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THREE MILE ISLAND NUCLEAR STATION
UNITS 1 and 2

Annual Radiological
Groundwater Protection Program Report (ARGPPR)

1 January Through 31 December 2012

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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, surface water, storm water and precipitation samples collected from the environment, both on and off station property in 2012. During that time period 618 analyses were performed on 354 samples from 59 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.

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, storm water and precipitation 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, storm water or precipitation 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 32 of 50 groundwater monitoring locations. The groundwater tritium concentrations ranged from 179 ± 113 pCi/L to 12,100 ± 1,250 pCi/L. Tritium that was detected in groundwater at the Station is believed to be the result of a potential leak, historical releases, the recapture of gaseous tritium releases via rainwater and/or background from external sources greater than 200 pCi/L. Tritium was detected in four of five precipitation water locations. The concentration ranged from 173 ± 112 to 2,070 ± 272 pCi/L. Tritium was not detected at any surface water location. Tritium was detected in three storm water samples. The concentrations ranged from 197 ± 124 to 358 ± 134 pCi/L.

Gross Alpha and Gross Beta analyses in the dissolved and suspended fractions were performed on groundwater samples during the second quarter sampling in 2012. Gross Alpha (dissolved) was detected in 2 of the 31 groundwater locations. The concentrations were 0.7 and 1.5 pCi/L. Gross Alpha (suspended) was detected in three of 31 groundwater locations. The concentrations ranged

from 0.9 to 4.9 pCi/L. Gross Beta (dissolved) was detected in 24 of 31 groundwater locations. The concentrations ranged from 1.5 to 10.4 pCi/L. Gross Beta (suspended) was detected in 2 of 31 groundwater locations. The concentrations were 2.6 and 2.8 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-234, U-235 and U-238. The isotopes of U-234 and U-238 were detected in one of three groundwater monitoring locations. The U-234 isotope had a concentration of 0.4 pCi/L and the U-238 isotope had a concentration of 0.3 pCi/L. The levels detected are from naturally occurring isotopes and are considered background.

All other hard-to-detect nuclides were not detected at concentrations greater than their respective MDCs. The concentrations detected are from naturally occurring isotopes and are considered background.

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, surface water, precipitation water and storm water samples collected in 2012. 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 2012.

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 procedures to identify and report 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, Storm Water, and Precipitation</u>

Samples of water are collected, managed, transported and analyzed in accordance with approved procedures. Groundwater, surface water, storm water and precipitation 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 2012.

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.

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

4. Concentrations of Am-241 in groundwater.

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

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

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

8. Concentrations of Fe-55 in groundwater.

9. Concentrations of Ni-63 in groundwater.

10. Concentrations of Gross Alpha and Gross Beta (Dissolved and Suspended) in groundwater.

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 50 locations were analyzed for tritium activity. Tritium values ranged from the detection limit to 12,100 pCi/L (Table B-I.1, Appendix B).

Tritium Split Samples

Tritium values ranged from 164 to10,153 pCi/L (Table C-1.1, Appendix C).

Strontium

Strontium-90 was not detected above the required detection limit of 1.0 pCi/L (Table B-I.1, Appendix B).

Strontium Split Samples

Strontium-89 and Strontium-90 were not detected above the required detection limit (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 2012. Gross Alpha (dissolved) was detected in two of the 31 groundwater locations. The concentrations were 0.7 and 1.5 pCi/L. Gross Alpha (suspended) was detected in three of 31 groundwater locations. The concentrations ranged from 0.9 to 4.9 pCi/L. Gross Beta (dissolved) was detected in 24 of 31 groundwater locations. The concentrations ranged from 1.5 to 10.4 pCi/L. Gross Beta (suspended) was detected in two of 31 groundwater locations. The concentrations were 2.6 and 2.8 pCi/L (Table B-I.1, Appendix B).

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

Three split samples were analyzed for Gross Alpha and Gross Beta (dissolved and suspended) in 2012. Gross Alpha was not detected above the required detection limit. Gross beta was detected in all three sample analyzed. The concentrations ranged from 1.9 to 2.3 pCi/L (Table C-I.1, Appendix C).

Gamma Emitters

Potassium-40 was detected in three of 67 samples with concentrations ranging from 40 pCi/L to 324 pCi/L. No other gamma-emitting nuclides were detected (Table B-I.2, Appendix B).

Gamma Emitters Split Samples

Six locations were analyzed for gamma-emitting nuclides in 2012. No gamma-emitting nuclides were detected in any split samples (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-234, U-235 and U-238. The isotopes of U-234 and U-238 were detected in one of three groundwater monitoring locations. The U-234 isotope had a concentration of 0.37 pCi/L and the U-238 isotope had a concentration of 0.27 pCi/L. The concentrations detected are from naturally occurring isotopes and are considered background (Table B-I.3, Appendix B).

Hard-To-Detect Split Samples

Hard to detects were not analyzed on any split samples in 2012 (Table C-I.3, Appendix C).

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

Three locations were analyzed for tritium in 2012. Tritium was not detected above the required detection limit of 200 pCi/L in any of the 14 samples analyzed (Table B-II.1, Appendix B).

Tritium Split Samples

One location was analyzed for tritium was analyzed in 2012. Tritium was not detected above the required detection limit (Table C-II.1, Appendix C).

Strontium

Surface water samples were not analyzed for Sr-90 in 2012 (Table B–II.1, Appendix B).

Gamma Emitters

Three locations were analyzed for gamma-emitting nuclides in 2012. None of the four samples detected gamma-emitting nuclides (Table B–II.2, Appendix B).

Gamma Emitters Split Samples

One location was analyzed for gamma-emitting nuclides in 2012. No gamma emitting nuclides were detected (Table C–II.2, Appendix C).

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

One location was analyzed for tritium. Tritium was detected in three samples above the required detection limit of 200 pCi/L. The concentrations ranged from 197 to 358 pCi/L (Table B–III.1, Appendix B).

Gamma Emitters

Samples from one location were analyzed for gamma-emitting

nuclides. Potassium-40 was detected in one of four samples with a concentration of 50 pCi/L. No other gamma emitting nuclides were detected (Table B–III.2, Appendix B).

D. Precipitation Water Results

Samples were collected at five locations. The following analyses were performed:

Tritium

Samples from five locations were analyzed for tritium activity. Tritium activity was detected at four of five locations. The concentrations ranged from 173 to 2070 pCi/L (Table B–IV.1, Appendix B).

