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U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Joseph M. Farley Nuclear Plant
Annual Environmental Operating Report Radiological

Gentlemen:

The attached "Annual Environmental Operating Report, Part B: Radiological" for the calendar year 1991, 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

JDW/DMH

Attachment

cc: U. S. Nuclear Regulatory Commission
Mr. S. D. Ebneter
Mr. S. T. Hoffman
Mr. G. F. Maxwell

State of Alabama
Director, Division of Radiation Control

State of Georgia
Director, Environmental Protection Division

IE25

SOUTHERN NUCLEAR OPERATING 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, 1991

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 II concluded its seventh refueling outage on January 6, 1991. Unit I was shutdown for its tenth refueling outage from March 8, 1991 through May 19, 1991.

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 11 TLD stations. The program was further modified in April 1982, by Ammendment 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 1991 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 1991.

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 1990 are listed in Table 4.

A. Airborne Particulates and Iodine

All 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 5μm filters. In series with, but downstream of the particulate filters, F&J 50 mm (or equivalent) activated charcoal cartridges 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. Both the 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 (Thimerasol) 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 six 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 percent 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 4095 channel computer-based MCA. One set of semi-annual sediment sample was split with Alabama Division of Radiation Control.

III. Results and Discussion

No known atmospheric nuclear tests were conducted during 1991.

The definitions of "lower limit of detection" (LLD) and "minimum detectable concentration" (MDC) have not changed since last reported (1990 Annual Environmental Operating Report).

Attachment 2 , Plots of Selected Environmental Data, has been added to this year's report 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 1991-01 and 1991-02, and Attachment 2, pages 1-5. The 1991 results are below pre-operational levels and consistent with previous years. Cesium 134, Cesium 137, and Iodine 131 were not detected and there are no significant differences in indicator, community and control measurements.

B. External Radiation

The results of the external radiation measurements are shown in Table 1991-03 and Attachment 2 page 6. The 1991 results are at or below pre-operational levels and consistent with previous years. There are no significant differences in indicator, community and control measurements.

C. Milk

The milk analysis results are shown in Table 1991-04 and Attachment 3, pages 7-9. Lewis Dairy was used as the control location. There were no indicator samples during 1991. The 1991 results are consistent with those of previous years, and Potassium-40 was the only isotope detected in milk samples.

D. Vegetation

Forage analysis results are shown in Table 1991-05 and Attachment 2, pages 10-14. The 1991 results are below pre-operational levels and consistent with the downward trends of recent years with the following exceptions. The August 1991 control sample contained 13 pCi/kg Cesium 137 activity, barely above the MDC of 12 pCi/kg. The mean annual Cesium 137 control sample was higher due to the December control sample containing 137 pCi/kg Cesium 137 activity. The most likely cause of the elevated activity in the December sample was the lack of sufficient fresh green forage at the control location due to cold weather and lack of rain. The sample consisted of grass and vegetation from the forage plot which had survived the dry weather and the cold. Cesium 137 has been shown to be present in the soil throughout the area since the pre-operational period. Consultation with University of Georgia, Center for Applied Isotopes Studies supervision, confirmed that such "old" vegetation, having had more time to concentrate Cesium 137 from the soil, is more likely to indicate Cesium 137 activity than fresh green growth. The control forage plot has been tilled, fertilized and reseeded with a mixture of rye and bahia grass and is being watered more frequently during dry weather. Subsequent samples have been adequate to meet analysis requirements.

E. Soil

The in situ soil analysis results are shown in Table 1991-06 and in Attachment 2, pages 15 and 16. The only man-made isotope found was Cesium 137 which has been present since the pre-operational period. Cesium 137 measurements for 1991 continue the downward trend of recent years with no significant difference in measurements taken at indicator, control and community locations.

F. Waterborne (Surface Water)

The surface water analysis results are shown in Table 1991-07 and in Attachment 2, pages 17-19. The tritium activity measured in two of four indicator samples was below pre-operational levels and consistent with a general downward trend observed since 1986. No measurable activity from man-made isotopes was detected in control samples.

G. Waterborne (Ground Water)

The ground water analysis results are shown in Table 1991-08 and in Attachment 2, pages 20-22. No measurable activity from man-made isotopes was detected in ground water samples in 1991.

H. River Sediment

The river sediment analysis results are shown in Table 1991-09, and in Attachment 2, pages 23-26. While activity from a variety of naturally occurring isotopes was measured, no man-made isotopes were detected.

I. Game Fish (River)

The analysis results of edible portions of Chattahoochee River game fish are shown in Table 1991-10 and in Attachment 2, page 27. Cesium 137 activity was detected in one of two indicator samples and one of two control samples. Detected activity was below pre-operational levels and consistent with established trends.

J. Bottom-Feeding Fish (River)

Analysis results of edible portions of Chattahoochee River bottomfeeding fish are shown in Table 1991-11 and in Attachment 2, page 28. 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.

IV. Land Use Census and Interlaboratory Comparison Program

A. Land Use Census

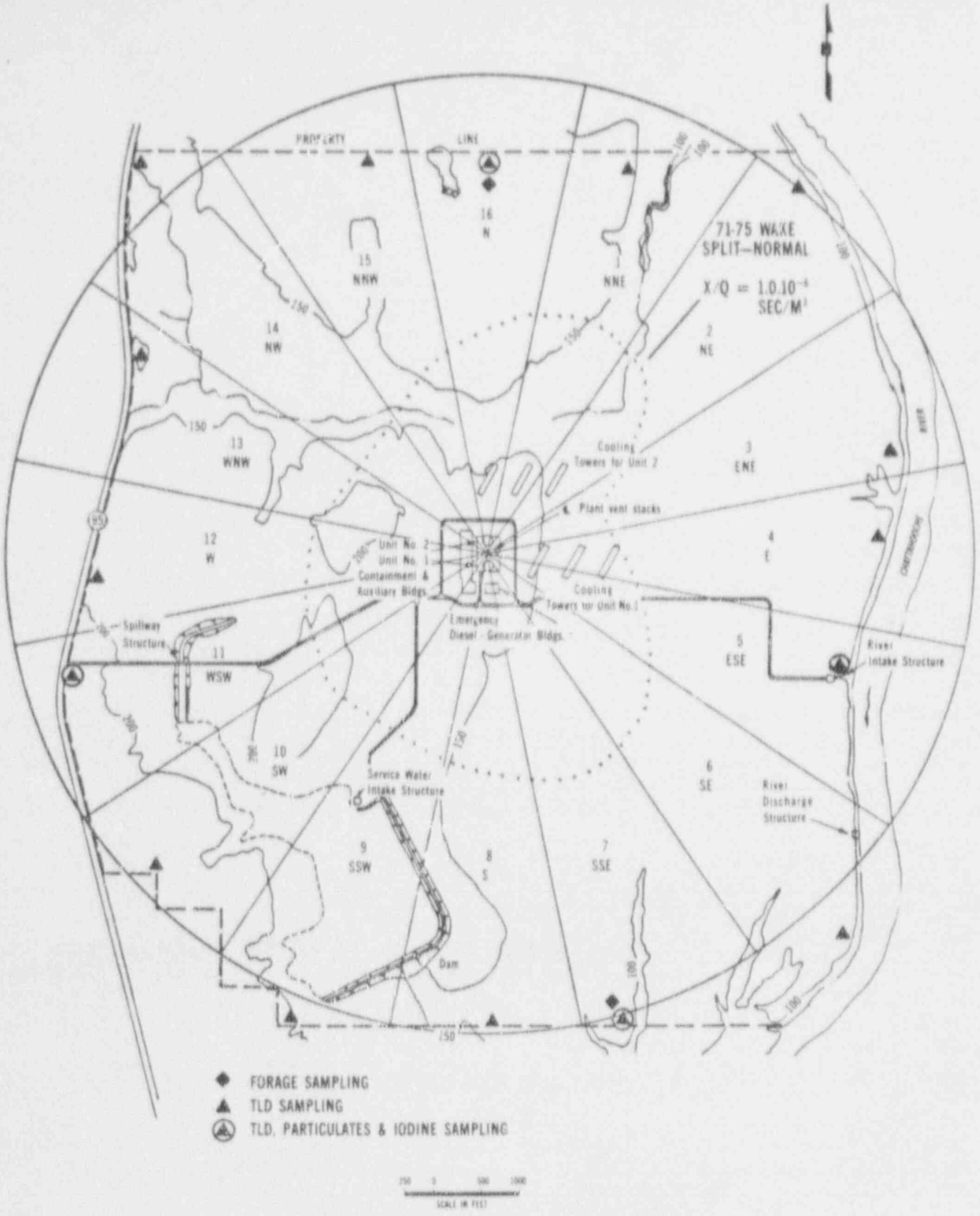
The results of the June, 1991, Land Use Census are given in Attachment 1 to this report.

B. Interlaboratory Comparison Program

During 1991, 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.

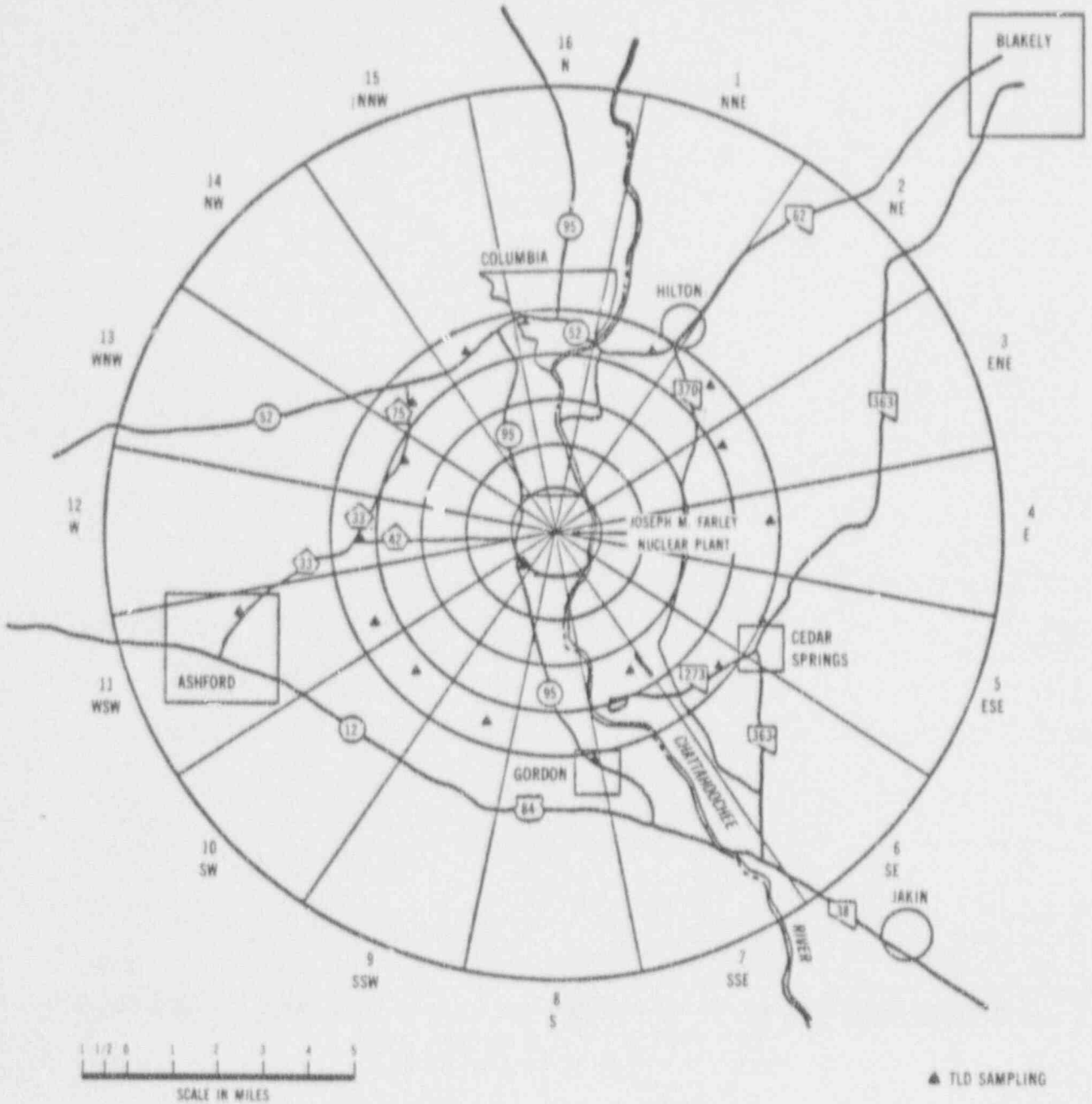
V. Data Trends and Conclusion

Review of data trends from the pre-operational period through 1991 indicates that environmental radiation levels measured in all the pathways monitored in 1991 remained at background levels and were at or below pre-operational levels. The atmospheric test 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 continue in 1991. Therefore, data obtained during 1991 demonstrated that continued operation of Farley Nuclear Plant has not harmed or caused any irreversible damage to the environment.



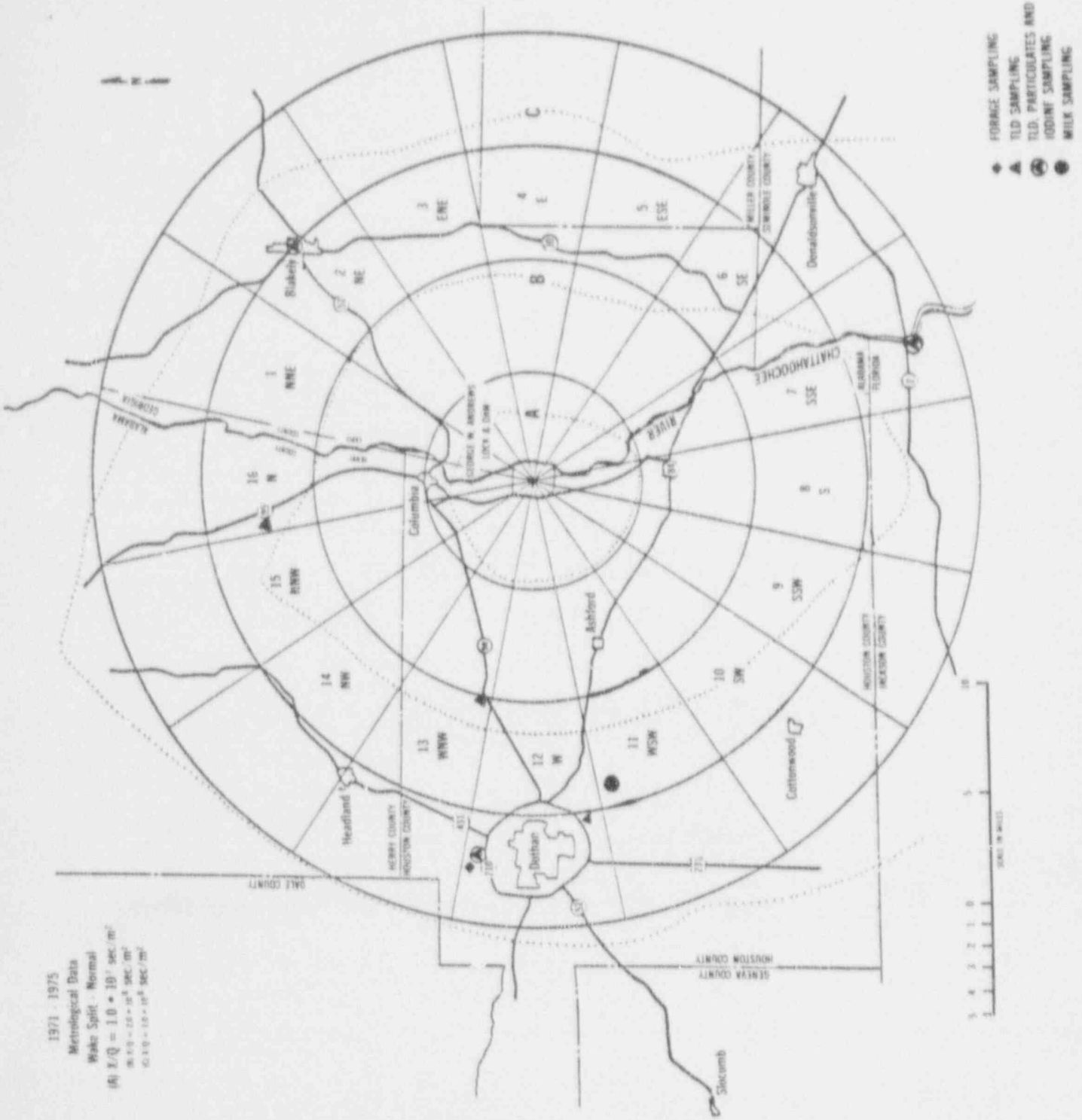
INDICATOR SAMPLING LOCATIONS FOR AIRBORNE ENVIRONMENTAL RADIOACTIVITY AT THE FARLEY NUCLEAR PLANT

FIGURE 1



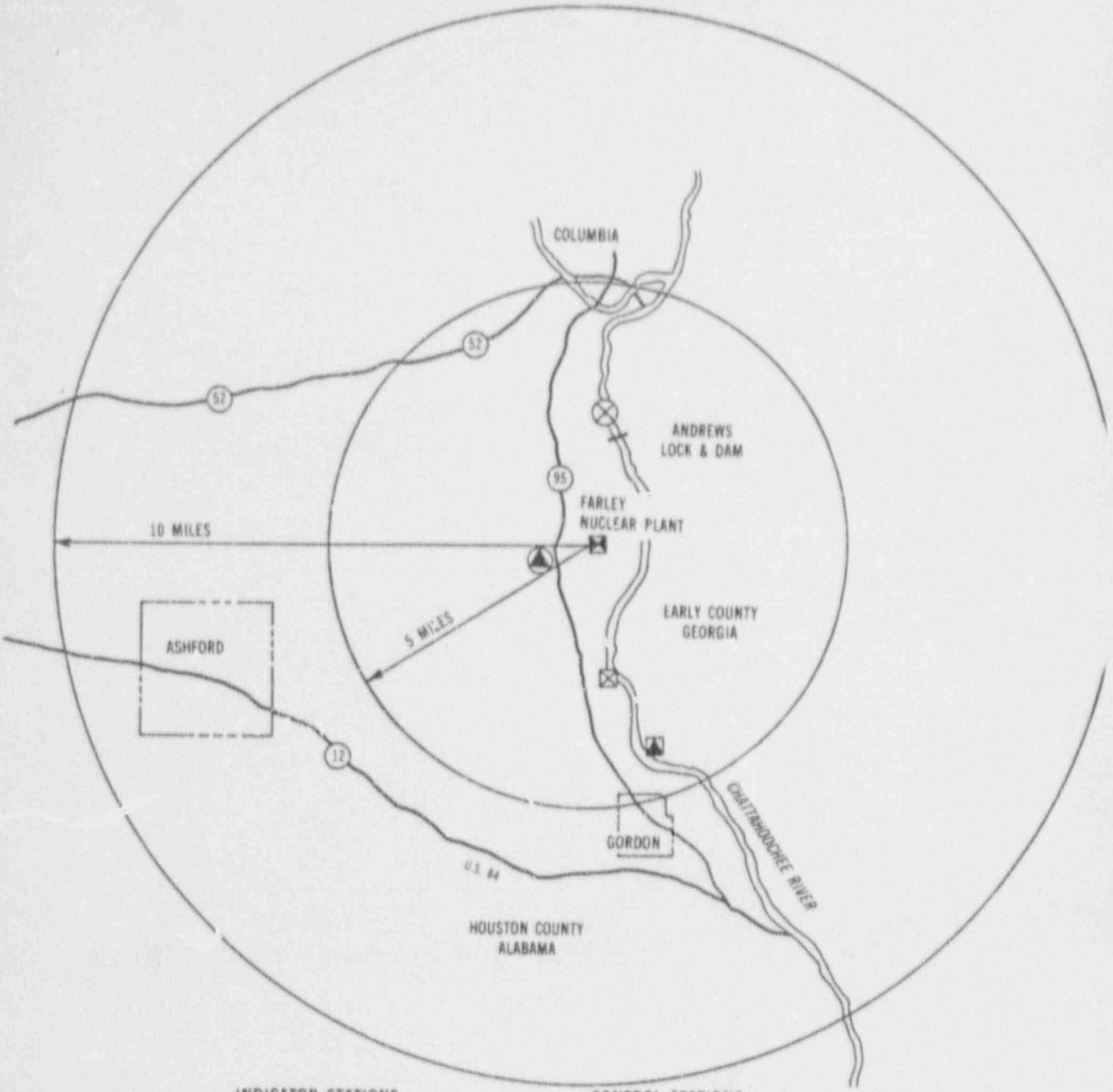
COMMUNITY (INDICATOR II) SAMPLING LOCATIONS FOR DIRECT RADIATION IN THE FARLEY NUCLEAR PLANT AREA

FIGURE 2



CONTROL SAMPLING LOCATIONS FOR AIRBORNE 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 1991

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) Great Southern 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:		
Great Southern Paper Co. (SSE-3)		
Control Stations:		
Blakely, GA. (NE-15) Dothan, AL. (W-18) Neals Landing, FL. (SSE-18)		
Soil	Annual in situ Ge(Li) gamma-ray spectroscopy measurements.	Gamma Isotopic Annually
Indicator Stations:		
Seven 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) Great Southern Paper Co. (SSE-3) Ashford, AL. (WSW-8)		
Control Stations:		
Blakely, GA. (NE-15) Dothan, AL. (W-18)		
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 3-8 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		
Surface Water Indicator Station: Great Southern 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:		
Great Southern 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 ANALY
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^{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-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

*For drinking water samples.

