Docket No: 50-352
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LIMERICK GENERATING STATION UNITS 1 and 2

Annual Radiological Environmental Operating Report

Report #12

1 January Through 31 December 1995

Prepared By

PECO Nuclear
a Unit of PECO Energy
965 Chesterbrook Blvd.
Wayne, PA 19087-5691

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I. Summary and Conclusions

This report on the Radiological Environmental Monitoring Program conducted for the Limerick Generating Station by PECO Nuclear covers the period 1 January 1995 through 31 December 1995. During that time period, 1120 analyses were performed on 889 samples.

Surface water samples were analyzed for concentrations of tritium and gamma emitting nuclides. No fission or activation products were found. Tritium activities detected were consistent with those observed in other years.

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

Fish (predator and bottom feeder) and sediment samples were analyzed for concentrations of gamma emitting nuclides. Concentrations of I-131 were detected in fish samples from both Control and Indicator locations. Since no other fission or activation products were present, this activity was considered the result of upstream sources. Sediment samples collected below the discharge had Cs-137 concentrations consistent with levels observed in the preoperational years. Positive activities for the activation products Mn-54, Co-60 and Zn-65 and the fission product I-131 were found at downstream locations 16B2 (Linfield Bridge) and 16C4 (Vincent Dam) during the October collection. These activities were attributable to LGS operations. The calculated dose to a teenager's whole body from the sediment pathway was 0.031 mrem/yr which represents 0.15% of the allowable fraction of 10 CFR 50, Appendix I limits.

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

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

Cow and goat milk samples were analyzed for concentrations of I-131 and gamma emitting nuclides. All I-131 results detected were below the minimum detectable activity. Concentrations of K-40 were consistent with those observed in other years. No fission or activation products were found.

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

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

II. Introduction

The Limerick Generating Station (LGS), consisting of two 1107 MWe boiling water reactors owned and operated by PECO Nuclear (PECO), is located adjacent to the Schuylkill River in Montgomery County, Pennsylvania. Unit No. 1 went critical on 22 December 1984. Unit No. 2 went critical on 11 August 1989. The site is located in Piedmont countryside, transversed by numerous valleys containing small tributaries which feed into the Schuylkill River. On the eastern river bank elevation rises from approximately 110 to 300 feet mean sea level (MSL). On the western river bank elevation rises to approximately 50 feet MSL to the western site boundary.

A Radiological Environmental Monitoring Program (REMP) for LGS was initiated in 1971. Review of the 1971 through 1977 REMP data resulted in the modification of the program to comply with changes in the Environmental Report Operating License Stage (EROL) and the Branch Technical Position Paper (Rev. 1, 1979). The preoperational period for most media covers the periods 1 January 1982 through 21 December 1984 and was summarized in a separate report. This report covers those analyses performed by GPU Nuclear and Teledyne Brown Engineering (TBE) on samples collected during the period 1 January 1995 through 31 December 1995.

A. Objectives of the REMP

The objectives of the REMP are to:

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

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

B. Implementation of the Objectives

The implementation of the objectives is accomplished by:

1. Identifying significant exposure pathways.

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

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

III. Program Description

A. Sample Collection

Samples for the LGS REMP were collected for PECO Nuclear by Normandeau Associates, RMC Environmental Services Division (RMC). This section describes the collection methods used by RMC to obtain environmental samples for the LGS REMP in 1995. Sample locations and descriptions can be found in Tables B-1 and B-2, and Figures B-1 through B-3, Appendix B.

Aquatic Environment

The aquatic environment was examined by analyzing samples of surface water, drinking water, fish, and sediment. Two gallon water samples were collected monthly from continuous samplers located at two surface water locations (13B1 and 24S1) and four drinking water locations (15F4, 15F7, 16C2, and 28F3). One additional surface water location (10F2) was sampled only during the months when water was taken from the Perkiomen Creek for cooling. Control locations were 10F2, 24S1, and 28F3. All samples were collected in 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 two locations: 16C5 and 29C1 (control). Sediment samples composed of recently deposited substrate were collected at three locations semiannually: 16B2 and 16C4 (indicator) and 33A2 (control).

Atmospheric Environment

The atmospheric environment was examined by analyzing samples of air particulate, airborne iodine, and milk. Airborne iodine and particulate samples were collected and analyzed weekly at five locations (10S3, 11S1, 13C1, 14S1, and 22G1). The control location was 22G1. Airborne iodine and particulate samples were obtained at each location, using a vacuum pump with charcoal and glass fiber filters attached. The pumps were run continuously and sampled air at the rate of approximately 1 cubic foot per minute. The filters were replaced weekly and sent to the laboratory for analysis.

Milk samples were collected biweekly at five locations (10B1, 19B1, 18C1, 21B1, and 22F1) during April through November, and monthly during December through March. Four additional locations (36E1, 9G1, 22C1, and 25C1) were sampled quarterly. Locations 9G1 and 22F1 were controls. All

samples were collected in new unused two gallon plastic bottles from the bulk tank at each location, refrigerated, and shipped promptly to the laboratory. No preservative was added.

Ambient Gamma Radiation

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

A site boundary ring consisting of sixteen locations (36S2, 3S1, 5S1, 7S1, 10S3, 11S1, 13S2, 14S1, 18S2, 21S2, 23S2, 25S2, 26S3, 29S1, 31S1 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.

An intermediate distance ring consisting of sixteen locations (36D1, 2E1, 4E1, 7E1, 10E1, 10F3, 13E1, 16F1, 19D1, 20F1, 24D1, 25D1, 28D2, 29E1, 31D2, and 34E1) extending to approximately 5 miles from the site designed to measure possible exposures to close-in population.

The balance of eight locations (5H1, 6C1, 9C1, 13C1, 15D1, 17B1, 20D1 and 31D1) representing control and special interests areas such as population centers, schools, etc.

The specific TLD locations were determined by the following criteria:

1. The presence of relatively dense population;

2. Site meteorological data taking into account distance and elevation for each of the 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 two thermoluminescent phosphors enclosed in plastic - were placed at each location in a PVC conduit located approximately three feet above ground level. The TLDs were exchanged quarterly and sent to the laboratory for analysis.

B. Sample Analysis

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

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

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

3. Concentrations of tritium in surface and drinking water.

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

5. Ambient gamma radiation levels at various site environs.

C. Data Interpretation

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

1. <u>Lower Limit of Detection and Minimum Detectable Level</u>

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.

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

2. Net Activity Calculation and Reporting of Results

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

Data reported in this report were generated using the convention of rounding the result to the same number of significant places as the first significant digit in the error term (i.e., 3.62 ± 1.23 rounds to 4 ± 1; 10.93 ± 0.96 rounds to 10.9 ± 1.0; -0.01 ± 0.1 rounds to 0.0 ± 0.1). Results for each type of sample were grouped according to the analyses performed. For gamma analyses, at least those nuclides required for each sample media and nuclides which had a significant positive occurrence were reported. Means and standard deviations of these results were calculated. These standard deviations represent the variability of measured results for different samples rather than single analysis uncertainty.

D. Program Exceptions

For 1995 the LGS REMP had a sample recovery rate of better than 99%. The exceptions to this program are listed below:

1. Air particulate and air iodine samples were not collected from location 10S3 from week #51 (12/18 to 12/26) due to a sample collection error.

2. Surface water samples collected at location 24S1 (LGS Intake) were composites of weekly grabs during the weeks of 1/4/95, 2/13/95, 2/22/95, 2/27/95, 3/6/95, 3/13/95, 4/24/95, and 6/5/95 due to equipment or weather problems.

3. Surface water samples collected at location 13B1 (Vincent Dam) were composites of weekly grabs during the weeks of 3/13/95, 9/5/95, 10/23/95, 11/13/95, and 11/20/95 due to equipment or weather problems.

4. Milk samples from farm 10B1 were not available for the months of January, February, October, November and December, and for the last collection of September, because the goats had stopped lactating.

Each program exception was reviewed to understand the causes of the program exception. Sampling and maintenance errors were reviewed with the personnel involved to prevent recurrence. Occasional equipment breakdowns and power outages were unavoidable.

The numerous equipment problems noted for surface water location 24S1 were discussed with the sample collection contractor. The major cause of pump failure had been silt build up with a subsequent loss of prime and then pump failure. A backup battery operated ISCO sampler was installed at that location to assist in water collections. In addition, the entire sampling unit was removed and refurbished.

The overall sample recovery rate indicates that the appropriate procedures and equipment are in place to assure reliable program implementation.

E. Program Changes

The following Program changes were made for 1995:

1. GPU Nuclear became the Primary Analytical Contract Laboratory, replacing Teledyne Brown Engineering (TBE). TBE replaced PSE&G as the QC Laboratory.

2. Surface Water:

   Station 10F2 was changed from a continuous monthly composite sample to a monthly composite sample only when water from the Perkiomen Creek was withdrawn for cooling.

   Gross beta analyses were discontinued on all samples.

3. Drinking Water:

   Station 13H2 was discontinued. Electrical power was restored to Station 16C2 in May.

4. Fish:

   Fish sampling was discontinued at Station 20S1. The program currently samples fish populations from upstream and downstream of the LGS discharge.

5. Air Particulate and Air Iodine:

The sampling program was reduced from seventeen locations to five locations.

6. TLD:

The program was changed from forty-eight TLD locations to forty. The monthly frequency was discontinued. The quarterly sampling frequency was maintained.

In late 1994 a review of the distance and direction from LGS was undertaken using Global Positioning System technology (GPS). The GPS data indicated that several TLD sampling locations near the site boundary were in the wrong sector. To assure that coverage in all sixteen sectors was present, some locations were moved and renamed to indicate the correct sector and distance.

IV. Results and Discussion

A. Aquatic Environment

1. Surface Water

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

Tritium

Monthly samples from all locations were composited quarterly and analyzed for tritium activity (Table C-I.1, Appendix C). Tritium activity ranged from -30 to 140 pCi/l.

Gamma Spectrometry

Samples from all locations were analyzed for gamma emitting nuclides (Table C-I.2, Appendix C). Positive K-40 results were found in one of 32 samples. Potassium-40 results ranged from 0 to 40 pCi/l. Positive activity for Ra-226 was found in only one sample. All other nuclides searched for were less than the minimum detectable level.

2. Drinking Water

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

Gross Beta

Samples from all locations were analyzed for concentrations of gross beta in the insoluble and soluble fractions (Tables C-II.1 and C-II.2, Appendix C). The values ranged from -1.3 to 1.1 pCi/l for the insoluble fraction and from 1 to 7 pCi/l for the soluble fraction. Concentrations detected in both fractions were consistent with those observed in previous years (Figures C-1 and C-2, Appendix C).

Tritium

Monthly samples from all locations were composited quarterly and analyzed for tritium activity (Table C-II.3, Appendix C). Tritium activity ranged from -10 to 130 pCi/l. Similar activity levels were observed at all locations.

Gamma Spectrometry

Samples from all locations were analyzed for gamma emitting nuclides (Table C-II.4, Appendix C). Positive I-131 activity was found in one sample from the upstream control location 28F3. This activity (2.4 ± 1.4) was attributed to upstream sources. An investigation concluded that thyroid treatments are routinely conducted at the Reading Hospital. All other nuclides searched for were less than the minimum detectable level.

3. Fish

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

Gamma Spectrometry

The edible portion of fish samples from both locations was analyzed for gamma emitting nuclides (Table C-III.1, Appendix C). With the exception of naturally occurring K-40 and I-131, no fission or activation products were found. Iodine-131 activity was found in both upstream Control and downstream Indicator samples collected during the first part of 1995. The I-131 activity ranged from 0 to 20 pCi/kg (wet) and was attributed to upstream sources. Historical levels of Cs-137 are shown in Figure C-3, Appendix C.

4. Sediment

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

Gamma Spectrometry

Sediment samples from all three locations were analyzed for gamma emitting nuclides (Table C-IV.1, Appendix C). Nuclides detected were cosmogenic Be-7; naturally occurring K-40, Ra-226 and Th-228; activation products Mn-54, Co-60, Zn-65; and fission product I-131 and Cs-137. The nuclides Th-228 and Ra-226 commonly occur in sediment from daughter decay of natural uranium.

Concentrations of the fission product Cs-137 were found in sediment samples from both indicator locations. Location 16B2 had the highest average concentration of 230 pCi/kg (dry). The activity detected was consistent with those observed in the preoperational years (Figure C-4, Appendix C).

Activity for Mn-54 ranged from 10 to 260 pCi/kg (dry). Cobalt-60 activity ranged from -10 to 120 pCi/kg (dry). Zinc-65 activity ranged from -30 to 290 pCi/kg (dry). The activity from I-131 ranged from -20 to 200 pCi/kg (dry). All activity was attributed to LGS operations.

The calculated dose from this pathway to a teenager's whole body was 3.07 E-02 mrem/yr. This value is based upon the assumption the maximum concentrations of Mn-54, Co-60, Zn-65, I-131 and Cs-137 at the downstream locations was present the entire year. This dose represents 0.15% of the allowable fraction of 10 CFR 50, Appendix I limits.

B. Atmospheric Environment

1. Airborne

a. Air Particulates

Continuous air particulate samples were collected from five locations on a weekly basis. The five locations were separated into three groups: Group I represents locations within the LGS site boundary (10S3, 11S1, and 1[illegible]S1), Group II represents the location at an intermediate distance from the LGS site (13C1), and Group III represents the control location at a remote distance from LGS (22G1). The following analyses were performed:

Gross Beta

Weekly samples were analyzed for concentrations of beta emitters (Table C-V.1 and C-V.2, Appendix C).

Detectable gross beta activity was observed at all locations. Comparison of results among the three groups aid in determining the effects, if any, resulting from the operation of LGS. The results from the On-Site locations (Group I) ranged from 5 to 30 E-3 pCi/m^3 with a mean of 16 E-3 pCi/m^3. The results from the Intermediate Distance location (Group II) ranged from 6 to 26 E-3 pCi/m^3 with a mean of 16 E-3 pCi/m^3. The results from the Distant locations (Group III) ranged from 5 to 24 E-3 pCi/m^3 with a mean of 15 E-3 pCi/m^3. Comparison of the weekly mean values indicate no notable differences among the three groups (Figure C-5, Appendix C). Comparison of the 1995 air particulate data with previous years data suggest no effects from the operation of LGS (Figure C-6, Appendix C).

Gamma Spectrometry

Weekly samples were composited quarterly and analyzed for gamma-emitting nuclides (Table C-V.3, Appendix C). Naturally occurring Be-7 due to cosmic ray activity was detected in all samples. These values ranged from 50 to 100 E-3 pCi/m^3. All other nuclides searched for were less than the minimum detectable level.

b. Airborne Iodine

Continuous air samples were collected from five (10S3, 11S1, 14S1, 13C1, and 22G1) locations and analyzed weekly for I-131 (Table C-VI.1, Appendix C). All results were less than the minimum detectable level and ranged from -20 to 20 E-3 pCi/m^3.

2. Terrestrial

a. Milk

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

Iodine-131

Milk samples from all locations were analyzed for concentrations of I-131 (Table C-VII.1, Appendix C). All results were less than the minimum detectable level and ranged from -0.6 to 0.3 pCi/l.

Gamma Spectrometry

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

Potassium-40 activity was found in all samples. The values ranged from 1200 to 1700 pCi/l. All other nuclides searched for were less than the minimum detectable level.

C. Ambient Gamma Radiation

Ambient gamma radiation levels were measured utilizing Panasonic 801 ($CaSO_4$) thermoluminescent dosimeters. Forty TLD locations were established around the site. Results of TLD measurements are listed in Tables C-VIII.1 to C-VIII.4, Appendix C.

All TLD measurements were below 10 mrad/std. month, with a range of 4.1 to 9.3 mR/std. A comparison of the Site Boundary and Intermediate Distance data to the Control Location data, indicate that the ambient gamma radiation levels from the Control Location 5H1 was consistently higher. The historical ambient gamma radiation data from Location 5H1 was plotted along with similar data from the Site, Intermediate Distance and Outer Ring Locations (Figure C-7, Appendix C). The data indicate that Location 5H1 had a historical high bias, but tracked with the data from all three groups.

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.

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

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

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

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

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

12 Radiological Environmental Operating Report No. 10, Limerick Generating Station Units 1 and 2, 1 January through 31 December 1993, PECO Energy Company, analyses by Teledyne Isotopes.

13 Radiological Environmental Operating Report No. 11, Limerick Generating Station Units 1 and 2, 1 January through 31 December 1994, PECO Energy Company.

APPENDIX A

RADIOLOGICAL ENVIRONMENTAL MONITORING REPORT SUMMARY

APPENDIX A
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

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

LOCATION OF FACILITY: MONTGOMERY COUNTY, PA REPORTING PERIOD: 1995

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)	TRITIUM	11	2000	100 (4/4) (60/140)	40 (7/7) (-30/80)	100 (4/4) (60/140)	13B1 (INDICATOR) VINCENT DAM 1.75 MILES SE OF SITE	0
	GAMMA	32						
	K-40		N/A	18 (12/12) (-4/43)	16 (20/20) (-4/41)	18 (12/12) (-4/43)	13B1 (INDICATOR) VINCENT DAM 1.75 MILES SE OF SITE	0
	MN-54		15	0.1 (12/12) (-0.9/2.8)	0.0 (20/20) (-1.1/1.4)	0.1 (12/12) (-0.9/2.8)	13B1 (INDICATOR) VINCENT DAM 1.75 MILES SE OF SITE	0
	CO-58		15	-0.2 (12/12) (-1.7/0.8)	-0.3 (20/20) (-1.3/0.4)	-0.1 (8/8) (-0.2/0.1)	10F2 (CONTROL) PERKIOMEN PUMPING STATION 7.30 MILES E OF SITE	0
	FE-59		30	1 (12/12) (-2/3)	1 (20/20) (-2/4)	1 (12/12) (-2/4)	24S1 (CONTROL) LGS INTAKE 0.20 MILES SW OF SITE	0
	CO-60		15	0.0 (12/12) (-0.7/0.8)	0.0 (20/20) (-1.6/1.3)	0.1 (12/12) (-1.6/1.3)	24S1 (CONTROL) LGS INTAKE 0.20 MILES SW OF SITE	0
	ZN-65		30	-3 (12/12) (-7/1)	-3 (20/20) (-9/1)	-3 (12/12) (-7/1)	13B1 (INDICATOR) VINCENT DAM 1.75 MILES SE OF SITE	0
	ZR-95		30	0 (12/12) (-2/2)	0 (20/20) (-3/1)	0 (12/12) (-2/2)	13B1 (INDICATOR) VINCENT DAM 1.75 MILES SE OF SITE	0

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

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

LOCATION OF FACILITY: MONTGOMERY COUNTY, PA — REPORTING PERIOD: 1995

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
	NB-95		15	0.1 (12/12) (-0.8/1.5)	0.4 (20/20) (-1.3/1.7)	0.4 (8/8) (0.0/1.4)	10F2 (CONTROL) PERKIOMEN PUMPING STATION 7.30 MILES E OF SITE	0
	CS-134		15	-2.0 (12/12) (-9.2/0.9)	-1.4 (20/20) (-8.7/1.2)	-0.2 (12/12) (-2.5/1.2)	24S1 (CONTROL) LGS INTAKE 0.20 MILES SW OF SITE	0
	CS-137		18	-0.4 (12/12) (-1.0/0.4)	-0.3 (20/20) (-1.0/0.7)	-0.2 (8/8) (-0.5/0.1)	10F2 (CONTROL) PERKIOMEN PUMPING STATION 7.30 MILES E OF SITE	0
	BA-140		60	-1 (12/12) (-4/2)	0 (20/20) (-6/5)	0 (12/12) (-6/5)	24S1 (CONTROL) LGS INTAKE 0.20 MILES SW OF SITE	0
	LA-140		15	-0.3 (12/12) (-2.1/0.7)	-0.1 (20/20) (-1.2/1.5)	-0.1 (8/8) (-0.5/0.3)	10F2 (CONTROL) PERKIOMEN PUMPING STATION 7.30 MILES E OF SITE	0
DRINKING WATER (PCI/LITER)	GROSS BETA SOLUBLE	48	4	3.5 (36/36) (0.6/7.2)	3 (12/12) (1/7)	4 (12/12) (3/6)	15F4 (INDICATOR) PHILA. SUB. WATER CO. 8.62 MILES SE OF SITE	0
	GROSS BETA INSOLUBLE	48	4	-0.2 (36/36) (-1.3/1.1)	-0.2 (12/12) (-1.3/0.8)	0.0 (12/12) (-0.8/1.1)	16C2 (INDICATOR) CITIZENS HOME WATER CO. 2.66 MILES SSE OF SITE	0
	TRITIUM	16	2000	70 (12/12) (20/130)	40 (4/4) (-10/60)	90 (4/4) (60/130)	16C2 (INDICATOR) CITIZENS HOME WATER CO. 2.66 MILES SSE OF SITE	0

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

APPENDIX A

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

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

LOCATION OF FACILITY: MONTGOMERY COUNTY, PA REPORTING PERIOD: 1995

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
	GAMMA	48						
	K-40		N/A	18 (36/36) (-11/40)	20 (12/12) (-1/39)	21 (12/12) (-4/36)	15F4 (INDICATOR) PHILA. SUB. WATER CO. 8.62 MILES SE OF SITE	0
	MN-54		15	-0.4 (36/36) (-2.1/0.7)	-0.6 (12/12) (-1.4/0.4)	-0.2 (12/12) (-0.5/0.3)	15F4 (INDICATOR) PHILA. SUB. WATER CO. 8.62 MILES SE OF SITE	0
	CO-58		15	-0.2 (36/36) (-1.3/0.6)	-0.2 (12/12) (-0.7/1.2)	-0.2 (12/12) (-0.8/0.4)	15F4 (INDICATOR) PHILA. SUB. WATER CO. 8.62 MILES SE OF SITE	0
	FE-59		30	0 (36/36) (-3/2)	0 (12/12) (-1/4)	1 (12/12) (0/2)	15F4 (INDICATOR) PHILA. SUB. WATER CO. 8.62 MILES SE OF SITE	0
	CO-60		15	0.1 (36/36) (-1.0/1.6)	0.1 (12/12) (-1.1/1.3)	0.2 (12/12) (-0.5/1.2)	15F4 (INDICATOR) PHILA. SUB. WATER CO. 8.62 MILES SE OF SITE	0
	ZN-65		30	-3 (36/36) (-8/2)	-3 (12/12) (-8/2)	-2 (12/12) (-8/2)	16C2 (INDICATOR) CITIZENS HOME WATER CO. 2.66 MILES SSE OF SITE	0
	ZR-95		30	0 (36/36) (-1/2)	0 (12/12) (-2/1)	0 (12/12) (-1/2)	16C2 (INDICATOR) CITIZENS HOME WATER CO. 2.66 MILES SSE OF SITE	0
	NB-95		15	0.4 (36/36) (-1.6/2.0)	0.2 (12/12) (-0.6/1.1)	0.8 (12/12) (-1.6/2.0)	16C2 (INDICATOR) CITIZENS HOME WATER CO. 2.66 MILES SSE OF SITE	0

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

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

LOCATION OF FACILITY: MONTGOMERY COUNTY, PA — REPORTING PERIOD: 1995

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	STATION # NAME DISTANCE & DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
	CS-134		15	-1.0 (36/36) (-15.0/1.3)	-1.3 (12/12) (-5.9/0.3)	-0.7 (12/12) (-5.1/0.7)	15F7 (INDICATOR) PHOENIXVILLE WATER WORKS 6.33 MILES SSE OF SITE	0
	CS-137		18	-0.1 (36/36) (-1.3/0.7)	-0.2 (12/12) (-0.7/0.4)	0.0 (12/12) (-1.3/0.7)	15F7 (INDICATOR) PHOENIXVILLE WATER WORKS 6.33 MILES SSE OF SITE	0
	BA-140		60	0 (36/36) (-4/3)	-2 (12/12) (-5/2)	0 (12/12) (-3/3)	16C2 (INDICATOR) CITIZENS HOME WATER CO. 2.66 MILES SSE OF SITE	0
	LA-140		15	-0.1 (36/36) (-2.1/1.8)	0.2 (12/12) (-1.0/2.2)	0.2 (12/12) (-1.0/2.2)	28F3 (CONTROL) POTTSTOWN WATER AUTHORITY 5.84 MILES WNW OF SITE	0
PREDATOR (FISH) (PCI/KG WET)	GAMMA	4						
	K-40		N/A	3100 (2/2) (2700/3500)	3100 (2/2) (3000/3100)	3100 (2/2) (2700/3500)	16C5 (INDICATOR) VINCENT POOL DOWNSTREAM OF DISCHARGE	0
	MN-54		130	-1 (2/2) (-2/0)	0 (2/2) (-2/2)	0 (2/2) (-2/2)	29C1 (CONTROL) POTTSTOWN VICINITY UPSTREAM OF DISCHARGE	0
	CO-58		130	0 (2/2) (0/0)	-4 (2/2) (-4/-3)	0 (2/2) (0/0)	16C5 (INDICATOR) VINCENT POOL DOWNSTREAM OF DISCHARGE	0
	FE-59		260	1 (2/2) (0/3)	0 (2/2) (0/0)	0 (2/2) (0/0)	29C1 (CONTROL) POTTSTOWN VICINITY UPSTREAM OF DISCHARGE	0