Tritium Split Samples

Samples from two locations were analyzed for tritium activity. Tritium activity was detected in three of four samples. The concentrations ranged from 185 to 310 pCi/L (Table C–III.1, Appendix C).

Gamma Emitters

Precipitation water was not analyzed for Gamma Emitters in 2012 (Table B–IV.2, Appendix B).

Gamma Emitters Split Samples

No gamma-emitting nuclides were analyzed in 2012 (Table C–III.2, Appendix C).

E. Leaks, Spills, and Releases

A potential leak was identified at TMI in 2012 due to elevated MS-22 tritium concentration readings. TMI continues to monitor MS-22 and surrounding wells, in addition to tritium plumes from previous years and reports the activity and dose to the public in the ARRER. The elevated MS-22 well tritium concentrations were voluntarily reported under the reporting requirements for the NEI Groundwater Protection Initiative (GPI) as implemented in Exelon's Reportability procedure LS-AA-1120, RAD 1.34.

F. Actions Taken

1. Compensatory Actions

TMI continues to monitor groundwater radioactivity as part of the on-going investigation into the potential leak. A Tritium Response Team was assembled and investigated numerous possible causes. The leak has not been identified to date, but additional wells are being planned for installation to help isolate the area of the leak. TMI has an extensive groundwater monitoring program with over 50 monitoring wells. Only MS-22 has seen elevated tritium levels from this potential leak. No gamma activity or hard-to-detects have been identified in MS-22.

APPENDIX A

LOCATION DESIGNATION & DISTANCE

TABLE A-1: **Radiological Groundwater Protection Program - Sampling Locations and Distance, Three Mile Island Nuclear Station, 2012**

Site	Site Type
#3	Monitoring Well
48N	Monitoring Well
48S	Production Potable Well
E1-2	Monitoring Well, Offsite
EDCB	Storm Water
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
TM-PR-ESE	Precipitation Water
TM-PR-MS-1	Precipitation Water
TM-PR-MS-2	Precipitation Water
TM-PR-MS-20	Precipitation Water
TM-PR-MS-22	Precipitation Water
TM-PR-MS-4	Precipitation Water
TM-PR-NW-B	Precipitation Water

TABLE A-1: **Radiological Groundwater Protection Program - Sampling Locations and Distance, Three Mile Island Nuclear Station, 2012**

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
MW-TMI-9S	Monitoring Well
TRAINING CENTER	Offsite Monitoring Well

* NO WATER PRESENT TO SAMPLE

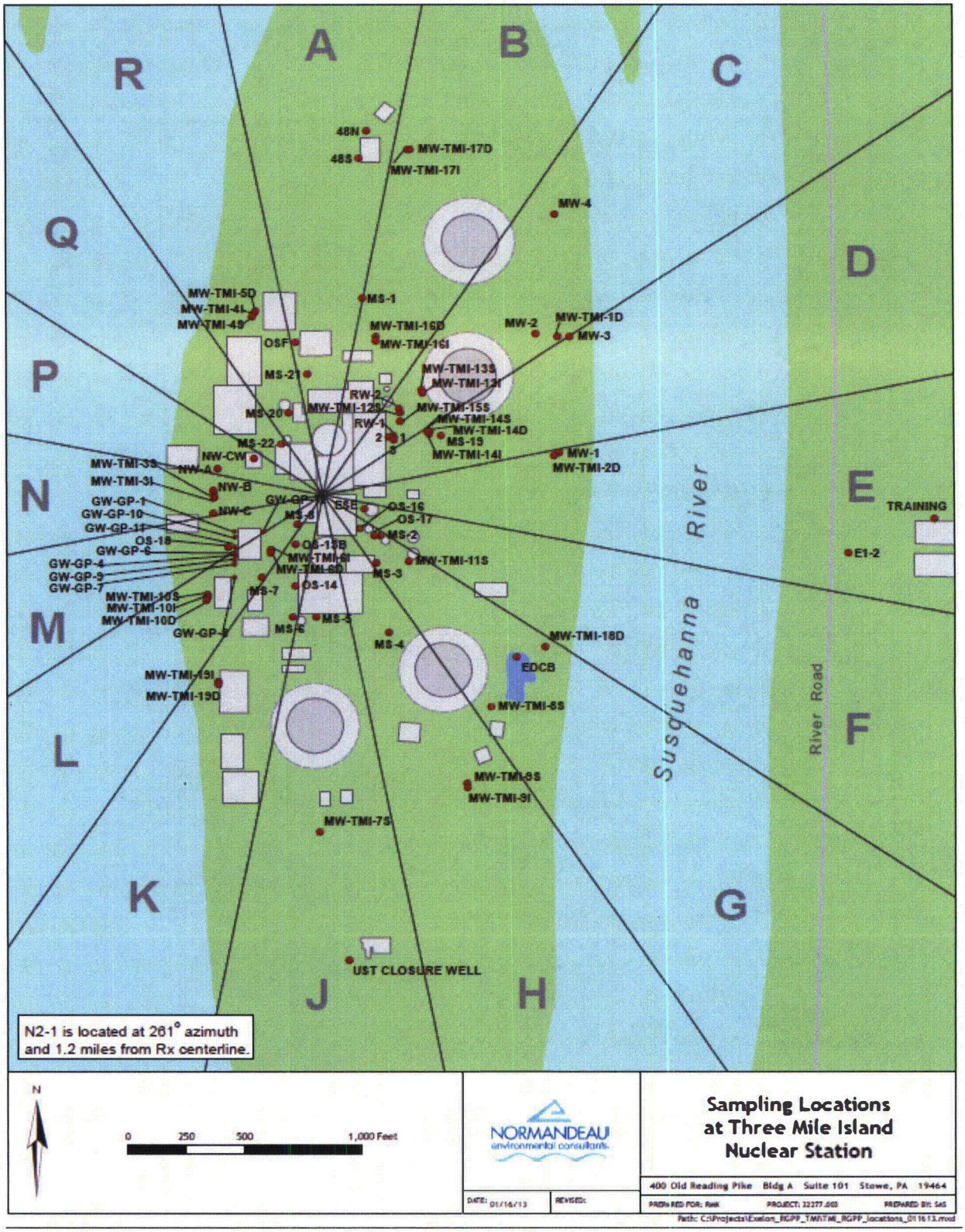

Figure A – 1
Sampling Locations at the Three Mile Island Nuclear Station, 2012

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APPENDIX B

DATA TABLES

TABLE B-I.1 **CONCENTRATIONS OF TRITIUM, STRONTIUM-90, GROSS ALPHA AND GROSS BETA IN GROUNDWATER SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, THREE MILE ISLAND NUCLEAR STATION, 2012**

