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Washington, D. C 20555

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

Gentlemen:

The attached "Annual Environmental Operating Report, Part B: Radiological" for calendar year 1992, is transmitted in accordance with the Joseph M. Farley Nuclear Plant Unit 1 and Unit 2 Technical Specifications Section 6.9.1.6.

If you have any questions, please advise.

Respectfully submitted,

J. D. Woodard

/WHO:sls
ENV-93-147

Enclosures
1. Annual Environmental Operating Report - Radiological

cc: See Next Page.

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State of Alabama
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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, 1992

ANNUAL ENVIRONMENTAL OPERATING REPORT
PART B: RADIOLOGICAL

TABLE OF CONTENTS

RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

LIST OF FIGURES

RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

LIST OF TABLES

RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

LIST OF ATTACHMENTS

OPERATIONAL RADIOLOGICAL ENVIRONMENTAL PROGRAM

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 II was shutdown for its eighth refueling outage from March 6, 1992, through May 12, 1992. Unit I was shutdown for its eleventh refueling outage from September 25, 1992 through December 2, 1992.

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 1992 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 (3-8 miles). 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. While no longer required by Technical Specifications, in situ soil monitoring was continued in 1992.

The samples were collected by Southern Nuclear's technical staff except for the in situ soil measurements, which were collected by staff members of the University of Georgia(UGA), Center for Applied Isotope Studies. All sample analyses were contracted to UGA, except TLD's, which are read at the plant. 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 1992 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 Chattahochee, 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

At the beginning of the year, the airborne particulate and iodine monitoring stations shown in Figures 1 and 3 were equipped with Roots vacuum pumps which operated continuously at a flow rate of approximately 0.04 m^3/min (1.5 ft^3/min). The particulates were collected on Gelman Metricel 5 micron filters. In series with, but downstream of the particulate filters, 50 millimeter F&J activated charcoal cartridges (or equivalent) were used for collection of iodine. The Roots system has the sample collector mounted outside of the cabinet horizontally to the ground with a Singer gas meter measuring the cumulative air flow. The gas meters were calibrated against a certified flow meter.

In May 1992, the Roots systems were replaced by 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. The five micron Gelman particulate filter and the 50 millimeter F&J activated charcoal cartridge (or equivalent) 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 more uniform distribution of sampled airborne particulates over the entire filter disk than was possible with the Roots system, where the filters were mounted horizontally, and the particulate filter was placed directly on the charcoal cartridge casing. The totalizers are calibrated using the SAIC Model C-812 calibrator.

Particulate filters and charcoal cartridges were collected weekly and sent to UGA for radioactivity analysis. Gross beta radioactivity measurements were performed on each air particulate filter using a Tennelec low background alpha-beta counting system. The filters from each station, composited at the end of each quarter, were analyzed for gamma emitters using a fifteen percent relative efficiency low background germanium lithium (Ge(Li)) detector and a Canberra 4096 channel computer-based multichannel analyzer (MCA).

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 UGA using a Canberra 1024 channel MCA and two 1" x 3" NaI detectors and matched photomultiplier tubes.

B. External Radiation

For the continuous measurement of environmental gamma radiation, natural Lithium Fluoride (LiF) (TLD-700) chips, manufactured by Harshaw-Filtrol Chemical Company, were used. TLD packets, each containing four annealed LiF chips, were sealed in opaque mylar to produce a packet that was light-tight, weather-proof, and which had a low mass attenuation for radiation (approximately 50mg/cm^2). 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 TLD packets, one changed and read quarterly and one changed and read annually, 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 UGA for I-131 and gamma emitters. As a preservative for shipment, 1 ml of 25 weight percent merthiolate (Thimerosal) solution was added to each one gallon sample. The I-131 concentration in each sample was determined by collection on anion exchange resin, elution with sodium hypochlorite, followed by organic extraction and counting, by beta-gamma coincidence, the resultant toluene-iodine solution in a low level liquid scintillation counter. Stable iodine carrier was added to each sample for determination of the radiochemical yield.

One liter of each sample was placed in a marinelli beaker and analyzed for gamma emitters using a 15 percent relative efficiency low background Ge(Li) detector and a Canberra 4096 channel computer-based MCA.

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. After drying and pulverizing, the samples were analyzed by UGA for gamma emitters using a 15 percent relative efficiency low background Ge(Li) detector and a Canberra 4096 channel computer-based MCA.

E. Soil

Annual *in situ* gamma-ray spectroscopy measurements were made by UGA using a 10 percent relative efficiency high purity germanium detector and gamma-ray spectroscopy system specially designed for field use. Measurements were taken at the seven indicator locations and at the three community and two control (background) locations listed in Table 1. A 1024 channel Canberra MCA interfaced to a Hewlett-Packard 9825A calculator was used for data storage and analysis.

F. Surface (River) Water

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. Monthly composites were sent to UGA for radioactivity analysis. Two liter aliquots from each monthly composite were placed in trays lined with plastic film and evaporated to dryness at 100°C. The residue (on plastic film) was folded to fit a petri-dish and analyzed for gamma emitters using a 15 percent relative efficiency Ge(Li) low background detector and a Canberra 4096 channel computer-based MCA.

At the end of each quarter, for each sampling location, the balance of the three monthly composites were combined to give a quarterly composite sample. Approximately 50 ml from each quarterly composite sample was distilled and a 25 ml aliquot taken for tritium analysis using a large volume (100 ml) Hewlett-Packard 200 low background liquid scintillation counter.

G. 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 UGA for radioactivity analysis. An aliquot from each sample was taken for tritium analysis. After distillation, 25 ml samples were analyzed using a large volume (100 ml) low background liquid scintillation counter. From the remainder of each sample, a two liter aliquot was taken and evaporated to dryness at 100°C in a tray lined with plastic film. The residue (on plastic film) was folded to fit a petri dish and analyzed for gamma emitters using a 15 per-cent relative efficiency Ge(Li) detector and a Canberra 4096 channel computer-based MCA.

H. **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 UGA for gamma-ray spectroscopy analysis. All fish samples sent to UGA consisted of fish fillets that had been split with Alabama Division of Radiation Control. These fish samples were coarsely chopped at UGA and were analyzed for gamma emitters using a 15 percent relative efficiency low background Ge(Li) detector and 4096 channel Canberra computer-based MCA.

I. **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 UGA where it was dried, mixed, and analyzed for gamma emitters using a 15 percent relative efficiency low background Ge(Li) detector and a Canberra 4096 channel computer-based MCA. One set of semi-annual sediment samples was split with Alabama Division of Radiation Control.

III. Results and Discussion

No known atmospheric nuclear tests were conducted during 1992.

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 charcoal cartridges are shown in Tables 1992-1 and 1992-2, and Attachment 2, pages 1-4. The 1992 results, while below pre-operational levels, showed increased particulate Beta activity and increased particulate Beryllium-7 activity. Investigation revealed that other nuclear facilities in the Southern Company System had not observed similar increases in activity and that the increases observed at FNP coincided with installation of the new environmental air sampling systems in May. The increased activity levels (approximately 0.008 to 0.022 pCi/cubic meter for Beta) were observed at all sample stations. The increase in measured activity at indicator, control and community stations were similar. A review of the Semi-Annual Effluent Release Reports for 1992 revealed that the plant particulate effluent releases did not correlate with the increases in particulate Beta activity. The same sample collection filters were used with both the old and the new samplers. Analytical equipment and techniques were also the same. This would indicate that the increases may have been caused by the new air sampling systems. The features of the new air samplers which could account for the increase are:

1. Vertical mounting of the sample filters with sample flow passing from top to bottom, first through the particulate filter and then through the charcoal cartridge.

2. Incorporation of a flow regulator valve to provide for constant sample flowrate by compensating for increased ΔP across the filters.

3. Housing each filter in a separate compartment in a filter holder designed to allow sampled particulate to be more evenly distributed over the filter disk.

The conclusion that the increased particulate Beta activity is related to the installation of the new air sampling systems is supported by the increases in activity levels of Beryllium-7, a naturally occurring isotope measured on the same filters, and a slight increase in the Iodine 131 MDC observed following installation of the new monitors. Cesium 134 and Cesium 137 were not detected. Since the annual mean Iodine 131 MDC was less than in 1991, the slight increase in Iodine 131 MDC is not considered significant.

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 1992-3 and Attachment 2 page 5. The 1992 results are at or below pre-operational levels and consistent with previous years. There are no significant differences in indicator, community and control measurements.

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 1992-4 and Attachment 2, pages 6-8. Lewis Dairy was used as the control location. There were no indicator samples during 1992. The 1992 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 1992-5 and Attachment 2, pages 9-12. The 1992 results are below pre-operational levels and consistent with the downward trends of recent years with the following exceptions. The October 1992 sample contained 43 pCi/kg Cesium 137 activity. This value is below pre-operational levels and is not considered significant since Cesium 137 has been shown to be present in the soil throughout the area.

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

E. Soil

The <u>in situ</u> soil analysis results are shown in Table 1992-6 and in Attachment 2, pages 13 and 14. The only man-made isotope found was Cesium 137 which has been present since the pre-operational period. Although the mean control Cesium 137 activity was greater than in 1991, Cesium 137 measurements for 1992 continue the downward trend of recent years.

F. **Waterborne (Surface Water)**

The surface water analysis results are shown in Table 1992-7 and in Attachment 2, pages 15-17. The mean indicator tritium activity was greater than the 1991 value and pre-operational levels. The activity, measured during the second, third and fourth quarters, peaked in the third quarter. The fourth quarter result was below pre-operational levels. The increased activity was due to increased levels of tritium in plant effluents based on a review of the Semi-Annual Effluent Reports for 1992. In addition, low river flow rates were observed during dry weather months. The background activity, measured in the first quarter only, was below pre-operational levels. No measurable activity from other man-made isotopes was detected in control samples.

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

G. **Waterborne (Ground Water)**

The ground water analysis results are shown in Table 1992-8 and in Attachment 2, pages 18-20. No measurable activity from man-made isotopes was detected in ground water samples in 1992.

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

H. **River Sedimen**

The river sediment analysis results are shown in Table 1992-9, and in Attachment 2, pages 21-24. Along with activity from a variety of naturally occurring isotopes, Cesium 134 activity was measured in the fall control and indicator samples. Activity from Cesium 134 has been detected sporadically in previous control samples but this is the first time it was detected in the indicator sample. Review of past Semi-Annual Effluent Reports revealed that Cesium 134 activity in 1992 plant effluents was less than in 1991 and consistent with established trends. This will be monitored for future trends.

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 1992-10 and in Attachment 2, page 25. Cesium 137 activity was detected in the spring and fall indicator samples and in the fall control sample. 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 bottomfeeding fish are shown in Table 1992-11 and in Attachment 2, page 26. No measurable activity from man-made isotopes was detected in control or indicator samples, and MDC values are less than those for the pre-operational period.

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 5, 1992. The results are given in Attachment I. The Milk Animal Survey reported that the owner of goats located 5.1 miles south of FNP could not be contacted. In July 1992, the owner was contacted and stated that the goats were not being milked. The animals were subsequently removed.

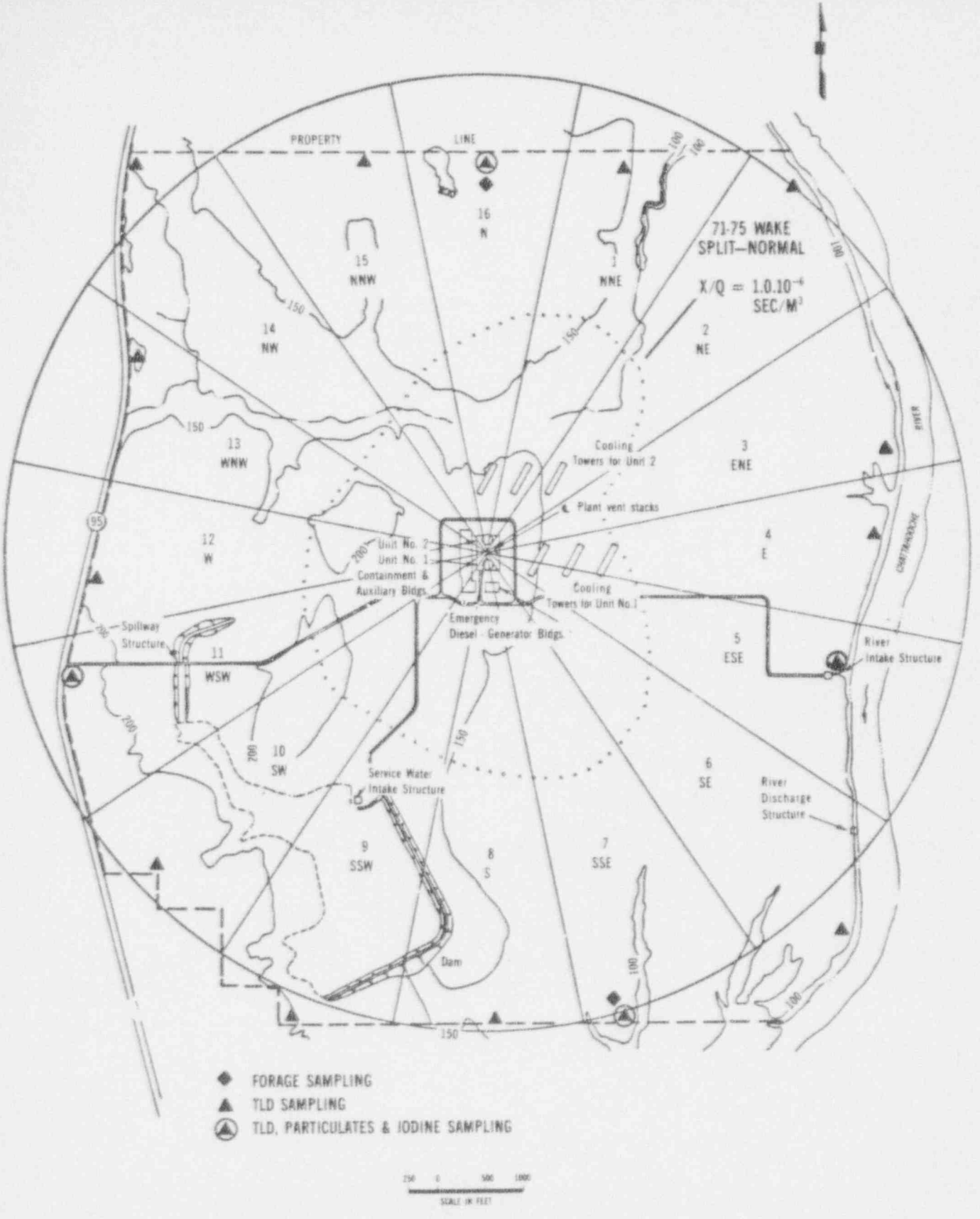
No deviations from the Environmental Monitoring Program occurred as a result of the Land Use Census and Milk Animal Survey.

B. Interlaboratory Comparison Program

During 1992, the University of Georgia Center for Applied Isotope Studies (UGA) was a participant in the EPA Crosscheck Program. The UGA EPA Program code designation is EA.

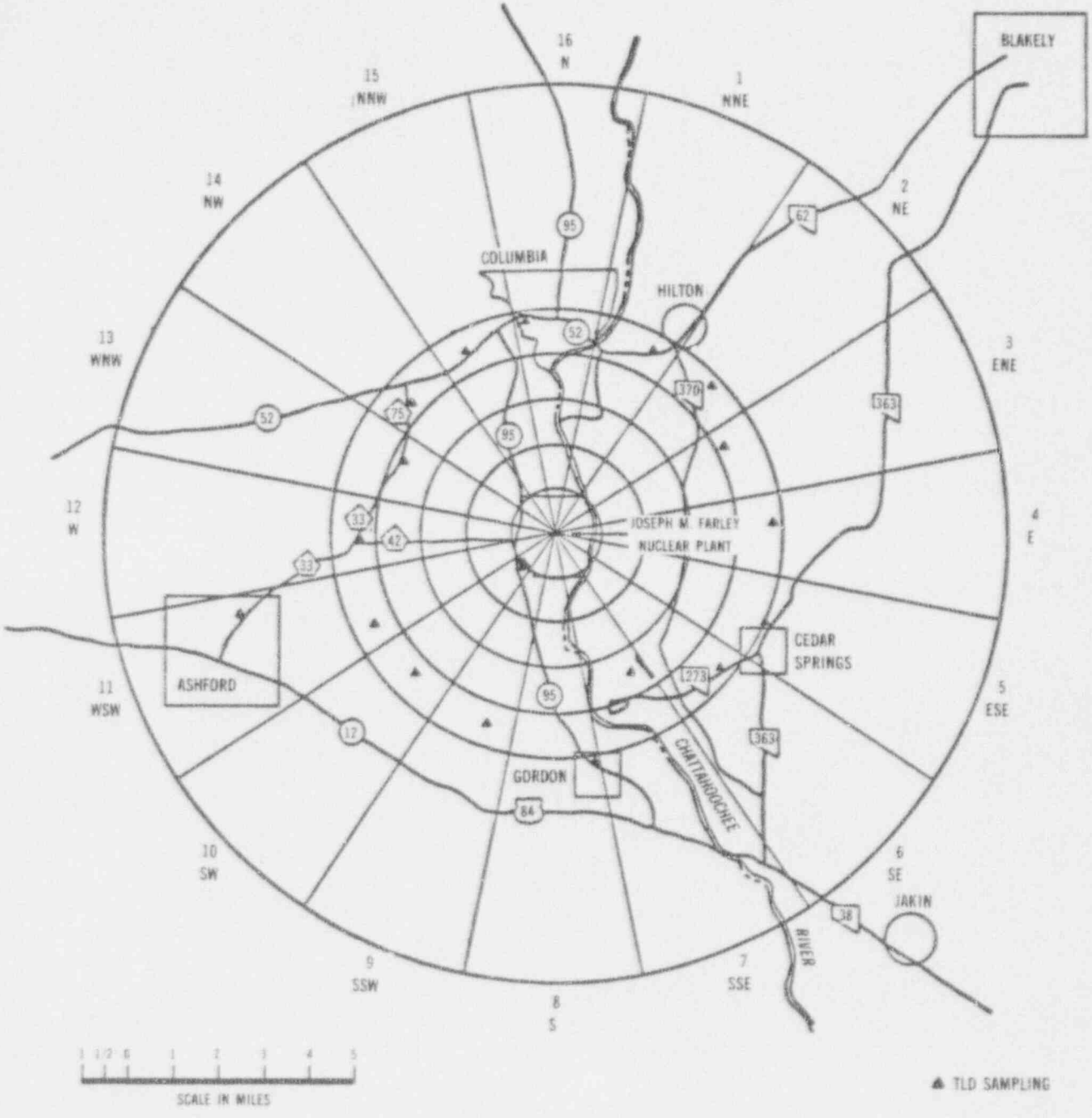
V. Data Trends and Conclusion

Review of data trends from the pre-operational period through 1992 indicates that environmental radiation levels measured in all the pathways monitored in 1992 remained at background levels and were at or below pre-operational levels, except river water tritium and river sediment Cesium 134. The atmospheric weapons tests conducted by the People's Republic of China in October 1980, and the Chernobyl disaster in April 1986, produced measurable increases in background radiation, but the effects dissipated within two to three years following each event. The general downward trend in environmental radiation levels observed since 1986 continued in 1992. Therefore, data obtained during 1992 demonstrated that continued operation of Farley Nuclear Plant has not harmed or caused any irreversible damage to the environment.



