

PEACH BOTTOM ATOMIC POWER STATION  
ENVIRONS RADIATION MONITORING PROGRAM

January 1, 1984 through December 31, 1984

REPORT NO. 42

for  
The Philadelphia Electric Company

May 1985



**Chemical Waste Management**

Of Massachusetts, Inc.

Five Strathmore Road  
Natick, MA 01760

Radiation Management Corp.  
Fricks Lock Road, R. D. 1  
Pottstown, PA 19464

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## I. INTRODUCTION AND SUMMARY

### A. INTRODUCTION

A pre-operational environmental radioactivity survey was initiated in March 1960 for the Philadelphia Electric Company in connection with Peach Bottom Atomic Power Station located in Peach Bottom Township, York County, Pennsylvania. The initial loading of fuel into Unit 1, a 40 MWe (net) high temperature, gas-cooled reactor, was started on February 5, 1966, and initial criticality was achieved on March 3, 1966. Shutdown of Peach Bottom Unit 1 for decommissioning was on October 31, 1974. For the purposes of this monitoring program, the beginning of the operational period for Unit 1 is February 5, 1966. A summary of the Unit 1 pre-operational monitoring program is presented in a previous report (1).

Peach Bottom Units 2 and 3 are boiling water reactors each with a power output of approximately 1050 MWe (net). First fuel was loaded into Peach Bottom Unit 2 on August 9, 1973, criticality was achieved on September 16, 1973, and full power was reached on June 16, 1974. The first fuel was loaded into Peach Bottom Unit 3 on July 5, 1974, criticality was achieved on August 7, 1974, and full power was first reached on December 21, 1974. A pre-operational summary report (2) for Units 2 and 3 has been issued previously and summarizes the results of all analyses performed on samples collected from February 5, 1966 through August 8, 1973. Detailed program description, station designation, reporting units, abbreviations, etc., are given in that report reflecting the program status at that time. Where changes had been made from the original program, they are indicated in the appropriate sections of that year's report. In general, any such changes have been made to increase the scope and specificity of the program to fulfill the program objective and to reflect the latest recommendations of various government agencies. These changes are detailed in previous reports.

This report summarizes the results of analyses performed by Chemical Waste Management on samples representing the period January 1 through December 31, 1984 in the Chemical Waste Management portion of the overall Peach Bottom program.

The objective of this program is to acquire quantitative data for the concentrations of radioactivity in environmental media in the vicinity of the reactor site prior to and during operation of the reactor plant. These data are then examined to determine the extent of the impact of the plant or plants on the environment as reflected by any changes in the radioactivity levels from those observed during the pre-operational survey. Generally, this is done by comparing the observed levels at

those sampling stations which would be expected from various considerations to show maximum effects of plant operation to levels at stations remote from the site. When possible, comparison is also made to data obtained by various government agencies. Since there are both natural and man-made radioactivity present in the environment which are not related to plant operation, it is important to understand and adequately measure these contributions.

A number of radioactive elements occur in nature. The most important of these are uranium and thorium, along with their respective radioactive decay products, and potassium-40 (K-40). The concentrations of natural radioactivity vary with geographical location and with time and are primarily dependent on the concentration of the respective elements in the constituents of the lithosphere. Therefore, environmental radioactivity measurements must be performed at a number of locations representative of the general geographical area of interest.

Other radionuclides have been introduced into the biosphere as a result of the detonation of nuclear devices in the atmosphere. A significant fraction of these nuclides is generally disseminated throughout the upper atmosphere with the fine particulate debris from the detonation. Varying fractions of the nuclear debris eventually are deposited at ground level, principally in conjunction with precipitation. After their arrival at ground level, the radionuclides enter soil or bodies of water, and varying fractions may enter drinking water supplies or be assimilated by edible plants or animals and thus enter the human food chain. Natural radioactivities are also introduced into the human diet by analogous processes.

The deposition patterns of nuclear debris depend on many factors including latitude, proximity to detonation sites, annual accumulation of precipitation, and the frequency, magnitude, location, and altitude of the detonations. In the absence of detonations, seasonal variations have been noted for several years, including maximum deposition rates in the spring and summer months and minimum rates in the late fall or early winter. Distinct variations have also been noted in individual precipitations. These latter variations have been attributed to variations of meteorological conditions prevailing during the respective precipitation events.

Since significant geographical and temporal variations are expected in the concentrations of both natural and man-made radioactivity in environmental media, it is necessary to acquire experimental values for their concentrations over a period of several years to achieve statistically-significant data. Such an approach also provides data for seasonal or annual trends in

the temporal behavior of these concentrations and permits correlations of these trends with meteorological or climatological factors or with known injections of man-made radionuclides into the atmosphere.

## B. SUMMARY

Except for fish and silt samples, no measurable amounts of radioactivity were found offsite by the environs radiation monitoring program which could be attributed to the operation of PBAPS. The program detected plant related radioactivity at very low levels in two sample types in Conowingo Pond. Cs-137, Cs-134 and Zn-65 were found in fish samples from offsite locations. Slightly higher concentrations of these nuclides and Co-60 were found in samples from the plant water discharge system. Silt samples at essentially all locations showed Cs-137, Cs-134 and Co-60. Zn-65 was found in one sample. The resulting doses to the maximum exposed individual were well below 10 CFR 50 Appendix I design objectives.

Samples such as soil, vegetation, etc, showed gross and/or net activities which are consistent with the known presence of naturally-occurring nuclides or which are most probably attributable to fallout from nuclear testing and therefore did not result from PBAPS operation.

There was no other measurable environmental radioactivity which is attributed to the operation of PBAPS.

## II. PROGRAM DESCRIPTION

The program as it existed at the end of the report period is described below. Since its inception, several changes have been made to better accomplish the program goals.

### A. Environmental Monitoring Stations and Media Collected

The environmental monitoring stations are described in Table II. 1 and are shown in Figures II. 1 through II. 3. In general, stations have not been moved significantly since the start of the program.

### B. Sampling and Analysis Program

The types of analysis performed, the frequency of sampling and analysis, the locations of samples, and the number of analyses per station scheduled for each location as of the end of the report period, are given in Table II. 2.

A summary of the analyses performed on samples representing January 1, 1984 through December 31, 1984 is given in Table II. 3.

TABLE II.1

ENVIRONMENTAL MONITORING STATIONS  
January through December 1984

Station No.	Station Name	Station Location, Direction and Distance from Peach Bottom Site	Environmental Media Collected	Station Type(1)
1	Peach Bottom Site Area	Located in Site Area	Vegetation, Small Game	I
1A	Peach Bottom - Weather Station 1	On Site at Weather Station, 0.3 miles SE of Units 2 & 3	Air Particulate, Precipitation	I
1B	Peach Bottom - Weather Station 2	On Site at Weather Station 2, 0.5 miles N of Units 2 & 3	Air Particulate, Precipitation	I
1M	Peach Bottom - Canal Discharge	On Site at Canal Discharge 1.0 miles SE of Units 2 & 3	Discharge Water	I
1Q	Peach Bottom Unit 2 Intake	On Site at Unit 2 Intake, 1200' ENE of Units 2 & 3	Surface Water	C
1U	Peach Bottom Site - Utility Building	Well at Plant Site, 1400' S of Units 2 & 3	Well Water	I
1V	Peach Bottom Site - Information Center	Well at Plant Site, 1400' SSE of Units 2 & 3	Well Water	I
1X	Peach Bottom Site - Cooling Tower Pond B1	About 1750' ESE of Units 2 & 3	Silt and Fish (Channel Catfish and White Crappie)	I
1AA	Peach Bottom - Discharge Canal Bank	Located about 2400' SE of Units 2 & 3 on the Discharge Canal Bank	Soil	I
1BB	Peach Bottom -	On Site in the Station Discharge Canal, 3300' SE of Units 2 & 3	Silt	I
1EE	Peach Bottom - Discharge Canal	In the Discharge Canal anywhere between the Peach Bottom Units 2 & 3 Liquid Radwaste Discharge and Canal Exit.	Fish (Channel Catfish and White Crappie)	I
1LL	Peach Bottom Units 2 & 3 Intake - Composite	Continuous Sampler on Site at Units 2 & 3 Intake, 1200' ENE of Units 2 & 3	Surface Water	C
1MM	Peach Bottom - Canal Discharge - Composite	Continuous Sampler on Site at Canal Discharge 1.0 miles SE of Units 2 & 3	Discharge Water	I

Station No.	Station Name	Station Location, Direction and Distance from Peach Bottom Site	Environmental Media Collected	Station Type(1)
2	Peach Bottom Site - 130° Sector Hill	On Site, 0.9 miles SE of Units 2 & 3	Air Particulate Soil	I
3A	Delta, Pa. - Substation	3.6 miles SW of Units 2 & 3 0.5 miles N of Maryland border	Air Particulate Vegetation, Soil	I
4B	Conowingo Dam - Powerhouse Roof	8.6 miles SE of Units 2 & 3 on Powerhouse roof in Cecil County, Md.	Air Particulate	C
4D	Conowingo Pond, Pa.	500' downstream from the Peach Bottom Station Discharge	Silt	I
4F	Conowingo Dam - El. 33' MSL Grab	In the Conowingo Hydro-Electric Station about 8.6 miles SE of Units 2 & 3. Water is sampled from a header which continuously draws pond water from about elevation 33' MSL.	Surface Water	I
4I	Conowingo Pond - Net Trap 8	Located in Conowingo Pond about 1400' N of Units 2 & 3	Fish (Channel Catfish and White Crappie)	I
4J	Conowingo Pond - Net Trap 15	Located in Conowingo Pond about 1.4 miles SE of Units 2 & 3	Fish (Channel Catfish and White Crappie), Silt	I
4L	Conowingo Dam - El. 33 (Ft.) Composite	Continuous sampler in the Conowingo Hydro-Electric Station, about 8.6 miles SE of Units 2 & 3. Water is continuously sampled from a header which draws pond water from about elevation 33' MSL.	Surface Water	I
4M	Conowingo Dam - Downstream El. 40 (Ft.) MSL	West bank downstream of Conowingo Hydro-Electric Station about 8.6 miles SE of Units 2 & 3	Precipitation	C
4N	Conowingo Dam - Environmental Station	Environmental Monitoring Station on west shore upstream of Conowingo Hydro-Electric Station about 8.6 miles SE of Units 2 & 3	Vegetation, Soil	C

Station No.	Station Name	Station Location, Direction and Distance from Peach Bottom Site	Environmental Media Collected	Station Type(1)
4T	Conowingo Pond - Near Conowingo Dam	Near middle of Conowingo Pond, about 8.1 miles SE of Units 2 & 3	Silt	I
5	Wakefield, Pa.	4.6 miles E of Units 2 & 3	Air Particulate, Soil and Vegetation	I
6A	Holtwood Dam - Hydro-Electric Station	5.8 miles NW of Units 2 & 3	Surface Water (through Hydro Plant)	C
6B	Holtwood Dam - Hydro-Electric Station	5.8 miles NW of Units 2 & 3	Air Particulate (Hydro Powerhouse Roof)	C
6D	Holtwood, Pa.	5.8 miles NW of Units 2 & 3 near Holtwood Dam in Lancaster County	Vegetation	C
6F	Holtwood Dam - East Shore Upstream	5.8 miles NW of Units 2 & 3 in Lancaster County	Silt (above dam)	C
6G	Holtwood, Pa.	5.8 miles NW of Units 2 & 3 near Holtwood Dam in Lancaster County	Soil	C
6H	Holtwood Pond	Located in Holtwood Pond about 6.2 miles NW of Units 2 & 3	Fish	C
6I	Holtwood Dam - Hydro-Electric Station - composite	Continuous sampler at Holtwood Hydro-Electric Station intake about 5.8 miles NW of Units 2 & 3 Water is continually sampled and collected in a 175 gallon tank.	Surface Water	C
6J	Holtwood Pond	Located in Holtwood Pond near the east bank about 10.7 miles NW of Units 2 & 3	Fish	C
7	Darlington, Maryland Area	9.6 miles SSE of Units 2 & 3 in Hartford County	Well Water	C
8	Colors, Maryland	9.9 miles ESE of Units 2 & 3 in Cecil County	Vegetation	C
12A	Philadelphia, Pa. 900 Sansom St.	63 miles ENE of Units 2 & 3 on the roof of 900 Sansom Street	Air Particulate	C

Station No.	Station Name	Station Location, Direction and Distance from Peach Bottom Site	Environmental Media Collected	Station Type(1)
12D	Philadelphia, Pa.	62 miles ENE of Units 2 & 3 on the roof of 2301 Market Street	Air Particulate	C
13A	Chester Water Intake Pond	On the east shore of Conowingo Pond at Chester Water Authority Intake, 2.4 miles ESE of Units 2 & 3	Surface Water	I
13B	Chester Water Intake Pump Discharge	At Chester Water Authority Intake 2.4 miles ESE of Units 2 & 3	Surface Water	I
14	Peters Creek	1.9 miles ESE of Units 2 & 3	Air Particulate	I
15	Silver Spring Road	3.6 miles N of Units 2 & 3	Air Particulate	I
17	Riverview Road	4.0 miles ESE of Units 2 & 3	Air Particulate	I
23	Peach Bottom 150° Sector Hill	Off-site, hill 1.0 miles SSE of Units 2 & 3	Vegetation	I
31	Pilottown Road	4.9 miles SE of Units 2 & 3 near Pilottown Road	Air Particulate	I
32	Slate Hill Road	2.7 miles ENE of Units 2 & 3 near Slate Hill Road	Air Particulate	I
33A	Fulton Weather Station	Fulton Main Weather Station 1.7 miles ENE of Units 2 & 3	Air Particulate	I
38	Peach Bottom Road	3.0 miles E of Units 2 & 3 near Peach Bottom Road	Air Particulate	I
40	Peach Bottom Site Area	Well in Site Area about 1.5 miles SW of Units 2 & 3	Well Water	I
	Peach Bottom Regional Farms	Nearby Regional Farms surrounding the Peach Bottom site on the west side of Conowingo Pond are Designated G, J, and O. Intermediate distance farms on distance farms on the east side of the pond are designated D, L, M, and N. Distant regional on the west side of Conowingo Pond are designated A, B, and C, and a distant farm on the east side is designated Farm E. (2)	Milk  G, J, O  D, L, M, N  A, B, C, E	  I  I  C

#### NOTES

1. For Station Type, I equals indicator, C equals control.
2. The precise farms involved in the program have changed in some cases due to circumstances beyond control of the program. The replacement farms are in the same general locations distributed so as to encircle the site close to and further away from the Peach Bottom site.

TABLE II.2

## ENVIRONMENTAL RADIATION MONITORING PROGRAM

PERIOD JANUARY THROUGH DECEMBER 1984

Media	Type and Frequency of Analysis (1)	Type and Quantity of Sample	Sample Collection Frequency (2)	Number of Locations	Station Number (3)	Scheduled Samples Per Year
1. Airborne Particulate	Gross Beta	About 1 cfm continuous flow through filter paper (approx 2" diam) (4)	Filter Paper collected Weekly	Sixteen	1A, 1B, 2, 3A, 4B, 5, 6B, 12A, 12D, 14, 15, 17, 31, 32, 33A, 38	52 X 16
	Gamma Spectrum (Monthly)		Monthly Composite of weekly Samples	Sixteen	1A, 1B, 2, 3A, 4B, 5, 6B, 12A, 12D, 14, 15, 17, 31, 32, 33A, 38	12 X 16
2. Water						
a. Precipitation	Gross Beta Sr-89, Sr-90 (Quarterly) Radioactive Cs (Quarterly)	Collected Continuously to form monthly composite sample.	Monthly	Three	1A, 1B, 4M	12 X 3
b. Surface Water	Gross Alpha(5) Gross Beta(5)	Spot; one gal.	Monthly	Four	10, 4F, 6A, 13A	12 X 4
		Continuous Composite; one gal	(6) Monthly	One Three	13B 4L, 6I, 11L	(6) 12 X 3
c. Discharge Water	Gross Alpha(5) Gross Beta (5)	Spot; one gal.	Monthly	One	1M	12 X 1
		Continuous Composite one gal	Monthly	One	1MM	12 X 1
d. Well Water	Gross Alpha Gross Beta Uranium Sr-89, Sr-90 (Semi-annually) Radioactive Cs (Semi-annually)	Spot; one gal.	Quarterly	Four	1U, 1V, 7, 40	4 X 4
3. Milk	Gross Beta Potassium-40 Sr-89, Sr-90 Cs-137, Cs-134 I-131	Spot; two gal.	Quarterly	Eleven	Farms A, B, C, D, E, G, O, J, L, M, N  Farms A,C,G,J	4 X 11  4 X 4

Media	Type and Frequency of Analysis (1)	Type and Quantity of Sample	Sample Collection Frequency (2)	Number of Locations	Station Number (3)	Scheduled Samples Per Year
4. Vegetation	Gross Beta Potassium-40 Sr-89, Sr-90 Radioactive Cs	Stems, leaves and fruit; Foods whenever available; one container full	Spring, Summer, and Fall	Seven	1,3A,4H,5,6D,8,23	3 X 2 (7) 6 X 5
5. Fish	Gross Beta Potassium-40 Sr-89, Sr-90 (one fish of each species) Gamma Spectrum (all fish of each species as one sample)	Channel Catfish and White Crappie, four fish each (if available)	Quarterly (no sample when ice conditions prevail)	Five	1X,4I,4J, 1EE,6H or 6J	32 X 5
6. Small Game	Gross Beta and Potassium-40 of muscle, soft tissue and bone separately I-131 of thyroid Sr-89, Sr-90 of bone	Rabbits, 5 at each collection (if available)	Semi-annually	One	1	10 X 1
7. Earth	Gross Beta Potassium-40 Sr-89, Sr-90 Radioactive Cs	Sunshine method; 500 grams	Semi-annually	Six	1AA,2,3A,4H, 5,6G	2 X 6
8. Silt	Gross Alpha Gross Beta Sr-89, Sr-90 Radioactive Cs Gamma Spectrum (GeLi)	Spot; 500 grams	Semi-annually	Six	1BB,1X,4J, 4D,4T,6F	2 X 6

#### FOOTNOTES

1. Frequency of each type of analysis is the same as the frequency of sample collection except where noted.
2. Sampling is conducted on the specified frequency unless unusual conditions, such as an equipment malfunction or an act of nature, prevent a specific sample from being obtained or analyzed.
3. Number indicates locations shown in Figures II.1, II.2, and II.3 and described in Table II.1
4. Sample flow rate is controlled with Restricting Orifice.
5. Soluble and insoluble radionuclide separately.
6. A monthly sample will be obtained only during those months in which the Chester Water Authority withdraws water from the pond.
7. Two kinds of vegetation during harvest at all locations except Delta and Conowingo.





TABLE II.4  
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

NAME OF FACILITY: PEACH BOTTOM ATOMIC POWER STATION DOCKET NO.: 50-277 & 50-278  
LOCATION OF FACILITY: YORK COUNTY, PA REPORTING PERIOD: 1984

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED MINIMUM DETECTABLE LEVEL (MDL)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATIONS MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN MEAN (F) RANGE	STATION # NAME DISTANCE & DIRECTION	NUMBER OF NONROUTIN REPORTED MEASUREMENTS
AIR PARTICULATE (PC/CU. METER)	GROSS BETA	803	0.006	.026 (595/600) (.007-.078)	.027 (202/203) (.008-.074)	.029 (52/52) (.013-.061)	1A (INDICATOR) WEATHER STATION 1 0.3 MILES SE OF SITE	0
	GAMMA BE-7	191	N/A	.12 (116/143) (.06-.7)	.11 (43/48) (.06-.2)	.16 (11/12) (.07-.7)	1B (INDICATOR) WEATHER STATION 2 0.5 MILES NW OF SITE	0
	K-40		N/A	.10 (5/143) (.08-.12)	.10 (6/48) (.08-.2)	.13 (3/12) (.09-.2)	12D (CONTROL) PHILADELPHIA, PA. 62 MILES ENE OF SITE	0
	CS-134		.04	< MDL	< MDL	< MDL		0
	CS-137		.04	< MDL	< MDL	< MDL		0
	PRECIPITATION (PC/LITER)							
PRECIPITATION (PC/LITER)	GROSS BETA	35	2.5	5 (12/23) (2-17)	4 (8/12) (2-7)	6 (7/11) (2-17)	1B (INDICATOR) WEATHER STATION 2 0.5 MILES NW OF SITE	0
	SR-89	12	N/A	1.0 (1/8) (1.0)	< MDL	1.0 (1/4) (1.0)	1B (INDICATOR) WEATHER STATION 2 0.5 MILES NW OF SITE	0
	SR-90	12	N/A	.4 (5/8) (.3-.7)	.8 (3/4) (.5-1.5)	.8 (3/4) (.5-1.5)	4M (CONTROL) CONOWINGO DAM EL. 40 FT. MSL 8.6 MILES SE OF SITE	0
	RAD. CESIUM	15	N/A	.2 (1/10) (.2)	.3 (2/5) (.2-.3)	.3 (2/5) (.2-.3)	4M (CONTROL) CONOWINGO DAM EL. 40 FT. MSL 8.6 MILES SE OF SITE	0
PRECIPITATION (PC/SQ. METER)	GROSS BETA	35	2.5	321 (12/23) (120-500)	264 (8/12) (80-800)	347 (7/11) (200-500)	1B (INDICATOR) WEATHER STATION 2 0.5 MILES NW OF SITE	0
	SR-89	12	N/A	90 (1/8) (90)	< MDL	90 (1/4) (90)	1B (INDICATOR) WEATHER STATION 2 0.5 MILES NW OF SITE	0

MEAN AND RANGE BASED UPON DETECTABLE MEASUREMENTS ONLY. FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES. (F)

TABLE II.4 (CONTINUED)  
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

NAME OF FACILITY: PEACH BOTTOM ATOMIC POWER STATION DOCKET NO.: 50-277 & 50-278  
LOCATION OF FACILITY: YORK COUNTY, PA REPORTING PERIOD: 1984

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED MINIMUM DETECTABLE LEVEL (MDL)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATIONS MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN MEAN (F) RANGE	STATION # NAME DISTANCE & DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
PRECIPITATION (PC/SQ. METER)	SR-90	12	N/A	39 (5/8) (14-70)	87 (3/4) (50-150)	87 (3/4) (50-150)	4M (CONTROL) CONOWINGO DAM EL. 40 FT. MSL 8.6 MILES SE OF SITE	0
	RAD. CESIUM	15	N/A	30 (1/10) (30)	20 (2/5) (20-20)	30 (1/5) (30)	1A (INDICATOR) WEATHER STATION 1 0.3 MILES SE OF SITE	0
SURFACE WATER (PC/LITER)	GROSS ALPHA INSOLUBLE	88	N/A	1.6 (38/43) (.1-3)	.6 (31/45) (.1-.5)	2.9 (12/12) (.4-3)	4F (INDICATOR) CONOWINGO DAM EL. 33FT. MSL GRAB 8.6 MILES SE OF SITE	0
	GROSS ALPHA SOLUBLE	88	N/A	2 (1/43) (2)	2 (2/45) (2-2)	2 (1/9) (2)	1LL (CONTROL) UNITS 2 & 3 INTAKE-COMPOSITE 0.25 MILES ENE OF SITE	0
	GROSS BETA INSOLUBLE	88	2.5	5.3 (29/43) (.4-70)	1.2 (22/45) (.4-.7)	10.0 (12/12) (.7-70)	4F (INDICATOR) CONOWINGO DAM EL. 33FT. MSL GRAB 8.6 MILES SE OF SITE	0
	GROSS BETA SOLUBLE	88	2.5	3 (11/43) (2-7)	4 (10/45) (3-8)	5 (2/12) (3-7)	13A (INDICATOR) CHESTER WATER INTAKE POND 2.4 MILES ESE OF SITE	0
	GROSS ALPHA INSOLUBLE	16	N/A	1.0 (14/16) (.2-5)		1.8 (4/4) (.5-5)	1MM (INDICATOR) CANAL DISCHARGE-COMPOSITE 1.0 MILES SE OF SITE	0
DISCHARGE WATER (PC/LITER)	GROSS ALPHA	16	N/A	< MDL		< MDL		0
	GROSS BETA INSOLUBLE	16	2.5	1.5 (11/16) (.4-3.9)		2.0 (3/4) (.7-3.9)	1MM (INDICATOR) CANAL DISCHARGE-COMPOSITE 1.0 MILES SE OF SITE	0
	GROSS BETA SOLUBLE	16	2.5	3 (4/16) (2-5)		4 (3/12) (2-5)	1M (INDICATOR) CANAL DISCHARGE 1.0 MILES SE OF SITE	0

MEAN AND RANGE BASED UPON DETECTABLE MEASUREMENTS ONLY. FRACTION OF DETECTABLE MEASUREMENTS AT  
SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES. (F)

TABLE II.4 (CONTINUED)  
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

NAME OF FACILITY: PEACH BOTTOM ATOMIC POWER STATION  
LOCATION OF FACILITY: YORK COUNTY, PA

DOCKET NO.: 50-277 & 50-278  
REPORTING PERIOD: 1984

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED MINIMUM DETECTABLE LEVEL (MDL)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATIONS MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN MEAN (F) RANGE	STATION # NAME DISTANCE & DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
WELL WATER (PC/LITER) A(UG/LITER)	GROSS ALPHA	13	N/A	2 (1/9) (2)	< MDL	2 (1/3) (2)	1V (INDICATOR) INFORMATION CENTER 0.3 MILES SSE OF SITE	0
	GROSS BETA	13	2.5	2 (1/9) (2)	< MDL	2 (1/2) (2)	1U (INDICATOR) UTILITY BUILDING 0.3 MILES S OF SITE	0
	SR-89	9	N/A	< MDL	< MDL	< MDL		
	SR-90	9	N/A	.4 (4/6) (.3-.5)	.4 (1/3) (.4)	.5 (1/3) (.5)	40 (INDICATOR) PEACH BOTTOM SITE AREA 1.5 MILES SW OF SITE	0
	RAD. CESIUM	9	11	.4 (2/6) (.2-.5)	< MDL	.5 (1/3) (.5)	40 (INDICATOR) PEACH BOTTOM SITE AREA 1.5 MILES SW OF SITE	0
	URANIUM (A)	13	N/A	.08 (5/9) (.07-.08)	.157 (3/4) (.012-.26)	.157 (3/4) (.012-.26)	7 (CONTROL) DARLINGTON, MD AREA 9.6 MILES SSE OF SITE	0
SOIL (PC/GRAM DRY)	GROSS BETA	12	N/A	3.1 (7/8) (1.5-4)	2.8 (4/4) (2-4)	4 (1/2) (4)	2 (INDICATOR) 130 DEGREE SECTOR HILL 0.9 MILES SE OF SITE	0
	NET BETA	12	N/A	3.0 (7/8) (1.4-4)	2.7 (4/4) (1.6-4)	4 (1/2) (4)	2 (INDICATOR) 130 DEGREE SECTOR HILL 0.9 MILES SE OF SITE	0
	K-40	12	N/A	.21 (7/8) (.11-.45)	.38 (4/4) (.25-.51)	.50 (2/2) (.49-.51)	4N (INDICATOR) CONOWINGO DAM AREA 8.6 MILES SE OF SITE	0
	SR-89	12	N/A	.04 (3/8) (.03-.06)	< MDL	.05 (2/2) (.03-.06)	3A (INDICATOR) DELTA, PA SUBSTATION 3.6 MILES SW OF SITE	0

MEAN AND RANGE BASED UPON DETECTABLE MEASUREMENTS ONLY. FRACTION OF DETECTABLE MEASUREMENTS AT  
SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES. (F)

TABLE II.4 (CONTINUED)  
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

NAME OF FACILITY: PEACH BOTTOM ATOMIC POWER STATION  
LOCATION OF FACILITY: YORK COUNTY, PA

DOCKET NO.: 50-277 & 50-278  
REPORTING PERIOD: 1984

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED MINIMUM DETECTABLE LEVEL (MDL)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATIONS MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN MEAN (F) RANGE	STATION # NAME DISTANCE & DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
SOIL (PC/GRAM DRY)	SR-90	12	N/A	.233 (8/8) (.029-.59)	.133 (4/4) (.039-.164)	.434 (2/2) (.277-.59)	2 (INDICATOR) 130 DEGREE SECTOR HILL 0.9 MILES SE OF SITE	0
	RAD. CESIUM	12	0.1	.198 (8/8) (.046-.36)	.301 (4/4) (.16-.429)	.400 (2/2) (.37-.429)	6G (CONTROL) HOLTWOOD, PA 5.8 MILES NW OF SITE	0
SILT (PC/GRAM DRY)	GROSS ALPHA	12	N/A	4.4 (10/10) (1.2-9)	4 (2/2) (2-5)	6 (2/2) (2-9)	1BB (INDICATOR) DISCHARGE CANAL 0.6 MILES SE OF SITE	0
	GROSS BETA	12	N/A	3 (7/10) (2-4)	3 (1/2) (3-3)	4 (1/2) (4-4)	1BB (INDICATOR) DISCHARGE CANAL 0.6 MILES SE OF SITE	0
	SR-89	12	N/A	< MDL	< MDL	< MDL		0
	SR-90	12	N/A	.027 (10/10) (.008-.054)	.027 (2/2) (.025-.029)	.044 (2/2) (.034-.054)	4T (INDICATOR) CONOWINGO POND NEAR CONOWINGO DAM 8.1 MILES SE OF SITE	0
	RAD. CESIUM	12	0.1	.170 (10/10) (.015-.392)	.072 (2/2) (.050-.094)	.296 (2/2) (.22-.371)	4T (INDICATOR) CONOWINGO POND NEAR CONOWINGO DAM 8.1 MILES SE OF SITE	0
	GAMMA	42						
	BE-7		N/A	.95 (2/35) (.6-1.3)	.9 (3/7) (.7-1.1)	.95 (2/7) (.6-1.3)	1BB (INDICATOR) DISCHARGE CANAL 0.6 MILES SE OF SITE	0
	K-40		N/A	12.6 (35/35) (7.2-17)	9.7 (7/7) (6.9-14)	15.2 (7/7) (12.9-17)	1BB (INDICATOR) DISCHARGE CANAL 0.6 MILES SE OF SITE	0

MEAN AND RANGE BASED UPON DETECTABLE MEASUREMENTS ONLY. FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES. (F)

TABLE II.4 (CONTINUED)  
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

NAME OF FACILITY: PEACH BOTTOM ATOMIC POWER STATION DOCKET NO.: 50-277 & 50-278  
LOCATION OF FACILITY: YORK COUNTY, PA REPORTING PERIOD: 1984

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED MINIMUM DETECTABLE LEVEL (MDL)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATIONS MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN MEAN (F) RANGE	STATION # NAME DISTANCE & DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
SILT (PC/GRAM DRY)	CO-60		N/A	.15 (13/35) (.05-.6)	< MDL	.20 (5/7) (.05-.6)	4J (INDICATOR) CONOWINGO POND 1.4 MILES SE OF SITE	0
	CS-134		0.1	.12 (19/35) (.05-.37)	< MDL	.19 (6/7) (.11-.37)	1BB (INDICATOR) DISCHARGE CANAL 0.6 MILES SE OF SITE	0
	CS-137		0.1	.37 (25/35) (.09-.8)	.15 (6/7) (.05-.2)	.51 (7/7) (.12-.8)	4T (INDICATOR) CONOWINGO POND NEAR CONOWINGO DAM 8.1 MILES SE OF SITE	0
	RA-226		N/A	.88 (35/35) (.38-1.3)	.88 (7/7) (.48-1.6)	1.1 (7/7) (.61-1.3)	1BB (INDICATOR) DISCHARGE CANAL 0.6 MILES SE OF SITE	0
	TH-228		N/A	1.14 (35/35) (.51-2)	.97 (7/7) (.5-1.6)	1.51 (7/7) (.8-2)	1BB (INDICATOR) DISCHARGE CANAL 0.6 MILES SE OF SITE	0
CATFISH (PC/GRAM ASH)	GROSS BETA	80	N/A	56 (64/64) (15-150)	44 (16/16) (13-100)	68 (16/16) (28-150)	1X (INDICATOR) COOLING TOWER POND B1 0.3 MILES ESE OF SITE	0
	NET BETA	80	N/A	19 (9/64) (10-30)	35 (2/16) (20-50)	35 (2/16) (20-50)	6H (CONTROL) HOLTWOOD POND 6.2 MILES NW OF SITE	0
	K-40	80	N/A	57 (64/64) (19-130)	40 (16/16) (19-86)	63 (16/16) (34-120)	1X (INDICATOR) COOLING TOWER POND B1 0.3 MILES ESE OF SITE	0
	SR-89	20	N/A	.5 (3/16) (.3-.8)	.5 (1/4) (.5)	.8 (1/4) (.8)	1X (INDICATOR) COOLING TOWER POND B1 0.3 MILES ESE OF SITE	0
	SR-90	20	N/A	.89 (16/16) (.57-1.5)	.96 (4/4) (.70-1.3)	1.00 (4/4) (.73-1.5)	1EE (INDICATOR) DISCHARGE CANAL SE OF SITE	0

MEAN AND RANGE BASED UPON DETECTABLE MEASUREMENTS ONLY. FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES. (F)

TABLE II.4 (CONTINUED)  
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

NAME OF FACILITY: PEACH BOTTOM ATOMIC POWER STATION  
LOCATION OF FACILITY: YORK COUNTY, PA

DOCKET NO.: 50-277 & 50-278  
REPORTING PERIOD: 1984

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED MINIMUM DETECTABLE LEVEL (MDL)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATIONS MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN MEAN (F) RANGE	STATION # NAME DISTANCE & DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
CATFISH (PC/GRAM WET)	GROSS BETA	80	N/A	1.9 (64/64) (.8-3.2)	1.7 (16/16) (.2-3.3)	2.1 (16/16) (.9-3.0)	4J (INDICATOR) CONOWINGO POND NET TRAP 15 1.4 MILES SE OF SITE	0
	NET BETA	80	N/A	.6 (9/64) (.5-.8)	1.7 (2/16) (1.6-1.8)	1.7 (2/16) (1.6-1.8)	6H (CONTROL) HOLTWOOD POND 6.2 MILES NW OF SITE	0
	K-40	80	N/A	2.0 (64/64) (1.0-3.7)	1.48 (16/16) (.27-2.3)	2.2 (16/16) (1.4-2.8)	4J (INDICATOR) CONOWINGO POND NET TRAP 15 1.4 MILES SE OF SITE	0
	SR-89	20	N/A	.021 (3/16) (.012-.03)	.02 (1/4) (.02)	.021 (2/4) (.012-.03)	4I (INDICATOR) CONOWINGO POND NET TRAP 8 0.3 MILES N OF SITE	0
	SR-90	20	N/A	.035 (16/16) (.015-.065)	.044 (4/4) (1.4-2.1)	.044 (4/4) (1.6-3.2)	6H (CONTROL) HOLTWOOD POND 6.2 MILES NW OF SITE	0
	GAMMA BE-7	20	N/A	.11 (1/16) (.11)	< MDL	.11 (1/16) (.11)	1X (INDICATOR) COOLING TOWER POND B1 0.3 MILES ESE OF SITE	0
	K-40		N/A	2.12 (16/16) (1.1-3.2)	1.65 (4/4) (1.4-2.1)	2.4 (4/4) (1.6-3.2)	1EE (INDICATOR) DISCHARGE CANAL SE OF SITE	0
	MN-54		.08	< MDL	< MDL	< MDL		0
	FE-59		.16	< MDL	< MDL	< MDL		0
	CO-58		.08	< MDL	< MDL	< MDL		0
	MN-60		.08	.013 (2/16) (.010-.016)	< MDL	.013 (2/4) (.010-.016)	1EE (INDICATOR) DISCHARGE CANAL SE OF SITE	0
	ZN-65		.16	.066 (7/16) (.02-.18)	< MDL	.11 (2/4) (.04-.18)	1EE (INDICATOR) DISCHARGE CANAL SE OF SITE	0

MEAN AND RANGE BASED UPON DETECTABLE MEASUREMENTS ONLY. FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES. (F)

TABLE II.4 (CONTINUED)  
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

NAME OF FACILITY: PEACH BOTTOM ATOMIC POWER STATION DOCKET NO.: 50-277 & 50-278  
LOCATION OF FACILITY: YORK COUNTY, PA REPORTING PERIOD: 1984

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED MINIMUM DETECTABLE LEVEL (MDL)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATIONS MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN MEAN (F) RANGE	STATION # NAME DISTANCE & DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
CATFISH (PC/GRAM WET)	I-131		N/A	< MDL	.6 (1/4) (.6)	.6 (1/4) (.6)	6H (CONTROL) HOLTWOOD POND 6.2 MILES NW OF SITE	0
	CS-134		.09	.057 (11/16) (.008-.07)	< MDL	.121 (4/4) (.024-.07)	1EE (INDICATOR) DISCHARGE CANAL SE OF SITE	0
	CS-137		.09	.034 (15/16) (.008-.07)	.007 (1/4) (.007)	.056 (4/4) (.044-.07)	1EE (INDICATOR) DISCHARGE CANAL SE OF SITE	0
	BA-140		N/A	.9 (1/16) (.9)	< MDL	.9 (1/16) (.9)	1X (INDICATOR) COOLING TOWER POND B1 0.3 MILES ESE OF SITE	0
	TH-228		N/A	.03 (3/16) (.02-.03)	.03 (1/4) (.03)	.03 (2/4) (.03-.03)	1X (INDICATOR) COOLING TOWER POND B1 0.3 MILES ESE OF SITE	0
CRAPPIE (PC/GRAM ASH)	GROSS BETA	48	N/A	47 (32/32) (30-70)	47 (16/16) (23-90)	49 (16/16) (31-70)	4I (INDICATOR) CONOWINGO POND NET TRAP 8 0.3 MILES N OF SITE	0
	NET BETA	48	N/A	17 (3/32) (10-20)	< MDL	20 (2/16) (20-20)	4I (INDICATOR) CONOWINGO POND NET TRAP 8 0.3 MILES N OF SITE	0
	K-40	48	N/A	50 (32/32) (35-82)	50 (16/16) (36-88)	50 (16/16) (37-82)	4I (INDICATOR) CONOWINGO POND NET TRAP 8 0.3 MILES N OF SITE	0
	SR-89	12	N/A	.5 (1/8) (.5-.5)	< MDL	.5 (1/4) (.5-.5)	4I (INDICATOR) CONOWINGO POND NET TRAP 8 0.3 MILES N OF SITE	0
	SR-90	12	N/A	.72 (8/8) (.38-1.04)	.93 (4/4) (.50-1.58)	.93 (4/4) (.50-1.58)	6H (CONTROL) HOLTWOOD POND 6.2 MILES NW OF SITE	0

MEAN AND RANGE BASED UPON DETECTABLE MEASUREMENTS ONLY. FRACTION OF DETECTABLE MEASUREMENTS AT  
SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES. (F)

TABLE II.4 (CONTINUED)  
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

NAME OF FACILITY: PEACH BOTTOM ATOMIC POWER STATION  
LOCATION OF FACILITY: YORK COUNTY, PA

DOCKET NO.: 50-277 & 50-278  
REPORTING PERIOD: 1984

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED MINIMUM DETECTABLE LEVEL (MDL)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATIONS MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN MEAN (F) RANGE	STATION # NAME DISTANCE & DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
CRAPPIE (PC/GRAM WET)	GROSS BETA	48	N/A	2.2 (32/32) (1.4-3.1)	2.1 (16/16) (.7-3.4)	2.3 (16/16) (1.4-3.1)	4I (INDICATOR) CONOWINGO POND NET TRAP 8 0.3 MILES N OF SITE	0
	NET BETA	48	N/A	.8 (3/32) (.8-.9)	< MDL	.9 (2/16) (.8-.9)	4I (INDICATOR) CONOWINGO POND NET TRAP 8 0.3 MILES N OF SITE	0
	K-40	48	N/A	2.4 (32/32) (1.8-3.1)	2.20 (16/16) (.93-3.1)	2.4 (16/16) (2.0-3.1)	4I (INDICATOR) CONOWINGO POND NET TRAP 8 0.3 MILES N OF SITE	0
	SR-89	12	N/A	.03 (1/8) (.03-.03)	< MDL	.03 (1/4) (.03-.03)	4I (INDICATOR) CONOWINGO POND NET TRAP 8 0.3 MILES N OF SITE	0
	SR-90	12	N/A	.036 (8/8) (.019-.058)	.048 (4/4) (.026-.069)	.048 (4/4) (.026-.069)	6H (CONTROL) HOLTWOOD POND 6.2 MILES NW OF SITE	0
	GAMMA	12						
	K-40		N/A	2.16 (8/8) (1.5-3.3)	2.17 (4/4) (1.4-3.4)	2.3 (4/4) (1.8-3.3)	4J (INDICATOR) CONOWINGO POND NET TRAP 15 1.4 MILES SE OF SITE	0
	MN-54		.08	< MDL	< MDL	< MDL		0
	FE-59		.16	< MDL	< MDL	< MDL		0
	CO-58		.08	< MDL	< MDL	< MDL		0
	CO-60		.08	< MDL	< MDL	< MDL		0
	ZN-65		.16	.03 (3/8) (.02-.05)	< MDL	.035 (2/4) (.02-.05)	4J (INDICATOR) CONOWINGO POND NET TRAP 15 1.4 MILES SE OF SITE	0
	CS-134		.09	.013 (4/8) (.007-.02)	< MDL	.015 (2/4) (.01-.02)	4I (INDICATOR) CONOWINGO POND NET TRAP 8 0.3 MILES N OF SITE	0
	CS-137		.09	.025 (6/8) (.007-.08)	.011 (1/4) (.011)	.032 (3/4) (.007-.08)	4J (INDICATOR) CONOWINGO POND NET TRAP 15 1.4 MILES SE OF SITE	0

