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Joseph M. Farley Nuclear Plant
Annual Environmental Operating Report –Radiological

Ladies and Gentlemen:

The enclosed "Annual Environmental Operating Report, Part B: Radiological" for 1994, is transmitted in accordance with the Joseph M. Farley Nuclear Plant Unit 1 and Unit 2 Technical Specifications Section 6.9.1.8 and 6.9.1.9.

If you have any questions, please advise.

Respectfully submitted,

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WHO/clt:enviorad.doc

Enclosure

cc: Mr. S. D. Ebneter
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ALABAMA POWER COMPANY

ANNUAL ENVIRONMENTAL OPERATING REPORT

PART B: RADIOLOGICAL

JOSEPH M. FARLEY NUCLEAR PLANT

UNIT NO. 1

LICENSE NO. NPF-2

AND

UNIT NO. 2

LICENSE NO. NPF-8

PERIOD ENDING DECEMBER 31, 1994

ANNUAL ENVIRONMENTAL OPERATING REPORT
PART B: RADIOLOGICAL

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JOSEPH M. FARLEY NUCLEAR PLANT

UNITS 1 AND 2

I. Introduction

The Joseph M. Farley Nuclear Plant, owned by Alabama Power Company (APCo) and operated by Southern Nuclear Operating Company (SNC), located in Houston County, Alabama is approximately fifteen miles east of Dothan, Alabama on the west bank of the Chattahoochee River. Unit 1, a Westinghouse Electric Corporation Pressurized Water Reactor (PWR) with a rated power output of 860 megawatts electrical (MWe) achieved initial criticality on August 9, 1977. The unit was declared "commercial" on December 1, 1977. Unit No. 2, also a 860 MWe Westinghouse PWR, achieved initial criticality on May 8, 1981 and was declared "commercial" on July 30, 1981.

Unit I was shutdown for its twelfth refueling outage from March 5, 1994 through April 24, 1994.

The Farley Nuclear Plant Environmental Monitoring Program is designed to detect the effects, if any, of plant operation on environmental radiation levels. The sample collection and analysis schedule was implemented in 1977, and modified on July 1, 1980, by adding 14 TLD stations. The program was further modified in April 1982, by Amendment No. 26 to the Unit I Technical Specifications. The program was changed a third time in 1989, with the addition of two more control TLDs and has continued through 1994 without further change. Indicator sampling stations are located, where practical, at locations where detection of the radiological effects of the plant's operation is thought to be most likely, where the samples collected should provide a significant indication of potential dose to man, and where an adequate comparison of predicted radiological levels might be made with measured levels. The control stations are placed at locations where radiological levels are not expected to be significantly influenced by plant operation, i.e., at background locations. For some airborne radioactivity samples, community stations are located at the principal population centers between the indicator and the control stations (3-5 miles). Community TLDs were placed at locations approximately 1.2 miles southwest of the plant site (nearest occupied residence) and 8 miles west southwest of the plant site (City of Ashford, Alabama). A community air monitoring station is also located in the city of Ashford. Community stations could be used, if desired, as additional control stations, and alternatively, as indicator stations for the nearest population centers in the event of a major airborne release from the plant.

II. Radiological Sampling and Analysis

To assess the environmental impact of plant operation, the Farley Nuclear Plant Environmental Monitoring Program monitors airborne, waterborne, ingestion and direct radiation pathways in the area surrounding the plant site. Table 1 details the sample types, collection and analysis frequency and locations of indicator, community and control stations. For each sample type and location, one sample was collected and analyzed to meet Technical Specification requirements for Units I and II. In situ soil monitoring was discontinued in 1994 as it is no longer required by Technical Specifications.

The samples were collected by Southern Nuclear's technical staff except for fish and river sediment samples. The fish and river sediment samples were collected by Alabama Power Company (APCo) Environmental Field Services personnel. All sample analyses were contracted to the Georgia Power Environmental Lab. The minimum detectable concentration (MDC), specified for the various samples and their respective analyses are given in Table 2. The reporting levels for radioactivity concentrations in environmental samples are provided in Table 3. Sampling and analysis deviations during 1994 are listed in Table 4.

To identify the locations of environmental monitoring stations, the area surrounding Farley Nuclear Plant is divided into sixteen radial sectors whose common origin is the point midway between the Unit I and Unit II plant vent stacks. This point is defined as "the plant site". Each sector of the resulting circle is numbered sequentially clockwise and the circle is oriented so that the centerline of sector 16 is due north. Each sampling point is identified by a four digit number. The first two digits indicate the sector number, and the last two digits indicate the distance, to the nearest mile, from the origin. For example, TLD station 0304 is located 4 miles east northeast of the plant site. Fish and sediment sample points are identified by their "river mile" location. The Jim Woodruff Dam near Chattahoochee, Florida is designated as river mile zero, and the miles are numbered sequentially northward along the navigable portion of the river to Columbus, Georgia. River mile 41 is approximately three miles downstream of the plant site, and river mile 47 is approximately three miles upstream.

A. Airborne Particulates and Iodine

The airborne particulate and iodine monitoring stations shown in Figures 1 and 3 are equipped with FN-210B air samplers manufactured by Science Applications International Corporation (SAIC). Each air sampler is a modular unit consisting of a sample pump, regulator valve assembly, a microprocessor based air volume totalizer, an open faced combination filter holder and a thermostatically controlled exhaust fan, all mounted in a ventilated aluminum weather house. In March 1993, electrical surge protectors were installed on all air monitoring stations. A 47 millimeter particulate filter and a 50 millimeter F&J activated charcoal cartridge are installed in separate compartments of the combination filter holder, which is mounted vertically on the pump suction. Sampled air flows vertically from top to bottom, first through the particulate filter, then through the charcoal cartridge. To compensate for dust buildup on the sample filters, the regulator valve assembly, located downstream of the combination filter holder, maintains a constant sample flowrate over a wide range of pressure differentials across the filters.

The design of the filter holder allows uniform distribution of sampled airborne particulates over the entire filter disk. The totalizers are calibrated using the SAIC Model C-812 calibrator.

Particulate filters and charcoal cartridges were collected weekly and sent to GPC lab for radioactivity analysis. Gross beta radioactivity measurements were performed on each air particulate filter using a low background gas flow proportional counting system. The filters from each station, composited at the end of each quarter, were analyzed for gamma emitters using either a twenty percent or forty percent relative efficiency EG & G intrinsic germanium detector system.

All air monitoring station locations shown in Figures 1 and 3 have the capability of monitoring airborne iodine. Weekly routine samples were analyzed for I-131 by the GPC Environmental lab using either a twenty percent or forty percent relative efficiency EG & G intrinsic germanium detector system.

B. External Radiation

Environmental TLDs are processed for external radiation using Panasonic UD-814 TLDs and UD-710A TLD readers. Replicate (3) elements of CaSO, encased in 860 mg cm2 of plastic and lead are used as the primary detector. Each field location contains two TLDs, therefore utilizing six elements of CaSO. Each badge is permanently sealed in a 10 mg/cm2 plastic bag to protect it from moisture. The mean and standard deviation is reported for each badge and field location. On the plant site, all TLD packets were kept in a lead safe with 2-inch walls except for those receiving field exposure or those in the process of being exchanged.

At each external radiation monitoring station (shown in Figures 1-3), two TLDs changed and read quarterly, were exposed side-by-side on metal stakes at a height of one meter above the ground. For the computation of the net field doses, a log of all exposure periods was maintained for each TLD packet.

C. Milk

The milk sample location is as indicated on Figure 3. All milk samples, collected bi-weekly, were analyzed by GPC for I-131 and gamma emitters. As a preservative for shipment, 1 ml of 25 weight percent mercurithiolate (Thimerosal) solution was added to each one gallon sample until November 22, 1994. Starting with the November 22 sample, the milk was no longer chemically preserved, but was maintained cold and shipped via over night express. The elimination of the preservative removed the need for correction for its addition in the analytical process, as well as making the preservation process consistent with Plants Vogtle and Hatch, whose milk samples are also analyzed at the Georgia Power Lab. The I-131 concentration in each sample was determined by collection on anion exchange resin, elution with sodium perchlorate, followed by precipitation as silver iodide and counting on a beta-gamma coincidence counter or the low background gas flow proportional counter. Stable iodide carrier was added to each sample for determination of the radiochemical yield. The concentration of stable iodine present in the sample before carrier addition was also determined and accounted for in the chemical yield determination.

One liter of each sample was placed in a marinelli beaker and analyzed for gamma emitters using either a twenty percent or forty percent relative efficiency EG & G Ortec intrinsic germanium detector system.

D. **Vegetation: Forage**

Monthly, forage was collected from indicator grass plots located near the air monitoring stations at the plant site perimeter in the SSE and N sectors, or alternate plots if needed, and from a control grass plot located near the air monitoring station in Dothan, Alabama. Vegetation samples were chopped to a smaller size, mixed well, then an approximate 200g sample aliquot of the wet sample was placed in a 0.45 liter marinelli beaker and analyzed for gamma emitters using either a twenty percent or forty percent relative efficiency EG & G Ortec intrinsic germanium detector system.

E. **Surface (River) Water**

Weekly, samples of water from the Chattahoochee River, upstream and downstream of the plant site at the locations shown in Figure 4 were collected on a semi-continuous basis with Instrumentation Specialties Company (ISCO) samplers. For each 28-day surveillance interval, one liter of each week's background and indicator samples were combined to make 4-liter composite samples which were sent to GPC Environmental Lab for radioactivity analysis. One liter of each sample was placed in a marinelli beaker and analyzed for gamma emitters using either a twenty percent or forty percent relative efficiency EG & G Ortec intrinsic germanium detector system.

For each calendar quarter, 75 milliliters (ml) of each week's indicator and background samples were combined to make a 975 milliliter composite sample for tritium analysis. River water quarterly composite samples were analyzed for tritium by distilling an aliquot of the sample along with sodium hydroxide and potassium permanganate. An aliquot of the distilled sample was mixed with liquid scintillation cocktail and analyzed for tritium on a Beckman LS7800 Liquid Scintillation Counter with the window settings and sample size optimized for tritium.

F. Ground (Well) Water

In the Farley Plant area there are no true indicator sources of groundwater. A well which serves Georgia Pacific Paper Company as a source of potable water, located on the east bank of the Chattahoochee River about four miles south-southeast of the plant, was sampled quarterly as an indicator station. A deep well which supplies water to the Whatley residence located about 1.2 miles southwest of the plant was sampled quarterly as a control (background) station. Samples from both were sent to the GPC lab for radioactivity analysis. Ground water samples were analyzed for tritium by distilling an aliquot of the sample along with sodium hydroxide and potassium permanganate. An aliquot of the distilled sample was mixed with liquid scintillation cocktail and analyzed for tritium on a Beckman LS7800 Liquid Scintillation Counter with the window settings and sample size optimized for tritium. Ground water samples were analyzed for low level I-131 by precipitating one liter of sample as palladium iodide and counting the final palladium iodide precipitate on a beta-gamma coincidence counter or the low background gas flow proportional counter. One liter of each sample was placed in a marinelli beaker and analyzed for gamma emitters using either a twenty percent or forty percent relative efficiency EG & G Ortec intrinsic germanium detector system.

G. Fish (River)

Semi-annually, two types of fish, game and bottom feeding, were collected from the Chattahoochee River at the locations shown in Figure 4, and sent to GPC for gamma-ray spectroscopy analysis. All fish samples sent to GPC consisted of fish fillets that had been split with Alabama Division of Radiation Control. These fish samples were chopped to a smaller size, mixed well, then an approximate 450g aliquot of the sample was placed in a 0.45 liter marinelli beaker and analyzed for gamma emitters using either a twenty percent or forty percent relative efficiency EG & G Ortec intrinsic germanium detector system.

H. Sediment (River)

Semi-annually, sediment samples were collected from the Chattahoochee River at the locations shown in Figure 4. Approximately one kilogram of each sample was sent to the GPC lab where it was dried, ground and mixed and an approximate 450g aliquot was placed in a 0.45 liter marinelli beaker and analyzed for gamma emitters using either a twenty percent or forty percent relative efficiency EG & G Ortec intrinsic germanium detector system.

III. Results and Discussion

No known atmospheric nuclear tests were conducted during 1994

Attachment 2 , Plots of Selected Environmental Data, is included as an enhancement to trending. In general, the mean annual concentrations of frequently identified isotopes were chosen to be plotted. In cases where many naturally occurring isotopes were identified, those chosen to be plotted were from differing decay chains. Significant uptrends in the data were as follows:

(1) Atmospheric Tests, Peoples Republic of China:

September 17, 1977
March 14, 1978
December 14, 1978
October 15, 1980

(2) Chernobyl Disaster, USSR, April 1986

A. Airborne Particulates and Iodines

Analysis results of airborne particulate filters and cartridges are shown in Tables 1994-1 and 1994-2, and Attachment 2, pages 1-4. The 1994 results remained below pre-operational levels, and showed a slight decrease in mean Beta activity while Beryllium-7 activity continued to increase. The 1992 Annual Environmental Operating Report documented step increases in these two parameters following the installation of new air monitoring stations in May 1992. The mean activities for these parameters in 1994 (0.019 pCi/m3 Beta, 0.076 pCi/m3 Beryllium-7) were consistent with mean activities observed from June through December 1992 (0.021 pCi/m3 Beta, 0.061 pCi/m3 Beryllium-7). As expected, these parameters appear to be stabilizing and will continue to be monitored for future trends.

The nominal MDC values for all parameters except charcoal cartridge I-131 showed increases after contracting the analyses to the Georgia Power Environmental Lab beginning in January 1993. All MDC values remained well within ODCM requirements.

As stated in Paragraph II A, in September 1993, the Gelman VM-1 Metricel membrane filters used for airborne particulate sampling since 1977 were replaced with Gelman A/E glass fiber filters. Following installation of the new air monitors in 1992, the membrane filters were found to clog and rupture occasionally. Ruptured filters were observed more frequently during the summer months, when high ambient temperatures and humidities prevailed. Review of product information and literature documented a "high resistance to airflow" and "brittleness" as undesirable characteristics of membrane filters and indicated that glass fiber filters are generally more desirable for use in sampling airborne particulates. The Gelman A/E glass fiber filter was selected for use in the FNP Radiological Environmental Monitoring Program (REMP) after comparison with other filters on the basis of flowrate, particle size retention, and cost. This filter is also used by the other nuclear generating plants in the Southern Company for sampling airborne particulates. There have been no instances of damaged filters since the change, and analytical results have been more consistent, with less variance between sampling stations than previously observed.

Deviations from the Environmental Monitoring Program resulting from airborne particulate and iodine analysis are given in Table 4.

B. External Radiation

The results of the external radiation measurements are shown in Table 1994-3 and Attachment 2 page 5. Mean external gamma exposure measured in 1994 was less than in 1993 and slightly greater than during the pre-operational period. The highest mean annual exposure to a single location, 87.5 mR, was again measured at station RI-0401, located on the plant perimeter 0.8 miles east of the midpoint between the Unit I and Unit II plant vent stacks. This represents a decrease from the 1993 value (94.9 mR). The mean external gamma exposures for all stations are consistent with previously observed annual variations, and no significant differences in indicator, community and control measurements were noted.

Deviations from the Environmental Monitoring Program resulting from external radiation measurements are given in Table 4.

C. Milk

The milk analysis results are shown in Table 1994-4 and Attachment 2, pages 6-8. Through 1993 Lewis Dairy had been used as the control location. In December 1993 Mr. Lewis indicated that he no longer wished to allow milk sampling. In January 1994 an agreement was reached with Mr. Bruce Ivey, owner of Ivey Dairy (Green Valley Farms), Webb, Alabama to allow sampling at his dairy. Beginning February 14, 1994 all control milk samples were from Ivey Dairy. There were no indicator samples in 1994. The 1994 results are consistent with those of previous years, and Potassium-40 was the only isotope detected in milk samples.

No deviations from the Environmental Monitoring Program resulted from milk sample analysis.

D. Vegetation

Forage analysis results are shown in Table 1994-5 and Attachment 2, pages 9-12. The 1994 results are below pre-operational levels and consistent with the downward trends of recent years. The control samples collected August 2, 1994 and October 24, 1994 contained 25.2 pCi/m3 and 21.8 pCi/m3 Cs-137 activity. These values are below pre-operational levels and are not considered significant since Cesium 137 has been shown to be present in the soil throughout the area. Mean Beryllium-7 activity increased in both the indicator and control samples but remained well below preoperational levels.

No deviations from the Environmental Monitoring Program resulted from forage sample analysis.

E. Soil

The in situ soil analysis was discontinued in 1994 since there is no requirement that this be performed.

F. Waterborne (Surface Water)

The surface water analysis results are shown in Table 1994-7 and in Attachment 2, pages 15-17. In years prior to 1994 the indicator samples (and occasionally the control sample) have shown tritium levels greater than MDC. Also prior to 1994, the MDC for tritium was approximately 100 pCi/l. In 1994, all tritium samples were shown to be less than an MDC of 271.5 pCi/l. Although the MDC for 1994 is higher than previous years, it is less than the levels of tritium which were measured in the indicator samples in both 1992 and 1993 (see Attachment 2, page 15), and still considerably lower than the ODCM requirement of 2000 pCi/l (drinking water pathway limit).

Deviations from the Environmental Monitoring Program occurred on 7-5-94 and 8-16-94 and are given in Table 4.

G. Waterborne (Ground Water)

The ground water analysis results are shown in Table 1994-8 and in Attachment 2, pages 18-20. No measurable activity from man-made isotopes was detected in ground water samples in 1994.

No deviations from the Environmental Monitoring Program resulted from ground water analysis.

H. River Sediment

River Sediment results are shown in Table 1994-9 and in Attachment 2, pages 21-24. Activity from several natural isotopes was identified in both the control and indicator samples. Cesium-137 was identified in both the Spring and Fall indicator samples and in the Spring control sample. The identified presence of Cesium-137 can be attributed to the fact that the nominal MDC for Cesium-137 decreased from 42.25 pCi/m3 in 1993 to 6.3 pCi/m3 in 1994 when the Georgia Power Environmental Lab began contracting the analyses. The mean Cesium-137 activity for 1994 (29 pCi/m3) is below the nominal MDC for 1993 (42.25 pCi/m3).

No deviations from the Environmental Monitoring Program resulted from river sediment analysis.

I. Game Fish (River)

The analysis results of edible portions of Chattahoochee River game fish are shown in Table 1994-10 and in Attachment 2, page 25. Cesium 137 activity was detected in both the spring and fall indicator and background samples. Detected activity was below pre-operational levels and consistent with established trends.

No deviations from the Environmental Monitoring Program resulted from game fish analysis.

J. Bottom-Feeding Fish (River)

Analysis results of edible portions of Chattahoochee River bottom-feeding fish are shown in Table 1994-11 and in Attachment 2, page 26. Cesium-137 activity was detected in the spring and fall indicator sample. Detected activity was below pre-operational levels and consistent with current trends.

No deviations from the Environmental Monitoring Program resulted from bottom feeding fish analysis.

IV. Land Use Census and Interlaboratory Comparison Program

A. Land Use Census and Milk Animal Survey

The Land Use Census and Milk Animal Survey was completed on June 17, 1994. The results are given in Attachment I.

No deviations from the Environmental Monitoring Program occurred as a result of the Land Use Census and Milk Animal Survey.

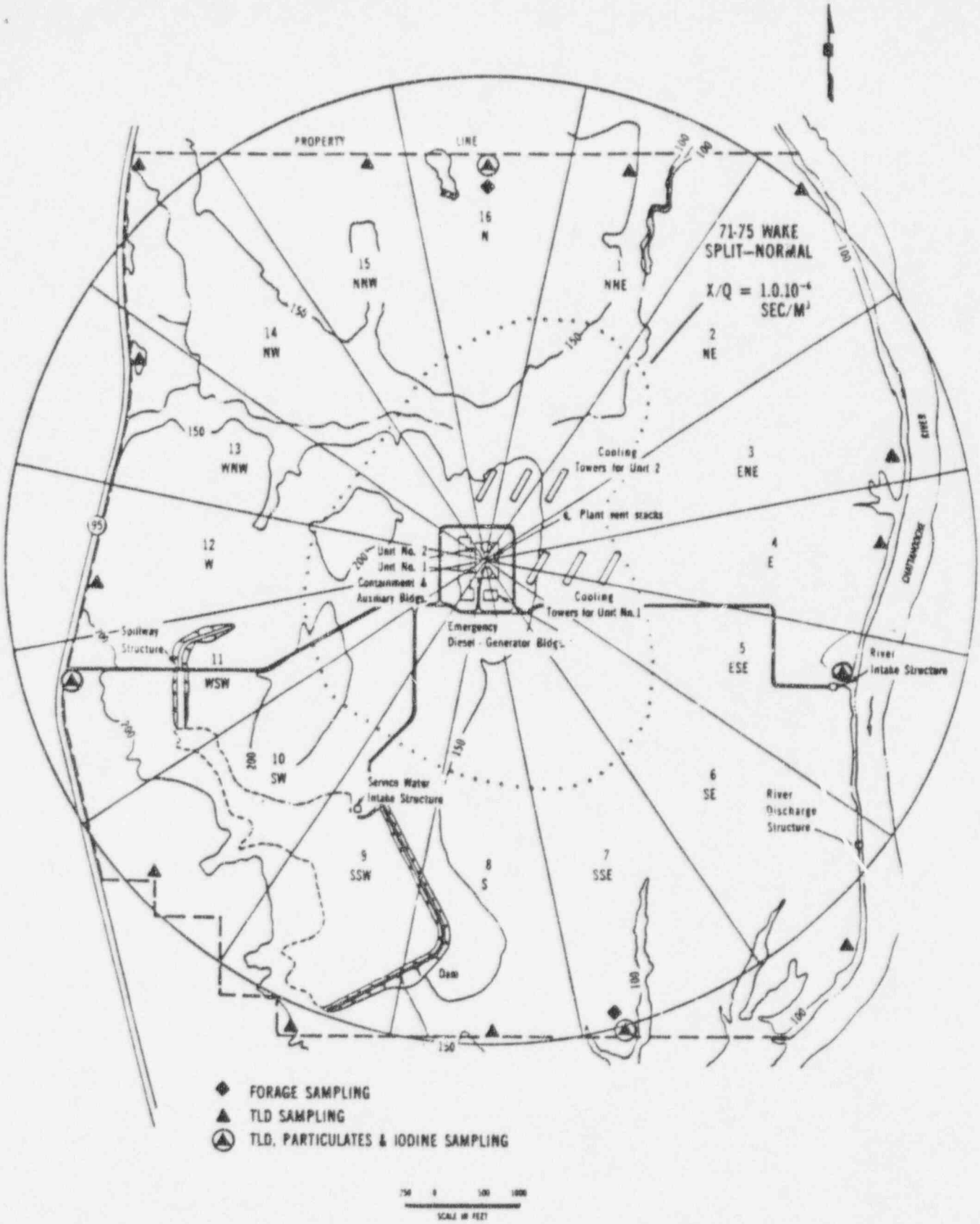
B. Interlaboratory Comparison Program

During 1994, the Georgia Power Environmental Lab as a participant in the EPA Crosscheck Program. The Georgia Power Environmental Lab EPA Program code designation is MQ.