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	01/31/12	< 197					
3	05/02/12	< 193	< 0.5	< 0.6	< 0.4	2.2 ± 0.8	< 1.7
3	07/24/12	< 167					
3	10/16/12	< 175					
48S	01/30/12	< 166					
48S	04/30/12	< 169	< 0.5	< 1.6	< 0.6	< 1.8	< 1.7
48S	07/09/12	< 189					
48S	07/25/12	< 179					
48S	08/23/12	< 183					
48S	09/17/12	< 174					
48S	10/17/12	< 180					
48S	10/17/12	< 196					
48S	11/12/12	< 175					
48S	12/10/12	< 180					
MS-1	02/01/12	< 187					
MS-1	04/30/12	< 183	< 0.7	< 1.6	< 0.5	< 2.2	< 1.5
MS-1	07/24/12	205 ± 122					
MS-1	10/16/12	200 ± 121					
MS-19	02/01/12	< 190					
MS-19	04/30/12	215 ± 126	< 0.7	< 0.7	< 0.6	2.4 ± 0.8	< 1.7
MS-19	07/25/12	< 184					
MS-19	10/16/12	< 179					
MS-2	01/31/12	595 ± 146					
MS-2	01/31/12	625 ± 145					
MS-2	05/01/12	385 ± 134	< 0.6	< 0.7	< 0.4	4.2 ± 0.9	< 1.6
MS-2	07/24/12	272 ± 116					
MS-2	10/16/12	336 ± 141					
MS-20	01/31/12	1660 ± 216					
MS-20	05/01/12	664 ± 138	< 0.6	< 0.9	< 0.6	5.1 ± 1.1	< 1.7
MS-20	05/01/12	589 ± 130	< 0.7	< 1.0	< 0.6	4.6 ± 1.1	< 1.7
MS-20	07/09/12	1000 ± 166					
MS-20	07/12/12	858 ± 163					
MS-20	07/16/12	901 ± 144					
MS-20	07/19/12	907 ± 149					
MS-20	07/23/12	861 ± 144					
MS-20	07/26/12	820 ± 161					
MS-20	07/30/12	680 ± 154					
MS-20	08/02/12	850 ± 156					
MS-20	08/06/12	738 ± 142					
MS-20	08/09/12	719 ± 157					
MS-20	08/13/12	730 ± 145					
MS-20	08/16/12	725 ± 139					
MS-20	08/20/12	879 ± 151					
MS-20	08/23/12	550 ± 140					
MS-20	08/27/12	699 ± 153					
MS-20	08/30/12	805 ± 145					
MS-20	09/04/12	594 ± 149					
MS-20	09/07/12	748 ± 141					
MS-20	09/10/12	884 ± 159					
MS-20	09/13/12	783 ± 132					
MS-20	09/17/12	763 ± 183					
MS-20	09/20/12	823 ± 143					

TABLE B-I.1 **CONCENTRATIONS OF TRITIUM, STRONTIUM-90, GROSS ALPHA AND GROSS BETA IN GROUNDWATER SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, THREE MILE ISLAND NUCLEAR STATION, 2012**

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)
MS-20	09/24/12		637 ± 140					
MS-20	09/27/12		600 ± 145					
MS-20	10/01/12		721 ± 145					
MS-20	10/08/12		549 ± 145					
MS-20	10/15/12		559 ± 136					
MS-20	10/22/12		534 ± 138					
MS-20	10/30/12		641 ± 163					
MS-20	11/05/12		611 ± 131					
MS-20	11/12/12		534 ± 126					
MS-20	11/19/12		828 ± 160					
MS-20	11/26/12		647 ± 164					
MS-20	12/03/12		698 ± 155					
MS-20	12/10/12		444 ± 134					
MS-20	12/17/12		519 ± 126					
MS-20	12/24/12		533 ± 131					
MS-20	12/31/12		617 ± 178					
MS-21	01/31/12		210 ± 113					
MS-21	01/31/12		197 ± 111					
MS-21	05/03/12		< 189	< 0.5	< 0.7	< 0.4	2.3 ± 0.8	< 1.5
MS-21	07/25/12		252 ± 119					
MS-21	10/16/12		265 ± 125					
MS-22	02/01/12		670 ± 147					
MS-22	02/01/12	Reanalysis	798 ± 162					
MS-22	05/02/12		5350 ± 591	< 0.6	< 0.7	< 0.4	5.2 ± 0.9	< 1.6
MS-22	05/02/12	Recount	5380 ± 591					
MS-22	05/02/12	Reanalysis	5120 ± 565					
MS-22	07/09/12		9570 ± 1000					
MS-22	07/09/12		9680 ± 1010					
MS-22	07/12/12		9020 ± 946					
MS-22	07/16/12		11800 ± 1210					
MS-22	07/19/12		12100 ± 1250					
MS-22	07/23/12		1060 ± 159					
MS-22	07/23/12		1030 ± 171					
MS-22	07/24/12		982 ± 169					
MS-22	07/26/12		1910 ± 251					
MS-22	07/30/12		1590 ± 222					
MS-22	08/02/12		864 ± 156					
MS-22	08/02/12	Reanalysis	989 ± 157					
MS-22	08/06/12		487 ± 129					
MS-22	08/09/12		2870 ± 342					
MS-22	08/13/12		5940 ± 645					
MS-22	08/16/12		1490 ± 204					
MS-22	08/20/12		5450 ± 590					
MS-22	08/20/12	Reanalysis	4880 ± 545					
MS-22	08/23/12		6110 ± 665					
MS-22	08/27/12		8330 ± 878					
MS-22	08/30/12		9220 ± 956					
MS-22	09/04/12		11000 ± 1150	< 0.6				
MS-22	09/07/12		8330 ± 877					
MS-22	09/10/12		5770 ± 610					
MS-22	09/13/12		3500 ± 386					
MS-22	09/17/12		5880 ± 643					

TABLE B-I.1 **CONCENTRATIONS OF TRITIUM, STRONTIUM-90, GROSS ALPHA AND GROSS BETA IN GROUNDWATER SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, THREE MILE ISLAND NUCLEAR STATION, 2012**

