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50 – 353

LIMERICK GENERATING STATION
UNITS 1 and 2

Annual Radiological
Environmental Operating Report

Report No. 24

1 January Through 31 December 2008

Prepared By

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Exelon
Nuclear

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I. Summary and Conclusions

In 2008 the Limerick Generating Station released to the environment through the radioactive effluent liquid and gaseous pathways approximately 73 curies of noble gas, fission and activation products and approximately 63 curies of tritium. The dose from both liquid and gaseous effluents was conservatively calculated for the Maximum Exposed Member of the Public. The results of those calculations and their comparison to the allowable limits were as follows:

Gaseous and liquid radiation doses to members of the public at locations								
Effluent	Applicable Organ	Estimated Dose	Age Group	Location		% of Applicable Limit	Limit	Unit
				Distance (meters)	Direction (toward)			
Noble Gas	Gamma - Air Dose	8.55E-03	All	762	SE	4.28E-02	20	mRad
Noble Gas	Beta – Air Dose	5.22E-03	All	762	SE	1.31E-02	40	mRad
Noble Gas	Total Body (Gamma)	5.32E-03	All	762	SE	5.32E-02	10	mrem
Noble Gas	Skin (Beta)	9.93E-03	All	762	SE	3.31E-02	30	mrem
Iodine, Particulate & Tritium	Thyroid	5.87E-03	Infant	762	SE	1.96E-02	30	mrem
Liquid	Total Body	7.11E-03	Adult	LGS Outfall		1.19E-01	6	mrem
Liquid	Liver	1.02E-03	Teen	LGS Outfall		5.10E-02	20	mrem

The doses as a result of the radiological effluents released from Limerick were a very small percentage of the allowable limits.

This report on the Radiological Environmental Monitoring Program conducted for the Limerick Generating Station (LGS) by Exelon covers the period 1 January 2008 through 31 December 2008. During that time period, 1141 analyses were performed on 929 samples.

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

Fish (predator and bottom feeder) and sediment samples were analyzed for concentrations of gamma emitting nuclides. No fission or activation products were detected.

Sediment samples collected below the discharge had elevated Cesium-137 concentrations that were the result of LGS discharges. No other Plant produced fission or activation products were found in sediment. The calculated dose to a teenager's skin and whole body was 4.62E-04 mrem and 3.96E-04 mrem, respectively. This dose represents 2.31E-03% and 6.60E-03%, respectively of the 10 CFR Part 50, 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.

Broad Leaf Vegetation samples were analyzed for gamma emitting nuclides. Concentrations of naturally occurring Be-7 and K-40 were detected. No activation or fission products were detected.

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 samples located at the Limerick intake (24S1) and downstream of the 10CFR20.2002 permitted storage area showed no evidence of offsite radionuclide transport from the 2002 permitted storage area.

A radiological groundwater protection program (RGPP) was established in 2006 as part of an Exelon Nuclear fleetwide assessment of potential groundwater intrusion from the operation of the Station. Well water samples were analyzed for tritium, Sr-90 and gamma emitters. Most tritium values were less than the lower limit of detection of 200 pCi/L. However, one well located near the radwaste /cooling tower blowdown line had a tritium value as high as 902 pCi/L. This activity was due to a cooling tower overflow while a Radwaste discharge was in progress. The discharge was secured and no radioactivity was found in the water sample obtained. Although no drinking water pathway exist, the dose via the drinking water pathway was calculated at 0.053 mrem to a child (total body), which was 0.89% of the 10 CFR 50, Appendix I dose limit. All results for Sr-90 and gamma emitting nuclides were less than MDC.

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.

II. Introduction

The Limerick Generating Station (LGS), consisting of two 3,458 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 2008 through 31 December 2008.

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, Inc. (NAI). This section describes the general collection methods used by NAI to obtain environmental samples for the LGS REMP in 2008. 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 NAI 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 three surface water locations (10F2, 13B1 and 24S1) and four drinking water locations (15F4, 15F7, 16C2, and 28F3). Control locations were 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.

Broad Leaf Vegetation was collected monthly at three locations (11S3, 13S3 and 31G1). The control location was 31G1. Eight different kinds of vegetation samples were collected and placed in new unused plastic bags, and sent to the laboratory for analysis.

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 releases.

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 Dosimetry for analysis.

10CFR20.2002 Permit Storage Area

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 2008. 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, broad leaf vegetation 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 MDC 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.

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

For sediment and broad leaf vegetation eight nuclides, Be-7, K-40, Mn-54, Co-58, Co-60, I-131, Cs-134, and Cs-137 were reported.

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

D. Program Exceptions

For 2008 the LGS REMP had a sample recovery rate in excess of 99%. Exceptions are listed below:

1. Air sample from location 14S1 for the week 07/27/08 – 08/02/08 was not available due to equipment malfunction (IR828053).
2. Air sample from location 13C1 for the week 09/28/08 – 10/04/08 was not available due to equipment malfunction (IR851235).
3. Grab samples were taken for the composite drinking water sampler at location 16C2 during the following periods due to equipment

malfunction or insufficient sample collected: 04/21/08- 05/03/08 and 08/25/08 – 09/06/08.

4. A grab sample was taken for the composite drinking water sampler at location 28F3 from 07/20/08 – 07/26/08, 08/03/08 – 08/09/08, 10/26/08 – 11/01/08 and 11/16/08 – 11/22/08 due to insufficient sample collection.

5. A grab sample was taken for the composite drinking water sampler at location 15F4 from 10/05/08 – 10/11/08 due to a change in river flow.

6. A grab sample was taken for the composite service water sampler at location 13B1 from 03/30/08 – 04/05/08, 04/13/08 – 04/19/08, 04/27/08 – 05/03/08, 05/04/08 – 05/10/08, 06/15/08 – 06/21/08, 08/31/08 – 09/06/08 and 09/07/08 – 09/13/08 due to equipment failure and low river water.

7. A grab sample was taken for the composite service water sampler at location 24S1 from 01/27/08 – 02/02/08 due to frozen sample line.

8. Only two broad leaf vegetation samples were collected at Stations 11S3 and 31G1 during the month of October. Cabbage was not available.

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

Surface water Station 10F2, which draws its water from the Delaware River was placed back into service on July 14, 2008 when LGS began using the Delaware River as the source for cooling tower makeup water.

IV. Results and Discussion

A. Aquatic Environment

1. Surface Water

Samples were taken from a continuous sampler at three locations (10F2, 13B1 and 24S1) on a monthly schedule. Of these locations

only 13B1 located downstream, could be affected by Limerick's effluent releases. The following analyses were performed.

Tritium

Monthly samples from all locations were composited quarterly and analyzed for tritium activity (Table C–I.1, Appendix C). All results were less than the MDC.

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 2.3 to 7.2 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). All results were less than the MDC.

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 2,660 to 3,680 pCi/kg wet and was consistent with levels detected in previous years. No other gamma emitting nuclides were found. 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 product Cs-137.

Beryllium-7 was found at locations 16B2 and 16C4 and ranged from 1,560 to 5,990 pCi/kg dry. Potassium-40 was found at all locations and ranged from 8,920 to 17,700 pCi/kg dry. The fission product Cs-137 was found at downstream locations 16B2 and 16C4 at concentrations of 176 and 162 pCi/kg dry, respectively. The Cs-137 activity found is attributed to LGS radioactive effluent releases. The dose to a teenager's skin and whole body was conservatively calculated at 4.62E-04 mrem and 3.96E-04 mrem, respectively. This dose represents 2.31E-03% and 6.60E-03%, of the Appendix I to 10 CFR Part 50 dose limits, respectively. The activity detected was consistent with those detected in the pre–operational years. (Figure C–4, Appendix C). No other Limerick fission or activation products were found.

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. The results from the On-Site locations (Group I) ranged from 7 to 33 E–3 pCi/m^3 with a mean of 16.1 E–3 pCi/m^3. The results from the Intermediate Distance location (Group II) ranged from 9 to 32 E–3 pCi/m^3 with a mean of 16.9 E–3 pCi/m^3. The results from the Distant locations (Group III) ranged from 8 to 38 E–3 pCi/m^3 with a mean of 16.5 E–3 pCi/m^3. Comparison of the 2008 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 2008 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 49 to 156 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 1,050 to 1,460 pCi/L. All other nuclides were less than the MDC.

b. Broad Leaf Vegetation

Three types of broad leaf vegetation samples were collected from three locations (11S3, 13S3 and 31G1) monthly from June through September. The following analysis was performed:

Gamma Spectrometry

Each broad leaf vegetation sample was analyzed for concentrations of gamma emitting nuclides (Table C-VIII.1, Appendix C).

Cosmogenic Be-7 was found in 30 of 43 samples and ranged from 74 to 2,060 pCi/kg wet. Naturally occurring K-40 was found in all samples and ranged from 1,680 to 7,060 pCi/kg wet. 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–IX.1 to C–IX.3, Appendix C.

Most TLD measurements were below 10 mR/standard month, with a range of 5.5 to 12.6 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 2008 around Limerick Generating Station (LGS) was performed by Normandeau Associates, Inc. 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 2008 survey. The gardens in the ENE, E and SW sectors are further away than 2007. The garden in the WSW sector is closer than 2007. 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	1.8	-
3 NE	0.7	1.6	-
4 ENE	0.7	2.7	-
5 E	0.6	2.4	-
6 ESE	0.5	0.3	-
7 SE	0.7	0.2	-
8 SSE	1.0	1.1	-
9 S	1.0	1.2	4.2
10 SSW	0.8	1.0	2.0
11 SW	1.0	1.0	-
12 WSW	0.6	2.3	2.7
13 W	0.7	0.8	2.8
14 WNW	0.7	0.7	-
15 NW	0.7	1.6	-
16 NNW	0.7	1.3	-

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 28 analytes (Appendix E). 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, 16 out of 18 analytes met the specified acceptance criteria. Two samples did not meet the specified acceptance criteria for the following reasons:

1. Teledyne Brown Engineering's Analytics December 2008 Sr-89 in milk result of 18.0 pCi/L was higher than the known value of 12.6 pCi/L, resulting in a found to known ratio of 1.43. NCR 09-02 was initiated to investigate this failure.

2. Teledyne Brown Engineering's Analytics' ERA Quik Response water sample January 2008 Sr-89 result of 37.33 pCi/L exceeded the upper acceptance limit of 25.2 pCi/L. NCR 08-03 was initiated to investigate this failure. No cause could be found for the failure. Studies bracketing these results, RAD 71 and RAD 72 had acceptable Sr-89 results.

For the secondary laboratory, Environmental, Inc. all 15 analytes met the specified acceptance criteria.

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 ANNUAL SUMMARY FOR THE LIMERICK GENERATING STATION, 2008

Name of Facility: LIMERICK GENERATING STATION **DOCKET NUMBER:** 50-352 & 50-353
Location of Facility: MONTGOMERY COUNTY PA **REPORTING PERIOD:** 2008

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN(M) (F) RANGE	CONTROL LOCATION MEAN(M) (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN(M) MEAN(M) (F) RANGE	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
SURFACE WATER (PCI/LITER)	H-3	10	200	<LLD	<LLD	-		0
	GAMMA	30						
	MN-54		15	<LLD	<LLD	-		0
	CO-58		15	<LLD	<LLD	-		0
	FE-59		30	<LLD	<LLD	-		0
	CO-60		15	<LLD	<LLD	-		0
	ZN-65		30	<LLD	<LLD	-		0
	NB-95		15	<LLD	<LLD	-		0
	ZR-95		30	<LLD	<LLD	-		0
	I-131		15	<LLD	<LLD	-		0
	CS-134		15	<LLD	<LLD	-		0
	CS-137		18	<LLD	<LLD	-		0
	BA-140		60	<LLD	<LLD	-		0
	LA-140		15	<LLD	<LLD	-		0

* THE MEAN AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING 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 ANNUAL SUMMARY FOR THE LIMERICK GENERATING STATION, 2008

Name of Facility: LIMERICK GENERATING STATION **DOCKET NUMBER:** 50-352 & 50-353
Location of Facility: MONTGOMERY COUNTY PA **REPORTING PERIOD:** 2008

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPES OF ANALYSIS PERFORMED	NUMBER OF ANALYSIS PERFORMED	REQUIRED LOWER LIMIT OF DETECTION (LLD)	INDICATOR LOCATIONS MEAN(M) (F) RANGE	CONTROL LOCATION MEAN(M) (F) RANGE	LOCATION WITH HIGHEST ANNUAL MEAN(M) MEAN(M) (F) RANGE	STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
DRINKING WATER (PCI/LITER)	GR-B	48	4	4.3 (33/36) (2.3/7.2)	3.3 (12/12) (2.3/5.1)	4.5 (11/12) (2.7/7.2)	15F7 INDICATOR PHOENIXVILLE WATER WORKS 6.33 MILES SSE OF SITE	0
	H-3	16	200	<LLD	<LLD	-		0
	GAMMA	48						
	MN-54		15	<LLD	<LLD	-		0
	CO-58		15	<LLD	<LLD	-		0
	FE-59		30	<LLD	<LLD	-		0
	CO-60		15	<LLD	<LLD	-		0
	ZN-65		30	<LLD	<LLD	-		0
	NB-95		15	<LLD	<LLD	-		0
	ZR-95		30	<LLD	<LLD	-		0
	I-131		15	<LLD	<LLD	-		0
	CS-134		15	<LLD	<LLD	-		0
	CS-137		18	<LLD	<LLD	-		0
	BA-140		60	<LLD	<LLD	-		0
	LA-140		15	<LLD	<LLD	-		0

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BOTTOM FEEDER (PCI/KG WET)	GAMMA	4						
	K-40		NA	3060 (2/2) (2660/3460)	3515 (2/2) (3350/3680)	3515 (2/2) (3350/3680)	29C1 CONTROL POTTSTOWN VICINITY UPSTREAM OF INTAKE	0
	MN-54		130	<LLD	<LLD	-		0
	CO-58		130	<LLD	<LLD	-		0
	FE-59		260	<LLD	<LLD	-		0
	CO-60		130	<LLD	<LLD	-		0
	ZN-65		260	<LLD	<LLD	-		0
	I-131		NA	<LLD	<LLD	-		0
	CS-134		100	<LLD	<LLD	-		0
	CS-137		100	<LLD	<LLD	-		0
PREDATOR (PCI/KG WET)	GAMMA	4						
	K-40		NA	3295 (2/2) (3290/3300)	2770 (2/2) (2690/2850)	3295 (2/2) (3290/3300)	16C5 INDICATOR VINCENT POOL DOWNSTREAM OF DISCHARGE	0
	MN-54		130	<LLD	<LLD	-		0
	CO-58		130	<LLD	<LLD	-		0
	FE-59		260	<LLD	<LLD	-		0

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PREDATOR (PCI/KG WET)	CO-60		130	<LLD	<LLD	-		0
	ZN-65		260	<LLD	<LLD	-		0
	I-131		NA	<LLD	<LLD	-		0
	CS-134		100	<LLD	<LLD	-		0
	CS-137		100	<LLD	<LLD	-		0
SEDIMENT (PCI/KG DRY)	GAMMA	6						
	BE-7		NA	4437 (3/4) (1560/5990)	<LLD	5875 (2/2) (5760/5990)	16C4 INDICATOR VINCENT DAM 2.18 MILES SSE OF SITE	0
	K-40		NA	14030 (4/4) (8920/17700)	13750 (2/2) (13000/14500)	14750 (2/2) (12900/16600)	16B2 INDICATOR LINFIELD BRIDGE 1.35 MILES SSE OF SITE	0
	MN-54		NA	<LLD	<LLD	-		0
	CO-58		NA	<LLD	<LLD	-		0
	CO-60		NA	<LLD	<LLD	-		0
	I-131		NA	<LLD	<LLD	-		0
	CS-134		150	<LLD	<LLD	-		0
	CS-137		180	169 (2/4) (162/176)	<LLD	176 (1/2)	16B2 INDICATOR LINFIELD BRIDGE 1.35 MILES SSE OF SITE	0

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AIR PARTICULATE (E-3 PCI/CU.METER)	GR-B	258	10	16 (202/206) (7/33)	16 (51/52) (8/38)	17 (49/51) (9/32)	13C1 INDICATOR KING ROAD 2.84 MILES SE OF SITE	0
	GAMMA	20						
	BE-7		NA	89 (16/16) (56/156)	83.4 (4/4) (49.1/134)	98.3 (4/4) (63.6/156)	13C1 INDICATOR KING ROAD 2.84 MILES SE OF SITE	0
	MN-54		NA	<LLD	<LLD	-		0
	CO-58		NA	<LLD	<LLD	-		0
	CO-60		NA	<LLD	<LLD	-		0
	CS-134		10	<LLD	<LLD	-		0
	CS-137		10	<LLD	<LLD	-		0
AIR IODINE (E-3 PCI/CU.METER)	GAMMA I-131	258	70	<LLD	<LLD	-		0
MILK (PCI/LITER)	I-131	118	1	<LLD	<LLD	-		0
	GAMMA	118						
	K-40		NA	1272 (92/92) (1080/1460)	1239 (26/26) (1050/1360)	1314 (22/22) (1140/1400)	19B1 INDICATOR 1.95 MILES SSW OF SITE	0
MILK (PCI/LITER)	CS-134		15	<LLD	<LLD	-		0
	CS-137		18	<LLD	<LLD	-		0

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MILK (PCI/LITER)	BA-140		60	<LLD	<LLD	-		0
	LA-140		15	<LLD	<LLD	-		0
VEGETATION (PCI/KG WET)	GAMMA	43						
	BE-7		NA	227 (21/29) (90/724)	649 (9/14) (74/2060)	649 (9/14) (74/2060)	31G1 CONTROL	0
	K-40		NA	3853 (29/29) (1680/7060)	4371 (14/14) (2010/5640)	4371 (14/14) (2010/5640)	31G1 CONTROL	0
	MN-54		NA	<LLD	<LLD	-		0
	CO-58		NA	<LLD	<LLD	-		0
	CO-60		NA	<LLD	<LLD	-		0
	I-131		60	<LLD	<LLD	-		0
	CS-134		60	<LLD	<LLD	-		0
	CS-137		80	<LLD	<LLD	-		0
	RA-226		NA	832 (15/29) (165/1680)	227 (1/14)	878 (14/15) (165/1680)	13S3 INDICATOR VINCENT DAM 0.24 MILES SE OF SITE	0

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VEGETATION (PCI/KG WET)	TH-228		NA	26 (13/29) (10/53)	26 (8/14) (12/56)	30 (8/15) (10/53)	13S3 INDICATOR VINCENT DAM 0.24 MILES SE OF SITE	0
	TH-232		NA	20 (1/29)	29 (3/14) (17/46)	29 (3/14) (17/46)	31G1 CONTROL	0
DIRECT RADIATION (MILLI-ROENTGEN/STD.MO.)	TLD-QUARTERLY	160	NA	7.8 (156/156) (5.5/12.6)	9.2 (4/4) (8.7/9.9)	11.9 (4/4) (10.5/12.6)	13S2 INDICATOR 500 KV SUBSTATION 0.41 MILES SE	0

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

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

TABLE B-2: Radiological Environmental Monitoring Program - Sampling Locations, Distance and Direction, Limerick Generating Station, 2008

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
~~H. Broad Leaf Vegetation~~		
11S3	LGS Information Center	0.35 miles ESE
13S3	LGS 500 KV Yard	0.24 miles SE
31G1	Prout's Jollyview Farm	13.6 miles NW

TABLE B-2: Radiological Environmental Monitoring Program - Sampling Locations, Distance and Direction, Limerick Generating Station, 2008

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, 2008

Sample Medium	Analysis	Sampling Method	Collection Procedure Number	Sample Size	Analytical Procedure Number
Surface Water	Gamma Spectroscopy	Monthly composite from a continuous water compositor.	RMC-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.	RMC-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.	RMC-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.	RMC-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.	RMC-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	RMC-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	RMC-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	RMC-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, 2008

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	RMC-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	RMC-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	RMC-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)	RMC-ER9 Collection of TLD samples for radiological analysis (Limerick Generating Station)	2 dosimeters	Global Dosimetry

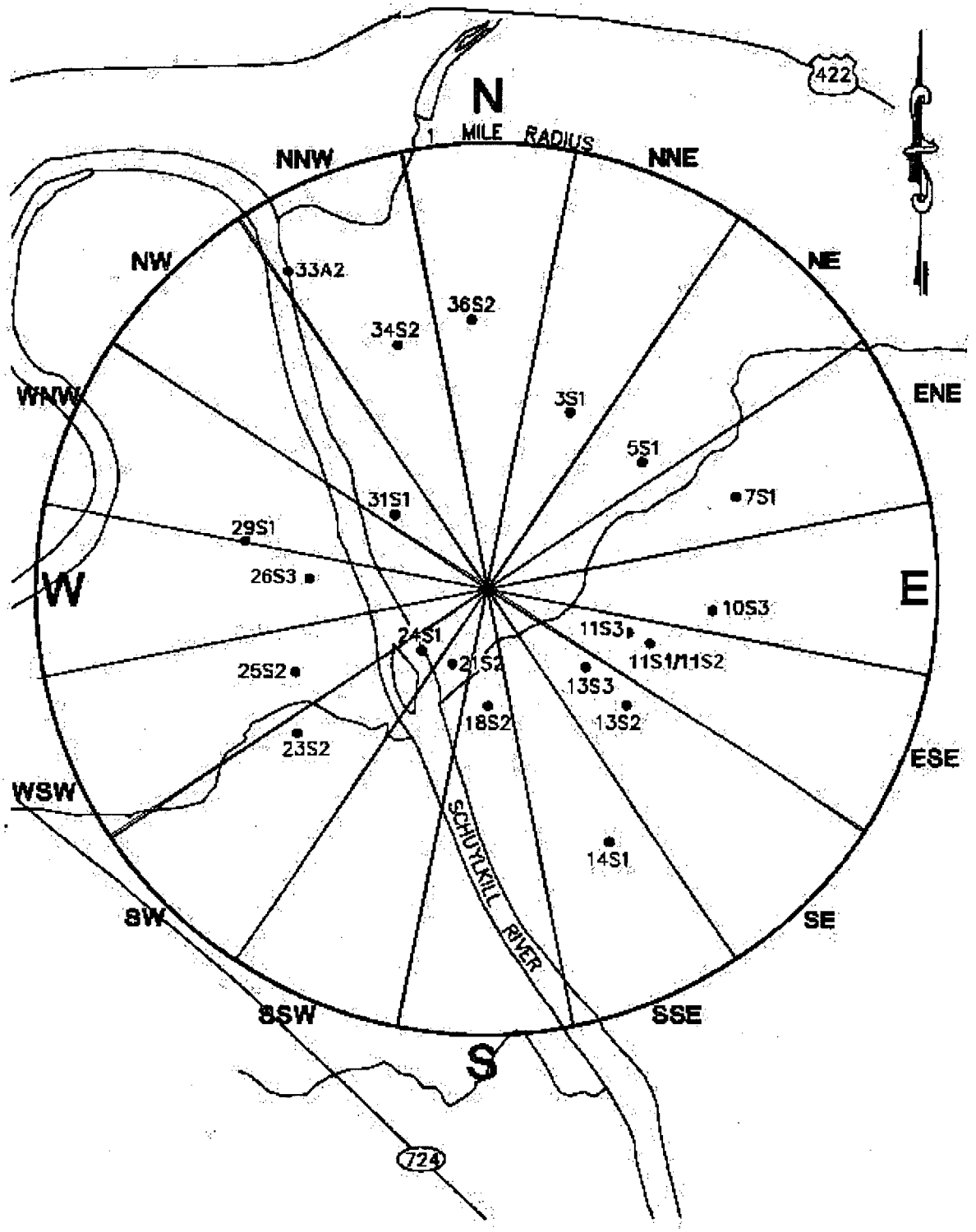


Figure B-1
Environmental Sampling Locations Within One
Mile of the Limerick Generating Station, 2008