MEAN AND RANGE BASED UPON DETECTABLE MEASUREMENTS ONLY. FRACTION OF DETECTABLE MEASUREMENTS AT  
SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES. (F)

TABLE II.4 (CONTINUED)  
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

NAME OF FACILITY: PEACH BOTTOM ATOMIC POWER STATION  
LOCATION OF FACILITY: YORK COUNTY, PA

DOCKET NO.: 50-277 & 50-278  
REPORTING PERIOD: 1984

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED MINIMUM DETECTABLE LEVEL (MDL)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATIONS MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN MEAN (F) RANGE	STATION # NAME DISTANCE & DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
VEGETATION (PC/GRAM ASH)	GROSS BETA	31	N/A	199 (18/18) (130-270)	183 (13/13) (60-260)	208 (5/5) (130-250)	23 (INDICATOR) 150 SECTOR HILL 1.0 MILES SSE OF SITE	0
	NET BETA	31	N/A	53 (17/18) (20-100)	47 (11/13) (20-60)	70 (5/5) (50-100)	23 (INDICATOR) 150 SECTOR HILL 1.0 MILES SSE OF SITE	0
	K-40	31	N/A	151 (18/18) (80-220)	142 (13/13) (39-230)	160 (5/5) (140-190)	1 (INDICATOR) PEACH BOTTOM SITE AREA SITE AREA	0
	SR-89	30	N/A	2.7 (7/18) (.7-12)	1.9 (4/13) (.4-4)	12 (1/3) (12)	3A (INDICATOR) DELTA, PA SUBSTATION 3.6 MILES SW OF SITE	0
	SR-90	30	N/A	12.6 (18/18) (2.4-45)	8.73 (13/13) (1.93-23.6)	32.4 (3/3) (8.7-45)	3A (INDICATOR) DELTA, PA SUBSTATION 3.6 MILES SW OF SITE	0
	RAD. CESIUM	31	0.04	1.4 (18/18) (.21-7)	1.34 (13/13) (.47-2.9)	3.4 (3/3) (1.4-7)	3A (INDICATOR) DELTA, PA SUBSTATION 3.6 MILES SW OF SITE	0
VEGETATION (PC/GRAM WET)	GROSS BETA	31	N/A	2.41 (18/18) (.59-5.1)	2.70 (13/13) (1.06-5.4)	3.6 (5/5) (2.5-5.4)	6D (CONTROL) HOLTWOOD, PA 5.8 MILES NW OF SITE	0
	NET BETA	31	N/A	.60 (17/18) (.13-1.3)	.7 (11/13) (.3-1.4)	.9 (4/5) (.3-1.4)	6D (CONTROL) HOLTWOOD, PA 5.8 MILES NW OF SITE	0
	K-40	31	N/A	1.85 (18/18) (.44-4.0)	2.10 (13/13) (.79-4.1)	2.9 (5/5) (1.9-4.1)	6D (CONTROL) HOLTWOOD, PA 5.8 MILES NW OF SITE	0
	SR-89	30	N/A	.027 (7/18) (.012-.07)	.035 (13/13) (.011-.08)	.07 (1/3) (.07-.07)	3A (INDICATOR) DELTA, PA SUBSTATION 3.6 MILES SW OF SITE	0

MEAN AND RANGE BASED UPON DETECTABLE MEASUREMENTS ONLY. FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES. (F)

TABLE II.4 (CONTINUED)  
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

NAME OF FACILITY: PEACH BOTTOM ATOMIC POWER STATION      DOCKET NO.: 50-277 & 50-278  
LOCATION OF FACILITY: YORK COUNTY, PA      REPORTING PERIOD: 1984

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED MINIMUM DETECTABLE LEVEL (MDL)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATIONS MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN MEAN (F) RANGE	STATION # NAME DISTANCE & DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
VEGETATION (PC/GRAM WET)	SR-90	30	N/A	.134 (18/18) (.016-.433)	.139 (3/13) (.15-.328)	.198 (5/5) (.016-.433)	23 (INDICATOR) 150 SECTOR HILL 1.0 MILES SSE OF SITE	0
	RAD. CESIUM	31	0.04	.014 (18/18) (.0037-.04)	.020 (13/13) (.005-.044)	.026 (3/3) (.010-.04)	3A (INDICATOR) DELTA, PA SUBSTATION 3.6 MILES SW OF SITE	0
MILK (PC/LITER)	GROSS BETA	44	N/A	970 (28/28) (590-1410)	955 (16/16) (630-1260)	1043 (4/4) (880-1200)	C (CONTROL) DISTANT FARM C WEST OF CONOWINGO POND	0
	NET BETA	44	N/A	185 (12/28) (100-300)	200 (6/16) (100-300)	300 (1/4) (300-300)	A (CONTROL) DISTANT FARM A WEST OF CONOWINGO POND	0
	K-40	44	N/A	870 (28/28) (530-1100)	896 (16/16) (610-1200)	968 (4/4) (790-1100)	B (CONTROL) DISTANT FARM B WEST OF CONOWINGO POND	0
	SR-89	44	N/A	1 (1/28) (1-1)	1 (3/16) (1-2)	2 (1/4) (2)	B (CONTROL) DISTANT FARM B WEST OF CONOWINGO POND	0
	SR-90	44	N/A	3.9 (28/28) (1.9-6.8)	3.2 (16/16) (2.3-4.6)	4.9 (4/4) (2.7-6.8)	D (INDICATOR) INTERMEDIATE DISTANCE FARM D EAST OF CONOWINGO POND	0
	I-131	16	0.6	.2 (3/8) (.1-.3)	.22 (4/8) (.17-.3)	.3 (1/4) (.3)	J (INDICATOR) NEARBY FARM J WEST OF CONOWINGO POND	0
	CS-134	44	10	5 (1/28) (5-5)	< MDL	5 (1/4) (5-5)	J (INDICATOR) NEARBY FARM J WEST OF CONOWINGO POND	0
	CS-137	44	10	3 (9/28) (2-4)	4 (1/16) (4)	4 (1/4) (4)	E (CONTROL) DISTANT FARM E EAST OF CONOWINGO POND	0

MEAN AND RANGE BASED UPON DETECTABLE MEASUREMENTS ONLY. FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES. (F)

TABLE II.4 (CONTINUED)  
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

NAME OF FACILITY: PEACH BOTTOM ATOMIC POWER STATION  
LOCATION OF FACILITY: YORK COUNTY, PA

DOCKET NO.: 50-277 & 50-278  
REPORTING PERIOD: 1984

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED MINIMUM DETECTABLE LEVEL (MDL)	INDICATOR	CONTROL	LOCATION WITH HIGHEST		NUMBER OF NONROUTINE REPORTED MEASUREMENTS
				LOCATIONS MEAN (F) RANGE	LOCATIONS MEAN (F) RANGE	MEAN (F) RANGE	ANNUAL MEAN STATION # NAME DISTANCE & DIRECTION	
RABBIT BONE (PC/GRAM ASH)	GROSS BETA	5	N/A	18 (5/5) (12-25)		18 (5/5) (12-25)	1 (INDICATOR) PEACH BOTTOM SITE AREA SITE AREA	0
	NET BETA	5	N/A	9 (1/5) (9)		9 (1/5) (9)	1 (INDICATOR) PEACH BOTTOM SITE AREA SITE AREA	0
	K-40	5	N/A	13 (5/5) (6-26)		13 (5/5) (6-26)	1 (INDICATOR) PEACH BOTTOM SITE AREA SITE AREA	0
	SR-89	5	N/A	1 (1/5) (1)		1 (1/5) (1)	1 (INDICATOR) PEACH BOTTOM SITE AREA SITE AREA	0
	SR-90	5	N/A	4.2 (5/5) (2.3-6.4)		4.2 (5/5) (2.3-6.4)	1 (INDICATOR) PEACH BOTTOM SITE AREA SITE AREA	0
RABBIT BONE (PC/GRAM WET)	GROSS BETA	5	N/A	3.3 (5/5) (2-4)		3.3 (5/5) (2-4)	1 (INDICATOR) PEACH BOTTOM SITE AREA SITE AREA	0
	NET BETA	5	N/A	3 (1/5) (3)		3 (1/5) (3)	1 (INDICATOR) PEACH BOTTOM SITE AREA SITE AREA	0
	K-40	5	N/A	2.1 (5/5) (1.6-2.6)		2.2 (5/5) (1.6-2.6)	1 (INDICATOR) PEACH BOTTOM SITE AREA SITE AREA	0
	SR-89	5	N/A	.2 (1/5) (.2)		.2 (1/5) (.2)	1 (INDICATOR) PEACH BOTTOM SITE AREA SITE AREA	0
	SR-90	5	N/A	.76 (5/5) (.32-1.17)		.76 (5/5) (.32-1.17)	1 (INDICATOR) PEACH BOTTOM SITE AREA SITE AREA	0
RABBIT THYROID (PC/GRAM WET)	I-131	5	N/A	< MDL		< MDL		0

MEAN AND RANGE BASED UPON DETECTABLE MEASUREMENTS ONLY. FRACTION OF DETECTABLE MEASUREMENTS AT  
SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES. (F)

TABLE II.4 (CONTINUED)  
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

NAME OF FACILITY: PEACH BOTTOM ATOMIC POWER STATION      DOCKET NO.: 50-277 & 50-278  
LOCATION OF FACILITY: YORK COUNTY, PA                      REPORTING PERIOD: 1984

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED MINIMUM DETECTABLE LEVEL (MDL)	INDICATOR LOCATIONS	CONTROL LOCATIONS	LOCATION WITH HIGHEST ANNUAL MEAN		NUMBER OF NONROUTINE REPORTED MEASUREMENTS
				MEAN (F) RANGE	MEAN (F) RANGE	MEAN (F) RANGE	STATION # NAME DISTANCE & DIRECTION	
RABBIT SOFT TISSUE (PC/GRAM ASH)	GROSS BETA	5	N/A	162 (5/5) (150-190)		162 (5/5) (150-190)	1 (INDICATOR) PEACH BOTTOM SITE AREA SITE AREA	0
	NET BETA	5	N/A	47 (3/5) (30-60)		47 (3/5) (30-60)	1 (INDICATOR) PEACH BOTTOM SITE AREA SITE AREA	0
	K-40	5	N/A	134 (5/5) (92-160)		134 (5/5) (92-160)	1 (INDICATOR) PEACH BOTTOM SITE AREA SITE AREA	0
RABBIT SOFT TISSUE (PC/GRAM WET)	GROSS BETA	5	N/A	2.2 (5/5) (.66-3.1)		2.2 (5/5) (.66-3.1)	1 (INDICATOR) PEACH BOTTOM SITE AREA SITE AREA	0
	NET BETA	5	N/A	.8 (3/5) (.4-1.2)		.8 (3/5) (.4-1.2)	1 (INDICATOR) PEACH BOTTOM SITE AREA SITE AREA	0
	K-40	5	N/A	1.7 (5/5) (.64-2.3)		1.7 (5/5) (.64-2.3)	1 (INDICATOR) PEACH BOTTOM SITE AREA SITE AREA	0
RABBIT MUSCLE (PC/GRAM ASH)	GROSS BETA	5	N/A	180 (5/5) (110-210)		180 (5/5) (110-210)	1 (INDICATOR) PEACH BOTTOM SITE AREA SITE AREA	0
	NET BETA	5	N/A	50 (2/5) (40-60)		50 (2/5) (40-60)	1 (INDICATOR) PEACH BOTTOM SITE AREA SITE AREA	0
	K-40	5	N/A	178 (5/5) (128-230)		178 (5/5) (128-230)	1 (INDICATOR) PEACH BOTTOM SITE AREA SITE AREA	0

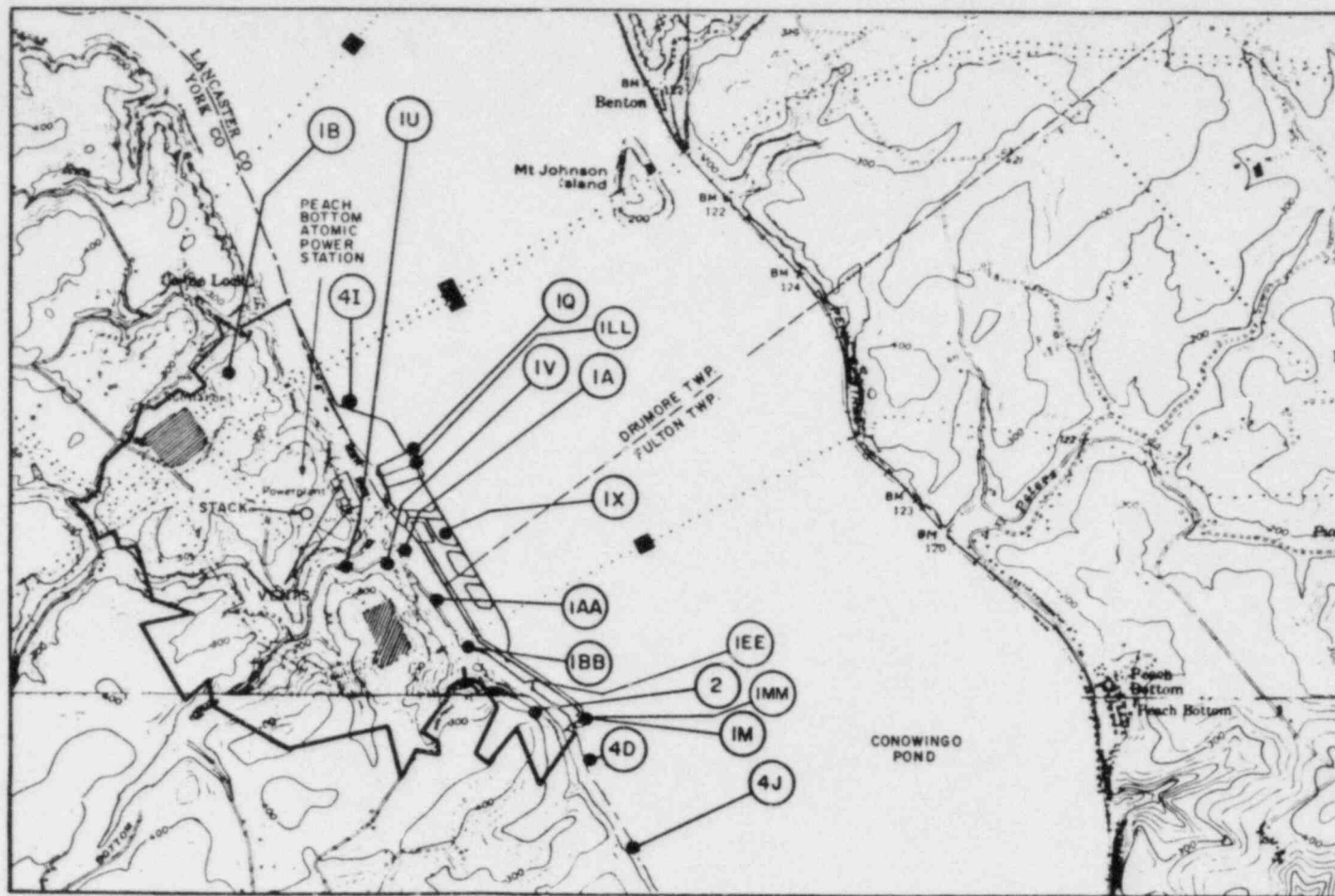
MEAN AND RANGE BASED UPON DETECTABLE MEASUREMENTS ONLY. FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES. (F)

TABLE II.4 (CONTINUED)  
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

NAME OF FACILITY: PEACH BOTTOM ATOMIC POWER STATION      DOCKET NO.: 50-277 & 50-278  
LOCATION OF FACILITY: YORK COUNTY, PA                      REPORTING PERIOD: 1984

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED MINIMUM DETECTABLE LEVEL (MDL)	INDICATOR	CONTROL	LOCATION WITH HIGHEST		NUMBER OF NONROUTINE REPORTED MEASUREMENTS
				LOCATIONS MEAN (F) RANGE	LOCATIONS MEAN (F) RANGE	MEAN (F) RANGE	ANNUAL MEAN STATION # NAME DISTANCE & DIRECTION	
RABBIT MUSCLE (PC/GRAM WET)	GROSS BETA	5	N/A	2.6 (5/5) (2.2-2.9)		2.6 (5/5) (2.2-2.9)	1 (INDICATOR) PEACH BOTTOM SITE AREA SITE AREA	0
	NET BETA	5	N/A	.7 (2/5) (.6-.8)		.7 (2/5) (.6-.8)	1 (INDICATOR) PEACH BOTTOM SITE AREA SITE AREA	0
	K-40	5	N/A	2.5 (5/5) (2.1-3.0)		2.5 (5/5) (2.1-3.0)	1 (INDICATOR) PEACH BOTTOM SITE AREA SITE AREA	0

MEAN AND RANGE BASED UPON DETECTABLE MEASUREMENTS ONLY. FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES. (F)



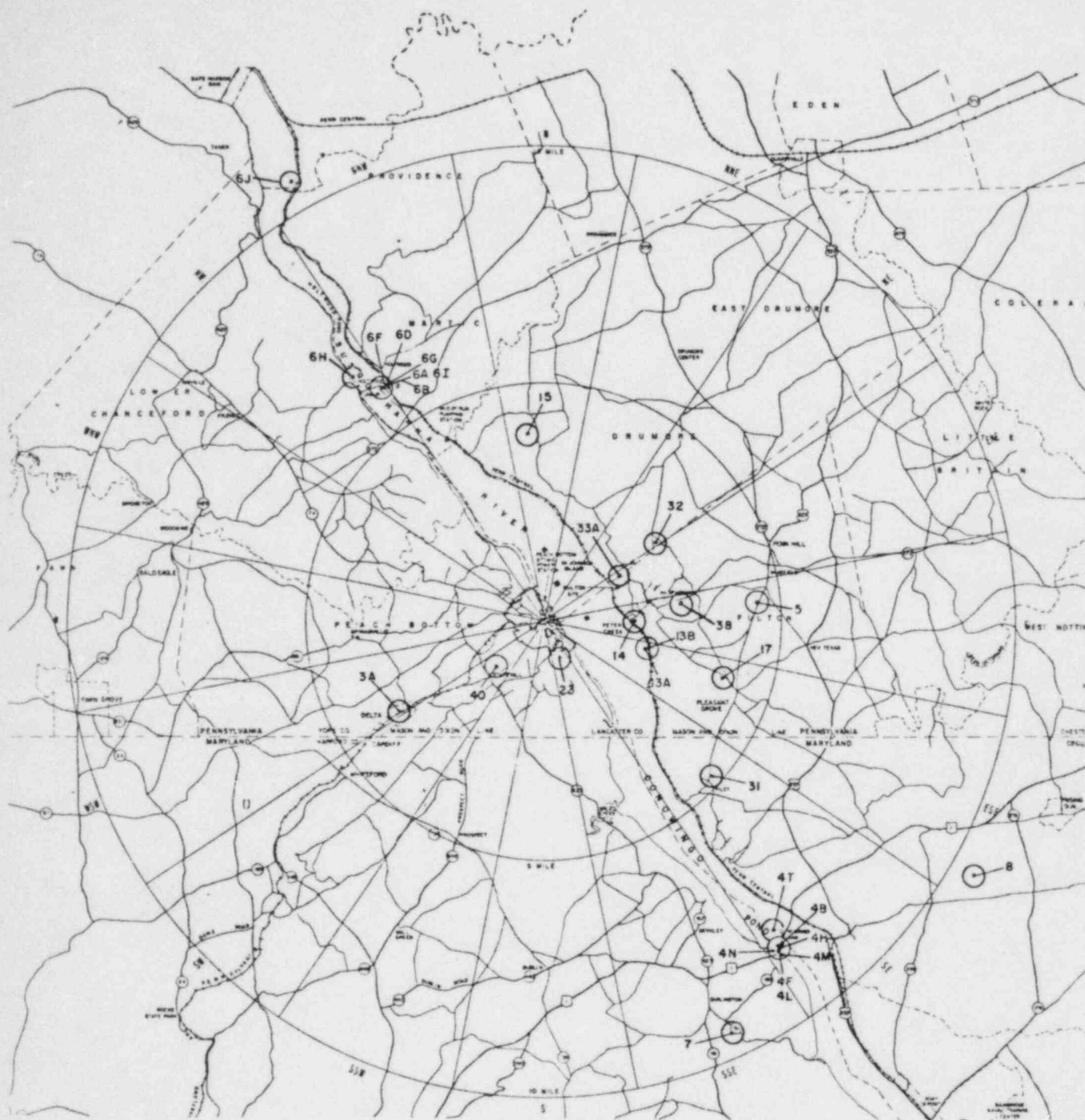
## LEGEND

### ENVIRONMENTAL SAMPLING STATIONS

- IA PEACH BOTTOM WEATHER STATION NO.1
- IB PEACH BOTTOM WEATHER STATION NO.2
- IM PEACH BOTTOM CANAL DISCHARGE
- IMM PEACH BOTTOM CANAL DISCHARGE  
-COMPOSITE
- ILL PEACH BOTTOM UNITS 2&3 INTAKE  
-COMPOSITE
- IQ PEACH BOTTOM UNIT NO.2 INTAKE
- IU PEACH BOTTOM SITE -UTILITY BUILDING
- IV PEACH BOTTOM SITE -  
INFORMATION CENTER
- IX PEACH BOTTOM SITE  
COOLING TOWER POND B-1
- IAA PEACH BOTTOM  
DISCHARGE CANAL BANK
- IBB PEACH BOTTOM DISCHARGE CANAL
- IEE PEACH BOTTOM DISCHARGE CANAL -  
BELOW RADWASTE DISCHARGE
- 2 PEACH BOTTOM SITE  
130° SECTOR HILL
- 4D CONOWINGO POND,PA.
- 4I CONOWINGO POND NET TRAP NO.8
- 4J CONOWINGO POND NET TRAP NO.15

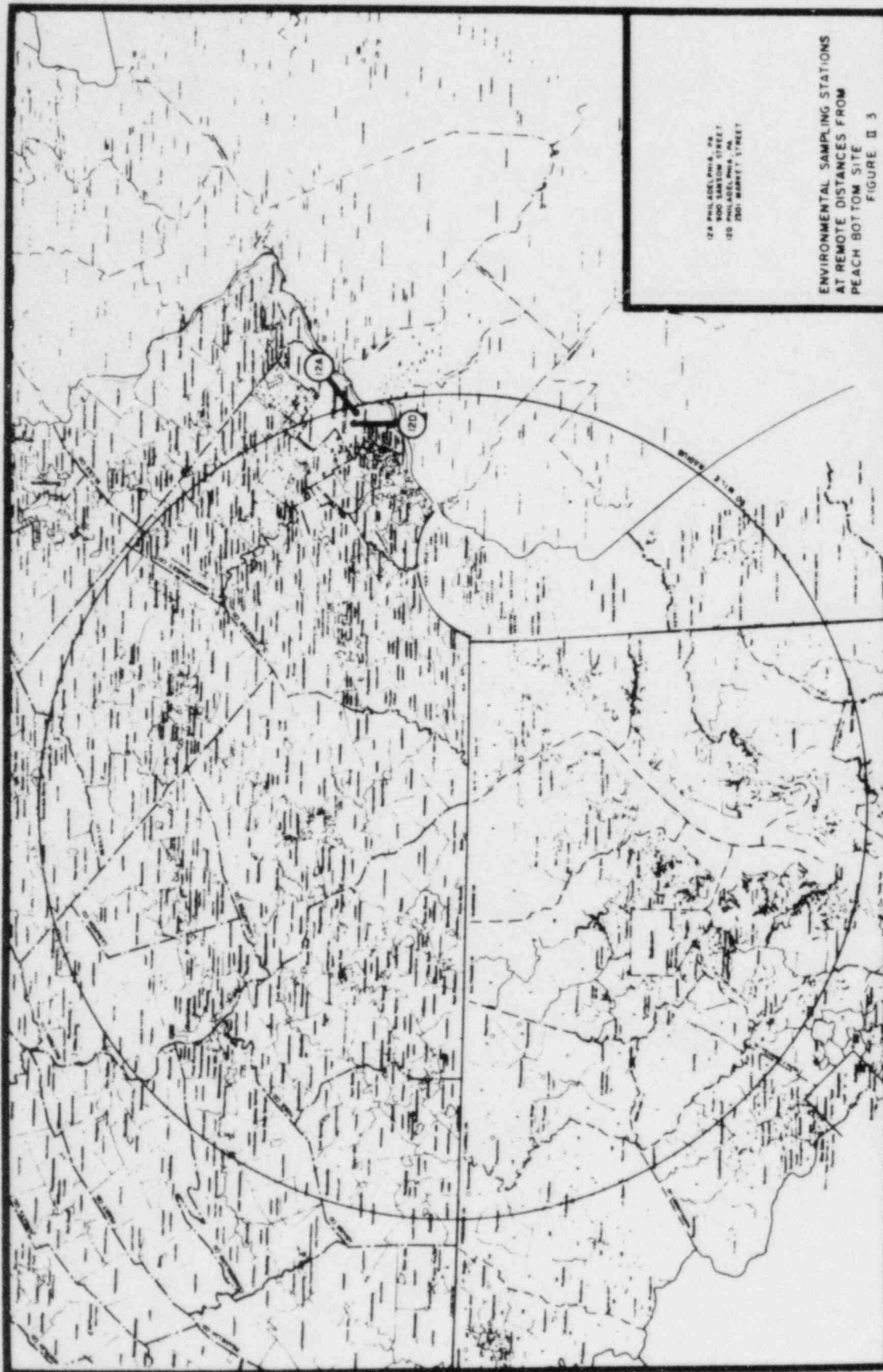
### ENVIRONMENTAL SAMPLING STATIONS ON OR NEAR PEACH BOTTOM SITE.

FIGURE II.1



- |  |   |   |
|--|---|---|
| 3A DELTA, PA - SUBSTATION                    | 6A HOLTWOOD DAM-HYDROELECTRIC STATION - GRAB      | 14 PETERS CREEK                         |
| 4B CONOWINGO DAM, MARYLAND                   | 6B HOLTWOOD DAM-HYDROELECTRIC STATION             | 15 SILVER SPRING ROAD                   |
| 4F CONOWINGO DAM, EL.33(FT.)MSL GRAB         | 6D HOLTWOOD, PA.                                  | 17 RIVERVIEW ROAD                       |
| 4H CONOWINGO DAM, TAILRACE                   | 6F HOLTWOOD DAM-EAST SHORE UPSTREAM               | 23 PEACH BOTTOM 150° SECTORHILL OFFSITE |
| 4L CONOWINGO DAM, EL.33(FT.)COMPOSITE        | 6G HOLTWOOD, PA.                                  | 31 PILOTOWN ROAD                        |
| 4M CONOWINGO DAM, DOWNSTREAM EL. 40(FT.) MSL | 6H HOLTWOOD POND PA                               | 32 SLATE HILL ROAD                      |
| 4N CONOWINGO DAM, ENVIRONMENTAL STATION      | 6I HOLTWOOD DAM-HYDROELECTRIC STATION - COMPOSITE | 33A FULTON WEATHER STATION              |
| 4T CONOWINGO POND-NEAR CONOWINGO DAM         | 6J HOLTWOOD POND, PA.                             | 38 PEACH BOTTOM ROAD                    |
| 6 WAKEFIELD, PA.                             | 7 DARLINGTON, MARYLAND AREA                       | 40 PEACH BOTTOM SITE AREA               |
|  | 8 COLORA MARYLAND                                 |   |
|  | 13A CHESTER WATER INTAKE-POND                     |   |
|  | 13B CHESTER WATER INTAKE - PUMP DISCHARGE         |   |

ENVIRONMENTAL SAMPLING STATIONS  
AT INTERMEDIATE DISTANCES FROM  
PEACH BOTTOM SITE  
FIGURE II.2



### III. PROCEDURES AND EPA RESULTS

Detailed sample collection and handling procedures and reporting procedures are given in a previous report (2). The sample preparation and analytical procedures as well as equipment specifications are also given in an earlier report (4). A summary of the current procedures is given in Appendix 1.

No changes were made in the analytical procedures for 1984.

The results of participation in the EPA Intercomparison Program using these procedures are given in Appendix 2.

TABLE III.1

## TYPICAL ANALYTICAL SENSITIVITIES (1)

Sample Medium	Type of Analysis	Sample Size Analyzed	Limit of Detection (2)	Reporting Unit	Systematic Uncertainty of the Analysis (percent of result) (4)
Air Particulate	Gross Beta Gamma Spectrum	Filter 1100-1500 m3	0.008 pCi/m3 (3)	pCi/m3 pCi/m3	(5)
Precipitation	Gross Beta Sr-89 Sr-90 Radioactive Cs	500 ml 1000 ml 1000 ml 1000 ml	2 pCi/liter 0.3 pCi/liter 0.3 pCi/liter 0.4 pCi/liter	pCi/liter, pCi/m2 pCi/liter, pCi/m2 pCi/liter, pCi/m2 pCi/liter, pCi/m2	+/-10 +/-15 +/-10 +/-10
Surface Water & Discharge Water	Gross Alpha Soluble Insoluble Gross Beta Soluble Insoluble	1000 ml 3500 ml 3500 ml 1000 ml 3500 ml	0.6 pCi/liter 0.4 pCi/liter 0.4 pCi/liter 2 pCi/liter 0.5 pCi/liter	pCi/liter pCi/liter pCi/liter pCi/liter pCi/liter	+/-20 +/-20 +/-10 +/-10
Well Water	Gross Alpha Gross Beta Uranium Sr-89 Sr-90 Radioactive Cs	1000 ml 1000 ml 1000 ml 1000 ml 1000 ml 1000 ml	0.5 pCi/liter 2 pCi/liter 0.03 ug/liter 0.4 pCi/liter 0.2 pCi/liter 0.3 pCi/liter	pCi/liter pCi/liter ug/liter pCi/liter pCi/liter pCi/liter	+/-20 +/-10 +/-10 (6) +/-15 +/-10 +/-10
Soil, Silt	Gross Alpha Gross Beta K-40 Sr-89 Sr-90 Radioactive Cs Gamma Spectrum	2 g dry wt. 2 g dry wt. 1 g dry wt. 75 g dry wt. 75 g dry wt. 75 g dry wt. 300-1000 g dry wt.	0.8 pCi/g dry wt. 1 pCi/g dry wt. 0.04 pCi/g dry wt. 0.01 pCi/g dry wt. 0.006 pCi/g dry wt. 0.008 pCi/g dry wt. (3)	pCi/g dry wt. pCi/g dry wt. pCi/g dry wt. pCi/g dry wt. pCi/g dry wt. pCi/g dry wt. pCi/g dry wt.	+/-20 +/-15 +/-15 +/-15 +/-15 +/-15
Fish	Gross Beta K-40 Sr-89 Sr-90 Gamma Spectrum	200 mg ash 10-20 mg ash 5 g ash 5 g ash 200-1500 g orig. wt.	10 pCi/g ash 1 pCi/g ash 0.3 pCi/g ash 0.1 pCi/g ash (3)	pCi/g ash pCi/g ash pCi/g ash pCi/g ash pCi/g	+/-10 +/-10 +/-15 +/-10

Sample Medium	Type of Analysis	Sample Size Analyzed	Limit of Detection (2)	Reporting Unit	Systematic Uncertainty of the Analysis (percent of result) (4)
Vegetation	Gross Beta	200 mg ash	10 pCi/g ash	pCi/g ash	+/-10
	K-40	20 mg ash	1 pCi/g ash	pCi/g ash	+/-10
	Sr-89	10 g ash	0.2 pCi/g ash	pCi/g ash	+/-15
	Sr-90	10 g ash	0.05 pCi/g ash	pCi/g ash	+/-10
	Radioactive Cs	10 g ash	0.08 pCi/g ash	pCi/g ash	+/-10
Rabbit	Gross Beta Muscle, Soft Tissue and Bone, Separately	200 mg ash	10 pCi/g ash	pCi/g ash	+/-10
	K-40 Muscle, Soft Tissue and Bone	20 mg ash	1 pCi/g ash	pCi/g ash	+/-10
	I-131 Thyroid	Total Thyroid	6 pCi/thyroid	pCi/thyroid	(5)
	Sr-89 Bone	10 g ash	0.3 pCi/g ash	pCi/g ash	+/-15
	Sr-90 Bone	10 g ash	0.1 pCi/g ash	pCi/g ash	+/-10
Milk	Gross Beta	200 mg ash	10 pCi/g ash, 75 pCi/liter	pCi/liter	+/-10
	K-40	20 mg ash	1 pCi/g ash, 8 pCi/liter	pCi/liter	+/-10
	Sr-89	1 liter	1 pCi/liter	pCi/liter	+/-15
	Sr-90	1 liter	0.3 pCi/liter	pCi/liter	+/-10
	I-131	4 liters	0.2 pCi/liter	pCi/liter	+/-10
	Cs-137	1 liter	2 pCi/liter	pCi/liter	+/-10
	Cs-134	1 liter	2 pCi/liter	pCi/liter	+/-10

#### FOOTNOTES

1. Defined as the result corresponding to two standard deviations in the net counting rate assuming typical count times, yields, etc.
2. Limits of detection are a function of sample volume, analytical methods, and instrument sensitivity. The values stated above are typical of those obtainable under the procedures used. Chemical yields, solids content, etc. will vary between samples and cause the sensitivity to change.
3. Limit of detection varies with sample size and type (i.e. geometry and internal absorption), with the specific nuclide in question and with the mixture of nuclides present.
4. Estimated overall error of measurement at levels where the counting error is not dominant.
5. There is no significant other systematic error compared to the counting error.
6. Or 0.03 ug/liter due to the low concentrations normally found.

#### IV. DISCUSSION OF RESULTS

The results obtained from the program are presented in the data tables and figures following this section and are discussed below according to sample type. Results of analyses which are performed on ashed samples of food products are reported in units of pCi/g original sample in addition to pCi/g ash. This is done to enable one to more easily estimate doses to man by reporting concentrations of radioactivity in food products, as determined by the radiation monitoring program, in terms of the sample state which is eaten by man. The results reported in these units, however, offer poorer comparisons of data because biological variables, such as water content, greatly affect the results. Results reported as radioactivity concentrations in terms of the ashed weights eliminate these variables and put the data on a more uniform basis for comparison. For this reason, the graphs in this report which are intended to show comparisons of concentrations of radioactivity between locations and time periods illustrate data reported in terms of the ashed weight, not the original sample weight.

All results are given with an error corresponding to two standard deviations in the net count rate except for K-40 which is generally 10% when significantly above the detection limit. Results which are less than the calculated error are reported as less than (<) the value corresponding to the error.

The heading "radioactive cesium" is used to indicate total radio-cesium which is the result from beta counting the radiochemically-separated cesium fraction. Where the nuclides are measured individually it is so indicated in the heading.

In calculating averages, results reported as "less than" a value are included as that value. The average of a series of numbers which contains at least one real number is given as a real number. If all of the numbers in a series to be averaged are "less than" numbers, the average value is given as a "less than" value. The deviation listed with means is equal to two standard deviations of the data comprising the mean.

In the discussion of data, general trends in the data are stressed as are comparisons of results from stations which would most likely be affected by Peach Bottom Atomic Power Station (PBAPS) operation, with data from those which are more remote from the site. Because of the presence of generally lower levels of radioactivity in the environment compared to earlier periods of atmospheric nuclear testing, precise trends tend to become obscured in the normal variability of data.

## A. AIR PARTICULATES

The values of the concentrations of gross beta radioactivity observed in air particulate samples are listed in Tables IV.1.1 through IV.1.4 and are presented graphically in Figures IV.1.1 and IV.1.2. Gamma spectral analyses are given in Table IV.1.5.

For comparative purposes, stations have been divided into three groups. Group I, which is on the Peach Bottom site and closest to the plant release points, consists of Stations 1A, 1B, and 2. Group II rings the site at further distances and consists of Stations 3A, 4B, 5, 6B, 14, 15, 17, 31, 32, 33A, and 38. Group III, which is in Philadelphia, Pennsylvania serves as a reference group and consists of Stations 12A and 12D.

Gross beta radioactivity concentrations were generally below 0.04 pCi/m<sup>3</sup> throughout the year. Values tended to be lower in the fall although the normal annual trend is becoming obscured at these low activity levels. Variability between weeks appears to be related to precipitation, which scavenges particulates from the air. Higher values were seen during the second week in December. The appearance of these levels at all of the stations in Groups I and II at approximately the same values makes it unlikely that they were due to the operation of PBAPS. The data are typical of those seen during the absence of recent nuclear testing.

As can be seen from Figures IV.1.1 and IV.1.2, there was no significant difference between the values obtained for the three groups of stations indicating no effects due to PBAPS operations.

Figure IV.1.3 shows comparable trends and values over the period shown for all three groups of stations even though the composition of the groups has been changed by adding more sampling stations. This was also true for the period omitted. This would indicate that the distribution of activity over the entire area is relatively uniform and is not affected by PBAPS.

Gamma spectrum measurements are made on monthly composite samples from each station. These samples generally consist of all weekly samples for the month from the given station taken together. Results of these analyses are given in Table IV.1.5. Naturally-occurring Be-7 was detected by GeLi gamma spectrometry in the majority of the samples as has been the case in the past. Naturally-occurring K-40 was measured at or near the detection limit in a few samples. No other nuclides were present above the minimum detectable level.

No contribution from the operation of PBAPS is indicated.

## B. PRECIPITATION

The concentrations and surface densities of gross beta, Sr-89, Sr-90, and Cesium radioactivity in precipitation samples collected at Stations 1A, 1B, and 4M are presented in Tables IV.2.1 and IV.2.2.

Most of the radioactivity in precipitation samples is in the form of particulates which are washed out of the air by rainfall and collected in sample containers. Since most of the particulate material is washed out in the initial part of a rainfall, the surface density, i.e., pCi/m<sup>2</sup>, is used in addition to concentration (pCi/l), because it tends to minimize the effect of sample volume. Lack of complete correlation with air particulate values comes about because rainfall generally does not occur at frequent intervals. The dependence of the activity levels on the precise conditions occurring at the start of each rainfall can cause wide variability between samples even when taken over limited geographical areas.

Similar to air particulate values, the gross beta radioactivity concentrations in precipitation samples collected at Stations 1A and 1B did not show any spring increase that was typical of previous year's data. Individual monthly samples ranged from undetectable to approximately 20 pCi/l. Corresponding surface densities were mainly in the low hundreds of pCi/m<sup>2</sup>. There did not appear to be any discernible difference between locations. The values observed were similar to those seen in earlier years and are in the range of preoperational data.

The values of monthly gross beta radioactivity concentrations observed in the precipitation samples collected at Station 4M are similar to those from comparable samples from Stations 1A and 1B except that they are generally slightly lower when compared as pCi/m<sup>2</sup>. This has been the case since 1974 and was seen in several years during the pre-operational period.

Sr-89 radioactivity was found in one of the samples probably due to counting statistics.

Sr-90 radioactivity concentrations where measurable were generally a few tenths of a pCi/l. Surface densities were generally in the tens of pCi/m<sup>2</sup>. A high value of 150 pCi/m<sup>2</sup> was seen at Station 4B. These levels are comparable to what has been observed in previous periods when there was no nuclear testing.

