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March 3, 2000

Docket Nos. 50-321
50-366

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

Edwin I. Hatch Nuclear Plant
Assessment of Results of Augmented Radiological
Environmental Monitoring Program for the Years 1995 Through 1999

Gentlemen:

A letter from Georgia Power Company (GPC) to the NRC dated January 7, 1987, provided a description of an augmented Radiological Environmental Monitoring Program (REMP) that was initiated on December 15, 1986 following the release of radioactive water from the spent fuel storage pools at Plant Hatch to an onsite swamp on December 3 and 4, 1986. By letters dated March 31, 1988, April 3, 1989, March 31, 1992, and March 28, 1995, GPC provided the results of the augmented REMP and appropriate program modifications as a consequence of such assessments for the periods of: December 15, 1986 through 1987; 1988; 1989 through 1991; and 1992 through 1994, respectively.

Enclosed herein is an assessment of the program results for the years 1995 through 1999. The assessment indicates that radioactivity levels in the swamp continue to decrease. Consequently, the program is modified so that samples will be collected biannually rather than annually and the assessment period will be extended to 8 years. The next status report will be submitted by April 1, 2008.

Please contact this office should you have any questions.

Sincerely,

A handwritten signature in cursive script that reads "Lewis Sumner".

H. L. Sumner, Jr.

HLS, Jr./RGK
ENV-00-046

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Monitoring Program for the Years 1995 through 1999

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cc: Southern Nuclear Operating Company
Mr. P. H. Wells, Nuclear Plant General Manager - Plant Hatch
NORMS

U. S. Nuclear Regulatory Commission, Washington, D. C.
Mr. L. N. Olshan, Project Manager - Plant Hatch

U. S. Nuclear Regulatory Commission, Region II
Mr. L. A. Reyes, Regional Administrator
Mr. J. T. Munday, Senior Resident Inspector - Plant Hatch

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bc: ES File H.03.17

Enclosure

Assessment of Results of Augmented Radiological Environmental Monitoring Program for the Years 1995 Through 1999

On December 3 and 4, 1986, an event occurred at the Hatch Nuclear Plant (HNP) in which radioactive water from the Spent Fuel Storage Pools (SFSP) was released into the onsite swamp east of the cooling towers. As a result of this event, Georgia Power Company (GPC) initiated an augmented radiological environmental monitoring program concerning the swamp on December 15, 1986. This program, as described in a letter to the NRC dated January 7, 1987, calls for a periodic assessment of the program's results and any appropriate modifications to the program (including termination) as a consequence of the assessment.

Past assessments of the results of this program were reported to the NRC by letter as given below.

<u>Period</u>	<u>Date of Letter</u>
12/15/86 through 1987	03/31/88
1988	04/03/89
1989-1991	03/31/92
1992-1994	03/28/95

This report provides the program's results for the years 1995 through 1999, an assessment of such results and program modifications as a consequence thereof.

The program's current commitment calls for the annual collection of muck samples at Locations A, PL-2, PL-3, MBC and a background location for gamma isotopic analysis. All of the sampling locations except for the background location are shown in Figure 1. The annual collections were made on October 2, 1995, October 7, 1996, September 8, 1997, September 14, 1998, and September 13, 1999. Three samples were collected at location A and two at each of the other locations. The muck samples are so called because generally they are composed of substantial quantities of root and other organic material, as well as mud and sediment. Usually, each of the sampling locations lay underwater for a few weeks or so each year due to flood conditions. All of the laboratory analyses were performed at Georgia Power Company's (GPC) Environmental Laboratory (EL) in Smyrna, Georgia.

Location A is situated in the swamp pond adjacent to the point where the water from the SFSP entered the swamp. Locations PL-2 and PL-3 lie along the plant's eastern property line. Location PL-2 lies on the left bank Bay Creek. Bay Creek provides a drain for the swamp; the mouth of Bay Creek is about three-quarters of a mile east of the plant's eastern property line. Location MBC lies along the right bank of Bay Creek adjacent to its entry into the Altamaha River. The background location, like the swamp, lies in the

floodplain of the Altamaha River but is positioned about 0.8 miles upstream of the plant's discharge and on the opposite side of the river.

The activities of the manmade radionuclides detected in each of the samples collected at these select locations during the 1995-1999 period are provided in Table 1. The average activities at these locations for each year from 1987 through 1999 are provided in Table 2. Plots of the annual averages of the activities for Co-60, Cs-134 and Cs-137 are presented in Figure 2, Figure 3 and Figure 4, respectively. No other manmade radionuclides have been detected in samples from the onsite swamp since 1989.

