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U.S. Nuclear Regulatory Commission
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THREE MILE ISLAND NUCLEAR STATION UNIT 1 AND UNIT 2
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SUBJECT: 2010 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM REPORT

In accordance with TMI-1 Technical Specification 6.9.3.1, TMI-2 Technical Specifications 6.8.1.1, enclosed is the Annual Radiological Environmental Operating Report covering the time-period of January 1 through December 31, 2010, for the Three Mile Island Nuclear Station.

Please contact Laura Weber of TMI-1 Chemistry at (717) 948-8947 if you have any questions regarding this submittal.

Sincerely,

Richard W. Libra
Plant Manager

RWL/lkw

Attachments/Enclosures

cc: Region 1 Administrator
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THREE MILE ISLAND NUCLEAR STATION
UNITS 1 and 2

Annual Radiological
Environmental Operating Report

1 January Through 31 December 2010

Prepared By
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Environmental Services

Exelon SM
Nuclear
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Appendices

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I. Summary and Conclusions

This report on the Radiological Environmental Monitoring Program conducted for the Three Mile Island Nuclear Station (TMINS) by Exelon covers the period 1 January 2010 through 31 December 2010. During that time period, 1,708 analyses were performed on 1,304 samples. In assessing all the data gathered for this report and comparing these results with preoperational data and operational REMP data, it was concluded that the operation of TMINS had no adverse radiological impact on the environment.

Surface, drinking, and effluent water samples were analyzed for concentrations of tritium and gamma emitting nuclides. Surface, drinking, and effluent water samples were also analyzed for concentrations of I-131. Drinking and effluent water samples were also analyzed for concentrations of gross beta. Effluent water samples were also analyzed for concentrations of Sr-89 and Sr-90. All groundwater and surface water results are now being reported in the ARGPPR, Appendix F. No Sr-89 and Sr-90 activities were detected. Iodine-131 and gross beta concentrations detected were consistent with those detected in previous years. Tritium activity in six surface water samples and several monthly effluent water samples was due to TMINS activities or releases. No other fission or activation products potentially attributed to TMI liquid releases were detected.

Fish (predator and bottom feeder) and sediment samples were analyzed for concentrations of gamma emitting nuclides. Fish samples were also analyzed for concentrations of Sr-90. No Sr-90 activity was detected. No fission or activation products were detected in fish samples. Cesium-137 was not detected in any sediment samples. Occasionally Cs-137 is detected at very low levels (just above LLD) and is not distinguishable from background levels.

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 other activation products were detected.

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

Cow milk samples were analyzed for concentrations of I-131, gamma emitting nuclides, Sr-89 and Sr-90. No I-131 and Sr-89 activities were detected. Concentrations of naturally occurring K-40 were consistent with those detected in previous years. Sr-90 activities detected were consistent with those detected in previous years and were attributed to fallout from nuclear weapons testing. No other fission or activation products were found.

Food Product samples were analyzed for concentrations of gamma emitting nuclides (including I-131) and Sr-90. Sr-90 activities were detected in both the indicator and control samples. This was a result of plant uptake of Sr-90 in soil as a result of past nuclear weapons testing. Concentrations of naturally occurring Be-7 and K-40 were consistent with those detected in previous years.

No other fission or activation products were detected.

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

In conclusion, radioactive materials related to TMINS operations were detected in environmental samples, but the measured concentrations were low and consistent with measured effluents. The environmental sample results verified that the doses received by the public from TMINS effluents in 2010 were well below applicable dose limits and only a small fraction of the doses received from natural background radiation. Additionally, the results indicated that there was no permanent buildup of radioactive materials in the environment and no increase in background radiation levels.

Therefore, based on the results of the radiological environmental monitoring program (REMP) and the doses calculated from measured effluents, TMINS operations in 2010 did not have any adverse effects on the health of the public or on the environment.

II. Introduction

The Three Mile Island Nuclear Station (TMINS), consisting of two pressurized water reactors (PWR), is located on the northern end of Three Mile Island in the Susquehanna River approximately 2.5 miles south of Middletown in Londonderry Township, Dauphin County, Pennsylvania. TMI-1 is owned and operated by Exelon and became operational in 1974. TMI-2 is operated by GPU Nuclear, Inc. and owned by Metropolitan Edison (50%), Pennsylvania Electric (25%) and Jersey Central Power & Light (25%). TMI-2 became operational in 1978 and was shut down following the 1979 accident. At the end of 1993, TMI-2 was placed in a condition called Post-Defueling Monitored Storage. TMI-2 is maintained by Exelon under contract with GPU Nuclear.

A Radiological Environmental Monitoring Program (REMP) for TMINS was initiated in 1974. This report covers those analyses performed by Teledyne Brown Engineering (TBE), Mirion Technologies, and Environmental Inc. (Midwest Labs) on samples collected during the period 1 January 2010 through 31 December 2010.

A. Objective of the REMP

The objectives of the REMP are to:

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

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

3. To verify inplant controls for the containment of radioactive materials.

4. To determine buildup of long-lived radionuclides in the environment and changes in background radiation levels.

5. To provide reassurance to the public that the program is capable of adequately assessing impacts and identifying noteworthy changes in the radiological status of the environment.

6. To fulfill the requirements of the TMI-1 and TMI-2 Technical Specifications.

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 TMINS REMP were collected for Exelon by Normandeau Associates, RMC Environmental Services Division (RMC). This section describes the general collection methods used by RMC to obtain environmental samples for the TMINS REMP in 2010. Sample locations and descriptions can be found in Tables B–1 and B–2, and Figures B–1 through B–3, Appendix B. The collection procedures used by RMC are listed in Table B–3.

Aquatic Environment

The aquatic environment was evaluated by performing radiological analyses on samples of surface water, drinking water, effluent water, fish, and sediment. Two gallon water samples were collected monthly from continuous samplers located at three surface water locations (A3-2, J1-2 and Q9-1), three drinking water locations (G15-2, G15-3 and Q9-1), and one effluent water location (K1-1). Control locations were A3-2 and Q9-1. All groundwater and storm water results are now being reported in the ARGPPR, Appendix F. All water samples were collected in unused plastic bottles, which were rinsed at least twice with source water prior to collection. Fish samples comprising the flesh of two groups, bottom feeders and predators, were collected semiannually at an upstream control (BKG) and a downstream Indicator (IND) location. Location IND could be affected by TMINS' effluent releases. Sediment samples composed of recently deposited substrate were collected semiannually at three locations (J2-1, K1-3 and A1-3). In addition, one sediment sample was collected annually at the EDCB. Location A1-3 was the control.

Atmospheric Environment

The atmospheric environment was evaluated by performing radiological analyses on samples of air particulates, airborne iodine, milk, and food product. Airborne iodine and particulate samples were collected and analyzed weekly at seven locations (A3-1, E1-2, F1-3, G2-1, H3-1, M2-1, and Q15-1). The control location was Q15-1. 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 (K15-3, E2-2, F4-1, G2-1 and P4-1) from March through November, and monthly from December through February. The control location was K15-3. 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.

Food products were collected monthly at two locations (B10-2 and H1-2), in lieu of milk sampling, and annually from the four food product groups at two locations (E1-2 and B10-2). B10-2 was the control location for both annual and monthly sampling. Five different kinds of vegetation samples and four different kinds of vegetation leaves 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 are arranged in generally concentric rings on and around the TMINS site as follows:

A site boundary ring consisting of 19 locations (A1-4, B1-2, C1-2, D1-1, E1-4, F1-2, F1-4, G1-3, G1-5, G1-6, H1-1, J1-3, K1-4, L1-1, M1-1, N1-3, P1-2, Q1-2, and R1-1) 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 TMINS release.

An indicator ring consisting of 60 locations (A3-1, A5-1, A9-3, B1-1, B2-1, B5-1, B10-1, C1-1, C2-1, C5-1, C8-1, D1-2, D2-2, D6-1, E1-2, E2-3, E5-1, E7-1, F1-1, F2-1, F5-1, F10-1, G1-2, G2-4, G5-1, H3-1, H5-1, H8-1, J1-1, J3-1, J5-1, J7-1 K2-1, K3-1, K5-1, K8-1, L1-2, L2-1, L5-1, L8-1, M1-2, M2-1, M5-1, M9-1, N1-1, N2-1, N5-1, N8-1, P1-1, P2-1, P5-1, P8-1, Q1-1,

Q2-1, Q5-1, Q9-1, R1-2, R3-1, R5-1, and R9-1) extending to approximately 10 miles from the site designed to measure possible exposures to close-in population.

The balance of 11 locations (D15-1, F25-1, G10-1, G15-1, H15-1, J15-1, K15-1, L15-1, N15-2, Q15-1, and R15-1) represent control areas.

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 TMINS, 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.

Each TLD station consists of two primary program TLD badges, each of which has three $CaSO_4$ thermoluminescent phosphors enclosed in plastic, placed at each location in a frame located approximately three to six feet above ground level. Since each TLD responds to radiation independently, this provides six independent detectors at each station. The TLDs were exchanged quarterly and sent to Global Dosimetry for analysis.

B. Sample Analysis

This section describes the general analytical methods used by TBE and Midwest Labs to analyze the environmental samples for radioactivity for the TMINS REMP in 2010. 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 and effluent water, and air particulates.

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

3. Concentrations of tritium in surface, drinking, effluent, and storm water.

4. Concentrations of I-131 in surface, drinking, and effluent water, air, milk and food products.

5. Concentrations of strontium in effluent water, fish, milk, and food products.

6. Ambient gamma radiation levels at various site environs.

C. Data Interpretation

Data were compared to previous years' operational data for consistency and trending. In addition, comparison to pre-operational data is sometimes made. For the purpose of this report, TMINS 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) 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 TMINS 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. 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 effecting a negative number. An MDC was reported in all cases where positive activity was not detected.

Gamma spectroscopy results for each type of sample were

grouped as follows:

For surface, drinking, and effluent water 11 nuclides, Mn-54, Co-58, Fe-59, Co-60, Zn-65, Zr-95, Nb-95, Cs-134, Cs-137, Ba-140 and La-140 were reported.

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

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

For air particulate eight nuclides, Be-7, Mn-54, Co-58, Co-60, Nb-95, Zn-95, Cs-134 and Cs-137 were reported.

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

For food products five nuclides, Be-7, K-40, I-131, Cs-134 and Cs-137 were reported.

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

D. Program Exceptions

For 2010 the TMINS REMP had a sample recovery rate in excess of 99%. Issue Reports (IR) were initiated to document exceptions. Exceptions are listed below:

AIR

1. At the time of collection the pump vacuum was zero and the timer was running. Pump malfunction was probably due to worn vanes and/or bearings. The samples were not valid and were not sent to the lab for analysis. The pump was replaced and the station was returned to service. The following periods and locations were affected:

   01/13/10 – 01/20/10, Location G2-1, IR1073167
   06/02/10 – 06/09/10, Location F1-3, IR 1081528
   08/18/10 – 08/25/10, Location Q15-1, IR 1108014

2. For the period 01/20/10 - 01/27/10, the sampler was found blown over due to high winds. The sampler did not appear to be impacted and the samples were sent for analyses. The results were not significantly impacted.

   Location F1-3

3. For the period 02/03/10 - 02/12/10, due to heavy snow and blizzard conditions, access was not available to these stations until the samples ran 9 days. All other air sample stations were collected after 8 days.

   Location F1-3, G2-1, H3-1, IR 1073167

4. For the period 09/01/10 - 09/08/10 the GFI breaker tripped and was reset, the samples had lower volumes but were still valid.

   Location E1-2

5. For the period 10/13/10 - 10/20/10 sampling period, no QC air sample results available. Samples were missing from the envelope when delivered to the QC lab. The sample collection documentation was received, but the samples were missing.

   Location E1-2Q, IR 1129635

6. For the period 12/1/10 - 12/8/10 sampling period, as a result of a breaker trip the samples had air volumes less than minimally required per procedure. The samples were considered invalid and not sent to the lab for analysis. The breaker was reset and the unit returned to operation.

   Location E1-2Q, IR 1170705

WATER

1. Surface water - The downstream river water sampler experienced weather related conditions that caused missed samples during the following sample periods. IR 1025964 describes the frozen river conditions. Sufficient sample was available for sampling periods so no grab samples were required, except as noted, for the following samples.

   01/04/10 – 01/12/10, Location J1-2, all samples missed, grab sample required
   01/12/10 – 01/19/10, Location J1-2, 47 samples missed
   01/19/10 – 01/26/10, Location J1-2, 10 samples missed
   01/26/10 – 02/02/10, Location J1-2, 88 samples missed, grab sample required
   02/02/10 – 02/10/10, Location J1-2, 81 samples missed, grab sample required
   02/10/10 – 02/16/10, Location J1-2, all samples missed, grab sample required
   02/16/10 – 02/23/10, Location J1-2, all samples missed, grab sample required
   02/23/10 – 03/02/10, Location J1-2, 27 samples missed

2. Drinking water - For the period 04/20/10 – 04/27/10, there was a maintenance power outage at the treatment plant that caused 4 samples to be missed. Sufficient volume was available therefore, no grab sample was required.

   Location G15-3

3. Surface water - For the period 04/20/10 – 04/27/10, a sampler experienced a Fatal Error. 123 samples were missed and insufficient volume was collected. A grab sample was collected to supplement the sample volume. The sampler was replaced and calibrated satisfactorily.

   Location J1-2, IR 1063746

4. Surface water - For the period 8/24/10 – 8/31/10, lower than normal volume was found, but volume was sufficient and no grab sample was required. The collection frequency was increased from hourly to every 30 minutes.

   Location A3-2

5. Effluent water - Location K1-1 plant effluent sampler, which is for information and not part of the REMP, was found to have missed samples during the following periods:

   8/10/10 – 8/17/10 no grab sample required
   8/17/10 – 8/24/10 no grab sample required
   8/24/10 – 8/31/10 no grab sample required, collection frequency increased from hourly to every 30 minutes

6. Effluent water - Location K1-1 plant effluent sampler, which is for information and not part of the REMP, was found with tubing cracked and was replaced. The sampler was unable to be recalibrated and was taken out of service until 9/10/10 when it was successfully calibrated to procedure specifications. No grab sample was required.

   08/31/10 – 09/07/10

7. Surface water - Due to a frozen sample line numerous hourly aliquots were missing from the weekly composite at the downstream surface water sampler at J1-2. Sufficient sample was available for sampling periods so no grab samples were required, except as noted. The following sampling periods were impacted (IR 1170705):

   12/08/10 – 12/14/10, sufficient volume was available
   12/15/10 – 12/21/10, insufficient volume, grab sample required
   12/21/10 – 12/28/10, sufficient volume was available

8. Effluent water - Insufficient volume was collected at location K1-1, plant effluent sampler, which is for information and not part of the REMP. The sampler was calibrated and a grab sample was required (IR 1170705).

   12/15/10 – 12/21/10

TLD

1. Frozen river conditions, made it unsafe to travel by boat to the following TLDs located on the islands west of the plant. Therefore, the following TLD stations were not changed out for the 4th quarter 2010:

   Location K2-1
   Location M1-2
   Location N1-1
   Location P1-1
   Location Q1-1

Location R1-2

VEGETATION

1. There were no missed samples during the period. Field corn from H1-2 was substituted for the annual grain because the sweet corn at E1-2 did not develop.

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

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

E. Program Changes

Milk Station D2-1 was removed from the REMP program in 2010 because they ceased operations in 2009. Milk Station P4-1 had been previously added in 2009 as a result of this change.

IV. Results and Discussion

A. Aquatic Environment

1. Surface Water

Samples were taken weekly from a continuous sampler at three locations (A3-2, J1-2, and Q9-1) and composited on a monthly schedule. Of these locations only J1-2 located downstream, could be affected by TMINS' effluent releases. The following analyses were performed.

Tritium

Monthly samples from J1-2 and Q9-1 were analyzed for tritium activity (Table C–I.1, Appendix C). Positive tritium activity was detected in six of 12 samples at location J1-2 which is located immediately downstream of the TMINS effluent outfall. The concentrations ranged from 282 to 887 pCi/l. The increased tritium concentrations detected were a result of TMINS releasing radwaste treatment system effluent water under permitted discharges in

accordance with NRC regulations. The indicator surface water sample is taken just downstream of the liquid discharge outfall where mixing of liquid effluents with the river water is incomplete. More complete mixing is not achieved until liquid effluents pass over the York Haven Dam. This water is normally not consumed by humans. The concentrations detected were well below any regulatory limits (Figures C–1 and C–2, Appendix C).

Iodine

Monthly samples from location A3-2 were analyzed for I-131 activity (Table C–I.2, Appendix C). This is a control or background station sampled because known medical discharges of radiopharmaceuticals occur into the surface water upstream of TMI from a nearby hospital. Iodine-131 was detected in two of twelve samples. The concentration ranged from 0.7 to 1.1 pCi/l.

Gamma Spectrometry

Locations J1-2 and Q9-1 were analyzed for gamma emitting nuclides (Table C–I.3, Appendix C), also nuclides were less than the MDC.

2. Drinking Water

Monthly samples were collected from continuous water samplers at three locations (G15-2, G15-3, and Q9-1). Two locations (G15-2 and G15-3) could be affected by TMINS' effluent releases. The following analyses were performed:

Gross Beta

Monthly samples from all locations were analyzed for concentrations of gross beta (Tables C–II.1, Appendix C). Gross beta activity was detected in 11 of 36 samples. The concentrations ranged from 2.7 to 5.5 pCi/l. Concentrations detected were consistent with those detected in previous years (Figure C–3, Appendix C).

Iodine

Monthly samples from all locations were analyzed for concentrations of Iodine-131 (Table C–II.2, Appendix C). Iodine-131 activity was not detected in any samples.

Tritium

Monthly samples from all locations were analyzed for tritium activity (Table C–II.3, Appendix C). Tritium was not detected in any samples (Figures C–4, Appendix C).

Gamma Spectrometry

Samples from all locations were analyzed for gamma emitting nuclides (Table C–II.4, Appendix C). All nuclides were less than the MDC.

3. Effluent Water

Monthly samples were collected from a continuous water sampler at one location (K1-1). The following analyses were performed:

Gross Beta

Monthly samples from location K1-1 were analyzed for concentrations of gross beta (Tables C–III.1, Appendix C). Gross beta was detected in 10 of 12 samples. The concentrations ranged from 3.3 to 8.7 pCi/l. Concentrations detected were consistent with those detected in previous years.

Iodine-131

Monthly samples from location K1-1 were analyzed for concentrations of I-131 (Tables C–III.1, Appendix C). Iodine-131 was detected in one sample at a concentration of 0.6 pCi/l. I-131 was detected in the upstream control sample location for the same period of time. No I-131 was identified in any tank effluent pre-release samples, and I-131 was not detected in any other downstream drinking water samples. Effluent water is not consumed by humans.

Tritium

Monthly samples from location K1-1 were analyzed for tritium activity (Table C–III.1, Appendix C). Tritium activity was detected in 11 of 12 samples. The concentrations ranged from 279 to 13,800 pCi/l. The elevated results were a result of TMI releasing radwaste treatment system effluent water under permitted discharges in accordance with NRC regulations. These results were from the liquid discharge mixing basin. The concentrations detected agree

with those obtained from the TMINS Effluent Monitoring Program. The concentrations were well below any regulatory limits.

Strontium

Semiannual samples from location K1-1 were analyzed for Sr-89 and Sr-90 (Table C–III.1, Appendix C). No strontium activity was detected. The highest MDC was calculated at 4.8 pCi/l for Sr-89 and at 0.8 pCi/l for Sr-90.

Gamma Spectrometry

Samples from location K1-1 were analyzed for gamma emitting nuclides (Table C–III.2, Appendix C). All nuclides were less than the MDC.

4. Storm Water

Storm water results are now included in the Annual Radiological Groundwater Protection Program (ARGPPR), Appendix F.

5. Ground Water

Groundwater results are now included in the Annual Radiological Groundwater Protection Program (ARGPPR), Appendix F.

6. Fish

Fish samples comprised of bottom feeders and predators were collected at two locations (IND and BKG) semiannually. Location IND could be affected by TMINS' effluent releases. The following analyses were performed:

Strontium

The edible portions of fish samples from both locations were analyzed for Sr-90. (Table C–IV.1, Appendix C). No strontium activity was detected. The highest MDC was calculated at <4 pCi/kg wet for Sr-90.

Gamma Spectrometry

The edible portions of fish samples from both locations were analyzed for gamma emitting nuclides (Table C–IV.2, Appendix C). Naturally occurring K-40 was found in all fish samples and ranged

from 2,100 to 3,850 pCi/kg wet and was consistent with levels detected in previous years. No fission or activation products were detected.

7. Sediment

Aquatic sediment samples were collected at three locations (A1-3, J2-1 and K1-3) semiannually. Of these locations two (J2-1 and K1-3) could be affected by TMINS' effluent releases. The following analysis was performed:

Gamma Spectrometry

Sediment samples from all locations were analyzed for gamma emitting nuclides (Table C–V.1, Appendix C). Potassium-40 was found in all sediment samples and ranged from 6,840 to 14,700 pCi/kg dry. Cesium-137 was not detected in any sediment samples. Cesium-137 is occasionally found in sediment at very low levels (just above LLD) and is not distinguishable from background levels. No other fission or activation products were detected (Figure C–5, Appendix C).

B. Atmospheric Environment

1. Airborne Particulates

a. Air Particulates

Continuous air particulate samples were collected from seven locations on a weekly basis. Six locations (E1-2, F1-3, G2-1, A3-1, M2-1 and H3-1) were indicator stations located in the highest D/Q sectors and the nearest communities to TMI. One sample (Q15-1) represents the control location at a remote distance from TMINS. The following analyses were performed:

Gross Beta

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

Detectable gross beta activity was observed at all locations. Comparison of results aid in determining the effects, if any, resulting from the operation of TMINS. The results from the closest to the site boundary locations (Group I) ranged from

8 to 31 E–3 pCi/m^3 with a mean of 17 E–3 pCi/m^3. The results from the intermediate offsite locations (Group II) ranged from 7 to 35 E–3 pCi/m^3 with a mean of 18 E–3 pCi/m^3. The results from the Control location (Group III) ranged from 8 to 32 E–3 pCi/m^3 with a mean of 18 E–3 pCi/m^3. Comparison of the 2010 air particulate data with previous years' data indicate no effects from the operation of TMINS (Figure C–6, Appendix C). In addition a comparison of the weekly mean values for 2010 indicate no notable differences between indicator and control stations (Figure C–7, Appendix C).

Gamma Spectrometry

Weekly samples were composited quarterly and analyzed for gamma emitting nuclides (Table C–VI.3, Appendix C). Naturally occurring Be-7 due to cosmic ray activity was detected in all 28 samples. These concentrations ranged from 49 to 117 E–3 pCi/m^3. All other nuclides were less than the MDC.

b. Airborne Iodine

Continuous air samples were collected from seven (A3-1, E1-2, F1-3, G2-1, H3-1, M2-1, and Q15-1) locations and analyzed weekly for I-131 (Table C–VII.1, Appendix C). All results were less than the MDC.

2. Terrestrial

a. Milk

Samples were collected from five locations (K15-3, E2-2, F4-1 G2-1 and P4-1) biweekly March through November and monthly December through February. The following analyses were performed:

Iodine–131

Milk samples from all locations were analyzed for concentrations of I-131 (Table C–VIII.1, Appendix C). All results were less than the MDC.

Strontium

Milk samples from all locations were composited quarterly and analyzed for Sr-89 and Sr-90 (Table C–IX.2, Appendix C). No Sr-89 activity was detected. Strontium-90 activity was detected in six of 20 samples. The concentrations ranged from 0.7 to 1.3 pCi/l. The activity detected was consistent with those detected in the pre–operational years (Figure C–8, Appendix C).

Gamma Spectrometry

Milk samples from all locations were analyzed for concentrations of gamma emitting nuclides (Table C–VIII.3, Appendix C).

Naturally occurring K-40 activity was found in all samples. The concentrations ranged from 688 to 1,760 pCi/l. All other nuclides were less than the MDC.

b. Food Products

Samples were collected from three locations (B10-2, E1-2 and H1-2) this year due to unavailability of sweet corn at E1-2on a monthly basis, in lieu of milk sampling. Samples from the four food product groups were collected from the three locations (B10-2, E1-2, and H1-2) annually. The following analyses were performed:

Strontium

Twenty-six of 31 food product samples was analyzed for concentrations of Sr-90 (Table C–IX.1, Appendix C). Strontium-90 activity was detected in 14 of 26 samples. The concentrations ranged from 3.4 to 36.5 pCi/kg wet.

Gamma Spectrometry

Each food product sample was analyzed for concentrations of gamma emitting nuclides (Table C–IX.1, Appendix C). Naturally occurring Be-7 due to cosmic ray activity was detected in 22 of 31 samples. These concentrations ranged from 169 to 2,460 pCi/l. Naturally occurring K-40 activity was found in all samples. The concentrations ranged from 1,700 to 8,630 pCi/l. All other nuclides were less than the

MDC.

C. Ambient Gamma Radiation

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

All of the TLD measurements were below 10 mR/standard month, with a range of 3.4 to 8.4 mR/standard month. A comparison of the Site Boundary and Indicator data to the Control Location data, indicate that the ambient gamma radiation levels from the Control Locations D15-1, F25-1, G10-1, G15-1, H15-1, J15-1, K15-1, L15-1, N15-2, Q15-1, and R15-1 averaged higher than indicator stations. The historical ambient gamma radiation data from Locations D15-1, F25-1, G10-1, G15-1, H15-1, J15-1, K15-1, L15-1, N15-2, Q15-1, and R15-1 were plotted along with similar data from the Site, Indicator and Control Ring Locations (Figure C–9, Appendix C). Locations D15-1, F25-1, G10-1, G15-1, H15-1, J15-1, K15-1, L15-1, N15-2, Q15-1, and R15-1 have a historical high bias, but tracked with the data from all three groups, this bias is most likely due to radon and other naturally occurring nuclides, e.g. K-40, emanating from the ground.

D. Land Use Survey

A Land Use Survey conducted in the August, September, and October 2010 growing season around the Three Mile Island Nuclear Station (TMINS) was performed by Normandeau Associates, RMC Environmental Services Division for Exelon to comply with Sections 2.15 and 3.4.2 of the Plant's Offsite Dose Calculation Manual (ODCM). The purpose of the survey was to document the nearest resident, milk-producing animal and garden of greater than 500 ft2 in each of the sixteen 22 ½ degree sectors around the site. There was one notable change for the 2010 census. The Sector D (ENE) dairy identified in the 2009 census ceased operations in 2009 and was not included in the 2010 census. No other dairy operations located within 5-miles of TMINS were identified in Sector D for the 2010 census. The results of this survey are summarized below.

Distance in Miles from the TMINS Reactor Buildings				
Sector		Residence Miles	Garden Miles	Milk Farm Miles
1	N	1.1	1.6	2.1
2	NNE	0.7	0.9	-
3	NE	0.5	1.5	4.1
4	ENE	0.5	0.5	-
5	E	0.4	0.5	1.1
6	ESE	1.1	1.2	3.2
7	SE	0.7	1.0	1.4
8	SSE	0.7	0.8	-
9	S	2.3	2.7	-
10	SSW	0.6	2.5	4.9, 14.5
11	SW	0.5	0.6	
12	WSW	0.5	1.3	-
13	W	0.7	1.3	-
14	WNW	0.4	2.2	3.7
15	NW	0.4	1.2	-
16	NNW	1.1	2.4	-

E. Radiological Impact of TMINS Operations

An assessment of potential radiological impact indicated that radiation doses to the public from 2010 operations at TMINS were well below all applicable regulatory limits and were significantly less than doses received from natural sources of radiation. The 2010 whole body dose potentially received by an assumed maximum exposed individual from TMI-1 and TMI-2 liquid and airborne effluents was conservatively calculated to be 0.17 mrem. This dose is equivalent to <0.05% of the dose that an individual living in the TMI area receives each year from natural background radiation.

1. Determination of Radiation Doses to the Public

Dose assessments can be performed by using either effluent data and an environmental transport model or environmental sample data. To the extent possible, doses to the public are based on the direct measurement of dose rates from external sources and the measurement of radionuclide concentrations in environmental media which may contribute to an internal dose of radiation. Thermoluminescent dosimeters (TLDs) positioned in the environment around TMINS provide measurements to determine external radiation doses to humans. Samples of air, water and food products are used to determine internal doses.

The quantity of radioactive materials released during normal

operations are typically too small to be measured once distributed in the offsite environment. Therefore, the potential offsite doses are more effectively calculated for TMINS operations using a computerized model that predicts concentrations of radioactive materials in the environment and subsequent radiation doses based on measured effluents.

Doses are calculated using an advanced "class A" dispersion model. This model incorporates the guidelines and methodology set forth by the USNRC in Regulatory Guide 1.109. Due to the conservative assumptions that are used in the model, the calculated doses are generally higher than the doses based on actual environmental sample concentrations.

Therefore, the model predicts doses that are higher than actual doses received by people. The type and amount of radioactivity released from TMINS is calculated using measurements from effluent sample analyses. Once released, the dispersion of radionuclides in the environment is readily determined by computer modeling.

Airborne releases are diluted and carried away from the site by atmospheric diffusion, which continuously acts to disperse radioactivity. Variables that affect atmospheric dispersion include wind speed, temperature at different elevations, terrain, and shift in wind direction. A weather station on the north end of TMI is linked to a data logger that records the meteorological data.

Computer models also are used to predict the downstream dilution and travel times for liquid releases into the Susquehanna River. Actual monthly Susquehanna River flows are obtained from the York Haven Hydroelectric Station.

The human exposure pathways also are included in the model and are depicted in Figure 1. The exposure pathways that are considered for the discharge of TMINS liquid effluents are consumption of drinking water and fish, and shoreline exposure. The exposure pathways considered for the discharge of TMINS airborne effluents are plume exposure, inhalation, cow milk consumption, goat milk consumption, fruit and vegetable consumption, meat consumption and land deposition.
Numerous data files are used in the calculations that describe the area around TMI in terms of population distribution and foodstuffs production. Data files include such information as the distance from the plant stack to the site boundary in each sector, the population

groupings, milk cows, milk goats, gardens of more than 500 square feet, meat animals, downstream drinking water users, and crop yields.

When determining the dose to humans, it is necessary to consider all applicable pathways and all exposed tissues, summing the dose from each to provide the total dose for each organ as well as the whole body from a given radionuclide. Dose calculations involve determining the energy absorbed per unit mass in the various tissues. Thus, for radionuclides taken into the body, the metabolism of the radionuclide in the body must be known along with the physical characteristics of the nuclide such as energies, types of radiations emitted and half-life. The dose assessment model also contains dose conversion factors for the radionuclides for each of four age groups (adults, teenagers, children and infants) and eight organs (total body, thyroid, liver, skin, kidney, lung, bone and GI tract).

Doses are calculated for what is termed the "maximum hypothetical individual". This individual is assumed to be affected by the combined maximum environmental concentrations wherever they occur.

For liquid releases, the maximum hypothetical individual would consume 193 gallons of Susquehanna River water per year from the first downstream drinking water supplier, eat 46 pounds of fish each year that reside in the plant discharge area and stand 67 hours per year on the shoreline influenced by the plant discharge.
For airborne releases, the maximum hypothetical individual would live at the location of highest radionuclide concentration for inhalation and direct plume exposure. Additionally, this individual each year would consume 106 gallons of cow milk, 141 pounds of leafy vegetables, 1389 pounds of non-leafy vegetables and fruits and 243 pounds of meat produced at the locations with the highest predicted radionuclide concentrations. Consumption of goat milk is not included, since this exposure pathway does not currently exist.

2. Result of Dose Calculations

The maximum hypothetical doses due to 2010 TMI-1 and TMI-2 liquid and airborne effluents are summarized in Tables 1 and 2. Table 1 compares the calculated maximum hypothetical individual doses to the USNRC 10 CFR 50 App. I guidelines. This table also compares the calculated doses (to an individual of the public) from effluents and direct radiation to USEPA 40 CFR 190 dose limits.

Table 2 presents the maximum hypothetical whole body doses to an individual.

As shown in Table 1, the doses calculated for 2010 operations at TMINS were well below the Federal dose limits (USEPA 40 CFR 190) and the guidelines of USNRC 10 CFR 50 App. I. This conclusion was supported by radionuclide concentrations detected in actual environmental samples.

Doses from natural background radiation provide a baseline for assessing the potential public health significance of radioactive effluents. Natural background radiation from cosmic, terrestrial and natural radionuclides in the human body (not including radon), averages about 81 mrem/yr (Ref. 5). Additionally, the average individual living in the United States receives an annual dose of about 2,760 mrem to the lung from natural radon gas. This lung dose is considered to be equivalent to a whole (or total) body dose of 230 mrem (Ref. 5). Therefore, the average person in the United States receives a whole body dose of about 311 mrem/yr from natural background radiation sources.

As shown on Table 2, the maximum hypothetical whole body dose received by an individual from 2010 TMI-1 and TMI-2 liquid and airborne effluents combined was conservatively calculated to be 0.17 mrem. This dose is equivalent to <0.05% percent of the dose that an individual living in the TMI area receives each year from natural background radiation (311 mrem).

The low doses calculated for 2010 TMINS operations were the result of efforts to maintain releases "as low as reasonably achievable" (ALARA).

In conclusion, radioactive materials related to 2010 TMINS operations were detected in environmental samples, but the measured concentrations were low and consistent with measured effluents. The environmental sample results verified that the doses received by the public from TMINS effluents in 2010 were well below applicable dose limits and only a small fraction of the doses received from natural background radiation. Additionally, the results indicated that there was no permanent buildup of radioactive materials in the environment and no increase in background radiation levels.

Therefore, based on the results of the radiological environmental monitoring program (REMP) and the doses calculated from

measured effluents, TMINS operations in 2010 did not have any adverse effects on the health of the public or on the environment.

TABLE 1

Calculated Maximum Hypothetical Doses to an Individual from 2010 TMI-1 and TMI-2 Liquid and Airborne Effluents

	Maximum Hypothetical Doses To An Individual		
	USNRC 10 CFR 50 APP. I Guidelines (mrem/yr)	Calculated Dose (mrem/yr) TMI-1	TMI-2
From Radionuclides In Liquid Releases	3 total body, or	1.50E-2	3.04E-4
	10 any organ	1.43E-2	4.75E-4
From Radionuclides In Airborne Releases (Noble Gases)	5 total body, or	4.46E-5	0*
	15 skin	1.96E-4	0*
From Radionuclides In Airborne Releases (Iodines, Tritium and Particulates)	15 any organ	1.53E-1	3.87E-5

*No noble gases were released from TMI-2.

	USEPA 40 CFR 190 Limits (mrem/yr)	Calculated Dose (mrem/yr) TMI-1 and TMI-2 Combined**
Total from Site	75 thyroid	0.36
	25 total body or other organs	0.47

** This sums together TMI-1 and TMI-2 maximum doses regardless of age group for different pathways. The combined doses include those due to radioactive effluents and direct radiation from TMINS. The direct radiation dose is calculated from environmental TLD data. For this calculation, exposure is assumed to be equal to dose.

The direct radiation dose from 2010 TMINS operations was 0.30 mrem. This dose was based on a maximum net fence-line exposure rate of 6.6 mR/std month and a shoreline/fence-line occupancy factor of 67 hours (Regulatory Guide 1.109). The combination of the maximum organ dose from TMI-1 and TMI-2 effluents (0.17 mrem) and the dose from direct radiation (0.30 mrem) yielded a maximum hypothetical dose of 0.47 mrem.

TABLE 2

Calculated Whole Body Doses to the Maximum Individual From 2010 TMI-1 and TMI-2 Liquid and Airborne Effluents

	Calculated Maximum Individual Whole Body Dose (mrem/yr)	
	TMI-1	**TMI-2**
From Radionuclides In Liquid Releases	**1.50E-2**	**3.04E-4**
From Radionuclides in Airborne Releases (Noble Gases)	**4.46E-5**	**0***
From Radionuclides In Airborne Releases (Iodines, Tritium and Particulates)	1.53E-1	**3.87E-5**

*No noble gases were released from TMI-2.

