SURRY POWER STATION

OFFSITE DOSE CALCULATION MANUAL

REFERENCES:

Surry Technical Specifications
10 CFR Part 20.106
10 CFR Part 50.34a
10 CFR Part 50.36a
10 CFR Part 50 Appendix I
NRC Regulatory Guide 1.21 (Rev. 1)
NRC Regulatory Guide 1.109 (Rev. 1)
NRC Regulatory Guide 1.111 (Rev. 1)
NUREG-0133

IMPLEMENTATION:

The provisions in the Surry Offsite Dose Calculation Manual will be implemented on approval by the NRC of Request for Technical Specification Change No. 73, dated March 15, 1979 (S.N. 411D/071078).

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SECTION 1

INTRODUCTION

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1. PURPOSE

The Offsite Dose Calculation Manual provides the methodology and parameters to be used in the calculation of off-site doses due to radioactive liquid and gaseous effluents to assure compliance with the dose limitations of the Technical Specifications. These dose limitations assure that:

1) the concentration of radioactive liquid effluents from the site to the unrestricted area will be limited to the concentration levels of 10CFR20, Appendix B, Table II;

2) the exposures to any individual from radioactive liquid effluents will not result in doses greater than the design objectives of 10CFR50, Appendix I;

3) the dose rate at any time at the site boundary from radioactive gaseous effluents will be limited to the annual dose limits of 10CFR20 for unrestricted areas; and

4) the exposure to any individual from radioactive gaseous effluents will not result in doses greater than the design objectives of 10CFR50, Appendix I.

2. SCOPE

The methodology used to assure compliance with the dose limitations described above shall be used to prepare the radioactive liquid and gaseous effluent procedures and reports required by the Technical Specifications.

The Manual also provides the methodology and parameters to be used in the calculation of radioactive liquid and gaseous effluent monitoring instrumentation alarm/trip setpoints to assure compliance with the concentration and dose rate limitations of the Technical Specifications. This manual does not include the procedures and forms required to document compliance with the surveillance requirements in the Technical Specifications.

Changes to this manual shall be reviewed and approved by the Station Safety and Operating Committee prior to implementation. Changes to this manual shall be submitted to the Nuclear Regulatory Commission by inclusion in the Monthly Operating Report within 90 days in which the change(s) were made effective.

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SECTION 2

LIQUID EFFLUENT RELEASE RATE

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1. MAXIMUM ALLOWABLE RELEASE RATE

1.1 To comply with Technical Specification 3.11.A.1.a to assure that the concentration of radioactive liquid effluents from the site to the unrestricted area is limited to the concentrations of 10CFR20, Appendix B, Table II, Column 2, the following release rate calculation shall be performed:

$$f = \frac{F}{\sum_{i=1}^{n} (\mu Ci/ml)_i / MPC_i}$$

where:

f = maximum allowable release rate, gpm.

F = dilution water, gpm.

MPC_i = the maximum permissible concentration, offsite, of nuclide i, expressed in μCi/ml from 10CFR20, Appendix B, Table II, Column 2, for radionuclides other than noble gases.

$(\mu Ci/ml)_i$ = the concentration of nuclide i in the effluent discharge.

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SECTION 3

GASEOUS EFFLUENT RELEASE RATE

1. RELEASE RATES FOR NOBLE GASES, RADIOIODINES, PARTICULATES WITH HALF-LIVES GREATER THAN EIGHT DAYS, AND TRITIUM

In order to comply with the Technical Specification 3.11.B.1.a to assure that the dose rate due to radioactive materials released in gaseous effluents from the site to unrestricted areas is limited to ≦ 500 mrem/yr to the total body and ≦ 3000 mrem/yr to the skin for the noble gases and is limited to ≦ 1500 mrem/yr to any organ for all radioiodines and for all radioactive materials in particulate form with half-lives greater than eight days and tritium, the following release rate calculations shall be performed:

a. Release rate limit for noble gases:

$$\Sigma_i \, K_i \, [(\overline{\chi/Q}) \, \dot{Q}_i] \leqq 500 \text{ mrem/yr}$$

$$\Sigma_i \, (L_i + 1.1 \, M_i) \, [(\overline{\chi/Q}) \, \dot{Q}_i] \leqq 3000 \text{ mrem/yr}$$

where the terms are defined below

b. Release rate limit for all radioiodines and radioactive materials in particulate form with half-lives greater than eight days and tritium:

$$\Sigma_i \, P_i \, [W \, \dot{Q}_i] \leqq 1500 \text{ mrem/yr}$$

where:

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

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

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

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

$\dot{Q}_i$ = The release rate of radionuclide, i, in gaseous effluent from all release points at the site, in $\mu Ci/sec$.

$(\overline{\chi/Q})$ = The highest calculated annual average relative concentration for any area at or beyond the unrestricted area boundary. $(\overline{\chi/Q})$ = 3.2E-07 sec/m^3 for process vent releases and 1.3E-04 sec/m^3 for ventilation vent releases. The location is 0.30 mi. NNE.

W = The highest calculated annual average dispersion parameter for estimating the dose to an individual at the controlling location:

W = 3.7E-06 sec/m^3, for the inhalation pathway

W = 4.5E-09 m^{-2}, for food and ground plane pathways.

The location is 1.9 miles NNE of the station.

2. RELEASE RATE CONSIDERATIONS

The most conservative release rate calculated in parts 1.a. and 1.b. shall control the release rate for a single release point.

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TABLE 3-1

DOSE FACTORS FOR NOBLE GASES AND DAUGHTERS*

Radionuclide	Total Body Dose Factor K_i (mrem/yr per $\mu Ci/m^3$)	Skin Dose Factor L_i (mrem/yr per $\mu Ci/m^3$)	Gamma Air Dose Factor M_i (mrad/yr per $\mu Ci/m^3$)	Beta Air Dose Factor N_i (mrad/yr per $\mu Ci/m^3$)
Kr-83m	7.56E-02**	---	1.93E+01	2.88E+02
Kr-85m	1.17E+03	1.46E+03	1.23E+03	1.97E+03
Kr-85	1.61E+01	1.34E+03	1.72E+01	1.95E+03
Kr-87	5.92E+03	9.73E+03	6.17E+03	1.03E+04
Kr-88	1.47E+04	2.37E+03	1.52E+04	2.93E+03
Kr-89	1.66E+04	1.01E+04	1.73E+04	1.06E+04
Kr-90	1.56E+04	7.29E+03	1.63E+04	7.83E+03
Xe-131m	9.15E+01	4.76E+02	1.56E+02	1.11E+03
Xe-133m	2.51E+02	9.94E+02	3.27E+02	1.48E+03
Xe-133	2.94E+02	3.06E+02	3.53E+02	1.05E+03
Xe-135m	3.12E+03	7.11E+02	3.36E+03	7.39E+02
Xe-135	1.81E+03	1.86E+03	1.92E+03	2.46E+03
Xe-137	1.42E+03	1.22E+04	1.51E+03	1.27E+04
Xe-138	8.83E+03	4.13E+03	9.21E+03	4.75E+03
Ar-41	8.84E+03	2.69E+03	9.30E+03	3.28E+03

*The listed dose factors are for radionuclides that may be detected in gaseous effluents.
**7.56E-02 = 7.56×10^{-2}.

Table from Regulatory Guide 1.109 (Rev. 1)

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TABLE 3-2

P_i VALUES* FOR AN INFANT FOR THE
Surry PLANT

Isotope	Inhlation[1]	Ground Plane[2]	Cow Milk[2]	Goat Milk[2]
H-3	6.47(2)*	0	2.38(3)	4.86(3)
P-32	2.03(6)	0	1.60(11)	1.93(11)
Mn-54	2.50(4)	1.09(9)	3.89(7)	4.68(6)
Fe-59	2.40(4)	3.92(8)	3.98(8)	5.11(6)
Co-58	1.10(4)	5.29(8)	6.06(7)	7.28(6)
Co-60	3.20(4)	4.40(9)	2.10(8)	2.52(7)
Zn-65	6.30(4)	6.89(8)	1.90(10)	2.29(9)
Rb-86	1.90(5)	1.28(7)	2.22(10)	2.67(9)
Sr-89	4.00(5)	3.16(4)	1.27(10)	2.66(10)
Sr-90	4.09(7)	-	1.21(11)	2.55(11)
Y-91	2.45(6)	1.52(6)	5.26(6)	6.32(5)
Zr-95	1.75(6)	3.48(8)	8.28(5)	9.95(4)
Nb-95	4.79(5)	1.95(8)	2.06(8)	2.48(7)
Ru-103	5.52(5)	1.55(8)	1.05(5)	1.27(4)
Ru-106	1.16(7)	2.99(8)	1.44(6)	1.73(5)
Ag-110m	3.67(6)	3.14(9)	1.46(10)	1.75(9)
Cd-115m	-	-	-	-
Sn-123	-	-	-	-
Sn-126	-	-	-	-
Sb-124	-	-	-	-
Sb-125	-	-	-	-
Te-127m	1.31(6)	1.18(5)	1.04(9)	1.24(8)
Te-129m	1.68(6)	2.86(7)	1.40(9)	1.68(8)
Cs-134	7.03(5)	2.81(9)	6.79(10)	2.04(11)
Cs-136	1.35(5)	2.13(8)	5.76(9)	1.73(10)
Cs-137	6.12(5)	1.15(9)	6.02(10)	1.81(11)
Ba-140	1.60(6)	2.94(7)	2.41(8)	2.89(7)
Ce-141	5.17(5)	1.98(7)	1.37(7)	1.65(6)
Ce-144	9.84(6)	5.84(7)	1.33(8)	1.60(7)
I-131	1.48(7)	2.46(7)	1.06(12)	1.27(12)
I-133	3.56(6)	3.54(6)	9.80(9)	1.18(10)

*6.47 (2) = 6.47 x 10^2

[1] mrem/yr per uCi/m^3

[2] m^2(mrem/yr per uCi/sec)

Calculated according to Nureg 0133

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SECTION 4

LIQUID EFFLUENT DOSE CALCULATIONS

1. LIQUID EFFLUENT DOSE CALCULATIONS

In order to comply with Technical Specification 3.11.A.2.a to assure that the dose or dose commitment per reactor to an individual from radioactive materials in liquid effluents released to unrestricted areas shall be limited during any calendar quarter to ≦ 1.5 mrem to the total body and to ≦ 5 mrem to any organ, and during any calendar year to ≦ 3 mrem to the total body and to ≦ 10 mrem to any organ, the following calculation shall be performed:

$$D_\tau = \sum_i \left(A_{i\tau} \sum_{\ell=1}^{m} \Delta t_\ell \, C_{i\ell} \, F_\ell\right)$$

Where:

D_τ = the cumulative dose or dose commitment to the total body or any organ, τ, from the liquid effluents for the total time period $\sum_{\ell=1}^{m} \Delta t_\ell$, in mrem.

Δt_ℓ = the length of ℓth time period over which $C_{i\ell}$ and F_ℓ are averaged for all liquid releases, in hours.

$C_{i\ell}$ = the average concentration of radionuclide i in undiluted liquid effluent during time period Δt_ℓ from any liquid release, in μCi/ml.

F_ℓ = the near field average dilution factor for $C_{i\ell}$ during any liquid effluent release. Defined as the ratio of the maximum undiluted liquid waste flow during release to the average flow from the site discharge structure to unrestricted receiving waters.

$A_{i\tau}$ = the site related ingestion dose commitment factor to the total body or any organ τ for each identified principal gamma and beta emitter in mrem-ml per hr-μCi from Table 4-1. For a salt water site:

$$A_{i\tau} = 1.14E05 \, (21BF_i + 5 \, BI_i) \, DF_i$$

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Where:

BF_i = Bioaccumulation factor for nuclide, i, in salt water fish, pCi/kg per pCi/ℓ, from Table 4-2.

BI_i = Bioaccumulation factor for nuclide, i, in salt water invertebrates, pCi/kg per pCi/ℓ from Table 4-2.

DF_i = Dose conversion factor for nuclide, i, for adults in pre-selected organ, τ, in mrem/pCi from Table 4-3.

1.14E05 = Units conversion factor,

1.14E05 = 1E06 pCi/μCi x 1E03 ml/kg ÷ 8760 hr/yr

21 = Adult fish consumption, kg/yr

5 = Adult invertebrate consumption, kg/yr

2. QUARTERLY COMPOSITE ANALYSES

For radionuclides not determined in each batch or weekly composite, the dose contribution to the current calendar quarter cumulative summation may be approximated by assuming an average monthly concentration based on the previous monthly or quarterly composite analyses. However, for reporting purposes, the calculated dose contribution shall be based on the actual composite analyses.

TABLE 4-1

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A_1 VALUES FOR

SURRY EFFLUENT TECHNICAL SPECIFICATIONS

Isotope	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
H-3	-	2.82(-1)	2.82(-1)	2.82(-1)	2.82(-1)	2.82(-1)	2.82(-1)
Na-24	4.57(-1)	4.57(-1)	4.57(-1)	4.57(-1)	4.57(-1)	4.57(-1)	4.57(-1)
P-32	1.67(7)	1.04(6)	6.45(5)	-	-	-	1.88(6)
Cr-51	-	-	5.58	3.34	1.23	7.40	1.40(3)
Mn-54	-	7.06(3)	1.35(3)	-	2.10(3)	-	2.16(4)
Fe-55	5.11(4)	3.53(4)	8.23(3)	-	-	1.97(4)	2.03(4)
Fe-59	8.03(4)	1.90(5)	7.27(4)	-	-	5.30(4)	6.32(5)
Co-58	-	6.03(2)	1.35(3)	-	-	-	1.22(4)
Co-60	-	1.73(3)	3.82(3)	-	-	-	3.25(4)
Zn-65	1.61(5)	5.13(5)	2.32(5)	-	3.43(5)	-	3.23(5)
Rb-86	-	6.24(2)	2.91(2)	-	-	-	1.23(2)
Sr-89	4.99(3)	-	1.43(2)	-	-	-	8.00(2)
Sr-90	1.23(5)	-	3.01(4)	-	-	-	3.55(3)
Y-91	8.88(1)	-	2.37	-	-	-	4.89(4)
Zr-95	1.59(1)	5.11	3.46	-	8.02	-	1.62(4)
Zr-97	8.81(-1)	1.78(-1)	8.13(-2)	-	2.68(-1)	-	5.51(4)
Nb-95	4.47(2)	2.49(2)	1.34(2)	-	2.46(2)	-	1.51(6)
Mo-99	-	1.28(2)	2.43(1)	-	2.89(2)	-	2.96(2)
Ru-103	1.07(2)	-	4.60(1)	-	4.07(2)	-	1.25(4)

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TABLE 4-1

$A_{1,r}$ VALUES FOR

SURRY EFFLUENT TECHNICAL SPECIFICATIONS (continued)

Isotope	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
Ru-106	1.59(3)	-	2.01(2)	-	3.06(3)	-	1.03(5)
Ag-110m	1.56(3)	1.45(3)	8.60(2)	-	2.87(3)	-	5.97(5)
Sb-124	2.76(2)	5.22	1.09(2)	6.70(-1)	-	2.15(2)	7.84(3)
Sb-125	1.77(2)	1.97	4.20(1)	1.79(-1)	-	1.36(2)	1.94(3)
Te-125m	2.17(2)	7.86(1)	2.91(1)	6.52(1)	8.82(2)	-	8.66(2)
Te-127m	5.48(2)	1.96(2)	6.68(1)	1.40(2)	2.23(3)	-	1.84(3)
Te-129m	9.31(2)	3.47(2)	1.47(2)	3.20(2)	3.89(3)	-	4.69(3)
Te-131m	1.40(2)	6.85(1)	5.71(1)	1.08(2)	6.94(2)	-	6.80(3)
Te-132	2.04(2)	1.32(2)	1.24(2)	1.46(2)	1.27(3)	-	6.24(3)
I-131	2.18(2)	3.12(2)	1.79(2)	1.02(5)	5.35(2)	-	8.23(1)
I-132	1.06(1)	2.85(1)	9.96	9.96(2)	4.54(1)	-	5.35
I-133	7.45(1)	1.30(2)	3.95(1)	1.90(4)	2.26(2)	-	1.16(2)
I-134	5.56	1.51(1)	5.40	2.62(2)	2.40(1)	-	1.32(-2)
I-135	2.32(1)	6.08(1)	2.24(1)	4.01(3)	9.75(1)	-	6.87(1)
Cs-134	6.84(3)	1.63(4)	1.33(4)	-	5.27(3)	1.75(3)	2.85(2)
Cs-136	7.16(2)	2.83(3)	2.04(3)	-	1.57(3)	2.16(2)	3.21(2)
Cs-137	8.77(3)	1.20(4)	7.85(3)	-	4.07(3)	1.35(3)	2.32(2)
Cs-138	6.07	1.20(1)	5.94	-	8.81	8.70(-1)	5.12(-5)
Ba-140	1.64(3)	2.06	1.08(2)	-	7.02(-1)	1.18	3.38(3)
La-140	1.57	7.94(-1)	2.10(-1)	-	-	-	5.83 (4)

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TABLE 4-1

$A_{1,r}$ VALUES FOR

SURRY EFFLUENT TECHNICAL SPECIFICATIONS (continued)

Isotope	Bone	Liver	Total Body	Thyroid	Kidney	Lung	GI-LLI
Ce-141	3.43	2.32	2.63(-1)	-	1.08	-	8.86(3)
Ce-143	6.04(-1)	4.46(2)	4.94(-2)	-	1.97(-1)	-	1.67(4)
Ce-144	1.79(2)	7.47(1)	9.59	-	4.43(1)	-	6.04(4)
Np-239	3.53(-2)	3.47(-3)	1.91(-3)	-	1.08(-2)	-	7.11(2)

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TABLE 4-2*

BIOACCUMULATION FACTORS TO BE USED IN THE ABSENCE OF SITE-SPECIFIC DATA
(pCi/kg per pCi/liter)*

ELEMENT	FRESHWATER		SALTWATER	
	FISH	INVERTEBRATE	FISH	INVERTEBRATE
H	9.0E-01	9.0E-01	9.0E-01	9.3E-01
C	4.6E 03	9 E 03	1.8E 03	1.4E 03
NA	1.0E 02	JE 02	6.7E-02	1.9E-01
P	1.0E 05	2.0E 04	2.9E 04	3.0E 04
CR	2.0E 02	2.0E 03	4.0E 02	2.0E 03
MN	4.0E 02	9.0E 04	5.5E 02	4.0E 02
FE	1.0E 02	3.2E 03	3.0E 03	2.0E 04
CO	5.0E 01	2.0E 02	1.0E 02	1.0E 03
NI	1.0E 02	1.0E 02	1.0E 02	2.5E 02
CU	5.0E 01	4.0E 02	6.7E 02	1.7E 03
ZN	2.0E 03	1.0E 04	2.0E 03	5.0E 04
BR	4.2E 02	3.3E 02	1.5E-02	3.1E 00
RB	2.0E 03	1.0E 03	8.3E 00	1.7E 01
SR	3.0E 01	1.0E 02	2.0E 00	2.0E 01
Y	2.5E 01	1.0E 03	2.5E 01	1.0E 03
ZR	3.3E 00	6.7E 00	2.0E 02	8.0E 01
NB	3.0E 04	1.0E 02	3.0E 04	1.0E 02
MO	1.0E 01	1.0E 01	1.0E 01	1.0E 01
TC	1.5E 01	5.0E 00	1.0E 01	5.0E 01
RU	1.0E 01	3.0E 02	3.0E 00	1.0E 03
RH	1.0E 01	3.0E 02	1.0E 01	2.0E 03
TE	4.0E 02	6.1E 03	1.0E 01	1.0E 02
I	1.5E 01	5.0E 00	1.0E 01	5.0E 01
CS	2.0E 03	1.0E 03	4.0E 01	2.5E 01
BA	4.0E 00	2.0E 02	1.0E 01	1.0E 02
LA	2.5E 01	1.0E 03	2.5E 01	1.0E 03
CE	1.0E 00	1.0E 03	1.0E 01	6.0E 02
PR	2.5E 01	1.0E 03	2.5E 01	1.0E 03
ND	2.5E 01	1.0E 03	2.5E 01	1.0E 03
W	1.2E 03	1.0E 01	3.0E 01	3.0E 01
NP	1.0E 01	4.0E 02	1.0E 01	1.0E 01

*Values in Table A-1 are taken from Reference 6 unless otherwise indicated.

*Table taken from Regulatory Guide 1.109(Rev. 1)

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TABLE 4-3*

INGESTION DOSE FACTORS FOR ADULTS
(MREM PER PCI INGESTED)

NUCLIDE	BONE	LIVER	T.BODY	THYROID	KIDNEY	LUNG	GI-LLI
H 3	NO DATA	1.05E-07	1.05E-07	1.05E-07	1.05E-07	1.05E-07	1.05E-07
C 14	2.84E-06	5.68E-07	5.68E-07	5.68E-07	5.68E-07	5.68E-07	5.68E-07
NA 24	1.70E-06	1.70E-06	1.70E-06	1.70E-06	1.70E-06	1.70E-06	1.70E-06
P 32	1.93E-04	1.20E-05	7.46E-06	NO DATA	NO DATA	NO DATA	2.17E-05
CR 51	NO DATA	NO DATA	2.66E-09	1.59E-09	5.86E-10	3.53E-09	6.69E-07
MN 54	NO DATA	4.57E-06	8.72E-07	NO DATA	1.36E-06	NO DATA	1.40E-05
MN 56	NO DATA	1.15E-07	2.04E-08	NO DATA	1.46E-07	NO DATA	3.67E-06
FE 55	2.75E-06	1.90E-06	4.43E-07	NO DATA	NO DATA	1.06E-06	1.09E-06
FE 59	4.34E-06	1.02E-05	3.91E-06	NO DATA	NO DATA	2.85E-06	3.40E-05
CO 58	NO DATA	7.45E-07	1.67E-06	NO DATA	NO DATA	NO DATA	1.51E-05
CO 60	NO DATA	2.14E-06	4.72E-06	NO DATA	NO DATA	NO DATA	4.02E-05
NI 63	1.30E-04	9.01E-06	4.36E-06	NO DATA	NO DATA	NO DATA	1.88E-06
NI 65	5.28E-07	6.86E-08	3.13E-08	NO DATA	NO DATA	NO DATA	1.74E-06
CU 64	NO DATA	8.33E-08	3.91E-08	NO DATA	2.10E-07	NO DATA	7.10E-06
ZN 65	4.84E-06	1.54E-05	6.96E-06	NO DATA	1.03E-05	NO DATA	9.70E-06
ZN 69	1.03E-08	1.97E-08	1.37E-09	NO DATA	1.28E-08	NO DATA	2.96E-09
BR 83	NO DATA	NO DATA	4.02E-08	NO DATA	NO DATA	NO DATA	5.70E-08
BR 84	NO DATA	NO DATA	5.21E-08	NO DATA	NO DATA	NO DATA	4.09E-13
BR 85	NO DATA	NO DATA	2.14E-09	NO DATA	NO DATA	NO DATA	LT E-24
RB 86	NO DATA	2.11E-05	9.83E-06	NO DATA	NO DATA	NO DATA	4.16E-06
RB 88	NO DATA	6.05E-08	3.21E-08	NO DATA	NO DATA	NO DATA	8.36E-19
RB 89	NO DATA	4.01E-08	2.82E-08	NO DATA	NO DATA	NO DATA	2.33E-21
SR 89	3.08E-04	NO DATA	8.04E-06	NO DATA	NO DATA	NO DATA	4.94E-05
SR 90	7.58E-03	NO DATA	1.86E-03	NO DATA	NO DATA	NO DATA	2.19E-04
SR 91	5.67E-06	NO DATA	2.20E-07	NO DATA	NO DATA	NO DATA	2.70E-05
SR 92	2.15E-06	NO DATA	9.30E-08	NO DATA	NO DATA	NO DATA	4.26E-05
Y 90	9.62E-09	NO DATA	2.58E-10	NO DATA	NO DATA	NO DATA	1.02E-04
Y 91M	9.09E-11	NO DATA	3.52E-12	NO DATA	NO DATA	NO DATA	2.67E-10
Y 91	1.41E-07	NO DATA	3.77E-09	NO DATA	NO DATA	NO DATA	7.76E-05
Y 92	8.45E-10	NO DATA	2.47E-11	NO DATA	NO DATA	NO DATA	1.48E-05

*Table taken from Regulatory Guide 1.109 (Rev. 1)

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TABLE 4-3 CONT"D

INGESTION DOSE FACTORS FOR ADULTS
(MREM PER PCI INGESTED)

NUCLIDE	BONE	LIVER	T.BODY	THYROID	KIDNEY	LUNG	GI-LLI
Y 93	2.68E-09	NO DATA	7.40E-11	NO DATA	NO DATA	NO DATA	8.50E-05
ZR 95	3.04E-08	9.75E-09	6.60E-09	NO DATA	1.53E-08	NO DATA	3.09E-05
ZR 97	1.68E-09	3.39E-10	1.55E-10	NO DATA	5.12E-10	NO DATA	1.05E-04
NB 95	6.22E-09	3.46E-09	1.86E-09	NO DATA	3.42E-09	NO DATA	2.10E-05
MO 99	NO DATA	4.31E-06	8.20E-07	NO DATA	9.76E-06	NO DATA	9.99E-06
TC 99M	2.47E-10	6.98E-10	8.89E-09	NO DATA	1.06E-08	3.42E-10	4.13E-07
TC101	2.54E-10	3.66E-10	3.59E-09	NO DATA	6.59E-09	1.87E-10	1.10E-21
RU103	1.85E-07	NO DATA	7.97E-08	NO DATA	7.08E-07	NO DATA	2.16E-05
RU105	1.54E-08	NO DATA	6.08E-09	NO DATA	1.99E-07	NO DATA	9.42E-06
RU106	2.75E-06	NO DATA	3.48E-07	NO DATA	5.31E-06	NO DATA	1.70E-04
AG110M	1.60E-07	1.48E-07	8.79E-08	NO DATA	2.91E-07	NO DATA	6.04E-05
TE125M	2.68E-06	9.71E-07	3.59E-07	8.06E-07	1.09E-05	NO DATA	1.07E-05
TE127M	6.77E-06	2.42E-06	8.25E-07	1.73E-06	2.75E-05	NO DATA	2.27E-05
TE127	1.10E-07	3.95E-08	2.38E-08	8.15E-08	4.48E-07	NO DATA	6.60E-06
TE129M	1.15E-05	4.29E-06	1.82E-06	3.95E-06	4.80E-05	NO DATA	5.79E-05
TE129	3.14E-08	1.18E-08	7.65E-09	2.41E-08	1.32E-07	NO DATA	2.37E-08
TE131M	1.73E-06	8.46E-07	7.05E-07	1.34E-06	8.57E-06	NO DATA	8.40E-05
TE131	1.97E-08	8.23E-09	6.22E-09	1.62E-08	8.63E-08	NO DATA	2.79E-09
TE132	2.52E-06	1.63E-06	1.53E-06	1.80E-06	1.57E-05	NO DATA	7.71E-05
I 130	7.56E-07	2.23E-06	8.80E-07	1.89E-04	3.48E-06	NO DATA	1.92E-06
I 131	4.16E-06	5.95E-06	3.41E-06	1.95E-03	1.02E-05	NO DATA	1.57E-06
I 132	2.03E-07	5.43E-07	1.90E-07	1.90E-05	8.65E-07	NO DATA	1.02E-07
I 133	1.42E-06	2.47E-06	7.53E-07	3.63E-04	4.31E-06	NO DATA	2.22E-06
I 134	1.06E-07	2.88E-07	1.03E-07	4.99E-06	4.58E-07	NO DATA	2.51E-10
I 135	4.43E-07	1.16E-06	4.28E-07	7.65E-05	1.86E-06	NO DATA	1.31E-06
CS134	6.22E-05	1.48E-04	1.21E-04	NO DATA	4.79E-05	1.59E-05	2.59E-06
CS136	6.51E-06	2.57E-05	1.85E-05	NO DATA	1.43E-05	1.96E-06	2.92E-06
CS137	7.97E-05	1.09E-04	7.14E-05	NO DATA	3.70E-05	1.23E-05	2.11E-06
CS138	5.52E-09	1.09E-07	5.40E-08	NO DATA	8.01E-08	7.91E-09	4.65E-13
BA139	9.70E-08	6.91E-11	2.84E-09	NO DATA	6.46E-11	3.92E-11	1.72E-07

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TABLE 4-3, CONT'D

INGESTION DOSE FACTORS FOR ADULTS
(MREM PER PCI INGESTED)

NUCLIDE	BONE	LIVER	T.BODY	THYROID	KIDNEY	LUNG	GI-LLI
BA140	2.03E-05	2.55E-08	1.33E-06	NO DATA	8.67E-09	1.46E-08	4.18E-05
BA141	4.71E-08	3.56E-11	1.57E-09	NO DATA	3.31E-11	2.02E-11	2.22E-17
BA142	2.13E-08	2.19E-11	1.34E-09	NO DATA	1.85E-11	1.24E-11	3.07E-26
LA140	2.50E-09	1.26E-09	5.33E-10	NO DATA	NO DATA	NO DATA	9.25E-05
LA142	1.28E-10	5.82E-11	1.45E-11	NO DATA	NO DATA	NO DATA	4.25E-07
CE141	9.36E-09	6.33E-09	7.18E-10	NO DATA	2.94E-09	NO DATA	2.42E-05
CE143	1.65E-07	1.22E-06	1.35E-10	NO DATA	5.37E-10	NO DATA	4.56E-05
CE144	4.88E-07	2.04E-07	2.62E-08	NO DATA	1.21E-07	NO DATA	1.65E-04
PR143	9.20E-09	3.69E-09	4.56E-10	NO DATA	2.13E-09	NO DATA	4.03E-05
PR144	3.01E-11	1.25E-11	1.54E-12	NO DATA	7.05E-12	NO DATA	4.33E-18
ND147	6.29E-09	7.27E-09	4.35E-10	NO DATA	4.25E-09	NO DATA	3.49E-05
W 187	1.03E-07	8.61E-08	3.01E-08	NO DATA	NO DATA	NO DATA	2.82E-05
NP239	1.19E-09	1.17E-10	6.45E-11	NO DATA	3.65E-10	NO DATA	2.40E-05

SURRY POWER STATION

OFFSITE DOSE CALCULATION MANUAL

SECTION 5

GASEOUS EFFLUENT DOSE CALCULATIONS

1. GASEOUS EFFLUENT AIR DOSE

In order to comply with Technical Specification 3.11.B.2.a to assure that the air dose per reactor in unrestricted areas due to noble gases released in gaseous effluents shall be limited to ≦ 5 mrad for gamma radiation and ≦ 10 mrad for beta radiation during any calendar quarter, and ≦ 10 mrad for gamma radiation and ≦ 20 mrad for beta radiation during any calendar year, the following calculations shall be performed:

For gamma radiation:

$$D_\gamma = 3.17E\text{-}08 \; \Sigma_i \; M_i \; (\overline{\chi/Q}) \; Q_i$$

For beta radiation:

$$D_\beta = 3.17E\text{-}08 \; \Sigma_i \; N_i \; (\overline{\chi/Q}) \; Q_i$$

Where:

D_γ = The air dose for gamma radiation in mrad.

D_β = The air dose for beta radiation in mrad.

3.17E-08 = The inverse of the number of seconds in a year.

M_i = The air dose factor due to gamma emissions for each identified noble gas radionuclide, in mrad/yr per μCi/m^3 from Table 3-1.

N_i = The air dose factor due to beta emissions for each identified noble gas radionuclide, in mrad/yr per μCi/m^3 from Table 3-1.

$(\overline{\chi/Q})$ = The highest calculated annual average relative concentration for any area at or beyond the unrestricted area boundary.

$(\overline{\chi/Q})_{vv}$ = 1.3E-04 sec/m^3 for ventilation vent, air ejector, and turbine building releases.

$(\overline{X/Q})_{pv}$ = 3.2E-07 for process vent

Q_i = The release of noble gas radionuclide, i, in gaseous effluents in μCi. Releases shall be cumulative over the calendar quarter or year as appropriate.

2. RADIOIODINES, PARTICULATES, AND TRITIUM

In order to comply with Technical Specification 3.11.B.3.a to assure that the dose per reactor 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 limited to ≦ 7.5 mrem to any organ during any calendar quarter, and ≦ 15 mrem to any organ during any calendar year, the following calculation shall be performed:

$$D_{ja} = 3.17E\text{-}08 \; \Sigma_i \; R_{ija} \; W \; Q_i$$

Where:

D = Dose to organ j of an individual in age group a in mrem.