From an examination of the results presented in the tables, the following observations are made.

As might be expected, the activities found in the samples collected at Location A continue to dominate those collected elsewhere both in number of radionuclides detected and in the levels of their activities. The tabulations and plots provided by Table 2 and Figure 2 show a generally steady (if not smooth) reduction in the activity levels at Location A over increments of a few years as a consequence of decay and weathering. However, due to the migration of radioactive material through the swamp, the activity levels deep in the swamp (Locations PL-2, PL-3 and MBC) might be characterized as mixed or even slightly increasing at times.

The variability in the activity levels found in the samples which were collected on the same dates at approximately the same locations (that is, within several feet of each other) as shown in Table 1 suggests a significant change in the density of the contamination over short distances. It also reflects the difficulty in obtaining replicate samples, especially at locations where there is a preponderance of root matter in the soil. Efforts were made in obtaining samples to an average depth of approximately one inch. The variability may also be attributed in part to a failure in obtaining each sample at the same depth.

Only radionuclides with half-lives greater than 2 years - namely Co-60, Cs-134, and Cs-137 - were found in the samples collected during this reporting period. The activity levels of Co-60, with a radiological half-life of 5.3 years, are a little less than twice the Minimum Detectable Concentration (MDC) at Location MBC and roughly an order of magnitude greater than the MDC at Location A. The EL has determined the MDC for Co-60 in soil to be 70 pCi/kg dry as this value may be routinely attained under normal conditions.

Except at Location A, Cs-134, with a half-life of 2.1 years, has not been detected since 1990. As shown in Table 1, it was found at only marginally detectable levels in six of the fifteen samples collected at Location A during this assessment period.

The swamp might be considered to have returned to a pristine condition when the radioactivity levels found in the samples are not significantly different from those found at the background location. On a practical basis, this means that Cs-137, which has a

half-life of 30.2 years, would be the only manmade radionuclide found in the samples, and its activity level would be on the order of several hundred pCi/kg dry. Except at Location A, the Cs-137 levels found during this sampling period at the swamp locations were on the order of that found at the background location.

Since reductions in the activity levels are anticipated to continue in the same fashion, collection of samples on a less frequent basis and a longer assessment period are warranted. Henceforth, the program is modified to collect samples biannually rather than annually, and to extend the assessment period from five to eight years. As a minimum, muck samples will be collected biannually at Locations A, PL-2, PL-3, MBC and at a background location for gamma isotopic analysis. By April 1, 2008, the NRC is to be informed by a written report of the assessment of the program results for the years 2000 through 2007 and of any suitable modifications to the program as a consequence thereof.

Table 1

**Activity of Manmade Radionuclides Found in Each Muck Sample Collected at Select Locations
1995 through 1999 (pCi/kg dry)**

Location/Nuclide	1995			1996			1997			1998			1999		
Background															
Cs-137	288	315		174	170		183	156		185	171		174	182	
A															
Co-60	458	437	752	499	602	610	1530	569	652	344	321	302	407	472	485
Cs-134	88.1	63.9	86	0	0	82.5	0	0	0	0	0	0	69.8	57.8	0
Cs-137	2460	1860	2610	2360	3080	2860	1070	1810	1950	1670	1470	1600	5090	5970	6630
PL-2															
Cs-137	299	337		91.2	94.2		192	229		425	363		245	215	
PL-3															
Cs-137	483	531		0	0		0	0		0	0		0	53.8	
MBC															
Co-60	43	0		0	0		144	118		110	0		111	111	
Cs-134	0	0		0	0		0	0		0	0		0	0	
Cs-137	254	266		295	285		167	216		232	0		230	211	

Note: Periods for which no detectable measurements were observed are listed in the table as zero.