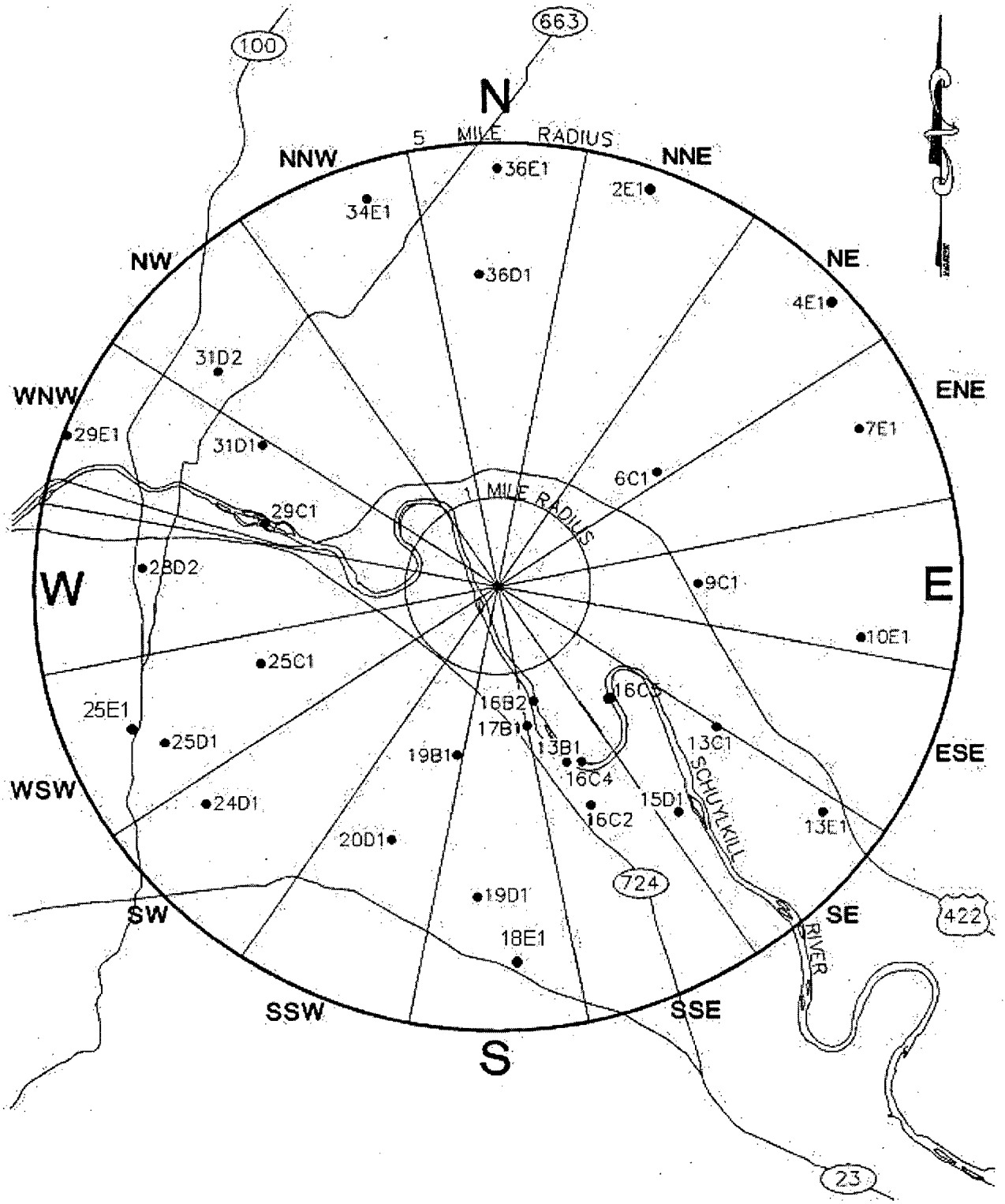


Figure B-2
Environmental Sampling Locations Between One and Five Miles from the Limerick Generating Station, 2008

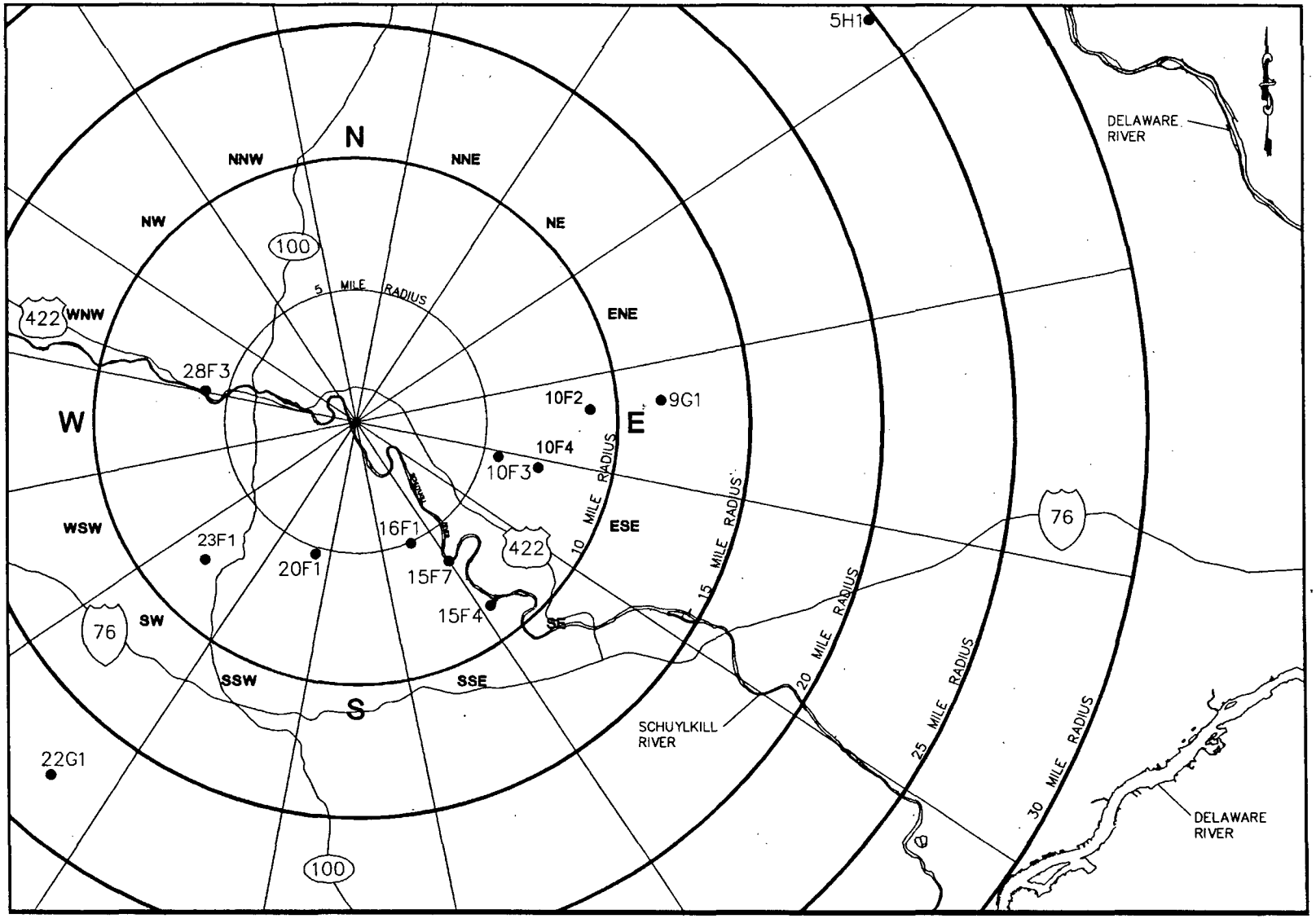


Figure B-3
Environmental Sampling Locations Greater than Five Miles from the Limerick Generating Station, 2008

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, 2008

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	10F2	13B1	24S1
12/31/2007 - 03/31/2008	(1)	< 168	< 165
03/31/2008 - 06/30/2008	(1)	< 174	< 177
07/14/2008 - 09/29/2008	< 148	< 151	< 135
09/29/2008 - 12/29/2008	< 179	< 174	< 173
MEAN	-	-	-

TABLE C-I.2 CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2008

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD (1)	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	07/14/2008 - 07/29/2008	< 1	< 1	< 2	< 1	< 2	< 1	< 2	< 12	< 1	< 1	< 16	< 4
	07/29/2008 - 09/02/2008	< 3	< 3	< 6	< 2	< 5	< 3	< 5	< 15	< 2	< 3	< 26	< 8
	09/02/2008 - 09/29/2008	< 2	< 2	< 4	< 2	< 3	< 2	< 4	< 12	< 2	< 2	< 21	< 6
	09/29/2008 - 11/03/2008	< 1	< 1	< 3	< 1	< 2	< 1	< 2	< 11	< 1	< 1	< 41	< 12
	11/03/2008 - 12/02/2008	< 3	< 4	< 7	< 4	< 7	< 3	< 7	< 7	< 3	< 4	< 20	< 5
	12/02/2008 - 12/29/2008	< 3	< 3	< 6	< 3	< 6	< 4	< 5	< 11	< 3	< 3	< 23	< 8
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
13B1	12/31/2007 - 01/29/2008	< 5	< 6	< 13	< 5	< 10	< 6	< 9	< 5	< 4	< 5	< 21	< 8
	01/29/2008 - 03/04/2008	< 4	< 4	< 9	< 5	< 9	< 4	< 7	< 5	< 4	< 5	< 18	< 6
	03/04/2008 - 03/31/2008	< 3	< 2	< 4	< 3	< 5	< 3	< 5	< 5	< 3	< 3	< 14	< 3
	03/31/2008 - 04/28/2008	< 4	< 4	< 8	< 4	< 9	< 4	< 8	< 7	< 4	< 4	< 19	< 6
	04/28/2008 - 06/03/2008	< 4	< 5	< 11	< 6	< 10	< 5	< 8	< 13	< 4	< 5	< 27	< 13
	06/03/2008 - 06/30/2008	< 2	< 2	< 5	< 2	< 5	< 3	< 5	< 15	< 2	< 2	< 24	< 6
	06/30/2008 - 07/29/2008	< 1	< 1	< 2	< 1	< 2	< 1	< 2	< 12	< 1	< 1	< 15	< 5
	07/29/2008 - 09/02/2008	< 2	< 2	< 5	< 2	< 5	< 3	< 5	< 13	< 2	< 2	< 26	< 7
	09/02/2008 - 09/29/2008	< 2	< 2	< 5	< 2	< 4	< 2	< 3	< 12	< 2	< 2	< 20	< 7
	09/29/2008 - 11/03/2008	< 1	< 1	< 3	< 1	< 2	< 1	< 2	< 11	< 1	< 1	< 36	< 14
	11/03/2008 - 12/02/2008	< 7	< 5	< 12	< 4	< 13	< 6	< 10	< 14	< 5	< 5	< 32	< 10
	12/02/2008 - 12/29/2008	< 3	< 3	< 8	< 3	< 6	< 4	< 5	< 12	< 3	< 3	< 24	< 7
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

TABLE C-II.1 CONCENTRATIONS OF GROSS BETA IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2008

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

COLLECTION PERIOD	15F4	15F7	16C2	28F3
12/31/2007 - 01/29/2008	2.6 ± 1.6	2.7 ± 1.5	< 2.2	3.0 ± 1.6
01/29/2008 - 03/04/2008	2.3 ± 1.5	3.2 ± 1.5	3.3 ± 1.6	3.1 ± 1.5
03/04/2008 - 03/31/2008	3.9 ± 1.6	2.7 ± 1.5	< 2.1	2.9 ± 1.5
03/31/2008 - 04/28/2008	3.6 ± 1.5	4.5 ± 1.6	2.8 ± 1.5	2.3 ± 1.5
04/28/2008 - 06/03/2008	4.0 ± 1.7	3.0 ± 1.6	3.4 ± 1.7	2.5 ± 1.6
06/03/2008 - 06/30/2008	3.9 ± 1.8	4.3 ± 1.8	3.8 ± 1.8	3.3 ± 1.8
06/30/2008 - 07/29/2008	5.5 ± 1.8	6.1 ± 1.8	4.2 ± 1.7	3.6 ± 1.7
07/29/2008 - 09/02/2008	5.4 ± 2.2	4.7 ± 2.2	6.0 ± 2.3	4.0 ± 2.2
09/02/2008 - 09/29/2008	5.8 ± 1.9	7.2 ± 2.0	3.8 ± 1.8	4.0 ± 1.8
09/29/2008 - 11/03/2008	5.7 ± 1.9	5.0 ± 1.9	3.2 ± 1.7	5.1 ± 1.9
11/03/2008 - 12/02/2008	5.8 ± 1.7	6.7 ± 1.8	4.6 ± 1.6	3.5 ± 1.5
12/02/2008 - 12/29/2008	4.3 ± 1.9	< 2.5	3.3 ± 1.9	2.8 ± 1.8
MEAN	4.6 ± 2.3	4.7 ± 3.1	3.8 ± 1.8	3.4 ± 1.6

TABLE C-II.2 CONCENTRATIONS OF TRITIUM IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2008

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

COLLECTION PERIOD	15F4	15F7	16C2	28F3
12/31/2007 - 03/31/2008	< 168	< 165	< 160	< 164
03/31/2008 - 06/30/2008	< 176	< 177	< 178	< 176
06/30/2008 - 09/29/2008	< 147	< 145	< 147	< 148
09/29/2008 - 12/29/2008	< 174	< 174	< 172	< 174
MEAN	-	-	-	-

TABLE C-II.3 CONCENTRATIONS OF GAMMA EMITTERS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2008

RESULTS IN UNITS OF PCI/LITER ± 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
15F4	12/31/2007 - 01/29/2008	< 5	< 5	< 10	< 4	< 11	< 5	< 8	< 7	< 5	< 6	< 20	< 7
	01/29/2008 - 03/04/2008	< 5	< 5	< 10	< 5	< 10	< 5	< 8	< 6	< 5	< 5	< 19	< 7
	03/04/2008 - 03/31/2008	< 4	< 5	< 11	< 5	< 9	< 6	< 8	< 9	< 5	< 5	< 23	< 7
	03/31/2008 - 04/28/2008	< 5	< 5	< 10	< 4	< 9	< 3	< 8	< 10	< 5	< 6	< 25	< 7
	04/28/2008 - 06/03/2008	< 4	< 5	< 12	< 4	< 11	< 4	< 9	< 13	< 4	< 5	< 32	< 11
	06/03/2008 - 06/30/2008	< 1	< 2	< 3	< 1	< 3	< 2	< 3	< 10	< 1	< 1	< 17	< 5
	06/30/2008 - 07/29/2008	< 1	< 1	< 2	< 1	< 2	< 1	< 2	< 12	< 1	< 1	< 15	< 4
	07/29/2008 - 09/02/2008	< 2	< 3	< 7	< 3	< 5	< 3	< 5	< 14	< 2	< 3	< 25	< 8
	09/02/2008 - 09/29/2008	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 14	< 2	< 2	< 25	< 7
	09/29/2008 - 11/03/2008	< 1	< 1	< 3	< 1	< 2	< 2	< 2	< 12	< 1	< 1	< 53	< 13
	11/03/2008 - 12/02/2008	< 6	< 7	< 11	< 6	< 10	< 6	< 9	< 14	< 6	< 6	< 31	< 13
	12/02/2008 - 12/29/2008	< 3	< 3	< 7	< 4	< 7	< 4	< 7	< 12	< 3	< 3	< 26	< 7
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
15F7	12/31/2007 - 01/29/2008	< 5	< 5	< 12	< 7	< 11	< 5	< 7	< 7	< 5	< 6	< 21	< 7
	01/29/2008 - 03/04/2008	< 5	< 5	< 10	< 6	< 12	< 6	< 10	< 7	< 5	< 7	< 20	< 7
	03/04/2008 - 03/31/2008	< 3	< 2	< 5	< 4	< 6	< 3	< 5	< 5	< 3	< 2	< 13	< 4
	03/31/2008 - 04/28/2008	< 4	< 4	< 11	< 4	< 7	< 6	< 8	< 8	< 5	< 5	< 21	< 6
	04/28/2008 - 06/03/2008	< 4	< 4	< 8	< 3	< 8	< 4	< 7	< 12	< 4	< 4	< 24	< 7
	06/03/2008 - 06/30/2008	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 11	< 2	< 2	< 19	< 6
	06/30/2008 - 07/29/2008	< 1	< 1	< 2	< 1	< 2	< 1	< 2	< 12	< 1	< 1	< 16	< 4
	07/29/2008 - 09/02/2008	< 2	< 2	< 5	< 2	< 4	< 3	< 4	< 13	< 2	< 2	< 22	< 8
	09/02/2008 - 09/29/2008	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 11	< 1	< 2	< 18	< 6
	09/29/2008 - 11/03/2008	< 1	< 1	< 3	< 1	< 2	< 1	< 3	< 11	< 1	< 1	< 44	< 12
	11/03/2008 - 12/02/2008	< 5	< 5	< 10	< 5	< 10	< 6	< 7	< 12	< 5	< 5	< 27	< 7
	12/02/2008 - 12/29/2008	< 3	< 4	< 8	< 3	< 8	< 5	< 7	< 13	< 3	< 4	< 26	< 9
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

TABLE C-II.3 CONCENTRATIONS OF GAMMA EMITTERS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2008

RESULTS IN UNITS OF PCI/LITER ± 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
16C2	12/31/2007 - 01/29/2008	< 4	< 4	< 8	< 5	< 8	< 5	< 7	< 6	< 4	< 4	< 17	< 5
	01/29/2008 - 03/04/2008	< 5	< 5	< 9	< 4	< 11	< 4	< 8	< 6	< 5	< 5	< 16	< 5
	03/04/2008 - 03/31/2008	< 4	< 6	< 11	< 6	< 8	< 4	< 10	< 9	< 5	< 6	< 29	< 8
	03/31/2008 - 04/28/2008	< 4	< 4	< 8	< 5	< 9	< 4	< 7	< 8	< 4	< 5	< 21	< 7
	04/28/2008 - 06/03/2008	< 5	< 5	< 9	< 5	< 11	< 6	< 10	< 13	< 5	< 5	< 30	< 11
	06/03/2008 - 06/30/2008	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 13	< 2	< 2	< 22	< 7
	06/30/2008 - 07/29/2008	< 1	< 1	< 3	< 1	< 2	< 1	< 2	< 15	< 1	< 1	< 19	< 6
	07/29/2008 - 09/02/2008	< 2	< 3	< 6	< 4	< 5	< 3	< 5	< 14	< 2	< 2	< 25	< 9
	09/02/2008 - 09/29/2008	< 2	< 2	< 4	< 1	< 3	< 2	< 3	< 11	< 1	< 2	< 18	< 6
	09/29/2008 - 11/03/2008	< 1	< 1	< 4	< 1	< 2	< 1	< 2	< 12	< 1	< 1	< 50	< 14
	11/03/2008 - 12/02/2008	< 6	< 6	< 13	< 6	< 11	< 7	< 11	< 14	< 5	< 7	< 31	< 9
	12/02/2008 - 12/29/2008	< 3	< 5	< 11	< 4	< 9	< 4	< 7	< 14	< 4	< 4	< 32	< 10
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-
28F3	12/31/2007 - 01/29/2008	< 5	< 6	< 11	< 6	< 15	< 6	< 9	< 7	< 5	< 6	< 23	< 7
	01/29/2008 - 03/04/2008	< 5	< 5	< 10	< 5	< 9	< 5	< 9	< 5	< 5	< 5	< 20	< 5
	03/04/2008 - 03/31/2008	< 3	< 4	< 6	< 4	< 7	< 3	< 6	< 6	< 3	< 4	< 14	< 5
	03/31/2008 - 04/28/2008	< 4	< 5	< 12	< 5	< 10	< 4	< 9	< 11	< 5	< 6	< 30	< 7
	04/28/2008 - 06/03/2008	< 4	< 4	< 10	< 5	< 11	< 5	< 8	< 12	< 4	< 5	< 25	< 10
	06/03/2008 - 06/30/2008	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 11	< 1	< 2	< 18	< 5
	06/30/2008 - 07/29/2008	< 1	< 1	< 3	< 1	< 2	< 1	< 2	< 13	< 1	< 1	< 17	< 5
	07/29/2008 - 09/02/2008	< 2	< 2	< 5	< 2	< 5	< 3	< 4	< 12	< 2	< 2	< 24	< 7
	09/02/2008 - 09/29/2008	< 2	< 2	< 4	< 1	< 3	< 2	< 3	< 13	< 2	< 2	< 21	< 6
	09/29/2008 - 11/03/2008	< 1	< 1	< 3	< 1	< 2	< 1	< 2	< 11	< 1	< 1	< 35	< 15
	11/03/2008 - 12/02/2008	< 4	< 5	< 11	< 7	< 9	< 5	< 10	< 12	< 5	< 5	< 25	< 10
	12/02/2008 - 12/29/2008	< 4	< 4	< 10	< 5	< 7	< 4	< 8	< 14	< 4	< 4	< 26	< 10
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

TABLE C-III.1 CONCENTRATIONS OF GAMMA EMMITTERS IN PREDATOR AND BOTTOM FEEDER (FISH) SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2008

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									
	05/08/2008	3300 ± 508	< 27	< 31	< 73	< 24	< 68	< 72	< 26	< 28
	10/14/2008	3290 ± 766	< 35	< 53	< 100	< 41	< 86	< 516	< 42	< 39
	MEAN	3295 ± 14	-	-	-	-	-	-	-	-
16C5	BOTTOM FEEDER									
	05/08/2008	2660 ± 559	< 31	< 28	< 75	< 38	< 57	< 79	< 26	< 31
	10/14/2008	3460 ± 621	< 40	< 37	< 88	< 39	< 75	< 323	< 28	< 35
	MEAN	3060 ± 1131	-	-	-	-	-	-	-	-
29C1	PREDATOR									
	05/07/2008	2690 ± 731	< 36	< 36	< 92	< 46	< 95	< 105	< 42	< 41
	10/13/2008	2850 ± 635	< 47	< 51	< 105	< 46	< 91	< 490	< 45	< 47
	MEAN	2770 ± 226	-	-	-	-	-	-	-	-
29C1	BOTTOM FEEDER									
	05/07/2008	3680 ± 629	< 39	< 35	< 73	< 37	< 84	< 95	< 38	< 37
	10/13/2008	3350 ± 598	< 41	< 46	< 105	< 32	< 95	< 454	< 40	< 37
	MEAN	3515 ± 467	-	-	-	-	-	-	-	-