Cesium radioactivity concentrations and surface densities at Stations 1A, 1B, and 4M were generally undetectable to 0.3 pCi/l. Corresponding surface density ranged up to 30 pCi/m<sup>2</sup>. Due to the unpredictable nature of precipitation and limited data available it is not possible to correlate the Cesium radioactivity with PBAPS operation.

The observed radioactivity concentrations at Station 1A, 1B, and 4M show the variability typical of precipitation and collectively do not indicate any contribution from the operation of PBAPS.

### C. SURFACE WATER AND DISCHARGE WATER

The concentrations of gross alpha and gross beta radioactivity in the soluble and insoluble fractions of surface water and discharge water grab samples are given in Tables IV.3.1 and IV.3.3. Similar values for the composite samples from Stations 1LL, 1MM, 4L and 6I are given in Tables IV.3.2 and IV.3.4. Mean radioactivity concentrations are given in Tables IV.3.1 through IV.3.4. Comparative monthly and annual values are presented in Figures IV.3.1 through IV.3.4.

The reporting unit for the insoluble fractions was changed back to pCi/l to permit comparison with data generated in other parts of the PBAPS program.

Gross alpha radioactivity was generally undetectable in the soluble fraction. The gross alpha radioactivity concentrations in the insoluble fraction were generally below pCi/l. The higher values of 5 pCi/l were found at Station 4F and corresponded to high sample weights. These values are consistent with those seen in the preoperational period.

Data for gross beta radioactivity concentration in surface water and discharge water samples are shown in Figures IV.3.1 through IV.3.4. The values obtained for the soluble fraction were generally between the lower detection limit of approximately 2 pCi/l and 5 pCi/l. Results for the insoluble fraction were usually in the range of undetectable to 2 pCi/l. Occasional high values, e.g. 70 +/- 10 and 11 +/- 1 pCi/l as seen at location 4F, occurred when the amount of solids in the sample was large.

Figure IV.3.2 compares the gross beta radioactivity in the insoluble portion of samples taken from Stations 1Q and 1M. The values obtained are generally comparable except for 3 months during which the amount of silt in the samples from Station 1M was high.

No significant differences between grab samples and composite samples were observed in the gross alpha and gross beta radioactivity concentrations.

The similarity of results among stations shows no indication of any measurable radioactivity in receiving water bodies due to the operation of PBAPS during the period of this report.

#### D. WELL WATER

Results of the analysis of well water samples for gross alpha, gross beta, Sr-89, Sr-90, Cesium radioactivity, and uranium are given in Table IV.4.1.

Radioactivity in well water samples generally arises from the leaching of naturally-occurring nuclides from the rocks and soil past which the water flows. As levels of the water table changes, variations can be encountered in the flow pattern followed by the water in a given well. This can cause changes in the radioactivity content of the water since the leachability of the radioactivity varies as the permeability of the soil and rock encountered by the water differs. An additional factor which can change radioactivity concentration is the well usage. A well which is used at a constant rate tends to maintain a more constant radioactivity level. Lack of usage can cause buildup of radioactivity concentration if conditions very close to the well are amenable to leaching, or it can cause concentrations to decrease if water from the major sources of the radioactivity does not reach the well when samples are taken.

Gross alpha radioactivity concentrations were generally found to be below the detection limit of several tenths of a pCi/l. This is consistent with data from the Units 2 and 3 preoperational period.

One of the gross beta values was at the detection limit of 2 pCi/l. The remainder of the samples had undetectable levels.

Uranium was detectable in the majority of the samples. The highest value of 0.26 ug/l was found at an off-site location. The levels are similar to those seen in previous periods. Uranium is naturally-occurring in most rocks and is not of plant origin.

No Sr-89 radioactivity was detected in any of the samples. Sr-90 was measured in most of the samples at levels of a few tenths of a pCi/l.

Cesium was measured in two samples, one at the detection limit of 0.2 pCi/l and the other at 0.5 pCi/l. These are probably due to counting statistics.

Mean values as given in Table IV.4.1 show no significant differences between wells close to or on site and those at distant locations indicating no measureable radioactivity from the operation of PBAPS.

#### E. SOIL

The results obtained for concentrations of acid-leachable gross beta, K-40, net beta, Sr-90, Sr-89, and cesium radioactivity in soil samples are given in Table IV.5.1. The area at Station 2 is heavily wooded with rock outcroppings. The soil at this location would be expected to contain substantial humus from the accumulation of natural vegetative debris. The other stations are in much more open locations with grass coverings or a combination of grass and cultivated land.

Alpha and beta radioactivity are found in soil samples because of the presence of naturally-occurring nuclides in the uranium and thorium series and K-40, and from nuclides present in fallout from atmospheric nuclear weapons testing. Specific analysis for Sr-89, Sr-90 and Cesium, which are normally present in fallout, are done to measure these nuclides in the presence of the larger quantities of naturally-occurring radioactivity.

Net beta radioactivity, which was detectable in the majority of the samples, ranged from about 1 to 4 pCi/g dry weight. This is within the range of normal variability.

The majority of the Sr-90 concentrations had mean values grouped in an approximate range of a few hundredths to a few tenths of a pCi/g dry weight. Differences between Station 2 and other stations is attributed to the accumulation of vegetative material at Station 2. All of the values are consistent with previous annual averages.

Sr-89 concentration was measured slightly above the detection limit in three samples, probably due to counting statistics.

The concentration of cesium generally was a few tenths of a pCi/g dry weight and measurable in all samples. All values were within the range of preoperational data.

Values obtained from samples taken at the Peach Bottom site are comparable to the average values from the surrounding sampling stations. Overall there is no indication of measurable radioactivity in soil from PBAPS operation.

#### F. SILT

Table IV.6.1 gives the analytical results and annual means for concentrations of acid-leachable gross alpha, gross beta,

Sr-89, Sr-90 and cesium radioactivity for silt samples. GeLi gamma spectrum analysis results are given in Table IV.6.2. Gross beta and specific nuclide activities observed at several stations are presented in Figures IV.6.1 through IV.6.4. The sampling and gamma spectrum analysis frequency was changed to monthly in mid-1984 on a temporary basis.

Silt samples are expected to contain naturally-occurring radioactivity, as discussed above for soil samples, in addition to any other activity introduced into the aquatic environment which would settle onto or be absorbed by the silt. As can be seen by comparison of the data in Tables IV.5.1 and IV.6.1, the activity levels in silt generally are similar to those found in soil, except as noted below.

The concentrations of gross alpha radioactivity at all sampling stations was generally 2 to 9 pCi/g dry weight and are well within the range of variability observed in PBAPS Units 2 and 3 preoperational period.

Gross beta radioactivity concentration was generally a few pCi/g dry weight. The results and variations between stations are consistent with the PBAPS Units 2 and 3 preoperational period.

Sr-90 concentrations occurred within the approximate range of 0.01 to 0.05 pCi/g continuing the lower trend seen since 1981. All results are within the range of variability observed during the PBAPS Units 2 and 3 preoperational period.

No Sr-89 was found in any of the samples.

Samples analyzed showed cesium generally at low levels of a few hundredths to a few tenths of a pCi/g dry weight which is well within the range of PBAPS preoperational data. Any apparent discrepancy between the radio-chemistry values and gamma spectrum values most probably occurs because the gamma spectrum values given in Table IV.6.2 are more representative of the whole sample, which is inhomogeneous, rather than only the aliquot analyzed. The differences between stations are discussed below under gamma spectrum analysis.

Figures IV.6.1 and IV.6.2 compare Stations 4D, 4J and 4T which are at increasing distances from the PBAPS discharge. There does not appear to be any consistent correlation of the observed levels with particular locations when normal variability is taken into account. The preoperational data show approximately the same spread in values and values of similar magnitude to those seen during this period. The observance of Cs-134 at several of the locations is discussed below.

Station 1BB, in the discharge canal below the liquid rad-waste outfall, and Station 6F, above Holtwood Dam, are compared in Figures IV.6.3 and IV.6.4. Figure IV.6.3 indicates no positive addition of Sr-90 radioactivity by PBAPS operation. The concentrations of radioactive Cesium as shown in Figure IV. 6.4 indicate higher levels at Station 1BB, consistent with the gamma spectrum data.

Gamma spectrum analysis showed primarily the presence of K-40 and the U, Th series as represented by Ra-226 and Th-228 respectively, all of which are naturally-occurring, and Cs-137. Several nuclides associated with PBAPS operation were found during 1984. Cs-134 was found in samples from all stations. Co-60 was found in samples from all but one station. Zn-65 was detected in the August sample from Station 4J.

Comparison of results between locations and with the preoperational data indicates no addition of radioactivity due to the operation of PBAPS except for small concentrations of Cs-134, Cs-137, Zn-65 and Co-60. If it is assumed that all Cesium, Co-60 and Zn-65 found at off-site locations is due to PBAPS releases, a dose calculation using the USNRC Regulatory Guide 1.109 model and assumptions results in a calculated dose of  $2.40 \times 10^{-2}$  mrem to a teenager's skin. This calculation conservatively assumes that the teenager was exposed to the maximum concentrations found for the entire exposure period. The calculated dose is 0.12% of 10CFR50 Appendix I design objectives.

#### G. FISH

The results of the analysis of fish samples for concentrations of gross beta, K-40, net beta, Sr-89 and Sr-90 radioactivity are given in Tables IV.7.1 and IV.7.2. Gamma spectrum data are presented in Table IV.7.3. Mean values are presented in Tables IV.7.1 and IV.7.2. Sr-90 concentrations are plotted in Figure IV.7.1.

Net beta radioactivity generally ranged from <10 to 30 pCi/g ash with an average of about 10 pCi/g ash. The values were well within the range of PBAPS preoperational data.

Radiostrontium analysis was resumed on a temporary basis during the second half of 1979 and continued through 1984 because of the possibility of release of Sr-89 and Sr-90 from a source upstream from the Peach Bottom site.

Sr-89 was measured in a few of the samples at a few tenths of a pCi/g ash probably due to counting statistics.

Sr-90 radioactivity concentration as determined in samples from all locations was generally several tenths to approximately

1 pCi/g ash corresponding to several hundredths of a pCi/g original sample.

Stations 1EE and 4J, as a group of stations which could be affected by PBAPS operation, and Station 6H which is above Holtwood Dam and therefore unaffected by PBAPS, are compared in Figure IV.7.1. There is essentially no difference in the range of concentrations for Sr-90 radioactivity in fish from these locations.

Gamma spectrum analyses are shown in Table IV.7.3. In addition to naturally-occurring K-40 and Th-228, and Cs-137 from atmospheric nuclear weapons test fallout, Cs-134 was found in most samples from Conowingo Pond and the plant water discharge system. Zn-65 was found at Stations 1EE, 1X, 4I and 4J. In addition, Co-60 was found in a few samples from the plant water discharge system. The Ba-140 found in one sample is probably due to counting statistics.

Examination of data indicates essentially no difference other than normal variability between off-site stations for all nuclides except Cs-137, Cs-134 and Zn-65. The maximum dose calculated using the USNRC Regulatory Guide 1.109 model and assumptions is  $2.17 \times 10^{-1}$  mrem to a teenager's liver. The actual dose due to PBAPS operations is less, since the maximum concentrations of radionuclides were assumed to exist all year. In addition, no credit was taken for Cs-137 from sources other than PBAPS. The calculated dose is 1.1% of the 10CFR50 Appendix I design objectives.

#### H. VEGETATION

The concentrations of gross beta, net beta, K-40, Sr-89, Sr-90, and cesium radioactivity are given in Tables IV.8.1 and IV.8.2 for vegetation samples. Mean values are in Tables IV.8.1 and IV.8.2.

The concentrations of net beta radioactivity are similar for all stations and appear to have approximately the same spread. Measurable values ranged from 20 to 100 pCi/g ash. All results are in the range measured during the PBAPS Units 2 and 3 preoperational period. Corresponding values were generally several tenths to approximately 1 pCi/g original sample. The raw weight to ashed weight ratio varies markedly between samples as would be expected from the different water content of various types of vegetables and vegetation.

Measurable Sr-90 radioactivity concentrations had a range from about 1 to approximately 45 pCi/g ash with the majority of values between 1 and 20 pCi/g ash. Wild vegetation tended to have higher values probably due to greater accumulation of

fallout because of the longer growing season. These concentrations are close to the range of PBAPS preoperational data. The corresponding values in terms of pCi/g original sample showed a similar range from a few hundredths to a few tenths of a pCi/g. The annual mean values of indicator and control stations, as given in Table II.4 are approximately the same.

Sr-89 was detected in several samples probably due to counting statistics, since there is a relatively large amount of Sr-90 present.

Cesium radioactivity was generally measured at concentrations from a few tenths to a few pCi/g ash. The highest value was seen at Station 3A. The corresponding average values were a several thousandths to a few hundredths of a pCi/g original sample similar to previous values. The annual mean values given in Tables II.4 are comparable to each other.

There is no indication of a contribution to the radioactivity in vegetation from the operation of PBAPS.

#### I. MILK

The concentrations of gross beta, K-40, net beta, Sr-89, Sr-90, Cs-134, Cs-137, and I-131 radioactivity are given in Table IV.9.1. Mean values are presented in Tables IV.9.1 and IV 9.2. Mean concentrations of Sr-90, Cs-137, and I-131 are plotted in Figures IV.9.1 through IV.9.3.

For purposes of data comparison, farms have been divided into three groups: one containing Farms G, J, and O, which are regional farms near the Peach Bottom site; a second consisting of Farms A, B, C and E, which encircle the Peach Bottom site at remote distances; and a third consisting of Farms D, L, M, and N, which are at intermediate distances from the Peach Bottom site.

The concentration of net beta radioactivity generally ranges from undetectable to a few hundred pCi/l as has been the case during and since the preoperational period. The major beta activity in milk is due to the presence of naturally-occurring K-40 at concentrations of approximately 900 pCi/l. The residual net beta values are most probably the result of the difference between two types of measurements and not real. The gross beta radioactivity is measured directly on milk ash while the K-40 value is calculated from chemical measurement of potassium on dissolved ash. From the known metabolic process of cows, it is unlikely that any radioactive nuclides from a nuclear power plant other than those of strontium, cesium, barium-lanthanum, hydrogen or iodine would be present in milk.

The Sr-90 radioactivity concentration for all farms was in the range of about 3 to 6 pCi/l. This range is similar to the ranges for 1975 through 1983. These concentrations are well within the range of PBAPS preoperational data.

The annual mean values of Sr-90 for each farm group as shown in Figure IV.9.1 generally lie between 3 and 5 pCi/l. Comparison of the historical Sr-90 data shows a statistically significant difference ( $P < .001$ ) between near, intermediate, and distant farms. Near and distant farms have the highest and lowest mean results respectively. This trend was noted in both the preoperational and postoperational periods. The preoperational/postoperational mean ratios are similar and therefore the higher Sr-90 radioactivity concentrations observed at the near farms are not due to PBAPS operation.

Sr-89 was found in a few of the samples at the detection limit, most likely due to counting statistics.

Measurable values for Cs-137 radioactivity concentration range from 2 to 10 pCi/l, somewhat lower than the range seen in previous years. No significant difference was observed among the three farm groups as can be seen from Figure IV.9.2. The results are similar to those measured during Units 2 and 3 preoperational period.

Cs-134 was detected in one sample, probably due to counting statistics. The general absence of Cs-134 indicates that the Cs-137 is due to atmospheric nuclear weapons testing.

I-131 radioactivity concentration results, corrected for decay to date of sampling, are presented in Table IV.9.1. I-131 was barely detected in a few of the samples analyzed. A portion of the PBAPS program performed by others did not find I-131 at these times so these values are probably due to counting statistics.

None of the samples contained radioactivity which can be attributed to the operation of PBAPS.

#### J. RABBITS

Tables IV. 10.1 and IV. 10.2 present the analytical data and mean values obtained from the analysis for gross beta, K-40, and net beta radioactivity concentrations in rabbit bone, soft tissue, and muscle, and Sr-89 and Sr-90 in bone. Iodine-131 concentrations in rabbit thyroids are also given. Quarterly mean values for net beta and Sr-90 radioactivity concentrations are shown in Figures IV. 10.1 and IV. 10.2. Samples collected in February of 1985 represent the second half of 1984, since they were unavailable during that period.

Measureable net beta radioactivity concentration in muscle and soft tissue ranged from 30 to 60 pCi/g ash indicating that the majority of the activity is due to K-40. Corresponding values are about a factor of 100 lower as pCi/g original sample. For bone, values generally were <10 pCi/g ash decreasing by a factor of 3-8 as pCi/g original sample. These values are consistent with the values seen during the PBAPS Units 2 and 3 preoperational period.

Sr-90 radioactivity values in bone ranged from about 1 to 6 pCi/g ash, similar to the range seen in previous periods. The pCi/g original sample values are a factor of 5-8 lower.

Sr-89 was measured near the detection limit in one sample, probably due to counting statistics.

No I-131 was measured in any of the samples.

There is no indication of radioactivity in rabbits which can be attributed to operation of PBAPS.

#### V. REFERENCES

1. Pre-operational Environs Radioactivity Survey Summary Report, March, 1960 through January, 1966. (September 1967)
2. Peach Bottom Atomic Power Station Environs Radiation Monitoring Program Pre-operational Summary Report, Units 2 and 3, February 5, 1966 through August 8, 1973. (June 1977)
3. Peach Bottom Atomic Power Station Regional Environs Radiation Monitoring Program. January 1, 1978 through December 31, 1978. (May 1979)
4. Peach Bottom Atomic Power Station Regional Environs Radiation Monitoring Program. January 1, 1975 through December 31, 1975. July 1976)
5. Environmental Radiation Data, U.S. Environmental Protection Agency
6. USNRC Regulatory Guide 4.8, Branch Technical Position, Revision 1, October 1979.

## Appendix 1

### Summary of Analytical Procedures

## 1.1 Air Particulates

### Gross Beta

Each filter paper is placed in a 2" diameter planchet and counted using a gas flow proportional counter.

The gross beta activity is calculated as follows:

$$\text{Result (pCi/m}^3\text{)} = (C(s)/T(s) - C(b)/T(b)) \times 1/E \times 1/V \times 1/.02832 \times 1/2.22$$

$$2 \text{ Sigma Error} = 2 \times \sqrt{(C(s)/T(s))^2 + (C(b)/T(b))^2} \times 1/E \times 1/V \times 1/.02832 \times 1/2.22$$

C(s) = Total gross sample counts

T(s) = Sample count time

C(b) = Total background count

T(b) = Background count time

E = Counting efficiency based on Cs-137

V = Sample volume in cubic feet calculated from the elapsed time meter readings and the flow rate

.02832 = conversion to cubic meters

2.22 = Dpm per pCi

### Gamma Spectrum

Filter papers from each location are placed in a Petri dish and counted on GeLi detector connected to a multichannel analyzer and microcomputer. Spectra are stored first on floppy disks and then on magnetic tape.

Results are calculated as follows:

$$\text{Results (pCi/m}^3\text{)} = \frac{P(J) - B(J) \times M \times E(J) \times .06}{A \times T \times DF(J)}$$

$$2 \text{ Sigma Error} = \frac{2 \times \sqrt{P(J) + B(J) \times M \times E(J) \times .06}}{A \times T \times DF(J)}$$

P(J) = Number of gross counts in peak channels for nuclide J

B(J) = Number of background in peak channels for nuclide J

M = Relative GeLi efficiency (GeLi 1 = 1)

E(J) = pCi/cpm for nuclide J in flat geometry

A = Aliquot in cubic meters

T = Time counted in kiloseconds

.06 = Conversion to minutes

DF(J) = Decay factor for nuclide J from time of sampling (considered to be the 15th of the month) to time of counting.

## 1.2 Water

### Gross Beta

For precipitation and well water samples, a 1 liter aliquot is evaporated almost to dryness in a beaker and then transferred to a 2" ringed planchet. It is then evaporated to dryness and counted using a gas flow proportional counter.

For surface and discharge water samples, the samples are first filtered through membrane filters of 0.45 micron mean pore size. The filtrate is treated as above. The filter papers are transferred to a pre-weighed planchet, ignited using acetone and a flame and then put into a muffle furnace for final ashing. The ash is then counted using a gas flow proportional counter.

The gross beta and gross alpha activities are calculated as follows:

$$\text{Result (pCi/l)} = (C(s)/T(s) - C(b)/T(b)) \times 1/E \times 1/A \times 1/2.22$$

$$2 \text{ Sigma Error} = 2 \times \sqrt{(C(s)/T(s))^2 + (C(b)/T(b))^2} \times 1/E \times 1/A \times 1/2.22$$

C(s) = Total gross sample counts

T(s) = Sample count time

C(b) = Total background count

T(b) = Background count time

E = Counting efficiency based on Cs-137 or Uranium for the weight of planchett sample

A = Aliquot size in liters

2.22 = Dpm per pCi

For precipitation the beta activity is further calculated as follows:

$$\text{Result (pCi/m}^2\text{)} = \text{Result (pCi/l)} \times TV/FA$$

$$2 \text{ Sigma Error} = \text{Error (pCi/l)} \times TV/FA$$

TV = Total volume of sample in liters

FA = Area of collection funnel (0.0327m<sup>2</sup>)

### Radioactive Cesium

For precipitation and well water samples, cesium and strontium carriers are added to an aliquot of sample. The sample is acidified, the cesium collected on ammonium molybdenum phosphate (AMP) by stirring and the supernate removed for strontium analysis. The cesium is purified as cesium cobaltinitrite and finally precipitated as the chloroplatinate for counting in a

low-background beta counter. Since both Cs-134 and Cs-137 emit beta particles, the result is reported as total radioactive cesium.

The cesium activity is calculated as follows:

$$\text{Result (pCi/l)} = (C(s)/T(s) - C(b)/T(b)) \times 1/E \times 1/A \times 1/Y \times 1/2.22$$

$$2 \text{ Sigma Error} = 2 \times \sqrt{(C(s)/T(s))^2 + (C(b)/T(b))^2} \times 1/E \times 1/A \times 1/Y \times 1/2.22$$

C(s) = Total gross sample counts  
T(s) = Sample count time  
C(b) = Total background count  
T(b) = Background count time  
E = Counting efficiency based on Cs-137  
A = Aliquot size in liters  
Y = Cesium yield  
2.22 = Dpm per pCi

For precipitation the Cs-137 activity is further calculated as follows:

$$\text{Result (pCi/m}^2\text{)} = \text{Result (pCi/l)} \times \text{TV/FA}$$

$$2 \text{ sigma error} = \text{Error (pCi/l)} \times \text{TV/FA}$$

TV = Total volume of sample  
FA = Area of collection funnel

#### Strontium 89,90

For precipitation and well water samples, strontium and cesium carriers are added to a 1 liter aliquot. After cesium removal the liquid is made basic and the strontium is precipitated as the carbonate. The carbonate precipitate is dissolved and strontium is purified by several precipitations as the nitrate. Possible interfering nuclides are removed by an iron hydroxide and then a barium chromate scavenge. The Y-90 is allowed to grow into the purified strontium fraction for a known amount of time. The Y-90 is separated as the hydroxide and then precipitated as the oxalate for counting in a low-background beta counter. The strontium is precipitated as the carbonate and counted in a low-background beta counter. Prior to precipitation, a known aliquot is taken for determination of the strontium yield by atomic absorption.

The Sr-90 activity is calculated from counting the Y-90 as follows:

$$\text{Result (pCi/l)} = (C(Y)/T(Y) - C(b)/T(b)) \times 1/E \times 1/A \times 1/DF \\ \times 1/GF \times 1/Y(Y) \times 1/Y(Sr)$$

$$2 \text{ Sigma Error} = 2 \times \sqrt{(C(Y)/T(Y))^2 + C(b)/T(b)^2} \times 1/E \times 1/A \times \\ 1/DF \times 1/GF \times 1/Y(Y) \times 1/Y(Sr)$$

C(Y) = Gross Y-90 counts

T(Y) = Y-90 count time

C(b) = Total background counts

T(b) = Background count time

E = Y-90 counting efficiency

A = Aliquot size in liters

DF = Decay factor for Y-90 from the time of separation to the midpoint of the count time

GF = Growth factor for Y-90 into the purified Sr-90 from the time of the hydroxide scavenge to the time yttrium precipitation

Y(Y) = Yttrium yield

Y(Sr) = Strontium yield

The Sr-89 activity is calculated from the strontium carbonate counts as follows:

$$\text{Result (pCi/l)} = ((C(Sr)/T(Sr) - C(b)/T(b)) - C(Sr') - C(Y)) \\ \times 1/Y(Sr) \times 1/E \times 1/DF \times 1/A \times 1/2.22$$

$$2 \text{ Sigma Error} = 2 \times \sqrt{(C(Sr)/T(Sr))^2 - C(b)/T(b)^2} - C(Sr') - \\ C(Y)) \times 1/Y(Sr) \times 1/E \times 1/DF \times 1/A \times 1/2.22$$

C(Sr) = Gross Sr counts

T(Sr) = Sr count time

C(b) = Total background counts

T(b) = Background count time

C(Sr') = Counts due to Sr-90

C(Y) = Counts due to Y-90

Y(Sr) = Strontium yield

E = Sr-89 counting efficiency

DF = Decay factor from the sample time to the midpoint of the Sr count time

A = Aliquot size in liters

2.22 = dpm per pCi

For precipitation both the Sr-89 and Sr-90 activities are further calculated as follows:

$$\text{Result (pCi/m}^2\text{)} = \text{Result (pCi/l)} \times TV/FA$$

$$2 \text{ Sigma error} = \text{Error (pCi/l)} \times TV/FA$$

TV = Total volume of sample

FA = Area of collection funnel

## Uranium

For well water samples, uranium is separated and purified by passing an aliquot of sample through an ion exchange column. After eluting and concentrating, an aliquot is evaporated onto a platinum dish and fused with a NaF/LiF pellet. The uranium is determined by fluorescence.

The uranium concentration is calculated as follows:

$$\text{Result (ug/l)} = R \times CF$$

R = Fluorometer reading

CF = Calibration factor from standard curve

## 1.3 Milk

Gross Beta, K-40, Net Beta

An aliquot of milk is wet ashed and the total ash is weighed. A 200 mg aliquot of ash is mounted on a 2" planchet and counted for beta activity using a gas flow proportional counter.

An additional portion of the ash is dissolved in acid and the potassium is measured by atomic absorption.

The gross beta activity is calculated as follows:

$$\text{Result (pCi/l)} = \frac{(C(s)/T(s) - C(b)/T(b)) \times 1/E \times 1/V \times W/A \times 1/2.22}{1/2.22}$$

$$2 \text{ Sigma Error} = 2 \times \frac{\sqrt{(C(s)/T(s)^2 + C(b)/T(b)^2)} \times 1/E \times 1/V \times W/A \times 1/2.22}{W/A \times 1/2.22}$$

C(s) = Total gross sample counts

T(s) = Sample count time

C(b) = Total background count

T(b) = Background count time

E = Counting efficiency based on K-40 for 200 mg.

W = Total ash weight in grams

A = Weight of ash used (0.2 grams)

V = Aliquot size in liters

2.22 = Dpm per pCi

The K-40 result is calculated as follows:

$$\text{Result (pCi/l)} = R \times CF \times F \times 20/A \times P/V$$

$$2 \text{ Sigma Error} = 10\%$$

R = AA reading in ppm  
 CF = Conversion for dilutions and unit changes  
 V = Aliquot size in liters  
 F = pCi of K-40 per mg of potassium (.794 as beta)  
 A = Weight of ash used in milligrams (approximately 20)  
 P = Total ash weight in grams

The net beta activity is calculated as follows:

$$\text{Result (pCi/l)} = \text{GB} - \text{K}$$

$$2 \text{ Sigma Error} = \sqrt{E(\text{GB})^2 + E(\text{K})^2}$$

GB = Gross beta result

K = K-40 result

E(GB) = 2 Sigma error for gross beta

E(K) = 2 Sigma error for K-40

#### Cs-134,137

Cesium and strontium carriers are added to an aliquot of sample, which is ashed with acid and then muffled. The ash is extracted with acid, cesium is collected onto ammonium molybdophosphate by stirring and the supernate is removed for strontium analysis. The cesium is purified as cesium cobaltinitrite and finally precipitated as the chloroplatinate for mounting and counting on a GeLi detector.

The Cs-137 and Cs-134 are calculated as follows using the 796 keV peak for Cs-134 and the 662 keV peak for Cs-137:

$$\text{Results (pCi/l)} = \frac{(P(J) - B(J)) \times M \times E(J) \times .06}{A \times T \times \text{DF}(J) \times Y}$$

$$2 \text{ Sigma Error} = \frac{2 \times \sqrt{(P(J) + B(J)) \times M \times E(J) \times .06}}{A \times T \times \text{DF}(J) \times Y}$$

P(J) = Number of gross counts in peak channels for nuclide J

B(J) = Number of background counts in peak channels for nuclide J

M = Relative GeLi efficiency (GeLi 1 = 1)

E(J) = pCi/cpm for nuclide J on a plastic mount

A = Aliquot in liters

T = Time counted in kiloseconds

.06 = Conversion to minutes

DF(J) = Decay factor for nuclide J from time of sampling to time of counting.

Y = Cesium yield

## Strontium 89,90

Strontium is precipitated from the supernate as the oxalate. After filtration, the oxalate is muffled and then dissolved. The strontium is purified by several precipitations as the nitrate. The remainder of the procedure and the calculation of results are as given above for water.

## I-131

Iodide carrier is added to an aliquot of sample and concentrated by stirring with ion exchange resin. The iodide is eluted and then purified by extraction into chloroform and back extraction. The iodide is precipitated as palladium iodide for counting in a low-background beta counter or a beta-gamma coincidence counter.

The I-131 activity is calculated as follows:

$$\text{Result (pCi/l)} = (C(s)/T(s) - C(b)/T(b)) \times 1/E \times 1/A \times 1/Y \times 1/DF \times 1/2.22$$

$$2 \text{ Sigma Error} = 2 \times \sqrt{(C(s)/T(s)^2 + C(b)/T(b)^2)} \times 1/E \times 1/A \times 1/Y \times 1/DF \times 1/2.22$$

C(s) = Total gross sample counts

T(s) = Sample count time

C(b) = Total background count

T(b) = Background count time

E = Counting efficiency for I-131

A = Aliquot size in liters

Y = Iodine yield

DF = Decay factor from time of sampling to the midpoint of the sample count

2.22 = Dpm per pCi

## 1.4 Soil and Silt

### Gross Activities, K-40, Net Beta

A 10 gram aliquot of dried sample is acid leached. The leachings are filtered and the filtrate diluted to 10.0 ml. A 2 ml quantity is plancheted, evaporated and counted using a gas flow proportional counter.

An additional aliquot is further diluted and potassium is measured by atomic absorption.

The gross alpha and gross beta activities are calculated as follows:

$$\text{Result (pCi/g)} = (C(s)/T(s) - C(b)/T(b)) \times 1/E \times 1/2 \times 1/2.22$$

$$2 \text{ Sigma Error} = \frac{2 \times \sqrt{(C(s)/T(s))^2 + C(b)/T(b)^2}}{1/2.22} \times 1/E \times 1/2 \times 1/2.22$$

C(s) = Total gross sample counts

T(s) = Sample count time

C(b) = Total background count

T(b) = Background count time

E = Counting efficiency based on Cs-137 or Uranium for the weight of planchatted sample

2 = Aliquot size in grams

2.22 = Dpm per pCi

The K-40 for soil is calculated as follows:

$$\text{Result (pCi/g)} = R \times CF \times F$$

$$2 \text{ Sigma Error} = .04 \text{ or } 10\% \text{ whichever is larger}$$

R = AA reading in ppm

CF = Conversion based on dilutions and weights used

F = pCi of K-40 per mg of potassium (.749 as beta)

The net beta activity is calculated as follows:

$$\text{Result (pCi/l)} = GB - K$$

$$2 \text{ Sigma Error} = \sqrt{E(GB)^2 + E(K)^2}$$

GB = Gross beta result

K = K-40 result

E(GB) = 2 Sigma error for gross beta

E(K) = 2 Sigma error for K-40

#### Radioactive Cesium

Strontium and cesium carrier are added to a sieved aliquot of sample, which is then leached with HCl. After filtration, silicates are removed, the cesium collected on AMP and the supernate is removed for strontium analysis. The remainder of the procedure and calculations are as given for water except that aliquots are in grams dry weight and no ash weight is used.

#### Strontium 89,90

Strontium is separated from the supernate as the oxalate, which is removed by filtration and then muffled. The remainder of the procedure and calculations are as given for milk except that the aliquot is grams dry weight and no ash weight is used.

## Gamma Spectrum

An aliquot of dried silt sample is placed into a Marinelli beaker and counted on GeLi detector connected to a multichannel analyzer and microcomputer. Spectra are stored first on floppy disks and then on magnetic tape. Activities are calculated for the nuclides of interest using calibration factors for the geometry used.

Results are calculated as follows:

$$\text{Results (pCi/g)} = \frac{(P(J) - B(J)) \times M \times E(J) \times G \times .06}{A \times T \times DF(J)}$$

$$2 \text{ Sigma Error} = \frac{2 \times \sqrt{(P(J) + B(J)) \times M \times E(J) \times G \times .06}}{A \times T \times DF(J)}$$

P(J) = Number of gross counts in peak channels for nuclide J

B(J) = Number of background counts in peak channels for nuclide J

M = Relative GeLi efficiency (GeLi 1 = 1)

E(J) = pCi/cpm for nuclide J

G = Geometry factor for deviation from 1 liter in volume

A = Aliquot in grams, dry weight

T = Time counted in kiloseconds

.06 = Conversion to minutes

DF(J) = Decay factor for nuclide J from time of sampling to time of counting.

## 1.5 Fish

### Gross Beta, K-40, Net Beta

These analyses are performed on 4 fish from each fish sample. Each fish is rinsed to remove adhering material. The entire fish or a 100g aliquot, whichever is smaller, is then wet ashed and dry ashed. Prior to ashing, strontium and cesium carriers are added to the largest two aliquots. The total ash is weighed, a 200 mg aliquot mounted on a 2" diameter planchet and counted for beta activity using a gas flow proportional counter.

An additional portion of the ash is dissolved in acid and the potassium is measured by atomic absorption.

The gross beta activity is calculated as follows:

$$\text{Result (pCi/g ash)} = \frac{(C(s)/T(s) - C(b)/T(b)) \times 1/E \times 1/A \times 1/2.22}{1/2.22}$$

$$2 \text{ Sigma Error} = \frac{2 \times \sqrt{(C(s)/T(s)^2 + C(b)/T(b)^2)} \times 1/E \times 1/A \times 1/2.22}{1/2.22}$$

$C(s)$  = Total gross sample counts  
 $T(s)$  = Sample count time  
 $C(b)$  = Total background counts  
 $T(b)$  = Background count time  
 $E$  = Counting efficiency based on K-40 for 200 mg.  
 $A$  = Weight of ash used (0.2 grams)  
 $2.22$  = Dpm per pCi

The K-40 result is calculated as follows:

$$\text{Result (pCi/g ash)} = R \times CF \times F \times 20/A$$

$$2 \text{ Sigma Error} = .04 \text{ or } 10\% \text{ whichever is larger}$$

$R$  = AA reading in ppm  
 $CF$  = Conversion for dilutions and weights used  
 $F$  = pCi of K-40 per mg of potassium (.794 as beta)  
 $A$  = Weight of ash used in milligrams (approximately 20)

The net beta activity is calculated as follows:

$$\text{Result (pCi/l)} = GB - K$$

$$2 \text{ Sigma Error} = \sqrt{E(GB)^2 + E(K)^2}$$

$GB$  = Gross beta result  
 $K$  = K-40 result  
 $E(GB)$  = 2 Sigma error for gross beta  
 $E(K)$  = 2 Sigma error for K-40

Results are further calculated in terms of grams original weight as follows:

$$\text{Result (pCi/g original sample)} = \text{Result (pCi/g ash)} \times A/W$$

$$2 \text{ Sigma Error} = 2 \text{ Sigma Error} \times A/W$$

$A$  = Total ash weight in grams  
 $W$  = Weight of original sample ashed in grams

#### Strontium 89,90

A portion of the ash from the larger aliquot to which carrier has been added is acid leached. The remainder of the procedure and calculations are as given for milk except that the units are in grams of ash.

The results are also calculated as pCi/g original sample as given above.

## Gamma Spectrum

An aliquot of sample up to an effective volume of 4 liters is placed into a Marinelli beaker and counted on a GeLi detector connected to a multichannel analyzer and microcomputer. The remainder of the procedure and calculations are as given for silt except that the aliquot weight is in units of grams original sample.

### 1.6 Vegetation

Gross Beta, K-40, Net Beta

Strontium and cesium carriers are added to an aliquot of sample which is then wet ashed and dry ashed. The remainder of the procedure and calculations are as given for fish.

Strontium 89,90

The procedure and calculations are as given for fish.

Radioactive Cesium

The separation and purification are as given for milk. The counting and calculations are as given for water except that the units are in grams ash. The results are further calculated as pCi/g original sample as given for fish.

### 1.7 Rabbits

Gross Beta, K-40, Net Beta

These analyses are done on muscle, soft tissue and bone separately. Procedures and calculations are as given for vegetation.

Strontium 89,90

These nuclides are measured on a leg bone from each rabbit separately. The procedure and calculations are as given for fish.

I-131

The thyroid from each rabbit is removed and inserted into a separate test tube. The tubes are counted in a well-type scintillation detector connected to a singlechannel analyzer set to accept pulses in the I-131 gamma ray energy region.

The results are calculated as follow:

# I-131

The thyroid from each rabbit is removed and inserted into a separate test tube. The tubes are counted in a well-type scintillation detector connected to a single channel analyzer set to accept pulses in the I-131 gamma ray energy region.

The results are calculated as follow:

$$\text{Result (pCi/g thyroid)} = (C(s)/T(s) - C(b)/T(b)) \times 1/E \times 1 \times 1/2.22$$

$$2 \text{ Sigma Error} = 2 \times \sqrt{(C(s)/T(s)^2 + C(b)/T(b)^2)} \times 1/E \times 1 \times 1/2.22$$

C(s) = Total gross sample counts

T(s) = Sample count time

C(b) = Total background counts

T(b) = Background count time

E = Counting efficiency for I-131

1 = Aliquot size in number of thyroids

2.22 = Dpm per pCi

Appendix 2

EPA Intercomparison Program

Results

### EPA Intercomparison Program Results

The results obtained from the analysis of EPA samples are given in this section. The conventions used in presenting the data are given on the following page.

Examination of the data shows that the vast majority is within the EPA control limits. Each case of exceeding the control limits has been investigated and no obvious reasons for the deviations have been found. There is no evidence to suggest systematic errors except for the variation in the K-40 values for milk. This will be the subject of a special calibration in 1985.

The results from participation in the EPA program are the basis for continued certification by the Commonwealth of Massachusetts in radiological analysis.

## EPA DATA

Results are presented as follow:

	<u>Sr-90</u>
	17 (xx)
	16
	<u>18</u>
CWM. Avg.	17 (1.0)
EPA Known	17 (1.5, 2.6)
EPA Gr. Avg.	16 (yy)

(xx) - This value is given when the precision (1 SD) of the CWM measurement due to counting statistics is significantly different from the expected EPA precision. This should cause different spread in our results.

(1.0) Next to CWM Avg. - This is the actual SD of the CWM data i.e. 1 SD, 1 determination. This means that an additional single measurement should yield a result within 1 SD of the mean 66% of the time.

(1.5, 2.6) Next to EPA Known - The first number is the anticipated 1 SD as decreed by the EPA. This value can be compared to the figure above to see that the CWM precision is as expected.

The second number is 3 SD of the mean which is the EPA Control Limit. If the observed mean (i.e. CWM Avg.) differs from the known by more than this value the result is unacceptable according to the EPA criteria.

(yy) - This when given is the observed 1 SD, 1 determination for all labs whose results were not deemed outliers. A significant difference between this value and the one above it indicates that the anticipated precision is not being attained by the majority of the laboratories.

