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LIMERICK GENERATING STATION
UNITS 1 and 2

Annual Radiological
Environmental Operating Report

Report No. 21

1 January Through 31 December 2005

Prepared By

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

Limerick Generating Station, Units 1 and 2
Facility Operating License Nos. NPF-39 and NPF-85
NRC Docket Nos. 50-352 and 50-353

Subject: 2005 Annual Radiological Environmental Operating Report

Dear Sir:

In accordance with the requirements of Section 6.9.17 of Limerick Generating Station (LGS) Unit 1 and Unit 2 Tech. Specs. and Section 6.1 of the LGS Units 1 and 2 Offsite Dose Calculation Manual (ODCM), this letter submits the 2004 Annual Radiological Environmental Operating Report No. 21. This report provides the 2005 results for the Radiological Environmental Monitoring Program (REMP) as called for in the Offsite Dose Calculation Manual.

In assessing the data collected for the REMP, we have concluded that the operation of LGS, Units 1 and 2 had no adverse impact on the environment. No plant-produced fission or activation products, with the exception of Cs-137, were found in any pathway modeled by the REMP. Cesium-137 levels detected in sediment were elevated from those found in previous years and were the result of LGS liquid releases.

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

Sincerely,

Ron J. DeGregorio
Vice President -LGS
Exelon Generation Company, LLC
Attachments: 2004 Annual Radiological Environmental Operating Report No. 21

cc: S. Collins, Administrator, Region I, USNRC
S. Hansell, USNRC Senior Resident Inspector, LGS
T. Valentine, Senior Project Manager-NRR, USNRC
T. Moslak, Inspector, Region I, USNRC

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I. Summary and Conclusions

This report on the Radiological Environmental Monitoring Program conducted for the Limerick Generating Station (LGS) by Exelon covers the period 1 January 2005 through 31 December 2005. During that time period, 1,100 analyses were performed on 890 samples. In assessing all the data gathered for this report and comparing these results with preoperational data, it was concluded that the operation of LGS had no adverse radiological impact on the environment.

Surface and drinking water samples were analyzed for concentrations of tritium and gamma emitting nuclides. Drinking water samples were also analyzed for concentrations of gross beta. No fission or activation products were detected. Gross beta activities detected were consistent with those detected in previous years. No tritium activity was detected.

Fish (predator and bottom feeder) and sediment samples were analyzed for concentrations of gamma emitting nuclides. Iodine-131 was detected in both predator and bottom feeder fish during the Spring season collection. The I-131 activity was attributable to medical discharges to the River from a sewage treatment plant located below the Limerick discharge. Cesium-137 was detected in one bottom feeder sample. The calculated dose to an adult consuming fish with this concentration of I-131 and Cs-137 was 1.51 mrem.

Sediment samples collected below the discharge had elevated Cesium-137 concentrations that were the result of LGS discharges. Iodine-131 was found in the upstream control location and was due to medical releases from upstream waste water treatment plants. No other Plant produced fission or activation products were found in sediment. The calculated dose to a teenager's skin and whole body was 2.97E-3 mrem and 2.54E-3 mrem, respectively. These doses represent 0.015% and 0.042%, respectively of the 10 CFR Part 20, Appendix I dose limits.

Air particulate samples were analyzed for concentrations of gross beta and gamma emitting nuclides. Cosmogenic Be-7 was detected at levels consistent with those detected in previous 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 concentration.

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

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

Review of the gamma spectroscopy results from the surface water sampler (24S1) located at the Limerick's intake and downstream of the 10CFR20.2002 permitted storage area indicated no offsite radionuclide transport was evident.

II. Introduction

The Limerick Generating Station (LGS), consisting of two 3458 MWt boiling water reactors owned and operated by Exelon Corporation, 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 that feed into the Schuylkill River. On the eastern river bank elevation rises from approximately 110 to 300 feet mean sea level (MSL). On the western river bank elevation rises to approximately 50 feet MSL to the western site boundary.

A Radiological Environmental Monitoring Program (REMP) for LGS was initiated in 1971. Review of the 1971 through 1977 REMP data resulted in the modification of the program to comply with changes in the Environmental Report Operating License Stage (EROL) and the Branch Technical Position Paper (Rev. 1, 1979). The preoperational period for most media covers the periods 1 January 1982 through 21 December 1984 and was summarized in a separate report. This report covers those analyses performed by Teledyne Brown Engineering (TBE), Global Dosimetry, and Environmental Inc. (Midwest Labs) on samples collected during the period 1 January 2005 through 31 December 2005.

On 6 July 1996 a 10CFR20.2002 permit was issued to Limerick for storage of slightly contaminated soils, sediments and sludges obtained from the holding pond, cooling tower and spray pond systems. These materials will decay to background while in storage. Final disposition will be determined at Station decommissioning.

A. Objective 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 radiological effects (if any) on man and the environment.

III. Program Description

A. Sample Collection

Samples for the LGS REMP were collected for Exelon Nuclear by Normandeau Associates, RMC Environmental Services Division (RMC). This section describes the general collection methods used by RMC to obtain environmental samples for the LGS REMP in 2005. Sample locations and descriptions can be found in Tables B–1 and B–2, and Figures B–1 through B–3, Appendix B. The collection procedures used by RMC are listed in Table B-3.

Aquatic Environment

The aquatic environment was evaluated by performing radiological analyses on 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 not sampled during 2005. 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, 16C4 and 33A2 (control).

Atmospheric Environment

The atmospheric environment was evaluated by performing radiological analyses on 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 one cubic foot per minute. The filters were replaced weekly and sent to the laboratory for analysis.

Milk samples were collected biweekly at five locations (10F4, 18E1, 19B1, 23F1, and 25C1) from April through November, and monthly from December through March. Two additional locations (25E1 and 36E1) were sampled quarterly. Locations 36E1 and 23F1 were controls. All samples were collected in new unused two gallon plastic bottles from the bulk tank at each location, preserved with sodium bisulfite, and shipped promptly to the laboratory.

Ambient Gamma Radiation

Direct radiation measurements were made using Panasonic 814 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 16 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 fence post 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 16 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 sixteen–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 three $CaSO_4$ 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 Global for analysis.

10CFR20.2002 Permit Storage Area

1. The results of the surface water sampling program were used to determine if radioactive nuclide transport from the storage area into the Schuylkill River had occurred.

B. Sample Analysis

This section describes the general analytical methodologies used by TBE and Midwest Labs to analyze the environmental samples for radioactivity for the LGS REMP in 2005. The analytical procedures used by the laboratories are listed in Table B-3.

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 these operational data were compared. For the purpose of this report, LGS was considered operational at initial criticality. In addition, data were compared to previous years' operational data for consistency and trending. Several factors were important in the interpretation of the data:

1. Lower Limit of Detection and Minimum Detectable Concentration

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 limits for environmental sample analysis.

The minimum detectable concentration (MDC) was defined as 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 may result in sample activity being lower than the background activity affecting a negative number. An MDC was reported in all cases where positive activity was not detected.

If no positive activity was detected, then gamma spectroscopy results for each type of sample were grouped as follows:

For surface and drinking water twelve nuclides, Mn-54, Co-58, Fe-59, Co-60, Zn-65, Zr-95, Nb-95, I-131, Cs-134, Cs-137, Ba-140, and La-140 were reported.

For fish nine nuclides, K-40, Mn-54, Co-58, Fe-59, Co-60, Zn-65, I-131, Cs-134, and Cs-137 were reported.

For sediment seven nuclides, Be-7, K-40, Mn-54, Co-58, Co-60, Cs-134, and Cs-137 were reported.

For air particulate six nuclides, Be-7, Mn-54, Co-58, Co-60, Cs-134, and Cs-137 were reported.

For milk five nuclides, K-40, Cs-134, Cs-137, Ba-140, and La-140 were reported.

Means and standard deviations of the results were calculated. The standard deviations represent the variability of measured results for different samples rather than single analysis uncertainty.

D. Program Exceptions

For 2005 the LGS REMP had a sample recovery rate in excess of 99%. Exceptions are listed below:

1. Drinking Water composite sampler at location 16C2 was out of service from 2/7/2005 to 4/4/2005 due to frozen pump and cracked pipe, weekly grab samples were taken.

2. Drinking Water composite sampler at location 15F4 was out of service on 11/14/2005 due to equipment malfunction. A partial grab sample was taken.

3. Drinking Water composite sampler at location 15F7 was out of service on 3/7/2005 due to equipment malfunction. A partial grab sample was taken.

4. Surface Water composite sampler at location 10F2 was out of service for the entire 2005, because no water was drawn from the Delaware River for cooling of the station.

5. Surface Water composite sampler at location 13B1 was out of service during the following periods:
   1/3/2005 – due to equipment malfunction. A weekly grab sample was taken.
   1/24/2005 – 1/31/2005 – due to freezing conditions. Weekly grab samples taken.
   3/14/2005 – due to electrical malfunction. A partial grab sample was taken.
   4/4/2005 – 4/18/2005 – Low sample volume due to changes in river level. A partial grab sample was taken.
   10/17/2005 – Equipment malfunction, weekly grab sample taken

6. Surface Water composite sampler at location 24S1 was out of service during the following periods:
   1/24/2005 – 1/31/2005 – River frozen, A weekly grab sample was taken.
   8/8/2005 – 10/17/2005 – Equipment malfunction. Weekly grab samples were taken.

7. Air particulate and air iodine samples were not available at location 13C1 from week 38 and week 39, due to electrical problems:

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

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

E. Program Changes

Milk station 25E1 was added to the quarterly sampling on 01/11/05.

Milk station 25C1 was added to the QC Laboratory Program beginning with the second quarter 2005.

Drinking water analysis of soluble and insoluble fractions of gross beta was discontinued beginning January 2005 and replaced by total gross beta. The drinking water data for the soluble and insoluble fractions was combined to create the total gross beta graph in Appendix C, Figure C-1. The previous data included summation of the less than values.

IV. Results and Discussion

A. Aquatic Environment

1. Surface Water

Samples were taken from a continuous sampler at two locations (13B1 and 24S1) on a monthly schedule. Of these locations only 13B1 located downstream, could be affected by Limerick's effluent releases. The following analyses were performed.

<u>Tritium</u>

Monthly samples from all locations were composited quarterly and analyzed for tritium activity (Table C–I.1, Appendix C). No tritium activity was detected. The highest MDC calculated was <200 pCi/l.

Gamma Spectrometry

Samples from all locations were analyzed for gamma emitting nuclides (Table C–I.2, Appendix C). All nuclides were less than the MDC.

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 Limerick's effluent releases. The following analyses were performed:

Gross Beta

Samples from all locations were analyzed for concentrations of total gross beta (Tables C–II.1, Appendix C). The values ranged from <1.9 to 6.8 pCi/l. Concentrations detected were consistent with those detected in previous years (Figure C–1, Appendix C).

Tritium

Monthly samples from all locations were composited quarterly and analyzed for tritium activity (Table C–II.2, Appendix C). No tritium activity was detected. The highest MDC calculated was <200 pCi/l.

Gamma Spectrometry

Samples from all locations were analyzed for gamma emitting nuclides (Table C–II.3, Appendix C). All nuclides were less than the MDC.

3. Fish

Fish samples comprised of catfish/bullhead (bottom feeder) and sunfish (predator) were collected at two locations (16C5 and 29C1) in the spring and fall season. Location 16C5 could be affected by Limerick's effluent releases. 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). Naturally occurring K-40 was found at all stations and ranged from 2,600 to 4,820 pCi/kg wet and was consistent with levels detected

in previous years. Iodine 131 was found in both predator and bottom feeder fish at the location 16C5 during the Spring season collection and was most likely the result of medical waste discharges from the sewage treatment plant located below the LGS discharge. The values ranged from 22.0 to 36.3 pCi/kg wet. In addition Cs-137 was detected in one sample at a concentration of 15 pCi/kg wet. No other gamma emitting nuclides were found. The dose to an adult consuming fish with this activity was conservatively calculated at 1.51 mrem. Historical levels of Cs-137 are shown in Figure C–2, Appendix C.

4. Sediment

Aquatic sediment samples were collected at three locations (16B2, 16C4 and 33A2) semiannually. Of these locations two 16B2 and 16C4 located downstream, could be affected by Limerick's effluent releases. 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 naturally occurring Be-7, K-40 and the fission products I-131 and Cs-137.

Beryllium-7 was found in one sample at location 16C4 at a concentration of 912 pCi/kg dry. Potassium-40 was found at all stations and ranged from 11,300 to 16,000 pCi/kg dry. The fission product Cs-137 was found at location 16C4 and ranged from 921 to 1130 pCi/kg dry. The elevated Cs-137 activity was due to LGS radioactive effluent releases (Figure C–3, Appendix C). The River flows during the Spring and Summer were extremely low. The dose to a teenager's skin and whole body was conservatively calculated at 2.97E-3 mrem and 2.54E-3 mrem, respectively. These doses represent 0.015% and 0.042%, respectively of the Appendix I to 10 CFR Part 50 dose limits. Iodine-131 was found at the control location 33A2 at 150 pCi/kg dry and was the result of medical applications. The calculated dose to a teenager's skin and whole body was conservatively calculated at 2.73E-4 mrem and 2.25E-4 mrem, respectively.

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 14S1), 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 <7 to 32 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 <7 to 30 E–3 pCi/m^3 with a mean of 15 E–3 pCi/m^3. The results from the Distant locations (Group III) ranged from 6 to 33 E–3 pCi/m^3 with a mean of 16 E–3 pCi/m^3. Comparison of the 2005 air particulate data with previous years data indicate no effects from the operation of LGS (Figure C–4, Appendix C). In addition a comparison of the weekly mean values for 2005 indicate no notable differences among the three groups (Figure C–5, 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 40 to 75 E–3 pCi/m^3. All other nuclides were less than the MDC.

b. Airborne Iodine

Continuous air samples were collected from five locations (10S3, 11S1, 14S1, 13C1, and 22G1) and analyzed weekly for I-131 (Table C–VI.1, Appendix C). All results were less than the MDC.

2. Terrestrial

a. Milk

Samples were collected from five locations (10F4, 18E1, 19B1, 23F1, and 25C1) biweekly April through November and monthly December through March. Samples from two additional locations (36E1 and 25E1) 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 MDC.

Gamma Spectrometry

Each milk sample was analyzed for concentrations of gamma emitting nuclides (Table C–VII.2, Appendix C).

Naturally occurring K-40 activity was found in all samples and ranged from 1,110 to 1,510 pCi/l. All other nuclides were less than the MDC.

C. Ambient Gamma Radiation

Ambient gamma radiation levels were measured utilizing Panasonic 814 ($CaSO_4$) thermoluminescent dosimeters. Forty TLD locations were established around the site. Results of TLD measurements are listed in Tables C–VIII.1 to C–VIII.3, Appendix C.

Most TLD measurements were below 10 mR/standard month, with a range of 5.3 to 12.4 mR/standard month. 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 were consistently higher. The historical ambient gamma radiation data from Location 5H1 were plotted along with similar data from the Site,

Intermediate Distance and Outer Ring Locations (Figure C–6, Appendix C). Location 5H1 has a historical high bias, but tracked with the data from all three groups. This bias is most likely due to radon emanating from the ground.

D. 10 CFR 20.2002 Permit Storage Area

The results of the surface water aquatic monitoring program from Location 24S1 were used to determine if radioactivity from the permit storage area had made it to the Schuylkill River. The data obtained from the gamma analysis program did not detect any migration of radioactivity from the permit storage area.

E. Land Use Survey

A Land Use Survey conducted in August 2005 around Limerick Generating Station (LGS) was performed by Normandeau Associates, RMC Environmental Services Division for Exelon Nuclear to comply with Bases 3.3.2 of the Limerick's Offsite Dose Calculation Manual. The purpose of the survey was to document the nearest resident, milk producing animal and garden of greater than 500 ft^2 in each of the sixteen 22 ½ degree sectors around the site. Four new gardens are included in the 2005 survey. The gardens are located in sectors SSW, SE, WSW and WNW. The distance and direction of all locations from the LGS reactor buildings were positioned using Global Positioning System (GPS) technology. There were no changes required to the LGS REMP, as a result of this survey. The results of this survey are summarized below.

Distance in Miles from the LGS Reactor Buildings			
Sector	Residence Miles	Garden Miles	Milk Farm Miles
1 N	0.6	1.8	4.7
2 NNE	0.5	0.5	-
3 NE	0.7	1.6	-
4 ENE	0.6	0.7	-
5 E	0.5	0.7	-
6 ESE	0.7	1.1	-
7 SE	1.0	2.8	-
8 SSE	1.0	1.1	-
9 S	0.8	1.2	4.2
10 SSW	1.0	1.0	2.0
11 SW	0.6	0.6	-
12 WSW	0.7	2.3	2.7
13 W	0.7	0.8	2.8
14 WNW	0.7	0.8	-
15 NW	0.7	1.6	-
16 NNW	1.0	1.6	-

F. Summary of Results – Inter-laboratory Comparison Program

The primary and secondary laboratories analyzed Performance Evaluation (PE) samples of air particulate, air iodine, milk, soil, vegetation and water matrices for 19 analytes. The PE samples, supplied by Analytics Inc., Environmental Resource Associates (ERA) and DOE's MAPEP, were evaluated against the following pre-set acceptance criteria:

1. Analytics Evaluation Criteria

   Analytics' evaluation report provides a ratio of TBE's result and Analytics' known value. Since flag values are not assigned by Analytics, TBE-ES evaluates the reported ratios based on internal QC requirements, which are based on the DOE MAPEP criteria.

2. ERA Evaluation Criteria

   ERA's evaluation report provides an acceptance range for control and warning limits with associated flag values. ERA's acceptance limits are established per the USEPA, NELAC, state specific PT program requirements or ERA's SOP for the Generation of Performance Acceptance Limits, as applicable. The acceptance limits are either determined by a regression equation specific to each analyte or a fixed percentage limit promulgated under the appropriate regulatory document.

3. DOE Evaluation Criteria

MAPEP's evaluation report provides an acceptance range with associated flag values.

The MAPEP defines three levels of performance: Acceptable (flag = "A"), Acceptable with Warning (flag = "W"), and Not Acceptable (flag = "N"). Performance is considered acceptable when a mean result for the specified analyte is ± 20% of the reference value. Performance is acceptable with warning when a mean result falls in the range from ±20% to ±30% of the reference value (i.e., 20% < bias < 30%). If the bias is greater than 30%, the results are deemed not acceptable.

For the primary laboratory, 18 out of 19 analytes met the specified acceptance criteria. One sample did not meet the specified acceptance criteria for the following reason:

1. Teledyne Brown Engineering's Analytics' September 2005 air particulate Fe-59 ratio of 1.35 exceeded the upper control limit of 1.30 due to a new technician not counting the air particulate in a petri dish.

For the secondary laboratory, 19 out of 23 analytes met the specified acceptance criteria. Four samples did not meet the specified acceptance criteria for the following reasons:

1. Environmental Inc.'s ERA's November 2005 water Gross Alpha result of 41.1 pCi/L exceeded the upper control limit of 33.4 pCi/L. This was due to using an Am-241 efficiency instead of a Th-232 efficiency when counting the sample. Using the correct efficiency gave a result of 27.0 pCi/L.

2. Environmental Inc.'s ERA's November 2005 water Ra-228 result of 5.5 pCi/L exceeded he upper control limit of 5.0 pCi/L due to presence of radium daughters. Delay in counting 100 minutes gave a result of 4.01 pci/L.

3. Environmental Inc.'s MAPEP's January 2005 air particulate Sr-90 result of 2.2 exceeded the upper control limit of 1.76 Bq/kg. Reanalysis result was 1.56 Bq/kg.

4. Environmental Inc.'s MAPEP's July 2005 soil Am-241 result of 48.4 exceeded the lower control limit of 56.77 Bq/kg due to incorrect

sample weight being used in the calculation. When recalculated with the correct sample weight, the result was 97.0 Bq/kg.

The Inter-Laboratory Comparison Program provides evidence of "in control" counting systems and methods, and that the laboratories are producing accurate and reliable data.

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. Pre-operational 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.

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APPENDIX A

RADIOLOGICAL ENVIRONMENTAL MONITORING REPORT SUMMARY

TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE LIMERICK GENERATING STATION, 2005

Name of Facility: LIMERICK GENERATING STATION — **DOCKET NUMBER:** 50-352 & 50-353

Location of Facility: MONTGOMERY COUNTY, PA — **REPORTING PERIOD:** 2005

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPES OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATION MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN: MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN: STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
SURFACE WATER (PCI/LITER)	H-3	8	2000	176 (0/4) (<159/<196)	177 (0/4) (<158/<200)	177 (0/8) (<158/<200)	24S1 CONTROL LIMERICK INTAKE 0.20 MILES SW	0
	GAMMA	24						
	MN-54		15	5 (0/12) (<2/<9)	4 (0/12) (<3/<7)	5 (0/24) (<2/<9)	13B1 INDICATOR VINCENT DAM 1.75 MILES SE	0
	CO-58		15	5 (0/12) (<3/<7)	4 (0/12) (<3/<6)	5 (0/24) (<3/<7)	13B1 INDICATOR VINCENT DAM 1.75 MILES SE	0
	FE-59		30	10 (0/12) (<5/<19)	9 (0/12) (<4/<16)	10 (0/24) (<5/<19)	13B1 INDICATOR VINCENT DAM 1.75 MILES SE	0
	CO-60		15	6 (0/12) (<2/<10)	5 (0/12) (<3/<9)	6 (0/24) (<2/<10)	13B1 INDICATOR VINCENT DAM 1.75 MILES SE	0
	ZN-65		30	10 (0/12) (<6/<16)	10 (0/12) (<7/<14)	10 (0/24) (<6/<16)	13B1 INDICATOR VINCENT DAM 1.75 MILES SE	0
	NB-95		15	5 (0/12) (<3/<8)	4 (0/12) (<3/<6)	5 (0/24) (<3/<8)	13B1 INDICATOR VINCENT DAM 1.75 MILES SE	0
	ZR-95		30	8 (0/12) (<5/<12)	8 (0/12) (<5/<13)	8 (0/24) (<5/<12)	13B1 INDICATOR VINCENT DAM 1.75 MILES SE	0

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

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	I-131		15	5 (0/12) (<3/<8)	4 (0/12) (<3/<6)	5 (0/12) (<3/<8)	13B1 INDICATOR VINCENT DAM 1.75 MILES SE OF SITE	0
	CS-134		15	5 (0/12) (<3/<8)	4 (0/12) (<3/<6)	5 (0/24) (<3/<8)	13B1 INDICATOR VINCENT DAM 1.75 MILES SE	0
	CS-137		18	5 (0/12) (<3/<8)	5 (0/12) (<3/<8)	5 (0/24) (<3/<8)	13B1 INDICATOR VINCENT DAM 1.75 MILES SE	0
	BA-140		60	23 (0/12) (<11/<37)	21 (0/12) (<13/<35)	23 (0/24) (<11/<37)	13B1 INDICATOR VINCENT DAM 1.75 MILES SE	0
	LA-140		15	7 (0/12) (<2/<13)	7 (0/12) (<4/<12)	7 (0/24) (<2/<13)	13B1 INDICATOR VINCENT DAM 1.75 MILES SE	0
DRINKING WATER (PCI/LITER)	GR-B	48	4	4.1 (32/36) (< 1.9/ 6.8)	4.6 (11/12) (< 2.3/ 6.5)	4.6 (11/12) (< 2.3/ 6.5)	28F3 CONTROL POTTSTOWN WATER AUTHORITY 5.84 MILES WNW	0
	H-3	16	2000	175 (0/12) (<157/<200)	175 (0/4) (<157/<195)	176 (0/8) (<157/<200)	15F7 INDICATOR PHOENIXVILLE WATER WORKS 6.33 MILES SSE	0
	GAMMA	48						
	MN-54		15	5 (0/36) (<2/<9)	5 (0/12) (<4/<6)	5 (0/24) (<4/<9)	16C2 INDICATOR CITIZENS HOME WATER COMPANY 2.66 MILES SSE	0

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	CO-58		15	5 (0/36) (<2/<9)	5 (0/12) (<4/<6)	5 (0/24) (<3/<9)	16C2 INDICATOR CITIZENS HOME WATER COMPANY 2.66 MILES SSE	0
	FE-59		30	10 (0/36) (<5/<18)	10 (0/12) (<7/<12)	11 (0/24) (<7/<17)	16C2 INDICATOR CITIZENS HOME WATER COMPANY 2.66 MILES SSE	0
	CO-60		15	5 (0/36) (<3/<9)	5 (0/12) (<3/<7)	6 (0/24) (<3/<9)	16C2 INDICATOR CITIZENS HOME WATER COMPANY 2.66 MILES SSE	0
	ZN-65		30	11 (0/36) (<4/<19)	10 (0/12) (<7/<12)	11 (0/24) (<7/<17)	15F7 INDICATOR PHOENIXVILLE WATER WORKS 6.33 MILES SSE	0
	NB-95		15	5 (0/36) (<3/<9)	5 (0/12) (<4/<6)	6 (0/24) (<4/<9)	16C2 INDICATOR CITIZENS HOME WATER COMPANY 2.66 MILES SSE	0
	ZR-95		30	9 (0/36) (<4/<17)	9 (0/12) (<7/<12)	9 (0/24) (<5/<12)	15F7 INDICATOR PHOENIXVILLE WATER WORKS 6.33 MILES SSE	0
	I-131		15	9 (0/36) (<3/<20)	8 (0/12) (<5/<15)	9 (0/12) (<5/<19)	16C2 INDICATOR CITIZENS HOME WATER COMPANY 2.66 MILES SSE OF SITE	0
	CS-134		15	5 (0/36) (<2/<9)	4 (0/12) (<3/<6)	5 (0/24) (<3/<9)	15F7 INDICATOR PHOENIXVILLE WATER WORKS 6.33 MILES SSE	0