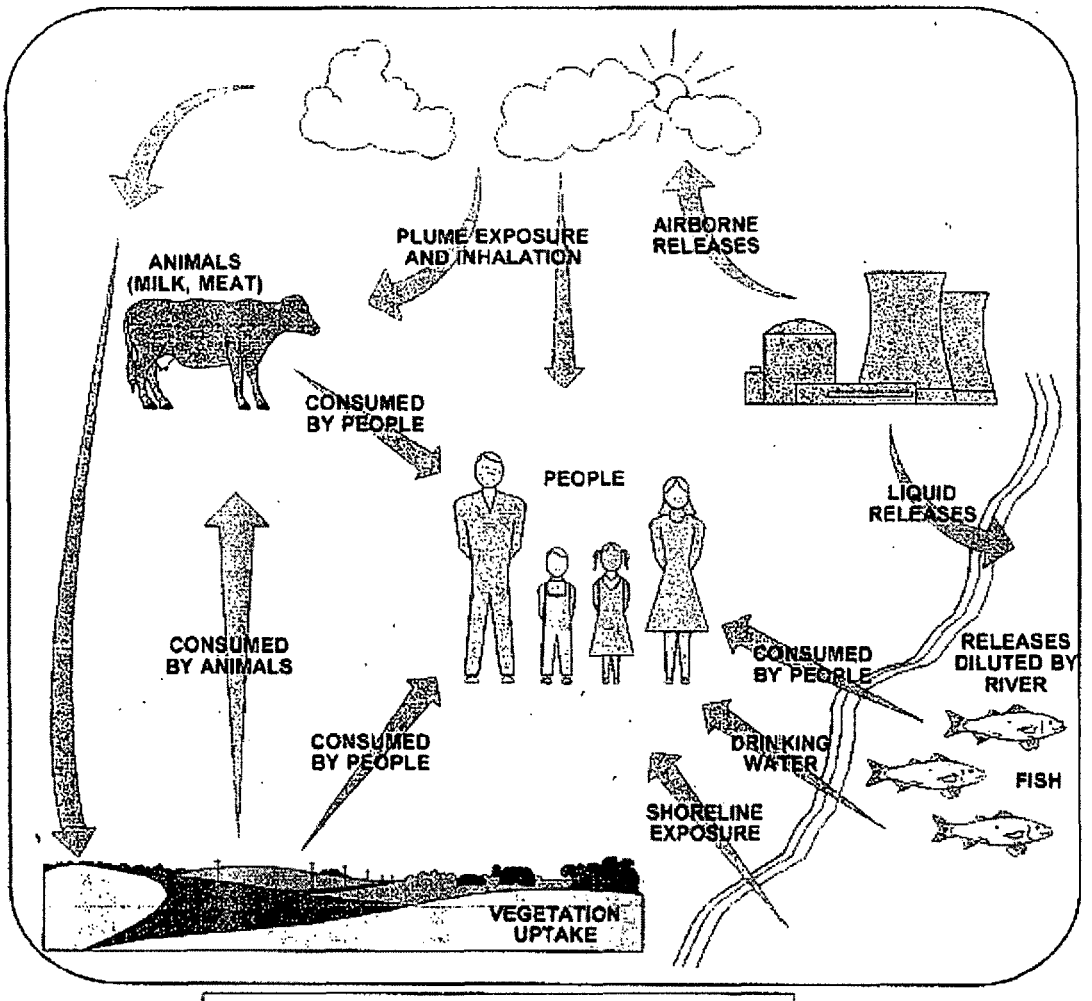
Individual Whole Body Dose Due to TMI-1 and TMI-2 Operations: **0.17 mrem/yr**

Individual Whole Body Dose Due to Natural Background Radiation (1) **311 mrem/yr**

(1) NCRP 160 – (2009)

Figure 1

Exposure Pathways For Radionuclides Routinely Released From TMINS



PREDOMINANT RADIONUCLIDES

NOBLE GASES (Xe,Kr)
Plume exposure

RADIOIODINES (I-131, I-133)
Inhalation and consumption of milk, water, fruits, and vegetables

RADIOSTRONTIUMS (Sr-89, Sr-90)
Consumption of milk, meat, fruits, and vegetables

ACTIVATION PRODUCTS (Co-60, Mn-54)
Shoreline exposure

RADIOCESIUMS (Cs-134, Cs-137)
Shoreline exposure and consumption of milk, meat, fish, water, fruits, and vegetables

TRITIUM (H-3)
Inhalation and consumption of water, milk, fruits, and vegetables

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 (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 analytes did not meet the specified acceptance criteria for the following reason:

1. Teledyne Brown Engineering's ERA November 2010 Sr-89 in water result of 77.8 pCi/L was higher than the known value of 68.5 pCi/L, resulting in a found to known ratio of 1.14. NCR 10-09 was initiated to investigate this failure. Since the ratio of 1.14 fell within an acceptance range of 20%, Teledyne considers this an acceptable result.
2. Teledyne Brown Engineering's ERA November 2010 Zn-65 in water result of 11.0 pCi/L was lower than the known value of 102 pCi/L. NCR 10-09 was initiated to investigate this failure. The Zn-65 result of 111 was incorrectly reported as 11.0.

For the secondary laboratory, Environmental, Inc., 14 out of 14 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. Three Mile Island Nuclear Station, Unit 1, Technical Specifications, DPR 50.
2. Three Mile Island Nuclear Station, Unit 2, PDMS Technical Specifications, DPR 73.
3. Radiation Management Corporation. "Three Mile Island Nuclear Station, Preoperational Radiological Environmental Monitoring Program, January 1, 1974 – June 5, 1974." RMC-TR-75-17, January 1975.
4. Exelon. "Three Mile Island Nuclear Station Offsite Dose Calculation Manual (ODCM)."
5. National Council of Radiation Protection and Measurements Report No. 160. "Ionizing Radiation Exposure of the Population of the United States." 2009.

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APPENDIX A

RADIOLOGICAL ENVIRONMENTAL MONITORING REPORT SUMMARY

TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE THREE MILE ISLAND NUCLEAR STATION, 2010

Name of Facility: THREE MILE ISLAND NUCLEAR STATION **DOCKET NUMBER: 50-289 & 50-320**

Location of Facility: MIDDLETOWN COUNTY PA **REPORTING PERIOD: 2010**

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	24	2000	463 (6/12) (282/887)	<LLD	463 (6/12) (282/887)	J1-2 INDICATOR WEST SHORE; TMI 0.5 MILES S OF SITE	0
	I-131	12	1	NA	0.9 (2/12) (0.7/1.1)	0.9 (2/12) (0.7/1.1)	A3-2 CONTROL SWATARA CREEK 2.5 MILES N OF SITE	0
	GAMMA	24						
	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

THE MEAN AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUE
FRACTION OF DETECTABLE MEASUREMENT AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESIS (F)

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SURFACE WATER (PCI/LITER)	NB-95		15	<LLD	<LLD	-		0
	ZR-95		30	<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
DRINKING WATER (PCI/LITER)	GR-B	36	4	3.7 (8/24) (2.7/5.5)	3.3 (3/12) (2.8/4.3)	4.0 (5/12) (3.0/5.5)	TM-DW-G15-2 INDICATOR WRIGHTS WATER SUPPLY 13.3 MILES SE OF SITE	0
	I-131	36	1	<LLD	<LLD	-		0

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DRINKING WATER (PCI/LITER)	H-3	36	2000	<LLD	<LLD	-		0
	GAMMA	36						
	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

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DRINKING WATER (PCI/LITER)	ZR-95		30	<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
EFFLUENT WATER (PCI/LITER)	GR-B	12	4	5.6 (10/12) (3.3/8.7)	NA	5.6 (10/12) (3.3/8.7)	K1-1 INDICATOR MAIN STATION LIQ. DISCHARGE ONSITE	0
	I-131	12	1	0.6 (1/12)	NA	0.6 (1/12)	K1-1 INDICATOR MAIN STATION LIQ. DISCHARGE ONSITE	0

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EFFLUENT WATER (PCI/LITER)	H-3	12	2000	4081 (11/12) (279/13800)	NA	4081 (11/12) (279/13800)	K1-1 INDICATOR MAIN STATION LIQ. DISCHARGE ONSITE	0
	SR-89	2	5	<LLD	NA	-		0
	SR-90	2	2	<LLD	NA	-		0
	GAMMA	12						
	MN-54		15	<LLD	NA	-		0
	CO-58		15	<LLD	NA	-		0
	FE-59		30	<LLD	NA	-		0
	CO-60		15	<LLD	NA	-		0

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EFFLUENT WATER (PCI/LITER)	ZN-65		30	<LLD	NA	-		0
	NB-95		15	<LLD	NA	-		0
	ZR-95		30	<LLD	NA	-		0
	CS-134		15	<LLD	NA	-		0
	CS-137		18	<LLD	NA	-		0
	BA-140		60	<LLD	NA	-		0
	LA-140		15	<LLD	NA	-		0
BOTTOM FEEDER (PCI/KG WET)	SR-90	4	10	<LLD	<LLD	-		0

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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	LOCATION WITH HIGHEST ANNUAL MEAN (M) STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
BOTTOM FEEDER (PCI/KG WET)	GAMMA	4						
	K-40		NA	2785 (2/2) (2100/3470)	3425 (2/2) (3410/3440)	3425 (2/2) (3410/3440)	BKGB CONTROL CITY ISLAND UPSTREAM OF DISCHARGE	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
	CS-134		130	<LLD	<LLD	-		0

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FRACTION OF DETECTABLE MEASUREMENT AT SPECIFIED LOCATIONS IS INDICATED IN PARENTHESIS (F)

TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE THREE MILE ISLAND NUCLEAR STATION, 2010

Name of Facility: THREE MILE ISLAND NUCLEAR STATION **DOCKET NUMBER: 50-289 & 50-320**

Location of Facility: MIDDLETOWN COUNTY PA **REPORTING PERIOD: 2010**

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
PREDATOR (PCI/KG WET)	CS-137		150	<LLD	<LLD	-		0
	SR-90	4	10	<LLD	<LLD	-		0
	GAMMA	4						
	K-40		NA	3085 (2/2) (2320/3850)	2990 (2/2) (2950/3030)	3085 (2/2) (2320/3850)	INDP INDICATOR YORK HAVEN DAM DOWNSTREAM OF DISCHARGE	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

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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	LOCATION WITH HIGHEST ANNUAL MEAN (M) STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
PREDATOR (PCI/KG WET)	ZN-65		260	<LLD	<LLD	-		0
	CS-134		130	<LLD	<LLD	-		0
	CS-137		150	<LLD	<LLD	-		0
SEDIMENT (PCI/KG DRY)	GAMMA	3						
	K-40		NA	12600 (2/2) (10500/14700)	6840 (1/1)	14700 (1/1)	J2-1 INDICATOR YORK HAVEN DAM 1.5 MILES S OF SITE	0
	MN-54		NA	<LLD	<LLD	-		0
	CO-58		NA	<LLD	<LLD	-		0
	CO-60		NA	<LLD	<LLD	-		0

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SEDIMENT (PCI/KG DRY)	CS-134		150	<LLD	<LLD	-		0
	CS-137		180	<LLD	<LLD	-		0
AIR PARTICULATE (E-3 PCI/CU.METER)	GR-B	362	10	17 (292/310) (7/35)	18 (49/52) (8/32)	18 (49/52) (8/32)	Q15-1 CONTROL WEST FAIRVIEW 13.5 MILES NW OF SITE	0
	GAMMA BE-7	28	NA	85 (24/24) (49/117)	73 (4/4) (60/87)	96 (4/4) (81/117)	M2-1 INDICATOR FISHING CREEK, GOLDSBORO 1.3 MILES WSW OF SITE	0
	MN-54		NA	<LLD	<LLD	-		0
	CO-58		NA	<LLD	<LLD	-		0
	CO-60		NA	<LLD	<LLD	-		0

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AIR PARTICULATE (E-3 PCI/CU.METER)	NB-95		NA	<LLD	<LLD	-		0
	ZR-95		NA	<LLD	<LLD	-		0
	CS-134		50	<LLD	<LLD	-		0
	CS-137		60	<LLD	<LLD	-		0
AIR IODINE (E-3 PCI/CU.METER)	GAMMA I-131	362	70	<LLD	<LLD	-		0
MILK (PCI/LITER)	I-131	115	1	<LLD	<LLD	-		0
	SR-89	20	5	<LLD	<LLD	-		0

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Location of Facility: MIDDLETOWN COUNTY PA **REPORTING PERIOD:** 2010

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	LOCATION WITH HIGHEST ANNUAL MEAN (M) STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
MILK (PCI/LITER)	SR-90	20	2	1 (6/16) (0.7/1.5)	<LLD	1 (3/4) (0.7/1.5)	E2-2 INDICATOR NISSLEY FARM 1.1 MILES E OF SITE	0
	GAMMA	115						
	K-40		NA	1295 (92/92) (688/1760)	1290 (23/23) (1150/1540)	1383 (23/23) (1250/1600)	P4-1 INDICATOR	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
VEGETATION (PCI/KG WET)	SR-90	26	10	10.7 (6/13) (3.4/15.9)	18.2 (8/13) (5.3/36.5)	18.2 (8/13) (5.3/36.5)	B10-2 CONTROL MILTON HERSHEY SCHOOL 10.1 MILES NNE OF SITE	0

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TABLE A-1 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL SUMMARY FOR THE THREE MILE ISLAND NUCLEAR STATION, 2010

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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	LOCATION WITH HIGHEST ANNUAL MEAN (M) STATION # NAME DISTANCE AND DIRECTION	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
VEGETATION (PCI/KG WET)	GAMMA	32						
	BE-7		NA	847 (13/16) (195/1910)	1164 (9/16) (169/2460)	1164 (9/16) (169/2460)	B10-2 CONTROL MILTON HERSHEY SCHOOL 10.1 MILES NNE OF SITE	0
	K-40		NA	3956 (16/16) (1380/5640)	4259 (16/16) (1700/8630)	4259 (16/16) (1700/8630)	B10-2 CONTROL MILTON HERSHEY SCHOOL 10.1 MILES NNE OF SITE	0
	I-131		60	<LLD	<LLD	-		0
	CS-134		60	<LLD	<LLD	-		0
	CS-137		80	<LLD	<LLD	-		0
DIRECT RADIATION (MILLI-ROENTGEN/STD.MO.)	TLD-QUARTERLY	354	NA	5.2 (310/310) (3.4/8.4)	5.7 (44/44) (4.4/7.6)	7.9 (4/4) (7.6/8.4)	H8-1 INDICATOR SAGINAW ROAD STARVIEW 7.4 MILES SSE OF SITE	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 Three Mile Island Nuclear Station

XYY-Z- General code for identification of locations, where:

X - Angular Sector of Sampling Location. The compass is divided into 16 sectors of 22 1/2 degrees each with center at Three Mile Island's Units 1 and 2 off-gas vents. Sector A is centered due North, and others are alphabetical in a clockwise direction.

YY - Radial Zone of Sampling Location in miles.

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, Three Mile Island Nuclear Station, 2010

Sample Medium	Station Code	Map Number	Distance (miles)	Azimuth	Description
AQS	A1-3	1	0.5	359°	N of site off north tip of TMI in Susquehanna River
ID	A1-4	1	0.3	6°	N of Reactor Building on W fence adjacent to North Weather Station, TMI
AP,AI,ID	A3-1	2	2.7	357°	N of site at Mill Street Substation
SW	A3-2	2	2.7	356°	N of site at Swatara Creek, Middletown
ID	A5-1	2	4.4	3°	N of site on Vine Street Exit off Route 283
ID	A9-3	3	8.0	2°	N of site at Duke Street Pumping Station, Hummelstown
ID	B1-1	1	0.6	25°	NNE of site on light pole in middle of North Bridge, TMI
ID	B1-2	1	0.4	23°	NNE of Reactor Building on top of dike, TMI
ID	B2-1	2	1.9	17°	NNE of site on Sunset Dr. (off Hillsdale Rd.)
ID	B5-1	2	4.9	19°	NNE of site at intersection of School House and Miller Roads
ID	B10-1	3	9.2	21°	NNE of site at intersection of West Areba Avenue and Mill Street, Hershey
FP	B10-2	3	10	31°	NNE of site at Milton Hershey School, Hershey
ID	C1-1	1	0.7	37°	NE of site along Route 441 N
ID	C1-2	1	0.3	50°	NE of Reactor Building on top of dike, TMI
ID	C2-1	2	1.5	44°	NE of site at Middletown Junction
ID	C5-1	2	4.7	43°	NE of site on Kennedy Lane
ID	C8-1	3	7.1	48°	NE of site at Schenk's Church on School House Road
AQF	Control	-	-	-	All locations where finfish are collected above Dock St. Dam, Harrisburg
ID	D1-1	1	0.2	76°	ENE of Reactor Building on top of dike, TMI
ID	D1-2	1	0.5	67°	ENE of site off Route 441 along lane between garden center and residence
ID	D2-2	2	1.6	74°	ENE of site along Hillsdale Rd. (S of Zion Rd.)
ID	D6-1	3	5.2	66°	ENE of site off Beagle Road
ID	D15-1	3	10.8	64°	ENE of site along Route 241, Lawn
AP, AI, ID, FP	E1-2	1	0.4	97°	E of site at TMI Visitor's Center
ID	E1-4	1	0.2	97°	E of Reactor Building on top of dike, TMI
M	E2-2	2	1.1	96°	E of site at farm on Pecks Road
ID	E2-3	2	2.0	97°	E of site along Hillsdale Rd. (N of Creek Rd.)
ID	E5-1	2	4.7	82°	E of site at intersection of North Market Street (Route 230) and Zeager Road
ID	E7-1	3	6.7	88°	E of site along Hummelstown Street, Elizabethtown
ID	F1-1	1	0.5	117°	ESE of site near entrance to 500 kV Substation
ID	F1-2	1	0.2	112°	ESE of Reactor Building on top of dike midway within ISWSF, TMI
AP, AI	F1-3	1	0.6	112°	ESE of site in 500 kV Substation
ID	F1-4	1	0.2	122°	ESE of Reactor Building on top of dike, TMI
ID	F2-1	2	1.3	119°	ESE of site along Engle Road
M	F4-1	2	3.2	104°	ESE of site at farm on Turnpike Road
ID	F5-1	2	4.7	109°	ESE of site along Amosite Road
ID	F10-1	3	9.4	112°	ESE of site along Donegal Springs Road, Donegal Springs
ID	F25-1	3	22	106°	ESE of site at intersection of Steel Way and Loop Roads, Lancaster
ID	G1-2	1	0.7	145°	SE of site along Route 441 S
ID	G1-3	1	0.2	130°	SE of Reactor Building on top of dike, TMI
ID	G1-5	1	0.3	143°	SE of Reactor Building on top of dike, TMI
ID	G1-6	1	0.3	139°	SE of Reactor Building on top of dike, TMI
AI, AP, M	G2-1	2	1.4	126°	SE of site at farm on Becker Road
ID	G2-4	2	1.7	138°	SE of site on Becker Road
ID	G5-1	2	4.8	131°	SE of site at intersection of Bainbridge and Risser Roads
ID	G10-1	3	9.7	128°	SE of site at farm along Engles Tollgate Road, Marietta
ID	G15-1	3	14.4	126°	SE of site at Columbia Water Treatment Plant
DW	G15-2	3	13.3	129°	SE of site at Wrightsville Water Treatment Plant
DW	G15-3	3	15.7	124	SE of site at Lancaster Water Treatment Plant

TABLE B-2: Radiological Environmental Monitoring Program - Sampling Locations, Distance and Direction, Three Mile Island Nuclear Station, 2010

Sample Medium	Station Code	Map Number	Distance (miles)	Azimuth	Description
ID	H1-1	1	0.5	167°	SSE of site, TMI
FP	H1-2	1	1.0	151°	SSE of site along Route 441, Red Hill Market
AP, AI, ID	H3-1	2	2.2	160°	SSE of site in Falmouth-Collins Substation
ID	H5-1	2	4.1	158°	SSE of site by Guard Shack at Brunner Island Steam Electric Station
ID	H8-1	3	7.4	163°	SSE of site along Saginaw Road, Starview
ID	H15-1	3	13.2	157°	SSE of site at intersection of Orchard and Stonewood Roads, Wilshire Hills
AQF	Indicator	-	-	-	All locations where finfish are collected downstream of the TMINS liquid discharge outfall
ID	J1-1	1	0.8	176°	S of site, TMI
SW	J1-2	1	0.5	188°	S of site downstream of the TMINS liquid discharge outfall in Susquehanna River
ID	J1-3	1	0.3	189°	S of Reactor Building just S of SOB, TMI
AQS	J2-1	2	1.4	179°	S of site in Susquehanna River just upstream of the York Haven Dam
ID	J3-1	2	2.7	179°	S of site at York Haven/Cly
ID	J5-1	2	4.9	181°	S of site along Canal Road, Conewago Heights
ID	J7-1	3	6.5	176°	S of site off of Maple Street, Manchester
ID	J15-1	3	12.6	183°	S of site in Met-Ed York Load Dispatch Station
EW	K1-1	1	0.2	210°	On site at RML-7 Main Station Discharge Building
AQS	K1-3	1	0.2	212°	SSW of site downstream of the TMINS liquid discharge outfall in the Susquehanna River
ID	K1-4	1	0.2	209°	SSW of Reactor Building on top of dike behind Warehouse 2, TMI
ID	K2-1	2	1.2	200°	SSW of site on S Shelley Island
ID	K3-1	2	2.0	206°	SSW of site along Rt. 262, N of Cly
ID	K5-1	2	4.9	202°	SSW of site along Conewago Creek Road, Strinestown
ID	K8-1	3	7.5	196°	SSW of site at intersection of Coppenhaffer Road and Route 295, Zions View
ID	K15-1	3	12.8	203°	SSW of site behind McDonald's and next to child care center, Weiglestown
M	K15-3	3	14.4	205°	SSW of site at farm along S Salem Church Rd, Dover
ID	L1-1	1	0.1	236°	SW of site on top of dike W of Mech. Draft Cooling Tower, TMI
ID	L1-2	1	0.5	221°	SW of site on Beech Island
ID	L2-1	2	1.8	224°	SW of site along Route 262
ID	L5-1	2	4.1	228°	SW of site at intersection of Stevens and Wilson Roads
ID	L8-1	3	8.0	225°	SW of site along Rohlers Church Rd., Andersontown
ID	L15-1	3	11.8	226°	SW of site on W side of Route 74, rear of church, Mt. Royal
ID	M1-1	1	0.1	250°	WSW of Reactor Building on SE corner of U-2 Screenhouse fence, TMI
ID	M1-2	1	0.4	252°	WSW of site on E side of Shelley Island, Lot #157
AP, AI, ID	M2-1	2	1.3	256°	WSW of site along Route 262 and adjacent to Fishing Creek, Goldsboro
ID	M5-1	2	4.3	249°	WSW of site at intersection of Lewisberry and Roxberry Roads, Newberrytown
ID	M9-1	3	8.7	243°	WSW of site along Alpine Road, Maytown
ID	N1-1	1	0.7	274°	W of site on W side of Shelley Island, between lots #13 and #14
ID	N1-3	1	0.1	274°	W of Reactor Building on fence adjacent to Screenhouse entrance gate, TMI
ID	N2-1	2	1.2	261°	W of site at Goldsboro Marina
ID	N5-1	2	5.0	268°	W of site off of Old York Road along Robin Hood Drive
ID	N8-1	3	7.7	262°	W of site along Route 382, 1/2 mile north of Lewisberry
ID	N15-2	3	10.4	275°	W of site at intersection of Lisburn Road and Main Street, Lisburn
ID	P1-1	1	0.4	303°	WNW of site on Shelley Island

TABLE B-2: Radiological Environmental Monitoring Program - Sampling Locations, Distance and Direction, Three Mile Island Nuclear Station, 2010

Sample Medium	Station Code	Map Number	Distance (miles)	Azimuth	Description
ID	P1-2	1	0.1	292°	WNW of Reactor Building on fence N of Unit 1 Screenhouse, TMI
ID	P2-1	2	2.0	283°	WNW of site along Route 262
M	P4-1	2	3.7	295	WNW of site at farm on Valley Road
ID	P5-1	2	5.0	284°	WNW of site at intersection of Valley Road (Route 262) and Beinhower Road
ID	P8-1	3	8.0	292°	WNW of site along Evergreen Road, Reesers Summit
ID	Q1-1	1	0.5	317°	NW of site on E side of Shelley Island
ID	Q1-2	1	0.2	321°	NW of Reactor Building on fence W of Warehouse 1, TMI
ID	Q2-1	2	1.9	310°	NW of site along access road along river
ID	Q5-1	2	5.0	317°	NW of site along Lumber Street, Highspire
SW, DW, ID	Q9-1	3	8.5	310°	NW of site at the Steelton Water Company
AP, AI, ID	Q15-1	3	13.4	309°	NW of site behind West Fairview Fire Dept. Social Hall (abandoned)
ID	R1-1	3	0.2	335°	NNW of Reactor Building along W fence, TMI
ID	R1-2	1	0.7	334°	NNW of site on central Henry Island
ID	R3-1	2	2.6	341°	NNW of site at Crawford Station, Middletown
ID	R5-1	2	4.9	339°	NNW of site at intersection of Spring Garden Drive and Route 441
ID	R9-1	3	8.0	341°	NNW of site at intersection of Derry and 66th Streets, Rutherford Heights
ID	R15-1	3	11.2	332°	NNW of site at intersection of Route 22 and Colonial Road, Colonial Park

IDENTIFICATION KEY

ID = Immersion Dose (TLD)
SW = Surface Water
AI = Air Iodine
AP = Air Particulate
FP = Food Products (Green Leafy Vegetation, Fruits, Vegetables)
EW = Effluent Water
DW = Drinking Water
M = Milk (Cow)
AQF = Finfish
AQS = Aquatic Sediment

TABLE B-3: Radiological Environmental Monitoring Program – Summary of Sample Collection and Analytical Methods, Three Mile Island Nuclear Station, 2010

Sample Medium	Analysis	Sampling Method	Collection Procedure Number	Sample Size	Analytical Procedure Number
Surface Water	Gamma Spectroscopy	Monthly composite from a continuous water compositor.	ER-TMI-06 Collection of water samples for radiological analysis (Three Mile Island Nuclear Station)	2 gallon	TBE, TBE-2007 Gamma emitting radioisotope analysis Env. Inc., GS-01 Determination of gamma emitters by gamma spectroscopy
Surface Water	Tritium	Monthly composite from a continuous water compositor.	ER-TMI-06 Collection of water samples for radiological analysis (Three Mile Island Nuclear Station)	2 gallon	TBE, TBE-2010 Tritium and carbon-14 analysis by liquid scintillation Env. Inc., T-02 Determination of tritium in water (direct method)
Surface Water	Iodine- 131	Monthly composite from a continuous water compositor.	ER-TMI-06 Collection of water samples for radiological analysis (Three Mile Island Nuclear Station)	2 gallon	TBE, TBE-2012 Radioiodine in various matrices Env. Inc., I-131-01 Determination of I-131 in milk by anion exchange
Drinking Water	Gross Beta	Monthly composite from a continuous water compositor.	ER-TMI-06 Collection of water samples for radiological analysis (Three Mile Island Nuclear 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)
Drinking Water	Gamma Spectroscopy	Monthly composite from a continuous water compositor.	ER-TMI-06 Collection of water samples for radiological analysis (Three Mile Island Nuclear Station)	2 gallon	TBE, TBE-2007 Gamma emitting radioisotope analysis Env. Inc., GS-01 Determination of gamma emitters by gamma spectroscopy
Drinking Water	Tritium	Monthly composite from a continuous water compositor.	ER-TMI-06 Collection of water samples for radiological analysis (Three Mile Island Nuclear Station)	2 gallon	TBE, TBE-2010 Tritium and carbon-14 analysis by liquid scintillation Env. Inc., T-02 Determination of tritium in water (direct method)
Drinking Water	Iodine-131	Monthly composite from a continuous water compositor.	ER-TMI-06 Collection of water samples for radiological analysis (Three Mile Island Nuclear Station)	2 gallon	TBE, TBE-2012 Radioiodine in various matrices Env. Inc., I-131-01 Determination of I-131 in milk by anion exchange
Effluent Water	Iodine-131	Monthly composite from a continuous water compositor.	ER-TMI-06 Collection of water samples for radiological analysis (Three Mile Island Nuclear Station)	2 gallon	TBE, TBE-2012 Radioiodine in various matrices Env. Inc., I-131-01 Determination of I-131 in milk by anion exchange
Effluent Water	Gross Beta	Monthly composite from a continuous water compositor.	ER-TMI-06 Collection of water samples for radiological analysis (Three Mile Island Nuclear 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)

TABLE B-3: Radiological Environmental Monitoring Program – Summary of Sample Collection and Analytical Methods, Three Mile Island Nuclear Station, 2010

Sample Medium	Analysis	Sampling Method	Collection Procedure Number	Sample Size	Analytical Procedure Number
Effluent Water	Gamma Spectroscopy	Monthly composite from a continuous water compositor.	ER-TMI-06 Collection of water samples for radiological analysis (Three Mile Island Nuclear Station)	2 gallon	TBE, TBE-2007 Gamma emitting radioisotope analysis Env. Inc., GS-01 Determination of gamma emitters by gamma spectroscopy
Effluent Water	Tritium	Monthly composite from a continuous water compositor.	ER-TMI-06 Collection of water samples for radiological analysis (Three Mile Island Nuclear Station)	2 gallon	TBE, TBE-2010 Tritium and carbon-14 analysis by liquid scintillation Env. Inc., T-02 Determination of tritium in water (direct method)
Effluent Water	Strontium 89/90	Semi-annual composite from monthly samples.	TBE, TBE-2023 Compositing of samples	2 gallon	TBE, TBE-2019 Radiostrontium analysis by ion exchange
Storm Water	Gamma Spectroscopy	Quarterly composite of monthly grab samples	ER-TMI-06 Collection of water samples for radiological analysis (Three Mile Island Nuclear Station)	1 gallon	TBE, TBE-2007 Gamma emitting radioisotope analysis Env. Inc., GS-01 Determination of gamma emitters by gamma spectroscopy
Storm Water	Tritium	Quarterly composite of monthly grab samples	ER-TMI-06 Collection of water samples for radiological analysis (Three Mile Island Nuclear Station)	1 gallon	TBE, TBE-2010 Tritium and carbon-14 analysis 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	ER-TMI-13 Collection of fish samples for radiological analysis (Three Mile Island Nuclear Station)	1000 grams (wet)	TBE, TBE-2007 Gamma emitting radioisotope analysis Env. Inc., GS-01 Determination of gamma emitters by gamma spectroscopy
Fish	Strontium 90	Semi-annual samples collected via electroshocking or other techniques	ER-TMI-13 Collection of fish samples for radiological analysis (Three Mile Island Nuclear Station)	1000 grams (wet)	TBE, TBE-2019 Radiostrontium analysis by ion exchange Env. Inc., SR-05, Determination of Sr-89 and Sr-90 in Ashed Samples

TABLE B-3: Radiological Environmental Monitoring Program – Summary of Sample Collection and Analytical Methods, Three Mile Island Nuclear Station, 2010

Sample Medium	Analysis	Sampling Method	Collection Procedure Number	Sample Size	Analytical Procedure Number
Sediment	Gamma Spectroscopy	Semi-annual grab samples	ER-TMI-03 Collection of sediment samples for radiological analysis (Three Mile Island Nuclear 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	ER-TMI-14 Collection of air particulate and air iodine samples for radiological analysis (Three Mile Island Nuclear 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
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	ER-TMI-14 Collection of air particulate and air iodine samples for radiological analysis (Three Mile Island Nuclear 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	ER-TMI-01 Collection of milk samples for radiological analysis (Three Mile Island Nuclear 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	Strontium-89/90	Quarterly composite of Bi-weekly and monthly grab samples	ER-TMI-01 Collection of milk samples for radiological analysis (Three Mile Island Nuclear Station) TBE, TBE-2023 Compositing of samples	2 gallon	TBE, TBE-2019 Radiostrontium analysis by ion exchange Enc. Inc., SR-07, Determination of Sr-89 and Sr-90 in Milk (Ion Exchange Batch Method)
Milk	Gamma Spectroscopy	Bi-weekly grab sample when cows are on pasture. Monthly all other times	ER-TMI-01 Collection of milk samples for radiological analysis (Three Mile Island Nuclear Station)	2 gallon	TBE, TBE-2007 Gamma emitting radioisotope analysis Env. Inc., GS-01 Determination of gamma emitters by gamma spectroscopy
Vegetation	Gamma Spectroscopy	Monthly and annual grab sample	ER-TMI-04 Collection of vegetation samples for radiological analysis (Three Mile Island Nuclear Station)	1000 grams	TBE, TBE-2007 Gamma emitting radioisotope analysis Env. Inc., GS-01 Determination of gamma emitters by gamma spectroscopy

TABLE B-3: Radiological Environmental Monitoring Program – Summary of Sample Collection and Analytical Methods, Three Mile Island Nuclear Station, 2010

Sample Medium	Analysis	Sampling Method	Collection Procedure Number	Sample Size	Analytical Procedure Number
Vegetation	Strontium-89/90	Monthly and annual grab sample	ER-TMI-04 Collection of vegetation samples for radiological analysis (Three Mile Island Nuclear Station)	1000 grams	TBE, TBE-2019 Radiostrontium analysis by ion exchange Env. Inc., SR-05, Determination of Sr-89 and Sr-90 in Ashed Samples
TLD	Thermoluminescence Dosimetry	Quarterly TLDs comprised of two Panasonic 814 (containing 4 each $CaSO_4$ elements)	ER-TMI-02 Collection of TLD samples for radiological analysis (Three Mile Island Nuclear Station)	2 badges with 3 dosimeters	Mirion Technologies

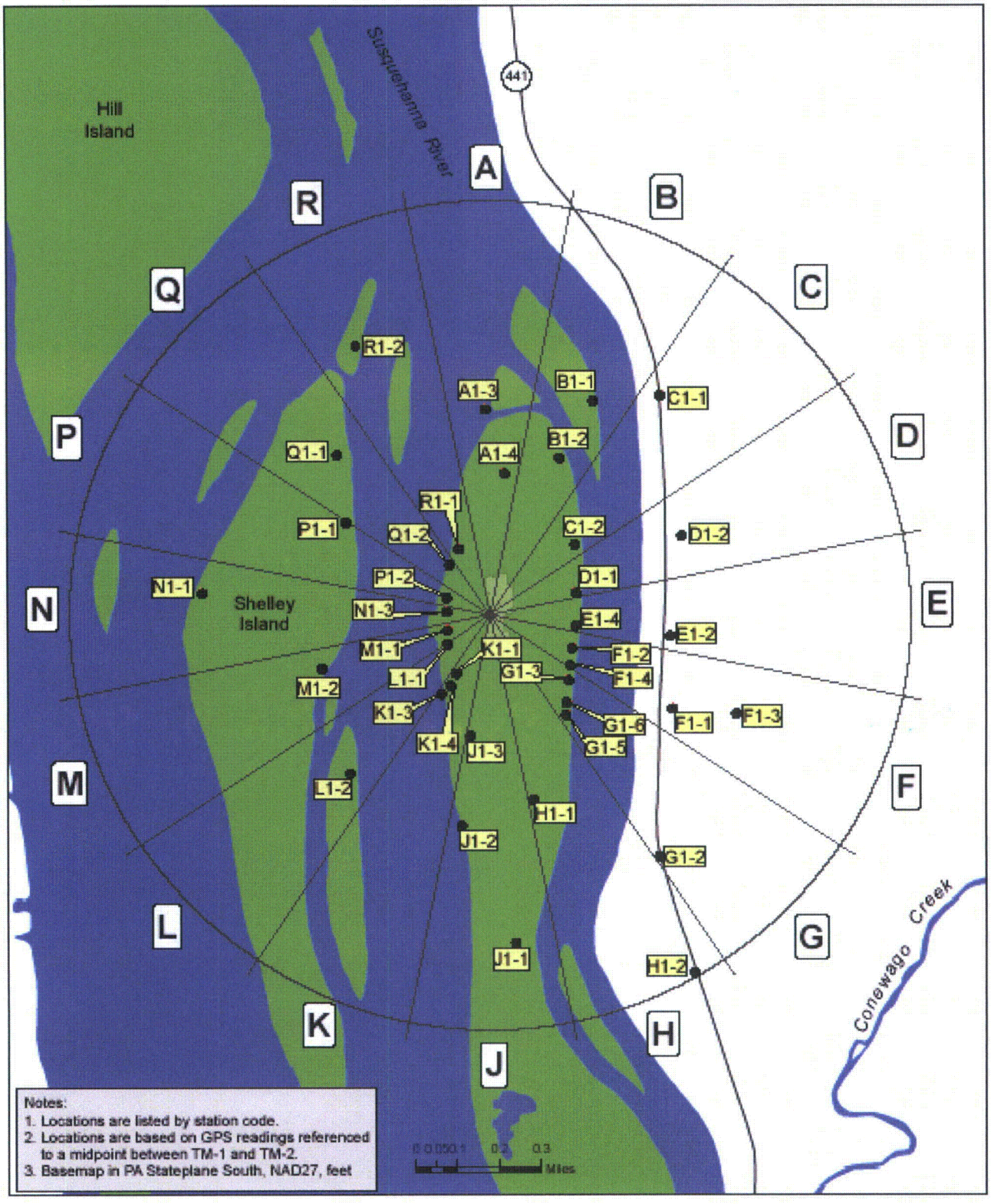

Figure B-1
Environmental Sampling Locations Within One Mile of the Three Mile Island Nuclear Station, 2010