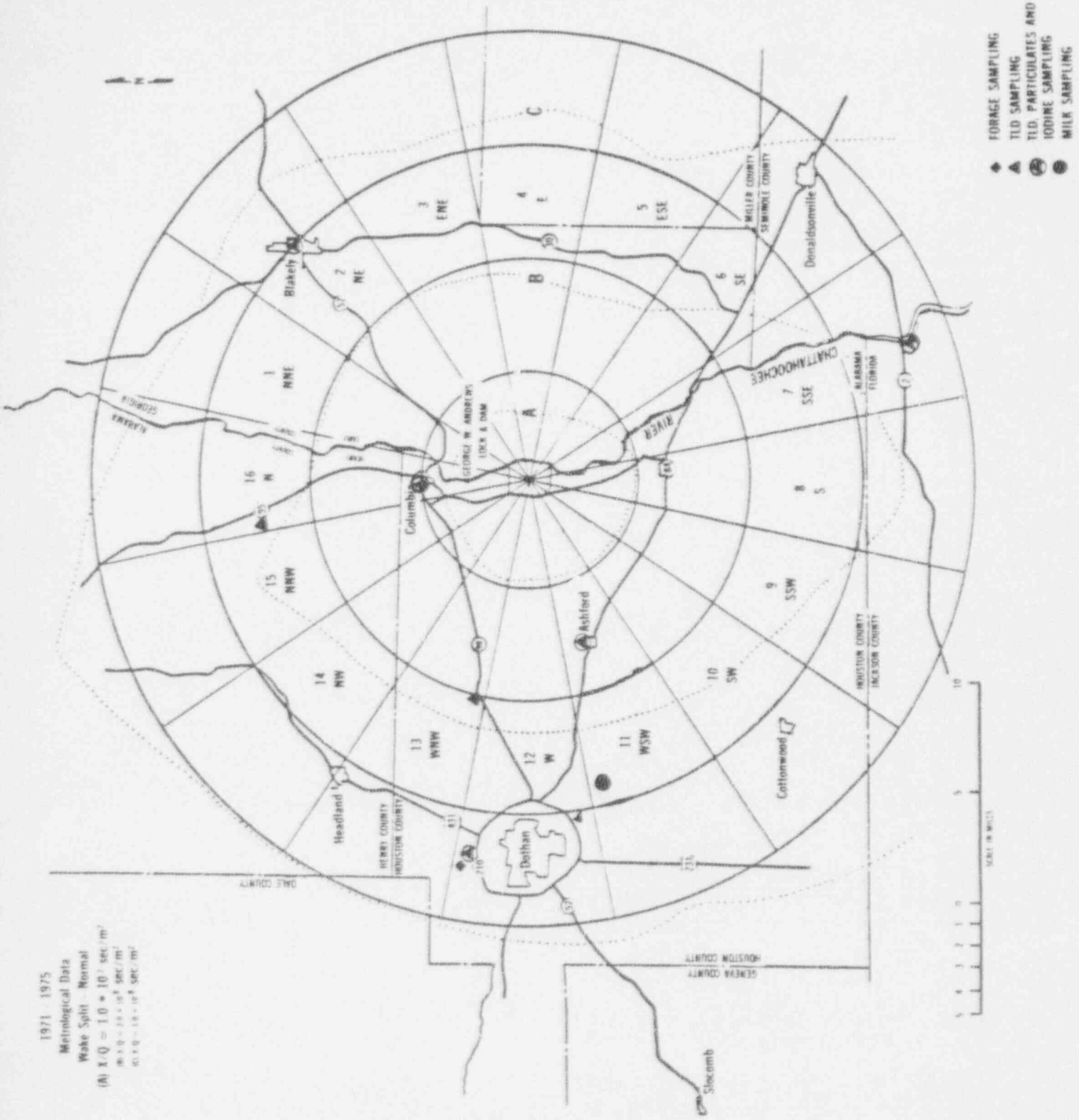
INDICATOR SAMPLING LOCATIONS FOR AIRBORNE/DIRECT ENVIRONMENTAL RADIOACTIVITY AT THE FARLEY NUCLEAR PLANT

FIGURE 1



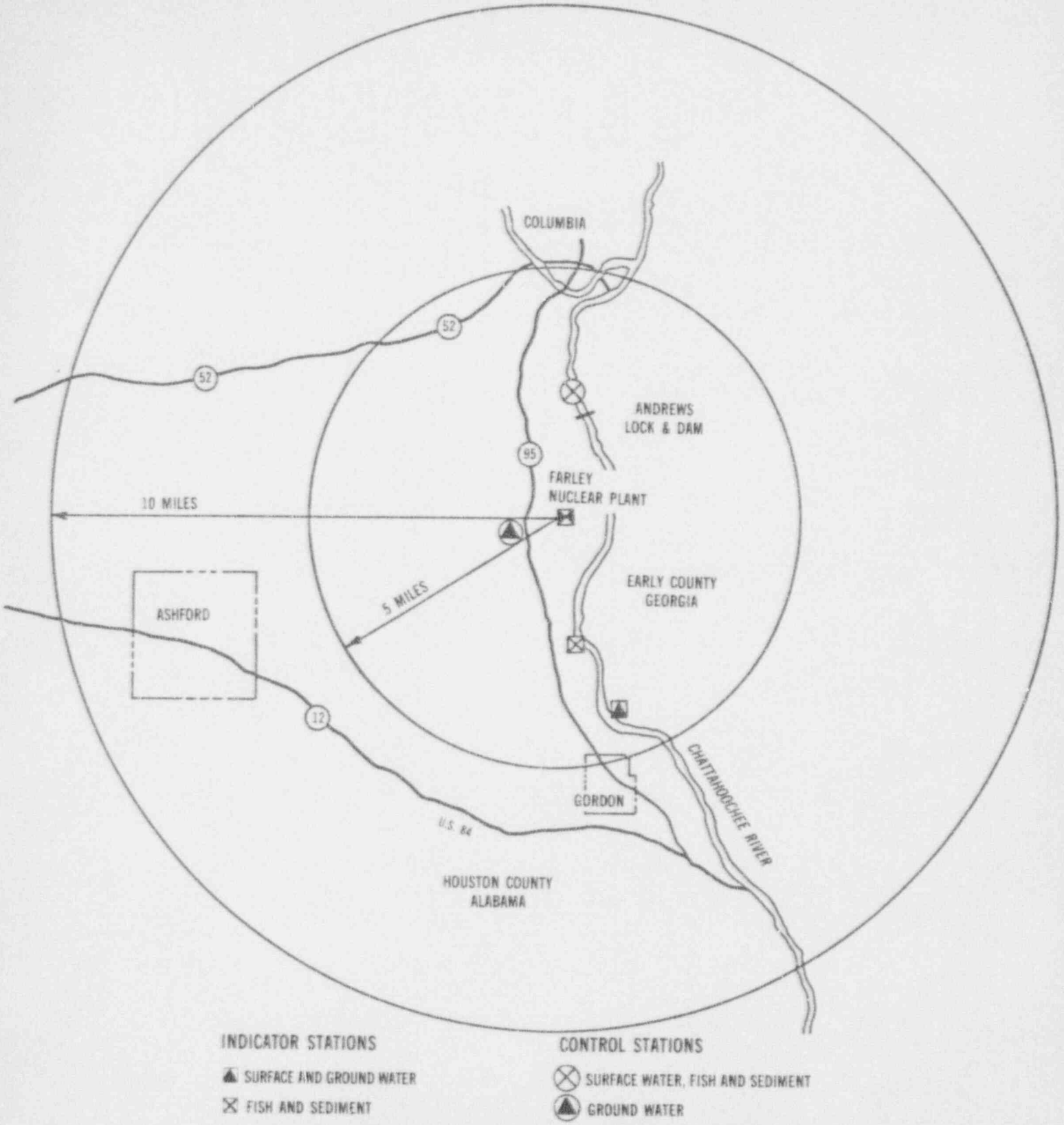
COMMUNITY (INDICATOR II) SAMPLING LOCATIONS FOR DIRECT RADIATION IN THE FARLEY NUCLEAR PLANT AREA.

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 1992

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)		
Soil Indicator Stations: Sever Stations along the plant perimeter (NE-1.0, E-0.8, SSE-1.0, SSW-1.0, WSW-0.9, NNW-0.8 and N-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)	Annual *in situ* Ge(Li) gamma-ray spectroscopy measurements.	Gamma Isotopic Annually
DIRECT RADIATION	At least once per 92 days	Gamma dose Readout at least once per 92 days

TABLE 1 (con'd)

Types of Samples and Sampling Locations (Distances Given in Miles)	Sampling and Collection Frequency	Type and Frequency of Analysis
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: Eighteen stations: At least one in each meteorological sector at a distance of 1.2-8 miles (NNE-4, NE-4, ENE-4, E-5, ESE-5, SE-5, SSE-3, S-5, SSW-4, SW-1.2, SW-5, WSW-4, WSW-8, W-4, WNW-4, NW-4, NNW-4, and N-5). 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		
<u>Surface Water</u> Indicator Station: Georgia Pacific Paper Co., (3 miles downstream of plant discharge, River Mile-40)	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.

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 Andrews Lock and Dam (≈3 miles upstream of plant intake, River Mile-47)		
Ground Water	Grab sample taken at least once per 92 days.	Gamma isotopic and tritium analyses of each sample once per quarter.
Indicator Station: Georgia Pacific Paper Co., Well (SSE-4)		
Control Station: Whatley Residence, Well (SW-1.2)		
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)		

TABLE 1 (con'd)

Types of Samples and Sampling Locations (Distances Given in Miles)	Sampling and Collection Frequency	Type and Frequency of Analysis
INGESTION		
Milk		
Control Staton:		
Lewis Dairy Avon, AL. (WSW-14)	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)		
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/m^3)	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):

$$MDC = \frac{4.66\ S_b}{E \quad V \quad 2.22 \quad Y \quad \exp(-\lambda \Delta t)}$$

Where:

MDC is the "a priori" lower limit of detection as defined above (as picocurie per unit mass or volume).

S_b is the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (as counts per minute).

E is the counting efficiency (as counts per transformation).

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

2.22 is the number of transformations per minute per picocurie.

Y is the fractional radiochemical yield (when applicable).

λ is the radioactive decay constant for the particular radionuclide.

Δt is the elapsed time between sample collection (or end of the sample collection period) and time of counting (for environmental samples, not plant effluent samples).

The value of S_b used in the calculation of the MDC for a detection system shall be based on the actual observed variance of the background counting rate or of the counting rate of the blank samples (as appropriate) rather than on an unverified theoretically predicted variance. In calculating the MDC for a radionuclide determined by gamma-ray spectroscopy, the background shall include the typical contributions of other radionuclides normally present in the samples (e.g., Potassium-40 in milk samples). Typical values of E, V, Y and Δt shall be used in the calculations.

[b]The MDC's for Tritium, Gross beta, and Radioiodine were obtained using blank background (a priori), whereas, for gamma-ray spectroscopy actual sample backgrounds were used (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	2×10^{4a}	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/Nb-95	4×10^{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/La-140	2×10^{2}	NA	NA	3×10^{2}	NA

[a]For drinking water samples.

Annual ENV Report/4(7)

TABLE 4
ENVIRONMENTAL MONITORING PROGRAM DEVIATIONS 1992

DATE/TIME	COMPONENT	CAUSE OF DEVIATION	RESOLUTION	REMARKS
2-18-92/0932	Air Monitor 1101	Blown fuse.	Replaced fuse.	Monitor out of service for approximately 163 hours; Insufficient sample volume to meet Technical Specification (TS) particulate gross beta and Iodine 131 MDC limits.
2-18-92/1340	Air Monitor 1218	Mechnical failure.	Work request submitted. Monitor repaired 2-20-92.	Monitor out of service for approximately 56 hours.
2-25-92/0839	Air Monitor 0701	Blown fuse.	Replaced fuse.	Monitor out of service for approximately 161 hours. Insufficient sample volume to meet TS particulate gross beta and Iodine 131 MDC limits.
2-25-92/0900	Air Monitor 1101	Electrical failure.	Work request submitted. Pump and electrical receptacle replaced 3-2-93.	Monitor out of service for approximately 144 hours. Insufficient sample volume to meet TS Iodine 131 MDC limit.
3-10-92/0857	Air Monitor 1101	Blown fuse.	Replaced fuse.	Monitor out of service for approximately 96 hours. Insufficient sample volume to meet TS Iodine 131 MDC limit.
3-10-92/0930	Air Monitor 0701	Loss of electrical power.	Work request submitted. Power restored 3-12-92.	Monitor out of service for approximately 153 hours. Insufficient sample volume to meet TS Iodine 131 MDC limit.
3-17-92/1057	Air Monitor 0215	Mechanical failure.	Work request submitted. Pump replaced 3-20-93.	Monitor out of service approximately 196 hours. Insufficient sample volume to meet TS Iodine 131 MDC limit.
3-17-92/1254	Air Monitor 1218	Sample volume 216 cubic meters due to low sample flowrate.	Adjusted sample flowrate.	Insufficient sample volume to meet TS Iodine 131 MDC limit.
3-31-92/1635	TLD Stake 0304	First quarter and annual TLD's destroyed by vandals.	Replaced annual TLD's on 4-1-92.	No first quarter TLD readings for this station.

TABLE 4
ENVIRONMENTAL MONITORING PROGRAM DEVIATIONS 1992

DATE/TIME	COMPONENT	CAUSE OF DEVIATION	RESOLUTION	REMARKS
3-31-92/1635	TLD Stake 0405	First quarter and annual TLD's destroyed by vandals.	Replaced Annual TLD's on 4-1-92.	No first quarter TLD readings for this station.
5-12-92/1635	Air Monitor 1218	Mechanical failure following routine filter changeout.	Work request submitted. New air monitor (FN-210B) installed 5-15-92.	Monitor out of service for approximately 72 hours.
6-9-92/1400	Air Monitor 1218	Circuit breaker tripped.	Reset circuit breaker. Submitted work request to investigate history of electrical failures at this site.	Monitor out of service for approximately 88 hours.
6-26-92/1530	TLD Stake 1215	Second quarter TLD packet knocked off stake and destroyed by lawn mower.	Installed third quarter TLD packet.	No second quarter TLD readings for this station.
6-26-92/1530	TLD Stake 0304	Second quarter TLD packet destroyed by vandals.	Used annual TLD packet (installed 4-1-92) for second quarter dose assessment.	Installed new annual TLD to replace the one which was read for the second quarter.
7-14-92/1010	Air Monitor 0718	Circuit breaker tripped.	Reset circuit breaker.	Monitor out of service for approximately 139 hours. Insufficient sample volume to meet TS Iodine 131 MDC limit.
9-1-92/1600	Air Monitor 1601	Loss of power due to lightning striking power pole on 8-27-92.	Power restored on 8-28-92.	Monitor out of service for approximately 20 hours.
10-20-92/0935	Air Monitor 1218	Circuit breaker tripped.	Reset circuit breaker.	Monitor out of service for approximately 26 hours.
11-11-92/1100	Air Monitor 1101	Loss of power caused by tagout of ID 4160 volt bus.	Power restored 11-12-92.	Tagout initiated 11-9-92/0635, completed 11-11-92/0739. Limiting Condition of Operation (LCO) declared. Monitor out of service for ~ 42 hrs.

TABLE 4
ENVIRONMENTAL MONITORING PROGRAM DEVIATIONS 1992

DATE/TIME	COMPONENT	CAUSE OF DEVIATION	RESOLUTION	REMARKS
11-11-92/1100	Air Monitor 0701	Loss of power caused by tagout of ID 4160 volt bus.	Power restored 11-12-92.	Tagout initiated 11-9-92/0639, completed 11-11-92/0730. LCO declared. Monitor out of service for approximately 42 hours.
12-15-92/0902	Air Monitor 1108	Power to monitor isolated from 12-3-92/1453 to 12-15-92/0902 due to renovation of Ashford. AL substation by Alabama Power Co. Southeast Division.	Power restored 12-15-92.	No sample for 12-8-92 to 12-15-92 sample period. Monitor out of service for approximately 222 hours.

ATTACHMENT 1

JOSEPH M. FARLEY NUCLEAR PLANT
LAND USE CENSUS

JUNE 5, 1992

I. PURPOSE

As required by FNP Technical Specifications 3.12.2 and 4.12.2, the annual land use census was completed on June 5, 1992. 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 Offsite Dose Calculation Manual (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. 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 1992 surveys revealed two changes from the 1991 surveys. The occupied residences identified in the 1991 surveys as those nearest the plant site in sectors five and fifteen were found to be abandoned in 1992. New locations were identified and plotted on the map. As shown in Table 1, both locations are farther from the plant site than the previously identified locations.

IV. 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

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

The current milk control sample location is Ray Lewis Dairy. Since milk animals have not been located within five miles of the plant site, no milk indicator sample is collected.