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TABLE 4
SAMPLING AND ANALYSIS DEVIATIONS DURING 1991

Component	Time Period	Reason for Deviation/Comments
Air Monitoring Station 1601	1/2/91 - 1/8/91	Low sample volume; adjusted sample flowrate.
Air Monitoring Station 0501	1/2/91 - 1/8/91	Low sample volume; adjusted sample flowrate.
Air Monitoring Station 0701	1/2/91 - 1/8/91	Low sample volume; adjusted sample flowrate.
Air Monitoring Station 0215	1/2/91 - 1/8/91	Low sample volume; adjusted sample flowrate.
Air Monitoring Station 0701	1/8/91 - 1/15/91	Low sample volume; adjusted sample flowrate.
Air Monitoring Station 0701	1/15/91 - 1/22/91	Low sample volume due to loss of electrical power. Power restored 1/25/91.
Air Monitoring Station 0703	1/15/91 - 1/22/91	Low sample volume; adjusted sample flowrate.
Air Monitoring Station 1601	1/22/91 - 1/29/91	Low sample volume due to dust loading on particulate filter.
Air Monitoring Station 0501	1/22/91 - 1/29/91	Low sample volume due to dust loading on particulate filter.
Air Monitoring Station 0701	1/22/91 - 1/29/91	Low sample volume due to dust loading on particulate filter.
Air Monitoring Station 0703	1/22/91 - 1/29/91	Low sample volume due to mechanical failure; monitor repaired 1/30/91.
Air Monitoring Station 0215	1/22/91 - 1/29/91	Low sample volume due to dust loading on particulate filter.
Air Monitoring Station 0701	1/29/91 - 2/5/91	Low sample volume due to dust loading on particulate filter.
Air Monitoring Station 0501	2/5/91 - 2/12/91	Low sample volume due to dust loading on particulate filter.
Air Monitoring Station 0703	2/5/91 - 2/12/91	Low sample volume due to dust loading on particulate filter.
Air Monitoring Station 0501	2/12/91 - 2/19/91	Low sample volume due to dust loading on particulate filter.

Component	Time Period	Reason for Deviation/Comments
Air Monitoring Station 0703	2/12/91 - 2/19/91	Low sample volume due to dust loading on particulate filter.
Air Monitoring Station 0501	2/19/91 - 2/26/91	Low sample volume due to dust loading on particulate filter.
Air Monitoring Station 0701	2/19/91 - 2/26/91	Low sample volume due to dust loading on particulate filter.
Air Monitoring Station 0703	2/19/91 - 2/26/91	Low sample volume due to dust loading on particulate filter.
Air Monitoring Station 0501	2/26/91 - 3/5/91	Low sample volume due to dust loading on particulate filter.
Air Monitoring Station 0701	2/26/91 - 3/5/91	Low sample volume due to electrical failure of pump motor; motor repaired 3/7/91.
Air Monitoring Station 0703	2/26/91 - 3/5/91	Low sample volume due to mechanical failure of pump; pump repaired 3/8/91.
Air Monitoring Station 0501	3/5/91 - 3/12/91	Low sample volume due to dust loading on particulate filter.
Air Monitoring Station 0701	3/5/91 - 3/12/91	Low sample volume due to dust loading on particulate filter.
Air Monitoring Station 0703	3/5/91 - 3/12/91	Low sample volume due to shortened collection period caused by pump failure.
Air Monitoring Station 0718	3/5/91 - 3/12/91	Low sample volume due to faulty totalizer. Totalizer replaced 3/19/91.
Air Monitoring Station 0501	3/12/91 - 3/19/91	Low sample volume due to dust loading on particulate filter.
Air Monitoring Station 0701	3/12/91 - 3/19/91	Low sample volume due to dust loading on particulate filter.
Air Monitoring Station 0718	3/12/91 - 3/19/91	Low sample volume due to faulty totalizer; totalizer replaced 3/19/91.
Air Monitoring Station 0501	3/19/91 - 3/26/91	Low sample volume; adjusted sample flowrate.
Air Monitoring Station 0701	3/19/91 - 3/26/91	Low sample volume; adjusted sample flowrate.

Component	Time Period	Reason for Deviation/Comments
Air Monitoring Station 1101	3/19/91 - 3/26/91	Sample station inoperable due to electrical failure; pump motor replaced 3/29/91.
Air Monitoring Station 1108	3/19/91 - 3/26/91	Low sample volume due to faulty totalizer; totalizer replaced 3/29/91.
Air Monitoring Station 0501	3/26/91 - 4/2/91	Low sample volume; adjusted sample flowrate.
Air Monitoring Station 1101	3/26/91 - 4/2/91	No sample; pump motor improperly installed; repaired 4/5/91.
Air Monitoring Station 0501	4/2/91 - 4/9/91	Low sample volume; sample flow obstructed; work request initiated.
Air Monitoring Station 0718	4/2/91 - 4/9/91	Low sample volume; increased sample flowrate.
Air Monitoring Station 0215	4/2/91 - 4/9/91	Low sample volume; increased sample flowrate.
Air Monitoring Station 0501	4/16/91 - 4/23/91	Low sample volume; work request outstanding. Repaired (new pump installed) 5-8-91.
Air Monitoring Station 1605	5/7/91 - 5/14/91	Low sample volume due to mechanical failure of totalizer.
Air Monitoring Station 0501	5/7/91 - 5/14/91	Particulate sample missing; reason unknown.
Air Monitoring Station 1605	5/14/91 - 5/21/91	No sample due to mechanical failure of totalizer; totalizer replaced 5/23/91.
Air Monitoring Station 0701	5/21/91 - 5/28/91	Low sample volume due to faulty totalizer; work request initiated.
Air Monitoring Station 1108	5/21/91 - 5/28/91	Package containing particulate filter accidently fell to ground and was destroyed by lawn mower.
In Situ Soil Sample 0201	5/28/91	Measurement not taken due to temporarily barricaded road.
Air Monitoring Station 0701	5/28/91 - 6/4/91	No sample due to mechanical failure of totalizer; totalizer replaced 6/4/91.
Air Monitoring Station 0701	6/4/91 - 6/12/91	Low sample volume; poor sample flow; work request initiated.
Air Monitoring Station 0701	6/12/91 - 6/18/91	Low sample volume due to poor sample flow and six-day collection period. (schedule changed due to NRC Inspection)

Component	Time Period	Reason for Deviation/Comments
Air Monitoring Station 0703	6/12/91 - 6/18/91	Low sample volume; adjusted sample flowrate.
Air Monitoring Station 0215	6/12/91 - 6/18/91	Low sample volume; adjusted sample flowrate.
Air Monitoring Station 0703	6/18/91 - 6/25/91	Low sample volume due to dust loading on particulate filter.
Air Monitoring Station 0218	6/18/91 - 6/25/91	Low sample volume due to blown fuse; replaced fuse.
Air Monitoring Station 0215	7/16/91 - 7/23/91	Monitoring station inoperable due to mechanical failure; repaired 7/25/91.
Air Monitoring Station 0215	7/23/91 - 7/30/91	Low sample volume; adjusted sample flowrate.
Air Monitoring Station 1218	7/23/91 - 7/30/91	Monitoring station inoperable due to electrical failure; repaired 8/2/91.
Air Monitoring Station 1218	7/30/91 - 8/6/91	Monitoring station inoperable due to electrical failure; repaired 8/9/91.
Air Monitoring Station 1218	8/6/91 - 8/13/91	Low sample volume; adjusted sample flowrate.
Air Monitoring Station 0701	8/13/91 - 8/20/91	Monitoring station shutdown 8/18/91 and moved to permit removal of dead tree for safety; monitoring station returned to service 8/24/91.
Air Monitoring Station 1101	8/13/91 - 8/20/91	Low sample volume due to blown fuse; replaced fuse.
Air Monitoring Station 0701	8/20/91 - 8/27/91	Low sample volume; monitoring station returned to service 8/24/91.
Air Monitoring Station 1101	8/20/91 - 8/27/91	Monitoring station inoperable due to blown fuse; replaced fuse.
Air Monitoring Station 1218	9/17/91 - 9/24/91	Low sample volume; adjusted sample flowrate.
Air Monitoring Station 1218	9/24/91 - 10/1/91	Particulate filter missing; reason unknown.
Air Monitoring Station 0703	10/29/91 - 11/5/91	Monitoring station inoperable due to broken drive belt; belt replaced 11/8/91.

Component	Time Period	Reason for Deviation/Comments
Air Monitoring Station 1218	10/29/91 - 11/5/91	Monitoring station inoperable due to blown fuse; replaced fuse.
Air Monitoring Station 1601	11/12/91 - 11/19/91	Low sample volume due to dust loading on particulate filter.
Air Monitoring Station 0701	11/12/91 - 11/19/91	Low sample volume; adjusted sample flowrate.
Air Monitoring Station 0718	11/12/91 - 11/19/91	Low sample volume; adjusted sample flowrate.
Air Monitoring Station 0215	11/12/91 - 11/19/91	Monitoring station inoperable due to mechanical failure of totalizer; replaced totalizer 11/21/91.
Air Monitoring Station 1218	11/2/91 - 11/19/91	Monitoring station inoperable due to fuse; replaced fuse.
Air Monitoring Station 0701	11/19/91 - 11/25/91	Monitoring station inoperable due to mechanical failure of totalizer; totalizer replaced 11/30/91.
Air Monitoring Station 1218	12/3/91 - 12/10/91	Monitoring station inoperable due to blown fuse; replaced fuse.
Air Monitoring Station 1218	12/10/91 - 12/17/91	Monitoring station inoperable due to blown fuse; replaced fuse, initiated work request to investigate repeat occurrence; work request completed 12/19/91.
Air Monitoring Station 0701	12/17/91 - 12/23/91	Monitoring station inoperable due to tripped breaker; reset breaker.

TABLE 1991-01
AIRBORNE PARTICULATES- OPERATIONAL RADIOACTIVITY SUMMARY

JOSEPH M. FARLEY NUCLEAR PLANT
LICENSE NOS. NPF-2 AND NPF-8 HOUSTON COUNTY ALABAMA
SUMMARY REPORT FROM 010191 TO 123191 (A)

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE AND TOTAL NUMBERS OF ANALYSIS PERFORMED	NOMINAL MDC(B)	ALL INDICATOR LOCATIONS MEAN (C/D) RANGE(C)	INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN NAME DISTANCE AND DIRECTION	MEAN (C/D) RANGE (C)	COMMUNITY LOCATIONS MEAN (C/D) RANGE (C)	CONTROL LOCATION MEAN (C/D) RANGE (C)
AIR PARTICULATES. (PCI/M**3)	GROSS BETA 524	.001	.009(208/209) (0.002- 0.033)	SOUTH PERIM. 1.0 MI. SSE	.010(52/ 52) (0.002- 0.033)	.008(157/157) (0.001- 0.031)	.010(156/158) (0.0C*- 0.035)
	BE-7 40	.010	.027(16/ 16) (0.016- 0.046)	SOUTH PERIM. 1.0 MI. SSE	.030(4/ 4) (0.023- 0.046)	.023(11/ 12) (0.013- 0.035)	.031(12/ 12) (0.016- 0.046)
	CS-134 40	.001	< MDC (0/ 16)			< MDC (0/ 12)	< MDC (0/ 12)
	CS-137 40	.001	< MDC (0/ 16)			< MDC (0/ 12)	< MDC (0/ 12)
	I-131 40	.001	< MDC (0/ 16)			< MDC (0/ 12)	< MDC (0/ 12)

(A) No Nonroutine Anomalous Measurements Reported During This Period.
(B) Mean Minimum Detectable Concentration Calculated Per Table 2 of This Report.
(C) Mean and Range of Number of Measurements With Detectable Activity Only.
(D) Total Number of Measurements Taken.

TABLE 1991-02

AIRBORNE IODINE - OPERATIONAL RADIOACTIVITY SUMMARY

JOSEPH M. FARLEY NUCLEAR PLANT

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

SUMMARY REPORT FROM 010191 TO 123191 (A)

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE AND TOTAL NUMBERS OF ANALYSIS PERFORMED	NOMINAL MDC(B)	ALL INDICATOR LOCATIONS MEAN (C/D) RANGE(C)	INDICATOR LOCATION WITH HIGHEST ANN. AL MEAN NAME DISTANCE AND DIRECTION	MEAN (C/D)	RANGE (C)	COMMUNITY LOCATIONS MEAN (C/D) RANGE (C)	CONTROL LOCATION MEAN (C/D) RANGE (C)
AIR IODINE (PCI/M**3)	IODINE 422	.047	< MDC (0/211)				< MDC (0/ 53)	< MDC (0/158)

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

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

(C) Mean and Range of Number of Measurements With Detectable Activity Only.

(D) Total Number of Measurements Taken.

TABLE 1991-03
EXTERNAL RADIATION - OPERATIONAL RADIOACTIVITY SUMMARY

JOSEPH M. FARLEY NUCLEAR PLANT
LICENSE NOS. NPF-2 AND NPF-8 HOUSTON COUNTY ALABAMA
SUMMARY REPORT FROM 010191 TO 123191 (A)

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE AND TOTAL NUMBER OF ANALYSIS PERFORMED	NOMINAL MDC(B)	ALL INDICATOR LOCATIONS MEAN (C/D) RANGE(C)	INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN NAME DISTANCE AND DIRECTION	MEAN (C/D) RANGE (C)	COMMUNITY LOCATIONS MEAN (C/D) RANGE (C)	CONTROL LOCATION MEAN (C/D) RANGE (C)
TLD-QUARTER (MRAD)	GROSS GAMMA 160	10.000	18.363(64/ 64) (11.88- 31.78)	EAST PERIM. 0.8 MI. E	24.652(4/ 4) (20.88- 31.78)	16.068(72/ 72) (9.33- 31.16)	16.108(24/ 24) (10.83- 23.74)
TLD-ANNUAL (MRAD)	GROSS GAMMA 40	10.000	53.160(16/ 16) (37.62- 78.62)	EAST PERIM. 0.8 MI. E	78.620(1/ 1)	43.630(18/ 18) (35.87- 60.37)	46.328(6/ 6) (37.87- 55.92)
TLD-ANNUAL-E (MRAD)	GROSS GAMMA 40	10.000	73.790(16/ 16) (55.61- 101.11)	EAST PERIM. 1.0 MI. NE	101.110(1/ 1)	64.275(18/ 18) (52.91- 76.41)	61.903(6/ 6) (42.67- 85.66)

(A) No Nonroutine Anomalous Measurements Reported During This Period.
(B) Mean Minimum Detectable Concentration.
(C) Mean and Range of Number of Measurements With Detectable Activity Only.
(D) Total Number of Measurements Taken.
(E) Sum of Four Quarters For Comparative Purposes

TABLE 1991-04
MILK - OPERATIONAL RADIOACTIVITY SUMMARY

JOSEPH M. FARLEY NUCLEAR PLANT
LICENSE NOS. NPF-2 AND NPF-8 HOUSTON COUNTY ALABAMA
SUMMARY REPORT FROM 010191 TO 123191 (A)

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE AND TOTAL NUMBERS OF ANALYSIS PERFORMED	NOMINAL MDC(B)	ALL INDICATOR LOCATIONS MEAN (C/D) RANGE(C)	INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN NAME DISTANCE AND DIRECTION	MEAN (C/D) RANGE (C)	COMMUNITY LOCATIONS MEAN (C/D) RANGE (C)	CONTROL LOCATION MEAN (C/D) RANGE (C)
MILK (PCI/L)	IODINE 27	.256					< MDC (0/ 27)
	BA-140 27	46.518					< MDC (0/ 27)
	CS-134 27	13.074					< MDC (0/ 27)
	CS-137 27	12.481					< MDC (0/ 27)
	K-40 27	98.666					1429.259(27/ 27)
							(1260.00- 1620.00)
	LA-140 27	9.148					< MDC (0/ 27)

(A) No Nonroutine Anomalous Measurements Reported During This Period.
(B) Mean Minimum Detectable Concentration Calculated Per Table 2 of this Report.
(C) Mean and Range of Number of Measurements With Detectable Activity Only.
(D) Total Number of Measurements Taken.

TABLE 1991-05
VEGETATION: FORAGE - OPERATIONAL RADIOACTIVITY SUMMARY

JOSEPH M. FARLEY NUCLEAR PLANT
LICENSE NOS. NPF-2 AND NPF-8 HOUSTON COUNTY ALABAMA
SUMMARY REPORT FROM 010191 TO 123191 (A)

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE AND TOTAL NUMBERS OF ANALYSIS PERFORMED	NOMINAL MDC(B)	ALL INDICATOR LOCATIONS MEAN (C/D) RANGE(C)	INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN NAME / DISTANCE AND DIRECTION	MEAN (C/D) RANGE (C)	COMMUNITY LOCATIONS MEAN (C/D) RANGE (C)	CONTROL LOCATION MEAN (C/D) RANGE (C/
FORAGE(E) (PCI/KG-WET)	AC-228 51	52.200	65.000(4/ 4) (57.00- 77.00)	NORTH PERIM. 0.8 MI. N	67.666(3/ 3) (59.0 - 77.0)		115.000(1/ 1) (115.00- 115.00)
	BE-7 36	101.111	743.416(24/ 24) (138.00- 1680.00)	SOUTH PERIM. 1.0 MI. SSE	739.909(12/ 11) (151.0 - 1680.0)		770.363(11/ 12) (185.00- 1680.00)
	BI-214 71	28.285	61.500(4/ 4) (38.00- 106.00)	SOUTH PERIM. 1.0 MI. SSE	67.333(3/ 3) (38.0 - 106.0)		52.000(2/ 3) (44.00- 60.00)
	CS-134 35	15.942	< MDC (0/ 24)				< MDC (0/ 11)
	CS-137 36	14.083	< MDC (0/ 24)				75.000(2/ 12) (13.00- 137.00)
	I-131 35	16.171	< MDC (0/ 24)				< MDC (0/ 11)
	K-40 36	109.111	4112.500(24/ 24) (2130.00- 6010.00)	NORTH PERIM. 0.8 MI. N	4403.846(13/ 13) (2130.0 - 6010.0)		5125.083(12/ 12) (3400.00- 6830.00)
	PB-214 41	21.260	30.000(3/ 3) (19.00- 41.00)	NORTH PERIM. 0.8 MI. N	30.000(2/ 2) (19.0 - 41.0)		53.000(1/ 1) (53.00- 53.00)
	PB-212 41	16.000	34.000(2/ 3) (26.00- 42.00)	NORTH PERIM. 0.8 MI. N	42.000(1/ 1) (42.0 - 42.0)		64.000(1/ 1) (64.00- 64.00)

(A) No Nonroutine Anomalous Measurements Reported During This Period.
(B) Mean Minimum Detectable Concentration Calculated Per Table 2 of This Report.
(C) Mean and Range of Number of Measurements With Detectable Activity Only.
(D) Total Number of Measurements Taken.
(E) Mean Wet/Dry Ratio for 1991 was 5.800
(F) Substitute Location Due to Unavailibity of Forage During Some Sample Periods.