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)
MS-22	09/20/12	1210 ± 170					
MS-22	09/24/12	3250 ± 374					
MS-22	09/27/12	4030 ± 460					
MS-22	10/01/12	2050 ± 256					
MS-22	10/08/12	2770 ± 337					
MS-22	10/15/12	5600 ± 607					
MS-22	10/22/12	989 ± 162					
MS-22	10/30/12	2460 ± 292					
MS-22	11/05/12	2760 ± 319					
MS-22	11/12/12	3870 ± 428					
MS-22	11/19/12	5020 ± 546					
MS-22	11/26/12	5400 ± 579					
MS-22	12/03/12	4830 ± 527					
MS-22	12/10/12	5540 ± 606					
MS-22	12/17/12	2870 ± 334					
MS-22	12/24/12	879 ± 147					
MS-22	12/31/12	1380 ± 186					
MS-3	02/01/12	271 ± 129					
MS-3	05/03/12	383 ± 136	< 0.5	< 0.9	0.9 ± 0.6	6.7 ± 1.1	< 1.5
MS-3	07/24/12	390 ± 123					
MS-3	10/16/12	433 ± 149					
MS-4	05/02/12	278 ± 130					
MS-5	01/31/12	< 196					
MS-5	05/01/12	< 189	< 0.6	< 0.7	< 0.4	5.5 ± 1.0	< 1.6
MS-5	07/24/12	< 170					
MS-5	10/16/12	< 192					
MS-5	10/16/12	< 198					
MS-7	01/31/12	< 199					
MS-7	05/01/12	< 184	< 0.6	< 0.4	< 0.5	< 1.2	< 1.5
MS-7	07/25/12	< 176					
MS-7	07/25/12	< 167					
MS-7	10/17/12	< 174					
MS-8	01/31/12	290 ± 134					
MS-8	05/01/12	< 193	< 0.6	< 0.7	4.9 ± 1.3	4.8 ± 1.0	2.8 ± 1.2
MS-8	07/09/12	377 ± 136					
MS-8	07/23/12	403 ± 120					
MS-8	08/06/12	381 ± 123					
MS-8	08/20/12	363 ± 123					
MS-8	09/04/12	279 ± 134					
MS-8	09/17/12	277 ± 124					
MS-8	10/01/12	338 ± 124					
MS-8	10/17/12	307 ± 140					
MS-8	10/30/12	410 ± 146					
MS-8	11/12/12	321 ± 115					
MS-8	11/26/12	343 ± 144					
MS-8	12/10/12	238 ± 121					
MS-8	12/24/12	226 ± 116					
MW-1	05/02/12	< 193					
MW-2	05/02/12	< 184					
MW-TMI-10D	01/31/12	221 ± 112					
MW-TMI-10D	05/01/12	228 ± 124					
MW-TMI-10D	07/24/12	222 ± 114					

TABLE B-I.1 **CONCENTRATIONS OF TRITIUM, STRONTIUM-90, GROSS ALPHA AND GROSS BETA IN GROUNDWATER SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, THREE MILE ISLAND NUCLEAR STATION, 2012**

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-10D	10/17/12	398 ± 145					
MW-TMI-10I	01/31/12	1540 ± 205					
MW-TMI-10I	05/01/12	1270 ± 183	< 0.6	< 0.6	< 0.5	2.9 ± 1.0	< 1.5
MW-TMI-10I	07/24/12	1320 ± 188					
MW-TMI-10I	10/17/12	1190 ± 195					
MW-TMI-10I	10/17/12	1040 ± 188					
MW-TMI-10S	01/31/12	1560 ± 208					
MW-TMI-10S	05/01/12	2060 ± 258	< 0.5	< 0.9	< 0.7	6.5 ± 1.6	2.6 ± 1.4
MW-TMI-10S	07/24/12	2260 ± 278					
MW-TMI-10S	10/17/12	1840 ± 238					
MW-TMI-12S	01/31/12	< 166					
MW-TMI-12S	05/02/12	< 192	< 0.5	< 0.5	< 0.4	6.0 ± 0.9	< 1.6
MW-TMI-12S	07/25/12	< 195					
MW-TMI-12S	10/17/12	325 ± 140					
MW-TMI-13I	01/31/12	< 187					
MW-TMI-13I	05/02/12	195 ± 127					
MW-TMI-13I	07/24/12	< 193					
MW-TMI-13I	07/24/12	266 ± 116					
MW-TMI-13I	10/16/12	255 ± 125					
MW-TMI-13S	01/31/12	< 186					
MW-TMI-13S	05/02/12	< 192	< 0.6	< 0.9	< 0.4	6.5 ± 1.0	< 1.5
MW-TMI-13S	07/24/12	< 186					
MW-TMI-13S	10/16/12	309 ± 126					
MW-TMI-14D	02/01/12	614 ± 145					
MW-TMI-14D	02/01/12	537 ± 141					
MW-TMI-14D	04/30/12	387 ± 124					
MW-TMI-14D	07/25/12	387 ± 124					
MW-TMI-14D	10/16/12	309 ± 127					
MW-TMI-14I	02/01/12	< 187					
MW-TMI-14I	04/30/12	193 ± 127					
MW-TMI-14I	04/30/12	< 168					
MW-TMI-14I	07/25/12	329 ± 121					
MW-TMI-14I	10/16/12	< 177					
MW-TMI-14S	02/01/12	< 190					
MW-TMI-14S	04/30/12	221 ± 127	< 0.7	< 0.7	< 0.6	2.2 ± 0.8	< 1.7
MW-TMI-14S	07/25/12	< 171					
MW-TMI-14S	10/16/12	< 180					
MW-TMI-16D	02/01/12	331 ± 135					
MW-TMI-16D	04/30/12	327 ± 130					
MW-TMI-16D	07/24/12	418 ± 126					
MW-TMI-16D	10/16/12	571 ± 155					
MW-TMI-16I	02/01/12	< 190					
MW-TMI-16I	04/30/12	< 183					
MW-TMI-16I	07/24/12	413 ± 126					
MW-TMI-16I	10/16/12	268 ± 123					
MW-TMI-17I	04/30/12	< 182					
MW-TMI-18D	05/02/12	< 179					
MW-TMI-19I	05/01/12	< 178					
MW-TMI-1D	05/02/12	316 ± 131					
MW-TMI-2D	01/31/12	< 195					
MW-TMI-2D	05/02/12	290 ± 127	< 0.7	0.7 ± 0.4	< 0.5	2.5 ± 0.8	< 1.5
MW-TMI-2D	05/02/12	251 ± 125	< 0.7	< 0.7	< 0.6	3.2 ± 0.8	< 1.7

