PEACH BOTTOM ATOMIC POWER STATION

ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT No.20

JANUARY 1, 1984 THROUGH DECEMBER 31, 1984

PREPARED FOR

PHILADELPHIA ELECTRIC COMPANY

BY

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MAY 1985

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I. SUMMARY AND CONCLUSIONS

1. SUMMARY AND CONCLUSIONS

This report on the radiological environmental monitoring program conducted at the Peach Bottom Atomic Power Station for Philadelphia Electric Company by Teledyne Isotopes covers the period January 1, 1984 to December 31, 1984. During this period 2263 analyses were performed on 1687 samples.

Surface water and discharge water samples were analyzed for concentrations of tritium, gross beta, and gamma-emitting nuclides. Surface water was also analyzed for concentrations of gross alpha and iodine-131. Water collected from station 4L showed positive iodine-131 concentrations in samples collected on March 31 and December 1 while station 6I showed positive iodine-131 concentrations on February 11, August 4, September 1, October 29, and December 1. The presence of this isotope at the unaffected station and at a greater level than the potentially affected station indicates that it is probably not plant related. Comparisons of the other samples collected at unaffected stations with potentially affected stations, in Conowingo Pond, showed no significant difference in concentrations of the radionuclides studied. It was shown that no significant differences existed between the preoperational and operational periods; therefore, it can be concluded that the levels of radioactivity in Conowingo Pond water have not been measurably influenced by the operation of the Peach Bottom Atomic Power Station.

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

High sensitivity iodine-131 analyses were also performed on weekly milk samples while cows were on pasture and on monthly samples when cows were not grazing. Milk collected from station G showed positive results on September 17, 24, October 1, 8, 15, 22 and 29, 1984. Milk collected from station J showed positive results on October 8, 15, 22, and 29, 1984. This was attributed to PBAPS operations. The maximum hypothetical dose is calculated to be 0.11 mRem to an infant's thyroid, or 0.37% of 10 CFR Part 50 Appendix I design objectives.

Soil samples were analyzed for concentrations of Strontium-89, Strontium-90 and gamma-emitting nuclides. The levels observed were not significantly different from preoperational data.

Environmental gamma radiation measurements were made using thermoluminescent dosimeters. Results from the site-boundary, middle and outer rings were found to be not significantly different, so it can be concluded that the operation of Peach Bottom Atomic Power Station did not produce measurable levels of ambient gamma radiation at any off-site location.

In assessing all the data gathered for this report and comparing the results with preoperational data, it was evident that the operation of the Peach Bottom Atomic Power Station resulted in no significant radiological impact on the environment.

II. INTRODUCTION

II. INTRODUCTION

Teledyne Isotopes (TI) began conducting a radiological environmental monitoring program in July 1983 for the Philadelphia Electric Company in connection with the Peach Bottom Atomic Power Station (PBAPS) located in Peach Bottom Township, York County, Pennsylvania. The preoperational phase of the program, as well as the operational phase up to July 1983 was conducted by Radiation Management Corporation. Data from programs conducted in prior years have been presented in a series of reports numbered 1 though 19.

This TI program complements an existing program being conducted by others which has been carried out since March 1960. PBAPS is located along the Susquehanna River between Holtwood and Conowingo Dams. The fourteen mile long pond created by Conowingo Dam is called Conowingo Pond.

The initial loading of fuel into Peach Bottom Unit No. 1, a 40 MWe (Net) high temperature gas-cooled reactor, was started on February 5, 1966, and initial criticality was achieved March 3, 1966. Final shutdown of Peach Bottom Unit No. 1 was on October 31, 1974. Peach Bottom Unit No. 2 and No. 3 are boiling water reactors each with a power output of approximately 1050 MWe (Net). The first fuel was loaded into Unit No. 2 on August 9, 1973, and criticality was first achieved on September 16, 1973. The fuel was loaded into Unit No. 3 on July 5, 1974 and criticality was first achieved on August 7, 1974. Peach Bottom Unit No. 2 first reached full power on June 16, 1974. Peach Bottom Unit No. 3 first reached full power on December 21, 1974.

A special preoperational report(1) for Peach Bottom Units No. 2 and No. 3 has been issued previously which summarizes results of all analyses performed on samples collected from September, 1970 through August 8, 1973, the day before fuel was first loaded into Peach Bottom Unit No. 2. This report contains data for samples representing the period January 1, 1984 through December 31, 1984.

A. PROGRAM OBJECTIVES

1. Identify, measure, and evaluate existing radionuclides in the environs of the Peach Bottom Site and any fluctuations in radioactivity levels which may occur.

2. Monitor and evaluate ambient radiation levels.

3. Determine, within the scope of the program, any measurable quantity of radioactivity introduced to the environment by the operation of the Peach Bottom Atomic Power Station.

4. Complement other existing radiological environmental monitoring programs at Peach Bottom Atomic Power Station.

B. PROGRAM IMPLEMENTATION

In order to achieve these objectives, the following analyses were performed on samples collected during the period of this report.

1. Measured and evaluated concentrations of aqueous tritium in surface water, discharge water, well water and milk.

2. Measured and evaluated concentrations of alpha emitters in surface water.

3. Measured and evaluated concentrations of beta emitters in surface water, discharge water, well water, precipitation and air particulates.

4. Identified, measured and evaluated gamma emitting radionuclides in surface water, discharge water, precipitation, air particulates, milk and soil.

5. Measured and evaluated concentrations of Iodine-131 in milk, air and surface water.

6. Measured and evaluated concentrations of Strontium-89 and Strontium-90 in soil and milk.

7. Measured ambient gamma radiation levels in the environment and evaluated the variations with time and location with respect to the Site.

III. TI PROGRAM DESCRIPTION

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A. SAMPLE COLLECTION AND TLD PLACEMENT PROCEDURES

The program being conducted by TI is described in Tables I and II and Figures 1-3.

1. Sample Collection

a. Water (except precipitation)

All samples were collected in new polyethylene bottles. All persons involved in sample collection and handling were advised not to wear luminous dial watches in order to avoid possible cross contamination from that source. Sample containers were rinsed at least twice with the water to be sampled before collection.

All water samples were grab samples except those collected at stations 1LL, 1MM, 6I and 4L. Weekly samples were taken from a tank which continually collects a sample at these four locations. The weekly samples were composited into a monthly sample for analysis. Collection methods are described in more detail in Table II, Section V.

b. Precipitation

Precipitation was collected in an apparatus consisting of a new polyethylene bottle with a plastic funnel 8 inches in diameter. The bottle was replaced monthly and the sample bottle was shipped to TI for analysis. The amount of precipitation was recorded continuously by a separate rain gauge at station 1A.

c. Air Particulates

Air particulate samples were obtained using a vacuum sampler and glass fiber filters, 47 millimeters in diameter. The filter was replaced weekly and sent to TI for analysis. The vacuum sampler was run continuously at approximately 1 cubic foot per minute.

d. Air Iodine

Air iodine samples were obtained using a vacuum sampler and charcoal filters, 47 millimeters in diameter. The filter was replaced weekly and sent to TI for analysis. The vacuum sampler was run continuously at approximately 1 cubic foot per minute.

e. Milk samples were collected in new polyethylene bottles from the bulk tank at each farm, refrigerated and shipped immediately. No preservative was added.

f. Soil

Soil samples consisting of seven cores, 2" in diameter and 6" deep were collected from a 50 X 50 ft. area at each sampling location. Top soil (upper 1 inch) and bottom soil (lower 5 inches) were separated, then sealed in separate plastic bags, and shipped to TI.

2. TLD Placement

A system using thermoluminescent dosimeters (TLDs) was used to measure the direct radiation levels in the PBAPS environment. The TLD stations were placed on and around the Peach Bottom Site using the "three ring concept". Two on-site stations, designated as plant complex stations are not included in any of the three rings.

a. A site boundary ring near and within the site perimeter, representing fencepost doses, i.e., at locations where the doses are greater than maximum annual off-site doses from Station releases;

b. A middle ring extending to approximately 10 miles from the Site, designed to measure possible exposures to close-in population;

c. An outer ring extending from approximately 10 to about 60 miles from the Site; and considered not to be affected by Station releases;

d. The specific location of each station was determined by the following criteria:

(1) The presence of relatively densely populated areas;

(2) From 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 the Station, if any, would be more significant;

(3) On hills and (where pratical) within sight of the stack, and free from local obstructions;

(4) Near the closest house to the stack in the prevailing down wind direction.

e. Each TLD set (4 TLDs per set) was placed in a sealed polyethylene package to verify the integrity of the dosimeters when collected. Two packages were kept in a locked formica "birdhouse" or polyethylene jar, about six feet above the ground or supporting surface at each location. At each station one package was exchanged for measurement on a monthly schedule, and one on a quarterly schedule.

B. PROGRAM CHANGES

None

C. ANALYSES PERFORMED

The schedule of analyses performed by TI is listed by sample type in Table II. This schedule was followed except where noted below. Table III lists the type and number of analyses performed during this period, along with the mean of indicator stations, control stations and the stations with the highest annual mean. Methods used in performing these analyses can be found in Section VII of this report.

D. EXCEPTIONS TO THE PROGRAM.

1. The composite discharge water sampler at station 1MM malfunctioned, therefore, no sample was collected between 01/07/84 and 06/03/84, 08/04/84 and 09/01/84, 10/26/84 and 12/01/84.

2. The composite surface water sampler at station 1LL malfunctioned, therefore, no sample was collected between 02/10/84 and 03/03/84, 05/06/84 and 06/03/84.

3. Well water was not collected from station 1U in the third or fourth quarter; nor from station 1V in the fourth quarter due to inaccessibility to the collection facility.

4. No air particulate sample for gross beta analysis was collected from station 1Z from 09/15/84 to 10/02/84 due to sampler malfunction.

5. No charcoal filter samples were collected from station 1Z between 09/15/84 and 10/02/84; at station 3A between 03/03/84 and 04/07/84; at station 5 between 08/11/84 and 08/18/84; at station 1B between 06/09/84 and 06/30/84, 08/12/84 and 08/18/84; and at station 12D between 04/16/84 and 04/23/84, 09/24/84 and 10/09/84. All stations except 12D from period 12/01/84 to 12/09/84 were lost in shipment.

6. TLD data was unavailable from station 16 in April; from station 1D in October and from station 6B in November of 1984 due to vandalism of TLD's.

7. TLD data was unavailable from station 16 in the second quarter and from station 1D in the fourth quarter due to vandalism of TLD's.

IV. RESULTS AND DISCUSSION

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A. DATA INTERPRETATION AND STATISTICAL ANALYSIS

Several factors are important in the interpretation of the data. In order to avoid undue repetition in the discussion which follows, these factors are described below.

1. Grab Sampling

Grab sampling is a useful and acceptable procedure for taking environmental samples of a medium in which the concentration of radionuclides is expected to vary slowly with time or where intermittent sampling is deemed sufficient to establish the radiological characteristics of the medium. This method, however, is only representative of the sampled medium for that specific location and instant of time. As a result, variation in the radionuclide concentrations of the samples will normally occur. Since these variations will tend to counterbalance one another, the extraction of averages based upon repetitive grab samples is valid.

2. Minimum Detectable Levels (MDL)

It is characteristic of environmental monitoring data that many results occur at or below the specified detection level. Formal statistical error analysis of groups of such data is difficult. Pragmatic approaches to the problem include counting the detection level entries as zero, as half the detection level value, or as full detection level value. For reporting and calculation of averages in this report, any result occuring at or below the minimum detectable level is considered to be at that level. Averages obtained using this method are therefore biased high.

3. Standard Deviation of Analytical Results

Within the data tables an approximate 95 percent (2 sigma) confidence interval is supplied for those data points at and above the minimum detectable level. These intervals represent the range of values into which 95 percent of repeated counts of the prepared sample would fall.

4. Table Means and Standard Deviations

Results for each type of sample were grouped according to the analysis performed. Means and standard deviations of these results were calculated. These standard deviations represent the variability of measured results for different samples rather than single analysis uncertainty. For these calculations, all results below the MDL were considered to be at the MDL. As a result, the means are biased high, and the standard deviations are biased low.

B. DISCUSSION OF RESULTS

Results are summarized in Table III. Tables of results for individual sample types and analyses performed can be found in Section V, Tables IV to XXIV. Graphical presentations of results can be found in Section VI.

1. Surface Water

Samples were taken from nine stations on a monthly schedule. Three stations (1LL, 4L and 6I) were continuous composite samples and five (1Q, 4F, 4G, 6A and 13A) were grab samples. Station 13B was sampled a total of seven times in 1984. Of these stations, seven could be affected by released from Peach Bottom Atomic Power Station. The remaining stations (6A and 6I) were above Holtwood Dam and, therefore, could not be affected by plant discharges (refer to Figures 1 and 2, Section VI, for station locations). The following analyses were performed on surface water samples.

a. Tritium

Total samples from seven stations were analyzed for concentrations of aqueous tritium. Samples from stations 1LL, 1Q, 4L and 6I were analyzed on a monthly basis, while samples from stations 4F, 6A and 13A were composited monthly into a quarterly sample. Results of this analysis for surface water samples can be found in Tables IV and V, Section V. The concentrations detected were within the range found during the Peach Bottom Units number 2 and number 3 preoperational period (1). Graphical comparisons of the unaffected stations (6A and 6I) above Holtwood Dam with potentially affected stations (4F and 4L) at Conowingo Dam showed no detectable addition of tritium to Conowingo Pond from the operation of PBAPS (Figures 4 and 5, Section VI). Reported tritium concentrations increased in the third quarter to the 400 pCi/ℓ range but decreased back down in the fourth quarter to levels seen during the first half of the year. The activity was still within historical environmental levels.

b. Gross Alpha

Samples from four stations (4F, 4L, 6A and 6I) were analyzed for gross alpha concentrations in the soluble and insoluble fractions. Results of gross alpha analysis in surface water samples can be found in Tables IV and V, Section V. Results at all locations were generally at or below the minimum detectable level in the soluble fraction. Results of the insoluble fraction were generally at or below the minimum detectable level at stations 4L, 6A and 6I, and detectable at low levels at station 4F. Those values were similar to those seen in previous year's and can be attributed to the presence of sediment, a reservoir of fallout and natural alpha emitters.

c. Gross Beta

Samples from all stations were analyzed for concentrations of gross beta in the soluble and insoluble fractions. Results of gross beta analysis in surface water samples can be found in Tables IV and V, Section V. The concentrations detected in the soluble and insoluble fractions were within the range observed during the preoperational period for Units number 2 and 3 (1). A graphical comparison of two Conowingo Dam stations (4F and 4G) with one Holtwood Dam station (6A) showed the results of the soluble fractions to be generally the same for all three locations except for the sample taken at station 4G on September 29. This elevated result was still within previously reported results. The insoluble fractions are quite variable, especially at station 4F. This can be attributed to the presence of varying amounts of sediment, a reservoir of fallout and natural radioactivity. (Figures 6 and 7, Section VI).

d. Iodine-131

Samples collected during the one week of each month from 02/04/84 to 01/04/85 from two stations (4L and 6I) were analyzed for concentrations of I-131. Results of I-131 analysis of surface water samples can be found in Table V, Section V. Almost all results were below the minimum detectable level. Detectable concentrations were found at station 6I in February, July, August, September and November and at station 4L in March and December. The I-131 activity was attributed to upstream sources.

e. Gamma Spectrometry

Samples from all stations were analyzed for gamma-emitting nuclides by gamma spectrometry. Results of gamma spectrometry on surface water samples can be found in Table VI, Section V. The nuclides searched for were below the minimum detectable level with the exception of K-40, Cs-137 and Th-228. K-40 was found in June at stations 1Q and 13B; in August at stations 4F and 13A; in October at station 6A and in December at stations 4F, 13B and 4L. Very low levels of Cs-137 and Th-228 were found at station 1LL in March and October, respectively.

2. Discharge Water

Samples were taken from two stations (1M and 1MM) on a monthly schedule (refer to Figure 1, Section VI, for station locations). The following analyses were performed on discharge water samples.

a. Tritium

Total samples from both stations were analyzed for concentrations of aqueous tritium on a monthly basis. Results of tritium analysis in discharge water samples can be found in Table VII and VIII, Section V. The concentrations detected were

within the range found during the Peach Bottom Units numbers 2 and 3 preoperational period (1). Reported tritium concentrations increased during the third quarter to the 400 pCi/ℓ range but decreased back down in the fourth quarter to levels seen during the first half of the year, except at Station 1Q. The elevated activity, still well within historical environmental levels, was most probably related to somewhat higher than normal PBAPS tritium realeases during the fourth quarter. Even the maximum concentrations found, 690±80 pCi/ℓ was well below the reporting level of 20,000 pCi/ℓ. A graphical comparison of concentrations of aqueous tritium results for composite surface water and discharge water samples showed no significant differences (Figure 8, Section VI).

b. Gross Beta

Monthly samples from both stations were analyzed for gross beta concentrations in the soluble and insoluble fractions. Results of these analyses in discharge water samples can be found in Tables VII and VIII, Section V. The concentrations detected in the soluble and insoluble fractions were similar to those observed in surface water samples (Figures 9 and 10, Section VI).

c. Gamma Spectrometry

Samples from both stations were analyzed for gamma-emitting nuclides by spectrometry. Results of gamma spectrometric analysis are given in Table IX, Section V. Low concentrations of K-40 were found at station 1M in December and Th-228 was found at Station 1MM in October. In all other samples all nuclides searched for were below the MDL.

3. Well Water

Well Water Samples were taken from four stations on a quarterly schedule. Two stations (1U and 1V) were located within the Site area. The other stations were located approximately one mile (Station 40) and 10 miles (station 7) from the Plant. These station locations are shown in Figures 1 and 2, Section VI. The following analyses were performed on well water samples.

a. Tritium

Total samples from all four stations were analyzed for aqueous tritium concentrations. Results of tritium analysis of well water samples can be found in Table X Section V. Results of all samples were within the range found during the Peach Bottom Units numbers 2 and 3 preoperational period (1). Reported tritium concentrations increased at station 40 in the third quarter to the 400 pCi/ℓ but decreased back down in the fourth quarter to levels seen during the first half of the year. The elevated activity was still well within environmental levels. A graphical comparison of the distant site-area, and on-site wells showed similar levels at all locations.(Figure 11, Section VI).

b. Gross Beta

Samples from all four stations were analyzed for gross beta concentrations in the soluble and insoluble fractions. Results of gross beta analysis on well water samples can be found in Table X, Section V. The concentrations detected were within the range observed during the Peach Bottom Units numbers 2 and 3 preoperational period (1).

4. Precipitation

Precipitation was collected from two stations on a monthly schedule. Station 1A is located at the on-site Peach Bottom Weather Station number 1. Station 8, located in Colora, Md., is approximately 10 miles from the Site (for station locations, refer to Figures 1 and 2, Section VI). The following analyses were performed on precipitation samples.

a. Gross Beta

Monthly samples were analyzed for gross beta concentrations in the total sample. Results of gross beta analysis in precipitation samples can be found in Table XI, Section V. Concentrations detected were within the range found during the Peach Bottom Units 2 and 3 preoperational period (1).

b. Gamma Spectrometry

Monthly samples were analyzed for gamma-emitting nuclides by spectrometry of the total sample. Results of gamma spectrometric analysis of samples from both stations are given in Table XII, Section V. Be-7 was found in nineteen of twenty-four samples and can be attributed to cosmic ray activity. All other gamma-emitting nuclides searched for were below minimum detectable levels.

5. Air Particulates

Continuous air particulate samples were collected from the on-site Peach Bottom Weather Station number 1 (1Z) and from the intermediate location, Conowingo Dam (4A) (For station locations, see Figure 1 and 2, section VI). The following analyses were performed on air particulate samples.

a. Gross Beta

Weekly samples were analyzed for concentrations of beta emitters. Results of gross beta analysis of air particulate samples can be found in Table XIII, Section V. Results observed were similar to levels observed in previous years.

b. Gamma Spectrometry

Monthly composite samples were analyzed for gamma-emitting nuclides by gamma spectrometry. Results of gamma spectrometric analysis are given in Table XIV, Section V. Be-7 was detected in all of the samples and was the result of cosmic ray activity. Naturally occuring K-40 was found in 1 of 24 samples. All other nuclides searched for were below the minimum detectable levels.

6. Air Iodine

Continuous air samples were collected weekly at eight stations and analyzed for I-131. Three stations (1B, 1Z, 2) were located within the Site area. Four stations (3A, 5, 6B, 14) were located at intermediate distances of 1.9 to 5.8 miles from the site. One station (12D) was located 62 miles from the Site. Results of I-131 analysis can be found in Table XV, Section V. All results of the 394 analyses performed were less than the minimum detectable level.

7. Milk

Milk was sampled at eleven farms; three farms (G, J and O) located within two miles of PBAPS were designated "near farms"; four farms (D, L, M and N) located 3 to 5 miles from PBAPS were designated as "intermediate farms"; and four farms (A, B, C and E) located greater than five miles from PBAPS were designated as "distant farms". The following analyses were performed on milk samples.

a. Tritium

Milk from four farms (A, C, G and J) was analyzed for tritium concentrations in the aqueous fraction on a quarterly basis. Results of tritium determinations in milk samples can be found in Table XVI, Section V. Concentrations detected were within the range found during the Peach Bottom Units numbers 2 and 3 peroperational period (1)

b. Iodine-131

Milk from eight farms (A, B, C, D, G, J, N and O) near Peach Bottom was analyzed for concentrations of I-131, monthly in January, February, March and December. Weekly I-131 analyses resumed during the first week of April and continued through

the third week of November. Three additional farms (L, M and E) were sampled and analyzed quarterly for I-131. Results of I-131 analysis can be found in Tables XVI and XVII, Section V and Figure 12, Section VI. Samples collected from station G had seven consecutive detectable levels reported for the period 09/17/84 through 10/29/84. Station J showed four consecutive samples with detectable activity for the period 10/08/84 through 10/29/84. This activity can be correllated with slightly increased I-131 releases from PBAPS during September and October.

The maximum hypothetical dose to an infant's thyroid was calculated to be 0.11 mRem. This calculation was done using the assumptions of USNRC Regulatory Guide 1.109, Revision 1, October 1977.

c. Strontium-89 and Strontium-90

One milk sample was collected at farm J in each quarter and analyzed for Sr-89 and Sr-90. Results can be found in Table XVIII, Section V. All Sr-89 results were less than the minimum detectable level. Sr-90 concentrations were similar to those observed in previous years.

d. Gamma Spectrometry

One milk sample collected at farm J in each quarter was analyzed for gamma-emitting nuclides by gamma spectrometry. Results can be found in Table XVIII, Section V. Nuclide detected was naturally-occuring K-40. Concentrations were similar to those observed in previous years.

8. Soil

Semiannual samples were taken at three locations, one on-site station (2) and two distant stations (3A and 5) located about four miles from PBAPS (for station locations, see Figures 1 and 2, Section VI). The area at station 2 is heavily wooded with rock outcroppings. The soil at this location would be expected to contain substantial humus from the accumulation of natural vegetative debris. Station 3A is covered only with grass. Station 5 is a combination of grass and cultivated land. The following analyses were performed on soil samples.

a. Strontium-89 and Strontium-90

Samples from all stations were analyzed for Sr-89 and Sr-90 concentrations in the top one inch and bottom five inches separately. Results of Sr-89 and Sr-90 analysis in soil samples can be found in Table XIX, Section V. Concentrations of Sr-89 were less than the minimum detectable level in all

samples. Concentrations of Sr-90 detected were within the range found during the PBAPS Units numbers 2 and 3 preoperational period (1). Graphical comparisons of Sr-90 in the top one inch and bottom cut can be found in Figures 13 and 14, Section VI. Differences between the on-site location (2) and distant locations (3A and 5) were attributed to the accumulation of vegetative debris at station 2.

b. Gamma Spectrometry

Samples from all stations were analyzed for gamma-emitting nuclides by Ge(Li) gamma spectrometry (Table XIX, Section V). Nuclides identified were generally the same as those found during the PBAPS Units numbers 2 and 3 preoperational period with most at the same or lower concentrations (1). Some naturally-occurring nuclides were found (K-40, Ra-226, Be-7 and Th-228). Small concentrations of Cs-137 were detected in all eleven samples and were similar to levels observed in previous years. The 30 year half-life and biological assimilation of Cs-137 accounts for the continued appearance of this nuclide in soil samples many years after atmospheric testing of nuclear weapons. There was little difference between the on-site location (2) and distant locations (3A and 5) (Figures 15 and 16, Section VI). The concentrations of other nuclides detected were similar to levels observed in previous years.

9. Ambient Gamma Radiation

Ambient gamma radiation levels were measured with calcium sulfate: Tm thermoluminescent dosimeters.

Thirteen stations (1B, 1C, 1D, 1E, 1F, 1G, 1H, 1J, 1L, 1M, 1NN, 2 and 40) were located around the Site boundary and designated for comparison purposes as the "site boundary ring". Twenty-five stations (3A, 4K, 5, 6B, 14, 15, 17, 22, 23, 26, 27, 31, 32, 33A, 38, 42, 43, 44, 45, 46, 47, 48, 49, 50 and 51) were located within a 10 mile radius of the Site and designated as the "middle ring". Seven stations (12B, 16, 18, 19, 20, 21B and 24) were located from 10 to 60 miles from the Site and designated as the "outer ring". Since they could be more directly affected by Plant activities and do not represent doses to the public, two stations (1A and 1I) located within the plant complex constitute a fourth group called plant-complex station (for station locations, see Figures 1, 2 and 3, Section VI). Results of TLD measurements are listed in Tables XX, XXI and XXII, Section V. The annual average of monthly and quarterly radiation levels were within the range found during the Peach Bottom Units numbers 2 and 3 preoperational period (1). Graphical comparisons of the site-boundary, middle and outer rings on monthly and quarterly readings showed no significant differences in ambient radiation levels with distance from PBAPS, indicating no measurable Station contribution (Table XXII, Section V, Figures 17 and 18, section VI).

REFERENCES

(1) Radiation Management Corporation Publication, Peach Bottom Atomic Power Station Preoperational Radiological Monitoring Report for Units 2 and 3, January 1974, Philadelphia, Pa.

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

(3) Teledyne Isotopes, Quality Control Data - 1984.

(4) Teledyne Isotopes, Peach Bottom Atomic Power Station Annual Radiological Environmental.Operating Report #19, May 1984, Westwood NJ.

TABLE I

TI STATION DESIGNATION AND SAMPLE IDENTIFICATION SYSTEM
FOR PEACH BOTTOM ATOMIC POWER STATION REMP, 1984

VV-WWW-XXYZ General code for identification of samples, where:

VV - Power Plant identification code

PB - Peach Bottom Atomic Power Station

WWW - Type of Sample

SWA - Surface Water

DWA - Discharge Water

WWA - Well Water

RWA - Rain Water

APT - Air Particulates

AIO - Air iodine

MLK - Milk

SOL - Soil

IDM - Immersion Dose

XX - Angular Sector of Sampling Location

Compass is divided into 36 sectors of 10 degrees each with center at Peach bottom off-gas stack. Sector 36 is centered due North, and others are numbered in a clockwise direction. Sector 00 is used to designate an unidentified direction.

Y - Radial Zone of Sampling Location

In this report, the Radial distance from the Peach Bottom off-gas stack for all regional stations.are as follows:

S:	on-site location	D:	3-4 miles off-site
A:	0-1 mile off-site	E:	4-5 miles off-site
B:	1-2 miles off-site	F:	5-10 miles off-site
C:	2-3 miles off-site	G:	10-20 miles off-site
		H:	20-100 miles off-site

Z - Station's Numerical Designation within sector and zone, using 1,2,3.... in each sector and zone.

TABLE II

TI SAMPLE COLLECTION AND ANALYSIS PROGRAM

ENV. STATION NO.	STATION NAME	TI STATION DESIGNATION	STATION LOCATION, DIRECTION AND DISTANCE FROM PEACH BOTTOM	COLLECTION METHOD AND FREQUENCY	ANALYSIS AND FREQUENCY PERFORMED
A. SURFACE WATER					
1LL	Peach Bottom Units 2 and 3 Intake - Composite	PB-SWA-6S4	Continuous sampler On Site at Units 2 and 3 Intake 1200' ENE of Units 2 and 3.	Water is continuously sampled from the Peach Bottom Units 2 and 3 Intake and is collected in a 190 gallon tank. Each week 2 qts. are withdrawn from the tank prior to draining the tank and placed in a 2 gallon polyethylene bottle to form a monthly composite sample.	Aq Tritium - monthly Gross Beta (S&I) - monthly Gamma Spec - monthly
1Q	Peach Bottom Unit No. 2 Intake	PB-SWA-6S3	On Site at Unit No. 2 Intake about 1200' ENE of Units 2 and 3.	Two gallon grab sample is collected in front of intake structure monthly.	Same as station 1LL above
4F	Conowingo Dam El. 33' MSL	PB-SWA-14F2	In the Conowingo Hydroelectric Station, 8.6 miles SE of Units 2 and 3.	Two gallon grab sample is taken monthly from the same header which is used for the composite sample (4L). This header continuously draws pond water from about elevation 33' MSL. This sample and PB-SWA-14F3 samples are collected at the same time.	Aq Tritium - quarterly comp. Gross Alpha (S&I) - monthly Gross Beta (S&I) - monthly Gamma Spec - monthly
4G	Conowingo Dam Surface	PB-SWA-14F3	At Conowingo Dam in Maryland, 8.5 miles SE of Units 2 and 3. Water sample is taken from Conowingo Pond on upstream side of dam.	Two gallon grab sample is collected near the surface of the Pond on the upstream side of the dam monthly.	Gross Beta (S&I) - monthly Gamma Spec - monthly
4L	Conowingo Dam El. 33' MSL - Composite	PB-SWA-14F5	Continuous sampler in Conowingo Hydroelectric Station; about 8.6 miles SE of Units 2 and 3.	Water is continuously sampled from a header which draws Pond water from elevation 33' MSL and is collected in a 175 gal. tank. Each week 2 qts. are withdrawn from the tank prior to draining the tank and placed in a 2 gal. polyethylene bottle to form a monthly composite sample.	Aq Tritium - monthly Gross Alpha (S&I) - monthly Gross Beta (S&I) - monthly Gamma Spec - monthly I-131 - monthly
6A	Holtwood Dam Hydroelectric Station	PB-SWA-33F1	At Holtwood Dam, Pa., 5.8 miles NW of Units 2 and 3.	Two gallon grab sample is collected from Holtwood Pond at Hydroelectric Station intake monthly.	Same as station 4F above

V. TABLES

TABLE II (cont.)

TI SAMPLE COLLECTION AND ANALYSIS PROGRAM

ENV. STATION NO.	STATION NAME	TI STATION DESIGNATION	STATION LOCATION, DIRECTION AND DISTANCE FROM PEACH BOTTOM	COLLECTION METHOD AND FREQUENCY	ANALYSIS AND FREQUENCY PERFORMED
A. SURFACE WATER (cont.)					
6I	Holtwood Dam Hydroelectric Station-Composite	PB-SWA-33F4	Continuous sampler at Holtwood Dam, Pa., 5.8 miles NW of Units 2 and 3.	Water is continuously sampled from the Holtwood Hydroelectric Station Intake and is collected in a 175 gal. tank. Each week 2 qts. are withdrawn from the tank and placed in a 2 gal. polyethylene bottle to form a monthly composite sample.	Aq Tritium - monthly Gross Alpha (S&I) - monthly Gross Beta (S&I) - monthly Gamma Spec - monthly I-131 - monthly
13A	Chester Water Intake-Pond	PB-SWA-11C1	On east shore of Conowngo Pond at Chester Water Authority Intake, 2.4 miles ESE of Units 2 and 3.	Two gallon grab sample is collected from Conowingo Pond near the shore monthly.	Aq Tritium - quarterly comp. Gross Beta (S&I) - monthly Gamma Spec - monthly
13B	Chester Water Intake-pump Discharge	PB-SWA-11C2	At Chester Water Authority Intake. The same as PB-SWA-11C1 but the sample is collected from the pump discharge.	Two gallon grab sample is collected from pump discharge during any month that the pump operates.	Gross Beta (S&I) - monthly Gamma Spec - monthly
B. DISCHARGE WATER					
1M	Peach Bottom Canal Discharge	PB-DWA-13S2	Located at Canal Discharge structure; 1.0 miles SE of Units 2 and 3.	Two gallon grab sample is collected at the exit of the discharge canal monthly.	Aq Tritium - monthly Gross Beta (S&I) - monthly Gamma Spec - monthly
1MM	Peach Bottom Canal Discharge-Composite	PB-DWA-13S5	A continuous sampler on site at canal discharge 1.0 miles SE of Units 2 and 3.	Water is continuously sampled from the Peach Bottom Unit 2 and 3 discharge canal and is collected in a 190 gallon tank. Each week 2 qts. are withdrawn from the tank and placed in a 2 gal. polyethylene bottle to form a monthly composite sample.	Same as station 1M above

TABLE II (cont.)

