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T.S.6.9.1.7
T.S. 3.12.2

PHILADELPHIA ELECTRIC COMPANY

LIMERICK GENERATING STATION
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GRAHAM M. LEITCH
VICE PRESIDENT
LIMERICK GENERATING STATION

April 30, 1990
Docket Nos. 50-352
50-353
License Nos. NPF-39
NPF-85

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

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 1989 Annual Radiological Environmental Monitoring Report No. 6. This report provides the information delineated in TS Section 6.9.1.7, including a summary of the Radiological Environmental Monitoring Program (REMP).

The Radiological Environmental Monitoring Program found that LGS effects on the environment were not measurable in any sample media. Trace concentrations of Cs-137 were found in fish and sediment consistent with levels observed in preoperational years.

The 1989 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,

KWM/kk

cc: T. T. Martin, Administrator, Region I, USNRC
T. J. Kenny, USNRC Senior Resident Inspector

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ATTACHMENT

3902085970

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DOCKET NO.: 50-352
50-353

LIMERICK GENERATING STATION

Units 1 and 2

Annual Radiological Environmental Operating Report Report #6

1 January through 31 December 1989

Prepared by

Philadelphia Electric Company
2301 Market Street
Philadelphia, Pennsylvania 19101

Analysis performed by

TELEDYNE ISOTOPES
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May 1990

TABLE OF CONTENTS

SUMMARY AND CONCLUSIONS

I. Summary and Conclusions

This report on the Radiological Environmental Monitoring Program conducted for the limerick Generating Station by Philadelphia Electric Company covers the period 1 January 1989 through 31 December 1989. During that time period, 3024 analyses were performed on 2403 samples.

Surface and drinking (potable) water samples were analyzed for concentrations of gross beta (soluble and insoluble fractions), tritium, and gamma emitting nuclides. Concentrations 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. Two fish samples collected below the discharge showed trace concentrations of Cs-137. Sediment samples collected below the discharge had Cs-137 concentrations consistent with levels observed in the preoperational years.

Air particulate samples were analyzed for concentrations of gross beta and gamma emitting nuclides. Concentrations detected were consistent with those observed in other years.

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

Cow and goat milk samples were analyzed for concentrations of I-131 and gamma emitting nuclides. Iodine-131 results were all less than the minimum detectable level. Concentrations of K-40 were consistent with those observed in other years. Trace amounts of Cs-137 were found in some milk samples. The activity was considered attributable to residual fallout from Chernobyl.

Well water samples were analyzed for concentrations of tritium and gamma emitting nuclides. All results were less than the minimum detectable level.

Vegetation samples were analyzed for concentrations of gamma emitting nuclides. Concentrations detected were consistent with those observed in other years.

A game sample was analyzed for concentrations of gamma emitting nuclides. Concentrations detected were consistent with those observed in other years.

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.

INTRODUCTION

II. Introduction

The Limerick Generating Station (LGS), consisting of two 1055 MWe boiling water reactors owned and operated by Philadelphia Electric Company (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 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 Isotopes (TI) on samples collected during the period 1 January 1989 through 31 December 1989.

A. Objectives

The objectives of the Radiological Environmental Monitoring Program are:

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

2. To 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

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

In order to achieve the stated objectives, the current program includes the following analyses on samples collected

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

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

3. Concentrations of gamma emitters in surface water, drinking (potable) water, well water, air particulates, milk, vegetation, game, fish, and sediment.

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

5. Ambient gamma radiation levels at various site environs.

PROGRAM DESCRIPTION

III. Program Description

A. Sample Collection

Samples for the LGS REMP were collected for Philadelphia Electric Company by RMC Environmental Services (RMC). This section describes the collection methods used by RMC to obtain environmental samples for the LGS REMP in 1989.

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 six surface water locations (10F2, 13H5, 15F5, 16B2, 24S1, and 24S2) and five drinking water locations (13H2, 15F4, 15F7, 16C2, and 28F3). Control locations were 10F2, 24S1, 24S2, 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, milk, well water, food products and game. Air particulate and airborne iodine samples were collected weekly at seventeen locations (2B1, 6C1, 9C1, 10S3, 11S1, 13C1, 13H4, 14S1, 15D1, 17B1, 20D1, 22G1, 26B1, 29B1, 31D1, 34S2, and 35B1). Of the airborne iodine samples at these seventeen locations, eight (10S3, 11S1, 13C1, 13H4, 14S1, 22G1, 31D1, and 35B1) were analyzed for I-131. The remaining nine samples were collected and retained for analysis if necessary. Control locations were 13H4 and 22G1. 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, 21B1, 22F1, and 25B1) and monthly at six locations (36E1, 9G1, 11E1, 13E2, 18C1, and 22C1) during April through November, and monthly at all locations during December through March. 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.

Well water samples were collected semiannually from two locations 11S1 (indicator) and 18A1 (control) in new unused two gallon plastic bottles. Vegetation samples composed of broad leafy vegetation and root crops were collected monthly from one location (11S1) during the growing season (May through September). A game sample was collected annually from one location (26S5) by hunting.

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 (36S1, 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 sealed 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. 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.

The minimum detectable level (MDL) was defined as the two sigma counting statistic. It represents the range of values into which 95% of repeated counts of the same aliquot would fall. For all analyses (gross beta, I-131, H-3 and gamma) an activity that was greater than or equal to the MDL was reported as "activity plus/minus the two sigma counting statistic". When an activity was less than the MDL, the result was reported as < the MDL value.

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. For a more detailed description of the results calculation, see Appendix D.

Data received from the laboratory were reported 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). Results for each type of sample were grouped according to the analyses performed. For gamma analyses, at least those nuclides specified in Technical Specification Table 3.12.1-2 for each sample media and nuclides which had a 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 below the MDL were considered to be at the MDL. As a result, the means were biased high, and the standard deviations were generally biased low.

C. Program Exceptions

For 1989 the LGS REMP had a sample recovery rate of better than 99%. The exceptions to this program are listed below:

1. Air particulate and an air iodine samples were not collected from station 6C1 between 7/23/89 and 7/31/89 due to loss of power

2. Surface water samples collected at station 24S2 (Fricks Lock) in June were grab composites due to pump malfunction.

3. Surface water samples collected at station 15F5 (Philadelphia Suburban Water Company) in January were partial composites due to pump malfunction. A grab sample was taken for the week that the pump was down.

4. Surface water samples collected at station 24S2 (Fricks Lock Boat Ramp) February and March were partial composites due to pump malfunction. Grab samples were taken for the weeks that the pump was down.

5. Surface water samples collected at station 24S2 (Fricks Lock) during the months of May through early September were partial composites, due to pump malfunctions caused by sediment build-up and in December, due to vandalism and weather. Grab samples were taken during the weeks that the pumps were down.

6. The surface water samples collected at station 15F5 (Philadelphia Suburban Water Company) in May, July and September, were partial composites due to pump malfunctions.

7. Surface water samples collected at station 16B2 (Linfield Bridge) in August through December were grab samples due to pump malfunctions.

8. Surface water and drinking water samples from stations 13H5 and 13H2, respectively (Belmont Water company) from the last week of September through December were weekly grab samples due to relocation of pumps.

9. Surface water samples collected at station 10F2 (Perkiomen Pump House) were partial composites in September, November, and December due to pump malfunctions. Grab samples were taken during the weeks the pump was down.

10. Drinking water samples taken at station 15F7 (Phoenixville Water Company) in May and in July were partial composites due to pump malfunction. Grab samples were taken during the weeks that the pump was down.

11. LLD values for Ba-140 and La-140 for milk samples collected from station 21B1 in February and March were not met as a result of the analyses being assigned late.

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

The problems observed at location 16B2 (Linfield Bridge) have occurred for many years. We are investigating relocating this sampler further downstream at a location that will permit easier maintenance.

D. Program Changes

1. Milk station 21B1 was changed from a monthly to a biweekly collection.

2. Milk station 19B1 was added to the program as a biweekly sample beginning 6/20/89.

3. TLD station 36S1 was moved and redesignated 3CS2.

RESULTS AND DISCUSSION

IV. Results and Discussion

A. Aquatic Environment

1. Surface Water

Samples were taken from six locations on a monthly schedule. Samples were collected from a continuous sampler at all six locations (10F2, 13H5, 15F5, 16B2, 24S1, and 24S2). Of these locations, three (15F5, 16B2 and 13H5) 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 soluble and insoluble fractions (Tables C-I and C-II, Appendix C). Detectable activity was observed in the soluble and insoluble fraction of the surface water samples; the values were consistent with previous years (Figures C-1 and C-2, Appendix C) and ranged from 2.7 to 9 pCi/l for the soluble fraction and from <.3 to 1.9 pCi/l for the insoluble fraction. Similar activity levels were observed between indicator and control locations for the soluble and insoluble fractions.

Tritium

Samples from locations 10F2, 16B2, and 24S1 were analyzed for aqueous tritium activity (Table C-III, Appendix C). Positive tritium activity was observed at each sample location and values ranged from <70 to 170 pCi/l. Similar activity levels were observed at all locations.

Gamma Spectrometry

Samples from all locations were analyzed for gamma emitting nuclides (Table C-IV, Appendix C). With the exception of naturally occurring K-40 and Th-228, all nuclides searched for were below the minimum detectable level.

2. Drinking (Potable) Water

Monthly samples were taken from five locations (13H2, 15F4, 15F7, 16C2 and 28F3) and were collected from continuous water samplers. Four stations (13H2, 15F4, 15F7 and 16C2) could be affected by Station discharges. The following analyses were performed:

Gross Beta

Samples from all stations were analyzed for concentrations of gross beta in the soluble and insoluble fractions (Tables C-V and C-VI, Appendix C). The values ranged from 1.9 to 8 pCi/l

for the soluble fraction and from <.3 to 2.0 pCi/l for the insoluble fraction. Concentrations detected in both fractions were consistent with those observed in previous years (Figures C-3 and C-4, Appendix C).

Tritium

Samples from locations 13H2, 15F4, 15F7, 16C2 and 28F3 were analyzed for aqueous tritium activity (Table C-VII, Appendix C). Positive tritium activity was observed at each sample location. The measurements ranged from 40 to 160 pCi/l. Similar activity levels were observed at all locations.

Gamma Spectrometry

Samples from all locations were analyzed for gamma emitting nuclides (Table C-VIII, Appendix C). With the exception of naturally occurring K-40, all nuclides searched for were below the minimum detectable level.

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-IX, Appendix C). With the exception of Cs-137 and naturally occurring K-40, all nuclides searched for were below the minimum detectable level. Trace quantities of Cs-137 ranging from .005 to .012 pCi/g wet were found at the indicator location 20S1. Levels observed were consistent with those observed in previous years (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-X, Appendix C). Nuclides detected were naturally occurring Be-7, K-40, Ra-226 and Th-228, and fission products Mn-54 and Cs-137. The nuclides Th-228 and Ra-226 commonly occur in sediment from daughter decay of natural uranium.

Maganese-54 was found at the detection limit of .04 pCi/g dry at location 16C4. The positive result may be the result of statistical fluctuations.

Concentrations of Cs-137 were found in sediment samples from the indicator locations below the discharge. Location 16C4 had the highest average concentration of .22 pCi/g dry. Cesium-137 commonly occurs in sediment from worldwide fall-out. Concentrations of Cs-137 observed were consistent with those observed from previous years (Figure C-6, Appendix C).

B. Atmospheric Environment

1. Airborne

a. Air Particulates

Continuous air particulate samples were collected from seventeen locations on a weekly basis. The seventeen locations are 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-XI, Appendix C).

Detectable gross beta activity was observed at all locations. Concentrations detected were consistent with those observed in previous years (Figure C-7, Appendix C). The values ranged from 3 to 48 E-3 pCi/m^3. No significant difference in activity was observed between the control and indicator stations.

Gamma Spectrometry

Weekly samples were composited and analyzed monthly for gamma-emitting nuclides (Table C-XII, Appendix C). Naturally occurring Be-7 due to cosmic ray activity was detected in all samples. These values ranged from 29 to 130 E-3 pCi/m^3. K-40, also naturally occurring, was detected in 33 samples. These values ranged from 4 to 50 E-3 pCi/m^3. All other nuclides searched for were below the minimum detectable level. No significant difference in activity was observed between the control and indicator stations.

b. Airborne Iodine

Continuous air samples were collected from the same seventeen locations as the air particulate samples. However, of the seventeen locations, eight (10S3, 11S1, 13C1, 13H4, 14S1, 22G1, 31D1, and 35B1) were analyzed weekly for I-131. For the remaining nine samples, the analysis was not necessary. Results of the I-131 analysis are found in Table C-XIII, Appendix C. All results were less than the minimum detectable level.

2. Terrestrial

A. Milk

Samples were taken from four locations (10B1, 21B1, 22F1 and 25B1) biweekly during the grazing season (April-November) and monthly at other times. A fifth location (19B1) was added in June. Samples from six additional locations (9G1, 11E1, 13E2, 18C1, 22C1 and 36E1) were taken monthly. The following analyses were performed:

Iodine-131

All milk samples from all locations were analyzed for concentrations of I-131 (Table C-XIV, Appendix C). All results were less than the minimum detectable level.

Gamma Spectrometry

Each milk sample from locations 10B1, 19B1, 21B1, 22F1 and 25B1 and quarterly milk samples from locations 9G1, 11E1, 13E2, 18C1, 22C1, and 36E1 were analyzed for concentrations of gamma emitting nuclides (Table C-XV, Appendix C).

With the exception of Cs-137 and K-40, all nuclides searched for were below the minimum detectable level. The values for K-40 ranged from 1000 to 1900 pCi/l and were consistent with previous years.

Concentrations of Cs-137 were found in goat milk (10B1) ranging from 3 to 7 pCi/l. Cesium-137 was also found at two milk farms (22F1 and 25B1). The positive values ranged from 4 to 5 pCi/l. This activity was attributed to residual fallout from Chernobyl.

b. Well Water

Samples were collected from two locations, 11S1 (indicator) and 18A1 (control), semiannually. The following analyses were performed:

Tritium

Total samples from both locations were analyzed for aqueous tritium activity (Table C-XVI, Appendix C). Results ranged from <30 to 60 pCi/l.

Gamma Spectrometry

Total samples from both locations were analyzed for gamma emitting nuclides (Table C-XVI, Appendix C). All nuclides searched for were below the minimum detectable level.

c. Vegetation

Vegetation samples were collected from one location (11S1) monthly during the growing season. The following analysis was performed:

Gamma Spectrometry

Vegetation samples were analyzed for gamma emitting nuclides (Table C-XVII, Appendix C). The nuclides detected were naturally occurring Be-7 (due to cosmic ray activity) ranging from <.03 to .4 pCi/g wet, K-40 ranging from 3.5 to 9.6 pCi/g wet and Cs-137 ranging from <.003 to 0.014 pCi/g wet. All other nuclides were less than the minimum detectable level.

d. Game

A rabbit sample was collected annually from one location (26S5) and the following analysis was performed:

Gamma Spectrometry

Rabbit flesh was analyzed for gamma emitting nuclides (Table C-XVIII, Appendix C). All nuclides searched for were less than the minimum detectable level with the exception of naturally occurring K-40, which had a value of 2.6 pCi/g wet.

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-XIX to C-XXII, Appendix C.

Most of the TLD measurements were below 10 mrad/std. month, with a range of 4.5 to 15.9 mR/std. month for the monthly TLDs and from 4.2 to 8.0 mR/std. month for the quarterly TLDs. Levels measured were consistent with those observed in previous years (Figure C-9, Appendix C).

The April monthly TLD data showed many results greater than 9.0 mR/std. month. This trend was consistent at all three rings (Table C-XII, Appendix C). Therefore, the increased gamma radiation levels were not considered a result of LGS operations.

REFERENCES

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.

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: 1989

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	72	4	4.8 (36/36) (2.7-9.0)	4.7 (36/36) (3.0-8.0)	5.4 (12/12) (3.6-8.0)	10F2 (CONTROL) PERKIOMEN PUMPING STATION 7.1 MILES E OF SITE	0
	GROSS BETA INSOLUBLE	72	4	1.1 (15/36) (0.4-2.0)	1.0 (15/36) (0.4-1.9)	1.3 (6/12) (0.4-1.9)	2452 (CONTROL) FRICKS LOCK 0.3 MILES WSW OF SITE	0
	TRITIUM	12	2000	130 (4/4) (90-170)	100 (7/8) (80-130)	130 (4/4) (90-170)	16B2 (INDICATOR) LINFIELD BRIDGE 1.1 MILES SSE OF SITE	0
	GAMMA	72						
	K-40		N/A	10 (7/36) (5-20)	8 (8/36) (5-10)	13 (2/12) (12-13)	16B2 (INDICATOR) LINFIELD BRIDGE 1.1 MILES SSE OF SITE	0
	MN-54		15	< LLD	< LLD	< LLD		0
	CO-58		15	< LLD	< LLD	< LLD		0
	FE-59		30	< LLD	< LLD	< LLD		0
	CO-60		15	< LLD	< LLD	< LLD		0
	ZN-65		30	< LLD	< LLD	< LLD		0
	ZR-95		30	< LLD	< LLD	< LLD		0
	NB-95		15	< LLD	< LLD	< LLD		0
	CS-134		15	< LLD	< LLD	< LLD		0
	CS-137		18	< LLD	< LLD	< LLD		0
	BA-140		60	< LLD	< LLD	< LLD		0
	LA-140		15	< LLD	< LLD	< LLD		0
	TH-228		N/A	< LLD	1.6 (1/36) (2-2)	1.6 (1/12) (2-2)	10F2 (CONTROL) PERKIOMEN PUMPING STATION 7.1 MILES E OF SITE	0
DRINKING WATER (PCI/LITER)	GROSS BETA SOLUBLE	60	4	4.6 (48/48) (1.9-8.0)	5 (12/12) (3-8)	5 (12/12) (4-8)	13H2 (INDICATOR) BELMONT WATER WORKS (PHILA.) 25.5 MILES SE OF SITE	0
	GROSS BETA INSOLUBLE	60	4	0.8 (12/48) (0.4-2.0)	0.8 (1/12) (0.8)	0.9 (2/12) (0.4-1.3)	13H2 (INDICATOR) BELMONT WATER WORKS (PHILA.) 25.5 MILES SE 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: 1989

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
DRINKING WATER (PCI/LITER)	TRITIUM	20	2000	110 (14/16) (70-150)	100 (3/4) (40-160)	120 (4/4) (70-150)	15F7 (INDICATOR) PHOENIXVILLE WATER WORKS 5.2 MILES SSE OF SITE	0
	GAMMA	60						
	K-40		N/A	8 (10/48) (5-10)	9 (2/12) (5-12)	9 (2/12) (8-10)	13H2 (INDICATOR) BELMONT WATER WORKS (PHILA.) 25.5 MILES SE OF SITE	0
	MN-54		15	< LLD	< LLD	< LLD		0
	CO-58		15	< LLD	< LLD	< LLD		0
	FE-59		30	< LLD	< LLD	< LLD		0
	CO-60		15	< LLD	< LLD	< LLD		0
	ZN-65		30	< LLD	< LLD	< LLD		0
	ZR-95		30	< LLD	< LLD	< LLD		0
	NB-95		15	< LLD	< LLD	< LLD		0
	CS-134		15	< LLD	< LLD	< LLD		0
	CS-137		18	< LLD	< LLD	< LLD		0
	BA-140		60	< LLD	< LLD	< LLD		0
	LA-140		15	< LLD	< LLD	< LLD		0
FISH BOTTOM FEEDER (PCI/GRAM WET)	GAMMA	6						
	K-40		N/A	3.1 (4/4) (2.6-3.4)	3.3 (2/2) (3.1-3.4)	3.3 (2/2) (3.1-3.4)	29C1 (CONTROL) POTTSTOWN VICINITY UPSTREAM OF DISCHARGE	0
	MN-54		.13	< LLD	< LLD	< LLD		0
	CO-58		.13	< LLD	< LLD	< LLD		0
	FE-59		.26	< LLD	< LLD	< LLD		0
	CO-60		.13	< LLD	< LLD	< LLD		0
	CS-134		.13	< LLD	< LLD	< LLD		0
	CS-137		.15	0.005 (1/4) (0.005-0.005)	< LLD	0.005 (1/2) (0.005-0.005)	20S1 (INDICATOR) DISCHARGE AREA N/A	0

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DOCKET NO.: 50-352 & 50-353
REPORTING PERIOD: 1989

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
FISH	GAMMA	6						
PREDATOR (PCI/GRAM WET)	K-40		N/A	3.1 (4/4) (2.8-3.9)	3.0 (2/2) (2.6-3.5)	3.4 (2/2) (2.8-3.9)	20S1 (INDICATOR) DISCHARGE AREA N/A	0
	MN-54		.13	< LLD	< LLD	< LLD		0
	CO-58		.13	< LLD	< LLD	< LLD		0
	FE-59		.26	< LLD	< LLD	< LLD		0
	CO-60		.13	< LLD	< LLD	< LLD		0
	ZN-65		.26	< LLD	< LLD	< LLD		0
	CS-134		.13	< LLD	< LLD	< LLD		0
	CS-137		.15	0.012 (1/4) (0.012-0.012)	< LLD	0.012 (1/2) (0.012-0.012)	20S1 (INDICATOR) DISCHARGE AREA N/A	0
SILT/SEDIMENT (PCI/GRAM DRY)	GAMMA	6						
	BE-7		N/A	2.8 (1/4) (2.8-2.8)	< LLD	2.8 (1/2) (2.8-2.8)	16C4 (INDICATOR) VINCENT DAM DOWNSTREAM OF DISCHARGE	0
	K-40		N/A	12.6 (4/4) (9.9-15)	10.6 (2/2) (9.7-12)	13 (2/2) (11-15)	16B2 (INDICATOR) LINFIELD BRIDGE 1.1 MILES SSE OF SITE	0
	MN-54		N/A	0.04 (1/4) (0.04-0.04)	< LLD	0.04 (1/2) (0.04-0.04)	16C4 (INDICATOR) VINCENT DAM DOWNSTREAM OF DISCHARGE	0
	CS-134		.15	< LLD	< LLD	< LLD		0
	CS-137		.18	0.20 (4/4) (0.13-0.25)	< LLD	0.21 (2/2) (0.19-0.24)	16C4 (INDICATOR) VINCENT DAM DOWNSTREAM OF DISCHARGE	0
	RA-226		N/A	1.6 (4/4) (1.0-2.2)	2.0 (2/2) (1.9-2.2)	2.0 (2/2) (1.9-2.2)	33A2 (CONTROL) UPSTREAM OF DISCHARGE N/A	0
	TH-228		N/A	1.2 (4/4) (1.1-1.6)	0.96 (2/2) (0.91-1.0)	1.3 (2/2) (1.1-1.6)	16B2 (INDICATOR) LINFIELD BRIDGE 1.1 MILES SSE OF SITE	0

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AIR PARTICULATE (E-3 PCI/CU. METER)	GROSS BETA	883	10	18.1 (779/779) (3.0-48.0)	20 (104/104) (6-46)	21 (52/52) (9-46)	13H4 (CONTROL) 2301 MARKET ST. (PHILA.) 28.8 MILES SE OF SITE	0
	GAMMA	204						
	BE-7		N/A	86 (180/180) (29-130)	85 (24/24) (44-110)	90 (12/12) (70-130)	2001 (INDICATOR) ELLIS WOODS ROAD 3.1 MILES SSW OF SITE	0
	K-40		N/A	20 (28/180) (4-50)	18 (5/24) (8-30)	28 (1/12) (30-30)	2B1 (INDICATOR) SANATOGA SUBSTATION 1.5 MILES NNE OF SITE	0
	CS-134		50	< LLD	< LLD	< LLD		0
	CS-137		60	< LLD	< LLD	< LLD		0
AIR IODINE (E-3 PCI/CU. METER)	I-131	416	70	< LLD	< LLD	< LLD		0
MILK (PCI/LITER)	I-131	169	1	< LLD	< LLD	< LLD		0
	GAMMA	121						
	K-40		N/A	1400 (96/96) (1000-1900)	1400 (25/25) (1300-1600)	1500 (21/21) (1100-1900)	10B1 (INDICATOR) REGIONAL FARM 1.1 MILES ESE OF SITE	0
	CS-134		15	< LLD	< LLD	< LLD		0
	CS-137		18	4 (9/96) (3-7)	5 (1/25) (5-5)	5 (1/21) (5-5)	22F1 (CONTROL) REGIONAL FARM 9.8 MILES SW OF SITE	0
	BA-140		60	< LLD	< LLD	< LLD		0
	LA-140		15	< LLD	< LLD	< LLD		0

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WELL WATER (PCI/LITER)	TRITIUM	4	2000	< LLD	60 (2/2) (50-60)	60 (2/2) (50-60)	18A1 (CONTROL) SOUTH SECTOR RESIDENCE 1.0 MILES S OF SITE	0
	MN-54		15	< LLD	< LLD	< LLD		0
	CO-58		15	< LLD	< LLD	< LLD		0
	FE-59		30	< LLD	< LLD	< LLD		0
	CO-60		15	< LLD	< LLD	< LLD		0
	ZN-65		30	< LLD	< LLD	< LLD		0
	ZR-95		30	< LLD	< LLD	< LLD		0
	NB-95		15	< LLD	< LLD	< LLD		0
	CS-134		15	< LLD	< LLD	< LLD		0
	CS-137		18	< LLD	< LLD	< LLD		0
	BA-140		60	< LLD	< LLD	< LLD		0
	LA-140		15	< LLD	< LLD	< LLD		0
LEAFY VEGETATION (PCI/GRAM WET)	GAMMA	6						
	BE-7		N/A	0.29 (4/6) (0.17-0.4)		0.29 (4/6) (0.17-0.4)	11S1 (INDICATOR) LGS INFORMATION CENTER 0.5 MILES ESE OF SITE	0
	K-40		N/A	6.0 (6/6) (3.5-9.6)		6.0 (6/6) (3.5-9.6)	11S1 (INDICATOR) LGS INFORMATION CENTER 0.5 MILES ESE OF SITE	0
	I-131		.06	< LLD		< LLD		0
	CS-134		.06	< LLD		< LLD		0
	CS-137		.08	0.014 (1/6) (0.014-0.014)		0.014 (1/6) (0.014-0.014)	11S1 (INDICATOR) LGS INFORMATION CENTER 0.5 MILES ESE OF SITE	0

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ROOT CROP (PCI/GRAM WET)	GAMMA	6						
	BE-7		N/A	0.08 (1/6) (0.08-0.08)		0.08 (1/6) (0.08-0.08)	11S1 (INDICATOR) LGS INFORMATION CENTER 0.5 MILES ESE OF SITE	0
	K-40		N/A	4.3 (6/6) (2.9-5.4)		4.3 (6/6) (2.9-5.4)	11S1 (INDICATOR) LGS INFORMATION CENTER 0.5 MILES ESE OF SITE	0
	I-131		.06	< LLD		< LLD		0
	CS-134		.06	< LLD		< LLD		0
	CS-137		.08	< LLD		< LLD		0
RABBIT (PCI/GRAM WET)	GAMMA	1						
	K-40		N/A	2.6 (1/1) (2.6-2.6)		2.6 (1/1) (2.6-2.6)	2655 (INDICATOR) FRICKS LOCK AREA N/A	0
	I-131		N/A	< LLD		< LLD		0
	CS-134		.06	< LLD		< LLD		0
	CS-137		.08	< LLD		< LLD		0
DIRECT RADIATION (MILLI-ROENTGEN / STD. MONTH)	TLD-MONTHLY	576	N/A	7.09 (516/516) (4.60-15.90)	7.04 (60/60) (4.50-12.00)	8.57 (12/12) (8.00-9.30)	31D1 (INDICATOR) LINCOLN SUBSTATION 3.0 MILES NW OF SITE	0
	TLD-QUARTERLY	192	N/A	6.26 (172/172) (4.20-8.00)	6.25 (20/20) (4.30-8.00)	7.75 (4/4) (7.60-8.00)	5H1 (CONTROL) BIRCH SUBSTATION 25.8 MILES NE OF SITE	0

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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 Operational Radiological Environmental Monitoring Program, Limerick Generating Station, 1989.

ENVIRONMENTAL STATION	LOCATION DESCRIPTION	DISTANCE & DIRECTION FROM LGS VENT	COLLECTION METHOD & FREQUENCY	ANALYSIS & FREQUENCY PERFORMED
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 Gamma Spec-monthly Tritium-quarterly composite
13H5	Belmont Water Works (indicator)	25.5 miles SE	Same as 10F2	G. Beta (S&I)-monthly Gamma Spec-monthly
15F5	Philadelphia Suburban Water Company (indicator)	7.8 miles SSE	Same as 10F2	Same as 13H5
16B2	Linfield Bridge (indicator)	1.1 miles SSE	Same as 10F2	Same as 10F2
24S1	Limerick Intake (control)	0.3 miles SSW	Same as 10F2	Same as 10F2
24S2	Fricks Lock Boat House (control)	0.3 miles WSW	Same as 10F2	Same as 13H5
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 Gamma Spec-monthly Tritium-quarterly composite
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	Same as 13H2	Same as 13H2
28F3	Pottstown Water Authority (control)	5.9 miles WNW	Same as 13H2	Same as 13H2

TABLE B-II: Sample Collection and Analysis Program for the Operational Radiological Environmental Monitoring Program, (contd.) Limerick Generating Station, 1989.

ENVIRONMENTAL STATION	LOCATION DESCRIPTION	DISTANCE & DIRECTION FROM LGS VENT	COLLECTION METHOD & FREQUENCY	ANALYSIS & FREQUENCY PERFORMED
C. Well Water				
11S1	LGS Information Center	0.5 miles ESE	Two gallon grab taken from faucet semiannually	Tritium-semiannually Gamma Spec-semiannually
18A1	Control	1.0 miles S	Same as 11S1	Same as 11S1
D. Cow's Milk				
36E1		4.7 miles N	Two gallons processed milk purchased monthly at farm dairy store	I-131-monthly Gamma Spec-quarterly
9G1	Control	11.4 miles E	Two gallon grab sample collected from bulk tank at farm monthly	Same as 36E1
11E1		4.9 miles ESE	Same as 9G1	Same as 36E1
13E2		4.5 miles SE	Same as 9G1	Same as 36E1
18C1		1.9 miles S	Same as 9G1	Same as 36E1
19B1		1.9 miles SSW	Bi-weekly during grazing season (April through November); monthly otherwise	I-131-biweekly Gamma Spec-biweekly
21B1		1.7 miles SW	Same as 9G1	Same as 36E1
22C1		3.0 miles SW	Same as 9G1	Same as 36E1
22F1	Control	9.8 miles SW	Same as 19B1	Same as 19B1
25B1		1.3 miles WSW	Same as 19B1	Same as 19B1

TABLE B-II: Sample Collection and Analysis Program for the Operational Radiological Environmental Monitoring Program, (contd.) Limerick Generating Station, 1989.

ENVIRONMENTAL STATION	LOCATION DESCRIPTION	DISTANCE & DIRECTION FROM LGS VENT	COLLECTION METHOD & FREQUENCY	ANALYSIS & FREQUENCY PERFORMED
E. Goat's Milk				
10B1		1.1 mile ESE	Two gallon grab sample purchased at goat farm, bi-weekly during grazing season (April through November); monthly otherwise	I-131-biweekly Gamma Spec-biweekly
F. 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 Gamma Spec-monthly composite 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 Gamma Spec-monthly composite I-131-weekly
11S1	LGS Information Center	0.5 miles ESE	Same as 2B1	Same as 10S3
13C1	King Road	2.9 miles SE	Same as 2B1	Same as 10S3
13H4	2301 Market Street, 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
15B1	Spring City Substation	3.2 miles SE	Same as 2B1	Same as 2B1

TABLE B-II: Sample Collection and Analysis Program for the Operational Radiological Environmental Monitoring Program, (contd.) Limerick Generating Station, 1989.

ENVIRONMENTAL STATION	LOCATION DESCRIPTION	DISTANCE & DIRECTION FROM LGS VENT	COLLECTION METHOD & FREQUENCY	ANALYSIS & FREQUENCY PERFORMED
F. Air Particulates/Air Iodine (contd.)				
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 10S3
26B1	Old Schuylkill Road	1.7 miles W	Same as 2B1	Same as 2B1
29B1	Yost Road	1.8 miles NW	Same as 2B1	Same as 2B1
31D1	Lincoln Substation	3.0 miles NW	Same as 2B1	Same as 10S3
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 10S3
G. 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
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 Operational Radiological Environmental Monitoring Program, (contd.) Limerick Generating Station, 1989.

