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May 19, 2000

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

SUBJECT: Peach Bottom Atomic Power Station Units 2 and 3, 1999 Annual Radiological Environmental Operating Report, Report No. 57

Gentlemen:

Attached is the 1999 Annual Radiological Environmental Operating Report No. 57, for the Peach Bottom Atomic Power Station for the period January 1, 1999 through December 31, 1999. This report is submitted in compliance with Appendix A of the Peach Bottom Atomic Power Station Operating License, Section 6.9.2.

The Radiological Environmental Monitoring Program found that Peach Bottom's effects on the environment were not measurable in any sample media except for a small amount of H-3 in water samples. Trace concentrations of Cs-137 were found in the sediment consistent with levels observed in previous years.

The 1999 Radiological Environmental Monitoring Program confirmed that the environmental effects from radioactive releases were well below Peach Bottom Technical Specifications and applicable regulatory limits.

Sincerely,

J. Doering, Jr.
Vice President
Peach Bottom Atomic Power Station

JD/MEW/SCB:jif

Attachment

cc:
Correspondence Control Desk
Nuclear Records - Doctype 273

File: 1999 Annual Radiological Env. Rpt No. 57

IE25

Docket No: 50-277
50-278

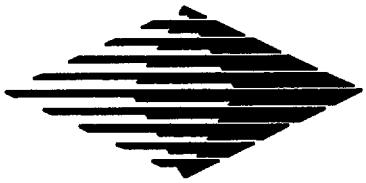
PEACH BOTTOM ATOMIC POWER STATION
UNITS 2 and 3

Annual Radiological
Environmental Operating Report

Report No. 57

1 January Through 31 December 1999

Prepared By



PECO Nuclear
a Unit of PECO Energy
Peach Bottom Atomic Power Station
Delta, PA 17314

May 2000

Docket No: 50-277
50-278

PEACH BOTTOM ATOMIC POWER STATION
UNITS 2 and 3

Annual Radiological
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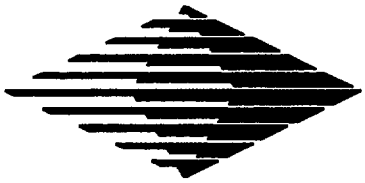

PECO Nuclear
a Unit of PECO Energy
Peach Bottom Atomic Power Station
Delta, PA 17314

May 2000

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I. Summary and Conclusions

This report on the Radiological Environmental Monitoring Program conducted for the Peach Bottom Atomic Power Station (PBAPS) by PECO Nuclear covers the period 1 January 1999 through 31 December 1999. During that time period, 965 analyses were performed on 867 samples.

Surface water samples were analyzed for concentrations of tritium and gamma emitting nuclides. No fission or activation products were found. Although consistent with those observed in other years, elevated tritium activity was detected at both the intake and discharge during the third quarter. The increased activity at the intake may be the result of low flows causing a re-concentration phenomenon. Elevated tritium activity was also observed in the drinking water control location at Holtwood Dam during this same period. That activity was the result of upstream sources.

Drinking water samples were analyzed for concentrations of gross beta (soluble and insoluble fractions), tritium, and gamma emitting nuclides. No fission or activation products were found. Gross beta and tritium activities detected were consistent with those observed in other years.

The remaining sample media representing the aquatic environment included fish and sediment samples. These media were analyzed for concentrations of gamma emitters. Fish samples showed no measurable effects from the operation of PBAPS. Cesium-137 activity was found at all sediment locations and was consistent with data from previous years. The dose to a teenager's skin from the sediment pathway was calculated to be 7.62 E-04 mrem/yr., which represents 0.004% of the allowable fraction of 10 CFR 50, Appendix I limits.

The atmospheric environment was divided into two parts for examination: airborne and terrestrial. Sample media for determining airborne effects included air particulates and air iodine samples. Analyses performed on air particulate samples included gross beta and gamma spectrometry. No fission or activation products were found. The gross beta results were consistent with results from the previous years. Furthermore, no notable differences between control and indicator locations were observed. These findings indicate no measurable effects from the operation of PBAPS.

High sensitivity Iodine-131 analyses were performed on weekly air samples. All results were less than the minimum detectable activity.

Examination of the terrestrial environment was accomplished by analyzing milk samples for concentrations of Iodine-131 and gamma emitters. No fission or activation products were found.

Ambient gamma radiation levels were measured quarterly throughout the year. All measurements were below 10 mR/std. month and consistent with those measured in previous years.

In assessing all the data gathered for this report and comprising these results with preoperational data, it was evident that the operation of PBAPS had no adverse radiological impact on the environment.

II. Introduction

Peach Bottom Atomic Power Station (PBAPS) is located along the Susquehanna River between Holtwood and Conowingo Dams in Peach Bottom Township, York County, Pennsylvania. The initial loading of fuel into Unit 1, a 40 MWe (net) high temperature, gas-cooled reactor, began on 5 February 1966, and initial criticality was achieved on 3 March 1966. Shutdown of Peach Bottom Unit 1 for decommissioning was on 31 October 1974. For the purposes of the monitoring program, the beginning of the operational period for Unit 1 was considered to be 5 February 1966. A summary of the Unit 1 preoperational monitoring program was presented in a previous report [1]. PBAPS Units 2 and 3 are boiling water reactors, each with a power output of approximately 1159 MWe. The first fuel was loaded into Peach Bottom Unit 2 on 9 August 1973. Criticality was achieved on 16 September 1973, and full power was reached on 16 June 1974. The first fuel was loaded into Peach Bottom Unit 3 on 5 July 1974. Criticality was achieved on 7 August 1974, and full power was first reached on 21 December 1974. Preoperational summary reports [2][3] for Units 2 and 3 have been previously issued and summarize the results of all analyses performed on samples collected from 5 February 1966 through 8 August 1973.

A. Objectives

The objectives of the REMP are:

1. To identify, measure, and evaluate existing radionuclides in the environs of PBAPS site and any fluctuations in radioactivity levels, which may occur.

2. To monitor and evaluate ambient radiation levels

3. To determine within the scope of the program, any measurable quantity of radioactivity introduced to the environment by the operation of PBAPS.

B. Implementation

Implementation of the stated objectives is accomplished by identifying significant exposure pathways, establishing baseline radiological data of media within those pathways, and monitoring those media during plant operation to assess plant effects (if any) on man and the environment.

In order to achieve the stated objectives, the current programs include the following analyses on samples collected:

1. Concentrations of beta emitters in drinking (potable) water, and air particulates.

2. Concentrations of gamma emitters in surface and drinking (potable) water, air particulates, milk, fish, and sediment.

3. Concentrations of tritium in surface and drinking (potable) water.

4. Concentrations of I-131 in air and milk.

5. Ambient gamma radiation levels at various site environs.

III. Program Description

A. Sample Collection

This section describes the collection methods used to obtain environmental samples for the PBAPS REMP in 1999. Normandeau Associates, RMC Environmental Services Division, collected samples for the PBAPS REMP for PECO. Sample locations and descriptions can be found in Table B-1 and Figures B-1 through B-3, Appendix B.

Aquatic Environment

The aquatic environment was examined by analyzing samples of surface water, drinking water, fish, and sediment. Surface water from two locations (1LL and 1MM) was collected weekly by automatic sampling equipment. Drinking water from two locations (4L and 6I) was collected weekly from a tank at each location. Both surface and drinking water samples were each composited into separate monthly sample for analysis. Two quarts of water are removed from the tank each week and placed into a clean two-gallon polyethylene bottle to form a monthly composite. Control locations were 1LL and 6I.

Fish samples comprising the flesh from two groups: Bottom Feeder (catfish) and Predator (smallmouth bass, largemouth bass, or bass) were collected semiannually from two locations: 4 and 6 (control) using several methods such as trapnet, seine or electroshocking.

Sediment samples composed of recently deposited substrate were collected semiannually at three locations: 4J, 4T and 6F (control) using one of two methods, determined by the depth from which the sediment was obtained. In water greater than 4 feet deep, either a Ponar or Ekman Grab collected sediment. In shallow water (1-4 feet), sediment was collected by scooping up mud with a plastic bucket.

Atmospheric Environment

The atmospheric environment was examined by analyzing airborne and terrestrial samples. These consisted of air particulates, airborne iodine, and milk. Air particulate and air iodine samples were collected and analyzed weekly from five locations (1B, 1Z, 1C, 3A, and 5H2). The control location was 5H2. Air samples were obtained using a vacuum sampler, glass fiber and charcoal filters, respectively. The filters were replaced weekly and sent

to the laboratory for analysis. The vacuum samplers were run continuously at approximately 1 cubic foot per minute.

Milk samples were collected from five locations (A, J, O, R and S) monthly from December through March and biweekly April through November. Additionally, samples from seven locations (B, C, D, E, L, P, and T) were collected quarterly. Locations A, B, C, and E were controls. Farm T was a goat farm. Milk samples were obtained by removing two gallons from the dairyman's bulk tank after mixing. The sample from each location was therefore a composite of all the milk collected from the dairy herd (from 1 to 3 milkings). The milk was scooped from the agitated bulk tank and placed in new plastic containers.

Ambient Gamma Radiation

Direct radiation measurements were made using Panasonic 801 calcium sulfate ($CaSO_4$) thermoluminescent dosimeters (TLD). The TLD locations were placed on and around the PBAPS site as follows:

A site boundary ring consisting of nineteen locations (1L, 1P, 1A, 1Q, 1D, 2, 1M, 1R, 1I, 2B, 1C, 1J, 1F, 40, 1NN, 1H, 1G, 1B, and 1E) near and within the site perimeter representing fence post doses (i.e., at locations where the doses will be potentially greater than maximum annual off-site doses) from PBAPS releases.

An intermediate distance ring consisting of nineteen locations (15, 22, 44, 32, 45, 14, 17, 31A, 4K, 23, 27, 48, 3A, 49, 50, 51, 26, 6B, and 42) extending to approximately 5 miles from the site designed to measure possible exposures to close-in population.

The balance of eight locations (43, 5, 16, 24, 46, 47, 18, and 19) representing control and special interests areas such as population centers, schools, etc.

The specific TLD locations were determined by the following criteria:

1. The presence of relatively dense population;

2. Site meteorological data taking into account distance and elevation for each of the 36 ten-degree sectors around the site, where estimated annual dose from PBAPS, if any, would be more significant;

3. On hills free from local obstructions and within sight of the vents (where practical);

4. Near the dwelling closest to the main stack in the prevailing down wind direction.

A TLD set was placed at each location in a Formica "birdhouse" or polyethylene jar located approximately six feet above ground level. The TLD sets were exchanged quarterly, then sent to the laboratory for analysis.

B. Data Interpretation

Several factors are important in the interpretation of the data. These factors are discussed here to avoid undue repetition in the discussion of the results.

1. Lower Limit of Detection and Minimum Detectable Activity

The lower limit of detection (LLD) was defined as the smallest concentration of radioactive material in a sample that would yield a net count (above background) that would be detected with only a 5% probability of falsely concluding that a blank observation represents a "real" signal. The LLD was intended as a before the fact estimate of a system (including instrumentation, procedure and sample type) and not as an after the fact criteria for the presence of activity. All analyses were designed to achieve the required PBAPS detection capabilities for environmental sample analysis.

The minimum detectable activity (MDA) is defined above with the exception that the measurement is an after the fact estimate of the presence of activity.

2. Net Activity Calculation and Reporting of Results

Net activity for a sample was calculated by subtracting background activity from the sample activity. Since the REMP measures extremely small changes in radioactivity in the environment, background variations will result in sample activity being lower than the background activity effecting a negative number. For a more detailed description of the result calculations, see Appendix E.

Results for each type of sample were grouped according to the analyses performed. For gamma analyses, fifteen nuclides (Be-7, K-40, Mn-54, Co-58, Fe-59, Co-60, Zn-65, Zr-95, Nb-95, Cs-134, Cs-137, Ba-140, La-140, Ra-226 and Th-232) were reported. Annual means and standard deviations of the individual results were calculated. The standard deviation represents the variability of measured results for different samples rather than the single analysis uncertainty.

C. Program Exceptions

For 1999 the PBAPS REMP had a sample collection recovery rate of better than 99%. The exceptions to this program are listed below:

1. Drinking water sampler at location 6I was out of service for the following dates: 03/12/99 to 03/18/99 and 03/26/99 to 04/20/99 due to faulty equipment. An ISCO sampler was installed on 04/20/99 as a temporary measure. On 07/16/99 a BVS composite sampler was installed as a permanent repair. Weekly grab samples were taken.

2. Surface water samplers at locations 1LL and 1MM were out of service for the following dates: 09/13/99 to 09/15/99 and 09/26/99 to 09/29/99 due to a maintenance outage.

3. Air particulate and air iodine samples from location 1C were not available for the period 08/20/99 to 08/27/99 due to a pump failure.

4. Air particulate and air iodine samples from location 1A/1Z were not available for the periods of 07/02/99 to 07/09/99, 08/13/99 to 08/20/99, and 12/05/99 to 12/10/99 due to power outages related to the Independent Spent Fuel Storage Installation.

5. Air particulate and air iodine samples from location 3A were not available for the period 03/26/99 to 04/02/99 due to a pump failure.

6. Farm T went out of business on 11/08/99.

Each program exception was reviewed to understand the causes of the program exception. Sampling and maintenance errors were reviewed with the personnel involved to prevent a recurrence. Occasional equipment breakdowns and power outages were unavoidable. The overall sample recovery rate indicates that the appropriate procedures and equipment are in place to assure reliable program implementation.

D. Program Changes

1. The TMI-1 Environmental Radioactivity Laboratory changed ownership from GPU to AmerGen in December 1999.

2. Farm S located in the SE sector at a distance of 19,085 feet from the vents was added to the biweekly program beginning in January.

IV. Results and Discussion

A. Aquatic Environment

1. <u>Surface Water</u>

Samples were collected from two locations monthly (1LL and 1MM). 1LL served as the control location. The following analyses were performed.
<u>Tritium</u>

Samples from both locations were analyzed for concentrations of tritium (Table C-I.1, Appendix C). Results ranged from -24 to 270 pCi/l and averaged 98 pCi/l at the control location and 107 pCi/l at the indicator location. Concentrations found were lower than those observed during the preoperational period. The increased tritium level (250 pCi/l) at the PBAPS intake (control) may be the result of re-concentration of effluent tritium releases due to the record low flows in the Susquehanna River. However, elevated tritium levels were also detected in drinking water taken from the upstream location 6I (Holtwood Dam). That location could not be affected by PBAPS releases. Therefore, the tritium levels may be the result of upstream sources.

Gamma Spectrometry

Samples from both locations were analyzed for concentrations of gamma emitters (Table C-I.2, Appendix C). No statistically significant fission or activation products were found. Naturally occurring K-40 was found in one of 24 samples and ranged from -17 to 67 pCi/l.

2. Drinking (Potable) Water

Samples were collected from two locations monthly (4L and 6I). 6I served as the control location. The following analyses were performed.

Gross Beta

Samples from both locations were analyzed for concentrations of gross beta activity in insoluble and soluble fractions (Tables C-II.1 and C-II.2 and Figures C-1 and C-2, Appendix C). Gross beta activity in the insoluble fraction ranged from –0.7 to 0.9 pCi/l. The values in the soluble fraction ranged from 0.8 to 7.3 pCi/l. No differences were observed between the means of the control and indicator stations. The values were generally below those seen in the preoperational period.

Tritium

Samples from both locations were analyzed for tritium concentration quarterly (Table C-II.3, Appendix C). The values for the indicator location (4L) ranged from –4.5 to 180 pCi/l with a mean of 80 pCi/l. Control location (6I) values ranged from 51 to 160 pCi/l with a mean of 101 pCi/l. The concentrations found were lower than those observed during the preoperational period.

Gamma Spectrometry

Samples from both locations were analyzed for concentrations of gamma emitters (Table C-II.4, Appendix C). No statistically significant fission or activation products were found. Naturally occurring K-40 was found in one of 24 samples ranging from -22 to 38 pCi/l.

3. Fish

Samples were collected from two locations semi-annually (4 and 6). The control location was 6. The following analyses were performed.

Gamma Spectrometry

Statistically significant activity was observed only for the nuclide K-40 that ranged from 2700 to 3200 pCi/kg (wet) (Table C-III.1, Appendix C). No statistically significant fission or activation products were found. Figure C-3 illustrates the Cs-137 activity for indicator and control locations from the beginning of the operational period through the present. Cesium-137 activity has declined to non-detectable levels.

4. Sediment

Samples were collected from three locations semi-annually (4J, 4T and 6F). The control location was 6F. The following analyses were performed.

Gamma Spectrometry

Samples from all locations were analyzed for concentrations of gamma emitters (Table C-IV.1, Appendix C). Statistically significant activity for naturally occurring Be-7, K-40, Ra-226 and Th-228 was found at all locations. K-40 results ranged from 8,500 to 22,000 pCi/kg (dry).

Statistically significant activity for Cs-137 was found at all locations with a mean value of 234 pCi/kg (dry) for the indicator locations and 69 pCi/kg (dry) for the control location. The maximum calculated dose from this pathway to a teenager's skin was 7.62 E-04 mrem/yr. This value is based upon the assumption the maximum concentrations of Cs-137 at the downstream location (4J) was present the entire year. This dose represents 0.004% of the allowable fraction of 10 CFR 50, Appendix I limits. Results found were consistent with those from previous years. Figure C-4, Appendix C illustrates the comparison of activities of Cs-137 detected at the control location and indicator locations from the preoperational period through the present.

B. Atmospheric Environment

1. Airborne

a. Air Particulates

Samples were collected from five locations (1B, 1Z, 1C, 3A, and 5H2). Control location was 5H2. The following analyses were performed.

Gross Beta

Samples from all locations were analyzed for concentrations of gross beta (Tables C-V.1 and C-V.2 and Figures C-5 and C-6, Appendix C). Air particulate locations were divided into three groups: Group I, consisting of 1B, 1Z, and 1C, located on PBAPS site; Group II, comprised of 3A, located at an intermediate distance from PBAPS; and Group III, consisting of 5H2, located at a remote distance from PBAPS. Comparison of results among these three groups aid in determining the effects, if any, resulting from the operation of PBAPS. The results from site location samples ranged from 5 E-3 to 29 E-3 pCi/m^3, with a mean of 15 E-3 pCi/m^3. The results from intermediate distance location ranged from 6 E-3 to 31 E-3 pCi/m^3, with a mean of 16 E-3 pCi/m^3. The results from the distant location ranged from 4 E-3 to 26 E-3 pCi/m^3, with a mean of 15 E-3 pCi/m^3. Comparison of the values indicates no notable difference among the three groups suggesting no effects from the operation of PBAPS (Figure C-5, Appendix C).

Gamma Spectrometry

Weekly samples from five locations (1B, 1Z, 1C, 3A, and 5H2) were composited and analyzed quarterly for the presence of gamma emitters (Table C-V.3). Naturally occurring Be-7 was found in all samples with activity values similar to those from the preoperational years. No statistically significant activation or fission products were detected.

b. Airborne Iodine

Continuous air samples were collected weekly at five locations (1B, 1Z, 1C, 3A, and 5H2) and analyzed for I-131 (Table C-VI.1, Appendix C). All results were less than the minimum detectable activity.

2. Terrestrial

a. Milk

Samples were collected from twelve locations (A, B, C, D, E, J, L, 0, P, R, S and T). Farms A, B, C, and E were control locations. The following analyses were performed.

Iodine-131

Samples from all locations were analyzed for concentrations of I-131 (Tables C-VII.1, Appendix C). All results were less than the minimum detectable activity and ranged from -0.3 to 0.4 pCi/l.

Gamma Spectrometry

Samples from five locations were analyzed quarterly for concentrations for gamma emitters (Table C-VII.2, Appendix C). Naturally occurring K-40 was found in all samples with values ranging from 1,300 to 1,600 pCi/l. All other nuclides searched for were less than the minimum detectable activity. Figure C-7 (Appendix C) illustrates the Cs-137 activity in milk from the beginning of the operational period through the present. Cesium-137 activity has declined to non-detectable levels.

C. Ambient Gamma Radiation

Ambient gamma radiation levels were measured quarterly at forty-six locations (as described in the program description section) using Panasonic 801 ($CaSO_4$) thermoluminescent dosimeters (Tables C-VIII.1 through C-VIII.3 and Figures C-8 and C-9, Appendix C). All TLD readings were below 10 mR/std. month with a range of 3.0 to 7.5 mR/std. month. No notable differences were observed between the site, intermediate, and distant TLD groupings.

VI. References

1. Preoperational Environs Radioactivity Survey Summary Report, March 1960 through January, 1966. (September 1967).

2. Interex Corporation, Peach Bottom Atomic Power Station Regional Environs Radiation Monitoring Program Preoperational Summary Report, Units 2 and 3, 5 February 1966 through 8 August 1973, June 1977, Natick, Massachusetts.

3. Radiation Management Corporation Publication, Peach Bottom Atomic Power Station Preoperational Radiological Monitoring Report for Unit 2 and 3, January 1974, Philadelphia, Pennsylvania.

APPENDIX A

RADIOLOGICAL ENVIRONMENTAL MONITORING REPORT SUMMARY

APPENDIX A
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

NAME OF FACILITY: PEACH BOTTOM ATOMIC POWER STATION DOCKET NUMBER: 50-277 & 50-278
LOCATION OF FACILITY: YORK COUNTY, PA REPORTING PERIOD: 1999

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATION MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
SURFACE WATER (PCI/LITER)	TRITIUM	8	2000	107 (4/4) (-24/270)	98 (4/4) (-1.5/250)	107 (4/4) (-24/270)	1MM (INDICATOR) CANAL DISCHARGE 1.04 MILES SE OF SITE	0
	GAMMA	24						
	BE-7		N/A	1.3 (12/12) (-5/12)	-1.2 (12/12) (-18/9.3)	1.3 (12/12) (-5/12)	1MM (INDICATOR) CANAL DISCHARGE 1.04 MILES SE OF SITE	0
	K-40		N/A	0.2 (12/12) (-17/14)	7.5 (12/12) (-12/67)	7.5 (12/12) (-12/67)	1LL (CONTROL) UNITS 2 & 3 INTAKE 0.24 MILES NE OF SITE	0
	MN-54		15	-0.2 (12/12) (-0.9/0.4)	-0.1 (12/12) (-1.7/1.5)	-0.1 (12/12) (-1.7/1.5)	1LL (CONTROL) UNITS 2 & 3 INTAKE 0.24 MILES NE OF SITE	0
	CO-58		15	-0.3 (12/12) (-1.8/1.8)	-0.7 (12/12) (-2.5/0.5)	-0.3 (12/12) (-1.8/1.8)	1MM (INDICATOR) CANAL DISCHARGE 1.04 MILES SE OF SITE	0
	CO-60		15	0.2 (12/12) (-1.5/1.7)	-0.1 (12/12) (-1.1/1.1)	0.2 (12/12) (-1.5/1.7)	1MM (INDICATOR) CANAL DISCHARGE 1.04 MILES SE OF SITE	0
	FE-59		30	1.8 (12/12) (0.2/5.7)	1.3 (12/12) (-0.1/3.6)	1.8 (12/12) (0.2/5.7)	1MM (INDICATOR) CANAL DISCHARGE 1.04 MILES SE OF SITE	0
	ZN-65		30	-4 (12/12) (-10/-0.4)	-4 (12/12) (-7/1.5)	-4 (12/12) (-10/-0.4)	1MM (INDICATOR) CANAL DISCHARGE 1.04 MILES SE OF SITE	0
	ZR-95		15	-0.1 (12/12) (-2/1.8)	0.4 (12/12) (-1.1/2)	0.4 (12/12) (-1.1/2)	1LL (CONTROL) UNITS 2 & 3 INTAKE 0.24 MILES NE OF SITE	0
	NB-95		15	0.2 (12/12) (-0.8/1.3)	0.3 (12/12) (-2/1.8)	0.3 (12/12) (-2/1.8)	1LL (CONTROL) UNITS 2 & 3 INTAKE 0.24 MILES NE OF SITE	0

FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES (F).

APPENDIX A
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

NAME OF FACILITY: PEACH BOTTOM ATOMIC POWER STATION **DOCKET NUMBER:** 50-277 & 50-278
LOCATION OF FACILITY: YORK COUNTY, PA **REPORTING PERIOD:** 1999

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATION MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
	CS-134		15	-7 (12/12) (-15/-2.4)	-6 (12/12) (-9/-4)	-6 (12/12) (-9/-4)	1LL (CONTROL) UNITS 2 & 3 INTAKE 0.24 MILES NE OF SITE	0
	CS-137		18	-0.2 (12/12) (-1.9/1.4)	-0.6 (12/12) (-2.4/-0.1)	-0.2 (12/12) (-1.9/1.4)	1MM (INDICATOR) CANAL DISCHARGE 1.04 MILES SE OF SITE	0
	BA-140		60	-0.1 (12/12) (-8/4.7)	-0.6 (12/12) (-6/2.6)	-0.1 (12/12) (-8/4.7)	1MM (INDICATOR) CANAL DISCHARGE 1.04 MILES SE OF SITE	0
	LA-140		15	-0.4 (12/12) (-2.8/1.3)	0.2 (12/12) (-1.3/2.7)	0.2 (12/12) (-1.3/2.7)	1LL (CONTROL) UNITS 2 & 3 INTAKE 0.24 MILES NE OF SITE	0
	RA-226		N/A	-7 (12/12) (-27/17)	2.8 (12/12) (-26/39)	2.8 (12/12) (-26/39)	1LL (CONTROL) UNITS 2 & 3 INTAKE 0.24 MILES NE OF SITE	0
	TH-232		N/A	-1.1 (12/12) (-7/6.7)	2.0 (12/12) (-4/8.8)	2.0 (12/12) (-4/8.8)	1LL (CONTROL) UNITS 2 & 3 INTAKE 0.24 MILES NE OF SITE	0
DRINKING WATER (PCI/LITER)	GROSS BETA SOLUBLE	24	4	3.0 (12/12) (1.3/7.3)	2.9 (12/12) (0.8/4.8)	3.0 (12/12) (1.3/7.3)	4L (INDICATOR) CONOWINGO DAM EL 33FT. 8.66 MILES SE OF SITE	0
	GROSS BETA INSOLUBLE	24	4	-0.1 (12/12) (-0.7/0.4)	0.0 (12/12) (-0.6/0.9)	0.0 (12/12) (-0.6/0.9)	6I (CONTROL) HOLTWOOD STATION INTAKE 5.74 MILES NW OF SITE	0
	TRITIUM	8	2000	80 (4/4) (-5/180)	101 (4/4) (51/160)	101 (4/4) (51/160)	6I (CONTROL) HOLTWOOD STATION INTAKE 5.74 MILES NW OF SITE	0

FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES (F).

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NAME OF FACILITY: PEACH BOTTOM ATOMIC POWER STATION DOCKET NUMBER: 50-277 & 50-278
LOCATION OF FACILITY: YORK COUNTY, PA REPORTING PERIOD: 1999

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATION MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
	GAMMA	24						
	BE-7		N/A	-0.1 (12/12) (-7/8.4)	0.8 (12/12) (-8/17)	0.8 (12/12) (-8/17)	6I (CONTROL) HOLTWOOD STATION INTAKE 5.74 MILES NW OF SITE	0
	K-40		N/A	-2.8 (12/12) (-22/6.9)	13 (12/12) (-1.8/38)	13 (12/12) (-1.8/38)	6I (CONTROL) HOLTWOOD STATION INTAKE 5.74 MILES NW OF SITE	0
	MN-54		15	-0.2 (12/12) (-1.0/0.8)	-0.4 (12/12) (-1.4/0.9)	-0.2 (12/12) (-1.0/0.8)	4L (INDICATOR) CONOWINGO DAM EL 33FT. 8.66 MILES SE OF SITE	0
	CO-58		15	-0.3 (12/12) (-1.0/0.5)	-0.2 (12/12) (-1/0.4)	-0.2 (12/12) (-1/0.4)	6I (CONTROL) HOLTWOOD STATION INTAKE 5.74 MILES NW OF SITE	0
	CO-60		15	0.0 (12/12) (-0.8/0.4)	0.5 (12/12) (-0.7/2.5)	0.5 (12/12) (-0.7/2.5)	6I (CONTROL) HOLTWOOD STATION INTAKE 5.74 MILES NW OF SITE	0
	FE-59		30	0.9 (12/12) (-1.1/4.2)	1.0 (12/12) (-1.5/4.5)	1.0 (12/12) (-1.5/4.5)	6I (CONTROL) HOLTWOOD STATION INTAKE 5.74 MILES NW OF SITE	0
	ZN-65		30	-4 (12/12) (-12/1.2)	-3 (12/12) (-6/-0.7)	-3 (12/12) (-6/-0.7)	6I (CONTROL) HOLTWOOD STATION INTAKE 5.74 MILES NW OF SITE	0
	ZR-95		15	0.4 (12/12) (-3/2.2)	-0.1 (12/12) (-2.7/2.3)	0.4 (12/12) (-3/2.2)	4L (INDICATOR) CONOWINGO DAM EL 33FT. 8.66 MILES SE OF SITE	0
	NB-95		15	0.5 (12/12) (-0.5/1.6)	-0.2 (12/12) (-2.1/1.2)	0.5 (12/12) (-0.5/1.6)	4L (INDICATOR) CONOWINGO DAM EL 33FT. 8.66 MILES SE OF SITE	0
	CS-134		15	-4 (12/12) (-13/0.1)	-4 (12/12) (-8/0.4)	-4 (12/12) (-8/0.4)	6I (CONTROL) HOLTWOOD STATION INTAKE 5.74 MILES NW OF SITE	0

FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES (F).

APPENDIX A
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

NAME OF FACILITY: PEACH BOTTOM ATOMIC POWER STATION DOCKET NUMBER: 50-277 & 50-278
LOCATION OF FACILITY: YORK COUNTY, PA REPORTING PERIOD: 1999

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATION MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
	CS-137		18	-0.2 (12/12) (-0.9/0.6)	0.0 (12/12) (-0.6/0.9)	0.0 (12/12) (-0.6/0.9)	6I (CONTROL) HOLTWOOD STATION INTAKE 5.74 MILES NW OF SITE	0
	BA-140		60	-0.7 (12/12) (-10/2.7)	1.7 (12/12) (-1.8/6.6)	1.7 (12/12) (-1.8/6.6)	6I (CONTROL) HOLTWOOD STATION INTAKE 5.74 MILES NW OF SITE	0
	LA-140		15	0.0 (12/12) (-1/1.2)	-0.5 (12/12) (-1.7/0.6)	0.0 (12/12) (-1/1.2)	4L (INDICATOR) CONOWINGO DAM EL 33FT. 8.66 MILES SE OF SITE	0
	RA-226		N/A	-4 (12/12) (-25/25)	4.8 (12/12) (-24/39)	4.8 (12/12) (-24/39)	6I (CONTROL) HOLTWOOD STATION INTAKE 5.74 MILES NW OF SITE	0
	TH-232		N/A	0.1 (12/12) (-4/5)	2.1 (12/12) (-4/11)	2.1 (12/12) (-4/11)	6I (CONTROL) HOLTWOOD STATION INTAKE 5.74 MILES NW OF SITE	0
BOTTOM FEEDER (FISH) (PCI/KG WET)	GAMMA	4						
	BE-7		N/A	11 (2/2) (9.6/12)	-8 (2/2) (-30/14)	11 (2/2) (9.6/12)	4 (INDICATOR) CONOWINGO POND BELOW DISCHARGE CONOWINGO POND - BELOW DISCHARGE	0
	K-40		N/A	2800 (2/2) (2700/2900)	2850 (2/2) (2700/3000)	2850 (2/2) (2700/3000)	6 (CONTROL) HOLTWOOD POND HOLTWOOD POND	0
	MN-54		130	-1.3 (2/2) (-5/2.7)	0.1 (2/2) (-0.9/1.2)	0.1 (2/2) (-0.9/1.2)	6 (CONTROL) HOLTWOOD POND HOLTWOOD POND	0
	CO-58		130	-0.6 (2/2) (-2/0.7)	-1.2 (2/2) (-2.1/-0.2)	-0.6 (2/2) (-2/0.7)	4 (INDICATOR) CONOWINGO POND BELOW DISCHARGE CONOWINGO POND - BELOW DISCHARGE	0

FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES (F).

APPENDIX A
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

NAME OF FACILITY: PEACH BOTTOM ATOMIC POWER STATION DOCKET NUMBER: 50-277 & 50-278
LOCATION OF FACILITY: YORK COUNTY, PA REPORTING PERIOD: 1999

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATION MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN MEAN (F) RANGE	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
	CO-60		130	0.5 (2/2) (-0.8/1.8)	0.8 (2/2) (-3/4.5)	0.8 (2/2) (-3/4.5)	6 (CONTROL) HOLTWOOD POND HOLTWOOD POND	0
	FE-59		260	2.2 (2/2) (1.5/2.9)	-4 (2/2) (-8/-0.4)	2.2 (2/2) (1.5/2.9)	4 (INDICATOR) CONOWINGO POND BELOW DISCHARGE CONOWINGO POND - BELOW DISCHARGE	0
	ZN-65		260	-4 (2/2) (-6/-0.9)	-13 (2/2) (-15/-11)	-4 (2/2) (-6/-0.9)	4 (INDICATOR) CONOWINGO POND BELOW DISCHARGE CONOWINGO POND - BELOW DISCHARGE	0
	ZR-95		N/A	1.1 (2/2) (-1.4/3.5)	2.4 (2/2) (-3/8)	2.4 (2/2) (-3/8)	6 (CONTROL) HOLTWOOD POND HOLTWOOD POND	0
	NB-95		N/A	2.1 (2/2) (2/2.1)	0.5 (2/2) (-2.5/3.5)	2.1 (2/2) (2/2.1)	4 (INDICATOR) CONOWINGO POND BELOW DISCHARGE CONOWINGO POND - BELOW DISCHARGE	0
	CS-134		130	-7 (2/2) (-12/-1.4)	-18 (2/2) (-20/-15)	-7 (2/2) (-12/-1.4)	4 (INDICATOR) CONOWINGO POND BELOW DISCHARGE CONOWINGO POND - BELOW DISCHARGE	0
	CS-137		150	1.8 (2/2) (-1.2/4.8)	0.8 (2/2) (-0.9/2.5)	1.8 (2/2) (-1.2/4.8)	4 (INDICATOR) CONOWINGO POND BELOW DISCHARGE CONOWINGO POND - BELOW DISCHARGE	0
	BA-140		N/A	4.1 (2/2) (-9/17)	-0.3 (2/2) (-0.5/0.0)	4.1 (2/2) (-9/17)	4 (INDICATOR) CONOWINGO POND BELOW DISCHARGE CONOWINGO POND - BELOW DISCHARGE	0
	LA-140		N/A	3.0 (2/2) (1.3/4.6)	1.2 (2/2) (0.0/2.5)	3.0 (2/2) (1.3/4.6)	4 (INDICATOR) CONOWINGO POND BELOW DISCHARGE CONOWINGO POND - BELOW DISCHARGE	0
	RA-226		N/A	-6 (2/2) (-21/9.3)	-4 (2/2) (-30/22)	-4 (2/2) (-30/22)	6 (CONTROL) HOLTWOOD POND HOLTWOOD POND	0

FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES (F).

APPENDIX A
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

NAME OF FACILITY: PEACH BOTTOM ATOMIC POWER STATION DOCKET NUMBER: 50-277 & 50-278
LOCATION OF FACILITY: YORK COUNTY, PA REPORTING PERIOD: 1999

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATION MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN MEAN (F) RANGE	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
	TH-232		N/A	8.8 (2/2) (5.6/12)	-4 (2/2) (-7/-1.8)	8.8 (2/2) (5.6/12)	4 (INDICATOR) CONOWINGO POND BELOW DISCHARGE CONOWINGO POND - BELOW DISCHARGE	0
PREDATOR (FISH) (PCI/KG WET)	GAMMA	4						
	BE-7		N/A	3.7 (2/2) (-10/17)	3.5 (2/2) (-11/18)	3.7 (2/2) (-10/17)	4 (INDICATOR) CONOWINGO POND BELOW DISCHARGE CONOWINGO POND - BELOW DISCHARGE	0
	K-40		N/A	3100 (2/2) (3000/3200)	2850 (2/2) (2800/2900)	3100 (2/2) (3000/3200)	4 (INDICATOR) CONOWINGO POND BELOW DISCHARGE CONOWINGO POND - BELOW DISCHARGE	0
	MN-54		130	0.2 (2/2) (-0.7/1)	0.7 (2/2) (-0.2/1.7)	0.7 (2/2) (-0.2/1.7)	6 (CONTROL) HOLTWOOD POND HOLTWOOD POND	0
	CO-58		130	-2.0 (2/2) (-2.8/-1.1)	0.7 (2/2) (-0.7/2)	0.7 (2/2) (-0.7/2)	6 (CONTROL) HOLTWOOD POND HOLTWOOD POND	0
	CO-60		130	1.4 (2/2) (0.6/2.2)	-0.3 (2/2) (-1.4/0.9)	1.4 (2/2) (0.6/2.2)	4 (INDICATOR) CONOWINGO POND BELOW DISCHARGE CONOWINGO POND - BELOW DISCHARGE	0
	FE-59		260	-6 (2/2) (-8/-4)	9.2 (2/2) (3.4/15)	9.2 (2/2) (3.4/15)	6 (CONTROL) HOLTWOOD POND HOLTWOOD POND	0
	ZN-65		260	-24 (2/2) (-35/-13)	-29 (2/2) (-39/-18)	-24 (2/2) (-35/-13)	4 (INDICATOR) CONOWINGO POND BELOW DISCHARGE CONOWINGO POND - BELOW DISCHARGE	0
	ZR-95		N/A	-0.4 (2/2) (-2.6/1.9)	3.0 (2/2) (-1.5/7.4)	3.0 (2/2) (-1.5/7.4)	6 (CONTROL) HOLTWOOD POND HOLTWOOD POND	0
	NB-95		N/A	-0.8 (2/2) (-5/3.6)	1.9 (2/2) (-3/6.8)	1.9 (2/2) (-3/6.8)	6 (CONTROL) HOLTWOOD POND HOLTWOOD POND	0

FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES (F).