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

APPENDIX A
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

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

LOCATION OF FACILITY: MONTGOMERY COUNTY, PA — REPORTING PERIOD: 1995

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATIONS MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN: MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN: STATION # NAME DISTANCE & DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
	CO-60		130	0 (2/2) (-1/1)	0 (2/2) (-1/0)	0 (2/2) (-1/1)	16C5 (INDICATOR) VINCENT POOL DOWNSTREAM OF DISCHARGE	0
	ZN-65		260	-10 (2/2) (-10/-10)	-20 (2/2) (-20/-10)	-10 (2/2) (-10/-10)	16C5 (INDICATOR) VINCENT POOL DOWNSTREAM OF DISCHARGE	0
	I-131		N/A	14 (2/2) (3/24)	9 (2/2) (0/18)	14 (2/2) (3/24)	16C5 (INDICATOR) VINCENT POOL DOWNSTREAM OF DISCHARGE	0
	CS-134		130	-1 (2/2) (-6/5)	-8 (2/2) (-22/6)	-1 (2/2) (-6/5)	16C5 (INDICATOR) VINCENT POOL DOWNSTREAM OF DISCHARGE	0
	CS-137		150	4 (2/2) (3/5)	2 (2/2) (2/2)	4 (2/2) (3/5)	16C5 (INDICATOR) VINCENT POOL DOWNSTREAM OF DISCHARGE	0
BOTTOM FEEDER (FISH) (PCI/KG WET)	GAMMA	4						
	K-40		N/A	3300 (2/2) (3200/3300)	3200 (2/2) (3200/3200)	3300 (2/2) (3200/3300)	16C5 (INDICATOR) VINCENT POOL DOWNSTREAM OF DISCHARGE	0
	MN-54		130	-3 (2/2) (-5/-1)	-2 (2/2) (-3/-1)	-2 (2/2) (-3/-1)	29C1 (CONTROL) POTTSTOWN VICINITY UPSTREAM OF DISCHARGE	0
	CO-58		130	-3 (2/2) (-4/-2)	0 (2/2) (-1/0)	0 (2/2) (-1/0)	29C1 (CONTROL) POTTSTOWN VICINITY UPSTREAM OF DISCHARGE	0

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

APPENDIX A
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

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

LOCATION OF FACILITY: MONTGOMERY COUNTY, PA — REPORTING PERIOD: 1995

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
	FE-59		260	-3 (2/2) (-4/-2)	0 (2/2) (-10/10)	0 (2/2) (-10/10)	29C1 (CONTROL) POTTSTOWN VICINITY UPSTREAM OF DISCHARGE	0
	CO-60		130	-1 (2/2) (-1/-1)	5 (2/2) (2/8)	5 (2/2) (2/8)	29C1 (CONTROL) POTTSTOWN VICINITY UPSTREAM OF DISCHARGE	0
	ZN-65		260	10 (2/2) (10/20)	-20 (2/2) (-30/-20)	10 (2/2) (10/20)	16C5 (INDICATOR) VINCENT POOL DOWNSTREAM OF DISCHARGE	0
	I-131		N/A	5 (2/2) (3/8)	11 (2/2) (5/17)	11 (2/2) (5/17)	29C1 (CONTROL) POTTSTOWN VICINITY UPSTREAM OF DISCHARGE	0
	CS-134		130	0 (2/2) (-2/3)	-1 (2/2) (-2/-1)	0 (2/2) (-2/3)	16C5 (INDICATOR) VINCENT POOL DOWNSTREAM OF DISCHARGE	0
	CS-137		150	3 (2/2) (3/4)	2 (2/2) (1/3)	3 (2/2) (3/4)	16C5 (INDICATOR) VINCENT POOL DOWNSTREAM OF DISCHARGE	0
SILT (PCI/KG DRY)	GAMMA	6						
	BE-7		N/A	2600 (4/4) (0/5800)	0 (2/2) (-100/100)	3200 (2/2) (600/5800)	16B2 (INDICATOR) LINFIELD BRIDGE 1.35 MILES SSE OF SITE	0
	K-40		N/A	16000 (4/4) (15000/18000)	10400 (2/2) (8800/12000)	17000 (2/2) (15000/18000)	16B2 (INDICATOR) LINFIELD BRIDGE 1.35 MILES SSE OF SITE	0

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

APPENDIX A
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

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

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MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATIONS MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN STATION # NAME DISTANCE & DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
	MN-54		N/A	130 (4/4) (10/260)	10 (2/2) (10/20)	140 (2/2) (20/260)	16B2 (INDICATOR) LINFIELD BRIDGE 1.35 MILES SSE OF SITE	0
	CO-58		N/A	0 (4/4) (-20/20)	-10 (2/2) (-20/-10)	10 (2/2) (0/20)	16B2 (INDICATOR) LINFIELD BRIDGE 1.35 MILES SSE OF SITE	0
	CO-60		N/A	60 (4/4) (-10/120)	0 (2/2) (-10/0)	70 (2/2) (20/120)	16B2 (INDICATOR) LINFIELD BRIDGE 1.35 MILES SSE OF SITE	0
	ZN-65		N/A	110 (4/4) (-30/290)	10 (2/2) (-10/20)	150 (2/2) (10/290)	16B2 (INDICATOR) LINFIELD BRIDGE 1.35 MILES SSE OF SITE	0
	I-131		N/A	90 (4/4) (-20/200)	0 (2/2) (-10/0)	100 (2/2) (0/200)	16B2 (INDICATOR) LINFIELD BRIDGE 1.35 MILES SSE OF SITE	0
	CS-134		150	10 (4/4) (0/30)	0 (2/2) (0/0)	10 (2/2) (0/30)	16C4 (INDICATOR) VICENT DAM 2.18 MILES SSE OF SITE	0
	CS-137		180	170 (4/4) (0/270)	-10 (2/2) (-10/-10)	230 (2/2) (190/270)	16B2 (INDICATOR) LINFIELD BRIDGE 1.35 MILES SSE OF SITE	0
	RA-226		N/A	2400 (4/4) (2200/2800)	2400 (2/2) (2300/2500)	2500 (2/2) (2200/2800)	16B2 (INDICATOR) LINFIELD BRIDGE 1.35 MILES SSE OF SITE	0
	TH-232		N/A	1500 (4/4) (1200/1700)	1200 (2/2) (1100/1200)	1600 (2/2) (1400/1700)	16B2 (INDICATOR) LINFIELD BRIDGE 1.35 MILES SSE OF SITE	0

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

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY

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

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MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATIONS MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN: MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN: STATION # NAME DISTANCE & DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
AIR PARTICULATE (E-3 PCI/CU. METER)	GROSS BETA	259	10	16 (207/207) (5/30)	15 (52/52) (5/24)	16 (52/52) (7/29)	11S1 (INDICATOR) LGS INFORMATION CENTER 0.38 MILES ESE OF SITE	0
	GAMMA	20						
	BE-7		N/A	70 (16/16) (40/100)	70 (4/4) (50/90)	70 (4/4) (50/90)	22G1 (CONTROL) MANOR SUBSTATION 17.73 MILES SW OF SITE	0
	K-40		N/A	8 (16/16) (-21/30)	10 (4/4) (10/20)	20 (4/4) (0/30)	14S1 (INDICATOR) LONGVIEW ROAD 0.63 MILES SSE OF SITE	0
	CS-134		50	-0.1 (16/16) (-3.9/1.0)	-0.4 (4/4) (-0.7/-0.1)	0.4 (4/4) (-0.2/0.8)	14S1 (INDICATOR) LONGVIEW ROAD 0.63 MILES SSE OF SITE	0
	CS-137		60	-0.2 (16/16) (-1.8/0.5)	0.1 (4/4) (-0.5/0.7)	0.1 (4/4) (-0.5/0.7)	22G1 (CONTROL) MANOR SUBSTATION 17.73 MILES SW OF SITE	0
AIR IODINE (E-3 PCI/CU. METER)	I-131	259	70	1 (207/207) (-16/18)	0 (52/52) (-11/15)	2 (52/52) (-11/12)	11S1 (INDICATOR) LGS INFORMATION CENTER 0.38 MILES ESE OF SITE	0
MILK (PCI/LITER)	I-131	104	1	0.0 (74/74) (-0.3/0.3)	0.0 (30/30) (-0.6/0.2)	0.1 (4/4) (0.0/0.3)	22C1 (INDICATOR) REGIONAL FARM 2.92 MILES SW OF SITE	0
	GAMMA	88						
	K-40		N/A	1400 (66/66) (1200/1500)	1400 (22/22) (1200/1500)	1400 (22/22) (1300/1500)	18C1 (INDICATOR) REGIONAL FARM 2.26 MILES S OF SITE	0

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

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

LOCATION OF FACILITY: MONTGOMERY COUNTY, PA REPORTING PERIOD: 1995

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATIONS MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN: MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN: STATION # NAME DISTANCE & DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
	CS-134		15	-5.6 (66/66) (-16.0/0.5)	-4.6 (22/22) (-11.0/0.7)	-4.4 (22/22) (-12.0/0.5)	19B1 (INDICATOR) REGIONAL FARM 1.95 MILES SSW OF SITE	0
	CS-137		18	0.1 (66/66) (-1.1/2.2)	1.0 (22/22) (-0.2/2.7)	1.0 (22/22) (-0.2/2.7)	22F1 (CONTROL) REGIONAL FARM 9.58 MILES SW OF SITE	0
	BA-140		60	0 (66/66) (-6/6)	1 (22/22) (-4/4)	1 (22/22) (-6/6)	21B1 (INDICATOR) REGIONAL FARM 1.75 MILES SSW OF SITE	0
	LA-140		15	0.0 (66/66) (-2.3/3.1)	-0.2 (22/22) (-3.2/1.1)	0.1 (22/22) (-1.2/1.6)	18C1 (INDICATOR) REGIONAL FARM 2.26 MILES S OF SITE	0
GOAT MILK (PCI/LITER)	I-131	13	1	0.0 (13/13) (-0.2/0.3)		0.0 (13/13) (-0.2/0.3)	10B1 (INDICATOR) REGIONAL FARM 1.08 MILES E OF SITE	0
	GAMMA	13						
	K-40		N/A	1600 (13/13) (1400/1800)		1600 (13/13) (1400/1800)	10B1 (INDICATOR) REGIONAL FARM 1.08 MILES E OF SITE	0
	CS-134		15	-8 (13/13) (-15/-3)		-8 (13/13) (-15/-3)	10B1 (INDICATOR) REGIONAL FARM 1.08 MILES E OF SITE	0
	CS-137		18	1 (13/13) (0/3)		1 (13/13) (0/3)	10B1 (INDICATOR) REGIONAL FARM 1.08 MILES E OF SITE	0

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

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

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MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATIONS MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN STATION # NAME DISTANCE & DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
	BA-140		60	1 (13/13) (-4/6)		1 (13/13) (-4/6)	10B1 (INDICATOR) REGIONAL FARM 1.08 MILES E OF SITE	0
	LA-140		15	-1 (13/13) (-3/0)		-1 (13/13) (-3/0)	10B1 (INDICATOR) REGIONAL FARM 1.08 MILES E OF SITE	0
DIRECT RADIATION (MILLI-ROENTGEN / STD. MONTH)	TLD-QUARTERLY	160	N/A	5.86 (156/156) (4.10-9.70)	7.20 (4/4) (7.10-7.50)	9.43 (4/4) (9.30-9.70)	13S2 (INDICATOR) 500 KV SUBSTATION 0.41 MILES SE OF SITE	0

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

APPENDIX B

SAMPLE DESIGNATION AND LOCATIONS

APPENDIX B: SAMPLE DESIGNATION AND LOCATIONS

LIST OF TABLES AND FIGURES

TABLES

FIGURES

TABLE B-1: 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's Units 1 and 2 off-gas vents. 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-2: Sample Collection and Analysis Program for the Radiological Environmental Monitoring Program for Limerick Generating Station, 1995

Location	Location Description	Distance & Direction	Collection Method and Frequency	Analysis & Frequency Performed--Consultant
<u>A. Surface Water</u>				
10F2	Perkiomen Pumping Station (control)	7.25 miles E	Two gallon sample collected from a continuous water sampler, monthly	Gamma Spec - monthly - GPU Tritium - quarterly comp. - GPU
13B1	Vincent Dam (indicator)	1.75 miles SE	Same as 10F2	Same as 10F2
24S1	Limerick Intake (control)	0.20 miles SW	Same as 10F2	Same as 10F2
<u>B. Drinking (Potable) Water</u>				
15F4	Philadelphia Suburban Water Company (indicator)	8.62 miles SE	Two gallon composite sample collected from a continuous water sampler, monthly	G. Beta (S&I) - monthly - GPU Gamma Spec - monthly - GPU Tritium - quarterly comp. - GPU
15F7	Phoenixville Water Works (indicator)	6.33 miles SSE	Same as 15F4	Same as 15F4
16C2	Citizens Home Water Company (indicator)	2.66 miles SSE	Two gallon composite sample collected by weekly grab samples, monthly	Same as 15F4 G. Beta (S&I) - monthly - TBE* Gamma Spec - monthly - TBE*
28F3	Pottstown Water Authority (control)	5.84 miles WNW	Same as 15F4	Same as 15F4
<u>C. Cow's Milk</u>				
36E1		4.70 miles N	Two gallons processed milk purchased quarterly at farm dairy store	I-131 - quarterly - GPU
9G1	Control	11.64 miles E	Two gallon grab sample collected from bulk tank at farm quarterly	Same as 36E1

TABLE B-2: Sample Collection and Analysis Program for the Radiological Environmental Monitoring Program for Limerick Generating Station, 1995

Location	Location Description	Distance & Direction	Collection Method and Frequency	Analysis & Frequency Performed--Consultant
18C1		2.26 miles S	Two gallon grab sample collected from bulk tank at farm bi-weekly during grazing season (April through November); monthly otherwise	I-131 - biweekly - GPU Gamma Spec - biweekly - GPU
19B1		1.95 miles SSW	Same as 18C1	I-131 - biweekly - GPU Gamma Spec - biweekly - GPU I-131 - quarterly - TBE* Gamma Spec - quarterly - TBE*
21B1		1.75 miles SSW	Same as 18C1	Same as 19B1
22C1		2.92 miles SW	Same as 9G1	Same as 36E1
22F1	Control	9.58 miles SW	Same as 18C1	Same as 19B1
25C1		2.59 miles WSW	Same as 18C1	Same as 18C1
D. Goat's Milk				
10B1		1.08 miles E	Two gallon grab sample purchased at goat farm, biweekly during grazing season (April through November); monthly otherwise	I-131 - biweekly - GPU Gamma Spec - biweekly - GPU
E. Air Particulates / Air Iodine				
10S3	Keen Road	0.50 miles E	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 - GPU Gamma Spec - quarterly comp. - GPU I-131 - weekly - GPU

TABLE B-2: Sample Collection and Analysis Program for the Radiological Environmental Monitoring Program for Limerick Generating Station, 1995

Location	Location Description	Distance & Direction	Collection Method and Frequency	Analysis & Frequency Performed--Consultant
11S1	LGS Information Center	0.38 miles ESE	Same as 10S3	Same as 10S3
11S2	LGS Information Center	0.38 miles ESE	Same as 10S3	G. Beta - weekly - TBE* Gamma Spec - quarterly comp. - TBE*
13C1	King Road	2.84 miles SE	Same as 10S3	Same as 10S3
14S1	Longview Road	0.63 miles SSE	Same as 10S3	Same as 10S3
22G1	Manor Substation (control)	17.73 miles SW	Same as 10S3	Same as 10S3
F. Fish				
16C5	Vincent Pool (indicator)	Downstream of Discharge	Fish flesh from two groups representing predator and bottom feeder species collected by electrofisher or other appropriate fishery gear, semiannually	Gamma Spec - semiannually - GPU
29C1	Pottstown Vicinity (control)	Upstream of Intake	Same as 16C5	Same as 16C5
G. Sediment				
16B2	Linfield Bridge (indicator)	1.35 miles SSE	Recently deposited sediment collected below the waterline, semi-annually	Gamma Spec - semiannually - GPU
16C4	Vicent Dam (indicator)	2.18 miles SSE	Same as 16B2	Same as 16B2
33A2	Control	0.84 miles NNW	Same as 16B2	Same as 16B2

TABLE B-2: Sample Collection and Analysis Program for the Radiological Environmental Monitoring Program for Limerick Generating Station, 1995

Location	Location Description	Distance & Direction	Collection Method and Frequency	Analysis & Frequency Performed--Consultant
H. Environmental Dosimetry - TLD				
Site Boundary				
36S2	Evergreen & Sanatoga Road	0.60 miles N	Collection method and frequency is described in placement procedure Section III, A.	TLD - quarterly - GPU
3S1	Sanatoga Road	0.44 miles NNE	Same as 36S2	Same as 36S2
5S1	Possum Hollow Road	0.45 miles NE	Same as 36S2	Same as 36S2
7S1	LGS Training Center	0.59 miles ENE	Same as 36S2	Same as 36S2
10S3	Keen Road	0.50 miles E	Same as 36S2	Same as 36S2
11S1	LGS Information Center	0.38 miles ESE	Same as 36S2	Same as 36S2
13S2	500 KV Substation	0.41 miles SE	Same as 36S2	Same as 36S2
14S1	Longview Road	0.63 miles SSE	Same as 36S2	Same as 36S2
18S2	Rail Line along Longview Road	0.26 miles S	Same as 36S2	Same as 36S2
21S2	Near Intake Building	0.19 miles SSW	Same as 36S2	Same as 36S2
23S2	Transmission Tower	0.53 miles SW	Same as 36S2	Same as 36S2
25S2	Sector Site Boundary	0.46 miles WSW	Same as 36S2	Same as 36S2
26S3	Met. Tower #2	0.40 miles W	Same as 36S2	Same as 36S2
29S1	Sector Site Boundary	0.55 miles WNW	Same as 36S2	Same as 36S2
31S1	Sector Site Boundary	0.26 miles NW	Same as 36S2	Same as 36S2
34S2	Met. Tower #1	0.58 miles NNW	Same as 36S2	Same as 36S2

TABLE B-2: Sample Collection and Analysis Program for the Radiological Environmental Monitoring Program for Limerick Generating Station, 1995

Location	Location Description	Distance & Direction	Collection Method and Frequency	Analysis & Frequency Performed--Consultant
Intermediate Distance				
36D1	Siren Tower No. 147	3.51 miles N	Same as 36S2	Same as 36S2
2E1	Laughing Waters GSC	4.76 miles NNE	Same as 36S2	Same as 36S2
4E1	Neiffer Road	4.78 miles NE	Same as 36S2	Same as 36S2
7E1	Pheasant Road	4.26 miles ENE	Same as 36S2	Same as 36S2
10E1	Royersford Road	3.94 miles E	Same as 36S2	Same as 36S2
10F3	Trappe Substation	5.58 miles ESE	Same as 36S2	Same as 36S2
13E1	Vaughn Substation	4.31 miles SE	Same as 36S2	Same as 36S2
16F1	Pikeland Substation	5.04 miles SSE	Same as 36S2	Same as 36S2
19D1	Snowden Substation	3.49 miles S	Same as 36S2	Same as 36S2
20F1	Sheeder Substation	5.24 miles SSW	Same as 36S2	Same as 36S2
24D1	Porters Mill Substation	3.97 miles SW	Same as 36S2	Same as 36S2
25D1	Hoffecker & Keim Streets	3.99 miles WSW	Same as 36S2	Same as 36S2
28D2	W. Cedarville Road	3.83 miles W	Same as 36S2	Same as 36S2
29E1	Prince Street	4.95 miles WNW	Same as 36S2	Same as 36S2
31D2	Poplar Substation	3.87 miles NW	Same as 36S2	Same as 36S2
34E1	Varnell Road	4.59 miles NNW	Same as 36S2	Same as 36S2

Distant and Special Interest

5H1	Birch Substation (Control)	24.76 miles NE	Same as 36S2	Same as 36S2
6C1	Pottstown Landing Field	2.14 miles NE	Same as 36S2	Same as 36S2
9C1	Reed Road	2.15 miles E	Same as 36S2	Same as 36S2
13C1	King Road	2.84 miles SE	Same as 36S2	Same as 36S2
15D1	Spring City Substation	3.20 miles SE	Same as 36S2	Same as 36S2
17B1	Linfield Substation	1.60 miles S	Same as 36S2	Same as 36S2
20D1	Ellis Woods Road	3.06 miles SSW	Same as 36S2	Same as 36S2
31D1	Lincoln Substation	3.00 miles WNW	Same as 36S2	Same as 36S2

* QC Laboratory

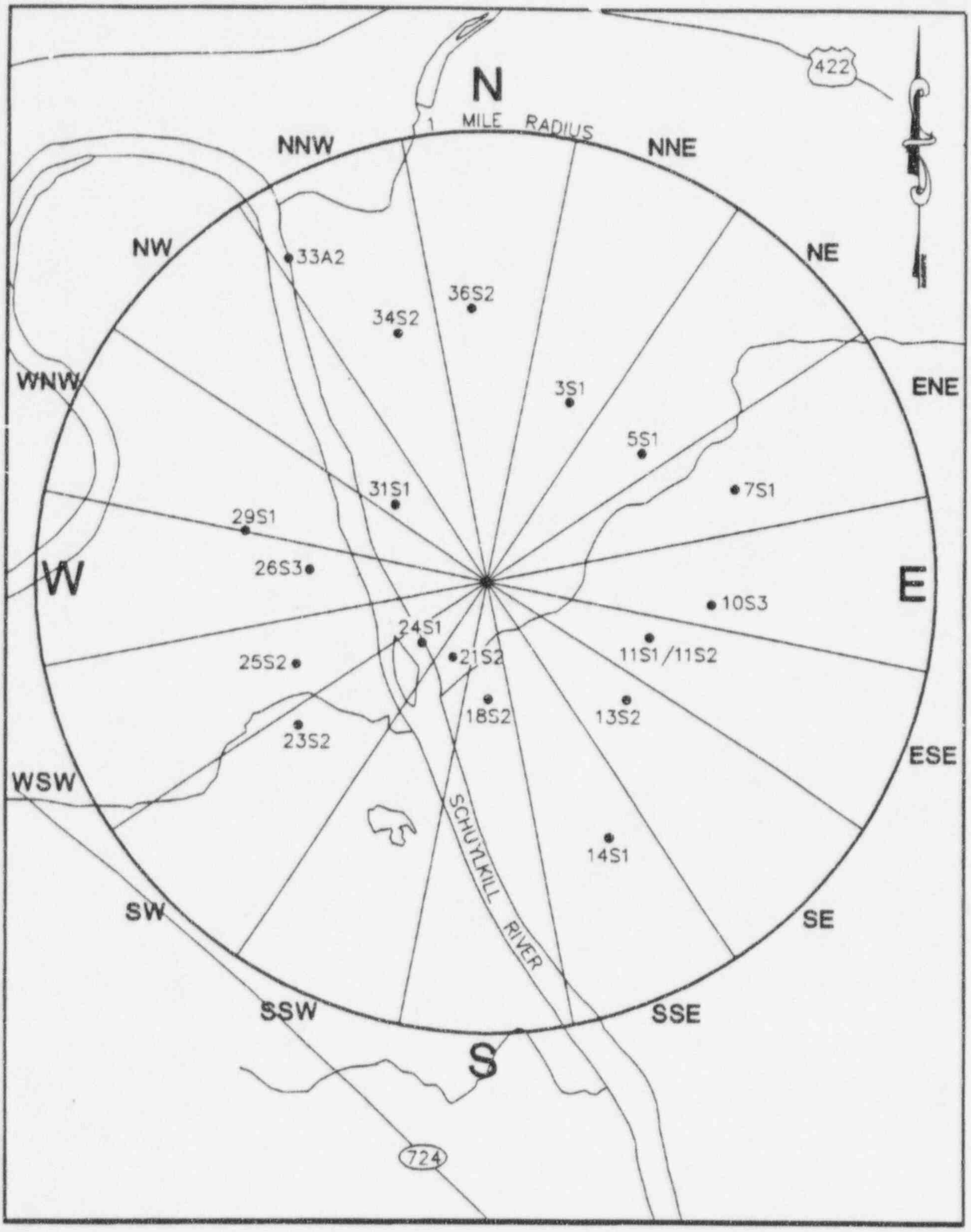


Figure B-1
Environmental Sampling Locations Within One
Mile of the Limerick Generating Station, 1995

