Exelon Generation®

Three Mile Island Unit 1
Route 441 South
P.O. Box 480
Middletown, PA 17057
717-948-8000 Office
www.exeloncorp.com

April 25, 2014

TMI-14-049

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

THREE MILE ISLAND NUCLEAR STATION UNIT 1 AND UNIT 2
RENEWED OPERATING LICENSE NO. DPR-50 AND POSSESSION ONLY
LICENSE NO. DPR 73
DOCKET NOS. 50-289 AND 50-320

SUBJECT: COMBINED 2013 ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

The 2013 Annual Radioactive Effluent Release Reports required by TMI-1 Technical Specification 6.9.4.1, TMI-2 Technical Specifications 6.8.1.2, and 6.12, and the Off-Site Dose Calculation Manual Part 4, Section 2.1, is enclosed.

Attachment 1 contains a summary of the quantities of radioactive liquid and gaseous effluents released from the site as outlined in Reg. Guide 1.21, Rev. 1, with data summarized on a quarterly basis following the format of Appendix B thereof.

Attachment 2 contains information for each type of solid waste shipped offsite during the report period including the container volume, total curie quantity (specified as determined by measurement or estimate), principal radionuclides (specified as determined by measurement or estimate) and type of waste.

Attachment 3 includes a summary of unplanned releases from the site to unrestricted areas of radioactive materials in gaseous and liquid effluents made during the reporting period.

Attachment 4 describes any changes made during 2013 to the Process Control Program (PCP) documents or to the Offsite Dose Calculation Manual (ODCM) and a listing of new locations for dose calculations and/or environmental monitoring identified by the land use census pursuant to Part 3, Section 8.2, of the ODCM.

Attachment 5 reports all instrumentation not returned to operable status within 30 days per the TMI ODCM Part 1, Sections 2.1.1.b and 2.1.2.b, and Part 2, Section 2.1.2.b.

A009
IE48
FSME20

NRR
FSME

Attachment 6 is quarterly summaries of hourly meteorological data collected for 2013 in the form of joint frequency distribution of wind speed, wind direction and atmospheric stability.

Attachment 7 is an assessment of the radiation doses due to the radioactive liquid and gaseous effluents released from the respective unit during 2013.

Attachment 8 is an assessment of the radiation doses from the radioactive liquid and gaseous effluents to members of the public due to their activities inside the site boundary during 2013.

Attachment 9 is an assessment of the radiation doses to the most likely exposed real individual from reactor releases and other nearby uranium fuel cycle sources including doses from primary effluent pathways and direct radiation for 2013.

Attachment 10 is a summation of deviations from the sampling and analysis regime specified in the ODCM for TMI-1 and TMI-2.

Enclosure 1 is a copy of the "TMI Offsite Dose Calculation Manual (ODCM)", CY-TM-170-300, Revision 3, which was issued on May 23, 2012, and current as of December 31, 2013. There were no revisions made to the ODCM during 2013.

Enclosure 2 is a copy of the change for TMI's Process Control Program, RW-AA-100 Revision 8, which was issued on March 20, 2013.

Please contact Laura Weber at 717-948-8947 if you have any questions concerning this report.

Sincerely,

Mark M. Newcomer
Plant Manager

MMN/LKW/dam

Attachments/Enclosures

cc: Region 1 Administrator
TMI Senior Resident Inspector
TMI-1 Senior Project Manager
TMI-2 Project Manager
GPU Nuclear Cognizant Officer
Department of Environmental Protection, Bureau of Radiation Protection

Summary of Radioactive Liquid and Gaseous Effluents Released from TMI during 2013

TABLE 1A
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT 2013
GASEOUS EFFLUENTS – SUMMATION OF ALL RELEASES
TMI-1

	UNIT	QUARTER 1	QUARTER 2	QUARTER 3	QUARTER 4	EST TOTAL ERROR %
A. FISSION AND ACTIVATION GASES						
1. Total Release	Ci	9.16E-02	7.10E-02	1.07E-02	1.80E-01	25%
2. Avg release rate for period	µCi/S	1.18E-02	9.03E-03	1.35E-02	2.27E-02	
3. Percent of applicable limit	%	*	*	*	*	
B. IODINES						
1. Total Iodine I131	Ci	<LLD	<LLD	<LLD	<LLD	25%
2. Avg release rate for period	µCi/S	N/A	N/A	N/A	N/A	
3. Percent of applicable limit	%	*	*	*	*	
C. PARTICULATES						
1. Part. With half-life >8 days	Ci	<LLD	<LLD	9.80E-05	<LLD	25%
2. Avg release rate for period	µCi/S	N/A	N/A	1.23E-05	N/A	
3. Percent of applicable limit	%	*	*	*	*	
D. TRITIUM						
1. Total Release	Ci	2.23E+01	1.34E+01	1.70E+01	6.51E+01	15%
2. Avg release rate for period	µCi/S	2.86E+00	1.71E+00	2.14E+00	8.20E+00	
3. Percent of applicable limit	%	*	*	*	*	
E. GROSS ALPHA						
1. Total Release	Ci	<LLD	<LLD	<LLD	<LLD	25%
2. Avg release rate for period	µCi/S	N/A	N/A	N/A	N/A	
3. Percent of applicable limit	%	*	*	*	*	
F. CARBON 14						
1. Total Release	Ci	2.10E+00	2.10 E+00	2.10E+00	2.10E+00	**
2. Avg release rate for period	µCi/S	2.66E-01	2.66E-01	2.66E-01	2.66E-01	
3. Percent of applicable limit	%	*	*	*	*	

Note: Table 3 contains a listing of TMI ODCM Lower Limit of Detection (LLD).
*ODCM Limits – Listed on Dose summary Table.
**C-14 production was estimated using EPRI Technical Report 1021106 Methodology.

TABLE 1B
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT 2013
GASEOUS EFFLUENTS - GROUND-LEVEL RELEASES - BATCH MODE
TMI-1

Fission And Activation Gasses	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Ar-41	Ci	9.13E-02	7.04E-02	9.13E-02	9.16E-02
Kr-85	Ci	<LLD	<LLD	<LLD	<LLD
Kr-85m	Ci	<LLD	<LLD	<LLD	<LLD
Kr-87	Ci	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	<LLD	<LLD	<LLD	<LLD
Xe-131m	Ci	<LLD	<LLD	<LLD	4.05E-04
Xe-133	Ci	3.16E-04	5.61E-04	1.61E-02	8.70E-02
Xe-133m	Ci	<LLD	<LLD	<LLD	2.52E-04
Xe-135	Ci	<LLD	<LLD	<LLD	1.09E-03
Xe-135m	Ci	<LLD	<LLD	<LLD	<LLD
Xe-138	Ci	<LLD	<LLD	<LLD	<LLD
Total	Ci	9.16E-02	7.10E-02	1.07 E-01	1.80E-01

Radioiodines	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4
I-131	Ci	<LLD	<LLD	<LLD	<LLD
I-132	Ci	<LLD	<LLD	<LLD	<LLD
I-133	Ci	<LLD	<LLD	<LLD	<LLD
Total	Ci	N/A	N/A	N/A	N/A

Particulates	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Cr-51	Ci	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	<LLD	<LLD	<LLD	<LLD
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD
Ag-110m	Ci	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	<LLD	<LLD	<LLD
Ba-140	Ci	<LLD	<LLD	<LLD	<LLD
La-140	Ci	<LLD	<LLD	<LLD	<LLD
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD
Total	Ci	N/A	N/A	N/A	N/A

Note: Table 3 contains a listing of TMI ODCM Lower Limit of Detection (LLD).

TABLE 1C
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT 2013
GASEOUS EFFLUENTS - GROUND-LEVEL RELEASES - CONTINUOUS MODE
TMI-1

Fission And Activation Gasses	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Ar-41	Ci	<LLD	<LLD	<LLD	<LLD
Kr-85	Ci	<LLD	<LLD	<LLD	<LLD
Kr-85m	Ci	<LLD	<LLD	<LLD	<LLD
Kr-87	Ci	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	<LLD	<LLD	<LLD	<LLD
Xe-133m	Ci	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	<LLD	<LLD	<LLD	<LLD
Xe-138	Ci	<LLD	<LLD	<LLD	<LLD
Total	Ci	N/A	N/A	N/A	N/A

Radioiodines	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4
I-131	Ci	<LLD	<LLD	<LLD	<LLD
I-132	Ci	<LLD	<LLD	<LLD	<LLD
I-133	Ci	<LLD	<LLD	<LLD	<LLD
Total	Ci	N/A	N/A	N/A	N/A

Particulates	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Cr-51	Ci	<LLD	<LLD	8.38E-06	<LLD
Mn-54	Ci	<LLD	<LLD	<LLD	<LLD
Fe-55	Ci	<LLD	<LLD	<LLD	<LLD
Co-57	Ci	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	<LLD	<LLD	8.73E-05	<LLD
Fe-59	Ci	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	<LLD	<LLD	1.96E-06	<LLD
Ni-63	Ci	<LLD	<LLD	<LLD	<LLD
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD
Nb-95	Ci	<LLD	<LLD	3.59E-07	<LLD
Zr-95	Ci	<LLD	<LLD	<LLD	<LLD
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD
Ag-110m	Ci	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	<LLD	<LLD	<LLD
Ba-140	Ci	<LLD	<LLD	<LLD	<LLD
La-140	Ci	<LLD	<LLD	<LLD	<LLD
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD
Total	Ci	N/A	N/A	9.80E-05	N/A

Tritium	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4
H3	Ci	2.23E+01	1.34E+01	1.70E+01	6.51E+01

Carbon 14	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4
C-14	Ci	2.10E+00	2.10E+00	2.10E+00	2.10E+00

Note: Table 3 contains a listing of TMI ODCM Lower Limit of Detection (LLD).

