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# Population Dose Commitments Due to Radioactive Releases from Nuclear Power Plant Sites in 1981

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Prepared by D. A. Baker, R. A. Peloquin

Pacific Northwest Laboratory  
Operated by  
Battelle Memorial Institute

Prepared for  
U.S. Nuclear Regulatory  
Commission

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PREVIOUS REPORTS IN THIS SERIES

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5. Population Dose Commitments Due to Radioactive Releases from Nuclear Power Plant Sites in 1979, NUREG/CR-2850, PNL-4221, Vol. 1, December 1982.
6. Population Dose Commitments Due to Radioactive Releases from Nuclear Power Plant Sites in 1980, NUREG/CR-2850, PNL-4221, Vol. 2, August 1983.

### ABSTRACT

Population radiation dose commitments have been estimated from reported radionuclide releases from commercial power reactors operating during 1981. Fifty-year dose commitments from a one-year exposure were calculated from both liquid and atmospheric releases for four population groups (infant, child, teen-ager and adult) residing between 2 and 80 km from each site. This report tabulates the results of these calculations, showing the dose commitments for both liquid and airborne pathways for each age group and organ. Also included for each site is a histogram showing the fraction of the total population within 2 to 80 km around each site receiving various average dose commitments from the airborne pathways.

The total dose commitment from both liquid and airborne pathways from 48 sites ranged from a high of 20 person-rem to a low of 0.008 person-rem with an arithmetic mean of 3 person-rem. The total population dose for all sites was estimated at 160 person-rem for the 98 million people considered at risk.

The average individual dose commitment from all pathways on a site basis ranged from a low of  $1 \times 10^{-5}$  mrem to a high of 0.05 mrem. No attempt was made in this study to determine the maximum dose commitment received by any one individual from the radionuclides released at any of the sites.

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## INTRODUCTION

Most commercial nuclear power reactors release small amounts of radioactive materials to the environment during normal operation. Because of these releases, concern was expressed about the magnitude of the collective dose received by the general population residing around these nuclear power plants. In response to this concern, the Pacific Northwest Laboratory (PNL)<sup>(a)</sup> contracted with the Nuclear Regulatory Commission (NRC) to undertake a series of studies to estimate radiation effective dose commitments produced by radionuclide releases from commercial light water cooled power reactors during the years 1975 thru 1980 (See previous reports in this series, p. ii). This document is a continuation of of these studies and considers the doses from releases during 1981. In this study, as in those previous, we estimated the collective (population) dose commitment<sup>(b)</sup> from both the liquid and gaseous releases to four age groups making up the population residing in the region of the site: infant (0 to 1 yr), child (1 to 11 yr), teen-ager (11 to 17 yr) and adult (17 yr and older).

The particular organs of reference in this study are listed in Table 1. The major pathways by which radionuclides travel from the reactor to the individual receptors are shown in Table 2. Other possible liquid pathways such as direct exposure from waterborne activities (swimming, boating, shoreline recreation) and internal exposure through ingestion of food produced using contaminated irrigation water were not included. This was because we have found from past experience that the doses from these pathways is generally much smaller than the doses from the pathways considered in this study.

The "source terms" used to estimate dose commitments produced from each site were the annual measured releases of radioactive materials as reported to the NRC by the plant operators and subsequently published in an NRC public document (Tichler and Benkovitz 1984).

The regional population for which we estimated dose commitments included those persons estimated to be living in a region between 2 and 80 km around the reactor sites during 1981. Population distributions for 1981 were supplied by the NRC's Office of Nuclear Reactor Regulation. Atmospheric transport factors (annual average dilution and annual average deposition) were calculated for the region around each site using appropriate

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(a) Operated by Battelle Memorial Institute for the Department of Energy.

(b) As used in this report, dose commitment describes the total-body dose equivalent in rem (1 rem = 0.01 sievert) received over 50 years from intake during the year in which radioactive materials were released into the environment from the plants.

meteorological data supplied by the NRC's Office of Nuclear Reactor Regulation. To calculate the doses, we used models approved by the NRC. We incorporated these models into two small computer codes to expedite the dose calculations involved for each site.

TABLE 1. Organs Considered in This Study

<u>Organs Affected by Airborne Releases</u>	<u>Organs Affected by Waterborne Releases</u>
Total body	Total body
Thyroid	Thyroid
Bone	Bone
GI tract	GI tract
Liver	Liver
Lung	

TABLE 2. Pathways Considered in This Study by Which Radionuclides Travel from Reactors to Persons

<u>Pathways for Airborne Releases</u>	<u>Pathways for Waterborne Releases</u>
Air submersion	Ingestion of drinking water
Contaminated ground	Ingestion of fish and
Inhalation	invertebrates
Ingestion of food crops and animal products	

Site-specific parameters other than releases, meteorology and population were obtained from environmental statements for the various reactors when available (Table 3). Such parameter values include the total population drinking contaminated water, river flow, dilution flow from the reactors (for sites not on rivers), fish and invertebrate harvest for region, and dilution factors for drinking water and aquatic foods. In those cases in which site-specific data are not readily available and the particular pathway is not expected to result in a large dose, pessimistic assumptions have been used to estimate doses. The use of more realistic data should result in lower dose estimates in some cases.

**TABLE 3. Environmental Statements for Power Plants  
Included in this Study**

Site Number	Reactor Site	Docket Number	Date	Remarks
1	Big Rock Point			ES <sup>(a)</sup> not available
2	Brown's Ferry		Jul 71	ES Published by Tenn. Valley Authority
3	Cooper Station	50-298	Feb 73	Draft ES
4	Dresden	50-237,50-249	Nov 73	
5	Beaver Valley	50-334	Jul 73	
6	Humboldt Bay			Not operational.
7	La Crosse	50-409	Jun 76	Draft ES
8	Millstone Point	50-245,50-336	Jun 73	
9	Monicello	50-263	Nov 72	
10	Nine Mile Point	50-220	Jan 74	
11	Oyster Creek	50-219	Dec 74	
12	Peach Bottom	50-277,50-278	Apr 73	
13	Pilgrim	50-293	May 72	
14	Quad Cities	50-254,50-265	Sep 72	
15	Vermont Yankee	50-271	Jul 72	
16	St. Lucie	50-335	Jun 73	
17	Brunswick	50-324,50-325	Jun 73	Draft ES
18	Duane Arnold	50-331	Mar 73	
19	J. A. Fitzpatrick	50-333	Mar 73	
20	E. I. Hatch	50-321	Oct 72	
21	Arkansas One	50-313,50-368	Feb 73, Sep 72	
22	Connecticut Yankee (Haddam Neck)	50-213	Oct 73	
23	Fort Calhoun	50-285	Aug 72	
24	H. B. Robinson	50-261	Apr 74	
25	Indian Point	50-247	Sep 72	ES of Indian Point 2 used
26	Salem	50-272,50-311	Apr 73	
27	Kewaunee	50-305	Dec 72	
28	Maine Yankee	50-309	Jul 72	
29	Oconee	50-269,50-270 50-287	Mar 72	
30	Palisades	50-255	Jun 72	
31	Point Beach	50-266,50-301	May 72	
32	Prairie Island	50-282,50-306	May 73	
33	R. E. Ginna	50-244	Dec 73	
34	San Onofre	50-206	Oct 73	
35	Surry	50-281	Jun 72	ES of Surry 2 used
36	Three Mile Island	50-289	Dec 72	
37	Turkey Point	50-210,50-251	Feb 72	Draft ES
38	Yankee Rowe			ES not available
39	Zion	50-295,50-304	Dec 72	
40	Calvert Cliffs	50-317	Apr 73	
41	Cook	50-315	Aug 73	
42	Trojan	50-344	Jan 73	Draft ES
43	Rancho Seco	50-312	Mar 73	
44	Crystal River	50-302	May 73	
45	Davis-Besse	50-346	Mar 73	
46	J. M. Farley	50-348,50-364	Jun 72	
47	North Anna	50-338,50-339	Apr 73	
48	Sequoyah	50-327,50-328	Feb 74	
49	McGuire	50-369,50-370	Apr 76	

(a) Environmental Statement

The reactors included in this study, their type, licensed thermal power rating and net electrical output for 1981 are listed in Table 4. Those boiling-water reactors which had an operating augmented gaseous radioactive waste system in 1981 are identified in the table. Populations at risk and the dose commitments derived in the study are also tabulated.

#### Site-Dependent Parameters

In the Site Summary section, the location (including latitude and longitude) for each reactor site and the estimated 1981 population within 2 to 80 km around each site is given. In addition, the location of major metropolitan centers within 80 km are listed along with their 1981 extrapolated populations. The populations of the Standard Metropolitan Statistical Areas (SMSA) are given where applicable. Next, the site-specific data pertinent to the airborne pathways are specified. The average production rates of vegetable crops and animal products are given for the area within an 80-km radius based upon the statewide average. This production has been reduced for sites on lakes and seacoasts to account for the presence of the body of water. An animal grazing factor is estimated for each site location. This factor accounts for the fraction of the year during which grazing animals such as milk cows and beef cattle graze on fresh pasture in the region around the site. After average production rates are given, the period of record and the percent data recovery of the meteorological data used in calculating diffusion factors is indicated.

Various site-dependent factors associated with the waterborne pathways are presented next. For lake and ocean sites, we used the average dilution of plant effluents for the year 1981 specified by Tichler and Benkovitz (1984). For river sites, the average annual river flow is tabulated. This flow was used in place of a dilution flow from the plant to account for dilutions of liquid releases at the locations of probable intake of drinking water and aquatic food catch. Any exceptions to this scheme have been footnoted. Next is shown the estimated 1981 population utilizing drinking water drawn from supplies containing diluted effluents from the site. These are shown with an estimated dilution factor where applicable. Fish and invertebrate catch data taken from the respective plant environmental statement, when available (see Table 3), are listed next, along with estimated dilution factors for the lake and ocean sites. When site-specific fish and invertebrate catch data were not available, the generic consumption rates were used for the particular site. Sites on salt water were assumed to contribute no dose from drinking water.

TABLE 4. Reactor Characteristics and Population Total-Body Dose Commitments, 1981

Site	Unit	Type	Licensed Thermal Power (MW)	Electric Energy Generation 1981 (TW.hr) <sup>(a)</sup>	Boiling Water Reactor Augmented Radioactive Waste System (1981)	Population Dose Commitment (Person-rem)			Population At Risk	Average Individual Total-Body Dose Commitment (mrem)
						Liquid	Air	Total		
Arkansas One	1	PWR <sup>(b)</sup>	2568	4.90	-					
	2	PWR	2815	4.32	-					
Arkansas One	TOTAL		5383	9.22		3.5	0.070	3.6	1.8E5	1.9E-2
Beaver Valley	1	PWR	2652	4.66	-	0.078	0.018	0.096	3.6E6	2.7E-5
Big Rock Point	1	BWR <sup>(c)</sup>	240	0.470	NO	3.3	0.25	3.6	1.7E5	2.1E-2
Browns Ferry	1	BWR	3293	4.41	YES					
	2	BWR	3293	7.47	YES					
	3	BWR	3293	6.26	YES					
Browns Ferry	TOTAL		9879	18.14		2.7	5.1	7.8	7.1E5	1.1E-2
Brunswick	1	BWR	2436	2.56	NO					
	2	BWR	2436	3.28	NO					
Brunswick	TOTAL		4872	5.84		0.0097	1.5	1.5	2.1E5	7.0E-3
Calvert Cliffs	1	PWR	2700	6.11	-					
	2	PWR	2700	5.42	-					
Calvert Cliffs	TOTAL		5400	11.53		0.65	0.069	0.72	2.6E6	2.8E-4
Cook	1	PWR	3250	6.78	-					
	2	PWR	3391	6.38	-					
Cook	TOTAL		6641	13.16		0.23	0.24	0.47	1.1E6	4.1E-4
Cooper Station	1	BWR	2381	3.85	YES	0.012	0.054	0.066	1.7E5	3.9E-4
Crystal River	3	PWR	2452	4.01	-	19	0.15	19	3.6E5	5.2E-2
Davis-Besse	1	PWR	2772	4.36	-	0.63	0.018	0.65	1.8E6	3.6E-4
Dresden	1	BWR	700	0	NO					
	2	BWR	2527	3.41	NO					
	3	BWR	2527	5.18	NO					
Dresden	TOTAL		5754	8.59		0	10	10	6.4E6	1.6E-3
Duane Arnold	1	BWR	1658	2.22	YES	0	0.032	0.032	6.0E5	5.3E-5
J. M. Farley	1	PWR	2652	2.62	-					
	2	PWR	2652	2.92	-					
J. M. Farley	TOTAL		5304	5.54		3.1	0.098	3.2	3.5E5	9.0E-3
J. A. Fitzpatrick	1	BWR	2436	4.78	YES	0.22	6.5	6.7	8.4E5	8.0E-3
Fort Calhoun	1	PWR	1420	2.15	-	6.0	0.0572	6.1	7.4E5	8.1E-3
R. E. Ginna	1	PWR	1520	3.32	-	0.12	0.026	0.15	1.2E6	1.2E-4
Haddam Neck	1	PWR	1825	4.06	-	0.20	0.35	0.55	3.4E6	1.6E-4
E. I. Hatch	1	BWR	2436	2.76	YES					
	2	BWR	2436	4.48	YES					
E. I. Hatch	TOTAL		4872	7.24		2.0	0.16	2.2	3.0E5	7.2E-3
Indian Point	1	PWR	615	0	-					
	2	PWR	2758	3.06	-					
	3	PWR	2760	3.03	-					
Indian Point	TOTAL		6133	6.09		0.54	8.1	8.6	1.5E7	5.6E-4
Kewaunee	1	PWR	1650	3.77	-	1.6	0.0013	1.6	6.1E5	2.6E-3
La Crosse	1	BWR	165	2.41	NO	4.6	0.30	4.9	3.4E5	1.4E-2
Maine Yankee	1	PWR	2440	5.21	-	0.0019	0.0065	0.0084	5.9E5	1.4E-5
McGuire	1	PWR	3411	0.019	-	0.20	0.00003	0.20	1.6E6	1.2E-4
Millstone	1	BWR	2011	2.52	NO					
	2	PWR	2560	6.09	-					
Millstone	TOTAL		4571	8.61		0.010	4.8	4.8	2.5E6	1.9E-3
Monticello	1	BWR	1670	3.26	YES	0.0001	0.14	0.14	2.1E6	6.5E-5
Nine Mile Point	1	BWR	1850	3.27	NO	4.9	0.25	5.2	8.4E5	6.1E-3
North Anna	1	PWR	2775	4.64	-					
	2	PWR	2775	5.65	-					
North Anna	TOTAL		5550	10.32		4.1	0.074	4.2	1.0E6	4.1E-3

(a) 1 TW.hr = 3.6E15 joules

(b) Pressurized water reactor

(c) Boiling water reactor

TABLE 4. Continued

Site	Unit	Type	Licensed Thermal Power (MW)	Electric Energy Generation 1981 (TW.hr) <sup>(a)</sup>	Boiling Water Reactor Augmented Radioactive Waste System (1981)	Population Dose Commitment (Person-rem)			Population At Risk	Average Individual Total-Body Dose Commitment (mrem)
						Liquid	Air	Total		
Oconee	1	PWR	2568	3.00	-					
	2	PWR	2568	5.17	-					
	3	PWR	2568	5.64	-					
Oconee	TOTAL		7704	13.83		13	0.35	13	8.9E5	1.5E-2
Oyster Creek	1	BWR	1930	2.63	NO	0.016	15	15	3.5E6	4.3E-3
Palisades	1	PWR	2530	3.46	-	0.13	0.031	0.16	1.1E6	1.5E-4
Peach Bottom	2	BWR	3293	6.63	YES					
	3	BWR	3293	3.13	YES					
Peach Bottom	TOTAL		6586	9.76		0.84	1.9	2.7	4.3E6	6.4E-4
Pilgrim	1	BWR	1998	3.44	YES	0.038	0.70	0.74	4.3E6	1.7E-4
Point Beach	1	PWR	1518	2.61	-					
	2	PWR	1518	3.72	-					
Point Beach	TOTAL		3036	6.33		0.063	0.13	0.19	6.2E5	3.1E-4
Prairie Island	1	PWR	1650	3.84	-					
	2	PWR	1650	3.09	-					
Prairie Island	TOTAL		3300	6.93		0.0030	0.040	0.043	2.2E6	2.0E-5
Quad Cities	1	BWR	2511	5.73	YES					
	2	BWR	2511	3.77	YES					
Quad Cities	TOTAL		5022	9.50		13	3.0	16	7.2E5	2.2E-2
Rancho Seco	1	PWR	2772	2.63	-	1.7	0.10	1.8	1.8E6	1.0E-3
H. B. Robinson	2	PWR	2200	3.50	-	1.3	0.019	1.3	6.6E5	2.0E-3
St. Lucie	1	PWR	2560	4.95	-	0.0041	0.68	0.68	5.7E5	1.2E-3
Salem	1	PWR	3338	6.19	-					
	2	PWR	3338	1.63	-					
Salem	TOTAL		6676	7.82		0.11	0.74	0.85	4.7E6	4.0E-4
San Onofre	1	PWR	1347	0.779	-	1.8	0.038	1.8	4.6E6	4.0E-4
Sequoyah	1	PWR	2815	2.53	-	0.26	0.41	0.67	8.3E5	8.1E-4
Surry	1	PWR	2441	2.38	-					
	2	PWR	2441	5.15	-					
Surry	TOTAL		4882	7.53		1.1	0.59	1.7	1.7E6	1.0E-3
Three Mile Island	1	PWR	2535	0	-					
	2	PWR	2772	0	-					
Three Mile Island	TOTAL		5307	0		0.13	0.11	0.24	2.1E6	1.1E-4
Trojan	1	PWR	3411	6.42	-	0.13	0.065	0.20	1.4E6	1.4E-4
Turkey Point	3	PWR	2200	9.12	-					
	4	PWR	2200	4.50	-					
Turkey Point	TOTAL		4400	13.62		0.0034	0.068	0.071	2.4E6	3.0E-5
Vermont Yankee	1	BWR	1593	3.57	YES	0.49	0.11	0.60	1.3E6	4.5E-4
Yankee Rowe	1	PWR	600	0.885	-	0.29	0.028	0.32	1.6E6	2.0E-4
Zion	1	PWR	3250	6.19	-					
	2	PWR	3250	5.26	-					
Zion	TOTAL		6500	11.45		1.1	0.62	1.7	7.2E6	2.4E-4
TOTAL FOR ALL SITES				280		93	63	160	9.8E7	---
Arithmetic Mean				5.8		1.9	1.3	3.3	2.0E6	4.7E-3
Geometric Mean				1.5		0.29	0.16	1.0	1.2E6	8.3E-4

## RESULTS

This report consists of a summary of values used for site-specific parameters at each site, as explained above, and the results of population dose commitment calculations. The population dose commitments are presented in two tables facing the page summarizing site-specific parameters for that site. These tables include both liquid and airborne pathway dose commitments for the several organs of reference for each age group investigated. They also include the dose to the whole population which includes all age groups. The airborne population dose commitments for each of 160 segments partitioning the region around the site<sup>(a)</sup> were divided by the population residing within that segment to derive an average individual dose for that segment. These doses are summarized as a histogram showing percent of the population receiving a given dose level for each site. The fractional population dose from the liquid pathway was not determined in this manner, because the NRC does not at present take into account the location of individuals exposed via this pathway, except those exposed through ingestion of drinking water.

Population dose commitments estimated for both the liquid pathways and airborne pathways varied widely over the 48 sites (71 reactors) studied. The total dose commitments (from both pathways) varied from a high of 20 to a low of 0.008 person-rem. The arithmetic mean for the dose from liquid pathways was 2 person-rem and the mean for the dose from airborne pathways was 1 person-rem (see Table 4).

Releases from Duane Arnold and Dresden resulted in zero and minimal doses from liquid pathways. This was because no liquid releases were reported for Arnold, and the receiving waters for the Dresden site are contaminated with Chicago sewage to such an extent as to severely limit use of this water for drinking or fishing. The largest liquid-pathway dose to the total body was 20 person-rem at Crystal River. This dose resulted primarily from the radioactive zinc and iron (Zn-65 and Fe-59) released by this plant.

The lowest airborne pathway doses to the total body was estimated for McGuire (0.00003 person-rem) and Kewaunee (0.001 person-rem). The highest airborne dose was at Oyster Creek (15 person-rem). The major contributors to this dose were the noble gases: Kr-88 and Xe-135.

The total population dose commitments from all sites for 1981 were estimated to be 90 person-rem via liquid pathways and 60 person-rem via airborne pathways (Table 4).

---

(a) See Appendix for definition of segments.



Figure 1 shows graphically the wide range of the airborne population dose commitments for the reactor sites. The median, upper and lower quartiles and upper and lower octiles for the distribution of doses calculated for each of 160 segments are indicated for each site. Figure 2 is a histogram for all 48 sites taken together. We can see from this plot that about 25% of the total population at risk (98 million) would each receive a dose commitment of between 0.00003 and 0.0001 mrem. We can see further that about 1.5% receive a dose which is less than  $1 \times 10^{-6}$  mrem. Although not discernible from the plot, 0.05% received a dose of between 0.1 and 10 mrem. However, no attempt was made in this study to estimate the maximum dose commitment received by any one individual from the radionuclides released at any of the sites.

We should point out here, however, that the doses estimated in this study are extremely low compared to an average annual background dose of approximately 100 mrem. We have compared dose commitments calculated in this study with annual background. However, this comparison is not quite exact, since these dose commitments are those total-body doses received from the year's (1981) effluent release -- over 50 years of a person's lifetime. However, most of the dose commitment calculated here is delivered in the first year, so the comparison is reasonably valid.

For comparison purposes the doses in the site summary tables are given to two significant figures; however, the data and models used in their calculation limit their accuracy to at most one significant figure.

## POPULATION DOSE COMMITMENT - PERSON REM

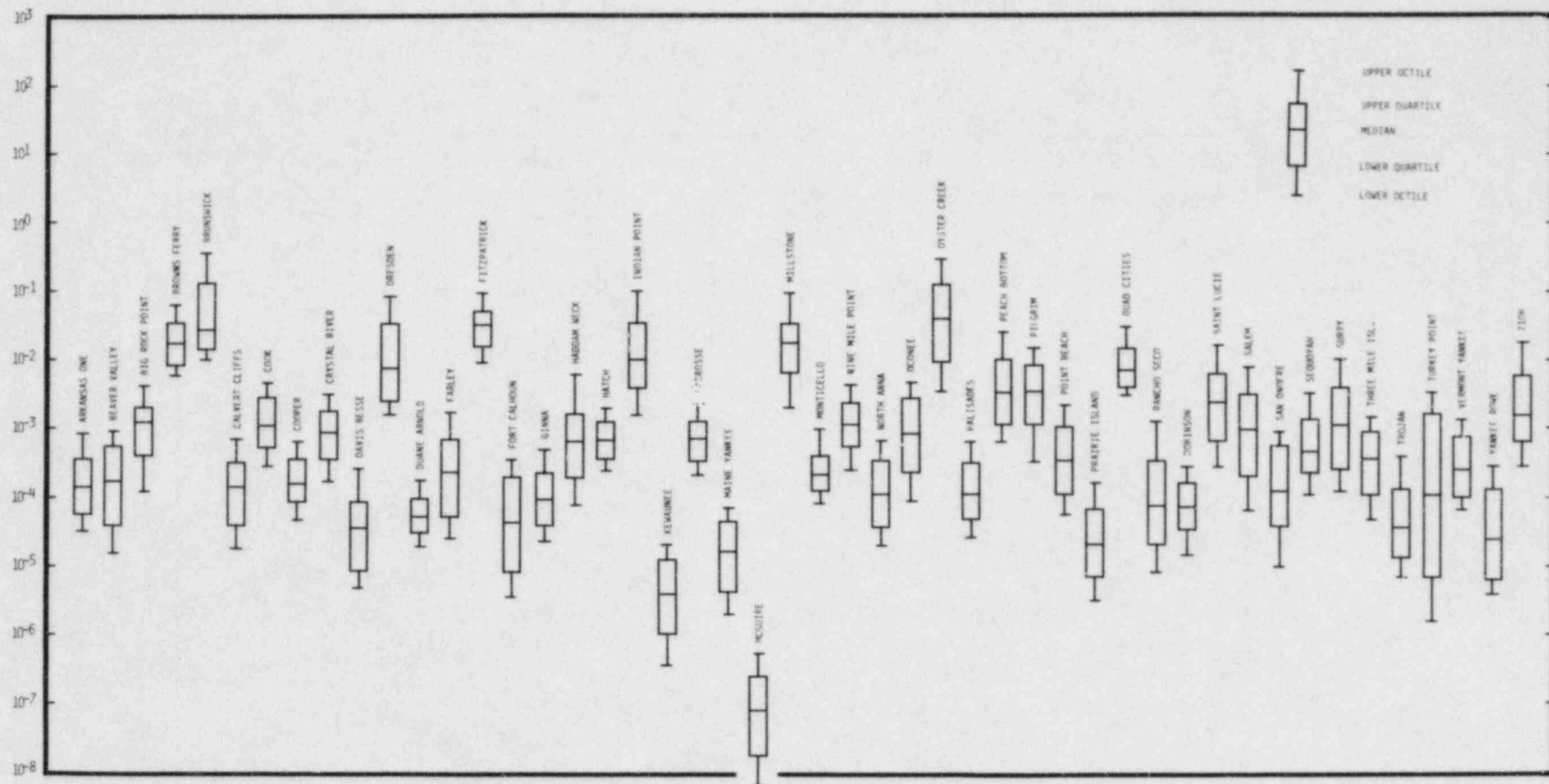


FIGURE 1. Airborne Population Dose Commitments for the Reactor Sites, 1981

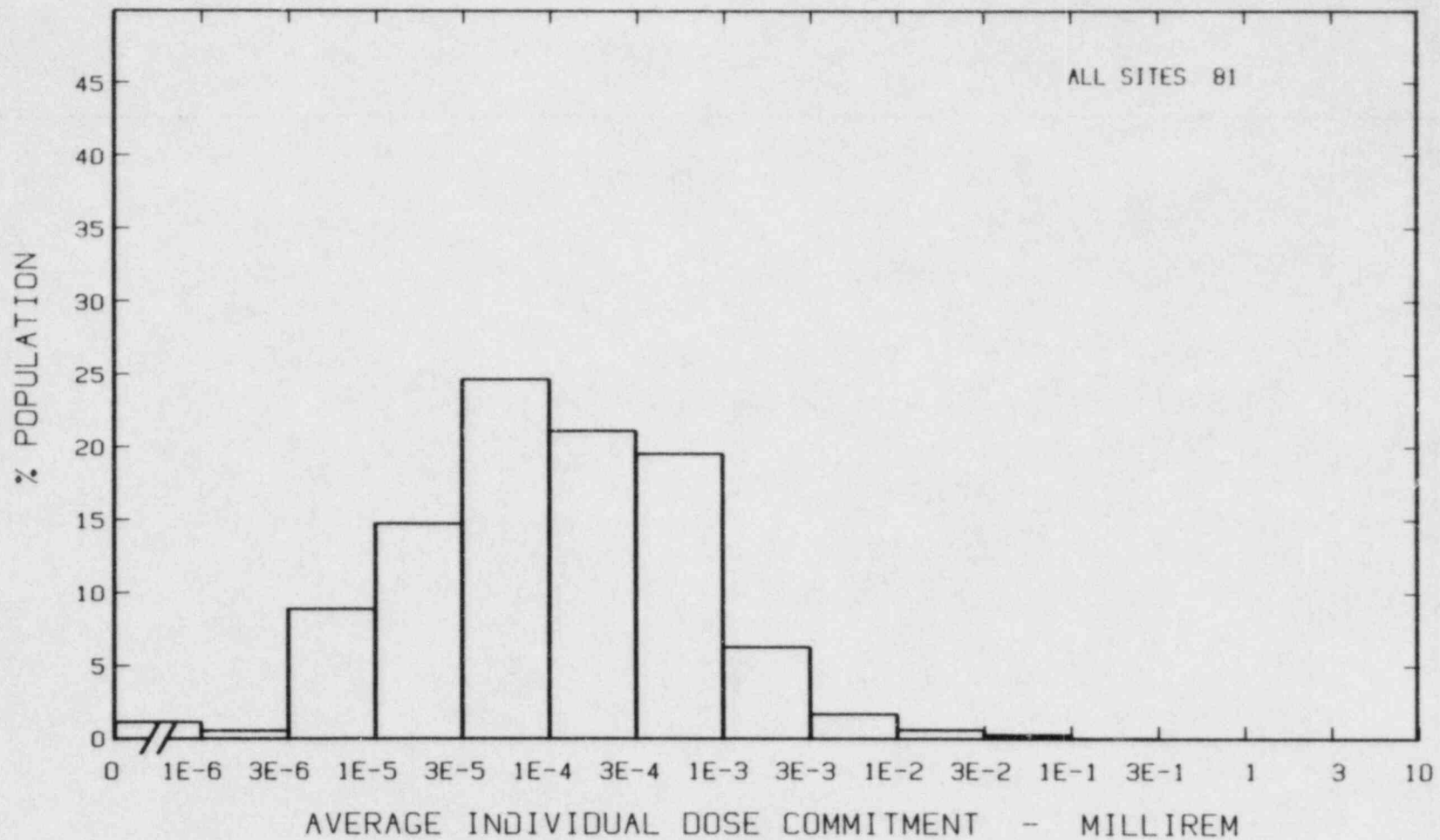


FIGURE 2. Fraction of Total Population Receiving Various Average Individual Dose Commitments for All Sites, 1981

## SITE COMPARISONS

Compared to 1980, the "liquid dose" is lower (93 vs. 120); whereas, the "air dose" is about the same (63 vs. 57). Table 5 compares the total population dose commitments estimated for the past seven years.

TABLE 5. Comparison of Annual Population Dose Commitments for the Last Seven Years (person-rem)

	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>
Liquid	76	82	160	110	220	120	93
Air	<u>1300</u>	<u>390</u>	<u>540</u>	<u>530</u>	<u>1600</u>	<u>57</u>	<u>63</u>
TOTAL	1300	470	700	640	1800	180	160

The reactor sites were compared as to the total population dose over the years of this study, 1975 - 1981. The sites were placed within six groupings depending on resulting population dose summed over each of the years thru 1981:

I	Greater than 100 person-rem	
II	26 - 100	"
III	11 - 25	"
IV	2.6 - 10	"
V	1 - 2.5	"
VI	Less than 1	"

Table 6 shows the sites within the groups along with the reactor manufacturer, year of commercial operation commencement, and the indicated population doses in person-rem. The manufacturer codes are as follows:

AC	Allis Chalmers
B	Babcox and Wilcox
CE	Combustion Engineering
GE	General Electric
W	Westinghouse

TABLE 6. Total Body Population Doses from Nuclear Power Plant Effluents During Normal Operations<sup>+</sup>, 1975-1981

Site	Year Commercial Operation	Total Person-rem for year							Total
		1975	1976	1977	1978	1979	1980	1981	
I. (>100) <sup>*</sup>									
Millstone, GE, CE	70,75	750.	160.	220.	200.	1.8	2.9	4.8	1340.
Dresden, GE	60,70,71	360	120.	180.	170.	15.	13.	10.	870.
Oyster Creek, GE	69	47.	37.	41.	110.	220.	9.5	15.	480.
Nine Mile Point, GE	69	69.	8.7	3.1	.07	140.	.04	5.2	230.
Quad Cities, GE	72,72	25.	11.	4.	7.3	6.5	42.	16.	110.
Oconee, B	73,74,74	9.2	20.	38.	12.	5.8	10.	13.	110.
II. (26 - 100) <sup>*</sup>									
Zion, W	73,73	6.1	17.	22.	23.	14.	11.	1.7	95.
Pilgrim, GE	72	6.2	14.	52.	7.3	3.1	4.3	.74	88.
Cook, W	75,78	.21	5.	23.	40.	17.	.34	.47	86.
Peach Bottom, GE	74,74	2.4	17.	11.	15.	30.	4.7	2.7	83.
Indian Pt., B, W, W	62,74,76	3.6	9.1	13.	6.4	5.9	4.9	8.6	54.
LaCrosse, AC	69	7.0	12.	9.4	5.9	4.1	2.1	4.9	45.
Big Rock Point, GE	62	4.6	7.7	2.6	2.6	9.0	10.	3.6	40.
Hatch, GE	75,80	-	.03	35.	-	-	.34	2.2	38.
Browns Ferry, GE	74,75,77	2.9	1.1	3.2	2.2	9.6	2.8	7.8	30.
Davis-Besse, B	77	-	-	14.	.6	.52	11.	0.65	27.
III. (11 - 25) <sup>*</sup>									
Humboldt Bay, GE	63	18.	5.8	-	-	-	-	-	24.
Haddam Neck, W	68	.54	3.7	2.4	5.6	3.6	7.5	.55	24.
Kewaunee, W	74	8.5	5.1	1.9	.59	1.8	3.	1.6	22.
Crystal River, B	77	-	-	.02	.29	.65	.32	19.	20.
Surry, W	72,73	5.4	3.4	3.7	1.4	1.0	1.2	1.7	18.
Rancho Seco, B	75	.05	.01	.06	.15	.32	15.	1.8	17.
Arkansas One, B	74,79	.3 <sup>a</sup>	4.5	1.6	2.2	.47	3.4	3.6	16.
Brunswick, GE	75,77	.02	.53	6.4	2.3	2.2	2.0	1.5	15.
North Anna, W	77,80	-	-	-	.48	4.9	3.1	4.2	13.
Robinson, W	71	9.3	.28	.47	.45	.19	.2	1.3	12.
Fitzpatrick, GE	75	.09	1.4	.56	.37	.24	2.8	6.7	12.
Calvert Cliffs, CE	75,77	.5	.74	1.9	2.6	3.0	1.7	.72	11.
IV. (2.6 - 10) <sup>*</sup>									
Turkey Point, W	72,73	.22	.28	.4	9.1	.17	.08	.07	10.
San Onofre, W	68	.28	1.4	.78	1.8	.52	3.1	1.8	9.7
Three Mile Is., B	74,78	.57	1.4	2.0	2.2	.29	2.2	.24	8.9
Ft. Calhoun, CE	73	.13	.26	.33	.48	.39	.48	6.1	8.2
Yankee Rowe, W	61	.11	.07	.2	4.6	.4	.55	.72	6.7
Monticello, GE	71	5.2	.25	.2	.2	.18	.16	.14	6.3
Farley, W	77,81	-	-	-	.19	.19	.58	3.2	4.2
Salem, W	77,81	-	-	.12	.37	2.3	.28	.85	3.9
St. Lucie, CE	76	-	.03	.65	1.1	.76	.51	.68	3.7
Prairie Island, W	73,74	.12	1.4	.59	.46	.1	.06	.04	2.8
V. (1 - 2.5) <sup>*</sup>									
Point Beach, W	70,72	1.2	.33	.18	.12	.25	.2	.19	2.5
Duane Arnold, GE	75	.18	.32	.31	.87	.54	.11	.03	2.4
Palisades, CE	73	.62	.64	.63	.11	.12	.03	.16	2.3
Vermont Yankee, GE	72	.08	.11	.37	.24	.46	.06	.6	1.9
Ginna, W	70	.28	.51	.14	.13	.11	.58	.15	1.9
Beaver Valley, W	76	-	.04	.40	.83	.17	.02	.11	1.6
Cooper, GE	74	.18	.39	.02	.05	.35	.07	.07	1.1
VI. (<1) <sup>*</sup>									
Sequoyah, W	80	-	-	-	-	-	.22	.67	.89
Trojan, W	76	-	.02	.11	.04	.05	.06	.20	.48
Maine Yankee, W	72	.10	.06	.01	.03	.04	.03	.01	.28
McGuire, W	81	-	-	-	-	-	-	.20	.20
		1300.	470.	700.	640.	510.	180.	160.	4000.