TABLE C-IV.1 CONCENTRATIONS OF GAMMA EMITTERS IN SEDIMENT SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2008

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	06/11/2008	1560 ± 774	16600 ± 1780	< 103	< 83	< 90	< 235	< 65	176 ± 69
	12/08/2008	< 814	12900 ± 1440	< 66	< 87	< 45	< 1550	< 55	< 77
	MEAN	1560 ± 0	14750 ± 5233	-	-	-	-	-	176 ± 0
16C4	06/11/2008	5760 ± 1140	17700 ± 2180	< 129	< 108	< 119	< 337	< 94	162 ± 123
	12/08/2008	5990 ± 1520	8920 ± 1370	< 128	< 122	< 144	< 4030	< 100	< 124
	MEAN	5875 ± 325	13310 ± 12417	-	-	-	-	-	162 ± 0
33A2	06/11/2008	< 795	13000 ± 1650	< 85	< 75	< 75	< 220	< 71	< 74
	12/08/2008	< 766	14500 ± 1450	< 62	< 63	< 53	< 1340	< 59	< 58
	MEAN	-	13750 ± 2121	-	-	-	-	-	-

TABLE C-V.1 **CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2008**

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

COLLECTION PERIOD	GROUP I			GROUP II	GROUP III
	10S3	11S1	14S1	13C1	22G1
12/31/2007 - 01/07/2008	21 ± 5	23 ± 6	18 ± 5	29 ± 6	24 ± 6
01/07/2008 - 01/14/2008	13 ± 5	12 ± 5	15 ± 5	12 ± 5	16 ± 5
01/14/2008 - 01/22/2008	19 ± 4	15 ± 5	21 ± 5	22 ± 5	20 ± 5
01/22/2008 - 01/28/2008	21 ± 6	24 ± 6	22 ± 6	21 ± 6	22 ± 6
01/28/2008 - 02/04/2008	27 ± 5	32 ± 6	28 ± 6	23 ± 5	27 ± 6
02/04/2008 - 02/11/2008	15 ± 5	18 ± 5	15 ± 5	14 ± 5	18 ± 5
02/11/2008 - 02/19/2008	19 ± 5	18 ± 5	21 ± 5	18 ± 5	19 ± 5
02/19/2008 - 02/25/2008	12 ± 5	22 ± 6	17 ± 6	16 ± 6	17 ± 6
02/25/2008 - 03/03/2008	10 ± 5	10 ± 5	12 ± 5	12 ± 5	15 ± 5
03/03/2008 - 03/10/2008	12 ± 5	12 ± 5	10 ± 5	13 ± 5	9 ± 5
03/10/2008 - 03/17/2008	19 ± 5	19 ± 5	22 ± 5	16 ± 5	20 ± 5
03/17/2008 - 03/24/2008	14 ± 4	15 ± 5	14 ± 5	11 ± 5	11 ± 5
03/24/2008 - 03/31/2008	12 ± 5	16 ± 5	16 ± 5	16 ± 5	17 ± 5
03/31/2008 - 04/07/2008	13 ± 4	15 ± 4	13 ± 4	14 ± 4	13 ± 4
04/07/2008 - 04/14/2008	8 ± 4	8 ± 4	7 ± 5	11 ± 5	10 ± 5
04/14/2008 - 04/21/2008	17 ± 5	14 ± 5	18 ± 5	21 ± 5	19 ± 5
04/21/2008 - 04/28/2008	18 ± 5	18 ± 5	15 ± 5	18 ± 5	18 ± 5
04/28/2008 - 05/05/2008	16 ± 4	17 ± 5	20 ± 5	15 ± 5	18 ± 5
05/05/2008 - 05/12/2008	13 ± 4	13 ± 5	15 ± 5	14 ± 5	15 ± 5
05/12/2008 - 05/20/2008	10 ± 4	10 ± 4	9 ± 4	< 6	12 ± 4
05/20/2008 - 05/27/2008	7 ± 4	8 ± 4	7 ± 4	9 ± 5	8 ± 5
05/27/2008 - 06/02/2008	14 ± 5	8 ± 5	16 ± 5	15 ± 6	11 ± 5
06/02/2008 - 06/09/2008	9 ± 4	13 ± 5	10 ± 5	13 ± 5	9 ± 5
06/09/2008 - 06/16/2008	15 ± 5	19 ± 5	17 ± 5	18 ± 5	15 ± 5
06/16/2008 - 06/23/2008	13 ± 4	12 ± 5	12 ± 5	16 ± 5	13 ± 5
06/23/2008 - 06/30/2008	16 ± 5	17 ± 5	14 ± 5	14 ± 5	14 ± 5
06/30/2008 - 07/07/2008	14 ± 5	16 ± 5	17 ± 5	13 ± 5	19 ± 5
07/07/2008 - 07/14/2008	15 ± 5	13 ± 5	12 ± 5	15 ± 5	14 ± 5
07/14/2008 - 07/21/2008	18 ± 5	24 ± 6	20 ± 6	26 ± 6	22 ± 6
07/21/2008 - 07/28/2008	17 ± 5	19 ± 5	(1)	24 ± 5	21 ± 5
07/28/2008 - 08/04/2008	22 ± 5	22 ± 5	21 ± 5	18 ± 5	24 ± 5
08/04/2008 - 08/11/2008	13 ± 5	14 ± 5	19 ± 5	14 ± 5	14 ± 5
08/11/2008 - 08/18/2008	15 ± 5	17 ± 5	17 ± 5	14 ± 5	14 ± 5
08/18/2008 - 08/25/2008	16 ± 5	18 ± 5	16 ± 5	14 ± 5	18 ± 5
08/25/2008 - 09/01/2008	11 ± 5	13 ± 5	13 ± 5	12 ± 5	9 ± 5
09/01/2008 - 09/09/2008	25 ± 5	22 ± 5	22 ± 5	23 ± 5	22 ± 5
09/09/2008 - 09/15/2008	13 ± 5	15 ± 6	13 ± 5	18 ± 6	21 ± 6
09/15/2008 - 09/22/2008	14 ± 5	11 ± 4	20 ± 5	15 ± 5	16 ± 5
09/22/2008 - 09/29/2008	10 ± 5	10 ± 5	10 ± 5	(1)	10 ± 5
09/29/2008 - 10/07/2008	11 ± 4	13 ± 4	12 ± 4	15 ± 4	17 ± 5
10/07/2008 - 10/13/2008	20 ± 6	21 ± 6	19 ± 6	21 ± 6	17 ± 6
10/13/2008 - 10/20/2008	21 ± 6	22 ± 6	24 ± 6	21 ± 6	19 ± 6
10/20/2008 - 10/27/2008	15 ± 5	14 ± 5	15 ± 5	15 ± 5	12 ± 5
10/27/2008 - 11/04/2008	16 ± 4	17 ± 5	19 ± 5	17 ± 4	17 ± 5
11/04/2008 - 11/10/2008	17 ± 5	14 ± 5	11 ± 5	19 ± 6	16 ± 5
11/10/2008 - 11/17/2008	10 ± 5	< 7	< 7	< 7	< 7
11/17/2008 - 11/24/2008	14 ± 5	17 ± 5	14 ± 5	16 ± 5	14 ± 5
11/24/2008 - 12/01/2008	20 ± 5	23 ± 5	21 ± 5	24 ± 5	19 ± 5
12/01/2008 - 12/08/2008	19 ± 5	17 ± 5	17 ± 5	17 ± 5	14 ± 5
12/08/2008 - 12/15/2008	18 ± 5	17 ± 5	17 ± 5	16 ± 5	15 ± 5
12/15/2008 - 12/22/2008	14 ± 5	17 ± 5	11 ± 5	11 ± 5	13 ± 5
12/22/2008 - 12/29/2008	28 ± 5	33 ± 6	32 ± 6	32 ± 6	38 ± 6
MEAN	16 ± 9	17 ± 10	16 ± 10	17 ± 10	16 ± 11

* THE MEAN AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

TABLE C-V.2 **MONTHLY AND YEARLY MEAN VALUES OF GROSS BETA CONCENTRATIONS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2008**

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

GROUP I - ON-SITE LOCATIONS				GROUP II - INTERMEDIATE DISTANCE LOCATIONS				GROUP III - CONTROL LOCATIONS			
COLLECTION PERIOD	MIN	MAX	MEAN ± 2SD	COLLECTION PERIOD	MIN	MAX	MEAN ± 2SD	COLLECTION PERIOD	MIN	MAX	MEAN ± 2SD
12/31/2007 - 01/28/2008	12	24	18.6 ± 7.9	12/31/07 - 01/28/08	12	29	21.0 ± 14.2	12/31/07 - 01/28/08	16	24	20.4 ± 6.9
01/28/2008 - 02/25/2008	12	32	20.1 ± 11.7	01/28/08 - 02/25/08	14	23	17.7 ± 7.5	01/28/08 - 02/25/08	17	27	20.1 ± 8.9
02/25/2008 - 03/31/2008	10	22	14.2 ± 7.3	02/25/08 - 03/31/08	11	16	13.6 ± 5.2	02/25/08 - 03/31/08	9	20	14.3 ± 8.9
03/31/2008 - 04/28/2008	7	18	13.7 ± 8.1	03/31/08 - 04/28/08	11	21	16.2 ± 9.0	03/31/08 - 04/28/08	10	19	15.0 ± 7.9
04/28/2008 - 06/02/2008	7	20	12.3 ± 8.1	04/28/08 - 06/02/08	9	15	13.2 ± 5.7	04/28/08 - 06/02/08	8	18	12.9 ± 7.3
06/02/2008 - 06/30/2008	9	19	13.8 ± 5.9	06/02/08 - 06/30/08	13	18	15.1 ± 4.5	06/02/08 - 06/30/08	9	15	12.5 ± 5.4
06/30/2008 - 07/28/2008	12	24	16.8 ± 6.7	06/30/08 - 07/28/08	13	26	19.6 ± 13.2	06/30/08 - 07/28/08	14	22	18.9 ± 7.2
07/28/2008 - 09/01/2008	11	22	16.4 ± 7.0	07/28/08 - 09/01/08	12	18	14.5 ± 4.0	07/28/08 - 09/01/08	9	24	15.7 ± 11.4
09/01/2008 - 09/29/2008	10	25	15.5 ± 10.7	09/01/08 - 09/22/08	15	23	18.4 ± 7.9	09/01/08 - 09/29/08	10	22	17.0 ± 11.0
09/29/2008 - 10/27/2008	11	24	17.3 ± 8.9	09/29/08 - 10/27/08	15	21	17.6 ± 7.0	09/29/08 - 10/27/08	12	19	16.3 ± 5.4
10/27/2008 - 12/01/2008	10	23	16.3 ± 7.5	10/27/08 - 12/01/08	16	24	18.8 ± 7.0	10/27/08 - 12/01/08	14	19	16.5 ± 4.3
12/01/2008 - 12/29/2008	11	33	20.0 ± 14.0	12/01/08 - 12/29/08	11	32	19.1 ± 17.8	12/01/08 - 12/29/08	13	38	19.9 ± 24.3
12/31/2007 - 12/29/2008	7	33	16.1 ± 9.8	12/31/07 - 12/29/08	11	32	16.9 ± 9.6	12/31/07 - 12/29/08	8	38	16.5 ± 10.5

TABLE C-V.3 CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2008

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	12/31/2007 - 03/31/2008	74 ± 27	< 3	< 4	< 3	< 3	< 2
	03/31/2008 - 06/30/2008	81 ± 29	< 2	< 4	< 3	< 3	< 2
	06/30/2008 - 09/29/2008	111 ± 77	< 3	< 8	< 3	< 4	< 3
	09/29/2008 - 12/29/2008	61 ± 25	< 3	< 3	< 2	< 3	< 2
	MEAN	82 ± 42	-	-	-	-	-
11S1	12/31/2007 - 03/31/2008	76 ± 21	< 3	< 3	< 2	< 3	< 2
	03/31/2008 - 06/30/2008	97 ± 24	< 2	< 3	< 2	< 2	< 2
	06/30/2008 - 09/29/2008	145 ± 73	< 4	< 10	< 5	< 5	< 3
	09/29/2008 - 12/29/2008	60 ± 25	< 4	< 4	< 3	< 3	< 3
	MEAN	94 ± 74	-	-	-	-	-
13C1	12/31/2007 - 03/31/2008	64 ± 25	< 3	< 4	< 3	< 3	< 2
	03/31/2008 - 06/30/2008	94 ± 28	< 3	< 4	< 4	< 3	< 3
	06/30/2008 - 09/29/2008	156 ± 65	< 4	< 10	< 4	< 4	< 4
	09/29/2008 - 12/29/2008	79 ± 22	< 2	< 3	< 3	< 2	< 2
	MEAN	98 ± 81	-	-	-	-	-
14S1	12/31/2007 - 03/31/2008	68 ± 33	< 3	< 4	< 3	< 3	< 3
	03/31/2008 - 06/30/2008	74 ± 33	< 3	< 4	< 2	< 2	< 2
	06/30/2008 - 09/29/2008	128 ± 75	< 5	< 12	< 4	< 5	< 3
	09/29/2008 - 12/29/2008	56 ± 25	< 3	< 3	< 3	< 3	< 3
	MEAN	82 ± 64	-	-	-	-	-
22G1	12/31/2007 - 03/31/2008	85 ± 33	< 3	< 4	< 4	< 4	< 4
	03/31/2008 - 06/30/2008	66 ± 31	< 2	< 4	< 3	< 3	< 3
	06/30/2008 - 09/29/2008	134 ± 48	< 5	< 9	< 3	< 4	< 3
	09/29/2008 - 12/29/2008	49 ± 19	< 2	< 3	< 3	< 3	< 3
	MEAN	83 ± 73	-	-	-	-	-

TABLE C-VI.1 **CONCENTRATIONS OF I-131 IN AIR IODINE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2008**

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

COLLECTION PERIOD	GROUP I			GROUP II	GROUP III
	10S3	11S1	14S1	13C1	22G1
12/31/2007 - 01/07/2008	< 19	< 31	< 31	< 31	< 31
01/07/2008 - 01/14/2008	< 15	< 30	< 31	< 31	< 31
01/14/2008 - 01/22/2008	< 18	< 20	< 20	< 20	< 12
01/22/2008 - 01/28/2008	< 26	< 51	< 51	< 52	< 51
01/28/2008 - 02/04/2008	< 16	< 27	< 27	< 27	< 27
02/04/2008 - 02/11/2008	< 31	< 33	< 34	< 25	< 34
02/11/2008 - 02/19/2008	< 20	< 39	< 39	< 40	< 39
02/19/2008 - 02/25/2008	< 29	< 47	< 48	< 48	< 48
02/25/2008 - 03/03/2008	< 10	< 21	< 21	< 21	< 21
03/03/2008 - 03/10/2008	< 22	< 38	< 39	< 39	< 39
03/10/2008 - 03/17/2008	< 48	< 52	< 53	< 54	< 29
03/17/2008 - 03/24/2008	< 24	< 40	< 40	< 40	< 40
03/24/2008 - 03/31/2008	< 14	< 36	< 36	< 37	< 36
03/31/2008 - 04/07/2008	< 16	< 18	< 18	< 18	< 11
04/07/2008 - 04/14/2008	< 19	< 42	< 42	< 43	< 42
04/14/2008 - 04/21/2008	< 57	< 61	< 62	< 27	< 62
04/21/2008 - 04/28/2008	< 19	< 48	< 49	< 49	< 49
04/28/2008 - 05/05/2008	< 23	< 58	< 59	< 60	< 59
05/05/2008 - 05/12/2008	< 33	< 20	< 37	< 37	< 37
05/12/2008 - 05/20/2008	< 17	< 34	< 34	< 35	< 34
05/20/2008 - 05/27/2008	< 25	< 54	< 56	< 55	< 56
05/27/2008 - 06/02/2008	< 27	< 68	< 68	< 70	< 68
06/02/2008 - 06/09/2008	< 19	< 49	< 50	< 50	< 50
06/09/2008 - 06/16/2008	< 13	< 27	< 27	< 28	< 27
06/16/2008 - 06/23/2008	< 29	< 57	< 59	< 58	< 58
06/23/2008 - 06/30/2008	< 44	< 59	< 59	< 59	< 59
06/30/2008 - 07/07/2008	< 40	< 66	< 67	< 66	< 67
07/07/2008 - 07/14/2008	< 22	< 41	< 41	< 42	< 41
07/14/2008 - 07/21/2008	< 20	< 29	< 30	< 29	< 30
07/21/2008 - 07/28/2008	< 12	< 20	(1)	< 20	< 20
07/28/2008 - 08/04/2008	< 23	< 42	< 43	< 42	< 43
08/04/2008 - 08/11/2008	< 37	< 67	< 67	< 66	< 68
08/11/2008 - 08/18/2008	< 29	< 69	< 70	< 69	< 70
08/18/2008 - 08/25/2008	< 23	< 54	< 54	< 53	< 54
08/25/2008 - 09/01/2008	< 31	< 62	< 64	< 62	< 64
09/01/2008 - 09/09/2008	< 22	< 51	< 51	< 51	< 51
09/09/2008 - 09/15/2008	< 22	< 50	< 51	< 50	< 49
09/15/2008 - 09/22/2008	< 35	< 44	< 45	< 44	< 46
09/22/2008 - 09/29/2008	< 59	< 59	< 59	(1)	< 59
09/29/2008 - 10/07/2008	< 33	< 65	< 66	< 65	< 66
10/07/2008 - 10/13/2008	< 24	< 43	< 44	< 43	< 44
10/13/2008 - 10/20/2008	< 26	< 62	< 62	< 61	< 62
10/20/2008 - 10/27/2008	< 23	< 53	< 54	< 53	< 54
10/27/2008 - 11/04/2008	< 25	< 59	< 59	< 58	< 60
11/04/2008 - 11/10/2008	< 25	< 60	< 60	< 59	< 60
11/10/2008 - 11/17/2008	< 52	< 68	< 58	< 68	< 58
11/17/2008 - 11/24/2008	< 24	< 57	< 57	< 56	< 57
11/24/2008 - 12/01/2008	< 20	< 47	< 47	< 46	< 47
12/01/2008 - 12/08/2008	< 37	< 55	< 56	< 55	< 56
12/08/2008 - 12/15/2008	< 31	< 63	< 63	< 62	< 63
12/15/2008 - 12/22/2008	< 28	< 66	< 67	< 65	< 67
12/22/2008 - 12/29/2008	< 26	< 59	< 60	< 59	< 60
MEAN	-	-	-	-	-

(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, 2008

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

	CONTROL FARMS		INDICATOR FARMS				
COLLECTION PERIOD	23F1	36E1	10F4	18E1	19B1	25C1	25E1
01/15/2008	< 0.6	< 0.7	< 0.5	< 0.7	< 0.7	< 0.7	< 1.0
02/12/2008	< 0.6		< 0.6	< 0.6	< 0.6	< 0.8	
03/11/2008	< 0.6		< 0.9	< 0.7	< 0.6	< 0.5	
04/01/2008	< 0.5	< 0.5	< 0.3	< 0.4	< 0.5	< 0.6	< 0.6
04/15/2008	< 0.5		< 0.6	< 0.5	< 0.6	< 0.5	
04/29/2008	< 0.5		< 0.5	< 0.6	< 0.5	< 0.4	
05/13/2008	< 0.8		< 0.8	< 0.9	< 0.8	< 0.7	
05/27/2008	< 0.9		< 0.8	< 0.8	< 0.7	< 0.8	
06/10/2008	< 0.8		< 0.6	< 0.8	< 0.7	< 0.9	
06/24/2008	< 0.4		< 0.4	< 0.4	< 0.4	< 0.6	
07/08/2008	< 0.8	< 0.8	< 0.7	< 0.8	< 0.7	< 0.8	< 0.6
07/22/2008	< 0.8		< 0.7	< 0.8	< 0.7	< 0.8	
08/05/2008	< 0.6		< 0.7	< 0.6	< 0.6	< 0.7	
08/19/2008	< 0.8		< 0.9	< 0.8	< 0.9	< 0.9	
09/02/2008	< 0.6		< 0.6	< 0.5	< 0.5	< 0.6	
09/16/2008	< 0.5		< 0.6	< 0.5	< 0.5	< 0.6	
09/30/2008	< 0.9		< 1.0	< 0.8	< 0.9	< 0.9	
10/14/2008	< 0.6	< 0.8	< 0.7	< 0.6	< 0.6	< 0.8	< 0.8
10/29/2008	< 0.8		< 0.6	< 0.9	< 0.8	< 0.8	
11/11/2008	< 0.9		< 0.8	< 0.9	< 0.7	< 0.9	
11/25/2008	< 0.7		< 0.7	< 0.7	< 0.8	< 0.8	
12/16/2008	< 0.8		< 0.6	< 0.6	< 0.8	< 0.6	
MEAN	-	-	-	-	-	-	-

TABLE C-VII.2 CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2008

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	K-40	Cs-134	Cs-137	Ba-140	La-140
10F4	01/15/2008	1160 ± 108	< 4	< 4	< 21	< 6
	02/12/2008	1450 ± 165	< 8	< 9	< 42	< 14
	03/11/2008	1230 ± 114	< 4	< 5	< 19	< 5
	04/01/2008	1200 ± 161	< 6	< 7	< 25	< 5
	04/15/2008	1220 ± 146	< 7	< 8	< 36	< 12
	04/29/2008	1230 ± 144	< 5	< 6	< 21	< 6
	05/13/2008	1190 ± 152	< 6	< 6	< 36	< 8
	05/27/2008	1300 ± 143	< 6	< 6	< 31	< 6
	06/10/2008	1160 ± 137	< 5	< 6	< 17	< 7
	06/24/2008	1290 ± 150	< 7	< 6	< 43	< 15
	07/08/2008	1240 ± 113	< 4	< 5	< 31	< 8
	07/22/2008	1320 ± 129	< 5	< 6	< 44	< 14
	08/05/2008	1410 ± 135	< 5	< 6	< 59	< 12
	08/19/2008	1190 ± 138	< 5	< 6	< 41	< 11
	09/02/2008	1220 ± 123	< 5	< 6	< 36	< 10
	09/16/2008	1370 ± 151	< 7	< 7	< 43	< 11
	09/30/2008	1280 ± 55	< 2	< 2	< 52	< 15
	10/14/2008	1280 ± 134	< 5	< 6	< 44	< 14
	10/29/2008	1230 ± 54	< 2	< 2	< 48	< 14
	11/11/2008	1290 ± 42	< 1	< 1	< 41	< 13
	11/25/2008	1270 ± 67	< 1	< 1	< 37	< 10
	12/16/2008	1210 ± 141	< 6	< 6	< 31	< 10
	MEAN	1261 ± 152	-	-	-	-
18E1	01/15/2008	1200 ± 126	< 5	< 6	< 26	< 9
	02/12/2008	1370 ± 132	< 5	< 6	< 24	< 7
	03/11/2008	1180 ± 145	< 7	< 7	< 33	< 10
	04/01/2008	1330 ± 147	< 6	< 7	< 22	< 7
	04/15/2008	1210 ± 131	< 6	< 6	< 27	< 8
	04/29/2008	1170 ± 141	< 6	< 7	< 27	< 7
	05/13/2008	1310 ± 181	< 7	< 8	< 34	< 13
	05/27/2008	1310 ± 157	< 5	< 6	< 31	< 4
	06/10/2008	1190 ± 171	< 7	< 8	< 29	< 8
	06/24/2008	1400 ± 171	< 7	< 7	< 47	< 15
	07/08/2008	1290 ± 140	< 6	< 7	< 43	< 15
	07/22/2008	1270 ± 118	< 5	< 5	< 36	< 10
	08/05/2008	1080 ± 118	< 5	< 5	< 53	< 13
	08/19/2008	1160 ± 104	< 4	< 5	< 33	< 8
	09/02/2008	1190 ± 146	< 6	< 6	< 51	< 12
	09/16/2008	1130 ± 118	< 5	< 5	< 31	< 7
	09/30/2008	1300 ± 51	< 2	< 2	< 41	< 12
	10/14/2008	1170 ± 131	< 5	< 6	< 35	< 12
	10/28/2008	1360 ± 51	< 2	< 2	< 42	< 12
	11/11/2008	1190 ± 53	< 1	< 1	< 52	< 12
	11/25/2008	1310 ± 80	< 2	< 2	< 48	< 13
	12/16/2008	1090 ± 150	< 6	< 8	< 32	< 7
	MEAN	1237 ± 183	-	-	-	-