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	CS-137		18	6 (0/36) (<3/<10)	5 (0/12) (<3/<6)	6 (0/24) (<4/<8)	15F7 INDICATOR PHOENIXVILLE WATER WORKS 6.33 MILES SSE	0
	BA-140		60	24 (0/36) (<12/<42)	22 (0/12) (<9/<33)	25 (0/24) (<14/<42)	16C2 INDICATOR CITIZENS HOME WATER COMPANY 2.66 MILES SSE	0
	LA-140		15	8 (0/36) (<2/<14)	6 (0/12) (<2/<13)	8 (0/24) (<5/<14)	16C2 INDICATOR CITIZENS HOME WATER COMPANY 2.66 MILES SSE	0
BOTTOM FEEDER (FISH) (PCI/KG WET)	GAMMA	4						
	K-40		N/A	3050 (2/2) (3050/3050)	3900 (2/2) (2980/4820)	3900 (4/4) (2980/4820)	29C1 CONTROL POTTSTOWN VICINITY UPSTREAM OF INTAKE	0
	MN-54		130	27 (0/2) (<6/<48)	26 (0/2) (<6/<45)	27 (0/4) (<6/<48)	16C5 INDICATOR VINCENT POOL DOWNSTREAM OF DISCHARGE	0
	CO-58		130	23 (0/2) (<6/<41)	28 (0/2) (<6/<50)	28 (0/4) (<6/<50)	29C1 CONTROL POTTSTOWN VICINITY UPSTREAM OF INTAKE	0
	FE-59		260	52 (0/2) (<13/<92)	72 (0/2) (<14/<130)	72 (0/4) (<14/<130)	29C1 CONTROL POTTSTOWN VICINITY UPSTREAM OF INTAKE	0
	CO-60		130	30 (0/2) (<6/<54)	29 (0/2) (<6/<53)	30 (0/4) (<6/<54)	16C5 INDICATOR VINCENT POOL DOWNSTREAM OF DISCHARGE	0

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	ZN-65		260	40 (0/2) (<12/<68)	69 (0/2) (<14/<124)	69 (0/4) (<14/<124)	29C1 CONTROL POTTSTOWN VICINITY UPSTREAM OF INTAKE	0
	I-131		N/A	56 (1/2) (36/<75)	66 (0/2) (<14/<119)	66 (0/2) (<14/<119)	29C1 CONTROL POTTSTOWN VICINITY UPSTREAM OF INTAKE	0
	CS-134		130	21 (0/2) (<5/<37)	26 (0/2) (<6/<46)	26 (0/4) (<6/<46)	29C1 CONTROL POTTSTOWN VICINITY UPSTREAM OF INTAKE	0
	CS-137		150	32 (1/2) (15/<49)	31 (0/2) (<6/<56)	32 (2/4) (15/<49)	16C5 INDICATOR VINCENT POOL DOWNSTREAM OF DISCHARGE	0
PREDATOR (FISH) (PCI/KG WET)	GAMMA	4						
	K-40		N/A	3020 (2/2) (2850/3190)	3525 (2/2) (2600/4450)	3525 (4/4) (2600/4450)	29C1 CONTROL POTTSTOWN VICINITY UPSTREAM OF INTAKE	0
	MN-54		130	19 (0/2) (<4/<33)	22 (0/2) (<5/<39)	22 (0/4) (<5/<39)	29C1 CONTROL POTTSTOWN VICINITY UPSTREAM OF INTAKE	0
	CO-58		130	13 (0/2) (<4/<21)	24 (0/2) (<5/<44)	24 (0/4) (<5/<44)	29C1 CONTROL POTTSTOWN VICINITY UPSTREAM OF INTAKE	0
	FE-59		260	35 (0/2) (<10/<61)	47 (0/2) (<10/<83)	47 (0/4) (<10/<83)	29C1 CONTROL POTTSTOWN VICINITY UPSTREAM OF INTAKE	0

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	CO-60		130	24 (0/2) (<4/<43)	24 (0/2) (<5/<44)	24 (0/4) (<5/<44)	29C1 CONTROL POTTSTOWN VICINITY UPSTREAM OF INTAKE	0
	ZN-65		260	37 (0/2) (<9/<65)	41 (0/2) (<10/<72)	41 (0/4) (<10/<72)	29C1 CONTROL POTTSTOWN VICINITY UPSTREAM OF INTAKE	0
	I-131		N/A	36 (1/2) (22/<49)	40 (0/2) (<11/<69)	40 (0/2) (<11/<69)	29C1 CONTROL POTTSTOWN VICINITY UPSTREAM OF INTAKE	0
	CS-134		130	16 (0/2) (<4/<27)	26 (0/2) (<5/<47)	26 (0/4) (<5/<47)	29C1 CONTROL POTTSTOWN VICINITY UPSTREAM OF INTAKE	0
	CS-137		150	18 (0/2) (<5/<31)	25 (0/2) (<5/<46)	25 (0/4) (<5/<46)	29C1 CONTROL POTTSTOWN VICINITY UPSTREAM OF INTAKE	0
SEDIMENT (PCI/KG DRY)	GAMMA	6						
	BE-7		N/A	466 (1/4) (<266/912)	426 (0/2) (<359/<493)	634 (2/4) (<356/912)	16C4 INDICATOR VINCENT DAM 2.18 MILES SSE	0
	K-40		N/A	13775 (4/4) (11300/16500)	12950 (2/2) (12500/13400)	16250 (4/4) (16000/16500)	16C4 INDICATOR VINCENT DAM 2.18 MILES SSE	0
	MN-54		N/A	51 (0/4) (<33/<79)	50 (0/2) (<43/<57)	60 (0/4) (<41/<79)	16C4 INDICATOR VINCENT DAM 2.18 MILES SSE	0

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	CO-58		N/A	43 (0/4) (<31/<61)	47 (0/2) (<42/<53)	50 (0/4) (<38/<61)	16C4 INDICATOR VINCENT DAM 2.18 MILES SSE	0
	CO-60		N/A	55 (0/4) (<31/<94)	52 (0/2) (<42/<63)	67 (0/4) (<39/<94)	16C4 INDICATOR VINCENT DAM 2.18 MILES SSE	0
	I-131		N/A	67 (0/4) (<49/<97)	102 (1/2) (<73/132)	102 (1/2) (<73/132)	33A2 CONTROL UPSTREAM OF INTAKE 0.84 MILES NNW OF SITE	0
	CS-134		150	56 (0/4) (<40/<68)	60 (0/2) (<50/<69)	67 (0/4) (<66/<68)	16C4 INDICATOR VINCENT DAM 2.18 MILES SSE	0
	CS-137		180	537 (3/4) (<44/1130)	56 (0/2) (<46/<65)	1026 (4/4) (921/1130)	16C4 INDICATOR VINCENT DAM 2.18 MILES SSE	0
AIR PARTICULATE (E-3 PCI/CU.METER)	GR-B	263	10	16 (204/210) (<7/32)	16 (52/53) (6/33)	17 (53/53) (8/31)	10S3 INDICATOR KEEN ROAD 0.50 MILES E	0
	GAMMA BE-7	20	N/A	60 (16/16) (40/68.9)	62 (4/4) (48.7/75)	64 (8/8) (49.1/68.9)	14S1 INDICATOR LONGVIEW ROAD 0.63 MILES SSE	0
	MN-54		N/A	1.0 (0/16) (< 0.5/< 1.4)	0.9 (0/4) (< 0.7/< 1.1)	1.2 (0/8) (< 0.9/< 1.4)	11S1 INDICATOR LGS INFORMATION CENTER 0.38 MILES ESE	0

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MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPES OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATION MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN: MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN: STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
	CO-58		N/A	1.1 (0/16) (< 0.7/< 1.7)	1.0 (0/4) (< 0.8/< 1.2)	1.3 (0/8) (< 1.0/< 1.6)	11S1 INDICATOR LGS INFORMATION CENTER 0.38 MILES ESE	0
	CO-60		N/A	1.2 (0/16) (< 1.0/< 1.5)	0.9 (0/4) (< 0.8/< 1.0)	1.2 (0/8) (< 1.1/< 1.5)	14S1 INDICATOR LONGVIEW ROAD 0.63 MILES SSE	0
	CS-134		50	0.9 (0/16) (< 0.4/< 1.3)	0.8 (0/4) (< 0.7/< 0.9)	1.1 (0/8) (< 0.9/< 1.2)	11S1 INDICATOR LGS INFORMATION CENTER 0.38 MILES ESE	0
	CS-137		60	0.9 (0/16) (< 0.6/< 1.3)	0.8 (0/4) (< 0.7/< 0.9)	1.0 (0/8) (< 0.9/< 1.2)	11S1 INDICATOR LGS INFORMATION CENTER 0.38 MILES ESE	0
AIR IODINE (E-3 PCI/CU.METER)	I-131	263	70	20 (0/210) (<4/<40)	15 (0/53) (<5/<26)	20 (0/102) (<4/<38)	13C1 INDICATOR KING ROAD 2.84 MILES SE	0
MILK (PCI/LITER)	I-131	118	1	0.5 (0/92) (< 0.2/< 1.0)	0.4 (0/26) (< 0.2/< 0.9)	0.6 (0/8) (< 0.3/< 0.9)	36E1 CONTROL 4.70 MILES N	0
	GAMMA K-40	118	N/A	1302 (92/92) (1110/1490)	1308 (26/26) (1140/1510)	1341 (44/44) (1150/1490)	25C1 INDICATOR 2.69 MILES WSW	0
	CS-134		15	5 (0/92) (<1/<11)	5 (0/26) (<1/<10)	6 (0/8) (<4/<8)	25E1 INDICATOR	0

THE MEAN AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING BOTH THE MDAs AND THE POSITIVE VALUES
FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES (F)

TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE LIMERICK GENERATING STATION, 2005

Name of Facility: LIMERICK GENERATING STATION — **DOCKET NUMBER:** 50-352 & 50-353

Location of Facility: MONTGOMERY COUNTY, PA — **REPORTING PERIOD:** 2005

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPES OF ANALYSES PERFORMED	NUMBER OF ANALYSES PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN (F) RANGE	CONTROL LOCATION MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN: MEAN (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN: STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
	CS-137		18	6 (0/92) (<1/<12)	6 (0/26) (<2/<10)	7 (0/8) (<5/<11)	25E1 INDICATOR	0
	BA-140		60	22 (0/92) (<5/<53)	22 (0/26) (<5/<43)	27 (0/8) (<14/<53)	25E1 INDICATOR	0
	LA-140		15	6 (0/92) (<1/<13)	7 (0/26) (<2/<12)	27 (0/8) (<4/<13)	25E1 INDICATOR	
DIRECT RADIATION (MILLI-ROENTGEN/STD.MO.	TLD-QUARTERLY	160	N/A	7.28 (156/156) (5.3/12.2)	8.6 (4/4) (7.9/9.3)	11.1 (4/4) (10.1/12.2)	13S2 INDICATOR 500 KV SUBSTATION 0.41 MILES SE OF SITE	0

THE MEAN AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING BOTH THE MDAs AND THE POSITIVE VALUES
FRACTION OF DETECTABLE MEASUREMENTS AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESES (F)

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APPENDIX B

LOCATION DESIGNATION, DISTANCE & DIRECTION, AND SAMPLE COLLECTION & ANALYTICAL METHODS

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: Radiological Environmental Monitoring Program - Sampling Locations, Distance and Direction, Limerick Generating Station, 2005

Location	Location Description	Distance & Direction From Site
A. Surface Water		
13B1	Vincent Dam (indicator)	1.75 miles SE
24S1	Limerick Intake (control)	0.20 miles SW
10F2	Perkiomen Pumping Station (control)	7.25 miles E
B. Drinking (Potable) Water		
15F4	Philadelphia Suburban Water Company (indicator)	8.62 miles SE
15F7	Phoenixville Water Works (indicator)	6.33 miles SSE
16C2	Citizens Home Water Company (indicator)	2.66 miles SSE
28F3	Pottstown Water Authority (control)	5.84 miles WNW
C. Milk - bi-weekly / monthly		
10F4		6.60 miles ESE
18E1		4.21 miles S
19B1		1.95 miles SSW
23F1	Control	5.02 miles SW
25C1		2.69 miles WSW
D. Milk - quarterly		
25E1		4.27 miles WSW
36E1	Control	4.70 miles N
E. Air Particulates / Air Iodine		
10S3	Keen Road	0.50 miles E
11S1	LGS Information Center	0.38 miles ESE
11S2	LGS Information Center	0.38 miles ESE
13C1	King Road	2.84 miles SE
14S1	Longview Road	0.63 miles SSE
22G1	Manor Substation (control)	17.73 miles SW
F. Fish		
16C5	Vincent Pool (indicator)	Downstream of Discharge
29C1	Pottstown Vicinity (control)	Upstream of Intake
G. Sediment		
16B2	Linfield Bridge (indicator)	1.35 miles SSE
16C4	Vincent Dam (indicator)	2.18 miles SSE
33A2	Upstream of Intake (control)	0.84 miles NNW

TABLE B-2: Radiological Environmental Monitoring Program - Sampling Locations, Distance and Direction, Limerick Generating Station, 2005

Location	Location Description	Distance & Direction From Site
H	Environmental Dosimetry - TLD	
Site Boundary		
36S2	Evergreen & Sanatoga Road	0.60 miles N
3S1	Sanatoga Road	0.44 miles NNE
5S1	Possum Hollow Road	0.45 miles NE
7S1	LGS Training Center	0.59 miles ENE
10S3	Keen Road	0.50 miles E
11S1	LGS Information Center	0.38 miles ESE
13S2	500 KV Substation	0.41 miles SE
14S1	Longview Road	0.63 miles SSE
18S2	Rail Line along Longview Road	0.26 miles S
21S2	Near Intake Building	0.19 miles SSW
23S2	Transmission Tower	0.53 miles SW
25S2	Sector Site Boundary	0.46 miles WSW
26S3	Met. Tower #2	0.40 miles W
29S1	Sector Site Boundary	0.55 miles WNW
31S1	Sector Site Boundary	0.26 miles NW
34S2	Met. Tower #1	0.58 miles NNW
Intermediate Distance		
36D1	Siren Tower No. 147	3.51 miles N
2E1	Laughing Waters GSC	4.76 miles NNE
4E1	Neiffer Road	4.78 miles NE
7E1	Pheasant Road	4.26 miles ENE
10E1	Royersford Road	3.94 miles E
10F3	Trappe Substation	5.58 miles ESE
13E1	Vaughn Substation	4.31 miles SE
16F1	Pikeland Substation	5.04 miles SSE
19D1	Snowden Substation	3.49 miles S
20F1	Sheeder Substation	5.24 miles SSW
24D1	Porters Mill Substation	3.97 miles SW
25D1	Hoffecker & Keim Streets	3.99 miles WSW
28D2	W. Cedarville Road	3.83 miles W
29E1	Prince Street	4.95 miles WNW
31D2	Poplar Substation	3.87 miles NW
34E1	Varnell Road	4.59 miles NNW
Control and Special Interest		
5H1	Birch Substation (control)	24.76 miles NE
6C1	Pottstown Landing Field	2.14 miles NE
9C1	Reed Road	2.15 miles E
13C1	King Road	2.84 miles SE
15D1	Spring City Substation	3.20 miles SE
17B1	Linfield Substation	1.60 miles S
20D1	Ellis Woods Road	3.06 miles SSW
31D1	Lincoln Substation	3.00 miles WNW

TABLE B-3: Radiological Environmental Monitoring Program – Summary of Sample Collection and Analytical Methods, Limerick Generating Station, 2005

Sample Medium	Analysis	Sampling Method	Collection Procedure Number	Sample Size	Analytical Procedure Number
Surface Water	Gamma Spectroscopy	Monthly composite from a continuous water compositor.	NAI-ER5 Collection of water samples for radiological analysis (Limerick Generating Station)	2 gallon	TBE, TBE-2007 Gamma emitting radioisotope analysis Env. Inc., GS-01 Determination of gamma emitters by gamma spectroscopy
Surface Water	Tritium	Quarterly composite from a continuous water compositor.	NAI-ER5 Collection of water samples for radiological analysis (Limerick Generating Station)	500 ml	TBE, TBE-2011 Tritium analysis in drinking water by liquid scintillation Env. Inc., T-02 Determination of tritium in water (direct method)
Drinking Water	Gross Beta	Monthly composite from a continuous water compositor.	NAI-ER5 Collection of water samples for radiological analysis (Limerick Generating Station)	2 gallon	TBE, TBE-2008 Gross Alpha and/or gross beta activity in various matrices Env. Inc., W(DS)-01 Determination of gross alpha and/or gross beta in water (dissolved solids or total residue) Env. Inc., W(SS)-02 Determination of gross alpha and/or gross beta in water (suspended solids)
Drinking Water	Gamma Spectroscopy	Monthly composite from a continuous water compositor.	NAI-ER5 Collection of water samples for radiological analysis (Limerick Generating Station)	2 gallon	TBE, TBE-2007 Gamma emitting radioisotope analysis Env. Inc., GS-01 Determination of gamma emitters by gamma spectroscopy
Drinking Water	Tritium	Quarterly composite from a continuous water compositor.	NAI-ER5 Collection of water samples for radiological analysis (Limerick Generating Station)	500 ml	TBE, TBE-2011 Tritium analysis in drinking water by liquid scintillation Env. Inc., T-02 Determination of tritium in water (direct method)
Fish	Gamma Spectroscopy	Semi-annual samples collected via electroshocking or other techniques	NAI-ER6 Collection of fish samples for radiological analysis (Limerick Generating Station)	1000 grams (wet)	TBE-2007 Gamma emitting radioisotope analysis Env. Inc., GS-01 Determination of gamma emitters by gamma spectroscopy
Sediment	Gamma Spectroscopy	Semi-annual grab samples	NAI-ER7 Collection of sediment samples for radiological analysis (Limerick Generating Station)	500 grams (dry)	TBE, TBE-2007 Gamma emitting radioisotope analysis Env. Inc., GS-01 Determination of gamma emitters by gamma spectroscopy
Air Particulates	Gross Beta	One-week composite of continuous air sampling through glass fiber filter paper	NAI-ER8 Collection of air particulate and air iodine samples for radiological analysis (Limerick Generating Station)	1 filter (approximately 280 cubic meters weekly)	TBE, TBE-2008 Gross Alpha and/or gross beta activity in various matrices Env. Inc., AP-02 Determination of gross alpha and/or gross beta in air particulate filters

TABLE B-3: Radiological Environmental Monitoring Program – Summary of Sample Collection and Analytical Methods, Limerick Generating Station, 2005

Sample Medium	Analysis	Sampling Method	Collection Procedure Number	Sample Size	Analytical Procedure Number
Air Particulates	Gamma Spectroscopy	Quarterly composite of each station	TBE, TBE-2023 Compositing of samples Env. Inc., AP-03 Procedure for compositing air particulate filters for gamma spectroscopic analysis	13 filters (approximately 3600 cubic meters)	TBE, TBE-2007 Gamma emitting radioisotope analysis Env. Inc., GS-01 Determination of gamma emitters by gamma spectroscopy
Air Iodine	Gamma Spectroscopy	One-week composite of continuous air sampling through charcoal filter	NAI-ER8 Collection of air particulate and air iodine samples for radiological analysis (Limerick Generating Station)	1 filter (approximately 280 cubic meters weekly)	TBE, TBE-2007 Gamma emitting radioisotope analysis Env. Inc., I-131-02 Determination of I-131 in charcoal canisters by gamma spectroscopy (batch method)
Milk	I-131	Bi-weekly grab sample when cows are on pasture. Monthly all other times	NAI-ER10 Collection of milk samples for radiological analysis (Limerick Generating Station)	2 gallon	TBE, TBE-2012 Radioiodine in various matrices Env. Inc., I-131-01 Determination of I-131 in milk by anion exchange
Milk	Gamma Spectroscopy	Bi-weekly grab sample when cows are on pasture. Monthly all other times	NAI-ER10 Collection of milk samples for radiological analysis (Limerick Generating Station)	2 gallon	TBE, TBE-2007 Gamma emitting radioisotope analysis Env. Inc., GS-01 Determination of gamma emitters by gamma spectroscopy
TLD	Thermoluminescence Dosimetry	Quarterly TLDs comprised of two Panasonic 814 (containing 3 each $CaSO_4$ elements)	NAI-ER9 Collection of TLD samples for radiological analysis (Limerick Generating Station)	2 dosimeters	Global Dosimetry

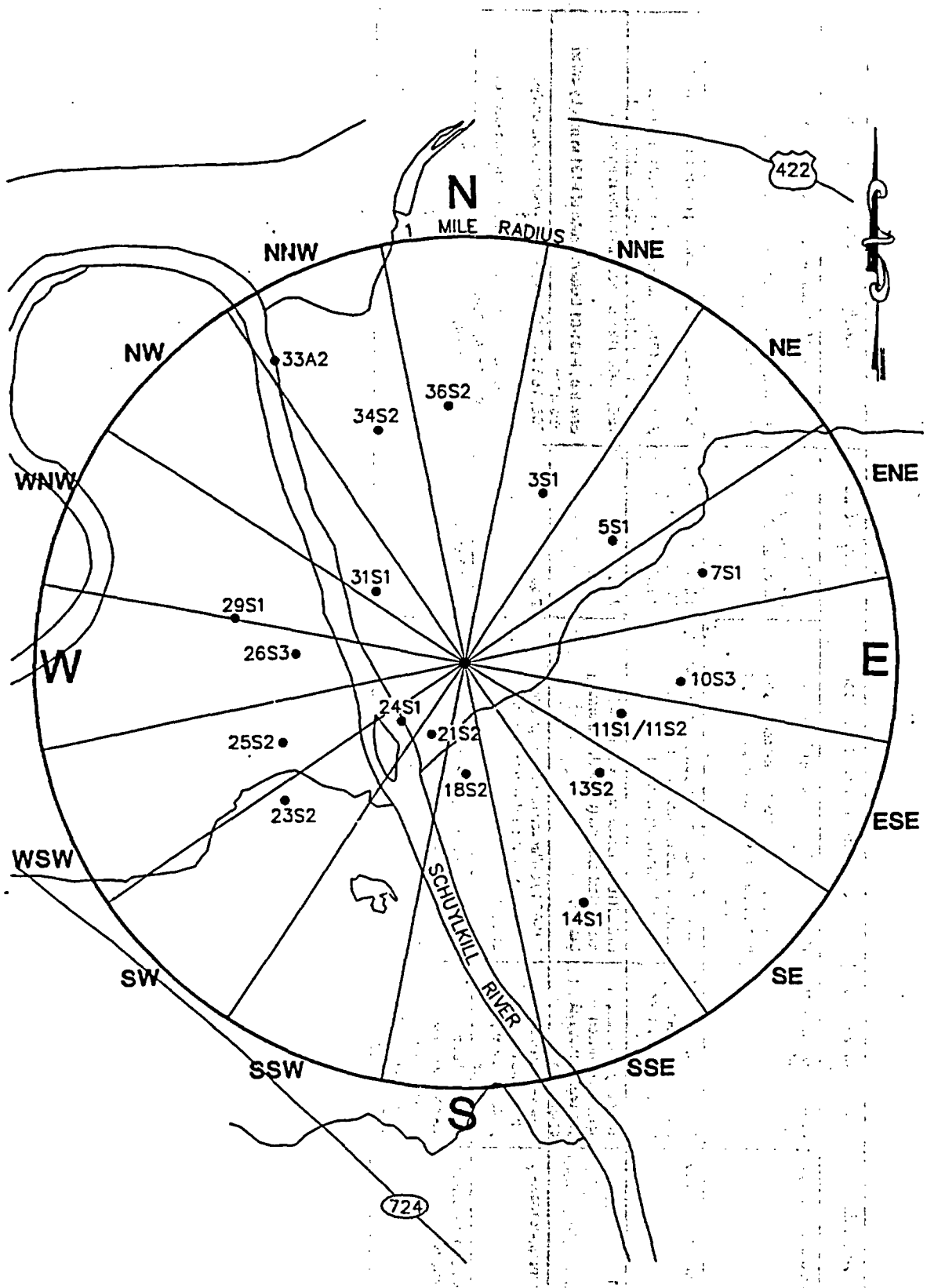

Figure B-1
Environmental Sampling Locations Within One
Mile of the Limerick Generating Station, 2005