TABLE 1? .-06
SOIL - OPERATIONAL RA.. ACTIVITY SUMMARY

JOSEPH M. FARLEY NUCLEAR PLANT
LICENSE NOS. NPF-2 AND NPF-8 HOUSTON COUNTY ALABAMA
SUMMARY REPORT FROM 0)0191 TO 123191 (A.

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE AND TOTAL NUMBERS OF ANALYSIS PERFORMED	NOMINAL MDC(B)	ALL INDICATOR LOCATIONS MEAN (C/D) RANGE(C)	INDICATOR LOCATION WITH HIGHEST ANNCAL MEAN NAME DISTANCE AND DIRECTION	MEAN (C/D) RANGE (C)	COMMUNITY LOCATIONS MEAN (C/D) RANGE (C)	CONTROL LOCATION MEAN (C/D) RANGE (C)
SOIL (IN SITU) (PCI/KG-DRY)	AC-228 111	303.909	1256.000(5/ 5) (1140.00- 1420.00)	SOUTH PERIM. 1.0 MI. SSE	1420.000(1/ 1)	1091.000(3/ 3) (873.00- 1390.00)	1970.000(3/ 3) (1190.00- 2980.00)
	BI-212 8	792.875	884.250(4/ 4) (702.00- 1210.00)	SOUTH PERIM. 1.0 MI. SSE	1210.000(1/ 1)	1270.000(1/ 1)	2090.000(1/ 3)
	BI-214 111	168.363	1025.200(5/ 5) (717.00- 1730.00)	WEST PERIM. 0.9 MI. WSW	1730.000(1/ 1)	948.000(3/ 3) (757.00- 1150.00)	1669.666(3/ 3) (799.00- 2270.00)
	CS-137 111	40.363	151.000(5/ 5) (70.00- 279.00)	WEST PERIM. 0.8 MI. WNW	279.000(1/ 1)	159.333(3/ 3) (78.00- 242.00)	122.333(3/ 3) (75.00- 178.00)
	K-40 111	480.545	5218.000(6/ 6) (878.00- 14900.0)	EAST PERIM. 0.8 MI. E	14900.000(1/ 1)	1078.333(3/ 3) (835.00- 1450.0)	2225.000(2/ 2) (1120.00- 3330.00)
	PB-214 111	274.090	1032.000(5/ 5) (779.00- 1700.00)	WEST PERIM. 0.9 MI. WSW	1700.000(1/ 1)	896.333(3/ 3) (861.00- 955.00)	1783.333(3/ 3) (1110.00- 2200.00)
	PB-212 111	278.727	782.600(5/ 5) (575.00- 906.00)	SOUTH PERIM. 1.0 MI. SSW	904.000(1/ 1)	714.666(3/ 3) (587.00- 938.00)	1308.000(3/ 3) (804. - 1930.00)
	RA-226 1	1230.000					1310.000(1/ 1)
	TL-208 111	106.131	405.800(5/ 5) (346.00- 519.00)	NORTH PERIM. 0.8 MI. N	519.000(1/ 1)	347.666(3/ 3) (231.00- 410.00)	714.666(3/ 3) (428.00- 1100.00)

(A) No Nonroutine Anomalous Measuremen's Reported During This Period.
(B) Mean Minimum Detectable Concentration Calculated Per Table 2 of This Report.
(C) Mean and Range of Number of Measurements With Detectable Activity Only.
(D) Total Number of Measurements Taken.

TABLE 1991-07
WATERBORNE: SURFACE WATER - OPERATIONAL RADIOACTIVITY SUMMARY

JOSEPH M. FARLEY NUCLEAR PLANT
LICENSE NOS. NPF-2 AND NPF-8 HOUSTON COUNTY ALABAMA
SUMMARY REPORT FROM 010191 TO 123191 (A)

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE AND TOTAL NUMBERS OF ANALYSIS PERFORMED		NOMINAL MDC(B)	ALL INDICATOR LOCATIONS MEAN (C/D) RANGE(C)	INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN NAME DISTANCE AND DIRECTION	MEAN (C/D) RANGE (C)	COMMUNITY LOCATIONS MEAN (C/D) RANGE (C)	CONTROL LOCATION MEAN (C/D) RANGE (C)
SURFACE WATER(RIVER) (PCI/L)	TRITIUM	8	100.000	122.000(2/ 4) (117.00- 127.00)	GREAT SOUTHERN PAPER CO. RIV. MI. 40	122.000(2/ 2) (117.0 - 127.0)		< MDC (0/ 4)
	BA-140	23	17.434	< MDC (0/ 11)				< MDC (0/ 12)
	CS-134	23	4.478	< MDC (0/ 11)				< MDC (0/ 12)
	CS-137	23	4.547	< MDC (0/ 11)				< MDC (0/ 12)
	CO-58	24	3.875	< MDC (0/ 12)				< MDC (0/ 12)
	CO-60	24	3.833	< MDC (0/ 12)				< MDC (0/ 12)
	FE-59	24	8.166	< MDC (0/ 12)				< MDC (0/ 12)
	LA-140	24	3.375	< MDC (0/ 12)				< MDC (0/ 12)
	MN-54	24	3.916	< MDC (0/ 12)				< MDC (0/ 12)
	NB-95	24	3.958	< MDC (0/ 12)				< MDC (0/ 12)
	ZN-65	24	8.416	< MDC (0/ 12)				< MDC (0/ 12)
	ZR-95	24	6.875	< MDC (0/ 12)				< MDC (0/ 12)

(A) No Nonroutine Anomalous Measurements Reported During This Period.
(B) Mean Minimum Detectable Concentration Calculated Per Table 2 of This Report.
(C) Mean and Range of Number of Measurements With Detectable Activity Only.
(D) Total Number of Measurements Taken.

TABLE 1991-08
WATERBORNE: GROUND WATER - OPERATIONAL RADIOACTIVITY SUMMARY

JOSEPH M. FARLEY NUCLEAR PLANT
LICENSE ..OS. NPF-2 AND NPF-8 HOUSTON COUNTY ALABAMA
SUMMARY REPORT FROM 010191 TO 123191 (A)

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE AND TOTAL NUMBERS OF ANALYSIS PERFORMED		ALL INDICATOR LOCATIONS MEAN (C/D) RANGE(C)	INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN NAME DISTANCE AND DIRECTION	MEAN (C/D) RANGE (C)	COMMUNITY LOCATIONS MEAN (C/D) RANGE (C)	CONTROL LOCATION MEAN (C/D) RANGE (C)
GROUND WATER(WELL) (PCI/L)	IODINE	31 .245	< MDC (0/ 4)				< MDC (0/ 4)
	TRITIUM	81 100.000	< MDC (0/ 4)				< MDC (0/ 4)
	BA-140	81 17.500	< MDC (0/ 4)				< MDC (0/ 4)
	CS-134	81 4.625	< MDC (0/ 4)				< MDC (0/ 4)
	CS-137	81 4.250	< MDC (0/ 4)				< MDC (0/ 4)
	CO-58	81 3.875	< MDC (0/ 4)				< MDC (0/ 4)
	CO-60	81 4.125	< MDC (0/ 4)				< MDC (0/ 4)
	FE-59	81 8.500	< MDC (0/ 4)				< MDC (0/ 4)
	LA-140	81 3.875	< MDC (0/ 4)				< MDC (0/ 4)
	MN-54	81 4.125	< MDC (0/ 4)				< MDC (0/ 4)
	NB-95	81 4.375	< MDC (0/ 4)				< MDC (0/ 4)
	ZN-65	81 8.750	< MDC (0/ 4)				< MDC (0/ 4)
	ZR95	81 7.250	< MDC (0/ 4)				< MDC (0/ 4)

(A) No Nonroutine Anomalous Measurements Reported During This Period.
(B) Mean Minimum Detectable Concentration Calculated Per Table 2 of This Report.
(C) Mean and Range of Number of Measurements With Detectable Activity Only.
(D) Total Number of Measurements Taken.

TABLE 1991-09
SEDIMENT: RIVER - OPERATIONAL RADIOACTIVITY SUMMARY

JOSEPH M. FARLEY NUCLEAR PLANT
LICENSE NOS. NPF-2 AND NPF-8 HOUSTON COUNTY ALABAMA
SUMMARY REPORT FROM 010191 TO 123191 (A)

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE AND TOTAL NUMBERS OF ANALYSIS PERFORMED	NOMINAL MDC(B)	ALL INDICATOR LOCATIONS MEAN (C/D) RANGE(C)	INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN NAME DISTANCE AND DIRECTION	MEAN (C/D) RANGE (C)	COMMUNITY LOCATIONS MEAN (C/D) RANGE (C)	CONTROL LOCATION MEAN (C/D) RANGE (C)
SEDIMENT (RIVER) (PCI/KG-DRY)	AC-228 41	139.500	2899.000(2/ 2) (758.00- 5040.00)	SMITH'S BEND RIV. MI. 41	2899.000(2/ 2) (758.0 - 5040.0)		1675.000(2/ 2) (1530.00- 1820.00)
	BI-212 41	640.250	3279.500(2/ 2) (899.00- 5660.00)	SMITH'S BEND RIV. MI. 41	3279.500(2/ 2) (899.0 - 5660.0)		2025.000(2/ 2) (1910.00- 2140.00)
	BI-214 41	88.750	1203.500(2/ 2) (347.00- 2060.00)	SMITHS'S BEND RIV. MI. 41	1203.500(2/ 2) (347.0 - 2060.0)		902.000(2/ 2) (895.00- 909.00)
	CS-134 41	44.000	< MDC (0/ 2)				< MDC (0/ 2)
	CS-137 41	51.500	< MDC (0/ 2)				< MDC (0/ 2)
	K-40 41	223.506	2225.000(2/ 2) (1880.00- 2570.00)	SMITH'S BEND RIV. MI. 41	2225.000(2/ 2) (1880.0 - 2570.0)		3130.000(2/ 2) (2630.00- 3630.00)
	PB-214 41	93.500	1263.000(2/ 2) (316.00- 2210.00)	SMITH'S BEND RIV. MI. 41	1263.000(2/ 2) (316.0 - 2210.0)		969.000(2/ 2) (918.00- 1020.00)
	PB-212 41	86.500	2212.500(2/ 2) (495.00- 3930.00)	SMITH'S BEND RIV. MI. 41	2212.500(2/ 2) (495.0 - 3930.0)		1205.000(2/ 2) (1070.00- 1340.00)
	RA-226 41	610.000	1511.000(2/ 2) (372.00- 2650.00)	SMITH'S BEND RIV. MI. 41	1511.000(2/ 2) (372.0 - 2650.0)		935.000(2/ 2) (720.00- 1150.00)
	TL-208 41	48.250	1024.500(2/ 2) (259.00- 1790.00)	SMITH'S BEND RIV. MI. 41	1024.500(2/ 2) (259.0 - 1790.0)		580.000(2/ 2) (541.00- 619.00)

(A) No Nonroutine Anomalous Measurements Reported During This Period.
(B) Mean Minimum Detectable Concentration Calculated Per Table 2 of This Report.
(C) Mean and Range of Number of Measurements With Detectable Activity Only.
(D) Total Number of Measurements Taken.

TABLE 1991-10
FISH: RIVER(GAME)-OPERATIONAL RADIOACTIVITY SUMMARY

JOSEPH M. FARLEY NUCLEAR PLANT
LICENSE NOS. NPF-2 AND NPF-8 HOUSTON COUNTY ALABAMA
SUMMARY REPORT FROM 010191 TO 123191 (A)

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE AND TOTAL NUMBERS OF ANALYSIS PERFORMED	NOMINAL MDC(B)	ALL INDICATOR LOCATIONS MEAN (C/D) RANGE(C)	INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN NAME DISTANCE AND DIRECTION	MEAN (C/D) RANGE (C)	COMMUNITY LOCATIONS MEAN (C/D) RANGE (C)	CONTROL LOCATION MEAN (C/D) RANGE (C)
FISH(GAME) (PC1/KG) WET TISSUE	CS-134 41	27.250	< MDC (0/ 2)				< MDC (0/ 2)
	CS-137 41	25.500	36.000(1/ 2)	SMITH'S BEND RIV. MI. 41	36.000(1/ 1)		24.000(1/ 2)
	CO-58 41	25.000	< MDC (0/ 2)				< MDC (0/ 2)
	CO-60 41	31.250	< MDC (0/ 2)				< MDC (0/ 2)
	FE-59 41	67.250	< MDC (0/ 2)				< MDC (0/ 2)
	K-40 41	179.500	2815.000(2/ 2) (2690.00- 2940.00)	SMITH'S BEND RIV. MI. 41	2815.0(2/ 2) (2690.0 - 2940.0)		3650.000(2/ 2) (3370.00- 3930.00)
	MN-54 41	25.500	< MDC (0/ 2)				< MDC (0/ 2)
	ZN-65 41	64.500	< MDC (0/ 2)				< MDC (0/ 2)

(A) No Nonroutine Anomalous Measurements Reported During This Period.
(B) Mean Minimum Detectable Concentration Calculated Per Table 2 of This Report.
(C) Mean and Range of Number of Measurements With Detectable Activity Only.
(D) Total Number of Measurements Taken.

TABLE 1991-11

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 010191 TO 123191 (A)

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE AND TOTAL NUMBERS OF ANALYSIS PERFORMED		ALL INDICATOR LOCATIONS MEAN (C/D) RANGE(C)	INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN NAME DISTANCE AND DIRECTION	MEAN (C/D) RANGE (C)	COMMUNITY LOCATIONS MEAN (C/D) RANGE (C)	CONTROL LOCATION MEAN (C/D) RANGE (C)
FISH (BOTTOM FEEDING) (PCI/KG) WET TISSUE	CS-134	41 27.750	< MDC (0/ 2)				< MDC (0/ 2)
	CS-137	41 26.000	< MDC (0/ 2)				< MDC (0/ 2)
	CO-58	41 25.500	< MDC (0/ 2)				< MDC (0/ 2)
	CO-60	41 29.250	< MDC (0/ 2)				< MDC (0/ 2)
	FE-59	41 64.750	< MDC (0/ 2)				< MDC (0/ 2)
	K-40	41 163.250	2780.000(2/ 2) (2450.00- 3110.00)	SMITH'S BEND RIV, MI, 41	2780.000(2/ 2) (2450.0 - 3110.0)		3095.000(2/ 2) (2990.00- 3200.00)
	MN-54	41 24.000	< MDC (0/ 2)				< MDC (0/ 2)
	ZN-65	41 60.500	< MDC (0/ 2)				< MDC (0/ 2)

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

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

(C) Mean and Range of Number of Measurements With Detectable Activity Only.

(D) Total Number of Measurements Taken.

ATTACHMENT 1

LAND USE SURVEY
FOR
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM
JOSEPH M. FARLEY NUCLEAR PLANT
JUNE 7, 1991

This Land Use Survey was performed to meet the requirements of the Farley Units 1 and 2 Technical Specifications, Section 3.12.2 and 4.12.2.

A. Houston County, Alabama

Lamar Nichols, Houston County Livestock Agent, was contacted for the purpose of reviewing known locations of milk animals in the county. He knew of no individually owned milk cows in the county. Mr. Thomas Dean of Gordon, AL, still has milk goats at his residence located in sector 08, 6 miles from FNP.

A house-to-house canvas of Alabama residents in a five-mile radius of the plant was conducted along Highways 95 and 52, Houston County Roads 42, 33, 75 and the interconnecting light-duty roads. No milk animals were located. Individuals interviewed were: Mr. John Griffin, Mrs. Terry Martin, Mrs. Adair Gilbert, and Mrs. Sandra Long.

Simultaneous with the milk animal survey, the nearest resident in each meteorological sector was identified. There were no new residents found closer to the site boundary than those identified in the ODCM.

B. Early County, Georgia

Mr. Micky Fouracres, Early County Extension Agent, was contacted to determine if any milk animals were currently present in the county. He knew of no milk animals in Early County.

A house-to-house canvas of residents in the area across the Chattahoochee River east of Farley Nuclear Plant revealed no milk animals within 5 miles of the plant site. The census of Georgia residents was conducted along Highways 62 and 370, Early County Roads 219, 239, 140 and the interconnecting light-duty roads. Individuals interviewed were Mr. Frank Loveless, Mrs. Martha Jean Knighton and Mrs. Eunice Harper.

Simultaneous with the milk animal survey, the nearest resident in each meteorological sector was identified. No new residences were found closer to the site boundary than those previously identified in the ODCM.

C. Results and Conclusions

The results of the Land Use Survey are shown in Table 1 of Attachment 1. The survey located milk goats 6 miles from FNP; however, no action is required for animals located outside a 5 mile radius. Therefore, based on the survey results, no change in the present milk sampling program is required.

