PEACH BOTTOM ATOMIC POWER STATION
ENVIRONS RADIATION MONITORING PROGRAM

January 1, 1978 through December 31, 1978

REPORT NO. 36

for
The Philadelphia Electric Company

May 1979

INTEREX CORPORATION
3 Strathmore Road
Natick, Mass. 01760

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I. INTRODUCTION

A pre-operational environmental radioactivity survey, initiated in March 1960, was conducted by Nuclear Science & Engineering Corporation 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 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 first 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 designations, 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 report. In general, any such changes have been made to increase the scope and specificity of the program to fulfill the program objective.

In 1967, site preparation for Units 2 and 3 at the Peach Bottom site was undertaken. This has resulted in certain physical changes which required moving some of the original sampling stations. Also, beginning in 1971, several sampling stations of significance to Units 2 and 3 were added to the program. Some additions and changes have been made in the analytical requirements 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 Interex on samples collected during the period January 1 through December 31, 1978 in the Interex portion of the overall Peach Bottom program.

The laboratory responsibility for performance of the environmental radiation monitoring program has been modified several times since the Peach Bottom Unit 1 pre-operational program was first undertaken in 1960. From the start of the program until the first quarter of 1969, a single laboratory located in Pittsburgh, Pa., was used. This

was initially called Nuclear Science and Engineering Corporation and later became Nuclear Science Division, International Chemical and Nuclear Corporation as the result of a change of ownership. During the first quarter of 1969, the program was transferred to ICN/Tracerlab, also part of the International Chemical and Nuclear Corporation and was performed by ICN in the Waltham, Mass., laboratory until the end of the first quarter of 1972. At this time the program was transferred to Interex Corporation laboratories in Waltham. The Interex Corporation laboratory, which is presently carrying out sample collection, analysis and report preparation, was moved to Natick, Mass. in May 1974. During the various change-overs and moves, extreme care was taken to insure that continuity in all aspects of the overall program was maintained. For example, samples were collected by the same individual throughout the entire period.

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 detonatons, 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.

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.

Two new sampling locations were created by installation of continuous water samples in the Units 2 and 3 intake and discharge canal. The intake location is designated 1LL and first started sampling on January 16, 1978. The discharge canal station 1MM was first sampled on January 1, 1978.

B. Sampling and Analysis Program

The types of analyses performed, the frequency of sampling and analysis, the locations of samples, and the number of analyses per statio.. 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 J nuary 1, 1978 through December 31, 1978 is given in Table II.3.

In addition to starting the analysis of samples from Stations 1LL and 1MM several modifications were made in sampling and analysis during 1978.

These changes are as follows:

1. Sampling was discontinued at surface water station 1P and discharge water station 1R.

2. Fish sampling in Peters and Pequea Creeks (Stations 25A through E and 30A, B and C) was stopped.

3. Shellfish sampling was terminated at all locations (Stations 9, 10 and 11).

4. Well water sampling at Station 8 was eliminated.

5. Gross alpha analysis of fish and vegetation samples was discontinued.

These changes were made after a thorough review of the program in late 1977. Elimination of the above sampling and related analyses does not in any way compromise the program and its objectives. Detailed reasons for making the changes are given in an earlier report (3).

In addition, beginning with 1978 the data from the NMC gamma radiation monitors is not being reported as part of the environs radiation monitoring program since the normal environmental levels are below the sensitivity threshold of the instrument.

C. Program Changes for 1979

As a result of further analysis of the results of the Peach Bottom program several changes will be made in 1979. None of these changes involved the PBAPS Tech Spec program.

Sampling and analysis of silt from Station 4C will be stopped and replaced with sampling at a new station, 4J. Previous studies have found that sedimentation can occur at closer range to the PBAPS canal discharge than 4C. Therefore, if any plant effect is present, it will be evident at 4D. The new station is at the nearest shoreline recreation area downstream and is consistent with the latest NRC recommendations.

Water samples from Station 1T will no longer be collected. This station is in the discharge canal upstream from the current rad waste discharge. Sampling is done at the canal exit.

All current analyses on soil will be performed semi-annually rather than quarterly. In addition gross alpha analysis will be discontinued on all soil samples. Soil is a poor media to sample because of the high natural background. Sampling of soil is no longer recommended by the NRC. Some soil analyses are being continued due to existing Tech. Specs.

Radiochemical analysis for Sr-89, Sr-90 and Cs-137 in fish will

be eliminated. Data from operating reactors indicates that radiostrontium is not a significant contributor to the dose to man. This is supported by data from PBAPS. The NRC no longer recommends radiostrontium analysis. Cs-137 is measured to an appropriate level by GeLi measurements, which are made on each sample.

Gamma spectra on air particulate composites will be measured using GeLi spectrometry rather than NaI. This will result in better resolution of nuclides present as well as increased sensitivity. Cs-134 will also be reported with an MDL below 0.008 pCi/cubic meter.

These changes reflect the latest NRC recommendations and eliminate analyses which contribute little to the goals of the program. The ability of the program to detect releases from PBAPS into the environment is in no way compromised.

TABLE II.1

ENVIRONMENTAL MONITORING STATIONS
January through December 1978

Station No.	Station Name	Station Location, Direction and Distance from Peach Bottom Site	Environmental Media Collected
1	Peach Bottom Site Area	Located in Site Area	Vegetation, Small Game
1A	Peach Bottom - Weather Station 1	On Site at Weather Station, 0.1 miles ESE of Unit 1	Air Particulate, Precipitation,
1B	Peach Bottom - Weather Station 2	On Site at Weather Station 2, 0.6 miles NNW of Unit 1	Air Particulate, Precipitation,
1M	Peach Bottom - Canal Discharge	On Site at Canal Discharge 0.9 miles SE of Unit 1	Discharge Water
1Q	Peach Bottom Unit 2 Intake	On Site at Unit 2 Intake, 1500' NNE of Unit 1	Surface Water
1T	Peach Bottom Discharge Canal - 2200'	On Site in the Station Discharge Canal, 0.4 miles SE of Unit 1, 2200' from Unit 1 Intake and upflow from the Units 2 and 3 rad-waste discharge	Discharge Water (1)
1U	Peach Bottom Site - Utility Building	Well at Plant Site, 450' SW of Unit 1	Well Water
1V	Peach Bottom Site - Information Center	Well at Plant Site, 450' SE of Unit 1	Well Water
1X	Peach Bottom Site - Cooling Tower Pond B-1	About 1100' ENE of Unit 1	Silt and Fish (2) (Channel Catfish and White Crappie)
1AA	Peach Bottom - Discharge Canal Bank	Located about 1400' SE of Unit 1 on the Discharge Canal Bank	Soil
1BB	Peach Bottom - Discharge Canal	On Site in the Station Discharge Canal, 2250' SE of Unit 1	Silt (1)
1EE	Peach Bottom - Discharge Canal	In the Discharge Canal anywhere between the Peach Bottom Unit 2 and 3 Liquid Radwaste Discharge and Canal Exit (between 2200 and 4600' SE of Unit 1)	Fish (Channel Catfish and White Crappie)
1LL	Peach Bottom Units 2 and 3 Intake - Composite	Continuous Sampler on Site at Unit 2 and 3 Intake, 1500' NNE of Unit 1	Surface Water

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TABLE II.1

Station No.	Station Name	Station Location, Direction and Distance from Peach Bottom Site	Environmental Media Collected
1MM	Peach Bottom - Canal Discharge - Composite	Continuous Sampler on Site at Canal Discharge 0.9 miles SE of Unit 1	Discharge Water
2	Peach Bottom Site - 130° Sector Hill	On Site, 0.7 miles SE of Unit 1	Air Particulate Soil
3A	Delta, Pa. - Substation	3.6 miles SW of Unit 1 0.5 miles N of Maryland border	Air Particulate, Vegetation, Soil
4A	Conowingo Dam - Powerhouse Roof	8.4 miles SE of Unit 1 on Powerhouse roof in Cecil County, Md	Air Particulate
4B	Conowingo Dam - Powerhouse Roof	8.4 miles SE of Unit 1 on Powerhouse roof in Cecil County, Md.	Air Particulate
4C	Conowingo Pond, Pa.	1,000' downstream from the Peach Bottom Station Discharge	Silt
4D	Conowingo Pond, Pa.	500' downstream from the Peach Bottom Station Discharge	Silt
4F	Conowingo Dam - El. 33' MSL Grab	In the Conowingo Hydro-Electric Station about 8.4 miles SE of Unit 1. Water is sampled from a header which continuously draws pond water from about elevation 33' MSL.	Surface Water
4H	Conowingo Dam - Tailrace	Tailrace on west side of river 8.5 miles SE of Unit 1	Fish (American Shad)
4I	Conowingo Pond - Net Trap 8	Located in Conowingo Pond about 1450' E of Unit 1	Fish (Channel Catfish and White Crappie)
4J	Conowingo Pond - Net Trap 15	Located in Conowingo Pond about 6400' SE of Unit 1	Fish (Channel Catfish and White Crappie)
4L	Conowingo Dam - El. 33 (Ft.) Composite	Continuous sampler in the Conowingo Hydro-Electric Station, about 8.4 miles SE of Unit 1. Water is continuously sampled from a header which draws pond water from about elevation 33' MSL.	Surface Water
4M	Conowingo Dam - Downstream El. 40 (Ft.) MSL	West bank downstream of Conowingo Hydro-Electric Station 8.5 miles SE of Unit 1	Precipitation
4N	Conowingo Dam - Environmental Station	Environmental Monitoring Station on west shore upstream of Conowingo Hydro-Electric Station about 8.4 miles SE of Unit 1	Vegetation, soil
4T	Conowingo Pond - Near Conowingo Dam	Near midole of Conowingo Pond, about 8 miles SE of Unit 1	Silt

TABLE II 1

Station No	Station Name	Station Location, Direction and Distance from Peach Bottom Site	Environmental Media Collected
5	Wakefield, Pa	4 5 miles E of Unit 1	Air Particulate, Soil and Vegetation
6A	Holtwood Dam - Hydro-Electric Station	5 9 miles NW of Unit 1	Surface Water (through Hydro Plant)
6B	Holtwood Dam - Hydro-Electric Station	5 9 miles NW of Unit 1	Air Particulate (Hydro Powerhouse Roof)
6D	Holtwood, Pa	6 0 miles NW of Unit 1 near Holtwood Dam in Lancaster County	Vegetation
6F	Holtwood Dam - East Shore Upstream	5 9 miles NW of Unit 1 in Lancaster County	Silt (above dam)
6G	Holtwood, Pa	6 0 miles NW of Unit 1 near Holtwood Dam in Lancaster County	Soil
6H	Holtwood pond -	Located in Holtwood Pond about 6 6 miles NW of Unit 1	Fish
6I	Holtwood Dam - Hydro-Electric Station - composite	Continuous sampler at Holtwood Hydro-Electric Station intake about 5 9 miles NW of Unit 1 Water is continually sampled and collected in a 175 gallon tank	Surface Water
6J	Holtwood Pond -	Located in Holtwood Pond near the east bank about 10 7 miles NNW of Unit 1	Fish
7	Darlington, Maryland Area	9 4 mi SSE of Unit 1 in Hart 1 County	Well Water
8	Colora, Maryland	9 9 miles SE of Unit 1 in Cecil County	Vegetation
12A	Philadelphia, Pa 900 Sansom St	63 miles ENE of Unit 1 on the roof of 900 Sansom Street	Air Particulate
12D	Philadelphia, Pa 2301 Market St	62 miles ENE of Unit 1 on the roof of 2301 Market Street	Air Particulate
13A	Chester Water Intake Pond	On the east shore of Conowingo Pond at Chester Water Authority Intake, 2 8 miles SE of Unit 1	Surface Water
13B	Chester Water Intake Pump Discharge	At Chester Water Authority Intake 2 8 miles SE of Unit 1	Surface Water
14	Peters Creek	2 3 miles E of Unit 1	Air Particulate
15	Silver Spring Road	3 8 miles N of Unit 1	Air Particulate
17	Riverview Road	4 4 miles ESE of Unit 1	Air Particulate
23	Peach Bottom 150° Sector Hill	Off-site, hill 0 9 miles SSE of Unit 1	Vegetation
31	Pilottown Road	4 8 miles SE of Unit 1 near Pilottown Road	Air Particulate
32	Slate Hill Road	2 8 miles NE of Unit 1 near Slate Road	Air Particulate
33A	Fulton Weather Station	Fulton Main Weather Station 1 8 miles ENE of Unit 1	Air Particulate
38	Peach Bottom Road	2 9 miles E of Unit 1 near Peach Bottom Road	Air Particulate
40	Peach Bottom Site Area	Well in Site Area about 1 2 miles SW of Unit 1	Well Water

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TABLE II.1

Station No.	Station Name	Station Location, Direction and Distance from Peach Bottom Site	Environmental Media Collected
	Peach Bottom Regional Farms	Nearby Regional Farms surrounding the Peach Bottom site on the west side of Conowingo Pond are designated G, H, and J. Intermediate distance farms on the east side of the pond are designated D, L, M, and N. Distant regional farms 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. (3)	Milk

1. These stations were exposed to Unit 1 discharge water after 12/6/72. Prior to this date only surface water was present.

2. These stations were exposed to Unit 1 discharge water until 12/6/72.

3. 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.

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TABLE II.2

ENVIRONMENTAL RADIATION MONITORING PROGRAM
PERIOD JANUARY THROUGH DECEMBER 1978

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	Seventeen	1A, 1B, 2, 3A, 4A, 4B, 5, 6B, 12A, 12D, 14, 15, 17, 31, 32, 33A, 38	52 X 17
	Gamma Spectrum (Monthly)		Monthly Composite of Weekly Samples	Seventeen	1A, 1B, 2, 3A, 4A, 4B, 5, 6B, 12A, 12D, 14, 15, 17, 31, 32, 33A, 38	12 X 17
2. Water						
a. Precipitation	Gross Beta Sr-89, Sr-90 (Quarterly) Cs-137 (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	1Q, 4F, 6A, 13A	12 X 4
			(6)	One	13B	(6)
		Continuous Composite; one gal	Monthly	Three	4L, 6I, 1LL	12 X 3
c. Discharge Water	Gross Alpha(5) Gross Beta(5)	Spot; one gal	Monthly	Two	1T, 1M	12 X 2
		Continuous Composite; one gal	Monthly	One	1MM	12 X 1
d. Well Water	Gross Alpha Gross Beta Uranium Sr-89, Sr-90 (Semi-annually) Cs-137 (Semi-annually)	Spot; one gal	Quarterly	Four	1U, 1V, 7, 40	4 X 4

TABLE II 2

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
3. Milk	Gross Beta Potassium-40 Sr-89, Sr-90 I-131 (7) Cs-137, Cs-134	Spot; two gal.	Quarterly	Eleven	Farms A, B, C, D, E, G, H, J, L, M, N	4 X 11
4. Vegetation	Gross Beta Potassium-40 Sr-89, Sr-90 Cs-137	Stems, leaves and fruit; Foods whenever available; one container full	Spring, Summer, and Fall	Seven	1, 3A, 4N, 5, 6D, 8, 23	3 X 2 (8) 6 X 5
5. Fish	Gross Beta Potassium-40 Sr-89, Sr-90 (one fish of each species) Cs-137 (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
		American Shad Four fish (if available)	Annually in Spring)	One	4H	4 X 1
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 Alpha Gross Beta Potassium-40 Sr-89, Sr-90 (Semi-annually) Cs-137 (Semi-annually)	Sunshine method, 500 grams	Quarterly	Six	1AA, 2, 3A, 4N, 5, 6G	4 X 6
8. Silt	Gross Alpha Gross Beta Sr-89, Sr-90 Cs-137 Gamma Spectrum (GeLi)	Spot, 500 grams	Semi-annually	Six	1BB, 1X, 4C, 4D, 4T, 6F	2 X 6

TABLE II.2

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. Sampler used is Gast Model 1V BF-10-M100X or equivalent with Restricting Orifice.
5. Soluble and insoluble radionuclides separately.
6. A monthly sample will be obtained only during those months in which the Chester Water Authority withdraws water from the pond.
7. On second, third and fourth quarter samples from Farms A, C, G, and J only.
8. Two kinds of vegetation during harvest at all locations except Delta and Conowingo.

TABLE II.3

SUMMARY OF ANALYSIS PERFORMED ON SAMPLES COLLECTED
January 1, 1978 THROUGH DECEMBER 31, 1978

Sample Type	Station Number	Number Samples	Gross Alpha	Gross Beta	Net Beta	K-40	U	Sr-89	Sr-90	I-131	Cs-134	Cs-137	Gamma Spec.	Geli	Total Analysis
Air	1A	51		51									12		63
Particulate	1B	52		52									12		64
	2	51		51									12		63
	3A	52		52									12		64
	4A	49		49									12		61
	4B	50		50									12		62
	5	52		52									12		64
	6B	52		52									12		64
	12A	52		52									12		64
	12D	51		51									12		63
	14	52		52									12		64
	15	52		52									12		64
	17	52		52									12		64
	31	51		51									12		63
	32	52		52									12		64
	33A	51		51									12		63
	38	52		52									12		64
Precipitation	1A	12		12				4	4			4			24
	1B	12		12				4	4			4			24
	4M	12		12				4	4			4			24
Surface water (Soil & Insol.)	1LL	12	12	12											24
	1Q	12	12	12											24
	4F	12	12	12											24
	4L	10	10	10											20
	6I	11	11	11											22
	6A	12	12	12											24
	13A	12	12	12											24
	13B	1	1	1											2

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TABLE II.3

Sample Type	Station Number	Number Samples	Gross Alpha	Gross Beta	Net Beta	K-40	U	Sr-89	Sr-90	I-131	Cs-134	Cs-137	Gamma Spec.	Geli	Total Analysis
Discharge Water	1M	12	12	12											24
(Sol. & Insol.)	1MM	12	12	12											24
	1T	12	12	12											24
Well Water	1U	4	4	4			4	2	2			2			18
	1V	4	4	4			4	2	2			2			18
	7	4	4	4			4	2	2			2			18
	40	4	4	4			4	2	2			2			18
Soil	1AA	4	4	4	4	4		2	2			2			22
	2	4	4	4	4	4		2	2			2			22
	3A	4	4	4	4	4		2	2			2			22
	4N	4	4	4	4	4		2	2			2			22
	5	4	4	4	4	4		2	2			2			22
	6G	4	4	4	4	4		2	2			2			22
Silt	1BB	2	2	2				2	2			2		2	12
	1X	2	2	2				2	2			2		2	12
	4C	2	2	2				2	2			2		2	12
	4D	2	2	2				2	2			2		2	12
	4T	2	2	2				2	2			2		2	12
	6F	2	2	2				2	2			2		2	12
Fish															
Catfish	1X	12		12	12	12		3	3			3		3	48
Catfish	1EE	12		12	12	12		3	3			3		3	48
Catfish	4I	11		11	11	11		3	3			3		3	45
Wh. Crappie	4I	10		10	10	10		3	3			3		3	42
Catfish	4J	16		16	16	16		4	4			4		4	64
Wh. Crappie	4J	16		16	16	16		4	4			4		4	64
Catfish	6H	12		12	12	12		3	3			3		3	48
Wh. Crappie	6H	10		10	10	10		3	3			3		3	42
Am. Shad	4H	3		3	3	3		1	1			1		1	13

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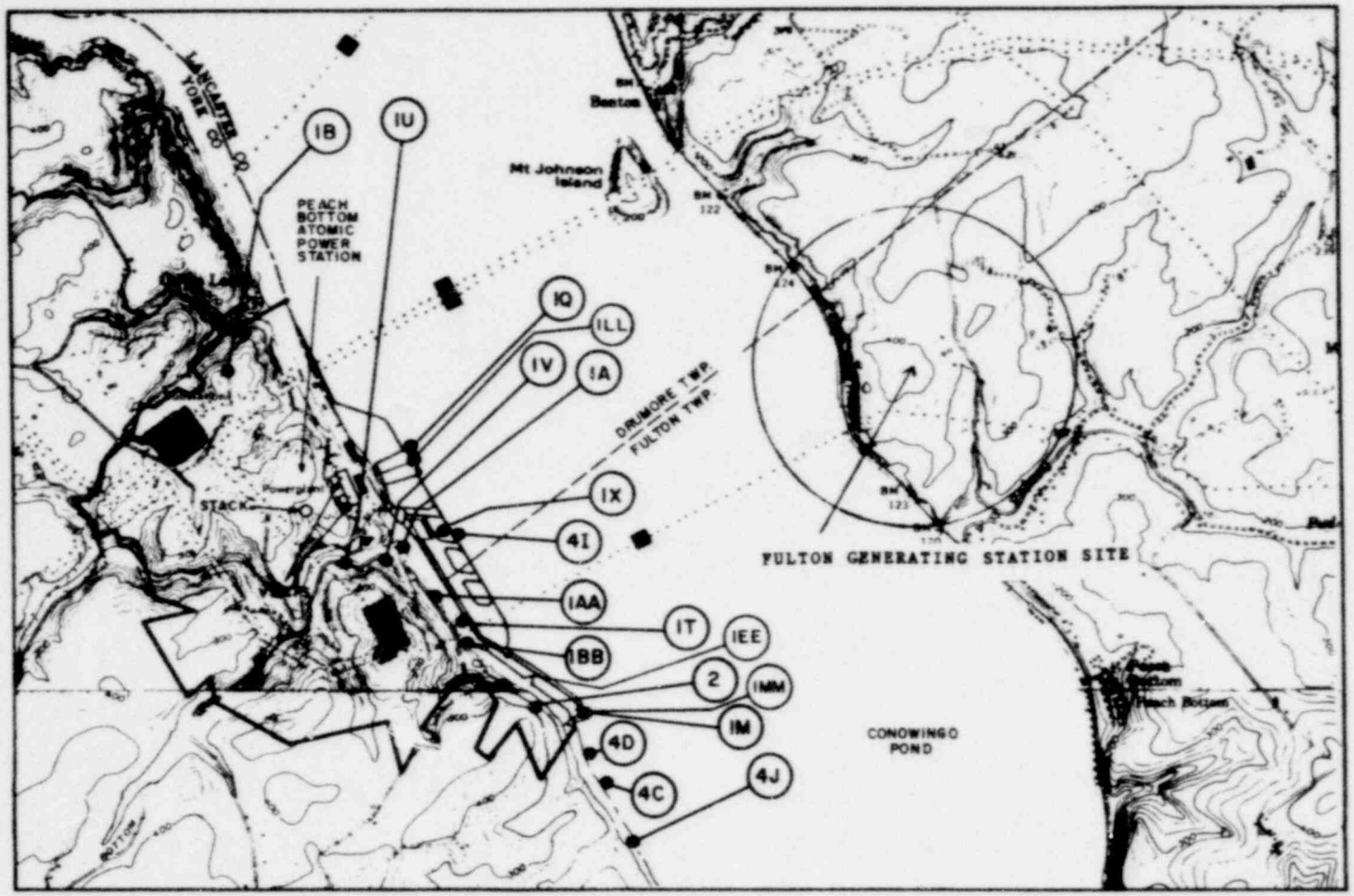
TABLE II.3

Sample Type	Station Number	Number Samples	Gross Alpha	Gross Beta	Net Beta	K-40	U	Sr-89	Sr-90	I-131	Cs-134	Cs-137	Gamma Spec.	Geli	Total Analysis
Vegetation	1	6		6	6	6		6	6			6			36
	3A	3		3	3	3		3	3			3			18
	4N	3		3	3	3		3	3			3			18
	5	6		6	6	6		6	6			6			36
	6D	6		6	6	6		6	6			6			36
	8	4		4	4	4		4	4			4			24
	23	3		3	3	3		3	3			3			18
Milk Farm	A	4		4	4	4		4	4	4	4	4			32
	B	4		4	4	4		4	4		4	4			28
	C	4		4	4	4		4	4	4	4	4			32
	D	4		4	4	4		4	4		4	4			28
	E	4		4	4	4		4	4		4	4			28
	G	4		4	4	4		4	4	4	4	4			32
	H	4		4	4	4		4	4		4	4			28
	J	4		4	4	4		4	4	4	4	4			32
	L	4		4	4	4		4	4		4	4			28
	M	4		4	4	4		4	4		4	4			28
	N	4		4	4	4		4	4		4	4			28
Rabbit															
Bone	1	5		5	5	5		5	5						25
Muscle	1	5		5	5	5									15
Thyroid	1	5								5					5
Tissue	1	5		5	5	5									15
TOTAL ANALYSES		1277	170	1272	216	216	16	151	151	21	44	146	204	39	2646



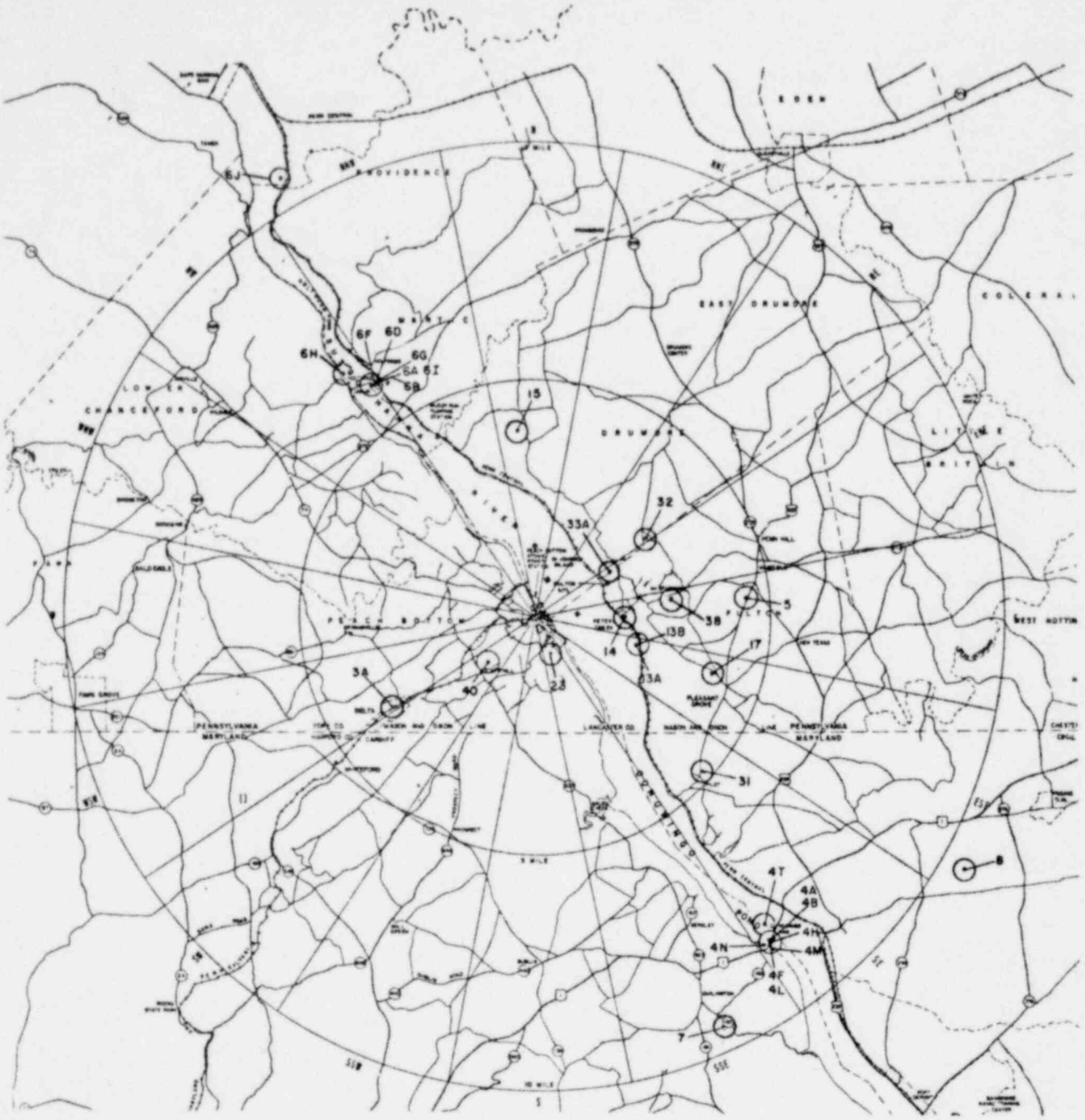
LEGEND

ENVIRONMENTAL SAMPLING STATIONS

1A	PEACH BOTTOM WEATHER STATION NO.1
1B	PEACH BOTTOM WEATHER STATION NO.2
1M	PEACH BOTTOM CANAL DISCHARGE
1MM	PEACH BOTTOM CANAL DISCHARGE - COMPOSITE
1LL	PEACH BOTTOM UNITS 2&3 INTAKE - COMPOSITE
1Q	PEACH BOTTOM UNIT NO. 2 INTAKE
1T	PEACH BOTTOM DISCHARGE CANAL - 2200 (FT)
1U	PEACH BOTTOM SITE - UTILITY BUILDING
1V	PEACH BOTTOM SITE - INFORMATION CENTER
1X	PEACH BOTTOM SITE COOLING TOWER POND B-1
1AA	PEACH BOTTOM DISCHARGE CANAL BANK
1BB	PEACH BOTTOM DISCHARGE CANAL
1EE	PEACH BOTTOM DISCHARGE CANAL - BELOW RADWASTE DISCHARGE
2	PEACH BOTTOM SITE 130° SECTOR HILL
4C	CONOWINGO POND, PA.
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



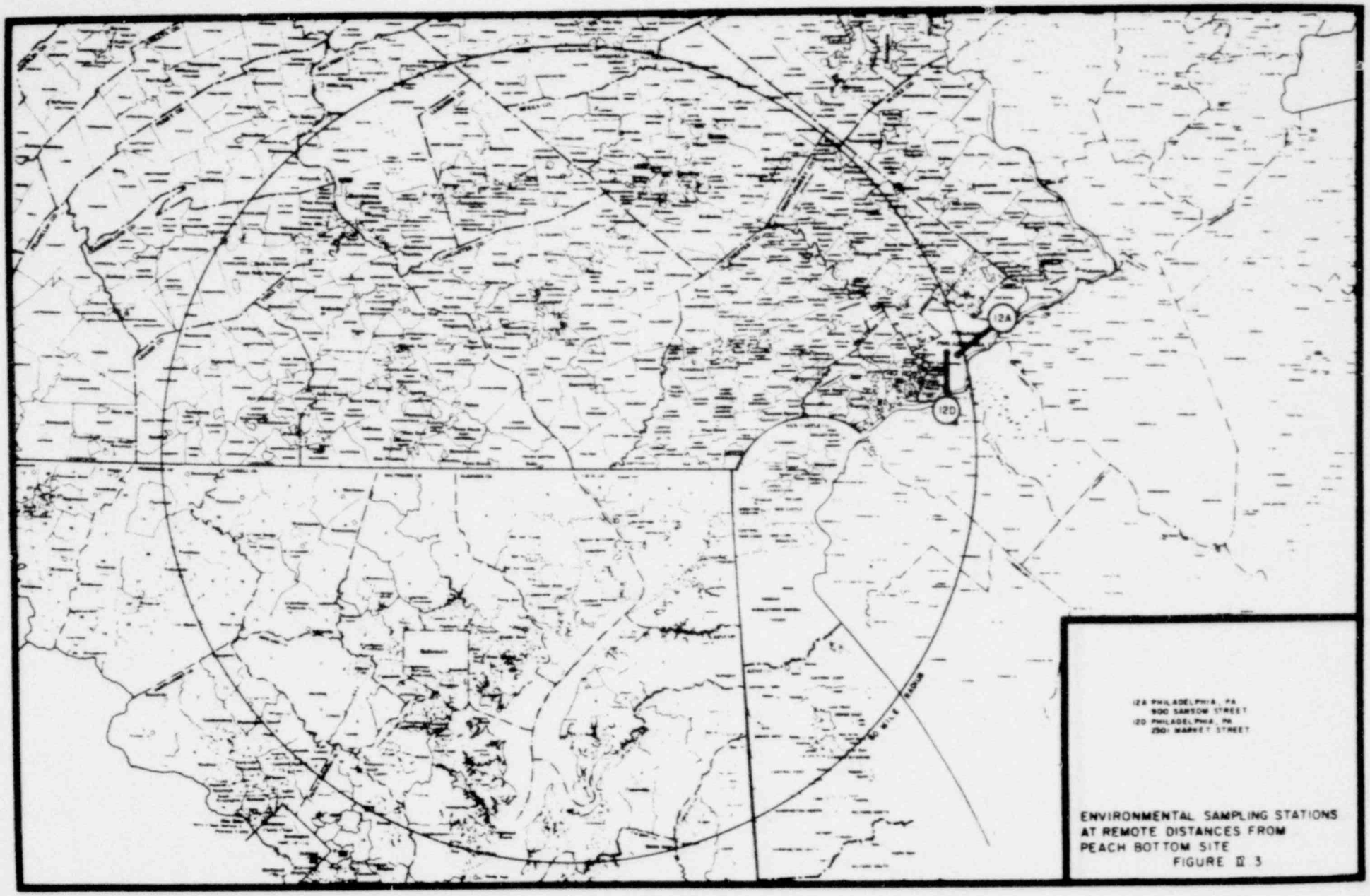
3A DELTA, PA – SUBSTATION
4A CONOWINGO DAM, MARYLAND
4B CONOWINGO DAM, MARYLAND
4F CONOWINGO DAM, EL33(FT.)MSL GRAB
4H CONOWINGO DAM, TAILRACE
4L CONOWINGO DAM, EL.33(FT)COMPOSITE
4M CONOWINGO DAM, DOWNSTREAM EL 40(FT.) MSL
4N CONOWINGO DAM, ENVIRONMENTAL STATION
4T CONOWINGO POND-NEAR CONOWINGO DAM
5 WAKEFIELD, PA.

6A HOLTWOOD DAM-HYDROELECTRIC STATION -GRAB
6B HOLTWOOD DAM-HYDROELECTRIC STATION
6D HOLTWOOD, PA.
6F HOLTWOOD DAM-EAST SHORE UPSTREAM
6G HOLTWOOD, PA.
6H HOLTWOOD POND PA
6I HOLTWOOD DAM-HYDROELECTRIC STATION-COMPOSITE
6J HOLTWOOD POND, PA.
7 DARLINGTON, MARYLAND AREA
8 COLORA MARYLAND
13A CHESTER WATER INTAKE-POND
13B CHESTER WATER INTAKE - PUMP DISCHARGE

14 PETERS CREEK
15 SILVER SPRING ROAD
17 RIVERVIEW ROAD
23 PEACH BOTTOM 150° SECTORHILL OFFSITE
31 PILOTOWN ROAD
32 SLATE HILL ROAD
33A FULTON WEATHER STATION
38 PEACH BOTTOM ROAD
40 PEACH BOTTOM SITE AREA

2339 090

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



ENVIRONMENTAL SAMPLING STATIONS
AT REMOTE DISTANCES FROM
PEACH BOTTOM SITE
FIGURE II 3

III. PROCEDURES

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 (3). Three changes were made in the analytical procedures for 1978.

The counting of radiochemically separated cesium in milk was done using a GeLi detector rather than a low background beta counter. Since nuclear power plant releases contain Cs-134 in addition to Cs-137, while fallout from nuclear testing does not, it is important to measure the two isotopes separately. These nuclides are now being measured individually using the GeLi system.

The initial portion of the procedure used to separate I-131 from milk was also changed. An aliquot of ion exchange resin is added to the milk sample and stirred for at least two hours. The milk is then decanted and the resin washed to remove the last traces of milk. The original procedure (3) is then followed starting at step 4.

An ultra-low background I-131 counter was put in operation during 1978 and was used for counting approximately half (second and third quarter) of the milk samples. One of the detectors was out for repairs during the fourth quarter.

The system detects the I-131 gamma rays with a well-type NaI detector and the I-131 beta with a plastic scintillation detector. The gamma detector output is put through a single channel analyzer, which generates a pulse when a gamma event corresponding to .31 to .41 MeV is measured. A count is recorded when a beta pulse is in coincidence with the analyzed gamma pulse.

The separated PdI2 is filtered, dried and weighed as was done previously. The filter paper is placed on a piece of sticky paper, precipitate side up. The precipitate is then covered with a thin piece of plastic wrap which adheres to the piece of sticky paper around the edges of the filter paper. For counting the mounted sample is placed face-up in the gamma detector well. The beta detector is then inserted into the well to rest flat on the sample. The system typically has an efficiency of 10 percent and a background of 0.05 cpm.