<sup>+</sup> Only the doses from the TMI accident, 1979, are excluded.

<sup>\*</sup> Total person-rem per site.

SITE SUMMARIES

1981

Site: ARKANSAS ONE

POPE COUNTY, ARKANSAS

Location: N 35.3100° W 93.2308°

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POPULATION DATA

Total Population Within 2-to-80-km Region: 1.8E5

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Russellville	14,000	10 km E
Conway	20,000	76 km ESE

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production Of Crops and Animal Products In 80-km Radius Circle	Veg: 5.8E6 kilogram Milk: 4.8E7 liter Meat: 7.2E7 kilogram
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Regional Productivity Factor:	1
Animal Grazing Factor:	0.7

Meteorology Period of Record: 1 JAN 75 - 31 DEC 75 Recovery: 97%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS via ARKANSAS RIVER

	Average River Flow at Site: 36,000 ft <sup>3</sup> /s
Drinking Water:	Exposed Population: None
Fish:	Edible Harvest: 1.4 <sup>(a)</sup> kg/yr Dilution Factor: 1

---

(a) Average individual consumption rates as given in the FES (1973) were used in lieu of catch data.

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
**ARKANSAS ONE 1 AND 2**

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Child	1.5E-01	3.3E-02	3.2E-02	7.6E-01	8.6E-01
Teen	2.9E-01	6.8E-02	2.3E-02	4.6E-01	7.3E-01
Adult	3.1E+00	5.9E-01	1.5E-01	2.6E+00	4.3E+00
TOTAL	3.5E+00	6.9E-01	2.0E-01	3.9E+00	5.9E+00

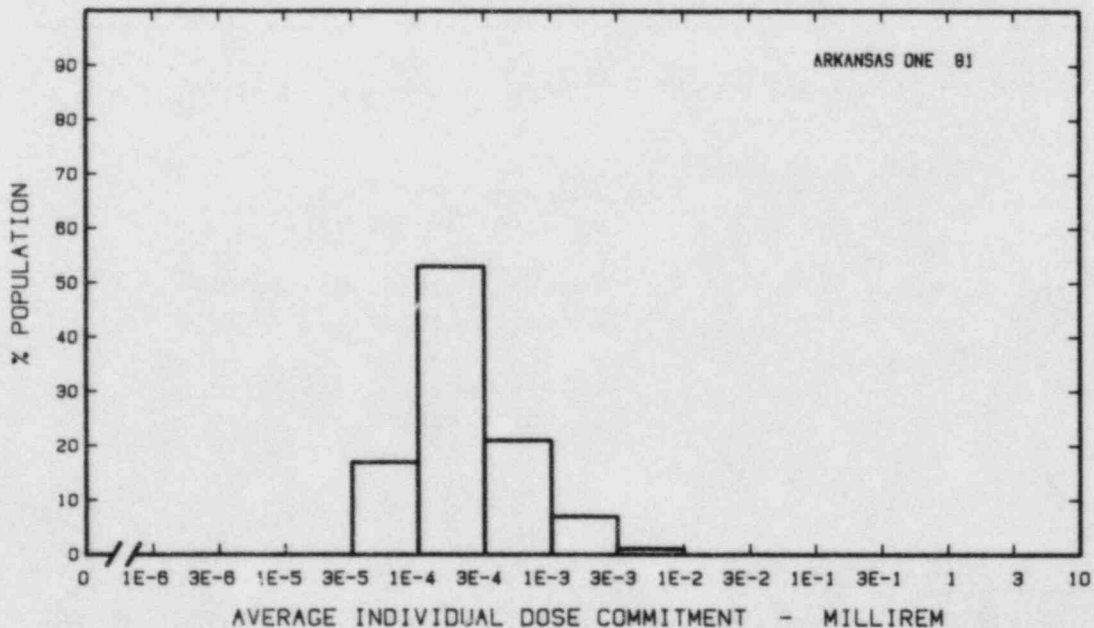
Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	9.7E-04	9.7E-04	3.9E-03	8.4E-04	9.8E-04	1.0E-03
Child	1.1E-02	1.1E-02	2.9E-02	9.3E-03	1.1E-02	1.2E-02
Teen	8.3E-03	8.2E-03	1.5E-02	6.8E-03	8.2E-03	9.5E-03
Adult	4.9E-02	4.9E-02	7.4E-02	4.1E-02	4.9E-02	5.3E-02
TOTAL	7.0E-02	7.0E-02	1.2E-01	5.8E-02	7.0E-02	7.6E-02

Production/Consumption factors: (a)

Produce: <1                  Milk: 2.0                  Meat: 4.9

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



(a) See Appendix A, Page A-5, for explanation of this ratio.



Site: BEAVER VALLEY

SHIPPINGPORT, PENNSYLVANIA

Location: N 40.6219°

W 80.4339°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: 3.6E6

Major Metropolitan Centers Within Region:

Center	Population	Location
Pittsburgh SMSA	2,300,000	42 km ESE
Youngstown-Warren SMSA	530,000	56 km NNW
Stuebenville-Weirton SMSA	160,000	33 km SSW
Wheeling SMSA	190,000	66 km SSW
New Castle	34,000	43 km N

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production  
Of Crops and Animal Products  
In 80-km Radius Circle

Veg: 5.3E7 kilogram  
Milk: 5.3E8 liter  
Meat: 5.4E7 kilogram

Regional Productivity Factor:  
Animal Grazing Factor:

1  
0.5

Meteorology Period of Record: 1 JAN 77 - 31 DEC 77      Recovery: 92%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS      via      OHIO RIVER

Average River Flow  
at Site: 30,000 ft<sup>3</sup>/s

Drinking Water:

Exposed Population: 6,200  
Dilution Factor: 12<sup>(a)</sup>

Fish:

Edible Harvest: 410 kg/yr  
Dilution Factor: 1

---

(a) This factor accounts for the incomplete dilution of plant effluent by river at point of drinking water intake at Midland.

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
BEAVER VALLEY

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	3.2E-04	3.1E-04	5.5E-04	7.1E-05	3.8E-04
Child	3.6E-03	3.6E-03	5.0E-03	7.6E-04	4.1E-03
Teen	1.4E-03	1.6E-03	1.8E-03	2.0E-04	1.5E-03
Adult	1.2E-02	1.4E-02	1.4E-02	1.2E-03	1.3E-02
TOTAL	1.8E-02	1.9E-02	2.2E-02	2.2E-03	1.9E-02

Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	1.1E-03	1.1E-03	1.4E-02	1.3E-03	1.2E-03	1.2E-03
Child	1.3E-02	1.2E-02	8.5E-02	1.5E-02	1.3E-02	1.4E-02
Teen	9.2E-03	9.0E-03	3.9E-02	1.1E-02	9.1E-03	1.1E-02
Adult	5.5E-02	5.4E-02	1.6E-01	6.3E-02	5.4E-02	6.1E-02
TOTAL	7.8E-02	7.7E-02	3.0E-01	9.0E-02	7.7E-02	8.7E-02

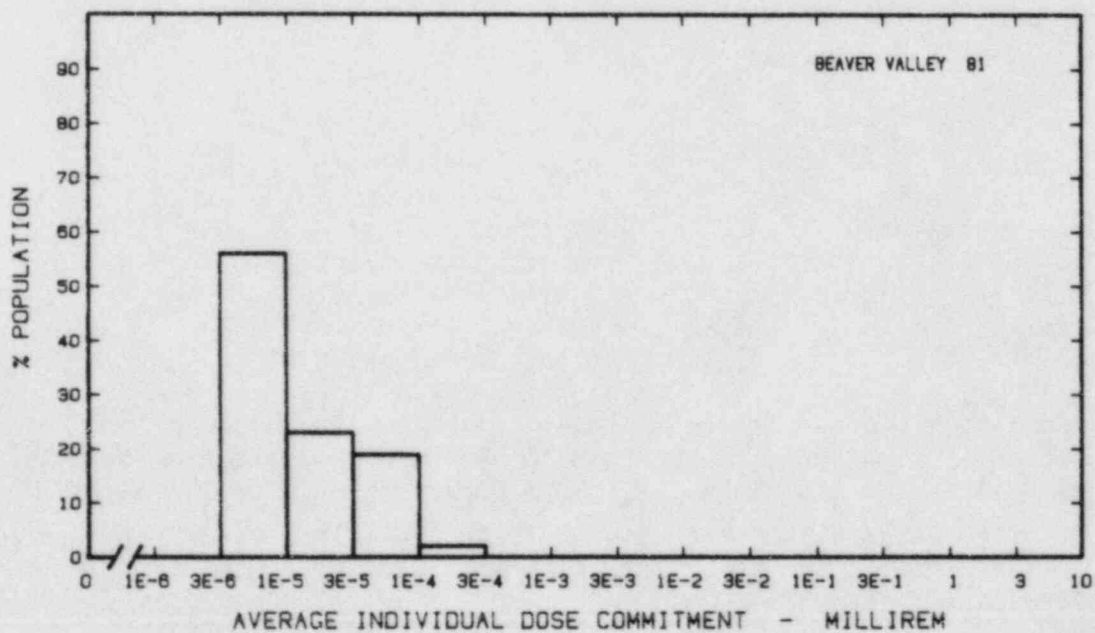
Production/Consumption factors:

Produce: <1

Milk: 1.1

Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: BIG ROCK POINT

CHARLEVOIX COUNTY, MICHIGAN

Location: N 45.3592°

W 85.1947°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: 1.7E5

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Traverse City	16,000	75 km SSW
Petoskey	6,100	18 km E
Cheboygan	5,100	65 km ENE

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production Of Crops and Animal Products In 80-km Radius Circle	Veg: 6.9E7 kilogram Milk: 2.9E8 liter Meat: 4.5E7 kilogram
---	--

Regional Productivity Factor:	0.5
Animal Grazing Factor:	0.5

Meteorology Period of Record: 9 FEB 61 ~ 8 FEB 63 Recovery: 85%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS via LAKE MICHIGAN

	Average Dilution Flow from Plant: 110 ft <sup>3</sup> /s
Drinking Water:	Exposed Population: 31,000 <sup>(a)</sup> Dilution Factor: 4.9E-5 <sup>(b)</sup>
Fish:	Edible Harvest: (c) kg/yr Dilution Factor: 0.01

(a) Population exposed to contaminated drinking water derived from information obtained from J. Hennigan, Division of Radiation Health, Bureau of Environment and Health, Michigan Department of Public Health.

(b) Drinking water dilution factor estimated by averaging dilution factor derived from Figure 6B-5, Vol. 1 of WASH-1258 (1973) suitably weighted for population.

(c) Generic consumption rate used (Table A-1).

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
BIG ROCK POINT

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	6.8E-07	1.2E-07	1.3E-07	5.0E-06	5.3E-06
Child	1.4E-01	6.2E-03	6.2E-05	8.3E-01	8.6E-01
Teen	2.7E-01	1.2E-02	4.5E-05	5.0E-01	7.2E-01
Adult	2.9E+00	9.9E-02	3.0E-04	2.9E+00	4.3E+00
TOTAL	3.3E+00	1.2E-01	4.1E-04	1.2E+00	5.8E+00

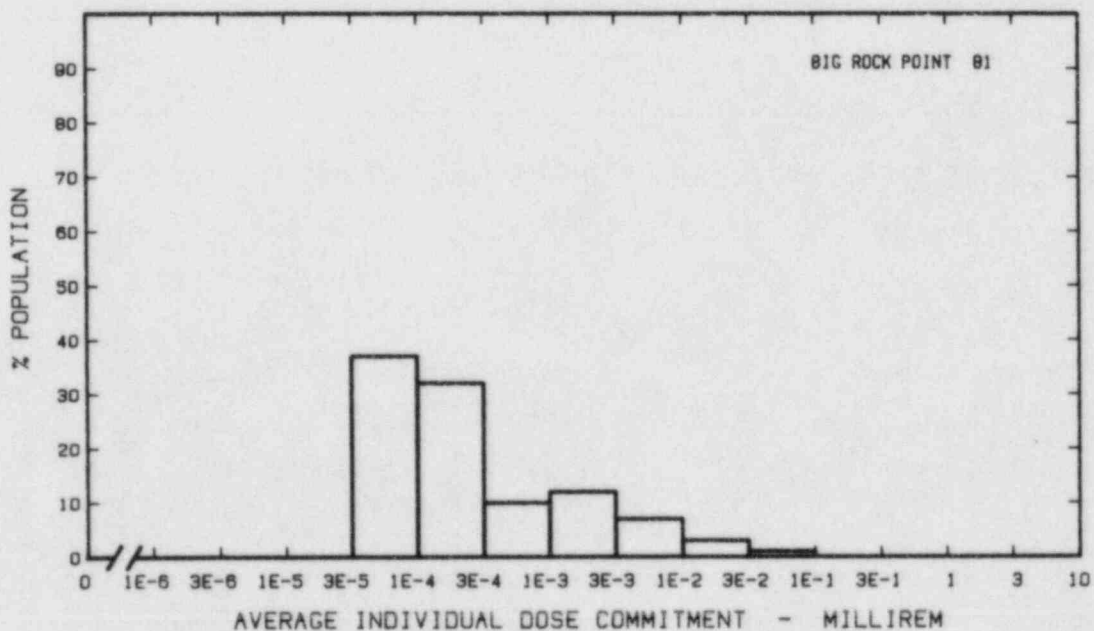
Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	3.6E-03	3.6E-03	3.8E-03	3.6E-03	3.6E-03	3.7E-03
Child	4.0E-02	4.0E-02	4.2E-02	4.0E-02	4.0E-02	4.1E-02
Teen	2.9E-02	2.9E-02	3.0E-02	2.9E-02	2.9E-02	3.1E-02
Adult	1.8E-01	1.8E-01	1.8E-01	1.8E-01	1.8E-01	1.8E-01
TOTAL	2.5E-01	2.5E-01	2.6E-01	2.5E-01	2.5E-01	2.6E-01

Production/Consumption factors:

Produce: 1.0                      Milk: 6.5                      Meat: 1.7

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: BROWNS FERRY

DECATUR, ALABAMA

Location: N 34.7042°

W 87.1186°

---

#### POPULATION DATA

Total Population Within 2-to-80-km Region: 7.2E5

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Huntsville SMSA	310,000	49 km E
Florence SMSA	140,000	52 km WNW
Decatur	42,000	16 km SE
Athens	15,000	17 km NE
Cullman	13,000	64 km SSE

---

#### SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production Of Crops and Animal Products In 80-km Radius Circle	Veg: 1.7E7 kilogram Milk: 5.7E7 liter Meat: 8.6E7 kilogram
---	--

Regional Productivity Factor:	1
Animal Grazing Factor:	0.7

Meteorology Period of Record: 1 JAN 74 - 31 DEC 75 Recovery: 94%

---

#### SITE SPECIFIC DATA - WATERBORNE PATHWAYS via TENNESSEE RIVER at WHEELER LAKE

	Average River Flow at Site: 45,000 ft <sup>3</sup> /s
Drinking Water:	Exposed Population: 25,000 Dilution Factor: 1
Fish:	Edible Harvest: 1.6E6 kg/yr Dilution Factor: 1

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
**BROWNS FERRY 1, 2 AND 3**

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	2.8E-04	8.4E-05	8.1E-04	1.2E-03	4.0E-04
Child	1.5E-01	3.7E-02	1.0E-02	5.4E-01	6.2E-01
Teen	2.3E-01	7.7E-02	5.0E-03	3.3E-01	5.3E-01
Adult	2.3E+00	6.7E-01	3.4E-02	2.0E+00	3.2E+00
TOTAL	2.7E+00	7.9E-01	5.0E-02	2.9E+00	4.3E+00

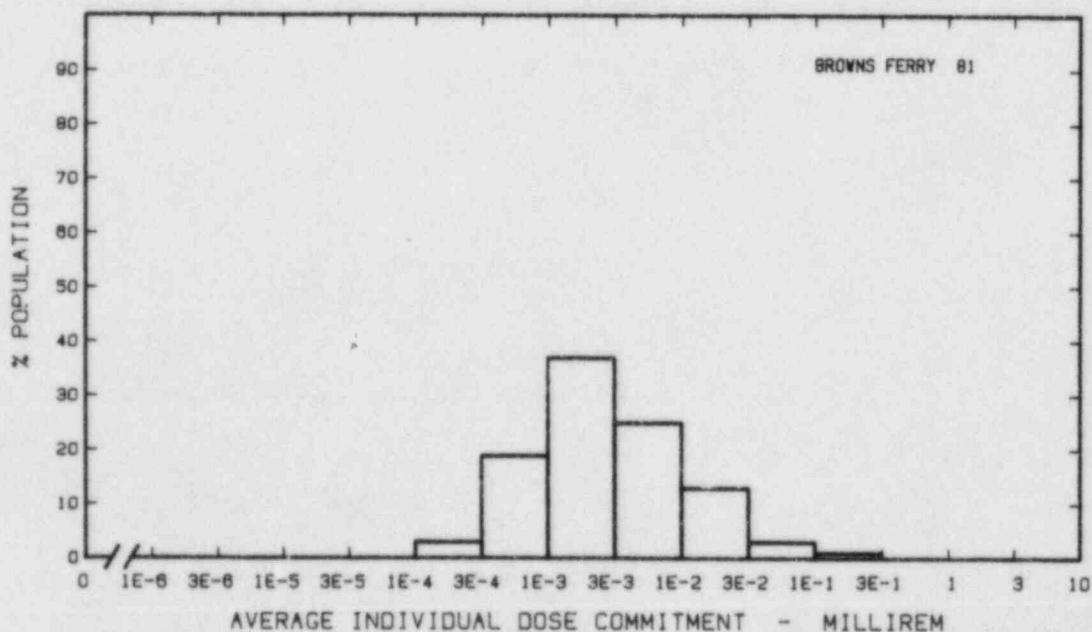
Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	7.4E-02	7.4E-02	8.6E-02	7.4E-02	7.4E-02	7.6E-02
Child	8.2E-01	8.2E-01	8.9E-01	8.4E-01	8.2E-01	8.5E-01
Teen	6.0E-01	6.0E-01	6.3E-01	6.1E-01	6.0E-01	6.4E-01
Adult	3.6E+00	3.6E+00	3.7E+00	3.7E+00	3.6E+00	3.7E+00
TOTAL	5.1E+00	5.1E+00	5.4E+00	5.2E+00	5.1E+00	5.3E+00

Production/Consumption factors:

Produce: <1                  Milk: <1                  Meat: 1.5

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: BRUNSWICK

BRUNSWICK COUNTY, NORTH CAROLINA

Location: N 33.9583°

W 78.0106°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: 2.2E5

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Wilmington SMSA	140,000	32 km NNE
Whiteville	5,600	75 km WNW
N. Myrtle Beach	4,000	65 km WSW

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production  
Of Crops and Animal Products  
In 80-km Radius Circle

Veg: 2.6E7 kilogram  
Milk: 1.0E8 liter  
Meat: 5.8E7 kilogram

Regional Productivity Factor: 0.3  
Animal Grazing Factor: 0.7

Meteorology Period of Record: 1 JAN 75 - 31 DEC 75 Recovery: 93%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS via ATLANTIC OCEAN

Average Dilution Flow  
from Plant: 180 ft<sup>3</sup>/s

Fish: Edible Harvest: 2.1E5<sup>(a)</sup> kg/yr  
Dilution Factor: 0.001

Invertebrates: Edible Harvest: 1.1E5<sup>(a)</sup> kg/yr  
Dilution Factor: 0.002

---

(a) Fish and invertebrate harvests together total harvest given in FES (1973).

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
BRUNSWICK 1 AND 2

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Child	1.3E-03	2.0E-03	1.5E-03	1.1E-03	1.9E-03
Teen	1.0E-03	4.2E-03	1.0E-03	6.7E-04	1.6E-03
Adult	7.4E-03	3.7E-02	6.8E-03	4.0E-03	9.9E-03
TOTAL	9.7E-03	4.4E-02	9.2E-03	5.0E-03	1.3E-02

Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	2.1E-01	2.1E-01	2.5E-01	2.1E-01	2.1E-01	2.2E-01
Child	2.4E+00	2.4E+00	2.6E+00	2.4E+00	2.4E+00	2.4E+00
Teen	1.7E+00	1.7E+00	1.8E+00	1.7E+00	1.7E+00	1.8E+00
Adult	1.0E+01	1.0E+01	1.1E+01	1.0E+01	1.0E+01	1.1E+01
TOTAL	1.5E+01	1.5E+01	1.5E+01	1.5E+01	1.5E+01	1.5E+01

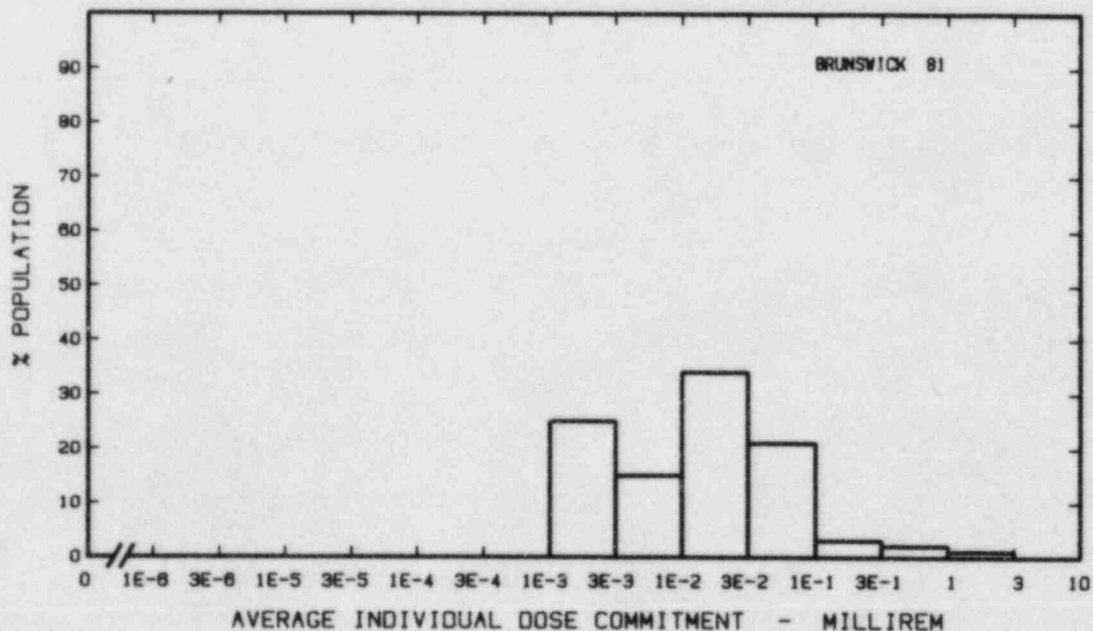
Production/Consumption factors:

Produce: <1

Milk: 1.1

Meat: 1.0

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS





Site: CALVERT CLIFFS

LUSBY, MARYLAND

Location: N 38.4347°

W 76.4419°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: 2.6E6

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Washington, DC SMSA (3/4)	3,100,000	73 km NW
Bowie	34,000	71 km NNW
Annapolis	32,000	61 km N
Waldorf	9,800	46 km WNW
Salisbury	16,000	75 km E
Cambridge	12,000	32 km ENE

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production  
Of Crops and Animal Products  
In 80-km Radius Circle

Veg: 4.5E7 kilogram  
Milk: 5.0E8 liter  
Meat: 6.2E7 kilogram

Regional Productivity Factor:  
Animal Grazing Factor:

0.6  
0.6

Meteorology Period of Record: 1 JAN 75 - 31 DEC 75

Recovery: 96%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS

via CHESAPEAKE BAY

Average Dilution Flow  
from Plant: 2,600 ft<sup>3</sup>/s

Fish:

Edible Harvest: 1.0E7 kg/yr  
Dilution Factor: 0.062<sup>(a)</sup>

Invertebrates:

Edible Harvest: 7.4E6 kg/yr  
Dilution Factor: 0.062<sup>(a)</sup>

---

(a) Dilutions given in FES (1973).

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
CALVERT CLIFFS 1 AND 2

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Child	8.6E-02	3.0E-01	3.3E-01	8.7E-02	1.0E-01
Teen	6.9E-02	6.3E-01	2.4E-01	6.2E-02	9.0E-02
Adult	5.0E-01	5.5E+00	1.6E+00	4.2E-01	5.6E-01
TOTAL	6.5E-01	6.5E+00	2.1E+00	5.7E-01	7.5E-01

Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	1.1E-03	1.0E-03	4.9E-02	1.1E-03	1.1E-03	1.1E-03
Child	1.2E-02	1.1E-02	2.6E-01	1.2E-02	1.2E-02	1.2E-02
Teen	8.2E-03	8.0E-02	1.1E-01	8.1E-03	8.3E-03	9.7E-03
Adult	4.8E-02	4.8E-02	3.7E-01	4.8E-02	4.9E-02	5.3E-02
TOTAL	6.9E-02	6.8E-02	7.9E-01	6.9E-02	7.0E-02	7.6E-02

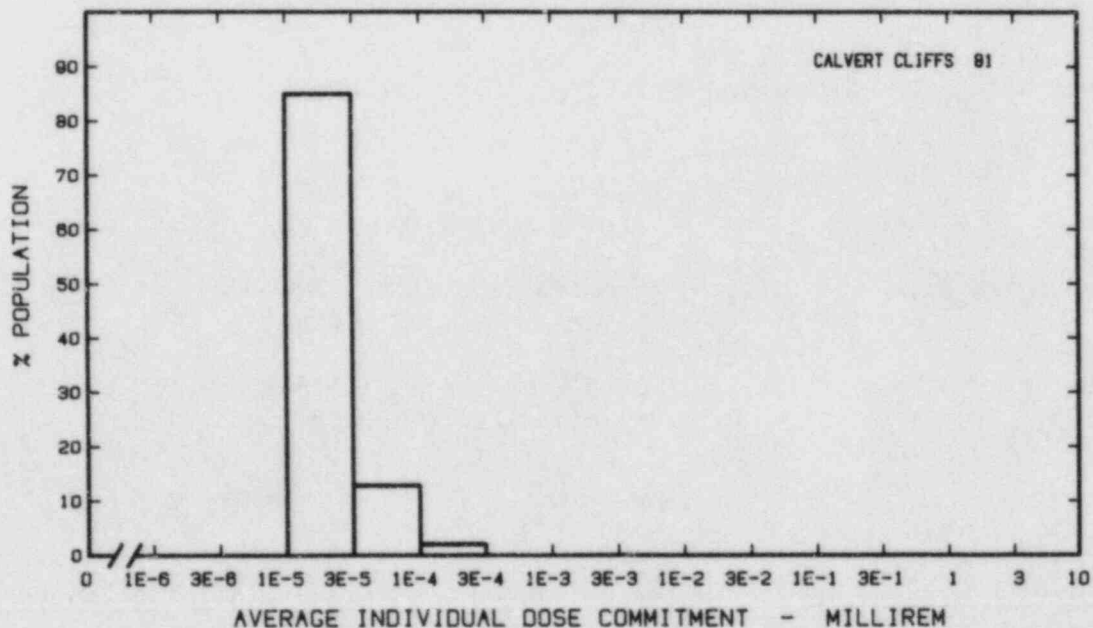
Production/Consumption factors:

Produce: <1

Milk: <1

Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: COOK

BENTON HARBOR, MICHIGAN

Location: N 41.9761°

W 86.5664°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: 1.2E6

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Gary	150,000	77 km SW
South Bend SMSA	280,000	42 km SE
Elkhart SMSA	140,000	58 km SE
Mishiwaka	40,000	47 km SE
Michigan City	37,000	40 km SW

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production Of Crops and Animal Products In 80-km Radius Circle

Veg: 1.1E8 kilogram  
Milk: 2.3E8 liter  
Meat: 1.9E8 kilogram

Regional Productivity Factor: 0.6  
Animal Grazing Factor: 0.5

Meteorology Period of Record: 1 MAY 75 - 31 APR 76 Recovery: 95%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS via LAKE MICHIGAN

Average Dilution Flow from Plant: 2,800 ft<sup>3</sup>/s

Drinking Water: Exposed Population: 260,000  
Dilution Factor: 0.025<sup>(a)</sup>

Fish: Edible Harvest: 1.5E6 kg/yr  
Dilution Factor: 0.01

---

(a) Drinking water dilution factor estimated by averaging dilution factors derived from FES (1973) suitably weighted for population.