TABLE 1
OF
ATTACHMENT 1

JOSEPH M. FARLEY NUCLEAR PLANT
LAND USE SURVEY
JUNE 7, 1991

RADIAL SECTORS (22.5 DEGREES)	(DISTANCE MILES TO NEAREST) RESIDENT	MILK ANIMAL
North Northeast (01)	2.5	> 5
Northeast (02)	2.4	> 5
East Northeast (03)	2.4	> 5
East (04)	2.8	> 5
East Southeast (05)	2.8	> 5
Southeast (06)	3.4	> 5
South Southeast (07)	> 5	> 5
South (08)	4.3	> 5
South Southwest (09)	2.9	> 5
Southwest (10)	1.2	> 5
West Southwest (11)	2.4	> 5
West (12)	1.3	> 5
West Northwest (13)	2.1	> 5
Northwest (14)	1.5	> 5
North Northwest (15)	2.0	> 5
North (16)	2.6	> 5

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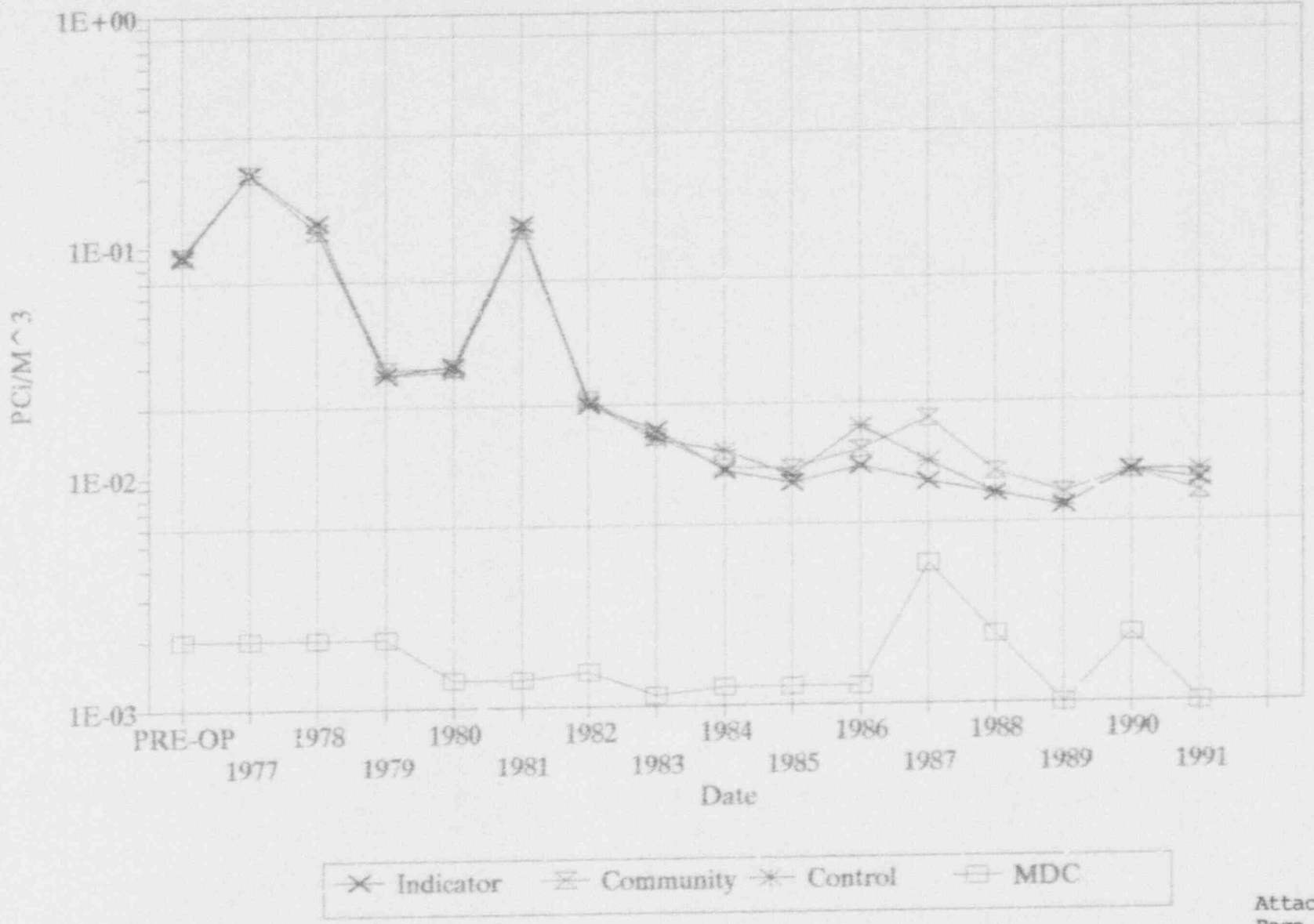
Annual Environmental Operating Report

Mean Annual Air Gross Beta



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Mean Annual Air Gross BE-7

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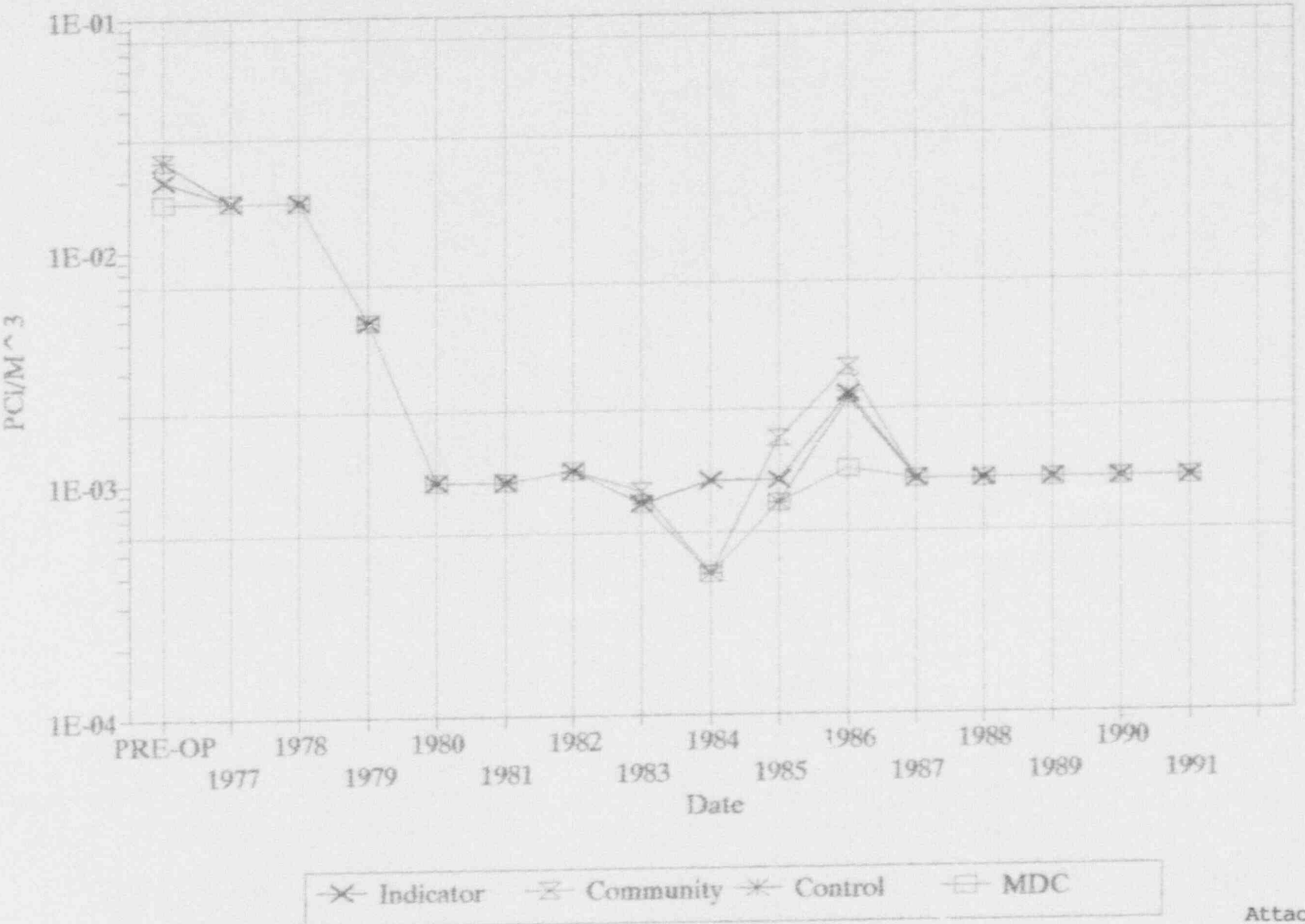
Annual Environmental Operating Report

Mean Annual Air Gross CS-134



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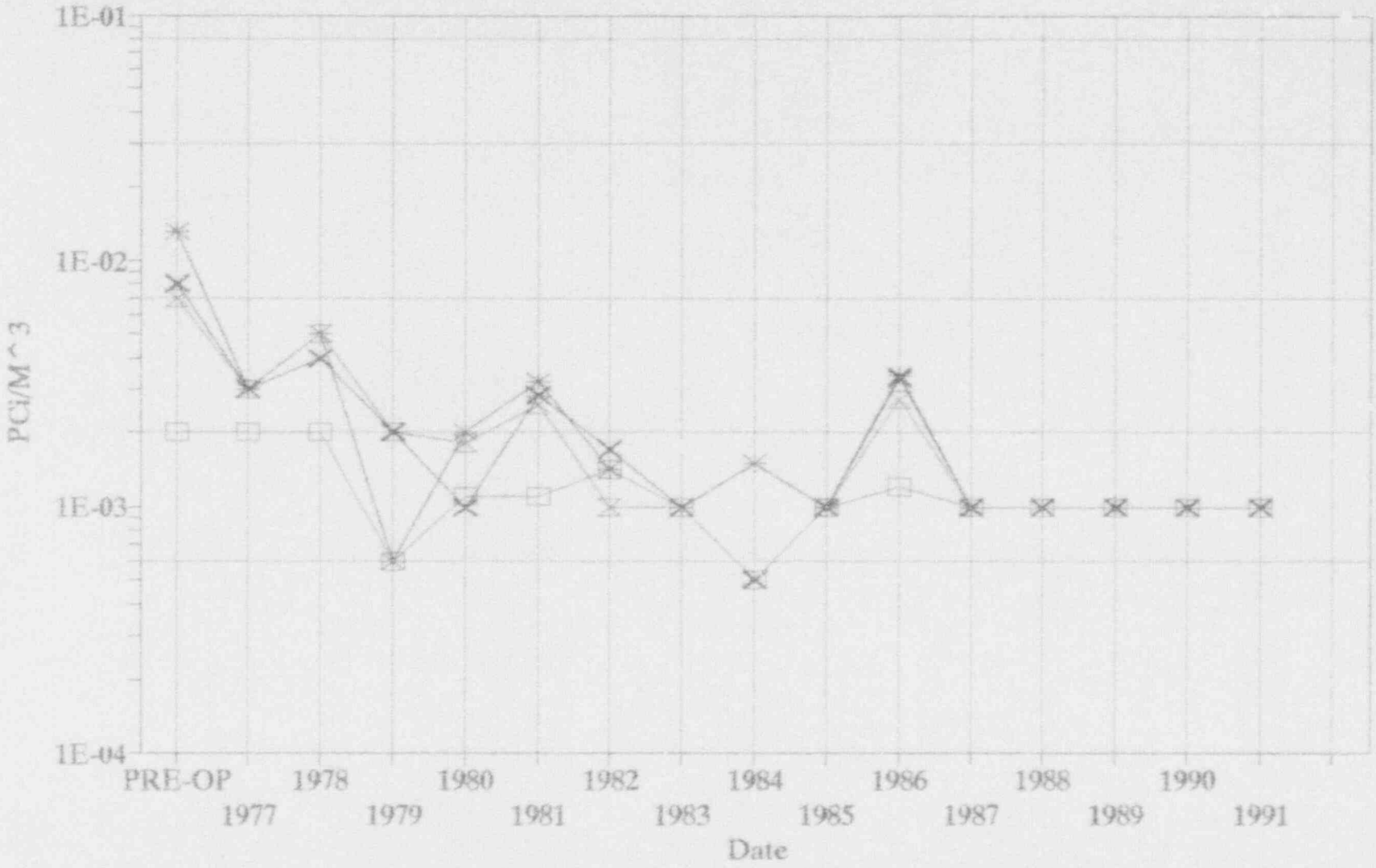
Mean Annual Air Gross CS-137



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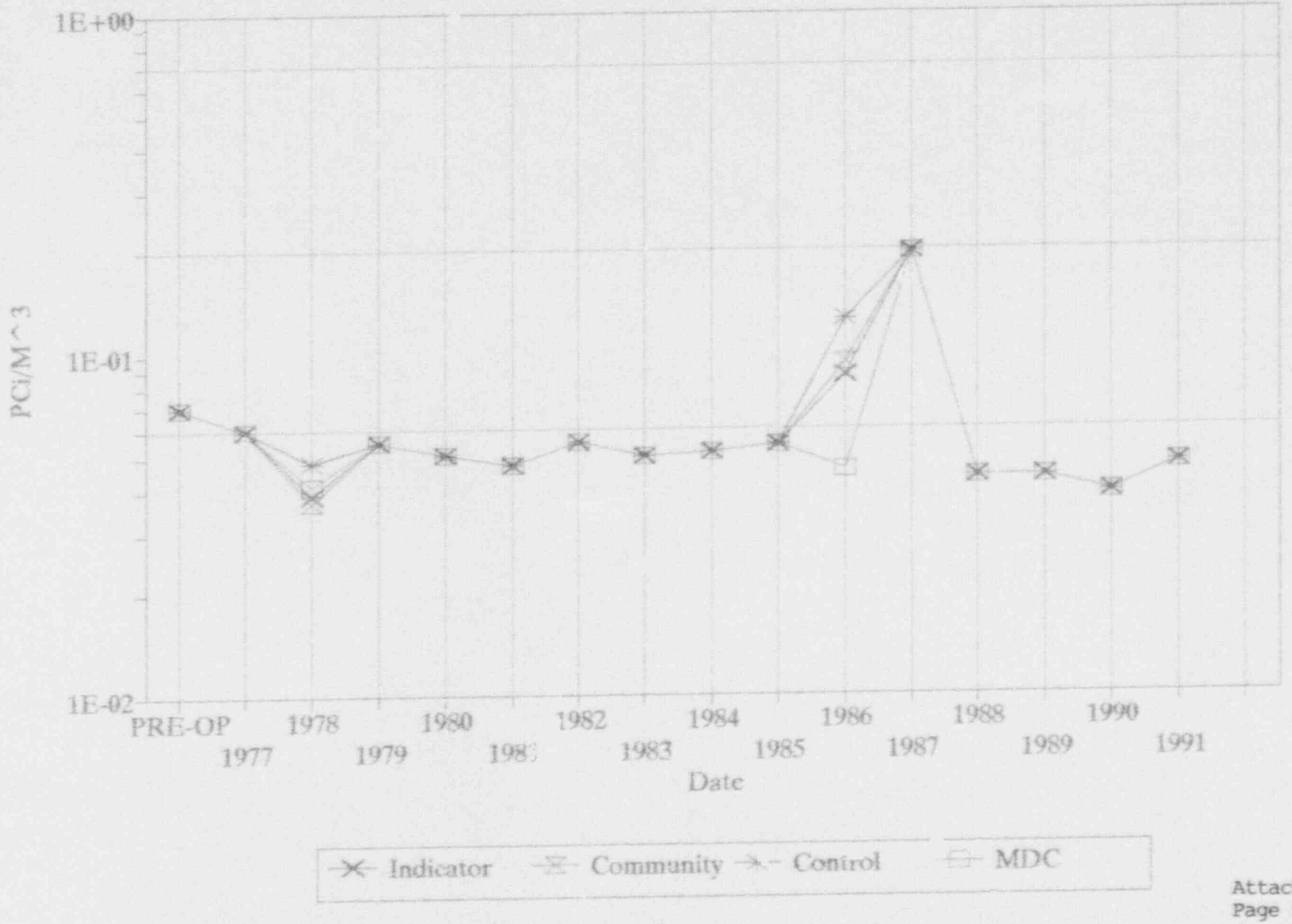
Mean Annual Air I-131



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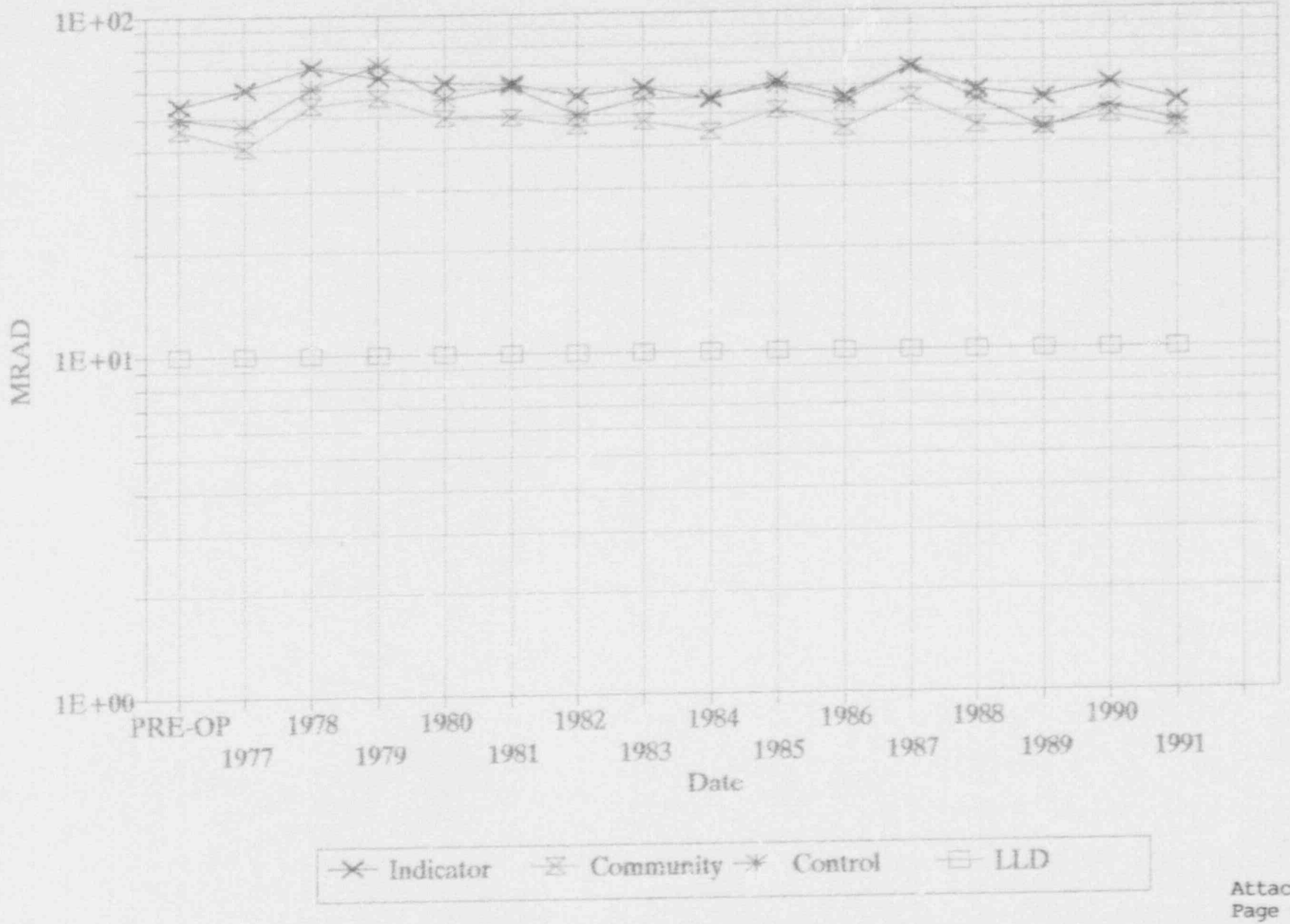
Annual Environmental Operating Report

Mean Annual External Gamma



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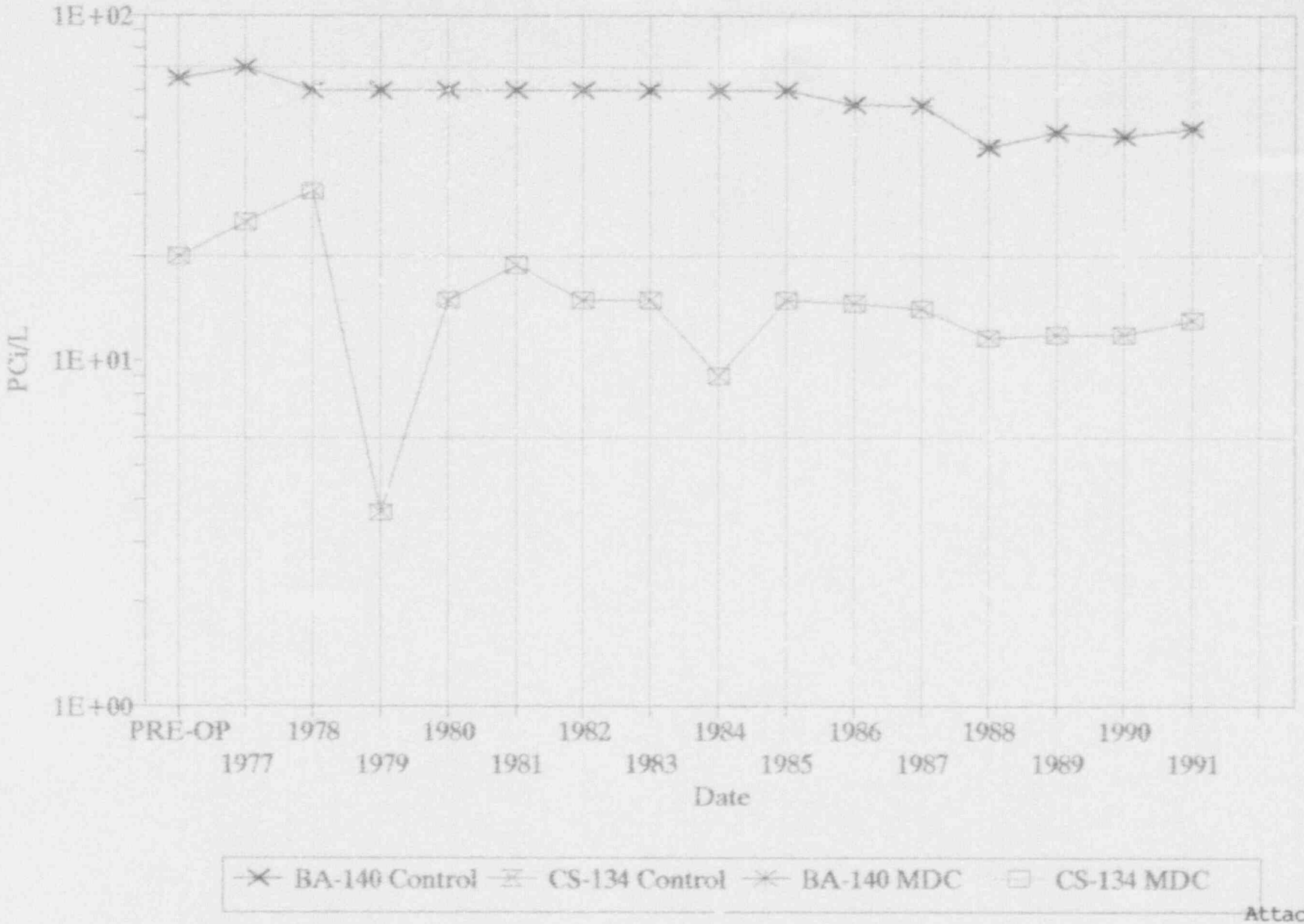
Annual Environmental Operating Report

