---
1984	<LLD	---	---	---	---
1983	<LLD	---	---	---	---
1982	<LLD	---	---	---	---
1981	7.0	ONLY	ONE	DATA	POINT
1980	<LLD	---	---	---	---
1979	3.73	0.29	3.9	3.4	0.5
1978	5.83	1.98	7.8	2.4	5.4
1977	NO	CONTROL	DATA	PRIOR TO	1978
1976					
1974					
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

INDICATOR

Milk Samples Cs-137 pCi/l	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	<LLD	---	---	---	---
1984	<LLD	---	---	---	---
1983	5.10	ONLY	ONE	DATA	POINT
1982	6.26	4.41	18.0	3.1	14.9
1981	7.57	5.95	29.0	4.3	24.7
1980	9.7	4.9	21.0	4.0	17.0
1979	9.4	8.0	40.0	2.7	37.3
1978	9.9	7.1	33.0	3.4	29.6
1977	17.1	3.9	22.0	11.0	11.0
1976	7.8	3.7	13.2	4.0	9.2
1974	26.1	10.5	61.0	13.0	48.0
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

HISTORICAL ENVIRONMENTAL SAMPLE DATA

CONTROL

Milk Samples I-131 pCi/l	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	<LLD	---	---	--- ---	
1984	<LLD	---	---	--- ---	
1983	<LLD	---	---	--- ---	
1982	<LLD	---	---	--- ---	
1981	<LLD	---	---	--- ---	
1980	1.41	ONLY	ONE	DATA PO	INT
1979	<LLD	---	---	--- ---	
1978	<MDL	---	---	--- ---	
1977	NO DATA	---	---	--- ---	
1976	NO DATA	---	---	--- ---	
1974	NO DATA	---	---	--- ---	
1969 (PRE-OPERATIONL)	NO DATA	---	---	--- ---	

INDICATOR

Milk Samples I-131 pCi/l	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	<LLD	---	---	---	---
1984	<LLD	---	---	---	---
1983	<LLD	---	---	---	---
1982	<LLD	---	---	---	---
1981	<LLD	---	---	---	---
1980	4.9	4.23	8.80	0.40	8.40
1979	<LLD	---	---	---	---
1978	0.19	ONLY	ONE	DATA	POINT
1977	0.20	0.14	0.22	-0.40	0.62
1976	3.20	7.81	45.00	0.02	44.98
1974	1.23	0.44	2.00	0.70	1.30
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

HISTORICAL ENVIRONMENTAL SAMPLE DATA

CONTROL

Human Food Crops Cs-137 pCi/g (wet) Produce	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	<LLD	---	---	---	---
1984	<LLD	---	---	---	---
1983	<LLD	---	---	---	---
1982	<LLD	---	---	---	---
1981	<LLD	---	---	---	---
1980	<LLD	---	---	---	---
1979	NO	CONTROL	DATA	PRIOR TO	1980
1978					
1977					
1976					
1974					
1969 (PRE-OPERATIONL)					

INDICATOR

Human Food Crops Cs-137 pCi/g (wet) Produce	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	0.047	ONLY	ONE	DATA	POINT
1984	<LLD	---	---	---	---
1983	<LLD	---	---	---	---
1982	<LLD	---	---	---	---
1981	<LLD	---	---	---	---
1980	0.033	2.26	0.06	0.004	0.056
1979	<LLD	---	---	---	---
1978	0.01	ONLY	ONE	DATA	POINT
1977	<MDL	---	---	---	---
1976	<MDL	---	---	---	---
1974	0.142	0.09	0.34	0.04	0.30
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

HISTORICAL ENVIRONMENTAL SAMPLE DATA

CONTROL

Human Food Crops I-131 pCi/g (wet) Produce	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	<LLD	---	---	---	---
1984	<LLD	---	---	---	---
1983	<LLD	---	---	---	---
1982	<LLD	---	---	---	---
1981	<LLD	---	---	---	---
1980	<LLD	---	---	---	---
1979	NO	CONTROL	DATA	PRIOR TO	1980
1978					
1977					
1976					
1974					
1969 (PRE-OPERATIONL)					

INDICATOR

Human Food Crops I-131 pCi/g (wet) Produce	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	<LLD	---	---	---	---
1984	<LLD	---	---	---	---
1983	<LLD	---	---	---	---
1982	<LLD	---	---	---	---
1981	<LLD	---	---	---	---
1980	<LLD	---	---	---	---
1979	<LLD	---	---	---	---
1978	<MDL	---	---	---	---
1977	<MDL	---	---	---	---
1976	<MDL	---	---	---	---
1974	NO DATA	---	---	---	---
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

HISTORICAL ENVIRONMENTAL SAMPLE DATA

CONTROL

Meat Cs-137 pCi/g (wet)	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	<LLD	---	---	---	---
1984	<LLD	---	---	---	---
1983	<LLD	---	---	---	---
1982	<LLD	---	---	---	---
1981	0.021	0.005	0.024	0.017	0.007
1980	0.01	ONLY	ONE	DATA	POINT
1979	NO	CONTROL	DATA	PRIOR TO	1980
1978					
1977					
1976					
1974					
1969 (PRE-OPERATIONL)					

INDICATOR

Meat Cs-137 pCi/g (wet)	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	<LLD	---	---	---	---
1984	0.04	0.01	0.05	0.03	0.02
1983	0.02	0.01	0.04	0.01	0.03
1982	0.034	0.026	0.08	0.02	0.06
1981	0.036	0.021	0.068	0.023	0.045
1980	0.02	0.013	0.042	0.009	0.033
1979	0.03	0.021	0.07	0.01	0.06
1978	0.021	0.011	0.04	0.013	0.027
1977	<MDL	---	---	---	---
1976	<MDL	---	---	---	---
1974	NO DATA	---	---	---	---
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

HISTORICAL ENVIRONMENTAL SAMPLE DATA

CONTROL

Eggs Cs-137 pCi/g (wet)	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	<LLD	---	---	---	---
1984	<LLD	---	---	---	---
1983	<LLD	---	---	---	---
1982	<LLD	---	---	---	---
1981	<LLD	---	---	---	---
1980	<LLD	---	---	---	---
1979	NO	CONTROL	DATA	PRIOR TO	1980
1978					
1977					
1976					
1974					
1969 (PRE-OPERATIONL)					

INDICATOR

Eggs Cs-137 pCi/g (wet)	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	<LLD	---	---	---	---
1984	<LLD	---	---	---	---
1983	<LLD	---	---	---	---
1982	<LLD	---	---	---	---
1981	<LLD	---	---	---	---
1980	<LLD	---	---	---	---
1979	<LLD	---	---	---	---
1978	<MDL	---	---	---	---
1977	<MDL	---	---	---	---
1976	<MDL	---	---	---	---
1974	NO DATA	---	---	---	---
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

HISTORICAL ENVIRONMENTAL SAMPLE DATA

CONTROL

Soil Samples Cs-137 pCi/g (dry)	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	0.35	0.26	0.78	0.09	0.69
1984	NO	SAMPLES	REQUIRED	IN	1984
1983	0.67	0.49	1.46	0.20	1.26
1982	NO	SAMPLES	REQUIRED	IN	1982
1981	NO	SAMPLES	REQUIRED	IN	1981
1980	1.20	0.91	2.90	0.41	2.49
1979	NO	SAMPLES	REQUIRED	IN	1979
1978	NO	SAMPLES	REQUIRED	IN	1978
1977	1.17	0.48	2.00	0.70	1.30
1976	NO DATA	---	---	---	---
1974	NO DATA	---	---	---	---
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

INDICATOR

Soil Samples Cs-137 pCi/g (dry)	MEAN	STANDARD DEVIATION	MAXIMUM	MINIMUM	RANGE
1985	0.36	0.29	0.94	0.08	0.86
1984	NO	SAMPLES	REQUIRED	IN	1984
1983	0.42	0.41	1.19	0.07	1.12
1982	NO	SAMPLES	REQUIRED	IN	1982
1981	NO	SAMPLES	REQUIRED	IN	1981
1980	1.26	0.61	2.1	0.29	1.81
1979	NO	SAMPLES	REQUIRED	IN	1979
1978	NO	SAMPLES	REQUIRED	IN	1978
1977	1.03	0.62	2.00	0.30	1.70
1976	NO DATA	---	---	---	---
1974	1.03	1.18	2.80	0.40	2.40
1969 (PRE-OPERATIONL)	NO DATA	---	---	---	---

VII

FIGURES AND MAPS

VII FIGURES AND MAPS

1. <u>DATA GRAPHS</u>

   This section includes graphic representation of selected sample results.

   For graphic representation, results less than the MDL or LLD were considered to be at the MDL or LLD level of activity. MDL and LLD values were indicated where possible.

2. <u>SAMPLE LOCATIONS</u>

   Sample locations referenced as letters and numbers on analysis results tabies are plotted on maps.

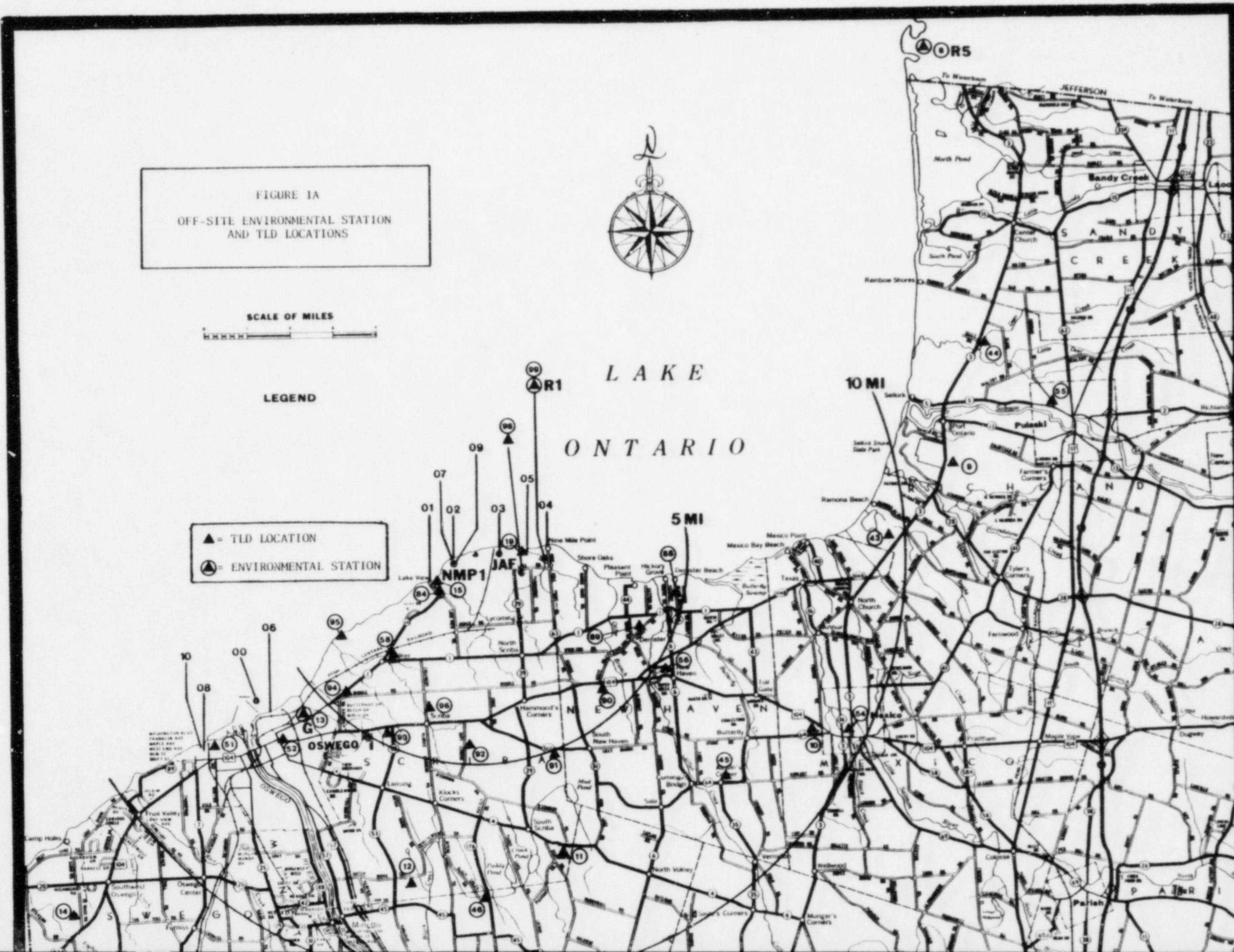


FIGURE 1A

OFF-SITE ENVIRONMENTAL STATION AND TLD LOCATIONS

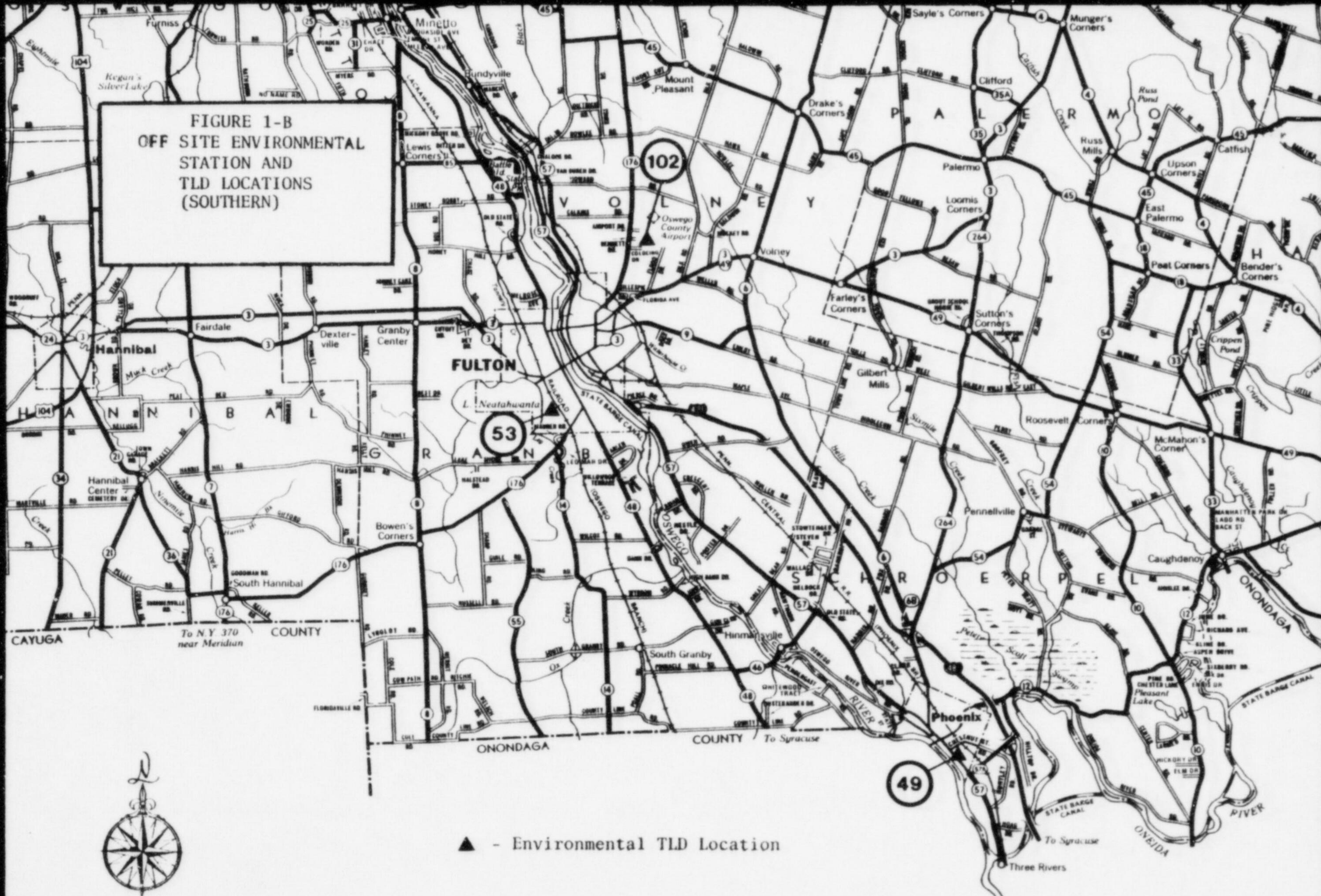


FIGURE 1-B
OFF SITE ENVIRONMENTAL
STATION AND
TLD LOCATIONS
(SOUTHERN)