3.17E-08 = The inverse of the number of seconds in a year.

Q_i = The release of radioiodines, radioactive materials in particulate form and radionuclides other than noble gases in gaseous effluents, i, in μCi. Releases shall be cumulative over the calendar quarter or year as appropriate.

W = The annual average dispersion parameter for estimating the dose to an individual at the controlling location.

W = $(\overline{\chi/Q})$ for the inhalation pathway, in sec/m^3 from Table 5-1 and 5-2.

W = $(\overline{D/Q})$ for the food and ground plane pathways, in meters $^{-2}$ from Table 5-3 and 5-4.

R_{ija} = The dose factor for each identified radionuclide, i, organ j, and age group a, in m^2 (mrem/yr) per μCi/sec or mrem/yr per μCi/m^3 from Table 5-15 or calculated as follows:

$$R_{ija} = R^{I}_{ija}[\chi/Q] + R^{G}_{ij}[D/Q] + R^{C}_{ija}[D/Q, \chi/Q] + R^{M}_{ija}[D/Q, \chi/Q] + R^{V}_{ija}[D/Q, \chi/Q]$$

Where:

Inhalation Pathway Factor, $R^{I}_{ija}[\chi/Q]$

$$R^{I}_{ija}[\chi/Q] = K'(BR)_a\ (DFA_{ija})\ (\text{mrem/yr per } \mu Ci/m^3)$$

Where:

K' = a constant of unit conversion, 1E06 pCi/μCi.

$(BR)_a$ = the breathing rate of the receptor of age group (a), in m^3/yr.

The breathing rates $(BR)_a$ for the various age groups are tabulated below as given in Regulatory Guide 1.109 (Rev. 1).

Age Group (a)	Breathing Rate (m^3/yr)
Infant	1400
Child	3700
Teen	8000
Adult	8000

(DFA_{ija}) = the inhalation dose factor for the receptor of the age group (a) for the i^{th} radionuclide, organ j, in mrem/pCi.

Inhalation dose factors (DFA_{ija}) for the various age groups are given in Tables 5-5, 5-6, 5-7 and 5-8 (taken from Regulatory Guide 1.109 (Rev. 1)).

Ground Plane Pathway Factor, $R^{G}_{ij}[D/Q]$

$$R^{G}_{ij}[D/Q] = K'K''(SF)\ DFG_{ij}[(1-e^{-\lambda_i t})/\lambda]\ (m^2 \cdot \text{mrem/yr per } \mu\text{Ci/sec})$$

Where:

K' = a constant of unit conversion, 1E06 pCi/μCi.

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, 4.73E08 sec (15 years)

DFG_{ij} = the ground plane dose conversion factor for the i^{th} radionuclide, organ j (mrem/hr per $\mu Ci/m^2$).

SF = the shielding factor (dimensionless), 0.7 (Regulatory Guide 1.109, (Rev. 1)).

Ground plane dose conversion factors, DFG_{ij}, are found in Table 5-9.

Grass-Cow-Milk Pathway Factor, $R^{C}_{ija}[D/Q]$

$$R^{C}_{ija}[D/Q] = K' \frac{Q_F\ (Uap)\ F_m\ (r)\ DFL_{ija})\ [\ \frac{f_p\ f_s}{Y_p} + \frac{(1-f_p f_s)e^{-\lambda_i t_h}}{Y_s}\ ]\ e^{-\lambda_i t_f}}{\lambda_i + \lambda_w}$$

$$(m^2 \cdot \text{mrem/yr per } \mu\text{Ci/sec})$$

Where:

K' = a constant of unit conversion, 1E06 pCi/μCi.

Q_F = the cow's consumption rate, in kg/day (wet weight), 50 (Regulatory Guide 1.109 (Rev.1)).

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

U_{ap} (liters/yr) -		
	Infant	330
	Child	330
	Teen	400
	Adult	310 (Regulatory Guide 1.109 (Rev.1))

Y_p = the agricultural productivity by unit area of pasture feed grass, in kg/m^2, 0.7.

Y_s = the agricultural productivity by unit area of stored feed, in kg/m^2, 2.0.

F_m = the stable element transfer coefficients, in days/liter, Table 5-10.

r = fraction of deposited activity retained on cow's feed grass, r=1 for radioiodine and r = 0.2 for particulates (Regulatory Guide 1.109 (Rev. 1)).

(DFL_{ija}) = the ingestion dose factor for the i^{th} radionuclide for the receptor in age group (a), organ j, in mrem/pCi. See Tables 5-11, 5-12, 5-13 and 5-14.

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

λ_w = the decay constant for the removal of activity on leaf and plant surfaces by weathering, 5.73E-07 sec^{-1} (corresponding to a 14 day half-life).

t_f = the transport time from pasture to cow, to milk, to receptor, in sec., 1.73E05 (2 days).

t_h = the transport time from pasture to harvest, to cow, to milk, to receptor, in sec, 7.78E06 (90 days).

f_p = fraction of the year that the cow is on pasture (dimensionless), 0.8.

f_s = fraction of the cow feed that is pasture grass while the cow is on pasture, dimensionless, 1.0.

The concentation of tritium in milk is based on the airborne concentration rather than the depostion. Therefore, the R^C_i is based on [χ/Q]:

$$R^C_{ija}\ [\chi/Q] = K'K'''F_m Q_F U_{ap}(DFL_{ija})[0.75(0.5/H)](\text{mrem/yr per } \mu Ci/m^3)$$

Where:

K''' = a constant of unit conversion, 1.E03 gm/kg.

H = absolute humidity of the atmosphere, in gm/m^3, 8 (Regulatory Guide 1.109 (Rev. 1)).

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.

Grass - Cow - Meat Pathway Factor, $R^M_{ija}[D/Q]$

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

$$R^M_{ija}[D/Q] = K' \frac{Q_F\,(U_{ap})}{\lambda_i + \lambda_w} F_f\,(r)\,(DFL_{ija}) \cdot \left[\frac{f_p\, f_s}{Y_p} + \frac{(1-f_p\, f_s)e^{-\lambda_i t_h}}{Y_s} \right] e^{-\lambda_i t_f}$$

$$(m^2 \cdot \text{mrem/yr per } \mu Ci/sec)$$

Where:

F_f = the stable element transfer coefficients, in days/kg, Table 5-10.

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

U_{ap} (kg/yr)		
	Infant	0
	Child	41
	Teen	65
	Adult	110 (Regulatory Guide 1.109 (Rev. 1)).

t_f = the transport time from pasture to receptor, 1.73E06 sec (20 days).

t_h = the transport time from crop field to receptor, 7.78E06 sec (90 days).

The concentration of tritium in meat is based on its airborne concentration rather than the deposition. Therefore, the R^M_{ija} is based on [χ/Q]:

$$R^M_{ija}\ [\chi/Q] = K'K'''F_F Q_F U_{ap}(DFL_{ija})[0.75(0.5/H)](\text{mrem/yr per } \mu Ci/m^3)$$

where all terms are defined above.

Vegatation Pathway Factor, $R^V_{ija}[D/Q]$

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:

$$R^V_{ija}[D/Q] = K' \left[\frac{(r)}{Y_v(\lambda_i + \lambda_w)} \right] (DFL_{ija}) \cdot \left[U^L_a f_L e^{-\lambda_i t_L} + U^S_a f_g e^{-\lambda_i t_h} \right]$$

$$(m^2 \cdot \text{mrem/yr per } \mu Ci/\text{sec})$$

Where:

K' = a constant of unit conversion, 1.E06pCi/μCi

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

U_a^L (kg/yr) -	
Infant	0
Child	26
Teen	42
Adult	64

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

U_a^S (kg/yr) -	
Infant	0
Child	520
Teen	630
Adult	520

f_L = the fraction of the annual intake of fresh leafy vegetation grown locally, 1.0.

f_g = the fraction of the annual intake of stored vegetation grown locally, 0.76.

t_L = the average time between harvest of leafy vegetation and its consumption, in seconds, 8.6E04 (1 day).

t_h = the average time between harvest of stored vegetation and its consumption, in seconds, 5 18E06 (60 days).

Y_v = the vegetation areal density, in kg/m^2, 2.0, and all other factors are previously defined. The concentration of tritium in vegetation is based on the airborne concentration rather than the deposition. Therefore, the R^V_{ija} is based on [χ/Q]:

$$R^V_{ija}[\chi/Q] = K'K'''U^L_a f_L + U^S_a f_g(DFL_{ija}) \cdot [0.75(0.5/H)]$$

(mrem/yr per μCi/m^3)

All terms defined previously.

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TABLE 5-1

SURRY PROCESS VENT DISPERSION PARAMETERS $\overline{(X/Q)}_D$ FOR
LONG-TERM MIXED-MODE RELEASES > 500 HR/YR OR > 150 HR/QTR

	Distance to the control location, in miles									
Sector	0-0.5	0.5-1.0	1.0-1.5	1.5-2.0	2.0-2.5	2.5-3.0	3.0-3.5	3.5-4.0	4.0-4.5	4.5-5.0
N	2.3×10^{-7}	2.8×10^{-7}	3.2×10^{-7}	2.7×10^{-7}	2.2×10^{-7}	1.9×10^{-7}	1.6×10^{-7}	1.4×10^{-7}	1.3×10^{-7}	1.2×10^{-7}
NNE	3.7×10^{-7}	4.9×10^{-7}	4.7×10^{-7}	3.6×10^{-7}	2.8×10^{-7}	2.2×10^{-7}	1.8×10^{-7}	1.6×10^{-7}	1.5×10^{-7}	1.5×10^{-7}
NE	6.9×10^{-7}	5.4×10^{-7}	4.3×10^{-7}	3.2×10^{-7}	2.4×10^{-7}	1.9×10^{-7}	1.6×10^{-7}	1.4×10^{-7}	1.3×10^{-7}	1.1×10^{-7}
ENE	3.4×10^{-7}	3.2×10^{-7}	2.6×10^{-7}	1.9×10^{-7}	1.5×10^{-7}	1.2×10^{-7}	9.5×10^{-8}	8.0×10^{-8}	6.8×10^{-8}	6.0×10^{-8}
E	3.4×10^{-7}	3.1×10^{-7}	2.5×10^{-7}	1.8×10^{-7}	1.4×10^{-7}	1.1×10^{-7}	8.8×10^{-8}	7.3×10^{-8}	6.2×10^{-8}	5.4×10^{-8}
ESE	5.3×10^{-7}	3.1×10^{-7}	2.2×10^{-7}	1.6×10^{-7}	1.2×10^{-7}	9.2×10^{-8}	7.4×10^{-8}	6.1×10^{-8}	5.2×10^{-8}	4.5×10^{-8}
SE	6.1×10^{-7}	3.9×10^{-7}	2.6×10^{-7}	1.8×10^{-7}	1.3×10^{-7}	1.0×10^{-7}	8.1×10^{-8}	6.7×10^{-8}	5.7×10^{-8}	4.9×10^{-8}
SSE	4.1×10^{-7}	4.7×10^{-7}	3.7×10^{-7}	2.6×10^{-7}	1.9×10^{-7}	1.5×10^{-7}	1.2×10^{-7}	9.6×10^{-8}	8.1×10^{-8}	6.9×10^{-8}
S	3.5×10^{-7}	4.2×10^{-7}	3.6×10^{-7}	2.7×10^{-7}	2.1×10^{-7}	1.6×10^{-7}	1.3×10^{-7}	1.1×10^{-7}	9.2×10^{-8}	8.0×10^{-8}
SSW	3.1×10^{-7}	2.9×10^{-7}	2.3×10^{-7}	1.6×10^{-7}	1.2×10^{-7}	9.6×10^{-8}	8.2×10^{-8}	7.0×10^{-8}	6.1×10^{-8}	5.2×10^{-8}
SW	3.2×10^{-7}	2.5×10^{-7}	1.8×10^{-7}	1.4×10^{-7}	1.2×10^{-7}	9.4×10^{-8}	7.5×10^{-8}	6.3×10^{-8}	5.5×10^{-8}	4.8×10^{-8}
WSW	3.3×10^{-7}	2.6×10^{-7}	2.0×10^{-7}	1.5×10^{-7}	1.2×10^{-7}	9.9×10^{-8}	8.4×10^{-8}	7.1×10^{-8}	5.9×10^{-8}	5.0×10^{-8}
W	4.9×10^{-7}	3.7×10^{-7}	2.8×10^{-7}	2.1×10^{-7}	1.5×10^{-7}	1.3×10^{-7}	1.1×10^{-7}	9.7×10^{-8}	8.6×10^{-8}	7.5×10^{-8}
WNW	5.7×10^{-7}	3.6×10^{-7}	3.0×10^{-7}	2.3×10^{-7}	1.7×10^{-7}	1.4×10^{-7}	1.1×10^{-7}	9.3×10^{-8}	7.9×10^{-8}	6.9×10^{-8}
NW	7.4×10^{-7}	3.0×10^{-7}	2.6×10^{-7}	2.1×10^{-7}	1.6×10^{-7}	1.3×10^{-7}	1.1×10^{-7}	9.5×10^{-8}	8.2×10^{-8}	7.2×10^{-8}
NNW	2.1×10^{-7}	2.1×10^{-7}	2.5×10^{-7}	2.2×10^{-7}	1.8×10^{-7}	1.5×10^{-7}	1.3×10^{-7}	1.1×10^{-7}	9.5×10^{-8}	8.5×10^{-8}

Period of Record 5/1/75–4/30/76

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TABLE 5-2
SURRY VENTILATION VENT DISPERSION PARAMETERS $\overline{(X/Q)}_p$ FOR LONG-TERM GROUND RELEASES > 500 HR/YR OR > 150 HR/QTR

	Distance to the control location, in miles									
Sector	0-0.5	0.5-1.0	1.0-1.5	1.5-2.0	2.0-2.5	2.5-3.0	3.0-3.5	3.5-4.0	4.0-4.5	4.5-5.0
N	1.8×10^{-4}	2.8×10^{-5}	6.9×10^{-6}	4.5×10^{-6}	2.7×10^{-6}	1.9×10^{-6}	1.4×10^{-6}	1.1×10^{-6}	8.5×10^{-7}	7.1×10^{-7}
NNE	1.8×10^{-4}	2.8×10^{-5}	8.8×10^{-6}	4.4×10^{-6}	2.7×10^{-6}	1.8×10^{-6}	1.3×10^{-6}	1.0×10^{-6}	8.3×10^{-7}	6.9×10^{-7}
NE	1.9×10^{-4}	2.8×10^{-5}	9.0×10^{-6}	4.5×10^{-6}	2.7×10^{-6}	1.9×10^{-6}	1.4×10^{-6}	1.1×10^{-6}	8.7×10^{-7}	7.2×10^{-7}
ENE	8.0×10^{-5}	1.3×10^{-5}	4.0×10^{-6}	2.0×10^{-6}	1.2×10^{-6}	8.1×10^{-7}	6.0×10^{-7}	4.6×10^{-7}	3.7×10^{-7}	3.1×10^{-7}
E	7.1×10^{-5}	1.1×10^{-5}	3.5×10^{-6}	1.7×10^{-6}	1.1×10^{-6}	7.2×10^{-7}	5.3×10^{-7}	4.1×10^{-7}	3.3×10^{-7}	2.7×10^{-7}
ESE	5.7×10^{-5}	9.0×10^{-6}	2.8×10^{-6}	1.4×10^{-6}	8.3×10^{-7}	5.7×10^{-7}	4.2×10^{-7}	3.2×10^{-7}	2.6×10^{-7}	2.1×10^{-7}
SE	5.9×10^{-5}	9.3×10^{-6}	2.9×10^{-6}	1.4×10^{-6}	8.6×10^{-7}	5.9×10^{-7}	4.3×10^{-7}	3.3×10^{-7}	2.7×10^{-7}	2.2×10^{-7}
SSE	5.6×10^{-5}	9.6×10^{-6}	2.9×10^{-6}	1.4×10^{-6}	8.5×10^{-7}	5.8×10^{-7}	4.2×10^{-7}	3.2×10^{-7}	2.6×10^{-7}	2.1×10^{-7}
S	5.2×10^{-5}	9.2×10^{-6}	2.8×10^{-6}	1.4×10^{-6}	8.1×10^{-7}	5.4×10^{-7}	3.9×10^{-7}	3.0×10^{-7}	2.4×10^{-7}	2.0×10^{-7}
SSW	2.7×10^{-5}	4.9×10^{-6}	1.5×10^{-6}	7.1×10^{-7}	4.2×10^{-7}	2.8×10^{-7}	2.0×10^{-7}	1.5×10^{-7}	1.2×10^{-7}	1.0×10^{-7}
SW	3.5×10^{-5}	5.7×10^{-6}	1.8×10^{-6}	8.6×10^{-7}	5.1×10^{-7}	3.5×10^{-7}	2.5×10^{-7}	1.9×10^{-7}	1.6×10^{-7}	1.3×10^{-7}
WSW	2.8×10^{-5}	5.0×10^{-6}	1.5×10^{-6}	7.2×10^{-7}	4.3×10^{-7}	2.8×10^{-7}	2.1×10^{-7}	1.6×10^{-7}	1.3×10^{-7}	1.0×10^{-7}
W	4.5×10^{-5}	7.7×10^{-6}	2.4×10^{-6}	1.1×10^{-6}	6.7×10^{-7}	4.5×10^{-7}	3.3×10^{-7}	2.5×10^{-7}	2.0×10^{-7}	1.6×10^{-7}
WNW	6.7×10^{-5}	1.1×10^{-5}	3.4×10^{-6}	1.7×10^{-6}	1.0×10^{-6}	6.8×10^{-7}	5.0×10^{-7}	3.8×10^{-7}	3.1×10^{-7}	2.5×10^{-7}
NW	8.1×10^{-5}	1.3×10^{-5}	4.1×10^{-6}	2.0×10^{-6}	1.2×10^{-6}	8.3×10^{-7}	6.0×10^{-7}	4.7×10^{-7}	3.7×10^{-7}	3.1×10^{-7}
NNW	1.4×10^{-4}	2.1×10^{-5}	6.3×10^{-6}	3.4×10^{-6}	2.0×10^{-6}	1.4×10^{-6}	1.0×10^{-6}	8.0×10^{-7}	6.4×10^{-7}	5.3×10^{-7}

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TABLE 5-3

SURRY PROCESS VENT DISPERSION PARAMETERS $\overline{(D/Q)}_D$ FOR
LONG-TERM MIXED-MODE RELEASES > 500 HR/YR OR > 150 HR/QTR

	Distance to the control location, in miles									
Sector	0-0.5	0.5-1.0	1.0-1.5	1.5-2.0	2.0-2.5	2.5-3.0	3.0-3.5	3.5-4.0	4.0-4.5	4.5-5.0
N	6.7×10^{-9}	2.8×10^{-9}	9.8×10^{-10}	4.8×10^{-10}	2.8×10^{-10}	1.8×10^{-10}	1.3×10^{-10}	9.6×10^{-11}	7.4×10^{-11}	5.9×10^{-11}
NNE	1.3×10^{-8}	5.6×10^{-9}	1.9×10^{-9}	9.4×10^{-10}	5.4×10^{-10}	3.5×10^{-10}	2.5×10^{-10}	1.8×10^{-10}	1.4×10^{-10}	1.2×10^{-10}
NE	2.5×10^{-8}	9.3×10^{-9}	3.1×10^{-9}	1.5×10^{-9}	8.4×10^{-10}	5.5×10^{-10}	3.8×10^{-10}	2.8×10^{-10}	2.2×10^{-10}	1.7×10^{-10}
ENE	1.2×10^{-8}	4.6×10^{-9}	1.5×10^{-9}	7.4×10^{-10}	4.3×10^{-10}	2.8×10^{-10}	2.0×10^{-10}	1.5×10^{-10}	1.1×10^{-10}	9.0×10^{-11}
E	1.2×10^{-8}	4.9×10^{-9}	1.7×10^{-9}	8.0×10^{-10}	4.6×10^{-10}	3.0×10^{-10}	2.1×10^{-10}	1.6×10^{-10}	1.2×10^{-10}	9.6×10^{-11}
ESE	1.8×10^{-8}	6.4×10^{-9}	2.1×10^{-9}	9.8×10^{-10}	5.7×10^{-10}	3.7×10^{-10}	2.6×10^{-10}	1.9×10^{-10}	1.5×10^{-10}	1.2×10^{-10}
SE	2.1×10^{-8}	7.8×10^{-9}	2.6×10^{-9}	1.2×10^{-9}	7.1×10^{-10}	4.6×10^{-10}	3.2×10^{-10}	2.4×10^{-10}	1.8×10^{-10}	1.5×10^{-10}
SSE	1.5×10^{-8}	6.9×10^{-9}	2.4×10^{-9}	1.2×10^{-9}	6.8×10^{-10}	4.4×10^{-10}	3.1×10^{-10}	2.3×10^{-10}	1.8×10^{-10}	1.4×10^{-10}
S	1.2×10^{-8}	6.0×10^{-9}	2.2×10^{-9}	1.1×10^{-9}	6.2×10^{-10}	4.0×10^{-10}	2.8×10^{-10}	2.1×10^{-10}	1.6×10^{-10}	1.3×10^{-10}
SSW	1.0×10^{-8}	4.4×10^{-9}	1.5×10^{-9}	7.3×10^{-10}	4.3×10^{-10}	2.8×10^{-10}	1.9×10^{-10}	1.4×10^{-10}	1.1×10^{-10}	9.1×10^{-11}
SW	9.7×10^{-9}	3.8×10^{-9}	1.3×10^{-9}	6.1×10^{-10}	3.6×10^{-10}	2.3×10^{-10}	1.6×10^{-10}	1.2×10^{-10}	9.4×10^{-11}	7.7×10^{-11}
WSW	9.6×10^{-9}	3.9×10^{-9}	1.3×10^{-9}	6.3×10^{-10}	3.7×10^{-10}	2.4×10^{-10}	1.7×10^{-10}	1.2×10^{-10}	9.7×10^{-11}	7.8×10^{-11}
W	1.5×10^{-8}	6.2×10^{-9}	2.1×10^{-9}	1.0×10^{-9}	6.0×10^{-10}	3.9×10^{-10}	2.7×10^{-10}	2.0×10^{-10}	1.6×10^{-10}	1.3×10^{-10}
WNW	1.5×10^{-8}	5.6×10^{-9}	1.8×10^{-9}	8.6×10^{-10}	5.0×10^{-10}	3.3×10^{-10}	2.3×10^{-10}	1.7×10^{-10}	1.3×10^{-10}	1.0×10^{-10}
NW	1.8×10^{-8}	6.0×10^{-9}	1.9×10^{-9}	8.7×10^{-10}	5.1×10^{-10}	3.3×10^{-10}	2.3×10^{-10}	1.7×10^{-10}	1.3×10^{-10}	1.1×10^{-10}
NNW	5.2×10^{-9}	2.1×10^{-9}	7.3×10^{-10}	3.5×10^{-10}	2.1×10^{-10}	1.4×10^{-10}	9.8×10^{-11}	7.3×10^{-11}	5.6×10^{-11}	4.5×10^{-11}

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TABLE 5-4

SURRY VENTILATION VENT DISPERSION PARAMETERS $(D/Q)_p$ FOR LONG-TERM GROUND RELEASES > 500 HR/YR OR > 150 HR/QTR

	Distance to the control location, in miles									
Sector	0-0.5	0.5-1.0	1.0-1.5	1.5-2.0	2.0-2.5	2.5-3.0	3.0-3.5	3.5-4.0	4.0-4.5	4.5-5.0
N	1.9×10^{-7}	3.3×10^{-8}	8.8×10^{-9}	3.8×10^{-9}	$2.\times10^{-9}$	1.3×10^{-9}	8.9×10^{-10}	6.4×10^{-10}	4.9×10^{-10}	3.8×10^{-10}
NNE	2.7×10^{-7}	4.7×10^{-8}	1.3×10^{-8}	5.5×10^{-9}	3.0×10^{-9}	1.9×10^{-9}	1.3×10^{-9}	9.2×10^{-10}	7.0×10^{-10}	5.5×10^{-10}
NE	2.7×10^{-7}	4.6×10^{-8}	1.2×10^{-8}	5.4×10^{-9}	2.9×10^{-9}	1.8×10^{-9}	1.3×10^{-9}	9.1×10^{-10}	6.9×10^{-10}	5.4×10^{-10}
ENE	1.2×10^{-7}	2.2×10^{-8}	5.8×10^{-9}	2.5×10^{-9}	1.4×10^{-9}	8.6×10^{-10}	5.8×10^{-10}	4.2×10^{-10}	3.2×10^{-10}	2.5×10^{-10}
E	1.2×10^{-7}	2.0×10^{-8}	5.4×10^{-9}	2.4×10^{-9}	1.3×10^{-9}	8.0×10^{-10}	5.5×10^{-10}	4.0×10^{-10}	3.0×10^{-10}	2.3×10^{-10}
ESE	1.2×10^{-7}	2.0×10^{-8}	5.5×10^{-9}	2.4×10^{-9}	1.3×10^{-9}	8.1×10^{-10}	5.5×10^{-10}	4.0×10^{-10}	3.0×10^{-10}	2.4×10^{-10}
SE	1.4×10^{-7}	2.5×10^{-8}	6.7×10^{-9}	2.9×10^{-9}	1.6×10^{-9}	9.9×10^{-10}	6.8×10^{-10}	4.9×10^{-10}	3.7×10^{-10}	2.9×10^{-10}
SSE	1.6×10^{-7}	2.8×10^{-8}	7.7×10^{-9}	3.3×10^{-9}	1.8×10^{-9}	1.1×10^{-9}	7.7×10^{-10}	5.6×10^{-10}	4.2×10^{-10}	3.3×10^{-10}
S	1.5×10^{-7}	2.6×10^{-8}	7.0×10^{-9}	3.0×10^{-9}	1.7×10^{-9}	1.0×10^{-9}	7.0×10^{-10}	5.1×10^{-10}	3.8×10^{-10}	3.0×10^{-10}
SSW	8.7×10^{-8}	1.5×10^{-8}	4.0×10^{-9}	1.8×10^{-9}	9.6×10^{-10}	6.0×10^{-10}	4.1×10^{-10}	3.0×10^{-10}	2.2×10^{-10}	1.8×10^{-10}
SW	7.9×10^{-8}	1.4×10^{-8}	3.7×10^{-9}	1.6×10^{-9}	8.7×10^{-10}	5.4×10^{-10}	3.7×10^{-10}	2.7×10^{-10}	2.0×10^{-10}	1.6×10^{-10}
WSW	7.9×10^{-8}	1.4×10^{-8}	3.7×10^{-9}	1.6×10^{-9}	8.8×10^{-10}	5.5×10^{-10}	3.7×10^{-10}	2.7×10^{-10}	2.0×10^{-10}	1.6×10^{-10}
W	1.2×10^{-7}	2.1×10^{-8}	5.8×10^{-9}	2.5×10^{-9}	1.4×10^{-9}	8.6×10^{-10}	5.8×10^{-10}	4.2×10^{-10}	3.2×10^{-10}	2.5×10^{-10}
WNW	1.4×10^{-7}	2.3×10^{-8}	6.3×10^{-9}	2.7×10^{-9}	1.5×10^{-9}	9.4×10^{-10}	6.4×10^{-10}	4.6×10^{-10}	3.5×10^{-10}	2.7×10^{-10}
NW	1.4×10^{-7}	2.4×10^{-8}	6.5×10^{-9}	2.8×10^{-9}	1.5×10^{-9}	9.6×10^{-10}	6.6×10^{-10}	4.7×10^{-10}	3.6×10^{-10}	2.8×10^{-10}
NNW	1.4×10^{-7}	2.4×10^{-8}	6.4×10^{-9}	2.8×10^{-9}	1.5×10^{-9}	9.5×10^{-10}	6.5×10^{-10}	4.7×10^{-10}	3.5×10^{-10}	2.8×10^{-10}

Period of Record 5/1/75—4/30/76

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TABLE 5-5*

INHALATION DOSE FACTORS FOR ADULTS
(MREM PER PCI INHALED)

NUCLIDE	BONE	LIVER	T.BODY	THYROID	KIDNEY	LUNG	GI-LLI
H 3	NO DATA	1.58E-07	1.58E-07	1.58E-07	1.58E-07	1.58E-07	1.58E-07
C 14	2.27E-06	4.26E-07	4.26E-07	4.26E-07	4.26E-07	4.26E-07	4.26E-07
NA 24	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06
P 32	1.65E-04	9.64E-06	6.26E-06	NO DATA	NO DATA	NO DATA	1.08E-05
CR 51	NO DATA	NO DATA	1.25E-08	7.44E-09	2.85E-09	1.80E-06	3.15E-07
MN 54	NO DATA	4.95E-06	7.87E-07	NO DATA	1.23E-06	1.75E-04	9.67E-06
MN 56	NO DATA	1.55E-10	2.29E-11	NO DATA	1.63E-10	1.18E-06	2.53E-06
FE 55	3.07E-06	2.12E-06	4.93E-07	NO DATA	NO DATA	9.01E-06	7.54E-07
FE 59	1.47E-06	3.47E-06	1.32E-06	NO DATA	NO DATA	1.27E-04	2.35E-05
CO 58	NO DATA	1.98E-07	2.59E-07	NO DATA	NO DATA	1.16E-04	1.33E-05
CO 60	NO DATA	1.44E-06	1.85E-06	NO DATA	NO DATA	7.46E-04	3.56E-05
NI 63	5.40E-05	3.93E-06	1.81E-06	NO DATA	NO DATA	2.23E-05	1.67E-06
NI 65	1.92E-10	2.62E-11	1.14E-11	NO DATA	NO DATA	7.00E-07	1.54E-06
CU 64	NO DATA	1.93E-10	7.69E-11	NO DATA	5.78E-10	8.48E-07	6.12E-06
ZN 65	4.05E-06	1.29E-05	5.82E-06	NO DATA	8.62E-06	1.08E-04	6.68E-06
ZN 69	4.23E-12	8.14E-12	5.69E-13	NO DATA	5.27E-12	1.15E-07	2.04E-09
BR 83	NO DATA	NO DATA	3.01E-08	NO DATA	NO DATA	NO DATA	2.90E-08
BR 84	NO DATA	NO DATA	3.91E-08	NO DATA	NO DATA	NO DATA	2.05E-13
BR 85	NO DATA	NO DATA	1.60E-09	NO DATA	NO DATA	NO DATA	LT E-24
RB 86	NO DATA	1.69E-05	7.37E-06	NO DATA	NO DATA	NO DATA	2.08E-06
RB 88	NO DATA	4.84E-08	2.41E-08	NO DATA	NO DATA	NO DATA	4.18E-19
RB 89	NO DATA	3.20E-08	2.12E-08	NO DATA	NO DATA	NO DATA	1.16E-21
SR 89	3.80E-05	NO DATA	1.09E-06	NO DATA	NO DATA	1.75E-04	4.37E-05
SR 90	1.24E-02	NO DATA	7.62E-04	NO DATA	NO DATA	1.20E-03	9.02E-05
SR 91	7.74E-09	NO DATA	3.13E-10	NO DATA	NO DATA	4.56E-06	2.39E-05
SR 92	8.43E-10	NO DATA	3.64E-11	NO DATA	NO DATA	2.06E-06	5.38E-06
Y 90	2.61E-07	NO DATA	7.01E-09	NO DATA	NO DATA	2.12E-05	6.32E-05
Y 91M	3.26E-11	NO DATA	1.27E-12	NO DATA	NO DATA	2.40E-07	1.66E-10
Y 91	5.78E-05	NO DATA	1.55E-06	NO DATA	NO DATA	2.13E-04	4.81E-05
Y 92	1.29E-09	NO DATA	3.77E-11	NO DATA	NO DATA	1.96E-06	9.19E-06

*Table taken from Regulatory Guide 1.109 (Rev. 1)

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TABLE 5-5, CONT'D

INHALATION DOSE FACTORS FOR ADULTS
(MREM PER PCI INHALED)