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	Filter	0.008 pCi/m3	pCi/m3	(5)
	Gamma Spectrum	1100-1500 m3	(3)	pCi/m3	
Precipitation	Gross Beta	500 ml	2 pCi/liter	pCi/liter, pCi/m2	+/-10
	Sr-89	1000 ml	0.3 pCi/liter	pCi/liter, pCi/m2	+/-15
	Sr-90	1000 ml	0.3 pCi/liter	pCi/liter, pCi/m2	+/-10
	Cs-137	1000 ml	0.3 pCi/liter	pCi/liter, pCi/m2	+/-10
Surface Water & Discharge Water	Gross Alpha				
	Soluble	1000 ml	0.6 pCi/liter	pCi/liter	+/-20
	Insoluble	4000 ml	0.1 pCi/liter	pCi/liter	+/-20
	Gross Beta				
	Soluble	1000 ml	2 pCi/liter	pCi/liter	+/-10
	Insoluble	4000 ml	0.4 pCi/liter	pCi/liter	+/-10
Well Water	Gross Alpha	1000 ml	0.5 pCi/liter	pCi/liter	+/-20
	Gross Beta	1000 ml	2 pCi/liter	pCi/liter	+/-10
	Uranium	1000 ml	0.03 ug/liter	ug/liter	+/-10 (6)
	Sr-89	1000 ml	0.3 pCi/liter	pCi/liter	+/-15
	Sr-90	1000 ml	0.2 pCi/liter	pCi/liter	+/-10
	Cs-137	1000 ml	0.3 pCi/liter	pCi/liter	+/-10
Soil, Silt	Gross Alpha	2 g dry wt.	0.8 pCi/g dry wt.	pCi/g dry wt.	+/-20
	Gross Beta	2 g dry wt.	1 pCi/g dry wt.	pCi/g dry wt.	+/-15
	K-40	1 g dry wt.	0.04 pCi/g dry wt.	pCi/g dry wt.	+/-15
	Sr-89	75 g dry wt.	0.01 pCi/g dry wt.	pCi/g dry wt.	+/-15
	Sr-90	75 g dry wt.	0.006 pCi/g dry wt.	pCi/g dry wt.	+/-15
	Cs-137	75 g dry wt.	0.008 pCi/g dry wt.	pCi/g dry wt.	+/-15
	Gamma Spectrum	300-1000 g dry wt.	(3)	pCi/g dry wt.	
Fish	Gross Beta	200 mg ash	10 pCi/g ash	pCi/g ash	+/-10
	K-40	10-20 mg ash	1 pCi/g ash	pCi/g ash	+/-10
	Sr-89	5 g ash	0.3 pCi/g ash	pCi/g ash	+/-15
	Sr-90	5 g ash	0.1 pCi/g ash	pCi/g ash	+/-10
	Cs-137	5 g ash	0.1 pCi/g ash	pCi/g ash	+/-10
	Gamma Spectrum	200-1500 g orig. wt.	(3)	pCi/g	

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TABLE III.1

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
	Cs-137	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/l	pCi/liter	+/-10
	K-40	20 mg ash	1 pCi g ash, 8 pCi/l	pCi/liter	+/-10
	Sr-89	1000 ml	1 pCi/liter	pCi/liter	+/-15
	Sr-90	1000 ml	0.3 pCi/liter	pCi/liter	+/-10
	I-131	4000 ml	0.2 pCi/liter	pCi/liter	+/-10
	Cs-137	1000 ml	2 pCi/liter	pCi/liter	+/-10
	Cs-134	1000 ml	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 or 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. In this report, results of analyses which are performed on ashed samples 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.

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 Pou 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 major atmospheric nuclear testing, precise trends tend to become obscured in the normal variability of data.

There were two atmospheric nuclear weapons tests during 1978 both by the Peoples Republic of China. The first test on March 14, 1978 was seen in air particulate, milk, precipitation, and rabbit samples using the techniques normally employed in the PBAPS program. The test on December 13, 1978 was not seen in samples from the PBAPS program or by beta measurements on samples taken nationwide as part of the ERAMS

network operated by the EPA. A few air particulate filters from the ERAMS program from central United States showed traces of I-131 when examined by GeLi spectrometry.

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 through IV.1.5. Comparative available EPA data are given in Table IV.1.5. Gamma spectral analyses are given in Table IV.1.6.

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, 4A, 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 showed the effects of the March 14, 1978 test superimposed on the typical trend seen in most earlier years. The maximum monthly average concentrations, exclusive of those months influenced by the March test fallout were about 0.1 - 0.2 pCi/m3. These are lower than the values of 0.4 - 0.5 pCi/m3 seen in 1977 and are indicative of a lower atmospheric inventory of radioactivity as would be expected from the limited testing.

The maximum values seen in individual March samples were about 1.5 pCi/m3, similar to values resulting from other recent tests.

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.

For comparison, data from the Environmental Protection Agency (EPA) (4) are presented in Table IV.1.5 and shown on the long term plots in Figures IV.1.3, IV.1.4, and IV.1.5. The values observed in the Peach Bottom program are somewhat higher than those seen at the EPA station in Harrisburg, Pennsylvania. The difference in results is apparently due to differences in laboratory techniques and is not attributable to PBAPS operation because it exists for all three groups. The EPA data also exhibit the same trend as the PBAPS data. The EPA values listed in Table IV.1.5 are based on laboratory measurements in contrast to the less sensitive field estimates available for some periods before 1974.

Figures IV.1.3 through IV.1.5 show comparable trends and values over the period 1966-1978 for all three groups of stations even though the composition of the groups has been changed by adding more sampling stations. 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.1.6. Other than Zr-95 and Nb-95 from nuclear test fallout and naturally-occurring Be-7 and K-40 no nuclides were detected by NaI gamma spectrometry. The observed values tended to follow the same trend as was found for gross beta radioactivity concentrations. Measurable values were similar at all locations.

No contribution from the operation of PBAPS is indicated.

B. PRECIPITATION

The concentrations and surface densities of gross beta, Sr-89, Sr-90, and Cs-137 radioactivity in precipitation samples collected at Stations 1A, 1B, and 4M are presented in Tables IV.2.1, IV.2.2, and IV.2.3. Results from the EPA stations in Harrisburg are given in Table IV.2.4.

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 the sample containers. Since most of the particulate material is washed out in the initial part of a rainfall, the surface density, i.e., pCi/m2, 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 a rainfall can cause wide variability between samples even when taken over limited geographical areas.

The March 1976 nuclear test produced increases in gross beta radioactivity concentrations in the March and April samples from all locations. The March monthly values were somewhat above 100 pCi/l and 10000 pCi/m2. April values were significantly lower.

Excluding the March and April results, the values for gross beta radioactivity monthly concentrations observed in samples collected at Stations 1A and 1B show an increase reaching maxima during the summer at values of about 15-30 pCi/l. The surface densities values were generally a few hundred to a few thousand pCi/m2. There did not appear to be any discernable 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 samples from Stations 1A and 1B except that they are generally slightly lower. This has been the case since 1974 and was seen in several years during the preoperational period.

EPA data from Harrisburg, Pa. presented in Table IV.2.4 show concentrations and surface densities of gross beta radioactivity. The high March values are evident. The values are generally lower than the values seen in this program. Prior to July 1973, the published EPA values were the results of field measurements. Since then, laboratory measurements have been reported. This changeover had the effect of decreasing the general level of reported monthly mean values due to an increased analytical sensitivity. The reason for the difference between data from this program and the EPA's is probably due to a difference in analytical procedure.

Sr-89 radioactivity concentration was barely detected in the June sample from Station 1A. This is consistent with the absence of fresh nuclear weapons test debris as evidenced by the air particulate data.

Sr-90 radioactivity concentrations were generally measured to be between a few tenths and 2 pCi/l. Surface densities ranged from tens to about 200 pCi/m2. These levels are comparable to what has been observed in previous periods.

Cs-137 radioactivity concentrations and surface densities at Stations 1A, 1B, and 4M as given in Tables IV.2.1 and IV.2.2 are generally less than 2 pCi/l or 150 pCi/m2. Station 4M tends to be somewhat lower than Stations 1A and 1B as was explained above.

The observed radioactivity concentrations at Station 1A, 1B, and 4M show the extreme 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.3.2. Similar values for the composite samples from Stations 1LL, 1MM, 4L, and 6I are given in Tables IV.3.3 and IV.3.4. Mean radioactivity concentrations are given in Tables IV.3.5 and IV.3.6. Comparative monthly and annual values are presented in Figures IV.3.1 through IV.3.6.

No measurable alpha radioactivity was found in the soluble fraction in any of the samples. The gross alpha radioactivity concentrations in the insoluble fraction were generally a few tenths of a pCi/l with two values as high as 5 and 7 pCi/l. The latter values were associated with samples which had large amounts of suspended material.

IV. DISCUSSION OF RESULTS

Data for gross beta radioactivity concentration in composite samples from Units 2 and 3 intake and discharge are shown in Figures IV.3.1 and IV.3.2. Similar to results from other stations most of the soluble fraction values were at or slightly above the detection limits. The insoluble fractions generally were higher at Station 1MM, however, except for the result from the January composite, they were within the range of values obtained from Station 1LL and other stations. An examination of the weights of the insoluble fractions from both locations shows very good correlation between those weights and the observed radioactivity concentrations. The January samples from Station 1MM contained almost 1g of insoluble material. The February and April samples from the same station contained about 0.2 and 0.4 g respectively. The January sample from Station 1LL had a weight of about 0.25 g and the March sample 0.1 g, similar to weights found in samples from Station 1MM which showed radioactivity levels of about 2 pCi/l. It would thus appear that the higher levels seen at Station 1MM are due to the naturally-occurring nuclides in the suspended sediment. When compared on a per gram basis Stations 1MM and 1LL have very similar radioactivity concentrations.

Composite water samples from Stations 4L and 6I are shown in Figures IV.3.3 and IV.3.4. The gross beta radioactivity concentrations for these locations are similar to each other and to the other locations sampled. The correlation between the weight of the insoluble fraction and the observed radioactivity is similar to that discussed above for Stations 1MM and 1LL indicating that the increased levels found early in the year at Stattion 4L are due to naturally-occuring nuclides. There was generally no apparent difference between the composite samples and the grab samples taken near the same location with the apparent exception of the insoluble fraction from Station 4F. This location generally has more insoluble material because it is a deep sampling point and its radioactivity concentrations reflect the naturally-occurring nuclides in the sediment.

Annual mean gross beta radioactivity concentrations in surface water samples from Stations 6A, 4F, and 13A are given in Figures IV.3.5 and IV.3.6. As has been the case in the past, these stations have relatively uniform concentrations. The slightly higher values in the insoluble fraction at Station 4F are attributable to the greater amount of sediment in the sample. The majority of the individual higher values in the insoluble fractions are associated with larger amounts of sediment.

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, and Cs-137 radioactivity and uranium are given in Tables IV.4.1 and IV.4.2.

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 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.

All but 2 of the gross beta values were below the detection limit of approximately 2 pCi/l. The two measured values were 3 +/- 2 pCi/l.

Uranium was also detected in about half of the samples from on-site and off-site locations. The levels in general are similar to those seen in previous periods. A relatively high concentration of 0.6 ug/l was seen at an off-site station. Uranium is naturally occurring in most rocks and is not of plant origin.

No Sr-89 or Cs-137 radioactivity was detected in any of the samples except for Cs-137 in one sample from Station 1U. Hydrological considerations make it improbable that the radioactivity is of plant origin.

Very low concentrations of Sr-90 were found in several of the samples from both on-site and off-site stations. Because of the small net count rates it was not possible to confirm the Y-90 decay so the concentrations may not be real.

Mean values as given in Table IV.4.2 show no significant differences between wells close to or on site and those at distant locations indicating no measured radioactivity from the operation of PBAPS.

E. SOIL

The results obtained for concentrations of acid-leachable gross alpha, gross beta, K-40, net beta, Sr-90, Sr-89, and Cs-137 radioactivity in soil samples are given in Tables IV.5.1 and IV.5.2.

IV. DISCUSSION OF RESULTS

Mean values for Sr-90, Sr-89, and Cs-137 are plotted in Figures IV.5.1 through IV.5.3.

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 nuclear testing. Specific analysis for Sr-89, Sr-90, and Cs-137 which are normally present in fallout are done to measure these nuclides in the presence of the larger quantities of naturally-occurring radioactivity.

The gross alpha radioactivity concentration was generally a few pCi/g dry weight, with the majority of the values below 2 pCi/g dry weight. The observed differences are most often the result of different soil composition at the various locations.

Net beta radioactivity, which was detectable in the majority of samples, was between 2 and 7 pCi/g dry weight. These values are within the range of normal variability.

The majority of the Sr-90 concentrations were grouped in a range of a few tenths of a pCi/g dry weight. All of the values are consistent with previous annual averages.

As a result of the atmospheric nuclear testing Sr-89 was found in many of the samples analyzed, especially those taken early in the year. Values were generally a few hundredths of a pCi/g dry weight and were not significantly different between locations.

The concentration of Cs-137 generally was several 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 or lower than the average values from the surrounding sampling stations indicating no measurable radioactivity in soil from PBAPS operation.

F. SILT

Tables IV.6.1 and IV.6.3 give the analytical results and annual means for concentrations of acid-leachable gross alpha, gross beta, Sr-89, Sr-90 and Cs-137 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.

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.6.1 and IV.5.1, the activity levels in silt generally are similar to those found in soil, although soil may tend to be somewhat higher due to the presence of fallout from previous atmospheric nuclear weapons testing.

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

Gross beta radioactivity concentration was similar to gross alpha concentration. 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 0.07 pCi/g. All results are within the range of variability observed during the PBAPS Units 2 and 3 preoperational period. Sr-89 was measured in two of the samples, most probably due to the atmospheric nuclear testing by the Peoples Republic of China.

All samples analyzed showed Cs-137 generally at low levels of a few tenths of a pCi/g dry weight which is well within the range of PBAPS preoperational data. Any apparent discrepancy between the radiochemistry 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 inhomogenious, 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, 4C, and 4T which are at increasing distances from the PBAPS discharge. There does not appear to be any correlation of the observed levels with particular locations when normal variability is taken into account. The pre-operational data show approximately the same spread in values and values of similar magnitude to those seen during 1978.

A comparison of Stations 1BB, in the discharge canal down-flow the liquid rad-waste discharge, and Station 6F, above Holtwood Dam, in Figures IV.6.3 and IV.6.4 indicates no positive addition of radio-activity by PBAPS operation, when normal variability is taken into account, except for cesium as is discussed below.

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. Cs-134 was found in some samples from Stations 1BB, IX, 4C, and 4D and is most likely from PBAPS operation because it is a reactor-generated product. Nb-95 and Ru-103 commonly found in atmospheric nuclear testing fallout were found in several samples.

The overall similarity of results between locations and with the

preoperational data indicates no addition of radioactivity due to the operation of PBAPS except for very small concentrations of Cs-134 near the plant discharge water system. If it is assumed that all cesium found is due to PBAPS releases, a dose calculation using the USNRC Regulatory Guide 1.109 model and assumptions results in a calculated dose of 5.63 E-3 mrem to a teenager's skin. This calculation conservatively assumes that the teenager was exposed to the maximum concentration found for the entire exposure period.

Silt sampling stations 4C and 4D have been labeled incorrectly in the 1973 through 1977 reports. These stations were sampled such that the reported locations were reversed from those actually sampled. The long term plots (Figures IV.6.1 and IV.6.2) have been corrected. There are no major differences in radioactivity concentrations between the stations, so the conclusions in previous reports do not change.

G. FISH

The results of the analysis of fish samples for concentrations of gross beta, K-40, net beta, Sr-89, Sr-90 and Cs-137 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.7.4 and IV.7.5. Sr-90 and Cs-137 concentrations are plotted in Figures IV.7.1 and IV.7.2.

Net beta radioactivity generally ranged from <10 to 50 pCi/g ash with the majority of the results below 20 pCi/g ash. The values were well within the range of PBAPS preoperational data.

Sr-89 was barely detected in a few fish. This is most likely due to atmospheric nuclear test fallout.

Sr-90 radioactivity concentration as determined in samples from all locations was generally a few tenths to a few pCi/g ash corresponding to several hundredths of a pCi/g original sample.

The concentration of Cs-137 radioactivity measured in samples from all stations was between approximately 0.1 and 4 pCi/g ash with the majority of values several tenths of a pCi/g ash. Corresponding values for the original samples were 0.006 to 0.12 pCi/g with the majority of values a few hundredths of a pCi/g.

Stations 1EE and 4J, as a group of stations which could be affected by PBAPS operation, and Stations 6H and 6J, which are above Holtwood Dam and therefore unaffected, are compared in Figures IV.7.1 and IV.7.2. There is essentially no difference in the range of concentrations for Sr-90 radioactivity in fish from the two groups of locations as can be seen from Figure IV.7.1. As has been the case since 1976, the quarterly mean Cs-137 concentrations tended to be higher at Stations 1EE and 4J. The levels found in catfish, which are bottom feeders, were again higher than those found in white crappie.

IV. DISCUSSION OF RESULTS

Gamma spectrum analyses as shown in Table IV.7.3 generally indicate the presence of only naturally-occurring K-40 and Cs-137 from nuclear test fallout. No Cs-134 was detected in any samples. Zn-65 was barely detected in a sample from Station 1EE which is in the plant water discharge system. No Zn-65 was found in fish caught at any off-site location.

Examination of the data for fish indicates no apparent difference in radioactivity concentration between species or station except for cesium concentrations. The species mean values given in Tables IV 7.4 and IV.7.5 indicate a higher concentration of Cs-137 in catfish

Examination of data from all stations in Tables IV.7.1, IV.7.2, and IV.7.3 indicates essentially no difference other than normal variability between off-site stations for all nuclides except cesium There is a small amount of Zn-65 in one sample from the onsite environment probably due to the operation of PBAPS. The maximum dose calculated using the USNRC Regulatory Guide 1.109 model and assumptions is 0.21 mrem to a teenager's liver. The actual dose due to PBAPS operations is much less than 0.21 mrem since only one fish was found to contain Zn-65 and Cs-137 is present at all stations from sources other than PBAPS.

H. VEGETATION

The concentrations of gross beta, net beta, K-40, Sr-89, Sr-90, and Cs-137 radioactivity are given in Tables IV.8.1 and IV.8.2 for vegetation samples. Mean values are in Tables IV.8.3 and IV.8.4. Figures IV.8.1 and IV.8.2 show annual mean values for Sr-90 and Cs-137 radioactivity concentrations.

The concentrations of net beta radioactivity are similar for all stations and appear to have approximately the same spread. Measurable values ranged from about <30 to 150 pCi/g ash with the majority of values nearer the low end of the range. All results are in range measured during the PBAPS Units 2 and 3 preoperational period. Corresponding values were in the general range of a few tenths to about 3 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.

Sr-90 radioactivity concentrations had a range from about 2 to approximately 50 pCi/g ash with the majority of values between 1 and 20 pCi/g ash. These concentrations are well within 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. As can be seen from the annual mean values shown in Figure IV.8.1 there is no significant difference between station groups.

IV. DISCUSSION OF RESULTS

Sr-89 was barely detected in one sample from Station 8 which is a remote location.

Cs-137 radioactivity was measured at concentrations from a few tenths to a few pCi/g ash. The corresponding average values were about 0.01 to 0.05 pCi/g original sample. As was the case in previous years, wild vegetation tended to have values well above the overall average. The annual mean values shown in Figure IV.8.2 indicate similar results at both groups of sample stations.

There is no indication of a contribution to the radioactivity in vegetation from the operation of PBAPS as can readily be seen in Tables IV.8.3 and IV.8.4 and Figures IV.8.1 and IV.8.2 comparing potentially affected stations with unaffected stations. Wide variability is to be expected between sample types because of differences in growing season and conditions.

1. MILK

The concentrations of gross beta, K-40, net beta, Sr-89, Sr-90, Cs-137, and I-131 radioactivity are given in Table IV.9.1. Mean values are presented in Table 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, H, and J, 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 1100 pCi/l. The residual net beta values are most probably the result of the difference between two types of measurements and are 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 1 to 15 pCi/l with the majority of samples approximately 5 pCi/l. This range is similar to or slightly lower than the ranges for 1975 through 1977. These concentrations are well within the range of PBAPS preoperational data.

The quarterly mean values of Sr-90 for each farm group as shown

in Figure IV.9.1 generally lie between 4 and 9 pCi/l and do not show any consistent difference between groups. The overall values are similar to those obtained during the PBAPS Units 2 and 3 preoperational period.

Sr-89 was found in a few of the samples analyzed at levels up to 9 pCi/l. Most of the measurable values were obtained in samples taken in the first and second quarters and probably reflect fallout from 1977 and early 1978 atmospheric nuclear weapons testing.

Values for Cs-137 radioactivity concentration range from about 2 to 15 pCi/l, similar to that seen in 1977. No significant difference was observed among the three farm groups as can be seen from Figure IV.9.2. The higher individual values tended to occur in samples taken during the second and third quarters. The results are similar to those measured during Units 2 and 3 preoperational period.

I-131 radioactivity concentration results, corrected for decay to date of sampling, are presented in Table IV.9.1. I-131 was detectable in only one of the regularly scheduled samples. The May sample from Farm J had a value of .7+/-.2 pCi/l. Data from another portion of the Peach Bottom environmental monitoring program indicated detectable values of I-131 in samples from all groups through most of May as a result of the March, 1978 atmospheric nuclear weapons test.

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

J. RABBITS

Tables IV.10.1 through IV.10.4 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.

No rabbits could be obtained during the second half of 1978. An additional set of rabbits will be obtained during the first quarter of 1979 to fulfill the sampling and analysis requirements.

Measureable net beta radioactivity concentration in muscle and soft tissue ranged from 20 to 50 pCi/g ash indicating again 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 ranged from about <10 to 20 pCi/g ash decreasing by a factor of 3-5 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 4 to 13

pCi/g ash similar to the range seen in 1977. The pCi/g original sample values are a factor of 2-5 lower.

Sr-89 was detected in one rabbit bone. The value of 2.3 pCi/g ash was similar to those found in 1977 and is probably the result of fallout from atmospheric nuclear weapons testing.

I-131 was barely measurable in three of the thyroids analyzed. This is probably the result of fallout from atmospheric nuclear weapons testing.

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

V. SUMMARY

The environs radiation monitoring program detected plant related radioactivity at very low levels in two sample types in or near the discharge water system. Cs-134 was detected in silt at several locations. Zn-65 was found in one fish from the onsite environment and slightly higher concentrations of Cs-137 were found in fish from some affected stations than unaffected stations. There was no other measurable environmental radioactivity which is attributed to the operation of PBAPS.

Several nuclides such as Sr-89, I-131, Zr-95, and Nb-95 were found in certain samples as a result of nuclear weapons testing by the Peoples Republic of China in September, 1976 and March, 1977. Another atmospheric nuclear weapons test in December, 1978 also by the Peoples Republic of China was not detected in this program or in any but a few locations in the nationwide ERAMS program operated by the Environmental Protection Agency.

Samples such as soil, fish, 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 earlier nuclear testing and therefore did not result from PBAPS operation.

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, 1975 through December 31, 1975. (July 1976)

4. Environmental Radiation Data, U.S. Environmental Protection Agency

5. USNRC Regulatory Guide 4.8, Branch Technical Position, March 1978

TABLE IV.1.1
ANALYTICAL DATA FOR AIR-PARTICULATE SAMPLES
CONCENTRATIONS OF GROSS BETA RADIOACTIVITY (PCI/M^3)

GROUP 1 - PEACH BOTTOM SITE

	COLLECTION PERIOD	1A	1B	2
78	12/31-01/07	.128 ± .008	.133 ± .009	.134 ± .009
	01/07-01/15	.101 ± .007	.101 ± .008	.099 ± .008
	01/15-01/22	.113 ± .008	.100 ± .008	.111 ± .009
	01/22-01/28	.15 ± .01	.14 ± .01	.13 ± .01
	01/28-02/04	.105 ± .008	.102 ± .008	.105 ± .009
	02/04-02/12	.113 ± .007	.125 ± .008	.122 ± .008
	02/12-02/18	.097 ± .009	.11 ± .01	.10 ± .01
	02/18-02/25	.119 ± .008	.112 ± .008	.120 ± .009
	02/25-03/05	.145 ± .008	.146 ± .008	.142 ± .008
	03/05-03/11	.21 ± .01	.22 ± .01	.22 ± .01
	03/11-03/18	.118 ± .008	.123 ± .008	.128 ± .008
	03/18-03/25	1.60 ± .02	1.69 ± .02	1.69 ± .02
	03/25-04/01	.26 ± .01	.26 ± .01	.28 ± .01
	04/01-04/09	.26 ± .01	.29 ± .01	.25 ± .01
	04/09-04/15	.29 ± .01	.30 ± .01	.33 ± .02
	04/15-04/22	.064 ± .008	.066 ± .008	
	04/15-04/23			(a)
	04/22-04/29	.20 ± .01	.23 ± .01	
	04/23-04/29			.22 ± .01
	04/29-05/06	.218 ± .009	.179 ± .009	.192 ± .009
	05/06-05/13	.072 ± .008	.083 ± .009	.084 ± .009
	05/13-05/20	.087 ± .009	.087 ± .009	.087 ± .009
	05/20-05/28	.142 ± .008	.150 ± .008	.147 ± .008
	05/28-06/03	.10 ± .01	.10 ± .01	.10 ± .01
	06/03-06/10	.138 ± .009	.150 ± .009	.15 ± .01
	06/10-06/17	.20 ± .01	.21 ± .01	.19 ± .01
	06/17-06/24	.19 ± .01	.21 ± .01	.20 ± .01
	06/24-07/02	.131 ± .008	.147 ± .008	.141 ± .008
	07/02-07/08	.16 ± .01	.17 ± .01	.17 ± .01
	07/08-07/15	.145 ± .009	.148 ± .009	.146 ± .009
	07/15-07/23	.129 ± .007	.134 ± .008	.135 ± .008
	07/23-07/29	.088 ± .009	.097 ± .009	.092 ± .009
	07/29-08/05	.049 ± .007	.051 ± .007	.054 ± .008
	08/05-08/11	.071 ± .009	.07 ± .01	.07 ± .01
	08/11-08/19	.059 ± .007		.067 ± .007
	08/11-08/20		.062 ± .007	
	08/19-08/26	.083 ± .008		.084 ± .008
	08/20-08/26		.093 ± .009	
	08/26-09/03	.066 ± .007	.063 ± .006	.069 ± .007
	09/03-09/10	.068 ± .008	.074 ± .009	.064 ± .009
	09/10-09/17	.057 ± .008	.073 ± .009	.055 ± .008
	09/17-09/24	.047 ± .007	.048 ± .007	.060 ± .007
	09/24-10/01	.037 ± .007	.045 ± .008	.048 ± .007
	10/01-10/08	.039 ± .007	.039 ± .008	.047 ± .008
	10/08-10/14	.06 ± .01	.06 ± .01	.05 ± .03
	10/14-10/22	(b)	.037 ± .006	.06 ± .02
	10/22-10/29	.064 ± .007	.056 ± .008	.07 ± .01
	10/29-11/05	.072 ± .007	.070 ± .008	.074 ± .008
	11/05-11/12	.096 ± .007	.097 ± .008	.091 ± .008
	11/12-11/19	.067 ± .006	.076 ± .007	.073 ± .007
	11/19-11/25	.061 ± .008	.059 ± .009	.060 ± .009
	11/25-12/02	.051 ± .007	.042 ± .008	.050 ± .008
	12/02-12/10	.063 ± .006	.064 ± .007	.057 ± .007
	12/10-12/17	.065 ± .007	.065 ± .008	.064 ± .008
	12/17-12/23	.057 ± .007	.058 ± .008	.08 ± .02
	12/23-12/31	.070 ± .007	.067 ± .007	.067 ± .007
	ANNUAL MEAN	.141 ± .435	.144 ± .456	.146 ± .459

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(a) No sample due to power failure.
(b) No sample due to pump replacement.

TABLE IV.1.2
ANALYTICAL DATA FOR AIR-PARTICULATE SAMPLES
CONCENTRATIONS OF GROSS BETA RADIOACTIVITY (PCI/M^3)

GROUP II - INTERMEDIATE DISTANCE LOCATIONS

	COLLECTION PERIOD	3A	4A	4B	5	6B	14
78	12/31-01/07	.138 ± .008	.135 ± .008	.123 ± .007	.130 ± .009	.130 ± .009	.119 ± .009
	01/07-01/15	.103 ± .007	.104 ± .007	.104 ± .006	.099 ± .008	.096 ± .008	.099 ± .008
	01/15-01/22	.106 ± .007	.13 ± .02	.14 ± .02	.105 ± .008	.114 ± .009	.113 ± .009
	01/22-01/28	.14 ± .01	(a)	(a)	.14 ± .01	.14 ± .01	.15 ± .01
	01/28-02/04	.099 ± .007	(a)	(a)	.099 ± .008	.106 ± .009	.106 ± .009
	02/04-02/11		.109 ± .008	.116 ± .007	.127 ± .009	.124 ± .009	.120 ± .009
	02/04-02/12	.124 ± .007					
	02/11-02/18		.095 ± .008	.094 ± .007	.096 ± .008	.098 ± .008	.103 ± .009
	02/12-02/18	.097 ± .008					
	02/18-02/25	.119 ± .007	.099 ± .008	.111 ± .007	.119 ± .009	.121 ± .009	.118 ± .009
	02/25-03/05	.146 ± .007	.132 ± .008	.141 ± .007	.140 ± .008	.153 ± .008	.147 ± .008
	03/05-03/11	.23 ± .01	.19 ± .01	.22 ± .01	.22 ± .01	.21 ± .01	.20 ± .01
	03/11-03/18	.126 ± .009	.113 ± .008	.121 ± .008	.113 ± .008	.123 ± .008	.120 ± .008
	03/18-03/25	1.73 ± .02	1.57 ± .02	1.57 ± .02	1.81 ± .02	1.58 ± .02	1.57 ± .02
	03/25-04/01	.28 ± .01	.28 ± .01	.28 ± .01	.26 ± .01	.22 ± .01	.24 ± .01
	04/01-04/09	.28 ± .01	.27 ± .01	.26 ± .01	.27 ± .01	.27 ± .01	.26 ± .01
	04/09-04/15	.29 ± .01	.31 ± .01	.29 ± .01	.27 ± .01	.30 ± .01	.28 ± .01
	04/15-04/22	.061 ± .009	.073 ± .009	.064 ± .009	.052 ± .009	.060 ± .009	.060 ± .009
	04/22-04/29	.22 ± .01	(b)	.20 ± .01	.19 ± .01	.22 ± .01	.22 ± .01
	04/29-05/06	.22 ± .01	.22 ± .01	.21 ± .01	.20 ± .01	.20 ± .01	.20 ± .01
	05/06-05/13	.079 ± .009	.081 ± .009	.082 ± .009	.076 ± .009	.080 ± .009	.075 ± .009
	05/13-05/20	.09 ± .01	.10 ± .01	.078 ± .009	.101 ± .009	.091 ± .009	.093 ± .009
	05/20-05/28	.145 ± .008	.147 ± .008	.140 ± .008	.135 ± .007	.160 ± .008	.138 ± .008
	05/28-06/03	.09 ± .01	.10 ± .01	.10 ± .01	.10 ± .01	.10 ± .01	.09 ± .01
	06/03-06/10	.15 ± .01	.16 ± .01	.15 ± .01	.15 ± .01	.15 ± .01	.15 ± .01
	06/10-06/17	.20 ± .01	.21 ± .01	.20 ± .01	.20 ± .01	.20 ± .01	.20 ± .01
	06/17-06/24	.20 ± .01	.22 ± .01	.21 ± .01	.15 ± .01	.21 ± .01	.21 ± .01
	06/24-07/02	.141 ± .009	.145 ± .008	.138 ± .008	.112 ± .008	.152 ± .008	.134 ± .008
	07/02-07/08	.16 ± .01	.18 ± .01	.16 ± .01	.16 ± .01	.17 ± .01	.17 ± .01
	07/08-07/15	.144 ± .009	.16 ± .01	.152 ± .009	.148 ± .009	.161 ± .009	.153 ± .009
	07/15-07/22				.135 ± .009	.149 ± .009	.138 ± .009
	07/15-07/23	.136 ± .008	.131 ± .008	.130 ± .008			
	07/22-07/29				.052 ± .008	.100 ± .008	.093 ± .009
	07/23-07/29	.09 ± .01	.09 ± .01	.09 ± .01			
	07/29-08/05	.059 ± .008	.053 ± .008	.054 ± .007	.057 ± .007	.049 ± .007	.047 ± .008
	08/05-08/11	.06 ± .01	.07 ± .01	.07 ± .01			
	08/05-08/12				.063 ± .008	.069 ± .009	.069 ± .009
	08/11-08/19	.062 ± .008	.057 ± .008	.056 ± .008			
	08/12-08/20				.063 ± .008	.066 ± .008	.064 ± .008
	08/19-08/26	.084 ± .009	.086 ± .009	.094 ± .009			
	08/20-08/26				.095 ± .009	.09 ± .01	.081 ± .009
	08/26-09/03	.060 ± .007	.056 ± .007	.065 ± .007	.061 ± .006	.062 ± .007	.063 ± .007
	09/03-09/10	.070 ± .009	.079 ± .009	.066 ± .009	.062 ± .008	.067 ± .009	.066 ± .009
	09/10-09/17	.065 ± .009	.063 ± .009	.068 ± .009	.066 ± .008	.056 ± .009	.060 ± .009
	09/17-09/24	.052 ± .007	.055 ± .008	.049 ± .007	.054 ± .007	.055 ± .008	.055 ± .008
	09/24-10/01	.038 ± .008	.048 ± .008	.049 ± .007	.047 ± .007	.058 ± .008	.051 ± .008
	10/01-10/08	.045 ± .008	.052 ± .008	.044 ± .008	.047 ± .008	.048 ± .009	.042 ± .008
	10/08-10/14	.07 ± .01	.05 ± .01	.05 ± .01	.050 ± .009	.06 ± .01	.05 ± .01
	10/14-10/22	.047 ± .007	.037 ± .007	.038 ± .006	.040 ± .006	.052 ± .007	.049 ± .007
	10/22-10/29	.051 ± .007	.060 ± .008	.054 ± .008	.057 ± .007	.063 ± .008	.058 ± .008
	10/29-11/05	.077 ± .009	.079 ± .009	.064 ± .008	.075 ± .008	.080 ± .009	.082 ± .009
	11/05-11/12	.097 ± .008	.092 ± .009	.080 ± .008	.088 ± .008	.094 ± .009	.105 ± .009
	11/12-11/19	.079 ± .007	.082 ± .008	.067 ± .007	.072 ± .007	.074 ± .008	.073 ± .007
	11/19-11/25	.059 ± .009	.059 ± .008	.056 ± .008			
	11/19-11/26				.056 ± .008	.054 ± .008	.055 ± .007
	11/25-12/02	.046 ± .008	.047 ± .008	.044 ± .008			
	11/26-12/02				.04 ± .01	.05 ± .01	.05 ± .01
	12/02-12/10	.062 ± .007	.066 ± .007	.058 ± .007	.058 ± .007	.058 ± .007	.063 ± .007
	12/10-12/17	.064 ± .008	.058 ± .008	.060 ± .008	.061 ± .008	.063 ± .008	.066 ± .008
	12/17-12/23	.049 ± .008	.054 ± .008	.052 ± .008	.054 ± .008	.054 ± .008	.056 ± .008
	12/23-12/31	.071 ± .008	.066 ± .007	.065 ± .007	.065 ± .008	.070 ± .008	.072 ± .008
	ANNUAL MEAN	.144 ± .467	.141 ± .437	.140 ± .433	.140 ± .487	.141 ± .426	.139 ± .422

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(a) No sample due to power failure.
(b) Sample lost in the field.