ENVIRONMENTAL STATION	LOCATION DESCRIPTION	DISTANCE & DIRECTION FROM LGS VENT	COLLECTION METHOD & FREQUENCY	ANALYSIS & FREQUENCY PERFORMED
H. Sediment				
16B2	Linfield Bridge (indicator)	Downstream of Discharge	Recently deposited sediment collected below the waterline, semiannually	Gamma Spec-Semiannually
16C4	Vicent Dam (indicator)	Downstream of Discharge	Same as 16B2	Same as 16B2
33A2	Control	Upstream of Discharge	Same as 16B2	Same as 16B2
I. Game				
26S5	Fricks Lock Area	Site Vicinity	Game animal collected by hunting annually	Gamma Spec-annually
J. Vegetation				
11S1	LGS Information Center	0.5 miles ESE	Broad leafy vegetation and root crops, monthly during the growing season (May-September)	Gamma Spec-monthly
K. Environmental Dosimetry-TLD				
36S1	Evergreen & Sanatoga Road	0.6 miles N	Collection method and frequency is described in placement procedure, Section III, A.	TLD-monthly TLD-quarterly
36S2	Evergreen & Sanatoga Road	0.6 miles N	Same as 36S1	Same as 36S1
2B1	Sanatoga Substation	1.5 miles NNE	Same as 36S1	Same as 36S1
2E1	Laughing Waters GSC	5.1 miles NNE	Same as 36S1	Same as 36S1

TABLE B-II: Sample Collection and Analysis Program for the Operational Radiological Environmental Monitoring Program, (contd.) Limerick Generating Station, 1989.

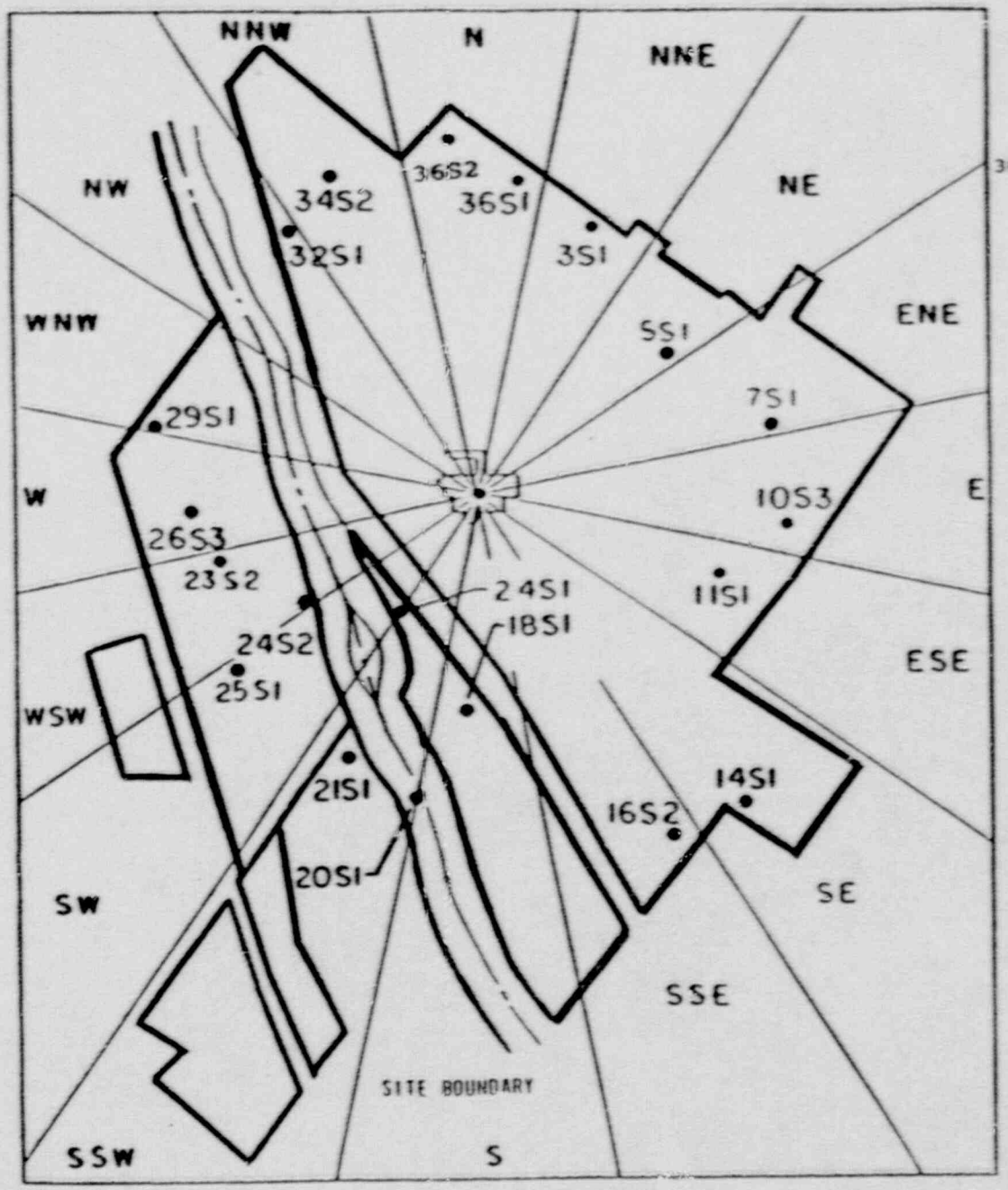
ENVIRONMENTAL STATION	LOCATION DESCRIPTION	DISTANCE & DIRECTION FROM LGS VENT	COLLECTION METHOD & FREQUENCY	ANALYSIS & FREQUENCY PERFORMED
K. Environmental Dosimetry-TLD (contd.)				
3S1	Sanatoga Road	0.6 miles NNE	Same as 36S1	Same as 36S1
4E1	Neiffer Road	4.6 miles NE	Same as 36S1	Same as 36S1
5S1	Possum Hollow Road	0.4 miles NE	Same as 36S1	Same as 36S1
5H1	Birch Substation	25.8 miles NE	Same as 36S1	Same as 36S1
6C1	Pottstown Landing Field	2.1 miles ENE	Same as 36S1	Same as 36S1
7S1	LGS Training Center	0.5 miles ENE	Same as 36S1	Same as 36S1
7E1	Pheasant Road	4.2 miles ENE	Same as 36S1	Same as 36S1
9C1	Reed Road	2.2 miles E	Same as 36S1	Same as 36S1
10S3	Keen Road	0.5 miles E	Same as 36S1	Same as 36S1
10E1	Royersford Road	3.9 miles E	Same as 36S1	Same as 36S1
10F3	Trappe Substation	5.5 miles ESE	Same as 36S1	Same as 36S1
11S1	LGS Information Center	0.5 miles ESE	Same as 36S1	Same as 36S1
13C1	King Road	2.8 miles SE	Same as 36S1	Same as 36S1
13E1	Vaughn Substation	4.3 miles SE	Same as 36S1	Same as 36S1
13H4	2301 Market Street, Philadelphia (control)	28.8 miles SE	Same as 36S1	Same as 36S1
14S1	Longview Road, SE Sector	0.6 miles SE	Same as 36S1	Same as 36S1
15D1	Spring City Substation	3.2 miles SE	Same as 36S1	Same as 36S1
16S2	Longview Road, SSE Sector	0.5 miles SSE	Same as 36S1	Same as 36S1
16F1	Pikeland Substation	4.9 miles SSE	Same as 36S1	Same as 36S1
17B1	Linfield Substation	1.6 miles S	Same as 36S1	Same as 36S1

TABLE B-II: Sample Collection and Analysis Program for the Operational Radiological Environmental Monitoring Program, (contd.) Limerick Generating Station, 1989.

ENVIRONMENTAL STATION	LOCATION DESCRIPTION	DISTANCE & DIRECTION FROM LGS VENT	COLLECTION METHOD & FREQUENCY	ANALYSIS & FREQUENCY PERFORMED
K. Environmental Dosimetry-TLD (contd.)				
18S1	Rail Line along Longview Road	0.3 miles S	Same as 36S1	Same as 36S1
18G1	Planebrook Substation	12.9 miles S	Same as 36S1	Same as 36S1
19D1	Snowden Substation	3.6 miles S	Same as 36S1	Same as 36S1
20D1	Ellis Woods Road	3.1 miles SSW	Same as 36S1	Same as 36S1
20F1	Sheeder Substation	5.2 miles SSW	Same as 36S1	Same as 36S1
21S1	Impound Basin	0.5 miles SSW	Same as 36S1	Same as 36S1
22G1	Manor Substation	17.6 miles SW	Same as 36S1	Same as 36S1
23S2	Transmission Tower	0.5 miles WSW	Same as 36S1	Same as 36S1
24D1	Porters Mill Substation	3.9 miles SW	Same as 36S1	Same as 36S1
25S1	Sector Site Boundary	0.5 miles SW	Same as 36S1	Same as 36S1
25D1	Hoffecker & Keim Streets	4.0 miles WSW	Same as 36S1	Same as 36S1
26S3	Met. Tower #2	0.4 miles W	Same as 36S1	Same as 36S1
26B1	Old Schuylkill Road	1.7 miles W	Same as 36S1	Same as 36S1
28D2	W. Cedarville Road	3.8 miles W	Same as 36S1	Same as 36S1
29S1	Sector Site Boundary	0.5 miles WNW	Same as 36S1	Same as 36S1
29B1	Yost Road	1.8 miles NW	Same as 36S1	Same as 36S1
29E1	Prince Street	4.9 miles WNW	Same as 36S1	Same as 36S1
31D1	Lincoln Substation	3.0 miles NW	Same as 36S1	Same as 36S1
31D2	Poplar Substation	3.9 miles NW	Same as 36S1	Same as 36S1
32S1	Sector Site Boundary	0.6 miles NW	Same as 36S1	Same as 36S1
32G1	Friedensburg Substation	15.6 miles NW	Same as 36S1	Same as 36S1

TABLE B-II: Sample Collection and Analysis Program for the Operational Radiological Environmental Monitoring Program, (contd.) Limerick Generating Station, 1989.

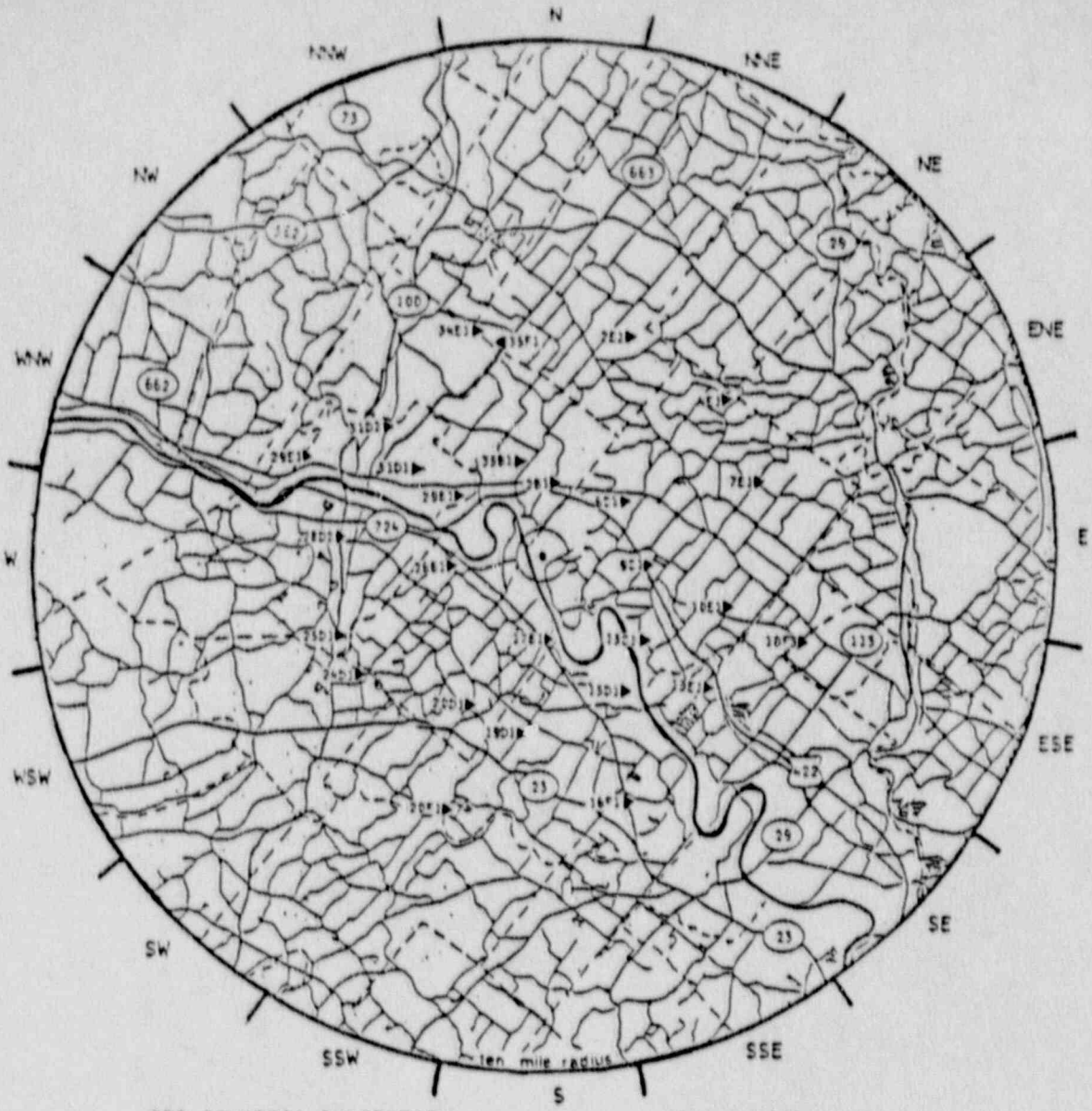
ENVIRONMENTAL STATION	LOCATION DESCRIPTION	DISTANCE & DIRECTION FROM LGS VENT	COLLECTION METHOD & FREQUENCY	ANALYSIS & FREQUENCY PERFORMED
K. Environmental Dosimetry-TLD (contd.)				
34S2	Met. Tower #1	0.6 miles NNW	Same as 36S1	Same as 36S1
34E1	Yarnell Road	4.6 miles NNW	Same as 36S1	Same as 36S1
35B1	Pleasantville Road	1.9 miles NNW	Same as 36S1	Same as 36S1
35F1	Ringing Rock Substation	4.2 miles N	Same as 36S1	Same as 36S1



36S1/36S2 EVERGREEN & SANATOGA RDS.

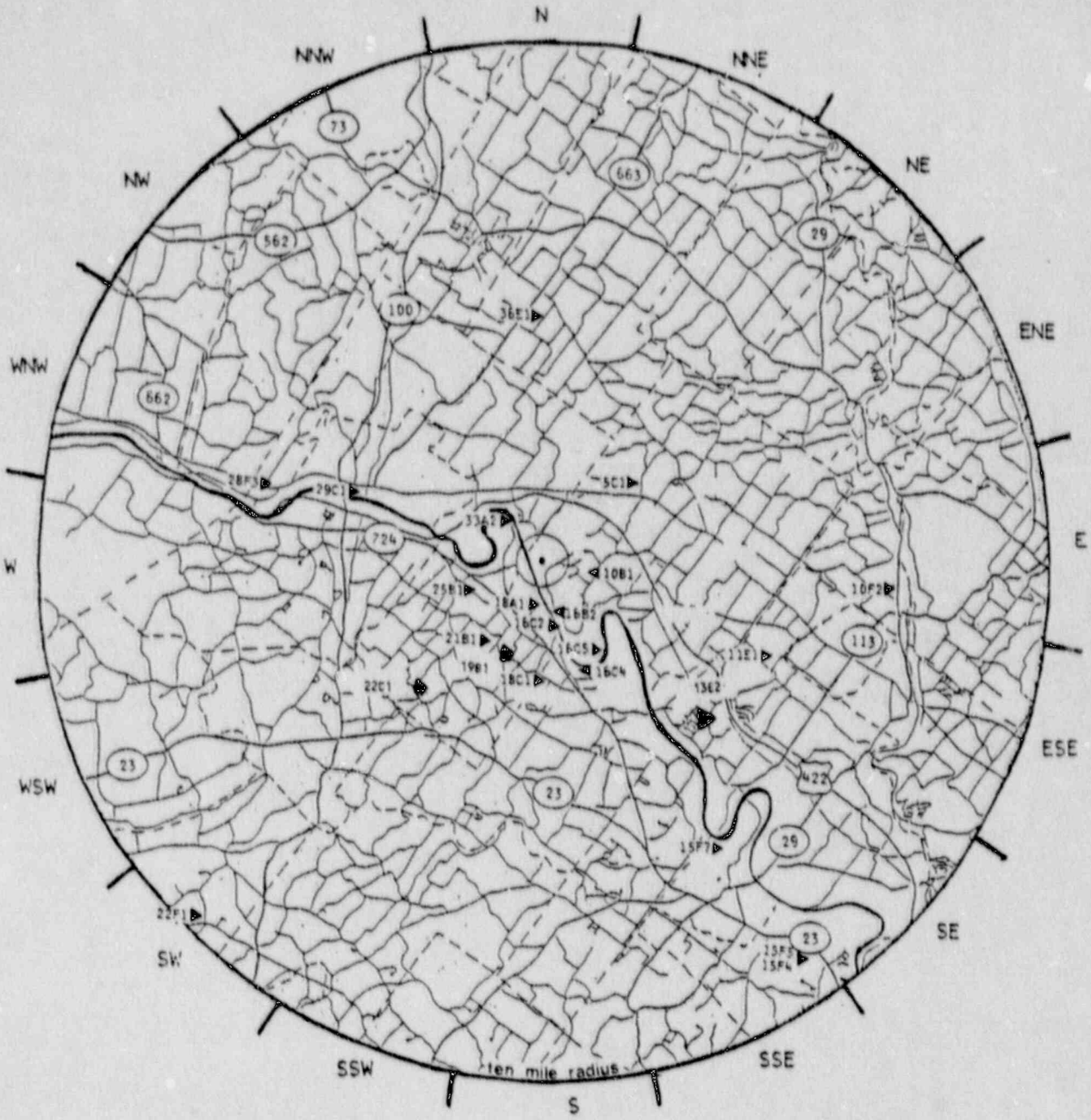
3S1	SANATOGA ROAD
5S1	POSSUM HOLLOW ROAD
7S1	LGS TRAINING CENTER
10S3	KEEN ROAD
11S1	LGS INFORMATION CENTER
14S1	LONGVIEW ROAD
16S2	LONGVIEW ROAD
18S1	RAILROAD TRACKS/LONGVIEW RD.
20S1	LGS DISCHARGE AREA
21S1	IMPOUNDING BASIN
23S2	TRANSMISSION TOWER
24S1	LGS INTAKE
24S2	FRICKS LOCK
25S1	SW SECTOR
26S3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

FIGURE 6-1
ENVIRONMENTAL SAMPLING LOCATIONS
ON-SITE OR NEAR THE LIMERICK
GENERATING STATION



2B1 SANATOGA SUBSTATION
2E1 LAUGHING WATERS
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 ROAD
28D2 W. CEDARVILLE ROAD
29B1 YOST ROAD
29E1 HIGH SUBSTATION
31D1 LINCOLN SUBSTATION
31D2 POPLAR SUBSTATION
34E1 YARNELL ROAD
35B1 PLEASANTVILLE ROAD
35F1 RINGING ROCKS SUBSTATION

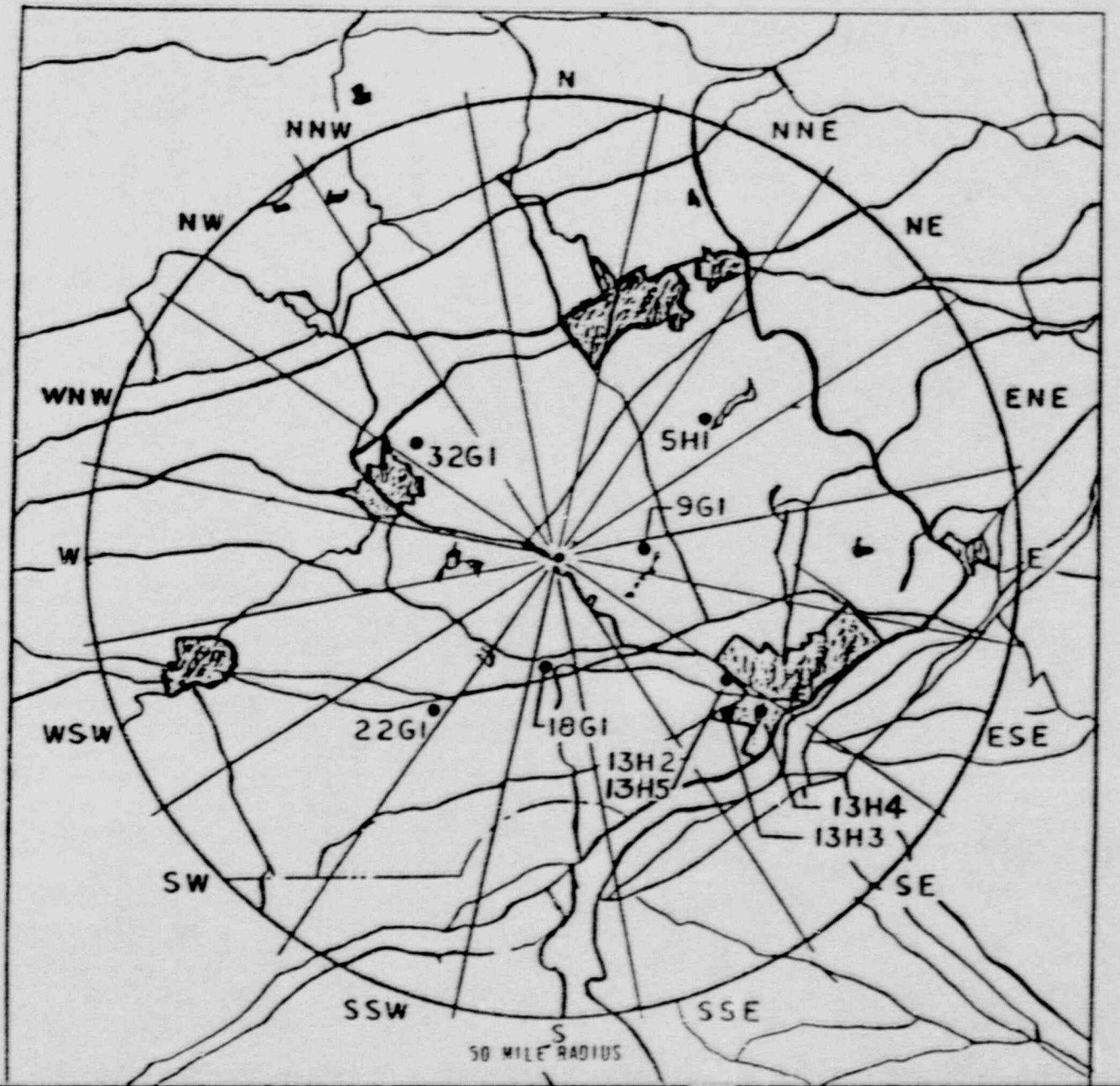
FIGURE B-2
AIRBORNE AND TLD
ENVIRONMENTAL SAMPLING
STATIONS AT INTERMEDIATE
DISTANCES FROM THE LIMERICK
GENERATING STATION



10B1	FARM IN ESE SECTOR
10F2	PERKIOMEN CREEK
11E1	FARM IN ESE SECTOR
13E2	FARM IN SE SECTOR
15F4	PHIL. SUBURBAN WATER CO.
15F5	PHIL. SUBURBAN WATER CO.
15F7	PHOENIXVILLE WATER CO.
16B2	LINFIELD BRIDGE
16C2	CITIZENS HOME WATER CO.
16C5	VINCENT POOL
18A1	ANDERSON ROAD
18C1	FARM IN S SECTOR
19B1	FARM IN SSW SECTOR
21B1	FARM IN SW SECTOR
22C1	FARM IN SW SECTOR
22F1	FARM IN SW SECTOR
25B1	FARM IN WSW SECTOR
28F3	POTTSTOWN WATER AUTHORITY
29C1	VINCENT POOL
36E1	FARM IN N SECTOR

FIGURE B-3

AQUATIC AND TERRESTRIAL ENVIRONMENTAL SAMPLING STATIONS AT INTERMEDIATE DISTANCES FROM THE LIMERICK GENERATING STATION



5H1 BIRCH SUBSTATION

9G1 FARM IN E SECTOR

13H2 BELMONT WATER WORKS

13H3 3508 MARKET ST. PHILA.

13H4 2301 MARKET ST. PHILA.

13H5 BELMONT WATER WORKS

18G1 PLANEBROOK SUBSTATION

22G1 MANOR SUBSTATION

32G1 FRIEDENBERG SUBSTATION

FIGURE B-4
ENVIRONMENTAL SAMPLING STATIONS AT REMOTE DISTANCES FROM THE LIMERICK GENERATING STATION

DATA TABLES

APPENDIX C: DATA TABLES

LIST OF TABLES AND FIGURES

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FIGURES

TABLE C-I CONCENTRATIONS OF GROSS BETA INSOLUBLE IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	10F2	13H5	15F5	16B2	24S1	24S2
JAN 89	1.0 ± 0.5	1.3 ± 0.5	< 0.5	< 0.5	< 0.5	< 0.5
FEB 89	1.0 ± 0.6	1.5 ± 0.6	< 0.5	< 0.5	< 0.5	< 0.5
MAR 89	0.4 ± 0.4	< 0.4	1.6 ± 0.5	0.7 ± 0.5	< 0.4	< 0.4
APR 89	< 0.4	< 0.4	1.2 ± 0.5	0.8 ± 0.4	< 0.4	0.4 ± 0.4
MAY 89	1.0 ± 0.4	0.4 ± 0.4	1.1 ± 0.4	< 0.4	< 0.4	1.4 ± 0.5
JUN 89	1.2 ± 0.5	< 0.5	1.5 ± 0.5	< 0.5	< 0.5	1.4 ± 0.6
JUL 89	1.0 ± 0.4	< 0.4	0.7 ± 0.4	< 0.4	< 0.3	1.8 ± 0.5
AUG 89	0.5 ± 0.5	< 0.4	< 0.5	< 0.4	< 0.4	< 0.4
SEP 89	< 0.6	< 0.6	< 0.6	< 0.5	< 0.6	< 0.5
OCT 89	0.7 ± 0.5	< 0.4	1.5 ± 0.5	2.0 ± 0.6	< 0.4	1.1 ± 0.5
NOV 89	< 0.4	< 0.4	0.6 ± 0.5	0.5 ± 0.5	< 0.4	< 0.4
DEC 89	0.5 ± 0.4	< 0.4	< 0.4	0.5 ± 0.5	< 0.4	1.9 ± 0.6
MEAN	0.7 ± 0.6	0.6 ± 0.8	0.9 ± 0.9	0.6 ± 0.9	< 0.4	0.9 ± 1.2

TABLE C-II CONCENTRATIONS OF GROSS BETA SOLUBLE IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	10F2	13H5	15F5	16B2	[illegible]	24S2
JAN 89	7 ± 1	4 ± 1	6 ± 1	4 ± 1	4 ± 1	4 ± 1
FEB 89	6 ± 1	4 ± 1	5 ± 1	4 ± 1	4 ± 1	4 ± 1
MAR 89	5 ± 1	3 ± 1	5 ± 1	4 ± 1	4 ± 1	3 ± 1
APR 89	5 ± 1	4.0 ± 1.0	4.0 ± 1.0	7 ± 1	4.0 ± 1.0	4 ± 1
MAY 89	7 ± 1	2.7 ± 0.9	4 ± 1	3.0 ± 1.0	3 ± 1	4 ± 1
JUN 89	5 ± 1	4 ± 1	4 ± 1	4 ± 1	4 ± 1	3 ± 1
JUL 89	5 ± 1	4 ± 1	4 ± 1	3 ± 1	4 ± 1	4 ± 1
AUG 89	3.6 ± 0.9	4 ± 1	6 ± 1	6 ± 1	4 ± 1	5 ± 1
SEP 89	4 ± 1	5 ± 1	7 ± 1	8 ± 2	6 ± 1	5 ± 1
OCT 89	8 ± 1	6 ± 1	6 ± 1	9 ± 2	5 ± 1	6 ± 1
NOV 89	4 ± 1	5 ± 1	5 ± 1	3 ± 1	5 ± 1	4 ± 1
DEC 89	5.0 ± 1.0	5 ± 1	5 ± 1	5 ± 1	5 ± 1	5 ± 1
MEAN	5.4 ± 2.7	4.2 ± 1.8	5.1 ± 2.0	5.0 ± 4.1	4.3 ± 1.6	4 ± 2

TABLE C-III CONCENTRATIONS OF TRITIUM IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	10F2	13H5	15F5	16B2	24S1	24S2
JAN-MAR 89	80 ± 40			90 ± 40	80 ± 40	
APR-JUN 89	120 ± 50			110 ± 50	100 ± 50	
JUL-SEP 89	110 ± 50			160 ± 50	< 70	
OCT-DEC 89	130 ± 50			170 ± 50	90 ± 50	
MEAN	110 ± 40			130 ± 80	90 ± 30	