NUCLIDE	BONE	LIVER	T.BODY	THYROID	KIDNEY	LUNG	GI-LLI
Y 93	1.18E-08	NO DATA	3.26E-10	NO DATA	NO DATA	6.06E-06	5.27E-05
ZR 95	1.34E-05	4.30E-06	2.91E-06	NO DATA	6.77E-06	2.21E-04	1.88E-05
ZR 97	1.21E-08	2.45E-09	1.13E-09	NO DATA	3.71E-09	9.84E-06	6.54E-05
NB 95	1.76E-06	9.77E-07	5.26E-07	NO DATA	9.67E-07	6.31E-05	1.30E-05
MO 99	NO DATA	1.51E-08	2.87E-09	NO DATA	3.64E-08	1.14E-05	3.10E-05
TC 99M	1.29E-13	3.64E-13	4.63E-12	NO DATA	5.52E-12	9.55E-08	5.20E-07
TC101	5.22E-15	7.52E-15	7.38E-14	NO DATA	1.35E-13	4.99E-08	1.36E-21
RU103	1.91E-07	NO DATA	8.23E-08	NO DATA	7.29E-07	6.31E-05	1.38E-05
RU105	9.88E-11	NO DATA	3.89E-11	NO DATA	1.27E-10	1.37E-06	6.02E-06
RU106	8.64E-06	NO DATA	1.09E-06	NO DATA	1.67E-05	1.17E-03	1.14E-04
AG110M	1.35E-06	1.25E-06	7.43E-07	NO DATA	2.46E-06	5.79E-04	3.78E-05
TE125M	4.27E-07	1.98E-07	5.84E-08	1.31E-07	1.55E-06	3.92E-05	8.83E-06
TE127M	1.58E-06	7.21E-07	1.96E-07	4.11E-07	5.72E-06	1.20E-04	1.87E-05
TE127	1.75E-10	8.03E-11	3.87E-11	1.32E-10	6.37E-10	8.14E-07	7.17E-06
TE129M	1.22E-06	5.64E-07	1.98E-07	4.30E-07	4.57E-06	1.45E-04	4.79E-05
TE129	6.22E-12	2.99E-12	1.55E-12	4.87E-12	2.34E-11	2.42E-07	1.96E-08
TE131M	8.74E-09	5.45E-09	3.63E-09	6.88E-09	3.86E-08	1.82E-05	6.95E-05
TE131	1.39E-12	7.44E-13	4.49E-13	1.17E-12	5.46E-12	1.74E-07	2.30E-09
TE132	3.25E-08	2.69E-08	2.02E-08	2.37E-08	1.82E-07	3.60E-05	6.37E-05
I 130	5.72E-07	1.68E-06	6.60E-07	1.42E-04	2.61E-06	NO DATA	9.61E-07
I 131	3.15E-06	4.47E-06	2.56E-06	1.49E-03	7.66E-06	NO DATA	7.85E-07
I 132	1.45E-07	4.07E-07	1.45E-07	1.43E-05	6.48E-07	NO DATA	5.08E-08
I 133	1.08E-06	1.85E-06	5.65E-07	2.69E-04	3.23E-06	NO DATA	1.11E-06
I 134	8.05E-08	2.16E-07	7.69E-08	3.73E-06	3.44E-07	NO DATA	1.26E-10
I 135	3.35E-07	8.73E-07	3.21E-07	5.60E-05	1.39E-06	NO DATA	6.56E-07
CS134	4.66E-05	1.06E-04	9.10E-05	NO DATA	3.59E-05	1.22E-05	1.30E-06
CS136	4.88E-06	1.83E-05	1.38E-05	NO DATA	1.07E-05	1.50E-06	1.46E-06
CS137	5.98E-05	7.76E-05	5.35E-05	NO DATA	2.78E-05	9.40E-06	1.05E-06
CS138	4.14E-08	7.76E-08	4.05E-08	NO DATA	6.00E-08	6.07E-09	2.33E-13
BA [illegible]	1.17E-10	8.32E-14	3.42E-12	NO DATA	7.70E-14	4.70E-07	1.12E-07

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TABLE 5-5, CONT'D

INHALATION DOSE FACTORS FOR ADULTS
(MREM PER PCI INHALED)

NUCLIDE	BONE	LIVER	T.BODY	THYROID	KIDNEY	LUNG	GI-LLI
BA140	4.88E-06	6.13E-09	3.21E-07	NO DATA	2.09E-09	1.59E-04	2.73E-05
BA141	1.25E-11	9.41E-15	4.20E-13	NO DATA	8.75E-15	2.42E-07	1.45E-17
BA142	3.29E-12	3.38E-15	2.07E-13	NO DATA	2.96E-15	1.49E-07	1.96E-26
LA140	4.30E-09	2.17E-08	5.73E-09	NO DATA	NO DATA	1.70E-05	5.73E-05
LA142	8.54E-11	3.80E-11	9.69E-12	NO DATA	NO DATA	7.91E-07	2.64E-07
CE141	2.49E-06	1.69E-06	1.91E-07	NO DATA	7.83E-07	4.52E-05	1.50E-05
CE143	2.33E-09	1.72E-08	1.91E-09	NO DATA	7.60E-09	9.97E-06	2.83E-05
CE144	4.29E-04	1.79E-04	2.30E-05	NO DATA	1.06E-04	9.72E-04	1.02E-04
PR143	1.17E-06	4.69E-07	5.80E-08	NO DATA	2.70E-07	3.51E-05	2.50E-05
PR144	3.76E-12	1.56E-12	1.91E-13	NO DATA	8.81E-13	1.27E-07	2.69E-18
ND147	6.59E-07	7.62E-07	4.56E-08	NO DATA	4.45E-07	2.76E-05	2.16E-05
W 187	1.06E-09	8.85E-10	3.10E-10	NO DATA	NO DATA	3.63E-06	1.94E-05
NP239	2.87E-08	2.82E-09	1.55E-09	NO DATA	8.75E-09	4.70E-06	1.49E-05

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TABLE 5-6*

INHALATION DOSE FACTORS FOR TEENAGER
(MREM PER PCI INHALED)

NUCLIDE	BONE	LIVER	T.BODY	THYROID	KIDNEY	LUNG	GI-LLI
H 3	NO DATA	1.59E-07	1.59E-07	1.59E-07	1.59E-07	1.59E-07	1.59E-07
C 14	3.25E-06	6.09E-07	6.09E-07	6.09E-07	6.09E-07	6.09E-07	6.09E-07
NA 24	1.72E-06	1.72E-06	1.72E-06	1.72E-06	1.72E-06	1.72E-06	1.72E-06
P 32	2.36E-04	1.37E-05	8.99E-06	NO DATA	NO DATA	NO DATA	1.16E-05
CR 51	NO DATA	NO DATA	1.69E-08	9.37E-09	3.84E-09	2.62E-06	3.75E-07
MN 54	NO DATA	6.39E-06	1.05E-06	NO DATA	1.59E-06	2.48E-04	8.35E-06
MN 56	NO DATA	2.12E-10	3.15E-11	NO DATA	2.24E-10	1.90E-06	7.18E-06
FE 55	4.18E-06	2.98E-06	6.93E-07	NO DATA	NO DATA	1.55E-05	7.99E-07
FE 59	1.09E-06	4.62E-06	1.79E-06	NO DATA	NO DATA	1.91E-04	2.23E-05
CO 58	NO DATA	2.59E-07	3.47E-07	NO DATA	NO DATA	1.68E-04	1.19E-05
CO 60	NO DATA	1.89E-06	2.48E-06	NO DATA	NO DATA	1.09E-03	3.24E-05
NI 63	7.25E-05	5.43E-06	2.47E-06	NO DATA	NO DATA	3.84E-05	1.77E-06
NI 65	2.73E-10	3.66E-11	1.59E-11	NO DATA	NO DATA	1.17E-06	4.59E-06
CU 64	NO DATA	2.54E-10	1.06E-10	NO DATA	8.01E-10	1.39E-06	7.68E-06
ZN 65	4.82E-06	1.67E-05	7.80E-06	NO DATA	1.08E-05	1.55E-04	5.83E-06
ZN 69	6.04E-12	1.15E-11	8.07E-13	NO DATA	7.53E-12	1.98E-07	3.56E-08
BR 83	NO DATA	NO DATA	4.30E-08	NO DATA	NO DATA	NO DATA	LT E-24
BR 84	NO DATA	NO DATA	5.41E-08	NO DATA	NO DATA	NO DATA	LT E-24
BR 85	NO DATA	NO DATA	2.29E-09	NO DATA	NO DATA	NO DATA	LT E-24
RB 86	NO DATA	2.38E-05	1.05E-05	NO DATA	NO DATA	NO DATA	2.21E-06
RB 88	NO DATA	6.82E-08	3.40E-08	NO DATA	NO DATA	NO DATA	3.65E-15
RB 89	NO DATA	4.40E-08	2.91E-08	NO DATA	NO DATA	NO DATA	4.22E-17
SR 89	5.43E-05	NO DATA	1.56E-06	NO DATA	NO DATA	3.02E-04	4.64E-05
SR 90	1.35E-02	NO DATA	8.35E-04	NO DATA	NO DATA	2.06E-03	9.56E-05
SR 91	1.10E-08	NO DATA	4.39E-10	NO DATA	NO DATA	7.59E-06	3.24E-05
SR 92	1.19E-09	NO DATA	5.08E-11	NO DATA	NO DATA	3.43E-06	1.49E-05
Y 90	3.73E-07	NO DATA	1.00E-08	NO DATA	NO DATA	3.66E-05	6.99E-05
Y 91M	4.63E-11	NO DATA	1.77E-12	NO DATA	NO DATA	4.00E-07	3.77E-09
Y 91	8.26E-05	NO DATA	2.21E-06	NO DATA	NO DATA	3.67E-04	5.11E-05
Y 92	1.84E-09	NO DATA	5.36E-11	NO DATA	NO DATA	3.35E-06	2.06E-05

*Table taken from Regulatory Guide 1.109 (Rev. 1)

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TABLE 5-6 CONT'D

INHALATION DOSE FACTORS FOR TEENAGER
(MREM PER PCI INHALED)

NUCLIDE	BONE	LIVER	T.BODY	THYROID	KIDNEY	LUNG	GI-LLI
Y 93	1.69E-08	NO DATA	4.65E-10	NO DATA	NO DATA	1.04E-05	7.24E-05
ZR 95	1.82E-05	5.73E-06	3.94E-06	NO DATA	8.42E-06	3.36E-04	1.86E-05
ZR 97	1.72E-08	3.40E-09	1.57E-09	NO DATA	5.15E-09	1.62E-05	7.88E-05
NB 95	2.32E-06	1.29E-06	7.08E-07	NO DATA	1.25E-06	9.39E-05	1.21E-05
MO 99	NO DATA	2.11E-08	4.03E-09	NO DATA	5.14E-08	1.92E-05	3.36E-05
TC 99M	1.73E-13	4.83E-13	6.24E-12	NO DATA	7.20E-12	1.44E-07	7.66E-07
TC101	7.40E-15	1.05E-14	1.03E-13	NO DATA	1.90E-13	8.34E-08	1.09E-16
RU103	2.63E-07	NO DATA	1.12E-07	NO DATA	9.29E-07	9.79E-05	1.36E-05
RU105	1.40E-10	NO DATA	5.42E-11	NO DATA	1.76E-10	2.27E-06	1.13E-05
RU106	1.23E-05	NO DATA	1.55E-06	NO DATA	2.38E-05	2.01E-03	1.20E-04
AG110M	1.73E-06	1.64E-06	9.99E-07	NO DATA	3.13E-06	8.44E-04	3.41E-05
TE125M	6.10E-07	2.80E-07	8.34E-08	1.75E-07	NO DATA	6.70E-05	9.38E-06
TE127M	2.25E-06	1.02E-06	2.73E-07	5.48E-07	8.17E-06	2.07E-04	1.99E-05
TE127	2.51E-10	1.14E-10	5.52E-11	1.77E-10	9.10E-10	1.40E-06	1.01E-05
TE129M	1.74E-06	8.23E-07	2.81E-07	5.72E-07	6.49E-06	2.47E-04	5.06E-05
TE129	8.87E-12	4.22E-12	2.20E-12	6.49E-12	3.32E-11	4.12E-07	2.02E-07
TE131M	1.23E-08	7.51E-09	5.03E-09	9.06E-09	5.49E-08	2.97E-05	7.76E-05
TE131	1.97E-12	1.04E-12	6.30E-13	1.55E-12	7.72E-12	2.92E-07	1.89E-09
TE132	4.50E-08	3.63E-08	2.74E-08	3.07E-08	2.44E-07	5.61E-05	5.79E-05
I 130	7.80E-07	2.24E-06	8.96E-07	1.86E-04	3.44E-06	NO DATA	1.14E-06
I 131	4.43E-06	6.14E-06	3.30E-06	1.83E-03	1.05E-05	NO DATA	8.11E-07
I 132	1.99E-07	5.47E-07	1.97E-07	1.89E-05	8.65E-07	NO DATA	1.59E-07
I 133	1.52E-06	2.56E-06	7.78E-07	3.65E-04	4.49E-06	NO DATA	1.29E-06
I 134	1.11E-07	2.90E-07	1.05E-07	4.94E-06	4.58E-07	NO DATA	2.55E-09
I 135	4.62E-07	1.18E-06	4.36E-07	7.76E-05	1.86E-06	NO DATA	8.69E-07
CS134	6.28E-05	1.41E-04	6.86E-05	NO DATA	4.69E-05	1.83E-05	1.22E-06
CS136	6.44E-06	2.42E-05	1.71E-05	NO DATA	1.38E-05	2.22E-06	1.36E-06
CS137	8.38E-05	1.06E-04	3.89E-05	NO DATA	3.80E-05	1.51E-05	1.06E-06
CS138	5.82E-08	1.07E-07	5.59E-08	NO DATA	8.28E-08	9.84E-09	3.38E-11
BA139	1.67E-10	1.18E-13	4.87E-12	NO DATA	1.11E-13	8.08E-07	8.06E-07

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TABLE 5-6, CONT'D

INHALATION DOSE FACTORS FOR TEENAGER
(MREM PER PCI INHALED)

NUCLIDE	BONE	LIVER	T.BODY	THYROID	KIDNEY	LUNG	GI-LLI
BA140	6.84E-06	8.58E-09	4.40E-07	NO DATA	2.85E-09	2.54E-04	2.86E-05
BA141	1.78E-11	1.32E-14	5.93E-13	NO DATA	1.23E-14	4.11E-07	9.33E-14
BA142	4.62E-12	4.63E-15	2.04E-13	NO DATA	3.92E-15	2.39E-07	5.99E-20
LA140	5.99E-08	2.95E-08	7.82E-09	NO DATA	NO DATA	2.68E-05	6.09E-05
LA142	1.20E-10	5.31E-11	1.32E-11	NO DATA	NO DATA	1.27E-06	1.50E-06
CE141	3.55E-06	2.37E-06	2.71E-07	NO DATA	1.11E-06	7.67E-05	1.58E-05
CE143	3.32E-08	2.42E-08	2.70E-09	NO DATA	1.08E-08	1.63E-05	3.19E-05
CE144	6.11E-04	2.53E-04	3.28E-05	NO DATA	1.51E-04	1.67E-03	1.08E-04
PR143	1.67E-06	6.64E-07	8.20E-08	NO DATA	3.86E-07	6.04E-05	2.67E-05
PR144	5.37E-12	2.20E-12	2.72E-13	NO DATA	1.26E-12	2.19E-07	2.94E-14
ND147	9.83E-07	1.07E-06	6.41E-08	NO DATA	6.28E-07	4.65E-05	2.28E-05
W 187	1.50E-09	1.22E-09	4.29E-10	NO DATA	NO DATA	5.92E-06	2.21E-05
NP239	4.23E-08	3.99E-09	2.21E-09	NO DATA	1.25E-08	8.11E-06	1.65E-05

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TABLE 5-7, CONT'D

INHALATION DOSE FACTORS FOR CHILD
(MREM PER PCI INHALED)

NUCLIDE	BONE	LIVER	T.BODY	THYROID	KIDNEY	LUNG	GI-LLI
Y 93	5.04E-08	NO DATA	1.38E-09	NO DATA	NO DATA	2.01E-05	1.05E-04
ZR 95	5.13E-05	1.13E-05	1.00E-05	NO DATA	1.61E-05	6.03E-04	1.65E-05
ZR 97	5.07E-08	7.34E-09	4.32E-09	NO DATA	1.05E-08	3.06E-05	9.49E-05
NB 95	6.35E-06	2.48E-06	1.77E-06	NO DATA	2.33E-06	1.66E-04	1.00E-05
MO 99	NO DATA	4.66E-06	1.15E-08	NO DATA	1.06E-07	3.66E-05	3.42E-05
TC 99M	4.81E-13	9.41E-13	1.56E-11	NO DATA	1.37E-11	2.57E-07	1.30E-06
TC101	2.19E-14	2.30E-14	2.91E-13	NO DATA	3.92E-13	1.58E-07	4.41E-09
RU103	7.55E-07	NO DATA	2.90E-07	NO DATA	1.90E-06	1.79E-04	1.21E-05
RU105	4.13E-10	NO DATA	1.50E-10	NO DATA	3.63E-10	4.30E-06	2.69E-05
RU106	3.68E-05	NO DATA	4.57E-06	NO DATA	4.97E-05	3.87E-03	1.16E-04
AG110M	4.56E-06	3.08E-06	2.47E-06	NO DATA	5.74E-06	1.48E-03	2.71E-05
TE125M	1.82E-06	6.29E-07	2.47E-07	5.20E-07	NO DATA	1.29E-04	9.13E-06
TE127M	6.72E-06	2.31E-06	8.16E-07	1.64E-06	1.72E-05	4.00E-04	1.93E-05
TE127	7.49E-10	2.57E-10	1.65E-10	5.30E-10	1.91E-09	2.71E-06	1.52E-05
TE129M	5.19E-06	1.85E-06	8.22E-07	1.71E-06	1.36E-05	4.76E-04	4.91E-05
TE129	2.64E-11	9.45E-12	6.44E-12	1.93E-11	6.94E-11	7.93E-07	6.89E-06
TE131M	3.63E-08	1.60E-08	1.37E-08	2.64E-08	1.08E-07	5.56E-05	8.32E-05
TE131	5.87E-12	2.28E-12	1.78E-12	4.59E-12	1.59E-11	5.55E-07	3.60E-07
TE132	1.30E-07	7.36E-08	7.12E-08	8.58E-08	4.79E-07	1.02E-04	3.72E-05
I 130	2.21E-06	4.43E-06	2.28E-06	4.99E-04	6.61E-06	NO DATA	1.38E-06
I 131	1.30E-05	1.30E-05	7.37E-06	4.39E-03	2.13E-05	NO DATA	7.68E-07
I 132	5.72E-07	1.10E-06	5.07E-07	5.23E-05	1.69E-06	NO DATA	8.65E-07
I 133	4.48E-06	5.49E-06	2.08E-06	1.04E-03	9.13E-06	NO DATA	1.48E-06
I 134	3.17E-07	5.84E-07	2.69E-07	1.37E-05	8.92E-07	NO DATA	2.58E-07
I 135	1.33E-06	2.36E-06	1.12E-06	2.14E-04	3.62E-06	NO DATA	1.20E-06
CS134	1.76E-04	2.74E-04	6.07E-05	NO DATA	8.93E-05	3.27E-05	1.04E-06
CS136	1.76E-05	4.62E-05	3.14E-05	NO DATA	2.58E-05	3.93E-06	1.13E-06
CS137	2.45E-04	2.23E-04	3.47E-05	NO DATA	7.63E-05	2.81E-05	9.78E-07
CS138	1.71E-07	2.27E-07	1.50E-07	NO DATA	1.68E-07	1.04E-08	7.29E-08
BA139	4.98E-10	2.66E-13	1.45E-11	NO DATA	2.33E-13	1.56E-05	1.56E-05

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TABLE 5-7, CONT'D

INHALATION DOSE FACTORS FOR CHILD
(MREM PER PCI INHALED)

NUCLIDE	BONE	LIVER	T.BODY	THYROID	KIDNEY	LUNG	GI-LLI
BA140	2.00E-05	1.75E-08	1.17E-06	NO DATA	5.71E-09	4.71E-04	2.75E-05
BA141	5.29E-11	2.95E-14	1.72E-12	NO DATA	2.56E-14	7.89E-07	7.44E-08
BA142	1.35E-11	9.73E-15	7.54E-13	NO DATA	7.07E-15	4.44E-07	7.41E-10
LA140	1.74E-07	6.08E-08	2.04E-08	NO DATA	NO DATA	4.94E-05	6.10E-05
LA142	3.50E-10	1.11E-10	3.49E-11	NO DATA	NO DATA	7.35E-06	2.05E-05
CE141	1.06E-05	5.28E-06	7.83E-07	NO DATA	2.31E-06	1.47E-04	1.53E-05
CE143	9.89E-08	5.37E-08	7.77E-09	NO DATA	2.26E-08	3.12E-05	3.44E-05
CE144	1.83E-03	5.72E-04	9.77E-05	NO DATA	3.17E-04	3.23E-03	1.05E-04
PR143	4.99E-06	1.50E-06	2.47E-07	NO DATA	8.11E-07	1.17E-04	2.63E-05
PR144	1.61E-11	4.99E-12	8.10E-13	NO DATA	2.64E-12	4.23E-07	5.32E-08
ND147	2.92E-06	2.36E-06	1.84E-07	NO DATA	1.30E-06	8.87E-05	2.22E-05
W 187	4.41E-09	2.61E-09	1.17E-09	NO DATA	NO DATA	1.11E-05	2.46E-05
NP2 9	1.26E-07	9.04E-09	6.35E-09	NO DATA	2.63E-08	1.57E-05	1.73E-05

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TABLE 5-8*

INHALATION DOSE FACTORS FOR INFANT
(MREM PER PCI INHALED)

NUCLIDE	BONE	LIVER	T.BODY	THYROID	KIDNEY	LUNG	GI-LLI
H 3	NO DATA	4.62E-07	4.62E-07	4.62E-07	4.62E-07	4.62E-07	4.62E-07
C 14	1.89E-05	3.79E-06	3.79E-06	3.79E-06	3.79E-06	3.79E-06	3.79E-06
NA 24	7.54E-06	7.54E-06	7.54E-06	7.54E-06	7.54E-06	7.54E-06	7.54E-06
P 32	1.45E-03	8.03E-05	5.53E-05	NO DATA	NO DATA	NO DATA	1.15E-05
CR 51	NO DATA	NO DATA	6.37E-08	4.11E-08	9.45E-09	9.17E-06	2.55E-07
MN 54	NO DATA	1.81E-05	3.56E-06	NO DATA	3.56E-06	7.14E-04	5.04E-06
MN 56	NO DATA	1.10E-09	1.58E-10	NO DATA	7.86E-10	8.95E-06	5.12E-05
FE 55	1.41E-05	8.39E-06	2.38E-06	NO DATA	NO DATA	6.21E-05	7.82E-07
FE 59	9.69E-06	1.68E-05	6.77E-06	NO DATA	NO DATA	7.25E-04	1.77E-05
CO 58	NO DATA	8.71E-07	1.30E-06	NO DATA	NO DATA	5.55E-04	7.95E-06
CO 60	NO DATA	5.73E-06	8.41E-06	NO DATA	NO DATA	3.22E-03	2.28E-05
NI 63	2.42E-04	1.46E-05	8.29E-06	NO DATA	NO DATA	1.49E-04	1.73E-06
NI 65	1.71E-09	2.03E-10	8.79E-11	NO DATA	NO DATA	5.80E-06	3.58E-05
CU 64	NO DATA	1.34E-09	5.53E-10	NO DATA	2.84E-09	6.64E-06	1.07E-05
ZN 65	1.38E-05	4.47E-05	2.22E-05	NO DATA	2.32E-05	4.62E-04	3.67E-05
ZN 69	3.85E-11	6.91E-11	5.13E-12	NO DATA	2.87E-11	1.05E-06	9.44E-06
BR 83	NO DATA	NO DATA	2.72E-07	NO DATA	NO DATA	NO DATA	LT E-24
BR 84	NO DATA	NO DATA	2.86E-07	NO DATA	NO DATA	NO DATA	LT E-24
BR 85	NO DATA	NO DATA	1.46E-08	NO DATA	NO DATA	NO DATA	LT E-24
RB 86	NO DATA	1.36E-04	6.30E-05	NO DATA	NO DATA	NO DATA	2.17E-06
RB 88	NO DATA	3.98E-07	2.05E-07	NO DATA	NO DATA	NO DATA	2.42E-07
RB 89	NO DATA	2.29E-07	1.47E-07	NO DATA	NO DATA	NO DATA	4.87E-08
SR 89	2.84E-04	NO DATA	8.15E-06	NO DATA	NO DATA	1.45E-03	4.57E-05
SR 90	2.92E-02	NO DATA	1.85E-03	NO DATA	NO DATA	8.03E-03	9.36E-05
SR 91	6.83E-08	NO DATA	2.47E-09	NO DATA	NO DATA	3.76E-05	5.24E-05
SR 92	7.50E-09	NO DATA	2.79E-10	NO DATA	NO DATA	1.70E-05	1.00E-04
Y 90	2.35E-06	NO DATA	6.30E-08	NO DATA	NO DATA	1.92E-04	7.43E-05
Y 91M	2.91E-10	NO DATA	9.90E-12	NO DATA	NO DATA	1.99E-06	1.68E-06
Y 91	4.20E-04	NO DATA	1.12E-05	NO DATA	NO DATA	1.75E-03	5.02E-05
Y 92	1.17E-08	NO DATA	3.29E-10	NO DATA	NO DATA	1.75E-05	9.04E-05

*Table taken from Regulatory Guide 1.109 (Rev. 1)

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TABLE 5-8, CONT'D

INHALATION DOSE FACTORS FOR INFANT
(MREM PER PCI INHALED)

NUCLIDE	BONE	LIVER	T.BODY	THYROID	KIDNEY	LUNG	GI-LLI
Y 93	1.07E-07	NO DATA	2.91E-09	NO DATA	NO DATA	5.46E-05	1.19E-04
ZR 95	8.24E-05	1.99E-05	1.45E-05	NO DATA	2.22E-05	1.25E-03	1.55E-05
ZR 97	1.07E-07	1.83E-08	8.36E-09	NO DATA	1.85E-08	7.88E-05	1.00E-04
NB 95	1.12E-05	4.59E-06	2.70E-06	NO DATA	3.37E-06	3.42E-04	9.05E-06
MO 99	NO DATA	1.18E-07	2.31E-08	NO DATA	1.89E-07	9.63E-05	3.48E-05
TC 99M	9.78E-13	2.06E-12	2.66E-11	NO DATA	2.22E-11	5.79E-07	1.45E-06
TC101	4.65E-14	5.98E-14	5.80E-13	NO DATA	6.99E-13	4.17E-07	6.03E-07
RU103	1.44E-06	NO DATA	4.85E-07	NO DATA	3.03E-06	3.94E-04	1.15E-05
RU105	8.74E-10	NO DATA	2.93E-10	NO DATA	6.42E-10	1.12E-05	3.46E-05
RU106	6.20E-05	NO DATA	7.77E-06	NO DATA	7.61E-05	8.26E-03	1.17E-04
AG110M	7.13E-06	5.16E-06	3.57E-06	NO DATA	7.80E-06	2.62E-03	2.36E-05
TE125M	3.40E-06	1.42E-06	4.70E-07	1.16E-06	NO DATA	3.19E-04	9.22E-06
TE127M	1.19E-05	4.93E-06	1.48E-06	3.48E-06	2.68E-05	9.37E-04	1.95E-05
TE127	1.59E-09	6.81E-10	3.40E-10	1.32E-09	3.47E-09	7.39E-06	1.74E-05
TE129M	1.01E-05	4.35E-06	1.59E-06	3.91E-06	2.27E-05	1.20E-03	4.93E-05
TE129	5.63E-11	2.48E-11	1.34E-11	4.82E-11	1.25E-10	2.14E-06	1.88E-05
TE131M	7.62E-08	3.93E-08	2.59E-08	6.38E-08	1.89E-07	1.42E-04	8.51E-05
TE131	1.24E-11	5.87E-12	3.57E-12	1.13E-11	2.85E-11	1.47E-06	5.87E-06
TE132	2.66E-07	1.69E-07	1.26E-07	1.99E-07	7.39E-07	2.43E-04	3.15E-05
I 130	4.54E-06	9.91E-06	3.98E-06	1.14E-03	1.09E-05	NO DATA	1.42E-06
I 131	2.71E-05	3.17E-05	1.40E-05	1.06E-02	3.70E-05	NO DATA	7.56E-07
I 132	1.21E-06	2.53E-06	8.99E-07	1.21E-04	2.82E-06	NO DATA	1.36E-06
I 133	9.46E-06	1.37E-05	4.00E-06	2.54E-03	1.60E-05	NO DATA	1.54E-06
I 134	6.58E-07	1.34E-06	4.75E-07	3.18E-05	1.49E-06	NO DATA	9.21E-07
I 135	2.76E-06	5.43E-06	1.98E-06	4.97E-04	6.05E-06	NO DATA	1.31E-06
CS134	2.83E-04	5.02E-04	5.32E-05	NO DATA	1.36E-04	5.69E-05	9.53E-07
CS136	3.45E-05	9.61E-05	3.78E-05	NO DATA	4.03E-05	8.40E-06	1.02E-06
CS137	3.92E-04	4.37E-04	3.25E-05	NO DATA	1.23E-04	5.09E-05	9.53E-07
CS138	3.61E-07	5.58E-07	2.64E-07	NO DATA	2.93E-07	4.67E-08	6.26E-07
BA139	1.06E-09	7.03E-13	3.07E-11	NO DATA	4.23E-13	4.25E-06	3.64E-05

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TABLE 5-8, CONT'D

INHALATION DOSE FACTORS FOR INFANT
(MREM PER PCI INHALED)

NUCLIDE	BONE	LIVER	T.BODY	THYROID	KIDNEY	LUNG	GI-LLI
BA140	4.00E-05	4.00E-08	2.07E-06	NO DATA	9.59E-09	1.14E-03	2.74E-05
BA141	1.12E-10	7.70E-14	3.55E-12	NO DATA	4.64E-14	2.12E-06	3.39E-06
BA142	2.04E-11	2.36E-14	1.40E-12	NO DATA	1.36E-14	1.11E-06	4.95E-07
LA140	3.61E-07	1.43E-07	3.68E-08	NO DATA	NO DATA	1.20E-04	6.06E-05
LA142	7.36E-10	2.69E-10	6.46E-11	NO DATA	NO DATA	5.87E-06	4.25E-05
CE141	1.98E-05	1.19E-05	1.42E-06	NO DATA	3.75E-06	3.69E-04	1.54E-05
CE143	2.09E-07	1.30E-07	1.59E-08	NO DATA	4.03E-08	8.30E-[illegible]	3.55E-05
CE144	2.28E-03	8.65E-04	1.26E-04	NO DATA	3.84E-04	7.03E-[illegible]	1.06E-04
PR143	1.00E-05	3.74E-06	4.99E-07	NO DATA	1.41E-06	3.09E-04	2.66E-05
PR144	3.42E-11	1.32E-11	1.72E-12	NO DATA	4.80E-12	1.15E-06	3.06E-06
ND147	5.67E-06	5.81E-06	3.57E-07	NO DATA	2.25E-06	2.30E-04	2.23E-05
W 187	9.26E-09	6.44E-09	2.23E-09	NO DATA	NO DATA	7.83E-05	2.54E-05
NP239	2.65E-07	2.37E-08	1.34E-08	NO DATA	4.73E-08	4.25E-05	1.78E-05

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TABLE 5-9*

EXTERNAL DOSE FACTORS FOR STANDING ON CONTAMINATED GROUND

(mrem/hr per pCi/m^2)