TABLE IV.1.2 (cont.)
ANALYTICAL DATA FOR AIR-PARTICULATE SAMPLES
CONCENTRATION OF GROSS BETA RADIOACTIVITY (PCI/M^3)

GROUP II - INTERMEDIATE DISTANCE LOCATIONS

	COLLECTION PERIOD	15	17	31	32	33A	38
78	12/31-01/07	.127 ± .008	.125 ± .008	.130 ± .008	.128 ± .008	.132 ± .009	.125 ± .008
	01/07-01/15	.103 ± .008	.108 ± .007	.099 ± .007	.093 ± .008	.103 ± .008	.101 ± .008
	01/15-01/22	.114 ± .009	.113 ± .008	.062 ± .007	.105 ± .008	.110 ± .008	.111 ± .009
	01/22-01/28	.13 ± .01	.14 ± .01	(a)	.13 ± .01	.14 ± .01	.14 ± .01
	01/28-02/04	.111 ± .008	.100 ± .008	.110 ± .009	.097 ± .008	.105 ± .008	.102 ± .008
	02/04-02/11	.120 ± .009	.125 ± .008	.113 ± .009	.127 ± .009	.128 ± .009	.124 ± .009
	02/11-02/18	.105 ± .008	.099 ± .008	.112 ± .009	.096 ± .008	.102 ± .008	.103 ± .008
	02/18-02/25	.125 ± .009	.117 ± .009	.113 ± .009	.120 ± .009	.121 ± .009	.121 ± .009
	02/25-03/05	.140 ± .008	.144 ± .008	.149 ± .008	.141 ± .008	.141 ± .008	.148 ± .008
	03/05-03/11	.21 ± .01	.21 ± .01	.20 ± .01	.20 ± .01	.22 ± .01	.22 ± .01
	03/11-03/18	.099 ± .008	.118 ± .008	.106 ± .008	.106 ± .008	.120 ± .008	.117 ± .008
	03/18-03/25	1.63 ± .02	1.71 ± .02	1.63 ± .02	1.62 ± .02	1.69 ± .02	1.62 ± .02
	03/25-04/01	.24 ± .01	.26 ± .01	.23 ± .01	.23 ± .01	.24 ± .01	.25 ± .01
	04/01-04/09	.24 ± .01	.24 ± .01	.28 ± .01	.25 ± .01	.25 ± .01	.28 ± .01
	04/09-04/15	.30 ± .01	.30 ± .01	.30 ± .01	.30 ± .01	.29 ± .01	.29 ± .01
	04/15-04/22	.066 ± .009	.060 ± .009	.060 ± .008	.055 ± .009	.059 ± .008	.065 ± .009
	04/22-04/29	.23 ± .01	.21 ± .01	.23 ± .01	.22 ± .01	.22 ± .01	.23 ± .01
	04/29-05/06	.21 ± .01	.189 ± .009	.167 ± .008	.179 ± .009	.179 ± .009	.20 ± .01
	05/06-05/13	.076 ± .009	.079 ± .009	.090 ± .008	.069 ± .009	.079 ± .008	.087 ± .009
	05/13-05/20	.073 ± .009	.079 ± .009	.096 ± .008	.071 ± .009	.083 ± .008	.088 ± .009
	05/20-05/28	.137 ± .008	.130 ± .008	.129 ± .007	.132 ± .008	.142 ± .008	.145 ± .008
	05/28-06/03	.09 ± .01	.10 ± .01	.087 ± .009	.10 ± .01	.09 ± .01	.10 ± .01
	06/03-06/10	.13 ± .01	.142 ± .009	.146 ± .009	.133 ± .009	(b)	.15 ± .01
	06/10-06/17	.18 ± .01	.19 ± .01	.177 ± .009	.19 ± .01	.20 ± .01	.20 ± .01
	06/17-06/24	.20 ± .01	.18 ± .01	.19 ± .01	.19 ± .01	.21 ± .01	.21 ± .01
	06/24-07/02	.143 ± .008	.148 ± .008	.127 ± .007	.140 ± .008	.142 ± .008	.150 ± .009
	07/02-07/08	.17 ± .01	.17 ± .01	.16 ± .01	.17 ± .01	.17 ± .01	.17 ± .01
	07/08-07/15	.138 ± .009	.143 ± .009	.137 ± .008	.128 ± .009	.136 ± .008	.153 ± .009
	07/15-07/22	.136 ± .009	.133 ± .009	.136 ± .008	.134 ± .009	.124 ± .008	.133 ± .009
	07/22-07/29	.097 ± .008	.086 ± .008	.100 ± .008	.091 ± .008	.102 ± .008	.112 ± .009
	07/29-08/05	.052 ± .008	.052 ± .007	.054 ± .007	.054 ± .007	.061 ± .007	.059 ± .008
	08/05-08/12	.061 ± .009	.058 ± .008	.074 ± .008	.068 ± .008	.065 ± .008	.066 ± .009
	08/12-08/20	.054 ± .008	.060 ± .007	.063 ± .007	.058 ± .007	.067 ± .007	.062 ± .008
	08/20-08/26	.083 ± .009	.090 ± .009	.094 ± .008	.074 ± .009	.090 ± .009	.09 ± .01
	08/26-09/03	.048 ± .006	.050 ± .006	.060 ± .006	.062 ± .006	.049 ± .006	.071 ± .007
	09/03-09/10	.061 ± .009	.063 ± .008	.070 ± .008	.070 ± .008	.065 ± .008	.070 ± .009
	09/10-09/17	.059 ± .009	.057 ± .008	.067 ± .008	.053 ± .008	.064 ± .008	.061 ± .009
	09/17-09/24	.054 ± .007	.058 ± .007	.060 ± .007	.054 ± .007	.055 ± .007	.055 ± .008
	09/24-10/01	.049 ± .007	.038 ± .007	.050 ± .007	.042 ± .007	.042 ± .007	.046 ± .007
	10/01-10/08	.041 ± .008	.029 ± .008	.049 ± .007	.050 ± .008	.039 ± .008	.037 ± .008
	10/08-10/14	.05 ± .01	.06 ± .01	.060 ± .009	.050 ± .009	.062 ± .009	.06 ± .01
	10/14-10/22	.041 ± .006	.039 ± .006	.042 ± .006	.038 ± .006	.040 ± .006	.038 ± .006
	10/22-10/29	.063 ± .008	.059 ± .008	.057 ± .007	.057 ± .007	.054 ± .007	.060 ± .008
	10/29-11/05	.070 ± .008	.070 ± .008	.077 ± .008	.066 ± .008	.068 ± .008	.071 ± .008
	11/05-11/12	.087 ± .009	.088 ± .008	.083 ± .007	.093 ± .008	.083 ± .008	.089 ± .008
	11/12-11/19	.074 ± .007	.069 ± .007	.077 ± .007	.070 ± .007	.080 ± .007	.074 ± .007
	11/19-11/26	.056 ± .007	.058 ± .007	.065 ± .007	.054 ± .007	.057 ± .007	.059 ± .008
	11/26-12/02	.06 ± .01	.041 ± .009	.051 ± .009	.048 ± .009	.048 ± .009	.05 ± .01
	12/02-12/10	.052 ± .007	.056 ± .007	.067 ± .006	.052 ± .006	.055 ± .006	.054 ± .007
	12/10-12/17	.060 ± .008	.065 ± .008	.063 ± .007	.065 ± .007	.065 ± .007	.061 ± .008
	12/17-12/23	.050 ± .008	.052 ± .008	.055 ± .008	.047 ± .008	.056 ± .008	.058 ± .009
	12/23-12/31	.059 ± .007	.062 ± .007	.074 ± .007	.068 ± .007	.067 ± .007	.070 ± .008
	ANNUAL MEAN	.138 ± .439	.139 ± .461	.140 ± .444	.135 ± .437	.141 ± .459	.142 ± .437

(a) No sample due to installation of new pump.
(b) Sampling pump off entire week.

TABLE IV.1.3
ANALYTICAL DATA FOR AIR-PARTICULATE SAMPLES
CONCENTRATIONS OF GROSS BETA RADIOACTIVITY (PCI/M^3)

GROUP III - DISTANT LOCATIONS

	COLLECTION PERIOD	12A	12D
78	01/03-01/09	.114 ± .009	.098 ± .009
	01/09-01/16	.102 ± .009	.112 ± .009
	01/16-01/23	.098 ± .008	.102 ± .008
	01/23-01/30	.11 ± .01	.13 ± .01
	01/30-02/08	.100 ± .007	.101 ± .007
	02/08-02/14	.104 ± .009	.100 ± .009
	02/14-02/21	.080 ± .008	.085 ± .008
	02/21-02/27	.12 ± .01	.12 ± .01
	02/27-03/06	.162 ± .009	.152 ± .009
	03/06-03/13	.167 ± .009	.157 ± .009
	03/13-03/20	.126 ± .008	.115 ± .008
	03/20-03/27	1.40 ± .02	1.33 ± .02
	03/27-04/03	< .008	.28 ± .01
	04/03-04/10	.25 ± .01	.25 ± .01
	04/10-04/17	.24 ± .01	.25 ± .01
	04/17-04/24	.15 ± .01	.15 ± .01
	04/24-05/01	.19 ± .01	.19 ± .01
	05/01-05/08	.122 ± .009	.125 ± .008
	05/08-05/15	.108 ± .009	.100 ± .009
	05/15-05/22	.087 ± .009	.083 ± .009
	05/22-05/30	.055 ± .007	.106 ± .007
	05/30-06/05	.15 ± .01	.14 ± .01
	06/05-06/12	.15 ± .01	.16 ± .01
	06/12-06/19	.20 ± .01	.21 ± .01
	06/19-06/26	.19 ± .01	.19 ± .01
	06/26-07/03	.16 ± .01	.161 ± .009
	07/03-07/10	.17 ± .01	.175 ± .009
	07/10-07/17	.135 ± .009	.140 ± .009
	07/17-07/25	.119 ± .008	.124 ± .008
	07/25-07/31	.095 ± .009	.092 ± .009
	07/31-08/08	.047 ± .007	.043 ± .007
	08/08-08/15	.021 ± .008	.070 ± .008
	08/15-08/22	.074 ± .009	.069 ± .009
	08/22-08/28	.088 ± .009	
	08/22-08/29		.082 ± .008
	08/28-09/05	.059 ± .007	
	08/29-09/05		.067 ± .007
	09/05-09/11	.06 ± .01	.07 ± .01
	09/11-09/19	.011 ± .006	.056 ± .007
	09/19-09/25	.055 ± .008	.061 ± .008
	09/25-10/02	.049 ± .007	.048 ± .007
	10/02-10/10	.039 ± .007	.031 ± .007
	10/10-10/16	.049 ± .009	.05 ± .01
	10/16-10/23	.049 ± .007	.057 ± .007
	10/23-11/01	.044 ± .006	.051 ± .006
	11/01-11/06	.08 ± .01	.08 ± .01
	11/06-11/13	.064 ± .007	.071 ± .008
	11/13-11/20	.073 ± .007	.072 ± .007
	11/20-11/27	.045 ± .007	.047 ± .007
	11/27-12/05	.044 ± .007	.045 ± .007
	12/05-12/11	.056 ± .008	.058 ± .008
	12/11-12/18	.048 ± .007	.046 ± .007
	12/18-12/26	.056 ± .006	(a)
	12/26-01/02	.047 ± .008	.053 ± .008
	ANNUAL MEAN	.124 ± .378	.133 ± .361

(a) No sample due to power failure.

TABLE IV.1.4
MONTHLY MEAN VALUES OF WEEKLY AIR PARTICULATE SAMPLES
CONCENTRATIONS OF GROSS BETA RADIOACTIVITY (pCi/M3)

Collection Period	GROUP I STATIONS (a) Min.	Max.	Mean	GROUP II STATIONS (b) Min.	Max.	Mean	Collection Period	GROUP III STATIONS (c) Min.	Max.	Mean
12/31/77-01/28/78	.099	.150	.120± .036	.062	.150	.118± .036	01/03/78-01/30/78	.098	.130	.108± .022
01/28/78-02/25/78	.097	.125	.111± .018	.094	.128	.111± .021	01/30/78-02/27/78	.080	.120	.101± .029
02/25/78-04/01/78	.118	1.690	.482±1.224	.099	1.810	.474±1.186	02/27/78-04/03/78	<.008	1.400	.390±1.037
04/01/78-04/29/78	.064	.330	.227± .178	.052	.310	.208± .184	04/03/78-05/01/78	.150	.250	.209± .088
04/29/78-06/03/78	.072	.218	.122± .092	.069	.220	.120± .091	05/01/78-05/30/78	.055	.125	.098± .046
06/03/78-07/02/78	.131	.210	.171± .062	.112	.220	.170± .060	05/30/78-07/03/78	.140	.210	.171± .048
07/02/78-07/29/78	.088	.170	.135± .057	.052	.180	.135± .059	07/03/78-07/31/78	.092	.175	.131± .061
07/29/78-09/03/78	.049	.093	.067± .025	.047	.095	.066± .026	07/31/78-08/28/78	.021	.088	.062± .045
09/03/78-10/01/78	.037	.074	.056± .024	.038	.072	.057± .018	08/28/78-10/02/78	.011	.070	.054± .033
10/01/78-10/29/78	.037	.070	.053± .022	.029	.070	.050± .018	10/02/78-11/01/78	.031	.057	.046± .016
10/29/78-12/02/78	.042	.097	.069± .033	.040	.105	.069± .031	11/01/78-11/27/78	.045	.080	.067± .027
12/02/78-12/31/78	.057	.080	.065± .012	.014	.074	.060± .019	11/27/78-01/02/79	.044	.058	.050± .011
Overall	.037	1.690	.143± .447	.014	1.810	.140± .442		<.008	1.400	.128± .368

(a) Group I consists of Stations 1A, 1B, and 2

(b) Group II consists of Stations 3A, 4A, 4B, 5, 6B, 14, 15, 17, 31, 32, 33A, and 38

(c) Group III consists of Stations 12A and 12D

TABLE IV.1.5

ANALYTICAL DATA FOR AIR PARTICULATE SAMPLES

Concentration of Gross Beta Radioactivity (pCi/m^3)

Comparative EPA DATA

Harrisburg, PA.

Period	Min.	Max.	Mean
January	.04	.11	.06
February	.01	.07	.05
March	.04	2.69	.34
April	.01	.21	.12
May	.01	.14	.07
June	.03	.11	.08
July	.03	.12	.08
August	.02	.08	.04
September	.02	.04	.03
October	.02	.03	.03
November	<.01	.06	.03
December	.02	.07	.02

TABLE IV.1.6
ANALYTICAL DATA FOR MONTHLY COMPOSITE AIR PARTICULATE SAMPLES
GAMMA SPECTRUM ANALYSIS
NUCLIDE CONCENTRATION (pCi/m^3)

Collection Period	Station	Cs-137	I-131	Ba-140	Mo-99	K-40	Cr-51	Co-60	Zr-Nb-95	Be-7
12/31/77 - 01/28/78	1A	<.01	<.01	<.01	<.1	<.09	<.1	<.01	.003±.003	.21±.09
	1B	<.01	<.01	<.01	<.1	<.09	<.1	<.01	.004±.003	.2 ±.1
	2	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.2 ±.1
	3A	<.01	<.01	<.01	<.08	<.08	<.09	<.008	<.003	.24±.08
	4A	<.02	<.02	<.02	<.1	<.1	<.2	<.01	<.005	.2 ±.1
	4B	<.02	<.02	<.02	<.1	<.1	<.1	<.01	.004±.004	.2 ±.1
	5	<.01	<.01	<.01	<.1	<.09	<.1	<.01	.003±.003	.2 ±.1
	6B	<.01	<.01	<.01	<.1	<.09	<.1	<.01	.003±.003	.2 ±.1
	14	<.01	<.01	<.01	<.1	<.1	<.1	<.01	<.003	.2 ±.1
	15	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.2 ±.1
	17	<.01	<.01	<.01	<.09	<.08	<.1	<.009	.003±.003	.22±.09
	31	<.01	<.01	<.01	<.1	<.1	<.1	<.01	<.004	.2 ±.1
	32	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.2 ±.1
	33A	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.2 ±.1
	38	<.01	<.01	<.01	<.1	<.09	<.1	<.01	.003±.003	.1 ±.1
01/03/78 - 01/30/78	12A	<.01	<.01	<.01	<.1	<.09	<.1	<.01	.003±.003	.2 ±.1
	12D	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.2 ±.1
01/28/78 - 02/25/78	1A	<.01	<.01	<.01	<.1	<.09	<.1	<.01	.003±.003	.23±.09
	1B	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.3 ±.1
	2	<.01	<.01	<.01	<.1	<.09	<.1	<.01	.003±.003	.2 ±.1
	3A	<.01	<.01	<.01	<.08	<.08	<.09	<.008	.003±.003	.26±.08
	4A	<.01	<.02	<.02	<.1	<.1	<.1	<.01	<.004	.2 ±.1
	4B	<.01	<.01	<.01	<.1	<.1	<.1	<.01	<.004	.3 ±.1
	5	<.01	<.01	<.01	<.1	<.09	<.1	<.01	.003±.003	.2 ±.1
	6B	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.2 ±.1
	14	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.2 ±.1
	15	<.01	<.01	<.01	<.1	<.09	<.1	<.01	.003±.003	.3 ±.1
	17	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.24±.09
	31	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.2 ±.1
	32	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.2 ±.1
	33A	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.2 ±.1
	38	<.01	<.01	<.01	<.1	<.09	<.1	<.01	.003±.003	.2 ±.1
01/30/78 - 02/27/78	12A	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.2 ±.1
	12D	<.01	<.01	<.01	<.1	<.09	<.1	<.01	.003±.003	.2 ±.1

TABLE IV.1.6 (CON'T)
ANALYTICAL DATA FOR MONTHLY COMPOSITE AIR PARTICULATE SAMPLES
GAMMA SPECTRUM ANALYSIS
NUCLIDE CONCENTRATION (pCi/m^3)

Collection Period	Station	Cs-137	I-131	Ba-140	Mo-99	K-40	Cr-51	Co-60	Zr-Nb-95	Be-7
2/25-4/1/78	1A	<.009	<.01	<.009	<.08	.08±.07	<.09	<.008	.004±.003	1.02±.08
	1B	<.009	<.009	<.009	<.07	.08±.07	<.08	<.008	.003±.003	.79±.07
	2	<.01	<.01	<.01	<.08	.09±.07	<.09	<.008	.005±.003	1.05±.08
	3A	<.009	<.01	<.01	<.08	<.07	<.09	<.008	.004±.003	1.12±.08
	4A	<.009	<.009	<.009	<.08	.11±.07	<.08	<.008	.005±.003	1.02±.07
	4B	<.009	<.01	<.009	<.08	<.07	<.08	<.008	.003±.003	.88±.08
	5	<.009	<.01	<.01	<.08	<.07	<.09	<.008	.006±.003	.89±.08
	6B	<.009	<.01	<.01	<.08	.07±.07	<.09	<.008	.005±.003	1.1 ±.2
	14	<.01	<.01	<.01	<.08	<.08	<.09	<.008	.005±.003	.87±.08
	15	<.009	<.01	<.01	<.08	.07±.07	<.09	<.008	.005±.003	.92±.08
	17	<.009	<.01	<.009	<.08	.09±.07	<.09	<.008	.004±.003	1.01±.08
	31	<.01	<.01	<.01	<.08	<.07	<.09	<.008	.003±.003	.96±.08
	32	<.009	<.01	<.01	<.08	<.07	<.09	<.008	.004±.003	.85±.08
	33A	<.009	<.009	<.009	<.07	.07±.07	<.08	<.007	.003±.003	.90±.07
	38	<.009	<.01	<.01	<.08	.09±.07	<.09	<.008	.004±.003	.97±.08
2/27-4/3/78	12A	<.01	<.01	<.01	<.08	<.07	<.09	<.008	.004±.003	.71±.08
	12D	<.009	<.01	<.01	<.08	<.07	<.09	<.008	.004±.003	.86±.08
4/1-4/29/78	1A	<.01	<.01	<.01	<.09	<.09	<.1	<.01	<.003	.40±.09
	1B	<.01	<.01	<.01	<.1	<.09	<.1	<.01	.003±.003	.6 ±.1
	2	<.02	<.02	<.02	<.2	<.2	<.2	<.02	<.006	.6 ±.2
	3A	<.01	<.01	<.01	<.1	<.09	<.1	<.01	.004±.004	.5 ±.1
	4A	<.02	<.02	<.02	<.1	<.1	<.1	<.01	<.004	.5 ±.1
	4B	<.01	<.01	<.01	<.1	<.09	<.1	<.01	.003±.003	.4 ±.1
	5	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.4 ±.1
	6B	<.01	<.01	<.01	<.1	<.09	<.1	<.01	.004±.003	.5 ±.1
	14	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.004	.5 ±.1
	15	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.5 ±.1
	17	<.01	<.01	<.01	<.1	<.09	<.1	<.01	.004±.003	.47±.09
	31	<.01	<.01	<.01	<.09	<.08	<.1	<.009	<.003	.45±.09
	32	<.01	<.01	<.01	<.1	<.09	<.1	<.01	.003±.003	.4 ±.1
	33A	<.01	<.01	<.01	<.09	<.08	<.1	<.009	.003±.003	.48±.09
	38	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.004	.5 ±.1
4/3/78 - 5/1/78	12A	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.5 ±.1
	12D	<.01	<.01	<.01	<.1	<.09	<.1	<.01	.003±.003	.5 ±.1

TABLE IV.1.6 (CON'T)
ANALYTICAL DATA FOR MONTHLY COMPOSITE AIR PARTICULATE SAMPLES
GAMMA SPECTRUM ANALYSIS
NUCLIDE CONCENTRATION (pCi/m^3)

Collection Period	Station	Cs-137	I-131	Ba-140	Mo-99	K-40	Cr-51	Co-60	Zr-Nb-95	Be-7
4/29/78 - 5/28/78	1A	<.01	<.01	<.01	<.09	<.08	<.1	<.009	<.003	.19±.09
	1B	<.01	<.01	<.01	<.09	<.08	<.1	<.009	<.003	.33±.09
	2	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.18±.09
	3A	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.3 ±.1
	4A	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.3 ±.1
	4B	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.3 ±.1
	5	<.01	<.01	<.01	<.09	<.09	<.1	<.009	<.003	.26±.09
	6B	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.20±.09
	14	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.2 ±.1
	15	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.3 ±.1
	17	<.01	<.01	<.01	<.09	<.08	<.1	<.009	<.003	.27±.09
	31	<.01	<.01	<.01	<.08	<.08	<.09	<.008	<.003	.21±.08
	32	<.01	<.01	<.01	<.09	<.09	<.1	<.01	<.003	.12±.09
	33A	<.01	<.01	<.01	<.09	<.08	<.1	<.009	<.003	.24±.09
	38	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.3 ±.1
5/01/78 - 5/30/78	12A	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.1 ±.1
	12D	<.01	<.01	<.01	<.09	<.09	<.1	<.01	<.003	.20±.09
5/28/78 - 7/02/78	1A	<.009	<.009	<.009	<.07	<.07	<.08	<.008	<.003	.30±.07
	1B	<.009	<.009	<.009	<.07	<.07	<.08	<.008	<.003	.34±.07
	2	<.009	<.01	<.01	<.08	<.07	<.09	<.008	<.003	.28±.08
	3A	<.01	<.01	<.01	<.08	<.08	<.09	<.008	<.003	.31±.08
	4A	<.01	<.01	<.01	<.08	<.08	<.09	<.008	<.003	.30±.08
	4B	<.009	<.01	<.01	<.08	<.07	<.09	<.008	<.003	.36±.08
	5	<.009	<.01	<.01	<.08	<.07	<.09	<.008	<.003	.28±.08
	6B	<.009	<.01	<.01	<.08	<.07	<.09	<.008	<.003	.33±.08
	14	<.01	<.01	<.01	<.08	<.08	<.09	<.008	<.003	.31±.08
	15	<.009	<.01	<.01	<.08	<.07	<.09	<.008	<.003	.30±.08
	17	<.009	<.01	<.009	<.08	<.07	<.09	<.008	<.003	.34±.08
	31	<.008	<.009	<.009	<.07	<.06	<.08	<.007	<.002	.35±.07
	32	<.009	<.01	<.01	<.08	<.07	<.09	<.008	<.003	.29±.08
	33A	<.01	<.01	<.01	<.09	<.09	<.1	<.009	<.003	.36±.09
	38	<.01	<.01	<.01	<.08	<.08	<.09	<.008	<.003	.27±.08
5/30/78 - 7/03/78	12A	<.01	<.01	<.01	<.08	<.08	<.09	<.008	<.003	.40±.08
	12D	<.009	<.01	<.01	<.08	<.07	<.09	<.008	<.003	.35±.08

TABLE IV.1.6 (CON'T)
ANALYTICAL DATA FOR MONTHLY COMPOSITE AIR PARTICULATE SAMPLES
GAMMA SPECTRUM ANALYSIS
NUCLIDE CONCENTRATION (pCi/m^3)

Collection Period	Station	Cs-137	I-131	Ba-140	Mo-99	K-40	Cr-51	Co-60	Zr-Nb-95	Be-7
7/02/78 -	1A	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.28±09
7/29/78	1B	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.3 ±.1
	2	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.3 ±.1
	3A	<.01	<.01	<.01	<.1	<.1	<.1	<.01	<.004	.4 ±.1
	4A	<.01	<.01	<.01	<.1	<.1	<.1	<.01	<.004	.4 ±.1
	4B	<.01	<.01	<.01	<.1	<.1	<.1	<.01	<.004	.3 ±.1
	5	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.3 ±.1
	6B	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.4 ±.1
	14	<.01	<.01	<.01	<.1	<.1	<.1	<.01	<.004	.3 ±.1
	15	<.01	<.01	<.01	<.1	<.1	<.1	<.01	<.004	.3 ±.1
	17	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.3 ±.1
	31	<.01	<.01	<.01	<.09	<.08	<.1	<.009	<.003	.31±.09
	32	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.3 ±.1
	33A	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.2 ±.1
	38	<.01	<.01	<.01	<.1	<.1	<.1	<.01	<.004	.4 ±.1
7/03/78 -	12A	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.4 ±.1
7/31/78	12D	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.4 ±.1
7/29/78 -	1A	<.009	<.009	<.009	<.07	<.07	<.08	<.007	<.002	.23±.07
9/03/78	1B	<.009	<.009	<.009	<.07	<.07	<.08	<.007	<.002	.19±.07
	2	<.009	<.01	<.009	<.08	<.07	<.09	<.008	<.003	.20±.08
	3A	<.009	<.01	<.01	<.08	<.07	<.09	<.008	<.003	.23±.08
	4A	<.009	<.01	<.01	<.08	<.07	<.09	<.008	<.003	.21±.08
	4B	<.009	<.01	<.01	<.08	<.07	<.09	<.008	<.003	.27±.08
	5	<.009	<.009	<.009	<.08	<.07	<.08	<.008	<.003	.26±.07
	6B	<.009	<.01	<.01	<.08	<.07	<.09	<.008	<.003	.23±.08
	14	<.009	<.01	<.01	<.08	<.07	<.09	<.008	<.003	.23±.08
	15	<.009	<.01	<.01	<.08	<.07	<.09	<.008	<.003	.26±.08
	17	<.009	<.009	<.009	<.07	<.07	<.08	<.008	<.003	.19±.07
	31	<.008	<.009	<.008	<.07	<.06	<.08	<.007	<.002	.26±.07
	32	<.009	<.009	<.009	<.07	<.07	<.08	<.007	<.003	.18±.07
	33A	<.008	<.009	<.009	<.07	<.07	<.08	<.007	<.002	.16±.07
	38	<.009	<.01	<.01	<.08	<.07	<.09	<.008	<.003	.22±.08
7/31/78 -	12A	<.009	<.01	<.01	<.08	<.07	<.09	<.008	<.003	.18±.08
9/05/78	12D	<.009	<.01	<.009	<.08	<.07	<.08	<.008	<.003	.25±.08

TABLE IV.1.6 (CON'T)
ANALYTICAL DATA FOR MONTHLY COMPOSITE AIR PARTICULATE SAMPLES
GAMMA SPECTRUM ANALYSIS
NUCLIDE CONCENTRATION (pCi/m^3)

Collection Period	Station	Cs-137	I-131	Ba-140	Mo-99	K-40	Cr-51	Co-60	Zr-Nb-95	Be-7
9/03/78 - 10/01/78	1A	<.01	<.01	<.01	<.09	<.08	<.1	<.009	<.003	.17±.09
	1B	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.2 ±.1
	2	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.3 ±.1
	3A	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.2 ±.1
	4A	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.004	.2 ±.1
	4B	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.3 ±.1
	5	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.2 ±.1
	6B	<.01	<.01	<.01	<.1	<.1	<.1	<.01	<.004	.2 ±.1
	14	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.3 ±.1
	15	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.3 ±.1
	17	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.2 ±.1
	31	<.01	<.01	<.01	<.09	<.08	<.1	<.009	<.003	.23±.09
	32	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.17±.09
	33A	<.01	<.01	<.01	<.09	<.09	<.1	<.009	<.003	.22±.09
	38	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.004	.2 ±.1
9/05/78 - 10/02/78	12A	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.2 ±.1
	12D	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.2 ±.1
10/01/78 - 10/29/78	1A	<.01	<.02	<.02	<.1	<.1	<.1	<.01	<.004	.3 ±.1
	1B	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.2 ±.1
	2	<.02	<.02	<.02	<.2	<.1	<.2	<.02	<.005	.2 ±.2
	3A	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.3 ±.1
	4A	<.01	<.01	<.01	<.1	<.1	<.1	<.01	<.004	.2 ±.1
	4B	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.2 ±.1
	5	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.2 ±.1
	6B	<.01	<.01	<.01	<.1	<.1	<.1	<.01	<.004	.2 ±.1
	14	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.3 ±.1
	15	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.2 ±.1
	17	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.2 ±.1
	31	<.01	<.01	<.01	<.09	<.08	<.1	<.009	<.003	.17±.09
	32	<.01	<.01	<.01	<.1	.09±.09	<.1	<.01	<.003	.20±.09
	33A	<.01	<.01	<.01	<.09	<.09	<.1	<.01	<.003	.19±.09
	38	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.2 ±.1
10/02/78 - 11/01/78	12A	<.01	<.01	<.01	<.09	<.08	<.1	<.009	<.003	.24±.09
	12D	<.01	<.01	<.01	<.09	<.08	<.1	<.009	<.003	.28±.09

TABLE IV.1.6 (CON'T)
ANALYTICAL DATA FOR MONTHLY COMPOSITE AIR PARTICULATE SAMPLES
GAMMA SPECTRUM ANALYSIS
NUCLIDE CONCENTRATION (pCi/m^3)

Collection Period	Station	Cs-137	I-131	Ba-140	Mo-99	K-40	Cr-51	Co-60	Zr-Nb-95	Be-7
10/29/78 - 12/02/78	1A	<.008	<.009	<.009	<.07	<.06	<.08	<.007	<.002	.21±.07
	1B	<.01	<.01	<.01	<.08	<.07	<.09	<.008	<.003	.19±.08
	2	<.009	<.01	<.01	<.08	<.07	<.09	<.008	<.003	.20±.08
	3A	<.01	<.01	<.01	<.08	<.08	<.09	<.008	<.003	.15±.08
	4A	<.01	<.01	<.01	<.08	<.08	<.09	<.008	<.003	.18±.08
	4B	<.009	<.01	<.01	<.08	<.07	<.09	<.008	<.003	.17±.08
	5	<.01	<.01	<.01	<.08	<.07	<.09	<.008	<.003	.23±.08
	6B	<.01	<.01	<.01	<.09	<.08	<.1	<.009	<.003	.19±.09
	14	<.01	<.01	<.01	<.08	<.08	<.09	<.008	<.003	.20±.08
	15	<.01	<.01	<.01	<.08	<.07	<.09	<.008	<.003	.16±.08
	17	<.009	<.01	<.01	<.08	<.07	<.09	<.008	<.003	.15±.08
	31	<.008	<.009	<.009	<.07	<.07	<.08	<.007	<.002	.21±.07
	32	<.009	<.01	<.01	<.08	<.07	<.09	<.008	<.003	.20±.08
	33A	<.009	<.01	<.01	<.08	<.07	<.09	<.008	<.003	.17±.08
	38	<.01	<.01	<.01	<.08	<.08	<.09	<.008	<.003	.16±.08
11/01/78 - 12/05/78	12A	<.009	<.01	<.01	<.08	<.07	<.09	<.008	<.003	.21±.08
	12D	<.009	<.01	<.009	<.08	<.07	<.09	<.008	<.003	.18±.08
12/02/78 - 12/31/78	1A	<.01	<.01	<.01	<.08	<.08	<.09	<.008	<.003	.20±.08
	1B	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.23±.09
	2	<.01	<.01	<.01	<.1	<.1	<.1	<.01	<.004	.2 ±.1
	3A	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.2 ±.1
	4A	<.01	<.01	<.01	<.09	<.09	<.1	<.009	<.003	.21±.09
	4B	<.01	<.01	<.01	<.09	<.09	<.1	<.01	<.003	.15±.09
	5	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.1 ±.1
	6B	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.2 ±.1
	14	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.16±.09
	15	<.01	<.01	<.01	<.09	<.09	<.1	<.01	<.003	.16±.09
	17	<.01	<.01	<.01	<.09	<.09	<.1	<.009	<.003	.23±.09
	31	<.01	<.01	<.01	<.08	<.08	<.09	<.008	<.003	.19±.08
	32	<.01	<.01	<.01	<.09	<.08	<.1	<.009	<.003	.16±.09
	33A	<.01	<.01	<.01	<.09	<.08	<.1	<.009	<.003	.14±.09
	38	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.2 ±.1
12/05/78 - 01/02/79	12A	<.01	<.01	<.01	<.1	<.09	<.1	<.01	<.003	.17±.09
	12D	<.02	<.02	<.02	<.1	<.1	<.1	<.01	<.004	<.1

TABLE IV.2.1
ANALYTICAL DATA FOR PRECIPITATION SAMPLES
CONCENTRATION (pCi/l)

STATION		COLLECTION PERIOD	VOLUME (LITERS)	G.BETA		SR-89		SR-90		CS-137	
1A	78	01/07-02/04	2.08	9	± 4	< .4		1.9	± .4	1.1	± .5
		02/04-03/05	0.115	110	± 40						
		03/05-04/01	2.66	131	± 4						
		04/01-05/06	1.65	62	± 3						
		05/06-06/03	0.57	10	± 8						
		06/03-07/02	2.80	28	± 3	.5	± .4	.7	± .2	1.3	± .3
		07/02-08/05	4.25	8	± 2	< .3		.6	± .2	1.0	± .5
		08/05-09/03	2.15	15	± 2						
		09/03-10/01	1.15	14	± 2						
		10/01-11/05	1.25	13	± 2						
		11/05-12/02	2.00	13	± 2	< .3		.4	± .2	.5	± .2
		12/02-01/06	5.20	5	± 2						
1B	78	01/07-02/04	4.24	8	± 4	< .5		2.1	± .4	1.3	± .5
		02/04-03/05	0.30	30	± 10						
		03/05-04/01	2.80	156	± 4						
		04/01-05/06	1.70	55	± 3						
		05/06-06/03	3.15	25	± 3						
		06/03-07/02	3.40	38	± 3	< .4		1.4	± .2	1.6	± .4
		07/02-08/05	3.95	11	± 2	< .4		.7	± .2	1.1	± .6
		08/05-09/03	2.00	16	± 2						
		09/03-10/01	1.25	23	± 2						
		10/01-11/05	1.05	27	± 2						
		11/05-12/02	1.90	14	± 2	< .4		.5	± .2	.3	± .2
		12/02-01/06	3.80	11	± 3						
4M	78	01/07-02/04	3.48	18	± 5	< .4		2.0	± .3	1.2	± .5
		02/04-03/05	0.88	< 7							
		03/05-04/01	2.70	122	± 4						
		04/01-05/06	0.70	28	± 8						
		05/06-06/03	2.00	18	± 3						
		06/03-07/02	0.9	18	± 5	< .8		2.0	± .4	1.4	± .7
		07/02-08/05	3.90	9	± 2	< .4		.7	± .2	.7	± .5
		08/05-09/03	2.20	7	± 2						
		09/03-10/01	0.046	70	± 40						
		10/01-11/05	1.30	6	± 2						
		11/05-12/02	0.85	15	± 5	< .6		.7	± .4	.5	± .4
		12/02-01/06	2.40	3	± 2						

TABLE IV.2.2
ANALYTICAL DATA FOR PRECIPITATION SAMPLES
CONCENTRATION (pCi/m^2)

STATION		COLLECTION PERIOD	VOLUME (LITERS)	G.BETA	SR-89	SR-90	CS-137
1A	78	01/07-02/04	2.08	600 ± 300	< 30	120 ± 20	70 ± 30
		02/04-03/05	0.115	400 ± 100			
		03/05-04/01	2.66	10700 ± 300			
		04/01-05/06	1.65	3100 ± 100			
		05/06-06/03	0.57	200 ± 100			
		06/03-07/02	2.80	2400 ± 200	40 ± 40	60 ± 20	110 ± 30
		07/02-08/05	4.25	1000 ± 300	< 40	80 ± 20	130 ± 60
		08/05-09/03	2.15	1000 ± 100			
		09/03-10/01	1.15	500 ± 70			
		10/01-11/05	1.25	510 ± 80			
		11/05-12/02	2.00	800 ± 100	< 20	20 ± 10	30 ± 10
		12/02-01/06	5.20	700 ± 400			
1B	78	01/07-02/04	4.24	1100 ± 500	< 60	280 ± 60	170 ± 60
		02/04-03/05	0.30	300 ± 100			
		03/05-04/01	2.80	13300 ± 300			
		04/01-05/06	1.70	2800 ± 100			
		05/06-06/03	3.15	2400 ± 300			
		06/03-07/02	3.40	4000 ± 300	< 40	140 ± 20	170 ± 40
		07/02-08/05	3.95	1400 ± 300	< 40	90 ± 20	130 ± 70
		08/05-09/03	2.00	1000 ± 100			
		09/03-10/01	1.25	870 ± 90			
		10/01-11/05	1.05	850 ± 80			
		11/05-12/02	1.90	800 ± 100	< 20	30 ± 10	20 ± 10
		12/02-01/06	3.80	1300 ± 300			
4B	78	01/07-02/04	3.48	1900 ± 500	< 50	210 ± 40	120 ± 50
		02/04-03/05	0.88	< 200			
		03/05-04/01	2.70	10100 ± 300			
		04/01-05/06	0.70	600 ± 200			
		05/06-06/03	2.00	1100 ± 200			
		06/03-07/02	0.9	500 ± 100	< 20	50 ± 10	40 ± 20
		07/02-08/05	3.90	1100 ± 300	< 50	80 ± 20	90 ± 60
		08/05-09/03	2.20	500 ± 100			
		09/03-10/01	0.046	90 ± 60			
		10/01-11/05	1.30	230 ± 80			
		11/05-12/02	0.85	400 ± 100	< 20	20 ± 10	10 ± 10
		12/02-01/06	2.40	300 ± 200			

TABLE IV.2.3

1978 ANNUAL MEAN RADIOACTIVITY CONCENTRATION IN PRECIPITATION
(pCi/l)

Environmental Station No.	G. BETA	SR-89	SR-90	CS-137
1A	35 ± 86	.38 ± .19	.90 ± 1.36	.98 ± .68
1B	35 ± 81	<.43	1.2 ± 1.5	1.1 ± 1.1
4M	27 ± 70	<.55	1.4 ± 1.5	.95 ± .84
Mean 1A & 1B	35 ± 82	.40 ± .15	1.0 ± 1.3	1.0 ± 0.9
Overall Mean	32 ± 77	.45 ± .28	1.1 ± 1.4	1.0 ± 0.8

MEAN RADIOACTIVITY SURFACE DENSITY IN PRECIPITATION

(pCi/M^2)

Environmental Station No.	G. BETA	SR-89	SR-90	CS-137
1A	1800 ± 5800	33 ± 19	70 ± 83	85 ± 89
1B	2500 ± 7100	<40	140 ± 210	120 ± 140
4M	1400 ± 5600	<35	90 ± 167	65 ± 99
Mean 1A & 1B	2200 ± 6400	36 ± 26	100 ± 170	100 ± 120
Overall Mean	1900 ± 6100	36 ± 28	98 ± 159	91 ± 113

TABLE IV. 2.4

ANALYTICAL DATA FOR PRECIPITATION SAMPLES

Comparative EPA DATA

Harrisburg, PA.