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
COOK 1 AND 2

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	2.0E-03	1.9E-03	1.5E-02	5.3E-04	2.4E-03
Child	2.8E-02	2.5E-02	1.1E-01	3.2E-02	5.5E-02
Teen	1.9E-02	1.5E-02	3.8E-02	1.7E-02	3.4E-02
Adult	1.8E-01	1.3E-01	2.8E-01	1.0E-01	2.3E-01
TOTAL	2.3E-01	1.7E-01	4.4E-01	1.5E-01	3.2E-01

Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	3.3E-03	3.2E-03	2.6E-02	4.2E-03	4.5E-03	3.6E-03
Child	3.8E-02	3.6E-02	1.9E-01	4.6E-02	4.7E-02	4.1E-02
Teen	2.8E-02	2.6E-02	8.6E-02	2.9E-02	3.1E-02	3.2E-02
Adult	1.7E-01	1.6E-01	3.6E-01	1.7E-01	1.7E-01	1.8E-01
TOTAL	2.4E-01	2.3E-01	6.7E-01	2.5E-01	2.6E-01	2.5E-01

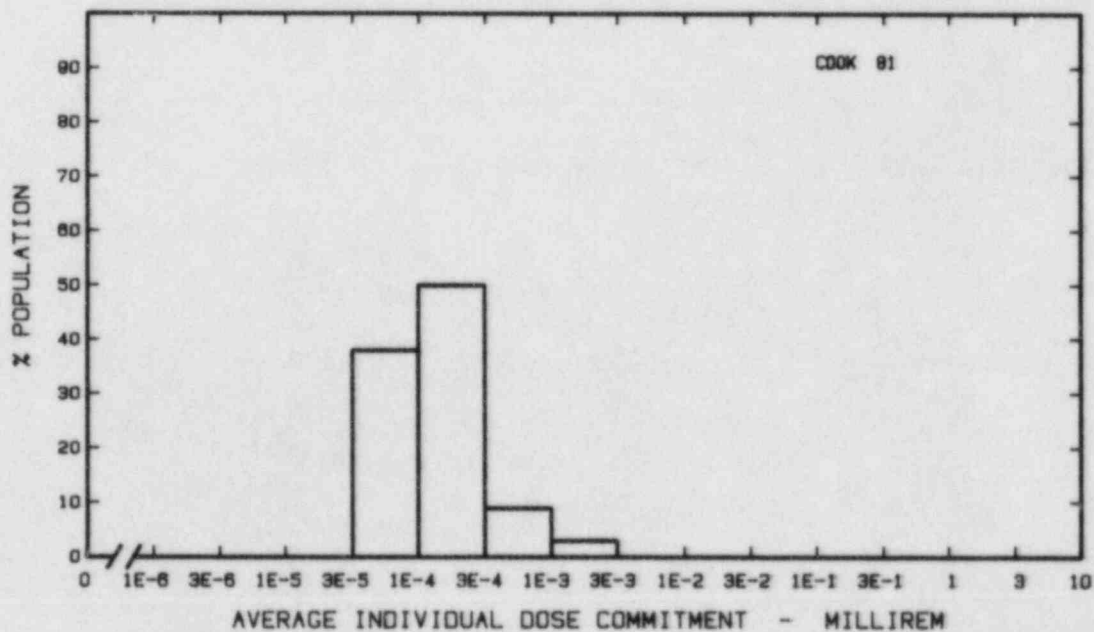
Production/Consumption factors:

Produce: <1

Milk: <1

Meat: 1.2

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: COOPER STATION

NEMAHA COUNTY, NEBRASKA

Location: N 40.3619°

W 95.6411°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: 1.7E5

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Nebraska City	7,100	40 km NNW
Red Oak	6,800	80 km NNE
Plattsmouth	6,300	76 km NNW
Shenandoah	6,300	51 km NNE
Falls City	5,400	33 km S

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production  
Of Crops and Animal Products  
In 80-km Radius Circle

Veg: 9.7E7 kilogram  
Milk: 7.2E7 liter  
Meat: 2.0E8 kilogram

Regional Productivity Factor:

1

Animal Grazing Factor:

0.6

Meteorology Period of Record: 1 MAR 70 - 31 DEC 75 Recovery: 89%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS via MISSOURI RIVER

Average River Flow  
at Site: 31,000 ft<sup>3</sup>/s

Drinking Water:

Exposed Population: None

Fish:

Edible Harvest: 5.0E3<sup>(a)</sup> kg/yr  
Dilution Factor: 0.5<sup>(a)</sup>

---

(a) Assumes 1/2 fish harvest caught below plant.

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
COOPER STATION

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Child	5.3E-04	6.4E-05	2.0E-05	2.4E-03	2.9E-03
Teen	1.0E-03	1.3E-04	1.4E-05	1.5E-03	2.5E-03
Adult	1.1E-02	1.2E-03	9.5E-05	8.5E-03	1.5E-02
TOTAL	1.2E-02	1.4E-03	1.3E-04	1.2E-02	2.0E-02

Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	7.7E-04	7.7E-04	1.4E-03	7.8E-04	7.9E-04	7.9E-04
Child	8.7E-03	8.7E-03	1.5E-02	8.9E-03	8.8E-03	9.0E-03
Teen	6.3E-03	6.3E-03	8.8E-03	6.4E-03	6.4E-03	6.7E-03
Adult	3.8E-02	3.8E-02	4.7E-02	3.8E-02	3.8E-02	3.9E-02
TOTAL	5.4E-02	5.4E-02	7.2E-02	5.5E-02	5.4E-02	5.6E-02

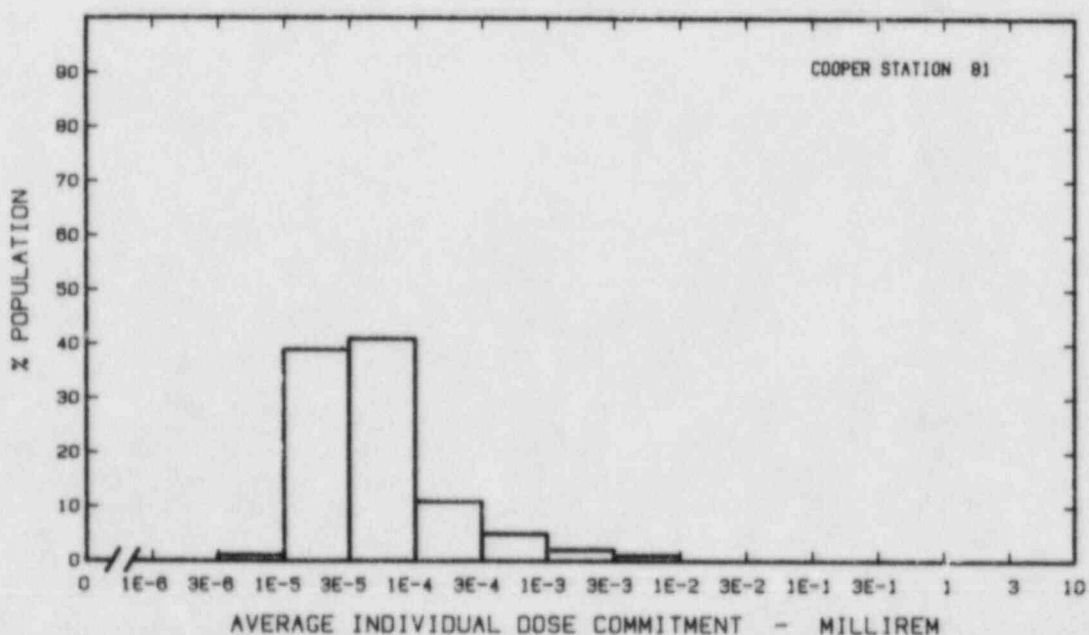
Production/Consumption factors:

Produce: 2.9

Milk: 3.2

Meat: 15

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: CRYSTAL RIVER

CRYSTAL RIVER, FLORIDA

Location: N 28.9572°

W 82.6989°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: 3.7E5

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Ocala	37,000	60 km ENE
Leesburg	13,000	80 km E
New Port Richey	11,000	79 km S

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production  
Of Crops and Animal Products  
In 80-km Radius Circle

Veg: 2.8E7 kilogram  
Milk: 1.1E8 liter  
Meat: 7.2E7 kilogram

Regional Productivity Factor:  
Animal Grazing Factor:

0.5  
1

Meteorology Period of Record: 1 JAN 75 - 31 DEC 75

Recovery: 93%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS via GULF of MEXICO

Average Dilution Flow  
from Plant: 4.1 ft<sup>3</sup>/s

Fish:

Edible Harvest: 3.2E5 kg/yr  
Dilution Factor: 0.1

Invertebrates:

Edible Harvest: 1.8E5 kg/yr  
Dilution Factor: 0.1

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
**CRYSTAL RIVER**

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Child	3.2E+00	3.6E+00	5.1E+00	2.7E+00	5.3E+00
Teen	2.2E+00	7.2E+00	3.6E+00	1.7E+00	4.8E+00
Adult	1.4E+00	6.2E+01	2.5E+00	1.1E+01	2.9E+01
TOTAL	1.9E+01	7.3E+01	3.3E+00	1.6E+01	3.9E+01

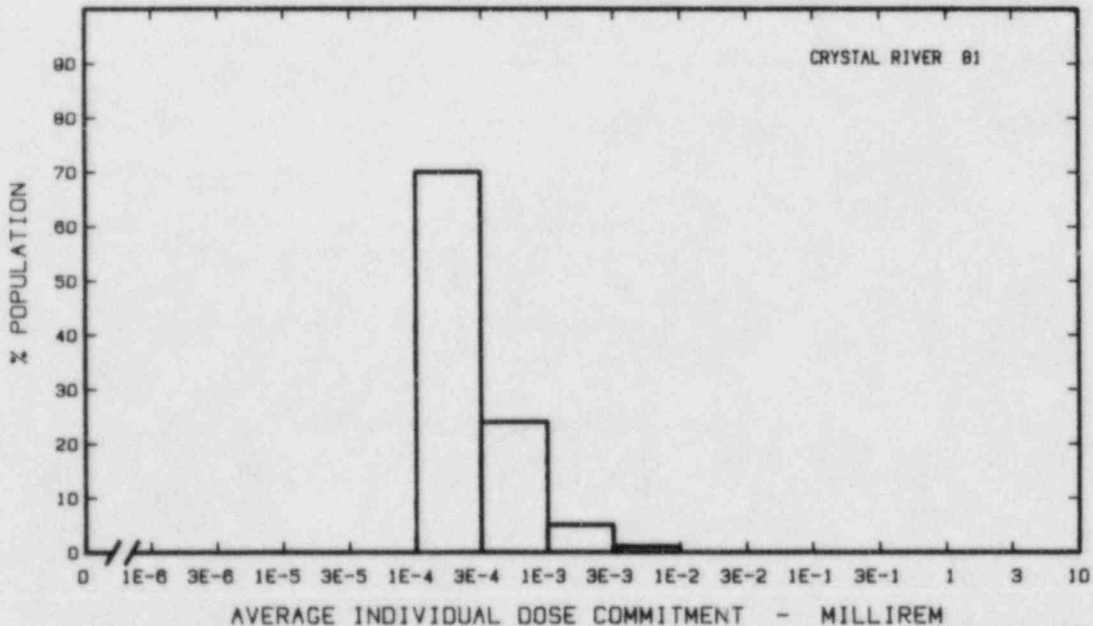
Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	2.2E-03	2.1E-03	5.7E-03	2.3E-03	2.3E-03	2.3E-03
Child	2.4E-02	2.4E-02	4.4E-02	2.5E-02	2.5E-02	2.6E-02
Teen	1.8E-02	1.7E-02	2.5E-02	1.8E-02	1.8E-02	2.0E-02
Adult	1.1E-01	1.1E-01	1.3E-01	1.1E-01	1.1E-01	1.1E-01
TOTAL	1.5E-01	1.5E-01	2.1E-01	1.5E-01	1.5E-01	1.6E-01

Production/Consumption factors:

Produce: <1                      Milk: 1.2                      Meat: 1.2

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS





Site: DAVIS-BESSE

PORT CLINTON, OHIO

Location: N 41.5972°

W 83.0864°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: 1.8E6

Major Metropolitan Centers Within Region:

Center	Population	Location
Toledo SMSA	790,000	38 km WNW
Dearborn	91,000	80 km N
Taylor	77,000	71 km N
Lorain	75,000	77 km ESE
Lincoln Park	45,000	73 km N
Findlay	36,000	77 km SW
Sandusky	33,000	35 km ESE

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production  
Of Crops and Animal Products  
In 80-km Radius Circle

Veg: 6.9E7 kilogram  
Milk: 3.7E8 liter  
Meat: 1.2E8 kilogram

Regional Productivity Factor:  
Animal Grazing Factor:

0.5  
0.5

Meteorology Period of Record: 4 AUG 74 - 3 AUG 76      Recovery: 99%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS      via      LAKE ERIE

Average Dilution Flow  
from Plant: 58<sup>(a)</sup> ft<sup>3</sup>/s

Drinking Water:

Exposed Population: 450,000  
Dilution Factor: 2.0E-4<sup>(b)</sup>

Fish:

Edible Harvest: 5.7E6<sup>(a)</sup> kg/yr  
Dilution Factor: 1.8E-4<sup>(a)</sup>

(a) Letter from Terry D. Murray, Toledo Edison Company to Charles A. Willis, NRC, July 20, 1984.

(b) Drinking water dilution factor estimated by averaging dilution factor derived from FES (1973), suitably weighted for population.

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
DAVIS-BESSE

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	2.2E-04	1.8E-04	1.1E-02	3.3E-04	6.1E-04
Child	2.8E-02	3.4E-03	8.9E-02	1.4E-01	1.5E-01
Teen	5.1E-02	3.4E-03	3.3E-02	8.0E-02	1.3E-01
Adult	5.5E-01	2.9E-02	2.3E-01	4.6E-01	7.6E-01
TOTAL	6.3E-01	3.6E-02	3.6E-01	6.8E-01	1.0E-00

Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	3.1E-04	2.5E-04	5.0E-02	3.4E-04	4.0E-04	2.6E-04
Child	3.3E-03	2.9E-03	2.8E-01	3.2E-03	3.6E-03	3.1E-03
Teen	2.2E-03	2.1E-03	1.1E-01	2.0E-03	2.3E-03	2.3E-03
Adult	1.2E-02	1.2E-02	3.4E-01	1.1E-02	1.3E-02	1.3E-02
TOTAL	1.8E-02	1.7E-02	7.8E-01	1.6E-02	1.9E-02	1.9E-02

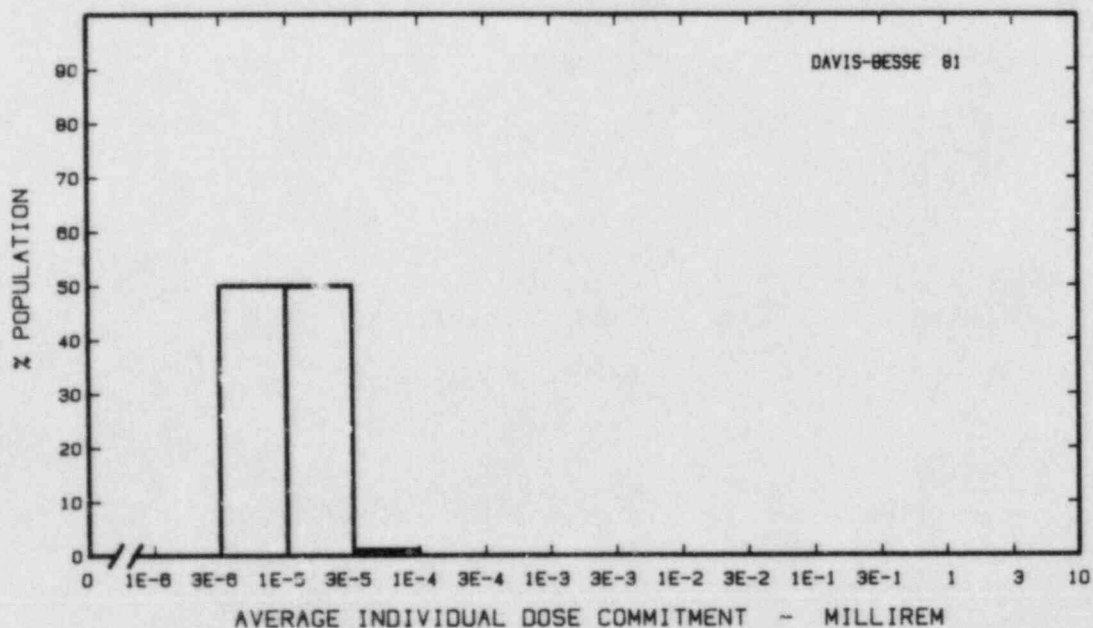
Production/Consumption factors:

Produce: <1

Milk: <1

Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: DRESDEN

GRUNDY COUNTY, ILLINOIS

Location: N 41.3897°

W 88.2711°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: 6.346

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Chicago SMSA	7,100,000 <sup>(a)</sup>	75 km NE
Gary-Hammond-E.Chicago-SMSA	640,000 <sup>(a)</sup>	80 km ENE
Kankakee SMSA	100,000	45 km SE
Aurora	81,000	41 km N
Joliet	78,000	22 km NE
Elgin	56,000	74 km N

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SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production Of Crops and Animal Products In 80-km Radius Circle

Veg: 1.1E8 kilogram  
Milk: 1.8E8 liter  
Meat: 1.9E8 kilogram

Regional Productivity Factor: 1  
Animal Grazing Factor: 0.5

Meteorology Period of Record: 1 JAN 74 - 31 JAN 75 Recovery: 77%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS via ILLINOIS RIVER

Average River Flow  
at Site: 12,000 ft<sup>3</sup>/s

Drinking Water: Exposed Population: (b)

Fish: Edible Harvest: (b) kg/yr

(a) Population of total SMSA given; population of SMSA fraction within 80 km of site would be somewhat smaller.

(b) River water used for sewage disposal for Chicago, so population doses from liquid pathways assumed to be near zero.

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
DRESDEN 1, 2 AND 3

Dose Commitments (person-rem) from Liquid Pathways

Total Body      GI-LLI      Thyroid      Bone      Liver

Little or No Liquid Pathway Doses

Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	1.5E-01	1.4E-01	3.6E+00	1.8E-01	1.6E-01	2.5E-01
Child	1.7E+00	1.8E+00	3.3E+01	2.8E+00	1.8E+00	3.0E+00
Teen	1.2E+00	1.4E+00	1.6E+01	1.6E+00	1.3E+00	2.4E+00
Adult	7.3E+00	8.3E+00	7.0E+01	8.5E+00	7.4E+00	1.2E+01
TOTAL	1.0E+01	1.2E+01	1.2E+02	1.3E+01	1.1E+01	1.7E+01

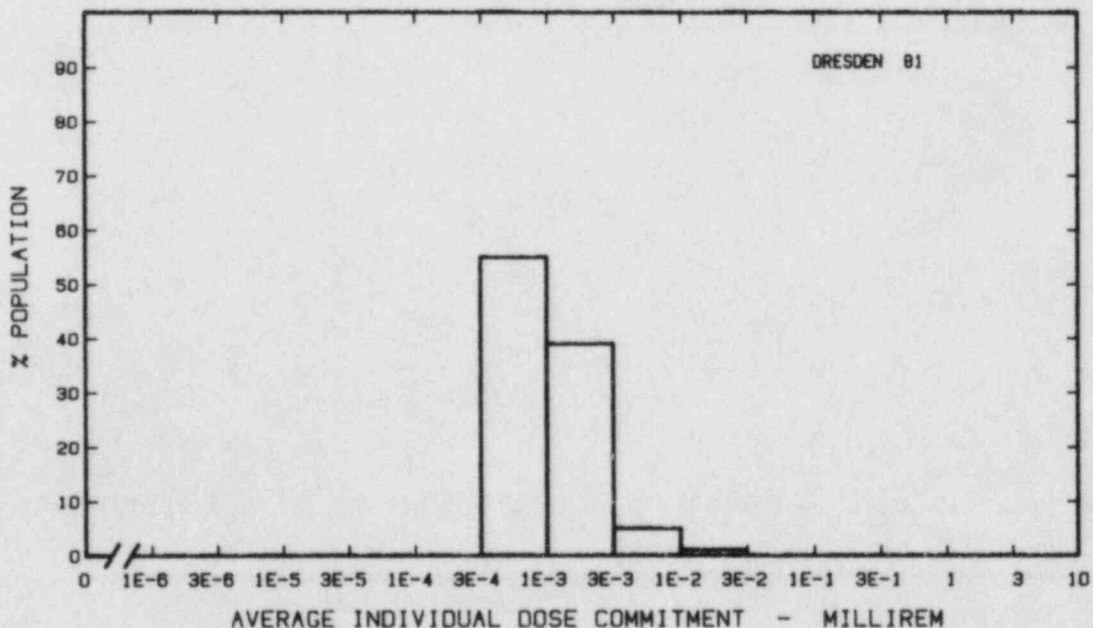
Production/Consumption factors:

Produce: <1

Milk: <1

Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: DUANE ARNOLD

CEDAR RAPIDS, IOWA

Location: N 42.1006°

W 91.7772°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: 6.0E5

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Cedar Rapids SMSA	170,000	17 km SE
Waterloo-Cedar Falls SMSA	140,000	64 km NW
Iowa City SMSA	82,000	52 km SSE
Marion	19,000	16 km ESE

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production Of Crops and Animal Products In 80-km Radius Circle	Veg: 9.8E7 kilogram Milk: 2.6E8 liter Meat: 4.2E8 kilogram
---	--

Regional Productivity Factor:	1
Animal Grazing Factor:	0.5

Meteorology Period of Record: 1 FEB 71 - 31 DEC 75      Recovery: 57%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS      via      CEDAR RIVER

	Average River Flow at Site: 3,100 ft <sup>3</sup> /s
Drinking Water:	Exposed Population: (a)
Fish:	Edible Harvest: (a)

---

a) No radionuclides released in liquid effluents reported (Tichler and Benkovitz, 1984).

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
**DUANE ARNOLD**

Dose Commitments (person-rem) from Liquid Pathways

Total Body      GI-LLI      Thyroid      Bone      Liver

No Liquid Pathway Doses

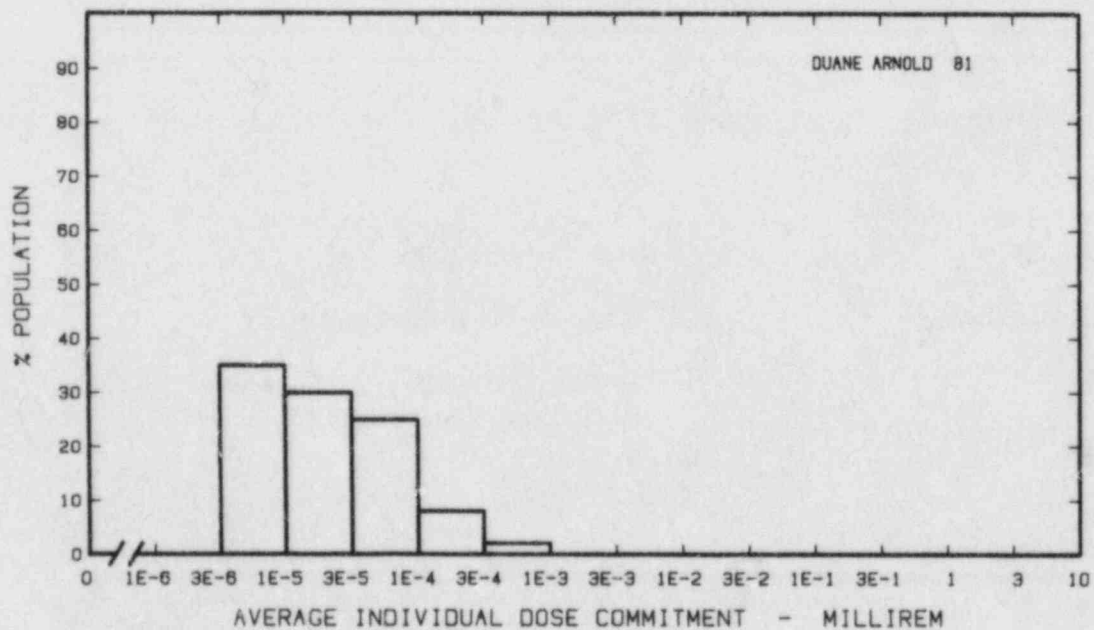
Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	4.6E-04	4.5E-04	6.0E-03	4.7E-04	4.7E-04	4.8E-04
Child	5.3E-03	5.1E-03	6.1E-02	6.1E-03	5.2E-03	5.5E-03
Teen	3.8E-03	3.8E-03	2.7E-02	4.1E-03	3.8E-03	4.1E-03
Adult	2.3E-02	2.3E-02	1.1E-01	2.4E-02	2.2E-02	2.4E-02
TOTAL	3.2E-02	3.2E-02	2.1E-01	3.5E-02	3.2E-02	3.4E-02

Production/Consumption factors:

Produce: <1                      Milk: 3.3                      Meat: 8.7

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: J. M. FARLEY

DOTHAN, ALABAMA

Location: N 31.2228°

W 85.1126°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: 3.5E5

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Dothan	49,000	27 km W
Enterprise	18,000	71 km W
Ozark	13,000	56 km WNW
Eufaula	12,000	75 km N
Bainbridge	11,000	62 km SE

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production  
Of Crops and Animal Products  
In 80-km Radius Circle

Veg: 1.7E7 kilogram  
Milk: 5.7E7 liter  
Meat: 8.6E7 kilogram

Regional Productivity Factor:  
Animal Grazing Factor:

0.95  
0.8

Meteorology Period of Record: 1 APR 71 - 31 MAR 75 Recovery: 100%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS via CHATTAHOOCHEE RIVER

Average River Flow  
at Site: 12,000 ft<sup>3</sup>/s

Drinking Water:

Exposed Population: **None**

Fish:

Edible Harvest: 2.3E5 kg/yr  
Dilution Factor: 1

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR

J. M. FARLEY 1 AND 2

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Child	1.3E-01	6.3E-03	1.4E-03	9.1E-01	8.7E-01
Teen	2.5E-01	1.2E-02	2.2E-03	5.4E-01	7.2E-01
Adult	2.8E+00	9.5E-02	7.3E-03	3.1E+00	4.2E+00
TOTAL	3.1E+00	1.1E-01	9.8E-03	4.5E+00	5.8E+00

Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	1.1E-03	8.5E-04	1.7E-03	3.1E-03	4.3E-03	1.6E-03
Child	1.6E-02	1.3E-02	1.7E-02	2.9E-02	3.8E-02	2.1E-02
Teen	1.2E-02	9.3E-03	9.7E-03	1.1E-02	1.9E-02	1.5E-02
Adult	6.9E-02	5.7E-02	5.1E-02	4.2E-02	7.9E-02	7.3E-02
TOTAL	9.8E-02	8.0E-02	7.9E-02	8.5E-02	1.4E-01	1.1E-01

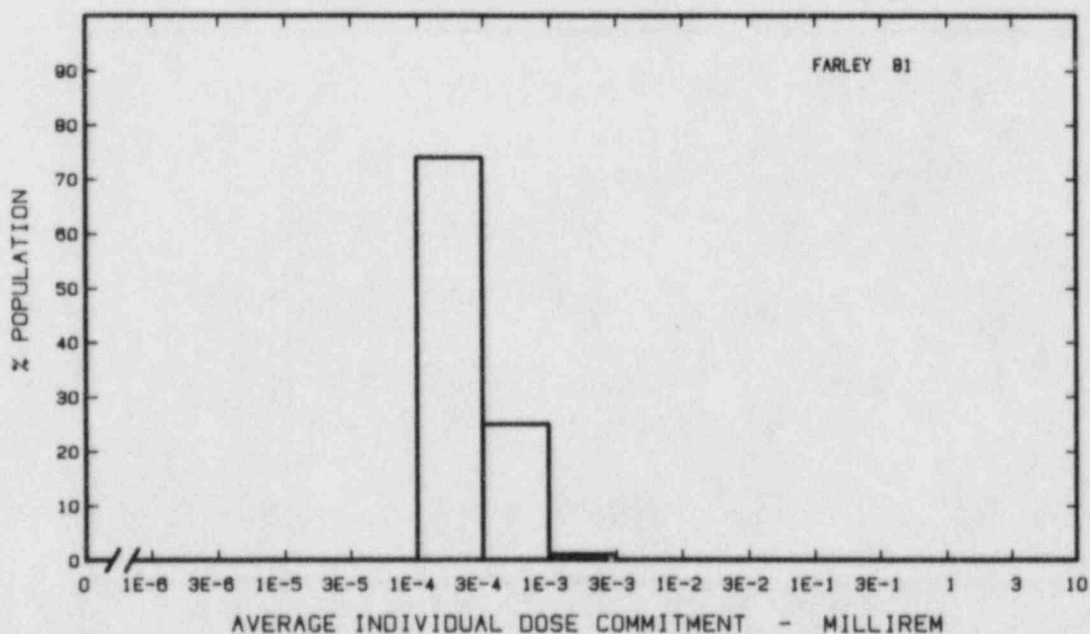
Production/Consumption factors:

Produce: <1

Milk: 1.2

Meat: 2.9

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS





Site: J. A. FITZPATRICK

OSWEGO, NEW YORK

Location: N 43.5239°

W 76.3983°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: 8.4E5

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Syracuse SMSA	640,000	56 km SSE
Rome	48,000	80 km ESE
Auburn	33,000	66 km SSW
Watertown	28,000	64 km NE
Kingston	24,000	79 km N

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production  
Of Crops and Animal Products  
In 80-km Radius Circle

Veg: 7.6E7 kilogram  
Milk: 7.0E8 liter  
Meat: 3.3E7 kilogram

Regional Productivity Factor:  
Animal Grazing Factor:

0.7  
0.5

Meteorology Period of Record: 1 JAN 74 - 31 DEC 75

Recovery: 97%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS via LAKE ONTARIO

Average Dilution Flow  
from Plant: 760 ft<sup>3</sup>/s

Drinking Water:

Exposed Population: 530,000<sup>(a)</sup>  
Dilution Factor: 0.003<sup>(b)</sup>

Fish:

Edible Harvest: 7.3E5 kg/yr  
Dilution Factor: 0.005<sup>(b)</sup>

---

(a) Population exposed to drinking water derived from Nine Mile Point FES (1974).

(b) Dilution factors derived from FES (1973).

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
**J. A. FITZPATRICK**

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	3.2E-04	2.7E-04	3.5E-03	6.0E-04	9.6E-04
Child	1.3E-02	5.6E-03	2.5E-02	4.5E-02	5.5E-02
Teen	1.8E-02	7.9E-03	7.9E-03	2.5E-02	4.3E-02
Adult	1.9E-01	7.3E-02	5.5E-02	1.5E-01	2.6E-01
TOTAL	2.2E-01	8.8E-02	9.2E-02	2.2E-01	3.6E-01

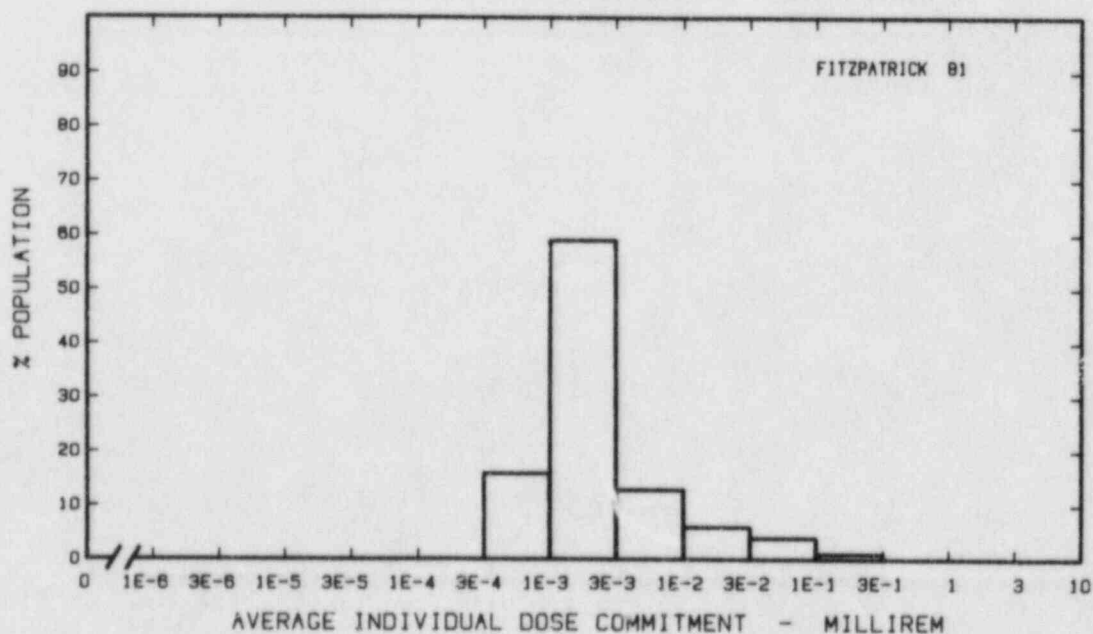
Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	9.3E-02	9.3E-02	1.6E-01	9.5E-02	9.3E-02	9.6E-02
Child	1.0E+00	1.0E+00	1.5E+00	1.1E+00	1.0E+00	1.1E+00
Teen	7.6E-01	7.6E-01	9.2E-01	7.8E-01	7.6E-01	8.1E-01
Adult	4.6E+00	4.6E+00	5.1E+00	4.7E+00	4.6E+00	4.7E+00
TOTAL	6.5E+00	6.5E+00	7.7E+00	6.7E+00	6.5E+00	6.7E+00

Production/Consumption factors:

Produce: <1                      Milk: 4.4                      Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: FORT CALHOUN

WASHINGTON COUNTY, NEBRASKA

Location: N 41.5208°

W 96.0767°

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POPULATION DATA

Total Population Within 2-to-80-km Region: 7.5E5

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Omaha SMSA	570,000	32 km SSE
Council Bluffs	56,000	34 km SE
Freemont	24,000	36 km WSW
Bellevue	22,000	44 km SSE

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production  
Of Crops and Animal Products  
In 80-km Radius Circle

Veg: 9.7E7 kilogram  
Milk: 7.2E7 liter  
Meat: 2.0E8 kilogram

Regional Productivity Factor: 1  
Animal Grazing Factor: 0.5

Meteorology Period of Record: 1 JAN 74 - 31 DEC 74 Recovery: 98%

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SITE SPECIFIC DATA - WATERBORNE PATHWAYS via MISSOURI RIVER

Average River Flow  
at Site: 27,000 ft<sup>3</sup>/s

Drinking Water:

Exposed Population: 570,000<sup>(a)</sup>  
Dilution Factor: 1

Fish:

Edible Harvest: 1.0E4 kg/yr  
Dilution Factor: 1

---

(a) Drinking water pollution assumed to be Omaha SMSA (FES, 1972).