Although milk animals have not been found within five miles of the plant site, the following items have been noted:

A. As reported in 1991 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. Mr. Dean was interviewed and the location of his residence and the presence of the goats confirmed.

B. A lone Holstein bull was seen in a pasture approximately 1.2 miles west southwest of the plant site. The occupant of the residence next to the pasture, Mr. Tommy Respress, confirmed that there were no milk animals present.

C. A mixed-breed Guernsey cow was observed in a field at the residence of Mrs. Mary Esther Allums in Early County, Georgia, three miles east southeast of the plant site. Mrs. Allums was interviewed and stated that the cow was not being milked, but is kept by her children as a pet.

D. A herd of approximately 20 goats was observed in Gordon, Alabama, 5.1 miles south of the plant site. The goats are confined in a field approximately one acre in size at the intersection of Alabama Highway 95 and Houston County Road 81. Neighbors identified Mr. William King of Gordon as the owner. Several attempts to contact Mr. King at his home and by telephone were unsuccessful. There is no evidence that the goats are being milked for human consumption.

V. RESULTS

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

B. In sectors 5 and 15, the distance from the plant site to the nearest occupied residence increased because the old locations were abandoned and new locations were identified.

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

VI. CONCLUSIONS

A. No changes to ODCM are required.

B. 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 5, 1992

RADIAL SECTORS 22.5 DEGREES EACH	DISTANCE IN MILES TO NEAREST RESIDENT 1991	1992	MILK ANIMAL 1991	1992	REASON FOR CHANGE	INDIVIDUALS INTERVIEWED
North-Northeast (01)	2.5	2.5	>5	>5	N/A	*Mrs. C. H. Freeman
Northest (02)	2.4	2.4	>5	>5	N/A	*Mrs. Barbara Kirkpatrick
East Northeast (03)	2.4	2.4	>5	>5	N/A	*Mrs. Jim Donaldson
East (04)	2.8	2.8	>5	>5	N/A	*Mr. Booker T. Spivey Mr. W. A. Mercer
East Southeast (05)	2.8	3.0	>5	>5	Note 1	*Mrs. Mary Esther Allums
Southeast (06)	3.4	3.4	>5	>5	N/A	*Mrs. Wanda Wilkerson Mr. David Smith
South Southeast (07)	>5	>5	>5	>5	N/A	Mr. Robert Weir *Note 3
South (08)	4.3	4.3	>5	>5	N/A	*Mrs. Francha Brown Mrs. Daisy Marsh Ms. Sarah Thomas Mrs. Doris Wade Mr. Thomas Dean
South Southwest (09)	2.9	2.9	>5	>5	N/A	Note 2
Southwest (10)	1.2	1.2	>5	>5	N/A	*Mrs. Adair Gilbert
West Southwest (11)	2.4	2.4	>5	>5	N/A	Note 2 Mr. Ray Lewis
West (12)	1.3	1.3	>5	>5	N/A	*Mr. Tommy Respress
West Northwest (13)	2.1	2.1	>5	>5	N/A	Note 2
Northwest (14)	1.5	1.5	>5	>5	N/A	*Mrs. Amanda Ryals Mr. Blake Jernigan
North Northwest (15)	2.0	3.3	>5	>5	Note 1	*Mrs. Thomas Steelman Mrs. Ruth Nall Mr. Ron Bumpus
North (16)	2.6	2.6	>5	>5	N/A	*Mr. Tony Knighton

*Nearest Resident in Sector

Note 1: New location. 1991 location abandoned.

Note 2: Resident not home during survey. Unable to make telephone contact.

Note 3: 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.

AIRBORNE: PARTICULATES - OPERATIONAL RADIOACTIVITY SUMMARY

JOSEPH M. FARLEY NUCLEAR PLANT

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

SUMMARY REPORT FROM 10192 TO 123192 (A)

AIRBORNE 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	0.011	0.0420	0.014	0.065	RIVER INTAKE	0.0425	0.02	0.065	0.0513	0.022	0.071	0.0468	0.021	0.071
				16	16	0.8 MI. ESE		4	4		12	12		12	12
BETA	519	0.002	0.0150	0.001	0.057	SSE PERIM.	0.0163	0.001	0.057	0.0185	0.001	0.08	0.0179	0.001	0.059
				208	208	1.0 MI. SSE		52	52		155	155		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	0.002	<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 10192 TO 123192 (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		
					NAME DISTANCE And DIRECTION									
		MEAN	MIN (C)	MAX (D)		MEAN	MIN (C)	MAX (D)	MEAN	MIN (C)	MAX (D)	MEAN	MIN (C)	MAX (D)
I-131 416	0.042	<MDC	NA 0	NA 208	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 10192 TO 123192 *(A)*

DOSE (MREM)

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
ANNUAL 40	NA	53.3688	37.7	80.7	PLANT PERIM.	80.7000	80.7	80.7	42.3833	34.4	52.1	42.1000	32.7	59.4
			16	16	1.0 MI. NE		1	1		18	18		6	6
QUARTER 157	NA	16.0938	9.7	25.1	PLANT PERIM.	22.2000	19.8	25.1	13.4829	7.7	19.9	13.6391	5.6	18.8
			64	64	1.0 MI. NE		4	4		70	70		23	23
SUM (E) 40	NA	62.7750	53.9	83.3	PLANT PERIM.	83.3000	83.3	83.3	53.9889	45.7	66.5	54.6000	46.6	70.9
			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 10192 TO 123192 (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	47.154	NA	NA 0	NA 0	NA	NA	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 26
CS-134 26	12.846	NA	NA 0	NA 0	NA	NA	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 26
CS-137 26	12.846	NA	NA 0	NA 0	NA	NA	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 26
I-131 26	12.846	NA	NA 0	NA 0	NA	NA	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 26
K-40 26	12.846	NA	NA 0	NA 0	NA	NA	NA 0	NA 0	NA	NA 0	NA 0	1358.846	1030 26	1510 26
LA-140 26	9.769	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 10192 TO 123192 (A)

FORAGE (E) (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		
			MEAN	MIN	MAX	NAME DISTANCE And DIRECTION	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
				C	D			C	D		C	D		C	D
AC-228	1	85.000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	174.0000	174	174
				0	0			0	0		0	0			1	1
BE-7	39	84.897	626.4800	130	1480	SSE PERIM.	584.6923	153	1480	NA	NA	NA	711.384	139	1860
				25	26	1.0 MI. SSE		13	13		0	0		13	13
BI-214	1	84.897	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	89.0000	89	89
				0	0			0	0		0	0		1	1
CS-134	39	84.897	<MDC	NA	NA	NA	<MDC	NA	NA	NA	NA	NA	<MDC	NA	NA
				0	26			0	0		0	0		0	13
CS-137	39	84.897	<MDC	NA	NA	NA	<MDC	NA	NA	NA	NA	NA	43.0000	43	43
				0	26			0	0		0	0		1	13
I-131	39	14.436	<MDC	NA	NA	NA	<MDC	NA	NA	NA	NA	NA	<MDC	NA	NA
				0	26			0	0		0	0		0	13
K-40	39	103.795	4577.500	875	7420	NORTH PERIM.	4833.076	1420	7420	NA	NA	NA	5232.307	2390	7190
				26	26	0.8 MI. N		13	13		0	0		13	13
TL-208	1	18.000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	44.0000	44	44
				0	0			0	0		0	0		1	1

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) Mean Wet/Dry Ratio for 1992 was 5.98

SOIL: OPERATIONAL RADIOACTIVITY SUMMARY
JOSEPH M. FARLEY NUCLEAR PLANT

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

SUMMARY REPORT FROM 10192 TO 123192 (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		
		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 12	335.000	1491.14	948	3270	NE PERIM.	3270.000	3270	3270	968.3333	618	1310	1515.00	1140	1890
			7	7	1.0 MI. NE		1	1		3	3		2	2
BI-212 12	793.917	1143.66	871	1310	PLANT PERIM.	1310.00	1310	1310	806.0000	806	806	695.5000	624	767
			3	7	1.0 MI. SSE		1	1		1	3		2	2
BI-214 12	793.917	1912.85	990	3810	PLANT PERIM.	3810.000	3810	3810	1563.333	1010	2490	1142.00	804	1480
			7	7	1.0 MI. SSE		1	1		3	3		2	2
CS-137 12	793.917	100.0000	36	277	PLANT PERIM.	277.0000	277	277	158.5000	64	253	140.5000	126	155
			7	7	0.8 MI. WNW		1	1		2	3		2	2
K-40 12	793.917	4288.571	1210	8220	PLANT PERIM.	8220.000	8220	8220	1349.000	835	2290	2150.000	1150	3150
			7	7	0.8 MI. E		1	1		3	3		2	2
PB-212 12	305.417	1058.666	535	2320	NE PERIM.	2320.000	2320	2320	1019.66	809	1140	1013.00	986	1040
			6	7			1	1		3	3		2	2
PB-214 12	289.750	2232.857	1090	3930	PLANT PERIM.	3930.000	3930	3930	1366.333	916	2210	2128.000	936	3320
			7	7	1.0 MI. SSE		1	1		3	3		2	2
TL-208 12	120.500	541.142	382	1200	NE PERIM.	1200.000	1200	1200	397.6667	271	488	515.5000	423	608
			7	7	1.0 MI. NE		1	1		3	3		2	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.

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

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

SUMMARY REPORT FROM 10192 TO 123122 (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	24	18.708	<MDC	NA 0	NA 12	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 12
CO-58	24	4.125	<MDC	NA 0	NA 12	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 12
CO-60	24	4.125	<MDC	NA 0	NA 12	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 12
CS-134	24	4.125	<MDC	NA 0	NA 12	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 12
CS-137	24	4.125	<MDC	NA 0	NA 12	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 12
FE-59	24	8.333	<MDC	NA 0	NA 12	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 12
LA-140	24	3.333	<MDC	NA 0	NA 12	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 12
MN-54	24	4.000	<MDC	NA 0	NA 12	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 12
NB-95	24	4.167	<MDC	NA 0	NA 12	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 12
TRITIUM	8	100.875	395.0000	183 3	683 4	GPPC RIV. MI. 40	395.0000	183 3	683 3	NA	NA 0	NA 0	134.0000	134 1	134 4
ZN-65	24	8.625	<MDC	NA 0	NA 12	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 12
ZR-95	24	6.958	<MDC	NA 0	NA 12	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 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.

WATERBORNE: GROUND WATER - OPERATIONAL RADIOACTIVITY SUMMARY

JOSEPH M. FARLEY NUCLEAR PLANT

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

SUMMARY REPORT FROM 10192 TO 123192 *(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	17.500	<MDC	NA 0	NA 4	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 4
CO-58	8	3.875	<MDC	NA 0	NA 4	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 4
CO-60	8	3.875	<MDC	NA 0	NA 4	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 4
CS-134	8	3.875	<MDC	NA 0	NA 4	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 4
CS-137	8	3.875	<MDC	NA 0	NA 4	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 4
FE-59	8	8.500	<MDC	NA 0	NA 4	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 4
I-131	8	0.246	<MDC	NA 0	NA 4	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 4
LA-140	8	3.500	<MDC	NA 0	NA 4	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 4
MN-54	8	4.000	<MDC	NA 0	NA 4	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 4
NB-95	8	4.125	<MDC	NA 0	NA 4	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 4
TRITIUM	8	100.000	<MDC	NA 0	NA 4	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 4
ZN-65	8	9.250	<MDC	NA 0	NA 4	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 4
ZR-95	8	6.625	<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 10192 TO 123192 (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	MAX	NAME DISTANCE And DIRECTION	MEAN	MIN	MAX	MEAN	MIN	MAX	MEAN	MIN	MAX
				C	D			C	D		C	D		C	D
AC-228	4	181.250	2570.000	2290	2850	SMITH'S BEND	2570.000	2290	2850	NA	NA	NA	1934.000	928	2940
				2	2	RIV. MI. 41		2	2		0	0		2	2
BI-212	4	658.750	3285.000	2870	3700	SMITH'S BEND	3285.000	2870	3700	NA	NA	NA	2720.000	1230	4210
				2	2	RIV. MI. 41		2	2		0	0		2	2
BI-214	4	658.750	1190.00	1090	1290	SMITH'S BEND	1190.00	1090	1290	NA	NA	NA	913.5000	557	1270
				2	2	RIV. MI. 41		2	2		0	0		2	2
CS-134	4	658.750	138.0000	138	138	SMITH'S BEND	138.0000	138	138	NA	NA	NA	51.0000	51	51
				1	2	RIV. MI. 41		1	1		0	0		1	2
CS-137	4	658.750	<MDC	NA	NA	NA	<MDC	NA	NA	NA	NA	NA	<MDC	NA	NA
				0	2			0	0		0	0		0	2
K-40	4	330.250	3355.000	2470	4240	SMITH'S BEND	3355.000	2470	4240	NA	NA	NA	3000.000	2210	3790
				2	2			2	2		0	0		2	2
PB-212	4	88.000	1965.000	1860	2070	SMITH'S BEND	1965.000	1860	2070	NA	NA	NA	1486.000	662	2310
				2	2	RIV. MI. 41		2	2		0	0		2	2
PB-214	4	97.500	1245.000	1150	1340	SMITH'S BEND	1245.000	1150	1340	NA	NA	NA	911.500	583	1240
				2	2	RIV. MI. 41		2	2		0	0		2	2
RA-226	4	662.500	1590.000	1490	1690	SMITH'S BEND	1590.000	1490	1690	NA	NA	NA	1276.500	863	1690
				2	2	RIV. MI. 41		2	2		0	0		2	2
TL-208	4	50.000	915.5000	821	1010	SMITH'S BEND	915.5000	821	1010	NA	NA	NA	696.5000	343	1050
				2	2	RIV. MI. 41		2	2		0	0		2	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 10192 TO 123192 (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	21.000	<MDC	NA 0	NA 2	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 2
CO-60	4	28.250	<MDC	NA 0	NA 2	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 2
CS-134	4	28.250	<MDC	NA 0	NA 2	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 2
CS-137	4	28.250	32.5000	28 2	37 2	SMITH'S BEND RIV. MI. 41	32.5000	28 2	37 2	NA	NA 0	NA 0	28.0000	28 2	28 2
FE-59	4	28.250	<MDC	NA 0	NA 2	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 2
K-40	4	165.500	2845.000	2810 2	2880 2	SMITH'S BEND	2845.000	2810 2	2880 2	NA	NA 0	NA 0	3025.000	2860 2	3190 2
MN-54	4	21.750	<MDC	NA 0	NA 2	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 2
ZN-65	4	55.500	<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 10192 TO 123192 (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		
			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	20.750	<MDC	NA 0	NA 2	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 2
CO-60	4	29.000	<MDC	NA 0	NA 2	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 2
CS-134	4	29.000	<MDC	NA 0	NA 2	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 2
CS-137	4	29.000	<MDC	NA 0	NA 2	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 2
FE-59	4	29.000	<MDC	NA 0	NA 2	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 2
K-40	4	184.000	2425.000	2380 2	2470 2	SMITH'S BEND	2425.000	2380 2	2470 2	NA	NA 0	NA 0	2535.000	2440 2	2630 2
MN-54	4	21.000	<MDC	NA 0	NA 2	NA	<MDC	NA 0	NA 0	NA	NA 0	NA 0	<MDC	NA 0	NA 2
ZN-65	4	55.250	<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.

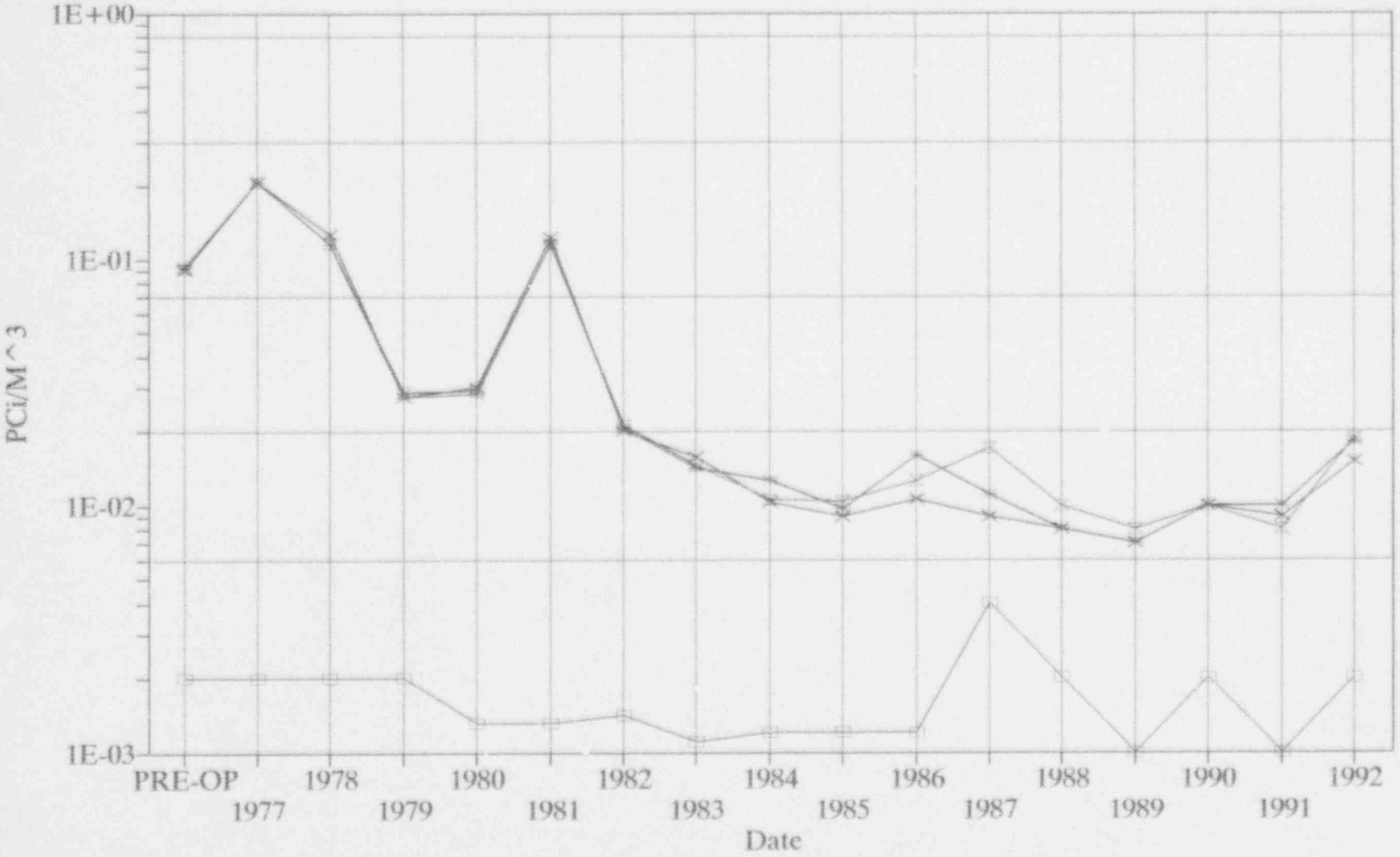
(C) Number of Measurements With Detectable Activity Only.