▲ - Environmental TLD Location

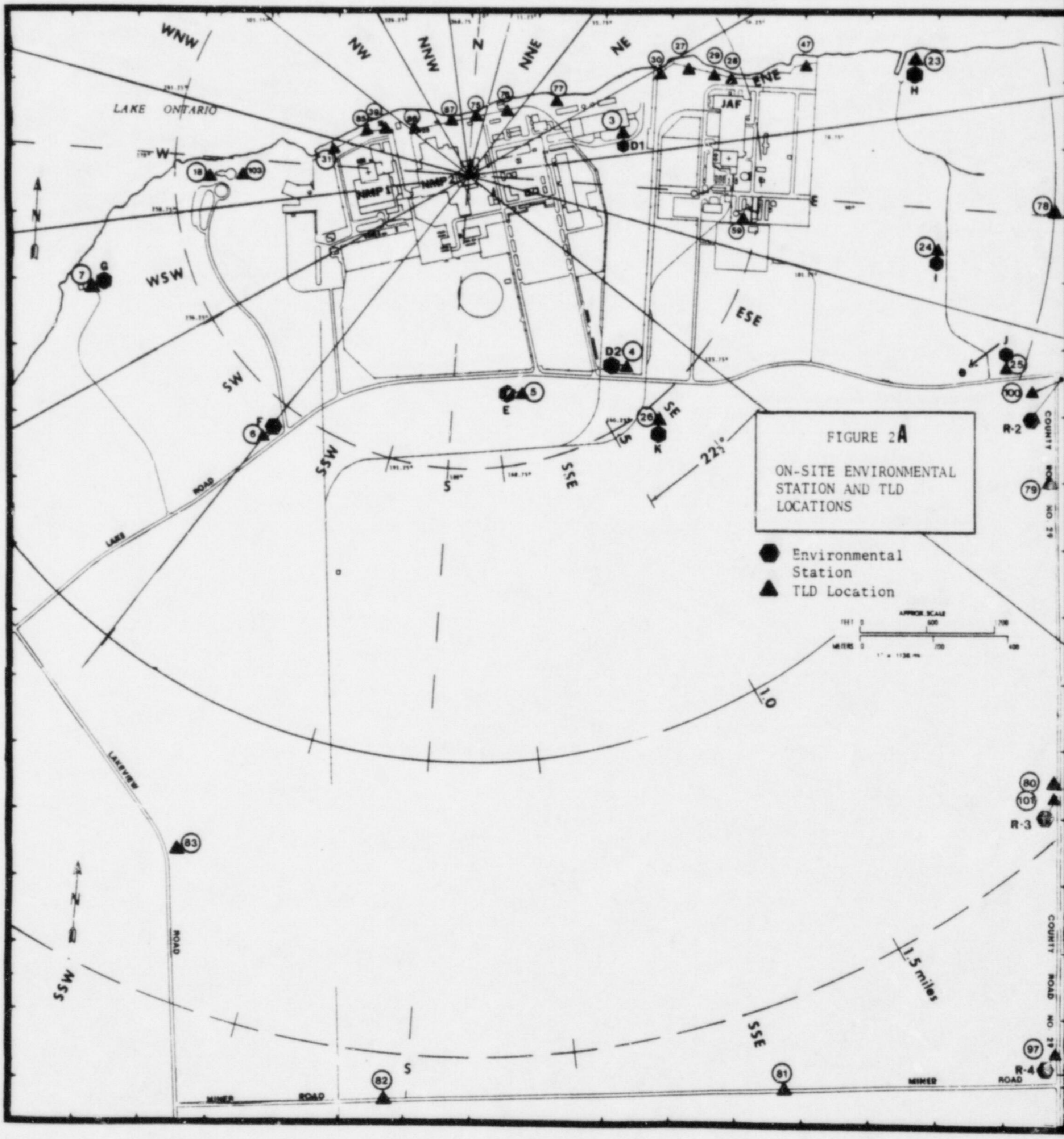
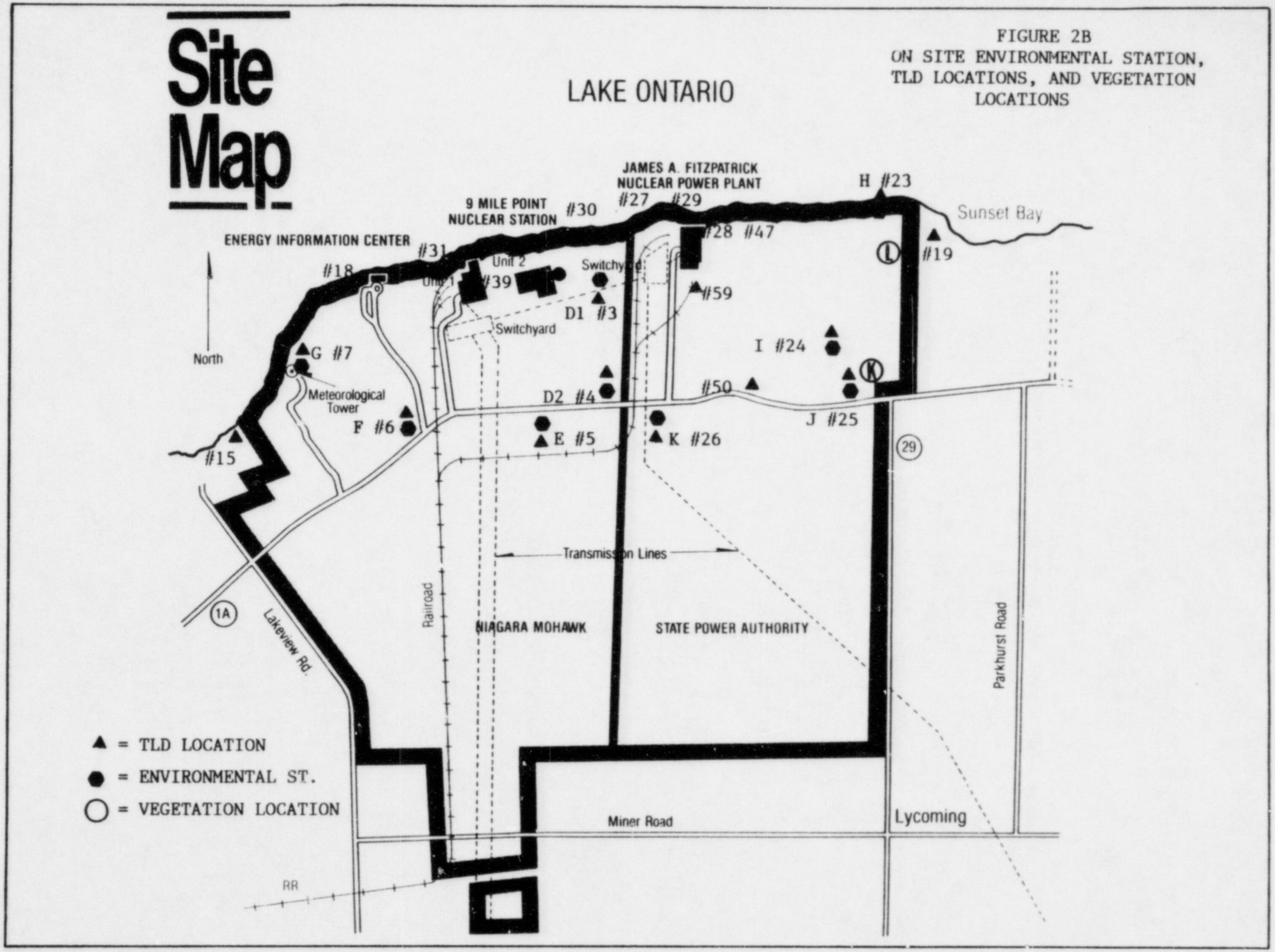


FIGURE 2A

ON-SITE ENVIRONMENTAL STATION AND TLD LOCATIONS


Site Map
LAKE ONTARIO
FIGURE 2B
ON SITE ENVIRONMENTAL STATION, TLD LOCATIONS, AND VEGETATION LOCATIONS
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
9 MILE POINT NUCLEAR STATION
ENERGY INFORMATION CENTER
H #23
Sunset Bay
#27 #29
#30
#31
#18
#28 #47
#19
L
Unit 2
Unit 1
#39
Switchyard
#59
D1 #3
Switchyard
North
G #7
I #24
K
Meteorological Tower
D2 #4
#50
F #6
E #5
K #26
J #25
#15
29
Transmission Lines
1A
Lakeview Rd.
Railroad
NIAGARA MOHAWK
STATE POWER AUTHORITY
Parkhurst Road
▲ = TLD LOCATION
⬢ = ENVIRONMENTAL ST.
○ = VEGETATION LOCATION
Miner Road
Lycoming
RR

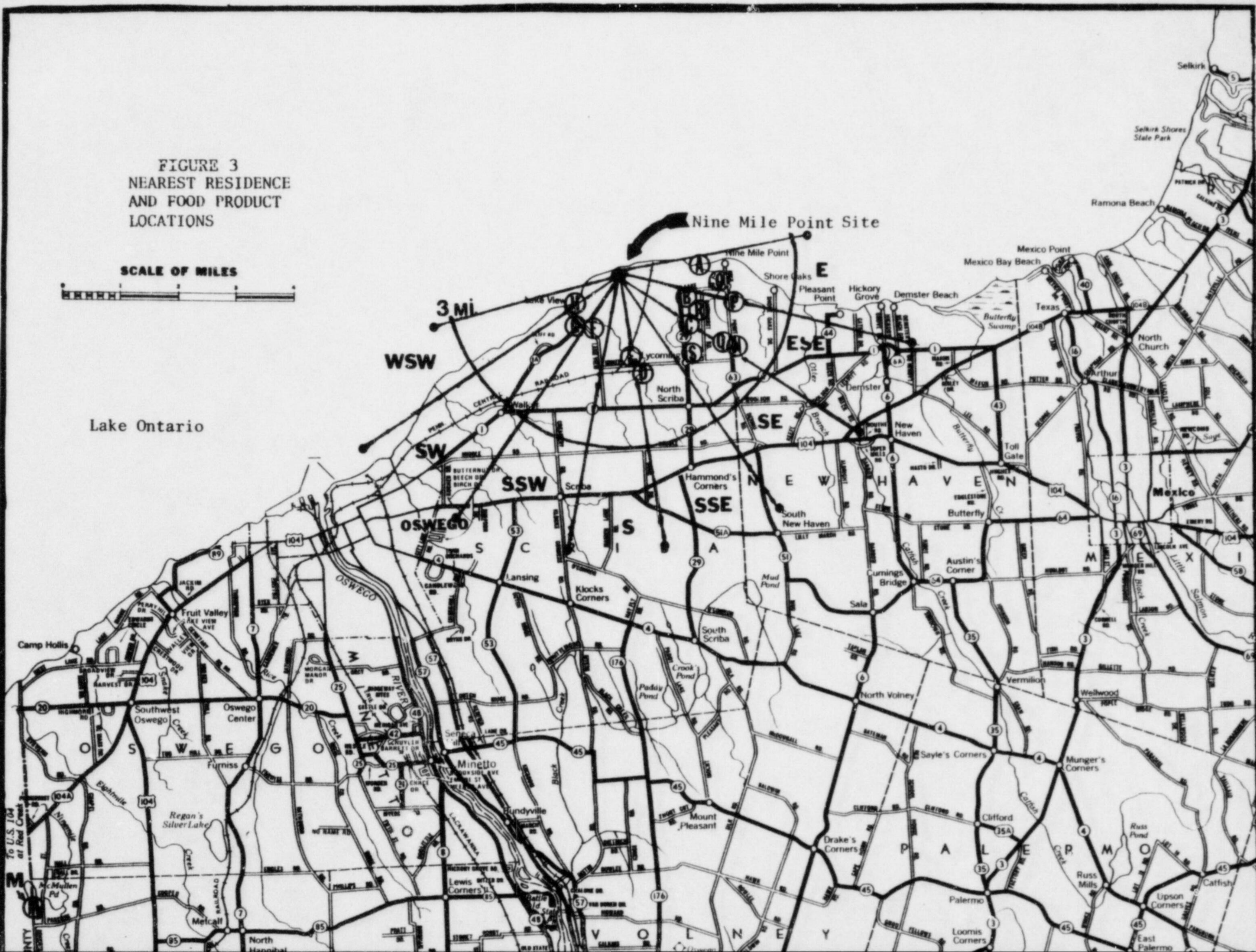


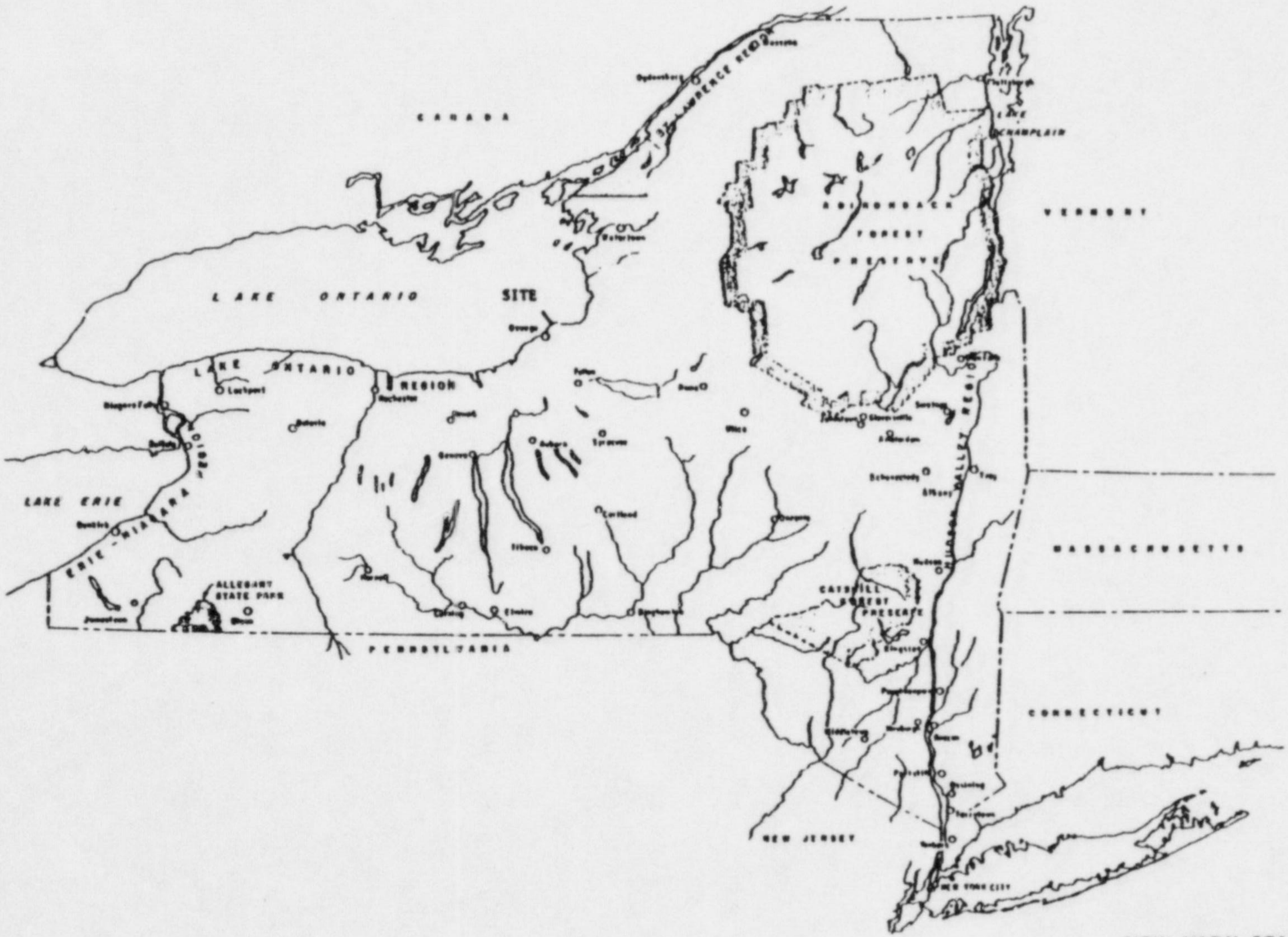
FIGURE 3
NEAREST RESIDENCE
AND FOOD PRODUCT
LOCATIONS