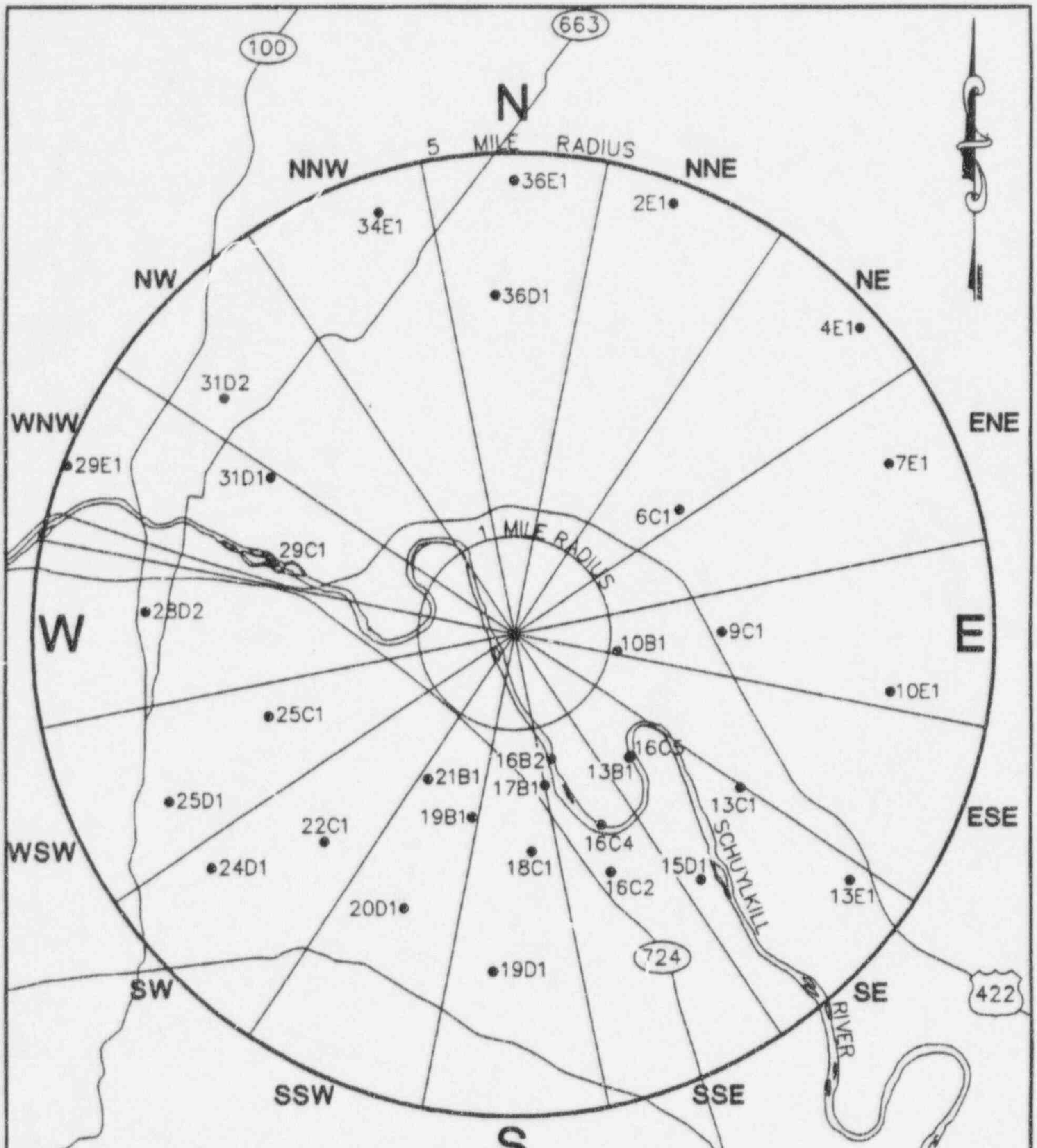


Figure B-2
Environmental Sampling Locations Between One and Five
Miles from the Limerick Generating Station, 1995

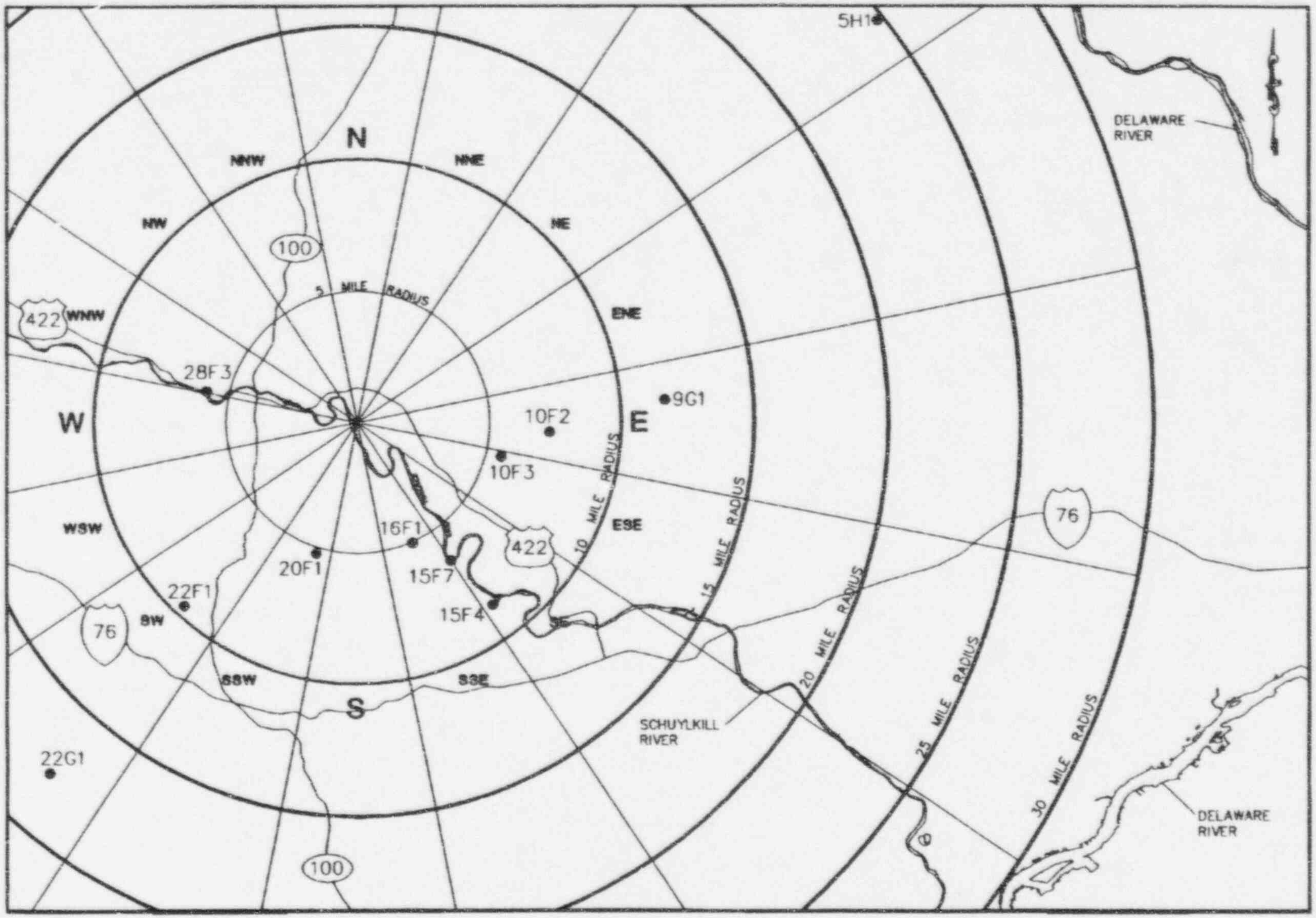


Figure B-3
Environmental Sampling Locations Greater Than
Five Miles from the Limerick Generating Station, 1995

APPENDIX C

DATA TABLES AND FIGURES
PRIMARY LABORATORY

APPENDIX C: DATA TABLES AND FIGURES - PRIMARY LABORATORY

TABLES

FIGURES

TABLE C-I.1 CONCENTRATIONS OF TRITIUM IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1995

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	10F2		13B1		24S1	
JAN-MAR 95	(1)		80	± 80	80	± 80
APR-JUN 95	40	± 70	60	± 70	40	± 70
JUL-SEP 95	30	± 70	140	± 70	-30	± 70
OCT-DEC 95	50	± 80	110	± 80	60	± 80
MEAN	40	± 20	100	± 70	40	± 90

(1) SEE PROGRAM CHANGES SECTION FOR EXPLANATION.

TABLE C-I.2 CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1995

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	K-40		MN-54		CO-58		FE-59		CO-60		ZN-65	
10F2	(1)												
	MAY 95	30	± 10	-0.4	± 0.8	-0.2	± 0.8	-1	± 2	0.4	± 0.9	1	± 2
	JUN 95	30	± 9	0.3	± 0.7	-0.2	± 0.6	1	± 1	-0.1	± 0.6	-7	± 2
	JUL 95	30	± 10	-0.3	± 0.8	-0.1	± 0.8	-1	± 2	0.0	± 0.9	-4	± 2
	AUG 95	21	± 9	-1.1	± 0.8	0.1	± 0.6	1	± 1	-0.9	± 0.7	-1	± 1
	SEP 95	10	± 9	0.2	± 0.8	0.0	± 0.7	1	± 1	-0.1	± 0.7	-4	± 2
	OCT 95	0	± 10	0.0	± 0.6	-0.1	± 0.7	0	± 1	-0.8	± 0.7	-2	± 2
	NOV 95	0	± 10	-0.1	± 0.9	-0.1	± 0.8	0	± 2	0.4	± 0.8	-5	± 2
	DEC 95	0	± 20	-0.4	± 0.8	-0.2	± 0.8	0	± 2	0.2	± 0.9	-6	± 2
	MEAN	14	± 28	-0.2	± 0.9	-0.1	± 0.2	0	± 2	-0.1	± 1.0	-3	± 5
13B1	JAN 95	40	± 20	0	± 2	-2	± 1.0	1	± 3	1	± 2	-7	± 4
	FEB 95	0	± 30	0	± 2	0	± 2.0	0	± 3	-1	± 2	-6	± 4
	MAR 95	27	± 9	0.2	± 0.7	-0.8	± 0.7	0	± 1	0.0	± 0.7	-5	± 2
	APR 95	20	± 10	0.2	± 0.7	0.0	± 0.6	-1	± 1	0.0	± 0.7	-1	± 1
	MAY 95	21	± 9	-0.1	± 0.6	0.0	± 0.6	1	± 2	0.1	± 0.8	1	± 2
	JUN 95	30	± 10	-0.2	± 0.8	-0.7	± 0.9	0	± 2	0.4	± 1.0	-2	± 2
	JUL 95	30	± 10	-0.5	± 0.6	0.3	± 0.6	0	± 1	-0.5	± 0.6	-4	± 2
	AUG 95	20	± 20	0	± 2	1	± 1	-2	± 3	1	± 2	-3	± 3
	SEP 95	30	± 20	3	± 2	[illegible]	± 2	3	± 3	-1	± 2	0	± 4
	OCT 95	20	± 10	-0.5	± 0.9	-0.7	± 0.9	2	± 2	0	± 1	-1	± 2
	NOV 95	0	± 20	-1	± 1	-1	± 1	2	± 3	1	± 1	-6	± 4
	DEC 95	0	± 10	-0.3	± 0.7	-0.6	± 0.7	0	± 1	-0.5	± 0.8	-1	± 2
	MEAN	18	± 29	0.1	± 1.8	-0.2	± 1.5	1	± 2	0.0	± 1.1	-3	± 5
24S1	JAN 95	0	± 20	1	± 1	0	± 1	2	± 2	-1	± 1	-4	± 3
	FEB 95	30	± 10	-0.5	± 0.9	0.3	± 0.8	-2	± 2	0.5	± 0.8	-6	± 2
	MAR 95	30	± 20	1	± 2	0	± 2	4	± 4	1	± 2	-5	± 4
	APR 95	40	± 20	0	± 2	0	± 2	2	± 4	-1	± 3	1	± 5
	MAY 95	20	± 30	1	± 2	-1	± 2	0	± 4	1	± 2	-4	± 4
	JUN 95	10	± 30	1	± 2	-1	± 2	0	± 4	-2	± 2	-9	± 5
	JUL 95	0	± 20	0	± 2	0	± 1	2	± 3	0	± 1	-1	± 3
	AUG 95	30	± 10	-0.3	± 0.9	-0.3	± 0.8	1	± 2	-0.5	± 0.9	-3	± 2
	SEP 95	20	± 10	0	± 1	0.4	± 0.9	0	± 2	0.8	± 1.0	0	± 2
	OCT 95	0	± 10	0.0	± 0.7	-0.4	± 0.6	-1	± 1	0.1	± 0.7	-5	± 2
	NOV 95	20	± 20	-1	± 1	-1	± 2	0	± [illegible]	1	± 2	1	± 4
	DEC 95	0	± 30	0	± 2	-1	± 2	4	± 4	1	± 2	0	± 4
	MEAN	20	± 30	0.1	± 1.4	-0.4	± 1.1	1	± 3	0.1	± 1.8	-3	± 6

(1) SEE PROGRAM CHANGES SECTION FOR EXPLANATION.

TABLE C-I.2 CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1995

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	ZR-95		NB-95		CS-134		CS-137		BA-140		LA-140	
10F2	(1)												
	MAY 95	1	± 1	0.4	± 0.8	-4.5	± 1.0	-0.5	± 0.8	0	± 3	0	± 1
	JUN 95	0	± 1	0.5	± 0.7	-0.5	± 0.7	0.1	± 0.8	0	± 3	0	± 1
	JUL 95	-1	± 1	0.1	± 0.9	0.0	± 0.9	-0.1	± 0.9	-2	± 3	0	± 1
	AUG 95	-1	± 1	0.0	± 0.6	0.2	± 0.8	0.1	± 0.8	-3	± 3	0.3	± 0.9
	SEP 95	-1	± 1	0.1	± 0.7	-0.5	± 0.8	-0.4	± 0.8	0	± 3	-1	± 1
	OCT 95	-1	± 1	0.1	± 0.6	-2.0	± 0.7	-0.1	± 0.7	-1	± 3	-0.1	± 0.9
	NOV 95	0	± 1	1.4	± 0.9	-9	± 1	-0.5	± 0.9	-3	± 3	0	± 1
	DEC 95	0	± 1	0.5	± 0.9	-9	± 1	0.1	± 0.9	0	± 3	0	± 1
	MEAN	0	± 2	0.4	± 0.9	-3.1	± 7.5	-0.2	± 0.5	-1	± 3	-0.1	± 0.7
13B1	JAN 95	2	± 2	-1	± 2	-1	± 2	-1	± 2	-4	± 6	0	± 2
	FEB 95	-1	± 3	0	± 2	0	± 2	0	± 2	1	± 6	-1	± 3
	MAR 95	1	± 1	0.4	± 0.7	-0.1	± 0.8	-0.2	± 0.8	0	± 3	0	± 1
	APR 95	0	± 1	-0.2	± 0.7	-0.1	± 0.8	0.0	± 0.8	2	± 3	1	± 1
	MAY 95	1	± 1	-0.1	± 0.6	-4.2	± 0.8	-0.9	± 0.7	0	± 2	0	± 1
	JUN 95	0	± 2	1.5	± 0.9	-9	± 1	-0.9	± 0.9	-1	± 3	-2	± 2
	JUL 95	0	± 1	0.0	± 0.6	-2.8	± 0.8	-0.2	± 0.7	-2	± 2	0.0	± 0.9
	AUG 95	2	± 2	0	± 1	1	± 2	0	± 2	-1	± 5	-2	± 3
	SEP 95	-1	± 3	0	± 2	-1	± 2	-1	± 2	-2	± 6	1	± 3
	OCT 95	1	± 2	-0.1	± 0.9	-4	± 1	-0.1	± 1.0	1	± 3	0	± 1
	NOV 95	-2	± 2	0	± 2	0	± 2	0	± 2	-3	± 5	-1	± 2
	DEC 95	-1	± 1	0.1	± 0.7	-3.9	± 0.9	-0.8	± 0.7	0	± 3	0.7	± 1.0
	MEAN	0	± 2	0.1	± 1.1	-2.0	± 5.9	-0.4	± 0.9	-1	± 3	-0.3	± 1.7
24S1	JAN 95	1	± 2	0	± 1	0	± 1	-1	± 2	-2	± 5	-1	± 2
	FEB 95	0	± 1	-0.2	± 0.9	0.5	± 0.9	0.0	± 1.0	0	± 3	1	± 1
	MAR 95	-1	± 3	1	± 2	0	± 2	0	± 2	4	± 7	-1	± 3
	APR 95	-3	± 4	-1	± 2	-1	± 2	1	± 2	-4	± 7	0	± 3
	MAY 95	0	± 3	2	± 2	0	± 2	-1	± 2	3	± 6	0	± 3
	JUN 95	-1	± 3	1	± 2	-1	± 2	-1	± 2	-6	± 7	-1	± 3
	JUL 95	0	± 2	0	± 1	0	± 1	-1	± 2	5	± 5	-1	± 2
	AUG 95	0	± 1	0.0	± 0.8	-0.3	± 0.9	-1	± 1	2	± 3	-1	± 1
	SEP 95	0	± 1	0.2	± 1.0	0.4	± 1.0	0	± 1	4	± 3	0	± 1
	OCT 95	0	± 1	0.5	± 0.7	-2.5	± 0.8	-0.2	± 0.7	-1	± 3	0.7	± 0.9
	NOV 95	0	± 2	1	± 2	1	± 2	-1	± 2	0	± 5	0	± 2
	DEC 95	-2	± 3	0	± 2	0	± 2	-1	± 2	-1	± 7	2	± 2
	MEAN	0	± 2	0.4	± 1.7	-0.2	± 1.9	-0.4	± 1.0	0	± 7	-0.1	± 1.7

(1) SEE PROGRAM CHANGES SECTION FOR EXPLANATION.

TABLE C-II.1 CONCENTRATIONS OF GROSS BETA INSOLUBLE IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1995

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	15F4		15F7		16C2		28F3	
JAN 95	0.0	± 0.6	0.0	± 0.6	0.5	± 0.7	0.2	± 0.7
FEB 95	-1.1	± 0.9	-1.3	± 0.9	-0.8	± 0.9	-1.3	± 0.9
MAR 95	-0.4	± 0.8	0.3	± 0.9	-0.7	± 0.8	-0.6	± 0.8
APR 95	-0.6	± 0.8	0.2	± 0.8	0.0	± 0.8	-0.2	± 0.8
MAY 95	0.4	± 0.8	0.0	± 0.8	1.1	± 0.9	0.6	± 0.8
JUN 95	0.5	± 0.8	0.2	± 0.8	0.5	± 0.8	0.8	± 0.8
JUL 95	0.4	± 0.9	-0.1	± 0.9	0.3	± 0.9	-0.6	± 0.9
AUG 95	-1.2	± 0.8	-0.7	± 0.8	-0.7	± 0.8	-0.5	± 0.8
SEP 95	0.0	± 0.8	-0.3	± 0.8	-0.2	± 0.8	-0.3	± 0.8
OCT 95	-0.1	± 0.8	0.0	± 0.8	0.1	± 0.8	-0.1	± 0.8
NOV 95	-0.7	± 0.9	-1.0	± 0.9	-0.2	± 1.0	-0.5	± 0.9
DEC 95	-0.7	± 0.9	-0.7	± 0.9	0.4	± 0.9	-0.2	± 0.9
MEAN	-0.3	± 1.2	-0.3	± 1.0	0.0	± 1.1	-0.2	± 1.1

TABLE C-II.2 CONCENTRATIONS OF GROSS BETA SOLUBLE IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1995

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	15F4		15F7		16C2		28F3	
JAN 95	4	± 1	2.3	± 0.9	2	± 1	2	± 1
FEB 95	4	± 1	3	± 1	1	± 1	3	± 1
MAR 95	3	± 1	2	± 1	1	± 1	1	± 1
APR 95	3	± 1	3	± 1	1	± 1	2	± 1
MAY 95	5	± 1	5	± 1	2	± 1	3	± 1
JUN 95	3	± 1	4	± 1	2	± 1	3	± 1
JUL 95	5	± 1	4	± 1	3	± 1	4	± 1
AUG 95	6	± 1	7	± 2	6	± 1	7	± 2
SEP 95	3	± 1	6	± 2	4	± 1	4	± 1
OCT 95	5	± 1	5	± 1	3	± 1	5	± 1
NOV 95	5	± 1	3	± 1	2	± 1	3	± 1
DEC 95	4	± 1	4	± 1	2	± 1	3	± 1
MEAN	4	± 2	3.9	± 3.0	2	± 3	3	± 3

TABLE C-II.3 CONCENTRATIONS OF TRITIUM IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1995

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	15F4		15F7		16C2		28F3	
JAN-MAR 95	20	± 80	60	± 80	130	± 80	50	± 80
APR-JUN 95	20	± 70	70	± 70	90	± 70	50	± 70
JUL-SEP 95	60	± 70	120	± 70	70	± 70	60	± 70
OCT-DEC 95	60	± 80	90	± 80	60	± 80	-10	± 80
MEAN	40	± 50	80	± 50	90	± 60	40	± 60

TABLE C-II.4 CONCENTRATIONS OF GAMMA EMITTERS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1995

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	K-40	MN-54	CO-58	FE-59	CO-60	ZN-65
15F4	JAN 95	20 ± 20	0 ± 2	0 ± 1	2 ± 3	1 ± 2	-3 ± 3
	FEB 95	25 ± 8	0.1 ± 0.7	-0.2 ± 0.6	0 ± 1	0.3 ± 0.7	-4 ± 2
	MAR 95	30 ± 10	0.2 ± 0.9	-0.3 ± 0.8	2 ± 2	-0.4 ± 0.9	-3 ± 2
	APR 95	40 ± 10	-0.5 ± 1.0	0.1 ± 0.8	0 ± 2	0.0 ± 0.9	-4 ± 2
	MAY 95	22 ± 9	-0.4 ± 0.8	-0.2 ± 0.6	0 ± 1	-0.4 ± 0.7	-3 ± 2
	JUN 95	20 ± 10	-0.1 ± 0.9	-0.8 ± 0.8	1 ± 1	0.4 ± 0.8	-5 ± 2
	JUL 95	13 ± 9	-0.2 ± 0.8	-0.2 ± 0.7	0 ± 1	0.1 ± 0.7	-2 ± 2
	AUG 95	30 ± 10	0 ± 1	-0.4 ± 0.9	2 ± 2	0 ± 1	-3 ± 2
	SEP 95	40 ± 10	-0.3 ± 0.9	-0.2 ± 0.8	2 ± 2	0.3 ± 0.8	-3 ± 2
	OCT 95	20 ± 20	0 ± 1	0 ± 1	2 ± 3	1 ± 1	0 ± 3
	NOV 95	3 ± 10	-0.3 ± 0.6	0.1 ± 0.6	1 ± 1	0.2 ± 0.6	-4 ± 2
	DEC 95	0 ± 10	-0.4 ± 0.7	-0.1 ± 0.7	1 ± 1	0.3 ± 0.8	-4 ± 2
	MEAN	21 ± 24	-0.2 ± 0.5	-0.2 ± 0.6	1 ± 2	0.2 ± 1.0	-3 ± 3
15F7	JAN 95	0 ± 20	0 ± 2	0 ± 2	-3 ± 3	-1 ± 2	-4 ± 3
	FEB 95	40 ± 10	-0.9 ± 0.9	-0.2 ± 0.8	1 ± 1	-0.5 ± 0.8	-5 ± 2
	MAR 95	21 ± 8	0.1 ± 0.8	-0.5 ± 0.7	-1 ± 1	-0.3 ± 0.7	-6 ± 2
	APR 95	10 ± 20	-1 ± 2	0 ± 1	-2 ± 3	2 ± 2	-1 ± 3
	MAY 95	30 ± 10	-0.9 ± 0.9	-0.3 ± 0.8	0 ± 1	0.3 ± 0.8	-6 ± 2
	JUN 95	7 ± 9	-0.1 ± 0.8	0.0 ± 0.7	1 ± 1	-0.4 ± 0.7	-4 ± 2
	JUL 95	20 ± 20	-1 ± 2	-1 ± 1	0 ± 3	1 ± 2	-2 ± 3
	AUG 95	10 ± 10	-0.2 ± 0.8	-0.4 ± 0.8	0 ± 2	0.2 ± 0.9	-3 ± 2
	SEP 95	20 ± 20	-0.4 ± 0.6	0.0 ± 0.6	1 ± 1	0.1 ± 0.7	-1 ± 2
	OCT 95	0 ± 10	-0.6 ± 0.6	0.3 ± 0.6	-1 ± 1	-0.2 ± 0.7	-1 ± 2
	NOV 95	-6 ± 10	-0.9 ± 0.7	-0.6 ± 0.7	0 ± 1	-0.2 ± 0.7	0 ± 2
	DEC 95	10 ± 10	-0.5 ± 0.7	-0.1 ± 0.6	1 ± 1	-0.2 ± 0.7	-3 ± 2
	MEAN	14 ± 27	-0.6 ± 0.8	-0.2 ± 0.7	0 ± 3	0.0 ± 1.4	-3 ± 4
16C2	JAN 95	10 ± 20	-2 ± 1	1 ± 1	0 ± 2	0 ± 1	2 ± 3
	FEB 95	22 ± 9.0	-0.7 ± 0.7	-1.3 ± 0.7	0 ± 1	0.6 ± 0.7	2 ± 2
	MAR 95	40 ± 10	-0.3 ± 0.9	-0.6 ± 0.8	0 ± 2	0.4 ± 0.9	-6 ± 2
	APR 95	30 ± 10	-0.9 ± 0.9	-0.4 ± 0.8	1 ± 2	0.3 ± 0.8	-5 ± 2
	MAY 95	10 ± 20	0 ± 1	0 ± 1	1 ± 3	1 ± 2	-2 ± 4
	JUN 95	40 ± 10	-0.1 ± 0.8	-0.7 ± 0.8	0 ± 2	0.5 ± 0.9	1 ± 2
	JUL 95	20 ± 20	1 ± 1	0.1 ± 1.0	1 ± 2	0 ± 1	-6 ± 3
	AUG 95	30 ± 20	-2 ± 2	0 ± 2	1 ± 4	0 ± 2	-2 ± 4
	SEP 95	20 ± 10	0 ± 1	-0.8 ± 1.0	0 ± 2	0 ± 1	-8 ± 3
	OCT 95	10 ± 20	0 ± 2	1 ± 2	1 ± 3	0 ± 2	-8 ± 4
	NOV 95	-10 ± 10	0.7 ± 0.9	-0.5 ± 0.9	0 ± 2	-0.9 ± 0.9	2 ± 2
	DEC 95	10 ± 10	-0.2 ± 0.7	-0.5 ± 0.7	0 ± 2	0.3 ± 0.7	0 ± 2
	MEAN	19 ± 29	-0.4 ± 1.6	-0.4 ± 1.1	0 ± 1	0.2 ± 1.0	-2 ± 8
28F3	JAN 95	20 ± 20	0 ± 2	0 ± 1	0 ± 3	-1 ± 2	-6 ± 3
	FEB 95	30 ± 20	-1 ± 2	0 ± 1	0 ± 3	1 ± 2	2 ± 3
	MAR 95	20 ± 20	0 ± 2	-1 ± 1	-1 ± 3	1 ± 2	-5 ± 3
	APR 95	16 ± 8	0.4 ± 0.7	-0.2 ± 0.6	0 ± 1	0.4 ± 0.7	-3 ± 1
	MAY 95	30 ± 10	-1 ± 1	-0.5 ± 0.9	1 ± 2	-1 ± 1	-3 ± 2
	JUN 95	20 ± 20	-1 ± 2	0 ± 1	0 ± 3	0 ± 2	-3 ± 3
	JUL 95	10 ± 10	-1 ± 1	1 ± 1	1 ± 2	0 ± 1	0 ± 2
	AUG 95	16 ± 9	-0.2 ± 0.6	-0.4 ± 0.6	-1 ± 1	0.0 ± 0.7	-4 ± 2
	SEP 95	40 ± 30	-1 ± 2	-1 ± 2	0 ± 4	0 ± 2	-8 ± 4
	OCT 95	20 ± 30	0 ± 2	0 ± 2	4 ± 4	1 ± 2	-1 ± 5
	NOV 95	10 ± 10	-0.7 ± 0.6	0.0 ± 0.6	-1 ± 1	-0.5 ± 0.7	-6 ± 2
	DEC 95	0 ± 10	-1.2 ± 0.8	-0.5 ± 0.8	1 ± 2	-0.1 ± 0.8	1 ± 2
	MEAN	20 ± 22	-0.6 ± 1.1	-0.2 ± 1	0 ± 3	0.1 ± 1.4	-3 ± 6