(D) Total Number of Measurements Taken.

J. M. Farley
Nuclear
Plant

Annual Environmental Operating Report

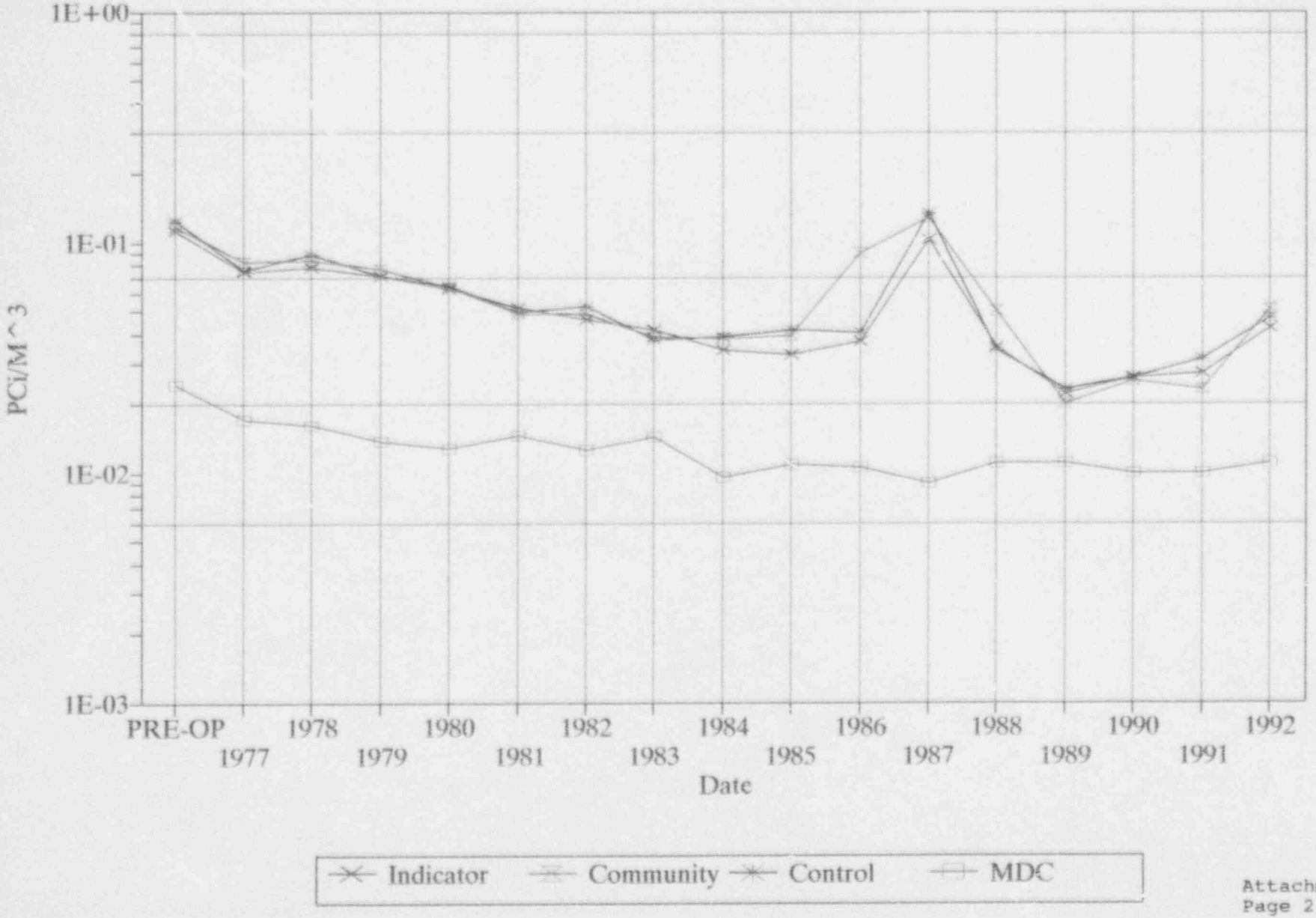
Mean Annual Air Gross Beta



J. M. Farley
Nuclear
Plant

Annual Environmental Operating Report

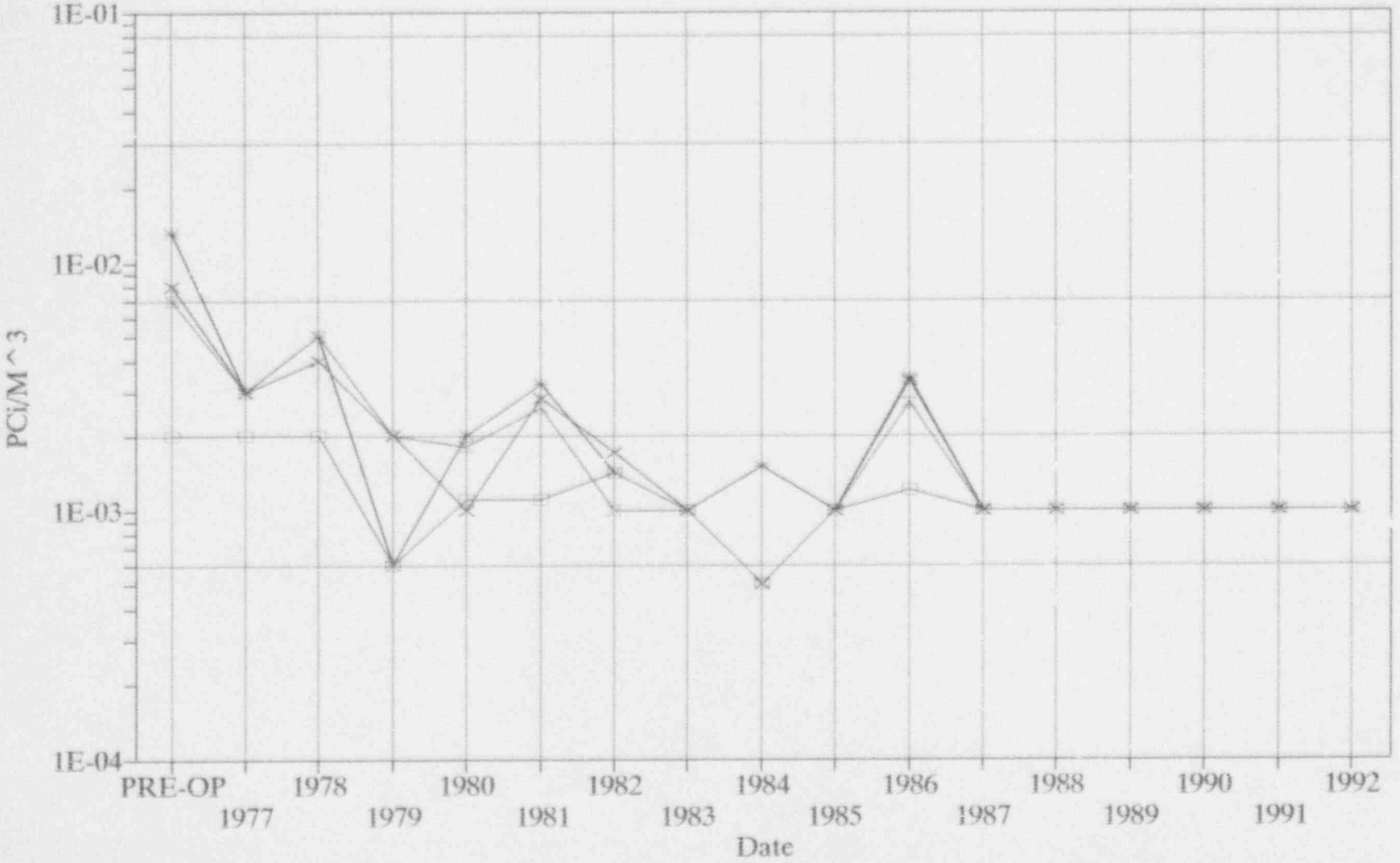
Mean Annual Air Gross BE-7



J. M. Farley
Nuclear
Plant

Annual Environmental Operating Report

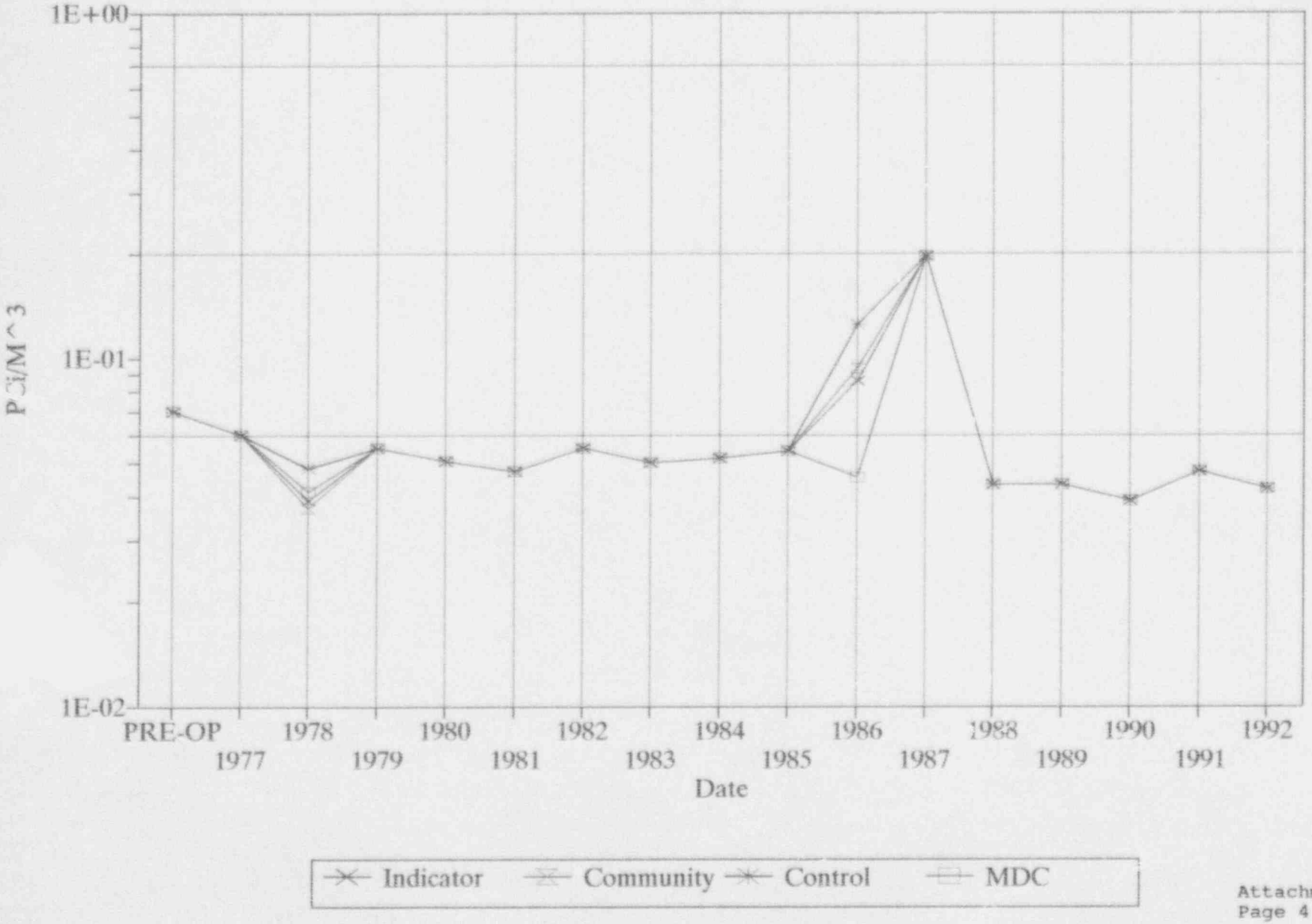
Mean Annual Air Gross CS-137



J. M. Farley
Nuclear
Plant

Annual Environmental Operating Report

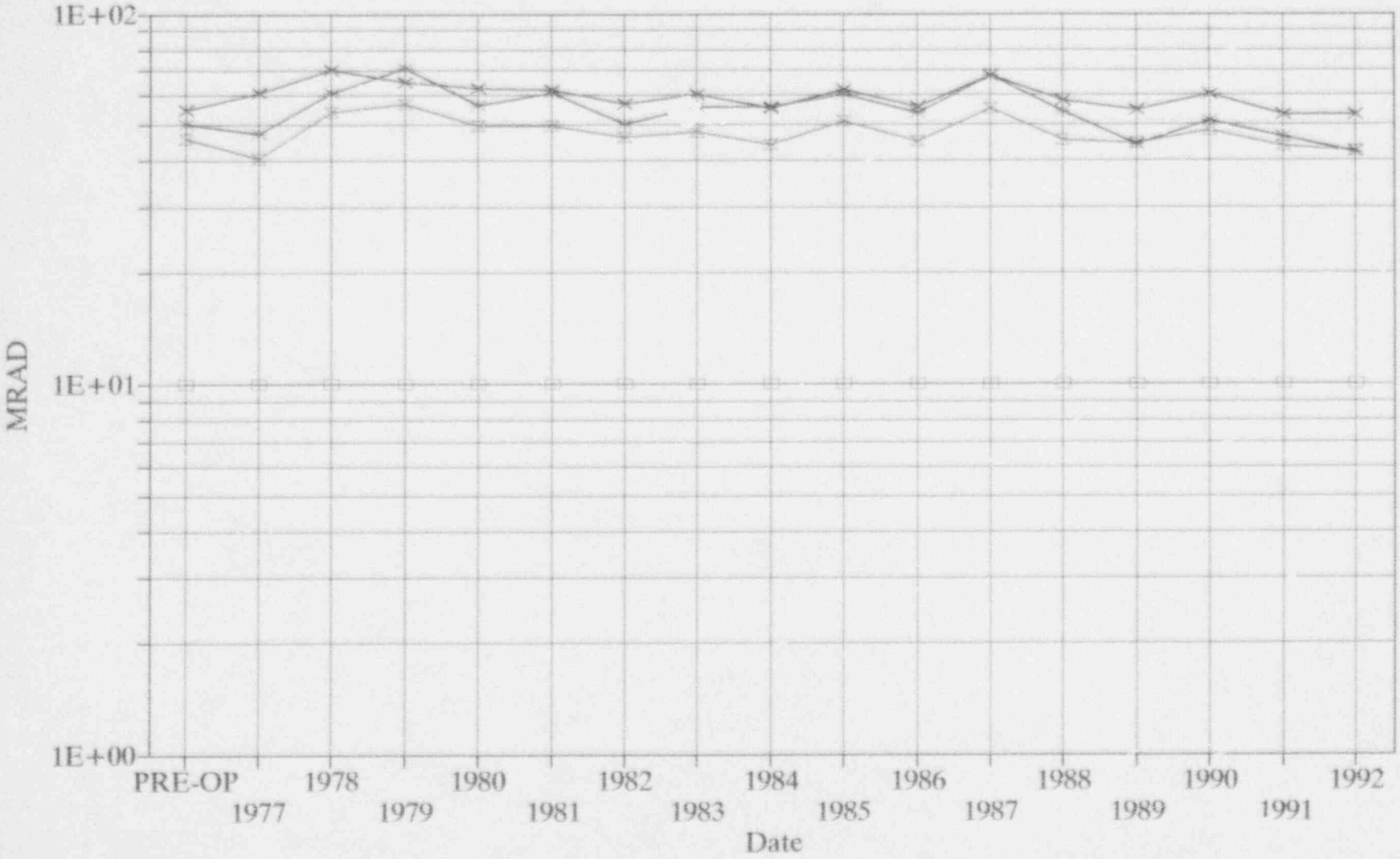
Mean Annual Air I-131



J. M. Farley
Nuclear
Plant

Annual Environmental Operating Report

Mean Annual External Gamma



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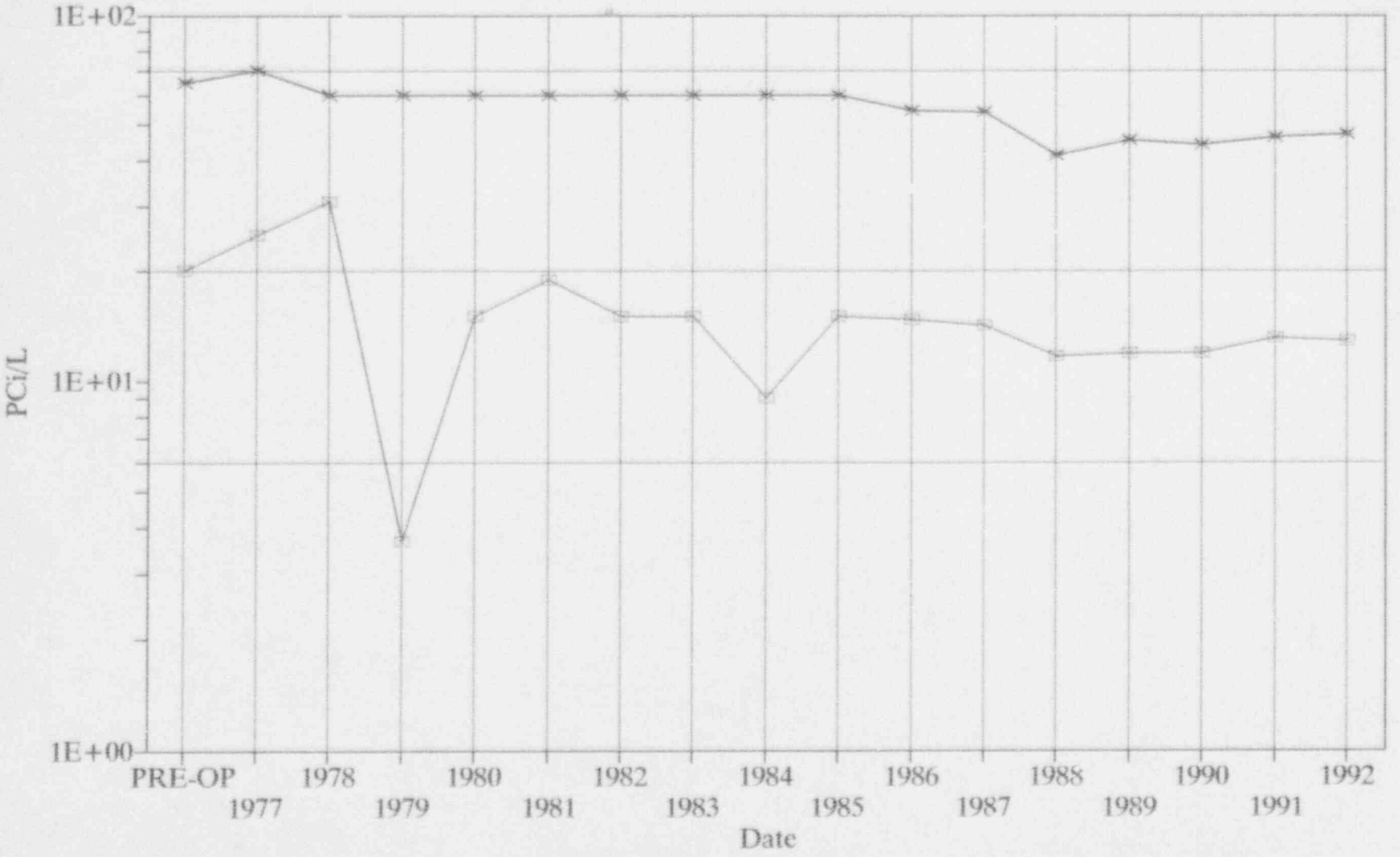
Annual Environmental Operating Report

