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

Subject: Limerick Generating Station Units 1 and 2
1993 Annual Radiological Environmental Operating Report

Gentlemen:

In accordance with the requirements of the Limerick Generating Station (LGS) Unit 1 & 2 Technical Specifications (TS) Section 6.9.1.7, this letter submits the 1993 Annual Radiological Environmental Operating Report No. 10. This report provides the information delineated in TS Section 6.9.1.7, including a summary of the Radiological Environmental Monitoring Program (REMP).

The 1993 Radiological Environmental Monitoring Program confirmed that the LGS environmental effects from radioactive releases were well below LGS Technical Specification and other applicable regulatory limits.

If you have any questions, please do not hesitate to contact us.

Very truly yours,

DRHelwig

FJH/eer

Enclosure

cc: T. T. Martin, Administrator, Region I, USNRC
Neil Perry, USNRC Senior Resident Inspector, LGS

IE25

Docket No: 50-352
50-353

LIMERICK GENERATING STATION
UNITS 1 and 2

Annual Radiological
Environmental Operating Report

Report #10

1 January Through 31 December 1993

Prepared By

PECO ENERGY
Nuclear Generation Group
965 Chesterbrook Blvd.
Wayne, PA 19087-5691

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TABLE OF CONTENTS

I. Summary and Conclusions

This report on the Radiological Environmental Monitoring Program conducted for the Limerick Generating Station by PECO Energy covers the period 1 January 1993 through 31 December 1993. During that time period, 2506 analyses were performed on 2157 samples.

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

Fish (predator and bottom feeder) and sediment samples were analyzed for concentrations of gamma emitting nuclides. No activation or fission products were detected in fish samples. Sediment samples collected below the discharge had Cs-137 concentrations consistent with levels observed in the preoperational years. Statistically significant activity for the activation product Co-60 was found at downstream location 16C4 (Vincent Dam) during the November collection. This activity was attributable to LGS operations. The calculated dose to a teenager's skin from the sediment pathway was 6.72 E-03 mrem/yr which represents 0.03% of the allowable fraction of 10 CFR 50, Appendix I limits.

Air particulate samples were analyzed for concentrations of gross beta and gamma emitting nuclides. Cosmogenic Be-7 and K-40 were observed at levels consistent with those observed in other years. No fission or activation products were detected.

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

Cow and goat milk samples were analyzed for concentrations of I-131 and gamma emitting nuclides. All I-131 results detected were below the minimum detectable activity. Concentrations of K-40 were consistent with those observed in other years. Of the 20 samples analyzed by gamma spectroscopy, only one sample contained trace activity of Cs-137. The activity was not attributable to LGS operations. No other fission or activation products were found.

Environmental gamma radiation measurements were made monthly and quarterly using thermoluminescent dosimeters. Levels detected were consistent with those observed in other years.

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

II. Introduction

The Limerick Generating Station (LGS), consisting of two 1055 MWe boiling water reactors owned and operated by PECO Energy (PECO), is located adjacent to the Schuylkill River in Montgomery County, Pennsylvania. Unit No. 1 went critical on 22 December 1984. Unit No. 2 went critical on 11 August 1989. The site is located in Piedmont countryside, transversed by numerous valleys containing small tributaries which feed into the Schuylkill River. On the eastern river bank elevation rises from approximately 110 to 300 feet mean sea level (MSL). On the western river bank elevation rises to approximately 50 feet MSL to the western site boundary.

A Radiological Environmental Monitoring Program (REMP) for LGS was initiated in 1971. Review of the 1971 through 1977 REMP data resulted in the modification of the program to comply with changes in the Environmental Report Operating License Stage (EROL) and the Branch Technical Position Paper (Rev. 1, 1979). The preoperational period for most media covers the periods 1 January 1982 through 21 December 1984 and was summarized in a separate report. This report covers those analyses performed by Teledyne Brown Engineering (TB) amd Public Service Electric and Gas Company (PSE&G) on samples collected during the period 1 January 1993 through 31 December 1993.

A. Objectives of the REMP

The objectives of the REMP are to:

1. Provide data on measurable levels of radiation and radioactive materials in the site environs.

2. Evaluate the relationship between quantities of radioactive material released from the plant and resultant radiation doses to individuals from principal pathways of exposure.

B. Implementation of the Objectives

The implementation of the objectives is accomplished by:

1. Identifying significant exposure pathways.

2. Establishing baseline radiological data of media within those pathways.

3. Continuously monitoring those media before and during Station operation to assess Station effects (if any) on man and the environment.

III. Program Description

A. Sample Collection

Samples for the LGS REMP were collected for PECO Energy by RMC Environmental Services, Inc. (RMC). This section describes the collection methods used by RMC to obtain environmental samples for the LGS REMP in 1993. Sample locations and descriptions can be found in Table B-1 and Figures B-1 through B-4, Appendix B.

Aquatic Environment

The aquatic environment was examined by analyzing samples of surface water, drinking water, fish, and sediment. Two gallon water samples were collected monthly from continuous samplers located at three surface water locations (10F2, 13B1, and 24S1) and four drinking water locations (13H2, 15F4, 15F7, and 28F3). One additional drinking water location (16C2) was sampled by compositing weekly grab samples into a monthly sample. Control locations were 10F2, 24S1, and 28F3. All containers used were new unused plastic bottles, which were rinsed at least twice with source water prior to collection. Fish samples comprising the flesh of two groups, catfish/bullhead (bottom feeder) and sunfish (predator), were collected semiannually at three locations: 16C5 and 20S1 (indicator) and 29C1 (control). Sediment samples composed of recently deposited substrate were collected at three locations semiannually: 16B2 and 16C4 (indicator) and 33A2 (control).

Atmospheric Environment

The atmospheric environment was examined by analyzing samples of air particulate, airborne iodine, and milk. Air particulate were collected and analyzed weekly at seventeen locations (2B1, 6C1, 9C1, 10S3, 11S1, 13C1, 13H4, 14S1, 15D1, 17B1, 20D1, 22G1, 26B1, 29B1, 31D1, 34S2, and 35B1). Control locations were 13H4 and 22G1. Airborne iodine samples were collected and analyzed weekly from five locations, (10S3, 11S1, 13C1, 13H4, and 14S1). Control location was 13H4. Air particulate and airborne iodine samples were obtained using a vacuum sampler, glass fiber and charcoal filters, respectively. The filters were replaced weekly and sent to the laboratory for analysis. The vacuum samplers were run continuously at approximately 1 cubic foot per minute.

Milk samples were collected biweekly at five locations (10B1, 19B1, 18C1, 21B1, and 22F1) during April through November, and monthly during December through March and quarterly at four locations (36E1, 9G1, 22C1, and 25C1). Locations 9G1 and 22F1 were controls. Samples were collected in new unused two gallon plastic bottles from the bulk tank at each location, refrigerated, and shipped promptly to the laboratory. No preservative was added.

Ambient Gamma Radiation

Direct radiation measurements were made using thermoluminescent dosimeters (TLD) consisting of calcium sulfate ($CaSO_4$) doped with dysprosium (Dy). The TLD locations were placed on and around the LGS site using a "three ring concept" consisting of:

A site boundary ring consisting of sixteen locations (36S2, 3S1, 5S1, 7S1, 10S3, 11S1, 14S1, 16S2, 18S1, 21S1, 23S2, 25S1, 26S3, 29S1, 32S1 and 34S2) near and within the site perimeter representing fencepost doses (i.e., at locations where the doses will be potentially greater than maximum annual off-site doses) from LGS release. A middle ring consisting of twenty-seven locations (2B1, 2E1, 4E1, 6C1, 7E1, 9C1, 10E1, 10F3, 13C1, 13E1, 15D1, 16F1, 17B1, 19D1, 20D1, 20F1, 24D1, 25D1, 26B1, 28D2, 29B1, 29E1, 31D1, 31D2, 34E1, 35B1 and 35F1) extending to approximately 5 miles from the site designed to measure possible exposures to close-in population. And an outer ring consisting of five locations (5H1, 13H4, 18G1, 22G1 and 32G1) extending from approximately 12 to 30 miles from the site and considered to be unaffected by LGS releases.

The specific TLD locations were determined by the following criteria:

1. The presence of relatively dense population;

2. Site meteorological data taking into account distance and elevation for each of the 16-22 1/2 degree sectors around the site, where estimated annual dose from LGS, if any, would be most significant;

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

4. And near the closest dwelling to the vents in the prevailing downwind direction.

Two TLDs - each comprised of four thermoluminescent phosphors enclosed in plastic - were placed at each location in a PVC conduit located approximately three feet above ground level. One TLD was exchanged monthly and the other quarterly and sent to the laboratory for analysis.

B. Sample Analysis

In order to achieve the stated objectives, the current program includes the following anayses:

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

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

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

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

5. Ambient gamma radiation levels at various site environs.

C. Data Interpretation

The radiological and direct radiation data collected prior to LGS becoming operational was used as a baseline with which this operational data will be compared. For the purpose of this report, LGS was considered operational at initial criticality. In addition data will be compared to previous years' operational data for consistency and trending. Several factors are important in the interpretation of the data. These factors are discussed here to avoid undue repetition in the discussion of the results.

1. Lower Limit of Detection

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

2. Net Activity Caluculation and Reporting of Results

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

Teledyne Brown Engineering (TB) reported all analysis results except gamma spec results as Activity ± 2 Sigma. Public Service Electric & Gas (PSE&G) reported all analysis results except gamma spec as Activity ± 1.96 Sigma.

TB reported all gamma spec results as Activity ± 2 Sigma using two conventions (statistically significant and statistically non-significant activity). A Statistically Significant Activity is calculated activity that is greater than the individual sample's Minimum Detectable Activity and therefore most likely a "true positive result". A Statistically Non-significant Activity is calculated activity that is below the individual sample's Minimum Detectable Activity and therefore

most likely not a "true positive result". Statistically Non-significant Activity includes calculated "negative activity".

PSE&G reported gamma spec and iodine-131 analyses as Activity ± 1.96 Sigma counting statistic when the activity was greater than or equal to the 1.96 sigma. When an activity was less than the 1.96 sigma, the result was reported as "< the 1.96 sigma value". PSE&G refers to the 1.96 sigma value as the individual sample MDA. For specific equations please see Appendix E.

Data reported in this report were generated using the convention of rounding the result to the same number of significant places as the first significant digit in the error term (i.e., 3.62 ± 1.23 rounds to 4 ± 1; 10.93 ± 0.96 rounds to 10.9 ± 1.0; -0.01 ± 0.1 rounds to 0.0 ± 0.1). Results for each type of sample were grouped according to the analyses performed. For gamma analyses, at least those nuclides required for each sample media and nuclides which had a significant positive occurrence were reported. 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 reported as < MDA were considered to be at the MDA.

D. Program Exceptions

For 1993 the LGS REMP had a sample recovery rate of better than 99%. The exceptions to this program are listed below:

1. Air particulate filters were not available from location 35B1 from week #13 due to a sample collection error.

2. Air particulate sample was not collected from location 31D1 from weeks #24, #28, and #37 due to pump failures.

3. Air particulate and air iodine samples were not collected from location 13H3 from weeks #16, #41, #43, and #45 due to electrical problems.

The specific dates for the above weeks may be found in Table C-IX.1, Appendix C.

4. Surface water samples collected at location 24S1 (LGS Intake) were composites of weekly grabs from 2/24/93 to 4/21/93 due to equipment problems. A one gallon grab was taken at this location on 12/27/93 because some of the composite was spilled due to freezing weather conditions.

5. Surface water samples collected at location 13B1 (Vincent Dam) were composites of weekly grabs from 3/9/93 to 3/31/93 due to equipment problems and from 11/29/93 to 12/13/93 due to flooding and freezing weather.

6. Surface water samples collected at location 10F2 (Perkiomen Pumping Station) were composites of weekly grabs due to equipment problems and maintenance during the following dates: 2/16/93 to 2/24/93, 3/25/93 to 7/15/93 and 12/7/93 to 12/13/93.

7. Drinking water samples collected at location 13H2 (Belmont Water Works) were composites of daily grabs due to maintenance and equipment problems during the following dates: 4/22/93 and 5/3/93.

8. Drinking water samples collected at location 28F3 (Pottstown) were composites of daily grabs on 3/1/93 and 8/12/93 to 8/26/93 due to equipment problems.

9. Ba-140 and La-140 LLDs for the milk sample collected in March 1993 farm 18C1 were not met because the analysis was added after several half-lives had past.

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

E. 1993 Program Changes

Bi-weekly milk farm 25B1 went out of business in March. Farm 18C1 which had the next highest D/Q value was move from the quarterly milk program to the bi-weekly program and farm 25C1 was added to the quarterly milk program.

Teledyne Isotopes through a reorganization became Teledyne Brown Engineering.

Philadelphia Electric Company changed its name to PECO Energy.

IV. Results and Discussion

A. Aquatic Environment

1. Surface Water

Samples were taken from a continuous sampler at three locations (10F2, 13B1, and 24S1) on a monthly schedule. Of these locations, only 13B1 could be affected by Station discharges. The following analyses were performed.

Gross Beta

Samples from all locations were analyzed for concentrations of gross beta in the insoluble and soluble fractions (Tables C-I.1 and C-I.2, Appendix C). Detectable activity was observed in the insoluble and soluble fraction of the surface water samples; the values were consistent with previous years (Figures C-1 and C-2, Appendix C) and ranged from -0.2 to 9 pCi/l for the insoluble fraction and from 2.1 to 10 pCi/l for the soluble fraction. Similar activity levels were observed between indicator and control locations for the insoluble and soluble fractions.

Tritium

Monthly samples from all locations were composited quarterly and analyzed for tritium activity (Table C-I.3, Appendix C). Tritium activity ranged from -200 to 90 pCi/l.

Gamma Spectrometry

Samples from all locations were analyzed for gamma emitting nuclides (Table C-I.4, Appendix C). Statistically significant activity for naturally occurring K-40 was found in 8 of 36 samples. Potassium-40 results ranged from -120 to 30 pCi/l. Statistically significant activity for Ra-226 was found in only one sample. No statistically significant fission or activation products were found.

2. Drinking (Potable) Water

Monthly samples were collected from continuous water samplers at four locations (13H2, 15F4, 15F7, and 28F3) and by weekly grab samples at one location (16C2). Four locations (13H2, 15F4, 15F7 and 16C2) could be affected by Station discharges. The following analyses were performed:

Gross Beta

Samples from all locations were analyzed for concentrations of gross beta in the insoluble and soluble fractions (Tables C-II.1 and C-II.2, Appendix C). The values ranged from -0.3 to 2.3 pCi/l for the insoluble fraction and from 2.8 to 8 pCi/l for the soluble fraction. Concentrations detected in both

fractions were consistent with those observed in previous years (Figures C-3 and C-4, Appendix C).

Tritium

Monthly samples from all locations were composited quarterly and analyzed for tritium activity (Table C-II.3, Appendix C). Tritium activity ranged from -190 to 100 pCi/l. Similar activity levels were observed at all locations.

Gamma Spectrometry

Samples from all locations were analyzed for gamma emitting nuclides (Table C-II.4, Appendix C). Statistically significant activity for naturally occurring K-40 was found in 14 of 60 samples. Potassium-40 results ranged from -43 to 19 pCi/l. No statistically significant fission or activation products were found.

3. Fish

Fish samples comprised of catfish/bullhead (bottom feeder) and redbreast/pumpkinseed (predator) were collected at three locations (16C5, 20S1 and 29C1) semiannually. Two locations (16C5 and 20S1) could be affected by Station discharges. The following analysis was performed:

Gamma Spectrometry

The edible portion of fish samples from all three locations was analyzed for gamma emitting nuclides (Table C-III.1, Appendix C). With the exception of naturally occurring K-40, no statistically significant fission or activation products were found. Historical levels of Cs-137 are shown in Figure C-5, Appendix C.

4. Sediment

Aquatic sediment samples were collected at three locations (16B2, 16C4 and 33A2) semiannually. Of these locations, two (16B2 and 16C4) could be affected by Station discharge. The following analysis was performed:

Gamma Spectrometry

Sediment samples from all three locations were analyzed for gamma emitting nuclides (Table C-IV.1, Appendix C). Nuclides detected were cosmogenic Be-7; naturally occurring K-40, Ra-226 and Th-228; activation products Cr-51, Mn-54 and Co-60; and fission product Cs-137. The nuclides Th-228 and Ra-226 commonly occur in sediment from daughter decay of natural uranium.

Concentrations of the fission product Cs-137 were found in sediment samples from both indicator and control locations.

Location 16B2 had the highest average concentration of .31 pCi/g dry. The activity detected was consistent with those observed in the preoperational years (Figure C-6, Appendix C).

Statistically significant activity for the activation product Co-60 was found at location 16C4 (Vincent Dam) during the November collection. The activity ranged from -0.02 to 0.07 pCi/g (dry).

The calculated dose from this pathway to a teenager's skin was 6.72 E-03 mrem/yr. This value is based upon the assumption the maximum concentration Co-60 at the downstream locations was present the entire year. This dose represents 0.03% of the allowable fraction of 10 CFR 50, Appendix I limits.

B. Atmospheric Environment

1. Airborne

a. Air Particulates

Continuous air particulate samples were collected from seventeen locations on a weekly basis. The seventeen locations were separated into three groups: Group I represents locations within the LGS site boundary (10S3, 11S1, 14S1 and 34S2), Group II represents locations near the LGS site (2B1, 6C1, 9C1, 13C1, 15D1, 17B1, 20D1, 26B1, 29B1, 31D1, 35B1), and Group III represents control locations at remote distances from LGS (13H4 and 22G1). The following analyses were performed:

Gross Beta

Weekly samples were analyzed for concentrations of beta emitters (Table C-V.1, Appendix C).

Detectable gross beta activity was observed at all locations. Comparison of results among the three groups aid in determining the effects, if any, resulting from the operation of LGS. The results from the On-Site locations (Group I) ranged from 4 to 33 E-3 pCi/m^3 with a mean of 16 E-3 pCi/m^3. The results from the Intermediate Distance locations (Group II) ranged from 1 to 34 E-3 pCi/m^3 with a mean of 16 E-3 pCi/m^3. The results from the Distant locations (Group III) ranged from 3 to 42 E-3 pCi/m^3 with a mean of 18 E-3 pCi/m^3. Comparison of the weekly mean values indicate no notable differences among the three groups (Figure C-7, Appendix C). Comparison of the 1993 air particulate data with previous years data suggest no effects from the operation of LGS (Figure C-8, Appendix C).

Gamma Spectrometry

Weekly samples from five locations (10S3, 11S1, 14S1, 13C1,

and 13H4) were composited and analyzed quarterly for gamma-emitting nuclides (Table C-V.2, Appendix C). Naturally occurring Be-7 due to cosmic ray activity was detected in all samples. These values ranged from 35 to 92 E-3 pCi/m^3. Potassium-40, also naturally occurring, was detected in statistically significantly quantities in 14 of 20 samples. Activity for K-40 ranged from -14 to 28 E-3 pCi/m^3. No statistically significant fission or activation products were found.

b. Airborne Iodine

Continuous air samples were collected from five (10S3, 11S1, 14S1, 13C1, and 13H4) locations and analyzed weekly for I-131 (Table C-VI.1, Appendix C). No statistically significant I-131 activity was found.

2. Terrestrial

a. Milk

Samples were taken from five locations (10B1, 18C1, 19B1, 21B1 and 22F1) biweekly April through November and monthly December through March. Samples from four additional locations (9G1, 22C1, 25C1 and 36E1) were taken quarterly. The following analyses were performed:

Iodine-131

All milk samples from all locations were analyzed for concentrations of I-131 (Table C-VII.1, Appendix C). Values ranged from -.17 to .07 pCi/l. All results were below the minimum detectable activity.

Gamma Spectrometry

Each milk sample from locations 10B1, 18C1, 19B1, 21B1 and 22F1 were analyzed for concentrations of gamma emitting nuclides (Table C-VII.2, Appendix C).

Statistically significant K-40 activity was found in all samples. The values ranged from 1100 to 2500 pCi/l.

Statistically significant activity for Cs-137 was found in 1 of 21 goat milk (10B1) samples. Activity for Cs-137 ranged from -1 to 6 pCi/l. Historical Cs-137 activity in milk is shown in Figure C-9, Appendix C.

C. Ambient Gamma Radiation

Ambient gamma radiation levels were measured utilizing $CaSO_4$:Dy thermoluminescent dosimeters. Forty-eight TLD locations were established around the site in a three ring concept for comparison purposes: an "inner ring" of sixteen locations around the site

boundary; a "middle ring" of twenty-seven locations within a ten mile radius of the site; and an "outer ring" of five locations at distances outside the ten mile radius of the site. Results of TLD measurements are listed in Tables C-VIII.1 to C-VIII.4, Appendix C.

Most of the TLD measurements were below 10 mrad/std. month, with a range of 5.2 to 12.7 mR/std. month for the monthly TLDs and from 3.9 to 8.3 mR/std. month for the quarterly TLDs. Levels measured were consistent with those observed in previous years (Figure C-10, Appendix C).

V. References

1. Environmental Report Operating License Stage, Limerick Generating Station, Units 1 and 2, Volumes 1-5 Philadelphia Electric Company.

2. Branch Technical Position Paper, Regulatory Guide 4.8, Revision 1, November 1979.

3. Preoperational Radiological Environmental Monitoring Program Report, Limerick Generating Station Units 1 and 2, 1 January 1982 through 21 December 1984, Teledyne Isotopes and Radiation Management Corporation.

4. Radiological Environmental Operating Report No. 2, Limerick Generating Station Units 1 and 2, 1 January through 31 December 1985, Philadelphia Electric Company, analyses by Teledyne Isotopes.

5. Radiological Environmental Operating Report No. 3, Limerick Generating Station Units 1 and 2, 1 January through 31 December 1986, Philadelphia Electric Company, analyses by Teledyne Isotopes.

6. Radiological Environmental Operating Report No. 4, Limerick Generating Station Units 1 and 2, 1 January through 31 December 1987, Philadelphia Electric Company, analyses by Teledyne Isotopes.

7. Radiological Environmental Operating Report No. 5, Limerick Generating Station Units 1 and 2, 1 January through 31 December 1988, Philadelphia Electric Company, analyses by Teledyne Isotopes.

8. Radiological Environmental Operating Report No. 6, Limerick Generating Station Units 1 and 2, 1 January through 31 December 1989, Philadelphia Electric Company, analyses by Teledyne Isotopes.

9. Radiological Environmental Operating Report No. 7, Limerick Generating Station Units 1 and 2, 1 January through 31 December 1990, Philadelphia Electric Company, analyses by Teledyne Isotopes.

10 Radiological Environmental Operating Report No. 8, Limerick Generating Station Units 1 and 2, 1 January through 31 December 1991, Philadelphia Electric Company, analyses by Teledyne Isotopes.

11 Radiological Environmental Operating Report No. 9, Limerick Generating Station Units 1 and 2, 1 January through 31 December 1992, Philadelphia Electric Company, analyses by Teledyne Isotopes.

RADIOLOGICAL ENVIRONMENTAL MONITORING
REPORT SUMMARY

APPENDIX A
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

NAME OF FACILITY: LIMERICK GENERATING STATION
LOCATION OF FACILITY: MONTGOMERY COUNTY, PA

DOCKET NO.: 50-352 & 50-353
REPORTING PERIOD: 1993

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL 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 (PCI/LITER)	GROSS BETA SOLUBLE	36	4	5.4 (12/12) (2.5/9.0)	6.0 (24/24) (2.1/9.8)	7.1 (12/12) (4.1/9.8)	10F2 (CONTROL) PERKIOMEN PUMPING STATION 7.1 MILES E OF SITE	0
	GROSS BETA INSOLUBLE	36	4	2.8 (12/12) (0.2/10.5)	0.6 (24/24) (-0.2/2.6)	2.8 (12/12) (0.2/10.5)	13B1 (INDICATOR) VINCENT DAM 1.8 MILES ESE OF SITE	0
	TRITIUM	12	2000	20 (4/4) (-10/60)	-10 (8/8) (-170/90)	20 (4/4) (-10/60)	13B1 (INDICATOR) VINCENT DAM 1.8 MILES ESE OF SITE	0
	GAMMA SPEC K-40	36	N/A	-2 (12/12) (-28/30)	-6 (24/24) (-120/17)	-2 (12/12) (-28/30)	13B1 (INDICATOR) VINCENT DAM 1.8 MILES ESE OF SITE	0
	MN-54		15	0.1 (12/12) (-0.1/0.4)	0.1 (24/24) (-0.8/0.6)	0.1 (12/12) (-0.7/0.6)	24S1 (CONTROL) LGS INTAKE 0.3 MILES WSW OF SITE	0
	CO-58		15	-0.1 (12/12) (-0.7/0.8)	-0.1 (24/24) (-0.7/0.4)	0.0 (12/12) (-0.7/0.4)	24S1 (CONTROL) LGS INTAKE 0.3 MILES WSW OF SITE	0
	FE-59		30	0.1 (12/12) (-0.6/1.0)	0.3 (24/24) (-0.6/0.8)	0.4 (12/12) (-0.2/0.8)	10F2 (CONTROL) PERKIOMEN PUMPING STATION 7.1 MILES E OF SITE	0
	CO-60		15	0.1 (12/12) (-0.4/0.4)	0.2 (24/24) (-0.2/0.9)	0.3 (12/12) (-0.1/0.6)	24S1 (CONTROL) LGS INTAKE 0.3 MILES WSW OF SITE	0

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

APPENDIX A

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

NAME OF FACILITY: LIMERICK GENERATING STATION — DOCKET NO.: 50-352 & 50-353

LOCATION OF FACILITY: MONTGOMERY COUNTY, PA — REPORTING PERIOD: 1993

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL 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
	ZN-65		30	0.2 (12/12) (-0.5/1.0)	0.0 (24/24) (-1.1/1.1)	0.2 (12/12) (-0.5/1.0)	13B1 (INDICATOR) VINCENT DAM 1.8 MILES ESE OF SITE	0
	ZR-95		30	0.6 (12/12) (-0.8/3.0)	0.5 (24/24) (-2.0/2.0)	0.7 (12/12) (-0.2/2.0)	24S1 (CONTROL) LGS INTAKE 0.3 MILES WSW OF SITE	0
	NB-95		15	0.3 (12/12) (-0.4/0.6)	0.3 (24/24) (0.0/0.6)	0.3 (12/12) (0.1/0.6)	10F2 (CONTROL) PERKIOMEN PUMPING STATION 7.1 MILES E OF SITE	0
	CS-134		15	-0.1 (12/12) (-0.5/0.6)	0.0 (24/24) (-0.7/0.6)	0.1 (12/12) (-0.3/0.6)	10F2 (CONTROL) PERKIOMEN PUMPING STATION 7.1 MILES E OF SITE	0
	CS-137		18	0.2 (12/12) (-0.2/0.5)	0.1 (24/24) (-1.1/0.5)	0.2 (12/12) (0.0/0.5)	24S1 (CONTROL) LGS INTAKE 0.3 MILES WSW OF SITE	0
	BA-140		60	1 (12/12) (-1/2)	0 (24/24) (-3/3)	1 (12/12) (-1/2)	13B1 (INDICATOR) VINCENT DAM 1.8 MILES ESE OF SITE	0
	LA-140		15	-0.3 (12/12) (-2.0/0.6)	-0.1 (24/24) (-0.9/1.1)	0.0 (12/12) (-0.9/1.1)	10F2 (CONTROL) PERKIOMEN PUMPING STATION 7.1 MILES E OF SITE	0
	RA-226		N/A	-5 (12/12) (-20/16)	-9 (24/24) (-29/20)	-5 (12/12) (-20/16)	13B1 (INDICATOR) VINCENT DAM 1.8 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).

APPENDIX A
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

NAME OF FACILITY: LIMERICK GENERATING STATION
LOCATION OF FACILITY: MONTGOMERY COUNTY, PA

DOCKET NO.: 50-352 & 50-353
REPORTING PERIOD: 1993

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL 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
	TH-228		N/A	0.5 (12/12) (-1.6/2.6)	-0.2 (24/24) (-1.7/1.1)	0.5 (12/12) (-1.6/2.6)	1381 (INDICATOR) VINCENT DAM 1.8 MILES ESE OF SITE	0
DRINKING WATER (PCI/LITER)	GROSS BETA SOLUBLE	60	4	5.4 (48/48) (2.6/8.4)	5.0 (12/12) (3.1/7.0)	5.8 (12/12) (4.0/7.8)	15F4 (INDICATOR) PHILA. SUB. WATER CO. 7.8 MILES SSE OF SITE	0
	GROSS BETA INSOLUBLE	60	4	0.4 (48/48) (-0.3/2.3)	0.2 (12/12) (0.0/0.4)	0.8 (12/12) (0.1/2.1)	13H2 (INDICATOR) BELMONT WATER WORKS (PHILA.) 25.5 MILES SE OF SITE	0
	TRITIUM	20	2000	-10 (16/16) (-90/100)	-40 (4/4) (-190/30)	20 (4/4) (-90/100)	15F7 (INDICATOR) PHOENIXVILLE WATER WORKS 5.2 MILES SSE OF SITE	0
	GAMMA SPEC K-40	60	N/A	-5 (48/48) (-42/19)	-4 (12/12) (-43/19)	-1 (12/12) (-8/17)	13H2 (INDICATOR) BELMONT WATER WORKS (PHILA.) 25.5 MILES SE OF SITE	0
	MN-54		15	0.1 (48/48) (-0.3/0.7)	0.1 (12/12) (-0.1/0.6)	0.2 (12/12) (-0.1/0.7)	15F7 (INDICATOR) PHOENIXVILLE WATER WORKS 5.2 MILES SSE OF SITE	0
	CO-58		15	-0.1 (48/48) (-0.6/0.4)	-0.2 (12/12) (-0.7/0.2)	0.0 (12/12) (-0.5/0.4)	15F7 (INDICATOR) PHOENIXVILLE WATER WORKS 5.2 MILES SSE OF SITE	0
	FE-59		30	0.0 (48/48) (-1.0/1.0)	-0.1 (12/12) (-0.8/0.6)	0.1 (12/12) (-0.3/0.3)	16C2 (INDICATOR) CITIZENS HOME WATER CO. 2.4 MILES SSE OF SITE	0

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APPENDIX A
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

NAME OF FACILITY: LIMERICK GENERATING STATION
LOCATION OF FACILITY: MONTGOMERY COUNTY, PA

DOCKET NO.: 50-352 & 50-353
REPORTING PERIOD: 1993

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL 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
	CO-60		15	0.1 (48/48) (-0.4/0.8)	0.1 (12/12) (-0.2/0.3)	0.2 (12/12) (-0.4/0.8)	15F7 (INDICATOR) PHOENIXVILLE WATER WORKS 5.2 MILES SSE OF SITE	0
	ZN-65		30	0.2 (48/48) (-1.3/2.0)	0.3 (12/12) (-0.7/2.0)	0.4 (12/12) (-0.3/1.5)	15F7 (INDICATOR) PHOENIXVILLE WATER WORKS 5.2 MILES SSE OF SITE	0
	ZR-95		30	0.4 (48/48) (-2.4/3.0)	0.5 (12/12) (-0.5/1.6)	0.7 (12/12) (-0.4/2.0)	15F4 (INDICATOR) PHILA. SUB. WATER CO. 7.8 MILES SSE OF SITE	0
	NB-95		15	0.3 (48/48) (-1.0/0.9)	0.3 (12/12) (-0.4/0.9)	0.3 (12/12) (-0.1/0.9)	16C2 (INDICATOR) CITIZENS HOME WATER CO. 2.4 MILES SSE OF SITE	0
	CS-134		15	0.0 (48/48) (-1.3/0.7)	0.1 (12/12) (-0.6/0.8)	0.1 (12/12) (-0.6/0.8)	28F3 (CONTROL) POTTSTOWN WATER AUTHORITY 5.9 MILES WNW OF SITE	0
	CS-137		18	0.2 (48/48) (-0.2/0.8)	0.2 (12/12) (-0.6/0.5)	0.3 (12/12) (0.1/0.8)	13H2 (INDICATOR) BELMONT WATER WORKS (PHILA.) 25.5 MILES SE OF SITE	0
	BA-140		60	0 (48/48) (-2/4)	0 (12/12) (-2/5)	1 (12/12) (0/4)	15F4 (INDICATOR) PHILA. SUB. WATER CO. 7.8 MILES SSE OF SITE	0
	LA-140		15	-0.1 (48/48) (-5.0/1.0)	0.1 (12/12) (-0.9/2.0)	0.2 (12/12) (-1.1/1.0)	15F4 (INDICATOR) PHILA. SUB. WATER CO. 7.8 MILES SSE OF SITE	0

MEAN AND RANGE BASED UPON DETECTABLE MEASUREMENTS ONLY.
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APPENDIX A
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

NAME OF FACILITY: LIMERICK GENERATING STATION
LOCATION OF FACILITY: MONTGOMERY COUNTY, PA

DOCKET NO.: 50-352 & 50-353
REPORTING PERIOD: 1993

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL 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
	RA-226		N/A	-8 (48/48) (-21/12)	-1 (12/12) (-20/20)	-1 (12/12) (-20/20)	28F3 (CONTROL) POTTSTOWN WATER AUTHORITY 5.9 MILES WNW OF SITE	0
	TH-228		N/A	-0.2 (48/48) (-2.2/3.0)	-0.3 (12/12) (-2.3/1.2)	0.3 (12/12) (-2.1/3.0)	15F7 (INDICATOR) PHOENIXVILLE WATER WORKS 5.2 MILES SSE OF SITE	0
PREDATOR (FISH) (PCI/KG WET)	GAMMA SPEC K-40	6		3300 (4/4) (2800/4400)	2800 (2/2) (2400/3200)	3700 (2/2) (2900/4400)	16C5 (INDICATOR) Vincent Pool DOWNSTREAM OF DISCHARGE	0
	MN-54	6	130	1 (4/4) (-9/6)	-1 (2/2) (-12/10)	6 (2/2) (5/6)	16C5 (INDICATOR) Vincent Pool DOWNSTREAM OF DISCHARGE	0
	CO-58	6	130	-5 (4/4) (-9/-2)	10 (2/2) (0/20)	10 (2/2) (0/20)	29C1 (CONTROL) Pottstown Vicinity UPSTREAM OF DISCHARGE	0
	FE-59	6	260	0 (4/4) (-30/20)	20 (2/2) (20/20)	20 (2/2) (20/20)	29C1 (CONTROL) Pottstown Vicinity UPSTREAM OF DISCHARGE	0
	CO-60	6	130	7 (4/4) (-6/20)	-1 (2/2) (-1/0)	14 (2/2) (7/20)	20S1 (INDICATOR) Discharge Area DOWNSTREAM OF DISCHARGE	0
	ZN-65	6	260	10 (4/4) (-10/30)	0 (2/2) (-10/0)	10 (2/2) (0/20)	20S1 (INDICATOR) Discharge Area DOWNSTREAM OF DISCHARGE	0

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MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL 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
	CS-134	6	130	2 (4/4) (-9/12)	-2 (2/2) (-5/0)	2 (2/2) (-9/12)	16C5 (INDICATOR) Vincent Pool DOWNSTREAM OF DISCHARGE	0
	CS-137	6	150	4 (4/4) (0/8)	10 (2/2) (-1/20)	10 (2/2) (-1/20)	29C1 (CONTROL) Pottstown Vicinity UPSTREAM OF DISCHARGE	0
BOTTOM FEEDER (FISH) (PCI/KG WET)	GAMMA SPEC K-40	6		3200 (4/4) (2300/4100)	4000 (2/2) (3200/4700)	4000 (2/2) (3200/4700)	29C1 (CONTROL) Pottstown Vicinity UPSTREAM OF DISCHARGE	0
	MN-54	6	130	2 (4/4) (-1/4)	-1 (2/2) (-2/0)	2 (2/2) (0/4)	20S1 (INDICATOR) Discharge Area DOWNSTREAM OF DISCHARGE	0
	CO-58	6	130	-2 (4/4) (-6/5)	1 (2/2) (-5/7)	1 (2/2) (-3/5)	20S1 (INDICATOR) Discharge Area DOWNSTREAM OF DISCHARGE	0
	FE-59	6	260	-10 (4/4) (-20/0)	-10 (2/2) (-20/0)	0 (2/2) (-10/0)	16C5 (INDICATOR) Vincent Pool DOWNSTREAM OF DISCHARGE	0
	CO-60	6	130	-1 (4/4) (-10/5)	5 (2/2) (4/6)	5 (2/2) (4/6)	29C1 (CONTROL) Pottstown Vicinity UPSTREAM OF DISCHARGE	0
	ZN-65	6	260	1 (4/4) (-6/6)	0 (2/2) (-10/10)	3 (2/2) (2/3)	20S1 (INDICATOR) Discharge Area DOWNSTREAM OF DISCHARGE	0

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	CS-134	6	130	-6 (4/4) (-20/1)	-3 (2/2) (-7/2)	0 (2/2) (-1/1)	20S1 (INDICATOR) Discharge Area DOWNSTREAM OF DISCHARGE	0
	CS-137	6	150	8 (4/4) (5/11)	6 (2/2) (2/10)	10 (2/2) (9/11)	16C5 (INDICATOR) Vincent Pool DOWNSTREAM OF DISCHARGE	0
SILT (PCI/GRAM DRY)	GAMMA SPEC BE-7	6		3.8 (4/4) (1.8/7.8)	1.1 (2/2) (0.2/2.0)	4.8 (2/2) (1.8/7.8)	16C4 (INDICATOR) Vincent Dam DOWNSTREAM OF DISCHARGE	0
	K-40	6		16 (4/4) (13/18)	10.2 (2/2) (9.0/11.3)	16 (2/2) (13/18)	16C4 (INDICATOR) Vincent Dam DOWNSTREAM OF DISCHARGE	0
	CO-60	6		0.03 (4/4) (0.00/0.07)	-0.01 (2/2) (-0.02/0.00)	0.04 (2/2) (0.01/0.07)	16C4 (INDICATOR) Vincent Dam DOWNSTREAM OF DISCHARGE	0
	CS-134	6	0.15	0.06 (4/4) (0.03/0.08)	0.04 (2/2) (0.03/0.06)	0.07 (2/2) (0.06/0.08)	16B2 (INDICATOR) LINFIELD BRIDGE 1.1 MILES SSE OF SITE	0
	CS-137	6	0.18	0.26 (4/4) (0.15/0.35)	0.06 (2/2) (0.04/0.08)	0.31 (2/2) (0.26/0.35)	16B2 (INDICATOR) LINFIELD BRIDGE 1.1 MILES SSE OF SITE	0
	RA-226	6		2.7 (4/4) (2.4/3.0)	2.1 (2/2) (1.9/2.2)	2.8 (2/2) (2.5/3.0)	16B2 (INDICATOR) LINFIELD BRIDGE 1.1 MILES SSE OF SITE	0

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RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

NAME OF FACILITY: LIMERICK GENERATING STATION
LOCATION OF FACILITY: MONTGOMERY COUNTY, PA
DOCKET NO.: 50-352 & 50-353
REPORTING PERIOD: 1993

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL 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
	TH-228	6		1.3 (4/4) (1.2/1.4)	1.0 (2/2) (1.0/1.1)	1.3 (2/2) (1.2/1.4)	1682 (INDICATOR) LINFIELD BRIDGE 1.1 MILES SSE OF SITE	0
AIR PARTICULATE (E-3 PCI/CU. METER)	GROSS BETA	893	10	16 (791/791) (1/34)	18 (102/102) (3/42)	20 (49/49) (12/42)	13H4 (CONTROL) 2301 MARKET ST. (PHILA.) 28.8 MILES SE OF SITE	0
	GAMMA SPEC	20						
	BE-7		N/A	65 (16/16) (35/92)	73 (4/4) (68/80)	73 (4/4) (68/80)	13H4 (CONTROL) 2301 MARKET ST. (PHILA.) 28.8 MILES SE OF SITE	0
	K-40		N/A	9 (16/16) (-2/28)	1 (4/4) (-14/14)	19 (4/4) (9/28)	14S1 (INDICATOR) LONGVIEW ROAD 0.6 MILES SE OF SITE	0
	CS-134		50	0.0 (16/16) (-0.2/0.1)	-0.1 (4/4) (-0.4/0.0)	0.1 (4/4) (0.0/0.1)	13C1 (INDICATOR) KING ROAD 2.9 MILES SE OF SITE	0
	CS-137		60	0.1 (16/16) (-0.2/0.5)	0.0 (4/4) (-0.1/0.1)	0.1 (4/4) (0.0/0.2)	14S1 (INDICATOR) LONGVIEW ROAD 0.6 MILES SE OF SITE	0
	RA-226		N/A	-3 (16/16) (-5/1)	-3 (4/4) (-6/0)	-1 (4/4) (-3/1)	13C1 (INDICATOR) KING ROAD 2.9 MILES SE OF SITE	0
	TH-228		N/A	-0.2 (16/16) (-1.1/1.3)	-0.3 (4/4) (-0.6/0.1)	0.3 (4/4) (-0.2/1.3)	10S3 (INDICATOR) KEEN ROAD 0.5 MILES E OF SITE	0

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MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL 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 IODINE (E-3 PCI/CU. METER)	I-131	261	70	0 (212/212) (-12/13)	1 (49/49) (-25/15)	1 (49/49) (-25/15)	13H4 (CONTROL) 2301 MARKET ST. (PHILA.) 28.8 MILES SE OF SITE	0
MILK (PCI/LITER)	I-131 BY RADIOCHEMISTRY	100	1	-0.02 (71/71) (-0.17/0.04)	-0.01 (29/29) (-0.09/0.04)	-0.01 (4/4) (-0.03/0.01)	22C1 (INDICATOR) REGIONAL FARM 3.0 MILES SW OF SITE	0
	GAMMA SPEC K-40	84	N/A	1400 (63/63) (1100/1600)	1300 (21/21) (1200/1400)	1500 (2/2) (1400/1600)	2581 (INDICATOR) REGIONAL FARM 1.3 MILES WSW OF SITE	0
	CS-134		15	0 (63/63) (-4/3)	0 (21/21) (-2/3)	0 (19/19) (-1/2)	18C1 (INDICATOR) REGIONAL FARM 1.9 MILES S OF SITE	0
	CS-137		18	1 (63/63) (-1/3)	2 (21/21) (0/4)	2 (21/21) (0/4)	22F1 (CONTROL) REGIONAL FARM 9.8 MILES SW OF SITE	0
	BA-140		60	-5 (63/63) (-290/10)	0 (21/21) (-7/7)	3 (2/2) (2/4)	2581 (INDICATOR) REGIONAL FARM 1.3 MILES WSW OF SITE	0
	LA-140		15	0 (63/63) (-29/4)	0 (21/21) (-3/5)	0 (21/21) (-2/4)	1981 (INDICATOR) REGIONAL FARM 1.9 MILES SSW OF SITE	0

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GOAT MILK (PCI/LITER	I-131 BY RADIOCHEMISTRY	21	1	-0.01 (21/21) (-0.16/0.07)		-0.01 (21/21) (-0.16/0.07)	1081 (INDICATOR) REGIONAL FARM 1.1 MILES ESE OF SITE	0
	GAMMA SPEC K-40	21	N/A	1600 (21/21) (1200/2500)		1600 (21/21) (1200/2500)	1081 (INDICATOR) REGIONAL FARM 1.1 MILES ESE OF SITE	0
	CS-134		15	0 (21/21) (-5/3)		0 (21/21) (-5/3)	1081 (INDICATOR) REGIONAL FARM 1.1 MILES ESE OF SITE	0
	CS-137		18	2 (21/21) (-1/6)		2 (21/21) (-1/6)	1081 (INDICATOR) REGIONAL FARM 1.1 MILES ESE OF SITE	0
	BA-140		60	1 (21/21) (-6/9)		1 (21/21) (-6/9)	1081 (INDICATOR) REGIONAL FARM 1.1 MILES ESE OF SITE	0
	LA-140		15	1 (21/21) (-2/5)		1 (21/21) (-2/5)	1081 (INDICATOR) REGIONAL FARM 1.1 MILES ESE OF SITE	0
DIRECT RADIATION (MILLI-ROENTGEN / STD. MONTH)	TLD-MONTHLY	576	N/A	7.11 (516/516) (4.90/12.70)	6.82 (60/60) (4.10/10.90)	8.75 (12/12) (7.70/10.90)	5H1 (CONTROL) BIRCH SUBSTATION 25.8 MILES NE OF SITE	
	TLD-QUARTERLY	192	N/A	6.09 (172/172) (3.90/7.70)	5.78 (20/20) (4.00/8.30)	7.55 (4/4) (6.40/8.30)	5H1 (CONTROL) BIRCH SUBSTATION 25.8 MILES NE OF SITE	

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

SAMPLE DESIGNATION
AND LOCATIONS

APPENDIX B: SAMPLE DESIGNATION AND LOCATIONS

LIST OF TABLES AND FIGURES

TABLES

FIGURES

TABLE B-I: Location Designation and Identification System for the Limerick Generating Station

XXYZ - General code for identification of locations, where:

XX - Angular Sector of Sampling Location.