Mean Annual Milk Concentration



J. M. Farley
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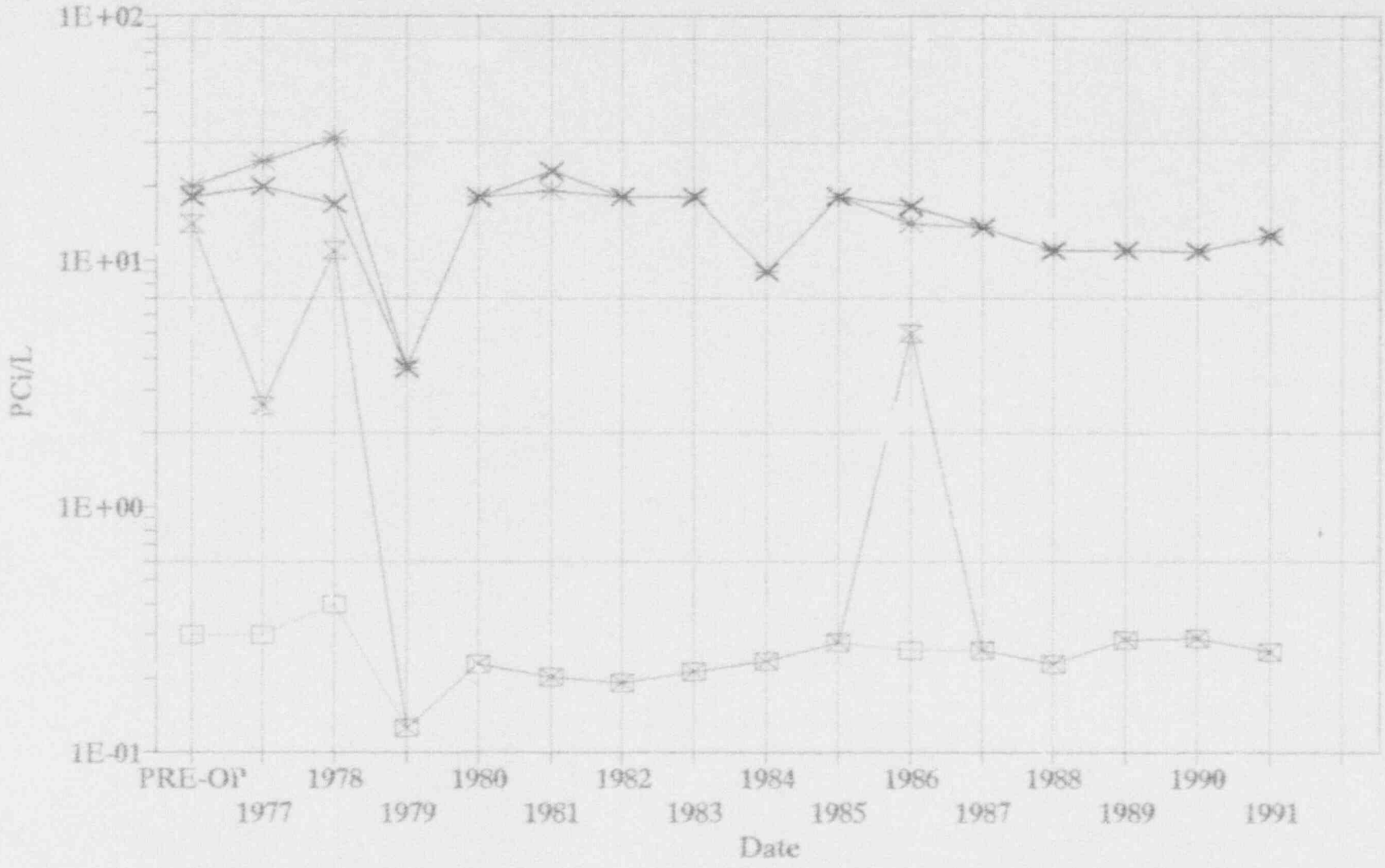
Annual Environmental Operating Report

Mean Annual Milk Concentration



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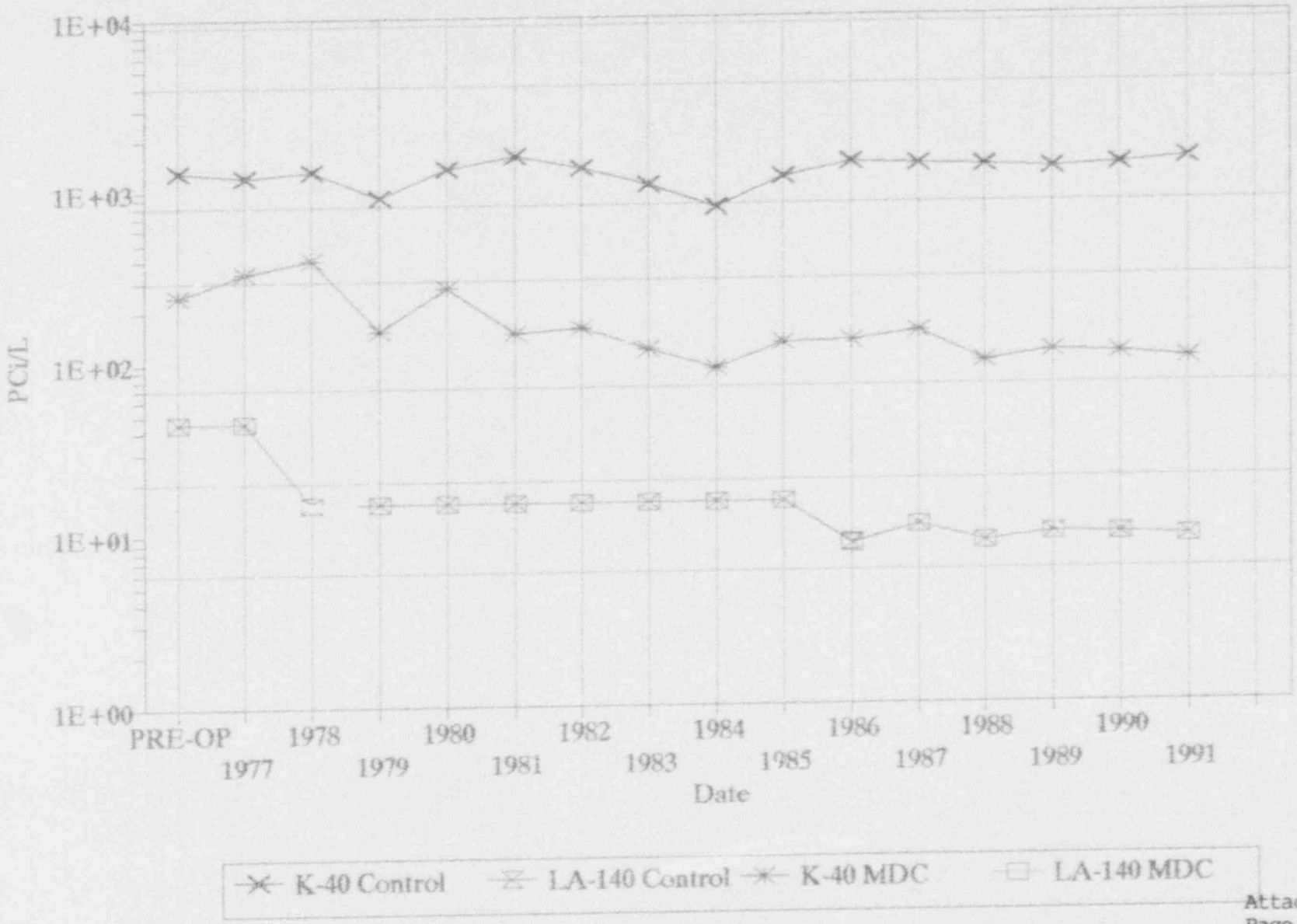
Mean Annual Milk Concentration



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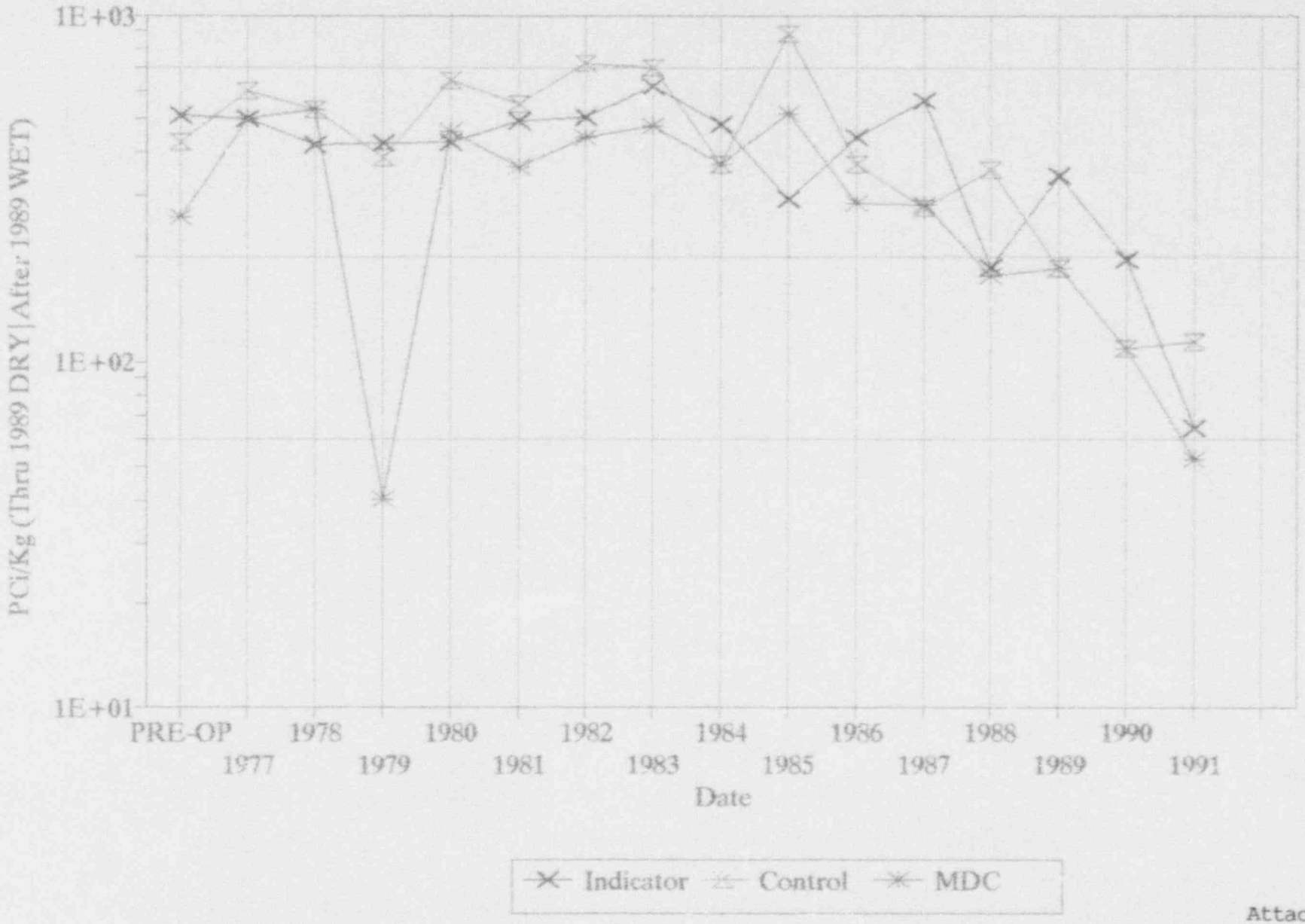
Mean Annual Forage Concentration AC-228



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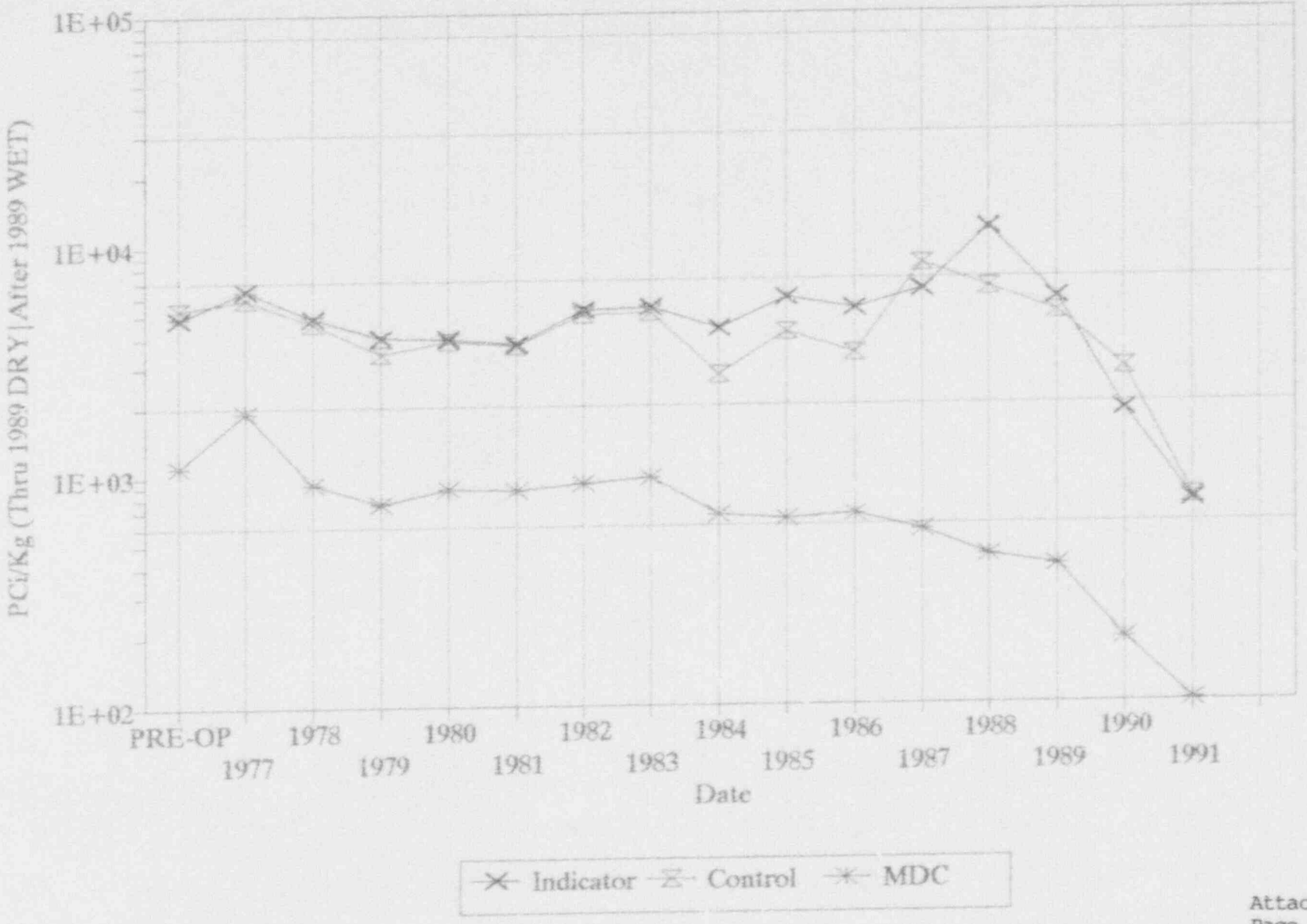
Annual Environmental Operating Report

Mean Annual Forage Concentration BE-7



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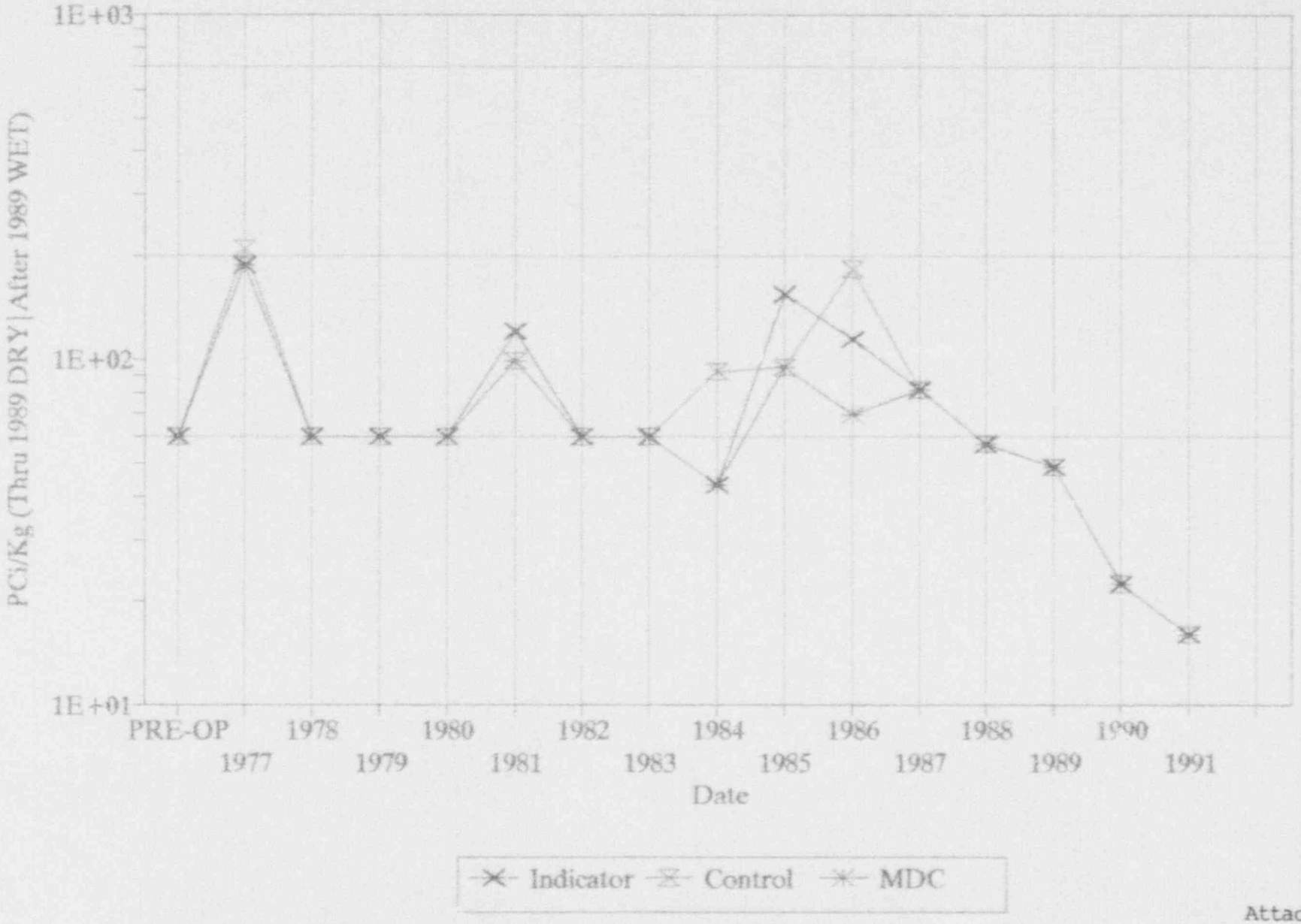
Mean Annual Forage Concentration CS-134



