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LAND AND WATER USE CHARACTERISTICS AND HUMAN HEALTH INPUT PARAMETERS FOR USE IN ENVIRONMENTAL DOSIMETRY AND RISK ASSESSMENTS AT THE SAVANNAH RIVER SITE

Author: G.T. Jannik
Author: D.J. Karapatakis
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Technical Reviewer: E.B. Farfán

REPORT DATE: AUGUST 6, 2010

Savannah River National Laboratory
Savannah River Nuclear Solutions
Aiken, SC 29808

Prepared for the U.S. Department of Energy Under Contract Number DE-AC09-08SR22470

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8/12/10

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1.0 EXECUTIVE SUMMARY

Operations at the Savannah River Site (SRS) result in releases of small amounts of radioactive materials to the atmosphere and to the Savannah River. For regulatory compliance purposes, potential offsite radiological doses are estimated annually using computer models that follow U.S. Nuclear Regulatory Commission (NRC) Regulatory Guides. Within the regulatory guides, default values are provided for many of the dose model parameters but the use of site-specific values by the applicant is encouraged. A detailed survey of land and water use parameters was conducted in 1991 and is being updated here. These parameters include local characteristics of meat, milk and vegetable production; river recreational activities; and meat, milk and vegetable consumption rates as well as other human usage parameters required in the SRS dosimetry models. In addition, the preferred elemental bioaccumulation factors and transfer factors to be used in human health exposure calculations at SRS are documented.

Based on comparisons to the 2009 SRS environmental compliance doses, the following effects are expected in future SRS compliance dose calculations:

- Aquatic all-pathway maximally exposed individual doses may go up about 10 percent due to changes in the aquatic bioaccumulation factors
- Aquatic all-pathway collective doses may go up about 5 percent due to changes in the aquatic bioaccumulation factors that offset the reduction in average individual water consumption rates
- Irrigation pathway doses to the maximally exposed individual may go up about 40 percent due to increases in the element-specific transfer factors
- Irrigation pathway collective doses may go down about 50 percent due to changes in food productivity and production within the 50-mile radius of SRS
- Air pathway doses to the maximally exposed individual may go down about 10 percent due to the changes in food productivity in the SRS area and to the changes in element-specific transfer factors
- Air pathway collective doses may go down about 30 percent mainly due to the decrease in the inhalation rate assumed for the average individual.

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2.0 INTRODUCTION

2.1 BACKGROUND

Operations at the Savannah River Site (SRS) result in releases of small amounts of radioactive materials to the atmosphere and to the Savannah River. For regulatory compliance purposes, potential offsite radiological doses are estimated annually using computer models that follow U.S. Nuclear Regulatory Commission (NRC) Regulatory Guides (NRC 1977a and 1977b). Within the regulatory guides, default values are provided for many of the dose model parameters but the use of site-specific values by the applicant is encouraged (NRC 1977a). A detailed survey of land and water use parameters was conducted in Hamby (1991) and is being updated here. These parameters include local characteristics of meat, milk and vegetable production; river recreational activities; and meat, milk and vegetable consumption rates as well as other human usage parameters required in the SRS dosimetry models. In addition, the preferred elemental bioaccumulation factors and transfer factors to be used in human health exposure calculations at SRS are documented.

2.2 PURPOSE

The purpose of this report is to review, and update as needed, the input parameters and environmental bioaccumulation and transfer factors used in human health exposure calculations at SRS for determining compliance with applicable U.S. Department of Energy (DOE) Orders (DOE 1988 and DOE 2010) and U.S. Environmental Protection Agency (EPA) National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations (EPA 2002). The reason for the update is to utilize more recent information issued, validate information currently used, and correct minor inconsistencies between other modeling efforts performed at SRS.

In Lee and Coffield (2008) many of the SRS input parameters utilized in dosimetry calculations were compared to a number of other DOE facilities and generic national/global references to establish relevance of the parameters selected and/or verify the regional differences of the U.S. Southeast. The parameters selected were applicable to SRS performance assessments (PAs) and were specifically chosen to be expected values (along with identifying a range for these values) versus the conservative specification of parameters for estimating an annual dose to the maximum exposed individual (MEI). However, because of its thoroughness and direct applicability to annual SRS dose compliance calculations, many of the parameters documented in Lee and Coffield (2008) are adopted in this report.

The intent of this report is to establish a standardized source for these parameters that is up to date with existing data and maintain it via review of any future issued national references to evaluate the need for changes as new information is released. These reviews are to be added to this document by revision.

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3.0 DISCUSSION

3.1 PHYSICAL PARAMETERS

Physical parameters are defined as those whose value would not change if a different group of receptors were considered. For the purposes of this report, these parameters include agricultural production factors and aquatic food harvest factors. The other physical input parameters are determined by SRS's geographical location, the geophysical characteristics of the site, and the element-specific transfer and bioaccumulation factors. A summary of current and updated productivity and other physical parameters are listed in Table 1.

The International Atomic Energy Agency recently published (in Technical Reports Series No. 472) updated recommended transfer factors for a limited number of elements (IAEA 2010). With only a few exceptions (noted in the discussions to follow) these element-specific transfer values were used in this report. For the elements not included in IAEA, the values documented in Lee and Coffield (2008) were used. The updated soil-to-vegetable, feed-to-milk, and feed-to-meat transfer factors are provided in Tables 2, 3, and 4, respectively. Updated water-to-fish bioaccumulation factors and water to saltwater invertebrates bioaccumulation factors are provided in Tables 5 and 6, respectively.

During this updated study, the physical parameters that were determined to differ from Hamby (1991) or Lee and Coffield (2008) are discussed below. The parameters that remained the same are also documented in Tables 1 through 6, but without additional comment.

3.1.1 Agricultural Productivity and Production

The updated agricultural productivity factors for vegetables, meat, and milk are weighted averages based on the 2007 U.S. Department of Agriculture (USDA) National Agricultural Statistics (USDA 2009). The annual production rates of this produce that occurs within a 50-mile radius of SRS, also are based on this report. The 2002 USDA agricultural statistics were also considered to confirm agricultural production trends (USDA 2004).

3.1.1.1 Vegetable Productivity and Production

Based on USDA (2009), the South Carolina and Georgia weighted average vegetable productivity was determined to be 2.2 kg/m^2. This value, which includes leafy and non-leafy vegetables, is over 200 percent more than the Hamby (1991) and Lee and Coffield (2008) reported value of 0.7 kg/m^2. However, it is comparable to the NRC (1977) default value of 2.0 kg/m^2 and is essentially the same as the USDA (2004) dataset.

Based on USDA (2009), the combined leafy and non-leafy vegetable commercial production within 50 miles of SRS was estimated to be 6.7E+05 kg/yr (1.4E+05 kg/yr for leafy vegetables and 5.3E+05 kg/yr for other vegetables). For the purposes of this report, the total combined vegetable production value was increased by a factor of 10 (revised up to 6.7E+06 kg/yr) to account for unreported and non-commercial (individual use) production of vegetables in the area. This conservative factor is based on professional judgment and on

personal discussions with County Agents and other professionals in the field. The updated production value of 6.7E+06 kg/yr is about 85 percent less than the Hamby (1991) estimated value of 4.7E+07 kg/yr. The USDA (2004) estimated combined total was 7.1E+06 kg/yr (including the factor of 10 for unreported production), which indicates a continuing downward trend in vegetable production in the SRS area. The updated, total combined vegetable production as a function of distance and sector is provided in Table 7.

3.1.1.2 Pasture Grass Productivity

Based on USDA (2009), the South Carolina and Georgia weighted average pasture grass productivity was determined to be 0.7 kg/m^2. This value is about 60 percent less than the Hamby (1991) and Lee and Coffield (2008) reported value of 1.8 kg/m^2. However, it is the same as the NRC (1977) default value and is essentially the same as the value estimated using the USDA (2002) dataset.

3.1.1.3 Meat (Beef) Productivity and Production

Because poultry and pork production are almost exclusively indoor operations, only beef production is considered for the meat pathway. Based on USDA (2009), the South Carolina and Georgia weighted average meat productivity was determined to be 0.01 kg/m^2. This value was not considered in the Hamby (1991) and Lee and Coffield (2008) reports. However, it is used in the LADTAP XL Irridose spreadsheet for population dose assessments to determine the amount of beef production on a given irrigated area. The 0.01 kg/m^2 value was determined based on the daily consumption rate of forage by beef cattle (36 kg/d), the current pasture grass productivity (0.7 kg/m^2), and an assumed edible meat amount per beef cow (200 kg) using the following equation:

$$\frac{\dfrac{200\ \text{kg/yr}}{36\ \text{kg/d} * 365\ \text{d/yr}}}{\dfrac{1\ \text{m}^2}{0.7\ \text{kg}}} = 0.01\ \text{kg/m}^2 \qquad (1)$$

Based on USDA (2009), the commercial beef production within 50 miles of SRS was estimated to be 6.1E+06 kg/yr. For the purposes of this report, the commercial beef production value was increased by a factor of 1.25 (revised up to 7.6E+06 kg/yr) to account for unreported and non-commercial (individual use) production of beef in the area. Again, this factor is based on professional judgment and on personal discussions with County Agents and other professionals in the field. The updated beef production value of 7.6E+06 kg/yr is about 50 percent less than the Hamby (1991) estimated value of 1.5E+07 kg/yr. The USDA (2004) estimated total was 1.3E+07 kg/yr (including the factor of 1.25 for unreported production), which indicates a continuing downward trend in beef production in the SRS area. The updated beef production as a function of distance and sector is provided in Table 8.

3.1.1.4 Milk Productivity and Production

Based on USDA (2009), the South Carolina and Georgia weighted average milk productivity was determined to be 0.34 L/m^2. This value was not considered in the Hamby (1991) and Lee and Coffield (2008) reports. However, it is used in the LADTAP XL Irridose spreadsheet for population dose assessments to determine the amount of milk production on a given irrigated area. The 0.34 kg/m^2 value was determined based on the daily consumption rate of forage by milk cows (52 kg/d), the current pasture grass productivity (0.7 kg/m^2), and an assumed daily milk production amount per milk cow (25 L/d) using the following equation:

$$\frac{\frac{25\ \text{L/d}}{52\ \text{kg/d}}}{\frac{1\ \text{m}^2}{0.7\ \text{kg}}} = 0.34\ \text{L/m}^2 \qquad (2)$$

Based on USDA (2009), the commercial milk production within 50 miles of SRS was estimated to be 6.8E+07 L/yr. For the purposes of this report, the commercial milk production value was increased by a factor of 1.25 (revised up to 8.5E+06 L/yr) to account for unreported and non-commercial (individual use) production of milk in the area. Again, this factor is based on professional judgment and on personal discussions with County Agents and other professionals in the field. The updated milk production value of 8.5+07 L/yr is about 23 percent less than the Hamby (1991) estimated value of 1.1E+08 L/yr. The USDA (2004) estimated total was 1.0E+08 L/yr (including the factor of 1.25 for unreported production), which indicates a continuing downward trend in milk production in the SRS area. The updated milk production as a function of distance and sector is provided in Table 9.

3.1.2 Soil to Vegetable Transfer Factors

In IAEA (2010), a selection of element-specific, soil-to-plant (vegetable) transfer factors are provided for a variety of plant groups. Based on USDA (2007), the estimated percentage breakdown of the major plant groups commercially produced in the SRS area is as follows:

- Leafy vegetables 20%
- Legumes 15%
- Tubers and Roots 10%
- Non-leafy 55%

These percentages were used to calculate a weighted-average element-specific transfer factor, which are documented in Table 2. For the elements not included in IAEA (2010), the values documented in Lee and Coffield (2008) were used. The updated soil-to-vegetable transfer factors are provided in the column labeled "Jannik et al." in Table 2.

3.1.3 Feed to Milk Transfer Factors

In IAEA (2010) a selection of element-specific transfer coefficients to cow's milk (feed-to-milk) are provided. For the elements not included in IAEA (2010), the values documented in Lee and Coffield (2008) were used. The updated milk transfer coefficients are provided in the column labeled "Jannik et al. 2010" in Table 3.

3.1.4 Feed to Meat Transfer Factors

In IAEA (2010) a selection of element-specific transfer coefficients to beef (feed-to-meat) are provided. For the elements not included in IAEA (2010), the values documented in Lee and Coffield (2008) were used. The updated meat transfer coefficients are provided in the column labeled "Jannik et al. 2010" in Table 4.

3.1.5 Water to Fish Bioaccumulation Factors

In IAEA (2010) a selection of element-specific concentrations ratios (bioaccumulation factors) for freshwater fish tissue are provided. For the elements not included in IAEA (2010), the values documented in Lee and Coffield (2008) were used as discussed below. Exceptions to this rule, which are described below, are plutonium, cesium, and carbon. The updated fish bioaccumulation factors are provided in the column labeled "Jannik et al. 2010" in Table 5.

As discussed in section 4.0 (Conclusions), the plutonium bioaccumulation factor recommended in IAEA (2010) is 21,000 L/kg. This is several orders of magnitude greater than the previous IAEA value, which (as documented in Lee and Coffield (2008) is 30 L/kg. The 21,000 L/kg bioaccumulation value for plutonium seems unreasonable based on the professional judgement of the authors and other national experts. Therefore, the Lee and Coffield (2008) value of 30 L/kg will be used until the IAEA (2010) value is verified or changed.

The SRS site-specific bioaccumulation factor for cesium of 3,000 L/kg (Jannik 2003) is used in this update in lieu of the IAEA (2010) value of 2,500 L/kg. The site-specific value is slightly more conservative than the IAEA (2010) value and is considered the best available data.

Also, the SRS determined bioaccumulation factor for carbon of 3 L/kg (Hinton et al. 2009) is used in lieu of the IAEA (2010) value of 400,000 L/kg. Hinton et al. (2009) used a systems model approach to study the carbon mass balance in an SRS stream. This study showed that most of the carbon in fish does not come from the water in which they live, which is the assumption that the IAEA referenced elemental bioaccumulation factors are based on.

3.1.6 Water to Saltwater Invertebrates Bioaccumulation Factors

Recommended concentration ratios for saltwater invertebrates were not addressed in IAEA (2010). Also, because the saltwater invertebrate pathway is not applicable to Performance Assessments at SRS, they were not addressed in Lee and Coffield (2008). Therefore, the values presented in PNNL (2003) were used for this update and are provided in the column

labeled "Jannik et al." in Table 6. In PNNL (2003), saltwater bioaccumulation factors are provided for crustaceans and mollusks. To be conservative, the larger of the two values was used.

3.2 BEHAVIORAL PARAMETERS

Behavioral parameters are defined as those whose value depends on the receptor's behavior and the defined exposure scenario. For the purposes of this report, these parameters include the metabolic characteristics of the receptor. A summary of current and updated behavioral and metabolic parameters are listed in Table 10 for the average individual and general population and in Table 11 for the maximally exposed individual.

During this updated study, the behavioral parameters that were determined to differ from Hamby (1991) or Lee and Coffield (2008) are discussed below. The parameters that remained the same are also documented in Tables 10 and 11, but without additional comment.

3.2.1 Average Individual and Population Usage Parameters

Except for current updates to the recreation exposure times, all of the average individual behavioral parameters that were considered and documented in Lee and Coffield (2008), were adopted for use in this report. Of these, the only average individual parameters that differ from Hamby (1991) are the inhalation rate and drinking water consumption rate.

3.2.1.1 Inhalation Rate

As discussed in Lee and Coffield (2008), the updated average individual inhalation rate for long term exposure is 5,548 m^3/yr. This value is based on EPA recommendations and is about 30 percent less than the Hamby (1991) value of 8,000 m^3/yr.

3.2.1.2 Drinking Water Consumption Rate

As discussed in Lee and Coffield (2008), the updated average individual drinking water consumption rate for long term exposure is 337 L/yr. This value is based on EPA recommendations and is about 9 percent less than the Hamby (1991) value of 370 L/yr.

3.2.1.3 Shoreline, Swimming, and Boating Exposure Time

As shown in Table 12, the updated average individual recreational exposure usage rates for shoreline usage, swimming, and boating in the SRS area were estimated to be 10 hr/yr, 7 hr/yr, and 22 hr/yr, respectively. These values are based on 2005 data from the Georgia Department of Natural Resources (GDNR 2005) and the South Carolina Department of Parks and Recreation (SCDPR 2005) and on the estimated hours per occasion from Hamby (1991). The updated shoreline exposure time of 10 hr/yr is about 57 percent less than the Hamby (1991) value of 23 hr/yr, but slightly more than the NRC (1977a) default value of 8.3 hr/yr. The updated swimming exposure time of 7 hr/yr is about 21 percent less than the Hamby

(1991) value of 8.9 hr/yr and the updated boating time of 22 hr/yr is about 5 percent more than the Hamby (1991) value of 21 hr/yr.

Based on these revised recreational usage rates, the updated weighted population exposure times for shoreline usage, swimming, and boating were determined and are provided in Table 13. These values are based on the SC and GA state usage available fractions from Hamby (1991), the 2000 census population fraction in the SC (0.6) and GA (0.4) counties within 50 miles of SRS, and on the projected 2010 total population (1.4E+06 people) in those counties. The updated population shoreline exposure time is 8.22E+05 person-hr, which is 14 percent less the Hamby (1991) value of 9.60E+05. The updated population swimming exposure time is 2.95E+05 person-hr, which is about 84 percent more than the Hamby (1991) value of 1.60E+05 person-hr. The updated population boating exposure time is 3.11E+06 person-hr, which is 183% more than the Hamby (1991) value of 1.10E+06 person-hr.

3.2.1.4 Fraction of Year Working in Garden

As documented in Lee and Coffield (2008), the recommended fraction of time an average person works in their garden is 0.01. This parameter was not considered in Hamby (1991).

3.2.1.5 Fraction of Year Residing in Home

As documented in Lee and Coffield (2008), the recommended fraction of time an average person stays inside of their home is 0.7. This parameter was not considered in Hamby (1991).

3.2.1.6 Time Taking a Shower

As documented in Lee and Coffield (2008), the recommended amount of time an average person takes a shower is 10 min/d. This parameter was not considered in Hamby (1991).

3.2.1.7 Population Served by Downriver Drinking Water Plants

In 2009, the operators of the three public drinking water plants that are located downriver of SRS estimated that the following populations were served:

- Beaufort-Jasper Water and Sewer Authority (Chelsea Plant) 77,000 people
- Beaufort-Jasper Water and Sewer Authority (Purrysburg Plant) 58,000 people
- City of Savannah Industrial and Domestic Water Supply Plant 26,300 people

These totals will be updated annually for use in the SRS Site Environmental Report.

