

## THREE MILE ISLAND UNIT II LIQUID AND GASEOUS EFFLUENTS

TYPE EFFLUENT	April	May	June	2nd Quarter			
	<u>Unit II</u>	<u>Unit II</u>	Unit II				
<b>I. Liquid Effluent: *</b>							
A) Fission and activation products (not including <sup>3</sup> H, gases & α)							
1) Total Release (Ci)	<LLD	<LLD	2.32E-5	2.32E-5			
2) Concentration (μCi/cc)	<LLD	<LLD	1.94E-12	1.03E-12			
B) Tritium			/				
1) Total Release (Ci)	<LLD	2.59E-4	7.16E-2	7.19E-2			
2) Concentration (μCi/cc)	<LLD	4.91E-11	5.98E-9	3.18E-9			
C) Dissolved and entrained gases							
1) Total Release (Ci)	<LLD	<LLD	<LLD	<LLD			
2) Concentration (μCi/cc)	<LLD	<LLD	<LLD	<LLD			
D) Gross α radioactivity							
1) Total Release (Ci)	<LLD	<LLD	<LLD	<LLD			
E) Volume of waste released * prior to dilution (cc)	-0-	4.85E7	2.90E8	3.39E8			
F) Volume of dilution water (Flow to river) (cc)	5.35E12	5.28E12	1.20E13	2.26E13			
<b>II. Gaseous Effluent:</b>							
	<u>Unit II</u>	<u>Epicor II</u>	<u>Unit II</u>	<u>Epicor II</u>	<u>Unit II</u>	<u>Epicor II</u>	
A) Fission & activation gases							
1) Total Release (Ci)	2.29E1	2.97E1	2.87E1	5.23E1	5.16E1	5.59E1	2.41E2
2) Release Rate (μCi/sec)	8.83E0	1.15E1	1.07E1	1.96E1	1.99E1	2.16E1	1.54E1
B) Iodine-131 Released (Ci)	As of 1/1/81 there was less than 1E-15 Ci of I-131 left in Unit II, Therefore, no release of I-131 can be detected from Unit II.						
C) Particulates with half lives > 8 days							
1) Total Release (including α) (Ci)	1.50E-6	3.15E-7	2.73E-8	<LLD	1.72E-6	3.21E-8	3.59E-6
2) Release Rate (μCi/sec)	5.78E-7	1.22E-7	1.02E-8	<LLD	6.79E-7	1.24E-8	2.34E-7
3) Gross Alpha Radioactivity (Ci)	<LLD	2.01E-9	1.29E-10	<LLD	<LLD	<LLD	2.14E-9
D) Tritium							
1) Total Release (Ci)	1.80E0	2.30E-3	6.31E0	1.26E-2	3.06E0	6.39E-3	1.12E1
2) Release Rate (μCi/sec)	6.94E-1	8.87E-4	2.36E0	4.70E-3	1.18E0	2.47E-3	7.07E-1
E) Seconds in period reported	2.592E6		2.6784E6		2.592E6		7.824E6

\* Includes only those releases which were found to contain radioisotopic concentrations &gt;LLD

The Dose Summary Table (Table 1) presents the maximum hypothetical doses to an individual and general population resulting from the release of gaseous and liquid effluents from TMI-2 and EPICOR 2 during the Second Quarter reporting period of 1982.

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 a shore line 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 that consumes water from the Susquehanna, and fish that have resided in the plant discharge, and who has resided on the shore line 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 Table presents the maximum whole body dose and which age group is affected along with the organ and associated age group that received the largest dose.

For the second quarter of 1982, the calculated maximum whole body dose received by anyone would have been  $1.82E-04$  mrem to an adult. Similarly, the maximum exposed organ would have been  $2.89E-04$  mrem to the liver of a teenager.

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 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 the site boundary. The Table presents the distance in meters to the site boundary in the affected sector (compass point). It should be noted that the real meteorology that occurred at the time of the releases were used in all dose calculations for gaseous effluents.

With respect to the release for the second quarter of 1982, the plume exposure at the site boundary would have been  $2.03E-04$  mrad and  $2.30E-02$  mrad gamma and beta dose respectively.

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

Plume exposure to an individual (regardless of age) from gaseous effluents during the second quarter were  $9.42\text{E-}05$  mrem and  $1.13\text{E-}02$  mrem whole body and skin exposure respectively.

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 second quarter dose due to the iodines and particulates would have resulted in a maximum dose of  $1.12\text{E-}03$  mrem to the liver of a child residing 630 meters from the site in the ESE sector. No other organ of any age group would have received a dose greater than this.

3. 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 second quarter, liquid effluents resulted in whole body population dose of  $4.4\text{E-}04$  person-rem with a maximum critical organ population dose to the liver of  $5.2\text{E-}04$  person-rem. Gaseous effluents resulted in whole body and maximum critical organ (GI Tract, Liver, Kidney, Thyroid, and Skin) doses of  $9.7\text{E-}02$  person-rem for each case.

## SUMMARY OF MAXIMUM INDIVIDUAL DOSES

## LAST ACCUMULATIONS FOR PERIODS

Liquid April 1, 1982 to June 30, 1982  
 Gaseous April 1, 1982 to June 30, 1982  
 Air April 1, 1982 to June 30, 1982

Effluent	Applicable Organ	Estimated Dose (mrem)	Age Group	Location Dist (M)	Dir (Toward)	% of Applicable Limit	Limit (mR)
1. Liquid	Total Body	1.82E-04	Adult	Receptor	1	6.1E-03	3.0
2. Liquid	Liver	2.89E-04	Teen	Receptor	1	2.9E-03	10.0
3. Noble Gas	Air Dose (Gamma-mrad)	2.03E-04		534	SSE	2.0E-03	10.0
4. Noble Gas	Air Dose (Beta-mrad)	2.30E-02		534	SSE	1.2E-01	20.0
5. Noble Gas	T. Body	9.42E-05	All	3200	N	1.9E-03	5.0
6. Noble Gas	Skin	1.13E-02	All	3200	N	7.5E-02	15.0
7. Iodine & Particulates	Liver	1.12E-03	Child	630	ESE	7.5E-03	15.0

## SUMMARY OF POPULATION DOSES

## LAST ACCUMULATIONS FOR PERIODS

Liquid April 1, 1982 to June 30, 1982  
 Gaseous April 1, 1982 to June 30, 1982

Effluent	Applicable Organ	Estimated Population Dose (Person-rem)
8. Liquid	Total Body	4.4E-04
9. Liquid	Liver	5.2E-04
10. Gaseous	Total Body	9.7E-02
11. Gaseous	GI Tract, Liver, Kidney, Thyroid, Skin	9.7E-02