TI SAMPLE COLLECTION AND ANALYSIS PROGRAM

ENV. STATION NO.	STATION NAME	TI STATION DESIGNATION	STATION LOCATION, DIRECTION AND DISTANCE FROM PEACH BOTTOM	COLLECTION METHOD AND FREQUENCY	ANALYSIS AND FREQUENCY PERFORMED
C. WELL WATER					
1U	Peach Bottom Site-Utility Building	PB-WWA-15S2	Well at Plant Site. 1400' S of Units 2 and 3.	Well pump is run for several minutes prior to sampling in order to flush the sample line. Then two gallon grab sample is taken from the building faucet quarterly.	Aq Tritium - quarterly Gross Beta (S&I) - quarterly
1V	Peach Bottom Site-Info. Center	PB-WWA-12S2	Well at Plant Site. 1400' SSE of Units 2 and 3.	Same as station 1U above	Same as station 1U above
40	Peach Bottom Site Area	PB-WWA-21B2	Well in Site Area, 1.5 miles SW of Units 2 and 3.	Same as station 1U above	Same as station 1U above
7	Darlington, Md. Area	PB-WWA-16F1	9.6 miles SSE of Units 2 and 3 in Hartford Co., Md.	Same as station 1U above	Same as station 1U above
D. PRECIPITATION					
1A	Peach Bottom Weather Station No. 1	PB-RWA-11S1	On Site at Weather Station NO. 1, 0.3 miles SE of Units 2 and 3.	The sample from the rain collector is shipped to TI monthly. The rain collector consists of an 8-inch diameter plastic funnel connected to a two-gallon polyethylene container.	Gross Beta - monthly Gamma Spec - monthly
8	Colora, Md.	PB-RWA-12F1	9.9 miles ESE of Units 2 and 3 in Cecil Co., Md.	Same as station 1A above	Same as station 1A above
E. AIR PARTICULATES - AIR IODINE					
1B	Peach Bottom Weather Station No. 2	PB-AIO-33S1	On Site, 0.3 miles SE of Units 2 and 3.	About 1 cfm continuous flow through charcoal filter (approx. 2" diam.) is installed for a week and replaced.	I - 131 weekly
1Z	Peach Bottom Weather Station No. 1	PB-API-11S4 PB-AIO-11S4	On Site at Weather Station No. 1, 0.3 miles SE of Units 2 and 3.	About 1 cfm continuous flow through glass fiber and charcoal filters (approx. 2" diam.) are installed for a week and replaced.	Gross Beta - weekly I - 131 weekly Gamma Spec - monthly comp.

TABLE II (cont.)

TI SAMPLE COLLECTION AND ANALYSIS PROGRAM

ENV. STATION NO.	STATION NAME	TI STATION DESIGNATION	STATION LOCATION, DIRECTION AND DISTANCE FROM PEACH BOTTOM	COLLECTION METHOD AND FREQUENCY	ANALYSIS AND FREQUENCY PERFORMED
E. AIR PARTICULATES - AIR IODINE (cont.)					
2	Peach Bottom Site 130° Sector Hill	PB-A1O-13S1	On Site, 0.9 Miles SE of Units 2 and 3.	Same as station 1B above	I-131 - weekly
3A	Delta, Pa. Substation	PB-A1O-23D1	3.6 miles SW of Units 2 and 3 at Delta, Pa.	Same as station 1B above	I-131 - weekly
4A	Conowingo Dam Powerhouse roof	PB-APT-14F1	8.6 miles SE of Units 2 and 3 on Powerhouse roof in Cecil County, Md.	About 1 cfm continuous flow through a glass fiber filter (approx. 2" diam.) is installed for a week and replaced.	Gross Beta - weekly Gamma Spec - monthly comp.
5	Wakefield, Pa.	PB-AIO-8E1	At Wakefield, Pa., 4.6 miles E of Units 2 and 3.	Same as station 1B above	I-131 - weekly
6B	Holtwood Dam Hydroelectric Station	PB-AIO-33F2	On the roof of Hydroelectric Station, 5.8 miles NW of Units of Units 2 and 3.	Same as station 1B abouve	I-131 - weekly
14	Peters Creek	PB-AIO-10B1	1.9 miles ESE of Units 2 and 3 near mouth of Peters Creek.	Same as station 1B above	I-131 - weekly
12D	Phila., Pa. 2301 Market St.	PB-AIO-8H2	62 miles ENE of Units 2 and 3 on the roof of 2301 Market Street.	Same as station 1B above	I-131 - weekly
F. MILK					
A	Regional Farm A	PB-MLK-12F1	Distant regional farms surrounding the Site, designated "A", "B" and "C" on the west side of Conowingo Pond and "E" on the east side of Conowingo Pond. Nearby regional farm surrounding the Peach Bottom Site on the west side of Conowingo Pond are designated "G", "J",	Two gallon grab sample is collected at each farm from a tank containing milk from all cows weekly while cows are on pasture, monthly otherwise. Samples are shipped to TI.	I-131 - weekly Aq tritium - quarterly
B	Regional Farm B	PB-MLK-24F1			I-131 - weekly
C	Regional Farm C	PB-MLK-31F1			Same as station A above
D	Regional Farm D	PB-MLK-5D1			Same as station B above

TABLE II (cont.)

TI SAMPLE COLLECTION AND ANALYSIS PROGRAM

ENV. STATION NO.	STATION NAME	TI STATION DESIGNATION	STATION LOCATION, DIRECTION AND DISTANCE FROM PEACH BOTTOM	COLLECTION METHOD AND FREQUENCY	ANALYSIS AND FREQUENCY PERFORMED
F. MILK (cont.)					
E	Regional Farm E	PB-MLK-36F1	and "O". Regional farms at intermediate distances from Peach Bottom on the east side are designated "D", "L", "M" AND "N".	Same as Station A above except quarterly	I-131 quarterly
G	Regional Farm G	PB-MLK-20B1			Same as station A above
J	Regional Farm J	PB-MLK-28A1			I-131 - weekly Aq tritium - quarterly Sr-89 & -90 - quarterly Gamma Spec - quarterly
L	Regional Farm L	PB-MLK-5B1		Same as station A above except quarterly	I-131 - quarterly
M	Regional Farm M	PB-MLK-7C1		Same as Station A above except quarterly	Same as station L above
N	Regional Farm N	PB-MLK-11C3			Same as station B above
O	Regional Farm O	PB-MLK-22C1			Same as station B above
G. SOIL					
2	Peach Bottom 130° Sector Hill	PB-SOL-13S1	On Site, 0.9 miles SE of Units 2 and 3.	Seven cores (2" in diameter and 6" deep) are collected from a 50 X 50 ft. area semi-annually. Top 1 inch and bottom 5 inches are separated, sealed in plastic bags, and shipped to TI.	Gamma Spec - semiannual Sr-89 & -90 - semiannual
3A	Delta, Pa. Substation	PB-SOL-23D1	3.6 miles SW of Units 2 and 3 at Delta, Pa.	Same as station 2 above	Same as station 2 above
5	Wakefield, Pa.	PB-SOL-8E1	4.6 miles E of Units 2 and 3 at Wakefield, Pa.	Same as station 2 above	Same as station 2 above

TABLE II (cont.)

TI SAMPLE COLLECTION AND ANALYSIS PROGRAM

ENV. STATION NO.	STATION NAME	TI STATION DESIGNATION	STATION LOCATION, DIRECTION AND DISTANCE FROM PEACH BOTTOM	COLLECTION METHOD AND FREQUENCY	ANALYSIS AND FREQUENCY PERFORMED
H. ENVIRONMENTAL DOSIMETRY - TLD					
	At each of the following stations there are 2 environmental dosimeter packets with . TLDs per package. One packet is replaced monthly, and one quarterly. The packets for each time period are collected and replaced on the same day at all the stations.				
1A	Peach Bottom Weather Station No. 1	PB-IDM-11S1	On Site, 0.3 miles SE of Units 2 and 3 .	Procedure for collection is described in the placement procedure in Sec. II., A.	TLD - monthly and quarterly
1B	Peach Bottom Weather Station No. 2	PB-IDM-33S1	On Site, 0.5 miles NW of Units 2 and 3.		TLD -monthly and quarterly
1C	Peach Bottom South Substation Rd.	PB-IDM-16S1	On Site, 0.9 miles SSE of Units 2 and 3.		TLD - monthly and quarterly
1D	Peach Bottom 140 ° Sector Site Boundary	PB-IDM-14S1	On Site, 0.7 miles SE of Units 2 and 3.		TLD - monthly and quarterly
1E	Peach Bottom 350° Sector Site Boundary	PB-IDM-35S1	On Site, 0.6 miles NNW of Units 2 and 3.		TLD - monthly and quarterly
1F	Peach Bottom 200° Sector Hill	PB-IDM-20S1	On Site, 0.6 miles SSW of Units 2 and 3.		TLD - monthly and quarterly
1G	Peach Bottom North Substation	PB-IDM-30S1	On Site, 0.7 miles WNW of Units 2 and 3.		TLD - monthly and quarterly
1H	Peach Bottom Site 270° Sector Hill	PB-IDM-27S1	On Site, 0.6 miles W of Units 2 and 3.		TLD - monthly and quarterly
1I	Peach Bottom South Substation	PB-IDM-15S1	On Site, 0.6 miles SSE of Units 2 and 3.		TLD - monthly and quarterly
1J	Peach Bottom Site 180° Sector Hill	PB-IDM-18S1	On Site, 0.7 miles S of Units 2 and 3.		TLD - monthly and quarterly

TABLE II (cont.)

TI SAMPLE COLLECTION AND ANALYSIS PROGRAM

ENV. STATION NO.	STATION NAME	TI STATION DESIGNATION	STATION LOCATION, DIRECTION AND DISTANCE FROM PEACH BOTTOM	COLLECTION METHOD AND FREQUENCY	ANALYSIS AND FREQUENCY PERFORMED
H. ENVIRONMENTAL DOSIMETRY - TLD (cont.)					
1L	Peach Bottom Unit 3 Intake	PB-IDM-6S2	Located near Unit 3 Intake structure; 0.2 miles ENE of Units 2 and 3.		TLD - monthly and quarterly
1M	Peach Bottom Canal Discharge	PB-IDM-13S2	Located near Canal Discharge structure; 1.0 miles SE of Units 2 and 3.		TLD - monthly and quarterly
1NN	Peach Bottom Site	PB-IDM-26S1	On Site, 0.5 miles WSW of Units 2 and 3.		TLD - monthly and quarterly
2	Peach Bottom Site 130° Sector Hill	F3-IDM-13S1	On Site, 0.9 miles SE of Units 2 and 3.		TLD - monthly and quarterly
3A	Delta, Pa. Substation	PB-IDM-23D1	3.6 miles SW of Units 2 and 3.		TLD - monthly and quarterly
4K	Conowingo Dam Powerhouse Roof	PB-IDM-14F1	On roof of Conowingo Powerhouse, 8.6 miles SE of Units 2 and 3.		TLD - monthly and quarterly
5	Wakefield, Pa.	PB-IDM-8E1	At Wakefield, Pa. 4.6 miles E of Units 2 and 3.		TLD - monthly and quarterly
6B	Holtwood Dam Hydroelectric Station	PB-IDM-33F2	On roof of Hydroelectric Station, 5.8 miles NW of Units 2 and 3.		TLD - monthly and quarterly
12B	Phila., Pa. 3508 Market St.	PB-IDM-8H1	On roof of 3508 Market St., Philadelphia, Pa. 64 miles E of Units 2 and 3.		TLD - monthly and quarterly
14	Peters Creek	PB-IDM-10B1	1.9 miles ESE of Units 2 and 3 near the mouth of Peters Creek.		TLD - monthly and quarterly
15	Silver Spring Road	PB-IDM-36D1	3.6 miles N of Units 2 and 3 near Silver Spring Road.		TLD - monthly and quarterly
16	Nottingham, Pa. Substation	PB-IDM-9G1	12.8 miles E of Units 2 and 3 at Nottingham Substation.		TLD - monthly and quarterly

TABLE II (cont.)

TI SAMPLE COLLECTION AND ANALYSIS PROGRAM

ENV. STATION NO.	STATION NAME	TI STATION DESIGNATION	STATION LOCATION, DIRECTION AND DISTANCE FROM PEACH BOTTOM	COLLECTION METHOD AND FREQUENCY	ANALYSIS AND FREQUENCY PERFORMED
H. ENVIRONMENTAL DOSIMETRY - TLD (cont.)					
17	Riverview Road	PB-IDM-11E1	4.0 Miles ESE of Units 2 and 3 near Riverview Road.		TLD - monthly and quarterly
18	Fawn Grove, Pa.	PB-IDM-26F1	10 miles W of Units 2 and 3 at Fawn Grove, Pa.		TLD - monthly and quarterly
19	Red Lion, Pa.	PB-IDM-30H1	20.6 miles WNW of Units 2 and 3 at Red Lion, Pa.		TLD - monthly and quarterly
20	Bel Air, Md. Area	PB-IDM-20G1	15.1 miles SSW of Units 2 and 3 near Bel Air, Maryland.		TLD - monthly and quarterly
21B	Lancaster, Pa. Area	PB-IDM-35G1	19 miles NNW of Units 2 and 3 near Lancaster, Pa.		TLD - monthly and quarterly
22	Eagle Road	PB-IDM-3C1	2.4 miles NNE of Units 2 and 3 near Eagle Road.		TLD - monthly and quarterly
23	Peach Bottom 150° Sector Hill Off Site	PB-IDM-15B1	Off-site Hill 1.0 miles SSE of Units 2 and 2.		TLD - monthly and quarterly
24	Harrisville, Md. Substation	PB-IDM-11G1	10.9 miles ESE of Units 2 and 3 at Harris Substation		TLD - monthly and quarterly
26	Slab Road	PB-IDM-31E1	4.2 miles NW of Units 2 and 3 near Slab Road.		TLD - monthly and quarterly
27	N. Cooper Road	PB-IDM-18C1	2.7 miles S of Units 2 and 3 near N. Cooper Road.		TLD - monthly and quarterly
31	Pilotown Road	PB-IDM-13E1	4.9 miles SE of Units 2 and 3 near Pilotown Road.		TLD - monthly and quarterly
32	Slate Hill Road	PB-IDM-6C1	2.7 miles ENE of Units 2 and 3 near Slate Hill Road.		TLD - monthly and quarterly
33A	Fulton Main Weather Station	PB-IDM-6B2	1.7 miles ENE of Units 2 and 3.		TLD - monthly and quarterly
38	Peach Bottom Road	PB-IDM-8D1	3.0 miles E of Units 2 and 3 near Peach Bottom Road.		TLD - monthly and quarterly

TABLE II (cont.)

TI SAMPLE COLLECTION AND ANALYSIS PROGRAM

ENV. STATION NO.	STATION NAME	TI STATION DESIGNATION	STATION LOCATION, DIRECTION AND DISTANCE FROM PEACH BOTTOM	COLLECTION METHOD AND FREQUENCY	ANALYSIS AND FREQUENCY PERFORMED
H. ENVIRONMENTAL DOSIMETRY - TLD (cont.)					
40	Peach Bottom Site Area	PB-IDM-21B2	In site Area about 1.2 miles SW of Units 2 and 3.		TLD - monthly and quarterly
42	Muddy Run Environmental Lab.	PB-IDM-35E1	4.2 miles NNW of Units 2 and 3.		TLD - monthly and quarterly
43	Drumore Township School	PB-IDM-2F1	5.0 miles NNE of Units 2 and 3.		TLD - monthly and quarterly
44	Goshen Mill Road	PB-IDM-5F1	5.1 miles NE of Units 2 and 3.		TLD - monthly and quarterly
45	PB - Keeney Line	PB-IDM-7D1	3.3 miles ENE of Units 2 and 3.		TLD - monthly and quarterly
46	Broad Creek	PB-IDM-[illegible]6E1	4.5 miles SSE of Units 2 and 3 near Flintville Road.		TLD - monthly and quarterly
47	Broad Creek Scout Camp	PB-IDM-18E1	4.3 miles S of Units 2 and 3.		TLD - monthly and quarterly
48	Macton Substation	PB-IDM-20E1	5.0 miles SSW of Units 2 and 3.		TLD - monthly and quarterly
49	PB-Conastone Line	PB-IDM-25E1	4.1 miles WSW of Units 2 and 3.		TLD - monthly and quarterly
50	TRANSCO Pumping Station	PB-IDM-26E1	4.9 miles W of Units 2 and 3.		TLD - monthly and quarterly
51	Fin Substation	PB-IDM-29D1	4.0 miles WNW of Units 2 and 3.		TLD - monthly and quarterly

TABLE III
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

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

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED MINIMUM DETECTABLE LEVEL (MDL)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATIONS MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN STATION # NAME DISTANCE & DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
AIR PARTICULATE (PC/CU. METER)	GROSS BETA	102	0.006	.018 (50/50) (.004-.044)	.017 (52/52) (.005-.08)	.018 (50/50) (.004-.044)	1Z (INDICATOR) WEATHER STATION 1 0.3 MILES SE OF SITE	0
	GAMMA	24						
	BE-7		N/A	.11 (12/12) (.06-.17)	.11 (12/12) (.06-.14)	.11 (12/12) (.08-.17)	1Z (INDICATOR) WEATHER STATION 1 0.3 MILES SE OF SITE	0
	K-40		N/A	.09 (1/12) (.09)	< MDL	.09 (1/12) (.09)	1Z (INDICATOR) WEATHER STATION 1 0.3 MILES SE OF SITE	0
	CS-134			< MDL	< MDL	< MDL		0
	CS-137			< MDL	< MDL	< MDL		0
PRECIPITATION (PC/LITER)	GROSS BETA	24	2.5	3.3 (12/12) (1.5-5.4)	8.7 (12/12) (1.1-30)	8.7 (12/12) (1.1-30)	8 (CONTROL) COLORA, MD 9.9 MILES ESE OF SITE	0
	GAMMA (TOTAL)	24						
	BE-7		N/A	34 (10/12) (17-68)	33 (9/12) (14-70)	34 (10/12) (17-68)	1A (INDICATOR) WEATHER STATION NO. 1 0.3 MILES SE OF SITE	0
	MN-54		9	< MDL	< MDL	< MDL		0
	FE-59		18	< MDL	< MDL	< MDL		0
	CO-58		9	< MDL	< MDL	< MDL		0
	CO-60		9	< MDL	< MDL	< MDL		0
	ZN-65		18	< MDL	< MDL	< MDL		0
	ZRNB-95		9	< MDL	< MDL	< MDL		0
	CS-134		9	< MDL	< MDL	< MDL		0
	CS-137		11	< MDL	< MDL	< MDL		0
	BALA-140		9	< MDL	< MDL	< MDL		0
PRECIPITATION (PC/SQ. METER)	GROSS BETA	24	N/A	249 (12/12) (140-600)	315 (12/12) (100-840)	315 (12/12) (100-840)	8 (CONTROL) COLORA, MD 9.9 MILES ESE OF SITE	0

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

TABLE III
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

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

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED MINIMUM DETECTABLE LEVEL (MDL)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATIONS MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN STATION # NAME DISTANCE & DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
SURFACE WATER (PC/LITER)	GROSS ALPHA INSOLUBLE	48	N/A	1.9 (10/24) (.3-4)	.5 (4/24) (.3-.6)	2.2 (8/12) (.6-4)	4F (INDICATOR) CONOWINGO DAM EL. 33FT. MSL-GRAB 8.6 MILES SE OF SITE	0
	GROSS ALPHA SOLUBLE	48	N/A	.6 (2/24) (.5-.6)	1 (1/24) (1)	1 (1/12) (1)	6A (CONTROL) HOLTWOOD DAM HYDRO-ELECTRIC STATION 5.8 MILES NW OF SITE	0
	GROSS BETA INSOLUBLE	100	2.5	2.6 (40/55) (.3-18)	1.4 (29/45) (.4-5.2)	4.8 (12/12) (.4-18)	4F (INDICATOR) CONOWINGO DAM EL. 33FT. MSL-GRAB 8.6 MILES SE OF SITE	0
	GROSS BETA SOLUBLE	100	2.5	3.0 (55/55) (1.3-16)	2.9 (45/45) (1-5)	4.2 (12/12) (1.3-16)	4G (INDICATOR) CONOWINGO DAM SURFACE-GRAB 8.5 MILES SE OF SITE	0
	I-131	24	N/A	.13 (2/12) (.10-.15)	.15 (5/12) (.06-.22)	.15 (5/12) (.06-.22)	6I (CONTROL) HOLTWOOD STATION INTAKE-COMPOSITE 5.8 MILES NW OF SITE	0
	AQUEOUS H3	57	1200	217 (15/20) (100-500)	230 (32/37) (80-800)	267 (3/4) (140-410)	6A (CONTROL) HOLTWOOD DAM HYDRO-ELECTRIC STATION 5.8 MILES NW OF SITE	0
	GAMMA (TOTAL)	100						
	K-40		N/A	29 (6/55) (11-60)	25 (2/45) (19-30)	60 (1/12) (60)	4L (INDICATOR) CONOWINGO DAM EL. 33 FT. MSL-COMPOSITE 8.6 MILES SE OF SITE	0
	MN-54			< MDL	< MDL	< MDL		0
	FE-59			< MDL	< MDL	< MDL		0
	CO-58			< MDL	< MDL	< MDL		0
	CO-60			< MDL	< MDL	< MDL		0
	ZN-65			< MDL	< MDL	< MDL		0
	ZRNB-95			< MDL	< MDL	< MDL		0
	CS-134			< MDL	< MDL	< MDL		0

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

TABLE III
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

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

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED MINIMUM DETECTABLE LEVEL (MDL)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATIONS MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN STATION # NAME DISTANCE & DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
SURFACE WATER (PC/LITER)	GAMMA (CONT.)	100						
	CS-137		11	< MDL	.7 (1/9) (.7)	.7 (1/9) (.7)	1LL (CONTROL) PBAPS INTAKE-COMPOSITE 0.3 MILES ENE OF SITE	0
	BALA-140		9	< MDL	< MDL	< MDL		0
	TH-228		N/A	< MDL	.5 (1/9) (5)	.5 (1/9) (5)	1LL (CONTROL) PBAPS INTAKE-COMPOSITE 0.3 MILES ENE OF SITE	0
DISCHARGE WATER (PC/LITER)	GROSS BETA INSOLUBLE	17	2.5	1.5 (12/17) (.4-4.0)		1.6 (4/5) (.7-4.0)	1MM (INDICATOR) CANAL DISCHARGE-COMPOSITE 1.0 MILES SE OF SITE	0
	GROSS BETA SOLUBLE	17	2.5	2.8 (17/17) (1.5-4)		2.8 (5/5) (1.4-4)	1MM (INDICATOR) CANAL DISCHARGE-COMPOSITE 1.0 MILES SE OF SITE	0
	AQUEOUS H3 TOTAL	17	1200	267 (15/17) (70-690)		280 (10/12) (70-690)	1M (INDICATOR) CANAL DISCHARGE 1.0 MILES SE OF SITE	0
	GAMMA (TOTAL)	17						
	K-40		N/A	20 (1/17) (20)		20 (1/17) (20)	1MM (INDICATOR) CANAL DISCHARGE-COMPOSITE 1.0 MILES SE OF SITE	0
	MN-54		9	< MDL		< MDL		0
	FE-59		18	< MDL		< MDL		0
	CO-58		9	< MDL		< MDL		0
	CO-60		9	< MDL		< MDL		0
	ZN-65		18	< MDL		< MDL		0
	ZRNB-95		9	< MDL		< MDL		0
	CS-134		9	< MDL		< MDL		0
	CS-137		11	< MDL		< MDL		0
	BALA-140		9	< MDL		< MDL		0
	TH-228		N/A	5 (1/17) (5)		5 (1/17) (5)	1MM (INDICATOR) CANAL DISCHARGE-COMPOSITE 1.0 MILES SE OF SITE	0

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

TABLE III
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

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

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED MINIMUM DETECTABLE LEVEL (MDL)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATIONS MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN STATION # NAME DISTANCE & DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
WELL WATER (PC/LITER)	GROSS BETA INSOLUBLE	13	2.5	1.3 (6/9) (.7-2.5)	.7 (2/4) (.7-.7)	1.8 (2/2) (1.1-2.5)	1U (INDICATOR) UTILITY BUILDING 0.3 MILES S OF SITE	0
	GROSS BETA SOLUBLE	13	2.5	1.4 (7/9) (.6-3.9)	1.9 (4/4) (1.7-2.3)	2.6 (2/2) (1.2-3.9)	1U (INDICATOR) UTILITY BUILDING 0.3 MILES S OF SITE	0
	AQUEOUS H3	13	1200	211 (7/9) (70-370)	133 (4/4) (60-200)	300 (2/2) (300-300)	1U (INDICATOR) UTILITY BUILDING 0.3 MILES S OF SITE	0
SOIL (PC/GRAM DRY)	SR-89 BOTTOM	6	N/A	< MDL	< MDL	< MDL		0
	SR-89 TOP	6	N/A	< MDL	< MDL	< MDL		0
	SR-90 BOTTOM	6	N/A	.15 (5/6) (.06-.31)		.29 (2/2) (.27-.31)	2 (INDICATOR) 130 DEGREE SECTOR HILL 0.9 MILES SE OF SITE	0
	SR-90 TOP	6	N/A	.21 (4/6) (.12-.31)		.28 (1/2) (.28)	3A (INDICATOR) DELTA, PA SUBSTATION 3.6 MILES SW OF SITE	0

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

TABLE III
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

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

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED MINIMUM DETECTABLE LEVEL (MDL)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATIONS MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN STATION # NAME DISTANCE & DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
SOIL (PC/GRAM DRY)	GAMMA (BOTTOM)	6						
	BE-7		N/A	< MDL		< MDL		0
	K-40		N/A	20 (6/6) (4.7-23)		23 (2/2) (22-23)	5 (INDICATOR) WAKEFIELD, PA. 4.6 MILES E OF SITE	0
	CS-134		N/A	< MDL		< MDL		0
	CS-137		N/A	.5 (5/6) (.34-.81)		.81 (1/2) (.81)	3A (INDICATOR) DELTA, PA SUBSTATION 3.6 MILES SW OF SITE	0
	RA-226		N/A	2 (6/6) (1.4-2.6)		2.5 (2/2) (2.3-2.6)	3A (INDICATOR) DELTA, PA SUBSTATION 3.6 MILES SW OF SITE	0
	TH-228		N/A	1 (6/6) (.37-1.7)		1.6 (2/2) (1.4-1.7)	5 (INDICATOR) WAKEFIELD, PA. 4.6 MILES E OF SITE	0
	GAMMA (TOP)	6						
	BE-7		N/A	.5 (2/6) (.1-.9)		.9 (1/2) (.9)	5 (INDICATOR) WAKEFIELD, PA. 4.6 MILES E OF SITE	0
	K-40		N/A	15 (6/6) (2.4-21)		21 (2/2) (20-21)	5 (INDICATOR) WAKEFIELD, PA. 4.6 MILES E OF SITE	0
	CS-134		N/A	< MDL		< MDL		0
	CS-137		N/A	.9 (6/6) (.35-1.5)		1.2 (2/2) (.97-1.5)	3A (INDICATOR) DELTA, PA SUBSTATION 3.6 MILES SW OF SITE	0
	RA-266		N/A	3 (5/6) (2.2-3.5)		3 (2/2) (2.4-3.5)	3A (INDICATOR) DELTA, PA SUBSTATION 3.6 MILES SW OF SITE	0
	TH-228		N/A	1 (6/6) (.12-1.8)		1.5 (2/2) (1.2-1.8)	5 (INDICATOR) WAKEFIELD, PA. 4.6 MILES E OF SITE	0

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

TABLE III
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

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

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED MINIMUM DETECTABLE LEVEL (MDL)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATIONS MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN STATION # NAME DISTANCE & DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
MILK (PC/LITER)	I-131	316	0.6	.15 (11/198) (.07-.43)	< MDL	.18 (7/38) (.08-.43)	G (INDICATOR) NEARBY FARM G WEST OF CONOWINGO POND	0
	AQUEOUS H3 MILK	16	N/A	198 (5/8) (90-280)	223 (6/8) (160-330)	260 (3/4) (210-330)	C (CONTROL) DISTANT FARM C WEST OF CONOWINGO POND	0
	AQUEOUS H3 WATER	16	N/A	230 (5/8) (110-320)	253 (6/8) (180-380)	297 (3/4) (240-380)	C (CONTROL) DISTANT FARM C WEST OF CONOWINGO POND	0
	SR-89	4	N/A	< MDL		< MDL		0
	SR-90	4	N/A	2.5 (4/4) (.8-5)		2.5 (4/4) (.8-5)	J (INDICATOR) NEARBY FARM J WEST OF CONOWINGO POND	0
	GAMMA	4						
	K-40		N/A	1425 (4/4) (1200-1500)		1425 (4/4) (1200-1500)	J (INDICATOR) NEARBY FARM J WEST OF CONOWINGO POND	0
	CS-134		10	< MDL		< MDL		0
	CS-137		10	< MDL		< MDL		0
	BALA-140		9	< MDL		< MDL		0
AIR IODINE (PC/CU. METER)	I-131	394	0.04	< MDL	< MDL	< MDL		0
DIRECT RADIATION (MRAD/STD. MONTH)	TLD MONTHLY	537	N/A	6.7 (454/454) (3.1-9.6)	6.4 (83/83) (4.5-9.7)	8.3 (12/12) (7.1-9.6)	42 (INDICATOR) MREL 4.2 MILES NNW OF SITE	0
	QUARTERLY	178	N/A	6.4 (151/151) (3.2-9.2)	6.4 (27/27) (4.6-8.3)	7.99 (4/4) (7.5-8.4)	42 (INDICATOR) MREL 4.2 MILES NNW OF SITE	0

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

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

STATION CODE	COLLECTION DATE	GROSS ALPHA SOLUBLE	GROSS ALPHA INSOLUBLE	GROSS BETA SOLUBLE	GROSS BETA INSOLUBLE	AQUEOUS H3 TOTAL
1Q	01/07/84			2.6 ± .5	1.2 ± .7	100 ± 80
	02/11/84			3 ± 1	.6 ± .4	300 ± 80
	03/03/84			1.9 ± .9	< .5	260 ± 70
	03/31/84			5 ± 1	.6 ± .4	230 ± 80
	05/06/84			2.4 ± .9	1.7 ± .7	300 ± 100
	06/03/84			4.0 ± .6	.9 ± .4	350 ± 70
	06/30/84			2.3 ± .9	.7 ± .6	150 ± 70
	08/04/84			3 ± 1	< .5	350 ± 80
	09/01/84			4.5 ± .5	1.9 ± .7	300 ± 100
	09/29/84			3 ± 1	3.7 ± .8	230 ± 60
	10/27/84			4 ± 1	< .5	90 ± 40
	12/01/84			3 ± 1	1.3 ± .6	80 ± 70
	MEAN			3.2 ± 1.9	1.2 ± 1.9	228 ± 200
4F	01/07/84	< .6	4 ± 2	2.2 ± .8	11 ± 1	
	02/11/84	.5 ± .4	3 ± 1	3.9 ± .9	5.1 ± .9	
	03/03/84	< .8	2 ± 1	2.1 ± .9	3.9 ± .9	150 ± 60
	03/31/84	< .9	< .5	2.9 ± .8	.7 ± .7	
	05/06/84	< .7	3 ± 2	2.1 ± .9	10 ± 1	
	06/03/84	< .6	3 ± 2	1.6 ± .7	18 ± 2	210 ± 70
	06/30/84	< .8	< .3	2 ± 1	.4 ± .3	
	08/04/84	< 1	1.0 ± .8	2.3 ± .9	2.8 ± .9	
	09/01/84	< .4	1.0 ± .8	2.6 ± .4	2.1 ± .7	470 ± 80
	09/29/84	< 1	.6 ± .5	3 ± 1	.6 ± .5	
	10/27/84	< 1	< .4	3.1 ± .9	1.3 ± .7	
	12/01/84	< 1	< .5	3 ± 1	1.4 ± .6	100 ± 70
	MEAN	.8 ± .4	1.6 ± 2.6	2.6 ± 1.3	4.8 ± 10.9	233 ± 329
4G	01/07/84			2.1 ± .5	1.6 ± .7	
	02/11/84			4 ± 1	.8 ± .4	
	03/03/84			1.3 ± .8	.5 ± .4	
	03/31/84			4 ± 1	1.0 ± .7	
	05/06/84			1.5 ± .8	.5 ± .4	
	06/03/84			1.9 ± .5	1.1 ± .4	
	06/30/84			2.3 ± .8	.7 ± .6	
	08/04/84			3 ± 1	< .5	
	09/01/84			3.2 ± .4	2.1 ± .7	
	09/29/84			16 ± 2	< .3	
	10/27/84			4 ± 1	< .5	
	12/01/84			7 ± 1	1.1 ± .6	
	MEAN			4.2 ± 8.1	.9 ± 1.1	
6A	01/07/84	1 ± 1	.5 ± .4	2.4 ± .8	< .4	
	02/11/84	< .4	< .3	4.3 ± .9	< .4	
	03/03/84	< .7	< .4	2.4 ± .9	.4 ± .4	250 ± 70
	03/31/84	< 1	.6 ± .5	3.0 ± .8	3.0 ± .8	
	05/06/84	< .7	< .5	2.1 ± .9	1.2 ± .7	
	06/03/84	< .4	< .3	1.6 ± .7	< .5	140 ± 70
	06/30/84	< .9	< .4	2 ± 1	.6 ± .3	
	08/04/84	< 1	< .4	3.3 ± .9	.8 ± .6	
	09/01/84	< .5	< .3	2.9 ± .4	< .4	410 ± 70
	09/29/84	< 1	< .3	3 ± 1	< .5	
	10/27/84	< 1	< .2	4 ± 1	< .5	
	12/01/84	< 1	< .5	4 ± 1	1.7 ± .6	< 100
	MEAN	.8 ± .5	.4 ± .2	2.9 ± 1.7	.9 ± 1.6	225 ± 277