V. Data Trends and Conclusion

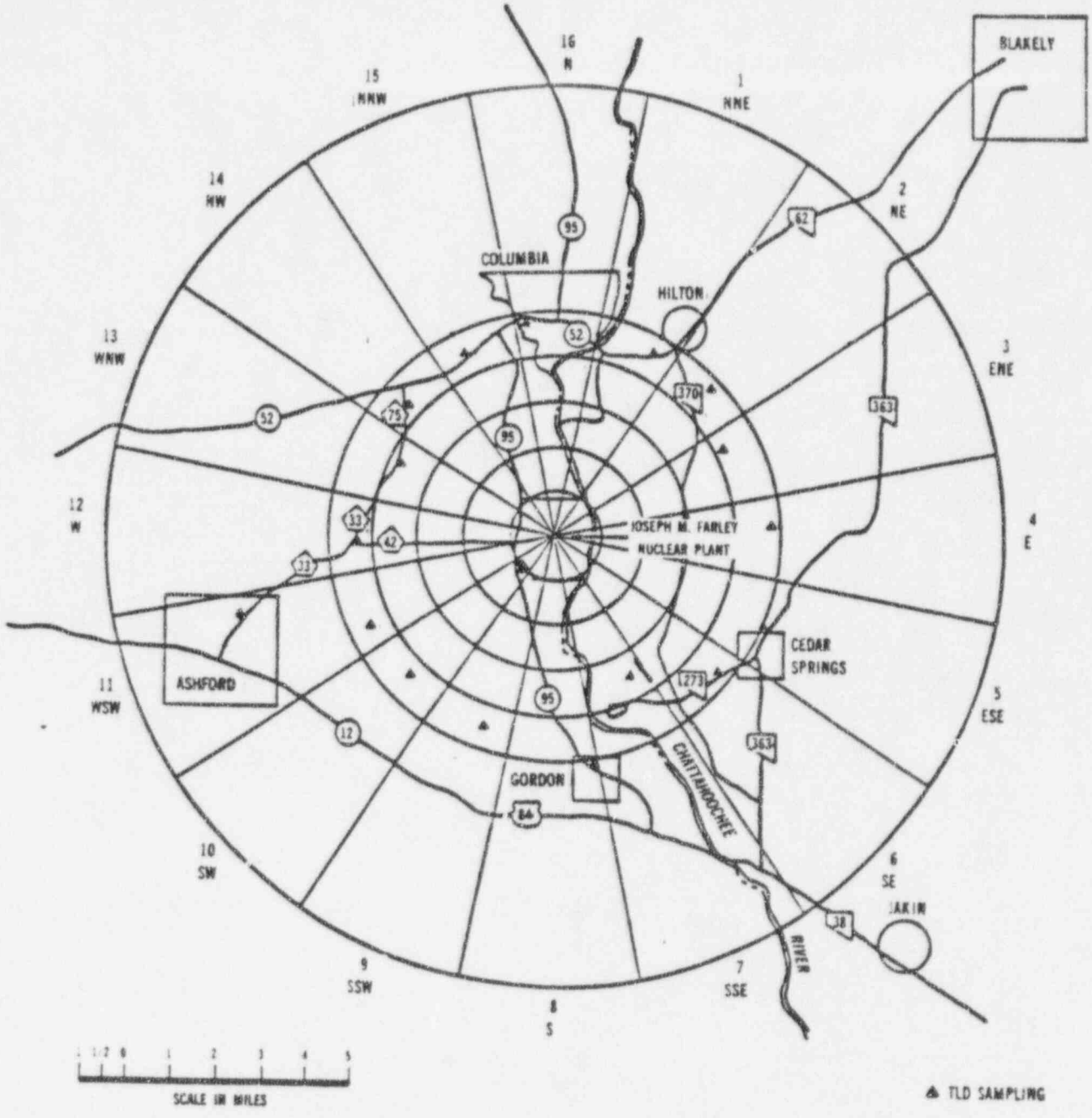
Review of the data trends from the pre-operational period through 1994 indicates that environmental radiation levels measured in all the pathways monitored in 1994 remained at background levels and were consistent with pre-operational levels. Cesium-137 was identified in river sediment, and game and bottom feeding fish but is not significant because Cesium-137 is known to occur in the environment, and was shown at levels below the MDCs of previous years.

It is noteworthy that the contract lab changed in 1994 from the University of Georgia to the Georgia Power Environmental Lab. As a result, MDCs of some analyses showed changes over MDC trends of previous years. All MDCs remained well below ODCM required limits. All data collected in 1994 continue to demonstrate that operation of Farley Nuclear Plant has had no detrimental affect on the environment.



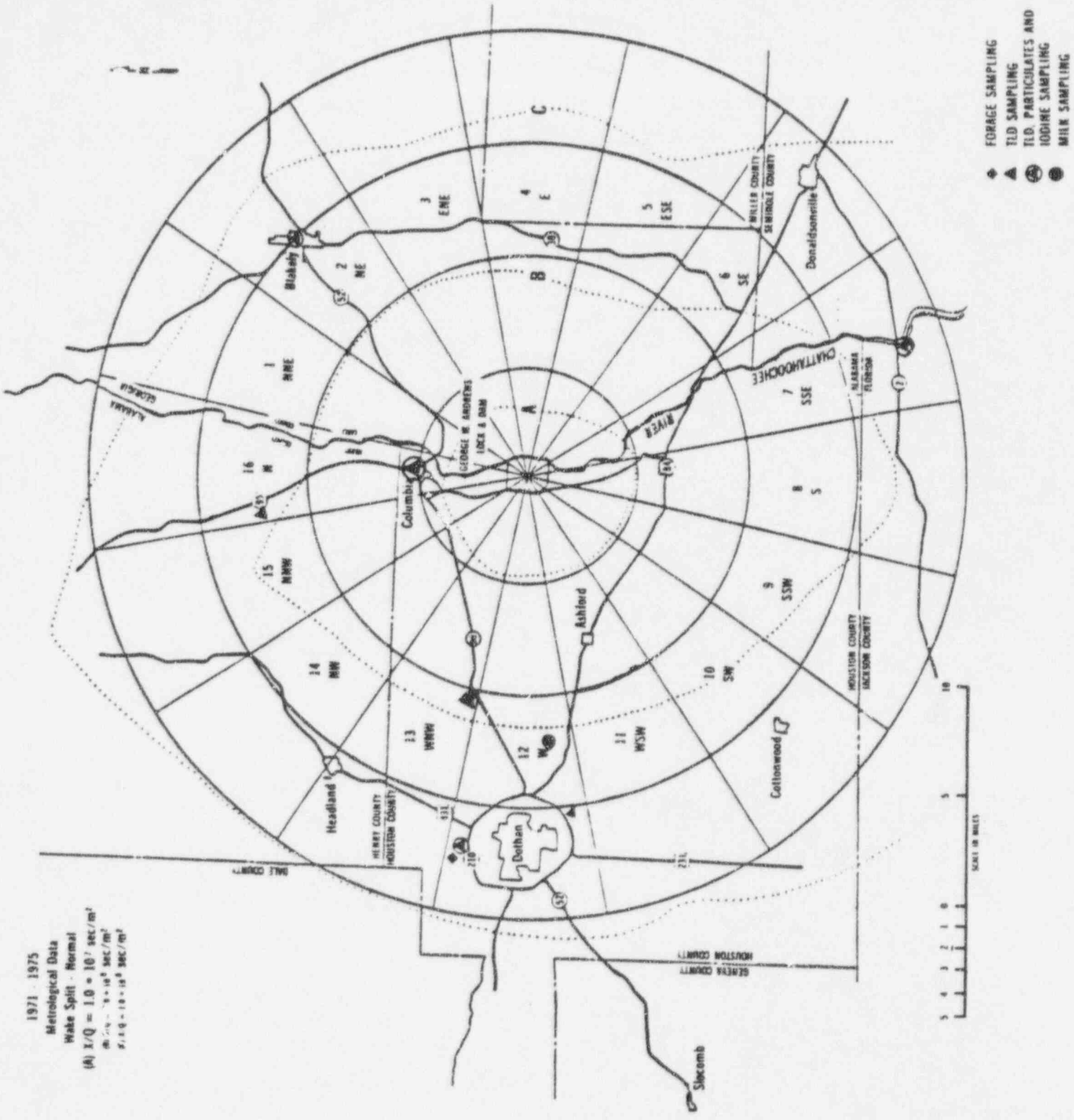
INDICATOR SAMPLING LOCATIONS FOR AIRBORNE/DIRECT ENVIRONMENTAL RADIOACTIVITY AT THE FARLEY NUCLEAR PLANT

FIGURE 1



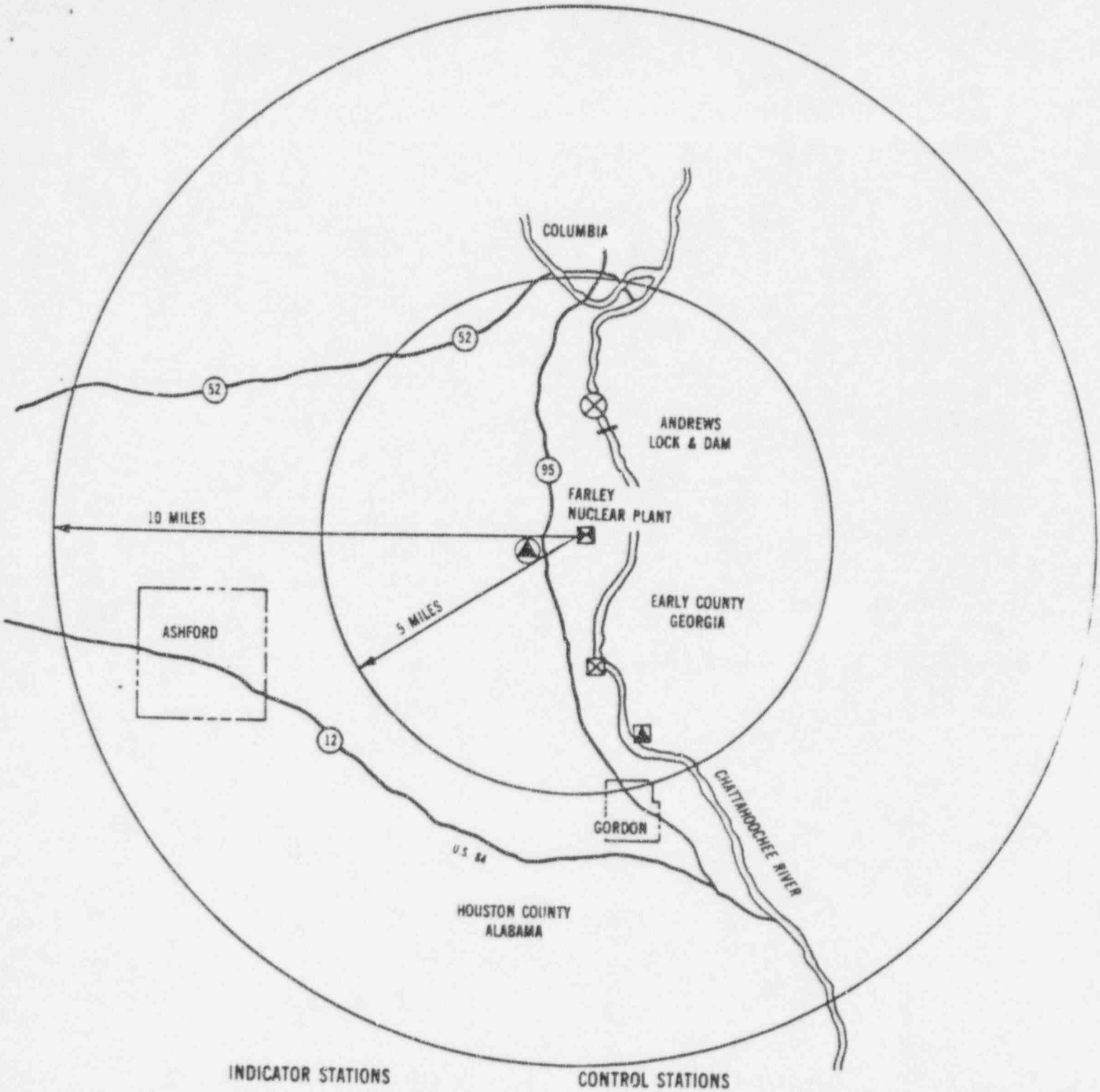
COMMUNITY (INDICATOR II) SAMPLING LOCATIONS FOR DIRECT RADIATION IN THE FARLEY NUCLEAR PLANT AREA.

FIGURE 2



CONTROL SAMPLING LOCATIONS FOR AIRBORNE/DIRECT ENVIRONMENTAL RADIOACTIVITY IN THE FARLEY NUCLEAR PLANT AREA

FIGURE 3



INDICATOR AND CONTROL SAMPLING LOCATIONS FOR WATERBORNE ENVIRONMENTAL RADIOACTIVITY IN THE FARLEY NUCLEAR PLANT AREA

FIGURE 4

TABLE 1

OUTLINE OF OPERATIONAL RADIOLOGICAL ENVIRONMENTAL
MONITORING PROGRAM FOR FARLEY NUCLEAR PLANT DURING 1994

Types of Samples and Sampling Locations (Distances Given in Miles)	Sampling and Collection Frequency	Type and Frequency of Analysis
AIRBORNE		
Particulates	Continuous operation of sampler with sample collection being performed once per 7 days.	Particulate sampler Analyze for gross beta radioactivity ≥ 24 hours following filter change. Perform gamma isotopic analysis on each sample when gross beta activity is >10 times the yearly mean of control samples. Perform gamma isotopic analysis on composite (by location) sample at least once per 92 days.
Indicator Stations: North Perimeter (N-0.8) South Perimeter (SSE-1.0) Plant Entrance (WSW-0.9) River Intake Structure (ESE-0.8)		
Community Stations: Columbia, AL. (N-5) Georgia Pacific Paper Co. (SSE-3) Ashford, AL. (WSW-8)		
Control Stations: Blakely, GA. (NE-15) Dothan, AL. (W-18) Neals Landing, FL. (SSE-18)		
Iodine	Continuous sampler operation with charcoal canister collection performed once per 7 days.	Radioiodine canister Analyze at least once per 7 days for I-131.
Indicator Stations: North Perimeter (N-0.8) South Perimeter (SSE-1.0) Plant Entrance - (WSW-0.9) River Intake Structure (ESE-0.8)		

TABLE 1 (con'd)

Types of Samples and Sampling Locations (Distances Given in Miles)	Sampling and Collection Frequency	Type and Frequency of Analysis
Community Stations:		
Georgia Pacific Paper Co. (SSE-3)		
Control Stations:		
Blakely, GA. (NE-15) Dothan, AL. (W-18) Neals Landing, FL. (SSE-18)		
DIRECT RADIATION	At least once per 92 days	Gamma dose Readout at least once per 92 days
Indicator I Stations:		
Sixteen stations, one in each meteorological sector along the plant perimeter (N-0.8, NNE-0.9, NE-1.0, ENE-0.9, E-0.8, ESE-0.8, SE-1.1, SSE-1.0, S-1.0, SSW-1.0, SW-0.9, WSW-0.9, W-0.8, WNW-0.8, NW-1.1, and NNW-0.9).		
Indicator II (Community) Stations:		
Sixteen stations: At least one in each meteorological sector at a distance of 3-5 miles (NNE-4, NE-4, ENE-4, E-5, ESE-5, SE-5, SSE-3, S-5, SSW-4, SW-5, WSW-4, W-4, WNW-4, NW-4, NNW-4, and N-5).		
Special Interest Stations: Occupied residence nearest the plant site (SW-1.2) City of Ashiord, AL (WSW-8.0)		

TABLE 1 (con'd)

Types of Samples and Sampling Locations (Distances Given in Miles)	Sampling and Collection Frequency	Type and Frequency of Analysis
Control Stations: Blakely, GA. (NE-15) Neals Landing, FL. (SSE-18) Dothan, AL. (W-18) Dothan, AL. (W-15) Webb, AL. (WNW-11) Haleburg, AL. (N-12)		
WATERBORNE		
Surface Water Indicator Station: Paper Mill at Cedar Springs, GA (3 miles downstream of plant discharge, River Mile-40) Control Station: Upstream of Andrews Lock and Dam (≈3 miles upstream of plant intake, River Mile-47)	Composite taken with proportional semi-continuous sampler, having a minimum sampling frequency not exceeding two hours collected over a period ≤ 31 days.	Monthly gamma isotopic analysis of each composite sample. Tritium analysis of each composite sample at least once per 92 days.
Ground Water Indicator Station: Paper Mill at Cedar Springs, GA, Well (SSE-4) Control Station: Whatley Residence, Well (SW-1.2)	Grab sample taken at least once per 92 days.	Gamma isotopic and tritium analyses of each sample once per quarter.

TABLE 1 (con'd)

Types of Samples and Sampling Locations (Distances Given in Miles)	Sampling and Collection Frequency	Type and Frequency of Analysis
River Sediment	Grab sample taken at least once per 184 days.	Gamma isotopic analysis of each sample twice per year.
Indicator Station:		
Downstream of plant discharge at Smith's Bend (River Mile - 41)		
Control Station:		
Upstream of plant discharge at Andrews Lock & Dam Reservoir (River Mile - 47)		
INGESTION		
Milk		
Control Staton:		
Ivey Dairy (Green Valley Farms) Webb, AL. (W-12)	At least once per 16 days	Gamma isotopic and I-131 analysis of each bi-weekly sample when animals are on pasture.
Fish		
Indicator Station:	One sample each of the following species at least once per each season (March 15 - May 15 and September 15 - November 15) 1. Game Fish 2. Bottom Feeding Fish	Gamma isotopic analysis on edible portions once per season.
Downstream of plant discharge in vicinity of Smith's Bend (River Mile - 41)		

TABLE 1 (con'd)

Types of Samples and Sampling Locations (Distances Given in Miles)	Sampling and Collection Frequency	Type and Frequency of Analysis
Control Station: Upstream of plant discharge in Andrews Lock & Dam Reservoir (River Mile - 47)		
Forage	Grab sample cut from green forage at least once per 31 days.	Gamma isotopic analysis (which includes I-131) of each monthly sample.
Indicator Station: North Perimeter (N-0.8) South Perimeter (SSE-1.0)		
Control Station: Dothan, AL. (W-18)		

TABLE 2

REQUIRED DETECTION CAPABILITIES FOR ENVIRONMENTAL SAMPLE ANALYSIS
FOR FARLEY NUCLEAR PLANT

VALUES FOR THE MINIMUM DETECTABLE CONCENTRATION(MDC)[a,b]

Analysis	Water (pCi/l)	Airborne Particulate or Gas (pCi/m³)	Fish (pCi/kg. wet)	Milk (pCi/l)	Food Products (pCi/kg. wet)	Sediment (pCi/kg. dry)
Gross beta	4	0.01	NA	NA	NA	NA
H-3	2000	NA	NA	NA	NA	NA
Mn-54	15	NA	130	NA	NA	NA
Fe-59	30	NA	260	NA	NA	NA
Co-58, 60	15	NA	130	NA	NA	NA
Zn-65	30	NA	260	NA	NA	NA
Zr-95	30	NA	NA	NA	NA	NA
Nb-95	15	NA	NA	NA	NA	NA
I-131	1[c]	0.07	NA	1	60	NA
Cs-134	15	0.05	130	15	60	150
Cs-137	18	0.06	150	18	80	180
Ba-140	60	NA	NA	60	NA	NA
La-140	15	NA	NA	15	NA	NA

[a]The MDC is the smallest concentration of radioactive material in a sample that will be detected with 95% probability with 5% probability of falsely concluding that a blank observation represents a "real" signal.

For a particular measurement system, which may include radiochemical separation, the MDC for a given radionuclide is determined as follows:

$$MDC = \frac{\frac{2.71}{t_s} + 3.29\sqrt{R_b\left(\frac{1}{t_s} + \frac{1}{t_b}\right)}}{E \cdot V \cdot 2.22 \times 10^6 \cdot Y \cdot e^{-\lambda \Delta t}}$$

where:

MDC = the *a priori* MINIMUM DETECTABLE CONCENTRATION (μCi per unit mass or volume).