TABLE C-VII.2 CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2008

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	K-40	Cs-134	Cs-137	Ba-140	La-140
19B1	01/15/2008	1310 ± 112	< 4	< 5	< 19	< 6
	02/12/2008	1280 ± 151	< 6	< 6	< 35	< 8
	03/11/2008	1140 ± 130	< 5	< 6	< 28	< 8
	04/01/2008	1280 ± 146	< 6	< 6	< 23	< 7
	04/15/2008	1290 ± 152	< 6	< 8	< 28	< 12
	04/29/2008	1310 ± 160	< 5	< 6	< 23	< 7
	05/13/2008	1220 ± 169	< 7	< 8	< 29	< 14
	05/27/2008	1320 ± 126	< 5	< 5	< 30	< 10
	06/10/2008	1270 ± 158	< 5	< 9	< 26	< 7
	06/24/2008	1320 ± 133	< 7	< 6	< 41	< 13
	07/08/2008	1390 ± 129	< 5	< 6	< 37	< 9
	07/22/2008	1400 ± 148	< 5	< 6	< 44	< 14
	08/05/2008	1380 ± 91	< 4	< 3	< 36	< 13
	08/19/2008	1380 ± 131	< 6	< 6	< 46	< 13
	09/02/2008	1300 ± 134	< 4	< 6	< 40	< 12
	09/16/2008	1310 ± 148	< 7	< 8	< 37	< 10
	09/30/2008	1300 ± 57	< 2	< 3	< 51	< 15
	10/14/2008	1300 ± 143	< 5	< 6	< 37	< 10
	10/28/2008	1350 ± 57	< 2	< 2	< 46	< 14
	11/11/2008	1290 ± 50	< 1	< 1	< 43	< 14
	11/25/2008	1370 ± 69	< 1	< 2	< 39	< 11
	12/16/2008	1390 ± 149	< 5	< 6	< 31	< 8
	MEAN	1314 ± 121	-	-	-	-
23F1	01/15/2008	1160 ± 132	< 5	< 6	< 30	< 7
	02/12/2008	1310 ± 130	< 3	< 4	< 14	< 4
	03/11/2008	1130 ± 142	< 6	< 7	< 29	< 7
	04/01/2008	1130 ± 159	< 6	< 8	< 26	< 5
	04/15/2008	1050 ± 151	< 6	< 7	< 36	< 9
	04/29/2008	1180 ± 153	< 6	< 7	< 22	< 5
	05/13/2008	1310 ± 212	< 6	< 8	< 37	< 9
	05/27/2008	1320 ± 144	< 6	< 7	< 38	< 8
	06/10/2008	1290 ± 171	< 8	< 8	< 27	< 11
	06/24/2008	1120 ± 153	< 7	< 8	< 58	< 14
	07/08/2008	1240 ± 146	< 7	< 7	< 46	< 14
	07/22/2008	1360 ± 121	< 5	< 5	< 43	< 15
	08/05/2008	1280 ± 112	< 4	< 5	< 51	< 14
	08/19/2008	1270 ± 143	< 5	< 6	< 36	< 12
	09/02/2008	1260 ± 110	< 5	< 5	< 36	< 13
	09/16/2008	1310 ± 136	< 6	< 7	< 31	< 10
	09/30/2008	1330 ± 46	< 2	< 2	< 37	< 12
	10/14/2008	1270 ± 113	< 5	< 5	< 35	< 8
	10/28/2008	1340 ± 52	< 2	< 2	< 49	< 15
	11/11/2008	1260 ± 44	< 1	< 1	< 39	< 14
	11/25/2008	1210 ± 66	< 1	< 2	< 36	< 12
	12/16/2008	1290 ± 156	< 6	< 8	< 33	< 8
	MEAN	1246 ± 168	-	-	-	-

TABLE C-VII.2 CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2008

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	K-40	Cs-134	Cs-137	Ba-140	La-140
25C1	01/15/2008	1340 ± 127	< 5	< 6	< 28	< 8
	02/12/2008	1110 ± 151	< 6	< 8	< 36	< 11
	03/11/2008	1310 ± 161	< 7	< 7	< 28	< 7
	04/01/2008	1280 ± 141	< 6	< 7	< 24	< 7
	04/15/2008	1330 ± 159	< 6	< 6	< 29	< 8
	04/29/2008	1210 ± 139	< 6	< 7	< 26	< 7
	05/13/2008	1140 ± 156	< 7	< 7	< 31	< 8
	05/27/2008	1430 ± 134	< 5	< 6	< 35	< 8
	06/10/2008	1230 ± 189	< 8	< 9	< 24	< 7
	06/24/2008	1200 ± 127	< 5	< 6	< 31	< 12
	07/08/2008	1160 ± 122	< 9	< 9	< 45	< 14
	07/22/2008	1210 ± 107	< 4	< 5	< 37	< 13
	08/05/2008	1330 ± 125	< 4	< 5	< 51	< 14
	08/19/2008	1170 ± 123	< 5	< 6	< 35	< 13
	09/02/2008	1270 ± 153	< 5	< 7	< 41	< 12
	09/16/2008	1330 ± 146	< 5	< 5	< 40	< 7
	09/30/2008	1340 ± 52	< 2	< 2	< 44	< 11
	10/14/2008	1460 ± 141	< 6	< 6	< 40	< 8
	10/28/2008	1260 ± 44	< 2	< 2	< 40	< 12
	11/11/2008	1280 ± 52	< 1	< 1	< 54	< 15
	11/25/2008	1450 ± 77	< 2	< 2	< 40	< 12
	12/16/2008	1400 ± 158	< 6	< 7	< 34	< 10
	MEAN	1284 ± 199	-	-	-	-
25E1	01/15/2008	1090 ± 120	< 5	< 5	< 27	< 7
	04/01/2008	1270 ± 139	< 5	< 6	< 22	< 7
	07/08/2008	1300 ± 158	< 7	< 7	< 39	< 9
	10/14/2008	1230 ± 102	< 4	< 4	< 44	< 12
	MEAN	1223 ± 186	-	-	-	-
36E1	01/15/2008	1200 ± 104	< 3	< 4	< 19	< 7
	04/01/2008	1090 ± 114	< 5	< 5	< 12	< 6
	07/08/2008	1250 ± 117	< 5	< 5	< 27	< 7
	10/14/2008	1260 ± 102	< 4	< 5	< 45	< 14
	MEAN	1200 ± 156	-	-	-	-

* THE MEAN AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES

TABLE C-VIII.1 CONCENTRATIONS OF GAMMA EMITTERS IN BROAD LEAFY VEGETATION SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2008

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

STC	COLLECTION PERIOD		Be-7	K-40	Mn-54	Co-58	Co-60	I-131	Cs-134	Cs-137
11S3	06/25/2008	Cabbage	304 ± 185	3300 ± 444	< 20	< 22	< 22	< 56	< 21	< 19
	06/25/2008	Collards	245 ± 210	4830 ± 536	< 21	< 20	< 19	< 57	< 19	< 22
	06/25/2008	Kale	217 ± 113	4210 ± 373	< 17	< 16	< 16	< 44	< 13	< 19
	07/24/2008	Cabbage	170 ± 70	2490 ± 151	< 6	< 7	< 6	< 52	< 5	< 6
	07/24/2008	Collards	254 ± 70	2530 ± 152	< 5	< 6	< 5	< 54	< 5	< 5
	07/24/2008	Kale	234 ± 54	2660 ± 134	< 5	< 6	< 5	< 50	< 5	< 5
	08/25/2008	Cabbage	< 139	2540 ± 275	< 15	< 15	< 16	< 36	< 14	< 17
	08/25/2008	Collards	< 163	3390 ± 348	< 16	< 17	< 14	< 45	< 14	< 17
	08/25/2008	Kale	279 ± 113	3840 ± 330	< 15	< 17	< 18	< 45	< 14	< 15
	09/15/2008	Cabbage	140 ± 67	3160 ± 167	< 8	< 9	< 7	< 54	< 7	< 8
	09/15/2008	Collards	199 ± 68	3180 ± 151	< 6	< 7	< 6	< 47	< 6	< 7
	09/15/2008	Kale	196 ± 72	3360 ± 197	< 9	< 11	< 8	< 59	< 7	< 9
	10/21/2008	Collards	209 ± 77	4040 ± 175	< 4	< 5	< 3	< 59	< 3	< 4
	10/21/2008	Kale	167 ± 65	3790 ± 164	< 3	< 5	< 3	< 58	< 3	< 3
	MEAN		218 ± 96	3380 ± 1408	-	-	-	-	-	-
13S3	06/25/2008	Cabbage	< 250	5000 ± 514	< 23	< 24	< 24	< 59	< 23	< 21
	06/25/2008	Collards	< 195	5540 ± 420	< 20	< 21	< 18	< 54	< 18	< 21
	06/25/2008	Kale	< 108	4630 ± 279	< 12	< 11	< 12	< 24	< 11	< 12
	07/24/2008	Cabbage	104 ± 62	3020 ± 162	< 6	< 7	< 5	< 53	< 5	< 6
	07/24/2008	Collards	724 ± 90	7060 ± 195	< 6	< 7	< 6	< 58	< 5	< 6
	07/24/2008	Kale	253 ± 100	5070 ± 172	< 5	< 5	< 4	< 44	< 4	< 5
	08/25/2008	Cabbage	< 100	1680 ± 200	< 12	< 11	< 10	< 36	< 10	< 10
	08/25/2008	Collards	319 ± 110	5370 ± 332	< 16	< 16	< 15	< 46	< 15	< 16
	08/25/2008	Kale	234 ± 129	4870 ± 392	< 19	< 19	< 15	< 55	< 16	< 19
	09/15/2008	Cabbage	< 67	2270 ± 131	< 6	< 7	< 6	< 48	< 6	< 6
	09/15/2008	Collards	< 85	3510 ± 168	< 7	< 9	< 8	< 55	< 7	< 7
	09/15/2008	Kale	109 ± 55	3320 ± 133	< 6	< 7	< 6	< 47	< 6	< 6
	10/21/2008	Cabbage	207 ± 107	4630 ± 190	< 3	< 4	< 3	< 59	< 3	< 3
	10/21/2008	Collards	119 ± 116	4010 ± 177	< 3	< 4	< 3	< 57	< 3	< 3
	10/21/2008	Kale	90 ± 67	4440 ± 161	< 3	< 4	< 3	< 59	< 3	< 3
	MEAN		240 ± 397	4295 ± 2738	-	-	-	-	-	-

TABLE C-VIII.1 CONCENTRATIONS OF GAMMA EMITTERS IN BROAD LEAFY VEGETATION SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2008

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

STC	COLLECTION PERIOD		Be-7	K-40	Mn-54	Co-58	Co-60	I-131	Cs-134	Cs-137
31G1	06/25/2008	Brussel Sprout Leaves	187 ± 108	5640 ± 349	< 15	< 14	< 16	< 33	< 12	< 14
	06/25/2008	Cabbage	< 139	4200 ± 361	< 16	< 17	< 13	< 44	< 15	< 14
	06/25/2008	Lettuce	286 ± 125	5630 ± 383	< 17	< 17	< 15	< 36	< 14	< 16
	07/24/2008	Brussel Sprout Leaves	521 ± 95	5080 ± 192	< 7	< 8	< 6	< 60	< 6	< 7
	07/24/2008	Cabbage	673 ± 89	3950 ± 172	< 5	< 5	< 4	< 47	< 4	< 5
	07/24/2008	Zucchini Leaves	1290 ± 101	5080 ± 195	< 5	< 5	< 4	< 45	< 4	< 5
	08/25/2008	Broccoli Leaves	< 140	5160 ± 374	< 15	< 17	< 15	< 49	< 13	< 17
	08/25/2008	Cabbage	< 118	4580 ± 302	< 12	< 12	< 12	< 38	< 11	< 12
	08/25/2008	Squash Leaves	615 ± 162	4910 ± 352	< 14	< 15	< 15	< 43	< 13	< 14
	09/15/2008	Broccoli Leaves	74 ± 39	3350 ± 111	< 5	< 6	< 5	< 40	< 5	< 5
	09/15/2008	Cabbage	< 79	2400 ± 142	< 7	< 8	< 7	< 57	< 7	< 8
	09/15/2008	Squash Leaves	2060 ± 79	5220 ± 129	< 5	< 6	< 5	< 43	< 5	< 5
	10/21/2008	Broccoli Leaves	134 ± 67	3980 ± 157	< 3	< 4	< 3	< 55	< 2	< 3
	10/21/2008	Cabbage	< 40	2010 ± 120	< 3	< 4	< 3	< 60	< 3	< 4
	MEAN		649 ± 1296	4371 ± 2269	-	-	-	-	-	-

* THE MEAN AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES

TABLE C-IX.1 QUARTERLY TLD RESULTS FOR LIMERICK GENERATING STATION, 2008

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
2E1	8.3 ± 1.1	9.1 ± 1.1	7.9 ± 1.6	7.9 ± 0.5	8.4 ± 0.5
3S1	7.9 ± 1.8	8.7 ± 0.6	6.6 ± 0.1	7.9 ± 0.8	8.3 ± 0.6
4E1	6.4 ± 1.3	7.2 ± 0.7	5.8 ± 0.4	5.9 ± 0.4	6.6 ± 0.4
5H1	9.2 ± 1.1	9.5 ± 0.9	8.7 ± 0.7	8.8 ± 0.4	9.9 ± 1.3
5S1	8.7 ± 1.5	9.3 ± 1.1	7.6 ± 0.5	8.6 ± 0.2	9.1 ± 0.6
6C1	7.9 ± 1.0	8.2 ± 0.7	7.3 ± 0.5	7.8 ± 0.3	8.4 ± 0.7
7E1	8.3 ± 1.2	9.0 ± 0.5	7.6 ± 0.5	8.1 ± 0.4	8.6 ± 0.6
7S1	8.2 ± 1.3	8.9 ± 0.6	7.3 ± 0.4	8.1 ± 0.6	8.4 ± 0.8
9C1	7.8 ± 1.4	8.4 ± 0.8	6.9 ± 0.4	7.5 ± 0.6	8.2 ± 0.5
10E1	8.0 ± 2.0	9.0 ± 0.6	7.6 ± 0.5	6.7 ± 0.7	8.5 ± 0.9
10F3	7.8 ± 1.5	8.5 ± 0.3	7.6 ± 1.4	6.8 ± 0.9	8.2 ± 0.5
10S3	7.7 ± 0.7	8.1 ± 0.7	7.2 ± 0.4	7.7 ± 0.6	7.8 ± 0.6
11S1	9.0 ± 1.3	9.4 ± 1.1	8.0 ± 0.5	9.3 ± 0.6	9.1 ± 0.7
13C1	6.1 ± 0.9	6.5 ± 0.4	5.9 ± 0.7	5.5 ± 0.2	6.4 ± 0.7
13E1	7.8 ± 1.6	8.8 ± 0.6	7.3 ± 0.5	7.0 ± 1.2	8.0 ± 0.5
13S2	11.9 ± 1.9	12.6 ± 1.2	10.5 ± 0.6	11.9 ± 0.7	12.5 ± 1.4
14S1	7.3 ± 1.5	8.0 ± 0.5	6.2 ± 0.6	7.4 ± 1.3	7.5 ± 0.7
15D1	8.1 ± 0.7	8.5 ± 0.5	7.8 ± 1.1	7.8 ± 0.4	8.1 ± 0.7
16F1	8.2 ± 1.0	8.8 ± 0.4	7.6 ± 0.6	8.2 ± 0.3	8.2 ± 0.4
17B1	7.7 ± 0.9	8.1 ± 0.6	7.3 ± 0.9	7.4 ± 1.0	8.1 ± 0.2
18S2	8.6 ± 1.3	9.2 ± 0.4	7.8 ± 0.8	8.4 ± 1.2	9.0 ± 1.1
19D1	7.4 ± 1.3	8.3 ± 0.9	6.8 ± 0.4	7.2 ± 0.3	7.1 ± 0.4
20D1	7.3 ± 1.1	7.9 ± 0.2	6.8 ± 0.3	6.9 ± 0.4	7.6 ± 0.6
20F1	7.7 ± 1.2	8.5 ± 0.8	7.2 ± 0.3	7.2 ± 0.6	7.8 ± 1.3
21S2	7.2 ± 1.4	7.9 ± 0.4	6.4 ± 0.2	6.9 ± 0.3	7.6 ± 0.4
23S2	7.3 ± 1.6	8.2 ± 0.5	6.5 ± 0.7	6.7 ± 0.2	7.6 ± 0.5
24D1	7.0 ± 1.2	7.7 ± 0.8	6.3 ± 1.1	6.8 ± 0.4	7.1 ± 0.4
25D1	6.8 ± 1.7	8.0 ± 1.1	6.1 ± 0.5	6.3 ± 0.6	6.6 ± 0.5
25S2	7.2 ± 1.5	8.2 ± 0.5	6.4 ± 1.0	7.1 ± 0.6	7.0 ± 0.7
26S3	7.0 ± 1.1	7.4 ± 0.3	6.2 ± 0.4	6.9 ± 0.4	7.3 ± 0.5
28D2	7.3 ± 1.4	8.3 ± 0.7	6.9 ± 0.4	6.7 ± 0.3	7.3 ± 0.4
29E1	7.6 ± 1.4	8.4 ± 0.7	6.9 ± 0.6	7.0 ± 0.5	7.9 ± 0.6
29S1	7.1 ± 1.4	8.1 ± 0.9	6.6 ± 0.6	6.7 ± 0.5	6.9 ± 0.4
31D1	9.0 ± 0.8	9.6 ± 0.2	8.7 ± 0.6	8.8 ± 1.1	8.8 ± 0.3
31D2	8.0 ± 0.5	8.1 ± 0.8	7.7 ± 1.2	7.8 ± 0.4	8.2 ± 0.7
31S1	8.0 ± 1.1	8.7 ± 1.4	7.5 ± 0.8	7.6 ± 0.8	8.0 ± 0.4
34E1	7.6 ± 0.7	7.9 ± 0.9	7.1 ± 0.8	7.5 ± 0.5	7.8 ± 0.8
34S2	8.2 ± 1.1	8.9 ± 1.1	7.6 ± 1.0	7.9 ± 0.3	8.4 ± 1.1
36D1	7.1 ± 1.7	8.3 ± 1.7	6.5 ± 0.5	6.5 ± 0.7	7.0 ± 0.6
36S2	7.9 ± 1.5	8.8 ± 0.4	7.0 ± 0.8	7.8 ± 0.6	8.0 ± 0.8

TABLE C-IX.2 **MEAN QUARTERLY TLD RESULTS FOR THE SITE BOUNDARY, MIDDLE AND CONTROL LOCATIONS FOR LIMERICK GENERATING STATION, 2008**

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

COLLECTION PERIOD	SITE BOUNDARY	MIDDLE	CONTROL
JAN-MAR	8.8 ± 2.3	8.3 ± 1.3	9.5 ± 0.0
APR-JUN	7.2 ± 2.1	7.1 ± 1.4	8.7 ± 0.0
JUL-SEP	7.9 ± 2.6	7.2 ± 1.5	8.8 ± 0.0
OCT-DEC	8.3 ± 2.6	7.8 ± 1.4	9.9 ± 0.0

TABLE C-IX.3 **SUMMARY OF THE AMBIENT DOSIMETRY PROGRAM FOR LIMERICK GENERATING STATION, 2008**

RESULTS IN UNITS OF MILLI-ROENTGEN/STD. MONTH

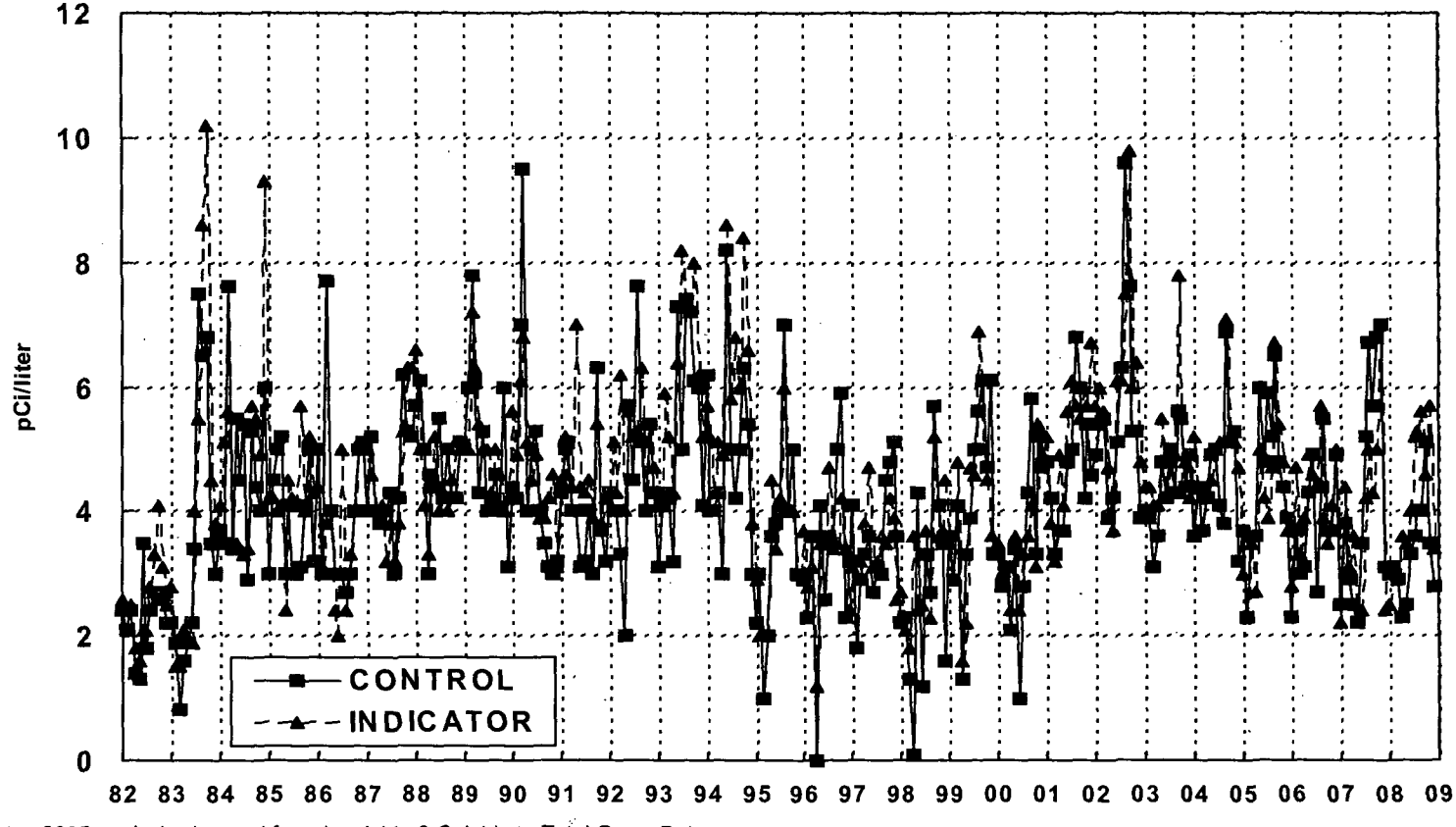
LOCATION	SAMPLES ANALYZED	PERIOD MINIMUM	PERIOD MAXIMUM	PERIOD MEAN ± 2 S.D.
SITE BOUNDARY	64	6.2	12.6	8.1 ± 2.6
MIDDLE	92	5.5	9.6	7.6 ± 1.7
CONTROL	4	8.7	9.9	9.2 ± 1.1

