

Offsite Dose Calculation Manual
For Arkansas Nuclear One
(Draft)

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1.0 Introduction

The Off-site Dose Calculation Manual (ODCM) provides guidance for making release rate and dose calculations for radioactive liquid and gaseous effluents from Arkansas Nuclear One-Units 1 and 2. The methodology is drawn from NuReg 0133, Rev. 0. Many of the numbers contained within this manual were taken from NuReg 0133 and Reg. Guide 1.109. These numbers and the calculational method may be changed as provided for in the technical specification (for ex. use site-specific data or more accurate calculational methodology found in Reg. Guide 1.109). Site-specific numbers will be indicated as such.

A specification for a given item will have a different specification number for each unit, therefore, in the ODCM references to technical specifications will be made to the specification subjects. The specification subjects and numbers are presented below.

<u>Subject</u>	<u>Specification Number</u>	
	<u>ANO-1</u>	<u>ANO-2</u>
Radioactive Gaseous Effluents - Instrumentation	3.5.7	3.3.3.9
Radioactive Liquid Effluents - Instrumentation	3.5.6	3.3.3.10
Radioactive Liquid Effluents - Concentration	3.22.1	3.11.1.1
Radioactive Liquid Effluents - Dose	3.22.2	3.11.1.2
Radioactive Liquid Effluents - Waste Treatment	3.22.3	3.11.1.3
Radioactive Gaseous Effluents - Dose Rate	3.23.1	3.11.2.1
Radioactive Gaseous Effluents - Dose, Noble Gases	3.23.2	3.11.2.2
Radioactive Gaseous Effluents - Dose, Particulates	3.23.3	3.11.2.3
Radioactive Gaseous Effluents - Radwaste Treatment	3.23.4	3.11.2.4
Radioactive Gaseous Effluents - Gas Storage Tanks	3.2.3.5	3.11.2.5

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2.1 Radioactive Liquid Effluent Monitor Setpoint.

The Radioactive Liquid Effluent Instrumentation specification requires that the radioactive liquid effluents be monitored with the alarm/trip setpoints adjusted to ensure that the limits of the radioactive liquid effluents concentration specification are not exceeded. These concentrations are for the site. The alarm/trip setpoint on the liquid effluent monitor is dependent upon the dilution water flowrate liquid, radwaste tank flowrate, the isotopic composition of the radioactive liquid to be discharged, a gross gamma count of the liquid to be discharged, the background countrate of the monitor, and the efficiency of the monitor. An adjustable setpoint will be used because of the variability of these parameters. The setpoint will be calculated and set on the monitor prior to the release of each batch of radioactive liquid effluents. The following methodology will be used for determining the setpoint.

- 1) A sample will be taken from the tank (batch) to be discharged. A gross gamma and a gamma isotopic analysis will be performed utilizing this sample.
- 2) A dilution factor (DF) for the tank will be calculated based upon the results of the gamma isotopic analysis and the Maximum Permissible Concentration (MPC) of each detected radionuclide.

The DF is calculated by using the following equation:

$$DF = \sum_i (C_i / MPC_i)$$

where;

- DF = dilution factor
- C_i = concentration of isotope i, ($\mu\text{Ci}/\text{ml}$).
- MPC_i = maximum permissible concentration of isotope i, from 10 CFR 20, App. B, Table II, Column 2 (attached as Table 2-1), $\mu\text{Ci}/\text{ml}$.

- 3) The dilution water flowrate is based upon the number of ANO-1 circulating water pumps in operation at the time of release. Each circulating water pump has an approximate flowrate of 191500 gpm.
- 4) The theoretical release rate, F_m , of the tank (batch) can be expressed in terms of the dilution water flowrate, such that for each volume of dilution water released you may combine a given volume of liquid radwaste. This may be expressed in terms of the dilution factors:

$$F_m = \text{PMPNUM} \times 191500 / DF$$

where;

- F_m = theoretical release rate.
- PMPNUM = number of ANO-1 circulating water pumps in operation.
- DF = dilution factor calculated in Step 2.
- 191500 = approximate flowrate of 1 ANO-1 circulating pump (gpm).

In the above equation, F_M approaches zero as DF increases. The actual Flowrate, F_A , will generally be equal to F_M for high activity releases. For low activity releases, F_M will become larger and may exceed the capacity of the pump. In this case flowrate, F_A may be set equal to the maximum flowrate of the pump.

- 5) The monitor setpoint is calculated by incorporating the detector efficiency monitor reading prior to starting the release (i.e., background countrate), and a factor which is the amount of increase in the release concentration needed to violate the radioactive liquid concentration specification. The monitor setpoint can be expressed as follows:

$$M_L = (K \times F_M/F_A) + B$$

where;

M_L	= monitor setpoint (CPM).
K	= monitor output countrate (CPM). for the gross activity of the release. This number is taken from a graph of activity ($\mu\text{Ci/ml}$) vs. output countrate for the monitor (CPM).
F_M/F_A	= number of times the activity would need to increase to violate the radioactive liquid effluent-concentration specification.
B	= background countrate (CPM) prior to starting the release.

NOTE: In general, the set points will be calculated assuming only one radioactive liquid effluent release at any given time.

2.2

Liquid "Dose" Calculation

2.2.1 The "dose" or "dose commitment" to an individual in the unrestricted area from radioactive materials in liquid effluents released to unrestricted areas shall be less than or equal to the limits specified in Radioactive Liquid Effluents-Dose specification. The dose limits are on a per reactor basis.

The dose contribution for each radioactive liquid release shall be calculated for the total time period (length) of the release.

The dose commitment for the whole body or organs for each release is given by the following equation:

$$D_T = \sum_i [A_{iT} \times \Delta t \times C_i \times F]$$

where;

D_T = dose commitment to the whole body or organ T , from the release (mrem).

A_{iT} = site related ingestion dose commitment factor to the total body or organ, T , for each identified principal gamma and beta emitting isotope i , ($\frac{\text{mrem ml}}{\text{hr } \mu\text{Ci}}$).

Calculational method is in Section 2.2.2.

Δt = length in time of the release (hours).

C_i = the concentration of isotope i , in the undiluted radioactive liquid effluent ($\mu\text{Ci/ml}$).

F = the near field average dilution factor for C_i during any liquid effluent release. This factor is calculated as:

$$F = \frac{\text{Radwaste flow rate (gallon/hr)}}{\text{dilution water flow rate (gallon/hr)} \times K}$$

where K , is used to account for any dilution in the near field of the plant (i.e. the discharge canal). For ANO-1, the factor is 1 since it has a once-through cooling system. A value of 1 will be used for ANO-2 since the unit 2 liquid radwaste effluents are discharged via the same point as for Unit 1.

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Equation 1 can be reduced by combining Δt and F to give the volume of the release.

$$\Delta t \times F = \Delta t \times \frac{\text{radwaste flow rate}}{\text{dilution flow rate}}$$

$\Delta t \times$ radwaste flow rate is simply the volume of the waste that was released which can be designed as, V , (gallons).

Substituting the volume into equation 1 gives,

$$(2) \quad D_{\tau} = \frac{V}{\text{Dilution Flowrate}} \times \sum_i C_i \times A_{i\tau}$$

Where;

D_{τ} = dose commitment to be the whole body or organ τ from this release (mrem).

C_i = Concentration of radionuclide i , in the undiluted radioactive liquid effluent ($\mu\text{Ci/ml}$).

$A_{i\tau}$ = ingestion dose commitment factor as calculated in Section 2.2.2 (see table 3-1 to locate tabulated values).

V = volume of the undiluted radioactive liquid released. (gallons)

dilution flow rate = flowrate of water in the discharge canal. This is conservatively assumed to be the ANO-1 circulating water flowrate (gallons/hours).

Equation 2 will be used to check the release against the radioactive liquid effluent dose technical specifications unless a more accurate method is used (i.e. from Reg. Guide 1.109).

2.2.2 Dose Commitment Factor $A_{i\tau}$

The equation for calculating dose contributions requires a dose commitment factor, $A_{i\tau}$, for each isotope, i . This factor embodies exposure from the consumption of fish, invertebrates and potable water where appropriate. The adult male is used as the maximum exposed individual. This factor can be expressed by:

$$(3) \quad A_{i\tau} = K_o (U_w/D_w + U_F B F_i + U_i B I_i) D F_i$$

where;

$A_{i\tau}$ = composite dose parameter for the total body or critical organ of an adult for isotope i , for all appropriate pathways.
(mrem/hr per $\mu\text{Ci/ml}$)

- K_0 = units conversion factor;
 $1.14 \times 10^5 = 10^6 \text{ pci/uci} \times 10^3 \text{ ml/lit}$
 divided by 8,760 hr/yr.
- U_W = average adult water consumption (assumed)
 730 Kg/yr.
- U_F = adult fish consumption (assumed) 21 Kg/yr.
- U_I = adult invertebrate consumption (for salt-
 water sites only), 0 Kg/yr since
 ANO is not a saltwater site.
- BF_I = bioaccumulation factor for isotope, i, in
 fish (pCi/kg per pCi/l).
 These values are taken from Reg. Guide
 1.109 Table A-1.
- BI_I = bioaccumulation factor for invertebrates
 (salt water sites only)
- DF_I = dose conversion factor for nuclide, i ,
 for adults in organ, τ , mrem/pCi inhaled,
 from Table E-11 of Reg. Guide 1.109.
- D_W = dilution factor from the near field area
 within one quarter mile of the release
 point to the potable water intake for
 adult water consumption.

The site is on Lake Dardanelle on the
 Arkansas River. There is no potable
 water intake in the Dardanelle or in
 the near vicinity downstream of the
 Dardanelle dam, therefore
 the term U_W/D_W will be deleted.

Substituting the appropriate factors into the above equation yields;

$$A_{i\tau} = 1.14 \times 10^5 \times 21 \text{ } BF_i \times DF_i$$

or

(4) $A_{i\tau} = 2.39 \times 10^6 \times BF_i \times DF_i$

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(See footnotes on page 20-15)

(See footnotes on page 20-15)

Element (atomic number)	Isotope ¹	Table I	Table II			Element (atomic number)	Isotope ¹	Table I	Table II		
		Column 1	Column 2	Column 1	Column 2			Column 1	Column 2	Column 1	Column 2
		Air ($\mu\text{Ci/ml}$)	Water ($\mu\text{Ci/ml}$)	Air ($\mu\text{Ci/ml}$)	Water ($\mu\text{Ci/ml}$)			Air ($\mu\text{Ci/ml}$)	Water ($\mu\text{Ci/ml}$)	Air ($\mu\text{Ci/ml}$)	Water ($\mu\text{Ci/ml}$)
Actinium (89)	Ac 227	S	2×10^{-12}	6×10^{-13}	8×10^{-14}	Bromine (83)	Br 82	S	1×10^{-6}	8×10^{-7}	4×10^{-8}
		I	3×10^{-11}	9×10^{-12}	9×10^{-13}			I	2×10^{-7}	1×10^{-7}	6×10^{-8}
	Ac 228	S	8×10^{-8}	3×10^{-8}	2×10^{-8}	Cadmium (48)	Cd 107	S	5	5×10^{-3}	2×10^{-3}
Americium (95)		I	2×10^{-8}	3×10^{-8}	6×10^{-10}			I	7×10^{-4}	5×10^{-5}	3×10^{-5}
	Am 241	S	6×10^{-12}	1×10^{-4}	2×10^{-13}		Cd 115m	S	4×10^{-8}	7×10^{-4}	1×10^{-9}
		* I	1×10^{-10}	8×10^{-4}	4×10^{-12}	Cesium (55)		I	4×10^{-8}	7×10^{-4}	1×10^{-9}
	Am 242m	S	6×10^{-12}	1×10^{-4}	2×10^{-13}		Cd 115	S	2×10^{-7}	1×10^{-3}	8×10^{-9}
		I	3×10^{-10}	3×10^{-3}	2×10^{-12}			I	2×10^{-7}	1×10^{-3}	6×10^{-9}
	Am 242	S	4×10^{-8}	4×10^{-3}	1×10^{-8}	Cobalt (27)	Co 45	S	3×10^{-8}	3×10^{-4}	1×10^{-9}
Antimony (51)		I	5×10^{-8}	4×10^{-3}	2×10^{-8}			I	1×10^{-7}	5×10^{-3}	4×10^{-9}
	Am 243	S	6×10^{-12}	1×10^{-4}	3×10^{-13}		Co 47	S	2×10^{-7}	1×10^{-3}	6×10^{-9}
		I	1×10^{-10}	8×10^{-4}	4×10^{-12}	Californium (98)		I	2×10^{-7}	1×10^{-3}	6×10^{-9}
	Am 243	S	1×10^{-8}	1×10^{-3}	5×10^{-9}		Cf 249	S	2×10^{-12}	1×10^{-4}	5×10^{-14}
		I	2×10^{-3}	1×10^{-1}	6×10^{-7}			I	1×10^{-10}	7×10^{-4}	3×10^{-12}
	Am 243	S	2×10^{-3}	8×10^{-4}	6×10^{-7}	Cf 250		S	5×10^{-12}	4×10^{-4}	2×10^{-13}
Argon (18)		I	1×10^{-7}	5×10^{-4}	3×10^{-3}			I	1×10^{-10}	7×10^{-4}	3×10^{-12}
	Sb 122	S	2×10^{-7}	7×10^{-4}	5×10^{-9}	Cf 251		S	2×10^{-12}	1×10^{-4}	6×10^{-14}
		I	2×10^{-8}	7×10^{-4}	7×10^{-10}			I	1×10^{-10}	8×10^{-4}	3×10^{-12}
Arsenic (33)	Sb 125	S	5×10^{-7}	3×10^{-3}	2×10^{-6}		Cf 252	* S	6×10^{-11}	2×10^{-4}	2×10^{-13}
		I	3×10^{-8}	3×10^{-3}	9×10^{-10}	Cf 253	* I	3×10^{-11}	2×10^{-4}	1×10^{-12}	7×10^{-4}
	A 37	Sub ²	6×10^{-3}		1×10^{-2}			S	8×10^{-10}	4×10^{-3}	3×10^{-11}
Barium (56)	A 41	Sub	2×10^{-4}		4×10^{-3}	Cf 254		I	8×10^{-10}	4×10^{-3}	3×10^{-11}
	As 73	S	2×10^{-7}	1×10^{-2}	7×10^{-8}			S	5×10^{-12}	4×10^{-4}	2×10^{-13}
		I	4×10^{-7}	1×10^{-2}	1×10^{-2}			I	5×10^{-12}	4×10^{-4}	2×10^{-13}
Berkelium (97)	As 74	S	3×10^{-7}	2×10^{-3}	1×10^{-2}	Carbon (6)	C 14	S	4×10^{-6}	2×10^{-7}	1×10^{-7}
		I	1×10^{-7}	2×10^{-3}	4×10^{-7}		(CO ₂)	Sub	5×10^{-5}		1×10^{-4}
	As 76	S	1×10^{-7}	6×10^{-4}	4×10^{-6}	Cerium (58)	Ce 141	S	4×10^{-7}	3×10^{-3}	2×10^{-8}
		I	1×10^{-7}	6×10^{-4}	3×10^{-6}			I	2×10^{-7}	3×10^{-3}	5×10^{-9}
	As 77	S	5×10^{-7}	2×10^{-3}	2×10^{-3}		Ce 143	S	3×10^{-7}	1×10^{-3}	9×10^{-9}
		I	4×10^{-7}	2×10^{-3}	1×10^{-3}	Cesium (55)		I	2×10^{-7}	1×10^{-3}	7×10^{-9}
Beryllium (4)	At 211	S	7×10^{-7}	5×10^{-3}	2×10^{-10}		Ce 144	S	1×10^{-8}	3×10^{-4}	3×10^{-10}
		I	3×10^{-8}	2×10^{-3}	1×10^{-3}			I	6×10^{-9}	3×10^{-4}	2×10^{-10}
	Ba 131	S	1×10^{-6}	5×10^{-3}	4×10^{-8}	Cesium (55)	Cs 131	S	1×10^{-5}	7×10^{-2}	4×10^{-7}
Bismuth (83)		I	4×10^{-7}	5×10^{-3}	1×10^{-8}			I	3×10^{-5}	3×10^{-2}	1×10^{-7}
	Ba 140	S	1×10^{-7}	8×10^{-4}	4×10^{-9}		Cs 134m	S	4×10^{-5}	2×10^{-1}	1×10^{-6}
		I	4×10^{-8}	7×10^{-4}	1×10^{-9}	Cesium (55)		I	6×10^{-5}	3×10^{-2}	2×10^{-7}
Berkelium (97)	Bk 249	S	9×10^{-10}	2×10^{-2}	3×10^{-11}		Cs 134	S	4×10^{-8}	3×10^{-4}	1×10^{-9}
		I	1×10^{-7}	2×10^{-2}	4×10^{-9}	Cesium (55)		I	1×10^{-8}	1×10^{-3}	4×10^{-10}
	Bk 250	S	1×10^{-7}	6×10^{-2}	2×10^{-9}		Cs 135	S	5×10^{-7}	3×10^{-3}	2×10^{-8}
Beryllium (4)		I	1×10^{-6}	4×10^{-2}	5×10^{-9}	Chlorine (17)		I	9×10^{-8}	7×10^{-3}	3×10^{-9}
	Be 7	S	6×10^{-4}	5×10^{-2}	2×10^{-7}		Cs 136	S	4×10^{-7}	2×10^{-3}	1×10^{-8}
		I	1×10^{-6}	5×10^{-2}	4×10^{-9}			I	2×10^{-7}	2×10^{-3}	6×10^{-9}
Bismuth (83)	Bi 206	S	2×10^{-7}	1×10^{-3}	5×10^{-9}	Chromium (24)	Cs 137	S	6×10^{-8}	4×10^{-4}	2×10^{-9}
		I	1×10^{-7}	1×10^{-3}	5×10^{-9}			I	1×10^{-8}	1×10^{-3}	5×10^{-10}
	Bi 207	S	2×10^{-7}	2×10^{-3}	6×10^{-9}		Cl 36	S	4×10^{-7}	2×10^{-3}	1×10^{-9}
Bismuth (83)		I	1×10^{-8}	2×10^{-3}	5×10^{-10}	Chromium (24)		I	2×10^{-8}	2×10^{-3}	8×10^{-10}
	Bi 210	S	6×10^{-9}	1×10^{-3}	2×10^{-10}		Cl 38	S	3×10^{-8}	1×10^{-2}	9×10^{-8}
		I	6×10^{-9}	1×10^{-3}	2×10^{-10}			I	2×10^{-8}	1×10^{-2}	7×10^{-8}
Bismuth (83)	Bi 212	S	1×10^{-7}	1×10^{-3}	3×10^{-9}		Cr 51	S	1×10^{-5}	5×10^{-2}	4×10^{-7}
		I	2×10^{-7}	1×10^{-3}	7×10^{-9}			I	2×10^{-6}	5×10^{-2}	8×10^{-8}

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PART 20 • STANDARDS FOR PROTECTION AGAINST RADIATION

Concentrations in Air and Water: Above Natural Background—Continued

(See footnotes on page 20-15)

Element (atomic number)	Isotope ¹	Table I		Isotope ¹	Table I		Table II	
		Column 1	Column 2		Column 1	Column 2	Column 1	Column 2
		Alr ($\mu\text{Ci}/\text{ml}$)	Water ($\mu\text{Ci}/\text{ml}$)		Alr ($\mu\text{Ci}/\text{ml}$)	Water ($\mu\text{Ci}/\text{ml}$)	Alr ($\mu\text{Ci}/\text{ml}$)	Water ($\mu\text{Ci}/\text{ml}$)
Cobalt (27)	Co 57	3×10^{-4}	2×10^{-2}	Fm 254	6×10^{-4}	4×10^{-3}	2×10^{-7}	1×10^{-4}
	Co 58m	2×10^{-7}	1×10^{-7}	Fm 255	7×10^{-4}	4×10^{-3}	2×10^{-7}	1×10^{-4}
	Co 58	2×10^{-3}	8×10^{-2}	Fm 256	2×10^{-4}	1×10^{-3}	6×10^{-10}	3×10^{-3}
	Co 58	9×10^{-4}	6×10^{-2}	F 18	1×10^{-4}	1×10^{-3}	1×10^{-10}	9×10^{-7}
	Co 60	8×10^{-7}	4×10^{-3}	Gd 153	3×10^{-7}	3×10^{-3}	6×10^{-11}	9×10^{-7}
	Co 60	5×10^{-4}	3×10^{-3}	Gd 159	2×10^{-7}	2×10^{-3}	2×10^{-7}	8×10^{-4}
	Cu 64	3×10^{-7}	1×10^{-3}	Ga 72	5×10^{-4}	1×10^{-3}	9×10^{-4}	5×10^{-4}
	Cu 64	9×10^{-4}	1×10^{-3}	Ga 71	3×10^{-4}	6×10^{-3}	8×10^{-4}	2×10^{-4}
	Cm 242	2×10^{-4}	1×10^{-2}	Au 196	9×10^{-4}	1×10^{-3}	3×10^{-4}	7×10^{-4}
	Cm 242	1×10^{-10}	6×10^{-3}	Au 198	5×10^{-4}	5×10^{-3}	2×10^{-4}	2×10^{-4}
Copper (29)	Cm 243	1×10^{-10}	7×10^{-4}	Au 199	1×10^{-4}	1×10^{-3}	4×10^{-4}	5×10^{-3}
	Cm 244	2×10^{-10}	2×10^{-4}	Hf 181	8×10^{-7}	4×10^{-3}	3×10^{-4}	2×10^{-4}
	Cm 245	1×10^{-10}	8×10^{-4}	Ho 166	4×10^{-4}	7×10^{-3}	1×10^{-4}	7×10^{-3}
	Cm 246	5×10^{-12}	1×10^{-4}	H3	2×10^{-7}	9×10^{-4}	7×10^{-4}	3×10^{-3}
	Cm 247	1×10^{-10}	8×10^{-4}	Indium (49)	2×10^{-7}	1×10^{-1}	2×10^{-7}	3×10^{-3}
	Cm 248	1×10^{-10}	1×10^{-4}	In 113m	6×10^{-7}	4×10^{-2}	4×10^{-3}	1×10^{-3}
	Cm 249	1×10^{-11}	4×10^{-3}	In 114m	7×10^{-4}	4×10^{-2}	2×10^{-7}	1×10^{-3}
	Dy 165	1×10^{-3}	6×10^{-2}	In 115m	1×10^{-7}	5×10^{-4}	4×10^{-4}	2×10^{-3}
	Dy 166	3×10^{-4}	1×10^{-2}	I 125	2×10^{-4}	1×10^{-7}	8×10^{-4}	4×10^{-4}
	Er 169	2×10^{-7}	1×10^{-3}	I 126	5×10^{-4}	3×10^{-3}	6×10^{-4}	9×10^{-3}
Dysprosium (65)	Er 169	2×10^{-7}	1×10^{-3}	I 129	3×10^{-4}	6×10^{-3}	9×10^{-11}	2×10^{-7}
	Er 171	4×10^{-7}	8×10^{-4}	I 131	5×10^{-4}	5×10^{-3}	6×10^{-4}	3×10^{-7}
	Eu 152	6×10^{-7}	3×10^{-3}	I 132	1×10^{-4}	1×10^{-3}	1×10^{-10}	6×10^{-3}
	Eu 152 (T/2 = 9.2 hrs)	4×10^{-7}	2×10^{-3}	I 133	9×10^{-7}	5×10^{-3}	3×10^{-4}	2×10^{-4}
	Eu 152	1×10^{-4}	2×10^{-3}	I 134	2×10^{-4}	4×10^{-3}	7×10^{-4}	4×10^{-3}
	Eu 154 (T/2 = 13 yrs)	2×10^{-4}	2×10^{-3}					
	Eu 154	4×10^{-4}	6×10^{-4}					
	Eu 155	7×10^{-4}	6×10^{-3}					
		9×10^{-4}	6×10^{-3}					
		7×10^{-4}	6×10^{-3}					
Einsteinium (99)	Eu 152	3×10^{-7}	2×10^{-3}					
	Eu 152	1×10^{-4}	2×10^{-3}					
	Eu 154	2×10^{-4}	2×10^{-3}					
	Eu 154	4×10^{-4}	6×10^{-4}					
	Eu 155	7×10^{-4}	6×10^{-3}					
		9×10^{-4}	6×10^{-3}					
		7×10^{-4}	6×10^{-3}					
		7×10^{-4}	6×10^{-3}					
		7×10^{-4}	6×10^{-3}					
		7×10^{-4}	6×10^{-3}					
Erbium (68)	Eu 152	3×10^{-7}	2×10^{-3}					
	Eu 152	1×10^{-4}	2×10^{-3}					
	Eu 154	2×10^{-4}	2×10^{-3}					
	Eu 154	4×10^{-4}	6×10^{-4}					
	Eu 155	7×10^{-4}	6×10^{-3}					
		9×10^{-4}	6×10^{-3}					
		7×10^{-4}	6×10^{-3}					
		7×10^{-4}	6×10^{-3}					
		7×10^{-4}	6×10^{-3}					
		7×10^{-4}	6×10^{-3}					
Europium (63)	Eu 152	3×10^{-7}	2×10^{-3}					
	Eu 152	1×10^{-4}	2×10^{-3}					
	Eu 154	2×10^{-4}	2×10^{-3}					
	Eu 154	4×10^{-4}	6×10^{-4}					
	Eu 155	7×10^{-4}	6×10^{-3}					
		9×10^{-4}	6×10^{-3}					
		7×10^{-4}	6×10^{-3}					
		7×10^{-4}	6×10^{-3}					
		7×10^{-4}	6×10^{-3}					
		7×10^{-4}	6×10^{-3}					

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Concentrations in Air and Water Above Natural Background—Continued

Concentrations in Air and Water Above Natural Background—Continued

(See footnotes on page 20-15)

(See footnotes on page 20-15)

Element (atomic number)	Isotope ¹	Table I		Element (atomic number)	Isotope ¹	Table I		Table II	
		Column 1	Column 2			Column 1	Column 2	Column 1	Column 2
		Air ($\mu\text{Ci}/\text{m}^3$)	Water ($\mu\text{Ci}/\text{m}^3$)			Air ($\mu\text{Ci}/\text{m}^3$)	Water ($\mu\text{Ci}/\text{m}^3$)	Air ($\mu\text{Ci}/\text{m}^3$)	Water ($\mu\text{Ci}/\text{m}^3$)
Iodine (53)	I 134	3×10^{-6}	2×10^{-2}	Neptunium (93)	Np 237	4×10^{-12}	9×10^{-3}	1×10^{-19}	3×10^{-6}
	I 135	1×10^{-7}	7×10^{-4}		Np 239	1×10^{-10}	9×10^{-4}	4×10^{-12}	3×10^{-3}
	Ir 190	4×10^{-7}	2×10^{-3}		Ni 59	7×10^{-7}	4×10^{-3}	2×10^{-8}	1×10^{-4}
	Ir 192	1×10^{-6}	6×10^{-3}		Ni 63	5×10^{-7}	4×10^{-3}	2×10^{-8}	1×10^{-4}
Iridium (77)	Ir 192	4×10^{-7}	5×10^{-3}	Nickel (28)	Ni 65	5×10^{-7}	6×10^{-3}	2×10^{-8}	7×10^{-3}
	Ir 192	1×10^{-6}	1×10^{-3}		Nb 93m	8×10^{-7}	6×10^{-3}	3×10^{-8}	7×10^{-3}
	Ir 194	3×10^{-6}	1×10^{-3}		Nb 93	6×10^{-6}	8×10^{-4}	1×10^{-8}	7×10^{-4}
	Ir 194	2×10^{-7}	1×10^{-3}		Nb 97	9×10^{-7}	4×10^{-3}	3×10^{-8}	1×10^{-4}
Iron (26)	Fe 55	9×10^{-7}	2×10^{-3}	Niobium (Columbium) (41)	Nb 93m	5×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
	Fe 59	1×10^{-6}	7×10^{-3}		Nb 93	1×10^{-7}	1×10^{-3}	4×10^{-8}	4×10^{-4}
	Fe 59	1×10^{-7}	2×10^{-3}		Nb 97	2×10^{-7}	1×10^{-3}	5×10^{-8}	4×10^{-4}
	Fe 59	5×10^{-8}	2×10^{-3}		Os 185	5×10^{-7}	3×10^{-3}	2×10^{-8}	1×10^{-4}
Krypton (36)	Kr 85m	6×10^{-6}	2×10^{-3}	Osmium (76)	Os 191m	1×10^{-7}	7×10^{-3}	6×10^{-7}	3×10^{-3}
	Kr 85	1×10^{-5}	4×10^{-4}		Os 191	2×10^{-6}	7×10^{-3}	3×10^{-7}	2×10^{-3}
	Kr 87	1×10^{-5}	1×10^{-3}		Os 192	1×10^{-6}	5×10^{-3}	4×10^{-8}	2×10^{-4}
	Kr 88	1×10^{-4}	1×10^{-2}		Pd 103	4×10^{-7}	5×10^{-3}	1×10^{-8}	2×10^{-4}
Lanthanum (57)	La 140	2×10^{-7}	7×10^{-4}	Palladium (46)	Pd 109	3×10^{-7}	2×10^{-3}	2×10^{-8}	7×10^{-3}
	Pb 203	1×10^{-7}	7×10^{-4}		P 32	7×10^{-8}	3×10^{-3}	2×10^{-8}	9×10^{-3}
	Pb 210	2×10^{-6}	1×10^{-3}		Pt 191	8×10^{-7}	4×10^{-3}	3×10^{-8}	1×10^{-4}
	Pb 212	2×10^{-6}	1×10^{-3}		Pt 193m	6×10^{-7}	3×10^{-3}	2×10^{-7}	1×10^{-3}
Lead (82)	Lu 177	5×10^{-7}	3×10^{-3}	Phosphorus (15)	Pr 193	5×10^{-6}	3×10^{-3}	2×10^{-7}	1×10^{-3}
	Mn 52	2×10^{-7}	1×10^{-3}		Pr 197m	3×10^{-7}	3×10^{-3}	1×10^{-8}	2×10^{-3}
	Mn 54	4×10^{-8}	3×10^{-3}		Pt 197	5×10^{-6}	3×10^{-3}	2×10^{-7}	9×10^{-4}
	Mn 56	8×10^{-7}	4×10^{-3}		Pu 238	8×10^{-7}	4×10^{-3}	3×10^{-8}	1×10^{-4}
Manganese (25)	Hg 197m	5×10^{-7}	3×10^{-3}	Platinum (78)	Pu 239	6×10^{-7}	1×10^{-3}	7×10^{-14}	5×10^{-6}
	Hg 197	7×10^{-7}	6×10^{-3}		Pu 240	2×10^{-12}	8×10^{-4}	5×10^{-14}	5×10^{-6}
	Hg 203	1×10^{-6}	5×10^{-3}		Pu 241	4×10^{-11}	8×10^{-4}	6×10^{-14}	3×10^{-3}
	Mo 99	7×10^{-7}	5×10^{-3}			9×10^{-11}	7×10^{-3}	1×10^{-12}	2×10^{-4}
Mercury (80)	Mo 99	1×10^{-6}	3×10^{-3}	Plutonium (94)		4×10^{-8}	4×10^{-3}	1×10^{-9}	1×10^{-3}
	Nd 144	2×10^{-7}	1×10^{-3}			3×10^{-7}	3×10^{-3}	1×10^{-8}	2×10^{-3}
	Nd 147	3×10^{-10}	2×10^{-3}			6×10^{-6}	3×10^{-3}	2×10^{-7}	1×10^{-3}
	Nd 149	2×10^{-6}	8×10^{-3}			8×10^{-7}	4×10^{-3}	3×10^{-8}	1×10^{-4}