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

STATION CODE	COLLECTION DATE	GROSS ALPHA SOLUBLE	GROSS ALPHA INSOLUBLE	GROSS BETA SOLUBLE	GROSS BETA INSOLUBLE	AQUEOUS H3 TOTAL
13A	01/07/84			2.6 ± .5	2.2 ± .7	
	02/11/84			5 ± 1	< .5	
	03/03/84			3 ± 1	.6 ± .4	270 ± 70
	03/31/84			5 ± 1	1.1 ± .7	
	05/06/84			1.8 ± .8	.8 ± .7	
	06/03/84			2.1 ± .5	.9 ± .4	140 ± 60
	06/30/84			2.8 ± .9	1.6 ± .7	
	08/04/84			1.6 ± .9	< .5	
	09/01/84			2 ± 1	1.8 ± .7	100 ± 70
	09/29/84			4 ± 1	< .3	
	10/27/84			4 ± 1	< .5	
	12/01/84			4 ± 1	1.5 ± .7	< 80
	MEAN			3.2 ± 2.4	1.0 ± 1.2	148 ± 171
13B (1)	02/08/84			2.1 ± .8	2 ± 1	
	03/15/84			3 ± 1	.7 ± .4	
	04/09/84			2.7 ± .8	2.7 ± .9	
	05/14/84			3.2 ± .6	7.7 ± .8	
	06/07/84			1.3 ± .7	1.4 ± .7	
	11/20/84			4 ± 1	3.9 ± .9	
	12/03/84			3.0 ± .5	2.3 ± .4	
	MEAN			2.8 ± 1.7	3.0 ± 4.6	
MEAN ALL STATIONS		.8 ± .5	1.0 ± 2.2	3.2 ± 3.8	1.9 ± 5.7	215 ± 226

(1) SAMPLE IS COLLECTED ONLY WHEN PUMP OPERATES

TABLE V ANALYTICAL DATA FOR SURFACE WATER COMPOSITE SAMPLES
CONCENTRATION (PC/LITER)

STATION CODE	COLLECTION PERIOD	GROSS ALPHA SOLUBLE	GROSS ALPHA INSOLUBLE	GROSS BETA SOLUBLE	GROSS BETA INSOLUBLE	I-131 TOTAL	AQUEOUS H3 TOTAL
1LL	02/03-02/10/84			2 ± 1	< .5		130 ± 70
	02/10-03/25/84			(1)	(1)		(1)
	03/25-03/30/84			2.5 ± .9	< .6		220 ± 60
	03/30-06/02/84			(1)	(1)		(1)
	06/02-06/22/84			2.5 ± .8	5.2 ± .9		330 ± 80
	06/22-08/03/84			4 ± 1	1.0 ± .6		130 ± 90
	08/03-08/31/84			1 ± 1	1.6 ± .7		200 ± 70
	08/31-09/07/84			(1)	(1)		(1)
	09/07-09/28/84			3 ± 1	1.0 ± .7		< 70
	09/28-10/26/84			3 ± 1	1.8 ± .6		130 ± 30
	10/26-11/21/84			5 ± 1	.7 ± .6		300 ± 70
	11/21-01/04/85			3 ± 1	1.0 ± .7		300 ± 100
	MEAN			2.9 ± 2.3	1.5 ± 2.9		201 ± 186
4L	01/07-02/11/84	.6 ± .5	< .3	3.0 ± .9	< .4		230 ± 60
	02/04-02/11/84					< .06	
	02/11-03/03/84	< .6	1.3 ± .9	1.9 ± .8	4.1 ± .9		< 70
	02/25-03/03/84					< .05	
	03/03-03/31/84	< .7	< .4	2.1 ± .7	< .6		< 80
	03/24-03/31/84					.10 ± .07	
	03/31-05/06/84	< .7	< .5	1.9 ± .8	1.8 ± .7		< 80
	04/29-05/06/84					< .04	
	05/06-06/03/84	< .5	< .3	2.1 ± .8	< .5		200 ± 100
	05/26-06/03/84					< .1	
	06/03-06/30/84	< .7	< .4	1.6 ± .9	.3 ± .3		160 ± 80
	06/23-06/30/84					< .09	
	06/30-08/04/84	< 1	< .4	1.6 ± .8	< .5		500 ± 80
	07/29-08/04/84					< .04	
	08/04-09/01/84	< .5	< .3	3.4 ± .4	< .5		< 100
	08/25-09/01/84					< .04	
	09/01-09/29/84	< 1	< .3	2.6 ± .9	< .5		370 ± 80
	09/23-09/29/84					< .2	
	09/29-10/14/84	(1)	(1)	(1)	(1)	(1)	(1)
	10/14-10/27/84	< 1	< .3	2.8 ± .9	< .5		100 ± 40
	10/21-10/27/84					< .04	
	10/27-12/01/84	< 1	< .2	3 ± 1	< .4		130 ± 70
	11/25-12/01/84					.15 ± .04	
	12/01-01/04/85	< .5	.3 ± .2	2 ± 1	1.1 ± .7		120 ± 90
	12/29-01/04/85					< .05	
	MEAN	.7 ± .4	.4 ± .6	2.3 ± 1.2	.9 ± 2.2	.08 ± .10	178 ± 265

TABLE V ANALYTICAL DATA FOR SURFACE WATER COMPOSITE SAMPLES (CONTINUED)
CONCENTRATION (PC/LITER)

STATION CODE	COLLECTION PERIOD	GROSS ALPHA SOLUBLE	GROSS ALPHA INSOLUBLE	GROSS BETA SOLUBLE	GROSS BETA INSOLUBLE	I-131 TOTAL	AQUEOUS H3 TOTAL
6I	01/07-02/11/84	< 1	< .3	1.6 ± .9	< .5		< 80
	02/04-02/11/84					.14 ± .05	
	02/11-03/03/84	< .3	< .1	1 ± 1	< .4		80 ± 60
	02/25-03/03/84					< .05	
	03/03-03/31/84	< .8	< .3	3.1 ± .9	.6 ± .5		160 ± 70
	03/24-03/31/84					< .08	
	03/31-05/06/84	< .8	< .5	3 ± 1	1.4 ± .7		160 ± 70
	04/28-05/06/84					< .04	
	05/06-06/03/84	< .4	< .4	1.4 ± .7	1.1 ± .6		200 ± 100
	05/26-06/03/84					< .09	
	06/03-06/23/84	< .9	< .3	2 ± 1	< .3		80 ± 70
	06/23-07/07/84	(1)	(1)	(1)	(1)	(1)	(1)
	07/07-07/15/84					< .04	
	06/07-08/04/84	< 1	< .5	3.0 ± .9	1.4 ± .8		< 100
	07/28-08/04/84					.19 ± .10	
	08/04-09/01/84	< .4	.6 ± .5	2.6 ± .4	1.1 ± .6		200 ± 70
	08/25-09/01/84					.13 ± .05	
	09/01-09/29/84	< 1	< .3	3 ± 1	.7 ± .5		800 ± 200
	09/22-09/29/84					.06 ± .04	
	09/29-10/27/84	< 1	< .3	4 ± 1	< .5		110 ± 30
	10/20-10/27/84					< .04	
	10/27-12/01/84	< 1	< .3	4 ± 1	< .4		280 ± 70
	11/24-12/01/84					.22 ± .04	
	12/01-01/04/85	< .3	.3 ± .2	1.8 ± .9	1.2 ± .7		< 80
	12/29-01/04/85					< .06	
	MEAN	< .7	.4 ± .3	2.5 ± 2.0	.8 ± .8	.10 ± .12	194 ± 402
MEAN ALL STATIONS		.7 ± .5	.4 ± .4	2.6 ± 1.8	1.0 ± 2.1	.09 ± .11	190 ± 298

(1) NO SAMPLE DUE TO PUMP MALFUNCTION

TABLE VI

CONCENTRATIONS OF GAMMA EMITTERS* IN SURFACE WATER
IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1984

Results in Units of pCi/ℓ ± 2 sigma

GRAB SAMPLES

Sample Dates

STATION NUMBER	1-07-84	2-11-84	3-03-84	3-31-84	5-06-84	6-03-84	6-30-84	8-04-84	9-01-84	9-29-84	10-27-84	12-01-84
1Q	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	K-40 19±7 Others<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL
4F	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	K-40 60±10 Others<MDL	ALL<MDL	ALL<MDL	ALL<MDL	K-40 16±8 Others<MDL
4G	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL
6A	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	K-40 30±10 Others<MDL	ALL<MDL	ALL<MDL
13A	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	All<MDL	K-40 11±6 Others<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL
13B(1)	(3)	ALL<MDL	ALL<MDL	All<MDL	All<MDL	K40 11±6 Others<MDL	(3)	(3)	(3)	(3)	ALL<MDL	K-40 13±6 Others<MDL

COMPOSITE SAMPLES

Sampling Period

STATION NUMBER	1-07-84 to 2-11-84	2-11-84 to 3-03-84	3-03-84 to 3-31-84	3-31-84 to 5-06-84	5-06-84 to 6-03-84	6-03-84 to 6-30-84	6-30-84 to 8-04-84	8-04-84 to 9-01-84	9-01-84 to 9-29-84	9-29-84 to 10-27-84	10-27-84 to 12-01-84	12-01-84 to 01-04-85
1LL(2)	ALL<MDL	(6)	Cs-137 .7±.4 Others<MDL	(6)	(6)	ALL<MDL	ALL<MDL	All<MDL	All<MDL	Th-228 5±3 Others<MDL	All<MDL	ALL<MDL
4L(4)	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	All<MDL	ALL<MDL	All<MDL	ALL<MDL	K-40 60±20 Others<MDL
6I(5)	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	All<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL

* For typical minimum detectable levels of nuclides searched for and not found, see Table XXVI.
(1) Sampling dates for station 13B were 2/08/84; 3/15/84; 4/09/84; 5/14/84; 6/07/84; 11/20/84; 12/03/84.
(2) Sampling dates for station 1LL were 2/03/84-2/10; 3/25-3/30; 6/02-6/22; 6/22-8/03; 8/03-8/31; 9/07-9/28; 9/28-10/26; 10/26-11/21;11/21-1/04/85.
(3) Sample is collected only when pump operates.
(4) Sampling dates for station 4L were 10/14/84-10/27/84.
(5) Sampling dates for station 6I were 6/03/84-6/23/84.
(6) No sample due to pump malfunction.

TABLE VII ANALYTICAL DATA FOR DISCHARGE WATER GRAB SAMPLES
CONCENTRATION (PC/LITER)

STATION CODE	COLLECTION DATE	GROSS BETA SOLUBLE	GROSS BETA INSOLUBLE	AQUEOUS H3 TOTAL
1M	01/07/84	2.4 ± .9	< .5	< 70
	02/11/84	3 ± 1	.4 ± .3	170 ± 60
	03/03/84	1.5 ± .9	< .3	180 ± 60
	03/31/84	2.5 ± .9	2.1 ± .6	150 ± 70
	05/06/84	1.6 ± .8	1.0 ± .7	110 ± 70
	06/03/84	1.7 ± .5	.6 ± .4	340 ± 90
	06/30/84	3 ± 1	1.6 ± .7	190 ± 70
	08/04/84	4 ± 1	.9 ± .6	< 80
	09/01/84	3 ± 1	< .5	500 ± 100
	09/29/84	3 ± 1	2.1 ± .7	400 ± 100
	10/27/84	4 ± 1	< .5	70 ± 30
	12/01/84	4 ± 1	2.4 ± .7	690 ± 80
	MEAN	2.8 ± 1.8	1.1 ± 1.5	246 ± 393

TABLE VIII ANALYTICAL DATA FOR DISCHARGE WATER COMPOSITE SAMPLES
CONCENTRATION (PC/LITER)

STATION CODE	COLLECTION PERIOD	GROSS BETA SOLUBLE	GROSS BETA INSOLUBLE	AQUEOUS H3 TOTAL
1MM	01/07-02/11/84	(1)	(1)	(1)
	02/11-03/03/84	(1)	(1)	(1)
	03/03-03/31/84	(1)	(1)	(1)
	03/31-05/06/84	(1)	(1)	(1)
	05/06-06/04/84	(1)	(1)	(1)
	06/04-06/22/84	2.3 ± .9	.7 ± .6	240 ± 80
	06/22-07/20/84	(1)	(1)	(1)
	07/20-08/03/84	2 ± 1	4.0 ± .9	210 ± 70
	08/03-09/19/84	(1)	(1)	(1)
	09/19-09/28/84	3 ± 1	.7 ± .6	410 ± 90
	09/28-10/26/84	4 ± 1	1.1 ± .6	110 ± 30
	10/26-12/31/84	(1)	(1)	(1)
	12/31-01/04/85	1.4 ± .9	< .5	240 ± 80
	MEAN	2.5 ± 2.0	1.4 ± 2.9	242 ± 216

(1) NO SAMPLE DUE TO PUMP MALFUNCTION

TABLE IX

CONCENTRATIONS OF GAMMA EMITTERS* IN DISCHARGE WATER
IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1984

GRAB SAMPLES

Sampling Dates

STATION NUMBER	01-07-84	02-11-84	03-03-84	03-31-84	05-06-84	06-03-84	06-30-84	08-04-84	09-01-84	09-29-84	10-27-84	12-01-84
1M	ALL<MDL	All<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	ALL<MDL	K-40 20±10 Others<MDL

COMPOSITE SAMPLES

SAMPLING PERIOD

STATION NUMBER	01-07-84 to 02-11-84	02-08-84 to 03-03-84	03-03-84 to 03-31-84	03-31-84 to 05-06-84	05-06-84 to 06-03-84	06-04-84 to 06-22-84	07-20-84 to 08-03-84	08-04-84 to 09-01-84	09-19-84 to 09-28-84	09-28-84 to 10-26-84	10-26-84 to 12-01-84	12-31-84 to 01-04-85
1MM	(1)	(1)	(1)	(1)	(1)	ALL<MDL	All<MDL	(1)	ALL<MDL	Th-228 5±1 Others<MDL	(1)	All<MDL

* For typical minimum detectable levels of nuclides serarched for and not found, see Table XXVI.
(1) Sample not collected due to sampler malfunction

TABLE X ANALYTICAL DATA FOR WELL WATER SAMPLES
CONCENTRATION (PC/LITER)

STATION CODE	COLLECTION DATE	GROSS BETA SOLUBLE	GROSS BETA INSOLUBLE	AQUEOUS H3
1U	01/07/84	1.2 ± .7	1.1 ± .6	300 ± 70
	03/31/84	3.9 ± .9	2.5 ± .8	300 ± 100
	06/30/84	(1)	(1)	(1)
	09/30/84	(1)	(1)	(1)
	MEAN	2.6 ± 3.8	1.8 ± 2.0	300 ± 0
1V	01/07/84	.8 ± .6	< .5	70 ± 60
	03/31/84	.6 ± .6	.9 ± .4	120 ± 80
	06/30/84	< .3	< .5	120 ± 90
	09/30/84	(1)	(1)	(1)
	MEAN	.6 ± .5	.6 ± .5	103 ± 58
7	01/08/84	1.7 ± .7	.7 ± .6	60 ± 60
	04/02/84	1.9 ± .8	.7 ± .4	100 ± 80
	07/01/84	1.8 ± .8	< .5	170 ± 70
	09/30/84	2.3 ± .9	< .3	200 ± 100
	MEAN	1.9 ± .5	.6 ± .4	133 ± 128
40	01/08/84	.7 ± .6	< .5	< 90
	03/31/84	1.3 ± .7	1.6 ± .7	200 ± 100
	06/30/84	1.2 ± .7	.7 ± .5	370 ± 80
	09/29/84	< .8	.9 ± .3	< 100
	MEAN	1.0 ± .6	.9 ± 1.0	190 ± 260
MEAN ALL STATIONS		1.4 ± 1.9	.9 ± 1.2	169 ± 199

(1) NO SAMPLE AVAILABLE

TABLE XI ANALYTICAL DATA FOR PRECIPITATION SAMPLES

STATION CODE	COLLECTION PERIOD	VOLUME (ML)	GROSS BETA (PCI/LITER)	GROSS BETA (PCI/SQ.M)
1A	01/07-02/11/84	1000	5.4 ± .9	170 ± 30
	02/11-03/03/84	2500	1.8 ± .8	140 ± 60
	03/03-03/31/84	2300	3.6 ± .9	260 ± 60
	03/31-05/06/84	3700	5.1 ± .9	600 ± 100
	05/06-06/03/84	2500	3.3 ± .5	250 ± 40
	06/03-06/30/84	4000	2.0 ± .7	250 ± 80
	06/30-08/04/84	7000	1.5 ± .7	300 ± 100
	08/04-09/01/84	2200	2.2 ± .8	150 ± 50
	09/01-09/29/84	1650	5.0 ± .9	250 ± 50
	09/29-10/27/84	2500	1.8 ± .7	140 ± 50
	10/27-12/01/84	2610	3.5 ± .9	280 ± 70
	12/01-01/05/85	1580	4.0 ± .9	200 ± 40
	MEAN		3.3 ± 2.8	249 ± 248
8	01/07-02/11/84	900	7 ± 1	180 ± 30
	02/11-03/03/84	2000	3.2 ± .8	200 ± 50
	03/03-03/31/84	2900	2.6 ± .8	240 ± 70
	03/31-05/06/84	3100	3.7 ± .8	350 ± 80
	05/06-06/03/84	3000	3.6 ± .5	330 ± 50
	06/03-06/30/84	2500	2.6 ± .7	200 ± 50
	06/30-08/04/84	5000	1.1 ± .6	160 ± 90
	08/04-09/01/84	250	30 ± 5	230 ± 40
	09/01-09/29/84	450	7 ± 2	100 ± 30
	09/29-10/27/84	400	14 ± 3	170 ± 30
	10/27-12/01/84	1580	17 ± 2	840 ± 80
	12/01-01/04/85	2000	13 ± 1	780 ± 90
	MEAN		8.7 ± 16.9	315 ± 483
MEAN ALL STATIONS			6.0 ± 13.1	282 ± 382

TABLE XII CONCENTRATIONS OF GAMMA EMITTERS* (PCI/LITER) IN PRECIPITATION IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1984

COLLECTION PERIOD	NUCLIDE	STATION 1A	STATION 8
1/07-02/11/84	BE-7	68 ± 8	70 ± 10
	OTHERS	< MDL	< MDL
2/11-03/03/84	BE-7	40 ± 10	31 ± 5
	OTHERS	< MDL	< MDL
3/03-03/31/84	BE-7	32 ± 8	36 ± 8
	OTHERS	< MDL	< MDL
3/31-05/06/84	BE-7	60 ± 10	30 ± 11
	OTHERS	< MDL	< MDL
5/06-06/03/84	BE-7	< 10	< 10
	OTHERS	< MDL	< MDL
6/03-06/30/84	BE-7	23 ± 9	28 ± 6
	OTHERS	< MDL	< MDL
6/30-08/04/84	BE-7	< 5	< 4
	OTHERS	< MDL	< MDL
8/04-09/01/84	BE-7	18 ± 7	14 ± 6
	OTHERS	< MDL	< MDL
9/01-09/29/84	BE-7	35 ± 9	40 ± 20
	OTHERS	< MDL	< MDL
9/29-10/27/84	BE-7	17 ± 8	< 4
	OTHERS	< MDL	< MDL
10/27-12/01/84	BE-7	20 ± 10	18 ± 9
	OTHERS	< MDL	< MDL
12/01-01/05/85	BE-7	30 ± 9	26 ± 9
	OTHERS	< MDL	< MDL
MEAN			
	BE-7	30 ± 40	23 ± 39
	OTHERS	< MDL	< MDL

* FOR TYPICAL MINIMUM DETECTABLE LEVELS OF NUCLIDES SEARCHED FOR AND NOT FOUND, SEE TABLE XXIII.

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

1984 PEACH BOTTOM LOCATIONS

WEEK #	1Z	4A
1	.026 ± .004	.026 ± .004
2	.021 ± .004	.014 ± .003
3	.034 ± .004	.028 ± .004
4	.020 ± .003	.023 ± .004
5	.019 ± .004	.009 ± .003
6	.017 ± .003	.012 ± .003
7	.010 ± .003	.012 ± .003
8	.017 ± .003	.017 ± .004
9	.013 ± .003	.005 ± .003
10	.016 ± .004	.010 ± .008
11	.018 ± .003	.016 ± .003
12	.010 ± .003	.010 ± .003
13	.009 ± .003	.011 ± .003
14	.008 ± .003	.010 ± .003
15	.007 ± .003	.010 ± .003
16	.008 ± .003	.007 ± .003
17	.012 ± .003	.010 ± .003
18	.015 ± .003	.016 ± .003
19	.009 ± .004	.011 ± .004
20	.013 ± .004	.014 ± .004
21	.018 ± .004	.017 ± .004
22	.011 ± .003	.012 ± .003
23	.030 ± .004	.030 ± .004
24	.025 ± .004	.025 ± .004
25	.014 ± .003	.014 ± .003
26	.016 ± .003	.016 ± .003
27	.017 ± .003	.013 ± .003
28	.020 ± .003	.017 ± .003
29	.016 ± .004	.018 ± .004
30	.011 ± .003	.011 ± .003
31	.017 ± .004	.022 ± .004
32	.026 ± .004	.023 ± .004
33	.020 ± .004	.026 ± .004
34	.013 ± .003	.014 ± .003
35	.022 ± .004	.018 ± .003
36	.018 ± .003	.016 ± .003
37	.004 ± .003	.018 ± .004
38	(1)	.017 ± .003
39	(1)	.020 ± .004
40	.020 ± .004	.020 ± .003
41	.020 ± .004	.025 ± .004
42	.019 ± .004	.019 ± .004
43	.017 ± .004	.021 ± .005
44	.019 ± .003	.017 ± .003
45	.016 ± .004	.018 ± .004
46	.015 ± .003	.013 ± .003
47	.019 ± .004	.020 ± .004
48	.028 ± .005	.024 ± .004
49	.023 ± .003	.025 ± .004
50	.044 ± .005	.038 ± .005
51	.027 ± .004	.022 ± .004
52	.024 ± .004	.021 ± .004
MEAN	.018 ± .015	.017 ± .013

(1) PUMP OUT OF SERVICE

TABLE XIV CONCENTRATIONS OF GAMMA EMITTERS* (PCI/ CU.M) IN AIR PARTICULATES IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1984

STATION CODE	NUCLIDE	12/31/83 TO 01/28/84	01/28/84 TO 03/03/84	03/03/84 TO 03/31/84	03/31/84 TO 04/29/84	04/29/84 TO 06/03/84	06/03/84 TO 06/30/84	06/30/84 TO 07/29/84	07/29/84 TO 09/01/84	09/01/84 TO 09/29/84 (1)	09/29/84 TO 11/04/84 (1)	11/04/84 TO 12/01/84	12/01/84 TO 12/29/84	MEAN
1Z	BE-7	.10 ±.03	.09 ±.03	.09 ±.02	.08 ±.02	.10 ±.02	.13 ±.02	.10 ±.02	.10 ±.02	.17 ±.07	.10 ±.03	.10 ±.02	.10 ±.02	.11 ±.05
	K-40	< .05	< .03	< .02	.09 ±.03	< .02	< .01	< .02	< .01	< .06	< .02	< .01	< .01	.03 ±.05
4A	BE-7	.09 ±.01	.07 ±.01	.10 ±.03	.09 ±.02	.13 ±.03	.14 ±.03	.09 ±.02	.12 ±.03	.13 ±.02	.12 ±.02	.06 ±.01	.12 ±.03	.11 ±.05
	K-40	< .05	< .01	< .02	< .09	< .02	< .05	< .01	< .04	< .01	< .03	< .02	< .04	< .03

* FOR TYPICAL MINIMUM DETECTABLE LEVELS OF NUCLIDES SEARCHED FOR AND NOT FOUND, SEE TABLE XXIII.

(1) COMPOSITE DATES FOR STATION 1Z WERE 09/01/84 TO 09/15/84 AND 10/02/84 TO 11/04/84.

TABLE XV ANALYTICAL DATA FOR AIR IODINE SAMPLES
CONCENTRATION OF I-131 (PC/CU. METER)

1984

WEEK #	GROUP I			GROUP II				GROUP III
	1B	1Z	2	3A	5	6B	14	12D
1	< .03	< .03	< .03	< .02	< .01	< .02	< .01	< .02
2	< .02	< .02	< .02	< .01	< .02	< .02	< .01	< .03
3	< .01	< .01	< .02	< .01	< .009	< .01	< .01	< .01
4	< .02	< .02	< .02	< .02	< .01	< .02	< .02	< .02
5	< .02	< .02	< .03	< .02	< .01	< .009	< .009	< .02
6	< .02	< .02	< .02	< .02	< .01	< .01	< .01	< .01
7	< .01	< .01	< .02	< .01	< .008	< .02	< .02	< .02
8	< .01	< .009	< .01	< .01	< .01	< .01	< .01	< .01
9	< .02	< .02	< .02	< .02	< .01	< .02	< .02	< .01
10	< .03	< .02	< .01	(1)	< .02	< .02	< .02	< .02
11	< .02	< .01	< .02	(1)	< .02	< .02	< .01	< .02
12	< .02	< .02	< .02	(1)	< .02	< .01	< .02	< .02
13	< .02	< .02	< .03	(1)	< .02	< .02	< .008	< .01
14	< .03	< .03	< .03	(1)	< .02	< .01	< .02	< .02
15	< .02	< .02	< .02	< .02	< .01	< .02	< .03	< .06
16	< .02	< .02	< .02	< .02	< .01	< .02	< .01	(1)
17	< .008	< .008	< .008	< .008	< .006	< .02	< .02	< .05
18	< .02	< .02	< .02	< .02	< .01	< .02	< .02	< .01
19	< .01	< .01	< .01	< .01	< .02	< .02	< .01	< .02
20	< .02	< .02	< .01	< .02	< .02	< .02	< .02	< .02
21	< .02	< .02	< .02	< .02	< .01	< .02	< .02	< .02
22	< .01	< .01	< .01	< .01	< .008	< .007	< .009	< .03
23	< .05	< .03	< .02	< .02	< .02	< .02	< .01	< .04
24	(1)	< .02	< .02	< .02	< .03	< .01	< .03	< .02
25	(1)	< .02	< .02	< .02	< .02	< .02	< .01	< .01
26	(1)	< .02	< .02	< .02	< .01	< .01	< .01	< .01
27	< .02	< .02	< .01	< .01	< .009	< .02	< .02	< .02
28	< .03	< .02	< .01	< .01	< .01	< .01	< .01	< .02
29	< .01	< .01	< .01	< .01	< .01	< .02	< .03	< .01
30	< .02	< .01	< .02	< .02	< .02	< .01	< .009	< .02
31	< .03	< .03	< .03	< .02	< .01	< .01	< .02	< .01
32	< .04	< .02	< .02	< .02	< .01	< .02	< .03	< .02
33	(1)	< .03	< .03	< .03	(1)	< .02	< .01	< .02
34	< .02	< .01	< .01	< .01	< .01	< .01	< .006	< .01
35	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .006
36	< .02	< .02	< .02	< .02	< .01	< .01	< .01	< .02
37	< .02	< .03	< .02	< .02	< .01	< .01	< .01	< .02
38	< .02	(1)	< .02	< .02	< .02	< .01	< .01	< .03
39	< .02	(1)	< .02	< .02	< .02	< .02	< .02	(1)
40	< .01	< .02	< .01	< .01	< .009	< .01	< .01	(1)
41	< .02	< .02	< .02	< .02	< .01	< .01	< .01	< .01
42	< .02	< .02	< .01	< .01	< .01	< .01	< .01	< .02
43	< .02	< .02	< .02	< .02	< .008	< .02	< .02	< .01
44	< .02	< .006	< .02	< .02	< .02	< .01	< .006	< .01
45	< .02	< .02	< .009	< .01	< .01	< .02	< .02	< .01
46	< .01	< .01	< .01	< .01	< .01	< .02	< .02	< .02
47	< .03	< .03	< .03	< .03	< .0	< .04	< .04	< .01
48	< .02	< .02	< .01	< .01	< .01	< .01	< .01	< .01
49	(2)	(2)	(2)	(2)	(2)	(2)	(2)	< .01
50	< .01	< .01	< .01	< .01	< .008	< .02	< .02	< .01
51	< .03	< .03	< .03	< .03	< .02	< .03	< .03	< .01
52	< .02	< .02	< .02	< .02	< .009	< .01	< .01	< .01
MEAN	< .020	< .019	< .018	< .017	< .013	< .016	< .016	< .018

(1) PUMP OUT OF SERVICE
(2) SAMPLE LOST IN SHIPPING

TABLE XVI ANALYTICAL DATA FOR MILK SAMPLES
CONCENTRATIONS OF I-131 (PC/LITER)

COLLECTION DATE	A	B	C	D	E	G	J	L	M	N	O
01/23/84	< .03	< .03	< .03	< .03		< .05	< .04			< .04	< .03
02/20/84	< .03	< .03	< .03	< .07		< .05	< .05			< .03	< .06
03/19/84	< .05	< .06	< .04	< .05	< .03	< .05	< .05	< .03	< .03	< .05	< .05
04/02/84	< .07	< .05	< .05	< .06		< .04	< .03			< .06	< .03
04/09/84	< .04	< .05	< .04	< .04		< .04	< .04			< .05	< .04
04/16/84	< .05	< .07	< .05	< .06		< .05	< .08			< .07	< .07
04/23/84	< .04	< .07	< .05	< .05		< .07	< .06			< .06	< .03
04/30/84	< .04	< .04	< .04	< .05		< .05	< .04			< .04	< .04
05/07/84	< .05	< .04	< .05	< .03		< .03	< .03			< .05	< .05
05/14/84	< .04	< .04	< .05	< .05		< .05	< .05			< .05	< .07
05/21/84	< .04	< .03	< .05	< .03		< .04	< .05			< .05	< .03
05/28/84	< .03	< .03	< .03	< .04		< .04	< .04			< .04	< .04
06/04/84	< .05	< .05	< .04	< .05		< .06	< .05			< .04	< .04
06/11/84	< .04	< .03	< .03	< .04		< .04	< .05			< .04	< .04
06/18/84	< .03	< .03	< .03	< .03		< .04	< .04			< .04	< .03
06/25/84	< .03	< .03	< .03	< .03		< .04	< .04			< .04	< .03
07/02/84	< .07	< .05	< .05	< .05		< .04	< .05			< .06	< .06
07/09/84	< .04	< .04	< .04	< .04		< .04	< .04			< .03	< .03
07/16/84	< .04	< .04	< .04	< .05		< .06	< .04			< .05	< .05
07/23/84	< .06	< .05	< .05	< .05		< .04	< .05			< .04	< .04
07/30/84	< .06	< .05	< .07	< .04		< .06	< .05			< .05	< .04
08/06/84	< .04	< .05	< .04	< .04		< .04	< .04			< .04	< .04
08/13/84	< .04	< .05	< .04	< .04	< .07	< .04	< .04	< .07	< .06	< .07	< .03
08/20/84	< .04	< .05	< .04	< .04		< .06	< .05			< .04	< .04
08/27/84	< .03	< .03	< .06	< .05		< .06	< .05			< .05	< .05
09/03/84	< .05	< .04	< .03	< .03	< .05	< .03	< .04	< .03	< .04	< .04	< .03
09/10/84	< .03	< .04	< .03	< .05		< .1	< .04			< .03	< .03
09/17/84	< .03	< .03	< .03	< .03		.16 ± .04	< .03			< .03	< .02
09/24/84	< .04	< .04	< .03	< .03		.17 ± .04	< .04			< .03	< .03
10/01/84	< .04	< .05	< .04	< .09		.11 ± .04	< .06			< .05	< .06
10/08/84	< .06	< .05	< .04	< .04		.14 ± .05	.09 ± .06			< .06	< .05
10/15/84	< .04	< .04	< .03	< .03		.43 ± .04	.11 ± .03			< .05	< .04
10/22/84	< .03	< .04	< .03	< .03		.15 ± .03	.10 ± .03			< .04	< .03
10/29/84	< .03	< .03	< .03	< .03		.08 ± .04	.07 ± .03			< .03	< .03
11/05/84	< .03	< .03	< .03	< .03		< .04	< .04			< .03	< .03
11/12/84	< .04	< .04	< .03	< .04		< .05	< .04			< .03	< .03
11/19/84	< .04	< .04	< .05	< .04		< .03	< .03			< .03	< .03
12/17/84	< .03	< .03	< .03	< .03	< .03	< .04	< .03	< .03	< .04	< .03	< .03
MEAN	< .04	< .04	< .04	< .04	< .05	.07 .14	.05 .04	< .04	< .04	< .04	< .04

CONCENTRATIONS OF AQUEOUS H3 (PC/LITER)

COLLECTION DATE	A		C		G		J	
	MILK	WATER	MILK	WATER	MILK	WATER	MILK	WATER
03/19/84	220 ± 80	250 ± 90	240 ± 80	270 ± 100	< 100	< 100	< 80	< 90
08/13/84	< 90	< 100	< 60	< 70	280 ± 60	320 ± 70	90 ± 80	110 ± 90
09/03/84	180 ± 60	200 ± 70	330 ± 70	380 ± 80	160 ± 90	200 ± 100	230 ± 80	260 ± 80
12/17/84	160 ± 60	180 ± 70	210 ± 80	240 ± 90	230 ± 60	260 ± 70	< 50	< 60
MEAN	160 ± 110	180 ± 130	210 ± 220	240 ± 260	190 ± 160	220 ± 190	110 ± 160	130 ± 180

TABLE XVII ANALYTICAL DATA FOR MILK SAMPLES
CONCENTRATIONS OF I-131 (PC/LITER)

COLLECTION DATE	NEARBY FARMS (G,J,O)	INTERMEDIATE FARMS (D,L,M,N)	DISTANT FARMS (A,B,C,E)	ALL FARMS
01/23/84	< .04	< .04	< .03	< .04
02/20/84	< .05	< .05	< .03	< .04
03/19/84	< .05	< .04	< .05	< .04
04/02/84	< .03	< .06	< .06	< .05
04/09/84	< .04	< .05	< .04	< .04
04/16/84	< .07	< .07	< .06	< .06
04/23/84	< .05	< .06	< .05	< 05
04/30/84	< .04	< .05	< .04	< .04
05/07/84	< .04	< .04	< .05	< .04
05/14/84	< .06	< .05	< .04	< .05
05/21/84	< .04	< .04	< .04	< .04
05/28/84	< .04	< .04	< .03	< .04
06/04/84	< .05	< .05	< .05	< .05
06/11/84	< .04	< .04	< .03	< .04
06/18/84	< .04	< .04	< .03	< .03
06/25/84	< .04	< .04	< .03	< .03
07/02/84	< .05	< .06	< .06	< .05
07/09/84	< .04	< .04	< .04	< .04
07/16/84	< .05	< .05	< .04	< .05
07/23/84	< .05	< .05	< .05	< .05
07/30/84	< .05	< .05	< .06	< .05
08/06/84	< .04	< .04	< .04	< .04
08/13/84	< .04	< .06	< .05	< .05
08/20/84	< .05	< .04	< .04	< .05
08/27/84	< .05	< .05	< .04	< .05
09/03/84	< .03	< .04	< .04	< .04
09/10/84	< .06	< .04	< .03	< .04
09/17/84	.07 ± .16	< .03	< .03	.05 ± .09
09/24/84	.08 ± .16	< .03	< .04	.05 ± .10
10/01/84	.08 ± .06	< .07	< .04	.06 ± .05
10/08/84	.09 ± .09	< .05	< .05	.07 ± .07
10/15/84	.19 ± .42	< .04	< .04	.10 ± .27
10/22/84	.09 ± .12	< .04	< .03	.06 ± .09
10/29/84	.06 ± .05	< .03	< .03	.04 ± .04
11/05/84	< .04	< .03	< .03	< .03
11/12/84	< .04	< .04	< .04	< .04
11/19/84	< .03	< .04	< .04	< .04
12/17/84	< .03	< .03	< .03	< .03

TABLE XVIII

CONCENTRATIONS OF Sr-89, Sr-90 and GAMMA EMITTERS* IN MILK
IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1984

Results in Units of pCi/ℓ ± 2 sigma

STATION NUMBER	SAMPLING DATE	NUCLIDES FOUND Sr-89	Sr-90	K-40	Cs-137
J	03/19/84	<3	2.7±.6	1500±200	<2
	08/13/84	<3	5±1	1500±200	<2
	09/03/84	<2	1.6±.3	1200±100	<2
	12/17/84	<2	.8±.7	1500±200	<2

* For typical minimum detectable levels of nuclides searched for and not found, see Table XXVI.