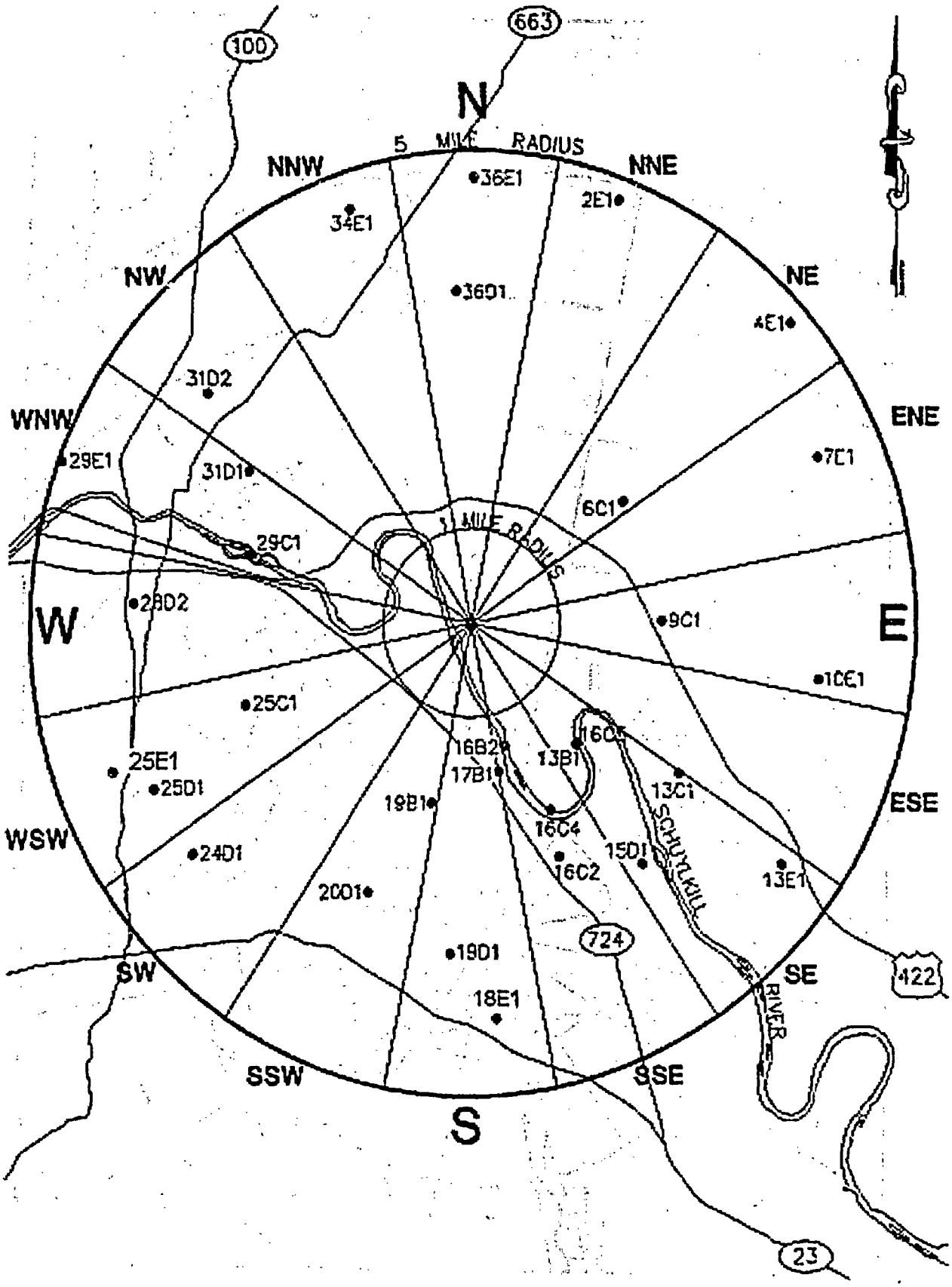

Figure B-2
Environmental Sampling Locations Between One and Five Miles from the Limerick Generating Station, 2005

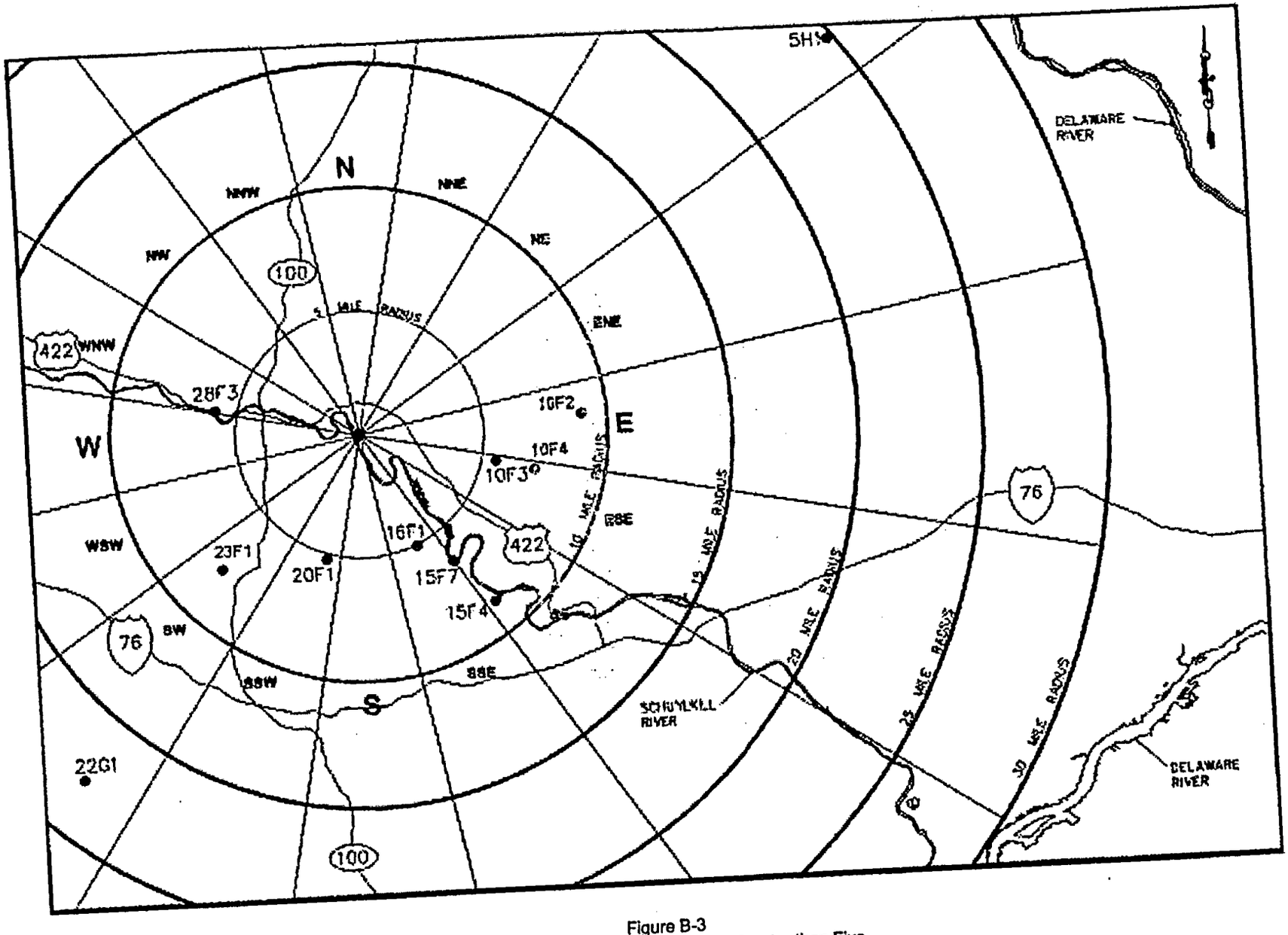

Figure B-3
Environmental Sampling Locations Greater than Five Miles from the Limerick Generating Station, 2005

APPENDIX C

DATA TABLES AND FIGURES
PRIMARY LABORATORY

TABLE C-I.1 CONCENTRATIONS OF TRITIUM IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2005

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	10F2	13B1	24S1
JAN-MAR	(1)	< 196	< 200
APR-JUN	(1)	< 164	< 168
JUL-SEP	(1)	< 183	< 183
OCT-DEC	(1)	< 159	< 158
MEAN		176 ± 34	177 ± 37

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

TABLE C-I.2 CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2005

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
10F2	JAN	(1)											
	FEB												
	MAR												
	APR												
	MAY												
	JUN												
	JUL												
	AUG												
	SEP												
	OCT												
	NOV												
	DEC												
	MEAN												
13B1	JAN	< 9	< 7	< 19	< 10	< 16	< 8	< 11	< 18	< 8	< 8	< 37	< 13
	FEB	< 8	< 6	< 12	< 6	< 14	< 6	< 12	< 8	< 6	< 8	< 31	< 9
	MAR	< 4	< 6	< 8	< 4	< 10	< 5	< 7	< 6	< 4	< 5	< 19	< 8
	APR	< 4	< 5	< 11	< 5	< 11	< 6	< 9	< 9	< 5	< 5	< 23	< 7
	MAY	< 2	< 3	< 5	< 2	< 6	< 3	< 5	< 4	< 3	< 3	< 11	< 2
	JUN	< 5	< 4	< 8	< 8	< 8	< 5	< 6	< 4	< 3	< 4	< 11	< 4
	JUL	< 5	< 5	< 9	< 7	< 8	< 6	< 10	< 6	< 5	< 6	< 16	< 7
	AUG	< 5	< 6	< 13	< 6	< 12	< 5	< 9	< 12	< 4	< 5	< 22	< 11
	SEP	< 3	< 4	< 6	< 3	< 7	< 4	< 5	< 9	< 3	< 4	< 24	< 6
	OCT	< 5	< 4	< 10	< 4	< 10	< 5	< 8	< 15	< 5	< 5	< 35	< 10
	NOV	< 4	< 4	< 8	< 5	< 8	< 5	< 7	< 5	< 3	< 5	< 15	< 6
	DEC	< 6	< 5	< 13	< 6	< 14	< 7	< 12	< 7	< 6	< 5	< 25	< 7
	MEAN	5 ± 4	5 ± 3	10 ± 8	6 ± 4	10 ± 6	5 ± 3	8 ± 4	9 ± 9	5 ± 3	5 ± 3	23 ± 17	7 ± 6

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

TABLE C-I.2 **CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2005**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
24S1	JAN	< 4	< 4	< 9	< 4	< 9	< 5	< 8	< 8	< 4	< 4	< 22	< 7
	FEB	< 4	< 4	< 4	< 6	< 8	< 4	< 7	< 4	< 3	< 5	< 13	< 4
	MAR	< 7	< 6	< 16	< 7	< 13	< 6	< 13	< 9	< 5	< 8	< 24	< 8
	APR	< 4	< 5	< 9	< 5	< 11	< 5	< 10	< 7	< 4	< 4	< 21	< 9
	MAY	< 4	< 3	< 7	< 5	< 7	< 4	< 7	< 5	< 4	< 4	< 15	< 5
	JUN	< 3	< 3	< 7	< 4	< 9	< 5	< 9	< 5	< 4	< 5	< 18	< 6
	JUL	< 5	< 5	< 11	< 4	< 12	< 4	< 8	< 7	< 5	< 6	< 19	< 7
	AUG	< 5	< 6	< 10	< 6	< 12	< 6	< 12	< 13	< 6	< 6	< 35	< 12
	SEP	< 4	< 5	< 15	< 9	< 14	< 4	< 8	< 13	< 6	< 8	< 33	< 11
	OCT	< 3	< 3	< 6	< 3	< 8	< 4	< 6	< 12	< 3	< 4	< 25	< 7
	NOV	< 3	< 3	< 6	< 5	< 7	< 3	< 5	< 4	< 3	< 3	< 13	< 5
	DEC	< 4	< 3	< 7	< 4	< 10	< 4	< 7	< 5	< 4	< 5	< 15	< 5
	MEAN	4 ± 2	4 ± 2	9 ± 7	5 ± 3	10 ± 5	4 ± 2	8 ± 5	8 ± 7	4 ± 2	5 ± 3	21 ± 14	7 ± 5

TABLE C-II.1 CONCENTRATIONS OF TOTAL GROSS BETA IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2005

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	15F4	15F7	16C2	28F3
JAN	3.2 ± 1.4	3.5 ± 1.5	2.4 ± 1.4	3.7 ± 1.5
FEB	< 2.2	< 2.3	< 2.2	< 2.3
MAR	3.5 ± 1.5	2.8 ± 1.5	4.1 ± 1.4	3.6 ± 1.6
APR	3.7 ± 1.5	< 1.9	2.5 ± 1.4	3.6 ± 1.6
MAY	6.1 ± 1.7	5.4 ± 1.7	3.4 ± 1.4	6.0 ± 1.8
JUN	3.0 ± 1.7	5.8 ± 1.9	3.9 ± 1.8	4.8 ± 1.9
JUL	4.7 ± 1.9	3.6 ± 1.8	3.5 ± 1.9	5.9 ± 2.1
AUG	5.1 ± 1.8	4.9 ± 1.8	4.3 ± 1.8	5.2 ± 1.9
SEP	6.8 ± 1.9	6.7 ± 1.9	5.3 ± 1.7	6.5 ± 2.0
OCT	6.3 ± 1.7	5.3 ± 1.6	4.7 ± 1.6	4.8 ± 1.6
NOV	4.7 ± 1.6	4.4 ± 1.6	5.3 ± 1.7	4.4 ± 1.6
DEC	3.7 ± 1.6	3.9 ± 1.6	3.4 ± 1.6	3.9 ± 1.7
MEAN	1.7 ± 0.3	2.4 ± 3.3	1.6 ± 0.4	1.7 ± 0.4

TABLE C-II.2 CONCENTRATIONS OF TRITIUM IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2005

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	15F4	15F7	16C2	28F3
JAN-MAR	< 200	< 200	< 198	< 195
APR-JUN	< 165	< 164	< 164	< 167
JUL-SEP	< 176	< 183	< 181	< 179
OCT-DEC	< 157	< 157	< 157	< 157
MEAN	175 ± 37	176 ± 39	175 ± 37	175 ± 33

TABLE C-II.3 CONCENTRATIONS OF GAMMA EMITTERS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2005

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zr-95	Nb-95	I-131	Cs-134	Cs-137	Ba-140	La-140
15F4	JAN	< 2	< 2	< 5	< 4	< 4	< 4	< 3	< 4	< 2	< 3	< 12	< 4
	FEB	< 4	< 4	< 9	< 4	< 8	< 9	< 3	< 5	< 4	< 5	< 19	< 5
	MAR	< 5	< 3	< 8	< 9	< 9	< 7	< 3	< 3	< 4	< 5	< 17	< 4
	APR	< 8	< 8	< 18	< 5	< 19	< 13	< 8	< 13	< 8	< 8	< 34	< 11
	MAY	< 6	< 4	< 9	< 7	< 10	< 10	< 5	< 6	< 5	< 6	< 20	< 8
	JUN	< 5	< 6	< 9	< 5	< 12	< 9	< 5	< 6	< 4	< 7	< 21	< 7
	JUL	< 4	< 4	< 10	< 3	< 8	< 6	< 4	< 5	< 4	< 5	< 14	< 4
	AUG	< 4	< 5	< 12	< 5	< 12	< 9	< 6	< 12	< 5	< 6	< 28	< 12
	SEP	< 6	< 7	< 14	< 5	< 12	< 9	< 7	< 16	< 6	< 6	< 37	< 12
	OCT	< 6	< 7	< 17	< 7	< 14	< 13	< 7	< 20	< 6	< 7	< 42	< 13
	NOV	< 5	< 5	< 10	< 6	< 8	< 9	< 5	< 6	< 5	< 5	< 18	< 6
	DEC	< 4	< 5	< 7	< 4	< 10	< 8	< 5	< 6	< 4	< 5	< 17	< 7
	MEAN	5 ± 3	5 ± 3	11 ± 8	5 ± 3	10 ± 8	9 ± 5	5 ± 4	8 ± 11	5 ± 3	5 ± 3	23 ± 19	8 ± 7
15F7	JAN	< 3	< 3	< 7	< 4	< 7	< 6	< 4	< 6	< 3	< 4	< 17	< 6
	FEB	< 5	< 6	< 11	< 5	< 14	< 12	< 7	< 7	< 5	< 6	< 20	< 6
	MAR	< 4	< 3	< 7	< 4	< 9	< 5	< 4	< 6	< 4	< 5	< 19	< 2
	APR	< 5	< 5	< 9	< 6	< 11	< 10	< 6	< 10	< 6	< 6	< 23	< 7
	MAY	< 6	< 4	< 5	< 5	< 11	< 11	< 5	< 6	< 5	< 6	< 23	< 5
	JUN	< 3	< 3	< 10	< 5	< 9	< 7	< 4	< 4	< 5	< 5	< 17	< 5
	JUL	< 6	< 5	< 14	< 6	< 15	< 12	< 6	< 8	< 5	< 7	< 23	< 7
	AUG	< 6	< 5	< 9	< 7	< 11	< 12	< 5	< 14	< 6	< 7	< 35	< 10
	SEP	< 5	< 6	< 12	< 5	< 10	< 11	< 6	< 13	< 5	< 5	< 34	< 11
	OCT	< 5	< 5	< 11	< 5	< 10	< 9	< 6	< 15	< 5	< 4	< 33	< 12
	NOV	< 5	< 5	< 9	< 6	< 10	< 9	< 5	< 6	< 5	< 5	< 21	< 6
	DEC	< 6	< 6	< 13	< 7	< 17	< 10	< 7	< 8	< 9	< 8	< 27	< 10
	MEAN	5 ± 2	5 ± 2	10 ± 5	5 ± 2	11 ± 6	9 ± 5	5 ± 2	9 ± 7	5 ± 3	6 ± 2	24 ± 13	7 ± 6

TABLE C-II.3 CONCENTRATIONS OF GAMMA EMITTERS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2005

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zr-95	Nb-95	I-131	Cs-134	Cs-137	Ba-140	La-140
16C2	JAN	< 9	< 9	< 17	< 9	< 19	< 17	< 9	< 19	< 9	< 10	< 42	< 14
	FEB	< 4	< 3	< 7	< 4	< 9	< 7	< 5	< 5	< 4	< 3	< 14	< 5
	MAR	< 6	< 4	< 9	< 6	< 11	< 7	< 6	< 7	< 5	< 6	< 19	< 6
	APR	< 5	< 5	< 10	< 6	< 8	< 10	< 5	< 8	< 5	< 5	< 26	< 8
	MAY	< 6	< 5	< 13	< 7	< 12	< 9	< 6	< 8	< 6	< 5	< 22	< 8
	JUN	< 7	< 6	< 12	< 7	< 13	< 8	< 7	< 6	< 6	< 6	< 27	< 9
	JUL	< 4	< 5	< 9	< 5	< 9	< 4	< 9	< 6	< 5	< 5	< 20	< 6
	AUG	< 5	< 7	< 12	< 5	< 13	< 10	< 7	< 12	< 5	< 7	< 37	< 12
	SEP	< 5	< 4	< 8	< 4	< 10	< 10	< 5	< 12	< 4	< 5	< 28	< 8
	OCT	< 4	< 4	< 9	< 3	< 8	< 8	< 4	< 14	< 4	< 4	< 29	< 7
	NOV	< 5	< 4	< 12	< 7	< 10	< 8	< 6	< 7	< 5	< 5	< 20	< 7
	DEC	< 4	< 4	< 9	< 4	< 8	< 8	< 4	< 5	< 4	< 4	< 18	< 6
	MEAN	5 ± 3	5 ± 3	11 ± 5	6 ± 3	11 ± 6	9 ± 6	6 ± 3	9 ± 8	5 ± 3	5 ± 3	25 ± 16	8 ± 5
28F3	JAN	< 4	< 4	< 9	< 4	< 9	< 8	< 4	< 9	< 4	< 5	< 22	< 8
	FEB	< 4	< 5	< 10	< 5	< 10	< 8	< 4	< 6	< 4	< 5	< 18	< 5
	MAR	< 6	< 5	< 10	< 6	< 10	< 9	< 6	< 7	< 5	< 5	< 23	< 5
	APR	< 5	< 5	< 9	< 6	< 11	< 9	< 6	< 9	< 6	< 6	< 26	< 8
	MAY	< 5	< 5	< 10	< 6	< 11	< 9	< 4	< 7	< 4	< 5	< 20	< 6
	JUN	< 4	< 6	< 9	< 7	< 9	< 7	< 4	< 6	< 4	< 5	< 9	< 2
	JUL	< 5	< 5	< 10	< 4	< 9	< 8	< 4	< 6	< 4	< 5	< 20	< 6
	AUG	< 4	< 5	< 9	< 3	< 7	< 9	< 4	< 9	< 4	< 3	< 26	< 5
	SEP	< 5	< 5	< 12	< 6	< 12	< 12	< 6	< 15	< 5	< 6	< 33	< 13
	OCT	< 5	< 5	< 12	< 6	< 11	< 8	< 5	< 15	< 4	< 4	< 29	< 9
	NOV	< 4	< 4	< 7	< 4	< 7	< 7	< 5	< 5	< 3	< 5	< 16	< 4
	DEC	< 5	< 5	< 8	< 5	< 11	< 8	< 5	< 6	< 5	< 5	< 19	< 5
	MEAN	5 ± 1	5 ± 1	10 ± 3	5 ± 2	10 ± 3	9 ± 2	5 ± 2	8 ± 7	4 ± 1	5 ± 1	22 ± 13	6 ± 6

TABLE C-III.1 **CONCENTRATIONS OF GAMMA EMITTERS IN PREDATOR AND BOTTOM FEEDER (FISH) SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2005**

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

STC	COLLECTION PERIOD	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	I-131	Cs-134	Cs-137
16C5	PREDATOR									
	05/17/05	2850 ± 98	< 4	< 4	< 10	< 4	< 9	22 ± 11	< 4	< 5
	10/20/05	3190 ± 717	< 33	< 21	< 61	< 43	< 65	< 49	< 27	< 31
	MEAN	3020 ± 481	19 ± 41	13 ± 23	35 ± 72	24 ± 55	37 ± 79	36 ± 39	16 ± 33	18 ± 37
	BOTTOM FEEDER									
	05/17/05	3050 ± 136	< 6	< 6	< 13	< 6	< 12	36 ± 12	< 5	15 ± 5
	10/20/05	3050 ± 1000	< 48	< 41	< 92	< 54	< 68	< 75	< 37	< 49
	MEAN	3050 ± 0	27 ± 60	23 ± 50	52 ± 113	30 ± 67	40 ± 79	56 ± 55	21 ± 45	32 ± 48
29C1	PREDATOR									
	05/18/05	4450 ± 96	< 5	< 5	< 10	< 5	< 10	< 11	< 5	< 5
	10/19/05	2600 ± 645	< 39	< 44	< 83	< 44	< 72	< 69	< 47	< 46
	MEAN	3525 ± 2616	22 ± 49	24 ± 56	47 ± 103	24 ± 56	41 ± 88	40 ± 82	26 ± 61	25 ± 58
	BOTTOM FEEDER									
	05/18/06	2980 ± 157	< 6	< 6	< 14	< 6	< 14	< 14	< 6	< 6
	10/19/05	4820 ± 853	< 45	< 50	< 130	< 53	< 124	< 119	< 46	< 56
	MEAN	3900 ± 2602	26 ± 55	28 ± 62	72 ± 164	29 ± 65	69 ± 156	66 ± 149	26 ± 57	31 ± 70

TABLE C-IV.1 **CONCENTRATIONS OF GAMMA EMITTERS IN SEDIMENT SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION**

RESULTS IN UNITS OF PCI/KG DRY ± 2 SIGMA

STC	COLLECTION PERIOD	Be-7	K-40	Mn-54	Co-58	Co-60	I-131	Cs-134	Cs-137
16B2									
	06/20/05	< 328	11300 ± 1220	< 53	< 39	< 57	< 49	< 40	< 44
	12/15/05	< 266	11300 ± 539	< 33	< 31	< 31	< 53	< 53	53 ± 21
	MEAN	297 ± 88	11300 ± 0	43 ± 30	35 ± 11	44 ± 36	51 ± 7	46 ± 18	48 ± 13
16C4									
	06/20/05	912 ± 529	16000 ± 1550	< 79	< 61	< 94	< 97	< 66	921 ± 107
	12/15/05	< 356	16500 ± 642	< 41	< 38	< 39	< 70	< 68	1130 ± 51
	MEAN	634 ± 786	16250 ± 707	60 ± 54	50 ± 32	67 ± 77	83 ± 37	67 ± 3	1026 ± 296
33A2									
	06/20/05	< 493	13400 ± 1230	< 57	< 53	< 63	132 ± 59	< 50	< 65
	12/15/05	< 359	12500 ± 602	< 43	< 42	< 42	< 73	< 69	< 46
	MEAN	426 ± 190	12950 ± 1273	50 ± 20	47 ± 16	52 ± 30	102 ± 84	60 ± 27	56 ± 27