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(See footnotes on page 20-15)

Element (atomic number)	Isotope	Table I			Element (atomic number)	Isotope	Table II			Isotope	Table I			Isotope	Table II						
		Air	Water	+ ($\mu\text{Ci}/\text{ml}$)($\mu\text{Ci}/\text{ml}$)($\mu\text{Ci}/\text{ml}$)			Air	Water	+ ($\mu\text{Ci}/\text{ml}$)($\mu\text{Ci}/\text{ml}$)($\mu\text{Ci}/\text{ml}$)		Air	Water	+ ($\mu\text{Ci}/\text{ml}$)($\mu\text{Ci}/\text{ml}$)($\mu\text{Ci}/\text{ml}$)		Air	Water	+ ($\mu\text{Ci}/\text{ml}$)($\mu\text{Ci}/\text{ml}$)($\mu\text{Ci}/\text{ml}$)				
Plutonium (94)	Pu 242	5	2×10^{-12}	6×10^{-14}	Ruthenium (44)	Ru 97	5	5×10^{-4}	3×10^{-3}	Ruthenium (44)	Ru 97	5	2×10^{-4}	1×10^{-3}	Ru 97	5	8×10^{-4}				
	Pu 243	1	4×10^{-11}	1×10^{-12}		Ru 98	1	3×10^{-3}	3×10^{-3}		Ru 98	1	2×10^{-4}	5×10^{-3}		1	3×10^{-4}				
	Pu 243	5	2×10^{-5}	6×10^{-6}		Ru 105	5	3×10^{-4}	4×10^{-4}		Ru 105	5	7×10^{-7}	2×10^{-3}		5	8×10^{-5}				
	Pu 244	1	2×10^{-12}	6×10^{-14}		Ru 106	1	3×10^{-3}	3×10^{-3}		Ru 106	1	5×10^{-7}	3×10^{-3}		1	1×10^{-4}				
Polonium (84)	Po 210	5	5×10^{-10}	2×10^{-11}	Samarium (62)	Sm 147	5	3×10^{-4}	2×10^{-3}	Samarium (62)	Sm 147	5	2×10^{-16}	3×10^{-4}	Sm 147	5	1×10^{-3}				
	Po 210	1	3×10^{-10}	7×10^{-12}		Sm 151	1	3×10^{-10}	2×10^{-3}		Sm 151	1	9×10^{-12}	6×10^{-3}		1	6×10^{-3}				
	Po 210	5	2×10^{-10}	7×10^{-12}		Sm 153	5	5×10^{-3}	5×10^{-3}		Sm 153	5	5×10^{-7}	4×10^{-4}		5	4×10^{-4}				
	Po 210	1	2×10^{-10}	7×10^{-12}		Sc 46	1	2×10^{-7}	1×10^{-3}	Scandium (21)	Sc 46	1	2×10^{-7}	1×10^{-3}	Sc 46	1	8×10^{-3}				
Promethium (61)	Pm 147	5	6×10^{-4}	2×10^{-9}		Sc 47	5	6×10^{-7}	3×10^{-3}		Sc 47	5	2×10^{-4}	2×10^{-4}		5	4×10^{-3}				
	Pm 147	1	1×10^{-2}	3×10^{-4}		Sc 48	1	2×10^{-7}	3×10^{-3}		Sc 48	1	2×10^{-7}	3×10^{-3}		1	9×10^{-3}				
	Pm 149	5	3×10^{-7}	1×10^{-3}		Se 73	5	1×10^{-4}	8×10^{-4}	Selenium (34)	Se 73	5	1×10^{-4}	8×10^{-4}	Se 73	5	3×10^{-3}				
	Pm 230	1	2×10^{-7}	7×10^{-3}	Silicon (14)	Si 31	1	6×10^{-4}	2×10^{-7}		Si 31	1	6×10^{-4}	2×10^{-7}		1	3×10^{-4}				
Protactinium (91)	Pa 231	5	1×10^{-12}	4×10^{-14}		Ag 105	5	1×10^{-4}	6×10^{-3}		Ag 105	5	1×10^{-4}	6×10^{-3}		5	1×10^{-4}				
	Pa 231	1	1×10^{-16}	2×10^{-11}		Ag 110m	1	3×10^{-3}	3×10^{-3}		Ag 110m	1	3×10^{-3}	3×10^{-3}		1	1×10^{-4}				
	Pa 233	5	6×10^{-7}	2×10^{-3}		Ag 111	5	2×10^{-7}	1×10^{-3}	Silver (47)	Ag 111	5	2×10^{-7}	1×10^{-3}	Ag 111	5	4×10^{-3}				
	Pa 233	1	2×10^{-7}	6×10^{-4}		Na 22	1	2×10^{-7}	1×10^{-3}		Na 22	1	2×10^{-7}	1×10^{-3}		1	4×10^{-3}				
Radium (88)	Ra 226	5	5×10^{-11}	9×10^{-12}	Sodium (11)	Na 22	5	9×10^{-4}	9×10^{-4}		Na 22	5	9×10^{-4}	9×10^{-4}		5	4×10^{-3}				
	Ra 228	1	4×10^{-11}	7×10^{-7}		Na 24	1	1×10^{-6}	6×10^{-3}		Na 24	1	1×10^{-6}	6×10^{-3}		1	2×10^{-4}				
	Ra 228	5	2×10^{-4}	8×10^{-11}		Sr 85m	5	3×10^{-3}	2×10^{-3}	Strontium (38)	Sr 85m	5	3×10^{-3}	2×10^{-3}	Sr 85m	5	3×10^{-3}				
	Ra 228	1	2×10^{-16}	2×10^{-10}		Sr 85	1	3×10^{-3}	3×10^{-3}		Sr 85	1	3×10^{-3}	3×10^{-3}		1	7×10^{-3}				
Rhenium (75)	Re 186	5	6×10^{-7}	2×10^{-3}	Strontium (38)	Sr 89	5	3×10^{-4}	3×10^{-4}		Sr 89	5	3×10^{-4}	3×10^{-4}		5	3×10^{-4}				
	Re 187	1	2×10^{-7}	8×10^{-3}		Sr 90	1	4×10^{-4}	8×10^{-4}		Sr 90	1	4×10^{-4}	8×10^{-4}		1	3×10^{-3}				
	Re 187	5	9×10^{-4}	7×10^{-3}		Sr 92	5	3×10^{-3}	3×10^{-3}		Sr 92	5	3×10^{-3}	3×10^{-3}		5	3×10^{-3}				
	Re 188	1	5×10^{-7}	4×10^{-3}		Sr 92	1	3×10^{-3}	2×10^{-3}	Sulfur (16)	S 35	1	3×10^{-7}	2×10^{-3}	S 35	1	6×10^{-3}				
Rhodium (45)	Rh 103m	5	8×10^{-3}	3×10^{-4}	Sulfur (16)	S 35	5	3×10^{-3}	2×10^{-3}		S 35	5	3×10^{-3}	2×10^{-3}		5	6×10^{-3}				
	Rh 105	1	6×10^{-3}	2×10^{-4}		Ta 182	1	2×10^{-4}	2×10^{-4}		Ta 182	1	2×10^{-4}	2×10^{-4}		1	3×10^{-4}				
	Rh 105	5	8×10^{-3}	2×10^{-4}		Ta 182	5	2×10^{-4}	2×10^{-4}		Ta 182	5	2×10^{-4}	2×10^{-4}		5	3×10^{-4}				
	Rh 106	1	3×10^{-7}	2×10^{-4}		Ta 182	1	2×10^{-4}	2×10^{-4}		Ta 182	1	2×10^{-4}	2×10^{-4}		1	4×10^{-3}				
Rubidium (37)	Rb 87	5	5×10^{-7}	3×10^{-3}	Tantalum (73)	Ta 182	5	2×10^{-4}	2×10^{-4}	Tantalum (73)	Ta 182	5	2×10^{-4}	2×10^{-4}	Ta 182	5	7×10^{-10}				
	Rb 87	1	7×10^{-4}	2×10^{-4}		Ta 182	1	2×10^{-4}	2×10^{-4}		Ta 182	1	2×10^{-4}	2×10^{-4}		1	4×10^{-3}				
	Rb 87	5	5×10^{-7}	3×10^{-3}		Ta 182	5	2×10^{-4}	2×10^{-4}		Ta 182	5	2×10^{-4}	2×10^{-4}		5	7×10^{-10}				
	Rb 87	1	7×10^{-4}	2×10^{-4}		Ta 182	1	2×10^{-4}	2×10^{-4}		Ta 182	1	2×10^{-4}	2×10^{-4}		1	4×10^{-3}				

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Concentrations in Air and Water Above Natural Background—Continued

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Concentrations in Air and Water Above Natural Background—Continued

(See footnotes on page 20-15)

Element (atomic number)	Isotope ¹	Table 1		Element (atomic number)	Isotope ¹	Table 2		Table 1		Table 2	
		Column 1	Column 2			Column 1	Column 2			Column 1	Column 2
		Air ($\mu\text{Ci}/\text{ml}$)	Water ($\mu\text{Ci}/\text{ml}$)			Air ($\mu\text{Ci}/\text{ml}$)	Water ($\mu\text{Ci}/\text{ml}$)			Air ($\mu\text{Ci}/\text{ml}$)	Water ($\mu\text{Ci}/\text{ml}$)
Technetium (43)	Tc 96m	8 x 10 ⁻³	4 x 10 ⁻¹	Thorium (90)	Th 234	6 x 10 ⁻³	5 x 10 ⁻⁴	Thallium (81)		2 x 10 ⁻³	2 x 10 ⁻³
	Tc 96	3 x 10 ⁻³	3 x 10 ⁻¹		Tm 170	1 x 10 ⁻⁴	5 x 10 ⁻⁴			1 x 10 ⁻³	2 x 10 ⁻³
	Tc 97m	6 x 10 ⁻³	3 x 10 ⁻¹		Tm 171	4 x 10 ⁻⁴	1 x 10 ⁻³			1 x 10 ⁻³	5 x 10 ⁻³
	Tc 97	2 x 10 ⁻³	1 x 10 ⁻¹		Sn 113	3 x 10 ⁻³	1 x 10 ⁻³			1 x 10 ⁻³	5 x 10 ⁻³
	Tc 99m	2 x 10 ⁻³	1 x 10 ⁻¹		Sn 125	2 x 10 ⁻³	1 x 10 ⁻³			1 x 10 ⁻³	5 x 10 ⁻³
	Tc 99	1 x 10 ⁻³	5 x 10 ⁻²		W 181	4 x 10 ⁻³	2 x 10 ⁻³			1 x 10 ⁻³	5 x 10 ⁻³
	Ta 125m	3 x 10 ⁻³	2 x 10 ⁻¹		W 185	1 x 10 ⁻³	5 x 10 ⁻⁴			1 x 10 ⁻³	5 x 10 ⁻³
	Ta 127m	4 x 10 ⁻³	3 x 10 ⁻¹		W 187	1 x 10 ⁻³	5 x 10 ⁻⁴			1 x 10 ⁻³	5 x 10 ⁻³
	Ta 129	1 x 10 ⁻³	5 x 10 ⁻²		U 230	1 x 10 ⁻³	5 x 10 ⁻⁴			1 x 10 ⁻³	5 x 10 ⁻³
	Ta 131m	1 x 10 ⁻³	5 x 10 ⁻²		U 232	1 x 10 ⁻³	5 x 10 ⁻⁴			1 x 10 ⁻³	5 x 10 ⁻³
Tellurium (52)	Ta 127m	1 x 10 ⁻³	5 x 10 ⁻²	Uranium (92)	U 233	1 x 10 ⁻³	5 x 10 ⁻⁴	Vanadium (23)		1 x 10 ⁻³	5 x 10 ⁻³
	Ta 129	1 x 10 ⁻³	5 x 10 ⁻²		U 234	1 x 10 ⁻³	5 x 10 ⁻⁴			1 x 10 ⁻³	5 x 10 ⁻³
	Ta 131m	1 x 10 ⁻³	5 x 10 ⁻²		U 235	1 x 10 ⁻³	5 x 10 ⁻⁴			1 x 10 ⁻³	5 x 10 ⁻³
	Ta 132	1 x 10 ⁻³	5 x 10 ⁻²		U 236	1 x 10 ⁻³	5 x 10 ⁻⁴			1 x 10 ⁻³	5 x 10 ⁻³
	Ta 160	1 x 10 ⁻³	5 x 10 ⁻²		U 238	1 x 10 ⁻³	5 x 10 ⁻⁴			1 x 10 ⁻³	5 x 10 ⁻³
	Ti 200	1 x 10 ⁻³	5 x 10 ⁻²		U 240	1 x 10 ⁻³	5 x 10 ⁻⁴			1 x 10 ⁻³	5 x 10 ⁻³
	Ti 201	1 x 10 ⁻³	5 x 10 ⁻²		U natural	1 x 10 ⁻³	5 x 10 ⁻⁴			1 x 10 ⁻³	5 x 10 ⁻³
	Ti 202	1 x 10 ⁻³	5 x 10 ⁻²		Xe 131m	1 x 10 ⁻³	5 x 10 ⁻⁴			1 x 10 ⁻³	5 x 10 ⁻³
	Ti 204	1 x 10 ⁻³	5 x 10 ⁻²		Xe 133	1 x 10 ⁻³	5 x 10 ⁻⁴			1 x 10 ⁻³	5 x 10 ⁻³
	Th 227	1 x 10 ⁻³	5 x 10 ⁻²		Xe 135	1 x 10 ⁻³	5 x 10 ⁻⁴			1 x 10 ⁻³	5 x 10 ⁻³
Thorium (90)	Th 228	1 x 10 ⁻³	5 x 10 ⁻²	Ytterbium (70)	Y 90	1 x 10 ⁻³	5 x 10 ⁻⁴	Yttrium (39)		1 x 10 ⁻³	5 x 10 ⁻³
	Th 230	1 x 10 ⁻³	5 x 10 ⁻²		Y 91m	1 x 10 ⁻³	5 x 10 ⁻⁴			1 x 10 ⁻³	5 x 10 ⁻³
	Th 231	1 x 10 ⁻³	5 x 10 ⁻²		Y 91	1 x 10 ⁻³	5 x 10 ⁻⁴			1 x 10 ⁻³	5 x 10 ⁻³
	Th 232	1 x 10 ⁻³	5 x 10 ⁻²		Y 92	1 x 10 ⁻³	5 x 10 ⁻⁴			1 x 10 ⁻³	5 x 10 ⁻³
	Th natural	1 x 10 ⁻³	5 x 10 ⁻²		Y 93	1 x 10 ⁻³	5 x 10 ⁻⁴			1 x 10 ⁻³	5 x 10 ⁻³

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(See footnotes on page 20-15)

Element (atomic number)	Isotope ¹	Table I		Table II		
		Column 1	Column 2	Column 1	Column 2	
		Air ($\mu\text{Ci/ml}$)	Water ($\mu\text{Ci/ml}$)	Air ($\mu\text{Ci/ml}$)	Water ($\mu\text{Ci/ml}$)	
Zinc (30)	Zn 65	5	1×10^{-7}	3×10^{-3}	4×10^{-9}	1×10^{-4}
		1	6×10^{-8}	5×10^{-3}	2×10^{-9}	2×10^{-4}
	Zn 69m	5	4×10^{-7}	2×10^{-3}	1×10^{-9}	7×10^{-3}
		1	3×10^{-7}	2×10^{-3}	1×10^{-9}	6×10^{-3}
	Zn 69	5	7×10^{-8}	5×10^{-3}	2×10^{-9}	2×10^{-3}
		1	9×10^{-8}	5×10^{-3}	3×10^{-9}	2×10^{-3}
Zirconium (40)	Zr 93	5	1×10^{-7}	2×10^{-3}	4×10^{-9}	8×10^{-4}
		1	3×10^{-7}	2×10^{-3}	1×10^{-9}	6×10^{-4}
	Zr 95	5	1×10^{-7}	2×10^{-3}	4×10^{-9}	6×10^{-4}
		1	3×10^{-7}	2×10^{-3}	1×10^{-9}	6×10^{-4}
	Zr 97	5	1×10^{-7}	5×10^{-4}	4×10^{-9}	2×10^{-3}
		1	9×10^{-8}	5×10^{-4}	3×10^{-9}	2×10^{-3}
Any single radionuclide not listed above with decay mode other than alpha emission or spontaneous fission and with radioactive half-life less than 2 hours.	Sub		1×10^{-4}		3×10^{-8}	
Any single radionuclide not listed above with decay mode other than alpha emission or spontaneous fission and with radioactive half-life greater than 2 hours.			3×10^{-9}	9×10^{-3}	1×10^{-10}	3×10^{-8}
Any single radionuclide not listed above, which decays by alpha emission or spontaneous fission.			6×10^{-12}	4×10^{-7}	2×10^{-14}	3×10^{-8}

¹ Soluble (S), Insoluble (I)² "Sub" means that values given are for subversion to a hemispherical infinite cloud of airborne material.

³ These radon concentrations are appropriate for protection from radon-222 combined with its short-lived daughters. Alternatively, the value in Table I may be replaced by one-third ($\frac{1}{3}$) "working level," (A "working level" is defined as any combination of short-lived radon-222 daughters, polonium-218, lead-214, bismuth-214 and polonium-214, in one liter of air, without regard to the degree of equilibrium, that will result in the ultimate emission of 1.3 ± 10 MeV of alpha particle energy.) The Table II value may be replaced by one-thirtieth ($\frac{1}{30}$) of a "working level." The limit on radon-222 concentrations in restricted areas may be based on an annual average.

14. For soluble mixtures of U-238, U-234 and U-235 in air chemical toxicity may be the limiting factor. If the percent by weight (enrichment) of U-235 is less than 5, the concentration value for a 40-hour workweek, Table I, is 0.2 milligrams uranium per cubic meter of air average. For any enrichment, the product of the average concentration and time of exposure during a 40-hour workweek shall not exceed 8×10^{-4} BA $\mu\text{Ci-hr/ml}$, where BA is the specific activity of the uranium inhaled. The concentration value for Table II is 0.007 milligrams uranium per cubic meter of air. The specific activity for natural uranium is 8.77×10^{-3} curies per gram U. The specific activity for other mixtures of U-238, U-235 and U-234, if not known, shall be:

$$\text{BA} = 3.6 \times 10^{-4} \text{ curies/gram U} \quad \text{U depleted}$$

$$\text{SA} = (0.4 + 0.38 E + 0.0034 E^2) 10^{-4} \text{ E } 20.72$$

where E is the percentage by weight of U-235, expressed as percent.

⁴ Amended 17 FR 23319.⁵ Amended 39 FR 23990, footnote re-designated 40 FR 50704.⁶ Amended 40 FR 50704.⁷ Amended 38 FR 29314.⁸ Amended 39 FR 25463, redesignated 40 FR 50704.

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3.0

Gaseous Effluents

3.1 Gaseous Monitor Setpoints

3.1.0 This section applies to the following gaseous radiation monitors.

ANO-1

RE 7400

Unit vents (reactor building purge, fuel handling area, and radwaste area ventilation systems)

RE 4830*

Waste gas holdup system monitor

ANO-2

2RE 8233

Containment purge

2RE 8540

Fuel handling area ventilation system

2RE 8542

Radwaste area ventilation system

2RE 7828

Auxiliary building extension ventilation system

2RE 2429

Waste gas holdup system monitor

*The determination of the setpoints for the above monitors will be based upon an arbitrarily set fraction of the maximum permissible concentration (MPC), at the site boundary, of noble gas activity (Xe-133 equivalent released from the above release points. Other factors considered in the setpoint calculations include; background contrate for each monitor, radwaste flowrate, Xe-133 equivalent monitor efficiency, atmospheric dilution factor and the number and type of ventilation systems in operation.

The fraction of an MPC allocated to each monitor will be dependent upon plant conditions, and the amount of activity that is expected to be released via each release point. The fraction assigned to each monitor may be varied, however, the sum of all of the fractions of an MPC assigned shall be less than or equal to 1 MPC. When the setpoint on one monitor is changed, the setpoint on at least one other monitor will be changed accordingly. Determining setpoints in this manner will allow the flexibility needed to maintain plant operation.

The fact that one monitor alarms would not necessarily mean the gaseous effluents are being released at such a rate that the one MPC limit is being violated. The alarm would indicate that more material is being released than the fraction of an MPC assigned to the alarmed monitor. An analysis of that material being released via all of the monitors and the release rate at those monitors would have to be done to ensure that the MPC limit is not being violated.

* These monitors provide an automatic isolation for the waste gas holdup systems and are not final effluent point monitors. The discharge from RE-4830 is monitored by RE-7400.

The initial fractions of one MPC allocated to the release points is given below. The allocations may be changed as indicated above.

ANO-1	50%
ANO-2 Radwaste area	30%
ANO-2 Fuel handling area	19%
ANO-2 Auxiliary building extension	0%
ANO-2 Containment purge	0%

The containment purge and the auxiliary building extension ventilation systems are not operated continuously, therefore, they will not be routinely allocated a fraction of an MPC to be released.

The setpoints to be used during a batch type of release (i.e. reactor building purge, release from the waste gas hold up system or any other non-routine release) will be calculated for each release before it occurs.

3.1.1 The basic methodology for determining a monitor setpoint starts by determining the allowable concentration at the monitor.

$$C_B = C_M \times F \times (\overline{x/q})_V \times 1 \times 10^{-6}$$

Where;

C_B = Xe-133 equivalent concentration at the site boundary ($\mu\text{Ci/ml}$). This is based upon the arbitrary fraction of 1MPC assigned to this monitor. (MPC values from Table 2-2 Column I).

C_M = Xe-133 equivalent concentration at the monitor ($\mu\text{Ci/ml}$).

F = the flowrate of radioactive gaseous effluent at the release point being considered (ml/sec).

$(\overline{x/q})_V$ = atmospheric dispersion factor. We will use $2.8 \times 10^{-6} \text{ sec/m}^3$ for this variable until it is replaced by data from the previous year. (Found in the ANO-2 FSAR on page 2.3-30).

1×10^{-6} = conversion factor (m^3/ml)

Solving for C_B gives;

$$C_M = \frac{C_B}{F \cdot (\overline{x/q})_V \cdot 1 \times 10^{-6}}$$

(usually F and C_M only will be varied)

The setpoint for each monitor is;

$$S = C_M \times K + B$$

Where;

- S = monitor setpoint (counts/sec)
- C_M = Xe-133 equivalent count at the monitor ($\mu\text{Ci/ml}$) (defined above).
- K = conversion factor determined from response curve of monitor (counts/sec vs. $\mu\text{Ci/ml}$).
- B = background count rate at the monitor (counts/sec).

3.2 Airborne Release Rates - Implementation of 10 CFR 20.

The section provides the calculational methodology to implement the Radioactive Gaseous Effluents - Dose Rate specifications. It should be noted that these specifications are site related not unit related.

As stated in the technical specifications, the instantaneous dose rate in unrestricted areas due to radioactive materials in gaseous effluents from the site shall be limited to;

- a) The dose rate limit for noble gases shall be to the total body, and to the skin, and
- b) The dose rate limit for all radioiodines and for all radioactive materials in particulate form and radionuclides other than noble gases with half lives greater than 8 days shall be to any organ.

3.2.1 Noble Gas Release Rate.

The release rate for noble gases can be calculated from;

- 1) $DR = 10^6 \times \sum_i [K_i \times (\overline{x/q})_V \times Q_i] \leq 500 \text{ mrem/yr to the total body}$
- 2) $DR = 10^6 \times \sum_i [(L_i + 1.1M_i) \times (\overline{x/q})_V \times Q_i] \leq 3000 \text{ mrem/yr to the skin}$

Where;

DR=dose rate for time and organ in question
(mrem/yr)

10^6 = Conversion factors, pCi/ μ Ci.

Q_i = Release rate of isotope, i , (μ Ci/sec).
The release rate of radionuclides, i ,
in gaseous effluent from all vent
releases, in μ Ci/sec.

$(\overline{x/q})_v = 2.8 \times 10^{-6}$ sec/ m^3 for all vent releases.

M_i = The air dose factor due to gamma
emissions for each identified noble
gas radionuclide, in mrad/yr per μ Ci/ m^3
(unit conversion constant of 1.1 mrem/mrad
converts air dose to skin dose).
(see Table 3-1)

K_i = The total body dose factor due to
gamma emissions for each identified
noble gas radionuclide, in mrem/yr per pCi/ m^3
(see Table 3-1)

L_i = The skin dose factor due to beta
emissions for each identified noble
gas radionuclide, in mrem/yr per μ Ci/ m^3 .
(see Table 3-1)

In equation 1), $(\overline{x/q})_v$ is constant and K_i is constant for a given radioisotope, and their product will be constant for a given isotope. The equation simplifies to:

$$3) \quad DR \leq \sum_i \overline{x/q}_v \times K_i \times Q_i \leq 500 \text{ mrem/yr} \quad \text{to the total body}$$

where; $\overline{x/q}_v = (\overline{x/q})_v \times k_i \times 10^6$, and all other
variables are defined above.

In equation 2) $(\overline{x/q})_v$ is constant and $(L_i + 1.1M_i)$ is constant for any given radioisotope, and therefore, their product is constant. Equation 2 simplifies to:

$$4) \quad DR = LM_i \times Q_i \leq 3000 \text{ mrem/yr} \quad \text{to the skin.}$$

where; $LM_i = 10^6 \times (\overline{x/q})_v \times (L_i + 1.1M_i)$

See table 3-1 to locate tabulated values.

3.2.2 Radioiodine and Particulate Release Rate.

The release rate for radioiodines, radioactive materials in particulate form and radionuclides other than noble gases with half lives > 8 days may be calculated from:

$$5) \quad DR_T = P_i \times W \times Q_i \leq 1500 \text{ mrem/yr to any organ}$$

Where;

DR_T = Dose rate to organ τ for the time period in question.
(mrem/yr)

P_i = The dose parameter for radionuclides other than noble gases for the inhalation pathway, in mrem/yr per $\mu\text{Ci}/\text{m}^3$ and for food and ground plane pathways, in m^2 (mrem/yr per $\mu\text{Ci}/\text{sec}$). The dose factors are based on the critical individual organ and most restrictive age group (infant).

P_i is determined in equations 6, 7, and 8.

Q_i = The release rate of radionuclides, i , in gaseous effluent from all vent releases, in $\mu\text{Ci}/\text{sec}$

W = The dispersion parameter for estimating the dose to an individual due to all vent releases:

$= 2.8 \times 10^{-6}$, for the inhalation pathway.

$= 1.4 \times 10^{-8} \text{ meters}^{-2}$, for the food and ground plane pathways.

Equation 5 considers the infant as the most restrictive age group. The organs that will be considered are the skin, bone, liver, total body, thyroid, kidney, lung and GI-LLI. There are three major pathways that may contribute to the dose rate to the above items. The pathways considered will be inhalation, ground plane and food. The food pathway for the infant is considered to be from milk only. All three pathways will contribute to the whole body dose, while the skin will be affected by only the ground plane pathway, and the other organs will be affected by only the inhalation and food pathways.

The dispersion factor for the inhalation pathway will be $(\overline{x/q})_v$, while $(\overline{d/q})_v$ will be used for the ground plane and food pathways.

The equations for the pathways to an infant are:

- 6) $P_i = 1.4 \times 10^9 \times \text{DFA}_i$ for inhalation
 7) $P_i = 8.76 \times 10^9 \times \text{DFG}_i \times (1 - e^{-\lambda_i \times 3.17 \times 10^7}) / \lambda_i$ for ground plane
 8) $P_i = 2.4 \times 10^{10} \times r \times F_i \times \text{DFL}_i \times (e^{-\lambda_i \times 1.73 \times 10^5}) / (\lambda_i + 5.73 \times 10^7)$ for food

where;

DFA_i = maximum organ inhalation dose factor
for radionuclide, i (mrem/pCi).

DFG_i = ground plane dose conversion factor
for radionuclide, i , (mrem/hr per pCi/m²)
(see Table 3-1)

λ_i = decay constant for radionuclide, i (sec⁻¹)

r = fraction of deposited activity retained
on cows' feed grass (=1 for radioiodines,
and .2 for particulates).

F_i = stable element transfer coefficient
(day/liter) (from Reg. Guide 1.109
Table E-1).

DFL_i = organ ingestion dose factor for radio-
nuclide, i . (mrem/pCi)

1.4×10^9 = Conversion factor, 10^6 pCi/ μ Ci \times 1400 m³/yr
(assume infant breathing rate)

8.76×10^9 = conversion factor, 10^6 pCi/ μ Ci \times 8760 hr/yr

2.4×10^{10} = conversion factor, (1m² pCi per yr day μ Ci)

Since $(\overline{x/q})_v$ and $(\overline{d/q})_v$ (and therefore W) are assumed to
be constant in equation 5, equation 5 may be reduced to

$$9) \text{DR} = \sum_i \text{PW}_i \times \text{Qi} \leq 1500 \text{ mrem/yr} \quad \text{to any organ.}$$

where $\text{PW}_i = \frac{P_{i \text{ inhalation}} \times (\overline{x/q})_v + P_{i \text{ ground plain}} (\overline{d/q})_v \times P_{i \text{ Food}}}{x (\overline{d/q})_v}$
and is determined for each organ.

See Table 3-1 to locate tabulated values of PW_i .

3.3 Dose Due to Noble Gases

The air dose in unrestricted areas due to noble gases released in gaseous effluents shall be less than or equal to 5 mrad for gamma radiation and 10 mrad for beta radiation for any calendar quarter for each unit. The general objective of less than or equal to 10 mrad of gamma radiation and 20 mrad of beta radiation for a calendar year per unit (2.5 mrad and 5 mrad respectively per quarter) should be used for planning releases.

The air dose in unrestricted area due to noble gases released in gaseous effluents should be determined by the following expressions:

During any calendar quarter, for gamma radiation:

$$1) \quad 3.17 \times 10^{-8} \sum_i [M_i \left[(\overline{x/Q}) \tilde{Q}_i + (\overline{x/q}) \tilde{q}_i \right]] = D \text{ mrad}$$

During any calendar quarter, for beta radiation:

$$2) \quad 3.17 \times 10^{-8} \sum_i N_i \left[(\overline{x/Q}) \tilde{Q}_i + (\overline{x/q}) \tilde{q}_i \right] = D \text{ mrad}$$

where:

M_i = The air dose factor due to gamma emissions for each identified noble gas radionuclide, in mrad/yr per $\mu\text{Ci}/\text{m}^3$

N_i = The air dose factor due to beta emissions for each identified noble gas radionuclide, in mrad/yr per $\mu\text{Ci}/\text{m}^3$

$(\overline{x/Q})$ = 0 sec/m^3 For vent releases. The highest calculated annual average relative concentration for area at or beyond the unrestricted area boundary for long term releases (greater than 500 hrs/year).

$(\overline{x/q})$ = 2.8×10^{-6} sec/m^3 For vent releases. The relative concentration for areas at or beyond the unrestricted area boundary for short term releases (equal to or less than 500 hrs/year).

\tilde{Q}_i = The average release of noble gas radionuclides in gaseous effluents, i, for long term releases (greater than 500 hrs/yr) from all vents, in μCi . Releases shall be cumulative over the calendar quarter or year as appropriate.

\tilde{q}_i = The average release of noble gas radionuclides in gaseous effluents, i, for short term releases (equal to or less than 500 hrs/year) from all vents, in μCi . Releases shall be cumulative over the calendar quarter or year as appropriate.

D = The "dose" for the type of radiation and time frame in question.

3.17×10^{-8} = The inverse of the number of seconds per year.

The above equations have been simplified from the equations found in NuReg 0133 Rev. 0, because we have no free-standing stacks. We will simplify the equation further by saying that there are no long term releases. We will take weekly samples from the unit vents (continuous release points) and use a release period of 168 hours per sample (i.e. consider items as short term releases). Individual samples will be taken for each batch release.