Period	Gross Beta pCi/l	Gross Beta pCi/m^2
January	4.8	100
February	8.9	120
March	169	4860
April	15	650
May	12	980
June	11	500
July	3.9	230
August	2.6	170
September	3.0	150
October	2.2	100
November	1	60
December	2.4	150

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

STATION	COLLECTION DATE	G. ALPHA SOLUBLE	G. ALPHA INSOLUBLE	G. BETA SOLUBLE	G. BETA INSOLUBLE
1Q	78 01/07	< .5	< .09	< 2	< .4
	02/04	< .3	1.0 ± .4	< 2	2.9 ± .6
	03/05	< .5	.1 ± .1	< 2	< .5
	04/01	< .5	1.0 ± .3	< 2	2.8 ± .6
	05/06	< .6	.2 ± .1	< 2	.8 ± .5
	06/03	< .5	.3 ± .2	< 3	< .5
	07/02	< .9	.5 ± .2	5 ± 2	.7 ± .5
	08/05	< .5	.3 ± .2	< 2	.5 ± .5
	09/03	< .7	.3 ± .1	< 2	< .5
	10/01	< 1	< .1	3 ± 2	< .6
	11/05	< .7	.1 ± .1	< 2	< .5
	12/02	< .5	< .07	2 ± 2	< .5
4F	78 01/07	< .4	1.1 ± .5	< 2	4.0 ± .6
	02/04	< .5	1.8 ± .7	< 2	5.6 ± .7
	03/05	< .5	1.8 ± .6	< 2	4.0 ± .7
	04/01	< .9	1.1 ± .4	< 2	8.2 ± .7
	05/06	< .4	.7 ± .4	< 2	3.2 ± .6
	06/03	< .6	2.4 ± .7	< 3	4.9 ± .7
	07/02	< .6	1.9 ± .5	< 2	2.5 ± .6
	08/05	< .5	.5 ± .2	< 2	.9 ± .5
	09/03	< .6	1.4 ± .4	3 ± 2	3.0 ± .6
	10/01	< 1	4 ± 1	< 2	7.6 ± .9
	11/05	< .6	.1 ± .1	4 ± 2	< .5
	12/02	< .4	.8 ± .3	3 ± 2	2.9 ± .6
6A	78 01/07	< .4	< .09	< 2	< .4
	02/04	< .3	5 ± 1	< 2	9.1 ± .9
	03/05	< .6	.3 ± .2	3 ± 2	.7 ± .5
	04/01	< .3	1.4 ± .5	< 2	5.7 ± .7
	05/06	< .4	< .09	< 2	.5 ± .5
	06/03	< .5	.2 ± .1	< 2	< .5
	07/02	< .5	.5 ± .2	< 2	.9 ± .5
	08/05	< .8	.3 ± .2	< 2	< .5
	09/03	< 1	.3 ± .1	3 ± 2	< .5
	10/01	< 1	.3 ± .2	4 ± 2	.7 ± .6
	11/05	< .5	.2 ± .1	2 ± 2	.5 ± .5
	12/02	< .5	< .08	3 ± 2	< .5
13A	78 01/07	< .4	.1 ± .1	< 2	< .4
	02/05	< .4	.3 ± .2	< 2	< .5
	03/05	< .5	.2 ± .1	3 ± 2	< .5
	04/01	< .2	5 ± 2	< 2	21 ± 1
	05/06	< .4	.1 ± .1	< 2	1.2 ± .5
	06/03	< .6	.5 ± .2	< 3	< .5
	07/02	< .8	.4 ± .2	< 3	.7 ± .5
	08/05	< .4	.3 ± .2	< 2	< .5
	09/03	< .7	.8 ± .3	< 2	2.1 ± .6
	10/01	< 1	.4 ± .2	3 ± 2	.9 ± .6
	11/05	< .6	.2 ± .2	2 ± 2	1.2 ± .5
	12/02	< .7	.2 ± .1	2 ± 2	< .5
13B	78 05/13	< .6	< .1	< 3	< .6

TABLE IV.3.2
ANALYTICAL DATA FOR DISCHARGE WATER GRAB SAMPLES
CONCENTRATION (pCi/l)

STATION	COLLECTION DATE	G. ALPHA SOLUBLE	G. ALPHA INSOLUBLE	G. BETA SOLUBLE	G. BETA INSOLUBLE
1M	78 01/07	< .4	< .09	< 2	< .4
	02/04	< .4	1.9 ± .5	< 2	3.1 ± .6
	03/05	< .4	.3 ± .2	< 2	< .5
	04/01	< .3	1.2 ± .4	< 2	2.4 ± .6
	05/06	< .6	.2 ± .2	2 ± 2	.9 ± .5
	06/03	< .5	.4 ± .2	< 2	.9 ± .5
	07/02	< 1	.8 ± .3	4 ± 3	1.7 ± .6
	08/05	< .9	.5 ± .2	2 ± 2	1.0 ± .5
	09/03	< .7	.1 ± .1	3 ± 2	1.0 ± .5
	10/01	< 1	.5 ± .2	2 ± 2	.9 ± .6
	11/05	< .9	.2 ± .1	3 ± 2	.8 ± .5
	12/02	< .5	< .09	< 2	< .5
1T	78 01/07	< .6	.1 ± .1	< 2	< .4
	02/04	< .5	1.3 ± .5	< 2	3.3 ± .6
	03/05	< .5	.1 ± .1	< 2	< .5
	04/01	< .4	1.2 ± .4	< 2	2.8 ± .6
	05/06	< .5	.2 ± .2	< 2	1.5 ± .5
	06/03	< .5	.4 ± .2	< 2	< .5
	07/02	< .9	1.0 ± .3	< 3	1.4 ± .5
	08/05	< .7	.8 ± .3	3 ± 2	1.1 ± .5
	09/03	< .6	.6 ± .2	2 ± 2	1.2 ± .5
	10/01	< 1	.3 ± .2	3 ± 2	< .6
	11/05	< .6	< .1	3 ± 2	.9 ± .5
	12/02	< .5	< .09	< 2	< .5

TABLE IV.3.3
ANALYTICAL DATA FOR SURFACE WATER COMPOSITE SAMPLES
CONCENTRATION (pCi/l)

STATION		COLLECTION PERIOD	G. ALPHA SOLUBLE	G. ALPHA INSOLUBLE	G. BETA SOLUBLE	G. BETA INSOLUBLE
1LL	78	01/16-02/03	< .3	1.1 ± .5	< 2	3.0 ± .8
		02/03-02/13	(c)	(c)	(c)	(c)
		02/13-03/03	< .5	.3 ± .2	2 ± 2	< .7
		03/03-03/31	< .4	1.2 ± .5	3 ± 2	4.2 ± .6
		03/31-05/05	< .3	.2 ± .2	2 ± 2	.8 ± .5
		05/05-06/02	< .8	.5 ± .2	< 3	.8 ± .6
		06/02-06/30	< .6	.2 ± .1	< 2	< .5
		06/30-08/04	< .6	< .06	< 2	< .5
		08/04-09/01	< .6	.2 ± .1	< 2	< .6
		09/01-09/29	< 1	< .2	4 ± 2	< .8
		09/29-11/03	< .7	< .07	4 ± 2	< .5
		11/03-12/01	< .6	< .1	3 ± 2	< .5
		12/01-01/05	< .5	.3 ± .2	< 2	< .5
4L	78	01/07-02/04	< .3	1.7 ± .6	< 2	3.4 ± .7
		02/04-03/05	< .3	.5 ± .2	< 2	1.7 ± .6
		03/05-04/01	< .4	1.1 ± .4	< 2	3.1 ± .6
		04/01-05/06	< .2	.3 ± .2	2 ± 2	2.0 ± .5
		05/06-06/03	< .6	.8 ± .3	< 3	1.0 ± .6
		06/03-07/02	(a)	(a)	(a)	(a)
		07/02-08/05	(a)	(a)	(a)	(a)
	(a)	08/05-09/03	< .8	.3 ± .2	4 ± 2	< 1
		09/03-10/01	< 1	< .2	3 ± 2	.9 ± .7
		10/01-11/05	< .6	< .09	4 ± 2	< .6
		11/05-12/02	< .6	.2 ± .2	3 ± 2	< .7
		12/02-01/05	< .6	< .1	< 2	< .6
6I	78	01/07-01/22	< .3	.4 ± .3	< 2	< 1
		01/22-03/10	(b)	(b)	(b)	(b)
	(b)	03/11-04/01	< .4	.2 ± .1	< 2	.6 ± .5
		04/01-05/06	< .4	< .1	< 2	.6 ± .4
		05/06-06/03	< .6	.5 ± .2	< 3	1.5 ± .6
	(d)	06/03-07/02	< .6	< .2	< 3	< 1
		07/02-08/05	< .6	.2 ± .2	< 2	< .8
		08/05-09/03	< .7	.2 ± .1	< 2	< .6
		09/03-10/01	< 1	< .1	< 2	< .7
		10/01-11/05	< .7	.3 ± .2	4 ± 2	.7 ± .5
		11/05-12/02	< .6	< .1	< 2	< .5
		12/02-01/05	< .4	.3 ± .2	2 ± 2	< .5

(a) Pump out of service, 6/03-7/02, 7/02-8/05, and 8/05-8/24
(b) Pump out of service, 1/22-3/10, and 3/10-3/11
(c) Pump out of service, 2/03-2/13
(d) Pump out of service, 6/03-6/10, and 6/17-6/24

TABLE IV.3.4
ANALYTICAL DATA FOR DISCHARGE WATER COMPOSITE SAMPLES
CONCENTRATION (pCi/l)

STATION	COLLECTION PERIOD	G. ALPHA SOLUBLE	G. ALPHA INSOLUBLE	G. BETA SOLUBLE	G. BETA INSOLUBLE
1MM	78 01/01-02/03	< .4	7 ± 2	< 2	16 ± 1
	02/03-02/24	< .5	1.3 ± .5	< 2	4.0 ± .9
	02/24-03/10	(a)	(a)	(a)	(a)
	03/10-03/31	< .4	.4 ± .2	< 2	1.8 ± .5
	03/31-05/05	< .2	1.0 ± .5	< 2	4.7 ± .7
	05/05-06/02	< .7	1.0 ± .3	< 3	2.2 ± .6
	(b) 06/02-06/30	< .6	1.3 ± .4	< 2	2.2 ± .7
	06/30-08/04	< .9	< .09	< 2	< .5
	08/04-09/01	< .5	.9 ± .3	3 ± 2	2.2 ± .7
	(c) 09/01-09/29	< 1	.3 ± .3	3 ± 2	< 1
	09/29-11/03	< .5	.3 ± .2	3 ± 2	1.3 ± .5
	11/03-11/09	< .7	< .2	3 ± 2	< 1
	11/09-12/12	(d)	(d)	(d)	(d)
	12/12-01/05	< .6	.3 ± .2	< 2	.7 ± .6

(a) Pump out of service, 2/24-3/10
(b) Pump out of service, 6/27-6/28
(c) Pump out of service, 9/15-9/29
(d) Pump out of service, 11/9-12/12

TABLE IV. 3.5

1978 ANNUAL MEAN RADIOACTIVITY CONCENTRATION IN SURFACE WATER
(pCi/l)

Environmental Station No.	SOLUBLE FRACTION		INSOLUBLE FRACTION	
Potentially Affected Stations	G. ALPHA	G. BETA	G. ALPHA	G. BETA
		GRAB SAMPLES		
1Q	<.60	2.4±1.8	.33±.67	.93±1.80
13A	<.56	2.3±1.0	.71±2.73	2.5±11.7
4F	<.58	2.4±1.3	1.5±2.1	3.9±4.7
Mean (1Q, 13A, 4F)	<.58	2.4±1.4	.84±2.18	2.5±7.6
Unaffected Station				
6A	<.57	2.4±1.3	.73±2.78	1.7±5.5
Overall Mean (1Q, 13A, 4F & 6A)	<.58	2.4±1.4	.81±2.31	2.3±7.1
		COMPOSITE SAMPLES		
1LL	<.58	2.5±1.6	.37±.77	1.1±2.4
4L	<.54	2.7±1.6	.53±1.05	1.5±2.1
6I	<.57	2.4±1.3	.24±.26	.77±.59

TABLE IV. 3.6

1978 ANNUAL MEAN RADIOACTIVITY CONCENTRATION IN DISCHARGE WATER
(pCi/l)

Environmental Station No.	SOLUBLE FRACTION		INSOLUBLE FRACTION	
	G. Alpha	G. Beta	G. Alpha	G. Beta
		GRAB SAMPLES		
1M	<.63	2.3±1.3	.52±1.09	1.2±1.6
1T	<.61	2.3±1.0	.52± .91	1.2±1.9
Overall Mean	<.62	2.3±1.1	.52± .98	1.2±1.7
		COMPOSITE SAMPLES		
1MM	<.58	2.4±1.0	1.2± 3.8	3.1±8.5

TABLE IV.4.1
ANALYTICAL DATA FOR WELL WATER SAMPLES
CONCENTRATION (pCi/l)

STATION	COLLECTION DATE	G.ALPHA	G.BETA	SR-89	SR-90	CS-137	URANIUM (a)
10	78 01/07	< .4	< 2	< .2	.3 ± .2	< .3	.08
	04/01	< .3	< 2				.07
	07/02	< .5	3 ± 2	< .5	.4 ± .3	.7 ± .5	.08
	10/01	< .6	< 2				< .03
1V	78 01/07	< .3	< 2	< .2	.3 ± .1	< .3	.22
	04/01	< .4	< 2				< .03
	07/02	< .4	< 2	< .6	.4 ± .3	< .4	< .03
	10/01	< .5	< 2				< .03
7	78 01/07	< .5	< 2	< .2	.3 ± .1	< .3	.02
	04/01	< .6	< 2				< .03
	07/03	< .7	< 2	< .3	.3 ± .2	< .4	< .03
	10/01	< .6	< 2				.6
40	78 01/07	< .4	< 2	< .4	< .2	< .3	.11
	04/01	< .6	< 2				.04
	07/02	< .6	< 2	< .4	< .2	< .4	< .03
	10/01	< 1	3 ± 2				< .03

(a) Uranium concentration in ug/l.

TABLE IV.4.2

1978 ANNUAL MEAN RADIOACTIVITY CONCENTRATION IN WELL WATER

Environmental Station No.	G. ALPHA (pCi/l)	G. BETA (pCi/l)	SR-89 (pCi/l)	SR-90 (pCi/l)	CS-137 (pCi/l)	URANIUM (Ug/l)
On site wells						
1U	<.45	2.25±1.00	<.35	.35±.14	.50±.57	.065±.048
1V	<.40	<2.0	<.40	.35±.14	<.35	.078±.190
Mean (1U & 1V)	<.43	2.1±0.7	<.38	.35±.12	.43±.38	.071±.129
Site Area Well						
40	<.65	2.25±1.00	<.40	<.20	<.35	.053±.077
Distant Well						
7	<.60	<2.0	<.25	<.30	<.35	.17±.57
Overall Mean (1U,1V, 7, & 40)	<.53	2.1±0.7	<.35	.30±.15	.39±.27	.091±.289

TABLE IV.5.1
ANALYTICAL DATA FOR SOIL SAMPLES
CONCENTRATION (pCi/g dry)

STATION	COLLECTION DATE		G.ALPHA	G.BETA	K-40	N.BETA	SR-89	SR-90	CS-137
1AA	78	03/25	1.8 ± .7	2 ± 1	.18 ± .04	2 ± 1	.06 ± .02	.195 ± .009	.54 ± .02
		06/03	1.9 ± .6	4 ± 1	.24 ± .04	4 ± 1			
		07/02	1.8 ± .7	4 ± 1	.12 ± .04	3 ± 1	< .02	.097 ± .005	.08 ± .01
		11/05	3.4 ± .9	5 ± 1	.12 ± .04	5 ± 1			
2	78	03/25	1.5 ± .5	6 ± 1	.26 ± .04	6 ± 1	.09 ± .04	.166 ± .009	.41 ± .02
		06/03	1.2 ± .6	4 ± 1	.20 ± .04	4 ± 1			
		07/02	1.2 ± .6	6 ± 1	.48 ± .05	5 ± 1	< .04	.39 ± .01	.66 ± .03
		11/06	3.0 ± .8	7 ± 1	.24 ± .04	7 ± 1			
3A	78	03/25	.7 ± .4	3 ± 1	.18 ± .04	3 ± 1	.06 ± .01	.048 ± .006	.26 ± .01
		06/03	1.2 ± .5	3 ± 1	.24 ± .04	3 ± 1			
		07/02	.9 ± .4	3 ± 1	.12 ± .04	3 ± 1	< .03	.291 ± .008	.19 ± .01
		11/05	1.9 ± .6	4 ± 1	.12 ± .04	4 ± 1			
4N	78	03/25	.6 ± .3	3 ± 1	.38 ± .04	2 ± 1	.03 ± .03	.26 ± .01	.43 ± .02
		06/03	1.1 ± .6	2 ± 1	.48 ± .05	1 ± 1			
		07/02	1.4 ± .5	5 ± 1	.40 ± .04	4 ± 1	.03 ± .02	.181 ± .006	.43 ± .02
		11/05	.6 ± .5	2 ± 1	.18 ± .04	2 ± 1			
5	78	03/25	1.8 ± .6	3 ± 1	.52 ± .05	3 ± 1	< .02	.274 ± .008	.23 ± .01
		06/03	1.5 ± .5	3 ± 1	.40 ± .04	3 ± 1			
		07/02	1.4 ± .7	7 ± 1	.44 ± .04	6 ± 1	.06 ± .03	.474 ± .009	.74 ± .03
		11/05	4.4 ± .8	7 ± 1	.56 ± .06	6 ± 1			
6S	78	03/25	1.7 ± .5	4 ± 1	.53 ± .05	4 ± 1	< .03	.164 ± .009	.26 ± .01
		06/03	1.1 ± .6	4 ± 1	.56 ± .06	3 ± 1			
		07/02	< .5	3 ± 1	.40 ± .04	2 ± 1	< .07	.17 ± .02	.40 ± .02
		11/05	3.3 ± .9	5 ± 1	.36 ± .04	5 ± 1			

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TABLE IV.5.2

1978 ANNUAL MEAN RADIOACTIVITY CONCENTRATION IN SOIL
(pCi/g dry)

Environmental Station No.	G. ALPHA	G. BETA	K-40	N. BETA	SR-89	SR-90	CS-137
On site Stations							
1AA	2.2±1.6	3.8±2.5	.17±.11	3.5±2.9	.040±.057	.15±.14	.31±.65
2	1.8±1.7	5.8±2.5	.30±.25	5.5±2.6	.065±.071	.28±.32	.54±.35
Mean (1AA & 2)	2.0±1.6	4.8±3.2	.23±.23	4.5±3.2	.053±.060	.21±.25	.42±.50
Distant Stations							
3A	1.2±1.1	3.3±1.0	.17±.11	3.3±1.0	.045±.042	.17±.34	.23±.10
4N	.93±.79	3.0±2.8	.36±.26	2.3±2.5	.03	.22±.11	.43
5	2.3±2.9	5.0±4.6	.48±.15	4.5±3.5	.040±.057	.37±.28	.49±.72
6G	1.7±2.4	4.0±1.6	.46±.19	3.5±2.6	<.050	.17±.01	.33±.20
Mean (3A, 4N, 5 & 6G)	1.5±2.1	3.8±3.0	.37±.31	3.4±2.8	.041±.038	.23±.25	.37±.36
Overall Mean (1AA, 2, 3A, 4N, 5, 6G)	1.7±1.9	4.1±3.1	.32±.31	3.8±3.1	.045±.045	.23±.24	.39±.39

TABLE IV.6.1
ANALYTICAL DATA FOR SILT SAMPLES
CONCENTRATION (pCi/g dry)

STATION	COLLECTION DATE	G. ALPHA	G. BETA	SR-89	SR-90	CS-137
1BB	78 05/04	1.5 ± .6	1 ± 1	< .07	.05 ± .02	.40 ± .02
	11/07	3.2 ± .8	4 ± 1	< .02	.015 ± .005	.17 ± .01
1X	78 05/04	1.8 ± .7	3 ± 1	< .07	.06 ± .01	.23 ± .01
	11/07	1.5 ± .5	1 ± 1	< .02	.017 ± .004	.38 ± .02
4D	78 05/04	2.3 ± .8	4 ± 1	.14 ± .01	.055 ± .005	.64 ± .03
	11/07	2.2 ± .6	2 ± 1	< .02	.031 ± .006	.17 ± .01
4C	78 05/04	1.5 ± .6	4 ± 1	.06 ± .02	.049 ± .007	.31 ± .02
	11/07	4 ± 1	5 ± 1	< .02	.069 ± .005	.41 ± .02
4T	78 05/04	2.8 ± .9	3 ± 1	< .04	.048 ± .009	.22 ± .01
	11/07	2.1 ± .8	3 ± 1	< .01	.057 ± .004	.20 ± .01
6F	78 05/04	3 ± 1	3 ± 1	< .02	.067 ± .006	.16 ± .01
	11/07	2.0 ± .6	3 ± 1	< .01	.031 ± .004	.10 ± .01

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-228	Be-7	Co-60	I-131	Cr-51	Ba-140	Other
1BB	05/04/78	.24±.04	.14±.04	17±1	.55±.08	.6±.1	<.6	<.05	<.6	<.8	<.8	
	11/07/78	.19±.04	.12±.05	26±1	.63±.09	.8±.1	<.5	<.06	<.8	<.9	<1	
	Mean	.22±.07	.13±.03	22±13	.59±.11	.7±.3	<.55	<.055	<.7	<.85	<.9	
1X	05/04/78	.55±.09	<.1	22±2	1.3±.2	1.5±.2	<.9	<.1	<.9	<2	<1	(a)
	11/07/78	.43±.06	.14±.06	14±1	.6±.1	.7±.1	<.6	.08±.05	<1	<1	<1	
	Mean	.49±.17	.12±.06	18±11	.95±1.00	1.1±1.1	<.75	.09±.03	<.95	<1.5	<1	
4D	05/04/78	.9±.1	.4±.1	21±2	1.2±.2	1.2±.3	<1	<.1	<1	<2	<1	
	11/07/78	.10±.03	.04±.03	8.3±.8	.32±.06	.35±.07	<.4	<.04	<.5	<.5	<.6	
	Mean	0.5±1.1	.22±.51	14.7±18.0	.76±1.24	.78±1.20	<.7	<.07	<.75	<1.25	<.8	
4C	05/04/78	.59±.07	.24±.07	19±2	.9±.1	1.0±.2	1.1±.7	<.08	<.7	<1	<1	(b)
	11/07/78	1.00±.09	.08±.07	22±2	1.0±.1	1.1±.2	<1	<.08	<1	<1	<2	
	Mean	.80±.58	.16±.23	21±4	.95±.14	1.05±.14	1.05±.14	<.08	<.85	<1	<1.5	
4T	05/04/79	.43±.08	<.1	22±2	1.0±.2	1.2±.2	<.9	<.09	<1	<1	<2	(c)
	11/07/78	.31±.09	<.1	15±2	.7±.2	.6±.2	<1	<.1	<2	<2	<2	
	Mean	.37±.17	<.1	18.5±9.9	.85±.42	.9±.8	<.95	<.095	<1.5	<1.5	<2	
6F	05/04/78	.35±.07	<.1	20±2	1.0±.1	1.2±.2	<.9	<.08	<1	<1	<1	
	11/07/78	.28±.07	<.1	16±2	1.1±.1	1.0±.2	<1	<.08	<1	<1	<2	
	Mean	.32±.10	<.1	18±6	1.05±.14	1.1±.3	±.95	<.08	<1	<1	<1.5	
	Overall Mean	.45±.55	.14±.19	18.5±9.5	.86±.59	.94±.66	.83±.47	.078±.039	<.96	<1.2	<1.3	

(a) Ru-103 = .2±.1, Zr-95 = <.1
(b) Ru-103 = .39±.09, Nb-95 = .2±.1
(c) Ru-103 = .2±.1, Nb-95 = .2±.1

TABLE IV.6.3

1978 ANNUAL MEAN RADIOACTIVITY CONCENTRATION IN SILT
(pCi/g dry)

Environmental Station No.	G. ALPHA	G. BETA	SR-89	SR-90	CS-137
1BB	2.4±2.4	2.5±4.2	<.045	.033±.049	.29±.33
1X	1.7±0.4	2.0±2.8	< .045	.039±.061	.31±.21
4D	2.3±0.1	3.0±2.8	.080±.170	.043±.034	.41±.66
4C	2.8±3.5	4.5±1.4	.040±.057	.059±.028	.36±.14
4T	2.5±1.0	3.0	<.025	.053±.013	.21±.03
6F	2.5±1.4	3.0	<.015	.049±.051	.13±.08
Overall	2.3±1.6	3.0±2.4	.042±.076	.046±.036	.28±.30

TABLE IV.7.1
ANALYTICAL DATA FOR FISH SAMPLES
CONCENTRATION (pCi/g ash)

STATION	MEDIA	COLLECTION DATE	ID	FISH NUMBER	G.BETA	K-40	N.BETA	SR-89	SR-90	CS-137
1EE	CATFISH 7d (a)	05/19	5A3179	78003046	90 ± 10	85 ± 9	< 10	< 2	1.3 ± .2	3.6 ± .9
			5B3179	78003047	100 ± 10	81 ± 8	23 ± 10			
		05/26	5C3179	78003138	70 ± 10	69 ± 7	< 10			
		06/06	5D3179	78003522	50 ± 10	54 ± 5	< 10			
		09/11	5A3254	78002885	40 ± 10	56 ± 6	< 10	< 1	1.6 ± .1	2.3 ± .1
			5B3254	78002884	100 ± 10	89 ± 9	< 10			
			5C3254	78002886	50 ± 10	50 ± 5	< 10			
			5D3254	78002887	30 ± 10	46 ± 5	< 10			
		10/23	5A3286	78003222	40 ± 10	62 ± 6	< 10	< .4	1.19 ± .06	.97 ± .05
			5B3286	78003220	100 ± 10	100 ± 10	< 20			
			5C3286	78003221	90 ± 10	110 ± 10	< 20			
			5D3286	78003223	60 ± 10	66 ± 6	< 10			
1K	CATFISH 7d	06/26	5A3178	78002541	40 ± 10	42 ± 4	< 10	< 2	2.9 ± .5	.8 ± .5
			5B3178	78002542	40 ± 10	38 ± 4	< 10			
			5C3178	78002543	40 ± 10	40 ± 4	< 10			
			5D3178	78002544	30 ± 10	33 ± 4	< 10			
		09/11	5A3259	78002901	50 ± 10	56 ± 6	< 10	< 1	2.0 ± .2	1.2 ± .1
			5C3259	78002902	40 ± 10	58 ± 6	< 10			
			5D3259	78002903	40 ± 10	39 ± 4	< 10			
		09/13	5B3259	78002893	40 ± 10	50 ± 5	< 10			
		10/11	5A3283	78002995	50 ± 10	63 ± 6	< 10	< .5	1.14 ± .07	.73 ± .06
			5B3283	78002996	40 ± 10	60 ± 6	< 10			
			5C3283	78002997	40 ± 10	48 ± 5	< 10			
			5D3283	78002998	40 ± 10	44 ± 4	< 10			
4H	AMERICAN SHAD 7d	06/03	5A3180	78000706	120 ± 10	120 ± 10	< 20	< 1	.2 ± .2	.6 ± .4
		06/14	5B3180	78000738	150 ± 10	120 ± 10	30 ± 20			
		06/16	5C3180	78000770	100 ± 10	110 ± 10	< 20			

(a) All catfish are channel catfish.

TABLE IV.7.1 (cont.)
ANALYTICAL DATA FOR FISH SAMPLES
CONCENTRATION (pCi/g ash)

STATION	MEDIA	COLLECTION DATE	ID NUMBER	FISH NUMBER	G.BETA	K-40	N.BETA	SR-89	SR-90	CS-137
41	CATFISH 7s (a)	05/09	5B3174	78002342	30 ± 10	34 ± 3	< 10			
			5C3174	78002344	40 ± 10	24 ± 2	10 ± 10			
			5D3174	78002343	20 ± 10	22 ± 2	< 10			
		06/06	5A3174	78003534	48 ± 6	38 ± 4	13 ± 7	< .3	1.21 ± .05	.5 ± .1
		09/19	5A3257	78001994	30 ± 10	52 ± 5	< 10	< .9	1.4 ± .1	.60 ± .06
			5C3257	78001995	40 ± 10	66 ± 7	< 10			
		09/25	5B3257	78002988	20 ± 10	50 ± 5	< 10			
		10/16	5A3282	78003026	40 ± 10	48 ± 5	< 10	< .2	1.20 ± .05	.62 ± .04
			5B3282	78003029	30 ± 10	34 ± 3	< 10			
			5C3282	78003028	40 ± 10	42 ± 4	< 10			
			5D3282	78003027	20 ± 10	32 ± 3	< 10			
	CRAPPIE 7s (b)	05/08	5B3175	78001602	60 ± 7	44 ± 4	16 ± 8			
			5C3175	78001603	49 ± 6	42 ± 4	< 8			
		05/09	5A3175	78002339	49 ± 6	36 ± 4	13 ± 7	< .5	1.17 ± .06	.9 ± .1
			5D3175	78002338	40 ± 10	36 ± 4	< 10			
		09/19	5A3258	78001986	30 ± 10	38 ± 4	< 10	< .5	1.01 ± .08	.39 ± .05
			5B3258	78001987	30 ± 10	46 ± 5	< 10			
			5C3258	78001988	30 ± 10	43 ± 4	< 10			
			5D3258	78001989	30 ± 10	50 ± 5	< 10			
		10/16	5B3281	78003025	40 ± 10	50 ± 5	< 10			
		11/14	5A3281	78002984	50 ± 10	62 ± 6	< 10	< .2	1.04 ± .05	.42 ± .04
43	CATFISH 7s	04/10	5A3050	78000289	50 ± 10	56 ± 6	< 10	< .1	.28 ± .02	
			5B3050	78000290	30 ± 10	48 ± 5	< 10			.94 ± .06
			5C3050	78000291	40 ± 10	48 ± 5	< 10			
			5D3050	78000292	40 ± 10	40 ± 4	< 10			
		05/08	5A3176	78001538	50 ± 10	40 ± 4	< 10	< .7	.97 ± .06	.7 ± .2
			5B3176	78001541	40 ± 10	42 ± 4	< 10			
			5C3176	78001539	40 ± 10	36 ± 4	< 10			
			5D3176	78001540	30 ± 10	30 ± 3	< 10			
		07/24	5A3255	78001864	110 ± 10	110 ± 10	< 20	< 3	1.7 ± .2	3.4 ± .2
			5B3255	78001865	40 ± 10	67 ± 7	< 10			
			5C3255	78001866	40 ± 10	40 ± 4	< 10			
			5D3255	78001867	20 ± 10	44 ± 4	< 10			
		11/14	5A3288	78002792	40 ± 10	62 ± 6	< 10	< .4	2.47 ± .09	3.3 ± .1
			5B3288	78002790	130 ± 10	130 ± 10	< 20			
			5C3288	78002794	40 ± 10	54 ± 5	< 10			
			5D3288	78002793	60 ± 10	60 ± 6	< 10			
	CRAPPIE 7s	04/10	5A3051	78000321	40 ± 10	50 ± 5	< 10	.1 ± .1	.50 ± .02	
			5B3051	78000322	80 ± 10	66 ± 7	20 ± 10			1.89 ± .06
			5C3051	78000323	60 ± 10	52 ± 5	< 10			
			5D3051	78000324	40 ± 10	52 ± 5	< 10			
		06/08	5A3177	78001580	35 ± 6	38 ± 4	< 7	< .3	1.31 ± .05	1.2 ± .1
			5B3177	78001582	55 ± 7	54 ± 5	< 8			
			5C3177	78001581	62 ± 7	42 ± 4	20 ± 8			
			5D3177	78001579	40 ± 10	34 ± 3	< 10			
		07/24	5B3256	78001862	40 ± 10	42 ± 4	< 10			
			5D3256	78001863	40 ± 10	54 ± 5	< 10			
		08/21	5A3256	78003032	20 ± 10	40 ± 4	< 10	< .4	1.40 ± .06	.67 ± .05
			5C3256	78003033	40 ± 10	48 ± 5	< 10			
		11/14	5B3287	78002788	30 ± 10	54 ± 5	< 10	< .3	1.19 ± .06	1.06 ± .06
			5D3287	78002786	60 ± 10	69 ± 7	< 10			
			5C3287	78002787	40 ± 10	48 ± 5	< 10			
			5D3287	78002789	50 ± 10	50 ± 5	< 10			

(a) All catfish are channel catfish.
(b) All crappie are white crappie.

TABLE IV.7.1 (cont.)
ANALYTICAL DATA FOR FISH SAMPLES
CONCENTRATION (pCi/g ash)

STATION	MEDIA	COLLECTION DATE	LD	FISH NUMBER	G.BETA	K-40	N.BETA	SR-89	SR-90	CS-137
6B	CATFISH 7B (a)	05/02	5A3053	78001506	80 ± 10	77 ± 8	< 10	< .5	1.1 ± .1	
			5B3053	78001507	20 ± 10	28 ± 3	< 10			.10 ± .06
			5C3053	78001508	30 ± 10	32 ± 3	< 10			
			5D3053	78001509	30 ± 10	44 ± 4	< 10			
		09/11	5D3260	78002881	40 ± 10	63 ± 6	< 10			
		09/13	5B3260	78002879	100 ± 10	50 ± 5	50 ± 10			
			5C3260	78002878	60 ± 10	81 ± 8	< 10			
		09/25	5A3260	78002927	20 ± 10	22 ± 2	< 10	< .5	1.29 ± .09	.26 ± .05
		10/11	5A3284	78002939	50 ± 10	62 ± 6	< 10	< .5	1.38 ± .07	.63 ± .07
			5B3284	78002938	50 ± 10	60 ± 6	< 10			
			5D3284	78002940	40 ± 10	54 ± 5	< 10			
		10/23	5C3284	78002557	40 ± 10	62 ± 6	< 10			
	CRAPPIE 7B (b)	05/02	5A3052	78001514	50 ± 10	62 ± 6	< 10	.3 ± .2	.72 ± .05	.25 ± .03
			5B3052	78001515	50 ± 10	56 ± 6	< 10			
			5C3052	78001516	40 ± 10	48 ± 5	< 10			
		09/11	5A3261	78002880	50 ± 10	54 ± 5	< 10	< .5	1.16 ± .06	.25 ± .04
		09/13	5C3261	78002876	60 ± 10	62 ± 6	< 10			
			5D3261	78002877	50 ± 10	58 ± 6	< 10			
		09/25	5B3261	78002907	70 ± 10	69 ± 7	< 10			
		10/23	5B3285	78002556	40 ± 10	58 ± 6	< 10			
			5C3285	78002555	60 ± 10	58 ± 6	< 10			
		11/03	5A3285	78003000	40 ± 10	47 ± 5	< 10	< .3	1.12 ± .06	.34 ± .05

(a) All catfish are channel catfish.
(b) All crappie are white crappie.