3.2.2 Maximally Exposed Individual Usage Parameters

Except for the current updates to the recreation exposure times, all of the maximally exposed individual behavioral parameters that were considered and documented in Hamby (1991) were adopted for use in this report. All of these values remain conservative and are within the range of values documented from various other sources in Lee and Coffield (2008).

Because of the exposure scenarios considered, Lee and Coffield (2008) did not specifically recommend maximally exposed individual parameters.

At SRS, fish consumption is an important pathway for the maximally exposed individual and for sportsmen. Though selected studies have shown that the potential for higher fish consumption rates in the Savannah River area exist (Burger 1998), the recommended maximally exposed individual fish consumption rate remains at 19 kg/yr. This value is realistically conservative and equates to the same value (54 g/d for 350 d) used by EPA in their Preliminary Remediation Goals calculator for the fish consumption pathway (EPA 2010).

3.2.2.1 Shoreline, Swimming, and Boating Exposure Time

The maximally exposed individual recreation exposure times were conservatively set at twice the per capita values. In Hamby (1991), the maximally exposed individual exposure times were the same as the average individual times. The updated maximally exposed individual exposure times for shoreline, swimming, and boating are 20 hr/yr, 14 hr/yr, and 44 hr/yr, respectively.

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4.0 CONCLUSIONS

4.1 UNIT RELEASE DOSE COMPARISONS

Dose comparisons were performed using the LADTAP XL, MAXDOSE-SR, and POPDOSE-SR dose models. The comparisons were done using the existing parameters (Hamby 1991) versus the updated physical and behavioral parameters and with the updated transfer factors and bioaccumulation factors. For these comparisons, unit releases (1 Ci/y) were assumed for each radionuclide in the dose model libraries.

4.1.1 LADTAP XL Maximally Exposed Individual Aquatic Dose Comparisons

The comparisons of estimated doses to the maximally exposed individual for the water ingestion, fish ingestion, shoreline exposure, swimming exposure, and boating exposure pathways are shown in Tables 14 through 18, respectively. The overall total dose comparison is provided in Table 19.

As expected, the water ingestion doses remained unchanged because there was no change in the maximally exposed individual water ingestion rate (Table 14).

The fish ingestion doses (Table 15) changed directly with the changes in the aquatic bioaccumulation factors (Table 5).

The recreation doses (shoreline, swimming, and boating; Table 16, 17, and 18, respectively) changed directly and consistently with the changes in the recreation exposure times (Table 11).

The total doses changed proportionately with the changes in the various exposure pathways (Table 19). However, because the recreation pathways are minor contributors to the total dose, the fish consumption pathway had the largest effect on changes in the total doses.

4.1.2 LADTAP XL Collective Aquatic Dose Comparisons

The comparisons of estimated doses to the affected downriver population for the water ingestion, sport and commercial fish ingestion, saltwater invertebrate ingestion, shoreline exposure, swimming exposure, and boating exposure pathways are shown in Tables 20 through 26, respectively. The overall total dose comparison is provided in Table 27.

The water ingestion population doses changed directly and consistently with the change in the average water consumption rate from 370 L/yr to 337 L/yr (Table20).

The fish and saltwater invertebrate ingestion collective doses (Tables 21, 22 and 23) changed proportionately with the changes in the sport and commercial harvests (Table 1) and the aquatic bioaccumulation factors (Tables 5 and 6).

The recreation doses (shoreline, swimming, and boating; Tables 24, 25, and 26, respectively) changed directly with the changes in the recreation exposure times (Tables 10).

The total collective doses changed proportionately with the changes in the various exposure pathways (Table 27).

4.1.3 LADTAP XL IRRIDOSE Irrigation Maximally Exposed Individual Dose Comparisons

The comparisons of estimated doses to a maximally exposed individual from use of the Savannah River for irrigation of farmland downstream of SRS are shown for the vegetable, milk, and meat consumption pathways in Tables 28, 29 and 30, respectively. The overall total dose comparison is provided in Table 31.

Since all of the maximally exposed individual consumption rates for vegetables, milk, and meat remained unchanged, the only changes in the doses were caused by the changes in the elemental transfer factors documented in Tables 2, 3, and 4, respectively.

The total irrigation pathway maximally exposed individual doses changed proportionately with these changes (Table 31).

4.1.4 LADTAP XL IRRIDOSE Irrigation Collective Dose Comparisons

The comparisons of estimated doses to a collective population from use of the Savannah River for irrigation of farmland downstream of SRS are shown for the vegetable, milk, and meat consumption pathways are shown in Tables 32, 33, and 34, respectively. The overall total irrigation collective dose comparisons are provided in Table 35.

For this comparison, it was assumed that 1,000 acres of irrigated land is devoted to each of the three major food types (vegetables, milk, and meat). It is assumed that all of the food produced on the 1,000 acre parcels is consumed by the local population.

The vegetable consumption pathway collective doses (Table 32) changed directly with the changes in the elemental soil-to-vegetable transfer factors (Table 2) and all radionuclide collective doses increased directly with the increase in vegetable productivity from 0.7 kg/m^2 to 2.2 kg/m^2 (Table 1).

The milk and meat consumption pathway collective doses (Tables 33 and 34) changed directly with the changes in the elemental feed-to-milk and feed-to-meat transfer factors (Tables 3 and 4) and all radionuclide collective doses decreased directly with the decrease in pasture grass productivity from 1.8 kg/m^2 to 0.7 kg/m^2 (Table 1).

The total irrigation pathway collective doses changed proportionately with the changes in the various exposure pathways (Table 35).

4.1.5 MAXDOSE-SR Maximally Exposed Individual Air Pathway Dose Comparisons

The comparisons of estimated doses to the maximally exposed individual for the ground exposure, plume immersion, inhalation, and vegetable, milk, and meat consumption pathways are shown in Tables 36 through 41, respectively. The overall total air pathway dose comparisons are provided in Table 42.

As expected, the ground exposure, plume immersion, and inhalation pathway doses (Tables 36, 37, and 38) to the maximally exposed individual remained unchanged because there were no changes in the physical or behavioral usage parameters for these pathways.

Also, since all of the maximally exposed individual consumption rates for vegetables, milk, and meat remained unchanged, the only changes in the food consumption doses (Tables 39, 40, and 41) were caused by the changes in the vegetable productivity and the elemental transfer factors documented in Tables 2, 3, and 4, respectively.

The total air pathway maximally exposed individual doses changed proportionately with these food consumption pathway changes (Table 42).

4.1.6 POPDOSE-SR Collective Air Pathway Dose Comparisons

The comparisons of estimated doses to the SRS 5-mile radius population for the ground exposure, plume immersion, inhalation, and vegetable, milk, and meat consumption pathways are shown in Tables 43 through 48, respectively. The overall total air pathway dose comparisons are provided in Table 49.

As expected, the ground exposure and plume immersion collective doses (Tables 43 and 44) remained unchanged because there were no changes in the physical or behavioral usage parameters for these pathways.

The inhalation pathway doses (Table 45) changed directly with the change in the average individual breathing rate from 8,000 m^3/yr to 5,548 m^3/yr.

Since all of the average individual consumption rates for vegetables, milk, and meat remained unchanged, the changes in the food consumption collective doses (Tables 46, 47, and 48) were caused by the changes in the elemental transfer factors and by the reduced amount of vegetables, milk, and meat produced within a 50-mile radius area of SRS (Tables 7, 8, and 9, respectively).

The total air pathway collective doses changed proportionately with the changes in these various exposure pathways (Table 49).

4.2 SITE ANNUAL COMPLIANCE DOSE COMPARISONS

Additional dose comparisons were performed using the LADTAP XL, MAXDOSE, and POPDOSE dose models. These comparisons were done using the existing parameters (Hamby 1991) and the 2009 SRS radiological source term as documented in the SRS site environmental report (Mamatey 2010) versus the updated physical and behavioral parameters and with the updated transfer factors and bioaccumulation factors.

4.2.1 LADTAP XL Maximally Exposed Individual Aquatic Dose Comparisons

The comparisons of estimated doses to the maximally exposed individual for all aquatic pathways are shown in Table 50. The overall dose using the updated parameters and transfer factors is estimated to be 0.084 mrem, which is about 10 percent more than the reported 2009

dose of 0.077 mrem calculated using the Hamby (1991) factors. Most of the increase is attributed to the increase in the fish bioaccumulation factors for americium and plutonium.

4.2.2 LADTAP XL Collective Aquatic Dose Comparisons

The comparisons of estimated doses to the affected downriver population for all aquatic pathways are shown in Table 51. The overall collective dose using the updated parameters and transfer factors is estimated to be 2.33 person-rem, which is about 4 percent more than the reported 2009 dose of 2.23 person-rem calculated using the Hamby (1991) factors. Again, most of the increase is attributed to the increase in the fish bioaccumulation factors for americium and plutonium, which offset the reduction in drinking water dose due to the decrease in the average individual water consumption rate.

4.2.3 LADTAP XL IRRIDOSE Irrigation Maximally Exposed Individual Dose Comparisons

The comparisons of estimated doses to a maximally exposed individual from use of the Savannah River for irrigation of farmland downstream of SRS are shown in Table 52. The overall dose using the updated parameters and transfer factors is estimated to be 0.083 mrem, which is about 39 percent more than the reported 2009 dose of 0.060 mrem calculated using the Hamby (1991) factors. All of the increase is attributed to the increases in the element-specific transfer factors (Tables 2, 3, and 4).

4.2.4 LADTAP XL IRRIDOSE Irrigation Collective Dose Comparisons

The comparisons of estimated doses to a collective population from use of the Savannah River for irrigation of farmland downstream of SRS are shown in Table 53. The overall collective dose using the updated parameters and transfer factors is estimated to be 2.01 person-rem, which is about 49 percent less than the reported 2009 dose of 3.94 person-rem calculated using the Hamby (1991) factors. Most of this decrease is attributed to the changes in food productivity and food production in the SRS area.

4.2.5 MAXDOSE-SR Maximally Exposed Individual Air Pathway Dose Comparisons

The comparisons of estimated doses to the maximally exposed individual for all air pathways are shown in Table 54. The overall dose using the updated parameters and transfer factors is estimated to be 0.0386 mrem, which is about 8 percent less than the reported 2009 dose of 0.0419 mrem calculated using the Hamby (1991) factors. Most of the decrease is attributed to the change in vegetable productivity and to changes in the element-specific transfer factors for iodine and plutonium.

4.2.6 POPDOSE-SR Collective Air Pathway Dose Comparisons

The comparisons of estimated doses to the population residing within 50-miles of SRS for all air pathways are shown in Table 55. The overall dose using the updated parameters and transfer factors is estimated to be 1.35 person-rem, which is about 32 percent less than the reported 2009 dose of 2.00 person-rem calculated using the Hamby (1991) factors. Most of

the decrease is attributed to the decrease in the annual inhalation rate for the average individual and to a lesser degree to the changes in vegetable productivity and production within the 50-mile radius of SRS.

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5.0 SUMMARY

A detailed survey of land and water use parameters was conducted by Hamby (1991) and has being updated in this report. These parameters include local characteristics of meat, milk and vegetable production; river recreational activities; and meat, milk and vegetable consumption rates as well as other human usage parameters required in the SRS dosimetry models. In addition, the preferred elemental bioaccumulation factors and transfer factors to be used in human health exposure calculations at SRS have been documented in this report.

Based on comparisons to the 2009 SRS environmental compliance doses that are documented in Mamatey (2010), the following effects are expected in future SRS compliance dose calculations:

- Aquatic all-pathway maximally exposed individual doses may go up about 10 percent due to changes in the aquatic bioaccumulation factors
- Aquatic all-pathway collective doses may go up about 5 percent due to changes in the aquatic bioaccumulation factors that offset the reduction in average individual water consumption rates
- Irrigation pathway doses to the maximally exposed individual may go up about 40 percent due to increases in the element-specific transfer factors
- Irrigation pathway collective doses may go down about 50 percent due to changes in food productivity and production within the 50-mile radius of SRS
- Air pathway doses to the maximally exposed individual may go down about 10 percent due to the changes in food productivity in the SRS area and to the changes in element-specific transfer factors
- Air pathway collective doses may go down about 30 percent mainly due to the decrease in the inhalation rate assumed for the average individual.

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APPENDIX A UPDATED PARAMETERS, TRANSFER FACTORS, AND BIOACCUMULATION FACTORS (TABLES 1-13)

APPENDIX A UPDATED PARAMETERS TRANSFER FACTORS AND BIOACCUMULATION FACTORS (TABLES 1-13)

Table 1. SRS Physical Parameters for Dose Calculations

Parameter	Units	1977	1991	2008	2010	% Difference
		NRC Default	Hamby	Lee and Coffield	Jannik et al.	1991 Hamby/ 2010 Jannik
Beef-cow forage consumption (wet)	kg/d	50	36	36	36	0.00%
Milk-cow forage consumption (wet)	kg/d	50	52	52	52	0.00%
Pasture-grass exposure time to irrigation	d	30	30	30	30	0.00%
Vegetable crop exposure time to irrigation	d	60	70	70	70	0.00%
Vegetable garden productivity	kg/m^2	2	0.7	0.7	2.2	214.29%
Agricultural productivity (produce/veg.)	kg/m^2	2	0.7	0.7	2.2	214.29%
Agricultural productivity (pasture grass)	kg/m^2	0.7	1.8	1.8	0.7	-61.11%
Agricultural productivity (edible beef.)	kg/m^2	-	-	-	0.01	-
Agricultural productivity (milk)	L/m^2	-	-	-	0.15	-
Irrigation rate	$L/d/m^2$		3.4	3.6	3.6	5.88%
Transport time (feed-milk-man)	d	4	3	3	3	0.00%
Transport time (produce for avg/pop)	d	14	14	6	6	-57.14%
Transport time (produce for MEI)	d	1	1	N/A	1	0.00%
Time from slaughter to consumption	d	20	6	6	6	0.00%
Holdup time (pasture grass, forage)	d	0	0	0	0	0.00%
Holdup time (stored feed)	d	90	90	N/A	90	0.00%
Fraction of time milk-cow on pasture	-	0.75	1	1	1	0.00%
Fraction of time beef-cow on pasture	-	0.75	1	1	1	0.00%
Fraction of intake from pasture (milk cow)	-	1 (b)	0.56	0.56	0.56	0.00%
Fraction of intake from pasture (beef-cow)	-	1 (b)	0.75	0.75	0.75	0.00%
Fraction of veg. from local farm (avg/pop)	-	1	1	0.308	0.308	-69.20%
Fraction of meat from local farm (avg/pop)	-	1	1	0.319	0.319	-68.10%
Fraction of milk from local farm (avg/pop)	-	1	1	0.254	0.254	-74.60%
Fraction of veg. from local farm (MEI)	-	1	1	N/A	1	0.00%
Fraction of meat from local farm (MEI)	-	1	1	N/A	1	0.00%

Table 1. SRS Physical Parameters for Dose Calculations (continued)

Parameter	Units	1977	1991	2008	2010	% Difference
		NRC Default	Hamby	Lee and Coffield	Jannik et al.	1991 Hamby/ 2010 Jannik
Fraction of milk from local farm (MEI)	-	1	1	N/A	1	0.00%
Fraction of intake from contaminated water	-	1	1	1	1	0.00%
Cattle consumption rate of water (meat)	L/d	50	50	28	28	-44.00%
Cattle consumption rate of water (milk)	L/d	60	60	50	50	-16.67%
Buildup time in soil	d	5475	7300	183	9125	25.00%
Areal density of soil	kg/m^2	240	240	240	240	0.00%
Soil density	kg/m^3	N/A	N/A	1.6	1.6	N/A
Weathering removal constant	1/d	0.0495	0.0495	0.0495	0.0495	0.00%
Fractional retention of leaves	-	0.25	0.25	0.25	0.25	0.00%
Depth of garden	cm	-	-	15	15	N/A
Edible sport fish harvest	kg/yr	-	3.50E+04	N/A	8.22E+03	-76.52%
Edible commercial fish harvest	kg/yr	-	2.70E+03	N/A	5.70E+04	2011.11%
Edible commercial invertebrate harvest	kg/yr	-	2.45E+05	N/A	3.80E+05	55.10%
Edible fraction of harvest - fish (whole)	-	-	0.5	N/A	0.5	0.00%
Edible fraction of harvest - crab (whole)	-	-	0.14	N/A	0.14	0.00%
Edible fraction of harvest - shrimp (tail only)	-	-	0.9	N/A	0.9	0.00%
Edible fraction of harvest - oysters (meat)	-	-	1	N/A	1	0.00%
Edible fraction of harvest - clams (meat)	-	-	1	N/A	1	0.00%
River dilution in estuary	-	-	3	N/A	3	0.00%
River Transport Time for Recreation	d	-	1	N/A	1	0.00%
River Transport Time for MEI (RM 118.8)	d	-	1.5	N/A	1.5	0.00%
River Transport Time for Fish	d	-	2	N/A	2	0.00%
River Transport Time for Irrigation	d	-	2	N/A	2	0.00%
River Transport Time for Drinking Water	d	-	4	N/A	4	0.00%
River Transport Time for Sport Fish	d	-	10	N/A	10	0.00%
River Transport Time for Commercial Fish	d	-	13	N/A	13	0.00%
River Transport Time for Invertibrates	d	-	13	N/A	13	0.00%
Shoreline width factor	-	0.2	0.2	N/A	0.2	0.00%

Table 2. Soil-to-Vegetable Transfer Factors

Element	Z	Current SRS Value	2008 Value Lee and Coffield	2010 Weighted Value IAEA #472	2003 Weighted Value PNNL-13421	2010 Value Jannik, et al.
Ac	89	2.5E-03	6.83E-05		6.11E-05	6.11E-05
Ag	47	1.5E-01	1.18E-02	1.19E-04		1.19E-04
Al	13	4.0E-03	1.27E-04			1.27E-04
Am	95	2.5E-04	6.83E-05	7.3E-05		7.33E-05
Ar	18		1.00E-20			1.00E-20
As	33		1.17E-03		2.73E-03	2.73E-03
At	85		2.93E-02			2.93E-02
Au	79		3.51E-03		2.64E-03	2.64E-03
B	5		3.90E-01			3.90E-01
Ba	56	5.0E-03	2.93E-03	9.75E-04		9.75E-04
Be	4	4.0E-03	2.93E-04		6.83E-04	6.83E-04
Bi	83	1.0E-01	9.75E-02		9.75E-02	9.75E-02
Bk	97	5.9E-05	1.00E-03			1.00E-03
Br	35		2.93E-01		2.93E-01	2.93E-01
C	6	5.5E+00	1.37E-01		1.37E-01	1.37E-01
Ca	20	5.0E-01	6.83E-02	3.9E+00		3.90E+00
Cd	48	3.0E-01	2.93E-02	1.5E-01		1.49E-01
Ce	58	2.5E-03	3.90E-03	1.6E-03		1.63E-03
Cf	98	1.0E-03	6.83E-05		6.11E-05	6.11E-05
Cl	17	2.0E+01	1.37E+01	3.5E+00		3.49E+00
Cm	96	2.5E-03	8.39E-05	1.3E-04		1.27E-04
Co	27	9.4E-03	1.31E-02	2.5E-02		2.48E-02
Cr	24	2.5E-04	8.78E-04	2.0E-04		1.95E-04
Cs	55	1.0E-02	9.00E-01	6.9E-03		6.85E-03
Cu	29	1.2E-01	4.88E-02	1.6E-01		1.56E-01
Dy	66		3.90E-03		3.90E-03	3.90E-03
Er	68		3.90E-03		3.90E-03	3.90E-03
Es	99	5.9E-05	1.00E-03			1.00E-03

Note: 1.00E-20 is equivalent to 0.00.