Equation "1") has been reduced to;

$$D \leq 3.17 \times 10^{-8} \sum MX_i q_i$$

and equation "2") has been reduced to;

$$D \leq 3.17 \times 10^{-8} \sum NX_i q_i$$

Where:

$$MX_i = M_i \times (\bar{x}/q) \times 10^6 \text{ pCi}/\mu\text{Ci}$$

$$NX_i = N_i \times (\bar{x}/q) \times 10^6 \text{ pCi}/\mu\text{Ci} \text{ (see table 3-1)}$$

q_i = has been previously defined.

3.4 Dose Due to Radioiodines, and Particulates in Gaseous Effluents

3.4.1 Dose Equation-Particulates, etc.

The dose to an individual from radioiodines, radioactive materials in particulate form and radionuclides other than noble gases, with half lives greater than 8 days in gaseous effluents released to unrestricted areas shall be as specified in the technical specifications. (Radioactive Gaseous Effluents-Dose Particulates) This section will provide the calculational methodology for verification that the limits are not exceeded.

$$D_{\tau} \leq 3.17 \times 10^{-8} \sum_i R_i [\bar{w}_c \bar{Q}_{is} + \bar{w}_s \bar{q}_{is} + \bar{w} \bar{Q}_i + \bar{w} \bar{q}_i]$$

where:

D_{τ} = Dose to the whole body or any organ.

\bar{Q} = The releases of radionuclides, radioactive materials in particulate form and radionuclides other than noble gases in gaseous effluents, i, for long term releases greater than 500 hrs/yr., in μCi . Releases shall be cumulative over the calendar quarter or year as appropriate.

W = The dispersion parameter for estimating the dose to an individual at the controlling location for long term releases (greater than 500 hrs/yr.):

$$W = (\overline{X/Q}) \quad \text{for the inhalation pathway, in } \frac{\text{sec}}{\text{m}^3}$$

$$W = (\overline{D/Q}) \quad \text{for the food and ground plane pathways in meters}^{-2}.$$

w = The dispersion parameter for estimating the dose to an individual at the controlling location for short term releases (equal to or less than 500 hrs/yr.):

$$w = 2.8 \times 10^{-6} \quad \text{for the inhalation pathway in } \frac{\text{sec}}{\text{m}^3}$$

$$w = 1.4 \times 10^{-8} \quad \text{for the food and ground plane pathway in meters}^{-2}.$$

3.17×10^{-8} = The inverse of the number of seconds in a year.

R_i = The dose factor for organ τ , for each identified radionuclide, i , in $\text{m}^2(\text{mrem}/\text{yr})$ per $\mu\text{Ci} \cdot \text{sec}$ or mrem/yr per $\mu\text{Ci}/\text{m}^3$ calculation method in section 3.4.2.

A dispersion parameter of $2.8 \times 10^{-6} \text{sec}/\text{m}^3$ (as per ANO Unit II, F.S.A.R., Section 2.3.4.4., Page 2.3-30) will be used for "w" for the inhalation pathway. The reasons for using this value are as follows:

- The majority of our releases are going to be in the 8-24 hour range (these being waste gas decay tanks and reactor building purges.)
- The majority of the gaseous activity released from the site will be released from the waste gas decay tanks and reactor building purges, within the time frame of 8 to 24 hours.

A dispersion parameter of $1.4 \times 10^{-8} \text{meters}^{-2}$ will be used for the food on ground plane pathways. This assumes a deposition velocity of $5 \times 10^{-3} \text{meters}/\text{sec}$; as obtained from the ANO-2 F.S.A.R., Page 11.3-15.

The quantity W.Q. (that is the values for long term releases) is dropped because we will not consider long term releases. (see Section 3.3)

There are no free standing stacks at ANO, therefore, we will delete the terms pertaining to stacks.

The previous equation reduces to:

$$D_{\tau} = 3.17 \times 10^{-8} \sum_i RW_i q_i$$

where $RW_i = R_i \times W_i$ for nuclide i , for organ τ , (see Table 3-1 to locate the tabulated values).

3.4.2 Calculation of R_i (or RW_i)

3.4.2.0 Introduction:

This part of the ODCM deals with the computation of pathway dose factors (R_i). These factors are for isotopes found in gaseous releases (the isotopes being in particulate form, radioiodine and tritium). Each potential pathway for the isotope to enter man is expressed in the form of an equation. These equations are then summed together so the total dose contribution for each isotope can be obtained.

There are four age groups for which these factors are to be considered: adult, teenager, child and infant. The infant and child are the least tolerant to radiation. Thus, they also possess the most restrictive limits as to how much radioactive gas can be released per unit time. Therefore, only these two age groups will be calculated, since it becomes apparent that if the limits for these two age groups are met, then the limits for the less restrictive teenager and adult groups must have been satisfied also.

In developing the R_i values, separate expressions are written for each of the potential pathways. These expressions are denoted by $R_i^G[D/Q]$, $R_i^I[X/Q]$, $R_i^C[D/Q]$, $R_i^M[D/Q]$ and $R_i^V[D/Q]$, where the superscripts G, I, C, M and V refer to ground plane, inhalation, cow's milk, meat and vegetation, respectively. The 'argument' notation, $()$, indicates the appropriate dispersion parameter, W, to be applied with the R_i factor. In the case of tritium, the dispersion parameter, W, is always taken as (X/Q) . The R_i values are listed in tabular form at the end of the ODCM.

Each of the five pathways mentioned in the above paragraph will, at this time, be considered and reduced to as simple an expression as possible.

3.4.2.1. Inhalation Pathway Factor, $R_i^I[X/Q]$

$$R_i^I[X/Q] = [K'(BR)_a (DFA_i)_a (\text{mrem/yr per } \mu\text{Ci/m}^3)] X/Q$$

where:

$$X/Q = 2.8 \text{ E-6 sec/m}^3$$

K' = a constant of unit conversion, $10^6 \text{ pCi}/\mu\text{Ci}$.

$$\text{Combining terms: } X/Q \times K' = (2.8\text{E}6)(10^6) = 2.8$$

$$R_i^I[X/Q] = 2.8(BR)_a (DFA_i)_a$$

$$(BR)_a = \frac{\text{the breathing rate of the receptor of age group (a) in m}^3/\text{yr}}{\text{m}^3/\text{yr}}$$

$(DFA_i)_a$ = the maximum organ inhalation dose factor for the receptor of age group (a) for the i th radionuclide, in mrem/pCi. The total body is considered as an organ in the selection of $(DFA_i)_t$.

The breathing rates $(BR)_a$ for the various age groups are tabulated below, as given in Table E-5 of the Regulatory Guide 1.109.

Age Group (a)	Breathing Rate (m^3/yr)
Infant	1400
Child	2700
Teen	8000
Adult	8000

Inhalation dose factors (DFA_i)_a for the various age groups are given in Tables E-7 through E-10 of Regulatory Guide 1.109. (See Table 3-1)

3.4.2.2. Ground Plane Pathway Factor, R_i^G [D/Q]

$$R_i^G[D/Q] = [K'K''(SF)DFG_i[(1-e^{-\lambda_i t})/\lambda_i](m^2mrem/yr \text{ per } \mu Ci/sec)]5E-3 \cdot \chi/Q$$

Where:

K' = a constant of unit conversion, 10^6 pCi/ μ Ci.

K'' = a constant of unit conversion, 8760 hr/yr.

λ_i = the decay constant for the i th radionuclide, sec^{-1} .

t = the exposure time, 4.73×10^8 sec (15 years).

DFG_i = the ground plane dose conversion factor for the i th radionuclide (mrem/hr per pCi/ m^2).

$5E-3$ = sec/m disposition factor.

SF = the shielding factor (dimensionless).

χ/Q = $2.8E-6(sec/m^3)$

A shielding factor of 0.7 is suggested in Table E-15 of Regulatory Guide 1.109. A tabulation of DFG_i values is presented in Table E-6 of Regulatory Guide 1.109.

Combining terms, the above equation can be expressed in the following manner:

$$R_i^G[D/Q] = ([6.13E9 DFG_i[(1-e^{-\lambda_i 4.73E8})/\lambda_i] \times 5E-3 \times 2.8E-6$$

where: $6.13 E9 = K' \times K'' \times 0.7$

NOTE: This equation is the same for all age groups.

Combining terms: $6.13 \times 10^9 \times 5 \times 10^{-3} \times 2.8 \times 10^6 =$

$$R_i^G[D/Q] = 85.8 DFG_i[(1-e^{-\lambda_i 4.73E8})/\lambda_i]$$

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3.4.2.3. Grass-Cow-Milk Pathway Factor, $R_i^C[D/Q]$

$$R_i^C[D/Q] = \left[K' \frac{Q_F (U_{ap})}{\lambda_i + \lambda_w} F_m(r) (DFL_i)_a \left[\frac{f_p f_s}{Y_p} + \frac{(1-f_p f_s) e^{-\lambda_i t_h}}{Y_s} \right] e^{-\lambda_i t_f} \right] 5E-3 \chi/Q \text{ (m}^2 \text{xmrem/yr per } \mu\text{Ci/sec)}$$

The quantity $f_p f_s = 1$ by definition (until site specific data is available via land census), and so everything within the inner brackets reduces to $[1/4]$, or $[1/0.7]$ or $[1.43]$, (see below).

$$\therefore K' \times Q_F \times (U_{ap}) \times [1.43] = 2.36E10$$

\therefore The equation can be written:

$$R_i^C[D/Q] = \left[\frac{(2.36E10) (F_m) (r) (DFL_i)_a (e^{-\lambda_i 1.73E5})}{(\lambda_i + 5.73E-7)} \right] \chi/Q \times 5E-3$$

Where:

$$\chi/a = 2.8E-6 \text{ sec/m}^3$$

K' = a constant of unit conversion, $10^6 \text{ pCi}/\mu\text{Ci}$.

Q_F = the cow's consumption rate, in kg/day wet weight.

U_{ap} = the receptor's milk consumption rate for age (a), in liters/yr.

Y_p = the agricultural productivity by unit area of pasture feed grass, in kg/m^2 .

Y_s = the agricultural productivity by unit area of stored feed, in kg/m^2 .

F_m = the stable element transfer coefficients, in days/liter.

r = fraction of deposited activity retained on cow's feed grass.

$(DFL_i)_a$ = the maximum organ ingestion dose factor for the i th radionuclide for the receptor in age group (a), in mrem/pCi.

λ_i = the decay constant for the i th radionuclide, in sec^{-1} .

λ_w = the decay constant for removal of activity on leaf and plant surfaces by weathering, $5.73 \times 10^{-7} \text{ sec}^{-1}$ (corresponding to a 14 day half-life).

t_f = the transport time from pasture to cow, to milk, to receptor, in sec.

t_h = the transport time from pasture, to harvest, to cow, to milk, to receptor, in sec.

f_p = fraction of the year that the cow is on pasture (dimensionless).

f_s = fraction of the cow feed that is pasture grass while the cow is on pasture (dimensionless).

$5E-3$ = m/sec disposition factor.

Combining terms: $(2.36E10)(2.8E-6)(5E-3) = 330$

$$R_i^C[D/Q] = \frac{(330)(F_m)(r)(DFL_i)_a(e^{-\lambda_i 1.73E5})}{(\lambda_i + 5.73E-7)}$$

SPECIAL NOTE: The above equation is applicable in the case that the milk animal is a goat.

Milk cattle are considered to be fed from two potential sources, pasture grass and stored feeds. Following the development in Regulatory Guide 1.109, the values of f_p and f_s will be considered unity, in lieu of site specific information provided in the annual land census report by the licensee.

Tabulated below are the appropriate parameter values and their reference to Regulatory Guide 1.109. In the case that the milk animal is a goat, rather than a cow, refer to Regulatory Guide 1.109 for the appropriate parameter values.

Parameter	Value	RG. 1.109
r (dimensionless)	1.0 for radioiodine 0.2 for particulates	E-15 E-15
F_m (days/liter)	Each stable element	E-1
U_{ap} (liters/yr)-Infant	330	E-5
-Child	330	E-5
-Teen	400	E-5
-Adult	310	E-5
$(DFL_i)_a$ (mrem/pCi)	Each radionuclide	E-11 to E-14
Y_p (kg/m ²)	0.7	E-15
Y_s (kg/m ²)	2.0	E-15
(seconds)	1.73×10^5 (2 days)	E-15
(seconds)	7.78×10^6 (90 days)	E-15
(kg/day)	50	E-3

The concentration of tritium in milk is based on the airborne concentration rather than the deposition. Therefore, the R_i^C is based on $[X/Q]$:

$$R_i^C[X/Q] = [K'K''' F_m Q U_{ap} (DFL_i)_a [0.75(0.5/H)] (\text{mrem/yr per } \mu\text{Ci/m}^2)] X/a$$

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where: $\chi/a = 2.8E-6 \text{ sec/m}^3$

$K''' =$ a constant on unit conversion, 10^3 gm/kg .

$H =$ absolute humidity of the atmosphere, in gm/m^3 .

0.75 = the fraction of total feed that is water.

0.5 = the ratio of the specific activity of the feed grass water to the atmospheric water. Other parameters and values are given above. The value of H may be considered as 8 grams/meter^3 , in lieu of site specific information (as per NuReg 0133, 5.3.1.3., Page 34, Paragraph 1).

Combining terms $\chi/Q (K' \times K''' \times U_{ap} \times (0.75(0.5/8))) = 4.5E4$

$$\therefore R_i^C[\chi/Q] = (4.5E4)(F_m)(DFL_i)_a$$

3.4.2.4. Grass-Cow-Meat Pathway Factor, $R_i^M[D/Q]$

The integrated concentration in meat follows in a similar manner to the development for the milk pathway, therefore:

$$R_i^M[D/Q] = \left[K' \frac{Q_F (U_{ap})}{\lambda_i + \lambda_w} F_f(r) (DFL_i)_a \left[\frac{f_p f_s}{Y_p} + \frac{(1-f_p f_s) e^{-\lambda_i t_h}}{Y_s} \right] e^{-\lambda_i t_f} \right] 5E-3 \times \chi/Q$$

(m².mrem/yr per $\mu\text{Ci/sec}$)

where:

5E-3 = m/sec deposition factor.

$F_f =$ the stable element transfer coefficients, in days/kg.

$U_{ap} =$ the receptor's meat consumption rate for age (a), in kg/yr.

$t_f =$ the transport time from pasture to receptor, in sec.

$t_h =$ the transport time from crop field to receptor, in sec.

$\chi/a = 2.8E-6 \text{ sec/m}^3$.

Tabulated below are the appropriate parameter values and their reference to Regulatory Guide 1.109:

Parameter	Value	RG 1.109
r (dimensionless)	1.0 for radioiodine	E-15
	0.2 for particulates	E-15
F _f (days/kg)	Each stable element	E-1
U _{ap} (kg/yr)	0	E-5
- Infant	41	E-5
- Child	65	E-5
- Teen	110	E-5
- Adult	Each radionuclide	E-11 to E-14
(DFL _i) _a (mrem/pCi)	0.7	E-15
Y _p (kg/m ²)	2.0	E-15
Y _s (kg/m ²)	1.73 x 10 ⁶ (20 days)	E-15
t _f (seconds)	7.78 x 10 ⁶ (90 days)	E-15
t _h (seconds)	50	E-3
Q _F (kg/day)		

The above equation can be reduced and rearranged to the following after inverting the appropriate values:

$$R_i^M[D/Q] = \left[\frac{(2.36E10)(F_f)(r)(DFL_i)_a (e^{-\lambda_i 1.73E6})}{(\lambda_i + 5.7E-7)} \right] \chi/Q \times 5E-3$$

Equation 3.4.2.4. was reduced in the same manner as was equation 3.4.2.3., and for the same reasons.

Combining terms: $(\chi/Q)(5E-3)(2.36E10) = 330$

$$R_i^M[D/Q] = \frac{(330)(F_f)(r)(DFL_i)_a (e^{-\lambda_i 1.73E6})}{(\lambda_i + 5.7E-7)}$$

The concentration tritium in meat based on its airborne concentration rather than the deposition. Therefore, the R_i^M is based on $[\chi/Q]$:

$$R_i^M[\chi/Q] = [K'K'''F_f Q_F U_{ap} (DFL_i)_a [0.75(0.5/H)] (\text{mrem/yr per } \mu\text{Ci/m}^3)] \chi/Q$$

where all terms are defined above and in Section 3.4.2.3. of this manual.

The equation for tritium contribution via the meat pathway is reduced to the following expression.

$$R_i^M[\chi/Q] = 4.5E4 \times F_f \times (DFL_i)_a \quad \text{where:}$$

$$4.5E4 = [K' \times K''' \times U_{ap} \times (0.75(0.5/8))] \chi/Q$$

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3.4.2.5. Vegetation Pathway Factor, $R_i^V[D/Q]$

The integrated concentration in vegetation consumed by man follows the expression developed in the derivation of the milk factor. Man is considered to consume two types of vegetation (fresh and stored) that differ only in the time period between harvest and consumption, therefore:

$$R_i^V[D/Q] = \left[K' \left[\frac{(r)}{Y_y(\lambda_i + \lambda_w)} \right] (DFL_i)_a \left[U_{afL}^L e^{-\lambda_i t_L} + U_{afg}^S e^{-\lambda_i t_h} \right] \right] \\ \times 5E-3 \times \chi/Q \quad (m^2 \cdot mrem/yr \text{ per } \mu Ci/sec)$$

where:

$$\chi/Q = 2.8E-6 \text{ sec}/m^3.$$

K' = a constant of unit conversion, $10^6 \text{ pCi}/\mu\text{Ci}$.

U_a^L = the consumption rate of fresh leafy vegetation by the receptor in age group (a), in kg/yr.

U_a^S = the consumption rate of stored vegetation by the receptor in age group (a), in kg/yr.

f_L = the fraction of the annual intake of fresh leafy vegetation grown locally.

f_g = the fraction of the annual intake of stored vegetation grown locally.

t_L = the average time between harvest of leafy vegetation and its consumption, in seconds.

t_h = the average time between harvest of stored vegetation and its consumption, in seconds.

Y = the vegetation areal density, in kg/m^2 .

$5E-3$ = deposition factor (m/sec).

and all other factors are defined in Section 3.4.2.3. of this manual.

Tabulated below are the appropriate parameter values and their reference to Regulatory Guide 1.109.

Parameter	Value	RG1.109
r (dimensionless)	1.0 for radioiodines	E-1
	0.2 for particulates	E-1
(DFL _i) _a (mrem/pCi)	Each radionuclide	E-11 to E-14
U _a ^L (kg/yr)	- Infant	E-5
	- Child	E-5
	- Teen	E-5
	- Adult	E-5
U _a ^S (kg/yr)	- Infant	E-5
	- Child	E-5
	- Teen	E-5
	- Adult	E-5
f _L (dimensionless)	site specific (default = 1.0)	
f _g (dimensionless)	site specific (default = 0.76) (see Ref. 6, Page 28)	
t _L (seconds)	8.6 x 10 ⁴ (1 day)	E-15
t _h (seconds)	5.18 x 10 ⁶ (60 days)	E-15
Y _v (kg/m ²)	2.0	E-15

Rearranging the above equation and maintaining appropriate values:

$$R_i^V[D/Q] = \left[\frac{5E5(r)(DFL_i)_a [26e^{-\lambda_i 8.6E4} + 395e^{-\lambda_i 5.18E6}]}{(\lambda_i + 5.73E-7)} \right] \times \chi/Q \times 5E-3$$

Combining terms: (5E5)(5E-3)(χ/Q) = 7E-3

$$R_i^V[D/Q] = \frac{(7E-3)(r)(DFL_i)_a [(26e^{-\lambda_i 8.6E4} + 395e^{-\lambda_i 5.18E6})]}{(\lambda_i + 5.73E-7)}$$

The concentration of tritium in vegetation is based on the airborne concentration rather than the deposition. Therefore, the R_i^V is based on $[\chi/Q]$:

$$R_i^V[\chi/Q] = (K'K''' [U_a^L f_L + U_a^S f_g] (DFL_i)_a [0.75(0.5/H)] \text{ (mrem/yr per } \mu\text{Ci/m}^3)) \times \chi/Q$$

where all terms have been defined above and in Section 3.4.2.3. of this manual.

This equation reduces to the following after inserting the appropriate value:

$$R_i[\chi/Q] = 7.42E4 \times (DFL_i)_a$$

$$\text{where: } 7.42E4 = (K' \times K''' \times [U_a^L f_L + U_a^S f_g] \times [0.75(0.518)]) \times \chi/Q$$

Calculation for the Infant

A value of zero is assigned to the U_{ap} parameter in the grass-cow-meat pathway for the infant. A zero value is also assigned to the U_a^L and U_a^S parameters in the grass-cow-vegetation pathway. The reason for this is that it is assumed that there is zero consumption via the meat and vegetation pathways for an infant. Therefore:

$$R_i = R_i^I[X/Q] + R_i^G[D/Q] + R_i^C[D/Q]$$

after substituting the expanded expressions for the various pathways considered here, the expression becomes:

$$R_i = [(3920)(DFA_i)_a] + (85.8)(DFG_i)[(1 - e^{-\lambda_i 4.73E8})/\lambda_i] + \frac{(330)(F_m)(r)(DFL_i)_a(e^{-\lambda_i 1.73E5})}{(\lambda_i + 5.73E-7)}$$

Where: $3920 = 2.8 (BR)_a$ for an infant.

$1.0E-2 = F_m$ as per table C-1 in NuReg 1.109 (for tritium).
 $3.08E-7 = (DFL_i)_a$ for tritium as per Table E-14 in NuReg 1.109.
 All other terms as defined previously. The tritium factor is calculated as follows:

$$R_i^I[X/Q] + R_i^C[X/Q] = (2.8(BR)_a)(DFA_i)_a + (4.5E4)(F_m)(IFL_i)_a$$

Substituting values the equation becomes:

$$R_i = [2.8(1400)(4.62E-7)] + [4.5E4(1.0E-2)(3.08E-7)] = 1.95E-3$$

Calculations for the Child

All five pathways are applicable for the child, therefore, the summation for each isotope is:

$$R_i = R_i^I[X/Q] + R_i^G[D/Q] + R_i^C[D/Q] + R_i^M[D/Q] + R_i^V[D/Q], \text{ or}$$

$$R_i = [(10360)(DFA_i)_a] + (85.8DFG_i)[(1 - e^{-\lambda_i 4.73E8})/\lambda_i] + \left(\frac{(330)(F_m)(r)(DFL_i)_a(e^{-\lambda_i 1.73E5})}{(\lambda_i + 5.7E-7)} \right) + \left(\frac{(330)(F_f)(r)(DFL_i)_a(e^{-\lambda_i 1.73E6})}{(\lambda_i + 5.7E-7)} \right) + ((7E-3)(r)(DFL_i)_a[(26e^{-\lambda_i 8.6E4} + 395e^{-\lambda_i 5.18E6})])$$

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where:

$$10360 = (2.8)(BR)_a = (2.8)(3700)$$

The tritium factor for the child is calculated as follows:

$$R_i = R_i^I [\lambda/Q] + R_i^C [\lambda/Q] + R_i^M [\lambda/Q] + R_i^V [\lambda/Q] \text{ or}$$
$$R_i = [2.8(BR)_a(DFA_i)_a] + [4.5E4(F_m)(DFL_i)_a] + [4.5E4(F_f)(DFL_i)_a] + [7.42E4(DFL_i)_a]$$

Substituting values:

$$R_i = [2.8(3700)(3.04E-7)] + [4.5E4(1.0E-2)(3.04E-7)] + [4.5E4(1.2E-2)(3.04E-7)] + [7.42E4(3.04E-7)]$$

$$R_i = 2.6E-2$$

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Table 3-1
Contents of ODCM Record File

<u>Variable</u>	<u>Record #</u>	<u>Elements</u>	<u>Description</u>
A _{IT}	62	16-100	Adult bone dose factor, liquid release
A _{IT}	63	16-100	Adult liver dose factor, liquid release
A _{IT}	64	16-100	Adult total body dose factor, liquid release
A _{IT}	65	16-100	Adult thyroid dose factor, liquid release
A _{IT}	66	16-100	Adult kidney dose factor, liquid release
A _{IT}	67	16-100	Adult lung dose factor, liquid release
A _{IT}	68	16-100	Adult GI-LLI dose factor, liquid release
BFI	61	16-100	Bio-accumulation factors for freshwater fish (Reg Guide 1.109 Table A-1)
DFA _i	31	16-100	Infant inhalation dose factor for bones
DFA _i	32	16-100	Infant inhalation dose factor for liver
DFA _i	33	16-100	Infant inhalation dose factor for total body
DFA _i	34	16-100	Infant inhalation dose factor for thyroid
DFA _i	35	16-100	Infant inhalation dose factor for kidneys
DFA _i	36	16-100	Infant inhalation dose factor for lungs
DFA _i	37	16-100	Infant inhalation dose factor for GI-LLI
DFA _i	46	16-100	Child inhalation dose factor for bone
DFA _i	47	16-100	Child inhalation dose factor for liver
DFA _i	48	16-100	Child inhalation dose factor for total body
DFA _i	49	16-100	Child inhalation dose factor for thyroid
DFA _i	50	16-100	Child inhalation dose factor for kidney
DFA _i	51	16-100	Child inhalation dose factor for lung
DFA _i	52	16-100	Child inhalation dose factor for GI-LLI
DFG _I	21	16-100	Skin external dose factor for standing on contaminated ground. (R.G. 1.109 Table E-9)

<u>Variable</u>	<u>Record #</u>	<u>Elements</u>	<u>Description</u>
DFG _i	22	16-100	Total body external dose factor for standing on contaminated ground (R.G. 1.109 Table E-9)
DFL _i	24	16-100	Infant ingestion dose factor for bone
DFL _i	25	16-100	Infant ingestion dose factor for liver
DFL _i	26	16-100	Infant ingestion dose factor for total body
DFL _i	27	16-100	Infant ingestion dose factor for thyroid
DFL _i	28	16-100	Infant ingestion dose factor for kidney
DFL _i	29	16-100	Infant ingestion dose factor for lung
DFL _i	30	16-100	Infant ingestion dose factor for GI-LLI
DFL _i	39	16-100	Child ingestion dose factor for bone
DFL _i	40	16-100	Child ingestion dose factor for liver
DFL _i	41	16-100	Child ingestion dose factor for total body
DFL _i	42	16-100	Child ingestion dose factor for thyroid
DFL _i	43	16-100	Child ingestion dose factor for kidney
DFL _i	44	16-100	Child ingestion dose factor for lung
DFL _i	45	16-100	Child ingestion dose factor for GI-LLI
F _f	53	16-100	Stable element transfer data-meat (R.G. 1.109, Table E-1)
F _m	23	16-100	Stable element transfer data-cow (R.G. 1.109, Table E-1)
HL _i	38	1-100	Radioisotope halflife in seconds
K _i	21	1-15	Gamma body dose factor (R.G. 1.109, Table B-1)
LM _i	5	1-15	Skin dose factors-gas release, $\left(L_i + 1.1 M_i \right) \times \left(\frac{x}{q} \right) \times 10^6$ L _i values from Reg. Guide 1.109
M _i	23	1-15	Gamma air dose factors-gas release (R.G. 1.109, Table B-1)
MX _i	6	1-15	M _i x (x/q) for gas release
N _i	24	1-15	Beta air dose factor-gas release (R.G. 1.109, Table B-1)

<u>Variable</u>	<u>Record #</u>	<u>Elements</u>	<u>Description</u>
NX_i	7	1-15	$N_i \times (\bar{x}/q)$
PW_i	4	16-100	Infant unshielded skin dose factor-gas release, $\Sigma P_i \times W$ for the ground plane, inhalation, and food pathways
PW_i	5	16-100	Infant unshielded total body doses factor-gas release
PW_i	6	16-100	Infant bone dose factors-gas release
PW_i	7	16-100	Infant liver dose factor-gas release
PW_i	8	16-100	Infant thyroid dose factor-gas release
PW_i	9	16-100	Infant kidney dose factor-gas release
PW_i	10	16-100	Infant lung dose factor-gas release
PW_i	11	16-100	Infant GI-LLI dose factor-gas release
RW_i	12	16-100	Infant shielded skin dose factors-gas release (ground plane)
RW_i	13	16-100	Infant shielded total body dose factor-gas release
RW_i	14	16-100	Child bone dose factor-gas release
RW_i	15	16-100	Child liver dose factor-gas release
RW_i	16	16-100	Child thyroid dose factor-gas release
RW_i	17	16-100	Child kidney dose factor-gas release
RW_i	18	16-100	Child lung dose factor-gas release
RW_i	19	16-100	Child GI-LLI dose factor-gas release
RW_i	20	16-100	Child shielded total body dose factor-gas release
XK_i	4	1-15	$K_i \times (\bar{x}/q) \times 10^6$; total body dose rate factor-gas release

AR-41	2. 475E-02	ZR-97	6. 930E-02
KR-83M	2. 117E-07	NB-94	0. 000E-01
KR-85M	3. 276E-03	NB-95	1. 614E 00
KR-85	4. 508E-05	MO-90	0. 000E-01
KR-87	1. 658E-02	MO-99	9. 342E-02
KR-88	4. 116E-02	TC-99M	4. 223E-03
KR-89	4. 648E-02	RU-103	1. 271E 00
KR-90	+ 368E-02	RU-106	3. 792E 00
XE-131M	3. 562E-04	AG-110M	3. 510E 01
XE-132M	7. 028E-04	CD-109	0. 000E-01
XE-133	8. 232E-04	CD-113M	0. 000E-01
XE-135M	8. 736E-03	SN-113	0. 000E-01
XE-135	5. 068E-03	SB-122	0. 000E-01
XE-137	3. 976E-03	SB-124	0. 000E-01
XE-138	2. 472E-02	SB-125	0. 000E-01
H-3	0. 000E-01	SB-127	0. 000E-01
BE-7	0. 000E-01	TE-132	9. 944E-02
C-14	0. 000E-01	I-131	2. 087E-01
NA-24	2. 776E-01	I-132	2. 905E-02
P-32	0. 000E-01	I-133	6. 019E-02
K-40	0. 000E-01	I-134	1. 073E-02
CR-51	5. 520E-02	I-135	5. 970E-02
MN-54	1. 305E 01	CS-134	3. 960E 01
MN-56	2. 145E-02	CS-136	1. 690E 00
FE-55	0. 000E-01	CS-137	1. 862E 01
FE-59	3. 210E 00	CS-138	8. 510E-03
CO-56	0. 000E-01	BA-139	2. 370E-03
CO-57	0. 000E-01	BA-140	2. 349E-01
CO-58	4. 465E 00	LA-140	4. 361E-01
CO-60	6. 832E 01	CE-139	0. 000E-01
NI-63	0. 000E-01	CE-144	6. 703E-01
NI-65	7. 015E-03	EU-152	0. 000E-01
CU-64	1. 375E-02	W-187	5. 478E-02
ZN-65	7. 492E 00	HG-203	0. 000E-01
SE-75	0. 000E-01	PB-214	0. 000E-01
BR-84	4. 726E-03	BI-214	0. 000E-01
RB-88	7. 559E-04	RA-226	0. 000E-01
RB-89	2. 981E-03	TH-228	0. 000E-01
SR-85	0. 000E-01	U-235	0. 000E-01
SR-89	2. 507E-04	NP-239	1. 985E-02
SR-90	0. 000E-01	AAAAAAA	0. 000E-01
SR-91	5. 155E-02	BBBBBBB	0. 000E-01
SR-92	1. 726E-02	CCCCCCC	0. 000E-01
Y-88	0. 000E-01	DDDDDDD	0. 000E-01
Y-90	1. 058E-04	EEEEEEE	0. 000E-01
Y-91M	2. 321E-03	FFFFFFF	0. 000E-01
Y-91	1. 208E-02	GGGGGGG	0. 000E-01
Y-92	4. 269E-03	HHHHHHH	0. 000E-01
Y-93	4. 747E-03	IIIIIII	0. 000E-01
ZR-95	2. 903E 00	JJJJJJJ	0. 000E-01