TABLE C-II.4 CONCENTRATIONS OF GAMMA EMITTERS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1995

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	ZR-95		NB-95		CS-134		CS-137		BA-140		LA-140	
15F4	JAN 95	0	± 2	-1	± 1	-1	± 1	0	± 2	0	± 5	1	± 2
	FEB 95	0	± 1	0.2	± 0.7	-0.1	± 0.7	0.5	± 0.7	1	± 3	1	± 1
	MAR 95	0	± 1	-0.5	± 0.9	-0.1	± 0.9	-0.8	± 1.0	0	± 3	-1	± 2
	APR 95	1	± 1	0.9	± 0.[illegible]	0.6	± 1.0	0	± 1	1	± 3	-1	± 1
	MAY 95	0	± 1	0.0	± 0.7	-0.8	± 0.8	0.2	± 0.8	0	± 2	0	± 1
	JUN 95	0	± 1	0.1	± 0.8	0.2	± 0.8	-0.2	± 0.9	1	± 3	-1	± 1
	JUL 95	0	± 1	-0.6	± 0.7	-0.5	± 0.8	0.4	± 0.8	1	± 3	0	± 1
	AUG 95	1	± 2	0.0	± 0.9	0	± 1	0	± 1	0	± 4	-1	± 2
	SEP 95	1	± 1	0.1	± 0.8	-0.5	± 0.9	0.1	± 1.0	-3	± 3	0	± 1
	OCT 95	-1	± 3	0	± 2	-3	± 2	0	± 1	-4	± 6	1	± 2
	NOV 95	0	± 1	0.2	± 0.6	-3.5	± 0.8	-0.6	± 0.7	-1	± 2	0.0	± 0.8
	DEC 95	0	± 1	-0.3	± 0.[illegible]	-5.1	± 0.9	-0.4	± 0.8	1	± 3	0.4	± 0.9
	MEAN	0	± 1	-0.1	± 1.0	-1.2	± 3.4	-0.1	± 0.8	0	± 3	-0.1	± 1.6
15F7	JAN 95	1	± 3	1	± 2	-1	± 2	-1	± 2	-4	± 6	-2	± 3
	FEB 95	0	± 1	0.2	± 0.8	0.5	± 0.8	-0.2	± 0.9	-2	± 3	0	± 1
	MAR 95	0	± 1	0.3	± 0.7	0.1	± 0.8	0.7	± 0.8	-1	± 3	0	± 1
	APR 95	1	± 2	0	± 1	0	± 1	1	± 2	-1	± 5	-1	± 2
	MAY 95	-1	± 1	0.4	± 0.8	0.7	± 0.9	0	± 1	0	± 3	0	± 1
	JUN 95	0	± 1	0.2	± 0.7	-0.5	± 0.8	0.6	± 0.8	1	± 3	0	± 1
	JUL 95	0	± 2	1	± 1	0	± 1	0	± 2	1	± 5	1	± 3
	AUG 95	0	± 2	0.7	± 1.0	0.4	± 1.0	0.1	± 1.0	-3	± 4	0	± 1
	SEP 95	-1	± 1	0.1	± 0.7	-2.4	± 0.8	0.0	± 0.7	-1	± 3	0	± 1
	OCT 95	0	± 1	0.0	± 0.6	-1.9	± 0.8	0.6	± 0.7	2	± 3	0.2	± 0.9
	NOV 95	0	± 1	0.0	± 0.8	0.2	± 0.9	-1.3	± 0.8	-2	± 3	-0.4	± 1.0
	DEC 95	0	± 1	0.4	± 0.7	-5.1	± 0.9	-0.1	± 0.7	1	± 2	0.3	± 0.8
	MEAN	0	± 1	0.4	± 0.7	-0.7	± 3.3	0.0	± 1.2	-1	± 3	-0.1	± 1.3
16C2	JAN 95	2	± 2	2	± 1	1	± 1	-1	± 1	-2	± 5	0	± 2
	FEB 95	0	± 1	2.0	± 0.9	-0.3	± 0.8	-0.7	± 0.7	-2	± 3	0.3	± 0.9
	MAR 95	-1	± 1	-0.2	± 0.9	-0.5	± 1.0	0	± 1	0	± 4	0	± 1
	APR 95	0	± 1	0.9	± 0.8	0.0	± 0.9	0	± 1	3	± 3	1	± 1
	MAY 95	0	± 2	1	± 2	1	± 1	-1	± 1	3	± 5	2	± 2
	JUN 95	0	± 1	0.2	± 0.9	0.0	± 1.0	1	± 1	3	± 3	1	± 1
	JUL 95	0	± 2	1	± 1	1	± 1	-1	± 1	-1	± 4	0	± 2
	AUG 95	0	± 3	0	± 2	-2	± 2	0	± 2	-1	± 6	-1	± 3
	SEP 95	-1	± 2	1	± 1	0	± 1	0	± 1	0	± 4	0	± 2
	OCT 95	0	± 3	-2	± 2	-15	± 2	-1	± 2	-3	± 7	-2	± 3
	NOV 95	0	± 2	1.4	± 0.9	0	± 1	0.6	± 0.9	1	± 4	-1	± 1
	DEC 95	1	± 1	1.4	± 0.8	0.2	± 0.8	-0.5	± 0.7	2	± 3	-1	± 1
	MEAN	0	± 1	0.8	± 2.0	-1.1	± 8.9	-0.3	± 1.1	0	± 4	-0.1	± 2.0
28F3	JAN 95	-1	± 2	-1	± 1	-2	± 2	0	± 2	2	± 5	-1	± 3
	FEB 95	1	± 2	0	± 2	0	± 1	0	± 1	-3	± 5	2	± 3
	MAR 95	0	± 2	1	± 1	0	± 1	0	± 1	-5	± 5	-1	± 3
	APR 95	0	± 1	0.3	± 0.6	-0.7	± 0.7	-0.1	± 0.8	2	± 3	1	± 1
	MAY 95	-1	± 2	0.6	± 1.0	-0.5	± 1.0	-1	± 1	-1	± 4	-1	± 2
	JUN 95	-2	± 2	0	± 1	0	± 1	0	± 1	-5	± 5	0	± 2
	JUL 95	1	± 2	1	± 1	-1	± 1	0	± 1	-3	± 5	0	± 2
	AUG 95	0	± 1	0.7	± 0.7	-0.4	± 0.8	-0.4	± 0.7	-2	± 3	0	± 1
	SEP 95	1	± 3	0	± 2	0	± 2	0	± 2	-4	± 7	-1	± 3
	OCT 95	-2	± 3	-1	± 2	-6	± 2	-1	± 2	0	± 7	2	± 3
	NOV 95	-1	± 1	-0.1	± 0.7	-4.5	± 0.9	-0.1	± 0.7	-1	± 3	-0.5	± 0.9
	DEC 95	1	± 1	0.3	± 0.9	0.3	± 0.9	0.1	± 0.8	-3	± 4	0	± 1
	MEAN	0	± 2	0.2	± 1.0	-1.3	± 3.9	-0.2	± 0.6	-2	± 5	0.2	± 2.1

TABLE C-III.1 CONCENTRATIONS OF GAMMA EMITTERS IN PREDATOR AND BOTTOM FEEDER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1995

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

STC	MEDIA	COLLECTION PERIOD	K-40		MN-54		CO-58		FE-59		CO-60	
16C5	PREDATOR	05/11-05/11/95	3500	± 300	0	± 3	0	± 4	3	± 9	1	± 4
		11/22-11/22/95	2700	± 300	-2	± 4	0	± 4	0	± 8	-1	± 4
		MEAN	3100	± 1100	-1	± 3	0	± 0	1	± 4	0	± 4
		05/11-05/11/95	3300	± 300	-5	± 4	-2	± 4	-4	± 9	-1	± 4
	BOTTOM FEEDER	11/22-11/28/95	3200	± 300	-1	± 6	-4	± 5	0	± 10	-1	± 6
		MEAN	3300	± 100	-3	± 5	-3	± 3	-3	± 3	-1	± 0
29C1	PREDATOR	05/24-05/24/95	3100	± 300	2	± 4	-4	± 4	0	± 10	-1	± 5
		10/12-10/12/95	3000	± 300	-2	± 4	-3	± 4	0	± 10	0	± 5
		MEAN	3100	± 100	0	± 5	-4	± 1	0	± 10	0	± 0
		05/24-05/24/95	3200	± 300	-1	± 5	-1	± 5	-10	± 10	2	± 5
	BOTTOM FEEDER	10/12-10/13/95	3200	± 300	-3	± 4	0	± 4	10	± 10	8	± 5
		MEAN	3200	± 0	-2	± 3	C	± 2	0	± 20	5	± 8

TABLE C-III.1 CONCENTRATIONS OF GAMMA EMITTERS IN PREDATOR AND BOTTOM FEEDER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1995

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

STC	MEDIA	COLLECTION PERIOD	ZN-65		I-131		CS-134		CS-137	
16C5	PREDATOR	05/11-05/11/95	-10	± 10	20	± 10	-6	± 4	3	± 4
		11/22-11/22/95	-10	± 10	3	± 6	5	± 4	5	± 4
		MEAN	-10	± 0	14	± 30	-1	± 16	4	± 3
		05/11-05/11/95	20	± 10	8	± 6	-2	± 6	3	± 4
	BOTTOM FEEDER	11/22-11/28/95	10	± 20	3	± 6	3	± 6	4	± 7
		MEAN	10	± 20	5	± 7	0	± 6	3	± 2
29C1	PREDATOR	05/24-05/24/95	-10	± 10	18	± 9	-22	± 5	2	± 4
		10/12-10/12/95	-20	± 10	0	± 7	6	± 5	2	± 4
		MEAN	-20	± 10	9	± 25	-8	± 39	2	± 0
		05/24-05/24/95	-30	± 10	17	± 9	-1	± 7	3	± 5
	BOTTOM FEEDER	10/12-10/13/95	-20	± 10	5	± 5	-2	± 4	1	± 4
		MEAN	-20	± 10	11	± 17	-1	± 1	2	± 3

TABLE C-IV.1 CONCENTRATIONS OF GAMMA EMITTERS IN SILT SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1995

RESULTS IN UNITS OF PCI/KG DRY ± 2 SIGMA

STC	COLLECTION PERIOD	BE-7	K-40	MN-54	CO-60	ZN-65	I-131
16B2	05/18/95	600 ± 200	15000 ± 2000	20 ± 20	20 ± 20	10 ± 40	0 ± 20
	10/31/95	5800 ± 600	18000 ± 2000	26? ± 30	120 ± 40	290 ± 60	200 ± 30
	MEAN	3200 ± 7400	17000 ± 4000	140 ± 340	70 ± 140	150 ± 400	100 ± 280
16C4	05/18/95	0 ± 100	16000 ± 2000	10 ± 20	-10 ± 10	-30 ± 40	-20 ± 20
	10/31/95	4000 ± 500	15000 ± 2000	220 ± 50	110 ± 40	180 ± 80	190 ± 50
	MEAN	2000 ± 5700	16000 ± 1000	110 ± 300	50 ± 170	80 ± 290	90 ± 300
33A2	05/18/95	-100 ± 100	8800 ± 900	20 ± 20	-10 ± 20	20 ± 40	-10 ± 20
	10/31/95	100 ± 100	12000 ± 1000	10 ± 10	0 ± 10	-10 ± 40	0 ± 20
	MEAN	0 ± 200	10400 ± 4500	10 ± 20	0 ± 10	10 ± 40	0 ± 0

STC	COLLECTION PERIOD	CS-134	CS-137	RA-226	TH-232
16B2	05/18/95	0 ± 20	190 ± 30	2200 ± 500	1400 ± 100
	10/31/95	20 ± 20	270 ± 40	2800 ± 600	1700 ± 200
	MEAN	10 ± 20	230 ± 110	2500 ± 800	1600 ± 400
16C4	05/18/95	0 ± 10	0 ± 10	2300 ± 500	1200 ± 100
	10/31/95	30 ± 30	220 ± 50	2000 ± 1000	1600 ± 200
	MEAN	10 ± 50	110 ± 320	2300 ± 100	1400 ± 600
33A2	05/18/95	0 ± 20	-10 ± 20	2300 ± 700	1100 ± 100
	10/31/95	0 ± 10	-10 ± 20	2500 ± 500	1200 ± 100
	MEAN	0 ± 0	-10 ± 0	2400 ± 300	1200 ± 100

TABLE C-V.1 CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1995

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

	GROUP I						GROUP II		GROUP III	
WEEK	10S3		11S1		14S1		13C1		22G1	
01	20	± 4	18	± 4	16	± 4	17	± 4	15	± 4
02	12	± 4	14	± 4	13	± 4	15	± 4	13	± 4
03	5	± 3	7	± 3	5	± 3	6	± 3	5	± 3
04	10	± 3	13	± 4	12	± 4	11	± 3	12	± 3
05	13	± 3	14	± 4	17	± 4	15	± 4	14	± 4
06	21	± 4	19	± 4	23	± 4	20	± 4	21	± 4
07	19	± 4	19	± 4	19	± 4	18	± 4	17	± 4
08	15	± 3	14	± 3	13	± 3	13	± 3	11	± 3
09	20	± 4	17	± 4	17	± 4	18	± 4	13	± 4
10	15	± 4	15	± 4	15	± 4	14	± 4	15	± 4
11	18	± 4	20	± 4	18	± 4	18	± 4	19	± 4
12	12	± 4	11	± 4	13	± 4	8	± 4	11	± 4
13	16	± 4	16	± 4	16	± 4	15	± 4	17	± 4
14	18	± 4	17	± 4	17	± 4	18	± 4	18	± 4
15	13	± 4	15	± 4	13	± 4	14	± 4	17	± 4
16	13	± 4	12	± 4	12	± 4	11	± 4	13	± 4
17	12	± 3	12	± 3	10	± 3	13	± 3	11	± 3
18	12	± 3	15	± 3	12	± 3	13	± 3	12	± 3
19	7	± 3	9	± 4	7	± 3	7	± 3	6	± 3
20	16	± 4	17	± 4	15	± 4	19	± 4	14	± 4
21	8	± 4	11	± 4	9	± 4	13	± 4	12	± 4
22	10	± 4	16	± 4	8	± 4	12	± 4	13	± 4
23	12	± 4	14	± 4	12	± 4	13	± 4	10	± 4
24	16	± 4	16	± 4	14	± 4	14	± 4	16	± 4
25	16	± 4	19	± 4	15	± 4	18	± 4	13	± 4
26	9	± 3	13	± 3	10	± 3	11	± 3	12	± 3
27	14	± 3	15	± 4	11	± 3	16	± 4	17	± 4
28	23	± 4	26	± 4	23	± 4	24	± 4	24	± 4
29	19	± 4	19	± 4	20	± 4	21	± 4	14	± 4
30	18	± 4	20	± 4	21	± 4	22	± 4	24	± 4
31	18	± 4	16	± 4	13	± 4	18	± 4	16	± 4
32	13	± 4	11	± 4	12	± 4	11	± 4	11	± 4
33	20	± 4	17	± 4	19	± 4	18	± 4	20	± 4
34	13	± 4	15	± 4	12	± 3	15	± 4	12	± 3
35	20	± 3	23	± 4	17	± 3	22	± 4	19	± 3
36	24	± 5	29	± 5	22	± 5	26	± 5	20	± 5
37	13	± 4	11	± 3	14	± 3	14	± 4	13	± 3
38	11	± 3	15	± 4	9	± 3	9	± 3	12	± 4
39	18	± 4	19	± 4	16	± 4	20	± 4	16	± 4
40	17	± 5	19	± 5	14	± 4	14	± 4	16	± 5
41	30	± 4	27	± 4	24	± 4	24	± 4	21	± 4
42	10	± 4	15	± 5	12	± 4	12	± 5	9	± 4
43	18	± 4	18	± 4	15	± 4	16	± 4	19	± 4
44	16	± 4	14	± 4	18	± 4	18	± 4	17	± 4
45	16	± 4	18	± 4	18	± 4	18	± 4	20	± 4
46	14	± 4	16	± 4	15	± 4	15	± 4	17	± 4
47	16	± 4	20	± 4	17	± 4	18	± 4	17	± 4
48	20	± 3	21	± 3	16	± 2	20	± 3	17	± 2
49	19	± 4	18	± 4	14	± 4	15	± 4	18	± 4
50	22	± 4	24	± 4	21	± 4	22	± 4	20	± 4
51		(1)	13	± 3	13	± 3	12	± 3	13	± 3
52	15	± 4	13	± 4	21	± 4	20	± 4	14	± 4
MEAN	16	± 9	16	± 9	15	± 8	16	± 9	15	± 8

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION.

TABLE C-V.2 MONTHLY AND YEARLY MEAN VALUES OF GROSS BETA CONCENTRATIONS (E-3 PCI/CU. METER) IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1995

GROUP I - ON-SITE LOCATIONS

COLLECTION PERIOD	MIN.	MAX.	MEAN	± 2 SD
01/03/95-01/30/95	5	20	12	± 9
01/30/95-02/28/95	13	23	17	± 7
02/28/95-04/03/95	11	20	16	± 5
04/03/95-05/01/95	10	18	14	± 5
05/01/95-05/29/95	7	[illegible]	11	± 7
05/29/95-07/03/95	8	19	13	± 6
07/03/95-07/31/95	11	26	19	± 8
07/31/95-08/28/95	11	20	15	± 6
08/28/95-10/02/95	9	29	[illegible]	± 11
10/02/95-10/30/95	10	30	[illegible]	± 12
10/30/95-11/27/95	14	20	17	± 4
11/27/95-01/02/96	13	24	[illegible]	± 8
01/03/95-01/02/96	5	30	16	± 9

GROUP II - INTERMEDIATE DISTANCE LOCATIONS

COLLECTION PERIOD	MIN.	MAX.	MEAN	± 2 SD
01/03/95-01/30/95	6	17	12	± 10
01/30/95-02/28/95	13	20	17	± 6
02/28/95-04/03/95	8	18	15	± 8
04/03/95-05/01/95	11	18	14	± 6
05/01/95-05/29/95	7	19	13	± 10
05/29/95-07/03/95	11	18	14	± 5
07/03/95-07/31/95	16	24	21	± 7
07/31/95-08/28/95	11	18	16	± 7
08/28/95-10/02/95	9	26	18	± 13
10/02/95-10/30/95	12	24	17	± 11
10/30/95-11/27/95	15	18	17	± 3
11/27/95-01/02/96	12	22	18	± 8
01/03/95-01/02/96	6	26	16	± 9

GROUP III - CONTROL LOCATIONS

COLLECTION PERIOD	MIN.	MAX.	MEAN	± 2 SD
01/03/95-01/30/95	5	15	11	± 9
01/30/95-02/28/95	11	21	16	± 9
02/28/95-04/03/95	11	19	15	± 6
04/03/95-05/01/95	11	18	15	± 7
05/01/95-05/29/95	6	14	11	± 7
05/29/95-07/03/95	10	16	13	± 4
07/03/95-07/31/95	14	24	20	± 10
07/31/95-08/28/95	11	20	15	± 8
08/28/95-10/02/95	12	20	16	± 7
10/02/95-10/30/95	9	21	16	± 10
10/30/95-11/27/95	17	20	18	± 3
11/27/95-01/02/96	13	20	16	± 6
01/03/95-01/02/96	5	24	15	± 8

NOTE: GROUP I CONSIST OF LOCATIONS 10S3, 11S1, AND 14S1
GROUP II CONSIST OF LOCATION 13C1
GROUP III CONSIST OF LOCATION 22G1

TABLE C-V.3 CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1995

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

STC	COLLECTION PERIOD	BE-7	K-40	CS-134	CS-137	RA-226	TH-232
10S3	01/03-04/03/95	80 ± 10	10 ± 10	-1.2 ± 0.8	0.0 ± 0.6	20 ± 10	0 ± 2
	04/03-07/03/95	80 ± 20	0 ± 20	0 ± 1	-0.9 ± 1.0	10 ± 20	3 ± 5
	07/03-10/02/95	60 ± 20	0 ± 10	1 ± 1	-0.2 ± 1.0	10 ± 20	1 ± 3
	10/02-01/02/96	60 ± 20	3 ± 7.0	-4 ± 2	-2 ± 2	0 ± 20	1 ± 5
	MEAN	70 ± 20	6 ± 11	-1.1 ± 4.0	-0.7 ± 1.6	10 ± 20	1 ± 3
11S1	01/03-04/03/95	80 ± 20	20 ± 20	1 ± 1	-1 ± 1	20 ± 20	1 ± 3
	04/03-07/03/95	60 ± 20	0 ± 20	1 ± 1	-0.1 ± 1.0	10 ± 20	-2 ± 4
	07/03-10/02/95	80 ± 20	10 ± 10	0.0 ± 0.9	1 ± 1	10 ± 20	1 ± 4
	10/02-01/02/96	60 ± 20	0 ± 20	-1 ± 2	0.1 ± 1.0	0 ± 20	3 ± 4
	MEAN	70 ± 30	10 ± 20	0.2 ± 1.4	-0.1 ± 1.0	10 ± 10	1 ± 4
13C1	01/03-04/03/95	60 ± 20	10 ± 10	0.7 ± 1.0	0 ± 1	0 ± 20	-1 ± 4
	04/03-07/03/95	70 ± 30	30 ± 20	1 ± 1	0 ± 1	0 ± 20	2 ± 4
	07/03-10/02/95	100 ± 20	-20 ± 30	0 ± 1	0 ± 1	10 ± 20	1 ± 4
	10/02-01/02/96	50 ± 20	10 ± 10	0 ± 1	0.3 ± 1.0	10 ± 20	0 ± 3
	MEAN	70 ± 40	0 ± 40	0.3 ± 1.3	-0.1 ± 0.6	10 ± 20	1 ± 2
14S1	01/03-04/03/95	70 ± 20	20 ± 10	-0.2 ± 0.8	0.1 ± 0.9	30 ± 20	[illegible] ± 3
	04/03-07/03/95	70 ± 20	30 ± 20	1 ± 1	0 ± 2	10 ± 20	3 ± 6
	07/03-10/02/95	60 ± 20	10 ± 20	0 ± 1	0 ± 1	20 ± 20	2 ± 6
	10/02-01/02/96	40 ± 20	0 ± 10	1 ± 1	0 ± 1	10 ± 20	2 ± 4
	MEAN	60 ± 30	20 ± 30	0.4 ± 0.9	0.0 ± 0.3	20 ± 20	2 ± 2
22G1	01/03-04/03/95	90 ± 30	10 ± 10	0 ± 1	1 ± 1	10 ± 20	-3 ± 6
	04/03-07/03/95	70 ± 20	10 ± 20	0 ± 1	-0.5 ± 1.0	30 ± 20	-2 ± 4
	07/03-10/02/95	80 ± 10	20 ± 10	-0.4 ± 0.7	0.1 ± 0.6	30 ± 20	2 ± 2
	10/02-01/02/96	50 ± 20	20 ± 20	-1 ± 1	0.1 ± 1.0	10 ± 20	2 ± 4
	MEAN	70 ± 30	10 ± 10	-0.4 ± 0.5	0.1 ± 0.9	20 ± 20	0 ± 5