TABLE C-V.1 CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2005

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

	GROUP I			GROUP II	GROUP III
WEEK	10S3	11S1	14S1	13C1	22G1
1	26 ± 6	26 ± 6	27 ± 6	29 ± 6	32 ± 7
2	11 ± 4	10 ± 5	11 ± 5	7 ± 5	14 ± 5
3	18 ± 5	13 ± 5	13 ± 5	13 ± 5	14 ± 5
4	24 ± 5	17 ± 5	19 ± 5	20 ± 5	20 ± 5
5	19 ± 5	18 ± 5	19 ± 5	17 ± 5	14 ± 5
6	26 ± 5	27 ± 5	24 ± 5	28 ± 6	22 ± 5
7	19 ± 5	17 ± 5	16 ± 5	16 ± 5	16 ± 5
8	15 ± 5	9 ± 5	15 ± 5	16 ± 5	13 ± 5
9	11 ± 4	7 ± 5	10 ± 5	13 ± 5	12 ± 5
10	12 ± 4	17 ± 5	16 ± 5	13 ± 5	15 ± 5
11	11 ± 4	14 ± 5	14 ± 5	16 ± 5	12 ± 5
12	15 ± 4	16 ± 5	16 ± 5	18 ± 5	15 ± 5
13	12 ± 4	10 ± 5	11 ± 5	14 ± 5	9 ± 5
14	9 ± 4	< 7	< 7	< 7	< 7
15	13 ± 4	19 ± 5	15 ± 5	16 ± 5	14 ± 5
16	11 ± 5	10 ± 5	13 ± 5	11 ± 5	14 ± 5
17	12 ± 4	11 ± 5	13 ± 5	9 ± 5	13 ± 5
18	8 ± 5	11 ± 5	9 ± 5	< 8	8 ± 5
19	15 ± 5	14 ± 5	27 ± 6	8 ± 5	14 ± 5
20	11 ± 5	9 ± 5	9 ± 5	11 ± 5	8 ± 5
21	9 ± 4	< 7	9 ± 5	< 7	8 ± 5
22	10 ± 4	8 ± 4	7 ± 4	8 ± 4	9 ± 4
23	9 ± 5	11 ± 5	15 ± 6	12 ± 5	13 ± 5
24	23 ± 5	18 ± 5	18 ± 5	19 ± 5	21 ± 5
25	13 ± 5	9 ± 5	10 ± 5	9 ± 5	8 ± 5
26	23 ± 5	15 ± 5	16 ± 5	16 ± 5	18 ± 5
27	11 ± 4	12 ± 4	10 ± 4	11 ± 4	10 ± 4
28	16 ± 6	17 ± 6	12 ± 5	12 ± 5	13 ± 5
29	11 ± 5	10 ± 5	12 ± 5	14 ± 5	11 ± 5
30	21 ± 5	18 ± 5	20 ± 5	21 ± 5	16 ± 5
31	18 ± 5	21 ± 5	18 ± 5	18 ± 5	22 ± 5
32	31 ± 6	30 ± 6	28 ± 6	24 ± 5	33 ± 6
33	28 ± 6	32 ± 6	25 ± 5	28 ± 5	27 ± 5
34	20 ± 5	23 ± 5	21 ± 5	21 ± 5	22 ± 5
35	11 ± 5	12 ± 4	13 ± 5	14 ± 5	14 ± 5
36	14 ± 5	13 ± 5	16 ± 5	12 ± 5	17 ± 5
37	24 ± 6	22 ± 5	22 ± 5	22 ± 5	21 ± 5
38	25 ± 5	18 ± 5	19 ± 5	(1)	20 ± 5
39	30 ± 6	27 ± 6	29 ± 6	(1)	23 ± 5
40	18 ± 5	20 ± 5	16 ± 5	16 ± 6	17 ± 5
41	18 ± 5	11 ± 5	14 ± 5	13 ± 5	16 ± 5
42	9 ± 4	8 ± 4	7 ± 4	9 ± 4	6 ± 4
43	11 ± 5	11 ± 5	14 ± 5	15 ± 5	13 ± 5
44	11 ± 5	10 ± 5	12 ± 5	7 ± 4	10 ± 4
45	29 ± 6	28 ± 6	31 ± 6	25 ± 5	22 ± 5
46	22 ± 5	23 ± 5	21 ± 5	18 ± 5	23 ± 5
47	22 ± 5	16 ± 5	19 ± 5	17 ± 5	23 ± 5
48	15 ± 5	17 ± 5	14 ± 5	15 ± 5	15 ± 5
49	12 ± 5	17 ± 5	16 ± 5	11 ± 5	12 ± 5
50	27 ± 6	26 ± 5	30 ± 6	29 ± 6	27 ± 5
51	13 ± 5	16 ± 5	15 ± 5	13 ± 5	13 ± 5
52	27 ± 5	32 ± 5	29 ± 5	30 ± 5	33 ± 5
53	15 ± 5	11 ± 5	13 ± 5	14 ± 5	9 ± 4
MEAN	17 ± 13	16 ± 13	16 ± 13	15 ± 12	16 ± 13

(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, 2005**

GROUP I - ON-SITE LOCATIONS				GROUP II - INTERMEDIATE DISTANCE LOCATIONS				GROUP III - CONTROL LOCATIONS			
COLLECTION PERIOD	MIN.	MAX.	MEAN ± 2 SD	COLLECTION PERIOD	MIN.	MAX.	MEAN ± 2 SD	COLLECTION PERIOD	MIN.	MAX.	MEAN ± 2 SD
12/28/04 - 01/31/05	10	27	18 ± 11	12/28/04 - 01/31/05	7	29	17 ± 16	12/28/04 - 01/31/05	14	32	19 ± 15
01/31/05 - 02/28/05	7	27	16 ± 13	01/31/05 - 02/28/05	13	28	18 ± 13	01/31/05 - 02/28/05	12	22	16 ± 9
02/28/05 - 03/28/05	10	17	14 ± 5	02/28/05 - 03/28/05	13	18	15 ± 4	02/28/05 - 03/28/05	9	15	13 ± 6
03/28/05 - 05/02/05	< 7	19	11 ± 6	03/28/05 - 05/02/05	< 7	16	10 ± 8	03/28/05 - 05/02/05	< 7	14	11 ± 7
05/02/05 - 05/31/05	< 7	27	11 ± 11	05/02/05 - 05/31/05	< 7	11	8 ± 3	05/02/05 - 05/31/05	8	14	10 ± 6
05/31/05 - 06/27/05	9	23	15 ± 10	05/31/05 - 06/27/05	9	19	14 ± 9	05/31/05 - 06/27/05	8	21	15 ± 12
06/27/05 - 08/01/05	10	21	15 ± 8	06/27/05 - 08/01/05	11	21	15 ± 9	06/27/05 - 08/01/05	10	22	14 ± 10
08/01/05 - 08/29/05	11	32	23 ± 15	08/01/05 - 08/29/05	14	28	22 ± 11	08/01/05 - 08/29/05	14	33	24 ± 17
08/29/05 - 10/03/05	13	30	21 ± 11	08/29/05 - 10/03/05	12	22	17 ± 9	08/29/05 - 10/03/05	17	23	20 ± 5
10/03/05 - 10/31/05	7	18	11 ± 6	10/03/05 - 10/31/05	7	15	11 ± 7	10/03/05 - 10/31/05	6	16	11 ± 8
10/31/05 - 11/28/05	14	31	21 ± 11	10/31/05 - 11/28/05	15	25	19 ± 8	10/31/05 - 11/28/05	15	23	21 ± 6
11/28/05 - 01/03/06	11	32	20 ± 15	11/28/05 - 01/03/06	11	30	19 ± 18	11/28/05 - 01/03/06	9	33	19 ± 21
12/28/04 - 01/03/06	< 7	32	16 ± 8	12/28/04 - 01/03/06	< 7	30	15 ± 8	12/28/04 - 01/03/06	6	33	16 ± 9

TABLE C-V.3 CONCENTRATION OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2005

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

STC	COLLECTION PERIOD	Be-7	Mn-54	Co-58	Co-60	Cs-134	Cs-137
10S3	12/28 - 03/28/05	61 ± 13	< 0.9	< 0.8	< 1.0	< 0.8	< 0.8
	03/28 - 06/27/05	64 ± 11	< 0.5	< 0.8	< 1.1	< 0.5	< 0.8
	06/27 - 09/26/05	64 ± 13	< 1.1	< 1.2	< 1.2	< 0.9	< 1.0
	09/26 - 01/03/06	40 ± 9	< 1.0	< 1.1	< 1.1	< 1.1	< 0.9
	MEAN	57 ± 23	0.9 ± 0.5	1.0 ± 0.4	1.1 ± 0.1	0.8 ± 0.5	0.9 ± 0.3
11S1	12/28 - 03/28/05	61 ± 14	< 0.9	< 1.0	< 1.0	< 0.9	< 0.9
	03/28 - 06/27/05	62 ± 16	< 1.4	< 1.6	< 1.3	< 1.1	< 0.9
	06/27 - 09/26/05	68 ± 17	< 1.3	< 1.3	< 1.4	< 1.1	< 1.1
	09/26 - 01/03/06	50 ± 9	< 1.1	< 1.2	< 1.2	< 1.2	< 1.2
	MEAN	60 ± 15	1.2 ± 0.4	1.3 ± 0.4	1.2 ± 0.4	1.1 ± 0.3	1.0 ± 0.3
13C1	12/28 - 03/28/05	65 ± 13	< 0.6	< 1.0	< 1.1	< 0.4	< 0.6
	03/28 - 06/27/05	60 ± 12	< 1.0	< 1.3	< 1.4	< 0.9	< 1.0
	06/27 - 09/26/05	62 ± 16	< 1.1	< 1.2	< 1.2	< 0.9	< 0.9
	09/26 - 01/03/06	48 ± 10	< 1.2	< 1.3	< 1.0	< 1.3	< 1.2
	MEAN	59 ± 15	1.0 ± 0.5	1.2 ± 0.3	1.2 ± 0.3	0.9 ± 0.7	0.9 ± 0.5
14S1	12/28 - 03/28/05	69 ± 13	< 0.9	< 1.0	< 1.2	< 0.6	< 0.6
	03/28 - 06/27/05	69 ± 15	< 0.8	< 0.7	< 1.1	< 0.6	< 0.7
	06/27 - 09/26/05	68 ± 16	< 1.3	< 1.7	< 1.5	< 1.1	< 1.3
	09/26 - 01/03/06	49 ± 11	< 1.2	< 1.1	< 1.2	< 1.2	< 1.2
	MEAN	64 ± 19	1.0 ± 0.5	1.1 ± 0.8	1.2 ± 0.3	0.9 ± 0.7	1.0 ± 0.8
22G1	12/28 - 03/28/05	55 ± 11	< 0.7	< 0.8	< 0.8	< 0.7	< 0.7
	03/28 - 06/27/05	75 ± 15	< 1.1	< 1.0	< 0.9	< 0.8	< 0.9
	06/27 - 09/26/05	71 ± 13	< 1.0	< 1.2	< 1.0	< 0.8	< 0.8
	09/26 - 01/03/06	49 ± 8	< 0.8	< 0.9	< 1.0	< 0.9	< 0.8
	MEAN	62 ± 25	0.9 ± 0.4	1.0 ± 0.3	0.9 ± 0.2	0.8 ± 0.2	0.8 ± 0.1

TABLE C-VI.1 CONCENTRATIONS OF I-131 IN AIR IODINE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2005

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

	GROUP I			GROUP II	GROUP III
WEEK	10S3	11S1	14S1	13C1	22G1
1	< 20	< 21	< 21	< 22	< 14
2	< 20	< 22	< 22	< 22	< 11
3	< 14	< 15	< 15	< 15	< 8
4	< 20	< 21	< 22	< 22	< 14
5	< 14	< 15	< 16	< 16	< 8
6	< 13	< 14	< 15	< 15	< 8
7	< 13	< 16	< 18	< 17	< 22
8	< 16	< 17	< 17	< 18	< 13
9	< 17	< 18	< 18	< 18	< 10
10	< 17	< 19	< 19	< 19	< 10
11	< 19	< 21	< 21	< 21	< 10
12	< 11	< 12	< 12	< 12	< 6
13	< 17	< 18	< 18	< 18	< 13
14	< 17	< 19	< 19	< 19	< 10
15	< 17	< 18	< 18	< 19	< 10
16	< 9	< 9	< 10	< 10	< 5
17	< 5	< 6	< 6	< 4	< 6
18	< 12	< 13	< 14	< 14	< 10
19	< 15	< 16	< 16	< 16	< 9
20	< 15	< 11	< 16	< 16	< 16
21	< 16	< 18	< 18	< 18	< 9
22	< 20	< 22	< 22	< 23	< 12
23	< 20	< 22	< 22	< 22	< 15
24	< 16	< 17	< 17	< 18	< 13
25	< 15	< 17	< 17	< 17	< 13
26	< 13	< 14	< 15	< 15	< 8
27	< 22	< 21	< 20	< 20	< 14
28	< 23	< 22	< 14	< 22	< 22
29	< 18	< 17	< 17	< 17	< 9
30	< 19	< 18	< 18	< 18	< 13
31	< 22	< 21	< 21	< 21	< 16
32	< 22	< 21	< 20	< 20	< 14
33	< 18	< 18	< 18	< 17	< 12
34	< 13	< 16	< 16	< 16	< 16
35	< 13	< 22	< 22	< 22	< 22
36	< 22	< 21	< 13	< 21	< 21
37	< 14	< 24	< 24	< 24	< 24
38	< 22	< 21	< 21	(1)	< 21
39	< 25	< 24	< 24	(1)	< 24
40	< 27	< 26	< 25	< 29	< 14
41	< 40	< 38	< 38	< 38	< 25
42	< 36	< 35	< 35	< 34	< 22
43	< 14	< 18	< 17	< 17	< 17
44	< 22	< 21	< 21	< 21	< 16
45	< 19	< 18	< 18	< 18	< 9
46	< 15	< 19	< 19	< 19	< 19
47	< 37	< 35	< 35	< 35	< 18
48	< 25	< 24	< 23	< 23	< 16
49	< 19	< 18	< 18	< 18	< 13
50	< 27	< 17	< 25	< 26	< 26
51	< 32	< 31	< 31	< 30	< 20
52	< 26	< 25	< 13	< 24	< 24
53	< 27	< 26	< 26	< 26	< 19
MEAN	19 ± 14	20 ± 12	19 ± 12	20 ± 12	15 ± 11

(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, 2005

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

	CONTROL FARMS		INDICATOR FARMS				
COLLECTION PERIOD	23F1	36E1	10F4	18E1	19B1	25C1	25E1
01/11/05	< 0.4	< 0.3	< 0.5	< 0.4	< 0.9	< 0.6	< 0.5
02/15/05	< 0.4		< 0.5	< 0.5	< 0.8	< 0.5	
03/08/05	< 0.2		< 0.2	< 0.3	< 0.3	< 0.3	
04/05/05	< 0.7	< 0.9	< 0.7	< 0.7	< 0.6	< 0.4	< 0.3
04/19/05	< 0.3		< 0.4	< 0.5	< 0.3	< 0.4	
05/03/05	< 0.3		< 0.3	< 0.4	< 0.3	< 0.3	
05/17/05	< 0.5		< 0.6	< 0.5	< 0.5	< 0.5	
05/31/05	< 0.2		< 0.3	< 0.3	< 0.5	< 0.3	
06/14/05	< 0.2		< 0.2	< 0.3	< 0.3	< 0.3	
06/28/05	< 0.4		< 0.4	< 1.0	< 0.8	< 0.4	
07/12/05	< 0.5	< 0.5	< 0.4	< 0.4	< 0.4	< 0.5	< 0.6
07/26/05	< 0.3		< 0.3	< 0.3	< 0.3	< 0.3	
08/09/05	< 0.3		< 0.4	< 0.3	< 0.6	< 0.3	
08/23/05	< 0.7		< 0.8	< 0.7	< 0.5	< 1.0	
09/06/05	< 0.5		< 0.6	< 0.2	< 0.5	< 0.3	
09/20/05	< 0.5		< 0.3	< 0.5	< 0.5	< 0.5	
10/04/05	< 0.4	< 0.7	< 0.5	< 0.5	< 0.8	< 0.5	< 0.6
10/18/05	< 0.7		< 0.9	< 0.5	< 0.5	< 0.5	
11/01/05	< 0.4		< 0.4	< 0.4	< 0.3	< 0.5	
11/15/05	< 0.4		< 0.6	< 0.4	< 0.5	< 0.4	
11/29/05	< 0.5		< 0.4	< 0.4	< 0.6	< 0.8	
12/13/05	< 0.4		< 0.3	< 0.4	< 0.3	< 0.5	
MEAN	0.4 + 0.3	0.6 + 0.5	0.5 + 0.4	0.4 + 0.3	0.5 + 0.4	0.4 + 0.3	0.5 + 0.3

TABLE C-VII.2 CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2005

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	K-40	Cs-134	Cs-137	Ba-140	La-140
10F4	01/11/05	1340 ± 136	< 4	< 6	< 19	< 6
	02/15/05	1360 ± 160	< 5	< 6	< 21	< 5
	03/08/05	1330 ± 158	< 4	< 5	< 14	< 5
	04/05/05	1190 ± 174	< 5	< 7	< 26	< 7
	04/19/05	1250 ± 48	< 1	< 1	< 5	< 1
	05/03/05	1200 ± 158	< 6	< 7	< 24	< 6
	05/17/05	1210 ± 205	< 8	< 9	< 27	< 4
	05/31/05	1210 ± 217	< 5	< 5	< 27	< 7
	06/14/05	1240 ± 143	< 5	< 7	< 27	< 7
	06/28/05	1360 ± 153	< 4	< 5	< 17	< 4
	07/12/05	1290 ± 153	< 5	< 7	< 21	< 7
	07/26/05	1230 ± 185	< 6	< 8	< 38	< 12
	08/09/05	1310 ± 240	< 11	< 12	< 40	< 9
	08/23/05	1290 ± 149	< 6	< 6	< 27	< 8
	09/06/05	1370 ± 147	< 5	< 5	< 20	< 6
	09/20/05	1270 ± 115	< 3	< 4	< 13	< 5
	10/04/05	1300 ± 146	< 4	< 6	< 20	< 4
	10/18/05	1310 ± 137	< 3	< 4	< 17	< 6
	11/01/05	1320 ± 162	< 5	< 8	< 26	< 7
	11/15/05	1320 ± 109	< 3	< 3	< 12	< 4
	11/29/05	1260 ± 101	< 4	< 4	< 17	< 6
	12/13/05	1470 ± 150	< 3	< 5	< 17	< 5
	MEAN	1292 ± 135	5 ± 4	6 ± 5	22 ± 16	6 ± 4
18E1	01/11/05	1250 ± 122	< 5	< 5	< 21	< 6
	02/15/05	1190 ± 180	< 5	< 5	< 23	< 7
	03/08/05	1300 ± 147	< 6	< 7	< 26	< 7
	04/05/05	1350 ± 147	< 4	< 4	< 15	< 4
	04/19/05	1220 ± 52	< 2	< 2	< 7	< 2
	05/03/05	1220 ± 135	< 4	< 5	< 17	< 6
	05/17/05	1260 ± 188	< 7	< 10	< 31	< 12
	05/31/05	1280 ± 221	< 9	< 10	< 31	< 4
	06/14/05	1300 ± 172	< 7	< 6	< 29	< 9
	06/28/05	1320 ± 159	< 4	< 6	< 20	< 5
	07/12/05	1410 ± 175	< 4	< 6	< 20	< 6
	07/26/05	1430 ± 174	< 6	< 7	< 34	< 9
	08/09/05	1270 ± 162	< 4	< 6	< 17	< 5
	08/23/05	1290 ± 133	< 5	< 6	< 25	< 6
	09/06/05	1110 ± 164	< 5	< 6	< 18	< 5
	09/20/05	1270 ± 137	< 5	< 7	< 26	< 7
	10/04/05	1310 ± 155	< 5	< 7	< 32	< 10
	10/18/05	1290 ± 171	< 5	< 8	< 35	< 8
	11/01/05	1320 ± 123	< 5	< 5	< 23	< 7
	11/15/05	1310 ± 133	< 4	< 5	< 18	< 6
	11/29/05	1280 ± 114	< 3	< 4	< 16	< 4
	12/13/05	1180 ± 111	< 4	< 5	< 20	< 7
	MEAN	1280 ± 142	5 ± 3	6 ± 4	23 ± 14	7 ± 5

TABLE C-VII.2 CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2005

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC		K-40	Cs-134	Cs-137	Ba-140	La-140
1931	01/11/05	1280 ± 97	< 3	< 4	< 14	< 4
	02/15/05	1190 ± 214	< 9	< 9	< 36	< 10
	03/08/05	1140 ± 162	< 4	< 4	< 13	< 4
	04/05/05	1320 ± 157	< 3	< 5	< 16	< 5
	04/19/05	1320 ± 45	< 2	< 2	< 6	< 2
	05/03/05	1300 ± 130	< 5	< 6	< 21	< 7
	05/17/05	1300 ± 172	< 7	< 7	< 23	< 9
	05/31/05	1280 ± 169	< 6	< 7	< 24	< 8
	06/14/05	1440 ± 135	< 5	< 5	< 20	< 6
	06/28/05	1260 ± 184	< 7	< 8	< 31	< 8
	07/12/05	1350 ± 186	< 6	< 7	< 25	< 9
	07/26/05	1310 ± 150	< 5	< 6	< 24	< 7
	08/09/05	1290 ± 140	< 5	< 6	< 19	< 6
	08/23/05	1270 ± 145	< 4	< 4	< 20	< 6
	09/06/05	1340 ± 165	< 6	< 7	< 22	< 7
	09/20/05	1340 ± 110	< 4	< 4	< 19	< 5
	10/04/05	1370 ± 131	< 5	< 6	< 30	< 4
	10/18/05	1390 ± 127	< 4	< 5	< 25	< 7
	11/01/05	1320 ± 148	< 3	< 4	< 20	< 5
	11/15/05	1270 ± 93	< 4	< 4	< 15	< 4
	11/29/05	1370 ± 120	< 4	< 5	< 20	< 7
	12/13/05	1280 ± 140	< 4	< 4	< 20	< 4
	MEAN	1306 ± 128	5 ± 3	5 ± 4	21 ± 13	6 ± 4
23F1	01/11/05	1400 ± 102	< 3	< 4	< 14	< 4
	02/15/05	1300 ± 179	< 6	< 5	< 27	< 8
	03/08/05	1280 ± 153	< 4	< 6	< 14	< 4
	04/05/05	1360 ± 145	< 6	< 6	< 23	< 8
	04/19/05	1270 ± 49	< 1	< 2	< 5	< 2
	05/03/05	1260 ± 142	< 5	< 6	< 23	< 6
	05/17/05	1170 ± 249	< 10	< 10	< 37	< 12
	05/31/05	1140 ± 164	< 7	< 9	< 22	< 10
	06/14/05	1270 ± 130	< 3	< 3	< 17	< 5
	06/28/05	1390 ± 153	< 5	< 7	< 19	< 7
	07/12/05	1200 ± 141	< 6	< 7	< 21	< 7
	07/26/05	1360 ± 176	< 5	< 6	< 22	< 5
	08/09/05	1410 ± 140	< 5	< 6	< 15	< 5
	08/23/05	1290 ± 139	< 4	< 4	< 15	< 5
	09/06/05	1300 ± 147	< 5	< 6	< 19	< 6
	09/20/05	1270 ± 137	< 5	< 6	< 27	< 7
	10/04/05	1480 ± 217	< 6	< 8	< 35	< 12
	10/18/05	1510 ± 139	< 5	< 5	< 27	< 11
	11/01/05	1300 ± 146	< 6	< 6	< 28	< 10
	11/15/05	1250 ± 119	< 2	< 4	< 11	< 3
	11/29/05	1290 ± 126	< 5	< 5	< 23	< 6
	12/13/05	1260 ± 149	< 5	< 6	< 27	< 9
	MEAN	1307 ± 182	5 ± 3	6 ± 4	21 ± 15	7 ± 6

TABLE C-VII.2 CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2005

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC		K-40	Cs-134	Cs-137	Ba-140	La-140
25C1	01/11/05	1370 ± 115	< 3	< 3	< 10	< 4
	02/15/05	1280 ± 192	< 8	< 11	< 32	< 7
	03/08/05	1310 ± 130	< 5	< 5	< 20	< 6
	04/05/05	1150 ± 155	< 7	< 8	< 34	< 9
	04/19/05	1360 ± 117	< 4	< 5	< 18	< 6
	05/03/05	1290 ± 172	< 4	< 5	< 17	< 3
	05/17/05	1370 ± 163	< 5	< 8	< 29	< 8
	05/31/05	1470 ± 203	< 5	< 6	< 21	< 7
	06/14/05	1400 ± 127	< 4	< 5	< 23	< 6
	06/28/05	1290 ± 183	< 5	< 5	< 18	< 5
	07/12/05	1490 ± 186	< 4	< 6	< 17	< 4
	07/26/05	1370 ± 176	< 4	< 5	< 23	< 5
	08/09/05	1260 ± 178	< 5	< 5	< 19	< 5
	08/23/05	1430 ± 128	< 5	< 5	< 23	< 7
	09/06/05	1340 ± 178	< 7	< 8	< 28	< 6
	09/20/05	1230 ± 150	< 5	< 6	< 21	< 7
	10/04/05	1420 ± 167	< 6	< 8	< 37	< 5
	10/18/05	1300 ± 151	< 4	< 5	< 22	< 6
	11/01/05	1320 ± 140	< 5	< 6	< 24	< 7
	11/15/05	1370 ± 131	< 4	< 5	< 16	< 5
	11/29/05	1330 ± 103	< 4	< 4	< 17	< 5
	12/13/05	1360 ± 128	< 5	< 5	< 24	< 7
	MEAN	1341 ± 156	5 ± 2	6 ± 4	22 ± 13	6 ± 3
25E1	01/11/05	1290 ± 116	< 4	< 5	< 14	< 5
	04/05/05	1240 ± 157	< 5	< 5	< 18	< 4
	07/12/05	1150 ± 168	< 6	< 8	< 24	< 9
	10/04/05	1300 ± 192	< 8	< 11	< 53	< 13
	MEAN	1245 ± 137	6 ± 4	7 ± 6	27 ± 35	8 ± 9
36E1	01/11/05	1500 ± 134	< 4	< 4	< 17	< 5
	04/05/05	1320 ± 149	< 5	< 6	< 22	< 7
	07/12/05	1280 ± 139	< 4	< 6	< 20	< 6
	10/04/05	1150 ± 183	< 7	< 8	< 43	< 9
	MEAN	1313 ± 289	5 ± 3	6 ± 3	26 ± 24	7 ± 3