XK_i - elements 1+15, total body dose factor - gas release
 $= K_i \times (x/q) \times 10^6$ (sec/yr per $\mu\text{Ci}/\text{mrem}$)

PW_i - elements 16+100, infant unshielded skin dose factor - gas release,
 $= EP_i \times W$ (mrem sec/yr μCi)

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AR-41	3. 618E-02	ZR-97	5. 959E-02
KR-83M	5. 944E-05	NB-94	0. 000E-01
KR-85M	7. 876E-03	NB-95	1. 284E 00
KR-85	3. 805E-03	MO-90	0. 000E-01
KR-87	4. 625E-02	MO-99	6. 666E-01
KR-88	5. 345E-02	TC-99M	3. 696E-03
KR-89	8. 156E-02	RU-103	1. 091E 00
KR-90	7. 062E-02	RU-106	3. 191E 00
XE-131M	1. 813E-03	AG-110M	3. 261E 01
XE-133M	3. 790E-03	CD-109	0. 000E-01
XE-133	1. 944E-03	CD-113M	0. 000E-01
XE-135M	1. 234E-02	SN-113	0. 000E-01
XE-135	1. 112E-02	SB-122	0. 000E-01
XE-137	3. 881E-02	SB-124	0. 000E-01
XE-138	3. 993E-02	SB-125	0. 000E-01
H-3	8. 400E-03	SB-127	0. 000E-01
BE-7	0. 000E-01	TE-132	2. 237E-01
C-14	7. 136E 00	I-131	1. 055E 01
NA-24	4. 899E-01	I-132	2. 822E-02
*P-32	5. 403E 01	I-133	2. 910E-01
K-40	0. 000E-01	I-134	1. 090E-02
CR-51	4. 860E-02	I-135	6. 018E-02
MN-54	1. 127E 01	CS-134	1. 301E 02
MN-56	1. 815E-02	CS-136	1. 982E 01
FE-55	3. 365E-01	CS-137	7. 685E 01
FE-59	4. 482E 00	CS-138	8. 951E-03
U-56	0. 000E-01	BA-139	2. 107E-03
CO-57	0. 000E-01	BA-140	3. 180E-01
CO-58	4. 544E 00	LA-140	3. 850E-01
CO-60	6. 105E 01	CE-139	0. 000E-01
NI-63	1. 730E 01	CE-144	1. 075E 00
NI-65	6. 036E-03	EU-152	0. 000E-01
OU-64	1. 235E-02	W-187	4. 739E-02
ZN-65	1. 246E 02	HG-203	0. 000E-01
SE-75	0. 000E-01	PB-214	0. 000E-01
BR-84	5. 172E-03	BI-214	0. 000E-01
RB-88	1. 465E-03	RA-226	0. 000E-01
RB-89	3. 060E-03	TH-228	0. 000E-01
SR-85	0. 000E-01	U-235	0. 000E-01
SR-89	4. 144E 00	NP-239	1. 720E-02
SR-90	4. 478E 02	AAAAAAA	0. 000E-01
SR-91	4. 426E-02	BBBBBBB	0. 000E-01
SR-92	1. 554E-02	CCCCCCC	0. 000E-01
Y-88	0. 000E-01	DDDDDDD	0. 000E-01
Y-90	3. 367E-04	EEEEEEE	0. 000E-01
Y-91M	2. 005E-03	FFFFFFF	0. 000E-01
Y-91	5. 467E-02	GGGGGGG	0. 000E-01
Y-92	3. 597E-03	HHHHHHH	0. 000E-01
Y-93	3. 481E-03	IIIIIII	0. 000E-01
ZR-95	2. 559E 00	JJJJJJJ	0. 000E-01

LM_i - elements 1-15, skin dose factors - gas release
 $= (L_i + 1.1 M_i) \times (\chi/q) \times 10^6$ (mrem/ μ Ci per yr/sec)

PW_i - elements 16-100, infant unshielded total body dose factor - gas release
 $= EP_i \times W$ (mrem sec/yr μ Ci)

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AR-41	2. 604E-02	ZR-97	4. 195E-04
KR-83M	5. 404E-05	NB-94	0. 000E-01
KR-85M	3. 444E-03	NB-95	5. 024E-02
KR-85	4. 816E-05	MO-90	0. 000E-01
KR-87	1. 728E-02	MO-99	0. 000E-01
KR-88	4. 256E-02	99M	2. 989E-07
KR-89	4. 844E-02	J-103	5. 740E-03
KR-90	4. 564E-02	RU-106	2. 456E-01
XE-131M	4. 368E-04	AG-110M	5. 227E 00
XE-133M	9. 156E-04	CD-109	0. 000E-01
XE-133	9. 884E-04	CD-113M	0. 000E-01
XE-135M	9. 408E-03	SN-113	0. 000E-01
XC-135	5. 376E-03	SB-122	0. 000E-01
XE-137	4. 228E-03	SB-124	0. 000E-01
XE-138	2. 579E-02	SB-125	0. 000E-01
H-3	0. 000E-01	SB-127	0. 000E-01
BE-7	0. 000E-01	TE-132	3. 011E-01
C-14	3. 343E 01	I-131	2. 003E 01
NR-24	2. 506E-01	I-132	4. 743E-03
P-32	1. 394E 03	I-133	5. 666E-01
K-40	0. 000E-01	I-134	2. 579E-03
CR-51	0. 000E-01	I-135	1. 255E-02
MN-54	0. 000E-01	CS-134	5. 108E 02
MN-56	0. 000E-01	CS-136	1. 669E 01
FE-55	1. 950E 00	CS-137	7. 341E 02
FE-59	2. 542E 00	CS-138	1. 415E-03
CO-56	0. 000E-01	BA-139	4. 155E-06
CO-57	0. 000E-01	BA-140	2. 183E 00
CO-58	0. 000E-01	LA-140	1. 416E-03
CO-60	0. 000E-01	CE-139	0. 000E-01
NI-63	4. 987E 02	CE-144	0. 969E 00
NI-65	6. 766E-06	EU-152	0. 000E-01
CU-64	0. 000E-01	W-187	9. 079E-04
ZN-65	7. 466E 01	HG-203	0. 000E-01
SE-75	0. 000E-01	PB-214	0. 000E-01
BR-84	0. 000E-01	BI-214	0. 000E-01
RB-88	0. 000E-01	RA-226	0. 000E-01
RB-89	0. 000E-01	TH-228	0. 000E-01
SR-85	0. 000E-01	U-235	0. 000E-01
SR-89	1. 445E 02	NP-239	1. 039E-03
SR-90	1. 845E 03	AAAAAAA	0. 000E-01
SR-91	4. 611E-03	BBBBBBB	0. 000E-01
SR-92	2. 947E-05	CCCCCCC	0. 000E-01
Y-88	0. 000E-01	DDDDDDD	0. 000E-01
Y-90	9. 222E-03	EEEEEEE	0. 000E-01
Y-91M	1. 141E-06	FFFFFFF	0. 000E-01
Y-91	1. 647E 00	GGGGGGG	0. 000E-01
Y-92	4. 586E-05	HHHHHHH	0. 000E-01
Y-93	4. 195E-04	IIIIIII	0. 000E-01
ZR-95	3. 231E-01	JJJJJJJ	0. 000E-01

MX_i - elements 1-15, M x (x/q) for gas release
(mrad/μ Ci per yr/sec)

PW_i - elements 16-100, infant bone dose factor, gas release
= EP_i x W (mrem sec/yr μCi)

461 040

POOR ORIGINAL

AR-41	9. 184E-03	ZR-97	7. 175E-05
KR-83M	9. 064E-04	NB-94	0. 000E-01
KR-85M	5. 516E-03	NB-95	2. 060E-02
KR-85	5. 460E-03	MO-90	0. 000E-01
KR-87	2. 884E-02	MO-99	3. 004E 00
KR-88	8. 204E-03	TC-99M	8. 228E-07
KR-89	2. 968E-02	RU-103	0. 000E-01
KR-90	2. 192E-02	RU-106	0. 000E-01
XE-121M	3. 108E-03	AG-110M	3. 815E 00
XE-132M	4. 144E-03	CD-109	0. 000E-01
XE-133	2. 940E-03	CD-113M	0. 000E-01
XE-135M	2. 069E-03	SN-113	0. 000E-01
XE-135	6. 888E-03	SB-122	0. 000E-01
XE-137	3. 556E-02	SB-124	0. 000E-01
XE-138	1. 330E-02	SB-125	0. 000E-01
H-3	8. 400E-03	SB-127	0. 000E-01
BE-7	0. 000E-01	TE-132	1. 493E-01
C-14	7. 136E 00	I-131	2. 361E 01
NA-24	2. 506E-01	I-132	9. 918E-03
P-32	8. 197E 01	I-133	8. 247E-01
K-40	0. 000E-01	I-134	5. 253E-03
CR-51	0. 000E-01	I-135	2. 472E-02
MN-54	6. 017E-01	CS-134	9. 524E 02
MN-56	4. 312E-06	CS-136	4. 906E 01
FE-55	1. 257E 00	CS-137	8. 592E 02
FE-59	4. 440E 00	CS-138	2. 187E-03
CO-56	0. 000E-01	BA-139	2. 756E-09
CO-57	0. 000E-01	BA-140	2. 183E-03
CO-58	2. 950E-01	LA-140	5. 608E-04
CO-60	1. 471E-01	CE-139	0. 000E-01
NI-63	3. 083E 01	CE-144	3. 404E 00
NI-65	8. 029E-07	EU-152	0. 000E-01
CU-64	2. 645E-03	W-187	6. 314E-04
ZN-65	2. 560E 02	HG-203	0. 000E-01
SE-75	0. 000E-01	PB-214	0. 000E-01
BR-84	0. 000E-01	BI-214	0. 000E-01
RB-88	1. 560E-03	RA-226	0. 000E-01
RB-89	8. 977E-04	TH-228	0. 000E-01
SR-85	0. 000E-01	U-235	0. 000E-01
SR-89	0. 000E-01	NP-	9. 292E-05
SR-90	0. 000E-01	AAAA .4	0. 000E-01
SR-91	0. 000E-01	BBBBBBB	0. 000E-01
SR-92	0. 000E-01	CCCCCCC	0. 000E-01
Y-88	0. 000E-01	DDDDDDD	0. 000E-01
Y-90	0. 000E-01	EEEEEEE	0. 000E-01
Y-91M	0. 000E-01	FFFFFFF	0. 000E-01
Y-91	0. 000E-01	GGGGGGG	0. 000E-01
Y-92	0. 000E-01	HHHHHHH	0. 000E-01
Y-93	0. 000E-01	IIIIIII	0. 000E-01
ZR-95	7. 803E-02	JJJJJJJ	0. 000E-01

NX_i - elements 1+15, = $N_i \times (x/q)_v$, gas releases (mrad/ μ Ci per yr/sec)

PW_i - elements 16+100, infant liver dose factor - gas release
= $EP_i \times W$ (mrem sec/yr μ Ci)

AR-41	0.000E-01	ZP-97	0.000E-01
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	0.000E-01
KR-85	0.000E-01	MO-98	0.000E-01
KR-87	0.000E-01	MO-99	0.000E-01
KR-88	0.000E-01	TC-99M	0.000E-01
KR-89	0.000E-01	RU-103	0.000E-01
KR-90	0.000E-01	RU-106	0.000E-01
XE-131M	0.000E-01	AG-110M	0.000E-01
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	8.400E-03	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	2.201E-01
C-14	7.136E-00	I-131	7.758E-03
NA-24	2.506E-01	I-132	4.743E-01
P-32	0.000E-01	I-133	1.502E-02
K-40	0.000E-01	I-134	1.247E-01
CR-51	1.231E-03	I-135	2.256E-00
MN-54	0.000E-01	CS-134	0.000E-01
MN-56	0.000E-01	CS-136	0.000E-01
FE-55	0.000E-01	CS-137	0.000E-01
FE-59	0.000E-01	CS-138	0.000E-01
CO-56	0.000E-01	BA-139	0.000E-01
CO-57	0.000E-01	BA-140	0.000E-01
CO-58	0.000E-01	LA-140	0.000E-01
CO-60	0.000E-01	CE-139	0.000E-01
NI-63	0.000E-01	CE-144	0.000E-01
NI-65	0.000E-01	EU-152	0.000E-01
CU-64	0.000E-01	W-187	0.000E-01
ZN-65	0.000E-01	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RE-88	0.000E-01	RA-226	0.000E-01
RE-89	0.000E-01	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	0.000E-01	NP-239	0.000E-01
SR-90	0.000E-01	AAAAAAA	0.000E-01
SR-91	0.000E-01	BBBBBBB	0.000E-01
SR-92	0.000E-01	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	0.000E-01	EEEEEEE	0.000E-01
Y-91M	0.000E-01	FFFFFFF	0.000E-01
Y-91	0.000E-01	GGGGGGG	0.000E-01
Y-92	0.000E-01	HHHHHHH	0.000E-01
Y-93	0.000E-01	IIIIIII	0.000E-01
ZR-95	0.000E-01	JJJJJJJ	0.000E-01

PW_i - elements 16-100, infant thyroid dose factor - gas release
=EP_i x W (mrem sec/ μ Ci yr)

461 042
POOR ORIGINAL

AR-41	0.000E-01	ZR-97	7.253E-05
KR-83M	0.000E-01	NE-94	0.000E-01
KR-85M	0.000E-01	NE-95	1.508E-02
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	4.489E-00
KR-88	0.000E-01	TC-99M	8.851E-06
KR-89	0.000E-01	RU-103	1.207E-02
KR-90	0.000E-01	RU-106	3.014E-01
XE-131M	0.000E-01	AG-110M	5.460E-00
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	8.400E-03	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	9.321E-01
C-14	7.136E-00	I-131	2.757E-01
NA-24	2.506E-01	I-132	1.105E-02
P-32	0.000E-01	I-133	9.693E-01
K-40	0.000E-01	I-134	5.841E-02
CR-51	2.707E-04	I-135	2.754E-02
MN-54	1.316E-01	CS-134	2.452E-02
MN-56	3.082E-06	CS-136	1.956E-01
FE-55	0.000E-01	CS-137	2.306E-02
FE-59	0.000E-01	CS-138	1.149E-03
CO-56	0.000E-01	BA-139	1.658E-09
CO-57	0.000E-01	BA-140	5.186E-04
CO-58	0.000E-01	LA-140	0.000E-01
CO-60	0.000E-01	CE-139	0.000E-01
NI-63	0.000E-01	CE-144	1.510E-00
NI-65	0.000E-01	EU-152	0.000E-01
CU-64	4.692E-03	W-187	0.000E-01
ZN-65	1.242E-02	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	0.000E-01	RA-226	0.000E-01
RB-89	0.000E-01	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	0.000E-01	NP-239	1.854E-04
SR-90	0.000E-01	AAAAAAA	0.000E-01
SR-91	0.000E-01	BBBBBBB	0.000E-01
SR-92	0.000E-01	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	0.000E-01	EEEEEEE	0.000E-01
Y-91M	0.000E-01	FFFFFFF	0.000E-01
Y-91	0.000E-01	GGGGGGG	0.000E-01
Y-92	0.000E-01	HHHHHHH	0.000E-01
Y-93	0.000E-01	IIIIIII	0.000E-01
ZR-95	8.705E-02	JJJJJJJ	0.000E-01

PW_i - elements 16-100, infant kidney dose factor - gas release
 =EP_i x W (mrem sec/μCi yr)

461 043
 POOR ORIGINAL

AR-41	0.000E-01	ZR-97	3.009E-01
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	1.341E 00
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	3.775E-01
KR-88	0.000E-01	TC-19M	2.270E-03
KR-89	0.000E-01	RU-113	1.544E 00
KR-90	0.000E-01	RU-107	3.238E 01
XE-131M	0.000E-01	AG-110 1	1.027E 01
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	8.400E-03	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	9.526E-01
C-14	7.136E 00	I-131	0.000E-01
NA-24	2.506E-01	I-132	0.000E-01
P-32	0.000E-01	I-133	0.000E-01
K-40	0.000E-01	I-134	0.000E-01
CR-51	3.803E-02	I-135	0.000E-01
MN-54	2.799E 00	CS-134	1.005E 02
MN-56	3.508E-02	CS-136	4.000E 00
FE-55	8.418E-01	CS-137	9.239E 01
FE-59	4.135E 00	CS-138	1.821E-04
CO-56	0.000E-01	BA-139	1.666E-02
CO-57	0.000E-01	BA-140	4.470E 00
CO-58	2.176E 00	LA-140	4.704E-01
CO-60	1.262E 01	CE-139	0.000E-01
NI-63	5.841E-01	CE-144	2.756E 01
NI-65	2.274E-02	EU-152	0.000E-01
CU-64	2.603E-02	W-187	1.109E-01
ZN-65	1.811E 00	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	0.000E-01	RA-226	0.000E-01
RB-89	0.000E-01	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	5.684E 00	NP-239	1.666E-01
SR-90	3.148E 01	AAAAAAA	0.000E-01
SR-91	1.474E-01	BBBBBBB	0.000E-01
SR-92	6.664E-02	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	7.526E-01	EEEEEEE	0.000E-01
Y-91M	7.801E-03	FFFFFFF	0.000E-01
Y-91	6.860E 00	GGGGGGG	0.000E-01
Y-92	6.860E-02	HHHHHHH	0.000E-01
Y-93	2.140E-01	IIIIIII	0.000E-01
ZR-95	4.900E 00	JJJJJJJ	0.000E-01

PW_i - elements 16+100, infant lung dose factors - gas release
 = EP_i x W (mrem sec/uCi yr)

POOR ORIGINAL 461 044

AR-41	0.000E-01	ZR-97	3.926E-01
KR-83M	0.000E-01	NE-94	0.000E-01
KR-85M	0.000E-01	NE-95	2.238E-00
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	1.126E-00
KR-88	0.000E-01	TC-99M	5.921E-03
KR-89	0.000E-01	RU-103	4.623E-02
KR-90	0.000E-01	RU-106	4.784E-01
XE-131M	0.000E-01	AG-110M	1.969E-02
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	8.400E-03	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	6.732E-01
C-14	7.136E-00	I-131	8.412E-01
NA-24	2.506E-01	I-132	5.331E-03
P-32	1.883E-01	I-133	1.365E-01
K-40	0.000E-01	I-134	3.610E-03
CR-51	1.477E-01	I-135	6.378E-03
MN-54	2.147E-01	CS-134	2.586E-00
MN-56	2.007E-01	CS-136	7.433E-01
FE-55	1.585E-01	CS-137	2.684E-00
FE-59	9.028E-02	CS-138	2.454E-03
CO-56	0.000E-01	BA-139	1.427E-01
CO-57	0.000E-01	BA-140	6.050E-01
CO-58	7.576E-01	LA-140	2.402E-01
CO-60	3.056E-00	CE-139	0.000E-01
NI-63	1.538E-00	CE-144	2.224E-00
NI-65	1.403E-01	EU-152	0.000E-01
CU-64	9.612E-02	W-187	1.352E-01
ZN-65	2.163E-02	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	3.920E-21	BI-214	0.000E-01
RB-88	9.486E-04	RA-226	0.000E-01
RB-89	1.909E-04	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	2.965E-01	NP-239	7.018E-02
SR-90	2.198E-01	AAAAAAA	0.000E-01
SR-91	2.105E-01	BBBBBBB	0.000E-01
SR-92	3.920E-01	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	3.046E-01	EEEEEEE	0.000E-01
Y-91M	6.586E-03	FFFFFFF	0.000E-01
Y-91	2.581E-01	GGGGGGG	0.000E-01
Y-92	3.544E-01	HHHHHHH	0.000E-01
Y-93	4.667E-01	IIIIIII	0.000E-01
ZR-95	7.060E-02	JJJJJJJ	0.000E-01

PW - elements 16-100, infant GI-LLI dose factor - gas release
 = $EP_i \times W$ (mrem sec/ μ Ci yr)

POOR ORIGINAL 461 045

AR-41	0.000E-01	ZR-97	4.851E-02
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	1.130E-00
KR-85	0.000E-01	MO-98	0.000E-01
KR-87	0.000E-01	MO-99	6.539E-02
KR-88	0.000E-01	TC-99M	2.956E-03
KR-89	0.000E-01	RU-103	8.895E-01
KR-90	0.000E-01	RU-106	3.545E-00
XE-131M	0.000E-01	AG-110M	2.835E-01
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	0.000E-01	SB-127	0.000E-01
BE-7	0.000E-01	IF-132	6.961E-02
C-14	0.000E-01	I-131	1.461E-01
NA-24	1.943E-01	I-132	2.033E-02
P-32	0.000E-01	I-133	4.213E-02
K-40	0.000E-01	I-134	7.511E-03
CR-51	3.864E-02	I-135	4.179E-02
MN-54	1.137E-01	CS-134	5.652E-01
MN-56	1.501E-02	CS-136	1.183E-00
FE-55	0.000E-01	CS-137	1.439E-02
FE-59	2.247E-00	CS-138	5.957E-03
CO-56	0.000E-01	BA-139	1.659E-03
CO-57	0.000E-01	BA-140	1.644E-01
CO-58	3.128E-00	LA-140	3.053E-01
CO-60	2.019E-02	CE-139	0.000E-01
NI-63	0.000E-01	CE-144	5.637E-01
NI-65	4.910E-03	EU-152	0.000E-01
CU-64	9.622E-03	W-187	3.834E-02
ZN-65	5.982E-00	HG-203	0.000E-01
SE-75	0.000E-01	FB-214	0.000E-01
BR-84	3.308E-03	BI-214	0.000E-01
RB-88	5.291E-04	RA-226	0.000E-01
RB-89	2.087E-03	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	1.755E-04	NP-239	1.390E-02
SR-90	0.000E-01	AAAAAAA	0.000E-01
SR-91	3.608E-02	BBBBBBB	0.000E-01
SR-92	1.208E-02	CCCCCCC	0.000E-01
Y-86	0.000E-01	DDDDDDD	0.000E-01
Y-90	7.406E-05	EEEEEEE	0.000E-01
Y-91M	1.625E-03	FFFFFFF	0.000E-01
Y-91	8.460E-03	GGGGGGG	0.000E-01
Y-92	2.989E-03	HHHHHHH	0.000E-01
Y-93	3.323E-03	IIIIIII	0.000E-01
ZR-95	2.033E-00	JJJJJJJ	0.000E-01

RW_i - elements 16+100, infant shielded skin dose factor
 $= ER_i \times W$ (mrem sec/ μ Ci yr)

POOR ORIGINAL

461 046

AR-41	0.000E-01	ZR-97	4.172E-02
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	9.722E-01
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	6.423E-01
KR-88	0.000E-01	TC-99M	2.591E-03
KR-89	0.000E-01	RU-103	7.644E-01
KR-90	0.000E-01	RU-106	2.985E 00
XE-131M	0.000E-01	AG-110M	2.682E 01
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	8.400E-03	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	1.983E-01
C-14	7.136E 00	I-131	1.050E 01
NA-24	4.181E-01	I-132	2.081E-02
P-32	5.403E 01	I-133	2.761E-01
K-40	0.000E-01	I-134	8.187E-03
CR-51	3.459E-02	I-135	4.483E-02
MN-54	9.832E 00	CS-134	1.446E 02
MN-56	1.270E-02	CS-136	1.937E 01
FE-55	3.365E-01	CS-137	1.842E 02
FE-59	3.662E 00	CS-138	6.717E-03
CO-56	0.000E-01	BA-139	1.475E-03
CO-57	0.000E-01	BA-140	2.563E-01
CO-58	3.403E 00	LA-140	2.695E-01
CO-60	1.746E 02	CE-139	0.000E-01
NI-63	1.730E 01	CE-144	9.832E-01
NI-65	4.225E-03	EU-152	0.000E-01
CU-64	9.715E-03	W-187	3.324E-02
ZN-65	1.233E 02	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	3.957E-03	BI-214	0.000E-01
RB-88	1.267E-03	RA-226	0.000E-01
RB-89	2.315E-03	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	4.144E 00	NP-239	1.205E-02
SR-90	4.478E 02	AAAAAAA	0.000E-01
SR-91	3.103E-02	BBBBBBB	0.000E-01
SR-92	1.088E-02	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	3.099E-04	EEEEEEE	0.000E-01
Y-91M	1.403E-03	FFFFFFF	0.000E-01
Y-91	5.145E-02	GGGGGGG	0.000E-01
Y-92	2.518E-03	HHHHHHH	0.000E-01
Y-93	2.440E-03	IIIIIII	0.000E-01
ZR-95	1.809E 00	JJJJJJJ	0.000E-01

RW_i - elements 16→100, infant shielded total body dose factor - gas release,
 $= \sum R_i \times W$ (mrem sec/μCi yr)

POOR ORIGINAL⁶¹ 047

AR-41	0.000E-01	ZR-97	5.334E-04
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	8.705E-02
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	0.000E-01
KR-88	0.000E-01	TC-99M	2.611E-07
KR-89	0.000E-01	RU-103	9.356E-01
KR-90	0.000E-01	RU-106	4.985E-01
XE-131M	0.000E-01	AG-110M	3.303E-00
XE-133M	0.000E-01	CO-109	0.000E-01
XE-133	0.000E-01	CO-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	8.400E-03	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	2.655E-01
C-14	3.334E-01	I-131	1.073E-01
NA-24	1.772E-01	I-132	5.927E-03
P-32	7.163E-02	I-133	3.475E-01
K-40	0.000E-01	I-134	3.284E-03
CR-51	0.000E-01	I-135	1.552E-02
MN-54	0.000E-01	CS-134	5.364E-02
MN-56	0.000E-01	CS-136	9.131E-00
FE-55	1.664E-01	CS-137	8.078E-02
FE-59	5.732E-00	CS-138	1.772E-02
CO-56	0.000E-01	BA-139	5.160E-06
CO-57	0.000E-01	BA-140	2.812E-00
CO-58	0.000E-01	LA-140	1.848E-03
CO-60	0.000E-01	CE-139	0.000E-01
NI-63	1.262E-03	CE-144	2.049E-01
NI-65	1.006E-05	EU-152	0.000E-01
CU-64	0.000E-01	W-187	1.364E-03
ZN-65	6.817E-01	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-80	0.000E-01	RA-226	0.000E-01
RB-89	0.000E-01	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	2.904E-02	NP-239	1.320E-03
SR-90	1.919E-04	AAAAAAA	0.000E-01
SR-91	1.029E-02	BBBBBBB	0.000E-01
SR-92	4.689E-05	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	1.183E-02	EEEEEEE	0.000E-01
Y-91M	1.419E-06	FFFFFFF	0.000E-01
Y-91	2.691E-00	GGGGGGG	0.000E-01
Y-92	5.700E-05	HHHHHHH	0.000E-01
Y-93	5.257E-04	IIIIIII	0.000E-01
ZR-95	5.768E-01	JJJJJJJ	0.000E-01

RW_i - elements 16-100, child bone dose factors - gas release
= $\sum R_i \times W$ (mrem sec/ μ Ci yr)

POOR ORIGINAL

461 048

AR-41	0.000E-01	ZR-97	7.721E-05
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	3.397E-02
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	1.286E 00
KR-88	0.000E-01	TC-99M	5.120E-07
KR-89	0.000E-01	RU-103	0.000E-01
KR-90	0.000E-01	RU-106	0.000E-01
XE-131M	0.000E-01	AG-110M	2.230E 00
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	2.408E-02	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	1.177E-01
C-14	6.666E 00	I-131	1.079E 01
NA-24	1.772E-01	I-132	1.140E-02
P-32	3.343E 01	I-133	4.291E-01
K-40	0.000E-01	I-134	6.050E-03
CR-51	0.000E-01	I-135	2.759E-02
MN-54	8.366E 00	CS-134	8.000E 02
MN-56	4.913E-06	CS-136	2.508E 01
FE-55	8.827E 00	CS-137	7.731E 02
FE-59	9.275E 00	CS-138	2.352E-03
CO-56	0.000E-01	BA-139	2.756E-09
CO-57	0.000E-01	BA-140	2.464E-03
CO-58	7.343E-01	LA-140	6.459E-04
CO-60	6.469E 00	CE-139	0.000E-01
NI-63	6.755E 01	CE-144	6.405E 00
NI-65	9.869E-07	EU-152	0.000E-01
CU-64	1.221E-03	W-187	8.077E-04
ZN-65	1.816E 02	HG-203	0.000E-01
SE-75	0.000E-01	FB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	1.575E-03	RA-226	0.000E-01
RB-89	9.666E-04	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	0.000E-01	NP-239	9.470E-05
SR-90	0.000E-01	AAAAAAA	0.000E-01
SR-91	0.000E-01	BBBBBBB	0.000E-01
SR-92	0.000E-01	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	0.000E-01	EEEEEEE	0.000E-01
Y-91M	0.000E-01	FFFFFFF	0.000E-01
Y-91	0.000E-01	GGGGGGG	0.000E-01
Y-92	0.000E-01	HHHHHHH	0.000E-01
Y-93	0.000E-01	IIIIIII	0.000E-01
ZR-95	1.270E-01	JJJJJJJ	0.000E-01

RW_i - elements 16+100, child liver dose factor - gas release
 = $\sum R_i \times W$ (mrem sec/ μ Ci yr)

POOR ORIGINAL 461 049

AR-41	0.000E-01	ZR-97	0.000E-01
KR-83M	0.000E-01	NR-94	0.000E-01
KR-85M	0.000E-01	NR-95	0.000E-01
KR-85	0.000E-01	MO-98	0.000E-01
KR-87	0.000E-01	MO-99	0.000E-01
KR-88	0.000E-01	TC-99M	0.000E-01
KR-89	0.000E-01	RU-103	0.000E-01
KR-90	0.000E-01	RU-106	0.000E-01
XE-131M	0.000E-01	AG-110M	0.000E-01
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	2.408E-02	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	1.711E-01
C-14	6.666E-00	I-131	3.568E-03
NA-24	1.772E-01	I-132	5.419E-01
P-32	0.000E-01	I-133	7.994E-01
K-40	0.000E-01	I-134	1.419E-01
CR-51	1.103E-02	I-135	2.495E-00
MN-54	0.000E-01	CS-134	0.000E-01
MN-56	0.000E-01	CS-136	0.000E-01
FE-55	0.000E-01	CS-137	0.000E-01
FE-59	0.000E-01	CS-138	0.000E-01
CO-56	0.000E-01	BA-139	0.000E-01
CO-57	0.000E-01	BA-140	0.000E-01
CO-58	0.000E-01	LA-140	0.000E-01
CO-60	0.000E-01	CE-139	0.000E-01
NI-62	0.000E-01	CE-144	0.000E-01
NI-65	0.000E-01	EU-152	0.000E-01
CU-64	0.000E-01	W-187	0.000E-01
ZN-65	0.000E-01	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	0.000E-01	RA-226	0.000E-01
RB-89	0.000E-01	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	0.000E-01	NP-239	0.000E-01
SR-90	0.000E-01	AAAAAAA	0.000E-01
SR-91	0.000E-01	BBBBBBB	0.000E-01
SR-92	0.000E-01	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	0.000E-01	EEEEEEE	0.000E-01
Y-91M	0.000E-01	FFFFFFF	0.000E-01
Y-91	0.000E-01	GGGGGGG	0.000E-01
Y-92	0.000E-01	HHHHHHH	0.000E-01
Y-93	0.000E-01	IIIIIII	0.000E-01
ZR-95	0.000E-01	JJJJJJJ	0.000E-01