TABLE C-VI.1 CONCENTRATIONS OF I-131 IN AIR IODINE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1995

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

	GROUP I			GROUP II	GROUP III
WEEK	10S3	11S1	14S1	13C1	22G1
01	0 ± 10	10 ± 10	0 ± 20	0 ± 20	0 ± 20
02	-4 ± 9	10 ± 20	0 ± 10	0 ± 20	10 ± 20
03	1 ± 7	0 ± 10	0 ± 8	-10 ± 10	-10 ± 20
04	10 ± 10	10 ± 10	1 ± 7	10 ± 10	-10 ± 10
05	-5 ± 10	0 ± 10	2 ± 8	-10 ± 10	10 ± 10
06	8 ± 8	1 ± 9	0 ± 9	0 ± 10	10 ± 10
07	-2 ± 7	10 ± 10	-1 ± 10	0 ± 10	10 ± 20
08	-1 ± 6	-1 ± 8	0 ± 10	0 ± 10	5 ± 6
09	-10 ± 10	0 ± 10	0 ± 10	10 ± 10	-2 ± 8
10	0 ± 10	0 ± 10	10 ± 10	7 ± 9	1 ± 9
11	8 ± 7	0 ± 8	10 ± 10	0 ± 10	10 ± 10
12	1 ± 9	0 ± 10	-3 ± 10	9 ± 9	-10 ± 20
13	-3 ± 10	0 ± 10	-10 ± 10	-10 ± 10	0 ± 20
14	10 ± 10	0 ± 10	0 ± 10	10 ± 20	-10 ± 20
15	3 ± 8	-10 ± 10	-10 ± 10	4 ± 7	0 ± 10
16	6 ± 9	10 ± 10	-2 ± 8	10 ± 10	0 ± 10
17	-10 ± 10	12 ± 9	10 ± 10	0 ± 20	-1 ± 10
18	-2 ± 8	-10 ± 10	0 ± 10	-10 ± 10	0 ± 10
19	1 ± 9	10 ± 9	10 ± 20	-10 ± 20	2 ± 10
20	0 ± 10	-10 ± 10	7 ± 10	0 ± 20	5 ± 9
21	7 ± 9	0 ± 10	0 ± 10	-10 ± 10	0 ± 10
22	12 ± 8	0 ± 10	0 ± 10	0 ± 10	4 ± 9
23	0 ± 10	0 ± 10	0 ± 10	10 ± 10	1 ± 8
24	6 ± 8	-3 ± 9	6 ± 8	0 ± 10	10 ± 10
25	2 ± 8	0 ± 8	-20 ± 10	0 ± 10	20 ± 10
26	-6 ± 10	0 ± 10	-4 ± 9	-20 ± 10	0 ± 10
27	-10 ± 10	0 ± 10	0 ± 10	0 ± 10	7 ± 8
28	-1 ± 7	10 ± 10	-5 ± 8	10 ± 20	0 ± 10
29	-1 ± 9	-5 ± 9	-4 ± 8	0 ± 10	-10 ± 10
30	6 ± 8	-3 ± 8	-6 ± 9	0 ± 10	3 ± 7
31	-6 ± 7	-2 ± 10	-10 ± 10	0 ± 20	-1 ± 7
32	5 ± 10	0 ± 10	0 ± 10	0 ± 10	4 ± 9
33	0 ± 10	10 ± 10	-4 ± 7	0 ± 10	-10 ± 10
34	-2 ± 9	-1 ± 10	10 ± 10	10 ± 10	-3 ± 8
35	0 ± 10	-4 ± 6	*0 ± 0	0 ± 10	-10 ± 10
36	-2 ± 8	0 ± 10	0 ± 10	0 ± 20	10 ± 20
37	-3 ± 8	10 ± 10	-2 ± 9	10 ± 10	0 ± 10
38	7 ± 8	10 ± 10	0 ± 10	-10 ± 10	0 ± 10
39	20 ± 10	0 ± 10	0 ± 20	3 ± 8	12 ± 10
40	0 ± 9	10 ± 10	0 ± 10	0 ± 10	-3 ± 10
41	10 ± 10	10 ± 10	10 ± 10	-2 ± 7	0 ± 10
42	6 ± 9	0 ± 10	6 ± 9	10 ± 20	-5 ± 9
43	0 ± 10	0 ± 10	3 ± 8	-10 ± 10	-5 ± 10
44	2 ± 9	2 ± 9	-10 ± 10	10 ± 10	-6 ± 9
45	-10 ± 10	0 ± 10	-10 ± 10	0 ± 10	10 ± 10
46	-3 ± 8	10 ± 10	2 ± 8	0 ± 10	-7 ± 10
47	6 ± 8	-3 ± 9	0 ± 10	0 ± 10	2 ± 8
48	5 ± 8	5 ± 9	-10 ± 10	-10 ± 10	-2 ± 7
49	3 ± 9	3 ± 7	2 ± 8	0 ± 10	-10 ± 10
50	0 ± 8	10 ± 10	0 ± 20	10 ± 10	-1 ± 8
51	(1)	4 ± 7	-1 ± 6	-1 ± 8	2 ± 7
52	-10 ± 10	0 ± 10	1 ± 9	0 ± 10	0 ± 10
MEAN	1 ± 12	2 ± 11	0 ± 10	1 ± 14	0 ± 12

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION.

TABLE C-VII.1 CONCENTRATIONS OF I-131 IN MILK SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1995

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION DATE	CONTROL FARMS 36B1		9G1		22F1		INDICATOR FARMS 10B1		18C1		19B1		21B1		22C1		25C1	
01/10/95	0.0	± 0.2	0.1	± 0.2	-0.1	± 0.2	(1)		0.1	± 0.2	0.0	± 0.3	0.1	± 0.2	0.1	± 0.2	-0.1	± 0.3
02/07/95					0.0	± 0.2			0.0	± 0.2	0.1	± 0.2	0.1	± 0.2				
03/07/95					0.2	± 0.2	0.0	± 0.2	0.0	± 0.2	0.0	± 0.2	-0.3	± 0.3				
04/04/95	-0.2	± 0.2	0.0	± 0.2	-0.1	± 0.2	0.1	± 0.3	0.1	± 0.2	-0.1	± [illegible]	-0.3	± 0.3	0.3	± 0.2	-0.1	± 0.3
04/18/95					-0.2	± 0.2	-0.2	± 0.2	0.1	± 0.2	-0.1	± 0.2	0.0	± 0.2				
05/02/95					0.0	± 0.2	0.0	± 0.2	0.0	± 0.2	0.1	± 0.2	0.1	± 0.3				
05/16/95					-0.1	± 0.2	0.0	± 0.2	-0.1	± 0.2	0.1	± 0.3	-0.1	± 0.2				
05/30/95					0.0	± 0.2	0.3	± 0.2	0.1	± 0.3	-0.1	± 0.2	-0.3	± 0.3				
06/13/95					-0.2	± 0.2	-0.1	± 0.2	-0.1	± 0.2	0.2	± 0.2	-0.1	± 0.2				
06/27/95					-0.1	± 0.2	0.0	± 0.2	0.1	± 0.2	-0.1	± 0.3	0.1	± 0.2				
07/11/95	-0.1	± 0.3	0.0	± 0.2	0.0	± 0.3	0.1	± 0.2	0.0	± 0.2	0.0	± 0.2	-0.2	± 0.3	0.1	± 0.3	0.3	± 0.2
07/25/95					0.0	± 0.2	-0.1	± 0.2	0.1	± 0.2	0.1	± 0.2	0.0	± 0.3				
08/08/95					0.0	± 0.2	0.1	± 0.2	-0.1	± 0.2	0.1	± 0.2	0.0	± 0.2				
08/22/95					0.0	± 0.2	0.2	± 0.2	0.0	± 0.2	0.1	± 0.3	0.0	± 0.2				
09/05/95					-0.6	± 0.3	0.1	± 0.2	-0.1	± 0.2	0.1	± 0.2	-0.1	± 0.3				
09/19/95					0.0	± 0.2			0.2	± 0.2	0.1	± 0.3	0.1	± 0.2				
10/03/95	0.1	± 0.2			0.1	± 0.3	(1)		-0.2	± 0.2	0.0	± 0.3	0.0	± 0.3	0.0	± 0.3	0.1	± 0.2
10/04/95			-0.1	± 0.2														
10/17/95					0.0	± 0.2			0.0	± 0.2	0.0	± 0.2	0.1	± 0.2				
10/31/95					-0.1	± 0.2			0.0	± 0.2	0.0	± 0.3	0.2	± 0.2				
11/14/95					0.1	± 0.2			0.0	± 0.2	-0.1	± 0.2	-0.2	± 0.2				
11/28/95					-0.1	± 0.2			0.1	± 0.2	-0.1	± 0.2	0.0	± 0.2				
12/19/95					-0.1	± 0.3			0.1	± 0.2	0.1	± 0.2	0.1	± 0.2				
MEAN	0.0	± 0.3	0.0	± 0.2	-0.1	± 0.3	0.0	± 0.2	0.0	± 0.2	0.0	± 0.2	0.0	± 0.3	0.1	± 0.2	0.1	± 0.3

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

TABLE C-VII.2 CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES
COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1995

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	K-40	CS-134	CS-137	BA-140	LA-140
10B1	(1)					
	03/07/95	1500 ± 200	-8 ± 1	1 ± 1	0 ± 4	0 ± 2
	04/04/95	1600 ± 200	-9 ± 2	0 ± 2	6 ± 6	-1 ± 2
	04/18/95	1700 ± 200	-7 ± 1	1 ± 1	1 ± 4	0 ± 1
	05/02/95	1500 ± 200	-6 ± 1	0 ± 1	-1 ± 4	0 ± 2
	05/16/95	1600 ± 200	-4 ± 2	1 ± 2	-4 ± 7	0 ± 3
	05/30/95	1700 ± 200	-9 ± 2	1 ± 2	0 ± 7	0 ± 3
	06/13/95	1600 ± 200	-11 ± 2	1 ± 2	-3 ± 7	-1 ± 3
	06/27/95	1600 ± 200	-3 ± 3	3 ± 3	4 ± 8	-3 ± 4
	07/11/95	1800 ± 200	-13 ± 2	0 ± 2	3 ± 6	-2 ± 2
	07/25/95	1600 ± 200	-10 ± 2	2 ± 2	1 ± 6	-1 ± 3
	08/08/95	1500 ± 100	-15 ± 2	1 ± 2	1 ± 7	-1 ± 2
	08/22/95	1400 ± 100	-8 ± 2	1 ± 2	-1 ± 6	0 ± 3
	09/05/95	1500 ± 100	-7 ± 2	3 ± 2	4 ± 7	-1 ± 3
	(1)					
	MEAN	1600 ± 200	-8 ± 7	1 ± 2	1 ± 6	-1 ± 2
18C1	01/10/95	1500 ± 100	-3.3 ± 0.9	-0.1 ± 0.8	0 ± 3	1 ± 1
	02/07/95	1400 ± 100	-1 ± 1	0 ± 1	0 ± 3	-1 ± 1
	03/07/95	1400 ± 100	-1 ± 1	-1 ± 1	0 ± 4	-1 ± 1
	04/04/95	1300 ± 100	-5 ± 2	1 ± 2	2 ± 6	-1 ± 3
	04/18/95	1400 ± 100	-8 ± 2	1 ± 2	3 ± 6	0 ± 3
	05/02/95	1400 ± 100	-4 ± 2	2 ± 2	2 ± 6	1 ± 2
	05/16/95	1400 ± 100	-3 ± 2	0 ± 2	2 ± 5	1 ± 2
	05/30/95	1400 ± 100	-6 ± 1	0 ± 1	2 ± 5	2 ± 2
	06/13/95	1400 ± 100	0 ± 1	1 ± 2	2 ± 5	-1 ± 2
	06/27/95	1300 ± 100	-12 ± 3	-1 ± 3	1 ± 8	-1 ± 3
	07/11/95	1500 ± 100	-6 ± 1	0 ± 1	0 ± 3	-1 ± 1
	07/25/95	1400 ± 100	-6 ± 2	2 ± 2	-2 ± 6	1 ± 2
	08/08/95	1500 ± 100	-3.5 ± 0.9	-0.4 ± 0.8	0 ± 3	0 ± 1
	08/22/95	1400 ± 100	-2.6 ± 0.9	0.1 ± 0.9	2 ± 3	-0.1 ± 0.9
	09/05/95	1400 ± 100	-7 ± 1	0 ± 1	1 ± 3	0 ± 1
	09/19/95	1300 ± 100	-6 ± 1	1 ± 1	0 ± 3	0 ± 1
	10/03/95	1400 ± 100	-3.3 ± 0.9	0.0 ± 0.9	1 ± 3	1 ± 1
	10/17/95	1400 ± 100	-16 ± 2	1 ± 2	3 ± 5	-1 ± 2
	10/31/95	1400 ± 100	-8 ± 1	0 ± 1	1 ± 4	0 ± 1
	11/14/95	1500 ± 100	-14 ± 2	0 ± 2	-6 ± 7	1 ± 2
	11/28/95	1500 ± 100	-10 ± 1	0 ± 1	0 ± 4	1 ± 1
	12/19/95	1400 ± 100	-12 ± 1	0 ± 1	-1 ± 4	0 ± 1
	MEAN	1400 ± 100	-6.2 ± 9.7	0.3 ± 1.4	0 ± 4	0.1 ± 1.7
19B1	01/10/95	1400 ± 100	-8 ± 1	0 ± 1	-1 ± 4	0 ± 1
	02/07/95	1400 ± 100	-1 ± 2	0 ± 2	-1 ± 5	-1 ± 2
	03/07/95	1400 ± 100	-8 ± 1	-0.4 ± 0.9	-1 ± 3	0 ± 1
	04/04/95	1400 ± 100	-6 ± 1	0 ± 1	-1 ± 3	0 ± 1
	04/18/95	1300 ± 100	-3 ± 2	0 ± 2	-1 ± 5	0 ± 2
	05/02/95	1400 ± 100	-3.0 ± 0.9	-0.2 ± 0.9	0 ± 3	0 ± 1
	05/16/95	1200 ± 100	-5 ± 2	0 ± 2	-3 ± 6	0 ± 3
	05/30/95	1300 ± 100	-5 ± 2	0 ± 2	4 ± 9	-2 ± 4
	06/13/95	1500 ± 100	-6 ± 2	1 ± 2	4 ± 6	-2 ± 3
	06/27/95	1400 ± 100	-12 ± 2	1 ± 2	-2 ± 5	1 ± 2
	07/11/95	1400 ± 100	-3 ± 1	0 ± 1	2 ± 4	1 ± 1
	07/25/95	1500 ± 100	-7.5 ± 0.9	0.1 ± 0.8	-2 ± 3	0 ± 1
	08/08/95	1400 ± 100	-3.4 ± 0.9	0.3 ± 0.9	0 ± 3	0.8 ± 0.[illegible]
	08/22/95	1500 ± 200	-4 ± 1	-1 ± 1	0 ± 3	1 ± 1
	09/05/95	1200 ± 100	-4 ± 2	0 ± 2	4 ± 6	-1 ± 2
	09/19/95	1400 ± 100	-3 ± 2	-1 ± 2	6 ± 7	-1 ± 3
	10/03/95	1400 ± 100	-5 ± 2	0 ± 2	0 ± 8	-1 ± 3
	10/17/95	1400 ± 100	-2.5 ± 0.9	0.5 ± 0.9	-1 ± 3	0.0 ± 0.9
	10/31/95	1400 ± 100	-2.9 ± 0.9	0.3 ± 0.9	1 ± 3	-0.1 ± 0.8
	11/14/95	1300 ± 100	-2.0 ± 0.9	-0.4 ± 0.9	-1 ± 3	0.1 ± 0.8
	11/28/95	1500 ± 100	1 ± 1	0 ± 1	-2 ± 4	1 ± 1
	12/19/95	1200 ± 100	-1 ± 2	0 ± 2	-6 ± 7	1 ± 3
	MEAN	1400 ± 200	-4.4 ± 5.5	0.0 ± 0.9	0 ± 5	-0.2 ± 1.8

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION.

TABLE C-VII.2 CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1995

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	K-40	CS-134	CS-137	BA-140	LA-140
21B1	01/10/95	1400 ± 100	-8 ± 1	-1 ± 1	2 ± 4	1 ± 1
	02/07/95	1400 ± 100	-7 ± 1	-0.2 ± 0.9	2 ± 3	0 ± 1
	03/07/95	1400 ± 100	0.5 ± 0.9	-0.2 ± 0.9	-1 ± 3	1 ± 1
	04/04/95	1300 ± 100	-7 ± 2	0 ± 2	3 ± 7	0 ± 3
	04/18/95	1400 ± 100	-11 ± 2	1 ± 2	-6 ± 7	0 ± 3
	05/02/95	1300 ± 100	-6 ± 2	-1 ± 2	-1 ± 7	3 ± 3
	05/16/95	1300 ± 100	-6 ± 1	1 ± 1	1 ± 4	0 ± 2
	05/30/95	1400 ± 100	-6 ± 1	1 ± 1	2 ± 5	-1 ± 2
	06/13/95	1400 ± 100	-5 ± 1	0 ± 1	-1 ± 3	0 ± 1
	06/27/95	1400 ± 100	0 ± 1	-1 ± 1	0 ± 5	-1 ± 2
	07/11/95	1500 ± 100	-5 ± 1	0 ± 1	2 ± 3	0 ± 1
	07/25/95	1400 ± 100	-6 ± 1	0.4 ± 0.9	4 ± 3	-2 ± 1
	08/08/95	1400 ± 100	-8 ± 1	-1 ± 1	0 ± 3	0 ± 1
	08/22/95	1400 ± 100	0 ± 2	-1 ± 2	1 ± [illegible]	-1 ± 2
	09/05/95	1400 ± 100	-7 ± 1	0.0 ± 0.9	1 ± 3	0 ± 1
	09/19/95	1400 ± 100	-8 ± 1	1 ± 1	-1 ± 3	1 ± 1
	10/03/95	1300 ± 100	-8 ± 2	2 ± 2	-5 ± 9	1 ± 3
	10/17/95	1300 ± 100	-16 ± 2	0 ± 2	6 ± 6	-1 ± 2
	10/31/95	1300 ± 100	-7 ± 1	-0.3 ± 0.9	3 ± 3	0.6 ± 0.9
	11/14/95	1300 ± 100	-14 ± 3	0 ± 2	2 ± 7	0 ± 3
	11/28/95	1400 ± 100	-1 ± 2	0 ± 2	3 ± 7	-1 ± 3
	12/19/95	1400 ± 100	-1 ± 1	0 ± 1	-3 ± 4	0 ± 1
	MEAN	1400 ± 100	-6.1 ± 8.5	0.0 ± 1.4	1 ± 6	0.1 ± 1.8
22F1	01/10/95	1300 ± 100	-4.5 ± 0.9	1.1 ± 0.9	0 ± 3	0 ± 1
	02/07/95	1400 ± 100	0 ± 1	1 ± 1	2 ± 4	1 ± 1
	03/07/95	1400 ± 100	-6 ± 1	2 ± 1	-2 ± 3	-1 ± 1
	04/04/95	1400 ± 100	-3.1 ± 0.9	1.0 ± 0.9	1 ± 3	-1 ± 1
	04/18/95	1400 ± 100	-10 ± 1	0 ± 1	3 ± 3	1 ± 1
	05/02/95	1200 ± 100	-7 ± 2	3 ± 2	1 ± 8	-3 ± 3
	05/16/95	1400 ± 100	-5 ± 1	1 ± 1	0 ± 4	-1 ± 1
	05/30/95	1300 ± 100	-6 ± 2	0 ± 2	4 ± 9	-1 ± 4
	06/13/95	1400 ± 100	-11 ± 2	1 ± 2	0 ± 5	1 ± 2
	06/27/95	1500 ± 100	1 ± 2	1 ± 2	4 ± 5	0 ± 2
	07/11/95	1300 ± 100	-2 ± 2	0 ± 2	-4 ± 7	-1 ± 2
	07/25/95	1300 ± 100	-1 ± 1	0 ± 2	-1 ± 6	-1 ± 2
	08/08/95	1400 ± 100	-3.3 ± 0.9	0.2 ± 0.9	2 ± 3	-0.1 ± 0.9
	08/22/95	1400 ± 100	-4 ± 1	1 ± 1	1 ± 3	0 ± 1
	09/05/95	1400 ± 100	-6 ± 1	0 ± 1	2 ± 4	0 ± 1
	09/19/95	1400 ± 100	-4 ± 2	2 ± 2	-1 ± 6	1 ± 2
	10/03/95	1300 ± 100	-4 ± 2	2 ± 2	-1 ± 6	1 ± 2
	10/17/95	1400 ± 100	1 ± 1	0 ± 1	0 ± 3	0 ± 1
	10/31/95	1300 ± 100	-7 ± 1	1 ± 1	2 ± 3	0 ± 1
	11/14/95	1300 ± 100	-6 ± 1	0 ± 1	1 ± 4	0 ± 1
	11/28/95	1400 ± 100	-3.6 ± 0.9	1.6 ± 0	2 ± 3	-0.3 ± 0.9
	12/19/95	1400 ± 100	-10 ± 2	2 ± 2	-1 ± 7	0 ± 2
	MEAN	1400 ± 100	-4.6 ± 6.5	1.0 ± 1.6	1 ± 4	-0.2 ± 1.9

TABLE C-VIII.1 QUARTERLY TLD RESULTS FOR LIMERICK GENERATING STATION, 1995
RESULTS IN UNITS OF MILLI-ROENTGEN/STD. MO. ± 2 S.D.