APPENDIX A
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

NAME OF FACILITY: PEACH BOTTOM ATOMIC POWER STATION DOCKET NUMBER: 50-277 & 50-278
LOCATION OF FACILITY: YORK COUNTY, PA REPORTING PERIOD: 1999

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATION MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN MEAN (F) RANGE	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
	CS-134		130	-24 (2/2) (-31/-16)	-23 (2/2) (-24/-21)	-23 (2/2) (-24/-21)	6 (CONTROL) HOLTWOOD POND HOLTWOOD POND	0
	CS-137		150	1.3 (2/2) (-0.3/2.9)	2.4 (2/2) (-0.5/5.2)	2.4 (2/2) (-0.5/5.2)	6 (CONTROL) HOLTWOOD POND HOLTWOOD POND	0
	BA-140		N/A	-7 (2/2) (-13/-1.7)	-7 (2/2) (-10/-5)	-7 (2/2) (-10/-5)	6 (CONTROL) HOLTWOOD POND HOLTWOOD POND	0
	LA-140		N/A	-2.1 (2/2) (-3/-1.2)	2.1 (2/2) (-1.8/6)	2.1 (2/2) (-1.8/6)	6 (CONTROL) HOLTWOOD POND HOLTWOOD POND	0
	RA-226		N/A	-9 (2/2) (-24/5.8)	-16 (2/2) (-86/54)	-9 (2/2) (-24/5.8)	4 (INDICATOR) CONOWINGO POND BELOW DISCHARGE CONOWINGO POND - BELOW DISCHARGE	0
	TH-232		N/A	0.7 (2/2) (-6/7.8)	8.8 (2/2) (7.5/10)	8.8 (2/2) (7.5/10)	6 (CONTROL) HOLTWOOD POND HOLTWOOD POND	0
SILT (PCI/KG DRY)	GAMMA	6						
	BE-7		N/A	548 (4/4) (-20/1600)	140 (2/2) (80/200)	955 (2/2) (310/1600)	4T (INDICATOR) CONOWINGO POND NEAR CONOWINGO DAM 7.92 MILES SE OF SITE	0
	K-40		N/A	21250 (4/4) (13000/30000)	10350 (2/2) (9700/11000)	26500 (2/2) (23000/30000)	4T (INDICATOR) CONOWINGO POND NEAR CONOWINGO DAM 7.92 MILES SE OF SITE	0
	MN-54		N/A	12 (4/4) (6.8/19)	0.8 (2/2) (-6/7.6)	13 (2/2) (6.8/19)	4T (INDICATOR) CONOWINGO POND NEAR CONOWINGO DAM 7.92 MILES SE OF SITE	0

FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES (F).

APPENDIX A
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

NAME OF FACILITY: PEACH BOTTOM ATOMIC POWER STATION DOCKET NUMBER: 50-277 & 50-278
LOCATION OF FACILITY: YORK COUNTY, PA REPORTING PERIOD: 1999

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATION MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN MEAN (F) RANGE	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
	CO-58		N/A	-19 (4/4) (-58/-1.9)	-18 (2/2) (-18/-17)	-7 (2/2) (-12/-1.9)	4J (INDICATOR) CONOWINGO POND NET TRAP 15 1.39 MILES SE OF SITE	0
	CO-60		N/A	14 (4/4) (3/19)	-3 (2/2) (-10/4)	19 (2/2) (18/19)	4J (INDICATOR) CONOWINGO POND NET TRAP 15 1.39 MILES SE OF SITE	0
	FE-59		N/A	-52 (4/4) (-130/7.4)	-8 (2/2) (-11/-5)	-8 (2/2) (-11/-5)	6F (CONTROL) HOLTWOOD DAM EAST SHORE UPSTREAM 5.96 MILES NW OF SITE	0
	ZN-65		N/A	-38 (4/4) (-240/58)	-7 (2/2) (-24/11)	40 (2/2) (21/58)	4J (INDICATOR) CONOWINGO POND NET TRAP 15 1.39 MILES SE OF SITE	0
	ZR-95		N/A	14 (4/4) (-7/43)	27 (2/2) (24/30)	27 (2/2) (24/30)	6F (CONTROL) HOLTWOOD DAM EAST SHORE UPSTREAM 5.96 MILES NW OF SITE	0
	NB-95		N/A	4.5 (4/4) (-38/44)	35 (2/2) (17/52)	35 (2/2) (17/52)	6F (CONTROL) HOLTWOOD DAM EAST SHORE UPSTREAM 5.96 MILES NW OF SITE	0
	CS-134		150	16 (4/4) (4.7/34)	0.8 (2/2) (-1.4/2.9)	19 (2/2) (4.7/34)	4T (INDICATOR) CONOWINGO POND NEAR CONOWINGO DAM 7.92 MILES SE OF SITE	0
	CS-137		180	234 (4/4) (45/370)	69 (2/2) (57/81)	300 (2/2) (230/370)	4T (INDICATOR) CONOWINGO POND NEAR CONOWINGO DAM 7.92 MILES SE OF SITE	0
	BA-140		N/A	-95 (4/4) (-270/61)	53 (2/2) (-4/110)	53 (2/2) (-4/110)	6F (CONTROL) HOLTWOOD DAM EAST SHORE UPSTREAM 5.96 MILES NW OF SITE	0
	LA-140		N/A	-34 (4/4) (-56/-8)	-30 (2/2) (-60/-0.5)	-15 (2/2) (-23/-8)	4J (INDICATOR) CONOWINGO POND NET TRAP 15 1.39 MILES SE OF SITE	0

FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES (F).

APPENDIX A
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

NAME OF FACILITY: PEACH BOTTOM ATOMIC POWER STATION DOCKET NUMBER: 50-277 & 50-278
LOCATION OF FACILITY: YORK COUNTY, PA REPORTING PERIOD: 1999

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATION MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN MEAN (F) RANGE	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
	RA-226		N/A	2975 (4/4) (1400/5400)	1900 (2/2) (1800/2000)	4100 (2/2) (2800/5400)	4T (INDICATOR) CONOWINGO POND NEAR CONOWINGO DAM 7.92 MILES SE OF SITE	0
	TH-232		N/A	1495 (4/4) (680/2500)	830 (2/2) (810/850)	2000 (2/2) (1500/2500)	4T (INDICATOR) CONOWINGO POND NEAR CONOWINGO DAM 7.92 MILES SE OF SITE	0
AIR PARTICULATE (E-3 PCI/CU. METER)	GROSS BETA	254	10	15 (203/203) (5.3/31)	15 (51/51) (3.7/26)	16 (52/52) (6.6/28)	1B (INDICATOR) WEATHER STATION NO.2 0.49 MILES NW OF SITE	0
	GAMMA	20						
	BE-7		N/A	69 (16/16) (43/110)	75 (4/4) (56/87)	75 (4/4) (56/87)	5H2 (CONTROL) MANOR SUBSTATION 30.79 MILES NE OF SITE	0
	K-40		N/A	5.4 (16/16) (-6/19)	3.7 (4/4) (-0.6/7.6)	8.6 (4/4) (4.4/14)	3A (INDICATOR) DELTA, PA SUBSTATION 3.62 MILES SW OF SITE	0
	MN-54		N/A	0.1 (16/16) (-1.0/1.1)	0.4 (4/4) (0.2/0.6)	0.4 (4/4) (0.2/0.6)	5H2 (CONTROL) MANOR SUBSTATION 30.79 MILES NE OF SITE	0
	CO-58		N/A	0.0 (16/16) (-1.2/0.8)	0.0 (4/4) (-0.3/0.5)	0.5 (4/4) (0.2/0.8)	3A (INDICATOR) DELTA, PA SUBSTATION 3.62 MILES SW OF SITE	0
	CO-60		N/A	0.2 (16/16) (-0.8/1.2)	-0.1 (4/4) (-0.8/1)	0.4 (4/4) (0.2/1.0)	1Z (INDICATOR) WEATHER STATION 1 0.26 MILES SE OF SITE	0
	FE-59		N/A	-0.4 (16/16) (-3/2.1)	0.5 (4/4) (-0.7/1.6)	0.5 (4/4) (-0.7/1.6)	5H2 (CONTROL) MANOR SUBSTATION 30.79 MILES NE OF SITE	0
	ZN-65		N/A	-1.7 (16/16) (-6/3.7)	-1.1 (4/4) (-3/2.2)	-0.1 (4/4) (-3/3.7)	3A (INDICATOR) DELTA, PA SUBSTATION 3.62 MILES SW OF SITE	0

FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES (F).

APPENDIX A
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

NAME OF FACILITY: PEACH BOTTOM ATOMIC POWER STATION DOCKET NUMBER: 50-277 & 50-278
LOCATION OF FACILITY: YORK COUNTY, PA REPORTING PERIOD: 1999

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATION MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
	ZR-95		N/A	0.0 (16/16) (-1.9/1.6)	0.0 (4/4) (-0.5/1.3)	0.5 (4/4) (-0.3/1.6)	1C (INDICATOR) SOUTH SUBSTATION ROAD 0.85 MILES SSE OF SITE	0
	NB-95		N/A	0.2 (16/16) (-1.0/1.3)	0.4 (4/4) (0.0/0.6)	0.4 (4/4) (0.0/0.6)	5H2 (CONTROL) MANOR SUBSTATION 30.79 MILES NE OF SITE	0
	CS-134		50	-0.3 (16/16) (-3/0.4)	-0.7 (4/4) (-1.8/0.1)	0.0 (4/4) (-0.6/0.3)	3A (INDICATOR) DELTA, PA SUBSTATION 3.62 MILES SW OF SITE	0
	CS-137		60	0.1 (16/16) (-0.5/1)	-0.4 (4/4) (-1.3/0.9)	0.4 (4/4) (-0.2/1)	1C (INDICATOR) SOUTH SUBSTATION ROAD 0.85 MILES SSE OF SITE	0
	BA-140		N/A	0.7 (16/16) (-8/9.5)	1.3 (4/4) (-0.6/2.9)	2.8 (4/4) (-2/7.9)	1C (INDICATOR) SOUTH SUBSTATION ROAD 0.85 MILES SSE OF SITE	0
	LA-140		N/A	0.1 (16/16) (-1.2/1.8)	-0.1 (4/4) (-1/1.2)	0.5 (4/4) (-0.3/1.1)	1Z (INDICATOR) WEATHER STATION 1 0.26 MILES SE OF SITE	0
	RA-226		N/A	0.3 (16/16) (-14/15)	2.2 (4/4) (-4/13)	4.5 (4/4) (-5/15)	1B (INDICATOR) WEATHER STATION NO.2 0.49 MILES NW OF SITE	0
	TH-232		N/A	-0.5 (16/16) (-2.7/2.7)	-0.7 (4/4) (-4/0.4)	-0.2 (4/4) (-1.4/2.7)	1B (INDICATOR) WEATHER STATION NO.2 0.49 MILES NW OF SITE	0
AIR IODINE (E-3 PCI/CU. METER)	I-131	254	70	0.2 (203/203) (-31/18)	1.1 (51/51) (-14/13)	1.1 (51/51) (-14/13)	5H2 (CONTROL) MANOR SUBSTATION 30.79 MILES NE OF SITE	0
GOAT MILK (PCI/LITER)	I-131	3	N/A	0.0 (3/3) (-0.1/0.1)		0.0 (3/3) (-0.1/0.1)	T (INDICATOR) INTERMEDIATE DISTANCE FARM T 3.17 MILES W OF SITE	0

FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES (F).

APPENDIX A

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

NAME OF FACILITY: PEACH BOTTOM ATOMIC POWER STATION DOCKET NUMBER: 50-277 & 50-278

LOCATION OF FACILITY: YORK COUNTY, PA REPORTING PERIOD: 1999

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATION MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
MILK (PCI/LITER)	I-131	108	1	0.0 (75/75) (-0.3/0.3)	0.0 (33/33) (-0.2/0.4)	0.1 (4/4) (0.1/0.2)	D (INDICATOR) INTERMEDIATE DISTANCE FARM D 3.51 MILES NE OF SITE	0
	GAMMA	16						
	BE-7		N/A	0.0 (12/12) (-20/14)	-1.4 (4/4) (-2.3/-0.4)	1.5 (4/4) (-9/14)	O (INDICATOR) NEARBY FARM O 2.32 MILES SW OF SITE	0
	K-40		N/A	1467 (12/12) (1300/1600)	1500 (4/4) (1500/1500)	1525 (4/4) (1400/1600)	R (INDICATOR) NEARBY FARM R 0.76 MILES WSW OF SITE	0
	MN-54		N/A	-0.4 (12/12) (-1.6/1.0)	-0.3 (4/4) (-1.4/0.5)	0.0 (4/4) (-0.9/1.0)	R (INDICATOR) NEARBY FARM R 0.76 MILES WSW OF SITE	0
	CO-58		N/A	-0.8 (12/12) (-2.3/0.0)	0.1 (4/4) (-0.7/0.8)	0.1 (4/4) (-0.7/0.8)	A (CONTROL) DISTANCE FARM A 5.78 MILES WSW OF SITE	0
	CO-60		N/A	0.4 (12/12) (-1.4/2.3)	0.1 (4/4) (-0.3/0.7)	0.6 (4/4) (-1.4/2.3)	O (INDICATOR) NEARBY FARM O 2.32 MILES SW OF SITE	0
	FE-59		N/A	-0.1 (12/12) (-4/3.8)	0.6 (4/4) (-2.3/4.7)	0.8 (4/4) (-1.0/3.8)	J (INDICATOR) NEARBY FARM J 0.97 MILES W OF SITE	0
	ZN-65		N/A	-5 (12/12) (-11/5.4)	-6 (4/4) (-10/-2.3)	-3 (4/4) (-5/-1.5)	J (INDICATOR) NEARBY FARM J 0.97 MILES W OF SITE	0
	ZR-95		N/A	-0.4 (12/12) (-1.8/1.2)	-1.4 (4/4) (-4/0.3)	-0.2 (4/4) (-1.8/1.2)	R (INDICATOR) NEARBY FARM R 0.76 MILES WSW OF SITE	0

FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES (F).

APPENDIX A
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

NAME OF FACILITY: PEACH BOTTOM ATOMIC POWER STATION DOCKET NUMBER: 50-277 & 50-278
LOCATION OF FACILITY: YORK COUNTY, PA REPORTING PERIOD: 1999

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATION MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
	NB-95		N/A	0.6 (12/12) (-1.3/1.7)	0.6 (4/4) (-0.8/1.3)	0.9 (4/4) (0.3/1.7)	O (INDICATOR) NEARBY FARM O 2.32 MILES SW OF SITE	0
	CS-134		15	-4 (12/12) (-10/0.9)	-11 (4/4) (-14/-7)	-1.4 (4/4) (-3/-0.4)	O (INDICATOR) NEARBY FARM O 2.32 MILES SW OF SITE	0
	CS-137		18	0.0 (12/12) (-1.9/0.8)	-0.2 (4/4) (-1.7/0.5)	0.3 (4/4) (-0.1/0.8)	J (INDICATOR) NEARBY FARM J 0.97 MILES W OF SITE	0
	BA-140		60	0.4 (12/12) (-4/6.3)	-0.7 (4/4) (-2.2/1.3)	1.8 (4/4) (0.0/6.3)	O (INDICATOR) NEARBY FARM O 2.32 MILES SW OF SITE	0
	LA-140		15	-0.6 (12/12) (-2.6/1.1)	0.1 (4/4) (-0.6/0.8)	0.1 (4/4) (-0.6/0.8)	A (CONTROL) DISTANCE FARM A 5.78 MILES WSW OF SITE	0
	CE-141		N/A	-0.8 (12/12) (-3/0.9)	-1.5 (4/4) (-2.4/-0.7)	-0.7 (4/4) (-2.3/0.2)	J (INDICATOR) NEARBY FARM J 0.97 MILES W OF SITE	0
	CE-144		N/A	0.7 (12/12) (-8/11)	2.1 (4/4) (-6/6.6)	2.2 (4/4) (-6/11)	J (INDICATOR) NEARBY FARM J 0.97 MILES W OF SITE	0
	RA-226		N/A	4.1 (12/12) (-23/45)	5.0 (4/4) (-24/26)	14 (4/4) (-3/45)	O (INDICATOR) NEARBY FARM O 2.32 MILES SW OF SITE	0
	TH-232		N/A	0.8 (12/12) (-4/4.8)	2.8 (4/4) (-2.2/6.5)	2.8 (4/4) (-2.2/6.5)	A (CONTROL) DISTANCE FARM A 5.78 MILES WSW OF SITE	0
DIRECT RADIATION (MILLI-ROENTGEN/STD. MO.)	TLD-QUARTERLY	184	N/A	5.8 (168/168) (3.0/7.5)	6.0 (16/16) (4.6/6.8)	7.3 (4/4) (7.2/7.5)	40 (INDICATOR) PEACH BOTTOM SITE AREA 1.46 MILES SW OF SITE	0

FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES (F).

APPENDIX B

SAMPLE DESIGNATION AND LOCATIONS

APPENDIX B: SAMPLE DESIGNATION AND LOCATIONS

LIST OF TABLES AND FIGURES

TABLES

FIGURES

TABLE B-1: Sample Collection and Analysis Program for the Radiological Environmental Monitoring Program for Peach Bottom Atomic Power Station, 1999

Location	Location Description	Distance & Direction from PBAPS Vents	Collection Method and Frequency	Analysis & Frequency Performed—Consultant
A. Surface Water				
1LL	Peach Bottom Units 2 and 3 Intake - Composite (Control)	0.24 miles NE	Two quart weekly water sample is collected from a continuous water sampler and placed in a 2 gallon polyethylene bottle to form a monthly composite sample	Gamma Spec - monthly - ERL Tritium - quarterly - ERL
1MM	Peach Bottom Canal Discharge -Composite	1.04 miles SE	Same as location 1LL	Same as location 1LL
B. Drinking (Potable) Water				
4L	Conowingo Dam EL 33' MSL - Composite	8.66 miles SE	Two quart weekly water sample is collected from a continuous water sampler and placed in a 2 gallon polyethylene bottle to form a monthly composite sample	Gross Beta (S&I) - monthly - ERL Gamma Spec - monthly - ERL Tritium - quarterly - ERL Gross Beta (S&I)- monthly - TBE* Gamma Spec - monthly - TBE*
6I	Holtwood Dam Hydroelectric Station - Composite (Control)	5.75 miles NW	Water is continuously sampled from the Holtwood Hydroelectric Station Intake and is collected in a 175 gallon tank. Each week 2 quarts are withdrawn from the tank and placed in a 2 gallon polyethene bottle to form a monthly composite.	Gross Beta (S&I) - monthly - ERL Gamma Spec - monthly - ERL Tritium - quarterly - ERL
C. Fish				
4	Conowingo Pond	Located in Conowingo Pond below the discharge	Fish from two groups representing predator and bottom feeder species collected by electrofishing or other fishery gear semiannually	Gamma Spec - semiannually - ERL
6	Holtwood Pond (Control)	Located in Holtwood Pond	Same as location 4	Same as location 4

TABLE B-1: Sample Collection and Analysis Program for the Radiological Environmental Monitoring Program for Peach Bottom Atomic Power Station, 1999

Location	Location Description	Distance & Direction from PBAPS Vents	Collection Method and Frequency	Analysis & Frequency Performed—Consultant
D. Sediment				
4J	Conowingo Pond near Berkin's Run	1.39 miles SE	Recently deposited sediment collected below the waterline, semi-annually	Gamma Spec - semiannually - ERL
4T	Conowingo Pond near Conowingo Dam	7.92 miles SE	Same as location 4D	Same as location 4D
6F	Holtwood Dam (Control)	5.96 miles NW	Same as location 4D	Same as location 4D
E. Air Particulate - Air Iodine				
1B	Weather Station #2	0.49 miles NW	About 1 cfm continuous flow through glass fiber and charcoal filters (approx. 2" diameter} which are installed for a week and replaced	Gross beta - weekly - ERL Gamma Spec - quarterly - ERL I-131 - weekly - ERL
1Z	Weather Station #1	0.26 miles SE	Same as location 1B	Same as location 1B
1A	Weather Station #1	0.26 miles SE	Same as location 1B	Gross beta - weekly - TBE* Gamma Spec - quarterly - TBE*
1C	Peach Bottom South Sub Station	0.85 miles SSE	Same as location 1B	Same as location 1B
3A	Delta, PA - Substation	3.62 miles SW	Same as location 1B	Same as location 1B
5H2	Manor Substation	30.79 miles NE	Same as location 1B	Same as location 1B

TABLE B-1: Sample Collection and Analysis Program for the Radiological Environmental Monitoring Program for Peach Bottom Atomic Power Station, 1999

Location	Location Description	Distance & Direction from PBAPS Vents	Collection Method and Frequency	Analysis & Frequency Performed—Consultant
F. Milk				
A	(Control)	5.78 miles WSW	Two gallon grab sample is collected at each farm from a bulk tank containing milk biweekly while cows are on pasture, monthly other times	I-131 - biweekly, monthly** - ERL Gamma Spec - quarterly - ERL I-131 - quarterly - TBE* Gamma Spec - quarterly - TBE*
B	(Control)	10.58 miles S	Same as Farm A	I-131 - quarterly - ERL
C	(Control)	9.54 miles NW	Same as Farm A	Same as Farm B
D		3.51 miles NE	Same as Farm A	Same as Farm B
E	(Control)	8.74 miles N	Same as Farm A	Same as Farm B
J		0.97 miles W	Same as Farm A	Same as Farm A
L		2.12 miles NE	Same as Farm A	Same as Farm B
O		2.32 miles SW	Same as Farm A	Same as Farm A
P		2.08 miles ENE	Same as Farm A	Same as Farm B
R		0.89 miles WSW	Same as Farm A	I-131 - biweekly, monthly** - ERL Gamma Spec - quarterly - ERL
S		3.61 miles ESE	Same as Farm A	Same as Farm R
T		3.17 miles W	Same as Farm A	Same as Farm B

TABLE B-1: Sample Collection and Analysis Program for the Radiological Environmental Monitoring Program for Peach Bottom Atomic Power Station, 1999

Location	Location Description	Distance & Direction from PBAPS Vents	Collection Method and Frequency	Analysis & Frequency Performed—Consultant
G. Environmental Dosimetry - TLD				
Site Boundary				
1L	Peach Bottom Unit 3 Intake	0.24 miles NE	Collection method and frequency is described in placement procedure Section III, A.	TLD - quarterly - ERL
1P	Tower B & C Fence	0.40 miles ESE		TLD - quarterly - ERL
1A	Weather Station #1	0.26 miles SE		TLD - quarterly - ERL
1Q	Tower D & E Fence	0.62 miles SE		TLD - quarterly - ERL
1D	140° Sector	0.67 miles SE		TLD - quarterly - ERL
2	Peach Bottom 130° Sector Hill	0.88 miles SE		TLD - quarterly - ERL
1M	Discharge	1.03 miles SE		TLD - quarterly - ERL
1R	Transmission Line Hill	0.53 miles SSE		TLD - quarterly - ERL
1I	Peach Bottom South Substation	0.54 miles SSE		TLD - quarterly - ERL
2B	Burk Property	0.71 miles SSE		TLD - quarterly - ERL
1C	Peach Bottom South Substation	0.85 miles SSE		TLD - quarterly - ERL
1J	Peach Bottom 180° Sector Hill	0.71 miles S		TLD - quarterly - ERL
1F	Peach Bottom 200° Sector Hill	0.51 miles SSW		TLD - quarterly - ERL
40	Peach Bottom Site Area	1.46 miles SW		TLD - quarterly - ERL

TABLE B-1: Sample Collection and Analysis Program for the Radiological Environmental Monitoring Program for Peach Bottom Atomic Power Station, 1999

Location	Location Description	Distance & Direction from PBAPS Vents	Collection Method and Frequency	Analysis & Frequency Performed—Consultant
1NN	Peach Bottom Site	0.48 miles WSW		TLD - quarterly - ERL
1H	Peach Bottom 270° Sector Hill	0.59 miles W		TLD - quarterly - ERL
1G	Peach Bottom North Substation	0.60 miles WNW		TLD - quarterly - ERL
1B	Weather Station #2	0.49 miles NW		TLD - quarterly - ERL
1E	Peach Bottom 350° Sector Hill	0.59 miles NNW		TLD - quarterly - ERL
Intermediate Distance				
15	Silver Spring Rd	3.68 miles N		TLD - quarterly - ERL
22	Eagle Road	2.39 miles NNE		TLD - quarterly - ERL
44	Goshen Mill Rd	5.07 miles NE		TLD - quarterly - ERL
32	Slate Hill Rd	2.75 miles ENE		TLD - quarterly - ERL
45	PB-Keeney Line	3.38 miles ENE		TLD - quarterly - ERL
14	Peters Creek	1.97 miles E		TLD - quarterly - ERL
17	Riverview Rd	4.07 miles ESE		TLD - quarterly - ERL
31A	Eckman Rd	4.57 miles SE		TLD - quarterly - ERL
4K	Conowingo Dam Power House Roof	8.61 miles SE		TLD - quarterly - ERL

TABLE B-1: Sample Collection and Analysis Program for the Radiological Environmental Monitoring Program for Peach Bottom Atomic Power Station, 1999

Location	Location Description	Distance & Direction from PBAPS Vents	Collection Method and Frequency	Analysis & Frequency Performed—Consultant
23	Peach Bottom 150° Sector Hill	1.01 miles SSE		TLD - quarterly - ERL
27	N. Cooper Road	2.68 miles S		TLD - quarterly - ERL
48	Macton Substation	4.99 miles SSW		TLD - quarterly - ERL
3A	Delta, PA Substation	3.62 miles SW		TLD - quarterly - ERL
49	PB-Conastone Line	4.05 miles WSW		TLD - quarterly - ERL
50	TRANSCO Pumping Station	4.99 miles W		TLD - quarterly - ERL
51	Fin Substation	3.98 miles WNW		TLD - quarterly - ERL
26	Slab Road	4.23 miles NW		TLD - quarterly - ERL
6B	Holtwood Dam Power House Roof	5.78 miles NW		TLD - quarterly - ERL
42	Muddy Run Envir. Laboratory	4.13 miles NNW		TLD - quarterly - ERL
Distant and Special Interest				
43	Drumore Township School	5.00 miles NNE		TLD - quarterly - ERL
5	Wakefield, PA	4.64 miles E		TLD - quarterly - ERL
16	Nottingham, PA Substation (Control)	12.72 miles E		TLD - quarterly - ERL
24	Harrisville, MD Substation (Control)	10.91 miles ESE		TLD - quarterly - ERL

TABLE B-1: Sample Collection and Analysis Program for the Radiological Environmental Monitoring Program for Peach Bottom Atomic Power Station, 1999

Location	Location Description	Distance & Direction from PBAPS Vents	Collection Method and Frequency	Analysis & Frequency Performed—Consultant
46	Broad Creek	4.48 miles SSE		TLD - quarterly - ERL
47	Broad Creek Scout Camp	4.26 miles S		TLD - quarterly - ERL
18	Fawn Grove, PA (Control)	9.86 miles W		TLD - quarterly - ERL
19	Red Lion, PA (Control)	20.21 miles WNW		TLD - quarterly - ERL

* QC Laboratory
** Monthly from December through March when cows are off pasture.

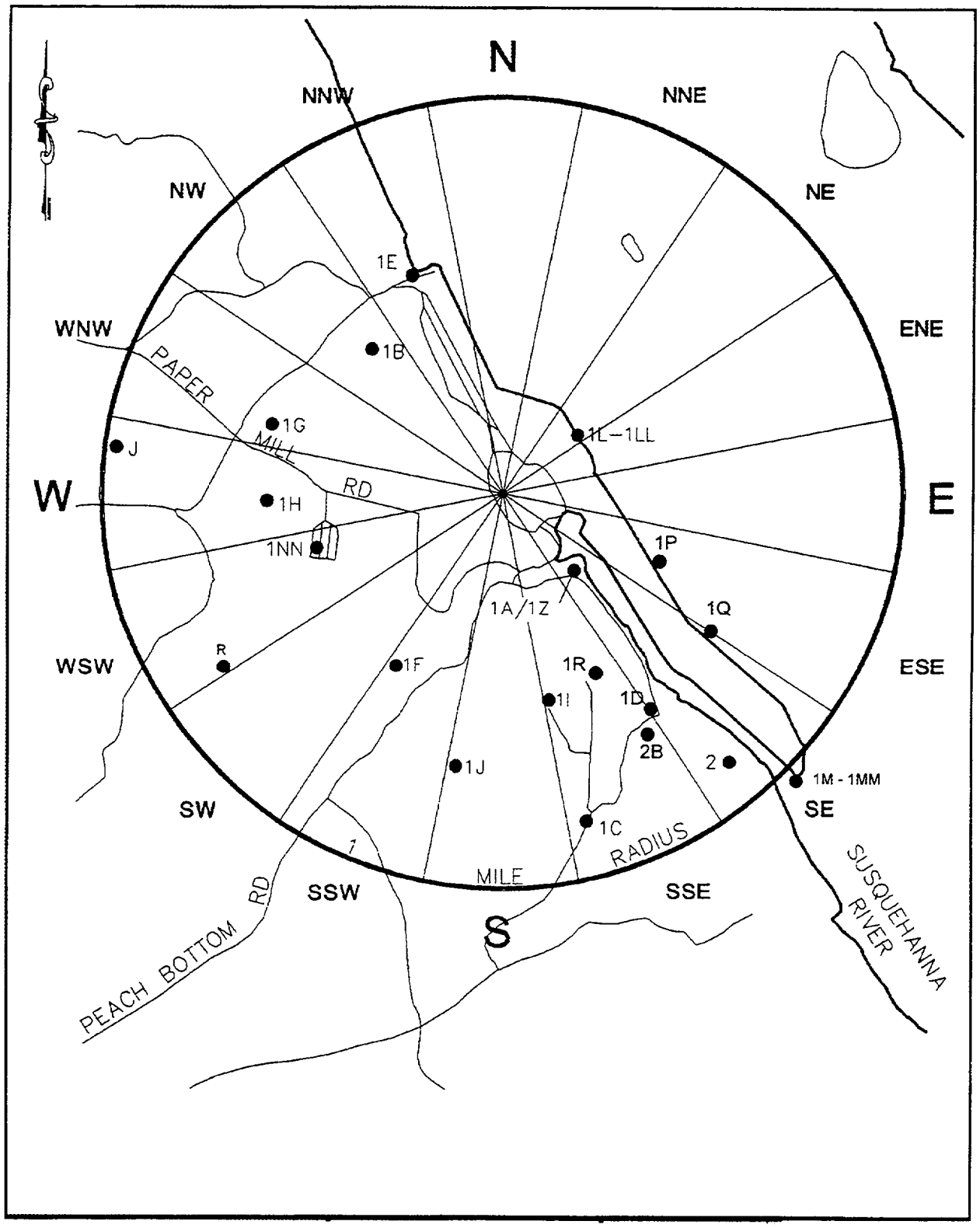


Figure B-1
Environmental Sampling Locations Within One
Mile of the Peach Bottom Atomic Power Station, 1999

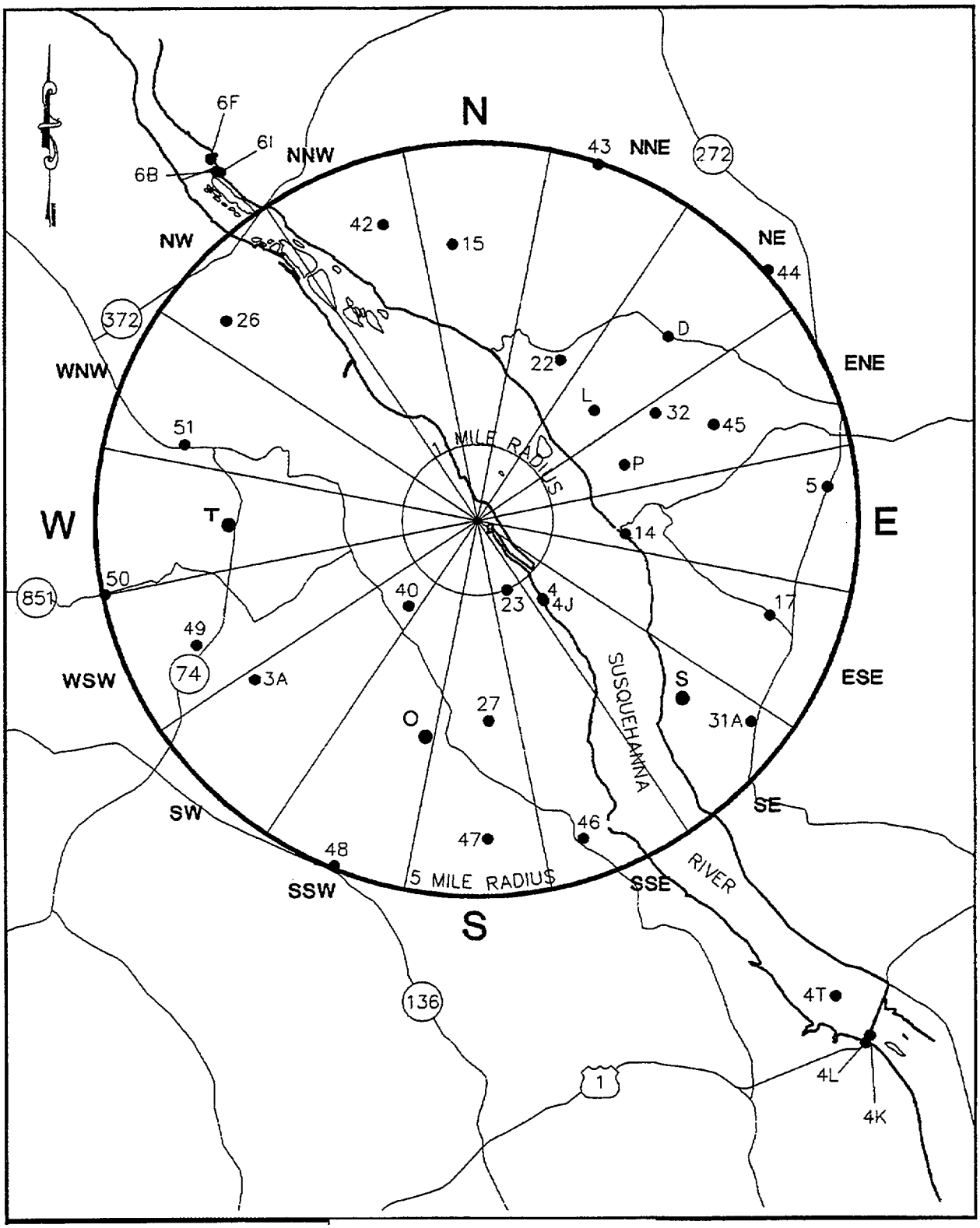


Figure B-2
Environmental Sampling Locations Between One and Approximately Five Miles of the Peach Bottom Atomic Power Station, 1999