Element	Total Body	Skin
H-3	0.0	0.0
C-14	0.0	0.0
NA-24	2.50E-08	2.90E-08
P-32	0.0	0.0
Cr-51	2.20E-10	2.60E-10
Mn-54	5.80E-09	6.80E-09
Mn-56	1.10E-08	1.30E-08
Fe-55	0.0	0.0
Fe-59	8.00E-09	9.40E-09
Co-58	7.00E-09	8.20E-09
Co-60	1.70E-08	2.00E-08
Ni-63	0.0	0.0
Nr-65	3.70E-09	4.30E-09
Cu-64	1.50E-09	1.70E-09
Zn-65	4.00E-09	4.60E-09
Zn-69	0.0	0.0
Br-83	6.40E-11	9.30E-11
Br-84	1.20E-08	1.40E-08
Br-85	0.0	0.0
Rb-86	6.30E-10	7.20E-10
Rb-88	3.50E-09	4.00E-09
Rb-89	1.50E-08	1.80E-08
Sr-89	5.60E-13	6.50E-13
Sr-91	7.10E-09	8.30E-09
Sr-92	9.00E-09	1.00E-08
Y-90	2.20E-12	2.60E-12
Y-91M	3.80E-09	4.40E-09
Y-91	2.40E-11	2.70E-11
Y-92	1.60E-09	1.90E-09
Y-93	5.70E-10	7.80E-10
Zr-95	5.00E-09	5.80E-09
Zr-97	5.50E-09	6.40E-09
Nb-95	5.10E-09	6.00E-09
Mo-99	1.90E-09	2.20E-09
Tc-99M	9.60E-10	1.10E-09
Tc-101	2.70E-09	3.00E-09
Ru-103	3.60E-09	4.20E-09
Ru-105	4.50E-09	5.10E-09
Ru-106	1.50E-09	1.80E-09
Ag-110M	1.80E-08	2.10E-08
Te-125M	3.50E-11	4.80E-11
Te-127M	1.10E-12	1.30E-12
Te-127	1.00E-11	1.10E-11
Te-129M	7.70E-10	9.00E-10
Te-129	7.10E-10	8.40E-10
Te-131M	8.40E-09	9.90E-09
Te-131	2.20E-09	2.60E-06
Te-132	1.70E-09	2.00E-09
I-130	1.40E-08	1.70E-08
I-131	2.80E-09	3.40E-09
I-132	1.70E-08	2.00E-08
I-133	3.70E-09	4.50E-09
I-134	1.60E-08	1.90E-08
I-135	1.20E-08	1.40E-08

*Table from Regulatory Guide 1.109 (Rev. 1)

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TABLE 5-9 Continued

Element	Total Body	Skin
Cs-134	1.20E-08	1.40E-08
Cs-136	1.50E-08	1.70E-09
Cs-137	4.20E-09	4.90E-09
Cs-138	2.10E-08	2.40E-08
Ba-139	2.40E-09	2.70E-09
Ba-140	2.10E-09	2.40E-09
Ba-141	4.30E-09	4.90E-09
Ba-142	7.90E-09	9.00E-09
La-140	1.50E-08	1.70E-08
La-142	1.50E-08	1.80E-08
Ce-141	5.50E-10	6.20E-10
Ce-143	2.20E-09	2.50E-09
Ce-144	3.20E-10	3.70E-10
Pr-143	0.0	0.0
Pr-144	2.00E-10	2.30E-10
Nd-147	1.00E-09	1.20E-09
W-187	3.10E-09	3.60E-09
Np-239	9.50E-10	1.10E-09

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TABLE 5-10*

STABLE ELEMENT TRANSFER DATA

Element	B_{iv} Veg/Soil	F_m (Cow) Milk (d/ℓ)	F_f Meat (d/kg)
H**	4.8E 00	1.0E-02	1.2E-02
C**	5.5E 00	1.2E-02	3.1E-02
Na	5.2E-02	4.0E-02	3.0E-02
P	1.1E 00	2.5E-02	4.6E-02
Cr	2.5E-04	2.2E-03	2.4E-03
Mn	2.9E-02	2.5E-04	8.0E-04
Fe	6.6E-04	1.2E-03	4.0E-02
Co	9.4E-03	1.0E-03	1.3E-02
Ni	1.9E-02	6.7E-03	5.3E-02
Cu	1.2E-01	1.4E-02	8.0E-03
Zn	4.0E-01	3.9E-02	3.0E-02
Rb	1.3E-01	3.0E-02	3.1E-02
Sr	1.7E-02	8.0E-04	6.0E-04
Y	2.6E-03	1.0E-05	4.6E-03
Zr	1.7E-04	5.0E-06	3.4E-02
Nb	9.4E-03	2.5E-03	2.8E-01
Mo	1.2E-01	7.5E-03	8.0E-03
Tc	2.5E-01	2.5E-02	4.0E-01
Ru	5.0E-02	1.0E-06	4.0E-01
Rh	1.3E 01	1.0E-02	1.5E-03
Ag	1.5E-01	5.0E-02	1.7E-02
Te	1.3E 00	1.0E-03	7.7E-02
I	2.0E-02	6.0E-03	2.9E-03
Cs	1.0E-02	1.2E-02	4.0E-03
Ba	5.0E-03	4.0E-04	3.2E-03
La	2.5E-03	5.0E-06	2.0E-04
Ce	2.5E-03	1.0E-04	1.2E-03
Pr	2.5E-03	5.0E-06	4.7E-03
Nd	2.4E-03	5.0E-06	3.3E-03
W	1.8E-02	5.0E-04	1.3E-03
Np	2.5E-03	5.0E-06	2.0E-04

*Table from Regulatory Guide 1.109 (Rev. 1)

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TABLE 5-11*

INGESTION DOSE FACTORS FOR ADULTS
(MREM PER PCI INGESTED)

NUCLIDE	BONE	LIVER	T.BODY	THYROID	KIDNEY	LUNG	GI-LLI
H 3	NO DATA	1.05E-07	1.05E-07	1.05E-07	1.05E-07	1.05E-07	1.05E-07
C 14	2.84E-06	5.68E-07	5.68E-07	5.68E-07	5.68E-07	5.68E-07	5.68E-07
NA 24	1.70E-06	1.70E-06	1.70E-06	1.70E-06	1.70E-06	1.70E-06	1.70E-06
P 32	1.93E-04	1.20E-05	7.46E-06	NO DATA	NO DATA	NO DATA	2.17E-05
CR 51	NO DATA	NO DATA	2.66E-09	1.59E-09	5.86E-10	3.53E-09	8.69E-07
MN 54	NO DATA	4.57E-06	8.72E-07	NO DATA	1.36E-06	NO DATA	1.40E-05
MN 56	NO DATA	1.15E-07	2.04E-08	NO DATA	1.46E-07	NO DATA	3.67E-06
FE 55	2.75E-06	1.90E-06	4.43E-07	NO DATA	NO DATA	1.06E-06	1.09E-06
FE 59	4.34E-06	1.02E-05	3.91E-06	NO DATA	NO DATA	2.85E-06	3.40E-05
CO 58	NO DATA	7.45E-07	1.67E-06	NO DATA	NO DATA	NO DATA	1.51E-05
CO 60	NO DATA	2.14E-06	4.72E-06	NO DATA	NO DATA	NO DATA	4.02E-05
NI 63	1.30E-04	9.01E-06	4.36E-06	NO DATA	NO DATA	NO DATA	1.88E-06
NI 65	5.28E-07	6.86E-08	3.13E-08	NO DATA	NO DATA	NO DATA	1.74E-06
CU 64	NO DATA	8.33E-08	3.91E-08	NO DATA	2.10E-07	NO DATA	7.10E-06
ZN 65	4.84E-06	1.54E-05	6.96E-06	NO DATA	1.03E-05	NO DATA	9.70E-06
ZN 69	1.03E-08	1.97E-08	1.37E-09	NO DATA	1.28E-08	NO DATA	2.96E-09
BR 83	NO DATA	NO DATA	4.02E-08	NO DATA	NO DATA	NO DATA	5.79E-08
BR 84	NO DATA	NO DATA	5.21E-08	NO DATA	NO DATA	NO DATA	4.09E-13
BR 85	NO DATA	NO DATA	2.14E-09	NO DATA	NO DATA	NO DATA	LT E-24
RB 86	NO DATA	2.11E-05	9.83E-06	NO DATA	NO DATA	NO DATA	4.16E-06
RB 88	NO DATA	6.05E-08	3.21E-08	NO DATA	NO DATA	NO DATA	8.36E-19
RB 89	NO DATA	4.01E-08	2.82E-08	NO DATA	NO DATA	NO DATA	2.33E-21
SR 89	3.08E-04	NO DATA	8.84E-06	NO DATA	NO DATA	NO DATA	4.94E-05
SR 90	7.58E-03	NO DATA	1.86E-03	NO DATA	NO DATA	NO DATA	2.19E-04
SR 91	5.67E-06	NO DATA	2.29E-07	NO DATA	NO DATA	NO DATA	2.70E-05
SR 92	2.15E-06	NO DATA	9.30E-08	NO DATA	NO DATA	NO DATA	4.26E-05
Y 90	9.62E-09	NO DATA	2.58E-10	NO DATA	NO DATA	NO DATA	1.02E-04
Y 91M	9.09E-11	NO DATA	3.52E-12	NO DATA	NO DATA	NO DATA	2.67E-10
Y 91	1.41E-07	NO DATA	3.77E-09	NO DATA	NO DATA	NO DATA	7.76E-05
Y 92	8.45E-10	NO DATA	2.47E-11	NO DATA	NO DATA	NO DATA	1.48E-05

*Table from Regulatory Guide 1.109 (Rev. 1)

TABLE 5-11, CONT'D

INGESTION DOSE FACTORS FOR ADULTS
(MREM PER PCI INGESTED)

NUCLIDE	BONE	LIVER	T.BODY	THYROID	KIDNEY	LUNG	GI-LLI
Y 93	2.66E-09	NO DATA	7.40E-11	NO DATA	NO DATA	NO DATA	8.50E-05
ZR 95	3.04E-08	9.75E-09	6.60E-09	NO DATA	1.53E-08	NO DATA	3.09E-05
ZR 97	1.68E-09	3.39E-10	1.55E-10	NO DATA	5.12E-10	NO DATA	1.05E-04
NB 95	6.22E-09	3.46E-09	1.86E-09	NO DATA	3.42E-09	NO DATA	2.10E-05
MO 99	NO DATA	4.31E-06	8.20E-07	NO DATA	9.76E-06	NO DATA	9.99E-06
TC 99M	2.47E-10	6.98E-10	8.89E-09	NO DATA	1.06E-08	3.42E-10	4.13E-07
TC101	2.54E-10	3.66E-10	3.59E-09	NO DATA	6.59E-09	1.87E-10	1.10E-21
RU103	1.85E-07	NO DATA	7.97E-08	NO DATA	7.06E-07	NO DATA	2.16E-05
RU105	1.54E-08	NO DATA	6.09E-09	NO DATA	1.99E-07	NO DATA	9.42E-06
RU106	2.75E-06	NO DATA	3.48E-07	NO DATA	5.31E-06	NO DATA	1.70E-04
AG110M	1.60E-07	1.48E-07	8.79E-08	NO DATA	2.91E-07	NO DATA	6.04E-05
TE125M	2.69E-06	9.71E-07	3.59E-07	8.06E-07	1.09E-05	NO DATA	1.07E-05
TE127M	6.77E-06	2.42E-06	8.25E-07	1.73E-06	2.75E-05	NO DATA	2.27E-05
TE127	1.10E-07	3.95E-08	2.38E-08	8.15E-08	4.48E-07	NO DATA	8.68E-06
TE129M	1.15E-05	4.29E-06	1.82E-06	3.95E-06	4.80E-05	NO DATA	5.79E-05
TE129	3.14E-08	1.18E-08	7.65E-09	2.41E-08	1.32E-07	NO DATA	2.37E-08
TE131M	1.73E-06	8.46E-07	7.05E-07	1.34E-06	8.57E-06	NO DATA	8.40E-05
TE131	1.97E-08	8.23E-09	6.22E-09	1.62E-08	8.63E-08	NO DATA	2.79E-09
TE132	2.52E-06	1.63E-06	1.53E-06	1.80E-06	1.57E-05	NO DATA	7.71E-05
I 130	7.56E-07	2.23E-06	8.80E-07	1.89E-04	3.48E-06	NO DATA	1.92E-06
I 131	4.16E-06	5.95E-06	3.41E-06	1.95E-03	1.02E-05	NO DATA	1.57E-06
I 132	2.03E-07	5.43E-07	1.90E-07	1.90E-05	8.65E-07	NO DATA	1.02E-07
I 133	1.42E-06	2.47E-06	7.53E-07	3.63E-04	4.31E-06	NO DATA	2.22E-06
I 134	1.06E-07	2.80E-07	1.03E-07	4.99E-06	4.58E-07	NO DATA	2.51E-10
I 135	4.43E-07	1.16E-06	4.23E-07	7.65E-05	1.86E-06	NO DATA	1.31E-06
CS134	6.22E-05	1.46E-04	1.21E-04	NO DATA	4.79E-05	1.59E-05	2.59E-06
CS136	6.51E-06	2.57E-05	1.85E-05	NO DATA	1.43E-05	1.96E-06	2.92E-06
CS137	7.97E-05	1.09E-04	7.14E-05	NO DATA	3.70E-05	1.23E-05	2.11E-06
CS138	5.52E-08	1.09E-07	5.40E-08	NO DATA	8.01E-08	7.91E-09	4.65E-13
BA139	9.70E-08	6.91E-11	2.84E-09	NO DATA	6.46E-11	3.92E-11	1.72E-07

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TABLE 5-11, CONT'D

INGESTION DOSE FACTORS FOR ADULTS
(MREM PER PCI INGESTED)

NUCLIDE	BONE	LIVER	T.BODY	THYROID	KIDNEY	LUNG	GI-LLI
BA140	2.03E-05	2.55E-08	1.33E-06	NO DATA	8.67E-09	1.46E-08	4.18E-05
BA141	4.71E-08	3.56E-11	1.59E-09	NO DATA	3.31E-11	2.02E-11	2.22E-17
BA142	2.13E-08	2.19E-11	1.34E-09	NO DATA	1.85E-11	1.24E-11	3.00E-26
LA140	2.50E-09	1.26E-09	3.33E-10	NO DATA	NO DATA	NO DATA	9.25E-05
LA142	1.28E-10	5.82E-11	1.45E-11	NO DATA	NO DATA	NO DATA	4.25E-07
CE141	9.36E-09	6.33E-09	7.18E-10	NO DATA	2.94E-09	NO DATA	2.42E-05
CE143	1.65E-09	1.22E-06	1.35E-10	NO DATA	5.37E-10	NO DATA	4.56E-05
CE144	4.88E-07	2.04E-07	2.62E-08	NO DATA	1.21E-07	NO DATA	1.65E-04
PR143	9.20E-09	3.69E-09	4.56E-10	NO DATA	2.13E-09	NO DATA	4.03E-05
PR144	3.01E-11	1.25E-11	1.53E-12	NO DATA	7.05E-12	NO DATA	4.33E-18
ND147	6.29E-09	7.27E-09	4.35E-10	NO DATA	4.25E-09	NO DATA	3.49E-05
W 187	1.03E-07	8.61E-08	3.01E-08	NO DATA	NO DATA	NO DATA	2.82E-05
NP239	1.19E-09	1.17E-10	6.45E-11	NO DATA	3.65E-10	NO DATA	2.40E-05

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TABLE 5-12*

INGESTION DOSE FACTORS FOR TEENAGER
(MREM PER PCI INGESTED)

NUCLIDE	BONE	LIVER	T.BODY	THYROID	KIDNEY	LUNG	GI-LLI
H 3	NO DATA	1.06E-07	1.06E-07	1.06E-07	1.06E-07	1.06E-07	1.06E-07
C 14	4.06E-06	8.12E-07	8.12E-07	8.12E-07	8.12E-07	8.12E-07	8.12E-07
NA 24	2.30E-06	2.30E-06	2.30E-06	2.30E-06	2.30E-06	2.30E-06	2.30E-06
P 32	2.76E-04	1.71E-05	1.07E-05	NO DATA	NO DATA	NO DATA	2.32E-05
CR 51	NO DATA	NO DATA	3.60E-09	2.00E-09	7.89E-10	5.14E-09	6.05E-07
MN 54	NO DATA	5.90E-06	1.17E-06	NO DATA	1.76E-06	NO DATA	1.21E-05
MN 56	NO DATA	1.58E-07	2.81E-08	NO DATA	2.00E-07	NO DATA	1.04E-05
FE 55	3.78E-06	2.68E-06	6.25E-07	NO DATA	NO DATA	1.70E-06	1.16E-06
FE 59	5.87E-06	1.37E-05	5.29E-06	NO DATA	NO DATA	4.32E-06	3.24E-05
CO 58	NO DATA	9.72E-07	2.24E-06	NO DATA	NO DATA	NO DATA	1.34E-05
CO 60	NO DATA	2.81E-06	6.33E-06	NO DATA	NO DATA	NO DATA	3.66E-05
NI 63	1.77E-04	1.25E-05	6.00E-06	NO DATA	NO DATA	NO DATA	1.99E-06
NI 65	7.49E-07	9.57E-08	4.36E-08	NO DATA	NO DATA	NO DATA	5.19E-06
CU 64	NO DATA	1.15E-07	5.41E-08	NO DATA	2.91E-07	NO DATA	8.92E-06
ZN 65	5.76E-06	2.00E-05	9.33E-06	NO DATA	1.28E-05	NO DATA	8.47E-06
ZN 69	1.47E-08	2.60E-08	1.96E-09	NO DATA	1.83E-08	NO DATA	5.16E-08
BR 83	NO DATA	NO DATA	5.74E-08	NO DATA	NO DATA	NO DATA	LT E-24
BR 84	NO DATA	NO DATA	7.22E-08	NO DATA	NO DATA	NO DATA	LT E-24
BR 85	NO DATA	NO DATA	3.05E-09	NO DATA	NO DATA	NO DATA	LT E-24
RB 86	NO DATA	2.98E-05	1.40E-05	NO DATA	NO DATA	NO DATA	4.41E-06
RB 88	NO DATA	8.32E-08	4.54E-08	NO DATA	NO DATA	NO DATA	7.30E-15
RB 89	NO DATA	5.50E-08	3.89E-08	NO DATA	NO DATA	NO DATA	8.43E-17
SR 89	4.40E-04	NO DATA	1.26E-05	NO DATA	NO DATA	NO DATA	5.24E-05
SR 90	8.30E-03	NO DATA	2.05E-03	NO DATA	NO DATA	NO DATA	2.33E-04
SR 91	8.07E-06	NO DATA	3.21E-07	NO DATA	NO DATA	NO DATA	3.66E-05
SR 92	3.05E-06	NO DATA	1.30E-07	NO DATA	NO DATA	NO DATA	7.77E-05
Y 90	1.37E-08	NO DATA	3.69E-10	NO DATA	NO DATA	NO DATA	1.13E-04
Y 91M	1.29E-10	NO DATA	4.93E-12	NO DATA	NO DATA	NO DATA	6.09E-09
Y 91	2.01E-07	NO DATA	5.39E-09	NO DATA	NO DATA	NO DATA	8.24E-05
Y 92	1.21E-09	NO DATA	3.50E-11	NO DATA	NO DATA	NO DATA	3.32E-05

*Table taken from Regulatory Guide 1.109 (Rev. 1)

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TABLE 5-12, CONT'D

INGESTION DOSE FACTORS FOR TEENAGER
(MREM PER PCI INGESTED)

NUCLIDE	BONE	LIVER	T.BODY	THYROID	KIDNEY	LUNG	GI-LLI
Y 93	3.83E-09	NO DATA	1.05E-10	NO DATA	NO DATA	NO DATA	1.17E-0.
ZR 95	4.12E-08	1.30E-08	8.94E-09	NO DATA	1.91E-08	NO DATA	3.00E-05
ZR 97	2.37E-09	4.69E-10	2.16E-10	NO DATA	7.11E-10	NO DATA	1.27E-04
NB 95	8.22E-09	4.56E-09	2.51E-09	NO DATA	4.42E-09	NO DATA	1.95E-05
MO 99	NO DATA	6.03E-06	1.15E-06	NO DATA	1.38E-05	NO DATA	1.08E-05
TC 99M	3.32E-10	9.26E-10	1.20E-08	NO DATA	1.38E-08	5.14E-10	6.08E-07
TC101	3.60E-10	5.12E-10	5.03E-09	NO DATA	7.26E-09	3.12E-10	8.75E-17
RU103	2.55E-07	NO DATA	1.09E-07	NO DATA	8.99E-07	NO DATA	2.13E-05
RU105	2.18E-08	NO DATA	8.46E-09	NO DATA	2.75E-07	NO DATA	1.76E-05
RU106	3.92E-06	NO DATA	4.94E-07	NO DATA	7.56E-06	NO DATA	1.88E-04
AG110M	2.05E-07	1.94E-07	1.18E-07	NO DATA	3.70E-07	NO DATA	5.45E-05
TE125M	3.83E-06	1.38E-06	5.12E-07	1.07E-06	NO DATA	NO DATA	1.13E-05
TE127M	9.67E-06	3.45E-06	1.15E-06	2.30E-06	3.92E-05	NO DATA	2.41E-05
TE127	1.58E-07	5.60E-08	3.40E-08	1.09E-07	6.40E-07	NO DATA	1.22E-05
TE129M	1.63E-05	6.05E-06	2.58E-06	5.26E-06	6.82E-05	NO DATA	6.12E-05
TE129	4.48E-09	1.67E-09	1.07E-08	3.20E-08	1.88E-07	NO DATA	2.45E-07
TE131M	2.44E-06	1.17E-06	9.76E-07	1.76E-06	1.22E-05	NO DATA	9.39E-05
TE131	2.79E-08	1.15E-08	8.72E-09	2.19E-08	1.22E-07	NO DATA	2.29E-09
TE132	3.49E-06	2.21E-06	2.05E-06	2.33E-06	2.12E-05	NO DATA	7.00E-05
I 130	1.03E-06	2.98E-06	1.19E-06	2.43E-04	4.59E-06	NO DATA	2.29E-06
I 131	5.85E-06	8.19E-06	4.40E-06	2.39E-03	1.41E-05	NO DATA	1.62E-06
I 132	2.79E-07	7.30E-07	2.62E-07	2.46E-05	1.15E-06	NO DATA	3.18E-07
I 133	2.01E-06	3.41E-06	1.04E-06	4.76E-04	5.00E-06	NO DATA	2.58E-06
I 134	1.46E-07	3.87E-07	1.39E-07	6.45E-06	6.10E-07	NO DATA	5.10E-09
I 135	6.10E-07	1.57E-06	5.82E-07	1.01E-04	2.48E-06	NO DATA	1.74E-06
CS134	8.37E-05	1.97E-04	9.14E-05	NO DATA	6.26E-05	2.39E-05	2.45E-06
CS136	8.59E-06	3.38E-05	2.27E-05	NO DATA	1.84E-05	2.90E-06	2.72E-06
CS137	1.12E-04	1.49E-04	5.17E-05	NO DATA	5.07E-05	1.97E-05	2.12E-06
CS138	7.76E-08	1.49E-07	7.45E-08	NO DATA	1.10E-07	1.28E-08	6.76E-11
BA139	1.39E-07	9.78E-11	4.05E-09	NO DATA	9.22E-11	6.74E-11	1.24E-06

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TABLE 5-12, CONT'D

INGESTION DOSE FACTORS FOR TEENAGER
(MREM PER PCI INGESTED)

NUCLIDE	BONE	LIVER	T.BODY	THYROID	KIDNEY	LUNG	GI-LLI
BA140	2.84E-09	3.48E-08	1.83E-06	NO DATA	1.18E-08	2.34E-08	4.38E-05
BA141	6.71E-08	5.01E-11	2.24E-09	NO DATA	4.65E-11	3.43E-11	1.43E-13
BA142	2.99E-08	2.99E-11	1.84E-09	NO DATA	2.53E-11	1.99E-11	9.18E-20
LA140	3.48E-09	1.71E-09	4.55E-10	NO DATA	NO DATA	NO DATA	9.82E-05
LA142	1.79E-10	7.95E-11	1.99E-11	NO DATA	NO DATA	NO DATA	2.47E-06
CE141	1.33E-08	5.98E-09	1.02E-09	NO DATA	4.18E-09	NO DATA	2.54E-05
CE143	2.35E-09	1.71E-06	1.91E-10	NO DATA	7.67E-10	NO DATA	5.14E-05
CE144	6.96E-07	2.88E-07	3.74E-08	NO DATA	1.72E-07	NO DATA	1.75E-04
PR143	1.31E-08	5.23E-09	6.52E-10	NO DATA	3.04E-09	NO DATA	4.31E-05
PR144	4.30E-11	1.76E-11	2.18E-12	NO DATA	1.01E-11	NO DATA	4.74E-14
ND147	9.38E-09	1.02E-08	6.11E-10	NO DATA	5.99E-09	NO DATA	3.68E-05
W 187	1.46E-07	1.19E-07	4.17E-08	NO DATA	NO DATA	NO DATA	3.22E-05
NP239	1.76E-09	1.66E-10	9.22E-11	NO DATA	5.21E-10	NO DATA	2.67E-05

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TABLE 5-13*

INGESTION DOSE FACTORS FOR CHILD
(MREM PER PCI INGESTED)

NUCLIDE	BONE	LIVER	T.BODY	THYROID	KIDNEY	LUNG	GI-LLI
H 3	NO DATA	2.03E-07	2.03E-07	2.03E-07	2.03E-07	2.03E-07	2.03E-07
C 14	1.21E-05	2.42E-06	2.42E-06	2.42E-06	2.42E-06	2.42E-06	2.42E-06
NA 24	5.80E-06	5.80E-06	5.80E-06	5.80E-06	5.80E-06	5.80E-06	5.80E-06
P 32	8.25E-04	3.86E-05	3.10E-05	NO DATA	NO DATA	NO DATA	2.28E-05
CR 51	NO DATA	NO DATA	8.90E-09	4.94E-09	1.35E-09	9.02E-09	4.72E-07
MN 54	NO DATA	1.07E-05	2.85E-06	NO DATA	3.00E-06	NO DATA	8.98E-06
MN 56	NO DATA	3.34E-07	7.54E-08	NO DATA	4.04E-07	NO DATA	4.84E-05
FE 55	1.15E-05	6.10E-06	1.89E-06	NO DATA	NO DATA	3.45E-06	1.13E-06
FE 59	1.65E-05	2.67E-05	1.35E-05	NO DATA	NO DATA	7.74E-06	2.78E-05
CO 58	NO DATA	1.80E-06	5.51E-06	NO DATA	NO DATA	NO DATA	1.05E-05
CO 60	NO DATA	5.29E-06	1.56E-05	NO DATA	NO DATA	NO DATA	2.93E-05
NI 63	5.38E-04	2.08E-05	1.83E-05	NO DATA	NO DATA	NO DATA	1.94E-06
NI 65	2.22E-06	2.09E-07	1.22E-07	NO DATA	NO DATA	NO DATA	2.56E-05
CU 64	NO DATA	2.45E-07	1.48E-07	NO DATA	5.92E-07	NO DATA	1.15E-05
ZN 65	1.37E-05	3.65E-05	2.27E-05	NO DATA	2.30E-05	NO DATA	6.41E-06
ZN 69	4.38E-08	6.53E-08	5.85E-09	NO DATA	3.84E-08	NO DATA	3.99E-06
BR 83	NO DATA	NO DATA	1.71E-07	NO DATA	NO DATA	NO DATA	LT E-24
BR 84	NO DATA	NO DATA	1.98E-07	NO DATA	NO DATA	NO DATA	LT E-24
BR 85	NO DATA	NO DATA	9.12E-09	NO DATA	NO DATA	NO DATA	LT E-24
RB 86	NO DATA	6.70E-05	4.12E-05	NO DATA	NO DATA	NO DATA	4.31E-06
RB 88	NO DATA	1.90E-07	1.32E-07	NO DATA	NO DATA	NO DATA	9.32E-09
RB 89	NO DATA	1.17E-07	1.04E-07	NO DATA	NO DATA	NO DATA	1.02E-09
SR 89	1.32E-03	NO DATA	3.77E-05	NO DATA	NO DATA	NO DATA	5.11E-05
SR 90	1.70E-02	NO DATA	4.31E-03	NO DATA	NO DATA	NO DATA	2.29E-04
SR 91	2.40E-05	NO DATA	9.06E-07	NO DATA	NO DATA	NO DATA	5.30E-05
SR 92	9.03E-06	NO DATA	3.62E-07	NO DATA	NO DATA	NO DATA	1.71E-04
Y 90	4.11E-08	NO DATA	1.10E-09	NO DATA	NO DATA	NO DATA	1.17E-04
Y 91M	3.82E-10	NO DATA	1.39E-11	NO DATA	NO DATA	NO DATA	7.48E-07
Y 91	6.02E-07	NO DATA	1.61E-08	NO DATA	NO DATA	NO DATA	8.02E-05
Y 92	3.60E-09	NO DATA	1.03E-10	NO DATA	NO DATA	NO DATA	1.04E-04

*Table taken from Regulatory Guide 1.109 (Rev. 1)

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TABLE 5-13, CONT'D

INGESTION DOSE FACTORS FOR CHILD
(MREM PER PCI INGESTED)

NUCLIDE	BONE	LIVER	T.BODY	THYROID	KIDNEY	LUNG	GI-LLI
Y 93	1.14E-09	NO DATA	3.13E-10	NO DATA	NO DATA	NO DATA	1.70E-04
ZR 95	1.16E-07	2.55E-08	2.27E-08	NO DATA	3.65E-08	NO DATA	2.66E-05
ZR 97	6.99E-09	1.61E-09	5.96E-10	NO DATA	1.45E-09	NO DATA	1.53E-04
NB 95	2.25E-08	8.76E-09	6.26E-09	NO DATA	8.23E-09	NO DATA	1.62E-05
MO 99	NO DATA	1.33E-05	3.29E-06	NO DATA	2.84E-05	NO DATA	1.10E-05
TC 99M	9.23E-10	1.81E-09	3.00E-08	NO DATA	2.63E-08	9.19E-10	1.03E-06
TC101	1.07E-09	1.12E-09	1.42E-08	NO DATA	1.91E-08	5.92E-10	3.56E-09
RU103	7.31E-07	NO DATA	2.81E-07	NO DATA	1.84E-06	NO DATA	1.09E-05
RU105	6.45E-08	NO DATA	2.34E-08	NO DATA	5.67E-07	NO DATA	4.21E-05
RU106	1.17E-05	NO DATA	1.46E-06	NO DATA	1.58E-05	NO DATA	1.82E-04
AG110M	5.39E-07	3.64E-07	2.91E-07	NO DATA	6.78E-07	NO DATA	4.33E-05
TE125M	1.14E-05	3.09E-06	1.52E-06	3.20E-06	NO DATA	NO DATA	1.10E-05
TE127M	2.89E-05	7.78E-06	3.43E-06	6.91E-06	8.24E-05	NO DATA	2.34E-05
TE127	4.71E-07	1.27E-07	1.01E-07	3.26E-07	1.34E-06	NO DATA	1.84E-05
TE129M	4.87E-05	1.36E-05	7.56E-06	1.57E-05	1.43E-04	NO DATA	5.94E-05
TE129	1.34E-07	3.74E-08	3.18E-08	9.56E-08	3.92E-07	NO DATA	8.34E-06
TE131M	7.20E-06	2.49E-06	2.65E-06	5.12E-06	2.41E-05	NO DATA	1.01E-04
TE131	8.30E-08	2.53E-08	2.47E-08	6.35E-08	2.51E-07	NO DATA	4.36E-07
TE132	1.01E-05	4.47E-06	5.40E-06	6.51E-06	4.15E-05	NO DATA	4.50E-05
I 130	2.92E-06	5.90E-06	3.04E-06	6.50E-04	8.82E-06	NO DATA	2.76E-06
I 131	1.72E-05	1.73E-05	9.83E-06	5.72E-03	2.84E-05	NO DATA	1.54E-06
I 132	8.00E-07	1.47E-06	6.76E-07	6.82E-05	2.25E-06	NO DATA	1.73E-06
I 133	5.92E-06	7.32E-06	2.77E-06	1.36E-03	1.22E-05	NO DATA	2.95E-06
I 134	4.19E-07	7.78E-07	3.58E-07	1.79E-05	1.19E-06	NO DATA	5.16E-07
I 135	1.75E-06	3.15E-06	1.49E-06	2.79E-04	4.83E-06	NO DATA	2.40E-06
CS134	2.34E-04	3.84E-04	8.10E-05	NO DATA	1.19E-04	4.27E-05	2.07E-06
CS136	2.35E-05	6.46E-05	4.18E-05	NO DATA	3.44E-05	5.13E-06	2.27E-06
CS137	3.27E-04	3.13E-04	4.62E-05	NO DATA	1.02E-04	3.67E-05	1.96E-06
CS138	2.28E-07	3.17E-07	2.01E-07	NO DATA	2.23E-07	2.40E-08	1.46E-07
BA139	4.14E-07	2.21E-10	1.20E-08	NO DATA	1.93E-10	1.30E-10	2.39E-05