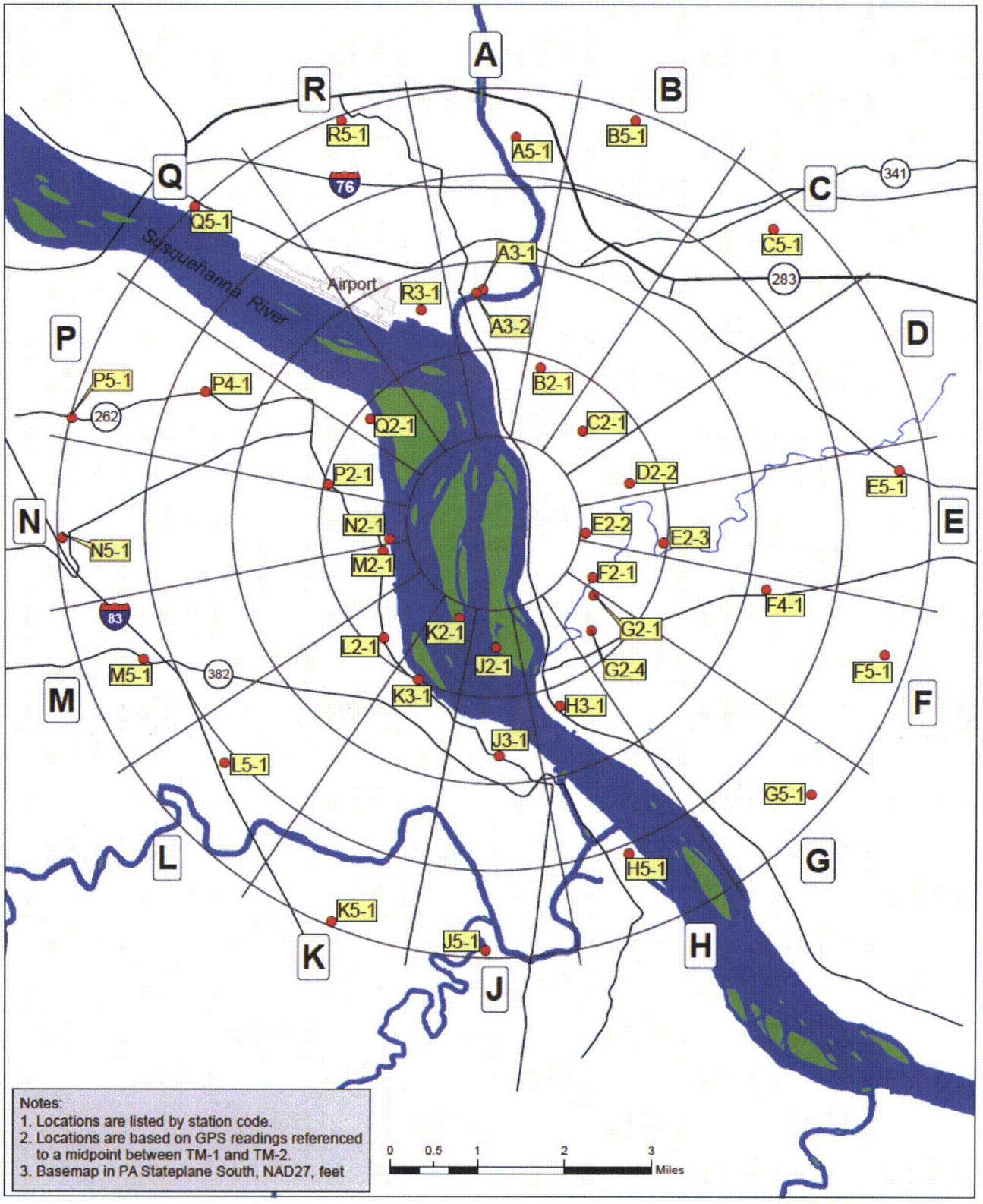

Figure B-2
Environmental Sampling Locations Between One and Five Miles of the Three Mile Island Nuclear Station, 2010

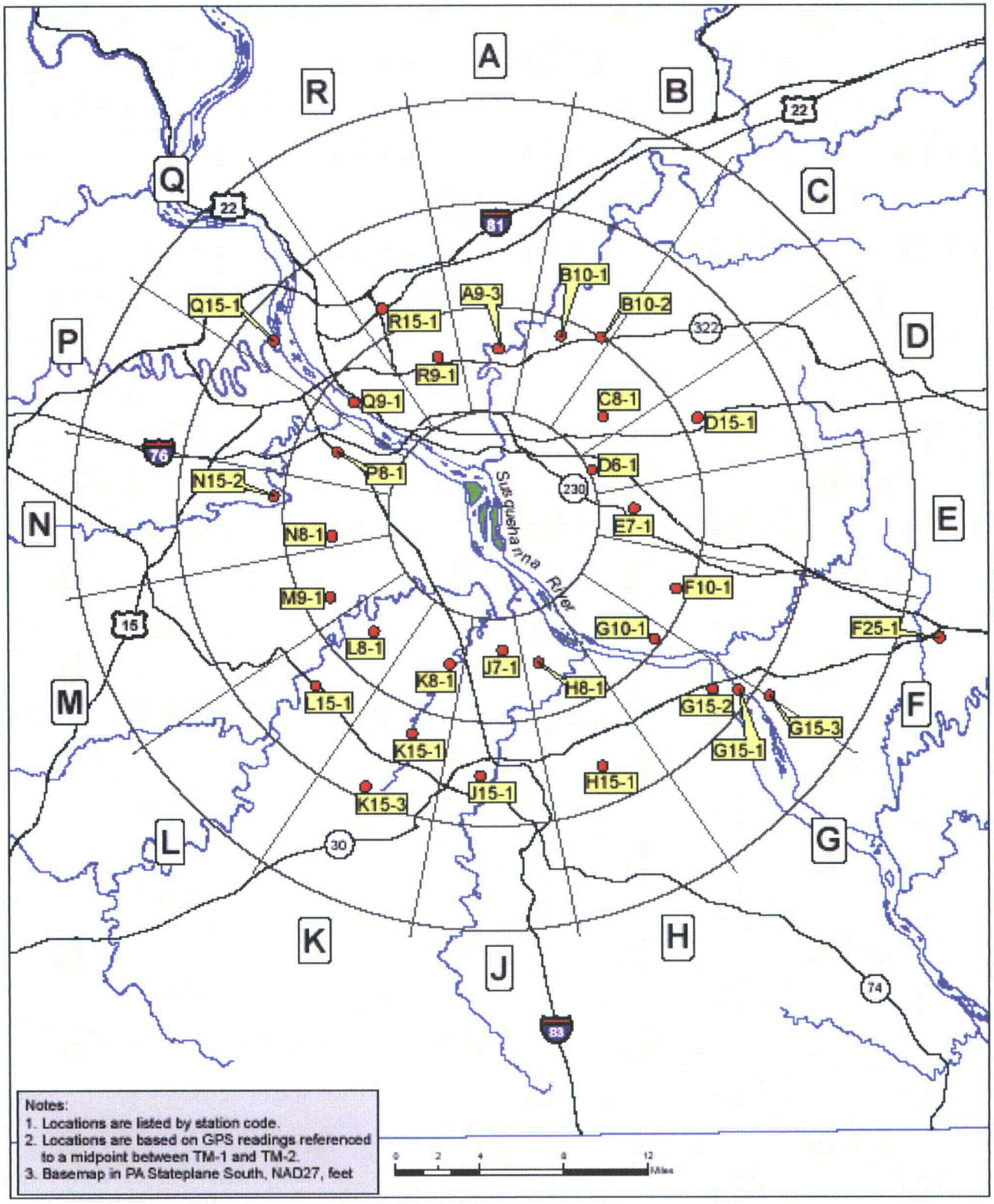

Figure B-3
Environmental Sampling Locations Greater than Five Miles of the Three Mile Island Nuclear Station, 2010

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APPENDIX C

DATA TABLES AND FIGURES - PRIMARY LABORATORY

TABLE C-I.1 CONCENTRATIONS OF TRITIUM IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	J1-2		Q9-1
12/29/09 - 02/02/10	316 ± 116	(1)	< 160
02/02/10 - 03/02/10	< 171	(1)	< 166
03/02/10 - 03/30/10	< 177		< 178
03/30/10 - 04/27/10	< 175	(1)	< 178
04/27/10 - 06/01/10	< 158		< 158
06/01/10 - 06/29/10	426 ± 122		< 164
06/29/10 - 08/03/10	282 ± 121		< 172
08/03/10 - 08/31/10	887 ± 156		< 181
08/31/10 - 09/28/10	334 ± 121		< 171
09/28/10 - 11/03/10	530 ± 123		< 164
11/03/10 - 11/30/10	< 178		< 182
11/30/10 - 12/28/10	< 174	(1)	< 173
MEAN	463 ± 453		-

TABLE C-I.2 CONCENTRATIONS OF I-131 IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	A3-2	
12/29/09 - 02/02/10	< 0.4	
02/02/10 - 03/02/10	1.1 ± 0.6	
03/02/10 - 03/30/10	< 0.5	
03/30/10 - 04/27/10	< 0.7	
04/27/10 - 06/01/10	< 0.8	
06/01/10 - 06/29/10	< 0.8	
06/29/10 - 08/03/10	0.7 ± 0.5	
08/03/10 - 08/31/10	< 0.8	(1)
08/31/10 - 09/28/10	< 0.9	
09/28/10 - 11/03/10	< 0.6	
11/03/10 - 11/30/10	< 0.4	
11/30/10 - 12/28/10	< 0.7	
MEAN	0.9 ± 0.5	

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

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

TABLE C-I.3 **CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140
J1-2	12/29/09 - 02/02/10 (1)	< 5	< 6	< 12	< 4	< 13	< 5	< 9	< 5	< 6	< 26	< 7
	02/02/10 - 03/02/10 (1)	< 4	< 4	< 10	< 4	< 9	< 5	< 8	< 5	< 5	< 31	< 7
	03/02/10 - 03/30/10	< 4	< 4	< 7	< 4	< 9	< 5	< 7	< 6	< 4	< 29	< 8
	03/30/10 - 04/27/10 (1)	< 3	< 3	< 6	< 3	< 6	< 3	< 5	< 2	< 3	< 28	< 9
	04/27/10 - 06/01/10	< 4	< 3	< 9	< 3	< 6	< 4	< 8	< 3	< 4	< 30	< 7
	06/01/10 - 06/29/10	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 2	< 2	< 14	< 5
	06/29/10 - 08/03/10	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 2	< 2	< 16	< 5
	08/03/10 - 08/31/10	< 2	< 2	< 3	< 2	< 3	< 2	< 3	< 1	< 2	< 16	< 5
	08/31/10 - 09/28/10	< 5	< 4	< 9	< 5	< 8	< 5	< 8	< 4	< 5	< 26	< 7
	09/28/10 - 11/03/10	< 4	< 5	< 10	< 5	< 9	< 5	< 8	< 4	< 4	< 32	< 10
	11/03/10 - 11/30/10	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 2	< 2	< 13	< 4
	11/30/10 - 12/28/10 (1)	< 5	< 5	< 10	< 4	< 10	< 4	< 9	< 5	< 5	< 25	< 5
	MEAN	-	-	-	-	-	-	-	-	-	-	-
Q9-1	12/29/09 - 02/02/10	< 7	< 7	< 14	< 7	< 15	< 7	< 12	< 5	< 6	< 32	< 6
	02/02/10 - 03/02/10	< 4	< 4	< 10	< 4	< 9	< 5	< 8	< 4	< 5	< 32	< 9
	03/02/10 - 03/30/10	< 3	< 3	< 7	< 3	< 6	< 4	< 6	< 3	< 3	< 22	< 7
	03/30/10 - 04/27/10	< 2	< 3	< 6	< 3	< 5	< 3	< 6	< 3	< 3	< 28	< 7
	04/27/10 - 06/01/10	< 4	< 3	< 9	< 4	< 6	< 4	< 7	< 3	< 4	< 29	< 8
	06/01/10 - 06/29/10	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 18	< 5
	06/29/10 - 08/03/10	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 2	< 2	< 17	< 5
	08/03/10 - 08/31/10	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 21	< 6
	08/31/10 - 09/28/10	< 6	< 7	< 13	< 6	< 11	< 7	< 9	< 5	< 6	< 24	< 9
	09/28/10 - 11/03/10	< 4	< 4	< 7	< 3	< 6	< 4	< 6	< 3	< 3	< 23	< 6
	11/03/10 - 11/30/10	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 14	< 5
	11/30/10 - 12/28/10	< 4	< 6	< 12	< 5	< 11	< 5	< 9	< 5	< 5	< 30	< 8
	MEAN	-	-	-	-	-	-	-	-	-	-	-

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

TABLE C-II.1 **CONCENTRATIONS OF GROSS BETA IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	G15-2	G15-3	Q9-1
12/29/09 - 02/02/10	4.8 ± 1.8	2.7 ± 1.6	< 2.2
02/02/10 - 03/02/10	3.3 ± 2.3	< 3.2	< 3.1
03/02/10 - 03/30/10	< 3.5	< 3.4	< 3.3
03/30/10 - 04/27/10	< 2.6	< 2.5 (1)	< 2.5
04/27/10 - 06/01/10	< 2.6	< 2.6	2.8 ± 1.7
06/01/10 - 06/29/10	< 2.8	< 2.8	< 2.6
06/29/10 - 08/03/10	5.5 ± 1.8	3.9 ± 1.7	4.3 ± 1.6
08/03/10 - 08/31/10	3.2 ± 1.8	< 2.7	< 2.6
08/31/10 - 09/28/10	3.0 ± 1.7	3.4 ± 1.7	2.8 ± 1.6
09/28/10 - 11/03/10	< 3.5	< 3.5	< 3.4
11/03/10 - 11/30/10	< 2.2	< 2.1	< 3.1
11/30/10 - 12/28/10	< 3.3	< 3.2	< 3.1
MEAN	4.0 ± 2.3	3.3 ± 1.2	3.3 ± 1.8

TABLE C-II.2 **CONCENTRATIONS OF I-131 IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION. 2010**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	G15-2	G15-3	Q9-1
12/29/09 - 02/02/10	< 0.6	< 0.7	< 0.6
02/02/10 - 03/02/10	< 0.8	< 0.7	< 0.9
03/02/10 - 03/30/10	< 0.5	< 0.7	< 0.5
03/30/10 - 04/27/10	< 0.6	< 0.8 (1)	< 0.6
04/27/10 - 06/01/10	< 0.6	< 0.6	< 0.7
06/01/10 - 06/29/10	< 0.9	< 0.8	< 0.7
06/29/10 - 08/03/10	< 0.9	< 0.8	< 0.8
08/03/10 - 08/31/10	< 0.7	< 0.8	< 0.7
08/31/10 - 09/28/10	< 0.4	< 0.4	< 0.8
09/28/10 - 11/03/10	< 0.9	< 0.5	< 0.5
11/03/10 - 11/30/10	< 0.4	< 0.6	< 0.7
11/30/10 - 12/28/10	< 0.6	< 0.8	< 0.6
MEAN	-	-	-

TABLE C-II.3 **CONCENTRATIONS OF TRITIUM IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	G15-2	G15-3	Q9-1
12/29/09 - 02/02/10	< 161	< 164	< 162
02/02/10 - 03/02/10	< 167	< 168	< 165
03/02/10 - 03/30/10	< 177	< 180	< 181
03/30/10 - 04/27/10	< 156	< 178 (1)	< 179
04/27/10 - 06/01/10	< 158	< 156	< 158
06/01/10 - 06/29/10	< 161	< 163	< 165
06/29/10 - 08/03/10	< 172	< 175	< 174
08/03/10 - 08/31/10	< 184	< 180	< 180
08/31/10 - 09/28/10	< 177	< 169	< 171
09/28/10 - 11/03/10	< 160	< 158	< 163
11/03/10 - 11/30/10	< 180	< 181	< 179
11/30/10 - 12/28/10	< 172	< 172	< 176
MEAN	-	-	-

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

(1) SEE PROGRAM EXCPETIONS SECTION FOR EXPLANATION

TABLE C-II.4 **CONCENTRATIONS OF GAMMA EMITTERS IN DRINKING WATER SAMPLES COLLECTED COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140
G15-2	12/29/09 - 02/02/10	< 8	< 6	< 14	< 6	< 16	< 7	< 9	< 6	< 7	< 31	< 5
	02/02/10 - 03/02/10	< 4	< 5	< 12	< 4	< 10	< 6	< 10	< 4	< 5	< 34	< 10
	03/02/10 - 03/30/10	< 3	< 3	< 6	< 3	< 5	< 3	< 5	< 3	< 3	< 21	< 6
	03/30/10 - 04/27/10	< 3	< 3	< 6	< 2	< 5	< 3	< 6	< 3	< 3	< 24	< 8
	04/27/10 - 06/01/10	< 4	< 4	< 9	< 4	< 7	< 4	< 7	< 3	< 4	< 30	< 8
	06/01/10 - 06/29/10	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 1	< 2	< 11	< 4
	06/29/10 - 08/03/10	< 1	< 2	< 4	< 1	< 3	< 2	< 3	< 1	< 2	< 15	< 5
	08/03/10 - 08/31/10	< 2	< 2	< 5	< 2	< 4	< 3	< 4	< 2	< 2	< 23	< 7
	08/31/10 - 09/28/10	< 3	< 3	< 10	< 4	< 10	< 5	< 7	< 4	< 4	< 24	< 7
	09/28/10 - 11/03/10	< 3	< 4	< 7	< 3	< 6	< 4	< 7	< 3	< 4	< 22	< 9
	11/03/10 - 11/30/10	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 15	< 6
	11/30/10 - 12/28/10	< 5	< 5	< 11	< 5	< 12	< 5	< 9	< 5	< 6	< 32	< 11
	MEAN	-	-	-	-	-	-	-	-	-	-	-
G15-3	12/29/09 - 02/02/10	< 5	< 8	< 12	< 8	< 16	< 10	< 11	< 6	< 7	< 33	< 12
	02/02/10 - 03/02/10	< 5	< 5	< 12	< 4	< 8	< 6	< 9	< 5	< 6	< 36	< 11
	03/02/10 - 03/30/10	< 3	< 4	< 7	< 3	< 6	< 4	< 7	< 4	< 4	< 29	< 6
	03/30/10 - 04/27/10 (1)	< 3	< 3	< 7	< 3	< 6	< 3	< 5	< 3	< 3	< 27	< 10
	04/27/10 - 06/01/10	< 3	< 4	< 8	< 4	< 8	< 4	< 7	< 3	< 4	< 28	< 9
	06/01/10 - 06/29/10	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 14	< 5
	06/29/10 - 08/03/10	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 20	< 6
	08/03/10 - 08/31/10	< 3	< 3	< 8	< 3	< 6	< 4	< 6	< 3	< 3	< 36	< 12
	08/31/10 - 09/28/10	< 6	< 7	< 14	< 7	< 11	< 6	< 11	< 6	< 5	< 33	< 9
	09/28/10 - 11/03/10	< 4	< 4	< 8	< 4	< 7	< 4	< 7	< 3	< 4	< 26	< 8
	11/03/10 - 11/30/10	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 2	< 2	< 14	< 4
	11/30/10 - 12/28/10	< 5	< 4	< 11	< 5	< 9	< 5	< 9	< 5	< 5	< 27	< 9
	MEAN	-	-	-	-	-	-	-	-	-	-	-

TABLE C-II.4 **CONCENTRATIONS OF GAMMA EMITTERS IN DRINKING WATER SAMPLES COLLECTED COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140
Q9-1	12/29/09 - 02/02/10	< 7	< 8	< 16	< 7	< 14	< 7	< 13	< 7	< 9	< 29	< 10
	02/02/10 - 03/02/10	< 5	< 5	< 10	< 4	< 10	< 5	< 11	< 5	< 5	< 34	< 10
	03/02/10 - 03/30/10	< 4	< 4	< 10	< 4	< 9	< 6	< 8	< 4	< 4	< 31	< 10
	03/30/10 - 04/27/10	< 3	< 3	< 8	< 3	< 6	< 3	< 6	< 3	< 3	< 28	< 9
	04/27/10 - 06/01/10	< 4	< 5	< 9	< 5	< 8	< 5	< 7	< 4	< 4	< 29	< 11
	06/01/10 - 06/29/10	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 15	< 5
	06/29/10 - 08/03/10	< 2	< 2	< 4	< 2	< 3	< 2	< 4	< 2	< 2	< 17	< 5
	08/03/10 - 08/31/10	< 3	< 3	< 8	< 3	< 6	< 4	< 6	< 3	< 3	< 34	< 11
	08/31/10 - 09/28/10	< 6	< 7	< 14	< 5	< 12	< 6	< 14	< 7	< 7	< 36	< 8
	09/28/10 - 11/03/10	< 4	< 5	< 11	< 4	< 8	< 4	< 8	< 4	< 5	< 28	< 11
	11/03/10 - 11/30/10	< 2	< 2	< 5	< 2	< 4	< 3	< 4	< 2	< 2	< 15	< 5
	11/30/10 - 12/28/10	< 4	< 4	< 9	< 4	< 9	< 4	< 8	< 4	< 4	< 26	< 8
	MEAN	-	-	-	-	-	-	-	-	-	-	-

TABLE C-III.1 **CONCENTRATIONS OF GROSS BETA, IODINE-131, TRITIUM, AND STRONTIUM IN EFFLUENT WATER SAMPLES FOR STATION K1-1 COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	GROSS BETA	I-131	H-3	SR-89	SR-90
12/28/09 - 02/02/10	5.0 ± 1.8	< 0.5	1840 ± 235	< 4.8	< 0.8
02/02/10 - 03/02/10	5.3 ± 2.7	0.6 ± 0.4	2230 ± 276		
03/02/10 - 03/30/10	4.7 ± 2.7	< 0.5	< 178		
03/30/10 - 04/27/10	3.3 ± 1.9	< 0.7	704 ± 140		
04/27/10 - 06/01/10	4.8 ± 2.0	< 0.6	887 ± 143		
06/01/10 - 06/29/10	5.9 ± 2.3	< 0.7	6660 ± 713		
06/29/10 - 08/03/10	8.7 ± 2.1	< 0.8	2890 ± 344	< 2.0	< 0.8
08/03/10 - 08/31/10 (1)	5.9 ± 2.2	< 0.7	13800 ± 1430		
08/31/10 - 09/28/10 (1)	7.0 ± 2.2	< 0.8	1590 ± 215		
09/28/10 - 11/03/10	5.3 ± 2.5	< 0.6	7170 ± 762		
11/03/10 - 11/30/10	< 2.1	< 0.5	279 ± 122		
11/30/10 - 12/28/10 (1)	< 3.4	< 0.7	6840 ± 738		
MEAN	5.6 ± 2.9	-	4081 ± 8256	-	-

* THE MEAN AND 2 STANDARD DEVIATION VALUES ARE CALCULATED USING THE POSITIVE VALUES
(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

TABLE C-III.2 **CONCENTRATIONS OF GAMMA EMITTERS IN EFFLUENT WATER SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD		Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140
K1-1	12/28/09 - 02/02/10		< 7	< 5	< 18	< 8	< 11	< 8	< 13	< 8	< 7	< 39	< 15
	02/02/10 - 03/02/10		< 5	< 5	< 10	< 5	< 10	< 5	< 9	< 4	< 4	< 30	< 5
	03/02/10 - 03/30/10		< 4	< 5	< 10	< 5	< 9	< 5	< 7	< 4	< 5	< 29	< 8
	03/30/10 - 04/27/10		< 2	< 3	< 6	< 2	< 5	< 3	< 5	< 2	< 2	< 24	< 8
	04/27/10 - 06/01/10		< 4	< 4	< 8	< 3	< 7	< 4	< 8	< 3	< 4	< 30	< 8
	06/01/10 - 06/29/10		< 2	< 3	< 6	< 2	< 5	< 3	< 5	< 3	< 3	< 19	< 6
	06/29/10 - 08/03/10		< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 2	< 2	< 17	< 5
	08/03/10 - 08/31/10	(1)	< 2	< 2	< 5	< 2	< 4	< 3	< 4	< 2	< 2	< 24	< 6
	08/31/10 - 09/28/10	(1)	< 5	< 6	< 12	< 6	< 10	< 6	< 12	< 5	< 5	< 32	< 7
	09/28/10 - 11/03/10		< 4	< 5	< 10	< 5	< 9	< 5	< 9	< 4	< 4	< 32	< 10
	11/03/10 - 11/30/10		< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 2	< 2	< 14	< 4
	11/30/10 - 12/28/10	(1)	< 4	< 5	< 10	< 4	< 10	< 5	< 8	< 4	< 4	< 25	< 9
	MEAN		-	-	-	-	-	-	-	-	-	-	-

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

TABLE C-IV.1 CONCENTRATIONS OF STRONTIUM IN PREDATOR AND BOTTOM FEEDER (FISH) SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

STC	COLLECTION PERIOD	Sr-90
INDP	PREDATOR	
	06/07/10	< 3
	10/25/10	< 4
	MEAN	-
INDB	BOTTOM FEEDER	
	06/07/10	< 4
	10/25/10	< 4
	MEAN	-
BKGP	PREDATOR	
	06/17/10	< 3
	10/28/10	< 3
	MEAN	-
BKGB	BOTTOM FEEDER	
	06/17/10	< 2
	10/28/10	< 2
	MEAN	-

TABLE C-IV.2 **CONCENTRATIONS OF GAMMA EMITTERS IN PREDATOR AND BOTTOM FEEDER (FISH) SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010**

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

STC	COLLECTION PERIOD	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137
BKGB	BOTTOM FEEDER								
	06/17/10	3440 ± 772	< 19	< 24	< 67	< 20	< 41	< 23	< 26
	10/28/10	3410 ± 725	< 43	< 46	< 96	< 50	< 93	< 45	< 46
	MEAN	3425 ± 42	-	-	-	-	-	-	-
BKGP	PREDATOR								
	06/17/10	3030 ± 729	< 43	< 47	< 87	< 47	< 89	< 38	< 47
	10/28/10	2950 ± 723	< 54	< 65	< 154	< 55	< 129	< 50	< 57
	MEAN	2990 ± 113	-	-	-	-	-	-	-
INDB	BOTTOM FEEDER								
	06/07/10	2100 ± 791	< 47	< 64	< 154	< 47	< 116	< 49	< 49
	10/25/10	3470 ± 676	< 50	< 46	< 99	< 46	< 104	< 49	< 43
	MEAN	2785 ± 1937	-	-	-	-	-	-	-
INDP	PREDATOR								
	06/07/10	3850 ± 698	< 48	< 58	< 110	< 47	< 122	< 60	< 56
	10/25/10	2320 ± 629	< 39	< 46	< 100	< 42	< 84	< 42	< 44
	MEAN	3085 ± 2164	-	-	-	-	-	-	-

TABLE C-V.1 CONCENTRATIONS OF GAMMA EMITTERS IN SEDIMENT SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010

RESULTS IN UNITS OF PCI/KG DRY ± 2 SIGMA

STC	COLLECTION PERIOD	K-40	Mn-54	Co-58	Co-60	Cs-134	Cs-137
A1-3	06/18/10	6840 ± 910	< 55	< 47	< 50	< 44	< 56
	MEAN	-	-	-	-	-	-
J2-1	06/18/10	14700 ± 1630	< 77	< 84	< 77	< 89	< 99
	MEAN	-	-	-	-	-	-
K1-3	06/18/10	10500 ± 1210	< 69	< 62	< 68	< 59	< 71
	MEAN	-	-	-	-	-	-

TABLE C-VI.1 CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010

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

COLLECTION PERIOD	GROUP I		GROUP II				GROUP III	
	E1-2	F1-3	A3-1	G2-1	H3-1	M2-1	Q15-1	
12/29/09 - 01/05/10	17 ± 4	8 ± 4	14 ± 4	16 ± 4	14 ± 4	15 ± 4	14 ± 4	
01/05/10 - 01/13/10	18 ± 5	17 ± 5	16 ± 5	12 ± 4	16 ± 5	17 ± 5	20 ± 5	
01/13/10 - 01/20/10	28 ± 5	29 ± 5	28 ± 5		(1) 23 ± 5	29 ± 5	32 ± 5	
01/20/10 - 01/27/10	20 ± 5	14 ± 5	(1) 18 ± 5	20 ± 6	19 ± 5	16 ± 5	18 ± 5	
01/27/10 - 02/03/10	19 ± 5	22 ± 6	21 ± 6	18 ± 5	20 ± 6	20 ± 6	24 ± 6	
02/03/10 - 02/11/10	14 ± 5	18 ± 4	(1) 14 ± 5	14 ± 4	(1) 15 ± 4	(1) 13 ± 5	14 ± 5	
02/11/10 - 02/17/10	10 ± 5	13 ± 6	10 ± 5	16 ± 6	< 9	10 ± 5	12 ± 5	
02/17/10 - 02/24/10	12 ± 5	12 ± 5	11 ± 5	9 ± 4	9 ± 4	15 ± 5	14 ± 5	
02/24/10 - 03/03/10	< 7	< 7	< 7	< 7	10 ± 5	< 7	< 7	
03/03/10 - 03/10/10	19 ± 6	15 ± 5	15 ± 5	19 ± 6	13 ± 5	16 ± 5	17 ± 6	
03/10/10 - 03/17/10	12 ± 5	15 ± 5	16 ± 5	12 ± 5	11 ± 5	15 ± 5	9 ± 5	
03/17/10 - 03/24/10	16 ± 5	23 ± 6	19 ± 5	17 ± 5	21 ± 5	17 ± 5	17 ± 5	
03/24/10 - 03/31/10	15 ± 5	14 ± 5	11 ± 5	13 ± 5	10 ± 5	15 ± 5	12 ± 5	
03/31/10 - 04/07/10	13 ± 4	17 ± 4	16 ± 4	15 ± 4	17 ± 5	17 ± 5	18 ± 5	
04/07/10 - 04/14/10	18 ± 4	18 ± 4	17 ± 4	14 ± 4	15 ± 4	20 ± 4	19 ± 4	
04/14/10 - 04/21/10	8 ± 5	12 ± 5	11 ± 5	10 ± 5	14 ± 5	13 ± 5	< 7	
04/21/10 - 04/28/10	19 ± 5	19 ± 5	19 ± 5	14 ± 5	15 ± 5	17 ± 5	17 ± 5	
04/28/10 - 05/05/10	15 ± 5	17 ± 5	15 ± 5	14 ± 5	16 ± 5	15 ± 5	16 ± 5	
05/05/10 - 05/12/10	9 ± 5	11 ± 5	13 ± 5	12 ± 5	< 8	10 ± 5	11 ± 5	
05/12/10 - 05/19/10	14 ± 4	14 ± 4	10 ± 4	10 ± 4	10 ± 4	10 ± 4	13 ± 4	
05/19/10 - 05/26/10	14 ± 4	14 ± 4	12 ± 4	11 ± 4	15 ± 4	14 ± 4	14 ± 4	
05/26/10 - 06/02/10	18 ± 4	13 ± 4	16 ± 4	18 ± 4	18 ± 4	20 ± 4	16 ± 4	
06/02/10 - 06/09/10	19 ± 4		(1) 15 ± 4	18 ± 4	14 ± 4	16 ± 4	18 ± 4	
06/09/10 - 06/16/10	17 ± 5	26 ± 7	18 ± 5	16 ± 5	15 ± 5	18 ± 5	14 ± 5	
06/16/10 - 06/23/10	22 ± 5	16 ± 4	16 ± 4	19 ± 5	20 ± 5	18 ± 5	12 ± 4	
06/23/10 - 06/30/10	18 ± 4	20 ± 4	22 ± 4	24 ± 5	23 ± 5	18 ± 4	21 ± 5	
06/30/10 - 07/07/10	16 ± 5	17 ± 6	17 ± 6	20 ± 6	15 ± 5	21 ± 6	21 ± 6	
07/07/10 - 07/14/10	15 ± 4	22 ± 5	22 ± 5	21 ± 5	27 ± 5	21 ± 5	22 ± 5	
07/14/10 - 07/21/10	13 ± 5	20 ± 6	19 ± 6	24 ± 6	16 ± 6	17 ± 6	17 ± 6	
07/21/10 - 07/28/10	15 ± 5	14 ± 5	20 ± 5	18 ± 5	19 ± 5	16 ± 5	21 ± 5	
07/28/10 - 08/04/10	14 ± 5	20 ± 6	16 ± 6	14 ± 5	16 ± 6	11 ± 5	18 ± 6	
08/04/10 - 08/11/10	22 ± 5	31 ± 5	27 ± 5	22 ± 5	31 ± 5	30 ± 5	32 ± 5	
08/11/10 - 08/18/10	17 ± 5	18 ± 6	19 ± 6	16 ± 6	20 ± 6	16 ± 5	18 ± 6	
08/18/10 - 08/25/10	24 ± 5	25 ± 5	23 ± 5	28 ± 5	27 ± 5	23 ± 5	22 ± 5 (1)	
08/25/10 - 09/01/10	30 ± 6	27 ± 6	27 ± 6	26 ± 6	23 ± 6	27 ± 6	31 ± 8	
09/01/10 - 09/08/10	31 ± 9	(1) 31 ± 6	33 ± 6	35 ± 6	33 ± 6	29 ± 6	29 ± 6	
09/08/10 - 09/15/10	< 7	11 ± 5	16 ± 5	9 ± 5	< 7	11 ± 5	12 ± 5	
09/15/10 - 09/22/10	15 ± 5	16 ± 5	20 ± 5	18 ± 5	13 ± 5	16 ± 5	18 ± 5	
09/22/10 - 09/29/10	19 ± 5	24 ± 6	25 ± 6	22 ± 5	23 ± 5	21 ± 5	24 ± 6	
09/29/10 - 10/06/10	< 7	9 ± 5	7 ± 5	8 ± 5	8 ± 5	< 7	9 ± 5	
10/06/10 - 10/13/10	20 ± 5	26 ± 6	27 ± 6	27 ± 6	28 ± 6	23 ± 6	29 ± 6	
10/13/10 - 10/20/10	12 ± 5	20 ± 6	15 ± 6	15 ± 6	12 ± 6	14 ± 6	18 ± 6	
10/20/10 - 10/27/10	12 ± 5	16 ± 5	22 ± 5	18 ± 5	21 ± 5	20 ± 5	18 ± 5	
10/27/10 - 11/03/10	11 ± 5	11 ± 5	15 ± 5	14 ± 5	14 ± 5	14 ± 5	15 ± 5	
11/03/10 - 11/09/10	< 8	8 ± 6	10 ± 6	< 8	10 ± 6	13 ± 6	8 ± 6	
11/09/10 - 11/17/10	13 ± 4	19 ± 5	19 ± 5	20 ± 5	19 ± 5	21 ± 5	24 ± 5	
11/17/10 - 11/23/10	16 ± 6	28 ± 7	28 ± 7	26 ± 7	26 ± 7	31 ± 7	25 ± 6	
11/23/10 - 12/01/10	11 ± 4	14 ± 4	19 ± 4	16 ± 4	17 ± 4	12 ± 4	15 ± 4	
12/01/10 - 12/08/10	9 ± 4	14 ± 4	15 ± 4	12 ± 4	15 ± 4	15 ± 4	11 ± 4	
12/08/10 - 12/15/10	12 ± 5	18 ± 5	16 ± 5	20 ± 5	18 ± 5	16 ± 5	17 ± 5	
12/15/10 - 12/22/10	16 ± 5	20 ± 6	23 ± 6	20 ± 6	23 ± 6	21 ± 6	23 ± 6	
12/22/10 - 12/29/10	< 7	< 7	< 7	7 ± 5	< 7	< 7	< 7	
MEAN	16 ± 10	18 ± 12	18 ± 11	17 ± 11	18 ± 12	18 ± 10	18 ± 12	