TABLE C-IV CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STATION CODE	COLLECTION PERIOD	K-40	MN-54	CO-58	FE-59	CO-60	ZN-65	ZR-95	NB-95	CS-134	CS-137	BA-140	LA-140	TH-228
10F2	JAN 89	< 6	< 0.3	< 0.3	< 0.6	< 0.3	< 0.6	< 0.6	< 0.3	< 0.3	< 0.3	< 2	< 0.8	< 0.6
	FEB 89	< 4	< 0.2	< 0.3	< 0.6	< 0.3	< 0.5	< 0.5	< 0.3	< 0.2	< 0.2	< 2	< 0.8	< 0.4
	MAR 89	< 6	< 0.3	< 0.3	< 0.8	< 0.3	< 0.7	< 0.8	< 0.4	< 0.3	< 0.4	< 2	< 1.0	< 0.7
	APR 89	< 5	< 0.3	< 0.3	< 0.7	< 0.3	< 0.6	< 0.7	< 0.3	< 0.3	< 0.3	< 2	< 1	< 0.6
	MAY 89	< 5	< 0.3	< 0.4	< 0.9	< 0.4	< 0.7	< 0.8	< 0.4	< 0.3	< 0.3	< 3	< 1	< 0.7
	JUN 89	< 4	< 0.2	< 0.3	< 0.7	< 0.3	< 0.5	< 0.6	< 0.3	< 0.3	< 0.2	< 2	< 1	< 0.4
	JUL 89	< 6	< 0.3	< 0.4	< 0.9	< 0.4	< 0.8	< 0.9	< 0.4	< 0.3	< 0.3	< 4	< 2	< 0.7
	AUG 89	5 ± 4	< 0.3	< 0.4	< 0.9	< 0.3	< 0.6	< 0.8	< 0.4	< 0.3	< 0.3	< 6	< 3	< 0.6
	SEP 89	< 4	< 0.2	< 0.3	< 0.7	< 0.3	< 0.6	< 0.6	< 0.3	< 0.2	< 0.2	< 2	< 1	< 0.4
	OCT 89	< 20	< 0.6	< 0.8	< 2	< 0.7	< 1	< 2	< 0.8	< 0.7	< 0.6	< 8	< 4	< 1
	NOV 89	5 ± 4	< 0.3	< 0.3	< 0.7	< 0.3	< 0.5	< 0.7	< 0.3	< 0.3	< 0.3	< 3	< 1	2 ± 1
	DEC 89	7 ± 5	< 0.3	< 0.3	< 0.7	< 0.3	< 0.6	< 0.7	< 0.4	< 0.3	< 0.3	< 3	< 1	< 0.6
	MEAN	6 ± 9	< 0.3	< 0.4	< 0.9	< 0.4	< 0.6	< 0.8	< 0.4	< 0.3	< 0.3	< 3	< 1.5	0.7 ± 0.9
13H5	JAN 89	7 ± 5	< 0.2	< 0.2	< 0.6	< 0.3	< 0.5	< 0.5	< 0.3	< 0.3	< 0.2	< 1	< 0.7	< 0.4
	FEB 89	< 6	< 0.3	< 0.4	< 0.8	< 0.4	< 0.8	< 0.9	< 0.4	< 0.3	< 0.4	< 2	< 1	< 0.7
	MAR 89	< 6	< 0.3	< 0.3	< 0.8	< 0.3	< 0.6	< 0.7	< 0.3	< 0.4	< 0.4	< 2	< 0.8	< 0.7
	APR 89	< 20	< 0.6	< 0.6	< 2	< 0.6	< 1	< 1	< 0.7	< 0.6	< 0.6	< 4	< 2	< 0.9
	MAY 89	< 20	< 0.6	< 0.7	< 2	< 0.7	< 2	< 2	< 0.8	< 0.7	< 0.7	< 6	< 2	< 1
	JUN 89	5 ± 4	< 0.3	< 0.4	< 0.9	< 0.3	< 0.6	< 0.8	< 0.4	< 0.3	< 0.3	< 4	< 2	< 0.6
	JUL 89	< 4	< 0.3	< 0.4	< 0.9	< 0.4	< 0.6	< 0.8	< 0.4	< 0.3	< 0.3	< 3	< 2	< 0.5
	AUG 89	< 20	< 0.5	< 0.7	< 2	< 0.6	< 1	< 1	< 0.7	< 0.6	< 0.6	< 10	< 6	< 0.8
	SEP 89	< 5	< 0.3	< 0.4	< 0.8	< 0.4	< 0.7	< 0.8	< 0.4	< 0.3	< 0.3	< 4	< 2	< 0.7
	OCT 89	< 6	< 0.3	< 0.4	< 1	< 0.4	< 0.7	< 0.9	< 0.4	< 0.4	< 0.3	< 4	< 2	< 0.7
	NOV 89	< 4	< 0.2	< 0.3	< 0.7	< 0.3	< 0.6	< 0.5	< 0.3	< 0.3	< 0.2	< 2	< 1	< 0.4
	DEC 89	< 8	< 0.6	< 0.5	< 2	< 0.6	< 1	< 1	< 0.6	< 0.5	< 0.5	< 6	< 3	< 1
	MEAN	9 ± 13	< 0.4	< 0.4	< 1.2	< 0.4	< 0.8	< 0.9	< 0.5	< 0.4	< 0.4	< 4	< 2.0	< 0.7
15F5	JAN 89	< 5	< 0.3	< 0.3	< 0.7	< 0.3	< 0.6	< 0.6	< 0.3	< 0.3	< 0.3	< 2	< 0.7	< 0.6
	FEB 89	< 7	< 0.4	< 0.4	< 0.9	< 0.3	< 0.8	< 0.8	< 0.4	< 0.4	< 0.4	< 3	< 1	< 0.7
	MAR 89	< 7	< 0.3	< 0.3	< 0.7	< 0.4	< 0.7	< 0.8	< 0.4	< 0.4	< 0.4	< 2	< 0.9	< 0.7
	APR 89	20 ± 7	< 0.3	< 0.3	< 0.7	< 0.3	< 0.6	< 0.6	< 0.3	< 0.3	< 0.3	< 2	< 0.9	< 0.4
	MAY 89	< 4	< 0.3	< 0.3	< 0.8	< 0.3	< 0.6	< 0.7	< 0.3	< 0.3	< 0.3	< 3	< 1	< 0.4
	JUN 89	< 5	< 0.3	< 0.4	< 0.8	< 0.3	< 0.6	< 0.8	< 0.4	< 0.3	< 0.3	< 4	< 2	< 0.6
	JUL 89	< 5	< 0.3	< 0.4	< 1.0	< 0.4	< 0.7	< 0.8	< 0.5	< 0.4	< 0.3	< 4	< 2	< 0.7
	AUG 89	9 ± 6	< 0.3	< 0.3	< 0.8	< 0.3	< 0.5	< 0.7	< 0.4	< 0.3	< 0.3	< 5	< 3	< 0.4
	SEP 89	< 20	< 0.5	< 0.6	< 1	< 0.5	< 1	< 1	< 0.6	< 0.6	< 0.6	< 5	< 2	< 0.8
	OCT 89	< 5	< 0.3	< 0.3	< 0.8	< 0.3	< 0.6	< 0.7	< 0.3	< 0.3	< 0.3	< 3	< 1	< 0.6
	NOV 89	< 4	< 0.3	< 0.3	< 0.6	< 0.3	< 0.6	< 0.6	< 0.3	< 0.3	< 0.3	< 3	< 1	< 0.6
	DEC 89	5 ± 4	< 0.2	< 0.2	< 0.6	< 0.2	< 0.5	< 0.5	< 0.3	< 0.2	< 0.3	< 2	< 1	< 0.5
	MEAN	8 ± 12	< 0.3	< 0.3	< 0.8	< 0.3	< 0.7	< 0.7	< 0.4	< 0.3	< 0.3	< 3	< 1.4	< 0.6

TABLE C-IV CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STATION CODE	COLLECTION PERIOD	K-40	MN-54	CO-58	FE-59	CO-60	ZN-65	ZR-95	NB-95	CS-134	CS-137	BA-140	LA-140	TH-228
16B2	JAN 89	12 ± 7	< 0.3	< 0.3	< 0.8	< 0.3	< 0.6	< 0.6	< 0.3	< 0.3	< 0.3	< 2	< 0.9	< 0.4
	FEB 89	< 5	< 0.3	< 0.3	< 0.7	< 0.3	< 0.6	< 0.6	< 0.3	< 0.3	< 0.3	< 2	< 0.9	< 0.6
	MAR 89	< 4	< 0.2	< 0.3	< 0.5	< 0.3	< 0.6	< 0.5	< 0.3	< 0.3	< 0.2	< 1	< 0.6	< 0.4
	APR 89	13 ± 6	< 0.3	< 0.3	< 0.8	< 0.4	< 0.6	< 0.6	< 0.3	< 0.3	< 0.3	< 2	< 1	< 0.7
	MAY 89	< 6	< 0.3	< 0.4	< 1.0	< 0.4	< 0.7	< 0.8	< 0.4	< 0.3	< 0.3	< 3	< 2	< 0.7
	JUN 89	< 5	< 0.3	< 0.3	< 0.8	< 0.3	< 0.6	< 0.7	< 0.3	< 0.3	< 0.3	< 3	< 1	< 0.6
	JUL 89	< 7	< 0.4	< 0.4	< 1	< 0.4	< 0.8	< 0.9	< 0.5	< 0.4	< 0.4	< 4	< 2	< 0.7
	AUG 89	< 5	< 0.3	< 0.4	< 1.0	< 0.3	< 0.7	< 0.8	< 0.4	< 0.3	< 0.3	< 6	< 3	< 0.6
	SEP 89	< 5	< 0.3	< 0.3	< 0.7	< 0.3	< 0.6	< 0.7	< 0.4	< 0.3	< 0.3	< 3	< 1	< 0.6
	OCT 89	< 5	< 0.3	< 0.4	< 0.8	< 0.3	< 0.6	< 0.7	< 0.4	< 0.3	< 0.3	< 4	< 2	< 0.4
	NOV 89	< 6	< 0.3	< 0.3	< 0.7	< 0.3	< 0.6	< 0.8	< 0.4	< 0.3	< 0.3	< 3	< 1	< 0.6
	DEC 89	< 4	< 0.3	< 0.3	< 0.7	< 0.3	< 0.6	< 0.6	< 0.3	< 0.3	< 0.3	< 2	< 1	< 0.4
	MEAN	6 ± 6	< 0.3	< 0.3	< 0.8	< 0.3	< 0.6	< 0.7	< 0.4	< 0.3	< 0.3	< 3	< 1.4	< 0.6
24S1	JAN 89	9 ± 8	< 0.3	< 0.3	< 0.7	< 0.4	< 0.7	< 0.6	< 0.4	< 0.3	< 0.4	< 2	< 0.9	< 0.7
	FEB 89	< 4	< 0.2	< 0.3	< 0.6	< 0.3	< 0.5	< 0.5	< 0.3	< 0.3	< 0.3	< 1	< 0.7	< 0.4
	MAR 89	< 5	< 0.3	< 0.3	< 0.6	< 0.3	< 0.5	< 0.6	< 0.3	< 0.3	< 0.3	< 1	< 0.6	< 0.6
	APR 89	< 5	< 0.3	< 0.3	< 0.8	< 0.3	< 0.6	< 0.7	< 0.4	< 0.4	< 0.3	< 2	< 1	< 0.6
	MAY 89	< 20	< 0.5	< 0.6	< 2	< 0.6	< 1	< 1	< 0.7	< 0.6	< 0.5	< 5	< 2	< 0.8
	JUN 89	< 6	< 0.3	< 0.4	< 0.9	< 0.3	< 0.7	< 0.8	< 0.4	< 0.3	< 0.3	< 4	< 2	< 0.6
	JUL 89	< 5	< 0.3	< 0.3	< 0.7	< 0.3	< 0.6	< 0.6	< 0.3	< 0.3	< 0.3	< 3	< 1	< 0.6
	AUG 89	< 5	< 0.4	< 0.5	< 1	< 0.4	< 0.8	< 0.9	< 0.5	< 0.4	< 0.3	< 7	< 3	< 0.7
	SEP 89	< 5	< 0.3	< 0.4	< 0.8	< 0.3	< 0.7	< 0.8	< 0.4	< 0.4	< 0.4	< 3	< 1	< 0.7
	OCT 89	< 6	< 0.3	< 0.4	< 0.9	< 0.4	< 0.8	< 0.8	< 0.4	< 0.3	< 0.4	< 4	< 2	< 0.7
	NOV 89	10 ± 5	< 0.2	< 0.3	< 0.6	< 0.3	< 0.6	< 0.6	< 0.3	< 0.2	< 0.2	< 2	< 0.8	< 0.4
	DEC 89	< 20	< 0.7	< 0.8	< 3	< 1	< 2	< 2	< 0.8	< 0.7	< 0.6	< 5	< 6	< 0.5
	MEAN	8 ± 11	< 0.3	< 0.4	< 1.1	< 0.4	< 0.8	< 0.8	< 0.4	< 0.4	< 0.4	< 3	< 1.8	< 0.6
24S2	JAN 89	< 6	< 0.3	< 0.3	< 0.7	< 0.3	< 0.7	< 0.8	< 0.4	< 0.4	< 0.3	< 2	< 0.9	< 0.6
	FEB 89	< 5	< 0.3	< 0.3	< 0.7	< 0.3	< 0.7	< 0.7	< 0.4	< 0.3	< 0.3	< 2	< 0.8	< 0.6
	MAR 89	7 ± 6	< 0.3	< 0.3	< 0.6	< 0.3	< 0.5	< 0.6	< 0.3	< 0.3	< 0.3	< 1	< 0.5	< 0.6
	APR 89	< 6	< 0.3	< 0.4	< 0.8	< 0.3	< 0.7	< 0.7	< 0.4	< 0.3	< 0.4	< 2	< 1	< 0.7
	MAY 89	< 6	< 0.3	< 0.4	< 0.9	< 0.3	< 0.8	< 0.9	< 0.4	< 0.4	< 0.3	< 4	< 2	< 0.7
	JUN 89	< 5	< 0.2	< 0.3	< 0.7	< 0.3	< 0.6	< 0.7	< 0.3	< 0.3	< 0.3	< 3	< 1	< 0.6
	JUL 89	< 4	< 0.2	< 0.3	< 0.6	< 0.3	< 0.6	< 0.6	< 0.3	< 0.3	< 0.2	< 2	< 1	< 0.4
	AUG 89	8 ± 6	< 0.3	< 0.4	< 1	< 0.3	< 0.6	< 0.8	< 0.5	< 0.3	< 0.3	< 7	< 3	< 0.6
	SEP 89	< 20	< 0.5	< 0.6	< 1	< 0.5	< 1	< 1	< 0.6	< 0.6	< 0.5	< 5	< 2	< 0.8
	OCT 89	9 ± 4	< 0.3	< 0.4	< 0.9	< 0.4	< 0.6	< 0.8	< 0.5	< 0.4	< 0.3	< 4	< 2	< 0.7
	NOV 89	< 20	< 0.5	< 0.6	< 1	< 0.5	< 1	< 1	< 0.6	< 0.6	< 0.6	< 4	< 2	< 0.8
	DEC 89	< 5	< 0.3	< 0.3	< 0.8	< 0.3	< 0.6	< 0.7	< 0.4	< 0.3	< 0.3	< 3	< 1	< 0.6
	MEAN	8 ± 11	< 0.3	< 0.4	< 0.8	< 0.3	< 0.7	< 0.8	< 0.4	< 0.4	< 0.3	< 3	< 1.4	< 0.6
MEAN ALL STATIONS		8 ± 10	< 0.3	< 0.4	< 0.9	< 0.4	< 0.7	< 0.8	< 0.4	< 0.4	< 0.3	< 3	< 1.6	0.6 ± 0.4

TABLE C-V CONCENTRATIONS OF GROSS BETA INSOLUBLE IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	13H2	15F4	15F7	16C2	28F3
JAN 89	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
FEB 89	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
MAR 89	1.3 ± 0.5	1.2 ± 0.5	0.4 ± 0.4	2.0 ± 0.5	0.8 ± 0.4
APR 89	< 0.4	< 0.4	< 0.4	0.5 ± 0.4	< 0.4
MAY 89	0.4 ± 0.4	0.4 ± 0.4	< 0.4	0.5 ± 0.4	< 0.4
JUN 89	< 0.5	< 0.5	< 0.5	0.7 ± 0.5	< 0.5
JUL 89	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
AUG 89	< 0.5	< 0.4	< 0.4	0.6 ± 0.5	< 0.4
SEP 89	< 0.5	< 0.6	< 0.5	< 0.6	< 0.6
OCT 89	< 0.4	< 0.4	< 0.4	0.5 ± 0.4	< 0.4
NOV 89	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
DEC 89	< 0.3	0.5 ± 0.4	< 0.4	< 0.4	< 0.4
MEAN	0.5 ± 0.5	0.5 ± 0.4	0.4 ± 0.1	0.6 ± 0.9	0.5 ± 0.2

TABLE C-VI CONCENTRATIONS OF GROSS BETA SOLUBLE IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	13H2	15F4	15F7	16C2	28F3
JAN 89	5 ± 1	5 ± 1	5 ± 1	4 ± 1	4 ± 1
FEB 89	4 ± 1	4 ± 1	5 ± 1	3 ± 1	4 ± 1
MAR 89	4 ± 1	6 ± 1	5 ± 1	3 ± 1	4 ± 1
APR 89	5 ± 1	5 ± 1	4.0 ± 1.0	4 ± 1	4 ± 1
MAY 89	5 ± 1	5 ± 1	3 ± 1	3 ± 1	6 ± 1
JUN 89	4 ± 1	5 ± 1	4 ± 1	3 ± 1	3 ± 1
JUL 89	6 ± 1	4 ± 1	5 ± 1	5 ± 1	4 ± 1
AUG 89	5 ± 1	6 ± 1	5 ± 1	1.9 ± 0.9	4 ± 1
SEP 89	6 ± 1	5 ± 1	6 ± 2	5 ± 1	7 ± 2
OCT 89	8 ± 1	5 ± 1	5 ± 1	3 ± 1	8 ± 2
NOV 89	5 ± 1	6 ± 2	4 ± 1	3 ± 1	4 ± 1
DEC 89	5 ± 1	5 ± 1	5 ± 1	2.5 ± 0.9	5 ± 1
MEAN	5 ± 2	5 ± 1	4.7 ± 1.6	3.4 ± 1.9	5 ± 3

TABLE C-VII CONCENTRATIONS OF TRITIUM IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	13H2	15F4	15F7	16C2	28F3
JAN-MAR 89	< 50	70 ± 50	70 ± 70	< 40	< 50
APR-JUN 89	80 ± 50	150 ± 50	150 ± 50	120 ± 50	40 ± 30
JUL-SEP 89	130 ± 70	110 ± 40	150 ± 40	110 ± 50	110 ± 50
OCT-DEC 89	70 ± 40	80 ± 60	110 ± 50	100 ± 50	160 ± 50
MEAN	80 ± 70	100 ± 70	120 ± 80	90 ± 70	90 ± 110

TABLE C-VIII CONCENTRATIONS OF GAMMA EMITTERS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STATION CODE	COLLECTION PERIOD	K-40	MN-54	CO-58	FE-59	CO-60	ZN-65	ZR-95	NB-95	CS-134	CS-137	BA-140	LA-140
13H2	JAN 89	< 20	< 0.6	< 0.6	< 1	< 0.6	< 1	< 1	< 0.6	< 0.6	< 0.6	< 2	< 1
	FEB 89	< 5	< 0.3	< 0.3	< 0.6	< 0.3	< 0.6	< 0.6	< 0.3	< 0.3	< 0.3	< 1	< 0.6
	MAR 89	< 6	< 0.3	< 0.3	< 0.7	< 0.3	< 0.6	< 0.7	< 0.4	< 0.3	< 0.3	< 2	< 0.9
	APR 89	< 6	< 0.3	< 0.3	< 0.8	< 0.3	< 0.7	< 0.7	< 0.4	< 0.3	< 0.3	< 3	< 1
	MAY 89	< 4	< 0.3	< 0.3	< 0.7	< 0.3	< 0.6	< 0.7	< 0.3	< 0.3	< 0.3	< 2	< 1
	JUN 89	< 4	< 0.2	< 0.2	< 0.5	< 0.3	< 0.6	< 0.5	< 0.2	< 0.2	< 0.2	< 1	< 0.6
	JUL 89	< 6	< 0.3	< 0.3	< 0.8	< 0.3	< 0.6	< 0.8	< 0.4	< 0.3	< 0.4	< 3	< 1
	AUG 89	< 5	< 0.3	< 0.3	< 0.8	< 0.3	< 0.6	< 0.7	< 0.4	< 0.3	< 0.3	< 4	< 2
	SEP 89	< 6	< 0.3	< 0.4	< 1.0	< 0.3	< 0.7	< 0.9	< 0.4	< 0.4	< 0.3	< 4	< 2
	OCT 89	10 ± 6	< 0.3	< 0.3	< 0.8	< 0.3	< 0.7	< 0.7	< 0.4	< 0.3	< 0.3	< 4	< 2
	NOV 89	< 5	< 0.3	< 0.3	< 0.8	< 0.3	< 0.7	< 0.7	< 0.4	< 0.3	< 0.3	< 3	< 1
	DEC 89	8 ± 6	< 0.3	< 0.3	< 0.7	< 0.3	< 0.6	< 0.7	< 0.3	< 0.3	< 0.3	< 2	< 1.0
	MEAN	7 ± 9	< 0.3	< 0.3	< 0.8	< 0.3	< 0.7	< 0.7	< 0.4	< 0.3	< 0.3	< 3	< 1.2
15F4	JAN 89	5 ± 5	< 0.3	< 0.2	< 0.6	< 0.3	< 0.6	< 0.6	< 0.3	< 0.3	< 0.3	< 1	< 0.5
	FEB 89	< 4	< 0.3	< 0.3	< 0.6	< 0.3	< 0.5	< 0.5	< 0.2	< 0.3	< 0.2	< 1	< 0.6
	MAR 89	< 4	< 0.2	< 0.2	< 0.6	< 0.3	< 0.5	< 0.5	< 0.3	< 0.3	< 0.2	< 1	< 0.5
	APR 89	8 ± 7	< 0.2	< 0.3	< 0.7	< 0.2	< 0.5	< 0.6	< 0.3	< 0.3	< 0.2	< 2	< 1
	MAY 89	< 5	< 0.3	< 0.3	< 0.8	< 0.3	< 0.6	< 0.7	< 0.3	< 0.3	< 0.3	< 3	< 1
	JUN 89	< 5	< 0.3	< 0.3	< 0.7	< 0.3	< 0.6	< 0.7	< 0.3	< 0.3	< 0.3	< 3	< 1
	JUL 89	< 4	< 0.3	< 0.3	< 0.7	< 0.3	< 0.6	< 0.6	< 0.3	< 0.3	< 0.3	< 2	< 1
	AUG 89	< 6	< 0.3	< 0.4	< 0.9	< 0.3	< 0.7	< 0.8	< 0.4	< 0.4	< 0.3	< 5	< 2
	SEP 89	8 ± 5	< 0.3	< 0.4	< 1.0	< 0.3	< 0.6	< 0.7	< 0.4	< 0.3	< 0.3	< 4	< 2
	OCT 89	< 4	< 0.3	< 0.3	< 0.7	< 0.3	< 0.6	< 0.6	< 0.3	< 0.2	< 0.3	< 3	< 1
	NOV 89	< 4	< 0.2	< 0.3	< 0.7	< 0.3	< 0.5	< 0.6	< 0.3	< 0.3	< 0.2	< 2	< 1
	DEC 89	9 ± 6	< 0.3	< 0.3	< 0.7	< 0.3	< 0.6	< 0.7	< 0.3	< 0.3	< 0.3	< 2	< 0.8
	MEAN	6 ± 4	< 0.3	< 0.3	< 0.7	< 0.3	< 0.6	< 0.6	< 0.3	< 0.3	< 0.3	< 2	< 1.0
15F7	JAN 89	< 5	< 0.3	< 0.3	< 0.8	< 0.4	< 0.7	< 0.7	< 0.4	< 0.3	< 0.3	< 3	< 1
	FEB 89	< 6	< 0.3	< 0.3	< 0.7	< 0.3	< 0.6	< 0.7	< 0.4	< 0.3	< 0.3	< 2	< 0.9
	MAR 89	< 5	< 0.3	< 0.3	< 0.7	< 0.3	< 0.6	< 0.6	< 0.3	< 0.3	< 0.3	< 1	< 0.6
	APR 89	8 ± 5	< 0.3	< 0.3	< 0.7	< 0.3	< 0.6	< 0.6	< 0.3	< 0.3	< 0.3	< 3	< 1
	MAY 89	< 4	< 0.3	< 0.3	< 0.7	< 0.3	< 0.6	< 0.7	< 0.3	< 0.3	< 0.3	< 3	< 1
	JUN 89	< 5	< 0.3	< 0.3	< 0.7	< 0.3	< 0.6	< 0.7	< 0.4	< 0.3	< 0.3	< 3	< 1
	JUL 89	< 6	< 0.3	< 0.3	< 0.8	< 0.3	< 0.6	< 0.7	< 0.3	< 0.3	< 0.3	< 3	< 1
	AUG 89	< 5	< 0.3	< 0.4	< 0.9	< 0.4	< 0.7	< 0.8	< 0.5	< 0.3	< 0.4	< 5	< 3
	SEP 89	7 ± 6	< 0.3	< 0.3	< 0.8	< 0.3	< 0.6	< 0.7	< 0.4	< 0.3	< 0.3	< 4	< 2
	OCT 89	< 20	< 0.5	< 0.6	< 2	< 0.6	< 1	< 1	< 0.6	< 0.6	< 0.5	< 6	< 3
	NOV 89	< 20	< 0.5	< 0.6	< 1	< 0.5	< 1	< 1	< 0.7	< 0.5	< 0.5	< 5	< 2
	DEC 89	< 20	< 0.7	< 0.7	< 2	< 1	< 2	< 1	< 0.8	< 0.7	< 0.6	< 3	< 4
	MEAN	9 ± 13	< 0.4	< 0.4	< 1.0	< 0.4	< 0.8	< 0.8	< 0.5	< 0.4	< 0.4	< 3	< 1.7

TABLE C-VIII CONCENTRATIONS OF GAMMA EMITTERS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STATION CODE	COLLECTION PERIOD	K-40	MN-54	CO-58	FE-59	CO-60	ZN-65	ZR-95	NB-95	CS-134	CS-137	BA-140	LA-140
16C2	JAN 89	< 5	< 0.3	< 0.3	< 0.7	< 0.3	< 0.7	< 0.6	< 0.4	< 0.3	< 0.3	< 1	< 0.6
	FEB 89	< 5	< 0.3	< 0.3	< 0.6	< 0.3	< 0.6	< 0.6	< 0.3	< 0.3	< 0.3	< 1	< 0.6
	MAR 89	< 5	< 0.3	< 0.3	< 0.6	< 0.3	< 0.6	< 0.6	< 0.3	< 0.3	< 0.3	< 1	< 0.6
	APR 89	6 ± 6	< 0.3	< 0.3	< 0.7	< 0.3	< 0.6	< 0.7	< 0.3	< 0.3	< 0.3	< 2	< 1
	MAY 89	< 20	< 0.6	< 0.6	< 2	< 0.6	< 1	< 2	< 0.7	< 0.6	< 0.6	< 5	< 2
	JUN 89	< 20	< 0.5	< 0.5	< 1	< 0.6	< 1	< 1	< 0.6	< 0.5	< 0.5	< 3	< 0.9
	JUL 89	< 5	< 0.3	< 0.3	< 0.8	< 0.3	< 0.6	< 0.7	< 0.4	< 0.3	< 0.3	< 3	< 1
	AUG 89	< 5	< 0.3	< 0.3	< 0.8	< 0.3	< 0.6	< 0.8	< 0.4	< 0.3	< 0.3	< 4	< 2
	SEP 89	< 20	< 0.6	< 0.7	< 2	< 0.6	< 1	< 2	< 0.8	< 0.7	< 0.6	< 7	< 3
	OCT 89	7 ± 6	< 0.3	< 0.3	< 0.8	< 0.3	< 0.6	< 0.7	< 0.3	< 0.3	< 0.3	< 3	< 2
	NOV 89	< 5	< 0.3	< 0.3	< 0.7	< 0.3	< 0.6	< 0.7	< 0.3	< 0.3	< 0.3	< 3	< 1
	DEC 89	< 4	< 0.3	< 0.3	< 0.7	< 0.3	< 0.6	< 0.6	< 0.3	< 0.3	< 0.3	< 2	< 0.8
	MEAN	9 ± 13	< 0.4	< 0.4	< 1.0	< 0.4	< 0.7	< 0.9	< 0.4	< 0.4	< 0.4	< 3	< 1.3
28F3	JAN 89	5 ± 5	< 0.2	< 0.3	< 0.6	< 0.4	< 0.6	< 0.6	< 0.3	< 0.3	< 0.3	< 1	< 0.5
	FEB 89	< 20	< 0.6	< 0.7	< 2	< 0.7	< 1	< 1	< 0.7	< 0.7	< 0.7	< 4	< 2
	MAR 89	< 5	< 0.3	< 0.3	< 0.7	< 0.3	< 0.5	< 0.6	< 0.3	< 0.3	< 0.3	< 1	< 0.7
	APR 89	< 5	< 0.3	< 0.3	< 0.7	< 0.3	< 0.6	< 0.7	< 0.3	< 0.3	< 0.3	< 3	< 1
	MAY 89	< 5	< 0.3	< 0.3	< 0.8	< 0.3	< 0.6	< 0.7	< 0.3	< 0.3	< 0.3	< 3	< 1
	JUN 89	< 6	< 0.3	< 0.3	< 0.8	< 0.3	< 0.6	< 0.7	< 0.4	< 0.3	< 0.3	< 3	< 1
	JUL 89	< 5	< 0.3	< 0.3	< 0.8	< 0.3	< 0.6	< 0.7	< 0.4	< 0.3	< 0.3	< 3	< 1
	AUG 89	< 4	< 0.3	< 0.3	< 0.7	< 0.3	< 0.5	< 0.6	< 0.3	< 0.3	< 0.3	< 3	< 2
	SEP 89	12 ± 6	< 0.3	< 0.3	< 0.8	< 0.3	< 0.7	< 0.7	< 0.4	< 0.3	< 0.3	< 4	< 2
	OCT 89	< 5	< 0.3	< 0.3	< 0.8	< 0.3	< 0.6	< 0.7	< 0.4	< 0.3	< 0.3	< 3	< 2
	NOV 89	< 4	< 0.3	< 0.3	< 0.7	< 0.3	< 0.5	< 0.7	< 0.3	< 0.3	< 0.3	< 3	< 1
	DEC 89	< 5	< 0.2	< 0.3	< 0.5	< 0.2	< 0.5	< 0.5	< 0.3	< 0.3	< 0.3	< 2	< 0.7
	MEAN	7 ± 9	< 0.3	< 0.3	< 0.8	< 0.3	< 0.6	< 0.7	< 0.4	< 0.3	< 0.3	< 3	< 1.2
MEAN ALL STATIONS		8 ± 10	< 0.3	< 0.3	< 0.9	< 0.3	< 0.7	< 0.7	< 0.4	< 0.3	< 0.3	< 3	< 1.3

TABLE C-IX CONCENTRAIONS OF GAMMA EMITTERS IN FISH SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

RESULTS IN UNITS OF PCI/GRAM (WET) ± 2 SIGMA

STATION CODE	COLLECTION PERIOD	MEDIA	K-40	MN-54	CO-58	FE-59	CO-60	ZN-65	CS-134	CS-137
16C5	05/23-05/23	BOTTOM FEEDER	3.3 ± 0.3	< 0.002	< 0.002	< 0.006	< 0.003	< 0.006	< 0.002	< 0.002
		PREDATOR	2.8 ± 0.3	< 0.003	< 0.004	< 0.01	< 0.004	< 0.009	< 0.004	< 0.003
	10/12-10/12	PREDATOR	2.9 ± 0.3	< 0.005	< 0.006	< 0.01	< 0.006	< 0.01	< 0.006	< 0.006
	11/07-11/07	BOTTOM FEEDER	2.6 ± 0.3	< 0.002	< 0.002	< 0.006	< 0.002	< 0.005	< 0.002	< 0.002
	MEAN	BOTTOM FEEDER	3.0 ± 1.0	< 0.002	< 0.002	< 0.006	< 0.003	< 0.006	< 0.002	< 0.002
		PREDATOR	2.9 ± 0.1	< 0.0[illegible]	< 0.005	< 0.01	< 0.005	< 0.010	< 0.005	< 0.005
20S1	04/28-05/01	BOTTOM FEEDER	3.4 ± 0.3	< 0.002	< 0.002	< 0.005	< 0.002	< 0.006	< 0.002	0.005 ± 0.004
		PREDATOR	3.9 ± 0.4	< 0.003	< 0.003	< 0.007	< 0.003	< 0.008	< 0.003	< 0.003
	10/03-10/03	BOTTOM FEEDER	3.1 ± 0.3	< 0.004	< 0.005	< 0.01	< 0.004	< 0.01	< 0.004	< 0.005
	10/03-10/05	PREDATOR	2.8 ± 0.3	< 0.004	< 0.004	< 0.01	< 0.004	< 0.01	< 0.005	0.012 ± 0.009
	MEAN	BOTTOM FEEDER	3.3 ± 0.4	< 0.003	< 0.004	< 0.008	< 0.003	< 0.008	< 0.003	0.005 ± 0.000
		PREDATOR	3.4 ± 1.6	< 0.004	< 0.004	< 0.009	< 0.004	< 0.009	< 0.004	0.[illegible] ± 0.013
29C1	05/25-05/25	BOTTOM FEEDER	3.4 ± 0.3	< 0.002	< 0.002	< 0.006	< 0.002	< 0.005	< 0.002	< 0.002
		PREDATOR	3.5 ± 0.3	< 0.002	< 0.003	< 0.007	< 0.003	< 0.006	< 0.003	< 0.003
	11/22-11/22	BOTTOM FEEDER	3.1 ± 0.3	< 0.002	< 0.003	< 0.007	< 0.003	< 0.007	< 0.003	< 0.003
	11/22-11/27	PREDATOR	2.6 ± 0.3	< 0.003	< 0.003	< 0.007	< 0.004	< 0.007	< 0.003	< 0.003
	MEAN	BOTTOM FEEDER	3.3 ± 0.[illegible]	< 0.002	< 0.003	< 0.007	< 0.003	< 0.006	< 0.003	< 0.003
		PREDATOR	3.1 ± 1.3	< 0.003	< 0.003	< 0.007	< 0.004	< 0.007	< 0.003	< 0.003
MEAN ALL STATIONS		BOTTOM FEEDER	3.2 ± 0.6	< 0.002	< 0.003	< 0.007	< 0.003	< 0.007	< 0.003	0.003 ± 0.003
		PREDATOR	3.1 ± 1.0	< 0.003	< 0.004	< 0.009	< 0.004	< 0.008	< 0.004	0.005 ± 0.007