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TABLE 5-13, CONT'D

INGESTION DOSE FACTORS FOR CHILD
(MREM PER PCI INGESTED)

NUCLIDE	BONE	LIVER	T.BODY	THYROID	KIDNEY	LUNG	GI-LLI
BA140	8.31E-05	7.28E-08	4.85E-06	NO DATA	2.37E-08	4.34E-08	4.21E-05
BA141	2.00E-07	1.12E-10	6.51E-09	NO DATA	9.69E-11	6.58E-10	1.14E-07
BA142	8.74E-08	6.29E-11	4.08E-09	NO DATA	5.09E-11	3.70E-11	1.14E-09
LA140	1.01E-08	3.53E-09	1.19E-09	NO DATA	NO DATA	NO DATA	9.84E-05
LA142	5.24E-10	1.67E-10	5.23E-11	NO DATA	NO DATA	NO DATA	3.31E-05
CE141	3.97E-08	1.98E-08	2.94E-09	NO DATA	8.88E-09	NO DATA	2.47E-05
CE143	6.99E-09	3.79E-06	5.49E-10	NO DATA	1.59E-09	NO DATA	5.55E-05
CE144	2.08E-06	6.52E-07	1.11E-07	NO DATA	3.61E-07	NO DATA	1.70E-04
PR143	3.93E-08	1.18E-08	1.95E-09	NO DATA	6.39E-09	NO DATA	4.24E-05
PR144	1.29E-10	3.97E-11	6.49E-12	NO DATA	2.11E-11	NO DATA	8.59E-08
ND147	2.79E-08	2.26E-08	1.75E-09	NO DATA	1.24E-08	NO DATA	3.58E-05
W 187	4.29E-07	2.54E-07	1.14E-07	NO DATA	NO DATA	NO DATA	3.57E-05
NP239	5.25E-09	3.77E-10	2.65E-10	NO DATA	1.09E-09	NO DATA	2.79E-05

TABLE 5-14 *

INGESTION DOSE FACTORS FOR INFANT
(MREM PER PCI INGESTED)

NUCLIDE	BONE	LIVER	T.BODY	THYROID	KIDNEY	LUNG	GI-LLI
H 3	NO DATA	3.08E-07	3.08E-07	3.08E-07	3.08E-07	3.08E-07	3.08E-07
C 14	2.37E-05	5.06E-06	5.06E-06	5.06E-06	5.06E-06	5.06E-06	5.06E-06
NA 24	1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05	1.01E-05
P 32	1.70E-03	1.00E-04	6.59E-05	NO DATA	NO DATA	NO DATA	2.30E-05
CR 51	NO DATA	NO DATA	1.41E-08	9.20E-09	2.01E-09	1.79E-08	4.11E-07
MN 54	NO DATA	1.99E-05	4.51E-06	NO DATA	4.41E-06	NO DATA	7.31E-06
MN 56	NO DATA	8.18E-07	1.41E-07	NO DATA	7.03E-07	NO DATA	7.43E-05
FE 55	1.39E-05	8.78E-06	2.40E-06	NO DATA	NO DATA	4.39E-06	1.14E-06
FE 59	3.08E-05	5.38E-05	2.12E-05	NO DATA	NO DATA	1.59E-05	2.57E-05
CO 58	NO DATA	3.60E-06	8.93E-06	NO DATA	NO DATA	NO DATA	8.97E-06
CO 60	NO DATA	1.08E-05	2.55E-05	NO DATA	NO DATA	NO DATA	2.57E-05
NI 63	6.34E-04	3.92E-05	2.20E-05	NO DATA	NO DATA	NO DATA	1.95E-06
NI 65	4.70E-06	5.32E-07	2.42E-07	NO DATA	NO DATA	NO DATA	4.05E-05
CU 64	NO DATA	6.09E-07	2.82E-07	NO DATA	1.03E-06	NO DATA	1.25E-05
ZN 65	1.94E-05	6.31E-05	2.91E-05	NO DATA	3.06E-05	NO DATA	5.33E-05
ZN 69	9.33E-08	1.68E-07	1.25E-08	NO DATA	6.98E-08	NO DATA	1.37E-05
BR 83	NO DATA	NO DATA	3.63E-07	NO DATA	NO DATA	NO DATA	LT E-24
BR 84	NO DATA	NO DATA	3.82E-07	NO DATA	NO DATA	NO DATA	LT E-24
BR 85	NO DATA	NO DATA	1.94E-08	NO DATA	NO DATA	NO DATA	LT E-24
RB 86	NO DATA	1.70E-04	8.40E-05	NO DATA	NO DATA	NO DATA	4.35E-06
RB 88	NO DATA	4.98E-07	2.73E-07	NO DATA	NO DATA	NO DATA	4.85E-07
RB 89	NO DATA	2.86E-07	1.97E-07	NO DATA	NO DATA	NO DATA	9.74E-08
SR 89	2.51E-03	NO DATA	7.20E-05	NO DATA	NO DATA	NO DATA	5.16E-05
SR 90	1.85E-02	NO DATA	4.71E-03	NO DATA	NO DATA	NO DATA	2.31E-04
SR 91	5.00E-05	NO DATA	1.81E-06	NO DATA	NO DATA	NO DATA	5.92E-05
SR 92	1.92E-05	NO DATA	7.13E-07	NO DATA	NO DATA	NO DATA	2.07E-04
Y 90	8.69E-08	NO DATA	2.33E-09	NO DATA	NO DATA	NO DATA	1.20E-04
Y 91M	8.10E-10	NO DATA	2.76E-11	NO DATA	NO DATA	NO DATA	2.70E-06
Y 91	1.13E-06	NO DATA	3.01E-08	NO DATA	NO DATA	NO DATA	8.10E-05
Y 92	7.65E-09	NO DATA	2.15E-10	NO DATA	NO DATA	NO DATA	1.46E-04

*Table taken from Regulatory Guide 1.109 (Rev. 1)

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TABLE 5-14, CONT'D

INGESTION DOSE FACTORS FOR INFANT
(MREM PER PCI INGESTED)

NUCLIDE	BONE	LIVER	T.BODY	THYROID	KIDNEY	LUNG	GI-LLI
Y 93	2.43E-08	NO DATA	6.62E-10	NO DATA	NO DATA	NO DATA	1.92E-04
ZR 95	2.06E-07	5.02E-08	3.56E-08	NO DATA	5.41E-08	NO DATA	2.50E-05
ZR 97	1.48E-08	2.54E-09	1.16E-09	NO DATA	2.56E-09	NO DATA	1.62E-04
NB 95	4.20E-08	1.73E-08	1.00E-08	NO DATA	1.24E-08	NO DATA	1.46E-05
MO 99	NO DATA	3.40E-05	6.63E-06	NO DATA	5.08E-05	NO DATA	1.12E-05
TC 99M	1.92E-09	3.96E-09	5.10E-08	NO DATA	4.26E-08	2.07E-09	1.15E-06
TC101	2.27E-09	2.86E-09	2.83E-08	NO DATA	3.40E-08	1.56E-09	4.86E-07
RU103	1.48E-06	NO DATA	4.95E-07	NO DATA	3.08E-06	NO DATA	1.80E-05
RU105	1.36E-07	NO DATA	4.58E-08	NO DATA	1.00E-06	NO DATA	5.41E-05
RU106	2.41E-05	NO DATA	3.01E-06	NO DATA	2.85E-05	NO DATA	1.83E-04
AG110M	9.96E-07	7.27E-07	4.81E-07	NO DATA	1.04E-06	NO DATA	3.77E-05
TE125M	2.33E-05	7.79E-06	3.15E-06	7.84E-06	NO DATA	NO DATA	1.11E-05
TE127M	5.85E-05	1.94E-05	7.08E-06	1.69E-05	1.44E-04	NO DATA	2.36E-05
TE127	1.00E-06	3.35E-07	2.15E-07	8.14E-07	2.44E-06	NO DATA	2.10E-05
TE129M	1.00E-04	3.43E-05	1.54E-05	3.84E-05	2.50E-04	NO DATA	5.97E-05
TE129	2.84E-07	9.79E-08	6.63E-08	2.38E-07	7.07E-07	NO DATA	2.27E-05
TE131M	1.52E-05	6.12E-06	5.05E-06	1.24E-05	4.21E-05	NO DATA	1.03E-04
TE131	1.76E-07	6.50E-08	4.94E-08	1.57E-07	4.50E-07	NO DATA	7.11E-06
TE132	2.08E-05	1.03E-05	9.61E-06	1.52E-05	6.44E-05	NO DATA	3.81E-05
I 130	6.00E-06	1.32E-05	5.30E-06	1.48E-03	1.45E-05	NO DATA	2.83E-06
I 131	3.59E-05	4.23E-05	1.86E-05	1.39E-02	4.94E-05	NO DATA	1.51E-06
I 132	1.66E-06	3.37E-06	1.20E-06	1.58E-04	3.76E-06	NO DATA	2.73E-06
I 133	1.25E-05	1.82E-05	5.33E-06	3.31E-03	2.14E-05	NO DATA	3.08E-06
I 134	8.69E-07	1.78E-06	6.33E-07	4.15E-05	1.99E-06	NO DATA	1.04E-06
I 135	3.64E-06	7.24E-06	2.64E-06	6.49E-04	8.07E-06	NO DATA	2.62E-06
CS134	3.77E-04	7.03E-04	7.10E-05	NO DATA	1.31E-04	7.42E-05	1.91E-06
CS136	4.59E-05	1.35E-04	5.04E-05	NO DATA	5.38E-05	1.10E-05	2.05E-06
CS137	5.22E-04	6.11E-04	4.33E-05	NO DATA	1.04E-04	6.64E-05	1.91E-06
CS138	4.81E-07	7.02E-07	3.79E-07	NO DATA	5.90E-07	6.09E-08	1.25E-06
BA139	8.81E-07	5.84E-10	2.55E-08	NO DATA	3.51E-10	3.54E-10	5.58E-05

TABLE 5-14, CONT'D

INGESTION DOSE FACTORS FOR INFANT
(MREM PER PCI INGESTED)

NUCLIDE	BONE	LIVER	T.BODY	THYROID	KIDNEY	LUNG	GI-LLI
BA140	1.71E-04	1.71E-07	8.81E-06	NO DATA	4.06E-08	1.05E-07	4.20E-05
BA141	4.25E-07	2.91E-10	1.34E-08	NO DATA	1.75E-10	1.77E-10	5.19E-06
BA142	1.84E-07	1.53E-10	9.06E-09	NO DATA	8.81E-11	9.26E-11	7.59E-07
LA140	2.11E-08	8.32E-09	2.14E-09	NO DATA	NO DATA	NO DATA	9.77E-05
LA142	1.10E-09	4.04E-10	9.67E-11	NO DATA	NO DATA	NO DATA	6.86E-05
CE141	7.07E-08	4.80E-08	5.65E-09	NO DATA	1.48E-08	NO DATA	2.48E-05
CE143	1.48E-08	9.82E-06	1.17E-09	NO DATA	2.86E-09	NO DATA	5.73E-05
CE144	2.98E-06	1.22E-06	1.67E-07	NO DATA	4.93E-07	NO DATA	1.71E-04
PR143	8.13E-08	3.04E-08	4.03E-09	NO DATA	1.13E-08	NO DATA	4.29E-05
PR144	2.74E-10	1.06E-10	1.38E-11	NO DATA	3.84E-11	NO DATA	4.93E-06
ND147	5.53E-08	5.68E-08	3.48E-09	NO DATA	2.19E-08	NO DATA	3.60E-05
W 187	9.03E-07	6.28E-07	2.17E-07	NO DATA	NO DATA	NO DATA	3.69E-05
NP239	1.11E-08	9.93E-10	5.61E-10	NO DATA	1.98E-09	NO DATA	2.87E-05

Table 5-15 R_i values for the Surry Plant for the inhalation pathway for an adult.*

SURRY EFFLUENT TECH SPECS 10/25/78

SPECIAL LOCATION = 1 SURRY * CAL
PATHWAY = INHAL

AGE GROUP = ADULT

NUCLIDE	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H 3	1.29E+03	1.29E+03	0.	1.29E+03	1.29E+03	1.29E+03	1.29E+03
	.02%	.02%	0.00%	.07%	0.00%	0.00%	100.00%
P 32	5.00E+06	8.83E+06	1.52E+06	7.70E+06	0.	0.	0.
	.64%	1.55%	1.25%	2.10%	0.00%	0.00%	0.00%
MN 54	8.29E+03	7.76E+03	0.	3.95E+04	9.83E+03	1.40E+06	0.
	.96%	1.39%	0.00%	1.11%	.51%	2.73%	0.00%
FE 59	1.05E+06	1.88E+05	1.17E+04	2.77E+04	0.	1.01E+06	0.
	.13%	3.37%	.01%	.78%	0.00%	1.96%	0.00%
CO 58	2.07E+03	1.80E+05	0.	1.58E+03	0.	9.27E+05	0.
	.03%	1.91%	0.00%	.04%	0.00%	1.81%	0.00%
CO 60	1.48E+04	2.84E+05	0.	1.15E+04	0.	5.98E+06	0.
	.19%	5.10%	0.00%	.32%	0.00%	11.62%	0.00%
ZN 65	4.05E+04	5.38E+04	3.26E+04	1.03E+05	6.89E+04	6.83E+05	0.
	.59%	.94%	.31%	2.89%	3.59%	1.86%	0.00%
NB 95	5.89E+04	1.86E+04	0.	1.39E+05	0.	0.	0.
	.75%	.30%	0.00%	3.79%	0.00%	0.00%	0.00%
SR 89	8.71E+03	3.69E+05	3.04E+05	0.	0.	1.40E+06	0.
	.11%	6.26%	.29%	0.00%	0.00%	2.73%	0.00%
SR 90	6.69E+06	7.21E+05	9.81E+07	0.	0.	9.59E+05	0.
	77.82%	12.93%	93.61%	0.00%	0.00%	1.89%	0.00%
Y 91	1.20E+04	3.84E+05	4.82E+05	0.	0.	1.70E+06	0.
	.16%	6.59%	.88%	0.00%	0.00%	3.32%	0.00%
ZR 95	2.32E+04	1.56E+05	1.47E+05	3.84E+04	3.41E+04	1.77E+06	0.
	.30%	2.69%	.19%	.96%	2.82%	3.44%	0.00%
NB 95	4.20E+03	1.08E+05	1.41E+04	7.40E+03	7.72E+04	5.06E+05	0.
	.05%	1.84%	.01%	.22%	.64%	.98%	0.00%
RU103	6.57E+02	1.30E+05	1.53E+03	0.	5.82E+03	5.04E+05	0.
	0.00%	1.99%	0.00%	0.00%	.30%	.98%	0.00%
RU106	8.71E+03	9.11E+05	9.90E+04	0.	1.33E+05	9.35E+06	0.
	.11%	15.34%	.07%	0.00%	6.94%	18.22%	0.00%
AG110M	5.90E+03	3.02E+05	1.04E+04	8.04E+03	1.97E+04	8.61E+06	0.
	.08%	5.42%	.01%	.28%	1.03%	8.06%	0.00%
TE127M	1.57E+03	1.49E+05	1.24E+04	5.76E+03	4.57E+04	3.20E+03	9.59E+05	0.
	.02%	2.84%	.01%	.18%	2.38%	.02%	1.87%	0.00%
TE129M	1.58E+03	3.83E+05	4.75E+03	8.87E+03	3.05E+04	3.06E+03	1.18E+06	0.
	.02%	6.86%	0.00%	.13%	1.90%	.02%	2.28%	0.00%
I 131	2.05E+04	4.27E+03	6.52E+04	5.57E+04	6.12E+04	1.14E+07	0.	0.
	.26%	.11%	.02%	1.40%	3.19%	84.84%	0.00%	0.00%
I 133	8.51E+03	8.87E+03	8.43E+03	1.80E+04	2.58E+04	2.15E+04	0.	0.
	.08%	.18%	0.00%	.41%	1.55%	15.28%	0.00%	0.00%
CS134	7.27E+05	1.04E+06	3.72E+05	4.47E+05	2.07E+05	0.	9.75E+04	0.
	9.29%	.19%	.35%	23.75%	14.96%	0.00%	.19%	0.00%
CS136	1.10E+05	1.17E+05	3.90E+04	1.08E+05	8.55E+04	0.	1.20E+06	0.
	1.41%	.21%	.04%	4.10%	4.86%	0.00%	.02%	0.00%
CS137	4.27E+05	8.34E+05	8.78E+04	8.20E+05	2.22E+05	0.	7.51E+04	0.
	5.46%	.15%	.05%	17.38%	11.58%	0.00%	.15%	0.00%
BA140	2.56E+03	2.18E+05	3.90E+04	8.90E+01	1.67E+01	0.	1.27E+06	0.
	.03%	3.91%	.00%	0.00%	0.00%	0.00%	2.90%	0.00%
CE141	1.53E+03	1.20E+05	1.99E+04	1.35E+04	6.25E+03	0.	3.61E+05	0.
	.02%	2.15%	.02%	.38%	.33%	0.00%	.70%	0.00%
CE144	1.88E+05	8.15E+05	3.43E+04	1.83E+06	8.47E+05	0.	7.76E+06	0.
	2.35%	14.62%	3.24%	40.10%	44.17%	0.00%	15.14%	0.00%
TOTAL	7.42E+06	5.57E+06	1.06E+06	3.57E+06	1.92E+06	1.41E+07	5.13E+07	1.29E+03

*Entry in each box represents the R_i value in units of mrem/yr per μCi/sec per m^2 for ground plane and food pathways and mrem/yr per μCi/m^3 for the inhalation pathway e.g. 3.95E+04 for MN-54 for the liver. The number below the R_i value e.g. 1.11 for MN-54 is the percent contributed to that particular organ dose if a unit source term mix existed for each of the isotopes listed in the Table. For other mixes these percentages would be different.

Table 5-15 cont'd R_i values for the Surry Plant for the inhalation pathway for a teen.*

SURRY EFFLUENT TEEN SHEES 10/24/78

SPECIAL LOCATION = 1 SURRY 8 CAL
PATHWAY = INHAL

AGE GROUP = TEEN

NUCLIDE	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H 3	1.27E+03	1.27E+03	0.	1.27E+03	1.26E+03	1.27E+03	1.27E+03	1.27E+03
	.02(	.02(	0.00(	.03(	.07(	0.00(	0.10(	100.00(
P 32	7.15E+04	9.23E+04	1.48E+06	1.04E+05	0.	0.	0.	0.
	.86(	1.62(	1.81(	2.23(	0.00(	0.00(	0.00(	0.00(
MN 54	8.39E+03	8.47E+04	0.	5.10E+04	9.85E+03	0.	1.98E+04	0.
	.10(	1.17(	0.00(	1.04(	.51(	0.00(	2.37(	0.00(
FE 59	1.43E+04	1.76E+05	1.59E+04	3.89E+04	0.	0.	1.53E+04	0.
	.17(	3.12(	.01(	.75(	0.00(	0.00(	1.43(	0.00(
CO 58	2.77E+03	9.61E+04	0.	2.07E+03	0.	0.	1.34E+04	0.
	.03(	1.84(	0.00(	.04(	0.00(	0.00(	1.61(	0.00(
CO 60	1.98E+04	2.49E+05	0.	1.51E+04	0.	0.	8.71E+04	0.
	.24(	4.53(	0.00(	.31(	0.00(	0.00(	10.48(	0.00(
ZN 65	6.23E+04	8.86E+04	3.45E+04	1.33E+05	8.49E+04	0.	1.29E+04	0.
	.75(	.82(	.03(	2.72(	3.59(	0.00(	1.48(	0.00(
RB 86	8.39E+04	1.77E+04	0.	1.94E+05	0.	0.	0.	0.
	1.01(	.31(	0.00(	3.84(	0.00(	0.00(	0.00(	0.00(
SR 89	1.25E+04	3.71E+05	8.35E+05	0.	0.	0.	2.41E+04	0.
	.15(	6.49(	.37(	0.00(	0.00(	0.00(	2.89(	0.00(
SR 90	6.07E+04	7.44E+03	1.08E+06	0.	0.	0.	1.65E+07	0.
	40.18(	13.37(	91.44(	0.00(	0.00(	0.00(	19.71(	0.00(
Y 91	1.77E+04	8.08E+05	8.68E+05	0.	0.	0.	2.93E+04	0.
	.21(	7.15(	.58(	0.00(	0.00(	0.00(	3.51(	0.00(
ZR 95	3.15E+04	1.69E+05	1.45E+05	8.58E+04	5.41E+04	0.	2.68E+04	0.
	.38(	2.80(	.12(	.93(	2.82(	0.00(	3.21(	0.00(
NB 95	5.66E+03	9.47E+04	1.85E+04	1.03E+04	7.72E+03	0.	7.50E+03	0.
	.07(	1.69(	.02(	.21(	.46(	0.00(	.90(	0.00(
RU103	8.95E+02	1.04E+05	2.10E+03	0.	5.02E+03	0.	7.82E+03	0.
	.01(	1.90(	0.00(	0.00(	.30(	0.00(	.94(	0.00(
RU106	1.24E+04	8.59E+04	9.43E+04	0.	1.33E+04	0.	1.61E+07	0.
	.15(	16.79(	.09(	0.00(	8.96(	0.00(	19.23(	0.00(
AG110M	7.98E+03	2.72E+05	1.34E+04	1.31E+04	1.97E+04	0.	8.74E+04	0.
	.10(	4.77(	.01(	.27(	1.03(	0.00(	8.37(	0.00(
TE127M	2.10E+03	1.54E+05	1.80E+04	8.15E+03	8.57E+04	8.30E+03	1.65E+04	0.
	.03(	2.78(	.02(	.17(	2.38(	.07(	1.98(	0.00(
TE129M	2.24E+03	8.04E+05	1.39E+04	6.57E+03	3.05E+04	8.57E+03	1.97E+04	0.
	.03(	7.04(	.01(	.13(	1.90(	.03(	2.36(	0.00(
I 131	2.04E+04	8.08E+03	3.50E+04	8.00E+04	8.12E+04	1.06E+07	0.	0.
	.32(	.11(	.03(	1.00(	3.19(	41.32(	0.00(	0.00(
I 133	8.21E+03	1.03E+04	1.21E+04	2.05E+04	2.58E+04	2.92E+04	0.	0.
	.07(	.18(	.01(	.42(	1.15(	10.84(	0.00(	0.00(
CS134	5.48E+05	8.75E+03	5.02E+05	1.13E+06	2.47E+05	0.	1.48E+05	0.
	6.58(	.17(	.83(	24.99(	10.96(	0.00(	.18(	0.00(
CS136	1.37E+05	1.04E+04	5.12E+04	1.93E+05	8.55E+04	0.	1.77E+04	0.
	1.64(	.19(	.08(	3.95(	3.80(	0.00(	.02(	0.00(
CS137	3.11E+05	8.07E+03	8.09E+05	8.07E+05	2.22E+05	0.	1.21E+05	0.
	3.73(	.18(	.57(	17.24(	11.58(	0.00(	.14(	0.00(
BA140	3.51E+03	2.28E+05	5.48E+04	8.89E+01	1.67E+01	0.	2.03E+04	0.
	.04(	4.00(	.05(	0.00(	0.00(	0.00(	2.43(	0.00(
CE141	2.16E+03	1.28E+05	2.44E+04	1.89E+04	8.25E+03	0.	8.13E+03	0.
	.03(	2.21(	.02(	.39(	.33(	0.00(	.73(	0.00(
CE144	2.82E+04	8.83E+05	8.48E+04	2.02E+06	8.47E+05	0.	1.33E+07	0.
	3.15(	15.11(	2.14(	41.25(	44.17(	0.00(	15.98(	0.00(
TOTAL	8.32E+04	8.71E+06	1.17E+06	4.90E+06	1.92E+06	1.75E+07	8.39E+07	1.27E+03

*Entry in each box represents the R_i value in units of mrem/yr per μCi/sec per m^2 for ground plane and food pathways and mrem/yr per μCi/m^3 for the inhalation pathway e.g. 5.10E+04 for MN-54 for the liver. The number below the R_i value e.g. 1.04 for MN-54 is the percent contributed to that particular organ dose if a unit source term mix existed for each of the isotopes listed in the Table. For other mixes these percentages would be different.

Table 5-15, cont'd R_i values for the Surry Plant for the inhalation pathway for a child.*

SURRY EFFLUENT TECH SPECS 10/25/77*

SPECIAL LOCATION = 1 SURRY = CAL
PATHWAY = INHAL

AGE GROUP = CHILD

NUCLIDE	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H 3	1.12E+03	1.12E+03	0.	1.12E+03	5.04E+02	1.12E+03	1.12E+03	1.12E+03
	.01(	.05(	0.00(	.02(	.07(	0.00(	0.00(	100.00(
P 32	9.80E+04	8.21E+04	2.68E+04	1.14E+05	0.	0.	0.	0.
	1.27(	1.79(	2.29(	2.38(	0.00(	0.00(	0.00(	0.00(
MN 54	9.50E+03	2.34E+04	0.	4.29E+04	4.54E+03	0.	1.57E+05	0.
	.12(	.92(	0.00(	.89(	.51(	0.00(	2.17(	0.00(
FE 59	1.07E+04	7.34E+04	2.07E+04	3.34E+04	0.	0.	1.27E+05	0.
	.21(	2.85(	.02(	.70(	0.00(	0.00(	1.75(	0.00(
CO 58	3.16E+03	1.03E+04	0.	1.77E+03	0.	0.	1.10E+05	0.
	.04(	1.39(	0.00(	.04(	0.00(	0.00(	1.52(	0.00(
CO 60	2.29E+04	9.81E+04	0.	1.31E+04	0.	0.	7.06E+05	0.
	.29(	3.84(	0.00(	.27(	0.00(	0.00(	9.74(	0.00(
ZN 65	7.02E+04	1.43E+04	6.25E+04	1.13E+05	3.18E+04	0.	9.99E+05	0.
	.91(	.56(	.06(	2.35(	3.59(	0.00(	1.37(	0.00(
RB 86	1.14E+05	7.04E+03	0.	1.98E+05	0.	0.	0.	0.
	1.47(	.32(	0.00(	4.12(	0.00(	0.00(	0.00(	0.00(
SR 89	1.72E+04	1.47E+05	5.99E+05	0.	0.	0.	2.15E+06	0.
	.22(	6.75(	.52(	0.00(	0.00(	0.00(	2.97(	0.00(
SR 90	6.43E+06	3.63E+05	1.01E+08	0.	0.	0.	1.87E+07	0.
	82.90(	13.85(	88.87(	0.00(	0.00(	0.00(	20.34(	0.00(
Y 91	2.43E+04	1.86E+05	9.13E+05	0.	0.	0.	2.62E+06	0.
	.31(	7.42(	.80(	0.00(	0.00(	0.00(	3.62(	0.00(
ZR 95	3.39E+04	8.10E+04	1.40E+05	8.17E+04	2.50E+04	0.	2.23E+06	0.
	.68(	2.44(	.17(	.87(	2.42(	0.00(	3.07(	0.00(
NB 95	8.54E+03	3.89E+04	2.35E+04	9.16E+03	3.57E+03	0.	8.13E+05	0.
	.08(	1.49(	.02(	.10(	.06(	0.00(	.85(	0.00(
RU103	1.07E+03	4.07E+04	2.79E+03	0.	2.69E+03	0.	8.61E+05	0.
	.01(	1.51(	0.00(	0.00(	.03(	0.00(	.91(	0.00(
RU106	1.09E+04	8.29E+05	1.18E+06	0.	8.17E+04	0.	1.43E+07	0.
	.22(	17.32(	.12(	0.00(	4.98(	0.00(	19.73(	0.00(
AG110M	9.13E+03	1.00E+05	1.68E+04	1.16E+04	9.09E+03	0.	5.47E+06	0.
	.12(	4.05(	.01(	.24(	1.03(	0.00(	7.54(	0.00(
TE127M	3.01E+03	7.13E+04	2.68E+04	8.53E+03	2.11E+04	6.06E+03	1.48E+06	0.
	.04(	2.88(	.02(	.18(	2.38(	.03(	2.04(	0.00(
TE129M	3.04E+03	1.81E+05	1.42E+04	8.84E+03	1.69E+04	4.32E+03	1.78E+06	0.
	.04(	7.33(	.02(	.18(	1.90(	.03(	2.43(	0.00(
I 131	2.72E+04	2.84E+03	4.40E+04	8.83E+04	2.03E+04	1.42E+07	0.	0.
	.35(	.11(	.04(	1.00(	3.19(	88.79(	0.00(	0.00(
I 133	7.69E+03	5.47E+03	1.06E+04	2.03E+04	1.19E+04	3.84E+04	0.	0.
	.10(	.22(	.01(	.22(	1.55(	19.14(	0.00(	0.00(
CS134	2.28E+05	3.84E+03	8.50E+05	1.01E+06	1.33E+05	0.	1.21E+05	0.
	2.89(	.15(	.57(	21.08(	14.94(	0.00(	.17(	0.00(
CS136	1.18E+05	8.17E+03	6.50E+04	1.71E+05	3.49E+04	0.	1.89E+04	0.
	1.50(	.17(	.04(	3.55(	4.84(	0.00(	.02(	0.00(
CS137	1.28E+05	3.81E+03	9.05E+05	8.26E+05	1.03E+05	0.	1.08E+05	0.
	1.65(	.15(	.79(	17.15(	11.58(	0.00(	.14(	0.00(
BA140	4.32E+03	1.02E+05	7.39E+04	6.47E+01	7.72E+00	0.	1.78E+04	0.
	.06(	4.11(	.06(	0.00(	0.00(	0.00(	2.40(	0.00(
CE141	2.89E+03	5.85E+04	3.42E+04	1.95E+04	2.89E+03	0.	5.43E+05	0.
	.04(	2.29(	.03(	.41(	.33(	0.00(	.75(	0.00(
CE144	3.61E+05	3.88E+05	6.76E+06	2.11E+06	3.92E+05	0.	1.19E+07	0.
	4.63(	15.68(	5.93(	44.00(	44.17(	0.00(	16.47(	0.00(
&TOTAL*	7.75E+04	2.47E+06	1.14E+08	4.80E+06	8.87E+05	2.01E+07	7.29E+07	1.12E+03

*Entry in each box represents the R_i value in units of mrem/yr per μCi/sec per m^2 for ground plane and food pathways and mrem/yr per μCi/m^3 for the inhalation pathway e.g. 4.29E+04 for MN-54 for the liver. The number below the R_i value e.g. 0.89 for MN-54 is the percent contributed to that particular organ dose if a unit source term mix existed for each of the isotopes listed in the Table. For other mixes these percentages would be different.