TABLE B-I.1 **CONCENTRATIONS OF TRITIUM, STRONTIUM-90, GROSS ALPHA AND GROSS BETA IN GROUNDWATER SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, THREE MILE ISLAND NUCLEAR STATION, 2012**

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-2D	07/24/12	< 170					
MW-TMI-2D	10/16/12	291 ± 139					
MW-TMI-3I	02/01/12	< 188					
MW-TMI-3I	05/02/12	213 ± 121	< 0.7	< 1.7	< 0.6	4.6 ± 1.3	< 1.7
MW-TMI-3I	07/09/12	< 185					
MW-TMI-3I	07/23/12	316 ± 116					
MW-TMI-3I	08/06/12	255 ± 116					
MW-TMI-3I	08/20/12	304 ± 121					
MW-TMI-3I	09/04/12	208 ± 129					
MW-TMI-3I	09/17/12	302 ± 123					
MW-TMI-3I	10/01/12	318 ± 125					
MW-TMI-3I	10/17/12	221 ± 121					
MW-TMI-3I	10/30/12	< 190					
MW-TMI-3I	11/12/12	< 165					
MW-TMI-3I	11/26/12	< 193					
MW-TMI-3I	12/10/12	377 ± 130					
MW-TMI-3I	12/24/12	< 169					
MW-TMI-4I	04/30/12	< 186					
MW-TMI-4S	04/30/12	< 182					
MW-TMI-6D	01/31/12	< 195					
MW-TMI-6D	05/01/12	255 ± 125	< 0.6	1.5 ± 0.7	< 0.5	< 1.5	< 1.5
MW-TMI-6D	07/25/12	197 ± 116					
MW-TMI-6D	10/17/12	< 188					
MW-TMI-6I	01/31/12	< 195					
MW-TMI-6I	05/01/12	< 180	< 0.6	< 1.2	2.8 ± 0.8	< 3.3	< 2.3
MW-TMI-6I	07/25/12	< 194					
MW-TMI-6I	10/17/12	< 191					
MW-TMI-7S	05/01/12	< 188					
MW-TMI-8S	05/01/12	< 178					
MW-TMI-8S	05/01/12	222 ± 126					
MW-TMI-9I	05/01/12	< 185					
NW-A	02/03/12	644 ± 139					
NW-A	04/30/12	603 ± 144	< 0.6	< 1.0	< 0.4	1.9 ± 0.9	< 1.5
NW-A	07/07/12	809 ± 157					
NW-A	07/24/12	893 ± 150					
NW-A	08/18/12	996 ± 156					
NW-A	09/15/12	1000 ± 162					
NW-A	10/16/12	875 ± 177					
NW-A	12/11/12	580 ± 133					
NW-B	02/03/12	418 ± 127					
NW-B	04/30/12	475 ± 139	< 0.6	< 0.8	< 0.4	1.5 ± 0.8	< 1.5
NW-B	07/07/12	443 ± 140					
NW-B	07/24/12	501 ± 131					
NW-B	08/18/12	416 ± 125					
NW-B	09/15/12	352 ± 126					
NW-B	10/16/12	394 ± 148					
NW-B	12/11/12	246 ± 116					
NW-C	02/03/12	1920 ± 245					
NW-C	04/30/12	2020 ± 267	< 0.5	< 0.9	< 0.4	< 1.4	< 1.5
NW-C	07/07/12	2100 ± 264					
NW-C	07/24/12	1690 ± 223					
NW-C	08/18/12	1560 ± 208					

TABLE B-I.1 **CONCENTRATIONS OF TRITIUM, STRONTIUM-90, GROSS ALPHA AND GROSS BETA IN GROUNDWATER SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, THREE MILE ISLAND NUCLEAR STATION, 2012**

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)
NW-C	09/15/12	1380 ± 196					
NW-C	10/16/12	1300 ± 196					
NW-C	12/11/12	1140 ± 168					
NW-CW	02/03/12	641 ± 141					
NW-CW	04/30/12	360 ± 136	< 0.5	< 0.8	< 0.4	< 1.3	< 1.5
NW-CW	07/24/12	670 ± 137					
NW-CW	08/18/12	869 ± 150					
NW-CW	09/15/12	701 ± 144					
NW-CW	10/16/12	437 ± 150					
NW-CW	12/11/12	248 ± 115					
OS-14	01/31/12	< 193					
OS-14	07/24/12	< 195					
OS-14	10/16/12	< 170	< 0.9	< 1.2	< 0.3	10.4 ± 1.3	< 1.6
OS-16	01/31/12	604 ± 150					
OS-16	05/01/12	384 ± 135	< 0.6	< 0.5	< 0.4	5.9 ± 0.9	< 1.7
OS-16	07/24/12	279 ± 118					
OS-16	10/16/12	300 ± 137					
OS-18	02/01/12	227 ± 127					
OS-18	02/01/12	< 189					
OS-18	05/01/12	233 ± 124	< 0.6	< 0.7	< 0.5	4.3 ± 1.2	< 1.5
OS-18	07/25/12	238 ± 117					
OS-18	10/17/12	< 183					
OSF	01/30/12	329 ± 119					
OSF	04/30/12	362 ± 134	< 0.5	< 1.5	< 0.4	5.5 ± 1.3	< 1.5
OSF	04/30/12	396 ± 123	< 0.7	< 1.5	< 0.6	4.1 ± 1.2	< 1.7
OSF	07/09/12	391 ± 135					
OSF	07/25/12	506 ± 131					
OSF	08/20/12	475 ± 130					
OSF	09/17/12	384 ± 129					
OSF	10/17/12	457 ± 132					
OSF	11/12/12	410 ± 120					
OSF	12/10/12	339 ± 129					
RW-1	01/31/12	< 195					
RW-1	05/02/12	< 186	< 0.5	< 0.7	< 0.4	4.0 ± 0.9	< 1.6
RW-1	07/24/12	< 176					
RW-1	10/16/12	< 172					
RW-2	01/31/12	< 196					
RW-2	05/02/12	< 189	< 0.6	< 0.6	< 0.4	6.5 ± 0.9	< 1.6
RW-2	07/25/12	262 ± 118					
RW-2	07/25/12	179 ± 113					
RW-2	10/17/12	< 191					
TRAINING CENTER	05/02/12	< 186					