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

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

CONTROL STATIONS - 5H1

FIGURE C-1
MEAN MONTHLY TOTAL GROSS BETA CONCENTRATIONS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LGS, 1982 - 2008

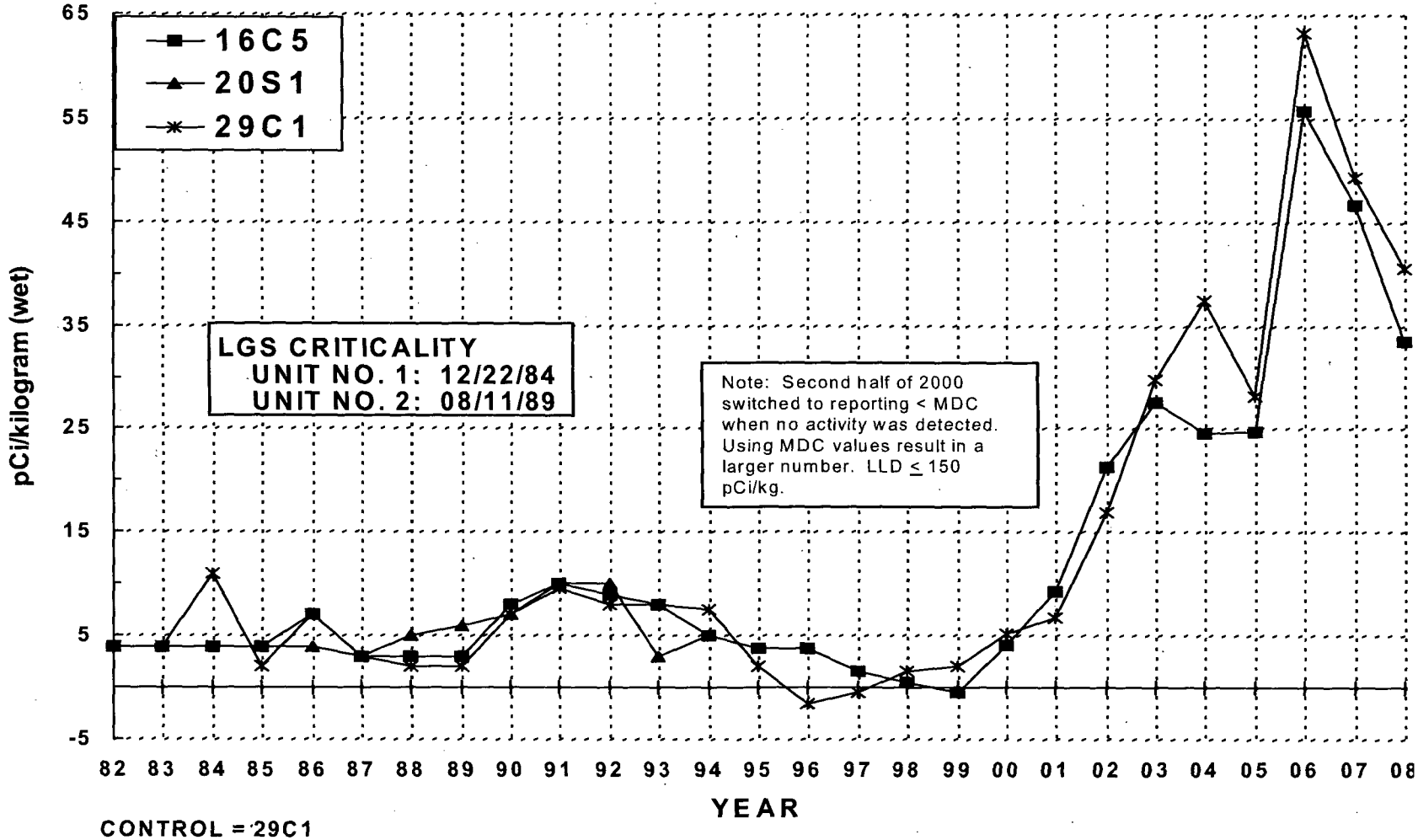


Note: 2005 analysis changed from Insoluble & Soluble to Total Gross Beta

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 - 2008



CONTROL = 29C1

Station 20S1 discontinued in 1995

FIGURE C-3
CONCENTRATIONS OF CS-137 IN SEDIMENT SAMPLES COLLECTED IN THE VICINITY OF LGS, 1982 – 2008

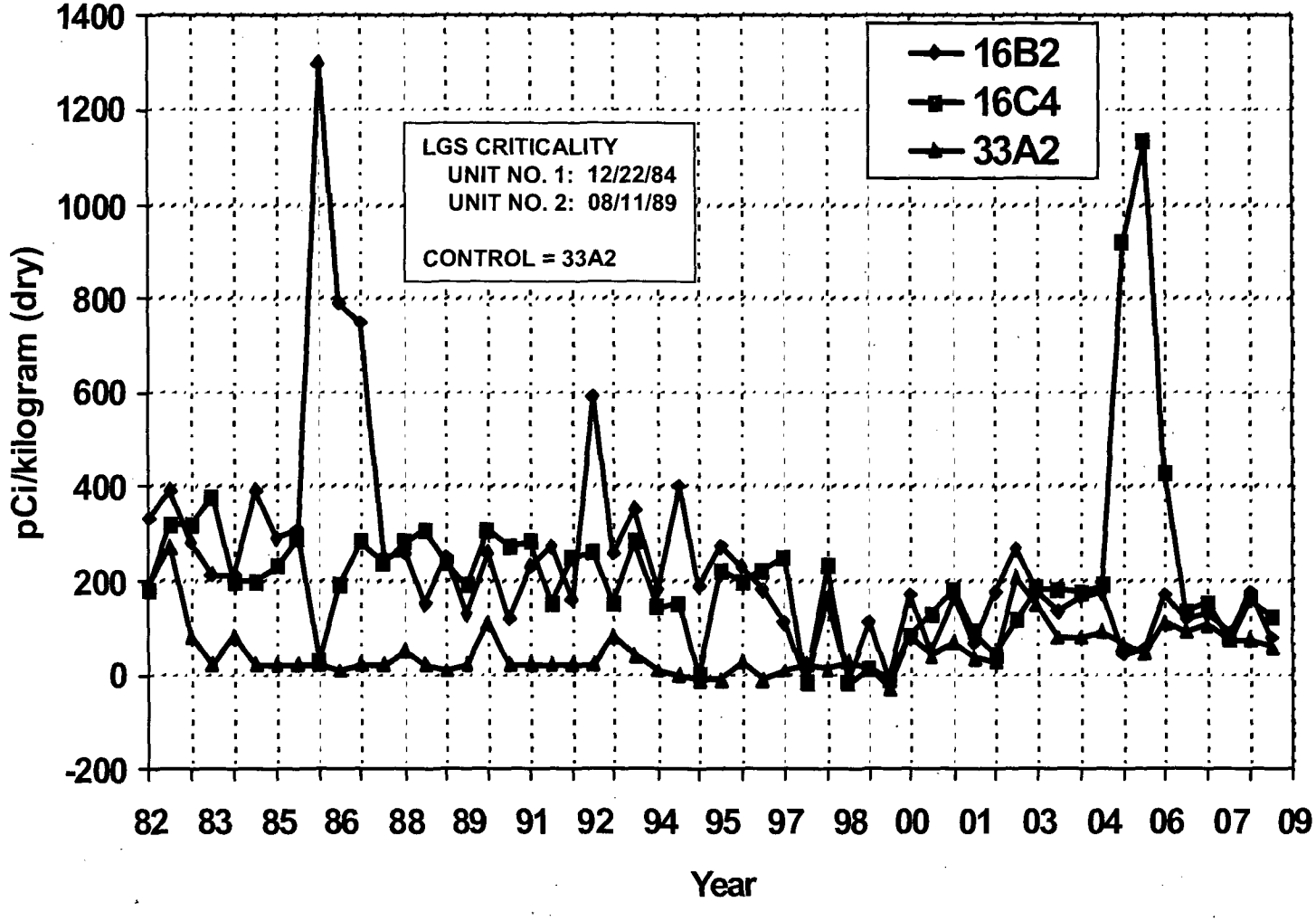


FIGURE C-4
MEAN MONTHLY GROSS BETA CONCENTRATIONS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LGS, 1982 – 2008

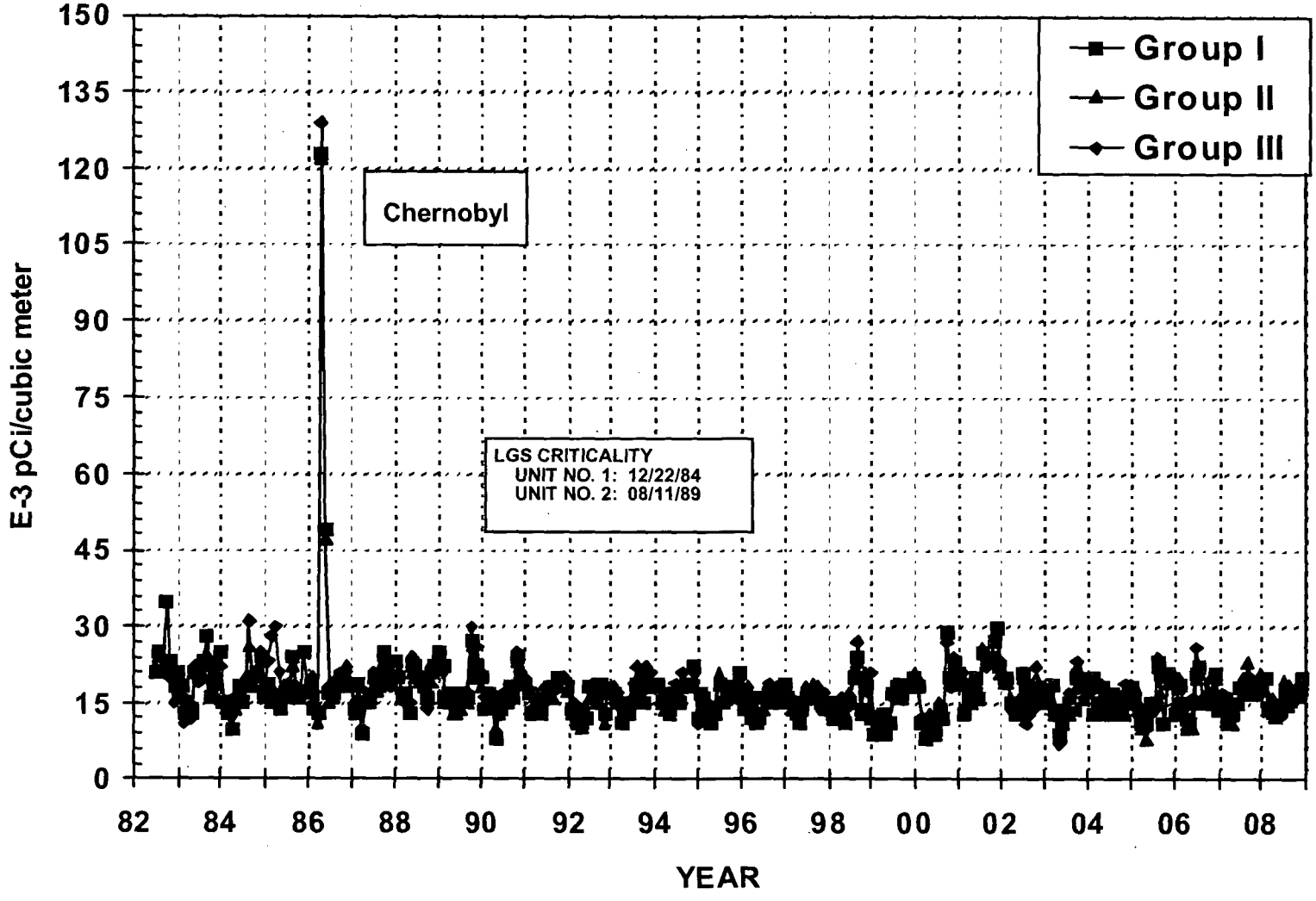


FIGURE C-5
MEAN WEEKLY GROSS BETA CONCENTRATIONS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LGS, 2008

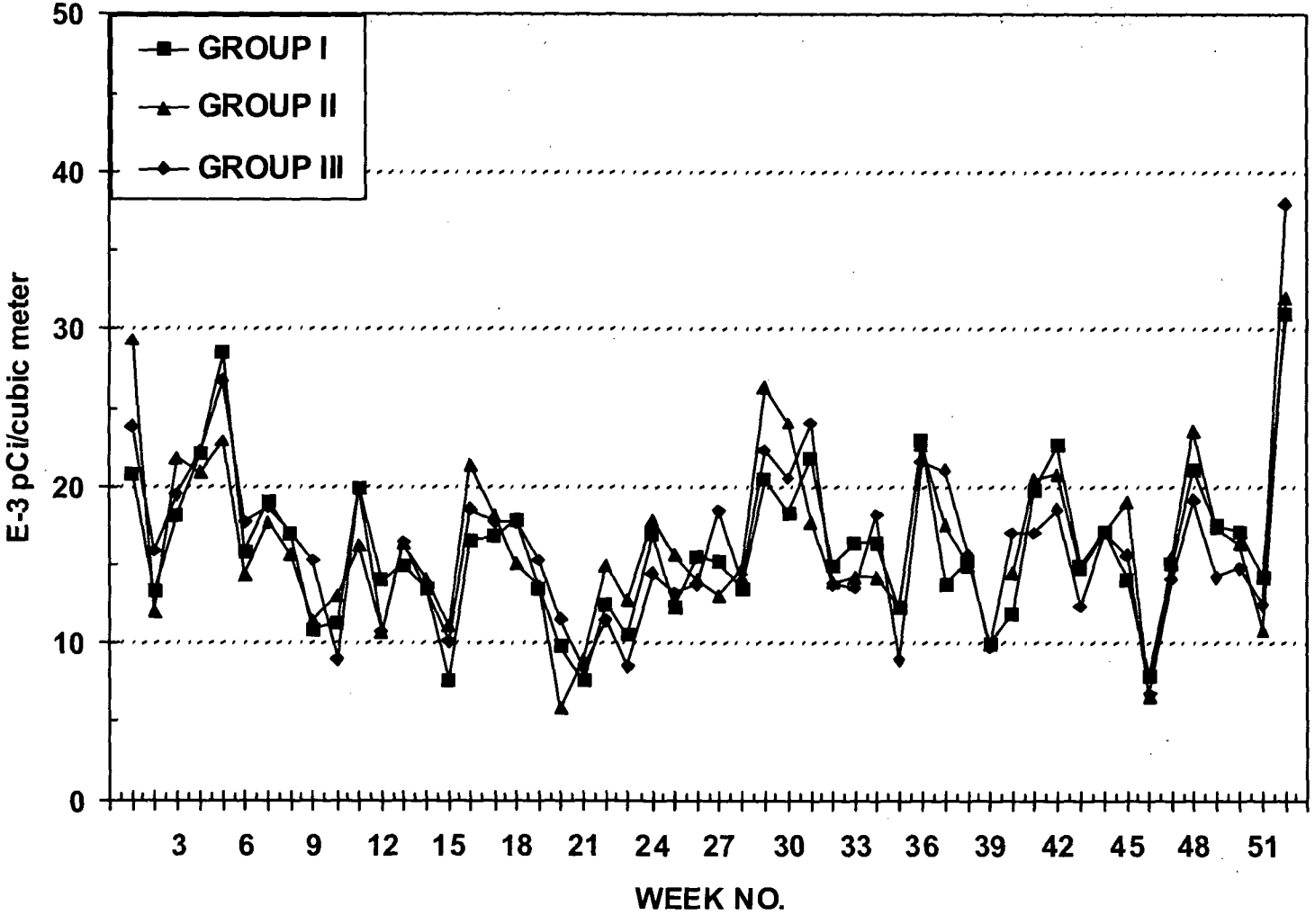
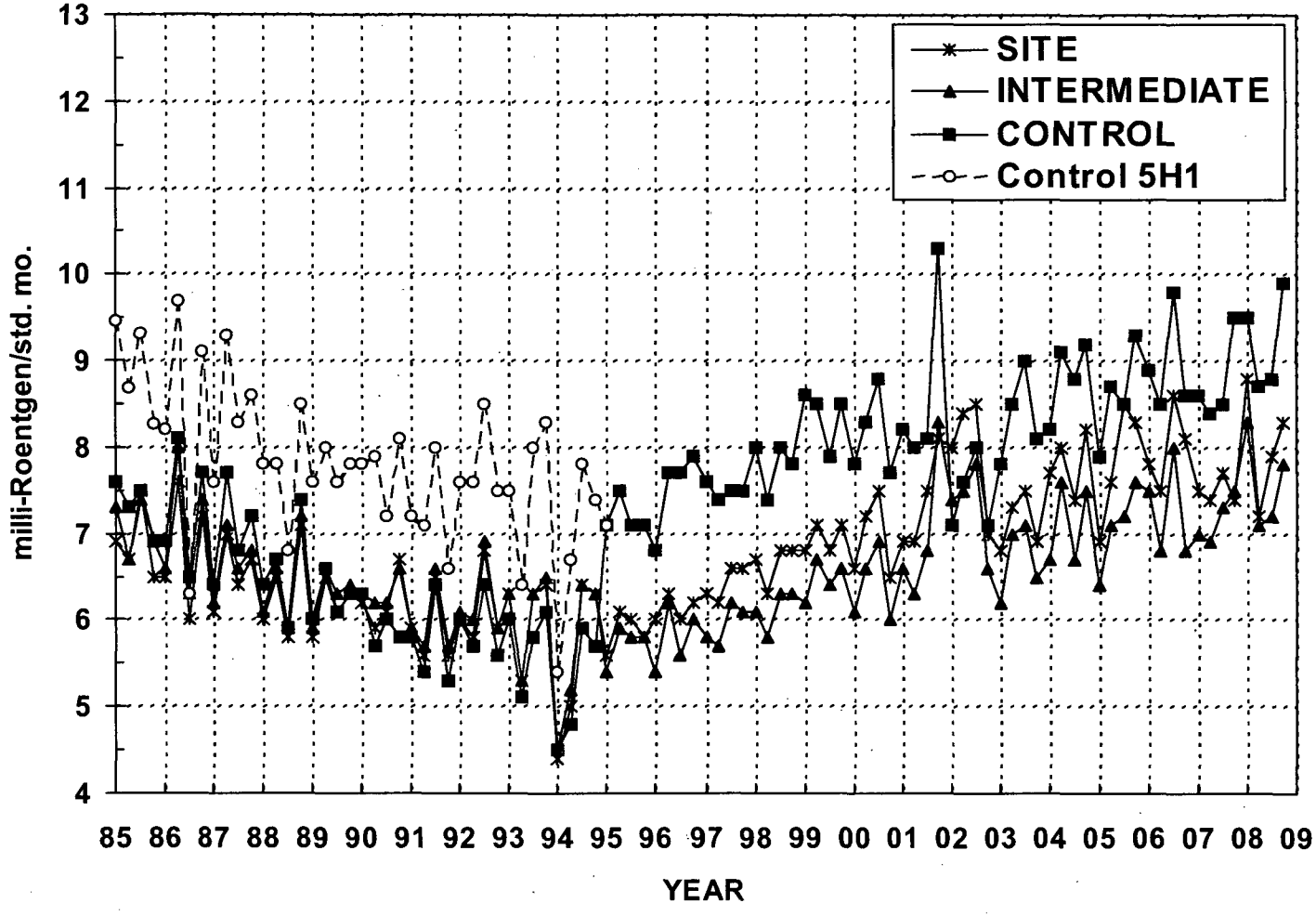


FIGURE C-6
MEAN QUARTERLY AMBIENT GAMMA RADIATION LEVELS (TLD) IN THE VICINITY OF LGS, 1985 – 2008



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

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APPENDIX D

DATA TABLES AND FIGURES
COMPARISON LABORATORY

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

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TABLE D-I.1 CONCENTRATIONS OF TOTAL GROSS BETA IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2008

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	16C2
12/31/07 - 01/29/08	3.15 ± 1.1
01/29/08 - 03/04/08	2.69 ± 1.1
03/04/08 - 03/31/08	0.87 ± 0.5
03/31/08 - 04/28/08	1.25 ± 0.6
04/28/08 - 06/03/08	0.92 ± 0.5
06/03/08 - 06/30/08	1.25 ± 0.4
06/30/08 - 07/29/08	2.51 ± 1.0
07/29/08 - 09/02/08	2.07 ± 0.6
09/02/08 - 09/29/08	1.98 ± 0.6
09/29/08 - 11/03/08	2.24 ± 0.7
11/03/08 - 12/02/08	3.88 ± 1.2
12/02/08 - 12/29/08	3.41 ± 1.1
MEAN	0.8 ± 0.6

TABLE D-I.2 CONCENTRATIONS OF TRITIUM IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2008