TABLE XIX ANALYTICAL DATA FOR SOIL SAMPLES
CONCENTRATION (PC/GRAM DRY)

TOP PORTION	STATION CODE	COLLECTION DATE	SR-89	SR-90	BE-7	K-40	CS-137	RA-226	TH-228
	2	08/04/84	< .2	.14 ± .07	.10 ± .05	9.6 ± .1	.85 ± .09	< .06	.76 ± .07
		10/27/84	< .08	.31 ± .07	< .4	2.4 ± .8	.9 ± .1	3 ± 1	.12 ± .07
		MEAN	< .14	.2 ± .2	.3 ± .4	6 ± 10	.88 ± .07	2 ± 4	.4 ± .9
	3A	08/04/84	< .1	.28 ± .08	< .2	18 ± 2	1.5 ± .2	2.4 ± .7	1.7 ± .2
		10/27/84	< .07	< .03	< .3	17 ± 2	.97 ± .01	3.5 ± .9	1.2 ± .1
		MEAN	< .09	.2 ± .4	< .3	18 ± 1	1.2 ± .7	3 ± 2	1.5 ± .7
	5	08/04/84	< .2	.12 ± .07	.9 ± .3	20 ± 2	.53 ± .05	2.2 ± .6	1.8 ± .2
		10/27/84	< .08	< .03	< .1	21 ± 2	.35 ± .04	2.8 ± .5	1.2 ± .1
		MEAN	< .14	.08 ± .13	.5 ± 1.1	21 ± 1	.4 ± .3	2.5 ± .8	1.5 ± .8
	MEAN	3A & 5	< .11	.12 ± .24	.4 ± .7	19 ± 4	.8 ± 1.0	2.7 ± 1.2	1.5 ± .6
	MEAN ALL STATIONS		< .12	.15 ± .24	.3 ± .6	15 ± 14	.9 ± .8	2 ± 2	1 ± 1

BOTTOM PORTION	STATION CODE	COLLECTION DATE	SR-89	SR-90	BE-7	K-40	CS-137	RA-226	TH-228
	2	08/04/84	< .2	.31 ± .07	< .2	12 ± 1	.37 ± .06	1.5 ± .08	.90 ± .09
		10/27/84	< .09	.27 ± .05	< .2	4.7 ± .5	.52 ± .05	1.4 ± .07	.37 ± .08
		MEAN	< .15	.29 ± .06	< .2	8 ± 10	.5 ± .2	1.5 ± .1	.6 ± .8
	3A	08/04/84	< .09	.06 ± .06	< .1	21 ± 2	< .03	2.3 ± .7	1.4 ± .1
		10/27/84	< .09	.06 ± .03	< .2	18 ± 2	.81 ± .08	2.6 ± .7	1.5 ± .2
		MEAN	< .09	.06 ± 0	< .2	19 ± 4	.4 ± 1	2.5 ± .4	1.5 ± .1
	5	08/04/84	< .2	.06 ± .05	< .1	23 ± 2	.55 ± .06	2.2 ± .5	1.4 ± .1
		10/27/84	< .09	< .03	< .1	22 ± 2	.34 ± .03	2.2 ± .4	1.7 ± .2
		MEAN	< .15	.05 ± .04	< .1	23 ± 1	.5 ± .3	2 ± 0	1.6 ± .4
	MEAN	3A & 5	< .12	.05 ± .03	< .13	21 ± 4	.4 ± .7	2.3 ± .4	1.5 ± .3
	MEAN ALL STATIONS		< .13	.13 ± .25	< .2	20 ± 10	.4 ± .5	2 ± 1	1 ± 1

* FOR TYPICAL MINIMUM DETECTABLE LEVELS OF NUCLIDES SEARCHED FOR AND NOT FOUND, SEE TABLE XXIII.

TABLE XX
MONTHLY TLD RESULTS
RESULTS IN UNITS OF MRADS/STD. MONTH

STATION CODE	EQV.MO.AVG.	84 01/07-02/11	84 02/11-03/03	84 03/03-03/31	84 03/31-05/06	84 05/06-06/03	84 06/03-06/30	84 06/30-08/04	84 08/04-09/01	84 09/01-09/29	84 09/29-10/27	84 10/27-12/01	85 12/01-01/05 (2)
1A	7.42 ± 0.90	6.75±0.50	7.11±1.45	7.83±0.71	8.01±1.76	7.24±0.62	6.92±1.11	6.80±0.59	7.69±1.02	7.78±1.03	7.25±0.77	7.86±0.54	7.68±1.19
1B	5.68 ± 1.33	5.50±1.04	6.07±0.87	4.81±0.25	6.64±0.47	5.79±0.47	5.56±0.88	4.37±0.89	6.04±0.63	5.55±2.13	6.70±1.32	5.90±0.74	5.42±1.19
1C	6.92 ± 1.57	5.89±1.43	6.78±1.04	6.15±0.57	8.31±0.29	6.19±2.71	7.55±0.97	5.72±1.74	7.04±0.88	7.33±0.70	7.02±0.93	7.34±1.49	7.59±0.93
1D	6.42 ± 1.36	5.46±0.19	6.47±0.78	5.76±0.35	7.52±0.71	5.74±0.35	7.02±0.93	5.85±2.05	6.33±0.24	7.32±1.02	(3)	6.77±1.08	6.41±0.94
1E	6.49 ± 1.35	5.48±0.69	6.49±1.59	6.59±0.14	6.45±1.13(1)	6.12±1.27	6.21±0.37	5.23±1.20	7.15±1.23	6.93±0.91	7.37±0.35	6.78±0.86	7.35±0.38
1F	7.73 ± 1.40	7.03±2.08	7.58±0.72	7.58±1.15	8.68±0.80	6.89±1.48	7.75±1.21	6.61±1.01	7.84±0.77	8.91±0.91	8.16±1.95	8.32±1.24	7.45±1.62
1G	5.09 ± 1.08	4.62±0.32	5.18±0.38	4.70±1.10	5.25±1.06	4.46±0.92	4.90±1.17	4.33±0.94	5.23±0.65	6.29±0.47	5.28±0.62	5.39±0.85	5.57±0.30
1H	6.67 ± 1.24	5.82±0.53	6.70±0.43	6.47±1.42	7.11±0.55	5.79±0.20	6.71±1.33	5.83±1.06	7.55±1.07	6.80±2.14	7.46±1.22	6.67±1.71	7.30±1.78
1I	5.35 ± 0.99	5.64±1.31	5.68±0.92	4.56±0.48	5.88±0.74	5.13±0.71	4.97±1.93	4.38±1.27	5.51±0.67	5.49±0.86	5.91±0.40	5.69±0.73	5.36±0.19
1J	7.83 ± 1.40	6.98±0.75	7.86±1.58	7.30±2.20	8.56±0.69	7.17±1.24	7.67±0.62	6.91±1.47	8.41±1.55	8.46±1.01	9.16±1.16	7.68±0.73	8.05±0.76
1L	4.97 ± 1.61	4.57±0.49	4.90±1.73	5.81±1.00	6.43±0.92	4.32±1.14	3.73±1.29	3.81±0.43	5.35±0.56	5.46±1.00	5.62±0.75	4.83±1.08	4.77±0.71
1M	3.69 ± 0.73	3.83±0.18	3.84±0.29	3.08±0.39	4.28±0.25	3.37±0.69	3.74±0.84	3.26±1.21	3.46±0.55	4.10±0.72	3.44±0.58	4.03±0.78	3.71±0.48
2	6.24 ± 1.13	5.79±0.43	5.97±0.78	6.27±1.10	6.58±1.05	6.76±1.08	6.35±0.41	5.01±0.59	6.57±1.23	6.78±1.34	7.03±1.13	5.71±1.32	6.45±1.44
3A	4.84 ± 0.99	4.36±0.26	4.56±0.49	5.39±0.48	5.32±0.99	4.53±0.74	4.48±0.41	3.78±0.24	5.09±0.47	5.15±0.46	5.35±1.11	5.11±0.44	4.97±0.19
4K	4.48 ± 1.28	5.74±1.19	4.51±0.90	3.93±0.58	4.79±0.82	3.85±0.25	4.85±0.81	3.23±0.20	4.70±0.77	4.13±0.72	4.60±1.04	4.96±0.44	4.31±0.17
5	6.36 ± 1.17	6.57±0.64	6.76±0.27	5.72±1.70	6.90±0.28	5.57±0.39	6.60±0.68	5.27±1.05	7.15±1.07	6.36±1.37	6.80±1.11	6.66±0.49	6.08±0.78
6B	5.32 ± 0.80	4.88±0.37	5.62±1.01	5.66±0.65	5.27±0.67	5.07±0.80	5.21±1.02	4.71±0.75	5.69±0.44	5.94±4.01	5.75±1.42	(3)	5.08±0.48
14	6.40 ± 1.27	6.49±0.64	6.90±0.98	7.00±0.77	6.75±0.68	5.95±0.70	5.81±0.79	5.21±0.95	7.22±0.74	6.56±1.53	7.17±1.58	6.48±1.15	5.72±0.35
15	6.91 ± 1.17	6.77±0.55	7.32±1.36	5.49±1.22	6.89±1.02	7.42±0.89	6.53±0.56	6.56±0.43	6.98±1.69	7.83±1.39	6.94±1.85	7.37±0.51	6.93±0.36
16	6.79 ± 1.23	6.89±0.44	7.15±0.50	6.63±1.05	(3)	6.87±0.44	5.79±1.11	6.23±0.76	7.45±0.50	6.00±2.18	7.65±0.58	6.56±1.03	7.48±1.18
17	7.59 ± 1.48	7.19±1.50	8.07±1.55	7.30±0.67	8.29±1.18	6.59±0.59	7.64±1.26	6.22±1.54	8.18±1.16	7.39±1.21	8.15±2.42	8.80±0.53	7.40±1.81
18	7.09 ± 1.96	5.92±1.02	9.69±8.67	6.08±1.08	7.30±1.01	6.56±1.26	6.86±0.52	7.08±0.47	7.26±0.92	6.97±1.24	7.10±1.05	8.06±0.34	6.90±1.54
19	6.40 ± 1.05	5.91±0.37	6.98±0.75	6.78±1.43	6.95±1.22	6.02±0.31	5.87±0.79	5.83±0.72	6.05±1.25	7.41±1.28	7.38±0.66	6.35±1.57	6.22±0.56
20	8.01 ± 0.84	7.43±0.98	8.20±1.31	8.13±1.44	7.69±0.76	7.48±1.94	8.03±0.45	7.88±1.84	7.92±1.41	8.69±0.69	8.79±0.38	8.26±1.35	7.93±1.10
21B	6.24 ± 1.34	5.12±1.40	6.34±1.07	5.69±0.61	6.98±0.52	6.59±1.63	6.03±0.48	5.14±0.23	6.68±0.64	6.62±1.35	6.58±1.30	6.07±1.30	7.21±1.18

TABLE XX (CONT.)
MONTHLY TLD RESULTS
RESULTS IN UNITS OF MRADS/STD. MONTH

STATION CODE	EQV.MO.AVG.	84 01/07-02/11	84 02/11-03/03	84 03/03-03/31	84 03/31-05/06	84 05/06-06/03	84 06/03-06/30	84 06/30-08/04	84 08/04-09/01	84 09/01-09/29	84 09/29-10/27	84 10/27-12/01	85 12/01-01/05 (2)
22	6.74 ± 1.17	6.20±1.04	6.97±1.81	6.21±1.14	7.16±0.71	6.31±1.73	6.25±0.90	6.75±1.07	6.22±1.04	7.31±0.65	5.99±2.04	7.44±1.32	7.69±1.08
23	7.01 ± 1.03	6.52±1.05	7.30±0.94	6.06±0.81	7.15±0.42	6.97±1.09	6.33±0.91	7.22±1.15	7.36±0.82	6.87±1.67	6.75±1.22	7.66±1.22	7.72±1.77
24	5.13 ± 1.01	4.60±0.23	5.74±0.66	4.48±0.32	5.51±1.09	4.90±1.01	5.16±1.24	4.68±1.52	5.17±0.95	5.15±0.04	6.18±0.62	5.50±1.28	4.79±0.38
26	7.49 ± 1.62	6.94±2.00	7.64±0.59	6.80±0.83	7.78±1.36	7.35±1.16	6.53±0.56	6.20±0.64	8.12±1.07	8.89±1.42	7.47±0.46	7.52±0.55	8.67±0.92
27	7.31 ± 1.23	7.58±0.47	7.08±0.28	6.46±0.32	7.59±0.22	6.44±0.43	6.61±1.09	6.87±1.53	7.40±1.77	8.14±1.57	8.23±1.58	7.80±1.18	7.28±1.42
31	6.69 ± 1.38	6.45±0.68	7.18±0.46	5.63±0.88	7.30±0.99	6.28±1.26	6.51±0.55	5.67±0.39	6.71±1.32	6.70±1.71	8.00±0.74	6.54±1.56	7.38±0.19
32	7.32 ± 1.04	6.73±0.37	7.56±1.01	6.70±0.41	7.53±1.10	7.12±1.19	6.72±1.13	6.66±1.22	7.65±1.36	7.36±1.70	8.02±1.34	8.00±0.82	7.81±0.34
33A	5.11 ± 0.86	4.55±0.89	5.19±0.60	4.45±0.95	5.58±0.65	4.85±0.40	4.96±0.96	4.72±0.91	4.93±0.82	5.50±0.64	5.69±0.66	5.28±0.66	5.62±0.49
38	7.08 ± 1.49	5.97±0.58	7.54±1.18	7.18±1.58	7.77±0.38	7.65±0.53	6.26±1.16	5.84±0.72	6.80±0.91	6.99±0.37	7.21±0.95	7.66±0.73	8.17±1.49
40	7.59 ± 1.65	7.77±0.46	8.32±1.14	6.92±1.23	8.22±0.51	6.43±0.90	6.56±0.67	7.31±2.84	6.33±2.42	8.36±0.30	8.63±0.72	7.82±0.84	8.15±0.75
42	8.28 ± 1.46	7.10±1.56	8.73±1.52	8.03±0.35	8.51±0.93	7.26±0.54	7.52±0.61	8.38±0.39	8.19±0.43	8.90±0.83	9.59±1.21	8.36±1.37	8.91±1.26
43	7.43 ± 1.23	6.36±0.73	7.16±2.26	6.83±1.88	7.64±0.81	7.07±1.16	6.73±1.33	7.29±0.82	7.51±1.06	8.17±1.85	8.24±1.29	8.20±0.69	7.79±0.95
44	6.09 ± 1.47	5.83±1.08	6.31±1.29	5.11±0.73	6.85±1.50	5.82±0.74	5.57±0.51	5.21±1.13	5.14±1.08	6.59±0.87	6.99±0.45	7.20±0.84	6.21±1.49
45	7.44 ± 1.09	6.87±1.36	7.89±2.02	6.75±1.84	7.85±0.94	7.08±0.84	6.93±0.67	7.56±1.20	7.19±0.59	7.17±1.54	8.34±1.75	7.30±0.49	8.29±0.98
46	6.17 ± 1.45	5.86±0.89	6.65±0.38	5.19±0.72	7.17±1.38	5.98±1.27	5.18±1.32	5.44±0.46	6.02±0.44	6.64±1.58	7.40±1.12	5.97±1.17	6.55±0.66
47	7.73 ± 1.15	7.05±1.36	8.54±0.64	6.94±1.15	8.02±0.84	8.13±0.23	7.02±0.41	7.19±1.61	7.90±0.61	8.38±1.20	8.28±1.45	7.61±0.72	8.03±1.15
48	6.88 ± 1.26	6.78±0.90	6.41±0.77	6.77±1.55	7.46±1.13	6.70±1.73	6.08±1.16	5.59±0.25	6.85±0.83	7.45±0.73	7.03±1.43	7.84±0.71	7.32±0.58
49	7.36 ± 1.11	6.27±0.82	7.88±0.84	6.60±1.73	7.55±0.55	7.12±0.54	6.85±1.26	7.89±0.56	7.37±0.70	7.41±1.57	8.03±1.54	7.86±0.76	7.51±1.45
50	8.06 ± 0.94	7.97±1.63	8.36±0.57	7.56±1.35	8.52±1.22	7.20±0.72	7.76±1.59	7.41±1.07	8.34±0.92	8.12±0.28	8.50±0.95	8.59±0.88	8.32±0.65
51	7.01 ± 1.27	7.15±0.96	7.10±1.80	5.46±0.81	7.36±1.46	6.73±0.44	6.48±1.11	6.50±0.45	7.42±0.73	6.99±1.63	7.94±1.31	7.29±2.64	7.46±0.81
1NN	7.93 ± 0.87	7.17±1.60	8.14±0.75	8.31±1.33	8.22±1.88	7.60±1.31	7.74±0.51	7.31±0.26	8.12±1.26	7.81±0.93	8.65±1.65	8.30±1.85	8.02±0.74
		01/09-02/13	02/13-03/07	03/07-04/02	04/02-05/07	05/07-06/01	06/01-07/03	07/03-08/07	08/07-09/04	09/04-10/01	10/01-10/29	10/29-11/30	11/30-01/05
12B	5.25 ± 0.72	5.14±0.58	5.71±0.38	5.31±0 66	5.37±1.46	4.48±0.21	5.52±1.08	4.98±0.57	5.10±0.45	4.94±2.82	5.60±1.00	5.68±0.49	5.13±1.64

1 COLLECTION DATES FOR STATION 1E WERE 04/06/84 TO 05/06/84
2 COLLECTION DATES FOR STATIONS 1B, 1C, 1G, 1H, 1I, 1J, 2, 3A, 4K, 5, 6B, 16, 17, 19, 21B, 23, 24, 27, 31, 44, 46, 47, 48, AND 1NN WERE 12/01/84 TO 01/04/85
3 TLD VANDALIZED

TABLE XXI
QUARTERLY TLD RESULTS
RESULTS IN UNITS OF MRADS/STD. MONTH

STATION CODE	EQV.MO.AVG.	84 01/07-03/31	84 03/31-06/30	84 06/30-09/29	85 09/29-01/05 (1)
1A	6.91 ± 1.79	6.21±0.58	6.54±0.48	6.54±0.59	8.20±0.51
1B	5.54 ± 0.62	5.29±0.27	5.32±0.61	5.53±0.77	5.97±0.55
1C	6.93 ± 0.77	6.78±0.59	6.49±0.98	7.40±1.41	7.02±1.03
1D	6.16 ± 0.95	5.60±0.52	6.46±0.78	6.37±0.63	(2)
1E	6.16 ± 1.02	6.30±1.19	5.59±0.48	5.95±0.33	6.78±0.38
1F	7.92 ± 1.96	7.36±1.46	6.90±1.07	9.12±1.12	8.22±0.39
1G	4.82 ± 0.88	4.70±0.34	4.38±0.57	4.71±0.96	5.43±0.68
1H	6.51 ± 1.13	6.72±0.44	5.70±0.67	7.01±1.43	6.60±1.01
1I	5.06 ± 0.69	5.06±0.23	4.69±0.52	5.52±0.63	4.99±1.19
1J	7.03 ± 1.06	6.47±1.02	6.64±1.33	7.42±2.27	7.51±0.97
1L	5.00 ± 1.11	5.64±0.45	4.62±0.32	4.47±0.44	5.31±0.47
1M	3.56 ± 0.97	3.51±0.81	3.17±0.25	3.25±0.74	4.24±0.39
2	5.94 ± 1.59	5.01±0.67	5.63±0.73	6.09±0.38	6.90±0.89
3A	4.76 ± 0.90	4.90±0.86	4.17±0.38	4.70±1.47	5.25±0.54
4K	4.42 ± 0.56	4.40±0.48	4.06±0.39	4.74±0.81	4.47±0.78
5	6.12 ± 1.09	5.94±1.21	5.45±0.55	6.73±1.56	6.33±1.06
6B	4.98 ± 0.66	5.20±0.84	4.73±0.45	4.66±0.51	5.31±0.70
14	6.16 ± 1.42	5.79±0.48	5.75±0.13	5.78±0.97	7.20±1.07
15	6.56 ± 1.62	6.30±1.10	5.91±0.42	6.19±1.69	7.72±0.85
16	6.83 ± 1.54	5.93±0.83	(2)	7.02±1.57	7.43±1.40
17	6.93 ± 1.38	6.32±0.71	6.57±0.87	6.80±0.26	7.89±0.69
18	6.99 ± 1.63	6.63±1.33	5.99±0.54	7.75±2.60	7.53±1.08
19	6.66 ± 1.20	6.44±1.37	5.90±0.79	6.94±1.38	7.28±1.32
20	7.44 ± 1.53	7.81±0.99	6.67±0.54	6.93±0.63	8.32±0.52
21B	6.51 ± 0.78	6.78±0.48	6.05±0.47	6.31±0.92	6.88±0.59
22	6.89 ± 0.70	7.23±0.79	6.41±0.33	6.92±0.89	7.02±0.77
23	6.59 ± 1.44	5.75±0.34	6.20±0.50	6.94±1.73	7.36±1.43
24	5.01 ± 0.70	5.11±0.28	4.62±0.69	4.83±0.72	5.44±0.44
26	7.52 ± 1.46	7.44±0.65	6.92±1.38	7.10±1.24	8.55±0.64
27	7.20 ± 1.28	7.26±1.26	6.30±0.17	7.40±1.08	7.81±0.72
31	6.05 ± 0.97	6.18±0.23	5.33±0.46	6.27±0.82	6.40±1.04
32	6.70 ± 2.04	5.94±0.99	6.41±0.28	6.12±1.28	8.16±1.08
33A	5.08 ± 0.61	5.39±0.63	4.68±0.41	5.02±0.65	5.24±1.10
38	6.96 ± 1.61	6.88±1.19	5.84±0.48	7.62±0.52	7.46±1.33
40	7.51 ± 1.65	6.81±0.69	6.78±0.45	7.86±1.63	8.46±0.33
42	7.99 ± 0.77	8.01±0.95	7.45±1.16	8.12±0.96	8.36±0.35
43	7.30 ± 0.88	7.57±1.17	6.69±0.68	7.25±2.13	7.68±0.79
44	6.37 ± 1.68	6.93±0.72	5.13±0.82	6.64±1.47	6.80±0.89
45	7.04 ± 1.37	7.01±1.07	6.07±0.58	7.55±1.43	7.51±1.11
46	5.96 ± 0.94	6.06±0.73	5.36±0.46	5.89±1.52	6.50±1.41
47	7.60 ± 1.39	7.71±0.87	6.61±0.68	7.79±1.61	8.26±0.68
48	6.64 ± 1.69	6.18±0.98	5.85±0.75	6.63±1.29	7.78±0.95
49	7.38 ± 2.04	8.32±1.23	5.97±0.24	7.89±0.76	7.42±0.45
50	7.99 ± 1.73	7.46±1.21	7.32±0.71	7.83±1.77	9.21±1.48
51	6.68 ± 1.16	6.16±0.42	6.26±0.47	6.79±0.94	7.42±0.82
1NN	7.26 ± 1.29	7.30±0.94	6.33±0.94	7.78±1.21	7.60±0.64
12B (3)	5.30 ± 0.89	4.75±0.70	5.09±0.82	5.71±0.26	5.59±0.54

1 COLLECTION DATES FOR STATIONS 1B, 1C, 1G, 1H, 1I, 1J, 2, 3A, 4K, 5, 6B, 16, 17, 19, 21B, 23, 24, 27, 31, 44, 46, 47, 48, AND 1NN WERE 09/29/84 TO 01/04/85

2 TLD VANDALIZED

3 COLLECTION DATES FOR STATION 12B WERE 01/09-04/02, 04/02-07/03, 07/03-10/01, 10/01-01/05/85

TABLE XXII
MEAN MONTHLY AND QUARTERLY TLD RESULTS
FOR THE SITE BOUNDARY, MIDDLE, AND OUTER RINGS

RESULTS IN UNITS OF MRAD/STD. MONTH ± 2 SIGMA DEVIATION OF THE DATA

SAMPLE TYPE	EXPOSURE PERIOD	1 SITE	2 MIDDLE RING	3 OUTER RING
MONTHLY	JAN/84	5.84 ± 2.29	6.41 ± 1.74	5.86 ± 2.03
	FEB/84	6.48 ± 2.64	7.01 ± 2.22	7.12 ± 2.86
	MAR/84	6.13 ± 2.74	6.21 ± 1.98	6.16 ± 2.35
	APR/84	7.10 ± 2.68	7.16 ± 1.97	6.63 ± 1.93
	MAY/84	5.89 ± 2.43	6.44 ± 2.08	6.13 ± 2.16
	JUN/84	6.27 ± 2.83	6.30 ± 1.72	6.18 ± 1.94
	JUL/84	5.50 ± 2.64	6.13 ± 2.53	5.97 ± 2.35
	AUG/84	6.57 ± 2.72	6.89 ± 2.15	6.52 ± 2.23
	SEP/84	6.93 ± 2.70	7.08 ± 2.25	6.45 ± 2.53
	OCT/84	7.04 ± 3.27	7.30 ± 2.30	7.04 ± 2.09
	NOV/84	6.58 ± 2.68	7.23 ± 2.10	6.64 ± 2.20
	DEC/84	6.63 ± 2.80	7.09 ± 2.43	6.52 ± 2.39
QUARTERLY	JAN/84-MAR/84	5.96 ± 2.26	6.49 ± 1.99	6.21 ± 2.09
	APR/84-JUN/84	5.69 ± 2.20	5.90 ± 1.76	5.72 ± 1.48
	JUL/84-SEP/84	6.38 ± 3.24	6.61 ± 2.06	6.50 ± 1.94
	OCT/84-JAN/85	6.67 ± 2.50	7.16 ± 2.31	6.92 ± 2.11

SUMMARY OF AMBIENT DOSIMETRY PROGRAM
STANDARD MONTHLY EQUIVALENT AVERAGE DOSE
UNITS IN MRAD/STD. MONTH

SAMPLE TYPE	LOCATION	NO. OF SAMPLES ANALYZED	PERIOD MINIMUM	PERIOD MAXIMUM	PERIOD MEAN ± 2 SIGMA	PRE-OP(1) MEAN ± 2 SIGMA
MONTHLY	SITE	612	3.08 ± 0.39	9.16 ± 1.16	6.41 ± 2.78	5.05 ± 2.05
	MIDDLE RING	1187	3.23 ± 0.20	9.59 ± 1.21	6.77 ± 2.26	5.70 ± 1.87
	OUTER RING	332	4.48 ± 0.32	9.69 ± 8.67	6.43 ± 2.24	5.89 ± 1.37
QUARTERLY	SITE	203	3.17 ± 0.25	9.12 ± 1.12	6.17 ± 2.62	5.14 ± 1.60
	MIDDLE RING	398	4.06 ± 0.39	9.21 ± 1.48	6.54 ± 2.20	5.07 ± 1.25
	OUTER RING	108	4.62 ± 0.69	8.32 ± 0.52	6.36 ± 2.02	5.44 ± 1.70

(1) THE PRE-OPTIONAL MEAN WAS CALCULATED FROM TLD READINGS 1-07-73 TO 8-05-76.
STATIONS 1M, 31 AND 32 WERE ADDED TO THE PROGRAM 7-06-73 AND STATIONS 33A, 38, WERE NOT IN THE PRE-OPERATIONAL PROGRAM.
STATIONS 1NN AND 40 THROUGH 51 WERE ADDED TO THE PROGRAM ON 07-12-80.

SITE BOUNDARY RING STATIONS- 1B, 1C, 1D, 1E, 1F, 1G, 1H, 1J, 1L, 1M, 1NN, 2, 40.

MIDDLE RING STATIONS - 3A, 4K, 5, 6B, 14, 15, 17, 22, 23, 26, 27, 31, 32, 33A, 38, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51.

OUTER RING STATIONS - 12B, 16, 18, 19, 20, 21B, 24.

TABLE XXIII

TYPICAL * MINIMUM DETECTABLE LEVELS OF NUCLIDES SEARCHED FOR BUT NOT FOUND
IN THE VICINITY OF PEACH BOTTOM NUCLEAR POWER STATION, 1984

NUCLIDE	SURFACE WATER (pCi/ℓ)	DISCHARGE WATER (pCi/ℓ)	RAIN WATER (pCi/ℓ)	AIR PARTICULATES (10-3 pCi/m3)	MILK (pCi/ℓ)	SOIL (pCi/g-dry)
Be-7	8.3	8.5	13	-	12	0.6
Na-22	**	**	**	**	**	**
K-40	28	27	26	18	-	-
Cr-51	8.8	11	16	31	59	0.4
Mn-54	0.7	0.8	0.9	1.2	1.7	0.03
Co-57	0.5	0.6	0.7	1.2	1.5	0.03
Co-58	0.9	0.9	0.9	2.8	5.0	0.04
Fe-59	2.3	2.3	2.4	11	28	0.08
Co-60	0.8	0.9	1.0	1.6	1.9	0.03
Zn-65	1.5	1.8	2.3	3.0	5.3	0.08
Zr-95	2.2	2.3	2.3	5.0	7.6	0.08
Nb-95	0.9	1.1	1.3	7	14	0.04
ZrNb-95	**	**	**	**	**	**
Mo-99	**	**	**	**	**	**
Ru-103	1.1	2.9	1.6	7.4	11	0.07
Ru-106	6.1	7.3	7.8	11	12	0.5
Ag-110M	1.0	1.2	1.4	1.3	1.8	0.5
Sb-125	2.2	2.4	2.6	3.2	3 4	0.08
Te-129M	1.1	1.2	1.6	129	180	0.04
I-131	24	6.9	7.8	82	8.3	0.2
Te-132	**	**	**	**	**	**
I-133	**	**	**	**	**	**
Cs-134	1.0	0.9	1.0	1.0	1.3	0.04
Cs-136	3.3	4.1	4.5	4.9	4.6	0.1
Cs-137	0.9	0.9	3	1.1	0.6	0.03
Ba-140	6.2	7.3	8	12	**	0.2
La-140	7.2	3.5	4	8.1	**	0.1
BaLa-140	**	**	**	**	**	**
Ce-141	1.5	1.6	2.2	4.9	37	0.1
Ce-144	4.9	4.7	4.7	5.1	15	0.4
Ra-226	11	11	18	2.9	2.5	0.6
Th-232/228	1.2	1.1	3.3	**	**	-
Np-239	**	**	**	**	**	**

* Typical refers to mean plus two standard deviations.
** Minimum detectable levels of these nuclides were not calculated for these media.
- Indicates a positive concentration was measured in all samples analyzed.