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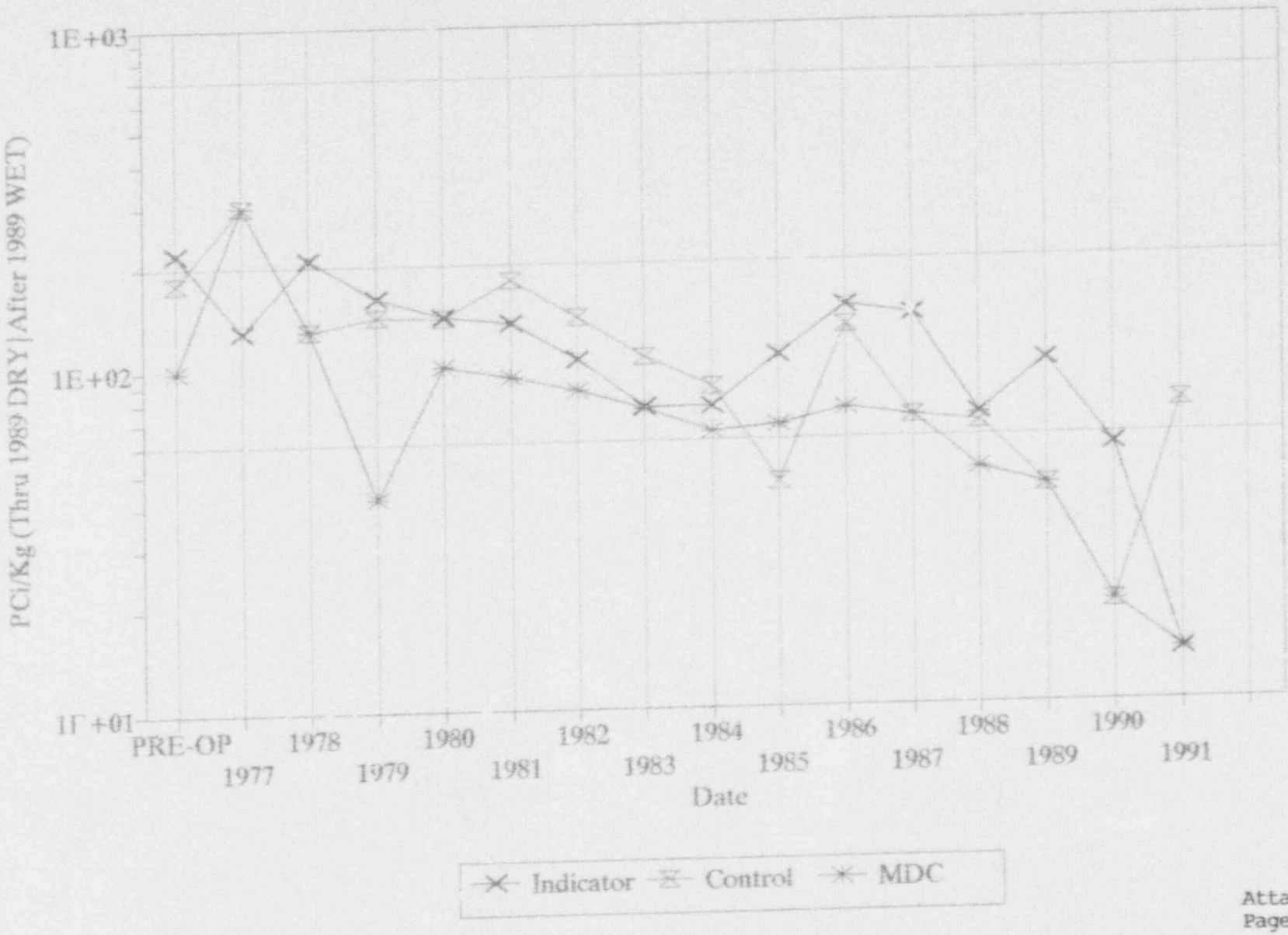
Mean Annual Forage Concentration CS-137



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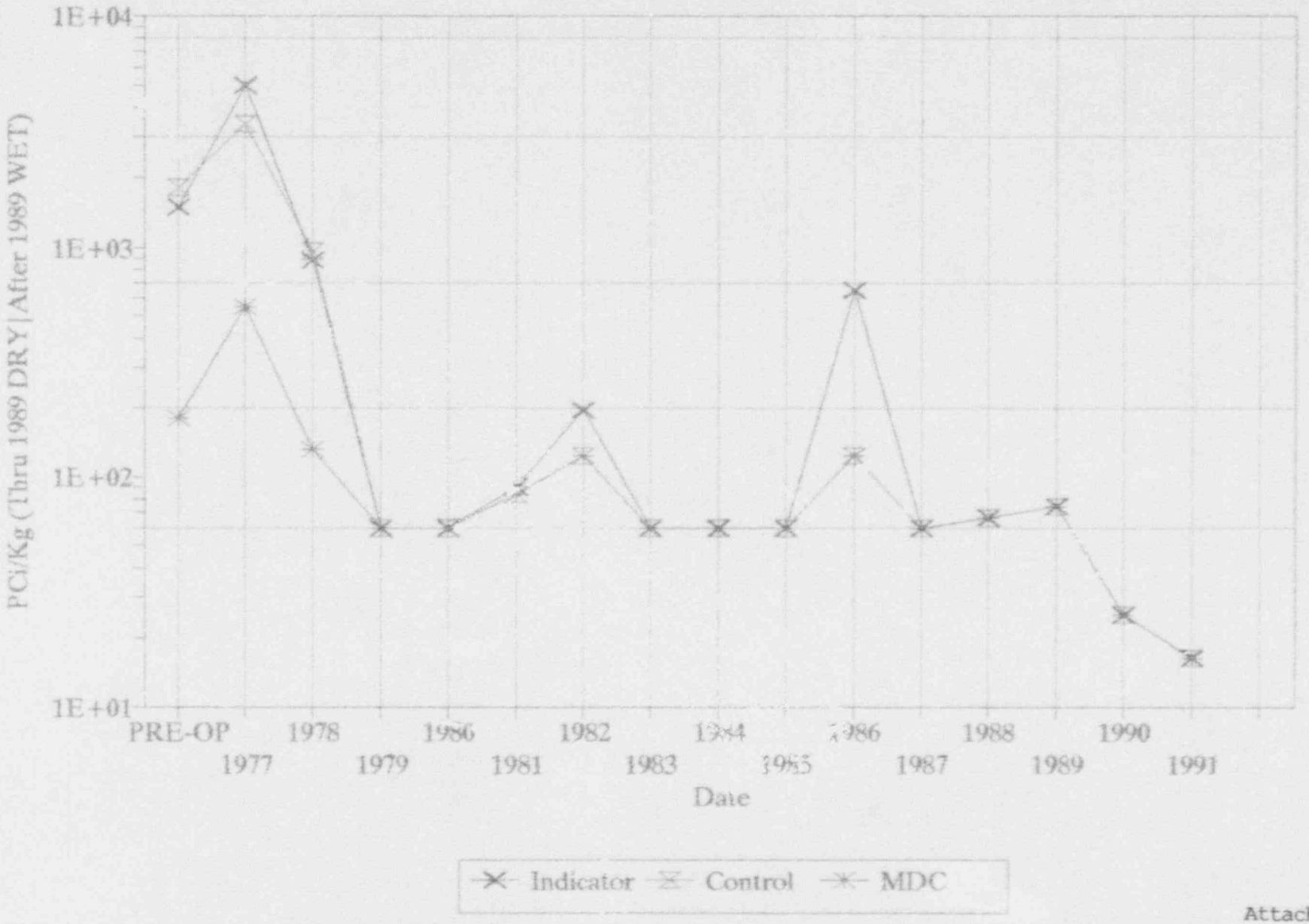
Annual Environmental Operating Report

Mean Annual Forage Concentration I-131



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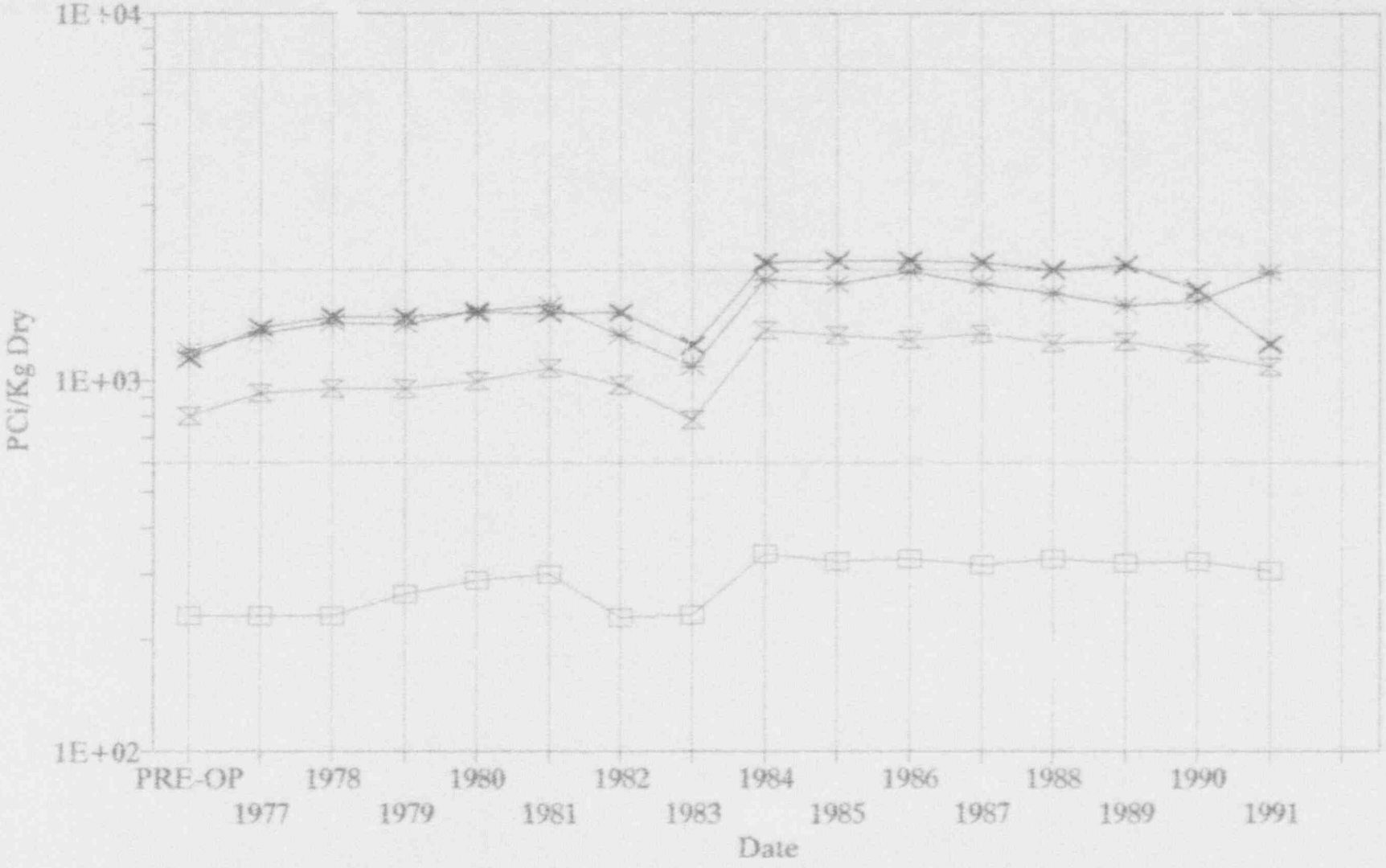
Mean Annual Soil In Situ AC-228



J. M. Farley
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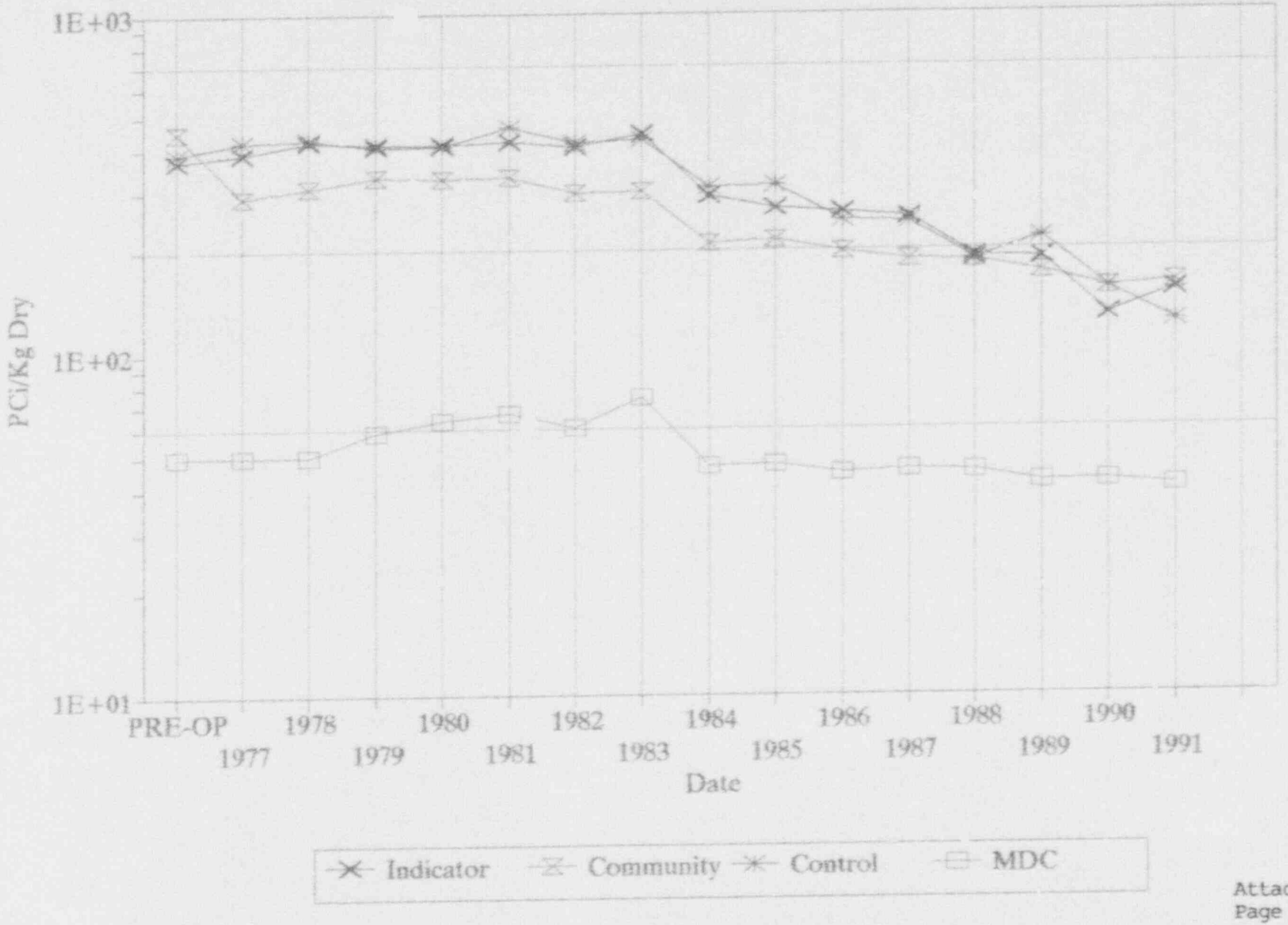
Annual Environmental Operating Report

Mean Annual Soil In Situ CS-137



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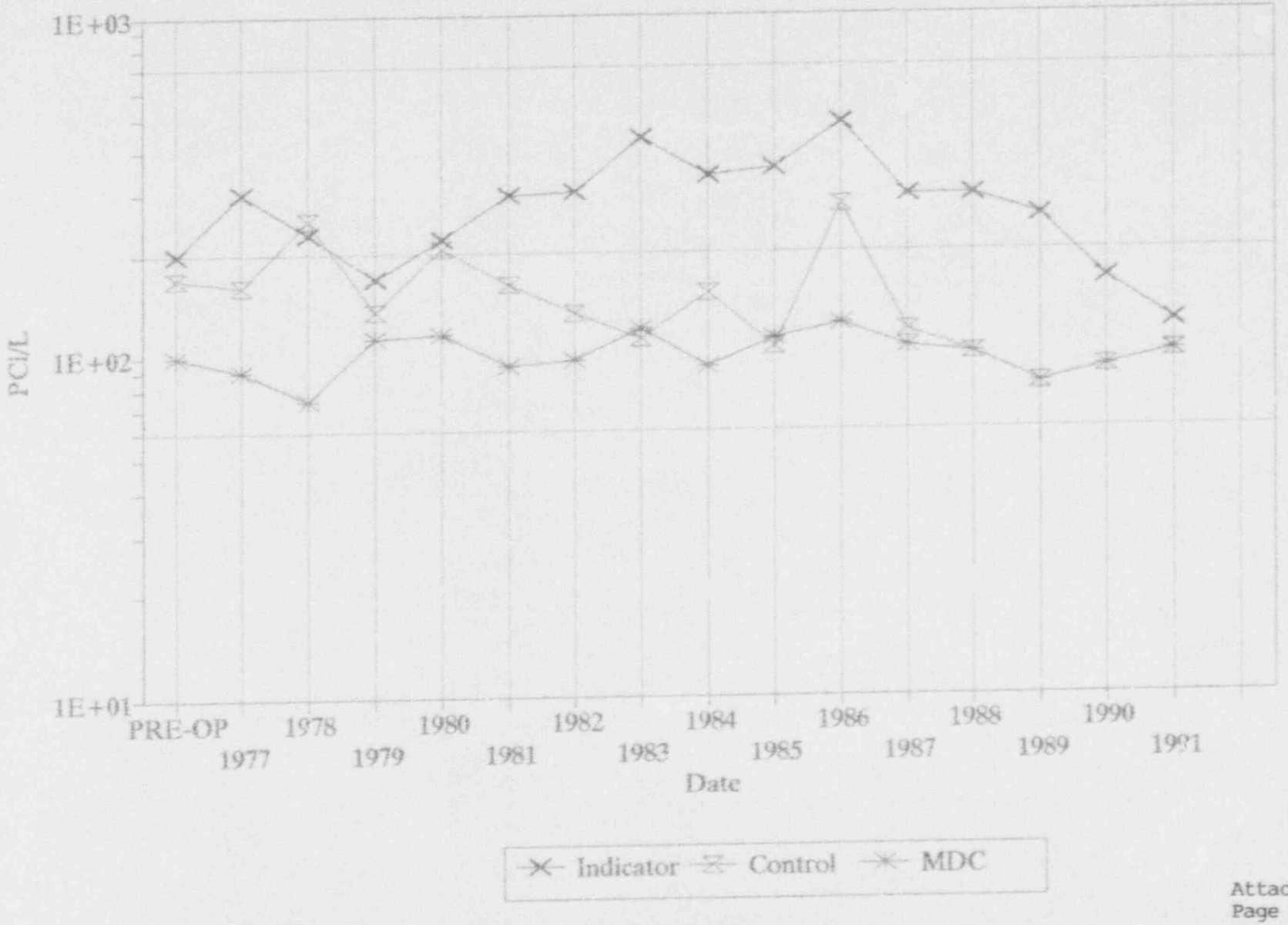
Annual Environmental Operating Report