The compass is divided into 36 sectors of 10 degrees each with center at Limerick off-gas vent. Sector 36 is centered due North, and others are numbered in a clockwise direction.

Y - Radial Zone of Sampling Location (in this report, the radial distance from the Limerick vent for all regional stations).

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

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

TABLE B-II: Sample Collection and Analysis Program for the Radiological Environmental Monitoring Program for Limerick Generating Station, 1993

Location	Location Description	Distance & Direction	Collection Method and Frequency	Analysis & Frequency Performed--Consultant
A. Surface Water				
10F2	Perkiomen Pumping Station (control)	7.1 miles E	Two gallon sample collected from a continuous water sampler, monthly	G. Beta (S&I) - monthly - TB Gamma Spec - monthly - TB Tritium - quarterly comp. - TB G. Beta (S&I) - monthly - PSEG* Gamma Spec - monthly - PSEG*
13B1	Vincent Dam (indicator)	1.8 miles ESE	Same as 10F2	Same as 10F2
24S1	Limerick Intake (control)	0.3 miles SSW	Same as 10F2	Same as 10F2
B. Drinking (Potable) Water				
13H2	Belmont Water Works (indicator)	25.5 miles SE	Two gallon composite sample collected from a continuous water sampler, monthly	G. Beta (S&I) - monthly - TB Gamma Spec - monthly - TB Tritium - quarterly comp. - TB
15F4	Philadelphia Suburban Water Company (indicator)	7.8 miles SSE	Same as 13H2	Same as 13H2
15F7	Phoenixville Water Works (indicator)	5.2 miles SSE	Same as 13H2	Same as 13H2
16C2	Citizens Home Water Company (indicator)	2.4 miles SSE	Two gallon composite sample collected by weekly grab samples, monthly	Same as 13H2

TABLE B-II: Sample Collection and Analysis Program for the Radiological Environmental Monitoring Program for Limerick Generating Station, 1993

Location	Location Description	Distance & Direction	Collection Method and Frequency	Analysis & Frequency Performed--Consultant
28F3	Pottstown Water Authority (control)	5.9 miles WNW	Same as 13H2	Same as 13H2
C. Cow's Milk				
36E1		4.7 miles N	Two gallons processed milk purchased quarterly at farm dairy store	I-131 - quarterly - TB
9G1	Control	11.4 miles E	Two gallon grab sample collected from bulk tank at farm quarterly	Same as 36E1
18C1		1.9 miles S	Two gallon grab sample collected from bulk tank at farm bi-weekly during grazing season (April through November); monthly otherwise	I-131 - biweekly - TB Gamma Spec - biweekly - TB
19B1		1.9 miles SSW	Same as 18C1	I-131 - biweekly - TB Gamma Spec - biweekly - TB I-131 - quarterly - PSEG* Gamma Spec - quarterly - PSEG*
21B1		1.7 miles SW	Same as 18C1	Same as 19B1
22C1		3.0 miles SW	Same as 9G1	Same as 36E1
22F1	Control	9.8 miles SW	Same as 18C1	Same as 19B1
25B1		1.3 miles WSW	Same as 18C1	Same as 18C1
25C1		2.7 miles WSW	Same as 18C1	Same as 18C1

TABLE B-II: Sample Collection and Analysis Program for the Radiological Environmental Monitoring Program for Limerick Generating Station, 1993

Location	Location Description	Distance & Direction	Collection Method and Frequency	Analysis & Frequency Performed--Consultant
D. Goat's Milk				
10B1		1.1 mile ESE	Two gallon grab sample purchased at goat farm, biweekly during grazing season (April through November); monthly otherwise	I-131 - biweekly - TB Gamma Spec - biweekly - TB
E. Air Particulates / Air Iodine				
2B1	Sanatoga Substation	1.5 miles NNE	Approximately 1 cfm continuous flow through glass fiber and charcoal filters (approx. 2" diameter) which are installed for one week and replaced	G. Beta - weekly - TB I-131 - if necessary
6C1	Pottstown Landing Field	2.1 miles ENE	Same as 2B1	Same as 2B1
9C1	Reed Road	2.2 miles E	Same as 2B1	Same as 2B1
10S3	Keen Road	0.5 miles E	Same as 2B1	G. Beta - weekly - TB Gamma Spec - quarterly comp. - TB I-131 - weekly - TB
11S1	LGS Information Center	0.5 miles ESE	Same as 2B1	Same as 10S3
11S2	LGS Information Center	0.5 miles ESE	Same as 2B1	G. Beta - weekly - PSEG* Gamma Spec - quar comp - PSEG*
13C1	King Road	2.9 miles SE	Same as 2B1	Same as 10S3
13H4	2301 Market St., Philadelphia (control)	28.8 miles SE	Same as 2B1	Same as 10S3
14S1	Longview Road	0.6 miles SE	Same as 2B1	Same as 10S3

TABLE B-II: Sample Collection and Analysis Program for the Radiological Environmental Monitoring Program for Limerick Generating Station, 1993

Location	Location Description	Distance & Direction	Collection Method and Frequency	Analysis & Frequency Performed--Consultant
14S2	Longview Road	0.6 miles SE	Same as 2B1	Same as 11S2
15D1	Spring City Substation	3.2 miles SE	Same as 2B1	Same as 2B1
17B1	Linfield Substation	1.6 miles S	Same as 2B1	Same as 2B1
20D1	Ellis Wood Road	3.1 miles SSW	Same as 2B1	Same as 2B1
22G1	Manor Substation (control)	17.6 miles SW	Same as 2B1	Same as 2B1
26B1	Old Schuylkill Road	1.7 miles W	Same as 2B1	Same as 2B1
29B1	Vost Road	1.8 miles NW	Same as 2B1	Same as 2B1
31D1	Lincoln Substation	3.0 miles NW	Same as 2B1	Same as 2B1
34S2	Met. Tower #1	0.6 miles NNW	Same as 2B1	Same as 2B1
35B1	Pleasantview Road	1.9 miles NNW	Same as 2B1	Same as 2B1
F. Fish				
16C5	Vincent Pool (indicator)	Downstream of Discharge	Fish flesh from two groups representing predator and bottom feeder species collected by electrofisher or other appropriate fishery gear, semiannually	Gamma Spec - semiannually - TB
20S1	Discharge Area (indicator)	Downstream of Discharge	Same as 16C5	Same as 16C5
29C1	Pottstown Vicinity (control)	Upstream of Intake	Same as 16C5	Same as 16C5

TABLE B-II: Sample Collection and Analysis Program for the Radiological Environmental Monitoring Program for Limerick Generating Station, 1993

Location	Location Description	Distance & Direction	Collection Method and Frequency	Analysis & Frequency Performed--Consultant
G. Sediment				
16B2	Linfield Bridge (indicator)	Downstream of Discharge	Recently deposited sediment collected below the waterline, semi-annually	Gamma Spec - semiannually - TB
16C4	Vicent Dam (indicator)	Downstream of Discharge	Same as 16B2	Same as 16B2
33A2	Control	Upstream of Discharge	Same as 16B2	Same as 16B2
H. Environmental Dosimetry - TLD				
36S2	Evergreen & Sanatoga Road	0.6 miles N	Collection method and frequency is described in placement procedure Section III, A.	TLD - monthly - TB TLD - quarterly - TB
2B1	Sanatoga Substation	1.5 miles NNE	Same as 36S2	Same as 36S2
2E1	Laughing Waters GSC	5.1 miles NNE	Same as 36S2	Same as 36S2
3S1	Sanatoga Road	0.6 miles NNE	Same as 36S2	Same as 36S2
4E1	Neiffer Road	4.6 miles NE	Same as 36S2	Same as 36S2
5S1	Possum Hollow Road	0.4 miles NE	Same as 36S2	Same as 36S2
5H1	Birch Substation	25.8 miles NE	Same as 36S2	Same as 36S2
6C1	Pottstown Landing Field	2.1 miles ENE	Same as 36S2	Same as 36S2
7S1	LGS Training Center	0.5 miles ENE	Same as 36S2	Same as 36S2
7E1	Pheasant Road	4.2 miles ENE	Same as 36S2	Same as 36S2
9C1	Reed Road	2.2 miles E	Same as 36S2	Same as 36S2

TABLE B-II: Sample Collection and Analysis Program for the Radiological Environmental Monitoring Program for Limerick Generating Station, 1993

Location	Location Description	Distance & Direction	Collection Method and Frequency	Analysis & Frequency Performed--Consultant
10S3	Keen Road	0.5 miles E	Same as 36S2	Same as 36S2
10E1	Royersford Road	3.9 miles E	Same as 36S2	Same as 36S2
10F3	Trappe Substation	5.5 miles ESE	Same as 36S2	Same as 36S2
11S1	LGS Information Center	0.5 miles ESE	Same as 36S2	Same as 36S2
13C1	King Road	2.9 miles SE	Same as 36S2	Same as 36S2
13E1	Vaughn Substation	4.3 miles SE	Same as 36S2	Same as 36S2
13H4	2301 Market Street Philadelphia, (control)	28.8 miles SE	Same as 36S2	Same as 36S2
14S1	Longview Road	0.6 miles SE	Same as 36S2	Same as 36S2
15D1	Spring City Substation	3.2 miles SE	Same as 36S2	Same as 36S2
16S2	Longview Road	0.6 miles SSE	Same as 36S2	Same as 36S2
16F1	Pikeland Substation	4.9 miles SSE	Same as 36S2	Same as 36S2
17B1	Linfield Substation	1.6 miles S	Same as 36S2	Same as 36S2
18S1	Rail Line along Longview Road	0.3 miles S	Same as 36S2	Same as 36S2
18G1	Planebrook Substation	12.9 miles S	Same as 36S2	Same as 36S2
19D1	Snowden Substation	3.6 miles S	Same as 36S2	Same as 36S2
20D1	Ellis Woods Road	3.1 miles SSW	Same as 36S2	Same as 36S2

TABLE B-II: Sample Collection and Analysis Program for the Radiological Environmental Monitoring Program for Limerick Generating Station, 1993

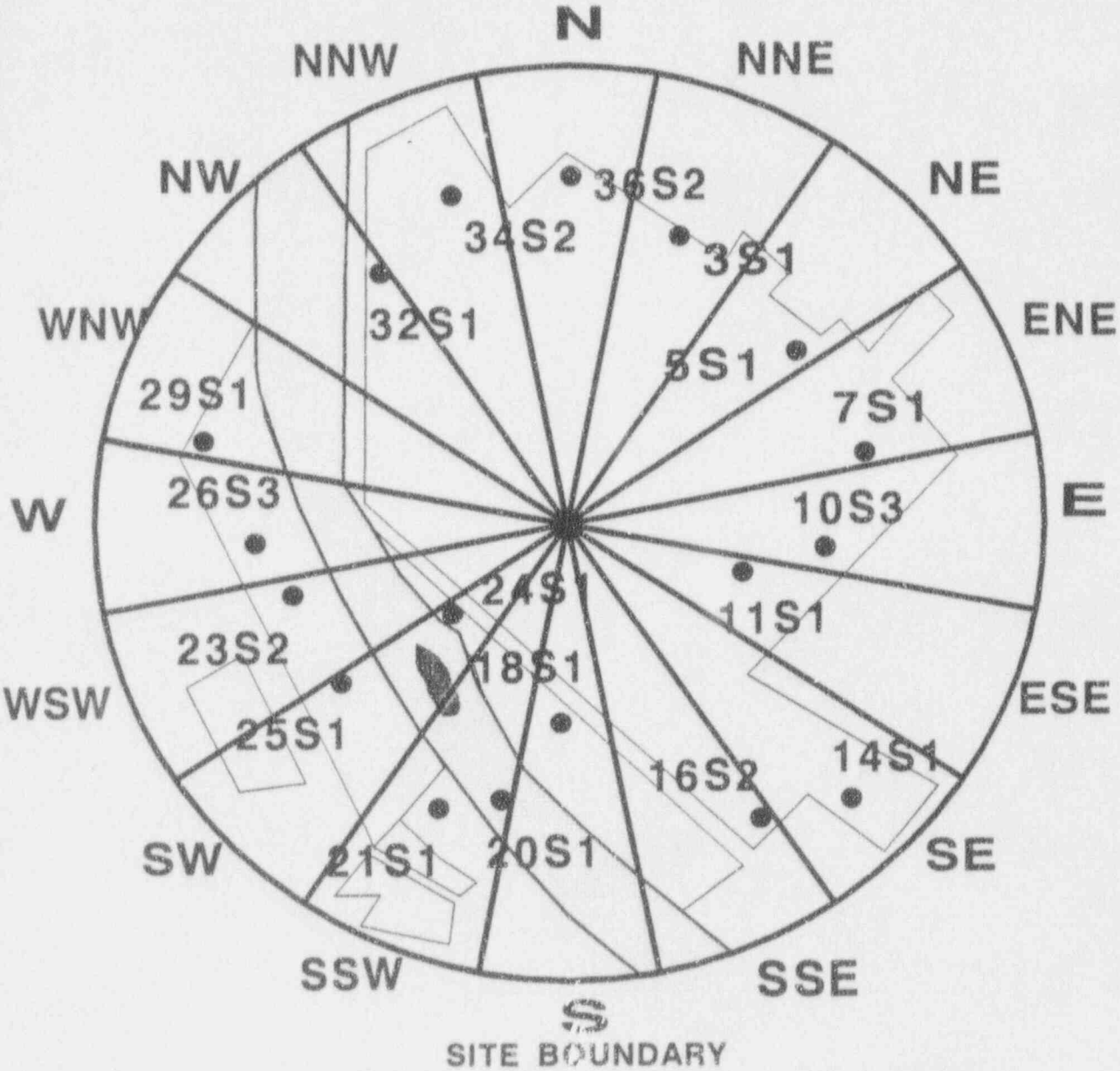
Location	Location Description	Distance & Direction	Collection Method and Frequency	Analysis & Frequency Performed--Consultant
20F1	Sheeder Substation	5.2 miles SSW	Same as 36S2	Same as 36S2
21S1	Impound Basin	0.5 miles SSW	Same as 36S2	Same as 36S2
22G1	Manor Substation	17.6 miles SW	Same as 36S2	Same as 36S2
23S2	Transmission Tower	0.5 miles WSW	Same as 36S2	Same as 36S2
24D1	Porters Mill Substation	3.9 miles SW	Same as 36S2	Same as 36S2
25S1	Sector Site Boundary	0.5 miles SW	Same as 36S2	Same as 36S2
25D1	Hoffecker & Keim Streets	4.0 miles WSW	Same as 36S2	Same as 36S2
26S3	Met. Tower #2	0.4 miles W	Same as 36S2	Same as 36S2
26B1	Old Schuylkill Road	1.7 miles W	Same as 36S2	Same as 36S2
28D2	W. Cedarville Road	3.8 miles W	Same as 36S2	Same as 36S2
29S1	Sector Site Boundary	0.5 miles WNW	Same as 36S2	Same as 36S2
29B1	Yost Road	1.8 miles NW	Same as 36S2	Same as 36S2
29E1	Prince Street	4.9 miles WNW	Same as 36S2	Same as 36S2
31D1	Lincoln Substation	3.0 miles NW	Same as 36S2	Same as 36S2
31D2	Poplar Substation	3.9 miles NW	Same as 36S2	Same as 36S2
32S1	Sector Site Boundary	0.6 miles NW	Same as 36S2	Same as 36S2
32G1	Friendensburg Substation	15.6 miles NW	Same as 36S2	Same as 36S2
34S2	Met. Tower #1	0.6 miles NNW	Same as 36S2	Same as 36S2

TABLE B-II: Sample Collection and Analysis Program for the Radiological Environmental Monitoring Program for Limerick Generating Station, 1993

Location	Location Description	Distance & Direction	Collection Method and Frequency	Analysis & Frequency Performed--Consultant
34E1	Varnell Road	4.6 miles NNW	Same as 36S2	Same as 36S2
35B1	Pleasantville Road	1.9 miles NNW	Same as 36S2	Same as 36S2
35F1	Ringing Rock Substation	4.2 miles N	Same as 36S2	Same as 36S2

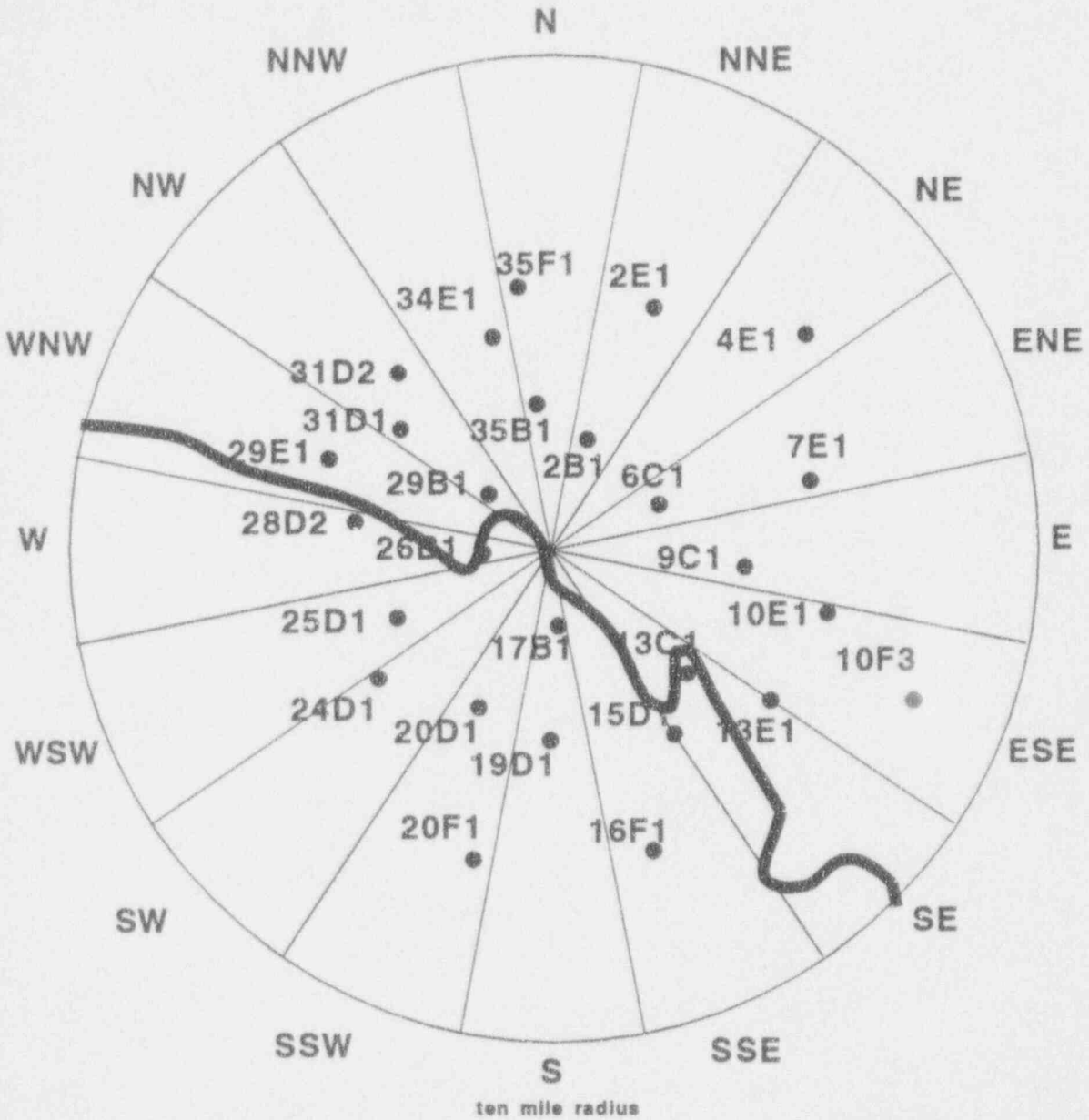
* QC Laboratory

FIGURE B-1
ENVIRONMENTAL SAMPLING LOCATIONS ON-SITE OR NEAR THE LIMERICK GENERATING STATION, 1993



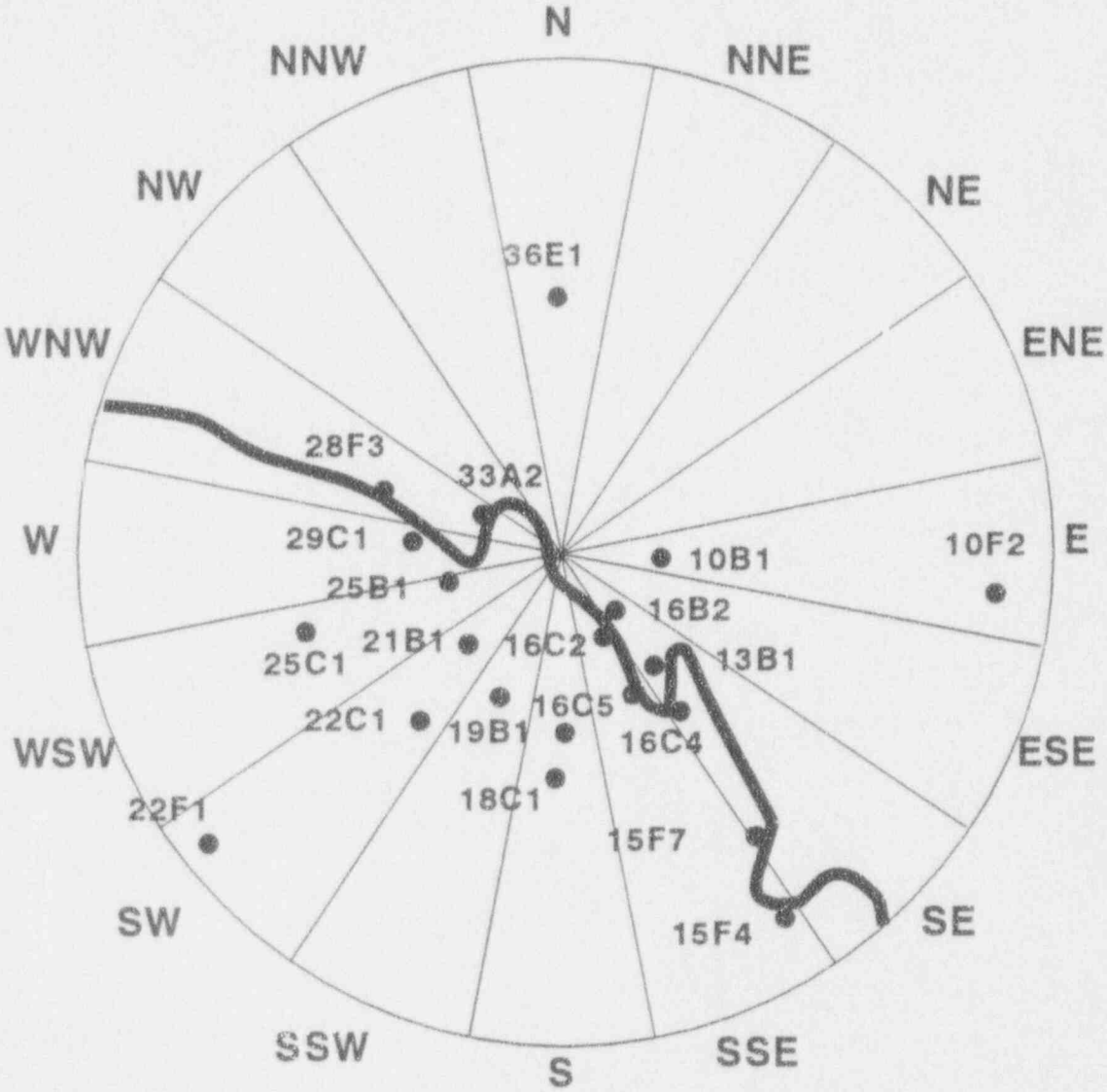
36S2	EVERGREEN & SANATOGA RD.	20S1	LGS DISCHARGE AREA
3S1	SANATOGA RD.	21S1	LGS IMPOUNDING BASIN
5S1	POSSUM HOLLOW RD.	23S2	TRANSMISSION TOWER
7S1	LGS TRAINING CENTER	24S1	LGS INTAKE
10S3	KEEN RD.	25S1	SW SECTOR
11S1	LGS INFORMATION CNTR.	26S3	MET. TOWER #2
14S1	LONGVIEW RD.	29S1	WNW SECTOR
16S2	LONGVIEW RD.	32S1	NW SECTOR
18S1	RAILROAD TRACKS	34S2	MET. TOWER #1

FIGURE B-2
AIRBORNE AND TLD ENVIRONMENTAL SAMPLING LOCATIONS AT INTERMEDIATE DISTANCES FROM LIMERICK GENERATING STATION, 1993



2B1 SANATOGA SUBSTATION
2E1 LAUGHING WATERS GSC
4E1 NEIFFER ROAD
6C1 POTTSTOWN AIRPORT
7E1 PHEASANT ROAD
9C1 REED ROAD
10E1 ROYERSFORD ROAD
10F3 TRAPPE SUBSTATION
13C1 KING ROAD
13E1 VAUGHN ROAD
15D1 SPRING CITY SUBSTATION
16F1 PIKELAND SUBSTATION
17B1 LINFIELD SUBSTATION
19D1 SNOWDEN SUBSTATION
20D1 ELLIS WOODS ROAD
20F1 SHEEDER SUBSTATION
24D1 PORTERS MILL SUBSTATION
25D1 HOFFECKER & KEIM ST.
26B1 OLD SCHUYLKILL RD
)D2 W. CEDARVILLE RD
)B1 YOST ROAD
)E1 HIGH SUBSTATION
)1D1 LINCOLN SUBSTATION
31D2 POPLAR SUBSTATION
34E1 YARNELL ROAD
35B1 PLEASANTVILLE RD
35F1 RINGING ROCKS SUB

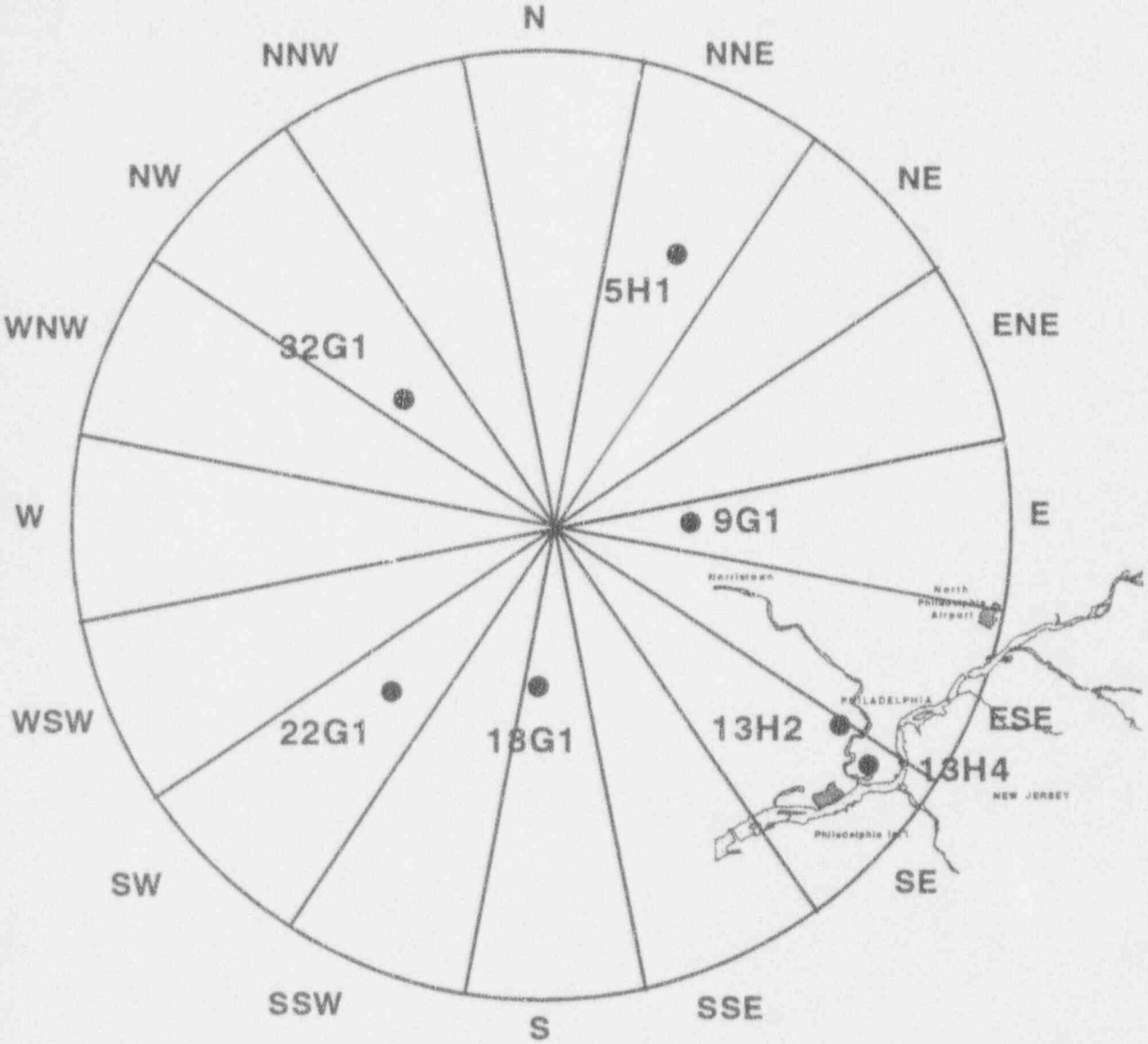
FIGURE B-3
AQUATIC AND TERRESTRIAL ENVIRONMENTAL SAMPLING LOCATIONS AT INTERMEDIATE DISTANCES FROM LIMERICK GENERATING STATION, 1993



ten mile radius

10B1 FARM IN ESE SECTOR	19B1 FARM IN SSW SECTOR
10F2 PERKIOMEN CREEK	21B1 FARM IN SW SECTOR
13B1 VINCENT DAM	22C1 FARM IN SW SECTOR
15F4 PHIL. SUB. WATER CO.	22F1 FARM IN SW SECTOR
15F7 PHOENIXVILLE WATER CO.	25B1 FARM IN WSW SECTOR
16B2 LINFIELD BRIDGE	25C1 FARM IN WSW SECTOR
16C2 CITIZENS HOME WATER CO.	28F3 POTTSTOWN WATER AUTH.
16C4 VINCENT POOL	29C1 POTTSTOWN VICINITY
16C5 VINCENT POOL	33A2 UPSTREAM OF LGS
18C1 FARM IN S SECTOR	36E1 FARM IN N SECTOR

FIGURE B-4
ENVIRONMENTAL SAMPLING LOCATIONS AT REMOTE DISTANCES FROM LIMERICK GENERATING STATION, 1993



fifty mile radius

5H1 BIRCH SUBSTATION
9G1 FARM IN E SECTOR
13H2 BELMONT WATER WORKS
13H4 PECo BUILDING
18G1 PLANEBROOK SUBSTATION
22G1 MANOR SUBSTATION
32G1 FRIEDENBERG SUBSTATION

DATA TABLES
AND FIGURES
PRIMARY LABORATORY

APPENDIX C: DATA TABLES AND FIGURES - PRIMARY LABORATORY

TABLES

FIGURES

TABLE C-I.1 CONCENTRATIONS OF GROSS BETA INSOLUBLE IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	10F2		13B1		24S1	
JAN 93	0.6	± 0.5	0.3	± 0.5	0.1	± 0.5
FEB 93	0.2	± 0.5	0.2	± 0.5	0.4	± 0.5
MAR 93	1.1	± 0.7	1.7	± 0.7	0.9	± 0.6
APR 93	0.3	± 0.5	0.5	± 0.5	0.5	± 0.5
MAY 93	0.0	± 0.4	1.8	± 0.6	0.1	± 0.4
JUN 93	1.0	± 0.5	11	± 1	0.4	± 0.5
JUL 93	2.6	± 0.7	4.6	± 0.9	0.0	± 0.4
AUG 93	2.0	± 0.6	0.6	± 0.5	0.6	± 0.5
SEP 93	0.7	± 0.5	1.2	± 0.5	0.5	± 0.5
OCT 93	0.2	± 0.5	0.9	± 0.5	0.8	± 0.5
NOV 93	0.1	± 0.5	9	± 1	-0.2	± 0.5
DEC 93	0.1	± 0.5	1.7	± 0.7	1.1	± 0.6
MEAN	0.8	± 1.6	2.8	± 7.2	0.4	± 0.8

TABLE C-I.2 CONCENTRATIONS OF GROSS BETA SOLUBLE IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	10F2		13B1		24S1	
JAN 93	6	± 1	3.0	± 1.0	3	± 1
FEB 93	10	± 1	5	± 1	5	± 1
MAR 93	9	± 1	5	± 1	3	± 1
APR 93	4.1	± 0.9	2.5	± 0.8	3.3	± 0.9
MAY 93	7	± 1	4	± 1	3	± 1
JUN 93	7	± 1	6	± 1	6	± 1
JUL 93	6	± 1	6	± 1	7	± 1
AUG 93	7	± 1	8	± 2	8	± 1
SEP 93	7	± 1	9	± 1	5	± 1
OCT 93	10	± 1	7	± 1	6	± 1
NOV 93	7	± 1	7	± 1	6	± 1
DEC 93	5	± 1	4	± 1	2.1	± 0.9
MEAN	7.1	± 3.6	5.5	± 4.0	4.8	± 3.8

TABLE C-I.3 CONCENTRATIONS OF TRITIUM IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	10F2		13B1		24S1	
JAN-MAR 93	-30	± 70	40	± 80	-20	± 70
APR-JUN 93	20	± 90	-10	± 90	50	± 90
JUL-SEP 93	40	± 60	60	± 60	90	± 60
OCT-DEC 93	-200	± 100	0	± 100	-100	± 100
MEAN	-30	± 190	20	± 60	10	± 130

TABLE C-I.4 CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES
COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	K-40		MN-54		CO-58		FE-59		CO-60		ZN-65	
10F2	JAN 93	8	± 5	0.1	± 0.4	0.2	± 0.4	0.5	± 0.9	0.1	± 0.4	-0.8	± 0.8
	FEB 93	1	± 5	-0.1	± 0.4	-0.2	± 0.4	0.1	± 1.0	0.0	± 0.4	0.3	± 0.9
	MAR 93	16	± 7	0.5	± 0.5	0.4	± 0.6	0	± 1	0.0	± 0.5	0	± 1
	APR 93	0	± 5	0.4	± 0.3	0.0	± 0.4	0.3	± 0.8	0.2	± 0.3	0.2	± 0.7
	MAY 93	-1	± 6	-0.8	± 0.4	-0.2	± 0.4	0.2	± 0.9	0.0	± 0.4	-0.3	± 0.9
	JUN 93	6	± 5	0.4	± 0.3	-0.1	± 0.4	0.3	± 0.8	0.3	± 0.4	0.1	± 0.7
	JUL 93	-120	± 10	0.0	± 0.5	-0.6	± 0.5	0	± 1	0.5	± 0.5	1	± 1
	AUG 93	17	± 7	0.0	± 0.5	0.0	± 0.5	0	± 1	-0.2	± 0.5	-1	± 1
	SEP 93	9	± 6	0.3	± 0.5	-0.2	± 0.5	1	± 1	0.1	± 0.5	0	± 1
	OCT 93	-3	± 6	0.1	± 0.4	0.0	± 0.5	1	± 1	0.0	± 0.4	-0.1	± 1.0
	NOV 93	-10	± 10	0.5	± 0.6	-0.5	± 0.6	0	± 1	0.4	± 0.5	0	± 1
	DEC 93	-5	± 7	0.2	± 0.4	0.0	± 0.4	1	± 1	0.9	± 0.5	0	± 1
	MEAN	-7	± 73	0.1	± 0.7	-0.1	± 0.5	0.4	± 0.6	0.2	± 0.6	-0.1	± 1.1
13B1	JAN 93	-10	± 7	0.4	± 0.4	-0.2	± 0.4	0.6	± 0.9	0.0	± 0.4	-0.5	± 0.9
	FEB 93	-28	± 8	-0.1	± 0.4	0.0	± 0.5	0	± 1	0.2	± 0.4	-0.1	± 0.9
	MAR 93	-6	± 7	0.1	± 0.4	0.1	± 0.4	0.3	± 1.0	0.2	± 0.4	-0.3	± 0.9
	APR 93	-5	± 5	0.1	± 0.4	-0.1	± 0.4	0.0	± 1.0	-0.1	± 0.4	0.8	± 0.8
	MAY 93	1	± 6	-0.1	± 0.4	0.0	± 0.4	-0.2	± 0.8	0.2	± 0.4	0.0	± 0.8
	JUN 93	-8	± 7	0.1	± 0.4	-0.1	± 0.4	-0.1	± 0.8	0.4	± 0.4	-0.3	± 0.8
	JUL 93	-2	± 7	-0.1	± 0.5	-0.2	± 0.5	0	± 1	0.4	± 0.6	1	± 1
	AUG 93	9	± 6	0.1	± 0.5	-0.7	± 0.5	0	± 1	0.1	± 0.5	0	± 1
	SEP 93	17	± 6	0.1	± 0.5	0.8	± 0.6	0	± 1	-0.1	± 0.5	0	± 1
	OCT 93	-12	± 9	0.2	± 0.4	-0.1	± 0.5	-1	± 1	-0.4	± 0.4	1	± 1
	NOV 93	30	± 8	0.2	± 0.6	-0.2	± 0.6	0	± 1	-0.2	± 0.6	0	± 1
	DEC 93	-10	± 10	0.1	± 0.6	-0.5	± 0.6	1	± 1	-0.1	± 0.6	1	± 1
	MEAN	-2	± 30	0.1	± 0.3	-0.1	± 0.7	0.1	± 0.9	0.1	± 0.5	0.2	± 1.0
24S1	JAN 93	-10	± 6	0.1	± 0.4	0.0	± 0.4	0.6	± 0.9	0.1	± 0.4	-1.0	± 0.9
	FEB 93	-17	± 7	0.1	± 0.4	0.0	± 0.5	0	± 1	0.0	± 0.5	0.5	± 1.0
	MAR 93	-2	± 6	0.3	± 0.4	0.2	± 0.5	0.3	± 1.0	0.1	± 0.4	0.0	± 0.9
	APR 93	-14	± 8	0.6	± 0.4	-0.1	± 0.5	0.4	± 1.0	0.5	± 0.4	0.5	± 0.9
	MAY 93	-4	± 6	-0.7	± 0.5	0.4	± 0.5	0	± 1	0.2	± 0.5	0.1	± 1.0
	JUN 93	-12	± 6	0.3	± 0.4	0.2	± 0.4	0.4	± 0.9	0.1	± 0.4	1.1	± 0.8
	JUL 93	1	± 7	0.0	± 0.4	-0.1	± 0.4	-1	± 1	0.6	± 0.4	0.9	± 0.8
	AUG 93	-3	± 7	0.1	± 0.5	0.1	± 0.5	0	± 1	0.4	± 0.5	0	± 1
	SEP 93	0	± 10	0.5	± 0.6	0.2	± 0.6	0	± 1	0.5	± 0.6	1	± 1
	OCT 93	-20	± 10	0.1	± 0.5	-0.2	± 0.6	0	± 1	0.4	± 0.5	0	± 1
	NOV 93	-2	± 6	-0.1	± 0.4	0.0	± 0.4	0.7	± 0.9	0.3	± 0.4	-1.1	± 0.8
	DEC 93	14	± 7	0.4	± 0.6	-0.7	± 0.6	1	± 1	-0.1	± 0.6	0	± 1
	MEAN	-5	± 18	0.1	± 0.7	0.0	± 0.6	0.2	± 0.8	0.3	± 0.4	0.1	± 1.4