TABLE B-I.2 **CONCENTRATIONS OF GAMMA EMITTERS IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2012**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	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	05/02/12	< 16	< 18	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 2	< 2	< 12	< 4
48S	04/30/12	< 20	< 18	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 16	< 5
MS-1	04/30/12	< 42	< 82	< 5	< 4	< 11	< 5	< 9	< 6	< 9	< 5	< 5	< 31	< 9
MS-19	04/30/12	< 18	< 17	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 2	< 2	< 14	< 4
MS-2	05/01/12	< 25	< 54	< 3	< 3	< 6	< 3	< 6	< 3	< 5	< 3	< 3	< 17	< 5
MS-20	05/01/12	< 18	< 18	< 2	< 2	< 4	< 2	< 3	< 2	< 4	< 2	< 2	< 15	< 4
MS-20	05/01/12	< 16	< 30	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 2	< 2	< 13	< 4
MS-21	05/03/12	< 15	< 29	< 1	< 2	< 3	< 1	< 2	< 2	< 3	< 1	< 1	< 9	< 3
MS-22	05/02/12	< 20	< 47	< 2	< 2	< 5	< 2	< 5	< 2	< 4	< 2	< 2	< 14	< 5
MS-22	09/04/12	< 7	< 6	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 14	< 4
MS-3	02/01/12	< 39	< 30	< 4	< 4	< 8	< 4	< 8	< 4	< 8	< 4	< 4	< 27	< 8
MS-3	05/03/12	< 14	< 15	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 1	< 2	< 10	< 3
MS-3	07/24/12	< 42	< 86	< 4	< 4	< 7	< 3	< 8	< 4	< 8	< 4	< 4	< 30	< 8
MS-3	10/16/12	< 51	< 60	< 6	< 7	< 14	< 6	< 12	< 7	< 11	< 5	< 7	< 21	< 10
MS-4	05/02/12	< 27	< 59	< 3	< 3	< 6	< 3	< 6	< 3	< 6	< 3	< 3	< 16	< 6
MS-5	01/31/12	< 35	< 34	< 4	< 4	< 8	< 4	< 8	< 4	< 7	< 4	< 4	< 26	< 7
MS-5	05/01/12	< 26	< 52	< 3	< 3	< 6	< 3	< 6	< 3	< 5	< 3	< 3	< 17	< 5
MS-5	07/24/12	< 43	< 87	< 4	< 5	< 10	< 5	< 6	< 4	< 9	< 4	< 4	< 29	< 12
MS-5	10/16/12	< 35	< 35	< 4	< 4	< 7	< 3	< 8	< 4	< 7	< 4	< 4	< 19	< 6
MS-5	10/16/12	< 64	< 61	< 6	< 6	< 11	< 7	< 14	< 6	< 8	< 5	< 8	< 35	< 11
MS-7	05/01/12	< 32	< 86	< 4	< 4	< 8	< 4	< 8	< 4	< 7	< 4	< 4	< 22	< 7
MS-8	01/31/12	< 27	< 53	< 3	< 4	< 8	< 3	< 7	< 4	< 7	< 3	< 4	< 22	< 8
MS-8	05/01/12	< 33	< 79	< 4	< 4	< 8	< 4	< 8	< 4	< 6	< 3	< 4	< 20	< 8
MS-8	07/23/12	< 34	< 34	< 3	< 4	< 7	< 2	< 6	< 4	< 6	< 3	< 4	< 29	< 10
MS-8	10/17/12	< 48	< 51	< 6	< 8	< 12	< 8	< 10	< 8	< 11	< 6	< 7	< 33	< 13
MW-1	05/02/12	< 19	< 19	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 2	< 2	< 14	< 4
MW-2	05/02/12	< 15	< 13	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 1	< 2	< 11	< 3
MW-TMI-10I	05/01/12	< 30	< 31	< 3	< 3	< 6	< 3	< 6	< 4	< 5	< 3	< 3	< 17	< 5
MW-TMI-10I	10/17/12	< 58	< 144	< 6	< 6	< 13	< 7	< 11	< 8	< 12	< 7	< 7	< 30	< 14
MW-TMI-10I	10/17/12	< 31	< 65	< 3	< 4	< 6	< 3	< 6	< 4	< 6	< 3	< 4	< 18	< 5
MW-TMI-10S	05/01/12	< 29	< 60	< 3	< 3	< 6	< 3	< 6	< 3	< 5	< 3	< 3	< 18	< 5
MW-TMI-10S	10/17/12	< 44	< 95	< 6	< 6	< 12	< 6	< 9	< 6	< 10	< 5	< 5	< 22	< 9
MW-TMI-12S	05/02/12	< 13	< 12	< 1	< 1	< 3	< 1	< 3	< 1	< 2	< 1	< 1	< 8	< 3
MW-TMI-13S	05/02/12	< 16	< 16	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 2	< 2	< 12	< 4
MW-TMI-14S	04/30/12	< 22	< 45	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 18	< 6
MW-TMI-17I	04/30/12	< 25	< 57	< 3	< 3	< 6	< 3	< 6	< 3	< 5	< 3	< 3	< 17	< 6