TABLE XXIV COLLECTION DATES FOR AIR PARTICULATE AND AIR IODINE SAMPLES
COLLECTED IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1984

WEEK #	1B	1Z	2	3A	4A	5	6B	14	12D
1	12/31-01/07/84	12/31-01/07/84	12/31-01/07/84	12/31-01/07/84	12/31-01/07/84	12/31-01/07/84	12/31-01/07/84	12/31-01/07/84	01/03-01/09/84
2	01/07-01/14/84	01/07-01/14/84	01/07-01/14/84	01/07-01/14/84	01/07-01/14/84	01/07-01/15/84	01/07-01/15/84	01/07-01/15/84	01/09-01/16/84
3	01/14-01/21/84	01/14-01/21/84	01/14-01/21/84	01/14-01/21/84	01/14-01/21/84	01/15-01/21/84	01/15-01/21/84	01/15-01/21/84	01/16-01/23/84
4	01/21-01/28/84	01/21-01/28/84	01/21-01/28/84	01/21-01/28/84	01/21-01/28/84	01/21-01/28/84	01/21-01/28/84	01/21-01/28/84	01/23-01/30/84
5	01/28-02/04/84	01/28-02/04/84	01/28-02/04/84	01/28-02/04/84	01/28-02/04/84	01/28-02/04/84	01/28-02/04/84	01/28-02/04/84	01/30-02/06/84
6	02/04-02/11/84	02/04-02/11/84	02/04-02/11/84	02/04-02/11/84	02/04-02/11/84	02/04-02/11/84	02/04-02/11/84	02/04-02/11/84	02/06-02/14/84
7	02/11-02/18/84	02/11-02/18/84	02/11-02/18/84	02/11-02/18/84	02/11-02/18/84	02/11-02/18/84	02/11-02/18/84	02/11-02/18/84	02/14-02/21/84
8	02/18-02/25/84	02/18-02/25/84	02/18-02/25/84	02/18-02/25/84	02/18-02/25/84	02/18-02/25/84	02/18-02/25/84	02/18-02/25/84	02/21-02/27/84
9	02/25-03/03/84	02/25-03/03/84	02/25-03/03/84	02/25-03/03/84	02/25-03/03/84	02/25-03/03/84	02/25-03/03/84	02/25-03/03/84	02/27-03/05/84
10	03/03-03/10/84	03/03-03/10/84	03/03-03/10/84		03/03-03/10/84	03/03-03/10/84	03/03-03/10/84	03/03-03/10/84	03/05-03/12/84
11	03/10-03/17/84	03/10-03/17/84	03/10-03/17/84		03/10-03/17/84	03/10-03/17/84	03/10-03/17/84	03/10-03/17/84	03/12-03/19/84
12	03/17-03/24/84	03/17-03/24/84	03/17-03/24/84		03/17-03/24/84	03/17-03/24/84	03/17-03/24/84	03/17-03/24/84	03/19-03/26/84
13	03/24-03/31/84	03/24-03/31/84	03/24-03/31/84		03/24-03/31/84	03/24-03/31/84	03/24-03/31/84	03/24-03/31/84	03/26-04/02/84
14	03/31-04/07/84	03/31-04/07/84	03/31-04/07/84		03/31-04/07/84	03/31-04/07/84	03/31-04/07/84	03/31-04/07/84	04/02-04/09/84
15	04/07-04/15/84	04/07-04/15/84	04/07-04/15/84	04/07-04/15/84	04/07-04/15/84	04/08-04/14/84	04/08-04/14/84	04/08-04/14/84	04/09-04/16/84
16	04/15-04/22/84	04/15-04/22/84	04/15-04/22/84	04/15-04/22/84	04/15-04/22/84	04/14-04/21/84	04/14-04/21/84	04/14-04/21/84	
17	04/22-04/29/84	04/22-04/29/84	04/22-04/29/84	04/22-04/29/84	04/22-04/29/84	04/21-04/28/84	04/21-04/28/84	04/21-04/28/84	04/23-04/30/84
18	04/29-05/06/84	04/29-05/06/84	04/29-05/06/84	04/29-05/06/84	04/29-05/06/84	04/28-05/06/84	04/28-05/06/84	04/28-05/06/84	04/30-05/07/84
19	05/06-05/12/84	05/06-05/12/84	05/06-05/12/84	05/06-05/12/84	05/06-05/12/84	05/06-05/12/84	05/06-05/12/84	05/06-05/12/84	05/07-05/14/84
20	05/12-05/19/84	05/12-05/19/84	05/12-05/19/84	05/12-05/19/84	05/12-05/19/84	05/12-05/19/84	05/12-05/19/84	05/12-05/19/84	05/14-05/21/84
21	05/19-05/26/84	05/19-05/26/84	05/19-05/26/84	05/19-05/26/84	05/19-05/26/84	05/19-05/26/84	05/19-05/26/84	05/19-05/26/84	05/21-05/27/84
22	05/26-06/03/84	05/26-06/03/84	05/26-06/03/84	05/26-06/03/84	05/26-06/03/84	05/26-06/03/84	05/26-06/03/84	05/26-06/03/84	05/29-06/04/84
23	06/03-06/09/84	06/03-06/09/84	06/03-06/09/84	06/03-06/09/84	06/03-06/09/84	06/03-06/09/84	06/03-06/09/84	06/03-06/09/84	06/04-06/11/84
24		06/09-06/16/84	06/09-06/16/84	06/09-06/16/84	06/09-06/16/84	06/09-06/16/84	06/09-06/16/84	06/09-06/16/84	06/11-06/18/84
25		06/16-06/23/84	06/16-06/23/84	06/16-06/23/84	06/16-06/23/84	06/16-06/23/84	06/16-06/23/84	06/16-06/23/84	06/18-06/25/84
26		06/23-06/30/84	06/23-06/30/84	06/23-06/30/84	06/23-06/30/84	06/23-06/30/84	06/23-06/30/84	06/23-06/30/84	06/25-07/02/84
27	06/30-07/07/84	06/30-07/07/84	06/30-07/07/84	06/30-07/07/84	06/30-07/07/84	06/30-07/07/84	06/30-07/07/84	06/30-07/07/84	07/02-07/09/84
28	07/07-07/15/84	07/07-07/15/84	07/07-07/15/84	07/07-07/15/84	07/07-07/15/84	07/07-07/15/84	07/07-07/15/84	07/07-07/15/84	07/09-07/16/84
29	07/15-07/21/84	07/15-07/21/84	07/15-07/21/84	07/15-07/21/84	07/15-07/21/84	07/15-07/21/84	07/15-07/21/84	07/15-07/21/84	07/16-07/23/84
30	07/21-07/29/84	07/21-07/29/84	07/21-07/29/84	07/21-07/29/84	07/21-07/29/84	07/21-07/28/84	07/21-07/28/84	07/21-07/28/84	07/23-07/30/84
31	07/29-08/04/84	07/29-08/04/84	07/29-08/04/84	07/29-08/04/84	07/29-08/04/84	07/28-08/04/84	07/28-08/04/84	07/28-08/04/84	07/30-08/06/84
32	08/04-08/12/84	08/04-08/12/84	08/04-08/12/84	08/04-08/12/84	08/04-08/12/84	08/04-08/11/84	08/04-08/11/84	08/04-08/11/84	08/06-08/13/84
33		08/12-08/18/84	08/12-08/18/84	08/12-08/18/84	08/12-08/18/84		08/11-08/18/84	08/11-08/18/84	08/13-08/20/84
34	08/18-08/25/84	08/18-08/25/84	08/18-08/25/84	08/18-08/25/84	08/18-08/25/84	08/18-08/25/84	08/18-08/25/84	08/18-08/25/84	08/20-08/27/84
35	08/25-09/01/84	08/25-09/01/84	08/25-09/01/84	08/25-09/01/84	08/25-09/01/84	08/25-09/01/84	08/25-09/01/84	08/25-09/01/84	08/27-09/04/84
36	09/01-09/09/84	09/01-09/09/84	09/01-09/09/84	09/01-09/09/84	09/01-09/09/84	09/01-09/08/84	09/01-09/08/84	09/01-09/08/84	09/04-09/10/84
37	09/09-09/15/84	09/09-09/15/84	09/09-09/15/84	09/09-09/15/84	09/09-09/15/84	09/08-09/15/84	09/08-09/15/84	09/08-09/15/84	09/10-09/17/84
38	09/15-09/23/84		09/15-09/23/84	09/15-09/23/84	09/15-09/23/84	09/15-09/22/84	09/15-09/22/84	09/15-09/22/84	09/17-09/24/84
39	09/23-09/29/84		09/23-09/29/84	09/23-09/29/84	09/23-09/29/84	09/22-09/29/84	09/22-09/29/84	09/22-09/29/84	
40	09/29-10/07/84	10/02-10/07/84	09/29-10/07/84	09/29-10/07/84	09/29-10/07/84	09/29-10/06/84	09/29-10/06/84	09/29-10/06/84	
41	10/07-10/14/84	10/07-10/14/84	10/07-10/14/84	10/07-10/14/84	10/07-10/14/84	10/06-10/13/84	10/06-10/13/84	10/06-10/13/84	10/09-10/15/84
42	10/14-10/21/84	10/14-10/21/84	10/14-10/21/84	10/14-10/21/84	10/14-10/21/84	10/13-10/20/84	10/13-10/20/84	10/13-10/20/84	10/15-10/22/84
43	10/21-10/27/84	10/21-10/27/84	10/21-10/27/84	10/21-10/27/84	10/21-10/27/84	10/20-10/27/84	10/20-10/27/84	10/20-10/27/84	10/22-10/29/84
44	10/27-11/04/84	10/27-11/04/84	10/27-11/04/84	10/27-11/04/84	10/27-11/04/84	10/27-11/03/84	10/27-11/03/84	10/27-11/03/84	10/29-11/05/84
45	11/04-11/11/84	11/04-11/11/84	11/04-11/11/84	11/04-11/11/84	11/04-11/11/84	11/03-11/10/84	11/03-11/10/84	11/03-11/10/84	11/05-11/13/84
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47	11/18-11/25/84	11/18-11/25/84	11/18-11/25/84	11/18-11/25/84	11/18-11/25/84	11/17-11/24/84	11/17-11/24/84	11/17-11/24/84	11/19-11/26/84
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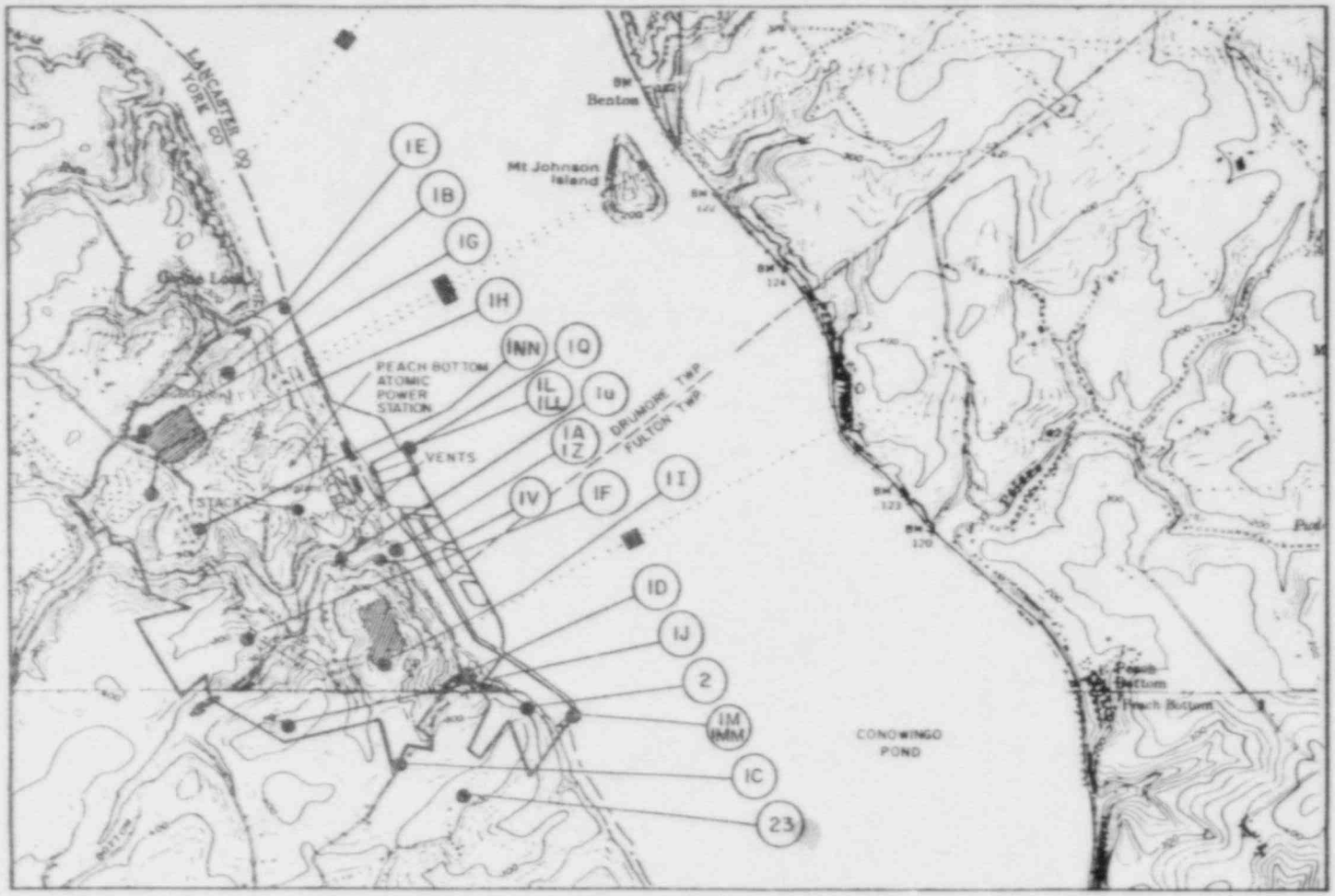
49		12/01-12/09/84			12/01-12/09/84				12/03-12/10/84
50	12/09-12/16/84	12/09-12/16/84	12/09-12/16/84	12/09-12/16/84	12/09-12/16/84	12/08-12/15/84	12/08-12/15/84	12/08-12/15/84	12/10-12/17/84
51	12/16-12/23/84	12/16-12/23/84	12/16-12/23/84	12/16-12/23/84	12/16-12/23/84	12/15-12/22/84	12/15-12/22/84	12/15-12/22/84	12/17-12/24/84
52	12/23-12/29/84	12/23-12/29/84	12/23-12/29/84	12/23-12/29/84	12/23-12/29/84	12/22-12/29/84	12/22-12/29/84	12/22-12/29/84	12/24-01/02/85

VI. FIGURES

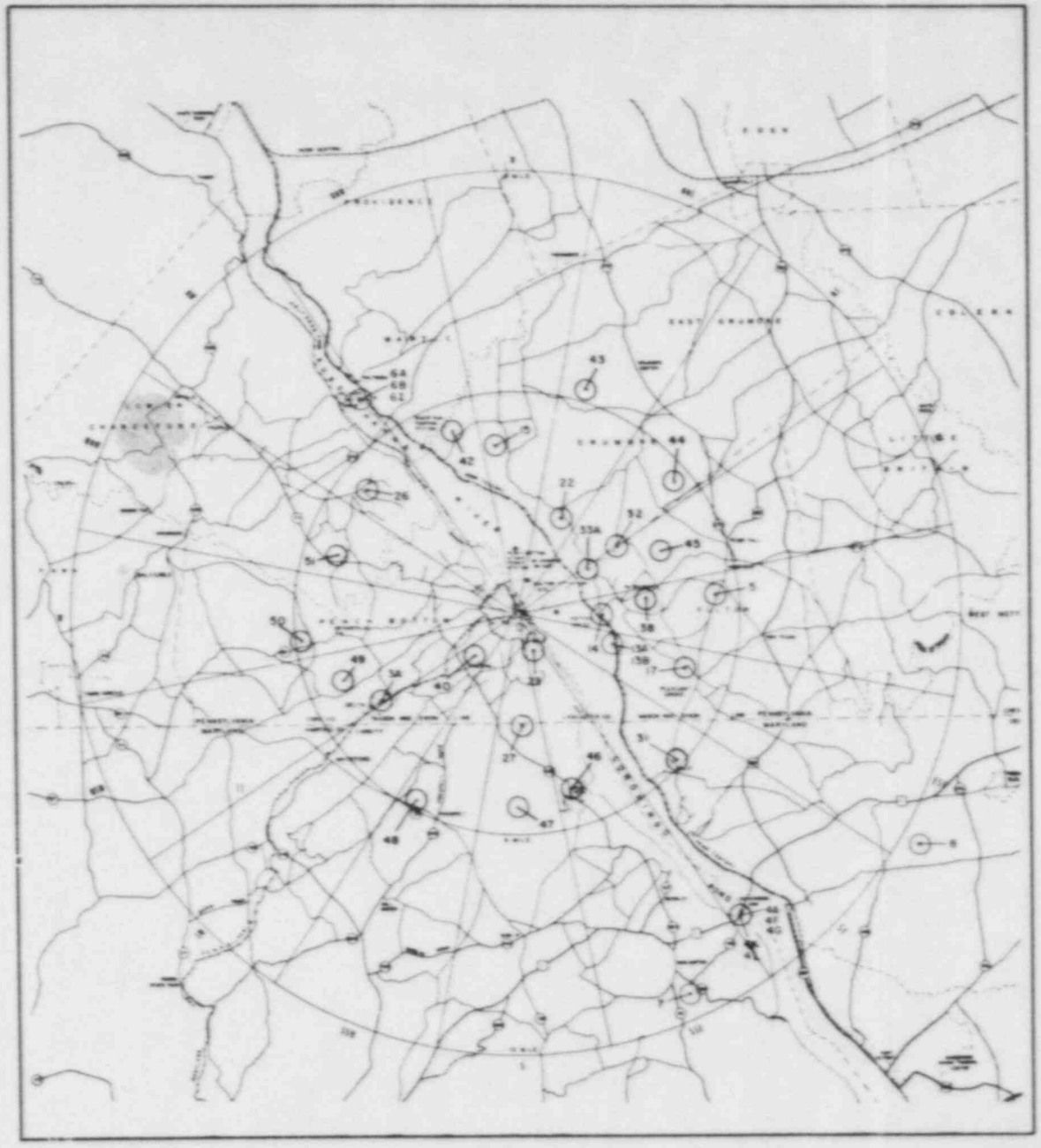


LEGEND

● ENVIRONMENTAL SAMPLING STATIONS

1A	PEACH BOTTOM WEATHER STATION #1
1B	PEACH BOTTOM WEATHER STATION #2
1C	PEACH BOTTOM SOUTH SUBSTATION RD.
1D	PEACH BOTTOM 140° SECTOR SITE BOUNDARY
1E	PEACH BOTTOM 350° SECTOR SITE BOUNDARY
1F	PEACH BOTTOM SITE - 200° SECTOR HILL
1G	PEACH BOTTOM NORTH SUBSTATION
1H	PEACH BOTTOM SITE - 270° SECTOR HILL
1I	PEACH BOTTOM SOUTH SUBSTATION
1J	PEACH BOTTOM SITE - 180° SECTOR HILL
1L	PEACH BOTTOM UNITS 2 & 3 INTAKE
1LL	PEACH BOTTOM UNITS 2 & 3 INTAKE-COMPOSITE
1M	PEACH BOTTOM CANAL DISCHARGE
1MM	PEACH BOTTOM CANAL DISCHARGE-COMPOSITE
1NN	PEACH BOTTOM SITE - 260° SECTOR
1Q	PEACH BOTTOM UNIT 2 INTAKE
1U	PEACH BOTTOM SITE-UTILITY BUILDING
1V	PEACH BOTTOM SITE-INFORMATION CENTER
1Z	PEACH BOTTOM WEATHER STATION #1
2	PEACH BOTTOM 130° SECTOR HILL
23	PEACH BOTTOM 150° SECTOR HILL OFF SITE

ENVIRONMENTAL SAMPLING STATIONS ON OR NEAR PEACH BOTTOM SITE
FIGURE 1

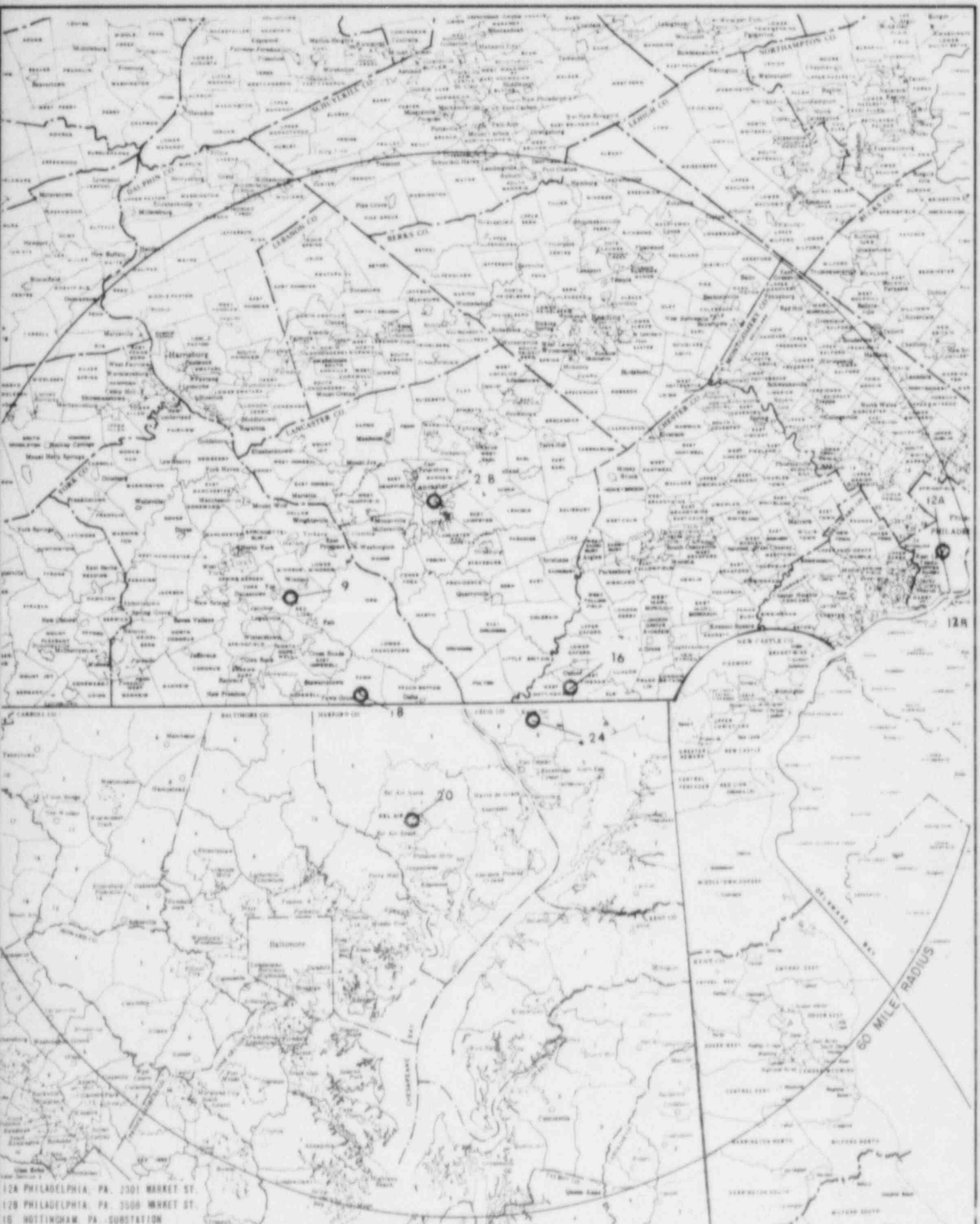


LEGEND

● ENVIRONMENTAL SAMPLING STATIONS

3A DELTA, PA.-SUBSTATION
4A CONOWINGO DAM-POWERHOUSE ROOF
4F CONOWINGO DAM-EL. 33' MSL GRAB
4G CONOWINGO DAM-SURFACE
4L CONOWINGO DAM-EL. 33' MSL COMPOSITE
5 WAKEFIELD, PA.
6A HOLTWOOD DAM-HYDROELECTRIC STATION-GRAB
6B HOLTWOOD DAM-HYDROELECTRIC STATION
6I HOLTWOOD DAM-HYDROELECTRIC STATION -COMPOSITE
7 DARLINGTON, MD. AREA
8 COLORA, MD.
13A CHESTER WATER INTAKE-POND
13B CHESTER WATER INTAKE-PUMP DISCHARGE
14 PETERS CREEK
15 SILVER SPRING ROAD
17 RIVERVIEW ROAD
22 EAGLE ROAD
23 PEACH BOTTOM-150° SECTOR OFF SITE
26 SLAB ROAD
27 NORTH COOPER ROAD
31 PILOTOWN ROAD
32 SLATE HILL ROAD
33A FULTON WEATHER STATION
38 PEACH BOTTOM ROAD
40 PEACH BOTTOM SITE AREA
42 MUDDY RUN ECOLOGICAL LAB
43 DRUMORE TOWNSHIP SCHOOL
44 GOSHENMILL ROAD
45 PB-KEENEY LINE
46 BROADCREEK
47 BROADCREEK SCOUT CAMP
48 MACTON SUBSTATION
49 PB-CONASTONE LINE
50 TRANSCO PIPELINE SITE
51 FIN SUBSTATION

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



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

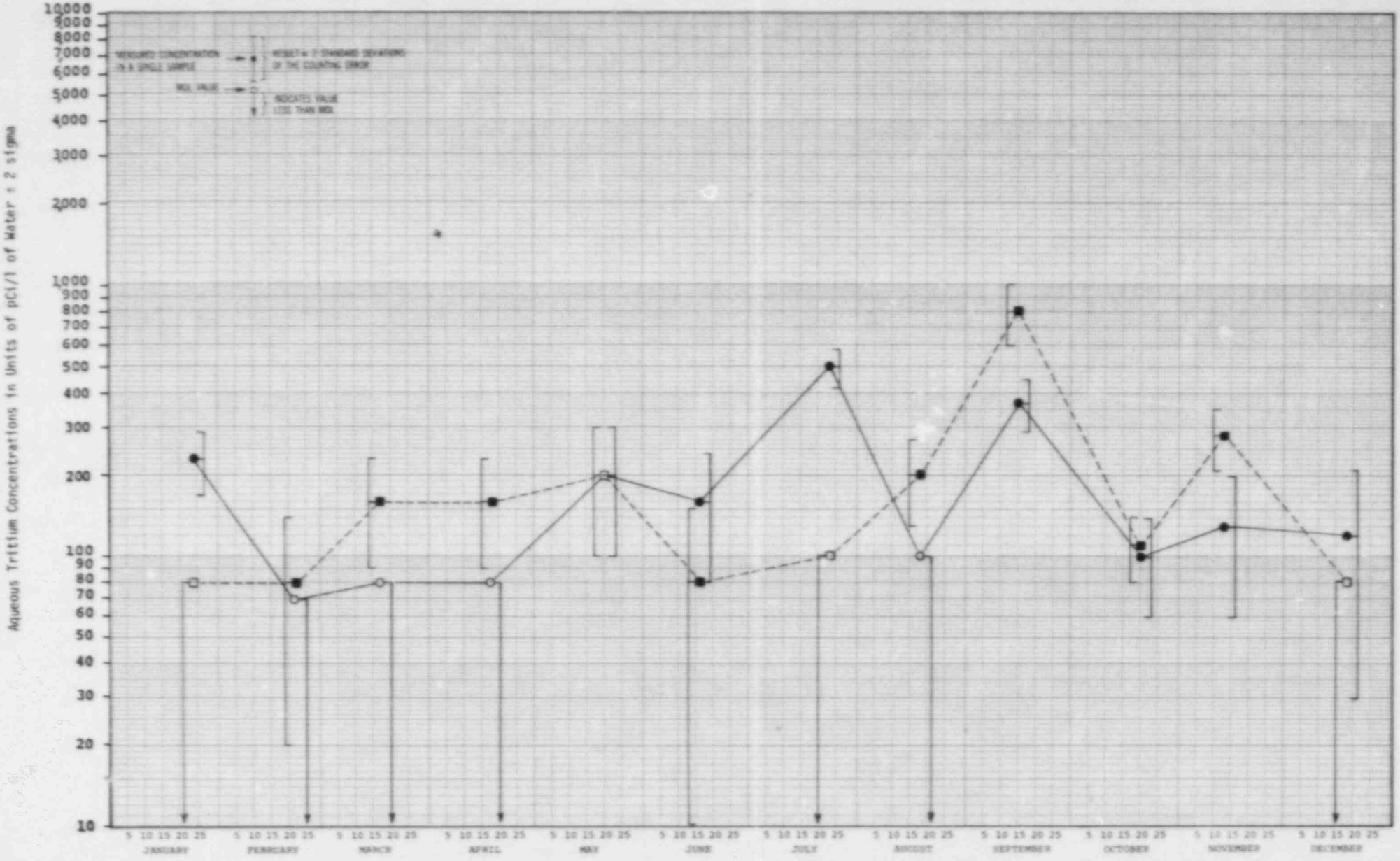
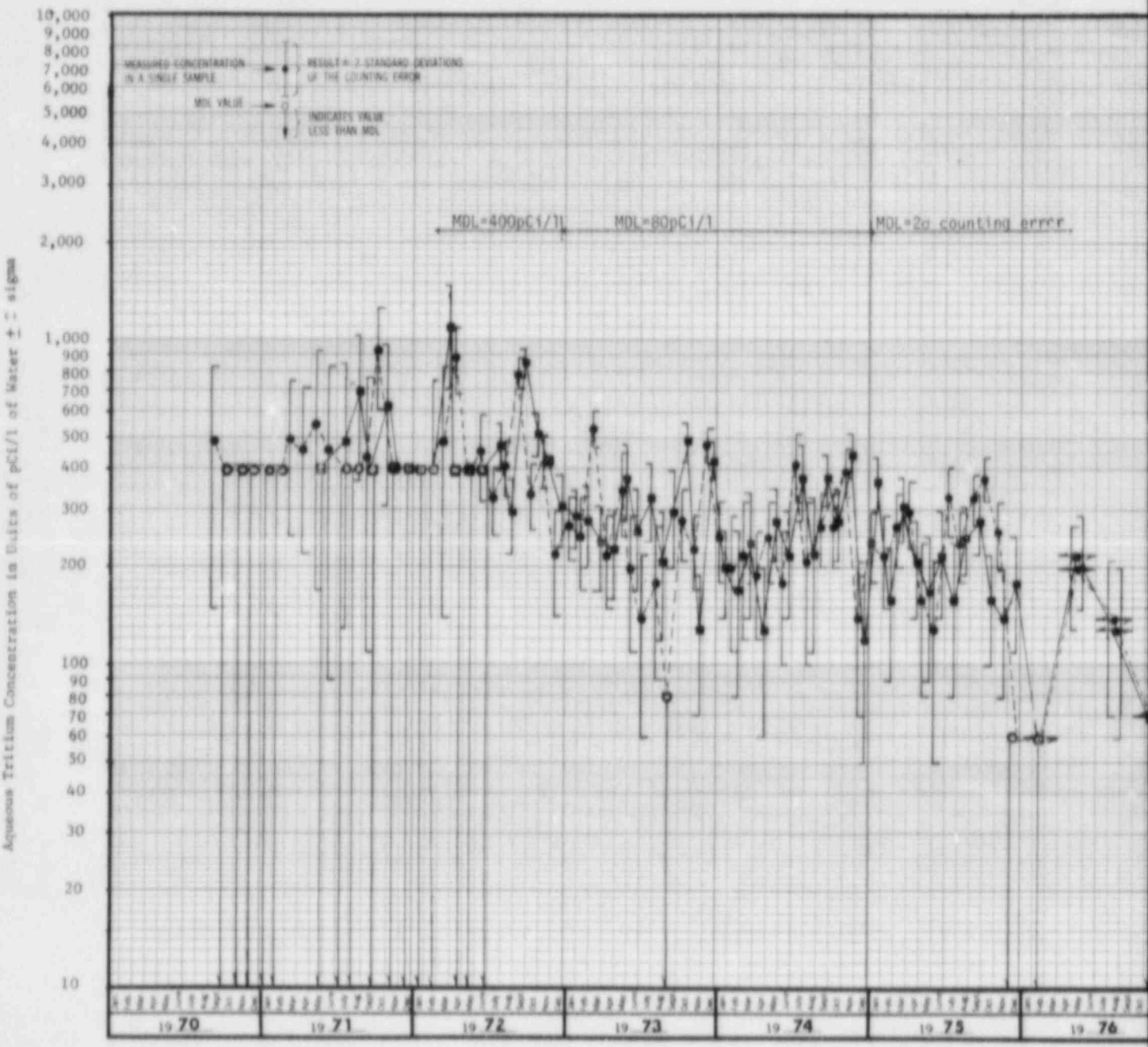


FIGURE 4

COMPARISON OF MONTHLY AQUEOUS TRITIUM CONCENTRATIONS IN SURFACE WATER
COLLECTED NEAR PEACH BOTTOM ATOMIC POWER STATION, 1984.
TOTAL SAMPLE - COMPOSITE