Table 2. Soil-to-Vegetable Transfer Factors (continued)

Element	Z	Current SRS Value	2008 Value	2010 Weighted Value	2003 Weighted Value	2010 Value
			Lee and Coffield	IAEA #472	PNNL-13421	Jannik, et al.
Eu	63	2.5E-03	3.90E-03		3.90E-03	3.90E-03
F	9		1.17E-03		3.65E-03	3.65E-03
Fe	26	6.6E-04	9.75E-03	1.10E-02		1.10E-02
Fm	100		2.00E-03			2.00E-03
Fr	87		5.85E-03			5.85E-03
Ga	31		7.80E-05		2.43E-04	2.43E-04
Gd	64	2.0E-03	3.90E-03		3.90E-03	3.90E-03
Ge	32	1.0E-01	1.56E-02			1.56E-02
H	1	not used	4.80E+00			4.80E+00
Ha	108		2.00E-03			2.00E-03
He	2		1.00E-20			1.00E-20
Hf	72	1.0E-04	1.95E-04		1.95E-04	1.95E-04
Hg	80	3.8E-01	3.90E-02		9.03E-02	9.03E-02
Ho	67	2.5E-03	3.90E-03		3.90E-03	3.90E-03
I	53	2.0E-02	7.80E-03	1.3E-02		1.32E-02
In	49	3.0E-03	7.80E-05		2.43E-04	2.43E-04
Ir	77	3.0E-02	2.93E-03		4.76E-03	4.76E-03
K	19	3.0E-01	1.07E-01	2.5E-01		2.54E-01
Kr	36		1.00E-20			1.00E-20
La	57	2.5E-03	6.83E-05	9.09E-04		9.09E-04
Li	3		7.80E-04			7.80E-04
Lr	103		2.00E-03			2.00E-03
Lu	71	2.5E-03	7.80E-04			7.80E-04
Md	101		2.00E-03			2.00E-03
Mg	12		1.07E-01		1.28E-01	1.28E-01
Mn	25	2.9E-02	3.90E-02	6.39E-02		6.39E-02
Mo	42	1.2E-01	1.56E-01	8.7E-02		8.71E-02
N	7		3.50E-01		7.43E-03	7.43E-03
Na	11	5.0E-02	5.85E-02	5.85E-03		5.85E-03

Note: 1.00E-20 is equivalent to 0.00.

Table 2. Soil-to-Vegetable Transfer Factors (continued)

Element	Z	Current SRS Value	2008 Value Lee and Coffield	2010 Weighted Value IAEA #472	2003 Weighted Value PNNL-13421	2010 Value Jannik, et al.
Nb	41	9.4E-03	4.88E-03	2.2E-03		2.18E-03
Nd	60		3.90E-03	3.9E-03		3.90E-03
Ne	10		1.00E-20			1.00E-20
Ni	28	1.9E-02	1.17E-02		2.18E-02	2.18E-02
No	102		2.00E-03			2.00E-03
Np	93	2.5E-03	2.54E-03	3.91E-03		3.91E-03
O	8		6.00E-01			6.00E-01
Os	76		6.83E-04		6.45E-03	6.45E-03
P	15	1.1E+00	6.83E-01	1.95E-01		1.95E-01
Pa	91	1.0E-02	4.18E-04		6.11E-05	6.11E-05
Pb	82	1.0E-02	1.17E-03	5.2E-03		5.18E-03
Pd	46	1.0E-01	7.80E-03		1.28E-02	1.28E-02
Pm	61	2.5E-03	3.90E-03	2.3E-02		2.32E-02
Po	84	1.0E-03	1.37E-03	4.3E-04		4.30E-04
Pr	59		3.90E-03	3.9E-03		3.90E-03
Pt	78	2.4E-02	4.88E-03			4.88E-03
Pu	94	2.5E-04	2.15E-04	2.0E-05		1.97E-05
Ra	88	4.0E-02	4.64E-03	1.2E-02		1.19E-02
Rb	37	1.3E-01	1.76E-01	1.4E-01		1.39E-01
Re	75	2.1E+02	1.29E+00		1.21E-01	1.21E-01
Rf	104		3.00E-03			3.00E-03
Rh	45		7.80E-03	1.76E-01		1.76E-01
Rn	86		1.00E-20			1.00E-20
Ru	44	5.0E-02	7.80E-03	6.29E-03		6.29E-03
S	16	5.9E-01	2.93E-01		2.93E-01	2.93E-01
Sb	51	1.1E-02	2.49E-03	2.6E-04		2.61E-04
Sc	21		1.95E-04		4.24E-04	4.24E-04

Note: 1.00E-20 is equivalent to 0.00.

Table 2. Soil-to-Vegetable Transfer Factors (continued)

Element	Z	Current SRS Value	2008 Value	2010 Weighted Value	2003 Weighted Value	2010 Value
			Lee and Coffield	IAEA #472	PNNL-13421	Jannik, et al.
Se	34	1.3E+00	5.14E-02		1.89E-02	1.89E-02
Si	14	8.8E-02	1.37E-02		2.65E-02	2.65E-02
Sm	62	2.5E-03	3.90E-03		3.90E-03	3.90E-03
Sn	50	2.5E-03	1.17E-03		2.27E-03	2.27E-03
Sr	38	1.7E-02	9.75E-02	1.2E-01		1.23E-01
Ta	73	2.5E-03	4.88E-03		4.88E-03	4.88E-03
Tb	65		3.90E-03		3.90E-03	3.90E-03
Tc	43	2.5E-01	4.68E-02	1.79E+01		1.79E+01
Te	52	1.3E+00	1.20E-02	5.9E-02		5.85E-02
Th	90	4.2E-03	6.44E-05	3.1E-04		3.14E-04
Ti	22	1.0E-04	5.85E-04			5.85E-04
Tl	81		7.80E-05		2.43E-04	2.43E-04
Tm	69		7.80E-04			7.80E-04
U	92	2.5E-03	2.34E-03	6.69E-03		6.69E-03
V	23	1.4E-03	5.85E-04			5.85E-04
W	74		5.00E-02	2.0E-02		1.95E-02
Xe	54		1.00E-20			1.00E-20
Y	39	2.6E-03	1.95E-03	3.90E-04		3.90E-04
Yb	70		7.80E-04			7.80E-04
Zn	30	4.0E-01	6.83E-02	1.71E-01		1.71E-01
Zr	40	1.7E-04	1.95E-04	7.8E-04		7.80E-04

Note: 1.00E-20 is equivalent to 0.00.

Table 3. Feed-to-Milk Transfer Factors

Element	Z	SRS Current Value	2008 Value Lee and Coffield	2010 Value IAEA #472	2010 Value Jannik et al.
Ac	89	2.0E-05	2.00E-05		2.00E-05
Ag	47	5.0E-02	1.58E-03		1.58E-03
Al	13	2.0E-04	2.06E-04		2.06E-04
Am	95	5.0E-06	1.50E-06	4.20E-07	4.20E-07
As	33		6.00E-05		6.00E-05
At	85		1.03E-02		1.03E-02
Au	79		5.50E-06		5.50E-06
B	5		1.55E-03		1.55E-03
Ba	56	4.0E-04	4.80E-04	1.60E-04	1.60E-04
Be	4	2.0E-06	9.00E-07	8.30E-07	8.30E-07
Bi	83	5.0E-04	5.00E-04		5.00E-04
Bk	97	4.0E-07	2.00E-06		2.00E-06
Br	35		2.00E-02		2.00E-02
C	6	1.2E-02	1.20E-02		1.20E-02
Ca	20	3.0E-03	3.00E-03	1.00E-02	1.00E-02
Cd	48	1.2E-04	1.00E-03	1.90E-04	1.90E-04
Ce	58	6.0E-04	3.00E-05	2.00E-05	2.00E-05
Cf	98	7.5E-07	1.50E-06		1.50E-06
Cl	17	2.0E-02	1.70E-02		1.70E-02
Cm	96	5.0E-06	2.00E-05		2.00E-05
Co	27	1.0E-03	3.00E-04	1.10E-04	1.10E-04
Cr	24	2.2E-03	1.00E-05	4.30E-04	4.30E-04
Cs	55	1.2E-02	7.90E-03	4.60E-03	4.60E-03
Cu	29	1.4E-02	2.00E-03		2.00E-03
Dy	66		3.00E-05		3.00E-05
Er	68		3.00E-05		3.00E-05
Es	99	4.0E-07	2.00E-06		2.00E-06
Eu	63	5.0E-06	3.00E-05		3.00E-05
F	9		1.00E-03		1.00E-03
Fe	26	1.2E-03	3.00E-05	3.50E-05	3.50E-05
Fr	87		2.06E-02		2.06E-02
Ga	31		5.00E-05		5.00E-05
Gd	64	6.0E-05	3.00E-05		3.00E-05
Ge	32	7.0E-02	7.21E-02		7.21E-02
H	1	not used	1.50E-02		1.50E-02
Ha	105		5.00E-06		5.00E-06
He	2		1.00E-20		1.00E-20
Hf	72	5.5E-07	5.50E-07		5.50E-07
Hg	80	5.0E-04	4.70E-04		4.70E-04
Ho	67	2.0E-05	3.00E-05		3.00E-05
I	53	6.0E-03	9.00E-03	5.40E-03	5.40E-03
In	49	2.0E-04	2.00E-04		2.00E-04
Ir	77	2.0E-06	2.00E-06		2.00E-06
K	19	7.0E-03	7.20E-03		7.20E-03
La	57	5.0E-06	2.00E-05		2.00E-05
Li	3		2.06E-02		2.06E-02
Lr	103		5.00E-06		5.00E-06
Lu	71	2.0E-05	2.06E-05		2.06E-05
Md	101		5.00E-06		5.00E-06

Table 3. Feed-to-Milk Transfer Factors (continued)

Element	Z	SRS Current Value	2008 Value	2010 Value	2010 Value
			Lee and Coffield	IAEA #472	Jannik et al.
Mg	12		3.90E-03		3.90E-03
Mn	25	2.5E-04	3.00E-05	4.10E-05	4.10E-05
Mo	42	7.5E-03	1.70E-03	1.10E-03	1.10E-03
N	7		2.50E-02		2.50E-02
Na	11	4.0E-02	1.60E-02	1.30E-02	1.30E-02
Nb	41	2.5E-03	3.20E-05	4.10E-07	4.10E-07
Nd	60		3.00E-05		3.00E-05
Ni	28	6.7E-03	1.60E-02	9.50E-04	9.50E-04
No	102		5.00E-06		5.00E-06
Np	93	5.0E-06	5.00E-06		5.00E-06
Os	76		5.00E-03		5.00E-03
P	15	2.5E-02	1.60E-02	2.00E-02	2.00E-02
Pa	91	5.0E-06	5.00E-06		5.00E-06
Pb	82	3.0E-04	2.60E-04	1.90E-04	1.90E-04
Pd	46	5.0E-03	1.00E-02		1.00E-02
Pm	61	5.0E-06	3.00E-05		3.00E-05
Po	84	3.4E-04	3.40E-04	2.10E-04	2.10E-04
Pr	59		3.00E-05		3.00E-05
Pt	78	5.0E-03	5.15E-03		5.15E-03
Pu	94	2.0E-06	1.10E-06	1.00E-05	1.00E-05
Ra	88	1.0E-03	1.30E-03	3.80E-04	3.80E-04
Rb	37	3.0E-02	1.20E-02		1.20E-02
Re	75	1.4E-04	1.50E-03		1.50E-03
Rf	104		2.00E-05		2.00E-05
Rh	45		1.00E-02		1.00E-02
Rn	86		1.00E-20		1.00E-20
Ru	44	1.0E-06	3.30E-06	9.40E-06	9.40E-06
S	16	1.8E-02	1.60E-02	7.90E-03	7.90E-03
Sb	51	1.5E-03	2.50E-05	3.80E-05	3.80E-05
Sc	21		5.00E-06		5.00E-06
Se	34	4.5E-02	4.00E-03	4.00E-03	4.00E-03
Si	14	2.0E-05	2.00E-05		2.00E-05
Sm	62	5.0E-06	3.00E-05		3.00E-05
Sn	50	2.5E-03	1.00E-03		1.00E-03
Sr	38	8.0E-04	2.80E-03	1.30E-03	1.30E-03
Ta	73	3.0E-06	4.10E-07		4.10E-07
Tb	65		3.00E-05		3.00E-05
Tc	43	2.5E-02	1.87E-03		1.87E-03
Te	52	1.0E-03	4.50E-04	3.40E-04	3.40E-04
Th	90	5.0E-06	5.00E-06		5.00E-06
Ti	22	5.5E-07	7.53E-05		7.53E-05
Tl	81		2.00E-03		2.00E-03
Tm	69		2.06E-05		2.06E-05
U	92	5.0E-04	4.00E-04	1.80E-03	1.80E-03
V	23	2.0E-05	2.06E-05		2.06E-05
W	74		3.00E-04	1.90E-04	1.90E-04
Y	39	1.0E-05	2.00E-05		2.00E-05
Yb	70		2.06E-05		2.06E-05
Zn	30	3.9E-02	1.00E-02	2.70E-03	2.70E-03
Zr	40	5.0E-06	5.50E-07	3.60E-06	3.60E-06

Table 4. Feed-to-Meat Transfer Factors

Element	Z	SRS Current Value	2008 Value Lee and Coffield	2010 Value IAEA #472	2010 Value Jannik et al.
Ac	89	2.0E-05	4.00E-04		4.00E-04
Ag	47	1.7E-02	3.00E-03		3.00E-03
Al	13	5.0E-04	1.50E-03		1.50E-03
Am	95	2.0E-04	4.00E-05	5.00E-04	5.00E-04
As	33		2.00E-03		2.00E-03
At	85		1.00E-02		1.00E-02
Au	79		5.00E-03		5.00E-03
B	5		8.00E-04		8.00E-04
Ba	56	3.2E-03	2.00E-04	1.40E-04	1.40E-04
Be	4	1.0E-03	1.00E-03		1.00E-03
Bi	83	2.0E-03	4.00E-04		4.00E-04
Bk	97	2.0E-05	2.50E-05		2.50E-05
Br	35		2.50E-02		2.50E-02
C	6	3.1E-02	3.10E-02		3.10E-02
Ca	20	1.6E-03	2.00E-03	1.30E-02	1.30E-02
Cd	48	5.3E-04	4.00E-04	5.80E-03	5.80E-03
Ce	58	1.2E-03	2.00E-05		2.00E-05
Cf	98	6.0E-05	4.00E-05		4.00E-05
Cl	17	6.0E-02	2.00E-02	1.70E-02	1.70E-02
Cm	96	2.0E-04	4.00E-05		4.00E-05
Co	27	1.3E-02	1.00E-02	4.30E-04	4.30E-04
Cr	24	2.4E-03	9.00E-03		9.00E-03
Cs	55	4.0E-03	5.00E-02	2.20E-02	2.20E-02
Cu	29	8.0E-03	9.00E-03		9.00E-03
Dy	66		2.00E-05		2.00E-05
Er	68		2.00E-05		2.00E-05
Es	99	2.0E-05	2.50E-05		2.50E-05
Eu	63	4.8E-03	2.00E-05		2.00E-05
F	9		1.50E-01		1.50E-01
Fe	26	4.0E-02	2.00E-02	1.40E-02	1.40E-02
Fm	100		2.00E-04		2.00E-04
Fr	87		2.50E-03		2.50E-03
Ga	31		5.00E-04		5.00E-04
Gd	64	2.0E-03	2.00E-05		2.00E-05
Ge	32	7.0E-01	7.00E-01		7.00E-01
H	1	not used	0.00E+00		0.00E+00
Ha	105		5.00E-06		5.00E-06
Hf	72	1.0E-06	3.16E-05		3.16E-05
Hg	80	1.0E-01	2.50E-01		2.50E-01
Ho	67	4.5E-03	3.00E-04		3.00E-04
I	53	2.9E-03	4.00E-02	6.70E-03	6.70E-03
In	49	4.0E-03	8.00E-03		8.00E-03
Ir	77	2.0E-03	1.50E-03		1.50E-03
K	19	2.0E-02	2.00E-02		2.00E-02
La	57	2.0E-04	2.00E-03	1.30E-04	1.30E-04
Li	3	4.5E-03	1.00E-02		1.00E-02
Lr	103		2.00E-04		2.00E-04
Lu	71		4.50E-03		4.50E-03
Mg	12		2.00E-02		2.00E-02
Mn	25	8.0E-04	5.00E-04	6.00E-04	6.00E-04

Table 4. Feed-to-Meat Transfer Factors (continued)