RW_i - elements 16-100, child thyroid dose factor - gas release
= $\sum R_i \times W$ (mrem sec/ μ Ci yr)

POOR ORIGINAL

461 050

AR-41	0.000E-01	ZR-97	1.105E-04
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	3.192E-02
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	2.746E-00
KR-88	0.000E-01	TC-99M	7.441E-06
KR-89	0.000E-01	RU-103	2.355E-00
KR-90	0.000E-01	RU-106	6.732E-01
XE-131M	0.000E-01	AG-110M	4.154E-00
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	2.408E-02	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	1.090E-00
C-14	6.666E-00	I-131	1.771E-01
NA-24	1.772E-01	I-132	1.751E-02
P-32	0.000E-01	I-133	7.150E-01
K-40	0.000E-01	I-134	9.241E-03
CR-51	3.042E-04	I-135	4.232E-02
MN-54	2.340E-00	CS-134	2.728E-02
MN-56	5.011E-06	CS-136	1.337E-01
FE-55	0.000E-01	CS-137	2.520E-02
FE-59	0.000E-01	CS-138	1.740E-03
CO-56	0.000E-01	BA-139	2.414E-09
CO-57	0.000E-01	BA-140	8.022E-04
CO-58	0.000E-01	LA-140	0.000E-01
CO-60	0.000E-01	CE-139	0.000E-01
NI-63	0.000E-01	CE-144	3.549E-00
NI-65	0.000E-01	EU-152	0.000E-01
CU-64	2.954E-03	W-187	0.000E-01
ZN-65	1.144E-02	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	0.000E-01	RA-226	0.000E-01
RB-89	0.000E-01	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	0.000E-01	NP-239	2.755E-04
SR-90	0.000E-01	AAAAAAA	0.000E-01
SR-91	0.000E-01	BBBBBBB	0.000E-01
SR-92	0.000E-01	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	0.000E-01	EEEEEEE	0.000E-01
Y-91M	0.000E-01	FFFFFFF	0.000E-01
Y-91	0.000E-01	GGGGGGG	0.000E-01
Y-92	0.000E-01	HHHHHHH	0.000E-01
Y-93	0.000E-01	IIIIIII	0.000E-01
ZR-95	1.810E-01	JJJJJJJ	0.000E-01

RW_i - elements 16-100, child kidney dose factors - gas release
 = $\sum R_i \times W$ (mrem sec/ μ Ci yr)

461 051
 POOR ORIGINAL

AR-41	0.000E-01	ZR-97	3.170E-01
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	1.720E-00
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	3.792E-01
KR-88	0.000E-01	TC-99M	2.663E-03
KR-89	0.000E-01	RU-103	1.854E-00
KR-90	0.000E-01	RU-106	4.009E-01
XE-131M	0.000E-01	AG-110M	1.533E-01
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	2.408E-02	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	1.057E-00
C-14	6.666E-00	I-131	0.000E-01
NA-24	1.772E-01	I-132	0.000E-01
P-32	0.000E-01	I-133	0.000E-01
K-40	0.000E-01	I-134	0.000E-01
CR-51	4.913E-02	I-135	0.000E-01
MN-54	4.413E-00	CS-134	9.788E-01
MN-56	3.678E-02	CS-136	1.994E-00
FE-55	5.263E-00	CS-137	9.067E-01
FE-59	6.215E-00	CS-138	1.906E-04
CO-56	0.000E-01	BA-139	1.616E-02
CO-57	0.000E-01	BA-140	4.881E-00
CO-58	3.098E-00	LA-140	5.118E-01
CO-60	1.979E-01	CE-139	0.000E-01
NI-63	7.697E-01	CE-144	3.232E-01
NI-65	2.290E-02	EU-152	0.000E-01
CU-64	2.683E-02	W-187	1.150E-01
ZN-65	2.787E-00	HG-203	0.000E-01
SE-75	0.000E-01	FB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	0.000E-01	RA-226	0.000E-01
RB-89	0.000E-01	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	6.040E-00	NP-239	1.627E-01
SR-90	4.134E-01	AAAAAAA	0.000E-01
SR-91	1.492E-01	BBBBBBB	0.000E-01
SR-92	6.724E-02	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	7.325E-01	EEEEEEE	0.000E-01
Y-91M	7.874E-03	FFFFFFF	0.000E-01
Y-91	7.356E-00	GGGGGGG	0.000E-01
Y-92	6.693E-02	HHHHHHH	0.000E-01
Y-93	2.082E-01	IIIIIII	0.000E-01
ZR-95	6.247E-00	JJJJJJJ	0.000E-01

RW_i - elements 16-100, child lung dose factors - gas release
 = $\sum R_i \times W$ (mrem sec/ μ Ci yr)

POOR ORIGINAL

461 052

AR-41	0.000E-01	ZR-97	1.163E 00
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	1.542E 01
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	1.417E 00
KR-88	0.000E-01	TC-99M	1.375E-02
KR-89	0.000E-01	RU-103	2.411E 01
KR-90	0.000E-01	RU-106	7.707E 02
XE-131M	0.000E-01	AG-110M	2.618E 02
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	2.408E-02	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	1.562E 00
C-14	6.666E 00	I-131	9.563E-01
NA-24	1.772E-01	I-132	8.964E-03
P-32	1.971E 01	I-133	1.654E-01
K-40	0.000E-01	I-134	2.673E-03
CR-51	8.559E-02	I-135	1.483E-02
MN-54	6.984E 00	CS-134	4.739E 00
MN-56	3.450E-01	CS-136	8.761E-01
FE-55	1.630E 00	CS-137	4.837E 00
FE-59	9.757E 00	CS-138	7.552E-04
CO-56	0.000E-01	BA-139	1.616E-01
CO-57	0.000E-01	BA-140	1.605E 00
CO-58	4.351E 00	LA-140	1.078E 00
CO-60	3.590E 01	CE-139	0.000E-01
NI-63	4.559E 00	CE-144	1.260E 02
NI-65	2.352E-01	EU-152	0.000E-01
CU-64	1.598E-01	W-187	3.646E-01
ZN-65	3.188E 01	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	1.036E-20	BI-214	0.000E-01
RB-88	4.828E-05	RA-226	0.000E-01
RB-89	5.294E-06	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	1.164E 01	NP-239	2.564E-01
SR-90	2.556E 02	AAAAAAA	0.000E-01
SR-91	5.089E-01	BBBBBBB	0.000E-01
SR-92	6.788E-01	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	1.684E 00	EEEEEEE	0.000E-01
Y-91M	4.807E-03	FFFFFFF	0.000E-01
Y-91	1.817E 01	GGGGGGG	0.000E-01
Y-92	6.699E-01	HHHHHHH	0.000E-01
Y-93	1.141E 00	IIIIIII	0.000E-01
ZR-95	1.055E 01	JJJJJJJ	0.000E-01

RW_i - elements 16+100, child GI-LLI dose factor - gas release
 = $\sum R_i \times W$ (mrem sec/ μ Ci yr)

POOR ORIGINAL

461

05

AR-41	0.000E-01	ZR-97	4.173E-02
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	9.844E-01
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	3.746E-01
KR-88	0.000E-01	TC-99M	2.589E-03
KR-89	0.000E-01	RU-103	1.122E 00
KR-90	0.000E-01	RU-106	9.174E 00
XE-131M	0.000E-01	AG-110M	2.608E 01
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	2.408E-02	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	2.011E-01
C-14	6.666E 00	I-131	6.250E 00
NA-24	3.448E-01	I-132	2.254E-02
P-32	2.761E 01	I-133	1.971E-01
K-40	0.000E-01	I-134	9.112E-03
CR-51	3.469E-02	I-135	4.891E-02
MN-54	1.192E 01	CS-134	2.341E 02
MN-56	1.270E-02	CS-136	1.729E 01
FE-55	2.735E 00	CS-137	2.375E 02
FE-59	6.532E 00	CS-138	6.766E-03
CO-56	0.000E-01	BA-139	1.475E-03
CO-57	0.000E-01	BA-140	3.000E-01
CO-58	4.912E 00	LA-140	2.696E-01
CO-60	1.906E 02	CE-139	0.000E-01
NI-63	4.292E 01	CE-144	1.581E 00
NI-65	4.226E-03	EU-152	0.000E-01
CU-64	9.227E-03	W-187	3.338E-02
ZN-65	1.181E 02	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	4.369E-03	BI-214	0.000E-01
RB-88	1.489E-03	RA-226	0.000E-01
RB-89	2.550E-03	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	8.294E 06	NP-239	1.207E-02
SR-90	4.811E 03	AAAAAAA	0.000E-01
SR-91	3.125E-02	BBBBBBB	0.000E-01
SR-92	1.088E-02	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	3.812E-04	EEEEEEE	0.000E-01
Y-91M	1.403E-03	FFFFFFF	0.000E-01
Y-91	7.934E-02	GGGGGGG	0.000E-01
Y-92	2.518E-03	HHHHHHH	0.000E-01
Y-93	2.443E-03	IIIIIII	0.000E-01
ZR-99	1.865E 00	JJJJJJJ	0.000E-01

RW_i - elements 16+100, child shielded total body dose factor - gas release
 $= \sum R_i \times W$ (mrem sec/ μ Ci yr)

POOR ORIGINAL

461

054

AR-41	8. 840E-03	ZR-97	6. 400E-09
KR-83M	7. 560E-08	NB-94	0. 000E-01
KR-85M	1. 170E-03	NB-95	6. 000E-09
KR-85	1. 610E-05	MO-90	0. 000E-01
KR-87	5. 920E-03	MO-99	2. 200E-07
KR-88	1. 470E-02	TC-99M	1. 100E-01
KR-89	1. 660E-02	RU-103	4. 200E-02
KR-90	1. 560E-02	RU-106	1. 800E-09
XE-131M	9. 150E-05	AG-110M	2. 100E-08
XE-132M	2. 510E-04	CD-109	0. 000E-01
XE-133	2. 940E-04	CD-113M	0. 000E-01
XE-135M	3. 120E-03	SN-113	0. 000E-01
XE-135	1. 810E-03	SB-122	0. 000E-01
XE-137	1. 420E-03	SB-124	0. 000E-01
XE-138	8. 830E-03	SB-125	0. 000E-01
H-3	0. 000E-01	SB-127	0. 000E-01
BE-7	0. 000E-01	TE-132	2. 000E-09
C-14	0. 000E-01	I-131	3. 400E-09
NA-24	2. 900E-08	I-132	2. 000E-08
P-32	0. 000E-01	I-133	4. 500E-09
K-40	0. 000E-01	I-134	1. 900E-08
CR-51	2. 600E-10	I-135	1. 400E-08
MN-54	6. 800E-09	CS-134	1. 400E-08
MN-56	1. 300E-08	CS-136	1. 700E-08
FE-55	0. 000E-01	CS-137	4. 900E-09
FE-59	9. 400E-09	CS-138	2. 400E-08
CO-56	0. 000E-01	PA-139	2. 700E-09
CO-57	0. 000E-01	BA-140	2. 400E-09
CO-58	8. 200E-09	LA-140	1. 700E-08
CO-60	2. 000E-08	CE-139	0. 000E-01
NI-63	0. 000E-01	CE-144	3. 700E-10
NI-65	4. 300E-09	EU-152	0. 000E-01
CU-64	1. 700E-09	W-187	3. 600E-09
ZN-65	4. 600E-09	HG-203	0. 000E-01
SE-75	0. 000E-01	PB-214	0. 000E-01
BR-84	1. 400E-08	BI-214	0. 000E-01
RB-88	4. 000E-09	RA-226	0. 000E-01
RB-89	1. 800E-08	TH-228	0. 000E-01
SR-85	0. 000E-01	U-235	0. 000E-01
SR-89	6. 500E-13	NP-239	1. 100E-09
SR-90	0. 000E-01	AAAAAAA	0. 000E-01
SR-91	8. 300E-07	BBBBBBB	0. 000E-01
SR-92	1. 000E-08	CCCCCCC	0. 000E-01
Y-88	0. 000E-01	DDDDDDD	0. 000E-01
Y-90	2. 600E-12	EEEEEEE	0. 000E-01
Y-91M	4. 400E-09	FFFFFFF	0. 000E-01
Y-91	2. 700E-11	GGGGGGG	0. 000E-01
Y-92	1. 900E-09	HHHHHHH	0. 000E-01
Y-93	7. 800E-10	IIIIIII	0. 000E-01
ZR-95	5. 800E-09	JJJJJJJ	0. 000E-01

K_i - elements 1-15, Gamma body dose factor, (mrem m^3/pCi yr)

DFG_i - elements 16-100, skin external dose factor for standing on contaminated ground (mrem/hr per pCi/m^2)

POOR ORIGINAL

461 055

AR-41	2.690E-03	ZR-97	5.500E-09
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	1.460E-03	NB-95	5.100E-09
KR-85	1.340E-03	MO-90	0.000E-01
KR-87	9.730E-03	MO-99	1.900E-09
KR-88	2.370E-03	TC-99M	9.600E-10
KR-89	1.010E-02	RU-103	3.600E-09
KR-90	7.290E-03	RU-106	1.500E-09
XE-131M	4.760E-04	AG-110M	1.800E-08
XE-133M	9.940E-04	CD-109	0.000E-01
XE-133	3.060E-04	CD-113M	0.000E-01
XE-135M	7.110E-04	SN-113	0.000E-01
XE-135	1.860E-03	SB-122	0.000E-01
XE-137	1.220E-02	SB-124	0.000E-01
XE-138	4.130E-03	SB-125	0.000E-01
H-3	0.000E-01	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	1.700E-09
C-14	0.000E-01	I-131	2.800E-09
NA-24	2.500E-08	I-132	1.700E-08
P-32	0.000E-01	I-133	3.700E-09
K-40	0.000E-01	I-134	1.600E-08
CR-51	2.200E-10	I-135	1.200E-08
MN-54	5.900E-09	CS-134	1.200E-08
MN-56	1.100E-08	CS-136	1.500E-08
FE-55	0.000E-01	CS-137	4.200E-09
FE-59	0.000E-09	CS-138	2.100E-08
CO-56	0.000E-01	BA-139	2.400E-09
CO-57	0.330E-01	BA-140	2.100E-09
CO-58	7.000E-09	LA-140	1.500E-08
CO-60	1.700E-08	CE-139	0.000E-01
NI-63	0.000E-01	CE-144	3.200E-10
NI-65	3.700E-09	EU-152	0.000E-01
CU-64	1.500E-09	W-187	3.100E-09
ZN-65	4.000E-09	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	1.200E-08	BI-214	0.000E-01
RB-88	3.500E-09	RA-226	0.000E-01
RB-89	1.500E-08	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	5.600E-13	NP-239	9.500E-10
SR-90	0.000E-01	AAAAAAA	0.000E-01
SR-91	7.100E-09	BBBBBBB	0.000E-01
SR-92	9.000E-09	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	2.200E-12	EEEEEEE	0.000E-01
Y-91M	3.800E-09	FFFFFFF	0.000E-01
Y-91	2.400E-11	GGGGGGG	0.000E-01
Y-92	1.600E-09	HHHHHHH	0.000E-01
Y-93	5.700E-10	IIIIIII	0.000E-01
ZR-95	5.000E-09	JJJJJJJ	0.000E-01

DFG_i - elements 16+100, total body external dose factor for standing or contaminated ground (mrem/hr per pCi/m²)

POCR ORIGINAL

461 056

AR-41	9. 300E-03	ZR-97	5. 000E-06
KR-83M	1. 930E-05	NB-94	2. 500E-03
KR-85M	1. 230E-03	NB-95	2. 500E-03
KR-85	1. 720E-05	MO-90	7. 500E-03
KR-87	6. 170E-03	MO-99	7. 500E-03
KR-88	1. 520E-02	TC-99M	2. 500E-02
KR-89	1. 730E-02	RU-103	1. 000E-06
KR-90	1. 630E-02	RU-106	1. 000E-06
XE-131M	1. 560E-04	AG-110M	5. 000E-02
XE-133M	3. 270E-04	CD-109	0. 000E-01
XE-133	3. 530E-04	CD-113M	0. 000E-01
XE-135M	3. 360E-03	SN-113	0. 000E-01
XE-135	1. 920E-03	SB-122	0. 000E-01
XE-137	1. 510E-03	SB-124	0. 000E-01
XE-138	9. 210E-03	SB-125	0. 000E-01
H-3	1. 000E-02	SB-127	0. 000E-01
BE-7	0. 000E-01	TE-132	1. 000E-03
C-14	1. 200E-02	I-131	6. 000E-03
NA-24	4. 000E-02	I-132	6. 000E-03
P-32	2. 500E-02	I-133	6. 000E-03
K-40	0. 000E-01	I-134	6. 000E-03
CR-51	2. 200E-03	I-135	6. 000E-03
MN-54	2. 500E-04	CS-134	1. 200E-02
MN-56	2. 500E-04	CS-136	1. 200E-02
FE-55	1. 200E-03	CS-137	1. 200E-02
FE-59	1. 200E-03	CS-138	1. 200E-02
CO-56	1. 000E-03	BA-139	4. 000E-04
CO-57	1. 000E-03	BA-140	4. 000E-04
CO-58	1. 000E-03	LA-140	5. 000E-06
CO-60	1. 000E-03	CE-139	1. 000E-04
NI-63	6. 700E-03	CE-144	1. 000E-04
NI-65	6. 700E-03	EU-152	0. 000E-01
CU-64	1. 400E-02	W-187	5. 000E-04
ZN-65	3. 900E-02	HG-203	0. 000E-01
SE-75	0. 000E-01	PB-214	0. 000E-01
BR-84	0. 000E-01	BI-214	0. 000E-01
RB-88	3. 000E-02	RA-226	0. 000E-01
RB-89	3. 000E-02	TH-228	0. 000E-01
SR-85	8. 000E-04	U-235	0. 000E-01
SR-89	8. 000E-04	NP-239	5. 000E-06
SR-90	8. 000E-04	AAAAAAA	0. 000E-01
SR-91	8. 000E-04	BBBBBBB	0. 000E-01
SR-92	8. 000E-04	CCCCCCC	0. 000E-01
Y-88	1. 000E-05	DDDDDDD	0. 000E-01
Y-90	1. 000E-05	EEEEEEE	0. 000E-01
Y-91M	1. 000E-05	FFFFFFF	0. 000E-01
Y-91	1. 000E-05	GGGGGGG	0. 000E-01
Y-92	1. 000E-05	HHHHHHH	0. 000E-01
Y-93	1. 000E-05	IIIIIII	0. 000E-01
ZR-95	5. 000E-06	JJJJJJJ	0. 000E-01

M_i - elements 1-15, Gamma air dose factors - gas release
(mrad/pCi per yr/m³)

F_m - elements 16-100, Stable element transfer data - cow
(days/liter)

POOR ORIGINAL

461 057

AR-41	3. 280E-03	ZR-97	1. 480E-08
KR-83M	2. 880E-04	NB-94	0. 000E-01
KR-85M	1. 970E-03	NB-95	4. 200E-08
KR-85	1. 950E-03	MO-90	0. 000E-01
KR-87	1. 030E-02	MO-99	0. 000E-01
KR-88	2. 930E-03	TC-99M	1. 920E-09
KR-89	1. 060E-02	RU-103	1. 480E-06
KR-90	7. 830E-03	RU-106	2. 410E-05
XE-131M	1. 110E-03	AG-110M	9. 960E-07
XE-133M	1. 480E-03	CD-109	0. 000E-01
XE-133	1. 050E-03	CD-113M	0. 000E-01
XE-135M	7. 390E-04	SN-113	0. 000E-01
XE-135	2. 460E-03	SB-122	0. 000E-01
XE-137	1. 270E-02	SB-124	0. 000E-01
XE-138	4. 750E-03	SB-125	0. 000E-01
H-3	0. 000E-01	SB-127	0. 000E-01
BE-7	0. 000E-01	TE-132	2. 080E-05
C-14	2. 370E-05	I-131	3. 590E-05
NA-24	1. 010E-05	I-132	1. 660E-06
P-32	1. 700E-03	I-133	1. 250E-05
K-40	0. 000E-01	I-134	8. 690E-07
CR-51	0. 000E-01	I-135	3. 640E-06
MN-54	0. 000E-01	CS-134	3. 770E-04
MN-56	0. 000E-01	CS-136	4. 590E-05
FE-55	1. 390E-05	CS-137	5. 220E-04
FE-59	3. 080E-05	CS-138	4. 810E-07
CO-56	0. 000E-01	BA-139	8. 810E-07
CO-57	0. 000E-01	BA-140	1. 710E-04
CO-58	0. 000E-01	LA-140	2. 110E-08
CO-60	0. 000E-01	CE-139	0. 000E-01
NI-63	6. 340E-04	CE-144	2. 980E-06
NI-65	4. 700E-06	EU-152	0. 000E-01
CU-64	0. 000E-01	W-187	9. 030E-07
ZN-65	1. 840E-05	HG-203	0. 000E-01
SE-75	0. 000E-01	PB-214	0. 000E-01
BR-84	0. 000E-01	BI-214	0. 000E-01
RB-88	0. 000E-01	RA-226	0. 000E-01
RB-89	0. 000E-01	TH-228	0. 000E-01
SR-85	0. 000E-01	U-235	0. 000E-01
SR-89	2. 510E-03	NP-239	1. 110E-08
SR-90	1. 850E-02	AAAAAAA	0. 000E-01
SR-91	5. 000E-05	BBBBBBB	0. 000E-01
SR-92	1. 920E-05	CCCCCCC	0. 000E-01
Y-88	0. 000E-01	DDDDDDD	0. 000E-01
Y-90	8. 690E-08	EEEEEEE	0. 000E-01
Y-91M	8. 100E-10	FFFFFFF	0. 000E-01
Y-91	1. 130E-06	GGGGGGG	0. 000E-01
Y-92	7. 650E-09	HHHHHHH	0. 000E-01
Y-93	2. 430E-08	IIIIIII	0. 000E-01
ZR-95	2. 060E-07	JJJJJJJ	0. 000E-01

 N_i - elements 1-15, Beta air dose factor, gas release (mrad/pCi per yr/m³)

 DFL_i - elements 16-100, infant ingestion dose factor for bone
(mrem/pCi ingested)

461
POOR ORIGINAL 058

AR-41	0.000E-01	ZR-97	2.540E-09
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	1.730E-08
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	3.400E-05
KR-88	0.000E-01	TC-99M	3.960E-09
KR-89	0.000E-01	RU-103	0.000E-01
KR-90	0.000E-01	RU-106	0.000E-01
XE-131M	0.000E-01	AG-110M	7.270E-07
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	3.080E-07	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	1.030E-05
C-14	5.060E-06	I-131	4.230E-05
NA-24	1.010E-05	I-132	3.370E-06
P-32	1.000E-04	I-133	1.820E-05
K-40	0.000E-01	I-134	1.780E-06
CR-51	0.000E-01	I-135	7.240E-06
MN-54	1.990E-05	CS-134	7.030E-04
MN-56	0.180E-07	CS-136	1.350E-04
FE-55	0.980E-06	CS-137	6.110E-04
FE-59	5.380E-05	CS-138	7.820E-07
CO-56	0.000E-01	BA-139	5.840E-10
CO-57	0.000E-01	BA-140	1.710E-07
CO-58	3.600E-06	LA-140	0.320E-09
CO-60	1.080E-06	CE-139	0.000E-01
NI-63	3.920E-05	CE-144	1.220E-06
NI-65	5.320E-07	EU-152	0.000E-01
CU-64	6.090E-07	W-187	6.280E-07
ZN-65	6.310E-05	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	4.980E-07	RA-226	0.000E-01
RB-89	2.860E-07	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	0.000E-01	NP-239	9.930E-10
SR-90	0.000E-01	AAAAAAA	0.000E-01
SR-91	0.000E-01	BBBBBBB	0.000E-01
SR-92	0.000E-01	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	0.000E-01	EEEEEEE	0.000E-01
Y-91M	0.000E-01	FFFFFFF	0.000E-01
Y-91	0.000E-01	GGGGGGG	0.000E-01
Y-92	0.000E-01	HHHHHHH	0.000E-01
Y-93	0.000E-01	IIIIIII	0.000E-01
ZR-95	5.020E-08	JJJJJJJ	0.000E-01

DFL_i - elements 16-100, infant ingestion dose factor for liver
(mrem/pCi ingested)

POOR ORIGINAL

461 059

AR-41	0.000E-01	ZR-97	1.160E-09
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	1.000E-08
KR-85	0.000E-01	MO-98	0.000E-01
KR-87	0.000E-01	MO-99	6.630E-06
KR-88	0.000E-01	TC-99M	5.100E-08
KR-89	0.000E-01	RU-103	4.950E-07
KR-90	0.000E-01	RU-106	3.010E-06
XE-131M	0.000E-01	AG-110M	4.810E-07
XE-132M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	3.000E-07	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	9.610E-06
C-14	5.060E-06	I-131	1.860E-05
NA-24	1.010E-05	I-132	1.200E-06
P-32	6.590E-05	I-133	5.330E-06
K-40	0.000E-01	I-134	6.330E-07
CR-51	1.410E-08	I-135	2.640E-06
MN-54	4.510E-06	CS-134	7.100E-05
MN-56	1.410E-07	CS-136	5.040E-05
FE-55	2.400E-06	CS-137	4.330E-05
FE-59	2.120E-05	CS-138	3.790E-07
CO-56	0.000E-01	BA-139	2.550E-08
CO-57	0.000E-01	BA-140	8.810E-06
CO-58	8.980E-06	LA-140	2.140E-09
CO-60	2.550E-05	CE-139	0.000E-01
NI-63	2.200E-05	CE-144	1.670E-07
NI-65	2.420E-07	EU-132	0.000E-01
CU-64	2.820E-07	W-187	2.170E-07
ZN-65	2.910E-05	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	3.820E-07	BI-214	0.000E-01
RB-88	2.730E-07	RA-226	0.000E-01
RB-89	1.970E-07	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	7.200E-05	NP-239	5.610E-10
SR-90	4.710E-03	AAAAAAA	0.000E-01
SR-91	1.810E-06	BBBBBBB	0.000E-01
SR-92	7.130E-07	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	2.330E-09	EEEEEEE	0.000E-01
Y-91M	2.760E-11	FFFFFFF	0.000E-01
Y-91	3.010E-08	GGGGGGG	0.000E-01
Y-92	2.150E-10	HHHHHHH	0.000E-01
Y-93	6.620E-10	IIIIIII	0.000E-01
ZR-95	3.560E-08	JJJJJJJ	0.000E-01

DFL_i - elements 16+100, infant ingestion dose factor for total body
(mrem/pCi ingested)

POOR ORIGINAL

461 060

AR-41	0.000E-01	ZR-97	0.000E-01
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	0.000E-01
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	0.000E-01
KR-88	0.000E-01	TC-99M	0.000E-01
KR-89	0.000E-01	RU-103	0.000E-01
KR-90	0.000E-01	RU-106	0.000E-01
XE-131M	0.000E-01	AG-110M	0.000E-01
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	3.080E-07	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	1.520E-05
C-14	5.060E-06	I-131	1.390E-02
NA-24	1.010E-05	I-132	1.580E-04
P-32	0.000E-01	I-133	3.310E-03
K-40	0.000E-01	I-134	4.150E-05
CR-51	9.200E-09	I-135	6.490E-04
MN-54	0.000E-01	CS-134	0.000E-01
MN-56	0.000E-01	CS-136	0.000E-01
FE-55	0.000E-01	CS-137	0.000E-01
FE-59	0.000E-01	CS-138	0.000E-01
CO-56	0.000E-01	BA-139	0.000E-01
CO-57	0.000E-01	BA-140	0.000E-01
CO-58	0.000E-01	LA-140	0.000E-01
CO-60	0.000E-01	CE-139	0.000E-01
NI-63	0.000E-01	CE-144	0.000E-01
NI-65	0.000E-01	EU-152	0.000E-01
CU-64	0.000E-01	W-187	0.000E-01
ZN-65	0.000E-01	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	0.000E-01	RA-226	0.000E-01
RB-89	0.000E-01	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	0.000E-01	NP-239	0.000E-01
SR-90	0.000E-01	AAAAAAA	0.000E-01
CR-91	0.000E-01	BBBBBBB	0.000E-01
SR-92	0.000E-01	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	0.000E-01	EEEEEEE	0.000E-01
Y-91M	0.000E-01	FFFFFFF	0.000E-01
Y-91	0.000E-01	GGGGGGG	0.000E-01
Y-92	0.000E-01	HHHHHHH	0.000E-01
Y-93	0.000E-01	IIIIIII	0.000E-01
ZR-95	0.000E-01	JJJJJJJ	0.000E-01

DFL_i - elements 16+100, infant ingestion dose factor for thyroid
(mrem/pCi ingested)

POOR ORIGINAL

461 061

AR-41	0.000E-01	ZR-97	2.560E-09
KR-83M	0.000E-01	NE-94	0.000E-01
KR-85M	0.000E-01	NE-95	1.240E-08
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	5.080E-05
KR-88	0.000E-01	TC-99M	4.260E-08
KR-89	0.000E-01	RU-103	3.080E-06
KR-90	0.000E-01	RU-106	2.850E-05
XE-131M	0.000E-01	AG-110M	1.040E-06
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	3.080E-07	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	6.440E-05
C-14	5.060E-06	I-131	4.940E-05
NA-24	1.010E-05	I-132	3.760E-06
P-32	0.000E-01	I-133	2.140E-05
K-40	0.000E-01	I-134	1.990E-06
CR-51	2.010E-09	I-135	8.070E-06
MN-54	4.410E-06	CS-134	1.810E-04
MN-56	7.030E-07	CS-136	5.380E-05
FE-55	0.000E-01	CS-137	1.640E-04
FE-59	0.000E-01	CS-138	3.900E-07
CO-56	0.000E-01	BA-139	3.510E-10
CO-57	0.000E-01	BA-140	4.060E-08
CO-58	0.000E-01	LA-140	0.000E-01
CO-60	0.000E-01	CE-139	0.000E-01
NI-63	0.000E-01	CE-144	4.930E-07
NI-65	0.000E-01	EU-152	0.000E-01
CU-64	1.080E-06	W-187	0.000E-01
ZN-65	3.060E-05	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	0.000E-01	RA-226	0.000E-01
RB-89	0.000E-01	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	0.000E-01	NP-239	1.980E-09
SR-90	0.000E-01	AAAAAAA	0.000E-01
SR-91	0.000E-01	BBBBBBB	0.000E-01
SR-92	0.000E-01	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	0.000E-01	EEEEEEE	0.000E-01
Y-91M	0.000E-01	FFFFFFF	0.000E-01
Y-91	0.000E-01	GGGGGGG	0.000E-01
Y-92	0.000E-01	HHHHHHH	0.000E-01
Y-93	0.000E-01	IIIIIII	0.000E-01
ZR-95	5.410E-08	JJJJJJJ	0.000E-01

DFL_i - elements 16-100, infant ingestion dose factor for kidneys
(mrem/pCi ingested)