TABLE 2A
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT 2013
LIQUID EFFLUENTS – SUMMATION OF ALL RELEASES
TMI-1

	UNIT	QUARTER 1	QUARTER 2	QUARTER 3	QUARTER 4	EST TOTAL ERROR %
A. FISSION AND ACTIVATION PRODUCTS						
1. Total Release (Not incl. Tritium, gases, alpha)	Ci	<LLD	9.45E-06	1.56E-03	9.03E-07	25%
2. Avg diluted concentration during period	µCi/ml	N/A	7.12E-08	1.19E-05	5.63E-09	
3. Percent of applicable limit	%	*	*	*	*	
B. TRITIUM						
1. Total Release	Ci	4.60E+01	1.44E+02	3.09E+02	1.05E+02	25%
2. Avg diluted concentration during period	µCi/ml	2.98E-01	1.08E+00	2.35E+00	6.53E-01	
3. Percent of applicable limit	%	*	*	*	*	
C. DISSOLVED AND ENTRAINED GASES						
1. Total Release	Ci	<LLD	<LLD	<LLD	<LLD	25%
2. Avg diluted concentration during period	µCi/ml	N/A	N/A	N/A	N/A	
3. Percent of applicable limit	%	*	*	*	*	
D. GROSS ALPHA RADIOACTIVITY						
1. Total Release	Ci	<LLD	<LLD	<LLD	<LLD	25%
E. VOLUME OF WASTE RELEASE (PRIOR TO DILUTION)	LITERS	1.22E+08	1.19E+08	1.20E+08	1.19E+08	10%
F. VOLUME OF DILUTION WATER USED	LITERS	6.36E+09	6.00E+09	7.10E+09	6.46E+09	10%

Note: Table 3 contains a listing of TMI ODCM Lower Limit of Detection (LLD).
*ODCM Limits – Listed on Dose summary Table

TABLE 2B
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT 2013
LIQUID EFFLUENTS - BATCH MODE
TMI-1

Fission and Activation Products	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4
H-3	Ci	4.59E+01	1.44E+02	3.09E+02	1.05E+02
Cr-51	Ci	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	<LLD	3.94E-06	<LLD
Fe-55	Ci	<LLD	<LLD	5.84E-04	<LLD
Co-58	Ci	<LLD	<LLD	5.42E-04	9.03E-07
Fe-59	Ci	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	<LLD	3.47E-06	3.59E-04	<LLD
Zn-65	Ci	<LLD	<LLD	<LLD	<LLD
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD
Zr-95	Ci	<LLD	<LLD	<LLD	<LLD
Nb-95	Ci	<LLD	<LLD	4.29E-06	<LLD
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD
Tc-99m	Ci	<LLD	<LLD	<LLD	<LLD
Ag-110m	Ci	<LLD	<LLD	<LLD	<LLD
I-131	Ci	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	2.27E-06	1.49E-05	<LLD
Ba-140	Ci	<LLD	<LLD	<LLD	<LLD
La-140	Ci	<LLD	<LLD	<LLD	<LLD
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD
Total	Ci	4.59E+01	1.44E+02	3.09E+02	1.05E+02

Dissolved and Entrained Gases	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Kr-87	Ci	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	<LLD	<LLD	<LLD	<LLD
Xe-133m	Ci	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	<LLD	<LLD	<LLD	<LLD
Total	Ci	N/A	N/A	N/A	N/A

Note: Table 3 contains a listing of TMI ODCM Lower Limit of Detection (LLD).

TABLE 2C
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT 2013
LIQUID EFFLUENTS - CONTINUOUS MODE
TMI-1

Fission and Activation Products	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4
H-3	Ci	9.33E-02	8.24E-02	8.24E-02	4.48E-02
Cr-51	Ci	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	<LLD	<LLD	<LLD
Fe-55	Ci	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	<LLD	<LLD	<LLD	<LLD
Zn-65	Ci	<LLD	<LLD	<LLD	<LLD
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD
Zr-95	Ci	<LLD	<LLD	<LLD	<LLD
Nb-95	Ci	<LLD	<LLD	<LLD	<LLD
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD
Tc-99m	Ci	<LLD	<LLD	<LLD	<LLD
Ag-110m	Ci	<LLD	<LLD	<LLD	<LLD
I-131	Ci	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	3.72E-06	5.43E-05	<LLD
Ba-140	Ci	<LLD	<LLD	<LLD	<LLD
La-140	Ci	<LLD	<LLD	<LLD	<LLD
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD
Total	Ci	9.33E-02	8.24E-02	8.25E-02	4.48E-02

Dissolved and Entrained Gases	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Kr-87	Ci	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	<LLD	<LLD	<LLD	<LLD
Xe-133m	Ci	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	<LLD	<LLD	<LLD	<LLD
Total	Ci	N/A	N/A	N/A	N/A

Note: Table 3 contains a listing of TMI ODCM Lower Limit of Detection (LLD).

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT 2013
SUPPLEMENTAL INFORMATION
FACILITY: TMI UNIT 1 LICENSE: DPR 50-289

1. Regulatory Limits -- Please refer to TMI Offsite Dose Calculation Manual

   A. Fission and Activation Gases:
   B. Iodines:
   C. Particulates, Half-Lives > 8 Days:
   D. Liquid Effluents:

2. Maximum Effluent Concentrations -- 10 Times CFR 20, Appendix B Table II

   Provide the maximum effluent concentrations used in determining allowable release rates or concentrations

   A. Fission and Activation Gases:
   B. Iodines:
   C. Particulates, Half-Lives > 8 Days:
   D. Liquid Effluents:

3. Average Energy

   Provide the average energy (E-BAR) of the radionuclide mixture in releases of fission and activation gases, if applicable

   E-BAR = 1.81E-01

4. Measurements and Approximations of Total Radioactivity

   Provide the methods to measure or approximate the total radioactivity in effluents and the methods used to determine radionuclide composition:

   A. Fission and Activ. Gases: HPGE Spectrometry, Liquid Scintillation
   B. Iodines: HPGE Spectrometry
   C. Particulates: HPGE Spectrometry, Gas Flow Proportional, Beta Spectrometry
   D. Liquid Effluents: HPGE Spectrometry, Liquid Scintillation
   E. Gross Alpha Gas Flow Proportional
   F. Carbon 14 Estimated using the methodology included in the EPRI Technical Report 1021106.

5. Batch Releases

   Provide the following information relating to batch releases of radioactive materials in liquid and gaseous effluents.

		Quarter 1	Quarter 2	Quarter 3	Quarter 4
A.	**LIQUID (ALL TIMES IN MINUTES)**				
1.	Number of batch releases	14	12	47	13
2.	Total time period for batch releases (min)	3144	3834	13164	3462
3.	Maximum time period for a batch release (min)	240	695	640	385
4.	Average time period for a batch release (min)	224	319	280	266
5.	Minimum time period for a batch release (min)	210	210	180	225
6.	Average stream flow during periods of release of effluent into a flowing stream (cfm)	2.63E+06	2.10E+06	1.10E+06	1.37E+06
B.	**GASEOUS**				
1.	Number of batch releases	5	3	5	11
2.	Total time period for batch releases (min)	3831	1781	3496	43689
3.	Maximum time period for a batch release (min)	826	870	761	34011
4.	Average time period for a batch release (min)	766	593	699	3971
5.	Minimum time period for a batch release (min)	710	191	475	8

6. Abnormal Releases

		Quarter 1	Quarter 2	Quarter 3	Quarter 4
A.	**LIQUID**				
1.	Number of releases	3	3	3	3
2.	Total activity released (curies)	1.31E-02	1.33E-02	1.34E-02	1.34E-02
B.	**GASEOUS**				
1.	Number of releases	0	0	0	0
2.	Total activity released (curies)	0	0	0	0

TABLE 1A
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT 2013
GASEOUS EFFLUENTS – SUMMATION OF ALL RELEASES
TMI-2

	UNIT	QUARTER 1	QUARTER 2	QUARTER 3	QUARTER 4	EST TOTAL ERROR %
A. FISSION AND ACTIVATION GASES						
1. Total Release	Ci	<LLD	<LLD	<LLD	<LLD	25%
2. Avg release rate for period	µCi/S	N/A	N/A	N/A	N/A	
3. Percent of applicable limit	%	*	*	*	*	
B. IODINES						
1. Total Iodine I131	Ci	N/A	N/A	N/A	N/A	25%
2. Avg release rate for period	µCi/S	N/A	N/A	N/A	N/A	
3. Percent of applicable limit	%	*	*	*	*	
C. PARTICULATES						
1. Part. With half-life >8 days	Ci	<LLD	<LLD	<LLD	<LLD	25%
2. Avg release rate for period	µCi/S	N/A	N/A	N/A	N/A	
3. Percent of applicable limit	%	*	*	*	*	
4. Gross alpha radioactivity	Ci	<LLD	<LLD	<LLD	<LLD	
D. TRITIUM						
1. Total Release	Ci	1.90E-01	1.81E-01	1.77E-01	1.09E-01	25%
2. Avg release rate for period	µCi/S	2.44E-02	2.30E-02	2.22E-02	1.38E-02	
3. Percent of applicable limit	%	*	*	*	*	