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

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

TABLE C-VI.2 **MONTHLY AND YEARLY MEAN VALUES OF GROSS BETA CONCENTRATIONS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010**

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

GROUP I - CLOSEST TO THE SITE BOUNDARY				GROUP II - INTERMEDIATE OFFSITE				GROUP III - CONTROL LOCATIONS			
COLLECTION PERIOD	MIN	MAX	MEAN ± 2SD	COLLECTION PERIOD	MIN	MAX	MEAN ± 2SD	COLLECTION PERIOD	MIN	MAX	MEAN ± 2SD
12/29/09 - 02/03/10	8	29	19 ± 12	12/29/09 - 02/03/10	12	29	19 ± 9	12/29/09 - 02/03/10	14	32	22 ± 14
02/03/10 - 02/24/10	10	18	13 ± 6	02/03/10 - 03/03/10	9	16	12 ± 5	02/03/10 - 02/24/10	12	14	13 ± 3
03/03/10 - 03/31/10	12	23	16 ± 7	03/03/10 - 03/31/10	10	21	15 ± 6	03/03/10 - 03/31/10	9	17	14 ± 8
03/31/10 - 04/28/10	8	19	15 ± 8	03/31/10 - 04/28/10	10	20	15 ± 5	03/31/10 - 04/28/10	17	19	18 ± 2
04/28/10 - 06/02/10	9	18	14 ± 5	04/28/10 - 06/02/10	10	20	14 ± 6	04/28/10 - 06/02/10	11	16	14 ± 5
06/02/10 - 06/30/10	16	26	20 ± 7	06/02/10 - 06/30/10	14	24	18 ± 6	06/02/10 - 06/30/10	12	21	16 ± 9
06/30/10 - 07/28/10	13	22	16 ± 6	06/30/10 - 07/28/10	15	27	20 ± 6	06/30/10 - 07/28/10	17	22	20 ± 4
07/28/10 - 09/01/10	14	31	23 ± 11	07/28/10 - 09/01/10	11	31	22 ± 11	07/28/10 - 09/01/10	18	32	24 ± 14
09/01/10 - 09/29/10	11	31	21 ± 16	09/01/10 - 09/29/10	9	35	22 ± 16	09/01/10 - 09/29/10	12	29	21 ± 15
09/29/10 - 11/03/10	9	26	15 ± 12	09/29/10 - 11/03/10	7	28	17 ± 13	09/29/10 - 11/03/10	9	29	18 ± 14
11/03/10 - 12/01/10	8	28	15 ± 13	11/03/10 - 12/01/10	10	31	19 ± 13	11/03/10 - 12/01/10	8	25	18 ± 16
12/01/10 - 12/22/10	9	20	15 ± 8	12/01/10 - 12/29/10	7	23	17 ± 9	12/01/10 - 12/22/10	11	23	17 ± 12
12/29/09 - 12/29/10	8	31	17 ± 11	12/29/09 - 12/29/10	7	35	18 ± 11	12/29/09 - 12/29/10	8	32	18 ± 12

TABLE C-VI.3 **CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010**

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

STC	COLLECTION PERIOD	Be-7	Mn-54	Co-58	Co-60	Nb-95	Zr-95	Cs-134	Cs-137
A3-1	12/29/09 - 03/31/10	53 ± 27	< 4	< 5	< 4	< 4	< 10	< 3	< 3
	03/31/10 - 06/30/10	83 ± 30	< 4	< 6	< 5	< 6	< 10	< 4	< 4
	06/30/10 - 09/29/10	80 ± 28	< 3	< 3	< 3	< 3	< 5	< 3	< 2
	09/29/10 - 12/29/10	60 ± 24	< 2	< 2	< 2	< 3	< 5	< 2	< 2
	MEAN	69 ± 30	-	-	-	-	-	-	-
E1-2	12/29/09 - 03/31/10	68 ± 27	< 3	< 3	< 3	< 3	< 6	< 3	< 2
	03/31/10 - 06/30/10	105 ± 41	< 4	< 4	< 2	< 7	< 8	< 4	< 4
	06/30/10 - 09/29/10	94 ± 32	< 3	< 4	< 4	< 4	< 5	< 3	< 2
	09/29/10 - 12/29/10	49 ± 13	< 2	< 2	< 2	< 3	< 5	< 2	< 2
	MEAN	79 ± 50	-	-	-	-	-	-	-
F1-3	12/29/09 - 03/31/10	100 ± 27	< 4	< 5	< 4	< 4	< 8	< 3	< 4
	03/31/10 - 06/30/10	84 ± 26	< 3	< 3	< 3	< 5	< 6	< 2	< 3
	06/30/10 - 09/29/10	105 ± 40	< 4	< 6	< 5	< 5	< 10	< 4	< 3
	09/29/10 - 12/29/10	52 ± 25	< 3	< 3	< 3	< 3	< 5	< 3	< 3
	MEAN	85 ± 48	-	-	-	-	-	-	-
G2-1	12/29/09 - 03/31/10	100 ± 35	< 4	< 5	< 4	< 4	< 5	< 3	< 3
	03/31/10 - 06/30/10	100 ± 40	< 5	< 5	< 3	< 5	< 11	< 5	< 5
	06/30/10 - 09/29/10	103 ± 32	< 2	< 6	< 3	< 5	< 10	< 4	< 2
	09/29/10 - 12/29/10	53 ± 22	< 2	< 3	< 2	< 2	< 5	< 2	< 2
	MEAN	89 ± 48	-	-	-	-	-	-	-
H3-1	12/29/09 - 03/31/10	103 ± 27	< 3	< 4	< 3	< 4	< 6	< 3	< 3
	03/31/10 - 06/30/10	111 ± 29	< 3	< 3	< 3	< 4	< 7	< 3	< 3
	06/30/10 - 09/29/10	82 ± 29	< 3	< 3	< 3	< 4	< 5	< 3	< 3
	09/29/10 - 12/29/10	64 ± 28	< 3	< 3	< 4	< 4	< 8	< 3	< 3
	MEAN	90 ± 43	-	-	-	-	-	-	-
M2-1	12/29/09 - 03/31/10	81 ± 21	< 3	< 4	< 3	< 3	< 6	< 3	< 3
	03/31/10 - 06/30/10	106 ± 45	< 6	< 6	< 3	< 6	< 10	< 4	< 5
	06/30/10 - 09/29/10	117 ± 33	< 4	< 5	< 3	< 5	< 8	< 3	< 3
	09/29/10 - 12/29/10	81 ± 27	< 3	< 4	< 4	< 3	< 7	< 4	< 3
	MEAN	96 ± 36	-	-	-	-	-	-	-
Q15-1	12/29/09 - 03/31/10	87 ± 27	< 5	< 5	< 4	< 5	< 9	< 5	< 4
	03/31/10 - 06/30/10	60 ± 41	< 4	< 6	< 3	< 5	< 9	< 4	< 4
	06/30/10 - 09/29/10	76 ± 37	< 3	< 6	< 3	< 5	< 9	< 3	< 3
	09/29/10 - 12/29/10	68 ± 21	< 3	< 4	< 4	< 4	< 7	< 4	< 3
	MEAN	72 ± 23	-	-	-	-	-	-	-

TABLE C-VII.1 CONCENTRATIONS OF I-131 IN AIR IODINE SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010

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

COLLECTION	GROUP I		GROUP II				GROUP III
PERIOD	E1-2	F1-3	A3-1	G2-1	H3-1	M2-1	Q15-1
12/29/09 - 01/05/10	< 55	< 55	< 54	< 56	< 57	< 54	< 55
01/05/10 - 01/13/10	< 44	< 44	< 52	< 45	< 53	< 52	< 29
01/13/10 - 01/20/10	< 66	< 66	< 60	(1)	< 61	< 60	< 60
01/20/10 - 01/27/10	< 48	< 26 (1)	< 26	< 56	< 49	< 48	< 21
01/27/10 - 02/03/10	< 37	< 37	< 41	< 38	< 38	< 41	< 42
02/03/10 - 02/11/10	< 55	< 25 (1)	< 25	< 46 (1)	< 46 (1)	< 25	< 25
02/11/10 - 02/17/10	< 19	< 23	< 25	< 23	< 24	< 25	< 25
02/17/10 - 02/24/10	< 14	< 24	< 29	< 25	< 25	< 29	< 29
02/24/10 - 03/03/10	< 34	< 34	< 44	< 35	< 35	< 44	< 45
03/03/10 - 03/10/10	< 19	< 19	< 10	< 8	< 20	< 10	< 10
03/10/10 - 03/17/10	< 38	< 38	< 55	< 39	< 39	< 56	< 56
03/17/10 - 03/24/10	< 32	< 32	< 37	< 32	< 18	< 38	< 38
03/24/10 - 03/31/10	< 34	< 34	< 34	< 35	< 35	< 33	< 34
03/31/10 - 04/07/10	< 35	< 35	< 31	< 35	< 32	< 13	< 32
04/07/10 - 04/14/10	< 42	< 42	< 39	< 43	< 44	< 39	< 39
04/14/10 - 04/21/10	< 56	< 55	< 52	< 56	< 53	< 52	< 32
04/21/10 - 04/28/10	< 30	< 29	< 28	< 30	< 30	< 28	< 28
04/28/10 - 05/05/10	< 31	< 30	< 39	< 31	< 40	< 39	< 40
05/05/10 - 05/12/10	< 48	< 47	< 59	< 48	< 49	< 59	< 60
05/12/10 - 05/19/10	< 28	< 15	< 41	< 28	< 28	< 44	< 43
05/19/10 - 05/26/10	< 46	< 46	< 51	< 47	< 47	< 50	< 51
05/26/10 - 06/02/10	< 18	< 32	< 36	< 32	< 32	< 37	< 37
06/02/10 - 06/09/10	< 58	(1)	< 46	< 57	< 58	< 47	< 47
06/09/10 - 06/16/10	< 27	< 39	< 32	< 16	< 28	< 32	< 32
06/16/10 - 06/23/10	< 42	< 42	< 54	< 43	< 43	< 54	< 54
06/23/10 - 06/30/10	< 36	< 36	< 39	< 37	< 37	< 39	< 39
06/30/10 - 07/07/10	< 40	< 41	< 41	< 41	< 41	< 40	< 41
07/07/10 - 07/14/10	< 26	< 27	< 34	< 27	< 14	< 34	< 34
07/14/10 - 07/21/10	< 21	< 21	< 28	< 22	< 21	< 28	< 28
07/21/10 - 07/28/10	< 32	< 33	< 29	< 33	< 30	< 21	< 29
07/28/10 - 08/04/10	< 29	< 30	< 36	< 30	< 30	< 35	< 36
08/04/10 - 08/11/10	< 34	< 35	< 47	< 35	< 47	< 46	< 20
08/11/10 - 08/18/10	< 42	< 43	< 53	< 44	< 44	< 52	< 53
08/18/10 - 08/25/10	< 29	< 30	< 43	< 31	< 30	< 42	< 43 (1)
08/25/10 - 09/01/10	< 21	< 22	< 22	< 22	< 22	< 22	< 32
09/01/10 - 09/08/10	< 64 (1)	< 23	< 40	< 41	< 40	< 40	< 41
09/08/10 - 09/15/10	< 41	< 42	< 54	< 42	< 42	< 53	< 54
09/15/10 - 09/22/10	< 28	< 29	< 39	< 29	< 29	< 39	< 40
09/22/10 - 09/29/10	< 37	< 38	< 42	< 38	< 38	< 42	< 43
09/29/10 - 10/06/10	< 47	< 49	< 67	< 38	< 48	< 66	< 68
10/06/10 - 10/13/10	< 46	< 48	< 35	< 48	< 48	< 34	< 35
10/13/10 - 10/20/10	< 66	< 67	< 69	< 68	< 30	< 68	< 70
10/20/10 - 10/27/10	< 42	< 43	< 47	< 43	< 43	< 46	< 47
10/27/10 - 11/03/10	< 60	< 62	< 68	< 62	< 69	< 28	< 68
11/03/10 - 11/09/10	< 58	< 59	< 31	< 60	< 31	< 30	< 31
11/09/10 - 11/17/10	< 41	< 42	< 32	< 42	< 32	< 32	< 18
11/17/10 - 11/23/10	< 65	< 67	< 65	< 68	< 68	< 63	< 66
11/23/10 - 12/01/10	< 47	< 48	< 19	< 48	< 45	< 44	< 45
12/01/10 - 12/08/10	< 45	< 46	< 49	< 47	< 46	< 48	< 49
12/08/10 - 12/15/10	< 29	< 16	< 38	< 29	< 29	< 38	< 38
12/15/10 - 12/22/10	< 58	< 59	< 56	< 60	< 59	< 55	< 57
12/22/10 - 12/29/10	< 27	< 64	< 49	< 65	< 64	< 48	< 50
MEAN	-	-	-	-	-	-	-

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

TABLE C-VIII.1 CONCENTRATIONS OF I-131 IN MILK SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

	CONTROL FARM	INDICATOR FARM			
COLLECTION PERIOD	K15-3	E2-2	F4-1	G2-1	P4-1
01/05/10	< 0.4	< 0.2	< 0.6	< 0.3	< 0.2
02/03/10	< 0.4	< 0.3	< 0.3	< 0.4	< 0.5
03/03/10	< 0.9	< 0.4	< 0.3	< 0.5	< 0.5
03/17/10	< 0.4	< 0.4	< 0.4	< 0.9	< 0.6
03/31/10	< 0.4	< 0.5	< 0.4	< 0.7	< 0.4
04/14/10	< 0.6	< 0.6	< 0.5	< 0.7	< 0.6
04/28/10	< 0.5	< 0.5	< 0.3	< 0.3	< 0.5
05/12/10	< 0.6	< 0.6	< 0.5	< 0.8	< 0.5
05/26/10	< 0.6	< 0.7	< 0.6	< 0.6	< 0.5
06/09/10	< 0.5	< 0.5	< 0.4	< 0.6	< 0.5
06/23/10	< 0.5	< 0.8	< 0.5	< 0.6	< 0.4
07/07/10	< 0.5	< 0.6	< 0.5	< 0.8	< 0.8
07/21/10	< 0.6	< 0.6	< 0.6	< 0.8	< 0.4
08/04/10	< 0.7	< 0.8	< 0.5	< 0.6	< 0.7
08/18/10	< 0.6	< 0.7	< 0.5	< 0.7	< 0.6
09/01/10	< 0.8	< 0.7	< 0.6	< 0.8	< 0.6
09/15/10	< 0.8	< 0.4	< 0.7	< 0.4	< 0.3
09/29/10	< 0.8	< 0.5	< 0.8	< 0.6	< 0.7
10/13/10	< 0.6	< 0.7	< 0.5	< 0.6	< 0.5
10/27/10	< 0.7	< 0.7	< 0.6	< 0.6	< 0.5
11/10/10	< 0.6	< 0.7	< 0.5	< 0.7	< 0.9
11/23/10	< 0.4	< 0.4	< 0.3	< 0.5	< 0.5
12/08/10	< 1.0	< 0.8	< 0.9	< 1.0	< 0.7
MEAN	-	-	-	-	-

TABLE C-VIII.2 CONCENTRATIONS OF STRONTIUM IN MILK SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION	CONTROL FARM		INDICATOR FARM							
	K15-3		P4-1		E2-2		F4-1		G2-1	
PERIOD	SR-89	SR-90	SR-89	SR-90	SR-89	SR-90	SR-89	SR-90	SR-89	SR-90
01/05/10 - 03/17/10	< 3.8	< 0.7	< 3.4	1.3 ± 0.4	< 3.8	0.7 ± 0.4	< 3.1	< 0.5	< 3.7	< 0.5
03/31/10 - 06/23/10	< 3.5	< 0.7	< 2.8	< 0.7	< 4.3	< 0.9	< 3.0	0.9 ± 0.5	< 2.9	< 0.6
06/23/10 - 09/29/10	< 2.0	< 0.7	< 2.0	0.7 ± 0.3	< 1.8	1.5 ± 0.4	< 2.2	< 0.8	< 1.9	< 0.6
10/13/10 - 12/08/10	< 1.7	< 0.8	< 1.9	< 0.7	< 1.9	0.9 ± 0.5	< 2.0	< 0.8	< 1.8	< 0.7
MEAN	-	-	-	1.0 ± 0.8	-	1.0 ± 0.8	-	-	-	-

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

TABLE C-VIII.3 CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	K-40	Cs-134	Cs-137	Ba-140	La-140
E2-2	01/05/10	1370 ± 111	< 4	< 5	< 43	< 13
	02/03/10	1360 ± 167	< 6	< 7	< 27	< 7
	03/03/10	1370 ± 131	< 6	< 7	< 37	< 10
	03/17/10	1300 ± 131	< 6	< 7	< 44	< 13
	03/31/10	1400 ± 132	< 5	< 6	< 26	< 8
	04/14/10	1430 ± 87	< 3	< 4	< 38	< 8
	04/28/10	1260 ± 135	< 5	< 6	< 41	< 12
	05/12/10	1430 ± 116	< 4	< 5	< 25	< 7
	05/26/10	1420 ± 45	< 2	< 2	< 22	< 5
	06/09/10	1340 ± 113	< 5	< 5	< 48	< 13
	06/23/10	1510 ± 149	< 5	< 7	< 28	< 8
	07/07/10	1370 ± 195	< 6	< 7	< 33	< 9
	07/21/10	1330 ± 110	< 5	< 5	< 20	< 7
	08/04/10	1760 ± 188	< 4	< 7	< 36	< 13
	08/18/10	1320 ± 144	< 5	< 7	< 41	< 10
	09/01/10	1240 ± 125	< 5	< 5	< 36	< 10
	09/15/10	1230 ± 153	< 6	< 7	< 28	< 13
	09/29/10	1230 ± 167	< 6	< 8	< 27	< 9
	10/13/10	1350 ± 143	< 5	< 7	< 31	< 11
	10/27/10	1320 ± 131	< 5	< 5	< 22	< 6
	11/10/10	1300 ± 156	< 6	< 6	< 29	< 9
	11/23/10	1500 ± 183	< 6	< 6	< 34	< 13
	12/08/10	1330 ± 155	< 6	< 7	< 27	< 10
	MEAN	1368 ± 228	-	-	-	-
F4-1	01/05/10	1380 ± 96	< 5	< 5	< 57	< 11
	02/03/10	1150 ± 153	< 6	< 7	< 28	< 10
	03/03/10	1550 ± 123	< 7	< 7	< 39	< 9
	03/17/10	1400 ± 115	< 4	< 4	< 30	< 9
	03/31/10	1420 ± 130	< 6	< 6	< 29	< 9
	04/14/10	1420 ± 96	< 4	< 4	< 43	< 12
	04/28/10	1400 ± 104	< 4	< 5	< 27	< 9
	05/12/10	1410 ± 111	< 7	< 6	< 34	< 9
	05/26/10	1290 ± 34	< 1	< 1	< 18	< 5
	06/09/10	1370 ± 149	< 5	< 7	< 54	< 13
	06/23/10	1320 ± 141	< 9	< 9	< 40	< 9
	07/07/10	1390 ± 140	< 5	< 7	< 24	< 8
	07/21/10	1360 ± 131	< 5	< 6	< 24	< 7
	08/04/10	1370 ± 138	< 5	< 5	< 36	< 9
	08/18/10	1330 ± 116	< 4	< 6	< 36	< 14
	09/01/10	1410 ± 120	< 5	< 5	< 41	< 11
	09/15/10	1490 ± 162	< 5	< 7	< 38	< 8
	09/29/10	1380 ± 152	< 5	< 6	< 27	< 7
	10/13/10	1460 ± 127	< 5	< 7	< 31	< 8
	10/27/10	1280 ± 135	< 5	< 6	< 29	< 9
	11/10/10	1390 ± 157	< 6	< 6	< 29	< 8
	11/23/10	1490 ± 144	< 6	< 7	< 33	< 11
	12/08/10	1300 ± 147	< 6	< 6	< 33	< 10
	MEAN	1381 ± 165	-	-	-	-

TABLE C-VIII.3 CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	K-40	Cs-134	Cs-137	Ba-140	La-140
G2-1	01/05/10	1140 ± 111	< 5	< 5	< 46	< 13
	02/03/10	1330 ± 169	< 7	< 8	< 29	< 8
	03/03/10	1190 ± 117	< 13	< 8	< 41	< 11
	03/17/10	1080 ± 126	< 6	< 6	< 48	< 14
	03/31/10	1080 ± 123	< 6	< 6	< 28	< 9
	04/14/10	1040 ± 76	< 3	< 4	< 35	< 11
	04/28/10	1360 ± 120	< 4	< 5	< 34	< 10
	05/12/10	1040 ± 102	< 4	< 5	< 22	< 8
	05/26/10	1210 ± 40	< 1	< 2	< 19	< 6
	06/09/10	973 ± 116	< 5	< 5	< 48	< 14
	06/23/10	1160 ± 168	< 6	< 7	< 34	< 13
	07/07/10	688 ± 124	< 6	< 7	< 31	< 9
	07/21/10	892 ± 139	< 6	< 8	< 33	< 10
	08/04/10	1000 ± 136	< 7	< 7	< 45	< 14
	08/18/10	1190 ± 95	< 9	< 6	< 39	< 13
	09/01/10	833 ± 94	< 4	< 5	< 33	< 9
	09/15/10	776 ± 140	< 8	< 9	< 38	< 10
	09/29/10	990 ± 179	< 8	< 9	< 47	< 12
	10/13/10	1220 ± 129	< 4	< 6	< 30	< 7
	10/27/10	726 ± 128	< 6	< 7	< 31	< 14
	11/10/10	1260 ± 124	< 4	< 6	< 21	< 6
	11/23/10	786 ± 125	< 6	< 7	< 36	< 9
	12/08/10	1130 ± 151	< 6	< 7	< 36	< 11
	MEAN	1048 ± 383	-	-	-	-
K15-3	01/05/10	1330 ± 120	< 4	< 6	< 48	< 9
	02/03/10	1310 ± 134	< 5	< 6	< 22	< 7
	03/03/10	1280 ± 130	< 5	< 6	< 29	< 9
	03/17/10	1300 ± 125	< 5	< 6	< 38	< 11
	03/31/10	1220 ± 164	< 8	< 9	< 42	< 7
	04/14/10	1290 ± 85	< 3	< 4	< 34	< 11
	04/28/10	1300 ± 123	< 5	< 5	< 31	< 10
	05/12/10	1240 ± 115	< 5	< 6	< 29	< 7
	05/26/10	1320 ± 41	< 1	< 2	< 19	< 5
	06/09/10	1400 ± 127	< 5	< 6	< 48	< 14
	06/23/10	1330 ± 159	< 6	< 6	< 32	< 9
	07/07/10	1180 ± 171	< 6	< 8	< 34	< 11
	07/21/10	1540 ± 50	< 2	< 2	< 22	< 6
	08/04/10	1220 ± 148	< 5	< 6	< 37	< 13
	08/18/10	1190 ± 107	< 5	< 5	< 36	< 14
	09/01/10	1330 ± 137	< 5	< 6	< 38	< 8
	09/15/10	1280 ± 128	< 5	< 6	< 31	< 8
	09/29/10	1290 ± 180	< 7	< 8	< 32	< 13
	10/13/10	1280 ± 118	< 3	< 3	< 14	< 5
	10/27/10	1260 ± 161	< 5	< 8	< 31	< 9
	11/10/10	1350 ± 138	< 6	< 6	< 33	< 9
	11/23/10	1150 ± 136	< 5	< 7	< 35	< 11
	12/08/10	1270 ± 119	< 4	< 5	< 27	< 7
	MEAN	1290 ± 160	-	-	-	-

TABLE C-VIII.3 CONCENTRATIONS OF GAMMA EMITTERS IN MILK SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	K-40	Cs-134	Cs-137	Ba-140	La-140
P4-1	01/05/10	1350 ± 119	< 4	< 5	< 52	< 12
	02/03/10	1370 ± 179	< 7	< 7	< 32	< 10
	03/03/10	1330 ± 143	< 5	< 6	< 30	< 10
	03/17/10	1510 ± 113	< 4	< 4	< 26	< 8
	03/31/10	1500 ± 144	< 7	< 8	< 39	< 9
	04/14/10	1420 ± 84	< 3	< 4	< 32	< 11
	04/28/10	1270 ± 103	< 4	< 4	< 26	< 8
	05/12/10	1460 ± 120	< 5	< 5	< 27	< 7
	05/26/10	1380 ± 33	< 1	< 1	< 15	< 4
	06/09/10	1400 ± 137	< 5	< 6	< 54	< 14
	06/23/10	1360 ± 175	< 5	< 8	< 35	< 10
	07/07/10	1460 ± 208	< 8	< 10	< 32	< 13
	07/21/10	1260 ± 106	< 4	< 5	< 19	< 5
	08/04/10	1290 ± 152	< 6	< 6	< 37	< 13
	08/18/10	1300 ± 116	< 5	< 5	< 41	< 14
	09/01/10	1310 ± 101	< 3	< 4	< 20	< 8
	09/15/10	1380 ± 185	< 8	< 8	< 41	< 8
	09/29/10	1310 ± 197	< 7	< 9	< 34	< 8
	10/13/10	1440 ± 156	< 6	< 7	< 33	< 9
	10/27/10	1250 ± 128	< 4	< 5	< 23	< 8
	11/10/10	1550 ± 167	< 5	< 7	< 30	< 10
	11/23/10	1600 ± 146	< 5	< 6	< 27	< 7
	12/08/10	1310 ± 162	< 7	< 7	< 30	< 6
	MEAN	1383 ± 192	-	-	-	-

TABLE C-IX.1 **CONCENTRATIONS OF STRONTIUM AND GAMMA EMITTERS IN FOOD PRODUCT SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010**

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

STC	COLLECTION PERIOD		SR-90	Be-7	K-40	I-131	Cs-134	Cs-137
B10-2	06/30/10	Cabbage	< 2	< 164	3690 ± 413	< 35	< 16	< 20
	06/30/10	Yellow Squash Leaves	< 4	< 218	5210 ± 596	< 42	< 18	< 20
	06/30/10	Zucchini Leaves	10 ± 2	286 ± 158	4860 ± 474	< 34	< 18	< 22
	07/20/10	Cabbage	< 2	< 126	1700 ± 229	< 22	< 13	< 13
	07/20/10	Red Beets	-	< 225	4000 ± 530	< 44	< 23	< 26
	07/28/10	Cabbage	< 3	< 42	2430 ± 109	< 28	< 4	< 4
	07/28/10	Pumpkin Leaves	11 ± 3	962 ± 80	5630 ± 168	< 41	< 6	< 7
	07/28/10	Zucchini Leaves	37 ± 4	559 ± 65	4440 ± 152	< 49	< 6	< 7
	08/11/10	Tomatoes	-	< 36	1850 ± 92	< 20	< 4	< 4
	08/17/10	Sweet Corn	-	< 95	2680 ± 262	< 34	< 11	< 13
	08/25/10	Sweet Corn Leaves	< 2	2460 ± 138	4630 ± 208	< 49	< 4	< 5
	08/25/10	Yellow Squash Leaves	16 ± 2	1300 ± 117	4680 ± 206	< 54	< 5	< 6
	08/25/10	Zucchini Leaves	5 ± 2	794 ± 93	3500 ± 167	< 49	< 5	< 5
	09/22/10	Squash Leaves	35 ± 4	2220 ± 51	4300 ± 84	< 25	< 3	< 3
	09/22/10	Sunflower Leaves	20 ± 3	169 ± 43	8630 ± 151	< 36	< 4	< 5
	09/22/10	Turnip Greens	13 ± 3	1730 ± 69	5910 ± 122	< 56	< 9	< 7
	MEAN		18 ± 23	1164 ± 1649	4259 ± 3444	-	-	-
E1-2	07/20/10	Cabbage	< 4	525 ± 220	2430 ± 337	< 32	< 19	< 18
	07/20/10	Radishes	-	< 271	5640 ± 636	< 56	< 33	< 39
	08/11/10	Tomatoes	-	< 48	1900 ± 118	< 24	< 5	< 5
	MEAN		-	-	3323 ± 4047	-	-	-

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

TABLE C-IX.1 **CONCENTRATIONS OF STRONTIUM AND GAMMA EMITTERS IN FOOD PRODUCT SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010**

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

STC	COLLECTION PERIOD		SR-90	Be-7	K-40	I-131	Cs-134	Cs-137
H1-2	06/30/10	Watermelon Leaves	< 2	252 ± 153	5160 ± 527	< 42	< 21	< 25
	06/30/10	Yellow Squash Leaves	< 2	195 ± 177	5030 ± 517	< 39	< 19	< 20
	06/30/10	Zucchini Leaves	< 2	276 ± 136	4470 ± 416	< 32	< 15	< 16
	07/28/10	Pumpkin Leaves	15 ± 3	480 ± 110	5170 ± 173	< 44	< 7	< 8
	07/28/10	Yellow Squash Leaves	< 4	1910 ± 120	4750 ± 184	< 46	< 7	< 8
	07/28/10	Zucchini Leaves	14 ± 3	939 ± 109	3970 ± 186	< 53	< 8	< 9
	08/17/10	Field Corn		< 137	1380 ± 398	< 49	< 13	< 18
	08/25/10	Pumpkin Leaves	11 ± 2	1800 ± 119	4330 ± 180	< 50	< 5	< 5
	08/25/10	Yellow Squash Leaves	< 4	1300 ± 170	3770 ± 218	< 47	< 4	< 5
	08/25/10	Zucchini Leaves	3 ± 2	454 ± 104	4600 ± 166	< 55	< 5	< 5
	09/22/10	Pumpkin Leaves	16 ± 2	895 ± 58	4990 ± 133	< 43	< 5	< 6
	09/22/10	Squash Leaves	5 ± 2	940 ± 53	2260 ± 91	< 32	< 4	< 4
	09/22/10	Zucchini Leaves	< 4	1050 ± 50	3440 ± 94	< 29	< 3	< 4
	MEAN		11 ± 11	874 ± 1158	4328 ± 1717	-	-	-

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

TABLE C-IX.1 **CONCENTRATIONS OF STRONTIUM AND GAMMA EMITTERS IN FOOD PRODUCT SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010**

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

STC	COLLECTION PERIOD	SR-90	Be-7	K-40	I-131	Cs-134	Cs-137

TABLE C-X.1 QUARTERLY TLD RESULTS FOR THREE MILE ISLAND NUCLEAR STATION, 2010

RESULTS IN UNITS OF MILLI-ROENTGEN/STD. MONTH

STATION CODE	MEAN ± 2 S.D.	JAN - MAR	APR - JUN	JUL - SEP	OCT - DEC	
A1-4	4.8 ± 0.9	4.9 ± 0.6	5.0 ± 0.5	5.0 ± 0.5	4.1 ± 0.5	
A3-1	5.0 ± 1.1	4.9 ± 0.4	5.6 ± 0.4	5.3 ± 0.8	4.3 ± 0.2	
A5-1	5.7 ± 0.8	5.4 ± 0.4	6.1 ± 0.6	5.9 ± 0.3	5.2 ± 0.4	
A9-3	4.7 ± 1.1	4.3 ± 0.5	5.4 ± 0.4	4.9 ± 0.5	4.3 ± 0.3	
B1-1	4.6 ± 0.8	4.2 ± 0.2	5.1 ± 0.3	4.6 ± 0.4	4.4 ± 0.6	
B1-2	4.8 ± 1.3	4.6 ± 1.0	5.7 ± 0.6	4.6 ± 0.5	4.2 ± 0.6	
B2-1	4.8 ± 0.8	4.7 ± 0.7	5.2 ± 0.4	4.9 ± 0.9	4.3 ± 0.4	
B5-1	5.5 ± 1.1	5.1 ± 0.7	6.0 ± 0.6	5.8 ± 0.4	4.9 ± 0.4	
C1-1	5.2 ± 0.7	5.0 ± 0.4	5.6 ± 0.2	5.4 ± 1.2	4.8 ± 0.5	
C1-2	4.5 ± 0.5	4.6 ± 0.6	4.8 ± 0.3	4.5 ± 0.4	4.2 ± 0.5	
C2-1	5.2 ± 0.8	4.8 ± 0.5	5.7 ± 0.5	5.2 ± 1.0	4.9 ± 0.7	
C5-1	5.6 ± 0.7	5.6 ± 0.5	6.0 ± 0.4	5.6 ± 0.4	5.2 ± 0.8	
C8-1	5.6 ± 0.6	5.4 ± 0.2	6.1 ± 0.8	5.5 ± 0.1	5.5 ± 0.4	
D1-1	4.8 ± 1.3	4.7 ± 0.4	5.4 ± 0.6	5.0 ± 0.7	3.9 ± 0.2	
D1-2	4.9 ± 0.8	4.7 ± 0.6	5.4 ± 0.8	5.1 ± 0.7	4.5 ± 0.6	
D2-2	6.2 ± 0.3	6.3 ± 0.6	6.3 ± 0.5	6.1 ± 1.1	6.0 ± 1.2	
D6-1	6.4 ± 2.1	5.6 ± 0.5	7.8 ± 3.3	6.6 ± 0.5	5.6 ± 0.4	
E1-2	4.8 ± 0.8	5.0 ± 0.6	5.1 ± 0.3	4.8 ± 0.5	4.2 ± 0.4	
E1-4	5.2 ± 1.6	5.5 ± 0.6	6.2 ± 1.5	4.7 ± 0.5	4.5 ± 0.3	
E2-3	5.7 ± 0.6	5.7 ± 0.9	6.1 ± 0.4	5.7 ± 0.5	5.4 ± 0.9	
E5-1	5.3 ± 0.8	4.9 ± 0.7	5.8 ± 0.7	5.4 ± 0.6	5.0 ± 0.8	
E7-1	5.4 ± 0.8	5.4 ± 0.5	5.9 ± 0.3	5.4 ± 0.8	4.9 ± 0.3	
F1-1	5.2 ± 1.1	4.9 ± 0.2	5.8 ± 0.2	5.4 ± 1.1	4.6 ± 0.4	
F1-2	5.8 ± 1.6	6.6 ± 0.8	6.2 ± 0.4	5.4 ± 1.2	4.8 ± 0.6	
F1-4	5.4 ± 0.9	5.6 ± 0.5	5.8 ± 0.4	5.5 ± 0.6	4.8 ± 0.5	
F2-1	6.0 ± 1.3	5.5 ± 0.3	6.8 ± 0.6	6.3 ± 1.1	5.5 ± 0.8	
F5-1	6.0 ± 1.0	5.7 ± 0.3	6.7 ± 0.3	6.0 ± 0.7	5.6 ± 0.6	
G1-2	5.4 ± 1.3	4.7 ± 0.2	6.1 ± 0.8	5.7 ± 1.1	5.0 ± 0.4	
G1-3	5.0 ± 1.0	5.1 ± 1.3	5.7 ± 1.0	4.6 ± 0.6	4.6 ± 0.2	
G1-5	4.7 ± 1.5	4.3 ± 0.7	5.7 ± 1.1	4.8 ± 0.7	4.0 ± 0.6	
G1-6	4.9 ± 0.8	5.0 ± 0.9	5.4 ± 0.4	4.9 ± 0.3	4.4 ± 0.5	
G2-4	6.3 ± 0.8	5.9 ± 0.3	6.8 ± 0.5	6.3 ± 0.6	6.0 ± 0.7	
G5-1	5.2 ± 1.0	5.1 ± 0.6	5.8 ± 0.3	5.4 ± 0.7	4.6 ± 0.5	
H1-1	5.0 ± 0.9	4.5 ± 0.7	5.6 ± 1.0	5.0 ± 0.9	5.0 ± 0.4	
H3-1	4.2 ± 1.2	3.7 ± 0.4	5.0 ± 0.5	4.1 ± 0.4	3.8 ± 0.3	
H5-1	4.2 ± 1.1	3.8 ± 0.9	4.9 ± 1.1	4.3 ± 0.6	3.7 ± 0.5	
H8-1	7.9 ± 0.8	7.6 ± 0.6	8.4 ± 0.9	8.1 ± 1.2	7.6 ± 0.6	
J1-1	4.7 ± 1.4	4.3 ± 0.2	5.7 ± 0.9	4.8 ± 0.6	4.1 ± 0.2	
J1-3	4.2 ± 1.1	3.8 ± 0.5	5.0 ± 0.8	4.1 ± 0.6	3.8 ± 0.4	
J3-1	5.2 ± 1.0	4.6 ± 0.6	5.7 ± 0.8	5.5 ± 0.9	4.9 ± 0.7	
J5-1	5.7 ± 1.2	5.3 ± 0.3	6.4 ± 1.2	6.1 ± 0.7	5.1 ± 0.3	
J7-1	5.8 ± 1.3	5.0 ± 0.3	6.5 ± 0.6	6.2 ± 1.1	5.6 ± 0.4	
K1-4	4.8 ± 1.8	4.0 ± 0.7	6.0 ± 2.3	4.8 ± 0.6	4.3 ± 0.6	
K2-1	6.1 ± 1.1	5.5 ± 0.3	6.6 ± 0.3	6.1 ± 0.7		(1)
K3-1	4.6 ± 0.9	4.1 ± 0.2	5.1 ± 0.4	4.8 ± 0.7	4.3 ± 0.8	
K5-1	5.7 ± 1.6	5.1 ± 0.4	6.4 ± 0.4	6.4 ± 0.5	4.9 ± 0.5	