FIGURE 4

MILK ANIMAL CENSUS AND MILK SAMPLE LOCATIONS

FIGURE 5
MEAT, POULTRY, AND
EGG LOCATIONS
DESIGNATED AS LETTERS

FIGURE 6



NEW YORK STATE MAP WITH REGIONS

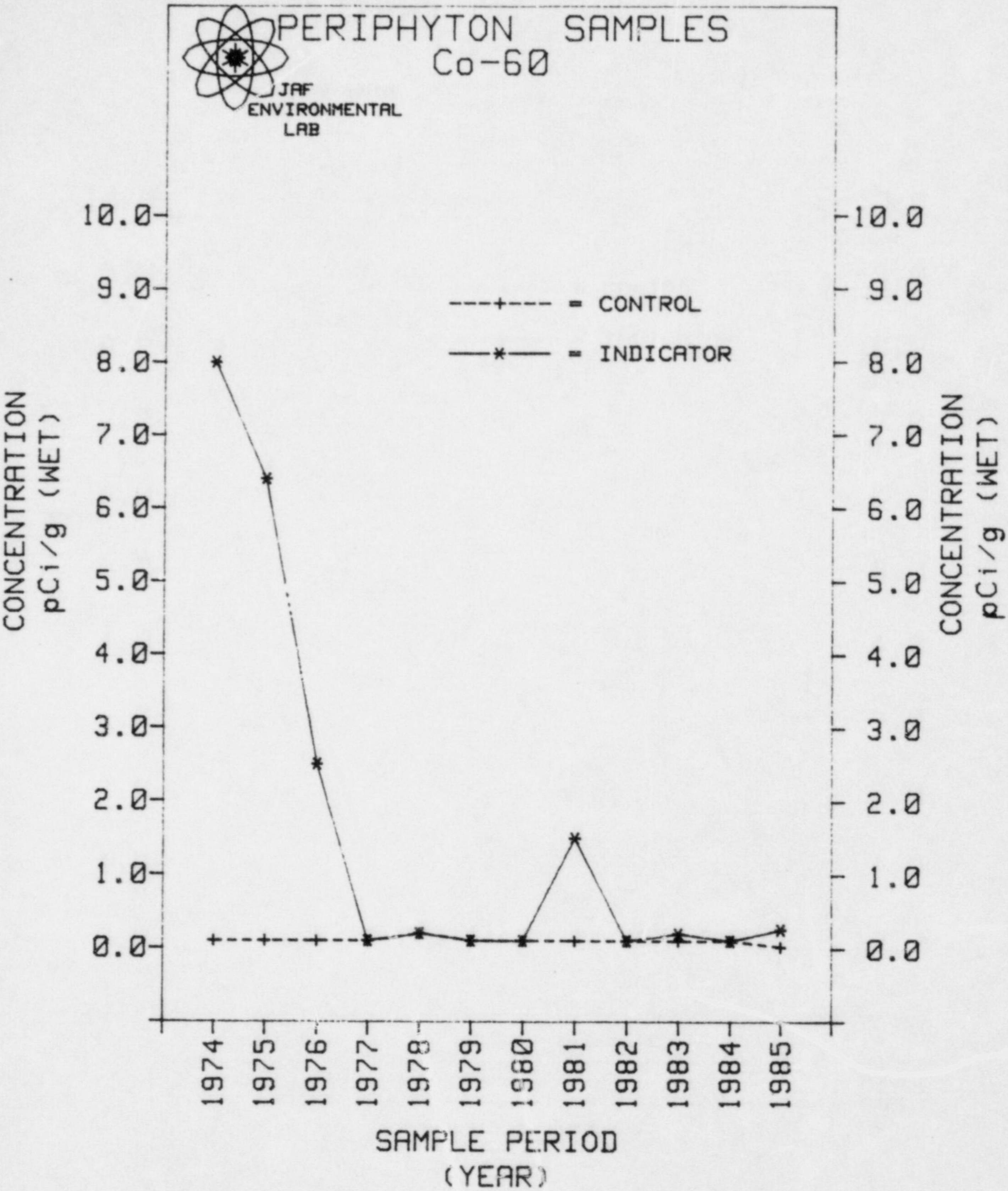
FIGURE 7

Composition of Bottom Sediment Determined by Visual Examination at Benthic Sampling Stations in the Vicinity of Nine Mile Point, 1978

Depth Contour (ft)	Transect	Description*	Comments
10	NMPW	100% bedrock	
	NMPP	70% boulders, 20% rubble, 10% gravel	Some algae on rocks
	FITZ	80% boulders, 10% gravel, 10% sand	Some algae
	NMPE	70% boulders, 20% gravel, 10% sand	Some algae
20	NMPW	50% bedrock, 50% rubble	
	NMPP	50% boulders, 30% rubble, 20% gravel	All lying on bedrock
	FITZ	50% boulders, 20% rubble, 20% gravel, 10% sand	
	NMPE	40% bedrock, 30% boulders, 25% gravel, 5% sand	
30	NMPW	100% bedrock	Some rubble
	NMPP	100% bedrock	Some boulders
	FITZ	80% bedrock	Some sand
	NMPE	100% bedrock	Some rubble and sand
40	NMPW	50% bedrock, 30% sand, 20% rubble	
	NMPP	80% boulders, 20% bedrock	
	FITZ	50% bedrock, 30% rubble, 20% boulders,	
	NMPE	100% bedrock	Some scattered sand
60	NMPW	100% bedrock	
	NMPP	80% boulders, 10% rubble, 10% gravel	
	FITZ	80% bedrock, 20% boulders	Some rubble
	NMPE	80% bedrock, 20% rubble	Some sand

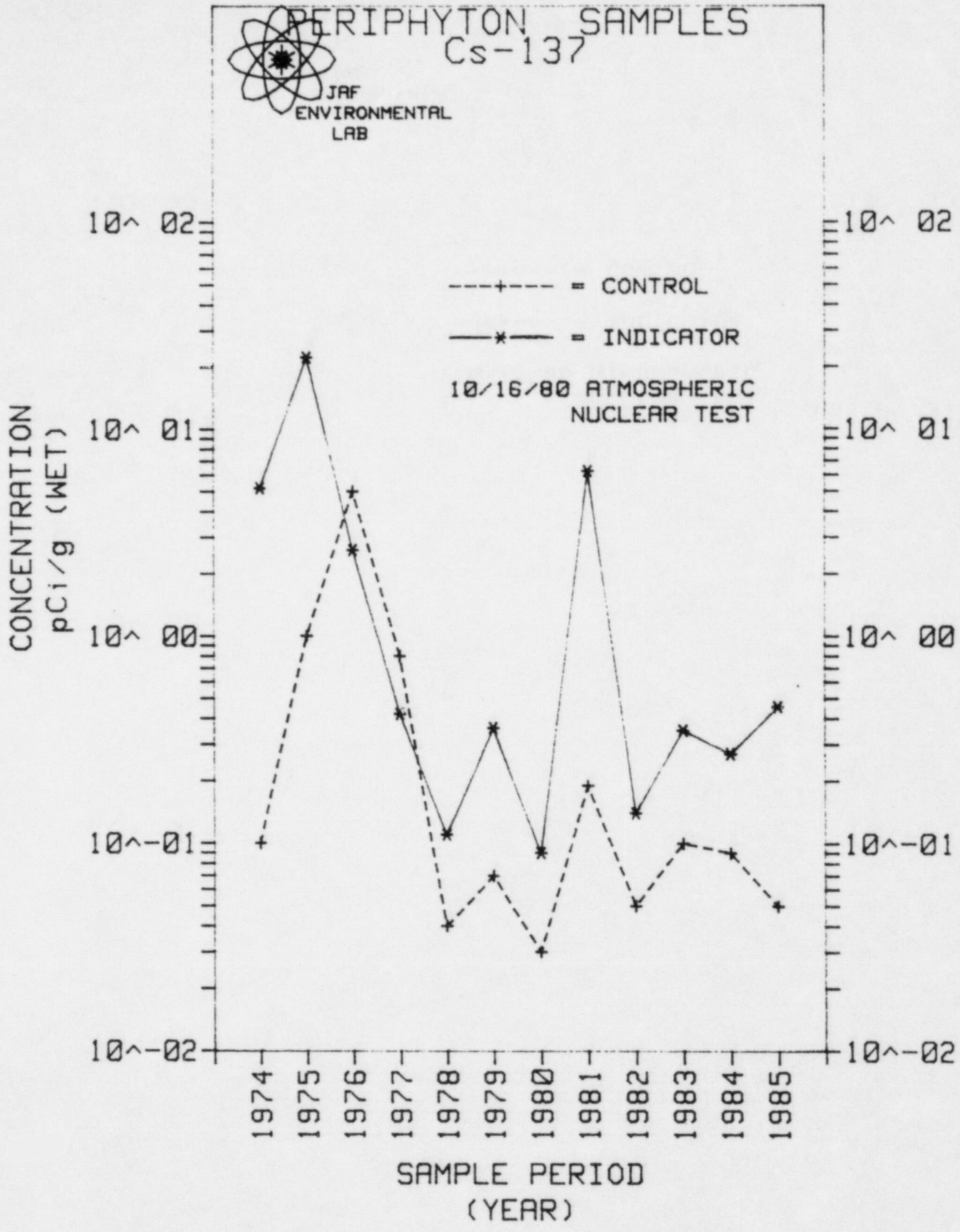
* Description based on USEPA (1973) field evaluation method for categorizing soils.

FIGURE 8



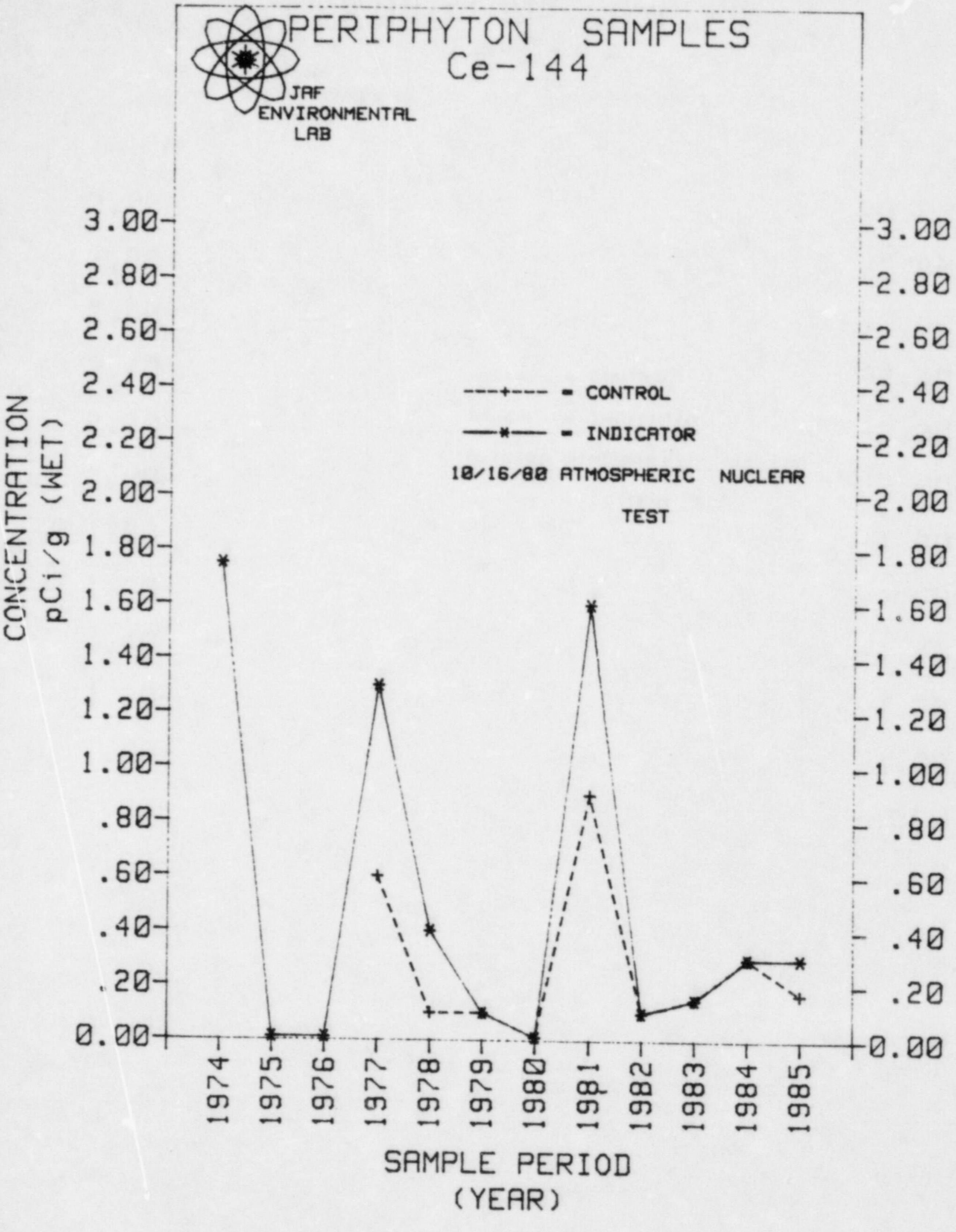
CONTROL VALUES 1974 TO 1979 ARE MDL's; 1980 TO 1985 ARE LLD's

FIGURE 9



CONTROL VALUES 1975 & 1977 ARE MDL's

FIGURE 10

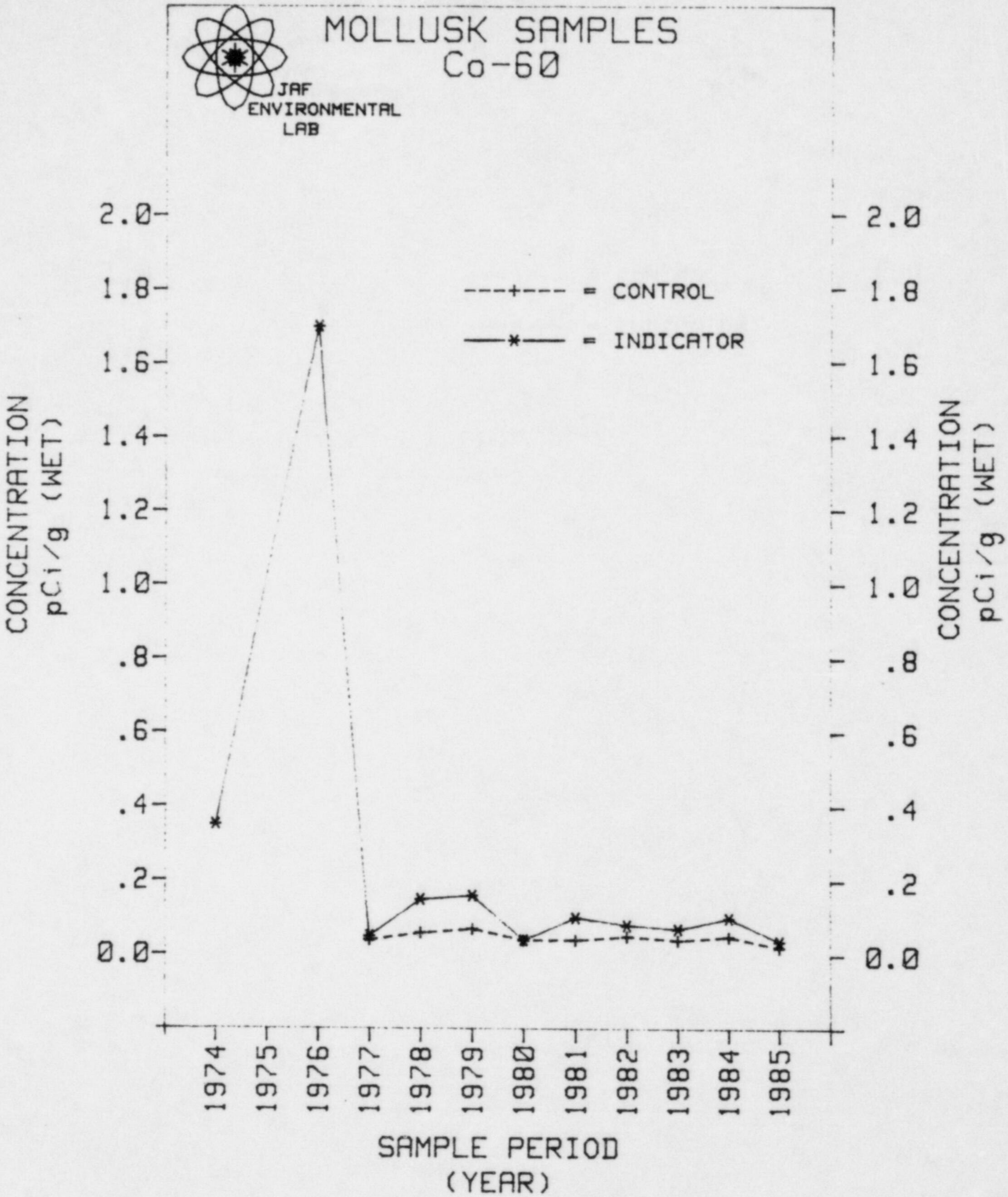


NO CONTROL DATA FOR 1974-1976.