Note: Table 3 contains a listing of TMI ODCM Lower Limit of Detection (LLD).
*ODCM Limits – Listed on Dose summary Table

TABLE 1B
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT 2013
GASEOUS EFFLUENTS - GROUND-LEVEL RELEASES - BATCH MODE
TMI-2

Fission And Activation Gasses	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Ar-41	Ci	N/A	N/A	N/A	N/A
Kr-85	Ci	N/A	N/A	N/A	N/A
Kr-85m	Ci	N/A	N/A	N/A	N/A
Kr-87	Ci	N/A	N/A	N/A	N/A
Kr-88	Ci	N/A	N/A	N/A	N/A
Xe-133	Ci	N/A	N/A	N/A	N/A
Xe-135	Ci	N/A	N/A	N/A	N/A
Xe-135m	Ci	N/A	N/A	N/A	N/A
Xe-138	Ci	N/A	N/A	N/A	N/A
Total	Ci	N/A	N/A	N/A	N/A

Radioiodines	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4
I-131	Ci	N/A	N/A	N/A	N/A
I-133	Ci	N/A	N/A	N/A	N/A
I-135	Ci	N/A	N/A	N/A	N/A
Total	Ci	N/A	N/A	N/A	N/A

Particulates	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Cr-51	Ci	N/A	N/A	N/A	N/A
Mn-54	Ci	N/A	N/A	N/A	N/A
Co-58	Ci	N/A	N/A	N/A	N/A
Fe-59	Ci	N/A	N/A	N/A	N/A
Co-60	Ci	N/A	N/A	N/A	N/A
Sr-89	Ci	N/A	N/A	N/A	N/A
Sr-90	Ci	N/A	N/A	N/A	N/A
Mo-99	Ci	N/A	N/A	N/A	N/A
Ag-110m	Ci	N/A	N/A	N/A	N/A
Cs-134	Ci	N/A	N/A	N/A	N/A
Cs-137	Ci	N/A	N/A	N/A	N/A
Ba-140	Ci	N/A	N/A	N/A	N/A
La-140	Ci	N/A	N/A	N/A	N/A
Ce-141	Ci	N/A	N/A	N/A	N/A
Ce-144	Ci	N/A	N/A	N/A	N/A
Total	Ci	N/A	N/A	N/A	N/A

Note: Table 3 contains a listing of TMI ODCM Lower Limit of Detection (LLD).

TABLE 1C
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT 2013
GASEOUS EFFLUENTS - GROUND-LEVEL RELEASES - CONTINUOUS MODE
TMI-2

Fission And Activation Gasses	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Ar-41	Ci	<LLD	<LLD	<LLD	<LLD
Kr-85	Ci	<LLD	<LLD	<LLD	<LLD
Kr-85m	Ci	<LLD	<LLD	<LLD	<LLD
Kr-87	Ci	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	<LLD	<LLD	<LLD	<LLD
Xe-135m	Ci	<LLD	<LLD	<LLD	<LLD
Xe-138	Ci	<LLD	<LLD	<LLD	<LLD
Total	Ci	N/A	N/A	N/A	N/A

Radioiodines	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4
I-131	Ci	N/A	N/A	N/A	N/A
I-133	Ci	N/A	N/A	N/A	N/A
I-135	Ci	N/A	N/A	N/A	N/A
Total	Ci	N/A	N/A	N/A	N/A

Particulates	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Cr-51	Ci	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	<LLD	<LLD	<LLD	<LLD
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD
Ag-110m	Ci	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	<LLD	<LLD	<LLD
Ba-140	Ci	<LLD	<LLD	<LLD	<LLD
La-140	Ci	<LLD	<LLD	<LLD	<LLD
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD
Total	Ci	N/A	N/A	N/A	N/A

Tritium	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4
H3	Ci	1.90E-01	1.81E-01	1.77E-01	1.09E-01

Note: Table 3 contains a listing of TMI ODCM Lower Limit of Detection (LLD).

TABLE 2A
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT 2013
LIQUID EFFLUENTS – SUMMATION OF ALL RELEASES
TMI-2

	UNIT	QUARTER 1	QUARTER 2	QUARTER 3	QUARTER 4	EST TOTAL ERROR %
A. FISSION AND ACTIVATION PRODUCTS						
1. Total Release (Not incl. Tritium, gases, alpha)	Ci	7.42E-07	1.42E-06	4.45E-06	9.70E-07	25%
2. Avg diluted concentration during period	µCi/ml	1.11E-13	2.44E-13	7.66E-13	1.77E-13	
3. Percent of applicable limit	%	*	*	*	*	
B. TRITIUM						
1. Total Release	Ci	<LLD	3.42E-06	1.51E-05	<LLD	25%
2. Avg diluted concentration during period	µCi/ml	N/A	5.89E-13	2.60E-12	N/A	
3. Percent of applicable limit	%	*	*	*	*	
C. DISSOLVED AND ENTRAINED GASES						
1. Total Release	Ci	<LLD	<LLD	<LLD	<LLD	25%
2. Avg diluted concentration during period	µCi/ml	N/A	N/A	N/A	N/A	
3. Percent of applicable limit	%	*	*	*	*	
D. GROSS ALPHA RADIOACTIVITY						
1. Total Release	Ci	<LLD	<LLD	<LLD	<LLD	25%
E. VOLUME OF WASTE RELEASE (PRIOR TO DILUTION)	LITERS	9.61E+02	7.79E+03	9.88E+03	8.29E+02	10%
F. VOLUME OF DILUTION WATER USED	LITERS	6.69E+09	5.79E+09	5.81E+09	5.46E+09	10%

Note: Table 3 contains a listing of TMI ODCM Lower Limit of Detection (LLD).
*ODCM Limits – Listed on Dose summary Table

TABLE 2B
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT 2013
LIQUID EFFLUENTS - BATCH MODE
TMI-2

Fission and Activation Products	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4
H-3	Ci	<LLD	3.42E-06	1.51E-05	<LLD
Cr-51	Ci	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	<LLD	<LLD	<LLD
Fe-55	Ci	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	<LLD	<LLD	<LLD	<LLD
Zn-65	Ci	<LLD	<LLD	<LLD	<LLD
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD
Zr-95	Ci	<LLD	<LLD	<LLD	<LLD
Nb-95	Ci	<LLD	<LLD	<LLD	<LLD
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD
Tc-99m	Ci	<LLD	<LLD	<LLD	<LLD
Ag-110m	Ci	<LLD	<LLD	<LLD	<LLD
I-131	Ci	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	7.42E-07	1.42E-06	4.45E-06	9.70E-07
Ba-140	Ci	<LLD	<LLD	<LLD	<LLD
La-140	Ci	<LLD	<LLD	<LLD	<LLD
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD
Total	Ci	7.42E-07	4.83E-06	1.96E-05	9.70E-07

Dissolved and Entrained Gases	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Kr-87	Ci	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	<LLD	<LLD	<LLD	<LLD
Xe-133m	Ci	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	<LLD	<LLD	<LLD	<LLD
Total	Ci	N/A	N/A	N/A	N/A

Note: Table 3 contains a listing of TMI ODCM Lower Limit of Detection (LLD).

TABLE 2C
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT 2013
LIQUID EFFLUENTS - CONTINUOUS MODE
TMI-2

Fission and Activation Products	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4
H-3	Ci	N/A	N/A	N/A	N/A
Cr-51	Ci	N/A	N/A	N/A	N/A
Mn-54	Ci	N/A	N/A	N/A	N/A
Fe-55	Ci	N/A	N/A	N/A	N/A
Co-58	Ci	N/A	N/A	N/A	N/A
Fe-59	Ci	N/A	N/A	N/A	N/A
Co-60	Ci	N/A	N/A	N/A	N/A
Zn-65	Ci	N/A	N/A	N/A	N/A
Sr-89	Ci	N/A	N/A	N/A	N/A
Sr-90	Ci	N/A	N/A	N/A	N/A
Zr-95	Ci	N/A	N/A	N/A	N/A
Nb-95	Ci	N/A	N/A	N/A	N/A
Mo-99	Ci	N/A	N/A	N/A	N/A
Tc-99m	Ci	N/A	N/A	N/A	N/A
Ag-110m	Ci	N/A	N/A	N/A	N/A
I-131	Ci	N/A	N/A	N/A	N/A
Cs-134	Ci	N/A	N/A	N/A	N/A
Cs-137	Ci	N/A	N/A	N/A	N/A
Ba-140	Ci	N/A	N/A	N/A	N/A
La-140	Ci	N/A	N/A	N/A	N/A
Ce-141	Ci	N/A	N/A	N/A	N/A
Ce-144	Ci	N/A	N/A	N/A	N/A
Total	Ci	N/A	N/A	N/A	N/A

Dissolved and Entrained Gases	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Kr-87	Ci	N/A	N/A	N/A	N/A
Kr-88	Ci	N/A	N/A	N/A	N/A
Xe-133	Ci	N/A	N/A	N/A	N/A
Xe-133m	Ci	N/A	N/A	N/A	N/A
Xe-135	Ci	N/A	N/A	N/A	N/A
Total	Ci	N/A	N/A	N/A	N/A