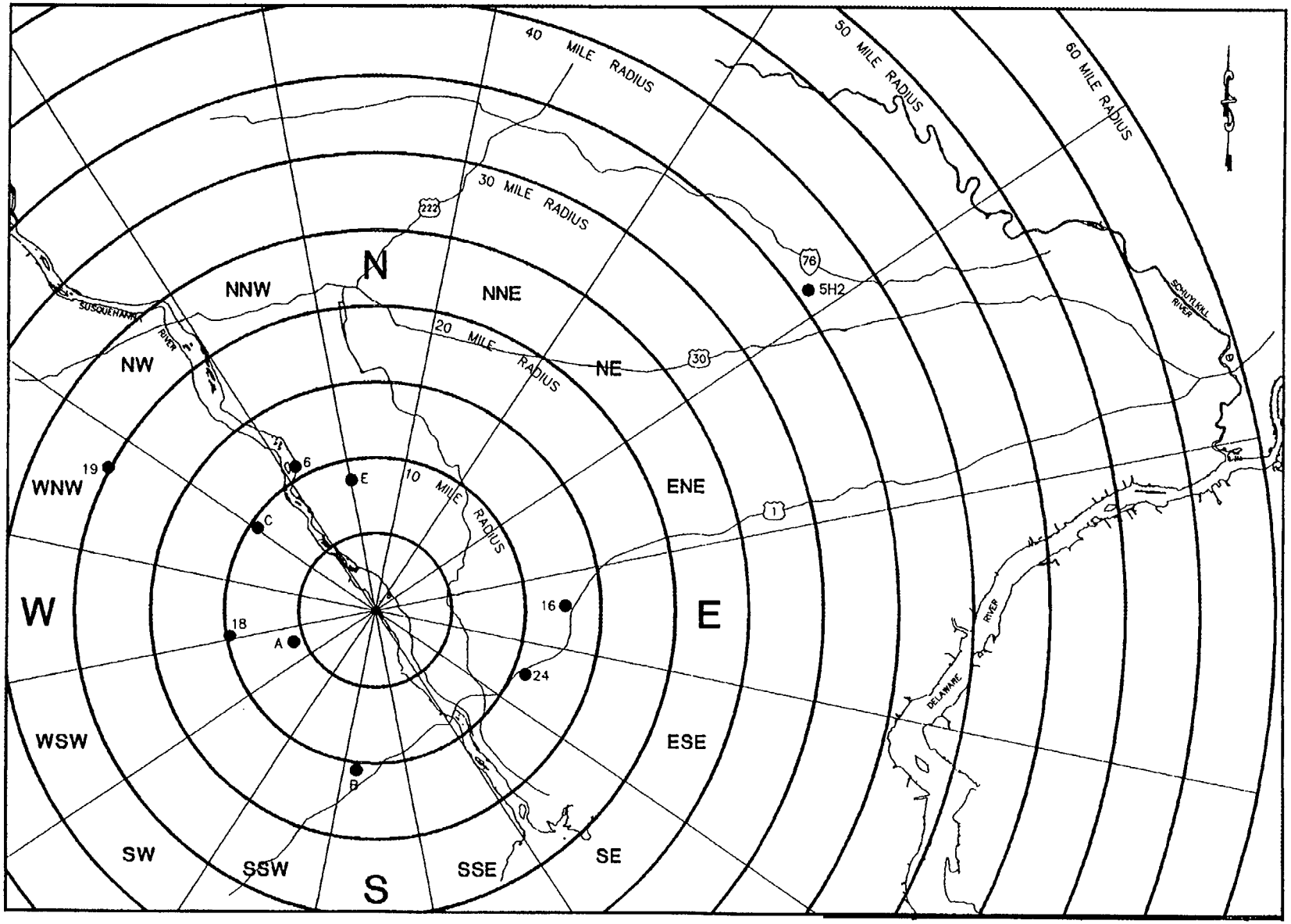


Figure B-3
Environmental Sampling Locations Greater Than
Five Miles from the Peach Bottom Atomic Power Station, 1999

APPENDIX C

DATA TABLES AND FIGURES
PRIMARY LABORATORY

APPENDIX C: DATA TABLES AND FIGURES - PRIMARY LABORATORY

TABLES

FIGURES

TABLE C-I.1 CONCENTRATIONS OF TITIUM IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1999

RESULTS IN UNITS OF PCI/LITER +/- 2 SIGMA

COLLECTION PERIOD	1LL	1MM
JAN-MAR	-1.5 ± 56	-24 ± 55
APR-JUN	95 ± 59	89 ± 59
JUL-SEP	250 ± 60	270 ± 70
OCT-DEC	47 ± 57	92 ± 58
MEAN	98 ± 218	107 ± 243

TABLE C-I.2 **CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1999**

RESULTS IN UNITS OF PCI/LITER +/- 2 SIGMA

STC	COLLECTION PERIOD	Be-7	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zr-95	Nb-95	Cs-134	Cs-137	Ba-140	La-140	Ra-226	Th-232
1LL	JAN	1 ± 8	-4 ± 14	0 ± 1	0 ± 1	1 ± 2	0 ± 1	-4 ± 2	2 ± 2	0 ± 1	-8 ± 1	0 ± 1	2 ± 4	0.1 ± 2	4 ± 24	-1 ± 4
	FEB	-9 ± 8	-6 ± 17	0 ± 1	0 ± 1	2 ± 2	0 ± 1	-5 ± 3	2 ± 2	2 ± 1	-7 ± 1	-1 ± 1	2 ± 5	-0.7 ± 2	12 ± 26	0 ± 4
	MAR	-11 ± 8	-6 ± 14	-1 ± 1	0 ± 1	0 ± 2	-1 ± 1	-5 ± 2	1 ± 2	1 ± 1	-5 ± 1	-1 ± 1	3 ± 5	0.4 ± 2	-2 ± 25	6 ± 3
	APR	1 ± 8	9 ± 15	0 ± 1	0 ± 1	2 ± 2	0 ± 1	-2 ± 2	-1 ± 2	1 ± 1	-4 ± 1	-1 ± 1	2 ± 4	-1.3 ± 2	13 ± 29	1 ± 5
	MAY	-18 ± 16	-5 ± 28	-2 ± 2	-3 ± 2	2 ± 4	1 ± 2	-7 ± 5	-1 ± 3	1 ± 2	-4 ± 2	0 ± 2	-6 ± 9	2.7 ± 4	39 ± 47	7 ± 8
	JUN	9 ± 14	17 ± 21	0 ± 2	-1 ± 2	1 ± 4	0 ± 2	-7 ± 4	1 ± 3	0 ± 2	-9 ± 2	0 ± 2	0 ± 7	-0.7 ± 4	5 ± 36	-3 ± 7
	JUL	6 ± 7	-12 ± 12	-1 ± 1	-1 ± 1	0 ± 2	0 ± 1	-3 ± 2	0 ± 1	0 ± 1	-5 ± 1	0 ± 1	-3 ± 4	0 ± 1	-4 ± 21	0 ± 3
	AUG	-11 ± 13	15 ± 22	0 ± 2	-1 ± 2	2 ± 4	0 ± 2	2 ± 4	1 ± 3	1 ± 2	-5 ± 2	-1 ± 2	-2 ± 8	-0.2 ± 3	-9 ± 34	4 ± 6
	SEP	0 ± 8	5 ± 15	0 ± 1	-1 ± 1	1 ± 2	-1 ± 1	-7 ± 3	1 ± 2	1 ± 1	-7 ± 1	-1 ± 1	2 ± 4	2.5 ± 2	-8 ± 26	0 ± 4
	OCT	1 ± 13	-9 ± 24	0 ± 2	-1 ± 2	4 ± 4	1 ± 2	-4 ± 4	1 ± 3	0 ± 2	-7 ± 2	0 ± 2	-1 ± 8	0.1 ± 3	-26 ± 36	9 ± 7
	NOV	7 ± 13	19 ± 21	0 ± 2	-2 ± 2	1 ± 4	-1 ± 2	-5 ± 4	0 ± 3	0 ± 2	-9 ± 2	-2 ± 2	-2 ± 8	0.7 ± 3	32 ± 36	4 ± 6
	DEC	8 ± 15	67 ± 39	2 ± 2	-1 ± 2	0 ± 4	0 ± 2	-4 ± 4	-1 ± 3	-2 ± 2	-4 ± 2	0 ± 2	-4 ± 8	-1.3 ± 3	-22 ± 45	-4 ± 9
	MEAN	-1 ± 18	8 ± 43	0 ± 2	-1 ± 2	1 ± 2	0 ± 1	-4 ± 5	0 ± 2	0 ± 2	-6 ± 4	-1 ± 1	-1 ± 5	0.2 ± 3	3 ± 39	2 ± 8
1MM	JAN	1 ± 7	4 ± 13	0 ± 1	0 ± 1	1 ± 2	0 ± 1	-2 ± 2	-1 ± 2	0 ± 1	-6 ± 1	0 ± 1	-2 ± 4	0.2 ± 1	-27 ± 31	0 ± 4
	FEB	-5 ± 8	-13 ± 13	0 ± 1	0 ± 1	0 ± 2	1 ± 1	-6 ± 2	1 ± 2	-1 ± 1	-6 ± 1	0 ± 1	-4 ± 5	-1.6 ± 1	-11 ± 30	-1 ± 4
	MAR	0 ± 8	8 ± 14	0 ± 1	0 ± 1	1 ± 2	1 ± 1	-3 ± 2	1 ± 2	0 ± 1	-3 ± 1	0 ± 1	-1 ± 4	0.6 ± 2	-13 ± 29	-4 ± 4
	APR	-3 ± 6	1 ± 12	-1 ± 1	0 ± 1	0 ± 2	0 ± 1	-3 ± 2	-1 ± 1	1 ± 1	-5 ± 1	0 ± 1	1 ± 4	-1.4 ± 1	-3 ± 24	0 ± 4
	MAY	12 ± 14	14 ± 22	-1 ± 2	1 ± 2	6 ± 4	2 ± 2	-3 ± 4	0 ± 3	0 ± 2	-6 ± 2	0 ± 2	-8 ± 8	-0.2 ± 3	-18 ± 38	7 ± 6
	JUN	7 ± 16	-8 ± 29	0 ± 2	-1 ± 2	0 ± 4	-2 ± 2	-10 ± 5	1 ± 3	1 ± 2	-10 ± 2	-1 ± 2	5 ± 9	-1.3 ± 4	-21 ± 48	-2 ± 9
	JUL	-2 ± 14	7 ± 22	0 ± 2	-1 ± 2	0 ± 3	-1 ± 2	-2 ± 4	-2 ± 3	-1 ± 2	-6 ± 2	-2 ± 2	4 ± 9	-0.7 ± 4	17 ± 39	1 ± 7
	AUG	7 ± 15	-7 ± 31	0 ± 2	2 ± 2	2 ± 4	1 ± 2	-2 ± 4	-1 ± 4	0 ± 2	-7 ± 2	0 ± 2	2 ± 8	-2.8 ± 4	16 ± 47	-4 ± 9
	SEP	3 ± 8	4 ± 15	0 ± 1	0 ± 1	3 ± 2	0 ± 1	-8 ± 3	0 ± 2	1 ± 1	-15 ± 2	0 ± 1	-2 ± 5	0 ± 2	-2 ± 30	0 ± 4
	OCT	-5 ± 15	5 ± 22	-1 ± 2	-2 ± 2	2 ± 5	0 ± 2	-7 ± 5	2 ± 4	0 ± 2	-6 ± 2	-1 ± 2	2 ± 9	0.4 ± 4	-12 ± 50	-3 ± 9
	NOV	4 ± 15	-17 ± 28	0 ± 2	-2 ± 2	5 ± 4	0 ± 2	-1 ± 5	-1 ± 4	1 ± 2	-7 ± 2	1 ± 2	2 ± 8	1.3 ± 4	-10 ± 46	-7 ± 9
	DEC	-3 ± 7	4 ± 12	0 ± 1	0 ± 1	2 ± 2	0 ± 1	0 ± 2	0 ± 1	0 ± 1	-2 ± 1	1 ± 1	1 ± 4	0.5 ± 1	-2 ± 19	0 ± 3
	MEAN	1 ± 11	0 ± 19	0 ± 1	0 ± 2	2 ± 3	0 ± 2	-4 ± 6	0 ± 2	0 ± 1	-7 ± 7	0 ± 2	0 ± 7	-0.4 ± 2	-7 ± 27	-1 ± 7

TABLE C-II.1 CONCENTRATIONS OF GROSS BETA INSOLUBLE IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1999

RESULTS IN UNITS OF PCI/LITER +/- 2 SIGMA

COLLECTION PERIOD	4L	6I
JAN	0.0 ± 0.7	-0.3 ± 0.6
FEB	-0.1 ± 0.7	0.2 ± 0.7
MAR	0.3 ± 0.7	0.3 ± 0.7
APR	-0.7 ± 0.7	-0.4 ± 0.7
MAY	0.3 ± 0.6	0.5 ± 0.6
JUN	-0.5 ± 0.7	-0.6 ± 0.7
JUL	-0.1 ± 0.7	-0.5 ± 0.7
AUG	0.3 ± 0.6	-0.4 ± 0.6
SEP	-0.1 ± 0.6	0.9 ± 0.7
OCT	-0.5 ± 0.6	-0.1 ± 0.6
NOV	-0.3 ± 0.6	-0.1 ± 0.6
DEC	0.3 ± 0.7	0.6 ± 0.7
MEAN	-0.1 ± 0.7	0.0 ± 0.9

TABLE II.2 CONCENTRATIONS OF GROSS BETA SOLUBLE IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1999

RESULTS IN UNITS OF PCI/LITER +/- 2 SIGMA

COLLECTION PERIOD	4L	6I
JAN	3.8 ± 1.0	2.9 ± 0.8
FEB	1.5 ± 0.8	1.9 ± 0.8
MAR	2.4 ± 1.1	3.2 ± 1.2
APR	1.3 ± 0.8	0.8 ± 0.8
MAY	1.5 ± 1.0	2.5 ± 1.1
JUN	1.9 ± 1.0	2.7 ± 1.1
JUL	1.6 ± 0.9	3.1 ± 1.0
AUG	7.3 ± 1.1	3.6 ± 1.0
SEP	6.4 ± 1.2	4.8 ± 1.1
OCT	3.0 ± 1.1	3.9 ± 1.1
NOV	2.8 ± 1.0	2.2 ± 1.0
DEC	2.4 ± 1.0	2.9 ± 1.0
MEAN	3.0 ± 3.9	2.9 ± 2.0

TABLE II-3 CONCENTRATIONS OF TRITIUM IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1999

RESULTS IN UNITS OF PCI/LITER +/- 2 SIGMA

COLLECTION PERIOD	4L	6I
JAN-MAR	88 ± 60	130 ± 60
APR-JUN	-4.5 ± 56	64 ± 58
JUL-SEP	180 ± 60	160 ± 60
OCT-DEC	56 ± 57	51 ± 57
MEAN	80 ± 154	101 ± 105

TABLE C-II.4 **CONCENTRATIONS OF GAMMA EMITTERS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1999**

RESULTS IN UNITS OF PCI/LITER +/- 2 SIGMA

STC	COLLECTION PERIOD	Be-7	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zr-95	Nb-95	Cs-134	Cs-137	Ba-140	La-140	Ra-226	Th-232
4L	JAN	-1 ± 6	-6 ± 12	0 ± 1	0 ± 1	1 ± 2	0 ± 1	-7 ± 2	1 ± 1	0 ± 1	-7 ± 1	0 ± 1	-2 ± 3	-1 ± 1	11 ± 20	2 ± 3
	FEB	8 ± 15	2 ± 28	0 ± 2	-1 ± 2	4 ± 4	0 ± 2	-12 ± 5	2 ± 3	1 ± 2	-13 ± 3	1 ± 2	-10 ± 8	-1 ± 4	-13 ± 50	1 ± 8
	MAR	2 ± 15	-22 ± 31	-1 ± 2	0 ± 2	2 ± 4	0 ± 2	-7 ± 4	1 ± 3	1 ± 2	-5 ± 2	-1 ± 2	1 ± 8	0 ± 3	-6 ± 46	-4 ± 1
	APR	0 ± 7	-2 ± 11	0 ± 1	0 ± 1	-1 ± 2	0 ± 1	-2 ± 2	1 ± 1	0 ± 1	-3 ± 1	0 ± 1	0 ± 3	-1 ± 1	6 ± 19	0 ± 3
	MAY	-7 ± 15	3 ± 29	1 ± 2	0 ± 2	1 ± 4	0 ± 2	-2 ± 4	-3 ± 3	1 ± 2	-5 ± 2	0 ± 2	-5 ± 9	0 ± 3	-12 ± 44	5 ± 8
	JUN	-5 ± 8	0 ± 12	0 ± 1	0 ± 1	1 ± 2	0 ± 1	1 ± 2	1 ± 2	2 ± 1	0 ± 1	-1 ± 1	3 ± 4	1 ± 1	-19 ± 29	3 ± 3
	JUL	-2 ± 6	7 ± 12	-1 ± 1	0 ± 1	1 ± 2	0 ± 1	-4 ± 2	0 ± 1	0 ± 1	-4 ± 1	0 ± 1	1 ± 4	0 ± 1	25 ± 21	-3 ± 3
	AUG	1 ± 7	-4 ± 14	0 ± 1	-1 ± 1	1 ± 2	-1 ± 1	-3 ± 2	0 ± 2	1 ± 1	-5 ± 1	-1 ± 1	3 ± 4	1 ± 1	-8 ± 26	1 ± 3
	SEP	2 ± 7	-1 ± 12	0 ± 1	-1 ± 1	1 ± 2	0 ± 1	-9 ± 2	2 ± 1	1 ± 1	0 ± 1	0 ± 1	1 ± 3	0 ± 1	-3 ± 25	-2 ± 4
	OCT	-2 ± 7	-5 ± 11	0 ± 1	0 ± 1	0 ± 2	0 ± 1	-1 ± 2	1 ± 1	0 ± 1	-3 ± 1	0 ± 1	0 ± 4	0 ± 1	-3 ± 20	-1 ± 2
	NOV	-3 ± 6	-5 ± 11	0 ± 1	0 ± 1	1 ± 2	0 ± 1	-2 ± 2	0 ± 1	0 ± 1	-3 ± 1	0 ± 1	-2 ± 3	0 ± 1	-1 ± 20	0 ± 3
	DEC	6 ± 8	0 ± 14	0 ± 1	0 ± 1	0 ± 2	0 ± 1	-2 ± 2	0 ± 2	1 ± 1	-4 ± 1	-1 ± 1	3 ± 4	0 ± 1	-25 ± 29	-2 ± 5
	MEAN	0 ± 9	-3 ± 14	0 ± 1	0 ± 1	1 ± 2	0 ± 1	-4 ± 8	0 ± 3	1 ± 1	-4 ± 7	0 ± 1	-1 ± 7	0 ± 1	-4 ± 27	0 ± 5
6I	JAN	0 ± 8	5 ± 14	0 ± 1	0 ± 1	0 ± 2	0 ± 1	-5 ± 2	0 ± 2	0 ± 1	-5 ± 1	0 ± 1	-2 ± 4	1 ± 1	-24 ± 31	0 ± 4
	FEB	2 ± 13	13 ± 18	0 ± 2	-1 ± 2	2 ± 4	-1 ± 2	-2 ± 4	2 ± 3	1 ± 2	-8 ± 2	0 ± 2	1 ± 7	0 ± 3	19 ± 37	11 ± 7
	MAR	-2 ± 12	8 ± 18	1 ± 2	0 ± 2	5 ± 4	0 ± 2	-2 ± 4	0 ± 3	-1 ± 2	-4 ± 2	0 ± 2	0 ± 7	0 ± 3	-12 ± 33	8 ± 6
	APR	6 ± 12	15 ± 21	-1 ± 2	0 ± 2	3 ± 4	3 ± 2	-1 ± 4	2 ± 3	1 ± 2	-5 ± 2	0 ± 2	-2 ± 6	-1 ± 3	31 ± 34	2 ± 6
	MAY	-8 ± 13	35 ± 21	0 ± 2	0 ± 2	4 ± 4	0 ± 2	-4 ± 4	0 ± 3	-1 ± 2	-5 ± 2	0 ± 2	7 ± 8	-2 ± 3	-5 ± 37	10 ± 6
	JUN	2 ± 7	10 ± 14	0 ± 1	0 ± 1	0 ± 2	0 ± 1	-1 ± 2	-2 ± 1	0 ± 1	0 ± 1	0 ± 1	3 ± 4	-1 ± 1	31 ± 23	1 ± 3
	JUL	-3 ± 13	-2 ± 23	-1 ± 2	-1 ± 2	-2 ± 4	1 ± 2	-3 ± 4	0 ± 3	0 ± 2	-5 ± 2	1 ± 2	2 ± 7	0 ± 3	39 ± 39	-4 ± 7
	AUG	-2 ± 7	9 ± 12	0 ± 1	0 ± 1	-1 ± 2	0 ± 1	-4 ± 2	0 ± 1	0 ± 1	-6 ± 1	0 ± 1	2 ± 3	0 ± 1	-14 ± 25	-2 ± 3
	SEP	17 ± 15	16 ± 29	-1 ± 2	0 ± 2	1 ± 4	0 ± 2	-6 ± 5	0 ± 3	-2 ± 2	-1 ± 2	0 ± 2	7 ± 8	-1 ± 3	23 ± 46	-2 ± 9
	OCT	0 ± 13	38 ± 24	0 ± 2	0 ± 1	3 ± 3	2 ± 2	-2 ± 3	0 ± 3	-1 ± 2	-5 ± 2	1 ± 2	-1 ± 7	-1 ± 2	-7 ± 35	4 ± 6
	NOV	2 ± 12	-1 ± 18	-1 ± 2	-1 ± 2	-1 ± 3	1 ± 2	-4 ± 4	-3 ± 3	-1 ± 1	-3 ± 2	-1 ± 2	1 ± 6	-1 ± 2	-1 ± 36	-2 ± 7
	DEC	-4 ± 8	8 ± 16	-1 ± 1	0 ± 1	-1 ± 2	1 ± 1	-5 ± 2	0 ± 2	1 ± 1	-3 ± 1	-1 ± 1	4 ± 4	-1 ± 2	-22 ± 26	-1 ± 3
	MEAN	1 ± 13	13 ± 25	0 ± 1	0 ± 1	1 ± 4	1 ± 2	-3 ± 3	0 ± 3	0 ± 2	-4 ± 5	0 ± 1	2 ± 6	0 ± 1	5 ± 45	2 ± 1

TABLE C-III.1 **CONCENTRATIONS OF GAMMA EMITTERS IN PREDATOR AND BOTTOM FEEDER FISH SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1999**

RESULTS IN UNITS OF PCI/KG WET +/- 2 SIGMA

STC	COLLECTION PERIOD	Be-7	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zr-95	Nb-95	Cs-134	Cs-137	Ba-140	La-140	Ra-226	Th-232
4	PREDATOR (FISH)															
	06/10 - 06/11/99	-10 ±39	3200 ±300	-1 ±5	-1 ±5	-4 ±10	1 ±5	-13 ±10	2 ±9	-5 ±5	-31 ±6	0 ±5	-13 ±20	-3 ±6	6 ±90	-6 ±20
	10/25 - 11/04/99	17 ±61	3000 ±400	1 ±8	-3 ±9	-8 ±20	2 ±10	-35 ±30	-3 ±10	4 ±9	-16 ±9	3 ±8	-2 ±40	-1 ±10	-24 ±100	8 ±30
	MEAN	4 ±38	3100 ±283	0 ±2	-2 ±2	-6 ±6	1 ±2	-24 ±31	0 ±6	-1 ±12	-24 ±21	1 ±5	-7 ±16	-2 ±3	-9 ±42	1 ±20
	BOTTOM FEEDER (FISH)															
	06/10 - 06/11/99	10 ±40	2700 ±300	-5 ±4	-2 ±4	3 ±10	-1 ±5	-1 ±10	4 ±8	2 ±5	-1 ±5	-1 ±5	-9 ±30	5 ±7	-21 ±100	12 ±20
	10/25 - 11/11/99	12 ±30	2900 ±300	3 ±4	1 ±4	2 ±10	2 ±4	-6 ±10	-1 ±8	2 ±5	-12 ±5	5 ±5	17 ±20	1 ±8	9 ±70	6 ±20
	MEAN	11 ±3	2800 ±283	-1 ±11	-1 ±4	2 ±2	1 ±4	-4 ±7	1 ±7	2 ±0	-7 ±15	2 ±8	4 ±36	3 ±5	-6 ±43	9 ±9
6	PREDATOR (FISH)															
	06/14 - 06/14/99	18 ±60	2900 ±400	2 ±8	2 ±7	15 ±20	1 ±8	-39 ±20	-2 ±10	-3 ±9	-24 ±9	0 ±9	-10 ±40	-2 ±10	54 ±100	8 ±30
	11/05 - 11/05/99	-11 ±70	2800 ±300	0 ±9	-1 ±9	3 ±20	-1 ±10	-18 ±30	7 ±10	7 ±10	-21 ±10	5 ±10	-5 ±40	6 ±10	-86 ±100	10 ±40
	MEAN	4 ±41	2850 ±141	1 ±3	1 ±4	9 ±16	0 ±3	-29 ±30	3 ±13	2 ±14	-23 ±4	2 ±8	-7 ±7	2 ±11	-16 ±198	9 ±4
	BOTTOM FEEDER (FISH)															
	06/11 - 06/12/99	14 ±30	2700 ±300	-1 ±4	0 ±5	-8 ±10	-3 ±5	-11 ±10	8 ±8	4 ±5	-20 ±6	-1 ±5	-1 ±20	3 ±6	22 ±80	-2 ±20
	11/09 - 11/10/99	-30 ±30	3000 ±300	1 ±4	-2 ±4	0 ±10	5 ±5	-15 ±10	-3 ±8	-3 ±5	-15 ±5	3 ±5	0 ±20	0 ±6	-30 ±90	-7 ±20
	MEAN	-8 ±62	2850 ±424	0 ±3	-1 ±3	-4 ±11	1 ±11	-13 ±6	2 ±16	1 ±8	-18 ±7	1 ±5	0 ±1	1 ±4	-4 ±74	-4 ±7

TABLE C-IV.1 CONCENTRATIONS OF GAMMA EMITTERS IN SILT SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1999

RESULTS IN UNITS OF PCI/KG DRY +/- 2 SIGMA

STC	COLLECTION PERIOD	Be-7	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zr-95	Nb-95	Cs-134	Cs-137	Ba-140	La-140	Ra-226	Th-232
4J	06/14/1999	-20 ± 160	19000 ± 2000	11 ± 20	-2 ± 20	7 ± 50	19 ± 20	58 ± 60	19 ± 40	44 ± 20	18 ± 20	290 ± 40	61 ± 100	-8 ± 40	2300 ± 600	1300 ± 200
	11/11/1999	300 ± 210	13000 ± 1000	13 ± 20	-12 ± 20	-43 ± 70	18 ± 30	21 ± 60	-7 ± 50	-15 ± 40	7 ± 20	45 ± 23	-270 ± 330	-23 ± 110	1400 ± 600	680 ± 150
	MEAN	140 ± 453	16000 ± 8485	12 ± 3	-7 ± 14	-18 ± 71	19 ± 1	40 ± 52	6 ± 37	15 ± 83	13 ± 15	168 ± 346	-105 ± 468	-15 ± 22	1850 ± 127	990 ± 877
4T	06/14/1999	1600 ± 500	30000 ± 3000	19 ± 50	-58 ± 50	-42 ± 100	17 ± 60	-240 ± 200	43 ± 100	27 ± 70	34 ± 50	370 ± 90	10 ± 300	-48 ± 100	5400 ± 150	2500 ± 400
	11/11/1999	310 ± 300	23000 ± 2000	7 ± 30	-5 ± 30	-130 ± 90	3 ± 30	10 ± 70	2 ± 60	-38 ± 50	5 ± 20	230 ± 40	-180 ± 500	-56 ± 200	2800 ± 900	1500 ± 200
	MEAN	955 ± 1824	26500 ± 9899	13 ± 17	-31 ± 76	-86 ± 124	10 ± 20	-115 ± 353	22 ± 58	-6 ± 92	19 ± 41	300 ± 198	-85 ± 269	-52 ± 11	4100 ± 367	2000 ± 141
6F	06/14/1999	200 ± 180	9700 ± 1000	-6 ± 20	-17 ± 20	-5 ± 40	-10 ± 20	-24 ± 50	24 ± 30	17 ± 20	3 ± 20	57 ± 36	-4 ± 96	0 ± 36	2000 ± 600	850 ± 150
	11/11/1999	80 ± 110	11000 ± 1000	8 ± 10	-18 ± 10	-11 ± 30	4 ± 10	11 ± 30	30 ± 25	52 ± 23	-1 ± 10	81 ± 13	110 ± 180	-60 ± 70	1800 ± 400	810 ± 80
	MEAN	140 ± 170	10350 ± 1838	1 ± 19	-18 ± 1	-8 ± 9	-3 ± 20	-7 ± 49	27 ± 8	35 ± 49	1 ± 6	69 ± 34	53 ± 161	-30 ± 84	1900 ± 283	830 ± 57

TABLE C-V.1 CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1999

RESULTS IN UNITS OF E-3 PCI/CU METER +/- 2 SIGMA

	GROUP I			GROUP II	GROUP III
WEEK NO	1B	1Z	2	3A	5H2
1	14 ± 3	15 ± 4	18 ± 4	18 ± 4	(1)
2	16 ± 3	16 ± 3	17 ± 3	19 ± 3	22 ± 3
3	11 ± 3	14 ± 3	12 ± 3	13 ± 3	22 ± 3
4	13 ± 3	11 ± 3	11 ± 3	14 ± 3	(1)
5	10 ± 3	12 ± 3	10 ± 3	9 ± 3	16 ± 4
6	13 ± 3	10 ± 2	13 ± 3	13 ± 3	7 ± 3
7	10 ± 4	10 ± 4	8 ± 4	10 ± 4	7 ± 3
8	9 ± 3	8 ± 3	6 ± 3	9 ± 3	12 ± 3
9	12 ± 3	10 ± 2	10 ± 2	11 ± 3	4 ± 3
10	14 ± 3	16 ± 3	10 ± 2	13 ± 3	11 ± 4
11	17 ± 4	14 ± 4	14 ± 4	10 ± 4	8 ± 2
12	11 ± 2	8 ± 2	8 ± 2	10 ± 2	14 ± 3
13	14 ± 3	14 ± 3	15 ± 3	(1)	11 ± 3
14	17 ± 3	12 ± 3	11 ± 3	16 ± 3	9 ± 2
15	13 ± 3	12 ± 3	14 ± 3	13 ± 3	13 ± 3
16	9 ± 2	8 ± 2	5 ± 2	9 ± 2	11 ± 3
17	12 ± 3	11 ± 3	9 ± 3	10 ± 3	14 ± 3
18	12 ± 3	14 ± 4	10 ± 3	9 ± 3	12 ± 2
19	12 ± 3	13 ± 3	12 ± 3	12 ± 3	7 ± 3
20	7 ± 2	6 ± 2	7 ± 2	6 ± 2	13 ± 3
21	18 ± 3	11 ± 3	14 ± 3	11 ± 3	8 ± 2
22	21 ± 4	20 ± 4	19 ± 4	21 ± 4	18 ± 3
23	17 ± 4	14 ± 4	16 ± 4	19 ± 4	14 ± 4
24	8 ± 2	9 ± 2	7 ± 2	7 ± 2	8 ± 3
25	14 ± 3	9 ± 3	11 ± 3	14 ± 3	7 ± 2
26	10 ± 3	10 ± 3	8 ± 3	13 ± 3	12 ± 3
27	17 ± 3	(1)	17 ± 3	17 ± 3	13 ± 3
28	13 ± 3	11 ± 3	10 ± 3	11 ± 3	15 ± 3
29	19 ± 4	18 ± 4	19 ± 4	24 ± 4	18 ± 3
30	22 ± 3	23 ± 3	23 ± 3	24 ± 4	21 ± 4
31	22 ± 3	25 ± 4	18 ± 3	19 ± 3	16 ± 3
32	21 ± 3	22 ± 3	23 ± 3	20 ± 3	20 ± 4
33	21 ± 4	(1)	21 ± 4	22 ± 4	16 ± 3
34	16 ± 4	16 ± 4	(1)	15 ± 4	18 ± 4
35	19 ± 4	17 ± 4	18 ± 4	21 ± 4	19 ± 4
36	14 ± 4	16 ± 4	14 ± 4	14 ± 4	14 ± 3
37	13 ± 5	13 ± 5	12 ± 5	14 ± 5	24 ± 5
38	16 ± 4	18 ± 4	17 ± 4	16 ± 4	16 ± 4
39	25 ± 3	28 ± 4	27 ± 4	25 ± 4	20 ± 4
40	19 ± 3	21 ± 3	19 ± 3	19 ± 3	25 ± 4
41	18 ± 4	19 ± 4	20 ± 4	18 ± 4	18 ± 3
42	14 ± 3	21 ± 4	16 ± 3	18 ± 4	10 ± 3
43	16 ± 4	15 ± 4	14 ± 4	18 ± 4	14 ± 4
44	25 ± 3	29 ± 4	23 ± 3	29 ± 4	25 ± 4
45	28 ± 4	25 ± 3	29 ± 4	31 ± 4	21 ± 3
46	20 ± 4	20 ± 4	23 ± 4	19 ± 4	26 ± 4
47	7 ± 2	9 ± 2	6 ± 2	8 ± 2	13 ± 3
48	23 ± 3	22 ± 3	21 ± 3	21 ± 3	10 ± 3
49	18 ± 4	(1)	19 ± 4	19 ± 4	20 ± 4
50	16 ± 4	13 ± 4	16 ± 4	14 ± 4	23 ± 3
51	19 ± 4	18 ± 4	18 ± 4	16 ± 4	13 ± 3
52	22 ± 4	17 ± 4	19 ± 4	19 ± 4	15 ± 4
53					21 ± 4
MEAN	16 ± 10	15 ± 11	15 ± 11	16 ± 11	15 ± 11

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

TABLE C-V.2 MONTHLY AND YEARLY MEAN VALUES OF GROSS BETA CONCENTRATIONS (E-3 PCI/CU. METER) IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1999

GROUP I - ON-SITE LOCATIONS				GROUP II - INTERMEDIATE DISTANCE LOCATION				GROUP III - CONTROL LOCATION			
COLLECTION PERIOD	MIN.	MAX.	MEAN +/- 2 SD	COLLECTION PERIOD	MIN.	MAX.	MEAN +/- 2 SD	COLLECTION PERIOD	MIN.	MAX.	MEAN +/- 2 SD
01/02/1999 - 01/29/1999	11	18	14 ± 5	01/02/1999 - 01/29/1999	13	19	16 ± 6	01/27/1999 - 02/01/1999	16	22	20 ± 7
01/29/1999 - 02/26/1999	6	13	10 ± 4	01/29/1999 - 02/26/1999	9	13	10 ± 4	02/01/1999 - 03/01/1999	4	12	8 ± 7
02/26/1999 - 04/02/1999	8	17	12 ± 6	02/26/1999 - 03/26/1999	10	13	11 ± 3	03/01/1999 - 03/29/1999	8	14	11 ± 5
04/02/1999 - 04/30/1999	5	17	11 ± 6	04/03/1999 - 04/30/1999	9	16	12 ± 7	03/29/1999 - 05/03/1999	9	14	12 ± 4
04/30/1999 - 06/04/1999	6	21	13 ± 10	04/30/1999 - 06/04/1999	6	21	12 ± 11	05/03/1999 - 06/01/1999	7	18	11 ± 10
06/04/1999 - 07/02/1999	7	17	11 ± 7	06/04/1999 - 07/02/1999	7	19	13 ± 10	06/01/1999 - 06/28/1999	7	14	10 ± 7
07/02/1999 - 07/30/1999	10	23	17 ± 9	07/02/1999 - 07/30/1999	11	24	19 ± 13	06/28/1999 - 08/02/1999	13	21	17 ± 6
07/30/1999 - 09/03/1999	16	25	20 ± 6	07/30/1999 - 09/03/1999	15	22	19 ± 5	08/02/1999 - 08/30/1999	16	20	18 ± 3
09/03/1999 - 10/01/1999	12	28	18 ± 11	09/03/1999 - 10/01/1999	14	25	17 ± 11	08/30/1999 - 10/04/1999	14	25	20 ± 10
10/01/1999 - 10/29/1999	14	21	18 ± 5	10/01/1999 - 10/29/1999	18	19	18 ± 1	10/04/1999 - 11/01/1999	10	25	17 ± 13
10/29/1999 - 12/05/1999	6	29	21 ± 15	10/29/1999 - 12/05/1999	8	31	22 ± 18	11/01/1999 - 11/29/1999	10	26	17 ± 15
12/05/1999 - 12/31/1999	13	22	18 ± 5	12/05/1999 - 12/31/1999	14	19	17 ± 5	11/29/1999 - 01/03/2000	13	23	18 ± 8
01/02/1999 - 12/31/1999	5	29	15 ± 11	01/02/1999 - 12/31/1999	6	31	16 ± 11	01/27/1999 - 01/03/2000	4	26	15 ± 11

NOTE; GROUP I CONSISTS OF LOCATIONS 1B, 1Z, AND 1C
GROUP II CONSISTS OF LOCATION 3A
GROUP III CONSISTS OF LOCATION 5H2

TABLE C-V.3 CONCENTRATION OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1999