STATION CODE	MEAN ± 2 S.D. (1)	JAN-MAR	APR-JUN	JUL-SEP	OCT-DEC
36S2	6.2 ± 0.3	6.0 ± 0.4	6.3 ± 0.8	6.2 ± 0.6	6.3 ± 0.5
36D1	5.0 ± 0.3	4.8 ± 0.3	5.1 ± 0.3	5.0 ± 0.5	5.2 ± 0.5
2E1	6.2 ± 0.8	5.8 ± 0.6	6.7 ± 0.4	6.3 ± 0.6	6.0 ± 0.4
3S1	5.8 ± 0.3	5.6 ± 0.3	5.9 ± 0.9	5.9 ± 0.5	5.7 ± 0.4
4E1	4.5 ± 0.3	4.3 ± 0.2	4.7 ± 0.5	4.6 ± 0.3	4.6 ± 0.2
5S1	6.6 ± 0.6	6.5 ± 0.4	6.8 ± 0.7	6.9 ± 0.3	6.3 ± 0.7
5H1	7.2 ± 0.4	7.1 ± 0.3	7.5 ± 0.6	7.1 ± 0.7	7.1 ± 0.5
6C1	5.9 ± 0.8	5.5 ± 0.6	6.0 ± 0.2	6.4 ± 0.5	5.7 ± 0.2
7S1	6.1 ± 0.4	5.9 ± 0.6	6.4 ± 0.5	6.2 ± 0.9	6.1 ± 0.4
7E1	6.0 ± 0.1	6.0 ± 0.4	6.0 ± 0.1	6.1 ± 0.3	6.1 ± 0.6
9C1	6.0 ± 0.4	5.7 ± 0.3	6.2 ± 0.7	6.1 ± 0.8	5.9 ± 0.5
10S3	6.2 ± 0.7	5.9 ± 0.4	6.3 ± 0.6	6.6 ± 1.1	5.9 ± 0.5
10E1	6.2 ± 0.7	5.8 ± 0.3	6.7 ± 0.6	6.2 ± 0.2	6.1 ± 0.3
10F3	6.1 ± 0.2	6.0 ± 0.3	6.2 ± 0.1	6.2 ± 0.6	6.1 ± 0.6
11S1	6.9 ± 0.8	6.5 ± 0.4	7.5 ± 2.0	7.0 ± 1.0	6.8 ± 0.6
13S2	9.4 ± 0.4	9.3 ± 0.7	9.3 ± 0.6	9.7 ± 0.9	9.4 ± 0.8
13C1	4.2 ± 0.2	4.2 ± 0.2	4.2 ± 0.2	4.1 ± 0.2	4.3 ± 0.3
13E1	6.1 ± 0.5	5.7 ± 0.4	6.3 ± 0.2	6.2 ± 0.3	6.1 ± 0.3
14S1	5.3 ± 0.3	5.1 ± 0.2	5.4 ± 0.4	5.4 ± 0.3	5.1 ± 0.4
15D1	6.2 ± 0.5	6.0 ± 0.0	6.5 ± 0.4	6.3 ± 0.5	6.0 ± 0.3
16F1	6.1 ± 0.9	5.5 ± 0.5	6.3 ± 0.3	6.5 ± 0.5	6.2 ± 0.4
17B1	5.6 ± 0.7	5.2 ± 0.7	6.0 ± 0.6	5.7 ± 0.3	5.7 ± 0.3
18S2	6.6 ± 0.6	6.3 ± 0.8	7.0 ± 0.4	6.7 ± 0.3	6.4 ± 0.2
19D1	5.8 ± 0.5	5.5 ± 0.5	5.9 ± 0.4	6.1 ± 0.4	5.7 ± 0.4
20D1	5.2 ± 0.8	4.9 ± 0.4	5.5 ± 0.5	4.8 ± 0.3	5.5 ± 0.3
20F1	5.8 ± 1.0	5.2 ± 0.3	6.1 ± 0.6	6.3 ± 0.2	5.7 ± 0.6
21S2	5.3 ± 0.4	5.2 ± 0.3	5.4 ± 0.3	5.0 ± 0.4	5.4 ± 0.1
23S2	5.4 ± 0.5	5.2 ± 0.7	5.8 ± 0.5	5.3 ± 0.6	5.4 ± 0.4
24D1	5.1 ± 0.5	4.8 ± 0.6	5.1 ± 0.1	5.3 ± 0.4	5.3 ± 0.5
25S2	5.3 ± 0.4	5.0 ± 0.1	5.5 ± 0.5	5.4 ± 0.6	5.4 ± 0.2
25D1	4.9 ± 0.4	4.6 ± 0.3	5.0 ± 0.5	4.8 ± 0.4	5.1 ± 0.2
26S3	4.8 ± 0.7	4.4 ± 0.3	4.9 ± 0.3	5.2 ± 0.6	4.9 ± 0.3
28D2	5.3 ± 0.4	5.0 ± 0.2	5.4 ± 0.3	5.3 ± 0.6	5.5 ± 0.3
29S1	5.0 ± 0.8	4.5 ± 0.4	5.4 ± 0.3	4.8 ± 0.4	5.3 ± 0.4
29E1	5.6 ± 1.0	5.0 ± 0.6	6.0 ± 0.4	5.5 ± 0.4	6.0 ± 0.3
31S1	5.9 ± 0.7	5.6 ± 0.1	6.3 ± 0.4	5.6 ± 0.8	6.1 ± 0.3
31D1	7.2 ± 0.5	6.9 ± 0.2	7.4 ± 0.7	7.2 ± 0.9	7.4 ± 0.5
31D2	6.1 ± 0.1	6.1 ± 0.4	6.2 ± 0.3	6.1 ± 0.3	6.2 ± 0.6
34S2	6.4 ± 0.2	6.4 ± 0.4	6.4 ± 0.6	6.6 ± 0.5	6.4 ± 0.3
34E1	5.9 ± 0.2	5.8 ± 0.6	5.8 ± 0.3	6.0 ± 0.5	5.9 ± 0.6

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

TABLE C-VIII.2 1995 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
QUARTERLY	JAN-MAR 1995	5.8 ± 2.3	5.4 ± 1.3	7.1 ± 0.0
	APR-JUN 1995	6.3 ± 2.1	5.9 ± 1.4	7.5 ± 0.0
	JUL-SEP 1995	5.2 ± 2.4	5.8 ± 1.5	7.1 ± 0.0
	OCT-DEC 1995	6.1 ± 2.1	5.8 ± 1.2	7.1 ± 0.0

TABLE C-VIII.3 SUMMARY OF THE 1995 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)
QUARTERLY	SITE	64	4.4	9.7	6.1 ± 2.2	7.6 ± 2.4
	MIDDLE RING	92	4.1	7.4	5.7 ± 1.4	7.8 ± 2.2
	OUTER RING	4	7.1	7.5	7.2 ± 0.4	7.8 ± 3.0

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

SITE BOUNDARY RING STATIONS - 36S2, 3S1, 5S1, 7S1, 10S3, 11S1, 13S2, 14S1,
- 18S2, 21S2, 23S2, 25S2, 26S3, 29S1, 31S1, 34S2.

MIDDLE RING STATIONS (Special interest and Itermediate Dstance) - 36D1, 2E1, 4E1, 6C1, 7E1, 9C1, 10E1, 10F3,
- 13C1, 13E1, 15D1, 16F1, 17B1, 19D1, 20D1, 20F1,
- 24D1, 25D1, 28D2, 29E1, 31D1, 31D2, 34E1.

OUTER RING STATIONS - 5H1.

TABLE C-IX.1 SUMMARY OF COLLECTION DATES FOR SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1995

SURFACE WATER (TRITIUM)

COLLECTION PERIOD	10F2	13B1	24S1
JAN-MAR 95		12/28-04/03	12/28-04/03
APR-JUN 95	05/01-06/26	04/03-06/26	04/03-06/26
JUL-SEP 95	06/26-10/02	06/26-10/02	06/26-10/02
OCT-DEC 95	10/02-01/02	10/02-01/02	10/02-01/02

SURFACE WATER (GAMMA)

JAN 95		12/28-01/30/95	12/28-01/30/95
FEB 95		01/30-02/27/95	01/30-02/27/95
MAR 95		02/27-04/03/95	02/27-04/03/95
APR 95		04/03-05/01/95	04/03-05/01/95
MAY 95	05/01-05/30/95	05/01-05/30/95	05/01-05/30/95
JUN 95	05/30-06/26/95	05/30-06/26/95	05/30-06/26/95
JUL 95	06/26-07/31/95	06/26-07/31/95	06/26-07/31/95
AUG 95	07/31-08/29/95	07/31-08/29/95	07/31-08/29/95
SEP 95	08/29-10/02/95	08/29-10/02/95	08/29-10/02/95
OCT 95	10/02-10/30/95	10/02-10/30/95	10/02-10/30/95
NOV 95	10/30-11/27/95	10/30-11/27/95	10/30-11/27/95
DEC 95	11/27-01/02/96	11/27-01/02/96	11/27-01/02/96

DRINKING WATER (GROSS BETA AND GAMMA)

COLLECTION PERIOD	15F4	15F7	16C2	28F3
JAN 95	12/28-01/30	12/28-01/30	12/28-01/30	12/28-01/30
FEB 95	01/30-02/27	01/30-02/27	01/30-02/27	01/30-02/27
MAR 95	02/27-04/03	02/27-04/03	02/27-04/03	02/27-04/03
APR 95	04/03-05/01	04/03-05/01	04/03-05/01	04/03-05/01
MAY 95	05/01-05/30	05/01-05/30	05/01-05/30	05/01-05/30
JUN 95	05/30-06/26	05/30-06/26	05/30-06/26	05/30-06/26
JUL 95	06/26-07/31	06/26-07/31	06/26-07/31	06/26-07/31
AUG 95	07/31-08/29	07/31-08/29	07/31-08/29	07/31-08/29
SEP 95	08/29-10/02	08/29-10/02	08/29-10/02	08/29-10/02
OCT 95	10/02-10/30	10/02-10/30	10/02-10/30	10/02-10/30
NOV 95	10/30-11/27	10/30-11/27	10/30-11/27	10/30-11/27
DEC 95	11/27-01/02	11/27-01/02	11/27-01/02	11/27-01/02

DRINKING WATER (TRITIUM)

JAN-MAR 95	12/28-04/03	12/28-04/03	12/28-04/03	12/28-04/03
APR-JUN 95	04/03-06/26	04/03-06/26	04/03-06/26	04/03-06/26
JUL-SEP 95	06/26-10/02	06/26-10/02	06/26-10/02	06/26-10/02
OCT-DEC 95	10/02-01/02	10/02-01/02	10/02-01/02	10/02-01/02

TABLE C-IX.1 SUMMARY OF COLLECTION DATES FOR SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1995

AIR PARTICULATE AND AIR IODINE

WEEK	10S3	11S1	14S1	13C1	22G1
01	01/03-01/09	01/03-01/09	01/03-01/09	01/03-01/09	01/03-01/09
02	01/09-01/16	01/09-01/16	01/09-01/16	01/09-01/16	01/09-01/16
03	01/16-01/23	01/16-01/23	01/16-01/23	01/16-01/23	01/16-01/23
04	01/23-01/30	01/23-01/30	01/23-01/30	01/23-01/30	01/23-01/30
05	01/30-02/06	01/30-02/06	01/30-02/06	01/30-02/06	01/30-02/06
06	02/06-02/13	02/06-02/13	02/06-02/13	02/06-02/13	02/06-02/13
07	02/13-02/20	02/13-02/20	02/13-02/20	02/13-02/20	02/13-02/20
08	02/20-02/28	02/20-02/28	02/20-02/28	02/20-02/28	02/20-02/28
09	02/28-03/06	02/28-03/06	02/28-03/06	02/28-03/06	02/28-03/06
10	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
12	03/20-03/27	03/20-03/27	03/20-03/27	03/20-03/27	03/20-03/27
13	03/27-04/03	03/27-04/03	03/27-04/03	03/27-04/03	03/27-04/03
14	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
16	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
18	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
20	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
22	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
24	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
26	06/26-07/03	06/26-07/03	06/26-07/03	06/26-07/03	06/26-07/03
27	07/03-07/10	07/03-07/10	07/03-07/10	07/03-07/10	07/03-07/10
28	07/10-07/17	07/10-07/17	07/10-07/17	07/10-07/17	07/10-07/17
29	07/17-07/24	07/17-07/24	07/17-07/24	07/17-07/24	07/17-07/24
30	07/24-07/31	07/24-07/31	07/24-07/31	07/24-07/31	07/24-07/31
31	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
33	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
35	08/28-09/05	08/28-09/05	08/28-09/05	08/28-09/05	08/28-09/05
36	09/05-09/11	09/05-09/11	09/05-09/11	09/05-09/11	09/05-09/11
37	09/11-09/18	09/11-09/18	09/11-09/18	09/11-09/18	09/11-09/18
38	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
40	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
42	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
44	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
46	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
48	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
50	12/11-12/18	12/11-12/18	12/11-12/18	12/11-12/18	12/11-12/18
51		12/18-12/26	12/18-12/26	12/18-12/26	12/18-12/26
52	12/26-01/02	12/26-01/02	12/26-01/02	12/26-01/02	12/26-01/02

TABLE C-IX.1 SUMMARY OF COLLECTION DATES FOR SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1995

TLD - QUARTERLY

STATION CODE	JAN-MAR 1995	APR-JUN 1995	JUL-SEP 1995	OCT-DEC 1995
36S2	01/03-04/04	04/04-07/03	07/03-10/03	10/03-01/02
36D1	01/04-04/04	04/04-07/03	07/03-10/03	10/03-01/02
2E1	01/03-04/04	04/04-07/03	07/03-10/03	10/03-01/02
3S1	01/03-04/04	04/04-07/03	07/03-10/03	10/03-01/02
4E1	01/03-04/04	04/04-07/03	07/03-10/03	10/03-01/02
5S1	01/03-04/04	04/04-07/03	07/03-10/03	10/03-01/02
5H1	01/03-04/04	04/04-07/03	07/03-10/03	10/03-01/02
6C1	01/04-04/04	04/04-07/03	07/03-10/03	10/03-01/02
7S1	01/03-04/04	04/04-07/03	07/03-10/03	10/03-01/02
7E1	01/03-04/04	04/04-07/03	07/03-10/03	10/03-01/02
9C1	01/04-04/04	04/04-07/03	07/03-10/03	10/03-01/02
10S3	01/03-04/04	04/04-07/03	07/03-10/03	10/03-01/02
10E1	01/03-04/04	04/04-07/03	07/03-10/03	10/03-01/02
10F3	01/03-04/04	04/04-07/03	07/03-10/03	10/03-01/02
11S1	01/03-04/04	04/04-07/03	07/03-10/03	10/03-01/02
13S2	01/03-04/04	04/04-07/03	07/03-10/03	10/03-01/02
13C1	01/04-04/04	04/04-07/03	07/03-10/03	10/03-01/02
13E1	01/03-04/04	04/04-07/03	07/03-10/03	10/03-01/02
14S1	01/03-04/04	04/04-07/03	07/03-10/03	10/03-01/02
15D1	01/04-04/04	04/04-07/03	07/03-10/03	10/03-01/02
16F1	01/04-04/04	04/04-07/03	07/03-10/03	10/03-01/02
17B1	01/04-04/04	04/04-07/03	07/03-10/03	10/03-01/02
18S2	01/03-04/04	04/04-07/03	07/03-10/03	10/03-01/02
19D1	01/04-04/04	04/04-07/03	07/03-10/03	10/03-01/02
20D1	01/04-04/04	04/04-07/03	07/03-10/03	10/03-01/02
20F1	01/04-04/04	04/04-07/03	07/03-10/03	10/03-01/02
21S2	01/03-04/04	04/04-07/03	07/03-10/03	10/03-01/02
23S2	01/03-04/04	04/04-07/03	07/03-10/03	10/03-01/02
24D1	01/04-04/04	04/04-07/03	07/03-10/03	10/03-01/02
25S2	01/03-04/04	04/04-07/03	07/03-10/03	10/03-01/02
25D1	01/04-04/04	04/04-07/03	07/03-10/03	10/03-01/02
26S3	01/03-04/04	04/04-07/03	07/03-10/03	10/03-01/02
28D2	01/04-04/04	04/04-07/03	07/03-10/03	10/03-01/02
29S1	01/03-04/04	04/04-07/03	07/03-10/03	10/03-01/02
29E1	01/04-04/04	04/04-07/03	07/03-10/03	10/03-01/02
31S1	01/03-04/04	04/04-07/03	07/03-10/03	10/03-01/02
31D1	01/04-04/04	04/04-07/03	07/03-10/03	10/03-01/02
31D2	01/04-04/04	04/04-07/03	07/03-10/03	10/03-01/02
34S2	01/03-04/04	04/04-07/03	07/03-10/03	10/03-01/02
34E1	01/04-04/04	04/04-07/03	07/03-10/03	10/03-01/02

FIGURE C-1
MEAN MONTHLY INSOLUBLE GROSS BETA CONCENTRATIONS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LGS, 1982 - 1995

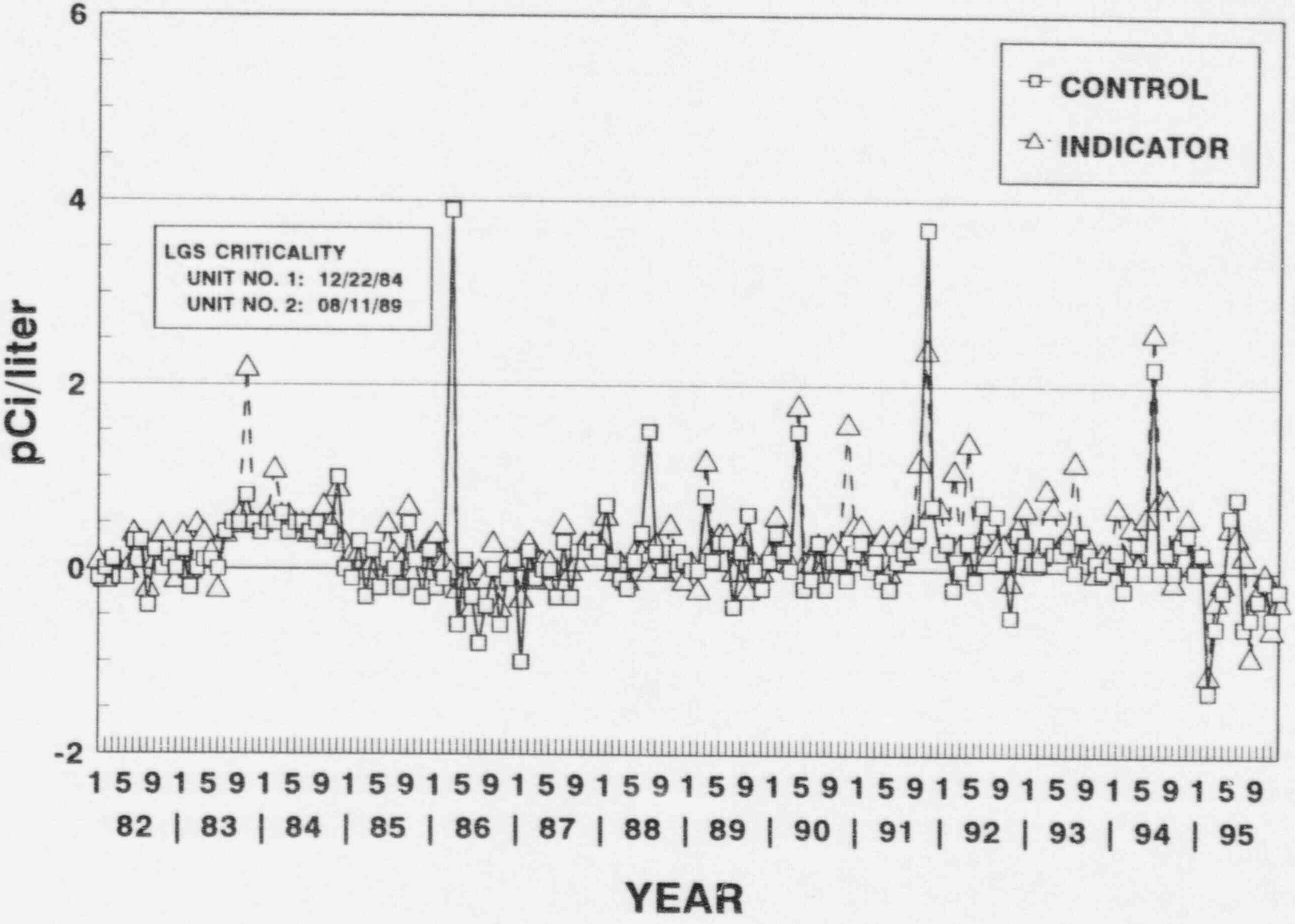


FIGURE C-2
MEAN MONTHLY SOLUBLE GROSS BETA CONCENTRATIONS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LGS, 1982 - 1995

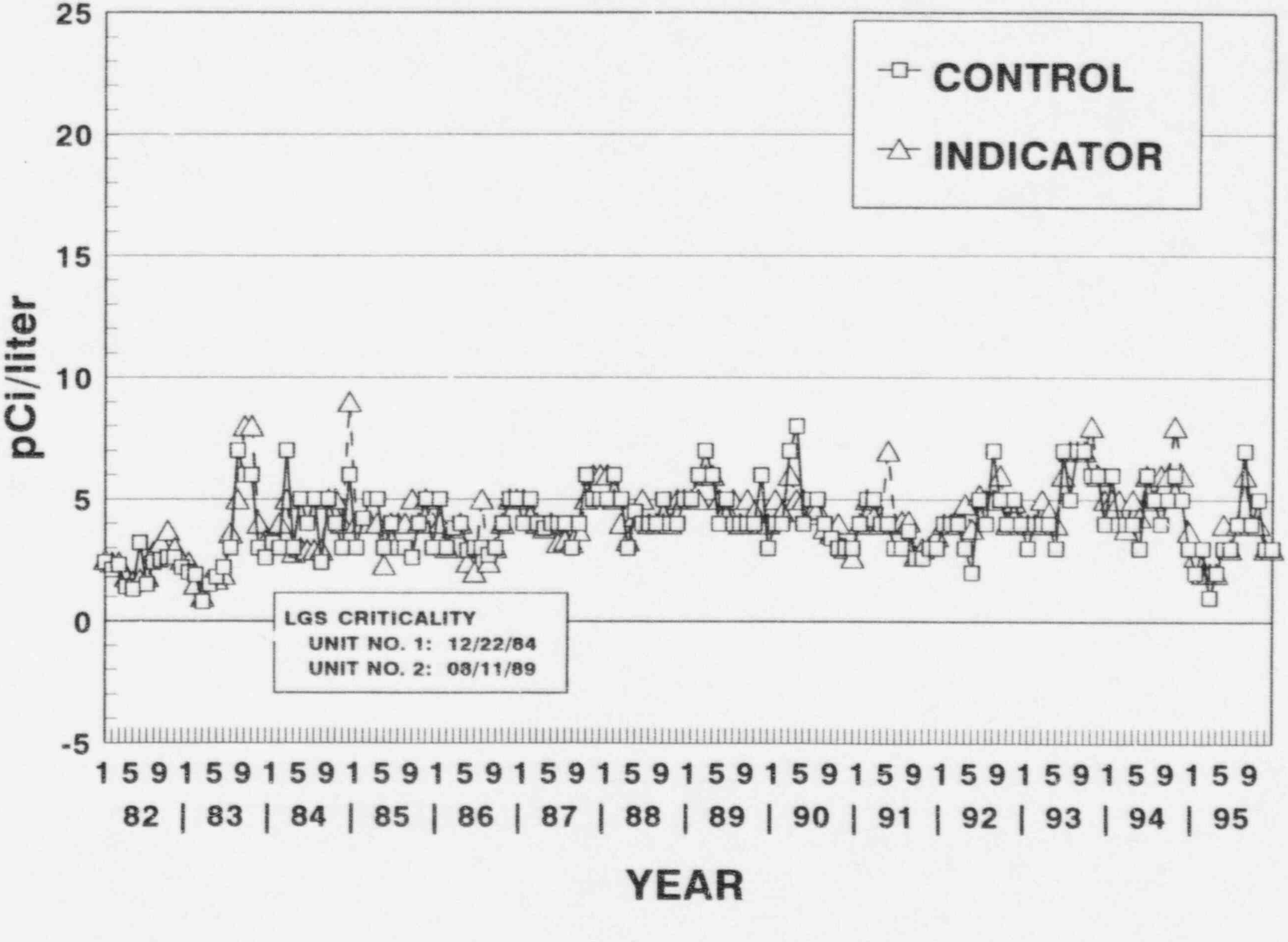
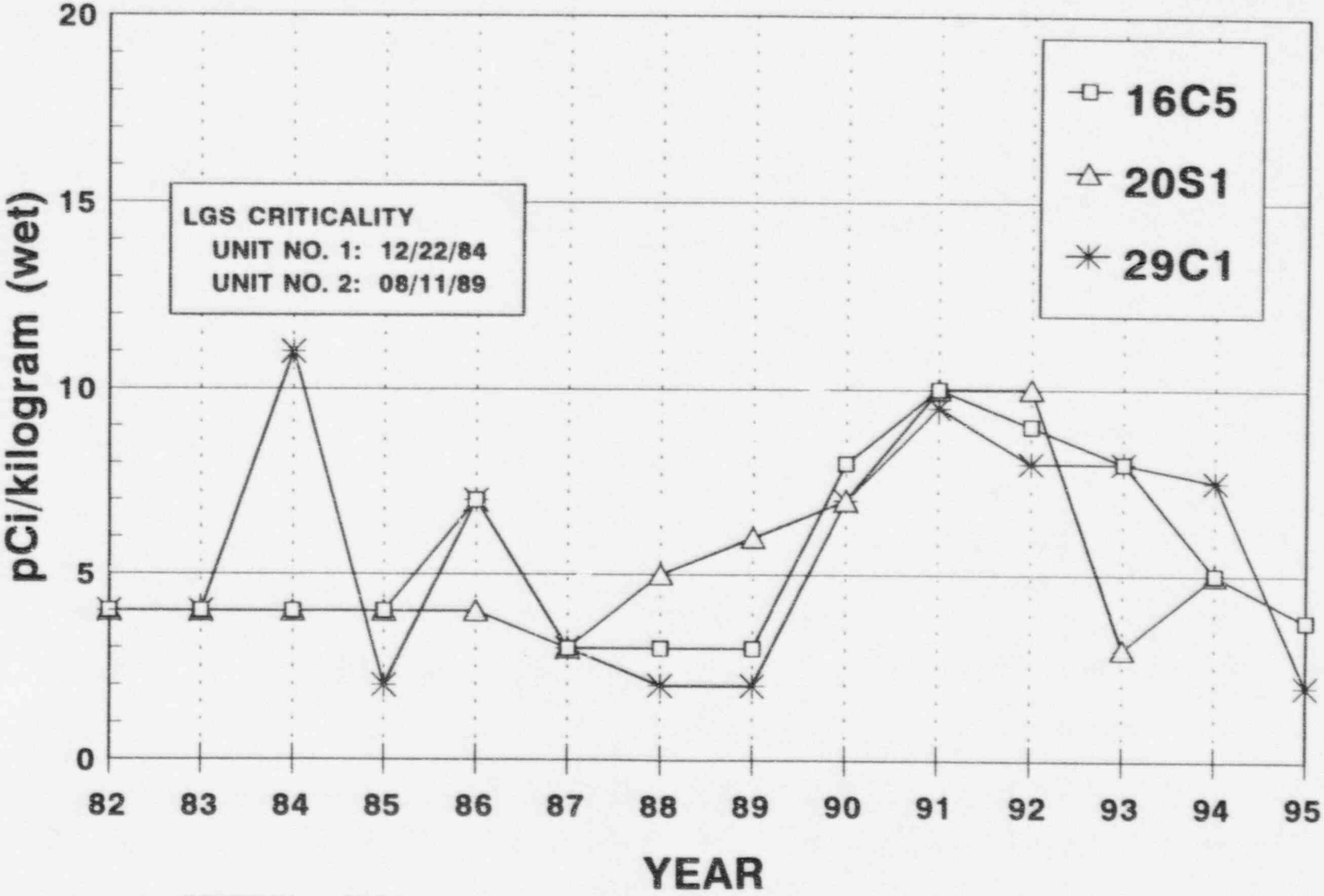