CONTROL YEARS 1977-1979 ARE MDL's; 1980-1985 ARE LLD's

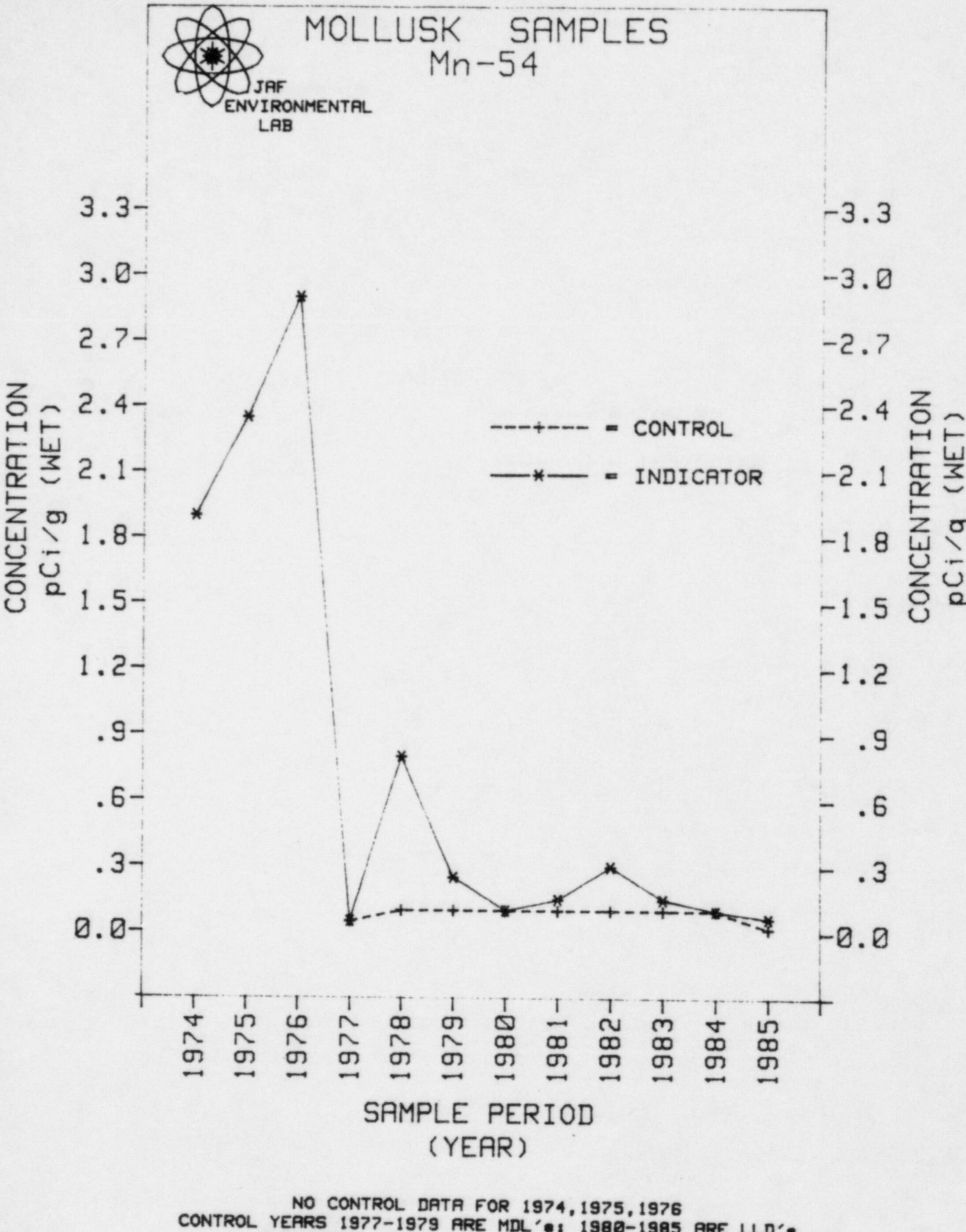
INDICATOR YEARS 1974-1979 ARE MDL's; 1980-1985 ARE LLD's

FIGURE 11



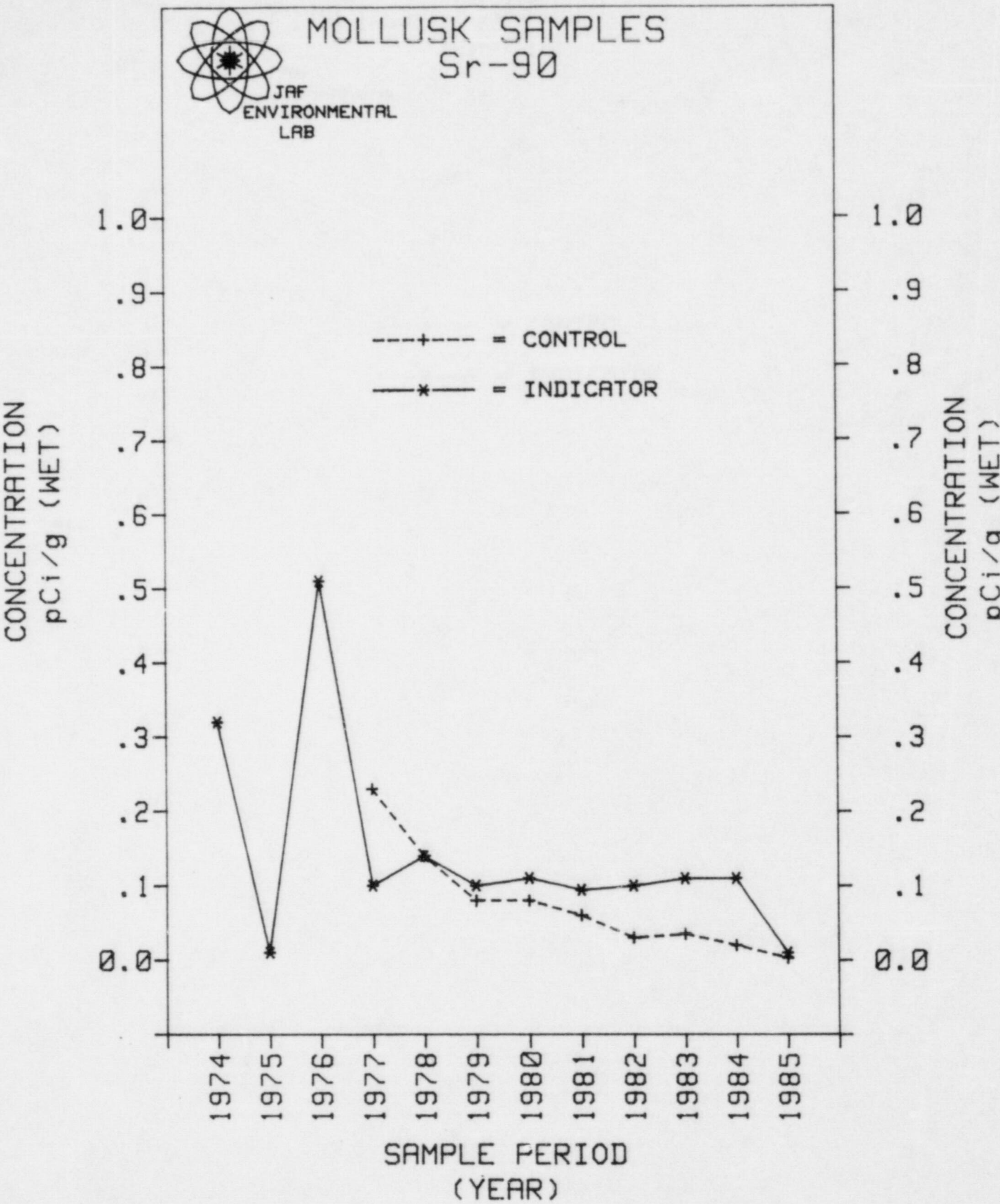
NO CONTROL DATA FOR 1974-1976
NO INDICATOR DATA FOR 1975
CONTROL YEARS 1977-1979 ARE MDL's; 1980-1985 ARE LLD's
INDICATOR YEAR 1977 IS MDL

FIGURE 12



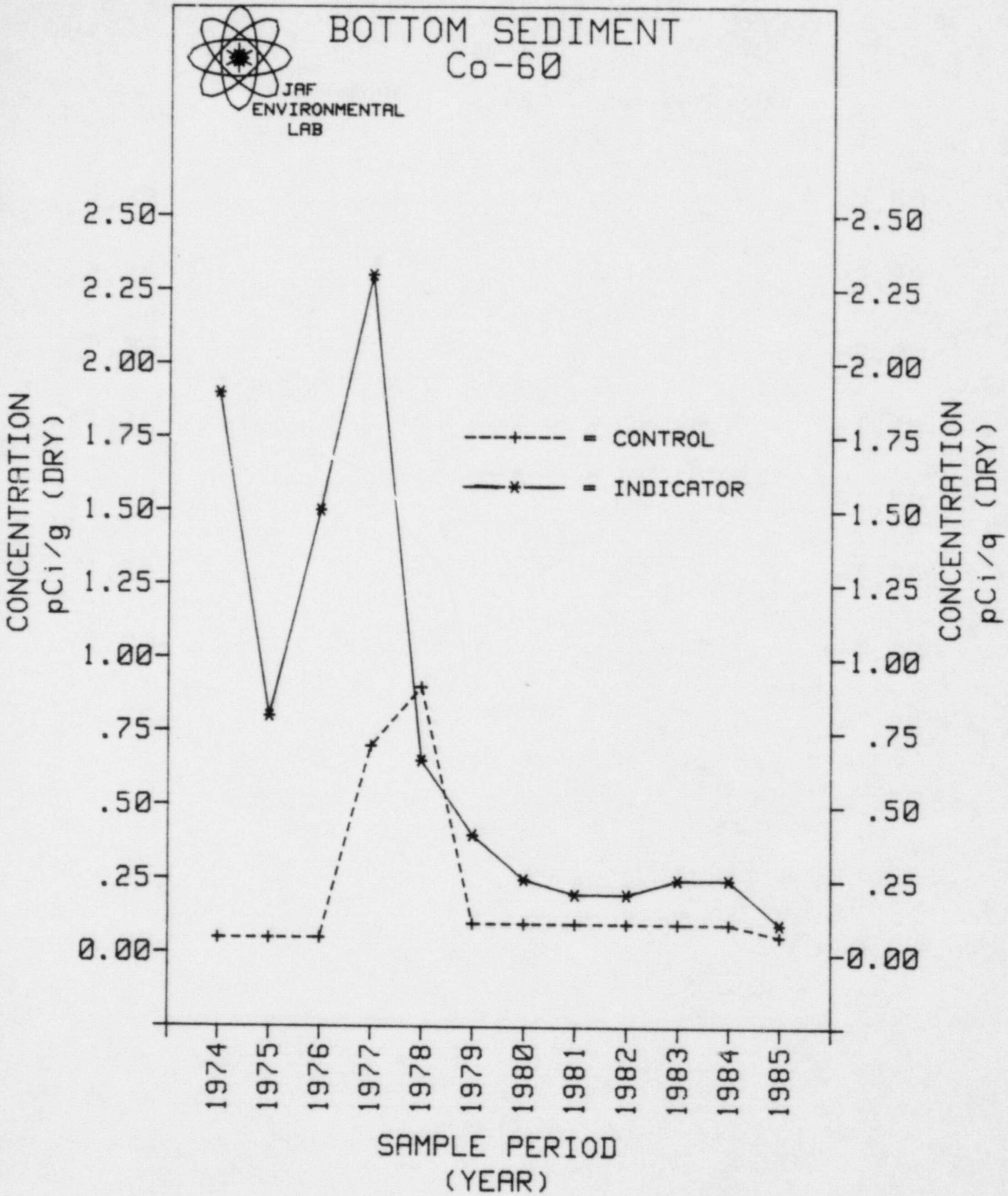
NO CONTROL DATA FOR 1974,1975,1976
CONTROL YEARS 1977-1979 ARE MDL's; 1980-1985 ARE LLD's
INDICATOR YEARS 1977-1979 ARE MDL's