2.71 = the square of the standard normal variate (1.645) for the 95 percent confidence level.

3.29 = Two times the standard normal variate (1.645) for the 95 percent conficence level.

R_b = the background counting rate, or the counting rate of a blank sample, as appropriate (counts per minute).

t_s = the length of the sample counting period (minutes).

t_b = the length of the background counting period (minutes).

E = the counting efficiency (counts per disintegration).

V = the sample size (units of mass or volume).

2.22×10^6 = the number of disintegrations per minutes per μCi.

Y = the fractional radiochemical yield, when applicable.

λ = the radioactive decay constant for the given radionuclide (h^{-1}). Values of λ used in effluent calculations should be based on decay data from a recognized and current source.

Δt = for effluent samples, the elapsed time between the midpoint of sample collection and the time of counting (h), for environmental samples, the elapsed time between the end of sample collection and the time of counting (h).

[b]Where values were reported as < MDC, the MDC was calculated using actual sample background (a posteriori).

[c]MDC for drinking water.

TABLE 3

REPORTING LEVELS FOR RADIOACTIVITY CONCENTRATIONS IN ENVIRONMENTAL SAMPLES

Analysis	Water (pCi/l)	Airborne Particulate or Gas (pCi/m^3)	Fish (pCi/kg. wet)	Milk (pCi/l)	Food Products (pCi/kg. wet)
H-3	$2 \times 10^{4*}$	NA	NA	NA	NA
Mn-54	1×10^{3}	NA	3×10^{4}	NA	NA
Fe-59	4×10^{2}	NA	1×10^{4}	NA	NA
Co-58	1×10^{3}	NA	3×10^{4}	NA	NA
Co-60	3×10^{2}	NA	1×10^{4}	NA	NA
Zn-65	3×10^{2}	NA	2×10^{4}	NA	NA
Zr-95	4×10^{2}	NA	NA	NA	NA
Nb-95	7×10^{2}	NA	NA	NA	NA
I-131	2×10^{0}	9×10^{-1}	NA	3×10^{0}	1×10^{2}
Cs-134	3×10^{1}	1×10^{1}	1×10^{3}	6×10^{1}	1×10^{3}
Cs-137	5×10^{1}	2×10^{1}	2×10^{3}	7×10^{1}	2×10^{3}
Ba-140	2×10^{2}	NA	NA	3×10^{2}	NA
La-140	1×10^{2}	NA	NA	NA	NA

*For drinking water samples.

TABLE 4

ENVIRONMENTAL MONITORING PROGRAM DEVIATIONS 1994

DATE/TIME	COMPONENT	CAUSE OF DEVIATION	RESOLUTION	REMARKS
3-15-94/1542	Air monitor 1605	Surge protector tripped after approximately 52:59 hours of operation.	Breaker was reset, tripped again, surge protector was replaced.	Monitor out of service for approximately 116 hours first trip, approximately 10 hours the second time.
4-5-94/*	Community TLD 1504	TLD and stake missing	Stake and TLD replaced.	No data for first quarter. Average of quarters 2,3,4 was used for computer trending.
5-9-94/0829	Air monitor 0718	Air monitor found not running, sample volume/time lost.	Surge protector was reset.	Monitor effectively out of service 171:31 hours.
5-31-94/0812	Air monitor 1108	Air monitor found tripped after 95:00 hours.	Surge protector reset.	Monitor out of service 72:52 hours. Sample volume of 264.5 m^3 met minimum requirement.
7-5-94/0804	Air monitor 1108	Monitor found tripped after 151:32 hours due to severe weather.	Reset breaker.	Monitor out of service 17:51 hours.
7-5-94/1553	Background River water sample	Sampler removed from Andrews Dam due to severe flooding.	Sampler replaced on 7-12-94 after flood waters receded.	No background river water sample for week of 7-5-94 → 7-12-94.
7-5-94/1830	Indicator TLDs	TLDs RI-0101, RI-0201, RI-0301, RI-0401, RI-0501, RI-0601, RI-0801, RI-0901, RI-1401, RI-1501, inaccessible due to flooding.	TLDs were collected on 7-11-94 after flood waters receded.	Although no TLDs were lost, they were collected greater than 92 days after installation.
7-12-94/0820	Air monitor 1108	Monitor tripped after 22:16 hours due to severe weather.	Monitor reset and restarted.	Monitor out of service for 145:57 hours. Required Gross Beta MDC of 0.01 pCi/m^3 met despite low sample volume.
7-12-94/0902	Air monitor 0718	Monitor tripped after 95:05 hours due to severe weather and loss of power due to flooding.	Monitor was reset and returned to service.	Monitor our of service 71:08 hours.
7-12-94/1125	Air monitor 1605	Monitor tripped after 148:09 hours due to severe weather.	Monitor reset and returned to service.	Monitor out of service 14:40 hours.
7-12-94/1233	Air monitor 1601	Monitor tripped after 153:59 hours.	Monitor reset and returned to service.	Monitor out of service 8:25 hours.
7-12-94/1320	Air monitor 0701	Monitor found to have been submerged during flooding.	New pump and totalizer installed, electrical power reestablished.	Monitor returned to service 7-14-94 0755 after being OOS for 186:23 hours.

*No time recorded

TABLE 4

ENVIRONMENTAL MONITORING PROGRAM DEVIATIONS 1994

DATE/TIME	COMPONENT	CAUSE OF DEVIATION	RESOLUTION	REMARKS
7-26-94/1315	Air monitor 1601	Power loss during thunderstorm caused sampler to stop after 150:30 hours.	Power restored and monitor returned to service 7-29-94/1538.	Monitor out of service 246:40 hours.
8-16-94/0910	River indicator sample	Sample supply tubing vibrated out of receptacle resulting in no sample.	Sample supply tubing secured to receptacle.	Missing sample volume made up with the next weeks' sample.
9-20-94/0711	Air monitor 1601	Quick connect fittings on filter holder not completely coupled allowing some air to bypass filters.	Filter holder was reinstalled properly.	Review of Beta particulate results indicated activity within expected range.
12-13-94/0812	Air monitor 1108	Monitor found sampling at 35 lpm (< required minimum)	Flow rate adjusted. Pump changed out 12-22-94/1415.	Total sample volume of 347.9 M^3 was sufficient to meet required MDCs.
12-20-94/1420	Air monitor 1601	Sample pump found not running. Due to blown fuse on pump.	Pump was replaced.	235.98 M^3 sample collected, unable to determine how long pump was inoperable because the timer continued to run. All MDC requirements were met on analysis of filters.

AIRBORNE: PARTICULATES - OPERATIONAL RADIOACTIVITY SUMMARY

JOSEPH M. FARLEY NUCLEAR PLANT

LICENSE NOS. NPF-2 AND NPF-8 HOUSTON COUNTY ALABAMA

SUMMARY REPORT FROM 10194 TO 123194 (A)

AIR PARTICULATES (pCi/Cubic Meter)

TYPE And TOTAL NUMBERS Of ANALYSIS PERFORMED		NOMINAL MDC(B)	ALL INDICATOR LOCATIONS			INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN				COMMUNITY LOCATIONS			CONTROL LOCATIONS		
			MEAN	MIN	MAX	NAME DISTANCE And DIRECTION	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
				C	D			C	D		C	D		C	D
BE-7	40	0.018	0.076	0.0527	0.0945	NORTH PERIM.	0.081	0.0603	0.0945	0.073	0.0464	0.0886	0.077	0.0552	0.0896
				16	16	0.8 MI. N		4	4		12	12		12	12
BETA	519	0.004	0.019	0.007	0.036	SSE PERIM.	0.020	0.012	0.032	0.019	0.004	0.035	0.020	0.006	0.046
				207	207	1.0 MI. SSE		51	51		156	156		156	156
CS-134	40	0.002	<MDC	NA	NA	NA	<MDC	NA	NA	<MDC	NA	NA	<MDC	NA	NA
				0	16			0	0		0	12		0	12
CS-137	40	0.002	<MDC	NA	NA	NA	<MDC	NA	NA	<MDC	NA	NA	<MDC	NA	NA
				0	16			0	0		0	12		0	12
I-131	40	0.004	<MDC	NA	NA	NA	<MDC	NA	NA	<MDC	NA	NA	<MDC	NA	NA
				0	16			0	0		0	12		0	12

Mean - Determined From Measurements With Detectable Activity Only.

(A) No Nonroutine Anomalous Measurements Reported During This Period.

(B) Mean Minimum Detectable Concentration Calculated Per Table 2 of This Report.

(C) Number of Measurements With Detectable Activity Only.

(D) Total Number of Measurements Taken.

AIRBORNE: IODINE - OPERATIONAL RADIOACTIVITY SUMMARY

JOSEPH M. FARLEY NUCLEAR PLANT

LICENSE NOS. NPF-2 AND NPF-8 HOUSTON COUNTY ALABAMA

SUMMARY REPORT FROM 10194 TO 123194 (A)

AIR IODINE (pCi/Cubic Meter)

TYPE And TOTAL NUMBERS Of ANALYSIS PERFORMED	NOMINAL MDC(B)	ALL INDICATOR LOCATIONS			INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN				COMMUNITY LOCATIONS			CONTROL LOCATIONS		
		MEAN	MIN (C)	MAX (D)	NAME DISTANCE And DIRECTION	MEAN	MIN (C)	MAX (D)	MEAN	MIN (C)	MAX (D)	MEAN	MIN (C)	MAX (D)
I-131 415	0.025	<MDC	NA 0	NA 207	NA	<MDC	NA 0	NA 0	<MDC	NA 0	NA 52	<MDC	NA 0	NA 156

Mean - Determined From Measurements With Detectable Activity Only.

(A) No Nonroutine Anomalous Measurements Reported During This Period.

(B) Mean Minimum Detectable Concentration Calculated Per Table 2 of This Report.

(C) Number of Measurements With Detectable Activity Only.

(D) Total Number of Measurements Taken.

EXTERNAL RADIATION: OPERATIONAL RADIOACTIVITY SUMMARY
JOSEPH M. FARLEY NUCLEAR PLANT

LICENSE NOS. NPF-2 AND NPF-8 HOUSTON COUNTY ALABAMA

SUMMARY REPORT FROM 10194 TO 123194 (A)

EXPOSURE (mR)

TYPE And TOTAL NUMBERS OF ANALYSIS PERFORMED	NOMINAL MDC(B)	ALL INDICATOR LOCATIONS			INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN				COMMUNITY LOCATIONS			CONTROL LOCATIONS		
					NAME DISTANCE And DIRECTION									
		MEAN	MIN	MAX		MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
			C	D			C	D		C	D		C	D
QUARTER 160	NA	15	10.72	23.7	PLANT PERIM.	22	20.83	23.7	12	9.25	13.65	13	9.6	15.65
			64	64	0.8 MI. E		4	4		71	72		24	24
SUM (E) 40	NA	58	45.1	87.5	PLANT PERIM.	87.5	87.5	87.5	47	38.7	53.1	50	41.2	61
			16	16	0.8 MI. E		1	1		18	18		6	6

Mean - Determined From Measurements With Detectable Activity Only.

(A) No Nonroutine Anomalous Measurements Reported During This Period.

(B) Mean Minimum Detectable Concentration Calculated Per Table 2 of This Report.

(C) Number of Measurements With Detectable Activity Only.

(D) Total Number of Measurements Taken.

(E) Sum of the Four Quarters.

MILK: OPERATIONAL RADIOACTIVITY SUMMARY
JOSEPH M. FARLEY NUCLEAR PLANT

LICENSE NOS. NPF-2 AND NPF-8 HOUSTON COUNTY ALABAMA

SUMMARY REPORT FROM 10194 TO 123194 (A)

MILK (PCI/L)

TYPE And TOTAL NUMBERS Of ANALYSIS PERFORMED	NOMINAL MDC(B)	ALL INDICATOR LOCATIONS			INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN				COMMUNITY LOCATIONS			CONTROL LOCATIONS		
		MEAN	MIN C	MAX D	NAME DISTANCE And DIRECTION	MEAN	MIN C	MAX D	MEAN	MIN C	MAX D	MEAN	MIN C	MAX D
BA-140 26	27	NA	NA 0	NA 0	NA	NA	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 26
CS-134 26	5.82	NA	NA 0	NA 0	NA	NA	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 26
CS-137 26	8.50	NA	NA 0	NA 0	NA	NA	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 26
I-131 26	0.73	NA	NA 0	NA 0	NA	NA	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 26
K-40 26	163	NA	NA 0	NA 0	NA	NA	NA 0	NA 0	NA	NA 0	NA 0	1350	1200 26	1540 26
LA-140 26	8.83	NA	NA 0	NA 0	NA	NA	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 26

Mean - Determined From Measurements With Detectable Activity Only.

(A) No Nonroutine Anomalous Measurements Reported During This Period.

(B) Mean Minimum Detectable Concentration Calculated Per Table 2 of This Report.

(C) Number of Measurements With Detectable Activity Only.

(D) Total Number of Measurements Taken.

VEGETATION: FORAGE - OPERATIONAL RADIOACTIVITY SUMMARY
JOSEPH M. FARLEY NUCLEAR PLANT

LICENSE NOS. NPF-2 AND NPF-8 HOUSTON COUNTY ALABAMA
SUMMARY REPORT FROM 10194 TO 123194 (A)

FORAGE (PCI/KG-WET)

TYPE And TOTAL NUMBERS Of ANALYSIS PERFORMED		NOMINAL MDC(B)	ALL INDICATOR LOCATIONS			INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN				COMMUNITY LOCATIONS			CONTROL LOCATIONS		
						NAME									
			MEAN	MIN	MAX	DISTANCE And DIRECTION	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
				(C)	(D)			(C)	(D)		(C)	(D)		(C)	(D)
AC-228	39	73	<MDC	NA	NA	NA	<MDC	NA	NA	NA	NA	NA	<MDC	NA	NA
				0	26			0	0		0	0		0	13
BE-7	39	380	1032	125	2750	SSE PERIM.	1065	125	2680	NA	NA	NA	812	256	2150
				25	26	1.0 MI. SSE		13	13		0	0		13	13
CS-134	39	12	<MDC	NA	NA	NA	<MDC	NA	NA	NA	NA	NA	<MDC	NA	NA
				0	26			0	0		0	0		0	13
CS-137	39	17	<MDC	NA	NA	NA	<MDC	NA	NA	NA	NA	NA	24	21.8	25.2
				0	26			0	0		0	0		2	13
I-131	39	16	<MDC	NA	NA	NA	<MDC	NA	NA	NA	NA	NA	<MDC	NA	NA
				0	26			0	0		0	0		0	13
K-40	39	516	4077	1950	7470	NORTH PERIM.	4246	2090	7470	NA	NA	NA	4622	2600	8140
				26	26	0.8 MI. N		13	13		0	0		13	13

Mean - Determined From Measurements With Detectable Activity Only.

(A) No Nonroutine Anomalous Measurements Reported During This Period.

(B) Mean Minimum Detectable Concentration Calculated Per Table 2 of This Report.

(C) Number of Measurements With Detectable Activity Only.

(D) Total Number of Measurements Taken.

SOIL: OPERATIONAL RADIOACTIVITY SUMMARY
JOSEPH M. FARLEY NUCLEAR PLANT

LICENSE NOS. NPF-2 AND NPF-8 HOUSTON COUNTY ALABAMA

SUMMARY REPORT FROM 10194 TO 123194 (A)

SOIL (IN SITU) (PCI/KG-DRY)

TYPE And TOTAL NUMBERS Of ANALYSIS PERFORMED	NOMINAL MDC(B)	ALL INDICATOR LOCATIONS			INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN				COMMUNITY LOCATIONS			CONTROL LOCATIONS		
					NAME									
		MEAN	MIN	MAX	DISTANCE And DIRECTION	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
			C	D			C	D		C	D		C	D
NONE 0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			NA	NA			0	0		NA	NA		NA	NA

Mean: Determined From Measurements With Detectable Activity Only.

(A) No Nonroutine Anomalous Measurements Reported During This Period.

(B) Mean Minimum Detectable Concentration Calculated Per Table 2 of This Report.

(C) Number of Measurements With Detectable Activity Only.

(D) Total Number of Measurements Taken.

WATERBORNE: SURFACE WATER - OPERATIONAL RADIOACTIVITY SUMMARY
JOSEPH M. FARLEY NUCLEAR PLANT

LICENSE NOS. NPF-2 AND NPF-8 HOUSTON COUNTY ALABAMA

SUMMARY REPORT FROM 10194 TO 123194 (A)

SURFACE WATER (PCI/L)

TYPE And TOTAL NUMBERS Of ANALYSIS PERFORMED		NOMINAL MDC(B)	ALL INDICATOR LOCATIONS			INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN				COMMUNITY LOCATIONS			CONTROL LOCATIONS		
			MEAN	MIN (C)	MAX (D)	NAME DISTANCE And DIRECTION	MEAN	MIN (C)	MAX (D)	MEAN	MIN (C)	MAX (D)	MEAN	MIN (C)	MAX (D)
BA-140	26	25	<MDC	NA 0	NA 13	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 13
CO-58	26	6.26	<MDC	NA 0	NA 13	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 13
CO-60	26	8.35	<MDC	NA 0	NA 13	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 13
CS-134	26	5.46	<MDC	NA 0	NA 13	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 13
CS-137	26	6.98	<MDC	NA 0	NA 13	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 13
FE-59	26	14	<MDC	NA 0	NA 13	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 13
I-131	26	7.75	<MDC	NA 0	NA 13	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 13
LA-140	26	8.73	<MDC	NA 0	NA 13	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 13
MN-54	26	6.99	<MDC	NA 0	NA 13	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 13
NB-95	26	6.82	<MDC	NA 0	NA 13	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 13
TRITIUM	8	272	<MDC	NA 0	NA 4	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 4
ZN-65	26	14	<MDC	NA 0	NA 13	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 13
ZR-95	26	11	<MDC	NA 0	NA 13	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 13

Mean - Determined From Measurements With Detectable Activity Only.

(A) No Nonroutine Anomalous Measurements Reported During This Period.

(B) Mean Minimum Detectable Concentration Calculated Per Table 2 of This Report.

(C) Number of Measurements With Detectable Activity Only.

(D) Total Number of Measurements Taken.

WATERBORNE: GROUND WATER - OPERATIONAL RADIOACTIVITY SUMMARY
JOSEPH M. FARLEY NUCLEAR PLANT

LICENSE NOS. NPF-2 AND NPF-8 HOUSTON COUNTY ALABAMA

SUMMARY REPORT FROM 10194 TO 123194 (A)

GROUND WATER (WELL) (PCI/L)

TYPE And TOTAL NUMBERS Of ANALYSIS PERFORMED		NOMINAL MDC(B)	ALL INDICATOR LOCATIONS			INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN				COMMUNITY LOCATIONS			CONTROL LOCATIONS		
			MEAN	MIN (C)	MAX (D)	NAME DISTANCE And DIRECTION	MEAN	MIN (C)	MAX (D)	MEAN	MIN (C)	MAX (D)	MEAN	MIN (C)	MAX (D)
BA-140	8	24	<MDC	NA 0	NA 4	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 4
CO-58	8	6.41	<MDC	NA 0	NA 4	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 4
CO-60	8	9.03	<MDC	NA 0	NA 4	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 4
CS-134	8	5.73	<MDC	NA 0	NA 4	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 4
CS-137	8	6.51	<MDC	NA 0	NA 4	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 4
FE-59	8	13	<MDC	NA 0	NA 4	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 4
I-131	8	0.73	<MDC	NA 0	NA 4	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 4
LA-140	8	8.79	<MDC	NA 0	NA 4	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 4
MN-54	8	6.84	<MDC	NA 0	NA 4	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 4
NB-95	8	6.76	<MDC	NA 0	NA 4	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 4
TRITIUM	8	267	<MDC	NA 0	NA 4	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 4
ZN-65	8	12	<MDC	NA 0	NA 4	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 4
ZR-95	8	10	<MDC	NA 0	NA 4	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 4

Mean - Determined From Measurements With Detectable Activity Only.

(A) No Nonroutine Anomalous Measurements Reported During This Period.

(B) Mean Minimum Detectable Concentration Calculated Per Table 2 of This Report.

(C) Number of Measurements With Detectable Activity Only.

(D) Total Number of Measurements Taken.

SEDIMENT: RIVER - OPERATIONAL RADIOACTIVITY SUMMARY
JOSEPH M. FARLEY NUCLEAR PLANT

LICENSE NOS. NPF-2 AND NPF-8 HOUSTON COUNTY ALABAMA

SUMMARY REPORT FROM 10194 TO 123194 (A)

SEDIMENT (RIVER) (PCI/KG-DRY)

TYPE And TOTAL NUMBERS Of ANALYSIS PERFORMED		NOMINAL MDC(B)	ALL INDICATOR LOCATIONS			INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN				COMMUNITY LOCATIONS			CONTROL LOCATIONS		
			MEAN	MIN (C)	MAX (D)	NAME DISTANCE And DIRECTION	MEAN	MIN (C)	MAX (D)	MEAN	MIN (C)	MAX (D)	MEAN	MIN (C)	MAX (D)
AC-228	4	36	760	708 2	812 2	SMITH'S BEND RIV. MI. 41	760	708 2	812 2	NA	NA 0	NA 0	900	539 2	1260 2
BI-212	4	76	607	568 2	646 2	SMITH'S BEND RIV. MI. 41	607	568 2	646 2	NA	NA 0	NA 0	644	418 2	870 2
BI-214	4	19	549	459 2	639 2	SMITH'S BEND RIV. MI. 41	549	459 2	639 2	NA	NA 0	NA 0	545	355 2	735 2
CS-134	4	7.39	<MDC	NA 0	NA 2	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 2
CS-137	4	6.30	29	12.4 2	46.2 2	SMITH'S BEND RIV. MI. 41	29	12.4 2	46.2 2	NA	NA 0	NA 0	11	11 1	11 2
K-40	4	112	4870	4070 2	5670 2	SMITH'S BEND RIV. MI. 41	4870	4070 2	5670 2	NA	NA 0	NA 0	3505	2640 2	4370 2
PB-212	4	16	457	72.4 2	841 2	SMITH'S BEND RIV. MI. 41	457	72.4 2	841 2	NA	NA 0	NA 0	647	53.6 2	1240 2
PB-214	4	22	588	495 2	680 2	SMITH'S BEND RIV. MI. 41	588	495 2	680 2	NA	NA 0	NA 0	620	404 2	835 2
RA-226	4	205	1164	998 2	1330 2	SMITH'S BEND RIV. MI. 41	1164	998 2	1330 2	NA	NA 0	NA 0	1292	804 2	1780 2
TL-208	4	9.00	275	237 2	312 2	SMITH'S BEND RIV. MI. 41	275	237 2	312 2	NA	NA 0	NA 0	32	21 2	43.1 2

Mean - Determined From Measurements With Detectable Activity Only.