Mean Annual River Water Conc. Tritium



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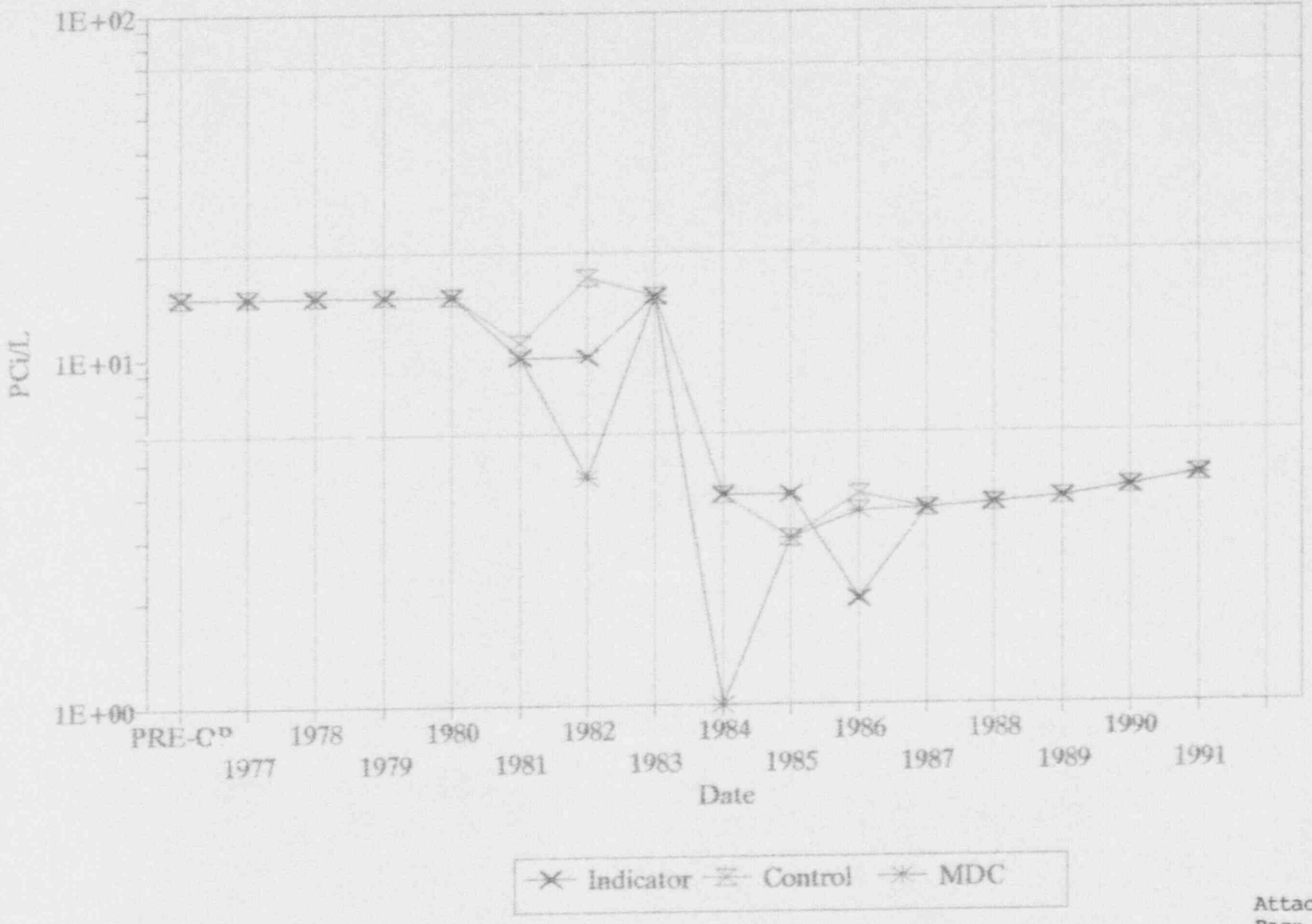
Plant

Annual Environmental Operating Report

Mean Annual River Water Conc. CS-134



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Nuclear
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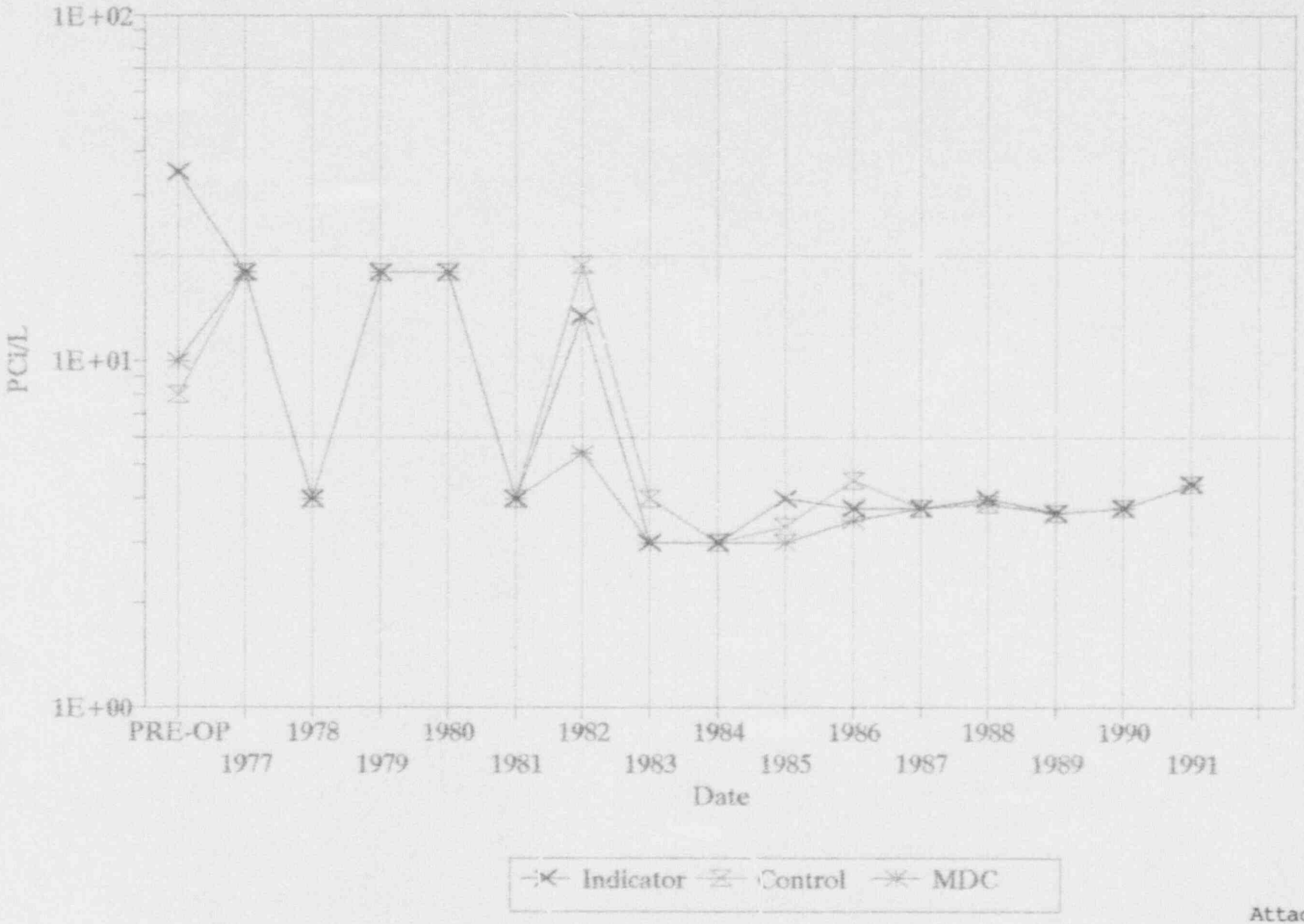
Annual Environmental Operating Report

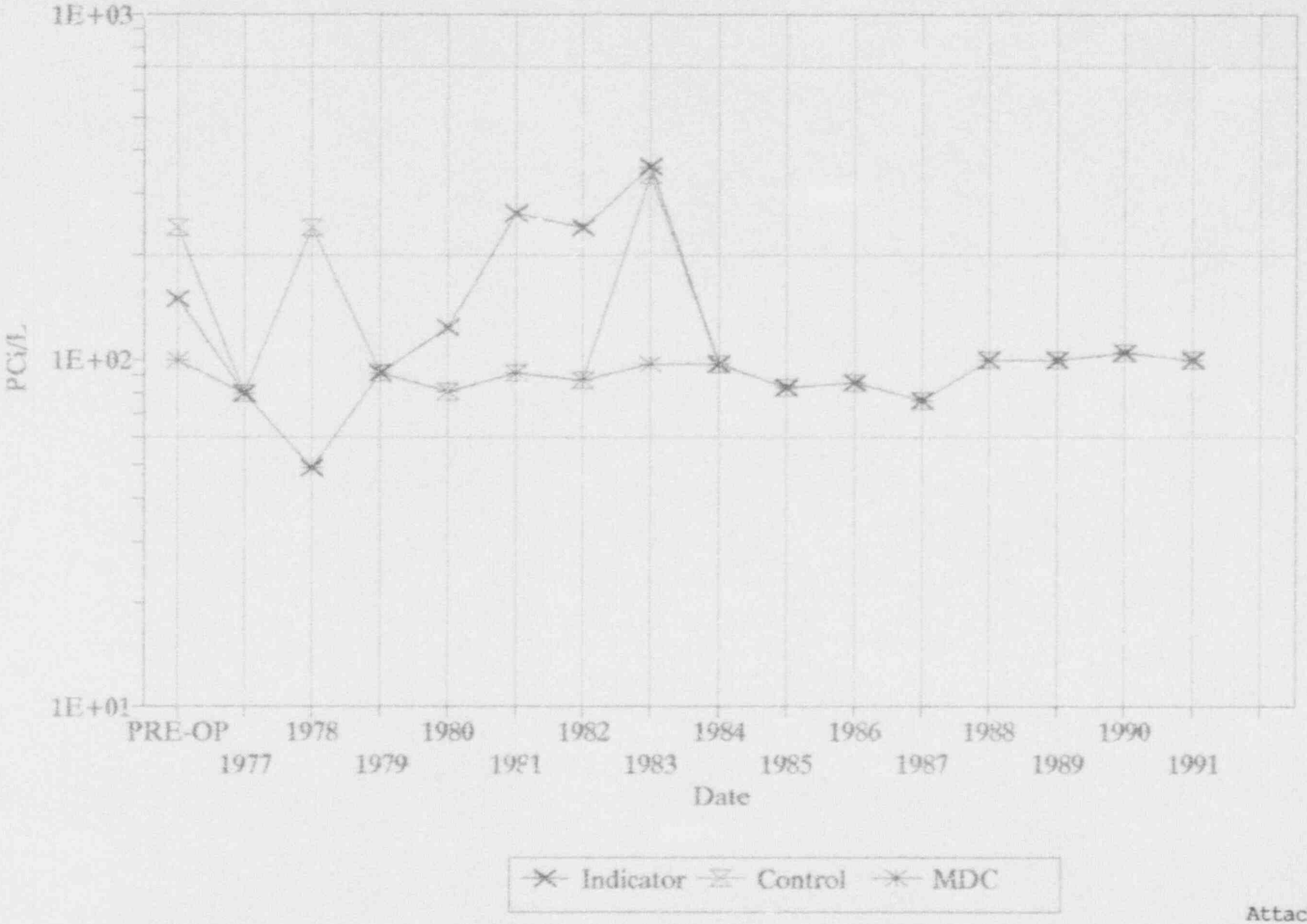
Mean Annual River Water Conc. CS-137



J. M. Farley
Nuclear
Plant

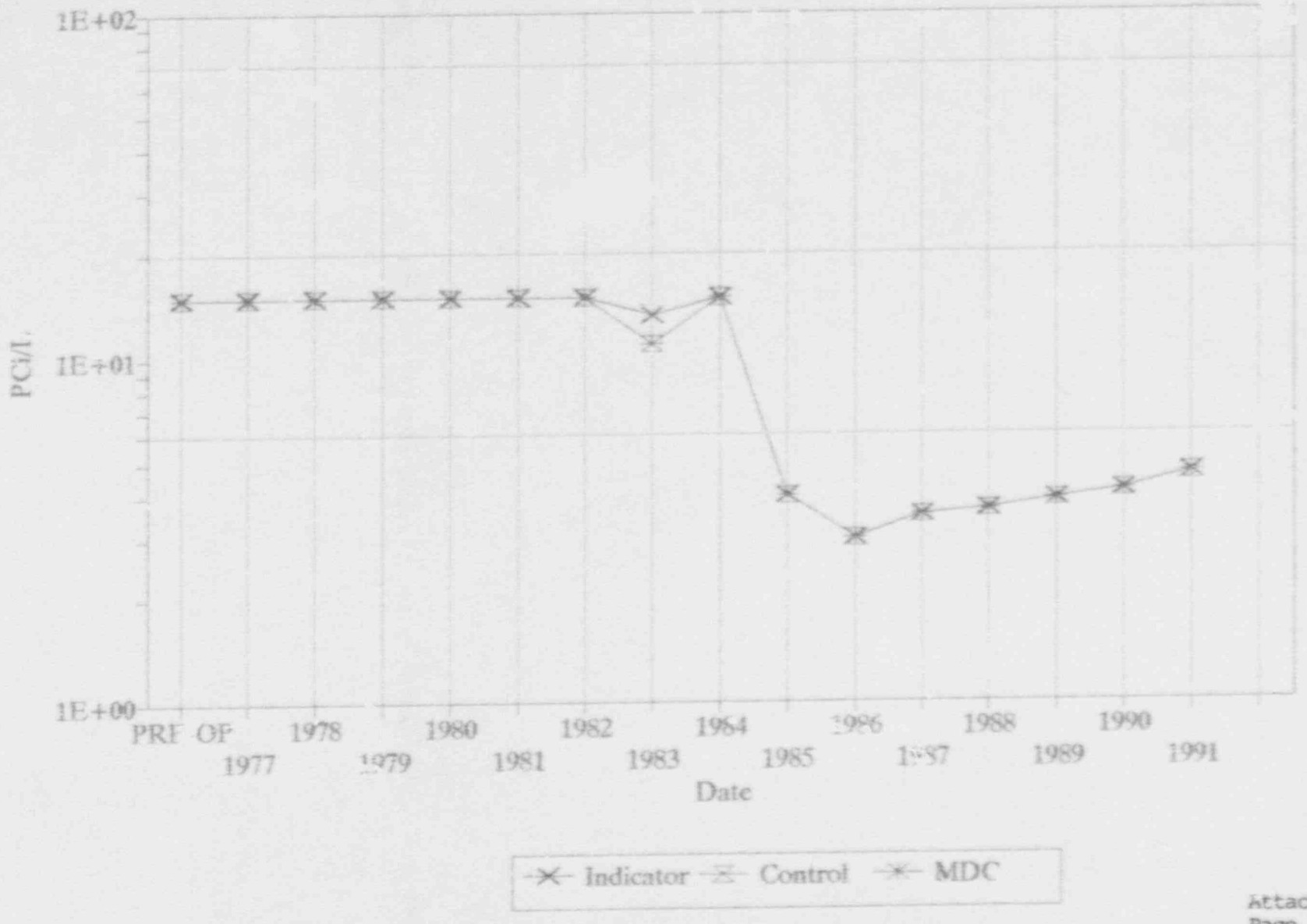
Annual Environmental Operating Report

Mean Annual Ground Water Conc. Tritium



J. M. Farley
Nuclear
Plant

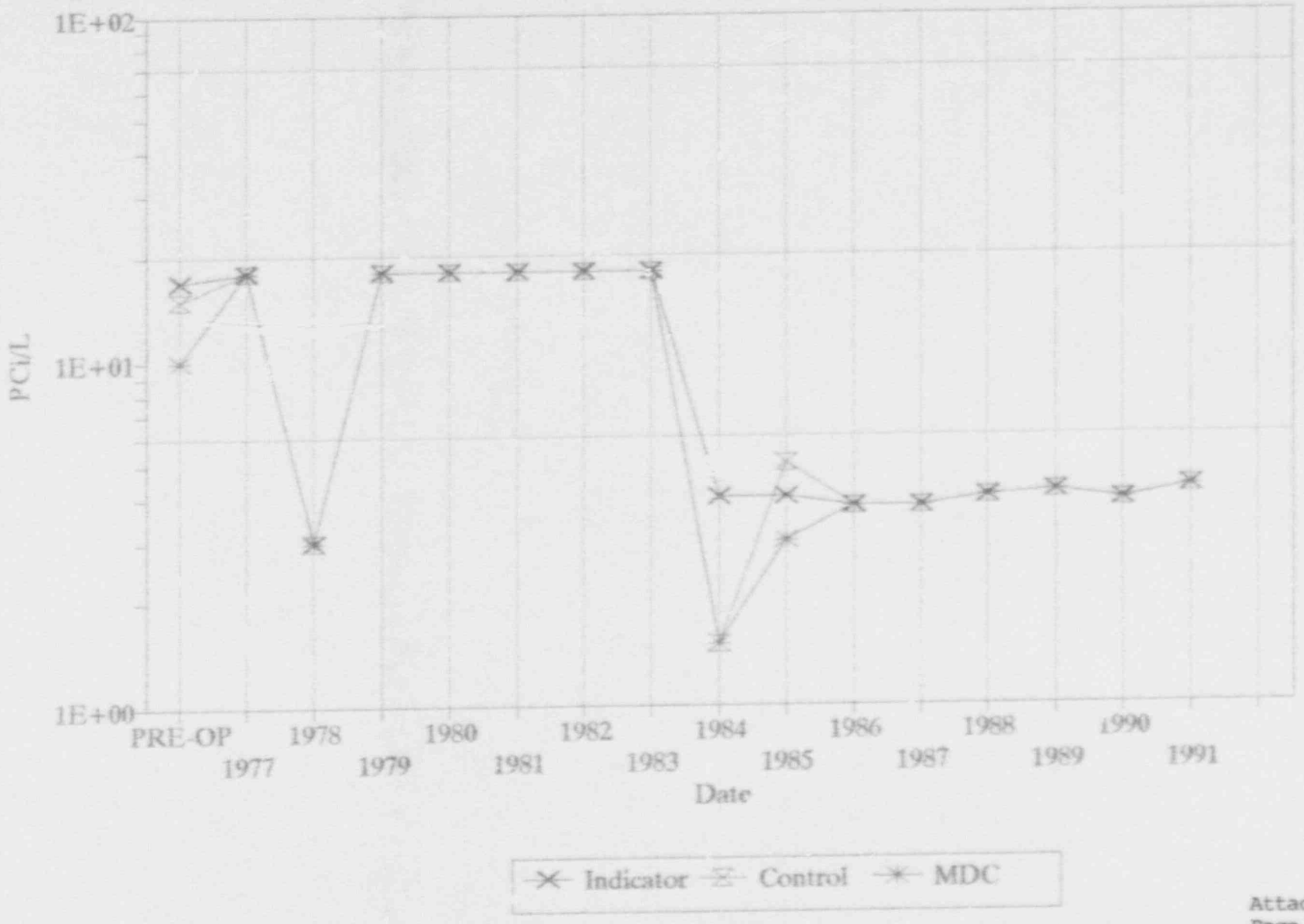
Annual Environmental Operating Report
Mean Annual Ground Water Conc. CS-134