TABLE 3
ODCM REQUIRED LOWER LIMIT OF DETECTION (LLD)

Gaseous Sampling	
Radioisotope:	**LLD Value**
Tritium	1E-06 µCi/ml
Principal Gamma Emitters Gas (Kr-87, Kr-88, Xe-133, Xe-133m, Xe-135	1E-04 µCi/ml
Principal Gamma Emitters Particulate	
Mn-54	1E-11 µCi/ml
Fe-59	1E-11 µCi/ml
Co-58	1E-11 µCi/ml
Co-60	1E-11 µCi/ml
Zn-65	1E-11 µCi/ml
Mo-99	1E-11 µCi/ml
Cs-137	1E-11 µCi/ml
Ce-141	1E-11 µCi/ml
Ce-144	1E-11 µCi/ml
Iodine 131	1E-12 µCi/ml
Gross Alpha	1E-11 µCi/ml
Sr-89	1E-11 µCi/ml
Sr-90	1E-11 µCi/ml

Liquid Sampling	
Radioisotope:	**LLD Value**
Tritium	1E-05 µCi/ml
Principal Gamma Emitters	
Mn-54	5E-07 µCi/ml
Fe-59	5E-07 µCi/ml
Co-58	5E-07 µCi/ml
Co-60	5E-07 µCi/ml
Zn-65	5E-07 µCi/ml
Mo-99	5E-07 µCi/ml
Cs-134	5E-07 µCi/ml
Cs-137	5E-07 µCi/ml
Ce-141	5E-07 µCi/ml
Ce-144	5E-07 µCi/ml
Iodine 131	1E-06 µCi/ml
Dissolved and Entrained Gases (Kr-87, Kr-88, Xe-133, Xe-133m, Xe-135)	1E-05 µCi/ml
Fe-55	1E-06 µCi/ml
Gross Alpha	1E-07 µCi/ml
Sr-89	5E-08 µCi/ml
Sr-90	5E-08 µCi/ml

Solid Waste Shipped Offsite During 2013

2013 Annual Radioactive Effluent Release Report
Solid Waste and Irradiated Fuel Shipments
TMI-1

A. Solid Waste Shipped Offsite for Burial or Disposal (Not irradiated fuel)

1. Types of Waste

Types of Waste	Total Quantity (m^3)	Total Activity (Ci)	Period	Est. Total Error %
a. Spent resins, filter sludges, evaporator bottoms, etc.	1.14E+02	9.89E+00	01/01/13-12/31/13	+/- 25%
b. Dry compressible waste, contaminated equip, etc.	3.74E+02	2.94E-01	01/01/13-12/31/13	+/- 25%
c. Irradiated components, control rods, etc.	0.00E+00	0.00E+00	01/01/13-12/31/13	+/- 25%
d. Other (describe) Oil, NaOH Waste	5.09E+01	1.97E-03	01/01/13-12/31/13	+/- 25%

2. Estimate of major nuclide composition (by waste type)

	Major Nuclide Composition	%
a.	H-3	41.166%
	Fe-55	1.179%
	Co-58	12.846%
	Co-60	7.042%
	Ni-63	16.834%
	Cs-134	8.273%
	Cs-137	11.690%
b.	Fe-55	17.462%
	Co-58	14.285%
	Co-60	17.673%
	Ni-63	30.928%
	Nb-95	1.109%
	Cs-134	2.522%
	Cs-137	12.812%
c	None	
d.	H-3	91.817%
	Cs-137	7.267%

2013 Annual Radioactive Effluent Release Report
Solid Waste and Irradiated Fuel Shipments
TMI-1

3. Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination
31	Hittman Transport Services	Energy Solutions
1	Fed Ex	Energy Solutions

B. Irradiated Fuel Shipments (disposition)

Number of Shipments	Mode of Transportation	Destination
0	NA	NA

C. Changes to the Process Control Program

There was one change to RW-AA-100 in 2013.

2013 Annual Radioactive Effluent Release Report
Solid Waste and Irradiated Fuel Shipments
TMI-2

A. Solid Waste Shipped Offsite for Burial or Disposal (Not irradiated fuel)

1. Types of Waste

Types of Waste	Total Quantity (m^3)	Total Activity (Ci)	Period	Est. Total Error %
a. Spent resins, filter sludges, evaporator bottoms, etc.	0.00E+00	0.00E+00	01/01/13-12/31/13	+/- 25%
b. Dry compressible waste, contaminated equip, etc.	0.00E+00	0.00E+00	01/01/13-12/31/13	+/- 25%
c. Irradiated components, control rods, etc.	0.00E+00	0.00E+00	01/01/13-12/31/13	+/- 25%
d. Other (describe) Waste Oil	0.00E+00	0.00E+00	01/01/13-12/31/13	+/- 25%

2. Estimate of major nuclide composition (by waste type)

	Major Nuclide Composition	%
a.	N/A	
b.	N/A	
c.	N/A	
d.	N/A	

3. Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination
0	NA	NA

B. Irradiated Fuel Shipments (disposition)

Number of Shipments	Mode of Transportation	Destination
0	NA	NA

Summary of Unplanned Releases from the TMI Site During 2013

There were no unplanned releases from TMI-2 in 2013. The unplanned releases for TMI-1 are summarized in the supplemental information in Attachment 1. The information is reported separately for liquid and gaseous releases, and the number of releases is reported for each quarter with a total curies released. The activity for these releases is also included in Tables 1A, 1C, 2A and 2C.

The abnormal liquid releases are monthly releases to account for the tritium in groundwater released into the river. There we no unplanned gaseous releases for TMI-1.

CHANGES TO THE PROCESS CONTROL PROGRAM AND THE OFFSITE DOSE CALCULATION MANUAL DURING 2013 AND A LISTING OF NEW LOCATIONS FOR DOSE CALCULATIONS AND/OR ENVIRONMENTAL MONITORING IDENTIFIED BY THE LAND USE CENSUS

1. Changes to the Process Control Program

There was one change to the Process Control Program. The procedure change is attached as Enclosure 2.

2. Changes to the Offsite Dose Calculation Manual

There were no changes to the Offsite Dose Calculation Manual.

3. A listing of new locations for dose calculations and/or environmental monitoring identified by the Land Use Census.

Based on the results of the 2013 Land Use Census, no changes were required to the Radiological Environmental Monitoring Program. The Land Use Census identified minor changes to new or relocated gardens for Sectors B (NNE), C (NE), G (SE), N (W) and R (NNW) and to a summer residence for Sector R(NNW).

Instrumentation Not Returned to Operable Status Within 30 Days During 2013

There was one instrument not returned to operable status within 30 days per the TMI ODCM Part 1, Sections 2.1.1.b and 2.1.2.b, and Part 2, Section 2.1.2.b, during 2013.

SR-FT-146 was out of service in November 2013 until the end ot the year. The instrument was calibrated and the propeller and the lower gearbox were replaced. All drive columns were rebuilt and the instrument was returned to service in March 2014.

Annual Summary of Hourly Meteorological Data for 2013

The osprey did return and nest on the TMI meteorological tower. However, the station was able to calibrate the sensors and instrumentation before and after the osprey nested. The percent data recovery for meteorological information for 2013 was 98.9 percent. The data is presented by quarter.

Three Mile Island Alpha
Period of Record: **January - March 2013**
Stability Class - **Extremely Unstable** - 145Ft-31Ft Delta-T (F)
Winds Measured at 98 Feet
Wind Speed (in mph)

Wind Direction	1 - 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	1	0	0	0	0	1
SSE	0	0	1	0	0	0	1
S	0	0	1	0	0	0	1
SSW	1	0	0	2	0	0	3
SW	0	0	0	1	0	0	1
WSW	0	0	0	0	0	0	0
W	0	1	0	0	0	0	1
WNW	0	0	0	0	0	0	0
NW	1	1	0	0	0	0	2
NNW	2	2	1	0	0	0	5
Variable	0	0	0	0	0	0	0
Total	4	5	3	3	0	0	15

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

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Three Mile Island Alpha
Period of Record: **January - March 2013**
Stability Class - **Moderately Unstable** - 145Ft-31Ft Delta-T (F)
Winds Measured at 98 Feet
Wind Speed (in mph)

Wind Direction	1 - 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24	Total
N	0	1	0	0	0	0	1
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	3	0	0	0	3
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	1	0	0	0	1
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	2	0	0	0	2
WNW	0	0	1	2	1	0	4
NW	1	1	0	0	0	0	2
NNW	0	0	0	0	0	0	0
Variable	0	0	0	0	0	0	0
Total	1	2	7	2	1	0	13

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

Three Mile Island Alpha
Period of Record: **January - March 2013**
Stability Class - **Slightly Unstable** - 145Ft-31Ft Delta-T (F)
Winds Measured at 98 Feet
Wind Speed (in mph)

Wind Direction	1 - 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24	Total
N	0	2	0	0	0	0	2
NNE	0	0	0	0	0	0	0
NE	0	1	0	0	0	0	1
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	4	0	0	0	4
SE	0	0	1	0	0	0	1
SSE	0	0	1	0	0	0	1
S	0	2	0	0	0	0	2
SSW	0	0	2	0	0	0	2
SW	0	1	1	2	0	0	4
WSW	0	0	0	0	0	0	0
W	0	0	3	1	0	0	4
WNW	0	1	0	2	0	0	3
NW	0	1	3	5	5	0	14
NNW	0	1	1	0	0	0	2
Variable	0	0	0	0	0	0	0
Total	0	9	16	10	5	0	40