TABLE C-X CONCENTRATIONS OF GAMMA EMITTERS IN SILT SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

RESULTS IN UNITS OF PCI/GRAM (DRY) ± 2 SIGMA

STATION CODE	COLLECTION PERIOD	BE-7	K-40	MN-54	CS-134	CS-137	RA-226	TH-228
16B2	05/26/89	< 0.2	15 ± 2	< 0.02	< 0.02	0.25 ± 0.05	2.2 ± 0.6	1.6 ± 0.2
	10/12/89	< 0.2	11 ± 1	< 0.02	< 0.02	0.13 ± 0.03	1.0 ± 0.5	1.1 ± 0.1
	MEAN	< 0.2	13 ± 6	< 0.02	< 0.02	0.19 ± 0.17	1.6 ± 1.7	1.4 ± 0.7
16C4	05/26/89	2.8 ± 0.4	14 ± 1	0.04 ± 0.04	< 0.02	0.24 ± 0.04	2.0 ± 0.6	1.2 ± 0.1
	10/12/89	< 0.3	9.9 ± 1.0	< 0.03	< 0.03	0.19 ± 0.07	1.0 ± 0.8	1.1 ± 0.1
	MEAN	1.6 ± 3.5	12.0 ± 5.8	0.04 ± 0.01	< 0.03	0.22 ± 0.07	1.5 ± 1.4	1.2 ± 0.1
33A2	05/26/89	< 0.1	9.7 ± 1.0	< 0.010	< 0.01	< 0.01	1.9 ± 0.4	0.91 ± 0.09
	10/12/89	< 0.3	12 ± 1	< 0.02	< 0.02	< 0.02	2.2 ± 0.7	1.0 ± 0.1
	MEAN	< 0.2	10.9 ± 3.3	< 0.015	< 0.02	< 0.02	2.1 ± 0.4	0.96 ± 0.13
MEAN ALL STATIONS		0.7 ± 2.1	11.9 ± 4.4	0.023 ± 0.021	< 0.02	0.14 ± 0.21	1.7 ± 1.1	1.15 ± 0.48

TABLE C-XI CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

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

GROUP I - ON-SITE LOCATIONS

WEEK	1053		1151		1491		3452	
1	23	± 4	25	± 4	25	± 4	31	± 4
2	26	± 4	24	± 4	22	± 4	20	± 4
3	21	± 4	21	± 4	22	± 4	22	± 4
4	29	± 4	27	± 4	26	± 4	31	± 4
5	23	± 4	22	± 4	21	± 4	20	± 4
6	23	± 4	24	± 4	25	± 4	26	± 4
7	25	± 4	22	± 3	25	± 4	24	± 4
8	13	± 3	18	± 3	15	± 3	21	± 3
9	14	± 4	14	± 4	17	± 4	16	± 4
10	20	± 4	20	± 4	21	± 4	28	± 4
11	16	± 4	20	± 4	19	± 4	23	± 4
12	13	± 3	15	± 3	13	± 3	12	± 3
13	11	± 4	11	± 4	11	± 4	6	± 4
14	14	± 4	12	± 3	14	± 4	12	± 4
15	16	± 4	19	± 4	13	± 4	15	± 4
16	18	± 4	17	± 4	29	± 8	20	± 4
17	17	± 4	17	± 4	14	± 4	17	± 4
18	9	± 3	18	± 4	11	± 4	12	± 4
19	9	± 3	9	± 3	6	± 3	10	± 4
20	25	± 4	25	± 4	21	± 3	24	± 4
21	14	± 3	15	± 3	16	± 3	14	± 3
22	22	± 3	25	± 4	25	± 4	24	± 4
23	11	± 3	9	± 3	13	± 3	11	± 3
24	9	± 3	10	± 3	8	± 3	9	± 3
25	8	± 3	11	± 3	9	± 3	11	± 3
26	16	± 4	16	± 4	16	± 4	15	± 4
27	13	± 4	12	± 3	8	± 3	9	± 3
28	17	± 3	17	± 3	17	± 3	20	± 4
29	13	± 3	9	± 3	12	± 3	11	± 3
30	19	± 3	20	± 3	24	± 3	44	± 4
31	21	± 4	19	± 4	21	± 4	20	± 4
32	11	± 3	10	± 3	12	± 3	11	± 3
33	17	± 3	19	± 3	19	± 4	15	± 3
34	15	± 4	16	± 4	14	± 4	24	± 4
35	23	± 4	19	± 4	24	± 4	23	± 4
36	20	± 3	23	± 3	23	± 3	25	± 3
37	10	± 3	12	± 3	12	± 3	12	± 3
38	5	± 3	4	± 3	6	± 3	7	± 3
39	13	± 3	18	± 4	15	± 3	18	± 4
40	17	± 3	17	± 3	14	± 3	17	± 3
41	32	± 4	33	± 4	35	± 4	35	± 4
42	14	± 3	12	± 3	12	± 3	11	± 3
43	43	± 4	46	± 4	43	± 4	43	± 4
44	22	± 3	22	± 4	21	± 3	20	± 3
45	24	± 4	25	± 4	22	± 3	23	± 4
46	21	± 3	23	± 4	22	± 3	24	± 4
47	16	± 3	17	± 3	14	± 3	19	± 3
48	20	± 3	19	± 3	21	± 3	20	± 3
49	20	± 3	20	± 3	22	± 3	22	± 3
50	32	± 4	34	± 4	29	± 4	31	± 4
51	19	± 4	21	± 4	20	± 4	22	± 4
52	19	± 3	18	± 3	19	± 3	18	± 3
MEAN	18	± 14	19	± 14	18	± 14	20	± 16

TABLE C-XI CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

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

GROUP II - INTERMEDIATE DISTANCE LOCATIONS

WEEK	2B1		6C1		9C1		13C1		15D1		17B1	
1	30	± 5	21	± 4	23	± 4	25	± 4	28	± 4	21	± 4
2	26	± 4	26	± 4	20	± 4	23	± 4	35	± 5	23	± 4
3	19	± 4	20	± 4	21	± 4	17	± 4	21	± 4	19	± 4
4	29	± 4	22	± 4	34	± 4	29	± 4	32	± 4	30	± 4
5	26	± 4	20	± 4	20	± 4	22	± 4	22	± 4	20	± 4
6	27	± 4	24	± 4	23	± 4	22	± 4	28	± 4	26	± 4
7	27	± 4	22	± 4	23	± 4	22	± 4	23	± 4	20	± 3
8	21	± 3	17	± 3	18	± 3	16	± 3	15	± 3	15	± 3
9	18	± 4	12	± 4	10	± 4	18	± 4	14	± 4	9	± 4
10	14	± 4	20	± 4	21	± 4	18	± 4	22	± 4	20	± 4
11	15	± 4	19	± 4	18	± 4	17	± 4	21	± 4	21	± 4
12	10	± 3	12	± 3	14	± 3	12	± 3	11	± 3	12	± 3
13	8	± 4	10	± 4	7	± 4	8	± 4	5	± 4	11	± 4
14	17	± 4	17	± 4	16	± 4	15	± 4	15	± 4	15	± 4
15	14	± 4	19	± 4	15	± 4	16	± 4	17	± 4	16	± 4
16	21	± 4	17	± 4	19	± 4	22	± 4	21	± 4	19	± 4
17	13	± 4	14	± 4	16	± 4	15	± 4	14	± 4	18	± 4
18	11	± 3	8	± 3	8	± 3	10	± 3	8	± 3	10	± 4
19	9	± 3	6	± 3	10	± 4	10	± 4	9	± 3	12	± 4
20	20	± 3	20	± 3	23	± 3	21	± 3	19	± 3	20	± 3
21	14	± 3	9	± 3	12	± 3	14	± 3	13	± 3	11	± 3
22	23	± 3	18	± 3	17	± 3	18	± 4	19	± 3	24	± 4
23	9	± 3	11	± 3	8	± 3	11	± 3	11	± 3	11	± 3
24	10	± 3	9	± 3	9	± 3	11	± 3	8	± 3	11	± 3
25	7	± 3	10	± 3	8	± 3	10	± 3	12	± 3	12	± 3
26	15	± 4	15	± 4	16	± 4	14	± 4	17	± 4	13	± 4
27	6	± 3	6	± 3	8	± 3	11	± 3	9	± 3	9	± 3
28	16	± 3	15	± 3	14	± 3	19	± 3	15	± 3	18	± 3
29	10	± 3	12	± 3	11	± 3	12	± 3	12	± 3	10	± 3
30	21	± 3	(1)		21	± 3	19	± 3	22	± 3	19	± 3
31	24	± 4	22	± 4	20	± 4	16	± 4	20	± 4	26	± 4
32	10	± 3	9	± 3	9	± 3	10	± 3	12	± 3	12	± 3
33	16	± 3	14	± 3	20	± 4	20	± 4	20	± 4	20	± 4
34	17	± 4	16	± 4	13	± 4	25	± 4	16	± 4	15	± 4
35	23	± 4	21	± 4	18	± 4	20	± 4	23	± 4	24	± 4
36	23	± 3	20	± 3	24	± 3	22	± 3	22	± 3	22	± 3
37	12	± 3	10	± 3	10	± 3	11	± 3	12	± 4	10	± 3
38	6	± 3	5	± 3	5	± 3	5	± 3	6	± 3	4	± 3
39	15	± 3	15	± 3	17	± 4	15	± 3	16	± 4	17	± 4
40	18	± 3	17	± 3	18	± 3	16	± 3	17	± 3	18	± 3
41	36	± 4	33	± 4	32	± 4	35	± 4	32	± 4	36	± 4
42	13	± 3	10	± 3	11	± 3	12	± 3	12	± 3	15	± 3
43	41	± 4	42	± 4	43	± 4	38	± 4	40	± 4	45	± 4
44	22	± 3	19	± 3	20	± 3	23	± 3	25	± 4	23	± 4
45	22	± 3	21	± 3	22	± 4	18	± 3	23	± 4	20	± 3
46	21	± 3	22	± 4	25	± 4	21	± 3	25	± 4	20	± 3
47	16	± 7	15	± 3	15	± 3	16	± 3	18	± 3	13	± 3
48	18	± 3	16	± 3	18	± 4	19	± 3	19	± 3	17	± 3
49	22	± 3	19	± 3	20	± 3	19	± 3	18	± 3	13	± 3
50	35	± 5	32	± 4	29	± 4	32	± 4	35	± 5	32	± 4
51	18	± 4	18	± 4	19	± 4	19	± 4	19	± 4	15	± 4
52	19	± 3	17	± 3	19	± 3	19	± 3	21	± 3	18	± 3
MEAN	18	± 15	16.9	± 14.0	18	± 15	18	± 13	19	± 15	18	± 15

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

TABLE C-XI CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

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

GROUP II - INTERMEDIATE DISTANCE LOCATIONS

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

TABLE C-XI CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

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

GROUP III - CONTROL LOCATIONS

WEEK	13H4		22G1	
1	28	± 4	23	± 4
2	22	± 3	24	± 4
3	21	± 3	21	± 4
4	29	± 4	30	± 10
5	23	± 3	22	± 4
6	27	± 4	18	± 4
7	21	± 3	21	± 4
8	19	± 3	13	± 3
9	27	± 3	14	± 4
10	21	± 3	19	± 4
11	15	± 3	15	± 4
12	12	± 3	13	± 3
13	13	± 3	6	± 4
14	14	± 3	14	± 4
15	18	± 3	16	± 4
16	23	± 3	20	± 4
17	13	± 3	14	± 4
18	15	± 3	11	± 3
19	11	± 3	9	± 3
20	36	± 4	25	± 4
21	14	± 2	14	± 3
22	25	± 3	25	± 4
23	12	± 3	7	± 3
24	15	± 3	9	± 3
25	14	± 3	9	± 3
26	19	± 3	14	± 4
27	17	± 3	11	± 3
28	17	± 3	14	± 3
29	13	± 3	9	± 3
30	24	± 3	17	± 3
31	23	± 3	20	± 4
32	10	± 3	9	± 3
33	20	± 3	17	± 3
34	21	± 3	14	± 4
35	23	± 3	21	± 4
36	24	± 4	21	± 3
37	15	± 3	9	± 3
38	9	± 3	7	± 3
39	21	± 3	17	± 4
40	18	± 3	18	± 3
41	45	± 4	40	± 4
42	15	± 3	13	± 3
43	46	± 4	44	± 4
44	23	± 3	20	± 3
45	26	± 3	21	± 4
46	28	± 3	22	± 4
47	23	± 3	17	± 3
48	22	± 3	20	± 4
49	23	± 3	21	± 3
50	38	± 4	34	± 5
51	26	± 3	35	± 4
52	22	± 3	21	± 3
MEAN	21	± 16	18	± 16

TABLE C-XII CONCENTRATIONS OF GAMMA EMMITERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

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

GROUP I - SITE LOCATIONS

STATION CODE	COLLECTION PERIOD	BE-7	K-40	CS-134	CS-137
1053	JAN 89	110 ± 20	< 10	< 0.6	< 0.7
	FEB 89	80 ± 10	< 8	< 0.5	< 0.5
	MAR 89	90 ± 20	< 30	< 0.9	< 0.9
	APR 89	120 ± 20	< 20	< 0.7	< 0.6
	MAY 89	80 ± 20	< 10	< 0.7	< 0.7
	JUN 89	80 ± 10	< 7	< 0.5	< 0.3
	JUL 89	90 ± 20	< 9	< 0.5	< 0.6
	AUG 89	90 ± 20	< 10	< 0.6	< 0.7
	SEP 89	80 ± 20	< 10	< 0.6	< 0.5
	OCT 89	90 ± 20	< 10	< 0.8	< 0.6
	NOV 89	90 ± 20	20 ± 10	< 0.6	< 0.7
	DEC 89	80 ± 20	< 10	< 0.6	< 0.6
	MEAN	90 ± 30	13 ± 14	< 0.6	< 0.6
1151	JAN 89	100 ± 20	< 30	< 1	< 1.0
	FEB 89	90 ± 10	20 ± 10	< 0.6	< 0.6
	MAR 89	90 ± 10	< 10	< 0.4	< 0.5
	APR 89	100 ± 20	< 10	< 0.6	< 0.6
	MAY 89	100 ± 30	< 10	< 0.7	< 0.7
	JUN 89	100 ± 20	< 30	< 1	< 0.9
	JUL 89	90 ± 20	< 10	< 0.6	< 0.5
	AUG 89	90 ± 20	< 10	< 0.7	< 0.6
	SEP 89	80 ± 20	< 10	< 0.6	< 0.6
	OCT 89	100 ± 20	< 10	< 0.7	< 0.7
	NOV 89	80 ± 20	< 10	< 0.6	< 0.5
	DEC 89	50 ± 10	14 ± 10	< 0.4	< 0.5
	MEAN	90 ± 30	15 ± 16	< 0.7	< 0.6
1451	JAN 89	100 ± 20	< 10	< 0.5	< 0.6
	FEB 89	90 ± 10	< 20	< 0.7	< 0.6
	MAR 89	80 ± 30	< 30	< 1.0	< 0.8
	APR 89	100 ± 20	< 10	< 0.7	< 0.6
	MAY 89	80 ± 10	< 10	< 0.5	< 0.5
	JUN 89	110 ± 20	20 ± 10	< 0.5	< 0.6
	JUL 89	90 ± 10	< 8	< 0.4	< 0.4
	AUG 89	90 ± 20	< 10	< 0.7	< 0.7
	SEP 89	80 ± 20	30 ± 10	< 0.5	< 0.5
	OCT 89	90 ± 20	< 10	< 0.6	< 0.6
	NOV 89	60 ± 10	< 10	< 0.7	< 0.6
	DEC 89	60 ± 20	< 9	< 0.5	< 0.4
	MEAN	90 ± 30	15 ± 16	< 0.6	< 0.6
3452	JAN 89	100 ± 20	< 10	< 0.6	< 0.5
	FEB 89	90 ± 20	< 40	< 1	< 1
	MAR 89	90 ± 10	< 10	< 0.6	< 0.5
	APR 89	100 ± 10	< 9	< 0.5	< 0.5
	MAY 89	80 ± 20	20 ± 10	< 0.6	< 0.6
	JUN 89	70 ± 20	20 ± 10	< 0.6	< 0.4
	JUL 89	80 ± 30	< 30	< 1	< 1.0
	AUG 89	100 ± 10	< 8	< 0.6	< 0.4
	SEP 89	80 ± 10	13 ± 9	< 0.4	< 0.4
	OCT 89	100 ± 30	< 40	< 1	< 1
	NOV 89	90 ± 10	< 10	< 0.6	< 0.5
	DEC 89	60 ± 10	< 6	< 0.4	< 0.4
	MEAN	90 ± 30	18 ± 25	< 0.7	< 0.6
MEAN GROUP I		90 ± 30	15 ± 18	< 0.6	< 0.6

TABLE C-XII CONCENTRATIONS OF GAMMA EMMITERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

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

GROUP II - NEAR SITE LOCATIONS

STATION CODE	COLLECTION PERIOD	BE-7	K-40	CS-134	CS-137
2B1	JAN 89	100 ± 10	< 9	< 0.5	< 0.5
	FEB 89	100 ± 20	< 10	< 0.6	< 0.6
	MAR 89	80 ± 20	< 10	< 0.5	< 0.5
	APR 89	110 ± 20	< 20	< 0.7	< 0.6
	MAY 89	90 ± 20	< 10	< 0.7	< 0.5
	JUN 89	80 ± 10	< 10	< 0.5	< 0.4
	JUL 89	100 ± 20	< 10	< 0.6	< 0.6
	AUG 89	80 ± 20	< 40	< 1	< 1
	SEP 89	70 ± 30	< 30	< 0.9	< 0.9
	OCT 89	90 ± 20	30 ± 10	< 0.6	< 0.7
	NOV 89	50 ± 20	< 50	< 2	< 1
	DEC 89	110 ± 20	< 10	< 0.6	< 0.5
	MEAN	90 ± 30	20 ± 28	< 0.8	< 0.7
6C1	JAN 89	100 ± 20	< 10	< 0.5	< 0.5
	FEB 89	80 ± 20	< 10	< 0.6	< 0.6
	MAR 89	80 ± 10	< 8	< 0.4	< 0.4
	APR 89	120 ± 20	30 ± 10	< 0.6	< 0.7
	MAY 89	80 ± 20	< 10	< 0.6	< 0.6
	JUN 89	70 ± 10	< 7	< 0.4	< 0.4
	JUL 89	90 ± 20	< 20	< 0.8	< 0.7
	AUG 89	70 ± 20	< 10	< 0.7	< 0.8
	SEP 89	90 ± 20	< 10	< 0.5	< 0.5
	OCT 89	90 ± 20	< 10	< 0.6	< 0.5
	NOV 89	90 ± 20	< 10	< 0.7	< 0.6
	DEC 89	70 ± 20	< 20	< 1.0	< 0.9
	MEAN	90 ± 30	14 ± 16	< 0.6	< 0.6
9C1	JAN 89	100 ± 10	< 9	< 0.5	< 0.5
	FEB 89	100 ± 20	12 ± 9	< 0.6	< 0.5
	MAR 89	80 ± 20	< 30	< 0.8	< 0.8
	APR 89	110 ± 20	< 10	< 0.5	< 0.6
	MAY 89	70 ± 20	< 9	< 0.6	< 0.5
	JUN 89	90 ± 20	< 30	< 0.9	< 1.0
	JUL 89	80 ± 20	< 10	< 0.6	< 0.5
	AUG 89	90 ± 20	< 10	< 0.5	< 0.6
	SEP 89	70 ± 20	< 9	< 0.6	< 0.5
	OCT 89	80 ± 20	< 10	< 0.6	< 0.6
	NOV 89	100 ± 20	20 ± 20	< 0.6	< 0.7
	DEC 89	70 ± 20	< 10	< 0.6	< 0.6
	MEAN	90 ± 30	14 ± 16	< 0.6	< 0.6
13C1	JAN 89	130 ± 10	10 ± 10	< 0.5	< 0.4
	FEB 89	90 ± 20	10 ± 10	< 0.5	< 0.5
	MAR 89	29 ± 4	4 ± 3	< 0.1	< 0.1
	APR 89	110 ± 20	< 9	< 0.5	< 0.5
	MAY 89	70 ± 20	< 40	< 1	< 1
	JUN 89	80 ± 10	< 10	< 0.5	< 0.6
	JUL 89	90 ± 10	< 9	< 0.5	< 0.5
	AUG 89	80 ± 10	< 10	< 0.6	< 0.5
	SEP 89	70 ± 10	< 9	< 0.6	< 0.5
	OCT 89	90 ± 20	< 8	< 0.5	< 0.5
	NOV 89	70 ± 10	< 10	< 0.6	< 0.6
	DEC 89	50 ± 20	< 9	< 0.5	< 0.5
	MEAN	80 ± 52	12 ± 18	< 0.5	< 0.5

TABLE C-XII CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

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

GROUP II - NEAR SITE LOCATIONS

STATION CODE	COLLECTION PERIOD	BE-7	K-40	CS-134	CS-137
15D1	JAN 89	110 ± 20	< 10	< 0.7	< 0.6
	FEB 89	100 ± 20	20 ± 20	< 0.7	< 0.6
	MAR 89	80 ± 20	< 30	< 0.8	< 0.8
	APR 89	90 ± 20	< 40	< 1	< 1
	MAY 89	90 ± 20	< 10	< 0.7	< 0.7
	JUN 89	80 ± 10	< 10	< 0.4	< 0.6
	JUL 89	90 ± 20	< 7	< 0.4	< 0.5
	AUG 89	80 ± 20	< 9	< 0.5	< 0.5
	SEP 89	50 ± 10	< 6	< 0.5	< 0.4
	OCT 89	90 ± 30	< 40	< 1	< 1
	NOV 89	80 ± 20	< 40	< 1	< 1
	DEC 89	60 ± 10	< 9	< 0.6	< 0.4
	MEAN	80 ± 30	19 ± 28	< 0.7	< 0.7
17B1	JAN 89	110 ± 20	< 40	< 1	< 1
	FEB 89	80 ± 30	< 30	< 1.0	< 1.0
	MAR 89	70 ± 10	< 7	< 0.4	< 0.3
	APR 89	110 ± 20	< 10	< 0.6	< 0.7
	MAY 89	60 ± 20	< 10	< 0.6	< 0.6
	JUN 89	70 ± 10	< 9	< 0.5	< 0.5
	JUL 89	110 ± 20	< 40	< 1	< 1
	AUG 89	60 ± 30	< 40	< 1	< 1
	SEP 89	70 ± 20	< 30	< 1.0	< 0.8
	OCT 89	80 ± 20	< 20	< 0.7	< 0.7
	NOV 89	80 ± 20	< 9	< 0.7	< 0.6
	DEC 89	60 ± 20	< 10	< 0.7	< 0.6
	MEAN	80 ± 40	< 21	< 0.8	< 0.7
20D1	JAN 89	110 ± 10	< 10	< 0.6	< 0.5
	FEB 89	100 ± 10	17 ± 10	< 0.5	< 0.5
	MAR 89	80 ± 10	< 10	< 0.5	< 0.5
	APR 89	110 ± 20	< 10	< 0.5	< 0.6
	MAY 89	80 ± 20	< 10	< 0.6	< 0.6
	JUN 89	90 ± 10	< 9	< 0.5	< 0.4
	JUL 89	90 ± 20	20 ± 20	< 0.7	< 0.7
	AUG 89	80 ± 20	< 10	< 0.8	< 0.7
	SEP 89	70 ± 20	< 10	< 0.6	< 0.5
	OCT 89	80 ± 20	< 10	< 0.7	< 0.6
	NOV 89	130 ± 20	< 20	< 0.8	< 0.9
	DEC 89	80 ± 20	40 ± 20	< 1	< 0.9
	MEAN	90 ± 30	15 ± 18	< 0.7	< 0.6
26B1	JAN 89	100 ± 10	< 9	< 0.6	< 0.4
	FEB 89	90 ± 20	< 10	< 0.5	< 0.6
	MAR 89	80 ± 10	< 10	< 0.5	< 0.5
	APR 89	110 ± 20	10 ± 10	< 0.6	< 0.5
	MAY 89	90 ± 10	20 ± 10	< 0.5	< 0.5
	JUN 89	80 ± 10	< 7	< 0.4	< 0.4
	JUL 89	100 ± 20	< 10	< 0.7	< 0.5
	AUG 89	70 ± 20	< 10	< 0.6	< 0.6
	SEP 89	70 ± 20	< 9	< 0.6	< 0.5
	OCT 89	80 ± 20	20 ± 10	< 0.6	< 0.5
	NOV 89	70 ± 30	< 40	< 1	< 1
	DEC 89	50 ± 10	< 9	< 0.5	< 0.5
	MEAN	80 ± 30	14 ± 19	< 0.6	< 0.5

TABLE C-XII CONCENTRATIONS OF GAMMA EMMITERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

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

GROUP II - NEAR SITE LOCATIONS

STATION CODE	COLLECTION PERIOD	BE-7	K-40	CS-134	CS-137
29B1	JAN 89	100 ± 30	< 20	< 1	< 1
	FEB 89	70 ± 20	< 20	< 0.7	< 0.6
	MAR 89	70 ± 10	< 8	< 0.5	< 0.4
	APR 89	110 ± 10	< 9	< 0.5	< 0.4
	MAY 89	90 ± 30	< 40	< 1	< 1
	JUN 89	80 ± 20	< 30	< 0.8	< 0.8
	JUL 89	90 ± 20	< 10	< 0.6	< 0.5
	AUG 89	100 ± 20	< 10	< 0.6	< 0.6
	SEP 89	60 ± 20	< 9	< 0.5	< 0.5
	OCT 89	90 ± 30	< 40	< 1	< 1
	NOV 89	80 ± 20	< 10	< 0.8	< 0.7
	DEC 89	60 ± 10	10 ± 10	< 0.5	< 0.5
	MEAN	80 ± 30	18 ± 24	< 0.7	< 0.7
31D1	JAN 89	100 ± 20	< 10	< 0.6	< 0.7
	FEB 89	90 ± 20	< 8	< 0.5	< 0.5
	MAR 89	100 ± 10	< 9	< 0.5	< 0.5
	APR 89	90 ± 20	< 30	< 1.0	< 1.0
	MAY 89	70 ± 20	< 10	< 0.5	< 0.6
	JUN 89	80 ± 10	< 10	< 0.6	< 0.6
	JUL 89	100 ± 20	< 8	< 0.5	< 0.4
	AUG 89	80 ± 20	20 ± 10	< 0.5	< 0.6
	SEP 89	60 ± 10	20 ± 10	< 0.4	< 0.4
	OCT 89	80 ± 20	< 10	< 0.7	< 0.6
	NOV 89	80 ± 20	< 10	< 0.5	< 0.6
	DEC 89	60 ± 20	< 7	< 0.5	< 0.4
	MEAN	80 ± 30	13 ± 14	< 0.6	< 0.6
35B1	JAN 89	100 ± 20	50 ± 20	< 1	< 1
	FEB 89	100 ± 20	< 10	< 0.5	< 0.5
	MAR 89	100 ± 20	< 20	< 0.9	< 0.8
	APR 89	100 ± 20	20 ± 10	< 0.7	< 0.7
	MAY 89	90 ± 20	< 10	< 0.6	< 0.5
	JUN 89	70 ± 10	< 10	< 0.5	< 0.5
	JUL 89	80 ± 30	< 40	< 1	< 1
	AUG 89	100 ± 20	8 ± 6	< 0.5	< 0.5
	SEP 89	70 ± 20	< 30	< 0.9	< 0.9
	OCT 89	90 ± 20	< 9	< 0.6	< 0.6
	NOV 89	70 ± 20	< 10	< 0.7	< 0.6
	DEC 89	100 ± 20	< 10	< 0.6	< 0.6
	MEAN	90 ± 30	19 ± 28	< 0.7	< 0.7
MEAN GROUP II		85 ± 34	16 ± 22	< 0.7	< 0.6

TABLE C-XII CONCENTRATIONS OF GAMMA EMMITERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

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

GROUP III - CONTROL LOCATIONS

STATION CODE	COLLECTION PERIOD	BE-7	K-40	CS-134	CS-137
13H4	JAN 89	90 ± 10	20 ± 20	< 0.7	< 0.7
	FEB 89	90 ± 30	< 10	< 0.6	< 0.6
	MAR 89	70 ± 20	30 ± 20	< 0.9	< 0.9
	APR 89	60 ± 10	8 ± 8	< 0.4	< 0.4
	MAY 89	90 ± 20	< 10	< 0.6	< 0.6
	JUN 89	90 ± 20	< 10	< 0.6	< 0.6
	JUL 89	110 ± 20	< 10	< 0.6	< 0.5
	AUG 89	90 ± 20	< 10	< 0.6	< 0.6
	SEP 89	70 ± 10	< 8	< 0.5	< 0.4
	OCT 89	110 ± 20	< 10	< 0.6	< 0.6
	NOV 89	44 ± 9	< 5	< 0.3	< 0.3
	DEC 89	70 ± 10	< 7	< 0.5	< 0.4
	MEAN	82 ± 39	12 ± 14	< 0.6	< 0.6
22G1	JAN 89	100 ± 20	< 10	< 0.7	< 0.6
	FEB 89	90 ± 20	20 ± 10	< 0.6	< 0.6
	MAR 89	90 ± 10	< 10	< 0.5	< 0.5
	APR 89	110 ± 20	20 ± 20	< 0.6	< 0.7
	MAY 89	90 ± 10	< 10	< 0.6	< 0.5
	JUN 89	80 ± 10	< 10	< 0.5	< 0.4
	JUL 89	80 ± 20	< 10	< 0.5	< 0.6
	AUG 89	80 ± 30	< 40	< 1	< 1
	SEP 89	70 ± 20	< 10	< 0.4	< 0.5
	OCT 89	110 ± 30	< 40	< 1	< 1
	NOV 89	90 ± 20	< 9	< 0.6	< 0.6
	DEC 89	50 ± 30	< 30	< 0.9	< 0.9
	MEAN	90 ± 30	18 ± 24	< 0.7	< 0.7
MEAN GROUP III		84 ± 36	15 ± 20	< 0.6	< 0.6

TABLE C-XIII CONCENTRATIONS OF I-131 IN AIR IODINE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

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

	GROUP I			GROUP II			GROUP III	
WEEK	10S3	11S1	14S1	13C1	31D1	35B1	13H4	22G1
1	< 9	< 9	< 9	< 8	< 8	< 8	< 10	< 9
2	< 10	< 10	< 10	< 10	< 10	< 9	< 20	< 10
3	< 9	< 9	< 9	< 9	< 9	< 9	< 30	< 9
4	< 10	< 10	< 10	< 9	< 9	< 8	< 10	< 30
5	< 10	< 10	< 10	< 9	< 9	< 8	< 20	< 10
6	< 10	< 10	< 10	< 10	< 10	< 9	< 30	< 10
7	< 9	< 9	< 9	< 9	< 9	< 7	< 4	< 9
8	< 10	< 10	< 10	< 9	< 9	< 8	< 8	< 10
9	< 10	< 10	< 10	< 10	< 10	< 10	< 20	< 20
10	< 9	< 9	< 9	< 9	< 8	< 10	< 7	< 10
11	< 10	< 10	< 10	< 10	< 8	< 9	< 10	< 10
12	< 8	< 8	< 8	< 8	< 7	< 7	< 7	< 7
13	< 10	< 10	< 10	< 10	< 10	< 10	< 20	< 10
14	< 10	< 10	< 10	< 10	< 8	< 10	< 10	< 10
15	< 10	< 10	< 10	< 10	< 9	< 10	< 10	< 10
16	< 9	< 9	< 20	< 9	< 6	< 10	< 20	< 10
17	< 10	< 10	< 10	< 10	< 8	< 8	< 8	< 8
18	< 9	< 9	< 9	< 9	< 7	< 10	< 20	< 10
19	< 10	< 10	< 10	< 10	< 9	< 10	< 10	< 10
20	< 10	< 10	< 10	< 10	< 8	< 8	< 10	< 8
21	< 10	< 10	< 10	< 10	< 9	< 10	< 9	< 10
22	< 9	< 9	< 10	< 10	< 8	< 10	< 20	< 10
23	< 10	< 10	< 10	< 10	< 9	< 9	< 9	< 9
24	< 9	< 9	< 9	< 9	< 7	< 7	< 10	< 8
25	< 10	< 10	< 10	< 10	< 9	< 6	< 9	< 8
26	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
27	< 10	< 10	< 10	< 10	< 8	< 10	< 8	< 10
28	< 10	< 10	< 10	< 10	< 9	< 10	< 9	< 10
29	< 10	< 10	< 10	< 10	< 8	< 9	< 6	< 9
30	< 10	< 10	< 10	< 9	< 8	< 8	< 8	< 9
31	< 10	< 10	< 10	< 10	< 8	< 8	< 10	< 8
32	< 9	< 9	< 9	< 9	< 7	< 8	< 20	< 8
33	< 10	< 10	< 10	< 10	< 8	< 10	< 10	< 10
34	< 10	< 10	< 20	< 10	< 10	< 10	< 8	< 10
35	< 10	< 10	< 10	< 10	< 8	< 9	< 8	< 9
36	< 8	< 9	< 9	< 8	< 7	< 9	< 20	< 7
37	< 10	< 10	< 10	< 10	< 9	< 30	< 10	< 30
38	< 10	< 10	< 10	< 10	< 8	< 9	< 20	< 9
39	< 20	< 20	< 20	< 10	< 9	< 10	< 10	< 10
40	< 10	< 10	< 10	< 10	< 9	< 9	< 7	< 10
41	< 9	< 9	< 30	< 10	< 10	< 10	< 20	< 9
42	< 10	< 10	< 10	< 10	< 8	< 8	< 10	< 9
43	< 7	< 7	< 8	< 9	< 10	< 10	< 10	< 8
44	< 10	< 10	< 10	< 10	< 8	< 10	< 20	< 10
45	< 10	< 10	< 10	< 9	< 8	< 9	< 10	< 9
46	< 8	< 8	< 8	< 7	< 6	< 6	< 8	< 6
47	< 20	< 20	< 10	< 20	< 10	< 10	< 20	< 10
48	< 10	< 10	< 10	< 10	< 10	< 30	< 10	< 20
49	< 10	< 10	< 10	< 10	< 9	< 20	< 10	< 20
50	< 10	< 10	< 10	< 10	< 10	< 10	< 9	< 10
51	< 20	< 20	< 20	< 20	< 10	< 10	< 20	< 10
52	< 8	< 8	< 8	< 8	< 5	< 10	< 20	< 10
MEAN	< 10	< 10	< 11	< 10	< 9	< 10	< 13	< 11