TABLE C-VIII.1 QUARTERLY TLD RESULTS FOR LIMERICK GENERATION STATION, 2005

RESULTS IN UNITS OF MILLI-ROENTGEN/STD. MONTH ± 2 STANDARD DEVIATIONS

STATION CODE	MEAN ± 2 S. D.	JAN - MAR	APR - JUN	JUL - SEP	OCT - DEC
36S2	7.7 ± 1.0	7.1 ± 0.7	7.7 ± 0.5	7.7 ± 0.7	8.4 ± 0.6
36D1	6.5 ± 0.7	6.0 ± 0.9	6.4 ± 0.7	6.6 ± 1.1	6.8 ± 0.5
2E1	7.4 ± 1.3	6.5 ± 0.5	7.3 ± 0.4	7.9 ± 1.1	7.9 ± 0.9
3S1	7.3 ± 1.1	6.6 ± 0.2	7.3 ± 0.4	7.2 ± 0.7	7.9 ± 1.0
4E1	5.8 ± 0.9	5.3 ± 0.6	5.7 ± 0.4	5.9 ± 0.8	6.4 ± 0.7
5S1	8.3 ± 1.3	7.5 ± 0.4	8.6 ± 1.0	8.2 ± 0.6	9.0 ± 0.5
5H1	8.6 ± 1.1	7.9 ± 0.6	8.7 ± 0.2	8.5 ± 0.7	9.3 ± 0.6
6C1	7.2 ± 0.9	6.6 ± 0.4	7.3 ± 0.9	7.4 ± 0.5	7.7 ± 0.5
7S1	7.4 ± 2.1	6.0 ± 0.8	7.6 ± 0.6	7.6 ± 1.0	8.5 ± 0.4
7E1	7.6 ± 1.5	6.6 ± 0.3	7.5 ± 0.6	8.1 ± 0.4	8.3 ± 1.1
9C1	7.2 ± 0.9	6.5 ± 1.0	7.2 ± 0.4	7.5 ± 0.6	7.4 ± 0.3
10S3	7.7 ± 0.7	7.2 ± 0.5	7.8 ± 1.3	7.7 ± 0.9	8.0 ± 0.4
10E1	7.6 ± 0.7	7.3 ± 0.8	7.4 ± 0.4	7.8 ± 0.5	8.1 ± 0.6
10F3	7.4 ± 1.2	6.6 ± 0.6	7.5 ± 0.2	7.4 ± 0.5	8.1 ± 0.5
11S1	8.5 ± 0.8	8.1 ± 1.5	8.5 ± 1.0	8.4 ± 0.3	9.1 ± 1.3
13S2	11.1 ± 1.8	10.1 ± 0.7	11.3 ± 1.0	10.8 ± 0.6	12.2 ± 1.0
13C1	5.7 ± 1.0	5.4 ± 0.4	5.3 ± 0.4	5.8 ± 0.5	6.4 ± 0.8
13E1	7.4 ± 0.7	6.9 ± 0.5	7.7 ± 0.4	7.5 ± 0.5	7.5 ± 1.1
14S1	6.9 ± 0.7	6.5 ± 0.5	6.9 ± 0.9	6.8 ± 1.1	7.3 ± 0.5
15D1	7.6 ± 1.7	6.3 ± 0.4	7.9 ± 0.5	7.8 ± 0.5	8.2 ± 0.4
16F1	7.8 ± 1.3	6.9 ± 0.2	7.9 ± 0.8	8.0 ± 0.9	8.4 ± 0.3
17B1	7.2 ± 1.0	6.5 ± 0.3	7.5 ± 0.7	7.4 ± 0.6	7.6 ± 0.4
18S2	8.1 ± 1.5	7.3 ± 0.7	8.2 ± 1.6	7.9 ± 0.8	9.1 ± 0.1
19D1	7.1 ± 1.1	6.3 ± 0.4	7.0 ± 0.7	7.4 ± 0.6	7.6 ± 0.4
20D1	6.7 ± 1.1	6.1 ± 0.8	6.5 ± 0.3	6.7 ± 0.6	7.4 ± 0.5
20F1	7.1 ± 1.5	6.2 ± 0.3	7.0 ± 0.3	7.4 ± 0.5	8.0 ± 0.4
21S2	6.7 ± 1.0	6.0 ± 0.5	6.7 ± 0.5	6.8 ± 0.5	7.3 ± 0.3
23S2	6.8 ± 1.2	6.2 ± 0.0	6.7 ± 1.0	6.9 ± 0.3	7.6 ± 0.5
24D1	6.5 ± 0.9	6.0 ± 0.4	6.3 ± 0.9	6.7 ± 0.5	7.0 ± 0.4
25S2	6.7 ± 0.9	6.4 ± 1.1	6.4 ± 1.0	6.5 ± 0.8	7.3 ± 0.6
25D1	6.2 ± 1.0	5.6 ± 0.5	6.1 ± 0.6	6.2 ± 0.7	6.8 ± 0.4
26S3	6.6 ± 1.2	6.1 ± 0.5	6.4 ± 0.3	6.5 ± 0.3	7.5 ± 0.7
28D2	7.0 ± 0.8	6.5 ± 0.3	7.1 ± 0.9	7.1 ± 0.6	7.4 ± 0.3
29S1	6.7 ± 1.5	6.2 ± 0.9	6.3 ± 0.8	6.6 ± 0.7	7.8 ± 0.4
29E1	7.0 ± 0.9	6.3 ± 0.7	7.1 ± 0.9	7.2 ± 0.8	7.2 ± 0.3
31S1	7.3 ± 1.2	6.7 ± 0.9	7.6 ± 0.5	6.9 ± 0.2	8.0 ± 0.3
31D1	7.9 ± 2.4	7.1 ± 0.2	8.7 ± 0.6	6.6 ± 1.1	9.1 ± 1.1
31D2	7.5 ± 1.3	6.7 ± 0.3	7.5 ± 1.0	7.4 ± 0.6	8.3 ± 0.4
34S2	7.4 ± 1.4	6.5 ± 1.0	7.6 ± 0.8	7.5 ± 0.6	8.2 ± 0.3
34E1	7.2 ± 1.2	6.7 ± 0.5	7.2 ± 0.8	7.0 ± 0.5	8.1 ± 0.6

TABLE C-VIII.2 **MEAN QUARTERLY TLD RESULTS FOR THE SITE BOUNDARY, MIDDLE AND CONTROL LOCATIONS FOR LIMERICK GENERATING STATION, 2005**

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

COLLECTION PERIOD	SITE BOUNDARY ± 2 S. D.	MIDDLE	CONTROL
JAN-MAR	6.9 ± 2.1	6.4 ± 1.0	7.9 ± 0.6
APR-JUN	7.6 ± 2.5	7.1 ± 1.5	8.7 ± 0.2
JUL-SEP	8.5 ± 2.8	7.2 ± 1.3	8.5 ± 0.7
OCT-DEC	8.3 ± 2.4	7.6 ± 1.3	9.3 ± 0.6

TABLE C-VIII.3 **SUMMARY OF THE AMBIENT DOSIMETRY PROGRAM FOR LIMERICK GENERATING STATION, 2005**

RESULTS IN UNITS OF MILLI-ROENTGEN/STD. MONTH

LOCATION	SAMPLES ANALYZED	PERIOD MINIMUM	PERIOD MAXIMUM	PERIOD MEAN ± 2 S. D.	PRE-OP MEAN ± 2 S. D.
SITE BOUNDARY	64	6.0	12.4	7.8 ± 2.4	7.6 ± 2.4
MIDDLE DISTANCE	92	5.3	9.1	7.1 ± 1.6	7.8 ± 2.2
CONTROL	4	7.9	9.3	8.6 ± 1.1	7.8 ± 3.0

THE PRE-OPERATIONAL MEAN WAS CALCULATED FROM MONTHLY TLD READINGS 01/15/82 TO 12/02/84.

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

MIDDLE DISTANCE STATIONS - 36D1, 2E1, 4E1, 6C1, 7E1, 9C1, 10E1, 10F3, 13C1, 13E1, 15D1, 16F1, 17B1, 19D1, 20D1, 20F1, 24D1, 25D1, 28D2, 29E1, 31D1, 31D2, 34E1

CONTROL STATIONS - 5H1

TABLE C-IX.1 SUMMARY OF COLLECTION DATES FOR SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2005

SURFACE WATER (TRITIUM LIQUID SCINTILLATION)

COLLECTION PERIOD	10F2	13B1	24S1
JAN-MAR	(1)	01/03/05 - 03/28/05	01/03/05 - 03/28/05
APR-JUN	(1)	03/28/05 - 06/27/05	03/28/05 - 06/27/05
JUL-SEP	(1)	06/27/05 - 10/03/05	06/27/05 - 10/03/05
OCT-DEC	(1)	10/03/05 - 01/03/06	10/03/05 - 01/03/06

SURFACE WATER (GAMMA SPECTROSCOPY)

COLLECTION PERIOD	10F2	13B1	24S1
JAN	(1)	01/03/05 - 01/31/05	01/03/05 - 01/31/05
FEB	(1)	01/31/05 - 02/28/05	01/31/05 - 02/28/05
MAR	(1)	02/28/05 - 03/28/05	02/28/05 - 03/28/05
APR	(1)	03/28/05 - 05/03/05	03/28/05 - 05/03/05
MAY	(1)	05/03/05 - 05/31/05	05/03/05 - 05/31/05
JUN	(1)	05/31/05 - 06/27/05	05/31/05 - 06/27/05
JUL	(1)	06/27/05 - 08/01/05	06/27/05 - 08/01/05
AUG	(1)	08/01/05 - 08/29/05	08/01/05 - 08/29/05
SEP	(1)	08/29/05 - 10/03/05	08/29/05 - 10/03/05
OCT	(1)	10/03/05 - 10/31/05	10/03/05 - 10/31/05
NOV	(1)	10/31/05 - 11/28/05	10/31/05 - 11/28/05
DEC	(1)	11/28/05 - 01/03/06	11/28/05 - 01/03/06

DRINKING WATER (TRITIUM)

COLLECTION PERIOD	15F4	15F7	16C2	28F3
JAN-MAR	01/03/05 - 03/28/05	01/03/05 - 03/28/05	01/03/05 - 03/28/05	01/03/05 - 03/28/05
APR-JUN	03/28/05 - 06/27/05	03/28/05 - 06/27/05	03/28/05 - 06/27/05	03/28/05 - 06/27/05
JUL-SEP	06/27/05 - 10/03/05	06/27/05 - 10/03/05	06/27/05 - 10/03/05	06/27/05 - 10/03/05
OCT-DEC	10/03/05 - 01/03/06	10/03/05 - 01/03/06	10/03/05 - 01/03/06	10/03/05 - 01/03/06

DRINKING WATER (GROSS BETA & GAMMA SPECTROSCOPY)

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

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

TABLE C-IX.1 SUMMARY OF COLLECTION DATES FOR SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2005

AIR PARTICULATE (GAMMA SPECTROSCOPY)

COLLECTION PERIOD	10S3	11S1	14S1	13CS	22G1
JAN-MAR	12/28/04 - 03/28/05	12/28/04 - 03/28/05	12/28/04 - 03/28/05	12/28/04 - 03/28/05	12/28/04 - 03/28/05
APR-JUN	03/28/05 - 06/27/05	03/28/05 - 06/27/05	03/28/05 - 06/27/05	03/28/05 - 06/27/05	03/28/05 - 06/27/05
JUL-SEP	06/27/05 - 09/26/05	06/27/05 - 09/26/05	06/27/05 - 09/26/05	06/27/05 - 09/26/05	06/27/05 - 09/26/05
OCT-DEC	09/26/05 - 01/03/06	09/26/05 - 01/03/06	09/26/05 - 01/03/06	09/26/05 - 01/03/06	09/26/05 - 01/03/06

AIR PARTICULATE (GROSS BETA & I-131)

COLLECTION PERIOD	10S3	11S1	14S1	13CS	22G1
1	12/28/04 - 01/03/05	12/28/04 - 01/03/05	12/28/04 - 01/03/05	12/28/04 - 01/03/05	12/28/04 - 01/03/05
2	01/03/05 - 01/10/05	01/03/05 - 01/10/05	01/03/05 - 01/10/05	01/03/05 - 01/10/05	01/03/05 - 01/10/05
3	01/10/05 - 01/17/05	01/10/05 - 01/17/05	01/10/05 - 01/17/05	01/10/05 - 01/17/05	01/10/05 - 01/17/05
4	01/17/05 - 01/24/05	01/17/05 - 01/24/05	01/17/05 - 01/24/05	01/17/05 - 01/24/05	01/17/05 - 01/24/05
5	01/24/05 - 01/31/05	01/24/05 - 01/31/05	01/24/05 - 01/31/05	01/24/05 - 01/31/05	01/24/05 - 01/31/05
6	01/31/05 - 02/07/05	01/31/05 - 02/07/05	01/31/05 - 02/07/05	01/31/05 - 02/07/05	01/31/05 - 02/07/05
7	02/07/05 - 02/14/05	02/07/05 - 02/14/05	02/07/05 - 02/14/05	02/07/05 - 02/14/05	02/07/05 - 02/14/05
8	02/14/05 - 02/21/05	02/14/05 - 02/21/05	02/14/05 - 02/21/05	02/14/05 - 02/21/05	02/14/05 - 02/21/05
9	02/21/05 - 02/28/05	02/21/05 - 02/28/05	02/21/05 - 02/28/05	02/21/05 - 02/28/05	02/21/05 - 02/28/05
10	02/28/05 - 03/07/05	02/28/05 - 03/07/05	02/28/05 - 03/07/05	02/28/05 - 03/07/05	02/28/05 - 03/07/05
11	03/07/05 - 03/14/05	03/07/05 - 03/14/05	03/07/05 - 03/14/05	03/07/05 - 03/14/05	03/07/05 - 03/14/05
12	03/14/05 - 03/21/05	03/14/05 - 03/21/05	03/14/05 - 03/21/05	03/14/05 - 03/21/05	03/14/05 - 03/21/05
13	03/21/05 - 03/28/05	03/21/05 - 03/28/05	03/21/05 - 03/28/05	03/21/05 - 03/28/05	03/21/05 - 03/28/05
14	03/28/05 - 04/04/05	03/28/05 - 04/04/05	03/28/05 - 04/04/05	03/28/05 - 04/04/05	03/28/05 - 04/04/05
15	04/04/05 - 04/11/05	04/04/05 - 04/11/05	04/04/05 - 04/11/05	04/04/05 - 04/11/05	04/04/05 - 04/11/05
16	04/11/05 - 04/18/05	04/11/05 - 04/18/05	04/11/05 - 04/18/05	04/11/05 - 04/18/05	04/11/05 - 04/18/05
17	04/18/05 - 04/25/05	04/18/05 - 04/25/05	04/18/05 - 04/25/05	04/18/05 - 04/25/05	04/18/05 - 04/25/05
18	04/25/05 - 05/02/05	04/25/05 - 05/02/05	04/25/05 - 05/02/05	04/25/05 - 05/02/05	04/25/05 - 05/02/05
19	05/02/05 - 05/09/05	05/02/05 - 05/09/05	05/02/05 - 05/09/05	05/02/05 - 05/09/05	05/02/05 - 05/09/05
20	05/09/05 - 05/16/05	05/09/05 - 05/16/05	05/09/05 - 05/16/05	05/09/05 - 05/16/05	05/09/05 - 05/16/05
21	05/16/05 - 05/23/05	05/16/05 - 05/23/05	05/16/05 - 05/23/05	05/16/05 - 05/23/05	05/16/05 - 05/23/05
22	05/23/05 - 05/31/05	05/23/05 - 05/31/05	05/23/05 - 05/31/05	05/23/05 - 05/31/05	05/23/05 - 05/31/05
23	05/31/05 - 06/06/05	05/31/05 - 06/06/05	05/31/05 - 06/06/05	05/31/05 - 06/06/05	05/31/05 - 06/06/05
24	06/06/05 - 06/13/05	06/06/05 - 06/13/05	06/06/05 - 06/13/05	06/06/05 - 06/13/05	06/06/05 - 06/13/05
25	06/13/05 - 06/20/05	06/13/05 - 06/20/05	06/13/05 - 06/20/05	06/13/05 - 06/20/05	06/13/05 - 06/20/05
26	06/20/05 - 06/27/05	06/20/05 - 06/27/05	06/20/05 - 06/27/05	06/20/05 - 06/27/05	06/20/05 - 06/27/05
27	06/27/05 - 07/05/05	06/27/05 - 07/05/05	06/27/05 - 07/05/05	06/27/05 - 07/05/05	06/27/05 - 07/05/05
28	07/05/05 - 07/11/05	07/05/05 - 07/11/05	07/05/05 - 07/11/05	07/05/05 - 07/11/05	07/05/05 - 07/11/05
29	07/11/05 - 07/18/05	07/11/05 - 07/18/05	07/11/05 - 07/18/05	07/11/05 - 07/18/05	07/11/05 - 07/18/05
30	07/18/05 - 07/25/05	07/18/05 - 07/25/05	07/18/05 - 07/25/05	07/18/05 - 07/25/05	07/18/05 - 07/25/05
31	07/25/05 - 08/01/05	07/25/05 - 08/01/05	07/25/05 - 08/01/05	07/25/05 - 08/01/05	07/25/05 - 08/01/05
32	08/01/05 - 08/08/05	08/01/05 - 08/08/05	08/01/05 - 08/08/05	08/01/05 - 08/08/05	08/01/05 - 08/08/05
33	08/08/05 - 08/15/05	08/08/05 - 08/15/05	08/08/05 - 08/15/05	08/08/05 - 08/15/05	08/08/05 - 08/15/05
34	08/15/05 - 08/22/05	08/15/05 - 08/22/05	08/15/05 - 08/22/05	08/15/05 - 08/22/05	08/15/05 - 08/22/05
35	08/22/05 - 08/29/05	08/22/05 - 08/29/05	08/22/05 - 08/29/05	08/22/05 - 08/29/05	08/22/05 - 08/29/05
36	08/29/05 - 09/05/05	08/29/05 - 09/05/05	08/29/05 - 09/05/05	08/29/05 - 09/05/05	08/29/05 - 09/05/05
37	09/05/05 - 09/12/05	09/05/05 - 09/12/05	09/05/05 - 09/12/05	09/05/05 - 09/12/05	09/05/05 - 09/12/05
38	09/12/05 - 09/19/05	09/12/05 - 09/19/05	09/12/05 - 09/19/05	09/12/05 - 09/19/05	09/12/05 - 09/19/05
39	09/19/05 - 09/26/05	09/19/05 - 09/26/05	09/19/05 - 09/26/05	09/19/05 - 09/26/05	09/19/05 - 09/26/05
40	09/26/05 - 10/03/05	09/26/05 - 10/03/05	09/26/05 - 10/03/05	09/27/05 - 10/03/05	09/26/05 - 10/03/05
41	10/03/05 - 10/10/05	10/03/05 - 10/10/05	10/03/05 - 10/10/05	10/03/05 - 10/10/05	10/03/05 - 10/10/05
42	10/10/05 - 10/17/05	10/10/05 - 10/17/05	10/10/05 - 10/17/05	10/10/05 - 10/17/05	10/10/05 - 10/17/05
43	10/17/05 - 10/24/05	10/17/05 - 10/24/05	10/17/05 - 10/24/05	10/17/05 - 10/24/05	10/17/05 - 10/24/05
44	10/24/05 - 10/31/05	10/24/05 - 10/31/05	10/24/05 - 10/31/05	10/24/05 - 10/31/05	10/24/05 - 10/31/05
45	10/31/05 - 11/07/05	10/31/05 - 11/07/05	10/31/05 - 11/07/05	10/31/05 - 11/07/05	10/31/05 - 11/07/05
46	11/07/05 - 11/14/05	11/07/05 - 11/14/05	11/07/05 - 11/14/05	11/07/05 - 11/14/05	11/07/05 - 11/14/05
47	11/14/05 - 11/21/05	11/14/05 - 11/21/05	11/14/05 - 11/21/05	11/14/05 - 11/21/05	11/14/05 - 11/21/05
48	11/21/05 - 11/28/05	11/21/05 - 11/28/05	11/21/05 - 11/28/05	11/21/05 - 11/28/05	11/21/05 - 11/28/05
49	11/28/05 - 12/05/05	11/28/05 - 12/05/05	11/28/05 - 12/05/05	11/28/05 - 12/05/05	11/28/05 - 12/05/05
50	12/05/05 - 12/12/05	12/05/05 - 12/12/05	12/05/05 - 12/12/05	12/05/05 - 12/12/05	12/05/05 - 12/12/05
51	12/12/05 - 12/19/05	12/12/05 - 12/19/05	12/12/05 - 12/19/05	12/12/05 - 12/19/05	12/12/05 - 12/19/05
52	12/19/05 - 12/27/05	12/19/05 - 12/27/05	12/19/05 - 12/27/05	12/19/05 - 12/27/05	12/19/05 - 12/27/05
53	12/27/05 - 01/03/06	12/27/05 - 01/03/06	12/27/05 - 01/03/06	12/27/05 - 01/03/06	12/27/05 - 01/03/06

TABLE C-IX.1 SUMMARY OF COLLECTION DATES FOR SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2005

TLD

STATION CODE	JAN - MAR	APR - JUN	JUL - SEP	OCT - DEC
3ES2	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
3ED1	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
2E1	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
3S1	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
4E1	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
5S1	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
5H1	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
6C1	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
7S1	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
7E1	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
9C1	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
10S3	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
10E1	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
10F3	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
11S1	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
13S2	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
13C1	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
13E1	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
14S1	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
15D1	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
16F1	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
17B1	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
18S2	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
19D1	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
20D1	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
20F1	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
21S2	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
23S2	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
24D1	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
25S2	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
25D1	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
26S3	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
28D2	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
29S1	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
29E1	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
31S1	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
31D1	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
31D2	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
34S2	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06
34E1	01/05/05 - 04/06/05	04/06/05 - 07/07/05	07/07/05 - 10/11/05	10/11/05 - 01/05/06

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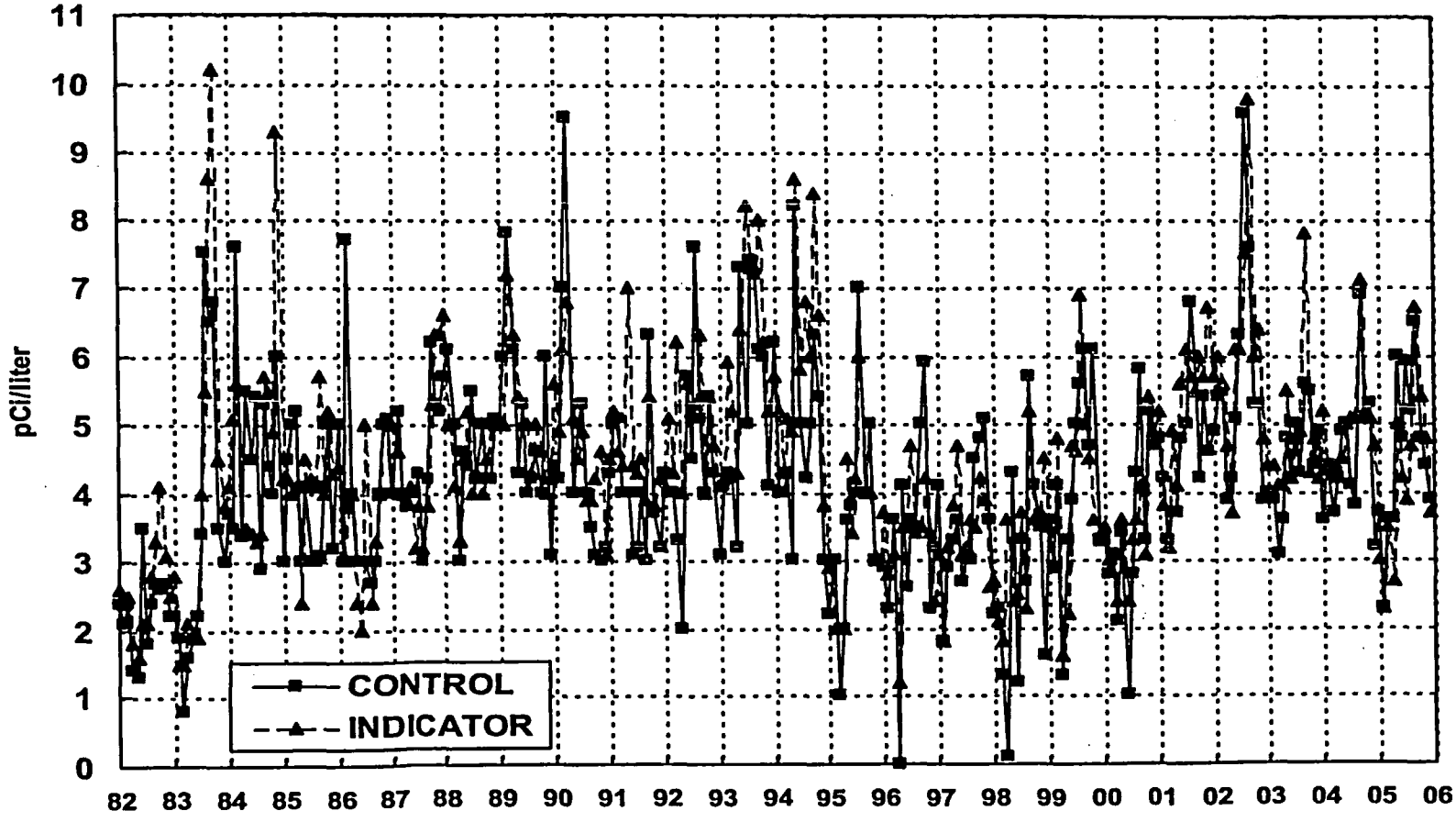
FIGURE C-1
MEAN MONTHLY TOTAL GROSS BETA CONCENTRATIONS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LGS, 1982 - 2005