RESULTS IN UNITS OF E-3 PCI/CU METER +/- 2 SIGMA

STC	COLLECTION PERIOD	Be-7	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zr-95	Nb-95	Cs-134	Cs-137	Ba-140	La-140	Ra-226	Th-232
1B	01/02 - 04/02/1999	62 ± 17	-3 ± 13	0.5 ± 1	-1.2 ± 1	-1 ± 2	-1 ± 1	-1 ± 2	0 ± 2	1 ± 1	-0.1 ± 1	-0.4 ± 1	3 ± 5	0 ± 2	-5 ± 16	-1 ± 3
	04/02 - 07/02/1999	110 ± 20	5 ± 10	-0.2 ± 1	0.7 ± 1	1 ± 2	0 ± 1	-2 ± 3	-1 ± 2	0 ± 2	-0.2 ± 1	-0.5 ± 1	10 ± 8	1 ± 3	15 ± 20	3 ± 5
	07/02 - 10/01/1999	77 ± 15	8 ± 12	-0.1 ± 1	0.2 ± 1	0 ± 1	0 ± 1	-3 ± 2	0 ± 1	0 ± 1	-0.3 ± 1	0.1 ± 1	-1 ± 6	-1 ± 3	11 ± 17	-1 ± 3
	10/01 - 12/31/1999	49 ± 12	7 ± 10	-0.3 ± 1	-0.1 ± 1	-1 ± 2	0 ± 1	-2 ± 2	1 ± 1	1 ± 1	-0.1 ± 1	-0.3 ± 1	-3 ± 6	1 ± 2	-3 ± 11	-1 ± 2
	MEAN	75 ± 53	4 ± 10	0 ± 1	-0.1 ± 2	0 ± 2	0 ± 1	-2 ± 2	0 ± 1	0 ± 1	-0.2 ± 0	-0.3 ± 1	2 ± 11	0 ± 2	5 ± 20	0 ± 4
1C	01/02 - 04/02/1999	52 ± 14	-5 ± 9	0.6 ± 1	0 ± 1	0 ± 2	-1 ± 1	-1 ± 2	0 ± 1	0 ± 1	0.4 ± 1	-0.2 ± 1	-2 ± 4	0 ± 2	7 ± 13	-1 ± 3
	04/02 - 07/02/1999	84 ± 18	-2 ± 8	0.3 ± 1	0.1 ± 1	1 ± 1	0 ± 1	-2 ± 2	1 ± 1	0 ± 1	-0.3 ± 1	0.2 ± 1	4 ± 5	2 ± 2	-6 ± 12	-1 ± 3
	07/02 - 10/01/1999	84 ± 22	19 ± 23	1 ± 1	0 ± 1	-2 ± 3	1 ± 2	0 ± 4	0 ± 2	0 ± 2	-3 ± 2	1 ± 1	8 ± 7	-1 ± 3	-10 ± 18	0 ± 6
	10/01 - 12/31/1999	52 ± 13	-6 ± 12	-0.8 ± 1	-0.3 ± 1	0 ± 1	0 ± 1	-1 ± 2	2 ± 2	1 ± 1	-0.1 ± 1	0.5 ± 1	2 ± 6	-1 ± 2	-8 ± 15	0 ± 3
	MEAN	68 ± 37	2 ± 23	0.3 ± 2	-0.1 ± 0	0 ± 2	0 ± 2	-1 ± 1	0 ± 2	0 ± 1	-0.8 ± 3	0.4 ± 1	3 ± 8	0 ± 3	-4 ± 15	-1 ± 1
1Z	01/02 - 04/02/1999	67 ± 14	-1 ± 12	0.6 ± 1	-0.6 ± 1	0 ± 3	0 ± 1	1 ± 2	-1 ± 1	0 ± 1	0 ± 1	-0.5 ± 1	-2 ± 4	1 ± 3	14 ± 14	0 ± 3
	04/02 - 07/02/1999	80 ± 19	10 ± 11	0.4 ± 1	-0.5 ± 1	2 ± 2	0 ± 1	-5 ± 3	-1 ± 2	-1 ± 1	-0.3 ± 1	-0.2 ± 1	5 ± 6	0 ± 3	5 ± 16	2 ± 4
	07/02 - 10/01/1999	74 ± 16	11 ± 14	-0.3 ± 1	-0.1 ± 1	-3 ± 3	0 ± 2	-5 ± 3	-2 ± 2	0 ± 1	0.3 ± 1	0.1 ± 1	0 ± 6	1 ± 3	-1 ± 13	0 ± 4
	10/01 - 12/31/1999	43 ± 20	10 ± 14	-1 ± 1	-0.2 ± 1	-2 ± 3	1 ± 1	-6 ± 4	0 ± 2	0 ± 1	-0.6 ± 2	0.6 ± 1	-3 ± 10	0 ± 1	-1 ± 16	-2 ± 3
	MEAN	66 ± 32	7 ± 12	-0.1 ± 1	-0.4 ± 0	-1 ± 4	0 ± 1	-4 ± 6	-1 ± 2	0 ± 1	-0.1 ± 1	0 ± 1	0 ± 7	0 ± 1	4 ± 14	0 ± 3
3A	01/02 - 04/02/1999	66 ± 20	4 ± 15	1.1 ± 1	0.8 ± 1	-1 ± 3	0 ± 1	4 ± 3	-1 ± 3	1 ± 2	-0.6 ± 1	-0.2 ± 1	2 ± 6	1 ± 2	-14 ± 21	-1 ± 4
	04/03 - 07/02/1999	86 ± 20	14 ± 19	-0.8 ± 1	0.2 ± 1	0 ± 3	0 ± 1	-2 ± 3	0 ± 2	1 ± 2	0 ± 1	0.4 ± 1	2 ± 9	-1 ± 3	2 ± 15	1 ± 3
	07/02 - 10/01/1999	70 ± 21	6 ± 14	0 ± 1	0.8 ± 2	2 ± 3	0 ± 1	-3 ± 4	1 ± 2	-1 ± 2	0.1 ± 1	-0.4 ± 1	-4 ± 7	-1 ± 4	0 ± 15	-3 ± 5
	10/01 - 12/31/1999	48 ± 17	10 ± 15	0.5 ± 1	0.2 ± 2	-2 ± 3	0 ± 1	2 ± 3	1 ± 3	0 ± 2	0.3 ± 1	0.9 ± 1	-8 ± 11	1 ± 4	-1 ± 17	-2 ± 4
	MEAN	68 ± 31	9 ± 9	0.2 ± 2	0.5 ± 1	0 ± 3	0 ± 1	0 ± 7	0 ± 2	0 ± 2	0 ± 1	0.2 ± 1	-2 ± 9	0 ± 2	-3 ± 15	-1 ± 3
5H2	12/29 - 03/29/1999	82 ± 16	8 ± 15	0.6 ± 1	-0.1 ± 1	0 ± 2	-1 ± 1	-3 ± 3	0 ± 2	0 ± 1	-0.1 ± 1	-1.3 ± 1	3 ± 7	0 ± 3	0 ± 14	-4 ± 4
	03/29 - 06/28/1999	74 ± 21	4 ± 12	0.6 ± 1	0.1 ± 1	2 ± 2	-1 ± 1	-3 ± 3	1 ± 1	1 ± 1	0.1 ± 1	-0.4 ± 1	-1 ± 7	1 ± 4	0 ± 15	0 ± 3
	06/28 - 09/27/1999	87 ± 20	-1 ± 10	0.2 ± 1	0.5 ± 1	-1 ± 2	0 ± 0	-1 ± 2	0 ± 2	0 ± 1	-1.8 ± 1	0.8 ± 1	0 ± 5	-1 ± 2	13 ± 13	0 ± 3
	09/27 - 01/03/1999	56 ± 19	4 ± 16	0.5 ± 1	-0.3 ± 1	2 ± 3	1 ± 1	2 ± 3	0 ± 2	1 ± 2	-1.1 ± 1	-0.7 ± 1	3 ± 7	0 ± 3	-4 ± 16	0 ± 4
	MEAN	75 ± 27	4 ± 7	0.4 ± 0	0 ± 1	0 ± 2	0 ± 2	-1 ± 5	0 ± 2	0 ± 1	-0.7 ± 2	-0.4 ± 2	1 ± 3	0 ± 2	2 ± 15	-1 ± 4

TABLE C-VI.1 CONCENTRATIONS OF I-131 IN AIR IODINE SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1999

RESULTS IN UNITS OF E-3 PCI/CU METER +/- 2 SIGMA

	GROUP I			GROUP II	GROUP III
WEEK NO	1B	1Z	1C	3A	5H2
1	-1 ± 14	3 ± 12	-11 ± 14	5 ± 23	(1)
2	-12 ± 15	0 ± 12	17 ± 17	7 ± 16	5 ± 22
3	-7 ± 11	2 ± 13	-14 ± 18	11 ± 14	7 ± 9
4	0 ± 11	-10 ± 13	2 ± 18	9 ± 12	(1)
5	-5 ± 18	11 ± 16	0 ± 12	8 ± 17	0 ± 16
6	-3 ± 10	-6 ± 11	9 ± 10	-5 ± 16	1 ± 12
7	-8 ± 14	3 ± 16	3 ± 23	-9 ± 22	-1 ± 8
8	-7 ± 19	4 ± 13	-31 ± 21	16 ± 16	-10 ± 12
9	5 ± 15	-5 ± 15	14 ± 17	18 ± 19	-1 ± 11
10	2 ± 15	1 ± 14	-4 ± 18	0 ± 15	-4 ± 9
11	-7 ± 10	3 ± 10	0 ± 10	-7 ± 16	0 ± 8
12	4 ± 16	-11 ± 15	6 ± 14	1 ± 8	-3 ± 11
13	3 ± 15	1 ± 10	5 ± 16	(1)	5 ± 8
14	-9 ± 16	4 ± 17	13 ± 13	-1 ± 13	1 ± 7
15	10 ± 19	2 ± 10	15 ± 19	-9 ± 14	0 ± 16
16	-5 ± 15	6 ± 12	9 ± 14	8 ± 10	-2 ± 13
17	-7 ± 14	3 ± 16	11 ± 22	5 ± 10	-1 ± 10
18	-6 ± 13	4 ± 14	-2 ± 16	-8 ± 11	-3 ± 14
19	-9 ± 12	-3 ± 12	3 ± 12	-2 ± 16	-1 ± 10
20	-7 ± 13	4 ± 12	-1 ± 16	-13 ± 16	-3 ± 11
21	5 ± 15	4 ± 15	15 ± 20	-4 ± 19	-3 ± 10
22	6 ± 12	3 ± 13	-23 ± 23	-17 ± 20	2 ± 7
23	0 ± 11	-3 ± 12	1 ± 17	2 ± 21	-7 ± 11
24	13 ± 19	0 ± 11	-7 ± 17	-7 ± 20	-5 ± 13
25	6 ± 14	-8 ± 12	7 ± 18	10 ± 12	4 ± 8
26	-5 ± 16	13 ± 21	2 ± 15	2 ± 12	1 ± 12
27	0 ± 14	(1)	4 ± 13	8 ± 16	7 ± 9
28	3 ± 13	3 ± 12	11 ± 20	-5 ± 15	2 ± 17
29	-2 ± 17	3 ± 14	0 ± 18	0 ± 12	13 ± 12
30	-10 ± 15	14 ± 17	0 ± 20	-6 ± 26	0 ± 9
31	3 ± 13	-10 ± 15	-9 ± 15	-8 ± 14	0 ± 12
32	1 ± 12	5 ± 15	-7 ± 16	8 ± 14	8 ± 12
33	-2 ± 14	(1)	-18 ± 16	-12 ± 17	6 ± 19
34	5 ± 18	7 ± 13	(1)	18 ± 13	6 ± 9
35	8 ± 10	-7 ± 10	8 ± 13	3 ± 12	2 ± 9
36	-5 ± 14	-10 ± 13	3 ± 20	-9 ± 17	7 ± 11
37	-17 ± 17	-7 ± 16	2 ± 20	-5 ± 22	9 ± 12
38	8 ± 15	6 ± 16	-7 ± 17	1 ± 12	1 ± 9
39	4 ± 15	0 ± 16	12 ± 19	0 ± 16	1 ± 11
40	3 ± 17	-1 ± 14	2 ± 18	3 ± 15	7 ± 11
41	4 ± 12	6 ± 15	-5 ± 20	0 ± 18	1 ± 9
42	-2 ± 11	-1 ± 14	1 ± 18	4 ± 19	4 ± 13
43	-3 ± 12	1 ± 13	7 ± 14	-1 ± 17	0 ± 13
44	3 ± 18	3 ± 12	9 ± 19	3 ± 18	0 ± 11
45	13 ± 13	-1 ± 13	-11 ± 18	12 ± 19	1 ± 10
46	-8 ± 17	-1 ± 11	-6 ± 15	-12 ± 14	-14 ± 11
47	5 ± 11	-3 ± 14	-8 ± 19	-5 ± 13	10 ± 13
48	2 ± 8	2 ± 8	-2 ± 13	-4 ± 8	-3 ± 13
49	-4 ± 13	±	2 ± 10	-22 ± 16	-1 ± 14
50	13 ± 13	-11 ± 14	2 ± 18	-8 ± 19	0 ± 12
51	11 ± 11	7 ± 19	7 ± 16	4 ± 15	-1 ± 11
52	6 ± 12	-10 ± 13	11 ± 16	-12 ± 16	-4 ± 12
53					10 ± 11
MEAN	0 ± 14	0 ± 12	1 ± 20	0 ± 18	1 ± 10

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

TABLE C-VII.1 CONCENTRATIONS OF I-131 IN MILK SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1999

RESULTS IN UNITS OF PCI/LITER +/- 2 SIGMA

	NEAR FARMS				INTERMEDIATE DISTANT FARMS				DISTANT FARMS			
COLLECTION PERIOD	J	O	R	S	D	L	P	T	A	B	C	E
01/18/1999	-0.1 ±0.2	0.1 ±0.2	0.1 ±0.2	0 ±0.3					0 ± 0.2			
02/15/1999	0 ±0.2	0.3 ±0.2	0 ±0.2	0 ±0.2	0.2 ± 0.2	0 ± 0.2	0 ± 0.2	-0.1 ± 0.2	0.1 ± 0.2	0.1 ± 0.2	0.2 ± 0.2	0.1 ± 0.2
03/15/1999	0.1 ±0.2	0 ±0.2	-0.1 ±0.2	0 ±0.2					0.2 ± 0.2			
04/12/1999	0.2 ±0.3	0.1 ±0.3	0 ±0.2	0.2 ±0.2					-0.1 ± 0.2			
04/26/1999	-0.3 ±0.3	-0.2 ±0.2	0 ±0.2	0 ±0.3					-0.1 ± 0.2			
05/10/1999	0 ±0.3	0.2 ±0.3	-0.2 ±0.2	0.1 ±0.2	0.1 ± 0.3	0.1 ± 0.2	0.1 ± 0.2	0.1 ± 0.2	0.4 ± 0.2	0.1 ± 0.2	-0.1 ± 0.2	-0.2 ± 0.3
05/24/1999	-0.1 ±0.2	0 ±0.2	0 ±0.2	0.1 ±0.2					0 ± 0.2			
06/07/1999	-0.1 ±0.2	0 ±0.2	0 ±0.2	0.2 ±0.2					0 ± 0.2			
06/21/1999	0.2 ±0.2	0 ±0.3	0 ±0.2	0.1 ±0.2					0 ± 0.2			
07/05/1999	0.1 ±0.2	-0.1 ±0.2	0 ±0.2	0.2 ±0.2					-0.1 ± 0.2			
07/19/1999	0 ±0.2	0 ±0.2	0.1 ±0.2	0.2 ±0.2					-0.1 ± 0.2			
08/02/1999	0.1 ±0.2	0 ±0.2	0.2 ±0.2	0 ±0.2					-0.1 ± 0.2			
08/16/1999	0 ±0.2	-0.1 ±0.3	-0.1 ±0.2	0 ±0.2	0.1 ± 0.3	0 ± 0.2	0.2 ± 0.2	0 ± 0.3	-0.1 ± 0.2	0 ± 0.2	0.2 ± 0.2	0.1 ± 0.2
08/30/1999	0.1 ±0.2	0 ±0.2	0.1 ±0.2	0 ±0.2					0 ± 0.2			
09/13/1999	-0.1 ±0.2	-0.1 ±0.2	-0.1 ±0.3	0 ±0.2					0 ± 0.2			
09/27/1999	0 ±0.2	0 ±0.2	-0.1 ±0.2	0.1 ±0.2					0 ± 0.2			
10/11/1999	0.1 ±0.2	0 ±0.2	-0.1 ±0.3	0.1 ±0.2					0.1 ± 0.2			
10/25/1999	0.1 ±0.2	0.3 ±0.2	0 ±0.2	0.2 ±0.2					-0.1 ± 0.2			
11/07/1999									0 ± 0.2			
11/08/1999	-0.2 ±0.3	0.1 ±0.3	0 ±0.2	0 ±0.2	0.1 ± 0.2	0.1 ± 0.2	-0.2 ± 0.3	(1)		-0.1 ± 0.2	0 ± 0.3	0.1 ± 0.3
11/22/1999	0 ±0.3	-0.1 ±0.2	-0.1 ±0.2	0 ±0.2					0 ± 0.2			
12/06/1999	-0.1 ±0.2	0 ±0.2	-0.1 ±0.2	0.3 ±0.2					0 ± 0.2			
MEAN	0 ±0.2	0 ±0.2	0 ±0.2	0 ±0.3	0.1 ± 0.1	0 ± 0.1	0 ± 0.3	0 ± 0.1	0 ± 0.2	0 ± 0.2	0.1 ± 0.2	0 ± 0.3

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

TABLE C-VII.2 CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1999

RESULTS IN UNITS OF PCI/LITER +/- 2 SIGMA

STC	COLLECTION PERIOD	Be-7	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zr-95	Nb-95	Cs-134	Cs-137	Ba-140	La-140	Ra-226	Th-232
A	02/15/1999	-1 ±15	1500 ±100	0 ±2	0 ±2	0 ±5	0 ±2	-10 ±6	-2 ±4	-1 ±2	-12 ±2	0 ±2	-2 ±7	0 ±2	-24 ±40	3 ±9
	05/10/1999	-2 ±15	1500 ±100	-1 ±2	1 ±2	-2 ±5	-2 ±2	-5 ±6	0 ±4	1 ±2	-7 ±2	0 ±2	1 ±7	1 ±2	7 ±40	7 ±9
	08/16/1999	0 ±15	1500 ±100	0 ±2	-1 ±2	0 ±5	0 ±2	-8 ±6	0 ±4	1 ±2	-12 ±2	0 ±2	0 ±7	-1 ±2	26 ±40	-2 ±9
	11/07/1999	-2 ±15	1500 ±100	-1 ±2	0 ±2	5 ±5	5 ±2	-2 ±6	-4 ±4	0 ±2	-14 ±2	-2 ±2	-2 ±7	0 ±2	11 ±40	4 ±9
	MEAN	-1 ±2	1500 ±0	0 ±2	0 ±1	1 ±5	0 ±1	-6 ±6	-1 ±4	1 ±2	-11 ±6	0 ±2	-1 ±3	0 ±1	5 ±38	3 ±7
J	02/15/1999	7 ±10	1400 ±100	0 ±2	-2 ±2	4 ±5	4 ±3	-5 ±6	-1 ±3	1 ±2	-10 ±2	0 ±2	-1 ±7	-2 ±3	10 ±40	3 ±8
	05/10/1999	2 ±10	1400 ±100	0 ±2	0 ±2	1 ±5	1 ±3	-2 ±6	-1 ±3	-1 ±2	-6 ±2	0 ±2	1 ±7	-3 ±3	7 ±40	4 ±8
	08/16/1999	2 ±10	1500 ±100	-1 ±2	-1 ±2	-1 ±5	-1 ±3	-5 ±6	1 ±3	1 ±2	-6 ±2	0 ±2	0 ±7	0 ±3	-4 ±40	1 ±8
	11/08/1999	-20 ±10	1400 ±100	-2 ±2	0 ±2	-1 ±5	-1 ±3	-2 ±6	-1 ±3	0 ±2	1 ±2	1 ±2	-2 ±7	1 ±3	-23 ±40	-1 ±8
	MEAN	-2 ±22	1425 ±89	-1 ±2	-1 ±2	1 ±4	0 ±1	-3 ±4	0 ±1	0 ±2	-5 ±8	0 ±1	0 ±2	-1 ±3	-3 ±26	2 ±3
O	02/15/1999	14 ±20	1400 ±100	-1 ±2	-2 ±2	-4 ±5	-4 ±3	-11 ±7	0 ±4	1 ±3	-1 ±2	1 ±2	0 ±8	0 ±3	-3 ±50	-3 ±10
	05/10/1999	-9 ±20	1300 ±100	-1 ±2	-1 ±2	2 ±5	2 ±3	5 ±7	-2 ±4	1 ±3	-1 ±2	-2 ±2	1 ±8	-1 ±3	15 ±50	-4 ±10
	08/16/1999	-4 ±20	1600 ±100	0 ±2	0 ±2	0 ±5	0 ±3	-4 ±7	0 ±4	0 ±3	-3 ±2	0 ±2	0 ±8	0 ±3	-2 ±50	4 ±10
	11/08/1999	5 ±20	1500 ±100	0 ±2	-1 ±2	-2 ±5	-2 ±3	-11 ±7	0 ±4	2 ±3	0 ±2	1 ±2	6 ±8	-2 ±3	45 ±50	4 ±10
	MEAN	1 ±18	1450 ±231	-1 ±1	-1 ±1	-1 ±4	1 ±3	-5 ±14	-1 ±1	1 ±1	-1 ±2	0 ±2	2 ±5	-1 ±2	14 ±40	0 ±8
R	02/15/1999	7 ±9	1600 ±200	0 ±1	0 ±1	1 ±2	1 ±1	-6 ±3	1 ±2	1 ±1	-9 ±1	0 ±1	1 ±4	0 ±1	8 ±30	5 ±4
	05/10/1999	-2 ±9	1600 ±200	0 ±1	0 ±1	-1 ±2	-1 ±1	-4 ±3	0 ±2	1 ±1	-6 ±1	-1 ±1	1 ±4	0 ±1	-1 ±30	0 ±4
	08/16/1999	-7 ±9	1400 ±200	-1 ±1	-1 ±1	-1 ±2	-1 ±1	-11 ±3	-2 ±2	1 ±1	-9 ±1	0 ±1	1 ±4	0 ±1	15 ±30	-2 ±4
	11/08/1999	5 ±9	1500 ±200	1 ±1	-1 ±1	0 ±2	0 ±1	-11 ±3	0 ±2	1 ±1	-3 ±1	1 ±1	-4 ±4	0 ±1	-18 ±30	-1 ±4
	MEAN	1 ±11	1525 ±171	0 ±1	-1 ±1	0 ±2	0 ±2	-8 ±6	0 ±2	1 ±0	-7 ±5	0 ±1	0 ±4	0 ±0	1 ±26	1 ±5
S	02/15/1999	-1 ±10	1400 ±100	-1 ±2	0 ±2	7 ±5	7 ±2	-6 ±6	1 ±3	2 ±2	-2 ±2	0 ±2	-1 ±6	0 ±2	14 ±40	1 ±8
	05/10/1999	-4 ±10	1600 ±100	0 ±2	-1 ±2	1 ±5	1 ±2	-2 ±6	-1 ±3	1 ±2	-8 ±2	0 ±2	2 ±6	1 ±2	0 ±40	1 ±8
	08/16/1999	-2 ±10	1500 ±100	-1 ±2	-1 ±2	1 ±5	1 ±2	-6 ±6	-1 ±3	1 ±2	-7 ±2	1 ±2	0 ±6	0 ±2	-5 ±40	2 ±8
	11/08/1999	12 ±10	1600 ±100	0 ±2	0 ±2	0 ±5	0 ±2	-11 ±6	3 ±3	0 ±2	-13 ±2	0 ±2	-4 ±6	0 ±2	-38 ±40	2 ±8
	MEAN	1 ±13	1525 ±171	-1 ±1	0 ±1	2 ±6	0 ±1	-6 ±7	1 ±3	1 ±2	-8 ±8	0 ±1	-1 ±4	0 ±0	-7 ±39	2 ±2

TABLE C-VII.1 QUARTERLY TLD RESULTS FOR PEACH BOTTOM ATOMIC POWER STATION, 1999

RESULTS IN UNITS OF MILLI-ROENTGEN/STD. +/- 2 SIGMA

STATION CODE	MEAN[1] +/- 2 S.D.	JAN-MAR	APR-JUN	JUL-SEP	OCT-DEC
1A	5.4 ± 0.9	4.8 ± 0.1	5.5 ± 0.4	5.7 ± 0.3	5.8 ± 0.2
1B	5.0 ± 0.6	4.6 ± 0.3	4.8 ± 0.3	5.2 ± 0.3	5.3 ± 0.4
1C	6.2 ± 0.7	5.8 ± 0.4	6.0 ± 0.4	6.5 ± 0.4	6.4 ± 0.3
1D	5.7 ± 0.4	5.7 ± 0.1	5.5 ± 0.3	5.8 ± 0.6	5.9 ± 0.3
1E	5.6 ± 0.3	5.5 ± 0.1	5.4 ± 0.4	5.8 ± 0.5	5.8 ± 0.4
1F	7.1 ± 0.6	6.8 ± 0.7	7.0 ± 0.2	7.4 ± 0.2	7.4 ± 0.3
1G	4.4 ± 0.4	4.3 ± 0.4	4.2 ± 0.3	4.5 ± 0.7	4.5 ± 0.3
1H	6.0 ± 0.8	5.7 ± 0.3	5.7 ± 0.3	6.3 ± 0.1	6.4 ± 0.2
1I	4.8 ± 0.5	4.5 ± 0.3	4.7 ± 0.4	4.9 ± 0.3	5.0 ± 0.1
1J	7.1 ± 0.5	6.8 ± 0.6	7.0 ± 0.5	7.3 ± 0.3	7.3 ± 0.4
1L	4.8 ± 0.2	4.9 ± 0.3	4.8 ± 0.2	4.8 ± 0.6	4.7 ± 0.3
1M	3.2 ± 0.4	3.2 ± 0.2	3.0 ± 0.2	3.0 ± 0.1	3.4 ± 0.2
1P	3.6 ± 0.3	3.8 ± 0.2	3.6 ± 0.2	3.4 ± 0.2	3.8 ± 0.1
1Q	4.2 ± 0.4	4.3 ± 0.3	4.0 ± 0.1	4.0 ± 0.3	4.4 ± 0.2
1R	6.5 ± 0.3	6.5 ± 0.2	6.5 ± 0.3	6.3 ± 0.4	6.7 ± 0.6
2	5.9 ± 0.1	5.9 ± 0.3	5.9 ± 0.5	5.9 ± 0.3	6.0 ± 0.1
2B	5.4 ± 0.3	5.3 ± 0.6	5.4 ± 0.3	5.3 ± 0.1	5.6 ± 0.4
3A	4.2 ± 0.3	4.1 ± 0.6	4.0 ± 0.2	4.1 ± 0.3	4.4 ± 0.3
4K	3.7 ± 0.4	3.7 ± 0.0	3.6 ± 0.1	3.6 ± 0.2	4.0 ± 0.1
5	5.5 ± 0.4	5.2 ± 0.5	5.5 ± 0.1	5.6 ± 0.3	5.7 ± 0.1
1NN	6.7 ± 0.4	6.5 ± 0.7	6.6 ± 0.2	6.8 ± 0.3	7.0 ± 0.5
6B	4.8 ± 0.4	4.7 ± 0.4	4.8 ± 0.2	4.7 ± 0.3	5.1 ± 0.2
14	5.8 ± 0.4	5.7 ± 0.4	5.7 ± 0.3	6.0 ± 0.3	6.1 ± 0.3
15	6.2 ± 0.3	6.0 ± 0.4	6.1 ± 0.3	6.3 ± 0.5	6.4 ± 0.2
16	6.2 ± 0.2	6.1 ± 0.3	6.3 ± 0.5	6.3 ± 0.2	6.3 ± 0.2
17	7.0 ± 0.9	6.6 ± 0.6	7.5 ± 0.6	6.7 ± 0.4	7.1 ± 0.3
18	6.5 ± 0.3	6.4 ± 0.3	6.5 ± 0.3	6.5 ± 0.4	6.8 ± 0.5
19	6.6 ± 0.5	6.3 ± 0.4	6.5 ± 0.1	6.7 ± 0.2	6.8 ± 0.2
22	6.3 ± 0.3	6.3 ± 0.6	6.2 ± 0.5	6.1 ± 0.5	6.4 ± 0.3
23	6.2 ± 0.6	5.8 ± 0.1	6.3 ± 0.4	6.2 ± 0.4	6.6 ± 0.5
24	4.7 ± 0.1	4.7 ± 0.4	4.6 ± 0.5	4.6 ± 0.2	4.7 ± 0.2
26	6.8 ± 0.5	6.7 ± 0.5	6.7 ± 0.8	6.7 ± 0.5	7.2 ± 0.3
27	6.4 ± 0.5	6.2 ± 0.6	6.3 ± 0.5	6.4 ± 0.5	6.8 ± 0.3
31A	4.5 ± 0.4	4.3 ± 0.2	4.5 ± 0.3	4.5 ± 0.3	4.8 ± 0.2
32	6.7 ± 0.5	6.4 ± 0.5	6.6 ± 0.2	6.6 ± 0.6	7.0 ± 0.4
40	7.3 ± 0.3	7.3 ± 0.6	7.2 ± 0.8	7.3 ± 0.4	7.5 ± 0.5
42	5.1 ± 0.5	5.2 ± 0.3	5.0 ± 0.2	4.8 ± 0.4	5.4 ± 0.1
43	6.9 ± 0.4	7.0 ± 0.6	6.8 ± 0.7	6.8 ± 0.2	7.2 ± 0.3
44	5.8 ± 0.4	5.8 ± 0.5	5.9 ± 0.6	5.6 ± 0.3	6.0 ± 0.2
45	6.6 ± 0.3	6.5 ± 0.6	6.7 ± 0.5	6.4 ± 0.2	6.8 ± 0.1
46	5.6 ± 0.3	5.6 ± 0.4	5.7 ± 0.3	5.4 ± 0.4	5.7 ± 0.2
47	6.9 ± 0.6	6.8 ± 0.6	7.1 ± 0.7	6.6 ± 0.7	7.3 ± 0.1
48	6.1 ± 0.6	5.7 ± 0.4	6.3 ± 0.4	6.1 ± 0.4	6.4 ± 0.3
49	6.3 ± 0.4	6.5 ± 0.7	6.4 ± 0.4	6.0 ± 0.4	6.4 ± 0.1
50	7.2 ± 0.4	7.2 ± 0.6	7.0 ± 0.6	7.3 ± 0.4	7.5 ± 0.2
51	6.4 ± 0.4	6.4 ± 0.3	6.5 ± 0.2	6.2 ± 0.4	6.6 ± 0.7

(1) MEAN AND TWO TIMES THE STANDARD DEVIATION OF THE QUARTERLY RESULTS

TABLE C-VIII.2 1999 MEAN TLD RESULTS FROM PEACH BOTTOM ATOMIC POWER STATION FOR THE SITE BOUNDARY, MIDDLE, AND OUTER RINGS 1999

RESULTS IN UNITS OF MILLI-ROENTGEN/STD. MO. +/- 2 STANDARD DEVIATIONS OF THE STATION DATA

EXPOSURE PERIOD	SITE RING	MIDDLE RING	OUTER RING
JAN-MAR	5.4 ± 2.2	5.8 ± 1.9	5.9 ± 1.6
APR-JUN	5.4 ± 2.4	6.0 ± 2.0	6.0 ± 1.8
JUL-SEP	5.6 ± 2.5	5.9 ± 1.9	6.0 ± 1.9
OCT-DEC	5.7 ± 2.4	6.2 ± 1.9	6.2 ± 1.9

TABLE C-VIII.3 SUMMARY OF THE 1999 AMBIENT DOSIMETRY PROGRAM FOR PEACH BOTTOM ATOMIC POWER STATION

RESULTS IN UNITS OF MILLI-ROENTGEN/STD. MO.