Element	Z	SRS Current Value	2008 Value Lee and Coffield	2010 Value IAEA #472	2010 Value Jannik et al.
Mo	42	8.0E-03	1.00E-03	1.00E-03	1.00E-03
N	7		7.50E-02		7.50E-02
Na	11	3.0E-02	8.00E-02	1.50E-02	1.50E-02
Nb	41	2.8E-01	2.90E-04	2.60E-07	2.60E-07
Nd	60		2.00E-05		2.00E-05
Ni	28	5.3E-03	5.00E-03		5.00E-03
No	102		2.00E-04		2.00E-04
Np	93	2.0E-04	1.00E-03		1.00E-03
Os	76		4.00E-01		4.00E-01
P	15	4.6E-02	5.00E-02	5.50E-02	5.50E-02
Pa	91	5.0E-03	4.47E-04		4.47E-04
Pb	82	8.0E-04	4.00E-04	7.00E-04	7.00E-04
Pd	46	1.0E-03	4.00E-03		4.00E-03
Pm	61	4.8E-03	2.00E-05		2.00E-05
Po	84	5.0E-03	5.00E-03		5.00E-03
Pr	59		2.00E-05		2.00E-05
Pt	78	4.0E-03	4.00E-03		4.00E-03
Pu	94	1.4E-05	1.00E-05	1.10E-06	1.10E-06
Ra	88	1.0E-03	9.00E-04	1.70E-03	1.70E-03
Rb	37	3.1E-02	1.00E-02		1.00E-02
Re	75	1.0E-04	8.00E-03		8.00E-03
Rh	45		2.00E-03		2.00E-03
Rn	86		1.00E-20		1.00E-20
Ru	44	4.0E-01	5.00E-02	3.30E-03	3.30E-03
S	16	1.0E-01	2.00E-01		2.00E-01
Sb	51	4.0E-03	1.00E-03	1.20E-03	1.20E-03
Sc	21		1.50E-02		1.50E-02
Se	34	1.5E-02	1.50E-02		1.50E-02
Si	14	4.0E-05	4.00E-05		4.00E-05
Sm	62	5.0E-03	3.16E-04		3.16E-04
Sn	50	8.0E-02	8.00E-02		8.00E-02
Sr	38	6.0E-04	8.00E-03	1.30E-03	1.30E-03
Ta	73	6.0E-04	1.34E-05		1.34E-05
Tb	65		2.00E-05		2.00E-05
Tc	43	4.0E-01	6.32E-03		6.32E-03
Te	52	7.7E-02	7.00E-03	7.00E-03	7.00E-03
Th	90	2.0E-04	4.00E-05	2.30E-04	2.30E-04
Ti	22	1.0E-06	1.73E-04		1.73E-04
Tl	81		4.00E-02		4.00E-02
Tm	69		4.50E-03		4.50E-03
U	92	3.4E-04	3.00E-04	3.90E-04	3.90E-04
V	23	2.5E-03	2.50E-03		2.50E-03
W	74		4.00E-02		4.00E-02
Y	39	4.6E-03	1.00E-03		1.00E-03
Yb	70		4.00E-03		4.00E-03
Zn	30	3.0E-02	1.00E-01	1.60E-01	1.60E-01
Zr	40	3.4E-02	1.84E-04	1.20E-06	1.20E-06

Table 5. Water-to-Fish Bioaccumulation Factors

Element	Z	SRS Current Value	2008 Value	2010 Value	2010 Value
			Lee and Coffield	IAEA #472	Jannik et al.
Ac	89	2.5E+01	2.50E+01		2.50E+01
Ag	47	2.3E+00	5.00E+00	1.10E+02	1.10E+02
Al	13	1.0E+01	5.00E+02	5.10E+01	5.10E+01
Am	95	2.5E+01	3.00E+01	2.40E+02	2.40E+02
As	33		1.70E+03	3.30E+02	3.30E+02
At	85	1.5E+01	1.50E+01		1.50E+01
Au	79	3.5E+01	3.30E+01	2.40E+02	2.40E+02
Ba	56		4.00E+00	1.20E+00	1.20E+00
Be	4	2.0E+00	1.00E+02		1.00E+02
Bi	83	1.5E+01	1.50E+01		1.50E+01
Bk	97	2.5E+01	2.50E+01		2.50E+01
Br	35		4.00E+02	9.10E+01	9.10E+01
C	6	4.6E+03	5.00E+04	4.00E+05	3.00E+00
Ca	20	4.0E+01	4.00E+01	1.20E+01	1.20E+01
Cd	48	2.0E+02	2.00E+02		2.00E+02
Ce	58		3.00E+01	2.50E+01	2.50E+01
Cf	98	2.5E+01	2.50E+01		2.50E+01
Cl	17	5.0E+01	5.00E+01	4.70E+01	4.70E+01
Cm	96	2.5E+01	3.00E+01		3.00E+01
Co	27	5.0E+01	3.00E+02	7.60E+01	7.60E+01
Cr	24		4.00E+00	4.00E+01	4.00E+01
Cs	55	3.0E+03	3.00E+03	2.50E+03	3.00E+03
Cu	29		2.00E+02	2.30E+02	2.30E+02
Dy	66		3.00E+01	6.50E+02	6.50E+02
Er	68		3.00E+01		3.00E+01
Es	99	1.0E+01	2.50E+01		2.50E+01
Eu	63		3.00E+01	1.30E+02	1.30E+02
F	9		1.00E+01		1.00E+01
Fe	26	1.0E+02	2.00E+02	1.70E+02	1.70E+02
Fr	87	3.0E+01	3.00E+01		3.00E+01
Ga	31	3.3E+02	4.00E+02		4.00E+02
Gd	64	2.5E+01	3.00E+01		3.00E+01
Ge	32	3.3E+03	4.00E+03		4.00E+03
He	2		1.00E+00		1.00E+00
H	1	9.0E-01	1.00E+00		1.00E+00
Hf	72	3.3E+00	3.00E+02	1.10E+03	1.10E+03
Hg	80	1.0E+03	1.00E+03	6.10E+03	6.10E+03
Ho	67	2.5E+01	3.00E+01		3.00E+01
I	53	1.5E+01	4.00E+01	3.00E+01	3.00E+01
In	49	1.0E+04	1.00E+04		1.00E+04
Ir	77	1.0E+01	1.00E+01		1.00E+01
K	19	1.0E+03	1.00E+03	3.20E+03	3.20E+03
La	57	2.5E+01	3.00E+01	3.70E+01	3.70E+01
Lu	71	2.5E+01	2.50E+01		2.50E+01
Mg	12		5.00E+01	3.70E+01	3.70E+01
Mn	25	1.0E+02	4.00E+02	2.40E+02	2.40E+02
Mo	42	1.0E+01	1.00E+01	1.90E+00	1.90E+00
N	7		2.00E+05		2.00E+05
Na	11		2.00E+01	7.60E+01	7.60E+01

Table 5. Water-to-Fish Bioaccumulation Factors (continued)

Element	Z	SRS Current Value	2008 Value	2010 Value	2010 Value
			Lee and Coffield	IAEA #472	Jannik et al.
Nb	41	3.0E+04	3.00E+02		3.00E+02
Nd	60		3.00E+01		3.00E+01
Ni	28	1.0E+02	1.00E+02	2.10E+01	2.10E+01
Np	93	1.0E+02	2.10E+01		2.10E+01
O	8		1.00E+00		1.00E+00
Os	76	1.0E+05	1.00E+03		1.00E+03
P	15		5.00E+04	1.40E+05	1.40E+05
Pa	91	1.1E+01	1.00E+01		1.00E+01
Pb	82	3.0E+02	3.00E+02	2.50E+01	2.50E+01
Pd	46	1.0E+01	1.00E+01		1.00E+01
Pm	61		3.00E+01		3.00E+01
Po	84	5.0E+02	5.00E+01	3.60E+01	3.60E+01
Pr	59		3.00E+01		3.00E+01
Pt	78	1.0E+02	3.50E+01		3.50E+01
Pu	94	3.5E+00	3.00E+01	2.1E+04*	3.00E+01
Ra	88	5.0E+01	5.00E+01	4.00E+00	4.00E+00
Rb	37	2.0E+03	2.00E+03	4.90E+03	4.90E+03
Re	75	1.2E+02	1.20E+02		1.20E+02
Rh	45		1.00E+01		1.00E+01
Rn	86	5.7E+01	7.55E-10		7.55E-10
Ru	44	1.0E+01	1.00E+02	5.50E+01	5.50E+01
S	16		8.00E+02		8.00E+02
Sb	51	1.0E+00	1.00E+02	3.70E+01	3.70E+01
Sc	21	1.0E+02	1.00E+02	1.90E+02	1.90E+02
Se	34	1.7E+02	1.70E+02	6.00E+03	6.00E+03
Si	14	2.5E+00	2.00E+01		2.00E+01
Sm	62	2.5E+01	3.00E+01		3.00E+01
Sn	50	3.0E+03	3.00E+03		3.00E+03
Sr	38	3.0E+01	6.00E+01	2.90E+00	2.90E+00
Ta	73	3.0E+04	3.00E+02		3.00E+02
Tb	65		3.00E+01	4.10E+02	4.10E+02
Tc	43	1.5E+01	2.00E+01		2.00E+01
Te	52	4.0E+02	4.00E+02	1.50E+02	1.50E+02
Th	90	3.0E+01	1.00E+02	6.00E+00	6.00E+00
Ti	22	1.0E+03	1.00E+03	1.90E+02	1.90E+02
Tl	81	1.0E+04	1.00E+04	9.00E+02	9.00E+02
U	92	2.0E+00	1.00E+01	9.60E-01	9.60E-01
V	23	1.0E+01	2.00E+02	9.70E+01	9.70E+01
W	74		1.00E+01		1.00E+01
Y	39	2.5E+01	3.00E+01	4.00E+01	4.00E+01
Zn	30		3.50E+02	3.40E+03	3.40E+03
Zr	40	3.3E+00	3.00E+02	2.20E+01	2.20E+01

*the plutonium value of 21,000 L/kg is considered suspect at this time.

Table 6. Water to Saltwater Invertebrates Bioaccumulation Factors

Element	Z	SRS Current Value	2008 Value	2003 Value	2010 Value
			Lee and Coffield	PNNL 13421	Jannik et al.
Ac	89	1.00E+03	N/A	1.00E+03	1.00E+03
Ag	47	3.33E+03	N/A	3.50E+02	3.50E+02
Al	13	6.00E+01	N/A		6.00E+01
Am	95	1.00E+03	N/A	3.60E+02	3.60E+02
As	33		N/A	3.00E+02	3.00E+02
Ba	56	1.00E+02	N/A	1.00E+00	1.00E+00
Be	4	2.00E+02	N/A	1.00E+04	1.00E+04
Bi	83	1.00E+01	N/A	1.00E+03	1.00E+03
Bk	97	1.00E+03	N/A		1.00E+03
Br	35		N/A	1.00E+01	1.00E+01
C	6	1.40E+03	N/A	2.00E+04	2.00E+04
Ca	20	1.25E+01	N/A	5.00E+00	5.00E+00
Cd	48	2.50E+05	N/A	5.00E+03	5.00E+03
Ce	58	6.00E+02	N/A	5.00E+02	5.00E+02
Cf	98	1.00E+03	N/A	5.00E+02	5.00E+02
Cl	17	1.90E-02	N/A	1.00E+00	1.00E+00
Cm	96	1.00E+03	N/A	4.60E+02	4.60E+02
Co	27	1.00E+03	N/A	2.00E+03	2.00E+03
Cr	24	2.00E+03	N/A	5.00E+02	5.00E+02
Cs	55	2.50E+01	N/A	3.00E+01	3.00E+01
Cu	29	1.70E+03	N/A	5.00E+03	5.00E+03
Dy	66		N/A	1.00E+03	1.00E+03
Er	68		N/A	5.00E+02	5.00E+02
Es	99	1.00E+01	N/A	7.00E+03	7.00E+03
Eu	63	1.00E+03	N/A	1.00E+03	1.00E+03
F	9		N/A	4.00E+00	4.00E+00
Fe	26	2.00E+04	N/A	5.00E+03	5.00E+03
Fr	87		N/A		3.00E+01
Ga	31		N/A	1.00E+04	1.00E+04
Gd	64	1.00E+03	N/A	2.00E+03	2.00E+03
Ge	32	1.57E+04	N/A		4.00E+03
He	2		N/A	1.00E+00	1.00E+00
H	1	9.30E-01	N/A		9.30E-01
Hf	72	2.00E+01	N/A	1.00E+03	1.00E+03
Hg	80	3.33E+04	N/A	2.00E+04	2.00E+04
Ho	67	1.00E+03	N/A	1.00E+03	1.00E+03
I	53	5.00E+01	N/A	5.00E+01	5.00E+01
In	49		N/A	1.00E+04	1.00E+04
Ir	77	2.00E+03	N/A	1.00E+02	1.00E+02
K	19	6.58E+00	N/A		6.58E+00
La	57	1.00E+03	N/A	1.00E+02	1.00E+02
Lu	71	1.00E+03	N/A		1.00E+03
Mn	25	1.00E+04	N/A	8.00E+02	8.00E+02
Mo	42	1.00E+01	N/A	2.00E+01	2.00E+01
N	7		N/A	1.00E+00	1.00E+00
Na	11	1.90E-01	N/A	1.00E+00	1.00E+00
Nb	41	1.00E+02	N/A	5.00E+01	5.00E+01
Ni	28	2.50E+02	N/A	5.00E+02	5.00E+02
Np	93	1.00E+01	N/A	1.00E+01	1.00E+01

Table 6. Water to Saltwater Invertebrates Bioaccumulation Factors (continued)

Element	Z	SRS Current Value	2008 Value	2003 Value	2010 Value
			Lee and Coffield	PNNL 13421	Jannik et al.
P	15	3.00E+04	N/A	3.80E+04	3.80E+04
Pa	91	1.00E+01	N/A	1.00E+01	1.00E+01
Pb	82	1.00E+03	N/A	1.00E+03	1.00E+03
Pd	46	2.00E+03	N/A	3.00E+02	3.00E+02
Pm	61	1.00E+03	N/A	1.00E+03	1.00E+03
Po	84	2.00E+04	N/A	5.00E+04	5.00E+04
Pr	59		N/A	1.00E+03	1.00E+03
Pt	78	2.00E+03	N/A		2.00E+03
Pu	94	1.00E+02	N/A	3.00E+02	3.00E+02
Ra	88	1.00E+02	N/A	1.00E+02	1.00E+02
Rb	37	1.70E+01	N/A	2.00E+02	2.00E+02
Re	75	5.95E+01	N/A		5.95E+01
Rh	45		N/A	1.00E+02	1.00E+02
Rn	86		N/A		
Ru	44	1.00E+03	N/A	1.00E+02	1.00E+02
S	16	4.40E-01	N/A	1.00E+00	1.00E+00
Sb	51	5.00E+00	N/A	1.00E+02	1.00E+02
Sc	21		N/A	3.00E+02	3.00E+02
Se	34	1.00E+03	N/A	5.00E+03	5.00E+03
Si	14	3.33E+01	N/A	5.00E+04	5.00E+04
Sm	62	1.00E+03	N/A	1.00E+03	1.00E+03
Sn	50	1.00E+03	N/A	5.00E+04	5.00E+04
Sr	38	2.00E+01	N/A	1.00E+00	1.00E+00
Ta	73	1.67E+04	N/A	3.00E+03	3.00E+03
Tb	65		N/A	1.00E+03	1.00E+03
Tc	43	5.00E+01	N/A	1.00E+01	1.00E+01
Te	52	1.00E+05	N/A	1.00E+03	1.00E+03
Th	90	2.00E+03	N/A	1.00E+03	1.00E+03
Ti	22	1.00E+03	N/A		1.00E+03
Tl	81		N/A	1.00E+03	1.00E+03
U	92	1.00E+01	N/A	1.00E+01	1.00E+01
V	23	5.00E+01	N/A		5.00E+01
W	74		N/A	1.00E+01	1.00E+01
Y	39	1.00E+03	N/A	1.00E+03	1.00E+03
Zn	30	5.00E+04	N/A	5.00E+04	5.00E+04
Zr	40	8.00E+01	N/A	5.00E+01	5.00E+01

Table 7. Vegetable Production as a Function of Distance and Sector

2007 Weighted Vegetable Production Grid surrounding SRS increased 10 times for unreported (home use) production (L/yr)

Sector	10-20 Mi	20-30 Mi	30-40 Mi	40-50 Mi	Total
N	1.5E+04	2.5E+04	4.1E+04	2.2E+05	3.1E+05
NNE	1.4E+04	2.5E+04	2.5E+05	7.9E+05	1.1E+06
NE	4.2E+04	4.0E+04	1.3E+05	4.7E+05	6.8E+05
ENE	6.1E+04	1.5E+05	6.4E+04	4.5E+04	3.2E+05
E	6.8E+04	2.6E+05	4.4E+05	2.5E+05	1.0E+06
ESE	6.2E+04	1.6E+05	3.1E+05	2.3E+05	7.5E+05
SE	5.2E+04	8.7E+04	4.5E+04	1.8E+04	2.0E+05
SSE	4.1E+04	6.4E+04	6.7E+04	2.5E+04	2.0E+05
S	1.3E+04	2.9E+04	4.1E+04	7.7E+04	1.6E+05
SSW	9.8E+03	1.3E+04	1.4E+04	8.8E+04	1.2E+05
SW	1.0E+04	1.5E+04	1.0E+04	1.2E+04	4.7E+04
WSW	1.1E+04	1.7E+04	2.4E+04	4.0E+04	9.0E+04
W	9.3E+03	1.3E+04	2.3E+04	3.1E+04	7.6E+04
WNW	1.4E+04	1.1E+04	1.0E+04	1.1E+04	4.6E+04
NW	1.6E+04	2.2E+04	2.6E+04	1.9E+04	8.3E+04
NNW	1.6E+04	2.5E+04	3.9E+04	5.6E+04	1.3E+05
Total	**4.5E+05**	**9.5E+05**	**1.5E+06**	**2.4E+06**	**5.3E+06**

Table 8. Beef Production as a Function of Distance and Sector

2007 Weighted Beef Production Grid surrounding SRS Increased 25% for unreported (home use) production (L/yr)

Sector	10-20 Mi	20-30 Mi	30-40 Mi	40-50 Mi	Total
N	4.9E+04	8.2E+04	1.3E+05	5.1E+05	7.8E+05
NNE	4.7E+04	8.2E+04	1.0E+05	1.0E+05	3.3E+05
NE	4.4E+04	7.9E+04	1.0E+05	1.0E+05	3.3E+05
ENE	4.6E+04	8.9E+04	1.1E+05	1.3E+05	3.8E+05
E	5.2E+04	1.0E+05	1.6E+05	1.5E+05	4.7E+05
ESE	4.8E+04	1.3E+05	1.4E+05	6.1E+04	3.8E+05
SE	9.2E+04	1.8E+05	8.5E+04	2.4E+04	3.8E+05
SSE	9.3E+04	1.5E+05	1.6E+05	6.2E+04	4.7E+05
S	8.9E+04	1.1E+05	1.5E+05	1.7E+05	5.2E+05
SSW	1.0E+05	1.3E+05	1.4E+05	1.2E+05	4.8E+05
SW	1.0E+05	1.7E+05	1.8E+05	1.5E+05	6.0E+05
WSW	1.1E+05	1.7E+05	2.4E+05	2.4E+05	7.7E+05
W	6.3E+04	1.0E+05	1.7E+05	1.7E+05	5.0E+05
WNW	4.8E+04	5.5E+04	8.8E+04	1.2E+05	3.1E+05
NW	5.2E+04	7.6E+04	1.1E+05	1.1E+05	3.5E+05
NNW	5.1E+04	8.2E+04	1.3E+05	2.5E+05	5.2E+05
Total	**1.1E+06**	**1.8E+06**	**2.2E+06**	**2.5E+06**	**7.6E+06**