TABLE C-I.4 CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	ZR-95		NB-95		CS-134		CS-137		BA-140		LA-140	
10F2	JAN 93	1.2	± 0.9	0.2	± 0.4	0.2	± 0.4	0.4	± 0.4	2	± 2	0.0	± 0.8
	FEB 93	0.1	± 0.8	0.5	± 0.4	-0.3	± 0.4	-0.2	± 0.4	2	± 2	1	± 1
	MAR 93	0	± 1	0.6	± 0.6	0.6	± 0.5	0.0	± 0.5	-1	± 4	0	± 1
	APR 93	-0.6	± 0.7	0.2	± 0.4	0.3	± 0.3	-0.1	± 0.4	-1	± 2	1	± 1
	MAY 93	0.7	± 0.9	0.1	± 0.4	0.2	± 0.4	0.0	± 0.5	0	± 2	0.2	± 0.9
	JUN 93	0.3	± 0.7	0.2	± 0.4	0.1	± 0.4	-0.1	± 0.4	0	± 2	-0.2	± 0.7
	JUL 93	2	± 1	0.2	± 0.6	0.0	± 0.5	-1.1	± 0.5	-2	± 4	0	± 1
	AUG 93	0	± 1	0.5	± 0.6	0.2	± 0.5	0.1	± 0.5	-1	± 4	1	± 2
	SEP 93	1	± 1	0.3	± 0.5	-0.2	± 0.5	0.3	± 0.5	0	± 2	-0.8	± 0.9
	OCT 93	1	± 1	0.4	± 0.5	-0.2	± 0.4	0.1	± 0.4	0	± 4	-1	± 2
	NOV 93	-2	± 1	0.4	± 0.6	0.1	± 0.6	0.3	± 0.6	0	± 3	-1	± 1
	DEC 93	0	± 1	0.2	± 0.5	-0.1	± 0.5	0.1	± 0.5	1	± 2	0	± 1
	MEAN	0.3	± 2.0	0.3	± 0.3	0.1	± 0.5	0.0	± 0.8	0	± 2	0.0	± 1.2
13B1	JAN 93	0.8	± 0.9	0.5	± 0.4	-0.5	± 0.4	0.3	± 0.4	1	± 2	-0.5	± 0.7
	FEB 93	0.6	± 1.0	0.3	± 0.5	0.0	± 0.4	0.2	± 0.5	0	± 3	1	± 1
	MAR 93	-0.4	± 0.9	0.2	± 0.5	-0.4	± 0.4	0.0	± 0.4	2	± 3	0	± 1
	APR 93	0.4	± 0.8	-0.1	± 0.4	-0.3	± 0.4	0.1	± 0.4	0	± 2	0	± 1
	MAY 93	-0.8	± 0.8	0.3	± 0.4	0.1	± 0.4	0.0	± 0.4	1	± 2	-0.3	± 0.8
	JUN 93	0.7	± 0.8	0.4	± 0.4	-0.2	± 0.4	0.5	± 0.4	-1	± 2	0.5	± 0.7
	JUL 93	1	± 1	0.6	± 0.6	0.6	± 0.5	0.3	± 0.5	0	± 4	0	± 2
	AUG 93	0	± 1	0.2	± 0.5	-0.1	± 0.5	-0.2	± 0.5	2	± 3	-1	± 1
	SEP 93	1	± 1	0.5	± 0.6	0.2	± 0.6	0.1	± 0.6	2	± 2	0.2	± 0.9
	OCT 93	1	± 1	0.6	± 0.5	-0.2	± 0.5	0.4	± 0.5	0	± 4	-2	± 1
	NOV 93	3	± 1	-0.4	± 0.7	-0.1	± 0.6	0.2	± 0.6	0	± 3	0	± 1
	DEC 93	0	± 1	0.3	± 0.6	0.2	± 0.6	0.1	± 0.6	1	± 3	-1	± 1
	MEAN	0.6	± 1.9	0.3	± 0.6	-0.1	± 0.6	0.2	± 0.4	1	± 2	-0.3	± 1.3
24S1	JAN 93	0.5	± 0.9	0.2	± 0.4	0.3	± 0.5	0.2	± 0.4	-1	± 2	-0.4	± 0.9
	FEB 93	1	± 1	0.4	± 0.5	0.0	± 0.4	0.5	± 0.5	-1	± 3	-1	± 1
	MAR 93	0.6	± 0.9	0.1	± 0.5	0.2	± 0.4	0.1	± 0.4	0	± 3	0	± 1
	APR 93	1	± 1	0.1	± 0.5	-0.1	± 0.4	0.2	± 0.4	0	± 3	0	± 1
	MAY 93	1	± 1	0.4	± 0.5	0.5	± 0.5	0.2	± 0.6	-1	± 3	-1	± 1
	JUN 93	0.1	± 0.9	0.5	± 0.4	-0.2	± 0.4	0.5	± 0.4	0	± 2	0.5	± 0.8
	JUL 93	0	± 1	0.2	± 0.5	0.1	± 0.4	0.3	± 0.4	1	± 3	-1	± 1
	AUG 93	0	± 1	0.3	± 0.5	0.2	± 0.5	0.1	± 0.5	1	± 4	0	± 1
	SEP 93	2	± 1	0.6	± 0.6	-0.3	± 0.6	0.4	± 0.6	0	± 3	0	± 1
	OCT 93	2	± 1	0.3	± 0.6	-0.1	± 0.5	0.0	± 0.5	-3	± 4	0	± 2
	NOV 93	0.4	± 0.8	0.0	± 0.4	0.1	± 0.4	0.3	± 0.4	0	± 2	-0.2	± 0.9
	DEC 93	1	± 1	0.2	± 0.6	-0.7	± 0.6	0.1	± 0.6	3	± 3	0	± 1
	MEAN	0.7	± 1.4	0.3	± 0.3	0.0	± 0.6	0.2	± 0.3	0	± 3	-0.2	± 1.0

TABLE C-II.1 CONCENTRATIONS OF GROSS BETA INSOLUBLE IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	13H2	15F4	15F7	16C2	28F3
JAN 93	0.6 ± 0.5	-0.3 ± 0.4	0.0 ± 0.5	0.2 ± 0.5	0.1 ± 0.5
FEB 93	0.3 ± 0.7	0.0 ± 0.6	-0.1 ± 0.6	0.7 ± 0.7	0.1 ± 0.6
MAR 93	1.3 ± 0.7	0.9 ± 0.6	0.8 ± 0.6	0.6 ± 0.6	0.3 ± 0.6
APR 93	1.7 ± 0.6	0.5 ± 0.5	0.1 ± 0.4	0.3 ± 0.5	0.2 ± 0.5
MAY 93	1.1 ± 0.6	0.0 ± 0.4	0.0 ± 0.4	0.1 ± 0.4	0.2 ± 0.4
JUN 93	0.2 ± 0.4	0.2 ± 0.4	0.4 ± 0.5	0.8 ± 0.5	0.3 ± 0.5
JUL 93	2.1 ± 0.8	0.0 ± 0.6	0.3 ± 0.6	2.3 ± 0.8	0.0 ± 0.6
AUG 93	0.5 ± 0.5	0.1 ± 0.5	0.0 ± 0.5	0.5 ± 0.5	0.4 ± 0.5
SEP 93	0.6 ± 0.5	0.1 ± 0.4	0.1 ± 0.4	0.5 ± 0.5	0.2 ± 0.4
OCT 93	0.1 ± 0.5	-0.2 ± 0.5	0.0 ± 0.5	0.1 ± 0.5	0.1 ± 0.5
NOV 93	0.9 ± 0.6	0.0 ± 0.5	-0.2 ± 0.5	0.1 ± 0.5	0.0 ± 0.5
DEC 93	0.2 ± 0.5	0.1 ± 0.5	-0.1 ± 0.5	0.7 ± 0.5	0.1 ± 0.5
MEAN	0.8 ± 1.3	0.1 ± 0.6	0.1 ± 0.6	0.6 ± 1.2	0.2 ± 0.2

TABLE C-II.2 CONCENTRATIONS OF GROSS BETA SOLUBLE IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	13H2	15F4	15F7	16C2	28F3
JAN 93	4 ± 1	4 ± 1	3 ± 1	3 ± 1	3 ± 1
FEB 93	4 ± 1	5 ± 1	4 ± 1	3 ± 1	4 ± 1
MAR 93	5 ± 1	4 ± 1	5 ± 1	4 ± 1	4 ± 1
APR 93	2.8 ± 0.9	4.0 ± 0.9	8 ± 1	3 ± 1	4.0 ± 1.0
MAY 93	4 ± 1	5 ± 1	4 ± 1	4 ± 1	3 ± 1
JUN 93	6 ± 1	7 ± 1	7 ± 1	5 ± 1	7 ± 1
JUL 93	7 ± 2	8 ± 2	5 ± 1	6 ± 2	5 ± 1
AUG 93	7 ± 1	7 ± 1	7 ± 1	7 ± 1	7 ± 1
SEP 93	7 ± 1	7 ± 1	7 ± 1	6 ± 1	7 ± 1
OCT 93	8 ± 1	7 ± 1	8 ± 1	8 ± 1	6 ± 1
NOV 93	5 ± 1	6 ± 1	7 ± 1	4 ± 1	6 ± 1
DEC 93	4 ± 1	5 ± 1	4 ± 1	7 ± 1	4 ± 1
MEAN	5.3 ± 3.3	5.8 ± 2.8	6 ± 4	5 ± 4	5.0 ± 3.1

TABLE C-II.3 CONCENTRATIONS OF TRITIUM IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	13H2	15F4	15F7	16C2	28F3
JAN-MAR 93	-10 ± 70	-50 ± 70	0 ± 70	-30 ± 80	10 ± 80
APR-JUN 93	-20 ± 90	20 ± 90	100 ± 90	-30 ± 80	30 ± 90
JUL-SEP 93	30 ± 60	20 ± 60	70 ± 60	20 ± 70	10 ± 60
OCT-DEC 93	-100 ± 100	0 ± 100	-100 ± 100	0 ± 100	-190 ± 90
MEAN	-20 ± 90	-10 ± 60	20 ± 160	-20 ± 50	-40 ± 210

TABLE C-II.4 CONCENTRATIONS OF GAMMA EMITTERS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	K-40	MN-54	CO-58	FE-59	CO-60	ZN-65
13E2	JAN 93	-6 ± 6	0.2 ± 0.4	0.0 ± 0.5	0.0 ± 0.9	0.3 ± 0.4	-1.0 ± 0.9
	FEB 93	0 ± 5	0.1 ± 0.3	-0.3 ± 0.4	-0.6 ± 0.8	0.1 ± 0.3	-0.4 ± 0.7
	MAR 93	-3 ± 7	0.4 ± 0.5	0.1 ± 0.6	1 ± 1	0.6 ± 0.5	0.7 ± 1.0
	APR 93	-4 ± 6	-0.3 ± 0.4	-0.1 ± 0.5	1 ± 1	0.1 ± 0.5	0.8 ± 0.9
	MAY 93	-4 ± 5	0.1 ± 0.4	-0.1 ± 0.4	1 ± 1	-0.2 ± 0.4	0 ± 1
	JUN 93	-3 ± 5	0.3 ± 0.3	-0.1 ± 0.3	0.4 ± 0.7	0.2 ± 0.3	0.4 ± 0.7
	JUL 93	17 ± 7	0.5 ± 0.5	0.0 ± 0.6	-1 ± 1	-0.1 ± 0.5	0 ± 1
	AUG 93	-4 ± 6	-0.1 ± 0.4	0.0 ± 0.5	-1 ± 1	0.0 ± 0.4	0.8 ± 0.9
	SEP 93	2 ± 5	-0.1 ± 0.4	-0.1 ± 0.4	-0.1 ± 0.9	0.3 ± 0.5	-0.5 ± 0.9
	OCT 93	-3 ± 6	0.1 ± 0.4	-0.3 ± 0.5	-1 ± 1	0.2 ± 0.4	0.9 ± 0.9
	NOV 93	2 ± 6	0.1 ± 0.5	0.1 ± 0.5	0 ± 1	0.0 ± 0.5	0 ± 1
	DEC 93	-8 ± 7	0.4 ± 0.5	-0.1 ± 0.5	1 ± 1	0.2 ± 0.5	0 ± 1
	MEAN	-1 ± 13	0.2 ± 0.4	-0.1 ± 0.3	0.0 ± 1.2	0.1 ± 0.4	0.2 ± 1.2
15F4	JAN 93	-9 ± 10	0.3 ± 0.5	-0.3 ± 0.5	1 ± 1	0.1 ± 0.5	-1 ± 1
	FEB 93	-22 ± 7	0.4 ± 0.4	-0.2 ± 0.4	-0.3 ± 1.0	0.0 ± 0.4	0.2 ± 0.8
	MAR 93	-3 ± 6	-0.1 ± 0.4	-0.2 ± 0.4	-0.7 ± 0.9	0.2 ± 0.4	-0.3 ± 0.8
	APR 93	-40 ± 10	0.0 ± 0.5	-0.1 ± 0.6	0 ± 1	0.0 ± 0.5	0 ± 1
	MAY 93	-17 ± 8	0.0 ± 0.5	-0.3 ± 0.5	0 ± 1	0.4 ± 0.4	0 ± 1
	JUN 93	-8 ± 6	0.4 ± 0.4	-0.5 ± 0.4	0.0 ± 0.9	0.2 ± 0.4	0.6 ± 0.8
	JUL 93	11 ± 6	0.1 ± 0.6	-0.6 ± 0.6	0 ± 2	-0.2 ± 0.6	1 ± 1
	AUG 93	1 ± 5	-0.1 ± 0.3	0.3 ± 0.4	0.0 ± 0.8	0.2 ± 0.4	0.6 ± 0.8
	SEP 93	13 ± 4	0.2 ± 0.3	-0.1 ± 0.3	-0.3 ± 0.7	0.3 ± 0.3	-0.1 ± 0.7
	OCT 93	-5 ± 5	-0.3 ± 0.4	-0.2 ± 0.4	-1.0 ± 0.9	0.2 ± 0.4	0.1 ± 0.8
	NOV 93	19 ± 7	-0.2 ± 0.6	-0.2 ± 0.6	1 ± 1	0.2 ± 0.6	2 ± 1
	DEC 93	-3 ± 8	-0.1 ± 0.5	0.0 ± 0.5	1 ± 1	0.2 ± 0.5	1 ± 1
	MEAN	-5 ± 33	0.1 ± 0.5	-0.2 ± 0.5	0.0 ± 1.2	0.1 ± 0.3	0.3 ± 1.6
15F7	JAN 93	-10 ± 10	0.1 ± 0.5	0.0 ± 0.5	0 ± 1	0.1 ± 0.4	1 ± 1
	FEB 93	-9 ± 6	0.3 ± 0.4	0.4 ± 0.5	-1 ± 1	0.1 ± 0.4	-0.3 ± 0.9
	MAR 93	0 ± 10	-0.1 ± 0.5	0.1 ± 0.6	0 ± 1	0.8 ± 0.5	0 ± 1
	APR 93	-40 ± 10	0.7 ± 0.6	-0.1 ± 0.6	1 ± 1	0.3 ± 0.5	2 ± 1
	MAY 93	-1 ± 9	0.2 ± 0.6	0.0 ± 0.7	0 ± 2	-0.4 ± 0.6	0 ± 1
	JUN 93	-11 ± 8	0.1 ± 0.5	0.0 ± 0.5	-1 ± 1	0.2 ± 0.5	0 ± 1
	JUL 93	-30 ± 10	0.5 ± 0.6	-0.5 ± 0.6	0 ± 2	0.0 ± 0.6	0 ± 1
	AUG 93	-4 ± 5	0.0 ± 0.3	0.1 ± 0.3	-0.3 ± 0.7	0.3 ± 0.3	-0.1 ± 0.7
	SEP 93	-10 ± 10	0.2 ± 0.5	0.0 ± 0.5	0 ± 1	0.3 ± 0.5	1 ± 1
	OCT 93	2 ± 5	0.2 ± 0.3	-0.2 ± 0.3	-0.2 ± 0.8	-0.2 ± 0.3	0.2 ± 0.7
	NOV 93	-20 ± 10	0.0 ± 0.5	0.1 ± 0.6	0 ± 1	0.3 ± 0.5	0 ± 1
	DEC 93	0 ± 6	-0.1 ± 0.4	0.0 ± 0.4	0.3 ± 0.9	0.2 ± 0.4	0.6 ± 0.8
	MEAN	-11 ± 24	0.2 ± 0.5	0.0 ± 0.4	-0.1 ± 0.7	0.2 ± 0.6	0.4 ± 1.1
16C2	JAN 93	9 ± 5	0.1 ± 0.3	-0.1 ± 0.3	0.3 ± 0.8	0.0 ± 0.4	-0.2 ± 0.8
	FEB 93	-20 ± 10	0.1 ± 0.5	-0.4 ± 0.5	0 ± 1	0.3 ± 0.5	1 ± 1
	MAR 93	-16 ± 8	0.0 ± 0.5	-0.1 ± 0.5	0 ± 1	-0.1 ± 0.5	0.4 ± 0.9
	APR 93	4 ± 4	0.1 ± 0.4	0.1 ± 0.4	-0.3 ± 0.8	0.2 ± 0.4	-0.1 ± 0.8
	MAY 93	8 ± 5	0.6 ± 0.4	0.0 ± 0.4	0.2 ± 0.9	0.0 ± 0.4	0.1 ± 0.8
	JUN 93	0 ± 10	0.0 ± 0.5	-0.3 ± 0.5	0 ± 1	0.1 ± 0.5	-1 ± 1
	JUL 93	2 ± 5	0.1 ± 0.4	-0.3 ± 0.5	0 ± 1	0.1 ± 0.4	-0.9 ± 0.9
	AUG 93	6 ± 5	0.1 ± 0.4	-0.1 ± 0.4	0 ± 1	-0.1 ± 0.4	-0.2 ± 0.8
	SEP 93	-6 ± 8	0.1 ± 0.5	0.1 ± 0.6	0 ± 1	0.1 ± 0.6	0 ± 1
	OCT 93	-31 ± 7	-0.2 ± 0.4	-0.2 ± 0.5	0 ± 1	0.0 ± 0.4	-0.1 ± 0.8
	NOV 93	12 ± 6	0.6 ± 0.4	-0.2 ± 0.4	0.0 ± 0.9	-0.1 ± 0.4	0.7 ± 0.9
	DEC 93	10 ± 6	0.0 ± 0.5	-0.2 ± 0.5	0 ± 1	0.3 ± 0.5	0 ± 1
	MEAN	-2 ± 28	0.1 ± 0.5	-0.1 ± 0.3	0.1 ± 0.4	0.1 ± 0.3	0.0 ± 1.2
28F3	JAN 93	-7 ± 5	0.1 ± 0.3	0.0 ± 0.3	-0.6 ± 0.7	0.1 ± 0.3	-0.2 ± 0.7
	FEB 93	-16 ± 6	0.1 ± 0.4	0.2 ± 0.4	-0.3 ± 1.0	0.3 ± 0.4	0.3 ± 0.9
	MAR 93	12 ± 6	0.1 ± 0.4	0.0 ± 0.4	-1 ± 1	0.3 ± 0.4	0.5 ± 0.9
	APR 93	-20 ± 10	-0.1 ± 0.5	-0.7 ± 0.6	-1 ± 1	0.2 ± 0.6	0 ± 1
	MAY 93	6 ± 6	-0.1 ± 0.5	0.1 ± 0.5	0 ± 1	-0.1 ± 0.5	1 ± 1
	JUN 93	-43 ± 9	0.0 ± 0.4	-0.4 ± 0.5	-1 ± 1	0.0 ± 0.5	2 ± 1
	JUL 93	-1 ± 6	-0.1 ± 0.4	-0.2 ± 0.4	0.4 ± 0.9	0.1 ± 0.4	0.7 ± 0.8
	AUG 93	6 ± 5	0.6 ± 0.4	-0.1 ± 0.4	1 ± 1	0.3 ± 0.4	-0.7 ± 0.9
	SEP 93	19 ± 5	0.1 ± 0.3	-0.2 ± 0.4	0.3 ± 0.8	0.3 ± 0.4	0.2 ± 0.8
	OCT 93	-2 ± 6	0.4 ± 0.4	-0.1 ± 0.4	0 ± 1	-0.2 ± 0.4	-0.1 ± 0.9
	NOV 93	-5 ± 6	-0.1 ± 0.4	-0.1 ± 0.4	-0.2 ± 0.8	0.2 ± 0.4	0.4 ± 0.8
	DEC 93	1 ± 7	0.2 ± 0.5	-0.3 ± 0.5	0 ± 1	0.1 ± 0.5	0 ± 1
	MEAN	-4 ± 32	0.1 ± 0.4	-0.2 ± 0.5	-0.1 ± 1.0	0.1 ± 0.3	0.3 ± 1.3

TABLE C-II.4 CONCENTRATIONS OF GAMMA EMITTERS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	ZR-95	NB-95	CS-134	CS-137	BA-140	LA-140
13H2	JAN 93	0.2 ± 1.0	0.2 ± 0.4	0.4 ± 0.4	0.1 ± 0.5	-1 ± 2	0.3 ± 1.0
	FEB 93	0.4 ± 0.8	0.6 ± 0.4	0.0 ± 0.3	0.4 ± 0.4	-1 ± 2	0.4 ± 1.0
	MAR 93	1 ± 1	0.2 ± 0.5	0.2 ± 0.5	0.2 ± 0.5	0 ± 3	0 ± 1
	APR 93	-0.3 ± 1.0	0.2 ± 0.5	-0.1 ± 0.5	0.3 ± 0.4	0 ± 2	0 ± 1
	MAY 93	0.8 ± 0.9	0.1 ± 0.4	-0.1 ± 0.4	0.2 ± 0.4	0 ± 2	0 ± 1
	JUN 93	-0.4 ± 0.6	0.2 ± 0.3	0.1 ± 0.3	0.2 ± 0.3	1 ± 1	-0.2 ± 0.6
	JUL 93	0 ± 1	0.3 ± 0.6	0.3 ± 0.5	0.8 ± 0.5	2 ± 4	-1 ± 2
	AUG 93	0 ± 1	0.4 ± 0.5	-0.1 ± 0.4	0.1 ± 0.4	2 ± 3	0 ± 1
	SEP 93	-2.4 ± 0.9	0.1 ± 0.4	0.0 ± 0.4	0.5 ± 0.4	0 ± 2	0.2 ± 0.9
	OCT 93	1 ± 1	0.2 ± 0.5	0.0 ± 0.4	0.1 ± 0.4	2 ± 4	0 ± 1
	NOV 93	0 ± 1	0.7 ± 0.5	0.2 ± 0.5	0.2 ± 0.5	-1 ± 3	0 ± 1
	DEC 93	1 ± 1	0.3 ± 0.5	0.1 ± 0.5	0.5 ± 0.5	-1 ± 3	0 ± 1
	MEAN	0.0 ± 1.8	0.3 ± 0.4	0.1 ± 0.3	0.3 ± 0.4	0 ± 2	0.0 ± 0.6
15F4	JAN 93	1 ± 1	0.4 ± 0.5	-0.1 ± 0.5	0.5 ± 0.5	1 ± 2	0.8 ± 0.9
	FEB 93	0.4 ± 0.9	0.3 ± 0.4	-0.2 ± 0.4	0.2 ± 0.4	1 ± 3	1 ± 1
	MAR 93	0.5 ± 0.9	0.1 ± 0.4	-0.1 ± 0.4	0.2 ± 0.4	0 ± 2	0 ± 1
	APR 93	0 ± 1	0.9 ± 0.6	-0.4 ± 0.6	0.2 ± 0.6	1 ± 3	-1 ± 1
	MAY 93	1 ± 1	0.0 ± 0.5	-0.3 ± 0.5	0.2 ± 0.5	1 ± 3	1 ± 1
	JUN 93	0.2 ± 0.9	0.2 ± 0.4	0.1 ± 0.4	0.0 ± 0.4	0 ± 2	0.8 ± 0.8
	JUL 93	2 ± 1	0.5 ± 0.7	-0.5 ± 0.7	0.4 ± 0.6	0 ± 5	1 ± 2
	AUG 93	0.5 ± 0.8	0.5 ± 0.4	0.2 ± 0.4	0.0 ± 0.4	0 ± 2	0 ± 1
	SEP 93	0.1 ± 0.7	0.4 ± 0.3	0.3 ± 0.3	0.1 ± 0.4	0 ± 2	0.1 ± 0.7
	OCT 93	0.6 ± 0.8	0.3 ± 0.4	-0.2 ± 0.3	0.2 ± 0.3	0 ± 3	0 ± 2
	NOV 93	2 ± 1	-1.0 ± 0.6	0.2 ± 0.7	0.0 ± 0.6	4 ± 3	-1 ± 1
	DEC 93	1 ± 1	0.6 ± 0.6	0.1 ± 0.5	0.3 ± 0.5	1 ± 3	-1 ± 1
	MEAN	0.7 ± 1.4	0.3 ± 0.9	-0.1 ± 0.5	0.2 ± 0.3	1 ± 2	0.2 ± 1.4
15F7	JAN 93	1 ± 1	-0.7 ± 0.5	-0.5 ± 0.5	0.3 ± 0.5	0 ± 2	-0.1 ± 0.9
	FEB 93	0.1 ± 1.0	0.2 ± 0.5	0.2 ± 0.5	0.4 ± 0.4	0 ± 3	0 ± 1
	MAR 93	-2 ± 1	0.8 ± 0.6	0.0 ± 0.6	0.4 ± 0.6	-2 ± 3	-1 ± 1
	APR 93	-1 ± 1	0.7 ± 0.6	-0.6 ± 0.6	0.3 ± 0.6	3 ± 4	-2 ± 2
	MAY 93	0 ± 1	0.0 ± 0.7	0.1 ± 0.6	0.4 ± 0.7	-1 ± 4	1 ± 2
	JUN 93	0 ± 1	0.5 ± 0.5	0.0 ± 0.5	-0.2 ± 0.5	2 ± 3	-1 ± 1
	JUL 93	1 ± 1	0.2 ± 0.7	0.7 ± 0.6	-0.1 ± 0.6	-1 ± 4	-5 ± 2
	AUG 93	-0.1 ± 0.7	0.0 ± 0.4	0.3 ± 0.3	0.2 ± 0.3	0 ± 2	0.8 ± 0.9
	SEP 93	3 ± 1	0.5 ± 0.5	-0.1 ± 0.5	0.7 ± 0.5	1 ± 2	-0.5 ± 0.9
	OCT 93	-0.3 ± 0.8	0.3 ± 0.3	0.2 ± 0.3	0.2 ± 0.3	-2 ± 3	0 ± 1
	NOV 93	0 ± 1	0.6 ± 0.6	-0.2 ± 0.6	0.5 ± 0.6	1 ± 3	0 ± 1
	DEC 93	0.1 ± 0.8	-0.2 ± 0.4	-0.2 ± 0.4	0.4 ± 0.4	-1 ± 2	0.5 ± 0.8
	MEAN	0.2 ± 2.3	0.2 ± 0.8	0.0 ± 0.7	0.3 ± 0.5	0 ± 3	-0.7 ± 3.2
16C2	JAN 93	0.2 ± 0.7	0.3 ± 0.4	0.0 ± 0.4	-0.2 ± 0.4	0 ± 2	-0.1 ± 0.8
	FEB 93	1 ± 1	0.9 ± 0.6	-0.3 ± 0.5	0.4 ± 0.5	0 ± 3	0 ± 1
	MAR 93	1 ± 1	-0.1 ± 0.5	-0.3 ± 0.5	0.1 ± 0.5	0 ± 3	0 ± 1
	APR 93	0.3 ± 0.9	0.2 ± 0.4	0.1 ± 0.4	0.2 ± 0.4	2 ± 3	0 ± 1
	MAY 93	0.0 ± 0.8	0.1 ± 0.4	0.4 ± 0.4	-0.1 ± 0.4	-1 ± 2	0.4 ± 0.9
	JUN 93	1 ± 1	0.6 ± 0.5	-1.3 ± 0.5	0.7 ± 0.5	-1 ± 2	0.1 ± 0.9
	JUL 93	0.1 ± 0.9	0.5 ± 0.5	-0.1 ± 0.5	0.1 ± 0.4	1 ± 3	-1 ± 2
	AUG 93	1.0 ± 0.9	0.7 ± 0.4	-0.1 ± 0.4	0.3 ± 0.4	1 ± 3	0 ± 1
	SEP 93	0 ± 1	0.4 ± 0.6	0.5 ± 0.6	0.1 ± 0.5	-1 ± 4	1 ± 2
	OCT 93	1 ± 1	-0.1 ± 0.5	-0.4 ± 0.4	-0.2 ± 0.4	0 ± 4	0 ± 1
	NOV 93	0.1 ± 0.9	0.0 ± 0.4	0.0 ± 0.5	0.0 ± 0.4	1 ± 2	-1 ± 1
	DEC 93	1 ± 1	0.3 ± 0.5	-0.1 ± 0.5	0.3 ± 0.5	0 ± 3	0 ± 1
	MEAN	0.5 ± 0.9	0.3 ± 0.6	-0.1 ± 0.9	0.1 ± 0.5	0 ± 2	0.0 ± 0.8
28F3	JAN 93	-0.2 ± 0.7	0.2 ± 0.3	0.1 ± 0.3	0.1 ± 0.3	1 ± 2	-0.1 ± 0.7
	FEB 93	0.6 ± 1.0	0.5 ± 0.5	0.1 ± 0.4	0.0 ± 0.4	-1 ± 3	0 ± 1
	MAR 93	1.3 ± 0.9	0.5 ± 0.5	-0.6 ± 0.4	-0.1 ± 0.4	0 ± 2	0 ± 1
	APR 93	1 ± 1	0.2 ± 0.6	0.2 ± 0.6	0.5 ± 0.6	5 ± 3	-1 ± 1
	MAY 93	1 ± 1	0.0 ± 0.5	-0.2 ± 0.5	0.2 ± 0.5	-2 ± 3	0 ± 1
	JUN 93	2 ± 1	0.9 ± 0.5	0.0 ± 0.5	0.3 ± 0.5	1 ± 2	-0.5 ± 0.8
	JUL 93	0.0 ± 0.9	0.0 ± 0.4	0.3 ± 0.4	0.3 ± 0.4	-1 ± 3	2 ± 1
	AUG 93	0 ± 1	-0.4 ± 0.5	0.8 ± 0.5	0.4 ± 0.4	-2 ± 3	-1 ± 1
	SEP 93	0.1 ± 0.8	0.2 ± 0.4	0.0 ± 0.4	0.1 ± 0.4	0 ± 2	0.1 ± 0.8
	OCT 93	1 ± 1	0.4 ± 0.5	0.3 ± 0.4	0.5 ± 0.4	2 ± 4	2 ± 2
	NOV 93	-0.5 ± 0.8	0.1 ± 0.4	0.0 ± 0.4	0.3 ± 0.4	1 ± 2	0.0 ± 0.9
	DEC 93	1 ± 1	0.4 ± 0.5	0.6 ± 0.5	-0.6 ± 0.5	-2 ± 3	-1 ± 1
	MEAN	0.5 ± 1.2	0.3 ± 0.7	0.1 ± 0.7	0.2 ± 0.6	0 ± 4	0.1 ± 2.0

TABLE C-III.1 CONCENTRATIONS OF GAMMA EMITTERS IN FISH SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

STC	MEDIA	COLLECTION PERIOD	K-40	MN-54	CO-58	FE-59	CO-60	ZN-65	CS-134	CS-137
16C5	PREADATOR	05/20-05/20/93	4400 ± 400	10 ± 20	-10 ± 20	10 ± 40	-10 ± 20	30 ± 40	-10 ± 20	10 ± 20
		11/08-11/08/93	2900 ± 300	5 ± 8	-2 ± 8	0 ± 20	6 ± 8	-10 ± 20	12 ± 9	5 ± 8
		MEAN	3700 ± 2100	6 ± 1	-6 ± 10	10 ± 10	0 ± 17	10 ± 60	2 ± 30	7 ± 4
	BOTTOM FEEDER	05/20-05/20/93	3400 ± 400	0 ± 10	-10 ± 10	0 ± 30	0 ± 10	-10 ± 30	-20 ± 10	10 ± 20
		11/02-11/02/93	2800 ± 300	4 ± 6	-2 ± 6	-10 ± 10	5 ± 6	10 ± 10	-5 ± 7	11 ± 7
		MEAN	3100 ± 800	2 ± 7	-4 ± 6	0 ± 10	3 ± 6	0 ± 20	-13 ± 21	10 ± 3
20S1	PREADATOR	05/21-05/21/93	2900 ± 500	-10 ± 20	-10 ± 20	-30 ± 40	20 ± 20	0 ± 40	0 ± 20	0 ± 20
		11/09-11/10/93	2800 ± 300	0 ± 7	-3 ± 8	20 ± 20	7 ± 8	20 ± 20	2 ± 8	4 ± 9
		MEAN	2900 ± 100	-4 ± 13	-5 ± 6	-10 ± 70	14 ± 18	10 ± 20	2 ± 1	2 ± 6
	BOTTOM FEEDER	05/21-05/21/93	4100 ± 500	0 ± 20	10 ± 20	-20 ± 40	-10 ± 20	0 ± 40	0 ± 20	10 ± 20
		11/09-11/09/93	2300 ± 200	0 ± 4	-3 ± 4	0 ± 10	1 ± 4	2 ± 9	1 ± 4	6 ± 4
		MEAN	3200 ± 2500	2 ± 6	1 ± 11	-10 ± 20	-5 ± 16	3 ± 1	0 ± 3	6 ± 1
29C1	PREADATOR	05/14-05/14/93	2400 ± 500	10 ± 20	20 ± 20	20 ± 60	0 ± 20	-10 ± 40	-10 ± 20	20 ± 20
		11/10-11/10/93	3200 ± 300	-12 ± 8	0 ± 9	20 ± 20	-1 ± 9	0 ± 20	0 ± 8	-1 ± 8
		MEAN	2800 ± 1100	-1 ± 31	10 ± 28	20 ± 0	-1 ± 1	0 ± 0	-2 ± 7	10 ± 30
	BOTTOM FEEDER	05/14-05/14/93	4700 ± 500	0 ± 20	10 ± 20	0 ± 40	10 ± 20	-10 ± 40	-10 ± 20	10 ± 20
		11/10-11/10/93	3200 ± 300	0 ± 8	-5 ± 9	-20 ± 20	4 ± 8	10 ± 20	2 ± 8	2 ± 8
		MEAN	4000 ± 2100	-1 ± 3	1 ± 17	-10 ± 30	5 ± 3	0 ± 10	-3 ± 13	6 ± 11

TABLE C-IV.1 CONCENTRATIONS OF GAMMA EMITTERS IN SILT SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

RESULTS IN UNITS OF PCI/GRAM DRY ± 2 SIGMA

STC	COLLECTION PERIOD	BE-7		K-40		CO-60		CS-134		CS-137		RA-226		TH-228	
16B2	05/07-05/07/93	2.7	± 0.4	16	± 2	0.00	± 0.02	0.03	± 0.03	0.26	± 0.04	2.5	± 0.6	1.2	± 0.1
	11/05-11/05/93	2.9	± 0.4	15	± 2	0.05	± 0.03	0.07	± 0.03	0.35	± 0.04	3.0	± 0.6	1.4	± 0.1
	MEAN	2.8	± 0.2	16	± 1	0.03	± 0.07	0.05	± 0.05	0.31	± 0.12	2.8	± 0.7	1.3	± 0.2
16C4	05/07-05/07/93	1.8	± 0.3	13	± 1	0.01	± 0.03	0.03	± 0.02	0.15	± 0.04	2.4	± 0.6	1.2	± 0.1
	11/05-11/05/93	7.8	± 0.8	18	± 2	0.07	± 0.04	0.06	± 0.03	0.28	± 0.04	2.9	± 0.7	1.4	± 0.1
	MEAN	4.8	± 8.6	16	± 7	0.04	± 0.08	0.04	± 0.05	0.22	± 0.18	2.7	± 0.7	1.3	± 0.4
33A2	05/07-05/07/93	0.2	± 0.2	11	± 1	0.00	± 0.02	0.08	± 0.03	0.08	± 0.04	1.9	± 0.6	1.1	± 0.1
	11/05-11/05/93	2.0	± 0.5	9.0	± 0.9	-0.02	± 0.03	0.06	± 0.03	0.04	± 0.04	2.2	± 0.8	1.0	± 0.1
	MEAN	1.1	± 2.5	10.2	± 3.3	-0.01	± 0.03	0.07	± 0.03	0.06	± 0.06	2.1	± 0.4	1.0	± 0.1

TABLE C-V.1 CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

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

GROUP I - ON-SITE LOCATIONS

WEEK	10S3		11S1		14S1		34S2	
01	15	± 3	16	± 3	14	± 3	16	± 3
02	18	± 3	21	± 3	20	± 3	19	± 3
03	20	± 3	19	± 3	16	± 3	20	± 3
04	16	± 3	15	± 3	12	± 3	17	± 3
05	16	± 3	17	± 3	14	± 3	19	± 3
06	16	± 3	21	± 3	16	± 3	17	± 3
07	14	± 3	14	± 3	14	± 3	16	± 3
08	14	± 3	16	± 3	16	± 3	18	± 4
09	20	± 4	18	± 4	20	± 4	19	± 4
10	23	± 3	19	± 3	18	± 3	19	± 3
11	16	± 3	17	± 3	14	± 3	17	± 3
12	16	± 4	16	± 4	16	± 4	19	± 4
13	7	± 3	8	± 3	6	± 3	7	± 3
14	5	± 3	5	± 3	4	± 3	5	± 3
15	9	± 3	10	± 3	8	± 3	10	± 3
16	9	± 3	10	± 3	11	± 3	10	± 3
17	14	± 3	14	± 3	12	± 3	12	± 3
18	19	± 3	18	± 3	17	± 3	17	± 3
19	12	± 3	13	± 3	11	± 3	12	± 3
20	16	± 3	17	± 3	15	± 3	16	± 3
21	13	± 3	12	± 3	12	± 3	12	± 3
22	17	± 3	16	± 3	16	± 3	18	± 3
23	13	± 3	10	± 2	11	± 3	12	± 3
24	16	± 3	14	± 3	11	± 3	13	± 3
25	15	± 3	14	± 3	14	± 3	16	± 3
26	16	± 3	14	± 3	13	± 3	12	± 3
27	15	± 3	15	± 3	13	± 3	15	± 3
28	22	± 4	21	± 4	20	± 4	25	± 4
29	14	± 3	13	± 3	10	± 3	14	± 3
30	12	± 3	12	± 3	10	± 3	10	± 3
31	14	± 3	14	± 3	12	± 3	13	± 3
32	16	± 3	18	± 3	19	± 3	18	± 3
33	16	± 3	18	± 3	18	± 3	17	± 3
34	17	± 3	18	± 3	15	± 2	16	± 3
35	25	± 4	28	± 4	27	± 4	25	± 4
36	19	± 3	15	± 3	18	± 3	21	± 3
37	16	± 3	14	± 3	18	± 3	17	± 3
38	14	± 3	12	± 3	11	± 3	14	± 3
39	16	± 3	17	± 3	16	± 3	13	± 3
40	10	± 3	20	± 4	10	± 3	10	± 3
41	13	± 3	13	± 3	17	± 3	18	± 3
42	16	± 4	16	± 4	15	± 4	20	± 4
43	14	± 3	16	± 3	13	± 3	13	± 3
44	18	± 3	17	± 3	19	± 3	21	± 3
45	16	± 3	14	± 3	16	± 3	15	± 3
46	29	± 4	33	± 4	30	± 4	30	± 4
47	19	± 3	17	± 3	17	± 3	21	± 3
48	24	± 4	22	± 3	20	± 3	19	± 3
49	22	± 3	20	± 3	22	± 3	20	± 3
50	24	± 4	20	± 4	14	± 3	20	± 4
51	14	± 3	17	± 3	12	± 3	18	± 3
52	19	± 3	18	± 3	20	± 3	19	± 3
53	23	± 4	19	± 3	14	± 3	18	± 3
MEAN	16	± 9	16	± 9	15	± 9	16	± 9

TABLE C-V.1 CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

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

GROUP II - INTERMEDIATE DISTANCE LOACATIONS

WEEK	2B1		6C1		9C1		13C1		15D1		17B1	
01	14	± 3	17	± 3	13	± 3	15	± 3	11	± 3	12	± 3
02	21	± 3	21	± 3	19	± 3	19	± 3	21	± 4	16	± 3
03	17	± 3	18	± 3	17	± 3	18	± 3	19	± 3	18	± 3
04	18	± 3	16	± 3	15	± 3	13	± 3	15	± 3	14	± 3
05	20	± 3	17	± 3	16	± 3	16	± 3	21	± 3	16	± 3
06	16	± 3	18	± 3	17	± 3	15	± 3	17	± 3	17	± 3
07	14	± 3	14	± 3	11	± 3	11	± 3	12	± 3	14	± 3
08	18	± 3	13	± 3	14	± 3	15	± 3	15	± 3	17	± 3
09	22	± 4	20	± 4	18	± 4	22	± 4	21	± 4	20	± 4
10	21	± 3	17	± 3	21	± 3	20	± 3	21	± 3	21	± 3
11	14	± 3	13	± 3	15	± 3	14	± 3	17	± 3	14	± 3
12	18	± 4	13	± 3	18	± 4	18	± 4	19	± 4	14	± 3
13	8	± 3	5	± 2	14	± 3	7	± 3	8	± 3	6	± 2
14	6	± 3	7	± 3	13	± 3	4	± 3	4	± 3	5	± 3
15	10	± 3	10	± 3	9	± 3	9	± 3	7	± 2	10	± 3
16	11	± 3	9	± 3	9	± 3	12	± 3	9	± 3	8	± 3
17	13	± 3	10	± 3	12	± 3	13	± 3	18	± 4	14	± 3
18	19	± 3	16	± 3	19	± 3	14	± 3	17	± 3	16	± 3
19	13	± 3	13	± 3	13	± 3	11	± 3	14	± 3	13	± 3
20	17	± 3	16	± 3	14	± 3	16	± 3	15	± 3	13	± 3
21	11	± 3	13	± 3	10	± 3	12	± 3	14	± 3	12	± 3
22	15	± 3	18	± 3	19	± 3	18	± 3	18	± 3	16	± 3
23	11	± 3	14	± 3	13	± 3	12	± 3	14	± 3	14	± 3
24	12	± 3	12	± 3	14	± 3	14	± 3	15	± 3	14	± 3
25	14	± 3	15	± 3	16	± 3	17	± 3	14	± 3	14	± 3
26	16	± 3	13	± 3	14	± 3	14	± 3	13	± 3	10	± 3
27	14	± 3	15	± 3	15	± 3	16	± 3	15	± 3	17	± 3
28	26	± 4	24	± 4	22	± 4	23	± 4	24	± 4	19	± 4
29	13	± 3	12	± 3	14	± 3	11	± 3	13	± 3	15	± 3
30	11	± 3	14	± 3	12	± 3	13	± 3	12	± 3	11	± 3
31	18	± 3	12	± 3	12	± 3	14	± 3	16	± 3	12	± 3
32	17	± 3	18	± 3	15	± 3	18	± 3	16	± 3	19	± 3
33	22	± 3	18	± 3	19	± 3	19	± 3	19	± 3	17	± 3
34	17	± 3	15	± 3	17	± 3	17	± 3	20	± 3	16	± 3
35	25	± 4	21	± 4	26	± 4	29	± 4	27	± 4	23	± 4
36	20	± 3	19	± 3	19	± 3	20	± 3	19	± 3	18	± 3
37	19	± 3	19	± 3	15	± 3	16	± 3	16	± 3	15	± 3
38	12	± 3	12	± 3	11	± 3	12	± 3	14	± 3	10	± 3
39	16	± 3	16	± 3	17	± 3	16	± 3	16	± 3	14	± 3
40	15	± 4	13	± 4	9	± 3	11	± 3	12	± 3	8	± 3
41	16	± 3	11	± 3	15	± 3	13	± 3	16	± 3	17	± 3
42	26	± 4	17	± 4	16	± 4	16	± 4	19	± 4	18	± 4
43	15	± 3	15	± 3	15	± 3	17	± 3	12	± 3	15	± 3
44	18	± 3	16	± 3	15	± 3	19	± 3	19	± 3	15	± 3
45	17	± 3	16	± 3	16	± 3	18	± 3	16	± 3	11	± 3
46	28	± 4	30	± 4	34	± 4	33	± 4	33	± 4	30	± 4
47	14	± 3	17	± 3	17	± 3	17	± 3	20	± 3	17	± 3
48	22	± 4	18	± 3	22	± 4	21	± 3	24	± 4	23	± 4
49	23	± 4	19	± 3	18	± 3	20	± 3	22	± 4	24	± 4
50	23	± 4	18	± 4	23	± 4	19	± 4	21	± 4	14	± 3
51	18	± 3	15	± 3	14	± 3	14	± 3	15	± 3	14	± 3
52	20	± 3	17	± 3	19	± 3	20	± 3	19	± 3	17	± 3
53	18	± 3	16	± 3	19	± 3	19	± 3	19	± 3	19	± 3
MEAN	17	± 9	15	± 8	16	± 9	16	± 10	17	± 10	15	± 9