POOR ORIGINAL ⁴⁶¹ 062

AR-41	0.000E-01	ZR-97	0.000E-01
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	0.000E-01
LP-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	0.000E-01
KR-88	0.000E-01	TC-99M	2.070E-09
KR-89	0.000E-01	RU-103	0.000E-01
KR-90	0.000E-01	RU-106	0.000E-01
XE-131M	0.000E-01	AG-110M	0.000E-01
YE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	3.080E-07	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	0.000E-01
C-14	5.060E-06	I-131	0.000E-01
NA-24	1.010E-05	I-132	0.000E-01
P-32	0.000E-01	I-133	0.000E-01
K-40	0.000E-01	I-134	0.000E-01
CR-51	1.790E-08	I-135	0.000E-01
MN-54	0.000E-01	CS-134	7.420E-05
MN-56	0.000E-01	CS-136	1.100E-05
FE-55	4.390E-06	CS-137	6.640E-05
FE-59	1.590E-05	CS-138	6.090E-08
CO-56	0.000E-01	BA-139	3.540E-10
CO-57	0.000E-01	BA-140	1.050E-07
CO-58	0.000E-01	LA-140	0.000E-01
CO-60	0.000E-01	CE-139	0.000E-01
NI-63	0.000E-01	CE-144	0.000E-01
NI-65	0.000E-01	EU-152	0.000E-01
CU-64	0.000E-01	W-187	0.000E-01
ZN-65	0.000E-01	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	0.000E-01	RA-226	0.000E-01
RB-89	0.000E-01	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	0.000E-01	NP-239	0.000E-01
SR-90	0.000E-01	AAAAAAA	0.000E-01
SR-91	0.000E-01	BBBBBBB	0.000E-01
SR-92	0.000E-01	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	0.000E-01	EEEEEEE	0.000E-01
Y-91M	0.000E-01	FFFFFFF	0.000E-01
Y-91	0.000E-01	GGGGGGG	0.000E-01
Y-92	0.000E-01	HHHHHHH	0.000E-01
Y-93	0.000E-01	IIIIIII	0.000E-01
ZR-95	0.000E-01	JJJJJJJ	0.000E-01

DFL_i - elements 16+100, infant ingestion dose factor for lungs
(mrem/pCi ingested)

POOR ORIGINAL

063

AR-41	0.000E-01	ZR-97	1.620E-04
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	1.460E-05
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	1.120E-05
KR-88	0.000E-01	TC-99M	1.150E-06
KR-89	0.000E-01	RU-103	1.800E-05
KR-90	0.000E-01	RU-106	1.830E-04
XE-131M	0.000E-01	AG-110M	3.770E-05
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	3.080E-07	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	3.810E-05
C-14	5.060E-06	I-131	1.510E-06
NA-24	1.010E-05	I-132	2.730E-06
P-32	2.300E-05	I-133	3.080E-06
K-40	0.000E-01	I-134	1.840E-06
CR-51	4.110E-07	I-135	2.620E-06
MN-54	7.310E-06	CS-134	1.910E-06
MN-56	7.430E-05	CS-136	2.050E-06
FE-55	1.140E-06	CS-137	1.910E-06
FE-59	2.570E-07	CS-138	1.250E-06
CO-56	0.000E-01	BA-139	5.580E-05
CO-57	0.000E-01	BA-140	4.200E-05
CO-58	8.970E-06	LA-140	9.770E-05
CO-60	2.570E-05	CE-139	0.000E-01
NI-63	1.950E-06	CE-144	1.710E-04
NI-65	4.050E-05	EU-152	0.000E-01
CU-64	1.250E-05	W-187	3.690E-05
ZN-65	5.330E-05	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	3.000E-01
BR-84	1.000E-24	BI-214	0.000E-01
RB-88	4.850E-07	RA-226	0.000E-01
RB-89	9.740E-08	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	5.160E-04	NP-239	2.870E-05
SR-90	2.310E-04	AAAAAAA	0.000E-01
SR-91	5.920E-05	BBBBBBB	0.000E-01
SR-92	2.070E-04	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	1.200E-04	EEEEEEE	0.000E-01
Y-91M	2.700E-06	FFFFFFF	0.000E-01
Y-91	8.100E-05	GGGGGGG	0.000E-01
Y-92	1.460E-04	HHHHHHH	0.000E-01
Y-93	1.920E-04	IIIIIII	0.000E-01
ZR-95	2.500E-05	JJJJJJJ	0.000E-01

DFL_i - elements 16+100, infant ingestion dose factors for GI-LLI
(mrem/pCi ingested)

POOR ORIGINAL

461 064

AR-41	0.000E-01	ZR-97	1.070E-07
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	1.120E-05
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	0.000E-01
KR-88	0.000E-01	TC-99M	9.980E-13
KR-89	0.000E-01	RU-103	1.440E-06
KR-90	0.000E-01	RU-106	6.200E-05
XE-131M	0.000E-01	AG-110M	7.130E-06
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	0.000E-01	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	2.660E-07
C-14	1.890E-05	I-131	2.710E-05
NA-24	7.540E-06	I-132	1.210E-06
P-32	1.450E-03	I-133	9.460E-06
K-40	0.000E-01	I-134	6.580E-07
CR-51	0.000E-01	I-135	2.760E-06
MN-54	0.000E-01	CS-134	2.830E-04
MN-56	0.000E-01	CS-136	3.450E-05
FE-55	1.410E-05	CS-137	3.920E-04
FE-59	9.690E-06	CS-138	3.610E-07
CO-56	0.000E-01	BA-139	1.060E-09
CO-57	0.000E-01	BA-140	4.000E-05
CO-58	0.000E-01	LA-140	2.610E-07
CO-60	0.000E-01	CE-139	0.000E-01
NI-63	2.420E-04	CE-144	2.280E-03
NI-65	1.710E-09	EU-152	0.000E-01
CU-64	0.000E-01	W-187	9.260E-09
ZN-65	1.380E-05	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	0.000E-01	RA-226	0.000E-01
RB-89	0.000E-01	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	2.840E-04	NP-239	2.650E-07
SR-90	2.920E-02	AAAAAAA	0.000E-01
SR-91	6.830E-08	BBBBBBB	0.000E-01
SR-92	7.500E-09	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	2.350E-06	EEEEEEE	0.000E-01
Y-91M	2.910E-10	FFFFFFF	0.000E-01
Y-91	4.200E-04	GGGGGGG	0.000E-01
Y-92	1.170E-08	HHHHHHH	0.000E-01
Y-93	1.070E-07	IIIIIII	0.000E-01
ZR-95	8.240E-05	JJJJJJJ	0.000E-01

DFA_i - elements 16+100, infant inhalation dose factors for bone
(mrem/pCi inhaled)

POOR ORIGINAL

461 065

AR-41	0.000E-01	ZR-97	1.830E-08
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	4.590E-06
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	1.180E-07
KR-88	0.000E-01	TC-99M	2.060E-12
KR-89	0.000E-01	RU-103	0.000E-01
KR-90	0.000E-01	RU-106	0.000E-01
XE-131M	0.000E-01	AG-110M	5.160E-06
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	4.620E-07	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	1.690E-07
C-14	3.790E-06	I-131	3.170E-05
NA-24	7.540E-06	I-132	2.570E-06
P-32	8.030E-05	I-133	1.370E-05
K-40	0.000E-01	I-134	1.340E-06
CR-51	0.000E-01	I-135	5.430E-06
MN-54	1.810E-05	CS-134	5.020E-04
MN-56	1.100E-09	CS-136	9.610E-05
FE-55	8.290E-06	CS-137	4.370E-04
FE-59	1.680E-05	CS-138	5.580E-07
CO-56	0.000E-01	BA-139	7.030E-13
CO-57	0.000E-01	BA-140	4.000E-08
CO-58	8.710E-07	LA-140	1.430E-07
CO-60	5.730E-06	CE-139	0.000E-01
NI-63	1.460E-05	CE-144	8.650E-04
NI-65	2.030E-10	EU-152	0.000E-01
CU-64	1.340E-09	W-187	6.440E-09
ZN-65	4.470E-05	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	3.980E-07	RA-226	0.000E-01
RB-89	2.290E-07	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	0.000E-01	NP-239	2.370E-08
SR-90	0.000E-01	AAAAAAA	0.000E-01
SR-91	0.000E-01	BBBBBBB	0.000E-01
SR-92	0.000E-01	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	0.000E-01	EEEEEEE	0.000E-01
Y-91M	0.000E-01	FFFFFFF	0.000E-01
Y-91	0.000E-01	GGGGGGG	0.000E-01
Y-92	0.000E-01	HHHHHHH	0.000E-01
Y-93	0.000E-01	IIIIIII	0.000E-01
ZR-95	1.990E-05	JJJJJJJ	0.000E-01

DFA_i - elements 16-100, infant inhalation dose factor for liver
(mrem/pCi inhaled)

POOR ORIGINAL

AR-41	0.000E-01	ZR-97	8.360E-09
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	2.700E-06
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	2.310E-08
KR-88	0.000E-01	TC-99M	2.660E-11
KR-89	0.000E-01	RU-103	4.850E-07
KR-90	0.000E-01	RU-106	7.770E-06
XE-131M	0.000E-01	AG-110M	3.570E-06
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	4.620E-07	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	1.260E-07
C-14	3.790E-06	I-131	1.400E-05
NA-24	7.540E-06	I-132	8.997E-07
P-32	5.530E-05	I-133	4.000E-06
K-40	0.000E-01	I-134	4.750E-07
CR-51	6.390E-08	I-135	1.980E-06
MN-54	3.560E-06	CS-134	5.320E-05
MN-56	1.580E-10	CS-136	3.780E-05
FE-55	2.380E-06	CS-137	3.250E-05
FE-59	6.770E-06	CS-138	3.840E-07
CO-56	0.000E-01	BA-139	3.070E-11
CO-57	0.000E-01	BA-140	2.070E-06
CO-58	1.300E-06	LA-140	3.680E-08
CO-60	8.410E-06	CE-139	0.000E-01
NI-63	8.290E-06	CE-144	1.260E-04
NI-65	8.790E-11	EU-152	0.000E-01
CU-64	5.530E-10	W-187	2.230E-09
ZN-65	2.220E-05	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	2.860E-07	BI-214	0.000E-01
RB-88	2.050E-07	RA-226	0.000E-01
RB-89	1.470E-07	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	8.150E-06	NP-239	1.340E-08
SR-90	1.850E-03	AAAAAAA	0.000E-01
SR-91	2.470E-09	BBBBBBB	0.000E-01
SR-92	2.790E-10	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	6.300E-08	EEEEEEE	0.000E-01
Y-91M	9.900E-12	FFFFFFF	0.000E-01
Y-91	1.120E-05	GGGGGGG	0.000E-01
Y-92	3.290E-10	HHHHHHH	0.000E-01
Y-93	2.910E-09	IIIIIII	0.000E-01
ZR-95	1.450E-06	JJJJJJJ	0.000E-01

DFA_i - elements 16→100, infant inhalation dose factor for total body
(mrem/pCi inhaled)

POOR ORIGINAL

461 067

AR-41	0.000E-01	ZR-97	0.000E-01
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	0.000E-01
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	0.000E-01
KR-88	0.000E-01	TC-99M	0.000E-01
KR-89	0.000E-01	RU-103	0.000E-01
KR-90	0.000E-01	RU-106	0.000E-01
XE-131M	0.000E-01	AG-110M	0.000E-01
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	4.620E-07	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	1.990E-07
C-14	3.790E-06	I-131	1.060E-02
NA-24	7.540E-06	I-132	1.210E-04
P-32	0.000E-01	I-133	2.540E-03
K-40	0.000E-01	I-134	3.180E-05
CR-51	4.110E-08	I-135	4.970E-04
MN-54	0.000E-01	CS-134	0.000E-01
MN-56	0.000E-01	CS-136	0.000E-01
FE-55	0.000E-01	CS-137	0.000E-01
FE-59	0.000E-01	CS-138	0.000E-01
CO-56	0.000E-01	BA-139	0.000E-01
CO-57	0.000E-01	BA-140	0.000E-01
CO-58	0.000E-01	LA-140	0.000E-01
CO-60	0.000E-01	CE-139	0.000E-01
NI-63	0.000E-01	CE-144	0.000E-01
NI-65	0.000E-01	EU-152	0.000E-01
CU-64	0.000E-01	W-187	0.000E-01
ZN-65	0.000E-01	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	0.000E-01	RA-226	0.000E-01
RB-89	0.000E-01	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	0.000E-01	NF-239	0.000E-01
SR-90	0.000E-01	AAAAAAA	0.000E-01
SR-91	0.000E-01	BBBBBBB	0.000E-01
SR-92	0.000E-01	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	0.000E-01	EEEEEEE	0.000E-01
Y-91M	0.000E-01	FFFFFFF	0.000E-01
Y-91	0.000E-01	GGGGGGG	0.000E-01
Y-92	0.000E-01	HHHHHHH	0.000E-01
Y-93	0.000E-01	IIIIIII	0.000E-01
ZR-95	0.000E-01	JJJJJJJ	0.000E-01

DFA_i - elements 16+100, infant inhalation dose factors for thyroid
(mrem/pCi inhaled)

POOR ORIGINAL

461 068

AR-41	0.000E-01	ZR-97	1.850E-08
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	3.370E-06
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	1.890E-07
KR-88	0.000E-01	TC-99M	2.220E-11
KR-89	0.000E-01	RU-103	3.030E-06
KR-90	0.000E-01	RU-106	7.610E-05
XE-131M	0.000E-01	AG-110M	7.800E-06
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	4.620E-07	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	7.390E-07
C-14	3.790E-06	I-131	3.700E-05
NA-24	7.540E-06	I-132	2.820E-06
P-32	0.000E-01	I-133	1.600E-05
K-40	0.000E-01	I-134	1.490E-06
CR-51	9.450E-09	I-135	6.050E-06
MN-54	3.560E-06	CS-134	1.360E-04
MN-56	7.660E-10	CS-136	4.030E-05
FE-55	0.000E-01	CS-137	1.230E-04
FE-59	0.000E-01	CS-138	2.930E-07
CO-56	0.000E-01	BA-139	4.230E-13
CO-57	0.000E-01	BA-140	9.590E-09
CO-58	0.000E-01	LA-140	0.000E-01
CO-60	0.000E-01	CE-139	0.000E-01
NI-63	0.000E-01	CE-144	3.840E-04
NI-65	0.000E-01	EU-152	0.000E-01
CU-64	2.840E-09	W-187	0.000E-01
ZN-65	2.320E-05	HG-203	0.000E-01
SE-75	0.000E-01	FB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	0.000E-01	RA-226	0.000E-01
RB-89	0.000E-01	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	0.000E-01	NP-239	4.720E-08
SR-90	0.000E-01	AAAAAAA	0.000E-01
SR-91	0.000E-01	BBBBBBB	0.000E-01
SR-92	0.000E-01	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	0.000E-01	EEEEEEE	0.000E-01
Y-91M	0.000E-01	FFFFFFF	0.000E-01
Y-91	0.000E-01	GGGGGGG	0.000E-01
Y-92	0.000E-01	HHHHHHH	0.000E-01
Y-93	0.000E-01	IIIIIII	0.000E-01
ZR-95	2.220E-05	JJJJJJJ	0.000E-01

DFA_i - elements 16+100, infant inhalation dose factors for kidneys
(mrem/pCi inhaled)

POOR ORIGINAL 461 069

AR-41	0.000E-01	ZR-97	7.880E-05
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	3.420E-04
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	9.630E-05
KR-88	0.000E-01	TC-99M	5.790E-07
KR-89	0.000E-01	RU-103	3.940E-04
KR-90	0.000E-01	RU-106	8.260E-03
XE-121M	0.000E-01	AG-110M	2.620E-03
XE-123M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	4.620E-07	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	2.430E-04
C-14	3.790E-06	I-131	0.000E-01
NA-24	7.540E-06	I-132	0.000E-01
P-32	0.000E-01	I-133	0.000E-01
K-40	0.000E-01	I-134	0.000E-01
CR-51	9.170E-06	I-135	0.000E-01
MN-54	7.140E-04	CS-134	5.690E-05
MN-56	8.950E-06	CS-136	8.400E-06
FE-55	6.210E-05	CS-137	5.090E-05
FE-59	7.250E-04	CS-138	4.670E-08
CO-56	0.000E-01	BA-139	4.250E-06
CO-57	0.000E-01	BA-140	1.140E-03
CO-58	5.550E-04	LA-140	1.200E-04
CO-60	3.220E-03	CE-139	0.000E-01
NI-63	1.490E-04	CE-144	7.030E-03
NI-65	5.000E-06	EU-152	0.000E-01
CU-64	6.640E-06	W-187	2.830E-05
ZN-65	4.620E-04	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	0.000E-01	RA-226	0.000E-01
RB-89	0.000E-01	TH-238	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	1.450E-03	NP-239	4.250E-05
SR-90	8.030E-03	AAAAAAA	0.000E-01
SR-91	3.760E-05	BBBBBBB	0.000E-01
SR-92	1.700E-05	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	1.920E-04	EEEEEEE	0.000E-01
Y-91M	1.990E-06	FFFFFFF	0.000E-01
Y-91	1.750E-03	GGGGGGG	0.000E-01
Y-92	1.750E-05	HHHHHHH	0.000E-01
Y-93	5.460E-05	IIIIIII	0.000E-01
ZR-95	1.250E-03	JJJJJJJ	0.000E-01

DFA_i - elements 16+100, infant inhalation dose factor for lungs
(mrem/pCi inhaled)

POOR ORIGINAL

AR-41	0.000E-01	ZR-97	1.000E-04
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	9.050E-06
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	3.480E-05
KR-88	0.000E-01	TC-99M	1.450E-06
KR-89	0.000E-01	RU-103	1.150E-05
KR-90	0.000E-01	RU-106	1.170E-04
XE-131M	0.000E-01	AG-110M	2.360E-05
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	4.620E-07	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	3.150E-05
C-14	3.790E-06	I-131	7.560E-07
NA-24	7.540E-06	I-132	1.360E-06
P-32	1.150E-05	I-133	1.540E-06
K-40	0.000E-01	I-134	9.210E-07
CR-51	2.550E-05	I-135	1.310E-06
MN-54	5.040E-06	CS-134	9.530E-07
MN-56	5.120E-05	CS-136	1.020E-06
FE-55	7.820E-07	CS-137	9.530E-07
FE-59	1.770E-05	CS-138	6.260E-07
CO-56	0.000E-01	BA-139	3.640E-05
CO-57	0.000E-01	BA-140	2.740E-05
CO-58	7.950E-06	LA-140	6.060E-05
CO-60	2.280E-05	CE-139	0.000E-01
NI-63	1.730E-06	CE-144	1.060E-04
NI-65	3.580E-05	EU-152	0.000E-01
CU-64	1.070E-05	W-187	2.540E-05
ZN-65	3.670E-05	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	1.000E-24	BI-214	0.000E-01
RB-88	2.420E-07	RA-226	0.000E-01
RB-89	4.870E-08	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	4.570E-05	NP-239	1.780E-05
SR-90	9.360E-05	AAAAAAA	0.000E-01
SR-91	5.240E-05	BBBBBBB	0.000E-01
SR-92	1.000E-04	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	7.430E-05	EEEEEEE	0.000E-01
Y-91M	1.680E-06	FFFFFFF	0.000E-01
Y-91	5.020E-05	GGGGGGG	0.000E-01
Y-92	9.040E-05	HHHHHHH	0.000E-01
Y-93	1.190E-04	IIIIIII	0.000E-01
ZR-95	1.550E-05	JJJJJJJ	0.000E-01

DFA_i - elements 16+100, infant inhalation dose factors for GI-LLI
(mrem/pCi inhaled)

POOR ORIGINAL

461 071

AR-41	6.588E 03	ZR-97	6.120E 04
KR-83M	6.700E 03	NB-94	3.160E 11
KR-85M	1.610E 04	NB-95	1.520E 06
KR-85	1.700E 08	MO-90	2.050E 04
KR-87	4.579E 03	MO-99	2.400E 05
KR-88	1.030E 04	TC-99M	2.170E 04
KR-89	1.900E 02	RU-103	1.710E 06
KR-90	3.230E 01	RU-106	1.590E 07
XE-131M	5.140E 05	AG-110M	1.090E 07
XE-132M	9.760E 04	CD-109	1.960E 07
XE-133	2.290E 05	CD-113M	2.310E 08
XE-135M	9.360E 02	SN-113	4.970E 06
XE-135	2.300E 04	SB-122	1.180E 05
XE-137	2.300E 02	SB-124	2.600E 06
XE-138	1.020E 03	SB-125	4.310E 07
H-3	1.950E 08	SB-127	3.350E 05
BE-7	2.300E 06	TE-132	2.810E 05
O-14	9.050E 10	I-131	3.470E 05
NA-24	5.410E 04	I-132	8.208E 03
P-32	6.180E 05	I-133	7.560E 04
K-40	1.990E 16	I-134	2.192E 03
CR-51	1.200E 06	I-135	2.410E 04
MN-54	1.350E 07	CS-134	3.260E 07
MN-56	9.324E 03	CS-136	5.620E 05
FE-55	4.110E 07	CS-137	4.770E 08
FE-59	1.930E 06	CS-138	2.004E 03
CO-56	2.240E 06	BA-139	4.962E 03
CO-57	1.170E 07	BA-140	5.530E 05
CO-58	3.080E 06	LA-140	1.450E 05
CO-60	8.310E 07	CE-139	5.920E 06
NI-63	1.450E 09	CE-144	1.230E 07
NI-65	9.220E 03	EU-152	2.090E 08
CU-64	4.570E 04	W-187	8.600E 04
ZN-65	1.050E 07	HG-203	2.020E 06
SE-75	5.180E 06	PB-214	1.608E 03
BR-84	1.908E 03	BI-214	1.182E 03
RB-88	1.068E 03	RA-226	2.530E 10
RB-89	9.360E 02	TH-228	3.020E 07
SR-85	2.820E 06	U-235	1.110E 16
SR-89	2.180E 06	NP-239	1.020E 05
SR-90	4.440E 08	AAAAAAA	0.000E-01
SR-91	3.510E 04	BBBBBBB	0.000E-01
SR-92	9.756E 03	CCCCCCC	0.000E-01
Y-88	4.610E 06	DDDDDDD	0.000E-01
Y-90	2.300E 05	EEEEEEE	0.000E-01
Y-91M	2.982E 03	FFFFFFF	0.000E-01
Y-91	2.530E 06	GGGGGGG	0.000E-01
Y-92	1.270E 04	HHHHHHH	0.000E-01
Y-93	3.440E 04	IIIIIII	0.000E-01
ZR-95	2.830E 06	JJJJJJJ	0.000E-01

HL_i or λ_i - elements 1+100, Radionuclide half life (sec⁻¹)

POOR ORIGINAL

AR-41	0.000E-01	ZR-97	6.990E-09
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	2.250E-08
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	0.000E-01
KR-88	0.000E-01	TC-99M	9.230E-10
KR-89	0.000E-01	RU-103	7.310E-07
KR-90	0.000E-01	RU-106	1.170E-05
XE-131M	0.000E-01	AG-110M	5.390E-07
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	0.000E-01	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	1.010E-05
C-14	1.210E-05	I-131	1.720E-05
NA-24	5.000E-06	I-132	8.000E-07
P-32	8.250E-04	I-133	5.920E-06
K-40	0.000E-01	I-134	4.190E-07
CR-51	0.000E-01	I-135	1.750E-06
MN-54	0.000E-01	CS-134	2.340E-04
MN-56	0.000E-01	CS-136	2.250E-05
FE-55	1.150E-05	CS-137	3.270E-04
FE-59	1.650E-05	CS-138	2.280E-07
CO-56	0.000E-01	BA-139	4.140E-07
CO-57	0.000E-01	BA-140	8.310E-05
CO-58	0.000E-01	LA-140	1.010E-08
CO-60	0.000E-01	CE-139	0.000E-01
NI-63	5.380E-04	CE-144	2.080E-06
NI-65	2.220E-06	EU-152	0.000E-01
CU-64	0.000E-01	W-187	4.290E-07
ZN-65	1.370E-05	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	0.000E-01	RA-226	0.000E-01
RB-89	0.000E-01	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	1.320E-03	NP-239	5.250E-09
SR-90	1.700E-02	AAAAAAA	0.000E-01
SR-91	2.400E-05	BBBBBBB	0.000E-01
SR-92	9.030E-06	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	4.110E-08	EEEEEEE	0.000E-01
Y-91M	3.820E-10	FFFFFFF	0.000E-01
Y-91	6.020E-07	GGGGGGG	0.000E-01
Y-92	3.600E-09	HHHHHHH	0.000E-01
Y-93	1.140E-08	IIIIIII	0.000E-01
ZR-95	1.160E-07	JJJJJJJ	0.000E-01

DFL_i - elements 16+100, child ingestion dose factor for bone
(mrem/pCi ingested)

POOR ORIGINAL

AR-41	0.000E-01	ZR-97	1.010E-09
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	0.760E-09
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	1.330E-05
KR-88	0.000E-01	TC-99M	1.810E-09
KR-89	0.000E-01	RU-103	0.000E-01
KR-90	0.000E-01	RU-106	0.000E-01
XE-131M	0.000E-01	AG-110M	3.640E-07
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	2.030E-07	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	4.470E-06
C-14	2.420E-06	I-131	1.730E-05
NA-24	5.800E-06	I-132	1.470E-06
P-32	3.860E-05	I-133	7.320E-06
K-40	0.000E-01	I-134	7.780E-07
CR-51	0.000E-01	I-135	3.150E-06
MN-54	1.070E-05	CS-134	3.840E-04
MN-56	3.340E-07	CS-136	6.460E-05
FE-55	6.100E-06	CS-137	3.130E-04
FE-59	2.670E-05	CS-138	3.170E-07
CO-56	0.000E-01	BA-139	2.210E-10
CO-57	0.000E-01	BA-140	7.280E-08
CO-58	1.800E-06	LA-140	3.530E-09
CO-60	5.290E-06	CE-139	0.000E-01
NI-63	2.880E-05	CE-144	6.520E-07
NI-65	2.090E-07	EU-152	0.000E-01
CU-64	2.450E-07	W-187	2.540E-07
ZN-65	3.650E-05	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	1.900E-07	RA-226	0.000E-01
RB-89	1.170E-07	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	0.000E-01	NP-239	3.770E-10
SR-90	0.000E-01	AAAAAAA	0.000E-01
SR-91	0.000E-01	BBBBBBB	0.000E-01
SR-92	0.000E-01	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	0.000E-01	EEEEEEE	0.000E-01
Y-91M	0.000E-01	FFFFFFF	0.000E-01
Y-91	0.000E-01	GGGGGGG	0.000E-01
Y-92	0.000E-01	HHHHHHH	0.000E-01
Y-93	0.000E-01	IIIIIII	0.000E-01
ZR-95	2.550E-08	JJJJJJJ	0.000E-01

DFL_i - elements 16-100, child ingestion dose factors for liver
(mrem/pCi ingested)

POOR ORIGINAL

AR-41	0.000E-01	ZR-97	5.960E-10
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	6.260E-09
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	3.290E-06
KR-88	0.000E-01	TC-93M	3.000E-08
KR-89	0.000E-01	RU-103	2.810E-07
KR-90	0.000E-01	RU-106	1.460E-06
XE-131M	0.000E-01	AG-110M	2.910E-07
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	2.030E-07	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	5.400E-06
C-14	2.420E-06	I-131	9.830E-06
NA-24	5.800E-06	I-132	6.760E-07
P-32	3.180E-05	I-133	2.770E-06
K-40	0.000E-01	I-134	3.580E-07
CR-51	8.900E-09	I-135	1.490E-06
MN-54	2.850E-06	CS-134	8.100E-05
MN-56	7.540E-08	CS-136	4.180E-05
FE-55	1.890E-06	CS-137	4.620E-05
FE-59	1.330E-05	CS-138	2.010E-07
CO-56	0.000E-01	BA-139	1.200E-08
CO-57	0.000E-01	BA-140	4.850E-06
CO-58	5.510E-06	LA-140	1.190E-09
CO-60	1.560E-05	CE-139	0.000E-01
NI-63	1.830E-05	CE-144	1.110E-07
NI-65	1.220E-07	EU-152	0.000E-01
CU-64	1.480E-07	W-187	1.140E-07
ZN-65	2.270E-05	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	1.980E-07	BI-214	0.000E-01
RB-88	1.320E-07	RA-226	0.000E-01
RB-89	1.040E-07	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	3.770E-05	NP-239	2.650E-10
SR-90	4.310E-03	AAAAAAA	0.000E-01
SR-91	9.060E-07	BBBBBBB	0.000E-01
SR-92	3.620E-07	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	1.100E-09	EEEEEEE	0.000E-01
Y-91M	1.390E-11	FFFFFFF	0.000E-01
Y-91	1.610E-08	GGGGGGG	0.000E-01
Y-92	1.030E-08	HHHHHHH	0.000E-01
Y-93	3.130E-10	IIIIIII	0.000E-01
ZR-95	2.270E-08	JJJJJJJ	0.000E-01

DFL_i - elements 16+100, child ingestion dose factors for total body
(mrem/pCi ingested)

POOR ORIGINAL 461 075

AR-41	0.000E-01	ZR-97	0.000E-01
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	0.000E-01
KR-85	0.000E-01	MO-98	0.000E-01
KR-87	0.000E-01	MO-99	0.000E-01
KR-88	0.000E-01	TC-99M	0.000E-01
KR-89	0.000E-01	RU-103	0.000E-01
KR-90	0.000E-01	RU-106	0.000E-01
XE-131M	0.000E-01	AG-110M	0.000E-01
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	2.030E-07	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	6.510E-06
C-14	2.420E-06	I-131	5.720E-03
NA-24	5.800E-06	I-132	6.820E-05
P-32	0.000E-01	I-133	1.360E-03
K-40	0.000E-01	I-134	1.790E-05
CR-51	4.940E-09	I-135	2.790E-04
MN-54	0.000E-01	CS-134	0.000E-01
MN-56	0.000E-01	CS-136	0.000E-01
FE-55	0.000E-01	CS-137	0.000E-01
FE-59	0.000E-01	CS-138	0.000E-01
CO-56	0.000E-01	BA-139	0.000E-01
CO-57	0.000E-01	BA-140	0.000E-01
CO-58	0.000E-01	LA-140	0.000E-01
CO-60	0.000E-01	CE-139	0.000E-01
NI-63	0.000E-01	CE-144	0.000E-01
NI-65	0.000E-01	EU-152	0.000E-01
CU-64	0.000E-01	W-187	0.000E-01
ZN-65	0.000E-01	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	0.000E-01	RA-226	0.000E-01
RB-89	0.000E-01	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	0.000E-01	NP-239	0.000E-01
SR-90	0.000E-01	AAAAAAA	0.000E-01
SR-91	0.000E-01	BBBBBBB	0.000E-01
SR-92	0.000E-01	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	0.000E-01	EEEEEEE	0.000E-01
Y-91M	0.000E-01	FFFFFFF	0.000E-01
Y-91	0.000E-01	GGGGGGG	0.000E-01
Y-92	0.000E-01	HHHHHHH	0.000E-01
Y-93	0.000E-01	IIIIIII	0.000E-01
ZR-95	0.000E-01	JJJJJJJ	0.000E-01

DFL_i - elements 16+100, child ingestion dose factors for thyroid
(mrem/pCi ingested)