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
FORT CALHOUN

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	9.8E-02	9.4E-02	1.7E-01	4.2E-02	1.5E-01
Child	1.1E+00	1.1E+00	1.6E+00	4.6E-01	1.6E+00
Teen	4.8E-01	4.1E-01	5.7E-01	1.3E-01	6.0E-01
Adult	4.3E+00	3.5E+00	4.6E+00	7.7E-01	4.7E+00
TOTAL	6.0E+00	5.1E+00	6.9E+00	1.4E+00	7.0E+00

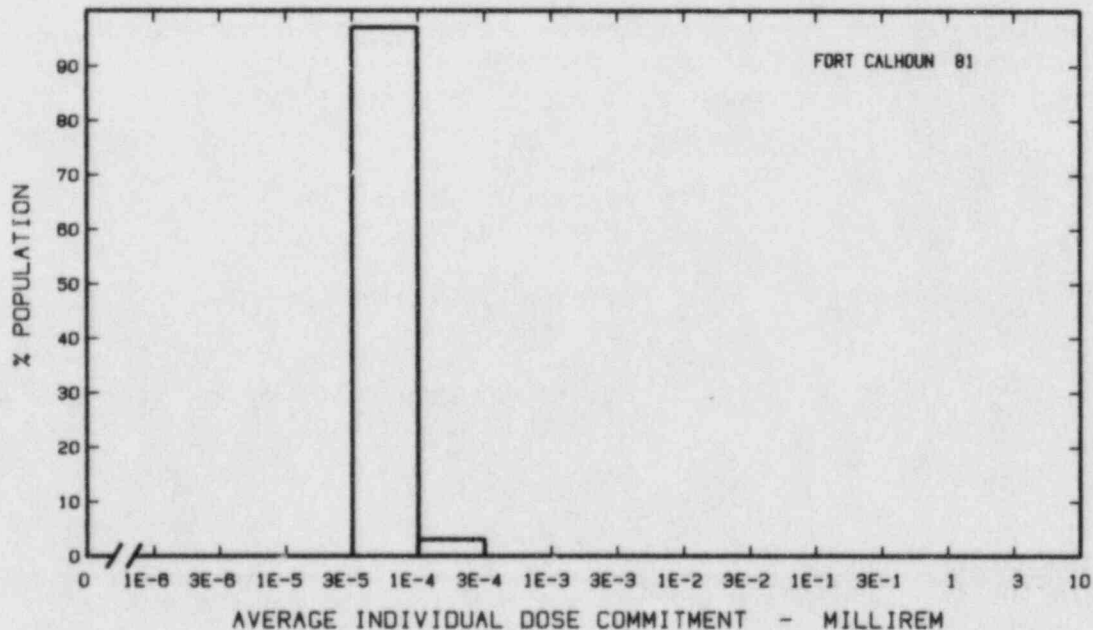
Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	4.2E-04	4.1E-04	1.6E-03	4.5E-03	3.0E-04	1.3E-03
Child	1.8E-02	2.3E-02	1.8E-02	4.5E-01	5.0E-03	1.7E-02
Teen	7.0E-03	2.0E-02	8.1E-03	1.3E-01	3.2E-03	1.3E-02
Adult	3.1E-02	9.7E-02	3.6E-02	4.5E-01	1.9E-02	5.2E-02
TOTAL	5.7E-02	1.4E-01	6.3E-02	1.0E+00	2.7E-02	8.3E-02

Production/Consumption factors:

Produce: <1                      Milk: <1                      Meat: 3.3

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: R. E. GINNA

ONTARIO, NEW YORK

Location: N 43.2778°

W 77.3089°

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POPULATION DATA

Total Population Within 2-to-80-km Region: 1.2E6

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Rochester SMSA	970,000	27 km WSW
Auburn	32,000	71 km ESE
Oswego	20,000	67 km ENE
Batavia	17,000	78 km WSW
Geneva	15,000	52 km SSE

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production  
Of Crops and Animal Products  
In 80-km Radius Circle

Veg: 7.6E7 kilogram  
Milk: 7.0E8 liter  
Meat: 3.3E7 kilogram

Regional Productivity Factor:  
Animal Grazing Factor:

0.6  
0.5

Meteorology Period of Record: 1 JAN 66 - 31 DEC 67

Recovery: 89%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS via LAKE ONTARIO

Average Dilution Flow  
from Plant: 780 ft<sup>3</sup>/s

Drinking Water:

Exposed Population: 560,000  
Dilution Factor: 0.01<sup>(a)</sup>

Fish:

Edible Harvest: 7.3E5 kg/yr  
Dilution Factor: 0.01<sup>(a)</sup>

---

(a) Dilution factors from FES (1973).

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
R. E. GINNA

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	1.5E-03	1.5E-03	1.7E-03	2.0E-04	1.7E-03
Child	1.8E-02	1.7E-02	1.8E-02	1.0E-02	2.8E-02
Teen	9.6E-03	6.5E-03	6.7E-03	5.3E-03	1.5E-02
Adult	9.0E-02	5.6E-02	5.7E-02	3.1E-02	1.0E-01
TOTAL	1.2E-01	8.1E-02	8.3E-02	4.6E-02	1.5E-01

Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	3.9E-04	3.9E-04	1.0E-03	1.2E-04	3.3E-04	4.0E-04
Child	5.0E-03	5.0E-03	8.9E-03	1.4E-03	5.0E-03	5.2E-03
Teen	3.2E-03	3.2E-03	4.7E-03	1.0E-03	3.2E-03	3.4E-03
Adult	1.8E-02	1.8E-02	2.3E-02	6.0E-03	1.8E-02	1.8E-02
TOTAL	2.6E-02	2.6E-02	3.7E-02	8.5E-03	2.6E-02	2.7E-02

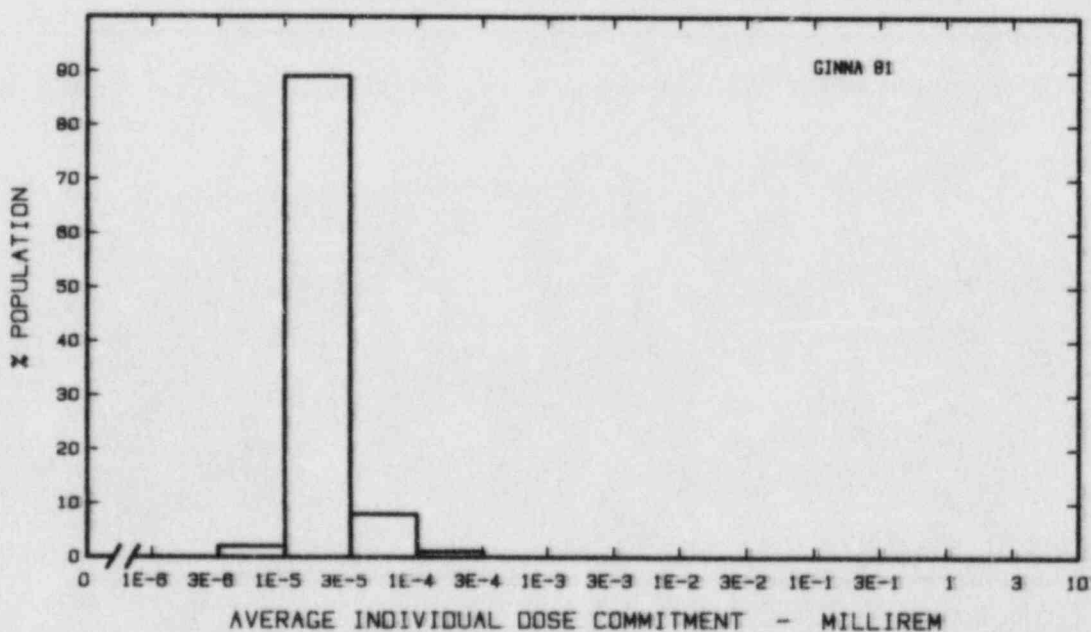
Production/Consumption factors:

Produce: <1

Milk: 2.7

Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: HADDAM NECK (CONN. YANKEE)

HADDAM NECK, CONNECTICUT

Location: N 41.4819°

W 72.4992°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: 3.4E6

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Hartford SMSA	730,000	35 km NNW
Springfield-Chicopee-Holyoke SMSA	530,000	70 km N
New Haven-West Haven SMSA	420,000	40 km WSW
Bridgeport SMSA	400,000	66 km WSW
New London-Norwich	250,000	35 km ESE

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production  
Of Crops and Animal Products  
In 80-km Radius Circle

Veg: 3.2E7 kilogram  
Milk: 4.4E8 liter  
Meat: 2.0E7 kilogram

Regional Productivity Factor:  
Animal Grazing Factor:

0.7  
0.6

Meteorology Period of Record: 1 JAN 75 - 31 DEC 75

Recovery: 95%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS via DISCHARGE CANAL TO CONN. RIVER

Average Discharge Canal  
Flow at Site: 850 ft<sup>3</sup>/s

Drinking Water:

Exposed Population: None

Fish:

Edible Harvest: 9.1E3<sup>(a)</sup> kg/yr  
Dilution Factor: 1

---

(a) Caught in discharge canal (FES, 1973).

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
HADDAM NECK

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Child	1.0E-02	6.0E-03	2.6E-03	5.3E-02	5.5E-02
Teen	1.9E-02	1.2E-02	2.0E-03	3.2E-02	4.6E-02
Adult	2.0E-01	9.9E-02	1.4E-02	1.9E-01	2.7E-01
TOTAL	2.3E-01	1.2E-01	1.9E-02	2.8E-01	3.8E-01

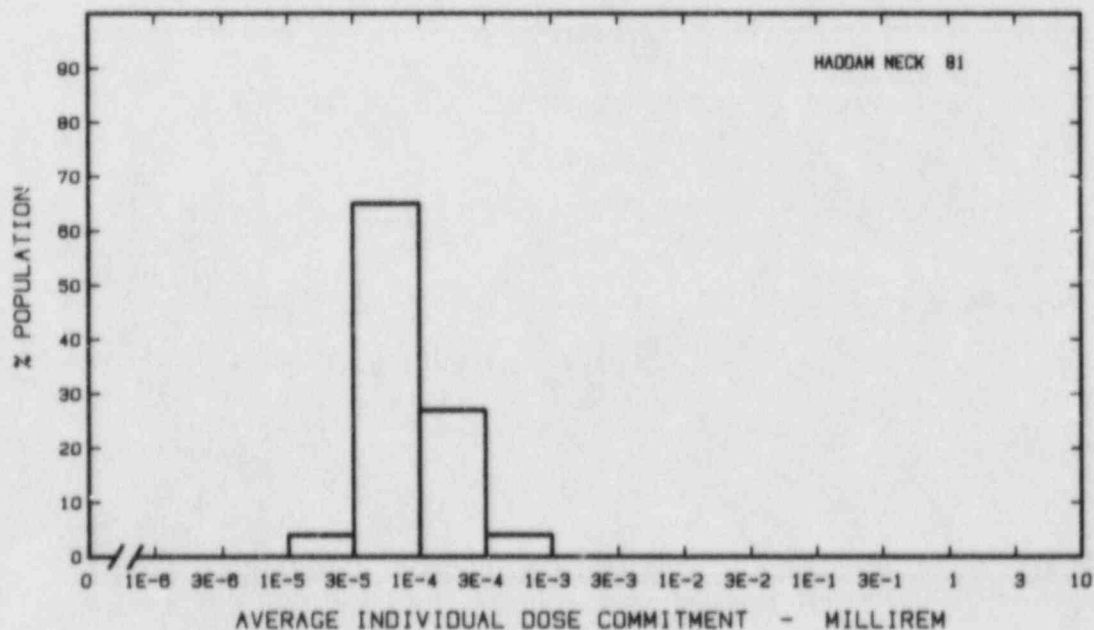
Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	5.0E-03	5.0E-03	2.0E-02	3.2E-03	5.2E-03	5.3E-03
Child	5.9E-02	5.9E-02	1.5E-01	3.4E-02	6.1E-02	6.4E-02
Teen	4.2E-02	4.2E-02	8.0E-02	2.4E-02	4.3E-02	4.8E-02
Adult	2.4E-01	2.4E-01	3.8E-01	1.5E-01	2.4E-01	2.6E-01
TOTAL	3.5E-01	3.5E-01	6.3E-01	2.1E-01	3.5E-01	3.8E-01

Production/Consumption factors:

Produce: <1                      Milk: <1                      Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS





Site: E. I. HATCH

BAXLEY, GEORGIA

Location: N 31.9342°

W 82.3444°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: 3.0E5

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Waycross	19,000	80 km S
Statesboro	15,000	78 km NE
Hinesville	11,000	71 km E
Douglas	11,000	67 km SW
Vidalia	10,000	32 km N

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production  
Of Crops and Animal Products  
In 80-km Radius Circle

Veg: 8.8E6 kilogram  
Milk: 7.0E7 liter  
Meat: 8.1E7 kilogram

Regional Productivity Factor: 1  
Animal Grazing Factor: 0.8

Meteorology Period of Record: 1 JUN 70 - 31 AUG 74 Recovery: 87%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS via ALTAMAHA RIVER

Average River Flow  
at Site: 13,000 ft<sup>3</sup>/s

Drinking Water:

Exposed Population: None

Fish:

Edible Harvest: 6.3E5<sup>(a)</sup> kg/yr  
Dilution Factor: 1

---

(a) Commercial catch plus 3 pounds of game fish per year taken from river by average person (FES, 1972).

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
E. I. HATCH 1 AND 2

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Child	8.8E-02	7.6E-03	7.6E-03	3.8E-01	4.6E-01
Teen	1.6E-01	1.6E-02	5.5E-03	2.3E-01	3.9E-01
Adult	1.7E+00	1.4E-01	3.6E-02	1.3E+00	2.4E+00
TOTAL	2.0E+00	1.6E-01	4.9E-02	1.9E+00	3.2E+00

Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	2.4E-03	2.3E-03	6.4E-02	2.6E-03	2.6E-03	2.5E-03
Child	2.6E-02	2.6E-02	3.6E-01	2.7E-02	2.8E-02	2.8E-02
Teen	1.9E-02	1.9E-02	1.5E-01	1.9E-02	2.0E-02	2.2E-02
Adult	1.1E-01	1.1E-01	5.4E-01	1.1E-01	1.2E-01	1.2E-01
TOTAL	1.6E-01	1.6E-01	1.1E+00	1.6E-01	1.7E-01	1.8E-01

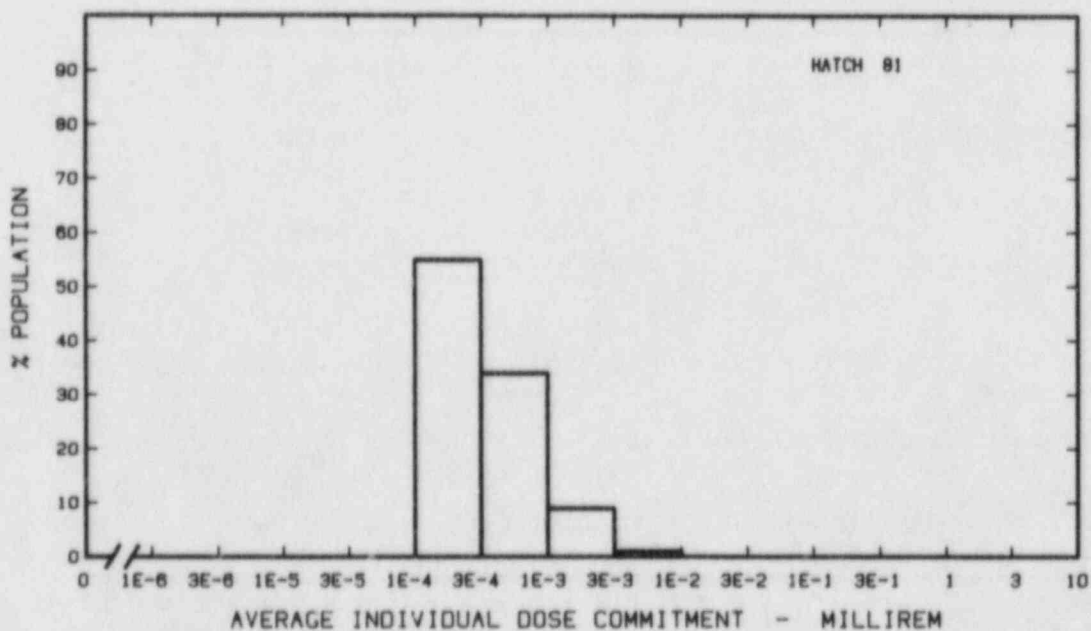
Production/Consumption factors:

Produce: <1

Milk: 1.8

Meat: 3.3

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: INDIAN POINT

BUCHANAN, NEW YORK

Location: N 41.2714°

W 73.9525°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: 1.5E7

Major Metropolitan Centers Within Region:

Center	Population	Location
New York SMSA	9,100,000	57 km S
Newark SMSA	2,000,000	62 km SSW
Nassau County SMSA	1,300,000	70 km SSE
Jersey City SMSA	560,000	61 km S
Paterson-Clifton-Passaic SMSA	450,000	44 km SSW

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production Of Crops and Animal Products In 80-km Radius Circle	Veg: 7.6E7 kilogram Milk: 7.0E8 liter Meat: 3.3E7 kilogram
---	--

Regional Productivity Factor:	0.8
Animal Grazing Factor:	0.5

Meteorology Period of Record: 1 JAN 75 - 31 DEC 75      Recovery: 96%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS      via HUDSON RIVER

Average River Flow  
at Site: 20,000 ft<sup>3</sup>/s

Drinking Water:      Exposed Population: None

Fish:      Edible Harvest: (a)  
Dilution Factor: 0.001 (b)

---

(a) No fish catch data given in FES, so generic consumption rates used (Table A-1).

(b) One percent of population obtain 10% of their fish from river (FES, 1972).

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
INDIAN POINT 1, 2 AND 3

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Child	2.5E-02	8.7E-03	2.4E-02	1.1E-01	1.3E-01
Teen	4.5E-02	1.8E-02	1.7E-02	6.9E-02	1.1E-01
Adult	4.7E-01	1.6E-01	1.1E-01	4.0E-01	6.5E-01
TOTAL	5.4E-01	1.8E-01	1.5E-01	5.8E-01	8.9E-01

Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	1.2E-01	1.2E-01	2.1E-01	1.2E-01	1.2E-01	1.3E-01
Child	1.3E+00	1.3E+00	2.0E+00	1.3E+00	1.3E+00	1.4E+00
Teen	9.5E-01	9.5E-01	1.3E+00	9.5E-01	9.6E-01	1.1E+00
Adult	5.8E+00	5.8E+00	7.1E+00	5.8E+00	5.8E+00	6.3E+00
TOTAL	8.1E+00	8.1E+00	1.1E+01	8.1E+00	8.2E+00	9.0E+00

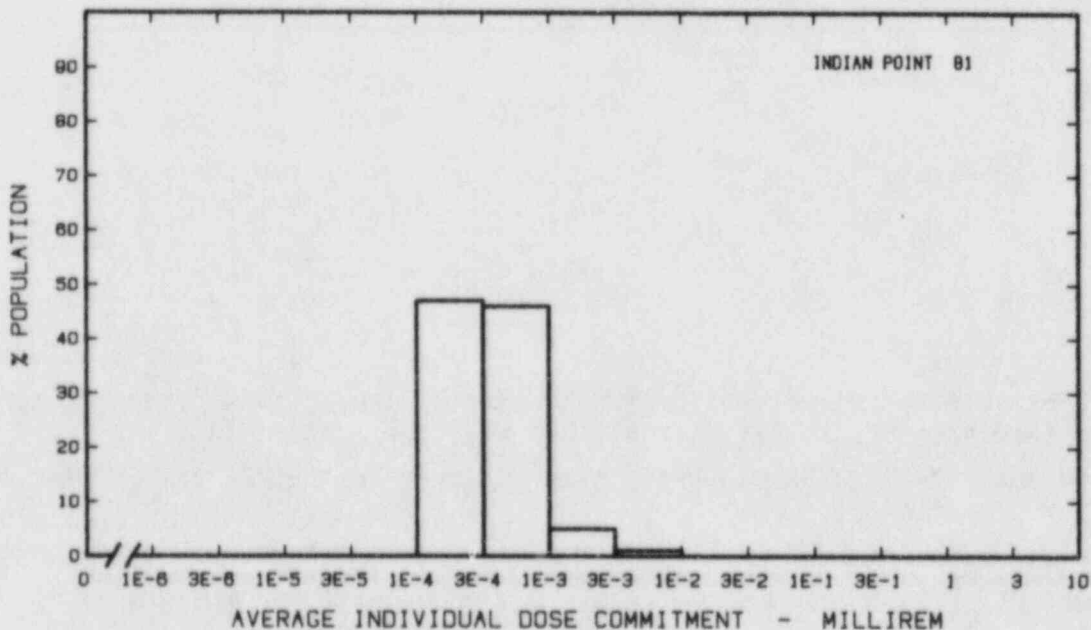
Production/Consumption factors:

Produce: <1

Milk: <1

Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: KEWAUNEE

CARLTON, WISCONSIN

Location: N 44.3431°

W 87.536°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: 6.1E5

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Greenbay SMSA	180,000	44 km NW
Appleton SMSA	290,000	72 km W
Sheboygan	48,000	65 km SSW
Manitowoc	33,000	29 km SSW
Neenah	22,000	72 km W

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production  
Of Crops and Animal Products  
In 80-km Radius Circle

Veg: 7.2E7 kilogram  
Milk: 1.2E9 liter  
Meat: 1.0E8 kilogram

Regional Productivity Factor: 0.5  
Animal Grazing Factor: 0.5

Meteorology Period of Record: 2 JAN 69 - 31 DEC 69 Recovery: 76%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS via LAKE MICHIGAN

Average Dilution Flow from  
Plant: 76 ft<sup>3</sup>/s

Drinking Water: Exposed Population: 260,000  
Dilution Factor: 8.2E-3<sup>(a)</sup>

Fish: Edible Harvest: 1.1<sup>(b)</sup> kg/yr  
Dilution Factor: 0.01<sup>(c)</sup>

(a) Drinking water dilution factor estimated by averaging dilution factors derived from FES (1972) suitably weighted for populations.

(b) Average individual consumption rate as given in the FES (1972) used in lieu of catch data.

(c) Dilution factor reduced 1/10 from that used in FES in consideration of lake mixing.

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
KEWAUNEE

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	6.9E-03	6.9E-03	5.9E-03	2.7E-03	9.7E-03
Child	1.3E-01	9.2E-02	6.7E-02	2.8E-01	3.8E-01
Teen	1.3E-01	5.6E-02	2.6E-02	1.6E-01	2.7E-01
Adult	1.3E+00	5.0E-01	2.2E-01	9.1E-01	1.7E+00
TOTAL	1.6E+00	6.5E-01	3.2E-01	1.4E+00	2.4E+00

Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	1.7E-05	1.7E-05	2.8E-05	3.4E-06	1.7E-05	1.7E-05
Child	2.6E-04	2.5E-04	3.4E-04	5.7E-05	2.5E-04	2.6E-04
Teen	1.6E-04	1.6E-04	1.9E-04	3.7E-05	1.6E-04	1.6E-04
Adult	8.7E-04	8.6E-04	1.0E-03	2.0E-04	8.6E-04	8.7E-04
TOTAL	1.3E-03	1.3E-03	1.6E-03	3.0E-04	1.3E-03	1.3E-03

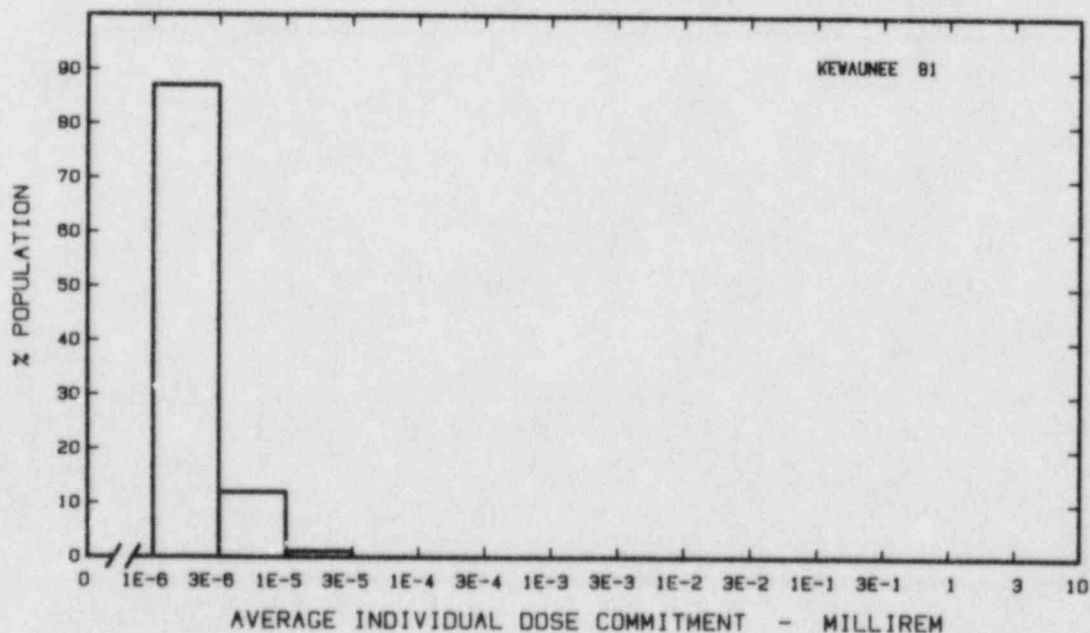
Production/Consumption factors:

Produce: <1

Milk: 7.3

Meat: 1.0

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: LA CROSSE

GENOA, WISCONSIN

Location: N 43.5583°

W 91.2306°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: 3.4E5

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
La Crosse SMSA	91,000	27 km N
Winona	25,000	64 km WNW

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production Of Crops and Animal Products In 80-km Radius Circle

Veg: 7.2E7 kilogram  
Milk: 1.2E9 liter  
Meat: 1.0E8 kilogram

Regional Productivity Factor:  
Animal Grazing Factor:

1  
0.5

Meteorology Period of Record: 1 JAN 75 - 31 DEC 75 Recovery: 97%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS via MISSISSIPPI RIVER

Average River  
Flow at Site: 28,000 ft<sup>3</sup>/s

Drinking Water:

Exposed Population: None

Fish:

Edible Harvest: (a) kg/yr  
Dilution Factor: 0.5<sup>(a)</sup>

---

(a) No fish catch data given in FES, so 1/2 population assumed to consume river fish at generic consumption rates (Table A-1).

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
LA CROSSE

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Child	1.9E-01	2.8E-02	2.4E-04	1.2E+00	1.2E+00
Teen	3.7E-01	5.8E-02	1.8E-04	7.1E-01	1.0E+00
Adult	4.0E+00	5.0E-01	1.2E-03	4.1E+00	5.9E+00
TOTAL	4.6E+00	5.8E-01	1.7E-03	6.0E+00	8.2E+00

Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	4.3E-03	4.3E-03	4.9E-03	4.2E-03	4.3E-03	4.4E-03
Child	4.8E-02	4.8E-02	5.5E-02	4.9E-02	4.8E-02	5.0E-02
Teen	3.5E-02	3.5E-02	3.8E-02	3.5E-02	3.5E-02	3.7E-02
Adult	2.1E-01	2.1E-01	2.2E-01	2.1E-01	2.1E-01	2.2E-01
TOTAL	3.0E-01	3.0E-01	3.2E-01	3.0E-01	3.0E-01	3.1E-01

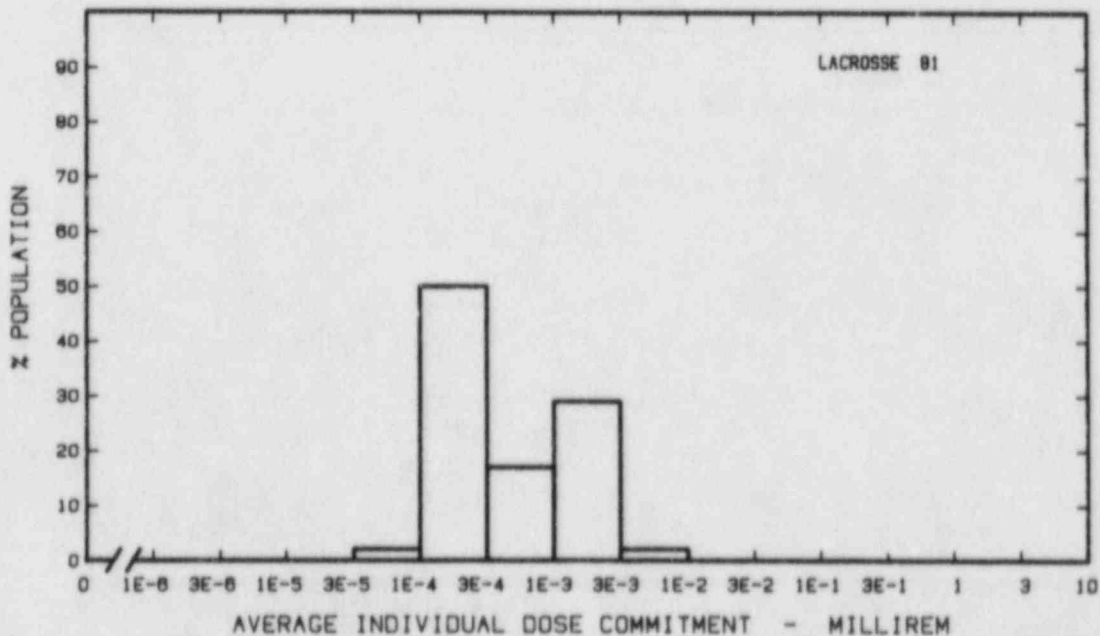
Production/Consumption factors:

Produce: 1.1

Milk: 26

Meat: 3.7

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS





Site: MAINE YANKEE

LINCOLN COUNTY, MAINE

Location: N 43.9506°

W 69.6961°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: 5.9E5

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Portland SMSA	180,000	56 km WSW
Lewiston-Auburn SMSA	72,000	45 km WNW
Augusta	22,000	41 km N
Biddeford	20,000	80 km SW
Waterville	18,000	67 km N

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production Of Crops and Animal Products In 80-km Radius Circle	Veg: 2.4E8 kilogram Milk: 6.6E7 liter Meat: 4.3E6 kilogram
Regional Productivity Factor:	0.6
Animal Grazing Factor:	0.5
Meteorology Period of Record: 1 APR 75 - 31 MAR 76	Recovery: 98%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS via ATLANTIC OCEAN

	Average Dilution Flow from Plant: 770 ft <sup>3</sup> /s
Fish:	Edible Harvest: (a) Dilution Factor: 0.001
Invertebrates:	Edible Harvest: (a) Dilution Factor: 0.002

---

(a) No seafood harvest data given in FES (1972), thus generic population consumption rates used (Table A-1).