TABLE C-V.1 CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

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

GROUP II - INTERMEDIATE DISTANCE LOACATIONS

WEEK	20D1		26B1		29B1		31D1		35B1	
01	18	± 3	18	± 3	17	± 3	15	± 3	16	± 3
02	17	± 3	18	± 3	18	± 3	21	± 3	20	± 3
03	16	± 3	20	± 3	14	± 3	18	± 3	16	± 3
04	13	± 3	14	± 3	16	± 3	14	± 3	12	± 3
05	16	± 3	14	± 2	17	± 3	16	± 3	20	± 3
06	16	± 3	13	± 3	19	± 3	14	± 3	16	± 3
07	13	± 3	14	± 3	12	± 3	16	± 3	17	± 3
08	16	± 3	16	± 3	15	± 3	11	± 3	15	± 3
09	19	± 4	21	± 4	18	± 4	21	± 4	21	± 4
10	20	± 3	22	± 3	20	± 3	17	± 3	18	± 3
11	13	± 3	15	± 3	12	± 3	12	± 3	17	± 3
12	19	± 4	16	± 3	18	± 4	17	± 4	17	± 4
13	7	± 3	8	± 2	10	± 3	8	± 3		(1)
14	5	± 3	3	± 3	6	± 3	7	± 3	1	± 3
15	11	± 3	10	± 3	11	± 3	10	± 3	9	± 3
16	9	± 3	8	± 3	10	± 3	13	± 3	11	± 3
17	24	± 2	16	± 3	14	± 3	14	± 3	15	± 3
18	21	± 3	18	± 3	17	± 3	18	± 3	18	± 3
19	13	± 3	13	± 3	13	± 3	12	± 3	15	± 3
20	14	± 3	16	± 3	18	± 3	22	± 3	13	± 3
21	14	± 3	16	± 3	14	± 3	14	± 6	11	± 3
22	16	± 3	17	± 3	16	± 3	15	± 3	16	± 3
23	13	± 3	15	± 3	14	± 3	13	± 3	14	± 3
24	17	± 4	16	± 3	14	± 3		(1)	16	± 3
25	18	± 3	13	± 3	17	± 4	15	± 3	13	± 3
26	12	± 3	11	± 3	13	± 6	16	± 3	16	± 3
27	17	± 3	18	± 3	14	± 3	16	± 3	14	± 3
28	21	± 4	26	± 4	21	± 4		(1)	22	± 4
29	14	± 3	13	± 3	19	± 8	10	± 3	12	± 3
30	12	± 3	12	± 3	9	± 3	10	± 3	14	± 3
31	13	± 3	13	± 3	14	± 3	14	± 3	13	± 3
32	18	± 3	17	± 3	19	± 3	19	± 3	17	± 3
33	20	± 3	17	± 3	19	± 6	21	± 3	17	± 3
34	18	± 3	18	± 3	17	± 3	17	± 3	17	± 3
35	28	± 4	27	± 4	26	± 4	24	± 4	27	± 4
36	21	± 3	19	± 3	14	± 3	19	± 3	19	± 3
37	18	± 3	17	± 3	17	± 3		(1)	19	± 3
38	13	± 3	14	± 3	13	± 3	13	± 3	12	± 3
39	18	± 3	15	± 3	17	± 3	15	± 3	17	± 3
40	14	± 4	12	± 3	16	± 4	10	± 3	13	± 4
41	17	± 3	14	± 3	13	± 3	12	± 3	13	± 3
42	18	± 4	21	± 4	7	± 6	18	± 4	17	± 4
43	16	± 3	15	± 3	15	± 3	16	± 3	16	± 3
44	18	± 3	16	± 3	20	± 3	12	± 3	15	± 3
45	19	± 3	17	± 3	17	± 3	15	± 3	17	± 3
46	31	± 4	32	± 4	28	± 4	31	± 4	30	± 4
47	18	± 3	14	± 3	17	± 3	16	± 3	18	± 3
48	22	± 4	23	± 4	17	± 3	19	± 3	24	± 4
49	18	± 3	15	± 3	19	± 3	20	± 3	18	± 3
50	21	± 4	21	± 4	19	± 3	24	± 4	20	± 4
51	11	± 3	15	± 3	15	± 3	16	± 3	13	± 3
52	19	± 3	20	± 3	20	± 3	16	± 3	20	± 3
53	19	± 3	19	± 3	17	± 3	20	± 3	19	± 3
MEAN	17	± 9	16	± 10	16	± 8	16	± 9	16	± 9

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

TABLE C-V.1 CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

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

GROUP III - CONTROL LOACATIONS

WEEK	13H4		22G1	
01	17	± 3	13	± 3
02	16	± 6	16	± 3
03	25	± 3	15	± 3
04	18	± 3	10	± 3
05	18	± 3	18	± 3
06	19	± 3	16	± 3
07	18	± 2	13	± 3
08	23	± 3	13	± 3
09	22	± 3	22	± 4
10	28	± 3	19	± 3
11	16	± 2	12	± 3
12	25	± 3	16	± 4
13	12	± 3	6	± 3
14	16	± 3	3	± 3
15	29	± 4	9	± 3
16		(1)	8	± 3
17	17	± 3	13	± 3
18	16	± 3	18	± 3
19	12	± 2	9	± 3
20	22	± 3	15	± 3
21	14	± 3	13	± 3
22	17	± 3	17	± 3
23	13	± 4	11	± 3
24	18	± 3	12	± 3
25	19	± 3	18	± 3
26	17	± 3	11	± 3
27	23	± 3	16	± 3
28	29	± 6	25	± 4
29	20	± 3	13	± 3
30	17	± 3	10	± 3
31	18	± 3	14	± 3
32	17	± 3	19	± 3
33	18	± 3	18	± 3
34	20	± 3	17	± 3
35	42	± 6	28	± 4
36	19	± 3	12	± 3
37	21	± 3	15	± 3
38	17	± 5	13	± 3
39	14	± 5	17	± 3
40	19	± 3	10	± 3
41		(1)	14	± 3
42	18	± 3	20	± 4
43		(1)	15	± 3
44	20	± 3	19	± 3
45		(1)	15	± 3
46	35	± 4	28	± 4
47	19	± 4	20	± 3
48	21	± 3	17	± 3
49	40	± 9	22	± 3
50	23	± 4	16	± 3
51	16	± 3	13	± 3
52	22	± 4	22	± 3
53	18	± 3	21	± 3
MEAN	20	± 12	15	± 10

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

TABLE C-V.2 MONTHLY AND YEARLY MEAN VALUES OF GROSS BETA CONCENTRATIONS (E-3 PCI/CU. METER) IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

GROUP I - ON-SITE LOCATIONS				GROUP II - INTERMEDIATE DISTANCE LOCATIONS				GROUP III - CONTROL LOCATIONS			
COLLECTION PERIOD	MIN.	MAX.	MEAN ± 2 SD	COLLECTION PERIOD	MIN.	MAX.	MEAN ± 2 SD	COLLECTION PERIOD	MIN.	MAX.	MEAN ± 2 SD
12/29/92-02/02/93	12	21	17 ± 5	12/29/92-02/02/93	11	21	17 ± 5	12/29/92-02/01/93	10	25	17 ± 8
02/01/93-03/01/93	14	21	17 ± 5	02/01/93-03/01/93	11	22	16 ± 6	02/01/93-03/01/93	13	23	18 ± 8
03/01/93-03/29/93	6	23	15 ± 10	03/01/93-03/29/93	5	22	15 ± 9	03/01/93-03/29/93	6	28	17 ± 14
03/29/93-05/03/93	4	19	11 ± 9	03/29/93-05/03/93	1	24	12 ± 10	03/29/93-05/03/93	3	29	14 ± 15
05/03/93-05/31/93	11	18	14 ± 5	05/03/93-05/31/93	10	22	15 ± 5	05/03/93-06/01/93	9	22	15 ± 8
05/31/93-06/28/93	10	16	13 ± 4	05/31/93-06/28/93	10	18	14 ± 4	05/31/93-06/28/93	11	19	15 ± 7
06/28/93-08/02/93	10	25	15 ± 8	06/28/93-08/02/93	9	26	15 ± 8	06/28/93-08/02/93	10	29	19 ± 12
08/02/93-08/30/93	15	28	19 ± 8	08/02/93-08/30/93	15	29	20 ± 8	08/02/93-08/30/93	17	42	22 ± 17
08/30/93-09/27/93	11	21	16 ± 5	08/30/93-09/27/93	10	21	16 ± 6	08/30/93-09/27/93	12	21	16 ± 6
09/27/93-11/01/93	10	21	15 ± 7	09/27/93-11/01/93	7	26	15 ± 7	09/27/93-11/01/93	10	20	17 ± 7
11/01/93-11/29/93	14	33	21 ± 12	1/93-11/29/93	11	34	21 ± 13	11/01/93-11/29/93	15	35	22 ± 14
11/29/93-01/03/94	12	24	19 ± 6	9/93-01/03/94	11	24	18 ± 6	11/29/93-01/03/94	13	40	21 ± 15
12/29/92-01/03/94	4	33	16 ± 9	29/92-01/03/94	1	34	16 ± 9	12/29/92-01/03/94	3	42	18 ± 12

NOTE:

GROUP I CONSISTST OF LOCATIONS 10S3, 11S1, 14S1,34S2
GROUP II CONSISTST OF LOCATIONS 2B1, 6C1, 9C1, 13C1, 15D1, 17B1, 20D1, 26B1, 29B1, 31D1, 35B1
GROUP III CONSISTST OF LOCATIONS 13H4, 22G1

TABLE C-V.3 CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

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

STC	COLLECTION PERIOD	BE-7		K-40		CS-134		CS-137		RA-226		TH-228	
10S3	12/29-03/29/93	3	5	5	± 3	0.0	± 0.2	-0.1	± 0.2	-3	± 3	-0.2	± 0.3
	03/29-06/28/93	94	9	5	± 3	-0.2	± 0.3	-0.2	± 0.2	-2	± 3	-0.2	± 0.3
	06/28-09/27/93	80	8	6	± 4	0.1	± 0.3	0.0	± 0.3	-3	± 5	0.1	± 0.5
	09/27-01/03/94	50	± 6	5	± 3	0.0	± 0.3	0.0	± 0.3	-1	± 5	1.3	± 0.5
	MEAN	67	± 50	5	± 1	0.0	± 0.2	-0.1	± 0.2	-2	± 2	0.3	± 1.4
11S1	12/29-03/29/93	53	± 6	-2	± 5	0.0	± 0.3	0.5	± 0.3	-3	± 5	-0.5	± 0.5
	03/29-06/28/93	78	± 8	5	± 3	0.0	± 0.3	0.0	± 0.3	-4	± 5	0.4	± 0.5
	06/28-09/27/93	64	± 6	9	± 4	-0.1	± 0.3	0.0	± 0.3	0	± 4	-1.1	± 0.4
	09/27-01/03/94	56	± 6	12	± 5	-0.2	± 0.3	0.0	± 0.3	-3	± 4	-0.5	± 0.4
	MEAN	63	± 22	6	± 12	-0.1	± 0.2	0.1	± 0.5	-3	± 3	-0.4	± 1.2
14S1	12/29-03/29/93	49	± 6	28	± 6	0.1	± 0.4	0.0	± 0.3	-3	± 5	-0.5	± 0.4
	03/29-06/28/93	79	± 8	28	± 6	-0.1	± 0.4	0.2	± 0.3	-5	± 5	-0.8	± 0.4
	06/28-09/27/93	84	± 8	9	± 4	-0.1	± 0.3	0.2	± 0.3	-5	± 6	-0.1	± 0.5
	09/27-01/03/94	50	± 5	11	± 4	0.1	± 0.3	0.2	± 0.3	-4	± 4	-0.6	± .4
	MEAN	65	± 37	19	± 21	0.0	± 0.2	0.1	± 0.2	-4	± 2	-0.5	± 0.6
13C1	12/29-03/29/93	56	± 6	4	± 3	0.1	± 0.2	0.1	± 0.2	-3	± 4	0.3	± 0.4
	03/29-06/28/93	72	± 7	6	± 3	0.0	± 0.2	0.2	± 0.2	1	± 4	-0.4	± 0.3
	06/28-09/27/93	72	± 7	10	± 4	0.1	± 0.3	0.1	± 0.2	-2	± 3	0.0	± 0.3
	09/27-01/03/94	57	± 7	1	± 4	0.1	± 0.3	0.0	± 0.3	1	± 5	-0.5	± 0.4
	MEAN	64	± 18	5	± 7	0.1	± 0.0	0.1	± 0.1	-1	± 4	-0.2	± 0.7
13H4	12/29-03/29/93	68	± 8	5	± 4	0.0	± 0.3	0.0	± 0.3	-2	± 6	-0.1	± 0.6
	03/29-06/28/93	75	± 8	-3	± 8	-0.4	± 0.4	-0.1	± 0.4	0	± 5	0.1	± 0.5
	06/28-09/27/93	70	± 7	-14	± 8	0.0	± 0.4	0.1	± 0.4	-5	± 5	-0.5	± 0.5
	09/27-01/03/94	80	± 9	14	± 6	-0.1	± 0.4	0.1	± 0.4	-6	± 8	-0.6	± 0.7
	MEAN	73	± 11	1	± 24	-0.1	± 0.4	0.0	± 0.2	-3	± 6	-0.3	± 0.6

TABLE C-VI.1 CONCENTRATIONS OF I-131 IN AIR IODINE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

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

	GROUP I						GROUP II		GROUP III	
WEEK	10S3		11S1		14S1		13C1		13H4	
01	0	± 20	0	± 20	0	± 20	0	± 20	10	± 10
02	0	± 10	0	± 10	0	± 10	0	± 10	20	± 30
03	0	± 10	0	± 10	0	± 10	0	± 10	10	± 10
04	0	± 10	0	± 10	0	± 10	0	± 10	0	± 20
05	-1	± 7	-1	± 7	-2	± 7	-2	± 7	0	± 20
06	0	± 20	0	± 20	0	± 20	0	± 20	-10	± 10
07	-10	± 10	-10	± 10	-10	± 10	-10	± 10	-3	± 5
08	0	± 10	0	± 10	0	± 10	0	± 10	-2	± 7
09	6	± 7	6	± 7	6	± 7	6	± 7	4	± 5
10	0	± 20	0	± 20	0	± 20	0	± 20	0	± 10
11	0	± 10	10	± 10	10	± 10	5	± 10	5	± 6
12	0	± 20	0	± 20	0	± 20	0	± 20	0	± 7
13	0	± 10	0	± 10	0	± 10	1	± 7	0	± 20
14	-10	± 10	-10	± 10	-10	± 10	-10	± 10	0	± 20
15	0	± 10	0	± 10	0	± 10	1	± 6	0	± 20
16	0	± 10	0	± 10	0	± 10	-1	± 5		(1)
17	0	± 20	0	± 20	0	± 20	0	± 10	0	± 20
18	0	± 20	0	± 20	0	± 20	0	± 20	0	± 10
19	-10	± 10	-10	± 10	-10	± 10	-4	± 5	-10	± 10
20	10	± 10	10	± 10	10	± 10	6	± 6	10	± 10
21	0	± 10	0	± 10	0	± 10	0	± 10	-2	± 8
22	0	± 10	0	± 10	0	± 10	0	± 10	-1	± 6
23	10	± 10	10	± 10	10	± 10	10	± 10	10	± 10
24	2	± 7	0	± 20	0	± 20	-1	± 8	0	± 20
25	-10	± 20	-10	± 20	-10	± 20	-10	± 10	-5	± 6
26	10	± 20	10	± 20	10	± 20	10	± 20	-3	± 9
27	10	± 10	10	± 10	10	± 10	3	± 6	0	± 10
28	0	± 10	0	± 10	0	± 10	2	± 9	10	± 30
29	0	± 10	0	± 10	0	± 10	2	± 6	0	± 10
30	5	± 8	5	± 8	5	± 8	4	± 6	5	± 9
31	10	± 10	10	± 10	10	± 10	3	± 6	10	± 10
32	0	± 20	0	± 20	0	± 20	0	± 20	0	± 10
33	0	± 10	0	± 10	0	± 10	0	± 10	-1	± 6
34	-2	± 9	-2	± 9	-2	± 9	-1	± 6	-2	± 9
35	0	± 20	0	± 20	0	± 20	0	± 7	0	± 20
36	-3	± 10	-4	± 10	-3	± 10	0	± 10	-2	± 6
37	10	± 20	10	± 20	10	± 20	10	± 20	2	± 7
38	0	± 10	0	± 10	0	± 10	0	± 10	0	± 10
39	10	± 10	10	± 10	10	± 10	3	± 7	10	± 20
40	0	± 10	0	± 10	0	± 10	-3	± 8	0	± 10
41	-10	± 10	-10	± 10	-10	± 10	-10	± 10		(1)
42	10	± 20	10	± 20	10	± 20	0	± 10	10	± 20
43	-10	± 10	-10	± 10	-10	± 10	-10	± 10		(1)
44	3	± 8	3	± 8	3	± 8	2	± 6	3	± 8
45	0	± 10	0	± 10	0	± 10	0	± 10		(1)
46	0	± 10	0	± 10	0	± 10	1	± 6	0	± 10
47	2	± 8	2	± 8	2	± 8	2	± 8	-10	± 10
48	0	± 10	0	± 10	0	± 10	0	± 10	2	± 6
49	-10	± 10	-10	± 10	-10	± 10	-4	± 9	-30	± 50
50	0	± 10	0	± 10	0	± 10	0	± 10	1	± 7
51	0	± 10	0	± 10	0	± 10	0	± 10	2	± 6
52	0	± 10	0	± 10	0	± 10	2	± 7	0	± 20
53	-10	± 10	-10	± 10	-10	± 10	-4	± 7	-10	± 10
MEAN	0	± 10	0	± 10	0	± 10	0	± 8	1	± 13

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

TABLE C-VII.1 CONCENTRATIONS OF I-131 IN MILK SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

	CONTROL FARMS						INDICATOR FARMS											
COLLECTION DATE	36E1		9G1		22F1		10B1		18C1		19B1		21B1		22C1		25B1		25C1	
01/19/93	0.00	± 0.05	-0.01	± 0.04	0.03	± 0.08	-0.1	± 0.1	-0.02	± 0.04	0.01	± 0.05	0.00	± 0.04	-0.03	± 0.05	-0.02	± 0.08	(1)	
02/09/93					-0.04	± 0.06	-0.1	± 0.1	(1)		-0.06	± 0.06	0.00	± 0.08			-0.03	± 0.07		
03/09/93					-0.08	± 0.07	-0.16	± 0.09	-0.07	± 0.06	-0.03	± 0.06	-0.06	± 0.06				(1)		
04/06/93	0.01	± 0.06	-0.02	± 0.04	0.02	± 0.07	0.1	± 0.1	-0.04	± 0.05			0.00	± 0.06	0.01	± 0.05			-0.04	± 0.06
04/07/93											0.04	± 0.08								
04/20/93					-0.09	± 0.05	0.02	± 0.05	-0.06	± 0.04	0.03	± 0.04	0.00	± 0.04						
05/04/93					0.01	± 0.04	-0.01	± 0.08	0.01	± 0.07	-0.02	± 0.04	-0.03	± 0.04						
05/18/93					-0.01	± 0.07	-0.04	± 0.06	-0.01	± 0.06	0.00	± 0.05	-0.03	± 0.05						
06/01/93					0.01	± 0.04	0.01	± 0.04	-0.01	± 0.04	-0.01	± 0.05	-0.06	± 0.04						
06/15/93					-0.03	± 0.06	0.02	± 0.05	-0.03	± 0.04	0.04	± 0.07	0.01	± 0.04						
06/29/93					0.01	± 0.05	-0.01	± 0.03	0.00	± 0.04	-0.04	± 0.06	0.02	± 0.04						
07/13/93	0.0	± 0.1	0.0	± 0.1	-0.02	± 0.09	-0.02	± 0.08	0.0	± 0.1	0.0	± 0.1	-0.01	± 0.07	0.00	± 0.09			-0.03	± 0.07
07/27/93					0.02	± 0.07	-0.03	± 0.05	0.03	± 0.06	0.00	± 0.04	0.01	± 0.04						
08/10/93					0.0	± 0.1	0.03	± 0.05	-0.04	± 0.04			0.00	± 0.07						
08/11/93											-0.17	± 0.09								
08/24/93					-0.02	± 0.06	0.04	± 0.10	0.02	± 0.06	-0.01	± 0.05	-0.03	± 0.06						
09/07/93					0.00	± 0.05	-0.02	± 0.04	-0.02	± 0.04	-0.03	± 0.05	0.02	± 0.04						
09/21/93					0.01	± 0.04	-0.05	± 0.06	0.02	± 0.05	0.01	± 0.04	0.01	± 0.04						
10/05/93	-0.06	± 0.05	-0.05	± 0.05	0.03	± 0.06	0.0	± 0.1	-0.01	± 0.05	-0.03	± 0.04	0.04	± 0.07	-0.01	± 0.06			0.01	± 0.05
10/19/93					0.03	± 0.04	0.02	± 0.04	-0.01	± 0.04	-0.05	± 0.07	0.00	± 0.05						
11/02/93					-0.07	± 0.05	0.0	± 0.1	-0.11	± 0.07	-0.04	± 0.05	-0.11	± 0.06						
11/16/93					0.0	± 0.1	0.06	± 0.09	-0.01	± 0.05	-0.04	± 0.05	-0.02	± 0.05						
12/14/93					0.02	± 0.07	-0.02	± 0.09	-0.01	± 0.07	0.02	± 0.04	0.03	± 0.06						
MEAN	-0.02	± 0.06	-0.01	± 0.07	-0.01	± 0.07	-0.01	± 0.10	-0.02	± 0.07	-0.01	± 0.09	-0.01	± 0.07	-0.01	± 0.04	-0.02	± 0.02	-0.02	± 0.06

NOTE: STATION 10B1 IS A GOAT MILK
(1) SEE PROGRAM CHANGES SECTION FOR EXPLANATION

TABLE C-VII.2 CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES
COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	K-40	CS-134	CS-137	BA-140	LA-140
10B1	01/19-01/19/93	1600 ± 200	3 ± 3	1 ± 3	9 ± 9	1 ± 4
	02/09-02/09/93	2500 ± 300	-1 ± 4	3 ± 4	0 ± 20	0 ± 6
	03/09-03/09/93	1700 ± 200	-1 ± 3	0 ± 2	-1 ± 8	-1 ± 3
	04/06-04/06/93	1600 ± 200	2 ± 3	3 ± 3	1 ± 10	-2 ± 4
	04/20-04/20/93	1500 ± 200	0 ± 2	2 ± 2	-3 ± 6	3 ± 3
	05/04-05/04/93	1600 ± 200	-1 ± 3	1 ± 2	1 ± 8	-1 ± 3
	05/18-05/18/93	1700 ± 200	1 ± 2	1 ± 2	3 ± 7	1 ± 3
	06/01-06/01/93	1800 ± 200	-1 ± 3	0 ± 2	0 ± 8	1 ± 3
	06/15-06/15/93	1600 ± 200	-2 ± 3	6 ± 3	4 ± 7	5 ± 3
	06/29-06/29/93	1600 ± 200	-5 ± 3	3 ± 3	6 ± 9	-1 ± 4
	07/13-07/13/93	1700 ± 200	-1 ± 2	2 ± 2	1 ± 7	-1 ± 3
	07/27-07/27/93	1700 ± 200	-2 ± 2	2 ± 3	-6 ± 8	0 ± 4
	08/10-08/10/93	1600 ± 200	1 ± 2	-1 ± 2	-1 ± 7	-1 ± 2
	08/24-08/24/93	1600 ± 200	0 ± 2	1 ± 2	5 ± 8	0 ± 4
	09/07-09/07/93	1500 ± 200	2 ± 2	1 ± 2	2 ± 7	0 ± 3
	09/21-09/21/93	1200 ± 100	0 ± 3	1 ± 3	-3 ± 9	1 ± 4
	10/05-10/05/93	1400 ± 100	0 ± 3	2 ± 3	-2 ± 9	3 ± 4
	10/19-10/19/93	1300 ± 100	0 ± 2	4 ± 2	-3 ± 7	2 ± 3
	11/02-11/02/93	1500 ± 100	1 ± 2	2 ± 2	0 ± 8	1 ± 4
	11/16-11/16/93	1300 ± 100	0 ± 2	2 ± 2	0 ± 7	2 ± 3
	12/14-12/14/93	1400 ± 100	2 ± 3	4 ± 3	3 ± 8	2 ± 3
	MEAN	1600 ± 500	0 ± 3	2 ± 3	1 ± 7	1 ± 3
18C1	03/09-03/09/93	1100 ± 100	1 ± 2	2 ± 2	-300 ± 100	-30 ± 50
	04/06-04/06/93	1400 ± 100	1 ± 2	2 ± 2	0 ± 20	2 ± 8
	04/20-04/20/93	1400 ± 100	2 ± 3	2 ± 3	-3 ± 10	0 ± 4
	05/04-05/04/93	1500 ± 200	0 ± 2	1 ± 2	3 ± 7	1 ± 3
	05/18-05/18/93	1500 ± 100	-1 ± 2	0 ± 2	3 ± 7	-2 ± 3
	06/01-06/01/93	1500 ± 100	0 ± 2	1 ± 2	3 ± 7	2 ± 3
	06/15-06/15/93	1300 ± 100	0 ± 2	2 ± 2	-3 ± 6	1 ± 3
	06/29-06/29/93	1400 ± 100	1 ± 2	-1 ± 2	1 ± 8	-5 ± 4
	07/13-07/13/93	1400 ± 100	-1 ± 2	1 ± 2	0 ± 7	-2 ± 3
	07/27-07/27/93	1400 ± 100	2 ± 2	3 ± 2	-7 ± 8	0 ± 3
	08/10-08/10/93	1400 ± 100	0 ± 2	1 ± 2	-3 ± 6	3 ± 3
	08/24-08/24/93	1300 ± 100	0 ± 2	2 ± 2	5 ± 8	0 ± 3
	09/07-09/07/93	1500 ± 200	1 ± 2	0 ± 2	1 ± 7	1 ± 2
	09/21-09/21/93	1500 ± 200	0 ± 2	3 ± 2	-4 ± 7	-2 ± 3
	10/05-10/05/93	1400 ± 100	0 ± 2	2 ± 2	-2 ± 8	-2 ± 3
	10/19-10/19/93	1400 ± 100	-1 ± 2	1 ± 2	2 ± 8	0 ± 3
	11/02-11/02/93	1400 ± 100	-1 ± 2	0 ± 2	-2 ± 8	1 ± 3
	11/16-11/16/93	1400 ± 100	1 ± 2	0 ± 2	1 ± 7	-1 ± 3
	12/14-12/14/93	1500 ± 100	0 ± 2	2 ± 2	0 ± 8	1 ± 3
	MEAN	1400 ± 200	0 ± 2	1 ± 2	-16 ± 133	-2 ± 14
19B1	01/19-01/19/93	1400 ± 100	-2 ± 2	2 ± 2	1 ± 7	-1 ± 3
	02/09-02/09/93	1200 ± 100	0 ± 2	1 ± 2	4 ± 9	1 ± 3
	03/09-03/09/93	1200 ± 100	3 ± 3	3 ± 3	3 ± 9	1 ± 4
	04/07-04/07/93	1400 ± 100	1 ± 2	1 ± 2	1 ± 8	3 ± 4
	04/20-04/20/93	1300 ± 100	-1 ± 2	1 ± 2	-1 ± 7	-2 ± 3
	05/04-05/04/93	1400 ± 100	1 ± 2	1 ± 2	0 ± 6	4 ± 2
	05/18-05/18/93	1400 ± 100	0 ± 3	-1 ± 3	-2 ± 9	2 ± 3
	06/01-06/01/93	1500 ± 100	0 ± 2	0 ± 2	3 ± 6	0 ± 2
	06/15-06/15/93	1200 ± 100	0 ± 2	1 ± 2	-3 ± 5	0 ± 2
	06/29-06/29/93	1400 ± 100	-1 ± 2	3 ± 2	-1 ± 7	1 ± 3
	07/13-07/13/93	1200 ± 100	1 ± 3	3 ± 3	10 ± 10	4 ± 4
	07/27-07/27/93	1300 ± 100	1 ± 2	3 ± 2	-4 ± 8	0 ± 3
	08/11-08/11/93	1500 ± 200	-1 ± 2	2 ± 2	1 ± 5	0 ± 2
	08/24-08/24/93	1300 ± 100	0 ± 2	0 ± 2	-2 ± 7	1 ± 3
	09/07-09/07/93	1400 ± 100	-1 ± 2	3 ± 2	-1 ± 8	-2 ± 3
	09/21-09/21/93	1300 ± 100	0 ± 2	0 ± 2	3 ± 7	-1 ± 3
	10/05-10/05/93	1300 ± 100	-3 ± 2	1 ± 2	-5 ± 7	-1 ± 3
	10/19-10/19/93	1400 ± 100	0 ± 2	2 ± 2	1 ± 8	-1 ± 3
	11/02-11/02/93	1400 ± 100	0 ± 2	0 ± 2	-3 ± 7	0 ± 3
	11/16-11/16/93	1600 ± 200	-1 ± 2	3 ± 2	-1 ± 7	0 ± 3
	12/14-12/14/93	1400 ± 100	0 ± 2	0 ± 2	4 ± 7	-2 ± 2
	MEAN	1400 ± 200	0 ± 2	1 ± 3	0 ± 6	0 ± 4

TABLE C-VII.2 CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	K-40	CS-134	CS-137	BA-140	LA-140
21B1	01/19-01/19/93	1400 ± 100	1 ± 2	3 ± 2	0 ± 8	-2 ± 3
	02/09-02/09/93	1400 ± 100	1 ± 2	1 ± 2	2 ± 7	2 ± 3
	03/09-03/09/93	1500 ± 200	-3 ± 2	2 ± 2	6 ± 7	1 ± 3
	04/06-04/06/93	1500 ± 200	0 ± 2	0 ± 2	-6 ± 7	0 ± 2
	04/20-04/20/93	1400 ± 100	-1 ± 2	1 ± 2	-7 ± 8	1 ± 3
	05/04-05/04/93	1500 ± 200	2 ± 3	2 ± 3	0 ± 9	2 ± 4
	05/18-05/18/93	1400 ± 100	1 ± 2	1 ± 2	-7 ± 7	1 ± 3
	06/01-06/01/93	1500 ± 100	1 ± 3	3 ± 3	1 ± 9	-1 ± 4
	06/15-06/15/93	1500 ± 100	-1 ± 2	0 ± 2	0 ± 5	2 ± 2
	06/29-06/29/93	1400 ± 100	0 ± 2	2 ± 2	-3 ± 7	2 ± 3
	07/13-07/13/93	1400 ± 100	0 ± 2	3 ± 2	1 ± 8	-2 ± 3
	07/27-07/27/93	1300 ± 100	1 ± 2	2 ± 2	2 ± 8	2 ± 3
	08/10-08/10/93	1400 ± 100	0 ± 2	0 ± 2	2 ± 5	1 ± 2
	08/24-08/24/93	1300 ± 100	-4 ± 3	1 ± 3	10 ± 10	-2 ± 4
	09/07-09/07/93	1500 ± 100	1 ± 3	1 ± 3	-8 ± 9	0 ± 4
	09/21-09/21/93	1400 ± 100	0 ± 3	2 ± 2	4 ± 8	0 ± 3
	10/05-10/05/93	1400 ± 100	1 ± 2	2 ± 2	-3 ± 7	-1 ± 3
	10/19-10/19/93	1400 ± 100	1 ± 2	1 ± 2	0 ± 8	-4 ± 4
	11/02-11/02/93	1200 ± 100	2 ± 3	2 ± 3	10 ± 10	-2 ± 4
	11/16-11/16/93	1500 ± 100	0 ± 2	2 ± 2	-4 ± 6	1 ± 2
	12/14-12/14/93	1500 ± 100	-1 ± 2	1 ± 2	1 ± 6	1 ± 3
	MEAN	1400 ± 200	0 ± 3	2 ± 2	0 ± 10	0 ± 3
22F1	01/19-01/19/93	1300 ± 100	1 ± 2	1 ± 2	0 ± 8	-2 ± 3
	02/09-02/09/93	1400 ± 100	2 ± 3	3 ± 3	0 ± 10	5 ± 4
	03/09-03/09/93	1200 ± 100	-1 ± 2	4 ± 2	3 ± 8	0 ± 3
	04/06-04/06/93	1400 ± 100	3 ± 3	2 ± 2	0 ± 8	-1 ± 3
	04/20-04/20/93	1400 ± 100	0 ± 2	1 ± 2	2 ± 7	2 ± 3
	05/04-05/04/93	1300 ± 100	0 ± 2	2 ± 2	2 ± 7	1 ± 3
	05/18-05/18/93	1300 ± 100	-1 ± 2	1 ± 2	0 ± 8	-2 ± 3
	06/01-06/01/93	1200 ± 100	1 ± 2	2 ± 2	-6 ± 8	-1 ± 3
	06/15-06/15/93	1300 ± 100	0 ± 2	2 ± 2	1 ± 5	-3 ± 2
	06/29-06/29/93	1400 ± 100	-1 ± 2	2 ± 2	-2 ± 8	0 ± 3
	07/13-07/13/93	1400 ± 100	0 ± 3	2 ± 3	4 ± 9	2 ± 4
	07/27-07/27/93	1200 ± 100	-1 ± 2	1 ± 2	3 ± 8	-3 ± 3
	08/10-08/10/93	1300 ± 100	-1 ± 2	1 ± 2	2 ± 5	1 ± 2
	08/24-08/24/93	1300 ± 100	-2 ± 2	4 ± 2	-7 ± 8	1 ± 3
	09/07-09/07/93	1300 ± 100	-2 ± 2	2 ± 2	2 ± 8	2 ± 3
	09/21-09/21/93	1300 ± 100	1 ± 2	2 ± 2	0 ± 8	2 ± 3
	10/05-10/05/93	1200 ± 100	2 ± 3	3 ± 3	10 ± 10	0 ± 4
	10/19-10/19/93	1300 ± 100	-2 ± 2	1 ± 2	-6 ± 9	2 ± 3
	11/02-11/02/93	1200 ± 100	0 ± 2	2 ± 2	-1 ± 9	0 ± 3
	11/16-11/16/93	1300 ± 100	0 ± 3	3 ± 3	-5 ± 9	0 ± 4
	12/14-12/14/93	1300 ± 100	1 ± 3	0 ± 3	-6 ± 9	-1 ± 4
	MEAN	1300 ± 100	0 ± 3	2 ± 2	0 ± 8	0 ± 4
25B1	01/19-01/19/93	1600 ± 200	1 ± 2	2 ± 2	4 ± 7	-1 ± 2
	02/09-02/09/93	1400 ± 100	-1 ± 2	0 ± 2	2 ± 8	0 ± 4
	MEAN	1500 ± 300	0 ± 2	1 ± 2	3 ± 3	-1 ± 2

TABLE C-VIII.1 MONTHLY TLD RESULTS **MERRICK GENERATING STATION, 1993

RESULTS IN UNITS OF MILLI-ROEN.**MN/STD. MO. ± 2 S.D.

STATION CODE	MEAN ± 2 S.D. (1)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
3SS2	8.0 ± 3.3	6.9 ± 0.5	6.8 ± 0.4	7.4 ± 0.4	7.1 ± 0.3	8.4 ± 1.2	7.9 ± 0.9	7.3 ± 0.2	7.7 ± 0.7	6.6 ± 0.3	8.6 ± 1.3	8.9 ± 1.6	12.7 ± 7.5
2B1	7.1 ± 2.2	6.3 ± 0.3	7.2 ± 0.6	6.9 ± 0.2	6.4 ± 0.3	7.3 ± 1.2	6.8 ± 1.0	6.7 ± 1.0	6.7 ± 0.5	6.1 ± 0.4	7.5 ± 1.3	7.5 ± 1.2	10.3 ± 6.3
2E1	7.4 ± 1.3	6.9 ± 0.4	6.1 ± 0.4	7.0 ± 0.2	7.1 ± 0.3	7.7 ± 0.3	7.6 ± 0.6	7.9 ± 0.5	7.5 ± 0.8	6.7 ± 0.4	8.2 ± 1.5	7.9 ± 0.9	8.1 ± 0.3
3S1	7.2 ± 1.4	6.4 ± 0.2	6.2 ± 1.8	6.5 ± 0.2	6.8 ± 0.4	7.5 ± 0.3	7.6 ± 0.4	7.0 ± 0.5	7.3 ± 0.9	6.6 ± 0.4	8.4 ± 1.8	7.6 ± 0.1	8.1 ± 0.8
4E1	5.7 ± 0.8	5.3 ± 0.4	5.7 ± 0.4	5.5 ± 0.2	5.1 ± 0.4	6.0 ± 0.3	5.7 ± 1.6	5.6 ± 0.7	5.2 ± 0.6	5.3 ± 0.3	6.3 ± 0.9	6.1 ± 0.4	6.3 ± 0.5
5S1	8.1 ± 1.6	7.7 ± 0.4	8.0 ± 0.6	7.3 ± 0.1	7.9 ± 0.2	7.9 ± 0.6	7.6 ± 0.8	7.6 ± 0.9	7.7 ± 0.4	7.3 ± 0.4	9.4 ± 1.0	8.6 ± 0.6	9.7 ± 0.6
5H1	8.8 ± 2.3	7.9 ± 0.3	7.7 ± 1.0	8.1 ± 0.3	7.8 ± 0.8	8.8 ± 0.4	8.2 ± 1.9	8.4 ± 0.3	8.5 ± 0.8	8.0 ± 0.6	10.6 ± 1.2	10.1 ± 3.2	10.9 ± 1.6
6C1	7.5 ± 1.2	6.7 ± 0.4	6.6 ± 0.5	7.1 ± 0.1	6.9 ± 0.3	8.1 ± 1.5	8.1 ± 1.2	7.8 ± 0.6	7.7 ± 0.5	6.9 ± 0.6	8.0 ± 1.9	7.4 ± 1.2	8.4 ± 1.8
7S1	7.6 ± 1.1	7.1 ± 0.3	6.9 ± 0.6	7.6 ± 0.3	7.6 ± 0.4	7.6 ± 0.2	8.1 ± 0.6	7.5 ± 0.4	7.2 ± 0.6	7.1 ± 0.5	8.4 ± 0.2	7.9 ± 0.4	8.7 ± 0.8
7E1	7.3 ± 1.9	6.8 ± 0.5	5.8 ± 0.3	7.1 ± 0.3	7.2 ± 0.3	7.8 ± 0.4	7.4 ± 1.2	6.5 ± 1.5	6.8 ± 0.8	6.5 ± 0.1	8.7 ± 1.6	7.5 ± 0.7	9.1 ± 0.3
9C1	7.1 ± 1.2	6.4 ± 0.3	6.5 ± 0.6	6.9 ± 0.2	6.8 ± 0.2	7.4 ± 0.1	7.5 ± 1.4	7.2 ± 0.4	7.3 ± 0.6	6.1 ± 0.4	8.2 ± 1.8	7.4 ± 0.6	7.8 ± 0.8
10S2	7.5 ± 1.3	7.0 ± 0.1	7.2 ± 0.7	7.4 ± 0.2	7.2 ± 0.4	7.6 ± 0.4	7.6 ± 0.9	7.0 ± 0.7	7.2 ± 0.7	6.8 ± 0.4	8.6 ± 1.2	7.8 ± 0.6	8.9 ± 0.9
10E1	7.5 ± 1.6	6.8 ± 0.3	6.9 ± 0.5	7.0 ± 0.5	7.4 ± 1.1	7.9 ± 0.7	7.7 ± 0.9	6.8 ± 0.7	7.5 ± 0.8	6.4 ± 0.3	8.4 ± 0.9	8.0 ± 1.0	9.3 ± 1.6
10F3	7.4 ± 1.2	6.8 ± 0.4	6.9 ± 0.8	7.0 ± 0.1	7.6 ± 0.6	7.9 ± 0.6	7.0 ± 0.9	7.7 ± 1.8	6.8 ± 0.5	6.9 ± 0.6	7.2 ± 1.1	8.1 ± 0.7	8.5 ± 0.7
11S1	8.0 ± 1.1	7.7 ± 0.5	7.7 ± 0.3	7.9 ± 0.3	7.2 ± 0.2	8.5 ± 0.8	8.5 ± 1.1	7.7 ± 1.1	8.5 ± 0.9	7.3 ± 0.5	7.8 ± 1.1	8.8 ± 0.7	8.8 ± 0.9
13C1	5.7 ± 1.5	5.1 ± 0.3	5.4 ± 0.7	5.5 ± 0.1	5.4 ± 0.4	5.8 ± 0.3	5.7 ± 0.3	5.1 ± 0.6	5.4 ± 0.5	4.9 ± 0.2	6.7 ± 0.4	5.9 ± 0.4	7.5 ± 0.9
13E1	7.6 ± 1.2	7.0 ± 0.9	7.2 ± 0.7	7.3 ± 0.3	7.3 ± 0.3	8.4 ± 1.5	7.7 ± 0.9	7.2 ± 0.6	7.6 ± 0.9	6.8 ± 0.9	8.4 ± 1.6	8.2 ± 0.6	8.5 ± 0.2
13H4	5.1 ± 1.4	6.2 ± 0.3	4.3 ± 0.3	4.8 ± 0.6	4.4 ± 0.4	5.7 ± 0.4	4.9 ± 1.2	5.0 ± 0.4	4.1 ± 0.3	4.7 ± 0.1	5.0 ± 0.7	5.7 ± 0.7	6.2 ± 0.5
14S1	6.7 ± 1.1	6.3 ± 0.3	6.4 ± 0.3	6.7 ± 0.5	6.0 ± 0.3	7.1 ± 0.8	6.9 ± 1.0	5.9 ± 2.3	6.7 ± 0.5	6.1 ± 0.4	7.0 ± 1.0	6.9 ± 0.6	7.9 ± 0.8
15D1	7.3 ± 1.5	6.7 ± 0.3	5.8 ± 0.3	7.2 ± 0.3	7.8 ± 0.5	7.8 ± 0.2	7.4 ± 1.6	6.9 ± 0.6	7.2 ± 0.9	6.5 ± 0.4	8.0 ± 1.5	7.5 ± 0.7	8.6 ± 1.4
16S2	6.6 ± 1.2	6.0 ± 0.4	5.7 ± 0.4	6.4 ± 0.2	5.6 ± 0.2	7.0 ± 0.4	6.7 ± 1.3	6.8 ± 0.3	6.6 ± 0.4	6.3 ± 0.4	7.2 ± 1.4	6.8 ± 0.5	7.7 ± 0.8
16F1	7.6 ± 1.0	7.0 ± 0.5	7.1 ± 0.2	7.1 ± 0.3	7.6 ± 0.4	7.5 ± 0.3	7.8 ± 1.3	7.4 ± 0.5	7.8 ± 0.4	7.0 ± 0.1	7.9 ± 0.5	8.1 ± 0.7	8.5 ± 0.5
17B1	7.2 ± 1.1	6.6 ± 0.4	7.1 ± 0.7	6.9 ± 0.1	6.8 ± 0.2	7.8 ± 1.3	7.6 ± 1.5	7.4 ± 1.0	7.2 ± 0.5	6.3 ± 0.5	7.5 ± 1.3	7.2 ± 0.5	8.3 ± 0.5
18S1	6.7 ± 1.3	6.0 ± 0.3	6.3 ± 0.5	6.2 ± 0.1	5.8 ± 0.3	6.9 ± 0.5	7.3 ± 1.8	6.6 ± 0.8	6.6 ± 0.8	6.0 ± 0.6	7.8 ± 1.5	7.1 ± 0.8	7.3 ± 0.6

1. MEAN AND TWO TIMES THE STANDARD DEVIATION OF THE MONTHLY RESULTS.
2. SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION.