LOCATION	SAMPLES ANALYZED	PERIOD MINIMUM	PERIOD MAXIMUM	PERIOD MEAN +/- 2 S.D.	PRE-OP MEAN +/- 2 S.D.
SITE RING	76	3.0	7.5	5.5 ± 2.4	5.4 ± 1.7
MIDDLE RING	92	3.6	7.5	6.0 ± 1.9	5.3 ± 1.3
OUTER RING	16	4.6	6.8	6.0 ± 1.6	5.7 ± 1.8

THE PRE-OPERATIONAL MEAN WAS CALCULATED FROM TLD READINGS 01/07/73 TO 08/05/73.
SITE BOUNDARY RING STATIONS - 1A, 1B, 1C, 1D, 1E, 1F, 1G, 1H, 1I, 1J, 1L, 1M, 1NN, 1P, 1W, 1R, 2, 2B,40
MIDDLE RING STATIONS - 3A, 4K, 5, 6B, 14, 15, 17, 22, 23, 26, 27, 31A, 32, 42, 43, 44, 45, 46, 47, 48, 49,
OUTER RING STATIONS - 16, 18, 19, 24

TABLE C-IX.1 SUMMARY OF COLLECTION DATES FOR SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1999

SURFACE WATER (TRITIUM)

COLLECTION PERIOD	1LL	1MM
JAN-MAR	12/30/1998 - 03/31/1999	12/30/1998 - 03/31/1999
APR-JUN	03/31/1999 - 06/30/1999	03/31/1999 - 06/30/1999
JUL-SEP	06/30/1999 - 09/29/1999	06/30/1999 - 09/29/1999
OCT-DEC	09/29/1999 - 12/29/1999	09/29/1999 - 12/29/1999

SURFACE WATER (GAMMA SPECTROSCOPY)

COLLECTION PERIOD	1LL	1MM
JAN	12/30/1998 - 02/03/1999	12/30/1998 - 02/03/1999
FEB	02/03/1999 - 03/03/1999	02/03/1999 - 03/03/1999
MAR	03/03/1999 - 03/31/1999	03/03/1999 - 03/31/1999
APR	03/31/1999 - 04/28/1999	03/31/1999 - 04/28/1999
MAY	04/28/1999 - 06/02/1999	04/28/1999 - 06/02/1999
JUN	06/02/1999 - 06/30/1999	06/02/1999 - 06/30/1999
JUL	06/30/1999 - 07/28/1999	06/30/1999 - 07/28/1999
AUG	07/28/1999 - 09/01/1999	07/28/1999 - 09/01/1999
SEP	09/01/1999 - 09/29/1999	09/01/1999 - 09/29/1999
OCT	09/29/1999 - 11/03/1999	09/29/1999 - 11/03/1999
NOV	11/03/1999 - 12/01/1999	11/03/1999 - 12/01/1999
DEC	12/01/1999 - 12/29/1999	12/01/1999 - 12/29/1999

DRINKING WATER (TRITIUM)

COLLECTION PERIOD	4L	6I
JAN-MAR	01/02/1999 - 04/02/1999	01/02/1999 - 04/02/1999
APR-JUN	04/02/1999 - 07/02/1999	04/02/1999 - 07/02/1999
JUL-SEP	07/02/1999 - 10/01/1999	07/02/1999 - 10/01/1999
OCT-DEC	10/01/1999 - 12/31/1999	10/01/1999 - 12/31/1999

DRINKING WATER (GROSS BETA & GAMMA)

COLLECTION PERIOD	4L	6I
JAN	01/02/1999 - 02/05/1999	01/02/1999 - 02/05/1999
FEB	02/05/1999 - 03/05/1999	02/05/1999 - 03/05/1999
MAR	03/05/1999 - 04/02/1999	03/05/1999 - 04/02/1999
APR	04/02/1999 - 04/30/1999	04/02/1999 - 04/30/1999
MAY	04/30/1999 - 06/04/1999	04/30/1999 - 06/04/1999
JUN	06/04/1999 - 07/02/1999	06/04/1999 - 07/02/1999
JUL	07/02/1999 - 07/30/1999	07/02/1999 - 07/30/1999
AUG	07/30/1999 - 09/03/1999	07/30/1999 - 09/03/1999
SEP	09/03/1999 - 10/01/1999	09/03/1999 - 10/01/1999
OCT	10/01/1999 - 11/05/1999	10/01/1999 - 11/05/1999
NOV	11/05/1999 - 12/05/1999	11/05/1999 - 12/05/1999
DEC	12/05/1999 - 12/31/1999	12/05/1999 - 12/31/1999

TABLE C-IX.1 SUMMARY OF COLLECTION DATES FOR SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1999

AIR PARTICULATE & AIR IODINE (G. BETA & I-131)

SAMPLING PERIOD	1B	1Z	1C	3A	5H2
1	01/02 - 01/08/1999	01/02 - 01/08/1999	01/02 - 01/08/1999	01/02 - 01/08/1999	-
2	01/08 - 01/15/1999	01/08 - 01/15/1999	01/08 - 01/15/1999	01/08 - 01/15/1999	01/04 - 01/11/1999
3	01/15 - 01/22/1999	01/15 - 01/22/1999	01/15 - 01/22/1999	01/15 - 01/22/1999	01/11 - 01/18/1999
4	01/22 - 01/29/1999	01/22 - 01/29/1999	01/22 - 01/29/1999	01/22 - 01/29/1999	-
5	01/29 - 02/05/1999	01/29 - 02/05/1999	01/29 - 02/05/1999	01/29 - 02/05/1999	01/27 - 02/01/1999
6	02/05 - 02/13/1999	02/05 - 02/13/1999	02/05 - 02/13/1999	02/05 - 02/13/1999	02/01 - 02/08/1999
7	02/13 - 02/19/1999	02/13 - 02/19/1999	02/13 - 02/19/1999	02/13 - 02/19/1999	02/08 - 02/15/1999
8	02/19 - 02/26/1999	02/19 - 02/26/1999	02/19 - 02/26/1999	02/19 - 02/26/1999	02/15 - 02/22/1999
9	02/26 - 03/05/1999	02/26 - 03/05/1999	02/26 - 03/05/1999	02/26 - 03/05/1999	02/22 - 03/01/1999
10	03/05 - 03/12/1999	03/05 - 03/12/1999	03/05 - 03/12/1999	03/05 - 03/12/1999	03/01 - 03/08/1999
11	03/12 - 03/18/1999	03/12 - 03/18/1999	03/12 - 03/18/1999	03/12 - 03/18/1999	03/08 - 03/15/1999
12	03/18 - 03/26/1999	03/18 - 03/26/1999	03/18 - 03/26/1999	03/18 - 03/26/1999	03/15 - 03/22/1999
13	03/26 - 04/02/1999	03/26 - 04/02/1999	03/26 - 04/02/1999	-	03/22 - 03/29/1999
14	04/02 - 04/09/1999	04/02 - 04/09/1999	04/02 - 04/09/1999	04/03 - 04/09/1999	03/29 - 04/05/1999
15	04/09 - 04/16/1999	04/09 - 04/16/1999	04/09 - 04/16/1999	04/09 - 04/16/1999	04/05 - 04/12/1999
16	04/16 - 04/23/1999	04/16 - 04/23/1999	04/16 - 04/23/1999	04/16 - 04/23/1999	04/12 - 04/19/1999
17	04/23 - 04/30/1999	04/23 - 04/30/1999	04/23 - 04/30/1999	04/23 - 04/30/1999	04/19 - 04/26/1999
18	04/30 - 05/07/1999	04/30 - 05/07/1999	04/30 - 05/07/1999	04/30 - 05/07/1999	04/26 - 05/03/1999
19	05/07 - 05/14/1999	05/07 - 05/14/1999	05/07 - 05/14/1999	05/07 - 05/14/1999	05/03 - 05/10/1999
20	05/14 - 05/21/1999	05/14 - 05/21/1999	05/14 - 05/21/1999	05/14 - 05/21/1999	05/10 - 05/17/1999
21	05/21 - 05/28/1999	05/21 - 05/28/1999	05/21 - 05/28/1999	05/21 - 05/28/1999	05/17 - 05/24/1999
22	05/28 - 06/04/1999	05/28 - 06/04/1999	05/28 - 06/04/1999	05/28 - 06/04/1999	05/24 - 06/01/1999
23	06/04 - 06/11/1999	06/04 - 06/11/1999	06/04 - 06/11/1999	06/04 - 06/11/1999	06/01 - 06/07/1999
24	06/11 - 06/18/1999	06/11 - 06/18/1999	06/11 - 06/18/1999	06/11 - 06/11/1999	06/07 - 06/14/1999
25	06/18 - 06/25/1999	06/18 - 06/25/1999	06/18 - 06/25/1999	06/18 - 06/25/1999	06/14 - 06/21/1999
26	06/25 - 07/02/1999	06/25 - 07/02/1999	06/25 - 07/02/1999	06/25 - 07/02/1999	06/21 - 06/28/1999
27	07/02 - 07/09/1999	-	07/02 - 07/09/1999	07/02 - 07/09/1999	06/28 - 07/06/1999
28	07/09 - 07/16/1999	07/09 - 07/16/1999	07/09 - 07/16/1999	07/09 - 07/16/1999	07/06 - 07/12/1999
29	07/16 - 07/23/1999	07/16 - 07/23/1999	07/16 - 07/23/1999	07/16 - 07/23/1999	07/12 - 07/19/1999
30	07/23 - 07/30/1999	07/23 - 07/30/1999	07/23 - 07/30/1999	07/23 - 07/30/1999	07/19 - 07/26/1999
31	07/30 - 08/06/1999	07/30 - 08/06/1999	07/30 - 08/06/1999	07/30 - 08/06/1999	07/26 - 08/02/1999
32	08/06 - 08/13/1999	08/06 - 08/13/1999	08/06 - 08/13/1999	08/06 - 08/13/1999	08/02 - 08/09/1999
33	08/13 - 08/20/1999	-	08/13 - 08/20/1999	08/13 - 08/20/1999	08/09 - 08/16/1999
34	08/20 - 08/27/1999	08/20 - 08/27/1999	-	08/20 - 08/27/1999	08/16 - 08/23/1999
35	08/27 - 09/03/1999	08/27 - 09/03/1999	08/27 - 09/03/1999	08/27 - 09/03/1999	08/23 - 08/30/1999
36	09/03 - 09/10/1999	09/03 - 09/10/1999	09/03 - 09/10/1999	09/03 - 09/10/1999	08/30 - 09/07/1999
37	09/10 - 09/17/1999	09/10 - 09/17/1999	09/10 - 09/17/1999	09/10 - 09/17/1999	09/07 - 09/13/1999
38	09/17 - 09/24/1999	09/17 - 09/24/1999	09/17 - 09/24/1999	09/17 - 09/24/1999	09/13 - 09/20/1999
39	09/24 - 10/01/1999	09/24 - 10/01/1999	09/24 - 10/01/1999	09/24 - 10/01/1999	09/20 - 09/27/1999
40	10/01 - 10/08/1999	10/01 - 10/08/1999	10/01 - 10/08/1999	10/01 - 10/08/1999	09/27 - 10/04/1999
41	10/08 - 10/15/1999	10/08 - 10/15/1999	10/08 - 10/15/1999	10/08 - 10/15/1999	10/04 - 10/11/1999
42	10/15 - 10/22/1999	10/15 - 10/22/1999	10/15 - 10/22/1999	10/15 - 10/22/1999	10/11 - 10/18/1999
43	10/22 - 10/29/1999	10/22 - 10/29/1999	10/22 - 10/29/1999	10/22 - 10/29/1999	10/18 - 10/25/1999
44	10/29 - 11/05/1999	10/29 - 11/05/1999	10/29 - 11/05/1999	10/29 - 11/05/1999	10/25 - 11/01/1999
45	11/05 - 11/12/1999	11/05 - 11/12/1999	11/05 - 11/12/1999	11/05 - 11/12/1999	11/01 - 11/08/1999
46	11/12 - 11/19/1999	11/12 - 11/19/1999	11/12 - 11/19/1999	11/12 - 11/19/1999	11/08 - 11/15/1999
47	11/19 - 11/26/1999	11/19 - 11/26/1999	11/19 - 11/26/1999	11/19 - 11/26/1999	11/15 - 11/22/1999
48	11/26 - 12/05/1999	11/26 - 12/05/1999	11/26 - 12/05/1999	11/26 - 12/05/1999	11/22 - 11/29/1999
49	12/05 - 12/10/1999	-	12/05 - 12/10/1999	12/05 - 12/10/1999	11/29 - 12/06/1999
50	12/10 - 12/17/1999	12/10 - 12/17/1999	12/10 - 12/17/1999	12/10 - 12/17/1999	12/06 - 12/13/1999
51	12/17 - 12/24/1999	12/17 - 12/24/1999	12/17 - 12/24/1999	12/17 - 12/24/1999	12/13 - 12/20/1999
52	12/24 - 12/31/1999	12/24 - 12/31/1999	12/24 - 12/31/1999	12/24 - 12/31/1999	12/20 - 12/27/1999
53					12/27 - 01/03/2000

AIR PARTICULATE (GAMMA SPECTROSCOPY)

JAN-MAR	01/02 - 04/02/1999	01/02 - 04/02/1999	01/02 - 04/02/1999	01/02 - 04/02/1999	12/29 - 03/29/1999
APR-JUN	04/02 - 07/02/1999	04/02 - 07/02/1999	04/02 - 07/02/1999	04/03 - 07/02/1999	03/29 - 06/28/1999
JUL-SEP	07/02 - 10/01/1999	07/02 - 10/01/1999	07/02 - 10/01/1999	07/02 - 10/01/1999	06/28 - 09/27/1999
OCT-DEC	10/01 - 12/31/1999	10/01 - 12/31/1999	10/01 - 12/31/1999	10/01 - 12/31/1999	09/27 - 01/03/2000

TABLE C-IX.1 SUMMARY OF COLLECTION DATES FOR SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1999

STATION CODE	JAN-MAR	APR-JUN	JUL-SEP	OCT-DEC
1A	01/02/1999 - 04/02/1999	04/02/1999 - 07/01/1999	07/01/1999 - 10/01/1999	10/01/1999 - 12/31/1999
1B	01/02/1999 - 04/02/1999	04/02/1999 - 07/02/1999	07/02/1999 - 10/01/1999	10/01/1999 - 12/31/1999
1C	01/02/1999 - 04/02/1999	04/02/1999 - 07/02/1999	07/02/1999 - 10/01/1999	10/01/1999 - 12/31/1999
1D	01/04/1999 04/02/1999	04/02/1999 - 07/01/1999	07/01/1999 - 10/01/1999	10/01/1999 - 12/31/1999
1E	01/02/1999 - 04/01/1999	04/01/1999 - 07/01/1999	07/01/1999 - 09/30/1999	09/30/1999 - 12/30/1999
1F	01/04/1999 - 04/02/1999	04/02/1999 - 07/01/1999	07/01/1999 - 09/30/1999	09/30/1999 - 12/30/1999
1G	01/02/1999 - 04/01/1999	04/01/1999 - 07/01/1999	07/01/1999 - 09/30/1999	09/30/1999 - 12/30/1999
1H	01/02/1999 - 04/02/1999	04/02/1999 - 07/01/1999	07/01/1999 - 09/30/1999	09/30/1999 - 12/30/1999
1I	01/02/1999 - 04/02/1999	04/02/1999 - 07/01/1999	07/01/1999 - 09/30/1999	09/30/1999 - 12/31/1999
1J	01/02/1999 - 04/01/1999	04/01/1999 - 07/01/1999	07/01/1999 - 09/30/1999	09/30/1999 - 12/30/1999
1L	01/02/1999 - 04/01/1999	04/01/1999 - 07/01/1999	07/01/1999 - 09/30/1999	09/30/1999 - 12/30/1999
1M	01/02/1999 04/01/1999	04/01/1999 - 07/01/1999	07/01/1999 - 10/01/1999	10/01/1999 - 12/31/1999
1P	01/02/1999 04/01/1999	04/01/1999 - 07/01/1999	07/01/1999 - 10/01/1999	10/01/1999 - 12/31/1999
1Q	01/02/1999 04/01/1999	04/01/1999 - 07/01/1999	07/01/1999 - 10/01/1999	10/01/1999 - 12/31/1999
1R	01/02/1999 04/02/1999	04/02/1999 - 07/01/1999	07/01/1999 - 10/01/1999	10/01/1999 - 12/31/1999
2	01/02/1999 - 04/01/1999	04/01/1999 - 07/01/1999	07/01/1999 - 09/30/1999	09/30/1999 - 12/30/1999
2B	01/02/1999 04/01/1999	04/01/1999 - 07/01/1999	07/01/1999 - 10/01/1999	10/01/1999 - 12/31/1999
3A	01/02/1999 - 04/02/1999	04/02/1999 - 07/02/1999	07/02/1999 - 10/01/1999	10/01/1999 - 12/31/1999
4K	01/02/1999 - 04/02/1999	04/02/1999 - 07/02/1999	07/02/1999 - 10/01/1999	10/01/1999 - 12/31/1999
5	01/03/1999 - 03/31/1999	03/31/1999 - 06/30/1999	06/30/1999 - 09/29/1999	09/29/1999 - 12/29/1999
1NN	01/02/1999 - 04/02/1999	04/02/1999 - 07/01/1999	07/01/1999 - 09/30/1999	09/30/1999 - 12/30/1999
6B	01/02/1999 - 04/02/1999	04/02/1999 - 07/02/1999	07/02/1999 - 10/01/1999	10/01/1999 - 12/31/1999
14	01/03/1999 - 03/31/1999	03/31/1999 - 06/30/1999	06/30/1999 - 09/29/1999	09/29/1999 - 12/29/1999
15	01/03/1999 - 03/31/1999	03/31/1999 - 06/30/1999	06/30/1999 - 09/29/1999	09/29/1999 - 12/29/1999
16	01/03/1999 - 03/31/1999	03/31/1999 - 06/30/1999	06/30/1999 - 09/29/1999	09/29/1999 - 12/29/1999
17	01/03/1999 - 03/31/1999	03/31/1999 - 06/30/1999	06/30/1999 - 09/29/1999	09/29/1999 - 12/29/1999
18	01/02/1999 - 03/31/1999	03/31/1999 - 06/30/1999	06/30/1999 - 09/29/1999	09/29/1999 - 12/29/1999
19	01/04/1999 - 03/31/1999	03/31/1999 - 07/01/1999	07/01/1999 - 09/29/1999	09/29/1999 - 12/29/1999
22	01/03/1999 - 03/31/1999	03/31/1999 - 06/30/1999	06/30/1999 - 09/29/1999	09/29/1999 - 12/29/1999
23	01/02/1999 - 04/01/1999	04/01/1999 - 07/01/1999	07/01/1999 - 09/30/1999	09/30/1999 - 12/30/1999
24	01/03/1999 - 03/31/1999	03/31/1999 - 06/30/1999	06/30/1999 - 09/29/1999	09/29/1999 - 12/29/1999
26	01/04/1999 - 03/31/1999	03/31/1999 - 06/30/1999	06/30/1999 - 09/29/1999	09/29/1999 - 12/29/1999
27	01/04/1999 - 04/01/1999	04/01/1999 - 07/01/1999	07/01/1999 - 09/30/1999	09/30/1999 - 12/30/1999
31A	01/03/1999 - 03/31/1999	03/31/1999 - 06/30/1999	06/30/1999 - 09/29/1999	09/29/1999 - 12/29/1999
32	01/03/1999 - 03/31/1999	03/31/1999 - 06/30/1999	06/30/1999 - 09/29/1999	09/29/1999 - 12/29/1999
40	01/04/1999 - 04/02/1999	04/02/1999 - 07/01/1999	07/01/1999 - 09/30/1999	09/30/1999 - 12/30/1999
42	01/03/1999 - 03/31/1999	03/31/1999 - 06/30/1999	06/30/1999 - 09/29/1999	09/29/1999 - 12/29/1999
43	01/03/1999 - 03/31/1999	03/31/1999 - 06/30/1999	06/30/1999 - 09/29/1999	09/29/1999 - 12/29/1999
44	01/03/1999 - 03/31/1999	03/31/1999 - 06/30/1999	06/30/1999 - 09/29/1999	09/29/1999 - 12/29/1999
45	01/03/1999 - 03/31/1999	03/31/1999 - 06/30/1999	06/30/1999 - 09/29/1999	09/29/1999 - 12/29/1999
46	01/03/1999 - 04/01/1999	04/01/1999 - 07/01/1999	07/01/1999 - 09/30/1999	09/30/1999 - 12/30/1999
47	01/03/1999 - 04/01/1999	04/01/1999 - 07/01/1999	07/01/1999 - 09/30/1999	09/30/1999 - 12/30/1999
48	01/03/1999 - 04/01/1999	04/01/1999 - 07/01/1999	07/01/1999 - 09/30/1999	09/30/1999 - 12/30/1999
49	01/02/1999 - 03/31/1999	03/31/1999 - 07/01/1999	07/01/1999 - 09/30/1999	09/30/1999 - 12/30/1999
50	01/02/1999 - 03/31/1999	03/31/1999 - 07/01/1999	07/01/1999 - 09/30/1999	09/30/1999 - 12/30/1999
51	01/04/1999 - 03/31/1999	03/31/1999 - 06/30/1999	06/30/1999 - 09/29/1999	09/29/1999 - 12/29/1999

FIGURE C-1
MONTHLY INSOLUBLE GROSS BETA CONCENTRATIONS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF PBAPS, 1999

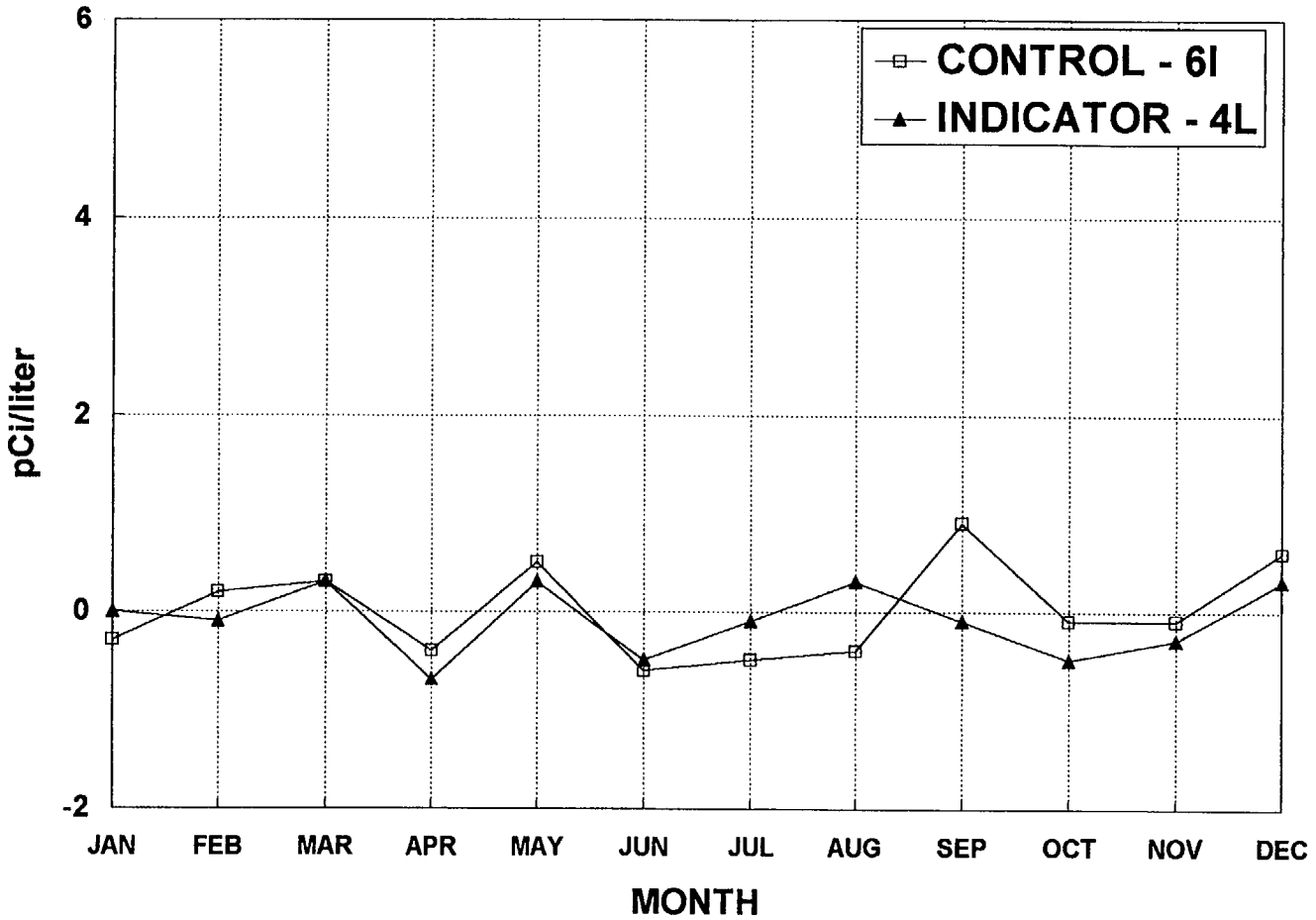


FIGURE C-2
MONTHLY SOLUBLE GROSS BETA CONCENTRATIONS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF PBAPS, 1999

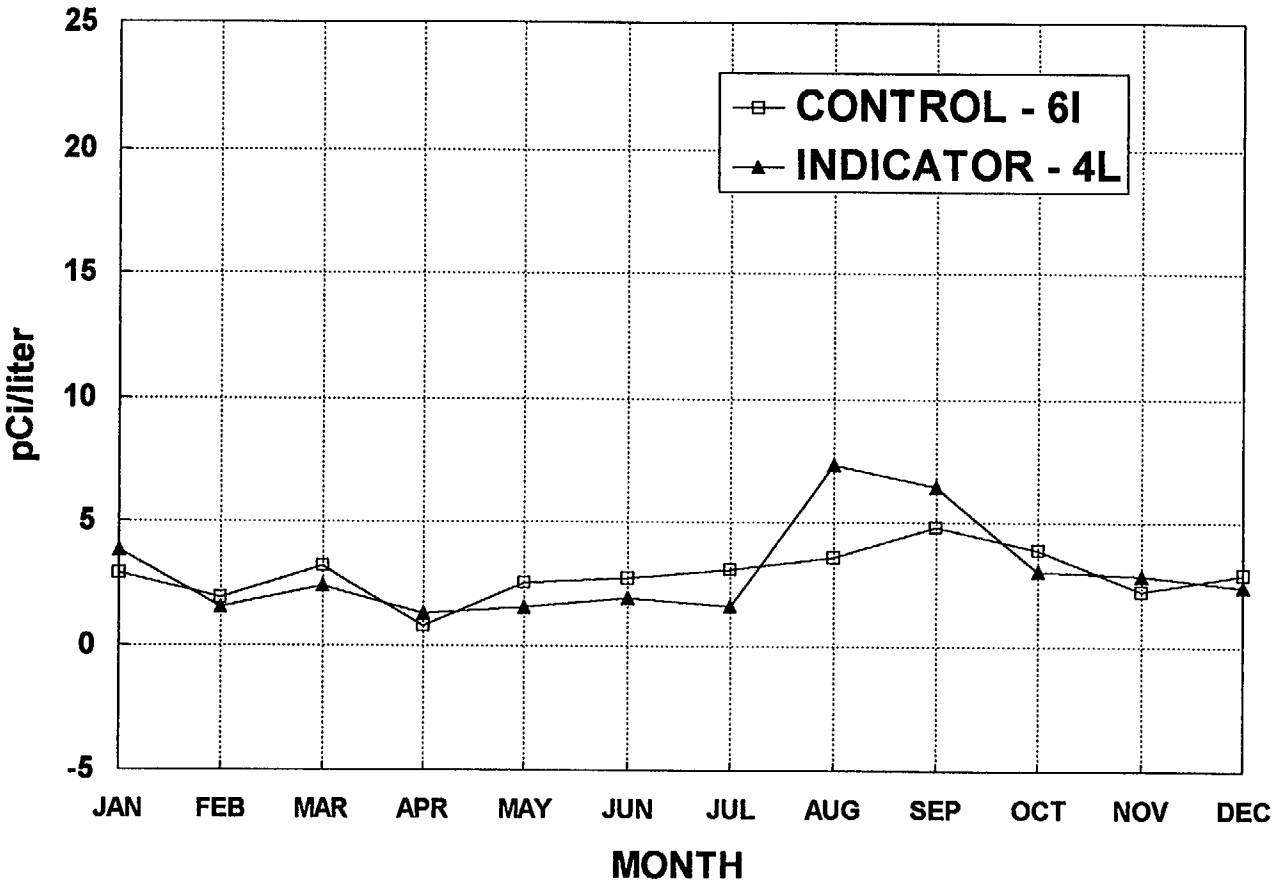


FIGURE C-3
MEAN ANNUAL CS-137 CONCENTRATIONS IN FISH SAMPLES COLLECTED IN THE VICINITY OF PBAPS, 1971 - 1999

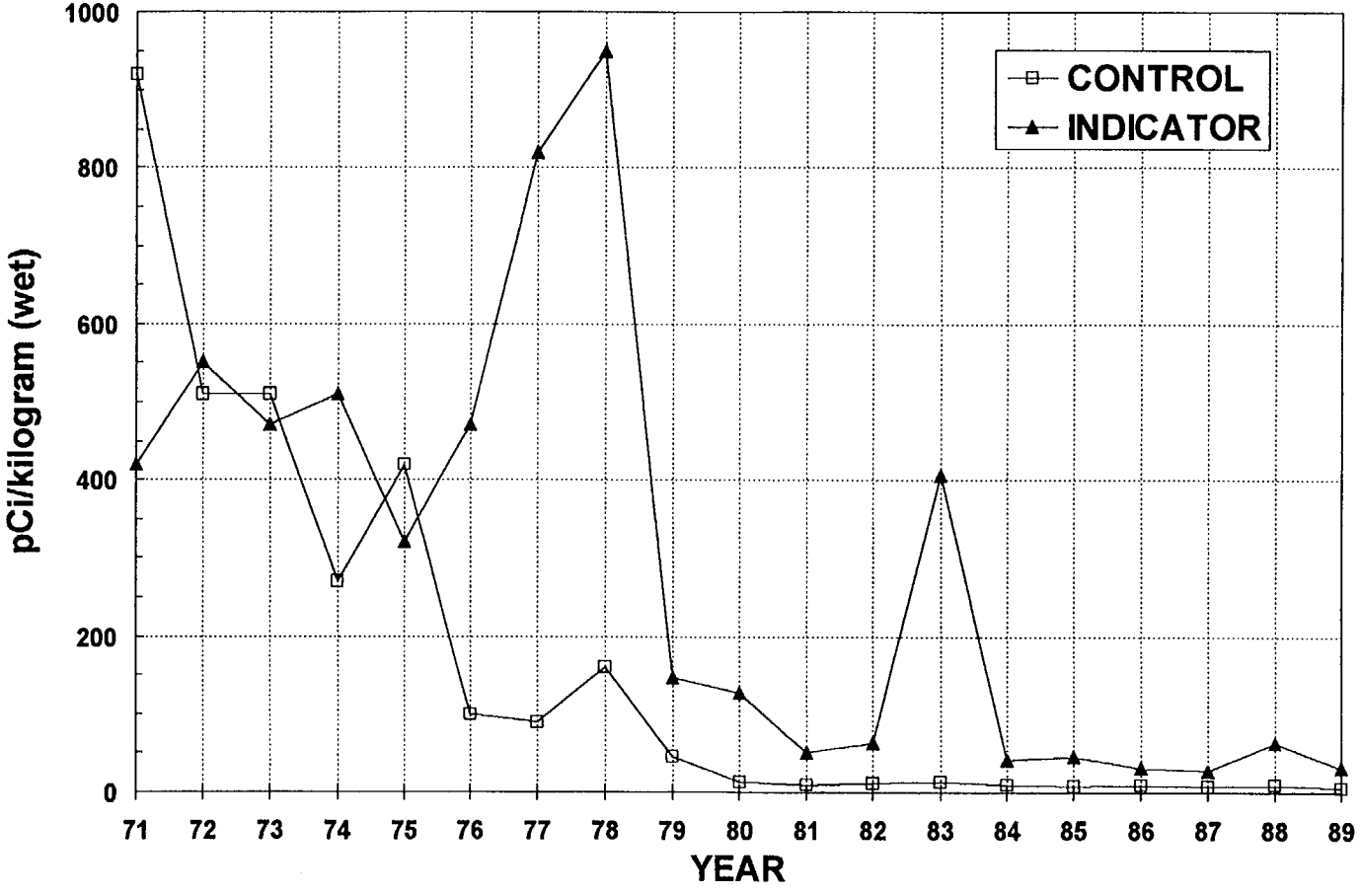


FIGURE C-3 (continued)

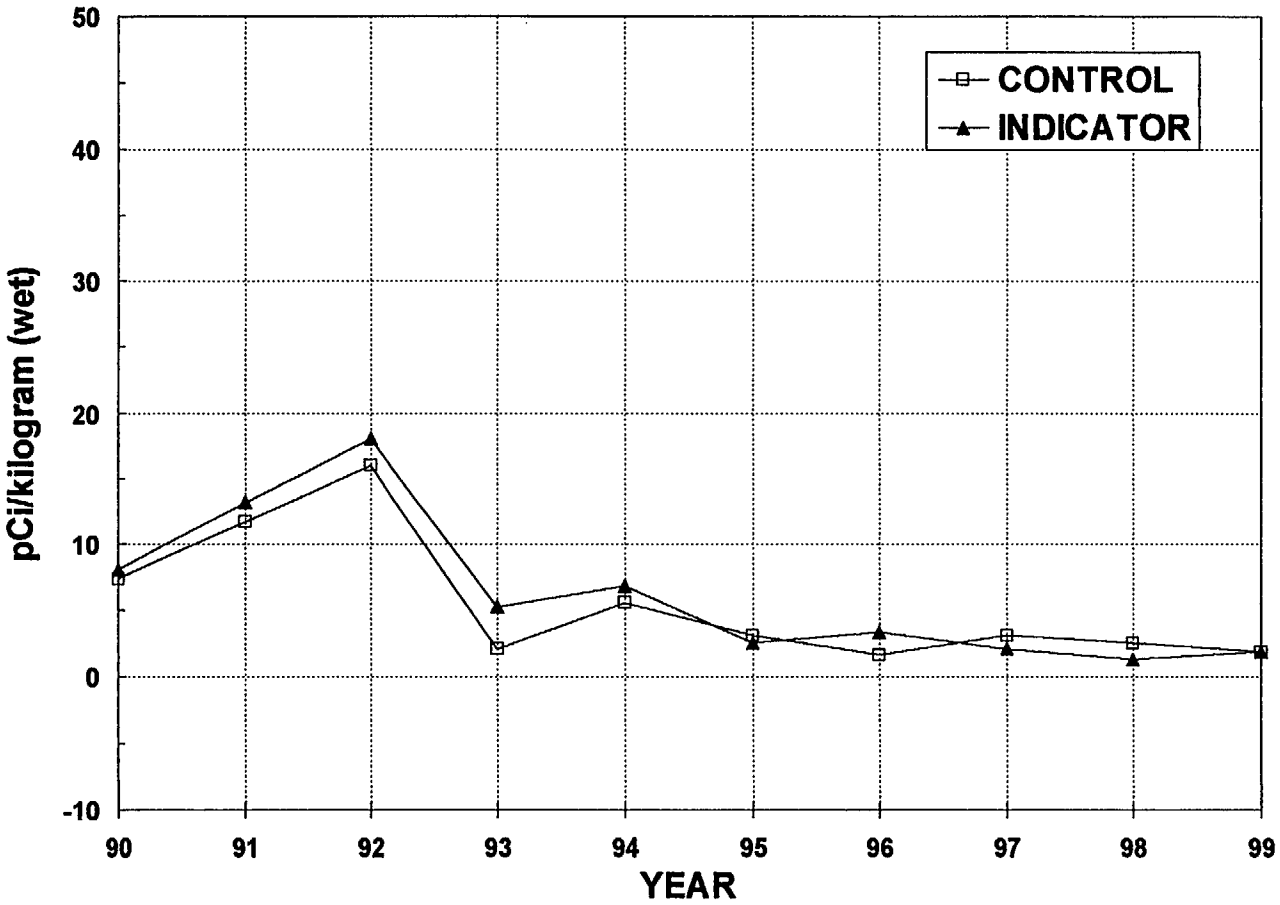


FIGURE C- 4
CONCENTRATIONS OF CS-137 IN SEDIMENT SAMPLES
COLLECTED IN THE VICINITY OF PBAPS, 1971 - 1999

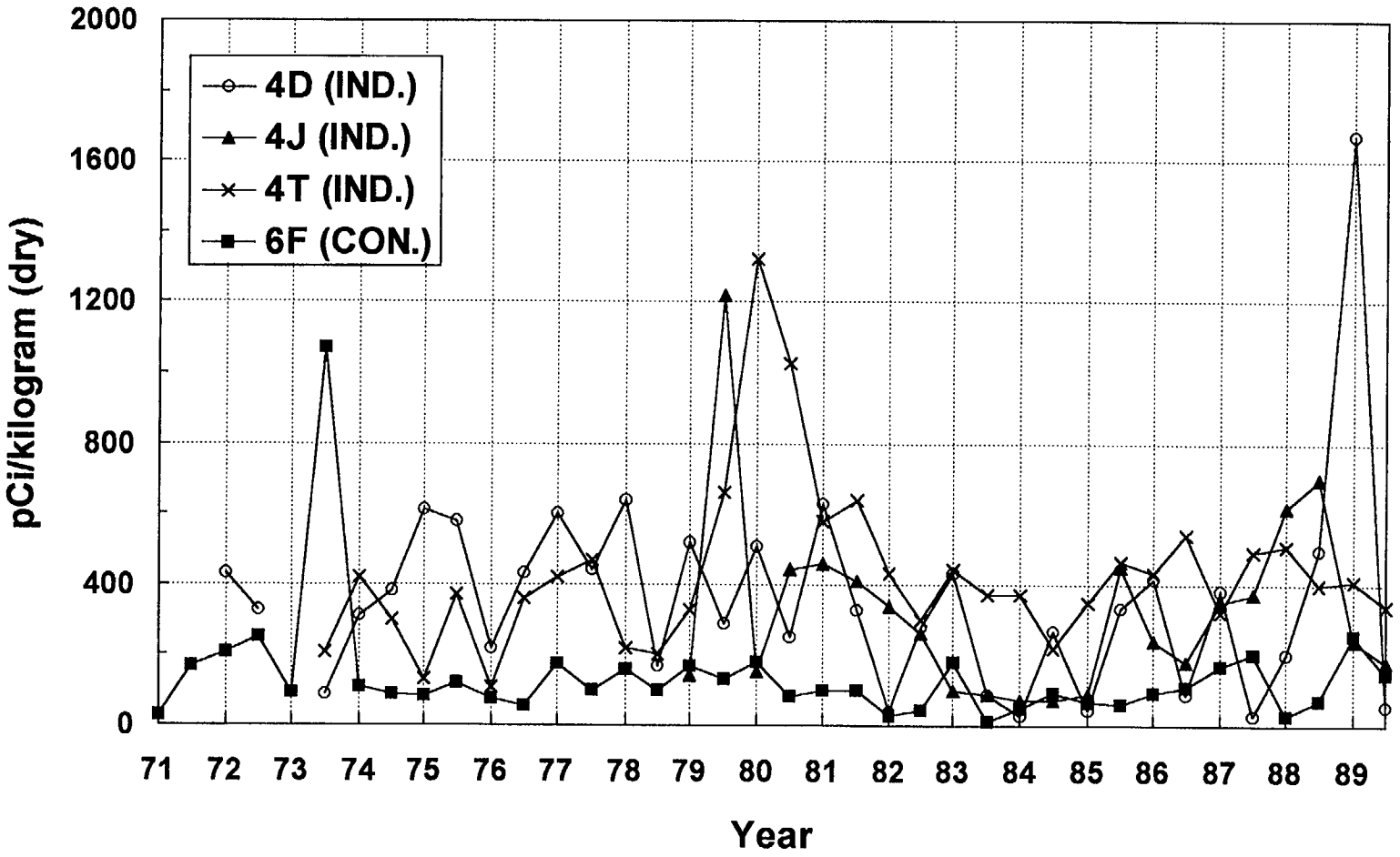
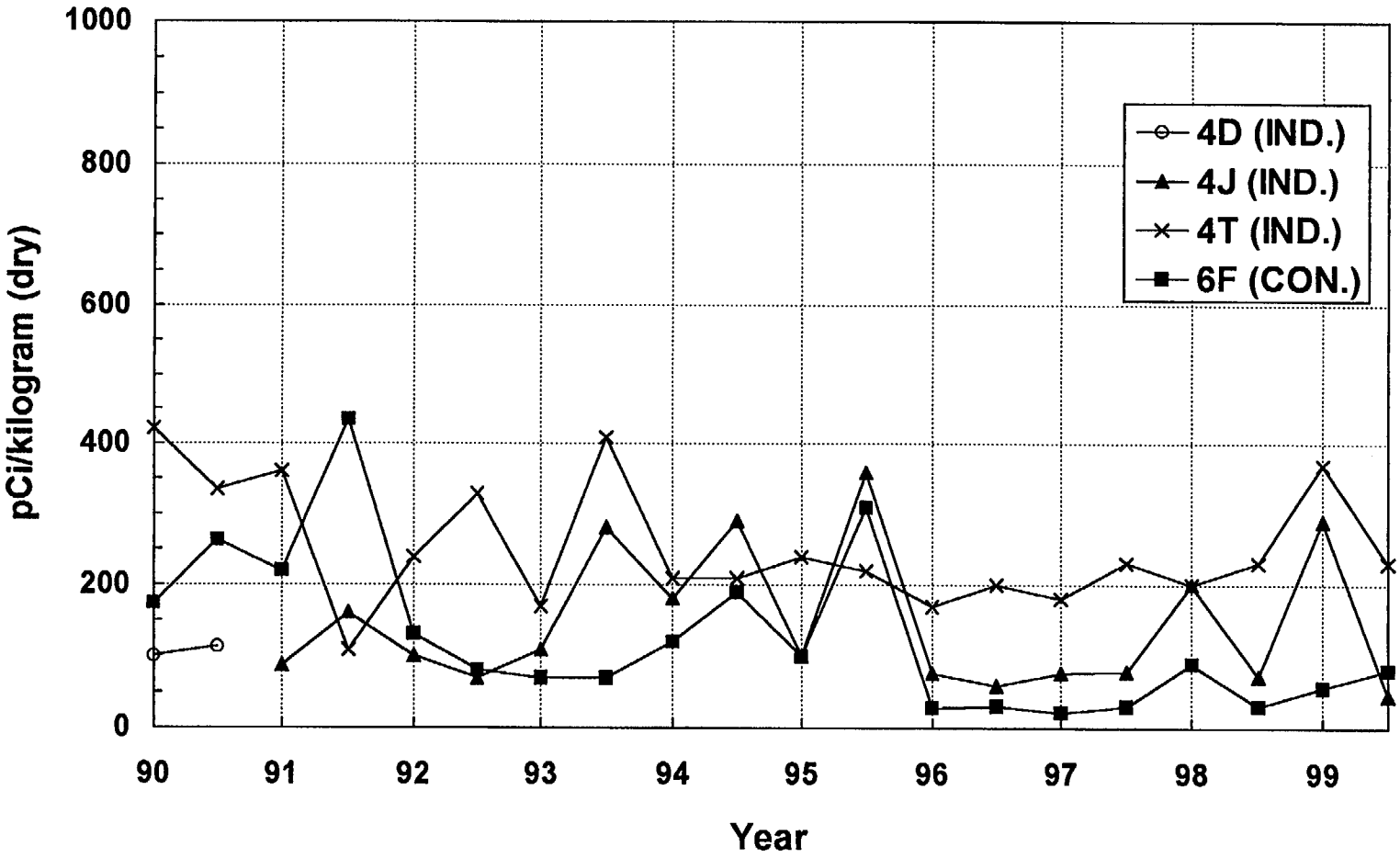


