

EFFLUENT SUMMARY
THREE MILE ISLAND UNIT 2 LIQUID AND GASEOUS EFFLUENTS
(Summary of All Releases)

TYPE EFFLUENT	JANUARY	FEBRUARY	MARCH	1st QUARTER 1985
I. Liquid Effluent:				
A. Fission and activation products (not including H-3, gases & alpha)				
1. Total Release (Ci) (Note 2)	1.06E-5	2.29E-5	6.37E-6	3.99E-5
2. Concentration (μ Ci/cc)	4.22E-12	1.15E-11	2.05E-12	5.36E-12
B. Tritium				
1. Total release (Ci)	1.21E-5	1.23E-5	1.12E-5	3.56E-5
2. Concentration (μ Ci/cc)	4.82E-12	6.18E-12	3.80E-12	4.78E-12
C. Dissolved and entrained gases				
1. Total release (Ci)	<LLD	<LLD	<LLD	<LLD
2. Concentration (μ Ci/cc)	N/A	N/A	N/A	N/A
D. Gross alpha radioactivity				
1. Total release (Ci)	Note 3	Note 3	Note 3	Note 3
E. Volume of waste released prior to dilution (liters) (Note 1)	2.58E4	1.99E3	1.10E4	3.68E4
F. Volume of dilution water (flow to river in liters from NPDES Report)	2.51E9	1.99E9	2.95E9	7.45E9
G. Number of batch releases:	10	9	8	27

- The concentration of radioactive material other than dissolved or entrained noble gases in liquid effluent released to the unrestricted area shall not exceed the values specified in 10CFR 20, Appendix B, Table II.
- Present liquid effluent release limits are 10% of the concentration values specified in 10CFR 20, Appendix B, Table II.
- Liquid effluent releases are also limited to 10CFR 50, Appendix I, not to exceed a dose of 3 mrem total body and 10 mrem to any organ per year.

Note 1) Includes only those releases which were found to contain radioisotopic concentration >LLD.

Note 2) Includes Industrial Waste and Sanitary Waste.

Note 3) These activities are to be verified by composite sampling.

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EFFLUENT SUMMARY
THREE MILE ISLAND UNIT 2 LIQUID AND GASEOUS EFFLUENTS (Continued)
(Summary of All Releases)

TYPE EFFLUENT	JANUARY	FEBRUARY	MARCH	1st QUARTER 1985
	<u>Unit 2</u>	<u>Unit 2</u>	<u>Unit 2</u>	
II. Gaseous Effluent				
A. Fission & activation gases				
1. Total release (Ci)	<LLD	<LLD	<LLD	<LLD
2. Release rate (μ Ci/sec)	N/A	N/A	N/A	N/A
B. Iodine-131 released (Ci):	As of 01/01/81 there was less than 1E-15 of I-131 left in Unit 2; therefore, no release of I-131 can be detected.			
C. Particulates with half-lives >8 days:				
1. Total releases (not including α)(Ci)	5.93E-6	6.27E-8	7.36E-7	6.80E-6
2. Release rate (μ Ci/sec)	2.24E-6	2.59E-8	2.75E-7	8.74E-7
3. Gross alpha radio-activity (Ci)	7.39E-8	<LLD	4.49E-9	7.84E-8
D. Tritium				
1. Total release (Ci)	8.30E-1	4.27E-1	5.35E-1	1.79E0
2. Release rate (μ Ci/sec)	3.10E-1	1.77E-1	2.00E-1	2.30E-1
E. Seconds in period reported	2.6784E6	2.4192E6	2.6784E6	7.7760E6
F. Number of batch releases	0	0	0	0

- The concentration of radioactive material in gaseous effluents released to the unrestricted area shall not exceed the values specified in 10CFR 20, Appendix B, Table II.
- 10CFR 50 dose to individual for: a) 10 mRad/yr, gamma radiation; b) 20 mRad/yr, beta radiation; and c) 15 mrem/yr to any organ.