FIGURE 13



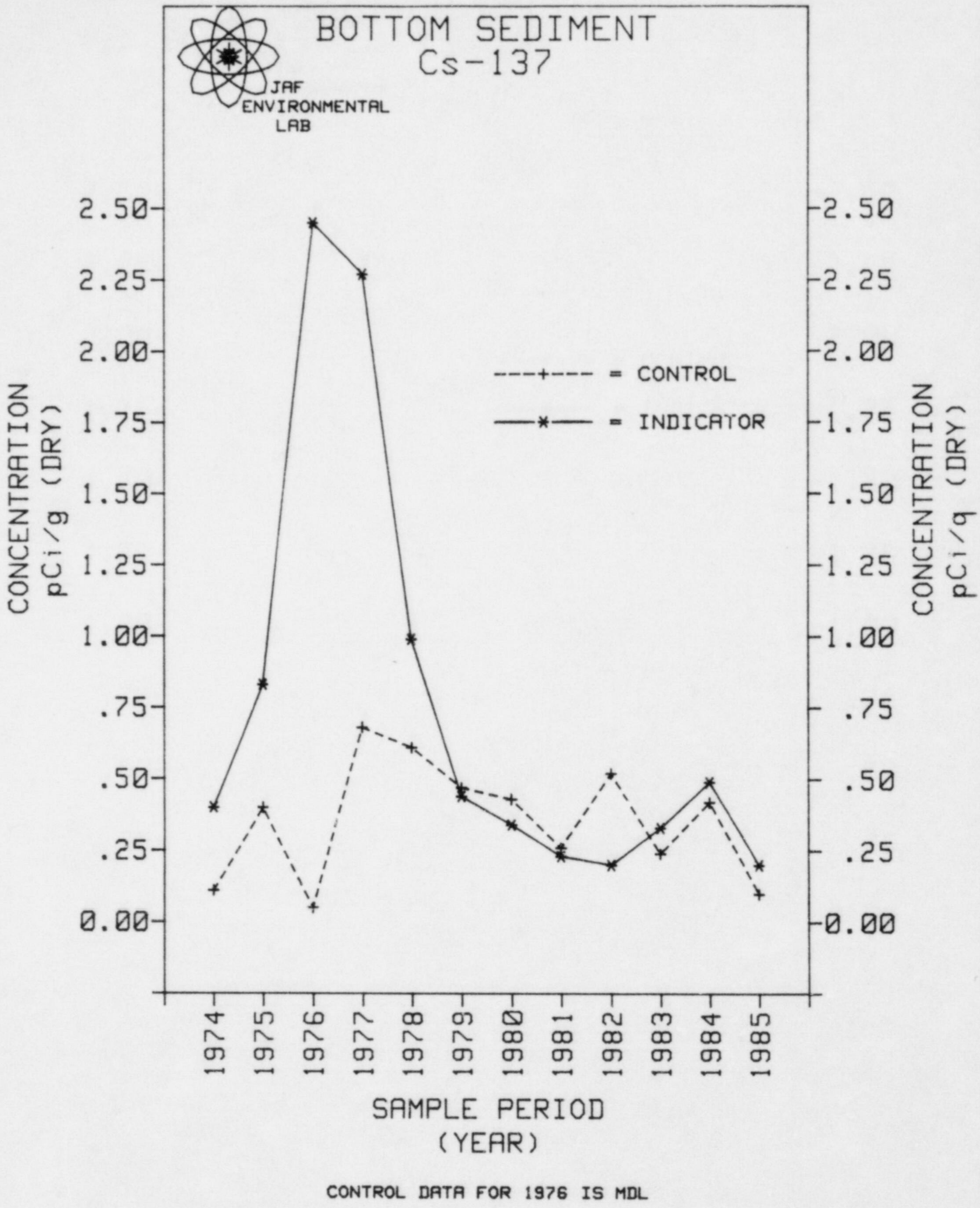
NO CONTROL DATA FOR YEARS 1974-1976

FIGURE 14



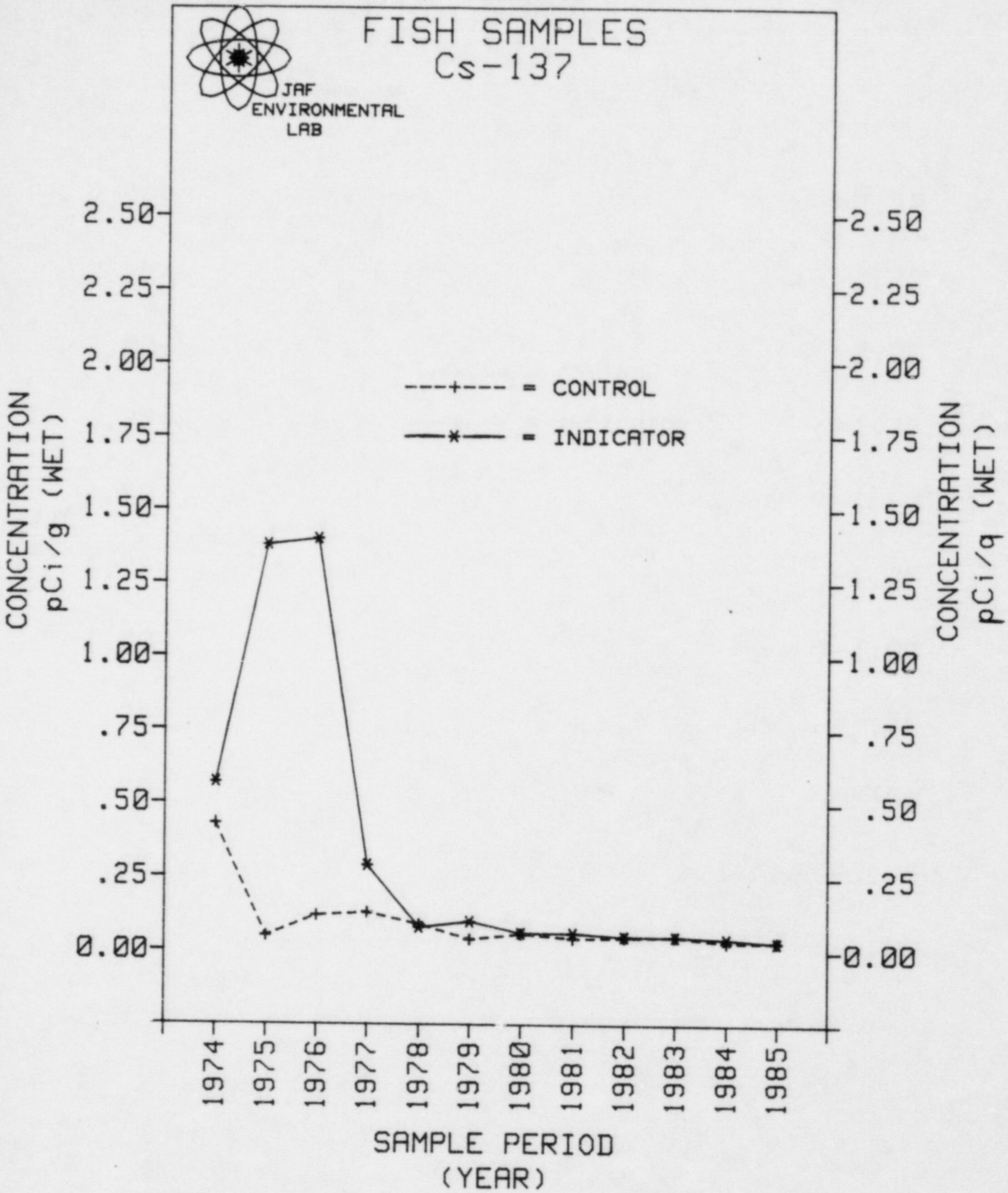
CONTROL DATA FOR 1975-1976,1978-1979 ARE MDL's; 1980-1985 ARE LLD's

FIGURE 15



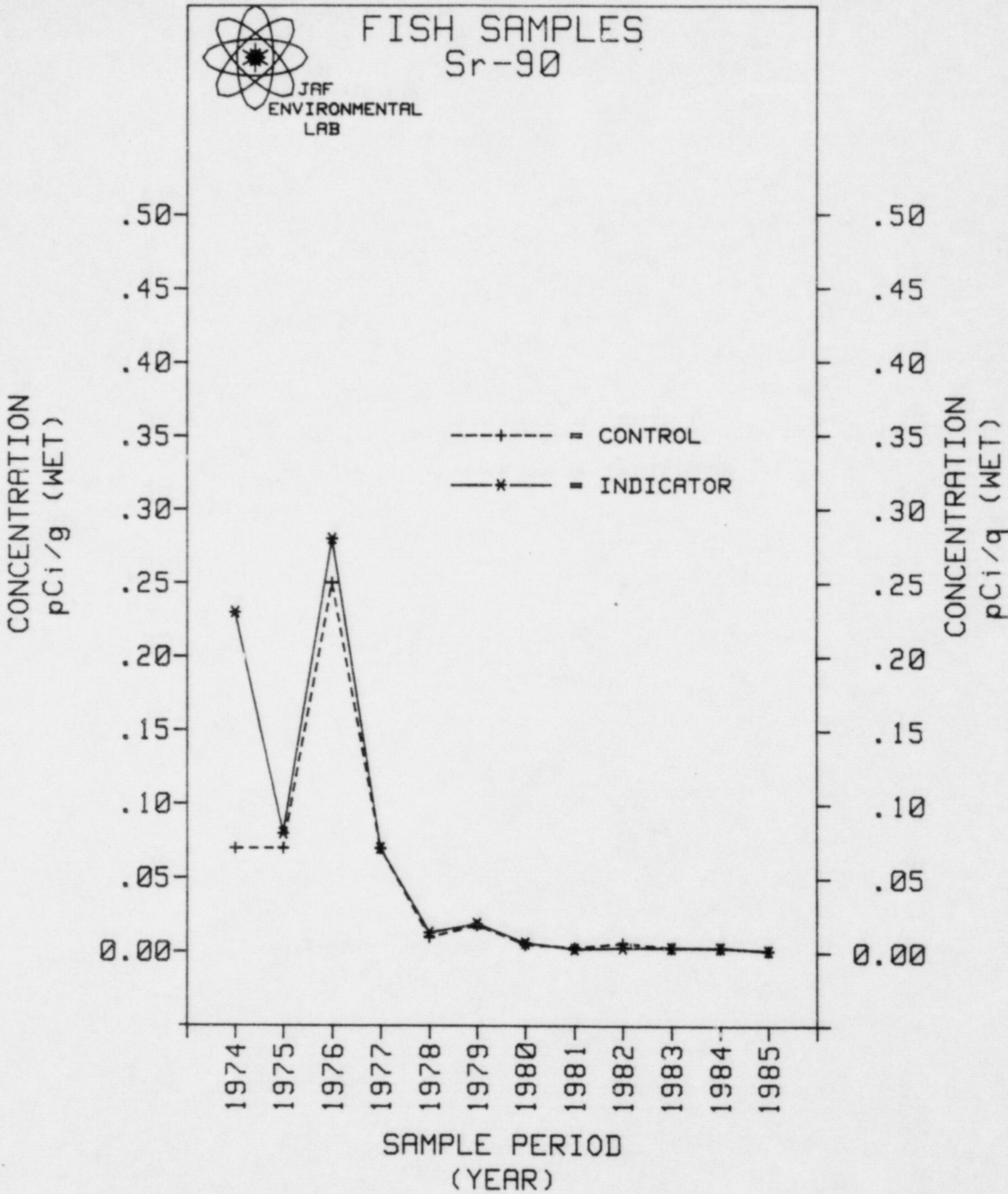
CONTROL DATA FOR 1976 IS MDL

FIGURE 16



CONTROL DATA FOR 1975 IS MDL; 1981 IS LLD

FIGURE 17



CONTROL DATA FOR 1981,1983-1984 ARE LLD

INDICATOR DATA FOR 1983-85 ARE LLD

FIGURE 18

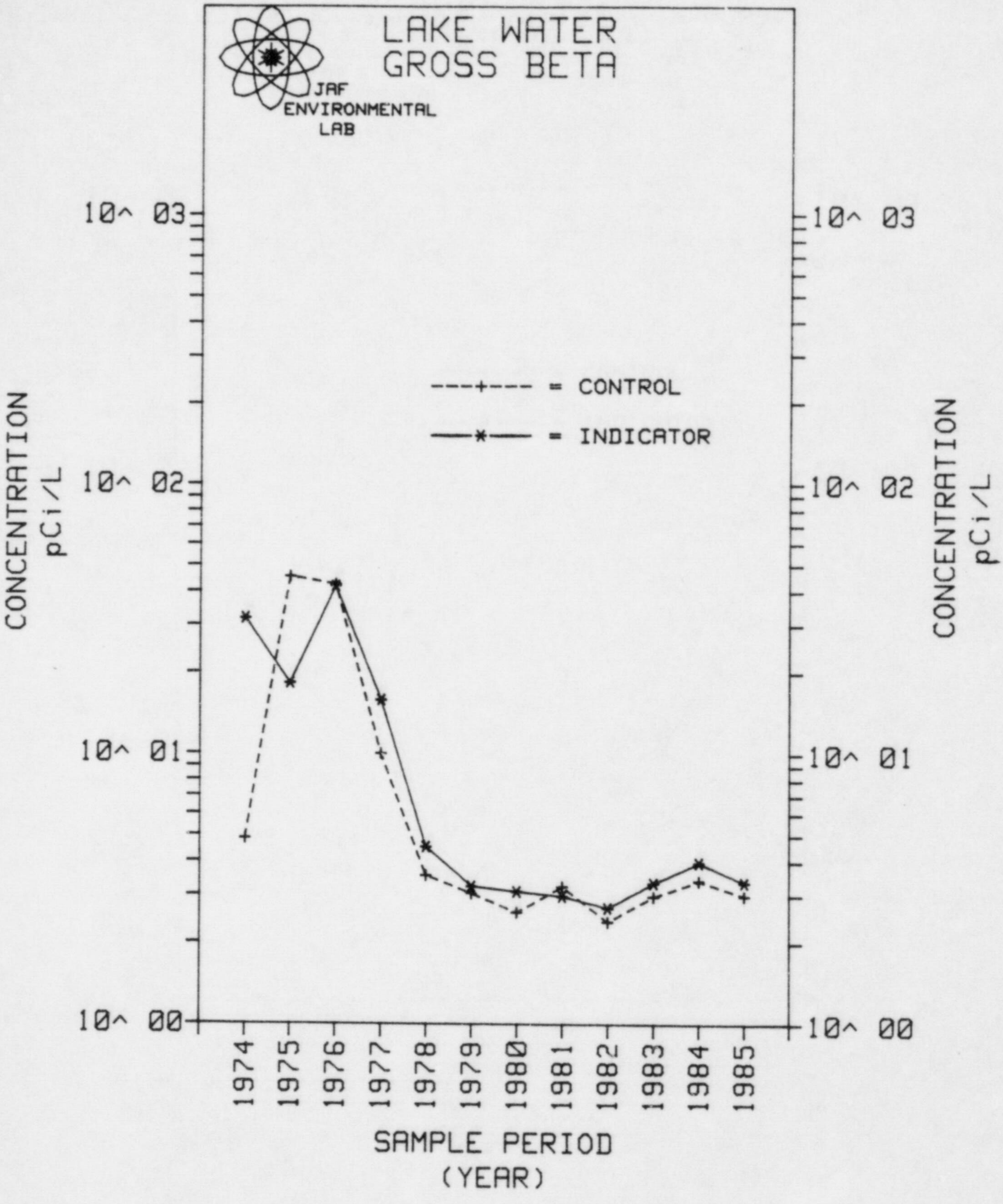

LAKE WATER
GROSS BETA
JAF
ENVIRONMENTAL
LAB
---+--- = CONTROL
---*--- = INDICATOR
CONCENTRATION
pCi/L
10^ 03
10^ 02
10^ 01
10^ 00
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
SAMPLE PERIOD
(YEAR)

FIGURE 19

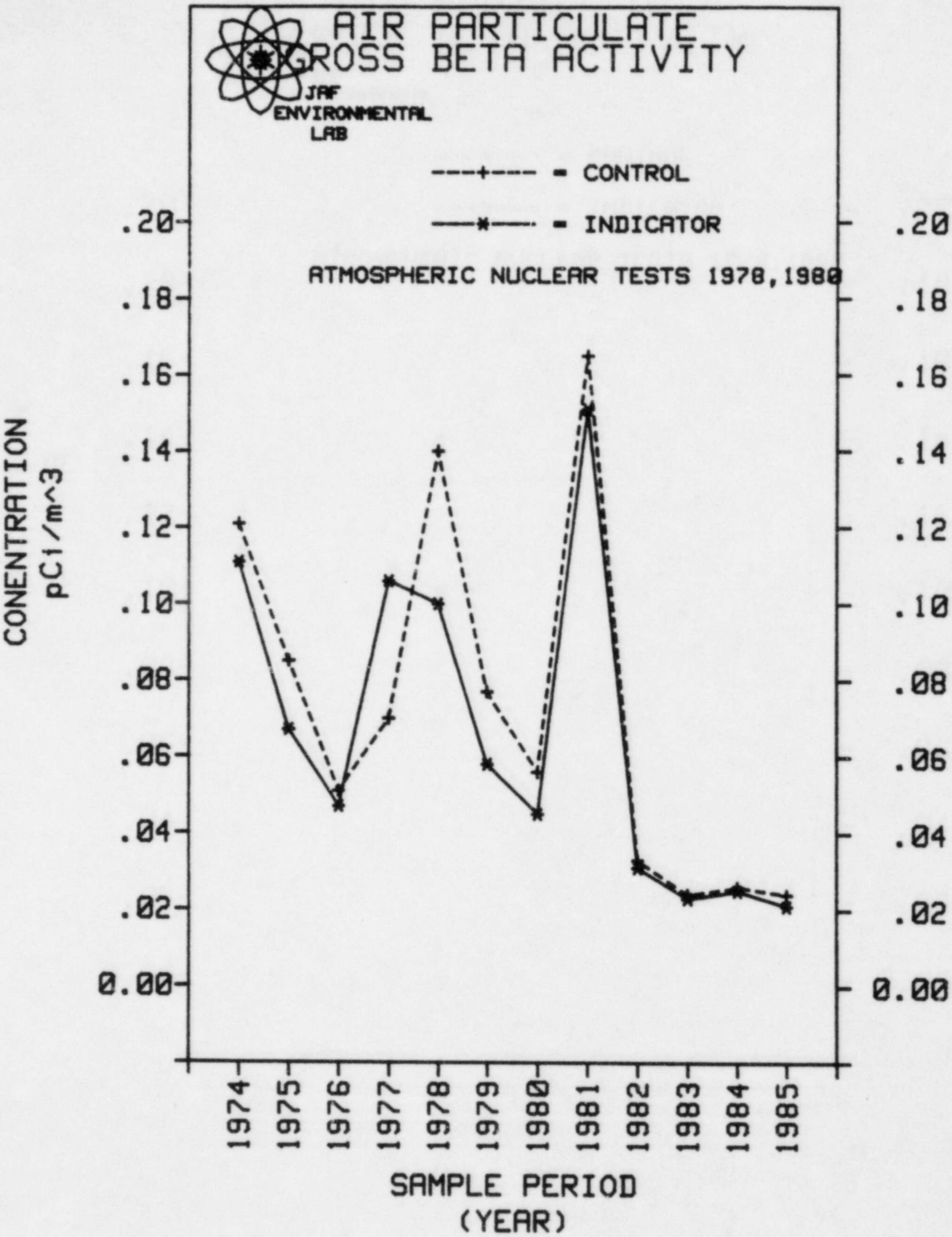

AIR PARTICULATE
GROSS BETA ACTIVITY
JAF
ENVIRONMENTAL
LAB
---+--- = CONTROL
---*--- = INDICATOR
ATMOSPHERIC NUCLEAR TESTS 1978,1980
CONENTRATION
pCi/m^3
CONCENTRATION
pCi/m^3
.20
.18
.16
.14
.12
.10
.08
.06
.04
.02
0.00
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
SAMPLE PERIOD
(YEAR)