Table 2

**Average Activity of Manmade Radionuclides Found in Muck Samples Collected at Select Locations
1987 through 1999 (pCi/kg dry)**

Location/Nuclide	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Background													
Cs-137	342	369	708	280	418	428	335	452	302	172	170	178	178
Eu-154	0	0	0	0	0	72	0	0	0	0	0	0	0
A													
Mn-54	1684	183	513	0	0	0	0	0	0	0	0	0	0
Fe-59	430	0	0	0	0	0	0	0	0	0	0	0	0
Co-58	270	0	0	0	0	0	0	0	0	0	0	0	0
Co-60	6202	3628	4627	2567	1312	1733	961	835	549	570	917	322	455
Zn-65	3118	631	0	0	0	0	0	0	0	0	0	0	0
Sb-125	658	0	0	0	0	0	0	0	0	0	0	0	0
Cs-134	10892	3642	3153	1400	576	718	326	229	79	83	0	0	64
Cs-137	19813	10708	12790	7667	5010	9763	4073	3855	2310	2767	1610	1580	5897
PL-2													
Co-60	0	27	0	0	49	0	0	0	0	0	0	0	0
Cs-134	194	67	0	145	0	0	0	0	0	0	0	0	0
Cs-137	1457	927	558	1450	1205	916	582	650	318	93	211	394	230
PL-3													
Mn-54	24	0	0	0	0	0	0	0	0	0	0	0	0
Cs-134	340	91	84	0	0	0	0	0	0	0	0	0	0
Cs-137	1488	862	76	870	967	288	128	134	507	0	0	0	54
MBC													
Mn-54	47	0	0	0	0	0	0	0	0	0	0	0	0
Co-60	68	34	0	34	48	70	90	134	43	0	131	110	111
Zn-65	95	0	0	0	0	0	0	0	0	0	0	0	0
Cs-134	331	224	0	0	0	0	0	0	0	0	0	0	0
Cs-137	807	556	419	280	298	304	377	266	260	290	193	232	221

Note: Periods for which no detectable measurements were observed are listed in the table as zero.