Mean Annual Milk Concentration



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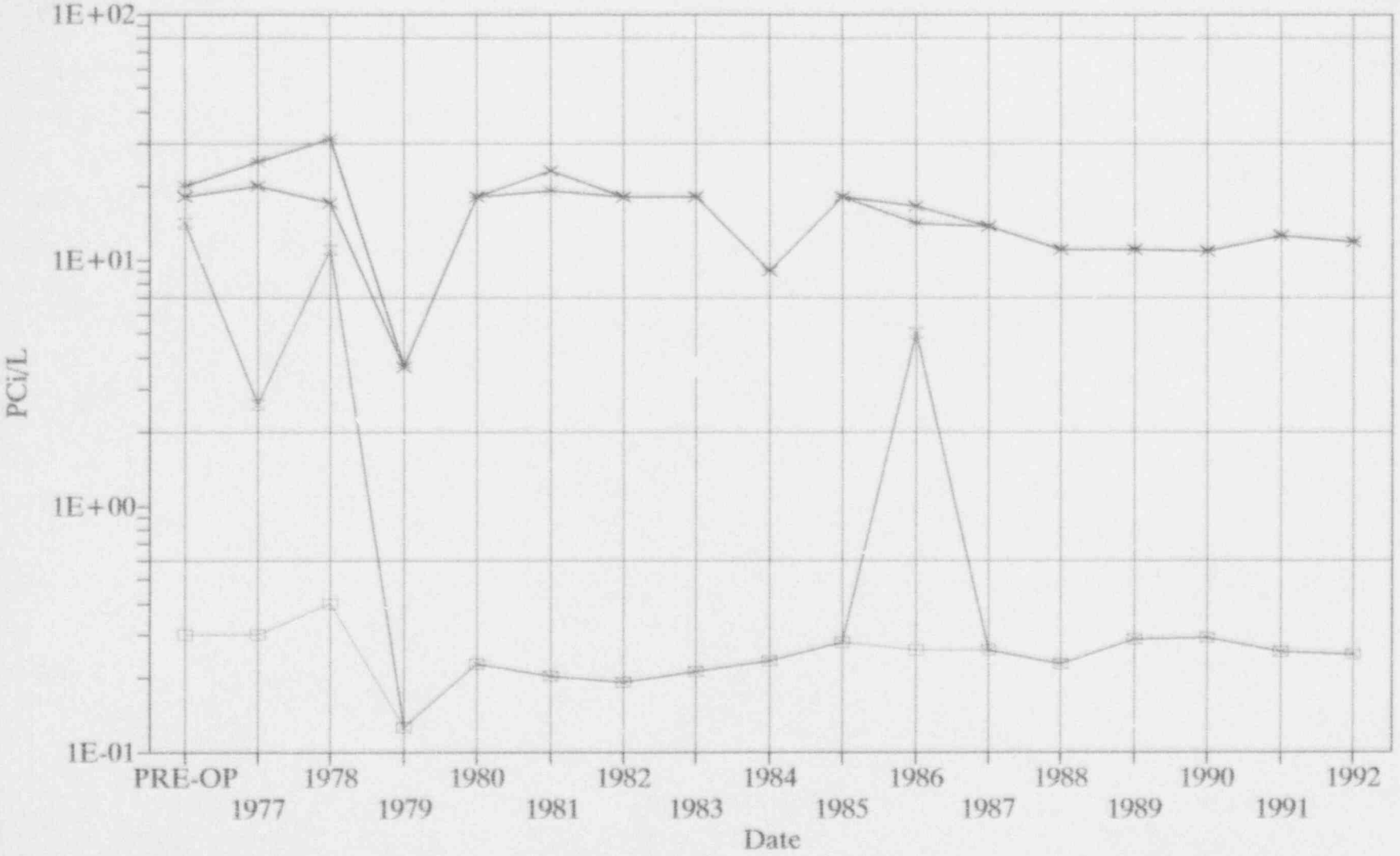
Annual Environmental Operating Report
Mean Annual Milk Concentration



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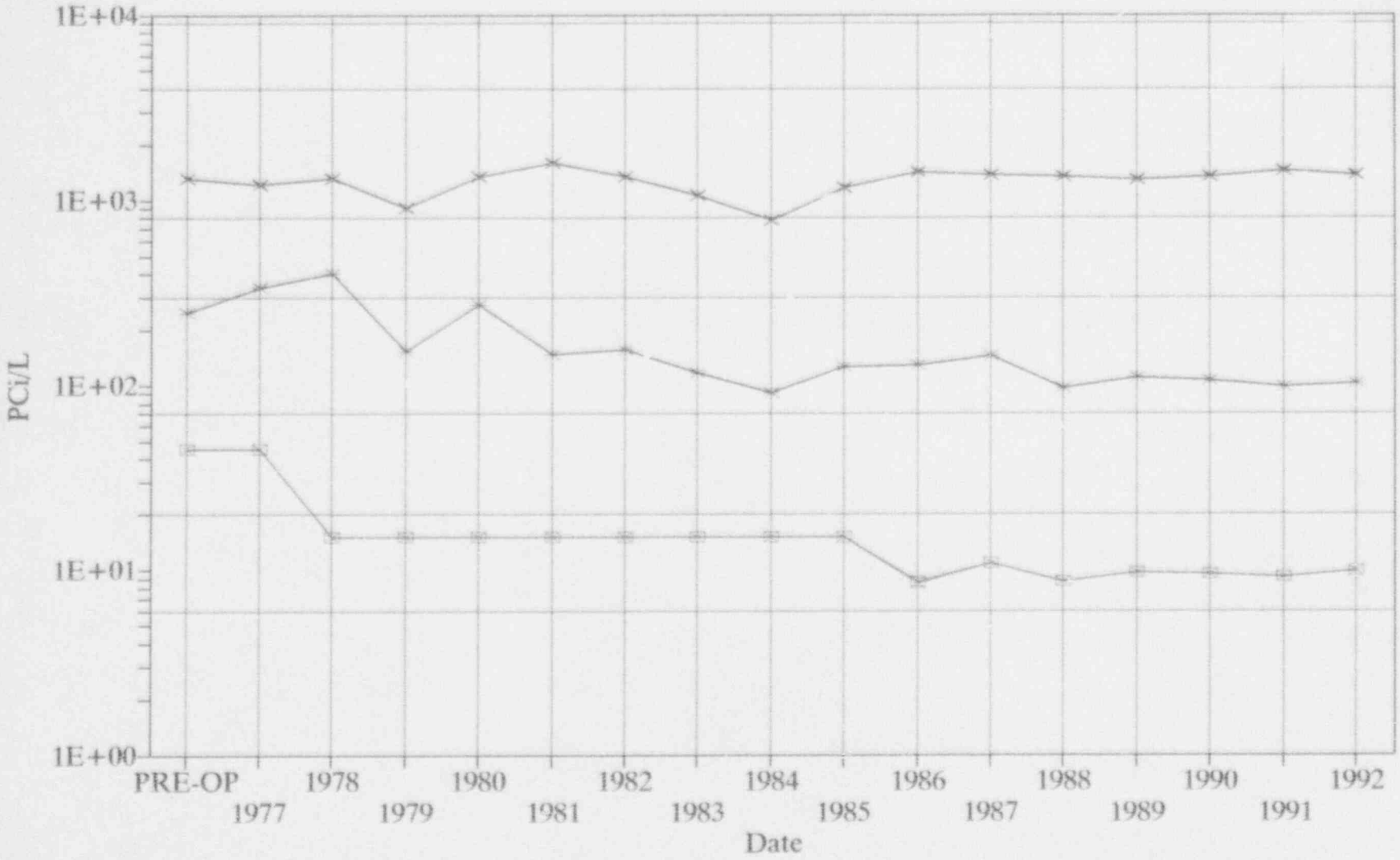
Annual Environmental Operating Report

Mean Annual Milk Concentration



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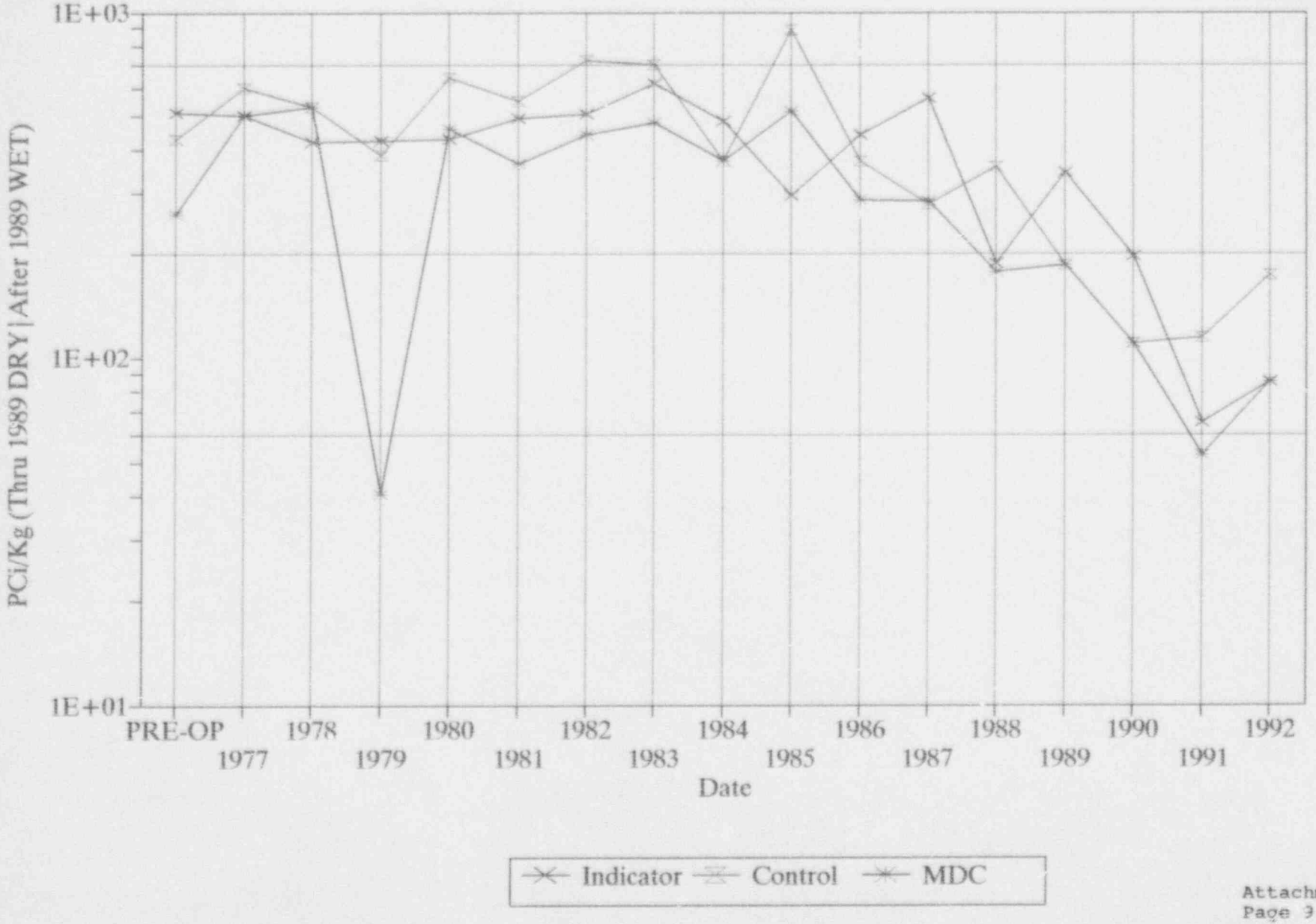
Annual Environmental Operating Report

Mean Annual Forage Concentration AC-228



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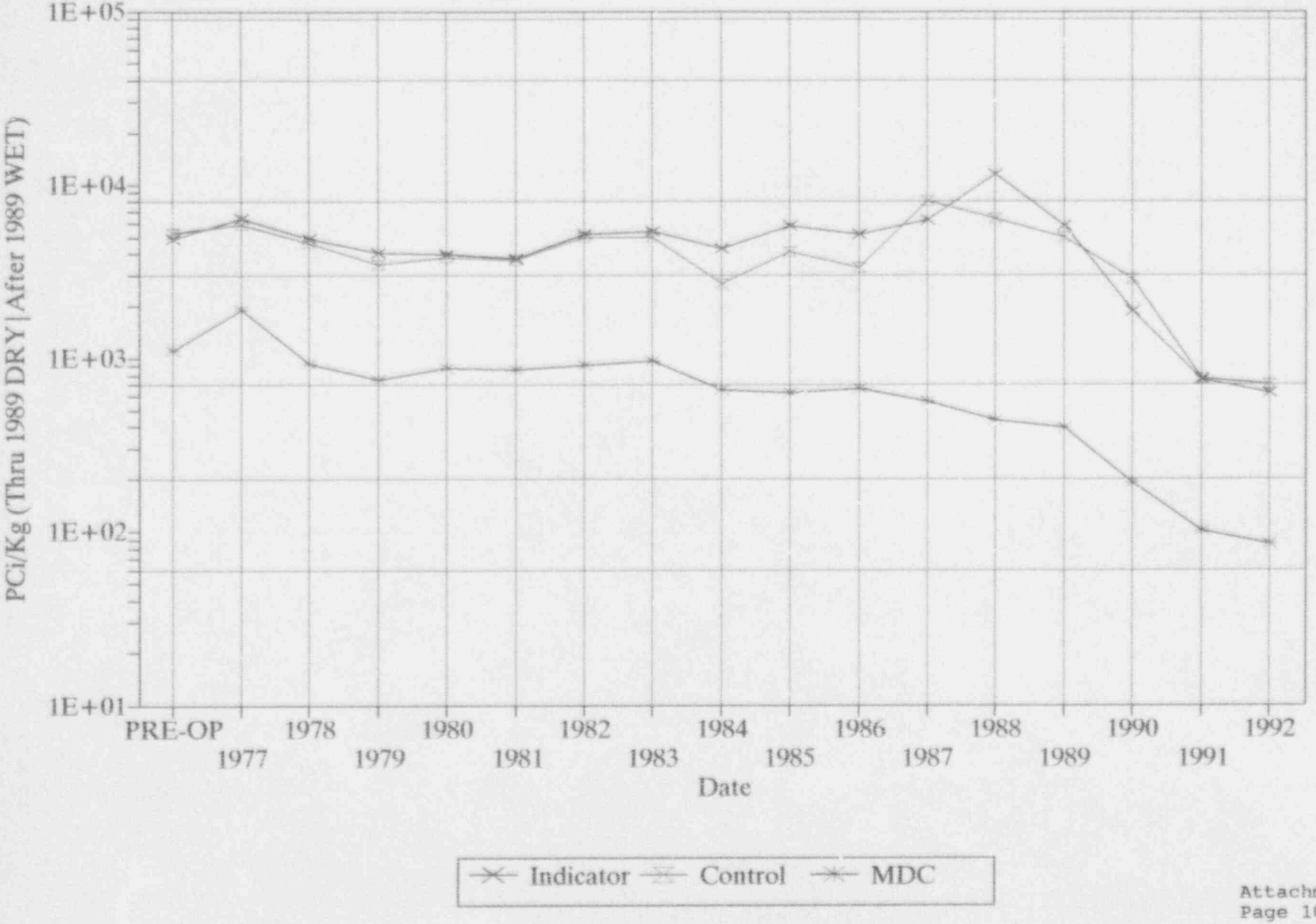
Nuclear
Plant