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
**MAINE YANKEE**

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Child	1.9E-04	3.1E-04	4.3E-04	2.6E-04	3.4E-04
Teen	1.8E-04	6.4E-04	3.1E-04	1.6E-04	2.9E-04
Adult	1.5E-03	5.8E-03	2.0E-03	8.9E-04	1.7E-03
TOTAL	1.9E-03	6.7E-03	2.8E-03	1.3E-03	2.4E-03

Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	7.8E-05	7.8E-05	1.6E-04	6.4E-05	7.9E-05	9.0E-05
Child	1.2E-03	1.2E-03	2.3E-03	7.2E-04	1.2E-03	1.3E-03
Teen	7.8E-04	7.8E-04	1.3E-03	5.2E-04	7.9E-04	9.9E-04
Adult	4.5E-03	4.5E-03	6.4E-03	3.1E-03	4.5E-03	5.2E-03
TOTAL	6.5E-03	6.5E-03	1.0E-02	4.5E-03	6.6E-03	7.6E-03

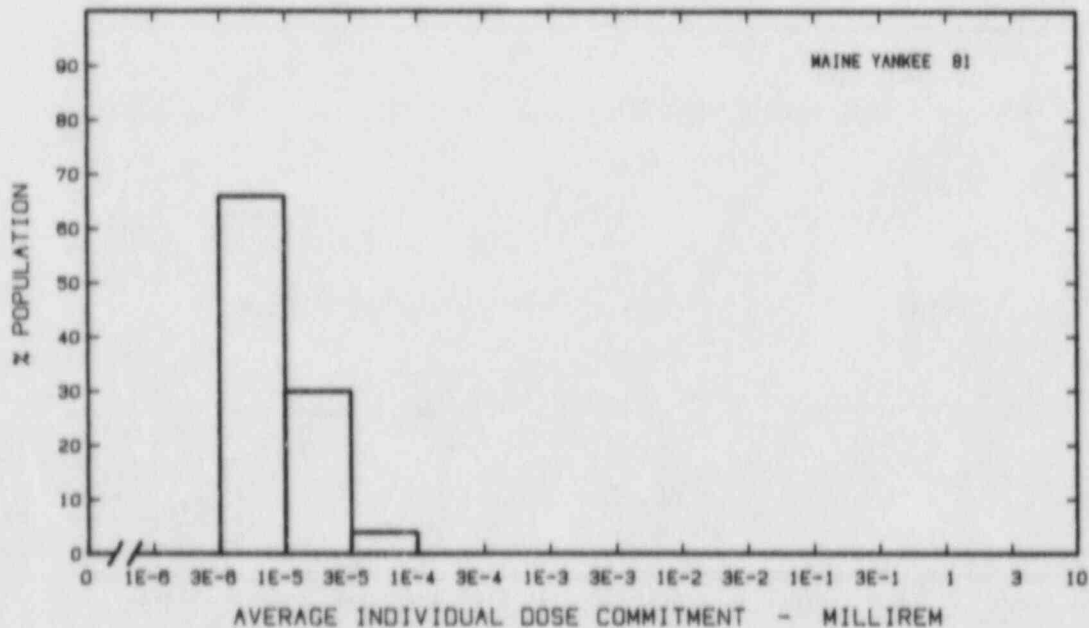
Production/Consumption factors:

Produce: 1.3

Milk: <1

Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: **McGUIRE**

CORNELIUS, NORTH CAROLINA

Location: N 35.4322° W 80.9483°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: **1.6E6**

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Charlotte-Gastonia SMSA	640,000	25 km S
Rockhill	35,000	57 km S
Kannapolis	35,000	30 km E
Salisbury	23,000	51 km ENE
Hickory	21,000	49 km NW

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production Of Crops and Animal Products In 80-km Radius Circle	Veg: <b>2.6E7</b> kilogram Milk: <b>1.0E8</b> liter Meat: <b>5.8E7</b> kilogram
---	---

Regional Productivity Factor:	<b>0.9</b>
Animal Grazing Factor:	<b>0.7</b>

Meteorology Period of Record: **17 OCT 70 - 16 OCT 71** Recovery: **90%**

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS via LAKE NORMAN on CATAWBA RIVER

	Average River Flow at Site: <b>28,000</b> ft <sup>3</sup> /s
Drinking Water:	Exposed Population: <b>700,000</b>
Fish:	Edible Harvest: <b>(a)</b> kg/yr Dilution Factor: <b>0.5<sup>(a)</sup></b>

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
**WILLIAM B. MCGUIRE**

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	3.8E-03	4.5E-03	1.1E-02	1.9E-03	2.6E-03
Child	4.9E-02	1.1E-01	8.7E-02	2.0E-02	3.3E-02
Teen	1.9E-02	1.4E-01	2.9E-02	5.8E-03	1.6E-02
Adult	1.3E-01	1.3E+00	2.1E-01	3.4E-02	1.2E-01
TOTAL	2.0E-01	1.5E+00	3.4E-01	6.2E-02	1.7E-01

Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	3.6E-07	3.6E-07	3.6E-07	5.4E-08	3.6E-07	3.7E-07
Child	5.5E-06	5.5E-06	5.5E-06	6.0E-07	5.5E-06	5.6E-06
Teen	3.9E-06	3.9E-06	3.9E-06	4.4E-07	3.9E-06	4.0E-06
Adult	2.2E-05	2.2E-05	2.2E-05	2.7E-06	2.2E-05	2.3E-05
TOTAL	3.2E-05	3.2E-05	3.2E-05	3.8E-06	3.2E-05	3.3E-05

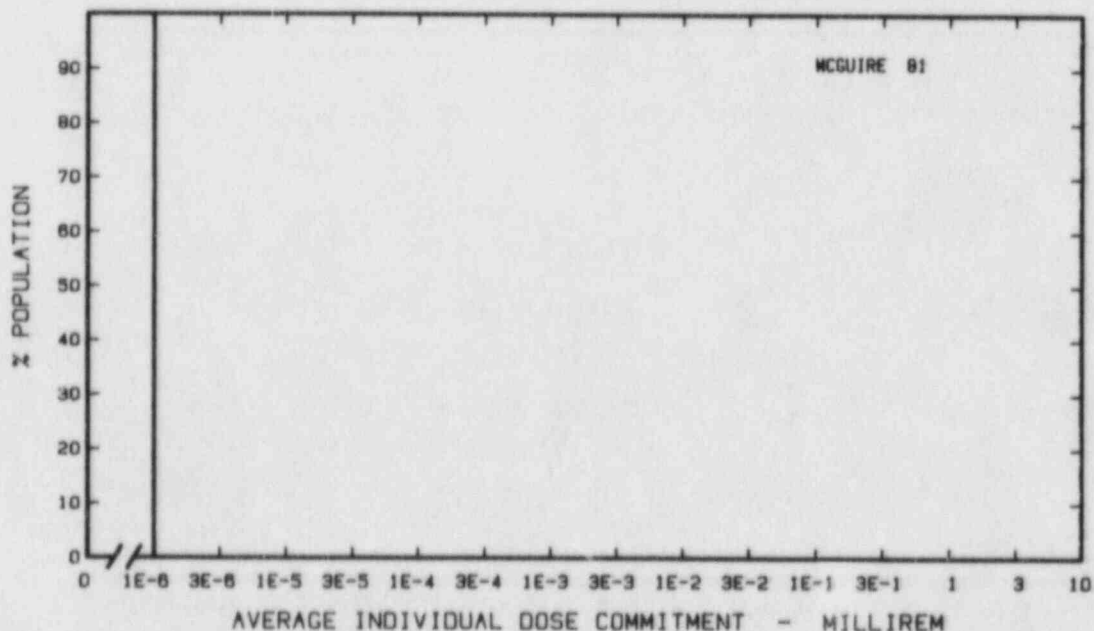
Production/Consumption factors:

Produce: <1

Milk: <1

Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: MILLSTONE

WATERFORD, CONNECTICUT

Location: N 41.3086°

W 72.1681°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: 2.5E6

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Hartford SMSA	730,000	67 km NW
New Haven-West Haven SMSA	420,000	64 km W
New London-Norwich SMSA	250,000	8 km NNE
New Britain SMSA	140,000	65 km NW
Waterbury SMSA	230,000	78 km WNW

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production  
Of Crops and Animal Products  
In 80-km Radius Circle

Veg: 3.2E7 kilogram  
Milk: 4.4E8 liter  
Meat: 2.0E7 kilogram

Regional Productivity Factor: 0.6  
Animal Grazing Factor: 0.6

Meteorology Period of Record: 1 JAN 74 - 31 DEC 74      Recovery: 95%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS      via      NIANTIC BAY

Average Dilution Flow  
from Plant: 203 ft<sup>3</sup>/s

Fish:      Edible Harvest: 9.1E4 kg/yr  
Dilution Factor: 0.001

Invertebrates:      Edible Harvest: 9.1E4 kg/yr  
Dilution Factor: 0.002

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
**MILLSTONE 1 AND 2**

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Child	1.2E-03	2.4E-03	5.2E-03	9.6E-04	1.5E-03
Teen	1.0E-03	4.8E-03	3.6E-03	5.7E-04	1.2E-03
Adult	7.9E-03	4.2E-02	2.4E-02	3.3E-03	7.4E-03
TOTAL	1.0E-02	4.9E-02	3.3E-02	4.8E-03	1.0E-02

Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	7.0E-02	6.9E-02	3.2E-01	6.9E-02	7.0E-02	7.1E-02
Child	7.7E-01	7.7E-01	2.1E+00	7.6E-01	7.8E-01	8.0E-01
Teen	5.6E-01	5.6E-01	1.1E+00	5.5E-01	5.7E-01	5.9E-01
Adult	3.4E+00	3.4E+00	5.1E+00	3.3E+00	3.4E+00	3.5E+00
TOTAL	4.8E+00	4.8E+00	8.5E+00	4.7E+00	4.8E+00	5.0E+00

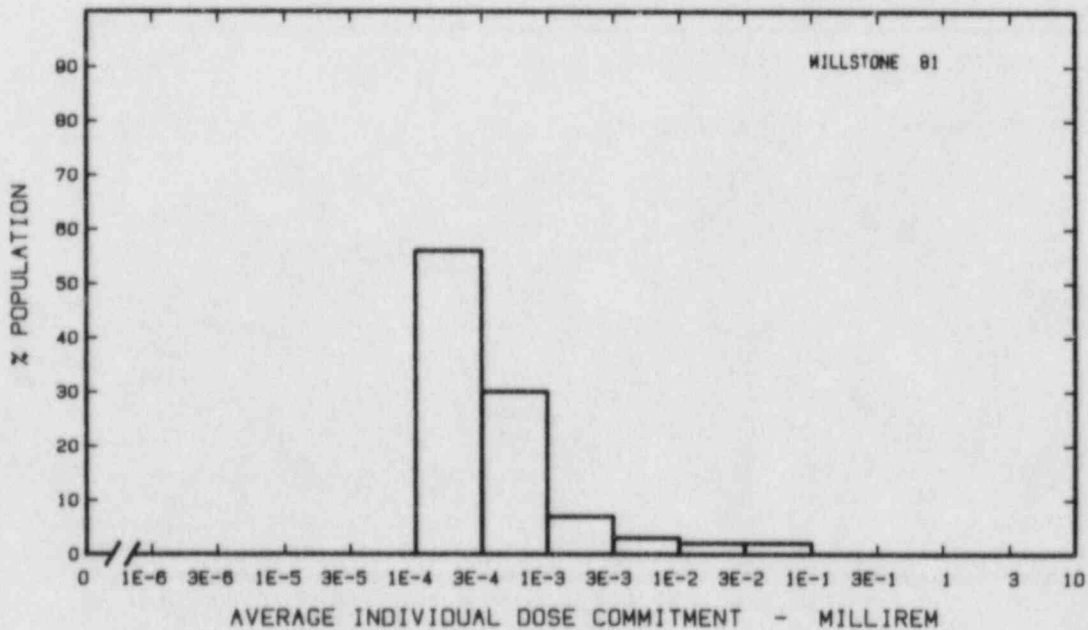
Production/Consumption factors:

Produce: <1

Milk: <1

Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: MONTICELLO

MONTICELLO, MINNESOTA

Location: N 45.3333°

W 93.8483°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: 2.1E6

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Minneapolis-St. Paul SMSA	2,100,000	60 km SE
St. Cloud SMSA	160,000	36 km NW
Bloomington	82,000	72 km SE
Edina	46,000	63 km SE
Richfield	38,000	67 km SE

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production Of Crops and Animal Products In 80-km Radius Circle	Veg: 1.2E8 kilogram Milk: 4.0E8 liter Meat: 1.1E8 kilogram
---	--

Regional Productivity Factor:	1
Animal Grazing Factor:	0.5

Meteorology Period of Record: 1 JAN 74 - 31 DEC 74      Recovery: 92%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS      via      MISSISSIPPI RIVER

	Average River Flow at Site: 4,600 ft <sup>3</sup> /s
Drinking Water:	Exposed Population: 1,800,000
Fish:	Edible Harvest: 2.4E5 kg/yr

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
**MONTICELLO**

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	1.5E-06	1.4E-06	6.5E-06	1.3E-07	1.6E-06
Child	1.6E-05	1.7E-05	5.1E-05	1.8E-06	1.7E-05
Teen	6.4E-06	6.8E-06	1.6E-05	6.0E-07	6.8E-06
Adult	5.5E-05	5.9E-05	1.2E-04	3.6E-06	5.6E-05
TOTAL	7.9E-05	8.4E-05	2.0E-04	6.1E-06	8.2E-05

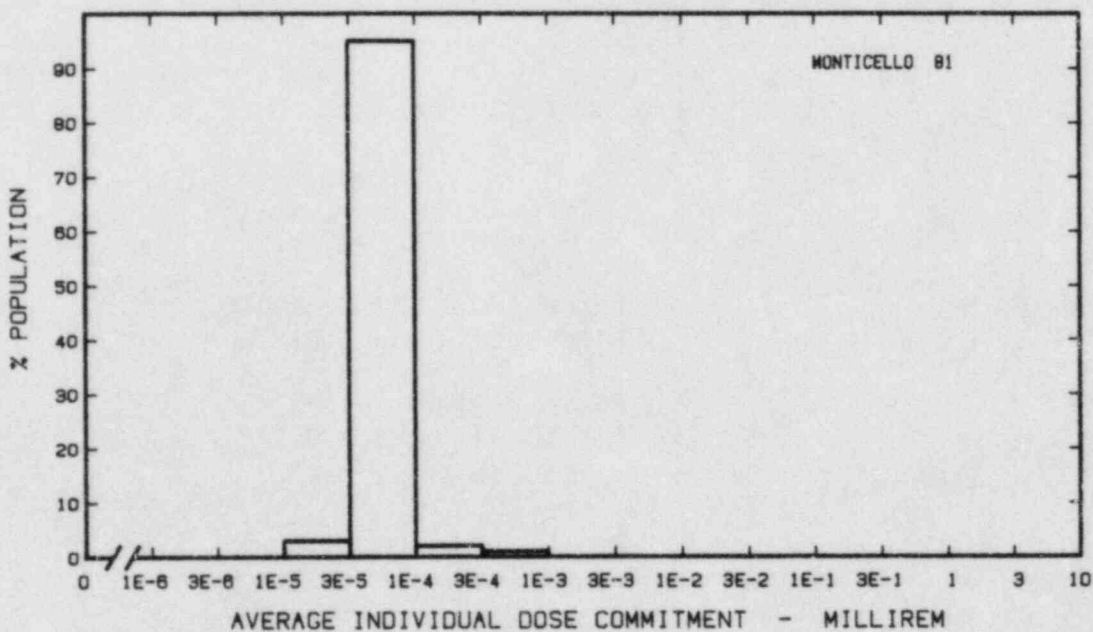
Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	2.0E-03	1.9E-03	2.3E-02	1.7E-03	2.2E-03	2.0E-03
Child	2.6E-02	2.5E-02	1.6E-01	2.8E-02	2.6E-02	2.6E-02
Teen	1.7E-02	1.7E-02	7.1E-02	1.5E-02	1.7E-02	1.8E-02
Adult	9.7E-02	9.7E-02	2.8E-01	7.8E-02	9.6E-02	1.0E-01
TOTAL	1.4E-01	1.4E-01	5.4E-01	1.2E-01	1.4E-01	1.5E-01

Production/Consumption factors:

Produce: <1                      Milk: 1.4                      Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS





Site: NINE MILE POINT

OSWEGO, NEW YORK

Location: N 43.5222°

W 76.4100°

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POPULATION DATA

Total Population Within 2-to-80-km Region: 8.4E5

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Syracuse SMSA	640,000	56 km SSE
Auburn	33,000	67 km SSW
Watertown	28,000	64 km NE
Kingston	24,000	79 km N
Oswego	20,000	11 km SW

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production  
Of Crops and Animal Products  
In 80-km Radius Circle

Veg: 7.6E7 kilogram  
Milk: 7.0E8 liter  
Meat: 3.3E7 kilogram

Regional Productivity Factor:  
Animal Grazing Factor:

0.7  
0.5

Meteorology Period of Record: 1 JAN 74 - 31 DEC 75

Recovery: 97%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS via LAKE ONTARIO

Average Dilution Flow  
from Plant: 460 ft<sup>3</sup>/s

Drinking Water:

Exposed Population: 550,000  
Dilution Factor: 0.01

Fish:

Edible Harvest: 7.3E5 kg/yr  
Dilution Factor: 0.0033

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
**NINE MILE POINT**

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	7.6E-03	1.3E-03	5.0E-05	6.8E-02	8.3E-02
Child	2.7E-01	3.1E-02	5.7E-04	1.6E+00	1.6E+00
Teen	3.8E-01	3.4E-02	2.2E-04	7.2E-01	1.0E+00
Adult	4.2E+00	3.0E-01	1.8E-03	4.2E+00	6.1E+00
TOTAL	4.9E+00	3.7E-01	2.7E-03	6.6E+00	8.9E+00

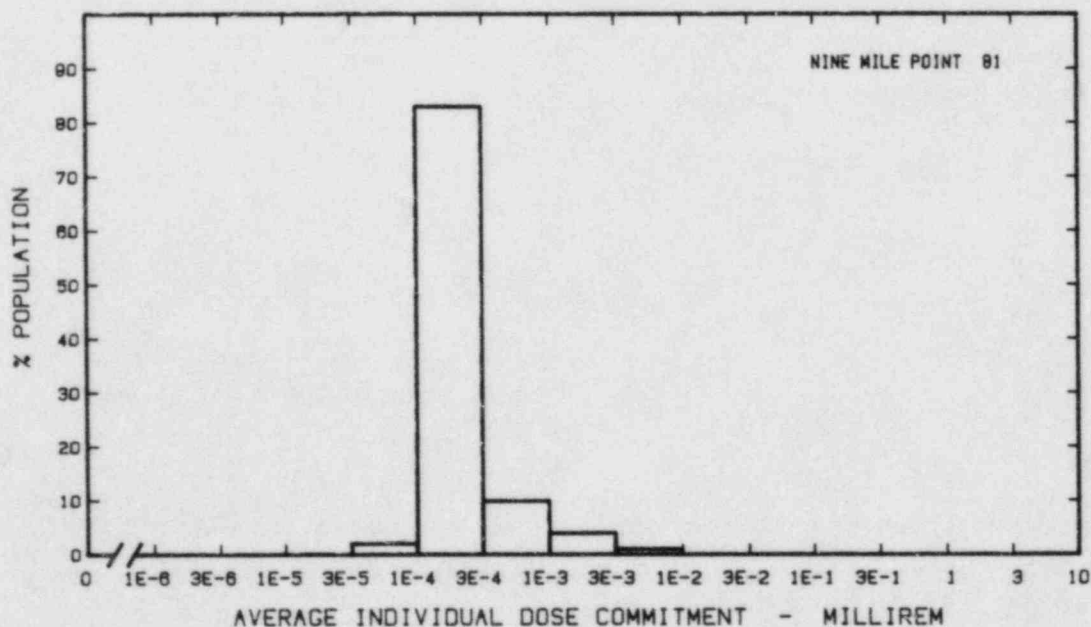
Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	3.6E-03	3.6E-03	7.5E-03	3.5E-03	3.7E-03	4.4E-03
Child	4.3E-02	4.7E-02	6.7E-02	4.0E-02	5.0E-02	5.5E-02
Teen	3.0E-02	3.8E-02	3.9E-02	2.8E-02	3.4E-02	4.2E-02
Adult	1.8E-01	2.2E-01	2.1E-01	1.7E-01	1.9E-01	2.3E-01
TOTAL	2.5E-01	3.1E-01	3.2E-01	2.4E-01	2.8E-01	3.3E-01

Production/Consumption factors:

Produce: <1                      Milk: 4.4                      Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: NORTH ANNA

LOUISA COUNTY, VIRGINIA

Location: N 38.0608°

W 77.7906°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: 1.0E6

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Richmond SMSA	630,000	66 km SSE
Charlottesville	40,000	63 km W
Fredricksburg	15,000	40 km NE
Culpeper	6,600	54 km NNW
Ashland	4,600	41 km SE

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SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production  
Of Crops and Animal Products  
In 80-km Radius Circle

Veg: 3.5E7 kilogram  
Milk: 1.5E8 liter  
Meat: 7.4E7 kilogram

Regional Productivity Factor: 0.9  
Animal Grazing Factor: 0.7

Meteorology Period of Record: 1 APR 74 - 31 APR 75 Recovery: 99%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS via LAKE ANNA<sup>(a)</sup>

Average Dilution Flow from  
Plant: 1,900 ft<sup>3</sup>/s

Drinking Water:

Exposed Population: None

Fish:

Edible Harvest: 7.3<sup>(b)</sup> kg/yr  
Dilution Factor: 0.001<sup>(b)</sup>

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(a) Reconcentration of radionuclides in lake accounted for (FES, 1973).

(b) Average individual consumption rates as given in the FES (1973) were used in lieu of catch data.

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
NORTH ANNA 1 AND 2

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Child	1.7E-01	9.6E-03	3.9E-03	8.7E-01	9.9E-01
Teen	3.3E-01	1.8E-02	3.0E-03	5.2E-01	8.4E-01
Adult	3.6E+00	1.5E-01	2.2E-02	3.0E+00	5.0E+00
TOTAL	4.1E+00	1.7E-01	2.9E-02	4.4E+00	6.8E+00

Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	1.4E-03	9.1E-04	4.1E-01	2.1E-03	2.5E-03	1.0E-03
Child	1.4E-02	1.1E-02	2.2E+00	1.7E-02	1.9E-02	1.2E-02
Teen	9.0E-03	7.8E-03	8.4E-01	9.0E-03	1.1E-02	8.9E-03
Adult	4.9E-02	4.6E-02	2.7E+00	4.5E-02	5.3E-02	4.8E-02
TOTAL	7.4E-02	6.5E-02	6.1E+00	7.4E-02	8.6E-02	7.0E-02

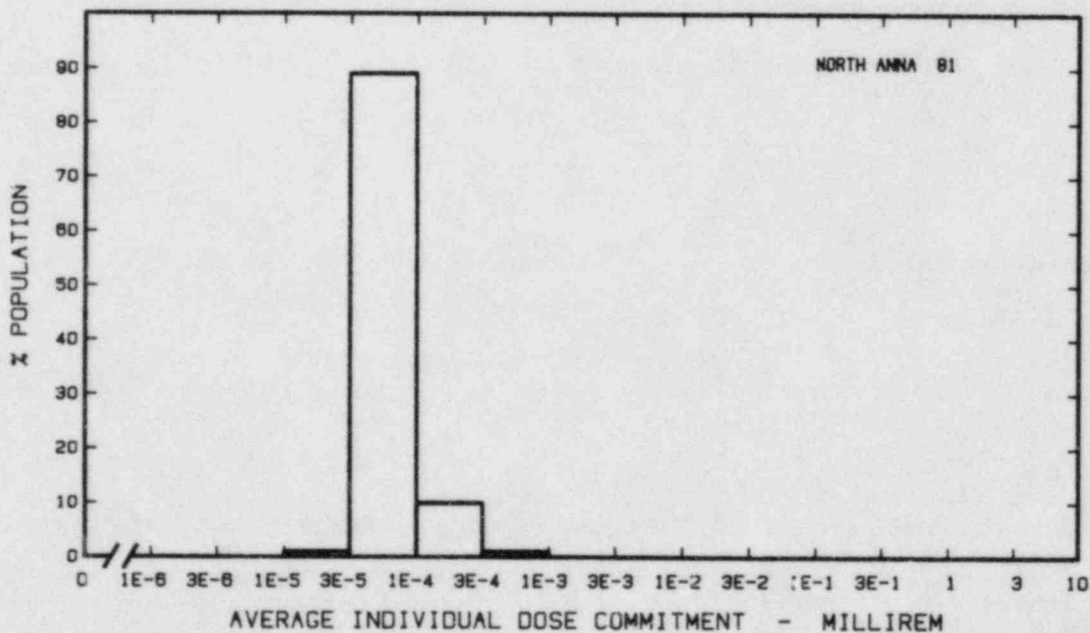
Production/Consumption factors:

Produce: <1

Milk: 1.0

Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: OCONEE

OCONEE COUNTY, SOUTH CAROLINA

Location: N 34.7917°

W 82.8986°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: 8.9E5

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Greenville SMSA	560,000	46 km E
Anderson	27,000	39 km SE
Easley	14,000	27 km E
Greer	11,000	64 km ENE

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production  
Of Crops and Animal Products  
In 80-km Radius Circle

Veg: 7.4E6 kilogram  
Milk: 5.7E7 liter  
Meat: 5.0E7 kilogram

Regional Productivity Factor:  
Animal Grazing Factor:

1  
0.7

Meteorology Period of Record: 1 JAN 75 - 31 DEC 75      Recovery: 86%

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SITE SPECIFIC DATA - WATERBORNE PATHWAYS      via      HARTWELL RES. on KEOWEE RIVER

Average River Flow  
at Site: 1,100 ft<sup>3</sup>/s

Drinking Water:

Exposed Population: 53,000  
Dilution Factor: 1

Fish:

Edible Harvest: (a)  
Dilution Factor: 0.01 (b)

---

(a) No fish catch data given in FES, so generic consumption rates used (Table A-1).

(b) Ten percent of population obtain 10% of their fish diet from Hartwell Reservoir (FES, 1972).

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
OCONEE 1, 2 AND 3

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	3.0E-02	2.2E-02	2.1E-01	7.8E-02	1.2E-01
Child	8.4E-01	2.8E-01	1.6E+00	2.9E+00	3.5E+00
Teen	1.1E+00	1.5E-01	5.0E-01	1.5E+00	2.5E+00
Adult	1.1E+01	1.3E+00	3.6E+00	8.6E+00	1.5E+01
TOTAL	1.3E+01	1.7E+00	5.9E+00	1.3E+01	2.1E+01

Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	5.0E-03	4.9E-03	8.0E-02	5.2E-03	5.5E-03	5.4E-03
Child	5.6E-02	5.6E-02	5.0E-01	5.6E-02	5.9E-02	6.3E-02
Teen	4.1E-02	4.2E-02	2.4E-01	3.9E-02	4.2E-02	4.9E-02
Adult	2.5E-01	2.6E-01	9.8E-01	2.4E-01	2.5E-01	2.7E-01
TOTAL	3.5E-01	3.6E-01	1.8E+00	3.4E-01	3.6E-01	3.9E-01

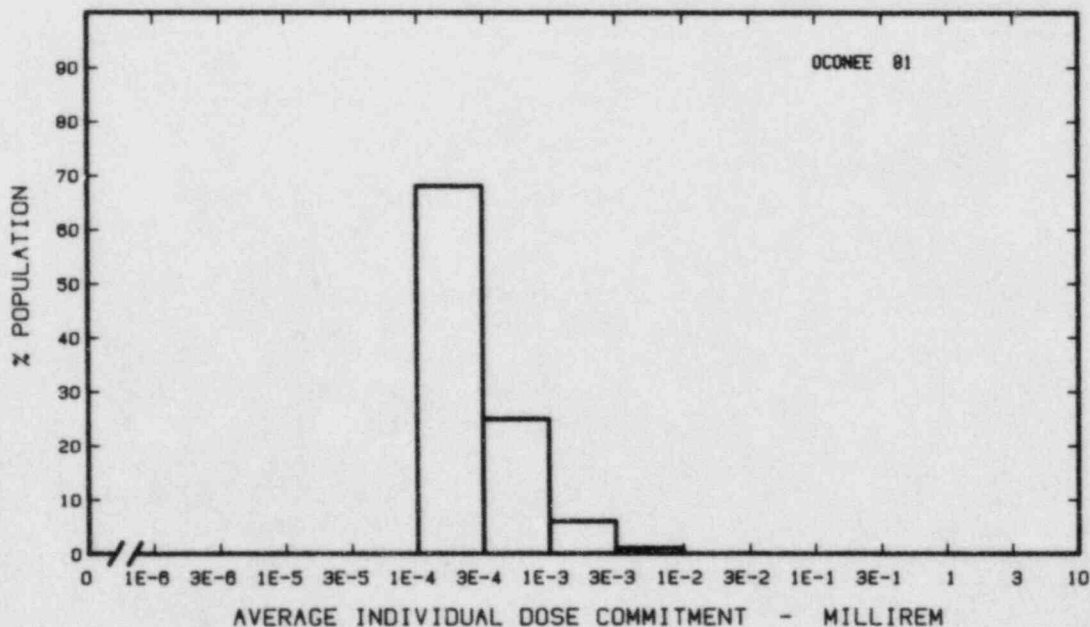
Production/Consumption factors:

Produce: <1

Milk: <1

Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: OYSTER CREEK

OYSTER CREEK, NEW JERSEY

Location: N 39.8142° W 74.2064°

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POPULATION DATA

Total Population Within 2-to-80-km Region: 3.5E6

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
New Brunswick-Sayreville SMSA	600,000	77 km N
Long Branch-Asbury Park SMSA	500,000	57 km NNE
Trenton SMSA	310,000	66 km NW
Atlantic City SMSA	190,000	55 km SSW
Camden	85,000	79 km W

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SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production Of Crops and Animal Products In 80-km Radius Circle	Veg: 7.4E7 kilogram Milk: 2.7E8 liter Meat: 2.4E7 kilogram
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Regional Productivity Factor:	0.5
Animal Grazing Factor:	0.6

Meteorology Period of Record: 15 FEB 66 - 31 DEC 68 Recovery: 63%

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SITE SPECIFIC DATA - WATERBORNE PATHWAYS via BARNEGAT BAY

	Average Dilution Flow from Plant: 1,700 ft <sup>3</sup> /s
Fish:	Edible Harvest: 2.1 <sup>(a)</sup> kg/yr Dilution Factor: 0.01 <sup>(b)</sup>
Invertebrates:	Edible Harvest: 0.96 <sup>(a)</sup> kg/yr Dilution Factor: 0.01 <sup>(b)</sup>

(a) Average individual consumption rate as given in the FES (1974) used in lieu of catch data.

(b) 10% of seafood eaten assumed caught in bay waters diluted to 10% of that of discharge canal (FES, 1974).

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
OYSTER CREEK

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Child	2.2E-03	4.6E-03	9.5E-04	1.5E-03	1.8E-03
Teen	1.7E-03	9.3E-03	6.7E-04	9.5E-04	1.6E-03
Adult	1.2E-02	8.1E-02	4.4E-03	5.8E-03	9.4E-03
TOTAL	1.6E-02	9.5E-02	6.1E-03	8.3E-03	1.3E-02

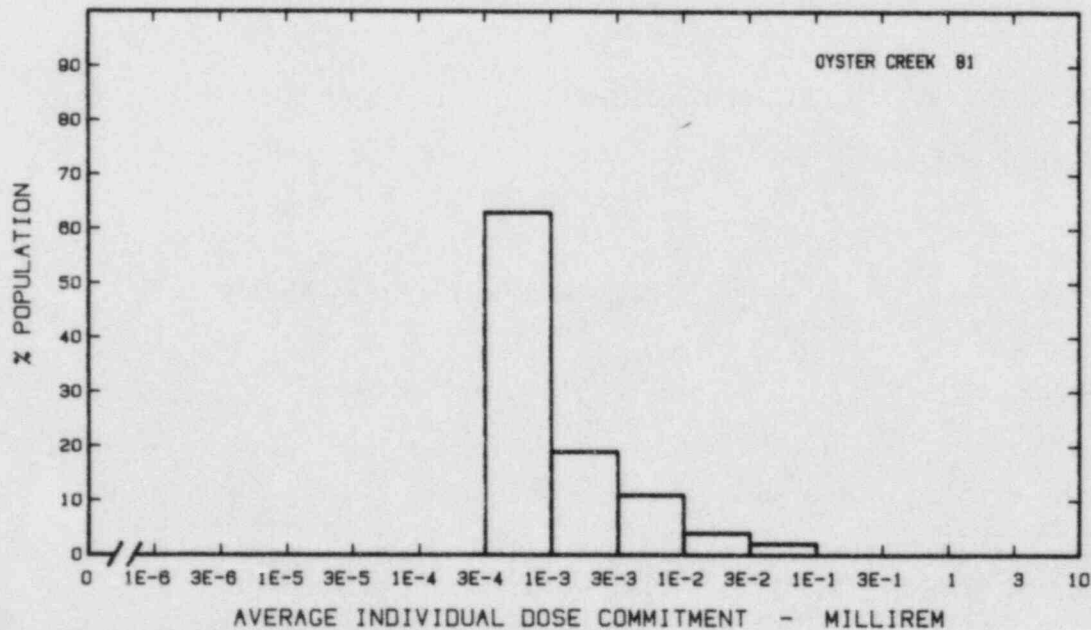
Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	2.1E-01	2.1E-01	7.2E-01	2.2E-01	2.1E-01	2.3E-01
Child	2.4E+00	2.4E+00	6.1E+00	2.6E+00	2.4E+00	2.6E+00
Teen	1.7E+00	1.8E+00	3.5E+00	1.8E+00	1.7E+00	1.9E+00
Adult	1.0E+01	1.1E+01	1.7E+01	1.1E+01	1.0E+01	1.1E+01
TOTAL	1.5E+01	1.5E+01	2.8E+01	1.5E+01	1.5E+01	1.6E+01

Production/Consumption factors:

Produce: <1                      Milk: <1                      Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS





Site: PALISADES

COVERT TOWNSHIP, MICHIGAN

Location: N 42.3222°

W 86.3153°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: 1.1E6

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Kalamazoo-Portage SMSA	280,000	61 km E
South Bend SMSA	280,000	72 km S
Elkhart SMSA	140,000	76 km SSE
Holland	26,000	53 km NNE
Benton Harbor	15,000	25 km SSW

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SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production Of Crops and Animal Products In 80-km Radius Circle	Veg: 6.8E7 kilogram Milk: 2.9E8 liter Meat: 4.5E7 kilogram
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Regional Productivity Factor:	0.6
Animal Grazing Factor:	0.5

Meteorology Period of Record: 1 SEP 73 - 31 AUG 74      Recovery: 67%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS    via    LAKE MICHIGAN

	Average Dilution Flow from Plant: 96 ft <sup>3</sup> /s
Drinking Water:	Exposed Population: 51,000 Dilution Factor: 3.5E-3 <sup>(a)</sup>
Fish:	Edible Harvest: (b) Dilution Factor: 0.001 <sup>(b)</sup>

(a) Drinking water dilution factor estimated by averaging dilution factor derived from FES (1972) suitably weighted for population.