ENVIRONMENTAL PROTECTION AGENCY SAMPLES

<u>Sample No.</u>	<u>Sample Date</u>	<u>Sample Type</u>	<u>Nuclide (pCi/l)</u>	<u>Nuclide (pCi/l)</u>	<u>Nuclide (pCi/l)</u>	<u>Nuclide (pCi/l)</u>
33308	01/06/84	Water	Sr-89	Sr-90		
			33	37		
			32	26		
			33	26		
			CWM Avg.	26 (1)		
			EPA Known	24 (1.5, 2.6)		
			EPA Gr. Avg.	23 (3)		
33333	01/20/84	Water	Alpha	Beta		
			6	11		
			7	16		
			7	8		
			CWM Avg.	12 (4)		
			EPA Known	12 (5,9)		
			EPA Gr. Avg.	13		
33341,2	02/10/84	Water	Tritium			
			2540			
			2360			
			2260			
			CWM Avg.	2390 (140)		
			EPA Known	2383 (350,610)		
			EPA Gr. Avg.	2366		
33347	02/03/84	Water	Cr-51	Co-60	Zn-65	Ru-106
			<90	14	59	114
			<100	8	55	84
			<100	15	58	70
			CWM Avg.	9 (5)	57 (2)	89 (22)
			EPA Known	10 (5,9)	50 (5,9)	61 (5,9)
			EPA Gr. Avg.	11 (2)	50	61 (5,9)

ENVIRONMENTAL PROTECTION AGENCY SAMPLES

<u>Sample No.</u>	<u>Sample Date</u>	<u>Sample Type</u>	<u>Nuclide (pCi/l)</u>	<u>Nuclide (pCi/l)</u>	<u>Nuclide (pCi/l)</u>	<u>Nuclide (pCi/l)</u>
33347	02/03/84	Water	Cs-134	Cs-137		
			44	15		
			46	24		
			37	27		
			CWM Avg.	22 (6)		
			EPA Known	16 (5,9)		
			EPA Gr. Avg.	16 (3)		
33399	3/9/84	Water	Ra-226	Ra-228		
			3.6	3.0 (.5)		
			3.7	2.3		
			2.6	2.8		
			CWM Avg.	2.7 (.4)		
			EPA Known	2.0 (.3, .5)		
			EPA Gr. Avg.			
33405	3/18/84	Water (b)	Alpha	Beta		
			4	18		
			4	25		
			5	17		
			CWM Avg.	20 (4)		
			EPA Known	20 (5,9)		
			EPA Gr. Avg.			
33406-8	3/23/84	Air Particulate	Alpha	Beta	Sr-90	Cs-137
			14	43	24	12
			15	42	22	11
			14	43	24	11
			CWM Avg.	43 (.6)	23 (1.1)	11 (.6)
			EPA Known	51 (5,9)	21 (1.5,2.6)	10 (5,9)
			EPA Gr. Avg.	56	19	12
33415	4/6/84	Water	I-131			
			6			
			7			
			7			
			CWM Avg.	7 (.6)		
			EPA Known	6 (.9, 1.6)		
			EPA Gr. Avg.	6 (2)		

ENVIRONMENTAL PROTECTION AGENCY SAMPLES

<u>Sample No.</u>	<u>Sample Date</u>	<u>Sample Type</u>	<u>Nuclide (pCi/l)</u>	<u>Nuclide (pCi/l)</u>	<u>Nuclide (pCi/l)</u>	<u>Nuclide (pCi/l)</u>
33430	4/13/84	Water	Tritium			
			4210			
			3950			
			5040			
		CWM Avg.	4400 (570)			
		EPA Known	3508 (360, 630)			
		EPA Gr. Avg.	3461			
33463	4/22/84	Water	Alpha	Beta	Ra-226	Ra-228
			20		3.3	5.3 (2)
			19		4.1	5.4
			22	Deleted by EPA	2.9	6.7
		CWM Avg.	20 (1.5)		3.4 (.6)	5.8 (.8)
		EPA Known	35 (8.8, 15.2)		4.0 (.6, 1.0)	8.3 (1.3, 2.2)
		EPA Gr. Avg.	28		4.0	7.7 (2.3)
			Uranium	Sr-89	Sr-90	Co-60
			20	26	27	35 (7)
			20	26	26	34
			20	25	28	28
		CWM Avg.	20 (-)	26 (.6)	27 (1)	32 (4)
		EPA Known	15 (5.8, 10)	23 (5, 9)	26 (1.5, 2.6)	30 (5, 9)
		EPA Gr. Avg.	14 (3)	24	25 (4)	30
			Cs-134	Cs-137		
			41 (7)	32 (7)		
			37	31		
			37	25		
		CWM Avg.	38 (2)	29 (4)		
		EPA Known	30 (5, 9)	26 (5, 9)		
		EPA Gr. Avg.	29	26		

ENVIRONMENTAL PROTECTION AGENCY SAMPLES

<u>Sample No.</u>	<u>Sample Date</u>	<u>Sample Type</u>	<u>Nuclide (pCi/l)</u>	<u>Nuclide (pCi/l)</u>	<u>Nuclide (pCi/l)</u>	<u>Nuclide (pCi/l)</u>
33479	5/4/84	Water	Sr-89	Sr-90		
			23	6		
			23	6		
			25	6		
		CWM Avg.	24 (1.1)	6 (0)		
		EPA Known	25 (5,9)	5 (1.5,2.6)		
		EPA Gr. Avg.	24	5		
33485	5/15/84	Water	Alpha	Beta		
			3	4		
			2	3		
			4	7		
		CWM Avg.	3 (1)	5 (2)		
		EPA Known	3 (5,9)	6 (5,9)		
		EPA Gr. Avg.	3	7		
33517	6/15/84	Water	Ra-226	Ra-228		
			3.2	1.6		
			3.7	1.7		
			3.3	1.9		
		CWM Avg.	3.4 (.3)	1.7 (.2)		
		EPA Known	3.5 (.5, .9)	2.0 (.3, .5)		
		EPA Gr. Avg.	3.5	2.2 (.9)		
33571	7/20/84	Water	Alpha	Beta		
			3	9		
			4	9		
			4	9		
		CWM Avg.	4 (.6)	9 (0)		
		EPA Known	6 (5,9)	13 (5,9)		
		EPA Gr. Avg.	5	13		

ENVIRONMENTAL PROTECTION AGENCY SAMPLES

<u>Sample No.</u>	<u>Sample Date</u>	<u>Sample Type</u>	<u>Nuclide (pCi/l)</u>	<u>Nuclide (pCi/l)</u>	<u>Nuclide (pCi/l)</u>	<u>Nuclide (pCi/l)</u>
33598	8/3/84	Water	I-131			
			36			
			30			
			31			
		CWM Avg.	32 (3)			
		EPA Known	34 (6,10)			
		EPA Gr. Avg.	36			
33599	8/10/84	Water	H-3			
			2240			
			2180			
			2080			
		CWM Avg.	2170 (80)			
		EPA Known	2817 (360,617)			
		EPA Gr. Avg.	2842			
33619	8/24/84	Air				
		Particulate	Alpha	Beta	Sr-90	Cs-137
			15	50	23	17
			16	54	20	17
			15	52	lost	16
		CWM Avg.	15 (.6)	52 (2)	22	17
		EPA Known	17 (5,9)	51 (5,9)	18 (1.4,2.4)	15 (5,9)
		EPA Gr. Avg.	17	52	17 (2)	17
33638	9/7/84	Water	Sr-89	Sr-90		
			34	21		
			34	21		
			33	21		
		CWM Avg.	34 (1)	21 (0)		
		EPA Known	34 (5,9)	19 (1.5, 2.6)		
		EPA Gr. Avg.	30 (8)	18 (3)		

ENVIRONMENTAL PROTECTION AGENCY SAMPLES

<u>Sample No.</u>	<u>Sample Date</u>	<u>Sample Type</u>	<u>Nuclide (pCi/l)</u>	<u>Nuclide (pCi/l)</u>	<u>Nuclide (pCi/l)</u>	<u>Nuclide (pCi/l)</u>
33720	9/14/84	Water	Ra-226	Ra-228		
			4.8	2.7 (.5)		
			4.9	2.4		
			<u>5.1</u>	<u>1.6</u>		
			CWM Avg. 4.9 (.2)	2.2 (.6)		
			EPA Known 4.9 (.7, 1.3)	2.3 (.3,.6)		
			EPA Gr. Avg. 4.7	2.4 (.8)		
33722	9/21/84	Water	Alpha	Beta		
			5	14		
			4	17		
			<u>5</u>	<u>10</u>		
			CWM Avg. 5 (1)	14 (4)		
			EPA Known 5 (5,9)	16 (5,9)		
			EPA Gr. Avg. 5 (2)	15 (3)		
33944	10/5/84	Water	Cr-51	Co-60	Zn-65	Ru-106
			<120	18	104 (30)	<60
			<110	22	156	<60
			<110	<u>17</u>	<u>104</u>	<u>&lt;60</u>
			CWM Avg. <110	19 (3)	121 (30)	<60
			EPA Known 40 (5,9)	20 (5,9)	147 (7,12)	47 (5,9)
			EPA Gr. Avg. 38 (8)	20	149	45 (9)
			Cs-134	Cs-137		
			25	25		
			22	17		
			<u>30</u>	<u>26</u>		
			CWM Avg. 26 (4)	23 (5)		
			EPA Known 31 (5,9)	24 (5,9)		
			EPA Gr. Avg. 29(3)	25 (3)		

Sample No.	Sample Date	Sample Type	Nuclide (pCi/l)	Nuclide (pCi/l)	Nuclide (pCi/l)	Nuclide (pCi/l)
34050	10/26/84	Milk	Sr-89	Sr-90	I-131(a)	Cs-137
			25	16	36	32
			26	12	34	33
			22	16	50	32
			CWM Avg. 24 (2)	15 (2)	40 (9)	32 (.6)
			EPA Known 22 (5,9)	16 (1.5,2.6)	42 (6,10)	32 (5,9)
			EPA Gr. Avg. 19	15	40	32
			K-40	Cs-137(a)		
			1573	25		
			1603	29		
			1710	31		
			CWM Avg. 1628 (72)	28 (3)		
			EPA Known 1517 (75,130)	32 (5,9)		
			EPA Gr. Avg. 1498	32		
34051	10/22/84	Water	Alpha	Beta	Uranium	Ra-226
			20	56	7	2.8
			23	50	7	2.4
			22	48	5	2.8
			CWM Avg. 22 (2)	51 (4)	6 (1)	2.7 (.2)
			EPA Known 14 (5,9)	64 (5,9)	5 (6,10)	3.0 (.5,.8)
			EPA Gr. Avg. 13	60 (7)	6	2.9
			Ra-228	Sr-89	Sr-90	Co-60(a)
			3.5	16	14	17
			2.5	16	14	15
			2.4	17	14	14
			CWM Avg. 2.8 (.6)	16 (.6)	14 (0)	15 (2)
			EPA Known 2.1 (.3,.5)	11 (5,9)	12 (1.5, 2.6)	14 (5,9)
			EPA Gr. Avg. 2.2 (.5)	11	13 (3)	16
			Cs-134	Cs-137		
			<7	12		
			<6	12		
			<6	17		
			CWM Avg. <6	14 (3)		
			EPA Known 2 (5,9)	14 (5,9)		
			EPA Gr. Avg. 3 *	16 (2)		

\*Most data LT and/or rejected from average

ENVIRONMENTAL PROTECTION AGENCY SAMPLES

<u>Sample No.</u>	<u>Sample Date</u>	<u>Sample Type</u>	<u>Nuclide (pCi/l)</u>	<u>Nuclide (pCi/l)</u>	<u>Nuclide (pCi/l)</u>	<u>Nuclide (pCi/l)</u>
34108	11/19/84	Water	Alpha	Beta		
			8	22		
			7	24		
			7	19		
		CWM Avg.	7 (1)	22 (3)		
		EPA Known	7 (5,9)	20 (5,9)		
		EPA Gr. Avg.	7	21		
34111	11/23/84	Air Particulate	Alpha	Beta	Sr-90	Cs-137
			16	49	26	10
			16	50	24	10
			15	47	24	10
		CWM Avg.	16 (.6)	49 (1.5)	25 (1.2)	10 (-)
		EPA Known	15 (5,9)	52 (5,9)	21 (1.5,2.6)	10 (5,9)
		EPA Gr. Avg.	16	56	21 (3)	11 (3)
			Cs-137 (a)			
			17 (6)			
			12			
			9			
		CWM Avg.	13 (4)			
		EPA Known	10 (5,9)			
		EPA Gr. Avg.	11 (3)			
34141	12/7/84	Water	I-131			
			30			
			32			
			29			
		CWM Avg.	30 (2)			
		EPA Known	36 (6,10)			
		EPA Gr. Avg.	36			

ENVIRONMENTAL PROTECTION AGENCY SAMPLES

<u>Sample No.</u>	<u>Sample Date</u>	<u>Sample Type</u>	<u>Nuclide (pCi/l)</u>	<u>Nuclide (pCi/l)</u>	<u>Nuclide (pCi/l)</u>	<u>Nuclide (pCi/l)</u>
34185	12/14/84	Water	Tritium			
			2340			
			2300			
			2490			
		CWM Avg.	2380 (100)			
		EPA Known	3182 (360,624)			
		EPA Gr. Avg.	3206			
34198	12/21/84	Water	Ra-226	Ra-228		
			6.5	1.5 (2)		
			7.3	3.0		
			7.1	2.4		
		CWM Avg.	7.0 (.4)	2.3 (.8)		
		EPA Known	8.6 (1.3,2.3)	4.1 (.6,1.1)		
		EPA Gr. Avg.	8.0	3.8		

TABLE IV.1.1 ANALYTICAL DATA FOR AIR PARTICULATE SAMPLES  
CONCENTRATIONS OF GROSS BETA RADIOACTIVITY (PC/CU. METER)  
1964 GROUP I - PEACH BOTTOM SITE

WEEK	#	1A	1B	2
1	1	.054 ± .008	.047 ± .008	.041 ± .008
2	2	.044 ± .007	.031 ± .006	.035 ± .006
3	3	.044 ± .008	.039 ± .007	.035 ± .008
4	4	.030 ± .007	.032 ± .007	.032 ± .008
5	5	.025 ± .007	.025 ± .007	.022 ± .007
6	6	.033 ± .006	.025 ± .006	.030 ± .007
7	7	.013 ± .006	.009 ± .006	.011 ± .006
8	8	.025 ± .006	.025 ± .006	.027 ± .007
9	9	.021 ± .006	.013 ± .006	.015 ± .006
10	10	.022 ± .006	.027 ± .006	.029 ± .006
11	11	.031 ± .006	.030 ± .006	.034 ± .006
12	12	.020 ± .006	.015 ± .006	.016 ± .006
13	13	.017 ± .006	.009 ± .006	< .006
14	14	.013 ± .007	.018 ± .007	.021 ± .008
15	15	.015 ± .008	.015 ± .005	.019 ± .005
16	16	.020 ± .006	.016 ± .006	.018 ± .006
17	17	.014 ± .006	.015 ± .006	.022 ± .006
18	18	.022 ± .006	.021 ± .006	.026 ± .006
19	19	.015 ± .006	.014 ± .006	.019 ± .006
20	20	.021 ± .007	.030 ± .007	.023 ± .007
21	21	.023 ± .006	.027 ± .006	.026 ± .006
22	22	.036 ± .007	.030 ± .006	.030 ± .006
23	23	.043 ± .008	.02 ± .01	.032 ± .007
24	24	.035 ± .007	(1)	.040 ± .007
25	25	.020 ± .007	(1)	.017 ± .006
26	26	.022 ± .007	.02 ± .02	.014 ± .007
27	27	.021 ± .006	.020 ± .006	.020 ± .006
28	28	.028 ± .006	.019 ± .008	.026 ± .005
29	29	.028 ± .007	.017 ± .007	.031 ± .007
30	30	.018 ± .005	.021 ± .005	.019 ± .005
31	31	.024 ± .007	.023 ± .007	.022 ± .007
32	32	.034 ± .007	.04 ± .01	.029 ± .006
33	33	.032 ± .009	(1)	.027 ± .008
34	34	.027 ± .007	.036 ± .008	.030 ± .006
35	35	.033 ± .006	.032 ± .006	.034 ± .006
36	36	.024 ± .005	.022 ± .006	.025 ± .005
37	37	.025 ± .007	.024 ± .007	.029 ± .007
38	38	.033 ± .006	.028 ± .005	.026 ± .005
39	39	.038 ± .009	.031 ± .008	.032 ± .008
40	40	.026 ± .007	.024 ± .006	.025 ± .006
41	41	.036 ± .008	.028 ± .007	.034 ± .007
42	42	.040 ± .007	.037 ± .006	.027 ± .006
43	43	.031 ± .008	.025 ± .008	.031 ± .008
44	44	.031 ± .006	.024 ± .006	.027 ± .006
45	45	.022 ± .007	.027 ± .007	.032 ± .007
46	46	.021 ± .007	.024 ± .007	.027 ± .007
47	47	.034 ± .008	.031 ± .007	.029 ± .007
48	48	.049 ± .009	.048 ± .009	.043 ± .008
49	49	.036 ± .006	.036 ± .006	.035 ± .006
50	50	.061 ± .008	.053 ± .008	.050 ± .008
51	51	.037 ± .008	.027 ± .007	.035 ± .007
52	52	.036 ± .009	.025 ± .008	.028 ± .008
MEAN .029 ± .021 .026 ± .019 .027 ± .016				

(1) PUMP OUT OF SERVICE

TABLE IV.1.2 ANALYTICAL DATA FOR AIR PARTICULATE SAMPLES  
CONCENTRATIONS OF GROSS BETA RADIOACTIVITY (PC/CU. METER)  
1964 GROUP II - INTERMEDIATE DISTANCE LOCATIONS

WEEK	#	3A	4B	5	6B	14
1	0.39	± .008	0.41	± .008	0.41	± .008
2	0.35	± .006	0.29	± .005	0.36	± .006
3	0.35	± .007	0.34	± .007	0.32	± .008
4	0.30	± .007	0.30	± .007	0.30	± .007
5	0.20	± .007	0.20	± .007	0.17	± .007
6	0.26	± .006	0.25	± .006	0.27	± .006
7	0.12	± .006	0.19	± .006	0.19	± .006
8	0.22	± .006	0.26	± .006	0.19	± .006
9	< .005		0.16	± .006	0.16	± .006
10	(1)		0.29	± .006	0.24	± .006
11	(1)		0.16	± .005	0.26	± .006
12	(1)		0.16	± .005	0.16	± .006
13	(1)		0.12	± .006	0.11	± .006
14	(1)		0.10	± .007	0.15	± .006
15	0.20	± .007	0.11	± .005	0.10	± .007
16	0.19	± .006	0.17	± .006	0.17	± .006
17	0.24	± .006	0.22	± .006	0.23	± .006
18	0.24	± .006	0.24	± .006	0.22	± .005
19	0.14	± .006	0.17	± .006	0.22	± .006
20	0.23	± .007	0.20	± .007	0.21	± .007
21	0.26	± .006	0.16	± .006	0.23	± .006
22	0.29	± .006	0.39	± .007	0.31	± .006
23	0.28	± .008	0.37	± .008	0.39	± .008
24	0.33	± .007	0.36	± .007	0.38	± .008
25	0.18	± .006	0.17	± .007	0.25	± .007
26	0.17	± .007	0.16	± .007	0.20	± .007
27	0.22	± .006	0.16	± .006	0.20	± .006
28	0.22	± .005	0.22	± .005	0.24	± .005
29	0.28	± .007	0.13	± .007	0.24	± .007
30	0.18	± .005	0.16	± .005	0.19	± .006
31	0.25	± .007	0.10	± .006	0.24	± .006
32	0.22	± .006	0.22	± .006	0.38	± .007
33	0.23	± .008	0.26	± .008	0.26	± .007
34	0.24	± .006	0.20	± .006	0.25	± .006
35	0.34	± .006	0.29	± .006	0.32	± .006
36	0.23	± .006	0.23	± .006	0.31	± .006
37	0.32	± .007	0.21	± .007	0.28	± .006
38	0.28	± .005	0.12	± .005	0.26	± .006
39	0.36	± .008	0.36	± .008	0.29	± .007
40	0.25	± .006	0.30	± .006	0.34	± .008
41	0.24	± .007	0.28	± .007	0.32	± .007
42	0.40	± .006	0.14	± .006	0.36	± .007
43	0.27	± .008	(1)		0.34	± .007
44	0.29	± .006	0.23	± .006	0.30	± .007
45	0.28	± .007	0.27	± .007	0.31	± .007
46	0.23	± .007	0.27	± .007	0.28	± .007
47	0.22	± .007	0.30	± .007	0.28	± .007
48	0.42	± .008	0.51	± .008	0.47	± .008
49	0.32	± .006	0.38	± .006	0.29	± .008
50	0.57	± .008	0.59	± .008	0.74	± .008
51	0.33	± .007	0.42	± .007	0.38	± .007
52	0.35	± .009	0.36	± .008	0.35	± .008
MEAN		0.27	0.17	0.25	0.21	0.24
		± .027	± .017	± .025	± .021	± .024

(1) PUMP OUT OF SERVICE



TABLE IV.1.3 ANALYTICAL DATA FOR AIR PARTICULATE SAMPLES  
CONCENTRATIONS OF GROSS BETA RADIOACTIVITY (PC/CU. METER)

1984 GROUP III - DISTANT LOCATIONS

WEEK #	12A	12D
1	.039 ± .009	.046 ± .009
2	.036 ± .006	.035 ± .006
3	.045 ± .007	.036 ± .007
4	.023 ± .007	.029 ± .007
5	.025 ± .007	.022 ± .007
6	.022 ± .006	.023 ± .005
7	.015 ± .006	.020 ± .009
8	.022 ± .007	.026 ± .007
9	.018 ± .006	.015 ± .006
10	.042 ± .006	.031 ± .006
11	.023 ± .006	.021 ± .006
12	.018 ± .006	.014 ± .005
13	.014 ± .006	.014 ± .006
14	.009 ± .007	.016 ± .007
15	.008 ± .005	.02 ± .02
16	.015 ± .006	(1)
17	.016 ± .006	< .01
18	.022 ± .006	.021 ± .006
19	.014 ± .005	.016 ± .006
20	.023 ± .007	.029 ± .008
21	.019 ± .005	.017 ± .006
22	.026 ± .008	.04 ± .01
23	.045 ± .007	.03 ± .01
24	.019 ± .007	.024 ± .007
25	.026 ± .007	.024 ± .007
26	.019 ± .006	.013 ± .007
27	.019 ± .006	.023 ± .006
28	.024 ± .006	.022 ± .006
29	.017 ± .006	.026 ± .006
30	.017 ± .006	.015 ± .006
31	.031 ± .006	.032 ± .006
32	.035 ± .007	.039 ± .007
33	.029 ± .007	.030 ± .007
34	.033 ± .006	.008 ± .006
35	.028 ± .005	.033 ± .006
36	.035 ± .008	.020 ± .007
37	.023 ± .006	.031 ± .006
38	.036 ± .006	.05 ± .010
39	.033 ± .007	(1)
40	.025 ± .006	(1)
41	.039 ± .009	.036 ± .009
42	.036 ± .006	.037 ± .006
43	.035 ± .007	.035 ± .007
44	.031 ± .008	.022 ± .007
45	.025 ± .006	.026 ± .006
46	.034 ± .009	.034 ± .008
47	.035 ± .008	.039 ± .007
48	.036 ± .003	.036 ± .007
49	.046 ± .009	.044 ± .007
50	.050 ± .008	.044 ± .007
51	.045 ± .007	.033 ± .007
52	.028 ± .006	.04 ± .01
MEAN	.027 ± .020	.027 ± .020

(1) PUMP OUT OF SERVICE

TABLE IV.1.4 MONTHLY MEAN VALUES OF WEEKLY OF GROSS BETA CONCENTRATIONS (PCI/CU.M) IN AIR PARTICULATE SAMPLES

GROUP I STATIONS (A)					GROUP II STATIONS (B)					GROUP III STATIONS (C)				
COLLECTION PERIOD		MIN.	MAX.	MEAN	COLLECTION PERIOD		MIN.	MAX.	MEAN	COLLECTION PERIOD		MIN.	MAX.	MEAN
12/31/83-01/28/84		.030	.054	.04 ± .01	12/31/83-01/28/84		.023	.048	.04 ± .01	01/03/84-01/30/84		.023	.046	.04 ± .02
01/28/84-02/25/84		.009	.033	.02 ± .02	01/28/84-02/25/84		.007	.029	.02 ± .01	01/30/84-02/27/84		.015	.026	.02 ± .007
02/25/84-03/31/84		<.006	.034	.02 ± .02	02/25/84-03/31/84		<.005	.035	.02 ± .01	02/27/84-04/02/84		.014	.042	.02 ± .02
03/31/84-04/29/84		.013	.022	.017 ± .006	03/31/84-04/29/84		.007	.024	.014 ± .009	04/02/84-04/30/84		.008	.020	.013 ± .009
04/29/84-06/03/84		.014	.036	.02 ± .01	04/28/84-06/03/84		<.006	.039	.02 ± .01	04/30/84-06/04/84		.014	.040	.02 ± .02
05/03/84-06/30/84		.014	.043	.03 ± .02	06/03/84-06/30/84		.009	.039	.03 ± .02	06/04/84-07/02/84		.013	.045	.03 ± .02
06/30/84-07/29/84		.017	.031	.022 ± .009	06/30/84-07/29/84		.012	.040	.02 ± .01	07/02/84-07/30/84		.015	.026	.020 ± .008
07/29/84-09/01/84		.022	.040	.03 ± .01	07/28/84-09/01/84		.010	.038	.03 ± .01	07/30/84-09/04/84		.008	.039	.03 ± .02
08/01/84-09/29/84		.022	.038	.028 ± .009	09/01/84-09/29/84		.012	.040	.03 ± .01	09/04/84-10/01/84		.020	.050	.03 ± .02
09/29/84-11/04/84		.024	.036	.029 ± .008	09/29/84-11/04/84		.021	.038	.030 ± .007	10/01/84-10/29/84		.025	.039	.035 ± .009
10/04/84-12/01/84		.021	.049	.03 ± .02	11/03/84-12/01/84		.020	.051	.03 ± .02	10/29/84-12/03/84		.022	.039	.03 ± .01
11/01/84-12/29/84		.025	.061	.04 ± .02	12/01/84-12/29/84		.022	.078	.04 ± .03	12/04/84-01/02/85		.028	.050	.04 ± .01
12/31/83-12/29/84		.006	.061	.03 ± .02	12/31/83-12/29/84		.005	.078	.03 ± .02	01/03/84-01/02/85		.008	.050	.03 ± .02

(A) GROUP I CONSISTS OF STATIONS 1A, 1B, AND 2

(B) GROUP II CONSISTS OF STATIONS 3A, 4B, 5, 6B, 14, 16, 17, 31, 32, 33A, AND 38

(C) GROUP III CONSISTS OF STATIONS 12A AND 12D

TABLE IV 1.5  
ANALYTICAL DATA FOR MONTHLY COMPOSITE AIR PARTICULATE SAMPLES  
GAMMA SPECTRUM ANALYSIS  
NUCLIDE CONCENTRATION (pCi/m<sup>3</sup>)

Collection Period	Station	Be-7	Cs-137	I-131	Ba-140	Nb-95	K-40	Cr-51	Co-60	Cs-134	Zr-9
12/31/83- 01/28/84	1A	.13±.08	<.008	<.2	<.3	<.02	<.07	<.2	<.009	<.008	<.02
	1B	.12±.09	<.009	<.3	<.2	<.02	<.06	<.1	<.009	<.008	<.02
	2	<.09	<.008	<.2	<.3	<.02	<.08	<.1	<.01	<.007	<.02
	3A	<.1	<.007	<.2	<.02	<.02	<.07	<.1	<.01	<.009	<.02
	4B	.11±.08	<.009	<.3	<.3	<.02	<.08	<.1	<.008	<.008	<.02
	5	<.1	<.009	<.3	<.3	<.02	<.05	<.1	<.008	<.008	<.01
	6B	.09±.08	<.008	<.3	<.3	<.02	<.06	<.1	<.008	<.008	<.02
	14	.18±.09	<.007	<.3	<.3	<.02	<.06	<.1	<.01	<.008	<.02
	15	<.2	<.01	<.5	<.4	<.03	.2±.2	<.2	<.01	<.02	<.03
	17	.10±.08	<.009	<.2	<.4	<.02	<.07	<.1	<.009	<.007	<.02
	31	<.1	<.007	<.3	<.3	<.02	<.05	<.1	<.009	<.007	<.02
	32	<.1	<.008	<.3	<.3	<.02	<.1	<.2	<.01	<.009	<.02
	38	.15±.08	<.008	<.2	<.3	<.02	<.08	<.1	<.009	<.008	<.02
	33A	<.1	<.1	<.4	<.3	<.2	<.1	<.2	<.1	<.1	<.2
01/03/84- 01/30/84	12A	.10±.08	<.009	<.3	<.3	<.02	<.1	<.1	<.009	<.007	<.02
	12D	<.09	<.008	<.3	<.3	<.02	<.08	<.1	<.009	<.008	<.02
02/04/84- 02/25/84	1A	.11±.07	<.008	<.07	<.1	<.01	<.07	<.08	<.009	<.008	<.02
	1B	<.09	<.008	<.1	<.2	<.02	<.08	<.1	<.009	<.009	<.02
	2	.12±.07	<.009	<.1	<.2	<.01	<.08	<.1	<.009	<.009	<.02
	3A	.10±.08	<.008	<.1	<.2	<.01	<.1	<.1	<.008	<.008	<.02
	4B	.08±.07	<.006	<.1	<.2	<.01	<.07	<.1	<.008	<.007	<.02
	5	.07±.07	<.009	<.1	<.2	<.02	<.07	<.1	<.01	<.008	<.02
	6B	.09±.07	<.007	<.1	<.2	<.01	<.06	<.1	<.009	<.008	<.02
	14	.10±.08	<.008	<.1	<.2	<.02	<.05	<.1	<.009	<.009	<.02
	15	.10±.08	<.009	<.1	<.2	<.02	<.08	<.1	<.01	<.009	<.02
	17	<.09	<.008	<.1	<.2	<.01	<.07	<.1	<.008	<.007	<.02
	31	.11±.06	<.006	<.1	<.2	<.01	<.06	<.1	<.007	<.006	<.02
	32	<.1	<.009	<.2	<.2	<.01	<.1	<.1	<.01	<.009	<.02
	38	.08±.06	<.007	<.1	<.2	<.01	<.08	<.1	<.008	<.007	<.02
	33A	.2±.1	<.02	<.3	<.5	<.03	<.1	<.3	<.01	<.02	<.04
02/06/84- 02/27/84	12A	.16±.08	<.008	<.2	<.3	<.02	<.09	<.1	<.009	<.008	<.02
	12D	.10±.07	<.009	<.1	<.3	<.02	<.07	<.1	<.008	<.009	<.02

TABLE IV 1.5  
ANALYTICAL DATA FOR MONTHLY COMPOSITE AIR PARTICULATE SAMPLES  
GAMMA SPECTRUM ANALYSIS  
NUCLIDE CONCENTRATION (pCi/m<sup>3</sup>)

Collection Period	Station	Be-7	Cs-137	I-131	Ba-140	Nb-95	K-40	Cr-51	Co-60	Cs-134	Zr-95
03/03/84- 03/31/84	1A	.09±0.5	<.006	<.04	<.1	<.01	<.07	<.07	<.008	<.007	<.01
	1B	.07±.05	<.006	<.04	<.08	<.01	<.05	<.06	<.006	<.006	<.01
	2	.09±.06	<.006	<.04	<.09	<.01	<.05	<.07	<.007	<.006	<.02
	3A										
	4B	.06±.05	<.006	<.05	<.07	<.009	<.05	<.08	<.008	<.006	<.01
	5	.09±.05	<.006	<.05	<.07	<.009	<.06	<.07	<.005	<.006	<.01
	6B	.08±.05	<.006	<.04	<.09	<.009	<.04	<.07	<.006	<.006	<.01
	14	.08±.05	<.006	<.05	<.09	<.008	<.07	<.08	<.006	<.006	<.01
	15	.07±.05	<.006	<.04	<.08	<.008	<.05	<.06	<.006	<.005	<.01
	17	.06±.05	<.005	<.05	<.1	<.01	<.06	<.07	<.007	<.006	<.02
	31	.08±.05	<.005	<.05	<.08	<.01	<.04	<.06	<.007	<.006	<.01
	32	.09±.05	<.006	<.05	<.09	<.01	<.05	<.06	<.007	<.006	<.01
	38	.10±.05	<.005	<.04	<.08	<.009	<.05	<.06	<.006	<.006	<.01
	33A	.08±.05	<.006	<.05	<.09	<.01	<.07	<.07	<.006	<.006	<.01
03/05/84- 04/02/84	12A	.08±.05	<.007	<.04	<.09	<.007	<.07	<.06	<.006	<.005	<.01
	12D	.08±.05	<.006	<.05	<.08	<.009	<.05	<.07	<.006	<.005	<.01
04/07,08/84 04/28,29/84	1A	<.09	<.007	<.09	<.1	<.01	<.08	<.1	<.008	<.009	<.02
	1B	.10±.07	<.008	<.08	<.1	<.01	<.04	<.1	<.009	<.007	<.02
	2	<.08	<.006	<.07	<.1	<.01	<.09	<.08	<.009	<.008	<.02
	3A	<.1	<.01	<.1	<.2	<.02	<.1	<.1	<.01	<.009	<.3
	4B	.12±.06	<.007	<.07	<.1	<.01	<.07	<.08	<.008	<.007	<.02
	5	<.09	<.010	<.09	<.1	<.02	<.09	<.1	<.009	<.008	<.02
	6B	.09±.07	<.007	<.08	<.1	<.01	<.09	<.09	<.009	<.007	<.02
	14	<.09	<.009	<.09	<.2	<.01	<.06	<.1	<.009	<.009	<.01
	15	.07±.06	<.006	<.08	<.1	<.010	<.07	<.09	<.008	<.007	<.02
	17	.10±.06	<.008	<.08	<.1	<.01	<.09	<.09	<.010	<.009	<.02
	31	.11±.06	<.006	<.08	<.1	<.01	<.08	<.1	<.009	<.007	<.02
	32	.11±.06	<.008	<.09	<.2	<.01	<.08	<.1	<.010	<.009	<.02
	38	<.08	<.008	<.08	<.1	<.01	<.08	<.09	<.008	<.008	<.02
	33A	.09±.07	<.007	<.08	<.1	<.01	<.05	<.1	<.010	<.009	<.02
04/09/84- 04/30/84	1A	.07±.07	<.008	<.09	<.1	<.01	<.06	<.08	<.008	<.008	<.02
	12D	<.2	<.01	<.2	<.3	<.02	<.2	<.2	<.02	<.02	<.03

TABLE IV 1.5  
ANALYTICAL DATA FOR MONTHLY COMPOSITE AIR PARTICULATE SAMPLES  
GAMMA SPECTRUM ANALYSIS  
NUCLIDE CONCENTRATION (pCi/m<sup>3</sup>)

Collection Period	Station	Be-7	Cs-137	I-131	Ba-140	Nb-95	K-40	Cr-51	Co-60	Cs-134	Zr-95
04/29/84- 5/26/84	1A	.18±.08	<.008	<.09	<.2	<.02	<.06	<.1	<.008	<.008	<.02
	1B	.15±.07	<.007	<.1	<.2	<.01	<.08	<.1	<.008	<.008	<.02
	2	.16±.08	<.007	<.1	<.2	<.01	<.1	<.1	<.009	<.008	<.02
	3A	.13±.07	<.008	<.1	<.1	<.01	<.09	<.09	<.006	<.008	<.02
	4B	.18±.08	<.008	<.1	<.2	<.02	<.08	<.09	<.009	<.008	<.02
	5	.12±.07	<.008	<.1	<.2	<.02	<.07	<.1	<.006	<.008	<.02
	6B	.18±.07	<.008	<.1	<.2	<.01	<.08	<.1	<.008	<.008	<.02
	14	.15±.07	<.006	<.1	<.1	<.01	<.08	<.1	<.007	<.008	<.02
	15	.09±.07	<.009	<.1	<.2	<.02	<.07	<.1	<.009	<.008	<.02
	17	.13±.07	<.006	<.1	<.2	<.01	<.05	<.1	<.009	<.008	<.02
	31	.17±.07	<.006	<.1	<.2	<.01	<.07	<.1	<.007	<.009	<.02
	32	.13±.07	<.008	<.1	<.2	<.02	<.09	<.1	<.008	<.008	<.02
	38	.21±.08	<.008	<.1	<.2	<.02	<.1	<.1	<.009	<.008	<.02
	33A	.16±.07	<.007	<.1	<.2	<.01	<.08	<.09	<.008	<.007	<.02
4/30/84- 5/29/94	12A	.2±.1	<.01	<.2	<.3	<.02	<.09	<.1	<.01	<.009	<.03
	12D	.1±.1	<.01	<.2	<.3	<.02	.1±.1	<.1	<.01	<.01	<.02
	1A	.12±.06	<.006	<.07	<.1	<.01	<.06	<.07	<.008	<.006	<.01
	1B	.7±.2	<.02	<.2	<.3	<.03	<.2	<.2	<.02	<.02	<.05
06/03/84- 06/30/84	2	.11±.06	<.005	<.06	<.09	<.010	<.06	<.06	<.007	<.006	<.01
	3A	.14±.06	<.006	<.08	<.1	<.01	<.07	<.09	<.007	<.007	<.01
	4B	.09±.05	<.006	<.07	<.1	<.01	.09±.06	<.08	<.008	<.007	<.01
	5	.13±.07	<.005	<.09	<.2	<.01	<.06	<.09	<.007	<.007	<.01
	6B	.11±.05	<.007	<.09	<.1	<.01	<.07	<.09	<.007	<.006	<.01
	14	.13±.06	<.007	<.1	<.1	<.01	<.06	<.09	<.007	<.007	<.02
	15	.08±.06	<.006	<.1	<.2	<.01	<.06	<.08	<.008	<.007	<.01
	17	.18±.06	<.005	<.08	<.1	<.01	<.05	<.07	<.007	<.006	<.02
	31	.14±.06	<.006	<.1	<.2	<.01	<.05	<.09	<.006	<.007	<.01
	32	.13±.05	<.006	<.09	<.1	<.01	<.07	<.08	<.006	<.006	<.01
	38	.13±.06	<.006	<.1	<.2	<.01	<.06	<.08	<.006	<.006	<.02
	33A	.07±.05	<.006	<.1	<.1	<.01	<.05	<.08	<.007	<.006	<.01
06/04/84- 07/02/84	12A	.10±.07	<.006	<.1	<.2	<.01	<.07	<.1	<.007	<.006	<.02
	12D	.10±.07	<.007	<.1	<.2	<.009	.09±.08	<.08	<.007	<.007	<.01

TABLE IV 1.5  
ANALYTICAL DATA FOR MONTHLY COMPOSITE AIR PARTICULATE SAMPLES  
GAMMA SPECTRUM ANALYSIS  
NUCLIDE CONCENTRATION (pCi/m<sup>3</sup>)