Station 6I (PB-SWA-33F4) Holtwood Dam
Station 4L (PB-SWA-14F5) Conowingo Dam

If More Than One Value The Same ◘

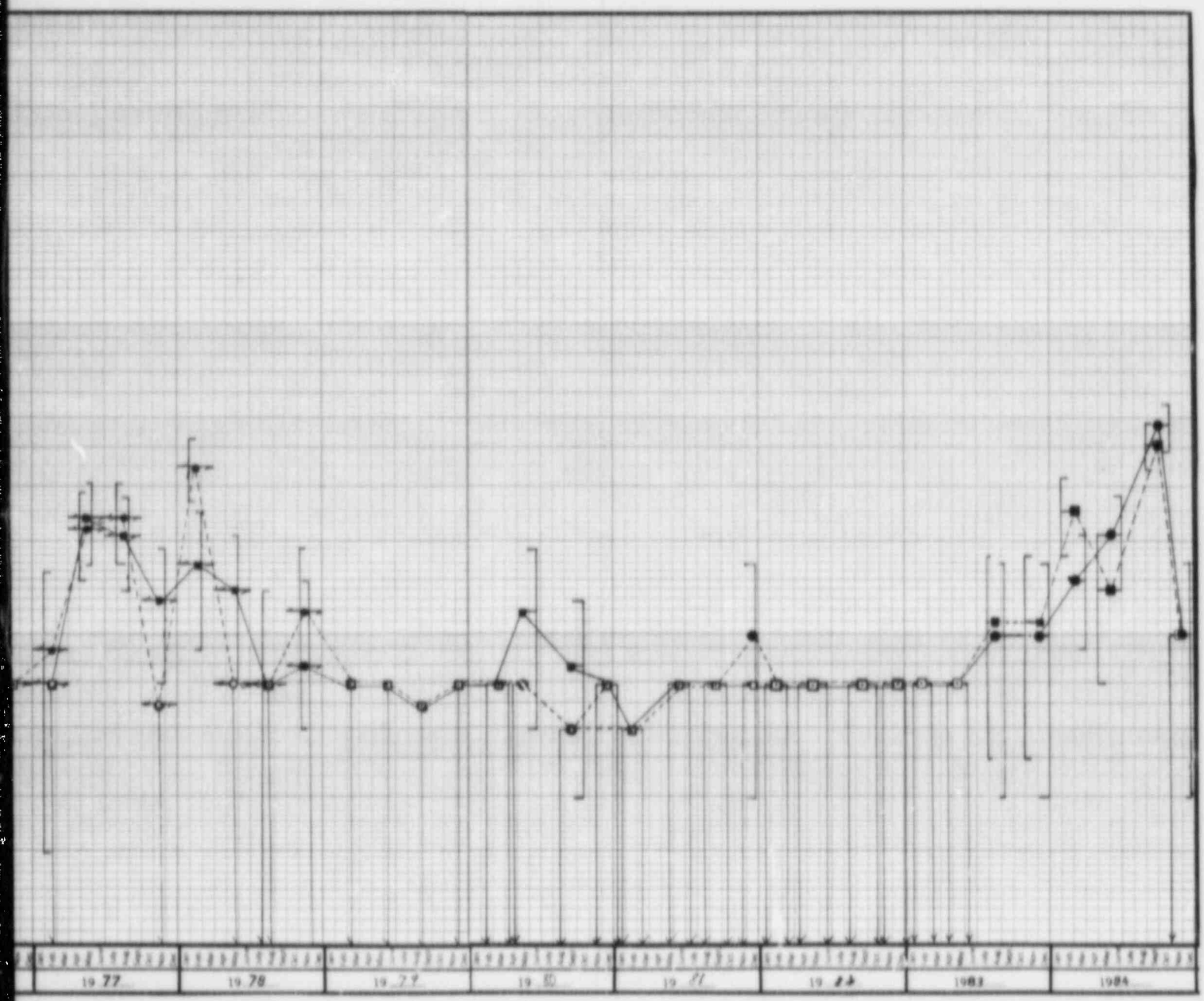


FIG

COMPARISON OF QUARTERLY AQUEOUS TR
COLLECTED NEAR PEACH BOTTOM
TOTAL SAMP

Station 6A (PB-SWA-33F1) Ho
Station 4F (PB-SWA-14F2) Co

If More Than One



URE 5

TIUM CONCENTRATIONS IN SURFACE WATER
TOMIC POWER STATION, 1970-1984.
E - COMPOSITE

twood Dam
owingo Dam - EL 33' MSL

alue The Same

8506060812-01

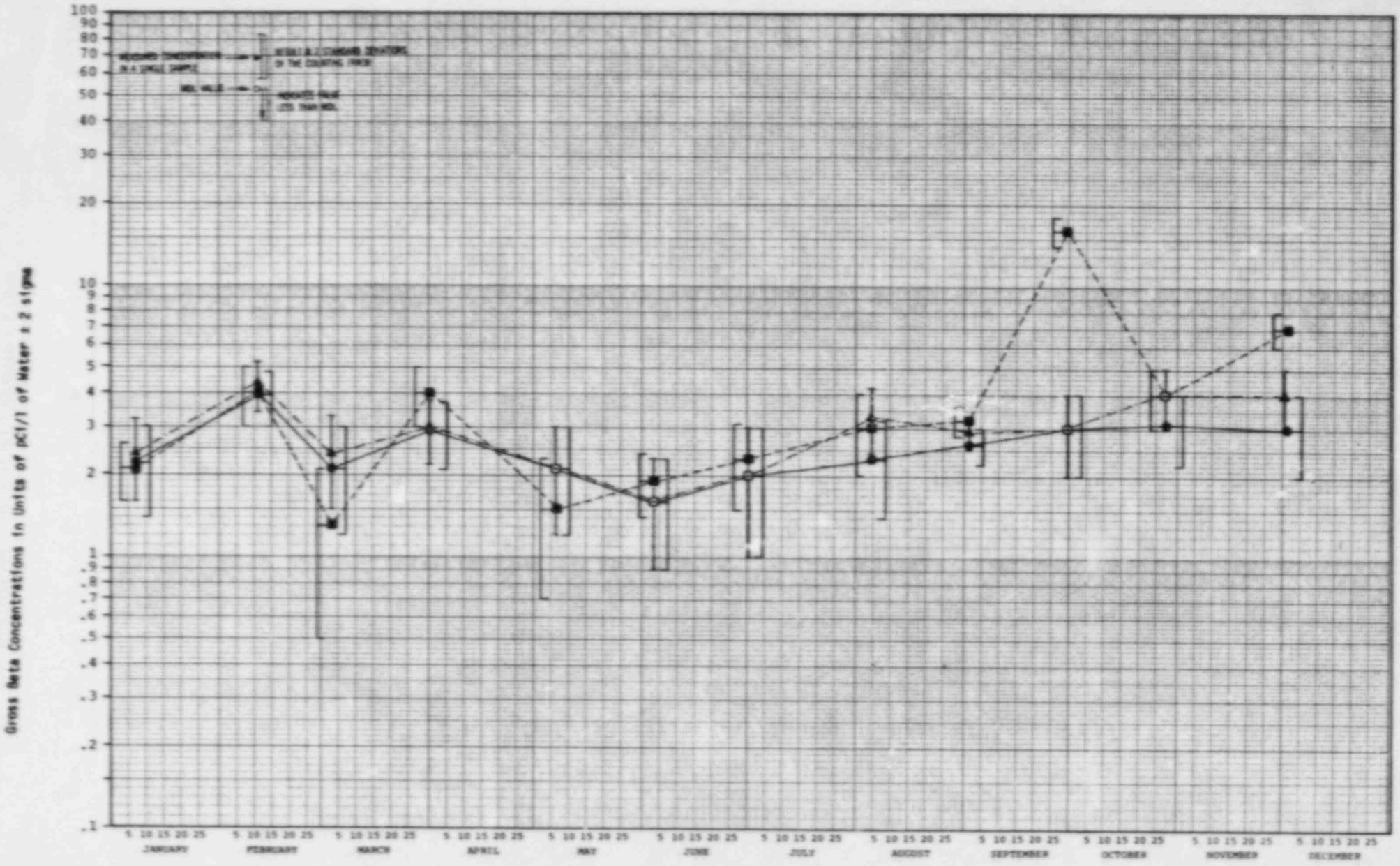


FIGURE 6

COMPARISON OF MONTHLY GROSS BETA CONCENTRATIONS IN SURFACE WATER
COLLECTED NEAR PEACH BOTTOM ATOMIC POWER STATION, 1984.
SOLUBLE FRACTION - GRAB

Station 4F (PB-SWA-14F2) Conowingo Dam - EL 33' MSL
Station 4G (PB-SWA-14F3) Conowingo Dam - Surface
Station 6A (PB-SWA-33F1) Holtwood Dam

If More Than One Value The Same ●

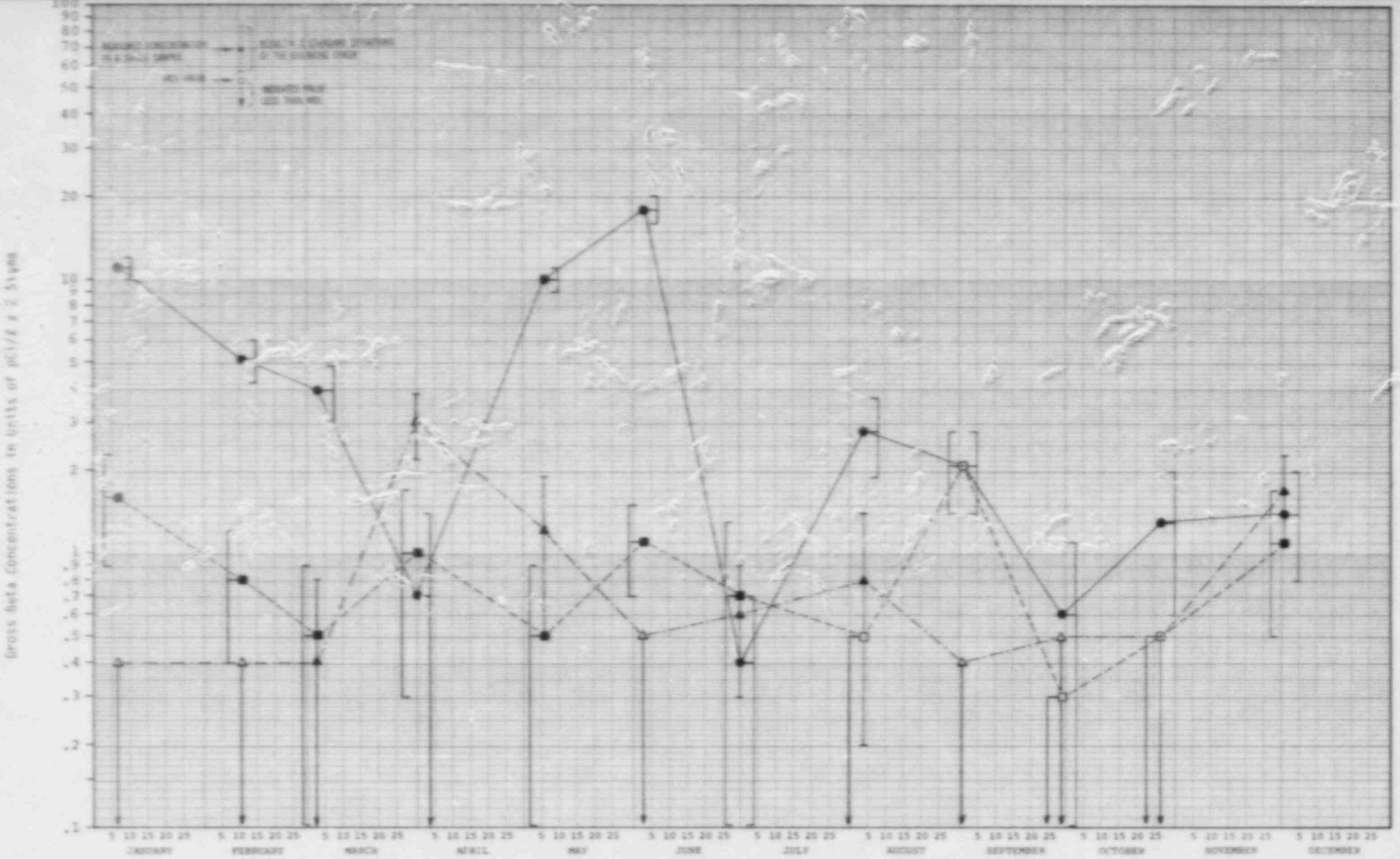


FIGURE 7

COMPARISON OF MONTHLY GROSS BETA CONCENTRATIONS IN SURFACE WATER
COLLECTED NEAR PEACH BOTTOM ATOMIC POWER STATION, 1984.
INSOLUBLE FRACTION - GRAB

Station 4F (PB-SWA-14F2) Conowingo Dam - EL 33' MSL
Station 4G (PB-SWA-14F3) Conowingo Dam - Surface
Station 6A (PB-SWA-33F1) Holtwood Dam

If More Than One Value The Same

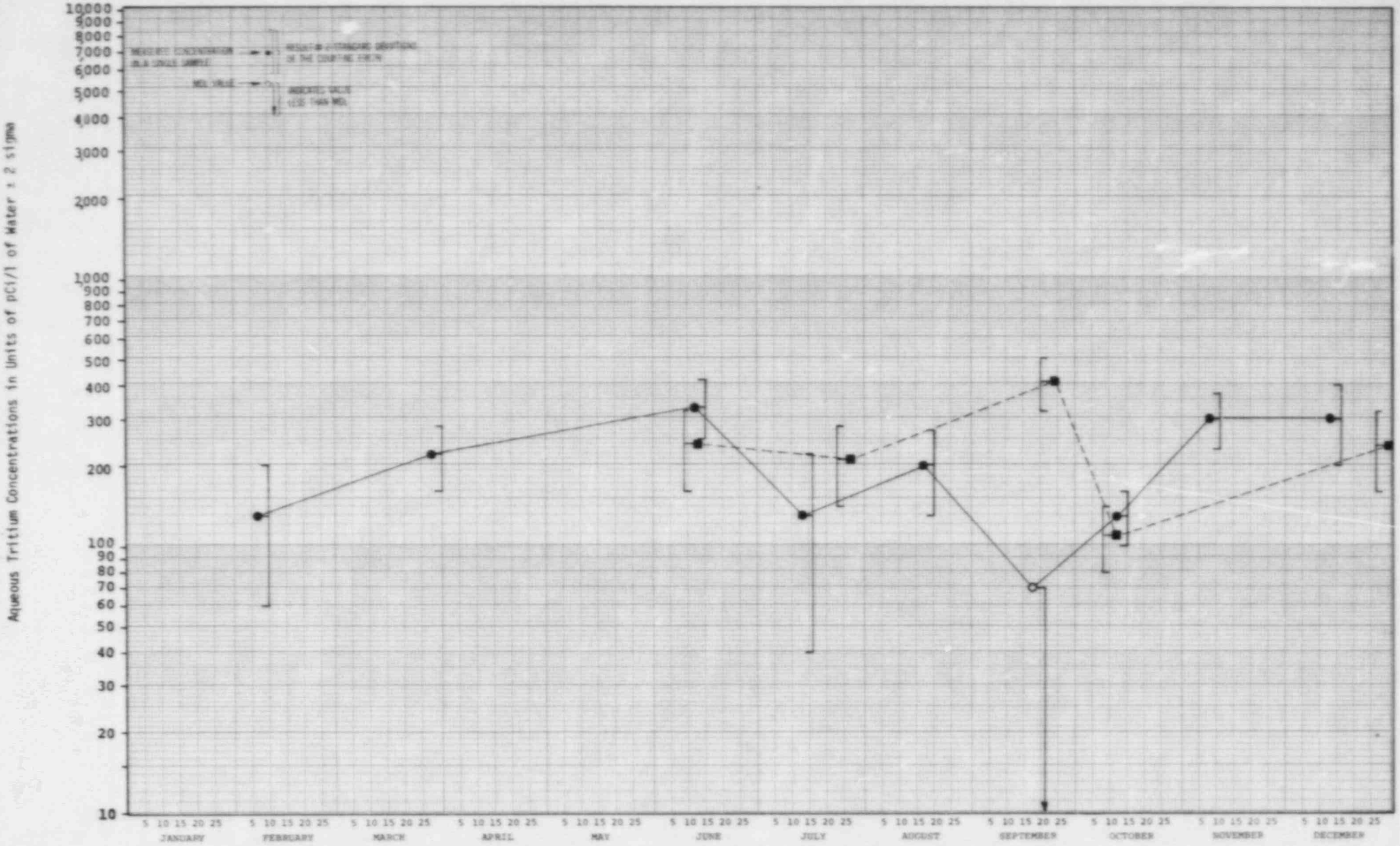


FIGURE 8

COMPARISON OF MONTHLY AQUEOUS TRITIUM CONCENTRATIONS IN SURFACE AND DISCHARGE WATER COLLECTED NEAR PEACH BOTTOM ATOMIC POWER STATION, 1984
TOTAL SAMPLE - COMPOSITE

Station 1LL (PB-SWA-6S3) PB Intake
Station 1MM (PB-SWA-13S2) PB Discharge

If More Than One Value The Same ◘

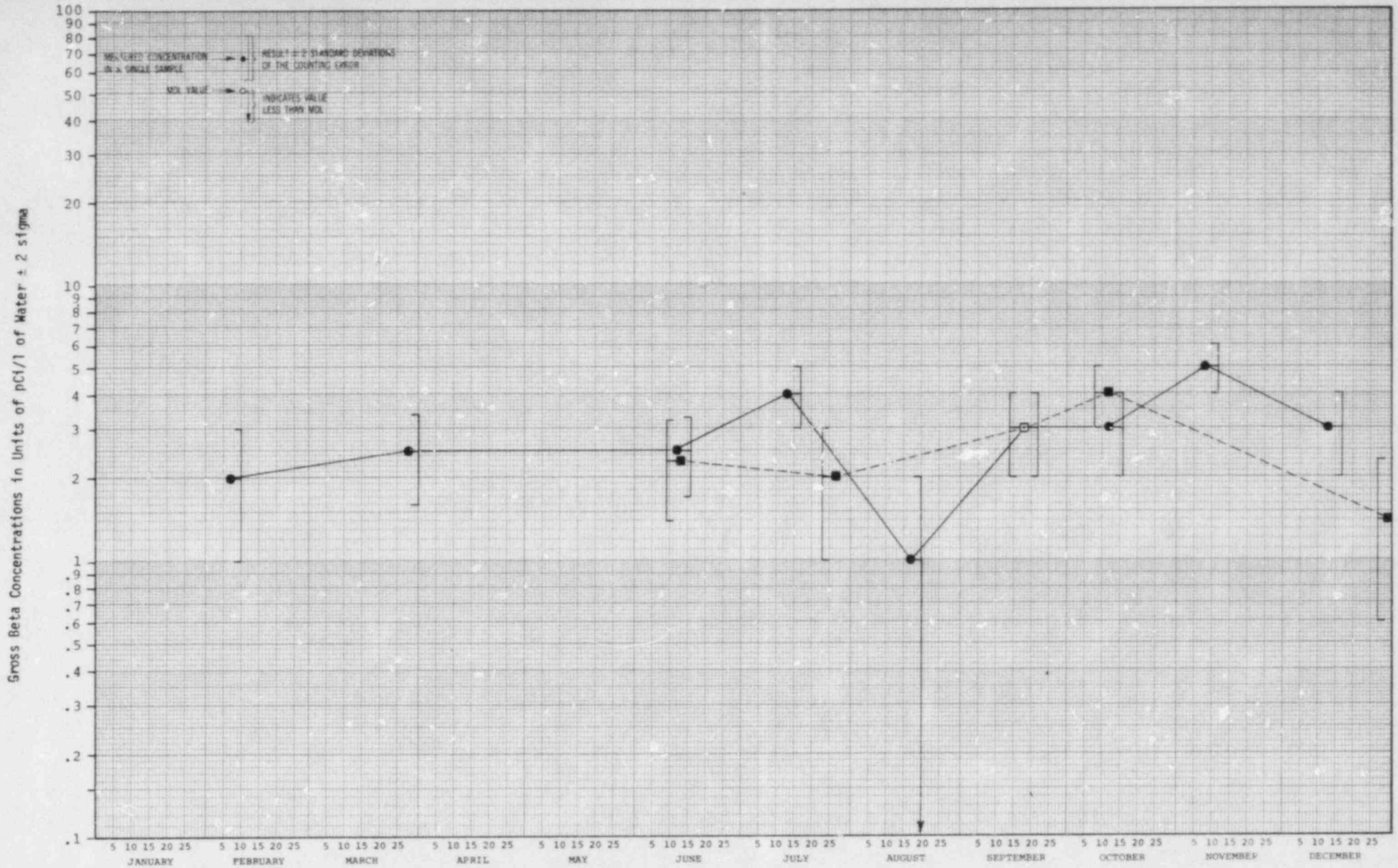


FIGURE 9

COMPARISON OF MONTHLY GROSS BETA CONCENTRATIONS IN SURFACE AND DISCHARGE WATER COLLECTED NEAR PEACH BOTTOM ATOMIC POWER STATION, 1984
SOLUBLE FRACTION - COMPOSITE

Station 1LL (PB-SWA-6S3) PB Intake
Station 1MM (PB-SWA-13S2) PB Discharge

If More Than One Value The Same

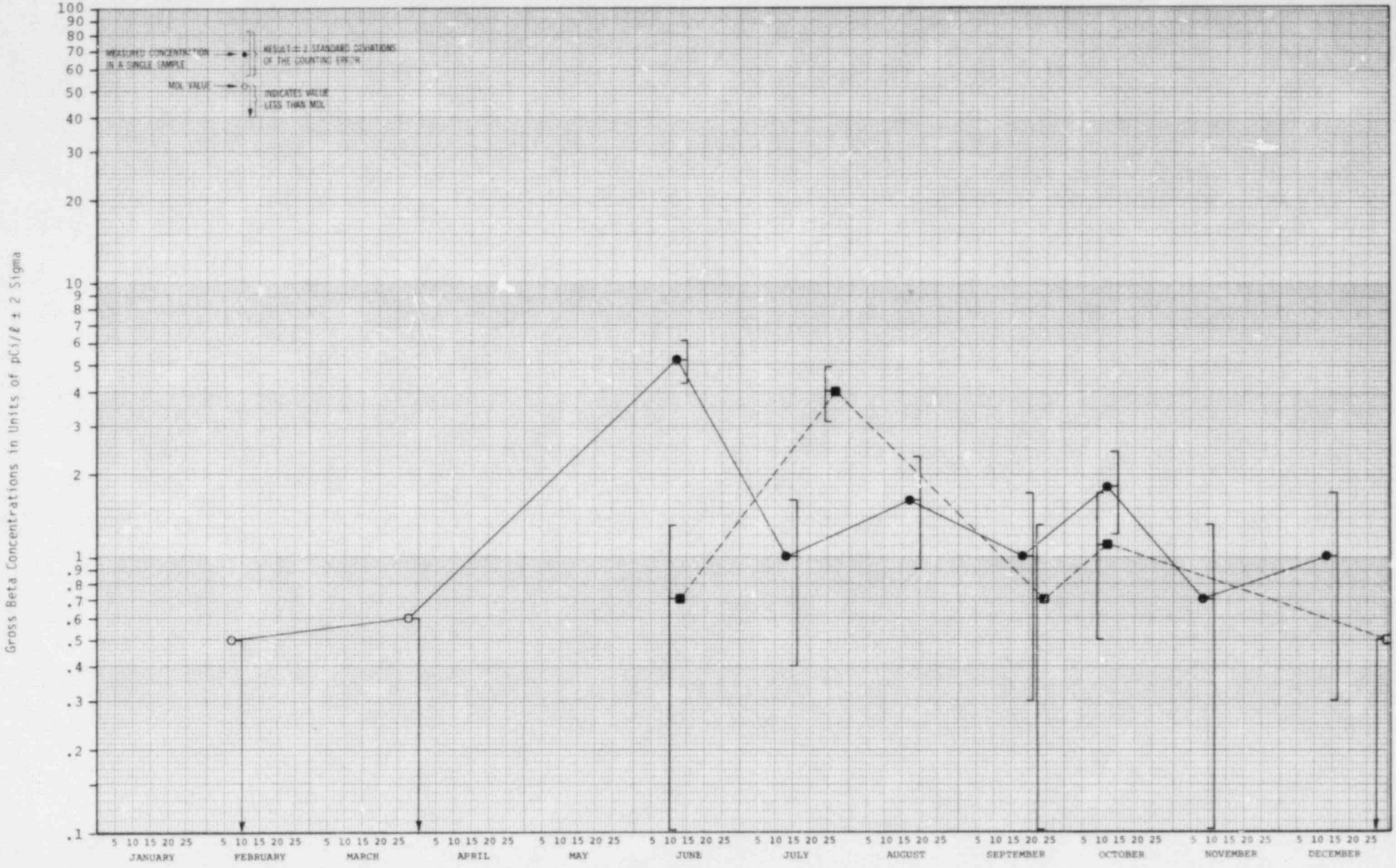
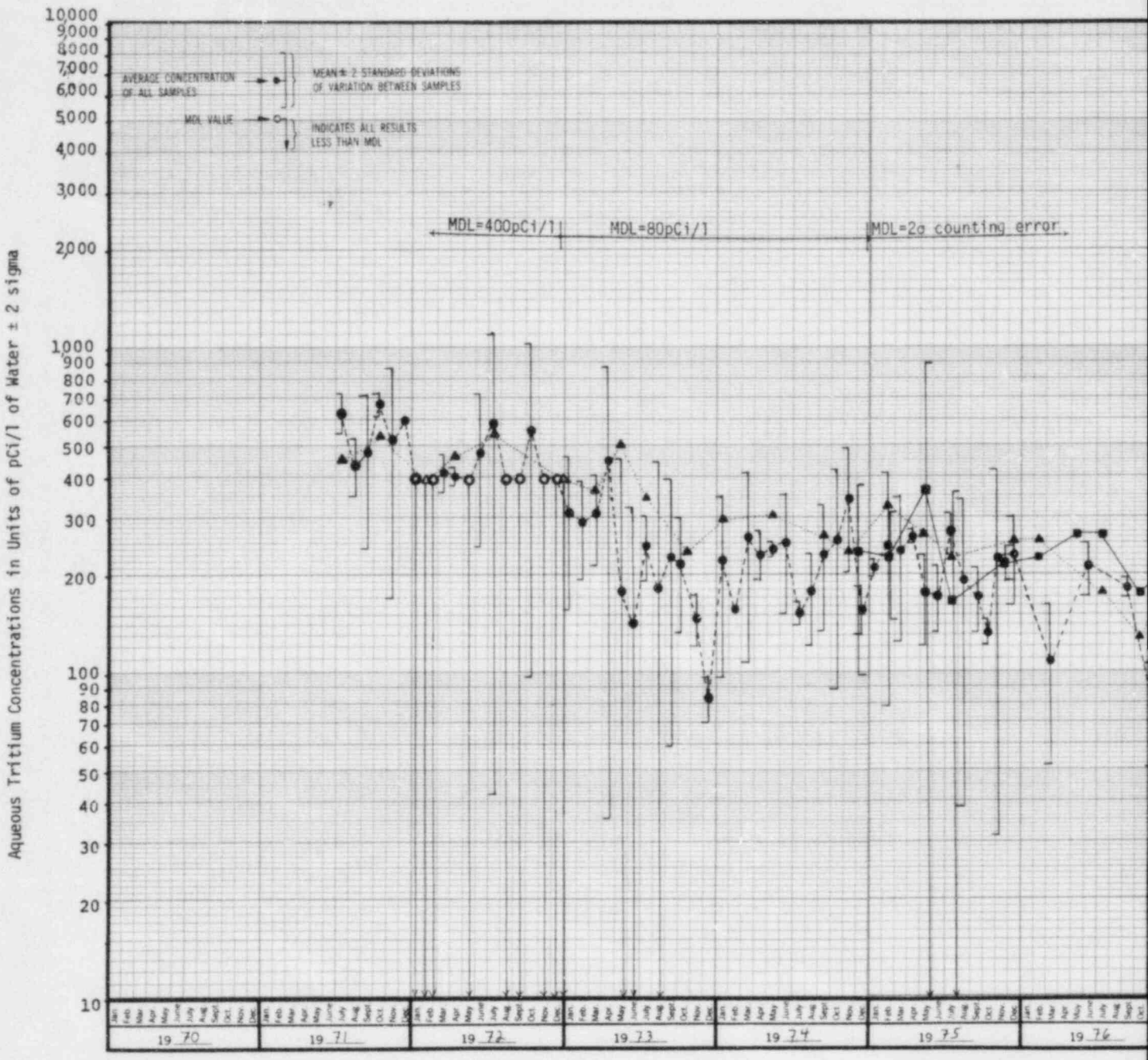


FIGURE 10

COMPARISON OF MONTHLY GROSS BETA CONCENTRATIONS IN SURFACE AND DISCHARGE WATER COLLECTED NEAR PEACH BOTTOM ATOMIC POWER STATION. 1984
INSOLUBLE FRACTION - COMPOSITE

Station 1LL (PB-SWA-6S3) PB Intake
Station 1MM (PB-SWA-13S2) PB Discharge

If More Than One Value The Same



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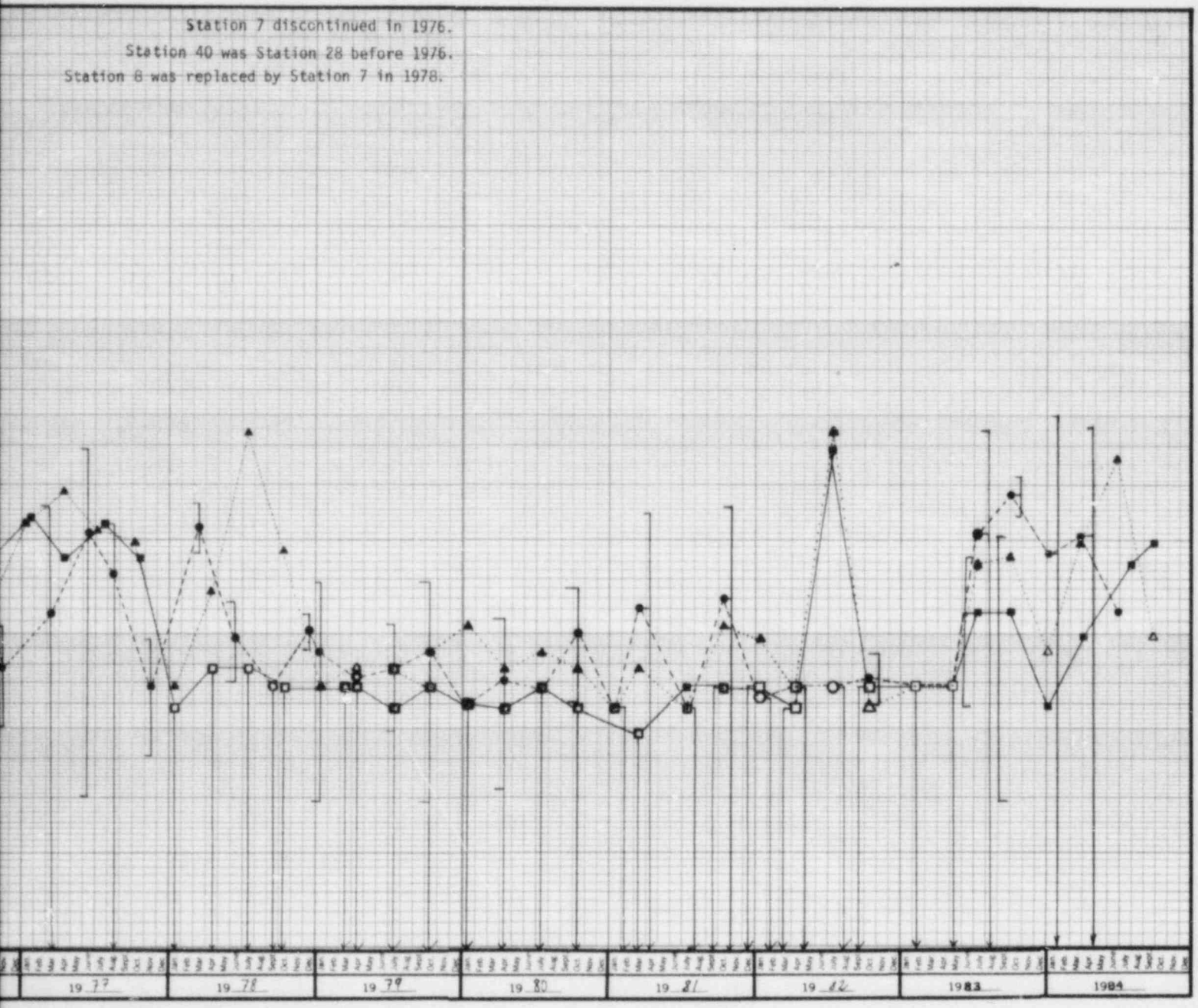


FIGURE 11

AVERAGE AQUEOUS TRITIUM CONCENTRATIONS IN WELL WATER
NEAR PEACH BOTTOM ATOMIC POWER STATION.1970-1984.
TOTAL SAMPLE - GRAB

Station 1U (PB-WWA-15S2) PB Site Utility Bldg.
Station 1V (PB-WWA-12S2) PB Site Info. Center
Station 40 (PB-WWA-21B2) PB Site Area
Station 7 (PB-WWA-16F1) Darlington, Md. Area
Station 8 (PB-WWA-12F1) Colora, MD.