FIGURE 20

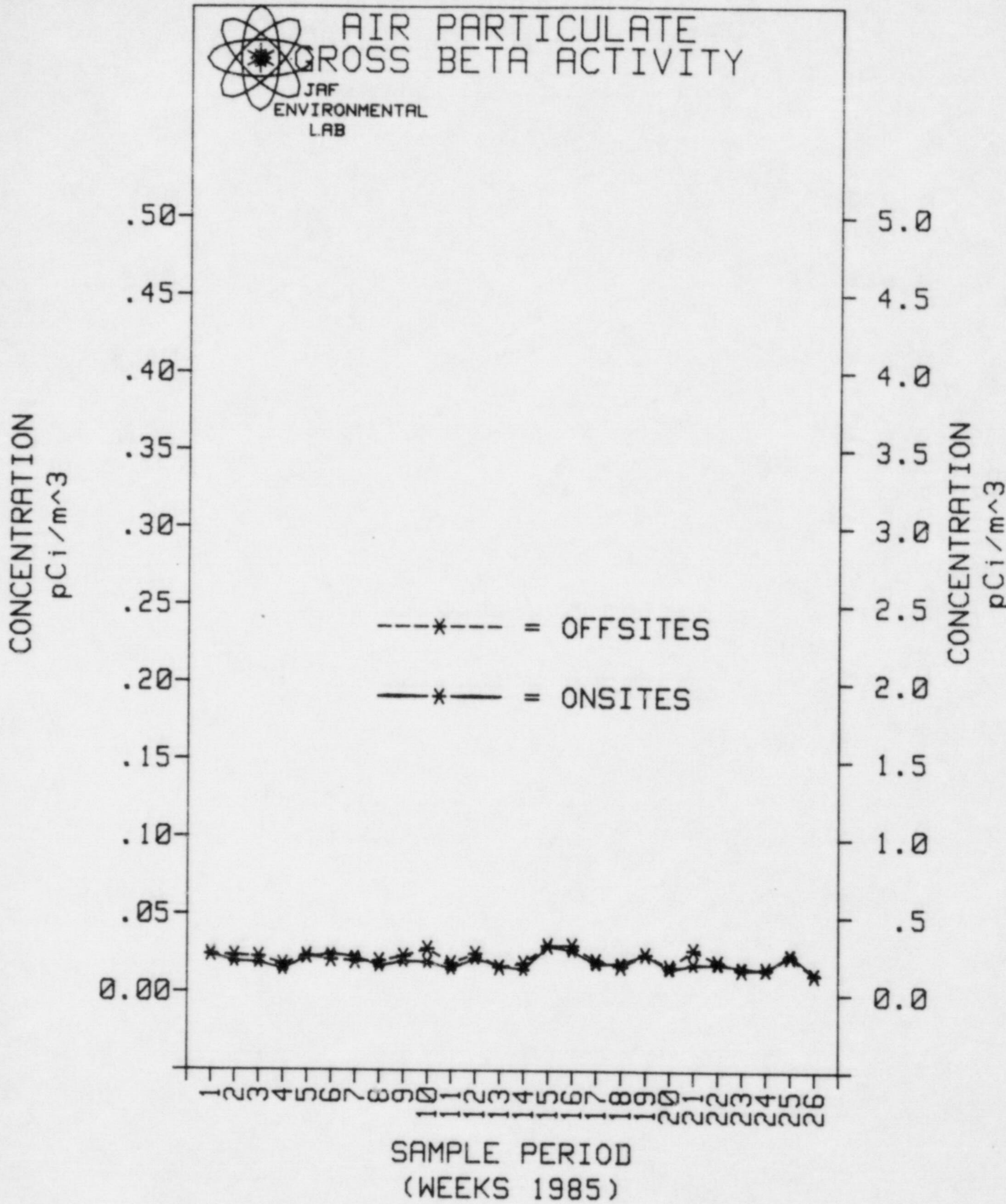

AIR PARTICULATE
GROSS BETA ACTIVITY
JAF
ENVIRONMENTAL
LAB
CONCENTRATION
pCi/m^3
.50
.45
.40
.35
.30
.25
.20
.15
.10
.05
0.00
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
.5
0.0
---*--- = OFFSITES
——*—— = ONSITES
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
SAMPLE PERIOD
(WEEKS 1985)

FIGURE 21

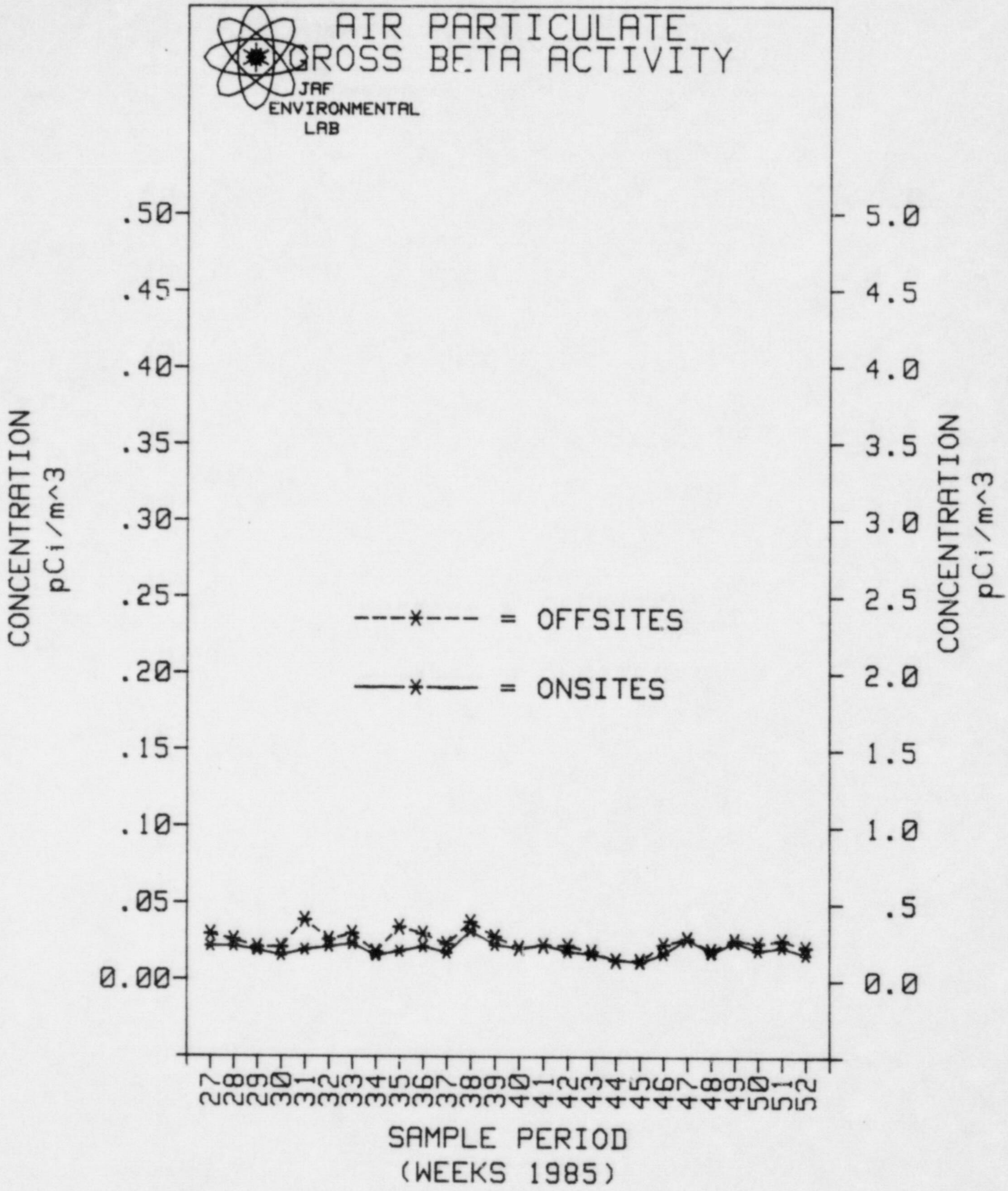

AIR PARTICULATE
GROSS BETA ACTIVITY
JAF
ENVIRONMENTAL
LAB
CONCENTRATION
pCi/m^3
.50
.45
.40
.35
.30
.25
.20
.15
.10
.05
0.00
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
.5
0.0
---*--- = OFFSITES
——*—— = ONSITES
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
SAMPLE PERIOD
(WEEKS 1985)

FIGURE 22

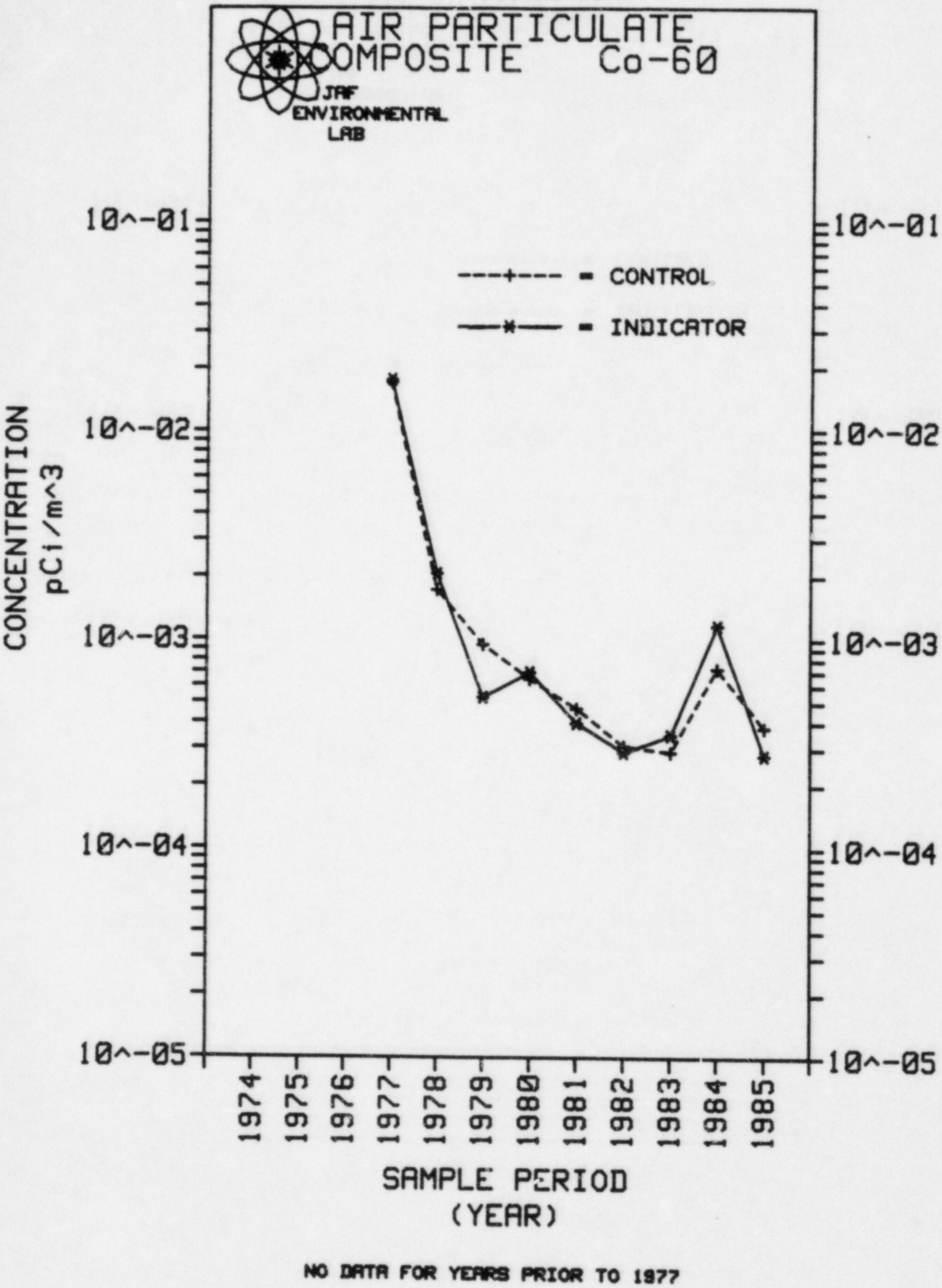
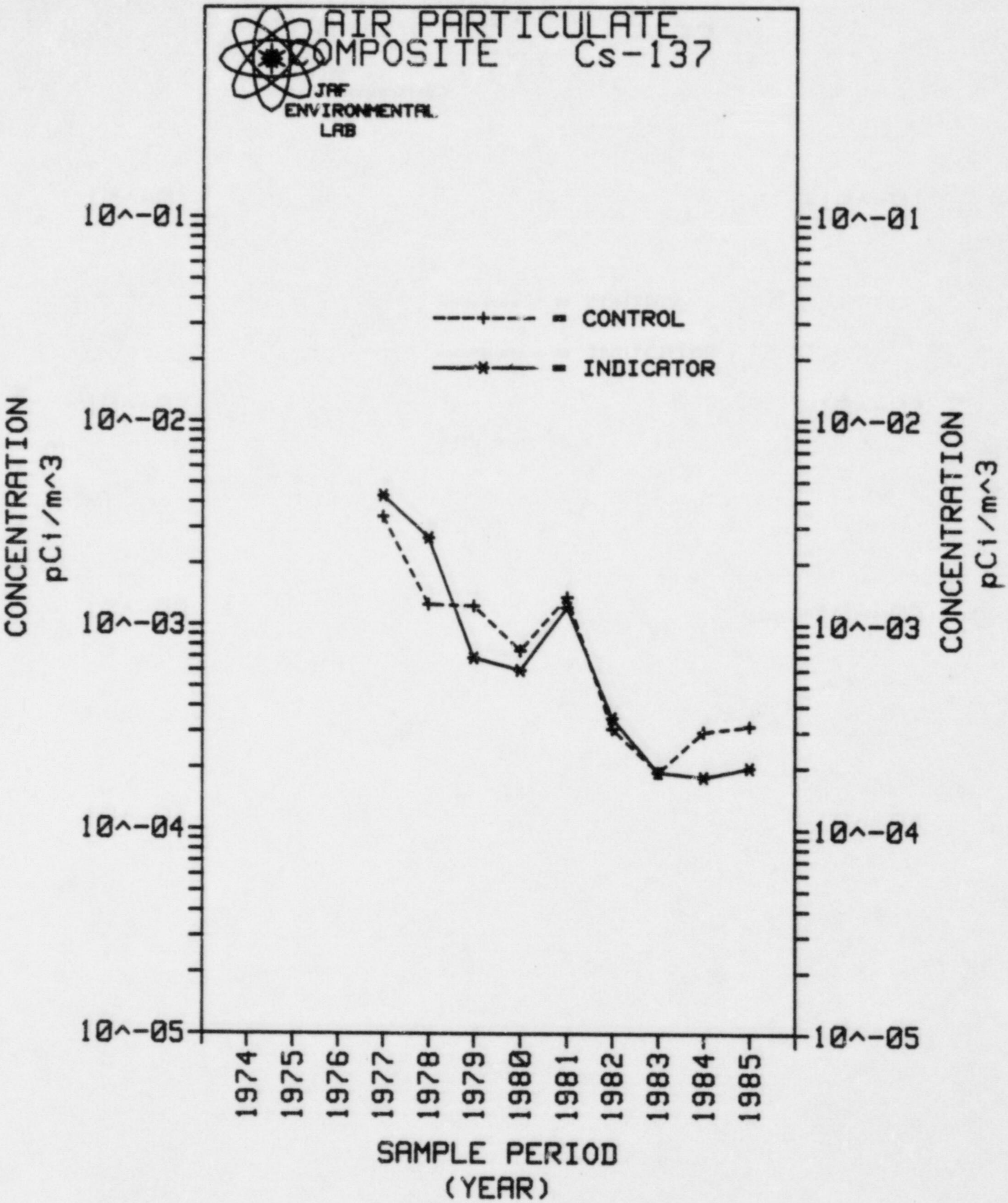
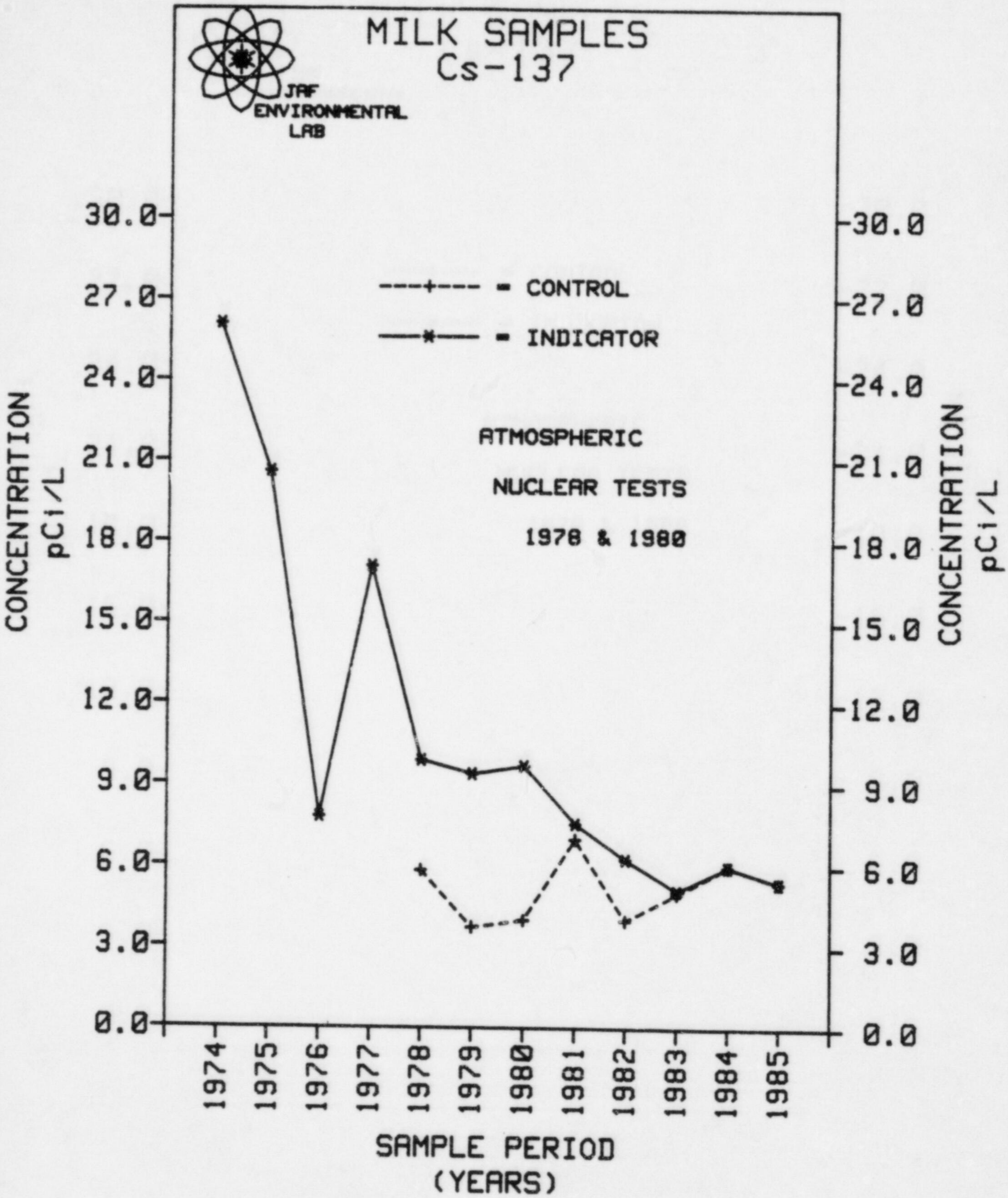