Annual Environmental Operating Report

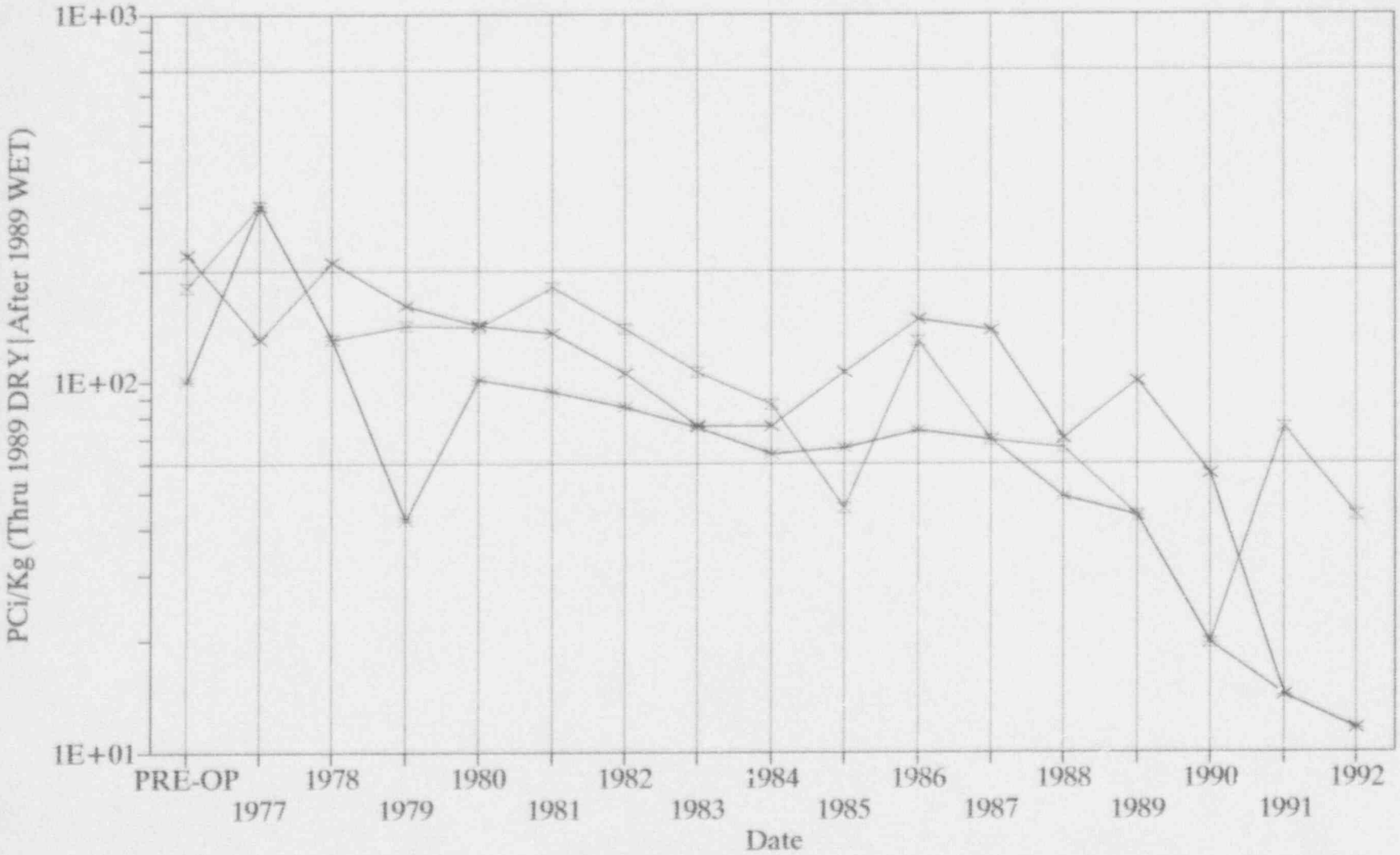
Mean Annual Forage Concentration BE-7



J. M. Farley
Nuclear
Plant

Annual Environmental Operating Report

Mean Annual Forage Concentration CS-137



J. M. Farley
Nuclear
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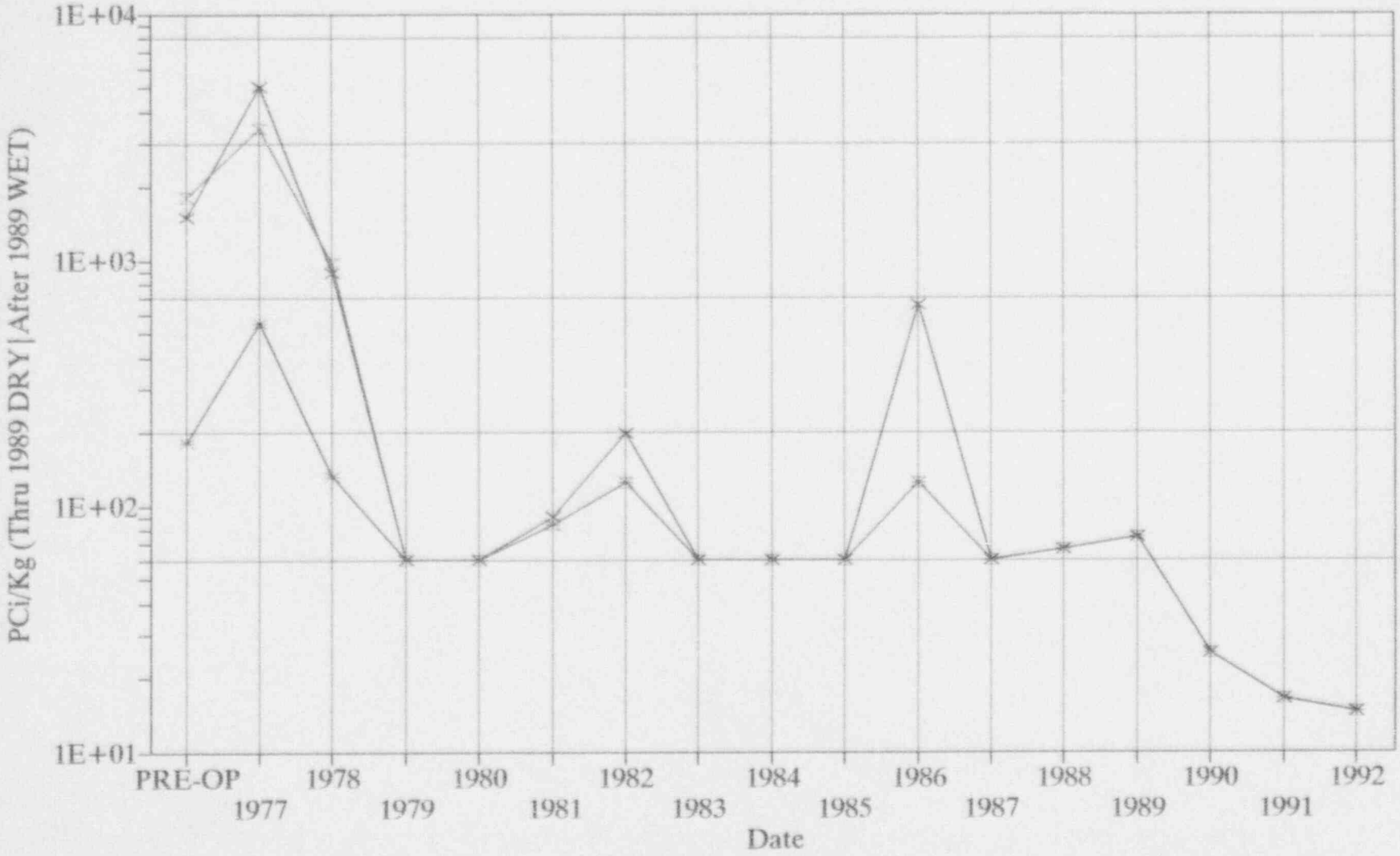
Annual Environmental Operating Report

Mean Annual Forage Concentration I-131



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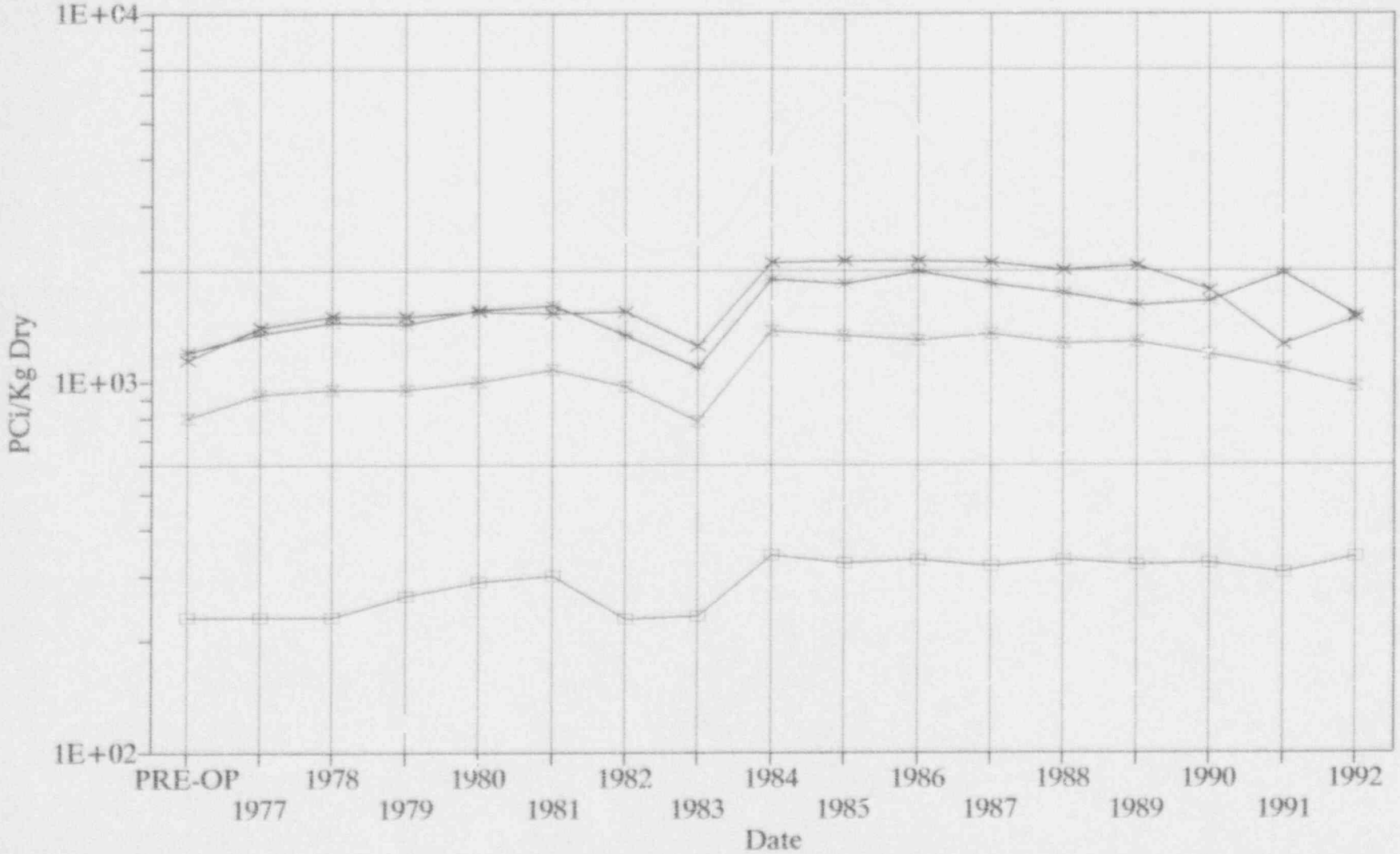
Annual Environmental Operating Report

Mean Annual Soil In Situ AC-228



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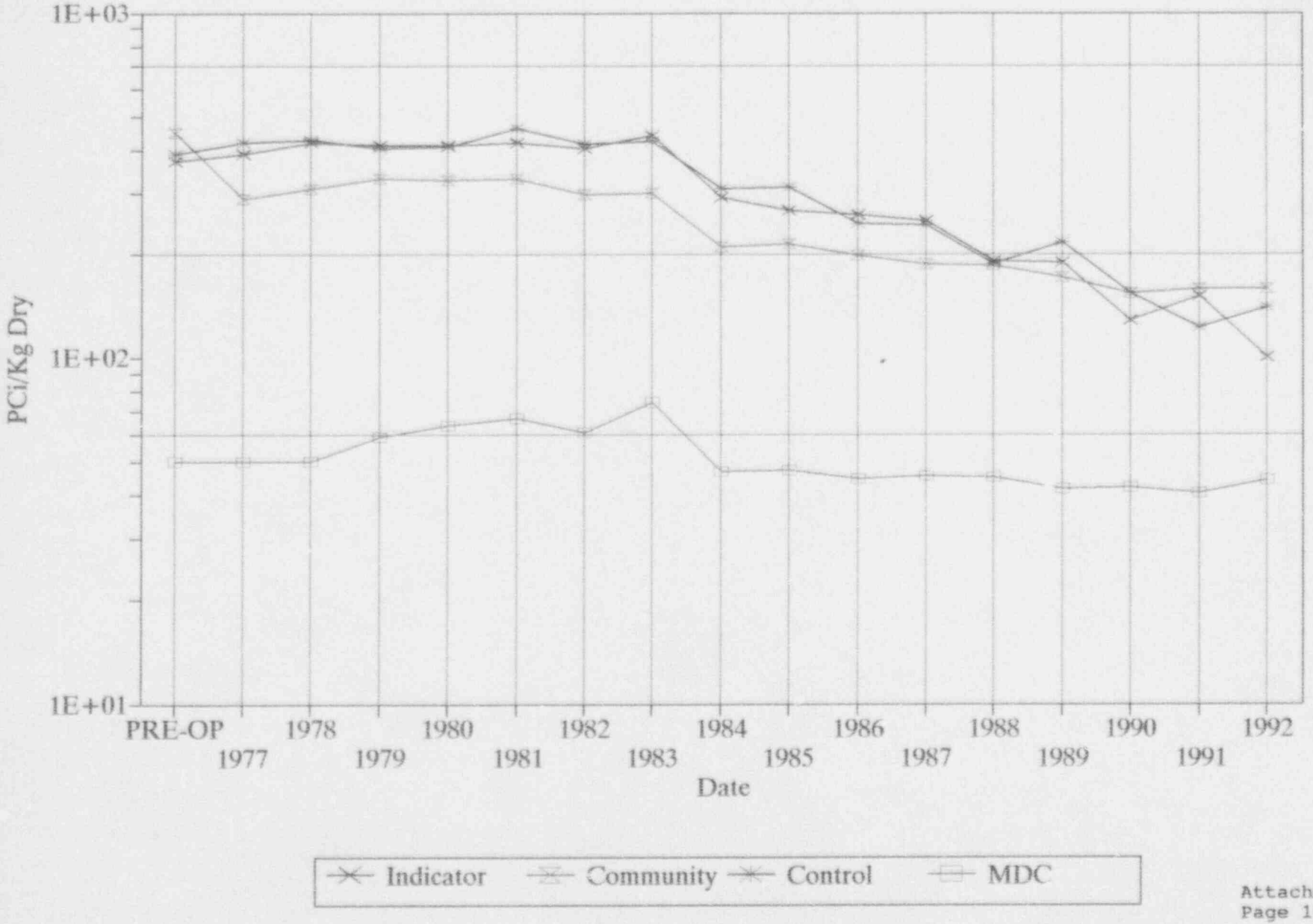
Annual Environmental Operating Report

Mean Annual Soil In Situ CS-137



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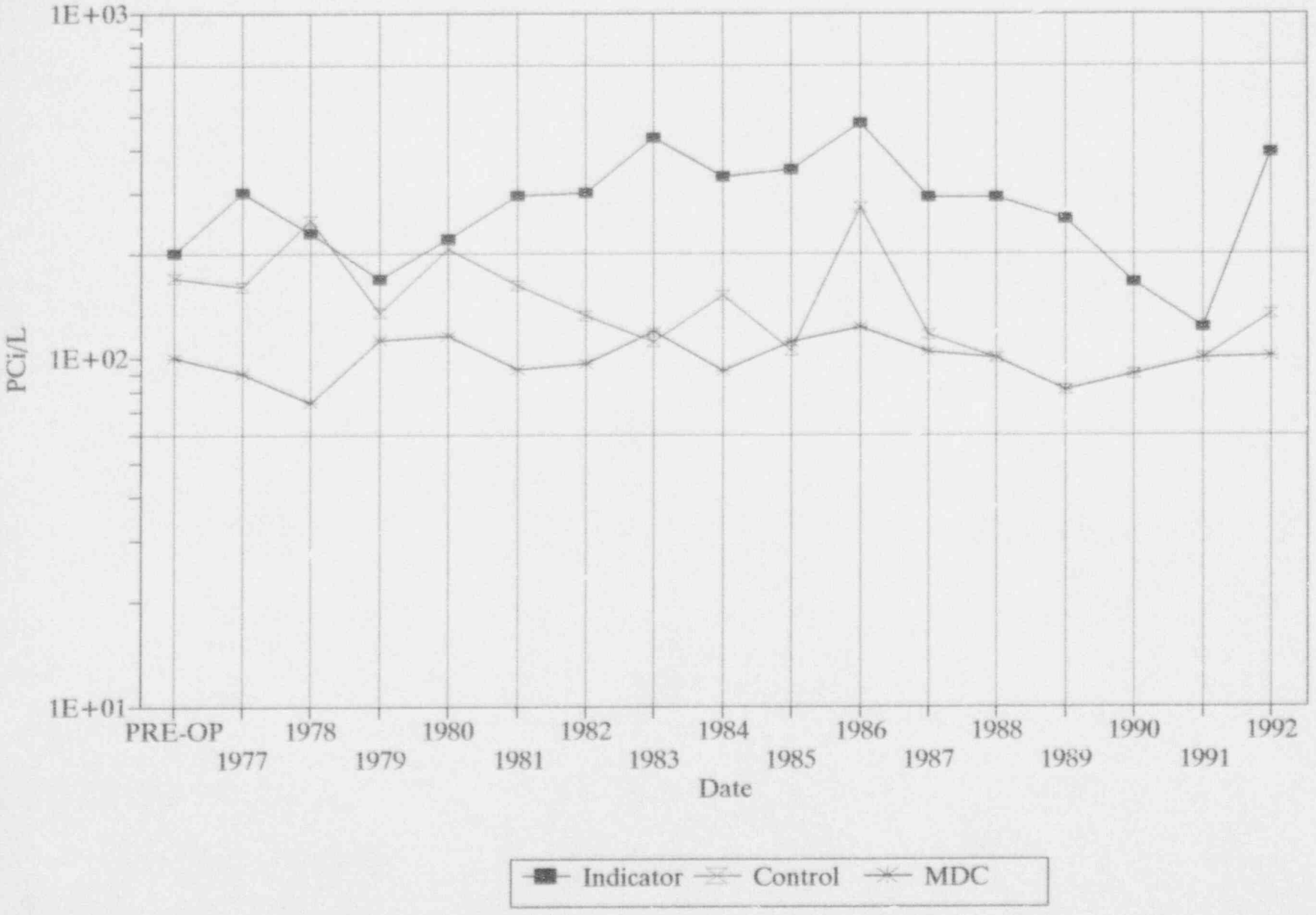
Annual Environmental Operating Report