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

****

Three Mile Island Alpha
Period of Record: **January - March 2013**
Stability Class - **Neutral** - 145Ft-31Ft Delta-T (F)
Winds Measured at 98 Feet
Wind Speed (in mph)

Wind Direction	1 - 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24	Total
N	5	31	16	1	2	0	55
NNE	5	21	2	1	0	0	29
NE	9	13	4	2	0	0	28
ENE	10	22	9	0	0	0	41
E	5	15	7	4	2	0	33
ESE	6	23	32	6	0	0	67
SE	6	12	13	2	0	0	33
SSE	3	7	6	0	0	0	16
S	3	14	3	1	0	0	21
SSW	5	13	12	3	0	0	33
SW	4	13	3	1	0	0	21
WSW	9	17	15	2	0	0	43
W	9	30	58	26	10	2	135
WNW	10	33	123	102	22	1	291
NW	13	41	100	139	50	2	345
NNW	13	41	59	32	13	5	163
Variable	1	0	0	0	0	0	1
Total	116	346	462	322	99	10	1355

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

Three Mile Island Alpha
Period of Record: **January - March 2013**
Stability Class - **Slightly Stable** - 145Ft-31Ft Delta-T (F)
Winds Measured at 98 Feet
Wind Speed (in mph)

Wind Direction	1 - 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24	Total
N	16	7	5	2	1	0	31
NNE	8	5	3	0	0	0	16
NE	4	6	1	0	0	0	11
ENE	6	5	2	0	0	0	13
E	10	6	0	0	0	0	16
ESE	7	11	6	0	0	0	24
SE	10	8	7	1	0	0	26
SSE	6	10	6	0	0	0	22
S	2	15	6	2	1	0	26
SSW	5	10	10	4	0	0	29
SW	5	12	3	3	0	0	23
WSW	9	26	1	1	0	0	36
W	16	40	14	5	4	0	79
WNW	11	25	22	2	0	0	60
NW	13	16	18	5	1	0	53
NNW	14	26	9	4	2	0	55
Variable	3	0	0	0	0	0	3
Total	144	228	113	29	9	0	523

Hours of calm in this stability class: 4
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

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Three Mile Island Alpha
Period of Record: **January - March 2013**
Stability Class - **Moderately Stable** - 145Ft-31Ft Delta-T (F)
Winds Measured at 98 Feet
Wind Speed (in mph)

Wind Direction	1 - 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24	Total
N	7	2	0	0	0	0	9
NNE	3	0	0	0	0	0	3
NE	3	0	0	0	0	0	3
ENE	3	2	0	0	0	0	5
E	6	3	2	0	0	0	11
ESE	6	0	0	0	0	0	6
SE	3	1	0	0	0	0	4
SSE	2	1	0	0	0	0	3
S	5	3	0	0	0	0	8
SSW	5	1	1	0	0	0	7
SW	6	4	0	0	0	0	10
WSW	5	2	0	0	0	0	7
W	8	3	1	0	0	0	12
WNW	8	1	0	0	0	0	9
NW	13	1	1	0	0	0	15
NNW	10	3	2	0	0	0	15
Variable	2	0	0	0	0	0	2
Total	95	27	7	0	0	0	129

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

Three Mile Island Alpha
Period of Record: **January - March 2013**
Stability Class - **Extremely Stable** - 145Ft-31Ft Delta-T (F)
Winds Measured at 98 Feet
Wind Speed (in mph)

Wind Direction	1 - 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24	Total
N	8	3	1	0	0	0	12
NNE	1	0	0	0	0	0	1
NE	1	0	0	0	0	0	1
ENE	3	1	0	0	0	0	4
E	4	2	0	0	0	0	6
ESE	3	0	0	0	0	0	3
SE	10	0	0	0	0	0	10
SSE	2	1	0	0	0	0	3
S	2	0	0	0	0	0	2
SSW	4	0	0	0	0	0	4
SW	2	0	0	0	0	0	2
WSW	3	2	0	0	0	0	5
W	3	1	1	0	0	0	5
WNW	7	0	0	0	0	0	7
NW	4	1	0	0	0	0	5
NNW	6	2	0	0	0	0	8
Variable	0	0	0	0	0	0	0
Total	63	13	2	0	0	0	78

Hours of calm in this stability class: 3
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 0

Three Mile Island Alpha
Period of Record: **April - June 2013**
Stability Class - **Extremely Unstable** - 145Ft-31Ft Delta-T (F)
Winds Measured at 98 Feet
Wind Speed (in mph)

Wind Direction	1 - 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24	Total
N	0	1	0	0	0	0	1
NNE	0	0	1	0	0	0	1
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	3	5	0	0	0	8
ESE	0	4	35	7	0	0	46
SE	0	2	8	1	0	0	11
SSE	0	1	1	0	0	0	2
S	0	2	4	0	0	0	6
SSW	0	6	4	6	0	0	16
SW	0	1	1	0	0	0	2
WSW	0	1	0	0	0	0	1
W	1	2	1	0	0	0	4
WNW	2	4	2	0	0	0	8
NW	3	5	1	0	0	0	9
NNW	0	6	2	0	3	0	11
Variable	0	0	0	0	0	0	0
Total	6	38	65	14	3	0	126

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

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Three Mile Island Alpha
Period of Record: **April - June 2013**
Stability Class - **Moderately Unstable** - 145Ft-31Ft Delta-T (F)
Winds Measured at 98 Feet
Wind Speed (in mph)

Wind Direction	1 - 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	1	1	0	0	0	2
ENE	0	0	0	0	0	0	0
E	0	1	4	1	0	0	6
ESE	0	5	1	1	0	0	7
SE	0	0	1	0	0	0	1
SSE	0	0	1	0	0	0	1
S	0	2	3	0	0	0	5
SSW	0	3	6	0	0	0	9
SW	0	5	1	0	0	0	6
WSW	1	0	0	0	0	0	1
W	0	0	0	0	0	0	0
WNW	0	0	0	3	0	0	3
NW	3	4	1	0	1	0	9
NNW	1	6	1	2	5	2	17
Variable	0	0	0	0	0	0	0
Total	5	27	20	7	6	2	67

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

Three Mile Island Alpha
Period of Record: **April - June 2013**
Stability Class - **Slightly Unstable** - 145Ft-31Ft Delta-T (F)
Winds Measured at 98 Feet
Wind Speed (in mph)

Wind Direction	1 - 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24	Total
N	1	1	0	0	0	0	2
NNE	0	0	0	0	0	0	0
NE	0	1	0	0	0	0	1
ENE	0	2	0	0	0	0	2
E	0	2	4	0	0	0	6
ESE	0	0	6	1	0	0	7
SE	0	0	6	1	0	0	7
SSE	0	2	2	0	0	0	4
S	0	2	2	1	0	0	5
SSW	0	5	3	1	0	0	9
SW	1	6	2	0	0	0	9
WSW	0	2	0	0	0	0	2
W	1	5	2	3	0	0	11
WNW	1	1	3	2	0	0	7
NW	1	3	4	4	4	0	16
NNW	1	2	4	1	2	0	10
Variable	0	0	0	0	0	0	0
Total	6	34	38	14	6	0	98

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

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Three Mile Island Alpha
Period of Record: **April - June 2013**
Stability Class - **Neutral** - 145Ft-31Ft Delta-T (F)
Winds Measured at 98 Feet
Wind Speed (in mph)

Wind Direction	1 - 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24	Total
N	9	7	16	3	0	0	35
NNE	4	8	0	0	0	0	12
NE	2	21	2	0	0	0	25
ENE	1	11	1	1	0	0	14
E	5	34	30	7	0	0	76
ESE	6	36	79	14	0	0	135
SE	3	26	33	0	0	0	62
SSE	3	13	9	0	0	0	25
S	8	34	30	5	0	0	77
SSW	4	50	37	7	0	0	98
SW	11	48	33	3	0	0	95
WSW	11	16	10	3	0	0	40
W	11	20	20	13	0	0	64
WNW	11	20	39	36	4	0	110
NW	9	19	61	57	13	0	159
NNW	16	26	31	11	3	0	87
Variable	0	0	0	0	0	0	0
Total	114	389	431	160	20	0	1114

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

Three Mile Island Alpha
Period of Record: **April - June 2013**
Stability Class - **Slightly Stable** - 145Ft-31Ft Delta-T (F)
Winds Measured at 98 Feet
Wind Speed (in mph)

Wind Direction	1 - 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24	Total
N	8	8	2	0	0	0	18
NNE	6	6	2	0	0	0	14
NE	15	1	0	0	0	0	16
ENE	9	8	0	0	0	0	17
E	17	26	9	0	0	0	52
ESE	17	17	16	0	0	0	50
SE	11	7	9	0	0	0	27
SSE	7	14	1	0	0	0	22
S	6	27	5	0	0	0	38
SSW	6	31	11	2	0	0	50
SW	14	22	10	0	0	0	46
WSW	7	17	7	0	0	0	31
W	13	25	7	1	0	0	46
WNW	6	19	5	1	0	0	31
NW	9	11	7	8	0	0	35
NNW	7	12	4	0	0	0	23
Variable	0	0	0	0	0	0	0
Total	158	251	95	12	0	0	516