If More Than One Value The Same ◘

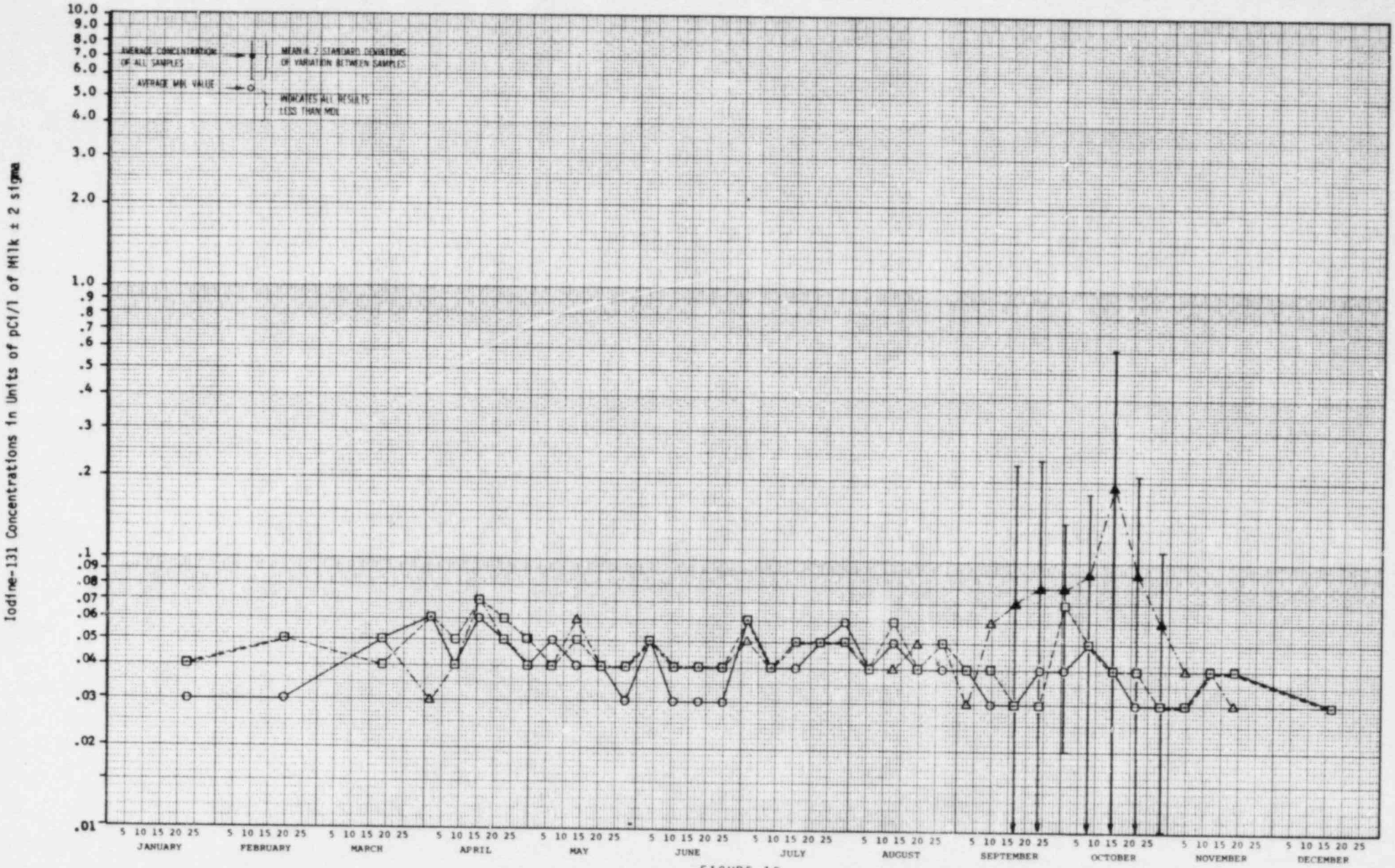
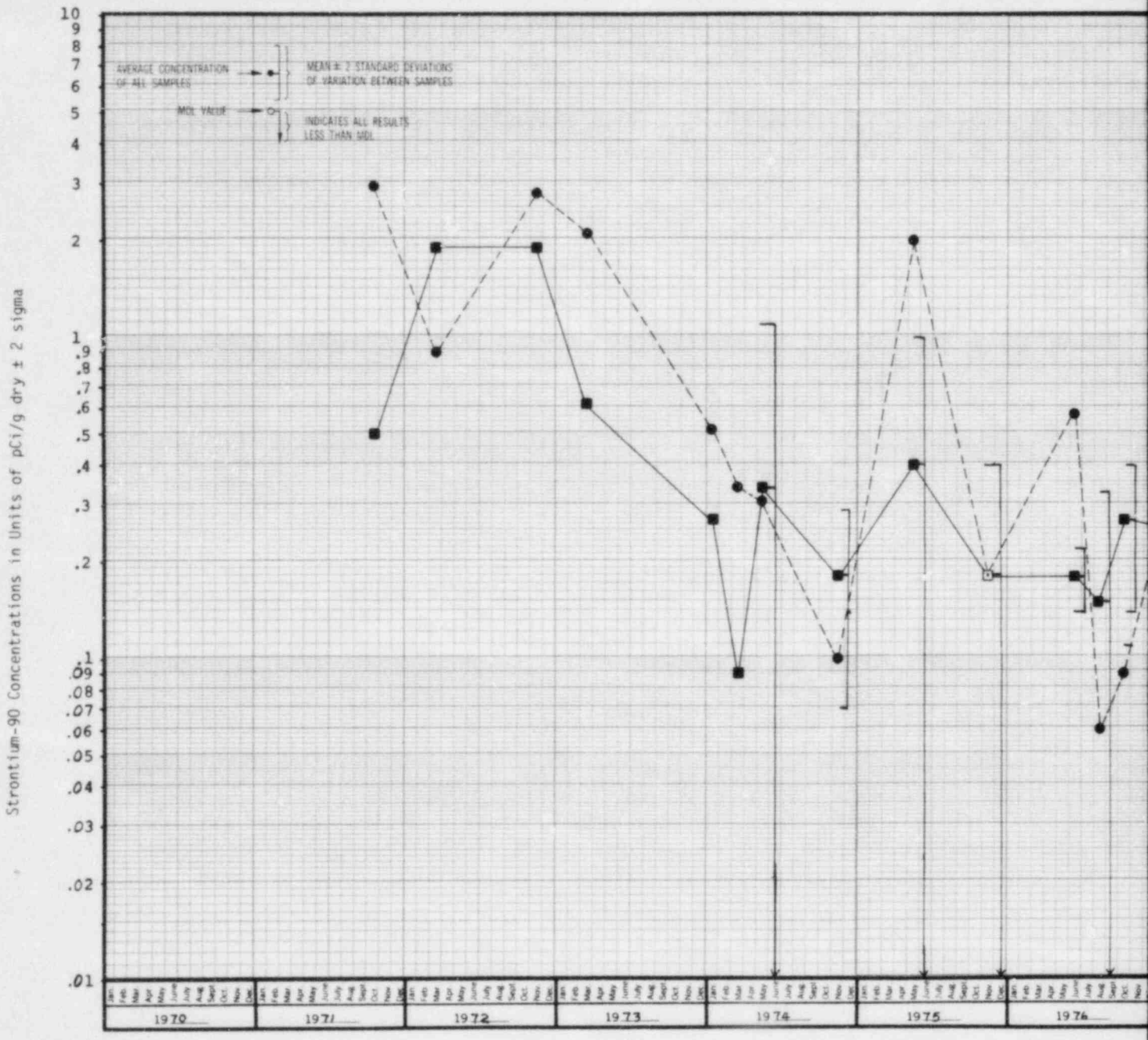


FIGURE 12

COMPARISON OF AVERAGE IODINE-131 CONCENTRATIONS IN MILK COLLECTED AT NEAR, INTERMEDIATE AND IDSTANT FARMS IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1984.
TOTAL SAMPLE

Near Farms (Station G, J and O)
Intermediate Farms (Stations D, L, M and N)
Distant Farms (Stations A, B, C and E)

If More Than One Value The Same



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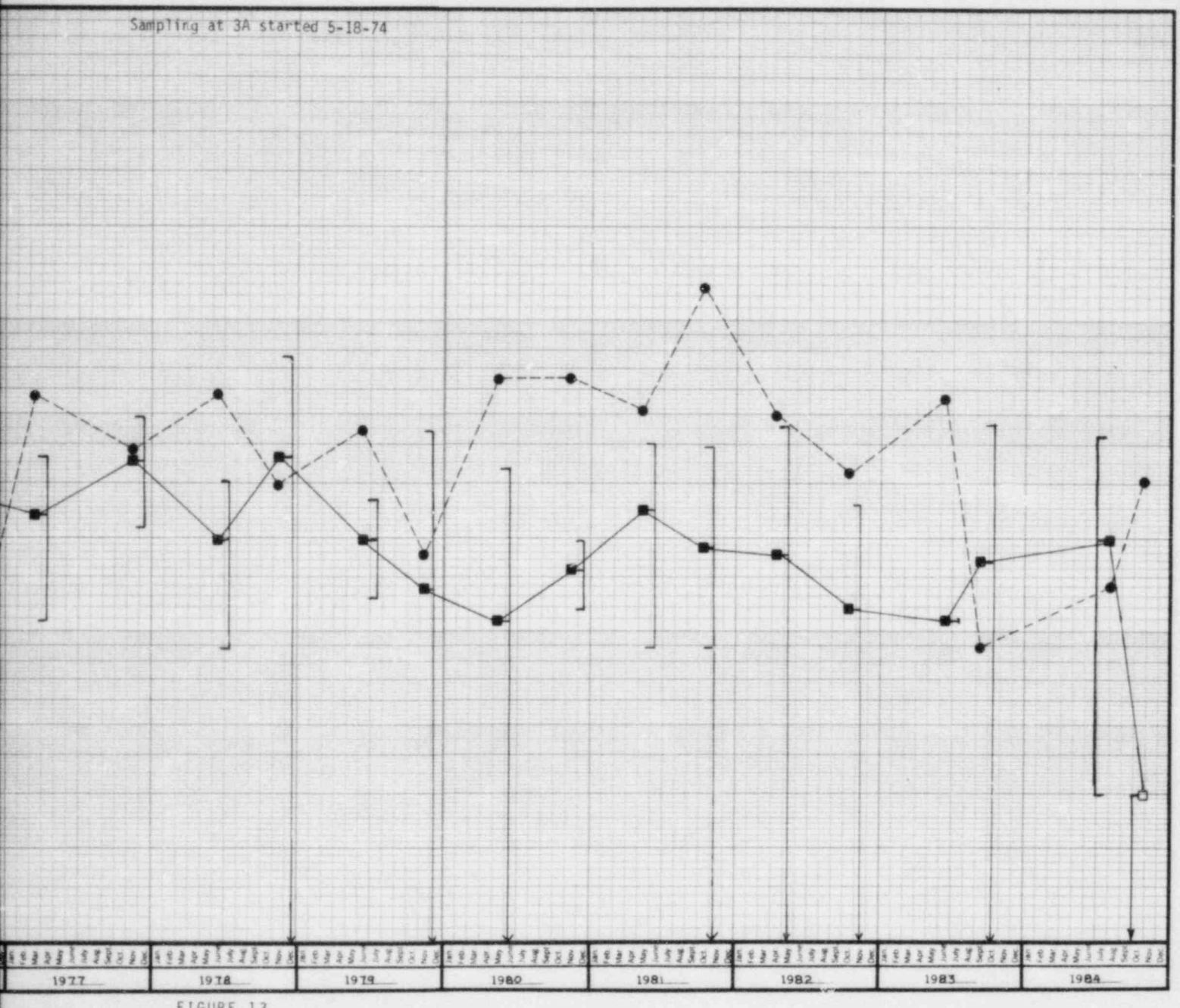
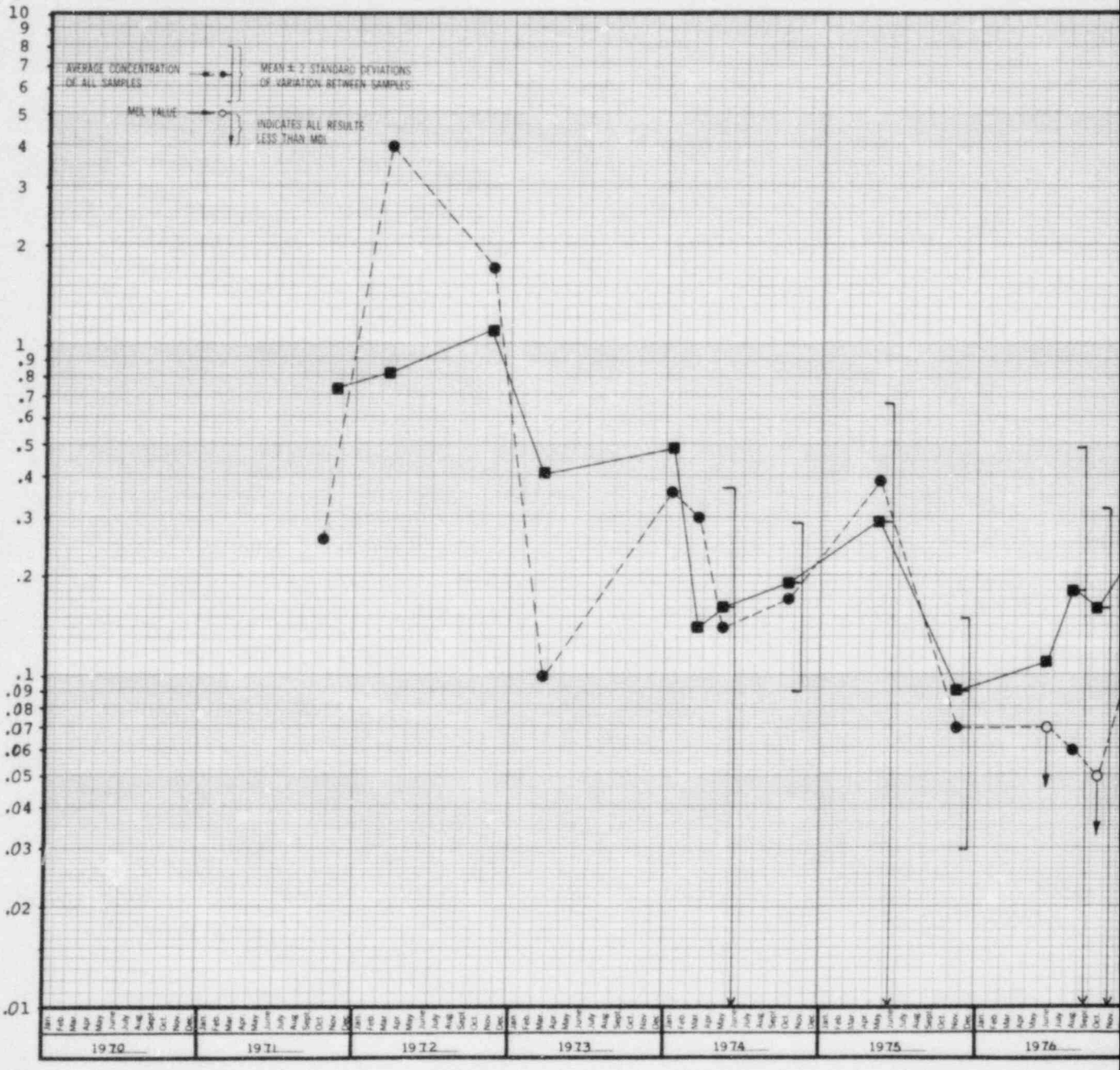


FIGURE 13

AVERAGE STRONTIUM-90 CONCENTRATIONS IN SOIL COLLECTED
PEACH BOTTOM ATOMIC POWER STATION. 1970-1984.
TOP ONE INCH

n 2 (PB-SOL-13S1) PB 130° Sector Hill
n 3A (PB-SOL-23D1) Delta, Pa. Substation
n 5 (PB-SOL-8E1) Wakefield, Pa.

If More Than One Value The Same



Strontium-90 Concentrations in Units of pCi/g dry ± 2 sigma

COMPARISON OF
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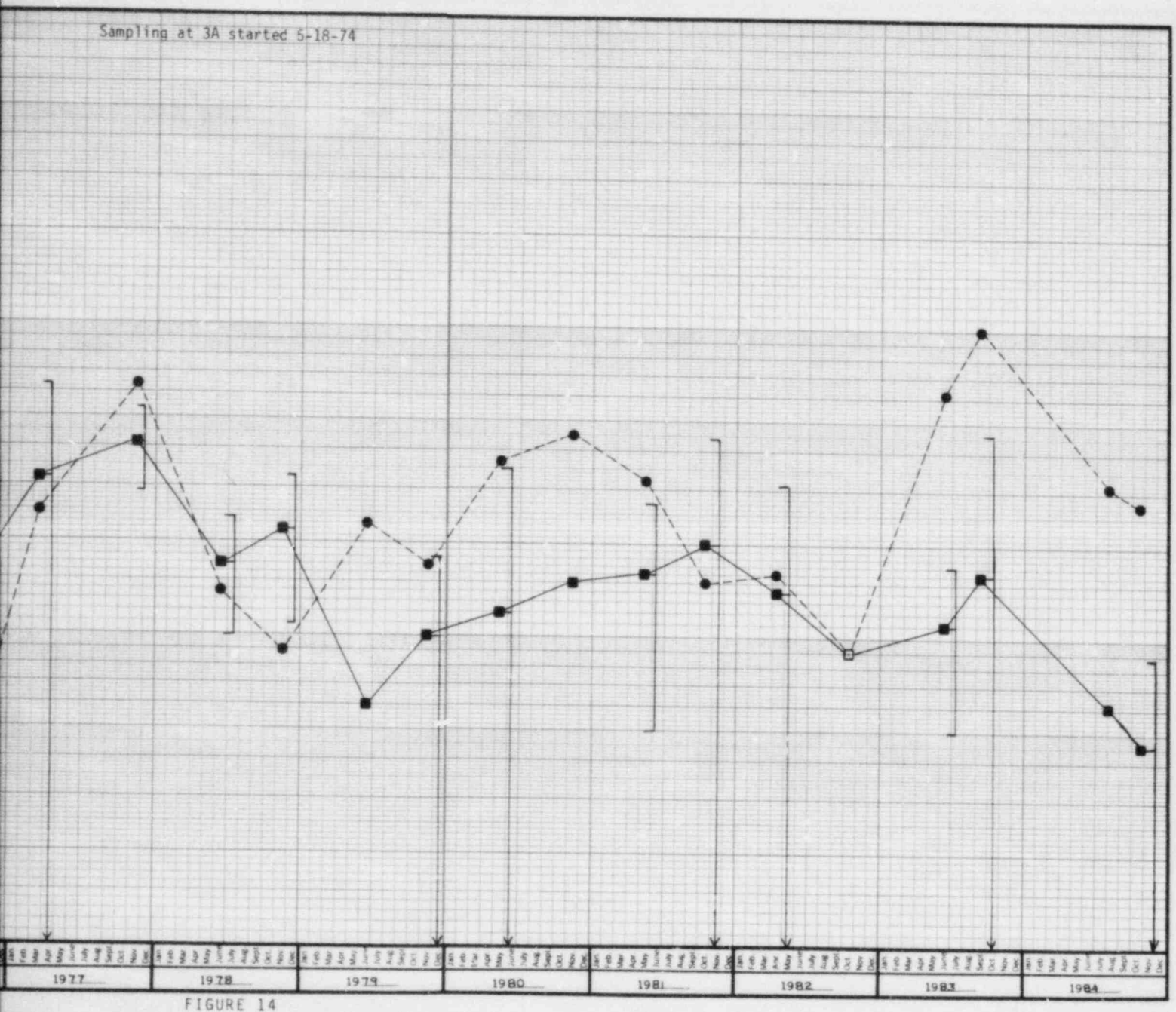
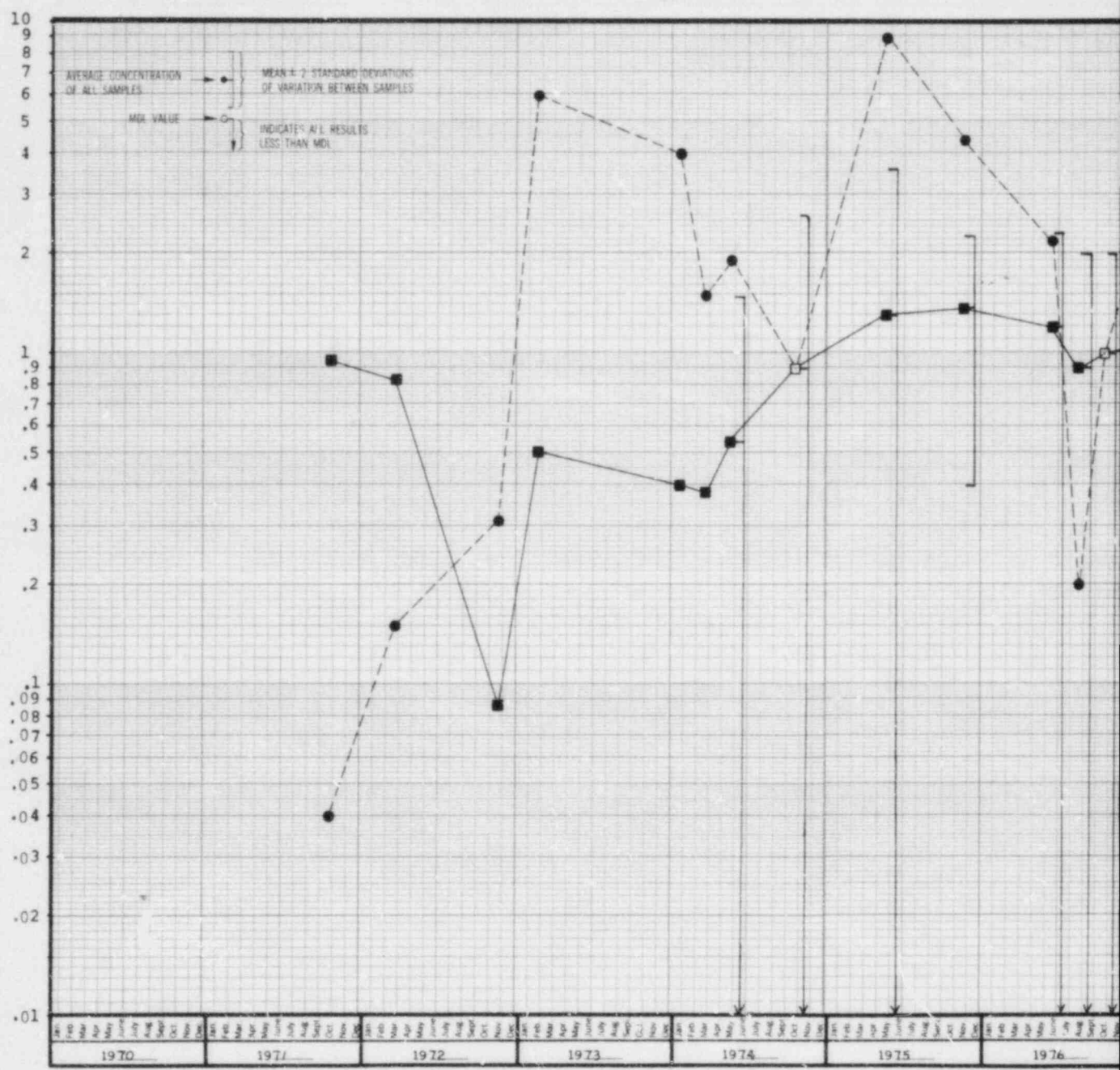


FIGURE 14

AVERAGE STRONTIUM-90 CONCENTRATIONS IN SOIL COLLECTED
E PEACH BOTTOM ATOMIC POWER STATION. 1970-1984.
BOTTOM CUT

on 2 (PB-SOL-13S1) PB 130° Sector Hill
on 3A (PB-SOL-23D1) Delta, Pa. Substation
on 5 (PB-SOL-8E1) Wakefield, Pa.

If More Than One Value The Same



COMPARISON OF AVERAG
NEAR THE PEAS

Station 2 (F
Station 3A (
Station 5 (F

I

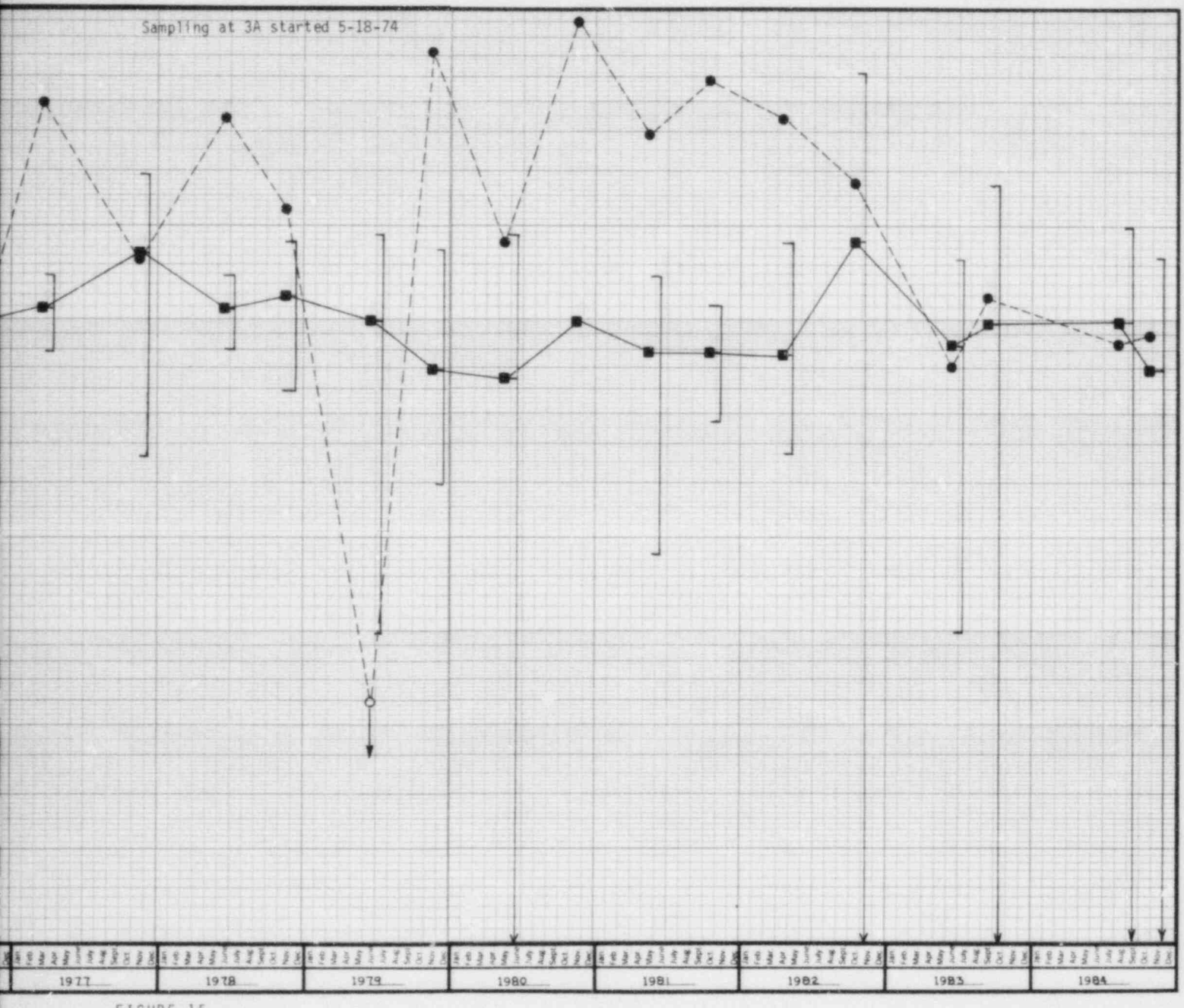
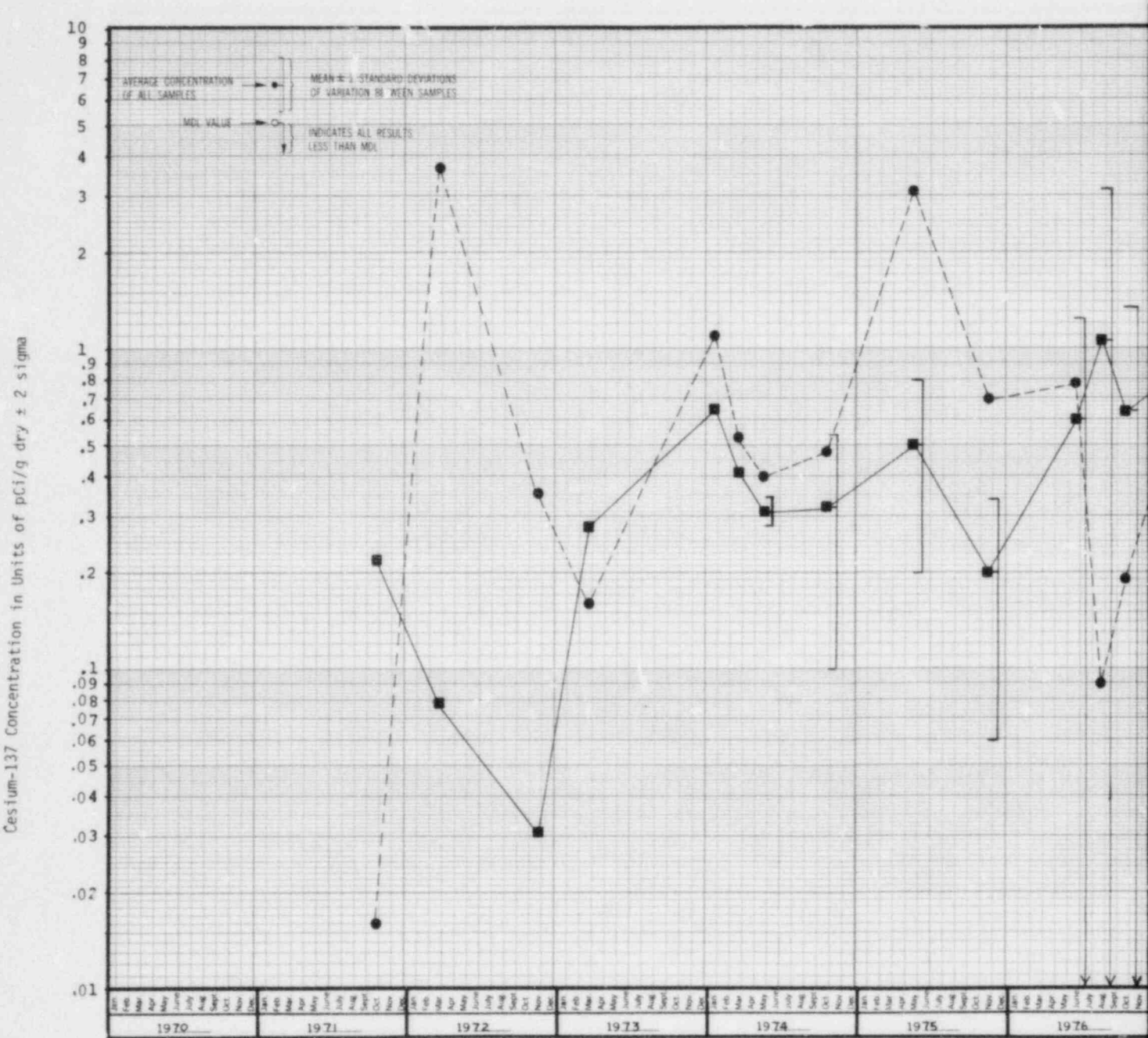


FIGURE 15

E CESIUM-137 CONCENTRATIONS IN SOIL COLLECTED
H BOTTOM ATOMIC POWER STATION. 1970-1984.
TOP ONE INCH

B-SOL-13S1) PB 130° Sector Hill ● ------
PB-SOL-23D1) Delta, Pa. Substation
B-SOL-8E1) Wakefield, Pa. ●——

More Than One Value The Same ◘



COMPARISON OF AVERAGE
NEAR PEACH BOT

Station 2 (PB
Station 3A (P
Station 5 (PB

If

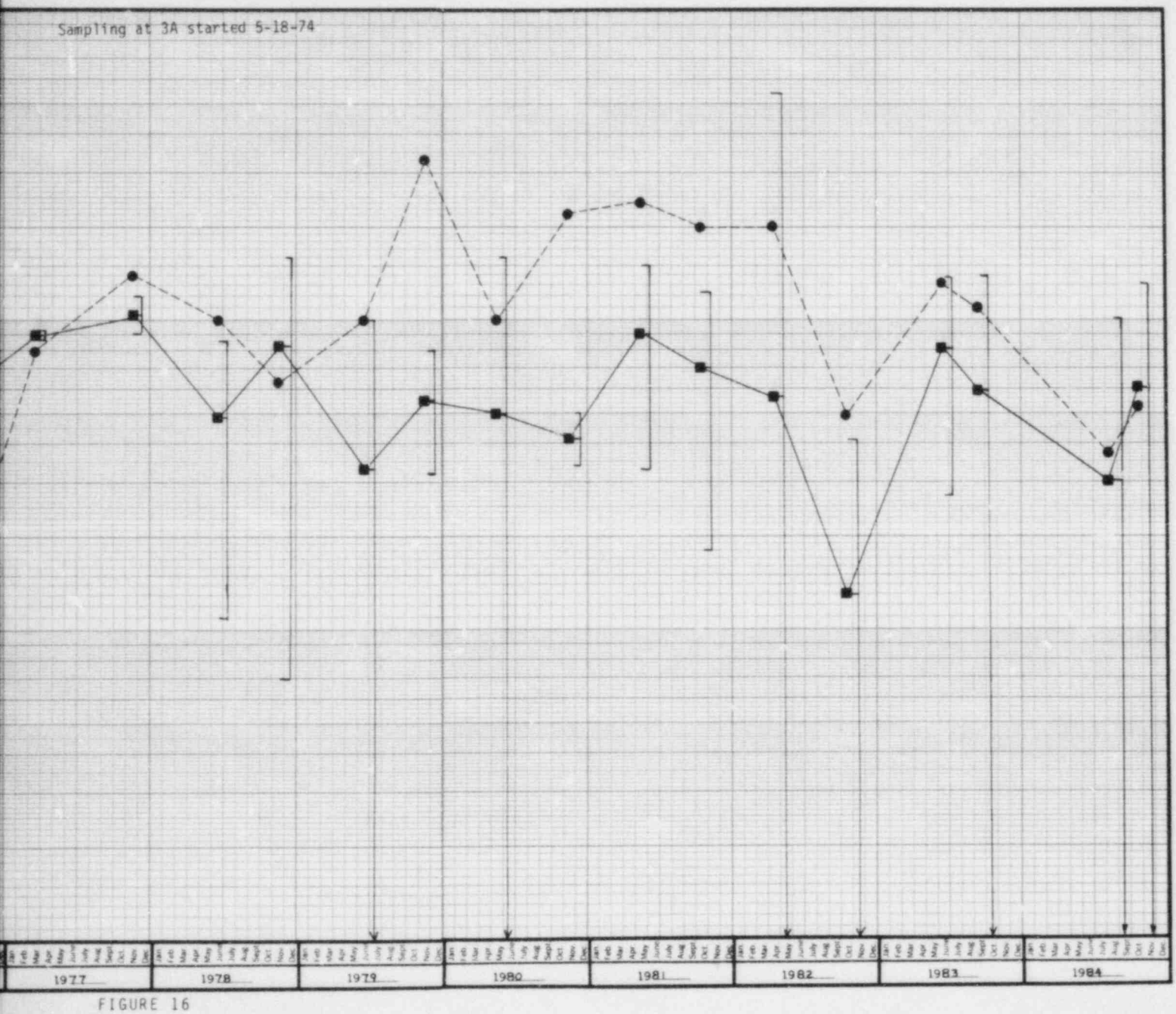


FIGURE 16

CESIUM-137 CONCENTRATIONS IN SOIL COLLECTED
OM ATOMIC POWER STATION. 1970-1984.
BOTTOM CUT

SOL-13S1) PB 130° Sector Hill
-SOL-23D1) Delta, Pa. Substation
SOL-8E1) Wakefield, Pa.