TABLE IV.7.2
ANALYTICAL DATA FOR FISH SAMPLES
CONCENTRATION (pCi/gram original sample)

STATION	MEDIA	COLLECTION DATE	ID	FISH NUMBER	G.BETA	K-40	N.BETA	SR-89	SR-90	CS-137
1EE	CATFISH 78 (a)	05/19	*A3179	78003046	2.0 ± .2	1.9 ± .2	< .3	< .02	.015 ± .002	.04 ± .01
			*B3179	78003047	3.1 ± .4	2.5 ± .3	.6 ± .4			
		05/26	*C3179	78003138	2.4 ± .4	2.5 ± .3	< .5			
		06/06	*D3179	78003522	2.1 ± .4	2.2 ± .2	< .5			
		09/11	*A3254	78002885	2.0 ± .5	2.7 ± .3	< .6	< .03	.056 ± .004	.078 ± .004
			*B3254	78002884	2.6 ± .3	2.4 ± .2	< .4			
			*C3254	78002886	2.4 ± .6	2.5 ± .2	< .7			
			*D3254	78002887	1.8 ± .6	2.5 ± .2	< .7			
		10/23	*A3286	78003222	1.8 ± .5	2.9 ± .3	< .6	< .01	.044 ± .002	.036 ± .002
			*B3286	78003220	3.0 ± .4	3.1 ± .3	< .5			
			*C3286	78003221	2.6 ± .3	3.1 ± .3	< .5			
			*D3286	78003223	2.1 ± .5	2.4 ± .2	< .5			
1X	CATFISH 78	06/26	*A3178	78002541	1.8 ± .4	1.8 ± .2	< .5	< .05	.07 ± .01	.02 ± .01
			*B3178	78002542	1.6 ± .5	1.7 ± .2	< .5			
			*C3178	78002543	1.9 ± .5	1.7 ± .2	< .5			
			*D3178	78002544	1.5 ± .5	1.6 ± .2	< .5			
		09/11	*A3259	78002901	2.1 ± .5	2.5 ± .3	< .5	< .04	.058 ± .006	.034 ± .004
			*C3259	78002902	2.2 ± .5	2.9 ± .3	< .6			
			*D3259	78002903	2.2 ± .6	2.3 ± .2	< .7			
		09/13	*B3259	78002893	2.6 ± .6	2.8 ± .3	< .7			
		10/11	*A3283	78002895	2.6 ± .5	3.2 ± .3	< .6	< .02	.042 ± .003	.027 ± .002
			*B3283	78002896	2.1 ± .7	3.5 ± .4	< .8			
			*C3283	78002897	2.5 ± .7	2.8 ± .3	< .8			
			*D3283	78002898	2.0 ± .6	2.3 ± .2	< .6			
4E	AMERICAN SHAD 78	06/03	*A3180	78000736	3.4 ± .3	3.3 ± .3	< .5	< .02	.004 ± .003	.011 ± .007
		06/14	*B3180	78000738	3.6 ± .3	2.9 ± .3	.7 ± .4			
		06/16	*C3180	78000770	2.8 ± .3	3.1 ± .3	< .4			

(a) All catfish are channel catfish.

TABLE IV.7.2 (cont.)
ANALYTICAL DATA FOR FISH SAMPLES
CONCENTRATION (pCi/gram original sample)

STATION	MEDIA	COLLECTION DATE	ID	FISH NUMBER	G.BETA	K-40	N.BETA	SR-89	SR-90	CS-137
4I	CATFISH 78 (a)	05/09	*B3174	78002342	1.4 ± .5	1.7 ± .2	< .6			
			*C3174	78002344	2.0 ± .6	1.3 ± .1	.7 ± .6			
			*D3174	78002343	1.4 ± .6	1.2 ± .1	< .6			
		06/06	*A3174	78003554	2.3 ± .3	1.8 ± .2	.5 ± .4	< .01	.049 ± .002	.019 ± .005
		09/19	*A3257	78001994	1.8 ± .8	3.3 ± .3	< .8	< .05	.072 ± .008	.032 ± .003
			*C3257	78001995	2.8 ± .8	4.3 ± .4	< .9			
		09/25	*B3257	78002988	1.4 ± .7	2.8 ± .3	< .7			
		10/16	*A3282	78003026	2.4 ± .6	2.6 ± .3	< .6	< .004	.057 ± .002	.029 ± .002
			*B3282	78003029	2.3 ± .9	2.6 ± .3	< .9			
			*C3282	78003028	1.8 ± .6	2.0 ± .2	< .6			
			*D3282	78003027	.8 ± .6	1.7 ± .2	< .6			
	CRAPPIE 78 (b)	05/08	*B3175	78001602	2.7 ± .3	2.0 ± .2	.8 ± .4			
			*C3175	78001603	2.7 ± .4	2.3 ± .2	< .4			
		05/09	*A3175	78002339	3.1 ± .4	2.3 ± .2	.9 ± .5	< .03	.066 ± .003	.052 ± .008
			*D3175	78002338	2.7 ± .7	2.4 ± .2	< .8			
		09/19	*A3258	78001986	1.8 ± .7	2.3 ± .2	< .8	< .03	.050 ± .004	.019 ± .002
			*B3258	78001987	1.8 ± .8	3.0 ± .3	< .8			
			*C3258	78001988	2.2 ± .7	2.7 ± .3	< .8			
			*D3258	78001989	2.1 ± .7	3.2 ± .3	< .7			
		10/16	*B3281	78003025	2.3 ± .7	3.1 ± .3	< .8			
		11/14	*A3281	78002984	2.6 ± .7	3.5 ± .4	< .8	< .01	.049 ± .002	.020 ± .002
4J	CATFISH 78	04/10	*A3050	78000289	5 ± 1	5.9 ± .6	< 1	< .01	.029 ± .002	
			*B3050	78000290	1.4 ± .5	2.1 ± .2	< .5			.041 ± .003
			*C3050	78000291	2.4 ± .6	2.6 ± .3	< .6			
			*D3050	78000292	2.0 ± .6	2.1 ± .2	< .6			
		05/08	*A3176	78001538	2.1 ± .5	1.8 ± .2	< .5	< .02	.036 ± .002	.031 ± .007
			*B3176	78001541	1.9 ± .5	2.1 ± .2	< .6			
			*C3176	78001539	2.7 ± .8	2.6 ± .3	< .8			
			*D3176	78001540	1.5 ± .5	1.5 ± .2	< .6			
		07/24	*A3255	78001864	2.1 ± .2	2.1 ± .2	< .3	< .04	.020 ± .003	.040 ± .032
			*B3255	78001865	2.3 ± .6	3.6 ± .4	< .7			
			*C3255	78001866	2.2 ± .6	2.1 ± .2	< .7			
			*D3255	78001867	1.3 ± .6	2.3 ± .2	< .6			
		11/14	*A3288	78002792	2.0 ± .5	2.8 ± .3	< .6	< .01	.086 ± .003	.115 ± .004
			*B3288	78002790	2.9 ± .3	2.9 ± .3	< .4			
			*C3288	78002794	2.0 ± .6	2.6 ± .3	< .6			
			*D3288	78002793	3.1 ± .6	3.0 ± .3	< .7			
	CRAPPIE 78	04/10	*A3051	78000321	4 ± 1	5.0 ± .5	< 1	.01 ± .01	.050 ± .002	
			*B3051	78000322	3.7 ± .5	3.0 ± .3	.8 ± .6			.085 ± .003
			*C3051	78000323	3.0 ± .6	2.7 ± .3	< .6			
			*D3051	78000324	2.4 ± .6	3.0 ± .3	< .7			
		06/08	*A3177	78001580	2.7 ± .4	2.6 ± .3	< .5	< .02	.080 ± .003	.072 ± .007
			*B3177	78001582	3.0 ± .4	2.9 ± .3	< .5			
			*C3177	78001581	2.9 ± .3	2.8 ± .2	.9 ± .4			
			*D3177	78001579	2.5 ± .6	2.2 ± .2	< .7			
		07/24	*B3256	78001862	2.6 ± .6	2.7 ± .3	< .7			
			*D3256	78001863	2.1 ± .6	2.9 ± .3	< .7			
		08/21	*A3256	78000802	1.2 ± .8	2.7 ± .3	< .8	< .02	.080 ± .004	.033 ± .003
			*C3256	78000803	2.4 ± .7	2.7 ± .3	< .7			
		11/14	*A3287	78002788	1.7 ± .7	2.9 ± .3	< .7	< .01	.060 ± .003	.054 ± .003
			*B3287	78002786	2.7 ± .5	2.9 ± .3	< .5			
			*C3287	78002787	2.5 ± .7	3.0 ± .3	< .7			
			*D3287	78002789	2.8 ± .7	3.0 ± .3	< .8			

(a) All catfish are channel catfish.
(b) All crappie are white crappie.

TABLE IV.7.2 (cont.)
ANALYTICAL DATA FOR FISH SAMPLES
CONCENTRATION (pCi/gram original sample)

STATION	MEDIA	COLLECTION DATE	ID	FISH NUMBER	G.BETA	K-40	N.BETA	SR-89	SR-90	CS-137
6H	CATFISH 78 (a)	05/02	*A3053	78001506	5.7 ± .8	5.3 ± .5	< .9	< .03	.064 ± .006	
			*B3053	78001507	1.5 ± .6	1.6 ± .2	< .6			.006 ± .004
			*C3053	78001508	1.3 ± .5	1.4 ± .1	< .5			
			*D3053	78001509	1.8 ± .6	1.4 ± .1	< .6			
		09/11	*D3260	78002881	1.9 ± .5	4.4 ± .4	< .7			
		09/13	*B3260	78002879	2.8 ± .3	1.3 ± .1	1.5 ± .3			
			*C3260	78002878	1.9 ± .4	2.8 ± .3	< .4			
		09/25	*A3260	78002927	1.1 ± .7	1.5 ± .2	< .7	< .03	.073 ± .005	.015 ± .003
		10/11	*A3284	78002939	2.4 ± .6	3.2 ± .3	< .7	< .02	.057 ± .003	.026 ± .003
			*B3284	78002938	2.9 ± .6	3.2 ± .3	< .6			
			*D3284	78002940	2.1 ± .6	2.8 ± .3	< .7			
		10/23	*C3284	78002557	1.9 ± .5	2.8 ± .3	< .5			
	CRAPPIE 78 (b)	05/02	*A3052	78001514	2.7 ± .5	3.1 ± .3	< .6	.01 ± .01	.036 ± .002	.012 ± .002
			*B3052	78001515	2.4 ± .5	2.5 ± .2	< .5			
			*C3052	78001516	1.9 ± .5	2.2 ± .2	< .5			
		09/11	*A3261	78002880	2.8 ± .6	3.1 ± .3	< .7	< .02	.055 ± .003	.012 ± .002
		09/13	*C3261	78002876	2.4 ± .4	2.0 ± .3	< .5			
			*D3261	78002877	1.9 ± .4	2.1 ± .2	< .4			
		09/25	*B3261	78002907	2.1 ± .5	3.3 ± .3	< .6			
		10/23	*B3285	78002556	1.7 ± .6	2.7 ± .3	< .6			
			*C3285	78002555	2.8 ± .6	2.8 ± .3	< .7			
		11/03	*A3285	78003000	2.1 ± .6	2.7 ± .3	< .6	< .01	.052 ± .003	.016 ± .002

(a) All catfish are channel catfish
(b) All crappie are white crappie.

TABLE IV.7.3
ANALYTICAL DATA FOR FISH
GAMMA SPECTRUM ANALYSIS (a)
(pCi/g original sample)

Station	Collection Date	Type	Cs-137	I-131	C-134	Ba-140	K-40	Cr-51	Co-60	Be-7	Ra-226	Th-228	Other
1EE	06/06/78	Channel Catfish	.05±.02	<10	<.02	<4	2.6±.5	<1	<.03	<.5	<.04	<.04	(b)
	09/11/78	Channel Catfish	.10±.04	<20	<.06	<7	2.4±.9	<2	<.05	<1	<.06	<.1	
	10/23/78	Channel Catfish	.07±.04	<6	<.05	<3	3.0±.8	<1	<.04	<.8	<.08	<.09	
1X	06/26/78	Channel Catfish	<.2	<9	<.2	<7	<2	<4	<.1	<2	.3±.2	<.4	
	09/13/78	Channel Catfish	<.07	<20	<.1	<10	<1	<3	<.09	<2	<.1	<.2	
	10/11/78	Channel Catfish	<.07	<40	<.06	<10	3±1	<3	<.08	<1	<.2	<.1	
4H	06/16/78	American Shad	<.02	<4	<.02	<2	3.0±.5	<.6	<.02	<.4	<.04	<.06	(c)
4I	05/09/78	White Crappie	.07±.04	<200	<.04	<30	3.3±.9	<4	<.05	<1	<.07	<.1	
	06/06/78	Channel Catfish	<.07	<30	<.1	<10	2±1	<3	<.08	<2	<.1	<.2	
	09/19/78	White Crappie	<.07	<10	<.1	<8	4±2	<3	<.1	<2	<.2	<.3	
	09/25/78	Channel Catfish	<.07	<8	<.08	<5	<1	<2	<.07	<1	<.1	<.2	
	10/16/78	Channel Catfish	<.1	<30	<.1	<10	4±1	<4	<.09	<2	<.1	<.3	
	11/14/78	White Crappie	<.1	<4	<.1	<4	2±2	<2	<.1	<2	<.2	<.3	

(a) Composite of all fish of same species with the same last 4 digits of ID number collected at the station on the date given and listed in TABLE IV.7.1 except where noted.

(b) Zn-65 = .06 ± .05

(c) Zn-65 = <.05

TABLE IV.7.3 (Cont.)
ANALYTICAL DATA FOR FISH
GAMMA SPECTRUM ANALYSIS
(pCi/g original sample)

Station	Collection Date	Type	Cs-137	I-131	C-134	Ba-140	K-40	Cr-51	Co-60	Be-7	Ra-226	Th-228	Other
4J	04/10/78	Channel Catfish	<.05	<7	<.08	<5	3±1	<2	<.07	<1	<.1	<.2	
	04/10/78	White Crappie	<.03	2±2	<.03	<2	3.1±.7	<1	<.04	<.6	<.07	<.1	
	05/08/78	Channel Catfish	<.08	<400	<.1	<60	3±1	<7	<.08	<3	<.1	<.2	
	06/08/78	White Crappie	<.03	<10	<.04	<5	2.8±.7	<2	<.04	<.8	<.07	<.1	
	07/24/78	Channel Catfish	<.04	<1000	<.07	<100	2.5±.9	<7	<.06	<1	<.07	<.1	
	08/21/78	White Crappie	<.05	<100	<.06	<20	1.5±.9	<3	<.06	<1	<.1	<.1	
	11/14/78	White Crappie	.05±.03	<1	<.03	<.9	2.9±.6	<.6	<.04	<.4	<.05	<.1	
	11/14/78	Channel Catfish	.04±.03	<1	<.04	<1	2.9±.7	<.8	<.04	<.5	<.07	<.08	
6H	05/02/78	White Crappie	<.05	<.8	<.06	<.9	3±1	<.8	<.05	<.6	<.09	<.09	
	05/02/78	Channel Catfish	<.08	<1	<.08	<2	2±1	<1	<.08	<1	<.1	<.2	
	09/25/78	Channel Catfish	<.02	<3	<.04	<2	2.5±.6	<.9	<.04	<.5	<.06	<.07	
	09/25/78	White Crappie	<.08	<9	<.1	<5	<1	<2	<.08	<1	<.1	<.2	
	10/23/78	Channel Catfish	<.04	<10	<.06	<6	3.2±.9	<2	<.06	<1	<.1	<.1	
	11/03/78	White Crappie	<.1	<10	<.2	<10	3±2	<4	<.2	<3	<.2	<.3	

TABLE IV.7.4
1978 ANNUAL MEAN RADIOACTIVITY CONCENTRATIONS IN FISH SAMPLES
(pCi/g Ash)

WHITE CRAPPIE

Environmental Station No.	G. Beta	K-40	N. Beta	SR-89	SR-90	CS-137
1EE (a)	-	-	-	-	-	-
1X (a)	-	-	-	-	-	-
4I (a)	41±22	45±16	11±5	<.43	1.1±0.2	.57±.57
4J (a)	46±29	49±19	11±7	.28±.25	1.1±0.8	1.2±1.0
6H (b)	48±16	52±13	<10	.37±.23	1.0±0.5	.28±.10
Overall	45±24	50±19	11±6	.35±.30	1.1±0.5	.74±1.06

CHANNEL CATFISH

Environmental Station No.	G. Beta	K-40	N. Beta	SR-89	SR-90	CS-137
1EE (a)	68±53	72±41	13±9	<1.1	1.4±0.4	2.3±2.6
1X (a)	41±10	48±18	<10	<1.2	2.0±1.8	.91±.51
4I (a)	33±20	40±26	10	<.47	1.3±0.2	.57±.13
4J (a)	50±58	57±54	<11	<1.1	1.4±1.9	2.1±2.8
6H (b)	47±48	53±44	13±23	<.50	1.3±0.3	.33±.54
Overall	48±48	54±44	11±11	<.88	1.4±1.2	1.3±2.3

(a) Potentially affected stations.
(b) Unaffected station.

MEAN RADIOACTIVITY CONCENTRATIONS IN CHANNEL CATFISH AND WHITE CRAPPIE
(pCi/g Ash)

Environmental Station No.	Period	Collection Date	G. Beta	K-40	N. Beta	SR-89	SR-90	CS-137
1EE & 4J (a)	1st	4/10	48±32	52±15	11±7	.10	.39±.31	1.4±1.3
6H (b)	Quarter	-						
1EE & 4J (a)	2nd	5/8-6/8	55±43	50±37	11±8	<1.0	1.2±.39	1.9±3.0
6H (b)	Quarter	5/2	43±40	47±39	<10	.40±.28	.91±.54	.18±.21
1EE & 4J (a)	3rd	7/24-9/11	48±57	57±43	<11	<1.5	1.6±0.3	2.1±2.7
6H (b)	Quarter	9/11-9/25	53±46	60±39	15±28	<.50	1.2±0.2	.26±.01
1EE & 4J (a)	4th	10/23-11/14	62±60	72±53	<13	<.37	1.6±1.5	1.8±2.6
6H (b)	Quarter	10/11-11/3	46±16	57±11	<10	<.40	1.3±0.4	.49±.41
1EE & 4J (a)	Annual Mean		54±50	58±44	11±8	.79±1.82	1.3±1.2	1.8±2.3
6H (b)	Annual Mean		47±36	55±33	12±17	.43±.21	1.1±0.5	.31±.35
Overall Mean			51±46	57±40	12±11	.66±1.49	1.2±1.0	1.3±2.3

(a) Potentially affected stations.
(b) Unaffected stations.

TABLE IV.7.5
1978 ANNUAL MEAN RADIOACTIVITY CONCENTRATIONS IN FISH SAMPLES
(pCi/g orig. samples)

WHITE CRAPPIE

Environmental Station No.	G. Beta	K-40	N. Beta	SR-89	SR-90	CS-137
1EE (a)	-	-	-	-	-	-
1X (a)	-	-	-	-	-	-
4I (a)	2.4±0.9	2.7±1.0	.76±.27	<.023	.055±.019	.030±.038
4J (a)	2.6±1.3	2.9±1.3	.71±.28	.015±.012	.068±.030	.062±.041
6H (b)	2.3±0.8	2.7±0.8	<.57	.013±.012	.048±.020	.013±.005
Overall	2.5±1.1	2.8±1.1	.68±.29	.017±.016	.058±.028	.038±.033

CHANNEL CATFISH

Environmental Station No.	G. Beta	K-40	N. Beta	SR-89	SR-90	CS-137
1EE (a)	2.3±0.9	2.6±0.7	.53±.23	<.020	.038±.042	.051±.046
1X (a)	2.1±0.7	2.4±1.3	<.61	<.037	.057±.028	.027±.014
4I (a)	1.9±1.2	2.3±1.9	.68±.27	<.023	.059±.023	.027±.014
4J (a)	2.3±1.7	2.6±2.0	<.61	<.020	.043±.059	.057±.078
6H (b)	2.3±2.4	2.6±2.6	<.70	<.027	.065±.016	.016±.020
Overall	2.2±1.5	2.5±1.8	.63±.35	<.025	.052±.040	.037±.052

(a) Potentially affected stations.
(b) Unaffected station.

MEAN RADIOACTIVITY CONCENTRATION IN CHANNEL CATFISH AND WHITE CRAPPIE
(pCi/g orig. sample)

Environmental Station No.	Period	Collection Date	G. Beta	K-40	N. Beta	SR-89	SR-90	CS-137
1EE & 4J (a)	1st	4/10	3.0±2.4	3.3±2.8	.73±.38	<.010	.040±.030	.063±.062
6H (b)	Quarter	-						
1EE & 4J (a)	2nd	5/8-6/8	2.4±1.0	2.2±0.8	.58±.32	<.020	.044±.066	.048±.043
6H (b)	Quarter	5/2	2.5±3.0	2.5±2.8	<.60	.020±.028	.050±.040	.0090±.0085
1EE & 4J (a)	3rd	7/24-9/11	2.1±0.9	2.6±0.8	<.63	<.030	.052±.060	.052±.045
6H (b)	Quarter	9/11-9/25	2.1±1.1	2.6±2.0	.69±.70	<.025	.064±.025	.014±.004
1EE & 4J (a)	4th	10/23-11/14	2.4±1.0	2.9±0.4	<.59	<.010	.063±.042	.068±.083
6H (b)	Quarter	10/11-11/3	2.3±0.9	2.9±0.4	<.63	<.015	.055±.007	.021±.014
1EE & 4J (a)	Annual Mean		2.4±1.4	2.7±1.5	.63±.31	.018±.019	.051±.049	.057±.053
6H (b)	Annual Mean		2.3±1.8	2.7±1.9	.64±.45	.020±.017	.056±.025	.015±.013
Overall Mean			2.4±1.6	2.7±1.6	.63±.36	.019±.019	.053±.042	.042±.060

(a) Potentially affected stations.
(b) Unaffected stations.

TABLE IV.8.1
ANALYTICAL DATA FOR VEGETATION SAMPLES
CONCENTRATION (pCi/g ash)

STATION	COLLECTION DATE	SAMPLE TYPE	G.BETA	K-40	N.BETA	SR-89	SR-90	CS-137
1	78 07/24	BEETS	240 ± 20	210 ± 20	30 ± 30	< .1	1.94 ± .05	.57 ± .03
		CABBAGE	200 ± 10	150 ± 20	40 ± 20	< .4	10.3 ± .1	.45 ± .04
	08/11	BEETS	210 ± 10	190 ± 20	< 20	< .1	1.38 ± .05	.54 ± .07
		PARSNIPS	170 ± 10	130 ± 10	40 ± 20	< .2	1.29 ± .04	.72 ± .08
	10/09	CABBAGE	270 ± 10	270 ± 30	< 30	< .4	4.6 ± .1	.4 ± .1
		TURNIPS+LEAVES	290 ± 10	280 ± 30	< 30	< .2	4.4 ± .1	.9 ± .1
3A	78 07/24	APPLES+LEAVES	280 ± 10	160 ± 20	120 ± 20	< 2	35.7 ± .5	4.2 ± .2
	08/11	WILD VEG	270 ± 10	160 ± 20	110 ± 20	< .5	18.1 ± .1	2.3 ± .1
	10/09	WILD VEG	320 ± 20	160 ± 20	160 ± 20	< 2	41.9 ± .7	3.3 ± .5
4N	78 07/24	WILD VEG	200 ± 10	250 ± 30	< 30	< .9	12.8 ± .3	5.6 ± .3
	08/11	WILD VEG	250 ± 10	160 ± 20	80 ± 20	< .6	8.0 ± .2	3.5 ± .3
	10/09	WILD VEG	260 ± 20	150 ± 20	110 ± 20	< .6	15.0 ± .2	2.5 ± .2
5	78 07/24	BEETS	280 ± 20	220 ± 20	50 ± 30	< .2	4.87 ± .07	.36 ± .03
		CORN	280 ± 10	160 ± 20	120 ± 20	< 1	2.2 ± .5	.8 ± .1
	08/11	CABBAGE	290 ± 10	260 ± 30	< 30	< .5	6.6 ± .2	.9 ± .2
		CORN	330 ± 10	280 ± 30	60 ± 30	< 1	1.8 ± .4	1.2 ± .5
	10/09	CABBAGE	190 ± 10	170 ± 20	20 ± 20	< .3	7.5 ± .2	.7 ± .1
		TURNIPS+LEAVES	240 ± 10	200 ± 20	40 ± 20	< .2	8.1 ± .1	.75 ± .09
6D	78 07/24	CABBAGE	300 ± 20	290 ± 30	< 30	< .6	2.4 ± .2	.5 ± .1
		CORN	300 ± 10	250 ± 30	< 30	< .5	1.6 ± .2	1.0 ± .2
	08/11	CABBAGE	320 ± 10	310 ± 30	< 30	< .7	5.2 ± .3	.5 ± .5
		CORN	220 ± 10	220 ± 20	< 30	< 1	1.8 ± .4	1.1 ± .5
	10/09	CABBAGE	220 ± 10	160 ± 20	60 ± 20	< .7	23.4 ± .2	.38 ± .04
		TURNIPS+LEAVES	220 ± 10	170 ± 20	50 ± 20	< .4	10.4 ± .2	2.8 ± .2
8	78 07/24	BEAN VINES	270 ± 20	180 ± 20	90 ± 20	< 3	43.6 ± .8	2.0 ± .3
		CORN	280 ± 10	260 ± 30	< 30	< 1	2.3 ± .4	.8 ± .1
	08/11	BEANS	350 ± 10	270 ± 30	80 ± 30	.9 ± .6	8.8 ± .2	1.1 ± .2
		CORN	330 ± 10	270 ± 30	60 ± 30	< .5	2.2 ± .1	1.3 ± .3
23	78 07/24	PEACHES+LEAVES	290 ± 10	120 ± 10	170 ± 20	< .6	14.0 ± .2	1.34 ± .06
	08/11	PEACHES+LEAVES	280 ± 10	230 ± 20	50 ± 30	< 2	52.9 ± .4	.9 ± .1
	10/09	APPLES	310 ± 10	270 ± 30	40 ± 30	< 1	4 ± 2	6 ± 1

TABLE IV.8.2
ANALYTICAL DATA FOR VEGETATION SAMPLES
CONCENTRATION (pCi/gram Original Sample)

STATION	COLLECTION DATE		SAMPLE TYPE	G.BETA	K-40	N.BETA	SR-89	SR-90	CS-137
1	78	07/24	BEETS	4.8 ± .3	4.3 ± .4	.5 ± .5	< .003	.0340 ± .0008	.0103 ± .0035
			CABBAGE	3.6 ± .3	2.8 ± .3	.8 ± .4	< .006	.166 ± .002	.0073 ± .0007
		08/11	BEETS	5.0 ± .3	4.6 ± .5	< .6	< .003	.030 ± .001	.014 ± .002
			PARSNIPS	6.9 ± .5	5.2 ± .5	1.7 ± .7	< .005	.049 ± .002	.027 ± .003
		10/09	CABBAGE	3.5 ± .2	3.4 ± .3	< .4	< .004	.048 ± .001	.004 ± .001
			TURNIPS+LEAVES	3.8 ± .2	3.6 ± .4	< .4	< .002	.047 ± .001	.009 ± .001
3A	78	07/24	APPLES+LEAVES	2.3 ± .1	1.3 ± .1	1.0 ± .2	< .01	.207 ± .003	.024 ± .001
		08/11	WILD VEG	6.9 ± .4	4.0 ± .4	2.8 ± .5	< .01	.396 ± .003	.051 ± .003
		10/09	WILD VEG	5.2 ± .3	2.6 ± .3	2.6 ± .4	< .02	.474 ± .007	.037 ± .006
4N	78	07/24	WILD VEG	2.8 ± .2	3.5 ± .4	< .4	< .009	.135 ± .003	.059 ± .003
		08/11	WILD VEG	5.1 ± .3	3.4 ± .3	1.7 ± .4	< .01	.132 ± .003	.059 ± .005
		10/09	WILD VEG	6.0 ± .3	3.5 ± .4	2.5 ± .5	< .01	.284 ± .004	.047 ± .004
5	78	07/24	BEETS	5.2 ± .3	4.2 ± .4	1.0 ± .5	< .004	.080 ± .001	.0141 ± .0035
			CORN	2.3 ± .1	1.3 ± .1	1.0 ± .2	< .007	.012 ± .003	.0042 ± .0005
		08/11	CABBAGE	3.0 ± .1	2.8 ± .3	< .3	< .004	.055 ± .002	.008 ± .002
			CORN	1.89 ± .08	1.6 ± .2	.3 ± .2	< .005	.007 ± .002	.005 ± .002
		10/09	CABBAGE	2.7 ± .2	2.4 ± .2	.3 ± .3	< .003	.088 ± .002	.008 ± .002
			TURNIPS+LEAVES	5.2 ± .3	4.3 ± .4	.9 ± .5	< .003	.151 ± .002	.014 ± .002
6D	78	07/24	CABBAGE	1.9 ± .1	1.9 ± .2	< .2	< .004	.015 ± .001	.0035 ± .0005
			CORN	1.87 ± .09	1.6 ± .2	.3 ± .2	< .002	.007 ± .001	.0045 ± .0009
		08/11	CABBAGE	2.2 ± .1	2.1 ± .2	< .2	< .003	.024 ± .001	.003 ± .002
			CORN	1.54 ± .09	1.6 ± .2	< .2	< .006	.009 ± .002	.005 ± .003
		10/09	CABBAGE	4.0 ± .3	3.0 ± .3	1.0 ± .4	< .01	.348 ± .003	.0072 ± .0006
			TURNIPS+LEAVES	4.4 ± .3	3.4 ± .3	1.0 ± .4	< .007	.174 ± .003	.047 ± .003
8	78	07/24	BEAN VINES	2.6 ± .1	1.7 ± .2	.9 ± .2	< .02	.282 ± .005	.013 ± .002
			CORN	1.50 ± .08	1.4 ± .1	< .2	< .005	.009 ± .002	.0032 ± .0005
		08/11	BEANS	3.9 ± .2	3.1 ± .3	.9 ± .4	.008 ± .006	.081 ± .002	.010 ± .002
			CORN	2.4 ± .1	2.0 ± .2	.5 ± .2	< .003	.0123 ± .0008	.007 ± .002
23	78	07/24	PEACHES+LEAVES	3.0 ± .2	1.2 ± .1	1.8 ± .2	< .005	.118 ± .001	.0113 ± .0005
		08/11	PEACHES+LEAVES	3.8 ± .2	3.2 ± .3	.6 ± .4	< .02	.624 ± .005	.011 ± .002
		10/09	APPLES	.72 ± .03	.62 ± .06	.09 ± .07	< .002	.007 ± .003	.011 ± .002

TABLE IV.8.3

1978 ANNUAL MEAN RADIOACTIVITY CONCENTRATION IN VEGETATION
(pCi/g ash)

Environmental Station No.	G. BETA	K-40	N. BETA	SR-89	SR-90	CS-137
Potentially Affected Stations 1 & 23	250±100	210±120	50±92	<.56	11±33	1.3±3.6
Unaffected Stations 3A, 4N, 5, 6D & 8	270±90	210±110	65±78	.86±1.34	12±26	1.7±2.8
Overall Mean	270±90	210±110	60±82	.78±1.32	12±28	1.6±3.0

TABLE IV.8.4

1978 ANNUAL MEAN RADIOACTIVITY CONCENTRATION IN VEGETATION
(pCi/g orig. sample)

Environmental Station No.	G. BETA	K-40	N. BETA	SR-89	SR-90	CS-137
Potentially Affected Stations 1 & 23	3.9±3.3	3.2±3.0	.77±1.18	<.0057	.12±.39	.012±.013
Unaffected Stations 3A, 4N, 5, 6D & 8	3.4±3.2	2.6±2.0	.92±1.61	.0074±.0099	.14±.28	.020±.040
Overall Mean	3.5±3.2	2.8±2.3	.87±1.48	.0069±.0102	.13±.31	.017±.035

TABLE IV.9.1
ANALYTICAL DATA FOR MILK SAMPLES
CONCENTRATION (pCi/l)

Nearby Farms

STATION		COLLECTION DATE	I-131	G.BETA	K-40	N.BETA	SR-89	SR-90	CS-134	CS-137
G	78	01/23	< .1	1130 ± 90	1100 ± 100	< 100	< .7	6.0 ± .5	< 1	6 ± 2
		05/15	< .2	1140 ± 90	1000 ± 100	100 ± 100	3.2 ± .7	5.5 ± .3	< 2	5 ± 3
		07/31	< .1	960 ± 90	900 ± 90	< 100	< 1	8.9 ± .4	< 1	8 ± 2
		11/06	< .1	1040 ± 70	910 ± 90	100 ± 100	< 1	5.9 ± .4	< 2	4 ± 2
H	78	01/23		970 ± 80	1100 ± 100	< 100	< .5	4.1 ± .3	< 2	4 ± 2
		05/15		960 ± 90	850 ± 80	< 100	2 ± 1	3.9 ± .3	< 2	9 ± 3
		07/31		830 ± 90	920 ± 90	< 100	< .8	4.6 ± .3	< 2	14 ± 3
		11/06		690 ± 60	800 ± 80	< 100	< .8	4.2 ± .3	< 2	4 ± 2
J	78	01/23	< .1	1300 ± 90	1200 ± 100	< 200	1.2 ± .6	6.4 ± .4	< 2	5 ± 2
		05/15	.7 ± .2	920 ± 90	810 ± 80	< 100	9 ± 1	11.7 ± .4	< 2	15 ± 3
		07/31	< .05	1020 ± 90	890 ± 90	100 ± 100	< 1	11.9 ± .4	< 3	9 ± 4
		11/06	< .1	1210 ± 60	1100 ± 100	< 100	< .7	9.4 ± .3	< 2	3 ± 2

TABLE IV.9.1 (cont'd)
ANALYTICAL DATA FOR MILK SAMPLES
CONCENTRATION (pCi/l)

Distant Farms

STATION	COLLECTION DATE	I-131	G.BETA	K-40	N.BETA	SR-89	SR-90	CS-134	CS-137
A	78 01/22	< .2	1200 ± 90	1200 ± 100	< 100	< 1	6.9 ± .7	< 2	4 ± 2
	05/15	< .3	910 ± 90	870 ± 90	< 100	2 ± 2	4.9 ± .4	< 2	5 ± 3
	07/31	< .06	1060 ± 90	950 ± 90	< 100	< .8	5.7 ± .3	< 1	9 ± 3
	11/06	< .1	800 ± 100	890 ± 90	< 100	< .5	4.6 ± .3	< 2	4 ± 3
B	78 01/22		1000 ± 90	1100 ± 100	< 100	< .4	3.4 ± .3	< 2	6 ± 3
	05/15		1000 ± 100	910 ± 90	< 100	< 3	1.3 ± .9	< 2	12 ± 3
	07/31		1020 ± 90	940 ± 90	< 100	< 1	6.4 ± .4	< 2	10 ± 3
	11/06		760 ± 60	800 ± 80	< 100	< .8	3.8 ± .3	< 2	5 ± 3
C	78 01/22	< .1	1100 ± 90	1200 ± 100	< 100	< .6	5.1 ± .5	< 1	4 ± 2
	05/15	< .2	920 ± 90	890 ± 90	< 100	< .8	5.1 ± .3	< 2	< 2
	07/31	< .1	1100 ± 100	940 ± 90	< 100	< 1	5.1 ± .4	< 2	9 ± 3
	11/06	< .1	720 ± 60	790 ± 80	< 100	< .9	4.1 ± .3	< 2	4 ± 3
E	78 01/22		1240 ± 90	1300 ± 100	< 200	< .6	4.3 ± .3	< 2	4 ± 2
	05/15		960 ± 90	1000 ± 100	< 100	< 1	3.7 ± .4	< 2	5 ± 3
	07/31		940 ± 90	850 ± 90	< 100	1.5 ± .9	4.1 ± .3	< 1	7 ± 2
	11/06		830 ± 60	820 ± 80	< 100	< .5	5.4 ± .3	< 1	5 ± 2

TABLE IV.9.1 (cont'd)
ANALYTICAL DATA FOR MILK SAMPLES
CONCENTRATION (pCi/l)