(1) SE PROGRAM EXCPETIONS SECTION FOR EXPLANATION

TABLE C-X.1 QUARTERLY TLD RESULTS FOR THREE MILE ISLAND NUCLEAR STATION, 2010

RESULTS IN UNITS OF MILLI-ROENTGEN/STD. MONTH

STATION CODE	MEAN ± 2 S.D.	JAN - MAR	APR - JUN	JUL - SEP	OCT - DEC	
K8-1	5.3 ± 1.1	5.1 ± 0.9	6.0 ± 0.9	5.4 ± 0.9	4.7 ± 0.3	
L1-1	4.8 ± 1.8	4.1 ± 0.6	6.0 ± 1.4	5.1 ± 0.7	4.1 ± 0.5	
L1-2	4.5 ± 0.8	4.4 ± 0.5	5.0 ± 0.6	4.1 ± 0.4	4.4 ± 0.5	
L2-1	5.0 ± 1.4	4.6 ± 0.8	6.0 ± 0.8	5.1 ± 0.8	4.4 ± 0.5	
L5-1	4.8 ± 1.2	4.5 ± 1.5	5.6 ± 0.3	4.7 ± 0.3	4.2 ± 0.3	
L8-1	5.3 ± 1.3	4.9 ± 0.4	5.7 ± 0.4	5.9 ± 0.7	4.5 ± 0.5	
M1-1	4.5 ± 1.1	4.6 ± 0.8	5.2 ± 0.7	4.2 ± 1.0	3.9 ± 0.6	
M1-2	5.5 ± 0.6	5.7 ± 0.8	5.7 ± 0.4	5.2 ± 0.4		(1)
M2-1	4.5 ± 1.3	4.1 ± 0.1	5.4 ± 1.8	4.6 ± 0.4	3.9 ± 0.4	
M5-1	5.1 ± 0.9	4.9 ± 0.9	5.7 ± 1.0	5.1 ± 0.7	4.7 ± 0.5	
M9-1	6.3 ± 1.6	5.7 ± 0.5	7.4 ± 0.8	6.2 ± 0.3	5.7 ± 0.8	
N1-1	5.4 ± 1.1	5.3 ± 0.7	6.0 ± 0.7	4.9 ± 0.4		(1)
N1-3	4.8 ± 1.2	5.1 ± 0.8	5.2 ± 0.9	4.8 ± 0.5	3.9 ± 0.6	
N2-1	5.1 ± 1.6	4.7 ± 0.6	5.8 ± 0.8	5.8 ± 1.0	4.2 ± 0.8	
N5-1	4.4 ± 1.0	4.4 ± 0.5	4.8 ± 0.8	4.6 ± 0.5	3.7 ± 0.2	
N8-1	5.5 ± 0.9	5.5 ± 0.6	5.9 ± 0.6	5.6 ± 0.9	4.8 ± 0.5	
P1-1	5.5 ± 1.2	6.1 ± 0.4	5.5 ± 0.3	4.9 ± 0.3		(1)
P1-2	4.9 ± 1.8	5.9 ± 0.4	5.4 ± 0.5	4.5 ± 0.6	3.9 ± 0.4	
P2-1	5.9 ± 1.5	5.4 ± 0.9	6.7 ± 0.5	6.4 ± 1.1	5.1 ± 0.9	
P5-1	5.1 ± 1.1	4.9 ± 0.6	5.9 ± 0.6	5.0 ± 0.5	4.6 ± 0.3	
P8-1	4.1 ± 1.0	3.9 ± 0.5	4.9 ± 0.1	3.9 ± 0.5	3.8 ± 0.3	
Q1-1	5.0 ± 1.4	4.6 ± 0.9	5.8 ± 0.5	4.5 ± 0.3		(1)
Q1-2	4.0 ± 1.3	4.1 ± 0.3	4.9 ± 0.3	3.4 ± 0.6	3.6 ± 0.5	
Q2-1	4.3 ± 1.0	3.9 ± 0.4	5.0 ± 0.4	4.3 ± 0.7	4.0 ± 0.5	
Q5-1	5.0 ± 2.0	4.7 ± 0.4	6.5 ± 1.1	4.4 ± 0.7	4.4 ± 0.5	
Q9-1	5.0 ± 2.0	4.5 ± 0.6	6.5 ± 0.4	4.7 ± 0.5	4.3 ± 0.5	
R1-1	4.2 ± 1.5	4.1 ± 0.5	5.3 ± 0.8	3.6 ± 0.4	3.8 ± 0.3	
R1-2	4.9 ± 1.8	4.8 ± 0.7	5.9 ± 0.8	4.1 ± 0.4		(1)
R3-1	5.6 ± 1.4	5.0 ± 0.5	6.6 ± 1.7	5.2 ± 0.6	5.5 ± 0.7	
R5-1	5.5 ± 1.6	4.8 ± 0.3	6.6 ± 0.5	5.5 ± 0.7	5.0 ± 0.5	
R9-1	5.4 ± 1.6	5.1 ± 0.7	6.6 ± 0.3	5.0 ± 0.4	4.9 ± 0.5	
B10-1	5.2 ± 0.9	5.0 ± 1.2	5.7 ± 0.3	5.3 ± 0.8	4.7 ± 0.6	
D15-1	5.2 ± 0.9	5.1 ± 0.4	5.8 ± 0.4	5.0 ± 0.6	4.7 ± 0.6	
F10-1	6.5 ± 0.8	6.5 ± 0.6	7.0 ± 1.2	6.4 ± 1.0	6.0 ± 0.7	
F25-1	6.0 ± 1.4	6.0 ± 0.4	6.9 ± 1.1	5.6 ± 0.6	5.3 ± 0.4	
G10-1	7.1 ± 1.1	6.5 ± 1.0	7.5 ± 1.2	7.6 ± 0.7	6.8 ± 0.5	
G15-1	6.8 ± 0.8	6.2 ± 0.7	7.1 ± 0.7	7.1 ± 0.9	6.8 ± 0.6	
H15-1	5.7 ± 1.0	5.6 ± 0.5	6.1 ± 0.9	5.9 ± 0.8	5.0 ± 0.7	
J15-1	5.8 ± 0.9	5.2 ± 0.8	6.2 ± 0.3	6.0 ± 0.9	5.6 ± 0.4	
K15-1	5.1 ± 1.4	4.4 ± 0.4	6.0 ± 0.6	5.1 ± 0.5	4.7 ± 0.7	
L15-1	5.3 ± 1.2	4.8 ± 0.9	5.9 ± 0.8	5.7 ± 0.3	4.7 ± 0.4	
N15-2	5.7 ± 1.0	5.5 ± 0.4	6.3 ± 0.6	5.7 ± 0.5	5.1 ± 0.5	
Q15-1	5.6 ± 2.1	5.2 ± 0.3	7.2 ± 1.2	5.2 ± 0.5	4.9 ± 0.7	
R15-1	5.0 ± 1.5	4.6 ± 0.6	6.1 ± 0.4	4.8 ± 0.6	4.4 ± 0.5	

(1) SE PROGRAM EXCPETIONS SECTION FOR EXPLANATION

TABLE C-X.2 MEAN QUARTERLY TLD RESULTS FOR THE SITE BOUNDARY, INDICATOR AND CONTROL LOCATIONS FOR THREE MILE ISLAND NUCLEAR STATION, 2010

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

COLLECTION PERIOD	SITE BOUNDARY ± 2 S.D.	INDICATOR	CONTROL
JAN-MAR	4.8 ± 1.4	5.0 ± 1.4	5.4 ± 1.3
APR-JUN	5.5 ± 0.9	6.0 ± 1.4	6.5 ± 1.2
JUL-SEP	4.7 ± 1.1	5.3 ± 1.5	5.8 ± 1.7
OCT-DEC	4.2 ± 0.8	4.8 ± 1.4	5.3 ± 1.6

TABLE C-X.3 SUMMARY OF THE AMBIENT DOSIMETRY PROGRAM FOR THREE MILE ISLAND NUCLEAR STATION, 2010

RESULTS IN UNITS OF MILLI-ROENTGEN/STD. MONTH

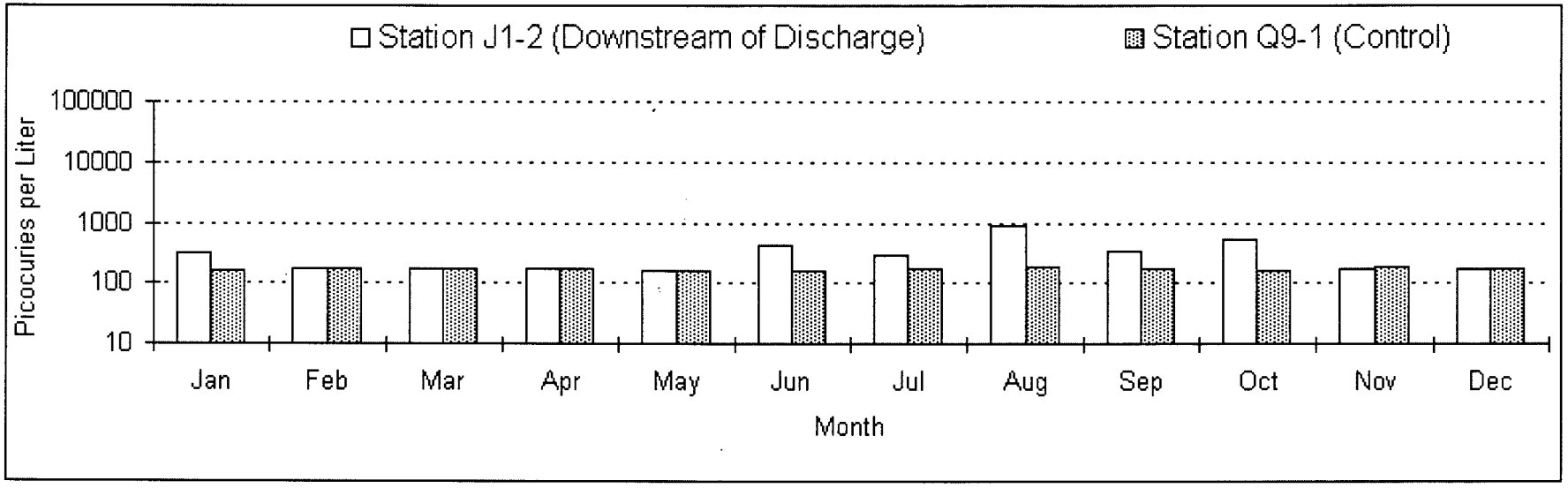
LOCATION	SAMPLES ANALYZED	PERIOD MINIMUM	PERIOD MAXIMUM	PERIOD MEAN ± 2 S.D.	PRE-OP MEAN ± 2 S.D.
SITE BOUNDARY	76	3.4	6.6	4.8 ± 1.4	4.8 ± 1.5
INDICATOR	234	3.7	8.4	5.3 ± 1.7	5.2 ± 1.5
CONTROL	44	4.4	7.6	5.7 ± 1.7	5.8 ± 1.7

SITE BOUNDARY STATIONS - A1-4, B1-2, C1-2, D1-1, E1-4, F1-2, F1-4, G1-3, G1-5, G1-6, H1-1, J1-3, K1-4, L1-1, M1-1, N1-3, P1-2, Q1-2, R1-1

INDICATOR STATIONS - A3-1, A5-1, A9-3, B1-1, B10-1, B2-1, B5-1, C1-1, C2-1, C5-1, C8-1, D1-2, D2-2, D6-1, E1-2, E2-3, E5-1, E7-1, F1-1, F10-1, F2-1, F5-1, G1-2, G2-4, G5-1, H3-1, H5-1, H8-1, J1-1, J3-1, J5-1, J7-1, K2-1, K3-1, K5-1, K8-1, L1-2, L2-1, L5-1, L8-1, M1-2, M2-1, M5-1, M9-1, N1-1, N2-1, N5-1, N8-1, P1-1, P2-1, P5-1, P8-1, Q1-1, Q2-1, Q5-1, Q9-1, R1-2, R3-1, R5-1, R9-1

CONTROL STATIONS - D15-1, F25-1, G10-1, G15-1, H15-1, J15-1, K15-1, L15-1, N15-2, Q15-1, R15-1

FIGURE C-1
Monthly Tritium Concentrations in Surface Water and Effluent Water
Three Mile Island Nuclear Station, 2010



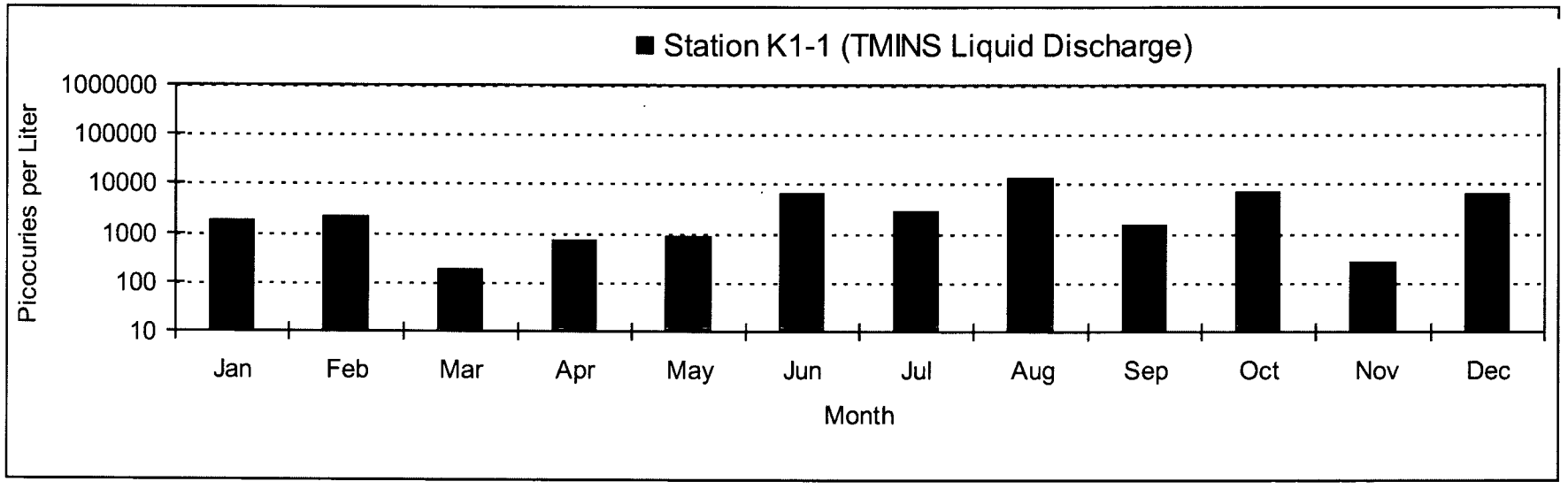


FIGURE C-2
Mean Quarterly Tritium Concentrations in Surface Water
Three Mile Island Nuclear Station, 1974 - 2010

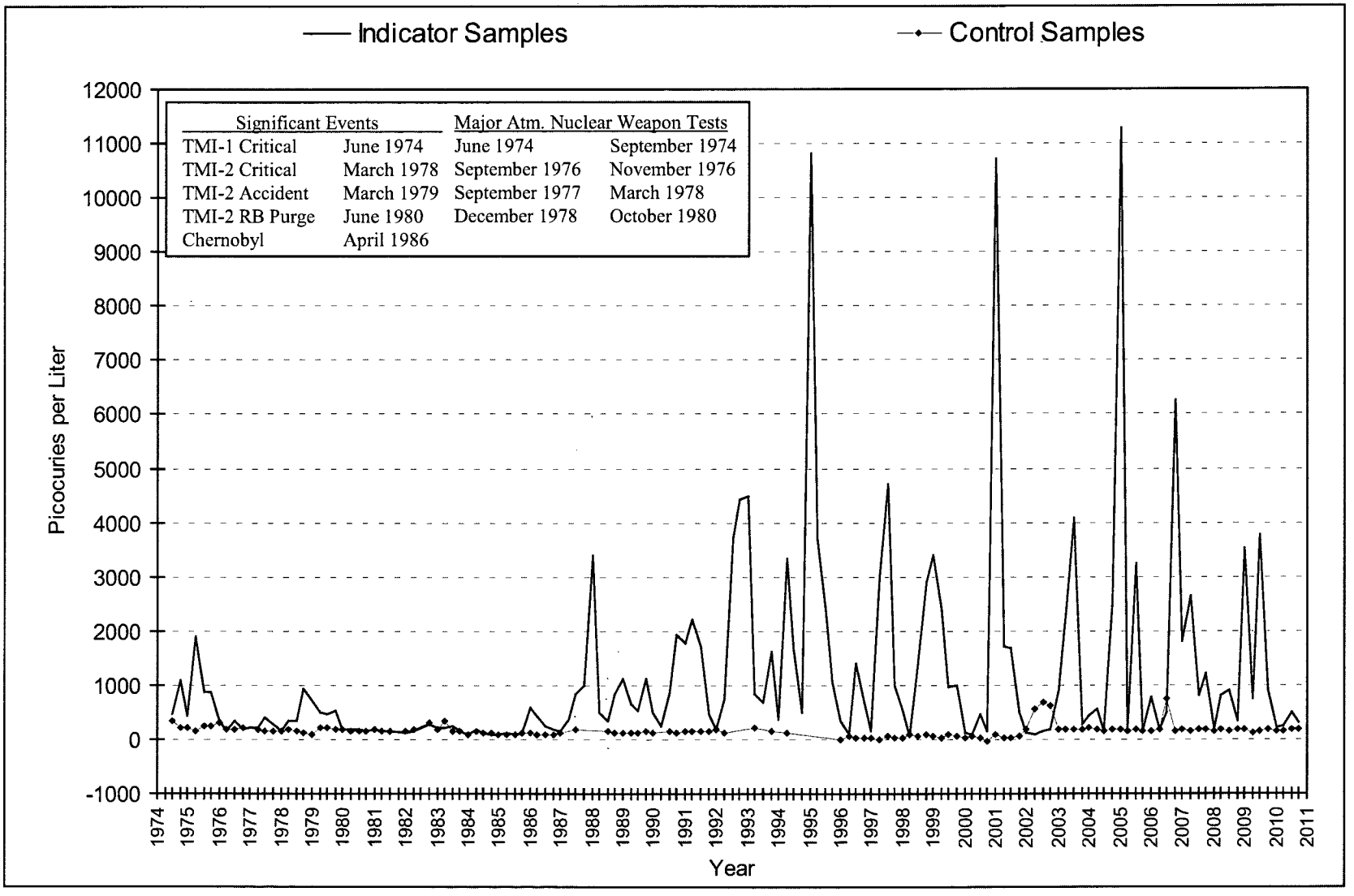


FIGURE C-3
Mean Monthly Gross Beta Concentrations in Drinking Water
Three Mile Island Nuclear Station, 2010

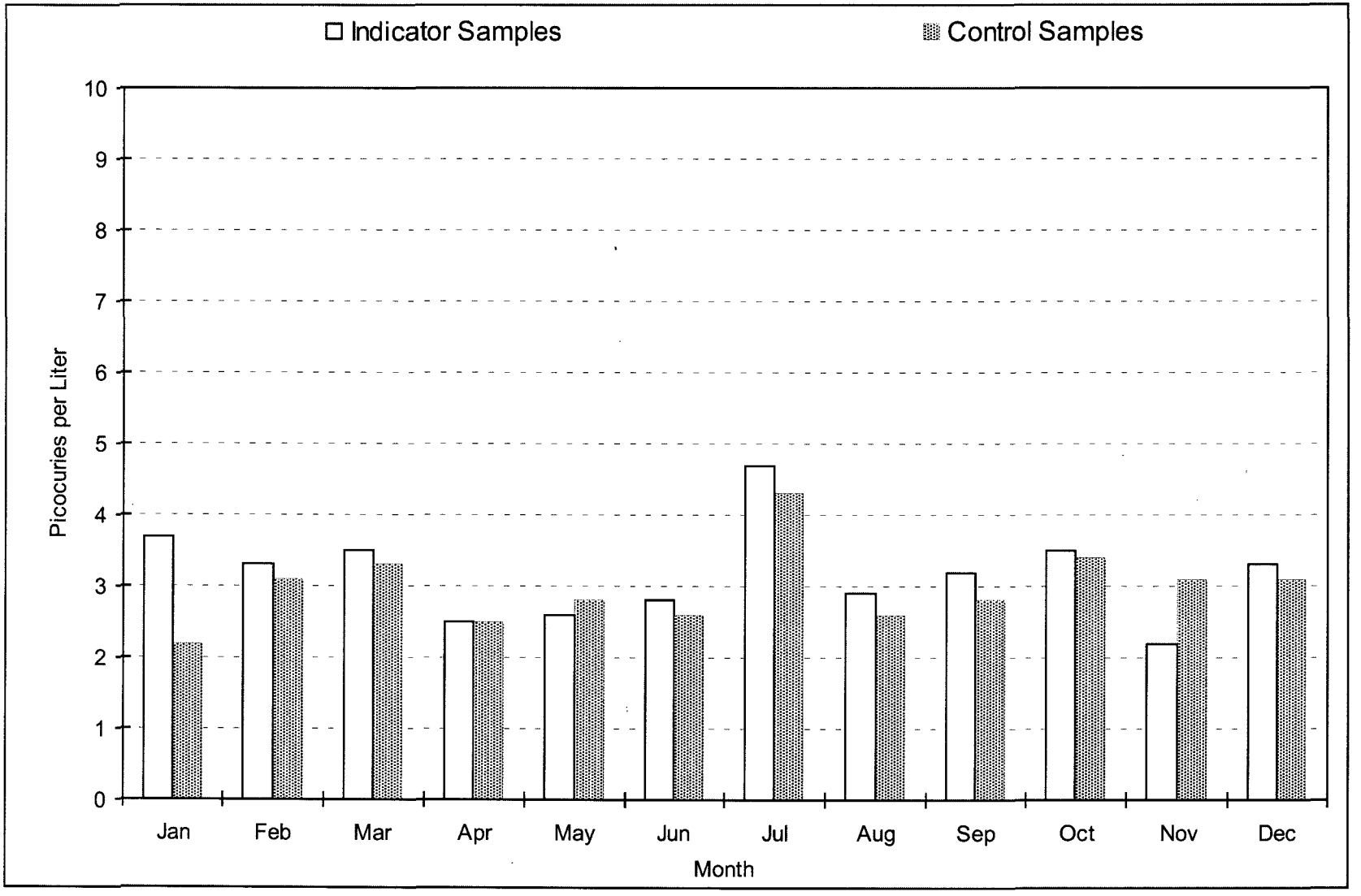
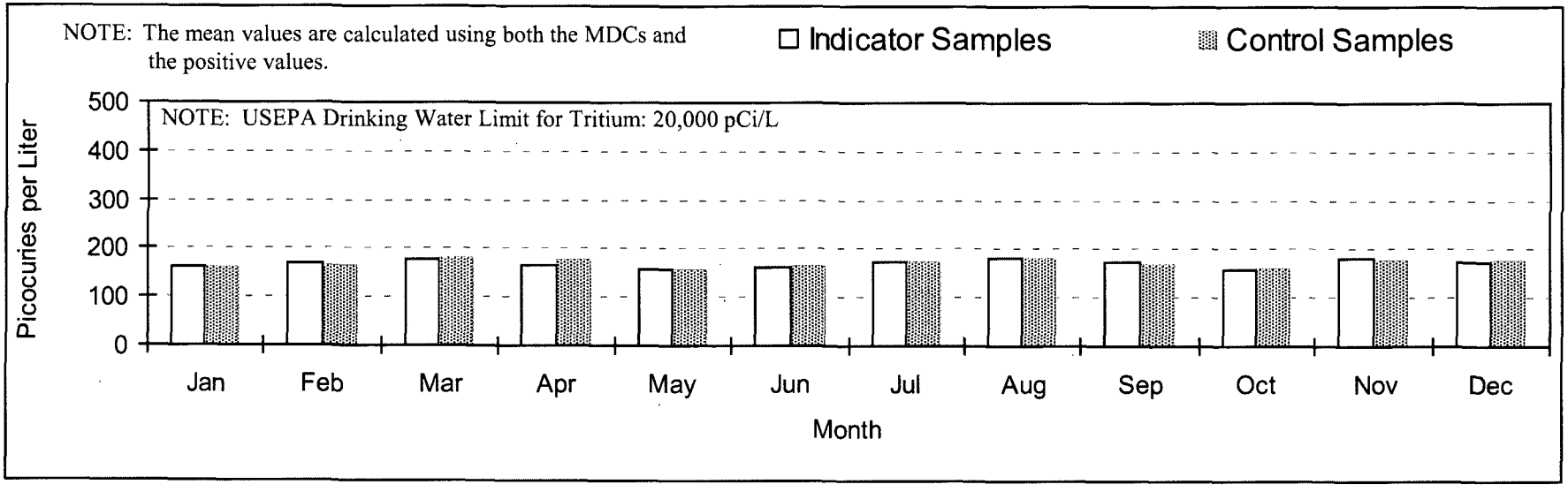


FIGURE C-4
Mean Monthly Tritium Concentrations in Drinking Water and Effluent Water
Three Mile Island Nuclear Station, 2010



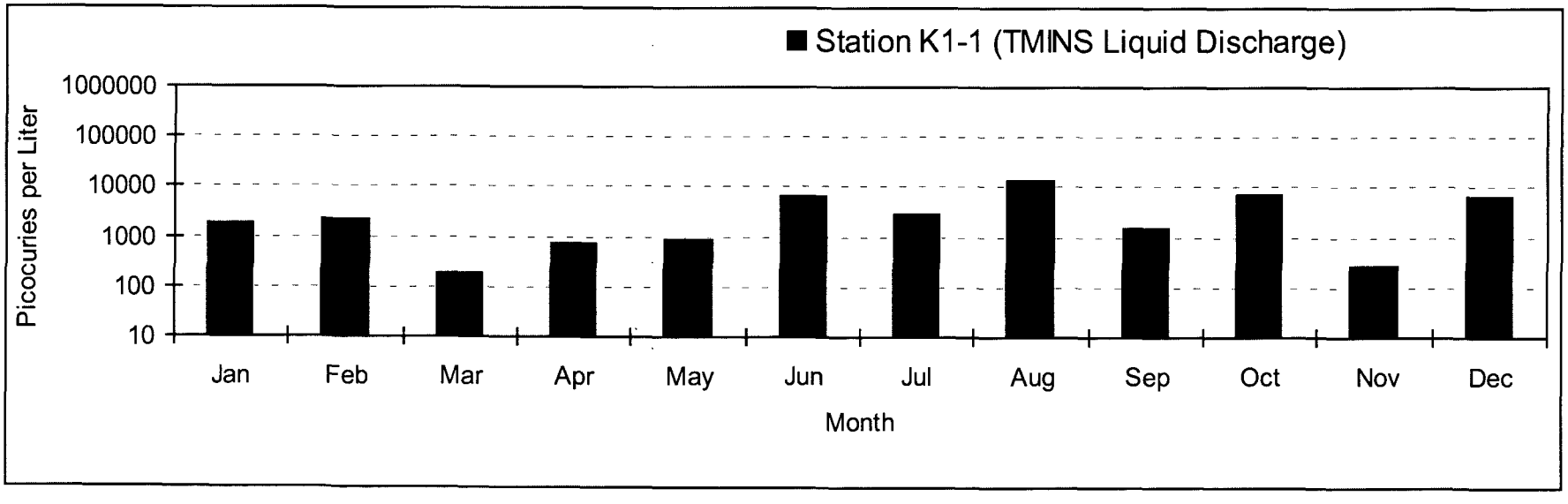


FIGURE C-5
Mean Cesium-137 Concentrations in Aquatic Sediments
Three Mile Island Nuclear Station, 1984 - 2010

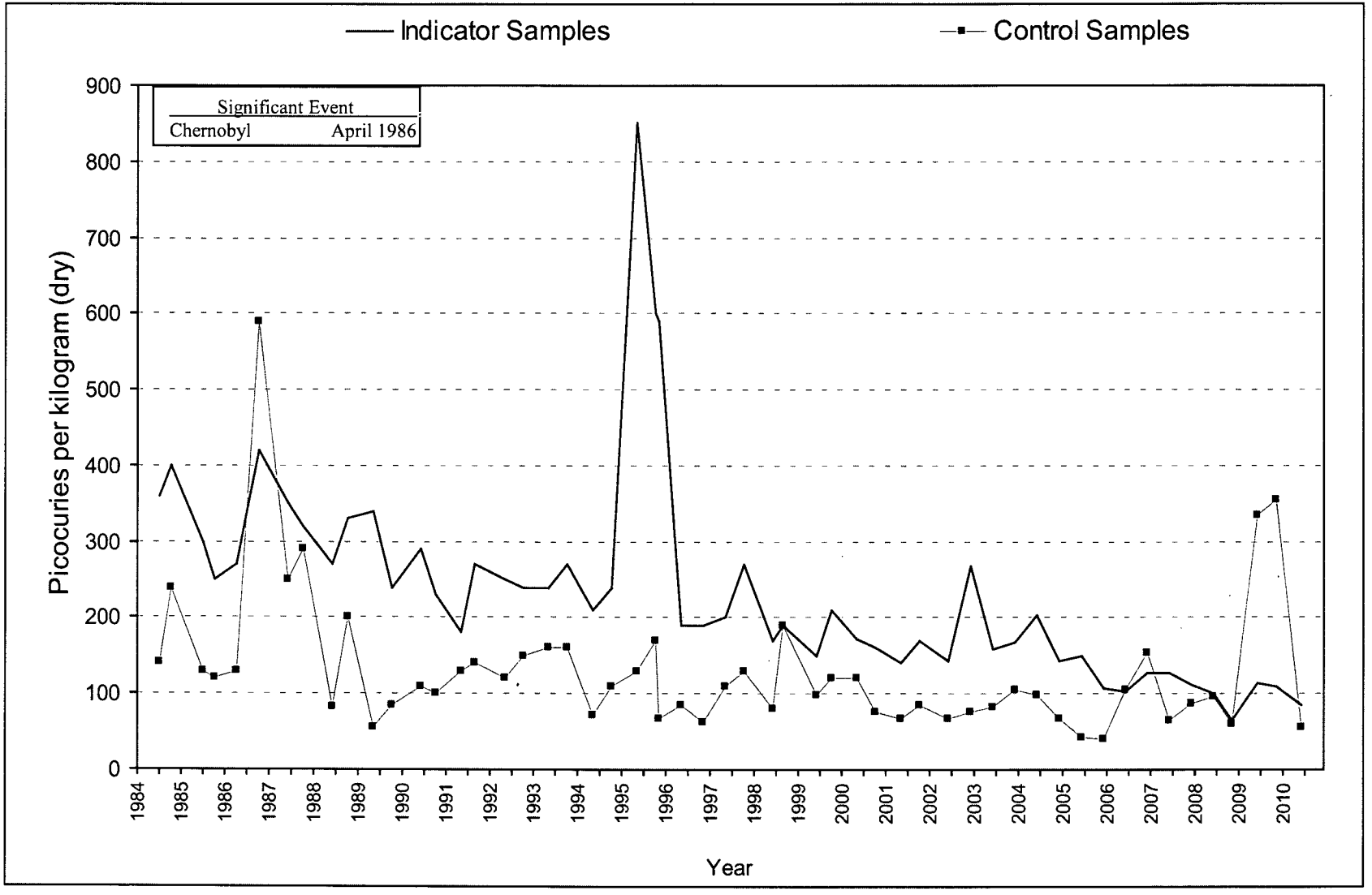


FIGURE C-6
Mean Quarterly Gross Beta Concentrations in Air Particulates
Three Mile Island Nuclear Station, 1972 - 2010