AIR PARTICULATE
COMPOSITE Co-60
JAF
ENVIRONMENTAL
LAB
CONTROL
INDICATOR
10^-01
10^-02
10^-03
10^-04
10^-05
CONCENTRATION
pCi/m^3
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
SAMPLE PERIOD
(YEAR)
NO DATA FOR YEARS PRIOR TO 1977

FIGURE 23



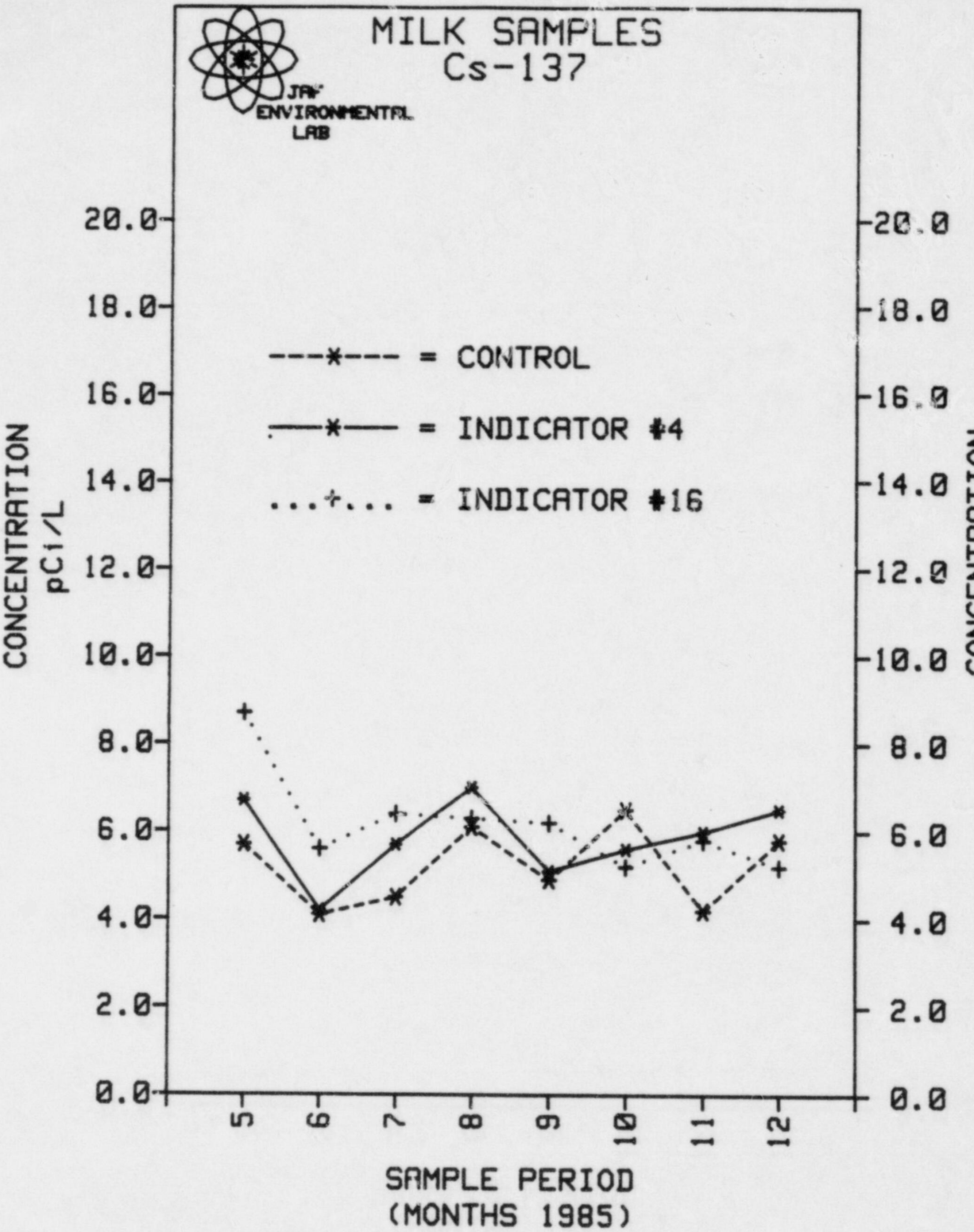
NO DATA FOR YEARS PRIOR TO 1977
CONTROL YEARS 1984-1985 ARE LLD's
INDICATOR YEAR 1985 IS LLD

FIGURE 24



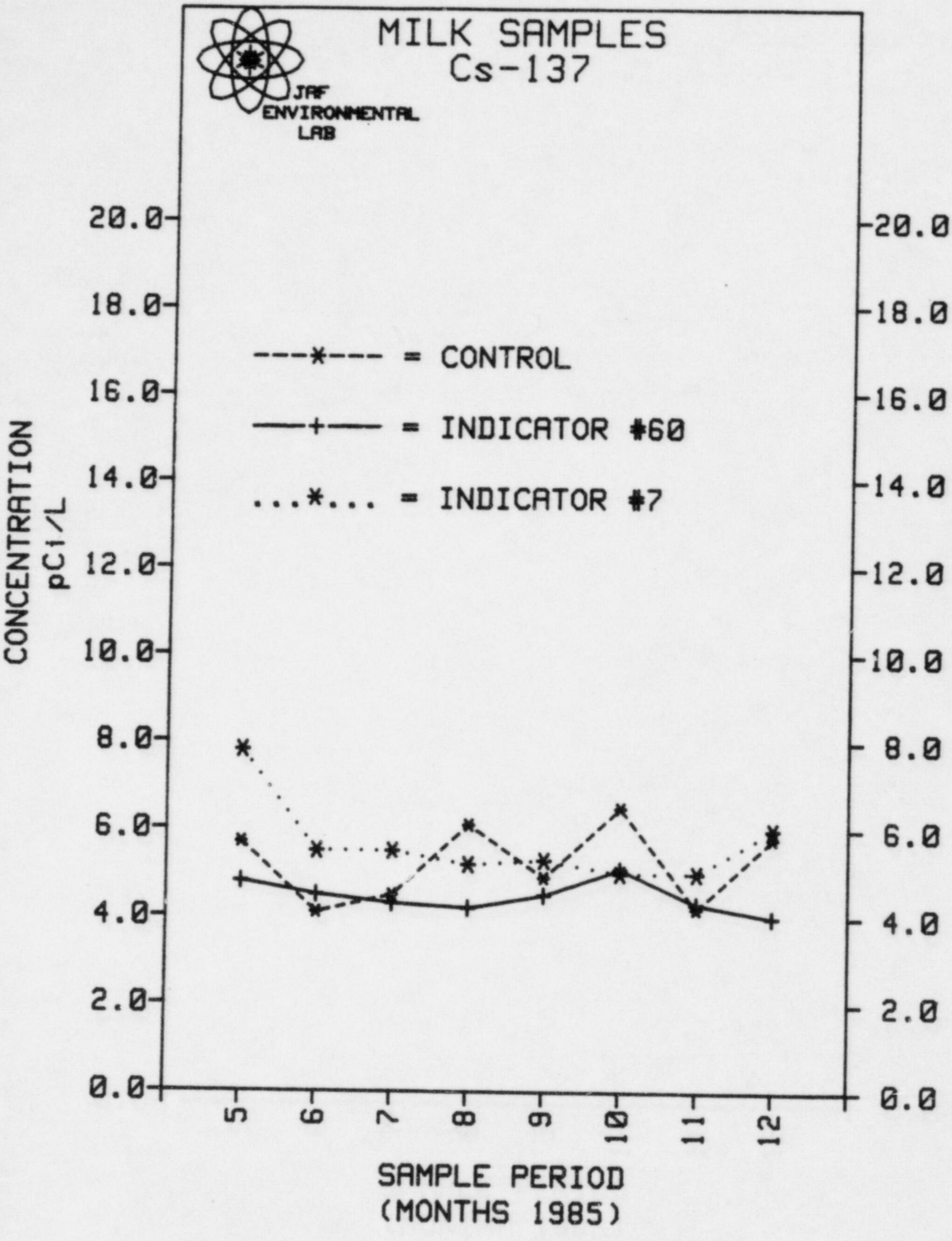
NO CONTROL DATA FOR YEARS 1974-1977
CONTROL DATA FOR YEARS 1980,1982-1985 ARE LLD's
INDICATOR DATA FOR 1984-1985 ARE LLD's

FIGURE 25



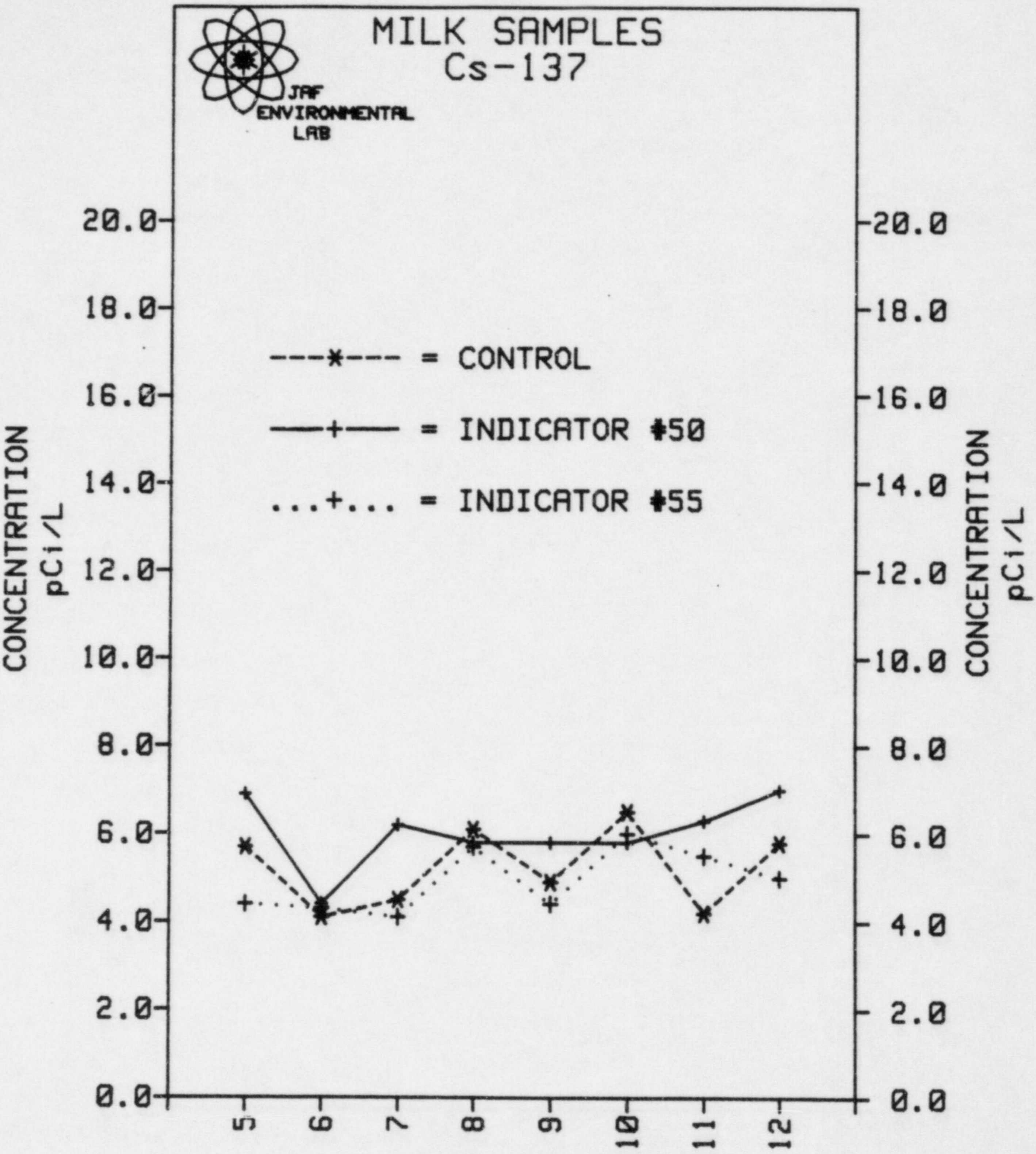
REFER TO TABLE #17 FOR EXACT DATA VALUES AND LLD OCCURRENCES