FIGURE C- 4 (continued)



Station 4D discontinued beginning 1991, No sample collected from Station 4J in 1990

FIGURE C- 5
MEAN WEEKLY GROSS BETA CONCENTRATIONS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF PBAPS, 1999

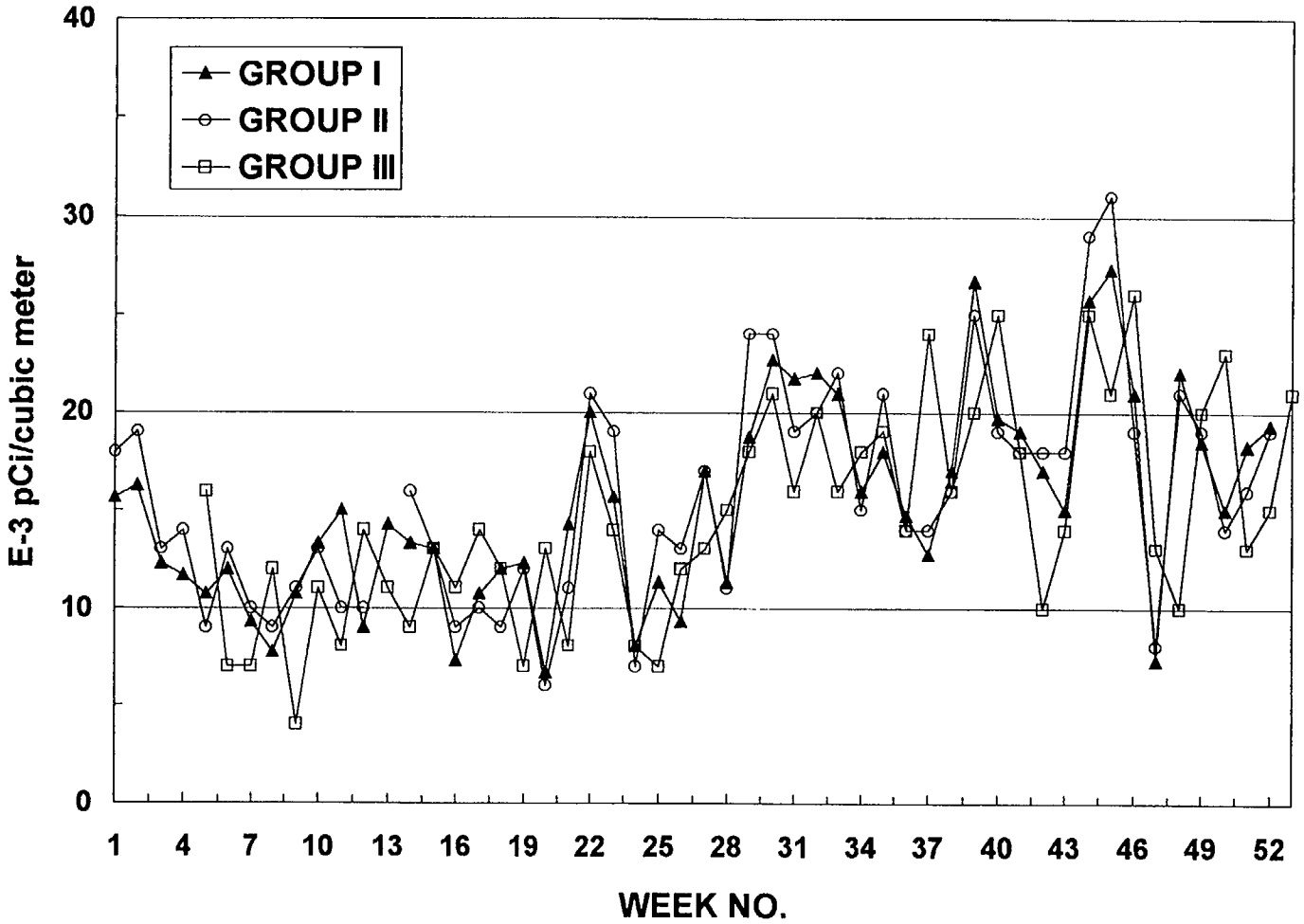


FIGURE C-6
MEAN MONTHLY GROSS BETA CONCENTRATIONS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF PBAPS, 1970 - 1999

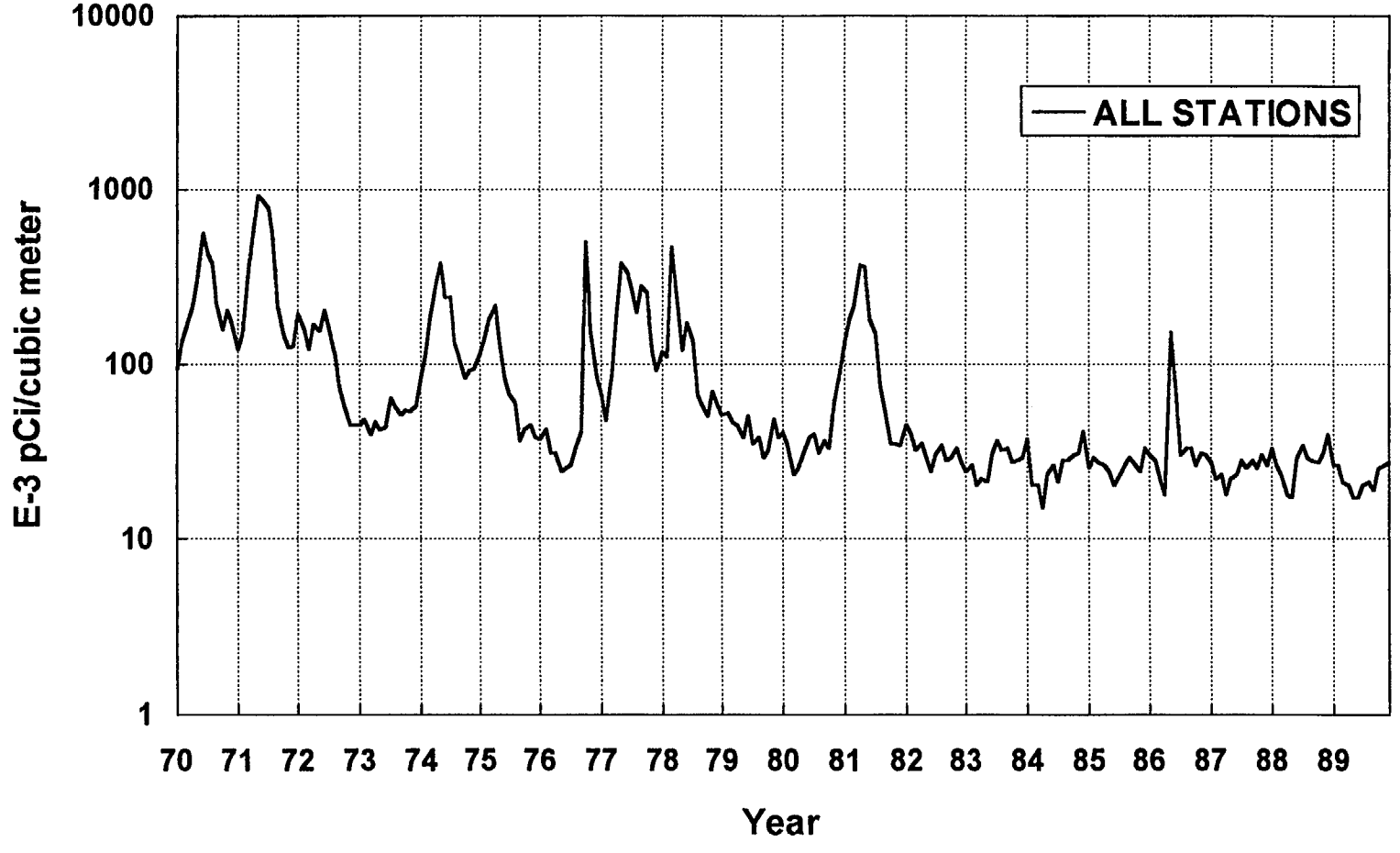


FIGURE C-6 (continued)

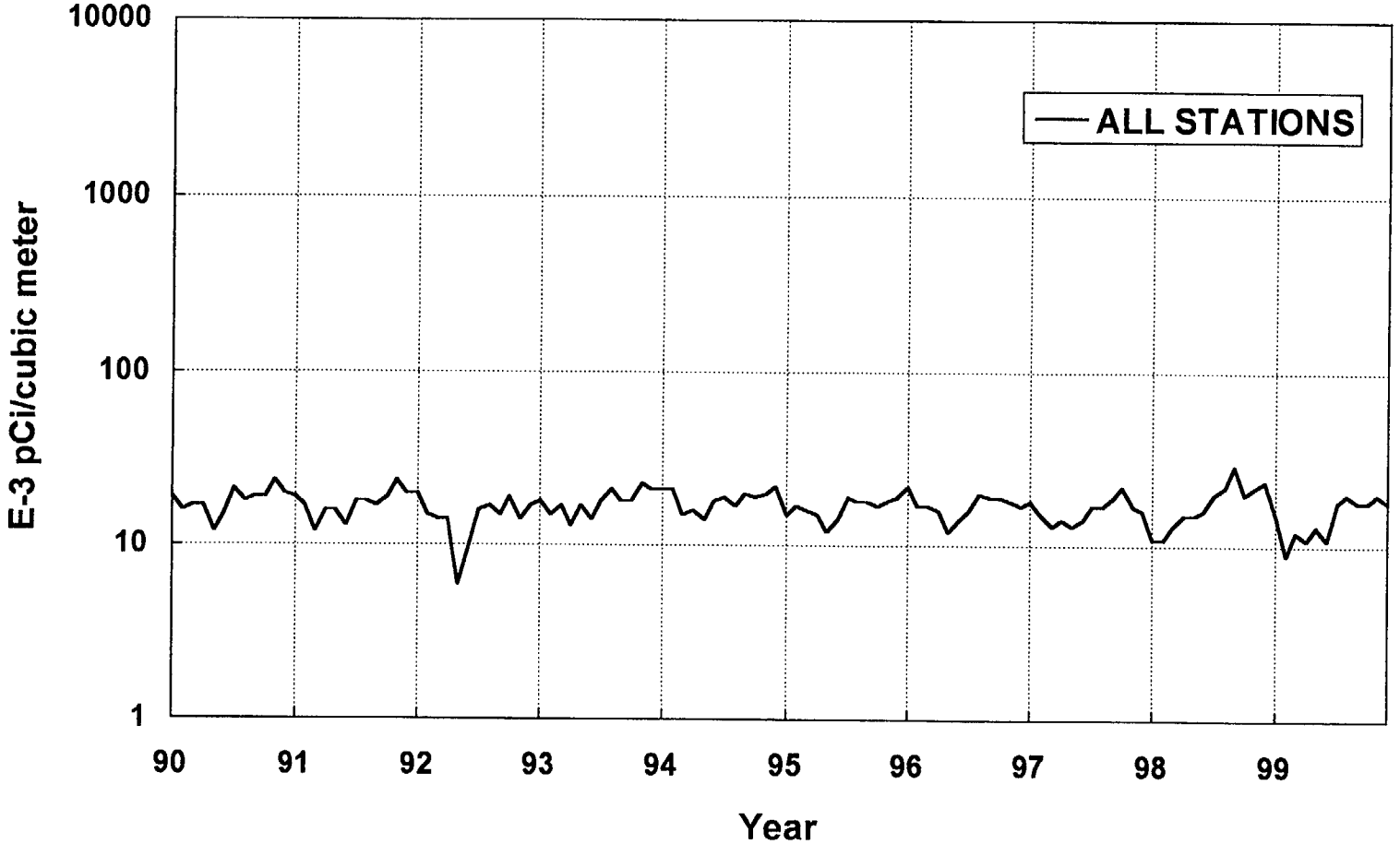


FIGURE C-7
MEAN ANNUAL CS-137 CONCENTRATIONS IN MILK SAMPLES COLLECTED IN THE VICINITY OF PBAPS, 1971 - 1999

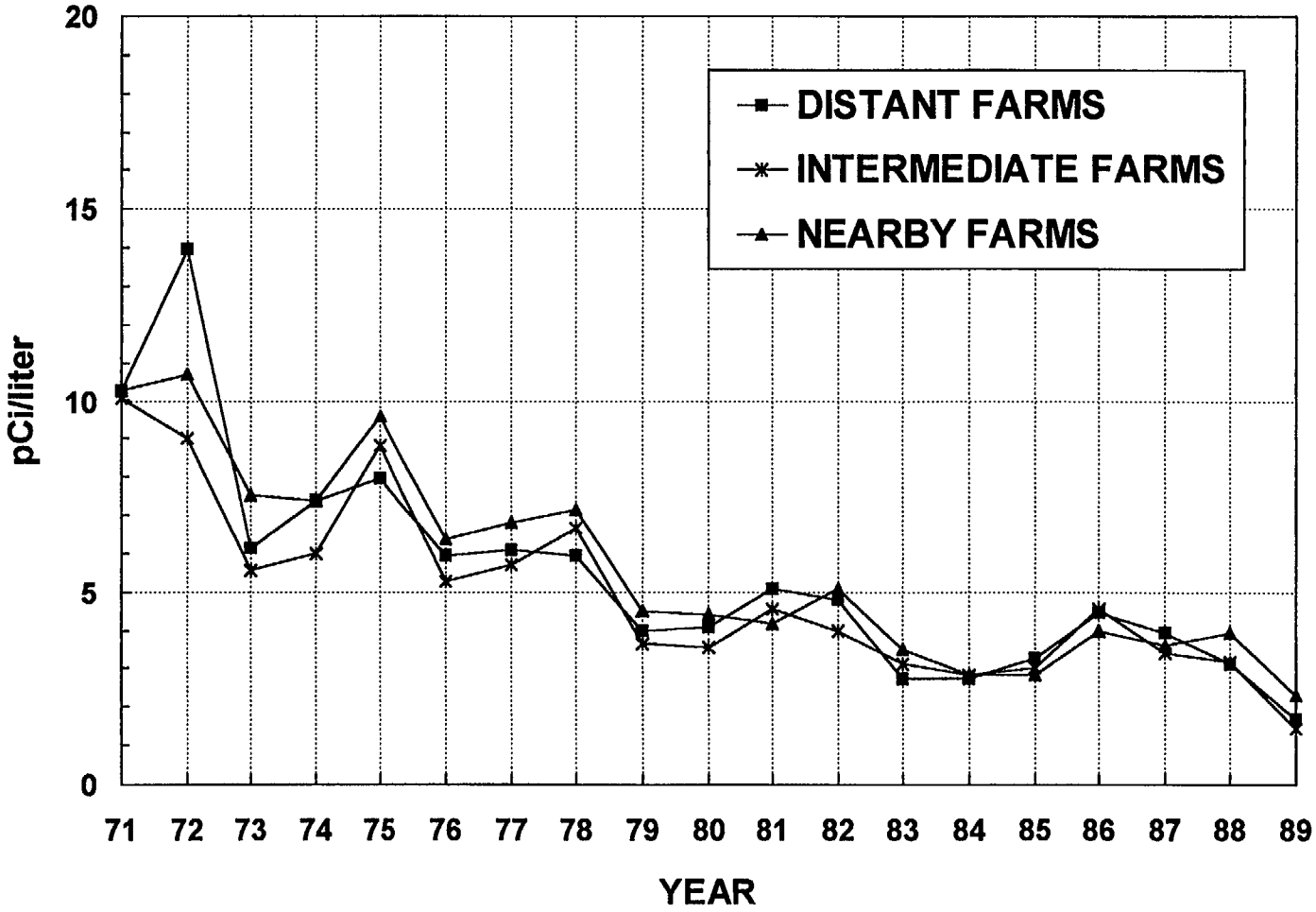
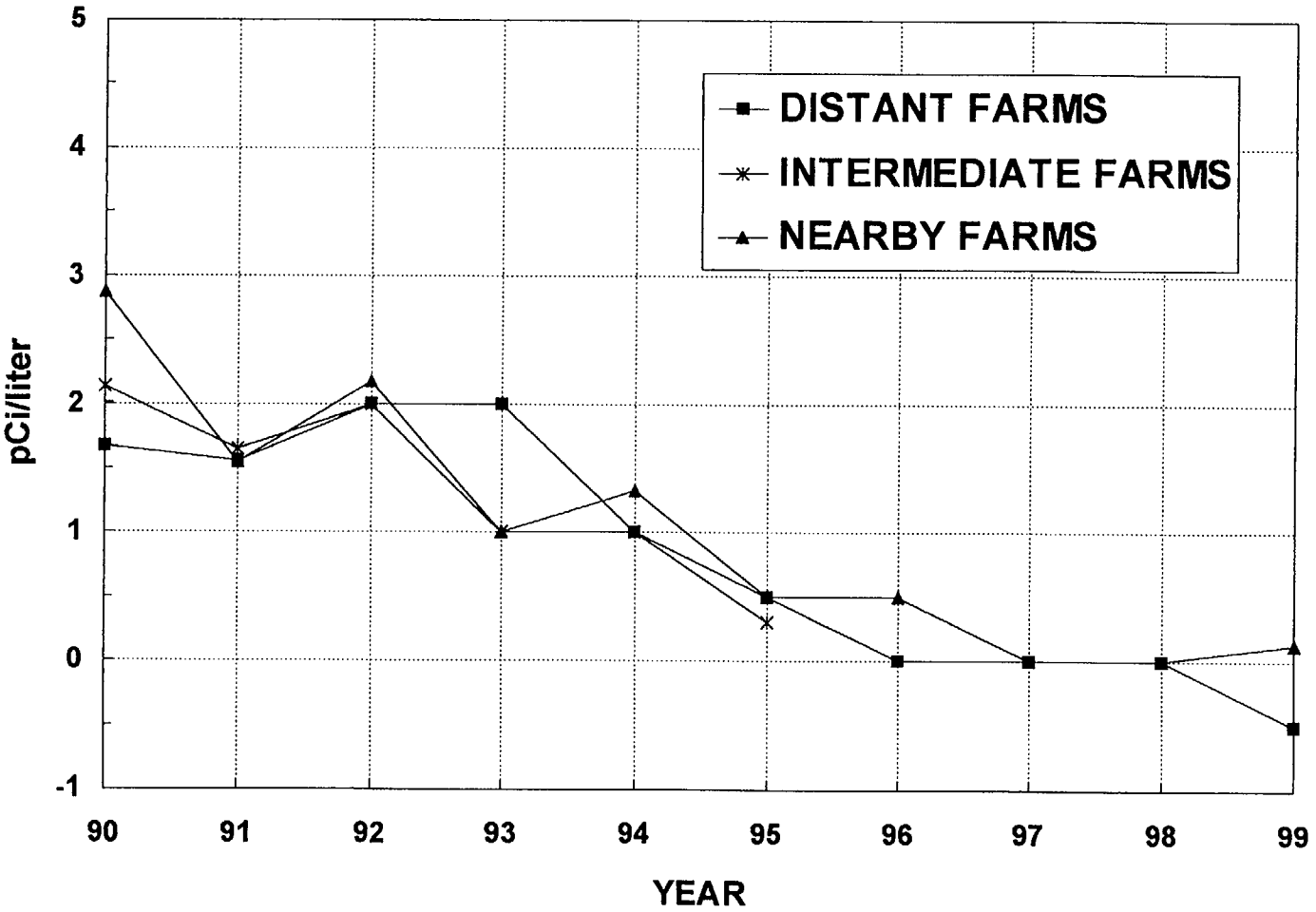


FIGURE C-7 (continued)



Intermediate Farms Discontinued in 1995

FIGURE C- 8
MEAN QUARTERLY AMBIENT GAMMA RADIATION LEVELS (TLD) IN THE VICINITY OF PBAPS, 1973 - 1999

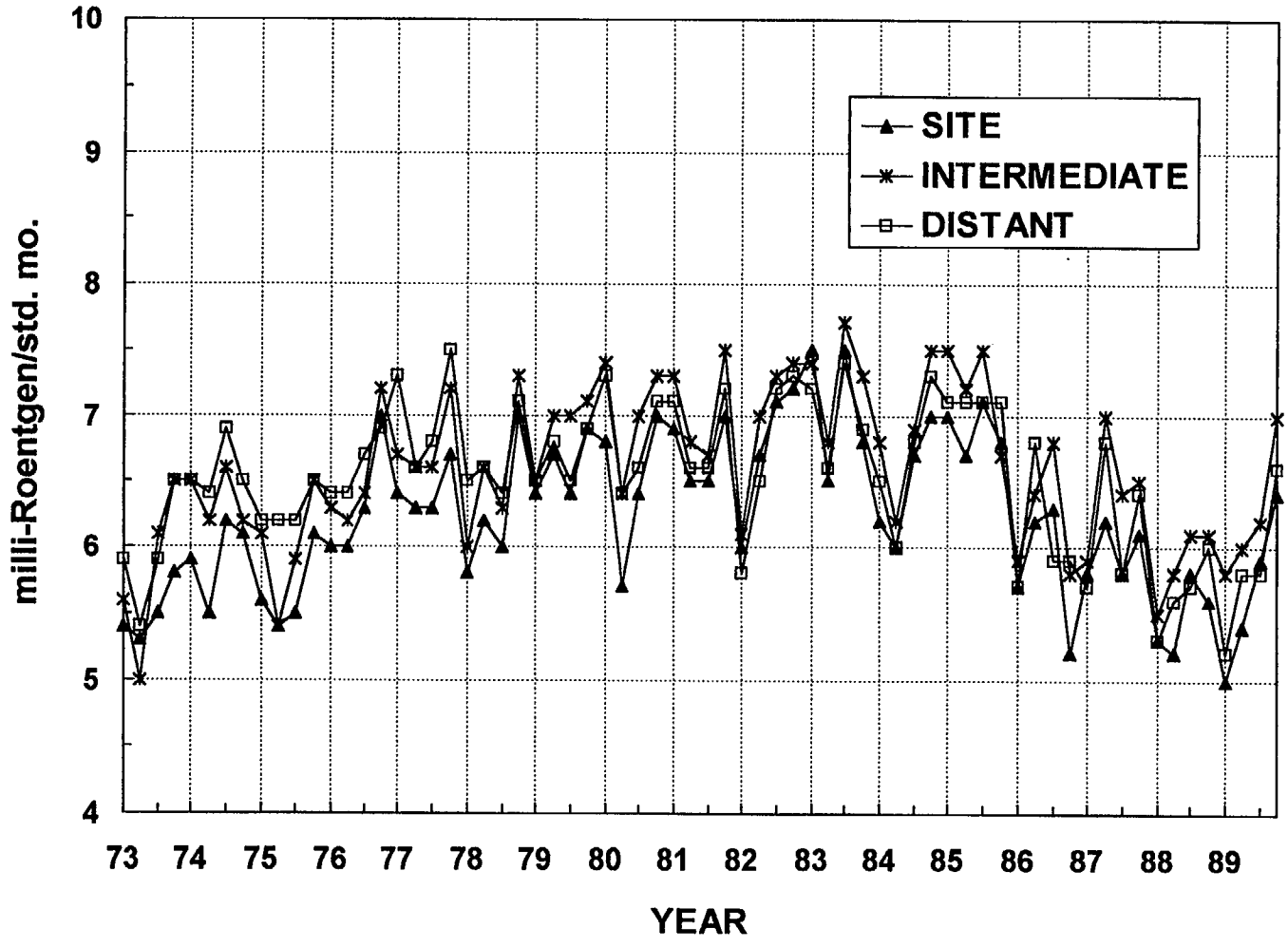
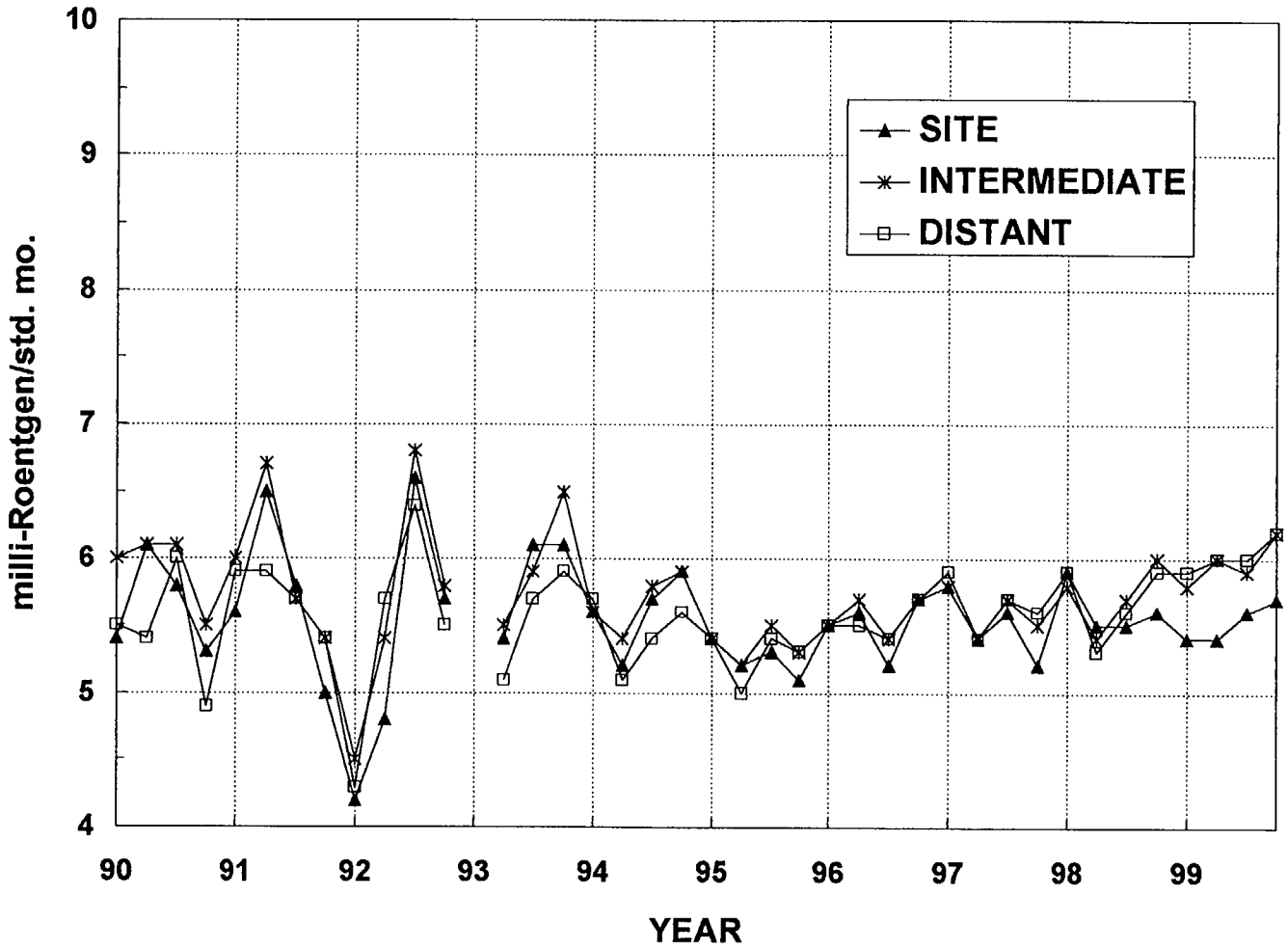


FIGURE C- 8 (continued)



APPENDIX D

DATA TABLES AND FIGURES
COMPARISON LABORATORY

APPENDIX D: DATA TABLES AND FIGURES - COMPARISON LABORATORY

TABLES

FIGURES

The following section contains data and figures illustrating the analyses performed by the quality control laboratory. Duplicate samples were obtained from several locations and media and split between the primary laboratory, AmerGen ERL and the quality control laboratory, Teledyne Brown Engineering (TBE). Comparison of the results for most media were within expected ranges, though occasional differences were seen:

TBE's results for gross beta insoluble and soluble in drinking water samples were very similar to those reported from ERL, except for the August and September soluble results. ERL reported 7.3 and 6.4 pCi/l versus 2.5 and 3.6 pCi/l for TBE, respectively. The data reported was well within the historical range.

The gross beta results for air particulate samples collected at the collocated stations 1Z and 1A compared very well (Figure D-3, Appendix D). No significant differences were noted. Both laboratories use Cs-137 as a calibration source.

TABLE D-I.1 CONCENTRATIONS OF GROSS BETA INSOLUBLE IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1999

RESULTS IN UNITS OF PCI/LITER +/- 2 SIGMA

COLLECTION PERIOD	4L
JAN	0.1 ±0.5
FEB	0.8 ±1.0
MAR	1.0 ±0.9
APR	0.1 ±0.5
MAY	1.3 ±1.0
JUN	0.1 ±1.0
JUL	1.5 ±0.9
AUG	0.2 ±0.9
SEP	1.0 ±1.0
OCT	0.6 ±0.8
NOV	0.5 ±0.9
DEC	0.0 ±1.0
MEAN	0.6 ±1.1

TABLE D-I.2 CONCENTRATIONS OF GROSS BETA SOLUBLE IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1999

RESULTS IN UNITS OF PCI/LITER +/- 2 SIGMA

COLLECTION PERIOD	4L
JAN	2.6 ±0.8
FEB	1.2 ±1.1
MAR	1.9 ±1.1
APR	1.6 ±0.8
MAY	1.4 ±1.2
JUN	0.6 ±1.3
JUL	3.2 ±1.3
AUG	2.5 ±1.4
SEP	3.6 ±1.4
OCT	3.4 ±1.3
NOV	2.4 ±1.3
DEC	3.7 ±1.4
MEAN	2.3 ±2.0

TABLE D-I.3 **CONCENTRATIONS OF GAMMA EMITTERS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1999**

RESULTS IN UNITS OF PCI/LITER +/- 2 SIGMA

STC	COLLECTION PERIOD	Be-7	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zr-95	Nb-95	Cs-134	Cs-137	Ba-140	La-140	Ra-226	Th-232
4L	JAN	-2 ± 4	-11 ± 6	0.5 ± 0.4	0 ± 0.4	0 ± 1	0.1 ± 0.4	0 ± 1	0.7 ± 0.8	0.1 ± 0.4	-0.1 ± 0.4	0.1 ± 0.4	2 ± 2	0.4 ± 1.1	-9 ± 8	0 ± 1
	FEB	-1 ± 4	-6 ± 6	-0.2 ± 0.4	0.1 ± 0.5	1 ± 1	0.1 ± 0.5	-3 ± 1	0.1 ± 0.9	0.1 ± 0.4	0.2 ± 0.5	0.6 ± 0.5	1 ± 2	-0.7 ± 0.7	-7 ± 11	1 ± 1
	MAR	-1 ± 4	-3 ± 6	0 ± 0.4	-0.1 ± 0.4	0 ± 1	0.2 ± 0.4	0 ± 1	0.6 ± 0.8	0.1 ± 0.4	0.3 ± 0.4	0.1 ± 0.4	0 ± 2	0.6 ± 0.9	-2 ± 8	1 ± 1
	APR	2 ± 4	-2 ± 6	0 ± 0.3	-0.3 ± 0.4	0 ± 1	0 ± 0.4	0 ± 1	-0.3 ± 0.8	0.2 ± 0.4	0.1 ± 0.4	0.1 ± 0.4	0 ± 3	-0.8 ± 1.1	-16 ± 8	-1 ± 1
	MAY	2 ± 4	-4 ± 6	0.2 ± 0.4	0.1 ± 0.4	1 ± 1	0.1 ± 0.4	0 ± 1	0.2 ± 0.9	0.3 ± 0.4	0.2 ± 0.4	0 ± 0.4	-1 ± 2	-0.5 ± 0.8	5 ± 8	0 ± 1
	JUN	3 ± 4	8 ± 4	0.5 ± 0.4	0 ± 0.4	0 ± 1	0.2 ± 0.3	0 ± 1	0.6 ± 0.8	-1 ± 0.4	0.1 ± 0.4	0 ± 0.4	-1 ± 2	0.2 ± 0.8	-10 ± 8	1 ± 1
	JUL	1 ± 5	0 ± 6	0.2 ± 0.4	-0.4 ± 0.4	1 ± 1	0 ± 0.4	1 ± 1	-0.8 ± 0.9	0.7 ± 0.4	0.2 ± 0.4	0.1 ± 0.4	1 ± 3	-0.4 ± 1.2	1 ± 10	-2 ± 1
	AUG	0 ± 5	-1 ± 6	0 ± 0.4	-0.1 ± 0.4	1 ± 1	0.2 ± 0.4	0 ± 1	1.5 ± 1.0	0.5 ± 0.5	0.5 ± 0.5	0.1 ± 0.4	-2 ± 3	0.4 ± 1.2	-20 ± 10	0 ± 1
	SEP	-1 ± 5	-3 ± 7	0.1 ± 0.5	-0.4 ± 0.5	1 ± 1	-0.1 ± 0.5	1 ± 1	1 ± 1.0	0.2 ± 0.5	0.3 ± 0.5	0.2 ± 0.5	-2 ± 4	-0.7 ± 1.7	-10 ± 10	-2 ± 1
	OCT	2 ± 5	-3 ± 7	-0.2 ± 0.4	-0.5 ± 0.5	-1 ± 1	0 ± 0.4	-1 ± 1	1 ± 1.0	0.7 ± 0.5	0 ± 0.5	0.7 ± 0.5	-3 ± 4	-2 ± 2.0	0 ± 7	0 ± 1
	NOV	0 ± 4	-2 ± 5	-0.2 ± 0.4	-0.1 ± 0.4	0 ± 1	0.5 ± 0.4	0 ± 1	0.3 ± 0.8	0.5 ± 0.4	0.4 ± 0.4	-0.1 ± 0.4	-1 ± 2	-0.6 ± 0.8	-10 ± 10	1 ± 1
	DEC	4 ± 6	2 ± 6	0.3 ± 0.5	0.1 ± 0.5	-1 ± 1	0.1 ± 0.5	0 ± 1	0.6 ± 1.1	0.1 ± 0.5	0.4 ± 0.4	0.3 ± 0.5	-2 ± 6	0.4 ± 2.5	-20 ± 10	2 ± 1
	MEAN	1 ± 4	-2 ± 9	0.1 ± 0.5	-0.1 ± 0.4	0 ± 1	0.1 ± 0.3	0 ± 2	0.5 ± 1.2	0.2 ± 0.7	0.2 ± 0.3	0.2 ± 0.5	-1 ± 3	-0.3 ± 1.5	-8 ± 16	0 ± 2