(b) Since the average individual consumption rate of 20 g/d as assumed in FES (1972) seemed unreasonably large, generic rates were used (Table A-1).

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
**PALISADES**

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	4.4E-04	4.4E-04	4.4E-04	2.2E-05	4.7E-04
Child	9.6E-03	5.7E-03	5.2E-03	2.3E-02	3.1E-02
Teen	1.1E-02	3.3E-03	2.1E-03	1.4E-02	2.4E-02
Adult	1.1E-01	2.8E-02	1.8E-02	8.0E-02	1.5E-01
TOTAL	1.3E-01	3.8E-02	2.5E-02	1.2E-01	2.0E-01

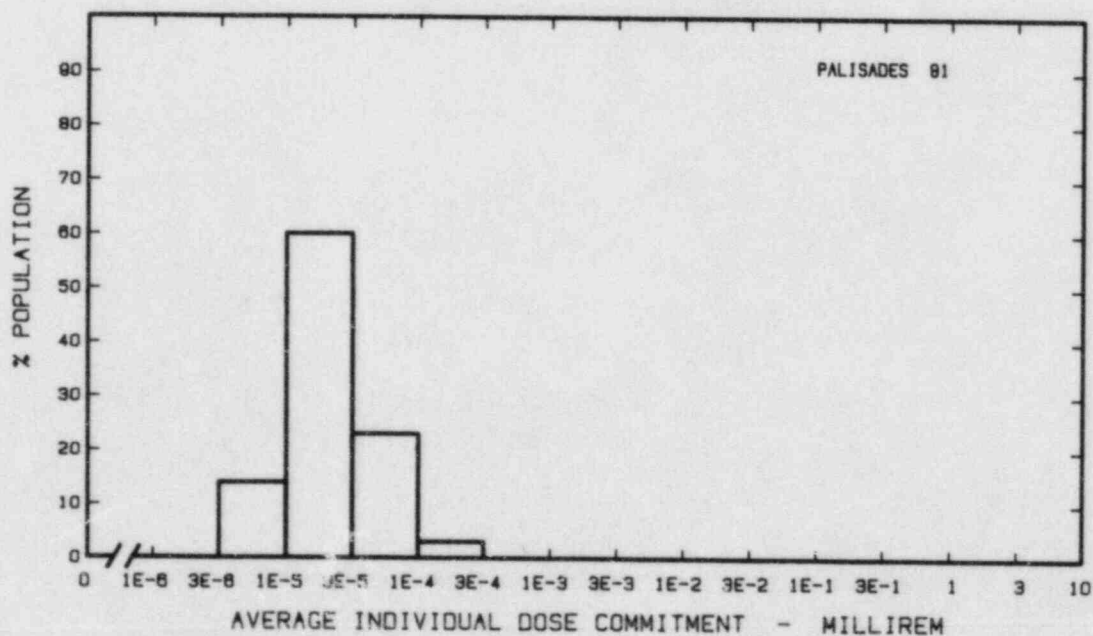
Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	4.6E-04	4.3E-04	1.7E-02	4.7E-04	5.0E-04	4.7E-04
Child	5.0E-03	4.9E-03	1.1E-01	5.0E-03	5.3E-03	5.5E-03
Teen	3.6E-03	3.5E-03	4.3E-02	3.5E-03	3.7E-03	4.3E-03
Adult	2.2E-02	2.1E-02	1.5E-01	2.1E-02	2.2E-02	2.4E-02
TOTAL	3.1E-02	3.0E-02	3.2E-01	3.0E-02	3.1E-02	3.4E-02

Production/Consumption factors:

Produce: <1                      Milk: 1.2                      Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: PEACH BOTTOM

YORK COUNTY, PENNSYLVANIA

Location: N 39.7589° W 76.2692°

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POPULATION DATA

Total Population Within 2-to-80-km Region: 4.3E6

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Baltimore SMSA	2,200,000	60 km SSW
Harrisburg SMSA	450,000	77 km NNW
Wilmington SMSA	400,000	62 km E
York SMSA	380,000	45 km NW
Lancaster SMSA	360,000	31 km N

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SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production Of Crops and Animal Products In 80-km Radius Circle	Veg: 5.3E7 kilogram Milk: 5.3E8 liter Meat: 5.4E7 kilogram
Regional Productivity Factor:	0.95
Animal Grazing Factor:	0.6
Meteorology Period of Record: 1 AUG 67 - 31 JUL 71	Recovery: 72%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS via SUSQUEHANNA RIVER

	Average River Flow at Site: 36,000 ft <sup>3</sup> /s
Drinking Water:	Exposed Population: 2.2E6 Dilution Factor: 1
Fish:	Edible Harvest: (a) Dilution Factor: 0.001 (b)

(a) No fish catch data given in FES (1974), thus generic consumption rates used (Table A-1).

(b) One percent of people obtain 10% of their fish diet from river downstream from plant (FES, 1973).

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
PEACH BOTTOM 2 AND 3

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	8.1E-03	5.8E-03	1.4E-01	2.9E-02	3.5E-02
Child	1.2E-01	4.8E-02	9.7E-01	3.4E-01	3.4E-01
Teen	6.4E-02	3.0E-02	2.9E-01	9.7E-02	1.2E-01
Adult	6.5E-01	2.7E-01	2.0E+00	6.5E-01	8.1E-01
TOTAL	8.4E-01	3.5E-01	3.4E+00	1.1E+00	1.3E+00

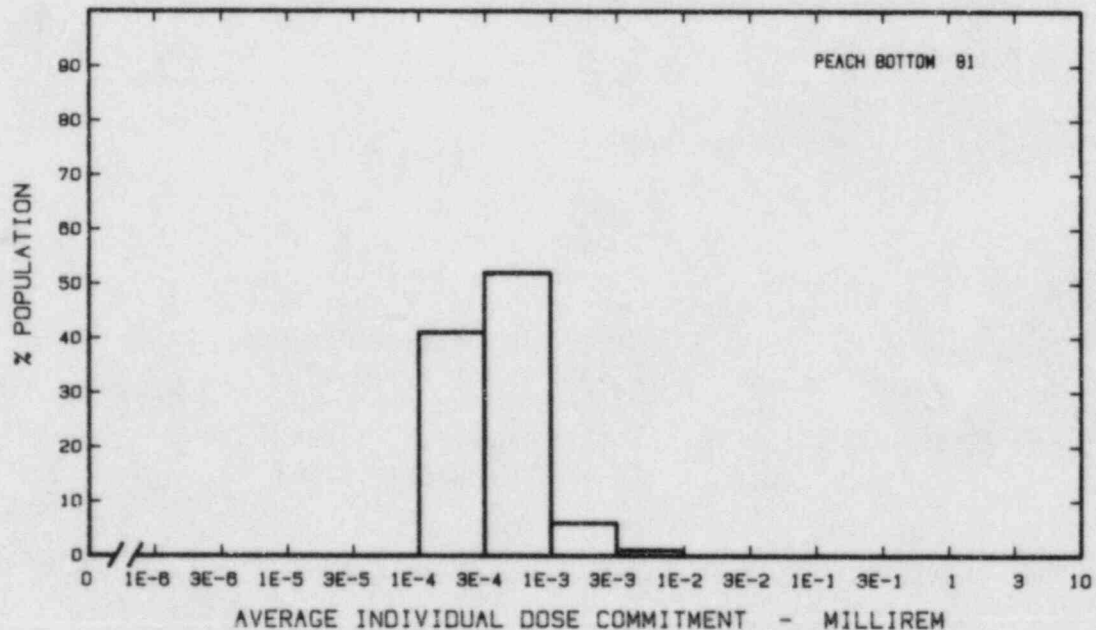
Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	2.8E-02	2.8E-02	1.3E-01	2.7E-02	2.8E-02	3.0E-02
Child	3.1E-01	3.1E-01	1.1E+00	3.0E-01	3.1E-01	3.4E-01
Teen	2.2E-01	2.2E-01	5.9E-01	2.2E-01	2.3E-01	2.6E-01
Adult	1.3E+00	1.3E+00	2.8E+00	1.3E+00	1.4E+00	1.5E+00
TOTAL	1.9E+00	1.9E+00	4.6E+00	1.9E+00	1.9E+00	2.1E+00

Production/Consumption factors:

Produce: <1                      Milk: <1                      Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: PILGRIM

PLYMOUTH, MASSACHUSETTS

Location: N 41.9444°

W 70.5794°

POPULATION DATA

Total Population Within 2-to-80-km Region: 4.3E6

Major Metropolitan Centers Within Region:

Center	Population	Location
Boston SMSA	2,800,000	61 km NW
Providence-Warwick-Pawtucket SMSA	820,000	70 km W
New Bedford SMSA	170,000	45 km SSW
Brockton SMSA	170,000	40 km WNW
Fall River SMSA	150,000	55 km SW

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production Of Crops and Animal Products In 80-km Radius Circle

Veg: 2.0E7 kilogram  
Milk: 2.6E3 liter  
Meat: 1.6E7 kilogram

Regional Productivity Factor: 0.3  
Animal Grazing Factor: 0.6

Meteorology Period of Record: 1 MAY 74 - 30 APR 75 Recovery: 93%

SITE SPECIFIC DATA - WATERBORNE PATHWAYS via CAPE COD BAY

Average Dilution Flow from Plant: 24 ft<sup>3</sup>/s

Fish: Edible Harvest: 2.6E4 kg/yr  
Dilution Factor: 0.001

Invertebrates: Edible Harvest: 3.1E4 kg/yr  
Dilution Factor: 0.002

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
**PILGRIM**

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Child	6.7E-03	6.3E-03	6.8E-05	2.5E-02	1.5E-02
Teen	4.3E-03	1.2E-02	4.8E-05	1.4E-02	1.2E-02
Adult	2.7E-02	1.0E-01	3.2E-04	8.1E-02	6.7E-02
TOTAL	3.8E-02	1.2E-01	4.3E-04	1.2E-01	9.4E-02

Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	1.0E-02	1.0E-02	3.4E-02	9.9E-03	1.0E-02	1.0E-02
Child	1.1E-01	1.1E-01	2.7E-01	1.1E-01	1.1E-01	1.2E-01
Teen	8.2E-02	8.3E-02	1.6E-01	7.9E-02	8.2E-02	9.0E-02
Adult	5.0E-01	5.0E-01	7.9E-01	4.8E-01	5.0E-01	5.2E-01
TOTAL	7.0E-01	7.0E-01	1.3E+00	6.8E-01	7.0E-01	7.4E-01

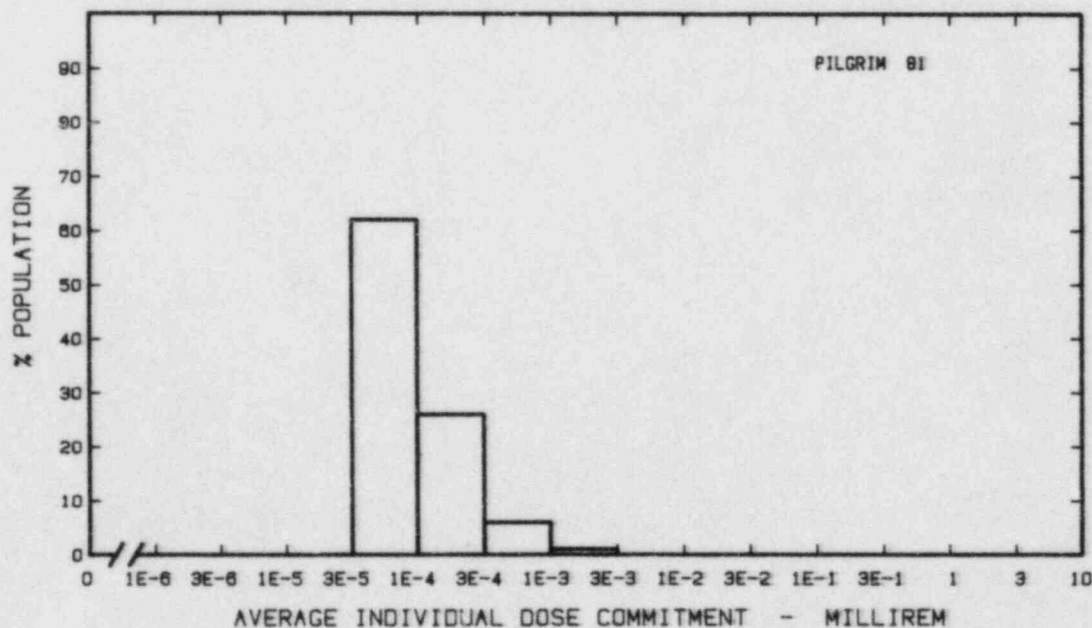
Production/Consumption factors:

Produce: <1

Milk: <1

Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: POINT BEACH

MANITOWOC COUNTY, WISCONSIN

Location: N 44.2808°

W 87.5361°

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POPULATION DATA

Total Population Within 2-to-80-km Region: 6.2E5

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Greenbay SMSA	180,000	47 km NW
Appleton	59,000	72 km W
Sheboygan	48,000	60 km SSW
Manitowoc	33,000	24 km SSW
Neenah	22,000	75 km W

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SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production  
Of Crops and Animal Products  
In 80-km Radius Circle

Veg: 7.2E7 kilogram  
Milk: 1.2E9 liter  
Meat: 1.0E8 kilogram

Regional Productivity Factor:  
Animal Grazing Factor:

0.5  
0.5

Meteorology Period of Record: 19 APR 67 - 18 APR 69 Recovery: 83%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS via LAKE MICHIGAN

Average Dilution Flow  
from Plant: 730 ft<sup>3</sup>/s

Drinking Water:

Exposed Population: 260,000  
Dilution Factor: 2.6E-3<sup>(a)</sup>

Fish:

Edible Harvest: 6.7E4<sup>(b)</sup> kg/yr  
Dilution Factor: 0.013<sup>(c)</sup>

(a) Drinking water dilution factor estimated by averaging dilution factor derived from FES (1972), suitably weighted for population.

(b) Includes both sport and commercial fish catch (FES, 1972).

(c) Dilution factor estimated by averaging sport and commercial dilution factor derived from FES (1972).

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
POINT BEACH 1 AND 2

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	5.5E-04	5.2E-04	7.6E-03	2.2E-04	7.6E-04
Child	7.6E-03	5.8E-03	5.6E-02	9.1E-03	1.5E-02
Teen	5.1E-03	2.3E-03	1.7E-02	4.7E-03	9.3E-03
Adult	5.0E-02	2.0E-02	1.2E-01	2.8E-02	6.1E-02
TOTAL	6.3E-02	2.9E-02	2.1E-01	4.2E-02	8.7E-02

Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	1.7E-03	1.7E-03	2.9E-03	3.7E-04	1.7E-03	1.7E-03
Child	2.5E-02	2.5E-02	3.4E-02	4.1E-03	2.5E-02	2.5E-02
Teen	1.6E-02	1.6E-02	1.9E-02	3.0E-03	1.6E-02	1.6E-02
Adult	8.8E-02	8.8E-02	9.9E-02	1.8E-02	8.8E-02	8.8E-02
TOTAL	1.3E-01	1.3E-01	1.6E-01	2.6E-02	1.3E-01	1.3E-01

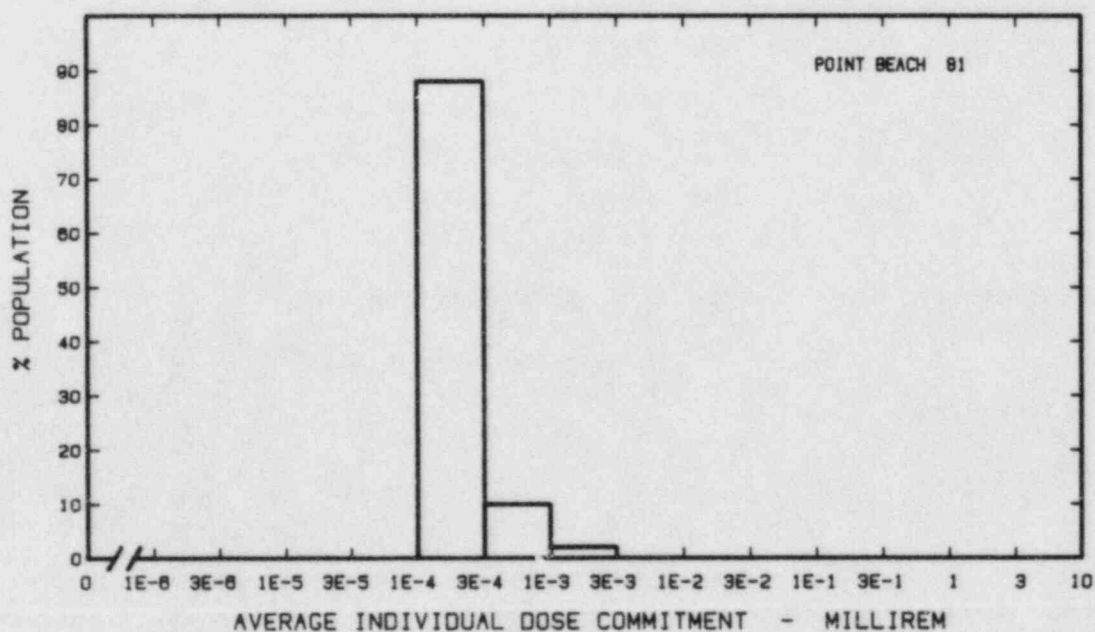
Production/Consumption factors:

Produce: <1

Milk: 7.3

Meat: 1.0

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS





Site: PRAIRIE ISLAND

RED WING, MINNESOTA

Location: N 44.6219°

W 92.6331°

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POPULATION DATA

Total Population Within 2-to-80-km Region: 2.2E6

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Minneapolis-St. Paul SMSA	2,100,000	63 km NW
Rochester SMSA	92,000	68 km SSE
Owatonna	19,000	77 km SW
Faribault	16,000	63 km SW
Redwing	14,000	10 km SE

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production  
Of Crops and Animal Products  
In 80-km Radius Circle

Veg: 1.2E8 kilogram  
Milk: 4.0E8 liter  
Meat: 1.0E8 kilogram

Regional Productivity Factor:  
Animal Grazing Factor:

1  
0.5

Meteorology Period of Record: 22 MAR 74 - 21 MAR 75 Recovery: 65%

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SITE SPECIFIC DATA - WATERBORNE PATHWAYS via MISSISSIPPI RIVER

Average River Flow  
at Site: 15,000 ft<sup>3</sup>/s

Drinking Water:

Exposed Population: None

Fish:

Edible Harvest: 6.8E5 kg/yr  
Dilution Factor: 1

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
PRAIRIE ISLAND 1 AND 2

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Child	3.2E-04	3.3E-04	3.1E-04	3.6E-05	3.5E-04
Teen	3.0E-04	3.1E-04	2.8E-04	2.1E-05	3.1E-04
Adult	2.4E-03	2.5E-03	2.2E-03	1.2E-04	2.4E-03
TOTAL	3.0E-03	3.1E-03	2.8E-03	1.8E-04	3.1E-03

Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	5.0E-04	5.0E-04	1.0E-03	5.9E-05	5.0E-04	5.0E-04
Child	7.6E-03	7.6E-03	1.1E-02	6.5E-04	7.6E-03	7.7E-03
Teen	4.9E-03	4.9E-03	6.2E-03	4.7E-04	4.9E-03	4.9E-03
Adult	2.7E-02	2.7E-02	3.1E-02	2.8E-03	2.7E-02	2.7E-02
TOTAL	4.0E-02	4.0E-02	5.0E-02	4.0E-03	4.0E-02	4.0E-02

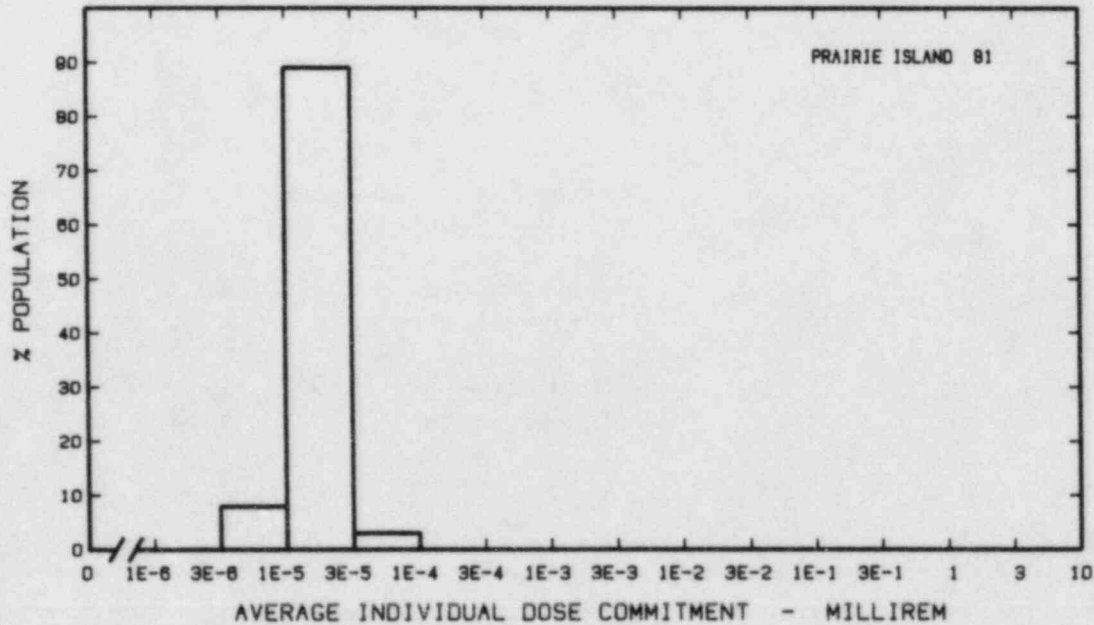
Production/Consumption factors:

Produce: <1

Milk: 1.4

Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: QUAD CITIES

ROCK ISLAND, ILLINOIS

Location: N 41.7261°

W 90.3100°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: 7.2E5

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Davenport-Rock Island-Moline SMSA	380,000	30 km SW
Muscatine	23,000	70 km WSW
Sterling	16,000	52 km E
Dixon	16,000	70 km E
Kewanee	15,000	62 km SSE

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SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production  
Of Crops and Animal Products  
In 80-km Radius Circle

Veg: 1.1E8 kilogram  
Milk: 1.8E8 liter  
Meat: 1.9E8 kilogram

Regional Productivity Factor: 1  
Animal Grazing Factor: 0.5

Meteorology Period of Record: 1 JAN 74 - 31 DEC 75      Recovery: 88%

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SITE SPECIFIC DATA - WATERBORNE PATHWAYS      via      MISSISSIPPI RIVER

Average River Flow  
at Site: 46,000 ft<sup>3</sup>/s

Drinking Water:

Exposed Population: 380,000<sup>(a)</sup>  
Dilution Factor: 1

Fish:

Edible Harvest: 2.1E6<sup>(b)</sup> kg/yr  
Dilution Factor: 0.5<sup>(b)</sup>

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(a) All people in Davenport SMSA assumed to drink river water.

(b) Assumes 1/2 fish harvest caught below plant.

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
**QUAD CITIES 1 AND 2**

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	3.7E-03	3.8E-04	4.0E-03	3.4E-02	4.3E-02
Child	5.6E-01	2.5E-02	2.9E-02	3.1E+00	3.4E+00
Teen	1.0E+00	4.1E-02	9.2E-03	1.8E+00	2.7E+00
Adult	1.1E+01	3.4E-01	6.4E-02	1.0E+01	1.6E+01
TOTAL	1.3E+01	4.1E-01	1.1E-01	1.5E+01	2.2E+01

Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	4.3E-02	4.3E-02	2.2E-01	4.4E-02	4.4E-02	4.4E-02
Child	4.8E-01	4.8E-01	2.2E+00	5.7E-01	4.9E-01	5.0E-01
Teen	3.5E-01	3.5E-01	1.0E+00	3.7E-01	3.5E-01	3.7E-01
Adult	2.1E+00	2.1E+00	4.7E+00	2.2E+00	2.1E+00	2.2E+00
TOTAL	3.0E+00	3.0E+00	8.1E+00	3.2E+00	3.0E+00	3.1E+00

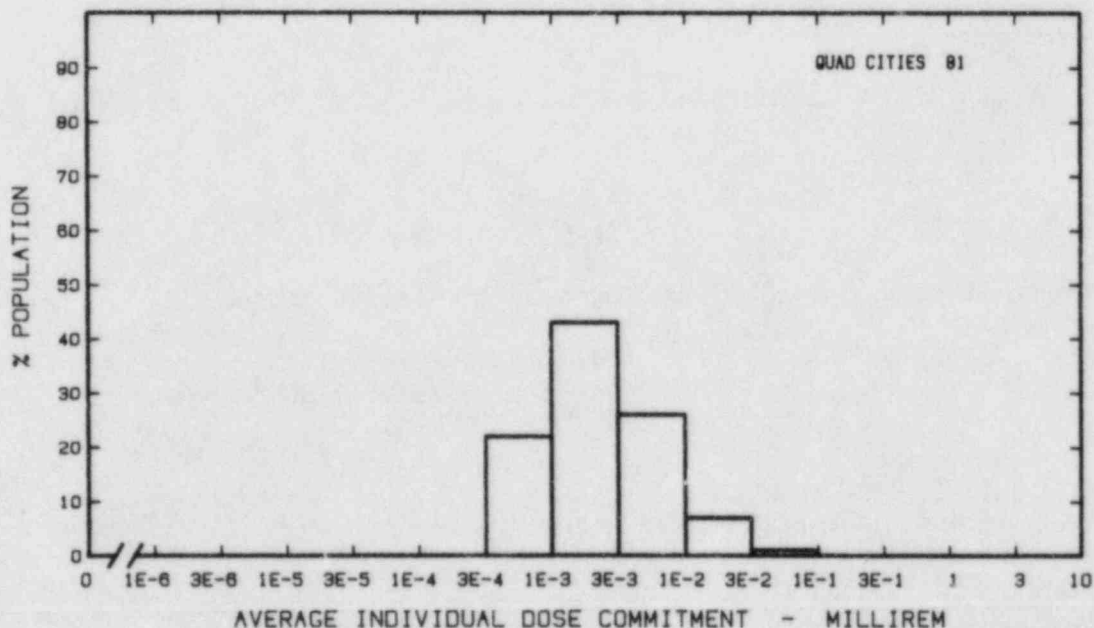
Production/Consumption factors:

Produce: <1

Milk: 1.9

Meat: 3.3

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: RANCHO SECO

SACRAMENTO COUNTY, CALIFORNIA

Location: N 38.3444°

W 121.1200°

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POPULATION DATA

Total Population Within 2-to-80-km Region: 1.8E6

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Sacramento SMSA	1,000,000	42 km NW
Stockton SMSA	350,000	45 km SSW
Modesto SMSA	210,000	79 km S
Antioch	43,000	71 km WSW
Davis	37,000	58 km WNW

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SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production  
Of Crops and Animal Products  
In 80-km Radius Circle

Veg: 4.8E7 kilogram  
Milk: 2.3E8 liter  
Meat: 5.0E7 kilogram

Regional Productivity Factor:  
Animal Grazing Factor:

1  
0.9

Meteorology Period of Record: 1 FEB 75 - 31 JAN 76 Recovery: 98%

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SITE SPECIFIC DATA - WATERBORNE PATHWAYS via COSUMNES & MOKELUMNE RIVERS

Average Dilution Flow  
from Plant: 9.4<sup>(a)</sup> ft<sup>3</sup>/s

Drinking Water:

Exposed Population: None

Fish:

Edible Harvest: (b)  
Dilution Factor: 0.005

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(a) Dilution flow over whole year (Letter from R. J. Rodriguez, Sacramento Municipal Utility District to J. B. Martin, NRC, May 14, 1984).

(b) One percent of population is assumed to obtain fish from river.  
Average individual consumption rate given in FES (1973) used in lieu of catch data.

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
RANCHO SECO

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Child	7.3E-02	8.5E-03	7.3E-03	3.6E-01	4.2E-01
Teen	1.4E-01	1.8E-02	5.3E-03	2.2E-01	3.5E-01
Adult	1.5E+00	1.5E-01	3.5E-02	1.3E+00	2.1E+00
TOTAL	1.7E+00	1.8E-01	4.7E-02	1.8E+00	2.9E+00

Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	1.5E-03	1.5E-03	6.6E-03	5.7E-04	1.5E-03	1.6E-03
Child	1.9E-02	1.9E-02	4.6E-02	6.2E-03	1.9E-02	2.0E-02
Teen	1.2E-02	1.2E-02	2.3E-02	4.4E-03	1.2E-02	1.3E-02
Adult	6.9E-02	6.9E-02	1.0E-01	2.6E-02	6.9E-02	7.2E-02
TOTAL	1.0E-01	1.0E-01	1.8E-01	3.8E-02	1.0E-01	1.1E-01

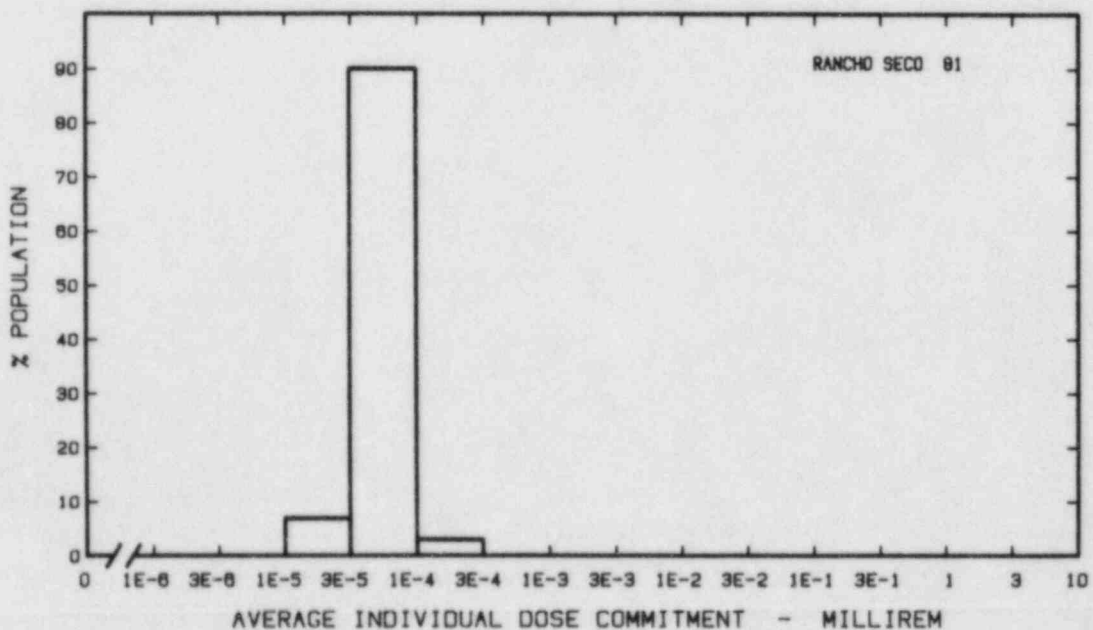
Production/Consumption factors:

Produce: <1

Milk: 1.0

Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: H. B. ROBINSON

HARTSVILLE, SOUTH CAROLINA

Location: N 34.4858°

W 80.1586°

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POPULATION DATA

Total Population Within 2-to-80-km Region: 6.6E5

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Florence	30,000	42 km ESE
Sumter	25,000	56 km SSW
Monroe	13,000	74 km NNW
Lancaster	10,000	66 km WNW

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SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production  
Of Crops and Animal Products  
In 80-km Radius Circle

Veg: 7.4E6 kilogram  
Milk: 5.7E7 liter  
Meat: 5.0E7 kilogram

Regional Productivity Factor:  
Animal Grazing Factor:

1  
0.8

Meteorology Period of Record: 1 JAN 75 - 31 DEC 75 Recovery: 94%

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SITE SPECIFIC DATA - WATERBORNE PATHWAYS via LAKE ROBINSON

Average Dilution Flow  
from Plant: 37 ft<sup>3</sup>/s

Drinking Water:

Exposed Population: None

Fish:

Edible Harvest: 1.8<sup>(a)</sup> kg/yr  
Dilution Factor: 0.02<sup>(b)</sup>

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(a) Average individual consumption rate as given in the FES (1975) used in lieu of catch data.

(b) Ten percent of population consumes fish taken from water diluted by a factor of 0.2 (FES, 1975).