POOR ORIGINAL

461 076

AR-41	3.157E-03	ZR-97	1.450E-09
KR-83M	4.178E-20	NB-94	0.000E-01
KR-85M	8.169E-02	NB-95	8.230E-09
KR-85	2.223E-15	MO-90	0.000E-01
KR-87	1.620E-10	MO-99	2.840E-05
KR-88	7.579E-13	TC-99M	2.630E-08
KR-89	4.926E-01	RU-103	1.840E-06
KR-90	3.684E-10	RU-106	1.580E-05
XE-131M	2.722E-15	AG-110M	6.780E-07
XE-133M	9.842E-15	CD-109	0.000E-01
XE-133	5.067E-07	CD-113M	0.000E-01
XE-135M	6.013E-13	SN-113	0.000E-01
XE-135	6.295E-13	SB-122	0.000E-01
XE-137	1.304E-31	SB-124	0.000E-01
XE-138	3.081E-00	SB-125	0.000E-01
H-3	2.300E-07	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	4.150E-05
C-14	2.420E-06	I-131	2.840E-05
NA-24	5.800E-06	I-132	2.250E-06
P-32	0.000E-01	I-133	1.220E-05
K-40	0.000E-01	I-134	1.190E-06
CR-51	1.350E-09	I-135	4.820E-06
MN-54	3.000E-06	CS-134	1.190E-04
MN-56	4.040E-07	CS-136	3.440E-05
FE-55	0.000E-01	CS-137	1.020E-04
FE-59	0.000E-01	CS-138	2.230E-07
CO-56	0.000E-01	BA-139	1.930E-10
CO-57	0.000E-01	BA-140	2.370E-08
CO-58	0.000E-01	LA-140	0.000E-01
CO-60	0.000E-01	CE-139	0.000E-01
NI-63	0.000E-01	CE-144	3.610E-07
NI-65	0.000E-01	EU-152	0.000E-01
CU-64	5.920E-07	W-187	0.000E-01
ZN-65	2.300E-05	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	0.000E-01	RA-226	0.000E-01
RB-89	0.000E-01	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	0.000E-01	NP-239	1.090E-09
SR-90	0.000E-01	AAAAAAA	0.000E-01
SR-91	0.000E-01	BBBBBBB	0.000E-01
SR-92	0.000E-01	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	0.000E-01	EEEEEEE	0.000E-01
Y-91M	0.000E-01	FFFFFFF	0.000E-01
Y-91	0.000E-01	GGGGGGG	0.000E-01
Y-92	0.000E-01	HHHHHHH	0.000E-01
Y-93	0.000E-01	IIIIIII	0.000E-01
ZR-95	3.650E-08	JJJJJJJ	0.000E-01

DFL_i - elements 16+100, child ingestion dose factors for kidneys
(mrem/pCi ingested)

POOR ORIGINAL

461 077

AR-41	0.000E-01	ZR-97	0.000E-01
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	0.000E-01
KR-85	0.000E-01	MO-98	0.000E-01
KR-87	0.000E-01	MO-99	0.000E-01
KR-88	0.000E-01	TC-99M	9.190E-10
KR-89	0.000E-01	RU-103	0.000E-01
KR-90	0.000E-01	RU-106	0.000E-01
XE-131M	0.000E-01	AG-110M	0.000E-01
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	2.030E-07	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	0.000E-01
C-14	2.420E-06	I-131	0.000E-01
NA-24	5.800E-06	I-132	0.000E-01
P-32	0.000E-01	I-133	0.000E-01
K-40	0.000E-01	I-134	0.000E-01
CR-51	9.020E-09	I-135	0.000E-01
MN-54	0.000E-01	CS-134	4.270E-05
MN-56	0.000E-01	CS-136	5.130E-06
FE-55	3.450E-06	CS-137	3.670E-05
FE-59	7.740E-06	CS-138	2.400E-08
CO-56	0.000E-01	BA-139	1.300E-10
CO-57	0.000E-01	BA-140	4.340E-08
CO-58	0.000E-01	LA-140	0.000E-01
CO-60	0.000E-01	CE-139	0.000E-01
NI-63	0.000E-01	CE-144	0.000E-01
NI-65	0.000E-01	EU-152	0.000E-01
CU-64	0.000E-01	W-187	0.000E-01
ZN-65	0.000E-01	HG-203	0.000E-01
SE-75	0.000E-01	PE-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	0.000E-01	RA-226	0.000E-01
RB-89	0.000E-01	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	0.000E-01	NP-239	0.000E-01
SR-90	0.000E-01	AAAAAAA	0.000E-01
SR-91	0.000E-01	BBBBBBB	0.000E-01
SR-92	0.000E-01	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	0.000E-01	EEEEEEE	0.000E-01
Y-91M	0.000E-01	FFFFFFF	0.000E-01
Y-91	0.000E-01	GGGGGGG	0.000E-01
Y-92	0.000E-01	HHHHHHH	0.000E-01
Y-93	0.000E-01	IIIIIII	0.000E-01
ZR-95	0.000E-01	JJJJJJJ	0.000E-01

DFL_i - elements 16+100, child ingestion dose factors for lung
(mrem/pCi ingested)

POOR ORIGINAL

461 078

AR-41	0.000E-01	ZR-97	1.530E-04
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	1.620E-05
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	1.100E-05
KR-88	0.000E-01	TC-99M	1.020E-06
KR-89	0.000E-01	RU-103	1.890E-05
KR-90	0.000E-01	RU-106	1.820E-04
XE-131M	0.000E-01	AG-110M	4.320E-05
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	2.030E-07	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	4.500E-05
C-14	2.420E-06	I-131	1.540E-06
NA-24	5.000E-06	I-132	1.720E-06
P-32	2.280E-05	I-133	2.950E-06
K-40	0.000E-01	I-134	5.160E-07
CR-51	4.720E-07	I-135	2.400E-06
MN-54	0.900E-06	CS-134	2.070E-06
MN-56	4.840E-05	CS-136	2.270E-06
FE-55	1.130E-06	CS-137	1.960E-06
FE-59	2.780E-05	CS-138	1.460E-07
CO-56	0.000E-01	BA-139	2.390E-05
CO-57	0.000E-01	BA-140	4.210E-05
CO-58	1.050E-05	LA-140	9.840E-05
CO-60	2.930E-05	CE-139	0.000E-01
NI-63	1.940E-06	CE-144	1.700E-04
NI-65	2.560E-05	EU-152	0.000E-01
CU-64	1.150E-05	W-187	3.570E-05
ZN-65	6.410E-06	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	1.000E-24	BI-214	0.000E-01
RB-88	9.320E-09	RA-226	0.000E-01
RB-89	1.020E-09	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	5.110E-05	NP-239	2.790E-05
SR-90	2.290E-04	AAAAAAA	0.000E-01
SR-91	5.300E-05	BBBBBBB	0.000E-01
SR-92	1.710E-04	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	1.170E-04	EEEEEEE	0.000E-01
Y-91M	7.480E-07	FFFFFFF	0.000E-01
Y-91	8.020E-05	GGGGGGG	0.000E-01
Y-92	1.040E-04	HHHHHHH	0.000E-01
Y-93	1.700E-04	IIIIIII	0.000E-01
ZR-95	2.660E-05	JJJJJJJ	0.000E-01

DFL_i - elements 16+100, child ingestion dose factors for
GI-LLI (mrem/pCi ingested)

POOR ORIGINAL

AR-41	0.000E-01	ZR-97	5.070E-08
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	6.350E-06
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	0.000E-01
KR-88	0.000E-01	TC-99M	4.810E-13
KR-89	0.000E-01	RU-103	7.550E-07
KR-90	0.000E-01	RU-106	3.680E-05
XE-131M	0.000E-01	AG-110M	4.560E-06
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	0.000E-01	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	1.300E-07
C-14	9.700E-06	I-131	1.300E-05
NA-24	4.350E-06	I-132	5.720E-07
P-32	7.040E-04	I-133	4.480E-06
K-40	0.000E-01	I-134	3.170E-07
CR-51	0.000E-01	I-135	1.330E-06
MN-54	0.000E-01	CS-134	1.760E-04
MN-56	0.000E-01	CS-136	1.760E-05
FE-55	1.280E-05	CS-137	2.450E-04
FE-59	5.590E-06	CS-138	1.710E-07
CO-56	0.000E-01	BA-139	4.980E-10
CO-57	0.000E-01	BA-140	2.000E-05
CO-58	0.000E-01	LA-140	1.740E-07
CO-60	0.000E-01	CE-139	0.000E-01
NI-63	2.220E-04	CE-144	1.830E-03
NI-65	8.880E-10	EU-152	0.000E-01
CU-64	0.000E-01	W-187	4.410E-09
ZN-65	1.150E-05	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	0.000E-01	RA-226	0.000E-01
RB-89	0.000E-01	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	1.620E-04	NP-239	1.260E-07
SR-90	2.730E-02	AAAAAAA	0.000E-01
SR-91	3.280E-08	BBBBBBB	0.000E-01
SR-92	3.540E-09	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	1.110E-06	EEEEEEE	0.000E-01
Y-91M	1.370E-10	FFFFFFF	0.000E-01
Y-91	2.470E-04	GGGGGGG	0.000E-01
Y-92	5.500E-09	HHHHHHH	0.000E-01
Y-93	5.040E-08	IIIIIII	0.000E-01
ZR-95	5.120E-05	JJJJJJJ	0.000E-01

DFA_i - elements 16+100, child inhalation dose factors for bone
(mrem/pCi inhaled)

POOR ORIGINAL

461 080

AR-41	0.000E-01	ZR-97	7.340E-09
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	2.480E-06
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	4.660E-08
KR-88	0.000E-01	TC-99M	9.410E-13
KR-89	0.000E-01	RU-103	0.000E-01
KR-90	0.000E-01	RU-106	0.000E-01
XE-131M	0.000E-01	AG-110M	3.080E-06
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	3.040E-07	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	7.360E-08
C-14	1.820E-06	I-131	1.300E-05
NA-24	4.350E-06	I-132	1.100E-06
P-32	3.090E-05	I-133	5.490E-06
K-40	0.000E-01	I-134	5.840E-07
CR-51	0.000E-01	I-135	2.360E-06
MN-54	1.160E-05	CS-134	2.740E-04
MN-56	4.480E-10	CS-136	4.620E-05
FE-55	6.800E-06	CS-137	2.230E-04
FE-59	9.040E-06	CS-138	2.270E-07
CO-56	0.000E-01	BA-139	2.660E-13
CO-57	0.000E-01	BA-140	1.750E-08
CO-58	4.790E-07	LA-140	6.080E-08
CO-60	3.550E-06	CE-139	0.000E-01
NI-63	1.250E-05	CE-144	5.720E-04
NI-65	7.990E-11	EU-152	0.000E-01
CU-64	5.390E-10	W-187	2.610E-09
ZN-65	3.060E-05	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	1.520E-07	RA-226	0.000E-01
RB-89	9.330E-08	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	0.000E-01	NP-239	9.040E-09
SR-90	0.000E-01	AAAAAAA	0.000E-01
SR-91	0.000E-01	BBBBBBB	0.000E-01
SR-92	0.000E-01	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	0.000E-01	EEEEEEE	0.000E-01
Y-91M	0.000E-01	FFFFFFF	0.000E-01
Y-91	0.000E-01	GGGGGGG	0.000E-01
Y-92	0.000E-01	HHHHHHH	0.000E-01
Y-93	0.000E-01	IIIIIII	0.000E-01
ZR-95	1.130E-05	JJJJJJJ	0.000E-01

DFA_i - elements 16-100, child inhalation dose factors for liver
(mrem/pCi inhaled)

POOR ORIGINAL

461 081

AR-41	0.000E-01	ZR-97	4.320E-09
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	1.770E-06
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	1.150E-08
KR-88	0.000E-01	TC-99M	1.560E-11
KR-89	0.000E-01	RU-103	2.900E-07
KR-90	0.000E-01	RU-106	4.570E-06
XE-131M	0.000E-01	AG-110M	2.470E-06
XE-133M	0.000E-01	CO-109	0.000E-01
XE-133	0.000E-01	CO-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	3.040E-07	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	7.120E-08
C-14	1.820E-06	I-131	7.370E-06
NA-24	4.350E-06	I-132	5.070E-07
P-32	2.670E-05	I-133	2.080E-06
K-40	0.000E-01	I-134	2.690E-07
CR-51	4.170E-08	I-135	1.120E-06
MN-54	2.570E-06	CS-134	6.070E-05
MN-56	8.430E-11	CS-136	3.140E-05
FE-55	2.100E-06	CS-137	3.470E-05
FE-59	4.510E-06	CS-138	1.500E-07
CO-56	0.000E-01	BA-139	1.450E-11
CO-57	0.000E-01	BA-140	1.170E-06
CO-58	8.550E-07	LA-140	2.040E-08
CO-60	6.120E-06	CE-139	0.000E-01
NI-62	7.560E-06	CE-144	9.770E-05
NI-65	4.440E-11	EU-152	0.000E-01
CU-64	2.900E-10	W-187	1.170E-09
ZN-65	1.900E-05	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	1.480E-07	BI-214	0.000E-01
RB-88	9.900E-08	RA-226	0.000E-01
RB-89	7.830E-08	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	4.660E-06	NP-239	6.350E-09
SR-90	1.740E-03	AAAAAAA	0.000E-01
SR-91	1.240E-09	BBBBBBB	0.000E-01
SR-92	1.420E-10	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	2.990E-08	EEEEEEE	0.000E-01
Y-91M	4.980E-12	FFFFFFF	0.000E-01
Y-91	6.590E-06	GGGGGGG	0.000E-01
Y-92	1.570E-10	HHHHHHH	0.000E-01
Y-93	1.360E-09	IIIIIII	0.000E-01
ZR-95	1.000E-05	JJJJJJJ	0.000E-01

DFA; - elements 16+100, child inhalation dose factor for total body
(mrem/pCi inhaled)

POOR ORIGINAL

461 082

AR-41	0.000E-01	ZR-97	0.000E-01
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	0.000E-01
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	0.000E-01
KR-88	0.000E-01	TC-99M	0.000E-01
KR-89	0.000E-01	RU-103	0.000E-01
KR-90	0.000E-01	RU-106	0.000E-01
XE-131M	0.000E-01	AG-110M	0.000E-01
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	3.040E-07	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	0.580E-08
C-14	1.820E-06	I-131	4.390E-03
NA-24	4.350E-06	I-132	5.230E-05
P-32	0.000E-01	I-133	1.040E-03
K-40	0.000E-01	I-134	1.370E-05
CR-51	2.310E-08	I-135	2.140E-04
MN-54	0.000E-01	CS-134	0.000E-01
MN-56	0.000E-01	CS-136	0.000E-01
FE-55	0.000E-01	CS-137	0.000E-01
FE-59	0.000E-01	CS-138	0.000E-01
CO-56	0.000E-01	BA-139	0.000E-01
CO-57	0.000E-01	BA-140	0.000E-01
CO-58	0.000E-01	LA-140	0.000E-01
CO-60	0.000E-01	CE-139	0.000E-01
NI-63	0.000E-01	CE-144	0.000E-01
NI-65	0.000E-01	EU-152	0.000E-01
CU-64	0.000E-01	W-187	0.000E-01
ZN-65	0.000E-01	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	0.000E-01	RA-226	0.000E-01
RB-89	0.000E-01	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SF-89	0.000E-01	NP-239	0.000E-01
SF-90	0.000E-01	AAAAAAA	0.000E-01
SR-91	0.000E-01	BBBBBBB	0.000E-01
SR-92	0.000E-01	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	0.000E-01	EEEEEEE	0.000E-01
Y-91M	0.000E-01	FFFFFFF	0.000E-01
Y-91	0.000E-01	GGGGGGG	0.000E-01
Y-92	0.000E-01	HHHHHHH	0.000E-01
Y-93	0.000E-01	IIIIIII	0.000E-01
ZR-95	0.000E-01	JJJJJJJ	0.000E-01

DPA_i - elements 16+100, child inhalation dose factor for thyroid
(mrem/pCi inhaled)

POOR ORIGINAL 461 083

AR-41	0.000E-01	ZR-97	1.050E-08
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	2.330E-06
KR-85	0.000E-01	MO-98	0.000E-01
KR-87	0.000E-01	MO-99	1.060E-07
KR-88	0.000E-01	TC-99M	1.370E-11
KR-89	0.000E-01	RU-103	1.900E-06
KR-90	0.000E-01	RU-106	4.970E-05
XE-131M	0.000E-01	AG-110M	5.740E-06
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	3.040E-07	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	4.790E-07
C-14	1.820E-06	I-131	2.130E-05
NA-24	4.350E-06	I-132	1.690E-06
P-32	0.000E-01	I-133	9.130E-06
K-40	0.000E-01	I-134	0.920E-07
CR-51	6.570E-09	I-135	3.620E-06
MN-54	2.710E-06	CS-134	0.930E-05
MN-56	4.520E-10	CS-136	2.580E-05
FE-55	0.000E-01	CS-137	7.630E-05
FE-59	0.000E-01	CS-138	1.680E-07
CO-56	0.000E-01	BA-139	2.330E-13
CO-57	0.000E-01	BA-140	5.710E-09
CO-58	0.000E-01	LA-140	0.000E-01
CO-60	0.000E-01	CE-139	0.000E-01
NI-63	0.000E-01	CE-144	3.170E-04
NI-65	0.000E-01	EU-152	0.000E-01
CU-64	1.630E-09	W-187	0.000E-01
ZN-65	1.930E-05	HG-203	0.000E-01
SE-70	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	0.000E-01	RA-226	0.030E-01
RB-89	0.000E-01	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	0.000E-01	NP-239	2.630E-08
SR-90	0.000E-01	AAAAAAA	0.000E-01
SR-91	0.000E-01	BBBBBBB	0.000E-01
SR-92	0.000E-01	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	0.000E-01	EEEEEEE	0.000E-01
Y-91M	0.000E-01	FFFFFFF	0.000E-01
Y-91	0.000E-01	GGGGGGG	0.000E-01
Y-92	0.000E-01	HHHHHHH	0.000E-01
Y-93	0.000E-01	IIIIIII	0.000E-01
ZR-95	1.610E-05	JJJJJJJ	0.000E-01

DFAi - elements 16+100, child inhalation dose factors for kidneys
(mrem/pCi inhaled)

POOR ORIGINAL

461 084

AR-41	0.000E-01	ZR-97	3.060E-05
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	1.660E-04
KR-85	0.000E-01	MO-98	0.000E-01
KR-87	0.000E-01	MO-99	3.660E-05
KR-88	0.000E-01	TC-99M	2.570E-07
KR-89	0.000E-01	RU-103	1.790E-04
KR-90	0.000E-01	RU-106	3.870E-03
XE-131M	0.000E-01	AG-110M	1.480E-03
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	3.070E-07	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	1.020E-04
C-14	1.820E-06	I-131	0.000E-01
NA-24	4.350E-06	I-132	0.000E-01
P-32	0.000E-01	I-133	0.000E-01
K-40	0.000E-01	I-134	0.000E-01
CR-51	4.590E-06	I-135	0.000E-01
MN-54	4.260E-04	CS-134	3.270E-05
MN-56	3.550E-06	CS-136	3.930E-06
FE-55	3.000E-05	CS-137	2.810E-05
FE-59	3.430E-04	CS-138	1.840E-08
CO-56	0.000E-01	BA-139	1.560E-06
CO-57	0.000E-01	BA-140	4.710E-04
CO-58	2.990E-04	LA-140	4.940E-05
CO-60	1.910E-03	CE-139	0.000E-01
NI-63	7.430E-05	CE-144	3.120E-05
NI-65	2.210E-06	EU-152	0.000E-01
CU-64	2.590E-06	W-187	1.110E-05
ZN-65	2.690E-04	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	0.000E-01	RA-226	0.000E-01
RB-89	0.000E-01	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	5.830E-04	NP-239	1.570E-05
SR-90	3.990E-03	AAAAAAA	0.000E-01
SR-91	1.440E-05	BBBBBBB	0.000E-01
SR-92	6.490E-06	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	7.070E-05	EEEEEEE	0.000E-01
Y-91M	7.600E-07	FFFFFFF	0.000E-01
Y-91	7.100E-04	GGGGGGG	0.000E-01
Y-92	6.460E-06	HHHHHHH	0.000E-01
Y-93	2.010E-05	IIIIIII	0.000E-01
ZR-95	6.030E-04	JJJJJJJ	0.000E-01

DFA_j - elements 16+100, child inhalation dose factor for lungs
(mrem/pCi inhaled)

POOR ORIGINAL

461 085

AR-41	0.000E-01	ZR-97	9.490E-05
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	1.000E-05
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	3.420E-05
KR-88	0.000E-01	TC-99M	1.300E-06
KR-89	0.000E-01	RU-103	1.210E-05
KR-90	0.000E-01	RU-106	1.160E-04
XE-131M	0.000E-01	AG-110M	2.710E-05
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	3.040E-07	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	3.720E-05
C-14	1.820E-06	I-131	7.680E-07
NA-24	4.350E-06	I-132	8.650E-07
P-32	1.140E-05	I-133	1.480E-06
K-40	0.000E-01	I-134	2.580E-07
CR-51	2.930E-07	I-135	1.200E-06
MN-54	6.160E-06	CS-134	1.040E-06
MN-56	3.330E-05	CS-136	1.130E-06
FE-55	7.750E-07	CS-137	9.780E-07
FE-59	1.910E-05	CS-138	7.290E-08
CO-56	0.000E-01	BA-139	1.560E-05
CO-57	0.000E-01	BA-140	2.750E-05
CO-58	9.290E-06	LA-140	6.100E-05
CO-60	2.600E-05	CE-139	0.000E-01
NI-63	1.710E-06	CE-144	1.050E-04
NI-65	2.270E-05	EU-152	0.000E-01
CU-64	9.920E-06	W-187	2.460E-05
ZN-65	4.410E-06	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	1.000E-24	BI-214	0.000E-01
RB-88	4.660E-09	RA-226	0.000E-01
RB-89	5.110E-10	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	4.520E-05	NP-239	1.730E-05
SR-90	9.280E-05	AAAAAAA	0.000E-01
SR-91	4.700E-05	BBBBBBB	0.000E-01
SR-92	6.550E-05	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	7.240E-05	EEEEEEE	0.000E-01
Y-91M	4.640E-07	FFFFFFF	0.000E-01
Y-91	4.970E-05	GGGGGGG	0.000E-01
Y-92	6.460E-05	HHHHHHH	0.000E-01
Y-93	1.050E-04	IIIIIII	0.000E-01
ZR-95	1.650E-05	JJJJJJJ	0.000E-01

DFA_i - elements 16+100, child inhalation dose factors for GI-LLI
(mrem/pCi inhaled)

POOR ORIGINAL

461 086

AR-41	0.000E-01	ZR-97	3.400E-02
KR-83M	0.000E-01	NB-94	2.800E-01
KR-85M	0.000E-01	NB-95	2.800E-01
KR-85	0.000E-01	MO-90	8.000E-03
KR-87	0.000E-01	MO-99	8.000E-02
KR-88	0.000E-01	TC-99M	4.000E-01
KR-89	0.000E-01	RU-103	4.000E-01
KR-90	0.000E-01	RU-106	4.000E-01
XE-131M	0.000E-01	AG-110M	1.700E-02
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	1.200E-02	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	7.700E-02
C-14	3.100E-02	I-131	2.900E-03
NA-24	3.000E-02	I-132	2.900E-03
P-32	4.600E-02	I-133	2.900E-03
K-40	0.000E-01	I-134	2.900E-03
CR-51	2.400E-03	I-135	2.900E-03
MN-54	8.000E-04	CS-134	4.000E-03
MN-56	8.000E-04	CS-136	4.000E-03
FE-55	4.000E-02	CS-137	4.000E-03
FE-59	4.000E-02	CS-138	4.000E-03
CO-56	1.300E-02	BA-139	3.200E-03
CO-57	1.300E-02	BA-140	3.200E-03
CO-58	1.300E-02	LA-140	2.000E-04
CO-60	1.300E-02	CE-139	1.200E-03
NI-63	5.300E-02	CE-144	1.200E-03
NI-65	5.300E-02	EU-152	0.000E-01
CU-64	8.000E-03	W-187	1.300E-03
ZN-65	3.000E-02	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	3.100E-02	RA-226	0.000E-01
RB-89	3.100E-02	TH-228	0.000E-01
SR-85	6.000E-04	U-235	0.000E-01
SR-89	6.000E-04	NP-239	2.000E-04
SR-90	6.000E-06	AAAAAAA	0.000E-01
SR-91	6.000E-04	BBBBBBB	0.000E-01
SR-92	6.000E-04	CCCCCCC	0.000E-01
Y-88	4.600E-03	DDDDDDD	0.000E-01
Y-90	4.600E-03	EEEEEEE	0.000E-01
Y-91M	4.600E-03	FFFFFFF	0.000E-01
Y-91	4.600E-03	GGGGGGG	0.000E-01
Y-92	4.600E-03	HHHHHHH	0.000E-01
Y-93	4.600E-03	IIIIIII	0.000E-01
ZR-95	3.400E-02	JJJJJJJ	0.000E-01

Ff - elements 16+100, stable element transfer data-meat
(day/kg)

POOR ORIGINAL

461 087

AR-41	0.000E-01	ZR-97	1.680E-09
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	6.220E-09
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	0.000E-01
KR-88	0.000E-01	TC-99M	2.470E-10
KR-89	0.000E-01	RU-103	1.850E-07
KR-90	0.000E-01	RU-106	2.750E-06
XE-131M	0.000E-01	AG-110M	1.600E-07
XE-132M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	0.000E-01	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	2.520E-06
C-14	2.840E-06	I-131	4.160E-06
NA-24	1.700E-06	I-132	2.030E-07
P-32	1.930E-04	I-133	1.420E-06
K-40	0.000E-01	I-134	1.060E-07
CR-51	0.000E-01	I-135	4.430E-07
MN-54	0.000E-01	CS-134	6.220E-05
MN-56	0.000E-01	CS-136	6.510E-06
FE-55	2.750E-06	CS-137	7.970E-05
FE-59	4.340E-06	CS-138	5.520E-08
CO-56	0.000E-01	BA-139	9.700E-08
CO-57	0.000E-01	BA-140	2.030E-05
CO-58	0.000E-01	LA-140	2.500E-09
CO-60	0.000E-01	CE-139	0.000E-01
NI-63	1.300E-04	CE-144	4.880E-07
NI-65	5.280E-07	EU-152	0.000E-01
CU-64	0.000E-01	W-187	1.030E-07
ZN-65	4.840E-06	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	0.000E-01	RA-226	0.000E-01
RB-89	0.000E-01	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	3.080E-04	NP-239	1.190E-09
SR-90	7.580E-03	AAAAAAA	0.000E-01
SR-91	5.670E-06	BBBBBBB	0.000E-01
SR-92	2.150E-06	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	9.620E-09	EEEEEEE	0.000E-01
Y-91M	9.090E-11	FFFFFFF	0.000E-01
Y-91	1.410E-07	GGGGGGG	0.000E-01
Y-92	8.450E-10	HHHHHHH	0.000E-01
Y-93	2.680E-09	IIIIIII	0.000E-01
ZR-95	3.040E-08	JJJJJJJ	0.000E-01

DF_i - elements 16-100, adult ingestion dose factors for bone - liquid releases
(mrem/pCi ingested)

POOR ORIGINAL

461 033

AR-41	0.000E-01	ZR-97	3.390E-10
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	3.460E-09
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	4.310E-06
KR-88	0.000E-01	TC-99M	6.980E-10
KR-89	0.000E-01	RU-103	0.000E-01
KR-90	0.000E-01	RU-106	0.000E-01
XE-131M	0.000E-01	AG-110M	1.480E-07
XE-133M	0.000E-01	CD-100	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	1.050E-07	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	1.630E-06
C-14	5.680E-07	I-131	5.950E-06
NA-24	1.700E-06	I-132	5.430E-07
P-32	1.200E-05	I-133	2.470E-06
K-40	0.000E-01	I-134	2.880E-07
CR-51	0.000E-01	I-135	1.160E-06
MN-54	4.570E-06	CS-134	1.480E-04
MN-56	1.150E-07	CS-136	2.570E-05
FE-55	1.900E-06	CS-137	1.090E-04
FE-59	1.020E-05	CS-138	1.090E-07
CO-56	0.000E-01	BA-139	6.910E-11
CO-57	0.000E-01	BA-140	2.550E-08
CO-58	7.450E-07	LA-140	1.260E-09
CO-60	2.140E-06	CE-139	0.000E-01
NI-63	9.010E-06	CE-144	2.040E-07
NI-65	6.860E-08	EU-152	0.000E-01
CU-64	8.330E-08	W-187	8.610E-08
ZN-65	1.540E-05	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	6.050E-08	RA-226	0.000E-01
RB-89	4.010E-08	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	0.000E-01	NP-239	1.170E-10
SR-90	0.000E-01	AAAAAAA	0.000E-01
SR-91	0.000E-01	BBBBBBB	0.000E-01
SR-92	0.000E-01	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	0.000E-01	EEEEEEE	0.000E-01
Y-91M	0.000E-01	FFFFFFF	0.000E-01
Y-91	0.000E-01	GGGGGGG	0.000E-01
Y-92	0.000E-01	HHHHHHH	0.000E-01
Y-93	0.000E-01	IIIIIII	0.000E-01
ZR-95	9.750E-09	JJJJJJJ	0.000E-01

DF_i - elements 16+100, adult ingestion dose factors for liver - liquid release
(mrem/pCi ingested)

POOR ORIGINAL

AR-41	0.000E-01	ZR-97	1.550E-10
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	1.860E-09
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	8.200E-07
KR-88	0.000E-01	TC-99M	8.890E-09
KR-89	0.000E-01	RU-103	7.970E-08
KR-90	0.000E-01	RU-106	3.480E-07
XE-131M	0.000E-01	AG-110M	8.790E-08
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	1.050E-07	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	1.530E-06
C-14	5.680E-07	I-131	3.410E-06
NA-24	1.700E-06	I-132	1.900E-07
P-32	7.460E-06	I-133	7.530E-07
K-40	0.000E-01	I-134	1.030E-07
CR-51	2.660E-09	I-135	4.280E-07
MN-54	8.720E-07	CS-134	1.210E-04
MN-56	2.040E-08	CS-136	1.850E-05
FE-55	4.430E-07	CS-137	7.140E-05
FE-59	3.910E-06	CS-138	5.400E-08
CO-56	0.000E-01	BA-139	2.840E-09
CO-57	0.000E-01	BA-140	1.330E-06
CO-58	1.670E-06	LA-140	3.230E-10
CO-60	4.720E-06	CE-139	0.000E-01
NI-63	4.360E-06	CE-144	2.620E-08
NI-65	3.130E-08	EU-152	0.000E-01
CU-64	3.910E-08	W-187	3.010E-08
ZN-65	6.960E-06	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	5.210E-08	BI-214	0.000E-01
RB-88	3.210E-08	RA-226	0.000E-01
RB-89	2.820E-08	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	8.840E-06	NP-239	6.450E-11
CR-90	1.860E-03	AAAAAAA	0.000E-01
SR-91	2.290E-07	BBBBBBB	0.000E-01
SR-92	9.300E-08	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	2.580E-10	EEEEEEE	0.000E-01
Y-91M	3.520E-12	FFFFFFF	0.000E-01
Y-91	3.770E-09	GGGGGGG	0.000E-01
Y-92	2.470E-11	HHHHHHH	0.000E-01
Y-93	7.400E-11	IIIIIII	0.000E-01
ZR-95	6.600E-09	JJJJJJJ	0.000E-01

DF_i - elements 16+100, adult ingestion dose factors for total body
-liquid release (mrem/pCi ingested)