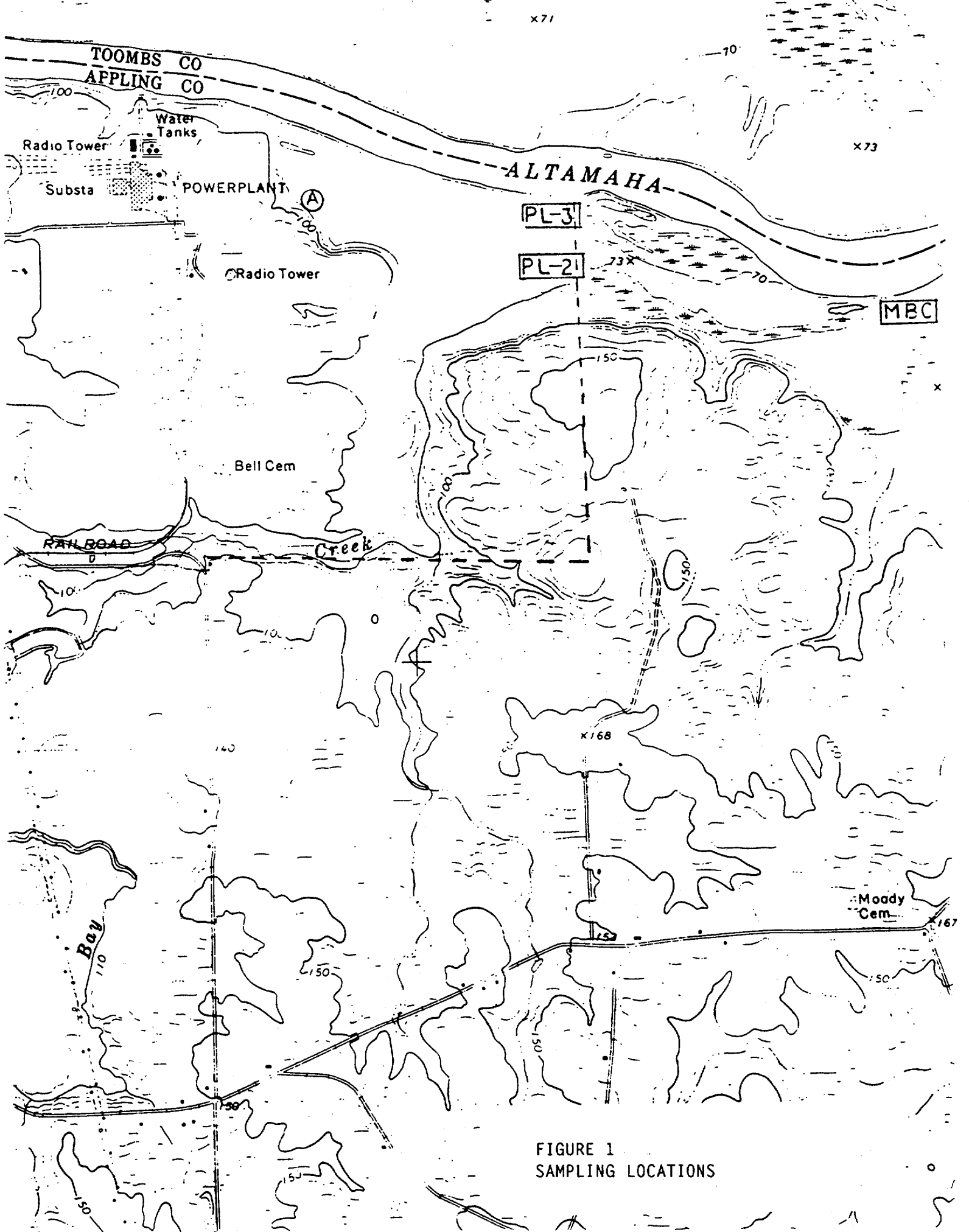
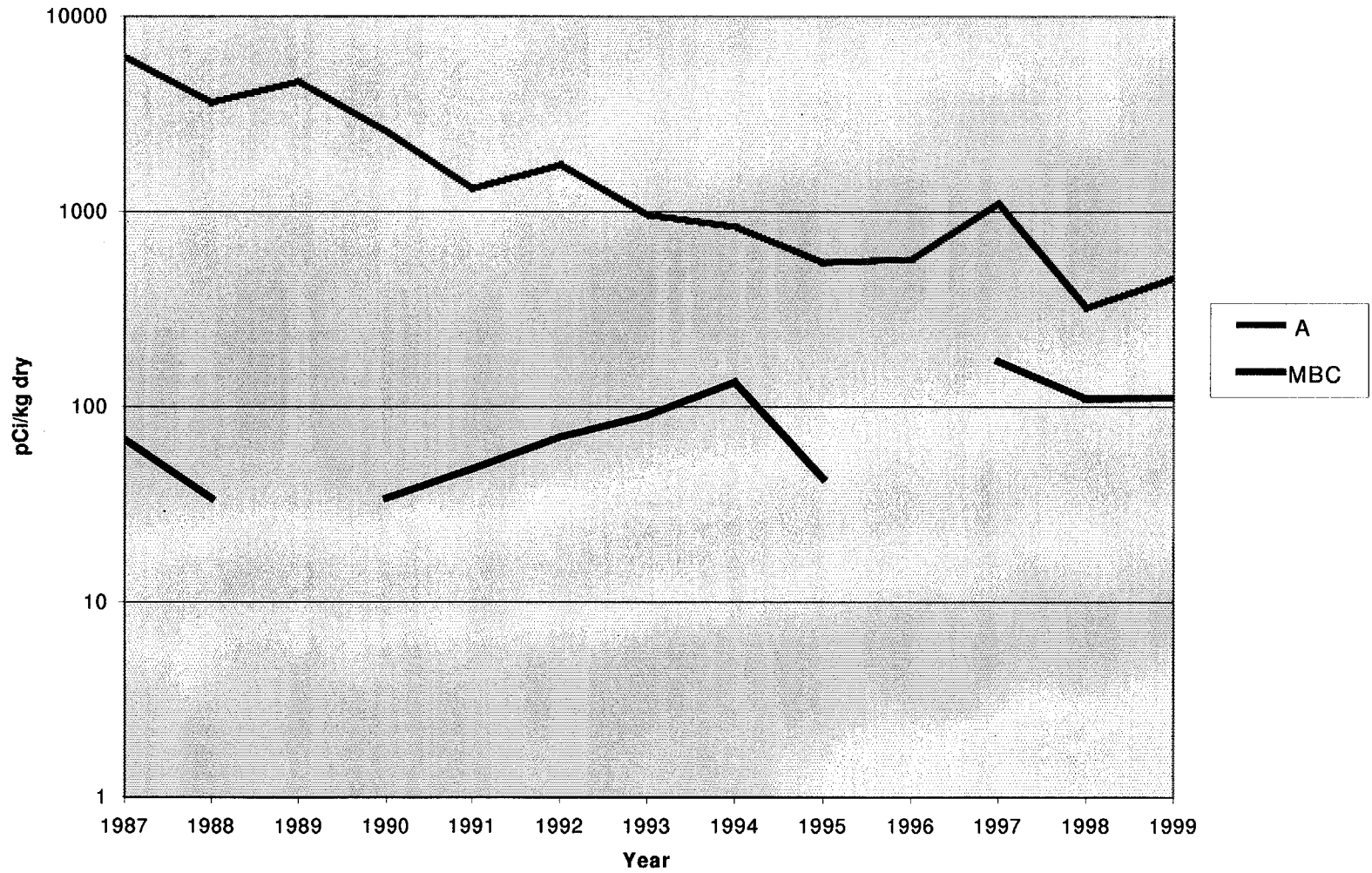