TABLE B-I.2

CONCENTRATIONS OF GAMMA EMITTERS IN GROUNDWATER SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2012

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	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-18D	05/02/12	< 31	< 34	< 3	< 3	< 7	< 3	< 7	< 4	< 6	< 3	< 4	< 19	< 8
MW-TMI-19I	05/01/12	< 33	< 37	< 3	< 3	< 7	< 4	< 7	< 4	< 6	< 3	< 4	< 20	< 6
MW-TMI-1D	05/02/12	< 19	53 ± 31	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 15	< 5
MW-TMI-2D	05/02/12	< 26	< 58	< 3	< 3	< 7	< 3	< 6	< 3	< 5	< 3	< 3	< 16	< 7
MW-TMI-2D	05/02/12	< 20	< 18	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 14	< 5
MW-TMI-3I	05/02/12	< 15	< 14	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 1	< 2	< 10	< 4
MW-TMI-4I	04/30/12	< 24	40 ± 25	< 2	< 3	< 6	< 2	< 5	< 3	< 4	< 2	< 2	< 15	< 5
MW-TMI-4S	04/30/12	< 25	< 54	< 3	< 3	< 6	< 3	< 5	< 3	< 5	< 3	< 3	< 16	< 5
MW-TMI-6D	05/01/12	< 25	< 29	< 3	< 3	< 7	< 4	< 5	< 3	< 5	< 3	< 3	< 16	< 5
MW-TMI-6I	05/01/12	< 35	< 40	< 4	< 4	< 7	< 4	< 7	< 4	< 6	< 3	< 4	< 22	< 6
MW-TMI-7S	05/01/12	< 23	< 24	< 2	< 2	< 6	< 2	< 4	< 3	< 4	< 2	< 2	< 16	< 4
MW-TMI-8S	05/01/12	< 29	< 54	< 3	< 3	< 7	< 3	< 6	< 4	< 5	< 3	< 3	< 17	< 6
MW-TMI-8S	05/01/12	< 18	< 34	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 2	< 2	< 14	< 5
MW-TMI-9I	05/01/12	< 27	< 64	< 2	< 3	< 7	< 3	< 6	< 3	< 5	< 3	< 3	< 18	< 6
NW-A	04/30/12	< 17	< 34	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 2	< 2	< 13	< 4
NW-B	04/30/12	< 17	< 15	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 2	< 2	< 12	< 4
NW-C	04/30/12	< 17	< 32	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 2	< 2	< 13	< 4
NW-CW	04/30/12	< 16	< 31	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 2	< 2	< 12	< 5
OS-14	01/31/12	< 37	< 77	< 4	< 4	< 9	< 5	< 9	< 4	< 7	< 3	< 5	< 29	< 9
OS-14	07/24/12	< 38	324 ± 83	< 3	< 4	< 10	< 4	< 7	< 5	< 8	< 4	< 4	< 33	< 11
OS-14	10/16/12	< 55	< 109	< 7	< 6	< 12	< 6	< 14	< 4	< 10	< 5	< 6	< 26	< 13
OS-16	01/31/12	< 34	< 34	< 4	< 5	< 8	< 4	< 9	< 4	< 8	< 4	< 4	< 28	< 7
OS-16	05/01/12	< 31	< 26	< 3	< 3	< 6	< 3	< 7	< 4	< 6	< 3	< 3	< 18	< 6
OS-16	07/24/12	< 42	< 37	< 4	< 4	< 10	< 4	< 7	< 5	< 6	< 4	< 4	< 29	< 12
OS-16	10/16/12	< 50	< 122	< 5	< 6	< 15	< 4	< 11	< 7	< 12	< 6	< 7	< 35	< 13
OS-18	05/01/12	< 31	< 56	< 3	< 4	< 6	< 3	< 5	< 4	< 6	< 3	< 3	< 21	< 6
OSF	04/30/12	< 20	< 35	< 2	< 2	< 5	< 2	< 4	< 2	< 4	< 2	< 2	< 15	< 6
OSF	04/30/12	< 15	< 32	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 2	< 2	< 12	< 4
RW-1	05/02/12	< 15	< 17	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 2	< 2	< 11	< 4
RW-2	05/02/12	< 18	< 33	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 2	< 2	< 12	< 4
TRAINING CENTER	05/02/12	< 17	< 16	< 2	< 2	< 4	< 2	< 3	< 2	< 3	< 2	< 2	< 12	< 3

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, 2012**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	Am-241	Cm-242	Cm-243/244	Pu-238	Pu-239/240	U-234	U-235	U-238	Fe-55	Ni-63
MS-22	09/04/12	< 0.10	< 0.03	< 0.03	< 0.10	< 0.06	< 0.03	< 0.02	< 0.05	< 79	< 3.2
MW-TMI-10I	05/01/12	< 0.06	< 0.09	< 0.10	< 0.03	< 0.16	0.37 ± 0.14	< 0.06	0.27 ± 0.12	< 147	< 3.6
MW-TMI-10S	05/01/12	< 0.10	< 0.09	< 0.08	< 0.11	< 0.13	< 0.16	< 0.07	< 0.09	< 99	< 3.7

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, 2012**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3
SW-E-1	01/30/12	< 193
SW-E-1	05/02/12	< 181
SW-E-1	07/25/12	< 168
SW-E-1	10/17/12	< 177
SW-E-2	01/30/12	< 164
SW-E-2	05/02/12	< 189
SW-E-2	05/02/12	< 182
SW-E-2	07/23/12	< 170
SW-E-2	10/17/12	< 181
SW-E-3	01/30/12	< 166
SW-E-3	05/02/12	< 182
SW-E-3	07/23/12	< 166
SW-E-3	10/17/12	< 177
SW-E-3	10/17/12	< 193

TABLE B-II.2 **CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2012**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	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	05/02/12	< 17	< 18	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 2	< 2	< 13	< 4
SW-E-2	05/02/12	< 13	< 12	< 1	< 1	< 3	< 1	< 3	< 2	< 2	< 1	< 1	< 10	< 3
SW-E-2	05/02/12	< 19	< 20	< 2	< 2	< 4	< 2	< 4	< 2	< 4	< 2	< 2	< 14	< 4
SW-E-3	05/02/12	< 17	< 33	< 2	< 2	< 4	< 2	< 4	< 2	< 3	< 2	< 2	< 13	< 4

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, 2012

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3
EDCB	01/31/12	358 ± 134
EDCB	05/01/12	197 ± 124
EDCB	07/31/12	< 191
EDCB	10/30/12	250 ± 133

TABLE B-III.2 CONCENTRATIONS OF GAMMA EMITTERS IN STORM WATER SAMPLES COLLECTED IN THE VICINITY OF THREE MILE ISLAND NUCLEAR STATION, 2012

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	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	01/31/12	< 32	50 ± 33	< 4	< 4	< 8	< 4	< 7	< 3	< 7	< 4	< 4	< 16	< 5
EDCB	05/01/12	< 40	< 78	< 3	< 4	< 9	< 4	< 7	< 4	< 7	< 4	< 4	< 32	< 7
EDCB	07/31/12	< 40	< 63	< 4	< 4	< 10	< 3	< 9	< 5	< 6	< 4	< 4	< 30	< 11
EDCB	10/30/12	< 48	< 40	< 5	< 5	< 9	< 5	< 10	< 5	< 8	< 4	< 6	< 27	< 9

TABLE B-IV.1 CONCENTRATIONS OF TRITIUM IN PRECIPITATION WATER SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM THREE MILE ISLAND NUCLEAR STATION, 2012