Collection Period	Station	Be-7	Cs-137	I-131	Ba-140	Nb-95	K-40	Cr-51	Co-60	Cs-134	Zr-95
07/07/84-	1A	.15±.08	<.006	<.2	<.2	<.01	<.05	<.1	<.008	<.008	<.02
07/28,29/84	1B	.09±.08	<.007	<.2	<.2	<.01	<.07	<.1	<.009	<.008	<.02
	2	.09±.07	<.008	<.2	<.2	<.02	<.08	<.1	<.008	<.009	<.02
	3A	.08±.07	<.008	<.1	<.2	<.01	<.07	<.1	<.008	<.007	<.02
	4B	.12±.08	<.008	<.2	<.2	<.02	<.09	<.1	<.009	<.008	<.02
	5	.09±.07	<.008	<.1	<.2	<.02	<.07	<.1	<.01	<.008	<.02
	6B	.16±.08	<.008	<.2	<.2	<.02	<.06	<.1	<.008	<.009	<.02
	14	.08±.07	<.008	<.2	<.2	<.02	<.08	<.1	<.01	<.007	<.02
	15	.08±.08	<.008	<.2	<.2	<.02	<.10	<.1	<.009	<.008	<.02
	17	<.2	<.02	<.4	<.6	<.04	<.3	<.3	<.02	<.02	<.05
	31	<.09	<.009	<.2	<.2	<.02	<.06	<.1	<.007	<.008	<.02
	32	.10±.07	<.007	<.1	<.2	<.02	<.07	<.1	<.008	<.008	<.01
	38	<.1	<.009	<.2	<.2	<.02	<.07	<.1	<.009	<.009	<.02
	33A	<.1	<.009	<.2	<.3	<.02	<.1	<.2	<.02	<.01	<.03
07/09/84-	12A	.11±.08	<.008	<.2	<.2	<.02	<.09	<.1	<.008	<.008	<.02
07/30/84	12D	.13±.07	<.006	<.2	<.2	<.01	<.07	<.1	<.008	<.008	<.01
08/04/84-											
08/25/84	1A	.13±.08	<.009	<.08	<.1	<.01	<.08	<.1	<.01	<.008	<.01
	1B	.1±.1	<.01	<.1	<.2	<.02	<.1	<.2	<.01	<.02	<.03
	2	.15±.06	<.007	<.07	<.1	<.02	<.08	<.09	<.009	<.008	<.02
	3A	.12±.06	<.007	<.07	<.1	<.01	<.08	<.1	<.009	<.007	<.02
	4B	.13±.08	<.009	<.08	<.2	<.01	<.09	<.1	<.008	<.008	<.02
	5	.15±.09	<.01	<.1	<.2	<.02	<.1	<.1	<.01	<.01	<.02
	6B	.11±.07	<.007	<.07	<.09	<.01	<.07	<.09	<.009	<.008	<.02
	14	.14±.06	<.006	<.07	<.1	<.01	.10±.09	<.09	<.008	<.008	<.02
	15	.13±.07	<.008	<.08	<.1	<.01	<.06	<.1	<.009	<.009	<.02
	17	.12±.06	<.007	<.07	<.1	<.01	.10±.08	<.08	<.009	<.006	<.01
	31	.10±.07	<.008	<.08	<.1	<.01	<.07	<.1	<.008	<.008	<.02
	32	.15±.06	<.008	<.07	<.1	<.01	<.1	<.08	<.009	<.008	<.02
	38	.15±.07	<.008	<.07	<.1	<.01	<.08	<.1	<.01	<.006	<.02
	33A	.14±.06	<.007	<.07	<.1	<.01	.12±.08	<.08	<.008	<.008	<.01
08/06/84-	12A	.18±.08	<.008	<.09	<.2	<.01	<.07	<.1	<.008	<.008	<.02
08/27/84	12D	.07±.07	<.007	<.08	<.1	<.01	<.09	<.1	<.008	<.008	<.02

TABLE IV 1.5  
ANALYTICAL DATA FOR MONTHLY COMPOSITE AIR PARTICULATE SAMPLES  
GAMMA SPECTRUM ANALYSIS  
NUCLIDE CONCENTRATION (pCi/m<sup>3</sup>)

Collection Period	Station	Be-7	Cs-137	I-131	Ba-140	Nb-95	K-40	Cr-51	Co-60	Cs-134	Zr-95
09/01/84-	1A	.11±.05	C.007	<.07	<.1	<.01	<.05	<.08	<.008	<.007	<.02
09/29/84	1B	.11±.06	<.006	<.07	<.1	<.01	<.06	<.08	<.006	<.007	<.01
	2	.11±.05	<.006	<.06	<.1	<.01	<.07	<.07	<.007	<.006	<.02
	3A	.1±.06	<.006	<.07	<.1	<.01	<.06	<.07	<.006	<.006	<.01
	4B	.07±.05	<.007	<.06	<.1	<.01	<.07	<.07	<.007	<.006	<.02
	5	.1±.06	<.006	<.07	<.1	<.01	<.08	<.07	<.007	<.007	<.02
	6B	.07±.06	<.007	<.07	<.1	<.01	<.05	<.08	<.006	<.006	<.01
	14	.11±.06	<.005	<.06	<.1	<.01	<.08	<.07	<.007	<.006	<.02
	15	.07±.06	<.007	<.07	<.1	<.01	<.05	<.09	<.008	<.007	<.02
	17	.06±.06	<.006	<.07	<.1	<.01	<.06	<.08	<.006	<.007	<.01
	31	.09±.06	<.006	<.09	<.1	<.01	<.06	<.09	<.008	<.007	<.01
	32	.06±.06	<.006	<.06	<.1	<.01	<.06	<.08	<.007	<.007	<.01
	38	.07±.06	<.006	<.07	<.1	<.01	<.05	<.09	<.008	<.007	<.02
	33A	.08±.06	<.007	<.07	<.1	<.01	<.05	<.08	<.006	<.005	<.01
09/04/84-	12A	.10±.06	<.007	<.08	<.1	<.01	.09±.09	<.09	<.008	<.006	<.02
10/10/84	12D	<.1	<.008	<.08	<.2	<.01	<.1	<.1	<.01	<.009	<.02
09/29/84-											
11/03/84	1A	.13±.06	<.006	<.2	<.2	<.01	<.06	<.1	<.007	<.006	<.01
	1B	.08±.06	<.006	<.2	<.2	<.02	.08±.08	<.1	<.007	<.007	<.02
	2	.07±.06	<.006	<.2	<.2	<.01	<.08	<.1	<.007	<.006	<.2
	3A	.10±.07	<.007	<.2	<.2	<.01	<.08	<.1	<.007	<.006	<.02
	4B	<.1	<.006	<.2	<.2	<.02	<.1	<.1	<.005	<.006	<.02
	5	.08±.07	<.006	<.2	<.2	<.02	<.06	<.1	<.008	<.007	<.02
	6B	<.1	<.008	<.3	<.3	<.02	.08±.08	<.2	<.009	<.008	<.02
	14	.11±.07	<.006	<.2	<.3	<.01	.08±.08	<.1	<.007	<.007	<.02
	15	<.09	<.007	<.2	<.2	<.01	<.05	<.1	<.008	<.006	<.02
	17	.09±.07	<.006	<.2	<.2	<.01	<.08	<.1	<.008	<.007	<.02
	31	.09±.07	<.006	<.2	<.3	<.01	<.06	<.1	<.007	<.007	<.02
	32	<.09	<.006	<.2	<.2	<.01	<.08	<.1	<.007	<.006	<.01
	38	.13±.07	<.006	<.2	<.3	<.01	<.06	<.1	<.008	<.006	<.01
	33A	.10±.08	<.007	<.2	<.3	<.01	<.07	<.1	<.008	<.007	<.02
10/01/84-	12A	.08±.07	<.006	<.2	<.2	<.02	<.07	<.1	<.006	<.007	<.02
11/05/84	12D	.10±.09	<.009	<.3	<.3	<.02	.20±.09	<.2	<.009	<.01	<.02

TABLE IV 1.5  
ANALYTICAL DATA FOR MONTHLY COMPOSITE AIR PARTICULATE SAMPLES  
GAMMA SPECTRUM ANALYSIS  
NUCLIDE CONCENTRATION (pCi/m<sup>3</sup>)

Collection Period	Station	Be-7	Cs-137	I-131	Ba-140	Nb-95	K-40	Cr-51	Co-60	Cs-134	Zr-95
11/03/84-	1A	.11±.09	<.008	<.3	<.4	<.02	<.06	<.2	<.01	<.009	<.02
12/01/84	1B	.10±.08	<.008	<.4	<.4	<.02	<.09	<.2	<.009	<.008	<.02
	2	.11±.08	<.008	<.4	<.4	<.02	<.08	<.2	<.009	<.009	<.02
	3A	<.1	<.009	<.4	<.4	<.02	<.1	<.2	<.01	<.009	<.02
	4B	.11±.09	<.008	<.3	<.4	<.01	<.09	<.1	<.007	<.008	<.02
	5	.2±.1	<.01	<.6	<.5	<.02	<.1	<.2	<.01	<.01	<.03
	6B	.11±.08	<.009	<.4	<.4	<.01	<.05	<.2	<.008	<.008	<.02
	14	.11±.09	<.007	<.3	<.3	<.02	<.1	<.1	<.01	<.008	<.02
	15	.15±.09	<.007	<.4	<.4	<.02	<.1	<.2	<.009	<.008	<.02
	17	.12±.08	<.009	<.4	<.4	<.02	<.08	<.2	<.009	<.007	<.02
	31	<.2	<.01	<.7	<.6	<.04	<.09	<.3	<.01	<.01	<.04
	32	<.1	<.008	<.4	<.4	<.02	<.09	<.2	<.009	<.009	<.02
	38	.13±.08	<.007	<.4	<.4	<.02	<.07	<.1	<.006	<.008	<.02
	33A	.10±.09	<.008	<.4	<.3	<.02	<.07	<.2	<.008	<.009	<.02
11/05/84-	12A	.09±.08	<.009	<.4	<.4	<.02	<.09	<.2	<.009	<.008	<.02
12/03/84	12D	.10±.09	<.007	<.4	<.4	<.02	<.07	<.1	<.009	<.008	<.02
12/01/84	1A	.07±.07	<.008	<.1	<.2	<.01	<.06	<.1	<.008	<.008	<.02
12/29/84	1B	.18±.09	<.01	<.2	<.2	<.02	<.1	<.1	<.01	<.01	<.02
	2	.14±.07	<.006	<.1	<.2	<.02	<.07	<.1	<.008	<.006	<.02
	3A	.13±.07	<.007	<.1	<.2	<.01	<.08	<.1	<.009	<.008	<.02
	4B	.13±.08	<.009	<.1	<.2	<.02	<.07	<.1	<.008	<.008	<.02
	5	.09±.07	<.009	<.1	<.2	<.01	<.09	<.1	<.008	<.007	<.02
	6B	.11±.07	<.008	<.1	<.2	<.02	<.07	<.1	<.007	<.008	<.02
	14	.10±.08	<.008	<.1	<.2	<.01	<.08	<.1	<.009	<.008	<.02
	15	.19±.09	<.01	<.1	<.2	<.02	<.1	<.1	<.01	<.01	<.02
	17	<.1	<.009	<.1	<.2	<.01	<.1	<.1	<.01	<.009	<.02
	31	<.09	<.008	<.2	<.2	<.02	<.1	<.1	<.009	<.008	<.02
	32	.08±.07	<.008	<.2	<.2	<.02	<.09	<.1	<.009	<.008	<.02
	38	.13±.07	<.007	<.1	<.2	<.01	<.1	<.1	<.007	<.008	<.02
	33A	.12±.08	<.009	<.2	<.2	<.02	<.08	<.1	<.009	<.008	<.02
12/03/84	12A	.10±.07	<.009	<.5	<.4	<.02	<.06	<.2	<.008	<.007	<.02
1/02/85	12D	.14±.09	<.007	<.6	<.5	<.02	<.1	<.2	<.009	<.01	<.02

TABLE IV.2.1 ANALYTICAL DATA FOR PRECIPITATION SAMPLES  
CONCENTRATION (PC/LITER)

STATION CODE	COLLECTION PERIOD	VOLUME (ML)	GROSS BETA	SR-89	SR-90	RAD. CESIUM
1A	01/07-02/11/84	780	5 ± 4			
	02/11-03/03/84	4750	< 1			
	03/03-03/31/84	3850	3 ± 2	< .4	.3 ± .2	< .4
	03/31-05/06/84	2950	< 2			
	05/06-06/03/84	3500	< 2			
	06/03-06/30/84	3900	< 2	< .4	.3 ± .2	< .2
	06/30-08/04/84	4000	< 1	< .4	< .2	.2 ± .2
	08/04-09/01/84	1600	< 1			
	09/01-09/29/84	3800	4 ± 2			< .3
	09/29-10/27/84	3150	2 ± 1			
	10/27-12/01/84	3900	< 2	< 2	< .8	< .2
	12/01-01/04/85	1950	6 ± 2			
	MEAN		3 ± 3	< .8	.4 ± .5	.3 ± .2
1B	01/07-02/11/84	620	17 ± 3			
	02/11-03/03/84	4800	3 ± 2			
	03/03-03/31/84	1000	(1)	< .4	.5 ± .2	< .3
	03/31-05/06/84	3500	< 1			
	05/06-06/03/84	2900	< .7			
	06/03-06/30/84	3800	< 2	< .5	< .3	< .4
	06/30-08/04/84	5500	< 1	< .5	.3 ± .2	< .2
	08/04-09/01/84	1700	8 ± 4			
	09/01-09/29/84	3050	4 ± 2			< .3
	09/29-10/27/84	2400	2 ± 1			
	10/27-12/01/84	3950	4 ± 2	1.0 ± .7	.7 ± .4	< .3
	12/01-01/04/85	1250	5 ± 2			
	MEAN		4.3 ± 9.4	.6 ± .5	.5 ± .4	< .3
4M	01/07-02/11/84	590	7 ± 3			
	02/11-03/03/84	2150	< 1			
	03/03-03/31/84	3850	3 ± 2	< .4	.5 ± .2	< .4
	03/31-05/06/84	1700	2 ± 2			
	05/06-06/03/84	2500	< 1			
	06/03-06/30/84	3100	< 2	< .5	< .2	.3 ± .2
	06/30-08/04/84	3300	3 ± 1	< .6	1.5 ± .4	.2 ± .2
	08/04-09/01/84	1800	< 1			
	09/01-09/29/84	3950	7 ± 2			< .5
	09/29-10/27/84	1600	3 ± 3			
	10/27-12/01/84	3850	2 ± 2	< .8	.5 ± .2	< .2
	12/01-01/04/85	1350	2 ± 2			
	MEAN		3 ± 4	< .6	.7 ± 1.1	.3 ± .3
MEAN ALL STATIONS			3.2 ± 6.1	.7 ± .9	.5 ± .7	.3 ± .2

(1) INSUFFICIENT SAMPLE FOR ANALYSIS

TABLE IV.2.2 ANALYTICAL DATA FOR PRECIPITATION SAMPLES  
CONCENTRATION (PC/SQ. METER)

STATION CODE	COLLECTION PERIOD	VOLUME (ML)	GROSS BETA	SR-89	SR-90	RAD. CESIUM
1A	01/07-02/11/84	780	120 ± 90			
	02/11-03/03/84	4750	< 200			
	03/03-03/31/84	3850	300 ± 200	< 50	30 ± 20	< 40
	03/31-05/06/84	2950	< 100			
	05/06-06/03/84	3500	< 200			
	06/03-06/30/84	3900	< 200	< 50	30 ± 30	< 20
	06/30-08/04/84	4000	< 200	< 50	< 30	30 ± 20
	08/04-09/01/84	1600	< 70			
	09/01-09/29/84	3800	500 ± 200			< 40
	09/29-10/27/84	3150	200 ± 100			
	10/27-12/01/84	3900	< 200	< 200	< 90	< 30
	12/01-01/04/85	1950	300 ± 100			
	MEAN		216 ± 226	< 88	45 ± 60	32 ± 17
1B	01/07-02/11/84	620	330 ± 70			
	02/11-03/03/84	4800	400 ± 200			
	03/03-03/31/84	1000	(1)	< 10	14 ± 6	< 10
	03/31-05/06/84	3500	< 200			
	05/06-06/03/84	2900	< 70			
	06/03-06/30/84	3800	< 200	< 60	< 30	< 50
	06/30-08/04/84	5500	< 200	< 80	50 ± 40	< 30
	08/04-09/01/84	1700	400 ± 200			
	09/01-09/29/84	3050	400 ± 200			< 30
	09/29-10/27/84	2400	200 ± 100			
	10/27-12/01/84	3950	500 ± 200	90 ± 60	70 ± 30	< 30
	12/01-01/04/85	1250	200 ± 70			
	MEAN		282 ± 261	60 ± 71	41 ± 49	< 30
4M	01/07-02/11/84	590	120 ± 60			
	02/11-03/03/84	2150	< 90			
	03/03-03/31/84	3850	400 ± 200	< 50	50 ± 20	< 40
	03/31-05/06/84	1700	110 ± 80			
	05/06-06/03/84	2500	< 100			
	06/03-06/30/84	3100	< 100	< 40	< 20	20 ± 20
	06/30-08/04/84	3300	300 ± 100	< 60	150 ± 40	20 ± 20
	08/04-09/01/84	1800	< 80			
	09/01-09/29/84	3950	800 ± 300			< 60
	09/29-10/27/84	1600	100 ± 100			
	10/27-12/01/84	3850	200 ± 200	< 90	60 ± 20	< 20
	12/01-01/04/85	1350	80 ± 60			
	MEAN		207 ± 424	< 60	70 ± 112	32 ± 36
MEAN ALL STATIONS			233 ± 315	69 ± 94	52 ± 76	31 ± 26

(1) INSUFFICIENT SAMPLE FOR ANALYSIS

TABLE IV.3.1 ANALYTICAL DATA FOR SURFACE WATER GRAB SAMPLES  
CONCENTRATION (PC/LITER)

STATION CODE	COLLECTION DATE	GROSS ALPHA SOLUBLE	GROSS ALPHA INSOLUBLE	GROSS BETA SOLUBLE	GROSS BETA INSOLUBLE
1Q	01/07/84	< 1	< .1	< 2	< .4
	02/11/84	< .8	< .1	4 ± 2	< .4
	03/03/84	2 ± 1	< .1	< 2	< .4
	03/31/84	< .9	.9 ± .3	< 2	1.3 ± .5
	05/06/84	< .8	1.0 ± .4	< 2	1.7 ± .5
	06/03/84	< .6	.5 ± .2	< 2	< .4
	06/30/84	< 2	.3 ± .3	< 2	.5 ± .4
	08/04/84	< 2	< .1	< 2	< .3
	09/01/84	< 2	.2 ± .2	< 2	< .5
	09/29/84	< 1	.3 ± .2	< 2	.5 ± .4
	10/27/84	< 4	< .1	3 ± 2	< .4
	12/01/84	< 1	.8 ± .3	< 2	.8 ± .5
	MEAN	1.5 ± 1.9	.4 ± .7	2 ± 1	.7 ± .9
4F	01/07/84	< 1	3 ± 1	< 2	4.3 ± .7
	02/11/84	< .9	3 ± 1	< 2	4.7 ± .8
	03/03/84	< 1	3 ± 1	< 2	3.4 ± .7
	03/31/84	< .9	1.6 ± .6	< 2	70 ± 10
	05/06/84	< .5	5 ± 2	< 2	11 ± 1
	06/03/84	< .6	3 ± 1	< 2	4.9 ± .8
	06/30/84	< 2	.9 ± .5	< 2	1.1 ± .5
	08/04/84	< 2	5 ± 2	< 2	5.7 ± .8
	09/01/84	< 1	.4 ± .3	2 ± 2	.7 ± .5
	09/29/84	< 2	.7 ± .3	< 2	1.6 ± .5
	10/27/84	< 3	.8 ± .4	5 ± 2	1.2 ± .5
	12/01/84	< 1	.6 ± .3	3 ± 2	1.9 ± .5
	MEAN	< 1.3	2.9 ± 6.1	2 ± 2	10.0 ± 38.6

TABLE IV.3.1 ANALYTICAL DATA FOR SURFACE WATER GRAB SAMPLES (CONTINUED)  
CONCENTRATION (PC/LITER)

STATION CODE	COLLECTION DATE	GROSS ALPHA SOLUBLE	GROSS ALPHA INSOLUBLE	GROSS BETA SOLUBLE	GROSS BETA INSOLUBLE
6A	01/07/84	< 1	< .09	< 2	.4 ± .4
	02/11/84	< 1	.2 ± .1	3 ± 2	.5 ± .4
	03/03/84	< 1	< .1	< 2	< .4
	03/31/84	< 1	.5 ± .2	< 2	1.1 ± .5
	05/06/84	< 1	.6 ± .3	< 2	1.2 ± .5
	06/03/84	< .6	.8 ± .3	< 2	.6 ± .5
	06/30/84	< 2	.5 ± .3	< 2	< .4
	08/04/84	< 2	< .2	< 2	< .3
	09/01/84	< 1	.2 ± .2	< 2	< .4
	09/29/84	< 2	.2 ± .2	< 2	< .4
	10/27/84	< 3	.3 ± .2	< 2	< .4
	12/01/84	< 1	.6 ± .4	5 ± 2	2.1 ± .6
	MEAN	< 1.4	.38 ± .44	2 ± 2	.7 ± 1.1
13A	01/07/84	< .8	< .1	3 ± 2	< .4
	02/11/84	< 1	.1 ± .1	< 2	.7 ± .4
	03/03/84	< 1	.2 ± .1	< 2	< .4
	03/31/84	< .9	.7 ± .3	< 2	1.3 ± .5
	05/06/84	< .8	1.2 ± .4	< 2	1.5 ± .5
	06/03/84	< .7	.5 ± .2	< 2	.4 ± .4
	06/30/84	< 1	.5 ± .3	< 2	.6 ± .6
	08/04/84	< 2	.2 ± .2	< 2	< .3
	09/01/84	< 1	.4 ± .2	< 2	< .5
	09/29/84	< 2	.2 ± .2	< 2	.6 ± .4
	10/27/84	< .7	.2 ± .2	< 2	< .4
	12/01/84	2 ± 2	.7 ± .3	7 ± 2	.6 ± .5
	MEAN	1.2 ± 1.0	.5 ± .6	3 ± 3	.8 ± 1.1
13B (1)	02/08/84	< 1	.9 ± .4	< 2	2.1 ± .6
	03/15/84	< 2	1.2 ± .6	< 2	1.5 ± .6
	04/09/84	< .7	.4 ± .1	< 2	4.6 ± .7
	05/14/84	< .8	.8 ± .3	< 2	6.2 ± .6
	06/07/84	< .8	.4 ± .2	< 2	< .4
	11/20/84	< 2	.9 ± .5	4 ± 2	2.4 ± .6
	12/03/84	< 1	.4 ± .3	3 ± 2	.8 ± .5
	MEAN	< 1.2	1.5 ± 2.4	2 ± 2	2.9 ± 3.9
MEAN ALL STATIONS 1.3 ± 1.4 1.1 ± 3.6 2 ± 2 3.0 ± 19.1					

(1) SAMPLE COLLECTED ONLY WHEN PUMP OPERATES

TABLE IV.3.2 ANALYTICAL DATA FOR SURFACE WATER COMPOSITE SAMPLES  
CONCENTRATION (PC/LITER)

STATION CODE	COLLECTION PERIOD	GROSS ALPHA SOLUBLE	GROSS ALPHA INSOLUBLE	GROSS BETA SOLUBLE	GROSS BETA INSOLUBLE
1LL	02/03-02/10/84	< 1	< .2	3 ± 2	< 1
	02/10-03/25/84	(1)	(1)	(1)	(1)
	03/25-03/30/84	< .6	.3 ± .2	< 2	< .9
	03/30-06/02/84	(1)	(1)	(1)	(1)
	06/02-06/22/84	2 ± 1	.6 ± .3	< 2	< .5
	06/22-08/03/84	< 1	.8 ± .4	< 2	1.1 ± .5
	08/03-08/31/84	< 1	.3 ± .2	5 ± 2	< .5
	08/31-09/07/84	(1)	(1)	(1)	(1)
	09/07-09/28/84	< 1	1.3 ± .5	< 2	2.5 ± .6
	09/28-10/26/84	< 3	1.7 ± .6	< 2	1.3 ± .5
	10/26-11/21/84	< 3	.1 ± .1	4 ± 2	.6 ± .4
	11/21-01/04/85	< .5	.2 ± .2	< 2	.7 ± .4
	MEAN	1.5 ± 1.9	.7 ± 1.1	3 ± 2	1.3 ± 1.8
4L	01/07-02/11/84	< 1	.1 ± .1	2 ± 2	.5 ± .4
	02/11-03/03/84	< .9	2.4 ± .9	< 2	2.2 ± .9
	03/03-03/31/84	< 1	.2 ± .2	< 2	< .6
	03/31-05/06/84	< .6	.7 ± .3	< 2	.9 ± .5
	05/06-06/03/84	< 1	.5 ± .2	< 2	< .5
	06/03-06/30/84	< .9	.6 ± .3	< 2	< .5
	07/29-08/04/84	< 2	< .2	< 2	< .8
	08/04-09/01/84	< 1	< .2	2 ± 2	< .6
	09/01-09/29/84	< 2	< .1	3 ± 2	< .4
	09/29-10/14/84	(1)	(1)	(1)	(1)
	10/14-10/27/84	< 3	< .2	< 2	< .7
	10/27-12/01/84	< 3	.2 ± .1	4 ± 2	.7 ± .4
	12/01-01/04/85	< .3	.3 ± .7	< 2	< .4
	MEAN	< 1.4	.8 ± 3.3	2 ± 1	1.1 ± 2.6
6I	01/07-02/11/84	< 1	.1 ± .1	< 2	.7 ± .4
	02/11-03/03/84	< 1	< .3	< 2	< 2
	03/03-03/31/84	< 1	.2 ± .1	< 2	< .5
	03/31-05/06/84	< .6	.9 ± .4	< 2	1.4 ± .5
	05/06-06/03/84	< 1	.7 ± .3	4 ± 2	< .5
	06/03-06/23/84	< .8	< .2	< 2	< .6
	06/23-07/07/84	(1)	(1)	(1)	(1)
	07/07-08/04/84	< 1	1.0 ± .4	< 2	.9 ± .5
	08/04-09/01/84	< 1	.4 ± .3	8 ± 2	.7 ± .6
	09/01-09/29/84	< 1	< .2	< 2	1.0 ± .5
	09/29-10/27/84	< 3	< .2	< 2	< .5
	10/27-12/01/84	< 3	< .1	3 ± 2	< .4
	12/01-01/04/85	< .4	.5 ± .2	< 2	.6 ± .4
	MEAN	< 1.2	.5 ± 1.1	3 ± 4	.9 ± .9
MEAN ALL STATIONS		1.4 ± 1.8	.7 ± 2.1	3 ± 3	1.1 ± 1.9

(1) NO SAMPLE DUE TO PUMP MALFUNCTION

TABLE IV.3.3 ANALYTICAL DATA FOR DISCHARGE WATER GRAB SAMPLES  
CONCENTRATION (PC/LITER)

STATION CODE	COLLECTION DATE	GROSS ALPHA SOLUBLE	GROSS ALPHA INSOLUBLE	GROSS BETA SOLUBLE	GROSS BETA INSOLUBLE
1M	01/07/84	< 2	.2 ± .1	< 2	< .4
	02/11/84	< .8	.4 ± .2	2 ± 2	1.4 ± .5
	03/03/84	< 1	< .1	< 2	< .4
	03/31/84	< 1	2.1 ± .5	< 2	1.5 ± .5
	05/06/84	< 1	.6 ± .3	< 2	2.0 ± .5
	06/03/84	< .6	.5 ± .2	< 2	< .4
	06/30/84	< 1	1.0 ± .6	< 2	1.5 ± .6
	08/04/84	< 2	< .2	< 2	< .4
	09/01/84	< 1	.3 ± .2	< 2	.6 ± .5
	09/29/84	< 3	.5 ± .2	5 ± 2	.8 ± .4
	10/27/84	< 3	.6 ± .3	< 2	.4 ± .4
	12/01/84	< 1	.2 ± .2	4 ± 2	2.6 ± .5
	MEAN	< 1.5	.6 ± 1.1	2 ± 2	1.2 ± 1.5

TABLE IV.3.4 ANALYTICAL DATA FOR DISCHARGE WATER COMPOSITE SAMPLES  
CONCENTRATION (PC/LITER)

STATION CODE	COLLECTION PERIOD	GROSS ALPHA SOLUBLE	GROSS ALPHA INSOLUBLE	GROSS BETA SOLUBLE	GROSS BETA INSOLUBLE
1MM	01/07-02/11/84	(1)	(1)	(1)	(1)
	02/11-03/03/84	(1)	(1)	(1)	(1)
	03/03-03/31/84	(1)	(1)	(1)	(1)
	03/31-05/06/84	(1)	(1)	(1)	(1)
	05/06-06/04/84	(1)	(1)	(1)	(1)
	06/04-06/22/84	< 1	.8 ± .4	2 ± 2	< .6
	06/22-07/20/84	(1)	(1)	(1)	(1)
	07/20-08/03/84	< 2	5 ± 2	< 2	3.9 ± .7
	08/03-09/19/84	(1)	(1)	(1)	(1)
	09/19-09/28/84	< 1	.5 ± .3	< 2	.7 ± .5
	09/28-10/26/84	< 3	1.0 ± .4	< 2	1.5 ± .5
	10/26-12/31/84	(1)	(1)	(1)	(1)
	12/31-01/04/85	< .3	< .2	< 2	< .8
	MEAN	< 1.5	1.5 ± 3.9	2 ± 0	1.5 ± 2.7

(1) NO SAMPLE DUE TO PUMP MALFUNCTION

TABLE IV.4.1 ANALYTICAL DATA FOR WELL WATER SAMPLES  
CONCENTRATION (PC/LITER)

STATION CODE	COLLECTION DATE	GROSS ALPHA	GROSS BETA	SR-89	SR-90	RAD. CESIUM	URANIUM (A)
1U	01/07/84	< .8	2 ± 2	< .6	.3 ± .2	.2 ± .2	.07
	03/31/84	< .8	< 2				< .02
	06/30/84	(1)	(1)	(1)	(1)	(1)	(1)
	09/30/84	(1)	(1)	(1)	(1)	(1)	(1)
	MEAN	< .8	2 ± 0	< .6	.3 ± .0	.2 ± .0	.05 ± .07
1V	01/07/84	< .4	< 2	< .5	.3 ± .2	< .2	< .02
	03/31/84	2 ± 1	< 2				< .02
	06/30/84	< .4	< 2	< .5	.3 ± .2	< .2	.08
	09/30/84	(1)	(1)	(1)	(1)	(1)	(1)
	MEAN	.9 ± 1.8	< 2	< .5	.3 ± .0	< .2	.04 ± .07
7	01/08/84	< .6	< 2	< .6	.4 ± .2	< .2	< .03
	04/02/84	< .8	< 2				.012
	07/01/84	< .7	< 2	< .4	< .2	< .2	.26
	09/30/84	< .5	< 2	< 1	< .5	< .4	.20
	MEAN	< .7	< 2	< .7	.4 ± .3	< .3	.126 ± .247
40	01/08/84	< .6	< 2	< .6	< .3	< .2	.08
	03/31/84	< .7	< 2				< .02
	06/30/84	< .7	< 2	< .5	< .2	< .2	.08
	09/29/84	< .6	< 2	< .9	.5 ± .4	.5 ± .4	.08
	MEAN	< .7	< 2	< .7	.3 ± .3	.3 ± .3	.07 ± .06
MEAN ALL STATIONS		.7 ± .8	2 ± 0	< .6	.3 ± .2	.3 ± .2	.075 ± .151

NOTE: (A) URANIUM CONCENTRATION IN UG/LITER  
(1) NO SAMPLE AVAILABLE

TABLE IV.5.1 ANALYTICAL DATA FOR SOIL SAMPLES  
CONCENTRATION (PC/GRAM DRY)

STATION CODE	COLLECTION DATE	GROSS BETA		NET BETA		K-40		SR-89		SR-90		RAD. CESIUM	
1AA	08/05/84	4	± 1	3	± 1	.45	± .05	.03	± .02	.414	± .009	.22	± .01
	10/27/84	2.6	± .9	2.5	± .9	< .04		< .01		.029	± .005	.046	± .006
	MEAN	3.3	± 2.0	2.8	± .7	.25	± .58	.02	± .03	.222	± .544	.133	± .246
2	08/04/84	< .9		< .9		.11	± .04	< .02		.277	± .008	.119	± .009
	10/27/84	4	± 1	4	± 1	.19	± .04	< .05		.59	± .01	.36	± .01
	MEAN	2.5	± 4.4	2.5	± 4.4	.15	± .11	< .04		.434	± .443	.240	± .341
3A	08/04/84	2.1	± .9	2.0	± .9	.13	± .04	.03	± .02	.165	± .007	.27	± .01
	10/27/84	4	± 1	4	± 1	.29	± .04	.06	± .04	.28	± .01	.28	± .01
	MEAN	3.1	± 2.7	3.0	± 2.8	.21	± .23	.05	± .04	.223	± .163	.28	± .01
4N	08/04/84	2.1	± .9	1.6	± .9	.51	± .05	< .01		.160	± .006	.243	± .006
	10/27/84	2.0	± .9	2	± 1	.49	± .05	< .02		.059	± .006	.16	± .01
	MEAN	2.1	± .1	1.8	± .6	.50	± .03	< .02		.110	± .143	.202	± .117
5	08/04/84	1.5	± .9	1.4	± .9	.12	± .04	< .01		.060	± .005	.147	± .006
	10/27/84	3.7	± .9	4	± 1	.16	± .04	< .05		.048	± .005	.143	± .009
	MEAN	2.6	± 3.1	2.7	± 3.7	.14	± .06	< .03		.054	± .017	.145	± .006
6G	08/04/84	3	± 1	3	± 1	.25	± .04	< .03		.164	± .006	.429	± .008
	10/27/84	4	± 1	4	± 1	.28	± .04	< .02		.149	± .007	.37	± .01
	MEAN	4	± 1	4	± 1	.27	± .04	< .03		.157	± .021	.400	± .083
MEAN ALL STATIONS		2.8	± 2.2	2.7	± 2.3	.25	± .32	.03	± .03	.200	± .335	.232	± .230

TABLE IV.6.1 ANALYTICAL DATA FOR SILT SAMPLES  
CONCENTRATION (PC/GRAM DRY)

STATION CODE	COLLECTION DATE	GROSS ALPHA		GROSS BETA		SR-89	SR-90		RAD. CESIUM
1BB	06/05/84	2	± 1	< 1		< .009	.013 ± .003	.392 ± .008	
	07/27/84	9	± 2	4	± 1	< .02	.042 ± .005	.138 ± .005	
	MEAN	6	± 10	3	± 4	< .015	.028 ± .041	.265 ± .359	
1X	06/05/84	6	± 2	3	± 1	< .01	.019 ± .006	.015 ± .003	
	07/27/84	1.2	± .5	< .8		< .02	.018 ± .006	.097 ± .005	
	MEAN	3.6	± 6.0	1.9	± 3.1	< .02	.019 ± .001	.056 ± .116	
4D	06/05/84	5	± 3	4	± 2	< .008	.008 ± .004	.035 ± .003	
	07/27/84	4	± 1	3	± 1	< .01	.044 ± .005	.278 ± .007	
	MEAN	5	± 1	4	± 1	< .009	.026 ± .051	.157 ± .344	
4J	06/05/84	3.1	± .9	2	± 1	< .03	.01 ± .01	.075 ± .004	
	07/27/84	5	± 1	2	± 1	< .02	.027 ± .008	.075 ± .004	
	MEAN	4.1	± 2.7	2	± 0	< .03	.019 ± .024	.075 ± .000	
4T	06/05/84	2	± 1	< 1		< .010	.034 ± .004	.371 ± .008	
	07/27/84	7	± 2	3	± 1	< .02	.054 ± .005	.22 ± .01	
	MEAN	5	± 7	2	± 3	< .015	.044 ± .028	.296 ± .214	
6F	06/05/84	2	± 1	< 1		< .01	.029 ± .004	.050 ± .004	
	07/27/84	5	± 2	3	± 1	< .01	.025 ± .003	.094 ± .004	
	MEAN	4	± 4	2	± 3	< .01	.027 ± .006	.072 ± .062	
MEAN ALL STATIONS		4.3	± 4.7	2.3	± 2.4	< .015	.027 ± .029	.153 ± .261	



TABLE IV 6.2  
ANALYTICAL DATA FOR SILT  
GAMMA SPECTRUM ANALYSIS (GELI)  
pCi/g DRY

Station	Collection Date	Cs-137	Cs-134	K-40	Ra-226	Th-232	Be-7	Co-60	I-131	Cr-51	Ba-140
6F	06/05/84	.11±.06	<.07	7.9±.7	.9±.1	.9±.2	.7±.5	<.07	<.3	<.8	<.6
	07/27/84	.16±.06	<.08	10.1±.9	.8±.1	1.0±.2	.9±.7	<.07	<1	<1	<1
	08/29/84	.20±.07	<.08	8.9±.8	.9±.1	1.1±.2	1.1±.7	<.07	<1	<1	<2
	09 --, --	.05±.04	<.04	11.1±.6	.48±.09	.8±.1	<.4	<.04	<.3	<.5	<.5
	10/24/84	<.04	<.04	6.9±.6	.48±.08	.5±.1	<.3	<.04	<.2	<.4	<.3
	11/19/84	.18±.07	<.06	9.2±.9	1.0±.1	.9±.2	<.7	<.08	<.5	<1	<.9
	12/05/84	.2±.1	<.00	14±1	1.6±.2	1.6±.3	<2	<.1	<6	<3	<5



TABLE IV.7.1 ANALYTICAL DATA FOR FISH SAMPLES (CONTINUED)  
CONCENTRATION (PC/GRAM ASH)

STATION CODE	MEDIA	COLLECTION DATE	ID	GROSS BETA		NET BETA		K-40		SR-89		SR-90	
4I	CATFISH	03/20/84	5A4899	32	± 8	< 9		33	± 3	.3	± .2	.71	± .04
			5B4899	20	± 8	< 9		36	± 4				
			5C4899	76	± 9	< 10		110	± 10				
			5D4899	19	± 8	< 8		29	± 3				
		06/19/84	5B4954	29	± 9	< 9		19	± 2				
		06/20/84	5A4954	60	± 10	< 10		55	± 6	< .4		.8	± .1
			5C4954	24	± 9	< 10		30	± 3				
			5D4954	26	± 9	< 10		31	± 3				
		09/18/84	5A5070	80	± 10	< 10		76	± 8	< .4		.57	± .06
			5B5070	30	± 10	< 10		35	± 3				
			5C5070	40	± 10	< 10		40	± 4				
			5D5070	30	± 10	< 10		33	± 3				
		11/08/84	5A5124	30	± 10	< 10		32	± 3	.5	± .4	.88	± .08
		11/18/84	5B5124	30	± 10	< 10		36	± 4				
			5C5124	20	± 10	< 10		28	± 3				
			5D5124	30	± 10	< 10		32	± 3				
		MEAN		35	± 39	< 10		41	± 45	.4	± .2	.74	± .27
CRAPPIE		03/15/84	5A4900	35	± 8	< 9		45	± 4	< .5		.5	± .1
			5B4900	31	± 8	< 10		52	± 5				
			5C4900	58	± 9	< 10		66	± 7				
			5D4900	62	± 9	< 10		82	± 8				
		05/10/84	5C4955	70	± 10	< 10		58	± 6				
		05/21/84	5A4955	50	± 10	< 10		56	± 6	< .4		.74	± .08
			5B4955	50	± 10	< 10		57	± 6				
			5D4955	38	± 10	< 10		48	± 5				
		09/18/84	5A5069	40	± 10	< 10		44	± 4	< .8		.9	± .1
			5B5069	40	± 10	< 10		38	± 4				
			5C5069	40	± 10	< 10		37	± 4				
			5D5069	50	± 10	< 10		44	± 4				
		10/02/84	5A5125	60	± 10	20 ± 10		41	± 4	.5	± .4	.72	± .05
		10/15/84	5D5125	50	± 10	< 10		43	± 4				
			5B5125	70	± 10	20 ± 10		48	± 5				
			5C5125	40	± 10	< 10		43	± 4				
		MEAN		49	± 24	11 ± 7		50	± 23	.6	± .3	.72	± .33

TABLE IV.7.1

ANALYTICAL DATA FOR FISH SAMPLES (CONTINUED)  
CONCENTRATION (PC/GRAM ASH)

STATION CODE	MEDIA	COLLECTION DATE	ID	GROSS BETA		NET BETA		K-40	SR-89	SR-90	
4J	CATFISH	03/15/84	5A4901	57	± 9	< 10		77 ± 8	< .5	.8	± .1
			5B4901	90	± 10	< 10		92 ± 9			
			5C4901	54	± 9	< 10		77 ± 8			
			5D4901	15	± 8	< 8		32 ± 3			
		06/04/84	5A4956	32	± 10	< 10		48 ± 5	< .3	.61	± .07
			5C4956	60	± 10	< 10		69 ± 7			
		06/18/84	5D4956	70	± 10	< 10		71 ± 7			
		06/25/84	5B4956	50	± 10	< 10		47 ± 5			
		09/17/84	5A5072	40	± 10	< 10		39 ± 4	< .9	1.0	± .2
			5B5072	60	± 10	< 10		58 ± 6			
			5C5072	60	± 10	10 ± 10		44 ± 4			
			5D5072	70	± 10	< 10		77 ± 8			
		10/02/84	5A5126	50	± 10	< 10		41 ± 4	< .5	.84	± .05
			5B5126	90	± 10	20 ± 10		67 ± 7			
			5C5126	80	± 10	< 10		69 ± 7			
			5D5126	120	± 10	30 ± 10		91 ± 9			
		MEAN		62	± 50	12 ± 11		62 ± 37	< .6	.81	± .32
	CRAPPIE	03/15/84	5A4902	45	± 8	< 10		59 ± 6	< .2	.38	± .04
			5B4902	52	± 10	< 10		64 ± 6			
			5C4902	51	± 10	< 10		58 ± 6			
			5D4902	43	± 9	< 10		61 ± 6			
		05/10/84	5A4957	50	± 10	< 10		46 ± 5	< .3	.66	± .05
			5C4957	46	± 10	< 10		55 ± 5			
			5D4957	50	± 10	< 10		56 ± 6			
		06/04/84	5B4957	37	± 10	< 10		49 ± 5			
		09/17/84	5A5071	40	± 10	< 10		37 ± 4	< .6	.8	± .1
			5B5071	30	± 10	< 10		35 ± 4			
			5C5071	50	± 10	< 10		44 ± 4			
		10/02/84	5D5071	30	± 10	< 10		38 ± 4			
			5A5127	30	± 10	< 10		39 ± 4	< .4	1.04	± .05
			5B5127	60	± 10	< 10		60 ± 6			
			5C5127	40	± 10	< 10		47 ± 5			
			5D5127	60	± 10	10 ± 10		44 ± 4			
		MEAN		45	± 19	10 ± 0		50 ± 19	< .4	.72	± .55