(A) No Nonroutine Anomalous Measurements Reported During This Period.

(B) Mean Minimum Detectable Concentration Calculated Per Table 2 of This Report.

(C) Number of Measurements With Detectable Activity Only.

(D) Total Number of Measurements Taken.

FISH: RIVER (GAME) - OPERATIONAL RADIOACTIVITY SUMMARY
JOSEPH M. FARLEY NUCLEAR PLANT

LICENSE NOS. NPF-2 AND NPF-8 HOUSTON COUNTY ALABAMA

SUMMARY REPORT FROM 10194 TO 123194 (A)

FISH (GAME) (PCI/KG WET TISSUE)

TYPE And TOTAL NUMBERS Of ANALYSIS PERFORMED		NOMINAL MDC(B)	ALL INDICATOR LOCATIONS			INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN				COMMUNITY LOCATIONS			CONTROL LOCATIONS		
			MEAN	MIN C	MAX D	NAME DISTANCE And DIRECTION	MEAN	MIN C	MAX D	MEAN	MIN C	MAX D	MEAN	MIN C	MAX D
CO-58	4	7.54	<MDC	NA 0	NA 2	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 2
CO-60	4	9.00	<MDC	NA 0	NA 2	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 2
CS-134	4	4.45	<MDC	NA 0	NA 2	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 2
CS-137	4	5.00	19	17.3 2	21.6 2	SMITH'S BEND RIV. MI. 41	19	17.3 2	21.6 2	NA	NA 0	NA 0	16	14.6 2	17.5 2
FE-59	4	14	<MDC	NA 0	NA 2	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 2
K-40	4	112	2930	2840 2	3020 2	SMITH'S BEND RIV. MI. 41	2930	2840 2	3020 2	NA	NA 0	NA 0	3155	2950 2	3360 2
MN-54	4	5.33	<MDC	NA 0	NA 2	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 2
ZN-65	4	16	<MDC	NA 0	NA 2	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 2

Mean - Determined From Measurements With Detectable Activity Only.

(A) No Nonroutine Anomalous Measurements Reported During This Period.

(B) Mean Minimum Detectable Concentration Calculated Per Table 2 of This Report.

(C) Number of Measurements With Detectable Activity Only.

(D) Total Number of Measurements Taken.

FISH: RIVER (BOTTOM FEEDING) - OPERATIONAL RADIOACTIVITY SUMMARY
JOSEPH M. FARLEY NUCLEAR PLANT

LICENSE NOS. NPF-2 AND NPF-8 HOUSTON COUNTY ALABAMA

SUMMARY REPORT FROM 10194 TO 123194 (A)

FISH (BOTTOM FEEDING) (PCI/KG WET TISSUE)

TYPE And TOTAL NUMBERS Of ANALYSIS PERFORMED		NOMINAL MDC(B)	ALL INDICATOR LOCATIONS			INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN				COMMUNITY LOCATIONS			CONTROL LOCATIONS		
						NAME DISTANCE And DIRECTION									
			MEAN	MIN C	MAX D		MEAN	MIN C	MAX D	MEAN	MIN C	MAX D	MEAN	MIN C	MAX D
CO-58	4	6.13	<MDC	NA 0	NA 2	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 2
CO-60	4	7.86	<MDC	NA 0	NA 2	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 2
CS-134	4	4.63	<MDC	NA 0	NA 2	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 2
CS-137	4	6.10	15.9	15.9 1	15.9 2	SMITH'S BEND RIV. MI. 41	15.9	15.9 1	15.9 1	NA	NA 0	NA 0	10.3	10.3 1	10.3 2
FE-59	4	15	<MDC	NA 0	NA 2	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 2
K-40	4	112	2730	2410 2	3050 2	SMITH'S BEND RIV. MI. 41	2730	2410 2	3050 2	NA	NA 0	NA 0	2700	2610 2	2790 2
MN-54	4	6.87	<MDC	NA 0	NA 2	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 2
ZN-65	4	12	<MDC	NA 0	NA 2	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 2

Mean - Determined From Measurements With Detectable Activity Only.

(A) No Nonroutine Anomalous Measurements Reported During This Period.

(B) Mean Minimum Detectable Concentration Calculated Per Table 2 of This Report.

(C) Number of Measurements With Detectable Activity Only.

(D) Total Number of Measurements Taken.

JOSEPH M. FARLEY NUCLEAR PLANT
LAND USE CENSUS

JUNE 17, 1994

I. PURPOSE

As required by Offsite Dose Calculation Manual (ODCM) section 4.1.2, the annual land use census was completed on June 17, 1994. The purpose of the census was:

A. To identify, within a five mile radius of FNP, the location of the resident nearest the plant site in each sector. As used in the Land Use Census report, the terms "FNP" and "plant site" are interchangeable, and are defined as the point midway between the Unit One and Unit Two plant vent stacks.

B. To identify within a five mile radius of FNP, the number and location of milk animals in each sector. As used in the Land Use Census report, the term "milk animal" is defined as a cow or goat whose milk is obtained for human consumption.

C. To determine, using results obtained in parts A and B above, if changes to the ODCM and/or the milk sampling program are necessary.

II. METHOD

Using topographic maps obtained from the U. S. Geological Survey (USGS) and highway maps obtained from the Alabama Highway Department and the Georgia Department of Transportation, field surveys were conducted in each sector out to five miles from the plant site. Information gained from residents interviewed during the surveys was used to establish or confirm the location of the resident nearest the plant site in each sector, and to determine whether milk animals were present in any sector within five miles of the plant site. The Houston County, Alabama, livestock agent and the Early County, Georgia, extension agent were contacted for assistance in locating commercial dairy farms or privately owned milk animals within five miles of the plant site. The results of the surveys are shown in Table 1.

III. RESULTS

A. NEAREST RESIDENT LOCATIONS

The location of the resident nearest the plant site in each sector is plotted on a USGS topographic map maintained by the environmental staff. The 1994 surveys revealed one change from the 1993 surveys. The residence identified in the 1993 surveys as nearest the plant site in sector eleven was found unoccupied during the 1994 surveys. The 1994 surveys identified a house approximately 700 feet north of the 1993 location and the same linear distance from the plant site as the nearest occupied residence in sector eleven. The location of the controlling receptor continues to be in the southwest sector (sector 10) at 1.2 miles, as indicated in ODCM Table 3.7.

B. MILK ANIMAL SURVEY

Mr. Mickey Fourakers, Early County, Georgia, Extension Agent stated that there are no commercial dairy farms in Early County, and that he knew of no privately owned milk animals within five miles of the plant site. Field surveys conducted along Georgia Highways 62, 370, 273 and 363, and Early County Roads 26, 103, 28, 270, 81 and 248 produced no evidence of milk animals.

Mr. Ricky Hudson, Houston County, Alabama Livestock Agent, provided a list of commercial dairy farms in Houston County, and stated that he knew of no privately owned milk animals within five miles of the plant site. Field surveys conducted along Alabama highways 52 and 95, and Houston County, Roads 75, 33, 42 and interconnecting secondary roads produced no evidence of milk animals.

There are three commercial dairy farms, all more than 5 miles from the plant site, in the vicinity of FNP:

Ray Lewis Dairy
Rt. 1
Ashford, AL

14 miles west southwest of the plant site; Ray Lewis, owner

Ivey Dairy (Green Valley Farms)
Webb, AL

12 miles west of the plant site; Bruce Ivey, owner

Robert Weir and Sons Dairy
Seminole County, GA

14 miles south southeast of the plant site; Robert Weir, owner

Since milk animals have not been located within five miles of the plant site, no milk indicator sample is collected. In February, 1994, the milk control sample location was changed to Ivey Dairy (Green Valley Farms).

As reported in 1993 and previous surveys, Mr. Thomas Dean of Gordon, Alabama, keeps milk goats for his personal use at his residence six miles south of the plant site. Mrs. Dean was interviewed and the location of his residence and the presence of the goats confirmed.

IV. CONCLUSIONS

A. There is no occupied residence in any sector closer to the plant site than currently assessed by the ODCM.

B. In sector 11, although the location of the resident nearest the plant site has changed, the linear distance from the plant site to the nearest resident is the same as that reported in 1993.

C. There are currently no milk animals within five miles of the plant site.

D. No changes to ODCM are required.

E. No change to the milk sampling program is necessary.

TABLE 1 OF ATTACHMENT 1
JOSEPH M. FARLEY NUCLEAR PLANT
LAND USE CENSUS AND MILK ANIMAL SURVEY
JUNE 17, 1994

	Distance In Miles To Nearest					
	Resident		Milk Animal			
Radial Sectors 22.5 Degrees Each	1993	1994	1993	1994	Reason For Change	Individuals Interviewed
North Northeast (01)	2.5	2.5	>5	>5	N/A	*Mr. C. H. Freeman Mrs. Art Freeman
Northeast (02)	2.4	2.4	>5	>5	N/A	*Mr. Judson Freeman
East Northeast (03)	2.4	2.4	>5	>5	N/A	*Mrs. Jim Donaldson
East (04)	2.8	2.8	>5	>5	N/A	*Mrs. Booker T. Spivey Mrs. Anna Grier
East Southeast (05)	3.0	3.0	>5	>5	N/A	*Mrs. Mary Esther Allums
Southeast (06)	3.4	3.4	>5	>5	N/A	Mr. David Smith Note 3
South Southeast (07)	>5	>5	>5	>5	N/A	Note 2
South (08)	4.3	4.3	>5	>5	N/A	*Mrs. Francha Brown Mrs. Thomas Dean
South Southwest (09)	2.9	2.9	>5	>5	N/A	Ms. Lula Mae McGriff Note 3
Southwest (10)	1.2	1.2	>5	>5	N/A	*Mr. Maurice Gilbert
West Southwest (11)	2.4	2.4	>5	>5	Note 1	Mrs. Terry Martin Note 3
West (12)	1.3	1.3	>5	>5	N/A	*Mr. Alfred Respress
West Northwest (13)	2.1	2.1	>5	>5	N/A	*Mrs. William Coulson
Northwest (14)	1.5	1.5	>5	>5	N/A	*Mrs. Amanda Ryals
North Northwest (15)	3.3	3.3	>5	>5	N/A	*Mrs. Thomas Steely
North (16)	2.6	2.6	>5	>5	N/A	*Mr. Tony Knighton

*Nearest Resident in Sector

Note 1: New location. 1994 location unoccupied.

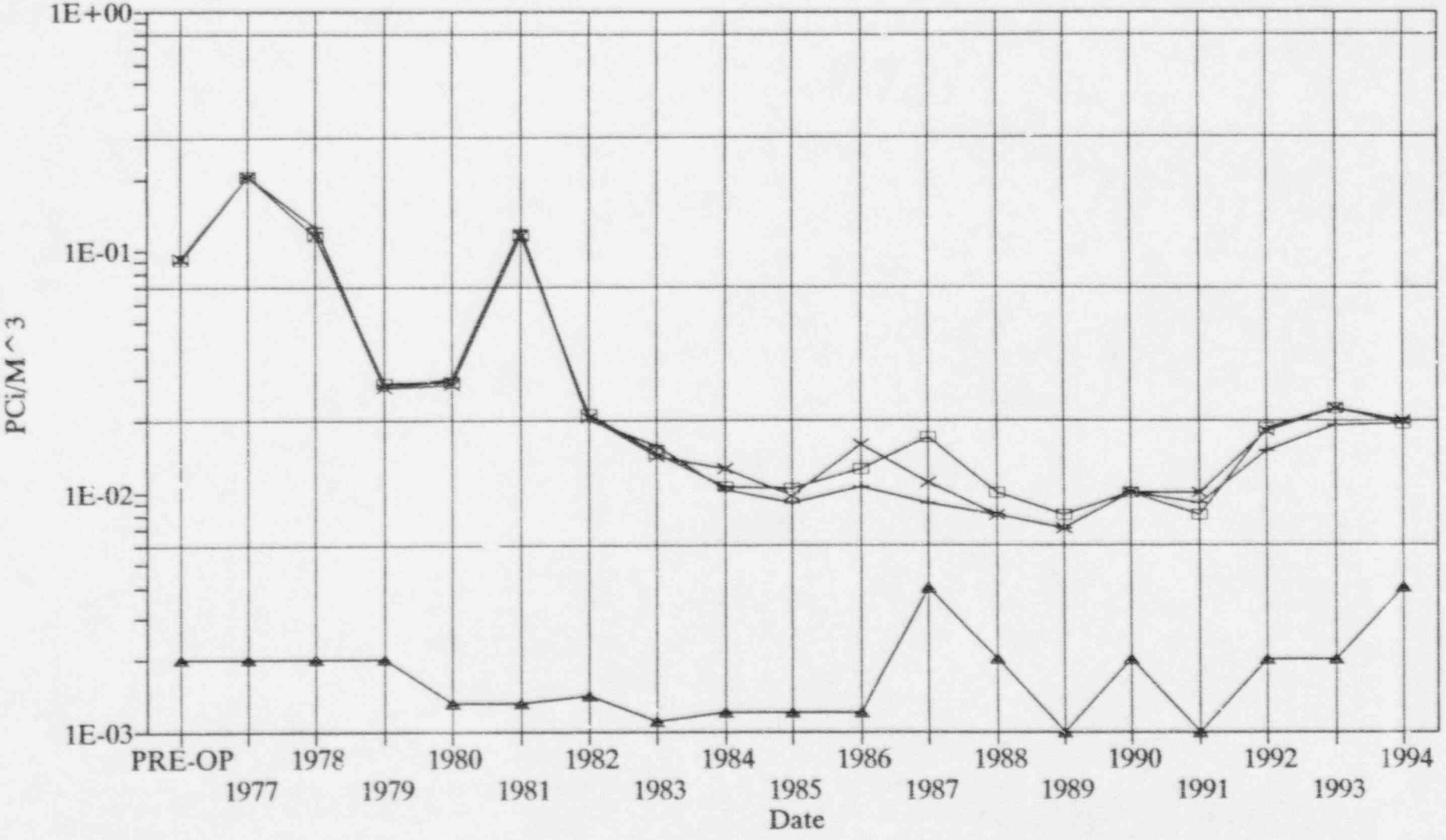
Note 2: No resident within 5 miles in sector 7. Georgia Pacific Paper Co. (GPPC) located in sector 7, 3.9 miles from plant site. Air sampler, surface water sampler, TLD located on GPPC plant site.

Note 3: Unable to contact nearest resident in this sector. Personal observation of residence location and interviews with neighbors or other residents indicate no milk animals present.

J. M. Farley
Nuclear
Plant

Annual Environmental Operating Report

Mean Annual Air Gross Beta



J. M. Farley
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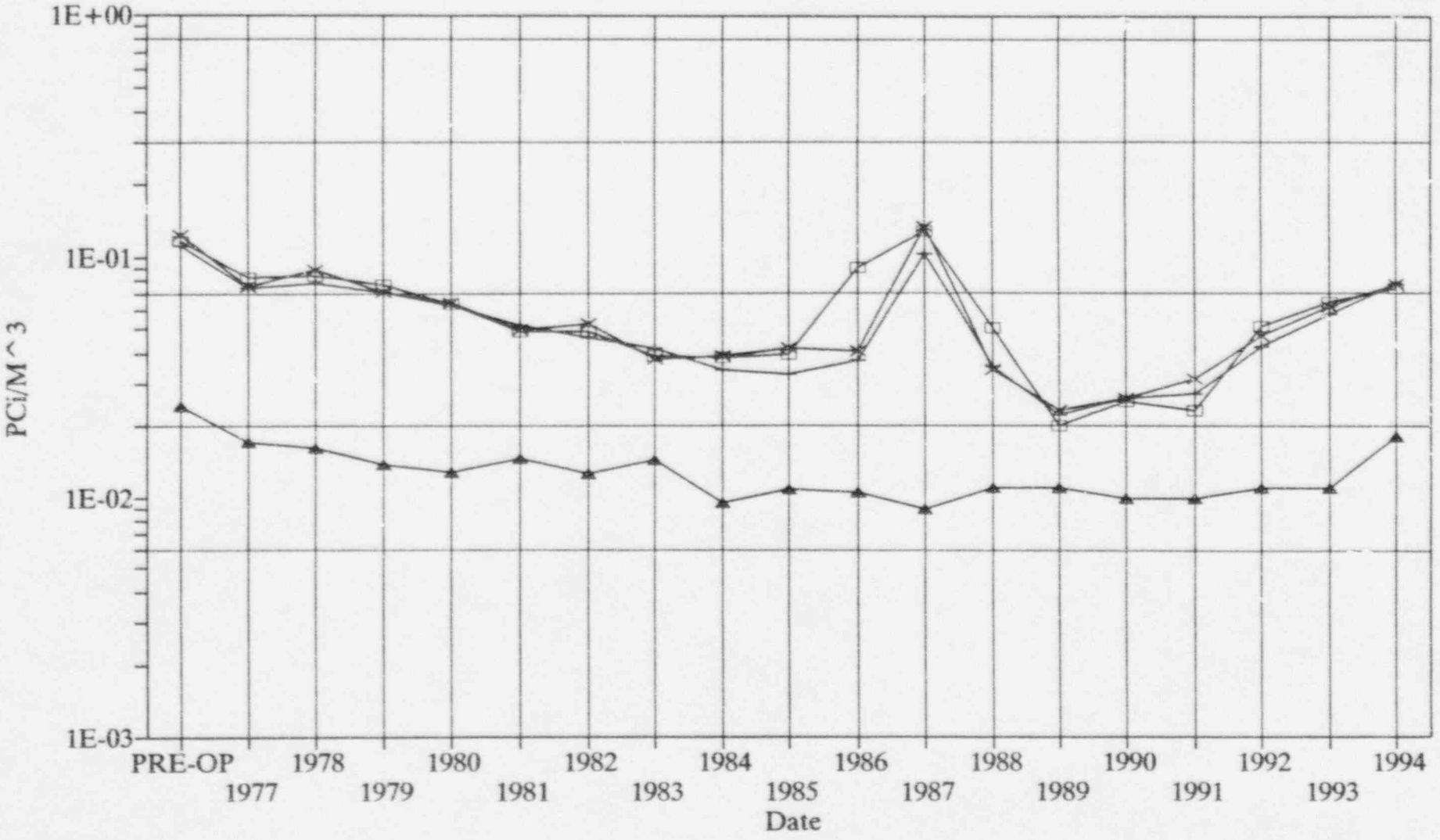
Annual Environmental Operating Report

Mean Annual Air Gross BE-7



J. M. Farley
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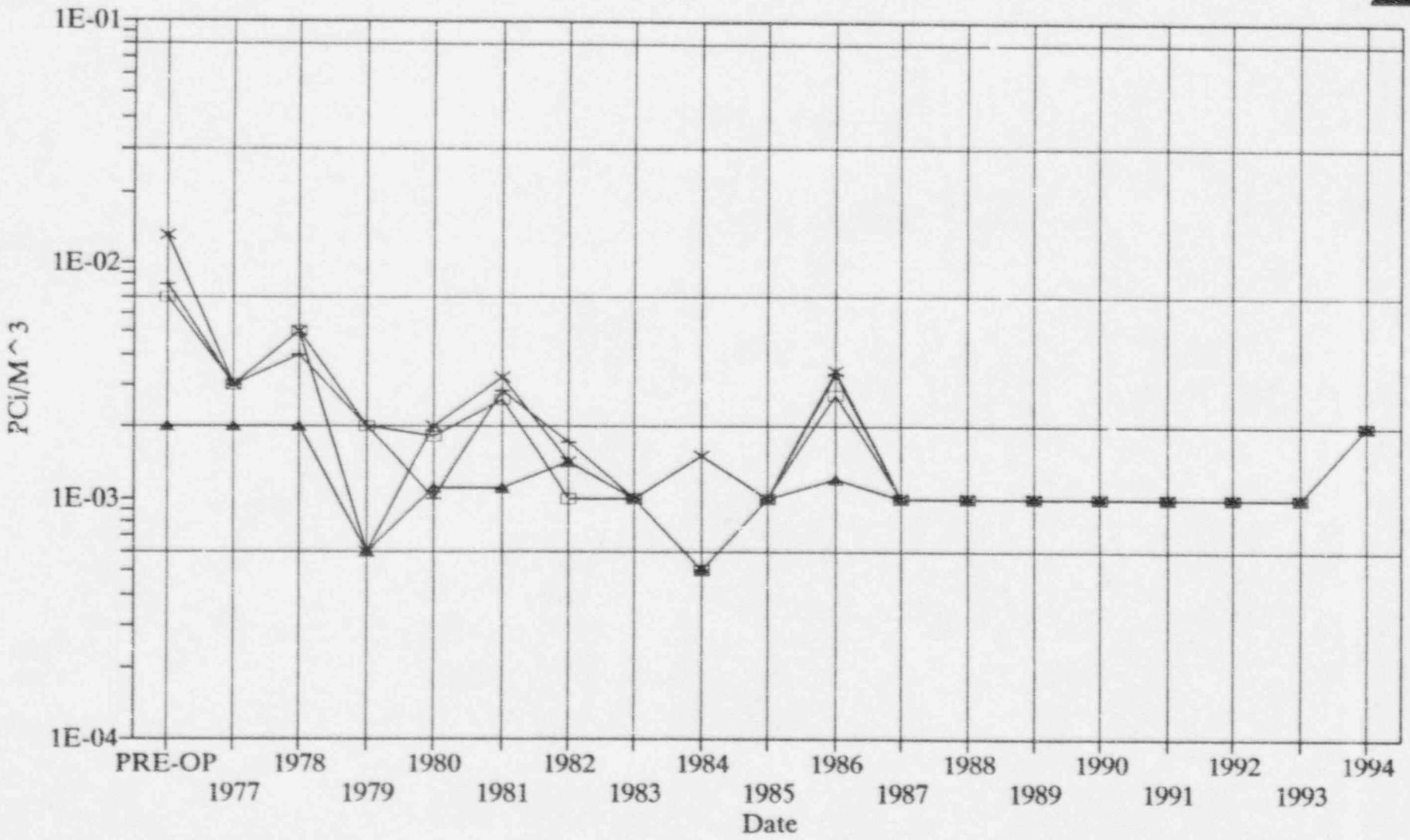
Annual Environmental Operating Report