Table 5-15, cont'd R_i values for the Surry Plant for the inhalation pathway for an infant*

BUNDY EFFLUENT TECH SPECS 10/25/78

SPECIAL LOCATION = 1 SURRY M CAL
PATHWAY = INHAL

AGE GROUP = INFANT

NUCLIDE	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H 3	6.46E+02	6.46E+02	0.	6.46E+02	2.21E+02	6.46E+02	6.46E+02	6.46E+02
	.02%	.07%	0.00%	.02%	.07%	0.00%	0.00%	100.00%
P 32	7.73E+04	1.61E+04	2.03E+06	1.12E+05	0.	0.	0.	0.
	2.37%	1.88%	0.18%	3.49%	0.00%	0.00%	0.00%	0.00%
MN 54	6.48E+03	7.35E+03	0.	2.53E+04	1.72E+03	0.	4.98E+05	0.
	.15%	.73%	0.00%	.79%	.51%	0.00%	1.74%	0.00%
FE 59	9.48E+03	2.67E+04	1.35E+04	2.35E+04	0.	0.	1.01E+06	0.
	.29%	2.55%	.03%	.73%	0.00%	0.00%	1.79%	0.00%
CO 58	1.82E+03	1.11E+04	0.	1.22E+03	0.	0.	7.76E+05	0.
	.30%	1.15%	0.00%	.08%	0.00%	0.00%	1.37%	0.00%
CO 60	1.18E+04	3.19E+04	0.	8.01E+03	0.	0.	8.50E+06	0.
	.38%	3.29%	0.03%	.25%	0.00%	0.00%	7.94%	0.00%
ZN 65	3.10E+04	5.13E+04	1.43E+04	4.25E+04	1.21E+04	0.	6.48E+05	0.
	.95%	5.29%	.04%	1.99%	3.59%	0.00%	1.14%	0.00%
RB 86	8.81E+04	3.03E+03	0.	1.92E+05	0.	0.	0.	0.
	2.70%	.31%	0.00%	5.91%	0.00%	0.00%	0.00%	0.00%
SR 89	1.16E+06	4.39E+04	3.97E+05	0.	0.	0.	2.03E+06	0.
	.35%	8.59%	.82%	0.00%	0.00%	0.00%	3.57%	0.00%
SR 90	2.59E+06	1.31E+05	8.08E+07	0.	0.	0.	1.12E+07	0.
	79.26%	13.50%	44.27%	0.00%	0.00%	0.00%	19.80%	0.00%
Y 91	1.57E+04	7.02E+04	5.47E+05	0.	0.	0.	2.48E+06	0.
	.48%	7.24%	1.21%	0.00%	0.00%	0.00%	4.31%	0.00%
ZR 95	2.03E+04	2.17E+04	1.15E+05	2.79E+04	9.48E+03	0.	1.79E+06	0.
	.62%	2.24%	.24%	.97%	2.82%	0.00%	3.08%	0.00%
NB 95	3.77E+03	1.27E+04	1.57E+04	8.02E+03	1.35E+03	0.	4.78E+05	0.
	.12%	1.31%	.03%	.28%	.40%	0.00%	.84%	0.00%
RU103	6.78E+02	1.81E+04	2.01E+03	0.	1.02E+03	0.	5.51E+05	0.
	.02%	1.86%	0.00%	0.00%	.30%	0.00%	.97%	0.00%
RU106	1.09E+06	1.84E+05	8.47E+04	0.	2.33E+04	0.	1.15E+07	0.
	.33%	18.89%	.18%	0.00%	6.96%	0.00%	20.36%	0.00%
AG110M	8.99E+03	3.30E+04	9.07E+03	7.21E+03	3.00E+03	0.	3.84E+06	0.
	.15%	3.40%	.02%	.27%	.91%	0.00%	6.80%	0.00%
TE127M	2.07E+03	2.73E+04	1.88E+04	6.89E+03	8.06E+03	8.86E+03	1.31E+06	0.
	.08%	2.81%	.05%	.21%	2.41%	.05%	2.31%	0.00%
TE129M	2.22E+03	8.49E+04	1.41E+04	6.84E+03	6.39E+03	5.07E+03	1.84E+06	0.
	.07%	7.11%	.03%	.19%	1.90%	.03%	2.96%	0.00%
I 131	1.96E+04	1.06E+03	3.79E+04	8.83E+04	1.07E+04	1.08E+07	0.	0.
	.80%	.11%	.08%	1.38%	3.19%	80.62%	0.00%	0.00%
I 133	5.59E+03	2.15E+03	1.32E+04	1.92E+04	4.52E+03	3.55E+06	0.	0.
	.17%	.22%	.03%	.30%	1.35%	19.32%	0.00%	0.00%
CS134	7.48E+04	1.33E+03	1.96E+05	7.02E+05	5.82E+04	0.	7.99E+06	0.
	2.28%	.14%	.42%	21.83%	18.94%	0.00%	.14%	3.00%
CS136	5.28E+04	1.03E+03	4.42E+04	1.36E+05	1.50E+04	0.	1.17E+06	0.
	1.62%	.10%	.10%	4.18%	4.86%	0.00%	.02%	0.00%
CS137	8.50E+04	1.33E+03	5.08E+05	8.11E+05	3.89E+04	0.	7.12E+06	0.
	1.39%	.14%	1.13%	19.91%	11.58%	0.00%	.13%	0.00%
BA140	2.89E+03	3.43E+04	5.59E+04	5.59E+01	2.92E+00	0.	1.59E+06	0.
	.09%	3.45%	.12%	0.00%	0.00%	0.00%	2.81%	0.00%
CE141	1.99E+03	2.15E+04	2.77E+04	1.66E+04	1.09E+03	0.	5.18E+05	0.
	.06%	2.23%	.06%	.52%	.33%	0.00%	.91%	0.00%
CE144	1.78E+05	1.48E+05	3.19E+04	1.21E+06	1.48E+05	0.	9.83E+06	0.
	5.80%	15.29%	0.58%	37.82%	44.17%	0.00%	17.33%	0.00%
TOTAL	3.26E+06	9.64E+05	8.48E+07	3.21E+06	3.36E+05	1.84E+07	5.67E+07	6.48E+02

*Entry in each box represents the R_i value in units of mrem/yr per μCi/sec per m^2 for ground plane and food pathways and mrem/yr per μCi/m^3 for the inhalation pathway e.g. 2.35E+04 for MN-54 for the liver. The number below the R_i value e.g. 0.79 for MN-54 is the percent contributed to that particular organ dose If a unit source term mix existed for each of the isotopes listed in the Table. For other mixes these percentages would be different.

Table 5-15, cont'd R_i values for the Surry Plant for the ground plane pathway.*

SURRY EFFLUENT TECH SPECS 10/25/78

SPECIAL LOCATION # : SURRY # CAL
PATHWAY # GROUND

NUCLIDE	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
MN 54	1.39E+09	1.39E+09	1.39E+09	1.39E+09	1.39E+09	1.39E+09	1.39E+09	1.57E+09
	2.91%	2.91%	2.91%	2.91%	2.91%	2.91%	2.91%	2.92%
FE 59	2.75E+08	2.75E+08	2.75E+08	2.75E+08	2.75E+08	2.75E+08	2.75E+08	3.23E+08
	.60%	.60%	.60%	.60%	.60%	.60%	.60%	.60%
CO 58	3.79E+08	3.79E+08	3.79E+08	3.79E+08	3.79E+08	3.79E+08	3.79E+08	4.44E+08
	.82%	.82%	.82%	.82%	.82%	.82%	.82%	.82%
CO 60	2.15E+10	2.15E+10	2.15E+10	2.15E+10	2.15E+10	2.15E+10	2.15E+10	2.52E+10
	46.84%	46.84%	46.84%	46.84%	46.84%	46.84%	46.84%	46.85%
ZN 65	7.49E+08	7.49E+08	7.49E+08	7.49E+08	7.49E+08	7.49E+08	7.49E+08	8.61E+08
	1.63%	1.63%	1.63%	1.63%	1.63%	1.63%	1.63%	1.60%
RB 86	8.99E+06	8.99E+06	8.99E+06	8.99E+06	8.99E+06	8.99E+06	8.99E+06	1.03E+07
	.02%	.02%	.02%	.02%	.02%	.02%	.02%	.02%
SR 89	2.23E+04	2.23E+04	2.23E+04	2.23E+04	2.23E+04	2.23E+04	2.23E+04	2.56E+04
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Y 91	1.08E+06	1.08E+06	1.08E+06	1.08E+06	1.08E+06	1.08E+06	1.08E+06	1.22E+06
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
ZR 95	2.49E+08	2.49E+08	2.49E+08	2.49E+08	2.49E+08	2.49E+08	2.49E+08	2.89E+08
	.54%	.54%	.54%	.54%	.54%	.54%	.54%	.54%
NB 95	1.36E+08	1.36E+08	1.36E+08	1.36E+08	1.36E+08	1.36E+08	1.36E+08	1.60E+08
	.30%	.30%	.30%	.30%	.30%	.30%	.30%	.30%
RU103	1.09E+08	1.09E+08	1.09E+08	1.09E+08	1.09E+08	1.09E+08	1.09E+08	1.27E+08
	.24%	.24%	.24%	.24%	.24%	.24%	.24%	.24%
RU106	4.19E+08	4.19E+08	4.19E+08	4.19E+08	4.19E+08	4.19E+08	4.19E+08	5.03E+08
	.91%	.91%	.91%	.91%	.91%	.91%	.91%	.93%
AG110M	3.48E+09	3.48E+09	3.48E+09	3.48E+09	3.48E+09	3.48E+09	3.48E+09	4.05E+09
	7.56%	7.56%	7.56%	7.56%	7.56%	7.56%	7.56%	7.53%
TE127*	9.15E+04	9.15E+04	9.15E+04	9.15E+04	9.15E+04	9.15E+04	9.15E+04	1.08E+05
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
TE129M	2.00E+07	2.00E+07	2.00E+07	2.00E+07	2.00E+07	2.00E+07	2.00E+07	2.34E+07
	.04%	.04%	.04%	.04%	.04%	.04%	.04%	.04%
I 131	1.72E+07	1.72E+07	1.72E+07	1.72E+07	1.72E+07	1.72E+07	1.72E+07	2.04E+07
	.04%	.04%	.04%	.04%	.04%	.04%	.04%	.04%
I 133	2.47E+06	2.47E+06	2.47E+06	2.47E+06	2.47E+06	2.47E+06	2.47E+06	3.00E+06
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CS134	6.82E+09	6.82E+09	6.82E+09	6.82E+09	6.82E+09	6.82E+09	6.82E+09	7.96E+09
	14.84%	14.84%	14.84%	14.84%	14.84%	14.84%	14.84%	14.74%
CS136	1.49E+08	1.49E+08	1.49E+08	1.49E+08	1.49E+08	1.49E+08	1.49E+08	1.69E+08
	.32%	.32%	.32%	.32%	.32%	.32%	.32%	.31%
CS137	1.03E+10	1.03E+10	1.03E+10	1.03E+10	1.03E+10	1.03E+10	1.03E+10	1.20E+10
	22.35%	22.35%	22.35%	22.35%	22.35%	22.35%	22.35%	22.26%
BA140	2.05E+07	2.05E+07	2.05E+07	2.05E+07	2.05E+07	2.05E+07	2.05E+07	2.34E+07
	.04%	.04%	.04%	.04%	.04%	.04%	.04%	.04%
CE141	1.36E+07	1.36E+07	1.36E+07	1.36E+07	1.36E+07	1.36E+07	1.36E+07	1.53E+07
	.03%	.03%	.03%	.03%	.03%	.03%	.03%	.03%
CE144	6.95E+07	6.95E+07	6.95E+07	6.95E+07	6.95E+07	6.95E+07	6.95E+07	8.03E+07
	.15%	.15%	.15%	.15%	.15%	.15%	.15%	.15%
TOTAL	4.60E+10	4.60E+10	4.60E+10	4.60E+10	4.60E+10	4.60E+10	4.60E+10	5.39E+10

*Entry in each box represents the R_i value in units of mrem/yr per μCi/sec per m^2 for ground plane and food pathways and mrem/yr per μCi/m^3 for the inhalation pathway e.g. 1.3-4E+09 for MN-54 for the liver. The number below the R_i value e.g. 2.91 for MN-54 is the percent contributed to that particular organ dose If a unit source term mix existed for each of the isotopes listed in the Table. For other mixes these percentages would be different.

Table 5-15, cont'd R_i values for the Surry Plant for the cow milk pathway for an adult.*

SURRY EFFLUENT TECH SPECS 10/25/78

SPECIAL LOCATION # 1 SURRY R CAL
PATHWAY # COW MILK

AGE GROUP # ADULT

NUCLIDE	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H 3	7.69E+02	7.69E+02	0.	7.69E+02	7.69E+02	7.69E+02	7.69E+02	7.69E+02
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	100.00(
P 32	9.37E+08	1.26E+09	1.12E+10	6.95E+08	0.	0.	0.	0.
	1.98(	0.29(	21.25(	3.30(	0.00(	0.00(	0.00(	0.00(
MN 54	9.78E+05	1.57E+07	0.	5.11E+06	1.52E+06	0.	0.	0.
	0.00(	.04(	0.00(	.02(	.02(	0.00(	0.00(	0.00(
FE 59	1.69E+07	1.39E+08	1.77E+07	6.17E+07	0.	0.	1.17E+07	0.
	.07(	.70(	.03(	.20(	0.00(	0.00(	.70(	0.00(
CO 58	6.28E+06	5.68E+07	0.	2.80E+06	0.	0.	0.	0.
	.03(	.28(	0.00(	.01(	0.00(	0.00(	0.00(	0.00(
CO 60	2.88E+07	1.91E+08	0.	1.02E+07	0.	0.	0.	0.
	.10(	.96(	0.00(	.05(	0.00(	0.00(	0.00(	0.00(
ZR 95	1.38E+04	1.92E+04	9.59E+03	3.05E+04	2.04E+04	0.	0.	0.
	0.32(	0.62(	1.82(	14.07(	25.18(	0.00(	0.00(	0.00(
NB 95	7.54E+03	3.19E+03	0.	1.62E+04	0.	0.	0.	0.
	3.96(	1.60(	0.00(	7.68(	0.00(	0.00(	0.00(	0.00(
MO 99	2.59E+02	1.03E+03	6.70E+03	0.	0.	0.	0.	0.
	.11(	.70(	1.65(	0.00(	0.00(	0.00(	0.00(	0.00(
RU 103	7.59E+04	8.96E+04	3.00E+05	0.	0.	0.	0.	0.
	34.76(	4.47(	58.79(	0.00(	0.00(	0.00(	0.00(	0.00(
I 131	1.37E+02	2.81E+03	5.11E+03	0.	0.	0.	0.	0.
	0.00(	.01(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
BA 140	1.22E+02	5.71E+05	5.62E+02	1.66E+02	2.83E+02	0.	0.	0.
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
LA 140	1.66E+04	1.67E+06	4.65E+04	2.75E+04	2.72E+04	0.	0.	0.
	0.00(	.84(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
AG110M	2.03E+02	7.14E+04	6.11E+02	0.	2.33E+03	0.	0.	0.
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
TE132	1.69E+03	8.17E+05	1.26E+04	0.	2.44E+04	0.	0.	0.
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
CS134	2.04E+07	1.40E+10	3.71E+07	3.44E+07	8.76E+07	0.	0.	0.
	.09(	70.21(	.07(	.16(	.83(	0.00(	0.00(	0.00(
TE132M	9.11E+02	1.13E+04	3.37E+03	1.21E+03	1.37E+04	8.62E+06	0.	0.
	.02(	.57(	.06(	.06(	1.69(	0.00(	0.00(	0.00(
TE132M	8.19E+06	1.97E+08	3.91E+07	1.46E+07	1.63E+08	1.34E+07	0.	0.
	.03(	.99(	.07(	.07(	2.01(	.01(	0.00(	0.00(
I 131	1.59E+08	7.32E+07	1.94E+08	2.77E+08	4.76E+08	9.04E+10	0.	0.
	.73(	.37(	.37(	1.32(	5.87(	99.29(	0.00(	0.00(
I 133	1.40E+06	6.13E+06	2.66E+06	6.54E+06	8.01E+06	6.75E+08	0.	0.
	0.00(	.02(	0.00(	.02(	.10(	.74(	0.00(	0.00(
CS136	6.71E+04	1.44E+06	3.45E+04	8.21E+04	2.68E+04	0.	8.82E+06	0.
	30.76(	.72(	4.56(	30.95(	32.79(	0.00(	52.79(	0.00(
CS134	4.73E+08	7.46E+07	1.66E+08	6.57E+08	3.65E+08	0.	5.01E+07	0.
	2.17(	.37(	.32(	3.12(	4.51(	0.00(	3.00(	0.00(
CS137	9.22E+08	1.25E+08	4.71E+09	8.44E+08	2.19E+09	0.	7.27E+08	0.
	19.34(	.62(	8.95(	30.57(	26.99(	0.00(	43.52(	0.00(
BA140	1.12E+06	3.53E+07	1.71E+07	2.15E+04	7.32E+03	0.	1.23E+04	0.
	0.00(	.18(	.03(	0.00(	0.00(	0.00(	0.00(	0.00(
CE141	2.23E+02	7.52E+04	2.91E+03	1.97E+03	9.18E+02	0.	0.	0.
	0.00(	.04(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
CE144	1.15E+04	7.26E+07	2.15E+05	8.97E+04	5.32E+04	0.	0.	0.
	0.00(	.36(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
TOTALS	2.18E+10	2.00E+10	5.24E+10	2.11E+10	4.10E+09	9.16E+10	1.67E+09	7.69E+02

*Entry in each box represents the R_i value in units of mrem/yr per μCi/sec per m^2 for ground plane and food pathways and mrem/yr per μCi/m^3 for the inhalation pathway e.g. 5.11E+06 for MN-54 for the liver. The number below the R_i value e.g. 0.02 for MN-54 is the percent contributed to that particular organ dose if a unit source term mix existed for each of the isotopes listed in the Table. For other mixes these percentages would be different.

Table 5-15, cont'd R_i values for the Surry Plant for the cow milk pathway for a teen.*

SURRY EFFLUENT TECH SPECS 10/25/78

SPECIAL LOCATION # 1 SURRY N CAL
PATHWAY # COW MILK

AGE GROUP # TEEN

NUCLIDE	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H 3	1.00E+03	1.00E+03	0.	1.00E+03	9.92E+02	1.00E+03	1.00E+03	1.00E+03
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	100.00(
P 32	6.00E+08	1.73E+09	2.78E+10	1.28E+09	0.	0.	0.	0.
	2.96(	7.24(	28.91(	3.49(	0.00(	0.00(	0.00(	0.00(
MN 54	1.69E+06	1.75E+07	0.	8.52E+06	1.96E+06	0.	0.	0.
	0.00(	.07(	0.00(	.02(	.02(	0.00(	0.00(	0.00(
FE 59	2.79E+07	1.71E+08	3.10E+07	7.23E+07	0.	0.	2.28E+07	0.
	.19(	.72(	.04(	.20(	0.00(	0.00(	.08(	0.00(
CO 58	1.09E+07	6.50E+07	0.	4.32E+06	0.	0.	0.	0.
	.04(	.27(	0.00(	.01(	0.00(	0.00(	0.00(	0.00(
CO 60	3.68E+07	2.25E+08	0.	1.76E+07	0.	0.	0.	0.
	.14(	.94(	0.00(	.05(	0.00(	0.00(	0.00(	0.00(
ZN 65	2.36E+09	2.14E+09	1.67E+09	6.11E+09	2.43E+09	0.	0.	0.
	8.81(	9.07(	1.78(	13.96(	25.18(	0.00(	0.00(	0.00(
RB 86	1.34E+09	8.37E+09	0.	2.45E+09	0.	0.	0.	0.
	5.12(	1.43(	0.00(	8.05(	0.00(	0.00(	0.00(	0.00(
SR 89	8.59E+07	1.01E+08	1.68E+08	0.	0.	0.	0.	0.
	.17(	.80(	1.94(	0.00(	0.00(	0.00(	0.00(	0.00(
SR 90	1.08E+10	1.23E+09	4.37E+10	0.	0.	0.	0.	0.
	39.89(	5.14(	52.75(	0.00(	0.00(	0.00(	0.00(	0.00(
Y 91	2.52E+02	3.85E+06	9.40E+03	0.	0.	0.	0.	0.
	0.00(	.02(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
ZR 95	2.13E+02	7.13E+05	9.23E+02	3.10E+02	3.65E+02	0.	0.	0.
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
NB 95	2.58E+04	2.00E+05	8.48E+04	4.68E+04	3.51E+04	0.	0.	0.
	0.00(	.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
RU103	4.65E+02	9.08E+04	1.08E+03	0.	3.01E+03	0.	0.	0.
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
RU106	2.93E+03	1.11E+06	2.32E+04	0.	3.15E+04	0.	0.	0.
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
AG110M	3.53E+07	1.63E+10	6.14E+07	5.81E+07	8.72E+07	0.	0.	0.
	.13(	88.34(	.07(	.18(	.83(	0.00(	0.00(	0.00(
TE127M	7.39E+06	1.55E+08	6.22E+07	2.21E+07	1.77E+08	1.48E+07	0.	0.
	.03(	.83(	.08(	.06(	1.69(	.01(	0.00(	0.00(
TE129M	1.13E+07	2.69E+08	7.15E+07	2.85E+07	2.11E+08	2.31E+07	0.	0.
	.04(	1.12(	.09(	.07(	2.01(	.02(	0.00(	0.00(
I 131	2.85E+08	9.75E+07	3.52E+08	9.93E+08	6.14E+08	1.44E+11	0.	0.
	.98(	.41(	.92(	1.35(	5.87(	99.19(	0.00(	0.00(
I 133	2.49E+06	6.19E+06	4.82E+06	8.18E+06	1.03E+07	1.14E+09	0.	0.
	0.00(	.04(	0.00(	.02(	.10(	.79(	0.00(	0.00(
CS134	6.50E+09	1.75E+08	5.99E+09	1.91E+10	3.43E+09	0.	1.71E+09	0.
	28.17(	.73(	7.23(	38.49(	32.79(	0.00(	51.34(	0.00(
CS136	7.48E+08	8.97E+07	2.83E+08	1.11E+09	4.71E+08	0.	9.56E+07	0.
	2.77(	.38(	.34(	3.08(	4.51(	0.00(	2.87(	0.00(
CS137	3.96E+09	1.62E+08	8.54E+09	1.14E+10	2.62E+09	0.	1.50E+09	0.
	16.83(	.64(	10.31(	31.03(	26.99(	0.00(	45.10(	0.00(
BA140	1.99E+06	4.77E+07	3.09E+07	3.79E+06	9.44E+05	0.	2.55E+06	0.
	0.00(	.20(	.04(	0.00(	0.00(	0.00(	0.00(	0.00(
CE141	4.09E+02	1.02E+07	5.33E+03	3.56E+03	1.18E+03	0.	0.	0.
	0.00(	.04(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
CE144	2.12E+06	9.93E+07	3.95E+05	1.63E+05	6.87E+04	0.	0.	0.
	0.00(	.42(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
TOTAL	2.71E+10	2.39E+10	9.28E+10	3.44E+10	1.05E+10	1.45E+11	3.33E+09	1.00E+03

*Entry in each box represents the R_i value in units of mrem/yr per μCi/sec per m^2 for ground plane and food pathways and mrem/yr per μCi/m^3 for the inhalation pathway e.g. 1.96E+06 for MN-54 for the liver. The number below the R_i value e.g. 0.02 for MN-54 is the percent contributed to that particular organ dose if a unit source term mix existed for each of the isotopes listed in the Table. For other mixes these percentages would be different.

Table 5-15, cont'd R_i values for the Surry Plant for the cow milk pathway for a child.*

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SURRY EFFLUENT TECH SPECS 10/25/78

SPECIAL LOCATION # 1 SURRY R CAL
PATHWAY # COW MILK

AGE GROUP # CHILD

NUCLIDE	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H 3	1.58E+03	1.58E+03	0.	1.58E+03	8.19E+02	1.58E+03	1.58E+03	1.58E+03
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	100.00(
P 32	1.96E+09	1.41E+09	5.09E+10	2.38E+09	0.	0.	0.	0.
	5.09(	8.64(	38.27(	3.91(	0.00(	0.00(	0.00(	0.00(
MN 54	3.39E+06	1.07E+07	0.	1.27E+07	1.62E+06	0.	0.	0.
	0.00(	.07(	0.00(	.02(	.02(	0.00(	0.00(	0.00(
FE 59	5.79E+07	1.21E+08	7.14E+07	1.16E+08	0.	0.	3.37E+07	0.
	.15(	.76(	.04(	.19(	0.00(	0.00(	.67(	0.00(
CO 58	2.21E+07	4.20E+07	0.	7.21E+06	0.	0.	0.	0.
	.06(	.26(	0.00(	.01(	0.00(	0.00(	0.00(	0.00(
CO 60	7.90E+07	1.48E+08	0.	2.68E+07	0.	0.	0.	0.
	.20(	.91(	0.00(	.04(	0.00(	0.00(	0.00(	0.00(
ZN 65	4.79E+09	1.35E+09	2.68E+09	7.70E+09	2.17E+09	0.	0.	0.
	12.92(	8.30(	1.72(	12.64(	25.18(	0.00(	0.00(	0.00(
RB 86	3.36E+09	3.52E+08	0.	5.47E+09	0.	0.	0.	0.
	8.73(	2.16(	0.00(	8.99(	0.00(	0.00(	0.00(	0.00(
SR 89	1.13E+08	1.54E+08	3.97E+09	0.	0.	0.	0.	0.
	.29(	.94(	2.56(	0.00(	0.00(	0.00(	0.00(	0.00(
SR 90	1.87E+10	9.95E+08	7.34E+10	0.	0.	0.	0.	0.
	48.56(	6.11(	83.93(	0.00(	0.00(	0.00(	0.00(	0.00(
Y 91	6.21E+02	3.09E+06	2.32E+08	0.	0.	0.	0.	0.
	0.00(	.02(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
ZR 95	8.47E+02	5.23E+05	2.28E+03	5.02E+02	3.01E+02	0.	0.	0.
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
NB 95	5.31E+06	1.37E+06	1.91E+05	7.12E+06	2.90E+06	0.	0.	0.
	0.00(	.84(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
RU103	9.88E+02	6.65E+06	2.57E+03	0.	2.68E+03	0.	0.	0.
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
RU106	7.14E+03	8.90E+05	5.72E+06	0.	2.60E+06	0.	0.	0.
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
AG110M	7.19E+07	1.07E+10	1.33E+08	9.00E+07	7.19E+07	0.	0.	0.
	.19(	65.74(	.08(	.15(	.83(	0.00(	0.00(	0.00(
TE127M	1.82E+07	1.24E+08	1.53E+08	4.13E+07	1.46E+08	3.66E+07	0.	0.
	.05(	.76(	.09(	.07(	1.69(	.01(	0.00(	0.00(
TE129M	2.74E+07	2.15E+08	1.76E+08	8.92E+07	1.74E+08	5.68E+07	0.	0.
	.07(	1.32(	.10(	.08(	2.01(	.02(	0.00(	0.00(
I 131	4.85E+08	7.64E+07	8.54E+08	8.59E+08	5.04E+08	2.44E+11	0.	0.
	1.27(	.47(	.51(	1.41(	5.87(	99.03(	0.00(	0.00(
I 133	5.48E+06	5.84E+06	1.17E+07	1.45E+07	8.53E+06	2.49E+09	0.	0.
	.01(	.04(	0.00(	.02(	.10(	.98(	0.00(	0.00(
CS134	4.78E+09	1.22E+09	1.38E+10	2.27E+10	2.83E+09	0.	2.92E+09	0.
	12.41(	.75(	8.22(	37.28(	32.79(	0.00(	50.39(	0.00(
CS136	1.14E+09	6.17E+07	6.39E+08	1.76E+09	3.89E+08	0.	1.40E+08	0.
	2.95(	.38(	.38(	2.89(	4.51(	0.00(	2.79(	0.00(
CS137	2.91E+09	1.23E+08	2.06E+10	1.97E+10	2.33E+09	0.	2.31E+09	0.
	7.58(	.76(	12.24(	32.34(	26.99(	0.00(	46.15(	0.00(
BA140	4.36E+06	3.78E+07	7.47E+07	6.54E+06	7.79E+03	0.	3.90E+06	0.
	.01(	.23(	.04(	0.00(	0.00(	0.00(	0.00(	0.00(
CE141	9.73E+02	8.17E+06	1.31E+06	6.55E+03	9.73E+02	0.	0.	0.
	0.00(	.05(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
CE144	5.20E+06	7.96E+07	8.78E+05	3.09E+05	5.67E+06	0.	0.	0.
	0.00(	.49(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
TOTAL	3.85E+10	1.63E+10	1.64E+11	8.09E+10	4.62E+09	2.47E+11	5.00E+09	1.58E+03

*Entry in each box represents the R_i value in units of mrem/yr per μCi/sec per m^2 for ground plane and food pathways and mrem/yr per μCi/m^3 for the inhalation pathway e.g. 1.27E+07 for MN-54 for the liver. The number below the R_i value e.g. 0.02 for MN-54 is the percent contributed to that particular organ dose if a unit source term mix existed for each of the isotopes listed in the Table. For other mixes these percentages would be different.