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	16C2
12/31/07 - 03/31/08	< 180
03/31/08 - 06/30/08	< 149
06/30/08 - 09/29/08	< 145
09/29/08 - 12/29/08	< 173
MEAN	-

TABLE D-I.3 CONCENTRATIONS OF GAMMA EMITTERS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2008

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	12/31/07 - 01/29/08	< 3	< 2	< 5	< 2	< 7	< 4	< 4	< 4	< 2	< 3	< 11	< 2
	01/29/08 - 03/04/08	< 3	< 3	< 3	< 3	< 6	< 6	< 3	< 5	< 3	< 3	< 16	< 3
	03/04/08 - 03/31/08	< 5	< 3	< 12	< 5	< 7	< 11	< 4	< 7	< 5	< 5	< 13	< 5
	03/31/08 - 04/28/08	< 4	< 2	< 9	< 3	< 4	< 8	< 3	< 5	< 2	< 3	< 13	< 5
	04/28/08 - 06/03/08	< 7	< 4	< 7	< 3	< 8	< 8	< 4	< 5	< 3	< 4	< 11	< 5
	06/03/08 - 06/30/08	< 3	< 3	< 7	< 3	< 6	< 5	< 3	< 12	< 4	< 3	< 21	< 6
	06/30/08 - 07/29/08	< 3	< 2	< 3	< 3	< 5	< 8	< 3	< 6	< 3	< 3	< 19	< 4
	07/29/08 - 09/02/08	< 2	< 1	< 4	< 2	< 4	< 3	< 3	< 6	< 2	< 2	< 17	< 3
	09/02/08 - 09/29/08	< 4	< 3	< 9	< 2	< 5	< 6	< 4	< 10	< 5	< 4	< 14	< 3
	09/29/08 - 11/03/08	< 2	< 3	< 6	< 2	< 5	< 6	< 3	< 12	< 5	< 3	< 18	< 4
	11/03/08 - 12/02/08	< 2	< 3	< 4	< 4	< 4	< 5	< 2	< 4	< 3	< 3	< 16	< 2
	12/02/08 - 12/29/08	< 2	< 3	< 7	< 2	< 6	< 5	< 3	< 8	< 3	< 3	< 11	< 4
	MEAN	-	-	-	-	-	-	-	-	-	-	-	-

TABLE D-II.1 CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2008

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

COLLECTION PERIOD	11S2
12/31/07 - 01/07/08	35 ± 5
01/07/08 - 01/14/08	17 ± 4
01/14/08 - 01/22/07	28 ± 4
01/22/07 - 01/28/08	33 ± 6
01/28/08 - 02/04/08	36 ± 4
02/04/08 - 02/11/08	23 ± 4
02/11/08 - 02/19/08	24 ± 4
02/19/08 - 02/25/08	24 ± 5
02/25/08 - 03/03/08	21 ± 4
03/03/08 - 03/10/08	16 ± 4
03/10/08 - 03/17/08	27 ± 5
03/17/08 - 03/24/08	21 ± 4
03/24/08 - 03/31/08	21 ± 4
03/31/08 - 04/07/08	21 ± 4
04/07/08 - 04/14/08	12 ± 4
04/14/08 - 04/21/08	26 ± 5
04/21/08 - 04/28/08	16 ± 4
04/28/08 - 05/05/08	26 ± 4
05/05/08 - 05/12/08	18 ± 5
05/12/08 - 05/20/08	17 ± 4
05/20/08 - 05/27/08	13 ± 4
05/27/08 - 06/02/08	17 ± 5
06/02/08 - 06/09/08	14 ± 4
06/09/08 - 06/16/08	20 ± 5
06/16/08 - 06/23/08	16 ± 4
06/23/08 - 06/30/08	21 ± 4
06/30/08 - 07/07/08	25 ± 4
07/07/08 - 07/14/08	22 ± 4
07/14/08 - 07/21/08	30 ± 4
07/21/08 - 07/28/08	25 ± 4
07/28/08 - 08/04/08	30 ± 4
08/04/08 - 08/11/08	22 ± 4
08/11/08 - 08/18/08	21 ± 4
08/18/08 - 08/25/08	24 ± 4
08/25/08 - 09/01/08	21 ± 4
09/01/08 - 09/09/08	30 ± 4
09/09/08 - 09/15/08	17 ± 4
09/15/08 - 09/22/08	25 ± 4
09/22/08 - 09/29/08	17 ± 4
09/29/08 - 10/07/08	24 ± 4
10/07/08 - 10/13/08	31 ± 5
10/13/08 - 10/20/08	29 ± 4
10/20/08 - 10/27/08	14 ± 4
10/27/08 - 11/04/08	19 ± 4
11/04/08 - 11/10/08	18 ± 4
11/10/08 - 11/17/08	15 ± 4
11/17/08 - 11/24/08	15 ± 4
11/24/08 - 12/01/08	24 ± 4
12/01/08 - 12/08/08	21 ± 4
12/08/08 - 12/15/08	16 ± 4
12/15/08 - 12/22/08	24 ± 4
12/22/08 - 12/29/08	37 ± 5
MEAN	22 ± 12

TABLE D-II.2 CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF LIMERICK GENERATING STATION, 2008

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	12/31/07 - 03/31/08	83 ± 15	< 0.7	< 0.5	< 0.9	< 0.5	< 0.4
	03/31/08 - 06/30/08	83 ± 15	< 0.6	< 0.5	< 0.8	< 0.8	< 0.7
	06/30/08 - 09/29/08	153 ± 20	< 1.0	< 1.1	< 0.8	< 0.7	< 0.8
	09/29/08 - 12/29/08	65 ± 15	< 0.7	< 0.5	< 1	< 0.7	< 0.5
	MEAN	96 ± 78	-	-	-	-	-

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, 2008

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	I-131	K-40	Cs-134	Cs-137	Ba-140	La-140
19B1	1/15/008	< 7.8	1287 ± 104	< 3	< 3	< 10	< 7
	04/01/08	< 6.6	1303 ± 115	< 4	< 4	< 18	< 3
	07/08/08	< 6.2	1431 ± 106	< 3	< 3	< 13	< 3
	10/14/08	< 6.4	1407 ± 113	< 5	< 4	< 17	< 4
	MEAN	-	1357 ± 145	-	-	-	-
10F4	1/15/008	< 5.7	1350 ± 95	< 4	< 3	< 11	< 2
	04/01/08	< 6.5	1447 ± 122	< 5	< 4	< 20	< 2
	07/08/08	< 5	1360 ± 115	< 3	< 3	< 14	< 3
	10/14/08	< 7.7	1300 ± 124	< 3	< 4	< 23	< 5
	MEAN	-	1364 ± 122	-	-	-	-
25C1	1/15/008	< 7.8	1262 ± 82	< 4	< 2	< 11	< 3
	04/01/08	< 8.5	1348 ± 127	< 4	< 3	< 15	< 3
	07/08/08	< 5.1	1331 ± 102	< 4	< 3	< 16	< 3
	10/14/08	< 9.6	1462 ± 113	< 5	< 4	< 21	< 3
	MEAN	-	1351 ± 166	-	-	-	-

FIGURE D-1
COMPARISON OF MONTHLY TOTAL GROSS BETA CONCENTRATIONS IN DRINKING WATER SAMPLES SPLIT BETWEEN ENV AND TBE, 2008

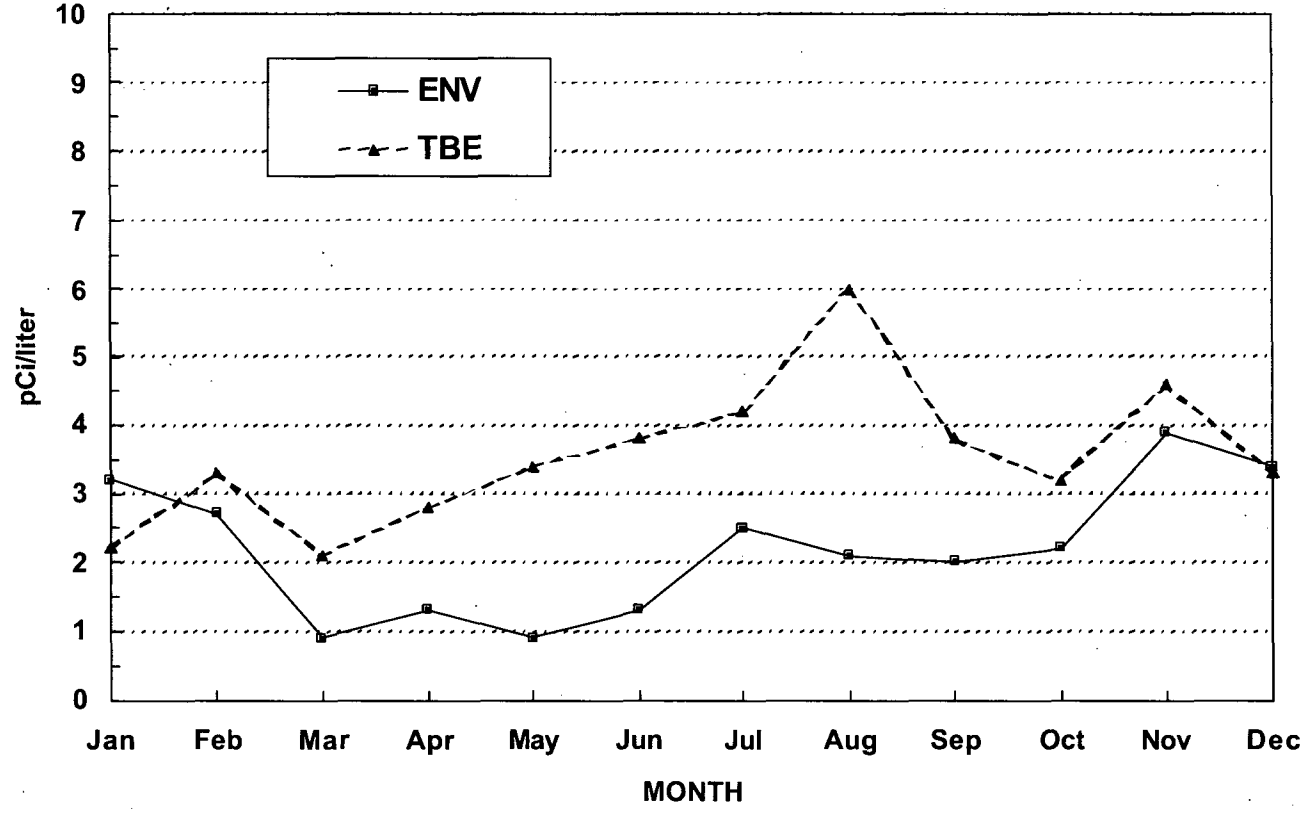
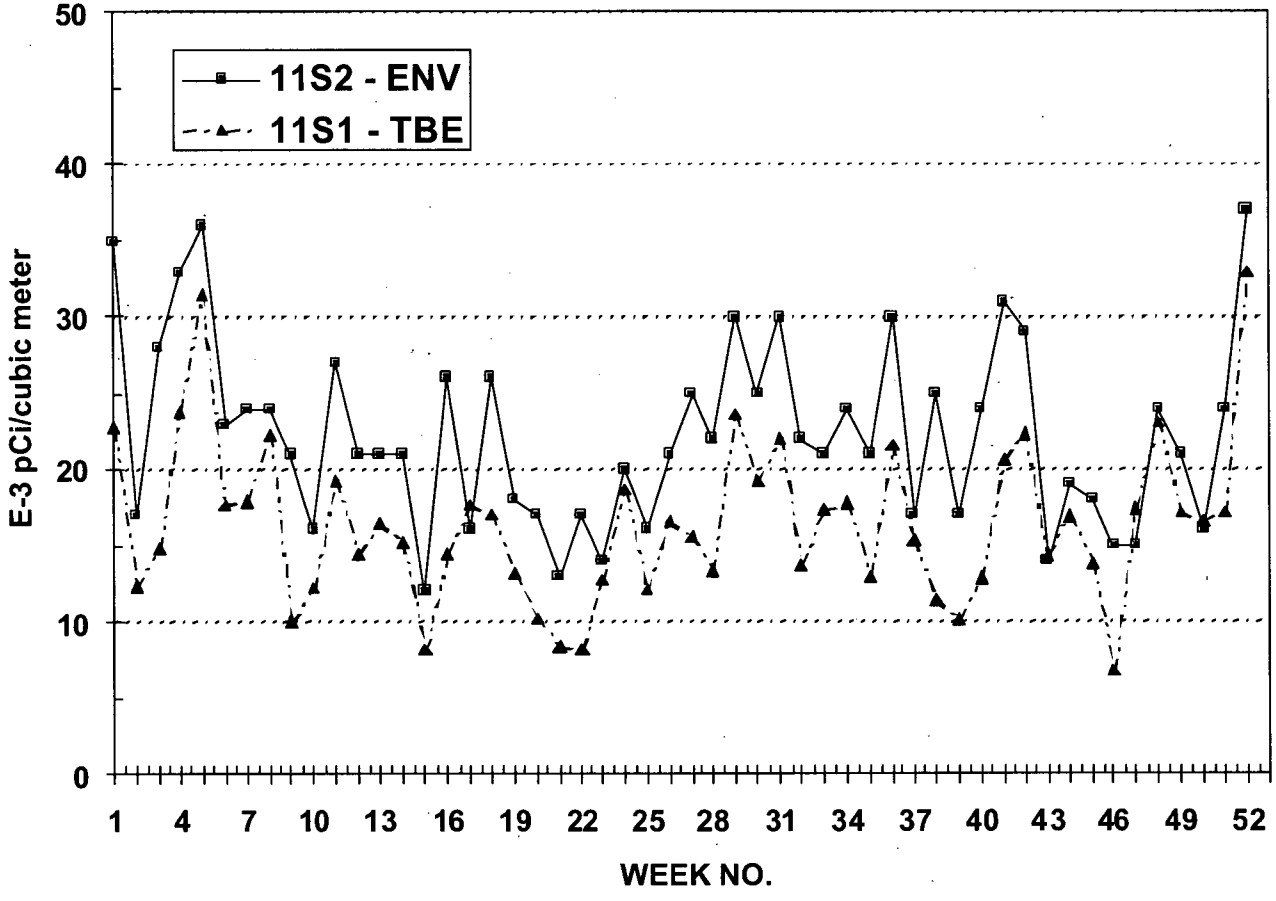


FIGURE D-2
COMPARISON OF WEEKLY GROSS BETA CONCENTRATIONS IN AIR PARTICULATE SAMPLES COLLECTED FROM LGS COLLOCATED LOCATIONS 11S1 AND 11S2, 2008



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APPENDIX E

INTER-LABORATORY COMPARISON PROGRAM

TABLE E-1 **ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM**
TELEDYNE BROWN ENGINEERING, 2008
(PAGE 1 OF 3)

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
March 2008	E5847-396	Milk	Sr-89	pCi/L	83.5	95.8	0.87	A
			Sr-90	pCi/L	13.9	12.9	1.08	A
	E5848-396	Milk	I-131	pCi/L	57.3	60.0	0.96	A
			Ce-141	pCi/L	229	249	0.92	A
			Cr-51	pCi/L	336	359	0.94	A
			Cs-134	pCi/L	106	125	0.85	A
			Cs-137	pCi/L	141	146	0.97	A
			Co-58	pCi/L	71.8	70.8	1.01	A
			Mn-54	pCi/L	98.1	94.2	1.04	A
			Fe-59	pCi/L	102	102	1.00	A
			Zn-65	pCi/L	135	137	0.99	A
			Co-60	pCi/L	230	236	0.97	A
	E5850A-396	AP	Ce-141	pCi	163	157	1.04	A
			Cr-51	pCi	233	227	1.03	A
			Cs-134	pCi	72.6	79.0	0.92	A
			Cs-137	pCi	98.3	92.0	1.07	A
			Co-58	pCi	46.7	44.7	1.04	A
			Mn-54	pCi	69.8	59.4	1.18	A
			Fe-59	pCi	72.2	64.5	1.12	A
			Zn-65	pCi	106	86.4	1.23	W
			Co-60	pCi	156	149	1.05	A
	E5849-396	Charcoal	I-131	pCi	65.5	60.1	1.09	A
June 2008	E5971-396	Milk	Sr-89	pCi/L	83.9	85.0	0.99	A
			Sr-90	pCi/L	14.4	15.8	0.91	A
	E5972-396	Milk	I-131	pCi/L	70.9	71.4	0.99	A
			Ce-141	pCi/L	157	174	0.90	A
			Cr-51	pCi/L	159	138	1.15	A
			Cs-134	pCi/L	69.7	76.7	0.91	A
			Cs-137	pCi/L	115	116	0.99	A
			Co-58	pCi/L	59.1	61.9	0.95	A
			Mn-54	pCi/L	139	135	1.03	A
			Fe-59	pCi/L	98.4	91.7	1.07	A
			Zn-65	pCi/L	129	127	1.02	A
			Co-60	pCi/L	101	104	0.97	A

TABLE E-1 ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING, 2008
(PAGE 2 OF 3)

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
June 2008	E5974-396	AP	Ce-141	pCi	206	207	1.00	A
			Cr-51	pCi	173	164	1.05	A
			Cs-134	pCi	95.9	91.0	1.05	A
			Cs-137	pCi	142.0	138.0	1.03	A
			Co-58	pCi	72.0	73.4	0.98	A
			Mn-54	pCi	180	160.0	1.13	A
			Fe-59	pCi	108.0	109.0	0.99	A
			Zn-65	pCi	159	150	1.06	A
			Co-60	pCi	129	124	1.04	A
June 2008	E5973-396	Charcoal	I-131	pCi	73.8	84.1	0.88	A
September 2008	E6284-396	Milk	Sr-89	pCi/L	76.2	73.9	1.03	A
			Sr-90	pCi/L	12.3	11.0	1.12	A
	E6285-396	Milk	I-131	pCi/L	65.7	67.9	0.97	A
			Ce-141	pCi/L	145	161	0.90	A
			Cr-51	pCi/L	406	421	0.96	A
			Cs-134	pCi/L	196	232	0.84	A
			Cs-137	pCi/L	147	162	0.91	A
			Co-58	pCi/L	167	179	0.93	A
			Mn-54	pCi/L	165	166	0.99	A
			Fe-59	pCi/L	161	144	1.12	A
			Zn-65	pCi/L	305	319	0.96	A
			Co-60	pCi/L	218	234	0.93	A
	E6287-396	AP	Ce-141	pCi	79.5	76.3	1.04	A
			Cr-51	pCi	208	199	1.05	A
			Cs-134	pCi	106	110	0.96	A
			Cs-137	pCi	79.3	76.7	1.03	A
			Co-58	pCi	87.7	84.4	1.04	A
			Mn-54	pCi	90.3	78.6	1.15	A
			Fe-59	pCi	81.7	68.3	1.20	A
			Zn-65	pCi	144	151	0.95	A
			Co-60	pCi	111	111	1.00	A
	E6286-396	Charcoal	I-131	pCi	93.2	90.0	1.04	A
December 2008	E6415-396	Milk	Sr-89	pCi/L	98.4	91.9	1.07	A
			Sr-90	pCi/L	18.0	12.6	1.43	N (1)

TABLE E-1 ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING, 2008
(PAGE 3 OF 3)

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
December 2008	E6416-396	Milk	I-131	pCi/L	69.2	79.9	0.87	A
			Ce-141	pCi/L	177	191	0.93	A
			Cr-51	pCi/L	231	246	0.94	A
			Cs-134	pCi/L	117	134	0.87	A
			Cs-137	pCi/L	119	120	0.99	A
			Co-58	pCi/L	104	104	1.00	A
			Mn-54	pCi/L	153	152	1.01	A
			Fe-59	pCi/L	99.6	100	1.00	A
			Zn-65	pCi/L	177	183	0.97	A
			Co-60	pCi/L	133	133	1.00	A
	E6418-396	AP	Ce-141	pCi	148	146	1.01	A
			Cr-51	pCi	202	187	1.08	A
			Cs-134	pCi	103	102	1.01	A
			Cs-137	pCi	95.4	91.2	1.05	A
			Co-58	pCi	81.4	79.2	1.03	A
			Mn-54	pCi	113	116.0	0.97	A
			Fe-59	pCi	76.5	76.4	1.00	A
			Zn-65	pCi	122	139	0.88	A
			Co-60	pCi	108	101	1.07	A
December 2008	E6417-396	Charcoal	I-131	pCi	65.8	74.1	0.89	A

(1) NCR 09-02 initiated to investigate the failure.