FIGURE 26



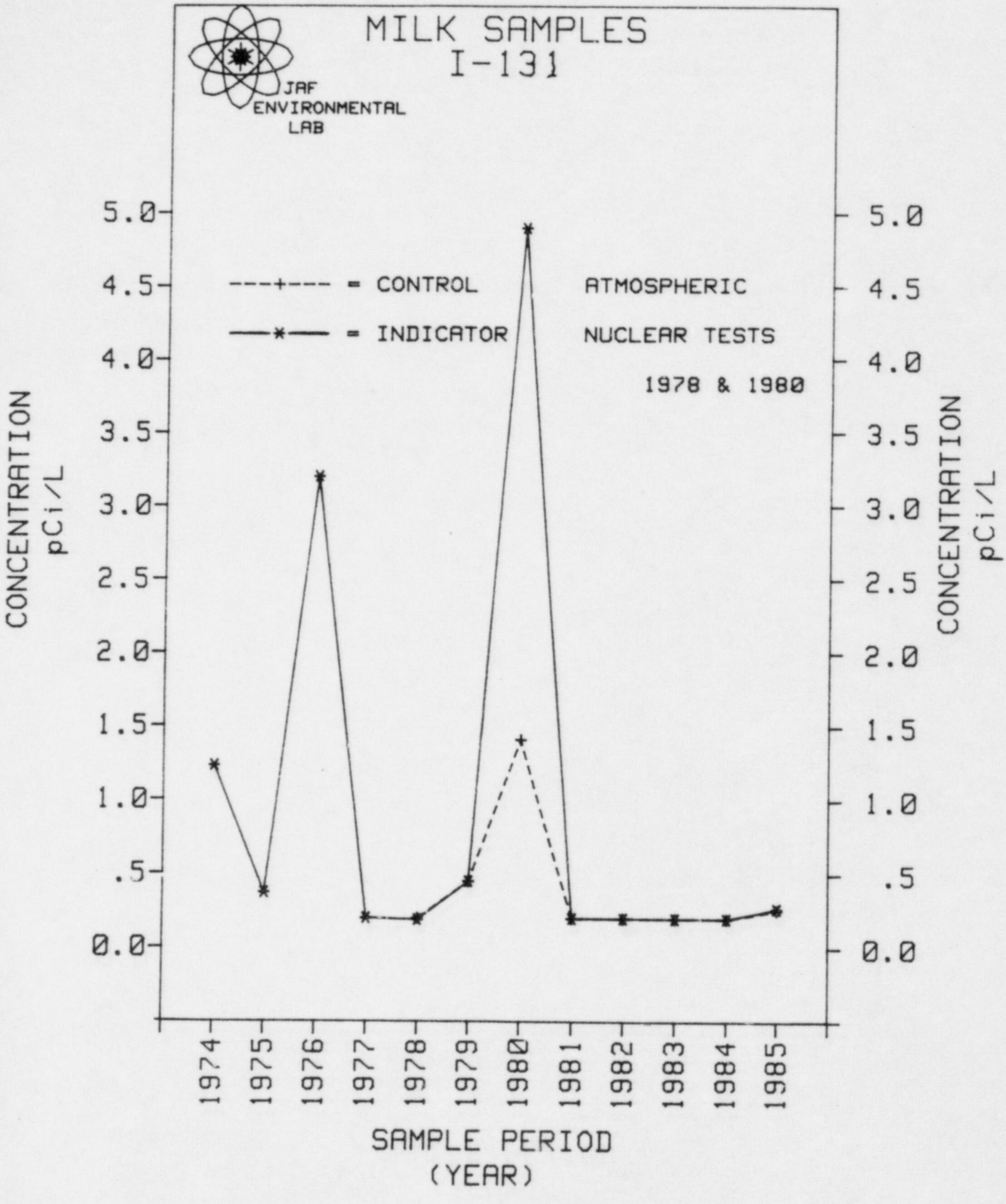
REFER TO TABLE #17 FOR EXACT DATA VALUES AND LLD OCCURRENCES

FIGURE 27



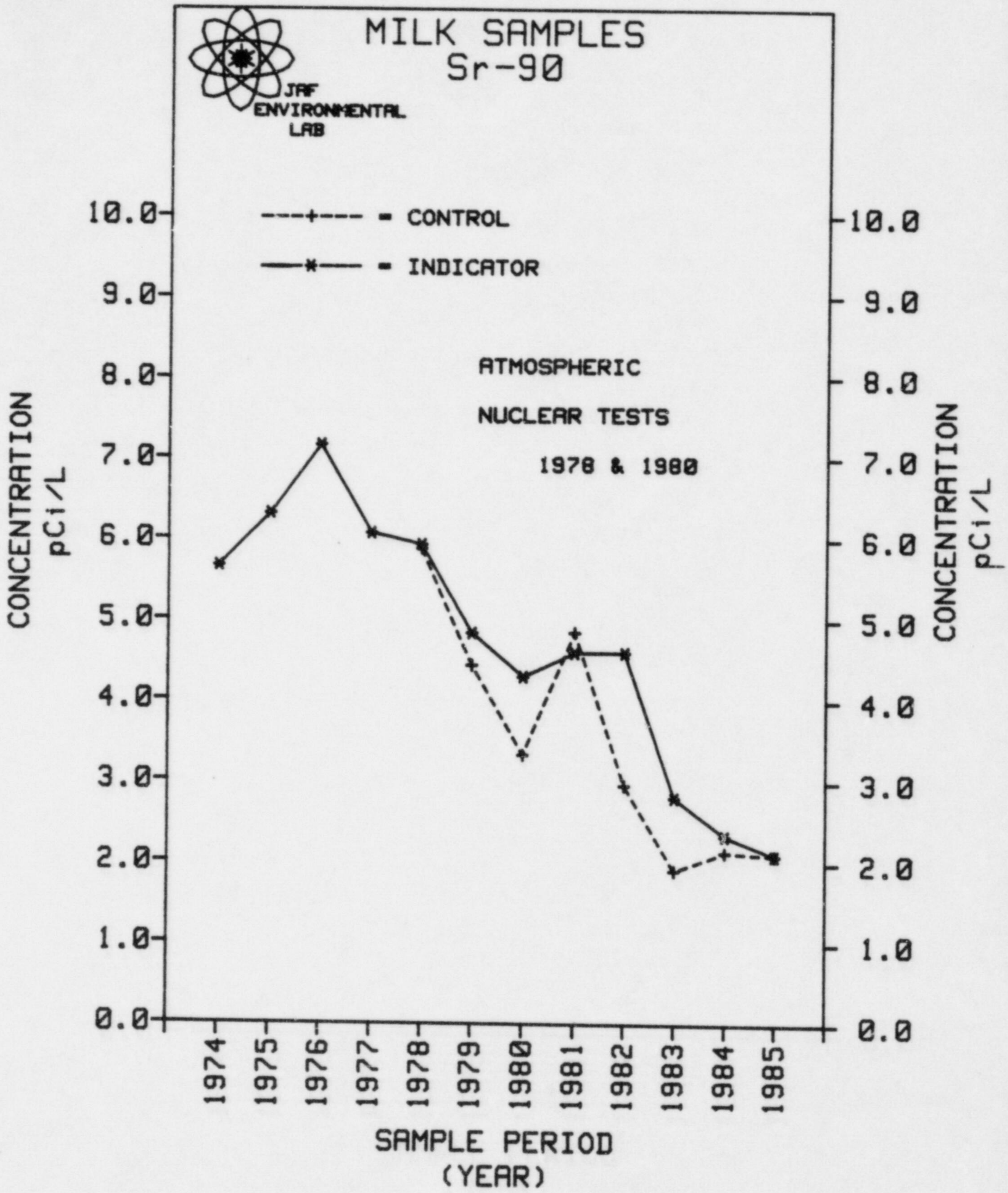
REFER TO TABLE #17 FOR EXACT DATA VALUES AND LLD OCCURRENCES

FIGURE 28



NO CONTROL DATA FOR 1974-1977
CONTROL DATA FOR 1978-79 ARE MDL's; 1981-85 ARE LLD's
INDICATOR DATA FOR 1979 IS MDL; 1981-85 ARE LLD's

FIGURE 29



NO CONTROL DATA FOR YEARS 1974-1977

VIII

USEPA ENVIRONMENTAL RADIOACTIVITY
LABORATORY INTERCOMPARISON STUDY PROGRAM

TABLE VIII-1

USEPA ENVIRONMENTAL RADIOACTIVITY LABORATORY
INTERCOMPARISON STUDY PROGRAM

Gross Beta Analysis of Water (pCi/L) and Air Particulate (pCi/filter)

DATE	JAF ENV ID NUMBER	MEDIUM	ANAYLSIS	JAF MEAN ± S.D.	EPA MEAN ± S.D.
1/85	QA85-6	WATER	BETA	15±2	15±9
3/85	QA85-18	WATER	BETA	13±2	15±9
3/85	QA85-23	APT	BETA	45±2	36±9
4/85	QA85-34	WATER (BLIND)	BETA	85±1	72±5
5/85	QA85-43	WATER	BETA	11±1	11±5
7/85	QA85-69	WATER	BETA	8±1	8±5
8/85	QA85-91	APT	BETA	60±6	44±5
9/85	QA85-99	WATER	BETA	8±5	8±5
11/85	QA85-126	WATER	BETA	13±1	13±5

TABLE VIII-2

USEPA ENVIRONMENTAL RADIOACTIVITY LABORATORY
INTERCOMPARISON STUDY PROGRAM

Trituim Analysis of Water (pCi/L)

DATE	JAF ENV ID NUMBER	MEDIUM	NUCLIDE	JAF MEAN ± S.D.	EPA MEAN ± S.D.
6/85	QA85-53	WATER	H-3	2633±100	2416±351
10/85	QA85-111	WATER	H-3	2000±200	1974±345

TABLE VIII-3

USEPA ENVIRONMENTAL RADIOACTIVITY LABORATORY
INTERCOMPARISON STUDY PROGRAM

Iodine Analysis of Water (pCi/L) and Milk (pCi/L)

DATE	JAF ENV ID NUMBER	MEDIUM	NUCLIDE	JAF MEAN ± S.D.	EPA MEAN ± S.D.
3/85	QA85-15	MILK	I-131	8±1	9±2
8/85	QA85-79	WATER	I-131	36±14	33±6
12/85	QA85-134	WATER	I-131	51±8	45±6

TABLE VIII-4

USEPA ENVIRONMENTAL RADIOACTIVITY
LABORATORY INTERCOMPARISON STUDY PROGRAM

Strontuim -89 and -90 Analysis of Milk, Water (pCi/L)
and Food Products (pCi/kg)

DATE	JAF ENV ID NUMBER	MEDIUM	NUCLIDE	JAF MEAN ± S.D.	EPA MEAN ± S.D.
1/85	QA85-1	WATER	Sr-89	<2.0	3±9
			Sr-90	26±1	30±3
1/85	QA85-3	FOOD	Sr-89	18±4	34±9
			Sr-90	25±2	26±3
4/85	QA85-34	WATER	Sr-89	9±2	10±5
		(BLIND)	Sr-90	15±1	15±2
5/85	QA85-35	WATER	Sr-89	33±1	39±5
			Sr-90	14±1	15±2
6/85	QA85-61	MILK	Sr-89	11±3	11±5
			Sr-90	10±1	11±2
7/85	QA85-70	FOOD	Sr-89	25±7	33±5
			Sr-90	28±2	26±2
9/85	QA85-96	WATER	Sr-89	21±1	20±5
			Sr-90	6±1	7±2
10/85	QA85-112	WATER	Sr-89	24±3	27±5
		(BLIND)	Sr-90	8±1	9±2
10/85	QA85-115	MILK	Sr-89	50±8	48±5
			Sr-90	23±2	26±2

TABLE VIII-5

USEPA ENVIRONMENTAL RADIOACTIVITY
LABORATORY INTERCOMPARISON STUDY PROGRAM

Gamma Analysis of Milk, Water (pCi/L)
Air Particulate (pCi/filter) and Food Products (pCi/kg)

DATE	JAF ENV ID NUMBER	MEDIUM	NUCLIDE	JAF MEAN ± S.D.	EPA MEAN ± S.D.
1/85	QA85-7	FOOD	I-131	44±11	35±10
			Cs-137	38±5	29±9
			K(*)	1220±120	1382±120
2/85	QA85-8	WATER	Cr-51	42±12	48±9
			Co-60	18±2	20±9
			Zn-65	53±5	55±9
			Ru-106	32±10	25±9
			Cs-134	29±2	35±9
			Cs-137	22±2	25±9
3/85	QA85-23	APT	Cs-137	8±2	6±9
4/85	QA85-34	WATER (BLIND)	Co-60	15±5	15±5
			Cs-134	17±5	15±5
			Cs-137	14±5	12±5
6/85	QA85-49	WATER	Cr-51	65±40	44±5
			Co-60	20±8	14±5
			Zn-65	52±16	47±5
			Ru-106	82±30	62±5
			Cs-134	35±8	35±5
			Cs-137	23±7	20±5
6/85	QA85-61	MILK	I-131	<20	11±6
			Cs-137	12±4	11±5
			K(*)	1367±140	1525±76
7/85	QA85-70	FOOD	I-131	38±3	35±6
			Cs-137	33±4	29±5
			K(*)	1346±130	1514±76

(*) Reported as mg/L of Potassium for EPA results, and pCi/Units for JAF results.

TABLE VIII-5
(CONTINUED)
USEPA ENVIRONMENTAL RADIOACTIVITY
LABORATORY INTERCOMPARISON STUDY PROGRAM

Gamma Analysis of Milk, Water (pCi/L)
Air Particulate (pCi/filter) and Food Products (pCi/kg)

DATE	JAF ENV ID NUMBER	MEDIUM	NUCLIDE	JAF MEAN ± S.D.	EPA MEAN ± S.D.
8/85	QA85-91	APT	Cs-137	10±2	8±5
10/85	QA85-108	WATER	Cr-51	45±25	21±5
			Co-60	22±5	20±5
			Zn-65	29±11	19±5
			Ru-106	41±25	20±5
			Cs-134	18±5	20±5
			Cs-137	20±4	20±5
10/85	QA85-112	WATER	Co-60	20±3	18±5
		(BLIND)	Cs-134	18±4	18±5
			Cs-137	22±3	18±5
10/85	QA85-115	MILK	I-131	33±3	42±6
			Cs-137	58±6	56±5
			K(*)	1250±130	1540±77

(*) Reported as mg/L of Potassium for EPA results, and pCi/Units for JAF results.