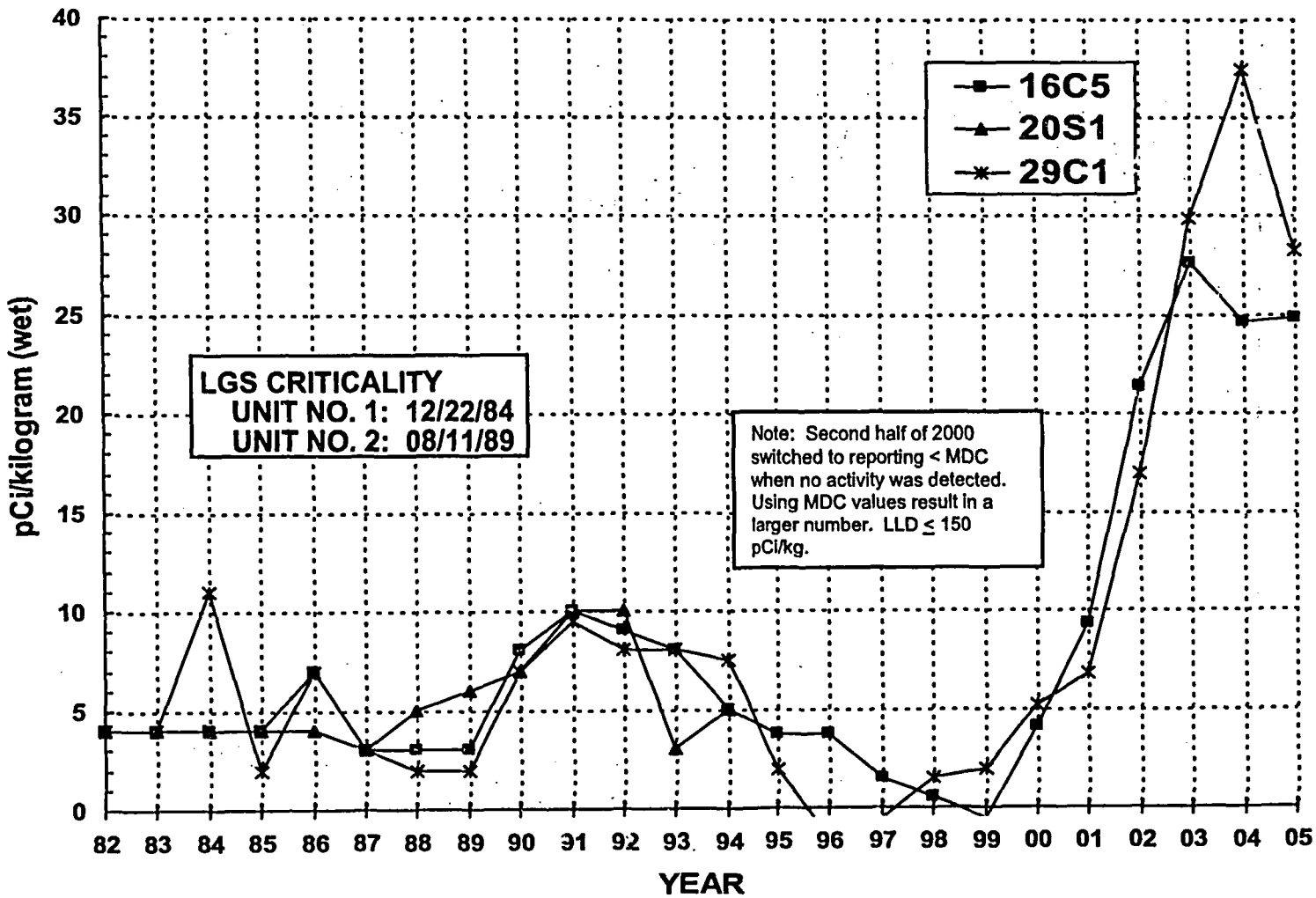


Note: 2005 analysis changed from Insoluble & Soluble to Total Gross Beta

LGS CRITICALITY
UNIT NO. 1: 12/22/84
UNIT NO. 2: 08/11/89

LGS CHANGED TO TOTAL GROSS BETA AT THE BEGINNING OF 2005. PREVIOUS DATA INCLUDED SUMMATION OF LESS THAN VALUES.

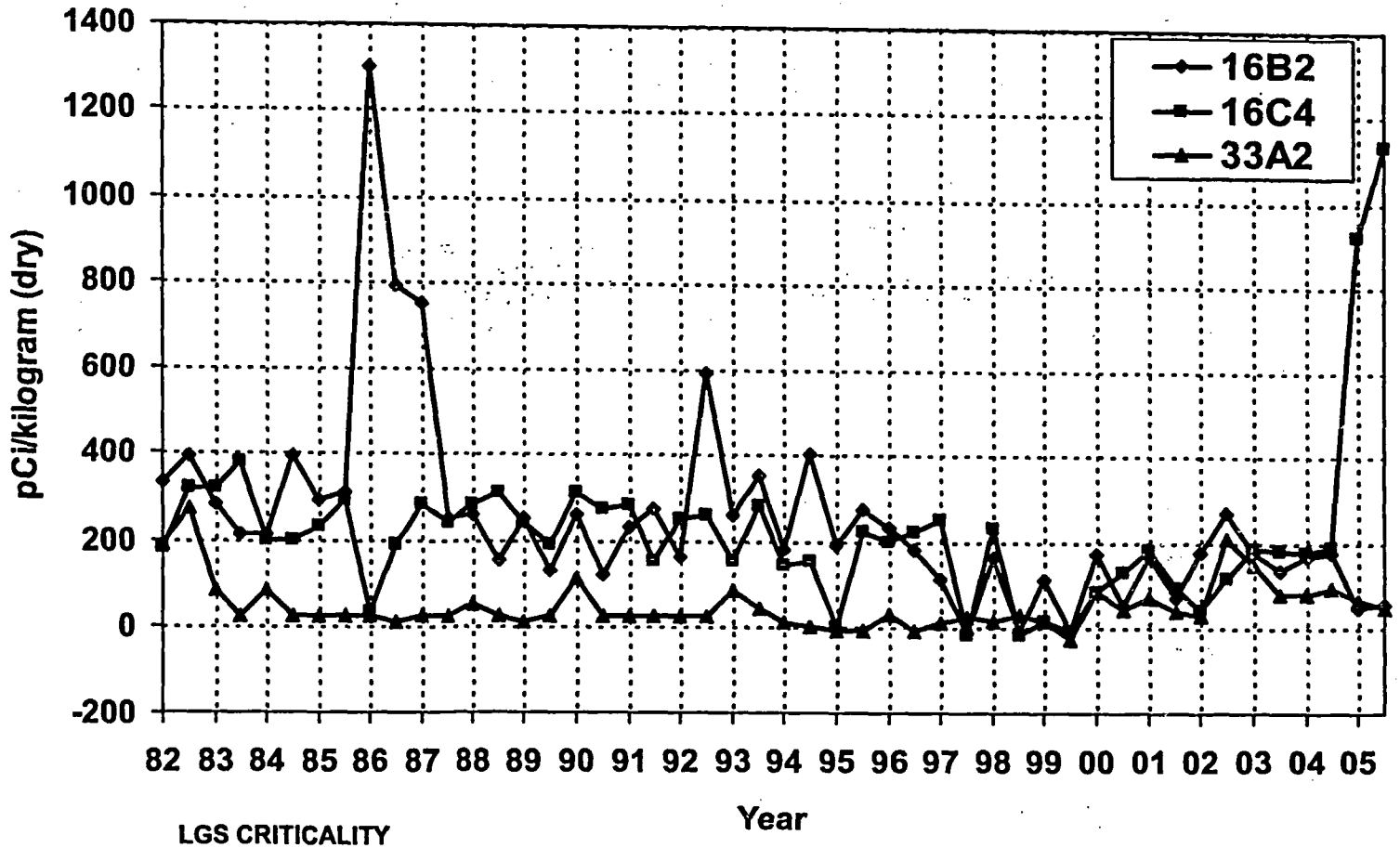
FIGURE C-2
MEAN ANNUAL CS-137 CONCENTRATIONS IN FISH SAMPLES COLLECTED IN THE VICINITY OF LGS, 1982 - 2005



CONTROL = 29C1

Station 20S1 discontinued in 1995

FIGURE C-3
CONCENTRATIONS OF CS-137 IN SEDIMENT SAMPLES COLLECTED IN THE VICINITY OF LGS, 1982 - 2005



LGS CRITICALITY
UNIT NO. 1: 12/22/84
UNIT NO. 2: 08/11/89

CONTROL = 33A2

FIGURE C-4
MEAN MONTHLY GROSS BETA CONCENTRATIONS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LGS, 1982 – 2005

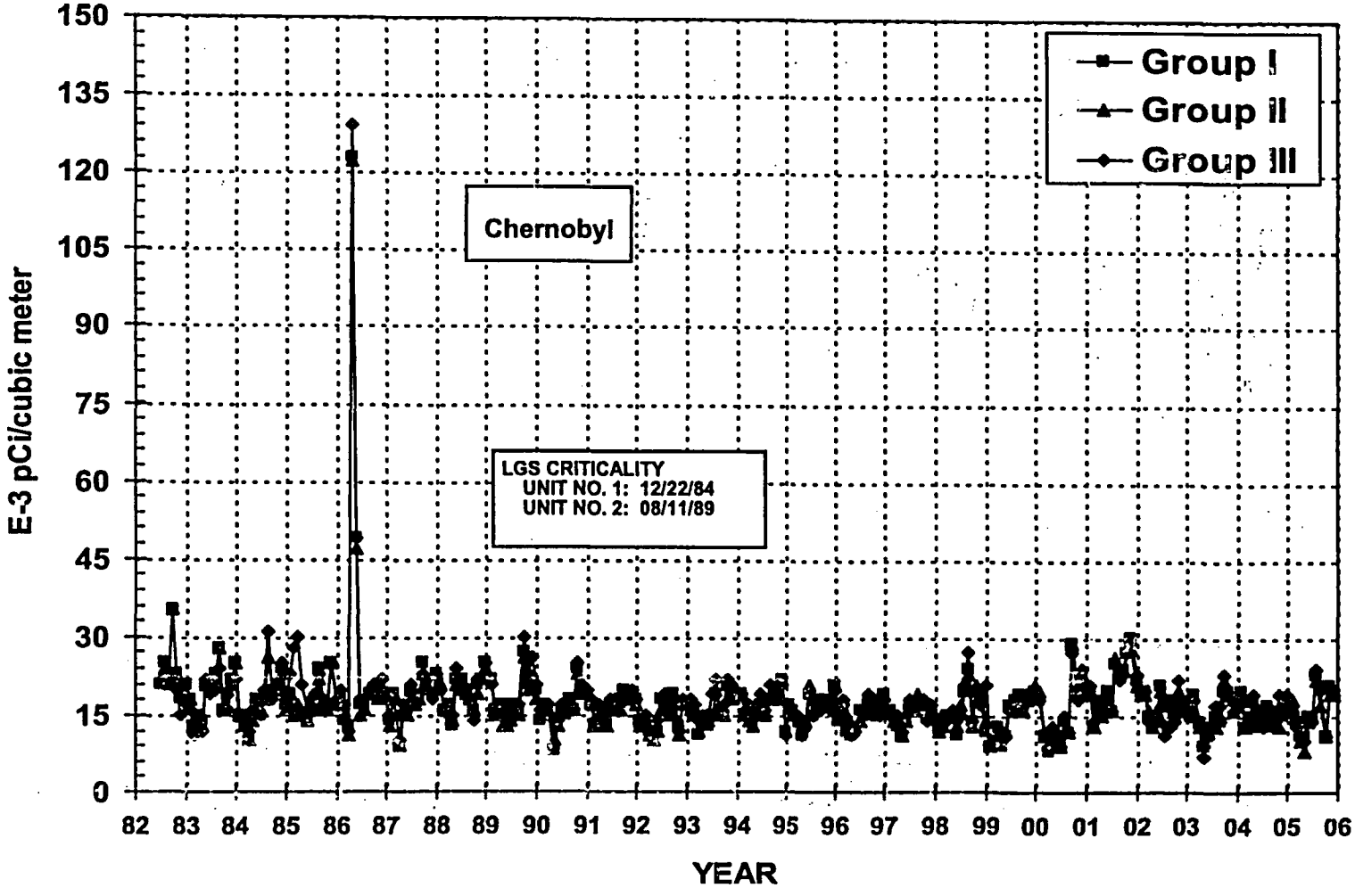


FIGURE C-5
MEAN WEEKLY GROSS BETA CONCENTRATIONS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LGS, 2005

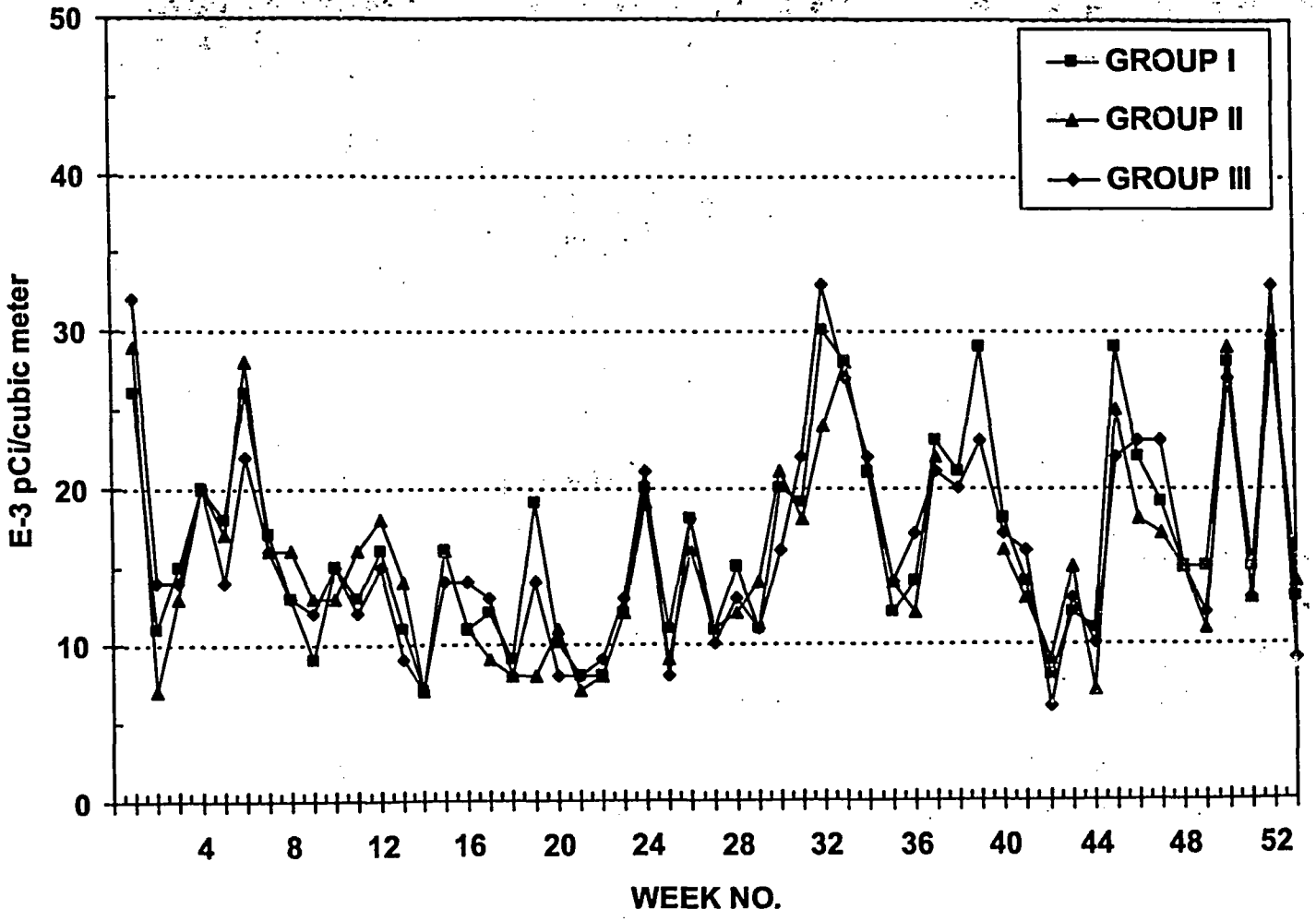
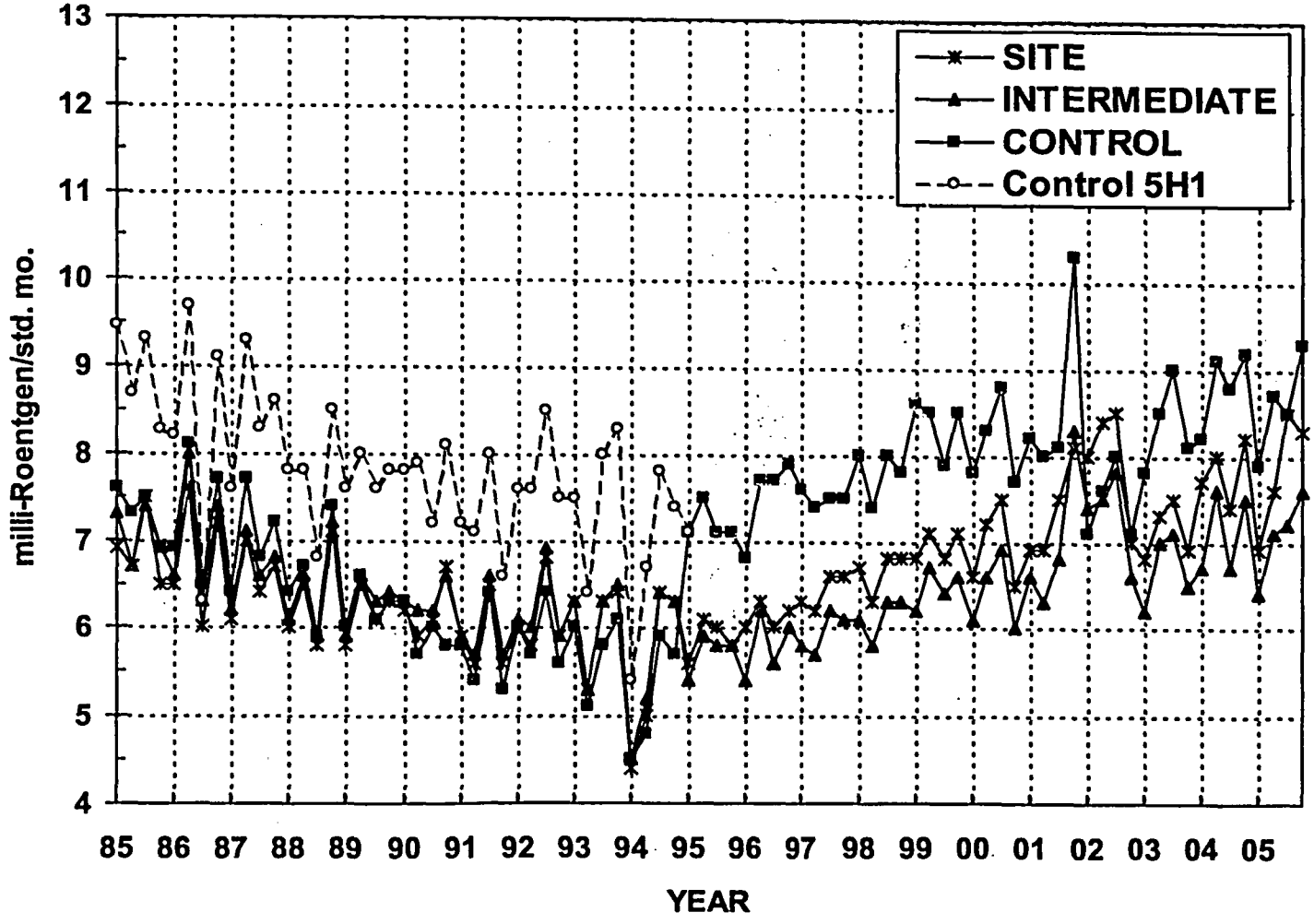


FIGURE C-6
MEAN QUARTERLY AMBIENT GAMMA RADIATION LEVELS (TLD) IN THE VICINITY OF LGS, 1985 – 2005



NOTE: Control Station 5H1 became the only distant location beginning in 1995

APPENDIX D

DATA TABLES AND FIGURES
COMPARISON LABORATORY

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

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TABLE D-I.1 CONCENTRATIONS OF GROSS BETA INSOLUBLE IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2005

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	16C2
JAN	1.4 ± 1.0
FEB	< 2.0
MAR	< 2.0
APR	< 1.9
MAY	< 2.1
JUN	< 2.0
JUL	1.7 ± 1.1
AUG	1.0 ± 0.8
SEP	< 2.1
OCT	< 2.0
NOV	< 1.7
DEC	< 1.9
MEAN	1.8 ± 0.7

TABLE D-I.2 CONCENTRATIONS OF GROSS BETA SOLUBLE IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2005

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	16C2
JAN	3.0 ± 1.1
FEB	2.0 ± 1.0
MAR	1.7 ± 1.0
APR	2.1 ± 0.9
MAY	3.2 ± 1.1
JUN	1.9 ± 0.6
JUL	1.9 ± 1.2
AUG	3.9 ± 1.0
SEP	3.3 ± 0.5
OCT	2.5 ± 1.1
NOV	3.1 ± 1.1
DEC	0.7 ± 0.5
MEAN	2.4 ± 1.8

TABLE D-I.3 CONCENTRATIONS OF TRITIUM IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2005

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	16C2
JAN - MAR	< 166
APR - JUN	< 165
JUL - SEP	121 ± 94
OCT - DEC	< 188
MEAN	160 ± 56

TABLE D-I.4 CONCENTRATIONS OF GAMMA EMITTERS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2005

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zr-95	Nb-95	I-131	Cs-134	Cs-137	Ba-140	La-140
16C2	JAN	< 2	< 5	< 11	< 5	< 8	< 6	< 5	< 7	< 4	< 3	< 21	< 5
	FEB	< 7	< 6	< 9	< 4	< 10	< 13	< 6	< 8	< 9	< 6	< 32	< 4
	MAR	< 2	< 2	< 5	< 3	< 3	< 4	< 4	< 4	< 3	< 2	< 12	< 4
	APR	< 3	< 4	< 6	< 3	< 3	< 6	< 5	< 16	< 4	< 3	< 28	< 5
	MAY	< 2	< 3	< 5	< 2	< 4	< 6	< 4	< 10	< 2	< 2	< 25	< 5
	JUN	< 5	< 3	< 13	< 3	< 3	< 9	< 5	< 8	< 6	< 4	< 11	< 6
	JUL	< 4	< 4	< 13	< 3	< 10	< 5	< 4	< 9	< 3	< 5	< 24	< 4
	AUG	< 6	< 2	< 6	< 2	< 8	< 6	< 5	< 7	< 4	< 5	< 12	< 4
	SEP	< 3	< 3	< 8	< 2	< 6	< 6	< 4	< 8	< 4	< 3	< 35	< 7
	OCT	< 5	< 5	< 12	< 3	< 6	< 4	< 4	< 14	< 3	< 4	< 28	< 6
	NOV	< 4	< 5	< 17	< 2	< 10	< 5	< 7	< 8	< 7	< 4	< 20	< 3
	DEC	< 4	< 4	< 15	< 3	< 7	< 4	< 3	< 7	< 3	< 6	< 16	< 3
	MEAN	3.9 ± 3.5	3.7 ± 2.2	10 ± 8.4	2.9 ± 1.8	6.5 ± 5.2	6.2 ± 4.9	4.6 ± 2.1	8.8 ± 6.6	4.4 ± 4.2	3.8 ± 2.7	22 ± 16	4.7 ± 2.3

TABLE D-II.1 CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2005

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

COLLECTION PERIOD	11S2
1	20 ± 4
2	19 ± 4
3	22 ± 4
4	25 ± 4
5	29 ± 4
6	26 ± 4
7	18 ± 4
8	19 ± 4
9	21 ± 4
10	15 ± 4
11	22 ± 4
12	15 ± 4
13	5 ± 4
14	19 ± 4
15	18 ± 4
16	21 ± 4
17	15 ± 4
18	19 ± 4
19	18 ± 4
20	14 ± 4
21	10 ± 3
22	14 ± 5
23	24 ± 4
24	10 ± 3
25	23 ± 4
26	16 ± 4
27	18 ± 5
28	17 ± 4
29	24 ± 4
30	29 ± 5
31	36 ± 5
32	33 ± 5
33	26 ± 5
34	17 ± 4
35	17 ± 5
36	27 ± 5
37	25 ± 5
38	30 ± 5
39	23 ± 5
40	14 ± 4
41	9 ± 4
42	16 ± 5
43	15 ± 4
44	38 ± 5
45	24 ± 5
46	28 ± 5
47	28 ± 5
48	17 ± 4
49	37 ± 5
50	21 ± 4
51	37 ± 5
52	19 ± 5
MEAN	21 ± 15