(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, 2008
(PAGE 1 OF 1)

Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Control Limits	Evaluation (c)
January 2008	Quik[tm] Respons	Water	Sr-89	pCi/L	37.33	19.0	11.8 - 25.2	N (1)
			Sr-90	pCi/L	40.40	42.7	31.5 - 49.0	A
			Ba-133	pCi/L	87.8	90.5	76.2 - 99.6	A
			Cs-134	pCi/L	80.67	88.9	72.9 - 97.8	A
			Cs-137	pCi/L	222.33	231	208 - 256	A
			Co-60	pCi/L	98.9	101.0	90.9 - 113	A
			Zn-65	pCi/L	352	350	315 - 408	A
			Gr-A	pCi/L	13.0	12.7	6.02 - 18.7	A
			Gr-B	pCi/L	32.7	36.2	23.8 - 43.8	A
			H-3	pCi/L	11100	11300	9840 - 12400	A
January 2008	RAD 72	Water	Sr-89	pCi/L	69.0	65.3	53.0 - 73.4	A
			Sr-90	pCi/L	35.6	41.4	30.5 - 47.6	A
			Ba-133	pCi/L	25.9	25.7	20.0 - 29.5	A
			Cs-134	pCi/L	86.5	92.6	76.0 - 102	A
			Cs-137	pCi/L	155	158	142 - 176	A
			Co-60	pCi/L	16.0	14.4	11.4 - 18.7	A
			Zn-65	pCi/L	214	204	184 - 240	A
			Gr-A	pCi/L	13.3	14.8	7.15 - 21.2	A
			Gr-B	pCi/L	21.2	22.5	13.7 - 30.6	A
			I-131	pCi/L	22.8	23.6	19.6 - 28.0	A
			H-3	pCi/L	3390	3540	3000 - 3910	A
April 2008	Rad 73	Water	Sr-89	pCi/L	65.47	60.4	48.6 - 68.2	A
			Sr-90	pCi/L	39.80	39.2	28.8 - 45.1	A
			Ba-133	pCi/L	59.63	58.3	48.3 - 64.3	A
			Cs-134	pCi/L	45.00	46.6	37.4 - 51.3	A
			Cs-137	pCi/L	97.97	102	91.8 - 115	A
			Co-60	pCi/L	75.47	76.6	68.9 - 86.7	A
			Zn-65	pCi/L	109	106	95.4 - 126	A
			Gr-A	pCi/L	41.03	50.8	26.5 - 63.7	A
			Gr-B	pCi/L	50.20	51.4	35.0 - 58.4	A
			I-131	pCi/L	26.67	28.7	23.9 - 33.6	A
			H-3	pCi/L	11633	12000	10400 - 13200	A

(1) Could find no cause for Sr-89 failure. Sample sent to outside lab for verification, but the outside laboratory was unable to confirm our numbers or ERA numbers. Studies bracketing these results, RAD 71 and RAD 72, had acceptable Sr-89 results. NCR 08-03

(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, 2008
(PAGE 1 OF 2)

Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Acceptance Range	Evaluation (c)
January 2008	07-MaW18	Water	Cs-134	Bq/L	-0.26		(1)	A
			Cs-137	Bq/L	0.029		(1)	A
			Co-57	Bq/L	21	22.8	16.0 - 29.6	A
			Co-60	Bq/L	8.2	8.40	5.88 - 10.92	A
			H-3	Bq/L	473	472	330 - 614	A
			Mn-54	Bq/L	12	12.1	8.5 - 15.7	A
			Sr-90	Bq/L	10.70	11.4	7.98- 14.82	A
			Zn-65	Bq/L	15.6	16.3	11.4 - 21.2	A
	07-GrW18	Water	Gr-A	Bq/L	1.4	1.399	>0.0 - 2.798	A
			Gr-B	Bq/L	3.06	2.43	1.22 - 3.65	A
	07-MaS18	Soil	Cs-134	Bq/kg	790	854.0	598 - 1110	A
			Cs-137	Bq/kg	568	545	382 - 709	A
			Co-57	Bq/kg	424	421	295 - 547	A
			Co-60	Bq/kg	2.307	2.9	(2)	A
			Mn-54	Bq/kg	611	570	399 - 741	A
			K-40	Bq/kg	6.09	571	400 - 742	A
			Sr-90	Bq/kg	454	493.0	345 - 641	A
			Zn-65	Bq/kg	0.162		(1)	A
	07-RdF18	AP	Cs-134	Bq/sample	2.73	2.5200	1.76 - 3.28	A
			Cs-137	Bq/sample	2.88	2.7	1.89 - 3.51	A
			Co-57	Bq/sample	3.493	3.55	2.49 - 4.62	A
			Co-60	Bq/sample	1.357	1.31	0.92 - 1.70	A
			Mn-54	Bq/sample	0.006		(1)	A
			Sr-90	Bq/sample	1.61	1.548	1.084 - 2.012	A
			Zn-65	Bq/sample	2.59	2.04	1.43 - 2.65	A
	07-GrF18	AP	Gr-A	Bq/sample	0.131	0.348	>0.0 - 0.696	A
			Gr-B	Bq/sample	0.261	0.286	0.143 - 0.429	A
January 2008	07-RdV18	Vegetatior	Cs-134	Bq/sample	5.25	6.28	4.40 - 8.16	A
			Cs-137	Bq/sample	3.13	3.41	2.39 - 4.43	A
			Co-57	Bq/sample	6.837	6.89	4.82 - 8.96	A
			Co-60	Bq/sample	2.44	2.77	1.94 - 3.60	A
			Mn-54	Bq/sample	4.45	4.74	3.32 - 6.16	A
			K-40	Bq/sample	61.3		(1)	
			Sr-90	Bq/sample	1.33	1.273	0.891 - 1.655	A
			Zn-65	Bq/sample	0.085		(1)	A

TABLE E-3 DOE'S MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)
TELEDYNE BROWN ENGINEERING, 2008
(PAGE 2 OF 2)

Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Acceptance Range	Evaluation (c)
August 2008	08-MaW19	Water	Cs-134	Bq/L	17.1	19.5	13.7 - 25.4	A
			Cs-137	Bq/L	21.4	23.6	16.5 - 30.7	A
			Co-57	Bq/L	-0.044		(1)	A
			Co-60	Bq/L	10.8	11.6	8.1 - 15.1	A
			H-3	Bq/L	334	341	239 - 443	A
			Mn-54	Bq/L	13.0	13.7	9.6 - 17.8	A
			Sr-90	Bq/L	6.55	6.45	4.52- 8.39	A
			Zn-65	Bq/L	16.5	17.1	12.0 - 22.2	A
August 2008	08-GrW19	Water	Gr-A	Bq/L	0.0612	<0.56	(3)	A
			Gr-B	Bq/L	0.222	<1.85	(3)	A
	08-MaS19	Soil	Cs-134	Bq/kg	546	581	407 - 755	A
			Cs-137	Bq/kg	2.52	2.8	(2)	A
			Co-57	Bq/kg	340	333	233 - 433	A
			Co-60	Bq/kg	157	145.0	102 - 189	A
			Mn-54	Bq/kg	460	415	291 - 540	A
			K-40	Bq/kg	650	571	399 - 741	A
			Sr-90	Bq/kg	1.40		(1)	A
			Zn-65	Bq/kg	-1.53		(1)	A
	08-RdF19	AP	Cs-134	Bq/sample	2.46	2.6300	1.84 - 3.42	A
			Cs-137	Bq/sample	0.0063		(1)	A
			Co-57	Bq/sample	1.36	1.50	1.05 - 1.95	A
			Co-60	Bq/sample	0.0143		(1)	A
			Mn-54	Bq/sample	2.70	2.64	1.85 - 3.43	A
			Sr-90	Bq/sample	1.42	1.12	0.78 - 1.46	W
			Zn-65	Bq/sample	0.975	0.94	0.66 - 1.22	A
	08-GrF19	AP	Gr-A	Bq/sample	-0.0037		(4)	A
			Gr-B	Bq/sample	0.540	0.525	0.263 - 0.788	A
	08-RdV19	Vegetatior	Cs-134	Bq/sample	4.36	5.5	3.9 - 7.2	W
			Cs-137	Bq/sample	-0.03		(1)	A
			Co-57	Bq/sample	6.72	7.1	5.0 - 9.2	A
			Co-60	Bq/sample	4.04	4.70	3.3 - 6.1	A
			Mn-54	Bq/sample	5.22	5.8	4.1 - 7.5	A
			K-40	Bq/sample	64.4		(1)	
			Sr-90	Bq/sample	1.62	1.9	1.3 - 2.5	A
			Zn-65	Bq/sample	6.160	6.9	4.8 - 9.0	A

(1) Not evaluated by MAPEP.

(2) Reported a statistically zero result.

(3) Designed to test the Safe Drinking Water screening levels. Labs reporting values less than ref values were found to be acceptable.

(4) False positive test.

(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., 2008

Lab Code [b]	Date	Concentration (pCi/L) Analysis	Laboratory Result [c]	ERA Result [d]	Control Limits	Acceptance
STAP-1143	03/24/08	Co-60	650.72 ± 3.00	730.0	565.0 - 912.0	Pass
STAP-1143	03/24/08	Cs-134	467.50 ± 5.53	523.0	341.0 - 647.0	Pass
STAP-1143	03/24/08	Cs-137	1375.90 ± 25.41	1450.0	1090.0 - 1900.0	Pass
STAP-1143 [e]	03/24/08	Mn-54	0.00 ± 0.00	0.0	0.0 - 10.0	Pass
STAP-1143	03/24/08	Sr-90	157.60 ± 7.70	152.0	66.9 - 236.0	Pass
STAP-1143	03/24/08	Zn-65	889.90 ± 15.90	872.0	604.0 - 1210.0	Pass
STAP-1144	03/24/08	Gr. Beta	99.90 ± 3.09	92.2	56.80 - 135.0	Pass
STSO-1145	03/24/08	Ac-228	1269.02 ± 36.81	1180.0	757.0 - 1660.0	Pass
STSO-1145	03/24/08	Bi-212	1407.10 ± 56.64	1360.0	357.0 - 2030.0	Pass
STSO-1145	03/24/08	Co-60	5219.70 ± 90.30	5130.0	3730.0 - 6890.0	Pass
STSO-1145	03/24/08	Cs-134	5427.30 ± 102.94	5640.0	3630.0 - 6790.0	Pass
STSO-1145	03/24/08	Cs-137	6346.60 ± 201.80	6010.0	4600.0 - 7810.0	Pass
STSO-1145	03/24/08	K-40	11052.70 ± 181.80	11000.0	7980.0 - 14900.0	Pass
STSO-1145 [e]	03/24/08	Mn-54	0.00 ± 0.00	0.0	0.0 - 10.0	Pass
STSO-1145	03/24/08	Pb-212	1198.20 ± 96.58	1080.0	697.0 - 1520.0	Pass
STSO-1145	03/24/08	Pb-214	2253.30 ± 291.60	2020.0	1210.0 - 3010.0	Pass
STSO-1145	03/24/08	Sr-90	6407.00 ± 277.00	5360.0	1940.0 - 8750.0	Pass
STSO-1145	03/24/08	Th-234	2421.80 ± 321.00	2030.0	644.0 - 3870.0	Pass
STSO-1145	03/24/08	Zn-65	2936.20 ± 73.50	2660.0	2110.0 - 3570.0	Pass
STVE-1146	03/24/08	Co-60	912.41 ± 13.59	888.0	600.0 - 1280.0	Pass
STVE-1146	03/24/08	Cs-134	1547.70 ± 38.81	1540.0	882.0 - 2130.0	Pass
STVE-1146	03/24/08	Cs-137	1163.80 ± 20.62	1100.0	807.0 - 1530.0	Pass
STVE-1146	03/24/08	K-40	22186.00 ± 339.40	24600.0	17700.0 - 34800.0	Pass
STVE-1146 [e]	03/24/08	Mn-54	0.00 ± 0.00	0.0	0.0 - 10.0	Pass
STVE-1146	03/24/08	Sr-90	3825.90 ± 140.66	4130.0	2310.0 - 5480.0	Pass
STVE-1146	03/24/08	Zn-65	1676.80 ± 43.00	1430.0	1030.0 - 1960.0	Pass
STW-1147	03/24/08	Co-60	1430.00 ± 33.33	1420.0	1240.0 - 1680.0	Pass
STW-1147	03/24/08	Cs-134	730.18 ± 33.39	751.0	555.0 - 862.0	Pass
STW-1147	03/24/08	Cs-137	1947.80 ± 13.80	1990.0	1690.0 - 2380.0	Pass
STW-1147 [e]	03/24/08	Mn-54	0.00 ± 0.00	0.0	0.0 - 10.0	Pass
STW-1147	03/24/08	Sr-90	512.03 ± 43.37	512.0	325.0 - 684.0	Pass
STW-1147	03/24/08	Zn-65	708.90 ± 29.00	694.0	588.0 - 865.0	Pass
STW-1120	03/19/07	Zn-65	2009.00 ± 36.40	1910.0	1600.0 - 2410.0	Pass

[a] Results obtained by Environmental, Inc., Midwest Laboratory as a participant in the crosscheck program for proficiency testing administered by Environmental Resources Associates, serving as a replacement for studies conducted previously by the Environmental Measurements Laboratory Quality Assessment Program (EML).

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

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

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

[e] Included in the testing series as a "false positive". No activity expected.

TABLE E-5 DOE'S MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)[a]
ENVIRONMENTAL, INC., 2008
(Page 1 of 2)

			Concentration [b]			
Lab Code[c]	Date	Analysis	Laboratory result	Known Activity	Control Limits [d]	Acceptance
STW-1137	01/01/08	Co-57	23.80 ± 0.60	22.80	16.00 - 29.60	Pass
STW-1137	01/01/08	Co-60	8.60 ± 0.50	8.40	5.88 - 10.92	Pass
STW-1137	01/01/08	Cs-134	-0.021 ± 0.10	0.00	-1.00 - 1.00	Pass
STW-1137	01/01/08	Cs-137	0.00 ± 0.10	0.00	-1.00 - 1.00	Pass
STW-1137	01/01/08	H-3	515.10 ± 12.70	472.00	330.00 - 614.00	Pass
STW-1137	01/01/08	Mn-54	12.90 ± 0.80	12.10	8.50 - 15.70	Pass
STW-1137	01/01/08	Sr-90	12.00 ± 1.50	11.40	7.98 - 14.82	Pass
STW-1137	01/01/08	Zn-65	16.90 ± 1.40	16.30	11.40 - 21.20	Pass
STW-1138	01/01/08	Gr. Beta	2.30 ± 0.15	2.43	1.22 - 3.65	Pass
STAP-1139	01/01/08	Co-57	3.90 ± 0.07	3.55	2.49 - 4.62	Pass
STAP-1139	01/01/08	Co-60	1.43 ± 0.07	1.31	0.92 - 1.70	Pass
STAP-1139	01/01/08	Cs-134	2.59 ± 0.16	2.52	1.76 - 3.28	Pass
STAP-1139	01/01/08	Cs-137	3.05 ± 0.12	2.70	1.89 - 3.51	Pass
STAP-1139	01/01/08	Mn-54	0.43 ± 0.58	0.00	0.00 - 1.00	Pass
STAP-1139	01/01/08	Sr-90	1.30 ± 0.27	1.55	1.08 - 2.01	Pass
STAP-1139	01/01/08	Zn-65	2.36 ± 0.18	2.04	1.43 - 2.65	Pass
STAP-1140	01/01/08	Gr. Beta	0.34 ± 0.04	0.29	0.14 - 0.43	Pass
STVE-1141	01/01/08	Co-57	8.30 ± 0.18	6.89	4.82 - 8.96	Pass
STVE-1141	01/01/08	Co-60	3.03 ± 0.13	2.77	1.94 - 3.60	Pass
STVE-1141	01/01/08	Cs-134	6.53 ± 0.29	6.28	4.40 - 8.16	Pass
STVE-1141	01/01/08	Cs-137	3.90 ± 0.19	3.41	2.39 - 4.43	Pass
STVE-1141	01/01/08	Mn-54	5.43 ± 0.21	4.74	3.32 - 6.16	Pass
STVE-1141	01/01/08	Zn-65	0.033 ± 0.10	0.00	0.00 - 1.00	Pass
STSO-1142	01/01/08	Co-57	483.00 ± 3.00	421.00	295.00 - 547.00	Pass
STSO-1142	01/01/08	Co-60	3.00 ± 0.80	2.90	0.00 - 5.00	Pass
STSO-1142	01/01/08	Cs-134	896.50 ± 7.40	854.00	598.00 - 1110.00	Pass
STSO-1142	01/01/08	Cs-137	624.40 ± 4.10	545.00	382.00 - 709.00	Pass
STSO-1142	01/01/08	Mn-54	667.20 ± 3.80	570.00	399.00 - 741.00	Pass
STSO-1142	01/01/08	Zn-65	0.093 ± 0.91	0.00	0.00 - 1.00	Pass
STSO-1158	08/01/08	Co-57	353.02 ± 2.01	333.00	233.00 - 433.00	Pass
STSO-1158	08/01/08	Co-60	151.99 ± 1.58	145.00	102.00 - 189.00	Pass
STSO-1158	08/01/08	Cs-134	499.72 ± 2.65	581.00	407.00 - 755.00	Pass
STSO-1158	08/01/08	Cs-137	2.54 ± 0.25	2.80	0.00 - 5.00	Pass
STSO-1158	08/01/08	K-40	643.94 ± 15.50	570.00	399.00 - 741.00	Pass
STSO-1158	08/01/08	Mn-54	452.14 ± 2.96	415.00	291.00 - 540.00	Pass
STSO-1158	08/01/08	Sr-90	1.95 ± 2.04	0.00	0.00 - 5.00	Pass
STSO-1158	08/01/08	Zn-65	0.10 ± 2.04	0.00	0.00 - 5.00	Pass

TABLE E-5 DOE'S MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)[a] ENVIRONMENTAL, INC., 2008

			Concentration [b]			
Lab Code[c]	Date	Analysis	Laboratory result	Known Activity	Control Limits [d]	Acceptance
STVE-1159	08/01/08	Co-57	8.52 ± 0.23	7.10	5.00 - 9.20	Pass
STVE-1159	08/01/08	Co-60	5.08 ± 0.19	4.70	3.30 - 6.10	Pass
STVE-1159	08/01/08	Cs-134	5.26 ± 0.18	5.50	3.90 - 7.20	Pass
STVE-1159	08/01/08	Cs-137	0.01 ± 0.14	0.00	0.00 - 1.00	Pass
STVE-1159	08/01/08	Mn-54	6.39 ± 0.28	5.80	4.10 - 7.50	Pass
STVE-1159	08/01/08	Zn-65	7.73 ± 0.45	6.90	4.80 - 9.00	Pass
STW-1162	08/01/08	Co-57	0.03 ± 0.16	0.00	0.00 - 5.00	Pass
STW-1162	08/01/08	Co-60	11.27 ± 0.23	11.60	8.10 - 15.10	Pass
STW-1162	08/01/08	Cs-134	17.93 ± 0.52	19.50	13.70 - 25.40	Pass
STW-1162	08/01/08	Cs-137	23.72 ± 0.43	23.60	16.50 - 30.70	Pass
STW-1162	08/01/08	H-3	385.15 ± 8.93	341.00	239.00 - 443.00	Pass
STW-1162	08/01/08	Mn-54	13.87 ± 0.37	13.70	9.60 - 17.80	Pass
STW-1162	08/01/08	Sr-90	6.49 ± 1.12	6.45	4.52 - 8.39	Pass
STW-1162	08/01/08	Zn-65	17.64 ± 0.61	17.10	12.00 - 22.20	Pass
STW-1163	08/01/08	Gr. Beta	0.12 ± 0.05	0.00	0.00 - 1.85	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).

[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.

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APPENDIX F

ANNUAL RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM REPORT (ARGPPR)

Docket No: 50 – 352
50 – 353

LIMERICK GENERATING STATION
UNITS 1 and 2

Annual Radiological
Groundwater Protection Program Report

1 January Through 31 December 2008

Prepared By

Teledyne Brown Engineering
Environmental Services

Exelon
Nuclear

Limerick Generating Station
Sanatoga, PA 19464

April 2009

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Appendices

I. Summary and Conclusions

This report on the Radiological Groundwater Protection Program (RGPP) conducted for the Limerick Generating Station (LGS) by Exelon Nuclear covers the period 01 January 2008 through 31 December 2008. During that time period, 103 analyses were performed on 58 samples from 21 groundwater and surface water locations collected from the environment, both on and off station property in 2008.

There was one known release into the groundwater at Limerick Generating Station that occurred from a cooling tower overflow while a Radwaste discharge was in progress. The discharge was secured and no radioactivity was found in the water sample obtained.

Gamma-emitting radionuclides associated with licensed plant operations were not detected at concentrations greater than their respective Lower Limits of Detection (LLDs) as specified in the Offsite Dose Calculation Manual (ODCM) in any of the groundwater or surface water samples.

Strontium-90 was not detected at a concentration greater than the LLD of 2.0 picoCuries per liter (pCi/L) in any of the groundwater or surface water samples tested.

Tritium was not detected in any of the groundwater or surface water samples at concentrations greater than the United States Environmental Protection Agency (USEPA) drinking water standard (and the Nuclear Regulatory Commission Reporting Limit) of 20,000 pCi/L. Low levels of tritium were detected at concentrations greater than the LLD of 200 pCi/L in 5 of 15 groundwater monitoring locations and 1 of 6 surface water monitoring locations. The tritium concentrations ranged from 208 to 902 pCi/L. Although no drinking water pathway is available from groundwater, the dose via the drinking water pathway was calculated at 0.053 mrem to a child (total body), which was 0.89% of the 10 CFR 50, Appendix I dose limit.

In assessing all the data gathered for this report, it was concluded that the operation of Limerick Generating Station had no adverse radiological impact on the environment offsite of LGS.

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.

This report covers those analyses performed by Teledyne Brown Engineering (TBE) on samples collected in 2008.

In 2006, Exelon instituted a comprehensive program to evaluate the impact of station operations on groundwater and surface water in the vicinity of Limerick Generating Station. This evaluation involved numerous station personnel and contractor support personnel.

A. Objective of the RGPP

The long-term objectives of the RGPP are as follows:

1. Identify suitable locations to monitor and evaluate potential impacts from station operations before significant radiological impact to the environment and potential drinking water sources.

2. Understand the local hydrogeologic regime in the vicinity of the station and maintain up-to-date knowledge of flow patterns on the surface and shallow subsurface.

3. Perform routine water sampling and radiological analysis of water from selected locations.

4. Report new leaks, spills, or other detections with potential radiological significance to stakeholders in a timely manner.

5. Regularly assess analytical results to identify adverse trends.

6. Take necessary corrective actions to protect groundwater resources.

B. Implementation of the Objectives

The objectives identified have been implemented at Limerick Generating Station as discussed below:

1. Exelon and its consultant identified locations as described in the 2006 Phase 1 study. The Phase 1 study results and conclusions

were made available to state and federal regulators as well as the public on an Exelon web site in station specific reports. www.exeloncorp.com/ourcompanies/powergen/nuclear/Tritium.htm

2. The Limerick Generating Station reports describe the local hydrogeologic regime. Periodically, the flow patterns on the surface and shallow subsurface are updated based on ongoing measurements.

3. Limerick Generating Station will continue to perform routine sampling and radiological analysis of water from selected locations.

4. Limerick Generating Station has implemented new procedures to identify and report new leaks, spills, or other detections with potential radiological significance in a timely manner.

5. Limerick Generating Station staff and consulting hydrogeologist assess analytical results on an ongoing basis to identify adverse trends.

C. Program Description

Samples for the ongoing ground water monitoring program were collected for Exelon Nuclear by Normandeau Associates, Inc.(NAI). This section describes the general collection methods used to obtain environmental samples for the LGS RGPP in 2008. Sample locations can be found in Table A–1, Appendix A.

1. Sample Collection

Groundwater and Surface Water

Samples of water were collected, managed, transported and analyzed in accordance with approved procedures following EPA methods. Both groundwater and surface water were collected. Sample locations, sample collection frequencies and analytical frequencies were controlled in accordance with approved station procedures. Contractor and/or station personnel were trained in the collection, preservation management, and shipment of samples, as well as in documentation of sampling events. Analytical laboratories were subject to internal quality assurance programs, industry cross-check programs, as well as nuclear industry audits. Station personnel reviewed and evaluated all analytical data deliverables as data were received.

Both station personnel and an independent hydrogeologist reviewed analytical data results for adverse trends or changes to hydrogeologic conditions.

D. Characteristics of Tritium (H-3)

Tritium (chemical symbol H-3) is a radioactive isotope of hydrogen. The most common form of tritium is tritium oxide, which is also called "tritiated water." The chemical properties of tritium are essentially those of ordinary hydrogen.

Tritiated water behaves the same as ordinary water in both the environment and the body. Tritium can be taken into the body by drinking water, breathing air, eating food, or absorption through skin. Once tritium enters the body, it disperses quickly and is uniformly distributed throughout the body. Tritium is excreted primarily through urine with a clearance rate characterized by an effective biological half-life of about 14 days. Within one month or so after ingestion, essentially all tritium is cleared. Organically bound tritium (tritium that is incorporated in organic compounds) can remain in the body for a longer period.

Tritium is produced naturally in the upper atmosphere when cosmic rays strike air molecules. Tritium is also produced during nuclear weapons explosions, as a by-product in reactors producing electricity, and in special production reactors, where the isotopes lithium-7 and/or boron-10 are activated to produce tritium. Like normal water, tritiated water is colorless and odorless. Tritiated water behaves chemically and physically like non-tritiated water in the subsurface, and therefore tritiated water will travel at the same velocity as the average groundwater velocity.