POOR ORIGINAL

461 090

AR-41	0.000E-01	ZR-97	0.000E-01
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	0.000E-01
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	0.000E-01
KR-88	0.000E-01	TC-99M	0.000E-01
KR-89	0.000E-01	RU-103	0.000E-01
KR-90	0.000E-01	RU-106	0.000E-01
XE-131M	0.000E-01	AG-110M	0.000E-01
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	1.050E-07	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	1.800E-06
C-14	5.680E-07	I-131	1.950E-03
NA-24	1.700E-06	I-132	1.900E-05
P-32	0.000E-01	I-133	3.630E-04
K-40	0.000E-01	I-134	4.990E-06
CR-51	1.590E-09	I-135	7.650E-05
MN-54	0.000E-01	CS-134	0.000E-01
MN-56	0.000E-01	CS-136	0.000E-01
FE-55	0.000E-01	CS-137	0.000E-01
FE-59	0.000E-01	CS-138	0.000E-01
CO-56	0.000E-01	BA-139	0.000E-01
CO-57	0.000E-01	BA-140	0.000E-01
CO-58	0.000E-01	LA-140	0.000E-01
CO-60	0.000E-01	CE-139	0.000E-01
NI-63	0.000E-01	CE-144	0.000E-01
NI-65	0.000E-01	EU-152	0.000E-01
CU-64	0.000E-01	W-187	0.000E-01
ZN-65	0.000E-01	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	0.000E-01	RA-226	0.000E-01
RB-89	0.000E-01	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	0.000E-01	NP-239	0.000E-01
SR-90	0.000E-01	AAAAAAA	0.000E-01
SR-91	0.000E-01	BBBBBBB	0.000E-01
SR-92	0.000E-01	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	0.000E-01	EEEEEEE	0.000E-01
Y-91M	0.000E-01	FFFFFFF	0.000E-01
Y-91	0.000E-01	GGGGGGG	0.000E-01
Y-92	0.000E-01	HHHHHHH	0.000E-01
Y-93	0.000E-01	IIIIIII	0.000E-01
ZR-95	0.000E-01	JJJJJJJ	0.000E-01

DF_i - elements 16-100, adult ingestion dose factors for thyroid - liquid releases (mrem/pCi ingested)

POOR ORIGINAL

461 09+

AR-41	0.000E-01	ZR-97	5.120E-10
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	3.420E-09
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	9.760E-06
KR-88	0.000E-01	TC-99M	1.060E-08
KR-89	0.000E-01	RU-103	7.060E-07
KR-90	0.000E-01	RU-106	5.310E-06
XE-131M	0.000E-01	AG-110M	2.910E-07
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	1.050E-07	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	1.570E-05
C-14	5.680E-07	I-131	1.020E-05
NA-24	1.700E-06	I-132	8.650E-07
P-32	0.000E-01	I-133	4.310E-06
K-40	0.000E-01	I-134	4.580E-07
CR-51	5.860E-10	I-135	1.860E-06
MN-54	1.360E-06	CS-134	4.790E-05
MN-56	1.460E-07	CS-136	1.430E-05
FE-55	0.000E-01	CS-137	3.700E-05
FE-59	0.000E-01	CS-138	8.010E-08
CO-56	0.000E-01	BA-139	6.460E-11
CO-57	0.000E-01	BA-140	8.670E-09
CO-58	0.000E-01	LA-140	0.000E-01
CO-60	0.000E-01	CE-139	0.000E-01
NI-63	0.000E-01	CE-144	1.210E-07
NI-65	0.000E-01	EU-152	0.000E-01
CU-64	2.100E-07	W-187	0.000E-01
ZN-65	1.030E-05	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	0.000E-01	RA-226	0.000E-01
RB-89	0.000E-01	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	0.000E-01	NP-239	3.650E-10
SR-90	0.000E-01	AAAAAAA	0.000E-01
SR-91	0.000E-01	BBBBBBB	0.000E-01
SR-92	0.000E-01	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	0.000E-01	EEEEEEE	0.000E-01
Y-91M	0.000E-01	FFFFFFF	0.000E-01
Y-91	0.000E-01	GGGGGGG	0.000E-01
Y-92	0.000E-01	HHHHHHH	0.000E-01
Y-93	0.000E-01	IIIIIII	0.000E-01
ZR-95	1.530E-08	JJJJJJJ	0.000E-01

DF_i - elements 16+100, adult ingestion dos factor for kidney - liquid release
(mrem/pCi ingested)

POOR ORIGINAL

461 092

ODCM RECORD # 59

AR-41	0.000E-01	ZR-97	0.000E-01
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	0.000E-01
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	0.000E-01
KR-88	0.000E-01	TC-99M	3.420E-10
KR-89	0.000E-01	RU-103	0.000E-01
KR-90	0.000E-01	RU-106	0.000E-01
XE-131M	0.000E-01	AG-110M	0.000E-01
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	1.050E-07	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	0.000E-01
C-14	5.680E-07	I-131	0.000E-01
NA-24	1.700E-06	I-132	0.000E-01
P-32	0.000E-01	I-133	0.000E-01
K-40	0.000E-01	I-134	0.000E-01
CR-51	3.530E-09	I-135	0.000E-01
MN-54	0.000E-01	CS-134	1.590E-05
MN-56	0.000E-01	CS-136	1.960E-06
FE-55	1.060E-06	CS-137	1.230E-05
FC-59	2.850E-06	CS-138	7.910E-09
CO-56	0.000E-01	BA-139	3.920E-11
CO-57	0.000E-01	BA-140	1.460E-08
CO-58	0.000E-01	LA-140	0.000E-01
CO-60	0.000E-01	CE-139	0.000E-01
NI-63	0.000E-01	CE-144	0.000E-01
NI-65	0.000E-01	EU-152	0.000E-01
CU-64	0.000E-01	W-187	0.000E-01
ZN-65	0.000E-01	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	0.000E-01	RA-226	0.000E-01
RB-89	0.000E-01	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	0.000E-01	NP-239	0.000E-01
SR-90	0.000E-01	AAAAAAA	0.000E-01
SR-91	0.000E-01	BBBBBBB	0.000E-01
SR-92	0.000E-01	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	0.000E-01	EEEEEEE	0.000E-01
Y-91M	0.000E-01	FFFFFFF	0.000E-01
Y-91	0.000E-01	GGGGGGG	0.000E-01
Y-92	0.000E-01	HHHHHHH	0.000E-01
Y-93	0.000E-01	IIIIIII	0.000E-01
ZR-95	0.000E-01	JJJJJJJ	0.000E-01

DF_i - elements 16+100, adult ingestion dose factor for lung-liquid release
(mrem/pCi ingested)

POOR ORIGINAL

461 093

AR-41	0.000E-01	ZR-97	1.050E-04
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	2.100E-05
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	9.990E-06
KR-88	0.000E-01	TC-99M	4.130E-07
KR-89	0.000E-01	RU-103	2.160E-05
KR-90	0.000E-01	RU-106	1.780E-04
XE-131M	0.000E-01	AG-110M	6.040E-05
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	1.050E-07	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	7.710E-05
C-14	5.680E-07	I-131	1.570E-06
NA-24	1.700E-06	I-132	1.020E-07
P-32	2.170E-05	I-133	2.220E-06
K-40	0.000E-01	I-134	2.510E-10
CR-51	6.690E-07	I-135	1.310E-06
MN-54	1.400E-05	CS-134	2.590E-06
MN-56	3.670E-06	CS-136	2.920E-06
FE-55	1.090E-06	CS-137	2.110E-06
FE-59	3.400E-05	CS-138	4.650E-13
CO-56	0.000E-01	BA-139	1.720E-07
CO-57	0.000E-01	BA-140	4.180E-05
CO-58	1.510E-05	LA-140	9.250E-05
CO-60	4.020E-05	CE-139	0.000E-01
NI-62	1.880E-06	CE-144	1.650E-04
NI-65	1.740E-06	EU-152	0.000E-01
CU-64	7.100E-06	W-187	2.820E-05
ZN-65	9.700E-06	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	4.090E-13	BI-214	0.000E-01
RB-88	8.360E-19	RA-226	0.000E-01
RB-89	2.330E-21	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	4.940E-05	NP-239	2.400E-05
SR-90	2.190E-04	AAAAAAA	0.000E-01
SR-91	2.700E-05	BBBBBBB	0.000E-01
SR-92	4.260E-05	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	1.020E-04	EEEEEEE	0.000E-01
Y-91M	2.670E-10	FFFFFFF	0.000E-01
Y-91	7.760E-05	GGGGGGG	0.000E-01
Y-92	1.480E-05	HHHHHHH	0.000E-01
Y-93	8.500E-05	IIIIIII	0.000E-01
ZR-95	3.090E-05	JJJJJJJ	0.000E-01

DF_i - elements 16+100, adult ingestion dose factors for GI- I - liquid releases (mrem/pCi ingested)

POOR ORIGINAL

461 094

AR-41	0.000E-01	ZR-97	3.300E 00
KR-83M	0.000E-01	NB-94	3.000E 04
KR-85M	0.000E-01	NB-95	3.000E 04
KR-85	0.000E-01	MO-90	1.000E 01
KR-87	0.000E-01	MO-99	1.000E 01
KR-88	0.000E-01	TC-99M	1.500E 01
KR-89	0.000E-01	RU-103	1.000E 01
KR-90	0.000E-01	RU-106	1.000E 01
XE-131M	0.000E-01	AG-110M	0.000E-01
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	9.000E-01	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	4.000E 02
C-14	4.500E 03	I-131	1.500E 01
NA-24	1.000E 02	I-132	1.500E 01
P-32	1.000E 05	I-133	1.500E 01
K-40	0.000E-01	I-134	1.500E 01
CR-51	2.000E 02	I-135	1.500E 01
MN-54	4.000E 02	CS-134	2.000E 03
MN-56	4.000E 02	CS-136	2.000E 03
FE-55	1.000E 02	CS-137	2.000E 03
FE-59	1.000E 02	CS-138	2.000E 03
CO-56	5.000E 01	BA-139	4.000E 00
CO-57	5.000E 01	BA-140	4.000E 00
CO-58	5.000E 01	LA-140	2.500E 01
CO-60	5.000E 01	CE-139	1.000E 00
NI-63	1.000E 02	CE-144	1.000E 00
NI-65	1.000E 02	EU-152	0.000E-01
CU-64	5.000E 01	W-187	1.200E 03
ZN-65	2.000E 03	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	4.200E 02	BI-214	0.000E-01
RB-88	2.000E 03	RA-226	0.000E-01
RB-89	2.000E 03	TH-228	0.000E-01
SR-85	3.000E 01	U-235	0.000E-01
SR-89	3.000E 01	NP-239	1.000E 01
SR-90	3.000E 01	AAAAAAA	0.000E-01
SR-91	3.000E 01	BBBBBBB	0.000E-01
SR-92	3.000E 01	CCCCCCC	0.000E-01
Y-88	2.500E 01	DDDDDDD	0.000E-01
Y-90	2.500E 01	EEEEEEE	0.000E-01
Y-91M	2.500E 01	FFFFFFF	0.000E-01
Y-91	2.500E 01	GGGGGGG	0.000E-01
Y-92	2.500E 01	HHHHHHH	0.000E-01
Y-93	2.500E 01	IIIIIII	0.000E-01
ZR-95	3.300E 00	JJJJJJJ	0.000E-01

BF_i - elements 16-100, bio-accumulation factors for fresh water fish,
(pCi/kg per pci/l, from Reg. Guide 1.109)

POOR ORIGINAL

AR-41	0.000E-01	ZR-97	1.327E-02
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	4.467E-02
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	0.000E-01
KR-88	0.000E-01	TC-99M	8.870E-03
KR-89	0.000E-01	RU-103	4.429E-00
KR-90	0.000E-01	RU-106	6.583E-01
XE-131M	0.000E-01	AG-110M	0.000E-01
XE-132M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	0.000E-01	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	2.413E-03
C-14	3.128E-04	I-131	1.494E-02
NA-24	4.070E-02	I-132	7.290E-00
P-32	4.620E-07	I-133	5.099E-01
K-40	0.000E-01	I-134	3.806E-00
CR-51	0.000E-01	I-135	1.591E-01
MN-54	0.000E-01	CS-134	2.978E-05
MN-56	0.000E-01	CS-136	3.117E-04
FE-55	6.583E-02	CS-137	3.816E-05
FE-59	1.039E-03	CS-138	2.643E-02
CO-56	0.000E-01	BA-139	9.289E-01
CO-57	0.000E-01	BA-140	1.944E-02
CO-58	0.000E-01	LA-140	1.496E-01
CO-60	0.000E-01	CE-139	0.000E-01
NI-63	3.112E-04	CE-144	1.168E-00
NI-65	1.264E-02	EU-152	0.000E-01
CU-64	0.000E-01	W-187	2.959E-02
ZN-65	2.317E-04	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	0.000E-01	RA-226	0.000E-01
RB-89	0.000E-01	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	2.212E-04	NP-239	2.849E-02
SR-90	5.444E-05	AAAAAAA	0.000E-01
SR-91	4.072E-02	BBBBBBB	0.000E-01
SR-92	1.544E-02	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	5.758E-01	EEEEEEE	0.000E-01
Y-91M	5.440E-03	FFFFFFF	0.000E-01
Y-91	8.439E-00	GGGGGGG	0.000E-01
Y-92	5.057E-02	HHHHHHH	0.000E-01
Y-93	1.604E-01	IIIIIII	0.000E-01
ZR-95	2.402E-01	JJJJJJJ	0.000E-01

Air - elements 16+100, Adult bone dose factor for liquid release
(mrem/hr per $\mu\text{Ci/ml}$)

POOR ORIGINAL

461 096

AR-41	0.000E-01	ZR-97	2.678E-03
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	2.485E-02
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	1.032E-02
KR-88	0.000E-01	TC-99M	2.507E-02
KR-89	0.000E-01	RU-103	0.000E-01
KR-90	0.000E-01	RU-106	0.000E-01
XE-131M	0.000E-01	AG-110M	0.000E-01
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	2.262E-01	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	1.561E-03
C-14	6.255E-03	I-131	2.137E-02
NA-24	4.070E-02	I-132	1.950E-01
P-32	2.873E-06	I-133	8.870E-01
K-40	0.000E-01	I-134	1.034E-01
CR-51	0.000E-01	I-135	4.166E-01
MN-54	4.376E-03	CS-134	7.086E-05
MN-56	1.101E-02	CS-136	1.231E-05
FE-55	4.549E-02	CS-137	5.219E-05
FE-59	2.442E-03	CS-138	5.219E-02
CO-56	0.000E-01	BA-139	6.617E-04
CO-57	0.000E-01	BA-140	2.442E-01
CO-58	8.918E-01	LA-140	7.541E-02
CO-60	2.562E-02	CE-139	0.000E-01
NI-63	2.157E-03	CE-144	4.884E-01
NI-65	1.642E-01	EU-152	0.000E-01
CU-64	9.971E-00	W-187	2.473E-02
ZN-65	7.5E-04	HG-203	0.000E-01
SE-75	0.0E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	2.897E-02	RA-226	0.000E-01
RB-89	1.920E-02	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	0.000E-01	NP-239	2.801E-03
SR-90	0.000E-01	AAAAAAA	0.000E-01
SR-91	0.000E-01	BBBBBBB	0.000E-01
SR-92	0.000E-01	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	0.000E-01	EEEEEEE	0.000E-01
Y-91M	0.000E-01	FFFFFFF	0.000E-01
Y-91	0.000E-01	GGGGGGG	0.000E-01
Y-92	0.000E-01	HHHHHHH	0.000E-01
Y-93	0.000E-01	IIIIIII	0.000E-01
ZR-95	7.703E-02	JJJJJJJ	0.000E-01

A_{LT} - elements 16-100, adult liver dose factor for liquid releases
(mrem/hr per μ Ci/ml)

461 097

POOR ORIGINAL

AR-41	0.000E-01	ZR-97	1.225E-03
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	1.336E-02
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	1.963E-01
KR-88	0.000E-01	TC-99M	3.192E-01
KR-89	0.000E-01	RU-103	1.908E-00
KR-90	0.000E-01	RU-106	8.331E-00
XE-131M	0.000E-01	AG-110M	0.000E-01
XE-133M	0.000E-01	CD-109	0.000E-01
XE-135	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	2.262E-01	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	1.465E-03
C-14	6.255E-03	I-131	1.225E-02
NA-24	4.070E-02	I-132	6.823E-00
P-32	1.786E-06	I-133	2.704E-01
K-40	0.000E-01	I-134	3.699E-00
CR-51	1.274E-00	I-135	1.537E-01
MN-54	8.350E-02	CS-134	5.793E-05
MN-56	1.954E-01	CS-136	8.858E-04
FE-55	1.061E-02	CS-137	3.419E-05
FE-59	9.361E-02	CS-138	2.586E-02
CO-56	0.000E-01	BA-139	2.720E-02
CO-57	0.000E-01	BA-140	1.274E-01
CO-58	1.999E-02	LA-140	1.993E-02
CO-60	5.650E-02	CE-139	0.000E-01
NI-63	1.044E-03	CE-144	6.272E-02
NI-65	7.493E-00	EU-152	0.000E-01
CU-64	4.680E-00	W-187	8.647E-01
ZN-65	3.332E-04	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	5.239E-01	BI-214	0.000E-01
RB-88	1.537E-02	RA-226	0.000E-01
RB-89	1.350E-02	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	6.349E-02	NP-239	1.544E-03
SR-90	1.336E-05	AAAAAAA	0.000E-01
SR-91	1.645E-01	BBBBBBB	0.000E-01
SR-92	6.679E-00	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	1.544E-02	EEEEEEE	0.000E-01
Y-91M	2.107E-04	FFFFFFF	0.000E-01
Y-91	2.256E-01	GGGGGGG	0.000E-01
Y-92	1.478E-03	HHHHHHH	0.000E-01
Y-93	4.429E-03	IIIIIII	0.000E-01
ZR-95	5.214E-02	JJJJJJJ	0.000E-01

A_{it} - elements 16-100, adult total body dose factors for liquid releases,
(mrem/hr per $\mu\text{Ci/ml}$)

POOR ORIGINAL

461 098

AR-41	0.000E-01	ZR-97	0.000E-01
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	0.000E-01
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	0.000E-01
KR-88	0.000E-01	TC-99M	0.000E-01
KR-89	0.000E-01	RU-103	0.000E-01
KR-90	0.000E-01	RU-106	0.000E-01
XE-131M	0.000E-01	AG-110M	0.000E-01
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	2.262E-01	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	1.724E 03
C-14	6.255E 03	I-131	7.002E 04
NA-24	4.070E 02	I-132	6.823E 02
P-32	0.000E-01	I-133	1.304E 04
K-40	0.000E-01	I-134	1.792E 02
CR-51	7.613E-01	I-135	2.747E 03
MN-54	0.000E-01	CS-134	0.000E-01
MN-56	0.000E-01	CS-136	0.000E-01
FE-55	0.000E-01	CS-137	0.000E-01
FE-59	0.000E-01	CS-138	0.000E-01
CO-56	0.000E-01	BA-139	0.000E-01
CO-57	0.000E-01	BA-140	0.000E-01
CO-58	0.000E-01	LA-140	0.000E-01
CO-60	0.000E-01	CE-139	0.000E-01
NI-63	0.000E-01	CE-144	0.000E-01
NI-65	0.000E-01	EU-152	0.000E-01
CU-64	0.000E-01	W-187	0.000E-01
ZN-65	0.000E-01	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	0.000E-01	RA-226	0.000E-01
RB-89	0.000E-01	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	0.000E-01	NP-239	0.000E-01
SR-90	0.000E-01	AAAAAAA	0.000E-01
SR-91	0.000E-01	BBBBBBB	0.000E-01
SR-92	0.000E-01	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	0.000E-01	EEEEEEE	0.000E-01
Y-91M	0.000E-01	FFFFFFF	0.000E-01
Y-91	0.000E-01	GGGGGGG	0.000E-01
Y-92	0.000E-01	HHHHHHH	0.000E-01
Y-93	0.000E-01	IIIIIII	0.000E-01
ZR-95	0.000E-01	JJJJJJJ	0.000E-01

Air - elements 16+100, adult thyroid dose factors for liquid releases
(mrem/hr per $\mu\text{Ci/ml}$)

POOR ORIGINAL

461 099

AR-41	0.000E-01	ZR-97	4.045E-03
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	2.456E-02
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	2.337E-02
KR-88	0.000E-01	TC-99M	3.806E-01
KR-89	0.000E-01	RU-103	1.690E-01
KR-90	0.000E-01	RU-106	1.271E-02
XE-131M	0.000E-01	AG-110M	0.000E-01
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	2.262E-01	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	1.503E-04
C-14	6.255E-03	I-131	3.663E-02
N-14	4.070E-02	I-132	3.106E-01
P-32	0.000E-01	I-133	1.548E-02
K-40	0.000E-01	I-134	1.645E-01
CR-51	2.806E-01	I-135	6.679E-01
MN-54	1.302E-03	CS-134	2.293E-05
MN-56	1.398E-02	CS-136	6.847E-04
FE-55	0.000E-01	CS-137	1.772E-05
FE-59	0.000E-01	CS-138	3.835E-02
CO-56	0.000E-01	BA-139	6.186E-04
CO-57	0.000E-01	BA-140	8.302E-02
CO-58	0.000E-01	LA-140	0.000E-01
CO-60	0.000E-01	CE-139	0.000E-01
NI-63	0.000E-01	CE-144	2.897E-01
NI-65	0.000E-01	EU-152	0.000E-01
CU-64	2.514E-01	W-187	0.000E-01
ZN-65	4.932E-04	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	0.000E-01	RA-226	0.000E-01
RB-89	0.000E-01	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	0.000E-01	NP-239	8.738E-03
SR-90	0.000E-01	AAAAAAA	0.000E-01
SR-91	0.000E-01	BBBBBBB	0.000E-01
SR-92	0.000E-01	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	0.000E-01	EEEEEEE	0.000E-01
Y-91M	0.000E-01	FFFFFFF	0.000E-01
Y-91	0.000E-01	GGGGGGG	0.000E-01
Y-92	0.000E-01	HHHHHHH	0.000E-01
Y-93	0.000E-01	IIIIIII	0.000E-01
ZR-95	1.209E-01	JJJJJJJ	0.000E-01

Air - elements 16-100, adult kidney dose factors, for liquid releases
(mrem/hr μ Ci/ml)

POOR ORIGINAL

461 100

AR-41	0.000E-01	ZR-97	0.000E-01
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	0.000E-01
KR-85	0.000E-01	MO-98	0.000E-01
KR-87	0.000E-01	MO-99	0.000E-01
KR-88	0.000E-01	TC-99M	1.228E-02
KR-89	0.000E-01	RU-103	0.000E-01
KR-90	0.000E-01	RU-106	0.000E-01
XE-131M	0.000E-01	AG-110M	0.000E-01
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	2.262E-01	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	0.000E-01
C-14	6.255E-03	I-131	0.000E-01
NA-24	4.070E-02	I-132	0.000E-01
P-32	0.000E-01	I-133	0.000E-01
K-40	0.000E-01	I-134	0.000E-01
CR-51	1.690E-00	I-135	0.000E-01
MN-54	0.000E-01	CS-134	7.613E-04
MN-56	0.000E-01	CS-136	9.384E-03
FE-55	2.538E-02	CS-137	5.889E-04
FE-59	6.823E-02	CS-138	3.787E-01
CO-56	0.000E-01	BA-139	3.754E-04
CO-57	0.000E-01	BA-140	1.398E-01
CO-58	0.000E-01	LA-140	0.000E-01
CO-60	0.000E-01	CE-139	0.000E-01
NI-63	0.000E-01	CE-144	0.000E-01
NI-65	0.000E-01	EU-152	0.000E-01
CU-64	0.000E-01	W-187	0.000E-01
ZN-65	0.000E-01	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	0.000E-01	BI-214	0.000E-01
RB-88	0.000E-01	RA-226	0.000E-01
RB-89	0.000E-01	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	0.000E-01	NP-239	0.000E-01
SR-90	0.000E-01	AAAAAAA	0.000E-01
SR-91	0.000E-01	BBBBBBB	0.000E-01
SR-92	0.000E-01	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	0.000E-01	EEEEEEE	0.000E-01
Y-91M	0.000E-01	FFFFFFF	0.000E-01
Y-91	0.000E-01	GGGGGGG	0.000E-01
Y-92	0.000E-01	HHHHHHH	0.000E-01
Y-93	0.000E-01	IIIIIII	0.000E-01
ZR-95	0.000E-01	JJJJJJJ	0.000E-01

A₁₇ - elements 16-100, adult lung dose factors for liquid releases
(mrem/hr per μ Ci/ml)

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AR-41	0.000E-01	ZR-97	8.295E-02
KR-83M	0.000E-01	NB-94	0.000E-01
KR-85M	0.000E-01	NB-95	1.508E-06
KR-85	0.000E-01	MO-90	0.000E-01
KR-87	0.000E-01	MO-99	2.392E-02
KR-88	0.000E-01	TC-99M	1.483E-01
KR-89	0.000E-01	RU-103	5.171E-02
KR-90	0.000E-01	RU-106	4.261E-03
XE-131M	0.000E-01	AG-110M	0.000E-01
XE-133M	0.000E-01	CD-109	0.000E-01
XE-133	0.000E-01	CD-113M	0.000E-01
XE-135M	0.000E-01	SN-113	0.000E-01
XE-135	0.000E-01	SB-122	0.000E-01
XE-137	0.000E-01	SB-124	0.000E-01
XE-138	0.000E-01	SB-125	0.000E-01
H-3	2.262E-01	SB-127	0.000E-01
BE-7	0.000E-01	TE-132	7.383E-04
C-14	6.255E-03	I-131	5.638E-01
NA-24	4.070E-02	I-132	3.663E-00
P-32	5.195E-06	I-133	7.972E-01
K-40	0.000E-01	I-134	9.013E-03
CR-51	3.203E-02	I-135	4.704E-01
MN-54	1.341E-04	CS-134	1.240E-04
MN-56	3.514E-03	CS-136	1.398E-04
FE-55	2.609E-02	CS-137	1.010E-04
FE-59	8.140E-03	CS-138	2.226E-03
CO-56	0.000E-01	BA-139	1.647E-00
CO-57	0.000E-01	BA-140	4.003E-02
CO-58	1.807E-03	LA-140	5.536E-03
CO-60	4.812E-03	CE-139	0.000E-01
NI-63	4.501E-02	CE-144	3.950E-02
NI-65	4.166E-02	EU-152	0.000E-01
CU-64	8.499E-02	W-187	8.101E-04
ZN-65	4.644E-04	HG-203	0.000E-01
SE-75	0.000E-01	PB-214	0.000E-01
BR-84	4.112E-04	BI-214	0.000E-01
RB-88	4.003E-09	RA-226	0.000E-01
RB-89	1.116E-11	TH-228	0.000E-01
SR-85	0.000E-01	U-235	0.000E-01
SR-89	3.548E-03	NP-239	5.746E-02
SR-90	1.573E-04	AAAAAAA	0.000E-01
SR-91	1.939E-03	BBBBBBB	0.000E-01
SR-92	3.060E-03	CCCCCCC	0.000E-01
Y-88	0.000E-01	DDDDDDD	0.000E-01
Y-90	6.105E-03	EEEEEEE	0.000E-01
Y-91M	1.598E-02	FFFFFFF	0.000E-01
Y-91	4.644E-03	GGGGGGG	0.000E-01
Y-92	8.858E-02	HHHHHHH	0.000E-01
Y-93	5.087E-03	IIIIIII	0.000E-01
ZR-95	2.441E-02	JJJJJJJ	0.000E-01

A_{IT} - elements 16+100, adult GI-LLI dose factors for liquid releases,
(mrem/hr per μ Ci/ml)

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4.0 Environmental Sampling Stations - Radiological

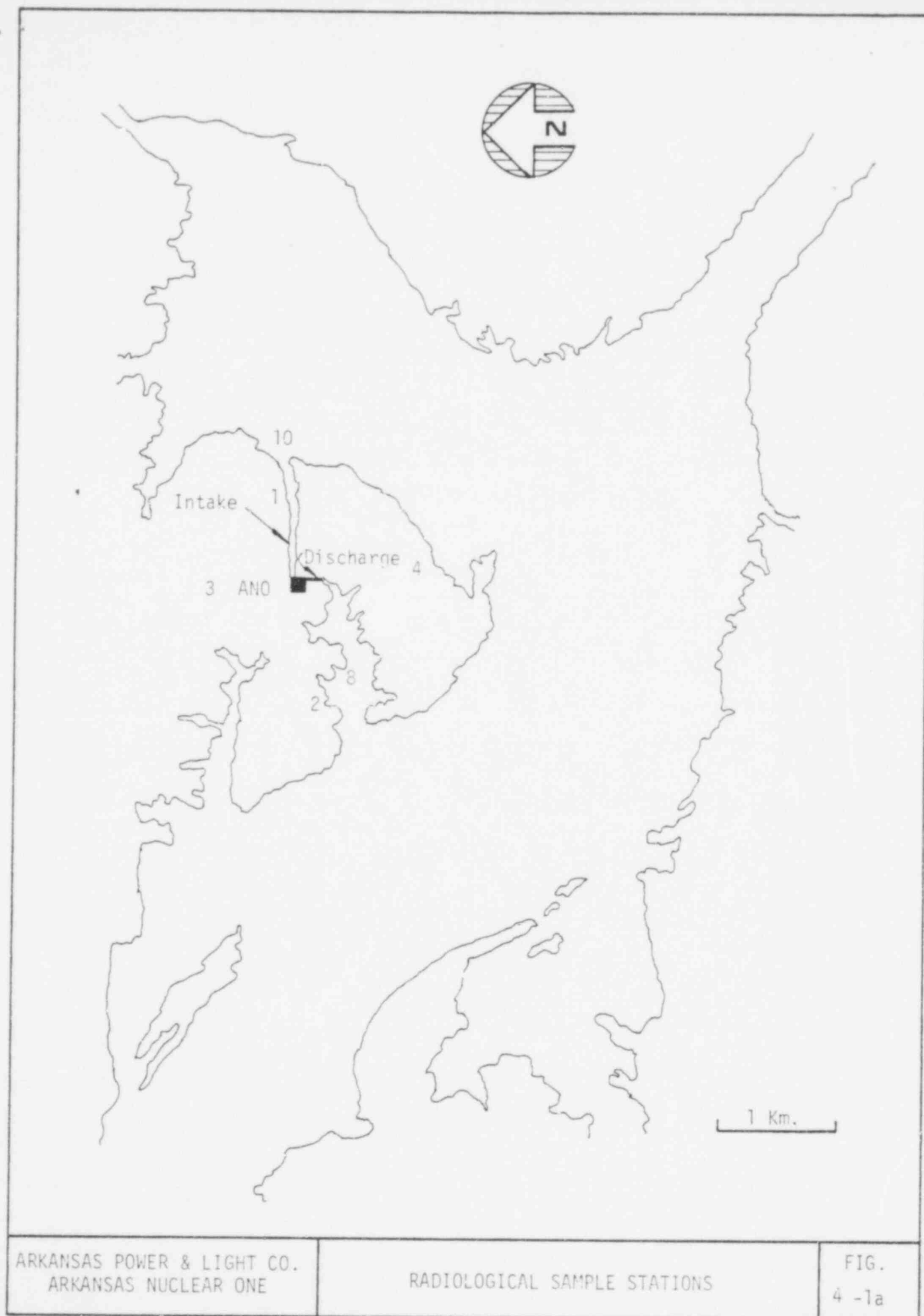
Environmental samples will be collected as specified in the technical specifications. The approximate locations of the sample sites are shown on figures 4-1a, and 4-1b.

Table 4-1 lists its approximate distances and directions of the sample stations from the plant.

Table 4-1

Location of Permanent Sample Stations

Permanent Sample Station	Approximate Direction and Distance From Plant
1	92 degrees-0.5 miles
2	235 degrees-0.5 miles
3	4 degrees-0.4 miles
4	171 degrees-0.4 miles
5	298 degrees-8.5 miles
6	109 degrees-6.8 miles
7	209 degrees-19.3 miles
8	180 degrees-0.1 miles
10	90 degrees-1.0 miles
11	240 degrees-0.5 miles
13	95 degrees-2.0 miles
14	65 degrees-5.8 miles
19	99 degrees-5.0 miles





Station 7 at Danville.

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Figure 4-1b
Radiological Sample Stations

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