Table 5-15, cont'd R_j values for the Surry Plant for the cow milk pathway for an infant.*

SURRY EFFLUENT TECH SPECS 10/25/78

SPECIAL LOCATION # 1 SURRY # CAL
PATHWAY # COW MILK

AGE GROUP # INFANT

NUCLIDE	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H 3	2.60E+03	2.60E+03	0.	2.60E+03	8.19E+02	2.60E+03	2.60E+03	2.60E+03
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	100.00(
P 32	4.66E+09	1.42E+09	1.05E+11	8.17E+09	0.	0.	0.	0.
	8.57(	5.73(	40.96(	5.15(	0.00(	0.00(	0.00(	0.00(
MN 54	5.37E+06	8.71E+06	0.	2.37E+07	1.62E+06	0.	0.	0.
	.01(	.04(	0.00(	.02(	.02(	0.00(	0.00(	0.00(
FE 59	9.23E+07	1.12E+08	1.34E+08	2.34E+08	0.	0.	6.92E+07	0.
	.19(	.45(	.05(	.20(	0.00(	0.00(	.78(	0.00(
CO 58	3.60E+07	3.59E+07	0.	1.44E+07	0.	0.	0.	0.
	.08(	.15(	0.00(	.01(	0.00(	0.00(	0.00(	0.00(
CO 60	1.29E+08	1.30E+08	0.	5.87E+07	0.	0.	0.	0.
	.27(	.53(	0.00(	.05(	0.00(	0.00(	0.00(	0.00(
ZN 65	6.14E+09	1.12E+10	3.88E+09	1.33E+10	2.17E+09	0.	0.	0.
	12.93(	45.83(	1.52(	11.10(	25.18(	0.00(	0.00(	0.00(
RB 86	6.86E+09	3.55E+08	0.	1.39E+10	0.	0.	0.	0.
	14.46(	1.44(	0.00(	11.58(	0.00(	0.00(	0.00(	0.00(
SR 89	2.17E+08	1.55E+08	7.55E+09	0.	0.	0.	0.	0.
	.46(	.63(	2.95(	0.00(	0.00(	0.00(	0.00(	0.00(
SR 90	2.05E+10	1.00E+09	8.04E+10	0.	0.	0.	0.	0.
	43.13(	4.06(	31.39(	0.00(	0.00(	0.00(	0.00(	0.00(
Y 91	1.16E+03	3.12E+06	8.36E+08	0.	0.	0.	0.	0.
	0.00(	.01(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
ZR 95	7.01E+02	6.92E+05	8.05E+03	9.88E+02	3.01E+02	0.	0.	0.
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
NB 95	8.40E+04	1.24E+06	3.58E+05	1.47E+05	2.90E+04	0.	0.	0.
	0.00(	.50(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
RU103	1.74E+03	6.33E+04	5.21E+03	0.	2.68E+03	0.	0.	0.
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
RU106	1.47E+04	8.95E+05	1.18E+05	0.	2.60E+04	0.	0.	0.
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
AG110M	1.19E+08	9.32E+08	2.66E+08	1.80E+08	7.19E+07	0.	0.	0.
	.25(	37.66(	.10(	.15(	.83(	0.00(	0.00(	0.00(
TE127M	3.75E+07	1.25E+08	3.10E+08	1.03E+08	1.46E+08	8.96E+07	0.	0.
	.08(	.51(	.12(	.09(	1.69(	.01(	0.00(	0.00(
TE129M	5.57E+07	2.16E+08	3.62E+08	1.24E+08	1.74E+08	1.39E+08	0.	0.
	.12(	.87(	.13(	.10(	2.01(	.02(	0.00(	0.00(
I 131	9.23E+08	7.49E+07	1.78E+09	2.10E+09	5.06E+08	4.90E+11	0.	0.
	1.95(	.30(	.70(	1.75(	5.87(	99.03(	0.00(	0.00(
I 133	1.05E+07	6.09E+06	2.47E+07	3.60E+07	8.55E+06	8.55E+09	0.	0.
	.02(	.02(	0.00(	.03(	.10(	.99(	0.00(	0.00(
CS134	4.19E+09	1.13E+08	2.23E+10	4.15E+10	2.83E+09	0.	4.38E+09	0.
	8.84(	.45(	8.70(	34.63(	32.79(	0.00(	49.07(	0.00(
CS136	1.37E+09	5.58E+07	1.25E+09	3.67E+09	3.89E+08	0.	2.99E+08	0.
	2.89(	.23(	.49(	3.06(	4.51(	0.00(	3.35(	0.00(
CS137	2.72E+09	1.00E+08	3.28E+10	3.84E+10	2.33E+09	0.	4.18E+09	0.
	5.74(	.39(	12.83(	32.08(	26.99(	0.00(	46.80(	0.00(
BA140	7.91E+06	3.77E+07	1.54E+08	1.54E+05	7.79E+03	0.	9.83E+04	0.
	.02(	.15(	.06(	0.00(	0.00(	0.00(	0.00(	0.00(
CE141	1.87E+03	8.21E+06	2.68E+08	1.59E+04	9.73E+02	0.	0.	0.
	0.00(	.03(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
CE144	7.82E+04	8.01E+07	1.40E+06	5.71E+05	5.67E+04	0.	0.	0.
	0.00(	.32(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
TOTAL	4.74E+10	2.47E+10	2.56E+11	1.20E+11	8.02E+09	4.97E+11	8.93E+09	2.60E+03

*Entry in each box represents the R_j value in units of mrem/yr per μCi/sec per m^2 for ground plane and food pathways and mrem/yr per $\mu Ci/m^3$ for the inhalation pathway e.g. 2.37E+07 for MN-54 for the liver The number below the R_j value e.g. 0.02 for MN-54 is the percent contributed to that particular organ dose if a unit source term mix existed for each of the isotopes listed in the Table. For other mixes these per-

Table 5-15, cont'd R_i values for the Surry Plant for the goat milk pathway for an adult.*

SURRY EFFLUENT TECH SPECS 10/25/78

SPECIAL LOCATION # : SURRY # CAL
PATHWAY # GOATMILK

AGE GROUP # ADULT

NUCLIDE	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H 3	1.57E+03	1.57E+03	0.	1.57E+03	1.57E+03	1.57E+03	1.57E+03	1.57E+03
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
P 32	5.19E+08	1.51E+09	1.34E+10	8.34E+08	0.	0.	0.	0.
	1.01%	22.00%	12.71%	1.75%	0.00%	0.00%	0.00%	0.00%
MN 54	1.17E+05	1.78E+06	0.	6.16E+05	1.83E+05	0.	0.	0.
	0.00%	.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
FE 59	2.08E+05	1.81E+06	2.31E+05	5.42E+05	0.	0.	1.51E+05	0.
	0.00%	.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CO 58	7.54E+05	6.82E+06	0.	3.36E+05	0.	0.	0.	0.
	0.00%	.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CO 60	2.69E+06	2.29E+07	0.	1.22E+06	0.	0.	0.	0.
	0.00%	.33%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
ZN 65	1.65E+08	2.31E+08	1.15E+08	3.66E+08	2.65E+08	0.	0.	0.
	.32%	3.36%	.11%	.77%	1.98%	0.00%	0.00%	0.00%
RB 86	9.05E+07	3.43E+07	0.	1.96E+08	0.	0.	0.	0.
	.18%	.56%	0.00%	.41%	0.00%	0.00%	0.00%	0.00%
SR 89	5.24E+07	2.93E+08	1.43E+09	0.	0.	0.	0.	0.
	.10%	4.27%	1.73%	0.00%	0.00%	0.00%	0.00%	0.00%
SR 90	1.59E+10	1.44E+09	8.08E+10	0.	0.	0.	0.	0.
	31.14%	27.37%	81.54%	0.00%	0.00%	0.00%	0.00%	0.00%
Y 91	1.68E+01	3.37E+05	8.13E+02	0.	0.	0.	0.	0.
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
ZR 95	1.46E+01	3.85E+04	8.72E+01	2.16E+01	3.39E+01	0.	0.	0.
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
NB 95	1.78E+03	2.81E+07	5.94E+03	3.31E+03	3.27E+03	0.	0.	0.
	0.00%	.29%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
RU103	3.16E+01	8.56E+03	7.33E+01	0.	2.80E+02	0.	0.	0.
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
RU106	1.92E+02	9.81E+04	1.52E+03	0.	2.93E+03	0.	0.	0.
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
AG110M	2.45E+06	1.66E+09	4.46E+06	4.12E+06	8.11E+06	0.	0.	0.
	0.00%	28.54%	0.00%	0.00%	.05%	0.00%	0.00%	0.00%
TE127M	8.93E+05	1.36E+07	8.05E+06	1.49E+06	1.64E+07	1.03E+06	0.	0.
	0.00%	.20%	0.00%	0.00%	.10%	0.00%	0.00%	0.00%
TE129M	7.43E+05	2.36E+07	4.69E+06	1.75E+06	1.96E+07	1.61E+06	0.	0.
	0.00%	.34%	0.00%	0.00%	.12%	0.00%	0.00%	0.00%
I 131	1.91E+08	8.78E+07	2.33E+08	3.33E+08	5.71E+08	1.89E+11	0.	0.
	.37%	1.28%	.22%	.70%	3.94%	99.28%	0.00%	0.00%
I 133	1.66E+06	6.95E+06	3.17E+06	5.51E+06	9.61E+06	8.10E+08	0.	0.
	0.00%	.07%	0.00%	.01%	.06%	.78%	0.00%	0.00%
CS134	2.01E+10	6.31E+08	1.03E+10	2.46E+10	7.97E+09	0.	2.65E+09	0.
	39.34%	4.29%	9.81%	51.66%	98.31%	0.00%	51.16%	0.00%
CS136	1.82E+09	2.74E+08	6.99E+08	1.97E+09	1.10E+09	0.	1.50E+08	0.
	2.77%	3.28%	.47%	6.13%	8.84%	0.00%	3.02%	0.00%
CS137	1.27E+10	3.78E+08	1.01E+10	1.93E+10	6.56E+09	0.	2.18E+09	0.
	24.74%	5.46%	13.39%	40.55%	39.77%	0.00%	43.82%	0.00%
BA140	1.35E+05	4.23E+06	2.04E+06	2.98E+03	8.78E+02	0.	1.98E+03	0.
	0.00%	.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CE141	2.68E+01	9.83E+05	3.49E+02	2.36E+02	1.10E+02	0.	0.	0.
	0.00%	.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CE144	1.35E+03	8.71E+06	2.58E+04	1.06E+04	6.39E+03	0.	0.	0.
	0.00%	.13%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
TOTAL	5.12E+10	6.96E+09	1.06E+11	6.77E+10	1.06E+10	1.10E+11	6.98E+09	1.57E+03

*Entry in each box represents the R_i value in units of mrem/yr per μCi/sec per m^2 for ground plane and food pathways and mrem/yr per μCi/m^3 for the inhalation pathway e.g. 6.14E+05 for MN-54 for the liver. The number below the R_i value e.g. 0.00 for MN-54 is the percent contributed to that particular organ dose if a unit source term mix existed for each of the isotopes listed in the Table. For other mixes these percentages would be different.

Table 5-15, cont'd R_i values for the Surry Plant for the goat milk pathway for a teen.*

SURRY EFFLUENT TECH SPECS 10/29/79

SPECIAL LOCATION # 1 SURRY R CAL
PATHWAY # GOATMILK

AGE GROUP # TEEN

NUCLIDE	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H 3	2.04E+03	2.04E+03	0.	2.04E+03	2.02E+03	2.04E+03	2.04E+03	2.04E+03
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	100.00(
P 32	9.60E+08	2.08E+09	2.AE+10	1.53E+09	0.	0.	0.	0.
	1.65(	23.47(	15.91(	1.85(	0.00(	0.00(	0.00(	0.00(
MN 54	2.03E+05	2.10E+06	0.	1.02E+06	2.36E+05	0.	0.	0.
	0.00(	.02(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
FE 59	3.63E+05	2.22E+06	4.03E+05	9.60E+05	0.	0.	2.96E+05	0.
	0.00(	.03(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
CO 58	1.30E+06	7.80E+06	0.	5.66E+05	0.	0.	0.	0.
	0.00(	.09(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
CO 60	4.66E+06	2.A9E+07	0.	2.07E+06	0.	0.	0.	0.
	0.00(	.30(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
ZN 65	2.86E+08	2.60E+08	1.77E+08	6.13E+08	3.1AE+08	0.	0.	0.
	.49(	2.93(	.11(	.74(	1.48(	0.00(	0.00(	0.00(
RB 86	1.66E+08	5.24E+07	0.	3.58E+08	0.	0.	0.	0.
	.29(	.59(	0.00(	.43(	0.00(	0.00(	0.00(	0.00(
SR 89	9.65E+07	8.01F+08	3.37E+09	0.	0.	0.	0.	0.
	.17(	9.52(	2.08(	0.00(	0.00(	0.00(	0.00(	0.00(
SR 90	2.27E+10	2.58E+09	9.1AE+10	0.	0.	0.	0.	0.
	38.91(	29.05(	55.63(	0.00(	0.00(	0.00(	0.00(	0.00(
Y 91	3.02E+01	8.82E+05	1.13E+03	0.	0.	0.	0.	0.
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
ZR 95	2.56E+01	8.49E+0a	1.1AE+02	3.72E+01	0.38E+01	0.	0.	0.
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
NB 95	3.09E+03	2.0F+07	1.01F+0a	5.62E+03	0.22E+03	0.	0.	0.
	0.00(	.87(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
RU103	5.58E+01	1.09E+04	..30E+02	0.	3.61E+02	0.	0.	0.
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
RU106	3.51E+02	1.34E+05	2.79E+03	0.	3.78E+03	0.	0.	0.
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
AG110M	8.24E+06	1.06E+09	7.37E+0A	6.97E+06	1.05E+07	0.	0.	0.
	0.00(	22.09(	0.00(	0.00(	.05(	0.00(	0.00(	0.00(
TE127M	8.87E+05	1.8AE+07	7.AAE+0A	2.65E+06	2.12E+07	1.77E+06	0.	0.
	0.00(	.21(	0.00(	0.00(	.10(	0.00(	0.00(	0.00(
TE129M	1.36E+06	3.22E+07	8.56E+06	3.19E+06	2.53E+07	2.77E+06	0.	0.
	0.00(	.36(	0.00(	0.00(	.12(	0.00(	0.00(	0.00(
I 131	3.18E+0A	1.17E+0A	8.22E+0A	5.91F+08	7.3AE+08	1.73F+11	0.	0.
	.55(	1.32(	.26(	.71(	3.96(	99.21(	0.00(	0.00(
I 133	2.99E+06	7.03F+06	5.79E+0A	9.A1F+06	1.2AE+07	1.37F+09	0.	0.
	0.00(	.0A(	0.00(	.01(	.0A(	.79(	0.00(	0.00(
CS134	1.96E+10	9.7AF+0A	1.A0E+10	4.23E+10	1.03E+10	0.	5.13E+09	0.
	33.69(	5.93(	10.89(	51.05(	48.31(	0.00(	51.70(	0.00(
CS136	2.25E+09	2.69E+0A	8.50E+0A	3.34E+09	1.01E+09	0.	2.87E+08	0.
	3.85(	3.03(	.52(	4.00(	4.64(	0.00(	2.89(	0.00(
CS137	1.19E+10	8.A5E+08	2.56E+10	3.01E+10	8.07E+09	0.	4.51E+09	0.
	20.39(	5.47(	15.53(	41.15(	39.77(	0.00(	45.41(	0.00(
BA140	2.39E+05	5.72E+0a	3.71E+0A	8.55E+03	1.13E+03	0.	3.0AE+03	0.
	0.00(	.0A(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
CE141	8.91E+01	1.22E+0a	8.A0E+02	8.27E+02	1.02E+02	0.	0.	0.
	0.00(	.01(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
CE144	2.55E+0.	1.19E+07	8.74E+0A	1.0AE+0a	8.2AE+03	0.	0.	0.
	0.00(	.13(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
TOTAL	5.83E+10	8.A7E+09	1.05E+11	8.28E+10	2.13E+10	1.74E+11	9.93E+09	2.04E+03

*Entry in each box represents the R_i value in units of mrem/yr per μCi/sec per m^2 for ground plane and food pathways and mrem/yr per $\mu Ci/m^3$ for the inhalation pathway e.g. 1.02E+06 for MN-54 for the liver. The number below the R_i value e.g. 0.00 for MN-54 is the percent contributed to that particular organ dose if a unit source term mix existed for each of the isotopes listed in the Table. For other mixes these percentages would be different.

Table 5-15, cont'd R_i values for the Surry Plant for the goat milk pathway for a child.*

BURRY EFFLUENT TECH SPECS 10/25/78

SPECIAL LOCATION # 1 BURRY R CAL
PATHWAY # GOATMILK

AGE GROUP # CHILD

NUCLIDE	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H 3	3.23E+03	3.23E+03	0.	3.23E+03	1.67E+03	3.23E+03	3.23E+03	3.23E+03
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	100.00(
P 32	2.35E+09	1.69E+09	8.11E+10	2.86E+09	0.	0.	0.	0.
	3.36(	25.16(	18.45(	2.07(	0.00(	0.00(	0.00(	0.00(
MN 54	8.07E+05	1.28E+06	0.	1.53E+06	1.94E+05	0.	0.	0.
	0.00(	.02(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
FE 59	7.52E+05	1.57E+06	9.34E+05	1.51E+06	0.	0.	6.38E+05	0.
	0.00(	.02(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
CO 58	2.65E+06	8.05E+06	0.	8.65E+05	0.	0.	0.	0.
	0.00(	.09(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
CO 60	9.48E+06	1.78E+07	0.	3.21E+06	0.	0.	0.	0.
	.01(	.27(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
ZN 65	5.74E+08	1.62E+08	3.47E+08	9.24E+08	2.61E+08	0.	0.	0.
	.82(	2.42(	.10(	.87(	1.48(	0.00(	0.00(	0.00(
RB 86	4.04E+08	4.22E+07	0.	4.57E+08	0.	0.	0.	0.
	.58(	.63(	0.00(	.48(	0.00(	0.00(	0.00(	0.00(
SR 89	2.38E+08	3.23E+08	8.34E+09	0.	0.	0.	0.	0.
	.34(	4.81(	2.52(	0.00(	0.00(	0.00(	0.00(	0.00(
SR 90	3.93E+10	2.09E+09	1.55E+11	0.	0.	0.	0.	0.
	56.18(	31.15(	46.85(	0.00(	0.00(	0.00(	0.00(	0.00(
Y 91	7.45E+01	3.71E+05	2.79E+03	0.	0.	0.	0.	0.
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
ZR 95	5.36E+01	6.28E+04	2.76E+02	6.02E+01	3.61E+01	0.	0.	0.
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
NB 95	6.37E+03	1.85E+07	2.25E+04	8.91E+03	3.48E+03	0.	0.	0.
	0.00(	.25(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
RU103	1.19E+02	7.98E+03	3.09E+02	0.	2.98E+02	0.	0.	0.
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
RU106	8.56E+02	1.07E+05	6.86E+03	0.	3.11E+03	0.	0.	0.
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
AG110M	8.63E+06	1.28E+09	1.60E+07	1.08E+07	8.63E+06	0.	0.	0.
	.01(	19.15(	0.00(	0.00(	.35(	0.00(	0.00(	0.00(
TE127M	2.14E+06	1.89E+07	1.84E+07	8.95E+06	1.75E+07	8.40E+06	0.	0.
	0.00(	.22(	0.00(	0.00(	.10(	0.00(	0.00(	0.00(
TE129M	3.28E+06	2.58E+07	2.12E+07	5.91E+06	2.09E+07	6.82E+06	0.	0.
	0.00(	.38(	0.00(	0.00(	.12(	0.00(	0.00(	0.00(
I 131	5.85E+08	9.17E+07	1.02E+09	1.03E+09	6.08E+08	3.61E+11	0.	0.
	.84(	1.37(	.31(	.75(	3.46(	99.46(	0.00(	0.00(
I 133	6.58E+06	7.00E+06	1.41E+07	1.74E+07	1.02E+07	3.23E+09	0.	0.
	0.00(	.10(	0.00(	.01(	.04(	.88(	0.00(	0.00(
CS134	1.43E+10	3.47E+08	8.18E+10	4.80E+10	8.48E+09	0.	7.58E+09	0.
	20.50(	5.47(	12.52(	49.33(	48.31(	0.00(	50.73(	0.00(
CS136	3.41E+09	1.45E+08	1.92E+09	5.27E+09	1.17E+09	0.	4.19E+08	0.
	4.87(	2.76(	.58(	3.82(	6.64(	0.00(	2.91(	0.00(
CS137	8.72E+09	3.70E+08	6.17E+10	5.41E+10	6.98E+09	0.	6.93E+09	0.
	12.46(	5.52(	18.65(	42.85(	39.77(	0.00(	48.46(	0.00(
BA140	5.23E+05	6.54E+06	6.96E+06	7.45E+03	9.35E+02	0.	6.68E+03	0.
	0.00(	.07(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
CE141	1.17E+02	9.81E+05	1.54E+03	7.86E+02	1.17E+02	0.	0.	0.
	0.00(	.01(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
CE144	6.24E+03	9.55E+06	1.17E+05	3.66E+04	6.60E+03	0.	0.	0.
	0.00(	.14(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
TOTAL	7.00E+10	6.71E+09	3.31E+11	1.38E+11	1.76E+10	3.44E+11	1.49E+10	3.23E+03

*Entry in each box represents the R_i value in units of mrem/yr per μCi/sec per m^2 for ground plane and food pathways and mrem/yr per μCi/m^3 for the inhalation pathway e.g. 1.53E+06 for MN-54 for the liver. The number below the R_i value e.g. 0.00 for MN-54 is the percent contributed to that particular organ dose if a unit source term mix existed for each of the isotopes listed in the Table. For other mixes these percentages would be different.

Table 5-15 cont'd R_i values for the Surry Plant for the goat milk pathway for an infant.*

BURRY EFFLUENT TECH SPECS 10/25/78

SPECIAL LOCATION = BURRY = CAL
PATHWAY = GOATMILK

AGE GROUP = INFANT

NUCLIDE	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H 3	4.99E+03	4.99E+03	0.	4.99E+03	1.67E+03	4.99E+03	4.99E+03	4.99E+03
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
P 32	6.88E+09	1.90E+09	1.26E+11	7.40E+09	0.	0.	0.	0.
	6.43%	22.10%	26.09%	2.80%	0.00%	0.00%	0.00%	0.00%
MN 54	6.45E+05	1.04E+06	0.	2.84E+06	1.94E+05	0.	0.	0.
	0.00%	.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
FE 59	1.20E+06	1.45E+06	1.76E+06	3.74E+06	0.	0.	9.00E+05	0.
	0.00%	.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CO 58	4.31E+06	4.31E+06	0.	1.73E+06	0.	0.	0.	0.
	0.00%	.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CO 60	1.55E+07	1.58E+07	0.	6.56E+06	0.	0.	0.	0.
	.02%	.20%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
ZN 65	7.36E+08	1.35E+09	4.84E+08	1.60E+09	2.61E+08	0.	0.	0.
	.97%	17.51%	.10%	.60%	1.46%	0.00%	0.00%	0.00%
RB 86	8.23E+08	4.26E+07	0.	1.67E+09	0.	0.	0.	0.
	1.08%	.55%	0.00%	.63%	0.00%	0.00%	0.00%	0.00%
SR 89	7.35E+08	3.26E+06	1.59E+10	0.	0.	0.	0.	0.
	.60%	4.23%	3.29%	0.00%	0.00%	0.00%	0.00%	0.00%
SR 90	6.30E+10	2.11E+09	1.68E+11	0.	0.	0.	0.	0.
	58.62%	27.38%	34.99%	0.00%	0.00%	0.00%	0.00%	0.00%
Y 91	1.39E+02	5.75E+05	5.23E+03	0.	0.	0.	0.	0.
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
ZR 95	8.41E+01	5.90E+04	4.84E+02	1.19E+02	3.81E+01	0.	0.	0.
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
NB 95	1.02E+04	1.48E+07	8.27E+06	1.78E+04	3.48E+03	0.	0.	0.
	0.00%	.19%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
RU103	2.99E+02	7.66E+03	8.29E+02	0.	2.98E+02	0.	0.	0.
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
RU106	1.77E+03	1.01E+05	1.41E+04	0.	3.11E+03	0.	0.	0.
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
AG110M	1.43E+07	1.12E+07	2.95E+07	2.16E+07	6.63E+06	0.	0.	0.
	.02%	14.52%	0.00%	0.00%	.05%	0.00%	0.00%	0.00%
TE127M	4.51E+06	1.50E+07	3.72E+07	1.23E+07	1.75E+07	1.08E+07	0.	0.
	0.00%	.25%	0.00%	0.00%	.10%	0.00%	0.00%	0.00%
TE129M	6.69E+06	2.59E+07	9.18E+07	1.49E+07	2.09E+07	1.67E+07	0.	0.
	0.00%	.34%	0.00%	0.00%	.12%	0.00%	0.00%	0.00%
I 131	1.11E+09	8.90E+07	2.14E+09	2.52E+09	8.04E+08	8.24E+11	0.	0.
	1.80%	1.17%	.84%	.95%	3.48%	99.06%	0.00%	0.00%
I 133	1.27E+07	7.31E+06	2.47E+07	8.12E+07	1.02E+07	7.48E+09	0.	0.
	.02%	.09%	0.00%	.02%	.08%	.90%	0.00%	0.00%
CS134	1.26E+10	1.14E+08	6.68E+10	1.25E+11	4.48E+09	0.	1.11E+10	0.
	16.57%	4.39%	13.85%	47.14%	68.51%	0.00%	69.48%	0.00%
CS136	4.11E+07	1.87E+08	3.75E+09	1.10E+10	1.17E+09	0.	8.98E+08	0.
	5.42%	2.17%	.78%	4.17%	6.64%	0.00%	3.38%	0.00%
CS137	8.17E+09	3.61E+08	9.85E+10	1.15E+11	6.98E+09	0.	1.25E+10	0.
	10.77%	4.08%	20.43%	43.80%	39.77%	0.00%	47.18%	0.00%
BA140	9.59E+05	4.53E+06	1.84E+07	1.84E+06	9.35E+02	0.	1.13E+04	0.
	0.00%	.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CE141	2.24E+02	8.45E+05	3.13E+03	1.91E+03	1.17E+02	0.	0.	0.
	0.00%	.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CE144	9.39E+03	8.61E+06	1.47E+05	6.86E+04	6.80E+03	0.	0.	0.
	0.00%	.12%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
TOTAL	1.59E+10	7.77E+09	6.62E+11	2.64E+11	1.76E+10	8.36E+11	2.66E+10	4.40E+03

*Entry in each box represents the R_i value in units of mrem/yr per μCi/sec per m^2 for ground plane and food pathways and mrem/yr per $\mu Ci/m^3$ for the inhalation pathway e.g. 2.54E+06 for MN-54 for the liver. The number below the R_i value e.g. 0.00 for MN-54 is the percent contributed to that particular organ dose if a unit source term mix existed for each of the isotopes listed in the Table. For other mixes these percentages would be different.

Table 5-15, cont'd R_i values for the Surry Plant for the meat pathway for an adult.*

SURRY EFFLUENT TECH SPECS 10/29/78

SPECIAL LOCATION # 1 SURRY R CAL
PATHWAY # MEAT

AGE GROUP # ADULT

NUCLIDE	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H 3	3.27E+02	3.27E+02	0.	3.27E+02	3.27E+02	3.27E+02	3.27E+02	3.27E+02
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	100.00(
P 32	1.18E+08	3.43E+08	3.05E+09	1.89E+08	0.	0.	0.	0.
	2.51(	.25(	18.80(	9.68(	0.00(	0.00(	0.00(	0.00(
MN 54	1.06E+06	1.71E+07	0.	5.57E+06	1.66E+06	0.	0.	0.
	.02(	.01(	0.00(	.14(	.01(	0.00(	0.00(	0.00(
FE 59	1.43E+	1.25E+09	1.59E+09	3.74E+08	0.	0.	1.04E+08	0.
	3.04(	.91(	.98(	9.22(	0.00(	0.00(	35.38(	0.00(
CO 58	2.43E+07	2.20E+08	0.	1.08E+07	0.	0.	0.	0.
	.52(	.16(	0.00(	.27(	0.00(	0.00(	0.00(	0.00(
CO 60	1.03E+08	8.75E+08	0.	8.66E+07	0.	0.	0.	0.
	2.20(	.64(	0.00(	1.15(	0.00(	0.00(	0.00(	0.00(
ZN 65	3.58E+08	8.98E+08	2.89E+08	7.91E+08	5.29E+08	0.	0.	0.
	7.63(	.36(	1.53(	19.52(	4.74(	0.00(	0.00(	0.00(
RB 86	1.42E+08	6.00E+07	0.	3.04E+08	0.	0.	0.	0.
	3.03(	.04(	0.00(	7.51(	0.00(	0.00(	0.00(	0.00(
SR 89	5.23E+06	2.62E+07	1.82E+08	0.	0.	0.	0.	0.
	.11(	.02(	1.12(	0.00(	0.00(	0.00(	0.00(	0.00(
SR 90	2.02E+09	2.38E+08	8.22E+09	0.	0.	0.	0.	0.
	43.05(	.17(	50.70(	0.00(	0.00(	0.00(	0.00(	0.00(
Y 91	1.80E+04	3.91E+06	6.75E+05	0.	0.	0.	0.	0.
	0.00(	.27(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
ZR 95	2.43E+05	1.14E+07	1.12E+06	3.59E+05	5.64E+05	0.	0.	0.
	0.00(	.83(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
NB 95	4.12E+05	4.65E+07	1.38E+06	7.66E+05	7.52E+05	0.	0.	0.
	0.00(	3.38(	0.00(	.02(	0.00(	0.00(	0.00(	0.00(
MO103	2.72E+01	7.38E+09	6.32E+07	0.	2.81E+08	0.	0.	0.
	.58(	5.36(	.39(	0.00(	2.16(	0.00(	0.00(	0.00(
RU106	2.19E+08	1.12E+11	1.73E+09	0.	3.35E+09	0.	0.	0.
	6.68(	81.44(	10.68(	0.00(	29.99(	0.00(	0.00(	0.00(
AG110M	2.34E+06	1.81E+09	6.27E+06	3.95E+06	7.76E+06	0.	0.	0.
	.05(	1.17(	.03(	.10(	.07(	0.00(	0.00(	0.00(
TE127M	1.00E+08	2.76E+09	8.22E+08	2.96E+08	3.34E+09	.10E+08	0.	0.
	2.14(	2.00(	5.07(	7.25(	29.93(	5.58(	0.00(	0.00(
TE129M	1.17E+08	3.73E+09	7.40E+08	2.76E+08	3.09E+09	2.54E+08	0.	0.
	2.50(	2.71(	4.56(	6.81(	27.69(	6.75(	0.00(	0.00(
I 131	5.77E+06	2.66E+06	7.04E+06	1.01E+07	1.73E+07	3.10E+09	0.	0.
	.12(	0.00(	.00(	.25(	.15(	87.48(	0.00(	0.00(
I 133	1.51E+01	6.44E+01	2.85E+01	4.96E+01	8.66E+01	7.79E+01	0.	0.
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
CS134	7.81E+08	1.47E+07	6.01E+08	2.55E+08	3.09E+08	0.	1.03E+08	0.
	16.66(	.01(	2.47(	23.56(	2.77(	0.00(	34.75(	0.00(
CS136	2.14E+07	3.38E+06	7.53E+06	2.97E+07	1.65E+07	0.	2.27E+06	0.
	.46(	0.00(	.05(	.73(	.15(	0.00(	.77(	0.00(
CS137	6.99E+08	1.47E+07	5.57E+08	7.41E+08	2.58E+08	0.	8.59E+07	0.
	10.64(	.01(	3.03(	18.78(	2.32(	0.00(	29.10(	0.00(
BA140	1.20E+06	3.77E+07	1.83E+07	2.30E+06	7.62E+03	0.	1.32E+06	0.
	.03(	.03(	.11(	0.00(	0.00(	0.00(	0.00(	0.00(
CE141	8.48E+02	2.16E+07	8.42E+03	5.49E+03	2.65E+03	0.	0.	0.
	0.00(	.02(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
CE144	4.70E+06	2.96E+08	8.75E+05	3.66E+06	2.17E+05	0.	0.	0.
	0.00(	.21(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
TOTAL	4.69E+09	1.36E+11	1.62E+10	4.05E+09	1.12E+10	3.77E+09	2.95E+08	5.27E+02

*Entry in each box represents the R_i value in units of mrem/yr per μCi/sec per m^2 for ground plane and food pathways and mrem/yr per μCi/m^3 for the inhalation pathway e.g. 5.57E+06 for MN-54 for the liver. The number below the R_i value e.g. 0.14 for MN-54 is the percent contributed to that particular organ dose if a unit source term mix existed for each of the isotopes listed in the Table. For other mixes these percentages would be different.