TABLE C-XIV CONCENTRATIONS OF I-131 IN MILK SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

INDICATOR FARMS

COLLECTION DATE	10B1	11E1	13E2	18C1	19B1	21B1	22C1	25B1
01/10/89	< 0.04	< 0.06	< 0.05	< 0.03		< 0.05	< 0.04	< 0.03
02/14/89	< 0.04	< 0.04	< 0.04	< 0.04		< 0.03	< 0.03	< 0.03
03/14/89	< 0.06	< 0.07	< 0.05	< 0.07		< 0.05	< 0.06	< 0.06
04/11/89	< 0.06	< 0.04	< 0.04	< 0.04		< 0.03	< 0.03	< 0.03
04/25/89	< 0.03					< 0.03		< 0.03
05/09/89	< 0.04	< 0.04	< 0.05	< 0.05		< 0.04	< 0.04	< 0.03
05/23/89	< 0.03					< 0.04		< 0.03
06/06/89	< 0.06	< 0.07	< 0.06	< 0.07		< 0.07	< 0.06	< 0.05
06/20/89	< 0.04				< 0.05	< 0.04		< 0.03
07/04/89	< 0.06	< 0.09	< 0.07	< 0.06	< 0.07	< 0.07	< 0.07	< 0.05
07/18/89					< 0.04	< 0.04		< 0.03
07/19/89	< 0.03							
08/01/89	< 0.04	< 0.07	< 0.06	< 0.04	< 0.06	< 0.05	< 0.05	< 0.04
08/15/89	< 0.03				< 0.05	< 0.04		< 0.03
08/29/89	< 0.03				< 0.04	< 0.04		< 0.02
09/13/89	< 0.04	< 0.07	< 0.06	< 0.04	< 0.06	< 0.05	< 0.06	< 0.04
09/26/89	< 0.04				< 0.05	< 0.05		< 0.05
10/10/89	< 0.03	< 0.05	< 0.03	< 0.03	< 0.04	< 0.04	< 0.04	< 0.03
10/24/89	< 0.03				< 0.04	< 0.03		< 0.03
11/07/89	< 0.05	< 0.09	< 0.05	< 0.06	< 0.08	< 0.06	< 0.07	< 0.06
11/21/89	< 0.05				< 0.06	< 0.06		< 0.04
12/05/89	< 0.05	< 0.08	< 0.06	< 0.05	< 0.07	< 0.06	< 0.06	< 0.05
MEAN	< 0.04	< 0.06	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.04

CONTROL FARMS

COLLECTION DATE	36E1	9G1	22F1
01/10/89	< 0.08	< 0.05	< 0.06
02/14/89	< 0.05	< 0.07	< 0.05
03/14/89	< 0.06	< 0.08	< 0.09
04/11/89	< 0.05	< 0.07	< 0.05
04/25/89			< 0.05
05/09/89	< 0.07	< 0.09	< 0.06
05/23/89			< 0.05
06/06/89	< 0.09	< 0.09	< 0.09
06/20/89			< 0.06
07/04/89	< 0.09	< 0.06	< 0.10
07/18/89			< 0.05
08/01/89	< 0.08	< 0.05	< 0.07
08/15/89			< 0.06
08/29/89			< 0.03
09/13/89	< 0.08	< 0.05	< 0.07
09/26/89			< 0.06
10/10/89	< 0.07	< 0.03	< 0.05
10/24/89			< 0.05
11/07/89	< 0.07	< 0.04	< 0.09
11/21/89			< 0.07
12/05/89	< 0.09	< 0.05	< 0.08
MEAN	< 0.07	< 0.06	< 0.06

NOTE: STATION 10B1 IS A GOAT MILK

TABLE C-XV CONCENTRATIONS OF GAMMA EMMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

INDICATOR FARMS

STATION CODE	COLLECTION DATE	K-40	CS-134	CS-137	BA-140	LA-140
10B1	01/10-01/10	1100 ± 100	< 3	< 3	< 7	< 3
	02/14-02/14	1300 ± 100	< 2	6 ± 3	< 4	< 2
	03/14-03/14	1400 ± 100	< 2	< 2	< 4	< 2
	04/11-04/11	1600 ± 200	< 2	3 ± 2	< 4	< 2
	04/25-04/25	1500 ± 100	< 1	3 ± 2	< 4	< 2
	05/09-05/09	1200 ± 100	< 3	< 3	< 8	< 4
	05/23-05/23	1500 ± 200	< 3	7 ± 5	< 6	< 3
	06/06-06/06	1400 ± 100	< 1	3 ± 3	< 4	< 2
	06/20-06/20	1900 ± 200	< 3	< 3	< 10	< 4
	07/04-07/04	1700 ± 200	< 3	< 3	< 8	< 3
	07/19-07/19	1900 ± 200	< 2	< 2	< 5	< 2
	08/01-08/01	1300 ± 100	< 3	< 3	< 10	< 5
	08/15-08/15	1500 ± 100	< 2	< 2	< 6	< 2
	08/29-08/29	1700 ± 200	< 2	< 2	< 7	< 3
	09/13-09/13	1900 ± 200	< 2	4 ± 3	< 5	< 2
	09/26-09/26	1700 ± 200	< 2	< 2	< 6	< 2
	10/10-10/10	1600 ± 200	< 2	< 2	< 5	< 3
	10/24-10/24	1400 ± 100	< 2	< 2	< 6	< 3
	11/07-11/07	1500 ± 200	< 2	4 ± 3	< 6	< 3
	11/21-11/21	1600 ± 200	< 2	< 2	< 6	< 2
	12/05-12/05	1600 ± 200	< 2	4 ± 3	< 6	< 2
	MEAN	1538 ± 440	< 2	3 ± 3	< 6	< 3
11E1	01/10-01/10	1200 ± 100	< 3	< 3	< 9	< 4
	04/11-04/11	1200 ± 100	< 3	< 3	< 8	< 4
	07/04-07/04	1200 ± 100	< 3	< 3	< 8	< 4
	10/10-10/10	1400 ± 100	< 2	< 2	< 6	< 3
	MEAN	1250 ± 200	< 3	< 3	< 8	< 4
13E2	01/10-01/10	1500 ± 100	< 2	< 2	< 6	< 3
	04/11-04/11	1400 ± 100	< 2	< 2	< 5	< 2
	07/04-07/04	1400 ± 100	< 2	< 2	< 6	< 3
	10/10-10/10	1600 ± 200	< 2	< 2	< 7	< 3
	MEAN	1475 ± 191	< 2	< 2	< 6	< 3
18C1	01/10-01/10	1400 ± 100	< 2	< 2	< 6	< 3
	04/11-04/11	1300 ± 100	< 2	< 2	< 5	< 2
	07/04-07/04	1300 ± 100	< 2	< 2	< 5	< 2
	10/10-10/10	1600 ± 200	< 2	< 2	< 5	< 2
	MEAN	1400 ± 283	< 2	< 2	< 5	< 2
19B1	06/20-06/20	1400 ± 100	< 2	< 2	< 6	< 2
	07/04-07/04	1300 ± 100	< 2	< 2	< 6	< 3
	07/18-07/18	1300 ± 100	< 2	< 2	< 6	< 2
	08/01-08/01	1300 ± 100	< 2	< 2	< 5	< 3
	08/15-08/15	1100 ± 100	< 2	< 2	< 6	< 2
	08/29-08/29	1300 ± 100	< 2	< 2	< 6	< 3
	09/13-09/13	1300 ± 100	< 2	< 2	< 5	< 3
	09/26-09/26	1200 ± 100	< 2	< 2	< 6	< 3
	10/10-10/10	1200 ± 100	< 2	< 2	< 6	< 3
	10/24-10/24	1400 ± 100	< 2	< 2	< 6	< 3
	11/07-11/07	1300 ± 100	< 2	< 2	< 6	< 3
	11/21-11/21	1000 ± 100	< 3	< 3	< 9	< 4
	12/05-12/05	1200 ± 100	< 3	< 3	< 9	< 4
	MEAN	1254 ± 225	< 2	< 2	< 6	< 3

TABLE C-XV CONCENTRATIONS OF GAMMA EMMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

INDICATOR FARMS

STATION CODE	COLLECTION DATE	K-40	CS-134	CS-137	BA-140	LA-140
21B1	01/10-01/10	1500 ± 200	< 2	< 2	< 5	< 3
	02/14-02/14	1400 ± 100	< 2	< 2	< 200	< 90
	03/14-03/14	1500 ± 100	< 2	< 2	< 40	< 20
	04/11-04/11	1100 ± 100	< 2	< 2	< 6	< 3
	04/25-04/25	1000 ± 100	< 2	< 3	< 7	< 3
	05/09-05/09	1500 ± 100	< 2	< 2	< 5	< 2
	05/23-05/23	1400 ± 100	< 2	< 2	< 4	< 2
	06/06-06/06	1300 ± 100	< 1	< 1	< 3	< 2
	06/20-06/20	1300 ± 100	< 1	< 1	< 4	< 2
	07/04-07/04	1500 ± 100	< 2	< 2	< 5	< 2
	07/18-07/18	1300 ± 100	< 2	< 2	< 5	< 2
	08/01-08/01	1400 ± 100	< 2	< 2	< 5	< 2
	08/15-08/15	1400 ± 100	< 2	< 2	< 5	< 2
	08/29-08/29	1300 ± 100	< 2	< 2	< 6	< 3
	09/13-09/13	1400 ± 100	< 2	< 2	< 5	< 2
	09/26-09/26	1300 ± 100	< 2	< 2	< 6	< 2
	10/10-10/10	1300 ± 100	< 2	< 2	< 5	< 2
	10/24-10/24	1400 ± 100	< 2	< 2	< 5	< 3
	11/07-11/07	1400 ± 100	< 2	< 2	< 6	< 3
	11/21-11/21	1400 ± 100	< 2	< 2	< 6	< 3
	12/05-12/05	1500 ± 100	< 2	< 2	< 6	< 3
	MEAN	1362 ± 257	< 2	< 2	< 16	< 7
22C1	01/10-01/10	1500 ± 100	< 2	< 2	< 6	< 3
	04/11-04/11	1500 ± 200	< 2	< 2	< 5	< 2
	07/04-07/04	1500 ± 100	< 2	< 2	< 5	< 3
	10/10-10/10	1400 ± 100	< 2	< 2	< 6	< 3
	MEAN	1475 ± 100	< 2	< 2	< 6	< 3
25B1	01/10-01/10	1200 ± 100	< 2	< 2	< 4	< 2
	02/14-02/14	1400 ± 100	< 2	< 2	< 4	< 2
	03/14-03/14	1400 ± 100	< 2	< 2	< 4	< 2
	04/11-04/11	1400 ± 100	< 1	< 2	< 4	< 2
	04/25-04/25	1300 ± 100	< 2	< 2	< 4	< 2
	05/09-05/09	1500 ± 100	< 2	< 2	< 5	< 3
	05/23-05/23	1500 ± 100	< 2	4 ± 3	< 4	< 2
	06/06-06/06	1400 ± 100	< 2	< 2	< 4	< 2
	06/20-06/20	1200 ± 100	< 1	< 1	< 4	< 2
	07/04-07/04	1500 ± 100	< 2	< 2	< 5	< 2
	07/18-07/18	1400 ± 100	< 2	< 2	< 5	< 2
	08/01-08/01	1400 ± 100	< 2	< 2	< 5	< 2
	08/15-08/15	1300 ± 100	< 2	< 2	< 6	< 2
	08/29-08/29	1400 ± 100	< 2	< 2	< 6	< 3
	09/13-09/13	1300 ± 100	< 2	< 2	< 5	< 2
	09/26-09/26	1500 ± 100	< 2	< 2	< 5	< 3
	10/10-10/10	1400 ± 100	< 2	< 2	< 6	< 3
	10/24-10/24	1300 ± 100	< 2	< 2	< 6	< 3
	11/07-11/07	1300 ± 100	< 3	< 3	< 9	< 4
	11/21-11/21	1200 ± 100	< 3	< 3	< 9	< 4
	12/05-12/05	1300 ± 100	< 2	< 2	< 6	< 2
	MEAN	1362 ± 195	< 2	2 ± 1	< 5	< 2
MEAN INDICATORS		1391 ± 339	< 2	2 ± 2	< 8	< 4

TABLE C-XV CONCENTRATIONS OF GAMMA EMMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

CONTROL FARMS

STATION CODE	COLLECTION DATE	K-40	CS-134	CS-137	BA-140	LA-140
36E1	01/10-01/10	1300 ± 100	< 2	< 2	< 6	< 3
	04/11-04/11	1100 ± 100	< 2	< 2	< 5	< 3
	07/04-07/04	1300 ± 100	< 2	< 2	< 5	< 3
	10/10-10/10	1300 ± 100	< 2	< 2	< 6	< 3
	MEAN	1250 ± 200	< 2	< 2	< 6	< 3
9G1	01/10-01/10	1300 ± 100	< 2	< 2	< 6	< 3
	04/11-04/11	1400 ± 100	< 2	< 2	< 5	< 2
	07/04-07/04	1400 ± 100	< 2	< 2	< 6	< 2
	10/10-10/10	1300 ± 100	< 2	< 2	< 7	< 3
	MEAN	1350 ± 115	< 2	< 2	< 6	< 3
22F1	01/10-01/10	1400 ± 100	< 2	< 2	< 4	< 2
	02/14-02/14	1400 ± 100	< 2	< 2	< 4	< 2
	03/14-03/14	1400 ± 100	< 2	< 2	< 4	< 2
	04/11-04/11	1400 ± 100	< 1	< 1	< 4	< 2
	04/25-04/25	1500 ± 100	< 2	< 2	< 4	< 2
	05/09-05/09	1500 ± 100	< 2	5 ± 4	< 6	< 2
	05/23-05/23	1400 ± 100	< 2	< 2	< 4	< 2
	06/06-06/06	1300 ± 100	< 2	< 2	< 5	< 2
	06/20-06/20	1500 ± 100	< 1	< 1	< 4	< 2
	07/04-07/04	1600 ± 200	< 2	< 2	< 5	< 2
	07/18-07/18	1400 ± 100	< 2	< 2	< 5	< 2
	08/01-08/01	1500 ± 200	< 2	< 2	< 5	< 2
	08/15-08/15	1400 ± 100	< 2	< 2	< 5	< 2
	08/29-08/29	1400 ± 100	< 2	< 2	< 6	< 3
	09/13-09/13	1300 ± 100	< 2	< 2	< 6	< 3
	09/26-09/26	1300 ± 100	< 2	< 2	< 5	< 2
	10/10-10/10	1400 ± 100	< 2	< 2	< 5	< 3
	10/24-10/24	1500 ± 100	< 2	< 2	< 5	< 3
	11/07-11/07	1600 ± 200	< 2	< 2	< 5	< 3
	11/21-11/21	1500 ± 100	< 2	< 2	< 6	< 2
	12/05-12/05	1400 ± 100	< 2	< 2	< 5	< 3
	MEAN	1433 ± 171	< 2	2 ± 1	< 5	< 2
MEAN CONTROLS		1397 ± 210	< 2	2 ± 1	< 5	< 2

TABLE C-XVI CONCENTRATIONS OF AQUEOUS TRITIUM AND GAMMA EMITTERS IN WELL WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STATION	COLLECTION DATE	AQUEOUS H3	MN-54	CO-58	FE-59	CO-60	ZN-65	ZR-95	NB-95	CS-134	CS-137	BA-140	LA-140
1151	05/30/89	< 30	< 0.3	< 0.4	< 0.9	< 0.3	< 0.7	< 0.8	< 0.4	< 0.3	< 0.4	< 3	< 1
	11/27/89	< 60	< 0.3	< 0.3	< 0.7	< 0.3	< 0.6	< 0.6	< 0.3	< 0.3	< 0.3	< 2	< 0.9
	MEAN	< 50	< 0.3	< 0.4	< 0.8	< 0.3	< 0.7	< 0.7	< 0.4	< 0.3	< 0.4	< 3	< 1.0
18A1	05/30/89	60 ± 30	< 0.3	< 0.4	< 0.7	< 0.3	< 0.6	< 0.7	< 0.4	< 0.3	< 0.3	< 3	< 1
	11/27/89	50 ± 50	< 0.3	< 0.3	< 0.7	< 0.3	< 0.6	< 0.6	< 0.3	< 0.3	< 0.3	< 2	< 0.8
	MEAN	60 ± 10	< 0.3	< 0.4	< 0.7	< 0.3	< 0.6	< 0.7	< 0.4	< 0.3	< 0.3	< 3	< 0.9

TABLE C-XVII CONCENTRATIONS OF GAMMA EMITTERS IN VEGETATION SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

RESULTS IN UNITS OF PCI/G (WET) ± 2 SIGMA

STATION CODE	COLLECTION PERIOD	MEDIA	BE-7	K-40	I-131	CS-134	CS-137
1151	05/30-05/30	LEAFY VEGETABLE	0.24 ± 0.07	5.2 ± 0.5	< 0.005	< 0.004	< 0.004
		ROOT CROP	0.08 ± 0.05	2.9 ± 0.3	< 0.004	< 0.003	< 0.003
	06/19-06/19	LEAFY VEGETABLE	0.17 ± 0.08	4.9 ± 0.5	< 0.01	< 0.004	< 0.005
		ROOT CROP	< 0.03	5.0 ± 0.5	< 0.008	< 0.004	< 0.004
	07/24-07/24	LEAFY VEGETABLE	< 0.04	3.5 ± 0.4	< 0.010	< 0.005	0.014 ± 0.009
		ROOT CROP	< 0.03	4.0 ± 0.4	< 0.006	< 0.004	< 0.004
	08/22-08/22	LEAFY VEGETABLE	0.35 ± 0.09	7.6 ± 0.8	< 0.009	< 0.005	< 0.005
		ROOT CROP	< 0.03	3.6 ± 0.4	< 0.006	< 0.003	< 0.003
	09/25-09/25	LEAFY VEGETABLE	0.4 ± 0.3	9.6 ± 1.0	< 0.03	< 0.02	< 0.01
		ROOT CROP	< 0.04	4.8 ± 0.5	< 0.01	< 0.005	< 0.005
	10/17-10/17	LEAFY VEGETABLE	< 0.10	5.4 ± 0.5	< 0.02	< 0.009	< 0.01
		ROOT CROP	< 0.05	5.4 ± 0.5	< 0.01	< 0.006	< 0.006
	MEAN		0.13 ± 0.26	5.2 ± 3.7	< 0.011	< 0.006	0.006 ± 0.007

TABLE C-XVIII CONCENTRATIONS OF GAMMA EMITTERS IN RABBIT SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

RESULTS IN UNITS OF PCI/G (WET) ± 2 SIGMA

STATION CODE	COLLECTION PERIOD	K-40	I-131	CS-134	CS-137
2655	11/15/89	2.6 ± 0.3	< 0.02	< 0.003	< 0.003

TABLE C-XIX MONTHLY TLD RESULTS FOR LIMERICK GENERATING STATION, 1989

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
36S1	7.4 ± 2.0	7.1 ± 0.2	7.0 ± 0.5	6.8 ± 0.6	9.5 ± 0.7	6.9 ± 0.4	6.5 ± 0.4	8.7 ± 0.6	7.3 ± 0.7	7.1 ± 0.4			
36S2	8.4 ± 0.3										8.2 ± 0.3	8.4 ± 1.2	8.5 ± 0.6
2B1	6.9 ± 1.8	6.4 ± 0.2	7.6 ± 0.6	5.9 ± 0.6	6.9 ± 0.4	6.3 ± 0.2	5.7 ± 0.2	7.0 ± 0.5	6.6 ± 0.7	7.1 ± 0.4	8.3 ± 0.2	6.2 ± 0.2	8.7 ± 1.1
2E1	7.4 ± 2.0	6.7 ± 0.6	6.9 ± 0.5	6.5 ± 0.4	8.7 ± 0.7	6.8 ± 0.4	6.3 ± 0.3	9.0 ± 1.0	7.0 ± 0.5	8.0 ± 0.5	8.8 ± 0.6	6.3 ± 0.2	7.6 ± 0.3
3S1	7.1 ± 1.8	6.3 ± 0.3	6.4 ± 0.6	6.4 ± 0.3	8.8 ± 0.3	6.5 ± 0.3	6.3 ± 0.5	7.3 ± 0.4	6.7 ± 0.6	6.9 ± 0.5	8.6 ± 0.3	7.0 ± 0.2	7.8 ± 0.5
4E1	5.8 ± 2.0	5.1 ± 0.3	5.4 ± 0.3	5.1 ± 0.4	8.5 ± 0.7	5.4 ± 0.5	4.9 ± 0.3	6.1 ± 0.3	5.6 ± 0.4	5.7 ± 0.3	6.1 ± 0.3	5.2 ± 0.2	6.7 ± 0.8
5S1	7.1 ± 2.1	6.4 ± 0.3	6.6 ± 0.4	6.0 ± 0.3	9.7 ± 4.0	6.5 ± 0.5	6.1 ± 0.3	7.4 ± 0.4	7.8 ± 0.6	6.9 ± 0.6	7.3 ± 0.4	6.6 ± 0.2	7.9 ± 1.1
5H1	8.4 ± 1.1	7.7 ± 0.5	8.9 ± 0.6	7.7 ± 0.4	8.8 ± 4.6	7.8 ± 0.4	7.7 ± 0.3	8.6 ± 0.5	9.1 ± 0.7	8.2 ± 0.5	8.8 ± 0.4	8.7 ± 0.8	9.1 ± 0.4
6C1	7.1 ± 1.7	6.4 ± 0.4	6.5 ± 0.4	6.5 ± 0.9	8.1 ± 0.1	6.5 ± 0.5	6.0 ± 0.2	7.4 ± 0.6	8.4 ± 0.8	7.1 ± 0.7	8.4 ± 0.2	6.4 ± 0.3	7.6 ± 0.7
7S1	7.7 ± 1.4	7.1 ± 0.5	7.0 ± 0.4	6.4 ± 0.5	8.6 ± 0.7	7.4 ± 0.3	7.7 ± 0.5	8.5 ± 0.6	8.5 ± 0.4	7.6 ± 1.0	8.1 ± 0.3	7.2 ± 0.2	8.0 ± 0.2
7E1	7.4 ± 1.6	6.6 ± 0.4	6.7 ± 0.4	6.6 ± 0.3	8.8 ± 0.3	6.9 ± 0.1	6.7 ± 0.2	8.1 ± 0.1	8.3 ± 0.7	7.2 ± 0.3	8.4 ± 0.6	7.0 ± 0.5	7.8 ± 0.2
9C1	7.7 ± 4.6	6.5 ± 0.3	6.5 ± 0.2	6.1 ± 0.2	14.5 ± 1.2	6.5 ± 0.1	6.0 ± 0.4	7.7 ± 0.5	7.1 ± 0.4	7.2 ± 0.8	8.4 ± 0.6	6.9 ± 0.7	8.6 ± 0.2
10S3	7.5 ± 1.9	6.8 ± 0.6	8.1 ± 0.4	6.2 ± 0.2	9.6 ± 0.8	7.8 ± 0.4	6.4 ± 0.2	7.8 ± 0.3	7.3 ± 0.5	7.5 ± 0.6	7.7 ± 0.2	7.1 ± 0.4	8.8 ± 0.3
10E1	7.1 ± 1.2	6.5 ± 0.4	6.7 ± 0.4	6.5 ± 0.2	8.6 ± 0.5	6.7 ± 0.6	6.6 ± 0.4	7.4 ± 0.3	7.1 ± 0.5	7.1 ± 0.8	7.5 ± 0.4	7.0 ± 0.3	7.7 ± 0.4
10F3	7.2 ± 1.5	6.5 ± 0.6	6.9 ± 0.1	6.5 ± 0.4	8.9 ± 0.6	7.1 ± 0.8	6.1 ± 0.5	7.5 ± 0.4	7.4 ± 0.5	7.3 ± 0.2	7.7 ± 0.4	7.0 ± 0.3	7.7 ± 0.4
11S1	7.8 ± 1.1	7.4 ± 0.6	7.4 ± 0.3	7.2 ± 1.4	8.2 ± 0.6	7.5 ± 0.4	6.7 ± 0.5	8.1 ± 0.4	7.9 ± 0.5	8.2 ± 0.5	8.6 ± 0.6	7.6 ± 0.4	8.3 ± 0.3
13C1	5.8 ± 3.5	4.9 ± 0.3	5.1 ± 0.4	4.8 ± 0.5	10.9 ± 0.5	5.1 ± 0.3	4.6 ± 0.3	5.6 ± 0.2	5.5 ± 0.5	5.3 ± 0.2	5.9 ± 0.3	4.9 ± 0.4	7.3 ± 0.5
13E1	7.4 ± 2.0	6.7 ± 0.3	6.8 ± 0.3	6.9 ± 0.8	9.4 ± 0.4	6.8 ± 0.4	6.3 ± 0.3	8.3 ± 0.4	7.1 ± 0.7	7.1 ± 0.4	7.7 ± 0.2	6.7 ± 0.4	8.9 ± 0.3
13H4	5.0 ± 0.6	4.9 ± 0.9	5.1 ± 0.2	5.2 ± 0.3	4.8 ± 0.5	4.5 ± 0.1	4.9 ± 0.3	4.9 ± 0.2	5.1 ± 0.4	5.4 ± 0.2	5.5 ± 0.4	5.4 ± 0.5	4.6 ± 0.4
14S1	6.9 ± 2.0	6.1 ± 0.3	7.4 ± 0.2	5.7 ± 0.1	9.4 ± 1.1	6.4 ± 0.5	6.2 ± 0.4	6.9 ± 0.4	6.6 ± 0.4	6.6 ± 0.5	8.2 ± 0.8	6.6 ± 0.2	7.0 ± 0.1
15D1	7.4 ± 1.5	6.7 ± 0.2	6.9 ± 0.3	6.8 ± 0.3	8.0 ± 0.5	6.9 ± 0.5	6.6 ± 0.4	7.7 ± 0.3	8.5 ± 0.3	7.3 ± 0.5	8.1 ± 0.2	7.1 ± 0.2	8.7 ± 1.2
16S2	6.7 ± 3.0	6.1 ± 0.7	6.1 ± 0.3	5.7 ± 0.3	11.1 ± 1.0	6.1 ± 0.4	5.5 ± 0.3	6.8 ± 0.4	6.3 ± 0.5	6.4 ± 0.4	7.0 ± 0.7	6.0 ± 0.4	7.2 ± 0.3
16F1	7.9 ± 2.8	7.1 ± 0.3	7.5 ± 0.3	6.7 ± 0.3	11.8 ± 1.1	7.0 ± 0.5	7.9 ± 1.0	7.9 ± 0.3	7.6 ± 0.3	7.3 ± 0.3	9.2 ± 0.5	7.1 ± 0.5	7.8 ± 0.2
17B1	7.0 ± 1.4	6.4 ± 1.0	6.6 ± 0.3	6.5 ± 0.2	8.9 ± 0.9	6.7 ± 0.4	7.2 ± 0.3	7.2 ± 0.1	6.5 ± 0.4	6.6 ± 0.5	7.4 ± 0.3	6.6 ± 0.3	7.7 ± 0.4
18S1	6.3 ± 1.2	5.7 ± 0.2	7.5 ± 0.4	5.8 ± 0.1	6.5 ± 0.4	5.9 ± 0.4	5.5 ± 0.3	6.9 ± 0.3	6.3 ± 0.4	6.3 ± 0.5	6.6 ± 0.3	5.9 ± 0.3	7.1 ± 0.1