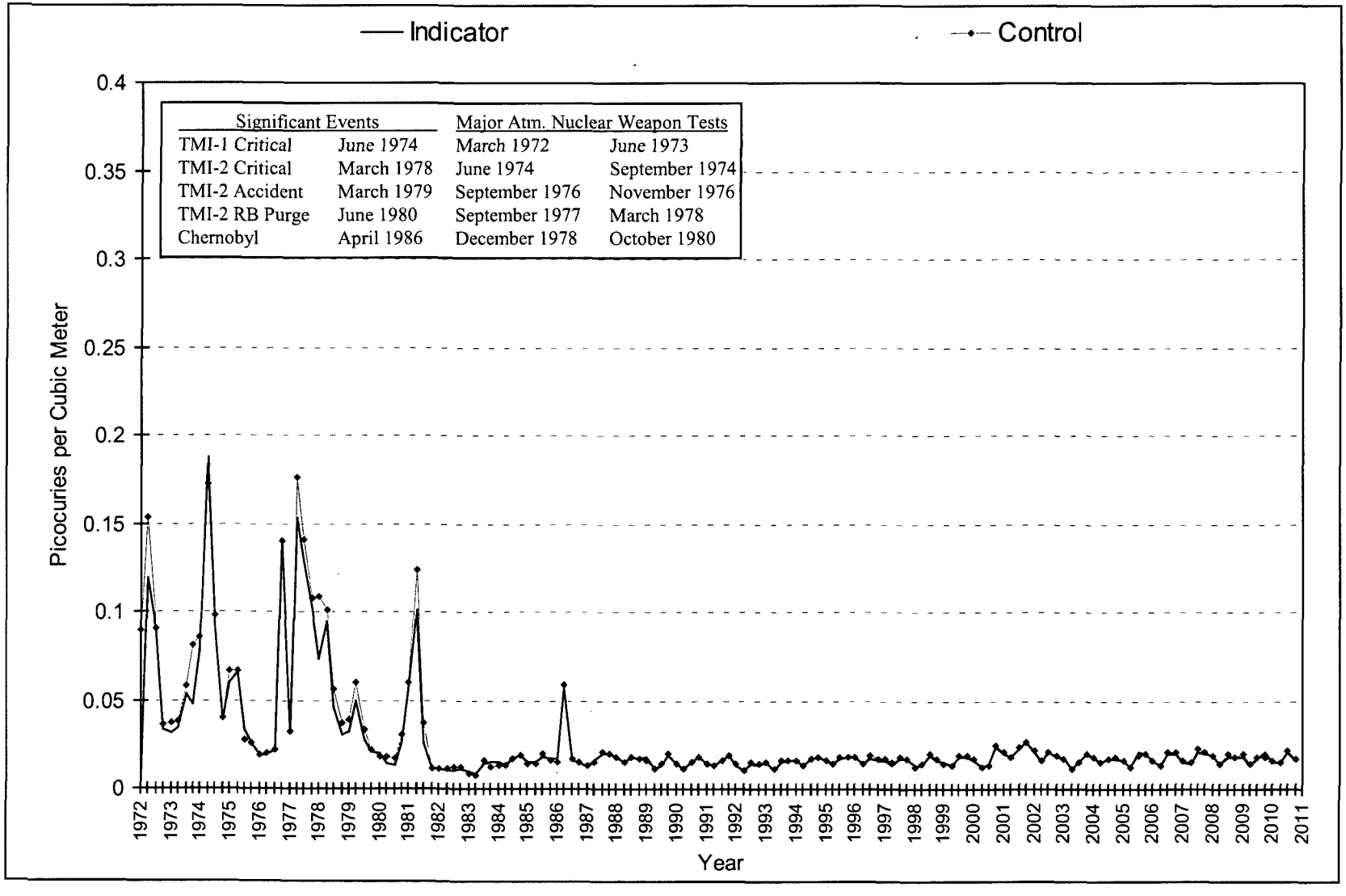
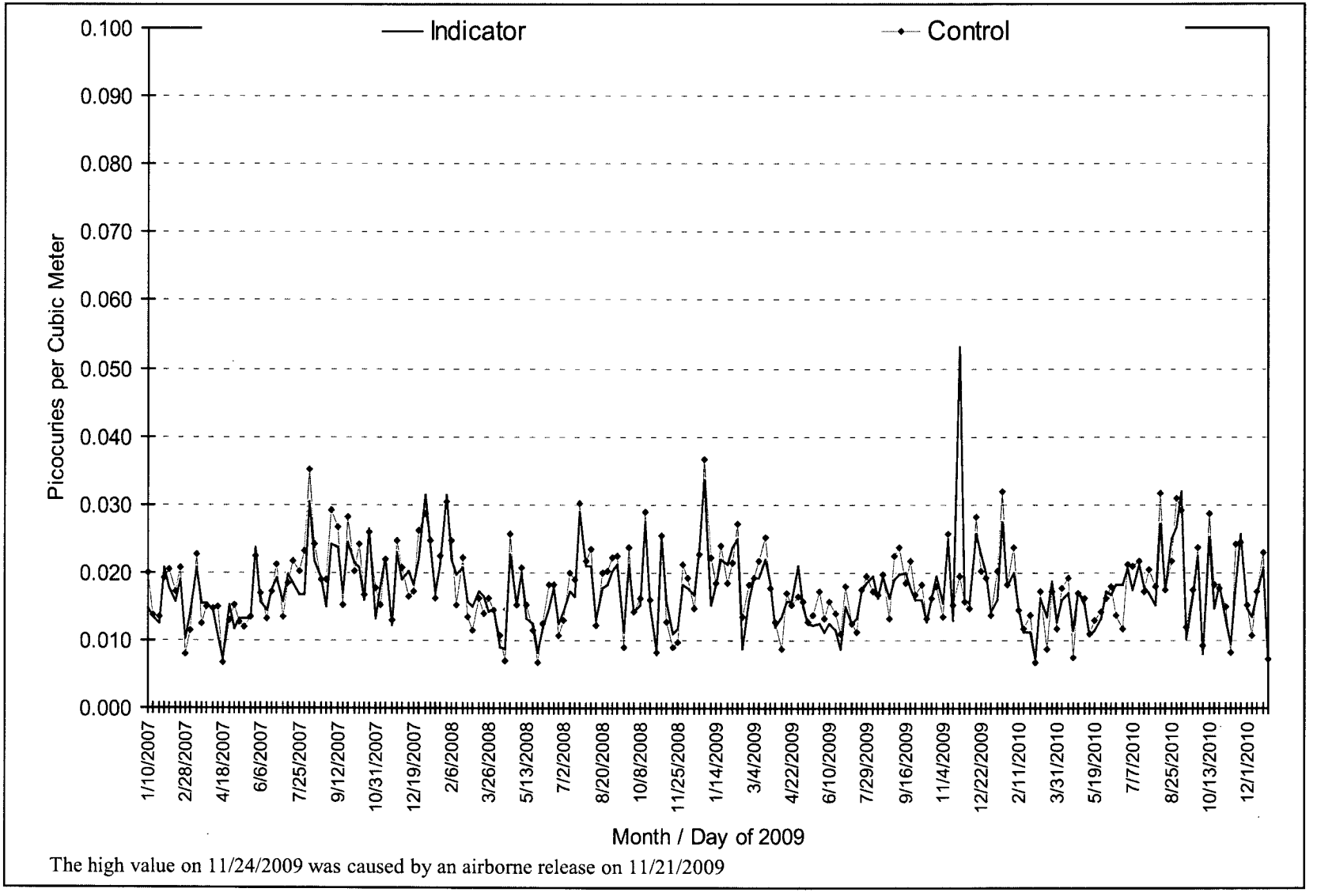


FIGURE C-7
Mean Weekly Gross Beta Concentrations in Air Particulates
Three Mile Island Nuclear Station, 2007 - 2010



The high value on 11/24/2009 was caused by an airborne release on 11/21/2009

FIGURE C-8
Mean Quarterly Strontium-90 Concentrations in Cow Milk
Three Mile Island Nuclear Station, 1979 - 2010

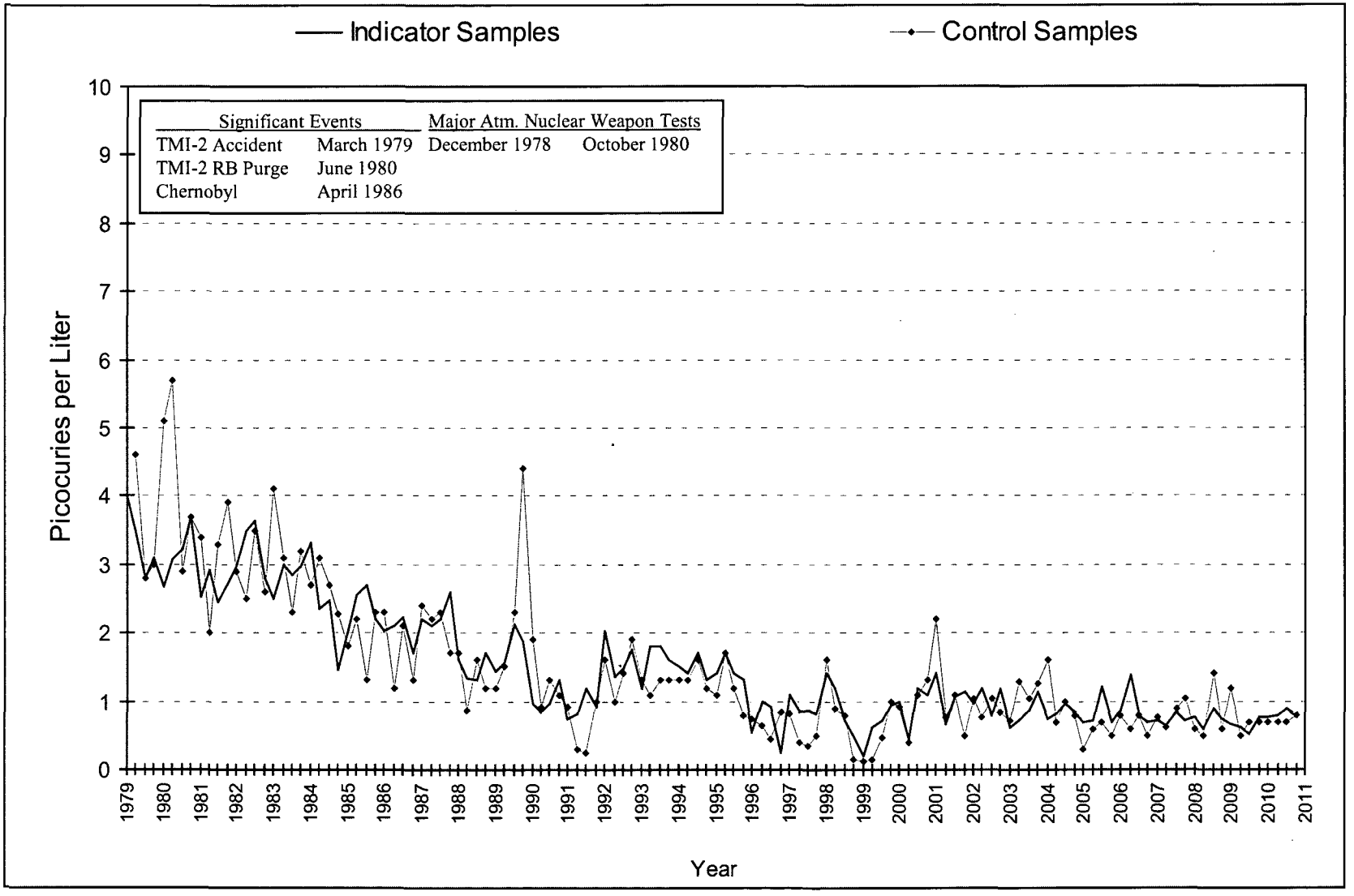
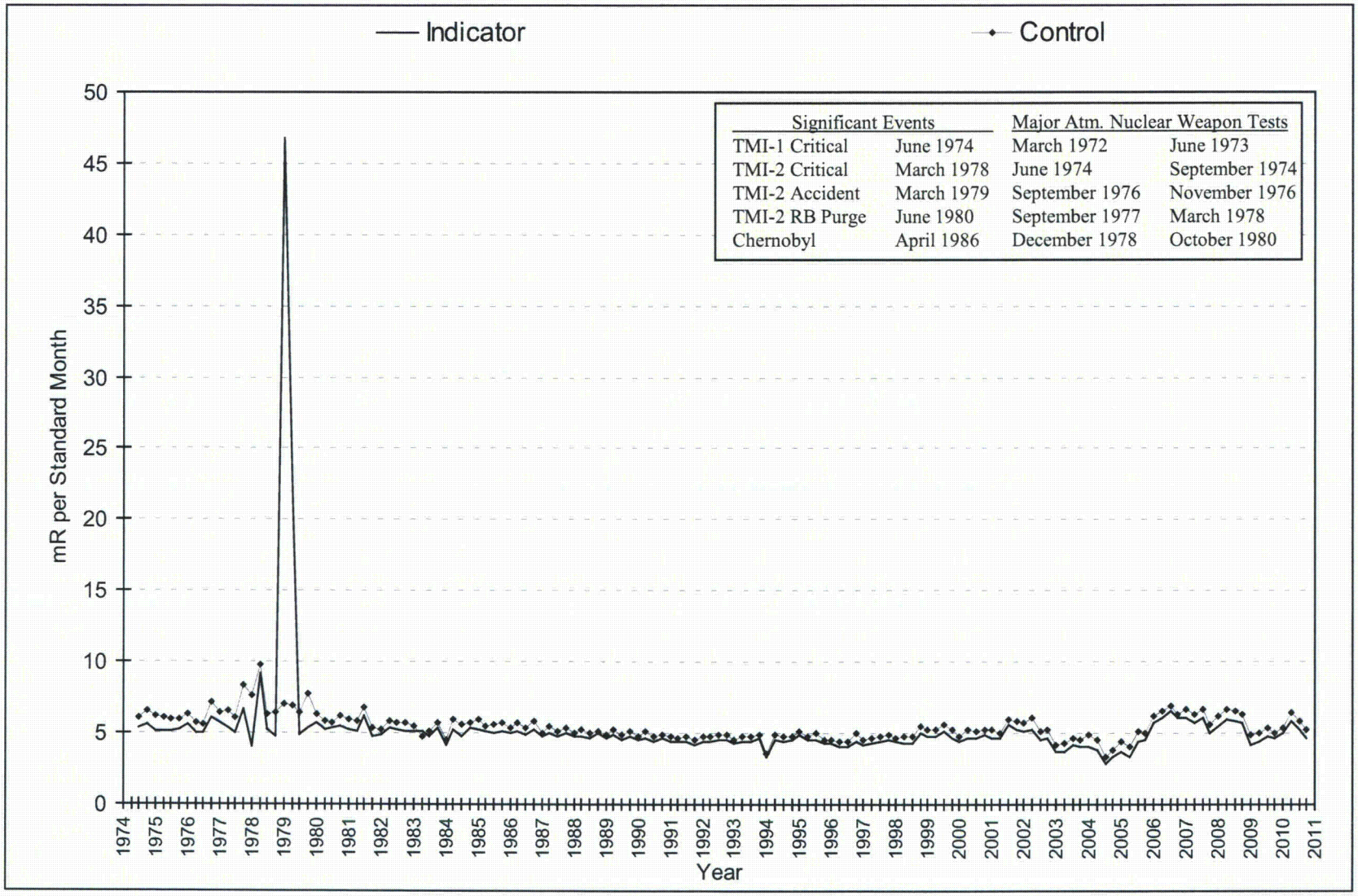


FIGURE C-9
Mean Quarterly Gamma Exposure Rates
Three Mile Island Nuclear Station, 1974 - 2010



Significant Events		Major Atm. Nuclear Weapon Tests	
TMI-1 Critical	June 1974	March 1972	June 1973
TMI-2 Critical	March 1978	June 1974	September 1974
TMI-2 Accident	March 1979	September 1976	November 1976
TMI-2 RB Purge	June 1980	September 1977	March 1978
Chernobyl	April 1986	December 1978	October 1980

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 Inc. (Env). Duplicate samples were obtained from several locations and media and split between the primary laboratory, Teledyne Brown Engineering (TBE) and Environmental Inc. (Env). Comparison of the results for most media were within expected ranges.

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TABLE D-I.1 **CONCENTRATIONS OF GROSS BETA IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	Q9-1Q
12/29/09 - 02/02/10	< 0.8
02/02/10 - 03/02/10	< 0.9
03/02/10 - 03/30/10	< 1.8
03/30/10 - 04/27/10	< 0.9
04/27/10 - 06/01/10	< 1.8
06/01/10 - 06/29/10	0.9 ± 0.5
06/29/10 - 08/03/10	0.9 ± 0.5
08/03/10 - 08/31/10	2.0 ± 1.0
08/31/10 - 09/28/10	2.2 ± 0.7
09/28/10 - 11/03/10	< 2.5
11/03/10 - 11/30/10	1.3 ± 0.8
11/30/10 - 12/28/10	1.9 ± 0.7
MEAN	1.5 ± 1.2

TABLE D-I.2 **CONCENTRATIONS OF TRITIUM IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	Q9-1Q
12/29/09 - 02/02/10	< 152
02/02/10 - 03/02/10	< 146
03/02/10 - 03/30/10	< 142
03/30/10 - 04/27/10	< 149
04/27/10 - 06/01/10	< 140
06/01/10 - 06/29/10	< 152
06/29/10 - 08/03/10	< 164
08/03/10 - 08/31/10	< 159
08/31/10 - 09/28/10	< 156
09/28/10 - 11/03/10	< 163
11/03/10 - 11/30/10	< 139
11/30/10 - 12/28/10	< 144
MEAN	-

TABLE D-I.3 **CONCENTRATIONS OF IODINE-131 IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

COLLECTION PERIOD	Q9-1Q
12/29/09 - 02/02/10	< 0.2
02/02/10 - 03/02/10	< 0.2
03/02/10 - 03/30/10	< 0.3
03/30/10 - 04/27/10	< 0.3
04/27/10 - 06/01/10	< 0.3
06/01/10 - 06/29/10	< 0.4
06/29/10 - 08/03/10	< 0.3
08/03/10 - 08/31/10	< 0.2
08/31/10 - 09/28/10	< 0.4
09/28/10 - 11/03/10	< 0.3
11/03/10 - 11/30/10	< 0.2
11/30/10 - 12/28/10	< 0.3
MEAN	-

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

TABLE D-I.4 CONCENTRATIONS OF GAMMA EMITTERS IN DRINKING WATER SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	Mn-54	Fe-59	Co-58	Co-60	Zn-65	Zr-95	Nb-95	Cs-134	Cs-137	Ba-140	La-140
Q9-1Q	12/29/09 - 02/02/10	< 3	< 4	< 3	< 2	< 3	< 5	< 2	< 4	< 3	< 14	< 3
	02/02/10 - 03/02/10	< 3	< 4	< 2	< 2	< 4	< 3	< 2	< 3	< 3	< 18	< 2
	03/02/10 - 03/30/10	< 2	< 5	< 2	< 1	< 5	< 5	< 3	< 2	< 3	< 14	< 3
	03/30/10 - 04/27/10	< 3	< 6	< 3	< 2	< 6	< 3	< 3	< 4	< 3	< 13	< 2
	04/27/10 - 06/01/10	< 2	< 5	< 3	< 2	< 3	< 4	< 3	< 3	< 3	< 21	< 5
	06/01/10 - 06/29/10	< 2	< 3	< 2	< 2	< 3	< 4	< 2	< 2	< 2	< 24	< 4
	06/29/10 - 08/03/10	< 3	< 6	< 3	< 3	< 5	< 5	< 4	< 4	< 3	< 21	< 4
	08/03/10 - 08/31/10	< 2	< 6	< 2	< 3	< 5	< 4	< 3	< 2	< 2	< 19	< 6
	08/31/10 - 09/28/10	< 3	< 5	< 2	< 3	< 4	< 6	< 3	< 3	< 3	< 16	< 4
	09/28/10 - 11/03/10	< 2	< 3	< 2	< 2	< 2	< 5	< 3	< 2	< 2	< 23	< 4
	11/03/10 - 11/30/10	< 4	< 7	< 1	< 2	< 4	< 5	< 5	< 3	< 2	< 15	< 3
	11/30/10 - 12/28/10	< 4	< 4	< 3	< 3	< 5	< 3	< 2	< 3	< 3	< 14	< 2

TABLE D-II.1 **CONCENTRATIONS OF STRONTIUM AND GAMMA EMITTERS IN FISH SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010**

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

STC	COLLECTION PERIOD	Sr-89	Sr-90	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137
INDP	11/02/10	< 12	< 7	3110 ± 400	< 8	< 18	< 47	< 13	< 17	< 7	< 7
INDP	10/22/09	**< 6**	**< 4**	3302 ± 3302	< 7	< 14	< 35	< 13	< 13	< 11	< 8

BOLDED 2009 VALUES ARE RE-REPORTED IN 2010 DUE TO INCORRECT HAND ENTRY

TABLE D-III.1 CONCENTRATIONS OF GAMMA EMITTERS IN SEDIMENT SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

STC	COLLECTION PERIOD	K-40	Cs-134	Cs-137
J2-1	11/09/10	14330 ± 1200	74 ± 31	88 ± 52

TABLE D-IV.1 CONCENTRATIONS OF GAMMA EMITTERS AND STRONTIUM IN FOOD PRODUCT SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010

RESULTS IN UNITS OF PCI/KG WET ± 2 SIGMA

STC	COLLECTION PERIOD	K-40	I-131	Cs-134	Cs-137	Sr-89	Sr-90
H1-2Q	06/30/10	4600 ± 350	< 18	< 13	< 11	< 5.0	21 ± 4
B10-2Q	07/20/10	2180 ± 270	< 18	< 13	< 13	< 2.0	1 ± 1
MEAN		3390 ± 3422	-	-	-	-	11 ± 28

TABLE D-V.1 CONCENTRATIONS OF GROSS BETA IN AIR PARTICULATE AND I-131 IN AIR IODINE SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010

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

COLLECTION PERIOD	E1-2Q GROSS BETA	E1-2Q I-131
12/29/09 - 01/05/10	15 ± 4	< 15
01/05/10 - 01/13/10	18 ± 3	< 6
01/13/10 - 01/20/10	31 ± 4	< 11
01/20/10 - 01/27/10	25 ± 4	< 9
01/27/10 - 02/03/10	22 ± 4	< 14
02/03/10 - 02/11/10	19 ± 3	< 13
02/11/10 - 02/17/10	20 ± 4	< 13
02/17/10 - 02/24/10	8 ± 3	< 6
02/24/10 - 03/03/10	7 ± 3	< 17
03/03/10 - 03/10/10	26 ± 4	< 22
03/10/10 - 03/17/10	16 ± 4	< 20
03/17/10 - 03/24/10	23 ± 4	< 17
03/24/10 - 03/31/10	21 ± 4	< 23
03/31/10 - 04/07/10	24 ± 4	< 9
04/07/10 - 04/14/10	21 ± 5	< 20
04/14/10 - 04/21/10	21 ± 5	< 21
04/21/10 - 04/28/10	20 ± 4	< 13
04/28/10 - 05/05/10	26 ± 4	< 9
05/05/10 - 05/12/10	18 ± 4	< 13
05/12/10 - 05/19/10	12 ± 3	< 14
05/19/10 - 05/26/10	16 ± 4	< 13
05/26/10 - 06/02/10	20 ± 4	< 17
06/02/10 - 06/09/10	20 ± 4	< 15
06/09/10 - 06/16/10	17 ± 4	< 15
06/16/10 - 06/23/10	22 ± 4	< 21
06/23/10 - 06/30/10	22 ± 4	< 17
06/30/10 - 07/07/10	25 ± 4	< 21
07/07/10 - 07/14/10	31 ± 4	< 14
07/14/10 - 07/21/10	30 ± 4	< 13
07/21/10 - 07/28/10	26 ± 4	< 18
07/28/10 - 08/04/10	32 ± 4	< 14
08/04/10 - 08/11/10	42 ± 5	< 17
08/11/10 - 08/18/10	24 ± 4	< 15
08/18/10 - 08/25/10	35 ± 5	< 20
08/25/10 - 09/01/10	35 ± 5	< 15
09/01/10 - 09/08/10	37 ± 5	< 8
09/08/10 - 09/15/10	17 ± 4	< 14
09/15/10 - 09/22/10	24 ± 4	< 11
09/22/10 - 09/29/10	32 ± 5	< 18
09/29/10 - 10/06/10	14 ± 4	< 15
10/06/10 - 10/13/10	36 ± 5	< 17
10/13/10 - 10/20/10	(1)	< (1)
10/20/10 - 10/27/10	27 ± 4	< 14
10/27/10 - 11/03/10	17 ± 4	< 11
11/03/10 - 11/09/10	14 ± 4	< 26
11/09/10 - 11/17/10	26 ± 4	< 10
11/17/10 - 11/23/10	42 ± 5	< 22
11/23/10 - 12/01/10	27 ± 4	< 20
12/01/10 - 12/08/10	(1)	< (1)
12/08/10 - 12/15/10	19 ± 4	< 21
12/15/10 - 12/22/10	29 ± 4	< 11
12/22/10 - 12/29/10	15 ± 4	< 18
MEAN	23 ± 16	-

(1) SEE PROGRAM EXCEPTIONS SECTION FOR EXPLANATION

TABLE D-V.2 CONCENTRATIONS OF GAMMA EMITTERS IN AIR PARTICULATE SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010

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

STC	COLLECTION PERIOD	Be-7	Cs-134	Cs-137
E1-2Q	12/29/09 - 03/31/10	82 ± 14	< 0.8	< 1.0
	03/31/10 - 06/30/10	100 ± 15	< 0.7	< 0.9
	06/30/10 - 09/29/10	85 ± 16	< 1.0	< 1.0
	09/29/10 - 12/29/10	80 ± 16	< 1.3	< 0.6
	MEAN	87 ± 18	-	-

TABLE D-VI.1 CONCENTRATIONS OF I-131 BY CHEMICAL SEPARATION, GAMMA EMITTERS, AND STRONTIUM IN MILK SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	I-131	K-40	Cs-134	Cs-137	Ba-140	La-140	Sr-89	Sr-90
G2-1Q	01/05/10	< 0.3	1136 ± 96	< 2.9	< 3.7	< 24	< 6.5		
	02/03/10	< 0.3	1363 ± 125	< 5.2	< 4.0	< 13	< 2.9		
	03/03/10	< 0.3	1041 ± 108	< 4.5	< 2.8	< 4	< 3.5		
	03/17/10	< 0.3	1115 ± 102	< 3.8	< 3.4	< 17	< 4.3		
	03/31/10	< 0.3	1125 ± 92	< 2.6	< 3.2	< 22	< 7.1	< 0.8	< 0.7
	04/14/10	< 0.3	1227 ± 106	< 3.9	< 3.8	< 14	< 2.8		
	04/28/10	< 0.2	1512 ± 117	< 3.3	< 3.4	< 18	< 2.3		
	05/12/10	< 0.3	1197 ± 111	< 4.9	< 4.5	< 18	< 4.6		
	05/26/10	< 0.3	1076 ± 105	< 3.7	< 3.2	< 24	< 3.8		
	06/09/10	< 0.3	1038 ± 108	< 3.7	< 4.2	< 23	< 3.1		
	06/23/10	< 0.4	1056 ± 109	< 3.8	< 2.8	< 24	< 3.0	< 1.0	0.8 ± 0.3
	07/07/10	< 0.3	955 ± 91	< 4.3	< 2.9	< 18	< 2.8		
	07/21/10	< 0.3	853 ± 95	< 4.2	< 3.0	< 15	< 4.2		
	08/04/10	< 0.3	1309 ± 100	< 3.4	< 3.7	< 12	< 4.0		
	08/18/10	< 0.3	1258 ± 100	< 3.3	< 3.4	< 31	< 4.1		
	09/01/10	< 0.2	1147 ± 95	< 3.4	< 2.9	< 20	< 3.8		
	09/15/10	< 0.4	991 ± 100	< 3.3	< 3.4	< 26	< 3.7		
	09/29/10	< 0.4	978 ± 101	< 5.0	< 4.4	< 16	< 2.9	< 0.8	< 0.5
	10/13/10	< 0.4	970 ± 95	< 4.2	< 3.6	< 17	< 6.6		
	10/27/10	< 0.3	817 ± 112	< 4.5	< 3.3	< 22	< 5.0		
	11/10/10	< 0.3	1541 ± 119	< 3.3	< 2.6	< 27	< 5.3		
	11/23/10	< 0.2	853 ± 91	< 3.2	< 2.7	< 41	< 4.7		
	12/08/10	< 0.3	1183 ± 110	< 4.7	< 3.4	< 23	< 4.5	< 0.8	< 0.5
	MEAN		1119 ± 383	-	-	-	-	-	0.7 ± 0.2

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

FIGURE D-1
MONTHLY GROSS BETA CONCENTRATIONS IN DRINKING WATER SAMPLES COLLECTED FROM TMINS LOCATION Q9-1Q, 2010

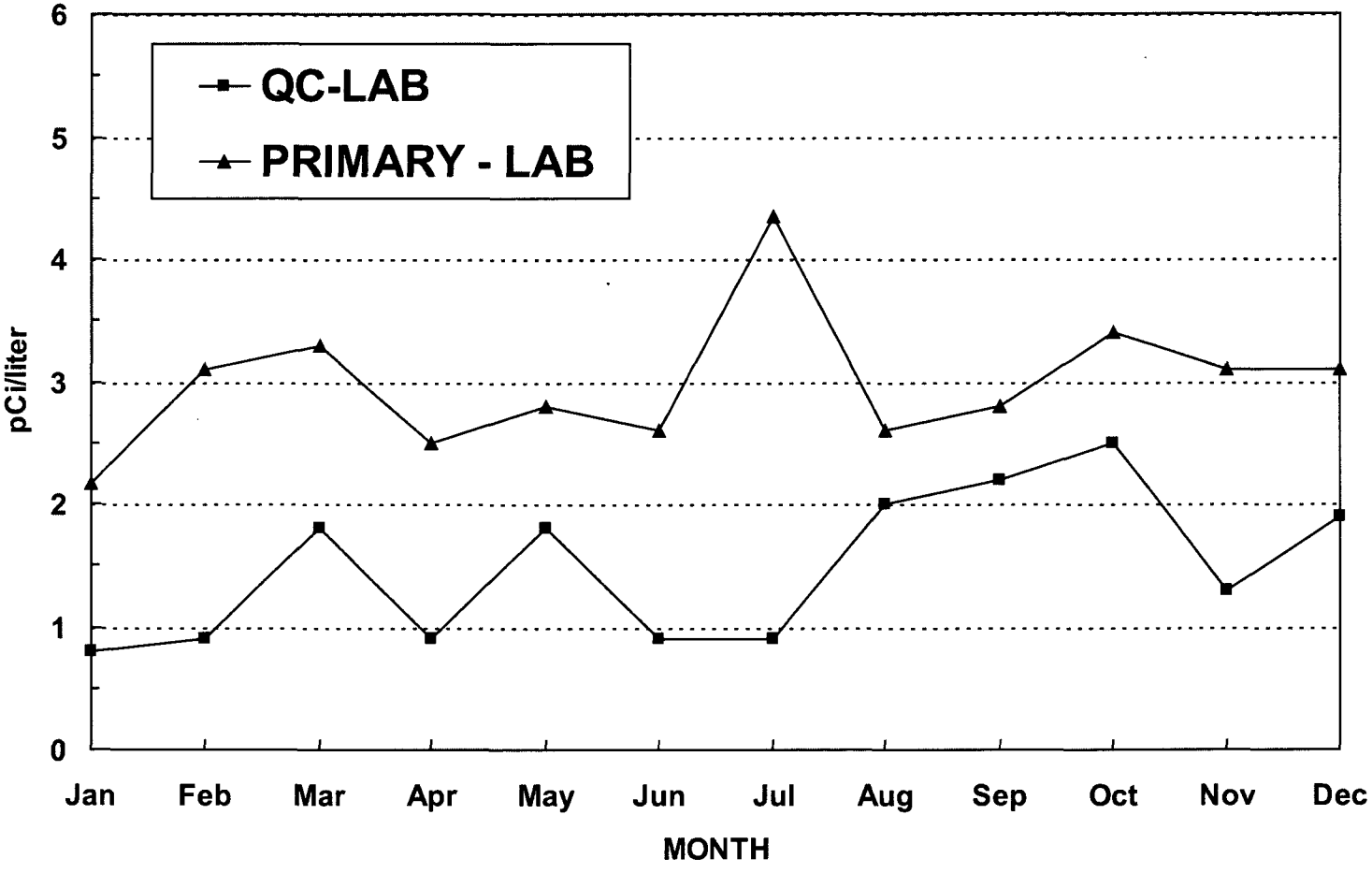
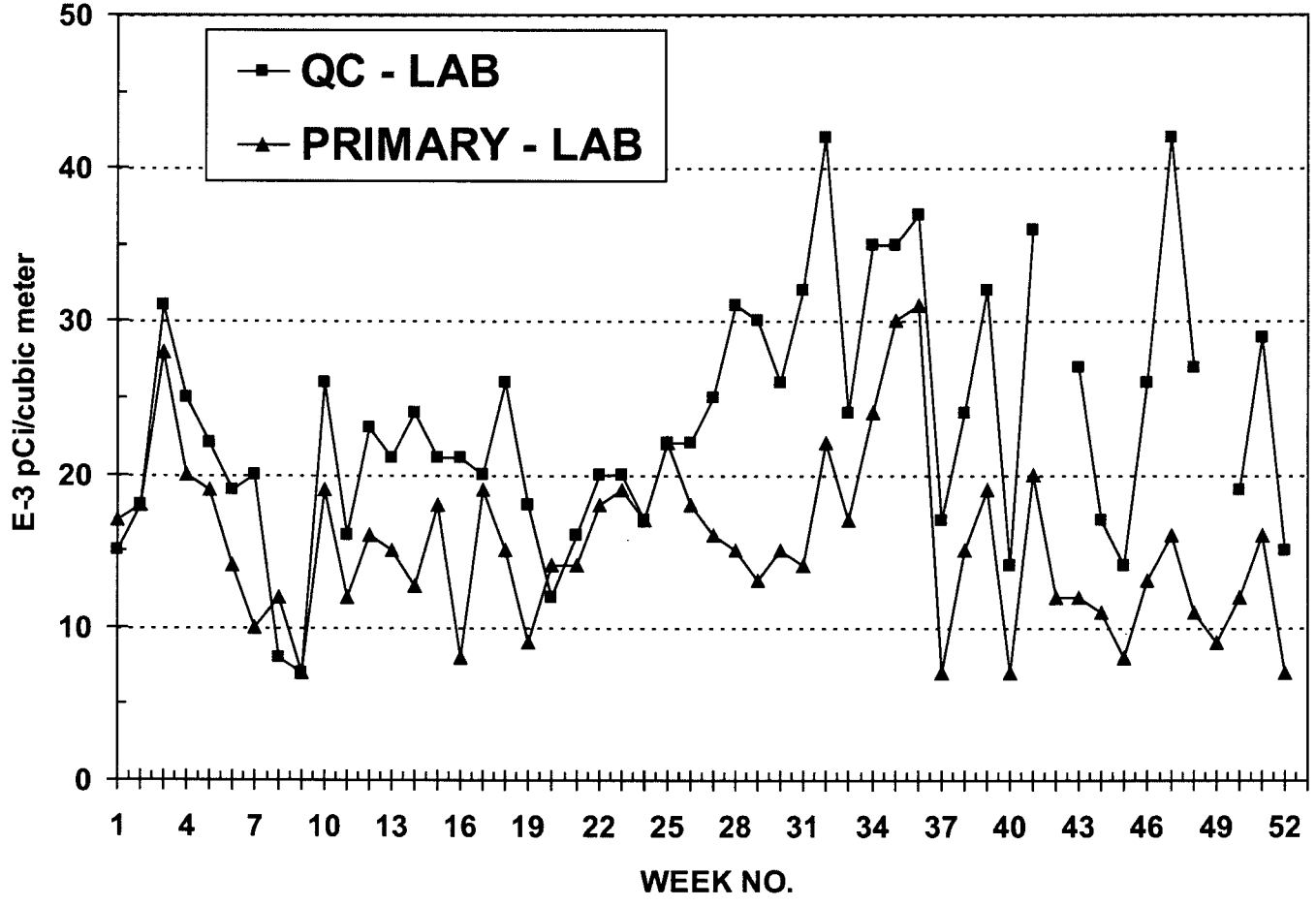


FIGURE D-2
WEEKLY GROSS BETA CONCENTRATIONS IN AIR PARTICULATE SAMPLES COLLECTED FROM TMINS LOCATION E1-2Q, 2010



APPENDIX E

INTER-LABORATORY COMPARISON PROGRAM

TABLE E-1 **ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM**
TELEDYNE BROWN ENGINEERING, 2010
(PAGE 1 OF 3)