Mean Annual River Water Conc. Tritium



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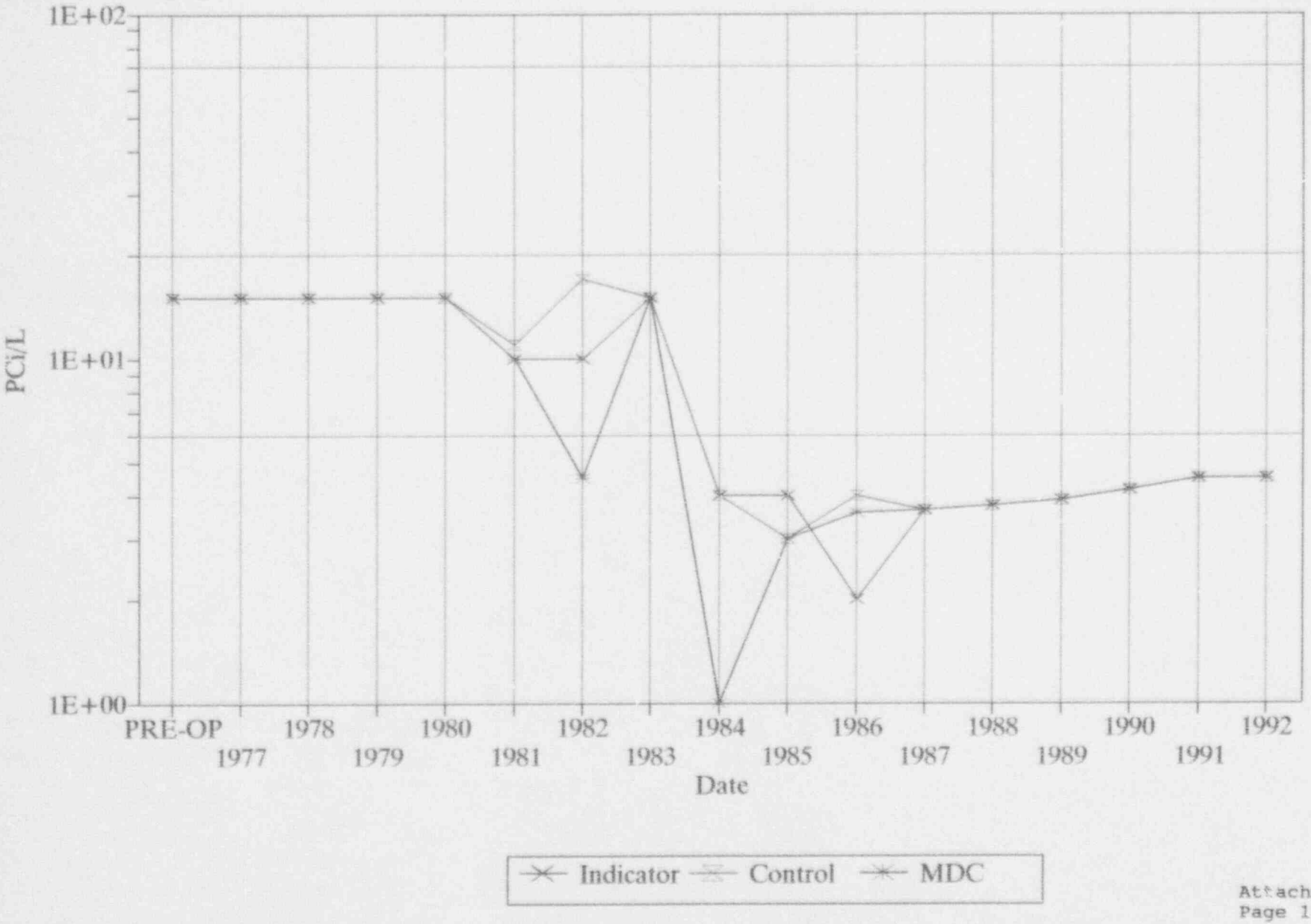
Annual Environmental Operating Report

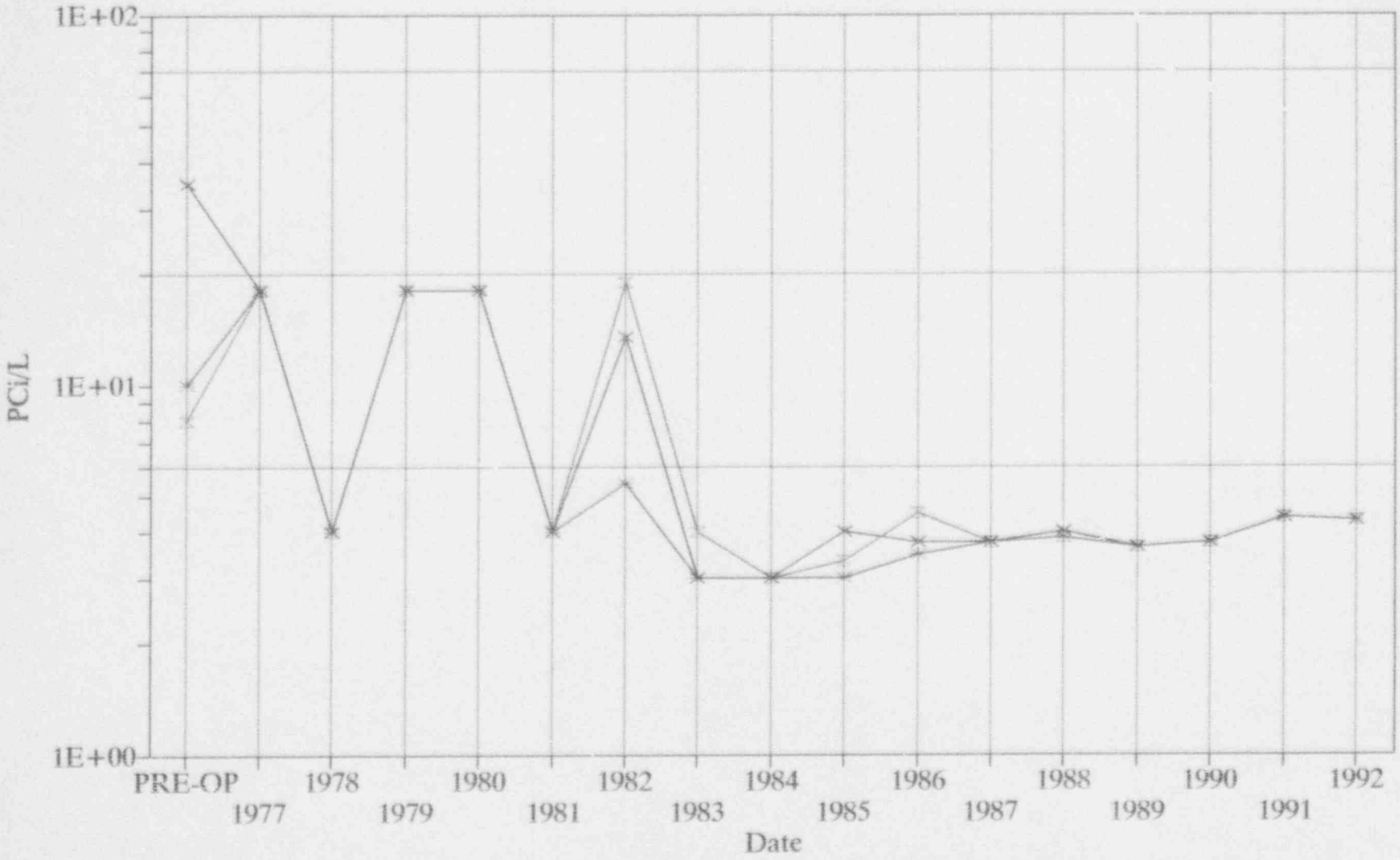
Mean Annual River Water Conc. CS-134



J. M. Farley
Nuclear
Plant

Annual Environmental Operating Report

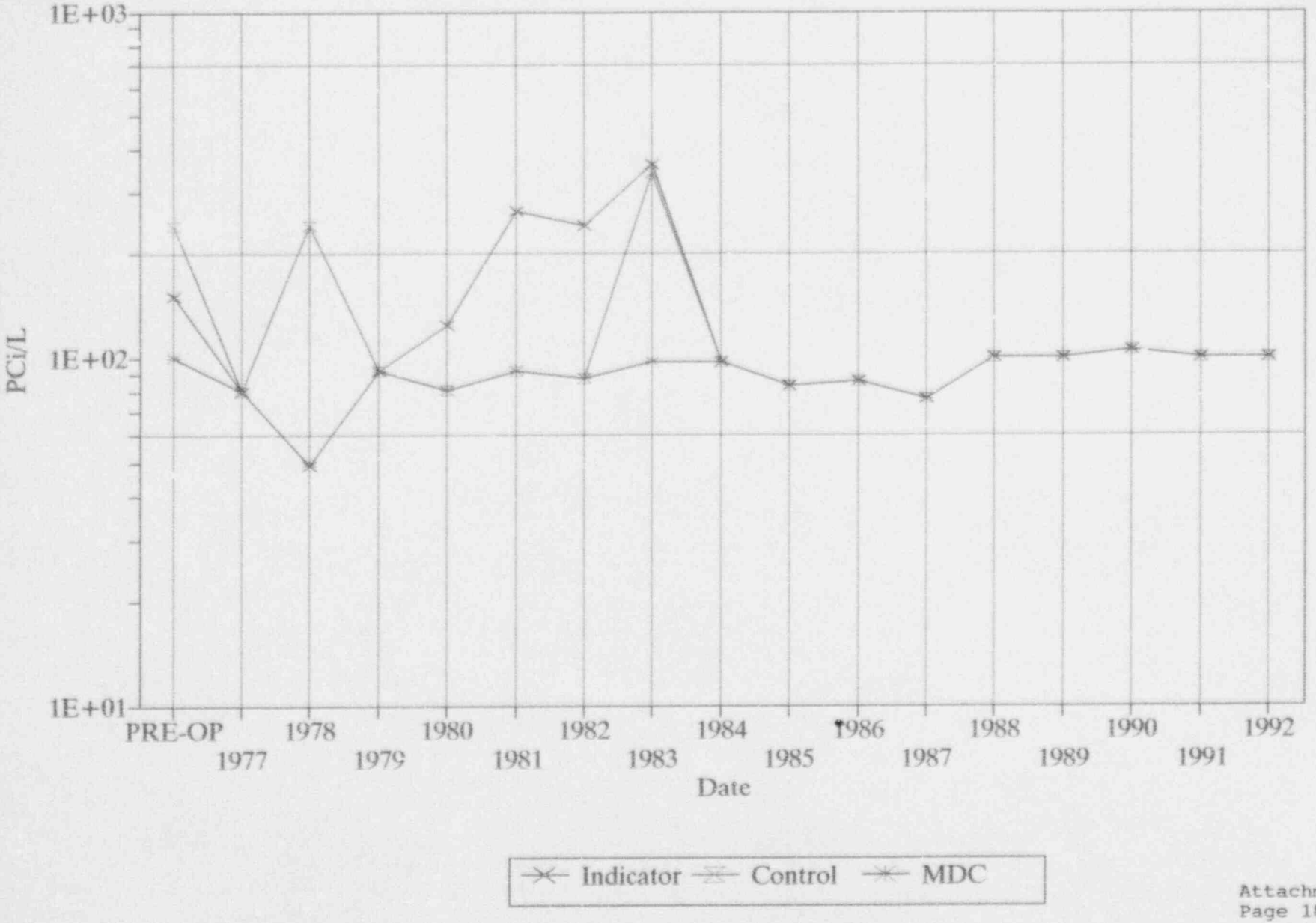
Mean Annual River Water Conc. CS-137



J. M. Farley
Nuclear
Plant

Annual Environmental Operating Report

Mean Annual Ground Water Conc. Tritium



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Nuclear
Plant

Annual Environmental Operating Report

Mean Annual Ground Water Conc. CS-134

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Nuclear
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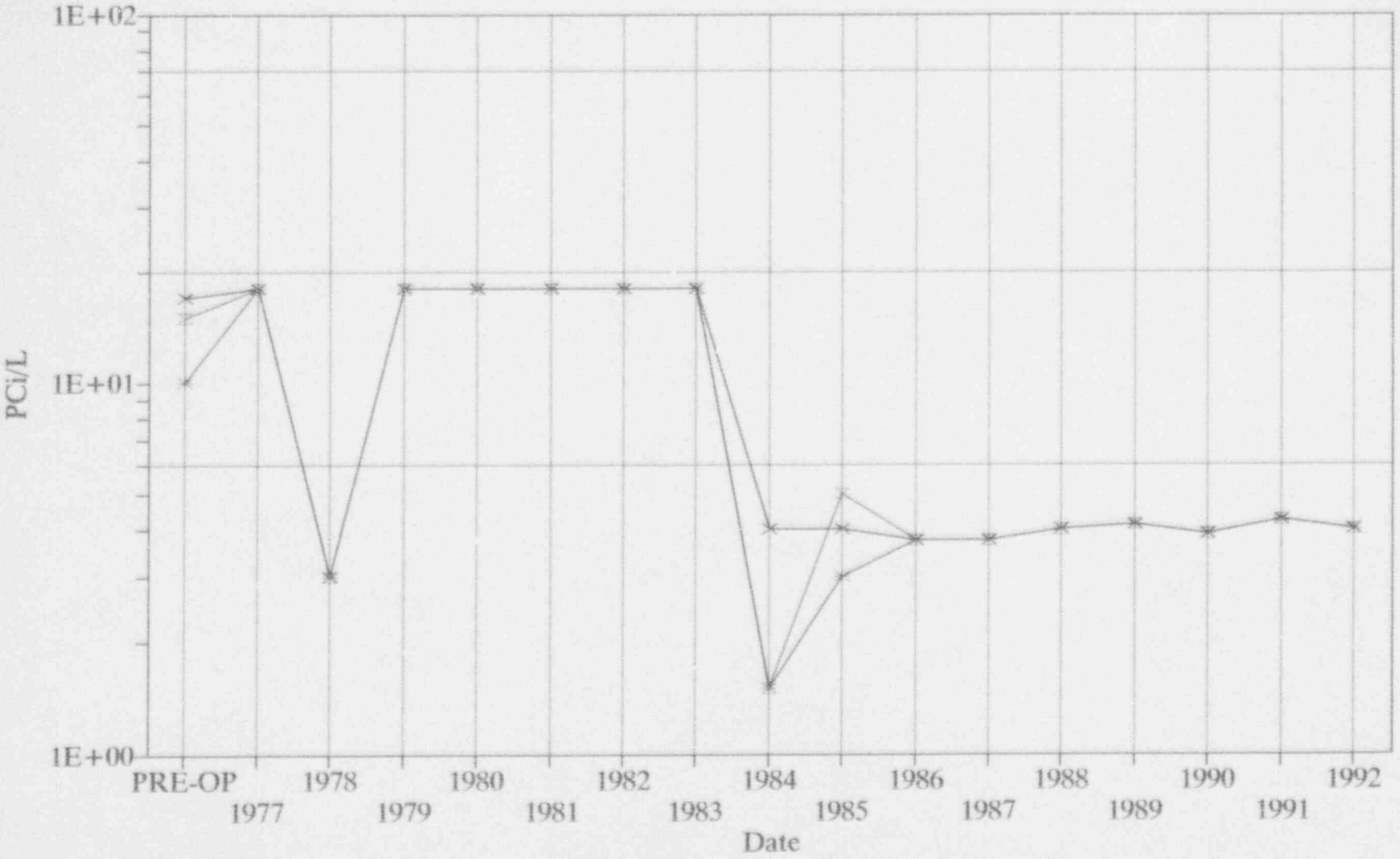
Annual Environmental Operating Report