Mean Annual Air Gross CS-137



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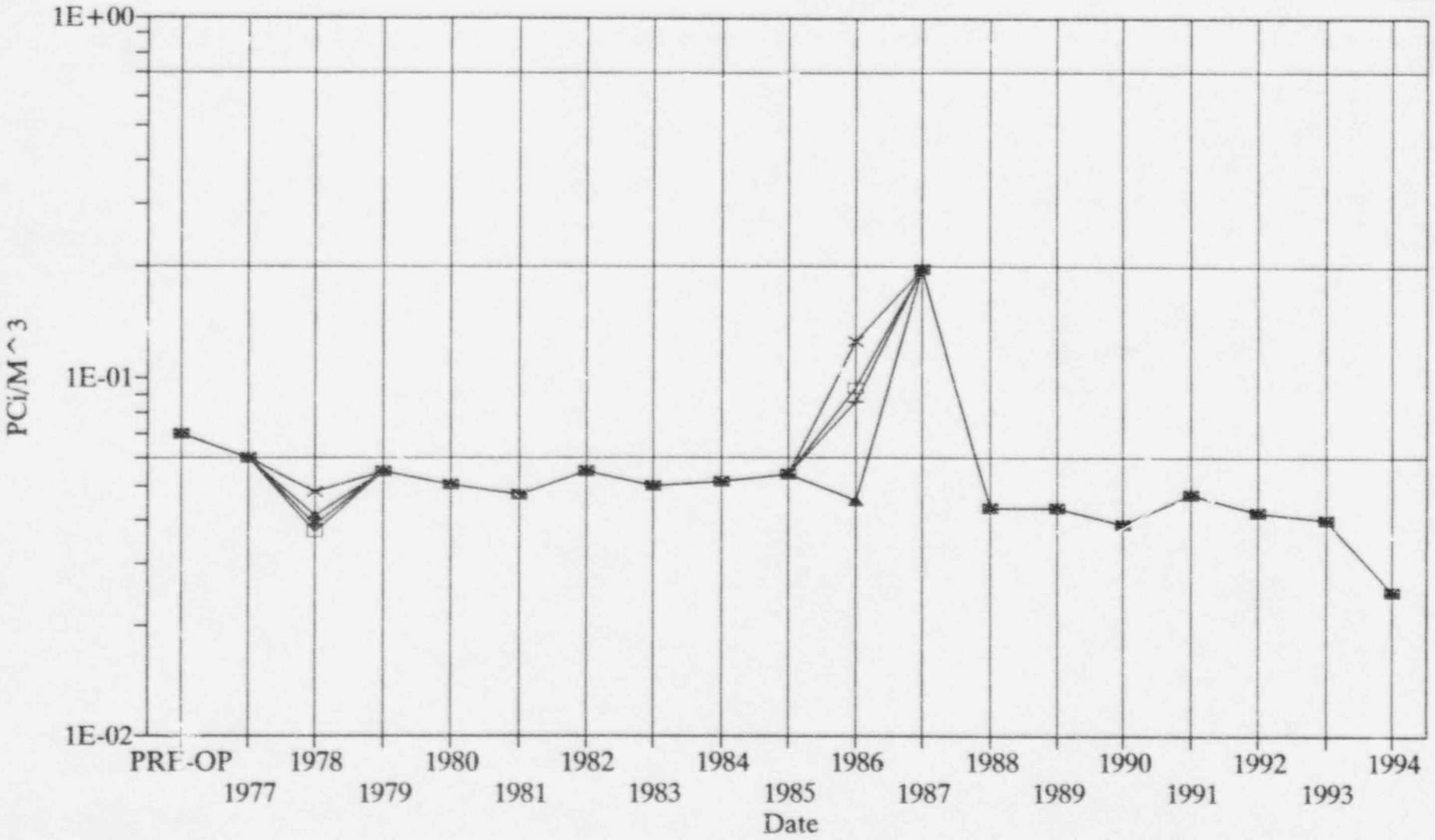
Annual Environmental Operating Report

Mean Annual Air I-131



J. M. Farley
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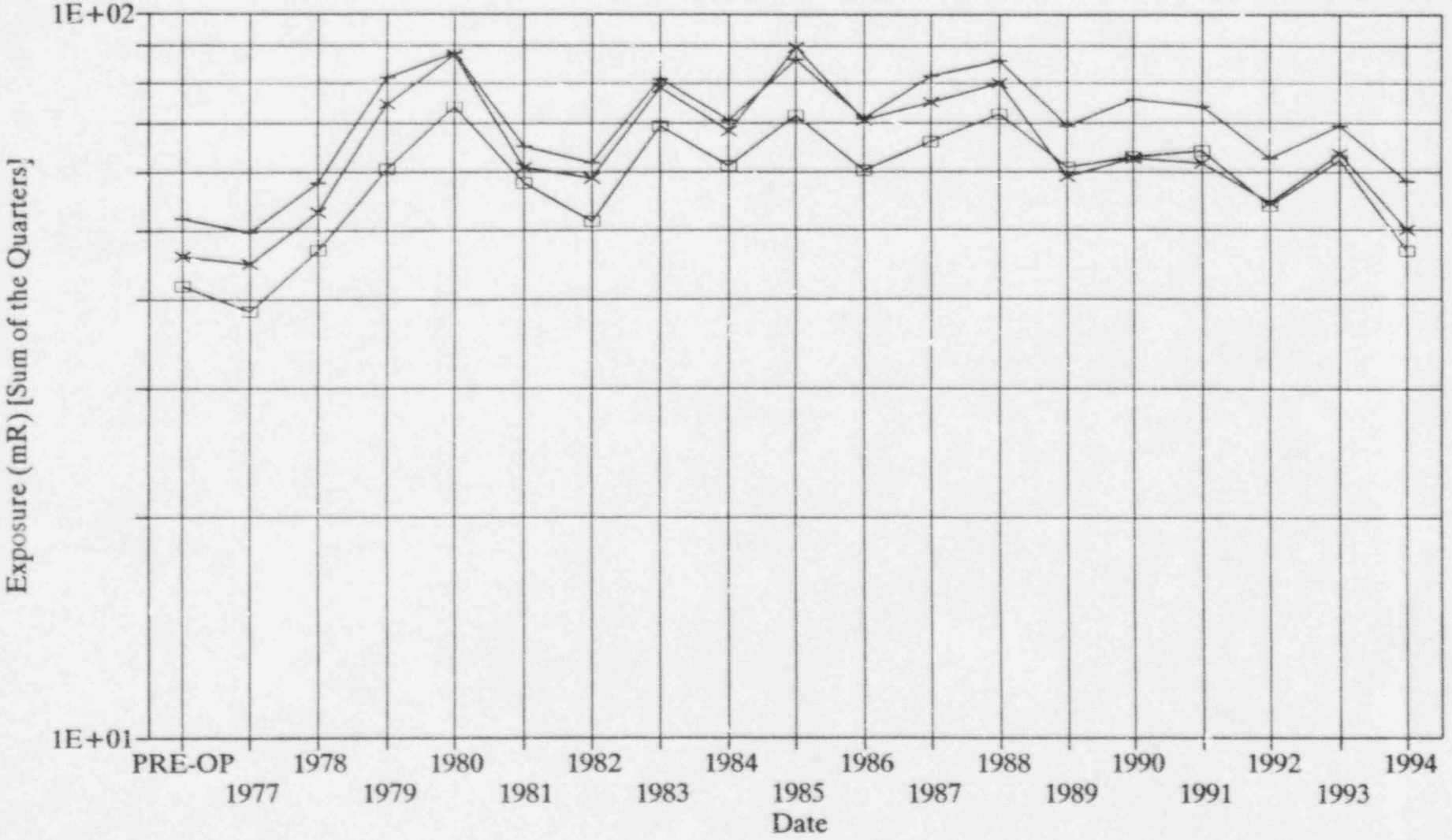
Annual Environmental Operating Report

Mean Annual External Gamma



J. M. Farley
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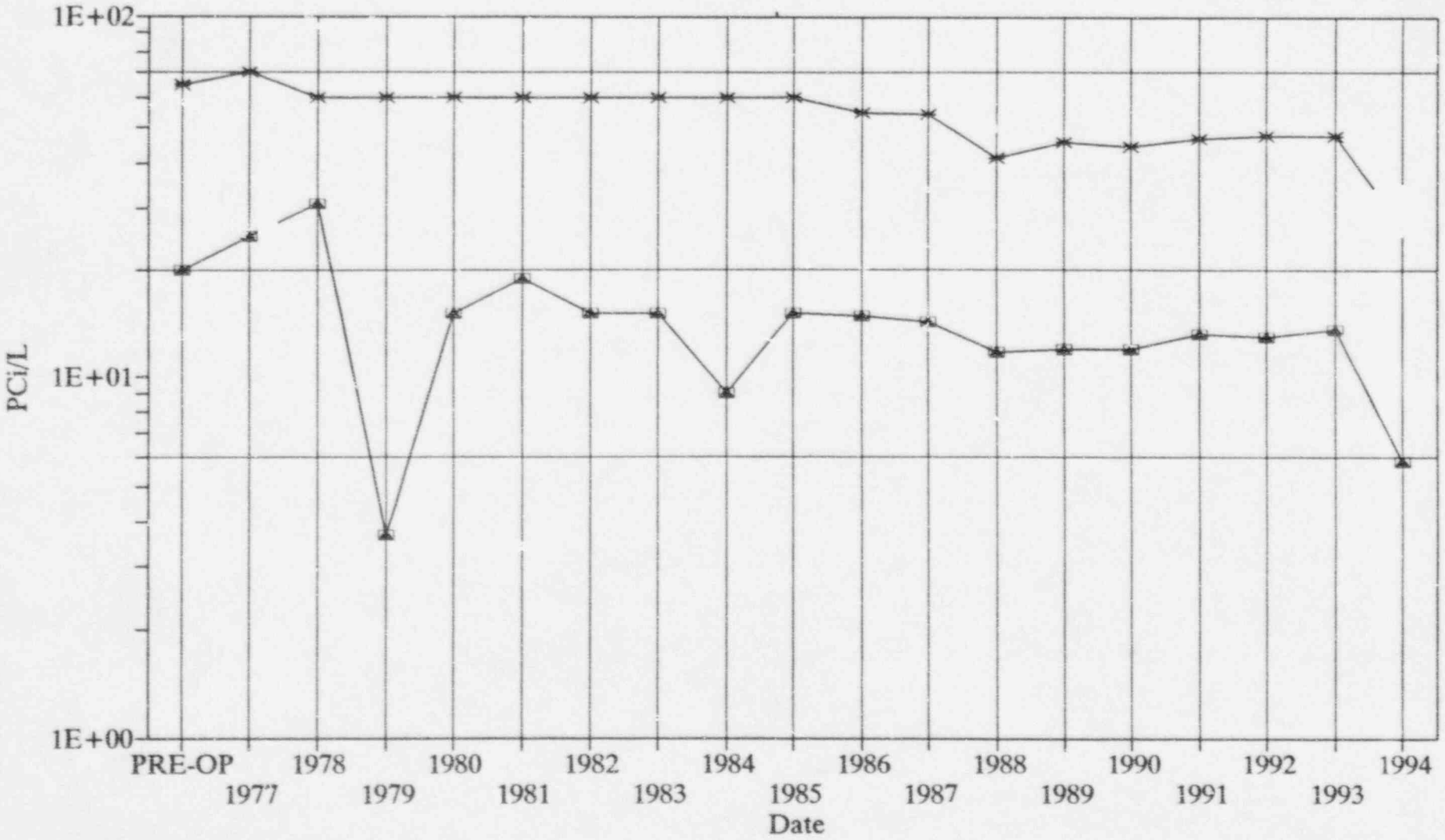
Annual Environmental Operating Report
Mean Annual Milk Concentration



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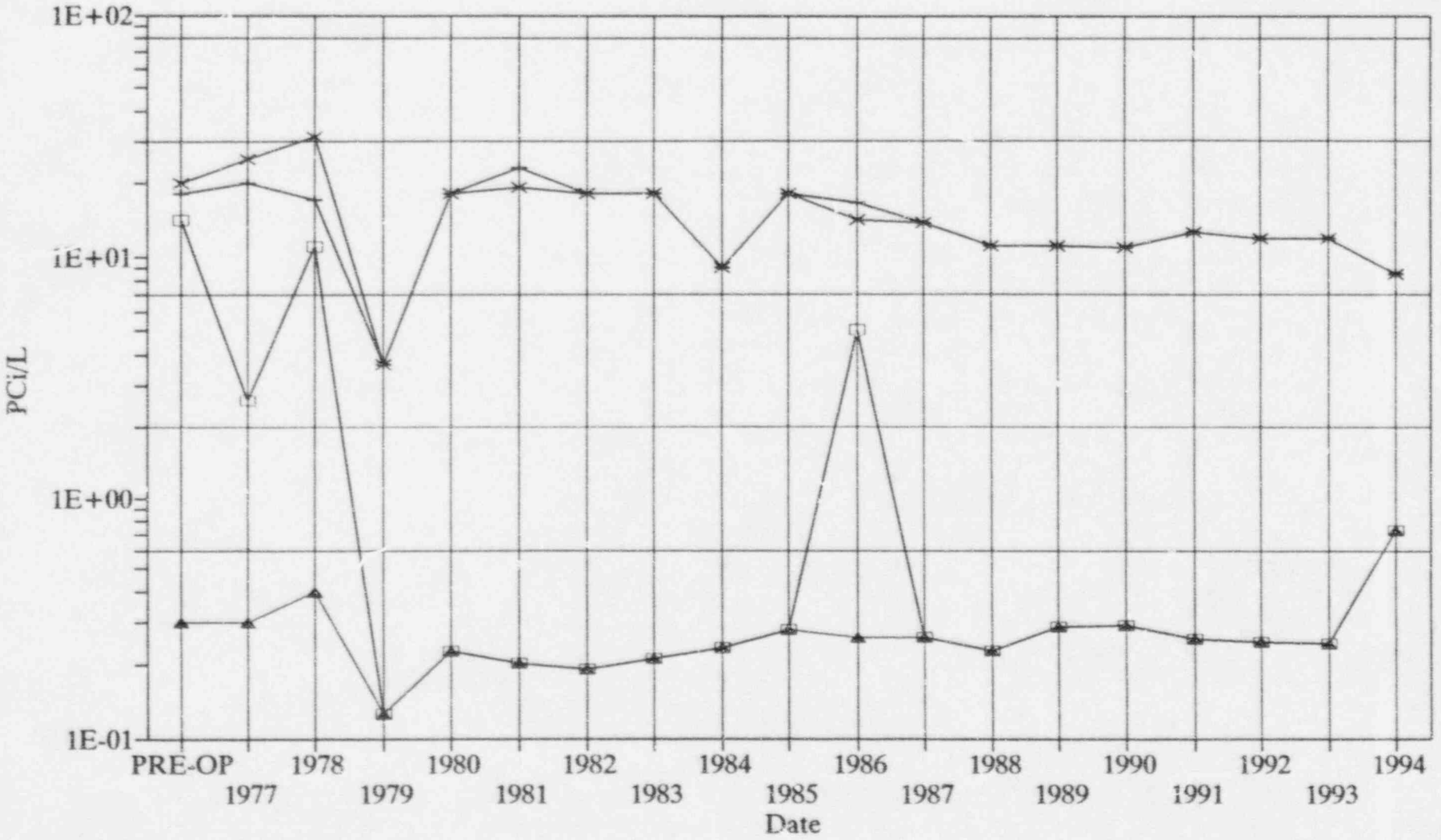
Annual Environmental Operating Report

Mean Annual Milk Concentration



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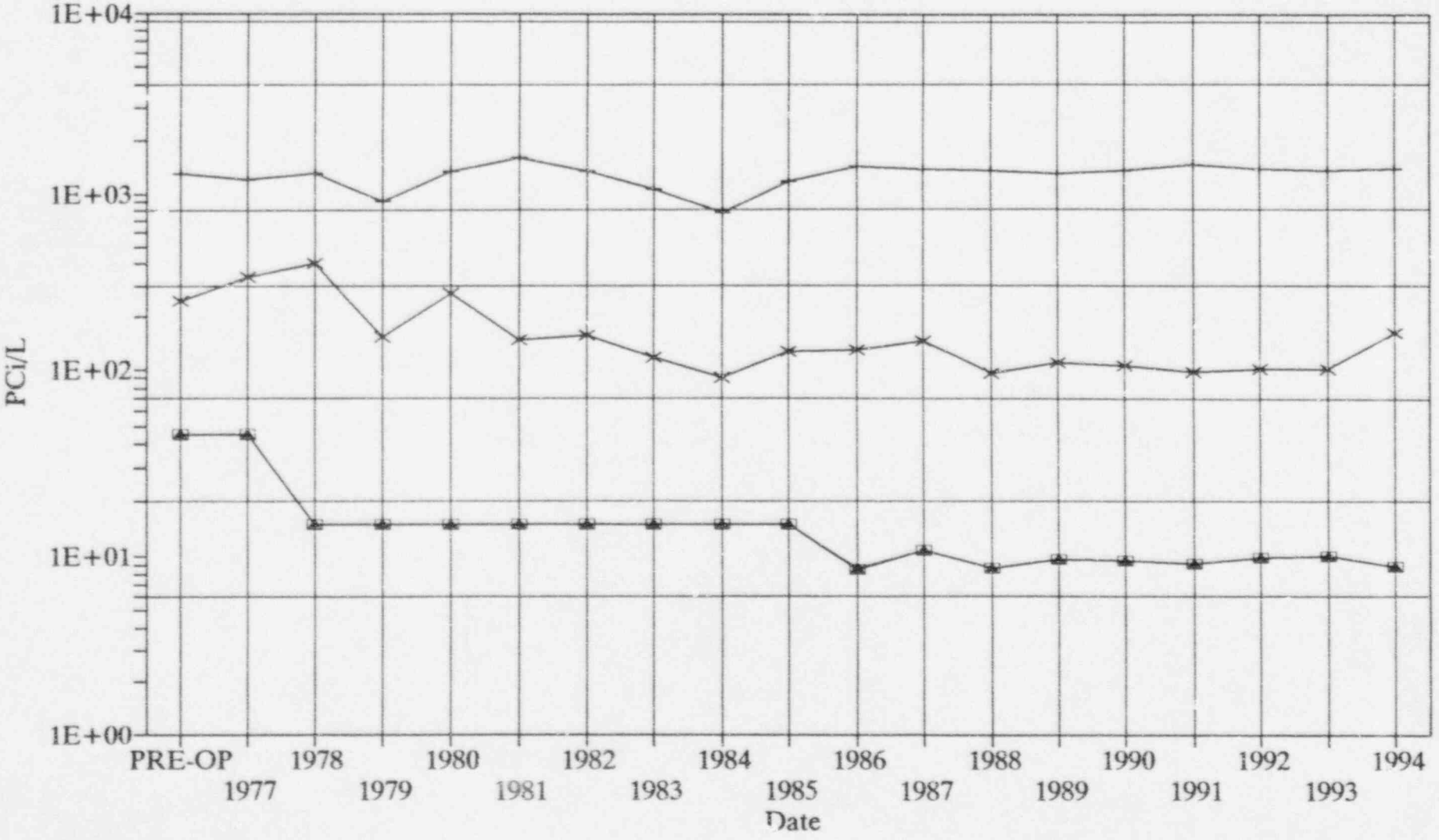
Annual Environmental Operating Report
Mean Annual Milk Concentration