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
March 2010	E6978-396	Milk	Sr-89	pCi/L	89.3	92.8	0.96	A
			Sr-90	pCi/L	13.8	12.7	1.09	A
	E6979-396	Milk	I-131	pCi/L	65.2	74.0	0.88	A
			Ce-141	pCi/L	241	261	0.92	A
			Cr-51	pCi/L	388	361	1.07	A
			Cs-134	pCi/L	157	178	0.88	A
			Cs-137	pCi/L	150	158	0.95	A
			Co-58	pCi/L	143	143	1.00	A
			Mn-54	pCi/L	202	207	0.98	A
			Fe-59	pCi/L	146	137	1.07	A
			Zn-65	pCi/L	247	254	0.97	A
			Co-60	pCi/L	177	183	0.97	A
	E6981-396	AP	Ce-141	pCi	211	185	1.14	A
			Cr-51	pCi	304	255	1.19	A
			Cs-134	pCi	142	125	1.14	A
			Cs-137	pCi	131	111	1.18	A
			Co-58	pCi	119	101	1.18	A
			Mn-54	pCi	162	146	1.11	A
			Fe-59	pCi	110	97	1.14	A
			Zn-65	pCi	217	179	1.21	W
			Co-60	pCi	145	129	1.12	A
	E6980-396	Charcoal	I-131	pCi	80.2	85.6	0.94	A
June 2010	E7132-396	Milk	Sr-89	pCi/L	82.0	93.4	0.88	A
			Sr-90	pCi/L	15.8	16.7	0.95	A
	E7133-396	Milk	I-131	pCi/L	83.5	96.9	0.86	A
			Ce-141	pCi/L	107	110	0.97	A
			Cr-51	pCi/L	325	339	0.96	A
			Cs-134	pCi/L	114	126	0.90	A
			Cs-137	pCi/L	144	150	0.96	A
			Co-58	pCi/L	92.3	101	0.91	A
			Mn-54	pCi/L	165	169	0.98	A
			Fe-59	pCi/L	121	119	1.02	A
			Zn-65	pCi/L	197	206	0.96	A
			Co-60	pCi/L	190	197	0.96	A
	E7135-396	AP	Ce-141	pCi	88.4	91.6	0.97	A
			Cr-51	pCi	292	282	1.04	A
			Cs-134	pCi	101	105	0.96	A
			Cs-137	pCi	132	125	1.06	A
			Co-58	pCi	87.3	84.0	1.04	A
			Mn-54	pCi	150	140	1.07	A
			Fe-59	pCi	105	98.6	1.06	A
			Zn-65	pCi	168	171	0.98	A
			Co-60	pCi	170	163	1.04	A
	E7134-396	Charcoal	I-131	pCi	76.4	79.9	0.96	A

TABLE E-1 ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING, 2010
(PAGE 2 OF 3)

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
September 2010	E7229-396	Milk	Sr-89	pCi/L	85.0	92.8	0.92	A
			Sr-90	pCi/L	12.6	14.7	0.86	A
	E7230-396	Milk	I-131	pCi/L	80.2	94.1	0.85	A
			Ce-141	pCi/L	130	130	1.00	A
			Cr-51	pCi/L	235	234	1.00	A
			Cs-134	pCi/L	83.2	93.0	0.89	A
			Cs-137	pCi/L	95.1	94.5	1.01	A
			Co-58	pCi/L	77.3	73.7	1.05	A
			Mn-54	pCi/L	121	119	1.02	A
			Fe-59	pCi/L	96.4	91.1	1.06	A
			Zn-65	pCi/L	216	204	1.06	A
			Co-60	pCi/L	172	171	1.01	A
	E7232-396	AP	Ce-141	pCi	122	119	1.03	A
			Cr-51	pCi	228	214	1.07	A
			Cs-134	pCi	79.9	85.3	0.94	A
			Cs-137	pCi	93.8	86.7	1.08	A
			Co-58	pCi	71.5	67.6	1.06	A
			Mn-54	pCi	113	110	1.03	A
			Fe-59	pCi	73.8	83.6	0.88	A
			Zn-65	pCi	186	187	0.99	A
			Co-60	pCi	163	157	1.04	A
	E7231-396	Charcoal	I-131	pCi/L	62.3	59.9	1.04	A
December 2010	E7375-396	Milk	Sr-89	pCi/L	92.7	98.0	0.95	A
			Sr-90	pCi/L	13.5	13.5	1.00	A
	E7376-396	Milk	I-131	pCi/L	87.9	96.9	0.91	A
			Ce-141	pCi/L	not provided by Analytics for this study			
			Cr-51	pCi/L	389	456	0.85	A
			Cs-134	pCi/L	137	157	0.87	A
			Cs-137	pCi/L	172	186	0.92	A
			Co-58	pCi/L	84.3	90.2	0.93	A
			Mn-54	pCi/L	120	120	1.00	A
			Fe-59	pCi/L	134	131	1.02	A
			Zn-65	pCi/L	162	174	0.93	A
			Co-60	pCi/L	284	301	0.94	A
	E7378-396	AP	Ce-141	pCi	not provided by Analytics for this study			
			Cr-51	pCi	387	365	1.06	A
			Cs-134	pCi	135	126	1.07	A
			Cs-137	pCi	157	149	1.05	A
			Co-58	pCi	73.6	72.3	1.02	A
			Mn-54	pCi	88.7	96	0.92	A
			Fe-59	pCi	127	105	1.21	W
			Zn-65	pCi	151	139	1.09	A
			Co-60	pCi	249	241	1.03	A

TABLE E-1 ANALYTICS ENVIRONMENTAL RADIOACTIVITY CROSS CHECK PROGRAM
TELEDYNE BROWN ENGINEERING, 2010
(PAGE 3 OF 3)

Month/Year	Identification Number	Matrix	Nuclide	Units	Reported Value (a)	Known Value (b)	Ratio (c) TBE/Analytics	Evaluation (d)
December 2010	E7377-396	Charcoal	I-131	pCi	79.6	84.2	0.95	A

(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, 2010
(PAGE 1 OF 1)

Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Control Limits	Evaluation (c)
May 2010	RAD-81	Water	Sr-89	pCi/L	64.4	60.4	48.6 - 68.2	A
			Sr-90	pCi/L	37.8	41.3	30.4 - 47.4	A
			Ba-133	pCi/L	66.4	65.9	54.9 - 72.5	A
			Cs-134	pCi/L	66.43	71.6	58.4 - 78.8	A
			Cs-137	pCi/L	137.33	146	131 - 163	A
			Co-60	pCi/L	83.33	84.5	76.0 - 95.3	A
			Zn-65	pCi/L	177	186	167 - 219	A
			Gr-A	pCi/L	26.37	32.9	16.9 - 42.6	A
			Gr-B	pCi/L	28.77	37.5	24.7 - 45.0	A
			I-131	pCi/L	26.27	26.4	21.9 - 31.1	A
			H-3	pCi/L	12967	12400	10800 - 13600	A
November 2010	RAD-83	Water	Sr-89	pCi/L	77.8	68.5	55.8 - 76.7	N (1)
			Sr-90	pCi/L	39.3	43.0	31.7 - 49.3	A
			Ba-133	pCi/L	70.3	68.9	57.5 - 75.8	A
			Cs-134	pCi/L	39.9	43.2	34.5 - 47.5	A
			Cs-137	pCi/L	117	123	111 - 138	A
			Co-60	pCi/L	53.5	53.4	48.1 - 61.3	A
			Zn-65	pCi/L	11.0	102	91.8 - 122	N (1)
			Gr-A	pCi/L	35.1	42.3	21.9 - 53.7	A
			Gr-B	pCi/L	35.5	36.6	24.0 - 44.2	A
			I-131	pCi/L	27.9	27.5	22.9 - 32.3	A
			H-3	pCi/L	13233	12900	11200 - 14200	A

(1) Sr-89 TBE to known ratio of 1.14 fell within acceptable range of ± 20%. No action required. NCR 10-09

(1) Zn-65 result of 111 was incorrectly reported as 11.0. No action required. NCR 10-09

(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, 2010
(PAGE 1 OF 2)

Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Acceptance Range	Evaluation (c)
March 2010	10-MaW22	Water	Cs-134	Bq/L	-0.0942		(1)	A
			Cs-137	Bq/L	58.5	60.6	42.4 - 78.8	A
			Co-57	Bq/L	27.2	28.3	19.8 - 36.8	A
			Co-60	Bq/L	0.0226		(1)	A
			H-3	Bq/L	104	90.8	63.6 - 118.0	A
			Mn-54	Bq/L	26.6	26.9	18.8 - 35.0	A
			Sr-90	Bq/L	0.1029		(1)	A
			Zn-65	Bq/L	42.0	40.7	28.5 - 52.9	A
	10-GrW22	Water	Gr-A	Bq/L	0.5173	0.676	0.00 - 1.352	A
			Gr-B	Bq/L	3.98	3.09	1.55 - 4.64	A
	10-MaS22	Soil	Cs-134	Bq/kg	665	733	513 - 953	A
			Cs-137	Bq/kg	800	779	545 - 1013	A
			Co-57	Bq/kg	508	522	365 - 679	A
			Co-60	Bq/kg	648	622	435 - 809	A
			Mn-54	Bq/kg	893	849	594 - 1104	A
			K-40	Bq/kg	597	559	391 - 727	A
			Sr-90	Bq/kg	221	288	202 - 374	W
			Zn-65	Bq/kg	-4.97		(1)	A
	10-RdF22	AP	Cs-134	Bq/sample	1.81	2.13	1.49 - 2.77	A
			Cs-137	Bq/sample	1.70	1.53	1.07 - 1.99	A
			Co-57	Bq/sample	0.0056		(1)	A
			Co-60	Bq/sample	2.65	2.473	1.731 - 3.215	A
			Mn-54	Bq/sample	3.70	3.02	2.11 - 3.93	W
			Sr-90	Bq/sample	0.0523		(1)	A
			Zn-65	Bq/sample	-0.0627		(1)	A
	10-GrF22	AP	Gr-A	Bq/sample	0.1533	0.0427	0.00 - 0.854	A
			Gr-B	Bq/sample	1.240	1.29	0.65 - 1.94	A
	10-RdV22	Vegetation	Cs-134	Bq/sample	4.48	4.39	3.07 - 5.71	A
			Cs-137	Bq/sample	3.43	3.06	2.14 - 3.98	A
			Co-57	Bq/sample	-0.0117		(1)	A
			Co-60	Bq/sample	3.55	3.27	2.29 - 4.25	A
			Mn-54	Bq/sample	0.007		(1)	A
			Sr-90	Bq/sample	-0.0002		(1)	A
			Zn-65	Bq/sample	8.12	7.10	4.97 - 9.23	A
September 2010	10-MaW23	Water	Cs-134	Bq/L	27.1	31.4	22.0 - 40.8	A
			Cs-137	Bq/L	41.8	44.2	30.9 - 57.5	A
			Co-57	Bq/L	33.2	36.0	25.2 - 46.8	A
			Co-60	Bq/L	26.5	28.3	19.8 - 36.8	A
			H-3	Bq/L	500	453.4	317.4 - 589.4	A
			Mn-54	Bq/L	0.024		(1)	A
			Sr-90	Bq/L	8.10	8.3	5.8 - 10.8	A
			Zn-65	Bq/L	30.8	31.0	21.7 - 40.3	A
	10-GrW23	Water	Gr-A	Bq/L	2.36	1.92	0.58 - 3.26	A
			Gr-B	Bq/L	6.37	4.39	2.20 - 6.59	A

TABLE E-3 DOE'S MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)
TELEDYNE BROWN ENGINEERING, 2010
(PAGE 2 OF 2)

Month/Year	Identification Number	Media	Nuclide	Units	Reported Value (a)	Known Value (b)	Acceptance Range	Evaluation (c)
September 2010	10-MaS23	Soil	Cs-134	Bq/kg	837	940	658 - 1222	A
			Cs-137	Bq/kg	680	670	469 - 871	A
			Co-57	Bq/kg	2.78		(1)	A
			Co-60	Bq/kg	350	343	240 - 446	A
			Mn-54	Bq/kg	853	820	574 - 1066	A
			K-40	Bq/kg	721	699	489 - 909	A
			Sr-90	Bq/kg	2.24		(1)	A
			Zn-65	Bq/kg	287	265	186 - 345	A
	10-RdF23	AP	Cs-134	Bq/sample	2.31	2.98	2.09 - 3.87	W
			Cs-137	Bq/sample	-0.025		(1)	A
			Co-57	Bq/sample	3.64	4.08	2.86 - 5.380	A
			Co-60	Bq/sample	2.81	2.92	2.04 - 3.80	A
			Mn-54	Bq/sample	3.19	3.18	2.23- 4.13	A
			Sr-90	Bq/sample	1.01	1.01	0.71 - 1.31	A
			Zn-65	Bq/sample	0.0310		(1)	A
	10-GrF23	AP	Gr-A	Bq/sample	0.004		(1)	A
			Gr-B	Bq/sample	0.473	0.50	0.25 - 0.75	A
	10-RdV23	Vegetation	Cs-134	Bq/sample	4.90	4.79	3.35 - 6.23	A
			Cs-137	Bq/sample	6.78	5.88	4.12 - 7.64	A
			Co-57	Bq/sample	10.2	8.27	5.79 - 10.75	W
			Co-60	Bq/sample	0.00		(1)	A
			Mn-54	Bq/sample	7.36	6.287	4.401 - 8.173	A
			Sr-90	Bq/sample	2.53	2.63	1.84 - 3.42	A
			Zn-65	Bq/sample	6.40	5.3900	3.77 - 7.01	A

(1) 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[a]**
ENVIRONMENTAL, INC., 2010

Lab Code	Date	Analysis	Concentration (pCi/L) Laboratory Result[b]	ERA Result[c]	Control Limits	Acceptance
STW-1205	04/05/10	Sr-89	63.0 ± 5.7	60.4	48.6 - 68.2	Pass
STW-1205	04/05/10	Sr-90	37.4 ± 2.4	41.3	30.4 - 47.4	Pass
STW-1206	04/05/10	Ba-133	63.6 ± 3.3	65.9	54.9 - 72.5	Pass
STW-1206	04/05/10	Co-60	83.3 ± 2.9	84.5	76.0 - 95.3	Pass
STW-1206	04/05/10	Cs-134	71.0 ± 3.4	71.6	58.4 - 78.8	Pass
STW-1206	04/05/10	Cs-137	145.5 ± 5.1	146.0	131.0 - 163.0	Pass
STW-1206	04/05/10	Zn-65	194.9 ± 7.8	186.0	167.0 - 219.0	Pass
STW-1207	04/05/10	Gr. Alpha	26.5 ± 1.7	32.9	16.9 - 42.6	Pass
STW-1207	04/05/10	Gr. Beta	34.5 ± 1.6	37.5	24.7 - 45.0	Pass
STW-1208	04/05/10	I-131	22.7 ± 0.8	26.4	21.9 - 31.1	Pass
STW-1210	04/05/10	H-3	12955 ± 332	12400.0	10800 - 13600	Pass
STW-1224	10/04/10	Sr-89	65.3 ± 5.7	68.5	55.8 - 76.7	Pass
STW-1224	10/04/10	Sr-90	39.9 ± 2.3	43.0	31.7 - 49.3	Pass
STW-1225	10/04/10	Ba-133	67.2 ± 4.3	68.9	57.5 - 75.8	Pass
STW-1225	10/04/10	Co-60	53.2 ± 3.3	53.4	48.1 - 61.3	Pass
STW-1225	10/04/10	Cs-134	47.3 ± 5.1	43.2	34.5 - 47.5	Pass
STW-1225	10/04/10	Cs-137	118.0 ± 5.9	123.0	111.0 - 138.0	Pass
STW-1225	10/04/10	Zn-65	107.0 ± 8.7	102.0	91.8 - 122.0	Pass
STW-1226	10/04/10	Gr. Alpha	30.7 ± 2.9	42.3	21.9 - 53.7	Pass
STW-1226	10/04/10	Gr. Beta	32.7 ± 0.8	36.6	24.0 - 44.2	Pass
STW-1227	10/04/10	I-131	28.6 ± 1.1	27.5	22.9 - 32.3	Pass
STW-1229	10/04/10	H-3	13682 ± 352	12900.0	11200 - 14200	Pass

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

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

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

TABLE E-5 DOE'S MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)[a] ENVIRONMENTAL, INC., 2010

(Page 1 of 3)

			Concentration [b]			
Lab Code [c]	Date	Analysis	Laboratory result	Known Activity	Control Limits [d]	Acceptance
STVE-1199	03/01/10	Co-57	0.01 ± 0.03	0.00	-	Pass
STVE-1199	03/01/10	Co-60	3.39 ± 0.12	3.27	2.29 - 4.25	Pass
STVE-1199	03/01/10	Cs-134	4.74 ± 0.15	4.39	3.07 - 5.71	Pass
STVE-1199	03/01/10	Cs-137	3.32 ± 0.17	3.06	2.14 - 3.98	Pass
STVE-1199	03/01/10	Mn-54	0.01 ± 0.05	0.00	-	Pass
STVE-1199	03/01/10	Zn-65	8.03 ± 0.33	7.10	4.97 - 9.23	Pass
STW-1200	03/01/10	Gr. Alpha	0.40 ± 0.05	0.68	0.00 - 1.35	Pass
STW-1200	03/01/10	Gr. Beta	3.03 ± 0.07	3.09	1.55 - 4.64	Pass
STW-1201	03/01/10	Co-57	28.90 ± 0.40	28.30	19.80 - 36.80	Pass
STW-1201	03/01/10	Co-60	0.06 ± 0.05	0.00	-	Pass
STW-1201	03/01/10	Cs-134	-0.03 ± 0.09	0.00	-	Pass
STW-1201	03/01/10	Cs-137	60.60 ± 0.60	60.60	42.40 - 78.80	Pass
STW-1201	03/01/10	H-3	93.20 ± 18.30	90.80	63.60 - 118.00	Pass
STW-1201	03/01/10	Mn-54	27.80 ± 0.40	26.90	18.80 - 35.00	Pass
STW-1201	03/01/10	Sr-90	-0.10 ± 0.60	0.00	-	Pass
STW-1201	03/01/10	Zn-65	42.70 ± 0.80	40.70	28.50 - 52.90	Pass
STSO-1202	03/01/10	Co-57	520.00 ± 10.80	522.00	365.00 - 679.00	Pass
STSO-1202	03/01/10	Co-60	599.10 ± 2.80	622.00	435.00 - 809.00	Pass
STSO-1202	03/01/10	Cs-134	666.10 ± 4.70	733.00	513.00 - 953.00	Pass
STSO-1202	03/01/10	Cs-137	774.40 ± 4.50	779.00	545.00 - 1013.00	Pass
STSO-1202	03/01/10	K-40	562.00 ± 15.30	559.00	391.00 - 727.00	Pass
STSO-1202	03/01/10	Mn-54	866.20 ± 4.60	849.00	594.00 - 1104.00	Pass
STSO-1202	03/01/10	Sr-90	225.50 ± 11.80	288.00	202.00 - 374.00	Pass
STSO-1202	03/01/10	Zn-65	-1.23 ± 1.96	0.00	-	Pass
STAP-1203	03/01/10	Co-57	0.01 ± 0.02	0.00	-	Pass
STAP-1203	03/01/10	Co-60	2.63 ± 0.19	2.47	1.73 - 3.22	Pass
STAP-1203	03/01/10	Cs-134	2.21 ± 0.34	2.13	1.49 - 2.77	Pass
STAP-1203	03/01/10	Cs-137	1.66 ± 0.22	1.53	1.07 - 1.99	Pass
STAP-1203	03/01/10	Mn-54	3.42 ± 0.26	3.02	2.11 - 3.93	Pass
STAP-1203	03/01/10	Sr-90	0.02 ± 0.06	0.00	-	Pass
STAP-1203	03/01/10	Zn-65	-0.05 ± 0.11	0.00	-	Pass
STAP-1204	03/01/10	Gr. Alpha	0.13 ± 0.03	0.43	0.00 - 0.85	Pass
STAP-1204	03/01/10	Gr. Beta	1.46 ± 0.07	1.29	0.65 - 1.94	Pass

TABLE E-5 DOE'S MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)[a] ENVIRONMENTAL, INC., 2010

			Concentration [b]			
Lab Code [c]	Date	Analysis	Laboratory result	Known Activity	Control Limits [d]	Acceptance
STW-1211	08/01/10	Co-57	36.40 ± 4.80	36.00	25.20 - 46.80	Pass
STW-1211	08/01/10	Co-60	28.30 ± 1.00	28.30	19.80 - 36.80	Pass
STW-1211	08/01/10	Cs-134	29.30 ± 2.10	31.40	22.00 - 40.80	Pass
STW-1211	08/01/10	Cs-137	44.60 ± 1.80	44.20	30.90 - 57.50	Pass
STW-1211	08/01/10	H-3	503.60 ± 12.80	453.40	317.40 - 589.40	Pass
STW-1211	08/01/10	K-40	38.50 ± 2.50	38.90	27.20 - 50.60	Pass
STW-1211	08/01/10	Mn-54	0.10 ± 0.30	0.00	-	Pass
STW-1211	08/01/10	Sr-90	9.20 ± 1.30	8.30	5.80 - 10.80	Pass
STW-1211	08/01/10	Zn-65	32.80 ± 3.00	31.00	21.70 - 40.30	Pass
STW-1212	08/01/10	Gr. Alpha	1.54 ± 0.09	1.92	0.58 - 3.26	Pass
STW-1212	08/01/10	Gr. Beta	4.13 ± 0.15	4.39	2.20 - 6.59	Pass
STVE-1213	08/01/10	Co-57	9.60 ± 0.54	8.27	5.79 - 10.75	Pass
STVE-1213	08/01/10	Co-60	0.05 ± 0.08	0.00	-	Pass
STVE-1213	08/01/10	Cs-134	4.83 ± 0.26	4.79	3.35 - 6.23	Pass
STVE-1213	08/01/10	Cs-137	6.45 ± 0.66	5.88	4.12 - 7.64	Pass
STVE-1213	08/01/10	Mn-54	7.12 ± 0.66	6.29	4.40 - 8.17	Pass
STVE-1213	08/01/10	Zn-65	6.05 ± 0.74	5.39	3.77 - 7.01	Pass
STSO-1214	08/01/10	Co-57	0.10 ± 1.60	0.00	-	Pass
STSO-1214	08/01/10	Co-60	370.00 ± 6.00	343.00	240.00 - 446.00	Pass
STSO-1214	08/01/10	Cs-134	1005.00 ± 21.00	940.00	658.00 - 1222.00	Pass
STSO-1214	08/01/10	Cs-137	755.00 ± 15.00	670.00	469.00 - 871.00	Pass
STSO-1214	08/01/10	K-40	783.00 ± 54.00	699.00	489.00 - 909.00	Pass
STSO-1214	08/01/10	Mn-54	942.00 ± 15.00	820.00	574.00 - 1066.00	Pass
STSO-1214	08/01/10	Sr-90	3.50 ± 8.00	0.00	-	Pass
STSO-1214	08/01/10	Zn-65	310.00 ± 18.00	265.00	186.00 - 345.00	Pass
STAP-1215	08/01/10	Co-57	4.47 ± 0.21	4.08	2.86 - 5.30	Pass
STAP-1215	08/01/10	Co-60	3.15 ± 0.30	2.92	2.04 - 3.80	Pass
STAP-1215	08/01/10	Cs-134	3.03 ± 0.17	2.98	2.09 - 3.87	Pass
STAP-1215	08/01/10	Cs-137	0.01 ± 0.05	0.00	-	Pass
STAP-1215	08/01/10	Mn-54	3.69 ± 0.39	3.18	2.23 - 4.13	Pass
STAP-1215	08/01/10	Sr-90	1.00 ± 0.12	1.01	0.71 - 1.31	Pass
STAP-1215	08/01/10	Zn-65	0.03 ± 0.15	0.00	-	Pass

TABLE E-5 DOE'S MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP)[a] ENVIRONMENTAL, INC., 2010

(Page 3 of 3)

			Concentration [b]			
Lab Code [c]	Date	Analysis	Laboratory result	Known Activity	Control Limits [d]	Acceptance
STAP-1216	08/01/10	Gr. Alpha	0.01 ± 0.01	0.00	-	Pass
STAP-1216	08/01/10	Gr. Beta	0.54 ± 0.05	0.50	0.25 - 0.75	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.*

[e] *Included in the testing series as a "false positive".*

APPENDIX F

ANNUAL RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM REPORT (ARGPPR)

Docket No: 50-289
50-320

THREE MILE ISLAND NUCLEAR STATION
UNITS 1 and 2

Annual Radiological
Groundwater Protection Program Report (ARGPPR)

1 January Through 31 December 2010

Prepared By

Teledyne Brown Engineering
Environmental Services

Exelon SM
Nuclear

Three Mile Island Nuclear Station
Middletown, PA 17057

April 2011

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Appendix C Data Tables

Tables

I. Summary and Conclusions

In 2006, Exelon instituted a comprehensive program to evaluate the impact of station operations on groundwater and surface water in the vicinity of Three Mile Island Nuclear Station. At Three Mile Island Nuclear, 31 new permanent groundwater monitoring wells were installed in 2006. The results for all TMI wells are included in this report. This report covers groundwater and surface water samples, collected from the environment, both on and off station property in 2010. During that time period, 641 analyses were performed on 183 samples from 63 locations.

In assessing all the data gathered for this report, it was concluded that the operation of Three Mile Island Nuclear Station had no adverse radiological impact on the environment, and there were no known active releases at the end of 2010 into the groundwater at Three Mile Island Nuclear Station.

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, surface water, or storm water samples. In the case of tritium, Exelon specified that its laboratories achieve a lower limit of detection 10 times lower than that required by federal regulation.

Strontium-89/90 was not detected at a concentration greater than the LLD of 1.0 picoCurie per liter (pCi/L) in the groundwater samples tested.

Tritium was not detected in any groundwater, surface water, or storm 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 33 of 58 groundwater monitoring locations. The groundwater tritium concentrations ranged from 170 ± 111 pCi/L to 5,470 ± 591 pCi/L. Tritium that was detected in groundwater at the Station is believed to be the result of historical releases, the recapture of gaseous tritium releases via rainwater and/or background from external sources greater than 200 pCi/L.

Gross Alpha and Gross Beta analyses in the dissolved and suspended fractions were performed on groundwater samples during the fourth quarter sampling in 2010. Gross Alpha (dissolved) was detected in 3 of 33 groundwater locations. The concentrations ranged from 2.7 to 7.9 pCi/L. Gross Alpha (suspended) was detected in 3 of 33 groundwater locations. The concentrations ranged from 1.5 to 131 pCi/L. Gross Beta (dissolved) was detected in 30 of 33 groundwater locations. The concentrations ranged from 3.1 to 23.1 pCi/L. Gross Beta

(suspended) was detected in 5 of 33 groundwater locations. The concentrations ranged from 2.4 to 118 pCi/L.

Hard-To-Detect analyses were performed on a select group of groundwater locations to establish background levels. The analyses included Fe-55, Ni-63, Am-241, Cm-242, Cm-243/244, Pu-238, Pu-239/240, U-233/234, U-235 and U-238. The isotopes of U-233/234 and U-238 were detected in two of six groundwater monitoring locations. The U-233/234 concentrations ranged from 0.5 to 1.3 pCi/L and the U-238 concentrations ranged from 0.3 to pCi/L. The levels detected are considered background.

All other hard-to-detect nuclides were not detected at concentrations greater than their respective MDCs.

II. Introduction

The Three Mile Island Nuclear Station (TMINS) established a revised and more comprehensive groundwater monitoring program in 2006 as part of an Exelon Nuclear fleetwide assessment.

Conestoga Rovers & Associates (CRA) performed the initial assessment. CRA prepared a Hydrogeologic Investigation Report (HIR) for Exelon to determine whether groundwater at and near TMINS has been adversely impacted by any releases of radionuclides. The CRA report documents the results of the May 2006 Hydrogeologic Investigation Work Plan. CRA assessed groundwater quality at the Station and identified locations designated as Areas for Further Evaluation. The results and conclusions of this Phase 1 study were made available to state and federal regulators, as well as the public, on an Exelon web site for station specific reports.

As a result of the Phase 1 study, the Radiological Groundwater Protection Program (RGPP) was revised to a long term monitoring program. This report covers those analyses performed by Teledyne Brown Engineering (TBE) and Environmental Inc. (Midwest Labs) on well water and surface water samples collected in 2010. TMINS groundwater movement is into the Susquehanna River which surrounds the station on all sides.

This report covers those analyses performed by Teledyne Brown Engineering (TBE) and Environmental Inc. (Midwest Labs) on samples collected in 2010.

A. Objective of the RGPP

The long-term objectives of the Radiological Groundwater Protection Program (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. Notify stakeholders in a timely manner for new leaks, spills, or other detections with potential radiological significance.

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 Three Mile Island Nuclear Station as discussed below:

1. Three Mile Island Nuclear Station continues to sample and monitor the groundwater at the station in accordance with station procedures. Sample frequencies and locations are adjusted based on monitoring results and investigations.

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

3. Three Mile Island Nuclear Station will continue to perform routine sampling and radiological analysis of water from selected locations.

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

5. Three Mile Island Nuclear Station staff and consulting hydrogeologist assess analytical results on an ongoing basis to identify adverse trends.

C. Program Description

1. Sample Collection

Sample locations can be found in Table A-1 and Figures A-1 and A-2, Appendix A.

<u>Groundwater, Surface Water, and Storm Water</u>

Samples of water are collected, managed, transported and analyzed in accordance with approved procedures. Groundwater, surface water, and storm water are collected. Sample locations, sample collection frequencies and analytical frequencies are controlled in accordance with approved station procedures. Contractor and/or station personnel are trained in the collection,

preservation management, and shipment of samples, as well as in documentation of sampling events. For split samples, collectors will periodically collect samples that are sent to Midwest Labs to confirm that TBE is producing comparable data. Analytical laboratories are subject to internal quality assurance programs, industry cross-check programs, as well as nuclear industry audits. Station personnel review and evaluate all analytical data deliverables as data are received.

Analytical data results are reviewed by both station personnel and an independent hydrogeologist 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." 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 is created in the environment from naturally occurring processes both cosmic and subterranean, as well as from anthropogenic (i.e., man-made) sources. Tritium is produced naturally in the upper atmosphere when cosmic rays strike air molecules. This “cosmogenic” tritium 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.

The chemical properties of tritium are essentially those of ordinary hydrogen. 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, all tritium is essentially cleared. Organically bound tritium (tritium that is incorporated in organic compounds) can remain in the body for a longer period.

Tritium has a radiological half-life of approximately 12.3 years. It decays spontaneously to helium-3 (He-3). 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 and Midwest Labs to analyze the environmental samples for radioactivity for the Three Mile Island Nuclear Station RGPP in 2010.

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

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

2. Concentrations of strontium in groundwater and surface water.

3. Concentrations of tritium in groundwater, surface water, and storm water.

4. Concentrations of Am-241 in groundwater and surface water.

5. Concentrations of Cm-242 and Cm-243/244 in groundwater and surface water.

6. Concentrations of Pu-238 and PU-239/240 in groundwater and surface water.

7. Concentrations of U-234, U-235 and U-238 in groundwater and surface water.

8. Concentrations of Fe-55 in groundwater and surface water.

9. Concentrations of Ni-63 in groundwater and surface water

B. Data Interpretation

1. Lower Limit of Detection and Minimum Detectable Concentration

The lower limit of detection (LLD) is specified by federal regulation as a minimum sensitivity value that must be achieved routinely by the analytical parameter.

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).

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

Gamma spectroscopy results for each type of sample were grouped as follows:

For groundwater, surface water, and storm water 13 nuclides, Be-7, K-40, Mn-54, Co-58, Fe-59, Co-60, Zn-65, Nb-95, Zr-95, Cs-134, Cs-137, Ba-140 and La-140 were reported.

The radio-analytical laboratory is counting tritium results to an 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

A. Groundwater Results

Samples were collected from on and off-site wells in accordance with the station radiological groundwater protection program. Analytical results and anomalies are discussed below.

Tritium

Samples from 58 locations were analyzed for tritium activity (Table B–I.1, Appendix B). Tritium values ranged from the detection limit to 5,470 pCi/l. Two of the locations were offsite drinking water wells with no detectable concentration of tritium.

Tritium Split Samples

Tritium values ranged from detection limit to 5,570 pCi/liter (Table C–1.1, Appendix C).

Strontium

Strontium-90 was not detected above the required detection limit of 2.0 pCi/liter (Table B–I.1, Appendix B)

Strontium Split Samples

Strontium-89 and Strontium-90 were not detected above the required detection limit of 2.0 pCi/liter (Table C–1.1, Appendix C).

Gross Alpha and Gross Beta (dissolved and suspended)

Gross Alpha and Gross Beta analyses in the dissolved and suspended fractions were performed on groundwater water samples during the second sampling in 2010. Gross Alpha (dissolved) was detected in 3 of 33 groundwater locations. The concentrations ranged from 2.7 to 7.9 pCi/L. Gross Alpha (suspended) was detected in 3 of 33 groundwater locations. The concentrations ranged from 1.5 to 131 pCi/L. Gross Beta (dissolved) was detected in 30 of 33 groundwater locations. The concentrations ranged from 3.1 to 23.1 pCi/L. Gross Beta (suspended) was detected in 5 of 33 groundwater locations. The concentrations ranged from 2.4 to 118 pCi/L (Table B-I.1, Appendix B).

Gross Alpha and Gross Beta (dissolved and suspended) Split Samples

Gross Alpha and Gross Beta analyses in the dissolved and suspended fractions were performed on groundwater water samples during the second sampling in 2010. Gross Alpha (dissolved) was detected in 1 of 6 groundwater locations at a concentration of 3.5 pCi/l. Gross Alpha (suspended) was not detected in any of groundwater locations. Gross Beta (dissolved) was detected in 4 of 6 groundwater locations. The concentrations ranged from 1.4 to 2.4 pCi/L. Gross Beta (suspended) was not detected in any of groundwater locations (Table C-I.1, Appendix B).

Gamma Emitters

Potassium-40 was detected in two of 51 samples. The concentrations ranged from 73 to 84 pCi/liter. No other gamma emitting nuclides were detected (Table B–I.2, Appendix B).

Gamma Emitters Split Samples

Potassium-40 was detected in five of six samples. The concentration ranged from 46 to 91 pCi/liter. No other gamma emitting nuclides were detected (Table C–I.2, Appendix C).

Hard-To-Detect

Hard-To-Detect analyses were performed on a select group of groundwater locations to establish background levels. The analyses included Fe-55, Ni-63, Am-241, Cm-242, Cm-243/244, Pu-238, Pu-239/240, U-233/234, U-235 and U-238. The isotopes of U-233/234 and U-238 were detected in two of six groundwater monitoring locations. The U-233/234 concentrations ranged from 0.5 to 1.3 pCi/L and the U-238 concentrations ranged from 0.3 to 0.5 pCi/L. The concentrations detected are considered background (Table B-I.3, Appendix B).

Hard-To-Detect Split Samples

Hard-To-Detect analyses were performed on a select group of groundwater locations to establish background levels. The analyses included Fe-55, Ni-63, Am-241, Cm-242, Cm-243/244, Pu-238, Pu-239/240, U-233/234, U-235 and U-238. The isotopes of U-233/234 and U-238 were detected in one groundwater

monitoring location at a concentration of 0.5 and 0.3 pCi/l respectively (Table C-I.3, Appendix B).

All other hard-to-detect nuclides were not detected at concentrations greater than their respective MDCs.

B. Surface Water Results

Samples were collected from surface water locations in accordance with the station radiological groundwater protection program. Analytical results and anomalies are discussed below.

Tritium

Tritium was not detected above the required detection limit of 200 pCi/liter (Table B-II.1, Appendix B).

Strontium

Surface water samples were not analyzed for Strontium-90 in 2010 (Table B–II.1, Appendix B).

Gamma Emitters

Potassium-40 was detected in one sample at a concentration of 135 pCi/l. No other gamma emitting nuclides were detected (Table B–II.2, Appendix B).

C. Storm Water Results

Samples were collected from storm water locations in accordance with the station radiological groundwater protection program. Analytical results and anomalies are discussed below.