TABLE IV.7.2 ANALYTICAL DATA FOR FISH SAMPLES  
CONCENTRATION (PC/GRAM WET)

STATION CODE	MEDIA	COLLECTION DATE	ID	GROSS BETA	NET BETA	K-40	SR-89	SR-90
1EE	CATFISH	03/20/84	*A4897	2.1 ± .2	< .4	3.0 ± .3		
			*B4897	2.0 ± .2	< .3	2.3 ± .2	< .009	.019 ± .002
			*C4897	1.7 ± .2	< .3	2.4 ± .2		
			*D4897	1.8 ± .2	< .3	2.1 ± .2		
		05/27/84	*A4952	1.8 ± .4	< .5	2.5 ± .3	< .008	.039 ± .003
			*B4952	3.1 ± .7	< .8	3.7 ± .4		
			*C4952	1.7 ± .5	< .5	2.2 ± .2		
			*D4952	1.4 ± .4	< .4	1.8 ± .2		
		08/31/84	*B5073	3.2 ± .8	< .8	2.6 ± .3		
			*D5073	1.8 ± .5	< .5	1.6 ± .2		
		09/18/84	*A5073	1.8 ± .4	< .5	1.6 ± .2	< .04	.065 ± .008
			*C5073	1.3 ± .4	< .4	1.1 ± .1		
		10/29/84	*D5129	1.7 ± .6	< .6	1.7 ± .2		
		10/30/84	*A5129	1.9 ± .5	< .5	1.7 ± .2	< .02	.036 ± .004
			*B5129	2.5 ± .4	.5 ± .4	2.1 ± .2		
			*C5129	2.5 ± .3	.8 ± .3	1.7 ± .2		
		MEAN		2.0 ± 1.1	.5 ± .3	2.1 ± 1.3	< .019	.040 ± .038
1X	CATFISH	03/20/84	*D4898	1.8 ± .2	< .3	2.2 ± .2		
		03/27/84	*A4898	2.0 ± .3	< .4	2.3 ± .2	.02 ± .01	.018 ± .004
		03/30/84	*B4898	1.9 ± .2	< .3	2.1 ± .2		
			*C4898	2.0 ± .2	< .3	2.2 ± .2		
		06/19/84	*B4953	2.9 ± .3	.6 ± .4	2.3 ± .2		
			*C4953	2.3 ± .3	< .3	2.0 ± .2		
		06/27/84	*A4953	1.9 ± .4	.5 ± .5	1.4 ± .1	< .02	.054 ± .006
			*D4953	1.2 ± .4	< .5	1.6 ± .2		
		08/24/84	*A5068	1.9 ± .6	< .4	1.7 ± .2	< .03	.053 ± .005
			*C5068	2.2 ± .5	< .5	1.9 ± .2		
			*D5068	2.8 ± .6	.7 ± .6	2.1 ± .2		
		08/31/84	*B5068	1.3 ± .4	< .4	1.3 ± .1		
		10/30/84	*A5128	1.8 ± .5	< .5	1.7 ± .2	< .02	.031 ± .003
			*B5128	2.2 ± .4	< .4	2.0 ± .2		
			*C5128	1.9 ± .2	< .3	1.9 ± .2		
			*D5128	2.6 ± .2	.6 ± .3	2.0 ± .2		
		MEAN		2.0 ± .9	.4 ± .3	1.9 ± .6	.02 ± .01	.039 ± .035

TABLE IV.7.2

ANALYTICAL DATA FOR FISH SAMPLES (CONTINUED)  
CONCENTRATION (PC/GRAM WET)

STATION CODE	MEDIA	COLLECTION DATE	ID	GROSS BETA	NET BETA	K-40	SR-89	SR-90
4I	CATFISH	03/20/84	*A4899	1.5 ± .4	< .4	1.5 ± .2	.012 ± .009	.033 ± .002
			*B4899	.8 ± .3	< .4	1.5 ± .1		
			*C4899	1.6 ± .2	< .3	2.2 ± .2		
			*D4899	.9 ± .3	< .4	1.3 ± .1		
		06/19/84	*B4954	1.0 ± .5	< .5	1.0 ± .1	< .01	.027 ± .005
		06/20/84	*A4954	2.3 ± .4	< .4	2.0 ± .2		
			*C4954	1.1 ± .4	< .5	1.4 ± .1		
			*D4954	1.1 ± .4	< .4	1.3 ± .1		
		09/18/84	*A5070	2.1 ± .3	< .4	2.0 ± .2	< .01	.015 ± .001
			*B5070	1.4 ± .4	< .5	1.5 ± .2		
			*C5070	2.1 ± .5	< .5	1.9 ± .2		
			*D5070	1.3 ± .5	< .5	1.7 ± .2		
		11/08/84	*A5124	1.3 ± .5	< .5	1.6 ± .2	.03 ± .02	.043 ± .004
		11/18/84	*B5124	1.3 ± .5	< .5	1.7 ± .2		
			*C5124	1.1 ± .4	< .5	1.2 ± .1		
			*D5124	1.6 ± .5	< .6	1.7 ± .2		
		MEAN		1.4 ± .9	< .5	1.6 ± .6	.016 ± .019	.030 ± .023
	CRAPPIE	03/15/84	*A4900	1.6 ± .4	< .4	2.0 ± .2	< .02	.023 ± .005
			*B4900	1.4 ± .4	< .4	2.4 ± .2		
			*C4900	2.5 ± .4	< .5	2.9 ± .3		
			*D4900	2.4 ± .3	< .5	3.1 ± .3		
		05/10/84	*C4955	2.8 ± .4	< .5	2.4 ± .2	< .02	.032 ± .003
		05/21/84	*A4955	2.3 ± .4	< .5	2.4 ± .2		
			*B4955	2.1 ± .4	< .5	2.3 ± .2		
			*D4955	2.1 ± .5	< .6	2.6 ± .3		
		09/18/84	*A5069	1.8 ± .5	< .5	2.2 ± .2	< .04	.042 ± .007
			*B5069	2.4 ± .6	< .6	2.2 ± .2		
			*C5069	2.5 ± .6	< .6	2.2 ± .2		
			*D5069	2.5 ± .5	< .5	2.2 ± .2		
		10/02/84	*A5125	3.1 ± .6	.9 ± .6	2.2 ± .2	.03 ± .02	.039 ± .003
		10/15/84	*D5125	2.5 ± .5	< .6	2.1 ± .2		
			*B5125	2.9 ± .5	.8 ± .5	2.1 ± .2		
			*C5125	2.3 ± .6	< .6	2.5 ± .2		
		MEAN		2.3 ± .9	.6 ± .3	2.4 ± .6	.03 ± .02	.034 ± .017

TABLE IV.7.2 ANALYTICAL DATA FOR FISH SAMPLES (CONTINUED)  
CONCENTRATION (PC/GRAM WET)

STATION CODE	MEDIA	COLLECTION DATE	ID	GROSS BETA	NET BETA	K-40	SR-89	SR-90
4J	CATFISH	03/15/84	*A4901	2.0 ± .3	< .4	2.7 ± .3	< .02	.026 ± .003
			*B4901	2.6 ± .3	< .4	2.6 ± .3		
			*C4901	1.6 ± .3	< .3	2.3 ± .2		
			*D4901	.9 ± .4	< .5	1.8 ± .2		
		06/04/84	*A4956	1.8 ± .5	< .6	2.6 ± .3	< .02	.034 ± .004
			*C4956	2.5 ± .4	< .5	2.8 ± .3		
		06/18/84	*D4956	2.6 ± .4	< .5	2.8 ± .3		
		06/25/84	*B4956	2.3 ± .5	< .5	2.1 ± .2		
		09/17/84	*A5072	1.6 ± .4	< .4	1.4 ± .1	< .04	.038 ± .009
			*B5072	2.2 ± .4	< .4	2.1 ± .2		
			*C5072	2.4 ± .4	.5 ± .5	1.9 ± .2		
			*D5072	2.1 ± .3	< .4	2.3 ± .2		
		10/02/84	*A5126	2.1 ± .4	< .5	1.7 ± .2	< .02	.035 ± .002
			*B5126	2.4 ± .3	.5 ± .4	1.8 ± .2		
			*C5126	2.2 ± .3	< .4	1.9 ± .2		
			*D5126	3.0 ± .3	.7 ± .4	2.4 ± .2		
		MEAN		2.1 ± 1.0	.5 ± .2	2.2 ± .9	< .03	.033 ± .010
	CRAPPIE	03/15/84	*A4902	2.2 ± .4	< .5	2.9 ± .3	< .009	.019 ± .002
			*B4902	2.3 ± .4	< .5	2.8 ± .3		
			*C4902	2.1 ± .4	< .5	2.4 ± .2		
			*D4902	1.9 ± .4	< .5	2.7 ± .3		
		05/10/84	*A4957	2.4 ± .5	< .6	2.3 ± .3	< .02	.033 ± .003
			*C4957	2.3 ± .5	< .6	2.7 ± .3		
			*D4957	2.3 ± .4	< .5	2.4 ± .2		
		06/04/84	*B4957	1.9 ± .5	< .6	2.5 ± .2		
		09/17/84	*A5071	1.8 ± .5	< .5	1.8 ± .2	< .03	.041 ± .007
			*B5071	1.5 ± .5	< .6	1.9 ± .2		
			*C5071	2.2 ± .5	< .5	2.0 ± .2		
			*D5071	1.8 ± .5	< .6	2.0 ± .2		
		10/02/84	*A5127	1.9 ± .6	< .6	2.2 ± .2	< .02	.058 ± .003
			*B5127	2.7 ± .5	< .5	2.6 ± .3		
			*C5127	2.2 ± .5	< .6	2.3 ± .2		
			*D5127	3.1 ± .6	.8 ± .6	2.3 ± .2		
		MEAN		2.2 ± .8	.6 ± .2	2.4 ± .7	< .020	.038 ± .033

TABLE IV.2.2

ANALYTICAL DATA FOR FISH SAMPLES (CONTINUED)  
CONCENTRATION (PC/GRAM WET)

STATION CODE	MEDIA	COLLECTION DATE	ID	GROSS BETA	NET BETA	K-40	SR-89	SR-90
6H	CATFISH	03/20/84	*B4903	1.2 ± .4	< .4	1.5 ± .2		
			*C4903	2.0 ± .3	< .4	2.3 ± .2		
			*D4903	1.6 ± .4	< .4	1.6 ± .2		
		03/27/84	*A4903	1.2 ± .4	< .4	1.4 ± .1	< .01	.034 ± .003
		05/18/84	*B4958	.2 ± .1	< .1	.27 ± .03		
			*C4958	2.3 ± .3	< .3	2.0 ± .2		
		06/18/84	*A4958	1.7 ± .4	< .5	2.1 ± .2	.02 ± .02	.039 ± .006
			*D4958	1.4 ± .4	< .5	2.1 ± .2		
		09/17/84	*B5074	3.3 ± .7	1.6 ± .7	1.7 ± .2		
		09/18/84	*D5074	1.8 ± .5	< .5	1.4 ± .1		
		09/25/84	*A5074	1.2 ± .4	< .4	1.2 ± .1	< .03	.047 ± .006
			*C5074	1.4 ± .3	< .4	1.2 ± .1		
		10/22/84	*D5130	1.0 ± .2	< .3	.9 ± .1		
		11/05/84	*A5130	1.4 ± .6	< .6	1.2 ± .1	< .02	.057 ± .003
			*B5130	1.4 ± .4	< .4	1.3 ± .1		
			*C5130	3.3 ± .3	1.8 ± .4	1.5 ± .2		
		MEAN		1.7 ± 1.6	.6 ± .9	1.48 ± 1.01	.02 ± .02	.044 ± .020
	CRAPPIE	03/29/84	*A4904	1.2 ± .5	< .5	2.6 ± .3	< .008	.026 ± .002
			*B4904	2.1 ± .4	< .5	2.2 ± .2		
			*C4904	2.1 ± .4	< .5	2.5 ± .2		
			*D4904	2.2 ± .4	< .4	2.2 ± .2		
		05/16/84	*A4959	1.4 ± .4	< .5	1.7 ± .2	< .02	.069 ± .004
			*D4959	2.0 ± .2	< .3	1.8 ± .2		
		05/18/84	*B4959	3.4 ± .6	< .6	3.1 ± .3		
			*C4959	1.7 ± .2	< .3	1.7 ± .2		
		09/17/84	*D5067	1.8 ± .6	< .6	2.3 ± .2		
		09/18/84	*A5067	2.4 ± .6	< .6	2.2 ± .2	< .06	.056 ± .007
			*B5067	2.5 ± .6	< .6	2.2 ± .2		
			*C5067	2.6 ± .7	< .8	3.0 ± .3		
		10/22/84	*A5131	2.7 ± .6	< .6	2.2 ± .2	< .02	.039 ± .003
			*D5131	2.3 ± .6	< .6	2.3 ± .2		
		10/24/84	*C5131	.7 ± .2	< .2	.93 ± .09		
		11/05/84	*B5131	2.2 ± .5	< .6	2.2 ± .2		
		MEAN		2.1 ± 1.3	< .5	2.20 ± 1.03	< .027	.048 ± .038
MEAN	CATFISH	ALL STATIONS		1.9 ± 1.2	.5 ± .5	1.86 ± 1.06	.020 ± .019	.037 ± .027
	CRAPPIE	ALL STATIONS		2.2 ± 1.0	.5 ± .2	2.31 ± .78	.025 ± .028	.040 ± .030







TABLE IV. 9.1 ANALYTICAL DATA FOR MILK SAMPLES  
CONCENTRATION (PC/LITER)  
NEARBY FARMS

STATION CODE	COLLECTION DATE	GROSS BETA	NET BETA	K-40	SR-89	SR-90	I-131	CS-134	CS-137
G	03/19/84	770 ± 80	100 ± 100	650 ± 70	< .7	4.8 ± .3	.1 ± .1	< 3	< 3
	08/13/84	1300 ± 90	200 ± 100	1100 ± 100	< 1	5.4 ± .3	.2 ± .1	< 6	< 5
	09/03/84	1170 ± 80	200 ± 100	1000 ± 100	< .9	3.9 ± .3	< .1	< 2	3 ± 2
	12/17/84	730 ± 60	< 90	690 ± 70	< 1	5.4 ± .3	< .2	< 3	3 ± 2
	MEAN	993 ± 571	148 ± 122	860 ± 448	< .9	4.9 ± 1.4	.2 ± .1	< 4	4 ± 2
J	03/19/84	820 ± 80	< 100	770 ± 80	< .6	3.5 ± .3	< .1	< 2	2 ± 2
	08/13/84	1410 ± 90	300 ± 100	1100 ± 100	< 1	5.9 ± .3	< .1	< 3	< 3
	09/03/84	590 ± 70	< 90	620 ± 60	< 1	5.5 ± .4	.3 ± .1	5 ± 5	< 4
	12/17/84	960 ± 80	100 ± 100	820 ± 80	< 1	2.9 ± .3	< .2	< 2	< 2
	MEAN	945 ± 691	148 ± 204	828 ± 401	< .9	4.5 ± 2.9	.2 ± .2	3 ± 3	3 ± 2
O	03/19/84	660 ± 80	< 100	640 ± 60	< .7	3.0 ± .3		< 3	< 2
	08/13/84	1280 ± 90	200 ± 100	1000 ± 100	< 2	4.5 ± .5		< 3	3 ± 2
	09/03/84	1050 ± 90	200 ± 100	850 ± 80	< 1	3.5 ± .5		< 2	< 2
	12/17/84	1110 ± 90	< 100	1000 ± 100	< .9	2.8 ± .2		< 2	2 ± 2
	MEAN	1025 ± 524	150 ± 115	873 ± 341	< 1.2	3.5 ± 1.5		< 3	2 ± 1
MEAN ALL STATIONS		986 ± 547	148 ± 136	853 ± 363	< 1.0	4.3 ± 2.3	.2 ± .1	3 ± 3	3 ± 2

TABLE IV. 9.1 ANALYTICAL DATA FOR MILK SAMPLES (CONTINUED)  
CONCENTRATION (PC/LITER)  
INTERMEDIATE FARMS

STATION CODE	COLLECTION DATE	GROSS BETA	NET BETA	K-40	SR-89	SR-90	I-131	CS-134	CS-137
D	03/19/84	590 ± 90	< 100	550 ± 50	< .8	4.0 ± .3		< 3	3 ± 2
	08/13/84	650 ± 50	120 ± 70	530 ± 50	< 2	6.8 ± .4		< 3	4 ± 2
	09/03/84	840 ± 90	< 100	900 ± 90	< .9	6.1 ± .4		< 3	< 2
	12/17/84	950 ± 90	< 120	860 ± 90	1 ± 1	2.7 ± .2		< 2	< 2
	MEAN	758 ± 334	110 ± 23	715 ± 405	1.2 ± 1.1	4.9 ± 3.8		< 3	3 ± 2
L	03/19/84	720 ± 80	< 100	790 ± 80	< .7	2.9 ± .3		< 3	< 2
	08/13/84	1160 ± 80	300 ± 100	910 ± 90	< 1	3.0 ± .3		< 2	< 2
	09/03/84	1080 ± 90	< 100	1000 ± 100	< .8	3.2 ± .3		< 3	< 2
	12/17/84	1210 ± 90	100 ± 100	1100 ± 100	< .9	1.9 ± .2		< 3	< 2
	MEAN	1043 ± 443	150 ± 200	950 ± 264	< .9	2.8 ± 1.2		< 3	< 2
H	03/19/84	1000 ± 100	< 100	970 ± 100	< 2	3.2 ± .4		< 3	< 3
	08/13/84	950 ± 70	200 ± 100	740 ± 70	< 1	3.8 ± .3		< 4	4 ± 3
	09/03/84	1100 ± 100	< 100	1000 ± 100	< .9	4.4 ± .3		< 5	< 5
	12/17/84	1100 ± 100	< 100	1100 ± 100	< 1	4.3 ± .3		< 2	< 2
	MEAN	1038 ± 150	125 ± 100	953 ± 304	< 1.2	3.9 ± 1.1		< 4	4 ± 3
N	03/19/84	1030 ± 90	< 100	1000 ± 100	< .9	3.3 ± .4		< 3	< 3
	08/13/84	1150 ± 80	200 ± 100	970 ± 100	< 1	3.8 ± .3		< 3	< 2
	09/03/84	820 ± 80	< 100	830 ± 80	< 1	3.2 ± .4		< 4	4 ± 4
	12/17/84	970 ± 90	< 100	860 ± 90	< .9	2.6 ± .2		< 3	< 3
	MEAN	993 ± 274	125 ± 100	915 ± 165	< 1.0	3.2 ± 1.0		< 3	3 ± 2
MEAN ALL STATIONS		958 ± 374	128 ± 114	883 ± 334	1.1 ± .8	3.7 ± 2.5		< 3	3 ± 2

TABLE IV.9.1 ANALYTICAL DATA FOR MILK SAMPLES (CONTINUED)  
CONCENTRATION (PC/LITER)  
DISTANT FARMS

STATION COLLECTION CODE	DATE	GROSS BETA	NET BETA	K-40	SR-89	SR-90	I-131	CS-134	CS-137
A	03/19/84	630 ± 70	< 100	1200 ± 100	< .7	2.6 ± .3	.2 ± .1	< 3	< 2
	08/13/84	1260 ± 80	< 100	1100 ± 100	< 1	2.6 ± .3	< .1	< 3	< 2
	09/03/84	750 ± 70	< 100	730 ± 70	< .8	2.3 ± .3	.2 ± .1	< 3	< 2
	12/17/84	1050 ± 80	300 ± 100	780 ± 80	< 1	2.4 ± .3	< .2	< 2	< 2
	MEAN	923 ± 572	150 ± 200	953 ± 465	< .9	2.5 ± .3	.2 ± .1	< 3	< 2
B	03/19/84	860 ± 90	< 100	1100 ± 100	< .7	2.9 ± .3		< 4	< 3
	08/13/84	1160 ± 80	200 ± 100	980 ± 100	2 ± 1	3.1 ± .4		< 4	< 3
	09/03/84	890 ± 80	< 100	790 ± 80	< 1	4.0 ± .4		< 4	< 4
	12/17/84	1030 ± 80	< 130	1000 ± 100	< .9	2.8 ± .2		< 3	< 2
	MEAN	985 ± 276	133 ± 94	968 ± 259	1.2 ± 1.2	3.2 ± 1.1		< 4	< 3
C	03/19/84	880 ± 90	< 100	860 ± 90	< .7	2.4 ± .3	< .1	< 2	< 2
	08/13/84	1130 ± 90	< 100	1000 ± 100	< 1	4.6 ± .4	.17 ± .09	< 5	< 5
	09/03/84	960 ± 90	200 ± 100	800 ± 80	1 ± 1	3.2 ± .4	.3 ± .1	< 3	< 3
	12/17/84	1200 ± 80	300 ± 100	870 ± 90	< 1	3.0 ± .2	< .2	< 3	< 3
	MEAN	1043 ± 296	175 ± 191	883 ± 168	.9 ± .3	3.3 ± 1.9	.19 ± .17	< 3	< 3
E	03/19/84	750 ± 80	100 ± 100	610 ± 60	< 1	3.7 ± .4		< .3	< 2
	08/13/84	1070 ± 80	< 100	990 ± 100	< 1	4.3 ± .3		< 4	< 3
	09/03/84	770 ± 80	< 100	760 ± 80	< .8	3.5 ± .3		< 3	4 ± 3
	12/17/84	890 ± 70	100 ± 100	770 ± 80	1 ± 1	4.5 ± .2		< 3	< 2
	MEAN	870 ± 294	100 ± 0	783 ± 313	1.0 ± .2	4.0 ± 1.0		< 2.6	3 ± 2
MEAN ALL STATIONS		955 ± 365	139 ± 142	896 ± 324	1.0 ± .6	3.2 ± 1.5	.18 ± .13	< 3.1	3 ± 2

TABLE IV.9.2 MEAN RADIOACTIVITY CONCENTRATION  
IN MILK SAMPLES (PC/LITER)

FARM GROUPS	COLLECTION DATE	GROSS BETA		NET BETA		K-40	SR-89	SR-90	I-131	CS-134	CS-137
NEARBY FARMS (1)	03/19/84	750	± 164	100	± 0	687 ± 145	< .7	3.8 ± 1.9	.1 ± .0	< 3	2 ± 1
	08/13/84	1330	± 140	233	± 115	1067 ± 115	< 1	5.3 ± 1.4	.2 ± .1	< 4	4 ± 2
	09/03/84	937	± 612	163	± 127	823 ± 383	< 1.0	4.3 ± 2.1	.2 ± .3	3 ± 3	3 ± 2
	12/17/84	933	± 383	97	± 12	837 ± 311	< 1.0	3.7 ± 2.9	< .2	< 2	2 ± 1
	MEAN	988	± 547	148	± 138	853 ± 363	< 1.0	4.3 ± 2.3	.2 ± .1	3 ± 3	3 ± 2
INTERMEDIATE FARMS (2)	03/19/84	835	± 430	< 100		828 ± 414	< 1.1	3.4 ± .9		< 3	3 ± 1
	08/13/84	978	± 478	205	± 147	788 ± 395	< 1	4.4 ± 3.4		< 3	3 ± 2
	09/03/84	960	± 301	< 100		933 ± 166	< .9	4.2 ± 2.7		< 4	3 ± 3
	12/17/84	1058	± 243	105	± 20	985 ± 266	1.0 ± .1	2.9 ± 2.0		< 3	< 2
	MEAN	958	± 374	128	± 114	883 ± 334	1.1 ± .8	3.7 ± 2.5		< 3	3 ± 2
DISTANT FARMS (3)	03/19/84	780	± 230	100	± 0	943 ± 527	< .8	2.9 ± 1.1	.2 ± .1	< 2.3	< 2
	08/13/84	1155	± 159	125	± 100	1018 ± 111	1 ± 1	3.7 ± 1.9	.14 ± .10	< 4	< 3
	09/03/84	843	± 200	125	± 100	770 ± 63	.9 ± .2	3.3 ± 1.4	.3 ± .1	< 3	3 ± 2
	12/17/84	1043	± 254	208	± 215	855 ± 213	1.0 ± .1	3.2 ± 1.8	< .2	< 3	< 2
	MEAN	955	± 365	139	± 142	896 ± 324	1.0 ± .6	3.2 ± 1.5	.18 ± .13	< 3.1	3 ± 2
MEAN ALL STATIONS		965	± 415	138	± 129	880 ± 332	1.0 ± .7	3.7 ± 2.2	.17 ± .14	3.1 ± 2.0	3 ± 2

(1) NEARBY FARMS WERE G, J AND O

(2) INTERMEDIATE FARMS WERE D, L, M AND N

(3) DISTANT FARMS WERE A, B, C AND E

TABLE IV.10.1 ANALYTICAL DATA FOR RABBIT SAMPLES  
CONCENTRATION (PC/GRAM ASH)

COLLECTION DATE	MEDIA	ID	GROSS BETA		NET BETA		K-40		SR-89		SR-90	
06/20/84	BONE	5B4949	21	± 9	< 9		16	± 2	< 2		5.5	± .5
	SOFT TISSUE	5T4949	190	± 10	50	± 20	150	± 10				
	MUSCLE	5M4949	190	± 10	40	± 20	150	± 10				
06/23/84	BONE	5B4950	25	± 9	< 10		26	± 3	< 3		6.4	± .8
	SOFT TISSUE	5T4950	150	± 10	30	± 20	120	± 10				
	MUSCLE	5M4950	210	± 10	60	± 20	150	± 20				
06/30/84	BONE	5B4951	12	± 9	< 9		11	± 1	1	± 1	2.3	± .3
	SOFT TISSUE	5T4951	150	± 10	60	± 20	92	± 9				
	MUSCLE	5M4951	110	± 10	< 20		128	± 1				
02/04/85	BONE	5B5187	15	± 9	9	± 9	6	± 1	< .2		4.14	± .08
	SOFT TISSUE	5T5187	160	± 10	< 20		150	± 20				
	MUSCLE	5M5187	190	± 10	< 30		230	± 20				
02/07/85	BONE	5B5188	16	± 9	< 9		8	± 1	< .2		2.87	± .07
	SOFT TISSUE	5T5188	160	± 10	< 20		160	± 20				
	MUSCLE	5M5188	200	± 10	< 30		230	± 20				
MEAN	BONE		18	± 10	9	± 1	13	± 16	1.3	± 2.4	4.24	± 3.45
	SOFT TISSUE		162	± 33	36	± 36	134	± 56				
	MUSCLE		180	± 80	36	± 30	178	± 97				

TABLE IV.10.2 ANALYTICAL DATA FOR RABBIT SAMPLES  
CONCENTRATION (PC/GRAM NET)

COLLECTION DATE	MEDIA	ID	GROSS BETA		NET BETA		K-40		SR-89		SR-90		I-131 (A)
06/20/84	BONE	*B4949	4	± 2	< 2		2.6	± .3	< .4		.92	± .08	< 1000
	THYROID	504949											
	SOFT TISSUE	*T4949	3.1	± .2	.7	± .3	2.3	± .2					
	MUSCLE	*M4949	2.7	± .2	.6	± .3	2.1	± .2					
06/23/84	BONE	*B4950	2.4	± .9	< .9		2.5	± .3	< .3		.61	± .08	< 900
	THYROID	504950											
	SOFT TISSUE	*T4950	2.5	± .2	.4	± .3	2.1	± .2					
	MUSCLE	*M4950	2.9	± .2	.8	± .3	2.1	± .2					
06/30/84	BONE	*B4951	2	± 1	< 1		1.6	± .2	.2	± .1	.32	± .04	< 500
	THYROID	504951											
	SOFT TISSUE	*T4951	3.0	± .2	1.2	± .3	1.8	± .2					
	MUSCLE	*M4951	2.2	± .2	< .3		2.4	± .2					
02/04/85	BONE	*B5187	4	± 3	3	± 3	1.7	± .3	< .05		1.17	± .02	< 40
	THYROID	505187											
	SOFT TISSUE	*T5187	1.6	± .1	< .2		1.6	± .2					
	MUSCLE	*M5187	2.5	± .2	< .3		3.0	± .3					
02/07/85	BONE	*B5188	4	± 2	< 2		2.3	± .3	< .04		.77	± .02	< 30
	THYROID	505188											
	SOFT TISSUE	*T5188	.66	± .05	< .08		.64	± .06					
	MUSCLE	*M5188	2.5	± .2	< .3		2.9	± .3					
MEAN	BONE		3.3	± 2.0	1.8	± 1.7	2.1	± .9	.20	± .31	.76	± .64	< 494
	THYROID												
	SOFT TISSUE		2.17	± 2.07	.52	± .90	1.69	± 1.29					
	MUSCLE		2.6	± .5	.5	± .5	2.5	± .9					

(A) PCI/THYROID

FIGURE IV.1.1

GROSS BETA RADIOACTIVITY IN AIR PARTICULATE SAMPLES  
FOR GROUP I - STATIONS 1A, 1B, & 2  
AND GROUP III - STATIONS 12A & 12D

CONCENTRATION (pCi/m<sup>3</sup>)

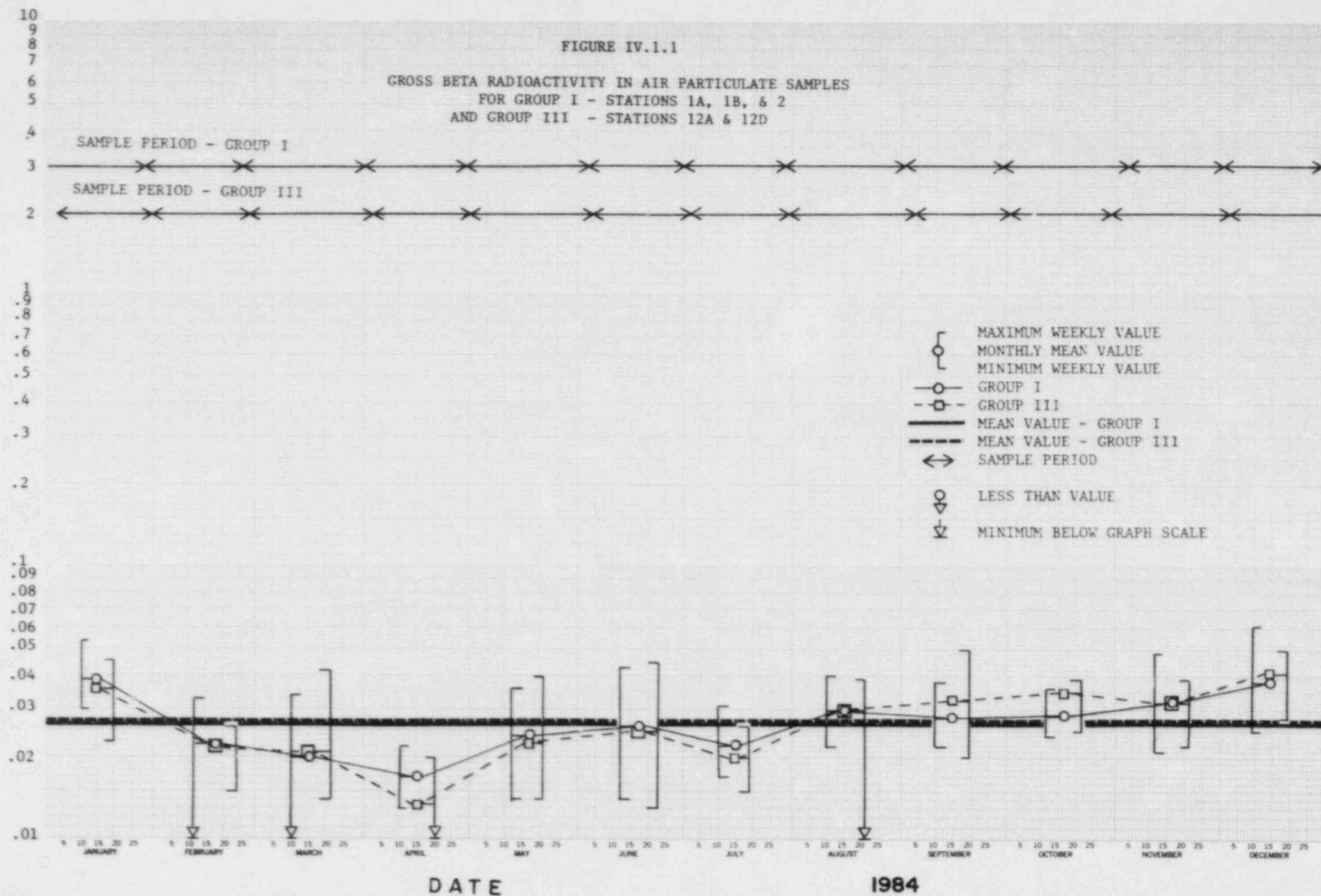


FIGURE IV.1.2

GROSS BETA RADIOACTIVITY IN AIR PARTICULATE SAMPLES  
FOR GROUP II - STATIONS 3A, 4A, 4B, 5, 6B, 14,  
15, 17, 31, 32, 33A & 38 and GROUP III -  
STATIONS 12A and 12D

CONCENTRATION (pCi/m<sup>3</sup>)

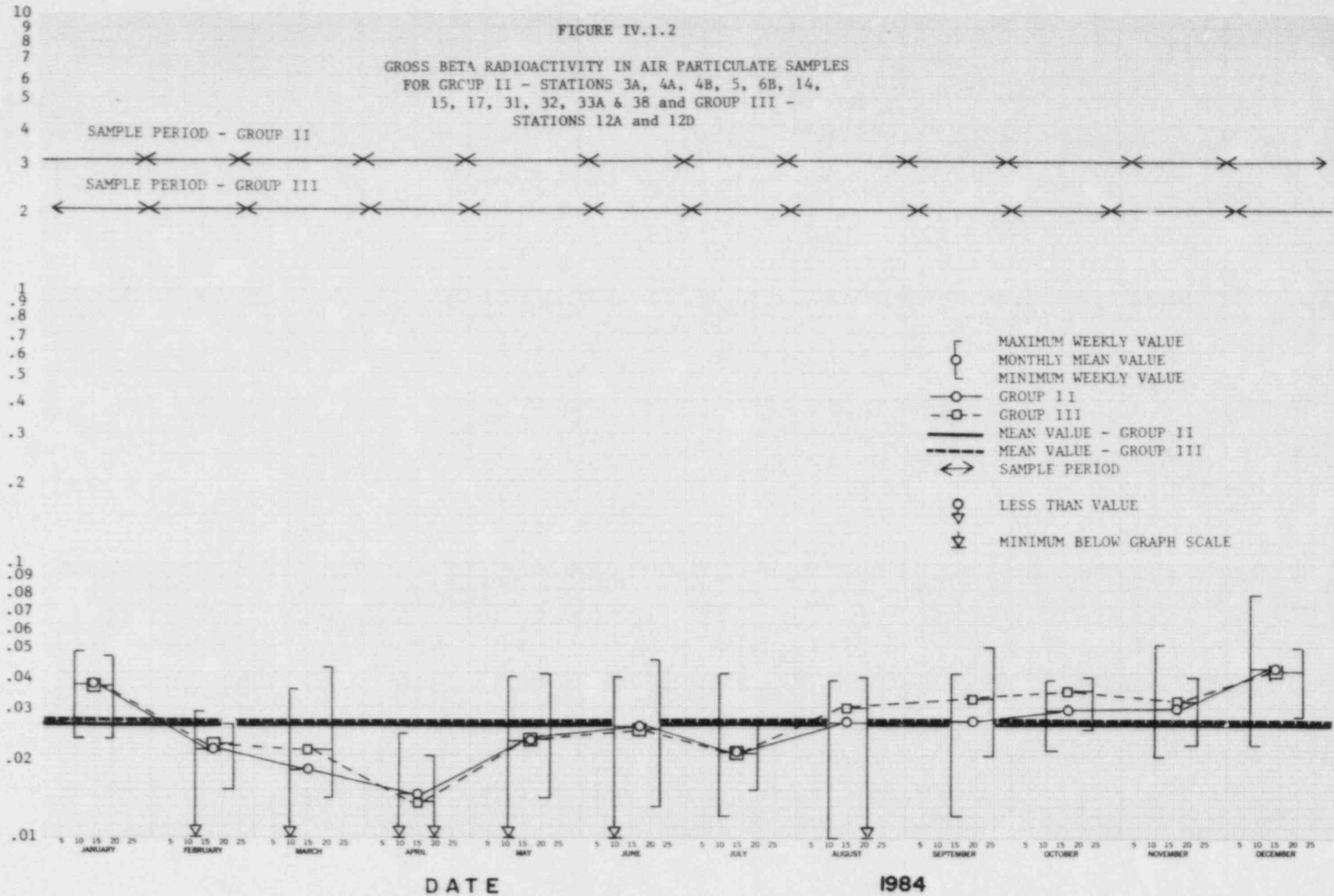


FIGURE IV. 1.3  
GROSS BETA RADIOACTIVITY IN AIR  
PARTICULATE SAMPLES FOR ALL STATIONS-  
LONG TERM PLOT

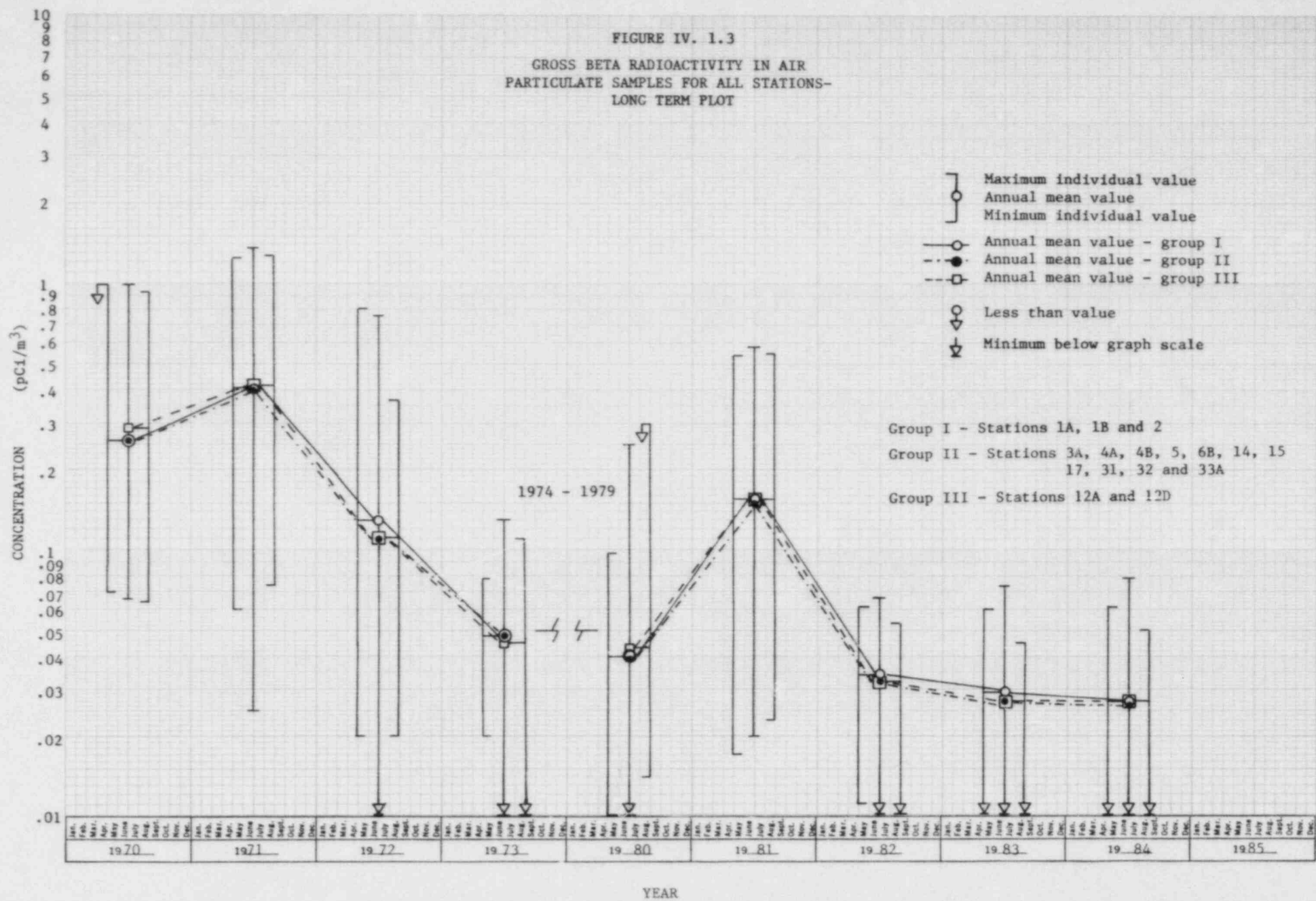


FIGURE IV.3.1

MONTHLY MEAN CONCENTRATION OF GROSS BETA  
RADIOACTIVITY IN UNITS 2 AND 3 INTAKE  
AND DISCHARGE WATER SAMPLES  
SOLUBLE FRACTION