TABLE D-II.2 CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2005

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

STC	COLLECTION PERIOD	Be-7	Mn-54	Co-58	Co-60	Cs-134	Cs-137
11S2	01/03 - 03/28/2005	66 ± 16	< 0.6	< 0.9	< 0.5	< 0.8	< 0.9
	03/28 - 06/27/2005	75 ± 15	< 0.6	< 0.8	< 0.9	< 0.6	< 1.0
	06/27 - 10/03/2005	81 ± 15	< 0.7	< 0.6	< 0.8	< 0.7	< 0.6
	10/03 - 01/03/2006	59 ± 14	< 0.6	< 1.1	< 0.8	< 0.9	< 0.6
	MEAN	70 ± 20	0.6 ± 0.1	0.9 ± 0.4	0.8 ± 0.3	0.8 ± 0.3	0.8 ± 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, 2005

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	I-131	K-40	Cs-134	Cs-137	Ba-140	La-140
19B1	01/11/2005	< 0.3	1308 ± 121	< 2	< 4	< 25	< 3
	04/05/2005	< 0.2	1319 ± 116	< 3	< 4	< 56	< 10
	07/12/2005	< 0.2	1532 ± 156	< 5	< 4	< 45	< 9
	10/04/2005	< 0.3	1363 ± 127	< 5	< 3	< 25	< 8
	MEAN	0.25 ± 0.12	1380 ± 207	4 ± 3	4 ± 1	38 ± 31	7 ± 7
10F4	01/11/2005	< 0.3	1386 ± 111.1	< 5	< 4	< 32	< 4
	04/05/2005	< 0.2	1285 ± 106	< 5	< 2	< 40	< 8
	07/12/2005	< 0.2	1287 ± 134	< 6	< 5	< 32	< 9
	10/04/2005	< 0.3	1373 ± 116	< 5	< 3	< 46	< 7
	MEAN	0.25 ± 0.12	1333 ± 109	5 ± 1	3 ± 2	37 ± 13	7 ± 5
25C1	01/11/2005	(1)					
	04/05/2005	< 0.3	1347 ± 121	< 5	< 4	< 47	< 4
	07/12/2005	< 0.2	1402 ± 180	< 3	< 3	< 37	< 11
	10/04/2005	< 0.2	1287 ± 125	< 2	< 2	< 31	< 8
	MEAN	0.23 ± 0.12	1345 ± 114	3 ± 3	3 ± 2	39 ± 16	8 ± 7

(1) SEE PROGRAM CHANGES SECTION FOR EXPLANATION

TABLE D-IV.1 SUMMARY OF COLLECTION DATES FOR SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2005

DRINKING WATER (GROSS BETA & GAMMA SPECTROSCOPY)

COLLECTION PERIOD	16C2
JAN	01/03/2005 - 01/31/2005
FEB	01/31/2005 - 02/28/2005
MAR	02/28/2005 - 03/28/2005
APR	03/28/2005 - 05/03/2005
MAY	05/03/2005 - 05/31/2005
JUN	05/31/2005 - 06/27/2005
JUL	06/27/2005 - 08/01/2005
AUG	08/01/2005 - 08/29/2005
SEP	08/29/2005 - 10/03/2005
OCT	10/03/2005 - 10/31/2005
NOV	10/31/2005 - 11/28/2005
DEC	11/28/2005 - 01/03/2006

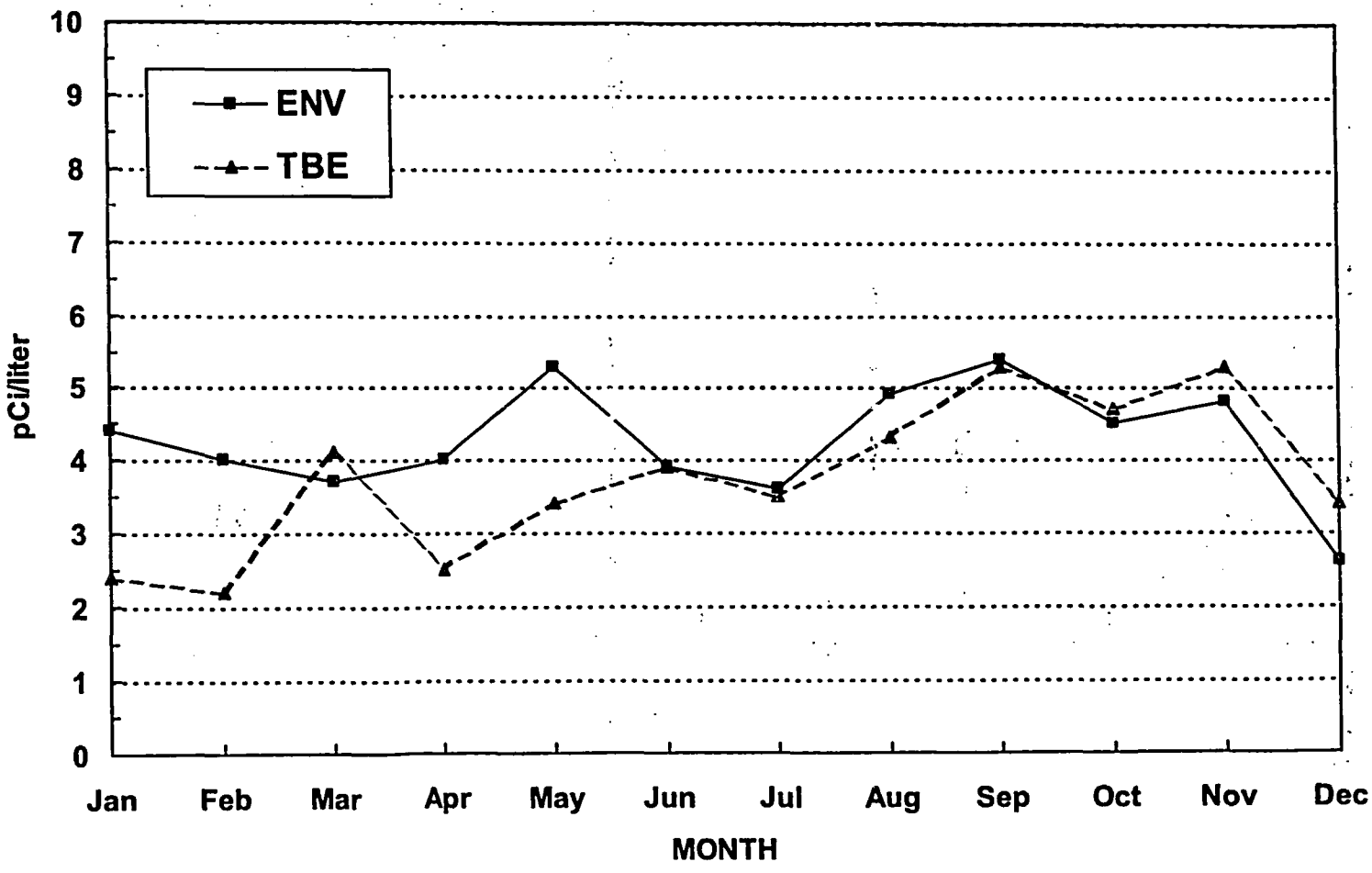
AIR PARTICULATE (GAMMA SPECTROSCOPY)

COLLECTION PERIOD	11S2
JAN-MAR	01/03/2005 - 03/28/2005
APR-JUN	03/28/2005 - 06/27/2005
JUL-SEP	06/27/2005 - 10/03/2005
OCT-DEC	10/03/2005 - 01/03/2006

AIR PARTICULATE (GROSS BETA)

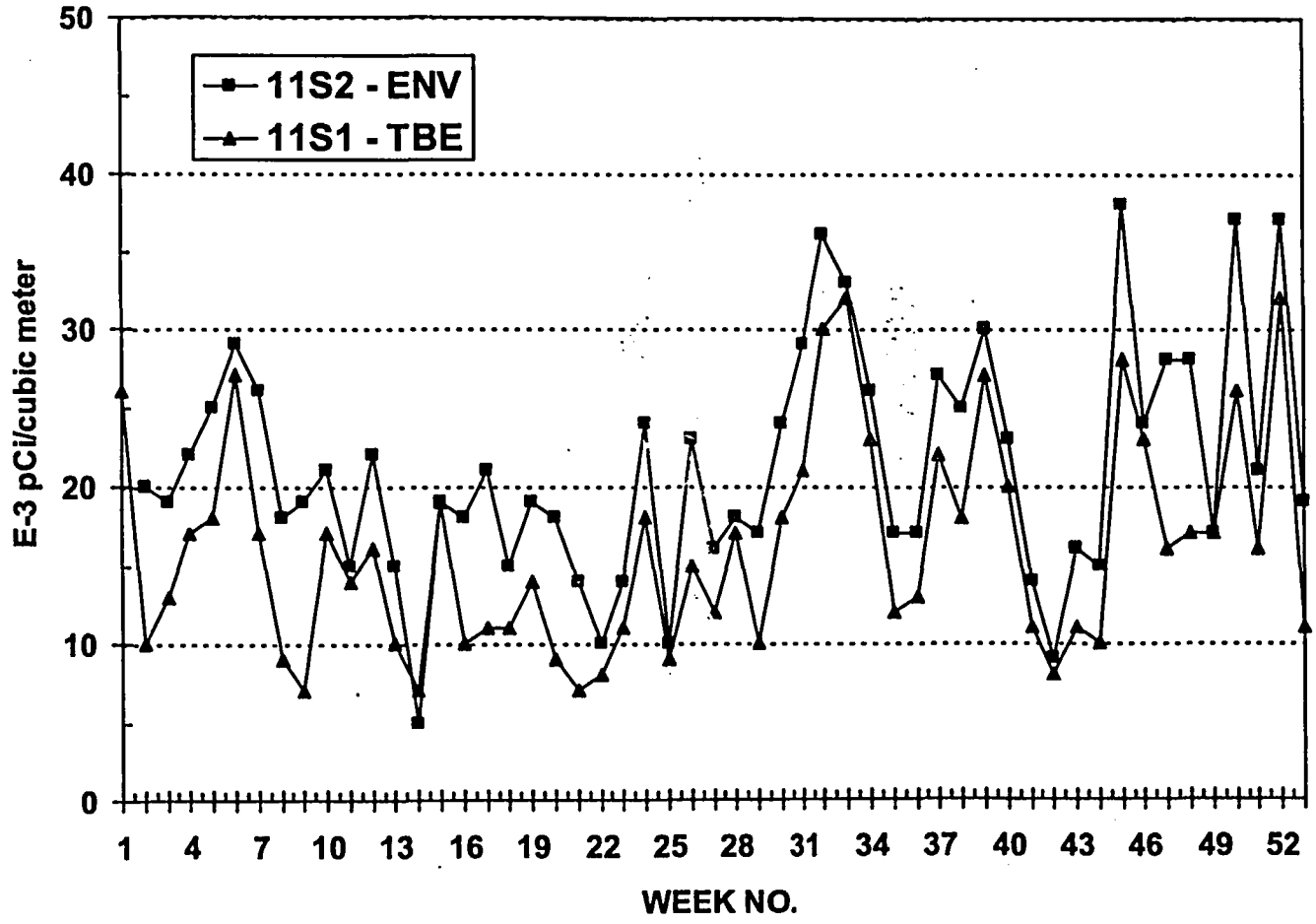
COLLECTION PERIOD	11S2	COLLECTION PERIOD	11S2
1	01/03/2005 - 01/10/2005	27	07/05/2005 - 07/11/2005
2	01/10/2005 - 01/17/2005	28	07/11/2005 - 07/18/2005
3	01/17/2005 - 01/24/2005	29	07/18/2005 - 07/25/2005
4	01/24/2005 - 01/31/2005	30	07/25/2005 - 08/01/2005
5	01/31/2005 - 02/07/2005	31	08/01/2005 - 08/08/2005
6	02/07/2005 - 02/14/2005	32	08/08/2005 - 08/15/2005
7	02/14/2005 - 02/21/2005	33	08/15/2005 - 08/22/2005
8	02/21/2005 - 02/28/2005	34	08/22/2005 - 08/29/2005
9	02/28/2005 - 03/07/2005	35	08/29/2005 - 09/05/2005
10	03/07/2005 - 03/14/2005	36	09/05/2005 - 09/12/2005
11	03/14/2005 - 03/21/2005	37	09/12/2005 - 09/19/2005
12	03/21/2005 - 03/28/2005	38	09/19/2005 - 09/26/2005
13	03/28/2005 - 04/04/2005	39	09/26/2005 - 10/03/2005
14	04/04/2005 - 04/11/2005	40	10/03/2005 - 10/10/2005
15	04/11/2005 - 04/18/2005	41	10/10/2005 - 10/17/2005
16	04/18/2005 - 04/25/2005	42	10/17/2005 - 10/24/2005
17	04/25/2005 - 05/02/2005	43	10/24/2005 - 10/31/2005
18	05/02/2005 - 05/09/2005	44	10/31/2005 - 11/07/2005
19	05/09/2005 - 05/16/2005	45	11/07/2005 - 11/14/2005
20	05/16/2005 - 05/23/2005	46	11/14/2005 - 11/21/2005
21	05/23/2005 - 05/31/2005	47	11/21/2005 - 11/28/2005
22	05/31/2005 - 06/06/2005	48	11/28/2005 - 12/05/2005
23	06/06/2005 - 06/13/2005	49	12/05/2005 - 12/12/2005
24	06/13/2005 - 06/20/2005	50	12/12/2005 - 12/19/2005
25	06/20/2005 - 06/27/2005	51	12/19/2005 - 12/27/2005
26	06/27/2005 - 07/05/2005	52	12/27/2005 - 01/03/2006

FIGURE D-1
COMPARISON OF MONTHLY TOTAL GROSS BETA CONCENTRATIONS IN DRINKING WATER SAMPLES SPLIT BETWEEN ENV AND TBE, 2005



ENVIRONMENTAL INC. SOLUBLE AND INSOLUBLE FRACTIONS WERE COMBINED FOR TOTAL GROSS BETA COMPARISON.

FIGURE D-2
COMPARISON OF WEEKLY GROSS BETA CONCENTRATIONS IN AIR PARTICULATE SAMPLES COLLECTED FROM LGS COLLOCATED LOCATIONS 11S1 AND 11S2, 2005



APPENDIX E

INTER-LABORATORY COMPARISON PROGRAM

TABLE E-1 ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING, 2005
(PAGE 1 OF 3)

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
March 2005	E4522-396	Milk	Sr-89	pCi/L	96.9	107	0.91	A
			Sr-90	pCi/L	16.9	17.9	0.94	A
	E4523-396	Milk	I-131	pCi/L	82.7	92.3	0.90	A
			Ce-141	pCi/L	217	229	0.95	A
			Cr-51	pCi/L	314	334	0.94	A
			Cs-134	pCi/L	123	139	0.89	A
			Cs-137	pCi/L	125	130	0.96	A
			Co-58	pCi/L	110	115	0.96	A
			Mn-54	pCi/L	158	160	0.99	A
			Fe-59	pCi/L	118	111	1.06	A
			Zn-65	pCi/L	191	198	0.96	A
			Co-60	pCi/L	140	144	0.97	A
	E4525-396	AP	Ce-141	pCi	150	172	0.87	A
			Cr-51	pCi	278	250	1.11	A
			Cs-134	pCi	105	104	1.01	A
			Cs-137	pCi	95.6	97.1	0.98	A
			Co-58	pCi	84.4	86.3	0.98	A
			Mn-54	pCi	112	120	0.93	A
			Fe-59	pCi	92.8	83.2	1.12	A
			Zn-65	pCi	162	148	1.09	A
			Co-60	pCi	102	108	0.94	A
	E4524-396	Charcoal	I-131	pCi	67.4	60.7	1.11	A
June 2005	E4630-396	Milk	Sr-89	pCi/L	89.4	88.1	1.01	A
			Sr-90	pCi/L	11.6	11.4	1.02	A
	E4631-396	Milk	I-131	pCi/L	82.3	86.9	0.95	A
			Ce-141	pCi/L	91.6	92.4	0.99	A
			Cr-51	pCi/L	278	303	0.92	A
			Cs-134	pCi/L	81.1	95.0	0.85	A
			Cs-137	pCi/L	180	189	0.95	A
			Mn-54	pCi/L	124	125	0.99	A
			Fe-59	pCi/L	61.1	63.9	0.96	A
			Zn-65	pCi/L	156	155	1.01	A
			Co-60	pCi/L	136	145	0.94	A
	E4633-396	AP	Ce-141	pCi	79.2	64.2	1.23	W
			Cr-51	pCi	263	210	1.25	W
			Cs-134	pCi	69.7	66.1	1.05	A
			Cs-137	pCi	135	131	1.03	A
			Mn-54	pCi	94.9	87.0	1.09	A
			Fe-59	pCi	48	44.4	1.09	A
			Zn-65	pCi	120	108	1.11	A
			Co-60	pCi	104	101	1.03	A
	E4632-396	Charcoal	I-131	pCi	88.9	92.5	0.96	A

TABLE E-1 ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING, 2005
(PAGE 2 OF 3)

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
September 2005	E4766-396	Milk	Sr-89	pCi/L	135.0	146.0	0.92	A
			Sr-90	pCi/L	9.7	11.5	0.84	A
	E4767-396	Milk	I-131	pCi/L	87.5	94.3	0.93	A
			Ce-141	pCi/L	203	233	0.87	A
			Cr-51	pCi/L	279	338	0.83	A
			Cs-134	pCi/L	102	122.0	0.84	A
			Cs-137	pCi/L	178	195	0.91	A
			Co-58	pCi/L	55.3	63.4	0.87	A
			Mn-54	pCi/L	81.8	92.0	0.89	A
			Fe-59	pCi/L	59.9	61.0	0.98	A
			Zn-65	pCi/L	120	123	0.98	A
			Co-60	pCi/L	146	167	0.87	A
	E4769-396	AP	Ce-141	pCi	193	169	1.14	A
			Cr-51	pCi	267	246	1.09	A
			Cs-134	pCi	78.4	88.8	0.88	A
			Cs-137	pCi	166	142	1.17	A
			Co-58	pCi	53.7	46.0	1.17	A
			Mn-54	pCi	81.6	66.8	1.22	W
			Fe-59	pCi	59.6	44.3	1.35	N (1)
			Zn-65	pCi	107	89.6	1.19	A
			Co-60	pCi	133	122	1.09	A
	E4768-396	Charcoal	I-131	pCi	63.9	64.2	1.00	A
December 2005	E4766-396	Milk	Sr-89	pCi/L	114	128	0.89	A
			Sr-90	pCi/L	11.6	10.3	1.13	A
	E4767-396	Milk	I-131	pCi/L	79.6	74.6	1.07	A
			Ce-141	pCi/L	202	224	0.90	A
			Cr-51	pCi/L	185	193	0.96	A
			Cs-134	pCi/L	74.9	87.3	0.86	A
			Cs-137	pCi/L	177	189	0.94	A
			Co-58	pCi/L	73.9	77.5	0.95	A
			Mn-54	pCi/L	152	152	1.00	A
			Fe-59	pCi/L	97.5	82.4	1.18	A
			Zn-65	pCi/L	161	154	1.05	A
			Co-60	pCi/L	102	111	0.92	A
	E4633-396	AP	Ce-141	pCi	221	201	1.10	A
			Cr-51	pCi	195	173	1.13	A
			Cs-134	pCi	68.4	78.3	0.87	A
			Cs-137	pCi	194	170	1.14	A
			Co-58	pCi	77.4	69.4	1.12	A
			Mn-54	pCi	171	137	1.25	W
			Fe-59	pCi	94.2	73.9	1.27	W
			Zn-65	pCi	173	138	1.25	W
			Co-60	pCi	109	99.1	1.10	A

TABLE E-1 ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING, 2005
(PAGE 3 OF 3)

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
December 2005	E4632-396	Charcoal	I-131	pCi	73.3	73.3	1.00	A

(1) New technician - AP not counted in petri dish resulted in high Fe-59 activity. Counting in petri dish, the Fe-59 would have been acceptable as evidenced by the 4Q05 AP recount data. NCR 06-01

(a) Teledyne Brown Engineering reported result.

(b) The Analytics known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation.

(c) Ratio of Teledyne Brown Engineering to Analytics results.

(d) Analytics evaluation based on TBE internal QC limits: A= Acceptable. Reported result falls within ratio limits of 0.80-1.20. W-Acceptable with warning. Reported result falls within 0.70-0.80 or 1.20-1.30. N = Not Acceptable. Reported result falls outside the ratio limits of < 0.70 and > 1.30.

TABLE E-2

ERA ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING, 2005

Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Control Limits	Evaluation (c)
May 2005	Rad 61	Water	Sr-89	pCi/L	37.5	41.3	32.6 - 50.0	A
			Sr-90	pCi/L	5.37	5.92	0.00 - 14.6	A
			Ba-133	pCi/L	88.6	88.4	73.1 - 104	A
			Cs-134	pCi/L	70.5	78.6	69.9 - 87.3	A
			Cs-137	pCi/L	201	201	184 - 218	A
			Co-60	pCi/L	37.5	37.0	28.3 - 45.7	A
			Zn-65	pCi/L	122	118	97.6 - 138	A
			Gr-A	pCi/L	35.5	37.0	21.0 - 53.0	A
			Gr-B	pCi/L	35.6	34.2	25.5 - 42.9	A
			H-3	pCi/L	24600	24400	20200 - 28600	A
	Rad 61	Water	I-131	pCi/L	13.6	15.5	10.3 - 20.7	A
November 2005	Rad 63	Water	Sr-89	pCi/L	18.0	19.0	10.3 - 27.7	A
			Sr-90	pCi/L	16.6	16.0	7.37 - 24.7	A
			Ba-133	pCi/L	31.7	31.2	22.5 - 39.9	A
			Cs-134	pCi/L	30.8	33.9	25.2 - 42.6	A
			Cs-137	pCi/L	26.8	28.3	19.6 - 37.0	A
			Co-60	pCi/L	83.9	84.1	75.4 - 92.8	A
			Zn-65	pCi/L	109	105	86.8 - 123	A
			Gr-A	pCi/L	19.5	23.3	13.2 - 33.4	A
			Gr-B	pCi/L	34.0	39.1	30.4 - 47.8	A
			H-3	pCi/L	12400	12200	10100 - 14300	A
	Rad 63	Water	I-131	pCi/L	17.8	17.4	12.2 - 22.6	A

(a) Teledyne Brown Engineering reported result.

(b) The ERA known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation.

(c) ERA evaluation: A=acceptable. Reported result falls within the Warning Limits. NA=not acceptable. Reported result falls outside of the Control Limits. CE=check for Error. Reported result falls within the Control Limits and outside of the Warning Limit.