FIGURE 1
SAMPLING LOCATIONS

Figure 2

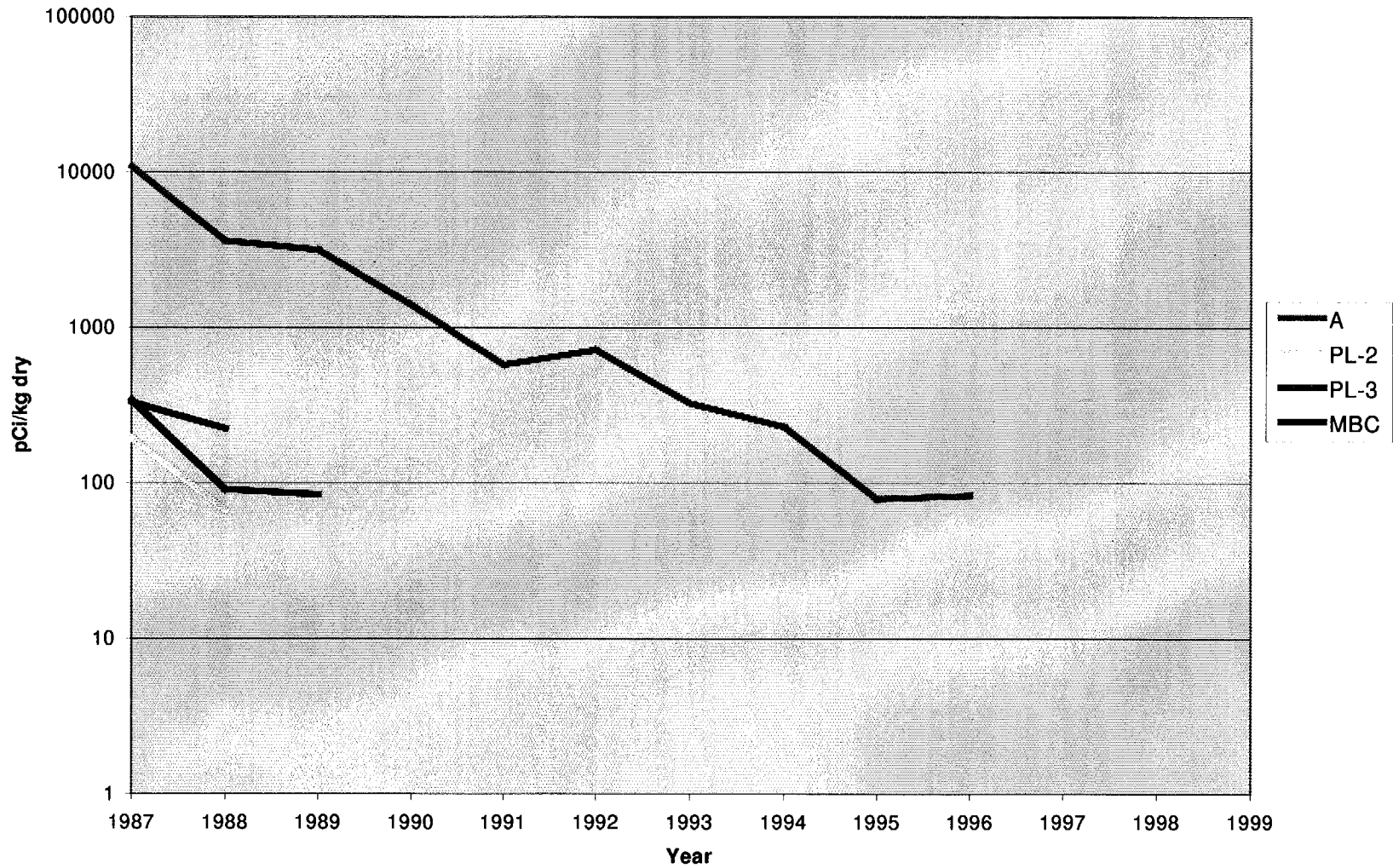
**Co-60 Yearly Average
Half-life 5.27 years**



Note: Zero cannot be plotted on a log scale and appears as a blank point on the figure.