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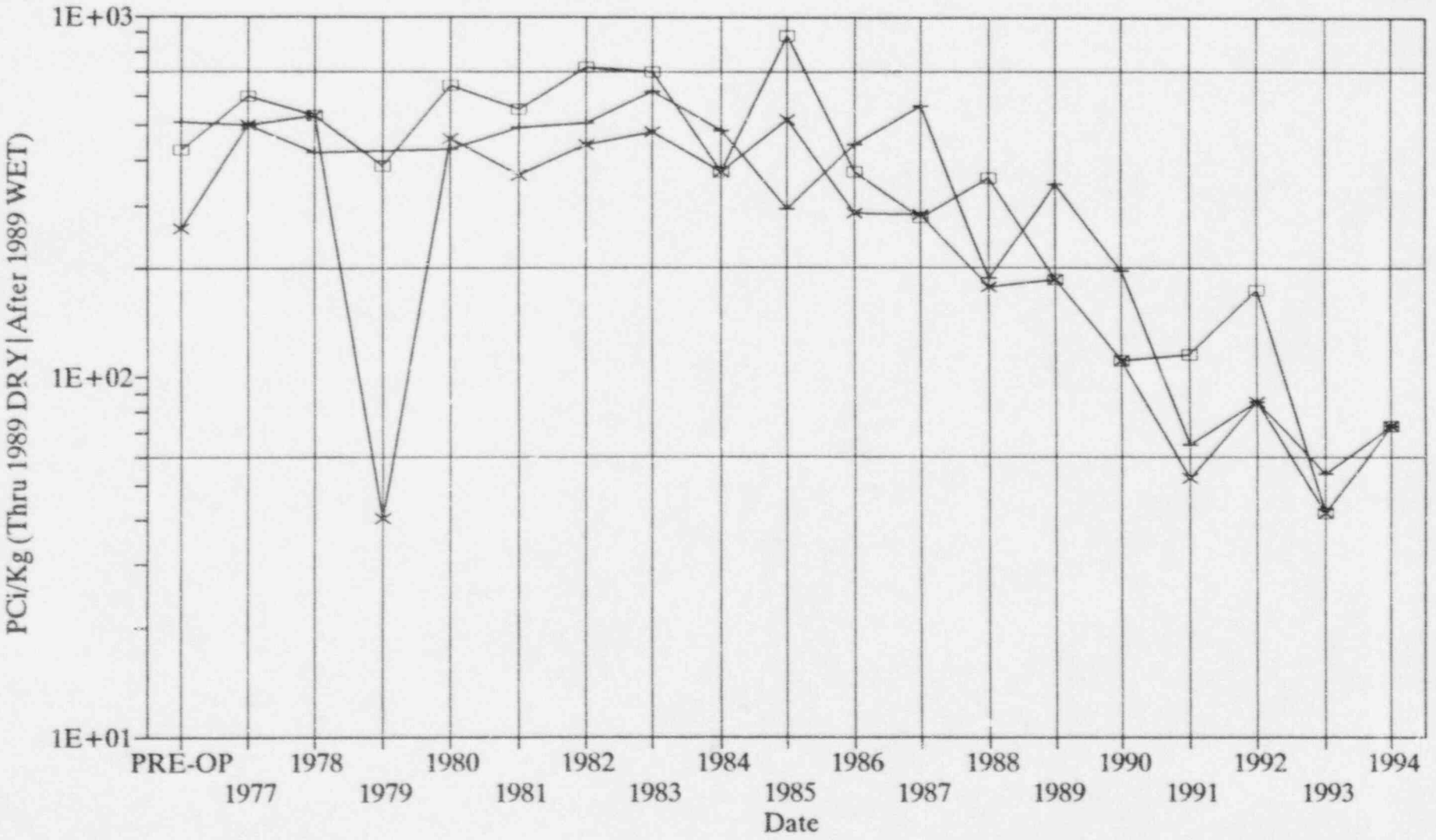
Annual Environmental Operating Report
Mean Annual Forage Concentration AC-228



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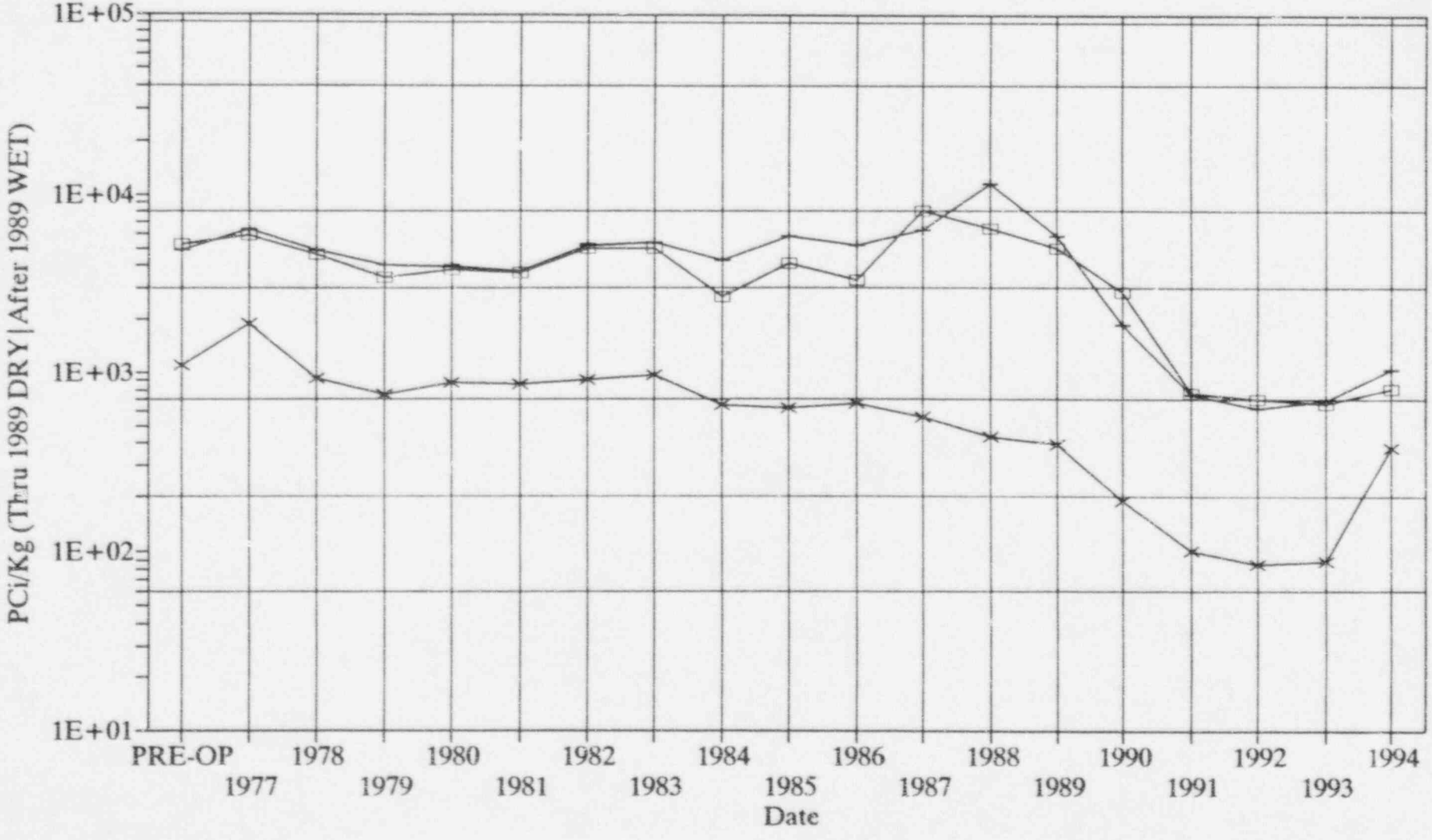
Annual Environmental Operating Report

Mean Annual Forage Concentration BE-7



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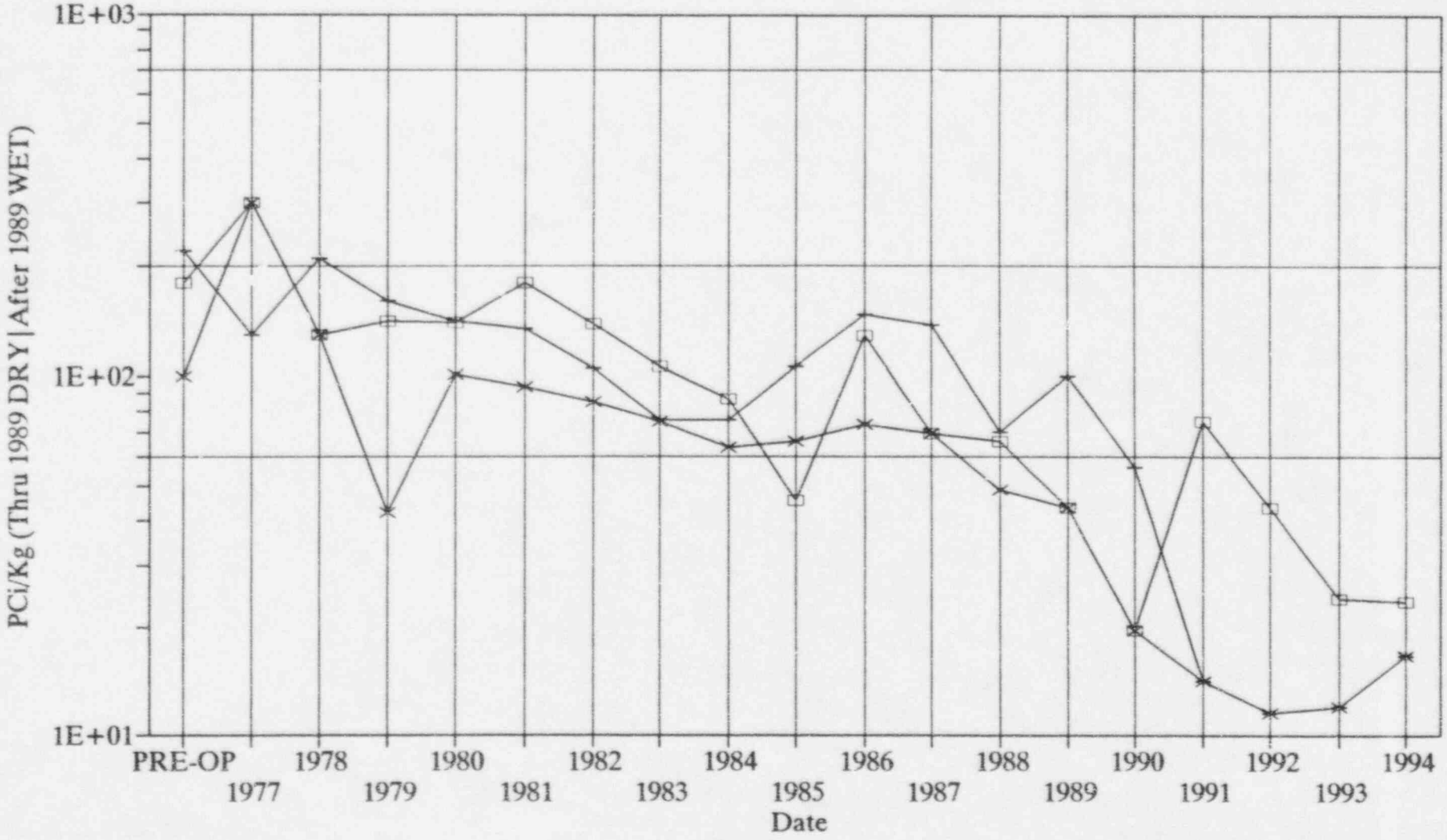
Annual Environmental Operating Report

Mean Annual Forage Concentration CS-137



J. M. Farley
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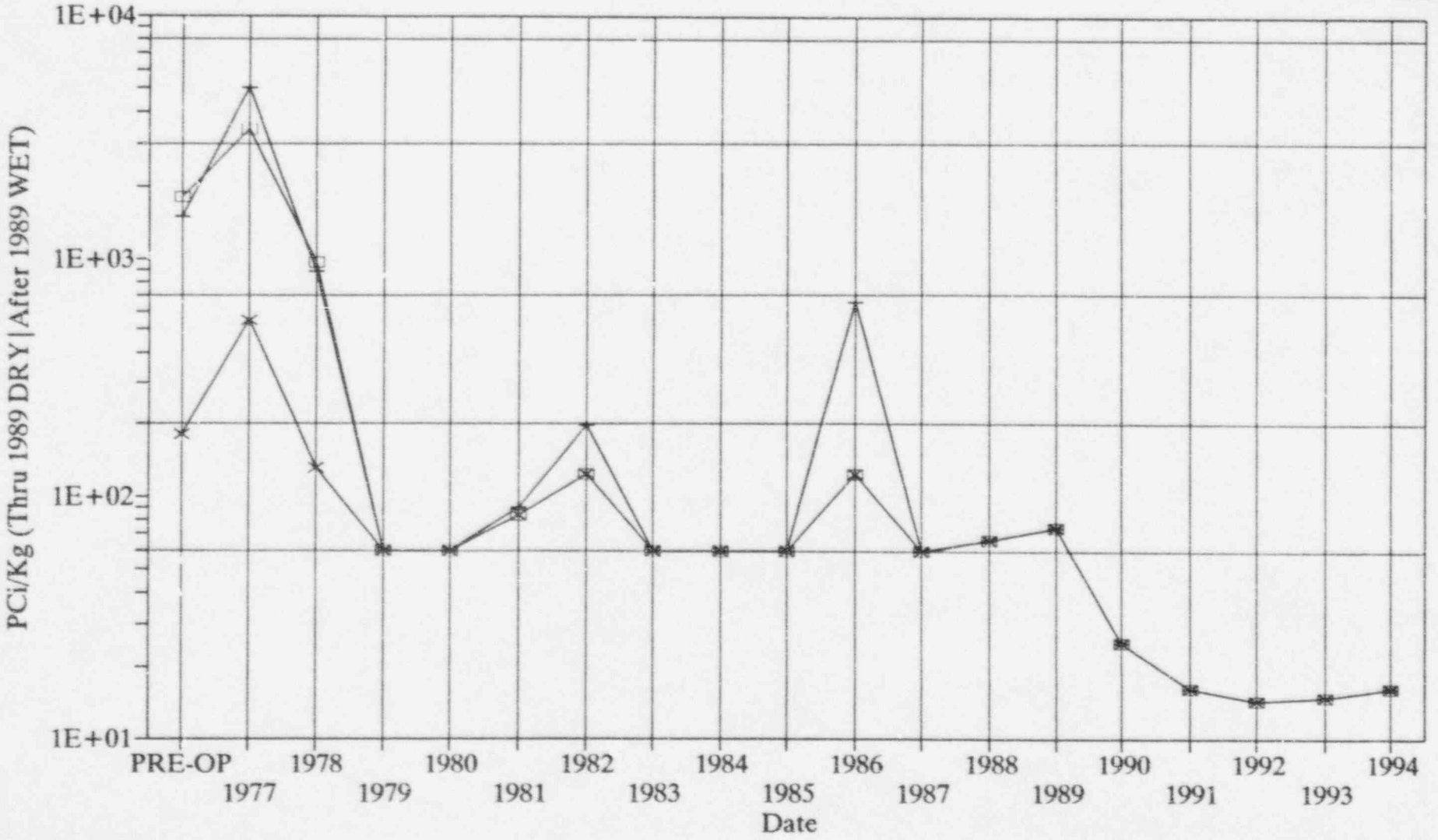
Annual Environmental Operating Report

Mean Annual Forage Concentration I-131



J. M. Farley
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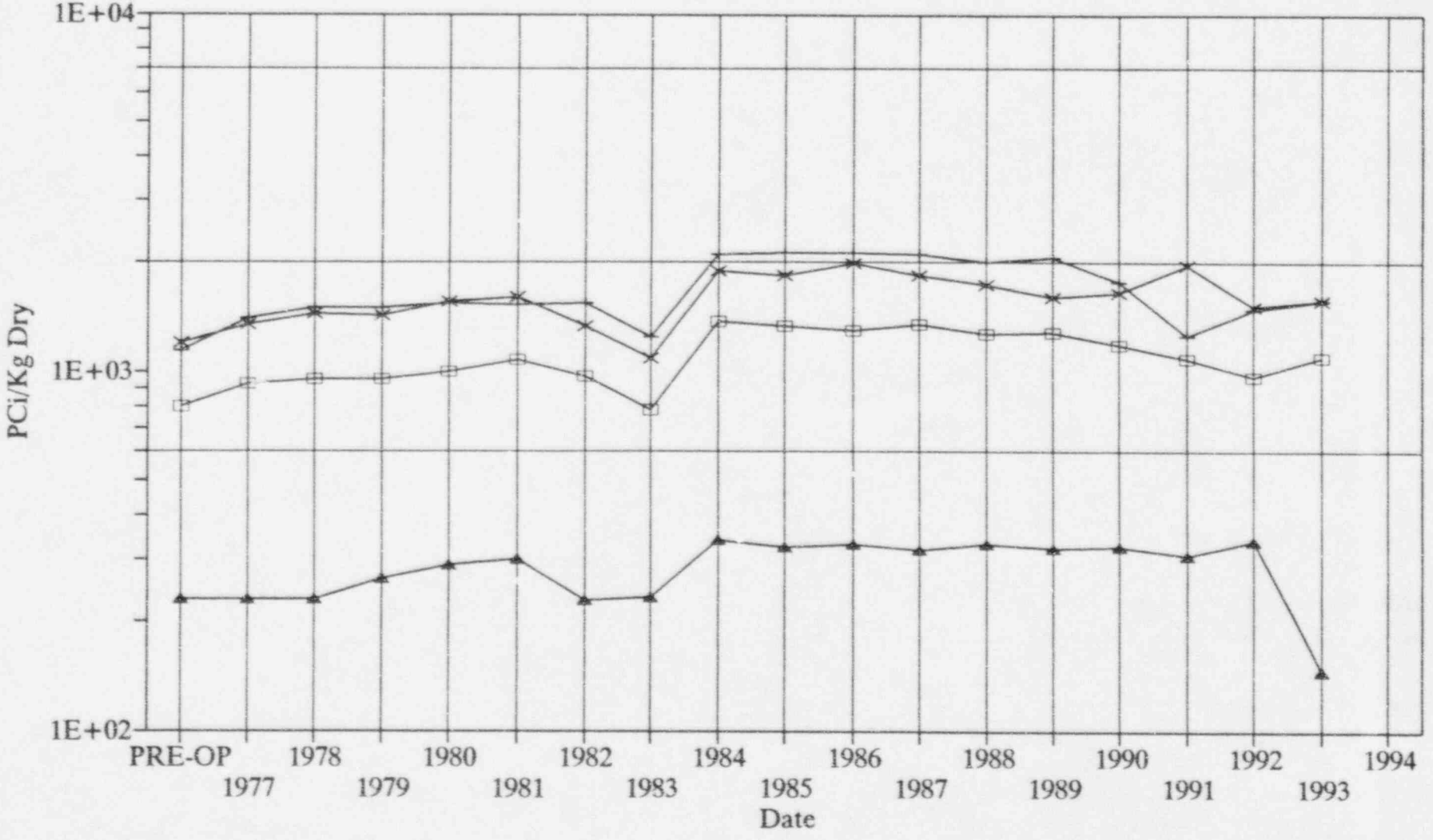
Mean Annual Soil In Situ AC-228



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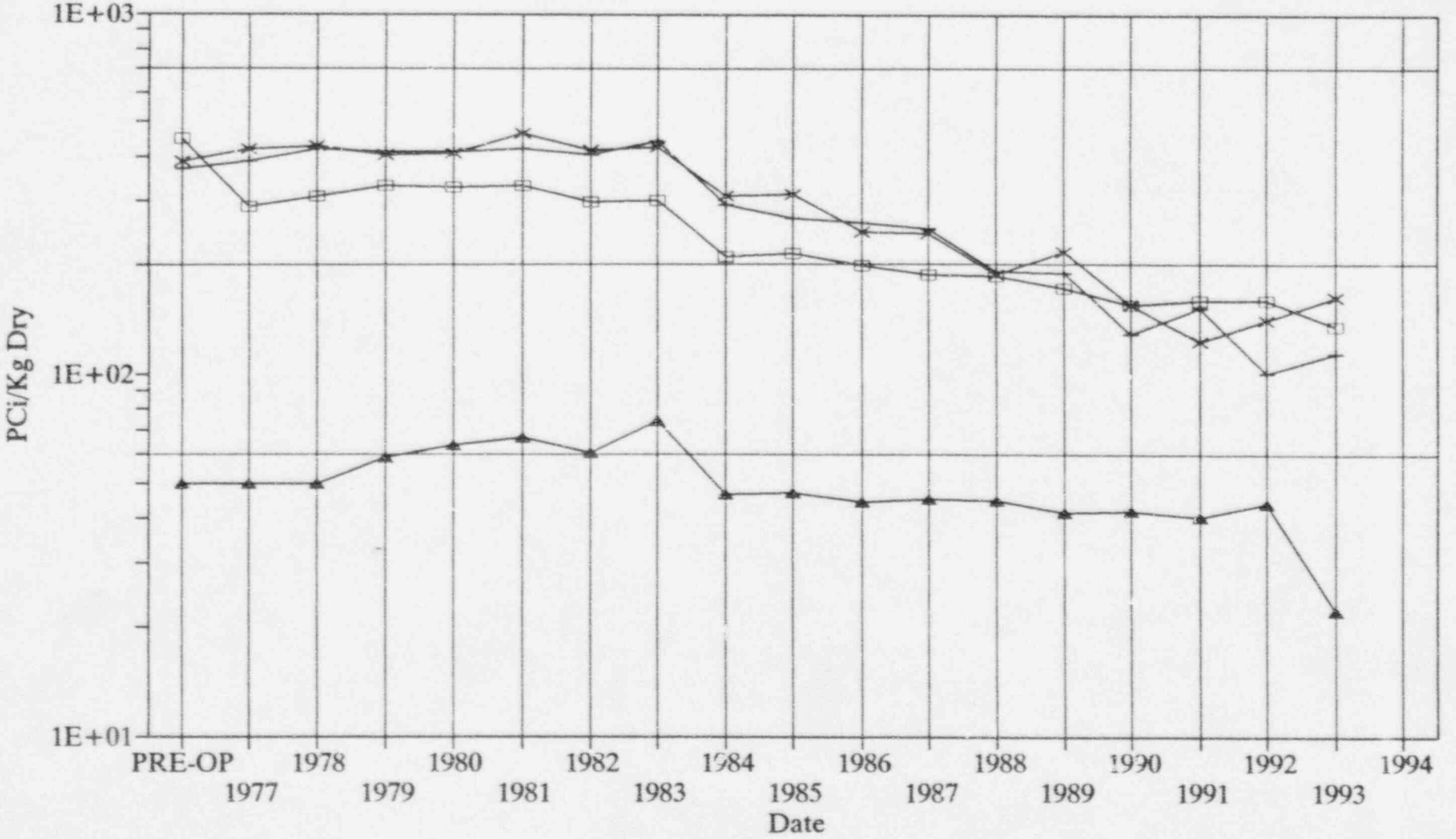
Annual Environmental Operating Report