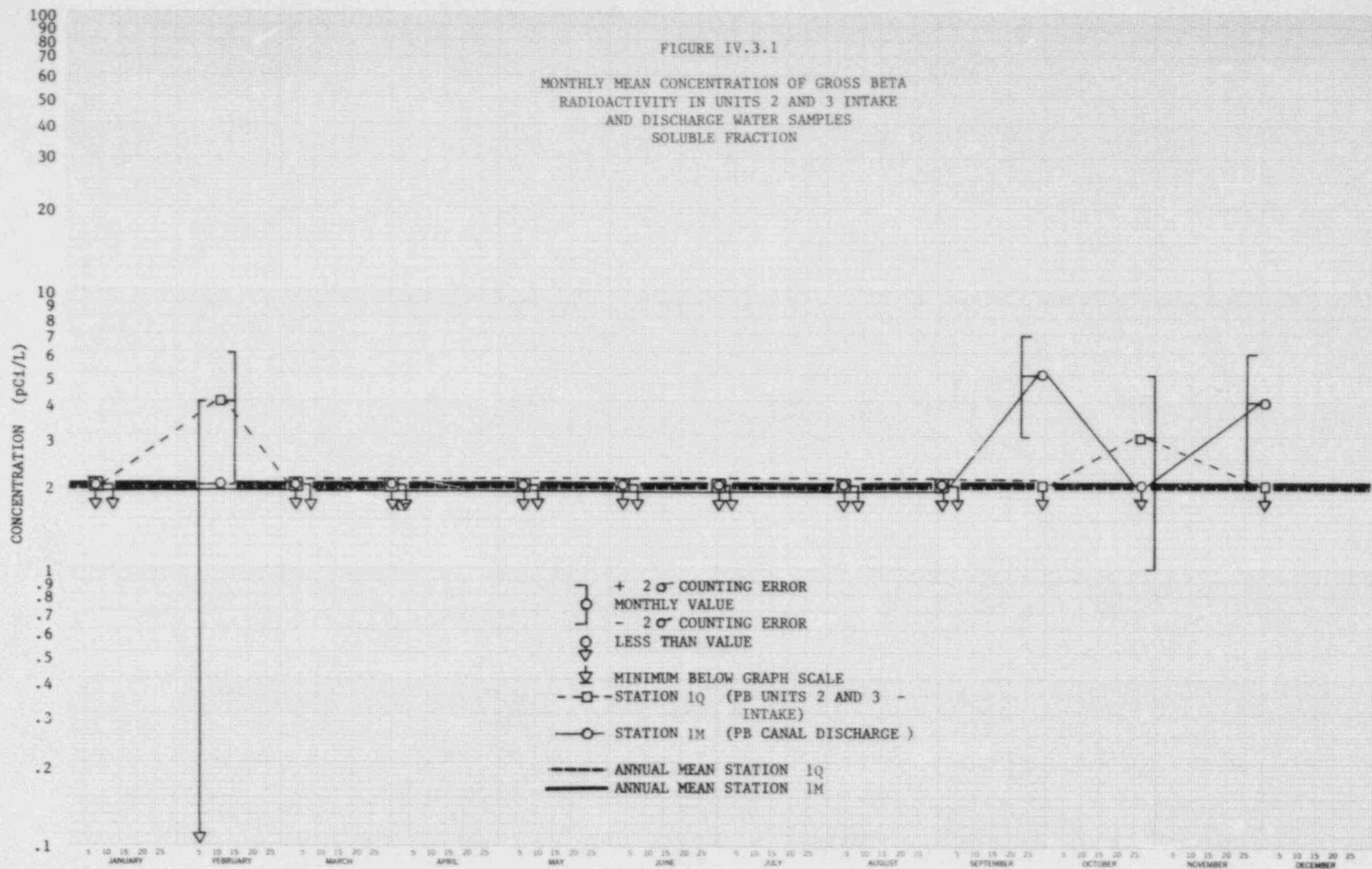


FIGURE IV.3.2

MONTHLY MEAN CONCENTRATION OF GROSS BETA  
RADIOACTIVITY IN UNITS 2 AND 3 INTAKE  
AND DISCHARGE WATER SAMPLES  
INSOLUBLE FRACTION

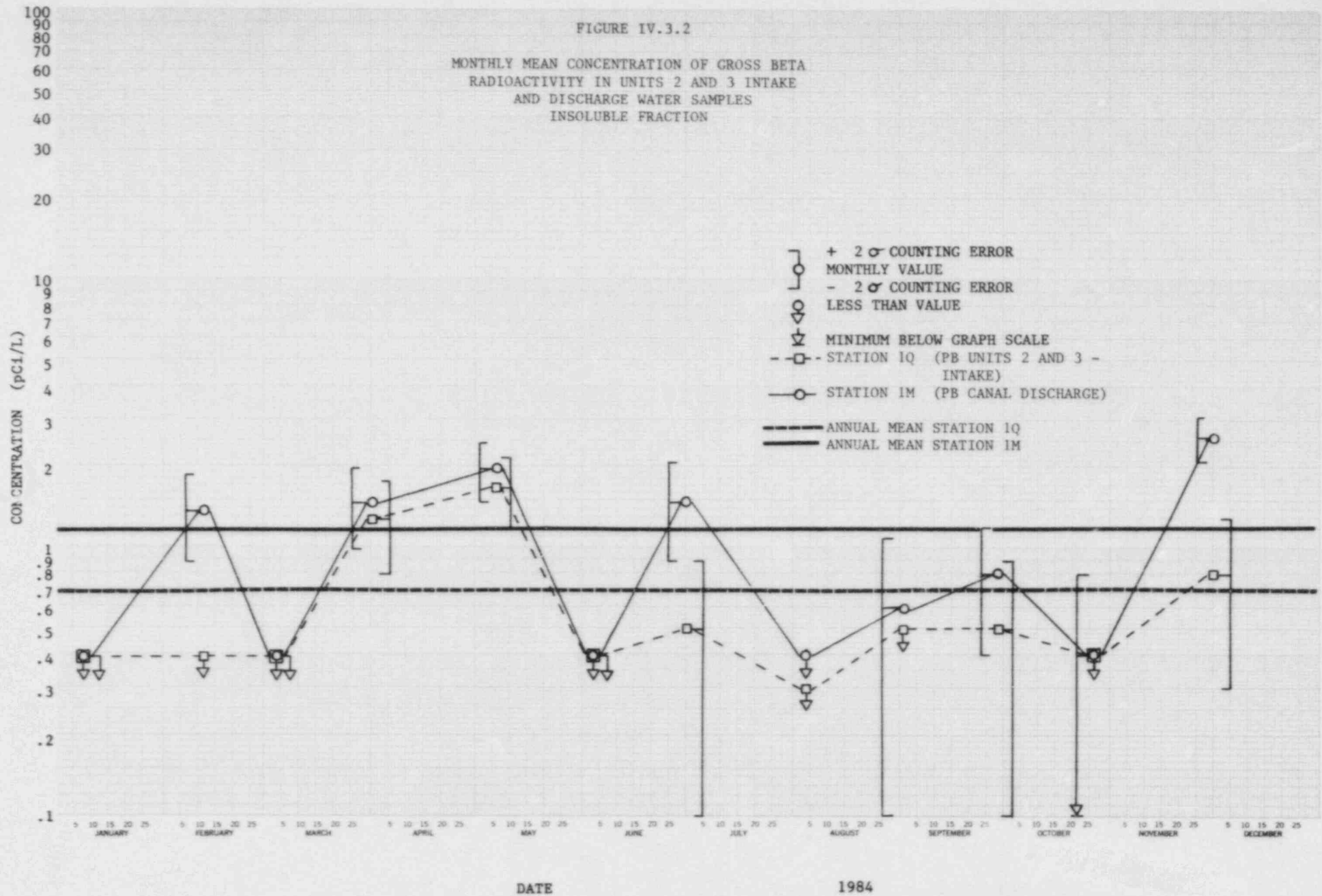


FIGURE IV.3.3

MONTHLY MEAN CONCENTRATION OF GROSS BETA  
RADIOACTIVITY IN COMPOSITE SURFACE WATER  
SAMPLES CONOWINGO DAM STATION 4L  
AND HOLTWOOD DAM STATION 6I  
SOLUBLE FRACTION

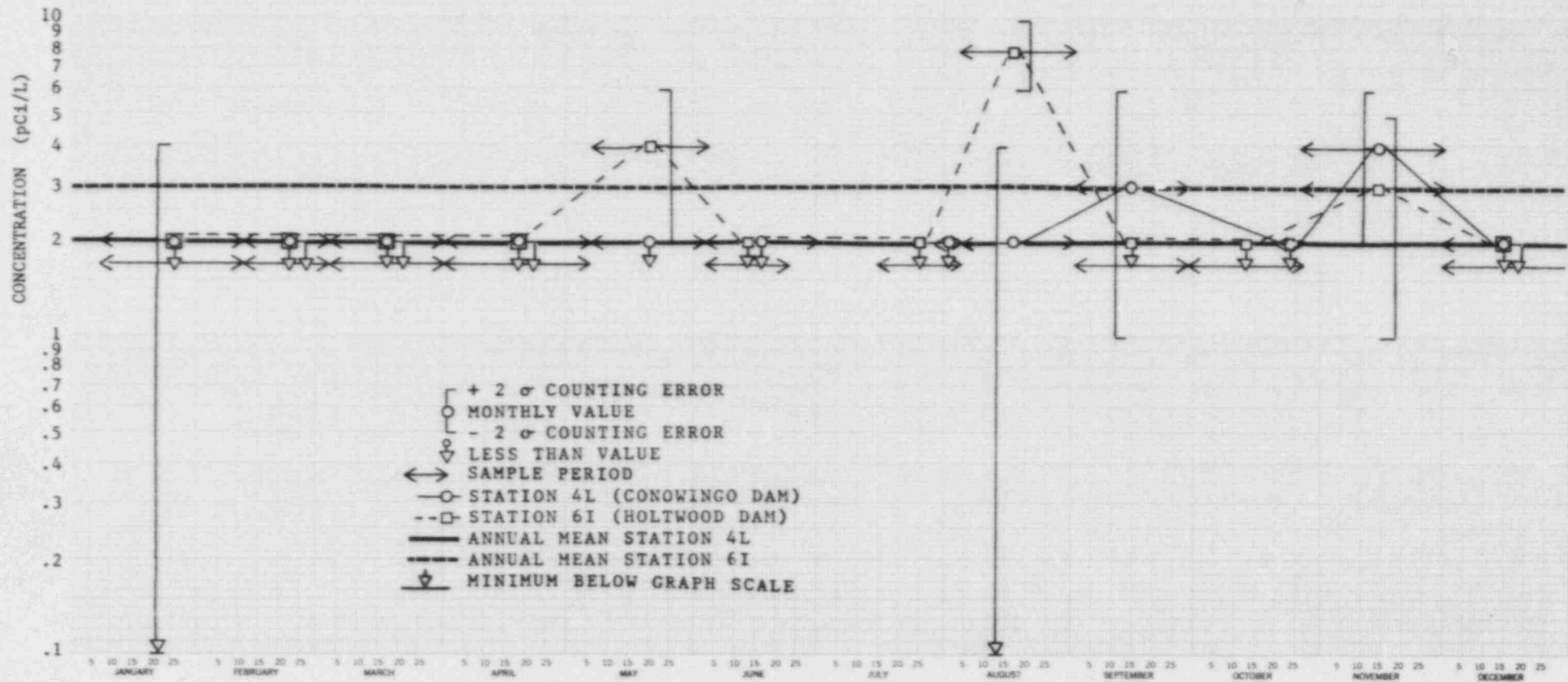
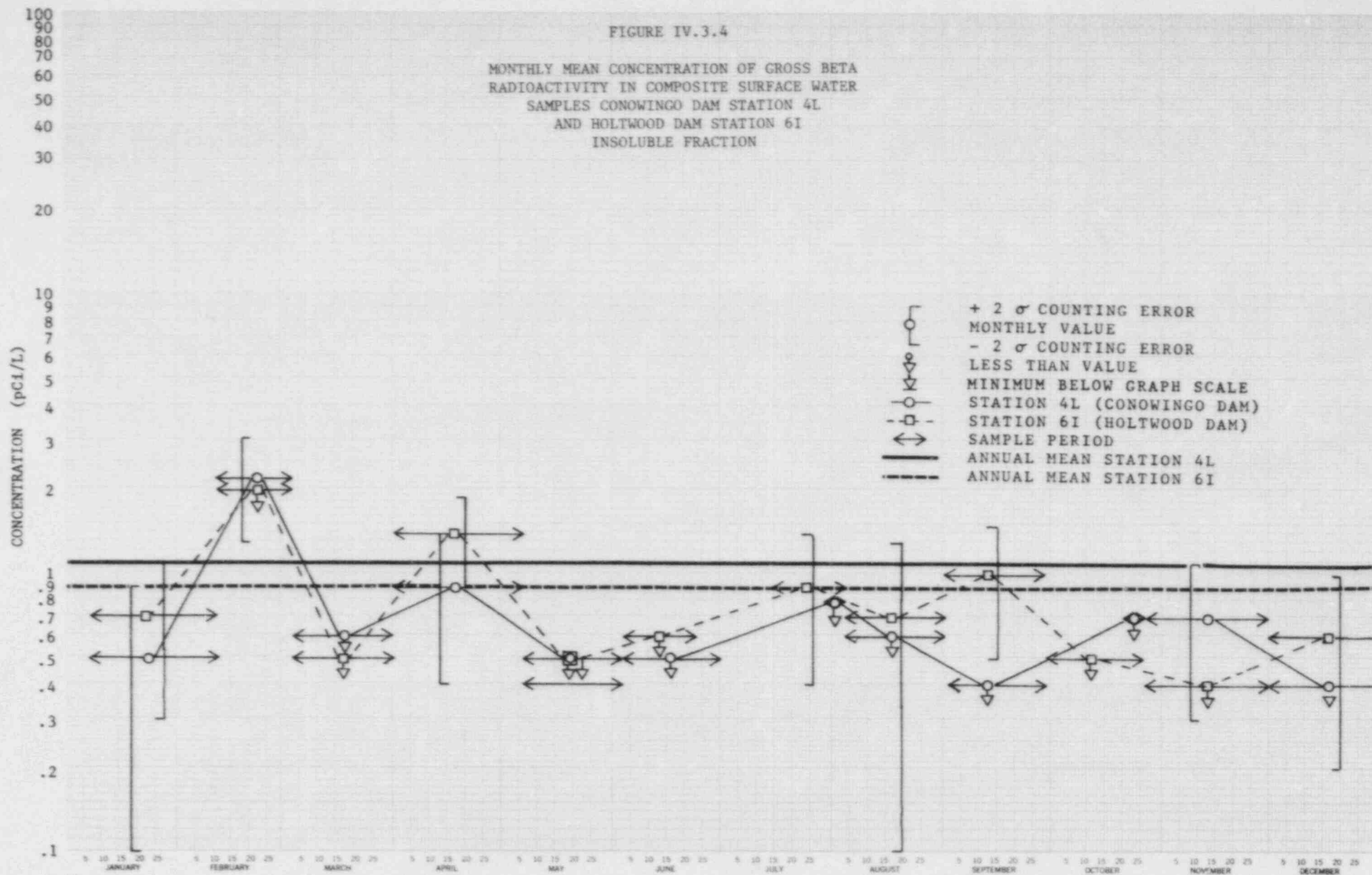
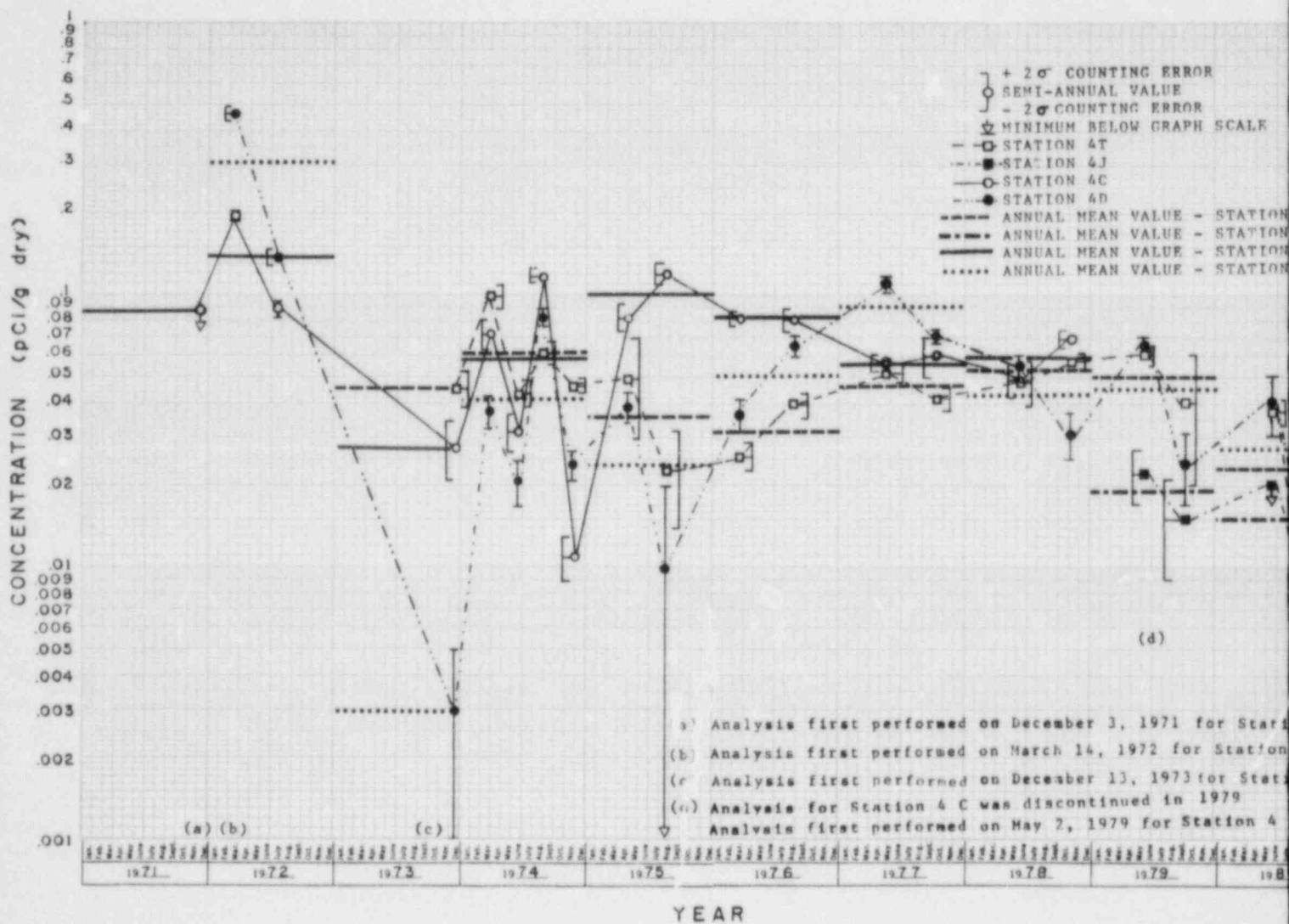


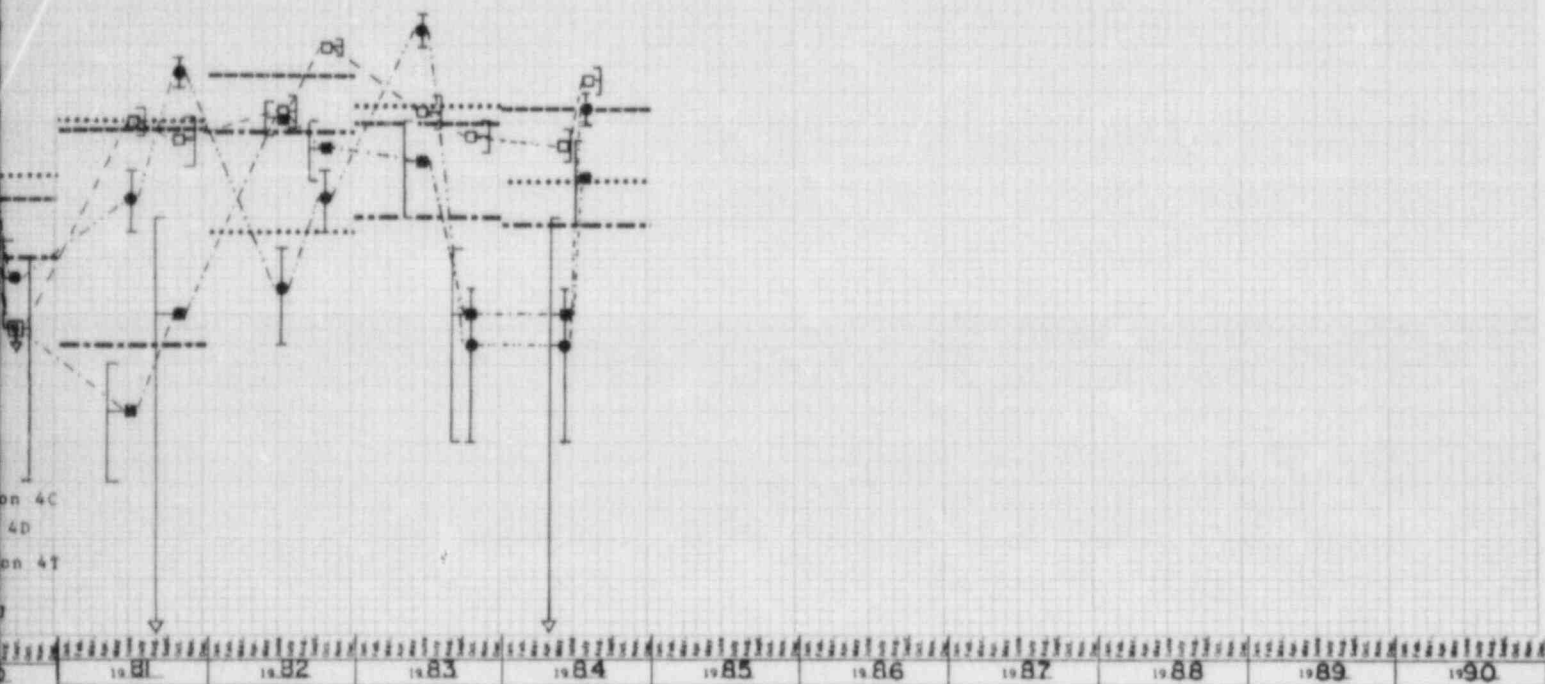
FIGURE IV.3.4

MONTHLY MEAN CONCENTRATION OF GROSS BETA  
RADIOACTIVITY IN COMPOSITE SURFACE WATER  
SAMPLES CONOWINGO DAM STATION 4L  
AND HOLTWOOD DAM STATION 6I  
INSOLUBLE FRACTION





4T  
4J  
4C  
4D

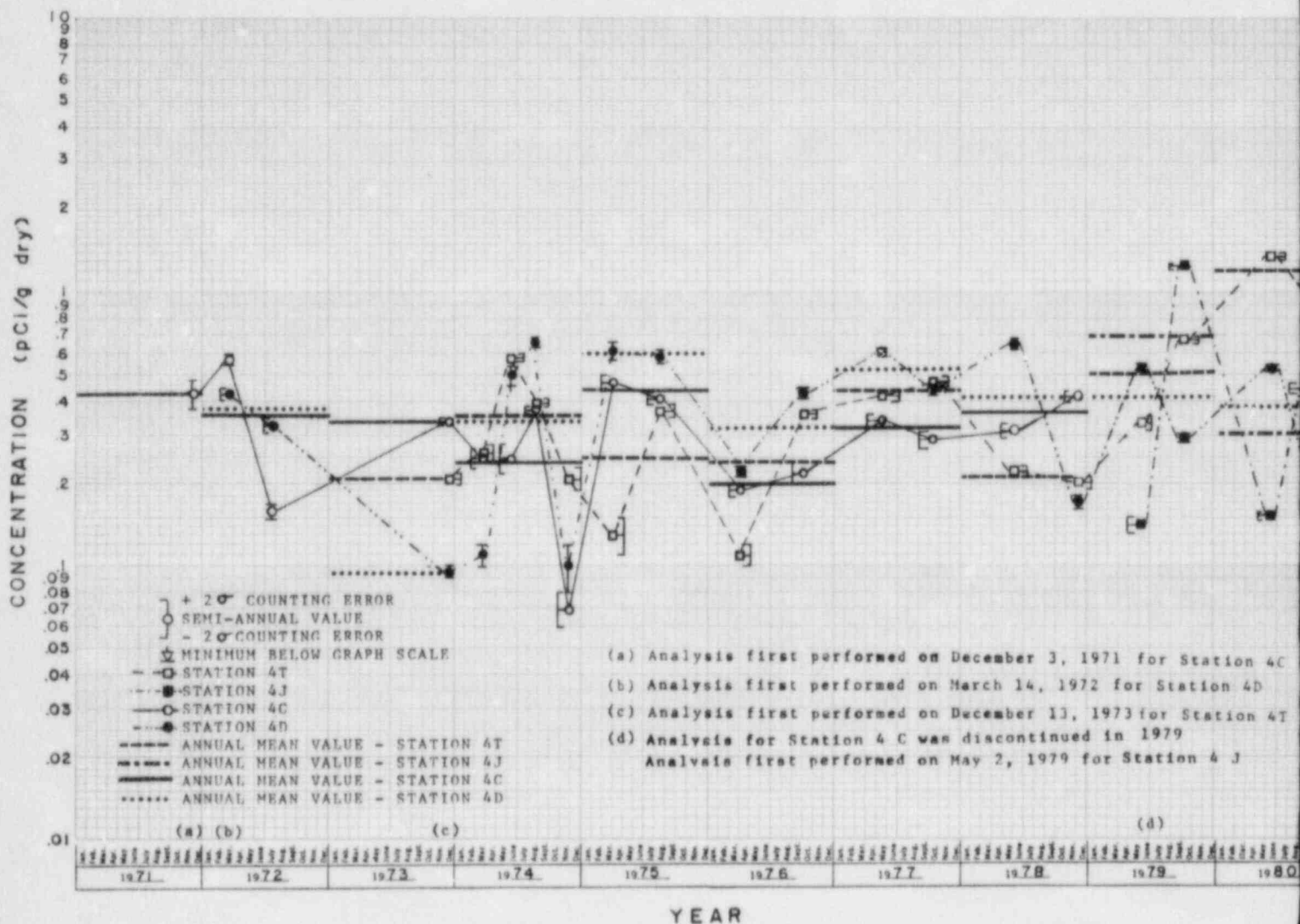


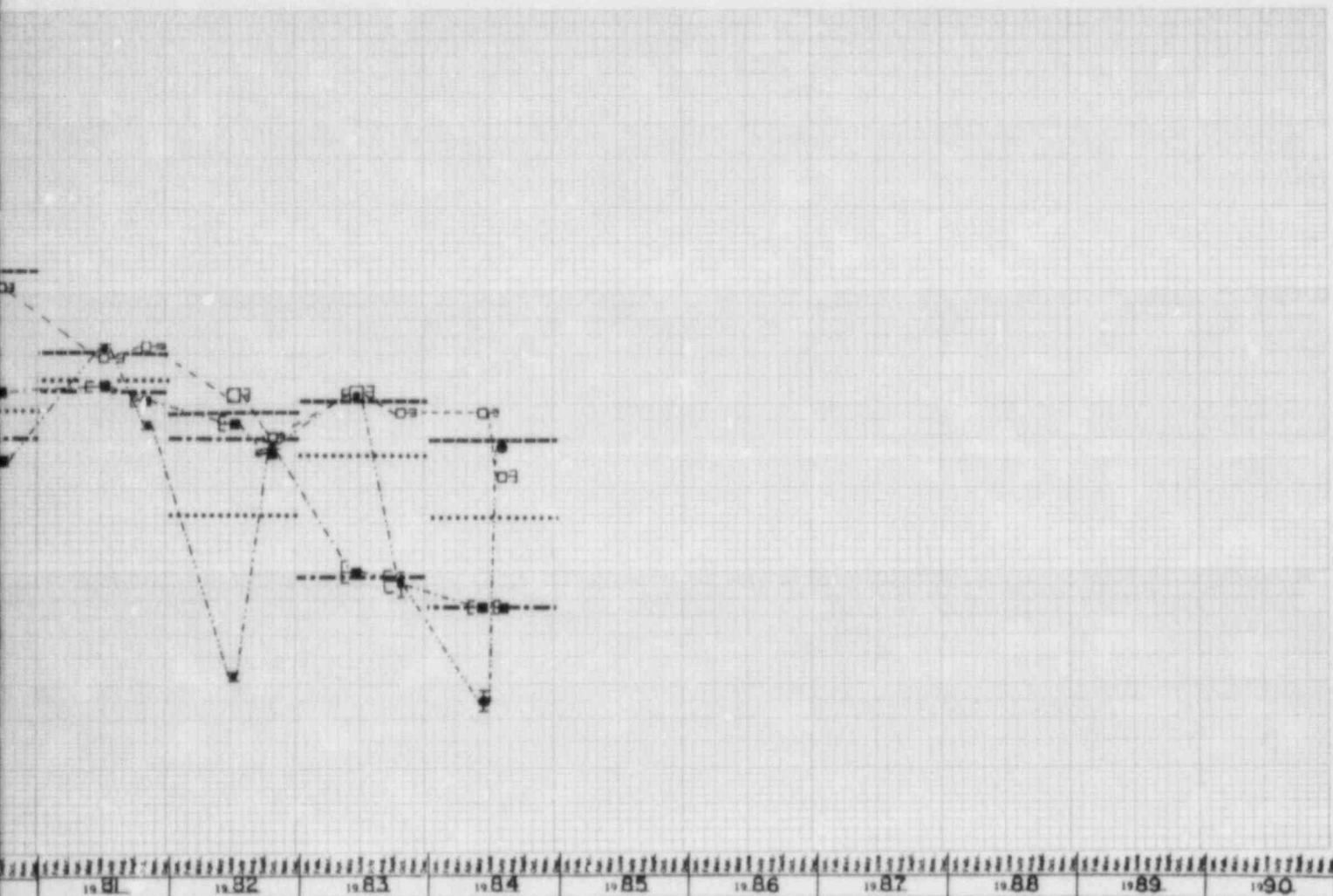
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FIGURE IV.6.1 \*  
SEMI-ANNUAL SR-90 RADIOACTIVITY  
CONCENTRATION IN SILT SAMPLES





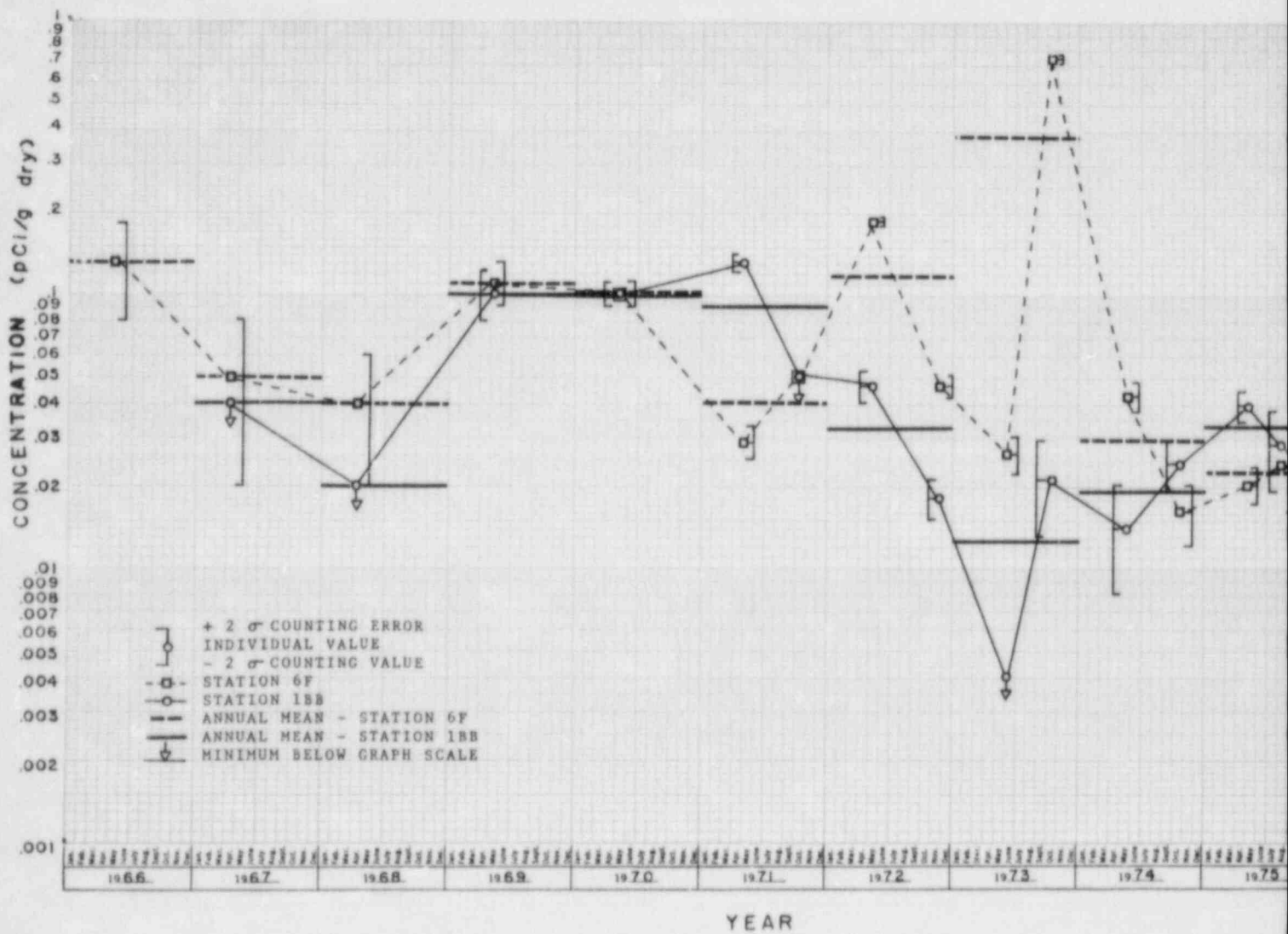
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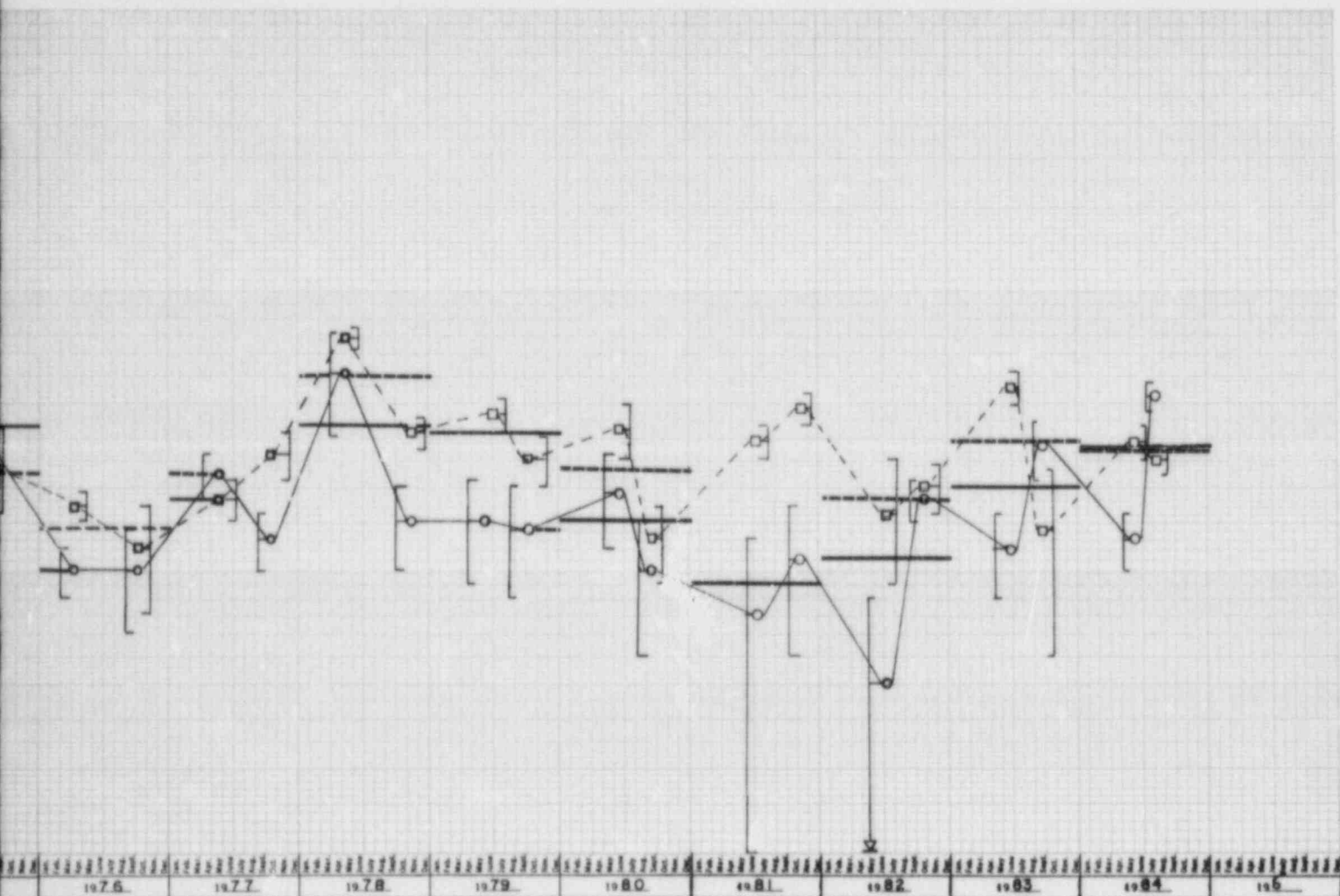
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FIGURE IV. 6.2