Table 5-15, cont'd R_i values for the Surry Plant for the meat pathway for a teen.*

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SURRY EFFLUENT TECH SPECS 10/25/76

SPECIAL LOCATION # 1 SURRY R CAL
PATHWAY # MEAT

AGE GROUP # TEEN

NUCLIDE	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H 3	1.95E+02	1.95E+02	0.	1.95E+02	1.95E+02	1.95E+02	1.95E+02	1.95E+02
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	100.00(
P 32	9.98E+07	2.16E+08	2.58E+09	1.60E+08	0.	0.	0.	0.
	3.32(	.26(	21.48(	4.92(	0.00(	0.00(	0.00(	0.00(
MN 54	8.43E+05	8.72E+06	0.	4.25E+06	9.60E+05	0.	0.	0.
	.03(	.01(	0.00(	.13(	.01(	0.00(	0.00(	0.00(
FE 59	1.15E+08	7.62E+08	1.27E+08	2.97E+08	0.	0.	9.36E+07	0.
	3.81(	.83(	1.06(	9.15(	0.00(	0.00(	34.92(	0.00(
CO 58	1.93E+07	1.15E+08	0.	8.36E+06	0.	0.	0.	0.
	.64(	.14(	0.00(	.26(	0.00(	0.00(	0.00(	0.00(
CO 60	8.15E+07	4.71E+08	0.	3.66E+07	0.	0.	0.	0.
	2.71(	.56(	0.00(	1.12(	0.00(	0.00(	0.00(	0.00(
ZN 65	2.83E+08	2.57E+08	1.75E+08	6.07E+08	3.13E+08	0.	0.	0.
	9.41(	.30(	1.46(	18.72(	4.74(	0.00(	0.00(	0.00(
RB 86	1.19E+08	3.76E+07	0.	2.54E+08	0.	0.	0.	0.
	3.97(	.04(	0.00(	7.83(	0.00(	0.00(	0.00(	0.00(
SR 89	2.60E+06	1.43E+07	1.54E+08	0.	0.	0.	0.	0.
	.15(	.02(	1.28(	0.00(	0.00(	0.00(	0.00(	0.00(
SR 90	1.31E+09	1.49E+08	5.32E+09	0.	0.	0.	0.	0.
	43.66(	.18(	44.37(	0.00(	0.00(	0.00(	0.00(	0.00(
Y 91	1.52E+04	2.33E+06	5.68E+05	0.	0.	0.	0.	0.
	0.00(	.27(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
ZR 95	1.95E+05	6.51E+06	8.97E+05	2.83E+05	3.33E+05	0.	0.	0.
	0.00(	.77(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
NB 95	3.29E+05	2.55E+06	1.08E+06	5.97E+05	6.48E+05	0.	0.	0.
	.01(	3.01(	0.00(	.02(	0.00(	0.00(	0.00(	0.00(
RU103	2.20E+07	9.30E+07	5.15E+07	0.	1.43E+08	0.	0.	0.
	.73(	5.07(	.93(	0.00(	2.16(	0.00(	0.00(	0.00(
RU106	1.84E+08	7.60E+10	1.44E+09	0.	1.98E+09	0.	0.	0.
	6.11(	82.47(	12.17(	0.00(	29.99(	0.00(	0.00(	0.00(
AG110M	1.86E+06	8.59E+06	3.23E+06	3.06E+06	8.58E+06	0.	0.	0.
	.06(	1.01(	.03(	.09(	.07(	0.00(	0.00(	0.00(
TE127M	8.25E+07	1.73E+08	6.96E+08	2.48E+08	1.97E+09	1.48E+08	0.	0.
	2.74(	2.04(	5.78(	7.58(	29.93(	5.99(	0.00(	0.00(
TE129M	9.81E+07	2.33E+09	8.20E+08	2.30E+08	1.82E+09	2.00E+08	0.	0.
	3.26(	2.74(	6.17(	7.09(	27.69(	7.26(	0.00(	0.00(
I 131	8.40E+06	1.62E+06	5.85E+06	8.20E+06	1.02E+07	7.39E+09	0.	0.
	.15(	0.00(	.05(	.25(	.15(	86.74(	0.00(	0.00(
I 133	1.23E+01	1.86E+01	2.19E+01	4.05E+01	5.11E+01	5.45E+01	0.	0.
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
CS134	3.48E+08	9.64E+06	3.19E+08	7.51E+08	1.43E+08	0.	8.11E+07	0.
	11.58(	.01(	2.66(	23.15(	2.77(	0.00(	34.00(	0.00(
CS136	1.55E+07	1.86E+06	5.87E+06	2.31E+07	9.77E+06	0.	1.98E+06	0.
	.52(	0.00(	.05(	.71(	.19(	0.00(	.84(	0.00(
CS137	2.18E+08	8.75E+06	8.62E+08	8.15E+08	1.53E+08	0.	8.13E+07	0.
	7.12(	.01(	3.45(	18.95(	2.32(	0.00(	30.34(	0.00(
BA140	9.76E+05	2.34E+07	1.51E+07	1.86E+04	4.62E+03	0.	1.25E+04	0.
	.03(	.03(	.13(	0.00(	0.00(	0.00(	0.00(	0.00(
CE141	5.42E+02	1.35E+07	7.07E+03	4.72E+03	1.56E+03	0.	0.	0.
	0.00(	.02(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
CE144	3.96E+04	1.45E+08	7.37E+05	1.05E+05	1.28E+05	0.	0.	0.
	0.00(	.22(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
TOTAL	3.01E+09	8.49E+10	1.20E+10	3.24E+09	6.59E+09	2.76E+09	2.68E+08	1.95E+02

*Entry in each box represents the R_i value in units of mrem/yr per μCi/sec per m^2 for ground plane and food pathways and mrem/yr per μCi/m^3 for the inhalation pathway e.g. 4.25E+06 for MN-54 for the liver. The number below the R_i value e.g. 0.13 for MN-54 is the percent contributed to that particular organ dose if a unit source term mix existed for each of the isotopes listed in the Table. For other mixes these per-

Table 5-15, cont'd R_i values for the Surry Plant for the meat pathway for a child.*

DRAFT

SURRY EFFLUENT TECH SPECS 10/25/78

SPECIAL LOCATION # 1 SURRY # CAL
PATHWAY # MEAT

AGE GROUP # CHILD NUCLIDE	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H 3	2.36E+02 0.00(	2.36E+02 0.00(	0. 0.00(	2.36E+02 0.00(	1.22E+02 0.00(	2.36E+02 0.00(	2.36E+02 0.00(	2.36E+02 100.00(
P 32	1.67E+08 8.89(	1.34E+08 .28(	4.86E+08 25.18(	2.27E+08 5.45(	0. 0.00(	0. 0.00(	0. 0.00(	0. 0.00(
MN 54	1.30E+06 .03(	4.86E+06 0.00(	0. 0.00(	4.26E+06 .12(	4.19E+05 .01(	0. 0.00(	0. 0.00(	0. 0.00(
FE 59	1.82E+08 4.55(	3.80E+08 .74(	2.25E+08 1.17(	3.65E+08 8.75(	0. 0.00(	0. 0.00(	1.08E+08 34.54(	0. 0.00(
CO 58	2.99E+07 .75(	4.70E+07 .11(	0. 0.00(	9.78E+06 .23(	0. 0.00(	0. 0.00(	0. 0.00(	0. 0.00(
CO 60	1.27E+08 3.17(	2.38E+08 .47(	0. 0.00(	4.30E+07 1.03(	0. 0.00(	0. 0.00(	0. 0.00(	0. 0.00(
ZN 65	4.35E+06 10.89(	1.23E+08 .24(	2.62E+08 1.36(	8.99E+08 18.77(	1.97E+08 4.74(	0. 0.00(	0. 0.00(	0. 0.00(
RB 86	2.21E+08 5.55(	2.32E+07 .05(	0. 0.00(	3.60E+08 8.64(	0. 0.00(	0. 0.00(	0. 0.00(	0. 0.00(
SR 89	8.31E+06 .21(	1.13E+07 .02(	2.91E+08 1.51(	0. 0.00(	0. 0.00(	0. 0.00(	0. 0.00(	0. 0.00(
SR 90	1.74E+09 43.63(	9.28E+07 .18(	6.67E+09 35.61(	0. 0.00(	0. 0.00(	0. 0.00(	0. 0.00(	0. 0.00(
Y 91	2.87E+06 0.00(	1.43E+08 .28(	1.07E+06 0.00(	0. 0.00(	0. 0.00(	0. 0.00(	0. 0.00(	0. 0.00(
ZR 95	3.12E+05 0.00(	3.45E+08 .71(	1.69E+06 0.00(	3.50E+06 0.00(	2.10E+05 0.00(	0. 0.00(	0. 0.00(	0. 0.00(
NB 95	5.17E+05 .01(	1.34E+09 2.82(	1.88E+06 0.00(	7.23E+05 .02(	2.82E+05 0.00(	0. 0.00(	0. 0.00(	0. 0.00(
RU103	3.58E+07 .90(	2.41E+09 4.71(	9.31E+07 .48(	0. 0.00(	9.63E+07 2.18(	0. 0.00(	0. 0.00(	0. 0.00(
RU106	3.43E+08 8.58(	4.27E+10 83.61(	2.76E+08 14.24(	0. 0.00(	1.25E+09 28.99(	0. 0.00(	0. 0.00(	0. 0.00(
AG110M	2.89E+06 .07(	4.30E+08 .84(	5.36E+06 .03(	3.62E+06 .09(	2.89E+06 .07(	0. 0.00(	0. 0.00(	0. 0.00(
TE127M	1.55E+08 3.89(	1.06E+09 2.07(	1.31E+09 6.76(	3.52E+06 8.44(	1.24E+09 28.93(	3.13E+06 7.27(	0. 0.00(	0. 0.00(
TE129M	1.81E+08 4.54(	1.42E+09 2.79(	1.17E+09 6.05(	3.26E+06 7.82(	1.15E+09 27.69(	3.77E+08 8.74(	0. 0.00(	0. 0.00(
I 131	6.20E+06 .16(	9.72E+06 0.00(	1.09E+07 .06(	1.09E+07 .26(	6.44E+06 .15(	3.61E+09 83.97(	0. 0.00(	0. 0.00(
I 133	2.07E+01 0.00(	2.21E+01 0.00(	4.43E+01 0.00(	5.48E+01 0.00(	3.23E+01 0.00(	1.04E+04 0.00(	0. 0.00(	0. 0.00(
CS134	1.95E+08 4.88(	4.98E+08 0.00(	5.63E+08 2.92(	9.23E+08 22.15(	1.15E+08 2.77(	0. 0.00(	1.03E+08 33.54(	0. 0.00(
CS136	3.80E+07 .45(	9.78E+05 0.00(	1.91E+07 .05(	2.78E+07 .87(	6.16E+06 .15(	0. 0.00(	2.21E+06 .72(	0. 0.00(
CS137	1.20E+08 3.01(	5.10E+06 0.00(	8.51E+08 4.41(	8.15E+08 19.54(	9.63E+07 2.32(	0. 0.00(	9.55E+07 31.20(	0. 0.00(
BA140	1.63E+06 .04(	1.42E+07 .03(	2.80E+07 .14(	2.45E+04 0.00(	2.92E+03 0.00(	0. 0.00(	1.48E+04 0.00(	0. 0.00(
CE141	9.86E+02 0.00(	8.28E+06 .02(	1.33E+06 0.00(	6.84E+03 0.00(	9.84E+02 0.00(	0. 0.00(	0. 0.00(	0. 0.00(
CE144	7.42E+06 0.00(	1.14E+08 .22(	1.39E+06 0.00(	4.36E+05 .01(	8.09E+06 0.00(	0. 0.00(	0. 0.00(	0. 0.00(
TOTAL	3.99E+09	5.11E+10	1.93E+10	4.17E+09	4.16E+09	4.34E+09	3.06E+08	2.36E+02

*Entry in each box represents the R_i value in units of mrem/yr per μCi/sec per m^2 for ground plane and food pathways and mrem/yr per μCi/m^3 for the inhalation pathway e.g. 4.86E+06 for MN-54 for the liver. The number below the R_i value e.g. 0.12 for MN-54 is the percent contributed to that particular organ dose if a unit source term mix existed for each of the isotopes listed in the Table. For other mixes these per-

Table 5-15, cont'd R_j values for the Surry Plant for the vegetable pathway for an adult*

DRAFT

SURRY EFFLUENT TECH SPECS 10/29/78

SPECIAL LOCATION # 1 SURRY # CAL
PATHWAY # VEGET

AGE GROUP # ADULT

NUCLIDE	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H 3	2.28E+03	2.28E+03	0.	2.28E+03	2.28E+03	2.28E+03	2.28E+03	2.28E+03
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	100.00(
P 32	5.04E+07	1.44E+08	1.08E+09	9.07E+07	0.	0.	0.	0.
	.04(	.30(	.25(	.08(	0.00(	0.00(	0.00(	0.00(
MN 54	9.84E+07	7.73E+08	0.	2.54E+08	7.55E+07	0.	0.	0.
	.03(	1.43(	0.00(	1.33(	.77(	0.00(	0.00(	0.00(
FE 59	9.81E+07	8.53E+08	1.09E+09	2.56E+08	0.	0.	7.15E+07	0.
	.06(	1.57(	.62(	1.34(	0.00(	0.00(	3.78(	0.00(
CO 58	5.74E+07	5.19E+08	0.	2.56E+07	0.	0.	0.	0.
	.04(	.95(	0.00(	.13(	0.00(	0.00(	0.00(	0.00(
CO 60	3.03E+08	2.52E+09	0.	1.37E+08	0.	0.	0.	0.
	.20(	4.74(	0.00(	.72(	0.00(	0.00(	0.00(	0.00(
ZN 65	5.02E+08	8.99E+08	3.09E+09	1.11E+09	7.63E+08	0.	0.	0.
	.33(	1.24(	.06(	5.82(	7.54(	0.00(	0.00(	0.00(
RB 86	9.60E+07	8.06E+07	0.	2.06E+08	0.	0.	0.	0.
	.06(	.09(	0.00(	1.08(	0.00(	0.00(	0.00(	0.00(
SR 89	2.49E+08	1.39E+09	8.68E+09	0.	0.	0.	0.	0.
	.16(	2.56(	1.48(	0.00(	0.00(	0.00(	0.00(	0.00(
SR 90	1.38E+11	1.63E+13	5.64E+11	0.	0.	0.	0.	0.
	90.85(	29.99(	96.41(	0.00(	0.00(	0.00(	0.00(	0.00(
Y 91	1.68E+05	2.38E+09	9.32E+06	0.	0.	0.	0.	0.
	0.00(	4.37(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
ZR 95	2.15E+05	1.01E+09	9.02E+05	3.16E+05	6.99E+05	0.	0.	0.
	0.00(	1.85(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
NB 95	3.72E+02	8.20E+06	1.24E+05	6.92E+04	6.84E+04	0.	0.	0.
	0.00(	.77(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
RU103	1.50E+06	8.88E+06	8.13E+06	0.	1.40E+07	0.	0.	0.
	0.00(	.90(	0.00(	0.00(	.18(	0.00(	0.00(	0.00(
RU106	2.05E+07	1.05E+10	1.62E+08	0.	3.13E+08	0.	0.	0.
	.03(	19.27(	.03(	0.00(	3.18(	0.00(	0.00(	0.00(
AG110M	5.27E+06	3.42E+09	9.60E+06	8.88E+06	1.75E+07	0.	0.	0.
	0.00(	6.86(	0.00(	.05(	.18(	0.00(	0.00(	0.00(
TE125M	5.04E+07	1.51E+09	6.49E+08	1.81E+08	1.83E+09	1.15E+08	0.	0.
	.04(	2.77(	.09(	.84(	18.52(	.30(	0.00(	0.00(
TE127M	4.28E+07	1.36E+09	2.70E+08	1.01E+08	1.11E+09	9.26E+07	0.	0.
	.03(	2.50(	.05(	.53(	11.24(	.24(	0.00(	0.00(
I 131	6.50E+07	2.99E+07	7.93E+07	1.13E+08	1.96E+08	3.76E+10	0.	0.
	.04(	.05(	.01(	.59(	1.97(	98.01(	0.00(	0.00(
I 133	1.12E+06	3.30E+06	2.11E+08	3.47E+06	6.40E+06	3.70E+08	0.	0.
	0.00(	0.00(	0.00(	.02(	.06(	1.42(	0.00(	0.00(
CS134	7.27E+09	1.56E+08	1.74E+09	8.89E+09	2.88E+09	0.	9.55E+08	0.
	4.77(	.29(	.66(	46.81(	29.21(	0.00(	50.52(	0.00(
CS136	1.19E+08	1.80E+07	4.01E+07	1.58E+08	8.81E+07	0.	1.21E+07	0.
	.07(	.03(	0.00(	.83(	.89(	0.00(	.64(	0.00(
CS137	8.94E+09	1.46E+08	5.52E+09	7.55E+09	2.54E+09	0.	8.32E+08	0.
	3.25(	.27(	.98(	39.57(	26.00(	0.00(	45.05(	0.00(
BA140	8.08E+06	2.53E+08	1.23E+08	1.54E+05	5.20E+06	0.	8.82E+06	0.
	0.00(	.48(	.02(	0.00(	0.00(	0.00(	0.00(	0.00(
CE141	1.32E+06	6.86E+06	1.73E+05	1.17E+05	5.42E+06	0.	0.	0.
	0.00(	.32(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
CE144	1.40E+06	8.79E+08	2.60E+07	1.39E+07	6.45E+06	0.	0.	0.
	0.00(	16.19(	0.00(	.06(	.07(	0.00(	0.00(	0.00(
TOTAL*	1.52E+11	5.08E+13	5.45E+11	1.01E+10	9.65E+09	3.79E+10	1.89E+09	2.28E+03

*Entry in each box represents the R_j value in units of mrem/yr per μCi/sec per m^2 for ground plane and food pathways and mrem/yr per μCi/m^3 for the inhalation pathway e.g. 2.54E+08 for MN-54 for the liver. †The number below the R_j value e.g. 1.33 for MN-54 is the percent contributed to that particular organ dose if a unit source term mix existed for each of the isotopes listed in the Table. For other mixes these per-

Table 5-15, cont'd R_i values for the Surry Plant for the vegetable pathway for a teen.*

SURRY EFFLUENT TECH SPECS 10/25/78

SPECIAL LOCATION # 1 SURRY A CAL
PATHWAY # VEGET

AGE GROUP # TEEN

NUCLIDE	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H 3	2.61E+03	2.61E+03	0.	2.61E+03	2.59E+03	2.61E+03	2.61E+03	2.61E+03
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	100.00(
P 32	6.68E+07	1.61E+08	1.67E+09	1.04E+08	0.	0.	0.	0.
	.03(	.23(	.23(	.36(	0.00(	0.00(	0.00(	0.00(
MN 54	7.30E+07	7.55E+08	0.	3.44E+08	8.49E+07	0.	0.	0.
	.04(	1.21(	0.00(	1.28(	.78(	0.00(	0.00(	0.00(
FE 59	1.40E+08	8.50E+08	1.55E+08	3.62E+08	0.	0.	1.16E+08	0.
	.08(	1.37(	.02(	1.26(	0.00(	0.00(	3.46(	0.00(
CO 58	8.37E+07	5.01E+08	0.	3.63E+07	0.	0.	0.	0.
	.05(	.80(	0.00(	.13(	0.00(	0.00(	0.00(	0.00(
CO 60	6.60E+08	2.66E+09	0.	2.04E+09	0.	0.	0.	0.
	.25(	4.26(	0.00(	.71(	0.00(	0.00(	0.00(	0.00(
ZN 65	7.55E+08	6.85E+08	4.66E+08	1.02E+09	4.34E+08	0.	0.	0.
	.41(	1.10(	.04(	5.03(	7.68(	0.00(	0.00(	0.00(
RB 86	1.21E+08	3.81E+07	0.	2.57E+08	0.	0.	0.	0.
	.07(	.06(	0.00(	.90(	0.00(	0.00(	0.00(	0.00(
SR 89	3.79E+08	1.53E+09	1.32E+10	0.	0.	0.	0.	0.
	.20(	2.52(	1.51(	0.00(	0.00(	0.00(	0.00(	0.00(
SR 90	1.73E+11	1.97E+10	7.00E+11	0.	0.	0.	0.	0.
	93.15(	31.48(	98.87(	0.00(	0.00(	0.00(	0.00(	0.00(
Y 91	1.78E+05	2.72E+09	6.62E+06	0.	0.	0.	0.	0.
	0.00(	4.35(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
ZR 95	3.18E+05	1.06E+09	1.06E+06	6.59E+05	5.02E+05	0.	0.	0.
	0.00(	1.70(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
NB 95	5.13E+04	3.99E+08	1.68E+05	9.32E+04	6.89E+04	0.	0.	0.
	0.00(	.64(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
RU103	2.56E+06	5.00E+08	5.98E+06	0.	1.66E+07	0.	0.	0.
	0.00(	.80(	0.00(	0.00(	.15(	0.00(	0.00(	0.00(
RU106	3.28E+07	1.25E+10	2.67E+08	0.	3.52E+08	0.	0.	0.
	.02(	19.98(	.08(	0.00(	3.25(	0.00(	0.00(	0.00(
AG110M	7.95E+06	3.67E+09	1.38E+07	1.31E+07	1.96E+07	0.	0.	0.
	0.00(	5.88(	0.00(	.05(	.18(	0.00(	0.00(	0.00(
TE127M	8.44E+07	1.77E+09	7.10E+08	2.52E+08	2.02E+09	1.69E+08	0.	0.
	.05(	2.83(	.19(	.89(	18.61(	.53(	0.00(	0.00(
TE129M	6.16E+07	1.46E+09	3.89E+08	1.45E+08	1.15E+09	1.28E+08	0.	0.
	.03(	2.34(	.05(	.50(	10.58(	.40(	0.00(	0.00(
I 131	5.68E+07	2.09E+07	7.55E+07	1.06E+08	1.32E+08	3.04E+10	0.	0.
	.03(	.03(	.01(	.37(	1.21(	97.60(	0.00(	0.00(
I 133	1.01E+06	2.51E+06	1.08E+06	3.32E+06	4.20E+06	4.44E+08	0.	0.
	0.00(	0.00(	0.00(	.01(	.04(	1.47(	0.00(	0.00(
CS134	6.21E+09	1.44E+08	5.68E+09	1.34E+10	1.25E+09	0.	1.42E+09	0.
	3.34(	.27(	.78(	96.57(	30.00(	0.00(	49.22(	0.00(
CS136	1.08E+06	1.29E+07	4.09E+07	1.61E+08	8.81E+07	0.	1.38E+07	0.
	.06(	.02(	0.00(	.56(	.83(	0.00(	.42(	0.00(
CS137	4.08E+09	1.66E+08	7.79E+09	1.17E+10	2.91E+09	0.	1.55E+09	0.
	2.19(	.27(	1.20(	40.73(	28.80(	0.00(	46.90(	0.00(
BA140	8.50E+06	2.03E+08	1.32E+08	1.62E+05	4.03E+04	0.	1.09E+05	0.
	0.00(	.33(	.02(	0.00(	0.00(	0.00(	0.00(	0.00(
CE141	1.00E+04	6.73E+06	2.47E+05	1.65E+05	5.47E+04	0.	0.	0.
	0.00(	.76(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
CE144	2.28E+06	1.05E+10	4.19E+07	1.32E+07	7.25E+06	0.	0.	0.
	0.00(	16.78(	0.00(	.46(	.07(	0.00(	0.00(	0.00(
TOTAL	1.84E+11	6.24E+10	7.32E+11	2.87E+10	1.28E+10	3.16E+10	3.30E+09	2.61E+03

*Entry in each box represents the R_i value in units of mrem/yr per μCi/sec per m^2 for ground plane and food pathways and mrem/yr per μCi/m^3 for the inhalation pathway e.g. 3.68E+08 for MN-54 for the liver. The number below the R_i value e.g. 1.28 for MN-54 is the percent contributed to that particular organ dose if a unit source term mix existed for each of the isotopes listed in the Table. For other mixes these percentages would be different.

Table 5-15, cont'd R_i values for the Surry Plant for the vegetable pathway for a child.*

SURRY EFFLUENT TECH SPECS 10/25/78

SPECIAL LOCATION # 1 SURRY # CAL
PATHWAY = VEGET

AGE GROUP = CHILD

NUCLIDE	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
H 3	4.04E+03	4.04E+03	0.	4.04E+03	2.09E+03	4.04E+03	4.04E+03	4.04E+03
	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(	100.00(
P 32	1.35E+08	9.68E+07	3.50E+09	1.54E+08	0.	0.	0.	0.
	.04(	.20(	.28(	.35(	0.00(	0.00(	0.00(	0.00(
MN 54	1.43E+08	4.52E+08	0.	5.39E+08	6.84E+07	0.	0.	0.
	.05(	.95(	0.00(	1.16(	.79(	0.00(	0.00(	0.00(
FE 59	2.77E+08	5.79E+08	3.44E+08	5.56E+08	0.	0.	1.61E+08	0.
	.09(	1.22(	.03(	1.20(	0.00(	0.00(	3.32(	0.00(
CO 58	1.64E+08	5.13E+08	0.	5.37E+07	0.	0.	0.	0.
	.05(	.66(	0.00(	.12(	0.00(	0.00(	0.00(	0.00(
CO 60	9.16E+08	1.72E+09	0.	3.11E+08	0.	0.	0.	0.
	.30(	3.63(	0.00(	.67(	0.00(	0.00(	0.00(	0.00(
ZN 65	1.48E+09	8.18E+08	8.90E+08	2.34E+09	8.72E+08	0.	0.	0.
	.48(	.88(	.07(	5.12(	7.79(	0.00(	0.00(	0.00(
RB 86	2.61E+08	2.73E+07	0.	4.25E+08	0.	0.	0.	0.
	.09(	.04(	0.00(	.91(	0.00(	0.00(	0.00(	0.00(
SR 89	8.98E+08	1.22E+09	3.14E+10	0.	0.	0.	0.	0.
	.29(	2.56(	2.55(	0.00(	0.00(	0.00(	0.00(	0.00(
SR 90	2.96E+11	1.56E+10	1.18E+12	0.	0.	0.	0.	0.
	95.97(	32.93(	94.03(	0.00(	0.00(	0.00(	0.00(	0.00(
Y 91	6.22E+05	2.10E+09	1.54E+07	0.	0.	0.	0.	0.
	0.00(	4.43(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
ZR 95	6.38E+05	7.68E+08	3.26E+08	7.17E+05	6.30E+05	0.	0.	0.
	0.00(	1.58(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
NB 95	9.98E+04	2.58E+08	3.59E+05	1.60E+05	5.45E+04	0.	0.	0.
	0.00(	.54(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
RU103	5.17E+06	3.68E+08	1.35E+07	0.	1.30E+07	0.	0.	0.
	0.00(	.73(	0.00(	0.00(	.15(	0.00(	0.00(	0.00(
RU106	7.82E+07	9.75E+09	6.27E+08	0.	2.84E+08	0.	0.	0.
	.03(	20.54(	.05(	0.00(	3.28(	0.00(	0.00(	0.00(
AG110M	1.58E+07	2.35E+09	2.93E+07	1.98E+07	1.56E+07	0.	0.	0.
	0.00(	4.96(	0.00(	.04(	.18(	0.00(	0.00(	0.00(
TE127M	2.02E+08	1.38E+09	1.70E+09	6.58E+08	1.62E+09	6.07E+08	0.	0.
	.07(	2.90(	.14(	.98(	18.64(	.84(	0.00(	0.00(
TE129M	1.61E+08	1.11E+09	9.06E+08	2.53E+08	8.93E+08	2.92E+08	0.	0.
	.05(	2.33(	.07(	.54(	10.29(	.61(	0.00(	0.00(
I 131	8.03E+07	1.26E+07	1.60E+08	1.41E+08	8.33E+07	8.67E+10	0.	0.
	.03(	.03(	.01(	.30(	.96(	96.89(	0.00(	0.00(
I 133	1.67E+06	1.78E+08	3.57E+06	8.42E+05	2.60E+06	8.21E+08	0.	0.
	0.00(	0.00(	0.00(	0.00(	.01(	1.78(	0.00(	0.00(
CS134	8.44E+09	1.14E+09	1.28E+10	2.11E+10	[illegible]	0.	2.34E+09	0.
	1.85(	.24(	1.04(	45.32(	.77(	0.00(	68.29(	0.00(
CS136	1.37E+08	1.03E+08	7.69E+07	2.11E+08	8.68E+07	0.	1.64E+07	0.
	.04(	.02(	0.00(	.45(	.56(	0.00(	.35(	0.00(
CS137	2.93E+09	1.24E+08	2.08E+10	1.[illegible]E+10	2.35E+09	0.	2.33E+09	0.
	.98(	.26(	1.88(	42.75(	27.36(	0.00(	68.04(	0.00(
BA140	1.50E+07	1.34E+08	2.68E+08	2.31E+05	2.76E+04	0.	1.38E+05	0.
	0.00(	.24(	.02(	0.00(	0.00(	0.00(	0.00(	0.00(
CE141	4.25E+04	3.57E+08	5.70E+06	2.48E+05	4.25E+04	0.	0.	0.
	0.00(	.75(	0.00(	0.00(	0.00(	0.00(	0.00(	0.00(
CE144	5.36E+08	8.21E+09	1.00E+08	3.15E+07	5.64E+06	0.	0.	0.
	0.00(	17.31(	0.00(	.07(	.07(	0.00(	0.00(	0.00(
TOTAL	3.06E+11	4.74E+10	1.23E+12	4.65E+10	8.68E+09	4.82E+10	4.85E+09	4.04E+03

*Entry in each box represents the R_i value in units of mrem/yr per μCi/sec per m^2 for ground plane and food pathways and mrem/yr per μCi/m^3 for the inhalation pathway e.g. 5.39E+08 for MN-54 for the liver. The number below the R_i value e.g. 1.16 for MN-54 is the percent contributed to that particular organ dose if a unit source term mix existed for each of the isotopes listed in the Table. For other mixes these percentages would be different.

SURRY POWER STATION

OFFSITE DOSE CALCULATION MANUAL

SECTION 6

LIQUID AND GASEOUS EFFLUENT DOSE PROJECTIONS

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1. LIQUID EFFLUENT DOSE PROJECTION

To comply with Technical Specification 3.11 A.3.a. to assure the liquid radwaste treatment system shall be used to reduce the radioactive materials in liquid wastes prior to their discharge when the projected doses due to the liquid effluent releases to unrestricted areas when averaged over 31 days, exceeds 0.06 mrem to the total body or 0.2 mrem to any organ, the following calculations shall be performed:

For Estimated Total Body Dose:

1.1 Determine $D_{\tau t}$ = quarterly total body dose from liquid effluents for the previous quarter.[1]

1.2 Estimate R1 = ratio of the estimated volume of liquid effluent releases for the present quarter to the volume released in the previous quarter.

1.3 Estimate F1 = ratio of the estimated liquid effluent radioactivity for the present quarter to the liquid effluent activity in the previous quarter.

1.4 Determine $DE_{\tau t}$ = estimated quarterly total body dose

$$DE_{\tau t} = D_{\tau t} (R1 \cdot F1)$$

For Estimated Critical Organ Dose:

1.5 Determine $D_{\tau o}$ = quarterly critical organ dose from liquid effluents for the previous quarter.[1]

1.6 Estimate R1 as in step 1.2.

[1]Calculated according to H.P. - ODCM-4.

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1.7 Estimate F1 as in step 1.3.

1.8 Determine DE_{to} = estimated quarterly critical organ dose.

$$DE_{to} = D_{to} (R1 \cdot F1)$$

Historical data pertaining to the volumes and radioactivity of liquid effluents released in connection to specific station functions, as maintenance or refueling outages, shall be used in the above estimates as appropriate.

2. AIRBORNE EFFLUENT DOSE PROJECTION

To comply with Technical Specification 3.11.B.4.a. to assure the Gaseous Radwaste Treatment System and the Ventilation Exhaust Treatment System shall be used to reduce radioactive materials in gaseous waste prior to their discharge when the projected gaseous effluent air releases from all release points to unrestricted areas would result in a dose in any period of 31 days that exceeds 0.2 mrad for gamma radiation, 0.4 mrad for beta radiation, or 0.3 mrem to any organ for that same period, the following calculations will be performed.

For Estimated Gamma Air Dose

2.1 Determine D_γ = quarterly air dose for the previous quarter.[1]

2.2 Estimate R_g = ratio of the volume of gaseous effluent for the present quarter to the volume released during the previous quarter.

2.3 Estimate F_g = ratio of the estimated noble gas effluent activitiy for the present quarter to the noble gas effluent activity to the present quarter.

2.4 Determine DE_γ = estimated quarterly gamma air dose.

$$DE_\gamma = D_\gamma (R_g F_g)$$

[1]Calculated according to H.P. - ODCM-5.

Estimated Beta Air Dose:

2.5 Determine D_β = quarterly beta air dose from the previous quarter.[1]

2.6 Estimate R_g and F_g as in steps 1.2 and 1.3 above.

2.7 Determine DE_β = estimated quarterly beta air dose.

$$DE_\beta = D_\beta (R_g \cdot F_g)$$

Estimated Dose from Radioiodine, Particulates, and Tritium:

2.8 Determine D_{RPT} = quarterly maxiumum individual dose from the previous quarter.[1]

2.9 Estimate Fi = ratio of the estimated activity from radioiodines, radioactive materials in particulate form, and tritium for the present quarter to the activity of radioiodines, radioactive materials in particulate form, and tritium during the previous quarter.

2.10 Determine DE_{RPT} = estimated quarterly individual dose.

$$DE_{RPT} = D_{RPT} (R_g F_i)$$

Historical data pertaining to the volume and radioactive concentrations of gaseous effluents released in connection to specific station functions, as containment purge, shall be used in the above estimates as appropriate.

[1]Calculated according to H.P. - ODCM-5.

SURRY POWER STATION

OFFSITE DOSE CALCULATION MANUAL

SECTION 7

QUARTERLY DOSE ASSESSMENT

1. QUARTERLY DOSE ASSESSMENT

Calculate the estimated radiation doses from radioactive liquid and gaseous effluents released from the station using the environmental dose models presented in Regulatory Guide 1.109 and 1.111 (Revisions in effect at the beginning of the annual report period).

Appropriate correlation of gaseous effluents with meteorological data shall be made in the calculation of offsite doses.

Effluent data shall be summarized on a monthly basis except that when the majority of the activity is released as batches and there are less than three batches per month. Dose estimates shall be calcuated for these batch releases individually.

Radiation doses from the radioactive liquid and gaseous effluents released from the site during each calendar quarter shall be assessed in accordance with the methodology of this manual. In addition, the unrestricted area boundary maximum, noble gas, gamma air and beta air doses shall be evaluated.

2. SEMI-ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

The Radioactive Effluent Release Reports during the previous 6 months of operation shall be submitted within 60 days after January 1 and July 1 of each year. The report shall contain a summary of the quantities of radioactive liquid and gaseous effluents released from the site, as outlined in Regulatory Guide 1.21, "Measuring, Evaluating and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants", Rev. 1, June 1974.

The report shall include a summary of the meteorological conditions during each quarter with data summarized on a quarterly basis. The summary will include the cumulative joint frequency distribution of wind speed, wind direction, and atmospheric stability for the quarterly periods.

SURRY POWER STATION

OFFSITE DOSE CALCULATION MANUAL

SECTION 8

RADIATION MONITOR SET SETPOINTS

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1. LIQUID EFFLUENT RADIATION MONITORS

Maximum setpoints values shall be calculated as follows:

$$c = \frac{CF}{f}$$

Where:

c = the setpoint, in μCi/ml, of the radioactivity monitor measuring the radioactivity concentration in the effluent line prior to dilution,

C = the effluent concentration limit implementing 10CFR20 for the site, in μCi/ml,

f = the flow setpoint as determined at the monitor location,

F = the dilution water flow, gpm.

2. GASEOUS EFFLUENT RADIATION MONITORS

2.1 Calculate a limiting release rate, R1, using Xe-133 as the nuclide to be released.

2.2 Calculate a maximum setpoint value for the monitor as follows:

$$c = \frac{(R1)\ 2.12E\text{-}03}{F_{max}}$$

Where:

c = the effluent concentration limit implementing 10CFR20 for the site, μCi/ml,

R1 = release rate limit, μCi/sec,

2.12E-03 = CFM per ml/sec, and

F_{max} = the maximum flow rate for the system, CFM.