Hours of calm in this stability class: 1
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

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Three Mile Island Alpha
Period of Record: **April - June 2013**
Stability Class - **Moderately Stable** - 145Ft-31Ft Delta-T (F)
Winds Measured at 98 Feet
Wind Speed (in mph)

Wind Direction	1 - 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24	Total
N	5	2	0	0	0	0	7
NNE	4	1	0	0	0	0	5
NE	1	2	0	0	0	0	3
ENE	4	4	0	0	0	0	8
E	7	4	3	0	0	0	14
ESE	10	2	5	0	0	0	17
SE	6	1	0	0	0	0	7
SSE	7	2	0	0	0	0	9
S	7	3	0	0	0	0	10
SSW	6	9	0	0	0	0	15
SW	9	7	0	0	0	0	16
WSW	15	5	0	0	0	0	20
W	20	4	0	0	0	0	24
WNW	20	2	0	0	0	0	22
NW	6	1	0	0	0	0	7
NNW	5	4	0	0	0	0	9
Variable	1	0	0	0	0	0	1
Total	133	53	8	0	0	0	194

Hours of calm in this stability class: 3
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

Three Mile Island Alpha
Period of Record: **April - June 2013**
Stability Class - **Extremely Stable** - 145Ft-31Ft Delta-T (F)
Winds Measured at 98 Feet
Wind Speed (in mph)

Wind Direction	1 - 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24	Total
N	2	1	0	0	0	0	3
NNE	1	0	0	0	0	0	1
NE	0	0	0	0	0	0	0
ENE	0	1	0	0	0	0	1
E	1	1	1	0	0	0	3
ESE	2	0	0	0	0	0	2
SE	4	0	0	0	0	0	4
SSE	4	1	0	0	0	0	5
S	4	1	0	0	0	0	5
SSW	6	4	0	0	0	0	10
SW	4	0	0	0	0	0	4
WSW	3	2	0	0	0	0	5
W	4	0	0	0	0	0	4
WNW	6	0	0	0	0	0	6
NW	1	1	0	0	0	0	2
NNW	3	0	0	0	0	0	3
Variable	1	0	0	0	0	0	1
Total	46	12	1	0	0	0	59

Hours of calm in this stability class: 2
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 4

Three Mile Island Alpha
Period of Record: **July - September 2013**
Stability Class - **Extremely Unstable** - 145Ft-31Ft Delta-T (F)
Winds Measured at 98 Feet
Wind Speed (in mph)

Wind Direction	1 - 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24	Total
N	0	1	0	0	0	0	1
NNE	1	0	0	0	0	0	1
NE	0	0	0	0	0	0	0
ENE	0	1	0	0	0	0	1
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	2	0	0	0	0	2
SSW	0	2	6	1	0	0	9
SW	0	6	1	0	0	0	7
WSW	1	0	0	0	0	0	1
W	0	0	0	0	0	0	0
WNW	1	1	0	0	0	0	2
NW	2	3	1	0	0	0	6
NNW	2	7	0	0	0	0	9
Variable	0	0	0	0	0	0	0
Total	7	23	8	1	0	0	39

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

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Three Mile Island Alpha
Period of Record: **July - September 2013**
Stability Class - **Moderately Unstable** - 145Ft-31Ft Delta-T (F)
Winds Measured at 98 Feet
Wind Speed (in mph)

Wind Direction	1 - 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24	Total
N	0	3	0	0	0	0	3
NNE	0	2	0	0	0	0	2
NE	0	0	0	0	0	0	0
ENE	0	0	1	0	0	0	1
E	0	4	0	0	0	0	4
ESE	0	1	0	0	0	0	1
SE	0	1	0	0	0	0	1
SSE	0	0	0	0	0	0	0
S	0	0	3	1	0	0	4
SSW	0	5	3	1	0	0	9
SW	0	4	1	0	0	0	5
WSW	0	1	0	0	0	0	1
W	2	0	0	0	0	0	2
WNW	1	4	0	0	0	0	5
NW	3	4	1	0	0	0	8
NNW	3	2	1	3	0	0	9
Variable	0	0	0	0	0	0	0
Total	9	31	10	5	0	0	55

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

Three Mile Island Alpha
Period of Record: **July - September 2013**
Stability Class - **Slightly Unstable** - 145Ft-31Ft Delta-T (F)
Winds Measured at 98 Feet
Wind Speed (in mph)

Wind Direction	1 - 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24	Total
N	0	3	0	0	0	0	3
NNE	0	0	0	0	0	0	0
NE	0	2	0	0	0	0	2
ENE	0	2	0	0	0	0	2
E	0	1	0	0	0	0	1
ESE	0	1	0	0	0	0	1
SE	0	0	0	0	0	0	0
SSE	0	2	0	0	0	0	2
S	0	0	2	1	0	0	3
SSW	0	5	10	0	0	0	15
SW	0	5	2	1	0	0	8
WSW	0	0	0	0	0	0	0
W	1	0	0	0	0	0	1
WNW	3	4	0	0	0	0	7
NW	1	4	6	0	0	0	11
NNW	2	2	7	2	0	0	13
Variable	0	0	0	0	0	0	0
Total	7	31	27	4	0	0	69

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

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Three Mile Island Alpha
Period of Record: **July - September 2013**
Stability Class - **Neutral** - 145Ft-31Ft Delta-T (F)
Winds Measured at 98 Feet
Wind Speed (in mph)

Wind Direction	1 - 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24	Total
N	8	20	21	7	0	0	56
NNE	7	11	1	0	0	0	19
NE	8	13	0	0	0	0	21
ENE	3	13	0	0	0	0	16
E	8	15	1	0	0	0	24
ESE	6	9	8	0	0	0	23
SE	8	18	11	0	0	0	37
SSE	2	19	2	0	0	0	23
S	6	45	21	5	0	0	77
SSW	10	50	46	1	0	0	107
SW	21	74	30	0	0	0	125
WSW	11	43	15	0	0	0	69
W	17	21	9	3	0	0	50
WNW	21	40	18	0	0	0	79
NW	23	55	61	39	0	0	178
NNW	18	35	32	17	0	0	102
Variable	1	0	0	0	0	0	1
Total	178	481	276	72	0	0	1007

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

Three Mile Island Alpha
Period of Record: **July - September 2013**
Stability Class - **Slightly Stable** - 145Ft-31Ft Delta-T (F)
Winds Measured at 98 Feet
Wind Speed (in mph)

Wind Direction	1 - 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24	Total
N	12	27	13	0	0	0	52
NNE	10	21	1	0	0	0	32
NE	4	20	0	0	0	0	24
ENE	8	14	0	0	0	0	22
E	19	9	1	0	0	0	29
ESE	22	7	0	0	0	0	29
SE	14	8	0	0	0	0	22
SSE	13	14	1	0	0	0	28
S	13	39	2	0	0	0	54
SSW	21	36	13	0	0	0	70
SW	39	36	1	0	0	0	76
WSW	38	36	3	0	0	0	77
W	30	30	1	0	0	0	61
WNW	19	38	4	0	0	0	61
NW	14	13	3	0	0	0	30
NNW	14	28	3	0	0	0	45
Variable	4	0	0	0	0	0	4
Total	294	376	46	0	0	0	716

Hours of calm in this stability class: 3
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

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Three Mile Island Alpha
Period of Record: **July - September 2013**
Stability Class - **Moderately Stable** - 145Ft-31Ft Delta-T (F)
Winds Measured at 98 Feet
Wind Speed (in mph)

Wind Direction	1 - 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24	Total
N	4	5	0	0	0	0	9
NNE	3	1	0	0	0	0	4
NE	5	1	0	0	0	0	6
ENE	11	0	0	0	0	0	11
E	18	9	0	0	0	0	27
ESE	26	3	0	0	0	0	29
SE	21	1	0	0	0	0	22
SSE	10	2	0	0	0	0	12
S	13	0	0	0	0	0	13
SSW	7	5	1	0	0	0	13
SW	13	0	1	0	0	0	14
WSW	17	0	0	0	0	0	17
W	24	8	0	0	0	0	32
WNW	21	1	0	0	0	0	22
NW	13	0	0	0	0	0	13
NNW	17	6	0	0	0	0	23
Variable	5	0	0	0	0	0	5
Total	228	42	2	0	0	0	272

Hours of calm in this stability class: 7
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

Three Mile Island Alpha
Period of Record: **July - September 2013**
Stability Class - **Extremely Stable** - 145Ft-31Ft Delta-T (F)
Winds Measured at 98 Feet
Wind Speed (in mph)

Wind Direction	1 - 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24	Total
N	0	1	0	0	0	0	1
NNE	1	0	0	0	0	0	1
NE	0	0	0	0	0	0	0
ENE	3	0	0	0	0	0	3
E	7	1	0	0	0	0	8
ESE	7	3	0	0	0	0	10
SE	5	0	0	0	0	0	5
SSE	0	0	0	0	0	0	0
S	1	0	0	0	0	0	1
SSW	1	0	0	0	0	0	1
SW	0	0	0	0	0	0	0
WSW	0	0	1	0	0	0	1
W	2	0	0	0	0	0	2
WNW	2	0	0	0	0	0	2
NW	1	0	0	0	0	0	1
NNW	1	0	0	0	0	0	1
Variable	0	0	0	0	0	0	0
Total	31	5	1	0	0	0	37