TABLE C-VIII.1 MONTHLY TLD RESULTS FOR LIMERICK GENERATING STATION, 1993

RESULTS IN UNITS OF MILLI-ROENTGEN/STD. MO. ± 2 S.D.

STATION CODE	MEAN ± 2 S.D. (1)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
18G1	5.5 ± 1.3	5.2 ± 0.7	5.6 ± 0.4	6.5 ± 0.4	5.5 ± 0.2	5.8 ± 0.3	5.1 ± 1.3	4.2 ± 1.9	5.1 ± 0.3	4.9 ± 0.5	5.4 ± 0.7	6.0 ± 0.5	6.5 ± 1.8
19D1	6.8 ± 1.3	6.2 ± 0.3	6.2 ± 0.1	6.8 ± 0.1	7.3 ± 0.6	6.6 ± 0.5	7.5 ± 0.7	6.0 ± 2.0	6.3 ± 0.4	6.3 ± 0.3	7.7 ± 1.5	7.4 ± 0.7	7.9 ± 0.4
20D1	7.0 ± 1.1	6.9 ± 0.4	6.7 ± 0.4	7.2 ± 0.6	6.4 ± 0.3	7.5 ± 0.8	6.9 ± 1.4	6.9 ± 0.7	7.1 ± 0.7	5.8 ± 0.3	6.9 ± 0.6	7.6 ± 0.9	7.7 ± 0.4
20F1	7.1 ± 1.1	6.8 ± 0.5	6.2 ± 0.5	7.1 ± 0.2	7.2 ± 0.2	7.7 ± 0.5	7.1 ± 1.1	7.3 ± 0.3	6.5 ± 0.2	6.5 ± 0.7	8.2 ± 0.6	7.5 ± 1.0	7.3 ± 0.6
21S1	6.4 ± 1.3	5.9 ± 0.2	6.0 ± 0.2	6.3 ± 0.1	6.2 ± 0.5	7.2 ± 0.4	6.5 ± 0.8	5.4 ± 2.1	7.0 ± 0.4	5.5 ± 0.3	7.6 ± 1.6	6.9 ± 0.5	6.6 ± 0.5
22G1	7.1 ± 1.3	6.3 ± 0.3	6.9 ± 0.4	6.8 ± 0.3	6.8 ± 0.6	7.6 ± 0.4	7.1 ± 1.5	7.0 ± 0.6	6.9 ± 1.0	6.3 ± 0.3	8.8 ± 2.2	7.4 ± 0.2	7.0 ± 0.3
23S2	6.8 ± 1.7	7.1 ± 0.2	6.1 ± 0.3	7.2 ± 0.2	6.1 ± 0.8	7.8 ± 1.0	6.7 ± 1.3	5.2 ± 3.1	6.3 ± 0.5	5.9 ± 0.4	7.5 ± 1.1	7.3 ± 0.5	8.1 ± 1.0
24D1	6.4 ± 1.3	5.7 ± 0.3	6.4 ± 0.5	6.5 ± 0.2	6.1 ± 0.2	6.6 ± 0.5	6.2 ± 1.2	5.8 ± 0.5	7.0 ± 0.8	5.5 ± 0.2	7.5 ± 1.7	6.6 ± 0.4	7.5 ± 0.7
25S1	6.8 ± 1.0	6.1 ± 0.7	6.3 ± 0.2	6.9 ± 0.8	6.7 ± 0.3	7.1 ± 0.2	7.1 ± 1.5	6.9 ± 0.4	7.0 ± 0.3	5.7 ± 0.3	6.8 ± 0.9	7.1 ± 0.5	7.3 ± 0.4
25D1	6.3 ± 1.2	5.7 ± 0.3	5.2 ± 0.3	6.5 ± 0.1	6.0 ± 0.4	7.1 ± 1.2	6.3 ± 0.6	6.1 ± 0.3	6.4 ± 0.8	5.7 ± 0.7	6.6 ± 1.2	6.6 ± 0.7	7.4 ± 1.8
26S3	6.6 ± 1.6	5.8 ± 0.2	6.1 ± 0.2	6.4 ± 0.3	6.2 ± 0.4	8.2 ± 0.6	7.6 ± 1.1	6.2 ± 0.6	6.2 ± 0.5	5.7 ± 0.4	6.8 ± 0.7	6.5 ± 0.6	7.8 ± 1.9
26B1	6.9 ± 0.9	6.3 ± 0.3	6.4 ± 1.1	6.9 ± 0.2	6.5 ± 0.1	7.6 ± 0.5	7.3 ± 0.9	7.1 ± 0.3	7.2 ± 0.7	6.1 ± 0.3	6.9 ± 0.6	7.2 ± 0.4	7.2 ± 0.3
28D2	6.9 ± 1.0	6.3 ± 0.4	6.3 ± 0.4	6.8 ± 0.2	6.6 ± 0.2	7.9 ± 0.7	6.9 ± 1.0	6.9 ± 0.6	6.8 ± 0.5	6.8 ± 0.4	7.9 ± 1.6	6.9 ± 0.4	7.2 ± 0.6
29S1	6.6 ± 1.3	5.8 ± 0.2	6.0 ± 0.3	7.5 ± 0.1	6.8 ± 0.6	7.2 ± 0.5	7.1 ± 1.3	6.1 ± 0.3	6.6 ± 0.2	5.7 ± 0.4	6.8 ± 1.9	6.5 ± 0.2	7.5 ± 0.3
29B1	6.9 ± 1.3	6.2 ± 0.2	6.6 ± 0.6	7.2 ± 0.3	6.7 ± 0.4	7.9 ± 1.5	7.5 ± 0.5	5.9 ± 0.8	7.2 ± 0.5	6.3 ± 0.6	6.8 ± 0.3	7.1 ± 0.5	7.8 ± 0.6
29E1	6.9 ± 1.0	6.6 ± 0.6	6.4 ± 0.5	7.2 ± 0.2	6.7 ± 0.2	7.8 ± 0.6	7.1 ± 0.9	6.6 ± 1.0	7.0 ± 0.1	6.2 ± 0.4	7.0 ± 1.1	6.9 ± 0.3	7.8 ± 0.5
31D1	8.6 ± 1.3	7.8 ± 0.2	7.8 ± 0.6	8.6 ± 0.4	8.9 ± 0.6	9.6 ± 0.4	9.6 ± 1.7	8.1 ± 1.0	9.0 ± 0.3	7.8 ± 0.5	9.0 ± 1.0	8.7 ± 0.6	8.5 ± 1.0
31D2	7.5 ± 1.2	6.8 ± 0.3	7.3 ± 0.3	7.9 ± 0.1	7.4 ± 0.7	8.5 ± 1.5	7.0 ± 1.1	7.5 ± 0.5	7.3 ± 0.5	6.7 ± 0.5	7.4 ± 1.3	7.6 ± 0.6	8.6 ± 0.3
32S1	5.8 ± 1.1	5.3 ± 0.5	5.5 ± 0.8	6.0 ± 0.3	5.7 ± 0.6	6.4 ± 1.0	5.6 ± 1.3	5.6 ± 0.5	5.4 ± 0.4	5.3 ± 0.5	5.9 ± 0.4	5.7 ± 0.5	7.2 ± 1.3
32G1	7.7 ± 1.0	7.5 ± 0.7	7.0 ± 0.5	7.6 ± 0.3	7.5 ± 0.4	8.5 ± 0.7	7.8 ± 0.9	8.2 ± 2.8	7.7 ± 1.4	7.0 ± 0.7	8.2 ± 0.7	7.5 ± 0.2	8.2 ± 0.5
34S2	7.9 ± 1.0	8.0 ± 0.4	7.6 ± 0.7	8.0 ± 0.4	8.4 ± 1.0	8.4 ± 0.5	7.9 ± 1.0	7.7 ± 0.5	7.2 ± 0.7	7.1 ± 0.5	8.2 ± 1.1	8.0 ± 0.8	8.8 ± 0.2
34E1	7.2 ± 0.8	7.4 ± 0.6	6.9 ± 0.8	7.3 ± 0.3	7.1 ± 0.3	7.6 ± 0.6	6.8 ± 0.7	7.3 ± 0.9	6.9 ± 0.5	6.7 ± 0.7	7.2 ± 0.8	7.1 ± 0.4	8.1 ± 1.4
35B1	7.3 ± 1.3	7.2 ± 0.3	7.2 ± 1.1	6.9 ± 0.1	7.3 ± 0.8	8.2 ± 0.4	7.8 ± 1.0	6.1 ± 1.1	7.5 ± 0.3	6.3 ± 0.4	7.4 ± 0.7	7.1 ± 0.4	8.4 ± 0.1
35F1	8.1 ± 1.2	8.1 ± 0.3	7.4 ± 0.3	7.8 ± 0.6	7.6 ± 0.5	9.1 ± 0.5	8.5 ± 0.8	7.6 ± 0.2	8.5 ± 0.2	7.1 ± 0.4	8.4 ± 1.6	8.3 ± 0.5	8.6 ± 0.7

1. MEAN AND TWO TIMES THE STANDARD DEVIATION OF THE MONTHLY RESULTS.
2. SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION.

TABLE C-VIII.2 QUARTERLY TLD RESULTS FOR LIMERICK GENERATING STATION, 1993

RESULTS IN UNITS OF MILLI-ROENTGEN/STD. MO. ± 2 S.D.

STATION CODE	MEAN ± 2 S.D. (1)	JAN-MAR	APR-JUN	JUL-SEP	OCT-DEC
36S2	6.8 ± 1.7	7.7 ± 0.7	5.7 ± 0.7	6.8 ± 0.1	7.2 ± 0.3
2B1	5.7 ± 1.4	6.1 ± 0.2	4.7 ± 0.4	6.1 ± 0.2	6.0 ± 0.3
2E1	6.3 ± 1.2	6.4 ± 0.2	5.5 ± 0.6	7.0 ± 0.3	6.4 ± 0.2
3S1	6.2 ± 0.8	6.1 ± 0.2	5.7 ± 0.6	6.5 ± 0.2	6.6 ± 0.6
4E1	4.8 ± 1.1	5.1 ± 0.1	4.0 ± 0.4	5.1 ± 0.1	5.0 ± 0.6
5S1	7.0 ± 1.5	7.0 ± 0.3	6.0 ± 0.8	7.7 ± 0.1	7.4 ± 0.4
5H1	7.5 ± 1.7	7.5 ± 0.2	6.4 ± 0.7	8.0 ± 0.2	8.3 ± 0.7
6C1	6.4 ± 1.4	6.4 ± 0.2	5.4 ± 0.6	7.0 ± 0.1	6.8 ± 0.9
7S1	6.8 ± 1.8	6.7 ± 0.2	5.6 ± 0.6	7.1 ± 0.3	7.7 ± 0.5
7E1	6.6 ± 1.7	6.4 ± 0.2	5.7 ± 0.4	6.7 ± 0.3	7.7 ± 0.3
9C1	6.2 ± 0.3	6.4 ± 0.2	6.0 ± 0.6	6.3 ± 0.2	6.2 ± 0.4
10S3	6.5 ± 1.3	6.8 ± 0.2	5.5 ± 0.6	6.9 ± 0.2	6.8 ± 0.4
10E1	6.4 ± 1.1	6.5 ± 0.1	5.7 ± 0.5	6.4 ± 0.3	7.0 ± 0.2
10F3	6.8 ± 1.7	7.3 ± 0.2	5.6 ± 0.9	6.7 ± 0.2	7.5 ± 0.2
11S1	7.3 ± 0.3	7.2 ± 0.3	7.3 ± 0.9	7.6 ± 0.2	7.3 ± 0.4
13C1	4.9 ± 1.4	5.1 ± 0.2	4.0 ± 0.3	4.7 ± 0.1	5.7 ± 0.3
13E1	6.3 ± 1.3	6.6 ± 0.2	5.3 ± 0.6	6.6 ± 0.2	6.7 ± 0.3
13H4	4.4 ± 0.6	4.7 ± 0.1	4.4 ± 0.5	4.0 ± 0.2	4.5 ± 0.9
14S1	6.0 ± 1.5	6.7 ± 0.3	4.9 ± 0.3	6.3 ± 0.3	6.0 ± 0.2
15D1	6.5 ± 0.9	6.7 ± 0.3	5.9 ± 0.5	6.7 ± 0.1	6.9 ± 0.4
16S2	5.7 ± 1.2	5.9 ± 0.2	4.8 ± 0.9	6.0 ± 0.3	6.1 ± 0.3
16F1	6.6 ± 1.2	6.6 ± 0.2	5.7 ± 0.8	7.1 ± 0.3	6.9 ± 0.3
17B1	6.1 ± 0.4	6.2 ± 0.2	6.0 ± 0.6	5.9 ± 0.1	6.4 ± 0.2
18S1	5.5 ± 1.0	5.7 ± 0.5	4.7 ± 0.3	5.8 ± 0.2	5.7 ± 0.1
18G1	4.8 ± 0.9	5.2 ± 0.2	4.4 ± 0.3	4.5 ± 0.2	5.3 ± 0.1
19D1	6.1 ± 0.5	6.2 ± 0.2	5.8 ± 0.8	6.4 ± 0.1	6.2 ± 0.5
20D1	5.5 ± 1.2	5.9 ± 0.2	4.6 ± 0.4	5.7 ± 0.1	5.8 ± 0.2
20F1	6.1 ± 1.0	6.2 ± 0.3	5.4 ± 0.5	6.4 ± 0.5	6.4 ± 0.1
21S1	5.5 ± 0.8	5.5 ± 0.2	4.9 ± 0.6	5.6 ± 0.2	5.9 ± 0.8
22G1	5.6 ± 1.3	5.9 ± 0.1	4.7 ± 0.5	6.0 ± 0.1	6.0 ± 0.3
23S2	6.0 ± 1.3	6.7 ± 0.1	5.1 ± 0.5	6.0 ± 0.2	6.2 ± 0.7
24D1	5.3 ± 1.1	5.6 ± 0.1	4.5 ± 0.5	5.4 ± 0.1	5.6 ± 0.1
25S1	5.7 ± 1.3	5.8 ± 0.3	4.8 ± 0.5	5.8 ± 0.3	6.3 ± 0.2
25D1	5.2 ± 1.0	5.6 ± 0.2	4.5 ± 0.5	5.4 ± 0.3	5.4 ± 0.2
26S3	5.5 ± 0.2	5.5 ± 0.1	5.5 ± 0.8	5.5 ± 0.1	5.7 ± 0.2
26B1	5.8 ± 0.8	6.0 ± 0.2	5.2 ± 0.4	6.0 ± 0.1	6.1 ± 0.4
28D2	5.9 ± 1.1	6.0 ± 0.1	5.1 ± 0.7	6.2 ± 0.1	6.2 ± 0.5
29S1	5.3 ± 1.0	5.6 ± 0.1	4.7 ± 0.6	5.3 ± 0.1	5.8 ± 0.4
29B1	6.0 ± 1.7	6.3 ± 0.3	4.8 ± 0.9	6.2 ± 0.1	6.7 ± 0.3
29E1	5.9 ± 1.2	6.2 ± 0.3	5.0 ± 0.3	6.2 ± 0.3	6.1 ± 0.4
31D1	7.3 ± 1.2	7.7 ± 0.2	6.4 ± 0.7	7.4 ± 0.3	7.7 ± 0.9
31D2	6.4 ± 1.3	6.8 ± 0.6	5.4 ± 0.5	6.6 ± 0.3	6.7 ± 0.8
32S1	4.7 ± 1.2	5.3 ± 0.2	3.9 ± 0.8	4.9 ± 0.2	4.8 ± 0.2
32G1	6.4 ± 0.9	6.7 ± 0.2	5.8 ± 1.0	6.7 ± 0.1	6.6 ± 0.4
34S2	6.9 ± 0.5	7.0 ± 0.2	6.5 ± 0.9	7.1 ± 0.2	6.9 ± 0.3
34E1	6.3 ± 1.5	6.2 ± 0.2	5.3 ± 0.7	6.6 ± 0.1	7.1 ± 0.3
35B1	6.3 ± 1.4	6.0 ± 0.3	5.5 ± 0.5	6.7 ± 0.3	7.1 ± 0.8
35F1	6.7 ± 1.3	6.8 ± 0.2	5.8 ± 0.8	7.3 ± 0.3	6.9 ± 0.3

1. MEAN AND TWO TIMES THE STANDARD DEVIATION OF THE QUARTERLY RESULTS.
2. SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION.

TABLE C-VII.3 1993 MEAN TLD RESULTS FROM LIMERICK GENERATING STATION FOR THE SITE BOUNDARY, MIDDLE, AND OUTER RINGS

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

SAMPLE TYPE	EXPOSURE PERIOD	SITE	MIDDLE RING	OUTER RING
MONTHLY	JAN 1993	6.6 ± 1.6	6.6 ± 1.3	6.6 ± 2.2
	FEB 1993	6.5 ± 1.5	6.6 ± 1.3	6.3 ± 2.7
	MAR 1993	7.0 ± 1.3	7.0 ± 1.2	6.8 ± 2.5
	APR 1993	6.7 ± 1.6	6.9 ± 1.5	6.4 ± 2.9
	MAY 1993	7.5 ± 1.2	7.7 ± 1.6	7.3 ± 2.9
	JUN 1993	7.3 ± 1.4	7.3 ± 1.6	6.6 ± 3.1
	JUL 1993	6.7 ± 1.7	6.9 ± 1.5	6.6 ± 3.8
	AUG 1993	6.9 ± 1.4	7.1 ± 1.6	6.5 ± 3.6
	SEP 1993	6.3 ± 1.3	6.4 ± 1.2	6.2 ± 2.8
	OCT 1993	7.7 ± 1.8	7.6 ± 1.4	7.6 ± 4.7
	NOV 1993	7.4 ± 1.8	7.4 ± 1.3	7.3 ± 3.5
	DEC 1993	8.3 ± 2.8	8.1 ± 1.6	7.8 ± 3.8
QUARTERLY	JAN-MAR 1993	6.3 ± 1.5	6.3 ± 1.1	6.0 ± 2.3
	APR-JUN 1993	5.3 ± 1.6	5.3 ± 1.2	5.1 ± 1.8
	JUL-SEP 1993	6.3 ± 1.7	6.3 ± 1.3	5.8 ± 3.3
	OCT-DEC 1993	6.4 ± 1.6	6.5 ± 1.3	6.1 ± 2.9

TABLE C-VIII.4 SUMMARY OF THE 1993 AMBIENT DOSIMETRY PROGRAM FOR LIMERICK GENERATING STATION

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

SAMPLE TYPE	LOCATION	NO. OF SAMPLES ANALYZED	PERIOD MINIMUM	PERIOD MAXIMUM	PERIOD MEAN ± 2 S.D.	PRE-OP MEAN ± 2 S.D. (1)
MONTHLY	SITE	192	5.2	12.7	7.1 ± 2.0	7.6 ± 2.4
	MIDDLE RING	324	4.9	10.3	7.1 ± 1.7	7.8 ± 2.2
	OUTER RING	60	4.1	10.9	6.8 ± 3.1	7.8 ± 3.0
QUARTERLY	SITE	64	3.9	7.7	6.1 ± 1.8	
	MIDDLE RING	108	4.0	7.7	6.1 ± 1.6	
	OUTER RING	20	4.0	8.3	5.8 ± 2.5	

(1) THE PRE-OPERATIONAL MEAN WAS CALCULATED FROM TLD READINGS 1-15-82 TO 12-02-84.

SITE BOUNDARY RING STATIONS - 3S1, 5S1, 7S1,10S3,11S1,14S1,16S2,18S1,
- 21S1,23S2,25S1,26S3,29S1,32S1,34S2,36S1,
- 36S2.

MIDDLE RING STATIONS - 2B1. 2E1, 4E1, 6C1, 7E1, 9C1,10E1,10F3,
- 13C1,13E1,15D1,16F1,17B1,19D1,20D1,20F1,
- 24D1,25D1,26B1,28D2,29B1,29E1,31D1,31D2,
- 34E1,35B1,35F1.

OUTER RING STATIONS - 5H1,13H4,18G1,22G1,32G1.

TABLE C-IX.1 SUMMARY OF COLLECTION DATES FOR SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

SURFACE WATER (GROSS BETA AND GAMMA)

COLLECTION PERIOD	10F2	13B1	24S1
JAN 93	12/29-02/01	12/29-02/01	12/29-02/01
FEB 93	02/01-03/01	02/01-03/01	02/01-03/01
MAR 93	03/01-03/30	03/01-03/30	03/01-03/30
APR 93	03/30-04/27	03/30-04/27	03/30-04/27
MAY 93	04/27-06/01	04/27-06/01	04/27-06/01
JUN 93	06/01-06/29	06/01-06/29	06/01-06/29
JUL 93	06/29-08/02	06/29-08/02	06/29-08/02
AUG 93	08/02-08/31	08/02-08/31	08/02-08/31
SEP 93	08/31-09/27	08/31-09/27	08/31-09/27
OCT 93	09/27-11/01	09/27-11/01	09/27-11/01
NOV 93	11/01-11/29	11/01-11/29	11/01-11/29
DEC 93	11/29-12/27	11/29-12/27	11/29-12/27

SURFACE WATER (TRITIUM)

JAN-MAR 93	12/29-03/30	12/29-03/30	12/29-03/30
APR-JUN 93	03/30-06/29	03/30-06/29	03/30-06/29
JUL-SEP 93	06/29-09/27	06/29-09/27	06/29-09/27
OCT-DEC 93	09/27-12/27	09/27-12/27	09/27-12/27

DRINKING WATER (GROSS BETA AND GAMMA)

COLLECTION PERIOD	13H2	15F4	15F7	16C2	28F3
JAN 93	12/29-02/01	12/29-02/01	12/29-02/01	12/29-02/01	12/29-02/01
FEB 93	02/01-03/01	02/01-03/01	02/01-03/01	02/01-03/01	02/01-03/01
MAR 93	03/01-03/30	03/01-03/30	03/01-03/30	03/01-03/30	03/01-03/30
APR 93	03/30-04/27	03/30-04/27	03/30-04/27	03/30-04/27	03/30-04/27
MAY 93	04/27-06/01	04/27-06/01	04/27-06/01	04/27-06/01	04/27-06/01
JUN 93	06/01-06/29	06/01-06/29	06/01-06/29	06/01-06/29	06/01-06/29
JUL 93	06/29-08/02	06/29-08/02	06/29-08/02	06/29-08/02	06/29-08/02
AUG 93	08/02-08/31	08/02-08/31	08/02-08/31	08/02-08/31	08/02-08/31
SEP 93	08/31-09/27	08/31-09/27	08/31-09/27	08/31-09/27	08/31-09/27
OCT 93	09/27-11/01	09/27-11/01	09/27-11/01	09/27-11/01	09/27-11/01
NOV 93	11/01-11/29	11/01-11/29	11/01-11/29	11/01-11/29	11/01-11/29
DEC 93	11/29-12/27	11/29-12/27	11/29-12/27	11/29-12/27	11/29-12/27

DRINKING WATER (TRITIUM)

JAN-MAR 93	12/29-03/30	12/29-03/30	12/29-03/30	12/29-03/30	12/29-03/30
APR-JUN 93	03/30-06/29	03/30-06/29	03/30-06/29	03/30-06/29	03/30-06/29
JUL-SEP 93	06/29-09/27	06/29-09/27	06/29-09/27	06/29-09/27	06/29-09/27
OCT-DEC 93	09/27-12/27	09/27-12/27	09/27-12/27	09/27-12/27	09/27-12/27

TABLE C-IX.1 SUMMARY OF COLLECTION DATES FOR SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

AIR PARTICULATES AND AIR IODINE

GROUP I - ON-SITE LOCATIONS

WEEK	10S3	11S1	14S1	34S2
01	12/29-01/04	12/29-01/04	12/29-01/04	12/29-01/04
02	01/04-01/11	01/04-01/11	01/04-01/11	01/04-01/11
03	01/11-01/18	01/11-01/18	01/11-01/18	01/11-01/18
04	01/18-01/25	01/18-01/25	01/18-01/25	01/18-01/25
05	01/25-02/02	01/25-02/02	01/25-02/01	01/25-02/02
06	02/01-02/08	02/01-02/08	02/01-02/08	02/01-02/08
07	02/08-02/15	02/08-02/15	02/08-02/15	02/08-02/15
08	02/15-02/22	02/15-02/22	02/15-02/22	02/15-02/22
09	02/22-03/01	02/22-03/01	02/22-03/01	02/22-03/01
10	03/01-03/08	03/01-03/08	03/01-03/08	03/01-03/08
11	03/08-03/16	03/08-03/16	03/08-03/16	03/08-03/16
12	03/16-03/22	03/16-03/22	03/16-03/22	03/16-03/22
13	03/22-03/29	03/22-03/29	03/22-03/29	03/22-03/29
14	03/29-04/05	03/29-04/05	03/29-04/05	03/29-04/05
15	04/05-04/12	04/05-04/12	04/05-04/12	04/05-04/12
16	04/12-04/20	04/12-04/20	04/12-04/20	04/12-04/20
17	04/20-04/26	04/20-04/26	04/20-04/26	04/20-04/26
18	04/26-05/03	04/26-05/03	04/26-05/03	04/26-05/03
19	05/03-05/10	05/03-05/10	05/03-05/10	05/03-05/10
20	05/10-05/17	05/10-05/17	05/10-05/17	05/10-05/17
21	05/17-05/24	05/17-05/24	05/17-05/24	05/17-05/24
22	05/24-05/31	05/24-05/31	05/24-05/31	05/24-05/31
23	05/31-06/08	05/31-06/08	05/31-06/08	05/31-06/08
24	06/08-06/14	06/08-06/14	06/08-06/14	06/08-06/14
25	06/14-06/21	06/14-06/21	06/14-06/21	06/14-06/21
26	06/21-06/28	06/21-06/28	06/21-06/28	06/21-06/28
27	06/28-07/06	06/28-07/06	06/28-07/06	06/28-07/06
28	07/06-07/12	07/06-07/12	07/06-07/12	07/06-07/12
29	07/12-07/19	07/12-07/19	07/12-07/19	07/12-07/19
30	07/19-07/26	07/19-07/26	07/19-07/26	07/19-07/26
31	07/26-08/02	07/26-08/02	07/26-08/02	07/26-08/02
32	08/02-08/09	08/02-08/09	08/02-08/09	08/02-08/09
33	08/09-08/16	08/09-08/16	08/09-08/16	08/09-08/16
34	08/16-08/24	08/16-08/24	08/16-08/24	08/16-08/24
35	08/24-08/30	08/24-08/30	08/24-08/30	08/24-08/30
36	08/30-09/07	08/30-09/07	08/30-09/07	08/30-09/07
37	09/07-09/13	09/07-09/13	09/07-09/13	09/07-09/13
38	09/13-09/20	09/13-09/20	09/13-09/20	09/13-09/20
39	09/20-09/27	09/20-09/27	09/20-09/27	09/20-09/27
40	09/27-10/04	09/27-10/04	09/27-10/04	09/27-10/04
41	10/04-10/12	10/04-10/12	10/04-10/12	10/04-10/12
42	10/12-10/18	10/12-10/18	10/12-10/18	10/12-10/18
43	10/18-10/25	10/18-10/25	10/18-10/25	10/18-10/25
44	10/25-11/01	10/25-11/01	10/25-11/01	10/25-11/01
45	11/01-11/08	11/01-11/08	11/01-11/08	11/01-11/08
46	11/08-11/15	11/08-11/15	11/08-11/15	11/08-11/15
47	11/15-11/22	11/15-11/22	11/15-11/22	11/15-11/22
48	11/22-11/29	11/22-11/29	11/22-11/29	11/22-11/29
49	11/29-12/06	11/29-12/06	11/29-12/06	11/29-12/06
50	12/06-12/13	12/06-12/13	12/06-12/13	12/06-12/13
51	12/13-12/20	12/13-12/20	12/13-12/20	12/13-12/20
52	12/20-12/27	12/20-12/27	12/20-12/27	12/20-12/27
53	12/27-01/03	12/27-01/03	12/27-01/03	12/27-01/03

TABLE C-IX.1 SUMMARY OF COLLECTION DATES FOR SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

AIR PARTICULATES AND AIR IODINE

GROUP II - INTERMEDIATE DISTANCE LOACATIONS

WEEK	2B1	6C1	9C1	13C1	15D1	17B1
01	12/29-01/04	12/29-01/04	12/29-01/04	12/29-01/04	12/29-01/04	12/29-01/04
02	01/04-01/11	01/04-01/11	01/04-01/11	01/04-01/11	01/04-01/11	01/04-01/11
03	01/11-01/18	01/11-01/18	01/11-01/18	01/11-01/18	01/11-01/18	01/11-01/18
04	01/18-01/25	01/18-01/25	01/18-01/25	01/18-01/25	01/18-01/25	01/18-01/25
05	01/25-02/02	01/25-02/01	01/25-02/01	01/25-02/01	01/25-02/01	01/25-02/01
06	02/01-02/08	02/01-02/08	02/01-02/08	02/01-02/08	02/01-02/08	02/01-02/08
07	02/08-02/15	02/08-02/15	02/08-02/15	02/08-02/15	02/08-02/15	02/08-02/15
08	02/15-02/22	02/15-02/22	02/15-02/22	02/15-03/22	02/15-02/22	02/15-02/22
09	02/22-03/01	02/22-03/01	02/22-03/01	02/22-03/01	02/22-03/01	02/22-03/01
10	03/01-03/08	03/01-03/08	03/01-03/08	03/01-03/08	03/01-03/08	03/01-03/08
11	03/08-03/16	03/08-03/16	03/08-03/16	03/08-03/16	03/08-03/16	03/08-03/16
12	03/16-03/22	03/16-03/22	03/16-03/22	03/16-03/22	03/16-03/22	03/16-03/22
13	03/22-03/29	03/22-03/29	03/22-03/29	03/22-03/29	03/22-03/29	03/22-03/29
14	03/29-04/05	03/29-04/05	03/29-04/05	03/29-04/05	03/29-04/05	03/29-04/05
15	04/05-04/12	04/05-04/12	04/05-04/12	04/05-04/12	04/05-04/12	04/05-04/12
16	04/12-04/20	04/12-04/20	04/12-04/20	04/12-04/20	04/12-04/20	04/12-04/20
17	04/20-04/26	04/20-04/26	04/20-04/26	04/20-04/26	04/20-04/26	04/20-04/26
18	04/26-05/03	04/26-05/03	04/26-05/03	04/26-05/03	04/26-05/03	04/26-05/03
19	05/03-05/10	05/03-05/10	05/03-05/10	05/03-05/10	05/03-05/10	05/03-05/10
20	05/10-05/17	05/10-05/17	05/10-05/17	05/10-05/17	05/10-05/17	05/10-05/17
21	05/17-05/24	05/17-05/24	05/17-05/24	05/17-05/24	05/17-05/24	05/17-05/24
22	05/24-05/31	05/24-05/31	05/24-05/31	05/24-05/31	05/24-05/31	05/24-05/31
23	05/31-06/08	05/31-06/08	05/31-06/08	05/31-06/08	05/31-06/08	05/31-06/08
24	06/08-06/14	06/08-06/14	06/08-06/14	06/08-06/14	06/08-06/14	06/08-06/14
25	06/14-06/21	06/14-06/21	06/14-06/21	06/14-06/21	06/14-06/21	06/14-06/21
26	06/21-06/28	06/21-06/28	06/21-06/28	06/21-06/28	06/21-06/28	06/21-06/28
27	06/28-07/06	06/28-07/06	06/28-07/06	06/28-07/06	06/28-07/06	06/28-07/06
28	07/06-07/12	07/06-07/12	07/06-07/12	07/06-07/12	07/06-07/12	07/06-07/12
29	07/12-07/19	07/12-07/19	07/12-07/19	07/12-07/19	07/12-07/19	07/12-07/19
30	07/19-07/26	07/19-07/26	07/19-07/26	07/19-07/26	07/19-07/26	07/19-07/26
31	07/26-08/02	07/26-08/02	07/26-08/02	07/26-08/02	07/26-08/02	07/26-08/02
32	08/02-08/09	08/02-08/09	08/02-08/09	08/02-08/09	08/02-08/09	08/02-08/09
33	08/09-08/16	08/09-08/16	08/09-08/16	08/09-08/16	08/09-08/16	08/09-08/16
34	08/16-08/24	08/16-08/24	08/16-08/24	08/16-08/24	08/16-08/24	08/16-08/24
35	08/24-08/30	08/24-08/30	08/24-08/30	08/24-08/30	08/24-08/30	08/24-08/30
36	08/30-09/07	08/30-09/07	08/30-09/07	08/30-09/07	08/30-09/07	08/30-09/07
37	09/07-09/13	09/07-09/13	09/07-09/13	09/07-09/13	09/07-09/13	09/07-09/13
38	09/13-09/20	09/13-09/20	09/13-09/20	09/13-09/20	09/13-09/20	09/13-09/20
39	09/20-09/27	09/20-09/27	09/20-09/27	09/20-09/27	09/20-09/27	09/20-09/27
40	09/27-10/04	09/27-10/04	09/27-10/04	09/27-10/04	09/27-10/04	09/27-10/04
41	10/04-10/12	10/04-10/12	10/04-10/12	10/04-10/12	10/04-10/12	10/04-10/12
42	10/12-10/18	10/12-10/18	10/12-10/18	10/12-10/18	10/12-10/18	10/12-10/18
43	10/18-10/25	10/18-10/25	10/18-10/25	10/18-10/25	10/18-10/25	10/18-10/25
44	10/25-11/01	10/25-11/01	10/25-11/01	10/25-11/01	10/25-11/01	10/25-11/01
45	11/01-11/08	11/01-11/08	11/01-11/08	11/01-11/08	11/01-11/08	11/01-11/08
46	11/08-11/15	11/08-11/15	11/08-11/15	11/08-11/15	11/08-11/15	11/08-11/15
47	11/15-11/22	11/15-11/22	11/15-11/22	11/15-11/22	11/15-11/22	11/15-11/22
48	11/22-11/29	11/22-11/29	11/22-11/29	11/22-11/29	11/22-11/29	11/22-11/29
49	11/29-12/06	11/29-12/06	11/29-12/06	11/29-12/06	11/29-12/06	11/29-12/06
50	12/06-12/13	12/06-12/13	12/06-12/13	12/06-12/13	12/06-12/13	12/06-12/13
51	12/13-12/20	12/13-12/20	12/13-12/20	12/13-12/20	12/13-12/20	12/13-12/20
52	12/20-12/27	12/20-12/27	12/20-12/27	12/20-12/27	12/20-12/27	12/20-12/27
53	12/27-01/03	12/27-01/03	12/27-01/03	12/27-01/03	12/27-01/03	12/27-01/03

TABLE C-IX.1 SUMMARY OF COLLECTION DATES FOR SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

AIR PARTICULATES AND AIR IODINE

GROUP II - INTERMEDIATE DISTANCE LOACATIONS

WEEK	20D1	26B1	29B1	31D1	35B1
01	12/29-01/04	12/29-01/04	12/29-01/04	12/29-01/04	12/29-01/04
02	01/04-01/11	01/04-01/11	01/04-01/11	01/04-01/11	01/04-01/11
03	01/11-01/18	01/11-01/18	01/11-01/18	01/11-01/18	01/11-01/18
04	01/18-01/25	01/18-01/25	01/18-01/25	01/18-01/25	01/18-01/25
05	01/25-02/01	01/25-02/01	01/25-02/01	01/25-02/02	01/25-02/02
06	02/01-02/08	02/01-02/08	02/01-02/08	02/01-02/08	02/01-02/08
07	02/08-02/15	02/08-02/15	02/08-02/15	02/08-02/15	02/08-02/15
08	02/15-02/22	02/15-02/22	02/15-02/22	02/15-02/22	02/15-02/22
09	02/22-03/01	02/22-03/01	02/22-03/01	02/22-03/01	02/22-03/01
10	03/01-03/08	03/01-03/08	03/01-03/08	03/01-03/08	03/01-03/08
11	03/08-03/16	03/08-03/16	03/08-03/16	03/08-03/16	03/08-03/16
12	03/16-03/22	03/16-03/22	03/16-03/22	03/16-03/22	03/16-03/22
13	03/22-03/29	03/22-03/29	03/22-03/29	03/22-03/29	
14	03/29-04/05	03/29-04/05	03/29-04/05	03/29-04/05	03/29-04/05
15	04/05-04/12	04/05-04/12	04/05-04/12	04/05-04/12	04/05-04/12
16	04/12-04/20	04/12-04/20	04/12-04/20	04/12-04/20	04/12-04/20
17	04/20-04/26	04/20-04/26	04/20-04/26	04/20-04/26	04/20-04/26
18	04/26-05/03	04/26-05/03	04/26-05/03	04/26-05/03	04/26-05/03
19	05/03-05/10	05/03-05/10	05/03-05/10	05/03-05/10	05/03-05/10
20	05/10-05/17	05/10-05/17	05/10-05/17	05/10-05/17	05/10-05/17
21	05/17-05/24	05/17-05/24	05/17-05/24	05/17-05/24	05/17-05/24
22	05/24-05/31	05/24-05/31	05/24-05/31	05/24-05/31	05/24-05/31
23	05/31-06/08	05/31-06/08	05/31-06/08	05/31-06/08	05/31-06/08
24	06/08-06/14	06/08-06/14	06/08-06/14		06/08-06/14
25	06/14-06/21	06/14-06/21	06/14-06/21	06/14-06/21	06/14-06/21
26	06/21-06/28	06/21-06/28	06/21-06/28	06/21-06/28	06/21-06/28
27	06/28-07/06	06/28-07/06	06/28-07/06	06/28-07/06	06/28-07/06
28	07/06-07/12	07/06-07/12	07/06-07/12		07/06-07/12
29	07/12-07/19	07/12-07/19	07/12-07/19	07/12-07/19	07/12-07/19
30	07/19-07/26	07/19-07/26	07/19-07/26	07/19-07/26	07/19-07/26
31	07/26-08/02	07/26-08/02	07/26-08/02	07/26-08/02	07/26-08/02
32	08/02-08/09	08/02-08/09	08/02-08/09	08/02-08/09	08/02-08/09
33	08/09-08/16	08/09-08/16	08/09-08/16	08/09-08/16	08/09-08/16
34	08/16-08/24	08/16-08/24	08/16-08/24	08/16-08/24	08/16-08/24
35	08/24-08/30	08/24-08/30	08/24-08/30	08/24-08/30	08/24-08/30
36	08/30-09/07	08/30-09/07	08/30-09/07	08/30-09/07	08/30-09/07
37	09/07-09/13	09/07-09/13	09/07-09/13		09/07-09/13
38	09/13-09/20	09/13-09/20	09/13-09/20	09/13-09/20	09/13-09/20
39	09/20-09/27	09/20-09/27	09/20-09/27	09/20-09/27	09/20-09/27
40	09/27-10/04	09/27-10/04	09/27-10/04	09/27-10/04	09/27-10/04
41	10/04-10/12	10/04-10/12	10/04-10/12	10/04-10/12	10/04-10/12
42	10/12-10/18	10/12-10/18	10/12-10/18	10/12-10/18	10/12-10/18
43	10/18-10/25	10/18-10/25	10/18-10/25	10/18-10/25	10/18-10/25
44	10/25-11/01	10/25-11/01	10/25-11/01	10/25-11/01	10/25-11/01
45	11/01-11/08	11/01-11/08	11/01-11/08	11/01-11/08	11/01-11/08
46	11/08-11/15	11/08-11/15	11/08-11/15	11/08-11/15	11/08-11/15
47	11/15-11/22	11/15-11/22	11/15-11/22	11/15-11/22	11/15-11/22
48	11/22-11/29	11/22-11/29	11/22-11/29	11/22-11/29	11/22-11/29
49	11/29-12/06	11/29-12/06	11/29-12/06	11/29-12/06	11/29-12/06
50	12/06-12/13	12/06-12/13	12/06-12/13	12/06-12/13	12/06-12/13
51	12/13-12/20	12/13-12/20	12/13-12/20	12/13-12/20	12/13-12/20
52	12/20-12/27	12/20-12/27	12/20-12/27	12/20-12/27	12/20-12/27
53	12/27-01/03	12/27-01/03	12/27-01/03	12/27-01/03	12/27-01/03