FIGURE C-3
MEAN ANNUAL CS-137 CONCENTRATIONS IN FISH SAMPLES COLLECTED IN THE VICINITY OF LGS, 1982 - 1995



CONTROL = 29C1

Station 20S1 discontinued in 1995

FIGURE C-4
CONCENTRATIONS OF CS-137 IN SEDIMENT SAMPLES COLLECTED IN THE VICINITY OF LGS, 1982 - 1995

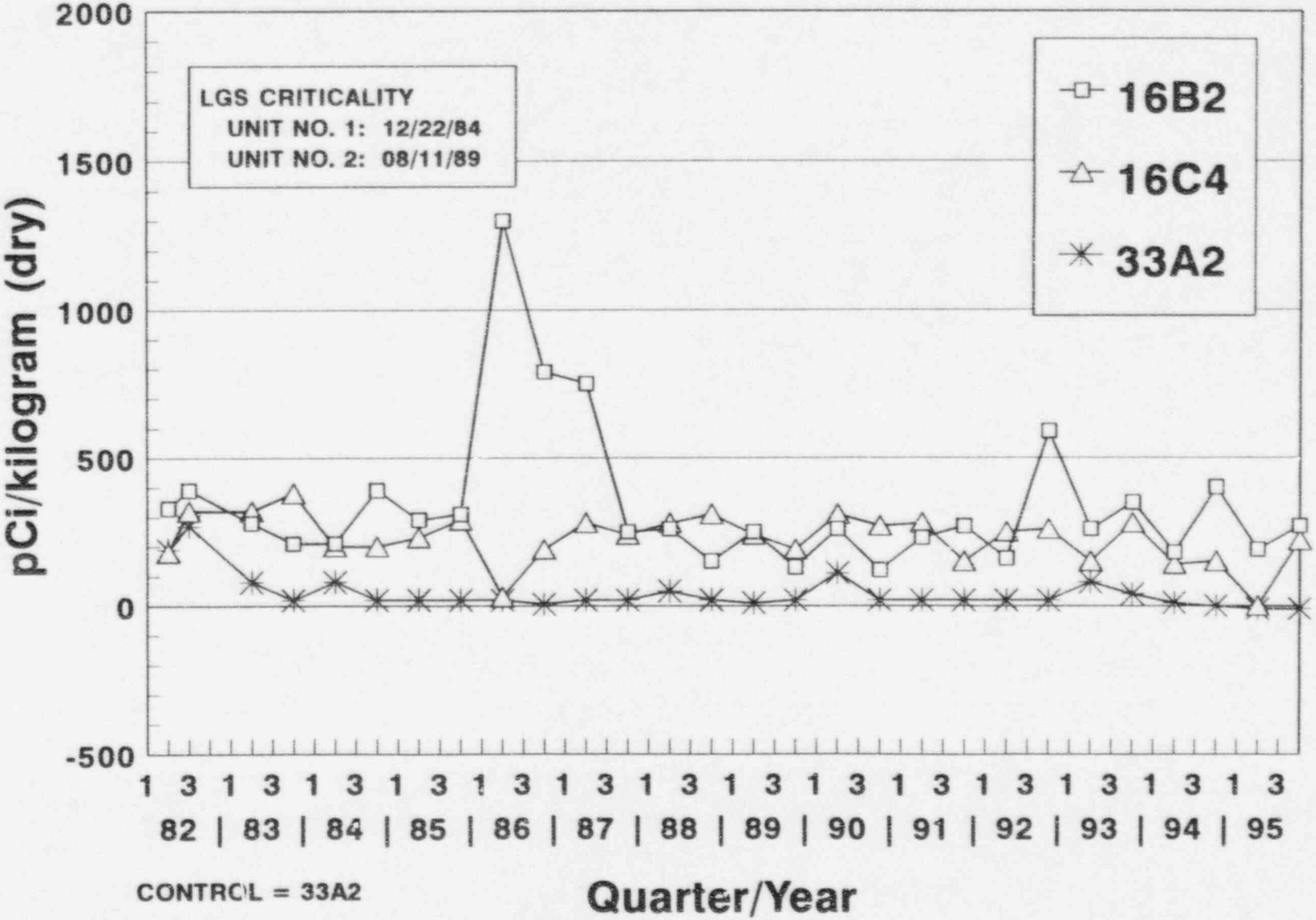


FIGURE C-5
MEAN WEEKLY GROSS BETA CONCENTRATIONS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LGS, 1995

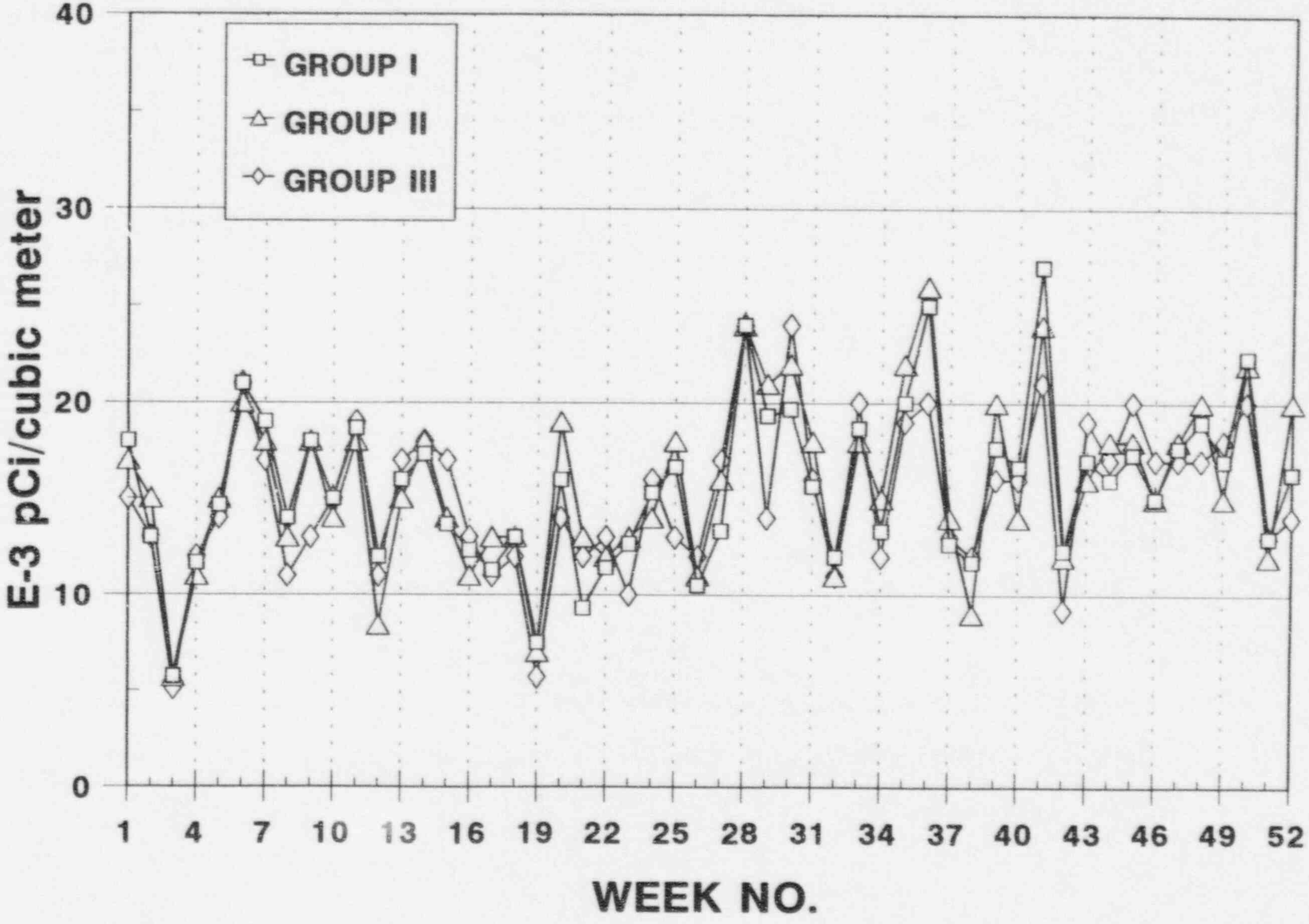


FIGURE C-6
MEAN MONTHLY GROSS BETA CONCENTRATIONS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LGS, 1982 - 1995

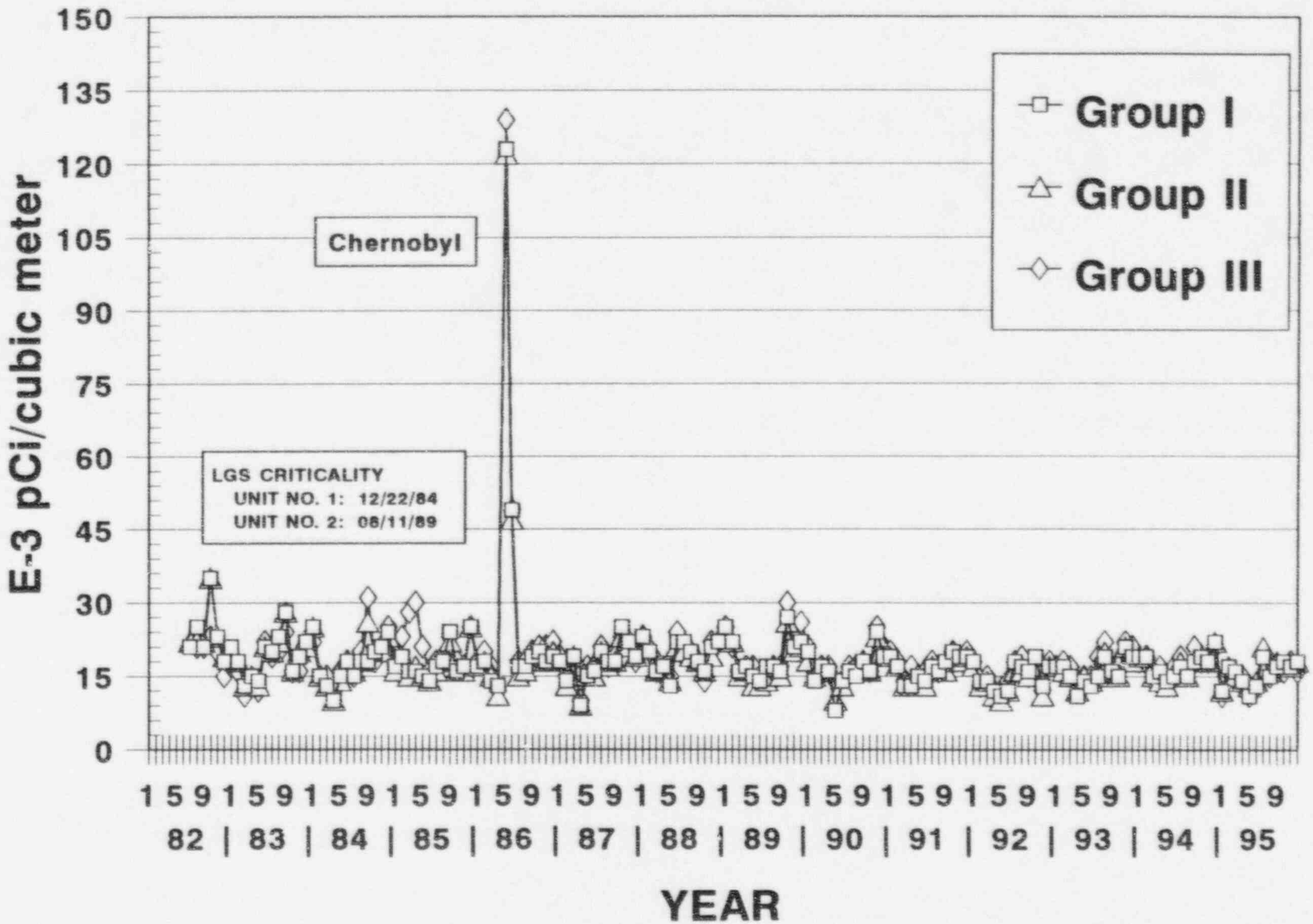
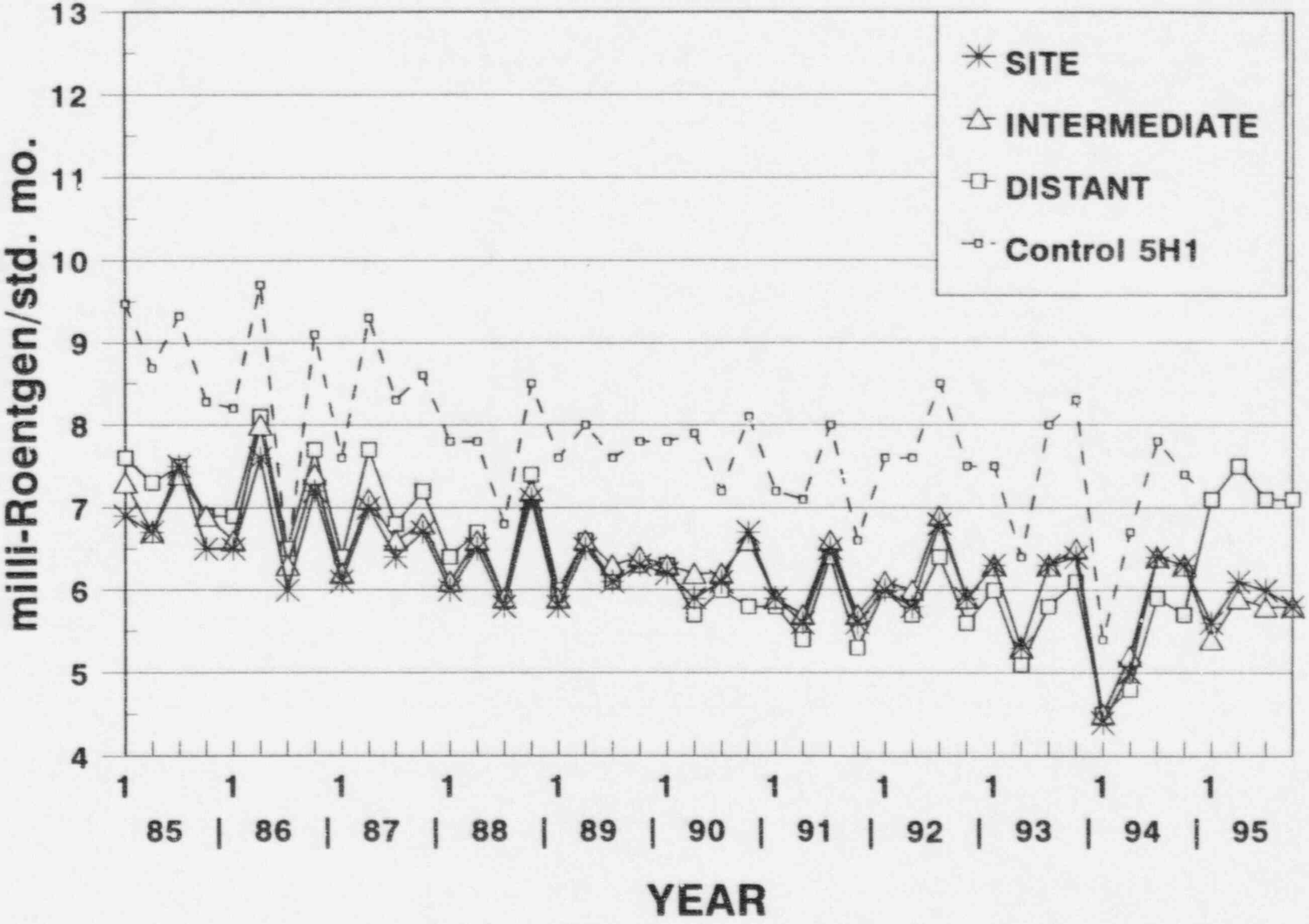


FIGURE C-7
MEAN QUARTERLY AMBIENT GAMMA RADIATION LEVELS (TLD)
IN THE VICINITY OF LGS, 1985 - 1995



APPENDIX D

DATA TABLES AND FIGURES
QC LABORATORY

APPENDIX D: DATA TABLES AND FIGURES - COMPARISON LABORATORY

TABLES

FIGURES

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

TBE's results of gross beta insoluble and soluble in drinking water samples were slightly higher than the results from GPU (Figures D-1 and D-2, Appendix D). The differences were probably due to variations in the respective laboratory's analytical procedures. TBE counts the samples for 50 minutes, GPU counts for 100 minutes.

The gross beta results for air particulate samples collected at the co-located stations 11S1 and 11S2 compared very well (Figure D-3, Appendix D). No significant diferences were noted. Both laboratories use Cs-137 as a calibration source.

TABLE D-I.1 CONCENTRATIONS OF GROSS BETA INSOLUBLE IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1995

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	16C2	
JAN 95	0.4	± 0.5
FEB 95	0.6	± 0.4
MAR 95	0.5	± 0.4
APR 95	0.8	± 0.5
MAY 95	0.1	± 0.6
JUN 95	0.7	± 0.4
JUL 95	0.0	± 0.4
AUG 95	-0.1	± 0.5
SEP 95	0.4	± 0.5
OCT 95	0.1	± 0.4
NOV 95	0.4	± 0.5
DEC 95	0.4	± 0.5
MEAN	0.4	± 0.6

TABLE D-I.2 CONCENTRATIONS OF GROSS BETA SOLUBLE IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1995

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	16C2	
JAN 95	3	± 1
FEB 95	3	± 1
MAR 95	4	± 1
APR 95	3.5	± 0.9
MAY 95	3	± 1
JUN 95	3	± 1
JUL 95	4	± 1
AUG 95	3	± 1
SEP 95	4	± 1
OCT 95	6	± 1
NOV 95	4	± 1
DEC 95	3	± 1
MEAN	3.6	± 1.8

TABLE D-I.3 CONCENTRATIONS OF GAMMA EMITTERS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1995

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	K-40		MN-54		CO-58		FE-59		CO-60		ZN-65	
16C2	JAN 95	-10	± 10	0.5	± 0.6	-0.4	± 0.6	-1	± 1	0.0	± 0.6	-1	± 1
	FEB 95	-60	± 10	0.1	± 0.5	0.0	± 0.5	1	± 1	0.2	± 0.5	0	± 1
	MAR 95	-33	± 9	0.1	± 0.5	0.1	± 0.5	0	± 1	0.2	± 0.5	1	± 1
	APR 95	-20	± 10	0.5	± 0.6	-0.3	± 0.7	0	± 2	0.1	± 0.6	2	± 1
	MAY 95	-20	± 10	0.3	± 0.5	0.1	± 0.6	0	± 1	-0.1	± 0.6	0	± 1
	JUN 95	0	± 10	0.5	± 0.6	0.0	± 0.7	-1	± 2	-0.1	± 0.6	-1	± 1
	JUL 95	2	± 7	0.2	± 0.4	-0.2	± 0.5	1	± 1	0.2	± 0.5	1	± 1
	AUG 95	38	± 7	0.4	± 0.6	-0.2	± 0.6	0	± 2	0.3	± 0.5	0	± 1
	SEP 95	-24	± 9	0.6	± 0.5	-0.6	± 0.5	0	± 1	0.1	± 0.5	1	± 1
	OCT 95	-11	± 8	0.1	± 0.4	0.1	± 0.4	0.5	± 0.9	0.1	± 0.4	0.8	± 0.9
	NOV 95	-98	± 9	-0.3	± 0.4	-0.1	± 0.5	0	± 1	0.1	± 0.4	0	± 1
	DEC 95	-16	± 7	0.3	± 0.5	0.2	± 0.5	0	± 1	-0.7	± 0.5	1	± 1
	MEAN	-21	± 67	0.3	± 0.5	-0.1	± 0.5	0.0	± 0.9	0.0	± 0.5	0.4	± 1.7

STC	COLLECTION PERIOD	ZR-95		NB-95		CS-134		CS-137		BA-140		LA-140	
16C2	JAN 95	1	± 1	0.2	± 0.6	0.0	± 0.7	0.5	± 0.6	1	± 3	0	± 1
	FEB 95	1	± 1	0.4	± 0.6	0.1	± 0.6	-0.5	± 0.6	0	± 2	-1.5	± 0.9
	MAR 95	0	± 1	0.2	± 0.5	0.0	± 0.5	-0.1	± 0.5	0	± 3	0	± 1
	APR 95	1	± 1	0.2	± 0.7	0.6	± 0.6	0.2	± 0.6	1	± 4	1	± 2
	MAY 95	2	± 1	0.8	± 0.6	0.0	± 0.6	0.5	± 0.6	-1	± 4	0	± 1
	JUN 95	2	± 2	0.5	± 0.7	0.0	± 0.6	0.2	± 0.6	0	± 6	1	± 3
	JUL 95	0	± 1	0.4	± 0.6	0.0	± 0.5	0.2	± 0.5	4	± 5	0	± 2
	AUG 95	2	± 1	0.8	± 0.7	0.2	± 0.6	0.3	± 0.6	3	± 5	-2	± 2
	SEP 95	1	± 1	0.5	± 0.5	0.0	± 0.5	-0.1	± 0.5	-1	± 2	-0.8	± 0.8
	OCT 95	1.0	± 0.9	0.4	± 0.4	-0.1	± 0.4	0.3	± 0.4	2	± 2	-0.2	± 0.8
	NOV 95	1	± 1	0.4	± 0.5	0.1	± 0.5	0.5	± 0.5	2	± 2	-0.2	± 0.8
	DEC 95	0	± 1	0.1	± 0.5	0.1	± 0.5	-0.5	± 0.5	0	± 2	-0.2	± 0.8
	MEAN	0.9	± 1.4	0.4	± 0.5	0.1	± 0.4	0.1	± 0.7	1	± 3	-0.3	± 1.6

TABLE D-II.1 CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1995

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

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

TABLE D-II.2 CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1995

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

STC	COLLECTION PERIOD	BE-7		K-40		CS-134		CS-137		RA-226		TH-228	
11S2	01/03-04/03/95	93	± 9	1	± 5	0.0	± 0.3	0.0	± 0.3	-3	± 6	-0.1	± 0.5
	04/03-07/03/95	84	± 8	8	± 4	0.3	± 0.3	0.1	± 0.3	1	± 5	-0.5	± 0.4
	07/03-10/02/95	89	± 9	4	± 4	0.0	± 0.3	0.1	± 0.3	-2	± 6	-0.4	± 0.5
	10/02-01/02/96	50	± 5	9	± 3	-0.1	± 0.2	0.1	± 0.2	-2	± 4	-0.1	± 0.3
	MEAN	79	± 39	5	± 8	0.1	± 0.3	0.1	± 0.1	-2	± 3	-0.3	± 0.4

TABLE D-III.1 CONCENTRATIONS OF I-131 BY CHEMICAL SEPARATION AND GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1995

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	I-131	K-40	CS-134	CS-137	BA-140	LA-140
19B1	01/10-01/10/95	-0.06 ± 0.06	1300 ± 100	2 ± 3	2 ± 3	-10 ± 10	4 ± 4
	04/04-04/04/95	-0.03 ± 0.04	1300 ± 100	1 ± 3	2 ± 3	1 ± 8	2 ± 3
	07/11-07/11/95	0.00 ± 0.05	1500 ± 100	-1 ± 2	1 ± 2	-1 ± 7	0 ± 2
	10/03-10/03/95	0.02 ± 0.05	1400 ± 100	-1 ± 2	2 ± 2	0 ± 6	2 ± 3
	MEAN	-0.02 ± 0.06	1400 ± 200	0 ± 3	2 ± 1	-1 ± 6	2 ± 3
21B1	01/10-01/10/95	-0.02 ± 0.08	1400 ± 100	-2 ± 3	1 ± 3	0 ± 9	0 ± 3
	04/04-04/04/95	-0.03 ± 0.04	1400 ± 100	2 ± 2	1 ± 2	4 ± 6	2 ± 2
	07/11-07/11/95	0.02 ± 0.06	1400 ± 100	0 ± 2	3 ± 2	-1 ± 8	2 ± 3
	10/03-10/03/95	0.01 ± 0.05	1400 ± 100	-2 ± 3	1 ± 3	-4 ± 8	-1 ± 3
	MEAN	0.00 ± 0.05	1400 ± 0	0 ± 4	1 ± 2	0 ± 7	1 ± 3
22F1	01/11-01/11/95	-0.01 ± 0.05	1300 ± 100	0 ± 2	4 ± 2	-5 ± 7	-1 ± 3
	04/04-04/04/95	-0.01 ± 0.04	1200 ± 100	0 ± 2	2 ± 2	-2 ± 6	0 ± 2
	07/11-07/11/95	0.02 ± 0.05	1000 ± 100	0 ± 2	1 ± 2	-10 ± 10	0 ± 4
	10/03-10/03/95	-0.01 ± 0.05	1400 ± 100	2 ± 2	2 ± 2	1 ± 6	-1 ± 2
	MEAN	0.00 ± 0.03	1200 ± 300	0 ± 2	2 ± 3	-3 ± 6	0 ± 1