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 3

Three Mile Island Alpha
Period of Record: **October - December 2013**
Stability Class - **Extremely Unstable** - 145Ft-31Ft Delta-T (F)
Winds Measured at 98 Feet
Wind Speed (in mph)

Wind Direction	1 - 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	1	0	0	0	0	1
SSE	0	0	0	0	0	0	0
S	0	0	1	0	0	0	1
SSW	1	2	3	3	0	0	9
SW	0	1	0	1	0	0	2
WSW	1	2	0	0	0	0	3
W	2	1	0	0	0	0	3
WNW	2	0	0	0	0	0	2
NW	2	1	0	0	0	0	3
NNW	0	1	0	0	0	0	1
Variable	0	0	0	0	0	0	0
Total	8	9	4	4	0	0	25

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 10

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Three Mile Island Alpha
Period of Record: **October - December 2013**
Stability Class - **Moderately Unstable** - 145Ft-31Ft Delta-T (F)
Winds Measured at 98 Feet
Wind Speed (in mph)

Wind Direction	1 - 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24	Total
N	0	1	1	0	0	0	2
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	2	0	0	0	2
ESE	0	1	0	0	0	0	1
SE	1	1	1	0	0	0	3
SSE	1	0	0	0	0	0	1
S	0	0	1	0	0	0	1
SSW	0	2	0	1	0	0	3
SW	1	0	1	0	0	0	2
WSW	0	1	0	0	0	0	1
W	0	0	0	0	0	0	0
WNW	0	0	1	0	0	0	1
NW	4	1	0	0	0	0	5
NNW	1	1	0	3	0	0	5
Variable	0	0	0	0	0	0	0
Total	8	8	7	4	0	0	27

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 10

Three Mile Island Alpha
Period of Record: **October - December 2013**
Stability Class - **Slightly Unstable** - 145Ft-31Ft Delta-T (F)
Winds Measured at 98 Feet
Wind Speed (in mph)

Wind Direction	1 - 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24	Total
N	0	0	4	0	0	0	4
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	1	0	0	0	0	1
E	0	0	2	0	0	0	2
ESE	0	1	3	0	0	0	4
SE	0	1	1	0	0	0	2
SSE	0	0	0	0	0	0	0
S	0	1	0	0	0	0	1
SSW	0	2	2	0	0	0	4
SW	0	1	3	0	0	0	4
WSW	0	0	0	0	0	0	0
W	0	0	1	1	0	0	2
WNW	0	0	0	0	0	0	0
NW	0	1	0	0	3	0	4
NNW	2	2	0	3	2	1	10
Variable	0	0	0	0	0	0	0
Total	2	10	16	4	5	1	38

Hours of calm in this stability class: 0
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 10

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Three Mile Island Alpha
Period of Record: **October - December 2013**
Stability Class - **Neutral** - 145Ft-31Ft Delta-T (F)
Winds Measured at 98 Feet
Wind Speed (in mph)

Wind Direction	1 - 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24	Total
N	12	15	16	1	0	0	44
NNE	10	13	1	0	0	0	24
NE	4	7	1	0	0	0	12
ENE	5	23	4	0	0	0	32
E	10	22	15	0	0	0	47
ESE	10	34	10	0	0	0	54
SE	10	23	4	0	0	0	37
SSE	8	26	9	0	0	0	43
S	5	22	21	1	0	0	49
SSW	4	12	12	3	0	0	31
SW	7	23	18	1	0	0	49
WSW	5	13	9	2	0	0	29
W	9	33	40	17	1	0	100
WNW	10	24	64	49	10	0	157
NW	11	14	66	81	21	2	195
NNW	17	20	36	26	7	0	106
Variable	0	0	0	0	0	0	0
Total	137	324	326	181	39	2	1009

Hours of calm in this stability class: 1
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 10

Three Mile Island Alpha
Period of Record: **October - December 2013**
Stability Class - **Slightly Stable** - 145Ft-31Ft Delta-T (F)
Winds Measured at 98 Feet
Wind Speed (in mph)

Wind Direction	1 - 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24	Total
N	28	35	6	0	0	0	69
NNE	12	21	3	0	0	0	36
NE	4	20	0	0	0	0	24
ENE	7	9	0	0	0	0	16
E	12	8	0	0	0	0	20
ESE	13	11	3	0	0	0	27
SE	14	16	0	0	0	0	30
SSE	8	14	2	0	0	0	24
S	7	17	15	6	0	0	45
SSW	7	25	12	2	0	0	46
SW	11	37	17	1	1	0	67
WSW	9	37	8	1	0	0	55
W	11	27	9	3	0	0	50
WNW	18	13	12	0	0	0	43
NW	16	13	12	8	1	0	50
NNW	26	19	3	5	0	0	53
Variable	1	0	0	0	0	0	1
Total	204	322	102	26	2	0	656

Hours of calm in this stability class: 13
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 10

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Three Mile Island Alpha
Period of Record: **October - December 2013**
Stability Class - **Moderately Stable** - 145Ft-31Ft Delta-T (F)
Winds Measured at 98 Feet
Wind Speed (in mph)

Wind Direction	1 - 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24	Total
N	9	6	0	0	0	0	15
NNE	2	1	0	0	0	0	3
NE	5	0	0	0	0	0	5
ENE	10	1	0	0	0	0	11
E	8	4	0	0	0	0	12
ESE	15	5	0	0	0	0	20
SE	14	2	0	0	0	0	16
SSE	11	0	0	0	0	0	11
S	21	2	1	0	0	0	24
SSW	18	7	0	0	0	0	25
SW	23	8	0	0	0	0	31
WSW	20	10	1	0	0	0	31
W	11	3	0	0	0	0	14
WNW	10	3	0	0	0	0	13
NW	16	0	0	0	0	0	16
NNW	16	6	0	0	0	0	22
Variable	1	0	0	0	0	0	1
Total	210	58	2	0	0	0	270

Hours of calm in this stability class: 17
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 10

Three Mile Island Alpha
Period of Record: **October - December 2013**
Stability Class - **Extremely Stable** - 145Ft-31Ft Delta-T (F)
Winds Measured at 98 Feet
Wind Speed (in mph)

Wind Direction	1 - 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24	Total
N	4	2	0	0	0	0	6
NNE	7	1	0	0	0	0	8
NE	4	1	0	0	0	0	5
ENE	3	1	0	0	0	0	4
E	8	1	0	0	0	0	9
ESE	6	1	0	0	0	0	7
SE	11	0	0	0	0	0	11
SSE	13	0	0	0	0	0	13
S	16	1	0	0	0	0	17
SSW	15	2	0	0	0	0	17
SW	12	0	0	0	0	0	12
WSW	4	0	0	0	0	0	4
W	5	2	0	0	0	0	7
WNW	6	0	0	0	0	0	6
NW	1	0	0	0	0	0	1
NNW	5	0	1	0	0	0	6
Variable	3	0	0	0	0	0	3
Total	123	12	1	0	0	0	136

Hours of calm in this stability class: 6
Hours of missing wind measurements in this stability class: 0
Hours of missing stability measurements in all stability classes: 10

Assessment of Radiation Doses Due to Radioactive Liquid and Gaseous Effluents Released from TMI During 2013

TMI-1

The attached table presents the maximum hypothetical doses to an individual and the general population resulting from 2013 TMI-1 releases of gaseous and liquid effluents. Provided below is a brief explanation of the table.

A. Liquid (Individual)

Calculations were performed on the four age groups and seven organs recommended in Regulatory Guide 1.109. The pathways considered for TMI-1 were the consumption of drinking water and fish and standing on the shoreline influenced by TMI-1 effluents. The latter two pathways are considered to be the primary recreational activities associated with the Susquehanna River in the vicinity of TMI. The "critical receptor" or Receptor 1 was that individual who 1) consumed Susquehanna River water from the nearest downstream drinking water supplier (Wrightsville Water Supply), 2) consumed fish residing in the vicinity of the TMI-1 liquid discharge and 3) occupied an area of shoreline influenced by the TMI-1 liquid discharge.

For 2013 the calculated maximum whole body (or total body) dose from TMI-1 liquid effluents was 2.48E-2 mrem to an adult (line 1). The maximum organ dose was 2.59E-2 mrem to the liver of an adult (line 2).

B. Gaseous (Individual)

There were six major pathways considered in the dose calculations for TMI-1 gaseous effluents. These were: (1) plume exposure (2) inhalation, consumption of; (3) cow milk, (4) vegetables and fruits, (5) meat, and (6) standing on contaminated ground. Real-time meteorology was used in all dose calculations for gaseous effluents.

Lines 3 and 4 present the maximum plume exposure at or beyond the site boundary. The notation of "air dose" is interpreted to mean that these doses are not to an individual, but is considered to be the maximum doses that would have occurred at or beyond the site boundary. The table presents the distance in meters to the location in the affected sector (compass point) where the theoretical maximum plume exposures occurred. The calculated maximum plume exposures were 2.09E-4 mrad and 7.49E-5 mrad for gamma and beta, respectively.

The maximum organ dose due to the release of iodines, particulates and tritium from TMI-1 in 2013 was 1.81E-1 mrem to the bone of a child residing 2150 meters from the site in the NNE sector (line 5). This dose again reflects the maximum exposed organ for the appropriate age group.

For 2013, TMI-1 liquid and gaseous effluents resulted in maximum hypothetical doses that were a small fraction of the quarterly and yearly ODCM dose limits.