Table 9. Milk Production as a Function of Distance and Sector

Sector	10-20 Mi	20-30 Mi	30-40 Mi	40-50 Mi	Total
N	4.4E+03	4.4E+03	3.0E+05	3.2E+06	3.5E+06
NNE	4.4E+03	4.4E+03	4.4E+03	4.4E+03	1.8E+04
NE	4.4E+03	1.0E+06	2.0E+06	1.2E+06	4.2E+06
ENE	4.4E+03	1.6E+06	3.8E+06	4.5E+06	9.9E+06
E	4.4E+03	2.5E+06	5.3E+06	5.2E+06	1.3E+07
ESE	4.4E+03	9.6E+05	3.0E+06	7.3E+05	4.7E+06
SE	4.4E+03	4.4E+03	4.4E+03	4.4E+03	1.8E+04
SSE	1.6E+05	1.3E+05	1.9E+05	1.4E+05	6.2E+05
S	1.5E+06	3.8E+05	4.7E+05	5.5E+05	2.9E+06
SSW	2.1E+06	1.9E+06	1.3E+06	1.3E+06	6.6E+06
SW	2.1E+06	3.4E+06	3.1E+06	2.6E+06	1.1E+07
WSW	2.2E+06	3.5E+06	4.8E+06	3.8E+06	1.4E+07
W	8.0E+05	1.4E+06	2.6E+06	3.7E+06	8.5E+06
WNW	4.4E+03	8.9E+03	6.6E+03	1.5E+06	1.5E+06
NW	4.4E+03	7.0E+04	6.1E+05	4.4E+05	1.1E+06
NNW	4.4E+03	1.5E+04	9.0E+05	1.8E+06	2.7E+06
Total	**9.0E+06**	**1.7E+07**	**2.9E+07**	**3.1E+07**	**8.5E+07**

Table 10. SRS Average Behavioral Parameters for Dose Calculations

Parameter	Units	1977	1991	2008	2010	% Difference 1991 Hamby/ 2010 Jannik
		NRC Default	Hamby	Lee and Coffield	Jannik et al.	
Average Individual and Population Usage						
Inhalation Rate	m^3/yr	8,000	8,000	5,548	5,548	-30.65%
Drinking Water consumption rate	L/yr	370	370	337	337	-8.92%
Leafy Vegetable consumption rate	kg/yr	64	21	21	21	0.00%
Other Produce consumption rate	kg/yr	190	163	163	163	0.00%
Meat consumption rate	kg/yr	95	43	43	43	0.00%
Milk consumption rate	L/yr	110	120	120	120	0.00%
Fish consumption rate	kg/yr	6.9	9	9	9	0.00%
Invertebrate consumption rate	kg/yr	1	2	N/A	2	0.00%
Soil consumption rate	kg/yr	-	-	0.0365	0.0365	N/A
Shoreline Exposure Time	hr/yr	8.3	23.0	23.0	10.0	-56.52%
Swimming Exposure Time	hr/yr	-	8.9	8.9	7.0	-21.35%
Boating Exposure Time	hr/yr	-	21.0	21.0	22.0	4.76%
Population Shoreline Exposure Time	per.-hr	-	9.60E+05	N/A	8.22E+05	-14.38%
Population Swimming Exposure Time	per.-hr	-	1.60E+05	N/A	2.95E+05	84.38%
Population Boating Exposure Time	per.-hr	-	1.10E+06	N/A	3.11E+06	182.73%
Fraction of year working in garden	-	-	-	0.01	0.01	N/A
Fraction of year residing in home	-	-	-	0.7	0.7	N/A
Time taking a shower	min/d	-	-	10	10	N/A
Population served - BJWSA (Chelsea)	persons	-	5.00E+04	N/A	7.70E+04	54.00%
Population served - BJWSA (Purrysburg)	persons	-	N/A	N/A	5.80E+04	N/A
Population served - Savannah I&D	persons	-	1.50E+04	N/A	2.63E+04	75.33%

Table 11. SRS Maximum Individual Behavioral Parameters for Dose Calculations

Parameter	Units	1977 NRC Default	1991 Hamby	2008 Lee and Coffield	2010 Jannik et al.	% Difference 1991 Hamby/ 2010 Jannik
Maximally Exposed Individual Usage						
Inhalation Rate	m^3/yr	8,000	8,000	N/A	8,000	0.00%
Drinking Water consumption rate	L/yr	730	730	N/A	730	0.00%
Leafy Vegetable consumption rate	kg/yr	64	43	N/A	43	0.00%
Other Produce consumption rate	kg/yr	520	276	N/A	276	0.00%
Meat consumption rate	kg/yr	110	81	N/A	81	0.00%
Milk consumption rate	L/yr	310	230	N/A	230	0.00%
Fish consumption rate	kg/yr	21	19	N/A	19	0.00%
Invertebrate consumption rate	kg/yr	5	8	N/A	8	0.00%
Soil consumption rate	kg/yr	-	-	N/A	0.0365	N/A
Shoreline Exposure Time	hr/yr	12	23.0	N/A	20.0	-13.04%
Swimming Exposure Time	hr/yr	-	8.9	N/A	14.0	57.30%
Boating Exposure Time	hr/yr	-	21.0	N/A	44.0	109.52%

Table 12. Average Recreational Usage Rates

Survey Activity	2005 Percentage Participating	2005 Average Annual Frequency	1991 Survey Hours per Occasion	2010 per Capita Usage (hr/yr)
Shoreline Usage				
Fresh water fishing	38%	5.0	5	9.50
				10
Swimming Usage				
Lake/River Swimming	28%	4.0	3	3.36
Jet and Water Skiing	28%	4.0	3	3.36
				7
Boating Usage				
Canoeing, kayaking, rafting	11%	1.0	3	0.33
Boating/Sailing	55%	8.0	5	22.00
				22

SC 2005 Recreational Participation & Preference Study
http://www.scprt.com/our-partners/tourismstatistics/researchreports.aspx

Table 13. Weighted Usage Fractions

Activity	State Usage Available Fraction	2000 Population Fraction*	Weighted Usage Fraction	Population Usage (person-hr/yr)
Shoreline				
SC, surf/bank fishing	0.041	0.6	0.0246	
GA, warmwater fishing	0.085	0.4	0.034	
			0.059	**8.22E+05**
Swimming				
SC, beach areas	0.032	0.6	0.0192	
GA, lake swimming	0.027	0.4	0.0108	
			0.030	**2.95E+05**
Boating				
SC, boat use average**	0.13	0.6	0.078	
GA, boating/sailing	0.057	0.4	0.0228	
			0.101	**3.11E+06**

* Assumes 60% of population lives in SC and 40% of population lives in Georgia.
Based on Projected Census Data for Counties
** Average of "other fishing" and "boat ramps" fractions

	Base Census 2000	Projected Census 2010
50 mile Counties SC Population	739,715	832,000
50 mile Counties GA Population	507,226	571,000
Total	**1,246,941**	**1,403,000**

APPENDIX B DOSE COMPARISONS (TABLES 14-55)

APPENDIX B DOSE COMPARISONS (TABLES 14-55)

Table 14. LADTAP XL Maximally Exposed Individual Water Ingestion Pathway Comparison (mrem/yr)

Nuclide	Hamby Ladtap Water Pathway	Jannik Ladtap Water Pathway	% Diff	Nuclide	Hamby Ladtap Water Pathway	Jannik Ladtap Water Pathway	% Diff
H-3	5.1E-06	5.1E-06	0.00%	Sm-146	1.6E-02	1.6E-02	0.00%
Be-7	8.8E-06	8.8E-06	0.00%	Sm-147	1.5E-02	1.5E-02	0.00%
Be-10	3.4E-04	3.4E-04	0.00%	Sm-151	2.8E-05	2.8E-05	0.00%
C-14	1.7E-04	1.7E-04	0.00%	Pm-147	7.8E-05	7.8E-05	0.00%
Na-22	9.8E-04	9.8E-04	0.00%	Eu-152	4.9E-04	4.9E-04	0.00%
Na-24	2.2E-05	2.2E-05	0.00%	Eu-154	7.4E-04	7.4E-04	0.00%
Al-26	1.1E-03	1.1E-03	0.00%	Eu-155	1.1E-04	1.1E-04	0.00%
P-32	5.9E-04	5.9E-04	0.00%	Gd-152	1.2E-02	1.2E-02	0.00%
Si-32	1.4E-04	1.4E-04	0.00%	Ho-166m	6.4E-04	6.4E-04	0.00%
S-35	5.2E-05	5.2E-05	0.00%	Lu-176	5.4E-04	5.4E-04	0.00%
Cl-36	2.5E-04	2.5E-04	0.00%	Ta-180	4.8E-84	4.8E-84	0.00%
K-40	1.6E-03	1.6E-03	0.00%	Hf-182	1.1E-03	1.1E-03	0.00%
K-43	2.1E-05	2.1E-05	0.00%	Re-186m	2.7E-04	2.7E-04	0.00%
Ca-41	9.8E-05	9.8E-05	0.00%	Re-187	6.8E-07	6.8E-07	0.00%
Ca-45	2.4E-04	2.4E-04	0.00%	Ir-192m	0.0E+00	0.0E+00	
Ca-47	4.0E-04	4.0E-04	0.00%	Pt-193	9.0E-06	9.0E-06	0.00%
Ti-44	1.6E-03	1.6E-03	0.00%	Hg-194	2.3E-02	2.3E-02	0.00%
V-49	4.4E-06	4.4E-06	0.00%	Hg-203	8.0E-04	8.0E-04	0.00%
Cr-51	1.0E-05	1.0E-05	0.00%	Pb-202	3.2E-03	3.2E-03	0.00%
Mn-53	8.1E-06	8.1E-06	0.00%	Pb-205	1.2E-04	1.2E-04	0.00%
Mn-54	2.2E-04	2.2E-04	0.00%	Pb-210	4.2E-01	4.2E-01	0.00%
Fe-55	4.7E-05	4.7E-05	0.00%	Bi-207	4.0E-04	4.0E-04	0.00%
Fe-60	1.2E-02	1.2E-02	0.00%	Bi-210	3.9E-04	3.9E-04	0.00%
Co-58	2.8E-04	2.8E-04	0.00%	Bi-210m	7.0E-03	7.0E-03	0.00%

Table 14. LADTAP XL Maximally Exposed Individual Water Ingestion Pathway Comparison (mrem/yr) (continued)

Nuclide	Hamby Ladtap Water Pathway	Jannik Ladtap Water Pathway	% Diff	Nuclide	Hamby Ladtap Water Pathway	Jannik Ladtap Water Pathway	% Diff
Co-60	2.1E-03	2.1E-03	0.00%	Po-210	1.3E-01	1.3E-01	0.00%
Ni-59	1.6E-05	1.6E-05	0.00%	Ra-223	4.1E-02	4.1E-02	0.00%
Ni-63	4.4E-05	4.4E-05	0.00%	Ra-224	2.0E-02	2.0E-02	0.00%
Cu-64	4.9E-06	4.9E-06	0.00%	Ra-225	2.4E-02	2.4E-02	0.00%
Zn-65	1.1E-03	1.1E-03	0.00%	Ra-226	9.0E-02	9.0E-02	0.00%
Ge-68	9.0E-05	9.0E-05	0.00%	Ra-228	9.8E-02	9.8E-02	0.00%
Se-75	7.1E-04	7.1E-04	0.00%	Ac-227	1.1E+00	1.1E+00	0.00%
Se-79	6.8E-04	6.8E-04	0.00%	Th-227	2.8E-03	2.8E-03	0.00%
Rb-87	3.9E-04	3.9E-04	0.00%	Th-228	3.1E-02	3.1E-02	0.00%
Sr-89	7.0E-04	7.0E-04	0.00%	Th-229	2.9E-01	2.9E-01	0.00%
Sr-90	1.1E-02	1.1E-02	0.00%	Th-230	4.3E-02	4.3E-02	0.00%
Y-90	5.5E-04	5.5E-04	0.00%	Th-231	4.0E-05	4.0E-05	0.00%
Y-91	7.1E-04	7.1E-04	0.00%	Th-232	2.3E-01	2.3E-01	0.00%
Mo-93	1.1E-04	1.1E-04	0.00%	Th-234	1.0E-03	1.0E-03	0.00%
Mo-99	2.5E-04	2.5E-04	0.00%	Pa-230	4.3E-04	4.3E-04	0.00%
Nb-93m	4.3E-04	4.3E-04	0.00%	Pa-231	9.0E-01	9.0E-01	0.00%
Nb-94	4.2E-04	4.2E-04	0.00%	Pa-233	2.6E-04	2.6E-04	0.00%
Nb-95	1.7E-04	1.7E-04	0.00%	U-232	1.1E-01	1.1E-01	0.00%
Zr-93	1.3E-04	1.3E-04	0.00%	U-233	2.2E-02	2.2E-02	0.00%
Zr-95	2.7E-04	2.7E-04	0.00%	U-234	2.1E-02	2.1E-02	0.00%
Tc-96	1.7E-04	1.7E-04	0.00%	U-235	2.0E-02	2.0E-02	0.00%
Tc-97	1.2E-05	1.2E-05	0.00%	U-236	2.0E-02	2.0E-02	0.00%
Tc-98	3.9E-04	3.9E-04	0.00%	U-237	1.9E-04	1.9E-04	0.00%
Tc-99	1.1E-04	1.1E-04	0.00%	U-238	1.9E-02	1.9E-02	0.00%
Ru-97	3.7E-05	3.7E-05	0.00%	Np-236	6.5E-02	6.5E-02	0.00%
Ru-103	2.1E-04	2.1E-04	0.00%	Np-237	3.2E-01	3.2E-01	0.00%
Ru-106	1.7E-03	1.7E-03	0.00%	Np-239	1.5E-04	1.5E-04	0.00%
Pd-107	1.1E-05	1.1E-05	0.00%	Am-237	7.5E-15	7.5E-15	0.00%
Ag-108m	6.1E-04	6.1E-04	0.00%	Am-241	3.7E-01	3.7E-01	0.00%

Table 14. LADTAP XL Maximally Exposed Individual Water Ingestion Pathway Comparison (mrem/yr) (continued)

Nuclide	Hamby Ladtap Water Pathway	Jannik Ladtap Water Pathway	% Diff	Nuclide	Hamby Ladtap Water Pathway	Jannik Ladtap Water Pathway	% Diff
Ag-110m	9.0E-04	9.0E-04	0.00%	Am-242m	3.4E-01	3.4E-01	0.00%
Cd-113	1.3E-02	1.3E-02	0.00%	Am-243	3.7E-01	3.7E-01	0.00%
Cd-115m	1.2E-03	1.2E-03	0.00%	Pu-237	8.0E-05	8.0E-05	0.00%
In-115	1.1E-02	1.1E-02	0.00%	Pu-238	3.1E-01	3.1E-01	0.00%
Sb-122	3.5E-04	3.5E-04	0.00%	Pu-239	3.5E-01	3.5E-01	0.00%
Sb-124	7.5E-04	7.5E-04	0.00%	Pu-240	3.5E-01	3.5E-01	0.00%
Sb-125	2.1E-04	2.1E-04	0.00%	Pu-241	7.0E-03	7.0E-03	0.00%
Te-123	3.4E-04	3.4E-04	0.00%	Pu-242	3.4E-01	3.4E-01	0.00%
Te-125m	2.7E-04	2.7E-04	0.00%	Pu-244	3.3E-01	3.3E-01	0.00%
Sn-126	1.4E-03	1.4E-03	0.00%	Cm-241	3.6E-04	3.6E-04	0.00%
I-129	2.3E-02	2.3E-02	0.00%	Cm-242	8.9E-03	8.9E-03	0.00%
I-131	3.8E-03	3.8E-03	0.00%	Cm-243	2.4E-01	2.4E-01	0.00%
Cs-134	6.0E-03	6.0E-03	0.00%	Cm-244	1.9E-01	1.9E-01	0.00%
Cs-135	5.8E-04	5.8E-04	0.00%	Cm-245	3.7E-01	3.7E-01	0.00%
Cs-137	4.1E-03	4.1E-03	0.00%	Cm-246	3.7E-01	3.7E-01	0.00%
La-137	3.5E-05	3.5E-05	0.00%	Cm-247	3.4E-01	3.4E-01	0.00%
La-138	4.8E-04	4.8E-04	0.00%	Cm-248	1.3E+00	1.3E+00	0.00%
La-140	3.4E-04	3.4E-04	0.00%	Cm-250	6.4E+00	6.4E+00	0.00%
Ba-140	6.3E-04	6.3E-04	0.00%	Bk-247	1.9E-01	1.9E-01	0.00%
Ce-141	2.1E-04	2.1E-04	0.00%	Bk-249	4.9E-04	4.9E-04	0.00%
Ce-144	1.6E-03	1.6E-03	0.00%	Cf-249	3.8E-01	3.8E-01	0.00%
				Cf-250	1.6E-01	1.6E-01	0.00%
				Cf-251	3.8E-01	3.8E-01	0.00%
				Cf-252	7.7E-02	7.7E-02	0.00%
				Es-253	1.9E-03	1.9E-03	0.00%
				Unidentified alpha	3.5E-01	3.5E-01	0.00%
				Unidentified beta	1.1E-02	1.1E-02	0.00%
				TOTAL Dose	**1.8E+01**	**1.8E+01**	**0.00%**

Table 15. LADTAP XL Maximally Exposed Individual Fish Ingestion Pathway Comparison (mrem/yr)