Mean Annual Soil In Situ CS-137



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J. M. Farley
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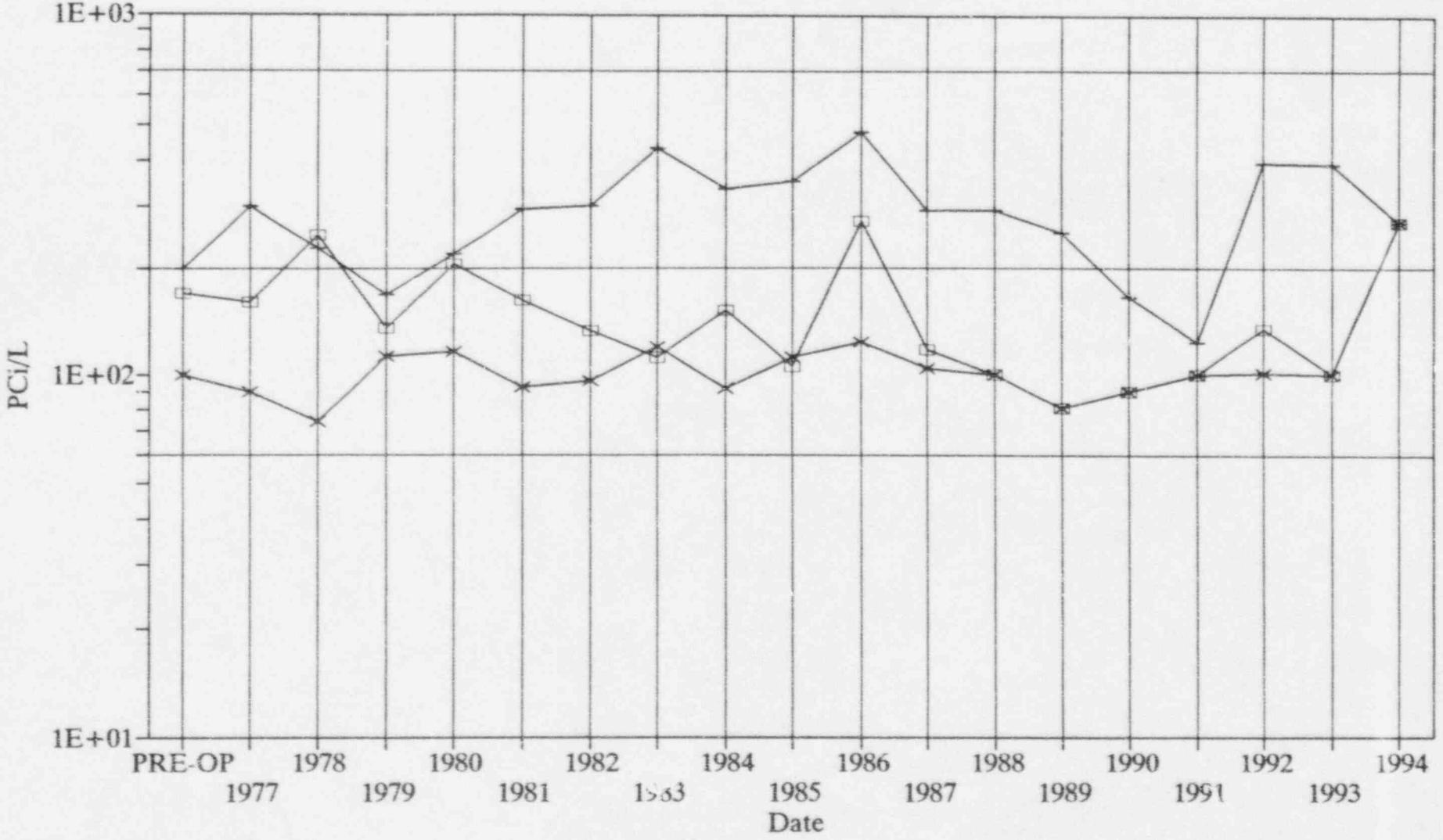
Annual Environmental Operating Report

Mean Annual River Water Conc. Tritium



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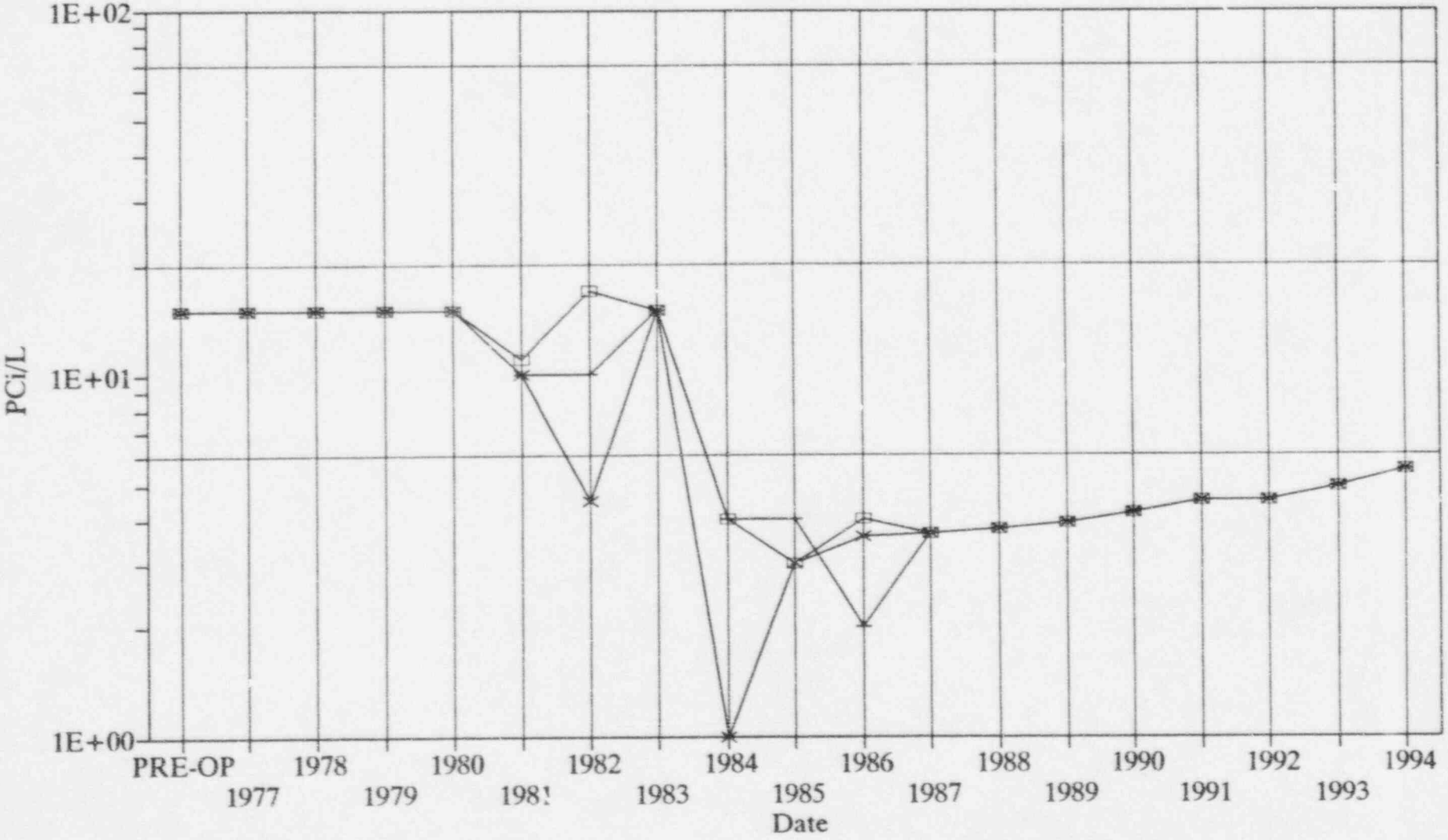
Annual Environmental Operating Report

Mean Annual River Water Conc. CS-134



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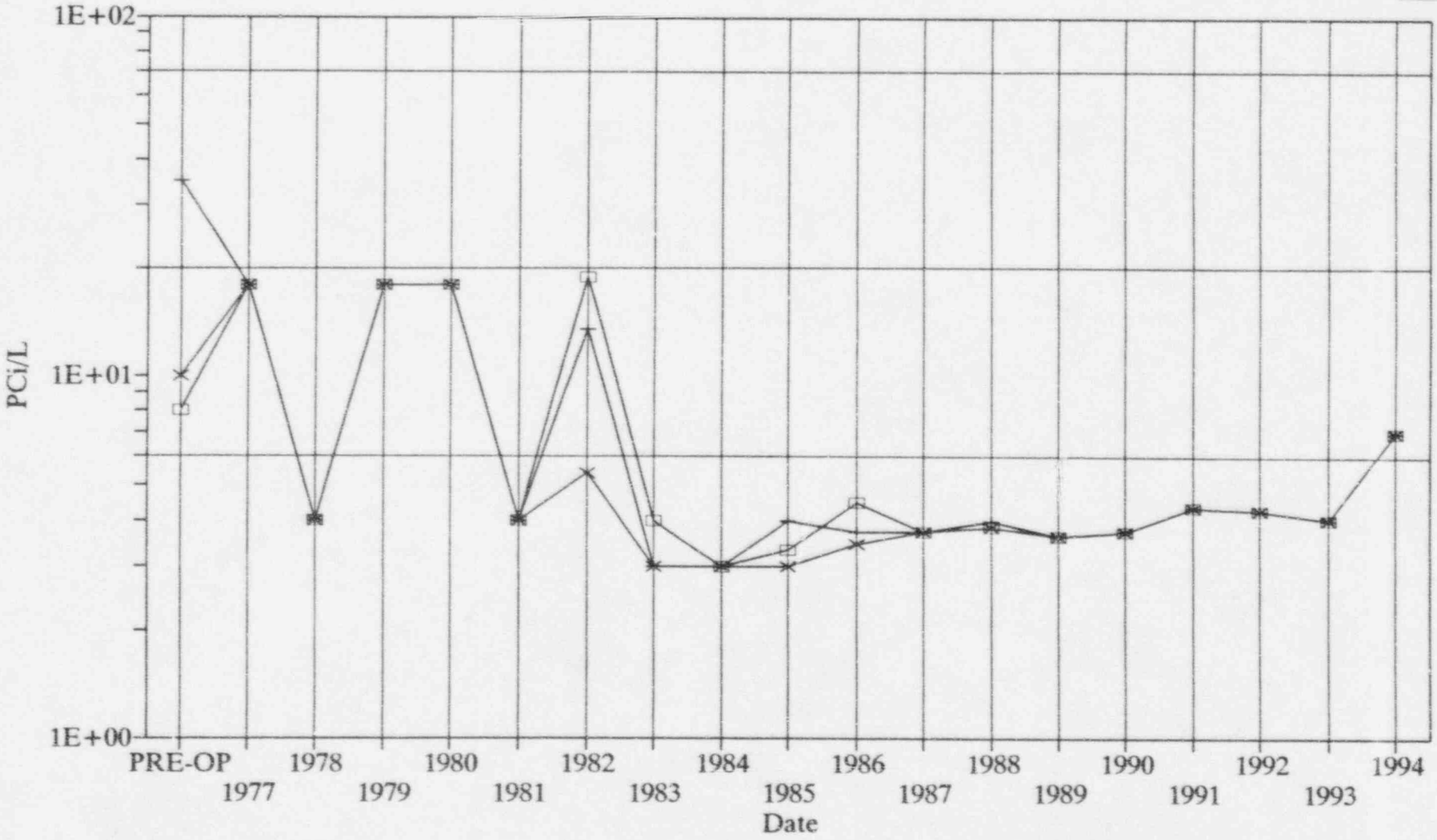
Mean Annual River Water Conc. CS-137



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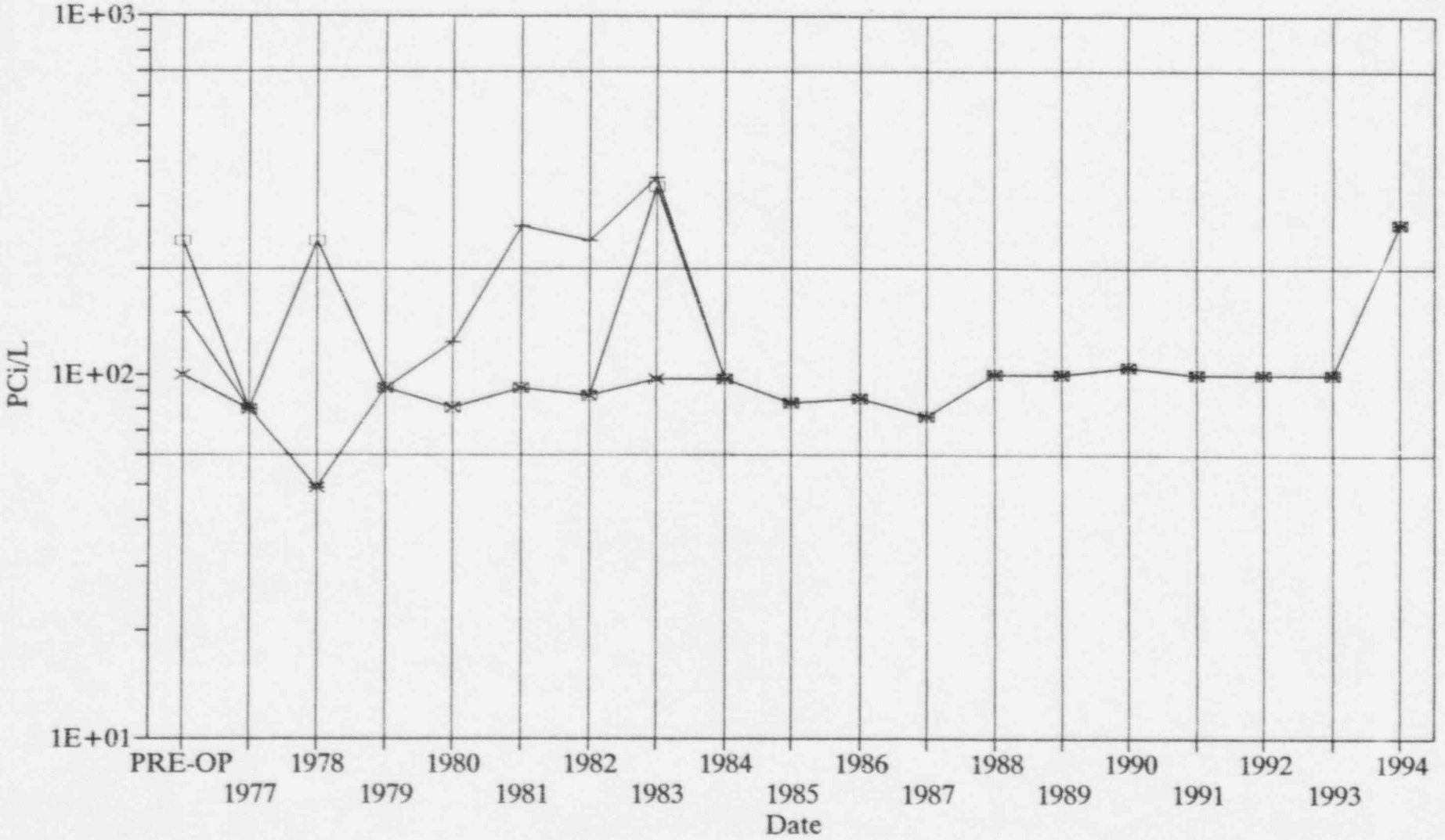
Mean Annual Ground Water Conc. Tritium



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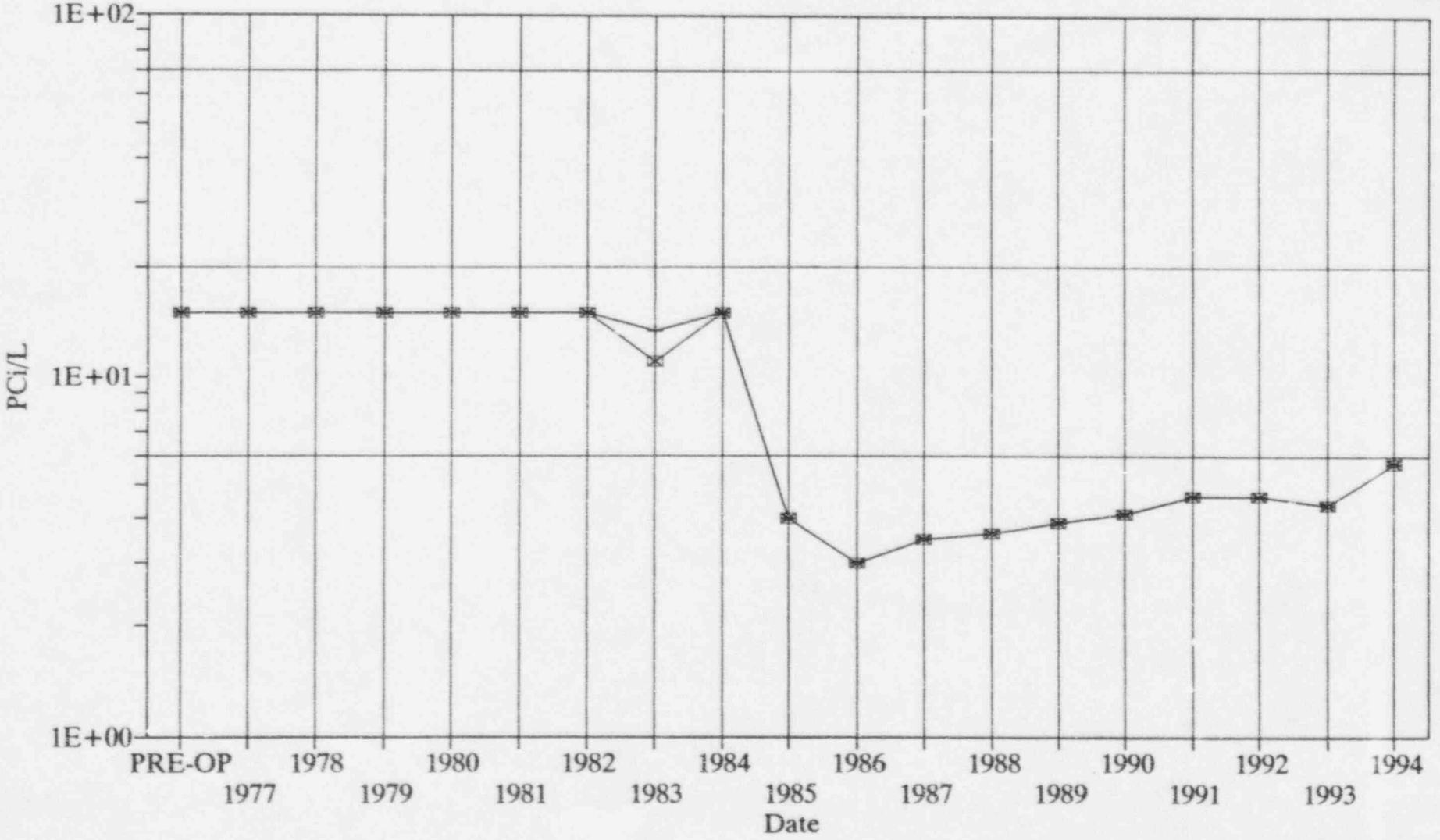
Mean Annual Ground Water Conc. CS-134