Intermediate Distance Farms

STATION	COLLECTION DATE	I-131	G.BETA	K-40	N.BETA	SR-89	SR-90	CS-134	CS-137
D	78 01/23		970 ± 80	1100 ± 100	< 100	.6 ± .6	3.6 ± .5	< 2	3 ± 2
	05/15		1000 ± 100	820 ± 80	200 ± 100	3 ± 2	5.3 ± .4	< 2	16 ± 3
	07/31		940 ± 90	850 ± 90	< 100	< .9	6.7 ± .4	< 1	5 ± 2
	11/06		790 ± 60	850 ± 80	< 100	< .8	3.6 ± .3	< 2	3 ± 2
L	78 01/22		1160 ± 90	1100 ± 100	< 100	< .5	4.6 ± .4	< 2	5 ± 3
	05/15		970 ± 90	860 ± 90	< 100	< 1	4.1 ± .3	< 2	6 ± 2
	07/31		910 ± 80	900 ± 90	< 100	< 1	5.4 ± .3	< 2	8 ± 3
	11/06		970 ± 90	820 ± 80	100 ± 100	< .8	3.8 ± .3	< 2	7 ± 2
M	78 01/22		1080 ± 90	1100 ± 100	< 100	.6 ± .5	4.9 ± .3	< 3	7 ± 4
	05/15		900 ± 100	840 ± 80	< 100	< 1	5.2 ± .3	< 2	9 ± 3
	07/31		1000 ± 90	860 ± 90	100 ± 100	< 1	15.3 ± .5	< 2	11 ± 3
	11/06		1300 ± 70	1300 ± 100	< 100	< .9	7.5 ± .3	< 2	3 ± 2
N	78 01/22		900 ± 80	1100 ± 100	< 100	< .6	7.7 ± .4	< 2	9 ± 4
	05/15		920 ± 90	900 ± 90	< 100	3 ± 1	5.2 ± .4	< 2	5 ± 3
	07/31		930 ± 80	850 ± 90	< 100	< .9	5.2 ± .3	< 1	6 ± 2
	11/06		1000 ± 100	1000 ± 100	< 100	< 1	7.1 ± .3	< 2	4 ± 2

TABLE IV.9.2

1978 MEAN RADIOACTIVITY CONCENTRATION IN MILK SAMPLES
(pCi/l)

Farm Groups	Collection Dates	G. BETA	K-40	N. BETA	SR-89	SR-90	CS-134	CS-137	I-131
Distant	1/22	1100±200	1200±200	<125	<.65	4.9±3.0	<1.8	4.5±2.0	<.15
Farms	5/15	950±80	920±110	<100	1.7±2.0	3.8±3.5	<2.0	6.0±8.5	<.25
(A,B,C,E)	7/31	1000±100	920±90	<100	1.1±.60	5.3±1.9	<1.5	8.8±2.5	<.08
	11/6	780±100	830±90	<100	<.68	4.5±1.4	<1.8	4.5±1.6	<.10
Annual Mean	1978	970±300	970±310	<110	1.0±1.3	4.6±2.6	<1.8	5.9±5.4	<.15
Nearby	1/23	1100±300	1100±100	<130	.80±.72	5.5±2.5	<1.7	5.0±2.0	<.10
Farms	5/15	1000±200	890±200	100	4.7±7.5	7.0±8.2	<2.0	9.7±10.1	.45±.71
(G,H,J)	7/31	940±190	900±30	100	<.93	8.5±7.3	<2.0	10±6	<.075
	11/6	980±530	940±300	<100	<.83	6.5±5.3	<2.0	3.7±1.2	<.10
Annual Mean	1978	1000±300	970±260	110±60	1.8±4.8	6.9±5.8	<1.9	7.2±7.9	.18±.43
Intermed.	1/22-1/23	1000±200	1100	<100	.58±.10	5.2±3.5	<2.3	6.0±5.2	
Farms	5/15	950±90	860±70	125±100	2.0±2.3	5.0±1.1	<2.0	9.0±9.9	
(D,L,M,N)	7/31	950±80	870±50	100	<.95	8.2±9.6	<1.5	7.5±5.3	
	11/6	1000±400	990±440	100	<.88	5.5±4.2	<2.0	4.3±3.8	
Annual Mean	1978	980±240	950±290	110±50	1.1±1.5	6.0±5.6	<1.9	6.7±6.9	
Overall Mean		990±280	960±280	100±50	1.3±2.8	5.7±5.0	<1.9	6.5±6.6	.16±.31

Individual Farms	Annual Mean	G. BETA	K-40	N. BETA	SR-89	SR-90	CS-134	CS-137	I-131
Farm	A	990±350	980±300	<100	1.1±1.3	5.5±2.1	<1.8	5.5±4.8	<.17
	B	950±250	940±250	<100	<1.3	3.7±4.2	<2.0	8.3±6.6	
	C	960±360	960±350	<100	<.83	4.9±1.0	<1.8	4.8±6.0	<.13
	D	930±190	910±260	125±100	1.3±2.2	4.8±3.0	<1.8	6.8±12.5	
	E	990±350	990±440	<125	.90±.91	4.4±1.5	<1.5	5.3±2.5	
	G	1100±170	980±190	100	1.5±2.3	6.6±3.1	<1.5	5.8±3.4	<.13
	H	860±260	920±260	<100	1.0±1.3	4.2±0.6	<2.0	7.8±9.6	
	J	1100±350	1000±360	125±100	3.0±8.0	9.9±5.1	<2.3	8.0±10.6	.24±.62
	L	1000±220	920±250	<100	<.83	4.5±1.4	<2.0	2.3±1.0	
	M	1100±340	1000±440	100	.88±.38	8.2±9.7	<2.3	7.5±6.8	
	N	940±90	960±220	<100	1.4±2.2	6.3±2.6	<1.8	6.0±4.3	

TABLE IV.10.1
ANALYTICAL DATA FOR RABBIT SAMPLES
CONCENTRATION (pCi/g ash)

COLLECTION DATE		ID	G. BETA	K-40	N. BETA	SR-89	SR-90
78 06/10	BONE	SB3098	30 ± 10	14 ± 1	10 ± 10	< 1	10.8 ± .3
		SB3099	30 ± 10	34 ± 3	< 10	< 1	6.5 ± .4
		SB3100	40 ± 10	22 ± 2	20 ± 10	< 2	13.5 ± .6
		SB3101	50 ± 10	36 ± 4	< 10	< 2	13.2 ± .4
		SB3102	20 ± 10	20 ± 2	< 10	2.5 ± .9	4.4 ± .2
	SOFT TISSUE	ST3098	180 ± 10	160 ± 20	20 ± 20		
		ST3099	210 ± 10	190 ± 20	< 20		
		ST3100	170 ± 10	150 ± 10	20 ± 20		
		ST3101	220 ± 10	190 ± 20	30 ± 20		
		ST3102	80 ± 10	52 ± 5	30 ± 10		
	MUSCLE	SM3098	270 ± 20	250 ± 30	< 30		
		SM3099	260 ± 20	240 ± 20	< 30		
		SM3100	300 ± 20	240 ± 20	50 ± 30		
		SM3101	260 ± 20	240 ± 20	< 30		
		SM3102	260 ± 20	240 ± 20	< 30		

TABLE IV.10.2
ANALYTICAL DATA FOR RABBIT SAMPLES
CONCENTRATION (pCi/gram original sample)

COLLECTION DATE		ID	G. BETA	I-131 (a)	K-40	N. BETA	SR-89	SR-90
78 06/10	BONE	*B3098	8 ± 3		4.1 ± .4	4 ± 4	< .3	3.22 ± .34
		*B3099	6 ± 2		7.0 ± .7	< 3	< .3	1.34 ± .07
		*B3100	10 ± 3		5.5 ± .6	4 ± 3	< .6	3.4 ± .2
		*B3101	10 ± 3		7.6 ± .8	< 3	< .3	2.80 ± .03
		*B3102	5 ± 3		4.5 ± .5	< 3	.6 ± .2	1.00 ± .05
	THYROID	503098		8 ± 7				
		503099		8 ± 7				
		503100		8 ± 7				
		503101		< 6				
		503102		< 6				
	SOFT TISSUE	*T3098	2.5 ± .2		2.1 ± .2	.3 ± .3		
		*T3099	2.5 ± .2		2.3 ± .2	< .3		
		*T3100	2.6 ± .2		2.3 ± .2	.3 ± .3		
		*T3101	2.6 ± .2		2.3 ± .2	.4 ± .3		
		*T3102	3.3 ± .5		2.2 ± .2	1.1 ± .6		
	MUSCLE	*M3098	3.2 ± .2		2.9 ± .3	< .3		
		*M3099	2.9 ± .2		2.7 ± .3	< .3		
		*M3100	3.5 ± .2		2.9 ± .3	.6 ± .3		
		*M3101	3.1 ± .2		2.9 ± .3	< .3		
		*M3102	3.0 ± .2		2.7 ± .3	< .3		

(a) I-131 is measured in pCi/thyroid

TABLE IV.10.3

1978 ANNUAL MEAN RADIOACTIVITY CONCENTRATION IN RABBIT SAMPLES
(pCi/g ash)

	G. BETA	K-40	N. BETA	SR-89	SR-90
RABBIT BONE	34±23	25±19	12±9	1.7±1.3	9.7±8.1
RABBIT MUSCLE	270±30	240±10	34±18		
RABBIT SOFT TISSUE	170±110	150±110	24±11		

TABLE IV.10.4

MEAN RADIOACTIVITY CONCENTRATION IN RABBIT SAMPLES
(pCi/g orig. samples)

	G. BETA	K-40	N. BETA	SR-89	SR-90	I-131 (a)
RABBIT BONE	7.8±4.6	5.7±3.1	3.4±1.1	.42±.33	2.4±2.2	
RABBIT MUSCLE	3.1±0.5	2.8±0.2	.36±.27			
RABBIT SOFT TISSUES	2.7±0.7	2.2±0.2	.48±.70			
RABBIT THYROID						7.2±2.2

(a) I-131 is measured in 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

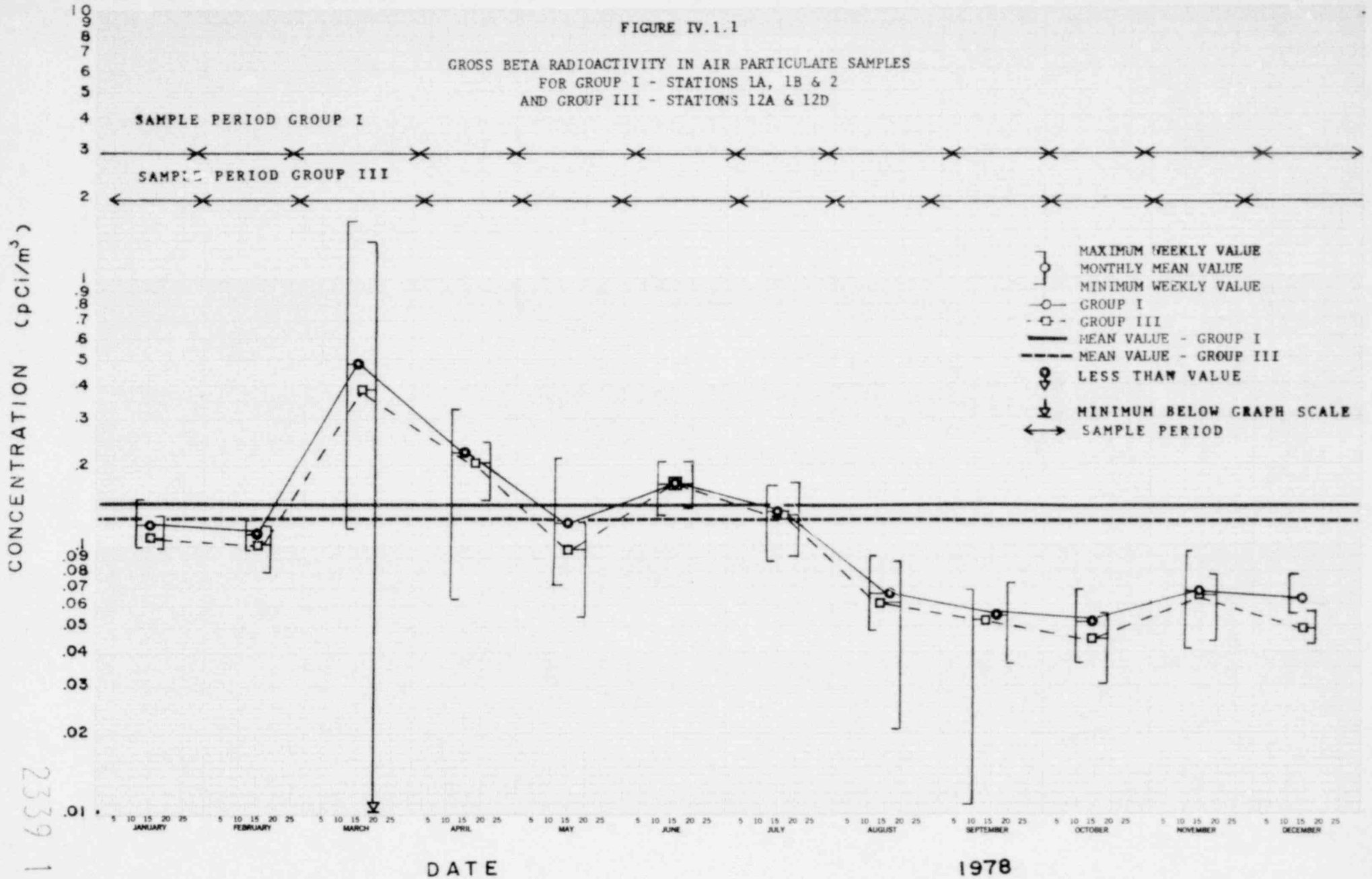


FIGURE IV.1.2

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

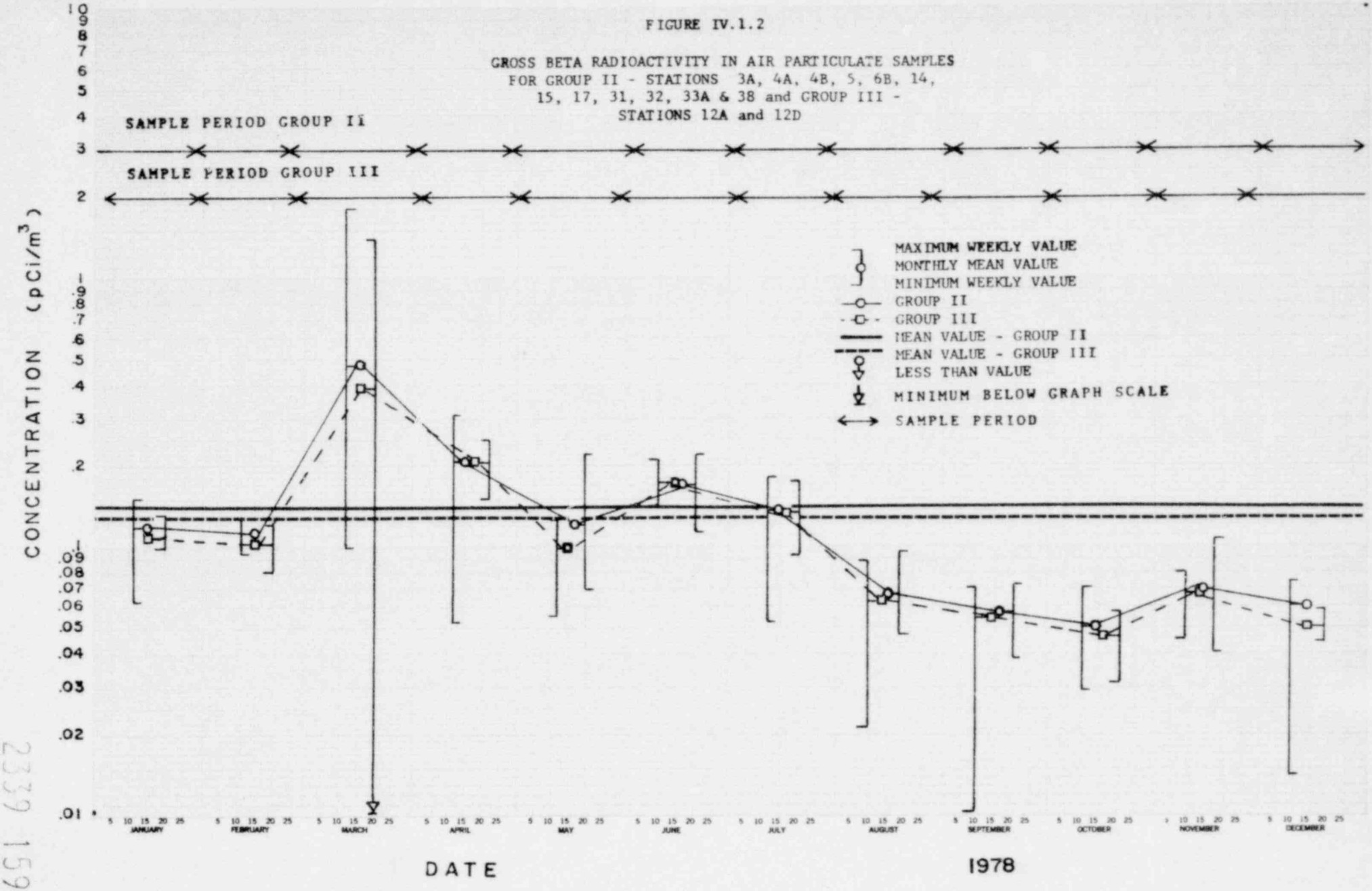
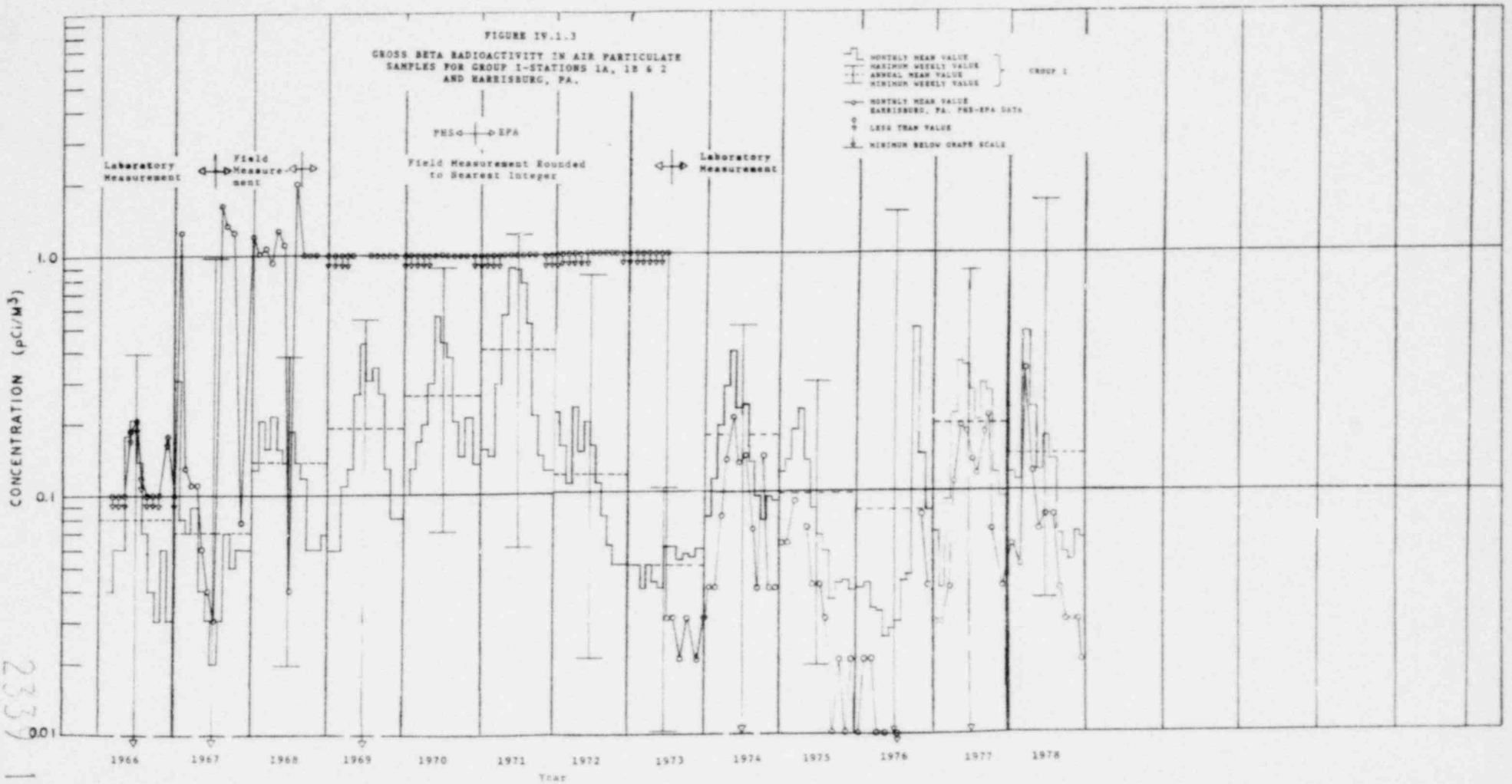


FIGURE IV.1.3

GROSS BETA RADIOACTIVITY IN AIR PARTICULATE SAMPLES FOR GROUP I-STATIONS 1A, 1B & 2 AND HARRISBURG, PA.



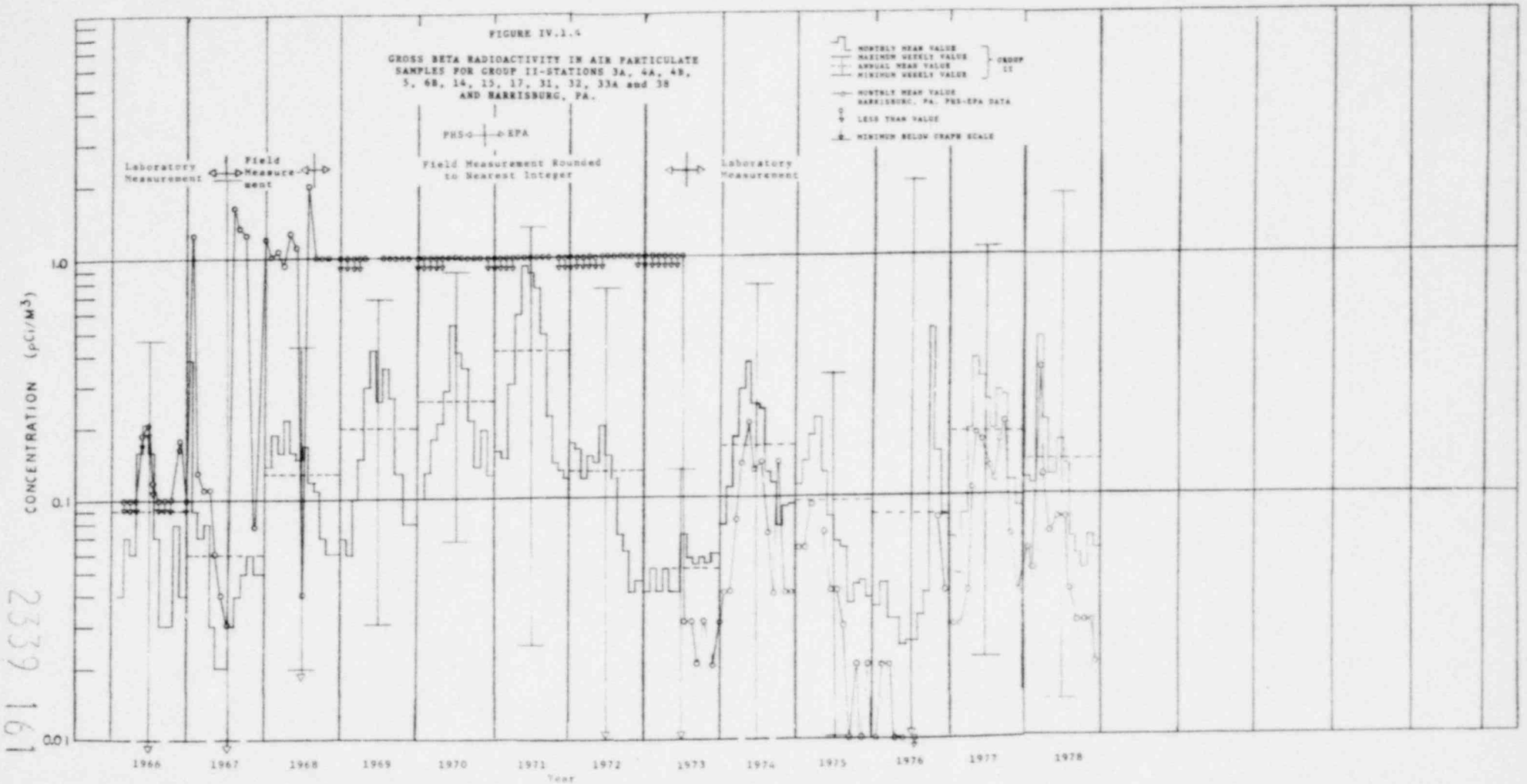


FIGURE IV.1.4
GROSS BETA RADIOACTIVITY IN AIR PARTICULATE SAMPLES FOR GROUP II-STATIONS 3A, 4A, 4B, 5, 6B, 14, 15, 17, 31, 32, 33A and 38 AND HARRISBURG, PA.
MONTHLY MEAN VALUE
MAXIMUM WEEKLY VALUE
ANNUAL MEAN VALUE
MINIMUM WEEKLY VALUE
GROUP II
MONTHLY MEAN VALUE HARRISBURG, PA. PHS-EPA DATA
LESS THAN VALUE
MINIMUM BELOW GRAPH SCALE
PHS
EPA
Field Measurement Rounded to Nearest Integer
Laboratory Measurement
Field Measurement
Laboratory Measurement
CONCENTRATION (pCi/M3)
1.0
0.1
0.01
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
Year

FIGURE IV.1.5

GROSS BETA RADIOACTIVITY IN AIR PARTICULATE SAMPLES FOR GROUP III-STATIONS 12A AND 12D AND HARRISBURG, PA.