SEMI-ANNUAL CESIUM RADIOACTIVITY  
CONCENTRATION IN SILT SAMPLES



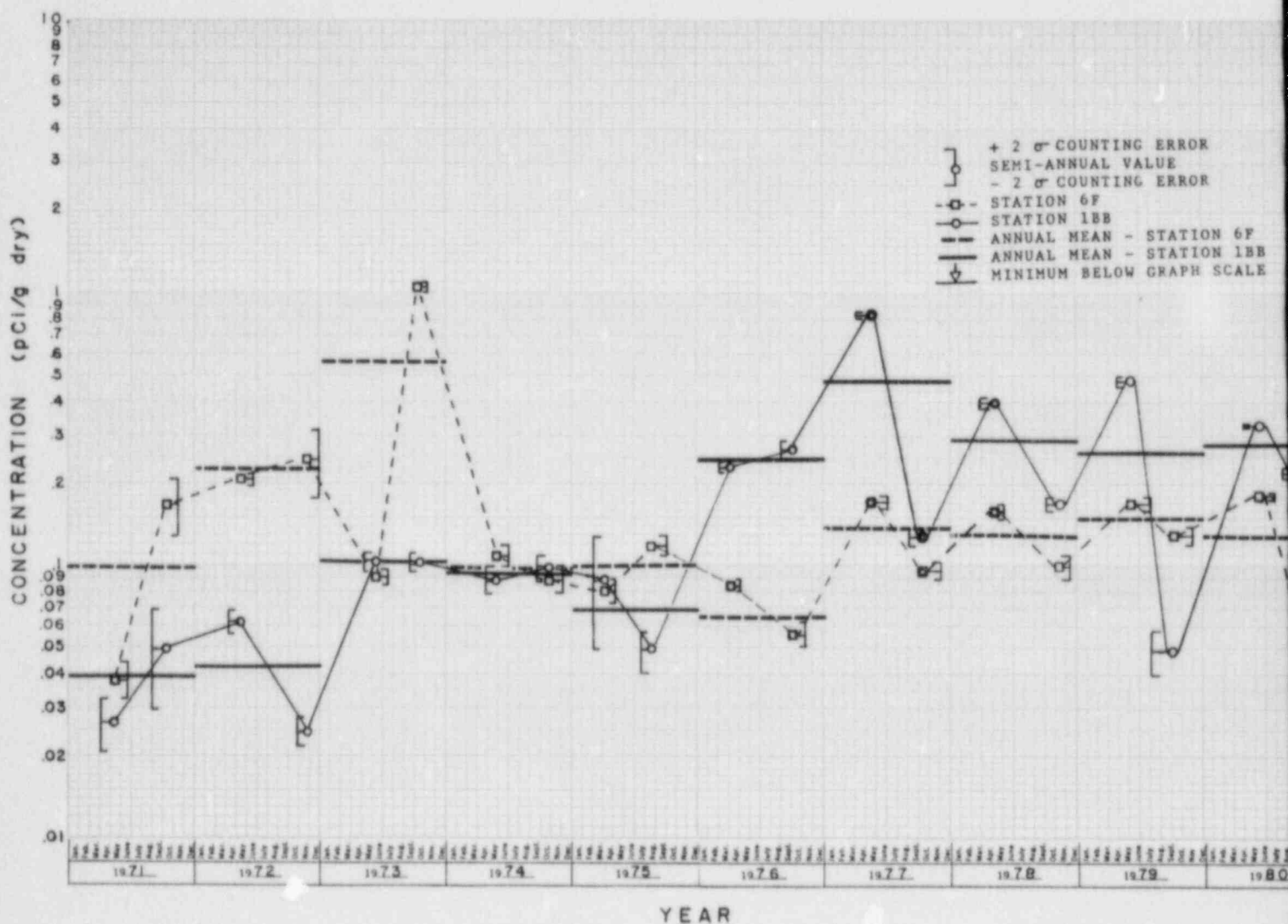


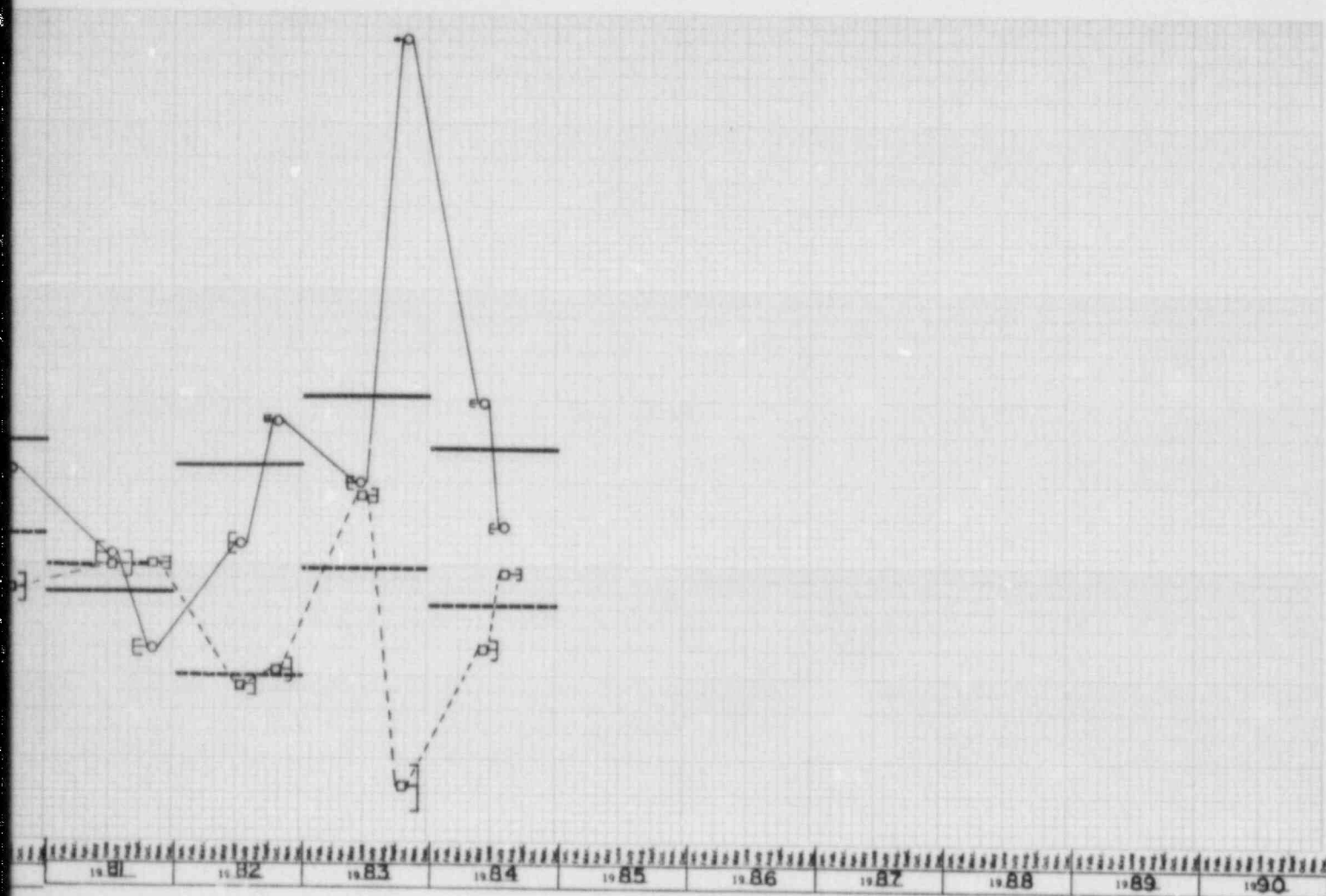
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FIGURE IV.6.3  
SR-90 RADIOACTIVITY CONCENTRATION  
IN SILT SAMPLES





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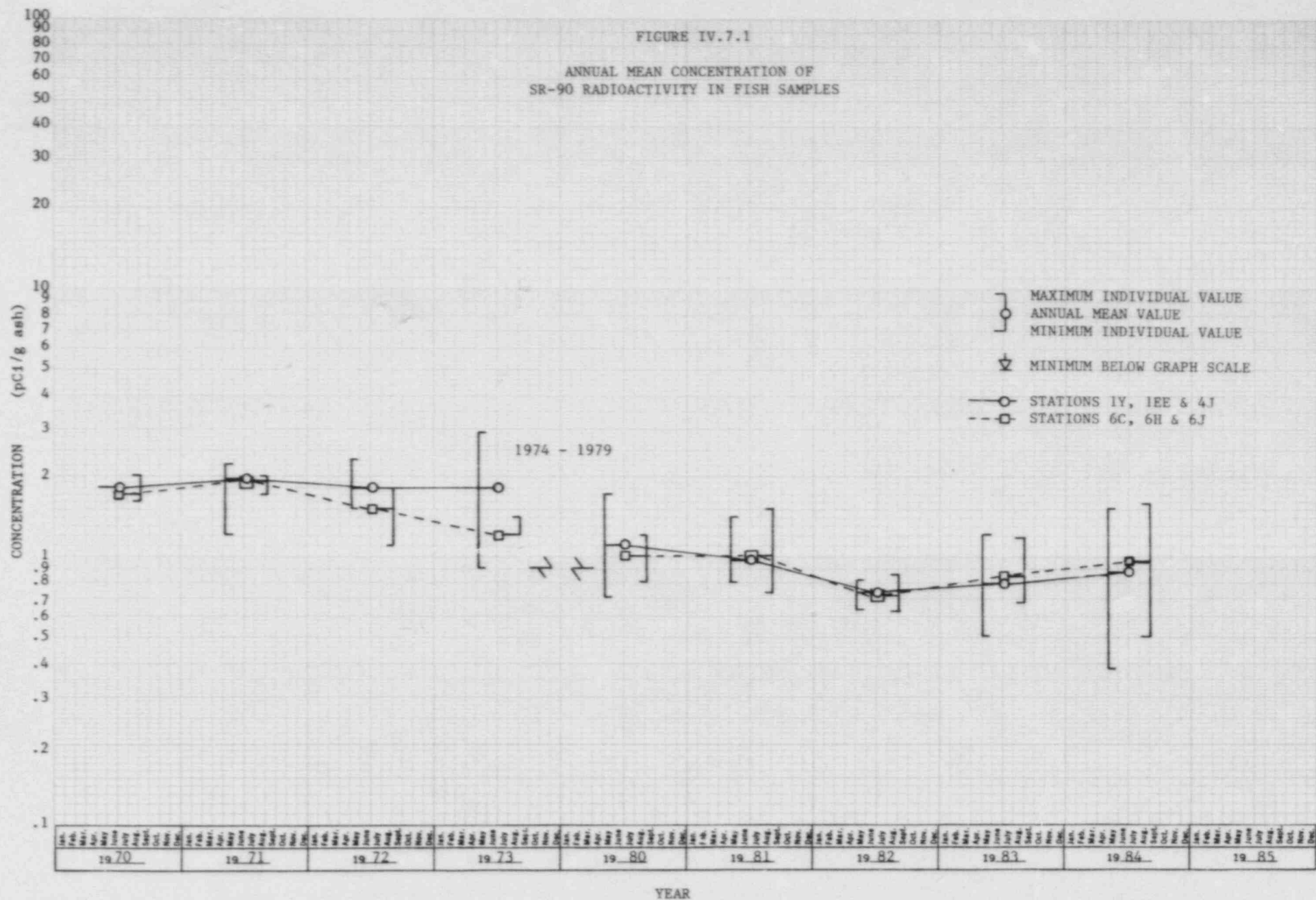
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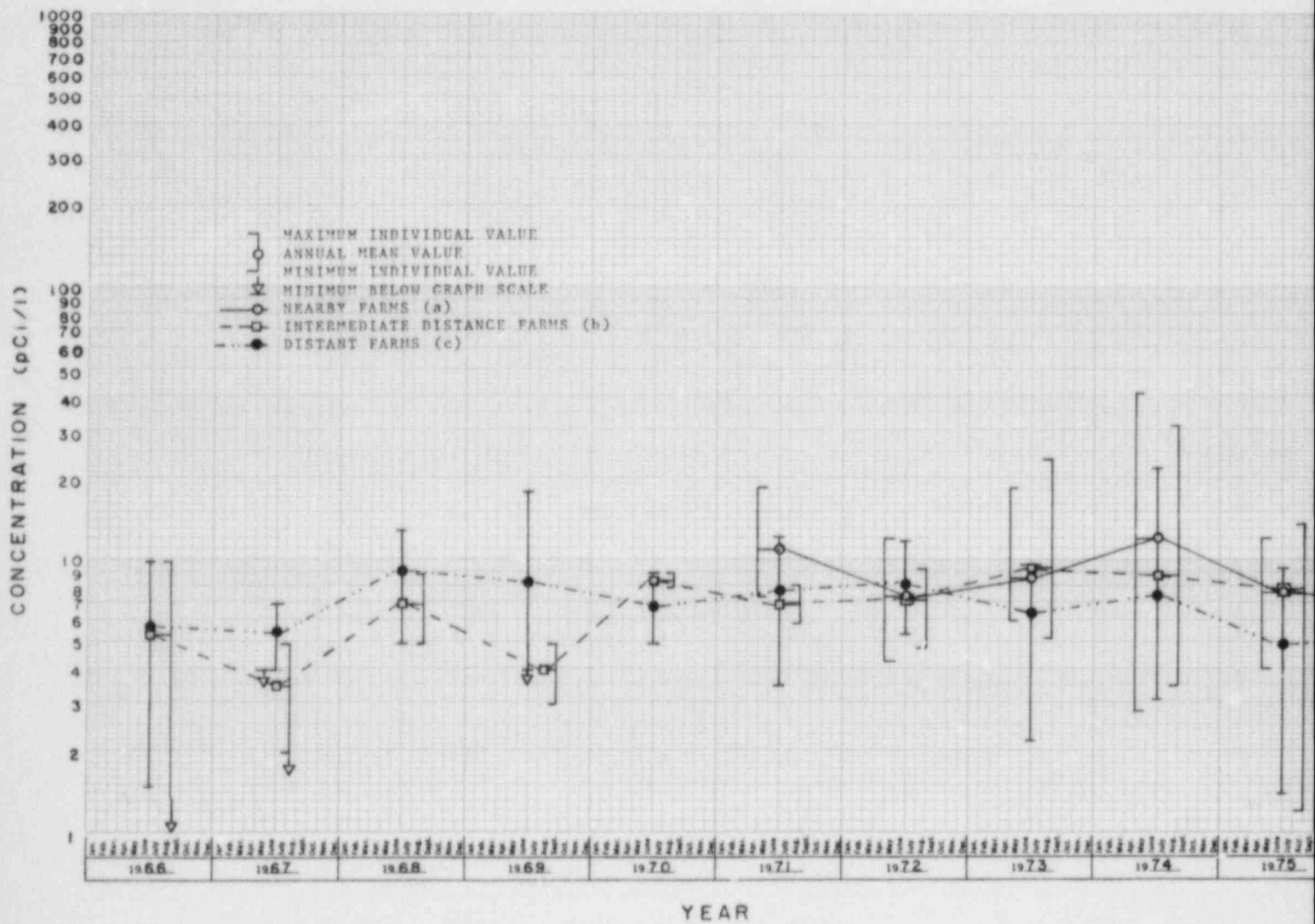
FIGURE IV, 6.4

SEMI-ANNUAL CESIUM RADIOACTIVITY  
CONCENTRATION IN SILT SAMPLES

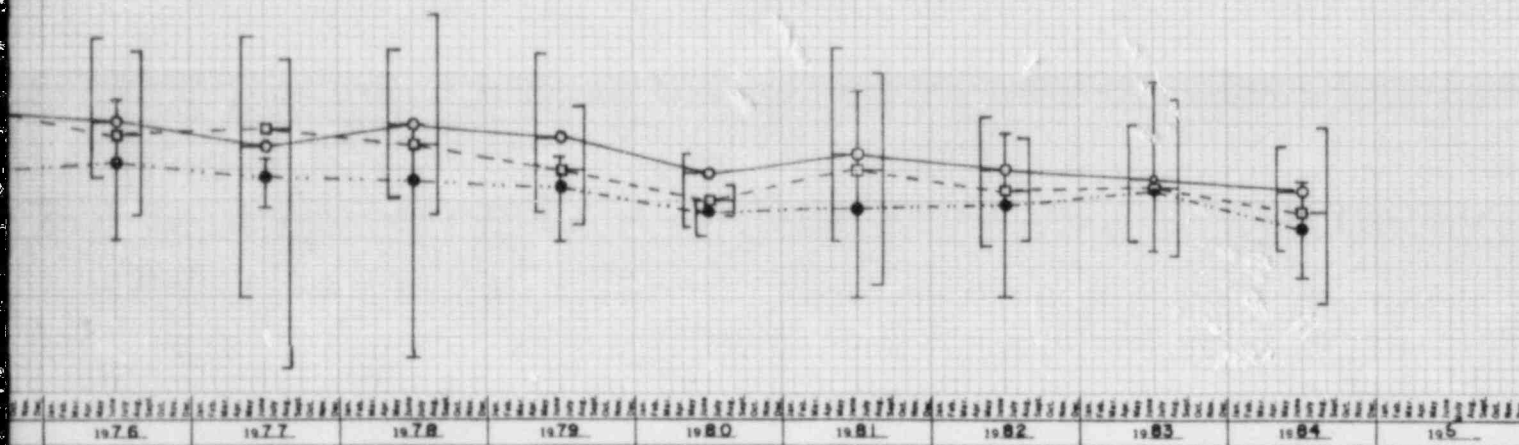
FIGURE IV.7.1

ANNUAL MEAN CONCENTRATION OF  
SR-90 RADIOACTIVITY IN FISH SAMPLES





- (a) Farms F, G, H, I, and J (Prior to 1974)  
 Farms F, G, H, and J (1st and 2nd Quarters 1974)  
 Farms G, H, and I (1976 through 1979)  
 Farms G, J, and O (All later periods)
- (b) Farms D and E (Prior to 1974)  
 Farms D, E, L, M, and N (1974)  
 Farms D, E, L, M, and N (1st, 2nd, and 3rd Quarters 1975)  
 Farms D, M, and N (4th Quarter 1975)  
 Farms D, L, M, and N (1976)
- (c) Farms A, B, and C (Prior to October 1975)  
 Farms A, B, C, and E (4th Quarter 1975 and 1976)



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FIGURE IV.9.1  
 MEAN CONCENTRATION  
 OF SR-90 RADIOACTIVITY  
 IN MILK SAMPLES

FIGURE IV.9.2  
MEAN CONCENTRATION  
OF CS-137 RADIOACTIVITY  
IN MILK SAMPLES

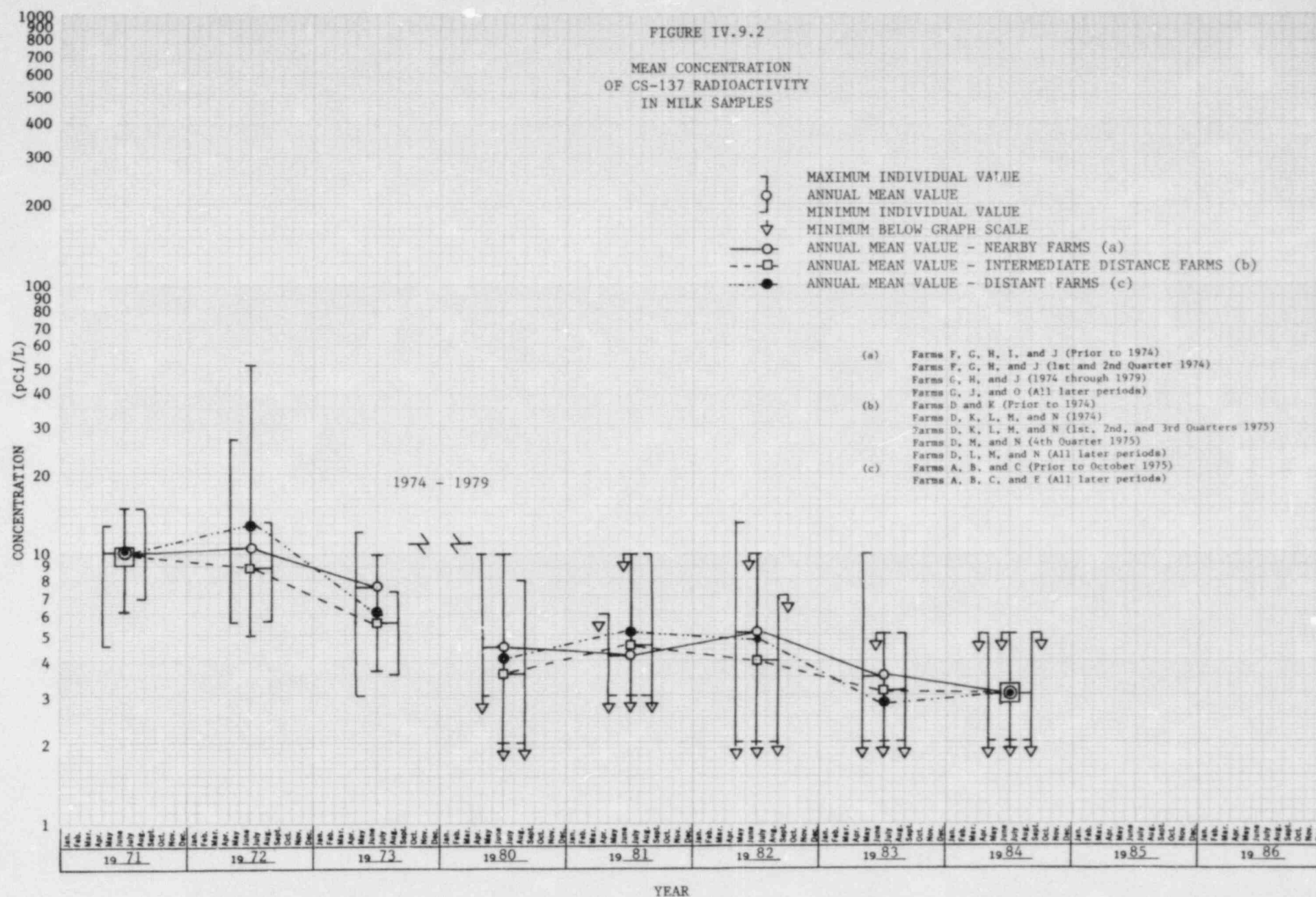
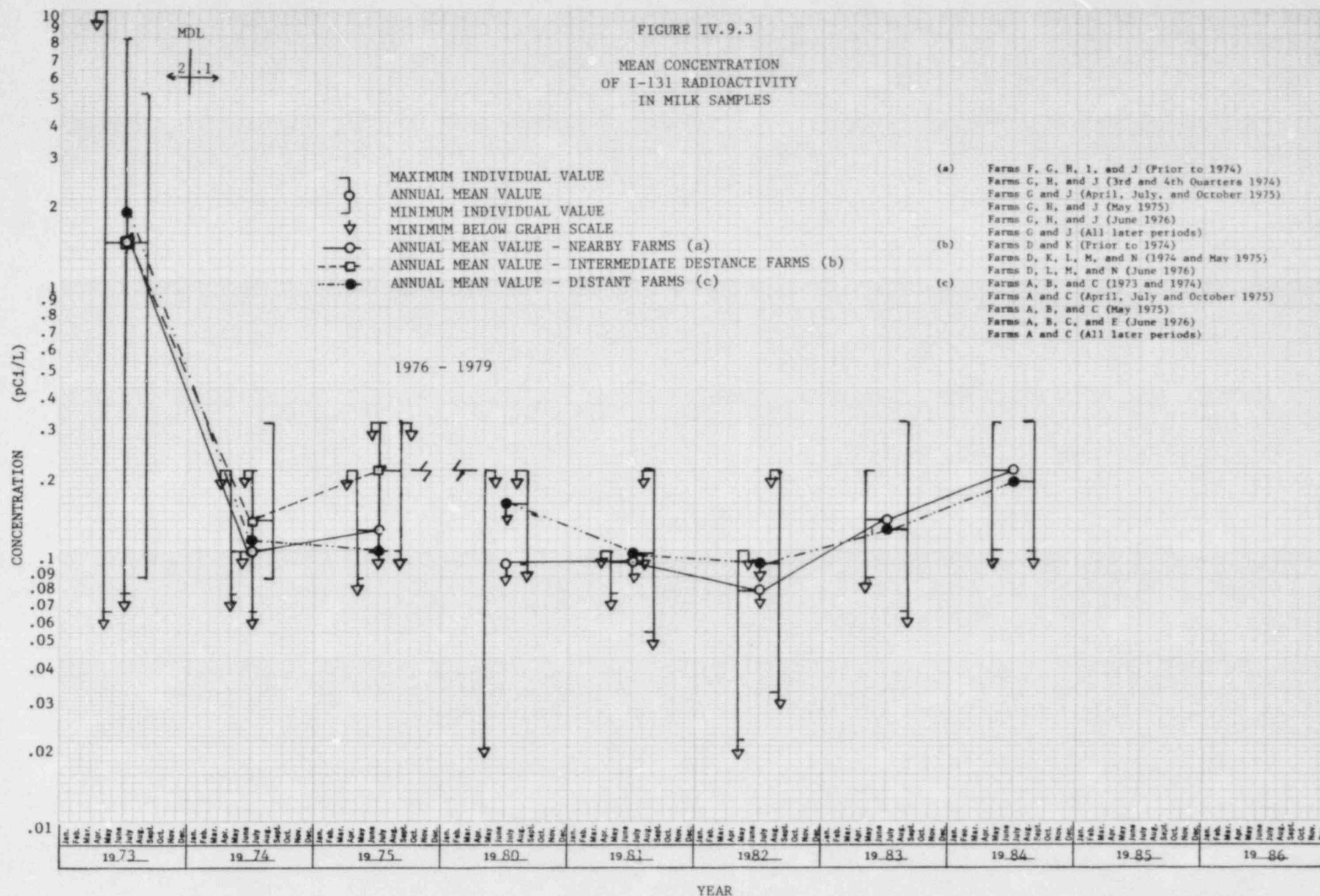
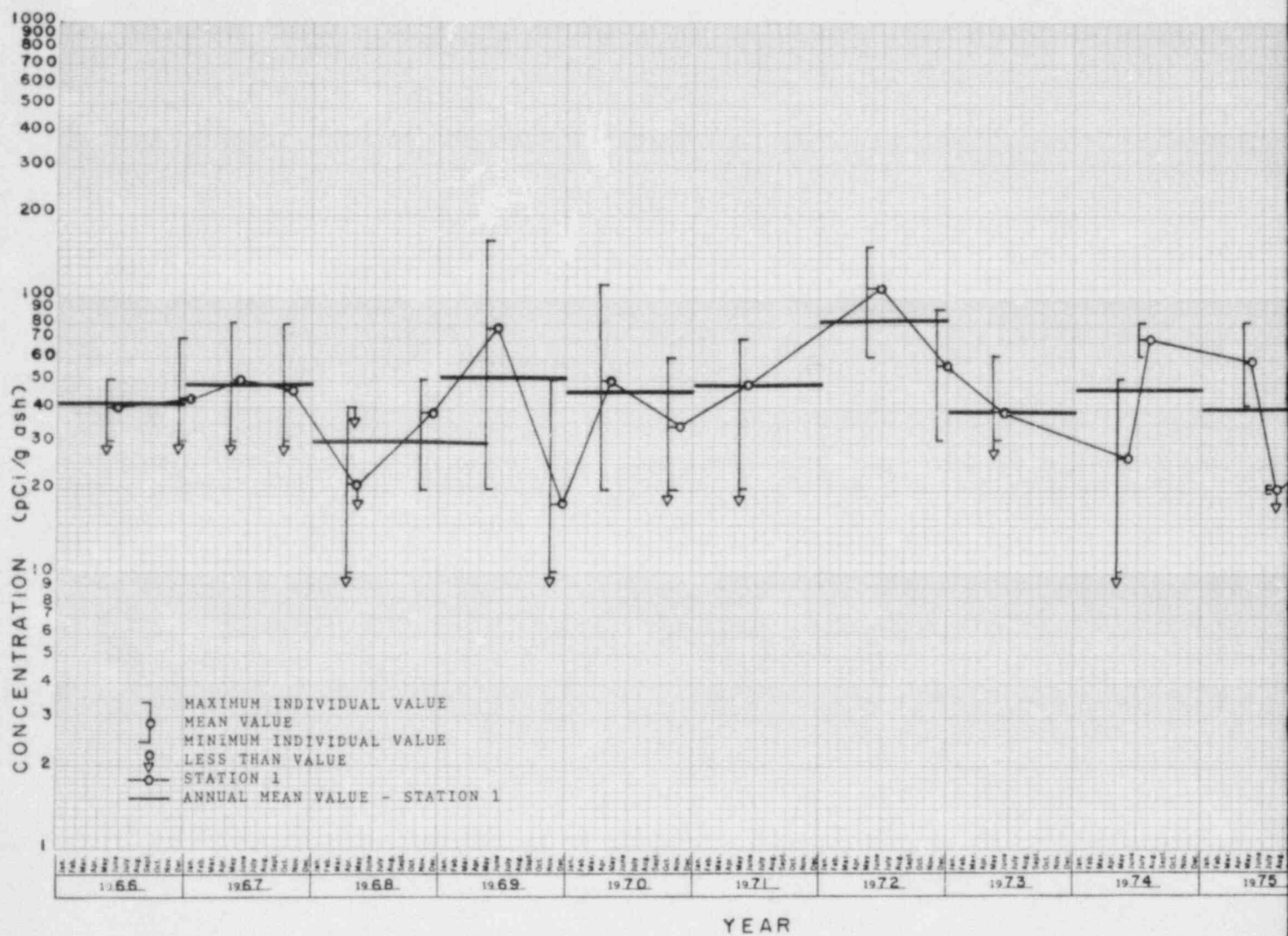
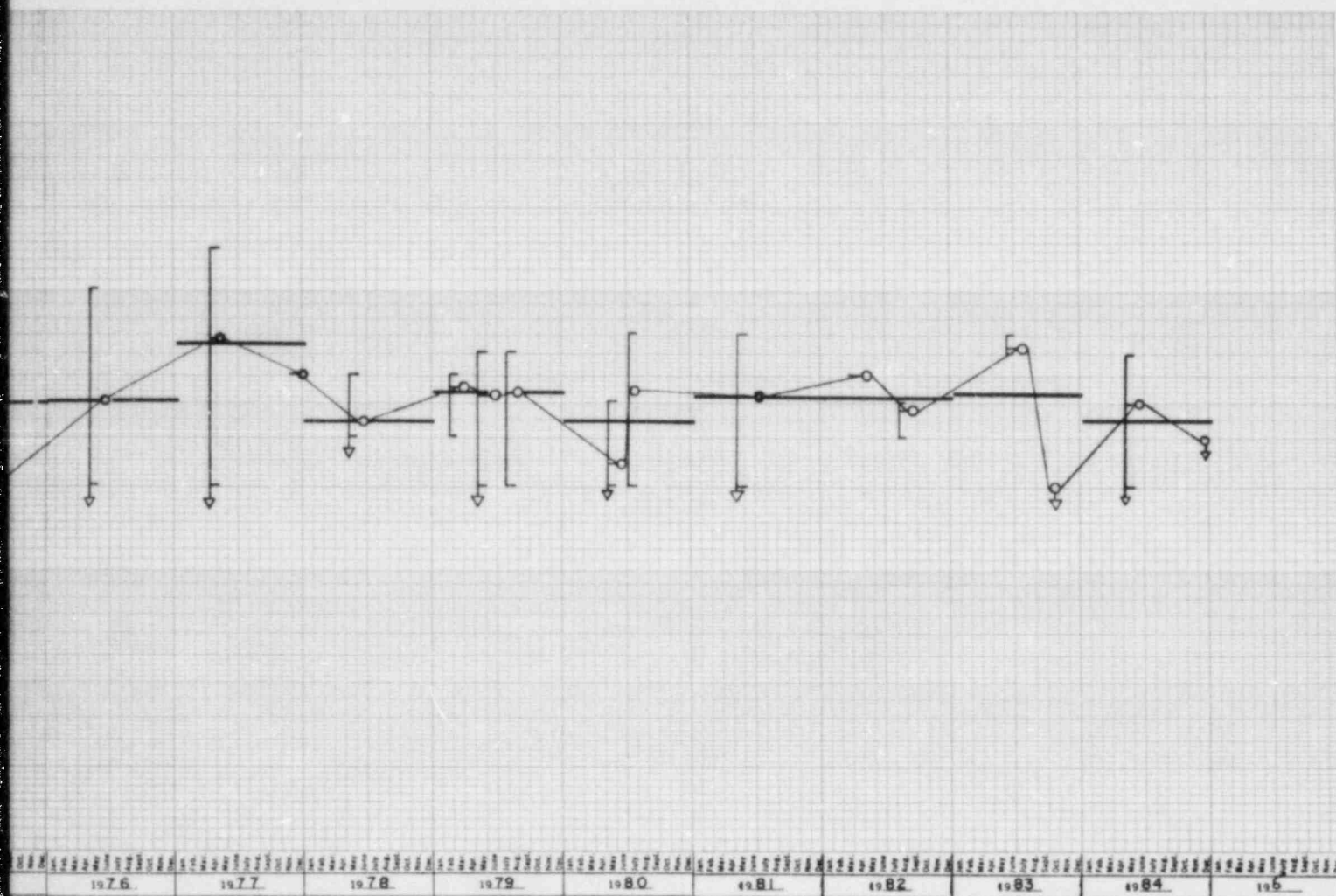


FIGURE IV.9.3  
MEAN CONCENTRATION  
OF I-131 RADIOACTIVITY  
IN MILK SAMPLES





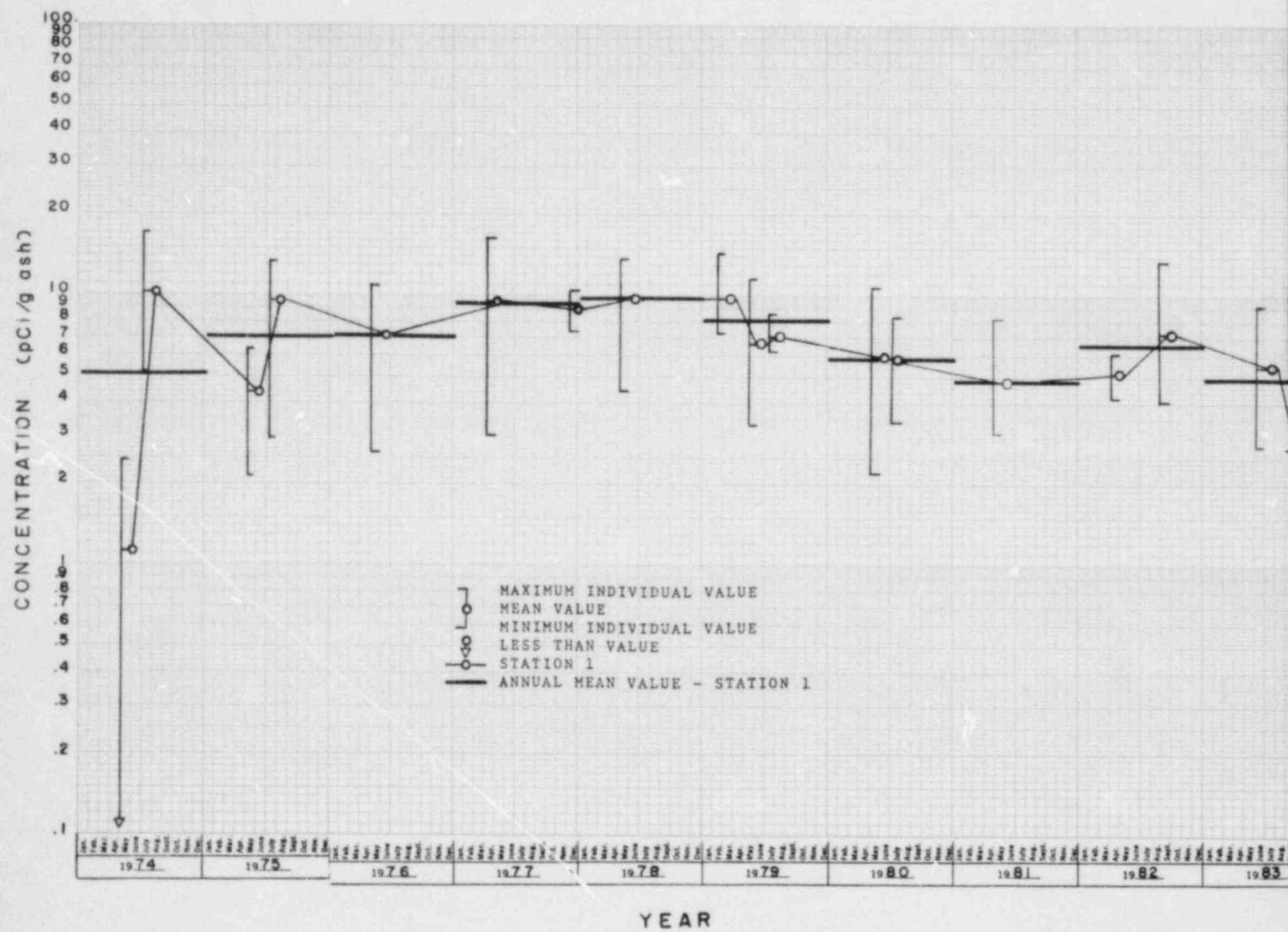


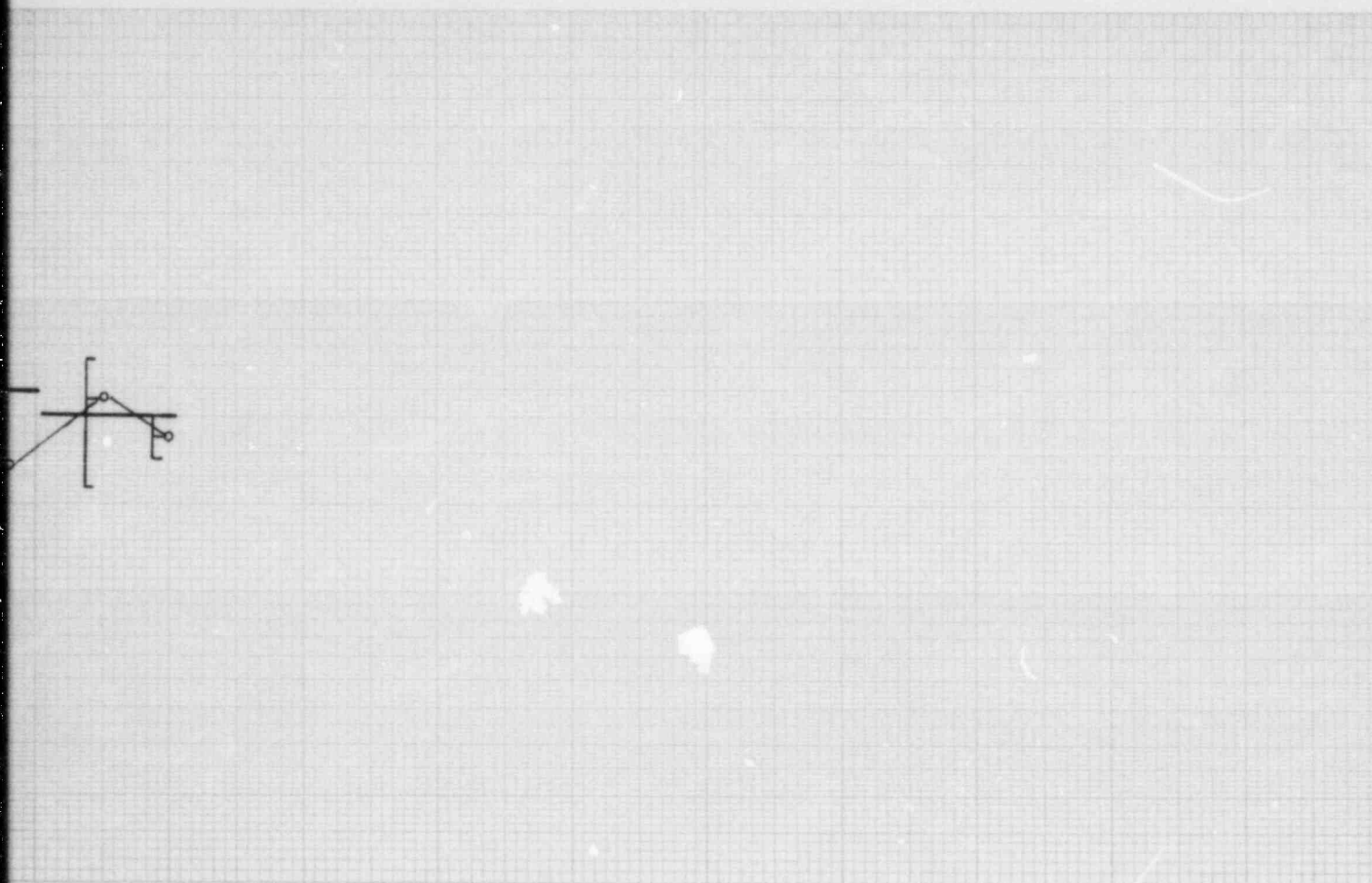
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FIGURE IV.10.1  
SEMI-ANNUAL MEAN CONCENTRATION  
OF NET BETA RADIOACTIVITY  
IN RABBIT MUSCLE SAMPLES





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FIGURE IV.10.2

SEMI-ANNUAL MEAN CONCENTRATION  
OF SR-90 RADIOACTIVITY  
IN RASJIT BONE SAMPLES