1985 UNIT 2 LIQUID RADIONUCLIDE RELEASES BY ISOTOPE (Ci)

RADIONUCLIDE	JANUARY	FEBRUARY	MARCH	1st QUARTER 1985
Fission and activation products (not including alpha, H-3 & gases)	<LLD	<LLD	<LLD	<LLD
Ag-110m	<LLD	<LLD	<LLD	<LLD
Ce-144	<LLD	<LLD	<LLD	<LLD
Co-58	<LLD	<LLD	<LLD	<LLD
Co-60	<LLD	<LLD	<LLD	<LLD
Cs-134	<LLD	<LLD	<LLD	<LLD
Cs-137	1.09E-6	1.61E-6	1.06E-6	3.76E-6
I-131	<LLD	<LLD	<LLD	<LLD
Sr-90	*	*	*	*
Unidentified Beta	9.49E-6	2.13E-5	5.31E-6	3.61E-5
TOTAL	1.06E-5	2.29E-5	6.37E-6	3.99E-5
H-3	1.21E-5	1.23E-5	1.12E-5	3.56E-5

*These activities are to be verified by composite sampling.

1985 UNIT 2 GASEOUS RADIONUCLIDE RELEASES BY ISOTOPE (Ci)

RADIONUCLIDE	JANUARY	FEBRUARY	MARCH	1st QUARTER 1985
<u>Fission and activation gases</u>	<u>Unit 2</u>	<u>Unit 2</u>	<u>Unit 2</u>	<u>Total</u>
Kr-85	<LLD	<LLD	<LLD	<LLD
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Total				
<u>Particulates (half lives >8 days)</u>				
Unidentified ,	5.93E-6	6.27E-8	7.36E-7	6.73E-6
Cs-137	<LLD	<LLD	7.67E-8	7.67E-8
Cs-134	<LLD	<LLD	<LLD	<LLD
Gross alpha	7.39E-8	<LLD	4.49E-9	7.84E-8
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TOTAL (including alpha	6.00E-6	6.27E-8	8.17E-7	6.88E-6
TOTAL (minus alpha)	5.93E-6	6.27E-8	8.13E-7	6.81E-6
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Tritium (³ H)	8.30E-1	4.27E-1	5.35E-1	1.79E0
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Interpretation of Dose Summary Table

The Dose Summary Table (Table 1) presents the maximum hypothetical doses to an individual and the general population resulting from the release of gaseous and liquid effluents from TMI-2 during the first quarter reporting period of 1985.

1. Liquid (Individual)

The first two lines of Table 1 present the maximum hypothetical dose to an individual. Presented are the whole body and critical organ doses. Calculations are performed on the four age groups and eight organs recommended in Regulatory Guide 1.109. The pathways considered for TMI are drinking water, consumption of fish, and standing on the shoreline influenced by TMI effluents. The latter two pathways are considered to be the primary recreational activities associated with the Susquehanna River in the vicinity of TMI. The "receptor" would be that individual who consumes water from the Susquehanna River and fish residing in the plant discharge, while occupying an area of shoreline influenced by the plant discharge.

After calculating the doses to all age groups for all eight organs resulting from the three pathways described above, the Dose Summary Table presents the maximum whole body dose and affected age group along with the organ and associated age group that received the largest dose.

For the first quarter of 1985 the calculated maximum whole body dose received by anyone would have been $3.76\text{E-}4$ mrem to an adult. Similarly, the maximum organ dose would have been $1.31\text{E-}3$ mrem to the bone of an adult.
(Note: The unidentified beta inventory is treated as Sr-90)

2. Gaseous (Individual)

There are seven major pathways considered in the dose calculations for gaseous effluents. These are: (1) plume, (2) inhalation, consumption of (3) cow milk, (4) goat milk, (5) vegetables, (6) meat, and (7) standing on contaminated ground.