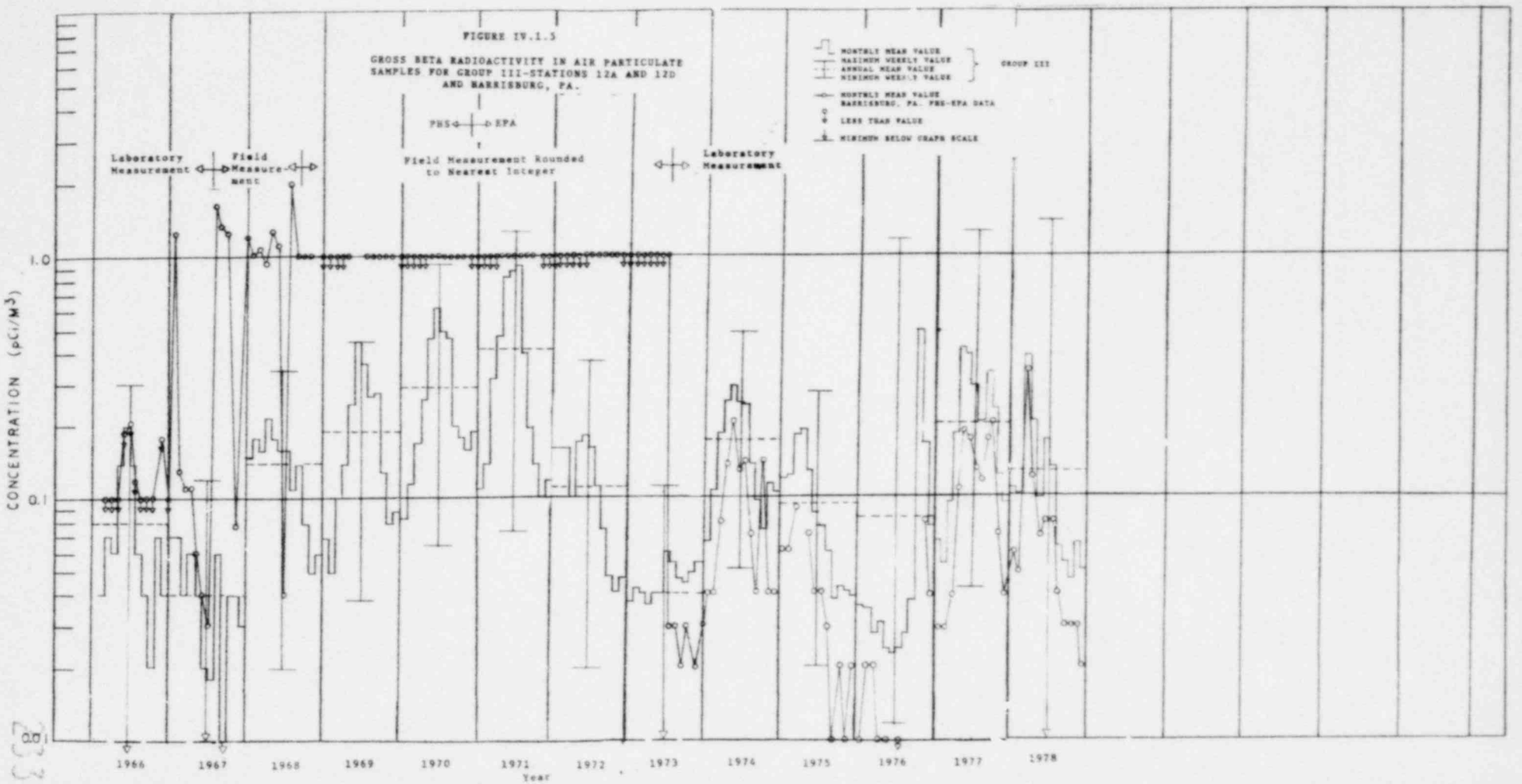


FIGURE IV.3.1

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

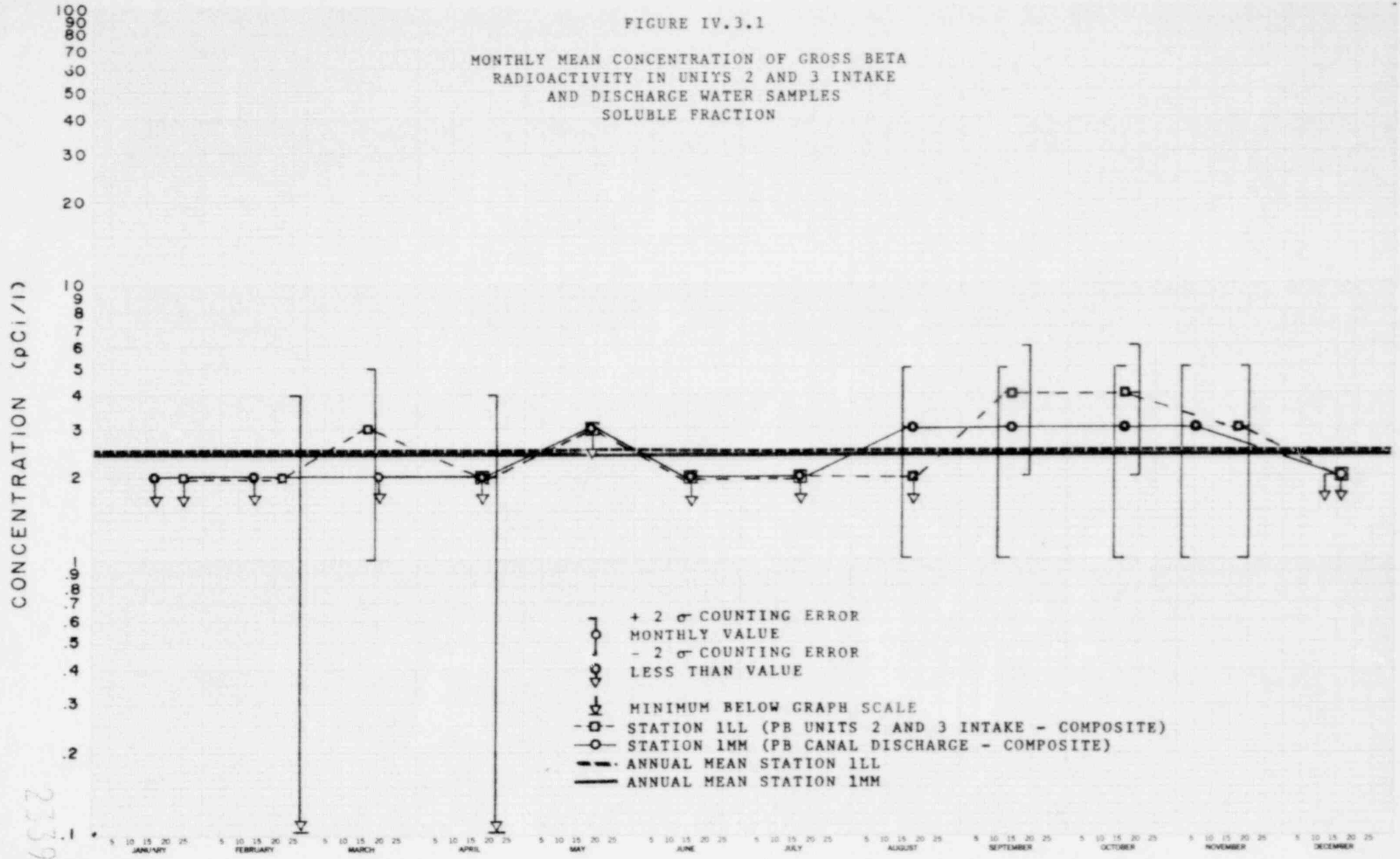


FIGURE IV.3.2

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

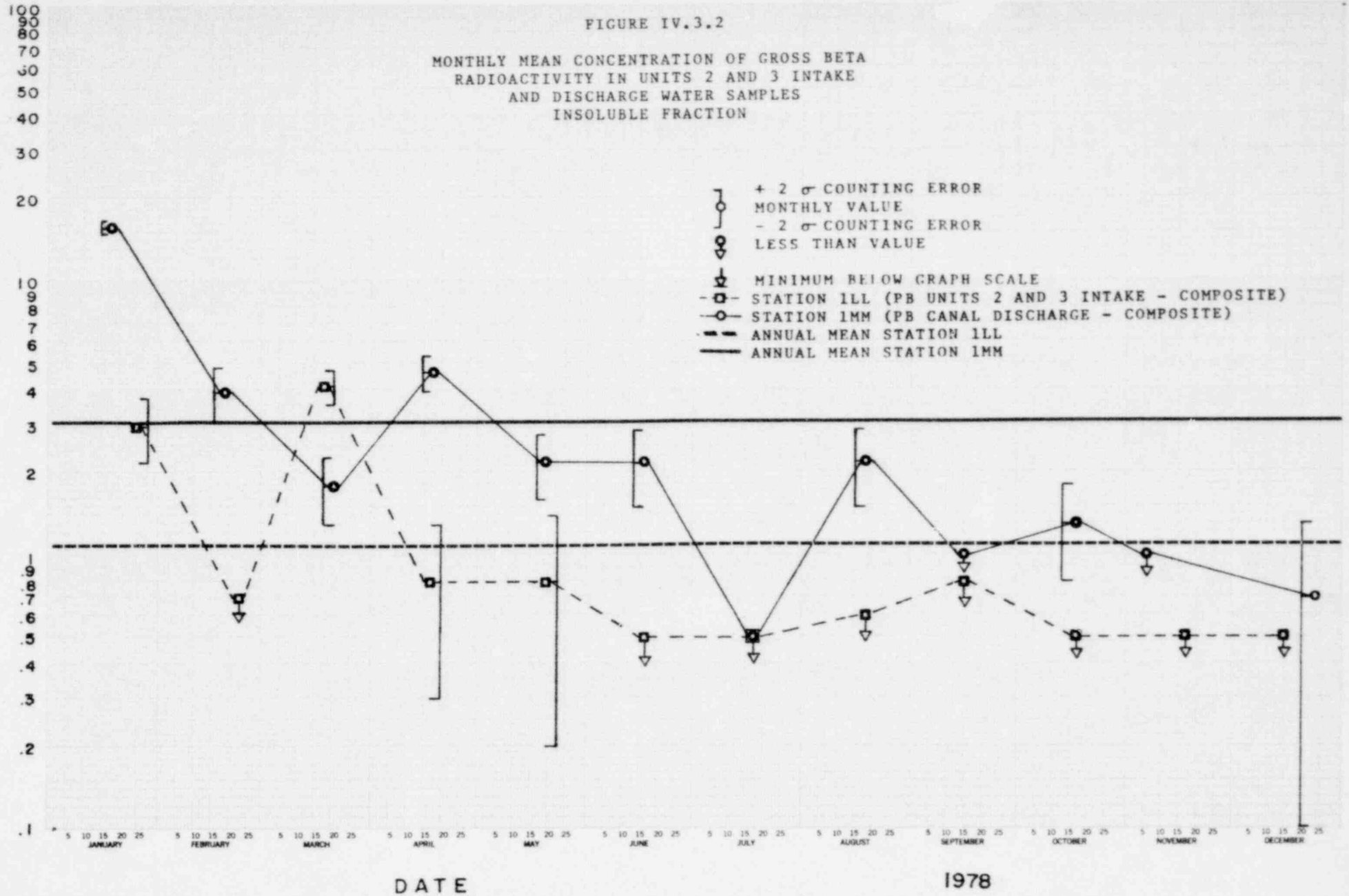


FIGURE IV.3.3

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

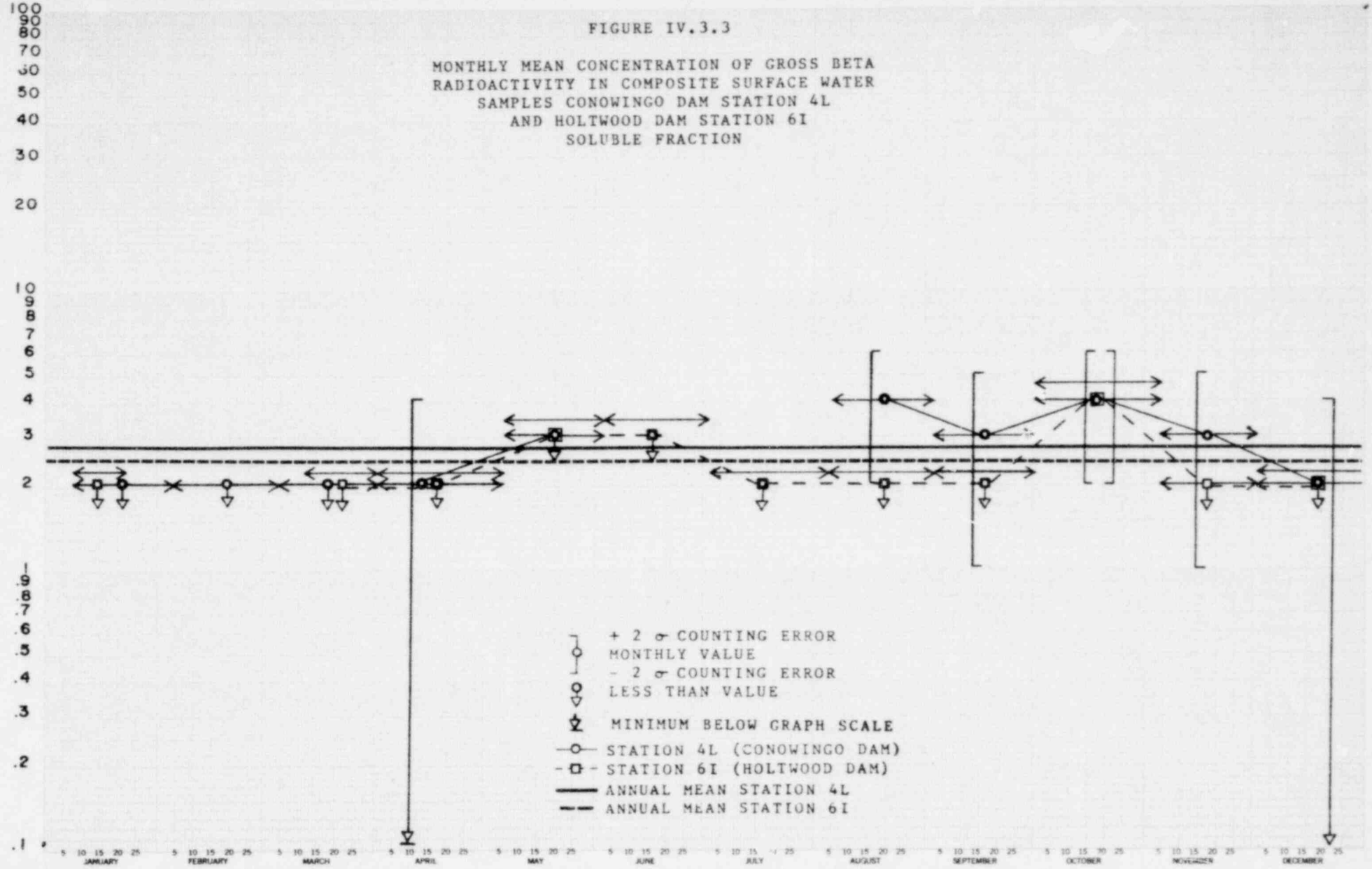


FIGURE IV.3.4

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

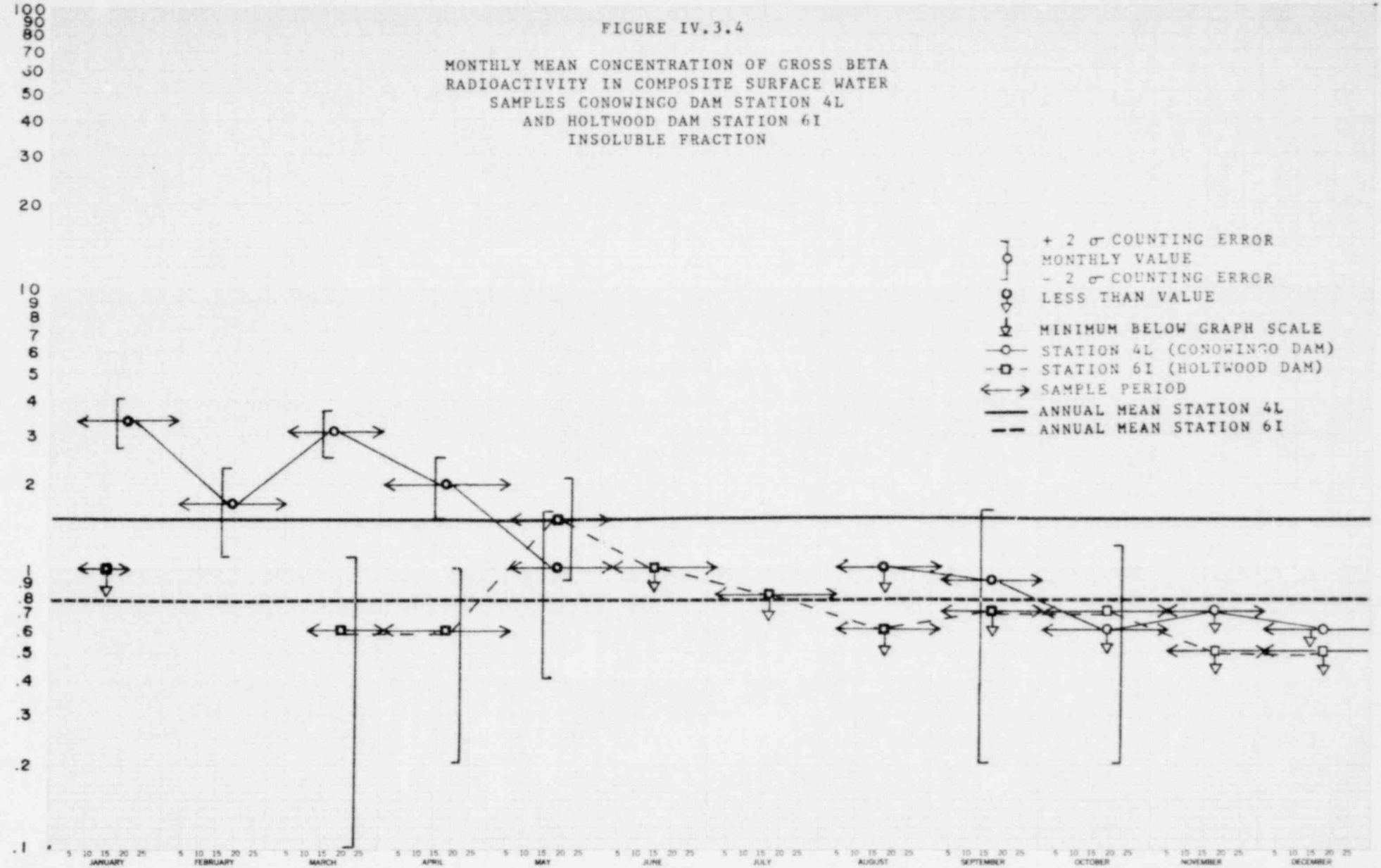


FIGURE IV.3.5

ANNUAL MEAN CONCENTRATION OF
GROSS BETA RADIOACTIVITY IN
SURFACE WATER SAMPLES
SOLUBLE FRACTION

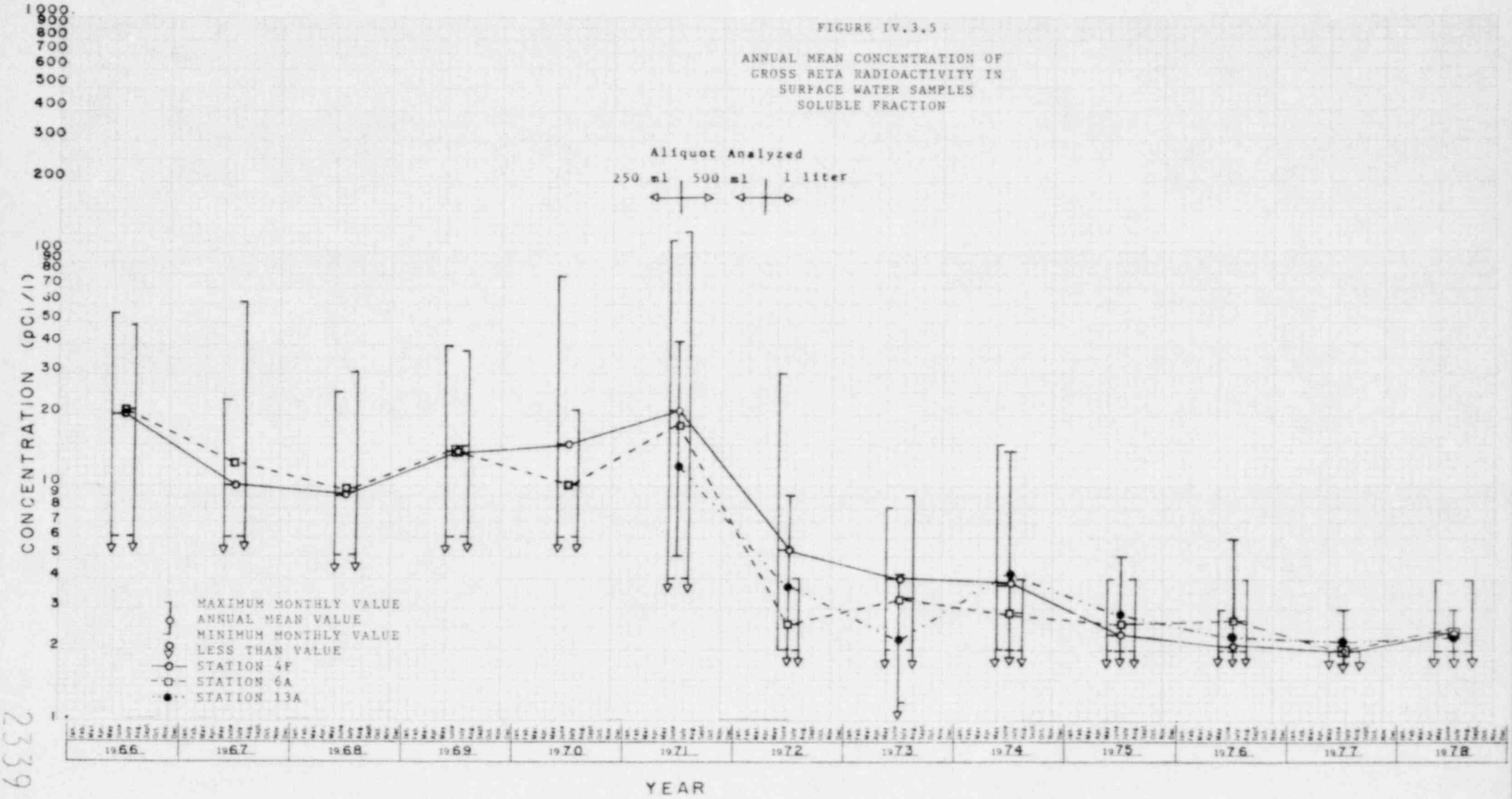


FIGURE IV.3.6

ANNUAL MEAN CONCENTRATION OF
GROSS BETA RADIOACTIVITY IN
SURFACE WATER SAMPLES
INSOLUBLE FRACTION

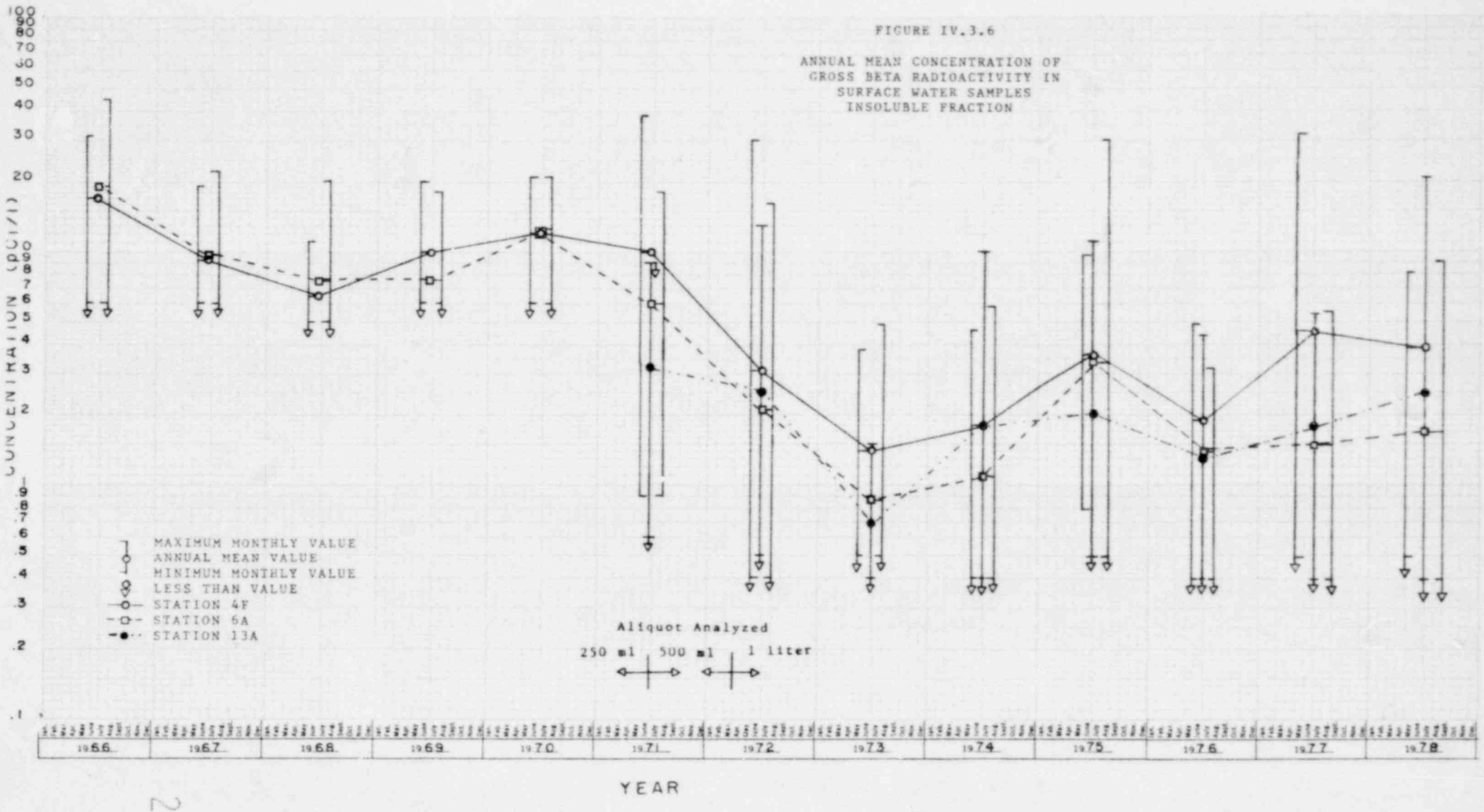


FIGURE IV.5.1

SEMI-ANNUAL MEAN SR-90 CONCENTRATION
IN SOIL SAMPLES

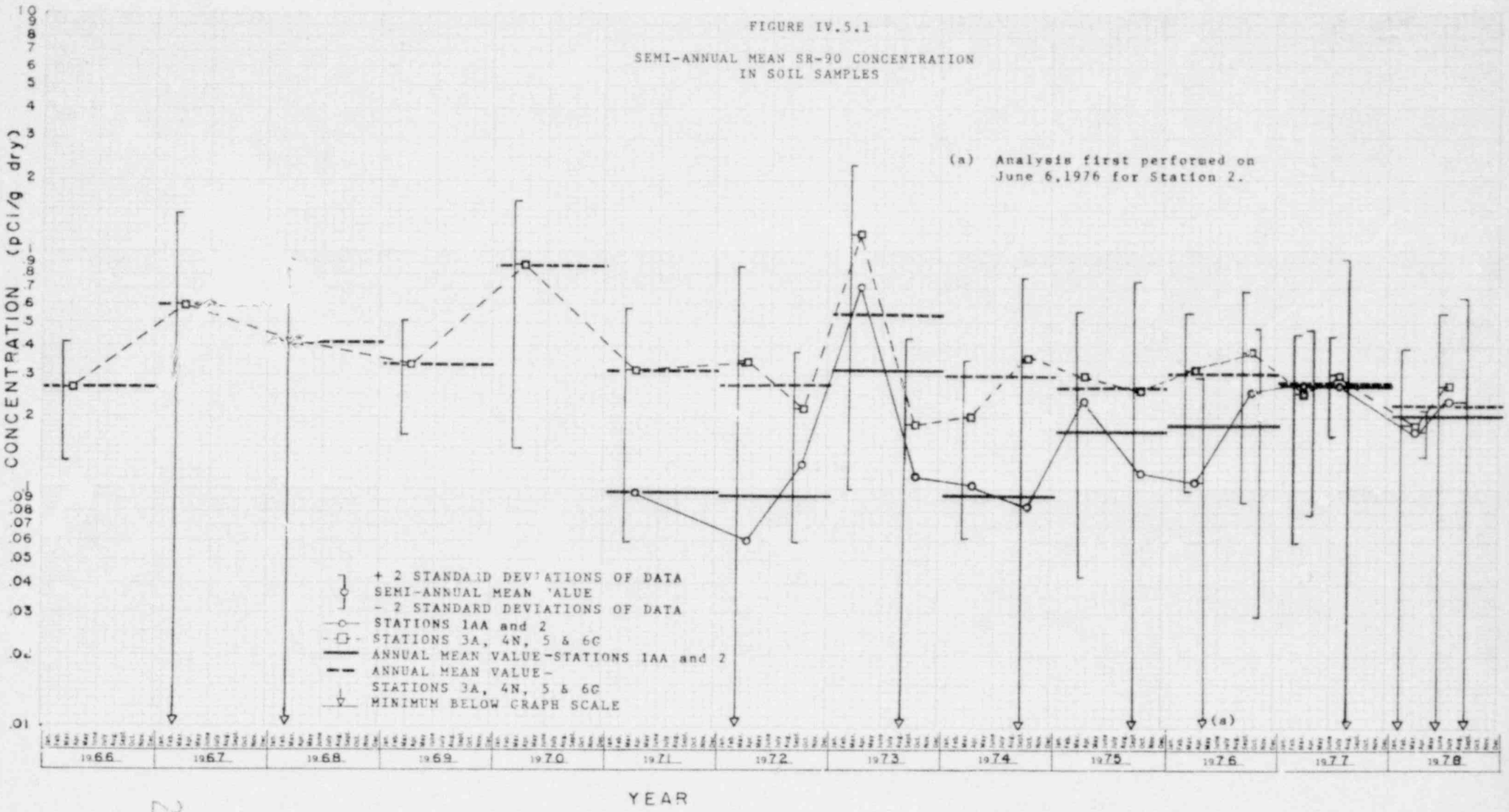


FIGURE IV.5.2

SEMI-ANNUAL MEAN SR-89 CONCENTRATION
IN SOIL SAMPLES

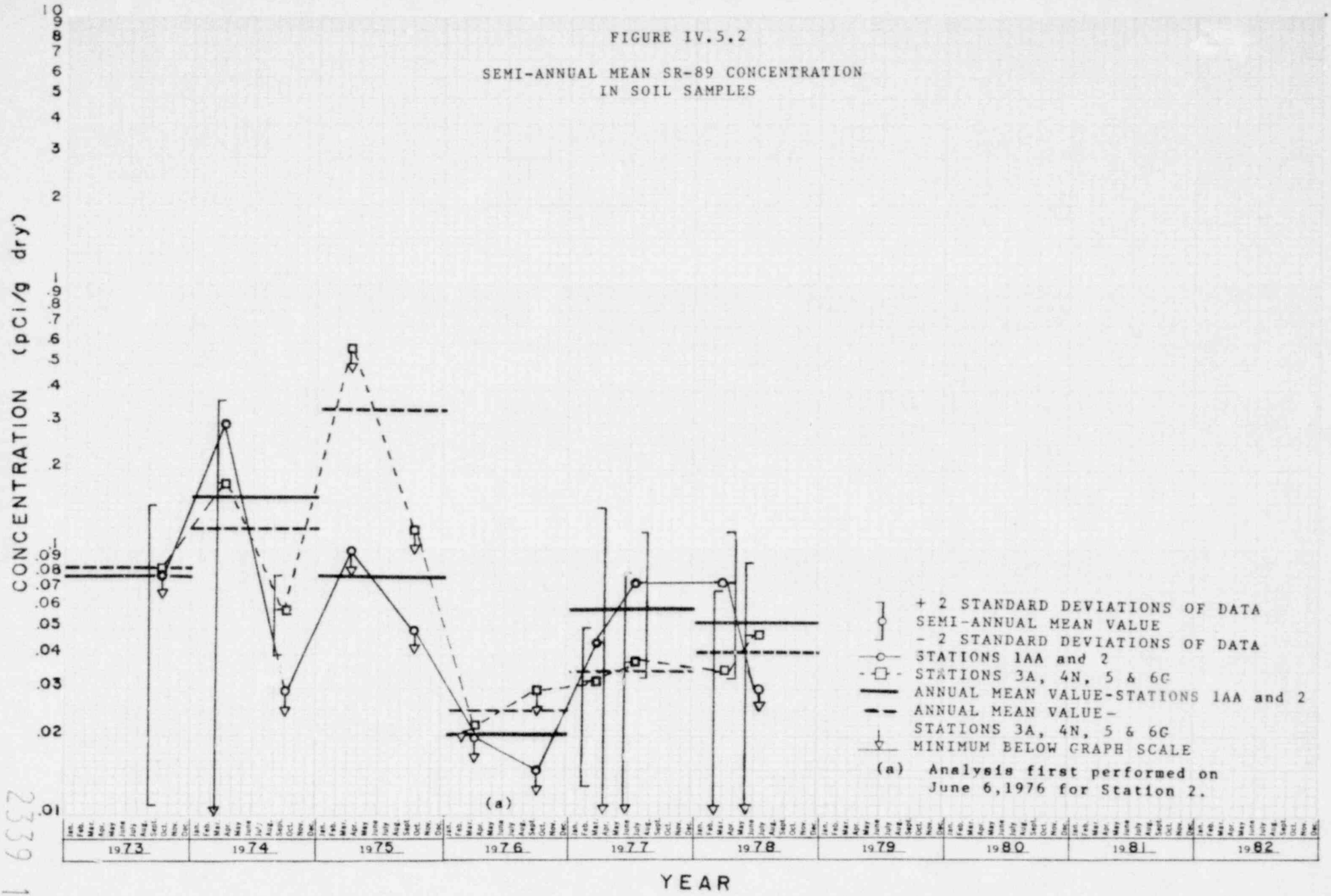
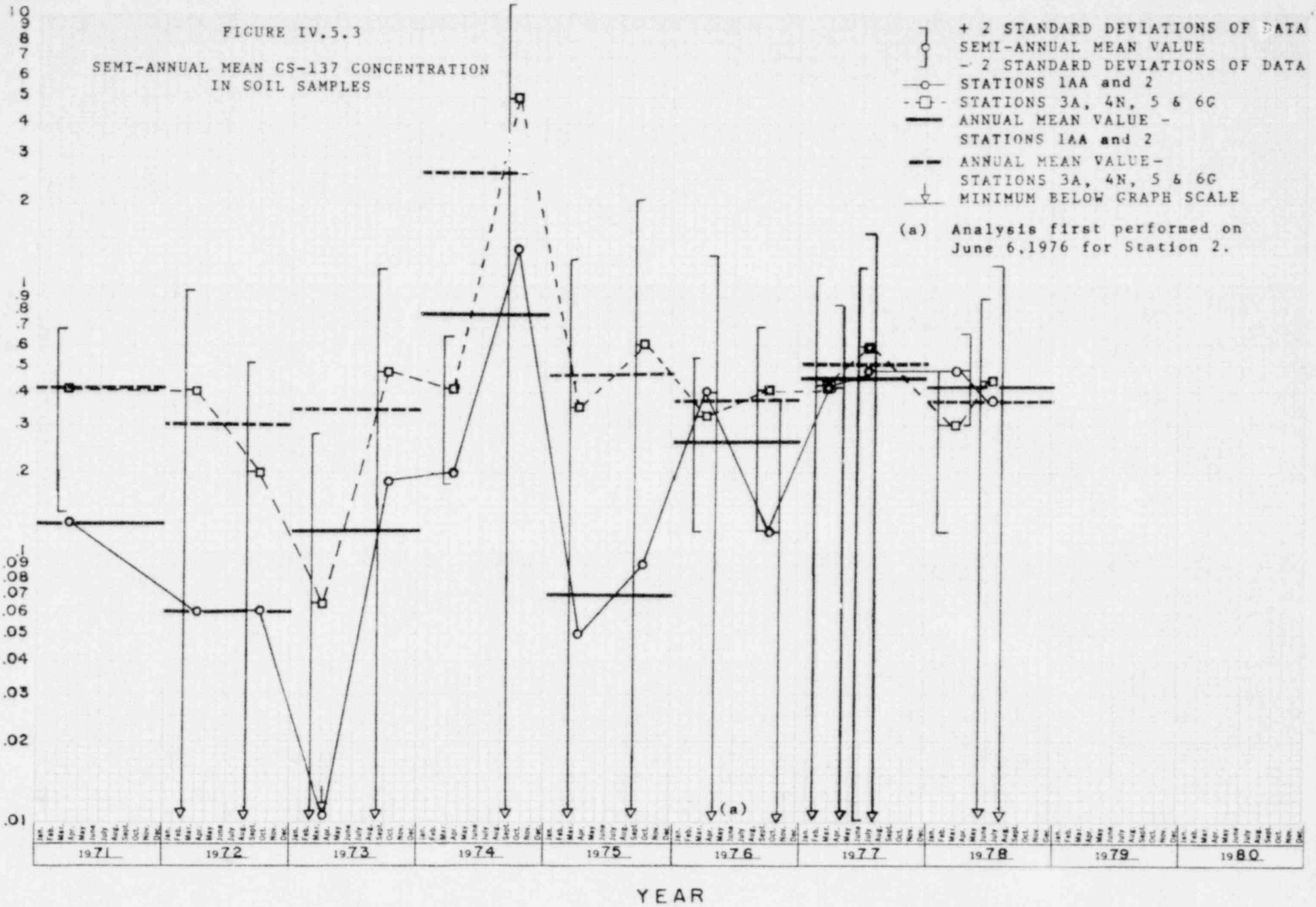


FIGURE IV.5.3

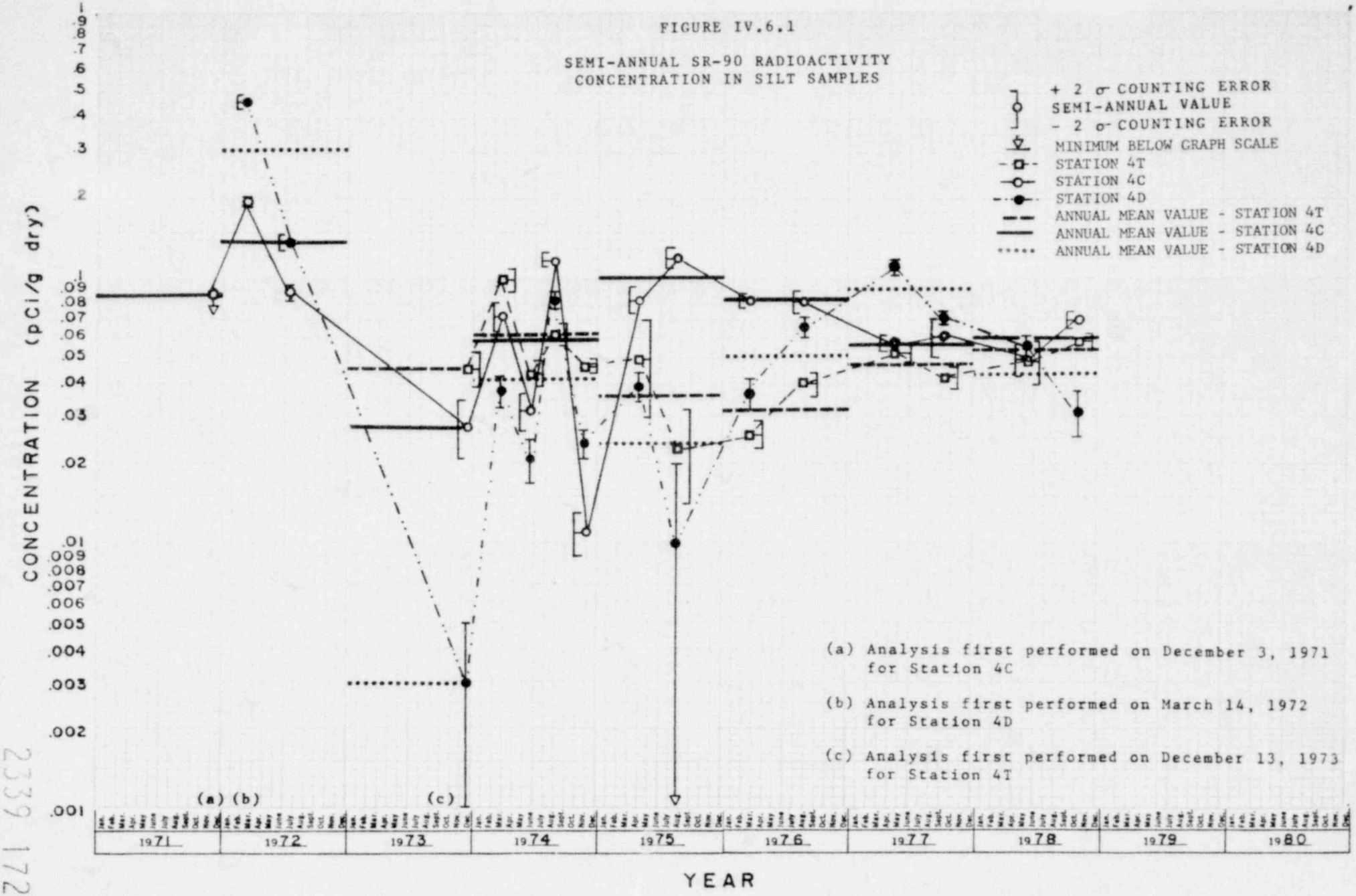
SEMI-ANNUAL MEAN CS-137 CONCENTRATION
IN SOIL SAMPLES



2239 171

FIGURE IV.6.1

SEMI-ANNUAL SR-90 RADIOACTIVITY
CONCENTRATION IN SILT SAMPLES



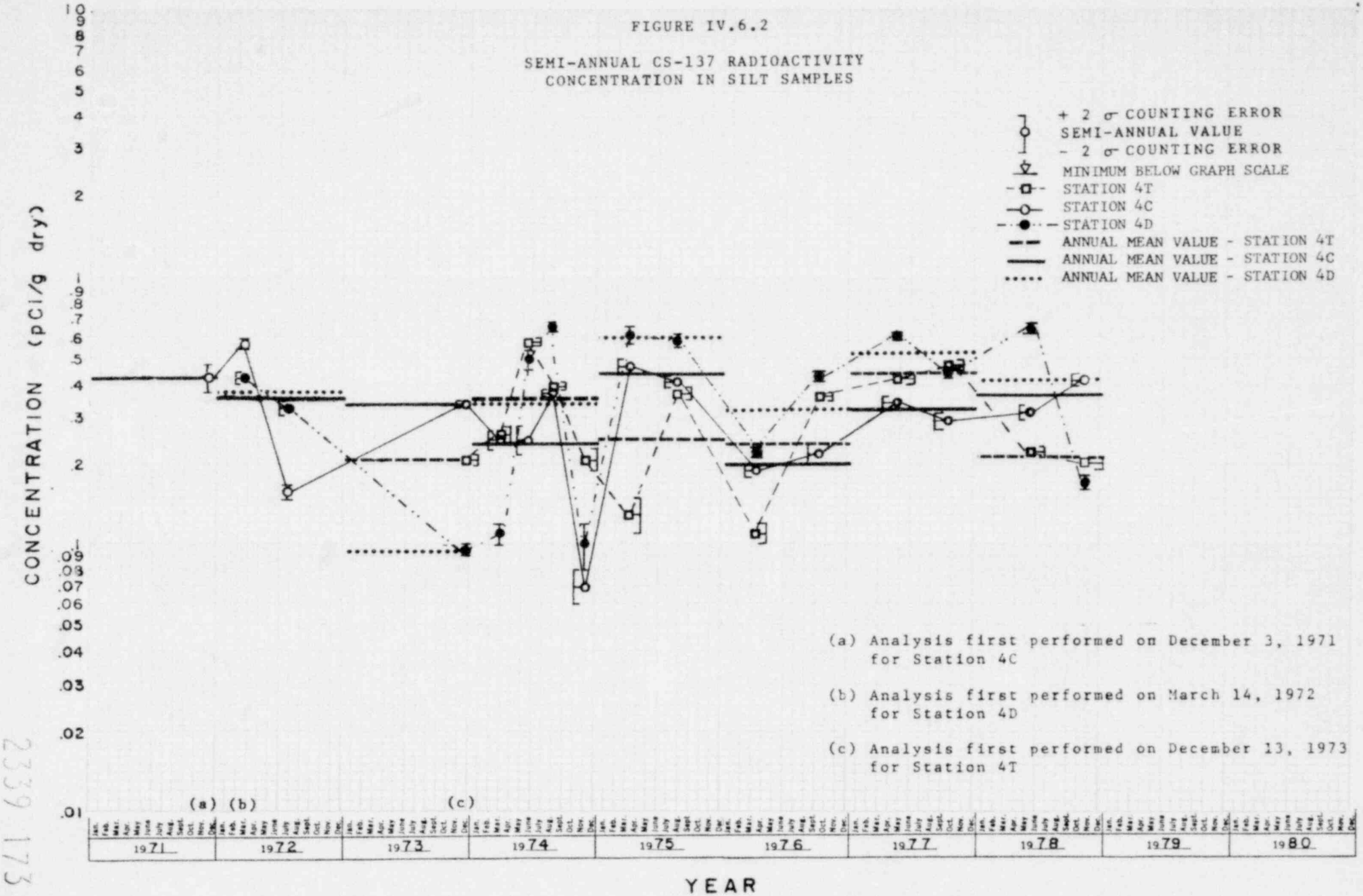
(a) Analysis first performed on December 3, 1971 for Station 4C