Tritium

Tritium was not detected above the required detection limit of 200 pCi/liter (Table B-III.1, Appendix B).

Gamma Emitters

Potassium-40 was detected in one sample at a concentration of 93 pCi/l. No other gamma emitting nuclides were detected (Table B-III.2, Appendix B).

D. Leaks, Spills, and Releases

No new active leaks were identified at the TMI in 2010. TMI continues to monitor tritium plumes from previous years and reports the dose to the public in the AREOR. No spills were determined to be reportable under voluntary reporting requirements for the NEI Groundwater Protection Initiative (GPI) as implemented in Exelon's Reportability procedure LS-AA-1120, RAD 1.34.

E. Actions Taken

1. Compensatory Actions

TMI continues to monitor groundwater radioactivity as part of natural monitored attenuation of historical leaks.

APPENDIX A

LOCATION DESIGNATION & DISTANCE

TABLE A-1: **Radiological Groundwater Protection Program - Sampling Locations and Distance, Three Mile Island Nuclear Station, 2010**

Site	Site Type
#3	Monitoring Well
48N	Monitoring Well
48S	Production Potable Well
E1-2	Monitoring Well, Offsite
GP-12	Monitoring Well
GP-6	Monitoring Well
GP-8	Monitoring Well
GP-9	Monitoring Well
MS-1	Monitoring Well
MS-19	Monitoring Well
MS-2	Monitoring Well
MS-20	Monitoring Well
MS-21	Monitoring Well
MS-22	Monitoring Well
MS-3	Monitoring Well
MS-4	Monitoring Well
MS-5	Monitoring Well
MS-6	Monitoring Well
MS-7	Monitoring Well
MS-8	Monitoring Well
MW-1	Monitoring Well
MW-2	Monitoring Well
MW-3	Monitoring Well
MW-4	Monitoring Well
N2-1	Monitoring Well, Offsite
NW-A	Production Well
NW-B	Production Well
NW-C	Production Well
NW-CW	Clearwell
OS-13B	Monitoring Well
OS-14	Monitoring Well
OS-16	Monitoring Well
OS-17	Monitoring Well
OS-18	Monitoring Well
OSF	Production Potable Well
RW-1	Monitoring Well
RW-2	Monitoring Well
SW-E-1	Surface Water
SW-E-2	Surface Water
SW-E-3	Surface Water
MW-TMI-9S*	Monitoring Well
MW-TMI-10D	Monitoring Well
MW-TMI-10I	Monitoring Well
MW-TMI-10S	Monitoring Well
MW-TMI-11S*	Monitoring Well
MW-TMI-12S	Monitoring Well
MW-TMI-13I	Monitoring Well
MW-TMI-13S	Monitoring Well
MW-TMI-14D	Monitoring Well
MW-TMI-14I	Monitoring Well
MW-TMI-14S	Monitoring Well
MW-TMI-16D	Monitoring Well
MW-TMI-16I	Monitoring Well

* NO WATER PRESENT TO SAMPLE

TABLE A-1: **Radiological Groundwater Protection Program - Sampling Locations and Distance, Three Mile Island Nuclear Station, 2010**

Site	Site Type
MW-TMI-17D	Monitoring Well
MW-TMI-17I	Monitoring Well
MW-TMI-18D	Monitoring Well
MW-TMI-19D	Monitoring Well
MW-TMI-19I	Monitoring Well
MW-TMI-1D	Monitoring Well
MW-TMI-2D	Monitoring Well
MW-TMI-3I	Monitoring Well
MW-TMI-4I	Monitoring Well
MW-TMI-4S	Monitoring Well
MW-TMI-5D	Monitoring Well
MW-TMI-6D	Monitoring Well
MW-TMI-6I	Monitoring Well
MW-TMI-7S	Monitoring Well
MW-TMI-8S	Monitoring Well
MW-TMI-9I	Monitoring Well
TRAINING CENTER	Offsite Monitoring Well

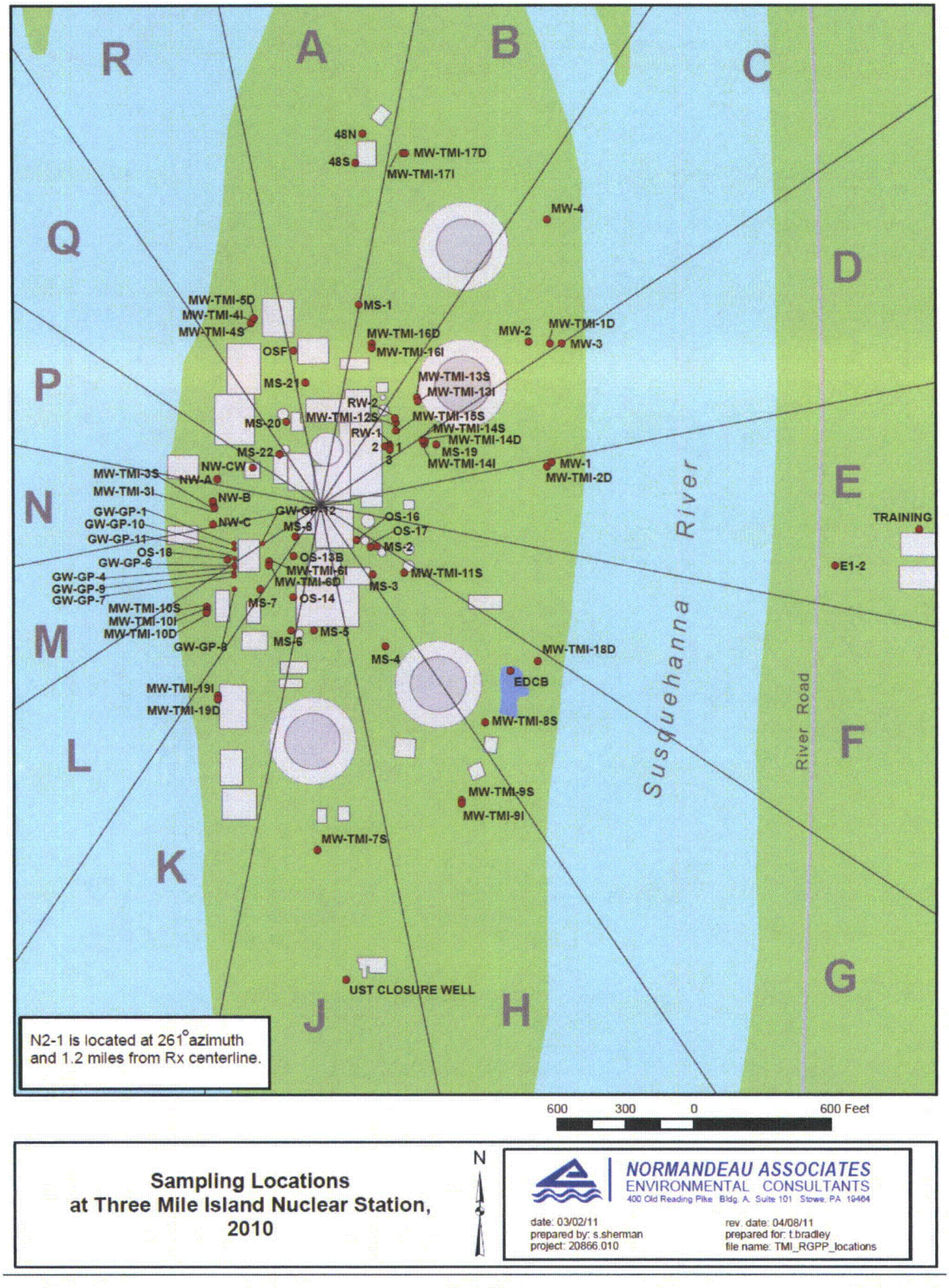

Figure A – 1
Sampling Locations at the Three Mile Island Nuclear Station, 2010

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APPENDIX B

DATA TABLES

TABLE B-I.1 CONCENTRATIONS OF TRITIUM, STRONTIUM, GROSS ALPHA, AND GROSS BETA IN GROUNDWATER SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM THREE MILE ISLAND NUCLEAR STATION, 2010

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3	SR-90	GR-A (DIS)	GR-A (SUS)	GR-B (DIS)	GR-B (SUS)
#3	05/18/10	< 169					
#3	10/27/10	< 176	< 0.6	< 1.8	< 0.8	< 2.1	< 1.6
48N	05/11/10	< 168					
48S	02/16/10	< 167					
48S	05/17/10	< 166					
48S	05/17/10	< 162					
48S	08/04/10	< 165					
48S	10/26/10	< 169	< 0.9	< 1.8	< 0.9	< 3.3	< 1.5
48S	10/26/10	< 180	< 0.6	< 4.4	< 1.0	< 3.8	< 1.6
MS-1	05/13/10	271 ± 115					
MS-1	10/28/10	308 ± 111	< 1.0	< 2.5	< 0.8	5.3 ± 2.7	< 1.6
MS-19	05/13/10	369 ± 123					
MS-19	05/13/10	285 ± 117					
MS-19	10/26/10	< 184	< 0.8	< 1.4	< 0.4	3.9 ± 1.6	< 1.4
MS-19	10/26/10	< 174	< 0.6	< 2.5	< 1.0	4.8 ± 1.8	< 1.6
MS-2	05/18/10	263 ± 116					
MS-2	10/26/10	256 ± 121	< 0.7	< 2.3	< 1.0	7.1 ± 2.1	< 1.5
MS-2	10/26/10	292 ± 113	< 0.6	< 3.5	< 1.0	6.9 ± 2.2	< 1.6
MS-20	02/18/10	1350 ± 196					
MS-20	03/24/10	1860 ± 233					
MS-20	03/24/10	1930 ± 239					
MS-20	05/19/10	665 ± 134					
MS-20	05/19/10	819 ± 146					
MS-20	10/26/10	371 ± 127	< 0.7	5.0 ± 3.3	< 0.4	3.9 ± 1.7	< 1.4
MS-21	05/19/10	179 ± 110					
MS-21	10/26/10	355 ± 126	< 0.7	< 1.0	< 0.4	3.7 ± 1.5	< 1.4
MS-22	03/24/10	794 ± 134					
MS-22	05/18/10	979 ± 161					
MS-22	08/03/10	1040 ± 163					
MS-22	08/03/10	1150 ± 175					
MS-22	10/26/10	988 ± 162	< 0.8	< 2.2	< 0.4	13.7 ± 2.7	< 1.4
MS-3	05/18/10	288 ± 117					
MS-3	10/27/10	< 173	< 0.6	< 2.0	< 1.1	9.9 ± 2.6	< 1.5
MS-4	05/19/10	384 ± 121					
MS-4	10/27/10	306 ± 125					
MS-5	05/18/10	< 169					
MS-5	10/26/10	< 179	< 0.6	< 2.3	< 1.0	9.6 ± 2.3	< 1.5
MS-6	05/18/10	< 170					
MS-6	08/03/10	< 165					
MS-7	05/13/10	352 ± 118					
MS-7	08/03/10	284 ± 116					
MS-7	10/27/10	189 ± 125	< 0.7	< 2.2	1.5 ± 1.0	4.9 ± 1.6	3.6 ± 1.2
MS-8	05/18/10	263 ± 117					
MS-8	08/03/10	245 ± 114					
MS-8	08/03/10	321 ± 118					
MS-8	10/26/10	259 ± 121	< 0.5	< 2.2	44.6 ± 6.2	9.3 ± 2.1	37.7 ± 3.2
MS-8	10/26/10	308 ± 114	< 0.5	7.9 ± 4.3	131.0 ± 18.0	10.4 ± 3.4	118.0 ± 7.5
MW-1	05/12/10	< 167					
MW-1	10/26/10	< 168					
MW-2	05/12/10	< 166					

TABLE B-I.1 CONCENTRATIONS OF TRITIUM, STRONTIUM, GROSS ALPHA, AND GROSS BETA IN GROUNDWATER SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM THREE MILE ISLAND NUCLEAR STATION, 2010

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3	SR-90	GR-A (DIS)	GR-A (SUS)	GR-B (DIS)	GR-B (SUS)
MW-2	10/26/10	< 170					
MW-3	05/12/10	< 167					
MW-3	05/12/10	< 165					
MW-4	05/12/10	< 168					
MW-TMI-10D	03/24/10	361 ± 111					
MW-TMI-10D	05/11/10	278 ± 118					
MW-TMI-10D	10/27/10	281 ± 129					
MW-TMI-10I	02/17/10	2190 ± 274					
MW-TMI-10I	03/24/10	2560 ± 300					
MW-TMI-10I	05/11/10	1820 ± 234					
MW-TMI-10I	08/04/10	1040 ± 162					
MW-TMI-10I	10/28/10	901 ± 148	< 0.9	< 2.2	< 0.8	6.3 ± 2.2	< 1.6
MW-TMI-10I	10/28/10	1000 ± 156	< 0.9	< 3.4	< 1.0	5.9 ± 2.2	< 1.6
MW-TMI-10S	02/17/10	4390 ± 491					
MW-TMI-10S	02/17/10	5160 ± 574					
MW-TMI-10S	03/24/10	2520 ± 297					
MW-TMI-10S	05/11/10	5470 ± 591					
MW-TMI-10S	05/11/10	5330 ± 577					
MW-TMI-10S	08/03/10	4420 ± 491					
MW-TMI-10S	10/28/10	4550 ± 509	< 0.6	< 2.1	< 1.0	8.7 ± 2.5	< 1.5
MW-TMI-12S	02/18/10	< 173					
MW-TMI-12S	05/19/10	< 172					
MW-TMI-12S	08/04/10	< 160					
MW-TMI-12S	10/27/10	< 179	< 0.6	< 2.0	13.7 ± 6.0	23.1 ± 3.4	38.5 ± 3.8
MW-TMI-13I	02/16/10	652 ± 137					
MW-TMI-13I	05/12/10	584 ± 131					
MW-TMI-13I	10/26/10	477 ± 131					
MW-TMI-13S	02/16/10	319 ± 124					
MW-TMI-13S	05/12/10	467 ± 125					
MW-TMI-13S	10/26/10	< 183	< 1.0	< 2.2	< 0.4	10.8 ± 2.2	< 1.4
MW-TMI-14D	02/17/10	576 ± 134					
MW-TMI-14D	05/13/10	418 ± 122					
MW-TMI-14D	10/26/10	654 ± 147					
MW-TMI-14I	02/17/10	341 ± 122					
MW-TMI-14I	02/17/10	310 ± 120					
MW-TMI-14I	05/13/10	390 ± 123					
MW-TMI-14I	10/26/10	245 ± 126					
MW-TMI-14S	02/17/10	< 172					
MW-TMI-14S	05/13/10	439 ± 124					
MW-TMI-14S	10/26/10	< 186	< 0.8	< 1.4	< 0.4	3.7 ± 1.6	< 1.4
MW-TMI-16D	02/17/10	717 ± 140					
MW-TMI-16D	05/18/10	674 ± 133					
MW-TMI-16D	10/28/10	733 ± 133					
MW-TMI-16I	02/17/10	< 173					
MW-TMI-16I	05/18/10	381 ± 121					
MW-TMI-16I	10/28/10	352 ± 132					
MW-TMI-17D	05/11/10	< 166					
MW-TMI-17I	05/11/10	< 169					
MW-TMI-17I	10/28/10	< 189					
MW-TMI-18D	05/12/10	< 163					

TABLE B-I.1 CONCENTRATIONS OF TRITIUM, STRONTIUM, GROSS ALPHA, AND GROSS BETA IN GROUNDWATER SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM THREE MILE ISLAND NUCLEAR STATION, 2010

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3	SR-90	GR-A (DIS)	GR-A (SUS)	GR-B (DIS)	GR-B (SUS)
MW-TMI-18D	10/26/10	< 173					
MW-TMI-19D	05/11/10	< 174					
MW-TMI-19D	08/03/10	< 169					
MW-TMI-19I	05/11/10	< 177					
MW-TMI-19I	05/11/10	< 165					
MW-TMI-19I	08/03/10	< 165					
MW-TMI-19I	10/28/10	< 190					
MW-TMI-1D	05/12/10	287 ± 118					
MW-TMI-1D	05/12/10	315 ± 120					
MW-TMI-1D	10/26/10	436 ± 131					
MW-TMI-2D	02/17/10	< 182					
MW-TMI-2D	05/12/10	517 ± 129					
MW-TMI-2D	08/04/10	525 ± 126					
MW-TMI-2D	10/26/10	454 ± 132	< 0.6	< 0.6	< 0.4	4.3 ± 1.4	< 1.4
MW-TMI-3I	05/18/10	338 ± 119					
MW-TMI-3I	10/26/10	263 ± 118	< 0.7	< 2.4	< 0.9	8.2 ± 2.8	< 1.5
MW-TMI-4I	05/18/10	< 165					
MW-TMI-4I	10/28/10	< 186					
MW-TMI-4S	05/18/10	< 161					
MW-TMI-4S	10/28/10	< 157					
MW-TMI-5D	05/19/10	< 161					
MW-TMI-6D	05/13/10	187 ± 113					
MW-TMI-6D	05/13/10	< 166					
MW-TMI-6D	08/03/10	188 ± 112					
MW-TMI-6D	08/03/10	187 ± 111					
MW-TMI-6D	10/27/10	< 189	< 0.7	< 2.7	< 0.9	4.5 ± 1.7	< 1.5
MW-TMI-6D	10/27/10	326 ± 112	< 0.6	< 3.5	< 1.0	3.7 ± 2.0	< 1.6
MW-TMI-6I	05/13/10	176 ± 112					
MW-TMI-6I	08/03/10	170 ± 111					
MW-TMI-6I	10/27/10	< 188	< 0.8	< 3.0	< 1.0	4.4 ± 1.7	< 1.5
MW-TMI-7S	10/27/10	< 184	< 0.9	< 1.7	< 0.9	5.9 ± 1.9	3.6 ± 1.2
MW-TMI-8S	05/12/10	< 166					
MW-TMI-8S	10/26/10	< 172					
MW-TMI-9I	05/13/10	< 166					
MW-TMI-9I	10/27/10	< 184	< 0.8	< 1.4	< 0.9	3.1 ± 1.6	< 1.5
N2-1	05/19/10	< 164					
N2-1	10/27/10	< 157					
NW-A	05/19/10	780 ± 140					
NW-A	10/29/10	676 ± 129	< 0.8	< 2.3	< 0.8	3.9 ± 2.0	< 1.6
NW-B	05/19/10	538 ± 129					
NW-B	10/29/10	437 ± 118	< 0.9	2.7 ± 1.7	< 0.8	4.7 ± 1.9	< 1.6
NW-C	05/19/10	1640 ± 215					
NW-C	10/29/10	1570 ± 208	< 0.9	< 2.0	< 0.8	< 2.6	< 1.6
NW-CW	05/19/10	852 ± 143					
NW-CW	10/29/10	743 ± 134	< 0.7	< 2.1	< 0.8	5.5 ± 2.2	< 1.6
OS-14	05/18/10	< 169					
OS-14	08/03/10	< 165					
OS-14	10/26/10	< 169	< 0.6	< 2.1	< 0.4	19.3 ± 3.2	< 1.4
OS-16	05/18/10	325 ± 120					
OS-16	10/27/10	281 ± 122	< 0.6	< 2.3	< 0.9	7.0 ± 1.9	2.4 ± 1.2

TABLE B-I.1 CONCENTRATIONS OF TRITIUM, STRONTIUM, GROSS ALPHA, AND GROSS BETA IN GROUNDWATER SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM THREE MILE ISLAND NUCLEAR STATION, 2010

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3	SR-90	GR-A (DIS)	GR-A (SUS)	GR-B (DIS)	GR-B (SUS)
OS-17	05/18/10	285 ± 117					
OS-18	02/17/10	< 173					
OS-18	05/12/10	298 ± 118					
OS-18	08/04/10	402 ± 119					
OS-18	10/27/10	195 ± 123	< 0.9	< 2.2	< 0.9	6.7 ± 2.0	< 1.5
OSF	02/16/10	258 ± 119					
OSF	05/19/10	292 ± 115					
OSF	08/04/10	404 ± 121					
OSF	10/26/10	226 ± 121	< 0.8	< 3.1	< 0.9	7.3 ± 3.0	< 1.5
RW-1	05/18/10	< 171					
RW-1	10/27/10	< 176	< 0.8	< 2.1	< 0.8	8.5 ± 2.4	< 1.6
RW-2	02/18/10	< 173					
RW-2	05/19/10	< 165					
RW-2	08/04/10	< 163					
RW-2	10/27/10	< 177	< 0.8	< 2.8	< 0.8	9.7 ± 2.1	< 1.6
TRAINING CENTER	05/11/10	< 161					
TRAINING CENTER	10/28/10	< 159					

TABLE B-I.2 **CONCENTRATIONS OF GAMMA EMITTERS IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION PERIOD	Be-7	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140
#3	10/27/10	< 19	< 16	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 17	< 6
48S	10/26/10	< 33	< 75	< 4	< 4	< 6	< 4	< 8	< 4	< 7	< 3	< 4	< 36	< 10
48S	10/26/10	< 21	< 45	< 2	< 2	< 5	< 2	< 5	< 2	< 4	< 2	< 2	< 21	< 7
MS-1	10/28/10	< 19	< 17	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 16	< 5
MS-19	10/26/10	< 33	< 27	< 3	< 4	< 8	< 3	< 6	< 4	< 7	< 3	< 4	< 30	< 9
MS-19	10/26/10	< 21	< 38	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 20	< 6
MS-2	10/26/10	< 25	< 27	< 3	< 3	< 5	< 3	< 6	< 2	< 5	< 2	< 3	< 26	< 7
MS-2	10/26/10	< 19	< 16	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 18	< 6
MS-20	10/26/10	< 27	< 77	< 3	< 3	< 4	< 4	< 7	< 3	< 7	< 3	< 3	< 25	< 8
MS-21	10/26/10	< 29	< 28	< 3	< 3	< 6	< 3	< 6	< 4	< 6	< 2	< 2	< 30	< 8
MS-22	10/26/10	< 24	< 67	< 2	< 3	< 6	< 2	< 4	< 3	< 6	< 2	< 2	< 26	< 10
MS-3	10/27/10	< 30	< 33	< 3	< 3	< 7	< 3	< 7	< 3	< 6	< 3	< 3	< 26	< 9
MS-4	10/27/10	< 18	< 16	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 18	< 7
MS-5	10/26/10	< 29	< 67	< 3	< 3	< 7	< 3	< 6	< 3	< 6	< 2	< 3	< 25	< 9
MS-7	10/27/10	< 12	< 11	< 1	< 1	< 3	< 1	< 3	< 1	< 2	< 1	< 1	< 10	< 3
MS-8	10/26/10	< 25	< 17	< 2	< 2	< 5	< 3	< 4	< 3	< 5	< 3	< 2	< 22	< 8
MS-8	10/26/10	< 22	< 42	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 21	< 8
MW-1	10/26/10	< 32	< 57	< 3	< 3	< 6	< 3	< 5	< 4	< 6	< 3	< 3	< 25	< 10
MW-2	10/26/10	< 34	73 ± 43	< 3	< 4	< 8	< 4	< 6	< 4	< 7	< 3	< 3	< 29	< 8
MW-TMI-10I	10/28/10	< 40	< 49	< 4	< 5	< 10	< 5	< 10	< 5	< 7	< 4	< 4	< 31	< 10
MW-TMI-10I	10/28/10	< 15	< 13	< 1	< 1	< 3	< 1	< 3	< 2	< 3	< 1	< 1	< 13	< 4
MW-TMI-10S	10/28/10	< 35	< 33	< 3	< 4	< 8	< 4	< 9	< 4	< 7	< 4	< 4	< 28	< 10
MW-TMI-12S	10/27/10	< 22	< 43	< 2	< 2	< 6	< 2	< 5	< 2	< 4	< 2	< 2	< 22	< 7
MW-TMI-13S	10/26/10	< 33	< 69	< 3	< 5	< 8	< 4	< 7	< 4	< 7	< 3	< 4	< 29	< 10
MW-TMI-14S	10/26/10	< 28	< 64	< 3	< 2	< 6	< 4	< 6	< 3	< 6	< 3	< 3	< 27	< 6
MW-TMI-17I	10/28/10	< 15	< 16	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 2	< 2	< 13	< 4
MW-TMI-18D	10/26/10	< 32	< 33	< 3	< 4	< 8	< 4	< 7	< 4	< 6	< 3	< 4	< 32	< 9
MW-TMI-19I	10/28/10	< 34	< 35	< 4	< 3	< 7	< 4	< 7	< 4	< 6	< 3	< 4	< 27	< 10
MW-TMI-1D	10/26/10	< 32	< 27	< 3	< 4	< 7	< 3	< 6	< 3	< 6	< 3	< 3	< 27	< 7
MW-TMI-2D	10/26/10	< 37	< 32	< 4	< 3	< 8	< 4	< 7	< 5	< 7	< 4	< 4	< 29	< 10
MW-TMI-3I	10/26/10	< 31	< 37	< 3	< 4	< 9	< 6	< 7	< 4	< 7	< 3	< 3	< 29	< 7

TABLE B-I.2 **CONCENTRATIONS OF GAMMA EMITTERS IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION PERIOD	Be-7	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140
MW-TMI-4I	10/28/10	< 31	< 28	< 3	< 3	< 7	< 3	< 5	< 4	< 7	< 3	< 3	< 29	< 9
MW-TMI-4S	10/28/10	< 19	< 17	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 18	< 5
MW-TMI-6D	10/27/10	< 17	< 15	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 1	< 2	< 14	< 4
MW-TMI-6D	10/27/10	< 16	< 31	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 1	< 2	< 15	< 5
MW-TMI-6I	10/27/10	< 15	< 25	< 1	< 1	< 3	< 1	< 3	< 2	< 3	< 1	< 1	< 12	< 3
MW-TMI-7S	10/27/10	< 35	< 67	< 3	< 4	< 8	< 3	< 6	< 4	< 7	< 3	< 4	< 29	< 8
MW-TMI-8S	10/26/10	< 30	< 27	< 3	< 3	< 7	< 3	< 5	< 3	< 6	< 3	< 3	< 25	< 8
MW-TMI-9I	10/27/10	< 37	84 ± 43	< 4	< 4	< 9	< 4	< 9	< 5	< 7	< 3	< 4	< 31	< 10
N2-1	10/27/10	< 20	< 45	< 2	< 2	< 6	< 2	< 4	< 3	< 4	< 2	< 2	< 20	< 7
NW-A	10/29/10	< 21	< 18	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 19	< 6
NW-B	10/29/10	< 26	< 24	< 3	< 3	< 6	< 2	< 6	< 3	< 5	< 3	< 3	< 24	< 8
NW-C	10/29/10	< 34	< 31	< 4	< 4	< 8	< 3	< 8	< 4	< 6	< 3	< 4	< 30	< 9
NW-CW	10/29/10	< 14	< 12	< 1	< 2	< 3	< 2	< 3	< 2	< 3	< 1	< 1	< 14	< 4
OS-14	10/26/10	< 26	< 23	< 2	< 2	< 5	< 2	< 5	< 3	< 4	< 2	< 3	< 21	< 5
OS-16	10/27/10	< 22	< 18	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 21	< 6
OS-18	10/27/10	< 19	< 32	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 2	< 2	< 15	< 5
OSF	10/26/10	< 31	< 27	< 3	< 3	< 7	< 3	< 7	< 4	< 6	< 3	< 3	< 25	< 10
RW-1	10/27/10	< 37	< 88	< 4	< 4	< 9	< 3	< 9	< 4	< 9	< 4	< 4	< 28	< 8
RW-2	10/27/10	< 18	< 16	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 2	< 2	< 16	< 6
TRAINING CENTER	10/28/10	< 15	< 31	< 1	< 1	< 3	< 1	< 3	< 2	< 3	< 1	< 2	< 13	< 4

TABLE B-I.3 **CONCENTRATIONS OF HARD TO DETECTS IN GROUNDWATER SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, THREE MILE ISLAND NUCLEAR STATION, 2010**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	AM-241	CM-242	CM-243/244	PU-238	PU-239/240	U-233/234	U-235	U-238	FE-55	NI-63
MW-TMI-10I	10/28/10	< 0.05	< 0.10	< 0.05	< 0.12	< 0.1	0.5 ± 0.2	< 0.03	0.4 ± 0.2	< 142.0	< 4.4
MW-TMI-10I	10/28/10	< 0.09	< 0.08	< 0.18	< 0.10	< 0.1	0.5 ± 0.2	< 0.07	0.3 ± 0.2	< 182.0	< 4.4
MW-TMI-10S	10/28/10	< 0.08	< 0.04	< 0.03	< 0.06	< 0.2	< 0.1	< 0.05	< 0.1	< 170.0	< 4.4
MW-TMI-7S	10/27/10	< 0.08	< 0.05	< 0.08	< 0.07	< 0.1	< 0.1	< 0.04	< 0.1	< 125.0	< 4.4
MW-TMI-9I	10/27/10	< 0.04	< 0.07	< 0.04	< 0.13	< 0.1	< 0.1	< 0.04	< 0.1	< 141.0	< 4.4
NW-C	10/29/10	< 0.06	< 0.07	< 0.05	< 0.04	< 0.1	1.3 ± 0.4	< 0.14	0.5 ± 0.2	< 161.0	< 4.4
RW-1	10/27/10	< 0.05	< 0.03	< 0.10	< 0.08	< 0.1	< 0.1	< 0.04	< 0.1	< 145.0	< 4.4

TABLE B-II.1 CONCENTRATIONS OF TRITIUM IN SURFACE WATER SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM THREE MILE ISLAND NUCLEAR STATION, 2010

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3
SW-E-1	03/24/10	< 155
SW-E-1	05/17/10	< 164
SW-E-1	08/04/10	< 164
SW-E-1	10/28/10	< 179
SW-E-2	02/16/10	< 180
SW-E-2	05/17/10	< 167
SW-E-2	08/04/10	< 165
SW-E-2	10/26/10	< 186
SW-E-3	02/16/10	< 177
SW-E-3	05/11/10	< 168
SW-E-3	08/04/10	< 165
SW-E-3	10/26/10	< 183

TABLE B-II.2 **CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010**

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	Cs-134	Cs-137	Ba-140	La-140
SW-E-1	10/28/10	< 28	< 67	< 2	< 3	< 6	< 3	< 5	< 4	< 6	< 3	< 3	< 30	< 7
SW-E-2	10/26/10	< 32	135 ± 58	< 3	< 4	< 6	< 3	< 7	< 3	< 7	< 3	< 3	< 28	< 6
SW-E-3	10/26/10	< 38	< 29	< 4	< 3	< 8	< 3	< 7	< 4	< 7	< 3	< 4	< 25	< 8

TABLE B-III.1 CONCENTRATIONS OF TRITIUM IN STORM WATER SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM THREE MILE ISLAND NUCLEAR STATION, 2010

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION PERIOD	H-3
EDCB	02/02/10 - 03/30/10	< 180
EDCB	04/27/10 - 06/29/10	< 187
EDCB	08/03/10 - 09/28/10	< 172
EDCB	11/03/10 - 12/28/10	< 167

TABLE B-III.2 **CONCENTRATIONS OF GAMMA EMITTERS IN STORM WATER SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2010**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION PERIOD	Be-7	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Nb-95	Zr-95	Cs-134	Cs-137	Ba-140	La-140
EDCB	02/02/10 - 03/30/10	< 53	93 ± 46	< 5	< 6	< 11	< 5	< 9	< 6	< 10	< 6	< 6	< 30	< 8
EDCB	04/27/10 - 06/29/10	< 54	< 117	< 5	< 5	< 12	< 6	< 12	< 5	< 10	< 5	< 6	< 28	< 8
EDCB	08/03/10 - 09/28/10	< 35	< 78	< 4	< 4	< 10	< 4	< 8	< 4	< 7	< 4	< 4	< 28	< 9
EDCB	11/03/10 - 12/28/10	< 33	< 30	< 3	< 3	< 7	< 3	< 6	< 4	< 6	< 3	< 3	< 24	< 7

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APPENDIX C

DATA TABLES

TABLE C-I.1 CONCENTRATIONS OF TRITIUM, STRONTIUM, GROSS ALPHA AND GROSS BETA IN WELL WATER SPLIT SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER GROUNDWATER PROTECTION PROGRAM, THREE MILE ISLAND NUCLEAR STATION, 2010

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3	SR-89	SR-90	GR-A (DIS)	GR-A (SUS)	GR-B (DIS)	GR-B (SUS)
MW-TMI-10S	02/17/10	5202 ± 220						
MW-TMI-14I	02/17/10	492 ± 100						
MS-20	03/24/10	1951 ± 155						
MW-TMI-10S	05/11/10	5570 ± 228						
MW-TMI-19I	05/11/10	< 151						
MW-3	05/12/10	< 151						
MW-TMI-1D	05/12/10	415 ± 98						
MS-19	05/13/10	420 ± 99						
MW-TMI-6D	05/13/10	< 151						
48S	05/17/10	197 ± 89						
MS-20	05/19/10	941 ± 118						
MS-22	08/03/10	1134 ± 131						
MS-8	08/03/10	285 ± 99						
MW-TMI-6D	08/03/10	< 164						
48S	10/26/10	< 161	< 0.7	< 0.5	< 2.7	< 1.3	< 1.5	< 4.1
MS-19	10/26/10	< 161	< 0.8	< 0.5	< 1.2	< 1.1	< 1.2	< 4.3
MS-2	10/26/10	304 ± 99	< 0.8	< 0.6	< 1.6	< 1.3	2.4 ± 0.8	< 4.1
MS-8	10/26/10	299 ± 99	< 0.9	< 0.7	< 1.4	< 1.4	2.0 ± 0.8	< 4.3
MW-TMI-6D	10/27/10	171 ± 93	< 0.8	< 0.5	3.5 ± 1.3	< 1.4	1.4 ± 0.8	< 4.0
MW-TMI-10I	10/28/10	844 ± 121	< 1.1	< 0.9	< 1.7	< 1.4	2.2 ± 0.9	< 4.0

TABLE C-I.2 **CONCENTRATIONS OF GAMMA EMITTERS IN GROUNDWATER SPLIT SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, THREE MILE ISLAND NUCLEAR STATION, 2010**

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	Cs-134	Cs-137	Ba-140	La-140
48S	10/26/10	< 29	80 ± 29	< 3	< 3	< 5	< 3	< 6	< 2	< 5	< 3	< 3	< 15	< 3
MS-19	10/26/10	< 26	91 ± 27	< 3	< 3	< 5	< 2	< 5	< 2	< 4	< 3	< 3	< 18	< 4
MS-2	10/26/10	< 34	78 ± 31	< 2	< 2	< 5	< 2	< 4	< 3	< 6	< 3	< 3	< 14	< 4
MS-8	10/26/10	< 31	73 ± 31	< 3	< 3	< 7	< 2	< 4	< 2	< 3	< 3	< 3	< 16	< 4
MW-TMI-6D	10/27/10	< 25	46 ± 25	< 3	< 3	< 5	< 3	< 5	< 3	< 4	< 3	< 3	< 17	< 3
MW-TMI-10I	10/28/10	< 37	< 71	< 2	< 3	< 7	< 4	< 9	< 4	< 4	< 4	< 3	< 22	< 2

TABLE C-I.3 CONCENTRATIONS OF HARD TO DETECTS IN GROUNDWATER SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, THREE MILE ISLAND NUCLEAR STATION, 2010

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

STC	COLLECTION PERIOD	AM-241	CM-242	CM-243/244	PU-238	PU-239/240	U-233/234	U-235	U-238	FE-55	NI-63
MW-TMI-10I	10/28/10	< 0.4	< 0.36	< 0.18	< 0.1	< 0.1	0.5 ± 0.1	< 0.07	0.3 ± 0.1	< 798	< 75

TABLE C-II.1 CONCENTRATIONS OF TRITIUM IN SURFACE WATER SPLIT SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, THREE MILE ISLAND NUCLEAR STATION, 2010

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3

NOT SAMPLED IN 2010