TABLE D-IV.1 SUMMARY OF COLLECTION DATES FOR SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 1995

DRINKING WATER

COLLECTION PERIOD	16C2
JAN 95	12/28-01/30
FEB 95	01/30-02/27
MAR 95	02/27-04/03
APR 95	04/03-05/01
MAY 95	05/01-05/30
JUN 95	05/30-06/26
JUL 95	06/26-07/31
AUG 95	07/31-08/29
SEP 95	08/29-10/02
OCT 95	10/02-10/30
NOV 95	10/30-11/27
DEC 95	11/27-01/02

AIR PARTICULATES

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

FIGURE D-1
COMPARISON OF MONTHLY INSOLUBLE GROSS BETA CONCENTRATIONS IN DRINKING WATER SAMPLES SPLIT BETWEEN GPU AND TBE, 1995

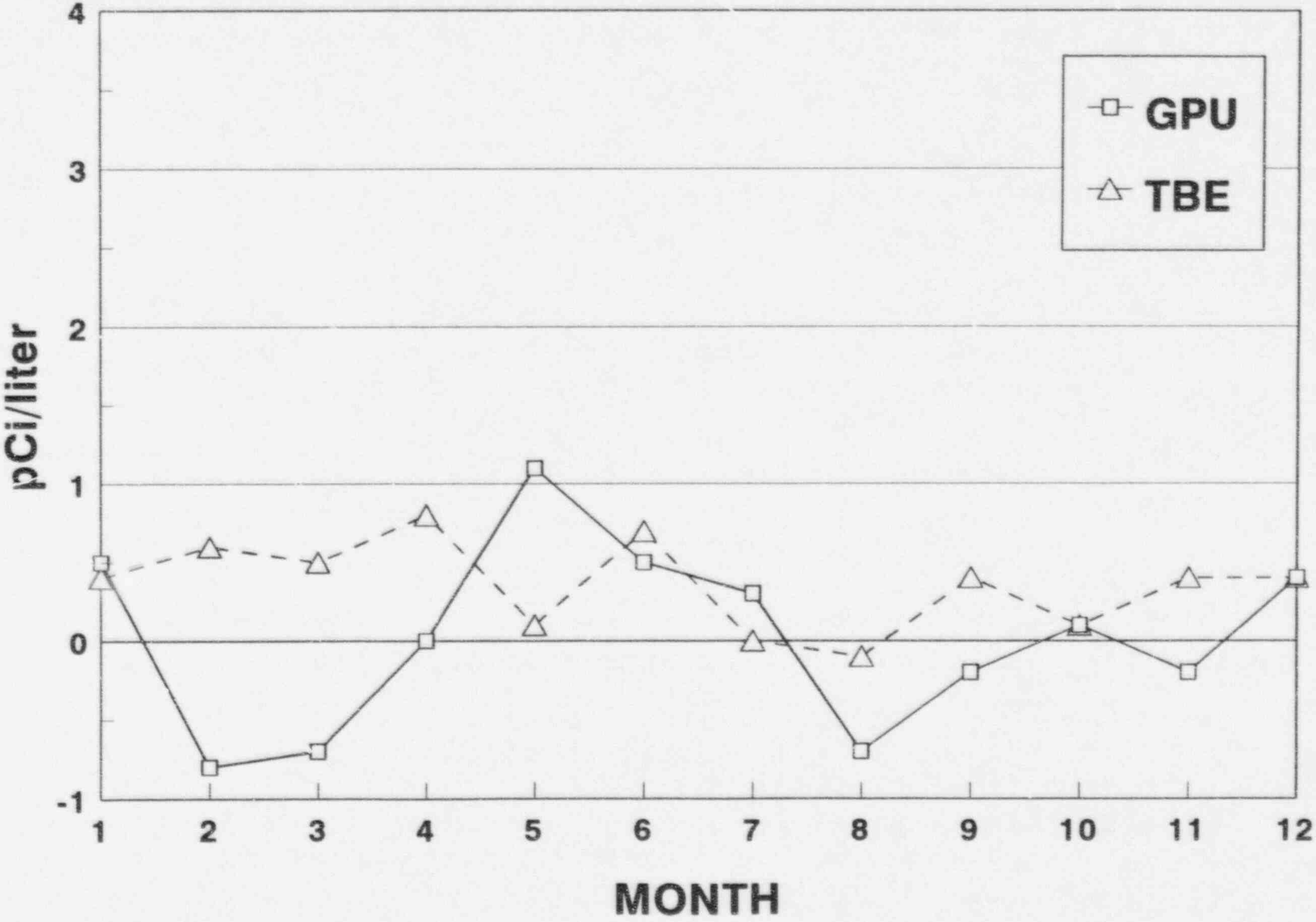


FIGURE D-2
COMPARISON OF MONTHLY SOLUBLE GROSS BETA CONCENTRATIONS IN DRINKING WATER SAMPLES SPLIT BETWEEN GPU AND TBE, 1995

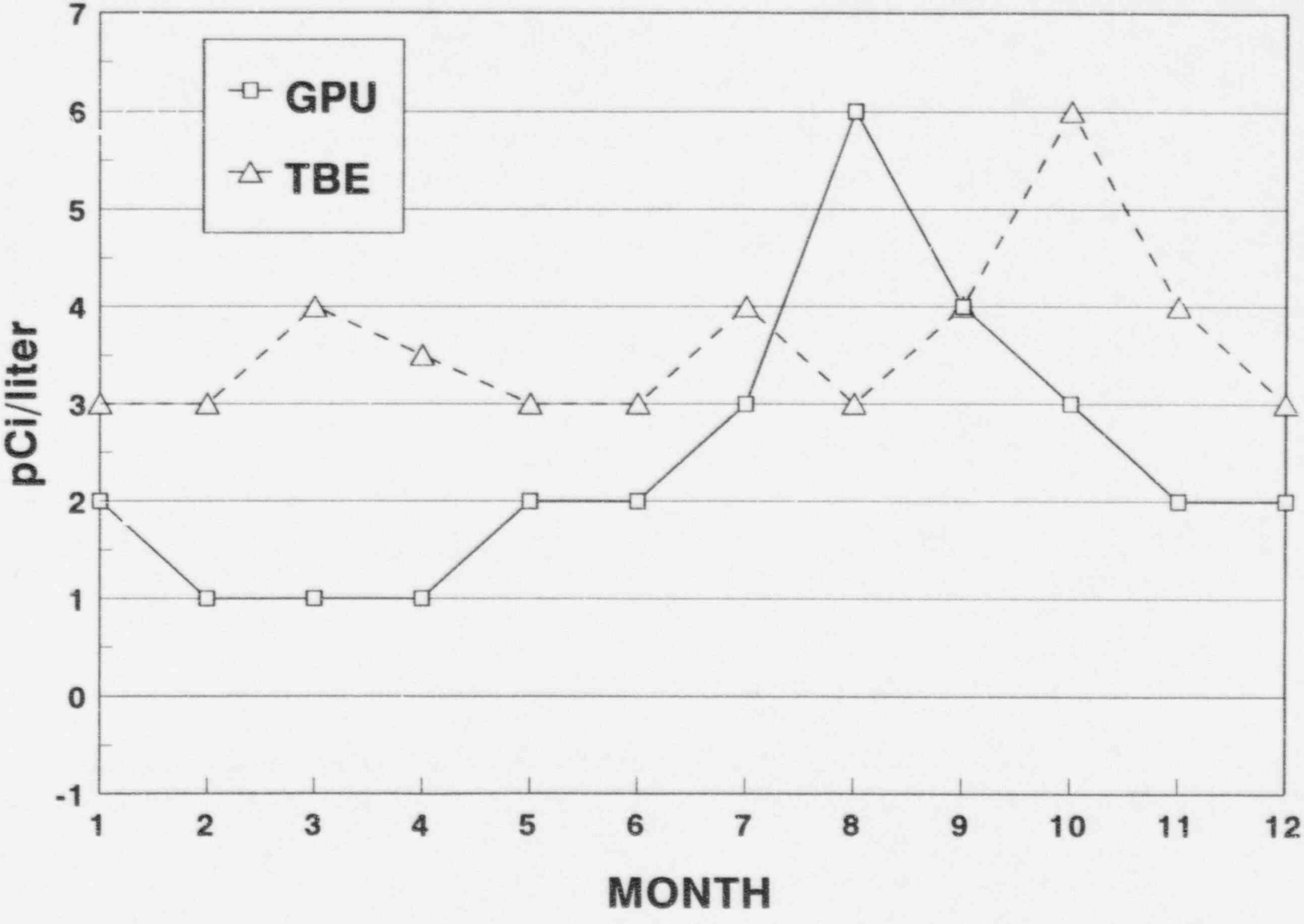
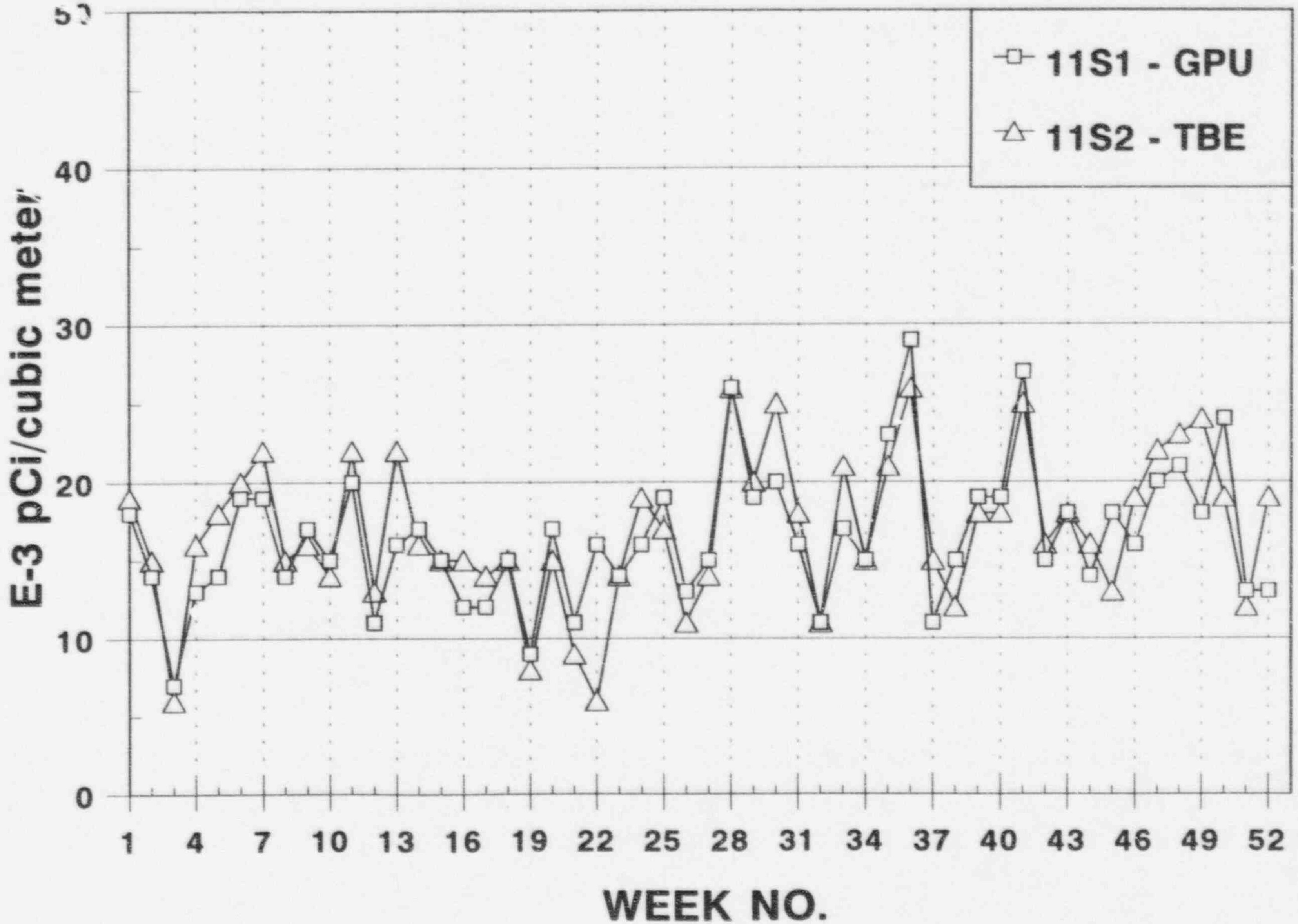


FIGURE D-3
COMPARISON OF WEEKLY GROSS BETA CONCENTRATIONS IN AIR PARTICULATE SAMPLES COLLECTED FROM LGS CO-LOCATED LOCATIONS 11S1 AND 11S2, 1995



APPENDIX E

SYNOPSIS OF ANALYTICAL PROCEDURES

APPENDIX E: SYNOPSIS OF ANALYTICAL PROCEDURES

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

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

GPUN Environmental Radioactivity Laboratory

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

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

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

Calculation of Sample Activity and 2 Sigma Uncertainty:

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

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

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

Where:

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

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

Teledyne Brown Engineering

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

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

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

Calculation of Sample Activity and 2 Sigma Error:

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

Net Activity　　　Counting Error

where:

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

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

DETERMINATION OF TRITIUM IN WATER BY
LIQUID SCINTILLATION COUNTING

GPUN Environmental Radioactivity Laboratory

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

Calculation of Sample Activity and 2 Sigma Uncertainty:

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

$$2s = \frac{2 \times \sqrt{\frac{C}{TA} + \frac{B}{TB}}}{2.22 \times E_0 \times V \times DF}$$

$$LLD = \frac{3.29 \times \sqrt{\frac{B}{TA} + \frac{B}{TB}}}{2.22 \times E_0 \times V \times DF}$$

Where:

TA	=	Total count time of sample in minutes
TB	=	Total count time of background in minutes
R	=	Tritium activity in picoCuries per unit volume (Volume units are those used in V)
2s	=	2 sigma Uncertainty in the same units as above
LLD	=	Lower limit of detection in same units as above
C	=	Average count rate of sample
B	=	Average count rate of background

E_0 = Tritium detection efficiency of counter, calculated as shown below
V = Volume of aliquot
DF = Decay factor, calculated as shown below

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

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

The efficiency is calculated as follows:

$$E_0 = \frac{S - B}{As \times Vs \times DFs}$$

Where:

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

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

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

DETERMINATION OF GROSS BETA ACTIVITY IN AIR PARTICULATE SAMPLES

GPUN Environmental Radioactivity Laboratory

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

Calculation of Sample Activity and 2 Sigma Uncertainty:

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

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

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

Where

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

DETERMINATION OF GROSS BETA ACTIVITY IN
AIR PARTICULATE SAMPLES

Teledyne Brown Engineering

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

Calculation of Sample Activity and 2 Sigma Error:

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

Net Activity Counting Error

where:

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

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

DETERMINATION OF I-131 IN MILK SAMPLES

GPUN Environmental Radioactivity Laboratory

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

Calculation of Sample Activity and 2 Sigma Uncertainty:

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

DETERMINATION OF I-131 IN MILK SAMPLES

Teledyne Brown Engineering

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

Calculation of the Sample Activity and 2 Sigma Error:

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

Net Activity Counting Error

where:

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

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

where:

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

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

DETERMINATION OF GAMMA EMITTING RADIOISOTOPES

GPUN Environmental Radioactivity Laboratory

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

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

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

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

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

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

Calculation of Sample Activity and 2 Sigma Uncertainty:

$$A = \frac{P}{2.22 \times q \times \epsilon \times b \times E_L} \times e^{\lambda T_e} \times \frac{\lambda E_R}{(1 - e^{-\lambda E_R})}$$

where:

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

T_s	=	acquisition start time
E_R	=	elapsed real time

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

where: ΔA = uncertainty in the a:tivity

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

ΔP	=	uncertainty in the peak area P
Δb	=	uncertainty in the S-ray abundance
$\Delta \epsilon$	=	uncertainty in the efficiency
sys	=	systematic Uncertainty estimate (in %)
$\Delta T_{1/2}$	=	uncertainty in the half-life

DETERMINATION OF GAMMA EMITTING RADIOISOTOPES

Teledyne Brown Engineering

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

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

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

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

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

Statistically Significant Activity

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

2 Sigma Counting Error

Where:

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

LIVE TIME	=	Elapsed Live Time (from Header Information)
ABN	=	Nuclide Abundance (from Nuclide Line Activity Report)
EFF	=	Detector Efficiency (from Nuclide Line Activity Report)
0.037	=	Conversion Factor (dps to picoCuries)
unit mass	=	Sample weight or volume (from Header Information)

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

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

Statistically Non Significant Activity

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

2 Sigma Counting Error

where:

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

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

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

where:

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

ENVIRONMENTAL DOSIMETRY

GPUN Environmental Radioactivity Laboratory

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

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

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

Each station comprises two TLD badges, each of which has two calcium sulfate elements. Outliers are identified using predefined algorithms. If all four elements are available, a given exposure value is judged an outlier if the standard deviation exceeds 5% of the mean exposure based on all four elements, and the exposure for one element is outside three standard deviations of the mean exposure based on the other three elements. If only two elements are available, the relative standard deviation based on the two exposure values must be 12% or less, or else both exposure values are considered outliers and no valid data are reported for that station for that quarter.

APPENDIX F

QUALITY CONTROL
EPA INTER-LABORATORY COMPARISON PROGRAM

APPENDIX F: QUALITY CONTROL PROGRAM

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

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

The results of GPU's and TBE's participation in the EPA cross check program can be found in Table F-1.

TABLE F-1

USEPA
INTER-LABORATORY COMPARISONS - 1995
GPU NUCLEAR AND TELEDYNE BROWN ENGINEERING

Collection Date	Media	Nuclide	EPA Results (a)	GPU Nuclear - ERL Results (b)		Teledyne Brown Engineering Results(b)	
01/13/95	Water	Sr-89	20.0 ± 8.7	-	(c)	19.00 ± 2.65	
		Sr-90	15.0 ± 8.7	-	(c)	14.00 ± 0.00	
01/27/95	Water	Gr-Alpha	5.0 ± 8.7	-	(d)	5.00 ± 1.00	
		Gr-Beta	5.0 ± 8.7	-	(d)	6.00 ± 1.00	
02/03/95	Water	I-131	100.0 ± 17.3	100 ± 2.52		88.33 ± 2.31	(e)
03/10/95	Water	H-3	7435.0 ± 1290.8	-	(f)	7066.67 ± 115.47	
04/18/95	Water	Gr-Alpha	47.5 ± 20.6	31.67 ± 3.21		39.67 ± 2.52	
		Gr-Beta	86.6 ± 17.3	75.00 ± 2.00		80.33 ± 2.52	
		Sr-89	20.0 ± 8.7	-	(c)	20.67 ± 1.15	
		Sr-90	15.0 ± 8.7	-	(c)	14.67 ± 0.58	
		Co-60	29.0 ± 8.7	29.67 ± 0.58		31.67 ± 2.08	
		Cs-134	20.0 ± 8.7	18.67 ± 0.58		19.67 ± 1.73	
		Cs-137	11.0 ± 8.7	10.00 ± 1.00		11.67 ± 1.53	
06/09/95	Water	Co-60	40.0 ± 8.7	40.33 ± 1.53		42.33 ± 2.52	
		Zn-65	76.0 ± 13.9	76.00 ± 5.57		82.33 ± 3.51	
		Cs-134	50.0 ± 8.7	46.00 ± 1.73		46.67 ± 2.08	
		Cs-137	35.0 ± 8.7	35.00 ± 2.65		37.67 ± 1.15	
		Ba-133	79.0 ± 13.9	79.67 ± 2.08		74.33 ± 2.08	
07/14/95	Water	Sr-89	20.0 ± 8.7	-	(c)	18.33 ± 1.53	
		Sr-90	8.0 ± 8.7	-	(c)	8.00 ± 0.00	
7/21/95	Water	Gr Alpha	27.5 ± 12.0	28.33 ± 4.04		18.33 ± 1.53	(g)
		Gr-Beta	19.4 ± 8.7	20.67 ± 3.51		19.33 ± 1.53	
08/04/95	Water	H-3	4872.0 ± 844.9	4933.33 ± 57.74		4866.67 ± 152.75	
8/25/95	Air Filters	Gr-Alpha	25.0 ± 10.9	25.00 ± 1.73		23.67 ± 1.53	
		Gr-Beta	86.6 ± 17.3	76.67 ± 2.89		84.67 ± 1.53	
		Sr-90	30.0 ± 8.7	-	(c)	25.33 ± 0.58	
		Cs-137	25.0 ± 8.7	28.00 ± 0.00		27.00 ± 1.00	
09/29/95	Milk	Sr-89	20.0 ± 8.7	-	(c)	23.33 ± 3.06	
		Sr-90	15.0 ± 8.7	-	(c)	16.33 ± 0.58	
		I-131	99.0 ± 17.3	98.33 ± 1.53		103.33 ± 5.77	
		Cs-137	50.0 ± 8.7	51.33 ± 2.89		54.67 ± 2.52	
		Total K	1654.0 ± 144.0	1733.33 ± 57.74		1683.33 ± 136.50	

TABLE F-1

USEPA
INTER-LABORATORY COMPARISONS - 1995
GPU NUCLEAR AND TELEDYNE BROWN ENGINEERING

Collection Date	Media	Nuclide	EPA Results (a)	GPU Nuclear - ERL Results (b)	Teledyne Brown Engineering Results(b)
10/06/95	Water	I-131	148.0 ± 26.0	156.67 ± 5.77	150.0 ± 0.00
10/17/95	Water	Gr-Alpha	99.4 ± 43.1	103.33 ± 5.77	94.67 ± 6.00
		Gr-Beta	141.8 ± 36.9	120.00 ± 10.00	120.00 ± 10.00
		Co-60	49.0 ± 8.7	49.33 ± 2.08	53.33 ± 5.37
		Sr-89	20.0 ± 8.7	- (c)	20.67 ± 3.00
		Sr-90	10.0 ± 8.7	- (c)	9.30 ± 1.20
		Cs-134	40.0 ± 8.7	33.33 ± 0.58	34.37 ± 4.03
		Cs-137	30.0 ± 8.7	29.00 ± 1.73	35.10 ± 3.93
10/27/95	Water	Gr-Alpha	51.2 ± 22.2	32.00 ± 0.00	37.00 ± 3.00
		Gr-Beta	24.8 ± 8.7	28.67 ± 1.53	25.33 ± 1.53
11/03/95	Water	Co-60	60.0 ± 8.7	57.33 ± 3.79	58.00 ± 7.00
		Zn-65	125.0 ± 22.6	133.33 ± 5.77	131.33 ± 19.14
		Ba-133	99.0 ± 17.3	94.67 ± 1.53	91.33 ± 3.06
		Cs-134	40.0 ± 8.7	85.67 ± 2.31	36.33 ± 2.08
		Cs-137	49.0 ± 8.7	49.33 ± 1.53	50.33 ± 4.62

Footnotes:

(a) EPA Results - Expected laboratory precision (control limit ± 3 sigma). Units are pCi/liter for water and milk except K is in mg/liter. Units are total pCi for air particulate filters.

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

(c) No data available. Analysis not performed by laboratory.

(d) The ERL results were not reported to the EPA. The sample was analyzed six times and the precision of the individual results was not acceptable. The ERL policy is to report only highly confident results and since the confidence level could not be achieved from this sample the results were not submitted to the EPA.

(e) The normalized deviation marginally exceeded the warning level and an apparent trend in the results appeared. The cause was a probable high bias in the beta counting efficiency. Check source control charts did not indicate any changes in the counting equipment, so the I-131 calibration was suspected. New I-131 calibrations were performed July 3 through 6, 1995 after receiving a new standard from the EPA. The intercomparison sample data sheets were recalculated with the new efficiencies and the average result

was in excellent agreement with the EPA (96 pCi/l versus the EPA value of 100 pCi/l). The discrepancy in the I-131 efficiency between the current calibration and the previous one (aside from the uncertainty in the standard) appears to be an abnormally low yield in the preparation of the standard for the older calibration which created a high bias in the counter efficiencies. The bias was less than ten percent, therefore further corrective action or revision of previously reported data is deemed not necessary.

(f) The ERL tritium results were not reported to the EPA in time for the report. The ERL result (average 3 determinations) was 7533.33 ± 208.17 pCi/l. The value was within all limits (0.23 sigma of known). Also, the precision (R.A. = 0.318) was acceptable.

(g) The mineral salt content of the water used by the EPA to prepare the samples has been shown to vary substantially throughout the year. Absorption curves to account for mount weight may vary from the true absorption characteristics of a specific sample. Previous results do not indicate a trend toward "out of control" for gross alpha/beta analysis and the normalized deviation from the grand average is only -0.36. The normalized deviation from the known for TBE-ES does not exceed three standard deviations and internal spikes have been in control. No corrective action is planned at this time.

APPENDIX G

LGS SURVEY

APPENDIX G: LGS SURVEYS

A Land Use Census around the Limerick Generating Station (LGS) was conducted by Normandeau Associates, RMC Environmental Services Division for PECO Energy to comply with Sections 2.5.1 and 3.4.2 of the Plant's Offsite Dose Calculation Manual. The survey was conducted during the May to September 1995 growing season. The results of this survey are summarized in Table G-1.

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

Table G-1 Location of Nearest Residence, Garden and Milk Farm within a Five Mile Radius of Limerick Generating Station, 1995

(Distance in Miles)

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

(1) Garden greater than 500 square feet
(2) Goat Milk