(b) Analysis first performed on March 14, 1972 for Station 4D

(c) Analysis first performed on December 13, 1973 for Station 4T

FIGURE IV.6.2

SEMI-ANNUAL CS-137 RADIOACTIVITY
CONCENTRATION IN SILT SAMPLES



(a) Analysis first performed on December 3, 1971 for Station 4C

(b) Analysis first performed on March 14, 1972 for Station 4D

(c) Analysis first performed on December 13, 1973 for Station 4T

FIGURE IV.6.3

SR-90 RADIOACTIVITY CONCENTRATION
IN SILT SAMPLES

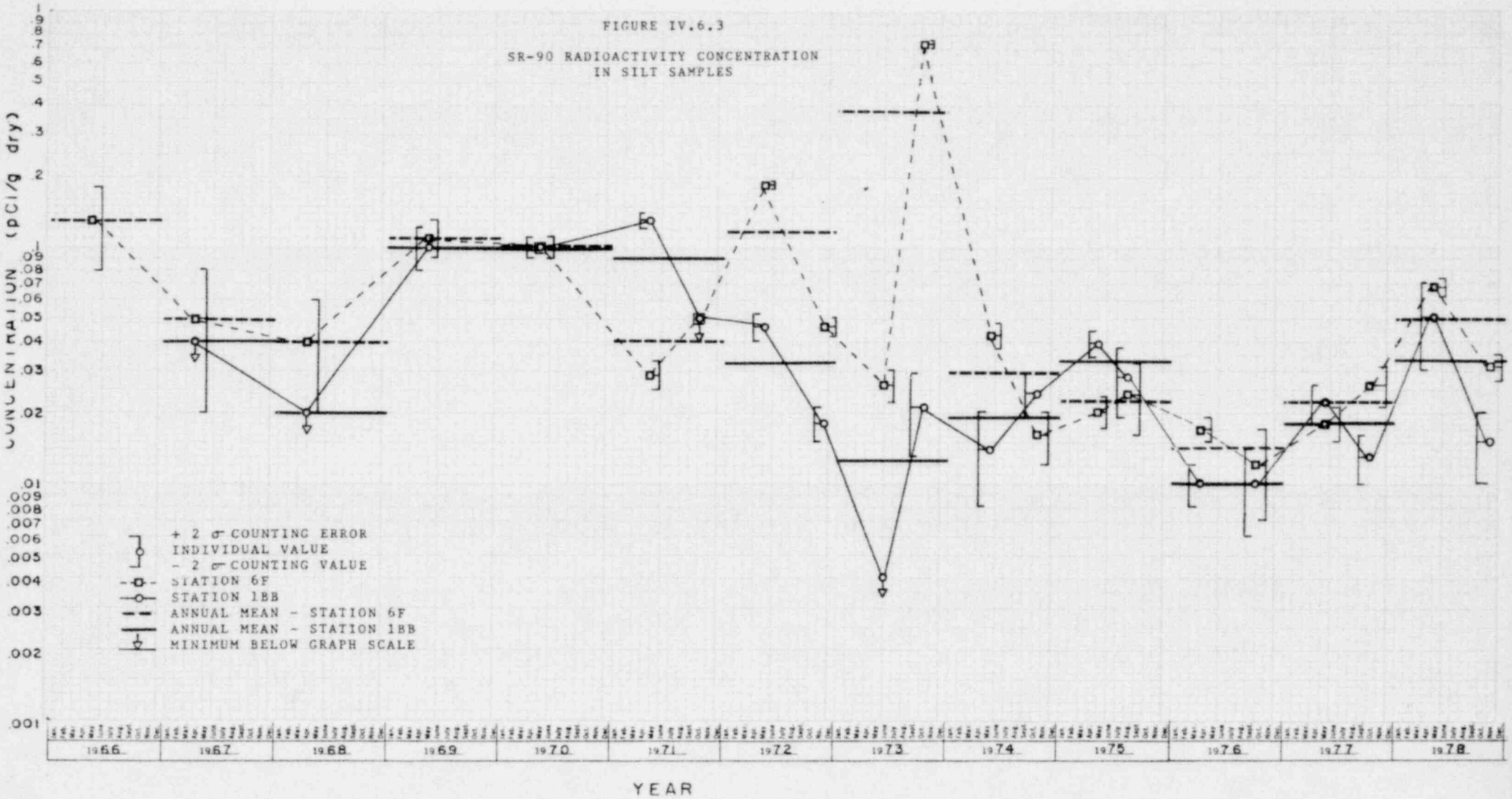


FIGURE IV.6.4

SEMI-ANNUAL CS-137 RADIOACTIVITY
CONCENTRATION IN SILT SAMPLES

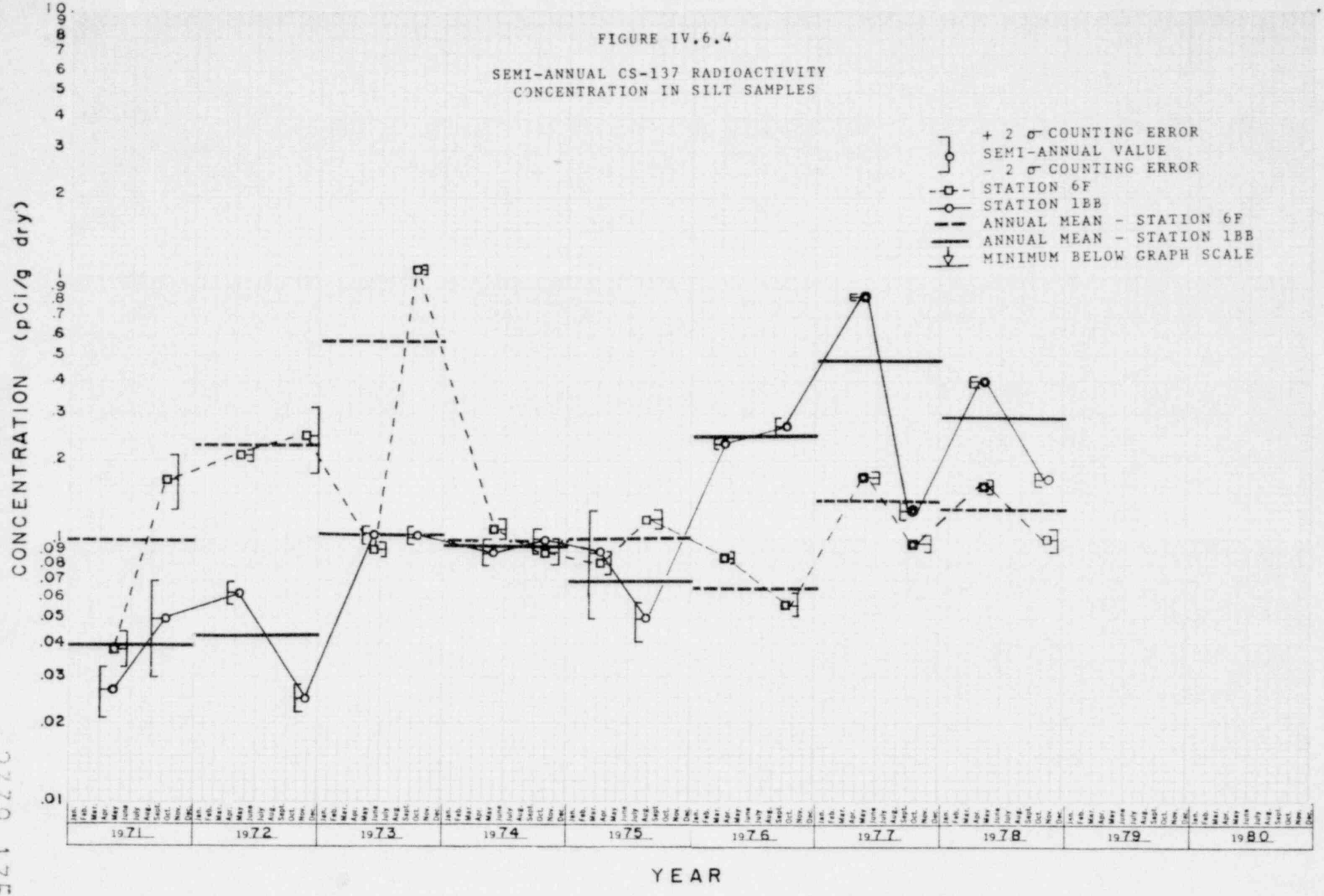


FIGURE IV.7.1

QUARTERLY MEAN CONCENTRATION OF
SR-90 RADIOACTIVITY IN FISH SAMPLES

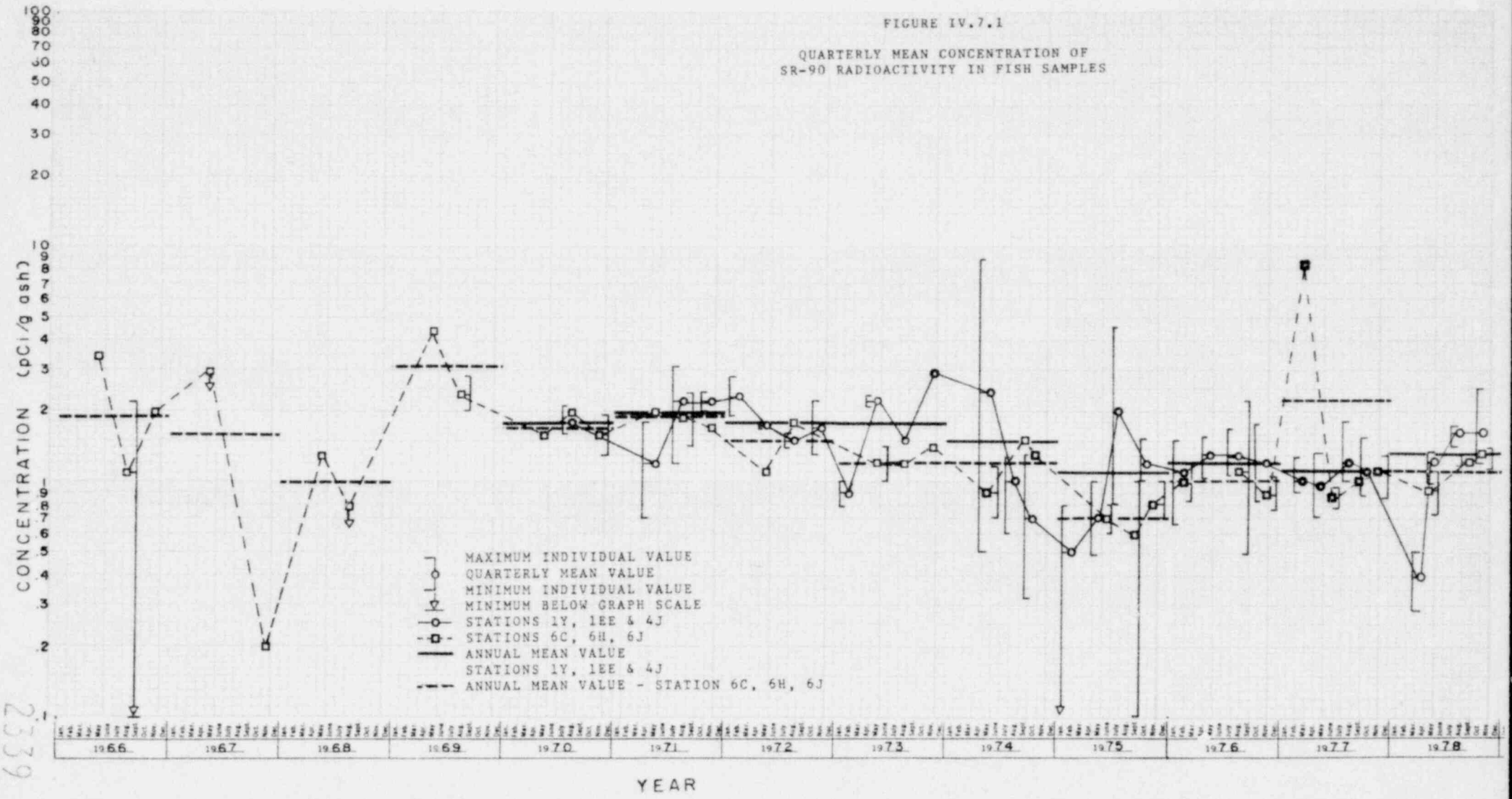


FIGURE IV.7.2

QUARTERLY MEAN CONCENTRATION OF
CS-137 RADIOACTIVITY IN FISH SAMPLES

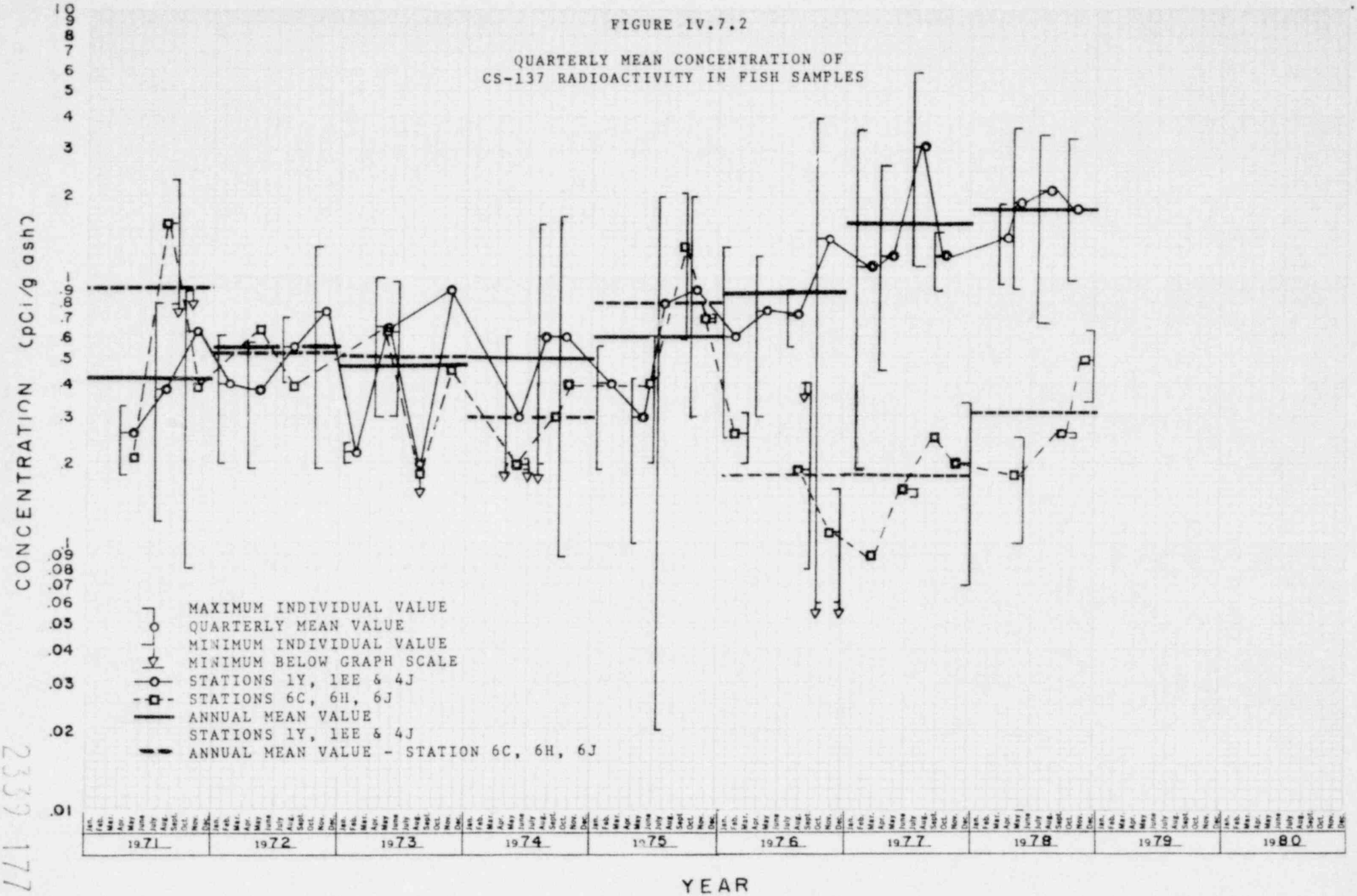


FIGURE IV.8.1

ANNUAL MEAN CONCENTRATION OF
SR-90 RADIOACTIVITY IN VEGETATION SAMPLES

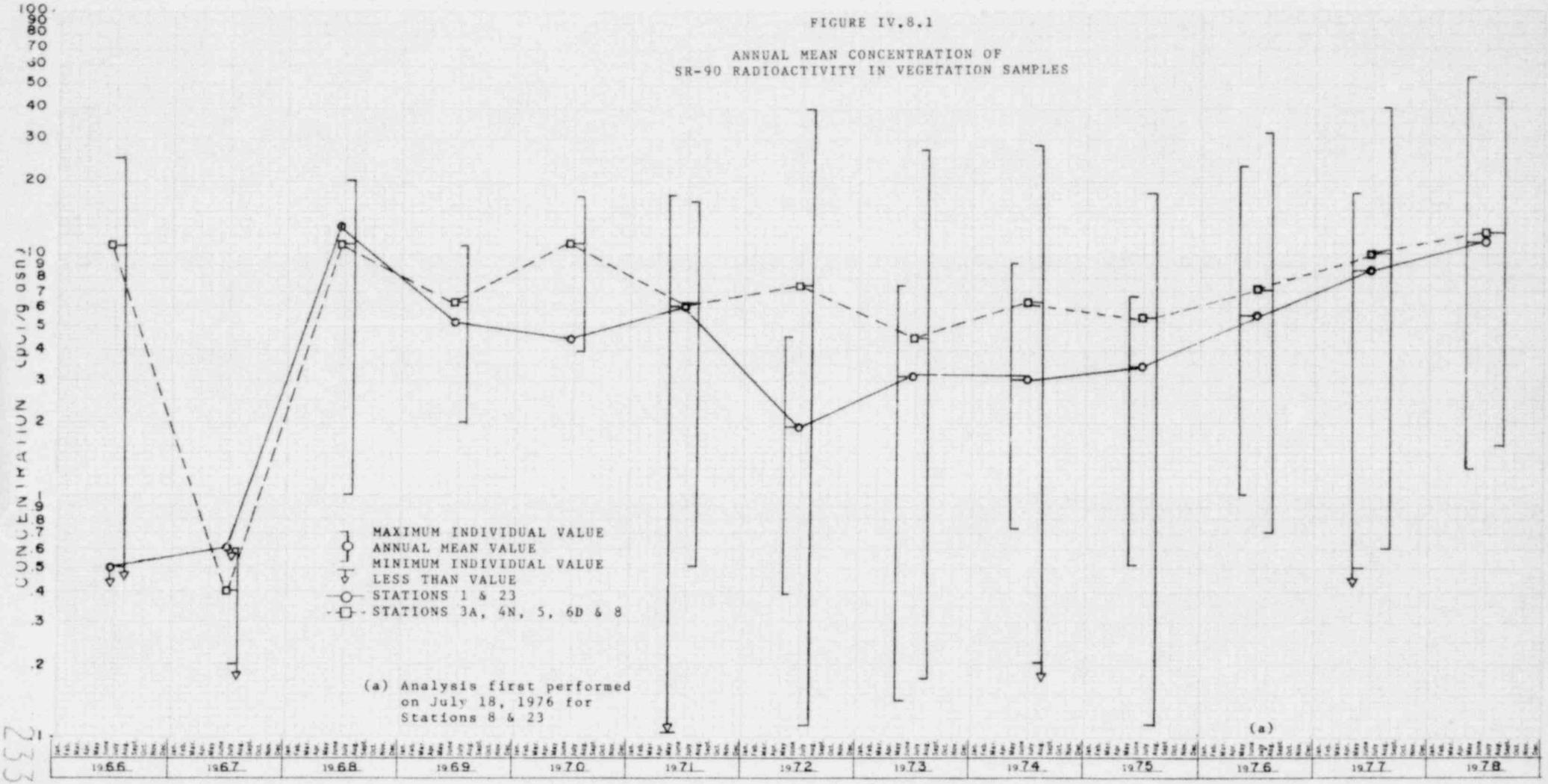


FIGURE IV.8.2

ANNUAL MEAN CONCENTRATION OF
CS-137 RADIOACTIVITY IN VEGETATION SAMPLES

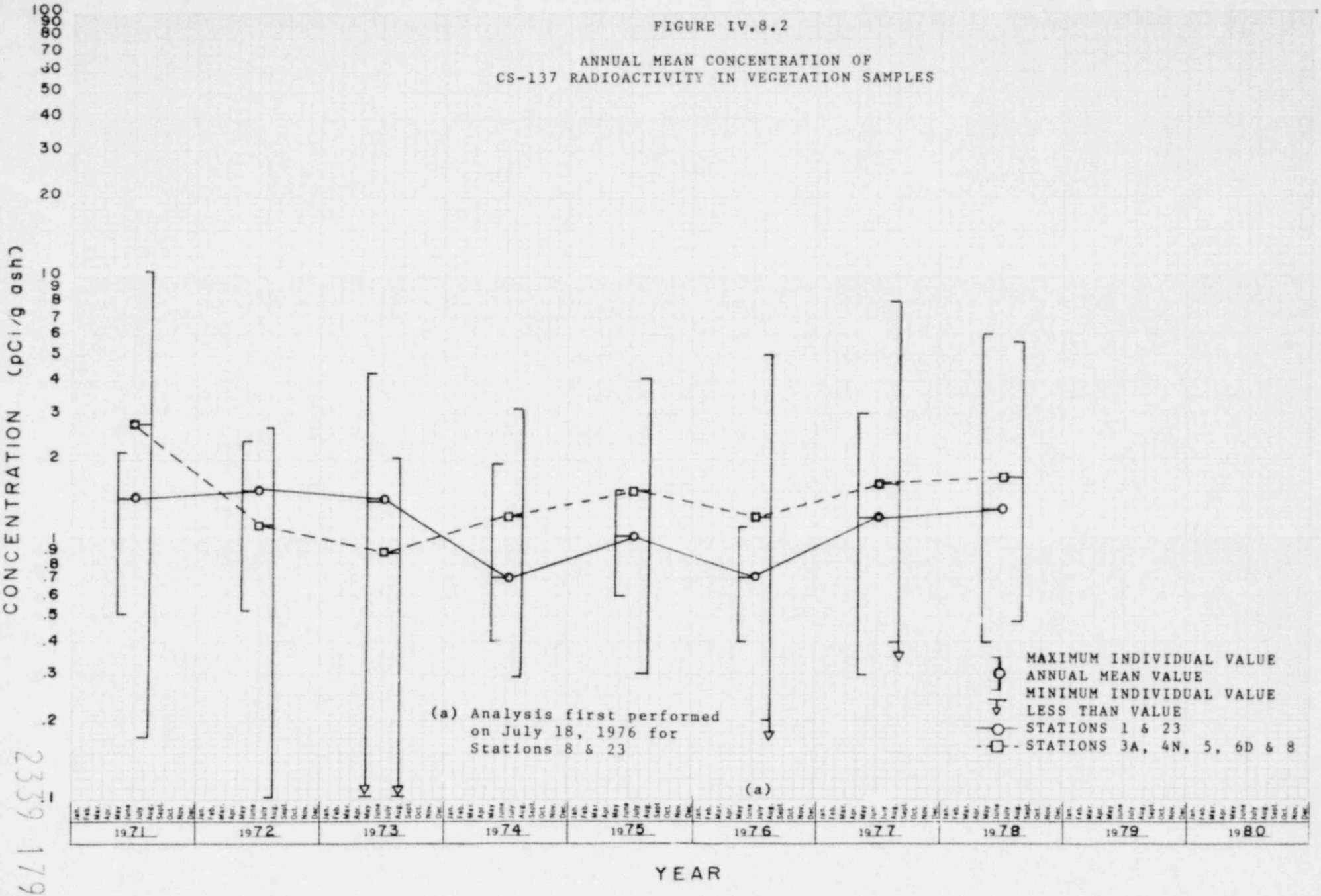


FIGURE IV.9.1

MEAN CONCENTRATION
OF SR-90 RADIOACTIVITY
IN MILK SAMPLES

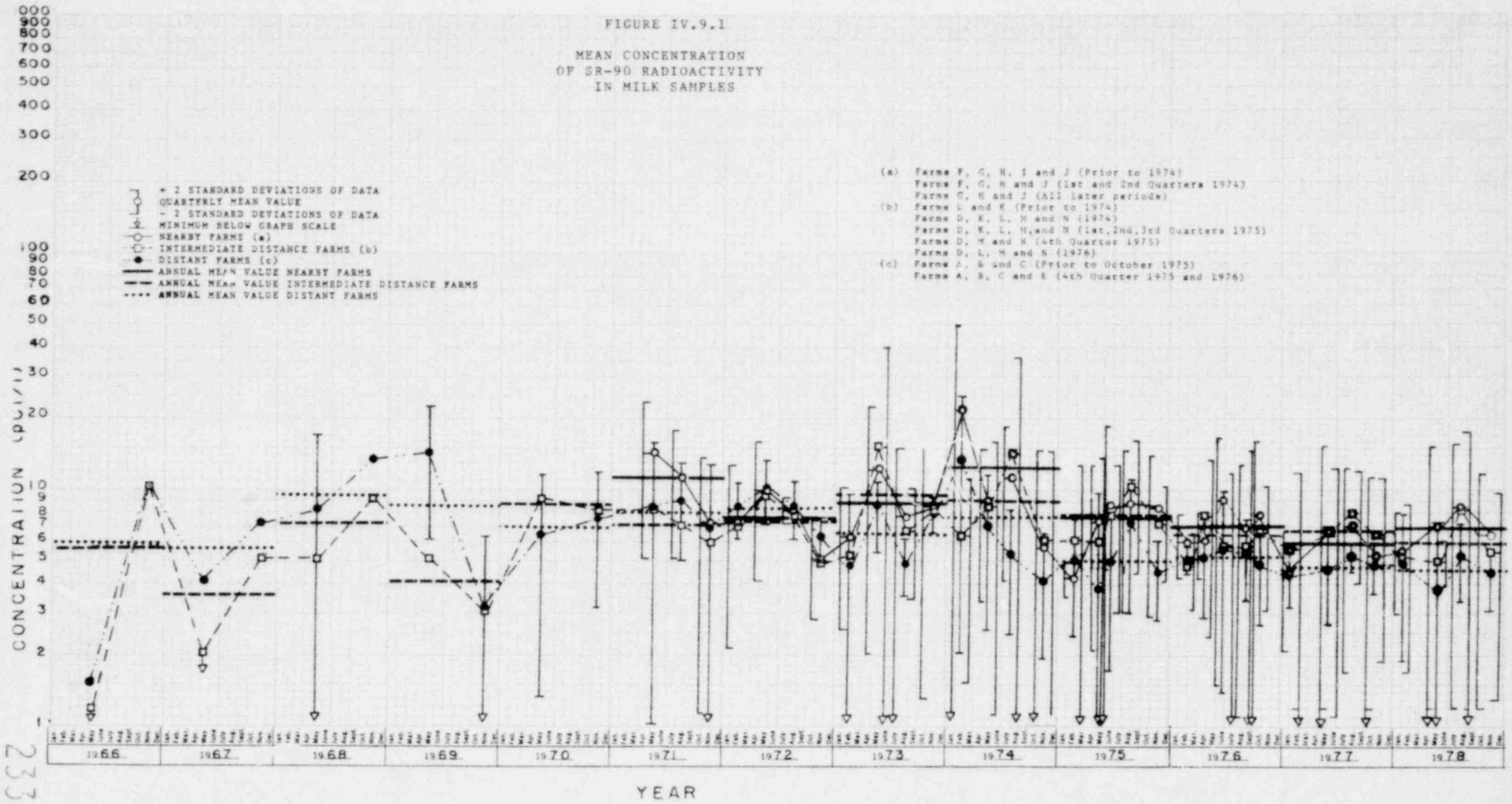
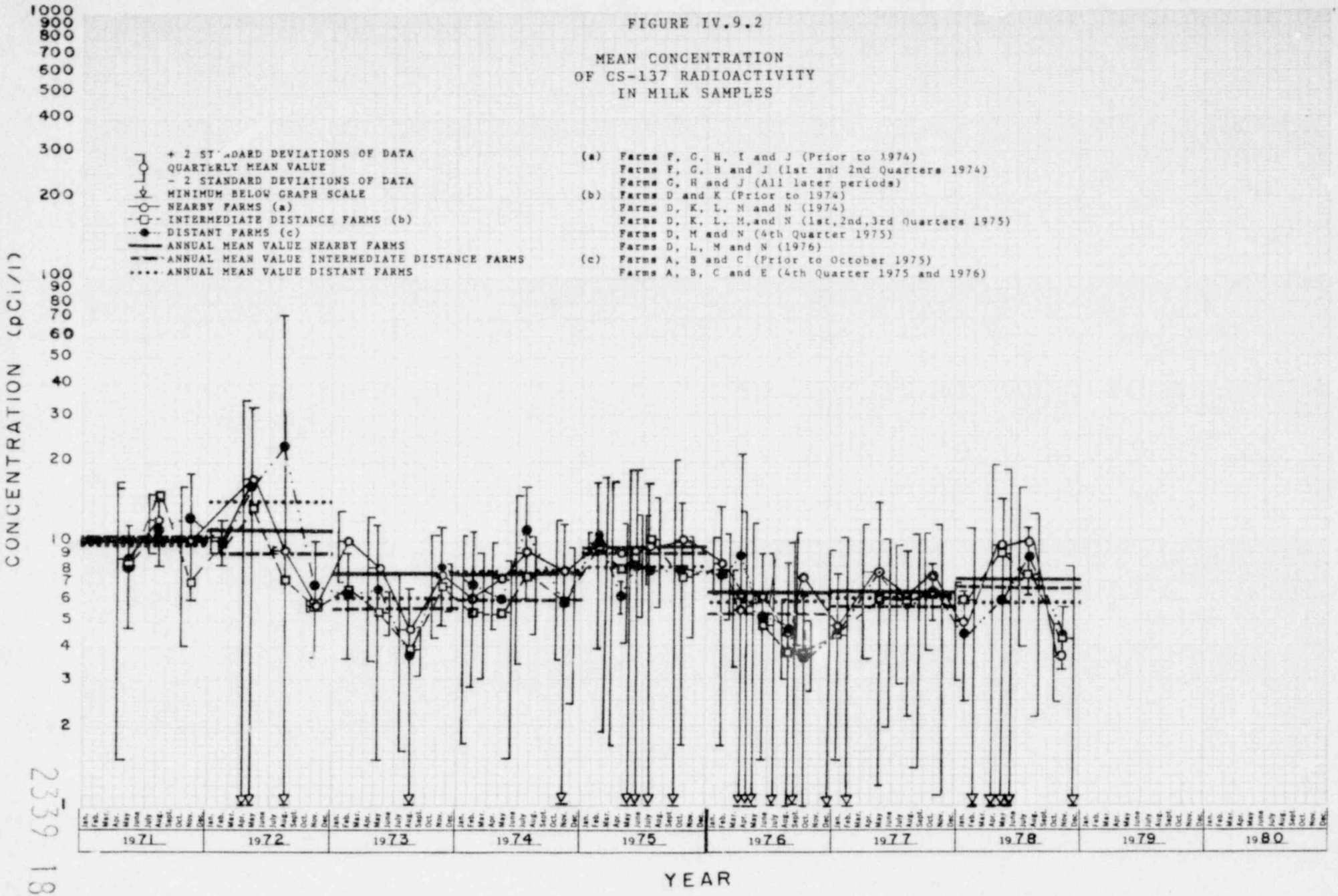


FIGURE IV.9.2

MEAN CONCENTRATION
OF CS-137 RADIOACTIVITY
IN MILK SAMPLES



2339 181

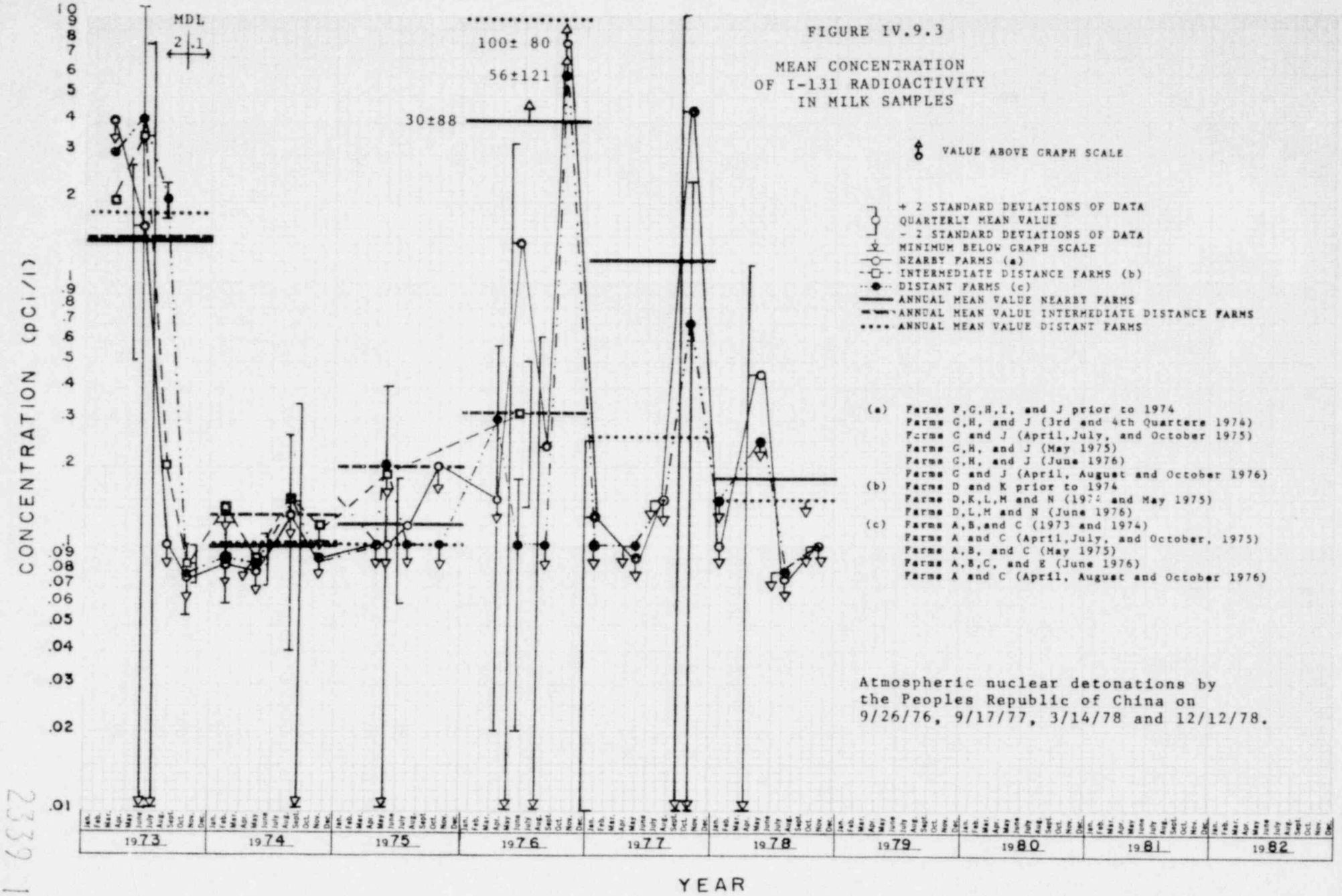


FIGURE IV.9.3

MEAN CONCENTRATION OF I-131 RADIOACTIVITY IN MILK SAMPLES

FIGURE IV.10.1

SEMI-ANNUAL MEAN CONCENTRATION
OF NET BETA RADIOACTIVITY
IN RABBIT MUSCLE SAMPLES

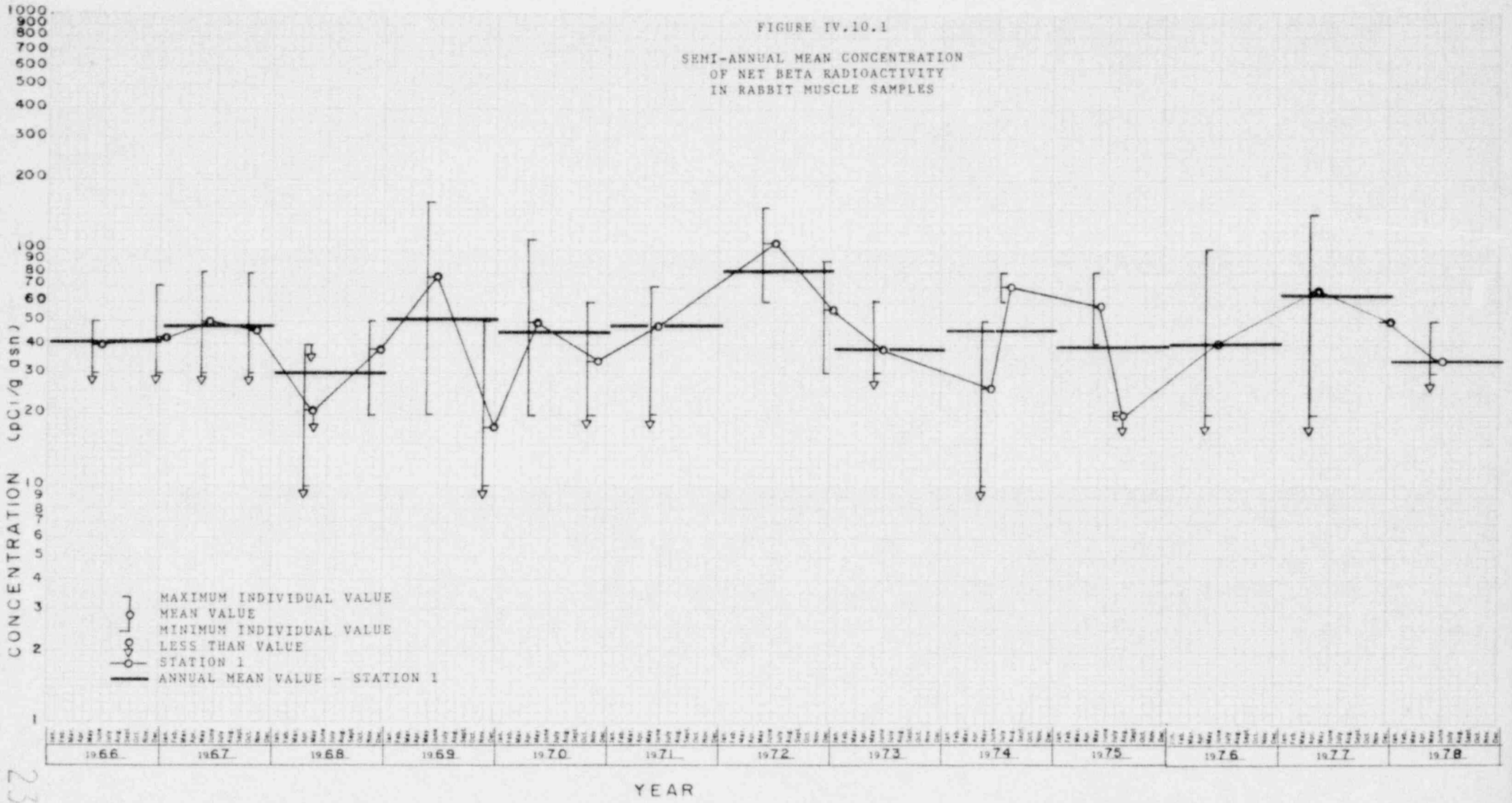


FIGURE IV.10.2

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