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE		H-3
TM-PR-ESE	03/16/12		< 166
TM-PR-ESE	05/08/12		382 ± 138
TM-PR-ESE	05/08/12	Recount	361 ± 123
TM-PR-ESE	07/10/12		357 ± 145
TM-PR-ESE	10/16/12		316 ± 123
TM-PR-MS-1	03/16/12		< 168
TM-PR-MS-1	05/08/12		236 ± 129
TM-PR-MS-1	05/08/12	Recount	187 ± 114
TM-PR-MS-1	07/10/12		< 195
TM-PR-MS-1	10/16/12		< 180
TM-PR-MS-2	03/16/12		293 ± 119
TM-PR-MS-2	05/08/12		205 ± 127
TM-PR-MS-2	07/10/12		< 193
TM-PR-MS-2	10/16/12		234 ± 119
TM-PR-MS-22	07/19/12		220 ± 114
TM-PR-MS-22	07/23/12		1990 ± 237
TM-PR-MS-22	08/02/12		< 184
TM-PR-MS-22	08/06/12		< 167
TM-PR-MS-22	08/13/12		< 177
TM-PR-MS-22	08/16/12		261 ± 117
TM-PR-MS-22	08/20/12		442 ± 129
TM-PR-MS-22	08/20/12	Reanalysis	248 ± 127
TM-PR-MS-22	08/23/12		1730 ± 236
TM-PR-MS-22	08/23/12	Reanalysis	1740 ± 231
TM-PR-MS-22	08/27/12		1040 ± 170
TM-PR-MS-22	09/04/12		2030 ± 260
TM-PR-MS-22	09/04/12	Recount	1990 ± 262
TM-PR-MS-22	09/04/12	Reanalysis	2070 ± 272
TM-PR-MS-22	09/07/12		173 ± 112
TM-PR-MS-22	09/10/12		270 ± 122
TM-PR-MS-22	09/20/12		179 ± 107
TM-PR-MS-22	09/27/12		< 189
TM-PR-MS-22	10/01/12		297 ± 123
TM-PR-MS-22	10/08/12		2020 ± 267
TM-PR-MS-22	10/08/12	Recount	2070 ± 254
TM-PR-MS-22	10/08/12	Reanalysis	1980 ± 245
TM-PR-MS-22	10/22/12		474 ± 132
TM-PR-MS-22	10/30/12		238 ± 136
TM-PR-MS-22	11/19/12		< 180
TM-PR-MS-22	12/03/12		1640 ± 217
TM-PR-MS-22	12/03/12	Recount	1650 ± 221
TM-PR-MS-22	12/03/12	Reanalysis	1520 ± 209
TM-PR-MS-22	12/10/12		1970 ± 256
TM-PR-MS-22	12/17/12		335 ± 120
TM-PR-MS-22	12/24/12		945 ± 153
TM-PR-MS-4	03/16/12		< 167
TM-PR-MS-4	05/08/12		< 188
TM-PR-MS-4	07/10/12		< 190
TM-PR-MS-4	10/16/12		< 171

APPENDIX C

DATA TABLES

TABLE C-I.1 CONCENTRATIONS OF TRITIUM, STRONTIUM, GROSS ALPHA AND GROSS BETA IN GROUNDWATER SPLIT SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, THREE MILE ISLAND NUCLEAR STATION, 2012

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3	Sr-89	Sr-90	Gr-A	Gr-B
MS-20	05/01/12	751 ± 106	< 0.7	< 0.5	< 2.4	2.0 ± 2.0
MS-21	01/31/12	257 ± 86				
MS-2	01/31/12	772 ± 108				
MS-22	07/09/12	10153 ± 306				
MS-22	07/23/12	1184 ± 132				
MS-5	10/16/12	< 149				
MS-7	07/25/12	217 ± 96				
MW-TMI-10I	10/17/12	1010 ± 116				
MW-TMI-13I	07/24/12	375 ± 103				
MW-TMI-14D	02/01/12	715 ± 105				
MW-TMI-14I	04/30/12	235 ± 84				
MW-TMI-2D	05/02/12	187 ± 81	< 0.7	< 0.5	< 1.5	1.9 ± 1.0
MW-TMI-8S	05/01/12	218 ± 83				
OS-18	02/01/12	233 ± 85				
OSF	04/30/12	488 ± 95	< 0.8	< 0.5	< 3.4	2.3 ± 1.2
RW-2	07/25/12	213 ± 96				
48S	10/17/12	164 ± 80				

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, 2012**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION PERIOD	Be-7	K-40	Mn-54	Fe-59	Co-58	Co-60	Zn-65	Zr-95	Nb-95	Cs-134	Cs-137	Ba-140	La-140
MW-TMI-8S	05/01/12	< 29	< 72	< 2	< 5	< 2	< 2	< 4	< 4	< 4	< 3	< 3	< 12	< 4
MW-TMI-2D	05/02/12	< 31	< 70	< 2	< 3	< 2	< 2	< 5	< 6	< 4	< 3	< 3	< 21	< 4
OSF	04/30/12	< 15	< 47	< 3	< 6	< 3	< 2	< 4	< 4	< 3	< 2	< 2	< 17	< 6
MS-20	05/01/12	< 13	< 54	< 2	< 4	< 2	< 2	< 4	< 4	< 4	< 3	< 2	< 19	< 3
MS-5	10/16/12	< 21	< 49	< 2	< 7	< 2	< 2	< 5	< 4	< 3	< 3	< 2	< 24	< 4
MW-TMI-10I	10/17/12	< 24	< 62	< 2	< 6	< 3	< 3	< 3	< 5	< 4	< 2	< 2	< 19	< 4

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, 2012

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	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

NONE FOR 2012

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, 2012

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3
SW-E-2	05/02/12	< 148

TABLE C-II.2 **CONCENTRATIONS OF GAMMA EMITTERS IN SURFACE WATER SPLIT SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, THREE MILE ISLAND NUCLEAR STATION, 2012**

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION PERIOD	Be-7	K-40	Mn-54	Fe-59	Co-58	Co-60	Zn-65	Zr-95	Nb-95	Cs-134	Cs-137	Ba-140	La-140
SW-E-2	05/02/12	< 33	< 63	< 2	< 7	< 3	< 2	< 4	< 6	< 3	< 3	< 3	< 12	< 2

TABLE C-III.1 CONCENTRATIONS OF TRITIUM IN PRECIPITATION WATER SPLIT SAMPLES COLLECTED AS PART OF THE RADIOLOGICAL GROUNDWATER PROTECTION PROGRAM, THREE MILE ISLAND NUCLEAR STATION, 2012

RESULTS IN UNITS OF PCI/LITER ± 2 SIGMA

SITE	COLLECTION DATE	H-3
TM-PR-MS-2Q	03/30/12	310 ± 87
TM-PR-MS-2Q	06/08/12	185 ± 79
TM-PR-MS-2Q	08/15/12	< 153
TM-PR-MS-2Q	10/26/12	253 ± 91