TABLE C-IX.1 SUMMARY OF COLLECTION DATES FOR SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

AIR PARTICULATES AND AIR IODINE

GROUP III - CONTROL LOACATIONS

WEEK	13H4	22G1
01	12/29-01/04	12/29-01/04
02	01/04-01/11	01/04-01/11
03	01/11-01/19	01/11-01/18
04	01/19-01/25	01/18-01/25
05	01/25-02/01	01/25-02/01
06	02/01-02/08	02/01-02/08
07	02/08-02/16	02/08-02/15
08	02/16-02/22	02/15-02/22
09	02/22-03/01	02/22-03/01
10	03/01-03/08	03/01-03/08
11	03/08-03/16	03/08-03/16
12	03/16-03/22	03/16-03/22
13	03/22-03/29	03/22-03/29
14	03/29-04/05	03/29-04/05
15	04/05-04/12	04/05-04/12
16		04/12-04/20
17	04/20-04/26	04/20-04/26
18	04/26-05/03	04/26-05/03
19	05/03-05/10	05/03-05/10
20	05/10-05/17	05/10-05/17
21	05/17-05/24	05/17-05/24
22	05/24-06/01	05/24-05/31
23	06/01-06/08	05/31-06/08
24	06/08-06/14	06/08-06/14
25	06/14-06/21	06/14-06/21
26	06/21-06/28	06/21-06/28
27	06/28-07/06	06/28-07/06
28	07/06-07/12	07/06-07/12
29	07/12-07/19	07/12-07/19
30	07/19-07/26	07/19-07/26
31	07/26-08/02	07/26-08/02
32	08/02-08/09	08/02-08/09
33	08/09-08/16	08/09-08/16
34	08/16-08/24	08/16-08/24
35	08/24-08/30	08/24-08/30
36	08/30-09/07	08/30-09/07
37	09/07-09/13	09/07-09/13
38	09/13-09/20	09/13-09/20
39	09/20-09/27	09/20-09/27
40	09/27-10/04	09/27-10/04
41		10/04-10/12
42	10/12-10/18	10/12-10/18
43		10/18-10/25
44	10/25-11/01	10/25-11/01
45		11/01-11/08
46	11/08-11/15	11/08-11/15
47	11/15-11/22	11/15-11/22
48	11/22-11/29	11/22-11/29
49	11/29-12/06	11/29-12/06
50	12/06-12/13	12/06-12/13
51	12/13-12/20	12/13-12/20
52	12/20-12/27	12/20-12/27
53	12/27-01/03	12/27-01/03

TABLE C-IX.1 SUMMARY OF COLLECTION DATES FOR SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

TLD - MONTHLY

STATION CODE	JAN 1993	FEB 1993	MAR 1993	APR 1993	MAY 1993	JUN 1993	JUL 1993	AUG 1993	SEP 1993	OCT 1993	NOV 1993	DEC 1993
36S2	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
2B1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
2E1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
3S1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
4E1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
5S1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
5H1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
6C1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
7S1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
7E1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
9C1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
10S3	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
10E1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
10F3	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
11S1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
13C1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
13E1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
13H4	01/11-02/01	02/01-03/01	03/01-04/05	04/05-05/06	05/05-06/01	06/01-07/06	07/06-08/02	08/02-09/07	09/10-10/04	10/04-11/01	11/01-12/06	12/06-01/05
14S1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
15D1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
16S2	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
16F1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
17B1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
18S1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
18G1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
19D1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
20D1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
20F1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
21S1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
22G1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
[illegible]S2	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
[illegible]1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
[illegible]1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
25D1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
26S3	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
26B1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
28D2	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
29S1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
29B1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
29E1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
31D1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
31D2	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
32S1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
32G1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
34S2	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
34E1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
35B1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04
35F1	01/05-02/02	02/02-03/02	03/02-04/06	04/06-05/04	05/04-06/01	06/01-07/06	07/06-08/03	08/03-09/06	09/06-10/05	10/05-11/02	11/02-12/07	12/07-01/04

TABLE C-IX.1 SUMMARY OF COLLECTION DATES FOR SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

TLD - QUARTERLY

STATION CODE	JAN-MAR 1993	APR-JUN 1993	JUL-SEP 1993	OCT-DEC 1993
36S2	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
2B1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
2E1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
3S1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
4E1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
5S1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
5H1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
6C1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
7S1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
7E1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
9C1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
10S3	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
10E1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
10F3	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
11S1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
13C1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
13E1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
13H4	01/11-04/05	04/05-07/06	07/06-10/04	10/04-01/05
14S1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
15D1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
16S2	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
16F1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
17B1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
18S1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
18G1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
19D1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
20D1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
20F1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
21S1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
22G1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
23S2	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
24D1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
25S1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
25D1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
26S3	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
26B1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
28D2	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
29S1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
29B1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
29E1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
31D1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
31D2	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
32S1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
32G1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
34S2	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
34E1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
35B1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04
35F1	01/05-04/06	04/06-07/06	07/06-10/05	10/05-01/04

FIGURE C-1

MEAN MONTHLY INSOLUBLE GROSS BETA CONCENTRATIONS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LGS, 1982 - 1993

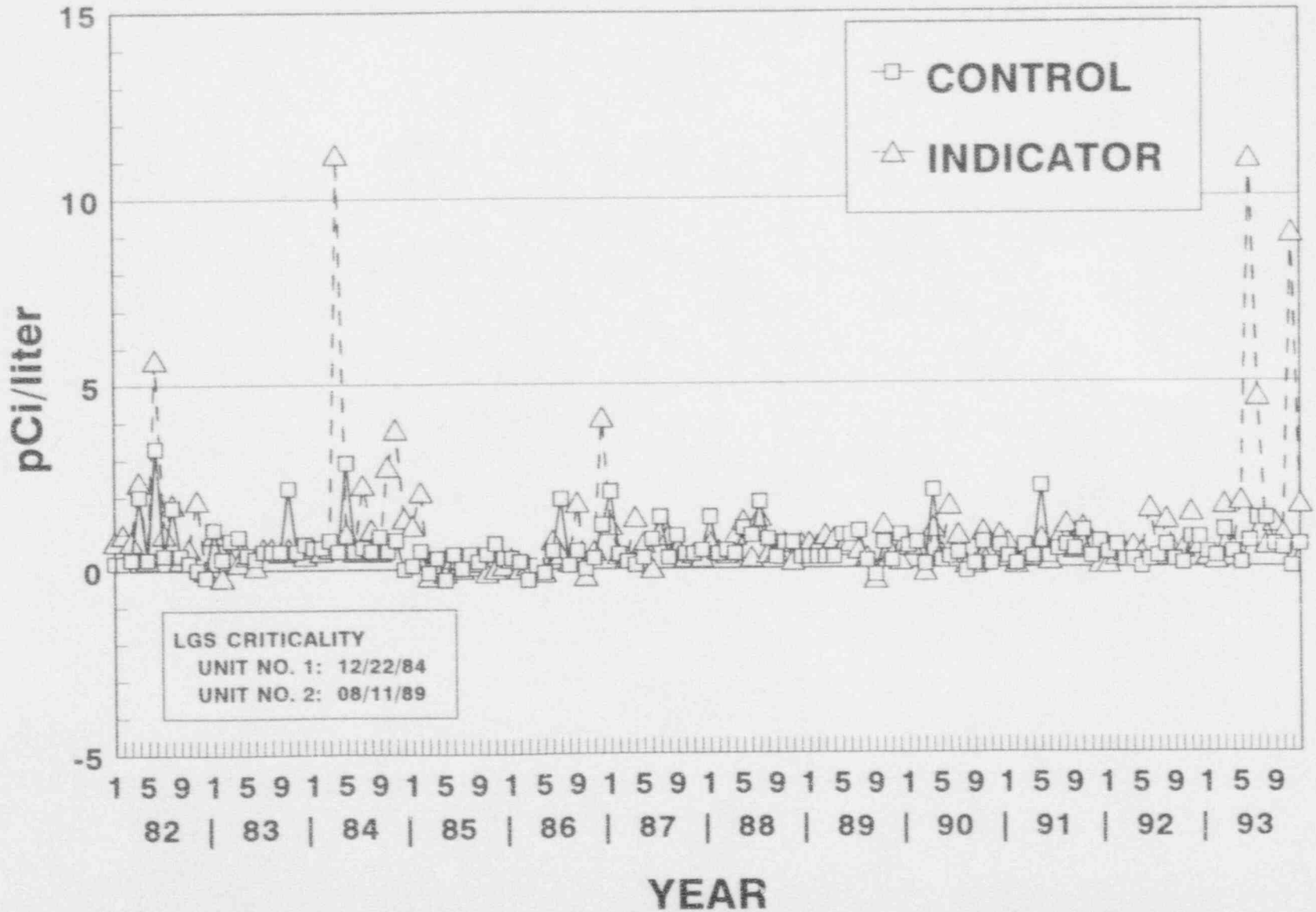


FIGURE C-2
MEAN MONTHLY SOLUBLE GROSS BETA CONCENTRATIONS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LGS, 1982 - 1993

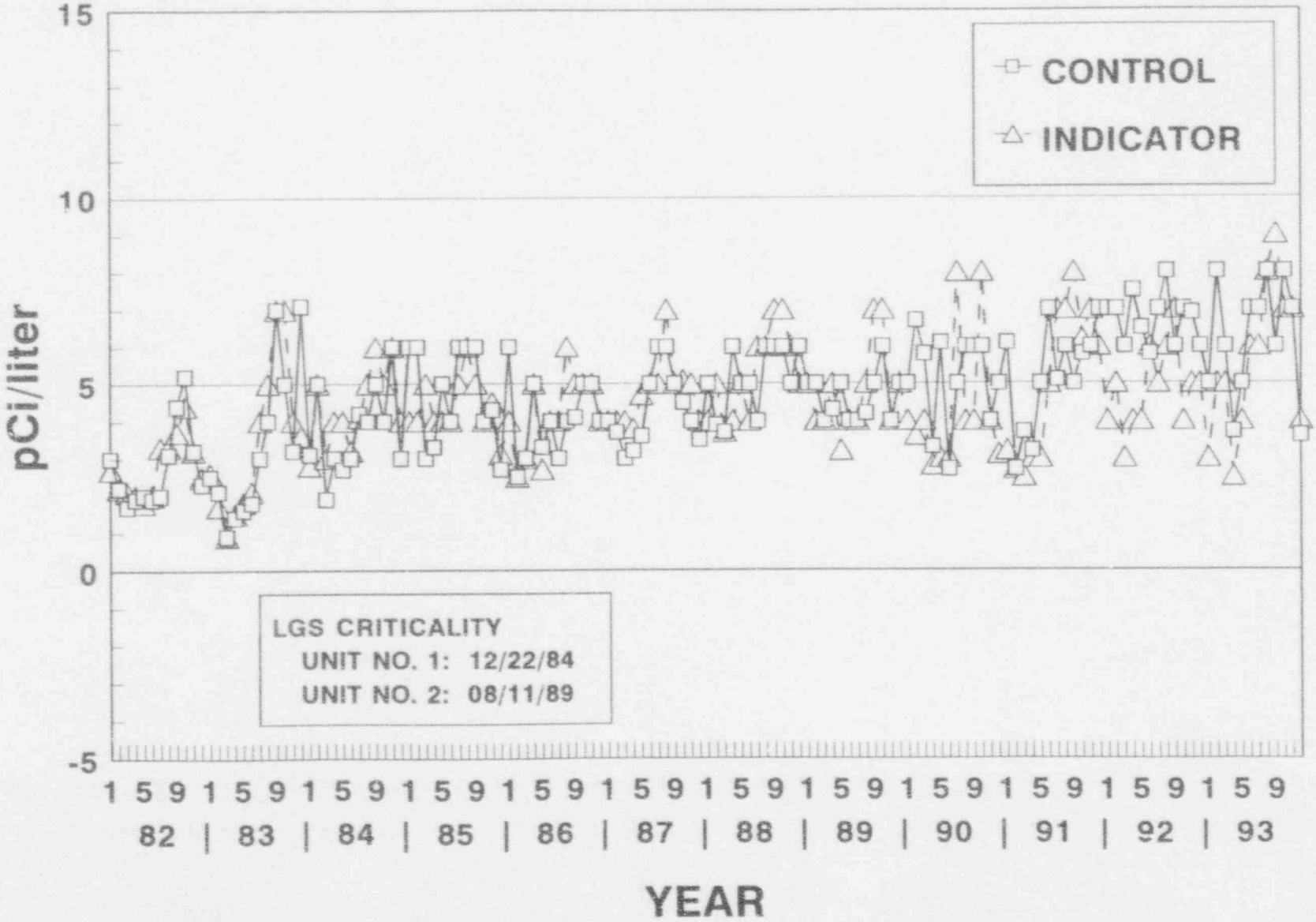


FIGURE C-3
MEAN MONTHLY INSOLUBLE GROSS BETA CONCENTRATIONS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LGS, 1982 - 1993

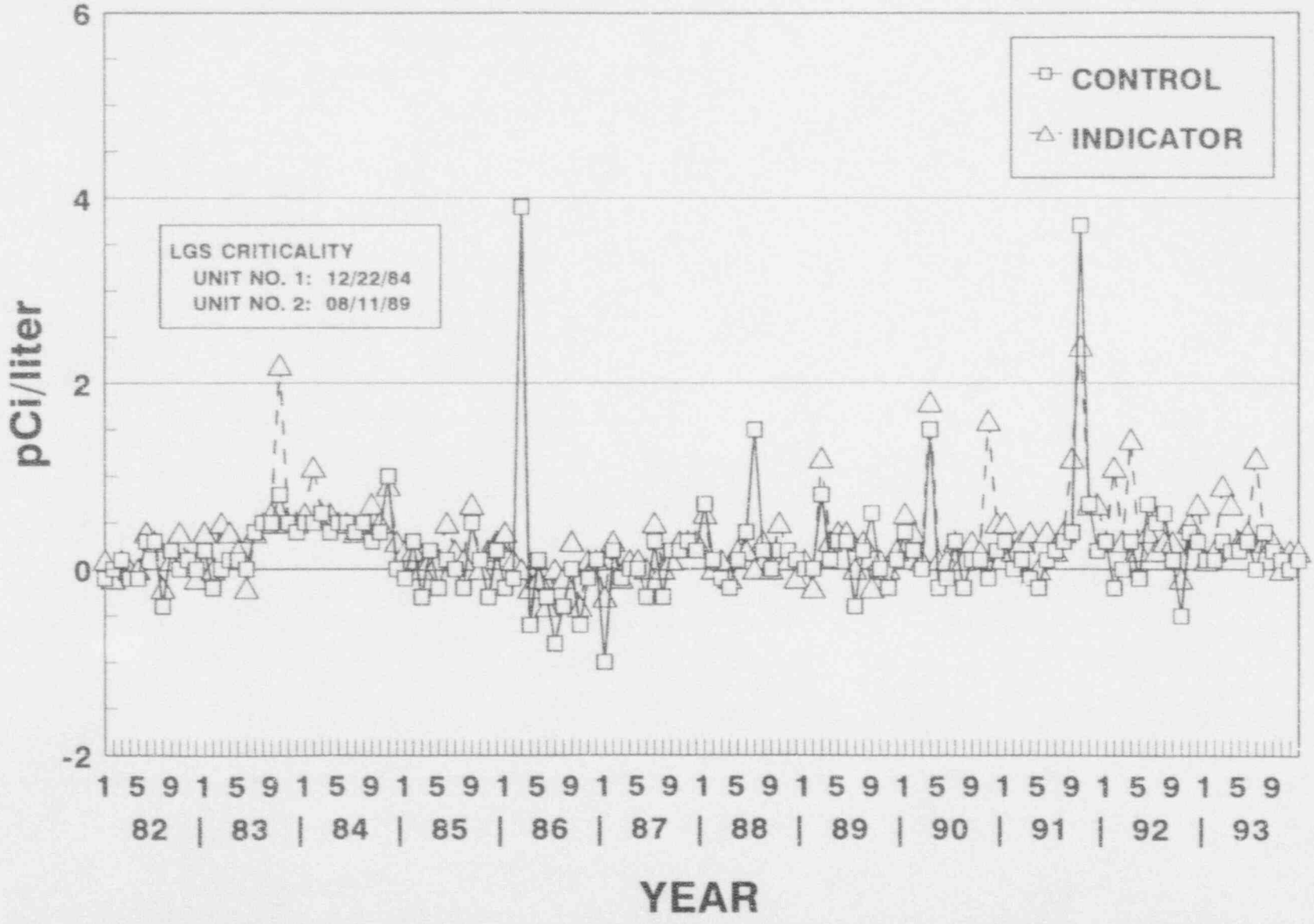


FIGURE C-4
MEAN MONTHLY SOLUBLE GROSS BETA CONCENTRATIONS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LGS, 1982 - 1993

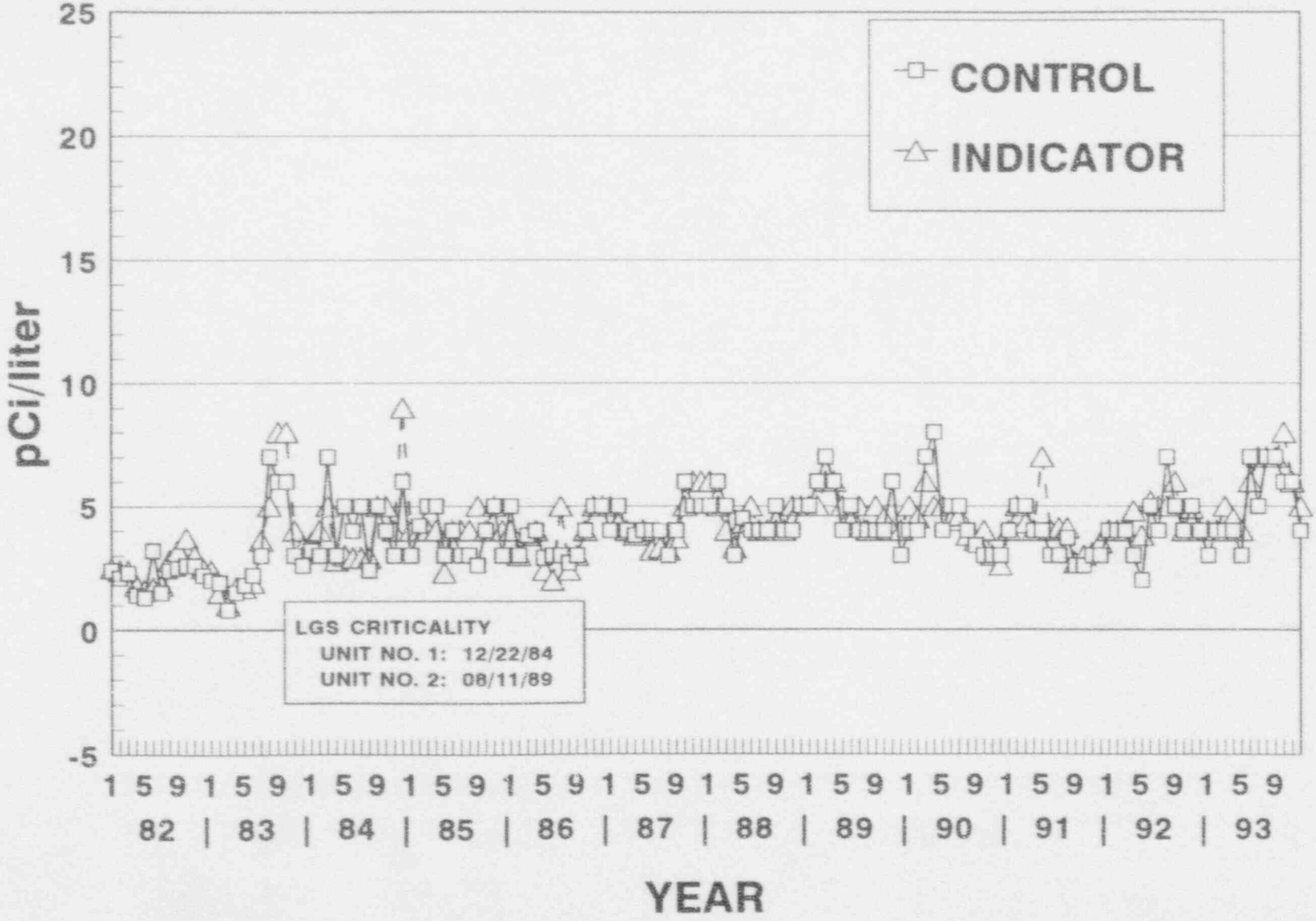


FIGURE C-5
MEAN ANNUAL CS-137 CONCENTRATIONS IN FISH SAMPLES COLLECTED IN THE VICINITY OF LGS, 1982 - 1993

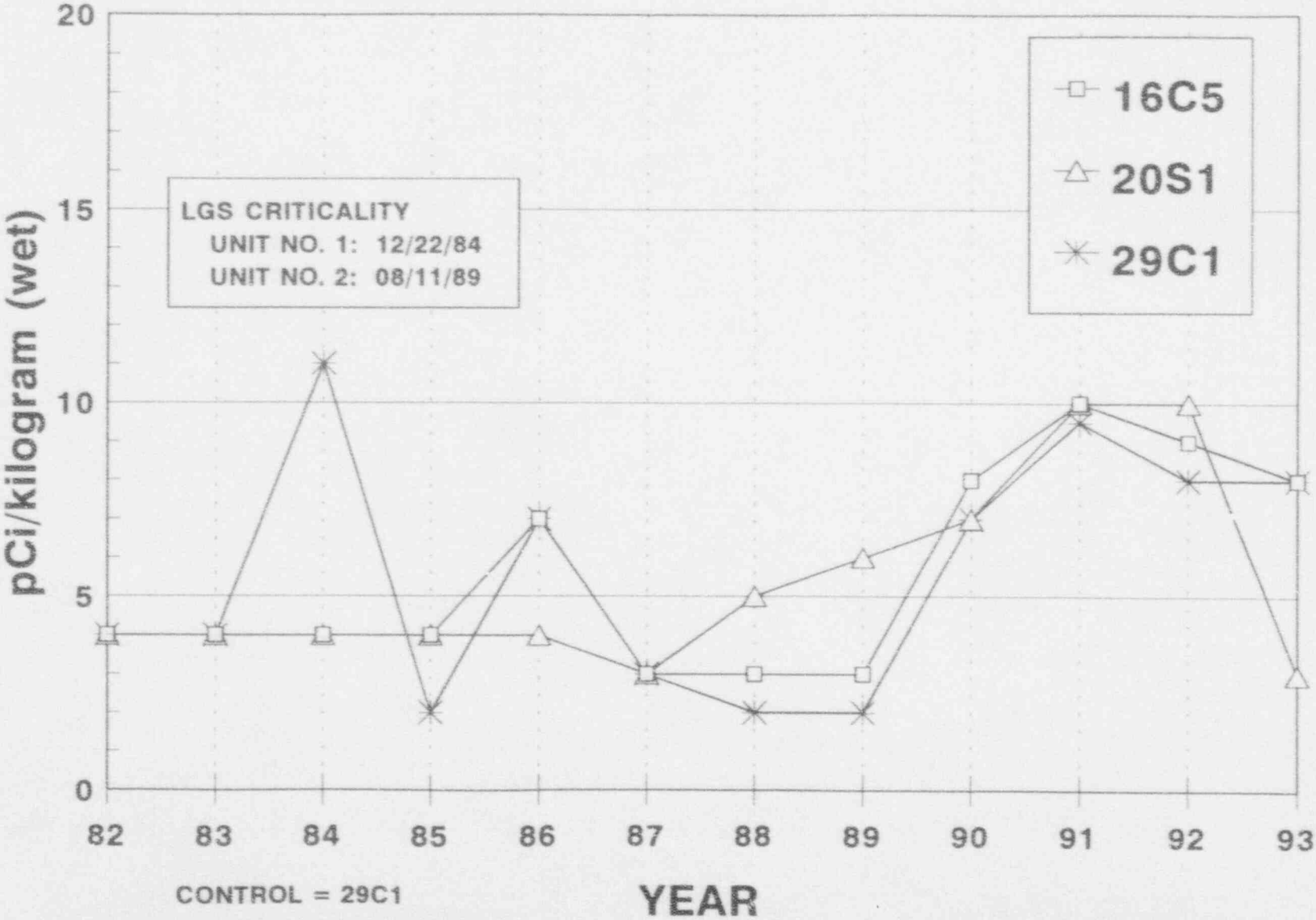


FIGURE C-6
CONCENTRATIONS OF CS-137 IN SEDIMENT SAMPLES COLLECTED IN THE VICINITY OF LGS, 1982 - 1993

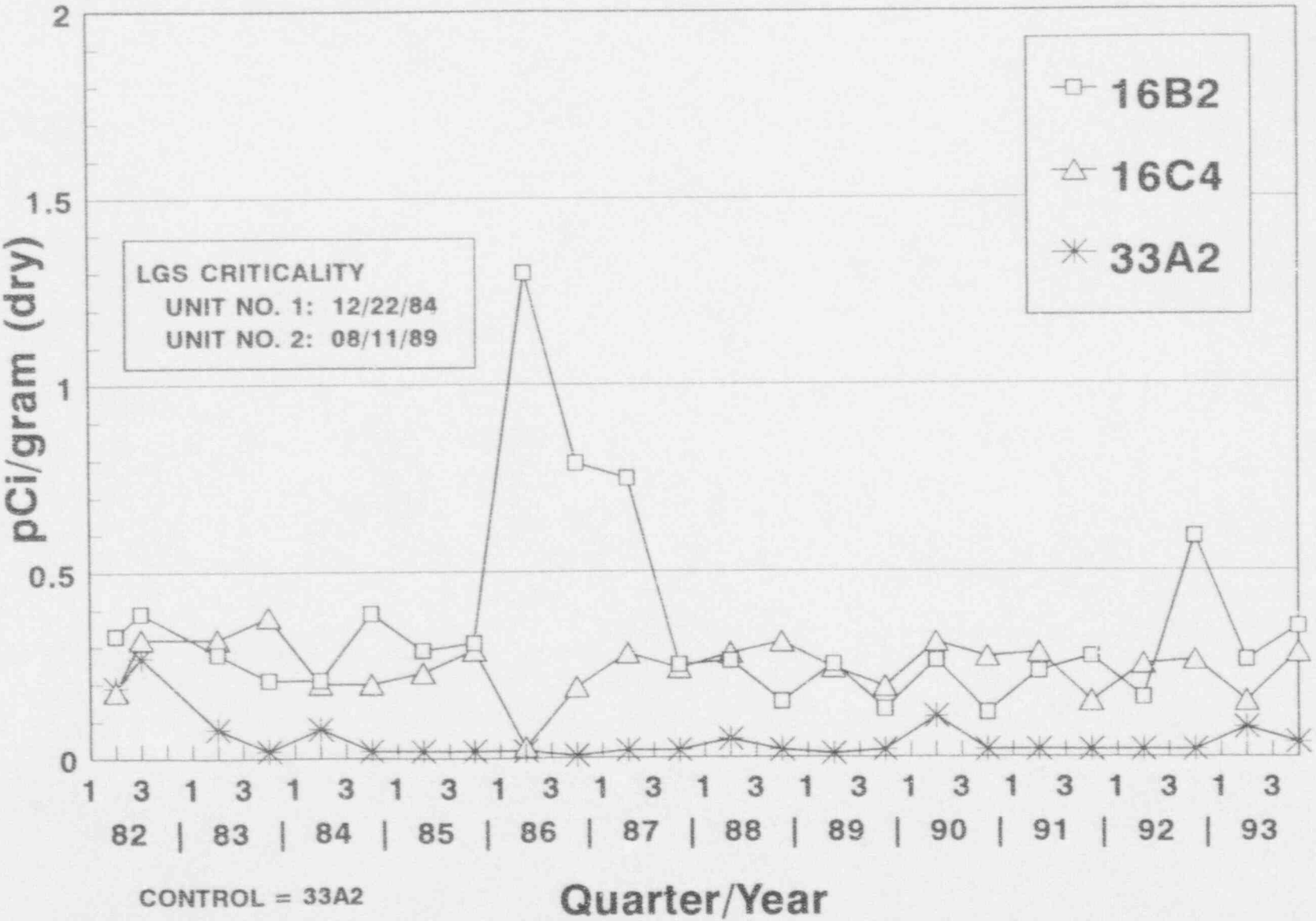


FIGURE C-7

MEAN WEEKLY GROSS BETA CONCENTRATIONS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LGS, 1993

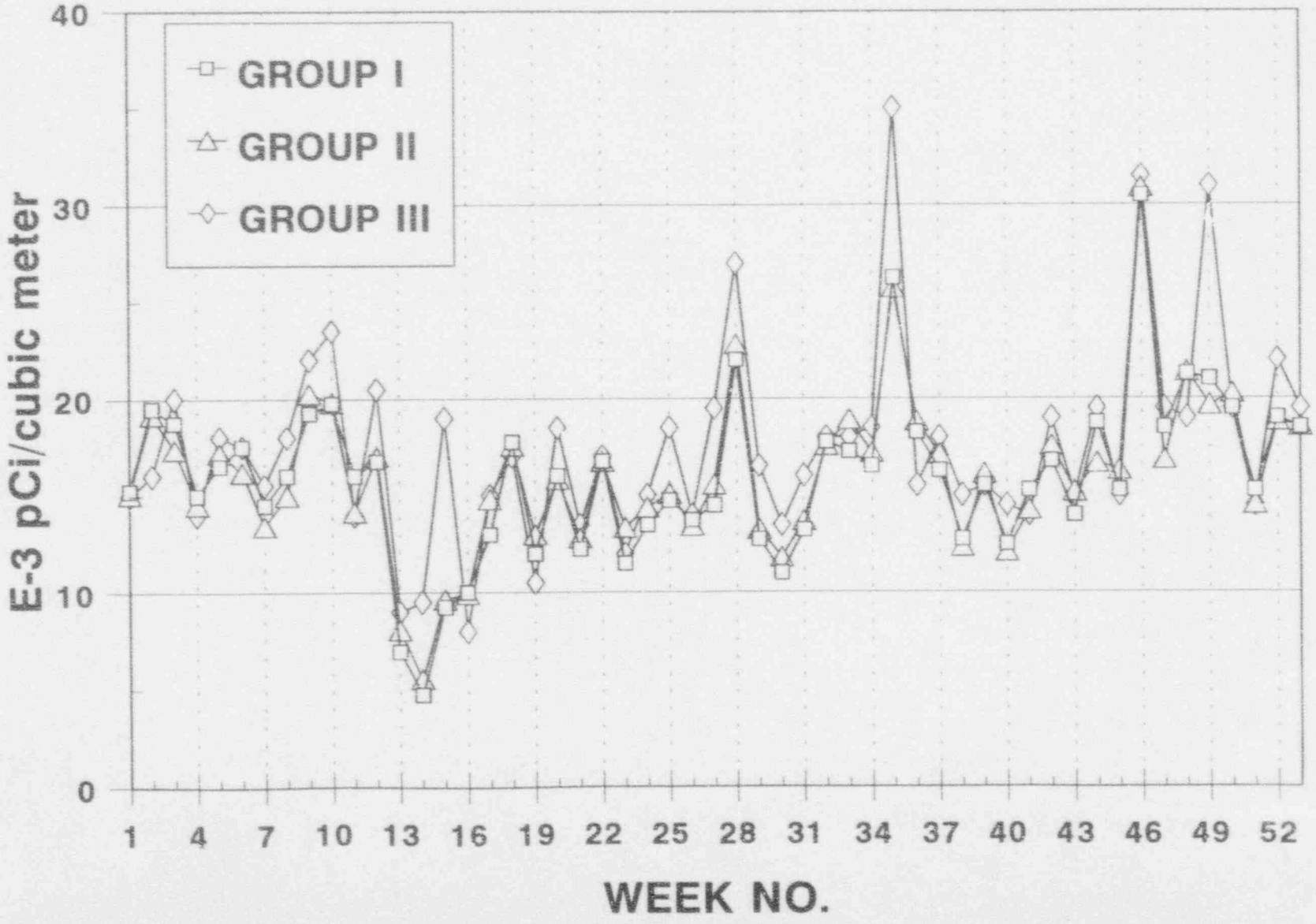


FIGURE C-8
MEAN MONTHLY GROSS BETA CONCENTRATIONS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LGS, 1982 - 1993

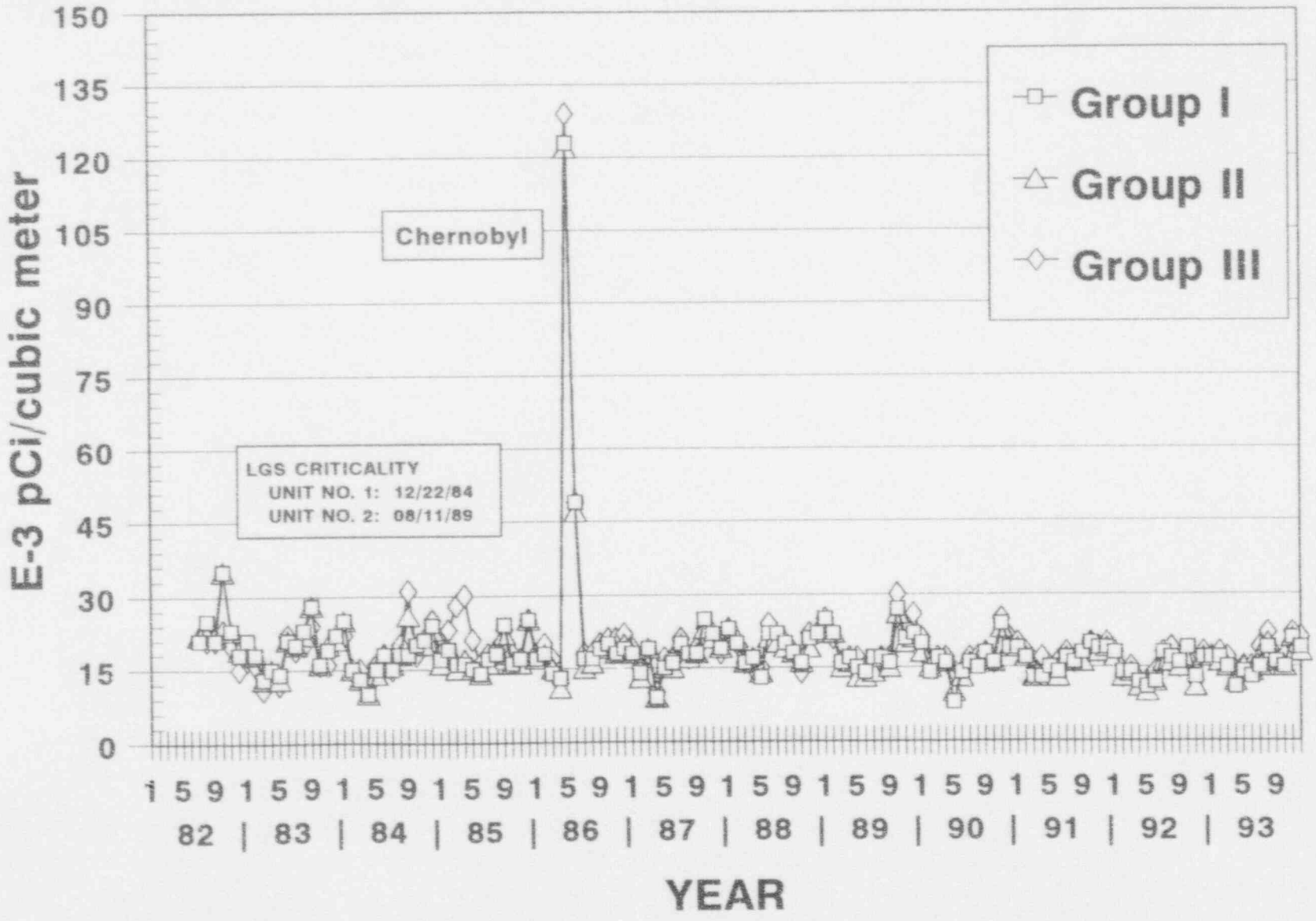


FIGURE C-9
COMPARISON OF POSITIVE MEAN MONTHLY CS-137 ACTIVITY IN MILK SAMPLES COLLECTED IN THE VICINITY OF LGS, 1984 - 1993

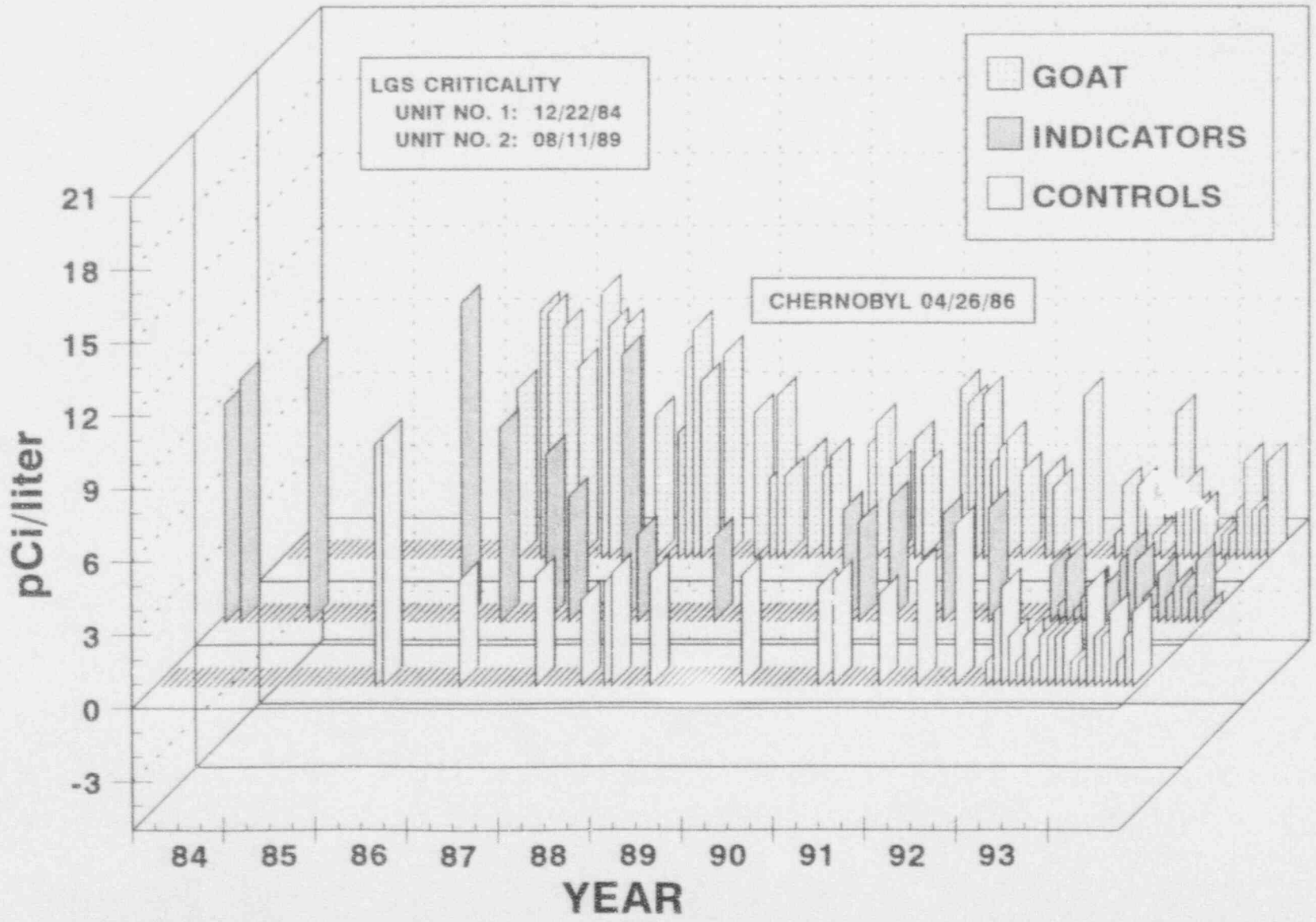
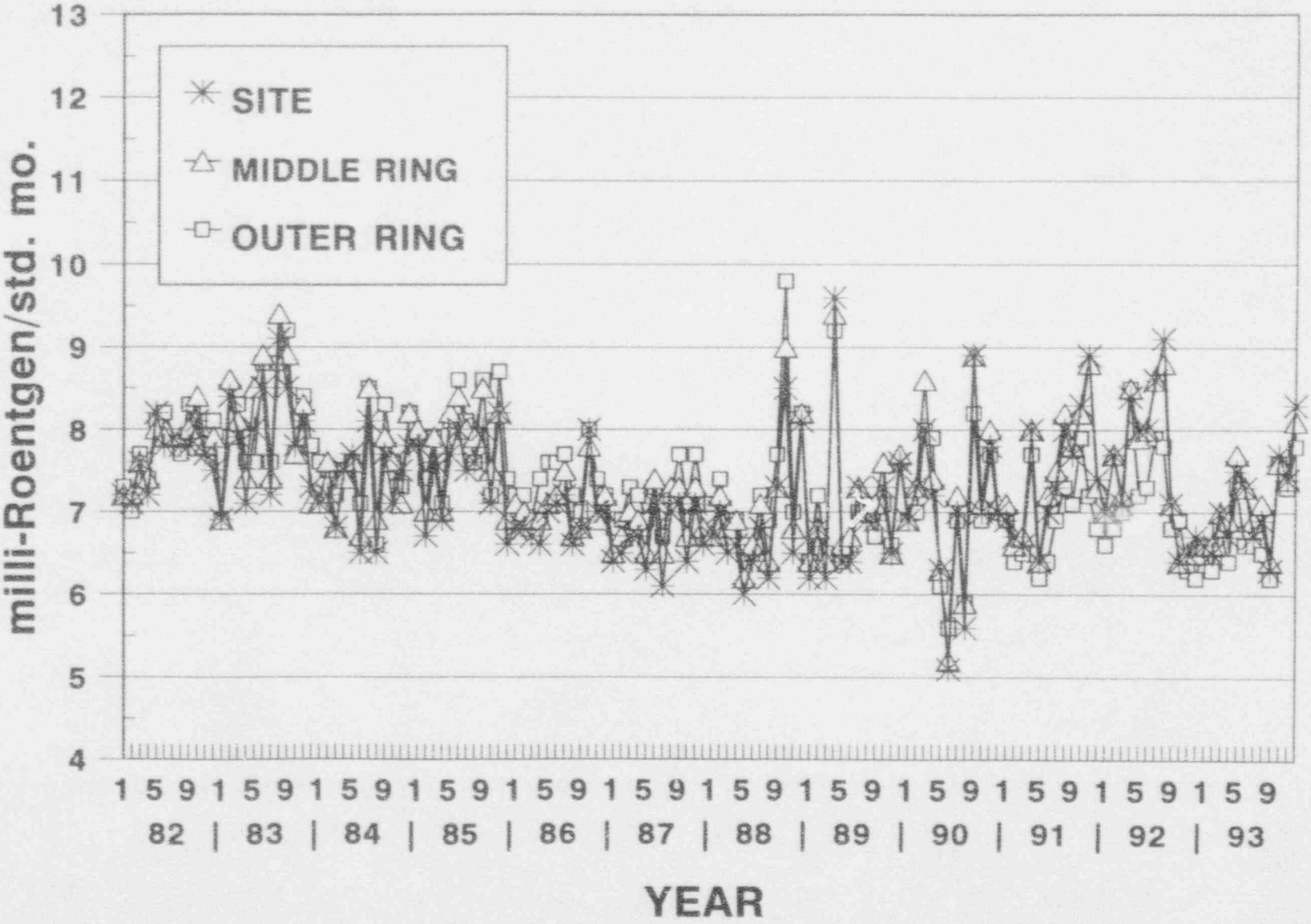


FIGURE C-10
MEAN MONTHLY AMBIENT GAMMA RADIATION LEVELS (TLD) IN THE VICINITY CF LGS, 1982 - 1993



DATA TABLES
QC LABORATORY

APPENDIX D: DATA TABLES AND FIGURES - COMPARISON LABORATORY

TABLES

FIGURES

The following section contains data and figures illustrating the analyses performed by the quality control laboratory. Duplicate samples were obtained from several locations and media and split between the primary laboratory, Teledyne Brown Engineering (TB) and the quality control laboratory, Public Service Electric & Gas Co. (PSE&G). Comparison of the results for most media were within expected ranges, though occasional differences were seen:

PSE&G's results of gross beta insoluble and soluble in surface and drinking water samples were generally lower than the results from TB (Figures D-1 through D-4, Appendix D). The differences were probably due to variations in the respective laboratory's analytical procedures. PSE&G ashes the sample prior to counting whereas, TB does not.