J. M. Farley
Nuclear
Plant

Annual Environmental Operating Report

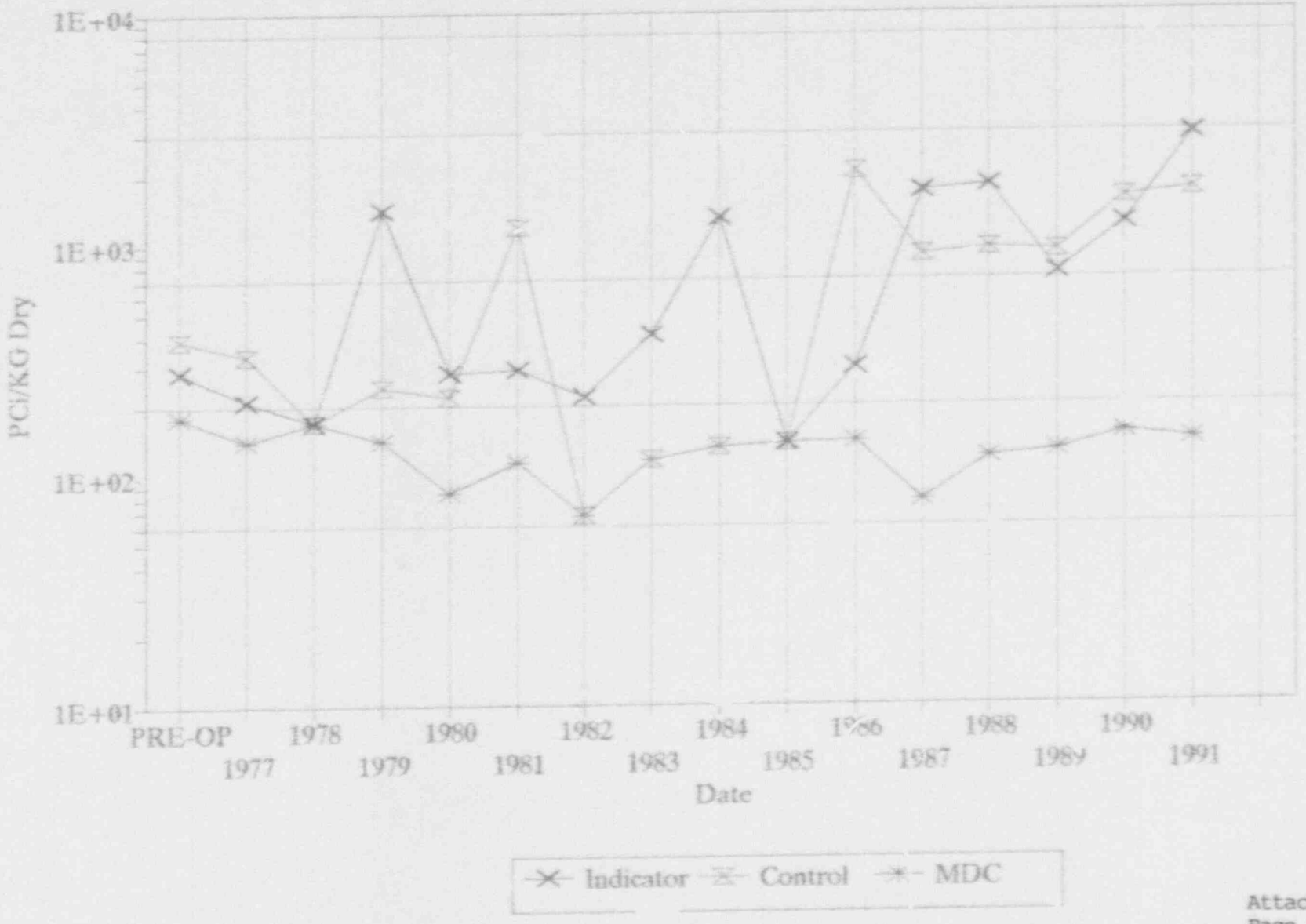
Mean Annual Ground Water Conc. CS-137



J. M. Farley
Nuclear
Plant

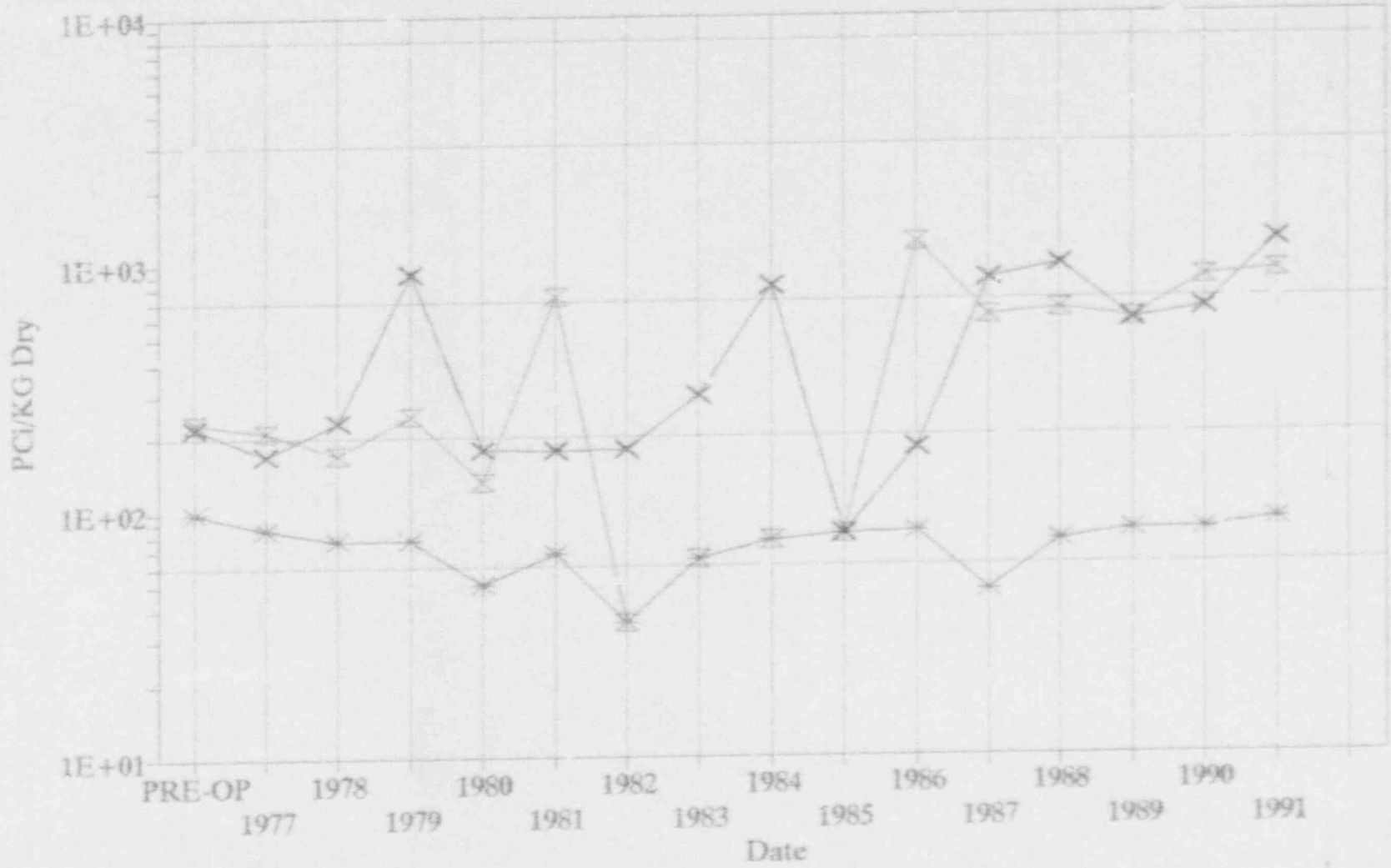
Annual Environmental Operating Report

Mean Annual River Sediment AC-228



J. M. Farley
Nuclear
Plant

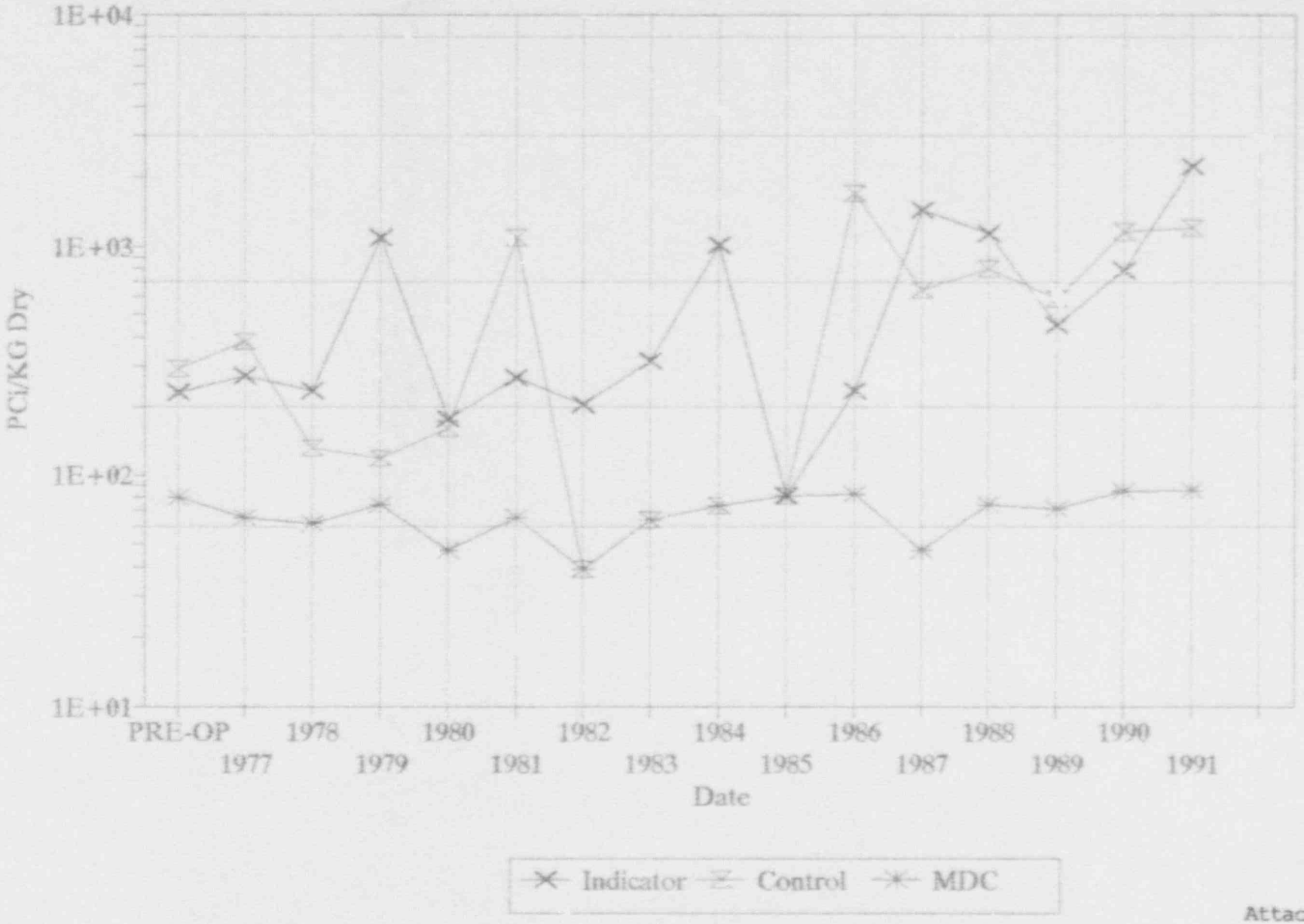
Annual Environmental Operating Report
Mean Annual River Sediment BI-214



J. M. Farley
Nuclear
Plant

Annual Environmental Operating Report

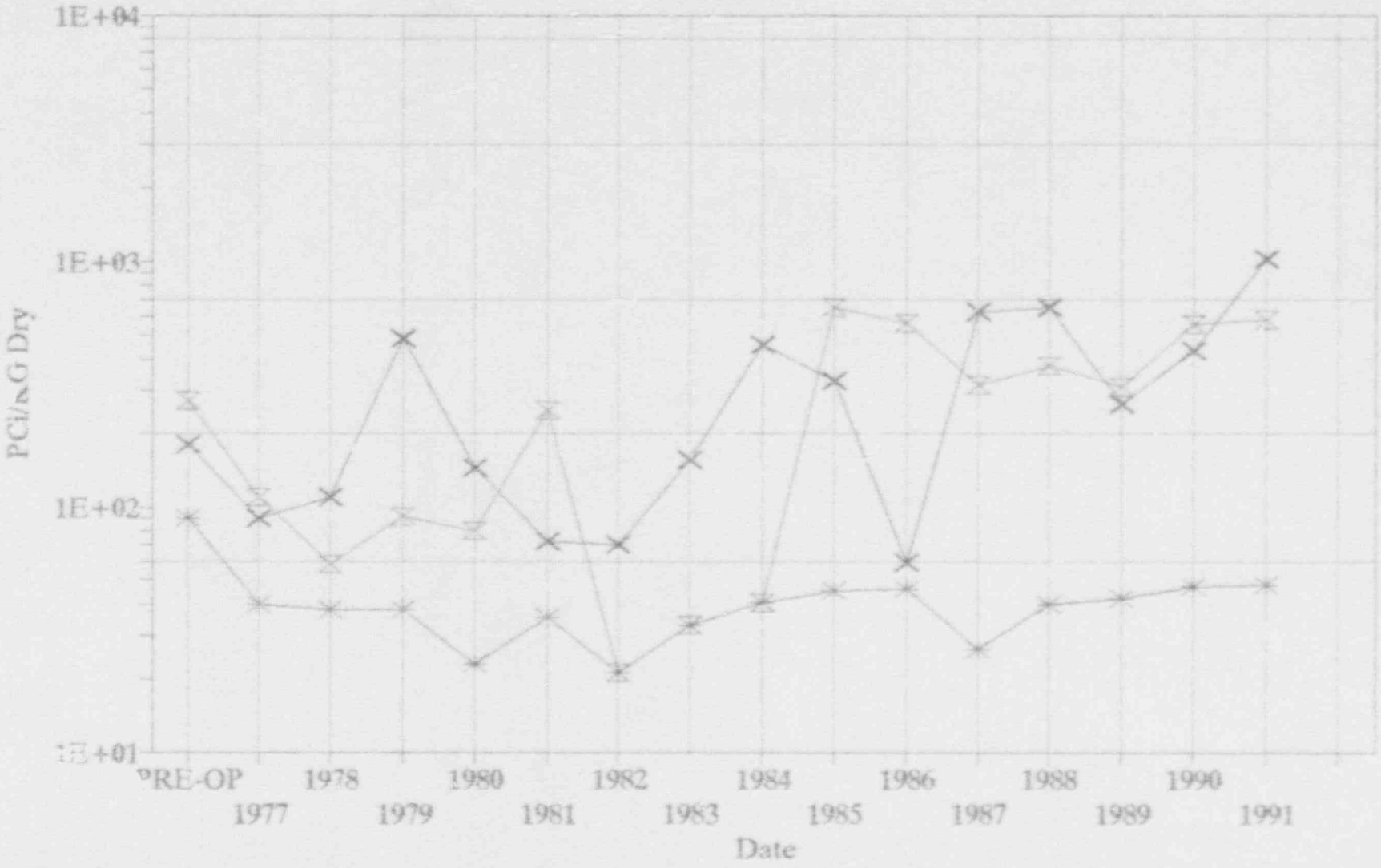
Mean Annual River Sediment PB-212



J. M. Farley
Nuclear
Plant

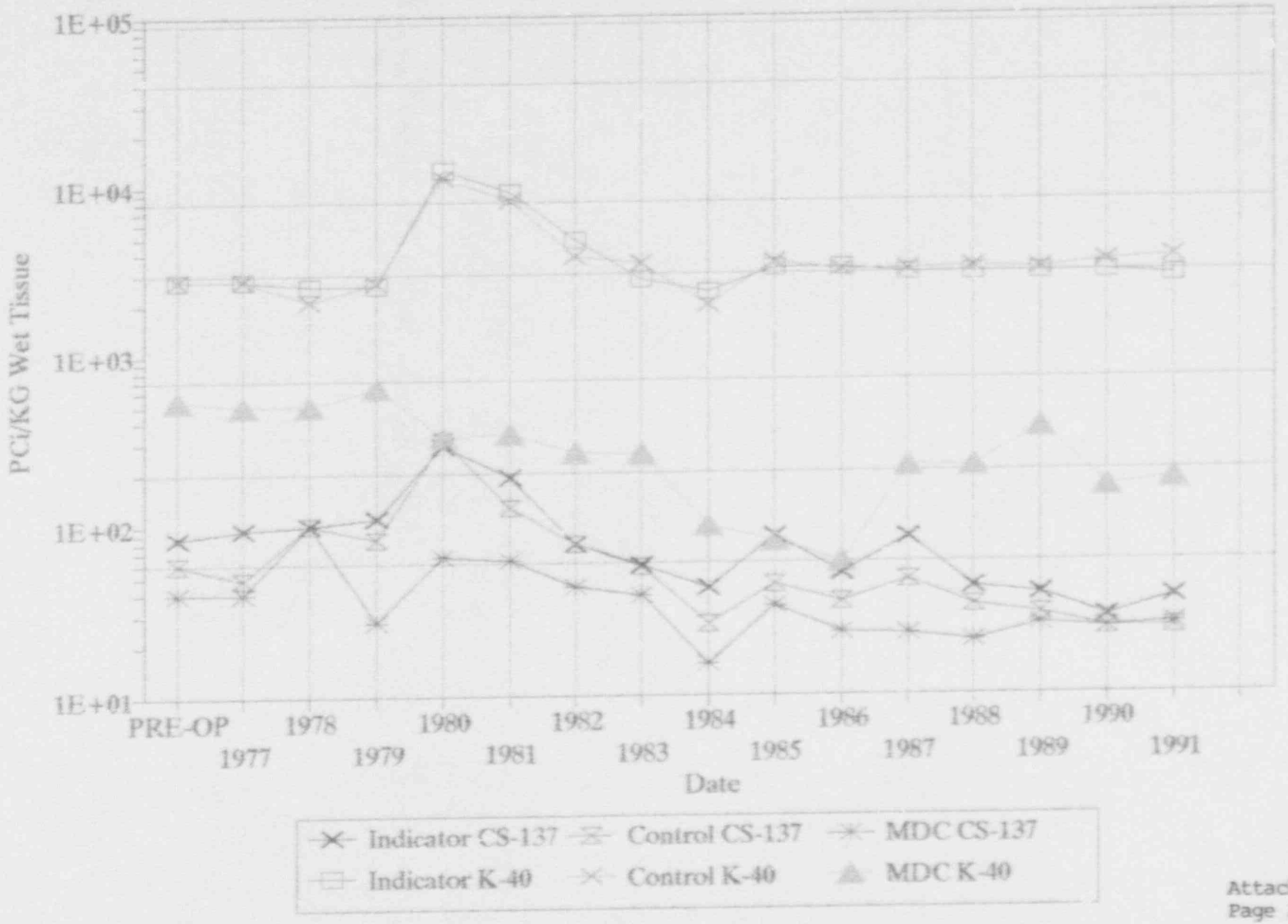
Annual Environmental Operating Report

Mean Annual River Sediment TL-208



J. M. Farley
Nuclear
Plant

Annual Environmental Operating Report
Mean Annual Game Fish Concentrations



J. M. Ferley
Nuclear
Plant

Annual Environmental Operating Report

Mean Annual Bottom-Feeding Fish Conc.