Nuclide	Hamby Ladtap Fish Ingestion	Jannik Ladtap Fish Ingestion	% Diff	Nuclide	Hamby Ladtap Fish Ingestion	Jannik Ladtap Fish Ingestion	% Diff
H-3	1.2E-07	1.3E-07	11.11%	Sm-146	1.1E-02	1.3E-02	20.00%
Be-7	4.6E-07	2.3E-05	4900.00%	Sm-147	9.6E-03	1.1E-02	20.00%
Be-10	1.8E-05	8.9E-04	4900.00%	Sm-151	1.8E-05	2.2E-05	20.00%
C-14	2.1E-02	1.3E-05	-99.93%	Pm-147	5.0E-05	6.1E-05	20.00%
Na-22	2.5E-03	1.9E-03	-24.00%	Eu-152	3.2E-04	1.7E-03	420.00%
Na-24	3.2E-05	2.5E-05	-24.00%	Eu-154	4.8E-04	2.5E-03	420.00%
Al-26	2.8E-04	1.4E-03	410.00%	Eu-155	6.9E-05	3.6E-04	420.00%
P-32	1.5E+00	2.1E+00	40.00%	Gd-152	8.0E-03	9.6E-03	20.00%
Si-32	9.0E-06	7.2E-05	700.00%	Ho-166m	4.1E-04	5.0E-04	20.00%
S-35	1.0E-03	1.1E-03	6.67%	Lu-176	3.5E-04	3.5E-04	0.00%
Cl-36	3.2E-04	3.0E-04	-6.00%	Ta-180	9.9E-108	9.9E-110	-99.00%
K-40	4.0E-02	1.3E-01	220.00%	Hf-182	9.9E-05	3.3E-02	32933.03%
K-43	3.7E-04	1.2E-03	220.00%	Re-186m	8.4E-04	8.4E-04	0.84%
Ca-41	1.0E-04	3.1E-05	-70.00%	Re-187	2.1E-06	2.1E-06	0.84%
Ca-45	2.5E-04	7.6E-05	-70.00%	Ir-192m	0.0E+00	0.0E+00	#DIV/0!
Ca-47	3.9E-04	1.2E-04	-70.00%	Pt-193	2.3E-05	8.2E-06	-65.00%
Ti-44	4.0E-02	7.7E-03	-81.00%	Hg-194	6.0E-01	3.6E+00	510.00%
V-49	1.1E-06	1.1E-05	870.00%	Hg-203	2.1E-02	1.3E-01	510.00%
Cr-51	5.3E-05	1.1E-05	-80.00%	Pb-202	2.5E-02	2.1E-03	-91.67%
Mn-53	2.1E-05	5.1E-05	140.00%	Pb-205	9.6E-04	8.0E-05	-91.67%
Mn-54	2.3E-03	1.4E-03	-40.00%	Pb-210	3.3E+00	2.7E-01	-91.67%
Fe-55	1.2E-04	2.1E-04	70.00%	Bi-207	1.6E-04	1.6E-04	0.00%
Fe-60	3.2E-02	5.4E-02	70.00%	Bi-210	1.4E-04	1.4E-04	0.00%
Co-58	3.7E-04	5.5E-04	52.00%	Bi-210m	2.7E-03	2.7E-03	0.00%
Co-60	2.8E-03	4.2E-03	52.00%	Po-210	1.7E+00	1.2E-01	-92.80%
Ni-59	4.3E-05	8.9E-06	-79.00%	Ra-223	5.2E-02	4.1E-03	-92.00%
Ni-63	1.1E-04	2.4E-05	-79.00%	Ra-224	2.4E-02	1.9E-03	-92.00%
Cu-64	1.3E-05	1.5E-05	15.00%	Ra-225	3.0E-02	2.4E-03	-92.00%

Table 15. LADTAP XL Maximally Exposed Individual Fish Ingestion Pathway Comparison (mrem/yr) (continued)

Nuclide	Hamby Ladtap Fish Ingestion	Jannik Ladtap Fish Ingestion	% Diff	Nuclide	Hamby Ladtap Fish Ingestion	Jannik Ladtap Fish Ingestion	% Diff
Zn-65	5.9E-02	1.0E-01	70.00%	Ra-226	1.2E-01	9.4E-03	-92.00%
Ge-68	7.8E-03	9.3E-03	20.12%	Ra-228	1.3E-01	1.0E-02	-92.00%
Se-75	3.1E-03	1.1E-01	3429.41%	Ac-227	7.4E-01	7.4E-01	0.00%
Se-79	3.0E-03	1.1E-01	3429.41%	Th-227	2.1E-03	4.3E-04	-80.00%
Rb-87	2.0E-02	5.0E-02	145.00%	Th-228	2.4E-02	4.8E-03	-80.00%
Sr-89	5.4E-04	5.2E-05	-90.33%	Th-229	2.2E-01	4.5E-02	-80.00%
Sr-90	8.3E-03	8.0E-04	-90.33%	Th-230	3.4E-02	6.8E-03	-80.00%
Y-90	3.2E-04	5.1E-04	60.00%	Th-231	2.3E-05	4.5E-06	-80.00%
Y-91	4.6E-04	7.4E-04	60.00%	Th-232	1.8E-01	3.6E-02	-80.00%
Mo-93	2.8E-05	5.3E-06	-81.00%	Th-234	7.8E-04	1.6E-04	-80.00%
Mo-99	5.7E-05	1.1E-05	-81.00%	Pa-230	1.2E-04	1.1E-04	-11.50%
Nb-93m	3.4E-01	3.4E-03	-99.00%	Pa-231	2.6E-01	2.3E-01	-11.50%
Nb-94	3.3E-01	3.3E-03	-99.00%	Pa-233	7.5E-05	6.7E-05	-11.50%
Nb-95	1.3E-01	1.3E-03	-99.00%	U-232	2.8E-02	2.7E-03	-90.40%
Zr-93	1.1E-05	7.5E-05	566.67%	U-233	1.1E-03	5.5E-04	-52.00%
Zr-95	2.3E-05	1.6E-04	566.67%	U-234	1.1E-03	5.3E-04	-52.00%
Tc-96	6.2E-05	8.3E-05	33.33%	U-235	1.1E-03	5.1E-04	-52.00%
Tc-97	4.8E-06	6.4E-06	33.33%	U-236	1.1E-03	5.1E-04	-52.00%
Tc-98	1.5E-04	2.0E-04	33.33%	U-237	9.3E-06	4.5E-06	-52.00%
Tc-99	4.1E-05	5.5E-05	33.33%	U-238	9.8E-04	4.7E-04	-52.00%
Ru-97	8.4E-06	4.6E-05	450.00%	Np-236	1.7E-02	3.5E-02	110.00%
Ru-103	5.5E-05	3.0E-04	450.00%	Np-237	8.3E-02	1.7E-01	110.00%
Ru-106	4.5E-04	2.4E-03	450.00%	Np-239	3.4E-05	7.2E-05	110.00%
Pd-107	3.0E-06	3.0E-06	0.00%	Am-237	5.3E-18	5.1E-17	860.00%
Ag-108m	3.7E-05	1.8E-03	4661.90%	Am-241	2.4E-01	2.3E+00	860.00%
Ag-110m	5.4E-05	2.6E-03	4682.61%	Am-242m	2.2E-01	2.1E+00	860.00%
Cd-113	6.8E-02	6.8E-02	0.00%	Am-243	2.4E-01	2.3E+00	860.00%

Table 15. LADTAP XL Maximally Exposed Individual Fish Ingestion Pathway Comparison (mrem/yr) (continued)

Nuclide	Hamby Ladtap Fish Ingestion	Jannik Ladtap Fish Ingestion	% Diff	Nuclide	Hamby Ladtap Fish Ingestion	Jannik Ladtap Fish Ingestion	% Diff
Cd-115m	6.2E-03	6.2E-03	0.00%	Pu-237	7.2E-06	6.2E-05	757.14%
In-115	0.0E+00	3.0E+00	0.00%	Pu-238	2.8E-02	2.4E-01	757.14%
Sb-122	8.0E-06	3.0E-04	3600.00%	Pu-239	3.2E-02	2.7E-01	757.14%
Sb-124	1.9E-05	7.2E-04	3600.00%	Pu-240	3.2E-02	2.7E-01	757.14%
Sb-125	5.5E-06	2.0E-04	3600.00%	Pu-241	6.4E-04	5.5E-03	757.14%
Te-123	0.0E+00	1.3E-03	0.00%	Pu-242	3.1E-02	2.6E-01	757.14%
Te-125m	2.8E-03	1.1E-03	-62.50%	Pu-244	3.0E-02	2.6E-01	757.14%
Sn-126	1.1E-01	1.1E-01	0.00%	Cm-241	2.3E-04	2.8E-04	20.00%
I-129	8.9E-03	1.8E-02	100.00%	Cm-242	5.8E-03	7.0E-03	20.00%
I-131	1.4E-03	2.8E-03	100.00%	Cm-243	1.5E-01	1.9E-01	20.00%
Cs-134	4.7E-01	4.7E-01	0.00%	Cm-244	1.2E-01	1.5E-01	20.00%
Cs-135	4.5E-02	4.5E-02	0.00%	Cm-245	2.4E-01	2.9E-01	20.00%
Cs-137	3.2E-01	3.2E-01	0.00%	Cm-246	2.4E-01	2.9E-01	20.00%
La-137	2.3E-05	3.4E-05	48.00%	Cm-247	2.2E-01	2.6E-01	20.00%
La-138	3.1E-04	4.6E-04	48.00%	Cm-248	8.5E-01	1.0E+00	20.00%
La-140	1.8E-04	2.7E-04	48.00%	Cm-250	4.1E+00	5.0E+00	20.00%
Ba-140	6.4E-05	1.9E-05	-70.00%	Bk-247	1.2E-01	1.2E-01	0.00%
Ce-141	5.3E-06	1.3E-04	2400.00%	Bk-249	3.2E-04	3.2E-04	0.00%
Ce-144	4.2E-05	1.1E-03	2400.00%	Cf-249	2.4E-01	2.4E-01	0.00%
				Cf-250	1.0E-01	1.0E-01	0.00%
				Cf-251	2.4E-01	2.4E-01	0.00%
				Cf-252	5.0E-02	5.0E-02	0.00%
				Es-253	4.8E-04	1.2E-03	150.00%
				Unidentified alpha	3.2E-02	2.7E-01	757.14%
				Unidentified beta	8.3E-03	8.0E-04	-90.33%
				TOTAL Dose	**1.9E+01**	**2.8E+01**	**51.91%**

Table 16. LADTAP XL Maximally Exposed Individual Shoreline Exposure Pathway Comparison (mrem/yr)

Nuclide	Hamby Ladtap Shoreline Pathway	Jannik Ladtap Shoreline Pathway	% Diff	Nuclide	Hamby Ladtap Shoreline Pathway	Jannik Ladtap Shoreline Pathway	% Diff
H-3	0.0E+00	0.0E+00		Sm-146	0.0E+00	0.0E+00	
Be-7	1.6E-06	1.4E-06	-13.04%	Sm-147	0.0E+00	0.0E+00	
Be-10	0.0E+00	0.0E+00		Sm-151	2.7E-08	2.3E-08	-13.04%
C-14	0.0E+00	0.0E+00		Pm-147	2.3E-09	2.0E-09	-13.04%
Na-22	1.2E-03	1.0E-03	-13.04%	Eu-152	2.8E-03	2.4E-03	-13.04%
Na-24	4.3E-07	3.7E-07	-13.04%	Eu-154	2.2E-03	1.9E-03	-13.04%
Al-26	1.5E-02	1.3E-02	-13.04%	Eu-155	7.6E-05	6.6E-05	-13.04%
P-32	0.0E+00	0.0E+00		Gd-152	0.0E+00	0.0E+00	
Si-32	0.0E+00	0.0E+00		Ho-166m	9.7E-03	8.4E-03	-13.04%
S-35	0.0E+00	0.0E+00		Lu-176	0.0E+00	0.0E+00	
Cl-36	2.8E-10	2.4E-10	-13.04%	Ta-180	0.0E+00	0.0E+00	
K-40	8.2E-04	7.1E-04	-13.04%	Hf-182	0.0E+00	0.0E+00	
K-43	2.6E-07	2.3E-07	-13.04%	Re-186m	0.0E+00	0.0E+00	
Ca-41	1.2E-07	1.1E-07	-13.04%	Re-187	0.0E+00	0.0E+00	
Ca-45	2.1E-14	1.8E-14	-13.04%	Ir-192m	0.0E+00	0.0E+00	
Ca-47	2.2E-06	1.9E-06	-13.04%	Pt-193	2.5E-06	2.2E-06	-13.04%
Ti-44	7.6E-04	6.6E-04	-13.04%	Hg-194	0.0E+00	0.0E+00	
V-49	1.5E-08	1.3E-08	-13.04%	Hg-203	6.7E-06	5.9E-06	-13.04%
Cr-51	5.4E-07	4.7E-07	-13.04%	Pb-202	0.0E+00	0.0E+00	
Mn-53	9.4E-07	8.2E-07	-13.04%	Pb-205	4.5E-06	3.9E-06	-13.04%
Mn-54	1.5E-04	1.3E-04	-13.04%	Pb-210	1.0E-05	8.9E-06	-13.04%
Fe-55	1.3E-07	1.1E-07	-13.04%	Bi-207	6.1E-03	5.3E-03	-13.04%
Fe-60	0.0E+00	0.0E+00		Bi-210	0.0E+00	0.0E+00	
Co-58	4.1E-05	3.5E-05	-13.04%	Bi-210m	0.0E+00	0.0E+00	
Co-60	2.6E-03	2.2E-03	-13.04%	Po-210	7.0E-10	6.1E-10	-13.04%
Ni-59	2.5E-06	2.2E-06	-13.04%	Ra-223	9.6E-07	8.4E-07	-13.04%
Ni-63	0.0E+00	0.0E+00		Ra-224	1.9E-08	1.7E-08	-13.04%
Cu-64	1.6E-08	1.4E-08	-13.04%	Ra-225	6.3E-08	5.5E-08	-13.04%

Table 16. LADTAP XL Maximally Exposed Individual Shoreline Exposure Pathway Comparison (mrem/yr) (continued)

Nuclide	Hamby Ladtap Shoreline Pathway	Jannik Ladtap Shoreline Pathway	% Diff	Nuclide	Hamby Ladtap Shoreline Pathway	Jannik Ladtap Shoreline Pathway	% Diff
Zn-65	7.8E-05	6.8E-05	-13.04%	Ra-226	4.5E-05	3.9E-05	-13.04%
Ge-68	1.9E-07	1.7E-07	-13.04%	Ra-228	8.2E-13	7.1E-13	-13.04%
Se-75	3.0E-05	2.6E-05	-13.04%	Ac-227	7.1E-07	6.2E-07	-13.04%
Se-79	0.0E+00	0.0E+00		Th-227	1.3E-06	1.1E-06	-13.04%
Rb-87	0.0E+00	0.0E+00		Th-228	1.1E-06	9.9E-07	-13.04%
Sr-89	4.0E-09	3.5E-09	-13.04%	Th-229	6.2E-04	5.4E-04	-13.04%
Sr-90	0.0E+00	0.0E+00		Th-230	5.4E-06	4.7E-06	-13.04%
Y-90	0.0E+00	0.0E+00		Th-231	6.2E-09	5.4E-09	-13.04%
Y-91	1.1E-07	9.8E-08	-13.04%	Th-232	4.0E-06	3.4E-06	-13.04%
Mo-93	3.4E-05	3.0E-05	-13.04%	Th-234	1.4E-07	1.2E-07	-13.04%
Mo-99	3.7E-07	3.2E-07	-13.04%	Pa-230	6.6E-06	5.7E-06	-13.04%
Nb-93m	2.6E-06	2.3E-06	-13.04%	Pa-231	2.1E-04	1.9E-04	-13.04%
Nb-94	9.5E-03	8.2E-03	-13.04%	Pa-233	3.7E-06	3.2E-06	-13.04%
Nb-95	1.6E-05	1.4E-05	-13.04%	U-232	5.1E-06	4.4E-06	-13.04%
Zr-93	0.0E+00	0.0E+00		U-233	3.0E-06	2.6E-06	-13.04%
Zr-95	5.7E-05	4.9E-05	-13.04%	U-234	4.8E-06	4.2E-06	-13.04%
Tc-96	5.4E-06	4.7E-06	-13.04%	U-235	1.0E-03	8.8E-04	-13.04%
Tc-97	3.8E-05	3.3E-05	-13.04%	U-236	4.4E-06	3.8E-06	-13.04%
Tc-98	8.4E-03	7.3E-03	-13.04%	U-237	5.7E-07	5.0E-07	-13.04%
Tc-99	3.7E-09	3.2E-09	-13.04%	U-238	3.8E-06	3.3E-06	-13.04%
Ru-97	3.5E-07	3.0E-07	-13.04%	Np-236	9.4E-04	8.2E-04	-13.04%
Ru-103	1.1E-05	9.9E-06	-13.04%	Np-237	1.9E-04	1.7E-04	-13.04%
Ru-106	4.5E-05	4.0E-05	-13.04%	Np-239	2.0E-07	1.7E-07	-13.04%
Pd-107	0.0E+00	0.0E+00		Am-237	0.0E+00	0.0E+00	
Ag-108m	8.9E-03	7.7E-03	-13.04%	Am-241	1.7E-04	1.5E-04	-13.04%
Ag-110m	3.9E-04	3.4E-04	-13.04%	Am-242m	1.5E-05	1.3E-05	-13.04%
Cd-113	0.0E+00	0.0E+00		Am-243	3.9E-04	3.4E-04	-13.04%

Table 16. LADTAP XL Maximally Exposed Individual Shoreline Exposure Pathway Comparison (mrem/yr) (continued)