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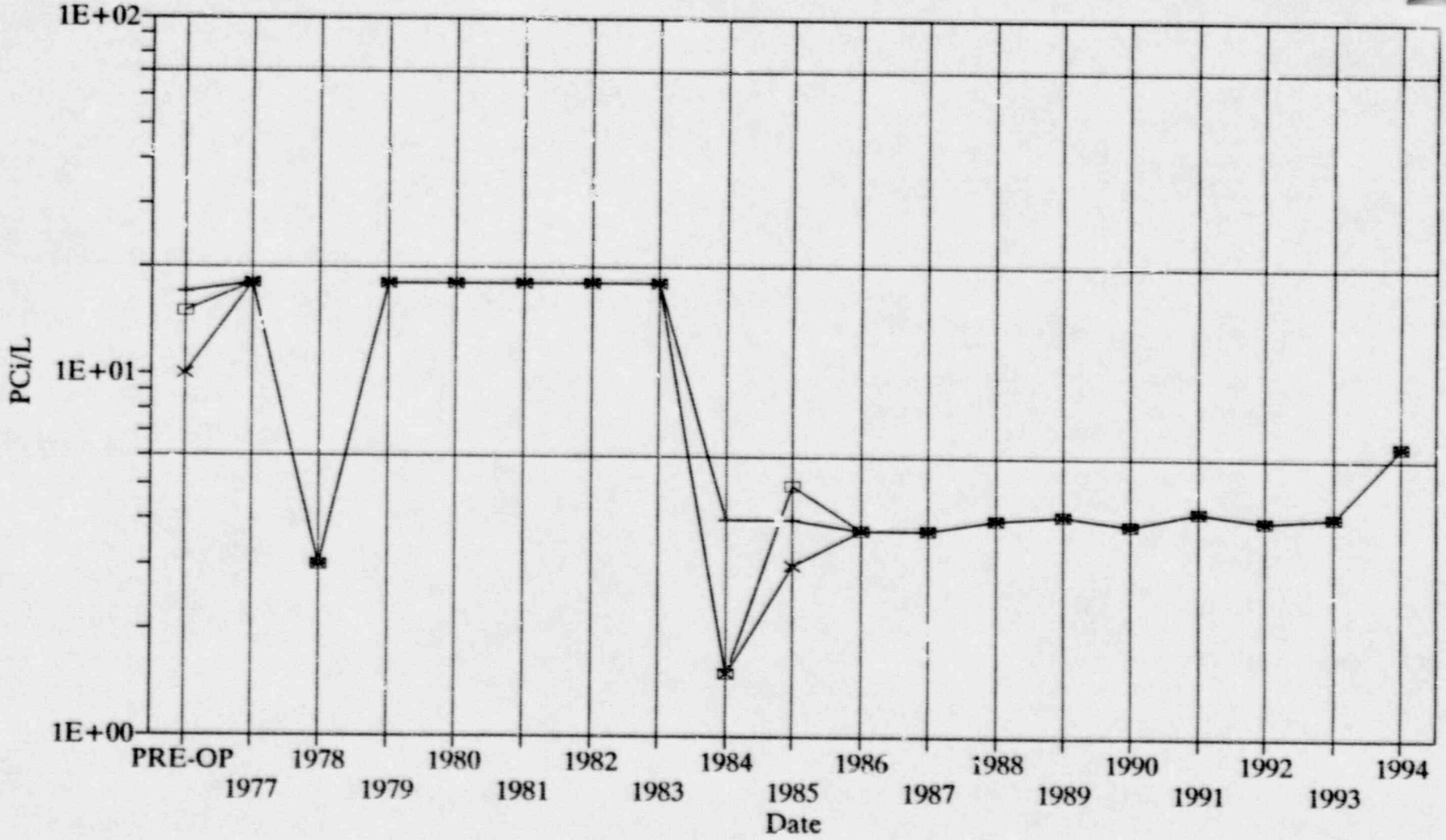
Mean Annual Ground Water Conc. CS-137



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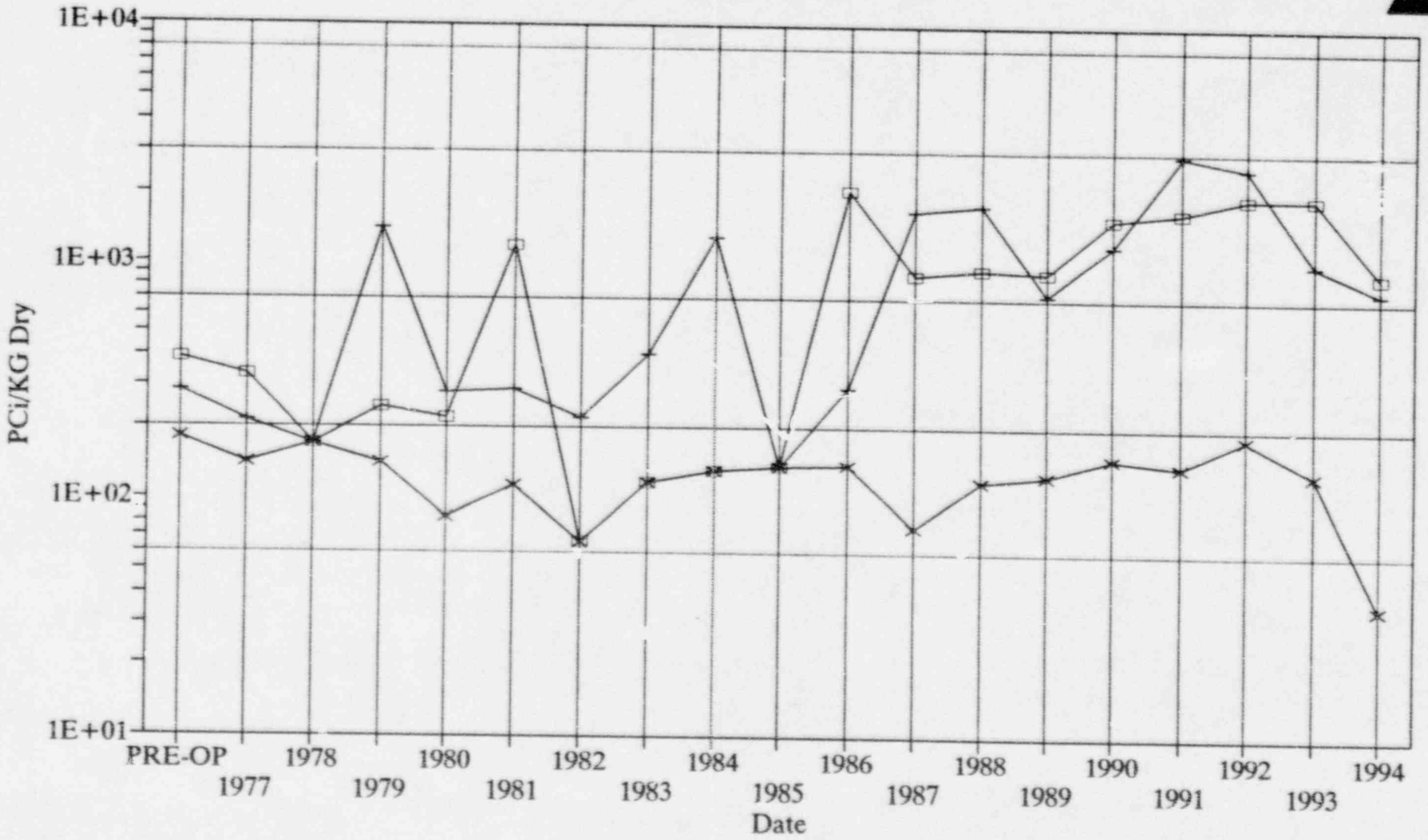
Annual Environmental Operating Report
Mean Annual River Sediment AC-228



J. M. Farley
Nuclear
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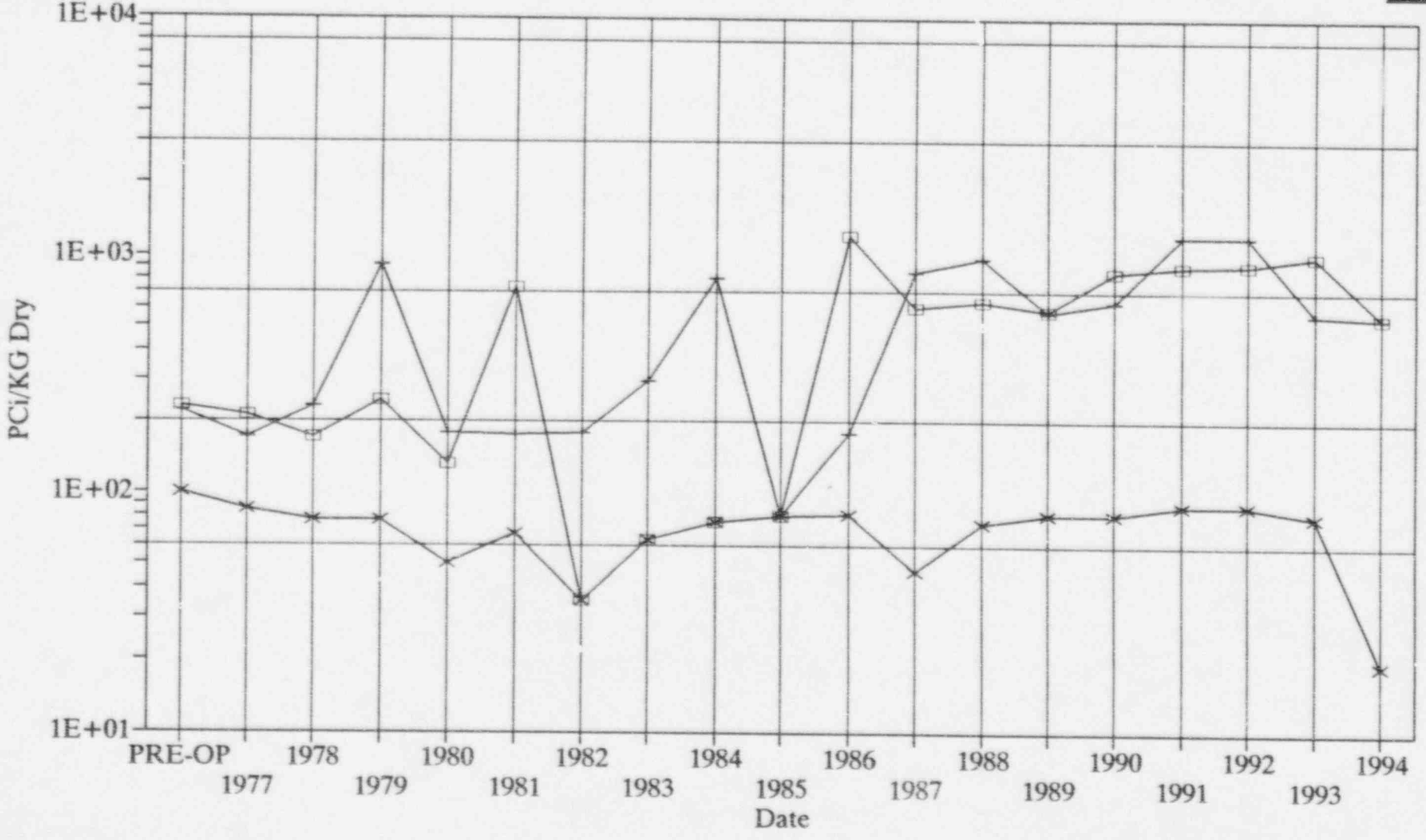
Annual Environmental Operating Report

Mean Annual River Sediment BI-214



J. M. Farley
Nuclear
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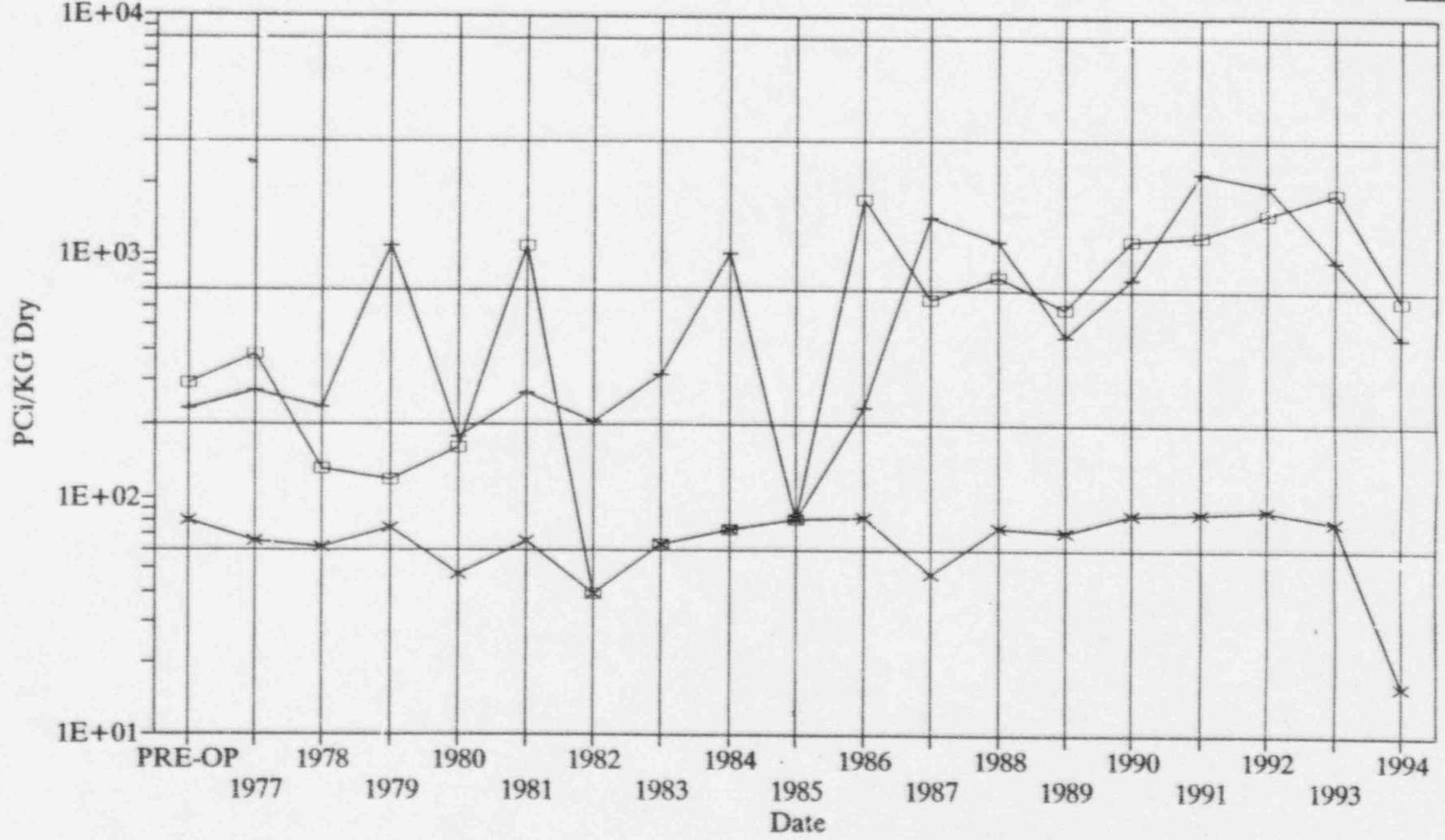
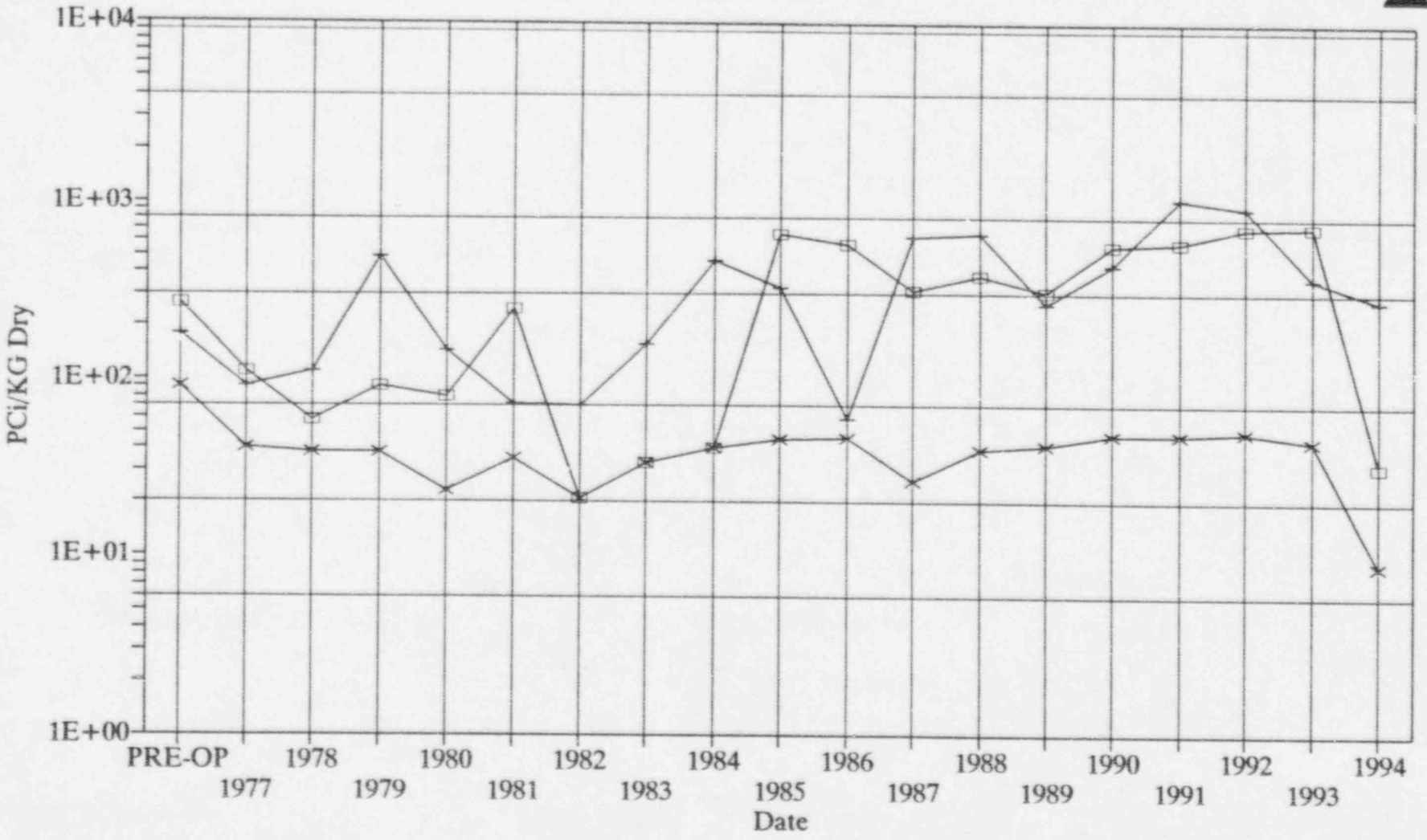
Annual Environmental Operating Report
Mean Annual River Sediment PB-212



J. M. Farley
Nuclear
Plant

Annual Environmental Operating Report

Mean Annual River Sediment TL-208



J. M. Farley
Nuclear
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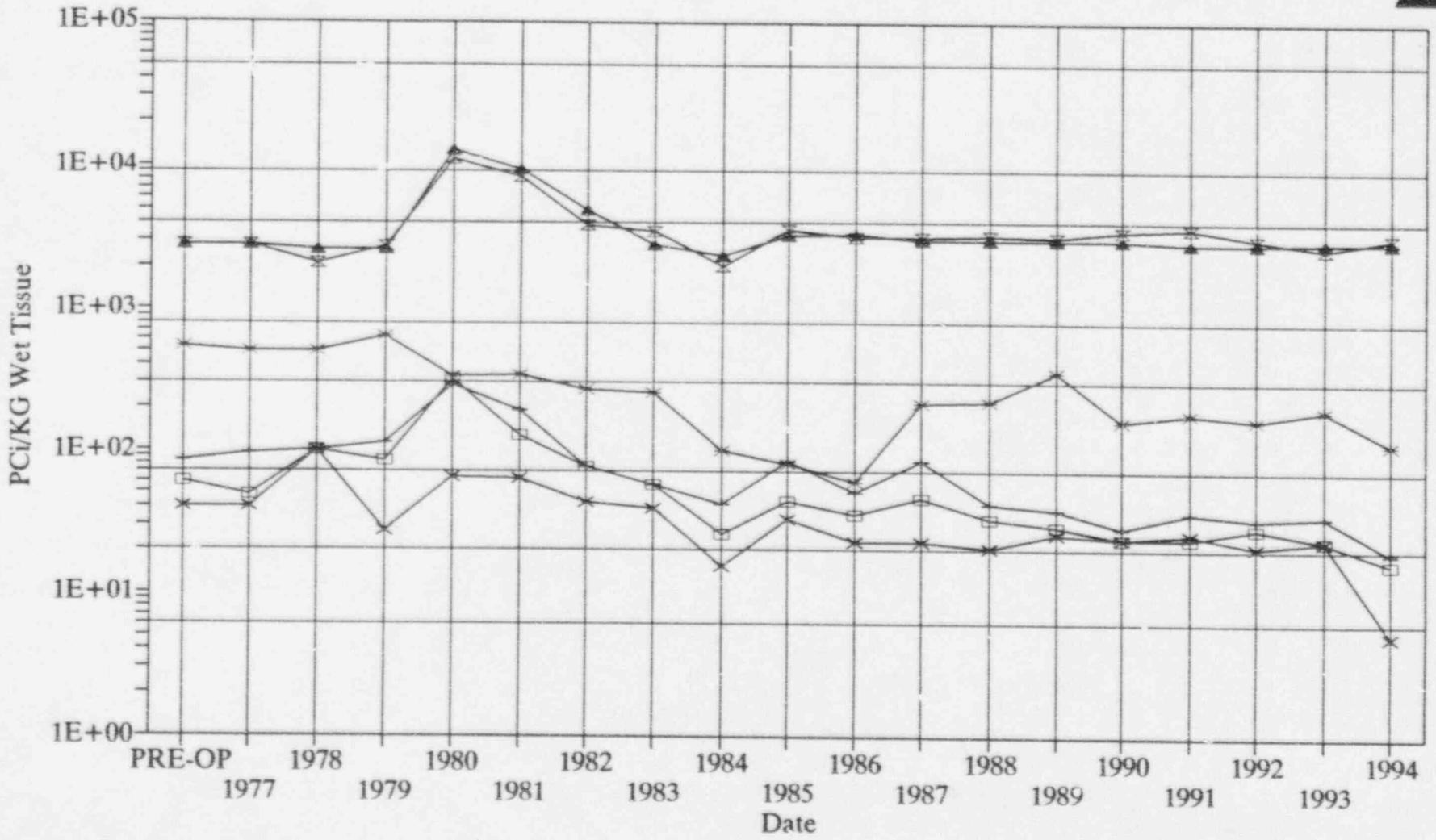
Annual Environmental Operating Report
Mean Annual Game Fish Concentrations



J. M. Farley
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Annual Environmental Operating Report

Mean Annual Bottom-Feeding Fish Conc.