1. MEAN AND TWO TIMES THE STANDARD DEVIATION OF THE MONTHLY RESULTS.

TABLE C-XIX MONTHLY TLD RESULTS FOR LIMERICK GENERATING STATION, 1989

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	6.9 ± 2.7	6.6 ± 0.5	7.1 ± 0.5	6.5 ± 0.3	10.9 ± 1.3	6.5 ± 0.2	6.8 ± 0.6	7.0 ± 0.4	6.1 ± 0.3	5.8 ± 0.4	6.7 ± 0.1	5.6 ± 0.3	7.4 ± 0.3
19D1	7.6 ± 5.2	7.1 ± 0.8	7.1 ± 0.8	6.4 ± 0.1	15.7 ± 0.0	6.6 ± 0.3	5.9 ± 0.3	7.2 ± 0.3	7.0 ± 0.3	6.6 ± 0.3	7.5 ± 0.2	6.5 ± 0.3	7.2 ± 0.2
20D1	6.8 ± 1.9	6.1 ± 0.2	6.5 ± 0.5	6.2 ± 0.1	9.5 ± 0.9	6.2 ± 0.4	7.2 ± 0.8	6.7 ± 0.6	6.3 ± 0.4	6.4 ± 0.4	6.8 ± 0.4	6.2 ± 0.2	7.1 ± 0.4
20F1	7.6 ± 3.7	6.6 ± 0.4	7.1 ± 0.3	6.7 ± 0.2	13.3 ± 1.2	6.7 ± 0.3	8.0 ± 0.5	7.5 ± 1.2	7.0 ± 0.3	7.1 ± 0.2	7.7 ± 0.5	6.6 ± 0.4	7.1 ± 0.3
21S1	6.7 ± 2.9	5.7 ± 0.3	6.1 ± 0.3	6.2 ± 0.4	11.1 ± 0.7	5.8 ± 0.2	6.4 ± 0.3	6.7 ± 0.3	6.2 ± 0.6	6.4 ± 0.4	6.8 ± 0.2	6.0 ± 0.4	7.0 ± 0.6
22G1	7.1 ± 3.3	6.1 ± 0.3	6.6 ± 0.3	6.2 ± 0.4	12.0 ± 0.6	6.2 ± 0.3	6.3 ± 0.4	6.9 ± 0.4	6.8 ± 0.2	6.6 ± 0.4	7.0 ± 0.3	6.5 ± 0.2	8.5 ± 0.7
23S2	7.2 ± 3.4	6.2 ± 0.2	6.7 ± 0.3	6.4 ± 0.5	12.5 ± 0.9	6.4 ± 0.1	6.9 ± 0.6	7.0 ± 0.4	6.7 ± 0.4	6.9 ± 0.5	6.9 ± 0.2	6.5 ± 0.4	7.2 ± 0.7
24G1	6.5 ± 2.6	5.7 ± 0.3	5.9 ± 0.3	5.9 ± 0.2	10.8 ± 0.7	5.9 ± 0.5	6.2 ± 0.5	6.7 ± 0.4	6.0 ± 0.5	6.3 ± 0.3	6.4 ± 0.3	5.8 ± 0.2	7.2 ± 1.0
25S1	6.7 ± 1.3	5.8 ± 0.0	7.4 ± 0.4	5.9 ± 0.1	7.4 ± 0.4	5.9 ± 0.5	6.1 ± 0.5	7.3 ± 0.3	7.6 ± 0.4	7.0 ± 0.4	7.0 ± 0.3	6.1 ± 0.2	7.0 ± 0.1
25D1	6.2 ± 0.9	5.6 ± 0.3	7.2 ± 0.6	5.5 ± 0.1	6.6 ± 0.6	5.8 ± 0.5	5.9 ± 0.3	6.3 ± 0.4	6.1 ± 0.2	6.2 ± 0.2	6.4 ± 0.3	6.0 ± 0.8	6.5 ± 0.4
26S3	7.0 ± 5.7	5.6 ± 0.3	6.1 ± 0.2	5.8 ± 0.3	15.9 ± 1.3	5.9 ± 0.3	6.2 ± 0.3	6.7 ± 0.4	6.1 ± 0.3	6.4 ± 0.8	6.5 ± 0.5	5.8 ± 0.2	6.8 ± 0.5
26B1	6.8 ± 1.1	6.1 ± 0.4	6.4 ± 0.4	6.1 ± 0.3	7.6 ± 0.5	6.4 ± 0.4	7.2 ± 1.2	6.8 ± 0.4	6.7 ± 0.2	7.3 ± 0.6	7.0 ± 0.3	6.3 ± 0.2	7.3 ± 0.6
28D2	6.8 ± 1.0	6.2 ± 0.2	6.6 ± 0.4	6.2 ± 0.3	7.5 ± 0.7	6.4 ± 0.5	7.2 ± 0.2	7.0 ± 0.3	6.7 ± 0.3	7.7 ± 0.7	7.1 ± 0.3	6.3 ± 0.3	7.1 ± 0.4
29S1	6.5 ± 1.6	5.7 ± 0.3	6.2 ± 0.4	6.1 ± 0.3	8.7 ± 0.5	5.8 ± 0.4	6.8 ± 0.3	7.3 ± 0.4	6.2 ± 0.3	6.4 ± 0.5	6.4 ± 0.6	5.9 ± 0.3	6.7 ± 0.3
29B1	6.9 ± 1.2	6.6 ± 0.4	6.7 ± 0.4	6.3 ± 0.2	8.4 ± 0.5	6.4 ± 0.5	6.9 ± 0.3	6.8 ± 0.4	6.6 ± 0.4	7.0 ± 0.3	7.0 ± 0.4	6.4 ± 0.1	7.4 ± 0.2
29E1	7.1 ± 1.6	6.4 ± 0.4	8.1 ± 0.8	6.5 ± 0.2	9.1 ± 1.1	6.3 ± 0.5	6.7 ± 0.5	7.0 ± 0.2	6.8 ± 0.5	7.4 ± 0.5	7.1 ± 0.4	6.5 ± 0.4	7.4 ± 0.4
31D1	8.6 ± 1.0	8.2 ± 0.2	8.0 ± 1.4	8.3 ± 0.3	9.1 ± 0.3	8.0 ± 0.5	8.8 ± 0.5	8.7 ± 0.5	8.6 ± 0.9	8.5 ± 0.3	9.3 ± 1.1	8.0 ± 0.3	9.3 ± 0.3
31D2	7.4 ± 1.1	7.0 ± 0.7	7.2 ± 0.4	6.8 ± 0.3	8.6 ± 0.5	7.0 ± 0.4	7.2 ± 0.4	7.8 ± 0.4	7.2 ± 0.6	7.7 ± 0.5	7.4 ± 0.5	6.9 ± 0.4	8.1 ± 0.3
32S1	5.5 ± 2.0	4.9 ± 0.2	5.3 ± 0.4	4.9 ± 0.4	8.6 ± 0.4	5.0 ± 0.1	5.2 ± 0.2	5.5 ± 0.2	5.2 ± 0.6	5.5 ± 0.3	5.4 ± 0.2	4.8 ± 0.0	6.8 ± 0.4
32G1	7.7 ± 1.5	6.7 ± 0.2	8.3 ± 0.3	7.1 ± 0.4	9.3 ± 0.9	6.9 ± 0.5	7.5 ± 0.3	7.7 ± 0.2	8.3 ± 0.9	7.7 ± 0.7	7.7 ± 0.4	6.9 ± 0.1	8.2 ± 0.7
34S2	7.8 ± 1.6	7.0 ± 0.3	7.4 ± 0.4	7.1 ± 0.1	8.3 ± 0.9	7.1 ± 0.4	8.6 ± 0.3	7.6 ± 0.4	7.3 ± 0.5	7.7 ± 0.2	8.0 ± 0.5	7.3 ± 0.8	9.7 ± 0.2
34E1	7.1 ± 1.2	6.3 ± 0.2	7.0 ± 0.4	6.6 ± 0.3	8.6 ± 0.5	6.9 ± 0.7	7.0 ± 0.6	7.1 ± 0.3	6.7 ± 0.6	7.2 ± 0.3	7.2 ± 1.0	6.6 ± 0.6	7.5 ± 0.4
35B1	7.1 ± 1.2	6.3 ± 0.3	6.7 ± 0.3	6.8 ± 0.4	7.5 ± 0.4	6.4 ± 0.4	7.1 ± 0.6	7.1 ± 0.3	7.0 ± 0.5	7.1 ± 0.4	6.5 ± 0.5	6.7 ± 0.1	7.6 ± 0.2
35F1	8.0 ± 1.7	7.1 ± 0.3	7.5 ± 0.4	7.3 ± 0.5	10.3 ± 1.0	7.4 ± 0.5	7.8 ± 0.2	7.9 ± 0.3	8.6 ± 1.1	8.0 ± 0.2	7.9 ± 0.3	7.4 ± 0.5	8.4 ± 0.5

1. MEAN AND TWO TIMES THE STANDARD DEVIATION OF THE MONTHLY RESULTS.

TABLE C-XX QUARTERLY TLD RESULTS FOR LIMERICK GENERATING STATION, 1989

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
3651	6.6 ± 0.6	6.3 ± 0.2	7.0 ± 0.2	6.4 ± 0.6	
3652	7.0 ± 0.0				7.0 ± 0.3
2B1	6.0 ± 1.1	5.5 ± 0.3	6.7 ± 0.4	5.7 ± 0.2	6.2 ± 0.2
2E1	6.5 ± 0.8	6.0 ± 0.3	6.9 ± 0.6	6.4 ± 0.5	6.8 ± 0.4
3B1	6.2 ± 0.3	6.1 ± 0.3	6.4 ± 0.6	6.1 ± 0.3	6.2 ± 0.5
4E1	4.8 ± 0.9	4.9 ± 0.2	5.0 ± 0.2	4.8 ± 0.1	4.6 ± 0.1
5B1	6.2 ± 1.0	5.7 ± 0.3	6.7 ± 0.4	5.8 ± 0.2	6.5 ± 0.3
5H1	7.6 ± 0.4	7.6 ± 0.3	8.0 ± 0.5	7.6 ± 0.3	7.6 ± 0.3
6C1	6.3 ± 0.9	5.7 ± 0.2	6.8 ± 0.4	6.1 ± 0.4	6.4 ± 0.3
7B1	6.8 ± 0.8	6.4 ± 0.2	7.3 ± 0.4	6.5 ± 0.3	7.0 ± 0.3
7E1	6.6 ± 0.3	6.5 ± 0.6	6.7 ± 0.3	6.6 ± 0.4	6.8 ± 0.1
9C1	6.3 ± 1.2	5.6 ± 0.2	7.0 ± 0.5	6.1 ± 0.4	6.4 ± 0.3
10S3	6.8 ± 0.8	6.3 ± 0.2	7.3 ± 0.3	6.7 ± 0.4	6.8 ± 0.1
10E1	6.7 ± 0.5	6.4 ± 0.2	6.9 ± 0.3	6.9 ± 0.3	6.6 ± 0.3
10F3	6.6 ± 0.8	6.1 ± 0.2	6.9 ± 0.5	6.7 ± 0.5	6.9 ± 0.2
11S1	7.3 ± 0.8	6.8 ± 0.4	7.7 ± 0.5	7.4 ± 0.2	7.5 ± 0.4
13C1	4.9 ± 0.7	4.5 ± 0.1	5.3 ± 0.2	4.9 ± 0.2	4.9 ± 0.2
13E1	6.4 ± 0.7	6.0 ± 0.2	6.4 ± 0.6	6.5 ± 0.3	6.8 ± 0.4
13H4	4.7 ± 0.5	4.3 ± 0.1	4.8 ± 0.3	4.7 ± 0.2	4.9 ± 0.3
14S1	5.9 ± 0.6	5.5 ± 0.7	6.2 ± 0.6	5.8 ± 0.4	6.0 ± 0.3
15D1	6.9 ± 0.6	6.5 ± 0.5	7.1 ± 0.6	7.2 ± 0.3	6.9 ± 0.3
16S2	6.0 ± 0.3	6.0 ± 0.2	6.3 ± 0.5	6.0 ± 0.4	5.9 ± 0.3
16F1	6.9 ± 0.7	6.7 ± 0.4	7.4 ± 0.3	6.6 ± 0.3	7.0 ± 0.3
17B1	6.2 ± 0.6	5.9 ± 0.2	6.6 ± 0.7	6.1 ± 0.4	6.3 ± 0.2
18S1	6.0 ± 0.9	5.4 ± 0.2	6.4 ± 0.2	5.9 ± 0.3	6.2 ± 0.6

1. MEAN AND TWO TIMES THE STANDARD DEVIATION OF THE QUARTERLY RESULTS.

TABLE C-XX QUARTERLY TLD RESULTS FOR LIMERICK GENERATING STATION, 1989

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
18G1	6.0 ± 1.4	5.9 ± 0.2	7.0 ± 0.3	5.3 ± 0.2	5.8 ± 0.4
19D1	6.2 ± 0.3	6.0 ± 0.2	6.3 ± 0.5	6.2 ± 0.3	6.4 ± 0.4
20D1	6.0 ± 0.8	5.6 ± 0.2	6.4 ± 0.1	5.7 ± 0.5	6.2 ± 0.3
20F1	6.4 ± 0.7	6.2 ± 0.2	6.9 ± 0.2	6.2 ± 0.2	6.4 ± 0.1
21S1	5.7 ± 0.6	5.3 ± 0.2	6.0 ± 0.4	5.6 ± 0.3	5.5 ± 0.3
22G1	6.0 ± 0.8	5.5 ± 0.3	6.4 ± 0.4	5.9 ± 0.2	6.3 ± 0.2
23S2	6.2 ± 0.9	5.7 ± 0.3	6.6 ± 0.1	6.1 ± 0.4	6.3 ± 0.2
24D1	5.6 ± 0.4	5.4 ± 0.2	5.8 ± 0.5	5.6 ± 0.3	5.5 ± 0.3
25S1	6.1 ± 0.6	5.8 ± 0.3	5.9 ± 0.4	6.5 ± 0.1	6.1 ± 0.2
25D1	5.4 ± 0.9	4.9 ± 0.2	5.9 ± 0.3	5.3 ± 0.2	5.7 ± 0.2
26S3	5.6 ± 0.6	5.1 ± 0.4	5.7 ± 0.4	5.7 ± 0.3	5.8 ± 0.2
26B1	6.2 ± 0.6	5.9 ± 0.3	6.4 ± 0.6	6.0 ± 0.4	6.5 ± 0.2
26D2	6.1 ± 1.0	5.5 ± 0.5	6.5 ± 0.4	5.9 ± 0.4	6.5 ± 0.3
29S1	5.9 ± 0.9	5.3 ± 0.1	6.1 ± 0.3	5.9 ± 0.5	6.3 ± 0.3
29B1	6.0 ± 1.0	5.6 ± 0.2	6.7 ± 0.2	6.1 ± 0.3	5.8 ± 0.1
29E1	6.3 ± 0.7	6.1 ± 0.3	6.8 ± 0.3	6.1 ± 0.4	6.4 ± 0.1
31D1	7.7 ± 0.5	7.6 ± 0.4	7.6 ± 0.4	8.0 ± 0.4	7.8 ± 0.3
31D2	6.6 ± 0.3	6.4 ± 0.3	6.6 ± 1.4	6.5 ± 0.2	6.8 ± 0.2
32S1	4.5 ± 0.6	4.3 ± 0.2	5.1 ± 0.5	4.5 ± 0.2	4.2 ± 0.2
32G1	6.8 ± 0.3	6.6 ± 0.3	6.9 ± 0.6	7.0 ± 0.2	6.8 ± 0.2
34S2	6.9 ± 0.6	6.5 ± 0.4	7.0 ± 0.3	6.8 ± 0.2	7.2 ± 0.2
34E1	6.6 ± 0.9	6.0 ± 0.1	6.8 ± 0.4	7.0 ± 0.4	6.6 ± 0.2
35B1	6.5 ± 0.9	6.2 ± 0.2	6.7 ± 0.6	6.7 ± 0.2	6.5 ± 0.3
35F1	7.4 ± 0.7	7.0 ± 0.3	7.6 ± 0.7	7.2 ± 0.4	7.5 ± 0.6

1. MEAN AND TWO TIMES THE STANDARD DEVIATION OF THE QUARTERLY RESULTS.

TABLE C-XXI 1989 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 1989	6.2 ± 1.4	6.4 ± 1.3	6.4 ± 2.0
	FEB 1989	6.8 ± 1.5	6.8 ± 1.3	7.2 ± 3.0
	MAR 1989	6.2 ± 1.1	6.4 ± 1.3	6.5 ± 1.9
	APR 1989	9.6 ± 4.5	9.4 ± 4.4	9.2 ± 5.5
	MAY 1989	6.4 ± 1.4	6.6 ± 1.2	6.4 ± 2.4
	JUN 1989	6.4 ± 1.7	6.7 ± 1.8	6.6 ± 2.2
	JUL 1989	7.3 ± 1.5	7.3 ± 1.5	7.0 ± 2.7
	AUG 1989	6.9 ± 1.7	7.0 ± 1.7	7.1 ± 3.2
	SEP 1989	6.9 ± 1.3	7.1 ± 1.4	6.7 ± 2.4
	OCT 1989	7.3 ± 1.8	7.6 ± 1.8	7.1 ± 2.4
	NOV 1989	6.5 ± 1.7	6.5 ± 1.3	6.6 ± 2.6
	DEC 1989	7.6 ± 1.9	7.7 ± 1.4	7.6 ± 3.5
QUARTERLY	JAN-MAR 1989	5.8 ± 1.3	5.9 ± 1.3	6.0 ± 2.5
	APR-JUN 1989	6.5 ± 1.4	6.6 ± 1.1	6.6 ± 2.3
	JUL-SEP 1989	6.1 ± 1.3	6.3 ± 1.4	6.1 ± 2.4
	OCT-DEC 1989	6.3 ± 1.5	6.4 ± 1.4	6.3 ± 2.2

TABLE C-XXII SUMMARY OF THE 1989 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	4.8	15.9	7.0 ± 2.6	7.6 ± 2.4
	MIDDLE RING	324	4.6	15.7	7.1 ± 2.5	7.8 ± 2.2
	OUTER RING	60	4.5	12.0	7.0 ± 3.1	7.8 ± 3.0
QUARTERLY	SITE	64	4.2	7.7	6.2 ± 1.4	
	MIDDLE RING	108	4.5	8.0	6.3 ± 1.4	
	OUTER RING	20	4.3	8.0	6.3 ± 2.2	

(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 - 5N1,13N4,18G1,22G1,32G1.

TABLE C-XXIII SUMMARY OF COLLECTION DATES FOR SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

SURFACE WATER (GROSS BETA AND GAMMA)

COLLECTION PERIOD	10F2	13H5	15F5	16B2	2451	2452
JAN 89	12/28-01/30	12/27-01/30	12/27-01/30	12/27-01/30	12/27-01/30	12/27-01/30
FEB 89	01/30-02/27	01/30-02/27	01/30-02/27	01/30-02/27	01/30-02/27	01/30-02/27
MAR 89	02/27-03/27	02/27-03/27	02/27-03/27	02/27-03/27	02/27-03/27	02/27-03/27
APR 89	03/27-04/24	03/27-04/24	03/27-04/24	03/27-04/24	03/27-04/24	03/27-04/24
MAY 89	04/24-05/30	04/24-05/30	04/24-05/30	04/24-05/30	04/24-05/30	04/24-05/30
JUN 89	05/30-06/26	05/30-06/26	05/30-06/26	05/30-06/26	05/30-06/26	05/30-06/26
JUL 89	06/26-07/31	06/26-07/31	06/26-07/31	06/26-07/31	06/26-07/31	06/26-07/31
AUG 89	07/31-08/28	07/31-08/28	07/31-08/28	07/31-08/28	07/31-08/28	07/31-08/28
SEP 89	08/28-09/25	08/28-09/25	08/28-09/25	08/28-09/25	08/28-09/25	08/28-09/25
OCT 89	09/25-10/30	09/25-10/27	09/25-10/27	09/25-10/27	09/25-10/27	09/25-10/27
NOV 89	10/27-11/28	10/27-11/27	10/27-11/27	10/27-11/27	10/27-11/27	10/27-11/27
DEC 89	11/28-12/26	11/27-12/26	11/27-12/26	11/27-12/26	11/27-12/26	11/27-12/26

SURFACE WATER (TRITIUM)

COLLECTION PERIOD	10F2	13H5	15F5	16B2	2451	2452
JAN-MAR 89	12/28-03/27			12/27-03/27	12/27-03/27	
APR-JUN 89	03/27-06/26			03/27-06/26	03/27-06/26	
JUL-SEP 89	06/26-09/25			06/26-09/25	06/26-09/25	
OCT-DEC 89	09/25-12/26			09/25-12/26	09/25-12/26	

DRINKING WATER (GROSS BETA AND GAMMA)

COLLECTION PERIOD	13H2	15F4	15F7	16C2	28F3
JAN 89	12/27-01/30	12/27-01/30	12/27-01/30	12/27-01/30	12/27-01/30
FEB 89	01/30-02/27	01/30-02/27	01/30-02/27	01/30-02/27	01/30-02/27
MAR 89	02/27-03/27	02/27-03/27	02/27-03/27	02/27-03/27	02/27-03/27
APR 89	03/27-04/24	03/27-04/24	03/27-04/24	03/27-04/24	03/27-04/24
MAY 89	04/24-05/30	04/24-05/30	04/24-05/30	04/24-05/30	04/24-05/30
JUN 89	05/30-06/26	05/30-06/26	05/30-06/26	05/30-06/26	05/30-06/26
JUL 89	06/26-07/31	06/26-07/31	06/26-07/31	06/26-07/31	06/26-07/31
AUG 89	07/31-08/28	07/31-08/28	07/31-08/28	07/31-08/28	07/31-08/28
SEP 89	08/28-09/25	08/28-09/25	08/28-09/25	08/28-09/25	08/28-09/25
OCT 89	09/25-10/27	09/25-10/27	09/25-10/27	09/25-10/27	09/25-10/27
NOV 89	10/27-11/27	10/27-11/27	10/27-11/27	10/27-11/27	10/27-11/27
DEC 89	11/27-12/26	11/27-12/26	11/27-12/26	11/27-12/26	11/27-12/26

DRINKING WATER (TRITIUM)

COLLECTION PERIOD	13H2	15F4	15F7	16C2	28F3
JAN-MAR 89	12/27-03/27	12/27-03/27	12/27-03/27	12/27-03/27	12/27-03/27
APR-JUN 89	03/27-06/26	03/27-06/26	03/27-06/26	03/27-06/26	03/27-06/26
JUL-SEP 89	06/26-09/25	06/26-09/25	06/26-09/25	06/26-09/25	06/26-09/25
OCT-DEC 89	09/25-12/26	09/25-12/26	09/25-12/26	09/25-12/26	09/25-12/26

TABLE C-XXIII SUMMARY OF COLLECTION DATES FOR SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

AIR PARTICULATE & AIR IODINE

GROUP I - SITE BOUNDARY LOCATIONS

WEEK	1053	1151	1451	3452
1	01/02-01/09	01/02-01/09	01/02-01/09	01/02-01/09
2	01/09-01/16	01/09-01/16	01/09-01/16	01/09-01/16
3	01/16-01/23	01/16-01/23	01/16-01/23	01/16-01/23
4	01/23-01/30	01/23-01/30	01/23-01/30	01/23-01/30
JAN 89	01/02-01/30	01/02-01/30	01/02-01/30	01/02-01/30
5	01/30-02/06	01/30-02/06	01/30-02/06	01/30-02/06
6	02/06-02/13	02/06-02/13	02/06-02/13	02/06-02/13
7	02/13-02/20	02/13-02/20	02/13-02/20	02/13-02/20
8	02/20-02/27	02/20-02/27	02/20-02/27	02/20-02/27
FEB 89	01/30-02/27	01/30-02/27	01/30-02/27	01/30-02/27
9	02/27-03/06	02/27-03/06	02/27-03/06	02/27-03/06
10	03/06-03/13	03/06-03/13	03/06-03/13	03/06-03/13
11	03/13-03/20	03/13-03/20	03/13-03/20	03/13-03/20
12	03/20-03/28	03/20-03/28	03/20-03/28	03/20-03/28
13	03/28-04/03	03/28-04/03	03/28-04/03	03/28-04/03
MAR 89	02/27-04/03	02/27-04/03	02/27-04/03	02/27-04/03
14	04/03-04/10	04/03-04/10	04/03-04/10	04/03-04/10
15	04/10-04/17	04/10-04/17	04/10-04/17	04/10-04/17
16	04/17-04/24	04/17-04/24	04/17-04/24	04/17-04/24
17	04/24-05/01	04/24-05/01	04/24-05/01	04/24-05/01
APR 89	04/03-05/01	04/03-05/01	04/03-05/01	04/03-05/01
18	05/01-05/08	05/01-05/08	05/01-05/08	05/01-05/08
19	05/08-05/15	05/08-05/15	05/08-05/15	05/08-05/15
20	05/15-05/22	05/15-05/22	05/15-05/22	05/15-05/22
21	05/22-05/29	05/22-05/29	05/22-05/29	05/22-05/29
MAY 89	05/01-05/29	05/01-05/29	05/01-05/29	05/01-05/29
22	05/29-06/05	05/29-06/05	05/29-06/05	05/29-06/05
23	06/05-06/12	06/05-06/12	06/05-06/12	06/05-06/12
24	06/12-06/19	06/12-06/19	06/12-06/19	06/12-06/19
25	06/19-06/26	06/19-06/26	06/19-06/26	06/19-06/26
26	06/26-07/02	06/26-07/02	06/26-07/02	06/26-07/02
JUN 89	05/29-07/02	05/29-07/02	05/29-07/02	05/29-07/02
27	07/02-07/09	07/02-07/09	07/02-07/09	07/02-07/09
28	07/09-07/16	07/09-07/16	07/09-07/16	07/09-07/16
29	07/16-07/23	07/16-07/23	07/16-07/23	07/16-07/23
30	07/23-07/31	07/23-07/31	07/23-07/31	07/23-07/31
JUL 89	07/02-07/31	07/02-07/31	07/02-07/31	07/02-07/31
31	07/31-08/07	07/31-08/07	07/31-08/07	07/31-08/07
32	08/07-08/14	08/07-08/14	08/07-08/14	08/07-08/14
33	08/14-08/21	08/14-08/21	08/14-08/21	08/14-08/21
34	08/21-08/28	08/21-08/28	08/21-08/28	08/21-08/28
AUG 89	07/31-08/28	07/31-08/28	07/31-08/28	07/31-08/28
35	08/28-09/04	08/28-09/04	08/28-09/04	08/28-09/04
36	09/04-09/12	09/04-09/12	09/04-09/12	09/04-09/12
37	09/12-09/18	09/12-09/18	09/12-09/18	09/12-09/18
38	09/18-09/25	09/18-09/25	09/18-09/25	09/18-09/25
39	09/25-10/02	09/25-10/02	09/25-10/02	09/25-10/02
SEP 89	08/28-10/02	08/28-10/02	08/28-10/02	08/28-10/02
40	10/02-10/09	10/02-10/09	10/02-10/09	10/02-10/09
41	10/09-10/16	10/09-10/16	10/09-10/16	10/09-10/16
42	10/16-10/23	10/16-10/23	10/16-10/23	10/16-10/23
43	10/23-10/30	10/23-10/30	10/23-10/30	10/23-10/30
OCT 89	10/02-10/30	10/02-10/30	10/02-10/30	10/02-10/30
44	10/30-11/06	10/30-11/06	10/30-11/06	10/30-11/06
45	11/06-11/13	11/06-11/13	11/06-11/13	11/06-11/13
46	11/13-11/20	11/13-11/20	11/13-11/20	11/13-11/20
47	11/20-11/27	11/20-11/27	11/20-11/27	11/20-11/27
NOV 89	10/30-11/27	10/30-11/27	10/30-11/27	10/30-11/27
48	11/27-12/04	11/27-12/04	11/27-12/04	11/27-12/04
49	12/04-12/11	12/04-12/11	12/04-12/11	12/04-12/11
50	12/11-12/17	12/11-12/17	12/11-12/17	12/11-12/17
51	12/17-12/24	12/17-12/24	12/17-12/24	12/17-12/24
52	12/24-01/01	12/24-01/01	12/24-01/01	12/24-01/01
DEC 89	11/27-01/01	11/27-01/01	11/27-01/01	11/27-01/01

TABLE C-XXIII SUMMARY OF COLLECTION DATES FOR SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

AIR PARTICULATE & AIR IODINE

GROUP II - NEAR SITE LOCATIONS

WEEK	2B1	6C1	9C1	13C1	15D1	17B1
1	01/02-01/09	01/02-01/09	01/02-01/09	01/02-01/09	01/02-01/09	01/02-01/09
2	01/09-01/16	01/09-01/16	01/09-01/16	01/09-01/16	01/09-01/16	01/09-01/16
3	01/16-01/23	01/16-01/23	01/16-01/23	01/16-01/23	01/16-01/23	01/16-01/23
4	01/23-01/30	01/23-01/30	01/23-01/30	01/23-01/30	01/23-01/30	01/23-01/30
JAN 89	01/02-01/30	01/02-01/30	01/02-01/30	01/02-01/30	01/02-01/30	01/02-01/30
5	01/30-02/06	01/30-02/06	01/30-02/06	01/30-02/06	01/30-02/06	01/30-02/06
6	02/06-02/13	02/06-02/13	02/06-02/13	02/06-02/13	02/06-02/13	02/06-02/13
7	02/13-02/20	02/13-02/20	02/13-02/20	02/13-02/20	02/13-02/20	02/13-02/20
8	02/20-02/27	02/20-02/27	02/20-02/27	02/20-02/27	02/20-02/27	02/20-02/27
FEB 89	01/30-02/27	01/30-02/27	01/30-02/27	01/30-02/27	01/30-02/27	01/30-02/27
9	02/27-03/06	02/27-03/06	02/27-03/06	02/27-03/06	02/27-03/06	02/27-03/06
10	03/06-03/13	03/06-03/13	03/06-03/13	03/06-03/13	03/06-03/13	03/06-03/13
11	03/13-03/20	03/13-03/20	03/13-03/20	03/13-03/20	03/13-03/20	03/13-03/20
12	03/20-03/28	03/20-03/28	03/20-03/28	03/20-03/28	03/20-03/28	03/20-03/28
13	03/28-04/03	03/28-04/03	03/28-04/03	03/28-04/03	03/28-04/03	03/28-04/03
MAR 89	02/27-04/03	02/27-04/03	02/27-04/03	02/27-04/03	02/27-04/03	02/27-04/03
14	04/03-04/10	04/03-04/10	04/03-04/10	04/03-04/10	04/03-04/10	04/03-04/10
15	04/10-04/17	04/10-04/17	04/10-04/17	04/10-04/17	04/10-04/17	04/10-04/17
16	04/17-04/24	04/17-04/24	04/17-04/24	04/17-04/24	04/17-04/24	04/17-04/24
17	04/24-05/01	04/24-05/01	04/24-05/01	04/24-05/01	04/24-05/01	04/24-05/01
APR 89	04/03-05/01	04/03-05/01	04/03-05/01	04/03-05/01	04/03-05/01	04/03-05/01
18	05/01-05/08	05/01-05/08	05/01-05/08	05/01-05/08	05/01-05/08	05/01-05/08
19	05/08-05/15	05/08-05/15	05/08-05/15	05/08-05/15	05/08-05/15	05/08-05/15
20	05/15-05/22	05/15-05/22	05/15-05/22	05/15-05/22	05/15-05/22	05/15-05/22
21	05/22-05/29	05/22-05/29	05/22-05/29	05/22-05/29	05/22-05/29	05/22-05/29
MAY 89	05/01-05/29	05/01-05/29	05/01-05/29	05/01-05/29	05/01-05/29	05/01-05/29
22	05/29-06/05	05/29-06/05	05/29-06/05	05/29-06/05	05/29-06/05	05/29-06/05
23	06/05-06/12	06/05-06/12	06/05-06/12	06/05-06/12	06/05-06/12	06/05-06/12
24	06/12-06/19	06/12-06/19	06/12-06/19	06/12-06/19	06/12-06/19	06/12-06/19
25	06/19-06/26	06/19-06/26	06/19-06/26	06/19-06/26	06/19-06/26	06/19-06/26
26	06/26-07/02	06/26-07/02	06/26-07/02	06/26-07/02	06/26-07/02	06/26-07/02
JUN 89	05/29-07/02	05/29-07/02	05/29-07/02	05/29-07/02	05/29-07/02	05/29-07/02
27	07/02-07/09	07/02-07/09	07/02-07/09	07/02-07/09	07/02-07/09	07/02-07/09
28	07/09-07/16	07/09-07/16	07/09-07/16	07/09-07/16	07/09-07/16	07/09-07/16
29	07/16-07/23	07/16-07/23	07/16-07/23	07/16-07/23	07/16-07/23	07/16-07/23
30	07/23-07/31	07/23-07/31	07/23-07/31	07/23-07/31	07/23-07/31	07/23-07/31
JUL 89	07/02-07/31	07/02-07/23	07/02-07/31	07/02-07/31	07/02-07/31	07/02-07/31
31	07/31-08/07	07/31-08/07	07/31-08/07	07/31-08/07	07/31-08/07	07/31-08/07
32	08/07-08/14	08/07-08/14	08/07-08/14	08/07-08/14	08/07-08/14	08/07-08/14
33	08/14-08/21	08/14-08/21	08/14-08/21	08/14-08/21	08/14-08/21	08/14-08/21
34	08/21-08/28	08/21-08/28	08/21-08/28	08/21-08/28	08/21-08/28	08/21-08/28
AUG 89	07/31-08/28	07/31-08/28	07/31-08/28	07/31-08/28	07/31-08/28	07/31-08/28
35	08/28-09/04	08/28-09/04	08/28-09/04	08/28-09/04	08/28-09/04	08/28-09/04
36	09/04-09/12	09/04-09/12	09/04-09/12	09/04-09/12	09/04-09/12	09/04-09/12
37	09/12-09/18	09/12-09/18	09/12-09/18	09/12-09/18	09/12-09/18	09/12-09/18
38	09/18-09/25	09/18-09/25	09/18-09/25	09/18-09/25	09/18-09/25	09/18-09/25
39	09/25-10/02	09/25-10/02	09/25-10/02	09/25-10/02	09/25-10/02	09/25-10/02
SEP 89	08/28-10/02	08/28-10/02	08/28-10/02	08/28-10/02	08/28-10/02	08/28-10/02
40	10/02-10/09	10/02-10/09	10/02-10/09	10/02-10/09	10/02-10/09	10/02-10/09
41	10/09-10/16	10/09-10/16	10/09-10/16	10/09-10/16	10/09-10/16	10/09-10/16
42	10/16-10/23	10/16-10/23	10/16-10/23	10/16-10/23	10/16-10/23	10/16-10/23
43	10/23-10/30	10/23-10/30	10/23-10/30	10/23-10/30	10/23-10/30	10/23-10/30
OCT 89	10/02-10/30	10/02-10/30	10/02-10/30	10/02-10/30	10/02-10/30	10/02-10/30
44	10/30-11/06	10/30-11/06	10/30-11/06	10/30-11/06	10/30-11/06	10/30-11/06
45	11/06-11/13	11/06-11/13	11/06-11/13	11/06-11/13	11/06-11/13	11/06-11/13
46	11/13-11/20	11/13-11/20	11/13-11/20	11/13-11/20	11/13-11/20	11/13-11/20
47	11/20-11/27	11/20-11/27	11/20-11/27	11/20-11/27	11/20-11/27	11/20-11/27
NOV 89	10/30-11/27	10/30-11/27	10/30-11/27	10/30-11/27	10/30-11/27	10/30-11/27
48	11/27-12/04	11/27-12/04	11/27-12/04	11/27-12/04	11/27-12/04	11/27-12/04
49	12/04-12/11	12/04-12/11	12/04-12/11	12/04-12/11	12/04-12/11	12/04-12/11
50	12/11-12/17	12/11-12/17	12/11-12/17	12/11-12/17	12/11-12/17	12/11-12/17
51	12/17-12/24	12/17-12/24	12/17-12/24	12/17-12/24	12/17-12/24	12/17-12/24
52	12/24-01/01	12/24-01/01	12/24-01/01	12/24-01/01	12/24-01/01	12/24-01/01
DEC 89	11/27-01/01	11/27-01/01	11/27-01/01	11/27-01/01	11/27-01/01	11/27-01/01