TABLE E-3 DOE's MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)
TELEDYNE BROWN ENGINEERING, 2005
(PAGE 1 OF 2)

Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Acceptance Range	Evaluation (c)
April 2005	05-MaW13	Water	Cs-134	Bq/L	108	127	88.90 - 165.10	A
			Cs-137	Bq/L	305	332	232.40 - 461.60	A
			Co-57	Bq/L	215	227	158.90 - 295.10	A
			Co-60	Bq/L	241	251	175.70 - 326.30	A
			H-3	Bq/L	283	280	196.00 - 364.00	A
			Mn-54	Bq/L	314	331	231.70 - 430.30	A
			Sr-90	Bq/L	0.093		no range given (1)	A
			Zn-65	Bq/L	509	496	347.20 - 644.80	A
	MaS13	Soil	Cs-134	Bq/L	655	759	531.30 - 986.70	A
			Cs-137	Bq/L	310	315	220.50 - 409.50	A
			Co-57	Bq/L	234	242	169.40 - 314.60	A
			Co-60	Bq/L	219	212	148.40 - 275.60	A
			Mn-54	Bq/L	512	485	339.50 - 630.50	A
			K-40	Bq/L	642	604	422.80 - 785.20	A
			Zn-65	Bq/L	890	810	567.00 - 1053	A
	GrW13	Water	Gr-A	Bq/L	0.601	0.525	>0.0 - 1.05	A
			Gr-B	Bq/L	1.54	1.67	0.84 - 2.51	A
	RdF13	AP	Cs-134	Bq/sample	3.26	3.51	2.46 - 4.56	A
			Cs-137	Bq/sample	2.05	2.26	1.58 - 2.94	A
			Co-57	Bq/sample	4.78	4.92	3.44 - 6.40	A
			Co-60	Bq/sample	3.02	3.03	2.12 - 3.94	A
			Mn-54	Bq/sample	3.31	3.33	2.33 - 4.33	A
			Sr-90	Bq/sample	1.15	1.35	0.95 - 1.76	A
			Zn-65	Bq/sample	3.14	3.14	2.20 - 4.08	A
	GrF13	AP	Gr-A	Bq/sample	0.0764	0.232	>0.0 - 0.46	A
			Gr-B	Bq/sample	0.305	0.297	0.15 - 0.45	A
April 2005	RdV13	Vegetation	Cs-134	Bq/kg	5.45	5	3.50 - 6.50	A
			Cs-137	Bq/kg	4.80	4.1	2.88 - 5.34	A
			Co-57	Bq/kg	13.4	9.88	6.92 - 12.84	A*
			Co-60	Bq/kg	3.67	3.15	2.21 - 4.10	A
			Mn-54	Bq/kg	6.45	5.18	3.63 - 6.73	A
			Sr-90	Bq/kg	1.49	1.65	1.16 - 2.15	A
			Zn-65	Bq/kg	7.71	6.29	4.40 - 8.18	A
October 2005	05-MaW14	Water	Cs-134	Bq/L	142	167	116.90 - 217.10	A
			Cs-137	Bq/L	302	333	233.10 - 432.90	A
			Co-57	Bq/L	251	272	190.40 - 353.60	A
			Co-60	Bq/L	243	261	182.70 - 339.30	A
			H-3	Bq/L	547	527	368.90 - 685.10	A
			Mn-54	Bq/L	383	418	292.60 - 543.40	A
			Sr-90	Bq/L	8.75	8.98	6.29 - 11.67	A
			Zn-65	Bq/L	324	330	231.00 - 429.00	A

TABLE E-3 DOE's MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)
TELEDYNE BROWN ENGINEERING, 2005
(PAGE 2 OF 2)

Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Acceptance Range	Evaluation (c)
October 2005	MaS14	Soil	Cs-134	Bq/L	494	568	397.60 - 738.40	A
			Cs-137	Bq/L	446	439	307.30 - 570.70	A
			Co-57	Bq/L	506	524	366.80 - 681.20	A
			Co-60	Bq/L	289	287	200.90 - 373.10	A
			Mn-54	Bq/L	460	439	307.30 - 570.70	A
			K-40	Bq/L	626	604	422.80 - 785.20	A
			Zn-65	Bq/L	889	823	576.10 - 1070	A
	GrW14	Water	Gr-A	Bq/L	0.858	0.79	0.21 - 1.38	A
			Gr-B	Bq/L	1.22	1.35	0.85 - 1.92	A
October 2005	RdF14	AP	Cs-134	Bq/sample	4.11	3.85	2.70 - 5.01	A
			Cs-137	Bq/sample	3.16	3.23	2.26 - 4.20	A
			Co-57	Bq/sample	6.14	6.2	4.34 - 8.06	A
			Co-60	Bq/sample	2.86	2.85	2.00 - 3.71	A
			Mn-54	Bq/sample	4.54	4.37	3.06 - 5.68	A
			Sr-90	Bq/sample	2.12	2.25	1.58 - 2.93	A
			Zn-65	Bq/sample	4.28	4.33	3.03 - 5.63	A
	GrF14	AP	Gr-A	Bq/sample	0.304	0.482	>0.0 - 0.80	A
			Gr-B	Bq/sample	0.858	0.827	0.55 - 1.22	A
	RdV13	Vegetation	Cs-134	Bq/kg	4.35	4.09	2.86 - 5.32	A
			Cs-137	Bq/kg	5.99	5.4	3.80 - 7.06	A
			Co-57	Bq/kg	17.0	13.30	9.31 - 17.29	W
			Co-60	Bq/kg	4.87	4.43	3.10 - 5.76	A
			Mn-54	Bq/kg	7.40	6.57	4.60 - 8.54	A
			Sr-90	Bq/kg	2.03	2.42	1.69 - 3.15	A
			Zn-65	Bq/kg	11.8	10.2	7.14 - 13.26	A

** Under investigation. MAPEP reported the result as acceptable although the reported value of 13.4 is higher than the acceptance range upper limit of 12.84.*

(1) The Sr-90 in water was a MAPEP false positive test. The TBE reported result of 0.093 ± 0.0908 Bq/L was the forced Sr-90 activity and uncertainty, as required by MAPEP. The MDC for the sample was 0.145 pCi/L.

(a) Teledyne Brown Engineering reported result.

(b) The MAPEP known value is equal to 100% of the parameter present in the standard as determined by gravimetric and/or volumetric measurements made during standard preparation.

(c) DOE/MAPEP evaluation: A=acceptable, W=acceptable with warning, N=not acceptable.

TABLE E-4

ERA[a] STATISTICAL SUMMARY PROFICIENCY TESTING PROGRAM ENVIRONMENTAL, INC., 2005

(Page 1 of 2)

Lab Code	Date	Analysis	Concentration (pCi/L) Laboratory Result[b]	ERA Result[c]	Control Limits	Acceptance
STW-1051	02/15/05	Sr-89	28.0 ± 1.2	29.4	20.7 - 38.1	Pass
STW-1051	02/15/05	Sr-90	25.1 ± 0.7	24.4	15.7 - 33.1	Pass
STW-1052	02/15/05	Ba-133	52.9 ± 2.8	53.4	44.2 - 62.6	Pass
STW-1052	02/15/05	Co-60	54.4 ± 0.4	56.6	47.9 - 65.3	Pass
STW-1052	02/15/05	Cs-134	67.7 ± 1.8	64.9	56.2 - 73.6	Pass
STW-1052	02/15/05	Cs-137	39.6 ± 1.8	40.2	31.5 - 48.9	Pass
STW-1052	02/15/05	Zn-65	159.7 ± 3.0	161.0	133.0 - 189.0	Pass
STW-1053	02/15/05	Gr. Alpha	55.1 ± 1.8	67.9	38.5 - 97.3	Pass
STW-1053	02/15/05	Gr. Beta	46.8 ± 1.3	51.1	38.5 - 97.3	Pass
STW-1054	02/15/05	Ra-226	13.7 ± 1.5	14.1	10.4 - 17.8	Pass
STW-1054	02/15/05	Ra-228	13.3 ± 0.6	13.7	7.8 - 19.6	Pass
STW-1054	02/15/05	Uranium	5.1 ± 0.2	5.0	0.0 - 10.2	Pass
STW-1055	05/17/05	Sr-89	45.1 ± 4.1	41.3	32.6 - 50.0	Pass
STW-1055	05/17/05	Sr-90	7.5 ± 0.9	5.9	0.0 - 14.6	Pass
STW-1056	05/17/05	Ba-133	87.1 ± 2.0	88.4	73.1 - 104.0	Pass
STW-1056	05/17/05	Co-60	38.4 ± 0.8	37.0	28.3 - 45.7	Pass
STW-1056	05/17/05	Cs-134	75.3 ± 0.7	78.6	69.9 - 87.3	Pass
STW-1056	05/17/05	Cs-137	201.0 ± 8.4	194.0	184.0 - 218.0	Pass
STW-1056	05/17/05	Zn-65	130.0 ± 6.7	118.0	97.6 - 138.0	Pass
STW-1057	05/17/05	Gr. Alpha	42.7 ± 2.9	37.0	21.0 - 53.0	Pass
STW-1057	05/17/05	Gr. Beta	34.0 ± 0.4	34.2	25.5 - 42.9	Pass
STW-1058	05/17/05	I-131	14.7 ± 0.5	15.5	10.3 - 20.7	Pass
STW-1059	05/17/05	Ra-226	6.6 ± 0.1	7.6	5.6 - 9.5	Pass
STW-1059	05/17/05	Ra-228	19.3 ± 0.7	18.9	10.7 - 27.1	Pass
STW-1059	05/17/05	Uranium	9.6 ± 0.1	10.1	4.9 - 15.3	Pass
STW-1060	05/17/05	H-3	24100.0 ± 109.0	24400.0	20200.0 - 28600.0	Pass
STW-1067	08/16/05	Sr-89	29.1 ± 3.0	28.0	19.3 - 36.7	Pass
STW-1067	08/16/05	Sr-90	36.0 ± 0.6	33.8	25.1 - 42.5	Pass
STW-1068	08/16/05	Ba-133	107.0 ± 1.7	106.0	87.7 - 124.0	Pass
STW-1068	08/16/05	Co-60	15.2 ± 0.2	13.5	4.8 - 22.2	Pass
STW-1068	08/16/05	Cs-134	89.1 ± 0.3	92.1	83.4 - 101.0	Pass
STW-1068	08/16/05	Cs-137	72.1 ± 1.0	72.7	64.0 - 81.4	Pass
STW-1068	08/16/05	Zn-65	67.4 ± 1.4	65.7	54.3 - 77.1	Pass
STW-1069	08/16/05	Gr. Alpha	44.3 ± 1.5	55.7	31.6 - 79.8	Pass
STW-1069	08/16/05	Gr. Beta	58.4 ± 2.1	61.3	44.0 - 78.6	Pass
STW-1070	08/16/05	Ra-226	16.6 ± 1.5	16.6	12.3 - 20.9	Pass
STW-1070	08/16/05	Ra-228	6.2 ± 0.3	6.2	3.5 - 8.9	Pass
STW-1070	08/16/05	Uranium	4.5 ± 0.1	4.5	0.0 - 9.7	Pass

TABLE E-4

ERA[a] STATISTICAL SUMMARY PROFICIENCY TESTING PROGRAM ENVIRONMENTAL, INC., 2005

(Page 1 of 2)

Lab Code	Date	Analysis	Concentration (pCi/L) Laboratory Result[b]	ERA Result[c]	Control Limits	Acceptance
STW-1072	11/15/05	Sr-89	20.6 ± 0.4	19.0	10.3 - 27.7	Pass
STW-1072	11/15/05	Sr-90	15.0 ± 0.3	16.0	7.3 - 24.7	Pass
STW-1073	11/15/05	Ba-133	31.8 ± 1.8	31.2	22.5 - 39.9	Pass
STW-1073	11/15/05	Co-60	85.0 ± 1.4	84.1	75.4 - 92.8	Pass
STW-1073	11/15/05	Cs-134	37.2 ± 2.1	33.9	25.2 - 42.6	Pass
STW-1073	11/15/05	Cs-137	27.8 ± 0.7	28.3	19.6 - 37.0	Pass
STW-1073	11/15/05	Zn-65	109.0 ± 1.0	105.0	86.8 - 123.0	Pass
STW-1074 [d]	11/15/05	Gr. Alpha	41.1 ± 1.2	23.3	13.2 - 33.4	Fail
STW-1074	11/15/05	Gr. Beta	42.7 ± 0.5	39.1	30.4 - 47.8	Pass
STW-1075	11/15/05	I-131	20.5 ± 0.6	17.4	12.2 - 22.6	Pass
STW-1076	11/15/05	Ra-226	7.8 ± 0.6	8.3	6.2 - 10.5	Pass
STW-1076 [e]	11/15/05	Ra-228	5.5 ± 0.6	3.5	2.0 - 5.0	Fail
STW-1076	11/15/05	Uranium	15.5 ± 0.3	16.1	10.9 - 21.3	Pass
STW-1077	11/15/05	H-3	12500.0 ± 238.0	12200.0	10100.0 - 14300.0	Pass

[a] Results obtained by Environmental, Inc., Midwest Laboratory as a participant in the crosscheck program for proficiency testing in drinking water conducted by Environmental Resources Associates (ERA).

[b] Unless otherwise indicated, the laboratory result is given as the mean ± standard deviation for three determinations.

[c] Results are presented as the known values, expected laboratory precision (1 sigma, 1 determination) and control limits as provided by ERA.

[d] The original samples were calculated using an Am-241 efficiency. The samples were spiked with Th-232. Samples were recounted and calculated using the Th-232 efficiency. Results of the recount: 27.01 ± 2.35 pCi/L.

[e] Decay of short-lived radium daughters contributed to a higher counting rate. Delay of counting for 100 minutes provided better results. The reported result was the average of the first cycle of 100 minutes, the average of the second cycle counts was 4.01 pCi/L

TABLE E-5 DOE'S MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)[a]
ENVIRONMENTAL, INC., 2005

Lab Code	Date	Analysis	Concentration[b] Laboratory result	Known Activity	Control Limits[a]	Acceptance
STW-1045	01/01/05	Gr. Alpha	0.45 ± 0.10	0.53	0.00 - 1.05	Pass
STW-1045	01/01/05	Gr. Beta	1.90 ± 0.10	1.67	0.84 - 2.51	Pass
STW-1046	01/01/05	Am-241	1.62 ± 0.12	1.72	1.20 - 2.24	Pass
STW-1046	01/01/05	Co-57	239.40 ± 1.20	227.00	158.90 - 295.10	Pass
STW-1046	01/01/05	Co-60	248.70 ± 1.00	251.00	175.70 - 326.30	Pass
STW-1046	01/01/05	Cs-134	115.50 ± 1.80	127.00	88.90 - 165.10	Pass
STW-1046	01/01/05	Cs-137	328.50 ± 1.70	332.00	232.40 - 431.60	Pass
STW-1046	01/01/05	Fe-55	64.90 ± 7.00	75.90	53.13 - 98.67	Pass
STW-1046	01/01/05	H-3	304.00 ± 9.70	280.00	196.00 - 364.00	Pass
STW-1046	01/01/05	Mn-54	334.80 ± 1.90	331.00	231.70 - 430.30	Pass
STW-1046	01/01/05	Ni-63	7.10 ± 1.60	9.00	0.00 - 20.00	Pass
STW-1046	01/01/05	Pu-238	0.01 ± 0.02	0.02	0.00 - 1.00	Pass
STW-1046	01/01/05	Pu-239/40	2.50 ± 0.14	2.40	1.68 - 3.12	Pass
STW-1046	01/01/05	Sr-90	0.70 ± 0.80	0.00	0.00 - 5.00	Pass
STW-1046	01/01/05	Tc-99	43.20 ± 1.40	42.90	30.03 - 55.77	Pass
STW-1046	01/01/05	U-233/4	3.31 ± 0.20	3.24	2.27 - 4.21	Pass
STW-1046	01/01/05	U-238	3.38 ± 0.20	3.33	2.33 - 4.33	Pass
STW-1046	01/01/05	Zn-65	538.40 ± 3.80	496.00	347.20 - 644.80	Pass
STVE-1047	01/01/05	Co-57	10.60 ± 0.20	9.88	6.92 - 12.84	Pass
STVE-1047	01/01/05	Co-60	3.00 ± 0.20	3.15	2.21 - 4.10	Pass
STVE-1047	01/01/05	Cs-134	4.80 ± 0.40	5.00	3.50 - 6.50	Pass
STVE-1047	01/01/05	Cs-137	4.10 ± 0.30	4.11	2.88 - 5.34	Pass
STVE-1047	01/01/05	Mn-54	5.10 ± 0.30	5.18	3.63 - 6.73	Pass
STVE-1047	01/01/05	Zn-65	6.20 ± 0.50	6.29	4.40 - 8.18	Pass
STSO-1048	01/01/05	Am-241	96.60 ± 10.00	109.00	76.30 - 141.70	Pass
STSO-1048	01/01/05	Co-57	264.00 ± 2.00	242.00	169.40 - 314.60	Pass
STSO-1048	01/01/05	Co-60	226.50 ± 2.20	212.00	148.40 - 275.60	Pass
STSO-1048	01/01/05	Cs-134	760.60 ± 3.70	759.00	531.30 - 986.70	Pass
STSO-1048	01/01/05	Cs-137	336.20 ± 3.60	315.00	220.50 - 409.50	Pass
STSO-1048	01/01/05	K-40	663.70 ± 18.00	604.00	422.80 - 785.20	Pass
STSO-1048	01/01/05	Mn-54	541.30 ± 3.90	485.00	339.50 - 630.50	Pass
STSO-1048	01/01/05	Ni-63	924.30 ± 17.20	1220.00	854.00 - 1586.00	Pass
STSO-1048	01/01/05	Pu-238	0.60 ± 0.80	0.48	0.00 - 1.00	Pass
STSO-1048	01/01/05	Pu-239/40	78.00 ± 4.80	89.50	62.65 - 116.35	Pass
STSO-1048	01/01/05	Sr-90	514.60 ± 18.70	640.00	448.00 - 832.00	Pass
STSO-1048	01/01/05	U-233/4	47.90 ± 4.00	62.50	43.75 - 81.25	Pass
STSO-1048	01/01/05	U-238	226.30 ± 8.60	249.00	174.30 - 323.70	Pass
STSO-1048	01/01/05	Zn-65	851.30 ± 7.30	810.00	567.00 - 1053.00	Pass
STAP-1050	01/01/05	Gr. Alpha	0.11 ± 0.03	0.23	0.00 - 0.46	Pass
STAP-1050	01/01/05	Gr. Beta	0.38 ± 0.05	0.30	0.15 - 0.45	Pass

TABLE E-5 DOE'S MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)[a]
ENVIRONMENTAL, INC., 2005

Lab Code[c]	Date	Analysis	Concentration[b] Laboratory result	Known Activity	Control Limits[a]	Acceptance
STAP-1049	01/01/05	Am-241	0.10 ± 0.04	0.10	0.07 - 0.13	Pass
STAP-1049	01/01/05	Co-57	4.76 ± 0.64	4.92	3.44 - 6.40	Pass
STAP-1049	01/01/05	Co-60	2.84 ± 0.22	3.03	2.12 - 3.94	Pass
STAP-1049	01/01/05	Cs-134	3.54 ± 0.37	3.51	2.46 - 4.56	Pass
STAP-1049	01/01/05	Cs-137	2.20 ± 0.27	2.26	1.58 - 2.94	Pass
STAP-1049	01/01/05	Mn-54	3.15 ± 0.21	3.33	2.33 - 4.33	Pass
STAP-1049	01/01/05	Pu-238	0.16 ± 0.04	0.20	0.14 - 0.25	Pass
STAP-1049	01/01/05	Pu-239/40	0.17 ± 0.02	0.17	0.14 - 0.25	Pass
STAP-1049[e]	01/01/05	Sr-90	2.24 ± 0.34	1.35	0.95 - 1.76	Fail
STAP-1049	01/01/05	U-233/4	0.34 ± 0.02	0.34	0.24 - 0.44	Pass
STAP-1049	01/01/05	U-238	0.35 ± 0.02	0.35	0.25 - 0.46	Pass
STAP-1049	01/01/05	Zn-65	3.12 ± 0.15	3.14	2.20 - 4.08	Pass
STW-1061	07/01/05	Am-241	2.21 ± 0.13	2.23	1.56 - 2.90	Pass
STW-1061	07/01/05	Co-57	293.20 ± 7.30	272.00	190.40 - 353.60	Pass
STW-1061	07/01/05	Co-60	275.70 ± 1.30	261.00	182.70 - 339.30	Pass
STW-1061	07/01/05	Cs-134	171.80 ± 4.00	167.00	116.90 - 217.10	Pass
STW-1061	07/01/05	Cs-137	342.10 ± 2.20	333.00	233.10 - 432.90	Pass
STW-1061	07/01/05	Fe-55	167.80 ± 9.30	196.00	137.20 - 254.80	Pass
STW-1061	07/01/05	H-3	514.20 ± 12.60	527.00	368.90 - 685.10	Pass
STW-1061	07/01/05	Mn-54	437.00 ± 2.50	418.00	292.60 - 543.40	Pass
STW-1061	07/01/05	Ni-63	105.10 ± 3.60	100.00	70.00 - 130.00	Pass
STW-1061	07/01/05	Pu-238	1.64 ± 0.12	1.91	1.34 - 2.48	Pass
STW-1061	07/01/05	Pu-239/40	2.32 ± 0.13	2.75	1.93 - 3.58	Pass
STW-1061	07/01/05	Sr-90	9.20 ± 1.30	8.98	6.29 - 11.67	Pass
STW-1061	07/01/05	Tc-99	72.30 ± 2.30	66.50	46.55 - 86.45	Pass
STW-1061	07/01/05	U-233/4	4.11 ± 0.18	4.10	2.87 - 5.33	Pass
STW-1061	07/01/05	U-238	4.14 ± 0.18	4.26	2.98 - 5.54	Pass
STW-1061	07/01/05	Zn-65	364.60 ± 4.90	330.00	231.00 - 429.00	Pass
STW-1062	07/01/05	Gr. Alpha	0.57 ± 0.05	0.79	0.21 - 1.38	Pass
STW-1062	07/01/05	Gr. Beta	1.36 ± 0.05	1.35	0.85 - 1.92	Pass
STSO-1063[f]	07/01/05	Am-241	48.40 ± 3.90	81.10	56.77 - 105.43	Fail
STSO-1063	07/01/05	Co-57	608.30 ± 2.80	524.00	366.80 - 681.20	Pass
STSO-1063	07/01/05	Co-60	322.70 ± 2.40	287.00	200.90 - 373.10	Pass
STSO-1063	07/01/05	Cs-134	632.10 ± 5.20	568.00	397.60 - 738.40	Pass
STSO-1063	07/01/05	Cs-137	512.40 ± 4.20	439.00	307.30 - 570.70	Pass
STSO-1063	07/01/05	K-40	720.50 ± 19.00	604.00	422.80 - 785.20	Pass
STSO-1063	07/01/05	Mn-54	516.80 ± 5.10	439.00	307.30 - 570.70	Pass
STSO-1063	07/01/05	Ni-63	366.50 ± 13.30	445.00	311.50 - 578.50	Pass
STSO-1063	07/01/05	Pu-238	68.80 ± 15.00	60.80	42.56 - 79.04	Pass
STSO-1063	07/01/05	Pu-239/40	0.00 ± 0.00	0.00	0.00 - 0.00	
STSO-1063	07/01/05	Sr-90	602.90 ± 17.20	757.00	529.90 - 984.10	Pass
STSO-1063	07/01/05	U-233/4	61.50 ± 1.00	52.50	36.75 - 68.25	Pass
STSO-1063	07/01/05	U-238	164.50 ± 16.70	168.00	117.60 - 218.40	Pass
STSO-1063	07/01/05	Zn-65	874.70 ± 8.40	823.00	576.10 - 1070.00	Pass

TABLE E-5 DOE'S MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)[a]
ENVIRONMENTAL, INC., 2005

(Page 3 of 3)

Lab Code[c]	Date	Analysis	Concentration[b] Laboratory result	Known Activity	Control Limits[d]	Acceptance
STVE-1064	07/01/05	Am-241	0.18 ± 0.03	0.23	0.16 - 0.30	Pass
STVE-1064	07/01/05	Co-57	15.90 ± 0.20	13.30	9.31 - 17.29	Pass
STVE-1064	07/01/05	Co-60	4.80 ± 0.10	4.43	3.10 - 5.76	Pass
STVE-1064	07/01/05	Cs-134	4.60 ± 0.20	4.09	2.86 - 5.32	Pass
STVE-1064	07/01/05	Cs-137	5.90 ± 0.30	5.43	3.80 - 7.06	Pass
STVE-1064	07/01/05	Mn-54	7.20 ± 0.20	6.57	4.60 - 8.54	Pass
STVE-1064	07/01/05	Pu-238	0.04 ± 0.02	0.00	0.00 - 1.00	Pass
STVE-1064	07/01/05	Pu-239/40	0.13 ± 0.02	0.16	0.11 - 0.21	Pass
STVE-1064	07/01/05	Sr-90	2.80 ± 0.30	2.42	1.69 - 3.15	Pass
STVE-1064	07/01/05	U-233/4	0.28 ± 0.03	0.33	0.23 - 0.43	Pass
STVE-1064	07/01/05	U-238	0.33 ± 0.04	0.35	0.24 - 0.45	Pass
STVE-1064	07/01/05	Zn-65	11.00 ± 0.50	10.20	7.14 - 13.26	Pass
STAP-1065	07/01/05	Gr. Alpha	0.30 ± 0.04	0.48	0.00 - 0.80	Pass
STAP-1065	07/01/05	Gr. Beta	0.97 ± 0.06	0.83	0.55 - 1.22	Pass
STAP-1066	07/01/05	Am-241	0.14 ± 0.03	0.16	0.11 - 0.21	Pass
STAP-1066	07/01/05	Co-57	5.81 ± 0.17	6.20	4.34 - 8.06	Pass
STAP-1066	07/01/05	Co-60	2.79 ± 0.14	2.85	2.00 - 3.71	Pass
STAP-1066	07/01/05	Cs-134	3.67 ± 0.12	3.85	2.70 - 5.01	Pass
STAP-1066	07/01/05	Cs-137	2.93 ± 0.23	3.23	2.26 - 4.20	Pass
STAP-1066	07/01/05	Mn-54	4.11 ± 0.26	4.37	3.06 - 5.68	Pass
STAP-1066	07/01/05	Pu-238	0.11 ± 0.02	0.10	0.07 - 0.13	Pass
STAP-1066	07/01/05	Pu-239/40	0.10 ± 0.01	0.09	0.06 - 0.12	Pass
STAP-1066	07/01/05	Sr-90	2.25 ± 0.29	2.25	1.58 - 2.93	Pass
STAP-1066	07/01/05	U-233/4	0.28 ± 0.02	0.27	0.19 - 0.35	Pass
STAP-1066	07/01/05	U-238	0.28 ± 0.02	0.28	0.20 - 0.37	Pass
STAP-1066	07/01/05	Zn-65	4.11 ± 0.26	4.33	3.06 - 5.68	Pass

[a] Results obtained by Environmental, Inc., Midwest Laboratory as a participant in the Department of Energy's Mixed Analyte Performance Evaluation Program, Idaho Operations office, Idaho Falls, Idaho

[b] Results are reported in units of Bq/kg (soil), Bq/L (water) or Bq/total sample (filters, vegetation) as requested by the Department of Energy.

[c] Laboratory codes as follows: STW (water), STAP (air filter), STSO (soil), STVE (vegetation).

[d] MAPEP results are presented as the known values and expected laboratory precision (1 sigma, 1 determination) and control limits as defined by the MAPEP.

[e] The strontium carbonate precipitates were redissolved and processed. The average of the three analyses was 1.34 pCi/L, although the recovery was only 30%. The result of a new analysis was 1.56 pCi/L.

[f] Incorrect sample weight used in calculation. Result of recalculation: 97.0 ± 7.8 Bq/kg.

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