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
H. B. ROBINSON

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Child	8.5E-02	3.5E-02	9.8E-03	4.5E-01	3.3E-01
Teen	1.2E-01	7.0E-02	7.3E-03	3.0E-01	2.7E-01
Adult	1.3E+00	6.0E-01	5.0E-02	1.9E+00	1.6E+00
TOTAL	1.5E+00	7.0E-01	6.7E-02	2.6E+00	2.2E+00

Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	2.7E-04	2.7E-04	2.8E-04	2.4E-04	2.7E-04	2.8E-04
Child	3.1E-03	3.1E-03	3.1E-03	2.7E-03	3.1E-03	3.3E-03
Teen	2.3E-03	2.3E-03	2.3E-03	2.0E-03	2.3E-03	2.5E-03
Adult	1.4E-02	1.4E-02	1.4E-02	1.2E-02	1.4E-02	1.4E-02
TOTAL	1.9E-02	1.9E-02	1.9E-02	1.7E-02	1.9E-02	2.0E-02

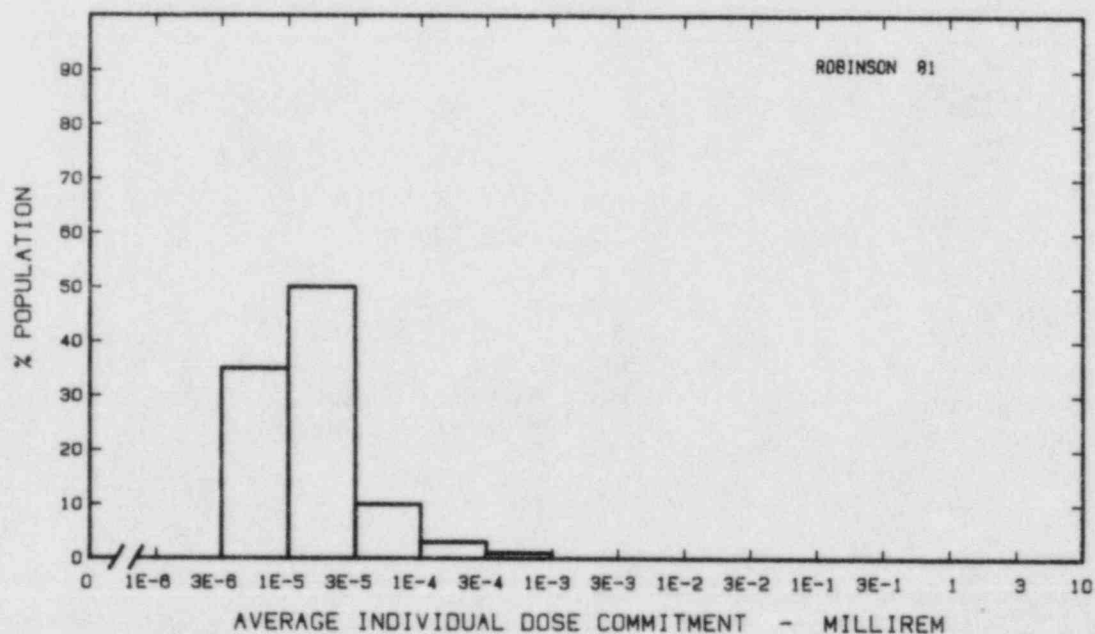
Production/Consumption factors:

Produce: <1

Milk: <1

Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS





Site: ST. LUCIE

FORT PIERCE, FLORIDA

Location: N 27.3486°

W 80.2464°

POPULATION DATA

Total Population Within 2-to-80-km Region: 5.7E5

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
West Palm Beach	63,000	73 km SSE
Ft. Pierce	34,000	14 km NW
Riviera Beach	26,000	65 km SSE
Vero Beach	16,000	36 km NNW
Palm Beach	10,000	72 km SSE

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production  
Of Crops and Animal Products  
In 80-km Radius Circle

Veg: 2.8E7 kilogram  
Milk: 1.1E8 liter  
Meat: 7.2E7 kilogram

Regional Productivity Factor:  
Animal Grazing Factor:

0.5  
1

Meteorology Period of Record: 1 JAN 76 - 31 DEC 76

Recovery: 92%

SITE SPECIFIC DATA - WATERBORNE PATHWAYS via ATLANTIC OCEAN

Average Dilution Flow  
from Plant: 940 ft<sup>3</sup>/s

Fish:

Edible Harvest: 2.6E5 kg/yr  
Dilution Factor: 0.005<sup>(a)</sup>

Invertebrates:

Edible Harvest: 2.7E4 kg/yr  
Dilution Factor: 0.005<sup>(a)</sup>

(a) Dilution factors as given in FES (1973).

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
**SAINT LUCIE**

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Child	5.6E-04	1.5E-03	3.3E-04	3.1E-04	5.9E-04
Teen	4.4E-04	3.1E-03	2.3E-04	1.9E-04	5.2E-04
Adult	3.1E-03	2.7E-02	1.5E-02	1.1E-03	3.2E-03
TOTAL	4.1E-03	3.2E-02	2.1E-03	1.6E-03	4.3E-03

Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	9.5E-03	9.5E-03	3.4E-02	8.7E-03	9.6E-03	1.0E-02
Child	1.1E-01	1.1E-01	2.5E-01	9.6E-02	1.1E-01	1.2E-01
Teen	8.0E-02	8.0E-02	1.4E-01	7.0E-02	8.0E-02	8.9E-02
Adult	4.8E-01	4.8E-01	6.9E-01	4.3E-01	4.8E-01	5.1E-01
TOTAL	6.8E-01	6.8E-01	1.1E+00	6.0E-01	6.8E-01	7.2E-01

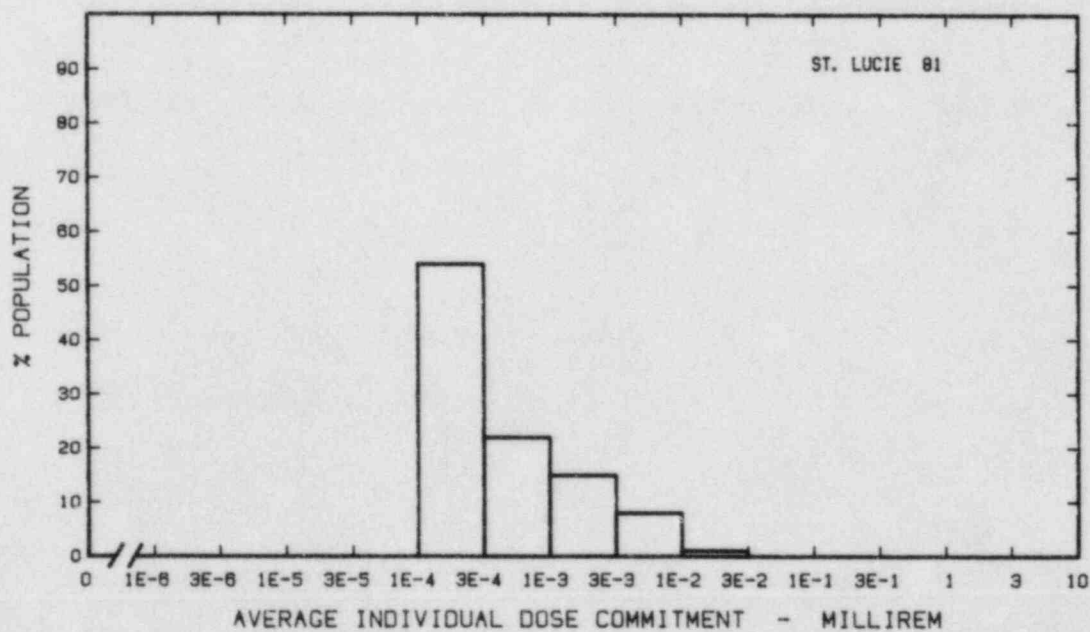
Production/Consumption factors:

Produce: <1

Milk: <1

Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: SALEM

SALEM, NEW JERSEY

Location: N 39.4628° W 75.5358°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: 4.7E6

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Philadelphia SMSA	4,700,000	63 km NNE
Wilmington SMSA	400,000	32 km NNW
Vineland-Millville-Bridgeton SMSA	130,000	48 km E
Chester	46,000	45 km NNE
Norristown	35,000	74 km N

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production  
Of Crops and Animal Products  
In 80-km Radius Circle

Veg: 7.4E7 kilogram  
Milk: 2.7E8 liter  
Meat: 2.4E7 kilogram

Regional Productivity Factor: 0.9  
Animal Grazing Factor: 0.6

Meteorology Period of Record: 1 JUN 70 - 31 MAY 71 Recovery: 95%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS via DELAWARE RIVER ESTUARY

Average River Flow  
at Site: 16,000 ft<sup>3</sup>/s

Fish: Edible Harvest: 3.6E5 kg/yr  
Dilution Factor: 1

Invertebrates: (a) Edible Harvest: 1.6E5 kg/yr  
Dilution Factor: 1

(a) Environment primarily salt water so invertebrates considered in lieu of drinking water.

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
SALEM 1 AND 2

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Child	1.7E-02	5.1E-02	2.1E-02	6.7E-03	1.5E-02
Teen	1.2E-02	1.1E-01	1.5E-02	4.0E-03	1.3E-02
Adult	8.3E-02	9.3E-01	9.9E-02	2.4E-02	8.0E-02
TOTAL	1.1E-01	1.1E+00	1.4E-01	3.4E-02	1.1E-01

Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	1.1E-02	1.1E-02	2.3E-02	1.0E-02	1.1E-02	2.0E-02
Child	1.2E-01	1.3E-01	1.9E-01	1.2E-01	1.2E-01	2.8E-01
Teen	8.7E-02	1.0E-01	1.1E-01	8.4E-02	8.6E-02	2.4E-01
Adult	5.2E-01	6.1E-01	6.1E-01	5.1E-01	5.2E-01	1.1E+00
TOTAL	7.4E-01	8.5E-01	9.4E-01	7.2E-01	7.3E-01	1.7E+00

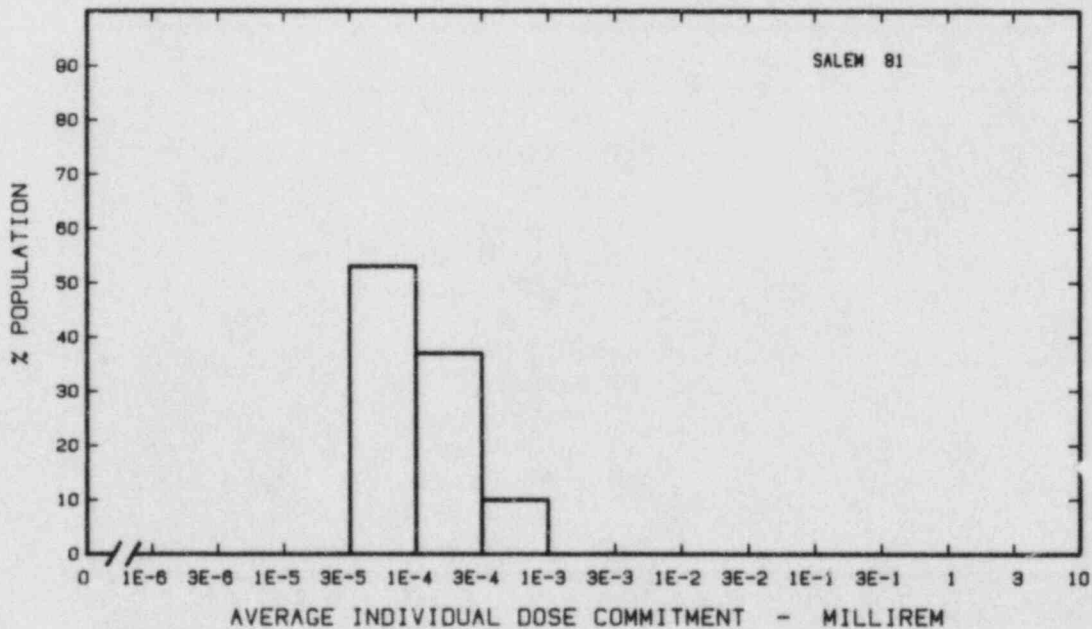
Production/Consumption factors:

Produce: <1

Milk: <1

Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: SAN ONOFRE

CAMP PENDLETON, CALIFORNIA

Location: N 33.3703°

W 117.5569°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: 4.7E6

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
San Diego SMSA	1,900,000	68 km SSE
Anaheim-Santa Ana-Garden Grove SMSA	1,900,000	62 km NW
Long Beach	360,000	75 km NW
Huntington Beach	170,000	61 km NW
Riverside	170,000	68 km N
Pomona	93,000	79 km NNW

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production  
Of Crops and Animal Products  
In 80-km Radius Circle

Veg: 4.8E7 kilogram  
Milk: 2.3E8 liter  
Meat: 5.0E7 kilogram

Regional Productivity Factor:

0.6

Animal Grazing Factor:

1

Meteorology Period of Record: 25 JAN 73 - 24 JAN 76 Recovery: 88%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS via PACIFIC OCEAN

Average Dilution Flow  
from Plant: 110 ft<sup>3</sup>/s

Fish:

Edible Harvest: 2.9E4<sup>(a)</sup>  
Dilution Factor: 1<sup>(a)</sup>

Invertebrates:

Edible Harvest: 2.9E3<sup>(a)</sup> kg/yr  
Dilution Factor: 1<sup>(a)</sup>

(a) Seafood caught in undiluted effluent (FES, 1973).

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
**SAN ONOFRE**

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Child	3.2E-02	1.2E-02	1.0E-03	1.6E-01	1.8E-01
Teen	6.1E-02	2.1E-02	9.2E-04	9.7E-02	1.5E-01
Adult	6.6E-01	1.6E-01	7.4E-03	5.6E-01	9.2E-01
TOTAL	7.5E-01	1.9E-01	9.3E-03	8.2E-01	1.3E+00

Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	5.1E-04	4.8E-04	4.9E-03	6.4E-04	8.1E-04	6.0E-04
Child	6.1E-03	5.8E-03	2.9E-02	6.4E-03	7.9E-03	7.3E-03
Teen	4.6E-03	4.3E-03	1.4E-02	3.9E-03	5.1E-03	5.7E-03
Adult	2.7E-02	2.6E-02	5.6E-02	2.2E-02	2.8E-02	3.0E-02
TOTAL	3.8E-02	3.6E-02	1.0E-01	3.3E-02	4.2E-02	4.4E-02

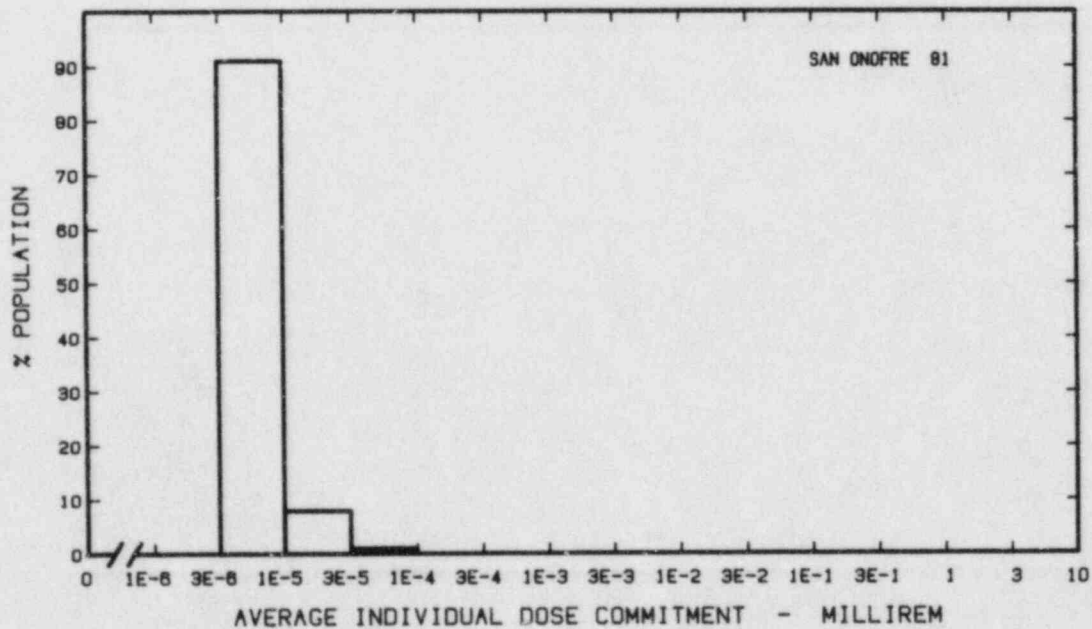
Production/Consumption factors:

Produce: <1

Milk: <1

Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: SEQUOYAH

HAMILTON COUNTY, TENNESSEE

Location: N 35.2233°

W 85.0878°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: 8.3E5

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Chattanooga SMSA	430,000	28 km SW
Cleveland	26,000	21 km SE
East Ridge	21,000	27 km SSW
Dalton	21,000	50 km S
Athens	12,000	53 km ENE

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production Of Crops and Animal Products In 80-km Radius Circle

Veg: 1.1E7 kilogram  
Milk: 1.6E8 liter  
Meat: 1.2E8 kilogram

Regional Productivity Factor: 0.25  
Animal Grazing Factor: 0.7

Meteorology Period of Record: 1 JAN 72 - 31 DEC 75 Recovery: 93%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS via TENNESSEE RIVER

Average River Flow at Site: 35,000 ft<sup>3</sup>/s

Drinking Water: Exposed Population: 430,000  
Dilution Factor: 1

Fish: Edible Harvest: 1.7E5<sup>(a)</sup> kg/yr  
Dilution Factor: 1

(a) Catch data given in FES (1974).

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
SEQUOYAH 1 AND 2

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	2.3E-03	1.5E-03	2.9E-02	5.4E-03	4.0E-03
Child	3.5E-02	2.9E-02	2.1E-01	9.8E-02	6.4E-02
Teen	2.1E-02	2.9E-02	6.5E-02	3.9E-02	3.7E-02
Adult	2.0E-01	2.6E-01	4.6E-01	2.6E-01	2.3E-01
TOTAL	2.6E-01	3.2E-01	7.6E-01	4.0E-01	3.4E-01

Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	5.9E-03	5.9E-03	6.1E-03	5.9E-03	5.9E-03	6.5E-03
Child	6.6E-02	6.6E-02	6.8E-02	6.6E-02	6.6E-02	7.4E-02
Teen	4.8E-02	4.8E-02	4.9E-02	4.8E-02	4.8E-02	5.8E-02
Adult	2.9E-01	2.9E-01	3.0E-01	2.9E-01	2.9E-01	3.2E-01
TOTAL	4.1E-01	4.1E-01	4.2E-01	4.1E-01	4.1E-01	4.6E-01

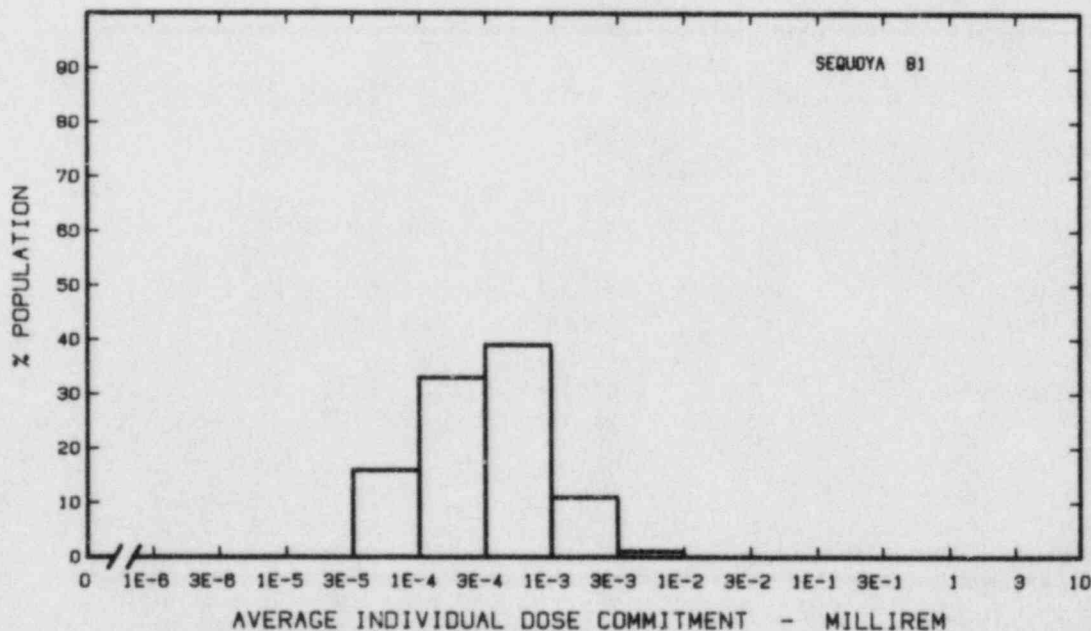
Production/Consumption factors:

Produce: <1

Milk: <1

Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS





Site: SURRY

SURRY COUNTY, VIRGINIA

Location: N 37.1656°

W 76.6983°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: 1.7E6

Major Metropolitan Centers Within Region:

Center	Population	Location
Norfolk-Virginia Beach-Portsmouth SMSA	810,000	50 km SE
Richmond SMSA	630,000	77 km WNW
Newport News-Hampton SMSA	360,000	33 km ESE
Petersburg-Colonial Heights-Hopewell SMSA	130,000	63 km W
Williamsburg	10,000	12 km N

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production  
Of Crops and Animal Products  
In 80-km Radius Circle

Veg: 3.5E7 kilogram  
Milk: 1.5E8 liter  
Meat: 7.4E7 kilogram

Regional Productivity Factor:  
Animal Grazing Factor:

0.8  
0.7

Meteorology Period of Record: 3 MAR 74 - 2 MAR 75

Recovery: 91%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS via JAMES RIVER ESTUARY

Average River Flow  
at Site: 25,000 ft<sup>3</sup>/s (a)

Fish:

Edible Harvest: 6.0E5 kg/yr  
Dilution Factor: 1

Invertebrates: (b)

Edible Harvest: 1.1E6 kg/yr  
Dilution Factor: 1

---

(a) Flow includes fresh water river flow and saline "mixing flow" of estuary (FES, 1972).

(b) Environment primarily salt water so invertebrates considered in lieu of drinking water.

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
SURRY 1 AND 2

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Child	1.1E-01	1.7E-01	8.3E-01	1.3E-01	1.8E-01
Teen	1.1E-01	3.4E-01	5.8E-01	7.2E-02	1.5E-01
Adult	8.9E-01	3.1E+00	3.8E+00	4.4E-01	9.1E-01
TOTAL	1.1E+00	3.6E+00	5.2E+00	6.4E-01	1.2E+00

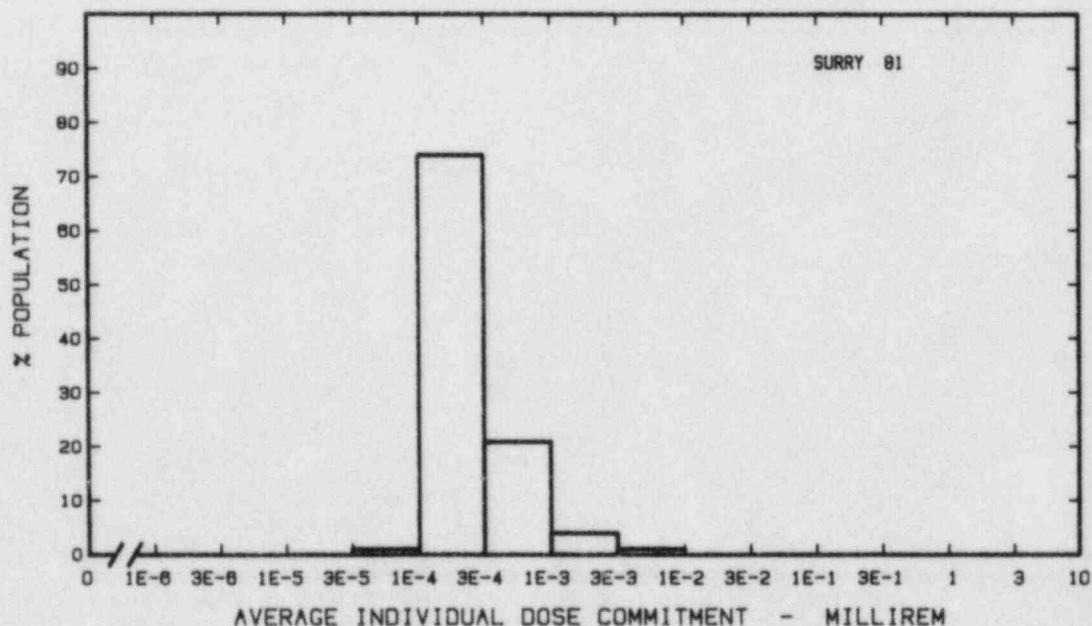
Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	8.5E-03	8.4E-03	3.9E-02	8.1E-03	8.6E-03	9.1E-03
Child	9.6E-02	9.5E-02	2.8E-01	8.9E-02	9.6E-02	1.1E-01
Teen	6.9E-02	6.9E-02	1.5E-01	6.5E-02	7.0E-02	8.3E-02
Adult	4.2E-01	4.2E-01	7.0E-01	3.9E-01	4.2E-01	4.6E-01
TOTAL	5.9E-01	5.9E-01	1.2E+00	5.6E-01	5.9E-01	6.6E-01

Production/Consumption factors:

Produce: <1                      Milk: <1                      Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: THREE MILE ISLAND

THREE MILE ISLAND, PENNSYLVANIA

Location: N 40.1531°

W 76.7250°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: 2.1E6

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Harrisburg SMSA	450,000	18 km NW
York SMSA	380,000	21 km S
Lancaster SMSA	360,000	38 km ESE
Reading SMSA	310,000	71 km ENE
Lebanon	26,000	33 km NE

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production  
Of Crops and Animal Products  
In 80-km Radius Circle

Veg: 5.3E7 kilogram  
Milk: 5.3E8 liter  
Meat: 5.4E7 kilogram

Regional Productivity Factor:  
Animal Grazing Factor:

1  
0.5

Meteorology Period of Record: 1 OCT 72 - 30 SEP 73      Recovery: 80%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS      via      SUSQUEHANNA RIVER

Average River Flow  
at Site: 34,000 ft<sup>3</sup>/s

Drinking Water:

Exposed Population: 230,000  
Dilution Factor: 1

Fish:

Edible Harvest: (a) kg/yr  
Dilution Factor: 0.025<sup>(b)</sup>

(a) No fish catch data given in FES, so generic consumption rates used (Table A-1).

(b) Ten percent of population consumes 25% of their fish from river (FES, 1972).

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
**THREE MILE ISLAND 1 AND 2**

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	1.2E-04	4.8E-05	4.1E-05	7.3E-04	9.3E-04
Child	6.6E-03	7.7E-04	4.6E-04	3.7E-02	3.8E-02
Teen	1.1E-02	6.4E-04	1.8E-04	1.9E-02	2.8E-02
Adult	1.2E-01	5.4E-03	1.5E-03	1.1E-01	1.7E-01
TOTAL	1.3E-01	6.9E-03	2.2E-03	1.7E-01	2.3E-01

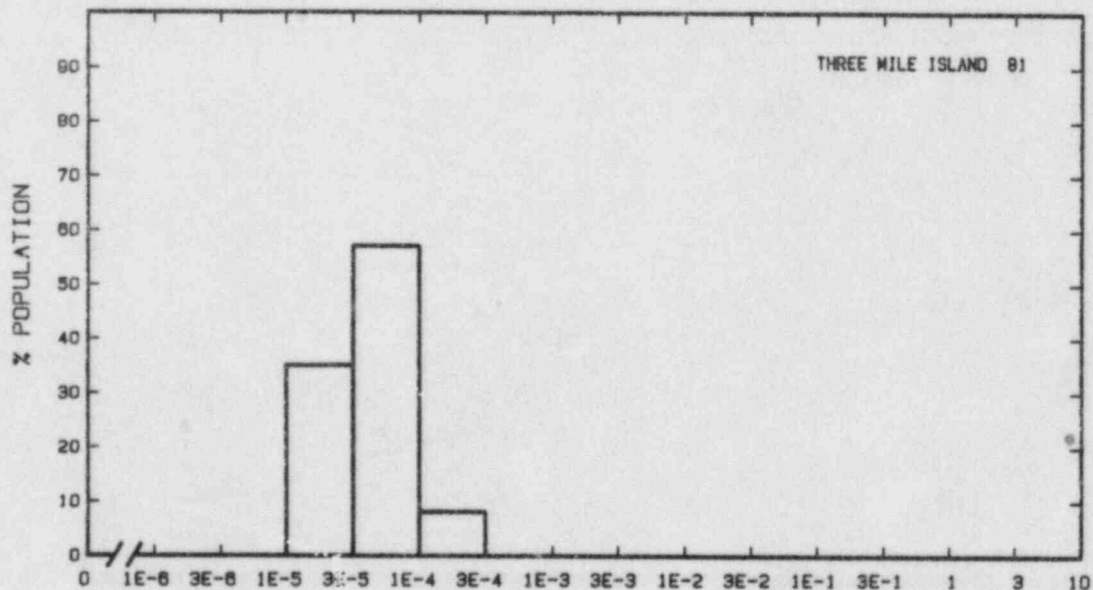
Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	1.4E-03	1.4E-03	1.4E-03	1.4E-04	1.5E-03	1.5E-03
Child	2.0E-02	2.0E-02	2.0E-02	1.7E-03	2.1E-02	2.2E-02
Teen	1.4E-02	1.3E-02	1.3E-02	9.3E-04	1.4E-02	1.5E-02
Adult	7.5E-02	7.4E-02	7.4E-02	4.8E-03	7.5E-02	8.0E-02
TOTAL	1.1E-01	1.1E-01	1.1E-01	7.6E-03	1.1E-01	1.2E-01

Production/Consumption factors:

Produce: <1                      Milk: 2.0                      Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



AVERAGE INDIVIDUAL DOSE COMMITMENT - MILLIREM

Note: Doses include releases from the TMI 2 / Epicore.

Site: TRJAN

PRESCOTT, OREGON

Location: N 46.0408°

W 122.8844°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: **1.4E6**

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Portland SMSA	1,200,000	60 km SSE
Longview	31,000	12 km NNW
Astoria	13,000	72 km WNW
Forest Grove	12,000	58 km SSW
Centralia	11,000	75 km N

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production  
Of Crops and Animal Products  
In 80-km Radius Circle

Veg: **6.4E7** kilogram  
Milk: **3.7E7** liter  
Meat: **2.6E7** kilogram

Regional Productivity Factor:  
Animal Grazing Factor:

**0.9**  
**0.75**

Meteorology Period of Record: **1 SEP 71 - 31 AUG 74** Recovery: **90%**

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS via COLUMBIA RIVER

Average River Flow  
at Site: **2.3E5** ft<sup>3</sup>/s

Drinking Water:

Exposed Population: **530<sup>(a)</sup>**  
Dilution Factor: 1

Fish:

Edible Harvest: **1.0E6** kg/yr  
Dilution Factor: 1

(a) Population of Rainier divided by 4, since residents only there for 25% of the year.