TABLE C-XXIII SUMMARY OF COLLECTION DATES FOR SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

AIR PARTICULATE & AIR IODINE

	GROUP II - NEAR SITE LOCATIONS					GROUP III - CONTROL LOCATIONS	
WEEK	20D1	26B1	29B1	31D1	35B1	13H4	22G1
1	01/02-01/09	01/02-01/09	01/02-01/09	01/02-01/09	01/02-01/09	01/03-01/09	01/02-01/09
2	01/09-01/16	01/09-01/16	01/09-01/16	01/09-01/16	01/09-01/16	01/09-01/17	01/09-01/16
3	01/16-01/23	01/16-01/23	01/16-01/23	01/16-01/23	01/16-01/23	01/17-01/23	01/16-01/23
4	01/23-01/30	01/23-01/30	01/23-01/30	01/23-01/30	01/23-01/30	01/23-01/30	01/23-01/30
JAN 89	01/02-01/30	01/02-01/30	01/02-01/30	01/02-01/30	01/02-01/30	01/03-01/30	01/02-01/30
5	01/30-02/06	01/30-02/06	01/30-02/06	01/30-02/06	01/30-02/06	01/30-02/07	01/30-02/06
6	02/06-02/13	02/06-02/13	02/06-02/13	02/06-02/13	02/06-02/13	02/07-02/13	02/06-02/13
7	02/13-02/20	02/13-02/20	02/13-02/20	02/13-02/20	02/13-02/20	02/13-02/21	02/13-02/20
8	02/20-02/27	02/20-02/27	02/20-02/27	02/20-02/27	02/20-02/27	02/21-02/27	02/20-02/27
FEB 89	01/30-02/27	01/30-02/27	01/30-02/27	01/30-02/27	01/30-02/27	01/30-02/27	01/30-02/27
9	02/27-03/06	02/27-03/06	02/27-03/06	02/27-03/06	02/27-03/06	02/27-03/06	02/27-03/06
10	03/06-03/13	03/06-03/13	03/06-03/13	03/06-03/13	03/06-03/13	03/06-03/13	03/06-03/13
11	03/13-03/20	03/13-03/20	03/13-03/20	03/13-03/20	03/13-03/20	03/13-03/20	03/13-03/20
12	03/20-03/28	03/20-03/28	03/20-03/28	03/20-03/28	03/20-03/28	03/20-03/27	03/20-03/28
13	03/28-04/03	03/28-04/03	03/28-04/03	03/28-04/03	03/28-04/03	03/27-04/03	03/28-04/03
MAR 89	02/27-04/03	02/27-04/03	02/27-04/03	02/27-04/03	02/27-04/03	02/27-04/03	02/27-04/03
14	04/03-04/10	04/03-04/10	04/03-04/10	04/03-04/10	04/03-04/10	04/03-04/10	04/03-04/10
15	04/10-04/17	04/10-04/17	04/10-04/17	04/10-04/17	04/10-04/17	04/10-04/17	04/10-04/17
16	04/17-04/24	04/17-04/24	04/17-04/24	04/17-04/24	04/17-04/24	04/17-04/24	04/17-04/24
17	04/24-05/01	04/24-05/01	04/24-05/01	04/24-05/01	04/24-05/01	04/24-05/02	04/24-05/01
APR 89	04/03-05/01	04/03-05/01	04/03-05/01	04/03-05/01	04/03-05/01	04/03-05/02	04/03-05/01
18	05/01-05/08	05/01-05/08	05/01-05/08	05/01-05/08	05/01-05/08	05/02-05/08	05/01-05/08
19	05/08-05/15	05/08-05/15	05/08-05/15	05/08-05/15	05/08-05/15	05/08-05/15	05/08-05/15
20	05/15-05/22	05/15-05/22	05/15-05/22	05/15-05/22	05/15-05/22	05/15-05/22	05/15-05/22
21	05/22-05/29	05/22-05/29	05/22-05/29	05/22-05/29	05/22-05/29	05/22-05/30	05/22-05/29
MAY 89	05/01-05/29	05/01-05/29	05/01-05/29	05/01-05/29	05/01-05/29	05/02-05/30	05/01-05/29
22	05/29-06/05	05/29-06/05	05/29-06/05	05/29-06/05	05/29-06/05	05/30-06/05	05/29-06/05
23	06/05-06/12	06/05-06/12	06/05-06/12	06/05-06/12	06/05-06/12	06/05-06/12	06/05-06/12
24	06/12-06/19	06/12-06/19	06/12-06/19	06/12-06/19	06/12-06/19	06/12-06/19	06/12-06/19
25	06/19-06/26	06/19-06/26	06/19-06/26	06/19-06/26	06/19-06/26	06/19-06/26	06/19-06/26
26	06/26-07/02	06/26-07/02	06/26-07/02	06/26-07/02	06/26-07/02	06/26-07/03	06/26-07/02
JUN 89	05/29-07/02	05/29-07/02	05/29-07/02	05/29-07/02	05/29-07/02	05/30-07/03	05/29-07/02
27	07/02-07/09	07/02-07/09	07/02-07/09	07/02-07/09	07/02-07/09	07/03-07/10	07/02-07/09
28	07/09-07/16	07/09-07/16	07/09-07/16	07/09-07/16	07/09-07/16	07/10-07/17	07/09-07/16
29	07/16-07/23	07/16-07/23	07/16-07/23	07/16-07/23	07/16-07/23	07/17-07/24	07/16-07/23
30	07/23-07/31	07/23-07/31	07/23-07/31	07/23-07/31	07/23-07/31	07/24-07/31	07/23-07/31
JUL 89	07/02-07/31	07/02-07/31	07/02-07/31	07/02-07/31	07/02-07/31	07/03-07/31	07/02-07/31
31	07/31-08/07	07/31-08/07	07/31-08/07	07/31-08/07	07/31-08/07	07/31-08/08	07/31-08/07
32	08/07-08/14	08/07-08/14	08/07-08/14	08/07-08/14	08/07-08/14	08/08-08/14	08/07-08/14
33	08/14-08/21	08/14-08/21	08/14-08/21	08/14-08/21	08/14-08/21	08/14-08/21	08/14-08/21
34	08/21-08/28	08/21-08/28	08/21-08/28	08/21-08/28	08/21-08/28	08/21-08/28	08/21-08/28
AUG 89	07/31-08/28	07/31-08/28	07/31-08/28	07/31-08/28	07/31-08/28	07/31-08/28	07/31-08/28
35	08/28-09/04	08/28-09/04	08/28-09/04	08/28-09/04	08/28-09/04	08/28-09/05	08/28-09/04
36	09/04-09/12	09/04-09/12	09/04-09/12	09/04-09/12	09/04-09/12	09/05-09/11	09/04-09/12
37	09/12-09/18	09/12-09/18	09/12-09/18	09/12-09/18	09/12-09/18	09/11-09/18	09/12-09/18
38	09/18-09/25	09/18-09/25	09/18-09/25	09/18-09/25	09/18-09/25	09/18-09/25	09/18-09/25
39	09/25-10/02	09/25-10/02	09/25-10/02	09/25-10/02	09/25-10/02	09/25-10/02	09/25-10/02
SEP 89	08/28-10/02	08/28-10/02	08/28-10/02	08/28-10/02	08/28-10/02	08/28-10/02	08/28-10/02
40	10/02-10/09	10/02-10/09	10/02-10/09	10/02-10/09	10/02-10/09	10/02-10/10	10/02-10/09
41	10/09-10/16	10/09-10/16	10/09-10/16	10/09-10/16	10/09-10/16	10/10-10/16	10/09-10/16
42	10/16-10/23	10/16-10/23	10/16-10/23	10/16-10/23	10/16-10/23	10/16-10/23	10/16-10/23
43	10/23-10/30	10/23-10/30	10/23-10/30	10/23-10/30	10/23-10/30	10/23-10/30	10/23-10/30
OCT 89	10/02-10/30	10/02-10/30	10/02-10/30	10/02-10/30	10/02-10/30	10/02-10/30	10/02-10/30
44	10/30-11/06	10/30-11/06	10/30-11/06	10/30-11/06	10/30-11/06	10/30-11/06	10/30-11/06
45	11/06-11/13	11/06-11/13	11/06-11/13	11/06-11/13	11/06-11/13	11/06-11/13	11/06-11/13
46	11/13-11/20	11/13-11/20	11/13-11/20	11/13-11/20	11/13-11/20	11/13-11/20	11/13-11/20
47	11/20-11/27	11/20-11/27	11/20-11/27	11/20-11/27	11/20-11/27	11/20-11/27	11/20-11/27
NOV 89	10/30-11/27	10/30-11/27	10/30-11/27	10/30-11/27	10/30-11/27	10/30-11/27	10/30-11/27
48	11/27-12/04	11/27-12/04	11/27-12/04	11/27-12/04	11/27-12/04	11/27-12/04	11/27-12/04
49	12/04-12/11	12/04-12/11	12/04-12/11	12/04-12/11	12/04-12/11	12/04-12/11	12/04-12/11
50	12/11-12/17	12/11-12/17	12/11-12/17	12/11-12/17	12/11-12/17	12/11-12/18	12/11-12/17
51	12/17-12/24	12/17-12/24	12/17-12/24	12/17-12/24	12/17-12/24	12/18-12/26	12/17-12/24
52	12/24-01/01	12/24-01/01	12/24-01/01	12/24-01/01	12/24-01/01	12/26-01/02	12/24-01/01
DEC 89	11/27-01/01	11/27-01/01	11/27-01/01	11/27-01/01	11/27-01/01	11/27-01/02	11/27-01/01

TABLE C-XXIII SUMMARY OF COLLECTION DATES FOR SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

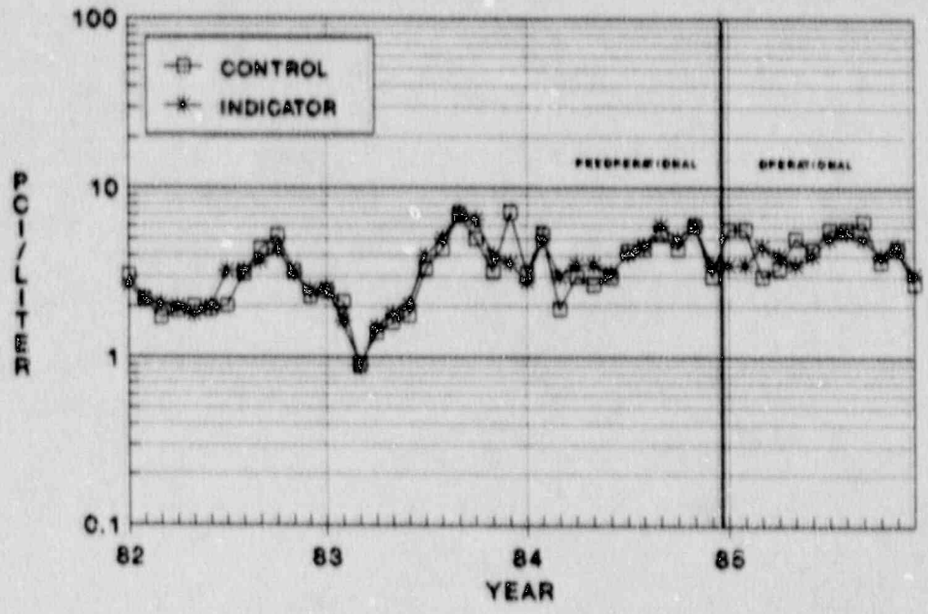
TATION CODE	JAN 1989	FEB 1989	MAR 1989	APR 1989	MAY 1989	JUN 1989	JUL 1989	AUG 1989	SEP 1989	OCT 1989	NOV 1989	DEC 1989
36S1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03			
36S2										10/03-11/01	11/01-12/06	12/06-01/03
2B1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
2E1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
351	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
4E1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
5S1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
5H1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
6C1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
7S1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
7E1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
9C1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
10S3	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
10E1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
10F3	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
11S1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
13C1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
13E1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
13H4	01/03-02/07	02/07-03/06	03/06-04/03	04/03-05/02	05/02-06/05	06/05-07/06	07/06-07/31	07/31-09/05	09/05-10/02	10/02-11/06	11/06-12/11	12/11-01/00
14S1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
15J1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
16S2	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/03	05/03-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
16F1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
17B1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
18S1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
18G1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
19D1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
20D1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
20F1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
21S1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
22G1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
23S2	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
24D1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
25S1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
25D1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
26S3	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
26B1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
28D2	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
29S1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
29B1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
29E1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
31D1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
31D2	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
32S1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
32G1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
34S2	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
34E1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
35B1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03
35F1	01/03-02/07	02/07-03/07	03/07-04/04	04/04-05/02	05/02-06/07	06/07-07/05	07/05-08/02	08/02-09/05	09/05-10/03	10/03-11/01	11/01-12/06	12/06-01/03

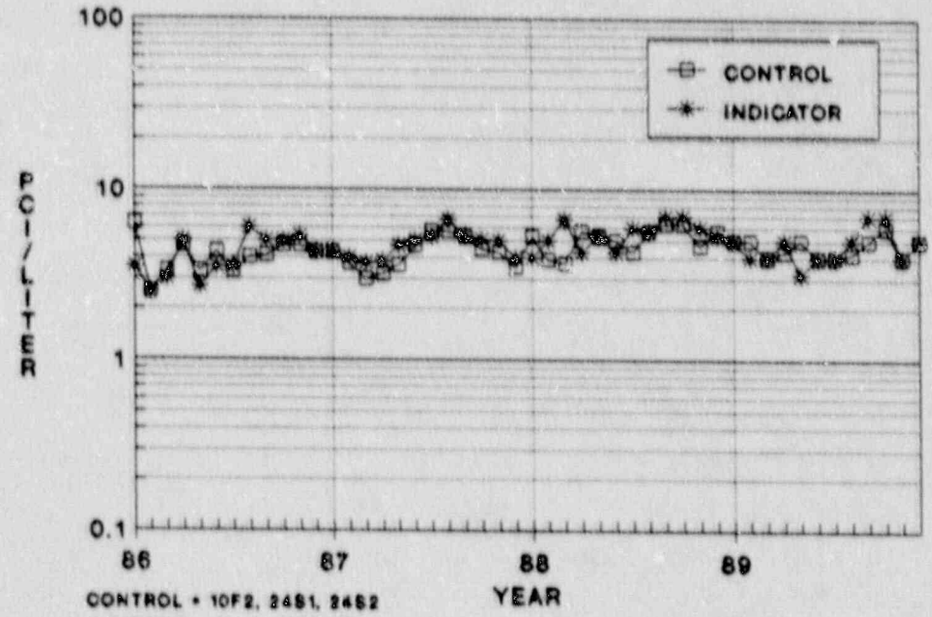
TABLE C-XXIII SUMMARY OF COLLECTION DATES FOR SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1989

STATION CODE	JAN-MAR 1989	APR-JUN 1989	JUL-SEP 1989	OCT-DEC 1989
3691	01/03-04/04	04/04-07/05	07/05-09/06	
3692				10/03-01/03
2B1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
2E1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
3S1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
4E1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
5S1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
9H1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
6C1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
7S1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
7E1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
9C1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
10S3	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
10E1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
10F3	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
11S1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
13C1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
13E1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
13H4	01/03-04/03	04/03-07/06	07/06-10/02	10/02-01/08
14S1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
15D1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
16S2	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
16F1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
17B1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
18S1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
18G1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
19D1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
20D1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
20F1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
21S1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
22G1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
23S2	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
24D1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
25S1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
25D1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
26S3	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
26B1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
28D2	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
29S1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
29B1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
29E1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
31D1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
31D2	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
32S1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
32G1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
34S2	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
34E1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
35B1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03
35F1	01/03-04/04	04/04-07/05	07/05-10/03	10/03-01/03

FIGURE C-1

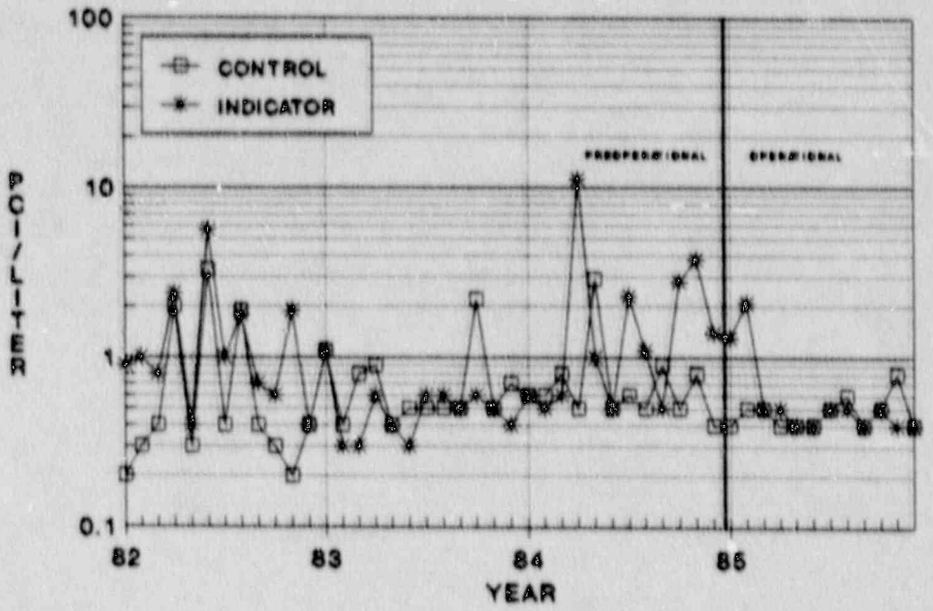
MEAN MONTHLY SOLUBLE GROSS BETA CONCENTRATIONS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LGS, 1982 - 1989

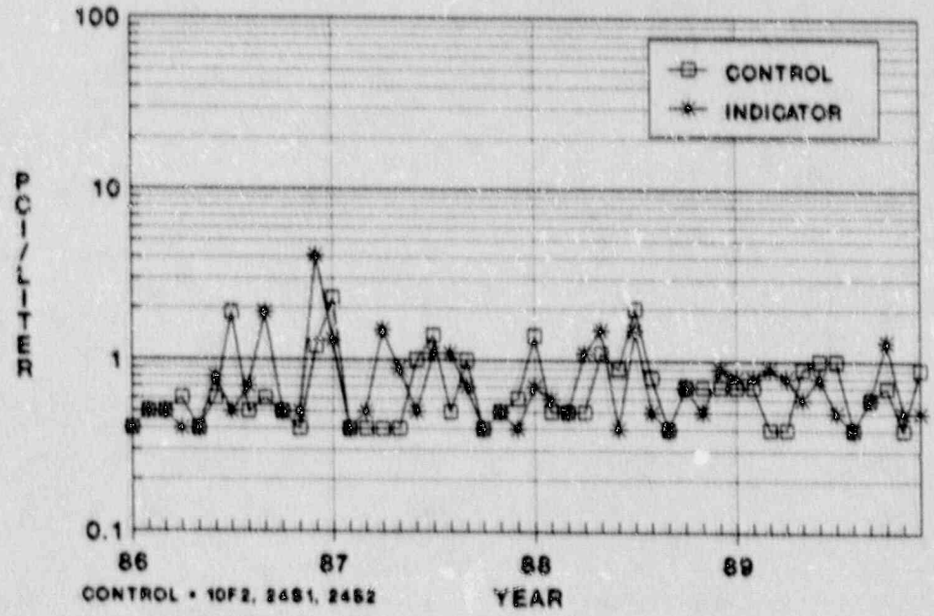




CONTROL • 10F2, 24S1, 24S2
INDICATOR • 13H2, 16F8, 16S2

FIGURE C-2
MEAN MONTHLY INSOLUBLE GROSS BETA CONCENTRATIONS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LGS, 1982 - 1989

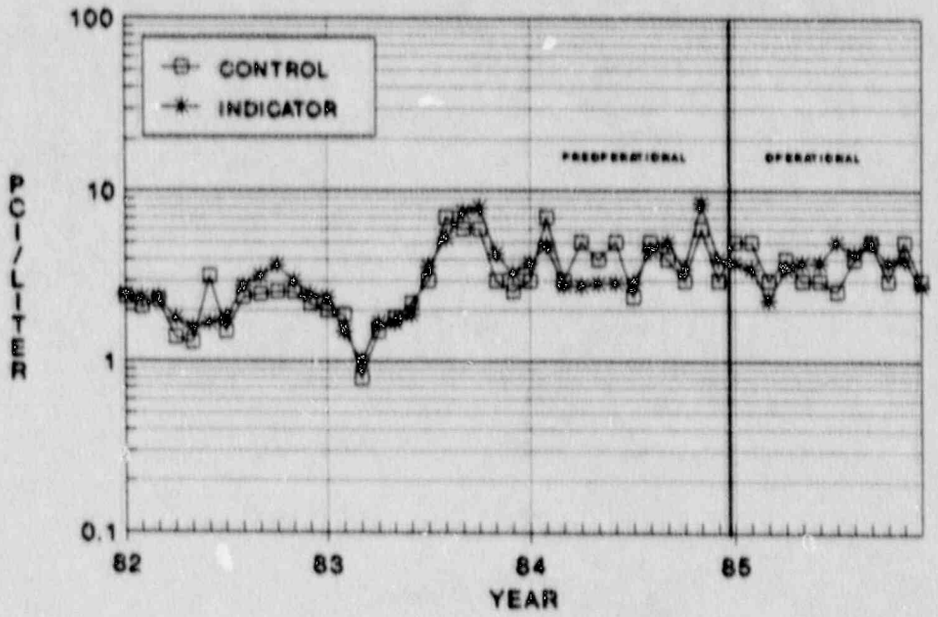


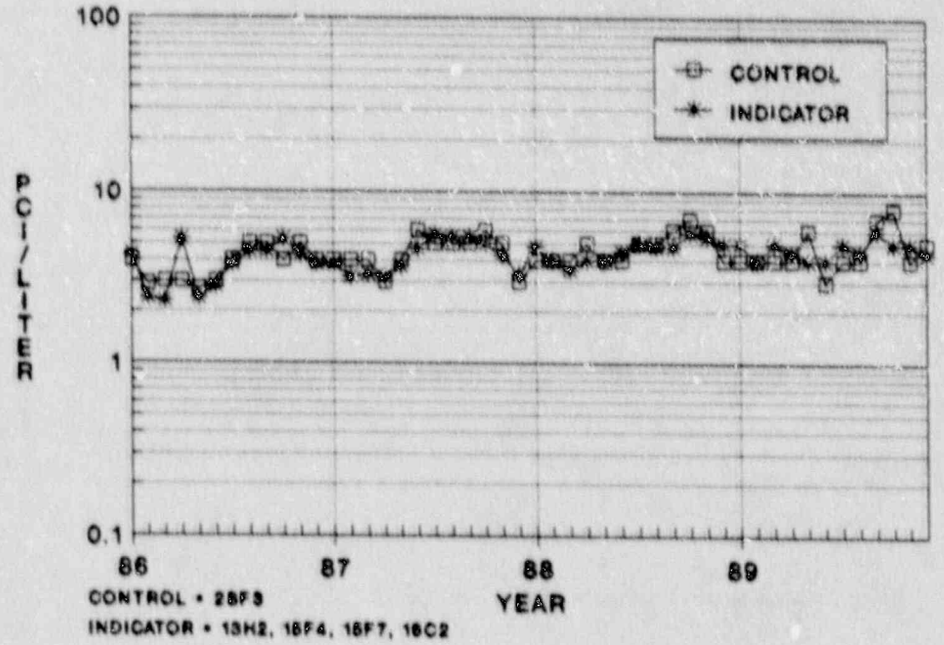


CONTROL • 10F2, 24S1, 24S2
INDICATOR • 13H2, 15F6, 16S2

FIGURE C-3

MEAN MONTHLY SOLUBLE GROSS BETA CONCENTRATIONS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINTY OF LGS, 1982 - 1989