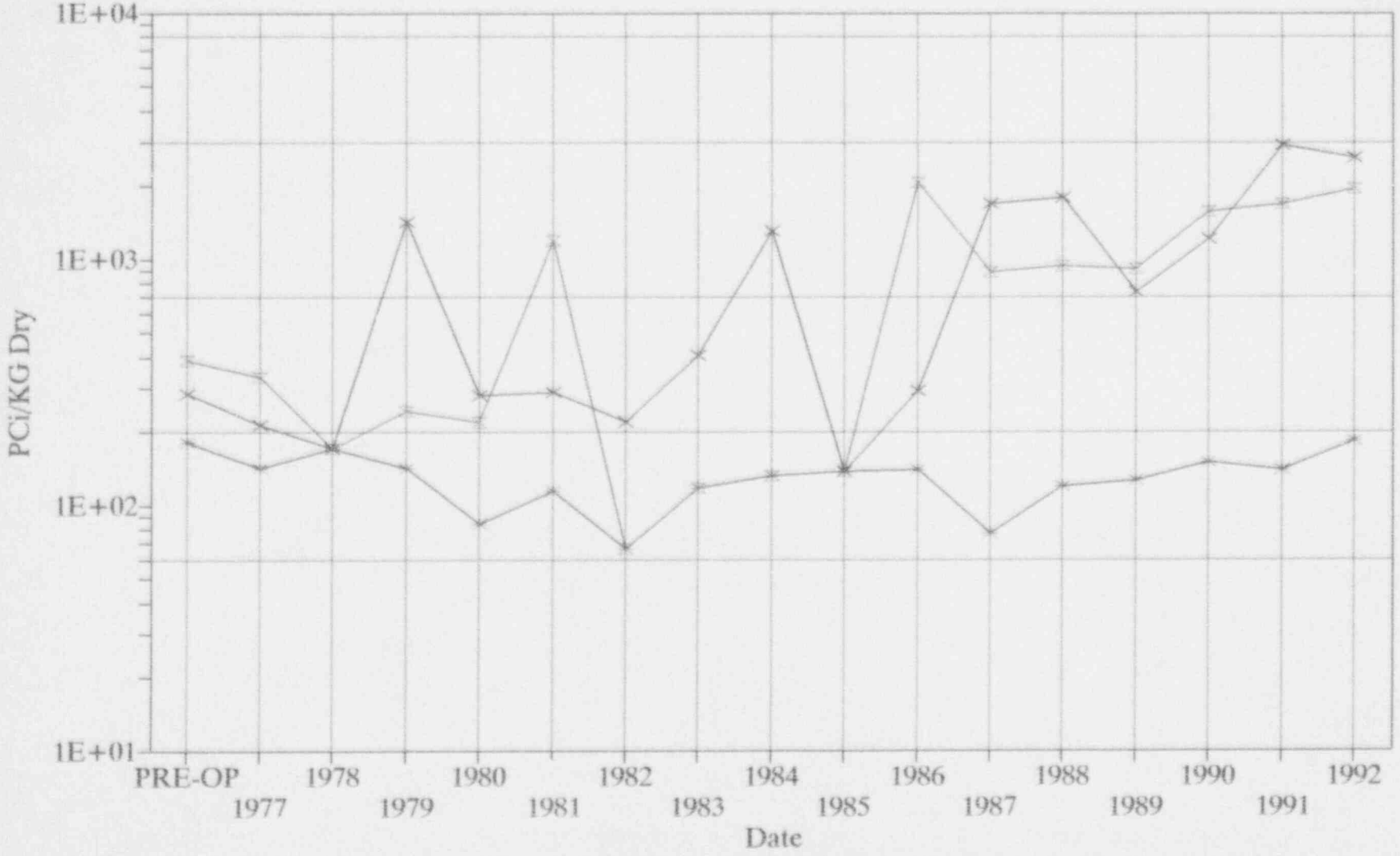
Mean Annual Ground Water Conc. CS-137



J. M. Farley
Nuclear
Plant

Annual Environmental Operating Report

Mean Annual River Sediment AC-228



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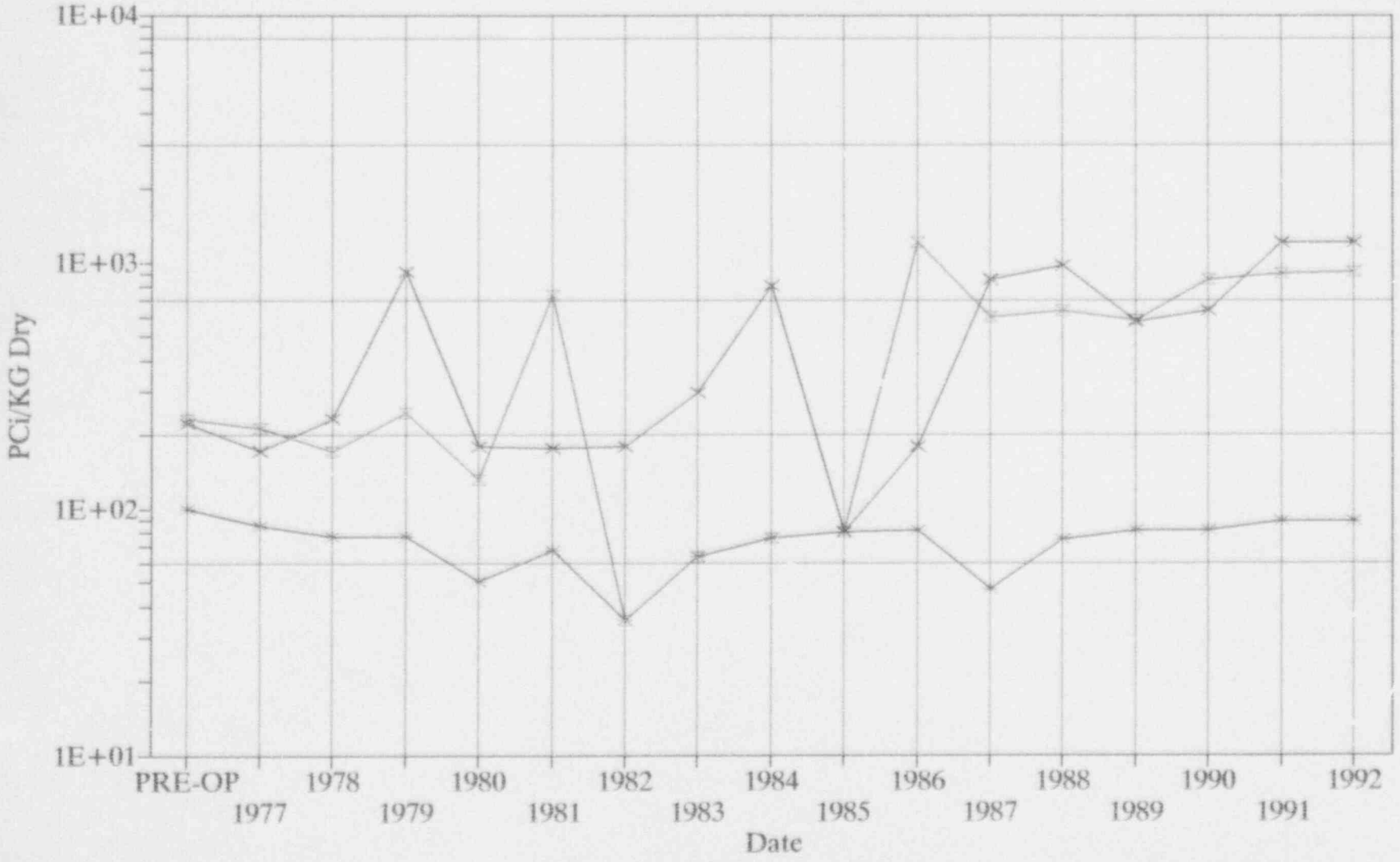
Nuclear
Plant

Annual Environmental Operating Report

Mean Annual River Sediment BI-214



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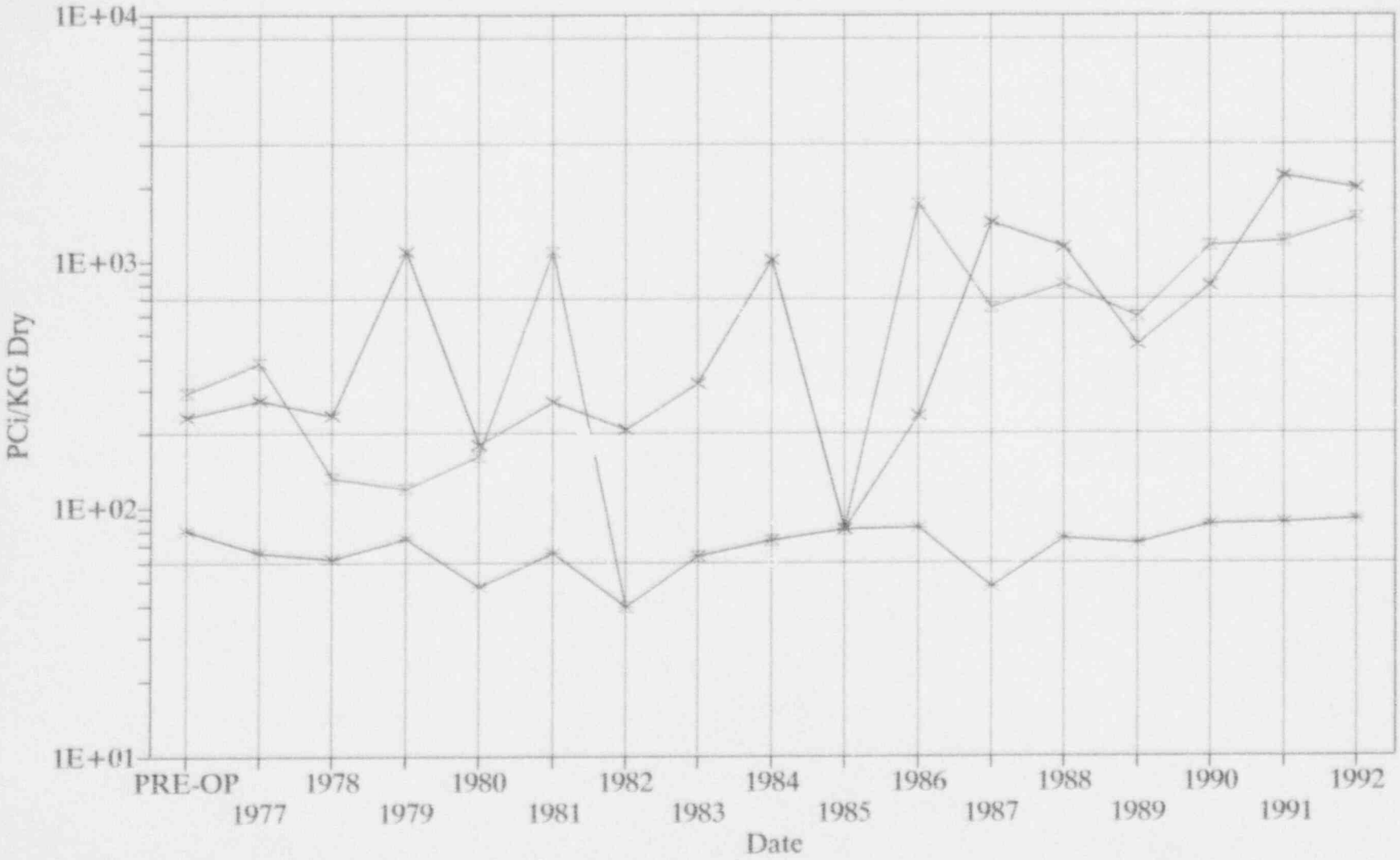
Nuclear
Plant

Annual Environmental Operating Report

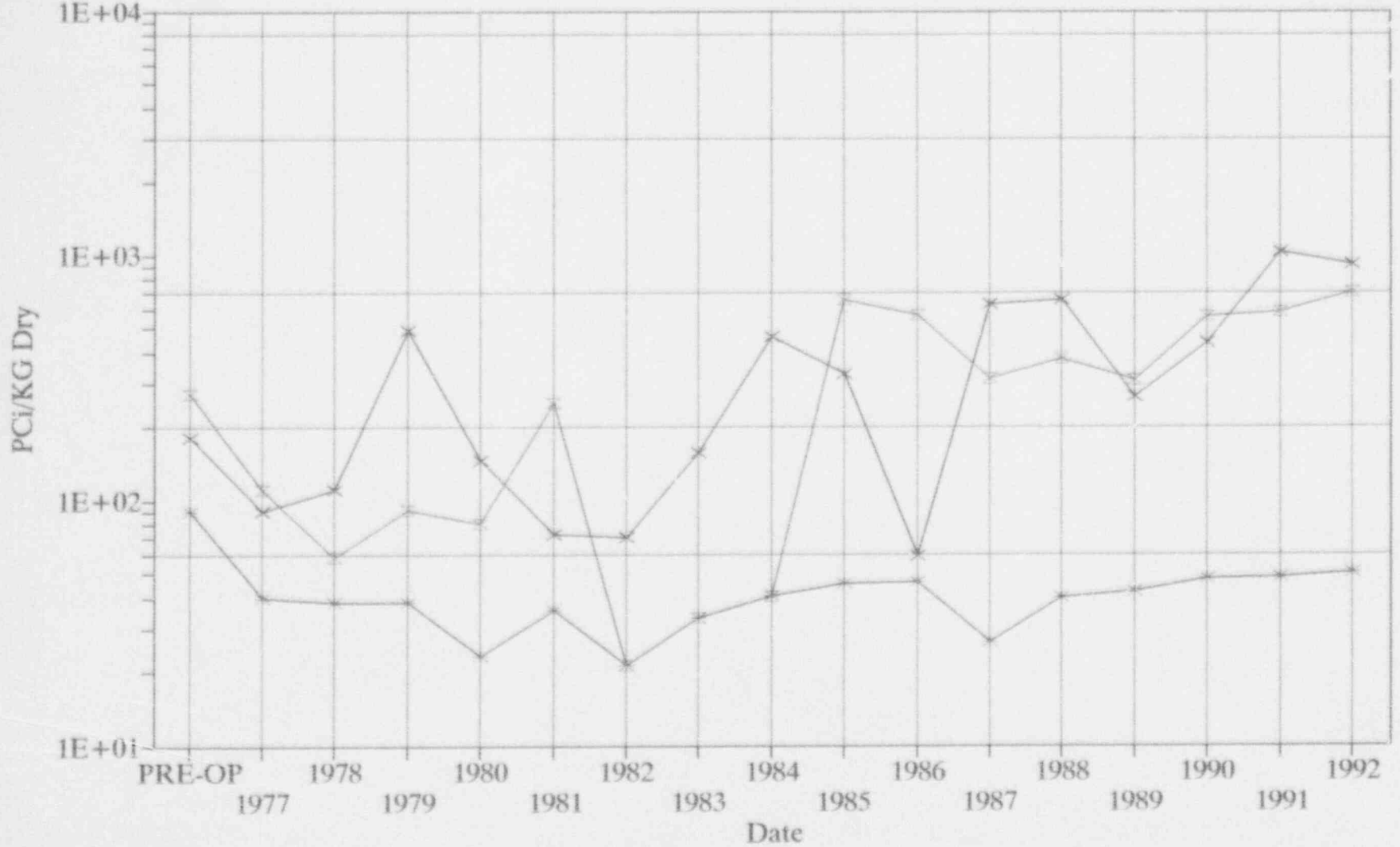
Mean Annual River Sediment PB-212



J. M. Farley
Nuclear
Plant

Annual Environmental Operating Report

Mean Annual River Sediment TL-208



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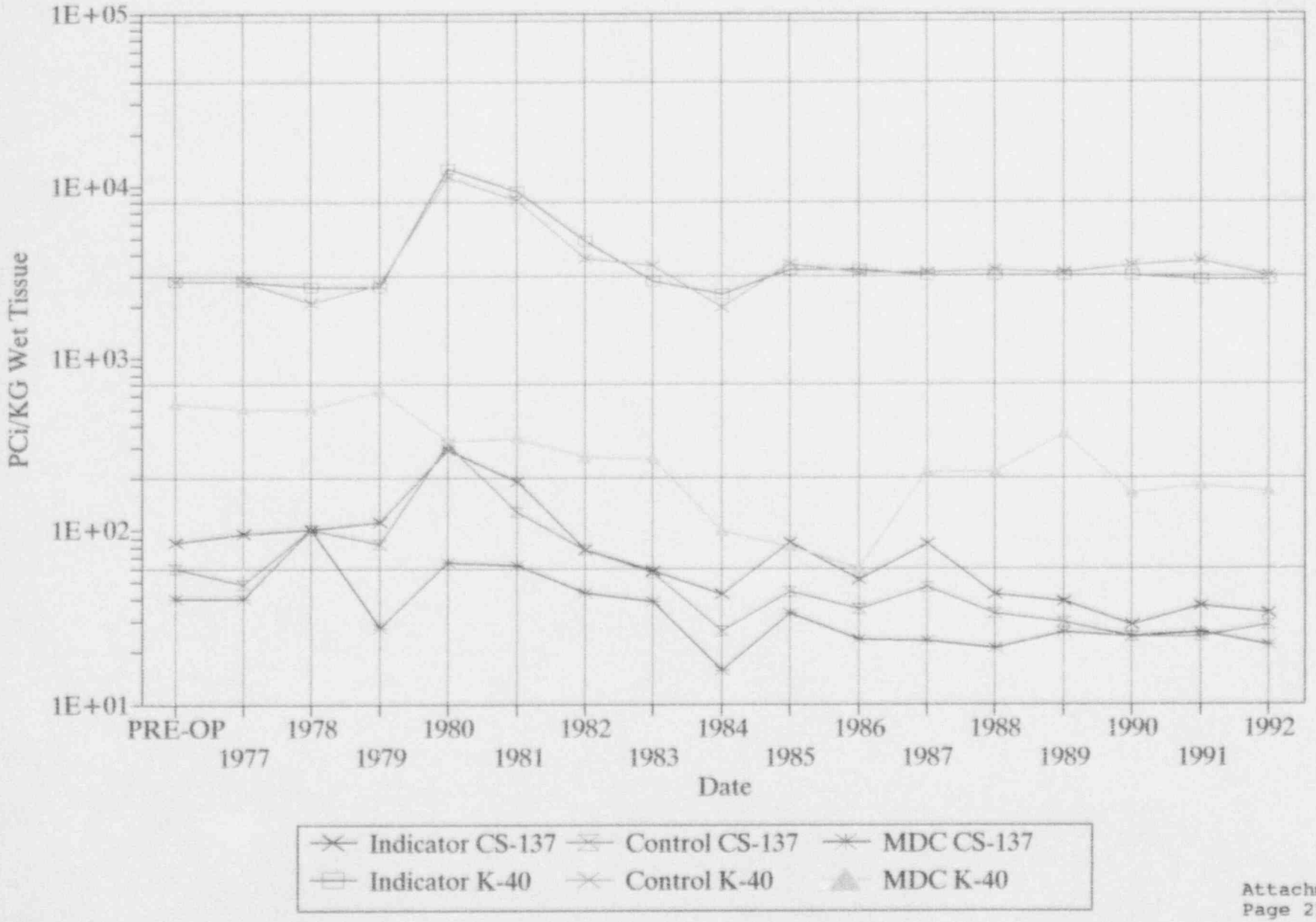
Mean Annual Game Fish Concentrations



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Mean Annual Bottom-Feeding Fish Conc.