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
TROJAN

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	3.7E-07	3.1E-07	4.9E-06	8.6E-07	8.7E-07
Child	5.6E-03	2.9E-03	8.2E-04	2.6E-02	3.1E-02
Teen	1.1E-02	6.0E-03	5.8E-04	1.6E-02	2.6E-02
Adult	1.2E-01	5.2E-02	3.8E-03	9.2E-02	1.6E-01
TOTAL	1.3E-01	6.0E-02	5.2E-03	1.3E-01	2.1E-01

Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	8.1E-04	8.0E-04	9.0E-03	6.9E-04	8.3E-04	8.6E-04
Child	1.1E-02	1.0E-02	9.2E-02	8.1E-03	1.1E-02	1.1E-02
Teen	7.7E-03	7.6E-03	4.6E-02	5.7E-03	7.7E-03	8.6E-03
Adult	4.6E-02	4.6E-02	2.0E-01	3.4E-02	4.6E-02	4.9E-02
TOTAL	6.5E-02	6.4E-02	3.5E-01	4.8E-02	6.5E-02	6.9E-02

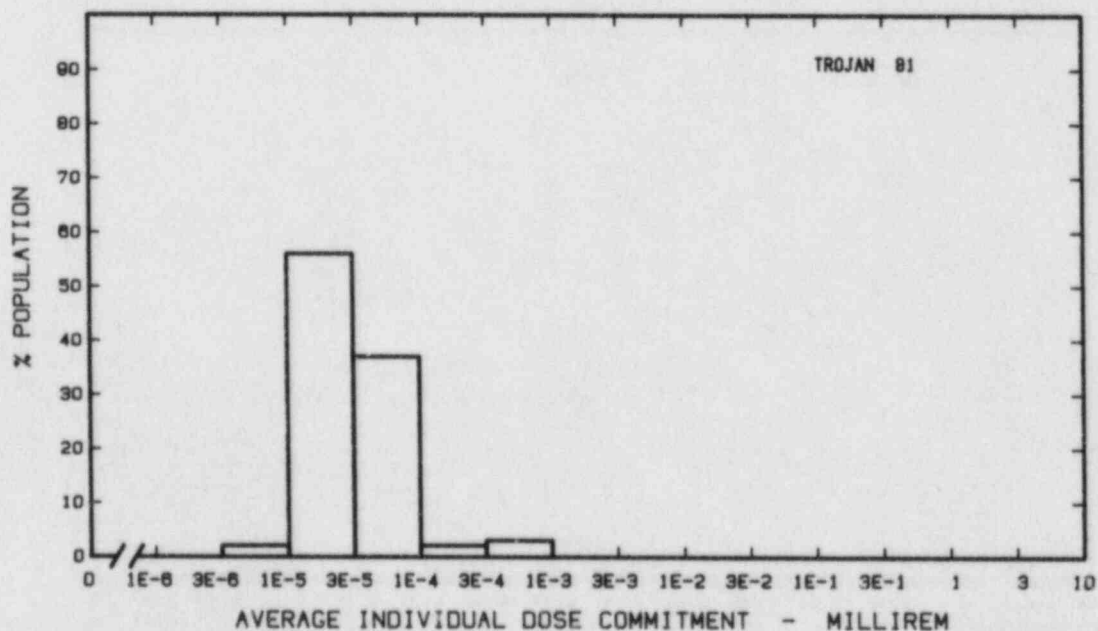
Production/Consumption factors:

Produce: <1

Milk: <1

Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: TURKEY POINT

DADE COUNTY, FLORIDA

Location: N 25.4350°

W 80.3314°

---

POPULATION DATA

Total Population Within 2-to-80-km Region: 2.4E6

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Miami SMSA	1,600,000	41 km NNE
Fort Lauderdale-Hollywood SMSA	1,000,000	79 km NNE
Homestead	21,000	16 km W
Upper Keys Division	15,000	42 km S

---

SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production  
Of Crops and Animal Products  
In 80-km Radius Circle

Veg: 2.8E7 kilogram  
Milk: 1.1E8 liter  
Meat: 7.2E7 kilogram

Regional Productivity Factor:  
Animal Grazing Factor:

0.4  
1

Meteorology Period of Record: 1 JAN 73 - 31 DEC 73      Recovery: 98%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS      via      BISCAYNE BAY

Average Dilution Flow  
from Plant: 2,600 ft<sup>3</sup>/s

Fish:

Edible Harvest: (a)  
Dilution Factor: 0.001

Invertebrates:

Edible Harvest: (a)  
Dilution Factor: 0.002

---

(a) No catch data given in DES (1972), so generic consumption rates used (Table A-1).

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
TURKEY POINT 3 AND 4

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Child	3.6E-04	1.2E-03	4.7E-04	4.5E-04	6.5E-04
Teen	3.4E-04	2.5E-03	3.4E-04	2.7E-04	5.6E-04
Adult	2.7E-03	2.2E-02	2.2E-03	1.6E-03	3.4E-03
TOTAL	3.4E-03	2.5E-02	3.0E-03	2.3E-03	4.6E-03

Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	9.9E-04	9.7E-04	1.5E-02	1.0E-03	1.0E-03	1.1E-03
Child	1.1E-02	1.1E-02	9.0E-02	1.1E-02	1.1E-02	1.2E-02
Teen	7.9E-03	7.9E-03	3.9E-02	8.0E-03	8.0E-03	9.4E-02
Adult	4.8E-02	4.8E-02	1.5E-01	4.8E-02	4.8E-02	5.3E-02
TOTAL	6.8E-02	6.8E-02	3.0E-01	6.8E-02	6.8E-02	7.5E-02

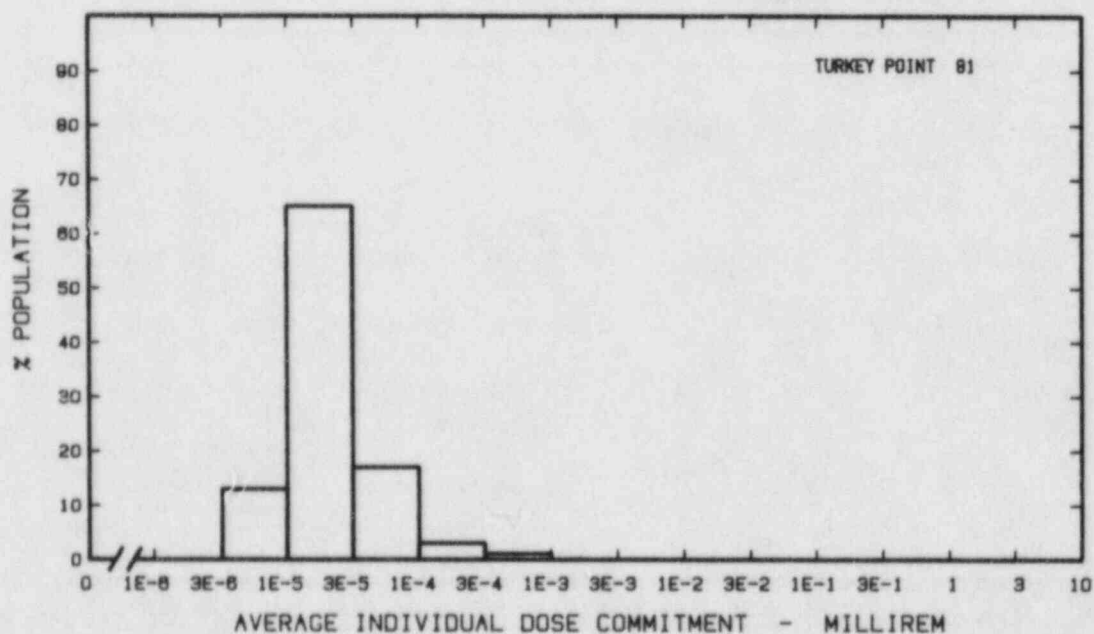
Production/Consumption factors:

Produce: <1

Milk: <1

Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS





Site: VERMONT YANKEE

VERNON, VERMONT

Location: N 42.7803°

W 72.5158°

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POPULATION DATA

Total Population Within 2-to-80-km Region: 1.3E6

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Springfield-Chicopee-Holyoke SMSA	530,000	70 km S
Worcester SMSA (1/2)	140,000	80 km SE
Pittsfield	91,000	71 km SW
Fitchburg	40,000	63 km ESE
Leominster	35,000	68 km ESE
Keene	21,000	26 km NW

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SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production  
Of Crops and Animal Products  
In 80-km Radius Circle

Veg: 4.4E6 kilogram  
Milk: 7.3E8 liter  
Meat: 2.7E7 kilogram

Regional Productivity Factor:  
Animal Grazing Factor:

1  
0.4

Meteorology Period of Record: 1 APR 75 - 31 MAR 76 Recovery: 97%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS via CONNECTICUT RIVER at VERNON POND

Average River Flow  
at Site: 10,000 ft<sup>3</sup>/s

Drinking Water:

Exposed Population: None

Fish:

Edible Harvest: (a)  
Dilution Factor: 0.5<sup>(a)</sup>

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(a) No fish catch data given in FES (1972), thus 1/2 population assumed to eat fish at level of generic consumption rates (Table A-1).

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
**VERMONT YANKEE**

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Child	2.1E-02	1.0E-03	1.8E-06	1.1E-01	1.2E-01
Teen	3.9E-02	2.1E-03	1.6E-06	6.8E-02	1.0E-01
Adult	4.3E-01	1.8E-02	1.3E-05	3.9E-01	6.1E-01
TOTAL	4.9E-01	2.1E-02	1.6E-05	5.7E-01	8.4E-01

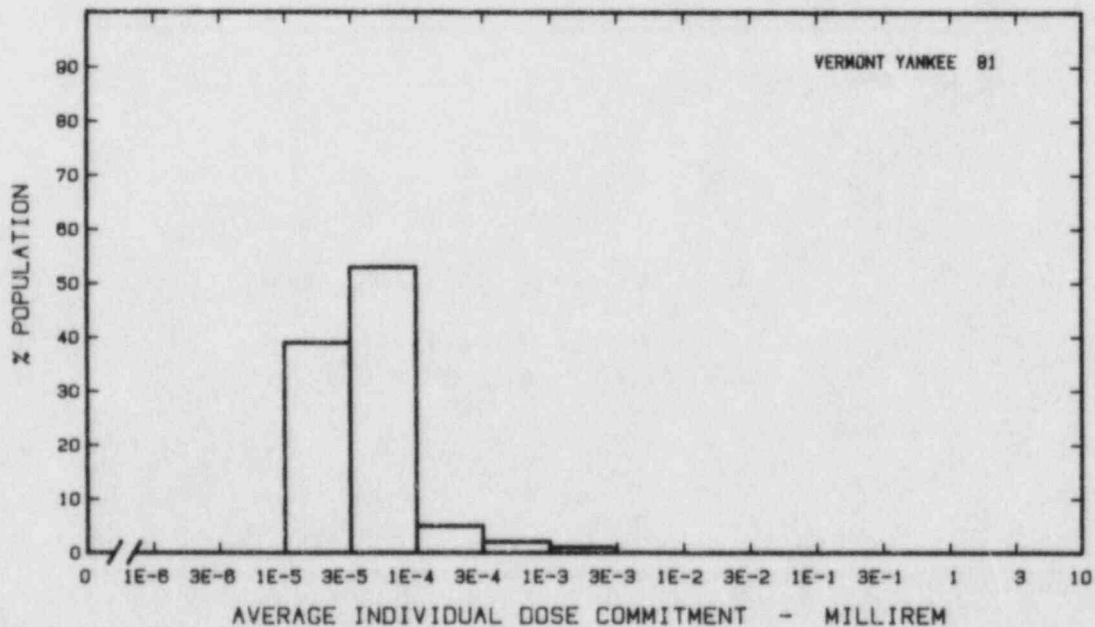
Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	1.6E-03	1.6E-03	2.6E-03	1.2E-03	1.6E-03	1.7E-03
Child	1.8E-02	1.7E-02	2.5E-02	1.4E-02	1.8E-02	2.0E-02
Teen	1.3E-02	1.3E-02	1.6E-02	9.7E-03	1.3E-02	1.5E-02
Adult	7.4E-02	7.4E-02	8.9E-02	5.9E-02	7.4E-02	8.2E-02
TOTAL	1.1E-01	1.1E-01	1.3E-01	8.3E-02	1.1E-01	1.2E-01

Production/Consumption factors:

Produce: <1                      Milk: 4.2                      Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: YANKEE ROWE

ROWE, MASSACHUSETTS

Location: N 42.7281°

W 72.9289°

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POPULATION DATA

Total Population Within 2-to-80-km Region: 1.6E6

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Springfield-Chicopee-Holyoke SMSA	530,000	74 km SSE
Albany	100,000	68 km W
Pittsfield SMSA	91,000	41 km SW
Troy	57,000	62 km W
Amherst	18,000	51 km SE

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SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production  
Of Crops and Animal Products  
In 80-km Radius Circle

Veg: 2.0E7 kilogram  
Milk: 2.6E8 liter  
Meat: 1.6E7 kilogram

Regional Productivity Factor:  
Animal Grazing Factor:

1  
0.5

Meteorology Period of Record: 1 OCT 71 - 30 SEP 72      Recovery: 94%

---

SITE SPECIFIC DATA - WATERBORNE PATHWAYS      via      DEERFIELD RIVER

Average River Flow  
at Site: 570 ft<sup>3</sup>/s

Drinking Water:

Exposed Population: None

Fish:

Edible Harvest: (a)  
Dilution Factor: 0.025<sup>(b)</sup>

(a) No catch data available, so generic consumption rates used (Table A-1).

(b) Ten percent of population obtain 25% of their fish from river.

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
YANKEE ROWE

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Child	1.4E-02	2.7E-03	6.5E-03	6.8E-02	6.9E-02
Teen	2.4E-02	2.6E-03	4.5E-03	4.1E-02	5.8E-02
Adult	2.5E-01	1.9E-02	2.9E-02	2.4E-01	3.5E-01
TOTAL	2.9E-01	2.5E-02	4.0E-02	3.4E-01	4.7E-01

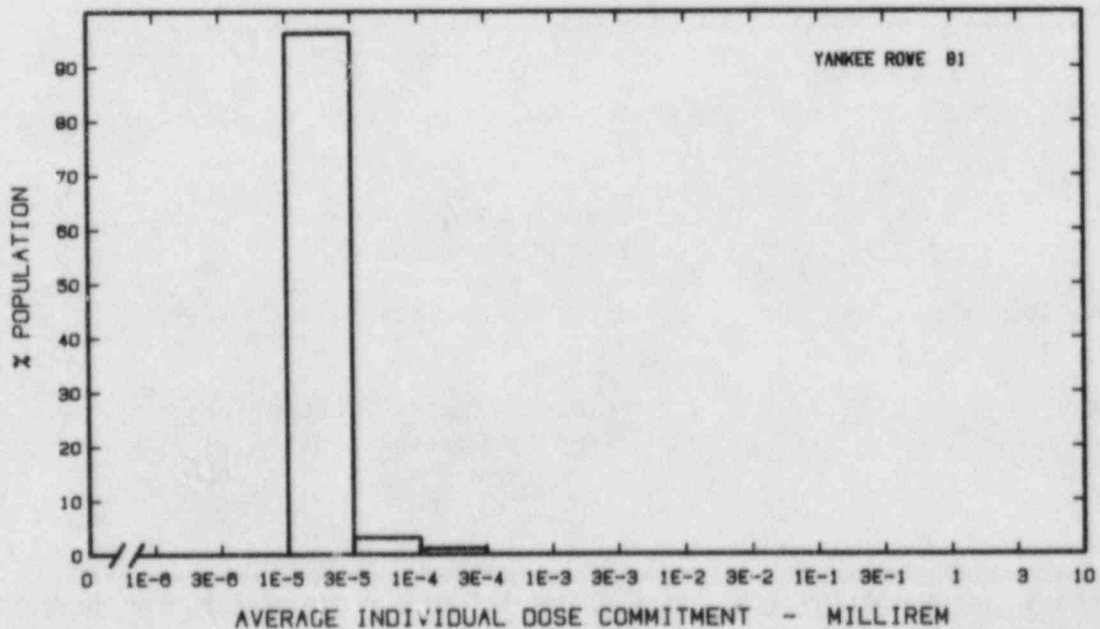
Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	4.3E-04	4.3E-04	4.9E-04	1.8E-03	4.4E-04	4.4E-04
Child	3.2E-03	3.2E-03	3.4E-03	1.2E-02	3.2E-03	3.2E-03
Teen	1.3E-03	1.3E-03	1.4E-03	4.0E-03	1.3E-03	1.3E-03
Adult	5.3E-03	5.3E-03	5.7E-03	1.3E-02	5.3E-03	5.5E-03
TOTAL	1.0E-02	1.0E-02	1.1E-02	3.1E-02	1.0E-02	1.1E-02

Production/Consumption factors:

Produce: <1                      Milk: 1.2                      Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



Site: ZION

ZION, ILLINOIS

Location: N 42.4456°

W 87.8022°

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POPULATION DATA

Total Population Within 2-to-80-km Region: 7.1E6

Major Metropolitan Centers Within Region:

<u>Center</u>	<u>Population</u>	<u>Location</u>
Chicago SMSA (2/3)	4,700,000	66 km S
Milwaukee SMSA	1,400,000	65 km N
Racine SMSA	170,000	30 km N
Kenosha SMSA	120,000	14 km N
Waukesha	50,000	71 km NNW

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SITE SPECIFIC DATA - AIRBORNE PATHWAYS

Average Annual State Production Of Crops and Animal Products In 80-km Radius Circle	Veg: 1.1E8 kilogram Milk: 1.8E8 liter Meat: 1.9E8 kilogram
Regional Productivity Factor:	0.5
Animal Grazing Factor:	0.5
Meteorology Period of Record: 1 JAN 74 - 31 DEC 75	Recovery: 88%

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SITE SPECIFIC DATA - WATERBORNE PATHWAYS via LAKE MICHIGAN

	Average Dilution Flow from Plant: 1700 ft <sup>3</sup> /s
Drinking Water:	Exposed Population: 6,800,000 Dilution Factor: 0.037 <sup>(a)</sup>
Fish:	Edible Harvest: 5.0E6 kg/yr Dilution Factor: 0.01 <sup>(b)</sup>

(a) Drinking water dilution factor estimated by averaging dilution factors derived from FES (1972) suitably weighted for population.

(b) Dilution factor derived from FES (1972).

POPULATION DOSE-COMMITMENT ESTIMATES AND  
AVERAGE INDIVIDUAL DOSE-COMMITMENT HISTOGRAM FOR  
ZION 1 AND 2

Dose Commitments (person-rem) from Liquid Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>
Infant	1.3E-02	1.5E-02	9.4E-01	1.6E-02	2.5E-02
Child	1.6E-01	3.2E-01	6.6E+00	2.4E-01	3.0E-01
Teen	8.8E-02	3.2E-01	2.0E+00	8.8E-02	1.5E-01
Adult	8.0E-01	2.9E+00	1.4E+01	5.3E-01	9.4E-01
TOTAL	1.1E+00	3.6E+00	2.4E+01	8.7E-01	1.4E+00

Dose Commitments (person-rem) from Airborne Pathways

	<u>Total Body</u>	<u>GI-LLI</u>	<u>Thyroid</u>	<u>Bone</u>	<u>Liver</u>	<u>Lung</u>
Infant	9.0E-03	9.0E-03	1.1E-02	9.0E-03	9.0E-03	9.6E-03
Child	1.0E-01	1.0E-01	1.2E-01	1.0E-01	1.0E-01	1.1E-01
Teen	7.3E-02	7.3E-02	8.2E-02	7.3E-02	7.3E-02	8.5E-02
Adult	4.4E-01	4.4E-01	4.8E-01	4.4E-01	4.4E-01	4.8E-01
TOTAL	6.2E-01	6.2E-01	7.0E-01	6.3E-01	6.2E-01	6.9E-01

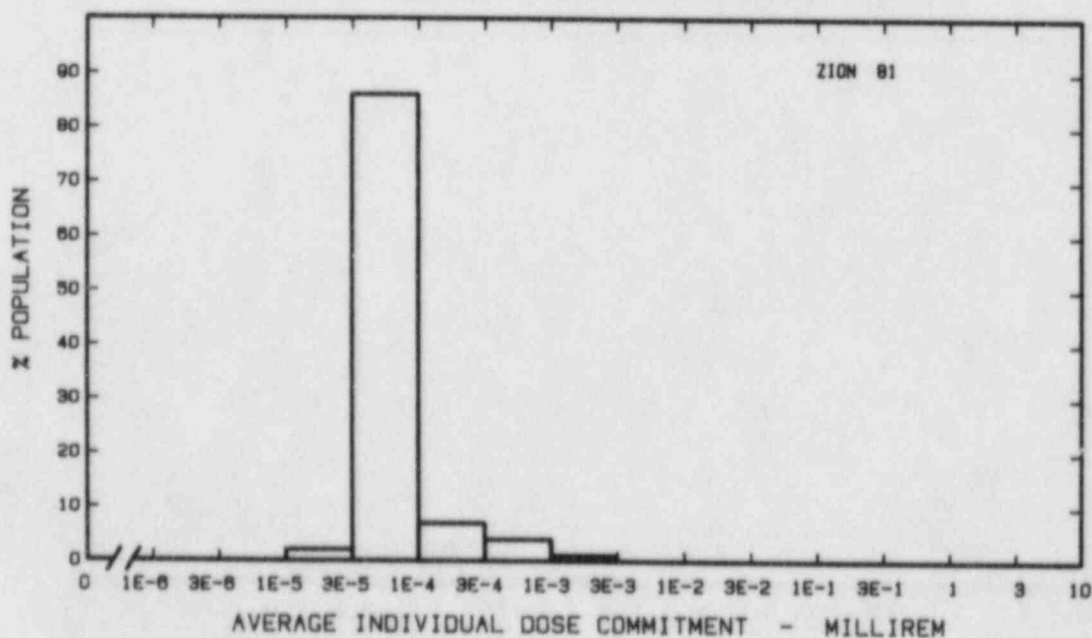
Production/Consumption factors:

Produce: <1

Milk: <1

Meat: <1

FRACTION OF POPULATION RECEIVING AN AVERAGE INDIVIDUAL  
TOTAL-BODY DOSE COMMITMENT FROM AIRBORNE PATHWAYS



## REFERENCES

Final Environmental Statement Concerning Proposed Rule-Making Action: Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion "As Low As Practicable" for Radioactive Material in Light-Water-Cooled Nuclear Power Reactor Effluents. 1973. WASH-1258, Vol. 1, Directorate of Regulatory Standards, U.S. Atomic Energy Commission, Washington, D.C.

Tichler, J., and C. Benkovitz. 1984. Radioactive Materials Released from Nuclear Power Plants, Annual Report 1981. NUREG/CR-2907, BNL-NUREG-51581, Vol. 2, U.S. Nuclear Regulatory Commission, Washington, D.C.\*

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\*Available for purchase from the NRC/GPO Sales Program, U.S. Nuclear Regulatory Commission, Washington, DC 20555, and the National Technical Information Service, Springfield, VA 22161.

APPENDIX

MODELS AND GENERIC PARAMETERS

The calculational models used were primarily those given in the Nuclear Regulatory Commission's Regulatory Guide 1.109 (1977). Computer programs were written to use these models to generate population dose commitments for four age groups. The percentages of the population comprising the four age groups were 1.44%, infant; 16.0%, child; 11.7%, teenager; and 70.9%, adult (Population Estimates and Projections, 1975). Where possible, the site-dependent parameters were taken from the environmental statements issued for each reactor (Table 3). The generic parameters used for this study such as consumption rates, occupancy factors and holdup times are given in Table A-1 and A-2 below. It should be noted that generic consumption rates for aquatic foods and inhalation rates are taken from Regulatory Guide 1.109 (1977). Bioaccumulation factors and terrestrial food transfer factors were taken from Regulatory Guide 1.109 (1977). Dose commitment factors for the four age groups were taken from Hoenes and Soldat (1977).

TABLE A-1. Generic Consumption Rates and Occupancy Factors Used for the Study of Average Members of the Population<sup>(a)</sup>

<u>Pathway</u>	<u>Infant</u>	<u>Child</u>	<u>Teenager</u>	<u>Adult</u>
Fruits, vegetables and grain (kg/yr)	0	200	240	190
Milk (L/yr)	170	170	200	110
Meat and poultry (kg/yr)	0	37	59	95
Fish (kg/yr) <sup>(b)</sup>	0	2.2	5.2	6.9
Invertebrates (kg/yr)	0	0.33	0.75	1.0
Drinking water (L/yr)	170 <sup>(c)</sup>	260	260	370
Inhalation (m <sup>3</sup> /yr)	1400 <sup>(d)</sup>	3700	8000	8000
Air submersion and ground irradiation occupancy factor	0.5	0.5	0.5	0.5

(a) Regulatory Guide 1.109 (1977)

(b) Both fresh and salt water

(c) Assumed to be equal to milk consumption

(d) Same as for maximum individual



TABLE A-2. Holdup Times Between Harvest and Consumption of Foods<sup>(a)</sup>

<u>Food</u>	<u>Holdup Time (days)</u>
Fruits, grains and vegetables	14
Milk <sup>(b)</sup>	4
Meat <sup>(b)</sup>	20
Aquatic foods (fish and invertebrates)	7
Drinking Water	1

(a) Regulatory Guide 1.109 (1977)

(b) Value given is time after milking or slaughter. For the portion of the time animals were fed stored feed, an additional 90 days was added to the holdup time.

#### SOURCE TERMS

The doses were estimated using the measured releases as reported by the site operators for 1981 (Tichler and Benkovitz, 1984).<sup>(a)</sup> These releases include all radionuclides specified by the NRC to be measured and reported by the operators of all commercial nuclear power plants. Radionuclides given as a combination of parent-daughter isotopes such as Y/Sr-90, Zr/Nb-95, Ba/La-140, I/Xe-133 and Pr/Ce-144 were divided evenly between the parent and daughter.

The radionuclides used in this study, along with their half-lives, are given in Table A-3. Note that the "+D" after some of the nuclides indicates that the decay energy of the daughter is included with the parent. Thus, whenever a parent nuclide release is specified, the result of the dose calculation will be as though an additional equilibrium amount of the daughter nuclide is specified. The daughter nuclide itself will be included separately if it can be released independently of the parent and/or if it has a relatively long half-life.

#### METEOROLOGY

When more than one set of meteorological (joint frequency) data were available for a site, the one which appeared to be the most reliable was used to generate atmospheric transport factors. Factors were calculated for 16 compass points, and ten radii from 2 to 80 km (see Table A-4) using the NRC computer program XQQDOQ (Sagendorf 1977).

(a) Very short-lived isotopes such as Kr-90, 91, 93, 94, Xe-139, 140, 141, 143 and Rb-88M; those not likely to be produced; and those which were daughters whose decay energies were accounted for in the dose factor for the parent were not included in the dose.

TABLE A-3. Radionuclides Considered in This Study

No.	Nuclide	Decay Constant (1/sec)	No.	Nuclide	Decay Constant (1/sec)
1	H-3	1.78E-09	43	Nb-97	1.57E-04
2	Be-10	1.37E-14	44	Mo-99+D	2.92E-06
3	C-14	3.83E-12	45	Tc-99M	3.19E-05
4	N-13	1.16E-03	46	Ru-103+D	2.02E-07
5	F-18	1.05E-04	47	Ru-106+D	2.17E-08
6	Na-22	8.44E-09	48	Ag-110M+D	3.19E-08
7	Na-24	1.28E-05	49	Cd-115M	1.80E-07
8	Ar-41	1.05E-04	50	Cd-115	3.60E-06
9	Sc-46	9.58E-08	51	Sn-125+D	8.31E-07
10	Cr-51	2.89E-07	52	Sb-124	1.33E-07
11	Mn-54	2.57E-08	53	Sb-125+D	8.06E-09
12	Mn-56	7.47E-05	54	Te-132+D	2.47E-06
13	Fe-55	8.14E-09	55	Te-133M+D	2.09E-04
14	Fe-59	1.80E-07	56	I-131+D	9.97E-07
15	Co-57	2.97E-08	57	I-132	8.42E-05
16	Co-58	1.12E-07	58	I-133+D	9.25E-06
17	Co-60	4.17E-09	59	I-134	2.20E-04
18	Ni-57	5.35E-06	60	I-135+D	2.92E-05
19	Ni-63	2.20E-10	61	Xe-131M	6.69E-07
20	Ni-65	7.64E-05	62	Xe-133M	3.61E-06
21	Cu-64	1.52E-05	63	Xe-133	1.52E-06
22	Zn-65	3.31E-08	64	Xe-135M	7.56E-04
23	Zn-69M+D	1.39E-05	65	Xe-135	2.10E-05
24	As-76	7.32E-06	66	Xe-137	3.01E-03
25	Br-82	5.44E-06	67	Xe-138+D	8.14E-04
26	Kr-83M	1.04E-04	68	Cs-134	1.07E-08
27	Kr-85M	4.31E-05	69	Cs-136	6.17E-07
28	Kr-85	2.05E-09	70	Cs-137+D	7.31E-10
29	Kr-87	1.52E-04	71	Cs-138	3.58E-04
30	Kr-88+D	6.89E-05	72	Cs-139+D	1.24E-03
31	Kr-89	3.64E-03	73	Ba-139	1.39E-04
32	Rb-88	6.53E-04	74	Ba-140+D	6.28E-07
33	Rb-89+D	7.61E-04	75	La-140	4.78E-06
34	Sr-89+D	1.59E-07	76	La-141	4.97E-05
35	Sr-90+D	7.58E-10	77	Ce-141	2.47E-07
36	Sr-91+D	2.03E-05	78	Ce-144+D	2.83E-08
37	Sr-92+D	7.11E-05	79	Eu-152	1.69E-09
38	Y-90	3.01E-06	80	Eu-154	2.55E-09
39	Y-91M+D	2.32E-04	81	W-187	8.06E-06
40	Zr-95+D	1.22E-07	82	Th-232+D	1.57E-18
41	Zr-97+D	1.14E-05	83	Np-239	3.42E-06
42	Nb-95	2.29E-07			

TABLE A-4. Radius Intervals and Midpoints for Airborne Dose Calculations (km)

<u>Interval</u>	<u>Midpoint</u>
2 - 3	2.5
3 - 4	3.5
4 - 6	5
6 - 9	7.5
9 - 14	11.5
14 - 20	17
20 - 30	25
30 - 40	35
40 - 60	50
60 - 80	70

The XQQDQQ program generates four sets of atmospheric transport factors:

- average annual atmospheric dilution factors which are not corrected for cloud depletion or radioactive decay
- dilution factors which are only corrected for decay assuming a 2.26-day half-life
- dilution factors which are corrected for depletion and for decay assuming an 8-day half-life
- relative deposition per unit area.

These factors were used to estimate the dose from airborne releases using methods similar to the NRC GASPAR program (Eckerman et al. 1980). The transport factors used this year were the same as those used for the previous estimates. The assumptions used in the calculation of these transport factors were as follows:

- 50-m source height with no correction for plume rise or building wake effects
- semi-infinite cloud model with sector-average, Gaussian-plume dispersion
- no correction for terrain height variation.

Since information about height and locations at each site for the releases given in Tichler and Benkovitz, (1984) was unavailable, a single generic height of 50 m was used at each site for the release point. Because the heights and locations of releases are uncertain, estimates of dose to persons living within 2 km of the site could be in serious error;

only persons living between 2 to 80 km from the site were included in the dose estimates.

#### POPULATION

The population distribution within 2 to 80 km around each site was determined from information supplied by the NRC from an updated reduction of 1980 census data (Sinisgalli, 1982). Also the NRC supplied updated estimates of the number of people residing in major metropolitan centers within the 80-km region around each site (Brauner, 1982).

#### FOOD PRODUCTION VERSUS FOOD CONSUMPTION

The total food production for the region within 80 km around each site was the product of the NRC state-wide productivity figure for each state and a site productivity factor. At some sites this total production may be more or less than the total consumption; i.e., population times average individual consumption (see Table A-1 for generic consumption rates). When production was more than consumption for a site, it was assumed that all persons in the 2-to-80-km region ate contaminated food; when production was less than consumption, it was assumed that dilution would occur because uncontaminated food would be shipped into the area from outside. Thus, the calculated doses for a particular food type were reduced in proportion to the ratio of production  $\div$  consumption (production/consumption < 1).

The dose to persons outside the 80-km limit from food shipped out of the region, in the case of production being greater than consumption, is not included in this report because it is concerned only with the dose within the 80-km radius. These production/consumption factors are given as footnotes to the tables showing airborne dose commitment in the Site Summary Section for reference.

#### DRINKING WATER

The population between 2 and 80 km of each plant site exposed to drinking water contaminated with released radionuclides was generally obtained from the environmental statement (ES) for the plant. For all sites located on salt water, it was assumed that no dose was received from drinking water. The consumption rates used are given in Table A-1 for drinking water.

The radionuclide concentration in the drinking water consumed by a population downstream from a site was usually estimated assuming 100% mixing of the plant effluent with the river. For lakes, an overall dilution factor was estimated from dilution factors given in the ES for each population center along the shore (within 80 km) that consume the contaminated lake water. These individual factors were weighted by population and averaged to obtain an effective dilution factor for the total population exposed to contaminated drinking water.

### AQUATIC FOOD

Wherever possible, the fish-catch data from the plant ES were used to estimate aquatic food consumption rates for the population living within the region. When these data were not found in the ES or were considered unrealistic, the generic values of Table A-1 were used.

The average radionuclide concentration of the waters in which this food was harvested was estimated assuming an additional dilution over the effluent flow from the reactor. For rivers, it was assumed that the fish were caught in waters in which the plant effluent was completely diluted. For lakes, an additional factor as given in the ES was used; when none was given in the ES, a generic value of 0.01 was used. For ocean and bay sites, a generic value of 0.001 and 0.002 was used for fish and invertebrates, respectively, if the ES yielded no values for these parameters. Invertebrates were not assumed to be caught in sufficient quantity at freshwater sites (river and lake) to affect the population dose and therefore were not included in the dose calculation. Any exceptions to these general guidelines are explained in the footnotes to the individual site summaries.

### TECHNICAL NOTES

The calculations leading to the dose estimates contained in this report were generated from recent versions of computer programs originally documented in Baker, et. al (1977). The revised programs were written in BASICA and run on an IBM PC microcomputer operating under the PC-DOS operating system. The text and tables of the report were typed on an NEC 7710 printer in Letter Gothic-12 font. The bar charts were all made using an HP 7470A plotter.

## APPENDIX REFERENCES

- Baker, D. A., J. K. Soldat and E. C. Watson. 1977. Population-Dose Commitments Due to Radioactive Releases from Nuclear Power Plant Sites in 1975. PNL-2439, Pacific Northwest Laboratory, Richland, Washington.\*
- Brauner, A. 1982. Population Estimates, Nuclear Power Plant Nearby Population Concentrations, U. S. Nuclear Regulatory Commission, Washington, D.C.
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