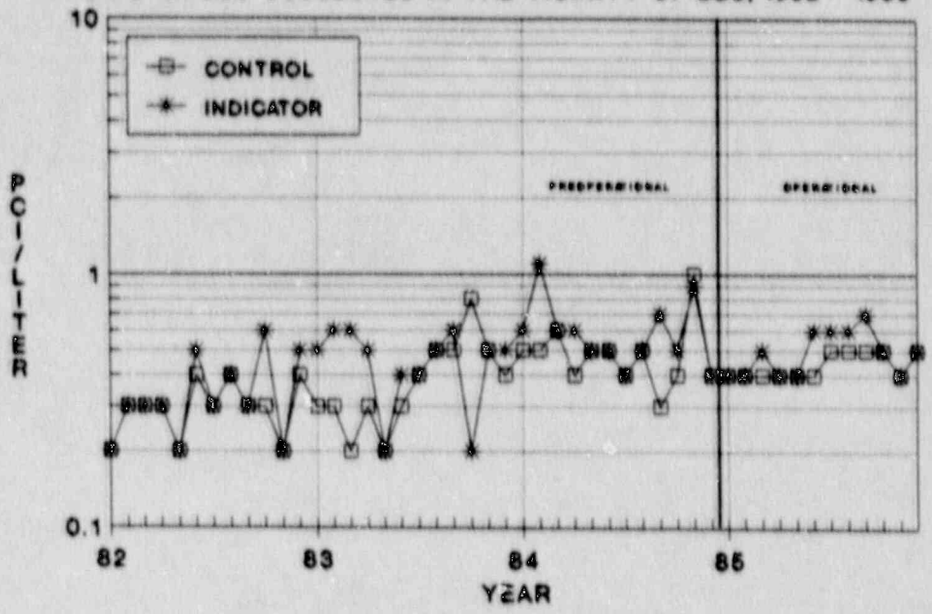


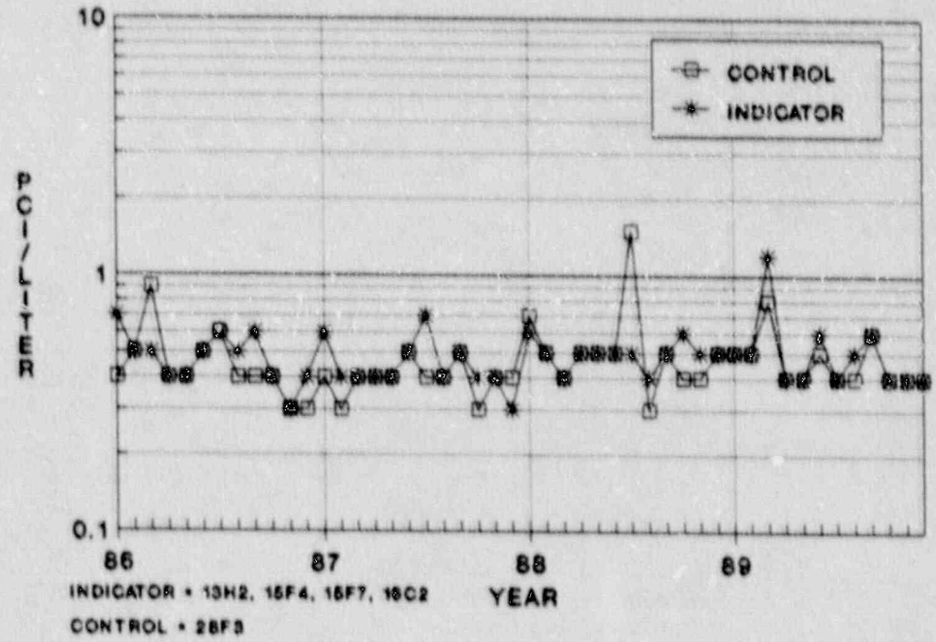
CONTROL • 28F9

INDICATOR • 13H2, 18F4, 18F7, 19C2

FIGURE C-4

MEAN MONTHLY INSOLUBLE GROSS BETA CONCENTRATIONS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LGS, 1982 - 1989





INDICATOR = 13H2, 15F4, 15F7, 16C2

CONTROL = 28F3

FIGURE C-5

MEAN ANNUAL CS-137 CONCENTRATIONS IN FISH SAMPLES

COLLECTED IN THE VICINITY OF LGS, 1982 - 1989

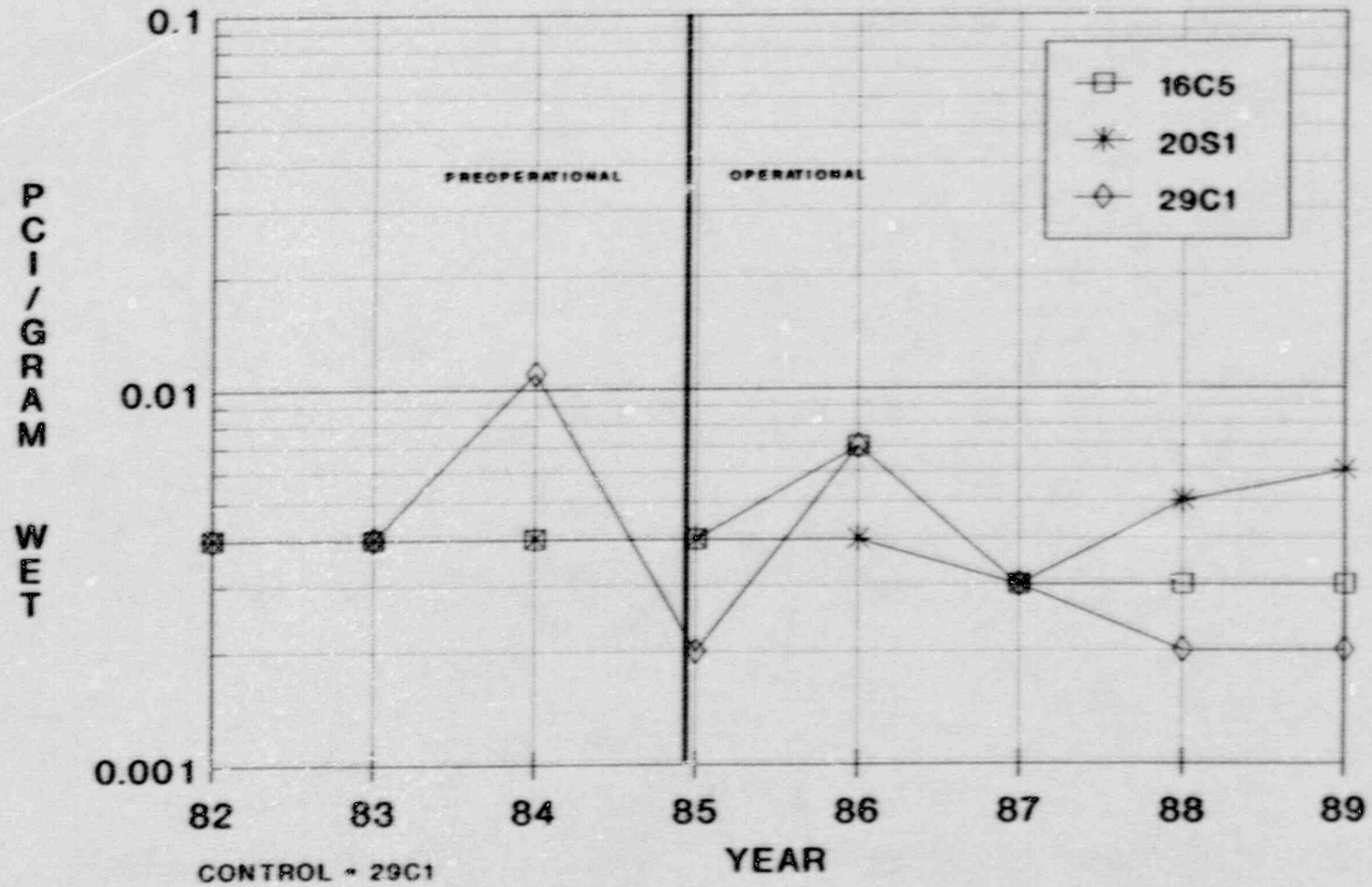


FIGURE C-6

MEAN ANNUAL CS-137 CONCENTRATIONS IN SEDIMENT SAMPLES

COLLECTED IN THE VICINITY OF LGS, 1982 - 1989

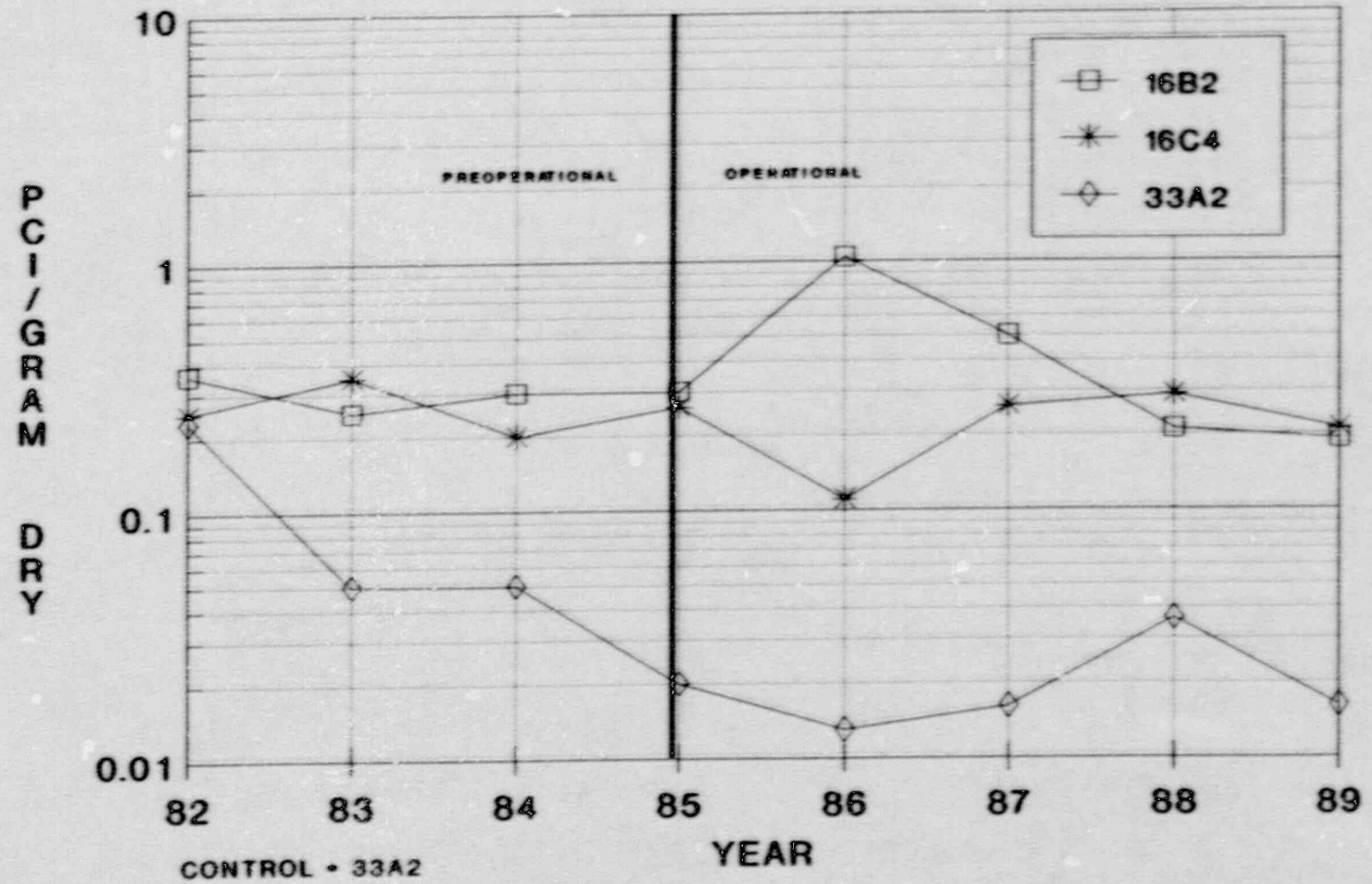
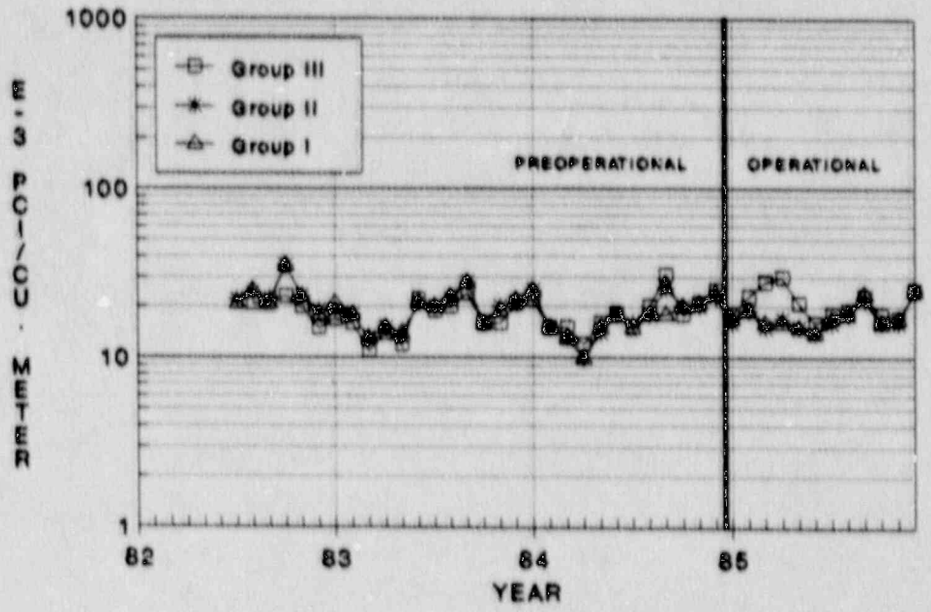


FIGURE C-7

MEAN MONTHLY GROSS BETA CONCENTRATIONS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LGS, 1982 - 1989



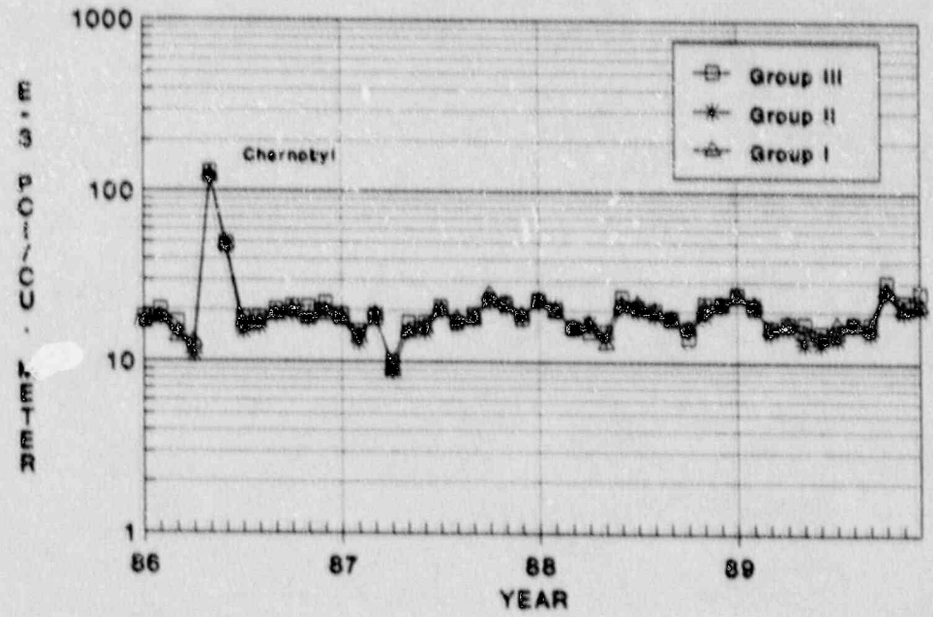
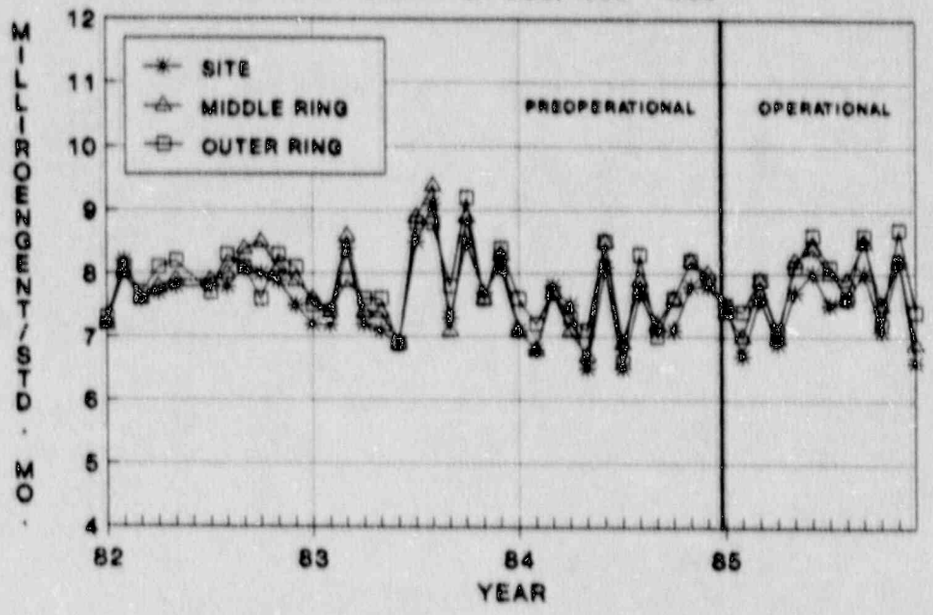
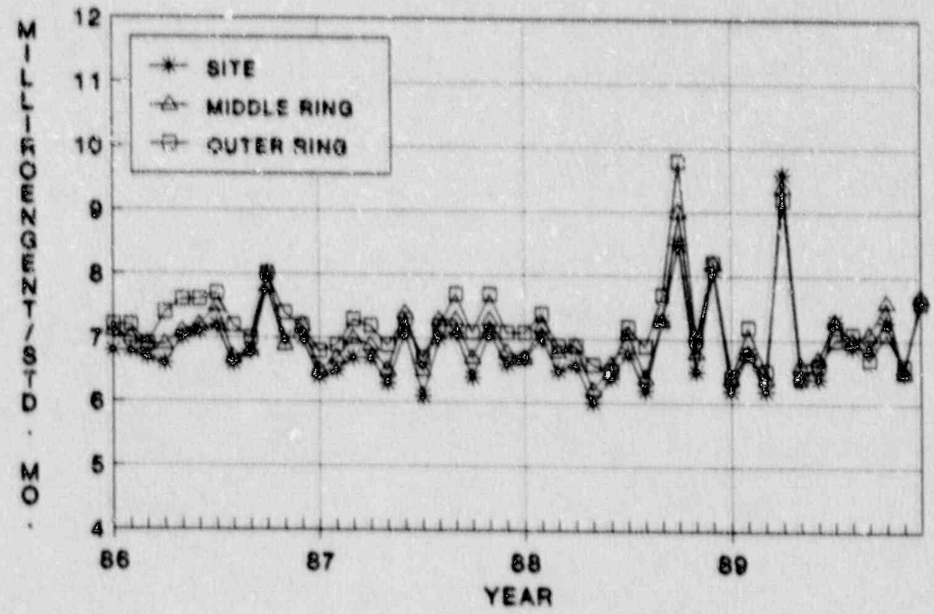


FIGURE C-8

MEAN MONTHLY AMBIENT GAMMA RADIATION LEVELS (TLD)

IN THE VICINITY OF LGS, 1982 - 1989





SYNOPSIS OF ANALYTICAL PROCEDURES

APPENDIX D SYNOPSIS OF ANALYTICAL PROCEDURES

The following section contains a description of the analytical laboratory procedures along with an explanation of the analytical calculation methods used by Teledyne Isotopes for sample analysis.

Sample Preparation and Counting Procedures

Several types of liquid samples are separated by filtration prior to analysis. Resulting portions are identified as soluble and insoluble. Therefore, soluble as used in this report, is defined as that portion of a sample that passes through a 0.45 Millipore micron filter. Insoluble is defined as that portion of a sample that is collected on the filter.

DETERMINATION OF GROSS BETA ACTIVITY IN AIR PARTICULATE SAMPLES

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.

$$\underset{(pCi/m^3)}{Result} = \underbrace{\frac{\left(\frac{N}{t}\right) - \beta}{(2.22)(v)(E)(.02832)}}_{\text{Net Activity}} \pm \underbrace{\frac{2\sqrt{\left(\frac{N}{t^2}\right) + \left(\frac{\beta}{t}\right)}}{(2.22)(v)(E)(.02832)}}_{\text{Counting Error}}$$

where:

N	= total counts from sample (counts)
t	= counting time for sample (min)
β	= background rate of counter (cpm)
2.22	= dpm per 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 from cubic feet 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 ALPHA AND/OR BETA ACTIVITY IN WATER SAMPLES (TOTAL SUSPENDED AND DISSOLVED FRACTION)

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 well water samples a 1-liter aliquot is evaporated almost to dryness and then transferred to a 2-inch stainless steel planchet.

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 filtrate which represents the soluble portion of the sample is evaporated on a hotplate, 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 or of the MDL

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

where:

N	= total counts from sample (counts)
t	= counting time for sample (min)
β	= background rate of counter (cpm)
2.22	= dpm per 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 net activity.

DETERMINATION OF TRITIUM BY GAS COUNTING

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

Calculation of the Sample Activity or the MDL:

$$\frac{3.234 \times TU_N \times V_N}{CPM_N \times V_s} [\ CPM_G - BKG\ ] \pm \frac{3.234 \times TU_N \times V_N}{CPM_N \times V_s} \left(2\sqrt{\sigma G^2 + \sigma B^2}\right)$$

Net Activity — Counting Error

where:

TU_N	= the tritium units of the standard
V_N	= volume of the standard used to calibrate the efficiency of the detector (psia)
V_s	= volume of the sample loaded into the detector (psia)
CPM_N	= the cpm activity of the standard of volume V
CPM_G	= the gross activity of the sample of volume V and the detector background
BKG	= the background of the detector in cpm
3.234	= conversion factor changing TU to pCi/l
2	= multiple of the counting error
σG	= standard deviation of the gross activity of the sample and the detector background, in cpm
σB	= standard deviation of the background, in cpm

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 ELECTROLYTIC ENRICHMENT AND LIQUID SCINTILLATION COUNTING

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 mls. 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 mls of cocktail is added. The sample is counted for 100 minutes in a liquid scintillation counter.

Determination of the Enrichment Factor

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.

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

Calculation of the Sample Activity or of the MDL for Tritium

$$\text{Net } \frac{\text{pCi}}{\text{unit vol.}} = \underbrace{\frac{\left(\frac{N}{t}\right) - \beta}{2.22(v)(EF)(E)}}_{\text{Net Activity}} \pm \underbrace{\frac{2\sqrt{\left(\frac{N}{t^2}\right)\left(\frac{\beta}{t}\right)}}{2.22(v)(EF)(E)}}_{\text{Counting Error}}$$

where:

N	= total counts from sample (counts)
t	= counting time for sample (min)
β	= background rate of counter (cpm)
2.22	= $\frac{\text{dpm}}{\text{pCi}}$
v	= initial volume (in liters) before enrichment
EF	= enrichment factor
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 I-131 IN MILK AND WATER SAMPLES BY RADIOCHEMISTRY AND LIQUID PHASE BETA ANALYSIS

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

Four liters of sample are first equilibrated with stable iodide carrier. A batch treatment with anion exchange resin is used to remove iodide from the sample. The iodine is then stripped from the resin with sodium hypochloride, reduced with hydroxylamine hydrochloride, and extracted into carbon tetrachloride as free iodine. It is then back-extracted as iodide into sodium bisulfite solution.

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

Calculation of the Sample Activity and 2 Sigma Error:

$$\underset{(pCi/l)}{\text{Result}} = \underbrace{\frac{\left(\frac{N}{t}\right) - \beta}{2.22(v)(y)(DF)(E)}}_{\text{Net Activity}} \pm \underbrace{\frac{2\sqrt{\left(\frac{N}{t^2}\right) + \left(\frac{\beta}{t}\right)}}{2.22(v)(y)(DF)(E)}}_{\text{Counting Error}}$$

where:

N	= total counts from sample (counts)
t	= counting time for sample (min)
β	= background rate of counter (cpm)
2.22	= dpm per pCi
v	= volume of sample analyzed (liters)
y	= chemical yield of the amount of sample counted
DF	= decay factor from the collection to the midcount time $\left(e^{-\lambda \Delta t(\text{days})}\right)$

E = efficiency of the counter for I-131

2 = multiple of the counting error

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

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 GAMMA EMITTING RADIOISOTOPES

Gamma emitting radioisotopes are determined with the use of lithium drifted germanium (GeLi) and high purity germanium (HPGe) 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 or HPGe 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 spectrometry systems are calibrated for each standard geometry using certified radionuclide standards traceable to the National Bureau of Standards.

Calculation of the Sample Activity and 2 Sigma Error:

$$\text{Net } \frac{\text{pCi}}{\text{vol. or mass}} = \underbrace{\frac{N_{(j)} - B_{(j)}}{2.22(V)(E_{(j)})(BI)(DF_{(j)})(t)}}_{\text{Net Activity}} \pm \underbrace{\frac{2\sqrt{N_{(j)} + B_{(j)}}}{2.22(V)(E_{(j)})(BI)(DF_{(j)})(t)}}_{\text{Counting Error}}$$

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 (BB)(t) is subtracted from N before using the above equation. BB 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.

t = counting interval of sample, minutes

2.22 = dpm per pCi

V = volume or mass of sample analyzed

$E_{(j)}$ = efficiency of counter at the energy region of interest

BI = branching intensity of the nuclide at the gamma emission energy under consideration

$DF_{(j)}$ = decay factor for nuclide j from sample collection time to midpoint of the counting interval $\left(e^{-\lambda \hat{\Delta} t(\text{days})}\right)$

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 net activity.

ENVIRONMENTAL DOSIMETRY

Teledyne Isotopes dosimeters are rectangular teflon wafers impregnated with 25% $CaSO_4$: 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 Isotopes 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:

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

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:

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

where:

cdose	= control area dose in mR
cr	= initial reading of the control area
crr	= second reading of the control area (after re-irradation)
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:

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

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

Appendix E: QUALITY CONTROL PROGRAM

TI participates in the EPA radiological interlaboratory comparison (cross check) program. This participation includes a number of analyses on various sample media as found in the 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. During 1989, 60 of the 62 samples analyzed fell within three standard deviations of the EPA known values. Table E-1 summarizes the 1989 results of this program.

The second quality control program includes the analysis of blank and spiked samples. This intralaboratory program indicates the proper functioning of the chemistry and instrumentation for gross alpha, gross beta, iodine-131, strontium-89 -90, gamma and the tritium analyses. Of the 1085 analyses completed during 1989, 4 were determined to be outside the expected range. One powdered milk was spiked with strontium showing activity in a blank. Two spiked strontium samples were low due to low chemical yields. One water spiked with H-3 was slightly high. The sample was recounted and the result fell within the expected range. All anomalies were investigated and resolved.

In conjunction with the Limerick REMP, TI participates in a duplicate analysis program.. The duplicate or replicate samples are prepared in the field from samples that are as homogenous as possible, such as well-stirred or mixed liquids. TLD's are co-located for ambient gamma radiation measurements. Of the 356 duplicate/replicate samples analyzed in 1989, 354 are considered to be in agreement with the original result. One K-40 analysis on milk which did not agree with its duplicate was re-analyzed. The second analysis showed consistent results. One gross beta analysis on an air particulate did not agree due to the loading difference of the two air particulates. One was noticeably darker than the other. Recounting the samples reaffirmed the inconsistency of the initial counts.

TABLE E-1

INTER-LABORATORY COMPARISONS, 1989

TELEDYNE ISOTOPES

Collection Date	Sequence No.	Media	Nuclide	EPA Results(a)	Teledyne Isotopes Results(b)	Normalized Deviation Grand Avg.	Normalized Deviation Known	All Participant Mean ± 2 s.d
10/18/88	503	Water	Cs-134	15.00 ± 8.66	15.67 ± 3.45	0.46	0.23	14.34 ± 3.48
			Cs-137	15.00 ± 8.66	16.33 ± 9.63	0.21	0.46	15.72 ± 3.38
01/20/89	507	Water	Gross Alpha	8.00 ± 8.66	8.00 ± 3.00	0.40	0.00	7.88 ± 4.52
			Gross Beta	4.00 ± 8.66	6.00 ± 0.00	0.21	0.69	5.41 ± 3.56
01/06/89	508	Water	Sr-89	40.00 ± 8.66	37.00 ± 7.95	-0.36	-1.04	38.04 ± 15.54
			Sr-90	25.00 ± 2.60	26.00 ± 6.00	1.86	1.15	24.39 ± 3.94
02/10/89	510	Water	Cr-51	235.00 ± 41.56	245.67 ± 35.16	0.93	0.77	232.71 ± 40.50
			Co-60	10.00 ± 8.66	12.67 ± 15.46	0.70	0.92	10.65 ± 4.18
			Zn-65	159.00 ± 27.71	181.33 ± 16.53 (d)	2.29	2.42	160.15 ± 23.58
			Ru-106	178.00 ± 31.18	191.00 ± 29.55	1.91	1.25	171.19 ± 30.24
			Cs-134	10.00 ± 8.66	10.33 ± 1.74	0.21	0.12	9.73 ± 3.78
			Cs-137	10.00 ± 8.66	13.67 ± 1.74	1.01	1.27	10.74 ± 3.78
02/17/89	511	Water	I-131	106.00 ± 19.05	98.67 ± 1.74	-1.19	-1.15	106.20 ± 14.38
02/24/89	512	Water	H-3	2754.00 ± 616.61	2866.67 ± 754.98	0.70	0.55	2722.79 ± 549.12
03/31/89	515	Air Filter	Gross Alpha	21.00 ± 8.66	28.67 ± 3.45 (e)	2.09	2.66	22.64 ± 8.64
			Gross Beta	62.00 ± 8.66	65.76 ± 4.59	0.88	1.27	63.14 ± 16.42
			Sr-90	20.00 ± 2.60	19.67 ± 6.24	0.53	-0.38	19.21 ± 5.50
			Cs-137	20.00 ± 8.66	18.00 ± 3.00	-1.15	-0.69	21.31 ± 7.74
05/12/89	516	Water	Gross Alpha	30.00 ± 13.86	28.67 ± 3.45	0.22	-0.29	27.64 ± 15.02
			Gross Beta	50.00 ± 8.66	52.00 ± 5.19	0.59	0.69	50.31 ± 16.04
04/18/89	517	Water	Gross Beta	57.00 ± 8.66	53.00 ± 10.83	0.89	-1.39	50.42 ± 14.90
			Sr-89	8.00 ± 8.66	8.00 ± 0.00	0.05	0.00	7.87 ± 3.80
			Sr-90	8.00 ± 2.60	7.67 ± 1.74	-0.13	-0.38	7.78 ± 2.32
			Cs-134	20.00 ± 8.66	19.67 ± 4.59	0.19	-0.12	19.12 ± 5.42
			Cs-137	20.00 ± 8.66	20.00 ± 7.95	-0.08	0.00	20.24 ± 4.58
04/28/89	518	Milk	Sr-89	39.00 ± 8.66	36.67 ± 3.45	0.73	-0.81	34.56 ± 17.56
			Sr-90	55.00 ± 5.20	56.33 ± 4.59	1.88	0.77	53.07 ± 10.90
			Cs-137	50.00 ± 8.66	53.33 ± 6.93	1.20	1.15	49.86 ± 6.28
			K	1600.00 ± 138.56	1760.00 ± 340.74 (f)	2.48	3.46	1645.58 ± 238.28

Footnotes are located at the end of table.

TABLE E-1

INTER-LABORATORY COMPARISONS, 1989

TELEDYNE ISOTOPES

(Page 2 of 3)

Collection Date	Sequence No.	Media	Nuclide	EPA Results(a)	Teledyne Isotopes Results(b)	Normalized Deviation Grand Avg.	Normalized Deviation Known	All Participant Mean ± 2 s.d
04/18/89	519	Water	Gross Alpha	29.00 ± 12.12	21.33 ± 6.93	-1.09	-1.90	25.75 ± 14.84
			Ra-226	3.50 ± 0.87	3.47 ± 0.69	0.17	-0.12	3.42 ± 0.10
			Ra-228	3.60 ± 0.87	3.60 ± 0.30	-0.76	0.00	3.82 ± 1.54
			U	3.00 ± 10.39	3.00 ± 0.00	-0.09	0.00	3.31 ± 3.42
05/05/89	520	Water	Sr-89	6.00 ± 8.66	6.33 ± 1.74	0.15	0.12	5.90 ± 2.96
			Sr-90	6.00 ± 2.60	6.33 ± 1.74	0.89	0.38	5.56 ± 1.70
06/09/89	521	Water	Ba-133	49.00 ± 8.66	33.00 ± 10.83 (g)	-5.05	-5.54	47.58 ± 10.24
			Co-60	31.00 ± 8.66	30.00 ± 7.95	-0.36	-0.35	31.04 ± 5.76
			Zn-65	165.00 ± 29.44	165.33 ± 1.74	-0.16	0.03	166.87 ± 22.92
			Ru-106	128.00 ± 22.52	113.67 ± 52.50	-1.29	-1.91	123.31 ± 27.28
			Cs-134	39.00 ± 8.66	34.00 ± 7.95	-1.13	-1.73	37.26 ± 6.58
			Cs-137	20.00 ± 8.66	22.00 ± 10.83	0.37	0.69	20.92 ± 4.46
06/23/89	522	Water	H-3	4503.00 ± 779.42	4466.67 ± 458.25	-0.09	-0.14	4491.17 ±768.26
08/04/89	525	Water	I-131	83.00 ± 13.86	79.33 ± 12.12	-1.10	-0.79	84.41 ± 7.58
08/25/89	527	Air Filter	Gross Alpha	6.00 ± 8.66	8.33 ± 2.98	0.63	0.81	6.51 ± 3.12
			Gross Beta	- Invalidated by EPA				
			I-131	- Invalidated by EPA				
			Cs-137	10.00 ± 8.66	12.00 ± 3.00	0.42	0.96	10.79 ± 3.92
09/22/89	528	Water	Gross Alpha	4.00 ± 8.66	5.00 ± 0.00	0.21	0.35	4.38 ± 3.64
			Gross Beta	6.00 ± 8.66	8.00 ± 0.00	0.45	0.69	6.70 ± 3.66
10/20/89	529	Water	H-3	3496.00 ± 630.46	3433.33 ± 173.22	-0.18	-0.30	3471.07 ±738.15
10/06/89	530	Water	Ba-133	59.00 ± 10.39	51.00 ± 13.08 (h)	-1.94	-2.31	57.72 ± 10.18
			Co-60	30.00 ± 8.66	30.67 ± 6.24	0.06	0.23	30.49 ± 4.98
			Zn-65	129.00 ± 22.52	128.33 ± 8.67	-0.05	-0.09	128.71 ± 17.56
			Ru-106	161.00 ± 27.71	139.00 ± 47.16	-1.49	-2.38	152.74 ± 27.14
			Cs-134	29.00 ± 8.66	23.67 ± 3.45	-1.27	-1.85	27.34 ± 5.66
			Cs-137	59.00 ± 8.66	61.67 ± 4.59	0.10	0.92	61.37 ± 8.96

Footnotes are located at the end of table.

TABLE E-1

INTER-LABORATORY COMPARISONS, 1989

TELEDYNE ISOTOPES

(Page 3 of 3)

Collection Date	Sequence No.	Media	Nuclide	EPA Results(a)	Teledyne Isotopes Results(b)	Normalized Deviation Grand Avg.	Normalized Deviation Known	All Participant Mean ± 2 s.d
10/31/89	532	Water	Gross Alpha	49.00 ± 20.78	42.33 ± 17.31	-0.40	-0.96	45.13 ± 22.14
			Gross Beta	32.00 ± 8.66	30.33 ± 1.74	-0.10	-0.58	30.61 ± 7.98
			Sr-89	15.00 ± 8.66	15.00 ± 10.38	0.30	0.00	14.14 ± 5.94
			Sr-90	7.00 ± 2.60	7.00 ± 0.00	0.53	0.00	6.54 ± 2.28
			Cs-134	5.00 ± 8.66	5.33 ± 3.45	0.07	0.12	5.51 ± 2.78
			Cs-137	5.00 ± 8.66	7.00 ± 0.00	0.37	0.69	5.93 ± 3.42
01/26/90	533	Water	Gross Alpha	12.00 ± 8.66	10.00 ± 5.19	-0.52	-0.69	12.30 ± 18.46
			Gross Beta	12.00 ± 8.66	12.33 ± 4.59	-0.20	0.12	14.96 ± 23.20

Footnotes:

(a) EPA Results - Expected laboratory precision (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) Units for food analysis are pCi/kg except K which is mg/kg.

(d) The three Zn-65 measurements were 184, 175 and 185 pCi/liter. These were measured on three detectors using the same aliquot. The other reported results (Cr-51, Co-60, Ru-106, Cs-134, Cs-137) were all within two standard deviations of the EPA results. This would indicate that the dilution made was correct (except that possibly the Zn-65 was not well mixed). Other parameters were investigated. The branching intensity, decay factor, and detection efficiencies were checked. Since one of the Co-60 gamma ray energies is only 60 KeV from Zn-65, the detector efficiencies must be correct. There is no obvious reason for the deviation. Another aliquot was counted yielding 165 pCi/l.

(e) The EPA deposits activity on the filter over a small diameter (nearly a point source) whereas our calibration is based on a deposit nearly 2 inches in diameter. In order to correct to point source geometry our practice has been to divide our results by 1.2. We neglected to do it on this test.

(f) There is no apparent reason why the potassium was high. Three separate detectors were used and the K-40 value for each was correctly divided by 0.86 to convert to potassium in mg/liter.

(g) There is no apparent reason why Ba-133 was low by 5.54 standard deviation while the other isotopes were within ± 2 standard deviations. The detector efficiencies and Ba-133 branching intensities were checked and found to be correct. On 10/31/89, 300 ml of the original, undiluted sample was counted giving 43.9 ± 5.8 pCi/l of Ba-133.

(h) This EPA samples was counted in two geometries; one in diluted stage, the other undiluted. There was no significant difference. Comparing detector efficiencies between two annual sets did not reveal any significant difference. Thus there is no apparent reason why our results differed as much as they did.

LGS SURVEY

APPENDIX F: LGS SURVEYS

A Land Use Census around the Limerick Generating Station (LGS) was conducted by RMC Environmental Services for Philadelphia Electric Company to comply with Section 3/4.12.2 of Plant's Technical Specifications. The survey was conducted during the May to September 1989 growing season. The results of this survey are summarized in Table F-1.

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

TABLE F-1

Location of the Nearest Residence, Garden and Milk Farm within a Five Mile Radius of Limerick Generating Station, 1989

(Distance in Miles)

Sector	Residence	Garden (1)	Milk Farm
N	0.5	2.0	4.7
NNE	0.5	1.0	-
NE	0.6	2.1	-
ENE	0.6	1.5	-
E	0.6	1.1	-
ESE	1.0	0.5(2)	1.1(3)
SE	1.0	2.4	4.5
SSE	0.8	1.1	4.6
S	1.0	1.2	2.3
SSW	0.6	1.1	1.8
SW	0.6	0.9	3.0
WSW	0.8	0.8	4.7
W	0.6	2.2	2.8
WNW	0.7	1.0	-
NW	0.7	1.6	-
NNW	0.9	1.5	-

(1) - Larger than 500 square feet.
(2) - Experimental garden at LGS Information Center
(3) - Goat Farm