TABLE D-II.1 **CONCENTRATIONS OF GROSS BETA INSOLUBLE IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1999**

RESULTS IN UNITS OF E-3 PCI/CU METER +/- 2 SIGMA

WEEK NO.	1A
1	23 ±4
2	17 ±3
3	29 ±4
4	13 ±3
5	16 ±3
6	14 ±3
7	20 ±4
8	14 ±3
9	12 ±3
10	15 ±3
11	12 ±3
12	8 ±2
13	15 ±3
14	17 ±3
15	13 ±3
16	10 ±3
17	10 ±3
18	8 ±3
19	9 ±3
20	7 ±2
21	11 ±3
22	19 ±4
23	14 ±3
24	9 ±3
25	11 ±3
26	9 ±3
27	(1)
28	13 ±3
29	15 ±3
30	26 ±4
31	15 ±3
32	23 ±4
33	(1)
34	14 ±3
35	18 ±4
36	15 ±3
37	23 ±4
38	13 ±3
39	30 ±4
40	15 ±3
41	18 ±3
42	18 ±3
43	16 ±3
44	29 ±4
45	29 ±4
46	20 ±3
47	12 ±3
48	20 ±3
49	(1)
50	17 ±3
51	18 ±3
52	21 ±3
MEAN	16 ±12

(1) See Programs Exceptions Section for Explanation

TABLE D-II.2 **CONCENTRATION OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1999**

RESULTS IN UNITS OF E-3 PCI/CU METER +/- 2 SIGMA

STC	COLLECTION PERIOD	Be-7	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zr-95	Nb-95	Cs-134	Cs-137	Ba-140	La-140	Ra-226	Th-232
1A	12/26 - 03/26/1999	70 ± 10	7 ± 5	0.4 ± 0.5	0 ± 0.6	1 ± 2.0	-0.1 ± 0.5	-0.1 ± 1	0.1 ± 1.3	0.3 ± 0.6	-0.2 ± 0.5	0.2 ± 0.4	-5 ± 11	-5 ± 5	-2 ± 6	1 ± 1
	03/26 - 06/25/1999	81 ± 8	2 ± 4	0 ± 0.2	0 ± 0.3	0.6 ± 0.9	0.1 ± 0.3	-0.3 ± 1	0.3 ± 0.7	0 ± 0.3	0.3 ± 0.3	-0.2 ± 0.3	-1 ± 6	-2 ± 3	-4 ± 6	1 ± 1
	06/25 - 09/24/1999	80 ± 10	-1 ± 4	0.2 ± 0.3	-0.1 ± 0.5	0.4 ± 1.5	0.2 ± 0.3	0.5 ± 1	0.4 ± 1.2	0.1 ± 0.6	-0.1 ± 0.3	0.4 ± 0.3	-20 ± 40	0 ± 20	-2 ± 7	1 ± 1
	09/24 - 12/31/1999	69 ± 8	1 ± 5	-0.5 ± 0.3	-0.2 ± 0.4	0.3 ± 1.1	0 ± 0.3	0.2 ± 1	-0.1 ± 0.8	0.3 ± 0.4	0.1 ± 0.3	0.3 ± 0.3	-1 ± 7	-1 ± 3	-2 ± 6	1 ± 1
	MEAN	75 ± 13	2 ± 7	0 ± 0.8	-0.1 ± 0.2	0.1 ± 0.3	0.6 ± 0.6	0.1 ± 1	0.2 ± 0.4	0.2 ± 0.3	0 ± 0.4	0.2 ± 0.5	-7 ± 18	-2 ± 4	-3 ±2	1 ± 0

TABLE D-III.1 CONCENTRATION OF I-131 BY CHEMICAL SEPARATION AND GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VINCINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1999

RESULTS IN UNITS OF PCI/LITER +/- 2 SIGMA

STC	COLLECTION PERIOD	I-131	Be-7	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zr-95	Nb-95	Cs-134	Cs-137	Ba-140	La-140	Ra-226	Th-232
A	02/15/1999	0 ± 0.10	10 ± 20	1400 ± 100	0 ± 2	-1 ± 2	1 ± 5	1 ± 2	-2 ± 5	0 ± 2	-1 ± 2	-1 ± 2	2 ± 2	-2 ± 3	1 ± 2	-1 ± 4	-8 ± 18
	05/10/1999	0.02 ± 0.06	10 ± 20	1200 ± 100	1 ± 2	2 ± 2	1 ± 5	-2 ± 2	-5 ± 6	-1 ± 4	2 ± 2	2 ± 2	1 ± 2	-2 ± 6	-2 ± 3	10 ± 50	-8 ± 4
	08/16/1999	0.07 ± 0.06	0 ± 20	970 ± 100	3 ± 2	-1 ± 2	0 ± 5	1 ± 3	2 ± 5	5 ± 5	2 ± 2	-1 ± 2	0 ± 2	4 ± 7	-2 ± 3	-30 ± 50	-6 ± 4
	11/07/1999	0.19 ± 0.16	-20 ± 20	1500 ± 100	-1 ± 2	0 ± 2	0 ± 4	-1 ± 2	0 ± 5	3 ± 4	2 ± 2	1 ± 2	3 ± 2	-3 ± 8	2 ± 3	-4 ± 36	-3 ± 3
	MEAN	0.07 ± 0.17	0 ± 28	1268 ± 469	1 ± 3	0 ± 3	1 ± 1	0 ± 3	-1 ± 6	2 ± 5	1 ± 3	0 ± 3	2 ± 3	-1 ± 6	0 ± 4	-6 ± 34	-6 ± 5
G	02/15/1999	-0 ± 0.08	10 ± 20	1300 ± 100	0 ± 2	0 ± 2	4 ± 4	0 ± 2	1 ± 4	2 ± 2	2 ± 2	2 ± 2	2 ± 2	-1 ± 3	1 ± 2	2 ± 3	-2 ± 14
	05/10/1999	0.03 ± 0.07	-3 ± 16	1300 ± 100	0 ± 2	-1 ± 2	-4 ± 4	1 ± 2	0 ± 4	0 ± 3	1 ± 2	-1 ± 2	2 ± 2	5 ± 6	-1 ± 2	-60 ± 40	-2 ± 4
	08/16/1999	-0 ± 0.07	-4 ± 20	1400 ± 100	1 ± 2	0 ± 2	-2 ± 6	0 ± 2	3 ± 5	3 ± 4	0 ± 2	1 ± 2	2 ± 2	-2 ± 8	-2 ± 3	-30 ± 40	-3 ± 4
	11/08/1999	-0 ± 0.09	0 ± 17	1300 ± 100	0 ± 2	1 ± 2	2 ± 4	-1 ± 2	0 ± 5	3 ± 4	2 ± 2	-1 ± 2	2 ± 2	-8 ± 8	-2 ± 3	-110 ± 40	-1 ± 4
	MEAN	0 ± 0.04	1 ± 13	1325 ± 100	1 ± 1	0 ± 2	0 ± 7	0 ± 1	1 ± 3	2 ± 3	1 ± 2	0 ± 3	2 ± 0	-1 ± 11	-1 ± 3	-50 ± 95	-2 ± 2
J	02/15/1999	-0 ± 0.08	0 ± 17	1300 ± 100	1 ± 2	0 ± 2	2 ± 4	0 ± 2	2 ± 5	-2 ± 2	2 ± 2	1 ± 2	1 ± 2	0 ± 3	4 ± 2	-2 ± 3	-20 ± 10
	05/10/1999	0.02 ± 0.06	8 ± 20	1300 ± 100	1 ± 2	2 ± 2	-1 ± 5	0 ± 2	3 ± 5	1 ± 5	3 ± 2	0 ± 3	2 ± 2	1 ± 7	0 ± 3	-10 ± 40	1 ± 4
	08/16/1999	0.04 ± 0.07	3 ± 16	1200 ± 100	0 ± 2	-1 ± 2	3 ± 4	0 ± 2	-2 ± 4	-6 ± 4	1 ± 2	0 ± 2	2 ± 2	-5 ± 5	1 ± 2	-20 ± 40	-7 ± 4
	11/08/1999	0.08 ± 0.08	10 ± 20	1300 ± 100	1 ± 2	-1 ± 2	-2 ± 5	0 ± 2	-1 ± 5	6 ± 5	2 ± 2	0 ± 2	2 ± 2	-2 ± 9	0 ± 3	-40 ± 40	-4 ± 3
	MEAN	0.03 ± 0.10	5 ± 9	1275 ± 100	1 ± 1	0 ± 3	1 ± 5	0 ± 0	1 ± 5	0 ± 10	2 ± 2	0 ± 1	2 ± 1	-1 ± 5	1 ± 4	-18 ± 33	-8 ± 18

TABLE D-IV.1 SUMMARY OF COLLECTION DATES FOR SAMPLES COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1999

DRINKING WATER (GROSS BETA & GAMMA SPECTROSCOPY)

COLLECTION PERIOD	4L
JAN	01/02/1999 - 02/05/1999
FEB	02/05/1999 - 03/05/1999
MAR	03/05/1999 - 04/02/1999
APR	04/02/1999 - 04/30/1999
MAY	04/30/1999 - 06/04/1999
JUN	06/04/1999 - 07/02/1999
JUL	07/02/1999 - 07/30/1999
AUG	07/30/1999 - 09/03/1999
SEP	09/03/1999 - 10/01/1999
OCT	10/01/1999 - 11/05/1999
NOV	11/05/1999 - 12/05/1999
DEC	12/05/1999 - 12/31/1999

AIR PARTICULATE (Gross Beta)

WEEK NO	1A	WEEK NO	1A
1	01/02/1999 - 01/08/1999	27	
2	01/08/1999 - 01/15/1999	28	07/09/1999 - 07/16/1999
3	01/15/1999 - 01/22/1999	29	07/16/1999 - 07/23/1999
4	01/22/1999 - 01/29/1999	30	07/23/1999 - 07/30/1999
5	01/29/1999 - 02/05/1999	31	07/30/1999 - 08/06/1999
6	02/05/1999 - 02/13/1999	32	08/06/1999 - 08/13/1999
7	02/13/1999 - 02/19/1999	33	
8	02/19/1999 - 02/26/1999	34	08/20/1999 - 08/27/1999
9	02/26/1999 - 03/05/1999	35	08/27/1999 - 09/03/1999
10	03/05/1999 - 03/12/1999	36	09/03/1999 - 09/10/1999
11	03/12/1999 - 03/18/1999	37	09/10/1999 - 09/17/1999
12	03/18/1999 - 03/26/1999	38	09/17/1999 - 09/24/1999
13	03/26/1999 - 04/02/1999	39	09/24/1999 - 10/01/1999
14	04/02/1999 - 04/09/1999	40	10/01/1999 - 10/08/1999
15	04/09/1999 - 04/16/1999	41	10/08/1999 - 10/15/1999
16	04/16/1999 - 04/23/1999	42	10/15/1999 - 10/22/1999
17	04/23/1999 - 04/30/1999	43	10/22/1999 - 10/29/1999
18	04/30/1999 - 05/07/1999	44	10/29/1999 - 11/05/1999
19	05/07/1999 - 05/14/1999	45	11/05/1999 - 11/12/1999
20	05/14/1999 - 05/21/1999	46	11/12/1999 - 11/19/1999
21	05/21/1999 - 05/28/1999	47	11/19/1999 - 11/26/1999
22	05/28/1999 - 06/04/1999	48	11/26/1999 - 12/05/1999
23	06/04/1999 - 06/11/1999	49	
24	06/11/1999 - 06/18/1999	50	12/10/1999 - 12/17/1999
25	06/18/1999 - 06/25/1999	51	12/17/1999 - 12/24/1999
26	06/25/1999 - 07/02/1999	52	12/24/1999 - 12/31/1999

AIR PARTICULATE (GAMMA SPECTROSCOPY)

COLLECTION PERIOD	1A
JAN-MAR	12/26/1998 - 03/26/1999
APR-JUN	03/26/1999 - 06/25/1999
JUL-SEP	06/25/1999 - 09/24/1999
OCT-DEC	09/24/1999 - 12/31/1999

FIGURE D-1
COMPARISON OF MONTHLY INSOLUBLE GROSS BETA CONCENTRATIONS IN DRINKING WATER SAMPLES SPLIT BETWEEN GPU AND TBE, 1999

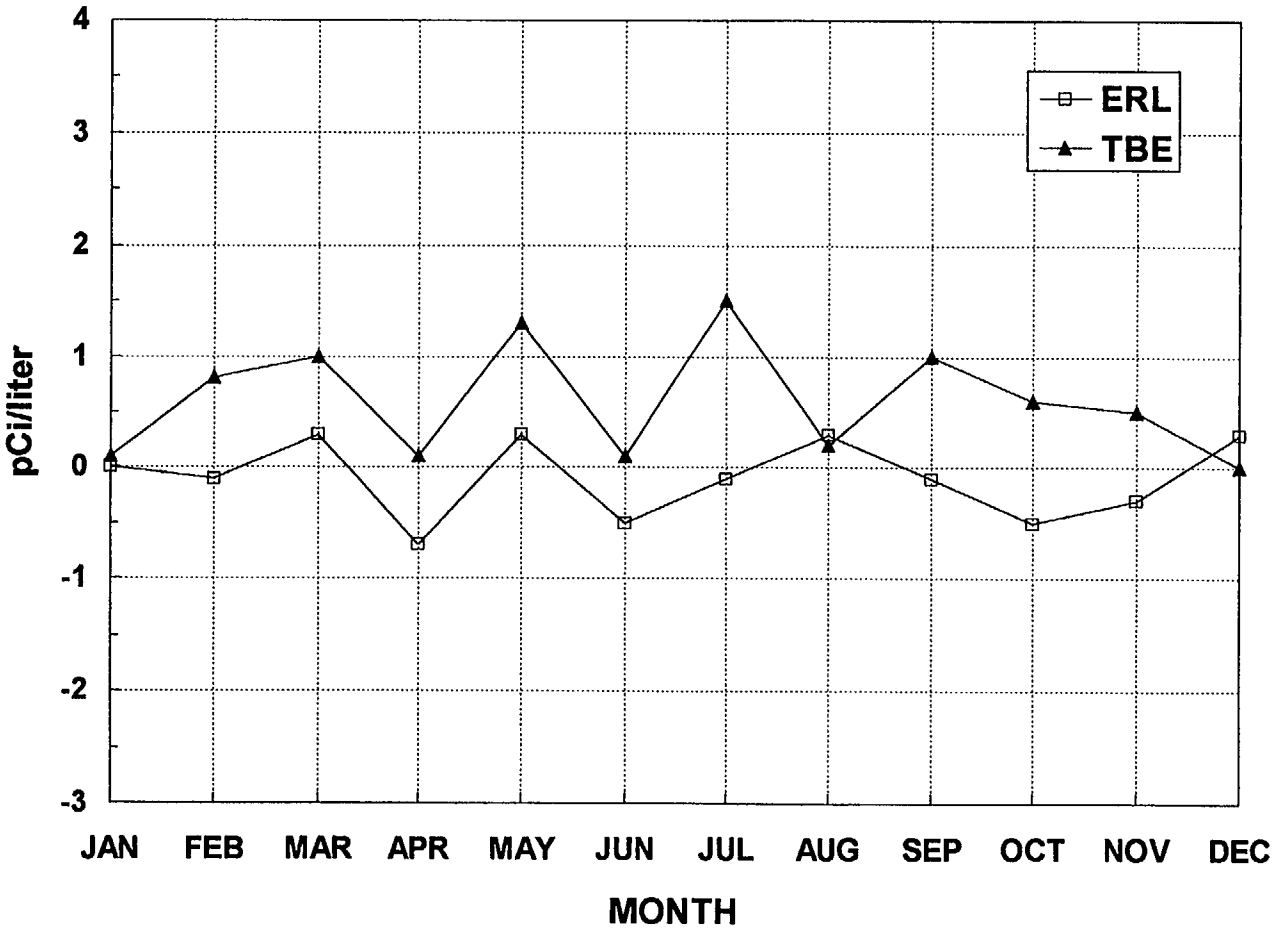


FIGURE D-2
COMPARISON OF MONTHLY SOLUBLE GROSS BETA CONCENTRATIONS IN DRINKING WATER SAMPLES SPLIT BETWEEN GPU AND TBE, 1999

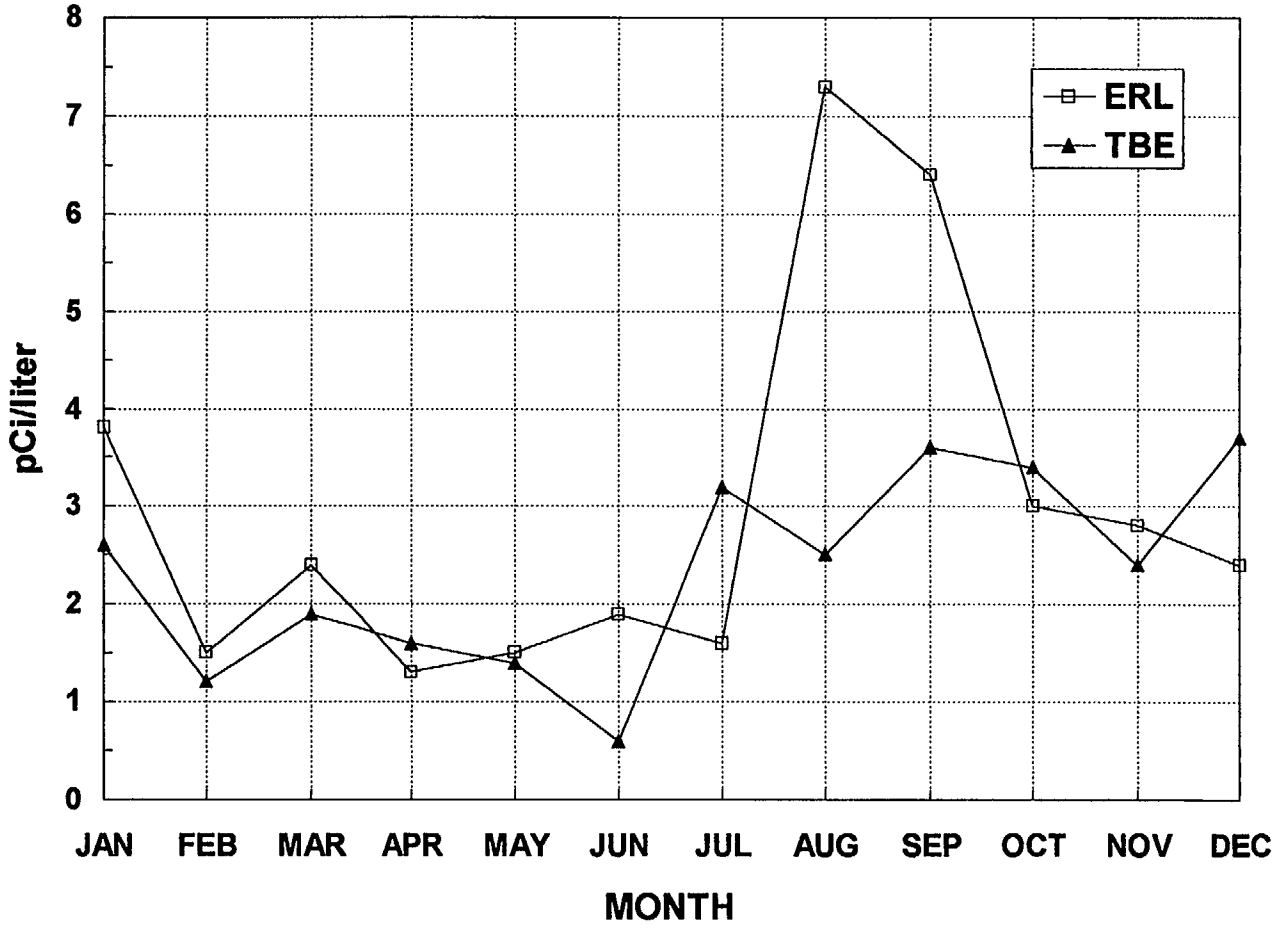
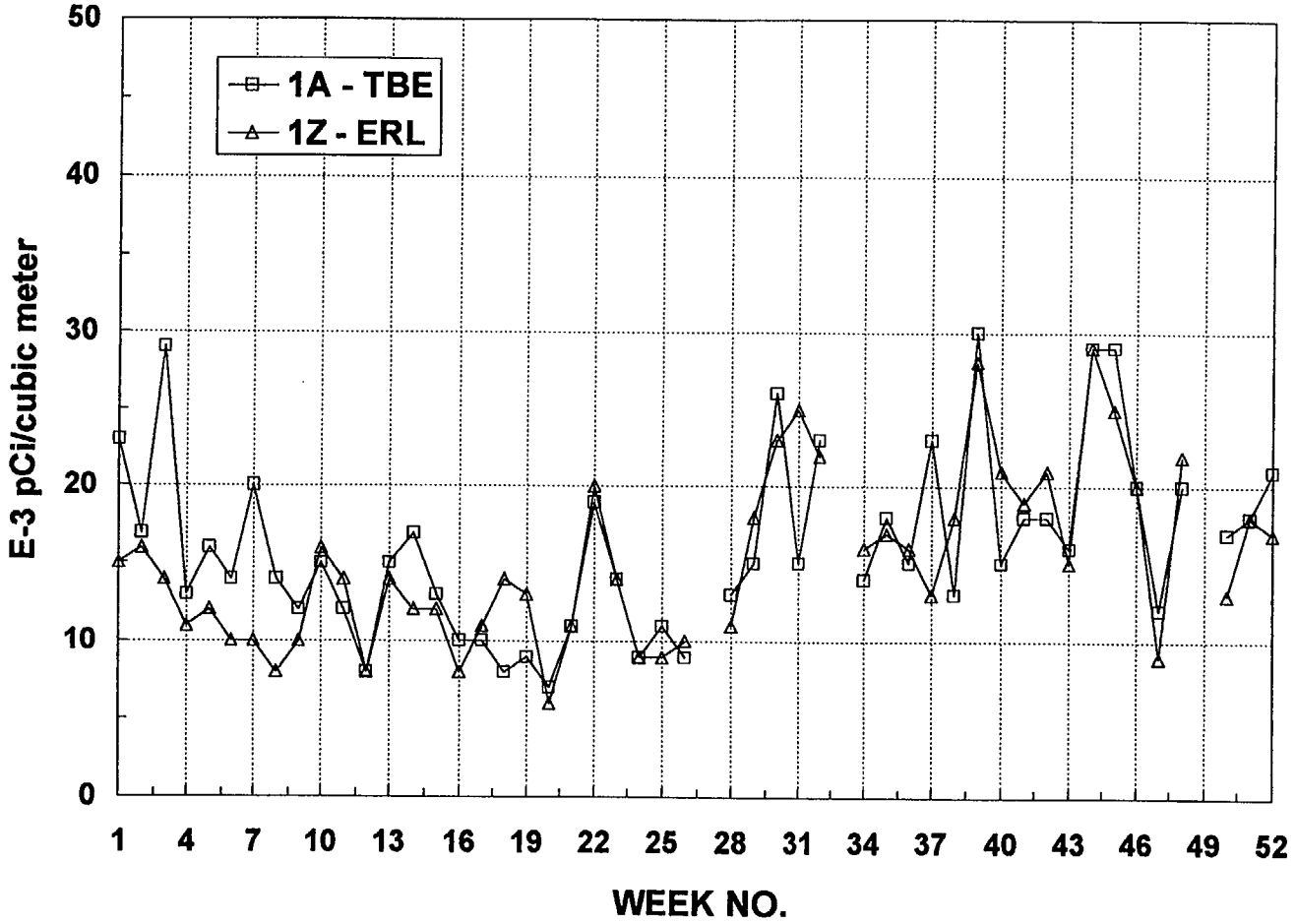


FIGURE D-3
COMPARISON OF WEEKLY GROSS BETA CONCENTRATIONS IN AIR PARTICULATE SAMPLES COLLECTED FROM PBAPS COLLOCATED LOCATIONS 1A AND 1Z, 1999



APPENDIX E

SYNOPSIS OF ANALYTICAL PROCEDURES

APPENDIX E: SYNOPSIS OF ANALYTICAL PROCEDURES

The following section contains a description of the analytical laboratory procedures along with an explanation of the analytical calculation methods used by AmerGen ERL and Teledyne Brown Engineering to obtain the sample activities.

DETERMINATION OF GROSS BETA ACTIVITY IN WATER SAMPLES
(TOTAL SUSPENDED AND DISSOLVED FRACTIONS)

AmerGen Environmental Radioactivity Laboratory

This describes the process used to measure the radioactivity of water samples without identifying the radioactive species present. No chemical separation techniques are involved.

For surface and drinking water samples, 400 ml of the sample is filtered under vacuum through a 0.45 micron filter. This filter represents the insoluble portion of the sample. The filter is dried and mounted on a planchet. The filtrate which represents the soluble portion of the sample is evaporated on a hot plate, and the residue is transferred and dried on another planchet.

The planchets are counted for 100 minutes in a low-background gas flow proportional counter. Calculation of activity includes a self-absorption correction for counter efficiency based on the weight of residue on each planchet.

Calculation of Sample Activity and 2 Sigma Uncertainty:

$$R = \frac{C - B}{2.22x\,E_0 x TF x V x T}$$

$$2s = \frac{2x\sqrt{C + B}}{2.22x\,E_0 x TF x V x T}$$

$$LLD = \frac{4.66x\sqrt{B}}{2.22x\,E_0 x TF x V x T}$$

Where:

R	=	Activity of sample in picocuries per unit volume or weight. Volume or weight units are those used for V.
2s	=	2 Sigma Counting Uncertainty
LLD	=	Lower Limit of Detection
C	=	Sample Counts
B	=	Blank Counts
E_0	=	Efficiency of the counter
TF	=	Transmission Factor
T	=	Acquisition time in minutes
V	=	Volume or weight of aliquot analyzed.

DETERMINATION OF GROSS BETA ACTIVITY IN WATER SAMPLES
(TOTAL SUSPENDED AND DISSOLVED FRACTIONS)

Teledyne Brown Engineering

This describes the process used to measure the radioactivity of water samples without identifying the radioactive species present. No chemical separation techniques are involved.

For surface and drinking water samples, one liter of the sample is filtered under vacuum through a 0.45 micron Millipore filter. This filter represents the insoluble portion of the sample. The filter is dried and mounted on a planchet. The filter which represents the soluble portion of the sample is evaporated on a hot plate, and the residue is transferred and dried on another planchet.

The planchets are counted for 50 minutes in a low-background gas flow proportional counter. Calculation of activity includes a self-absorption correction for counter efficiency based on the weight of residue on each planchet.

Calculation of Sample Activity and 2 Sigma Error:

$$\frac{Result}{(pCi/l)} = \frac{\frac{N}{t_s} - \beta}{(2.22)(v)(E)} \pm \frac{2\sqrt{\frac{N}{t_s^2} + \frac{\beta}{t_b}}}{(2.22)(v)(E)}$$

Net Activity Counting Error

where:

N	=	total counts from sample (counts)
t_s	=	counting time for sample (min)
ß	=	background rate of counter (cpm)
t_b	=	counting time for background (min)
2.22	=	dpm/pCi
v	=	volume in liters
E	=	efficiency of the counter
2	=	multiple of counting error

The MDA is defined as that value equal to the two sigma counting error of the result.

DETERMINATION OF TRITIUM IN WATER BY
LIQUID SCINTILLATION COUNTING

AmerGen Environmental Radioactivity Laboratory

Seven (7) milliliters of sample is filtered through a 0.45 micron filter into a vial and mixed with 15 ml of liquid scintillation material and counted for a minimum of 480 minutes to determine its activity. The tritium activity is determined by measuring the count rate in the beta activity energy spectrum in Region A. 20.0 to 2000 represents Region C. If the sample Region C cpm is within ± 25% of the average background Region C cpm and the sample Quench Indicating Parameter (QIP) is within 20 of the H-3 source QIP the sample has no contamination and the tritium activity may be calculated directly. If not the sample must be purified before recounting.

Calculation of Sample Activity and 2 Sigma Uncertainty:

$$R = \frac{C - B}{2.22x\,E_0 x V x DF}$$

$$2s = \frac{2x\sqrt{\frac{C}{T_a} + \frac{\beta}{T_b}}}{2.22x\,E_0 x V x DF}$$

$$LLD = \frac{3.29x\sqrt{\frac{\beta}{T_a} + \frac{\beta}{T_b}}}{2.22x\,E_0 x V x DF}$$

Where:

T_a	=	Total count time of sample in minutes
T_b	=	Total count time of background in minutes
R	=	Tritium activity in picoCurie per unit volume (Volume units are those used in V)
2s	=	2 sigma Uncertainty in the same units as above
LLD	=	Lower limit of detection in same units as above
C	=	Average count rate of sample
ß	=	Average count rate of background
E_0	=	Tritium detection efficiency of counter, calculated as shown below
V	=	Volume of aliquot

DF = Decay factor, calculated as shown below

$$DF = e^{\frac{-\ln 2 x DT}{12.43}}$$

DT = time difference in years from collection stop date to counting date of sample

The efficiency is calculated as follows:

$$E_0 = \frac{S - B}{AsxVsxDFs}$$

Where:

S = Average count rate for the "efficiency determination" standard
B = Average count rate of background
As = Activity of standard in dpm per unit volume
Vs = Volume of standard used
DFs = Decay factor of standard, calculated as follows:

$$DFs = e^{\frac{-\ln 2 x DTs}{12.43}}$$

DTs = time difference (in years) between calibration date and counting date

DETERMINATION OF GROSS BETA ACTIVITY IN AIR PARTICULATE SAMPLES

AmerGen Environmental Radioactivity Laboratory

After allowing at least a three-day (extending from the sample stop date to the sample count time) period for the short-lived radionuclides to decay out, each air particulate filter paper is placed in a 2-inch diameter stainless steel planchet and counted using a gas flow proportional counter.

Calculation of Sample Activity and 2 Sigma Uncertainty:

$$R = \frac{C - B}{2.22x\,E_0 x TF x V x T}$$

$$2s = \frac{2x\sqrt{C + B}}{2.22x\,E_0 x TF x V x T}$$

$$LLD = \frac{4.66x\sqrt{B}}{2.22x\,E_0 x TF x V x T}$$

Where

R	=	Activity of sample in picoCuries per unit volume or weight. Volume or weight units are those used for V.
2s	=	2 Sigma Counting Uncertainty
LLD	=	Lower Limit of Detection
C	=	Sample Counts
B	=	Blank Counts
E_0	=	Efficiency of the counter
TF	=	Transmission Factor of filter (i.e. 1.00 for gross beta, 0.80 for gross alpha)
T	=	Acquisition time in minutes
V	=	Volume analyzed.

DETERMINATION OF GROSS BETA ACTIVITY IN AIR PARTICULATE SAMPLES

Teledyne Brown Engineering

This describes the process used to measure the overall beta activity of air particulate filters without identifying the radioactive species present. No chemical separation techniques are involved. Each air particulate filter is placed directly on a 2-inch stainless steel planchet. The planchets are then counted for beta activity in a low-background gas flow proportional counter. Calculation of activity includes an empirical self-absorption correction curve which allows for the change in effective counting efficiency caused by the residue mass. Self-absorption is not considered in the case of air particulate filters because of the impracticality of accurately weighing the deposit and because the penetration depth of the deposit into the filter is unknown.

Calculation of Sample Activity and 2 Sigma Error:

$$\frac{Result}{(pCi/m^3)} = \frac{\frac{N}{t_s} - \beta}{2.22(v)(E)(.02832)} \pm \frac{2\sqrt{\frac{N}{t_s^2} + \frac{\beta}{t_b}}}{2.22(v)(E)(.02832)}$$

Net Activity Counting Error

where:

N	=	total counts from sample (counts)
t_s	=	counting time for sample (min)
ß	=	background rate of counter (cpm)
t_b	=	counting time for background (min)
2.22	=	dpm/pCi
v	=	volume of sample analyzed in cubic feet calculated from the elapsed time meter
E	=	efficiency of the counter
2	=	multiple of counting error
.02832	=	conversion to cubic meters

The MDA is defined as that value equal to the two sigma counting error of the result.

DETERMINATION OF I-131 IN MILK SAMPLES

AmerGen Environmental Radioactivity Laboratory

Stable iodine carrier is equilibrated in a 3.5-liter volume of raw milk before pumping through 25cc of anion exchange resin to extract iodine. The system is washed with de-ionized water until clear and the washed resin is transferred to a gamma counting container and analyzed by gamma spectroscopy.

Calculation of Sample Activity and 2 Sigma Uncertainty:

The same calculations are used as in DETERMINATION OF GAMMA EMITTING RADIOISOTOPES below.

DETERMINATION OF I-131 IN MILK SAMPLES

Teledyne Brown Engineering

Two liters of sample are first equilibrated with stable iodide carrier. A batch treatment with anion exchange resin is used to remove iodide from the sample. The iodine is then stripped from the resin with sodium hypochlorite, reduced with hydroxylamine hydrochloride, and extracted into carbon tetrachloride as free iodine. It is then back-extracted as iodide into sodium bisulfite solution and is precipitated as palladium iodide. The precipitate is weighed for chemical yield and is mounted on a nylon planchet for low level beta counting. The chemical yield is corrected by measuring the stable iodide content of the milk or water with a specific ion electrode.

Calculation of the Sample Activity and 2 Sigma Error:

$$\frac{Result}{(pCi/l)} = \frac{\frac{N}{t_s} - \beta}{(2.22)(v)(E)(y)(\exp^{-\lambda\Delta t})} \pm \frac{2\sqrt{\frac{N}{t_s^2} + \frac{\beta}{t_b}}}{(2.22)(v)(E)(y)(\exp^{-\lambda\Delta t})}$$

Net Activity Counting Error

where:

N	=	total counts from sample (counts)
t_s	=	counting time for sample (min)
ß	=	background rate of counter (cpm)
t_b	=	counting time for background (min)
2.22	=	dpm/pCi
v	=	volume of sample analyzed (liters)
y	=	chemical yield of the amount of sample counted
λ	=	is the radioactive decay constant for I-131 (0.693/8.05)
Δt	=	is the elapsed time between sample collection (or end of the sample collection) to the midcount time
2	=	multiple of the counting error
E	=	efficiency of the counter for I-131, corrected for self absorption effects by the formula:

$$E = E_s \frac{(\exp^{-0.0061M})}{(\exp^{-0.0061M_s})}$$

where:

E_s	=	efficiency of the counter determined from an I-131 standard mount
M	=	mass of PdI_2 on the sample mount (mg)
M_s	=	mass of PdI_2 on the standard mount (mg)

The MDA is defined as that value equal to the two sigma counting error of the result.

DETERMINATION OF GAMMA EMITTING RADIOISOTOPES

AmerGen Environmental Radioactivity Laboratory

The procedure for detection of gamma emitting radioisotopes generates high resolution gamma spectra which are used for quantitative determination and identification. Standard geometries have been established to maximize efficiency for sample types: air particulate filters, water, milk, soil/sediment and food products.

A description of the analytical methods, beginning with air particulates used for each sample type is presented, followed by the general formula used for calculation of the sample activities.

Air particulate: At the end of each calendar quarter, 13 (or 14) weekly air filters from the given location are stacked in a two inch diameter Petri dish in chronological order, with the oldest filter at the bottom, nearest the detector, and the newest one on top. The Petri dish is closed and the sample counted.

Water and Milk: A well-mixed 3.5-liter sample is poured into a Marinelli beaker. The samples are brought to ambient temperature and counted.

Soil and Sediment: The sample is dried, sieved and put into a counting container and counted.

Food products: The sample is chopped up and put into a counting container and counted.

Calculation of Sample Activity and 2 Sigma Uncertainty:

$$A = \frac{P}{2.22xqx\varepsilon xbx\,E_L} x\, e^{\lambda T_s} x \frac{\lambda E_R}{(1 - e^{-\lambda E_R})}$$

where:

A	=	the computed specific activity
P	=	peak area
2.22	=	dpm/picoCurie
q	=	sample quantity
ε	=	detection efficiency
b	=	gamma-ray abundance
E_L	=	elapsed live time
λ	=	decay constant
T_S	=	acquisition start time
E_R	=	elapsed real time

$$\Delta A = A\sqrt{\left(\frac{\Delta P}{P}\right)^2 + \left(\frac{\Delta b}{b}\right)^2 \left(\frac{\Delta \varepsilon}{\varepsilon}\right)^2 \left(\frac{sys}{100}\right)^2 (\Delta Decay)^2}$$

where: ΔA = uncertainty in the activity

$$\Delta Decay = \frac{\Delta T_{1/2}}{T_{1/2}} x \left(\frac{\lambda E_R}{1 - e^{-\lambda E_R}} - \lambda (T_S + E_R) - 1\right)$$

ΔP = uncertainty in the peak area P
Δb = uncertainty in the **S**-ray abundance
$\Delta \varepsilon$ = uncertainty in the efficiency
sys = systematic Uncertainty estimate (in %)
ΔT ½ = uncertainty in the half-life

DETERMINATION OF GAMMA EMITTING RADIOISOTOPES

Teledyne Brown Engineering

Gamma emitting radioisotopes are determined with the use of a lithium drifted germanium (GeLi) and high purity germanium detectors with high resolution spectrometry in specific media; such as, air particulate filters, charcoal filters, milk and water. Each sample to be assayed is prepared and counted in standard geometries such as one liter wrap-around Marinelli containers, 300 ml or 150 ml bottles, or 2-inch filter paper source geometries.