TMI-1
SUMMARY OF MAXIMUM INDIVIDUAL DOSES FOR TMI-1 FROM
January 1, 2013 through December 31, 2013

Effluent	Applicable Organ	Estimated Dose (mrem)	Age Group	Location Dist (m)	Location Dir (to)	% of ODCM Dose Limit		ODCM Dose Limit (mrem)	
						Quarter	Annual	Quarter	Annual
(1) Liquid	Total Body	2.48E-2	Adult	Receptor 1		1.65E0	8.27-1	1.5	3
(2) Liquid	Liver	2.59E-2	Adult	Receptor 1		5.18E-1	2.59E-1	5	10
(3) Noble Gas	Air Dose (gamma-mrad)	2.09E-4	-	2000	SSE	4.18E-3	2.09E-3	5	10
(4) Noble Gas	Air Dose (beta-mrad)	7.49E-5	-	2000	SSE	7.49E-4	3.75E-4	10	20
(5) Iodine, Tritium & Particulates	Bone	1.81E-1	Child	2150	NNE	2.41E0	1.21E0	7.5	15

TMI-2

The attached table presents the maximum hypothetical doses to an individual and the general population resulting from 2013 TMI-2 releases of gaseous and liquid effluents. Provided below is a brief explanation of the table.

A. Liquid (Individual)

Calculations were performed on the four age groups and seven organs recommended in Regulatory Guide 1.109. The pathways considered for TMI-2 were the consumption of drinking water and fish and standing on the shoreline influenced by TMI-2 effluents. The latter two pathways are considered to be the primary recreational activities associated with the Susquehanna River in the vicinity of TMI. The "critical receptor" or Receptor 1 was that individual who 1) consumed Susquehanna River water from the nearest downstream drinking water supplier (Wrightsville Water Supply), 2) consumed fish residing in the vicinity of the TMI-2 liquid discharge and 3) occupied an area of shoreline influenced by the TMI-2 liquid discharge.

For 2013 the calculated maximum whole body (or total body) dose from TMI-2 liquid effluents was 1.84E-4 mrem to an adult (line 1). The maximum organ dose was 2.92E-4 mrem to the liver of a teen (line 2).

B. Gaseous (Individual)

There were six major pathways considered in the dose calculations for TMI-2 gaseous effluents. These were: (1) plume exposure (2) inhalation, consumption of; (3) cow milk, (4) vegetables and fruits, (5) meat, and (6) standing on contaminated ground. Real-time meteorology was used in all dose calculations for gaseous effluents.

Since there were no noble gases released from TMI-2 during 2013, the gamma and beta air doses (lines 3 and 4, respectively) were zero.

The maximum organ dose due to the release of particulates and tritium from TMI-2 in 2013 was 2.67E-5 mrem to the liver, total body, thyroid, kidney, lung, and GI tract of a child residing 2000 meters from the site in the SE sector (line 5).

For 2013, TMI-2 liquid and gaseous effluents resulted in maximum hypothetical doses that were a small fraction of the quarterly and yearly ODCM dose limits.

TMI-2
SUMMARY OF MAXIMUM INDIVIDUAL DOSES FOR TMI-2 FROM
January 1, 2013 through December 31, 2013

Effluent	Applicable Organ	Estimated Dose (mrem)	Age Group	Location		% of ODCM Dose Limit		ODCM Dose Limit (mrem)	
				Dist (m)	Dir (to)	Quarter	Annual	Quarter	Annual
(1) Liquid	Total Body	1.84E-4	Adult	Receptor 1		1.23E-2	6.13E-3	1.5	3
(2) Liquid	Liver	2.92E-4	Teen	Receptor 1		5.84E-3	2.92E-3	5	10
(3) Noble Gas	Air Dose (gamma-mrad)	0	-	-	-	0	0	5	10
(4) Noble Gas	Air Dose (beta-mrad)	0	-	-	-	0	0	10	20
(5) Tritium & Particulate	Liver, Total Body, Thyroid, Kidney, Lung & GI Tract	2.67E-5	Child	2000	SE	3.56E-4	1.78E-4	7.5	15

Assessment of Radiation Doses from Liquid and Gaseous Effluents Releases to Members of the Public within the TMI Site Boundaries During 2013

The Offsite Dose Calculation Manual requires an assessment of the radiation doses from radioactive liquid and gaseous effluents to members of the public due to their activities inside the site boundary during the reporting period. The estimated dose to a member of the public at or within the TMI Site Boundary was 1.053 mrem for 2013.

The following are the assumptions made in this assessment:

Access to the TMI Owner Controlled Area is limited to only those persons who have business related activities that support the operation of the facility. Therefore, based on the definition of a 'member of the public' in NUREG-1301, there is no credible scenario for this individual to receive non-occupational dose inside the TMI Owner Controlled Area. The scenario selected will be recreational use of the Susquehanna River and shoreline next to the Owner Controlled Area fence. Based on the two definitions of Site Boundary in the ODCM, this scenario is AT the Site Boundary for liquid releases but INSIDE the Site Boundary for gaseous releases.

A member of the public stays next to the owner controlled area for 67 hours. The 67 hours is based upon Reg. Guide 1.109 shoreline recreation period given in Table E-5. This is a table of recommended values to be used for the maximum exposed individual in lieu of site-specific data. Three Mile Island is co-located with other islands in the Lake Frederick area of the Susquehanna River. This area is used recreationally for boating and fishing over the summer months. The application of the 67 hours of recreational use from Reg. Guide 1.109 is appropriate.

The highest dose from liquid releases is characterized by release L201308856. This release was from the Industrial Waste Filter Sump. The total body dose from release L201308856 was 1.59E-3 mrem.

The highest dose from a single airborne release is characterized by release G201311556. This release was from TMI's Auxiliary and Fuel Handling Buildings ventilation system. The release contained airborne tritium from spent fuel pool evaporation. This release occurred over 168 hours. The entire dose from this release will be applied to the 67 hour recreational use period. The application of the total dose from this release to 67 hours is conservative. The total body dose from release G201311556 was 6.66E-3 mrem to a hypothetical receptor at the site boundary.

The highest fenceline direct radiation result (assumed to be equal to dose) will be added to the dose from the highest liquid and gaseous releases to yield the hypothetical maximum dose to a member of the public within the site boundaries.

The highest fenceline direct radiation result for 2013 was from Station F1-2 and was 30.9 mrem per quarter. The net direct radiation dose, obtained by subtracting the results from a control station dosimeter from the indicator results, was not used. This again is conservative.

Calculations:

30.9 mrem/qtr * 1/91.5 d/qtr * 1/24 hr/day * 67 hr = 0.94 mrem

The dose from liquid release L201308856 was 0.00159 mrem.

The dose from gas release G201311556 was 0.00666 mrem.

Total Dose Calculation

0.94 mrem + 0.00159 mrem + 0.00666 mrem = 0.95 mrem

Assessment of Radiation Dose to Most Likely Exposed Real Individual per 40 CFR 190

Dose calculations were performed to demonstrate compliance with 40 CFR 190 (ODCM Part IV Section 2.10). Gaseous and liquid effluents released from TMI-1 and TMI-2 in 2013 resulted in maximum individual doses (regardless of age group) of 0.068 mrem to the thyroid and 0.21 mrem to any other organ including the whole (total) body. The direct radiation component was determined using the highest quarterly fence-line exposure rate as measured by an environmental dosimeter, and subtracting from it, the lowest quarterly environmental dosimeter exposure rate.

Based on the maximum exposure rate of 30.9 mR/quarter, a person residing at the fence-line for 67 hours (shoreline exposure from Reg. Guide 1.109) received an exposure of 0.94 mR. Based on the lowest exposure rate of 14.0 mR/quarter and converting it by the same method yielded a background exposure of 0.43 mR. Therefore, the net exposure from direct radiation from TMINS was 0.51 mR. Combining the direct radiation exposure (assumed to be equal to dose) with the maximum organ doses from liquid and gaseous releases, the maximum potential (total) doses were 0.58 mrem to the thyroid and 0.72 mrem to any other organ. Both doses were well below the limits specified in 40 CFR 190.

Deviations from the ODCM Sampling and Analysis Regime During 2013

The Turbine Building Integrator (SD-FQ-301) sends a signal to the Turbine Building Compositor (SD-CE-253) to collect a flow proportional sample. In 2012, engineering identified that the integrator does not work at low flows. An Engineering Change Request (ECR) 14-00015 has been initiated to upgrade the integrator. ECR installation is scheduled during 2014. The only known low flow source is from a non-radioactive system – industrial cooler blowdown. Weekly compensatory sampling to confirm no radioisotopes are present in the industrial coolers will continue until the integrator is upgraded or the blowdown is re-routed.

No sample results are available for the Unit 2 monthly vent composite for the time period 10/10/13 to 11/7/13. The samples were obtained and shipped for hard to detect analysis as required by the ODCM. To analyze for hard to detect Strontium 89/90 the filter composite is digested into liquid form. This sample was spilled by a vendor technician during analysis and was not salvageable. TMI IR 1608473 documents this condition.

ODCM Change for TMI
Offsite Dose Calculation Manual, Revision 3
CY-TM-170-300

(Revision 3 was issued on May 23, 2012)

Process Control Program for Radioactive Wastes, Revision 8
RW-AA-100

(Revision 8 was issued on March 20, 2013)