PSE&G's gross beta results for air particulate samples were higher than TB's results, but the trends were similar for both laboratories (Figures D-5 and D-6). PSE&G uses Sr-90 as a calibration source whereas, TB uses Cs-137.

TABLE D-1.1 CONCENTRATIONS OF GROSS BETA INSOLUBLE IN SURFACE AND DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	10F2		16C2	
JAN 93	0.7	± 0.5	0.6	± 0.4
FEB 93	-0.3	± 0.4	-0.3	± 0.4
MAR 93	0.1	± 0.5	-0.4	± 0.5
APR 93	0.3	± 0.4	-0.2	± 0.4
MAY 93	0.0	± 0.4	-0.2	± 0.4
JUN 93	0.7	± 0.4	0.0	± 0.4
JUL 93	1.7	± 0.5	0.2	± 0.4
AUG 93	0.9	± 0.5	0.2	± 0.4
SEP 93	0.8	± 0.5	-0.2	± 0.4
OCT 93	0.3	± 0.4	-0.1	± 0.4
NOV 93	-0.1	± 0.4	0.0	± 0.4
DEC 93	0.5	± 0.3	0.1	± 0.2
MEAN	0.5	± 1.1	0.0	± 0.5

TABLE D-1.2 CONCENTRATIONS OF GROSS BETA SOLUBLE IN SURFACE AND DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	10F2		16C2	
JAN 93	3.8	± 0.7	1.4	± 0.5
FEB 93	4.6	± 0.7	2.3	± 0.6
MAR 93	4.4	± 0.7	1.4	± 0.6
APR 93	2.8	± 0.6	1.0	± 0.5
MAY 93	5.6	± 0.8	1.9	± 0.6
JUN 93	5.2	± 0.8	2.8	± 0.6
JUL 93	4.5	± 0.7	3.3	± 0.6
AUG 93	4.4	± 0.7	4.3	± 0.8
SEP 93	5.3	± 0.8	3.6	± 0.7
OCT 93	7.2	± 0.9	2.6	± 0.6
NOV 93	5.2	± 0.8	2.3	± 0.6
DEC 93	2.0	± 0.4	1.1	± 0.4
MEAN	4.6	± 2.7	2.3	± 2.1

TABLE D-I.3 CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE AND DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	K-40	MN-54	CO-58	FE-59	CO-60	ZN-65	ZR-95
10F2	JAN 93	< 6	< 0.8	< 0.7	< 1	< 0.5	< 2	< 2
	FEB 93	50 ± 20	< 0.6	< 0.5	< 0.7	< 1	< 0.6	< 1
	MAR 93	50 ± 20	< 1	< 0.9	< 1.0	< 2	< 3	< 2
	APR 93	< 10	< 1	< 0.6	< 1	< 0.4	< 0.7	< 2
	MAY 93	60 ± 20	< 0.9	< 0.7	< 1.0	< 1	< 2	< 0.9
	JUN 93	60 ± 20	< 0.8	< 0.7	< 1	< 1.0	< 1	< 1
	JUL 93	60 ± 20	< 1	< 1.0	< 2	< 0.9	< 3	< 3
	AUG 93	< 20	< 0.7	< 0.7	< 0.9	< 0.4	< 1	< 1
	SEP 93	70 ± 20	< 0.4	< 0.5	< 0.6	< 1	< 2	< 0.9
	OCT 93	< 30	< 1.0	< 1	< 0.9	< 1	< 2	< 3
	NOV 93	50 ± 20	< 0.6	< 0.8	< 2	< 0.9	< 1	< 0.9
	DEC 93	< 40	< 0.3	< 1.8	< 0.9	< 0.5	< 1	< 4
	MEAN	41 ± 42	< 0.8	< 0.8	< 1.1	< 0.9	< 1.6	< 1.8
16C2	JAN 93	< 20	< 0.9	< 1	< 2	< 0.6	< 3	< 2
	FEB 93	< 20	< 1	< 0.9	< 1	< 1	< 1	< 1
	MAR 93	< 50	< 0.5	< 0.6	< 1.0	< 0.4	< 1	< 2
	APR 93	< 40	< 0.9	< 0.4	< 2	< 0.3	< 2	< 2
	MAY 93	50 ± 10	< 1.0	< 0.4	< 1	< 0.9	< 0.8	< 2
	JUN 93	50 ± 20	< 0.7	< 0.6	< 0.8	< 0.9	< 1	< 1
	JUL 93	60 ± 20	< 0.8	< 0.7	< 0.9	< 1.0	< 1	< 1
	AUG 93	50 ± 20	< 0.6	< 0.4	< 2	< 1	< 2	< 2
	SEP 93	< 40	< 1	< 1	< 0.7	< 0.5	< 0.9	< 1.0
	NOV 93	60 ± 20	< 1.0	< 1.0	< 1.0	< 1	< 2	< 2
	DEC 93	50 ± 20	< 0.7	< 0.4	< 0.9	< 0.7	< 2	< 2
	MEAN	40 ± 30	< 0.8	< 0.7	< 1.2	< 0.8	< 1.5	< 1.6

TABLE D-1.3 CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE AND DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	NB-95	CS-134	CS-137	BA-140	LA-140	RA-226	TH-228
10F2	JAN 93	< 0.4	< 0.4	< 0.4	< 2	< 1	< 2	< 3
	FEB 93	< 1.0	< 0.6	< 0.9	< 3	< 1	< 3	< 7
	MAR 93	< 0.7	< 0.8	< 0.9	< 4	< 2	< 2	< 4
	APR 93	< 0.5	< 0.6	< 0.8	< 3	< 2	< 3	< 3
	MAY 93	< 0.7	< 0.6	< 0.9	< 3	< 1	< 2	< 8
	JUN 93	< 0.5	< 1	< 0.7	< 3	< 0	< 10	< 0
	JUL 93	< 1	< 1	< 1	< 4	< 2	< 3	< 3
	AUG 93	< 2	< 1	< 0.5	< 4	< 1	< 3	< 2
	SEP 93	< 0.4	< 0.6	< 0.6	< 1	< 0.6	< 2	< 7
	OCT 93	< 1.0	< 1	< 1.0	< 5	< 4	10 ± 2	< 9
	NOV 93	< 0.5	< 0.7	< 0.6	< 1	< 1	6 ± 2	13 ± 4
	DEC 93	< 3	< 0.8	< 0.9	< 3	< 1	< 7	< 6
	MEAN	< 1.0	< 0.7	< 0.8	< 3	< 1.6	4 ± 6	6 ± 7
16C2	JAN 93	< 1	< 0.6	< 0.5	< 3	< 1	< 2	< 9
	FEB 93	< 0.8	< 2	< 0.9	< 2	< 2	15 ± 2	< 4
	MAR 93	< 0.5	< 2	< 1	< 4	< 2	< 9	< 9
	APR 93	< 0.5	< 0.7	< 0.4	< 5	< 4	30 ± 3	< 5
	MAY 93	< 0.3	< 0.5	< 0.8	< 4	< 2	< 3	< 8
	JUN 93	< 0.5	< 0.5	< 0.4	< 3	< 10	< 4	< 3
	JUL 93	< 0.5	< 0.7	< 0.7	< 3	< 2	< 10	< 2
	AUG 93	< 0.5	< 0.5	< 1	< 2	< 2	11 ± 3	< 8
	SEP 93	< 0.9	< 0.8	< 0.8	< 5	< 1.0	< 3	< 7
	NOV 93	< 0.6	< 0.5	< 0.4	< 4	< 2	49 ± 3	< 3
	DEC 93	< 0.6	< 0.4	< 0.4	< 3	< 9	22 ± 3	< 4
	MEAN	< 0.6	< 0.8	< 0.7	< 3	< 3.4	14 ± 29	< 6

TABLE D-II.1 CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES
COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

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

WEEK	1152		1452	
01	16	± 3	19	± 3
02	28	± 3	25	± 3
03	27	± 3	26	± 3
04	23	± 3	23	± 3
05	23	± 3	24	± 3
06	25	± 3	26	± 3
07	22	± 3	22	± 3
08	24	± 3	27	± 3
09	28	± 3	25	± 3
10	30	± 3	32	± 3
11	20	± 3	20	± 3
12	26	± 3	26	± 3
13	10	± 2	10	± 2
14	7	± 2	7	± 2
15	14	± 3	14	± 3
16	16	± 2	16	± 2
17	20	± 3	22	± 3
18	19	± 3	23	± 3
19	16	± 3	18	± 3
20	19	± 3	18	± 3
21	14	± 3	14	± 3
22	19	± 3	21	± 3
23	26	± 3	28	± 3
24	20	± 3	18	± 3
25	19	± 3	19	± 3
26	20	± 3	20	± 3
27	20	± 3	22	± 3
28	27	± 3	28	± 3
29	17	± 3	18	± 3
30	20	± 3	20	± 3
31	15	± 3	17	± 3
32	24	± 3	27	± 3
33	25	± 3	26	± 3
34	22	± 3	23	± 3
35	36	± 4	38	± 4
36	24	± 3	27	± 3
37	25	± 3	22	± 3
38	18	± 3	18	± 3
39	23	± 3	19	± 3
40	17	± 3	18	± 3
41	19	± 3	19	± 3
42	27	± 3	25	± 3
43	19	± 3	18	± 3
44	22	± 3	22	± 3
45	23	± 3	20	± 3
46	38	± 3	39	± 3
47	20	± 3	21	± 3
48	29	± 3	25	± 3
49	30	± 3	30	± 3
50	36	± 3	34	± 3
51	20	± 3	22	± 3
52	22	± 3	25	± 3
53	25	± 3	25	± 3
MEAN	22	± 12	22	± 12

TABLE D-II.2 CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES
COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

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

STC	COLLECTION PERIOD	BE-7	K-40	CS-134	CS-137	RA-226	TH-228
11S2	12/29-03/29/93	64 ± 6	20 ± 6	< 0.3	< 0.10	< 0.6	< 2
	03/29-06/28/93	86 ± 7	< 6	< 0.4	< 0.1	< 0.6	< 1
	06/28-09/27/93	69 ± 4	13 ± 3	< 0.1	< 0.10	< 0.4	< 0.1
	09/27-12/27/93	62 ± 5	13 ± 3	< 0.1	< 0.2	< 1	< 0.7
	MEAN	70 ± 22	13 ± 11	< 0.2	< 0.13	< 0.7	< 1.0
14S2	12/29-03/29/93	71 ± 6	< 4	< 0.2	< 0.1	< 0.3	< 1
	03/29-06/28/93	83 ± 6	14 ± 4	< 0.1	< 0.1	< 0.6	< 2
	06/28-09/27/93	71 ± 4	13 ± 3	< 0.3	< 0.3	< 0.6	< 2
	09/27-12/27/93	64.0 ± 6.00	< 5.00	< 0.20	< 0.20	< 0.60	< 0.80
	MEAN	72.2 ± 15.7	9.00 ± 10.4	< 0.20	< 0.17	< 0.52	< 1.45

TABLE D-III.1 CONCENTRATIONS OF I-131 BY CHEMICAL SEPARATION AND GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	I-131	K-40	CS-134	CS-137	BA-140	LA-140	RA-226
19B1	01/19-01/19/93	< 0.5	1370 ± 80	< 1	< 3	< 4	< 1	< 1
	04/07-04/07/93	< 0.3	1340 ± 70	< 0.9	< 2	< 5	< 0.7	< 3
	07/13-07/13/93	< 0.3	1400 ± 100	< 2	< 2	< 5	< 4	< 5
	10/05-10/05/93	< 0.2	1380 ± 70	< 0.6	< 1.0	< 4	< 2	17 ± 5
	MEAN	< 0.3	1370 ± 40	< 1.1	< 2.0	< 5	< 1.9	7 ± 14
21B1	01/19-01/19/93	< 0.1	1370 ± 80	< 0.6	< 2	< 6	< 5	14 ± 4
	04/06-04/06/93	< 0.2	1400 ± 90	< 3	< 1	< 6	< 5	< 10
	07/13-07/13/93	< 0.1	1350 ± 90	< 0.6	< 2	< 4	< 4	< 20
	10/05-10/05/93	< 0.2	1310 ± 70	< 2	< 3	< 3	< 2	< 9
	MEAN	< 0.2	1360 ± 80	< 1.6	< 2	< 5	< 4	14 ± 11
22F1	01/19-01/19/93	< 0.4	1390 ± 90	< 1	< 3	< 5	< 2	< 5
	04/06-04/06/93	< 0.4	1350 ± 80	< 1	< 2	< 7	< 4	< 8
	07/13-07/13/93	< 0.4	1390 ± 80	< 0.7	< 1	< 2	< 1	< 6
	10/05-10/05/93	< 0.2	1360 ± 70	< 0.6	< 2	< 2	< 3	< 4
	MEAN	< 0.4	1370 ± 40	< 0.8	< 2	< 4	< 3	< 6

TABLE D-IV.1 SUMMARY OF COLLECTION DATES FOR SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

COLLECTION PERIOD	10F2	16C2
JAN 93	12/29-02/01	12/29-02/01
FEB 93	02/01-03/01	02/01-03/01
MAR 93	03/01-03/31	03/01-03/31
APR 93	03/30-04/27	03/30-04/27
MAY 93	04/27-06/01	04/27-06/01
JUN 93	06/01-06/29	06/01-06/29
JUL 93	06/29-08/02	06/29-08/02
AUG 93	08/02-08/31	08/02-08/31
SEP 93	08/31-09/27	08/31-09/27
OCT 93	09/27-11/01	09/27-11/01
NOV 93	11/01-11/29	11/01-11/29
DEC 93	11/29-12/27	11/29-12/27

TABLE D-IV.1 SUMMARY OF COLLECTION DATES FOR SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1993

WEEK	11S2	14S2	WEEK	11S2	14S2
01	12/29-01/04	12/29-01/04	28	07/06-07/12	07/06-07/12
02	01/04-01/11	01/04-01/11	29	07/12-07/19	07/12-07/19
03	01/11-01/18	01/11-01/18	30	07/19-09/26	07/19-07/26
04	01/18-01/25	01/18-01/25	31	07/26-08/02	07/26-08/02
05	01/25-02/01	01/25-02/01	32	08/02-08/09	08/02-08/09
06	02/01-02/08	02/01-02/08	33	08/09-08/16	08/09-08/16
07	02/08-02/15	02/08-02/15	34	08/16-08/24	08/16-08/24
08	02/15-02/22	02/15-02/22	35	08/24-08/30	08/24-08/30
09	02/22-03/01	02/22-03/01	36	08/30-09/07	08/30-09/07
10	03/01-03/08	03/01-03/08	37	09/07-09/13	09/07-09/13
11	03/08-03/16	03/08-03/16	38	09/13-09/20	09/13-09/20
12	03/16-03/22	03/16-03/22	39	09/20-09/27	09/20-09/27
13	03/22-03/29	03/22-03/29	40	09/27-10/04	09/27-10/04
14	03/29-04/05	03/29-04/05	41	10/04-10/12	10/04-10/12
15	04/05-04/12	04/05-04/12	42	10/12-10/18	10/12-10/18
16	04/12-04/20	04/12-04/20	43	10/18-10/25	10/18-10/25
17	04/20-04/26	04/20-04/26	44	10/25-11/01	10/25-11/01
18	04/26-05/03	04/26-05/03	45	11/01-11/08	11/01-11/08
19	05/03-05/10	05/03-05/10	46	11/08-11/15	11/08-11/15
20	05/10-05/17	05/10-05/17	47	11/15-11/22	11/15-11/22
21	05/17-05/24	05/17-05/24	48	11/22-11/29	11/22-11/29
22	05/24-05/31	05/24-05/31	49	11/29-12/06	11/29-12/06
23	05/31-06/08	05/31-06/08	50	12/06-12/13	12/06-12/13
24	06/08-06/14	06/08-06/14	51	12/13-12/20	12/13-12/20
25	06/14-06/21	06/14-06/21	52	12/20-12/27	12/20-12/27
26	06/21-06/28	06/21-06/28	53	12/27-01/03	12/27-01/03
27	06/28-07/06	06/28-07/06			

FIGURE D-1
COMPARISON OF MONTHLY INSOLUBLE GROSS BETA CONCENTRATIONS IN SURFACE WATER SAMPLES SPLIT BETWEEN TB AND PSE&G, 1993

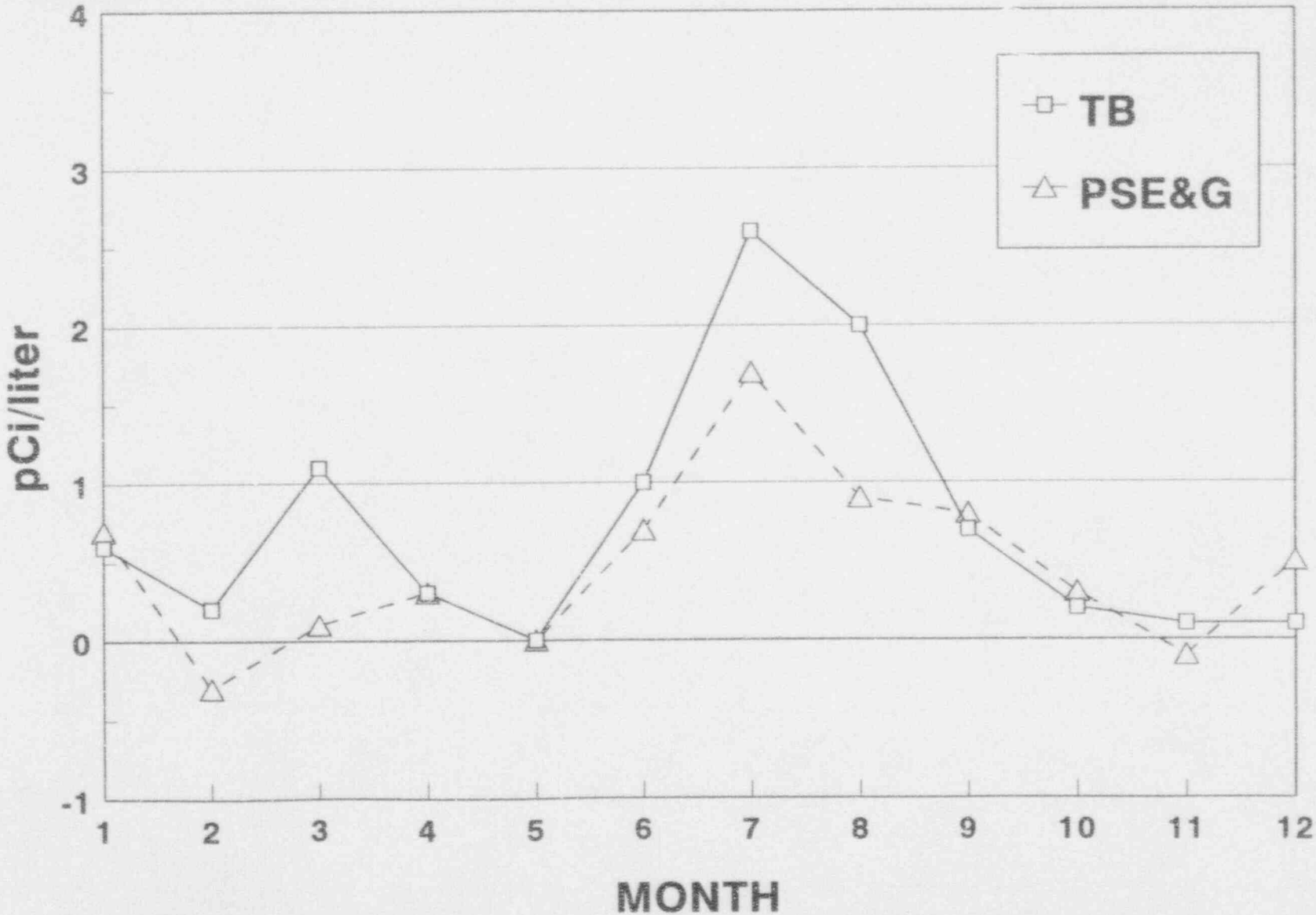


FIGURE D-2
COMPARISON OF MONTHLY SOLUBLE GROSS BETA CONCENTRATIONS IN SURFACE WATER SAMPLES SPLIT BETWEEN TB AND PSE&G, 1993

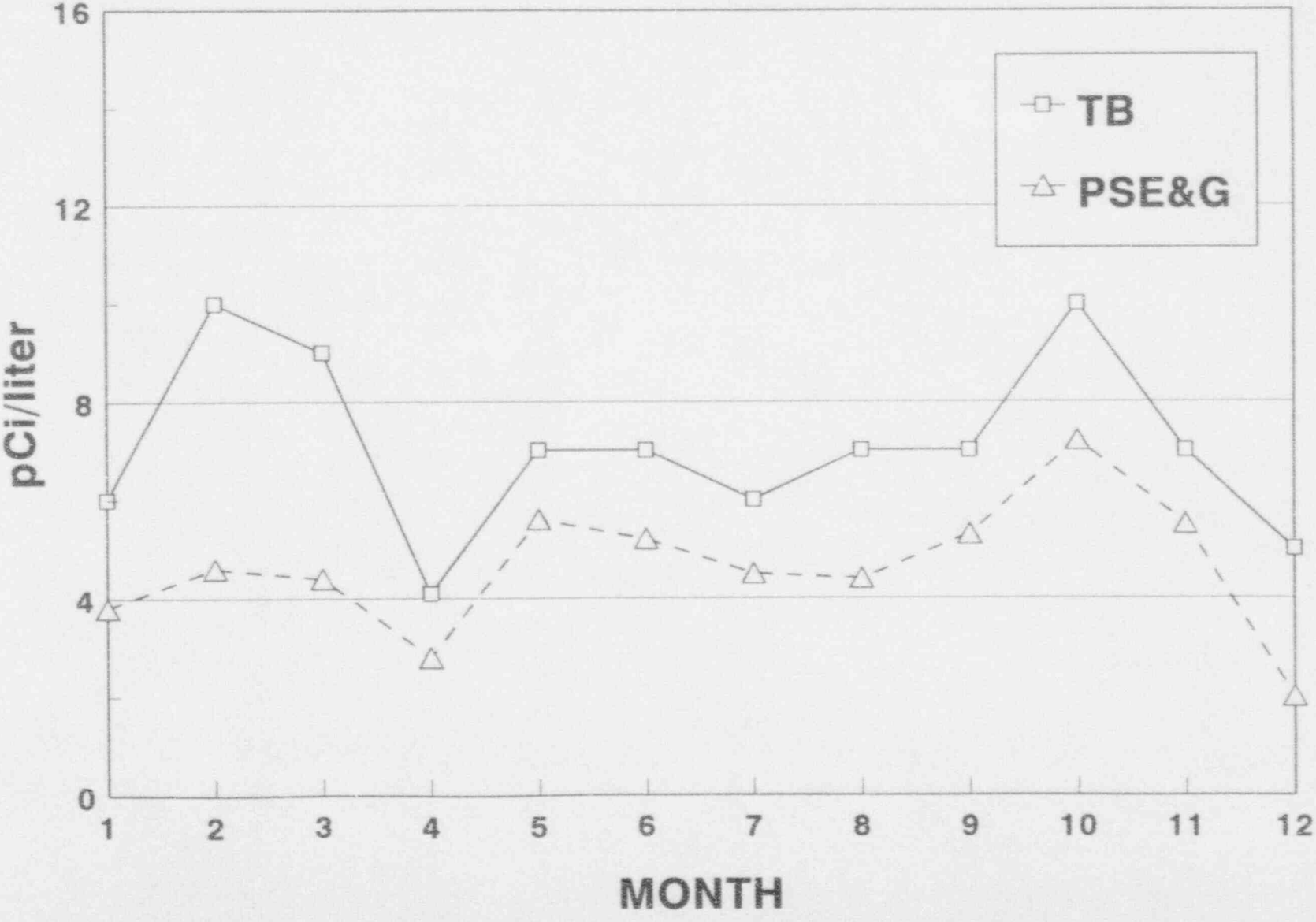


FIGURE D-3
COMPARISON OF MONTHLY INSOLUBLE GROSS BETA CONCENTRATIONS IN DRINKING WATER SAMPLES SPLIT BETWEEN TB AND PSE&G, 1993

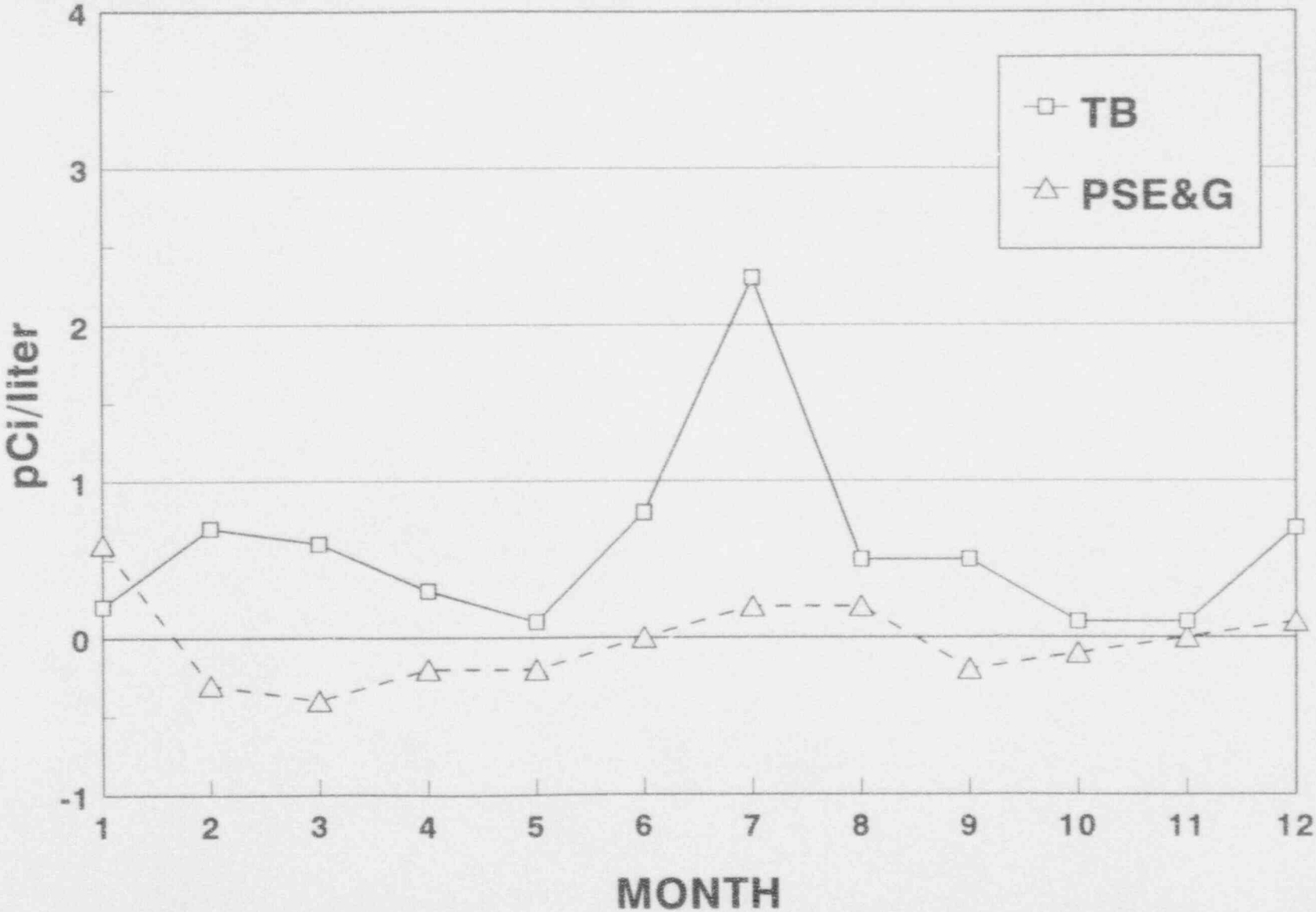


FIGURE D-4

COMPARISON OF MONTHLY SOLUBLE GROSS BETA CONCENTRATIONS IN DRINKING WATER SAMPLES SPLIT BETWEEN TB AND PSE&G, 1993

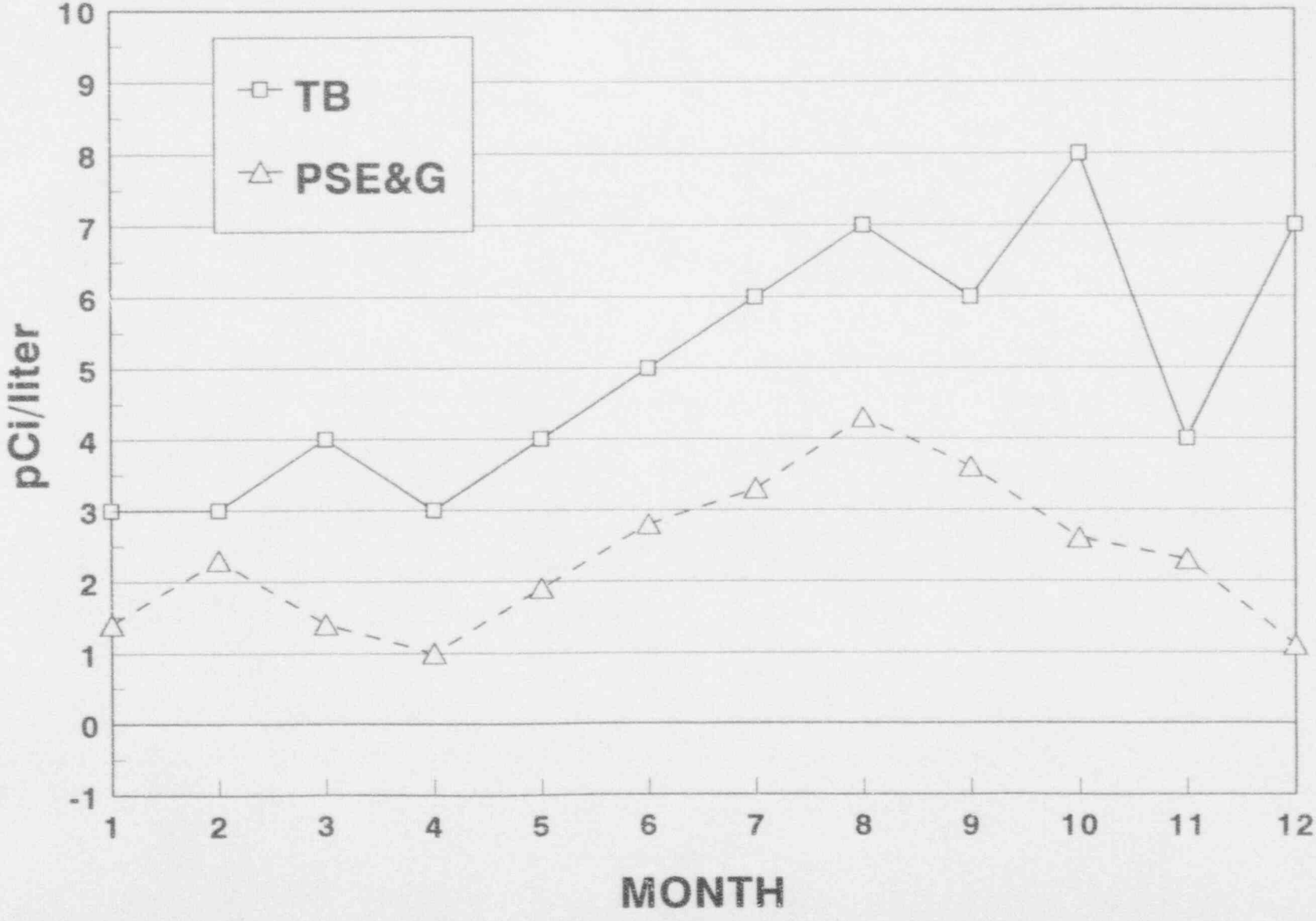


FIGURE D-5
MEAN WEEKLY GROSS BETA CONCENTRATIONS IN AIR PARTICULATE SAMPLES COLLECTED FROM LGS LOCATIONS 11S1 AND 11S2, 1993

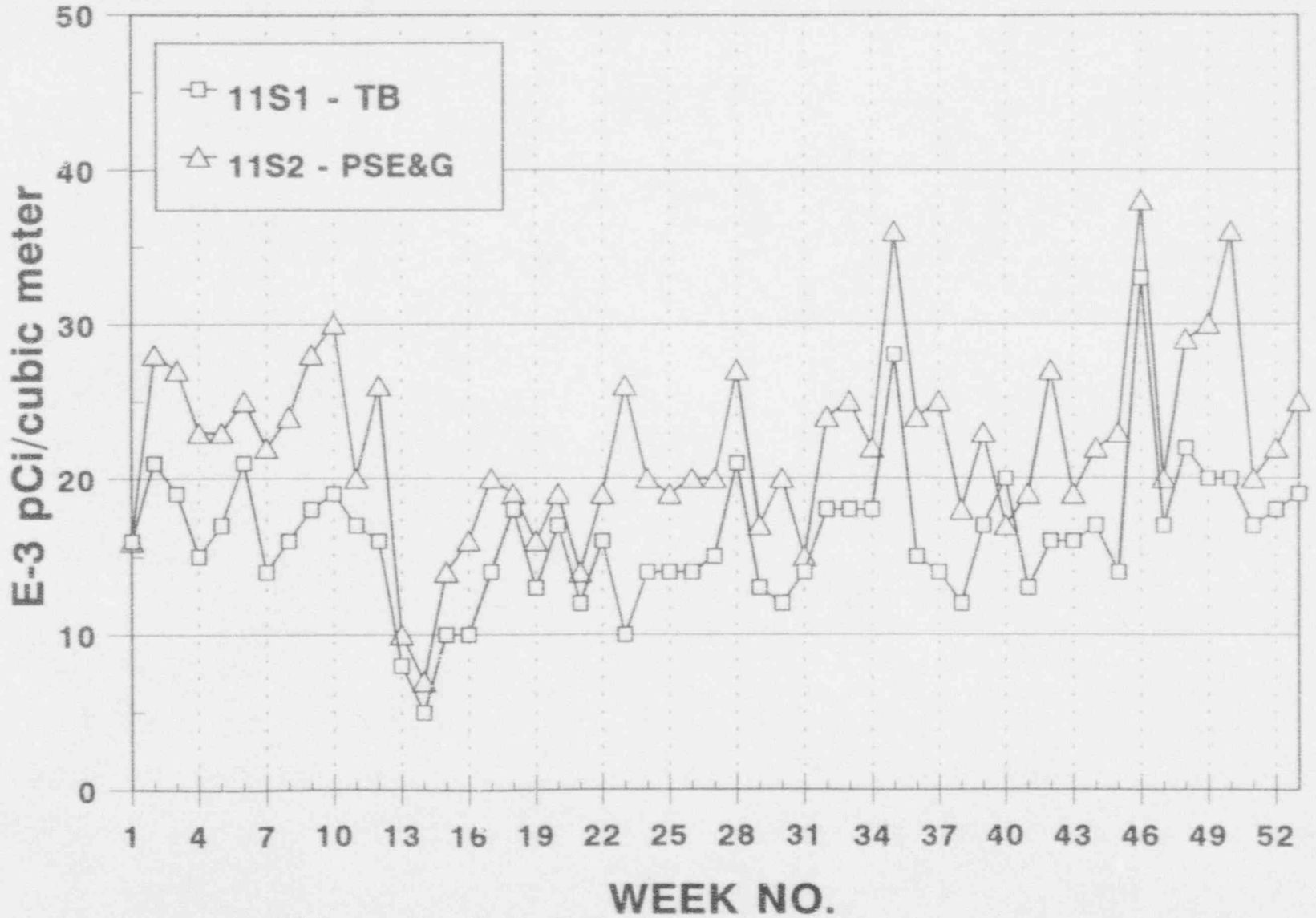
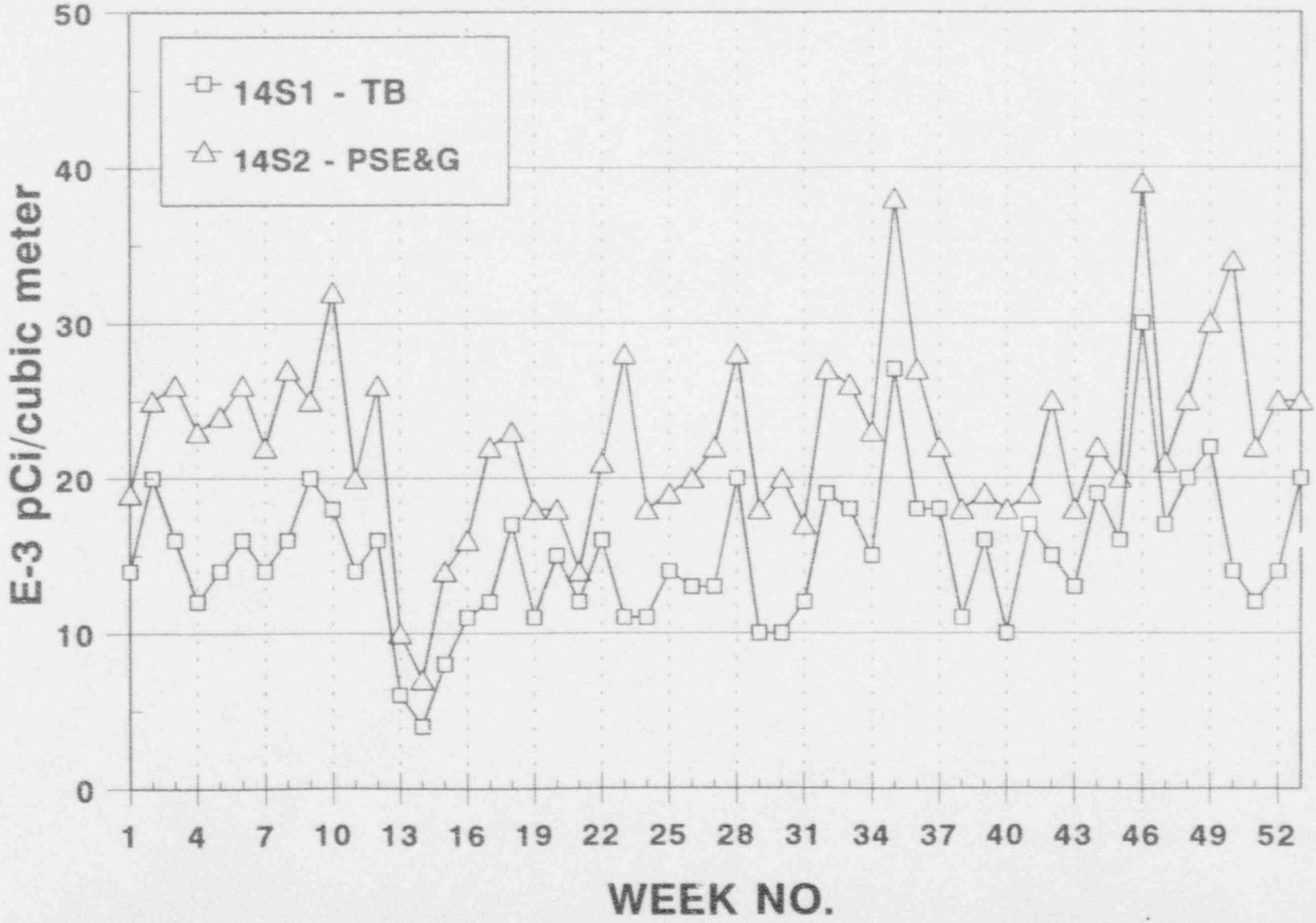


FIGURE D-6
MEAN WEEKLY GROSS BETA CONCENTRATIONS IN AIR PARTICULATE SAMPLES COLLECTED FROM LGS LOCATIONS 14S1 AND 14S2, 1993



SYNOPSIS OF ANALYTICAL PROCEDURES

APPENDIX E: SYNOPSIS OF ANALYTICAL PROCEDURES

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

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

Teledyne Brown Engineering

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

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

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

Calculation of Sample Activity and 2 Sigma Error:

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

Net Activity Counting Error

where:

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

The MDL is defined as that value equal to the two sigma counting error of the result. Less than MDL is reported as the result when this value is greater than the measured result defined above.

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

Public Service Electric & Gas

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.

The sample is mixed thoroughly. Then, a 1.0 liter portion is removed from the surface or drinking water container and filtered through a slow, hardened ashless filter paper mounted in a Buchner funnel. The filter paper is removed from the Buchner funnel, folded into a triangle, placed in a covered porcelain crucible and heated over a Bunsen burner until completely charred. The crucible is then ashed for at least 2 hours in a muffle furnace at 500° C. The cooled ash is then transferred to a tared stainless steel ribbed planchet using a rubber policeman with laboratory aerosol and reagent water.