Nuclide	Hamby Ladtap Shoreline Pathway	Jannik Ladtap Shoreline Pathway	% Diff	Nuclide	Hamby Ladtap Shoreline Pathway	Jannik Ladtap Shoreline Pathway	% Diff
Cd-115m	5.4E-07	4.7E-07	-13.04%	Pu-237	1.6E-06	1.4E-06	-13.04%
In-115	0.0E+00	0.0E+00		Pu-238	4.4E-06	3.8E-06	-13.04%
Sb-122	5.6E-07	4.9E-07	-13.04%	Pu-239	2.2E-06	2.0E-06	-13.04%
Sb-124	6.2E-05	5.4E-05	-13.04%	Pu-240	4.9E-06	4.2E-06	-13.04%
Sb-125	2.6E-04	2.3E-04	-13.04%	Pu-241	0.0E+00	0.0E+00	
Te-123	4.2E-05	3.7E-05	-13.04%	Pu-242	4.1E-06	3.5E-06	-13.04%
Te-125m	7.1E-07	6.2E-07	-13.04%	Pu-244	3.5E-06	3.0E-06	-13.04%
Sn-126	3.7E-04	3.2E-04	-13.04%	Cm-241	0.0E+00	0.0E+00	
I-129	1.3E-04	1.1E-04	-13.04%	Cm-242	8.9E-08	7.8E-08	-13.04%
I-131	1.8E-06	1.5E-06	-13.04%	Cm-243	5.6E-04	4.8E-04	-13.04%
Cs-134	7.0E-04	6.1E-04	-13.04%	Cm-244	2.5E-06	2.2E-06	-13.04%
Cs-135	0.0E+00	0.0E+00		Cm-245	5.1E-04	4.4E-04	-13.04%
Cs-137	2.2E-03	2.0E-03	-13.04%	Cm-246	4.4E-06	3.8E-06	-13.04%
La-137	0.0E+00	0.0E+00		Cm-247	2.0E-03	1.7E-03	-13.04%
La-138	0.0E+00	0.0E+00		Cm-248	3.5E-06	3.0E-06	-13.04%
La-140	1.4E-06	1.2E-06	-13.04%	Cm-250	0.0E+00	0.0E+00	
Ba-140	1.7E-05	1.4E-05	-13.04%	Bk-247	0.0E+00	0.0E+00	
Ce-141	1.6E-06	1.4E-06	-13.04%	Bk-249	0.0E+00	0.0E+00	
Ce-144	8.5E-06	7.4E-06	-13.04%	Cf-249	2.0E-03	1.8E-03	-13.04%
				Cf-250	1.7E-06	1.5E-06	-13.04%
				Cf-251	8.0E-04	6.9E-04	-13.04%
				Cf-252	3.6E-07	3.1E-07	-13.04%
				Es-253	8.3E-09	7.2E-09	-13.04%
				Unidentified alpha	2.2E-06	2.0E-06	-13.04%
				Unidentified beta	0.0E+00	0.0E+00	
				TOTAL Dose	**8.2E-02**	**7.1E-02**	**-13.04%**

Table 17. LADTAP XL Maximally Exposed Individual Swimming Exposure Pathway Comparison (mrem/yr)

Nuclide	Hamby Ladtap Swimming Pathway	Jannik Ladtap Swimming Pathway	% Diff	Nuclide	Hamby Ladtap Swimming Pathway	Jannik Ladtap Swimming Pathway	% Diff
H-3	2.2E-09	3.5E-09	57.30%	Sm-146	0.0E+00	0.0E+00	
Be-7	6.1E-08	9.6E-08	57.30%	Sm-147	0.0E+00	0.0E+00	
Be-10	0.0E+00	0.0E+00		Sm-151	1.3E-12	2.1E-12	57.30%
C-14	0.0E+00	0.0E+00		Pm-147	4.7E-12	7.4E-12	57.30%
Na-22	2.8E-06	4.3E-06	57.30%	Eu-152	1.5E-06	2.3E-06	57.30%
Na-24	1.9E-06	3.0E-06	57.30%	Eu-154	1.6E-06	2.5E-06	57.30%
Al-26	3.6E-06	5.6E-06	57.30%	Eu-155	7.6E-08	1.2E-07	57.30%
P-32	0.0E+00	0.0E+00		Gd-152	0.0E+00	0.0E+00	
Si-32	0.0E+00	0.0E+00		Ho-166m	3.6E-08	5.7E-08	57.30%
S-35	0.0E+00	0.0E+00		Lu-176	0.0E+00	0.0E+00	
Cl-36	1.2E-14	1.9E-14	57.30%	Ta-180	0.0E+00	0.0E+00	
K-40	2.0E-07	3.1E-07	57.30%	Hf-182	0.0E+00	0.0E+00	
K-43	5.7E-07	9.0E-07	57.30%	Re-186m	0.0E+00	0.0E+00	
Ca-41	4.4E-12	6.9E-12	57.30%	Re-187	0.0E+00	0.0E+00	
Ca-45	2.4E-17	3.7E-17	57.30%	Ir-192m	0.0E+00	0.0E+00	
Ca-47	1.2E-06	1.8E-06	57.30%	Pt-193	6.3E-11	1.0E-10	57.30%
Ti-44	1.8E-07	2.9E-07	57.30%	Hg-194	0.0E+00	0.0E+00	
V-49	1.3E-11	2.1E-11	57.30%	Hg-203	2.8E-07	4.5E-07	57.30%
Cr-51	3.8E-08	6.1E-08	57.30%	Pb-202	0.0E+00	0.0E+00	
Mn-53	2.5E-11	3.9E-11	57.30%	Pb-205	8.3E-11	1.3E-10	57.30%
Mn-54	1.1E-06	1.7E-06	57.30%	Pb-210	1.9E-09	3.0E-09	57.30%
Fe-55	3.3E-11	5.1E-11	57.30%	Bi-207	2.0E-06	3.1E-06	57.30%
Fe-60	0.0E+00	0.0E+00		Bi-210	0.0E+00	0.0E+00	
Co-58	1.2E-06	1.9E-06	57.30%	Bi-210m	0.0E+00	0.0E+00	
Co-60	4.3E-06	6.8E-06	57.30%	Po-210	1.1E-11	1.7E-11	57.30%
Ni-59	5.5E-11	8.7E-11	57.30%	Ra-223	1.6E-07	2.5E-07	57.30%
Ni-63	0.0E+00	0.0E+00		Ra-224	1.0E-08	1.6E-08	57.30%
Cu-64	6.3E-08	9.9E-08	57.30%	Ra-225	9.3E-09	1.5E-08	57.30%

Table 17. LADTAP XL Maximally Exposed Individual Swimming Exposure Pathway Comparison (mrem/yr) (continued)

Nuclide	Hamby Ladtap Swimming Pathway	Jannik Ladtap Swimming Pathway	% Diff	Nuclide	Hamby Ladtap Swimming Pathway	Jannik Ladtap Swimming Pathway	% Diff
Zn-65	7.4E-07	1.2E-06	57.30%	Ra-226	8.7E-09	1.4E-08	57.30%
Ge-68	1.3E-10	2.0E-10	57.30%	Ra-228	9.1E-17	1.4E-16	57.30%
Se-75	4.9E-07	7.8E-07	57.30%	Ac-227	1.6E-10	2.6E-10	57.30%
Se-79	0.0E+00	0.0E+00		Th-227	1.3E-07	2.0E-07	57.30%
Rb-87	0.0E+00	0.0E+00		Th-228	2.6E-09	4.1E-09	57.30%
Sr-89	1.7E-10	2.7E-10	57.30%	Th-229	1.1E-07	1.8E-07	57.30%
Sr-90	0.0E+00	0.0E+00		Th-230	5.3E-10	8.3E-10	57.30%
Y-90	0.0E+00	0.0E+00		Th-231	8.1E-09	1.3E-08	57.30%
Y-91	4.6E-09	7.2E-09	57.30%	Th-232	2.6E-10	4.0E-10	57.30%
Mo-93	1.1E-09	1.8E-09	57.30%	Th-234	1.0E-08	1.6E-08	57.30%
Mo-99	2.7E-07	4.2E-07	57.30%	Pa-230	8.1E-07	1.3E-06	57.30%
Nb-93m	2.0E-10	3.1E-10	57.30%	Pa-231	3.8E-08	6.0E-08	57.30%
Nb-94	2.0E-06	3.2E-06	57.30%	Pa-233	2.6E-07	4.1E-07	57.30%
Nb-95	9.5E-07	1.5E-06	57.30%	U-232	3.6E-10	5.7E-10	57.30%
Zr-93	0.0E+00	0.0E+00		U-233	3.1E-10	4.9E-10	57.30%
Zr-95	9.2E-07	1.5E-06	57.30%	U-234	2.1E-10	3.3E-10	57.30%
Tc-96	2.7E-06	4.3E-06	57.30%	U-235	2.0E-07	3.1E-07	57.30%
Tc-97	1.4E-09	2.2E-09	57.30%	U-236	1.7E-10	2.7E-10	57.30%
Tc-98	1.8E-06	2.8E-06	57.30%	U-237	1.6E-07	2.5E-07	57.30%
Tc-99	7.0E-13	1.1E-12	57.30%	U-238	1.5E-10	2.3E-10	57.30%
Ru-97	2.3E-07	3.6E-07	57.30%	Np-236	1.7E-07	2.7E-07	57.30%
Ru-103	5.9E-07	9.2E-07	57.30%	Np-237	3.0E-08	4.8E-08	57.30%
Ru-106	2.6E-07	4.1E-07	57.30%	Np-239	1.6E-07	2.5E-07	57.30%
Pd-107	0.0E+00	0.0E+00		Am-237	0.0E+00	0.0E+00	
Ag-108m	2.0E-06	3.2E-06	57.30%	Am-241	2.7E-08	4.2E-08	57.30%
Ag-110m	3.5E-06	5.5E-06	57.30%	Am-242m	6.6E-10	1.0E-09	57.30%
Cd-113	0.0E+00	0.0E+00		Am-243	6.9E-08	1.1E-07	57.30%

Table 17. LADTAP XL Maximally Exposed Individual Swimming Exposure Pathway Comparison (mrem/yr) (continued)

Nuclide	Hamby Ladtap Swimming Pathway	Jannik Ladtap Swimming Pathway	% Diff	Nuclide	Hamby Ladtap Swimming Pathway	Jannik Ladtap Swimming Pathway	% Diff
Cd-115m	2.8E-08	4.4E-08	57.30%	Pu-237	6.2E-08	9.8E-08	57.30%
In-115	0.0E+00	0.0E+00		Pu-238	1.3E-10	2.0E-10	57.30%
Sb-122	4.3E-07	6.7E-07	57.30%	Pu-239	1.1E-10	1.7E-10	57.30%
Sb-124	2.4E-06	3.8E-06	57.30%	Pu-240	1.3E-10	2.0E-10	57.30%
Sb-125	5.3E-07	8.3E-07	57.30%	Pu-241	0.0E+00	0.0E+00	
Te-123	4.4E-09	7.0E-09	57.30%	Pu-242	1.1E-10	1.7E-10	57.30%
Te-125m	1.4E-08	2.2E-08	57.30%	Pu-244	7.8E-11	1.2E-10	57.30%
Sn-126	6.5E-08	1.0E-07	57.30%	Cm-241	0.0E+00	0.0E+00	
I-129	1.2E-08	1.9E-08	57.30%	Cm-242	1.4E-10	2.2E-10	57.30%
I-131	4.4E-07	6.8E-07	57.30%	Cm-243	1.6E-07	2.6E-07	57.30%
Cs-134	2.0E-06	3.1E-06	57.30%	Cm-244	1.2E-10	1.9E-10	57.30%
Cs-135	0.0E+00	0.0E+00		Cm-245	9.3E-08	1.5E-07	57.30%
Cs-137	7.1E-07	1.1E-06	57.30%	Cm-246	1.0E-10	1.6E-10	57.30%
La-137	0.0E+00	0.0E+00		Cm-247	3.9E-07	6.2E-07	57.30%
La-138	0.0E+00	0.0E+00		Cm-248	8.9E-11	1.4E-10	57.30%
La-140	2.0E-06	3.1E-06	57.30%	Cm-250	0.0E+00	0.0E+00	
Ba-140	3.1E-06	4.9E-06	57.30%	Bk-247	0.0E+00	0.0E+00	
Ce-141	9.7E-08	1.5E-07	57.30%	Bk-249	0.0E+00	0.0E+00	
Ce-144	6.7E-08	1.1E-07	57.30%	Cf-249	4.1E-07	6.4E-07	57.30%
				Cf-250	1.2E-10	1.9E-10	57.30%
				Cf-251	1.5E-07	2.4E-07	57.30%
				Cf-252	1.1E-10	1.7E-10	57.30%
				Es-253	4.2E-10	6.6E-10	57.30%
				Unidentified alpha	1.1E-10	1.7E-10	57.30%
				Unidentified beta	0.0E+00	0.0E+00	
				TOTAL Dose	**5.5E-05**	**8.6E-05**	**57.30%**

Table 18. LADTAP XL Maximally Exposed Individual Boating Exposure Pathway Comparison (mrem/yr)

Nuclide	Hamby Ladtap Boating Pathway	Jannik Ladtap Boating Pathway	% Diff	Nuclide	Hamby Ladtap Boating Pathway	Jannik Ladtap Boating Pathway	% Diff
H-3	0.0E+00	0.0E+00		Sm-146	0.0E+00	0.0E+00	
Be-7	7.2E-08	1.5E-07	109.52%	Sm-147	0.0E+00	0.0E+00	
Be-10	0.0E+00	0.0E+00		Sm-151	1.6E-12	3.3E-12	109.52%
C-14	0.0E+00	0.0E+00		Pm-147	5.6E-12	1.2E-11	109.52%
Na-22	3.3E-06	6.8E-06	109.52%	Eu-152	1.7E-06	3.6E-06	109.52%
Na-24	2.3E-06	4.8E-06	109.52%	Eu-154	1.9E-06	4.0E-06	109.52%
Al-26	4.2E-06	8.8E-06	109.52%	Eu-155	9.0E-08	1.9E-07	109.52%
P-32	0.0E+00	0.0E+00		Gd-152	0.0E+00	0.0E+00	
Si-32	0.0E+00	0.0E+00		Ho-166m	4.2E-08	8.9E-08	109.52%
S-35	0.0E+00	0.0E+00		Lu-176	0.0E+00	0.0E+00	
Cl-36	1.4E-14	2.9E-14	109.52%	Ta-180	0.0E+00	0.0E+00	
K-40	2.4E-07	4.9E-07	109.52%	Hf-182	0.0E+00	0.0E+00	
K-43	6.7E-07	1.4E-06	109.52%	Re-186m	0.0E+00	0.0E+00	
Ca-41	5.2E-12	1.1E-11	109.52%	Re-187	0.0E+00	0.0E+00	
Ca-45	2.8E-17	5.9E-17	109.52%	Ir-192m	0.0E+00	0.0E+00	
Ca-47	1.4E-06	2.9E-06	109.52%	Pt-193	7.5E-11	1.6E-10	109.52%
Ti-44	2.2E-07	4.5E-07	109.52%	Hg-194	0.0E+00	0.0E+00	
V-49	1.6E-11	3.3E-11	109.52%	Hg-203	3.3E-07	7.0E-07	109.52%
Cr-51	4.5E-08	9.5E-08	109.52%	Pb-202	0.0E+00	0.0E+00	
Mn-53	2.9E-11	6.1E-11	109.52%	Pb-205	9.8E-11	2.0E-10	109.52%
Mn-54	1.3E-06	2.6E-06	109.52%	Pb-210	2.3E-09	4.7E-09	109.52%
Fe-55	3.8E-11	8.0E-11	109.52%	Bi-207	2.3E-06	4.9E-06	109.52%
Fe-60	0.0E+00	0.0E+00		Bi-210	0.0E+00	0.0E+00	
Co-58	1.4E-06	3.0E-06	109.52%	Bi-210m	0.0E+00	0.0E+00	
Co-60	5.1E-06	1.1E-05	109.52%	Po-210	1.3E-11	2.7E-11	109.52%
Ni-59	6.5E-11	1.4E-10	109.52%	Ra-223	1.9E-07	4.0E-07	109.52%
Ni-63	0.0E+00	0.0E+00		Ra-224	1.2E-08	2.6E-08	109.52%
Cu-64	7.5E-08	1.6E-07	109.52%	Ra-225	1.1E-08	2.3E-08	109.52%

Table 18. LADTAP XL Maximally Exposed Individual Boating Exposure Pathway Comparison (mrem/yr) (continued)

Nuclide	Hamby Ladtap Boating Pathway	Jannik Ladtap Boating Pathway	% Diff	Nuclide	Hamby Ladtap Boating Pathway	Jannik Ladtap Boating Pathway	% Diff
Zn-65	8.8E-07	1.8E-06	109.52%	Ra-226	1.0E-08	2.1E-08	109.52%
Ge-68	1.5E-10	3.2E-10	109.52%	Ra-228	1.1E-16	2.3E-16	109.52%
Se-75	5.8E-07	1.2E-06	109.52%	Ac-227	1.9E-10	4.0E-10	109.52%
Se-79	0.0E+00	0.0E+00		Th-227	1.5E-07	3.1E-07	109.52%
Rb-87	0.0E+00	0.0E+00		Th-228	3.0E-09	6.4E-09	109.52%
Sr-89	2.1E-10	4.3E-10	109.52%	Th-229	1.3E-07	2.8E-07	109.52%
Sr-90	0.0E+00	0.0E+00		Th-230	6.2E-10	1.3E-09	109.52%
Y-90	0.0E+00	0.0E+00		Th-231	9.6E-09	2.0E-08	109.52%
Y-91	5.4E-09	1.1E-08	109.52%	Th-232	3.0E-10	6.4E-10	109.52%
Mo-93	1.3E-09	2.8E-09	109.52%	Th-234	1.2E-08	2.5E-08	109.52%
Mo-99	3.2E-07	6.7E-07	109.52%	Pa-230	9.6E-07	2.0E-06	109.52%
Nb-93m	2.3E-10	4.9E-10	109.52%	Pa-231	4.5E-08	9.4E-08	109.52%
Nb-94	2.4E-06	5.0E-06	109.52%	Pa-233	3.1E-07	6.5E-07	109.52%
Nb-95	1.1E-06	2.4E-06	109.52%	U-232	4.3E-10	9.0E-10	109.52%
Zr-93	0.0E+00	0.0E+00		U-233	3.7E-10	7.8E-10	109.52%
Zr-95	1.1E-06	2.3E-06	109.52%	U-234	2.5E-10	5.2E-10	109.52%
Tc-96	3.2E-06	6.7E-06	109.52%	U-235	2.3E-07	4.8E-07	109.52%
Tc-97	1.6E-09	3.4E-09	109.52%	U-236	2.0E-10	4.2E-10	109.52%
Tc-98	2.1E-06	4.4E-06	109.52%	U-237	1.9E-07	3.9E-07	109.52%
Tc-99	8.3E-13	1.7E-12	109.52%	U-238	1.7E-10	3.6E-10	109.52%
Ru-97	2.7E-07	5.7E-07	109.52%	Np-236	2.0E-07	4.2E-07	109.52%
Ru-103	6.9E-07	1.5E-06	109.52%	Np-237	3.6E-08	7.5E-08	109.52%
Ru-106	3.1E-07	6.4E-07	109.52%	Np-239	1.9E-07	4.0E-07	109.52%
Pd-107	0.0E+00	0.0E+00		Am-237	0.0E+00	0.0E+00	
Ag-108m	2.4E-06	5.0E-06	109.52%	Am-241	3.1E-08	6.6E-08	109.52%
Ag-110m	4.1E-06	8.6E-06	109.52%	Am-242m	7.8E-10	1.6E-09	109.52%
Cd-113	0.0E+00	0.0E+00		Am-243	8.2E-08	1.7E-07	109.52%