Tritium has a half-life of approximately 12.3 years. It decays spontaneously to helium-3 (3He). This radioactive decay releases a beta particle (low-energy electron). The radioactive decay of tritium is the source of the health risk from exposure to tritium. Tritium is one of the least dangerous radionuclides because it emits very weak radiation and leaves the body relatively quickly. Since tritium is almost always found as water, it goes directly into soft tissues and organs. The associated dose to these tissues is generally uniform and is dependent on the water content of the specific tissue.

III. Program Description

A. Sample Analysis

This section describes the general analytical methodologies used by TBE to analyze the environmental samples for radioactivity for the Limerick

Generating Station RGPP in 2008.

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

1. Concentrations of gamma emitters in groundwater and surface water.

2. Concentrations of strontium in groundwater and surface water.

3. Concentrations of tritium in groundwater and surface water.

B. Data Interpretation

The radiological data collected prior to Limerick Generating Station becoming operational were used as a baseline with which these operational data were compared. For the purpose of this report, Limerick Generating Station was considered operational at initial criticality. 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) is 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 is intended as a before the fact estimate of a system (including instrumentation, procedure and sample type) and not as an after the fact criterion for the presence of activity. All analyses were designed to achieve the required LGS detection capabilities for environmental sample analysis.

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

2. Laboratory Measurements Uncertainty

The estimated uncertainty in measurement of tritium in environmental samples is frequently on the order of 50% of the measurement value.

Statistically, the exact value of a measurement is expressed as a range with a stated level of confidence. The convention is to report results with a 95% level of confidence. The uncertainty comes from calibration standards, sample volume or weight measurements, sampling uncertainty and other factors. Exelon reports the

uncertainty of a measurement created by statistical process (counting error) as well as all sources of error (Total Propagated Uncertainty or TPU). Each result has two values calculated. Exelon reports the TPU by following the result with plus or minus ± the estimated sample standard deviation, as TPU, that is obtained by propagating all sources of analytical uncertainty in measurements.

Analytical uncertainties are reported at the 95% confidence level in this report for reporting consistency with the AREOR.

C. Background Analysis

A pre-operational radiological environmental monitoring program (pre-operational REMP) was conducted to establish background radioactivity levels prior to operation of the Station. The environmental media sampled and analyzed during the pre-operational REMP were atmospheric radiation, fall-out, domestic water, surface water, aquatic life, and foodstuffs. The results of the monitoring were detailed in the report entitled, 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.

The pre-operational REMP contained analytical results from samples collected from both surface water and groundwater.

Monthly surface water sampling began in 1982, and the samples were analyzed for tritium as well as other radioactive analytes. During the preoperational program tritium was detected at a maximum concentration of 420 pCi/L, indicating that these preoperational results were from nuclear weapons testing and are radioactively decaying as predicted. Gamma isotopic results from the preoperational program were all less than or at the minimum detectable concentration (MDC) level.

1. Background Concentrations of Tritium

The purpose of the following discussion is to summarize background measurements of tritium in various media performed by others. Additional detail may be found by consulting references.

a. Tritium Production

Tritium is created in the environment from naturally occurring processes both cosmic and subterranean, as well as from anthropogenic (i.e., man-made) sources. In the upper

atmosphere, "Cosmogenic" tritium is produced from the bombardment of stable nuclides and combines with oxygen to form tritiated water, which will then enter the hydrologic cycle. Below ground, "lithogenic" tritium is produced by the bombardment of natural lithium present in crystalline rocks by neutrons produced by the radioactive decay of naturally abundant uranium and thorium. Lithogenic production of tritium is usually negligible compared to other sources due to the limited abundance of lithium in rock. The lithogenic tritium is introduced directly to groundwater.

A major anthropogenic source of tritium and strontium-90 comes from the former atmospheric testing of thermonuclear weapons. Levels of tritium in precipitation increased significantly during the 1950s and early 1960s, and later with additional testing, resulting in the release of significant amounts of tritium to the atmosphere. The Canadian heavy water nuclear power reactors, other commercial power reactors, nuclear research and weapons production continue to influence tritium concentrations in the environment.

b. Precipitation Data

Precipitation samples are routinely collected at stations around the world for the analysis of tritium and other radionuclides. Two publicly available databases that provide tritium concentrations in precipitation are Global Network of Isotopes in Precipitation (GNIP) and USEPA's RadNet database. GNIP provides tritium precipitation concentration data for samples collected world wide since 1960. RadNet provides tritium precipitation concentration data for samples collected at stations through out the U.S. Based on GNIP data for sample stations located in the U.S. Midwest, tritium concentrations peaked around 1963. This peak, which approached 10,000 pCi/L for some stations, coincided with the atmospheric testing of thermonuclear weapons. Tritium concentrations in surface water showed a sharp decline up until 1975 followed by a gradual decline since that time. Tritium concentrations in have typically been below 100 pCi/L since around 1980. Tritium concentrations in wells may still be above the 200 pCi/L detection limit from the external causes described above. Water from previous years was naturally captured in groundwater. As a result, some well water sources today are affected by the surface water from the 1960s that contained elevated tritium activity.

c. Surface Water Data

Tritium concentrations are routinely measured in the Schuylkill and Delaware Rivers. Pennsylvania surface water data are typically less than 100 pCi/L.

The USEPA RadNet surface water data typically has a reported 'Combined Standard Uncertainty' of 35 to 50 pCi/L. According to USEPA, this corresponds to a ±70 to 100 pCi/L 95% confidence bound on each given measurement. Therefore, the typical background data provided may be subject to measurement uncertainty of approximately ± 70 to 100 pCi/L.

The radio-analytical laboratory is counting tritium results to an Exelon specified LLD of 200 pCi/L. Typically, the lowest positive measurement will be reported within a range of 40 – 240 pCi/L or 140 ± 100 pCi/L. Clearly, these sample results cannot be distinguished as different from background at this concentration.

IV. Results and Discussion

Gamma spectroscopy results for groundwater and surface water sample were reported for twelve nuclides (Mn-54, Co-58, Fe-59, Co-60, Zn-65, Nb-95, Zr-95, I-131, Cs-134, Cs-137, Ba-140 and La-140).

A. Groundwater Results

Samples were collected from onsite wells throughout the year in accordance with the station radiological groundwater protection program. Analytical results and anomalies are discussed below.

Tritium

Samples from fifteen locations were analyzed for tritium activity (Table B–I.1, Appendix B). Tritium values ranged from non detectable to 902 pCi/L. Well MW-LR-5 had the highest value of 902 pCi/L. Although no drinking water pathway is available from groundwater, the dose via the drinking water pathway was calculated at 0.053 mrem to a child (total body), which was 0.889% of the 10 CFR 50, Appendix I dose limit.

Strontium

No Sr-90 activity was detected in any of the ground water samples analyzed (Table B–I.1, Appendix B).

Gamma Emitters

No gamma emitting nuclides were detected (Table B-I.2, Appendix B).

B. Surface Water Results

In accordance with the Station's radiological groundwater protection program surface water samples were collected from streams that transverses the site, as well as, from other water bodies that could influence the tritium concentration at Limerick. Analytical results and anomalies are discussed below.

Tritium

Samples from six locations were analyzed for tritium activity Tritium activity was detected in station SW-LR-6 at a concentration of 208 pCi/Liter (Table B-1.3, Appendix B).

Strontium

No Sr-90 activity was detected in any of surface water samples analyzed (Table B–I.3, Appendix B).

Gamma Emitters

Potassium-40 was detected in two of six samples. Potassium-40 values ranged from 54 pCi/Liter to 69 pCi/Liter. No other gamma emitting nuclides were detected (Table B–I.4, Appendix B).

C. Drinking Water Well Survey

A drinking water well survey was conducted during the summer 2006 by CRA (CRA 2006) around the Limerick Generating Station. CRA reviewed the Pennsylvania Groundwater Information System database to identify wells within a 1-mile radius from the center of the Station. Forty-six domestic withdrawal wells, two industrial wells, two commercial wells, and one institutional well were identified within the specified radius. The well depths range from 78 to 345 feet blow ground surface (bgs), and they yield between 8 and 100 gallons per minute (gpm). All wells are completed in the Brunswick Formation.

The Station has one potable supply well and one fire water well. The potable supply well is constructed as an open-rock borehole. Groundwater was measured at a depth 102 feet bgs during a well pump replacement in 2004 (personal communication with Station, 2006). The pump was placed at a depth of approximately 294 feet bgs. The total well depth and the depth of the steel casing are unknown. The well is located approximately

175 feet east of the Reactor Building. The Station estimates that the well is pumped at approximately 2 gpm. The fire water well is constructed as an open-rock borehole. Groundwater was encountered at 121 feet bgs during a well pump replacement in 2004. The well pump was placed at a depth of approximately 399 feet bgs. The total well depth and the depth of the steel casing are unknown. The well is located approximately 500 feet east of the cooling towers. The well is used only in an emergency fire situation; therefore, water use is estimated to be zero.

D. Summary of Results – Inter-Laboratory Comparison Program

Inter-Laboratory Comparison Program results for TBE are presented in the Annual Radiological Environmental Operating Report.

E. Leaks, Spills, and Releases

There was one known release into the groundwater at Limerick Generating Station that occurred from a cooling tower overflow on March 20, 2008, while a Radwaste discharge was in progress (IR752414). The discharge was secured and no radioactivity was found in the water sample obtained; however tritium was identified in a nearby well as part of the RGPP.

F. Trends

No trends have been identified.

G. Investigations

Conclusions from the Phase 1 report have been made available to state and federal regulators and to the public. Currently no investigations are on going.

H. Actions Taken

1. Compensatory Actions

   There have been no station events requiring compensatory actions at the Limerick Generating Station.

2. Installation of Monitoring Wells

   No new wells have been installed in 2007

3. Actions to Recover/Reverse Plumes

   No actions were required to recover or reverse groundwater plumes.

V. References

1. Conestoga Rovers and Associates, Fleetwide Assessment, Limerick Generating Station, Sanatoga, Pennsylvania, Ref. No. 045136(17), September 2006

2. 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

LOCATION DESIGNATION

TABLE A-1: Radiological Groundwater Protection Program – Sampling Locations for the Limerick Generating Station, 2008

Location	Type	Distance
MW-LR-1	Monitoring Well	Onsite
MW-LR-2	Monitoring Well	Onsite
MW-LR-3	Monitoring Well	Onsite
MW-LR-4	Monitoring Well	Onsite
MW-LR-5	Monitoring Well	Onsite
MW-LR-6	Monitoring Well	Onsite
MW-LR-7	Monitoring Well	Onsite
MW-LR-8	Monitoring Well	Onsite
MW-LR-9	Monitoring Well	Onsite
P11	Monitoring Well	Onsite
P14	Monitoring Well	Onsite
P16	Monitoring Well	Onsite
P17	Monitoring Well	Onsite
P3	Monitoring Well	Onsite
SP22	Monitoring Well	Onsite
SW-LR-2	Surface Water	Offsite
SW-LR-4	Surface Water	Offsite
SW-LR-6	Surface Water	Offsite
SW-LR-7	Surface Water	Onsite
SW-LR-8	Surface Water	Onsite
SW-LR-9	Surface Water	Onsite

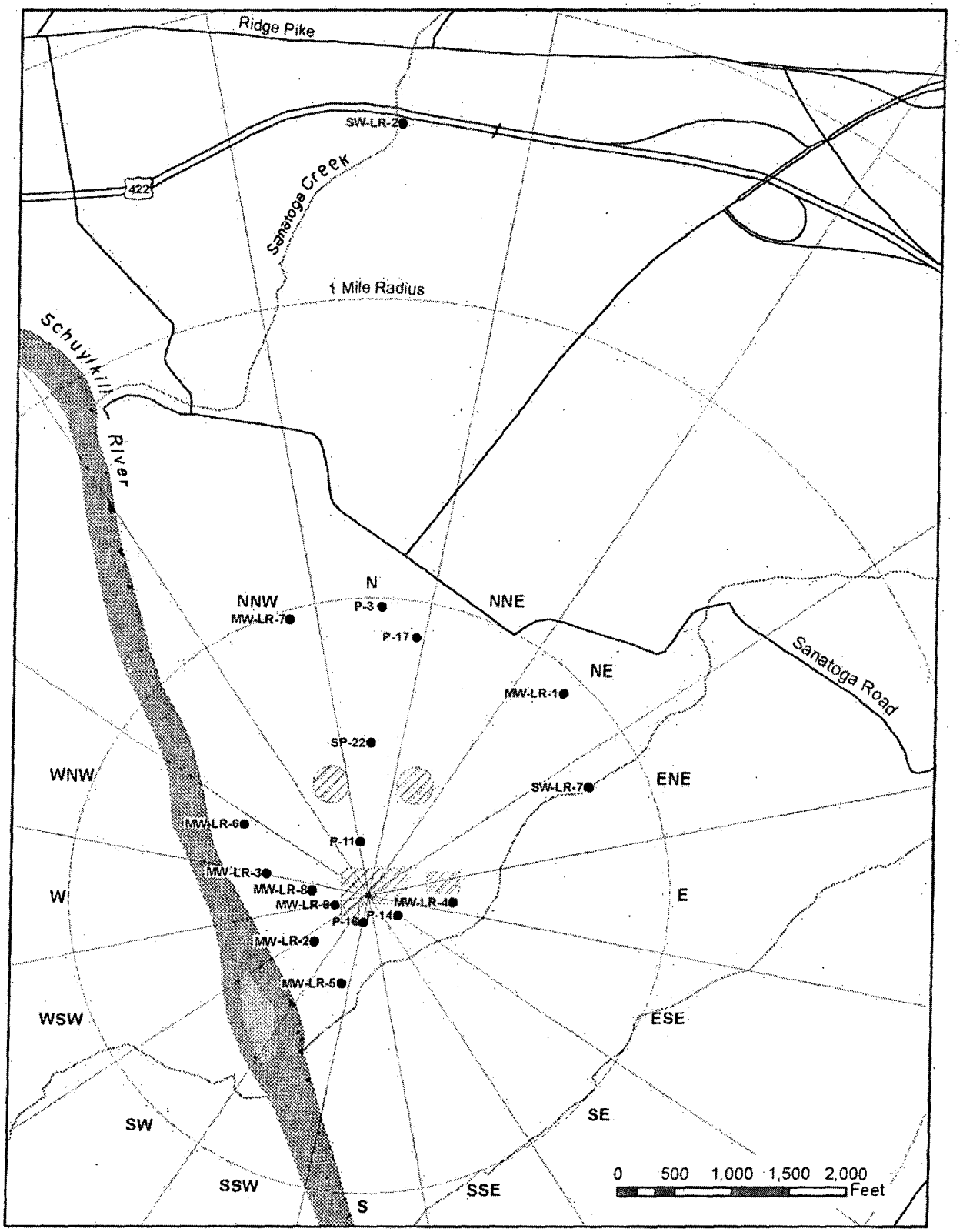

Figure 1 Routine Well Water and Surface Water Sample Locations for the Radiological Groundwater Protection Program, Limerick Generating Station, 2008

APPENDIX B

DATA TABLES

TABLE B-I.1 CONCENTRATIONS OF TRITIUM AND STRONTIUM-90 IN WELL WATER SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, LIMERICK GENERATING STATION, 2008

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE		COLLECTION DATE	H-3	SR-90
MW-LR-1		04/29/08	< 186	
MW-LR-1		10/08/08	< 143	< 1.0
MW-LR-2		04/30/08	< 187	
MW-LR-2		10/09/08	< 146	< 0.9
MW-LR-3		04/30/08	< 187	
MW-LR-3		10/09/08	< 138	< 1.1
MW-LR-4		04/30/08	< 190	
MW-LR-4		10/08/08	< 143	< 1.0
MW-LR-5	ORIGINAL	04/28/08	902 ± 180	
MW-LR-5	RERUN	04/28/08	832 ± 171	
MW-LR-5	ORIGINAL	04/29/08	806 ± 171	
MW-LR-5	RERUN	04/29/08	791 ± 166	
MW-LR-5	ORIGINAL	07/21/08	< 196	
MW-LR-5	RERUN	07/21/08	275 ± 110	
MW-LR-5	DUPLICATE	07/21/08	366 ± 138	
MW-LR-5	ORIGINAL	08/18/08	420 ± 133	
MW-LR-5	RERUN	08/18/08	425 ± 136	
MW-LR-5	ORIGINAL	09/17/08	375 ± 106	
MW-LR-5	RERUN	09/17/08	432 ± 106	
MW-LR-5	ORIGINAL	10/09/08	167 ± 93.6	< 1.3
MW-LR-5	DUPLICATE	10/09/08	< 147	< 0.9
MW-LR-6		04/30/08	< 190	
MW-LR-6		10/09/08	< 140	< 0.9
MW-LR-7		04/30/08	< 187	
MW-LR-7		10/09/08	< 144	< 0.8
MW-LR-8	ORIGINAL	04/29/08	241 ± 124	
MW-LR-8	RERUN	04/29/08	230 ± 131	
MW-LR-8		10/08/08	218 ± 97	< 0.7
MW-LR-9		04/28/08	< 186	
MW-LR-9		04/29/08	< 186	
MW-LR-9		10/08/08	240 ± 108	< 0.9
P3		04/29/08	< 188	
P3		10/09/08	< 139	< 0.7
P11	ORIGINAL	04/29/08	256 ± 125	
P11	RERUN	04/29/08	222 ± 130	
P11	ORIGINAL	10/08/08	185 ± 94	< 0.9
P11	DUPLICATE	10/08/08	197 ± 103	< 1.6
P14		04/29/08	< 187	
P14		10/08/08	212 ± 98	< 0.8
P16		04/30/08	< 189	
P16		10/09/08	< 139	
P17		04/29/08	< 184	
P17		10/08/08	< 136	< 1.3
SP22		04/29/08	< 186	
SP22		10/08/08	< 150	< 0.9

Samples are distilled for H-3 analysis

TABLE B-I.2 CONCENTRATIONS OF GAMMA EMITTERS IN WELL WATER SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, LIMERICK GENERATING STATION, 2008

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	Be-7	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
MW-LR-1	10/08/08	< 32	< 23	< 3	< 4	< 8	< 3	< 5	< 3	< 6	< 19	< 3	< 3	< 33	< 10
MW-LR-2	10/09/08	< 34	< 28	< 3	< 4	< 8	< 3	< 6	< 4	< 6	< 20	< 3	< 3	< 33	< 11
MW-LR-3	10/09/08	< 26	< 59	< 2	< 3	< 6	< 3	< 5	< 3	< 5	< 15	< 2	< 3	< 27	< 7
MW-LR-4	10/08/08	< 34	< 63	< 3	< 4	< 8	< 3	< 6	< 4	< 6	< 21	< 3	< 3	< 35	< 12
MW-LR-5	07/21/08	< 52	< 54	< 6	< 6	< 12	< 6	< 11	< 8	< 10	< 10	< 5	< 7	< 28	< 8
MW-LR-5	10/09/08	< 35	< 32	< 3	< 3	< 9	< 3	< 5	< 5	< 7	< 23	< 3	< 4	< 37	< 11
MW-LR-5	10/09/08	< 27	< 25	< 2	< 3	< 7	< 3	< 5	< 3	< 5	< 22	< 2	< 3	< 30	< 10
MW-LR-6	10/09/08	< 30	< 70	< 3	< 4	< 8	< 3	< 6	< 4	< 7	< 17	< 3	< 3	< 33	< 12
MW-LR-7	10/09/08	< 33	< 28	< 4	< 4	< 8	< 3	< 8	< 4	< 7	< 19	< 3	< 4	< 34	< 11
MW-LR-8	10/08/08	< 39	< 32	< 3	< 4	< 9	< 4	< 7	< 5	< 8	< 26	< 3	< 4	< 38	< 13
MW-LR-9	10/08/08	< 34	< 25	< 3	< 4	< 7	< 3	< 7	< 4	< 6	< 21	< 3	< 3	< 37	< 9
P11	10/08/08	< 41	< 34	< 3	< 4	< 10	< 3	< 8	< 5	< 8	< 34	< 3	< 4	< 51	< 15
P11	10/08/08	< 34	< 34	< 3	< 4	< 7	< 3	< 6	< 4	< 7	< 19	< 3	< 3	< 34	< 10
P14	10/08/08	< 26	< 21	< 2	< 3	< 7	< 3	< 5	< 3	< 5	< 17	< 2	< 3	< 29	< 9
P-16	10/08/08 (1)														
P17	10/08/08	< 34	< 57	< 3	< 4	< 9	< 3	< 7	< 4	< 8	< 29	< 3	< 4	< 42	< 15
P3	10/09/08	< 22	< 45	< 2	< 2	< 5	< 2	< 4	< 3	< 4	< 13	< 2	< 2	< 24	< 7
SP22	10/08/08	< 28	< 24	< 3	< 3	< 6	< 3	< 6	< 3	< 5	< 17	< 3	< 3	< 30	< 11

(1) INSUFFICIENT VOLUME FOR GAMMA ANALYSIS

TABLE B-II.1 CONCENTRATIONS OF TRITIUM AND STRONTIUM-90 IN SURFACE WATER SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, LIMERICK GENERATING STATION, 2008

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3	SR-90
SW-LR-2	04/28/08	< 186	
SW-LR-2	04/28/08	< 190	
SW-LR-2	10/07/08	< 142	< 1.3
SW-LR-4	04/28/08	< 185	
SW-LR-4	10/07/08	< 147	< 1.0
SW-LR-6	04/28/08	< 183	
SW-LR-6	10/07/08	208 ± 102	< 0.9
SW-LR-7	04/28/08	< 186	
SW-LR-7	10/07/08	< 131	< 1.1
SW-LR-8	04/28/08	< 186	
SW-LR-8	10/09/08	< 145	< 1.0
SW-LR-9	04/28/08	< 190	
SW-LR-9	10/10/08	< 166	< 1.7

SAMPLES ARE DISTILLED FOR H-3 ANALYSIS

TABLE B-II.2 **CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, LIMERICK GENERATING STATION, 2008**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	Be-7	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	I-131	Cs-134	Cs-137	Ba-140	La-140
SW-LR-2	10/07/08	< 31	54 ± 33	< 3	< 3	< 8	< 3	< 6	< 3	< 6	< 20	< 3	< 3	< 34	< 10
SW-LR-4	10/07/08	< 37	< 60	< 3	< 4	< 10	< 3	< 6	< 5	< 7	< 23	< 3	< 3	< 35	< 12
SW-LR-6	10/07/08	< 28	69 ± 32	< 3	< 3	< 7	< 3	< 5	< 3	< 6	< 19	< 2	< 3	< 31	< 10
SW-LR-7	10/07/08	< 33	< 33	< 3	< 4	< 8	< 3	< 6	< 4	< 7	< 21	< 3	< 4	< 38	< 12
SW-LR-8	10/09/08	< 34	< 27	< 3	< 4	< 7	< 3	< 7	< 3	< 6	< 18	< 3	< 3	< 32	< 11
SW-LR-9	10/10/08	< 20	< 29	< 1	< 2	< 5	< 1	< 3	< 2	< 4	< 54	< 1	< 1	< 48	< 14