ore Than One Value The Same

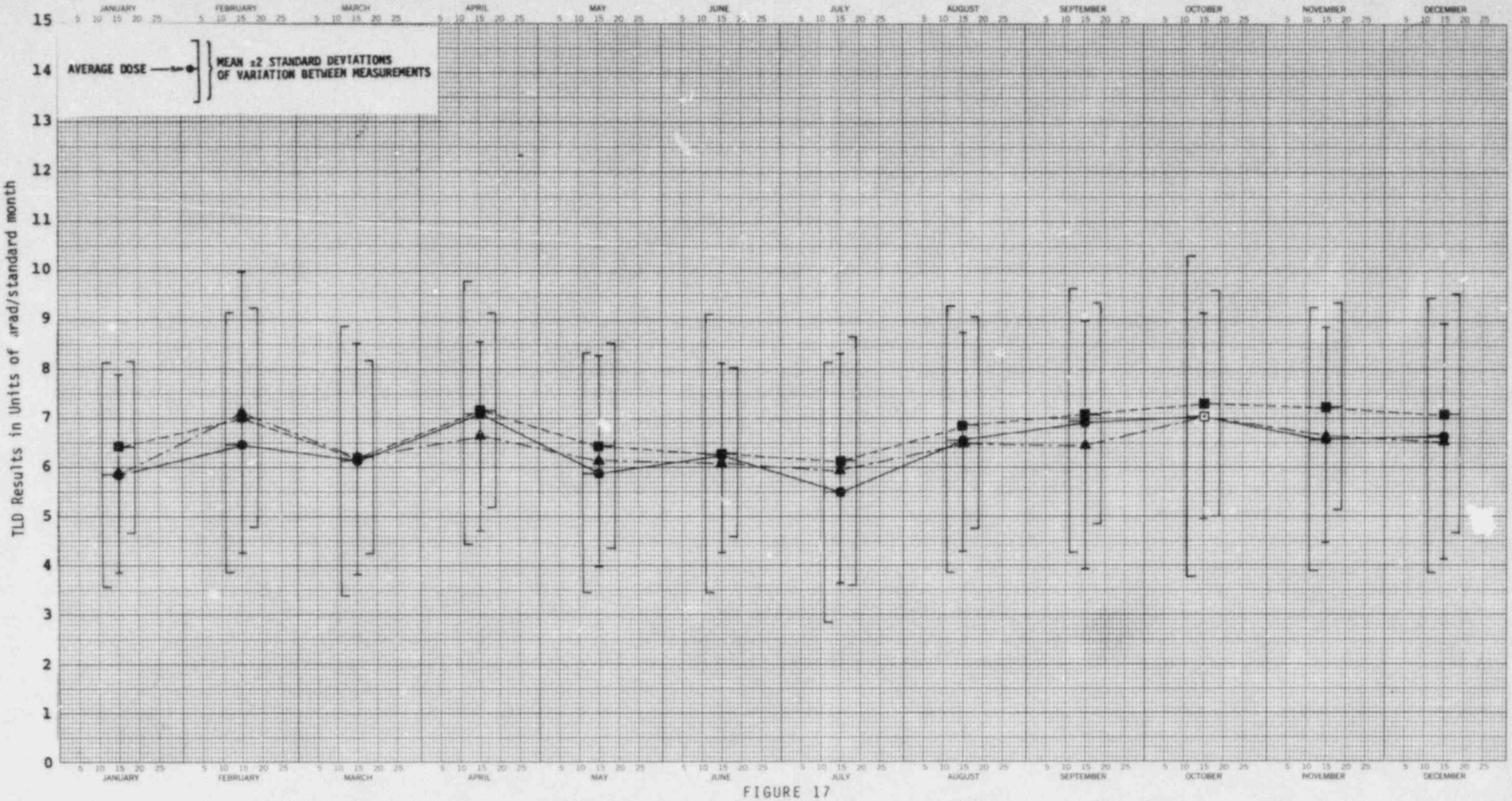


FIGURE 17

COMPARISON OF AVERAGE MONTHLY TLD RESULTS COLLECTED AT SITE BOUNDARY, MIDDLE, AND OUTER RING STATIONS IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1984.

Site Boundary (Stations 1B, 1C, 1D, 1E, 1F, 1G, 1H, 1J, 1L, 1M, 1NN, 2 and 40)

Middle Ring (Stations 3A, 4K, 5, 6B, 14, 15, 17, 22, 23, 26, 27, 31, 32, 33A, 38, 42, 43, 44, 45, 46, 47, 48, 49, 50 and 51)

Outer Ring (Stations 12B, 16, 18, 19, 20, 21B and 24)

If More Than One Value The Same

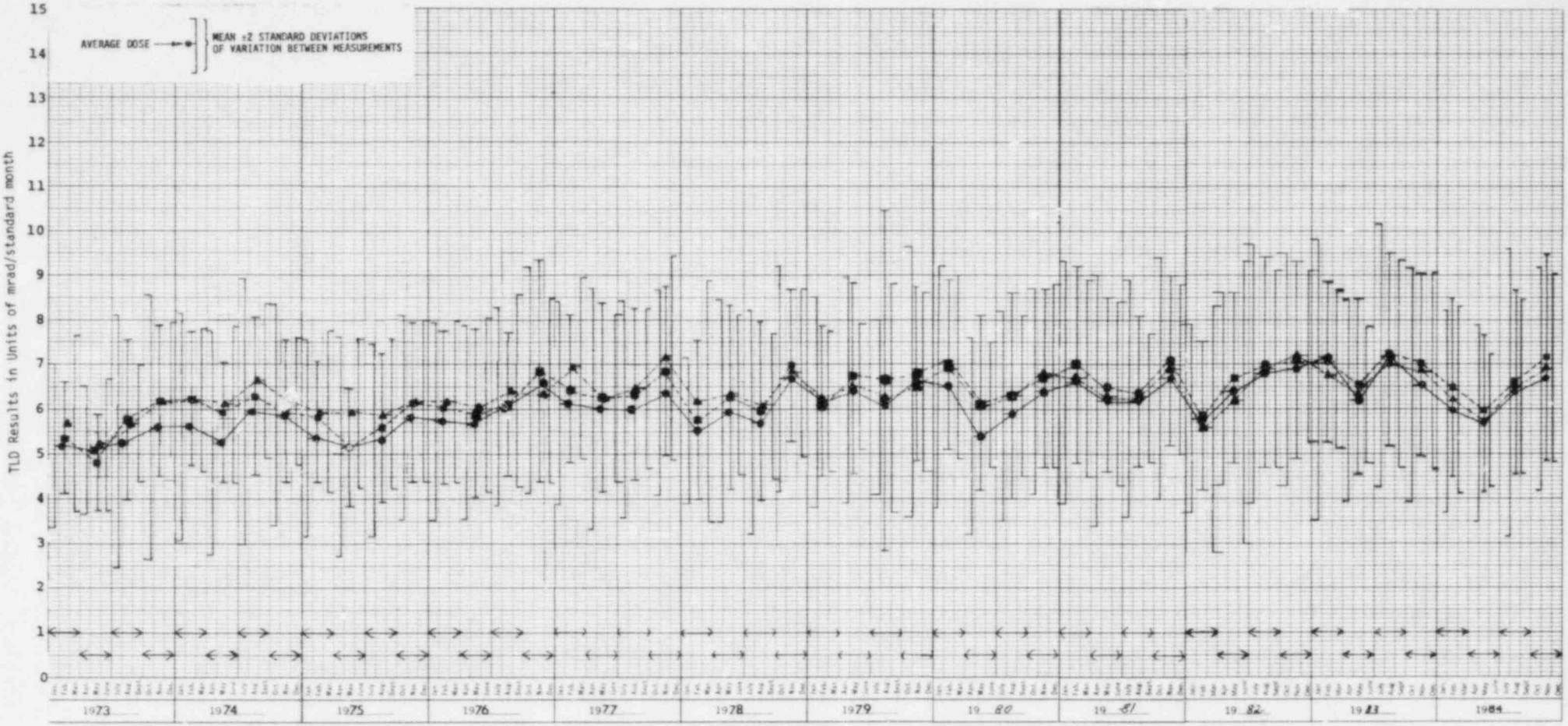


FIGURE 18

COMPARISON OF AVERAGE QUARTERLY TLD RESULTS COLLECTED AT SITE BOUNDARY, MIDDLE, AND OUTER RING STATIONS IN THE VICINITY OF PEACH BOTTOM ATOMIC POWER STATION, 1984.

Site Boundary (Stations 1B, 1C, 1D, 1E, 1F, 1G, 1H, 1J, 1L, 1M, 1NN, 2 and 40)

Middle Ring (Stations 3A, 4K, 5, 6B, 14, 15, 17, 22, 23, 26, 27, 31, 32, 33A, 38, 42, 43, 44, 45, 46, 47, 48, 49, 50 and 51)

Outer Ring (Stations 12B, 16, 18, 19, 20, 21B and 24)

If More Than One Value The Same

VII. SYNOPSIS OF ANALYTICAL PROCEDURES

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 Teledyne Isotopes for sample analysis.

Sample Preparation and Counting Procedures

Several types of liquid samples are separated by filtration prior to analysis. Resulting portions are identified as soluble and insoluble. Therefore, soluble as used in this report, is defined as that portion of a sample that passes through a No. 50 Whatman filter paper. Insoluble is defined as that portion of a sample that is collected on No. 50 Whatman filter paper.

DETERMINATION OF GROSS ALPHA AND/OR GROSS BETA ACTIVITY
IN WATER SAMPLES

(SUSPENDED AND DISSOLVED FRACTIONS)

TELEDYNE ISOTOPES

This describes the process used to measure the overall radioactivity of water samples without identifying the radioactive species present. No chemical separation techniques are involved. One liter of the sample is filtered under vacuum through a 0.45 μm Millipore filter. The filter is dried and mounted on a 2 inch stainless steel planchet to represent the suspended fraction of the sample. The filtrate is evaporated on a hotplate, and the residue is transferred and dried on another planchet to represent the dissolved fraction of the sample.

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 THE SAMPLE ACTIVITY OR OF THE MDL

$$\frac{\text{Net pCi on collection date}}{\text{unit volume or wt.}} = \frac{\frac{N}{\Delta t} - \beta}{2.22\,(v)\,(y)\,(DF)\,(\varepsilon)} \pm \frac{\sigma m \sqrt{\frac{\frac{N}{\Delta t} + \beta}{\Delta t}}}{2.22\,(v)\,(y)\,(DF)\,(\varepsilon)}$$

net activity counting error

where: N = total counts from sample (counts)

Δt = counting time for sample (min)

β = background rate of counter (cpm)

$2.22 = \frac{dpm}{pCi}$

v(w)= volume or weight of sample analyzed

y = chemical yield of the mount or sample counted

DF = decay factor from the collection to the counting date

$\mathcal{E}$ = efficiency of the counter

σm = multiples of counting error

For gross alpha and gross beta calculations set y = 1 and DF = 1.

If the net activity $\left(\frac{N}{\Delta t} - \beta\right)$ is equal to or is less than the counting error, the activity on the collection date is below the limits of detection and is called "less than" (L.T.) or "minimum detectable level" (MDL).

ENVIRONMENTAL DOSIMETRY

By TI definition, a thermoluminescent dosimeter (TLD) is considered one end of a capillary tube containing calcium sulfate (Tm) powder as the thermoluminescent material. This material was chosen for its characteristic high light output, minimal thermally induced signal loss (fading), and negligible self-dosing. The energy response curve has been flattened by a complex multiple element energy compensator shield supplied by Panasonic Corporation, manufacturer of the TLD reader. There exists four dosimeters per station sealed in a polyethylene bag to demonstrate integrity at the time of measurement, and for visualization of the sample placement instructions. The zero dose is determined from TLDs located in the lead shield at Teledyne Isotopes, Westwood, New Jersey.

Following the predesignated exposure period the TLDs are placed in the TLD reader. The reader heats the calcium sulfate (Tm) and the measured light emission (luminescence) is used to calculate the environmental radiation exposure.

Data are normalized to standard machine conditions by correcting machine settings to designated values before readout. Data are also corrected for in-transit dose using a set of TLDs kept in a lead shield in the field, exposed only during transit. The average dose per exposure period, and its associated error is then calculated.

A Cs-137 source is used to expose TLDs as a reference sample. An absorbed dose in tissue is determined using the 0.955 rad/Roentgen conversion factor and dose equivalent (mrem) by using a quality factor of 1.

Calculation of results and two sigma error:

$$\text{Gross TLD (i)} = [\text{TLD (i)} - \text{DO(i)}] \times \text{CF(i)} \times \text{CF(ins)} \times 0.955 \text{ mrad/mRoentgen}$$

$$\text{ITD - Net (site 0) - [NET(RMC 0) (D(sta) / D(RMC 0))]}$$

$$\text{NET TLD(i) - gross TLD(i) - ITD}$$

$$\text{AVG} = \left[\left(\sum_{1=1}^{n} \text{sigma NET TLD}\right) / n\right] [\text{D(STD)} / \text{D(EX)}]$$

$$\text{ERROR (95\% CL)} = t(n-1) [\text{sigma NET TLD (i)} / \sqrt{n}] [\text{D(STD)} / \text{D(EX)}]$$

TLD (Cont.)

Where	Gross TLD(1)	=	individual TLD reading correctd to standard instrument conditions
	TLD(i)	=	Gross reading of dosimeter i
	NET TLD(i)	=	Net dose obtained during exposure period in the field
	CF(ins)	=	Correction factor of reader = (6.158) ($ELS^{-1.0129}$)
	ELS	=	External light source
	DO(i)	=	Zero for dosimeter i
	CF(i)	=	Calibration factor for dosimeter i
	ITD	=	in-Transit dose
	NET(site)O	=	Mean of n dosimeters in site lead shield
	NET(RMC)O	=	Mean of n dosimeters in RMC lead shield
	D(sta)	=	Exposure period of station (SZRO)
	D(RMC)O	=	Exposure period of RMC O
	AVG	=	Mean exposure per standard exposure period at a given station
	n	=	Number of readings
	D(EX)	=	Days exposed
	D(STD)	=	Days in standard exposure period
	t(n-1)	=	T-distribution (student) factor for 95% CL
	sigma NET TLD (1)	=	Standard deviation of n readings of NET TLD (i)
	ERROR	=	The 95% confidence limit error of AVG

DETERMINATION OF GAMMA EMITTING RADIOISOTOPES

TELEDYNE ISOTOPES

Gamma emitting radioisotopes are determined with the use of a lithium-drifted germanium (Ge(Li)) and high purity germanium detectors with high resolution spectrometry in specific media, for example, air particulate filters, charcoal filters, milk, water, vegetation, soil/sedimerts, biological media, etc. 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 two-inch filter paper source geometries.

Samples are counted on large (>55 cc volume) Ge(Li) 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 Ge(Li) systems are calibrated for each standard geometry using certified radionuclide standards traceable to the National Bureau of Standards.

DETERMINATION OF I-131 IN MILK AND WATER SAMPLES BY RADIOCHEMISTRY AND LIQUID PHASE BY ANALYSIS

TELEDYNE ISOTOPES

This describes the radiochemical methods for determining I-131 activity in milk and water samples by coincidence counting in the liquid phase.

Four 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 solution, is reduced with hydroxylamine hydrochloride and is extracted into carbon tetrachloride as free iodine. It is then back-extracted as iodide into sodium bisulfite solution.

The iodide sample solution is oxidized to the free state using $NaNO_2$ reagent and is extracted several times into a total of 15 ml of toluene. A 200 μl aliquot is taken for determining chemical yield by spectrophotometer. A decolorizing agent (2-methyl-2-butene) is added to the toluene-iodine solution to form an inert molecule and to minimize liquid scintillation quenching. A toluene-based liquid scintillation counting solution is added to the sample, which is then analyzed by a beta-gated gamma-coincidence counting system.

CALCULATION OF THE SAMPLE ACTIVITY OR OF THE MDL

The Sample Activity and the 2-sigma Counting Error are Calculated as Follows:

$$\frac{\text{Net pCi on collection date}}{\text{liter}} = \underbrace{\frac{\frac{N}{\Delta t} - \beta}{2.22(v)(y)(DF)(\xi)}}_{\text{net activity}} \pm \underbrace{\frac{2\sqrt{\frac{\frac{N}{\Delta t} + \beta}{\Delta t}}}{2.22\,(v)(y)(DF)(\xi)}}_{\text{counting error}}$$

where: N = total counts from sample (counts)

Δt = counting time for sample (min)

β = background rate of counter (cpm)

$2.22 = \frac{\text{dpm}}{\text{pCi}}$

v = volume of sample analyzed (liters)

y = chemical yield of the mount or sample counted

DF = decay factor from the collection to the mid count time

ξ = efficiency of the counter for I-131

Note: Efficiency is determined by counting an I-131 standard. Consequently, the branching intensity (abundance) of the I-131 gamma does not appear in the above equation.

Calculation of the MDL

If the net activity (previously defined) is equal to or is less than a specified multiple of the background counting error, the activity on the collection date is below the limits of detection and is called "less than" (L.T.) or "minimum detectable level" (MDL).

The L.T. value can be specified by stating only the counting error at a predetermined multiple (σm) of the one sigma statistics. A sigma multiple (σm) of 4.66 is used for calculation of the L.T. values unless another multiple such as 2.83 is specified.

$$\text{thus L.T.} = \frac{\sigma m\sqrt{\frac{\beta}{\Delta t}}}{(2.22(v)(y)(DF)(\xi)}$$

DETERMINATION OF RADIOSTRONTIUM IN MILK SAMPLES

TELEDYNE ISOTOPES

Stable strontium carrier is added to 1 liter of sample and trichloracetic acid (TCA) is added to produce a curd. The curd is separated by filtration and is discarded. An oxalate precipitation is performed on the filtrate and the precipitate is ashed in a muffle furnace. The ash is leached in hydrochloric acid. Calcium and strontium are precipitated as phosphates, collected by vacuum filtration, then dissolved in nitric acid. Strontium is precipitated as $Sr(NO_3)_2$ repeatedly using 90 %, then 70% nitric acid. A barium chromate scavenge and an iron (ferric hydroxide) scavenge are then performed. Stable yttrium carrier is added and the sample is allowed to stand for 5 days or longer for yttrium ingrowth. Yttrium is then precipitated as hydroxide, is dissolved and re-precipitated as oxalate. The yttrium oxalate is mounted on a nylon planchet and is counted in a low level beta counter to infer Sr-90 activity. Sr-89 activity is determined by precipitating $SrCO_3$ from the sample after yttrium separation. The precipitate is mounted on a nylon planchette and is covered with an 80 mg/cm^2 aluminum absorber for low level beta counting.

CALCULATION OF THE SAMPLE ACTIVITY OR OF THE MDL FOR Sr-89

$$\frac{\text{Net pCi}}{\text{liter}} = \frac{\frac{N}{\Delta t} - \beta_C - \beta_A}{2.22(v)(y_S)(DF_{SR-89})(\varepsilon_{SR-89})} \pm \frac{2\sqrt{\frac{\frac{N}{\Delta t} + \beta_C + \beta_A}{\Delta t}}}{2.22(v)(y_S)(DF_{SR-89})(\varepsilon_{SR-89})}$$

(corrected to collection date) — net activity — counting error 2 sigma

where:

N	=	total counts from sample (counts)
Δt	=	counting time for sample (min)
β_C	=	background rate of counter (cpm) using absorber configuration
2.22	=	$\frac{dpm}{pCi}$
v	=	volume of sample analyzed, liters
β_A	=	background addition from Sr-90 and ingrowth of Y-90, cpm
y_S	=	checmical yield of strontium
DF Sr-89	=	decay factor from the mid collection date to the counting date for Sr-89
ε Sr-89	=	Efficiency of the counter Sr-89 with the 80 mg/cm.sq. aluminum absorber
m or 2	=	multiples of counting error

CALCULATION OF THE SAMPLE ACTIVITY OR OF THE MDL FOR Sr-90

$$\frac{\text{Net pCi on Collection date}}{\text{(unit vol. or wt.)}} = \underbrace{\frac{\frac{N}{\Delta t} - \beta}{2.22\,(v)(y_1)(y_2)(DF)(IF)(\varepsilon)}}_{\text{net activity}} \pm \underbrace{\frac{2\sqrt{\frac{\frac{N}{\Delta t} + \beta}{\Delta t}}}{2.22\,(v)(y_1)(y_2)(DF)(\varepsilon)(IF)}}_{\text{counting error}}$$

Strontium (Cont.)

where: N = total counts from sample (counts)

Δt = counting time for sample (min)

β = background rate of counter (cpm)

$2.22 = \frac{dpm}{pCi}$

v = volume or weight of sample analyzed

y_1 = chemical yield of the mount or sample counted

y_2 = chemical yield of strontium

DF = decay factor of yttrium from the milking time to the mid count time

ϵ = efficiency of the counter

2 or σm = multiples of counting error

IF = ingrowth factor for Y-90 from scavenge time to milking time

DETERMINATION OF TRITIUM BY GAS COUNTING

TELEDYNE ISOTOPES

A 2 ml aliquot is changed into hydrogen gas and collected in an activated charcoal trap. The hydrogen is then transferred into a previously evacuated one liter proportional counter. Non tritiated hydrogen and ultra-high purity methane is added and then counted. Backgrounds and standards are counted in the same gas mixture as the samples.

Calculation of the sample activity or the MDL:

$$\frac{\text{Net pCi}}{\text{unit vol.}} = \frac{3.234 \times (TU)_N \times V_N}{CPM_N \times V_S} \qquad \left[(CPM)_G - BKG \pm \overline{\sigma m} \sqrt{\sigma G^2 + \sigma B^2} \right]$$

where: $(TU)_N$ = the tritium units of the standard

V_N = volume of the standard used to calibrate the efficiency of the detector - in psia

V_S = volume of the sample loaded into the detector - in psia

$(CPM)_N$ = the cpm activity of the standard of volume V_N

$(CPM)_G$ = the gross activity of the sample of volume V_S and the detector background

BKG = the background of the detector in cpm

3.234 = conversion factor changing TU to pC/ℓ

Δt = counting time for the sample

σm = multiple of the counting error

σG = standard deviation of the gross activity of the sample and the detector background, in cpm

σB = standard deviation of the background, in cpm

Tritium (cont.)

If the net activity $(CPM)_G$ - BKG is equal to or is less than twice the counting error, the activity on the collection date is below the limits of detection and is called "less than" (L.T.) or "minimum detectable level" (MDL).

$$\text{thus L.T.} = \frac{2 \times 3.234 \times (TU)_N \times V_N \times \sqrt{\sigma_G^{\,2} + \sigma_\beta^{\,2}}}{(CPM)_N \times V_S}$$

where: σ_G = standard deviation of the gross activity of the sample and the detector background, in cpm

σ_β = standard deviation of the background, in cpm

VIII. EPA INTERLABORATORY COMPARISON PROGRAM

INTER-LABORATORY COMPARISON PROGRAM

Teledyne Isotopes participates in the EPA radiological interlaboratory comparison (cross check) program. This participation includes a number of analyses on various sample 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. Of the 92 analyses performed at TI, 86 fell within the EPA mean and standard deviation. Refrences E, F, and G discuss any discrepancies between the data. Table E-1 summarizes the results of the 1984 samples.

TABLE 1

INTER-LABORATORY COMPARISONS, 1984

TELEDYNE ISOTOPES

Collection Date	Media	Nuclide	EPA-Results(A)	Teledyne Isotopes Results(B)	All Participants Mean ± 2 s.d.
01/06	Water	Sr-89	36. ± 8.7	29.3 ± 8.7	36. ± 9.
		Sr-90	24. ± 2.6	23. ± 3.	23. ± 3.
01/20	Water	Gross Alpha	10. ± 8.7	8. ± 3.	10. ± 3.
		Gross Beta	12. ± 8.7	12. ± 3.	13. ± 3.
01/27	Food	Sr-89	34. ± 8.7	33.3 ± 1.7	31. ± 5.
		Sr-90	20. ± 8.7	21.7 ± 1.7	21. ± 3.
		I-131	20. ± 10.4	16.3 ± 1.7	20. ± 4.
		Cs-137	20. ± 8.7	24.1 ± 0.6	21. ± 3.
		K	2720. ±235.	2503. ±555.	2665. ±246.
02/03	Water	Cr-51	40. ± 8.7	L.T. 80.	40. ± 8.
		Co-60	10. ± 8.7	15. ± 7.9	11. ± 2.
		Zn-65	50. ± 8.7	53.3 ± 16.5	50. ± 8.
		Ru-106	61. ± 8.7	58.7 ± 33.	55. ± 9.
		Cs-134	31. ± 8.7	33.3 ± 3.	29. ± 3.
		Cs-137	16. ± 8.7	19.3 ± 1.7	16. ± 3.
02/10	Water	H-3	2383. ±607.	2270. ±786.	2366. ±247.
03/02	Milk	I-131	6. ± 1.6	5.7 ± 1.7	6. ± 1.
03/16	Water	Gross Alpha	5. ± 8.7	5. ± 1.3	6. ± 2.
		Gross Beta	20. ± 8.7	20. ± 3.	20. ± 3.
03/23	Air Filter	Gross Alpha	15. ± 8.7	19. ± 1.7	16. ± 3.
		Gross Beta	51. ± 8.7	45. ± 3.0	56. ± 6.
		Sr-90	21. ± 2.6	20. ± 6.0	19. ± 2.
		Cs-137	10. ± 8.7	11. ± 3.5	12. ± 3.
04/06	Water	I-131	6. ± 1.5	5.5 ± 0.4	6. ± 2.
04/13	Water	H-3(E)	3508. ±728.	2660. ±342.	3461. ±288.

TABLE 1 (Cont.)

INTER-LABORATORY COMPARISONS, 1984

TELEDYNE ISOTOPES

Collection Date	Media	Nuclide	EPA-Results(A)	Teledyne Isotopes Results(B)	All Participants Mean ± 2 s.d.
04/20	Water (Sample A)	Gross Alpha	35. ± 15.2	22. ± 4.6	28. ± 7.
04/20	Water (Sample B)	Gross Beta	147. ± 12.7	117. ± 17.3	(D)
		Sr-89	23. ± 8.7	18. ± 7.5	24. ± 7.
		Sr-90	26. ± 2.6	22. ± 3.5	25. ± 4.
		Co-60	30. ± 8.7	29. ± 6.2	30. ± 4.
		Cs-134	30. ± 8.7	29. ± 4.6	29. ± 4.
		Cs-137	26. ± 8.7	29. ± 6.0	26. ± 3.
05/04	Water	Sr-89	25. ± 8.7	23. ± 5.	24. ± 4.
		Sr-90	5. ± 2.6	5.0 ± 0.5	5. ± 1.
05/18	Water	Gross Alpha	3. ± 8.7	2.7 ± 0.8	3. ± 1.
		Gross Beta	6. ± 8.7	6.9 ± 4.0	7. ± 2.
06/01	Water	Cr-51	66. ± 8.7	L.T. 90.	64. ± 13.
		Co-60	31. ± 8.7	33. ± 3.5	31. ± 4.
		Zn-65	63. ± 8.7	68. ± 15.	63. ± 9.
		Ru-106	29. ± 8.7	L.T. 50.	30. ± 11.
		Cs-134	47. ± 8.7	46. ± 5.	44. ± 6.
		Cs-137	37. ± 8.7	39. ± 1.7	37. ± 4.
06/08	Water	H-3	3051. ±622.	3210. ±834.	3039. ±235.
06/22	Milk	Sr-89	25. ± 8.7	22. ± 1.7	21. ± 5.
		Sr-90	17. ± 2.6	17. ± 4.6	15. ± 2.
		I-131	43. ± 10.4	40. ± 9.6	43. ± 4.
		Cs-137	35. ± 8.7	37. ± 3.	36. ± 3.
		K (F)	1496. ±130.	1653. ± 46.	1560. ± 97.
07/20	Water	Gross Alpha	6. ± 8.7	3.8 ± 2.4	(D)
		Gross Beta	13. ± 8.7	11.3 ± 3.5	(D)

TABLE 1 (Cont.)

INTER-LABORATORY COMPARISONS, 1984

TELEDYNE ISOTOPES

Collection Date	Media	Nuclide	EPA-Results(A)	Teledyne Isotopes Results(B)	All Participants Mean ± 2 s.d.
07/27	Food (C)	Sr-89	25.0 ± 8.7	17. ± 9.	(D)
		Sr-90	20.0 ± 2.6	20. ± 9.	(D)
		I-131 (G)	39.0 ± 10.4	19. ± 3.5	(D)
		Cs-137	25.0 ± 8.7	26. ± 11.	(D)
		K (F)	2605.0 ±226.0	3027. ±1183.	(D)
08/03	Water	I-131	34.0 ± 10.4	31. ± 3.0	36. ± 5.
08/10	Water	H-3	2817. ±617.	2930. ± 127.	2842. ±251.
08/24	Air Filter	Gross Alpha	17. ± 8.7	16. ± 1.7	17. ± 3.
		Gross Beta	51. ± 8.7	47. ± 3.	52. ± 6.
		Sr-90	18. ± 2.4	18. ± 1.7	17. ± 2.
		Cs-137	15. ± 8.7	17. ± 4.6	17. ± 4.
09/07	Water	Sr-89	34. ± 8.7	29. ± 4.5	30. ± 8.
		Sr-90	19. ± 2.6	19. ± 1.0	18. ± 3.
09/21	Water	Gross Alpha	5.0 ± 8.7	6. ± 0.0	5. ± 2.
		Gross Beta	16.0 ± 8.7	14. ± 3.	15. ± 3.
10/05	Water	Cr-51	40. ± 8.7	L.T. 107.	38. ± 8.
		Co-60	20. ± 8.7	23. ± 10.4	20. ± 3.
		Zn-65	147. ± 8.7	155. ± 17.6	149. ± 12.
		Ru-106	47. ± 8.7	L.T. 53.	45. ± 9.
		Cs-134	31. ± 8.7	34. ± 12.	29. ± 3.
		Cs-137	24. ± 8.7	28. ± 10.	25. ± 3.
10/12	Water	H-3	2810. ±356.	2720. ± 531.	2814. ±213.
10/22	Water (Sample A)	Gross Alpha	14. ± 8.7	11. ± 1.7	13. ± 4.
	Water (Sample B)	Gross Beta	64. ± 8.7	65. ± 10.	60. ± 7.
		Sr-89	11. ± 8.7	9. ± 3.5	11. ± 4.
		Sr-90	12. ± 2.6	13. ± 3.	13. ± 3.
		Co-60	14. ± 8.7	19. ± 3.5	16. ± 2.
		Cs-134	2. ± 8.7	L.T. 5.	3. ± 2.

TABLE 1 (Cont.)

INTER-LABORATORY COMPARISONS, 1984

TELEDYNE ISOTOPES

Collection Date	Media	Nuclide	EPA-Results(A)	Teledyne Isotopes Results(B)	All Participants Mean ± 2 s.d.
10/26	Milk	Sr-89	22. ± 8.7	15. ± 1.7	19. ± 4.
		Sr-90	16. ± 2.6	14. ± 3.	15. ± 2.
		I-131	42. ± 10.4	34. ± 9.6	40. ± 5.
		Cs-137	32. ± 8.7	32. ± 12.	32. ± 3.
		K (F)	1517. ±131.	1370. ± 52.7	1498. ±143.
11/16	Water	Gross Alpha	7.0 ± 8.7	7.3 ± 1.7	7. ± 2.
		Gross Beta	20.0 ± 8.7	21.7 ± 1.7	21. ± 3.
11/23	Air Filter	Gross Alpha	15. ± 8.7	15. ± 1.7	(D)
		Gross Beta	52. ± 8.7	54. ± 3.5	(D)
		Sr-90	21. ± 2.6	23. ± 3.	(D)
		Cs-137	10. ± 8.7	9. ± 4.6	(D)
12/07	Water	I-131	36. ± 10.4	36. ± 6.9	36. ± 5.
12/14	Water	H-3	3182. ±624.	3523. ±868.	3206. ±236.

Notes

(A) EPA Results-Expected laboratory precision (3 sigma). Units are pCi/ℓ for water, urine, and milk except K is in mg/1. Units are total pCi for air particulate filters.

(B) Teledyne Results - Average ± three sigma. Units are pCi/ℓ for water, urine, and milk except K is in mg/ℓ. Units are total pCi for air particulate filters.

(C) Units for food analysis are pCi/kg.

(D) Results were not released at time of report.

(E) No action was considered necessary as the tritium results are usually accurate.

(F) Teledyne Isotopes is now using the same conversion factor to convert pCi/liter of K-40 to mg/liter of K.

(G) There was a high decay factor due to a delay in receipt of sample after collection. Since results are generally accurate for I-131, no further action was planned.