The filtrate portion of the sample is evaporated on a hot plate until the volume approaches 20 to 25 ml. At that point, the filtrate is transferred to a tared stainless steel ribbed planchet. Both planchets are evaporated to dryness under an infrared heat lamp. They are subsequently cooled in a desiccator, weighed and counted using a low background gas proportional counter.

Calculation of Sample Activity and 1.96 Sigma Error:

$$\frac{Result}{(pCi/l)} = 100\frac{\frac{C_s}{T_s} - \frac{C_b}{T_b}}{2.22(v)(E)} \pm \frac{1.96\sqrt{\frac{C_s}{T_s^2} + \frac{C_b}{T_b^2}}}{2.22(v)(E)}$$

Net Activity Counting Error

where:

C_s	=	total gross sample counts (counts)
T_s	=	sample count time (min)
C_b	=	total background count (counts)
T_b	=	background count time (min)
E	=	counting efficiency based on Sr-90 for the weight of planchetted sample
v	=	aliquot size in liters
2.22	=	dpm per pCi
1.96	=	multiple of counting error

The MDL is defined as that value equal to the 1.96 sigma counting error of the result. Less than MDL is reported as the result when this value is greater than the net activity.

DETERMINATION OF TRITIUM IN WATER BY ELECTROLYTIC ENRICHMENT AND LIQUID SCINTILLATION COUNTING

Teledyne Brown Engineering

A 60 ml aliquot is distilled and collected in an Erlenmeyer flask. Approximately 55 g of the distillate is transferred into an electrolytic enrichment cell. One ml of 30% sodium hydroxide solution is added to the cell. The sample is electrolyzed in a 10° C cooling water bath until the volume is 3-4 ml. CO_2 is bubbled through the solution to neutralize the sodium hydroxide. The sample is transferred to a collecting bottle at 80° C and weighed. It is then transferred into a liquid scintillation vial and 20 ml of cocktail is added. The sample is counted for 100 minutes in a liquid scintillation counter.

Determination of the Enrichment Factor:

$$Enrichment\ Factor = \frac{(final\ volume)(observed\ dpm/ml)}{(initial\ volume)(standard\ dpm/ml)}$$

Aliquots of a tritium standard solution have been enriched to different final volumes to provide a graph of the enrichment factor versus the final volume.

Calculation of Sample Activity and 2 Sigma Error:

$$\frac{Result}{(pCi/l)} = \underbrace{\frac{\frac{N}{t_s} - \beta}{2.22(v)(EF)(E)}}_{\text{Net Activity}} \pm \underbrace{\frac{2\sqrt{\frac{N}{t_s^2} + \frac{\beta}{t_b}}}{2.22(v)(EF)(E)}}_{\text{Counting Error}}$$

where:

N	=	total counts from sample (counts)
t_s	=	counting time for sample (min)
β	=	background rate of counter (cpm)
t_b	=	counting time for background (min)
2.22	=	dpm/pCi
v	=	initial volume (in liters) before enrichment
EF	=	enrichment factor = .039 x VF + .603 where VF = Final Volume
E	=	efficiency of the counter tritium
2	=	multiples of counting error

The MDL is defined as that value equal to the two sigma counting error of the result. Less than MDL is reported as the result when this value is greater than the net activity.

DETERMINATION OF TRITIUM IN WATER
BY LIQUID SCINTILLATION COUNTING

Teledyne Brown Engineering

Ten (10) milliliters of sample is directly pipetted into a 25 ml vial and mixed with liquid scintillation material and counted for a minimum of 100 minutes to determine its activity. The tritium activity is determined by measuring the count rate in the beta activity energy spectrum from 0 to 18 KeV. Eighteen to 100 KeV represents the carbon-14 energy region. If there is no count rate above background in the carbon-14 energy region, the sample has no contamination and the tritium activity may be calculated directly. If the net count rate in the carbon-14 energy channel is 10% of the tritium count rate or higher, the sample contains contamination that may affect the count rate in the tritium channel, and the sample must be purified by distillation before recounting.

Calculation of Sample Activity and 2 Sigma Error:

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

Net Activity Counting Error

where:

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

The MDL is defined as that value equal to the two sigma counting error of the result. Less than MDL is reported as the result when this value is greater than the net activity.

DETERMINATION OF GROSS BETA ACTIVITY IN AIR PARTICULATE SAMPLES

Teledyne Brown Engineering

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

Calculation of Sample Activity and 2 Sigma Error:

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

Net Activity — Counting Error

where:

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

The MDL is defined as that value equal to the two sigma counting error of the result. Less than MDL is reported as the result when this value is greater than the net activity.

DETERMINATION OF GROSS BETA ACTIVITY IN AIR PARTICULATE SAMPLES

Public Service Electric & Gas

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

Calculation of Sample Activity and 1.96 Sigma Error:

$$\frac{Result}{(pCi/m^3)} = \underbrace{\frac{\frac{C_s}{T_s} - \frac{C_b}{T_b}}{2.22(v)(E)(.02832)}}_{\text{Net Activity}} \pm \underbrace{\frac{1.96\sqrt{\frac{C_s}{T_s^2} + \frac{C_b}{T_b^2}}}{2.22(v)(E)(.02832)}}_{\text{Counting Error}}$$

where:

C_s	=	total gross sample counts (counts)
T_s	=	sample count time (min)
C_b	=	total background count (counts)
T_b	=	background count time (min)
E	=	counting efficiency based on Sr-90
v	=	sample volume in cubic feet calculated from the elapsed time meter readings and the flow rate
.02832	=	conversion to cubic meters
2.22	=	dpm/pCi
1.96	=	multiple of the counting error

The MDL is defined as that value equal to the 1.96 sigma counting error of the result. Less than MDL is reported as the result when this value is greater than the net activity.

DETERMINATION OF I-131 IN MILK AND WATER SAMPLES

Teledyne Brown Engineering

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

Calculation of the Sample Activity and 2 Sigma Error:

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

Net Activity — Counting Error

where:

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

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

where:

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

The MDL is defined as that value equal to the two sigma counting error of the result. Less than MDL is reported as the result when this value is greater than the net activity.

DETERMINATION OF I-131 IN MILK AND WATER SAMPLES

Public Service Electric & Gas

Stable iodine carrier is equilibrated in a 4-liter volume of raw milk before two separate 50 ml batches of anion exchange resin are introduced to extract iodine. After each batch has been stirred in the milk for an appropriate time, both are then transferred to an aluminum sample can where the resins are rinsed with demineralized water several times and any leftover rinse water removed with an aspirator stick. The can is hermetically sealed and then counted on a gamma detector.

Calculation of the Sample Activity and 1.96 Sigma Error:

$$\frac{Result}{(pCi/l)} = \underbrace{\frac{\left(\frac{C_s}{T_s} - \frac{C_b}{T_b}\right)(1.05)}{(2.22)(v)(E)(y)(\exp^{-\lambda\Delta t})}}_{\text{Net Activity}} \pm \underbrace{\frac{1.96\sqrt{\frac{C_s}{T_s^2} + \frac{C_b}{T_b^2}}\,(1.05)}{(2.22)(v)(E)(y)(\exp^{-\lambda\Delta t})}}_{\text{Counting Error}}$$

where:

C_s	=	total gross sample counts (counts)
T_s	=	sample count time (min)
C_b	=	total background count time (counts)
T_b	=	background count time (min)
E	=	counting efficiency for I-131
v	=	aliquot analyzed (liters)
y	=	iodine yield
λ	=	is the radioactive decay constant for I-131 (0.693/8.05)
Δt	=	is the elapsed time between sample collection (or end of the sample collection) to the midcount time
1.05	=	Correction factor for protein-bound iodine
2.22	=	dpm/pCi
1.96	=	multiple of counting error

The MDL is defined as that value equal to the 1.96 sigma counting error of the result. Less than MDL is reported as the result when this value is greater than the net activity.

DETERMINATION OF GAMMA EMITTING RADIOISOTOPES

Teledyne Brown Engineering

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

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

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

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

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

Statistically Significant Activity

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

2 Sigma Counting Error

where:

AREA = Net Peak Area (from Nuclide Line Activity Report)

BKGND = Compton Background (from Nuclide Line Activity Report)

DECAY = Decay Correction Factor (from Minimum Detectable Activity Report) (Nuclide Half Life - Collection time to Mid Count time)

LIVE TIME = Elapsed Live Time (from Header Information)

ABN = Nuclide Abundance (from Nuclide Line Activity Report)

EFF = Detector Efficiency (from Nuclide Line Activity Report)

0.037 = Conversion Factor (dps to picocuries)

wgt. or vol. = Sample weight or volume (from Header Information)

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

$$\frac{Net\,Activity}{\left(\frac{pCi}{wgt.\ or\ vol.}\right)} = \frac{NET * DECAY}{LIVETIME(\text{sec.}) * (EFF * B.I.) * 0.037 * (wgt.\ or\ vol.)}$$

Statistically Non Significant Activity

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

2 Sigma Counting Error

where:

NET = Net Peak Area (from Minimum Detectable Activity Report)

BKGND = Compton Background (from Nuclide Line Activity Report)

DECAY = Decay Correction Factor (from Minimum Detectable Activity Report) (Nuclide Half Life - Collection time to Mid Count time)

LIVE TIME = Elapsed Live Time (from Header Information)

(EFF*B.I) = Efficiency * Abundance (from Minimum Detectable Activity Report)

0.037 = Conversion Factor (dps to picocuries)

wgt. or vol. = Sample weight or volume (from Header Information)

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

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

where:

BKGN = Total Peak Background Area (from Minimum Detectable Activity Report)

DECAY = Decay Correction Factor (from Minimum Detectable Activity Report) (Nuclide Half Life - Collection time to Mid Count time)

LIVE TIME = Elapsed Live Time (from Header Information)

(EFF*B.I) = Efficiency * Abundance (from Minimum Detectable Activity Report)

0.037 = Conversion Factor (dps to picocuries)

wgt. or vol. = Sample weight or volume (from Header Information)

DETERMINATION OF GAMMA EMITTING RADIOISOTOPES

Public Service Electric & Gas

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

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

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

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

Calculation of the Sample Activity and 1.96 Sigma Error:

$$\frac{Result}{\left(\frac{pCi}{vol - mass}\right)} = \frac{N_{(j)} - B_{(j)}}{(2.22)(v)(t)(E_{(j)})(BI_{(j)})(\exp^{-\lambda_{(j)}\Delta t})}$$

Net Activity

$$\pm \frac{1.96\sqrt{N_{(j)} + B_{(j)}}}{(2.22)(v)(t)(E_{(j)})(BI_{(j)})(\exp^{-\lambda_{(j)}\Delta t})}$$

Counting Error

where:

$N_{(j)}$ = area, in counts, of a special region containing a gamma emission of the nuclide of interest

NOTE: If the detector exhibits a peak in this region when counting a blank (i.e., from natural background (B)(t) is subtracted from N before using the above equation. B is the count rate of the blank, cpm, in the background peak.

$B_{(j)}$	=	background counts in the region of interest, calculated by fitting a straight line across the region connecting the two adjacent region.
1.96	=	multiple of counting error
2.22	=	dpm/pCi
V	=	volume or mass of sample analyzed
t	=	counting interval of sample, minutes
$E_{(j)}$	=	efficiency of counter at the energy region of interest
$BI_{(j)}$	=	branching intensity of the nuclide at the gamma emission energy under consideration (no. of photons per disintegration)
$\lambda_{(j)}$	=	is the radioactive decay constant for $nuclide_{(j)}$ (0.693/nuclide half life)
Δt	=	is the elapsed time between sample collection (or end of the sample collection) to the midcount time

The MDL is defined as that value equal to the two sigma counting error of the result. Less than MDL is reported as the result when this value is greater than the measured result defined above.

Teledyne Brown Engineering

Teledyne Brown Engineering dosimeters are rectangular teflon wafers impregnated with 25% CaSO4:Dy phosphor. They are annealed in a hot air oven prior to use and are inserted into black polyethylene pouches. The filled pouches are labelled and placed in rectangular holders which contain copper shielding to filter out low energy radiation. After exposure in the environment, four separate areas of the dosimeter are read in a Teledyne Brown Engineering model 8300 TLD reader. The dosimeter is then re-irradiated by a standardized Cs-137 source and the four areas are read again. Calculation of the environmental exposure is performed by computer, using the re-irradiation readings to determine the sensitivity of each area of the dosimeter. The reading of control dosimeters are subtracted to allow for transit dose and system background.

A. For any given area of the dosimeter, the dose mR is calculated by the formula:

$$Dose = (R)\left(\frac{redose}{RR}\right)(avcontrol)$$

where:

R	=	initial reading of the area
RR	=	second reading of the area (after re-irradiation)
redose	=	re-irradiation dose in mR
avcontrol	=	average of control values calculated as explained below. If no controls are used, avcontrol = 0 and gross exposures result

B. Each area of each control is calculated by the formula:

$$cdose = (cr)\left(\frac{credose}{crr}\right)$$

where:

cdose	=	control area dose in mR
cr	=	initial reading of the control area
crr	=	second reading of the control area (after re-irradiation)
credose	=	re-irradiation dose of the control dosimeter in mR

The average of control values is then calculated from all four areas of all controls by the formula:

$$avcontrol = \frac{\sum_{1}^{4N} cdose}{4N}$$

where:

N = total number of control dosimeters

C. The average and standard deviation of the area readings for each dosimeter are calculated by standard methods.

D. Using the criteria that if one standard deviation is greater than 10% of the average of the four readings and that if the value of one area is outside the range of 3 standard deviations of the average of the other three areas, then that area will be eliminated and the results will be based on the remaining areas.

QUALITY CONTROL
EPA INTER-LABORATORY COMPARISON PROGRAM

APPENDIX F: QUALITY CONTROL PROGRAM

Teledyne Brown Engineering (TB) and Public Service Electric & Gas (PSE&G) participate in the EPA Radiological Inter-laboratory Comparison (cross check) Program. This participation includes a number of analyses on various sample media as found in the Limerick Generating Station REMP. As a result of this participation, an objective measurement of analytical precision and accuracy as well as, a bias estimation of the results are obtained.

Examination of the data shows that the vast majority were within the EPA control limits. Each case of exceeding the control limits was investigated. There was no evidence to suggest systematic errors.

The results of TB's and PSE&G's participation in the EPA cross check program can be found in Tables F-1 and F-2, respectively.

As part of another intercomparison program, Thermoluminescent dosimeters (TLDs) from the NRC, Pennsylvania Department of Environmental Resources and PECO are placed at various distances around the Limerick Generating Station. The data were summarized into three categories: 0-2 miles, 2-5 miles and greater than 5 miles from the Limerick Generating Station (Figures F-1 through F-3, Appendix F). The data overlap each other, indicating that each TLD system accurately represents the ambient gamma radiation levels in the environs around the Limerick Generating Station.

TABLE F-1

USEPA
INTER-LABORATORY COMPARISONS - 1993
TELEDYNE BROWN

Collection Date	Sequence No.	Media	Nuclide	EPA Results(a)	Teledyne Brown Results(b)	Normalized Deviation Grand Avg.	Normalized Deviation Known	All Participants Mean ± 2 s.d.	
01/15/93	619	Water	Sr-89	15.0 ± 8.66	12.67 ± 3.45	-0.64	-0.81	14.53 ± 6.24	
			Sr-90	10.0 ± 8.66	8.33 ± 3.45	-0.46	-0.58	9.66 ± 4.40	
01/29/93	616	Water	Gr-Alpha	34.0 ± 15.59	17.33 ± 3.45	0.05	-3.21	17.09 ± 15.08	(c)
			Gr-Beta	44.0 ± 8.66	52.00 ± 3.00	3.47	2.77	41.99 ± 14.82	(d)
02/05/93	618	Water	I-131	100.0 ± 17.32	106.67 ± 17.31	0.92	1.15	101.36 ± 16.40	
06/04/93	623	Water	H-3	9844.0 ± 1704.33	9366.67 ± 458.25	-0.40	-0.84	9591.82 ± 1378.20	
04/20/93	624	Water	Gr-Beta	177.0 ± 46.77	150.0 ± 0.00	-0.35	-1.73	155.52 ± 36.82	
			Sr-89	41.0 ± 8.66	35.33 ± 4.59	-0.78	-1.96	37.59 ± 16.64	
			Sr-90	29.0 ± 8.66	27.33 ± 1.74	-0.17	-0.58	27.82 ± 3.45	
			Co-60	39.0 ± 8.66	40.67 ± 10.53	0.45	0.58	39.36 ± 5.80	
			Cs-134	27.0 ± 8.66	23.67 ± 4.59	-0.60	-1.15	25.40 ± 4.28	
			Cs-137	32.0 ± 8.66	34.33 ± 6.24	0.60	0.81	32.60 ± 5.62	
			Gr-Alpha	95.0 ± 41.57	94.33 ± 3.45	-0.17	-0.05	96.63 ± 40.34	
06/11/93	622	Water	Co-60	15.0 ± 8.66	16.33 ± 4.59	0.50	0.46	14.90 ± 4.16	
			Zn-64	103.0 ± 17.32	121.33 ± 60.27	2.39	3.18	107.54 ± 15.66	(e)
			Ru-106	119.0 ± 20.78	106.33 ± 47.67	0.36	-1.83	103.87 ± 25.66	
			Cs-134	5.0 ± 8.66	5.67 ± 1.74	0.10	0.23	5.39 ± 3.14	
			Cs-137	5.0 ± 8.66	6.67 ± 1.74	0.31	0.58	5.76 ± 2.94	
			Ba-133	99.0 ± 17.32	104.33 ± 27.87	1.31	0.92	96.74 ± 13.74	
07/16/93	626	Water	Sr-89	34.0 ± 8.66	31.67 ± 7.56	-0.88	-0.81	34.20 ± 13.32	
			Sr-90	25.0 ± 8.66	24.00 ± 0.00	-0.01	-0.35	24.02 ± 6.30	
07/23/93	625	Water	Gr-Alpha	15.0 ± 8.66	18.67 ± 6.24	2.29	1.27	12.06 ± 8.56	
			Gr-Beta	43.0 ± 11.95	42.67 ± 7.56	1.25	-0.08	37.65 ± 16.95	
08/27/93	628	Air Filter	Gr-Alpha	19.0 ± 8.66	17.00 ± 0.00	-1.04	-0.69	20.00 ± 6.54	
			Gr-Beta	47.0 ± 8.66	49.00 ± 5.19	-0.11	0.69	49.32 ± 9.24	
			Sr-90	19.0 ± 8.66	17.67 ± 1.74	-0.17	-0.46	18.17 ± 6.32	
			Cs-137	9.0 ± 8.66	9.67 ± 1.74	-0.12	0.23	10.00 ± 3.34	
09/24/93	631	Milk	Sr-89	30.0 ± 8.66	35.67 ± 10.53	4.03	1.96	24.03 ± 15.04	
			Sr-90	25.00 ± 8.66	24.00 ± 5.19	1.40	-0.35	19.97 ± 10.46	
			I-131	120.0 ± 20.78	126.67 ± 17.31	0.95	0.96	120.12 ± 16.74	
			Cs-137	49.0 ± 8.66	50.67 ± 3.45	0.22	0.58	50.02 ± 6.00	
			K	1679.0 ± 145.49	1620.00 ± 57.96	-1.11	-1.22	1674.07 ± 190.44	

TABLE F-1

USEPA
INTER-LABORATORY COMPARISONS - 1993
TELEDYNE BROWN

Collection Date	Sequence No.	Media	Nuclide	EPA Results(a)	Teledyne Brown Results(b)	Normalized Deviation Grand Avg.	Normalized Deviation Known	All Participants Mean ± 2 s.d.	
10/08/93	629	Water	I-131	117.0 ± 20.78	103.33 ± 17.31	-2.07	-1.97	117.68 ± 21.24	
10/29/93	632	Water	Gr-Alpha	20.0 ± 8.66	20.33 ± 6.24	2.17	0.12	14.08 ± 9.28	
			Gr-Beta	15.0 ± 8.66	15.67 ± 6.24	-0.46	0.23	17.01 ± 9.60	
11/05/93	633	Water	H-3	7398.0 ± 1281.72	6900.00 ± 300.00	-0.74	-1.17	7215.65 ± 1149.36	
11/12/93	634	Water	Co-60	30.0 ± 8.66	28.67 ± 8.67	-0.36	-0.46	29.72 ± 4.66	
			Zn-65	150.0 ± 25.98	152.00 ± 27.51	-0.47	0.23	156.07 ± 18.48	
			Ru-106	201.0 ± 34.64	177.33 ± 16.53	0.19	-2.05	175.18 ± 36.64	(f)
			Cs-134	59.0 ± 8.66	53.33 ± 14.79	-0.38	-1.96	54.42 ± 9.06	
			Cs-137	40.0 ± 8.66	41.33 ± 9.18	-0.28	0.46	42.14 ± 6.08	
			Ba-133	79.0 ± 13.86	69.33 ± 9.18	-1.54	-2.09	76.45 ± 12.62	(f)
10/19/93	635	Water	Gr. Beta	58.0 ± 17.32	51.33 ± 9.63	-0.36	-1.15	53.40 ± 12.86	
			Sr-89	15.0 ± 8.66	15.00 ± 3.00	0.36	0.00	13.96 ± 6.06	
			Sr-90	10.0 ± 8.66	10.00 ± 0.00	-0.09	0.00	10.26 ± 4.04	
			Co-60	10.0 ± 8.66	12.00 ± 3.00	0.55	0.69	10.41 ± 3.26	
			Cs-134	12.0 ± 8.66	9.00 ± 3.00	-0.27	-1.04	9.78 ± 3.72	
			Cs-137	10.0 ± 8.66	12.67 ± 7.56	0.60	0.92	10.93 ± 3.44	
			Gr-Alpha	40.0 ± 17.32	39.67 ± 1.74	-0.19	-0.06	40.77 ± 16.54	

(a) EPA Results - Expected laboratory preceision (3 sigma). Units are pCi/l for water and milk except K is in mg/l.

(b) Teledyne Results - Average ± 3 sigma. Units are pCi/l for water and milk except K is in mg/l. Units are total pCi for air particulate filters.

(c) The EPA switched from Am-241 to Th-230 alpha spike. We calibrated with Th-230, using sodium nitrate to generate a self-absorption curve. The EPA water, however, has minerals whcih have greater self-absorption than the sodium nitrate matrix. Ehe EPA has agreed to send us a gallon of their water which we can use to prepare a self-absorption curve with Th-230.

(d) By oversight, we did not use the special self-absorption curve which we had previously derived using EPA water and Cs-137 standard. We will use the EPA curve in the future. We may also re-derive this curve using a water sample which the the EPA has agreed to send us.

(e) The calculations were checked and found to be correct. The results of six gamma emitting isotopes were reported to the EPA. The results of four were within 1 normalized deviation: a fifth, within 2 normalized deviations. Only the Zn-65 average was outside the control limits. There is no obvious reason whay one isotope should be outside the control limits, while five other isotopes were within the control limits.

(f) An investigation is being conducted.

TABLE F-2
USEPA ENVIRONMENTAL RADIOACTIVITY LABORATORY
INTERCOMPARISON STUDY PROGRAM
PSE&G

Gross Alpha and Gross Beta Analysis
of Water (pCi/L) and Air Particulate (pCi/filter)

DATE MM-YY	ENV SAMPLE CODE	MEDIUM	ANALYSIS	* PSE&G Mean ± s.d.	** EPA Known
01-93	EPA-WAT-AB359	Water	Alpha	15±3	34±9
			Beta	39±0.5	44±5
04-93	EPA-WAT-P361	Water	Alpha	110±5	95±24
			Beta	168±2.4	177±27
07-93	EPA-WAT-AB365	Water	Alpha	16±0.5	15±5
			Beta	40±2.6	43±6.9
08-93	EPA-APT-GABS366	APT	Alpha	22±0	19±5
			Beta	48±0.5	47±5
10-93	EPA-WAT-P369	Water	Alpha	55±1.2	40±10
			Beta	57±1.2	58±10
10-93	EPA-WAT-AB372	Water	Alpha	18±2.4	20±5
			Beta	20±1.2	15±5

The results for the January 93 gross alpha in water were not within the EPA limit values of 34 ± 17.3 (two sigma). an examination of the analyses and counting parameters showed no apparent discrepancies in how the results were developed. A review of the performance of other participants in the cross check program indicated that 65% of the responding laboratories developed results outside the EPA control limits with a grand average value of 17.1 pCi/l. In conversations with the EPA it was determined that the Agency recently switched over to using Th-230 as the gross alpha reference standard. Previously the EPA and PSE&G used Am-241. The difference in detector response to Am-241 and Th-230 is approximately a factor of two for our instruments. If Th-230 was used as the gross reference standard the calculated response would have been doubled. A Th-230 standard was obtained from EPA in order to develop a new self-absorption curve and to recalibrate the detectors. Subsequent results have been in agreement.

* s.d. - one standard deviation of three individual analytical results
** known value plus or minus one sigma as reported by EPA

TABLE F-2
USEPA ENVIRONMENTAL RADIOACTIVITY LABORATORY
INTERCOMPARISON STUDY PROGRAM
PSE&G

Gamma Analysis of Milk, Water (pCi/L) and
Air Particulate (pCi/filter)

DATE MM-YY	ENV SAMPLE CODE	MEDIUM	ANALYSIS	* PSE&G Mean ± s.d.	** EPA Known
06-93	EPA-WAT-G363	Water	Ba-133	94±2.1	99±10
			Co-60	15±0.5	15±5
			Zn-65	103±2.9	103±10
			Ru-106	100±3.7	119±12
			Cs-134	7±1.6	5±5
			Cs-137	7±0.9	5±5
04-93	EPA-WAT-P361	Water	Cs-134	27±1.2	27±5
			Cs-137	31±1.2	32±5
			Co-60	41±1.6	39±5
08-93	EPA-APT-GABS366	APT	Cs-137	11±0.5	9±5
09-93	EPA-MLK-GS367	Milk	Cs-137	48±1.2	49±5
			K(1)	1640±16	1680±84
			I-131	117±1.4	120±12
10-93	EPA-WAT-P369	Water	Co-60	11±0.5	10±5
			Cs-134	10±0	12±5
			Cs-137	11±0	10±5
11-93	EPA-WAT-G371	Water	Co-60	31±0.9	30±5
			Zn-65	155±2.6	150±15
			Ru-106	200±9.5	201±20
			Cs-134	57±0.9	59±5
			Cs-137	42±0.5	40±5
			Ba-133	76±1.7	79±8

(1) Reported as mg/l of Potassium

* s.d. - one standard deviation of three individual analytical results
** known value plus or minus one sigma as reported by EPA

TABLE F-2
USEPA ENVIRONMENTAL RADIOACTIVITY LABORATORY
INTERCOMPARISON STUDY PROGRAM
PSE&G

Tritium Analysis of Water (pCi/L)

DATE MM-YY	ENV SAMPLE CODE	MEDIUM	ANALYSIS	* PSE&G Mean ± s.d.	** EPA Known
06-93	EPA-WAT-H362	Water	H-3	9260±258	9840±980
11-93	EPA-WAT-H370	Water	H-3	7030±33	7400±740

* s.d. - one standard deviation of three individual analytical results
** known value plus or minus one sigma as reported by EPA

TABLE F-2
USEPA ENVIRONMENTAL RADIOACTIVITY LABORATORY
INTERCOMPARISON STUDY PROGRAM
PSE&G

Iodine Analysis of Water (pCi/L)

DATE MM-YY	ENV SAMPLE CODE	MEDIUM	ANALYSIS	* PSE&G Mean ± s.d.	** EPA Known
02-93	EPA-WAT-I360	Water	I-131	125±3.3	100±10
10-93	EPA-WAT-I368	Water	I-131	106±1.9	117±12

The results for the February 1993 I-131 in water did not agree with the EPA known. An evaluation of the completed analyses showed no obvious errors by the analyst. A review of the calibration process revealed a gap by a plastic spacer between the source and the detector, sufficient to allow a difference in the solid angle, which altered the results by a factor of 25%. The corrective action taken was to post signs both inside and outside the detector caves, requiring spacers to be inserted at the time of analysis. Future calibrations reverted to counting the sample directly on top of the detector without a spacer. Subsequent results have been in agreement.

* s.d. - one standard deviation of three individual analytical results
** known value plus or minus one sigma as reported by EPA

TABLE F-2
USEPA ENVIRONMENTAL RADIOACTIVITY LABORATORY
INTERCOMPARISON STUDY PROGRAM
PSE&G

Strontium-89 and Strontium-90 Analysis of
Air Particulates (pCi/filter),
Milk (pCi/L) and Water (pCi/L)

DATE MM-YY	ENV SAMPLE CODE	MEDIUM	ANALYSIS	* PSE&G Mean ± s.d.	** EPA Known
01-93	EPA-WAT-S358	Water	Sr-89	16±0.4	15±5
			Sr-90	9±0.2	10±5
04-93	EPA-WAT-P361	Water	Sr-89	44±5.1	41±5
			Sr-90	28±1.4	29±5
07-93	EPA-WAT-S364	Water	Sr-89	35±2.5	34±5
			Sr-90	25±0.8	25±5
08-93	EPA-APT-GABS366	APT	Sr-90	18±0.9	19±5
09-93	EPA-MLK-GS367	Milk	Sr-89	27±0.9	30±5
			Sr-90	24±0.5	25±5
10-93	EPA-WAT-P369	Water	Sr-89	13±0	15±5
			Sr-90	10±0.5	10±5

* s.d. - one standard deviation of three individual analytical results
** known value plus or minus one sigma as reported by EPA

FIGURE F-1
COMPARISON OF PECo, NRC AND DER TLD DATA AT DISTANCES OF 0 - 2 MILES FROM LIMERICK GENERATING STATION, 1988 - 1992

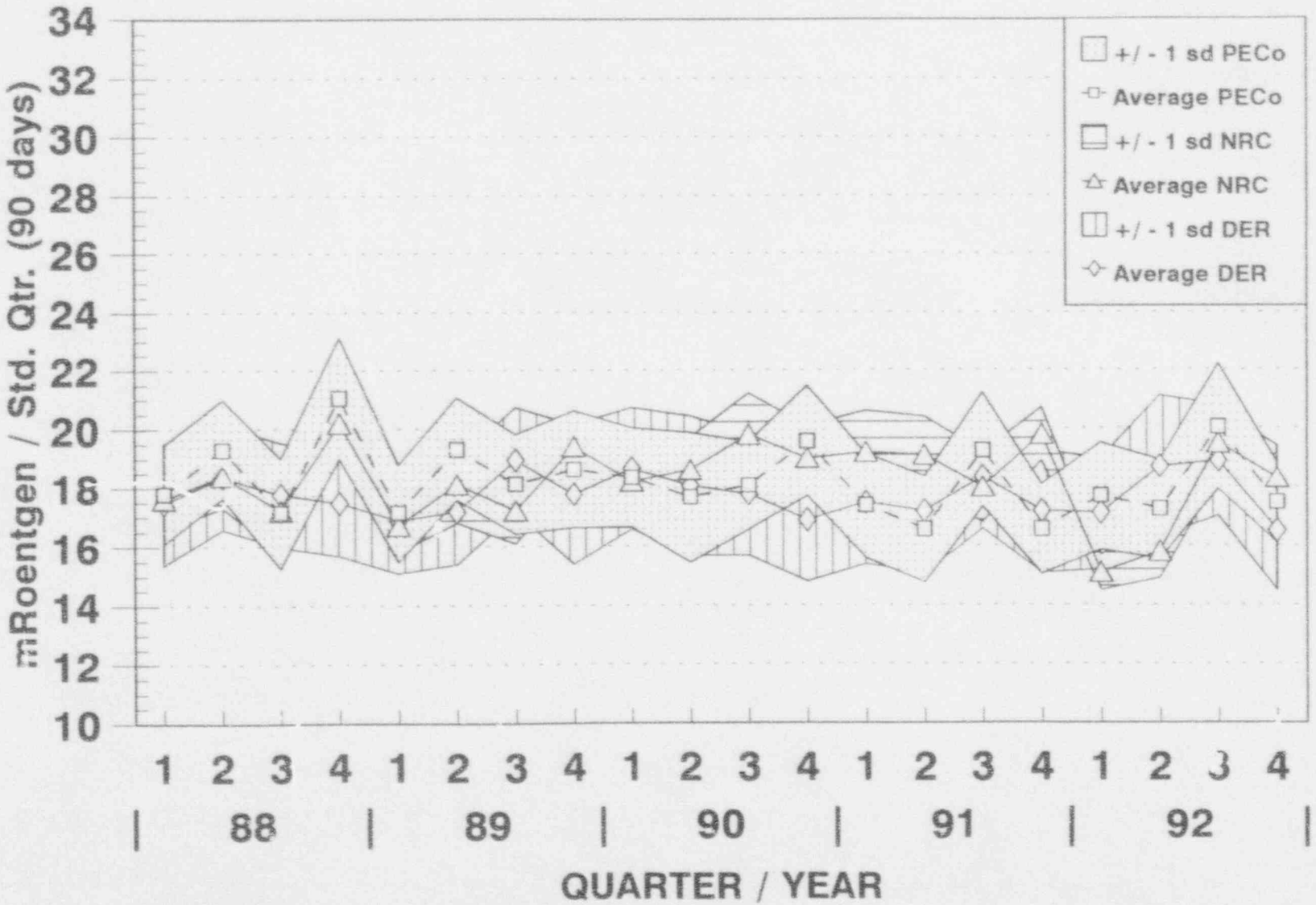


FIGURE F-2
COMPARISON OF PECo, NRC AND DER TLD DATA AT DISTANCES OF 2 - 5 MILES FROM LIMERICK GENERATING STATION, 1988 - 1992

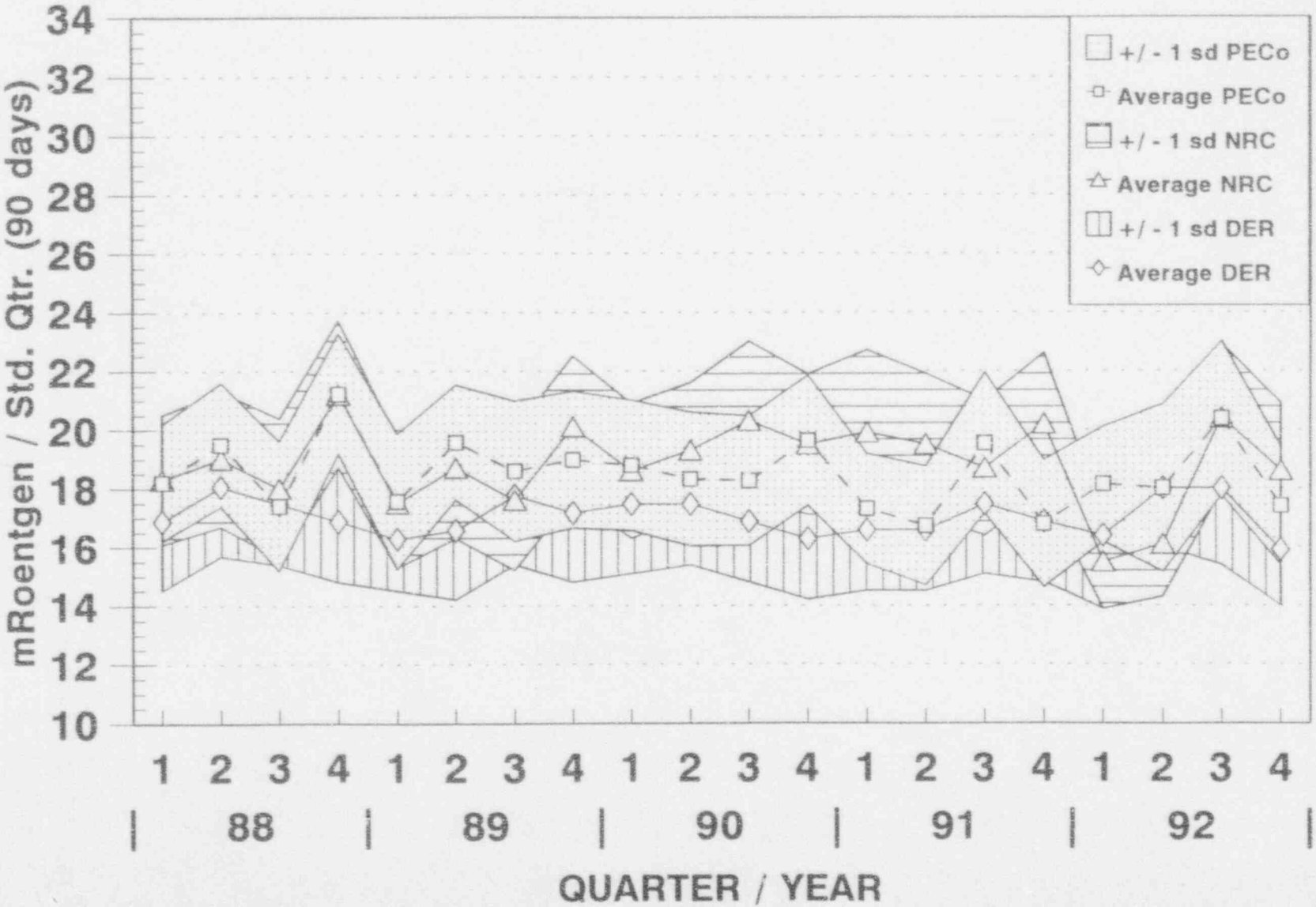
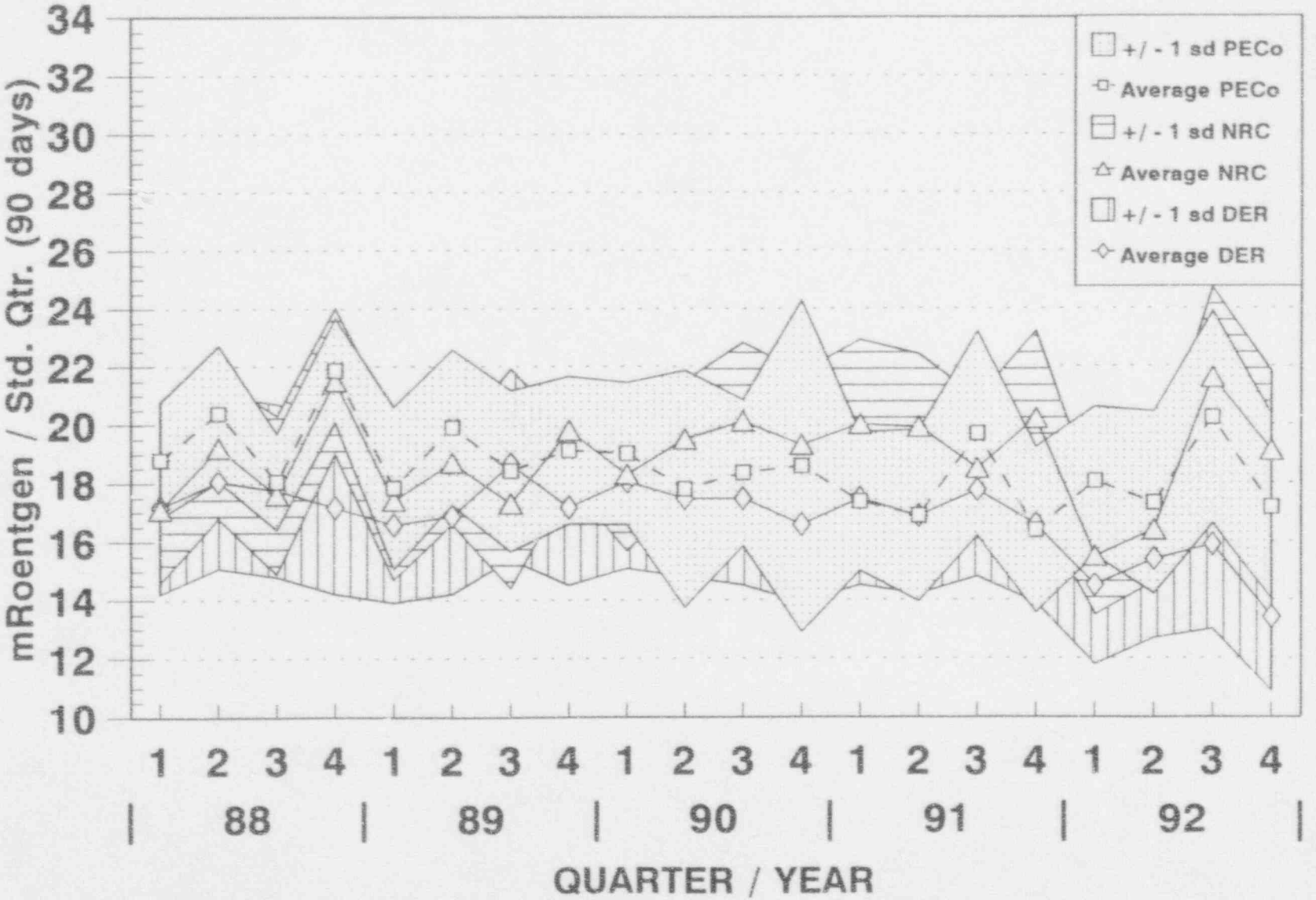


FIGURE F-3
COMPARISON OF PECo, NRC AND DER TLD DATA AT DISTANCES OF > 5 MILES FROM LIMERICK GENERATING STATION, 1988 - 1992



LGS SURVEY

APPENDIX G: LGS SURVEYS

A Land Use Census around the Limerick Generating Station (LGS) was conducted by RMC Environmental Services for PECO Energy to comply with sections 2.5.1 and 3.4.2 of the Plant's Offsite Dose Calculation Manual. The survey was conducted during the May to September 1993 growing season. The results of this survey are summarized in Table G-1.

There were no changes required to the LGS REMP as a result of this survey.

Table G-1 Location of Nearest Residence, Garden and Milk Farm within a Five Mile Radius of Limerick Generating Station, 1993

(Distance in Miles)

Sector	Residence	Garden[1]	Milk Farm
N	0.6	1.8	4.7
NNE	0.5	0.5	-
NE	0.8	1.5	-
ENE	0.6	0.9	-
E	0.6	1.1	-
ESE	0.5	0.6	1.1[2]
SE	1.0	1.5	4.6
SSE	1.0	1.2	-
S	0.8	1.2	2.3
SSW	1.0	1.8	1.8
SW	0.6	0.6	3.0
WSW	0.8	1.4	2.8
W	0.6	2.2	2.8
WNW	0.7	1.0	-
NW	1.3	1.6	4.6[2]
NNW	0.9	0.8	-

(1) Garden greater than 500 square feet

(2) Goat Milk