Samples are counted on large (>55 cc volume) GeLi detectors connected to Nuclear Data 6620 data acquisition and computation systems. All resultant spectra are stored on magnetic tape.

The analysis of each sample consists of calculating the specific activities of all detected radionuclides or the detection limits from a standard list of nuclides. The GeLi systems are calibrated for each standard geometry using certified radionuclides standards traceable to the National Bureau of Standards.

Gamma Spectroscopy Statistically Significant Activity and 2 Sigma Error Calculation for the ND6620 and ND6700 Systems:

$$\frac{Activity}{\left(\frac{pCi}{unit\ mass}\right)} = \frac{AREA * DECAY}{LIVETIME(\text{sec.}) * ABN * EFF * 0.037 * (unit\ mass)}$$

Statistically Significant Activity

$$\pm\ 200 * \frac{\sqrt{2 * BKGND + AREA}}{AREA} * Activity$$

2 Sigma Counting Error

Where:

AREA	=	Net Peak Area (from Nuclide Line Activity Report)
BKGND	=	Compton Background (from Nuclide Line Activity Report
DECAY	=	Decay Correction Factor (from Minimum Detectable Activity Report) (Nuclide Half Life - Collection time to Mid Count time)
LIVE TIME	=	Elapsed Live Time (from Header Information)

ABN	=	Nuclide Abundance (from Nuclide Line Activity Report)
EFF	=	Detector Efficiency (from Nuclide Line Activity Report)
0.037	=	Conversion Factor (dps to picoCurie)
unit mass	=	Sample weight or volume (from Header Information)

Gamma Spectroscopy Statistically Non Significant Activity and 2 Sigma Error Calculation for the ND6620 and ND6700 Systems:

$$\frac{Activity}{\left(\frac{pCi}{unit\ mass}\right)} = \frac{AREA * DECAY}{LIVETIME(\text{sec.}) * ABN * EFF * 0.037 * (unit\ mass)}$$

Statistically Non Significant Activity

$$\pm\ 200 * \frac{\sqrt{2 * BKGND + NET}}{NET} * Net\ Activity$$

2 Sigma Counting Error

where:

NET	=	Net Peak Area (from Minimum Detectable Activity Report)
BKGND	=	Compton Background (from Nuclide Line Activity Report)
DECAY	=	Decay Correction Factor (from Minimum Detectable Activity Report) (Nuclide Half Life - Collection time to Mid Count time)
LIVE TIME	=	Elapsed Live Time (from Header Information)
(EFF*B.I)	=	Efficiency * Abundance (from Minimum Detectable Activity Report)
0.037	=	Conversion Factor (dps to picoCurie)
unit mass	=	Sample weight or volume (from Header Information)

Gamma Spectroscopy Minimum Detectable Activity Calculation for the ND6620 and ND6700 Systems:

$$\frac{MDA}{\left(\frac{pCi}{unit\ mass}\right)} = \frac{2.83\sqrt{BKGN} * DECAY}{LIVETIME(\text{sec.}) * (EFF * B.I.) * 0.037 * (unit\ mass)}$$

where:

BKGN	=	Total Peak Background Area (from Minimum Detectable Activity Report)
DECAY	=	Decay Correction Factor (from Minimum Detectable Activity Report) (Nuclide Half Life - Collection time to Mid Count time)
LIVE TIME	=	Elapsed Live Time (from Header Information)
(EFF*B.I)	=	Efficiency * Abundance (from Minimum Detectable Activity Report)
0.037	=	Conversion Factor (dps to picoCurie)
unit mass	=	Sample weight or volume (from Header Information)

ENVIRONMENTAL DOSIMETRY

AmerGen Environmental Radioactivity Laboratory

AmerGen ERL thermoluminescent dosimeters (TLDS) are Panasonic Type 801 AS badges, two of which are deployed at each station. Each badge contains two calcium sulfate and two lithium borate elements. Since each element responds to radiation independently, this provides eight independent detectors at each station. The calcium sulfate elements are shielded with a thin layer of lead, which makes the response to different energies of gamma radiation more linear. The lead also shields the calcium sulfate elements from beta radiation, so that they respond to gamma radiation only. The two lithium borate elements are shielded differently to permit the detection of beta radiation. Only the calcium sulfate elements normally are used for environmental monitoring; however, the lithium borate elements can be used to evaluate beta exposures or as a backup to the calcium sulfate elements should more data be required.

TLDs are annealed and read using a Panasonic UD701 A TLD Reader equipped with glow curve capture capability. A reader alignment is performed monthly using TLDs irradiated to a known exposure. Run Correction Factors (RCF) are inserted in each read batch to correct for small drifts in reader calibration. An Element Correction Factor (ECF) is generated for each element before a new TLD badge is placed into service to standardize each element to a known exposure. The ECF for each element is updated every two years. Each calcium sulfate element is annealed to a total residual exposure of less than 0.5 mR prior to being issued each time that a badge is used.

Control (transit) badges are issued with every batch of field TLDs and accompany the badges into the field to quantify transit exposure. After the field badges are deployed, the control badges are kept in a lead shield with minimum 2" thick lead during the period of field exposure. Additional control badges are kept in a lead shield for the entire quarter, and receive essentially no transit exposure. All control and field badges are read together at the end of each quarter, and the average field control badge exposure is subtracted from the average shield control badge exposure to generate the transit exposure. The transit exposure (generally less than 1 mR total) is subtracted from the gross exposures on the field badges to yield the net exposures. Net exposures are then converted to mR per standard month. This method of calculating transit exposure conforms to guidance contained in ANSI N545.

Each station comprises two TLD badges, each of which has two calcium sulfate elements. Outliers are identified using predefined algorithms. If all four elements are available, a given exposure value is judged an outlier if the standard deviation exceeds 5% of the mean exposure based on all four elements, and the exposure for one element is outside three standard deviations of the mean exposure based on the

other three elements. If only two elements are available, the relative standard deviation based on the two exposure values must be 12% or less, or else both exposure values are considered outliers and no valid data are reported for that station for that Quarter.

APPENDIX F

QUALITY CONTROL
INTER-LABORATORY COMPARISON PROGRAM

APPENDIX F: QUALITY CONTROL PROGRAM

AmerGen's ERL and Teledyne Brown Engineering (TBE) participated in an Inter-laboratory Radiological Comparison (cross check) Program provided by Analytics. In addition ERL participated in the DOE Radiological Comparison Program and TBE participated in Environmental Resources Associates (ERA) Proficiency Testing Program. The results of these inter-laboratory programs represent the various media as found in the Peach Bottom Atomic Power Station REMP. As a result of this participation, an objective measurement of analytical precision and accuracy as well as, a bias estimation of the results are obtained.

Examination of the data shows that the vast majority were within the Analytics's, DOE's, or ERA's control limits. Each case of exceeding the control limits was investigated. There was no evidence to suggest systematic errors.

The results of ERL's and TBE's participation in the DOE, Analytics and ERA cross check programs can be found in Tables F-1, F-2, F-3 and F-4, respectively.

TABLE F-1
1999 DOE EML Cross Check Program Results

Collection Date	Media	Nuclide	ERL VALUE (A & D)	UNCERTAINTY (A)	DOE EML VALUE (B &D)	UNCERTAINTY (C)	RATIO	Min. RATIO	Max. RATIO	AGREEMENT
3/1/1999	Air Filter	AM-241	0.13	0.01	0.134	0.001	0.970	0.73	2.58	YES
		CO-57	3.1	0.4	3.01	0.14	1.030	0.65	1.39	YES
		CO-60	5	0.8	4.96	0.28	1.008	0.75	1.32	YES
		CS-137	6.3	0.8	6.05	0.3	1.041	0.73	1.37	YES
		PU-238	0.26	0.03	0.272	0.001	0.956	0.74	1.4	YES
		PU-239	0.12	0.01	0.124	0.003	0.968	0.76	1.44	YES
		SB-125	3.7	1	3.59	0.31	1.031	0.61	1.43	YES
		SR-90	0.31	0.1	0.644	0.015	0.481	0.61	1.93	NO (E)
		U-234	0.064	0.007	0.06	0.002	1.067	0.83	1.92	YES
		U-238	0.063	0.007	0.061	0.003	1.033	0.84	2.61	YES
		U-NAT	0.13		0.123	0.004	1.057	0.8	3.35	YES
3/1/1999	Air Filter	ALPHA	1.7	0.2	1.61	0.16	1.056	0.5	1.55	YES
		BETA	1.5	0.1	1.56	0.16	0.962	0.72	1.67	YES
3/1/1999	Soil	AM-241	7.2	2.1	4.894	0.969	1.471	0.63	2.31	YES
		CS-137	665	65	659.5	24.95	1.008	0.83	1.32	YES
		K-40	370	35	362.75	20.156	1.020	0.78	1.53	YES
		PU-239	7.8	3.1	8.112	1.068	0.962	0.69	1.74	YES
		SR-90	17	5	32.4	0.529	0.525	0.6	3.66	NO (F)
		U-234	140	28	140.667	1.155	0.995	0.47	1.3	YES
		U-238	145	28	145	1.732	1.000	0.44	1.42	YES
		U-NAT	285		291	3	0.979	0.46	1.39	YES
3/1/1999	Vegetation	AM-241	3.5	1	3.522	0.59	0.994	0.68	2.7	YES
		CM-244	1.9	0.6	1.671	0.542	1.137	0.47	1.65	YES
		CO-60	24	3	21.45	1	1.119	0.69	1.46	YES
		CS-137	505	50	467	20	1.081	0.8	1.39	YES
		K-40	730	70	656.5	20	1.112	0.79	1.42	YES
		PU-239	5.1	1.1	5.204	0.428	0.980	0.68	6.95	YES
		SR-90	700	70	736.1	7.7	0.951	0.5	1.33	YES

TABLE F-1
1999 DOE EML Cross Check Program Results

Collection Date	Media	Nuclide	ERL VALUE (A & D)	UNCERTAINTY (A)	DOE EML VALUE (B &D)	UNCERTAINTY (C)	RATIO	Min. RATIO	Max. RATIO	AGREEMENT
3/1/1999	Water	AM-241	1.2	0.2	1.146	0.051	1.047	0.75	1.49	YES
		CO-60	55	5	51.1	3	1.076	0.8	1.2	YES
		CS-137	42	4	39.375	2.405	1.067	0.8	1.26	YES
		FE-55	96	10	97.4	1.65	0.986	0.44	1.53	YES
		H-3	130	30	121.08	6.78	1.074	0.71	1.79	YES
		PU-238	0.78	0.14	0.772	0.037	1.010	0.78	1.25	YES
		PU-239	1	0.2	1.009	0.058	0.991	0.8	1.39	YES
		SR-90	2.6	0.6	4.104	0.045	0.634	0.75	1.5	NO (G)
		U-234	0.29	0.07	0.269	0.016	1.078	0.8	1.4	YES
		U-238	0.27	0.06	0.262	0.016	1.031	0.8	1.26	YES
		U-Nat	0.57		0.541	0.025	1.054	0.67	1.42	YES
3/1/1999	Water	ALPHA	1100	100	1090	20	1.009	0.61	1.32	YES
		BETA	1400	100	1100	40	1.273	0.55	1.54	YES
9/1/1999	Air Filter	Am-241	0.12	0.01	0.127	0.0099	0.945	0.73	2.58	YES
		Co-57	7.2	0.7	7.73	0.033	0.931	0.65	1.39	YES
		Co-60	6.3	0.6	6.35	0.41	0.992	0.75	1.32	YES
		Cs-137	6.2	0.6	6.43	0.42	0.964	0.73	1.37	YES
		Mn-54	7.5	0.8	7.91	0.45	0.948	0.74	1.4	YES
		Pu-238	0.077	0.012	0.0968	0.0065	0.795	0.76	1.44	YES
		Pu-239	0.12	0.01	0.136	0.011	0.882	0.61	1.43	YES
		Ru-106	5	2.2	5.5	1.76	0.909	0.61	1.93	YES
		Sr-90	12	1	0.336	0.0141	35.714	0.83	1.92	NO (H)
		U-234	0.066	0.013	0.0658	0.0034	1.003	0.83	1.92	YES
		U-238	0.062	0.013	0.0646	0.0048	0.960	0.84	2.61	YES
		U-NAT	0.13		0.133	0.0081	0.977	0.8	3.35	YES
9/1/1999	Air Filter	ALPHA	2.9	0.3	2.77	0.26	1.047	0.5	1.55	YES
		BETA	2.7	0.3	2.66	0.26	1.015	0.72	1.67	YES
9/1/1999	Soil	Am-241	1.8	0.7	1.44	0.19	1.250	0.63	2.31	YES
		Cs-137	210	20	204	5	1.029	0.63	2.31	YES
		K-40	845	85	780	27	1.083	0.78	1.53	YES
		Pu-239	3	0.8	3.2	0.5	0.938	0.69	1.74	YES
		Sr-90	19	2	13	.47	1.46	.6	1.66	YES
		U-234	197	20	190	5.2	1.037	0.6	3.66	YES
		U-238	203	20	202	7.2	1.005	0.47	1.3	YES
		U-NAT	407		401	8.7	1.015	0.46	1.39	YES

TABLE F-1
1999 DOE EML Cross Check Program Results

Collection Date	Media	Nuclide	ERL VALUE (A & D)	UNCERTAINTY (A)	DOE EML VALUE (B &D)	UNCERTAINTY (C)	RATIO	Min. RATIO	Max. RATIO	AGREEMENT
9/1/1999	Vegetation	Am-214	3	0.4	2.88	0.22	1.042	0.68	2.7	YES
		Cm-244	1.9	0.2	1.61	0.36	1.180	0.47	1.65	YES
		Co-60	17	2	17.6	1	0.966	0.69	1.46	YES
		Cs-137	440	40	440	20	1.000	0.8	1.39	YES
		K-40	515	50	513	20	1.004	0.79	1.42	YES
		Pu-238	0.39	0.08	0.5	0.1	0.780	0.66	7.94	YES
		Pu-239	4.4	0.5	4.3	0.46	1.023	0.68	6.95	YES
		Sr-90	650	70	595	29	1.092	0.5	1.33	YES
9/1/1999	Water	Am-241	0.87	0.1	0.85	0.1	1.024	0.75	1.49	YES
		Co-60	54	5	52.4	2.2	1.031	0.8	1.2	YES
		Cs-137	215	20	76	3.4	2.829	0.8	1.26	NO (I)
		Fe-55	44	4	53	2	0.830	0.44	1.53	YES
		H-3	150	10	80.7	3.7	1.859	0.71	1.79	NO (I)
		Pu-238	0.8	0.08	0.79	0.08	1.013	0.78	1.25	YES
		Pu-239	0.89	0.09	0.87	0.1	1.023	0.8	1.39	YES
		Sr-90	1.5	0.6	1.72	0.1	0.872	0.75	1.5	YES
		U-234	0.4	0.05	0.37	0.02	1.081	0.8	1.4	YES
		U-238	0.41	0.06	0.36	0.02	1.139	0.8	1.26	YES
		U-NAT	0.82		0.76	0.04	1.079	0.67	1.42	YES
9/1/1999	Water	ALPHA	1400	100	1580	20	0.886	0.61	1.32	YES
		BETA	910	90	740	40	1.230	0.55	1.54	YES

A. The ERL Value is an average of 1 to 4 determinations.
B. The DOE EML value is the mean of replicate determinations for each nuclide.
C. The DOE EML uncertainty is the standard error of the mean.
D. The units are Bq/l for water, Bq/kg (dry) for soil, Bq/kg (wet) for vegetation and total Bq for air filters.
E. The Sr-90 in EML air particulate result (0.31 Bq/UN) is not acceptable with the EML value (0.644 Bq/UN). Three aliquots were analyzed using different size volumes, 0.05, 0.1, and 0.15 unit. The digestion of the filter was adequate because all other analyses performed, such as gamma isotopic and Alpha Spec., were acceptable. The Sr-90 results did yield a high uncertainty and in retrospect larger aliquots should have been analyzed. Future analysis of cross-check samples will process larger aliquots, especially if the activity is low, as was the case with this survey.
F. The EML soil Sr-90 result (17 Bq/kg) is not within acceptable agreement with the EML value (32.4 Bq/kg). Three aliquots (3g, 5g, and 7g) were processed and yielded results of 15.6, <15, and 18.5 Bq/kg. The two positive results were averaged and reported. Upon review of these results it shows that the larger aliquot used for

the analysis yielded the highest result. Future analysis of EML soil samples will process larger aliquots, similarly to the sample size used for environmental samples, that is, ~ 25 grams.

G. The Sr-90 in EML water (known value 4.104 Bq/l) failed to achieve acceptable results. Two aliquots were analyzed and yielded results of 3.1 ± 0.8 and 2.1 ± 0.4 Bq/l. These results overlap and were averaged before submitting the final result of 2.6 Bq/l to EML. A subsequent reanalysis was performed yielding 2.4 and 2.8 Bq/l. All these samples were counted on the same detector, Detector 46. Reanalysis samples were then counted on Detector 42. Surprisingly, Detector 42 results averaged 3.6 Bq/l, an acceptable 0.88 ratio to the known. This would lead one to think that perhaps detector 46's efficiency is incorrect. However, the Sr-90 check standard was acceptable for all reports. Further testing by counting additional samples on different detectors showed no discrepancies. Two things will be done for future samples. First, different volume aliquots will be taken for analysis. This will show if there are problems with lower activity results. Secondly, samples will be counted on different detectors to determine whether detector efficiency is a problem.

H. The ERL Sr-90 value (12 ± 1 Bq/filter) submitted does not agree with the EML value (0.336 ± 0.014 Bq/filter. The ratio was 35.7 and the acceptance range is for ratios between 0.83 and 1.92. A reanalysis was performed and the result (0.37 ± 0.11 Bq/filter) has a ratio of 1.09 and is Acceptable. An investigation was conducted to determine why the original result exceeded the acceptable range. The sample was analyzed in duplicate using 0.1 and 0.2 UNIT of digested sample. After reviewing the first count (total strontium), the data looked normal, 280 and 354 counts respectfully. After an ingrowth period of one week, the total strontium samples were dissolved and passed through the original columns in order to separate out the ingrown yttrium. The yttrium portion was evaporated onto a planchet and counted. These counts also looked normal, i.e., one sample had twice as many counts as the other (1761 and 3119 counts). In retrospect, looking at both the total strontium counts and the purified yttrium counts together, it can be seen that there is no way the yttrium counts could be higher then the total strontium counts. There must have been something that contaminated the yttrium portion. There are two possibilities for what could have occurred. The samples were analyzed with five other crosscheck samples, all with much higher activities. There could have been cross contamination however, none of the other crosschecks came up low in their known activity. Another possibility is that during the ingrowth period, besides yttrium ingrowing from the strontium, there was also bismuth ingrowing from the lead that had a stronger affinity to adhere onto the Sr resin. This bismuth is normally removed by passing a 0.05M HNO3 rinse through the column, which is what the procedure instructs you to do. This rinse may have been omitted causing the bismuth to be counted with the yttrium and resulting in a much higher count rate and activity. In order to prevent this omission from occurring again, the calculation program now has a step built in to alert the analyst if the total strontium counts are lower then the yttrium counts. This warning will prevent false positives from being reported.

I. The water sample received from the EML consisted of a spiked, 455 ml aliquot (approximate) of acidified water. The Lab ID number was 109360 so it was duplicated as 109361. When the first 100 ml aliquot was measured out into a gamma counting container its result was significantly higher then the duplicate result. The analyst then poured the aliquots back into the original container. Before reporting the duplicate results, fresh aliquots were gamma scanned and were found to agree with each other. Upon investigation it was discovered that the graduated cylinder used was contaminated with Cs-137. The sample that contaminated the graduated cylinder may also have resulted in the H-3 contamination. ERL staff have been instructed to use disposable labware for high activity samples or to gamma scan glassware and dispose of it if it is contaminated.

The control limit concept was established from percentiles of historic data distributions (1982 - 1992). The evaluation of this historic data and the development of the control limits are presented in DOE report EML-564. The control limits for QAP-XLVII were developed from percentiles of data distributions for the years 1991 - 1999.

TABLE F-2
ERL 1999 ANALYTICS Environmental Cross Check Program Results

Collection Date	Media	Nuclide	ERL VALUE (B)	ANALYTICS VALUE (A)	UNCERTAINTY (3 SIGMA)	UNCERTAINTY (1 SIGMA)	RESOLUTION	RATIO	Min. RATIO	Max. RATIO	AGREEMENT
6/24/1999	Air Filter	Ce-141	180	169	8	2.7	63.4	1.07	0.8	1.25	YES
		Cr-51	250	217	11	3.7	59.2	1.15	0.8	1.25	YES
		Cs-134	110	116	6	2.0	58.0	0.95	0.8	1.25	YES
		Cs-137	200	190	10	3.3	57.0	1.05	0.8	1.25	YES
		Mn-54	98	85	4	1.3	63.8	1.15	0.8	1.25	YES
		Fe-59	69	48	2	0.7	72.0	1.44	0.8	1.25	NO (C)
		Zn-65	150	123	6	2.0	61.5	1.22	0.8	1.25	YES
		Co-60	220	215	11	3.7	58.6	1.02	0.8	1.25	YES
6/24/1999	Cartridge	I-131	89	76	4	1.3	57.0	1.17	0.8	1.25	YES
6/24/1999	Milk	I-131	75	72	4	1.3	54.0	1.04	0.8	1.25	YES
6/24/1999	Milk	Sr-89	66	70	4	1.3	52.5	0.94	0.8	1.25	YES
		Sr-90	41	42	2	0.7	63.0	0.98	0.8	1.25	YES
6/24/1999	Water	Sr-89	86	69	3	1.0	69.0	1.25	0.8	1.25	YES
		Sr-90	42	46	2	0.7	69.0	0.91	0.8	1.25	YES
6/24/1999	Water	I-131	68	68	3	1.0	68.0	1.00	0.8	1.25	YES
		Ce-141	140	134	7	2.3	57.4	1.04	0.8	1.25	YES
		Cr-51	160	172	9	3.0	57.3	0.93	0.8	1.25	YES
		Cs-134	84	92	5	1.7	55.2	0.91	0.8	1.25	YES
		Cs-137	160	151	8	2.7	56.6	1.06	0.8	1.25	YES
		Mn-54	66	68	3	1.0	68.0	0.97	0.8	1.25	YES
		Fe-59	48	38	2	0.7	57.0	1.26	0.8	1.25	NO (C)
		Zn-65	110	98	5	1.7	58.8	1.12	0.8	1.25	YES
		Co-60	190	171	9	3.0	57.0	1.11	0.8	1.25	YES
6/24/1999	Water	I-131	68	68	3	1.0	68.0	1.00	0.8	1.25	YES
6/24/1999	Water	Alpha	91	98	5	1.7	58.8	0.93	0.8	1.25	YES
		Beta	250	290	15	5.0	58.0	0.86	0.8	1.25	YES
9/23/1999	Water	Alpha	46	51	3	1.0	51.0	0.90	0.8	1.25	YES
		Beta	240	271	14	4.7	58.1	0.89	0.8	1.25	YES
9/23/1999	Water	Sr-89	81	77	4	1.3	57.8	1.05	0.8	1.25	YES
		Sr-90	41	38	2	0.7	57.0	1.08	0.8	1.25	YES

TABLE F-2
ERL 1999 ANALYTICS Environmental Cross Check Program Results

Collection Date	Media	Nuclide	ERL VALUE (B)	ANALYTICS VALUE (A)	ANALYTICS UNCERTAINTY (3 SIGMA)	ANALYTICS UNCERTAINTY (1 SIGMA)	RESOLUTION	RATIO	Min. RATIO	Max. RATIO	AGREEMENT
9/23/1999	Milk	I-131	100	91	5	1.7	54.6	1.10	0.8	1.25	YES
		Ce-141	200	197	10	3.3	59.1	1.02	0.8	1.25	YES
		Cr-51	160	149	7	2.3	63.9	1.07	0.8	1.25	YES
		Cs-134	89	96	5	1.7	57.6	0.93	0.8	1.25	YES
		Cs-137	230	217	11	3.7	59.2	1.06	0.8	1.25	YES
		Mn-54	180	170	9	3.0	56.7	1.06	0.8	1.25	YES
		Fe-59	96	76	4	1.3	57.0	1.26	0.8	1.25	NO (C)
		Zn-65	160	164	8	2.7	61.5	0.98	0.8	1.25	YES
		Co-60	140	129	6	2.0	64.5	1.09	0.8	1.25	YES
9/23/1999	Water	I-131	91	77	4	1.3	57.8	1.18	0.8	1.25	YES
		Ce-141	240	244	12	4.0	61.0	0.98	0.8	1.25	YES
		Cr-51	180	184	9	3.0	61.3	0.98	0.8	1.25	YES
		Cs-134	100	119	6	2.0	59.5	0.84	0.8	1.25	YES
		Cs-137	280	268	13	4.3	61.8	1.04	0.8	1.25	YES
		Mn-54	220	210	11	3.7	57.3	1.05	0.8	1.25	YES
		Fe-59	100	94	5	1.7	56.4	1.06	0.8	1.25	YES
		Zn-65	220	202	10	3.3	60.6	1.09	0.8	1.25	YES
		Co-60	160	159	8	2.7	59.6	1.01	0.8	1.25	YES
9/23/1999	Water	I-131	80	77	4	1.3	57.8	1.04	0.8	1.25	YES
		Ce-141	240	244	12	4.0	61.0	0.98	0.8	1.25	YES
		Cr-51	180	184	9	3.0	61.3	0.98	0.8	1.25	YES
		Cs-134	110	119	6	2.0	59.5	0.92	0.8	1.25	YES
		Cs-137	280	268	13	4.3	61.8	1.04	0.8	1.25	YES
		Mn-54	230	210	11	3.7	57.3	1.10	0.8	1.25	YES
		Fe-59	110	94	5	1.7	56.4	1.17	0.8	1.25	YES
		Zn-65	220	202	10	3.3	60.6	1.09	0.8	1.25	YES
		Co-60	170	159	8	2.7	59.6	1.07	0.8	1.25	YES
9/23/1999	Water	I-131	79	77	4	1.3	57.8	1.03	0.8	1.25	YES
9/23/1999	Soil	Ce-141	0.32	0.399	0.020	0.007	59.9	0.80	0.8	1.25	YES
		Cr-51	0.38	0.301	0.015	0.005	60.2	1.26	0.8	1.25	NO (D)
		Cs-134	0.15	0.195	0.010	0.003	58.5	0.77	0.8	1.25	NO (D)
		Cs-137	0.37	0.439	0.022	0.007	59.9	0.84	0.8	1.25	YES
		Mn-54	0.30	0.343	0.017	0.006	60.5	0.87	0.8	1.25	YES
		Fe-59	0.13	0.154	0.008	0.003	57.8	0.84	0.8	1.25	YES
		Zn-65	0.32	0.331	0.017	0.006	58.4	0.97	0.8	1.25	YES
		Co-60	0.21	0.260	0.013	0.004	60.0	0.81	0.8	1.25	YES

Notes:

A. The Analytics Value is the known concentration. Units are pCi/l for Milk, pCi/g (dry) for Soil and total pCi for Filter and Cartridge.
B. The ERL Value is an average of three or more determinations. Units are pCi/l for Milk, pCi/g (dry) for Soil and total pCi for Filter and Cartridge.
C. A new calibration source with Fe-59 has been ordered.
D. This sample was analyzed three times. The results were:

Nuclide	Result 1	Result 2	Result 3	Analytics	Ratio
Cr-51	0.38 ± 0.24	0.37 ± 0.17	L.T. 0.2	0.301	1.26
Cs-134	0.16 ± 0.02	0.14 ± 0.01	0.14 ± 0.01	0.195	0.77

The acceptance range for the ratio is between 0.8 and 1.25. Because the other nuclides in the sample had Acceptable Agreement and because of the non-homogeneous nature of soil samples, the small deviation from the acceptance range is acceptable.

To determine agreement or possible agreement:

1. Divide each Analytics value by its associated one sigma uncertainty to obtain the resolution.
2. Divide each ERL value by the corresponding Analytics value to obtain the ratio.
3. The ERL measurement is in agreement if the value of the ratio falls within the limits shown in the following table for the corresponding resolution.

Resolution	Agreement
< 4	0.4 - 2.5
= 4 - < 8	0.5 - 2.0
= 8 - < 16	0.6 - 1.66
= 16 - < 51	0.75 - 1.33
= 51 - < 200	0.80 - 1.25
= 200	0.85 - 1.18

Criteria are similar to those listed in USNRC Inspection Procedure 84750 "Radioactive Waste Treatment, and Effluent and Environmental Monitoring" with minor adjustments to account for activity concentrations with large uncertainties.

TABLE F-3
Teledyne Brown Engineering 1999 ANALYTICS Cross Check Program Results

Collection Date	Media	Nuclide	TBE VALUE	ANALYTICS VALUE (A)	ANALYTICS UNCERTAINTY (3 SIGMA)	ANALYTICS UNCERTAINTY (1 SIGMA)	RESOLUTION	RATIO (B)	Min. RATIO	Max. RATIO	AGREEMENT
6/24/1999	Water	Sr-89	60	69	3.0	1.0	69.0	0.87	0.8	1.25	YES
		Sr-90	35	46	2.0	0.7	69.0	0.76	0.8	1.25	NO (C)
6/24/1999	Water	Alpha	160	98	5.0	1.7	58.8	1.63	0.8	1.25	NO (D)
		Beta	300	290	15.0	5.0	58.0	1.03	0.8	1.25	YES
6/24/1999	Water	I-131	77	68	3.0	1.0	68.0	1.13	0.8	1.25	YES
		Ce-141	139	134	7.0	2.3	57.4	1.04	0.8	1.25	YES
		Cr-51	162	172	9.0	3.0	57.3	0.94	0.8	1.25	YES
		Cs-134	86	92	5.0	1.7	55.2	0.93	0.8	1.25	YES
		Cs-137	167	151	8.0	2.7	56.6	1.11	0.8	1.25	YES
		Mn-54	77	68	3.0	1.0	68.0	1.13	0.8	1.25	YES
		Fe-59	40	38	2.0	0.7	57.0	1.05	0.8	1.25	YES
		Zn-65	113	98	5.0	1.7	58.8	1.15	0.8	1.25	YES
		Co-60	179	171	9.0	3.0	57.0	1.05	0.8	1.25	YES
6/24/1999	Air Filter	Ce-141	169	162	8.0	2.7	60.8	1.04	0.8	1.25	YES
		Cr-51	241	208	10.0	3.3	62.4	1.16	0.8	1.25	YES
		Cs-134	105	111	6.0	2.0	55.5	0.95	0.8	1.25	YES
		Cs-137	211	182	9.0	3.0	60.7	1.16	0.8	1.25	YES
		Mn-54	96	82	4.0	1.3	61.5	1.17	0.8	1.25	YES
		Fe-59	55	46	2.0	0.7	69.0	1.20	0.8	1.25	YES
		Zn-65	144	118	6.0	2.0	59.0	1.22	0.8	1.25	YES
		Co-60	214	206	10.0	3.3	61.8	1.04	0.8	1.25	YES
6/24/1999	Soil	Ce-141	0.274	0.269	0.0	0.0	62.1	1.02	0.8	1.25	YES
		Cr-51	0.374	0.345	0.0	0.0	60.9	1.08	0.8	1.25	YES
		Cs-134	0.2	0.184	0.0	0.0	61.3	1.09	0.8	1.25	YES
		Cs-137	0.45	0.429	0.0	0.0	61.3	1.05	0.8	1.25	YES
		Mn-54	0.153	0.136	0.0	0.0	58.3	1.13	0.8	1.25	YES
		Fe-59	0.118	0.077	0.0	0.0	57.8	1.53	0.8	1.25	NO (E)
		Zn-65	0.206	0.196	0.0	0.0	58.8	1.05	0.8	1.25	YES
		Co-60	0.351	0.343	0.0	0.0	60.5	1.02	0.8	1.25	YES

A. The Analytics Value is the known concentration. Units are pCi/l for Milk, pCi/g (dry) for Soil and total pCi for Filter and Cartridge.
B. Ratio of Teledyne Brown Engineering to Analytics results.
C. Under investigation.
D. A high Gross Alpha result was obtained because the calculation was mistakenly performed using Th-230 counting efficiency. If the normal Am-241 calibration were used, TBE would have reported *110 +- 10 pCi/l*, which is an acceptable value.
E. Random or coincidental summing caused the problem. Two other energy lines can sum a peak on the same energy band causing more counts to be thrown in. The key line was changed and the resulting value was 0.079, which is in agreement with Analytics.

To determine agreement or possible agreement:

1. Divide each Analytics value by its associated one sigma uncertainty to obtain the resolution.
2. Divide each TBE value by the corresponding Analytics value to obtain the ratio.
3. The measurement is in agreement if the value of the ratio falls within the limits shown in the following table for the corresponding resolution.

Resolution	Agreement
< 4	0.4 - 2.5
= 4 - < 8	0.5 - 2.0
= 8 - < 16	0.6 - 1.66
= 16 - < 51	0.75 - 1.33
= 51 - < 200	0.80 - 1.25
= 200	0.85 - 1.18

Criteria are similar to those listed in USNRC Inspection Procedure 84750 "Radioactive Waste Treatment, and Effluent and Environmental Monitoring" with minor adjustments to account for activity concentrations with large uncertainties.

TABLE F-4
Teledyne Brown Engineering ERA Statistical Summary
Proficiency Testing (PT) Program - 1999

DATE	MEDIA	NUCLIDE	ERA Known Value (pCi/l) (a)	TBE Result (pCi/l) (b)	Expected Dev. Known (pCi/l) (c)	Control Limits (pCi/l) (d)	Performance Evaluation (e)
8/23/99	Water	U(NAT)	12.4	13.0	3.00	7.20-17.6	A
8/20/99	Water	Ra-226	7.21	7.37	1.08	5.34-9.08	A
8/23/99	Water	Ra-228	4.51	7.17	1.13	2.57-6.45	NA (f)
8/24/99	Water	Sr-89	26.6	25.0	5.00	17.9-35.3	A
8/24/99	Water	Sr-90	40.2	39.7	5.00	31.5-48.9	A
9/15/99	Water	Gr-A	48.6	30.3	12.2	27.7-69.5	CE
9/14/99	Water	Gr-B	20.0	22.0	5.00	11.3-28.7	A
9/01/99	Water	H-3	6130	5530	613	5090-7170	A

Footnotes:

(a) The ERA Known Value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation.
(b) Average $\pm$ 1 sigma.
(c) Established per the guidelines contained in the EPA's National Standards for Water Proficiency Testing Criteria Document, December 1998, as applicable.
(d) Established per the guidelines contained in the EPA's National Standards for Water Proficiency Testing Criteria Document, December 1998, as applicable.
(e) A= Acceptable. Reported Result falls within the Warning Limits.
(f) NA = Not Acceptable. Reported Result falls outside of the Control Limits.
(g) CE = Check for Error. Reported Result falls within the Control Limits and outside of the Warning Limits.
(h) A calculation error was made by not correcting for Ra-226 content. If this correction is made, an average result of 5.7 pCi/l is obtained which is in the acceptance region.

APPENDIX G

PBAPS SURVEY

APPENDIX G: PBAPS SURVEYS

A Land Use Census around the Peach Bottom Atomic Power Station (PBAPS) was conducted by Normandeau Associates, RMC Environmental Services Division for PECO Nuclear to comply with Section 3.8.E.2 of PBAPS's Offsite Dose Calculation Manual Specifications (ODCMS) and Bases. The survey was conducted during the May to October 1999 growing season. The distance and direction of all locations were positioned from the barn to the PBAPS vents using Global Positioning System (GPS) technology. The results of this survey are summarized in Table G-1.

No changes were required to the PBAPS REMP as a result of this survey.

TABLE G-1 LOCATION OF THE NEAREST MILK PRODUCING ANIMAL WITHIN A FIVE MILE RADIUS OF PBAPS, 1999

Sector	Distance (ft.) from Vents
N	14,650
NNE	11,078
NE	11,211
ENE	10,978
E	15,163
ESE	20,149
SE	19,085
SSE	-
S	-
SSW	12,200
SW	12,241
WSW	4,694
W	5,119
WNW	9,428
NW	17,570
NNW	-

- INDICATES NO MILK ANIMALS LOCATED