Lines 3 and 4 present the maximum plume exposure at or near the site boundary. The notation of "air dose" is interpreted to mean that these doses are not to an individual, but are considered to be the maximum dose that would have occurred at or near the site boundary. The Dose Summary Table presents the distance in meters to the site boundary in the affected sector (compass point). It should be noted that real-time meteorology was used in all dose calculations for gaseous effluents.

With respect to the gaseous release for the first quarter of 1985, the plume exposure at or near the site boundary would have been 0 mrad and 0 mrad, gamma and beta dose respectively.

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Lines 5 and 6 present the largest calculated dose to a receptor (individual) in the maximally affected sector(s). The location of the receptor is described by both distance (meters) and direction from the site.

Plume exposures to an individual, regardless of age, from gaseous effluents during the first quarter were 0 mrem and 0 mrem, whole body and skin, respectively.

The Iodines and Particulates section described in line 7 represents the maximum exposed organ due to iodine and particulates. This does not include the whole body plume exposure which was separated out by line 5. The doses presented in this section again reflect the maximum exposed organ for the appropriate age group.

The first quarter exposure due to the iodines and particulates would have resulted in a maximum dose of $1.35\text{E-}4$ mrem to the skin and liver of a teen residing 620 meters from the site in the east sector. No other organ of any age group would have received a dose greater than this.

3.0 Liquid and Gaseous (Population)

Lines 8 - 11 present the person-rem doses resulting from the liquid and gaseous effluents. These doses are summed over all pathways and the affected populations. Liquid person-rem is based upon the population encompassed within the region from the TMI outfall extending down to the Chesapeake Bay. The person-rem for gaseous effluents are based upon the 1980 population projections of the FSAR and consider the population out to a distance of 50 miles around TMI. Population doses are summed over all distances and sectors to give an aggregate dose.

Based upon the calculations performed for the first quarter, liquid effluents resulted in a whole body population dose of $4.8\text{E-}3$ person-rem with a maximum critical organ population dose to the bone of $1.9\text{E-}2$ person-rem. Gaseous effluents resulted in a whole body population dose of $1.0\text{E-}3$ person-rem with a maximum critical organ population dose to the gi-tract, liver, thyroid, kidney and lung of $1.0\text{E-}3$ person-rem.

UNIT 2
Quarter Dose Report

SUMMARY OF MAXIMUM INDIVIDUAL DOSES FOR UNIT FROM
January 1, 1985 through March 31, 1985

Effluent	Applicable Organ	Estimated Dose (mrem)	Age Group	Location Dist Dir (m) (toward)	% of Applicable Limit		10CFR50 App. I Limits (mrem)	
					Quarterly	Annual	Quarterly	Annual
Liquid	Total Body	3.76E-4	Adult	Receptor 1	2.5E-2	1.3E-2	1.5	3.0
Liquid	Bone	1.31E-3	Adult	Receptor 1	2.6E-2	1.3E-2	5.0	10.0
Noble Gas	Air Dose (gamma-mrad)	0	---	---	---	---	5.0	10.0
Noble Gas	Air Dose (beta-mrad)	0	---	---	---	---	10.0	20.0
Noble Gas	Total Body	0	---	---	--	---	--	5.0
Noble Gas	Skin	0	---	---	--	---	--	15.0
Iodine & Particulates	Skin Liver	1.35E-4	Teen	620 E	1.8E-3	9.0E-4	7.5	15.0

SUMMARY OF MAXIMUM POPULATION DOSES FOR UNIT 2 FROM
January 1, 1985 through March 31, 1985

<u>Effluent</u>	<u>Applicable Organ</u>	<u>Estimated Population Dose (person-rem)</u>
Liquid	Total Body	4.8E-3
Liquid	Bone	1.9E-2
Gaseous	Total Body	1.0E-3
Gaseous	Thyroid, GI-TRACT Liver Kidney, Lung	1.0E-3