Figure 3

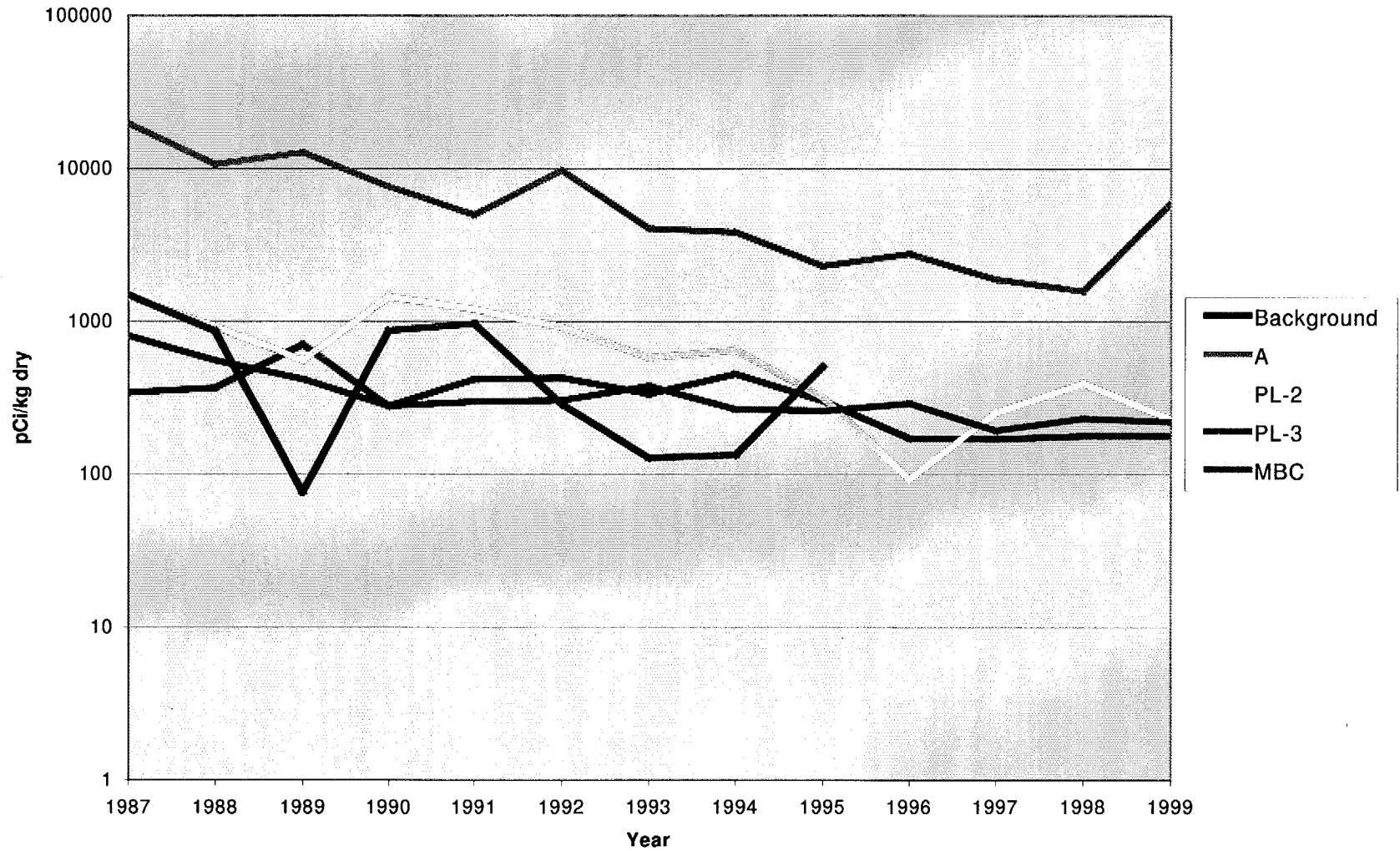
**Cs-134 Yearly Average
Half-life 2.06 years**



Note: Zero cannot be plotted on a log scale and appears as a blank point on the figure.

Figure 4

Cs-137 Yearly Average
Half-life 30.17 years



Note: Zero cannot be plotted on a log scale and appears as a blank point on the figure.