Table 18. LADTAP XL Maximally Exposed Individual Boating Exposure Pathway Comparison (mrem/yr) (continued)

Nuclide	Hamby Ladtap Boating Pathway	Jannik Ladtap Boating Pathway	% Diff	Nuclide	Hamby Ladtap Boating Pathway	Jannik Ladtap Boating Pathway	% Diff
Cd-115m	3.3E-08	6.9E-08	109.52%	Pu-237	7.3E-08	1.5E-07	109.52%
In-115	0.0E+00	0.0E+00		Pu-238	1.5E-10	3.1E-10	109.52%
Sb-122	5.0E-07	1.1E-06	109.52%	Pu-239	1.3E-10	2.7E-10	109.52%
Sb-124	2.9E-06	6.0E-06	109.52%	Pu-240	1.5E-10	3.1E-10	109.52%
Sb-125	6.2E-07	1.3E-06	109.52%	Pu-241	0.0E+00	0.0E+00	
Te-123	5.2E-09	1.1E-08	109.52%	Pu-242	1.3E-10	2.6E-10	109.52%
Te-125m	1.6E-08	3.4E-08	109.52%	Pu-244	9.2E-11	1.9E-10	109.52%
Sn-126	7.7E-08	1.6E-07	109.52%	Cm-241	0.0E+00	0.0E+00	
I-129	1.4E-08	3.0E-08	109.52%	Cm-242	1.7E-10	3.5E-10	109.52%
I-131	5.1E-07	1.1E-06	109.52%	Cm-243	1.9E-07	4.0E-07	109.52%
Cs-134	2.3E-06	4.9E-06	109.52%	Cm-244	1.4E-10	3.0E-10	109.52%
Cs-135	0.0E+00	0.0E+00		Cm-245	1.1E-07	2.3E-07	109.52%
Cs-137	8.3E-07	1.7E-06	109.52%	Cm-246	1.2E-10	2.5E-10	109.52%
La-137	0.0E+00	0.0E+00		Cm-247	4.6E-07	9.7E-07	109.52%
La-138	0.0E+00	0.0E+00		Cm-248	1.1E-10	2.2E-10	109.52%
La-140	2.4E-06	4.9E-06	109.52%	Cm-250	0.0E+00	0.0E+00	
Ba-140	3.6E-06	7.6E-06	109.52%	Bk-247	0.0E+00	0.0E+00	
Ce-141	1.1E-07	2.4E-07	109.52%	Bk-249	0.0E+00	0.0E+00	
Ce-144	7.9E-08	1.7E-07	109.52%	Cf-249	4.8E-07	1.0E-06	109.52%
				Cf-250	1.4E-10	3.0E-10	109.52%
				Cf-251	1.8E-07	3.7E-07	109.52%
				Cf-252	1.3E-10	2.7E-10	109.52%
				Es-253	4.9E-10	1.0E-09	109.52%
				Unidentified alpha	1.3E-10	2.7E-10	109.52%
				Unidentified beta	0.0E+00	0.0E+00	
				TOTAL Dose	**6.4E-05**	**1.3E-04**	**109.52%**

Table 19. LADTAP XL Maximally Exposed Individual Total of All Pathways Comparison (mrem/yr)

Nuclide	Hamby Ladtap Total Pathway	Jannik Ladtap Total Pathway	% Diff	Nuclide	Hamby Ladtap Total Pathway	Jannik Ladtap Total Pathway	% Diff
H-3	5.3E-06	5.29E-06	0.28%	Sm-146	2.7E-02	2.91E-02	7.88%
Be-7	1.1E-05	3.33E-05	202.17%	Sm-147	2.4E-02	2.62E-02	7.88%
Be-10	3.6E-04	1.24E-03	242.45%	Sm-151	4.6E-05	4.95E-05	7.87%
C-14	2.1E-02	1.85E-04	-99.11%	Pm-147	1.3E-04	1.38E-04	7.88%
Na-22	4.7E-03	3.95E-03	-16.14%	Eu-152	3.6E-03	4.60E-03	26.86%
Na-24	5.9E-05	5.44E-05	-7.18%	Eu-154	3.4E-03	5.17E-03	51.24%
Al-26	1.6E-02	1.54E-02	-4.93%	Eu-155	2.5E-04	5.32E-04	111.63%
P-32	1.5E+00	2.08E+00	39.98%	Gd-152	2.0E-02	2.18E-02	7.88%
Si-32	1.5E-04	2.11E-04	42.77%	Ho-166m	1.1E-02	9.57E-03	-11.00%
S-35	1.1E-03	1.14E-03	6.34%	Lu-176	8.9E-04	8.90E-04	0.00%
Cl-36	5.6E-04	5.45E-04	-3.39%	Ta-180	4.8E-84	4.84E-84	0.00%
K-40	4.3E-02	1.32E-01	207.58%	Hf-182	1.2E-03	3.39E-02	2626.69%
K-43	4.0E-04	1.22E-03	207.84%	Re-186m	1.1E-03	1.11E-03	0.64%
Ca-41	2.0E-04	1.29E-04	-35.69%	Re-187	2.8E-06	2.80E-06	0.64%
Ca-45	5.0E-04	3.20E-04	-35.67%	Ir-192m	0.0E+00	0.00E+00	0.00%
Ca-47	8.0E-04	5.26E-04	-33.93%	Pt-193	3.5E-05	1.94E-05	-44.48%
Ti-44	4.3E-02	9.89E-03	-76.84%	Hg-194	6.2E-01	3.66E+00	491.13%
V-49	5.6E-06	1.55E-05	179.02%	Hg-203	2.1E-02	1.27E-01	490.82%
Cr-51	6.3E-05	2.14E-05	-66.31%	Pb-202	2.8E-02	5.26E-03	-81.26%
Mn-53	3.0E-05	5.95E-05	97.57%	Pb-205	1.1E-03	2.06E-04	-80.98%
Mn-54	2.7E-03	1.73E-03	-35.03%	Pb-210	3.7E+00	6.88E-01	-81.26%
Fe-55	1.7E-04	2.57E-04	50.52%	Bi-207	6.7E-03	5.87E-03	-11.89%
Fe-60	4.4E-02	6.65E-02	50.57%	Bi-210	5.3E-04	5.35E-04	0.00%
Co-58	6.9E-04	8.77E-04	27.06%	Bi-210m	9.8E-03	9.77E-03	0.00%
Co-60	7.5E-03	8.56E-03	14.92%	Po-210	1.8E+00	2.51E-01	-86.16%
Ni-59	6.1E-05	2.74E-05	-55.30%	Ra-223	9.3E-02	4.52E-02	-51.34%
Ni-63	1.6E-04	6.83E-05	-57.07%	Ra-224	4.4E-02	2.22E-02	-49.85%
Cu-64	1.8E-05	2.05E-05	11.49%	Ra-225	5.4E-02	2.60E-02	-51.49%

Table 19. LADTAP XL Maximally Exposed Individual Total of All Pathways Comparison (mrem/yr) (continued)

Nuclide	Hamby Ladtap Total Pathway	Jannik Ladtap Total Pathway	% Diff	Nuclide	Hamby Ladtap Total Pathway	Jannik Ladtap Total Pathway	% Diff
Zn-65	6.0E-02	1.02E-01	68.57%	Ra-226	2.1E-01	9.93E-02	-52.02%
Ge-68	7.8E-03	9.41E-03	19.89%	Ra-228	2.3E-01	1.08E-01	-52.02%
Se-75	3.9E-03	1.12E-01	2773.16%	Ac-227	1.9E+00	1.89E+00	0.00%
Se-79	3.7E-03	1.07E-01	2797.22%	Th-227	4.9E-03	3.21E-03	-34.70%
Rb-87	2.1E-02	5.04E-02	142.27%	Th-228	5.5E-02	3.59E-02	-35.07%
Sr-89	1.2E-03	7.49E-04	-39.46%	Th-229	5.1E-01	3.31E-01	-35.05%
Sr-90	1.9E-02	1.14E-02	-39.61%	Th-230	7.7E-02	5.01E-02	-35.08%
Y-90	8.7E-04	1.06E-03	21.82%	Th-231	6.3E-05	4.45E-05	-28.80%
Y-91	1.2E-03	1.45E-03	23.56%	Th-232	4.1E-01	2.65E-01	-35.08%
Mo-93	1.7E-04	1.41E-04	-15.98%	Th-234	1.8E-03	1.17E-03	-34.79%
Mo-99	3.0E-04	2.59E-04	-14.92%	Pa-230	5.6E-04	5.50E-04	-2.42%
Nb-93m	3.4E-01	3.82E-03	-98.87%	Pa-231	1.2E+00	1.13E+00	-2.62%
Nb-94	3.4E-01	1.19E-02	-96.45%	Pa-233	3.4E-04	3.30E-04	-2.55%
Nb-95	1.4E-01	1.54E-03	-98.86%	U-232	1.3E-01	1.09E-01	-18.67%
Zr-93	1.4E-04	2.06E-04	44.82%	U-233	2.3E-02	2.26E-02	-2.57%
Zr-95	3.6E-04	4.82E-04	35.63%	U-234	2.2E-02	2.18E-02	-2.58%
Tc-96	2.5E-04	2.72E-04	10.19%	U-235	2.3E-02	2.18E-02	-3.04%
Tc-97	5.5E-05	5.17E-05	-6.09%	U-236	2.2E-02	2.09E-02	-2.58%
Tc-98	9.0E-03	7.95E-03	-11.64%	U-237	2.0E-04	1.95E-04	-2.33%
Tc-99	1.5E-04	1.62E-04	9.36%	U-238	2.0E-02	1.93E-02	-2.57%
Ru-97	4.6E-05	8.42E-05	83.71%	Np-236	8.2E-02	1.01E-01	22.31%
Ru-103	2.8E-04	5.32E-04	88.02%	Np-237	4.0E-01	4.93E-01	22.70%
Ru-106	2.2E-03	4.20E-03	90.68%	Np-239	1.9E-04	2.25E-04	20.26%
Pd-107	1.4E-05	1.44E-05	0.00%	Am-237	7.5E-15	7.57E-15	0.60%
Ag-108m	9.5E-03	1.01E-02	5.93%	Am-241	6.1E-01	2.67E+00	338.90%
Ag-110m	1.3E-03	3.81E-03	182.39%	Am-242m	5.7E-01	2.49E+00	338.99%
Cd-113	8.1E-02	8.12E-02	0.00%	Am-243	6.1E-01	2.67E+00	338.78%

Table 19. LADTAP XL Maximally Exposed Individual Total of All Pathways Comparison (mrem/yr) (continued)

Nuclide	Hamby Ladtap Total Pathway	Jannik Ladtap Total Pathway	% Diff	Nuclide	Hamby Ladtap Total Pathway	Jannik Ladtap Total Pathway	% Diff
Cd-115m	7.4E-03	7.39E-03	0.00%	Pu-237	8.9E-05	1.43E-04	61.47%
In-115	1.1E-02	2.99E+00	26027.40%	Pu-238	3.4E-01	5.53E-01	63.21%
Sb-122	3.6E-04	6.50E-04	80.46%	Pu-239	3.8E-01	6.26E-01	63.21%
Sb-124	8.3E-04	1.53E-03	83.10%	Pu-240	3.8E-01	6.26E-01	63.21%
Sb-125	4.8E-04	6.45E-04	34.62%	Pu-241	7.7E-03	1.25E-02	63.21%
Te-123	3.8E-04	1.68E-03	345.19%	Pu-242	3.7E-01	5.97E-01	63.21%
Te-125m	3.1E-03	1.33E-03	-56.98%	Pu-244	3.6E-01	5.82E-01	63.21%
Sn-126	1.1E-01	1.10E-01	-0.04%	Cm-241	6.0E-04	6.46E-04	7.83%
I-129	3.2E-02	4.09E-02	27.91%	Cm-242	1.5E-02	1.59E-02	7.87%
I-131	5.2E-03	6.66E-03	27.21%	Cm-243	3.9E-01	4.23E-01	7.85%
Cs-134	4.8E-01	4.78E-01	-0.02%	Cm-244	3.1E-01	3.35E-01	7.88%
Cs-135	4.6E-02	4.59E-02	0.00%	Cm-245	6.1E-01	6.55E-01	7.87%
Cs-137	3.3E-01	3.25E-01	-0.09%	Cm-246	6.1E-01	6.55E-01	7.88%
La-137	5.8E-05	6.90E-05	18.92%	Cm-247	5.6E-01	5.99E-01	7.81%
La-138	8.0E-04	9.47E-04	18.92%	Cm-248	2.2E+00	2.33E+00	7.88%
La-140	5.2E-04	6.13E-04	17.11%	Cm-250	1.0E+01	1.13E+01	7.88%
Ba-140	7.2E-04	6.79E-04	-5.73%	Bk-247	3.1E-01	3.10E-01	0.00%
Ce-141	2.1E-04	3.40E-04	59.71%	Bk-249	8.1E-04	8.07E-04	0.00%
Ce-144	1.7E-03	2.69E-03	60.44%	Cf-249	6.2E-01	6.22E-01	-0.04%
				Cf-250	2.6E-01	2.56E-01	0.00%
				Cf-251	6.2E-01	6.21E-01	-0.02%
				Cf-252	1.3E-01	1.27E-01	0.00%
				Es-253	2.3E-03	3.06E-03	30.56%
				Unidentified alpha	3.8E-01	6.3E-01	63.21%
				Unidentified beta	1.9E-02	1.1E-02	-39.61%
				TOTAL Dose	**3.7E+01**	**4.6E+01**	**26.61%**

Table 20. LADTAP XL Collective Water Ingestion Comparisons (person-rem)

Nuclide	Hamby Ladtap Total Water	Jannik Ladtap Total Water	% Diff	Nuclide	Hamby Ladtap Total Water	Jannik Ladtap Total Water	% Diff
H-3	4.2E-04	3.8E-04	-8.92%	Sm-146	1.3E+00	1.2E+00	-8.92%
Be-7	7.0E-04	6.4E-04	-8.92%	Sm-147	1.2E+00	1.1E+00	-8.92%
Be-10	2.8E-02	2.6E-02	-8.92%	Sm-151	2.3E-03	2.1E-03	-8.92%
C-14	1.4E-02	1.3E-02	-8.92%	Pm-147	6.3E-03	5.8E-03	-8.92%
Na-22	8.0E-02	7.3E-02	-8.92%	Eu-152	4.0E-02	3.6E-02	-8.92%
Na-24	1.1E-04	1.0E-04	-8.92%	Eu-154	6.1E-02	5.5E-02	-8.92%
Al-26	8.7E-02	7.9E-02	-8.92%	Eu-155	8.7E-03	7.9E-03	-8.92%
P-32	4.2E-02	3.9E-02	-8.92%	Gd-152	1.0E+00	9.1E-01	-8.92%
Si-32	1.1E-02	1.0E-02	-8.92%	Ho-166m	5.2E-02	4.7E-02	-8.92%
S-35	4.2E-03	3.8E-03	-8.92%	Lu-176	4.4E-02	4.0E-02	-8.92%
Cl-36	2.0E-02	1.8E-02	-8.92%	Ta-180	4.9E-215	4.4E-215	-8.92%
K-40	1.3E-01	1.2E-01	-8.92%	Hf-182	9.4E-02	8.5E-02	-8.92%
K-43	2.6E-04	2.4E-04	-8.92%	Re-186m	2.2E-02	2.0E-02	-8.92%
Ca-41	8.0E-03	7.3E-03	-8.92%	Re-187	5.5E-05	5.1E-05	-8.92%
Ca-45	2.0E-02	1.8E-02	-8.92%	Ir-192m	0.0E+00	0.0E+00	0.00%
Ca-47	2.2E-02	2.0E-02	-8.92%	Pt-193	7.3E-04	6.7E-04	-8.92%
Ti-44	1.3E-01	1.2E-01	-8.92%	Hg-194	1.9E+00	1.7E+00	-8.92%
V-49	3.6E-04	3.3E-04	-8.92%	Hg-203	6.3E-02	5.7E-02	-8.92%
Cr-51	7.9E-04	7.2E-04	-8.92%	Pb-202	2.6E-01	2.4E-01	-8.92%
Mn-53	6.6E-04	6.0E-04	-8.92%	Pb-205	1.0E-02	9.1E-03	-8.92%
Mn-54	1.8E-02	1.6E-02	-8.92%	Pb-210	3.4E+01	3.1E+01	-8.92%
Fe-55	3.9E-03	3.5E-03	-8.92%	Bi-207	3.3E-02	3.0E-02	-8.92%
Fe-60	1.0E+00	9.1E-01	-8.92%	Bi-210	2.3E-02	2.1E-02	-8.92%
Co-58	2.2E-02	2.0E-02	-8.92%	Bi-210m	5.7E-01	5.2E-01	-8.92%
Co-60	1.7E-01	1.6E-01	-8.92%	Po-210	1.0E+01	9.5E+00	-8.92%
Ni-59	1.3E-03	1.2E-03	-8.92%	Ra-223	2.9E+00	2.6E+00	-8.92%
Ni-63	3.6E-03	3.3E-03	-8.92%	Ra-224	1.0E+00	9.3E-01	-8.92%
Cu-64	1.5E-05	1.4E-05	-8.92%	Ra-225	1.7E+00	1.6E+00	-8.92%

Table 20. LADTAP XL Collective Water Ingestion Comparisons (person-rem) (continued)

Nuclide	Hamby Ladtap Total Water	Jannik Ladtap Total Water	% Diff	Nuclide	Hamby Ladtap Total Water	Jannik Ladtap Total Water	% Diff
Zn-65	9.2E-02	8.4E-02	-8.92%	Ra-226	7.4E+00	6.7E+00	-8.92%
Ge-68	7.3E-03	6.6E-03	-8.92%	Ra-228	8.0E+00	7.3E+00	-8.92%
Se-75	5.7E-02	5.2E-02	-8.92%	Ac-227	9.4E+01	8.5E+01	-8.92%
Se-79	5.5E-02	5.1E-02	-8.92%	Th-227	2.1E-01	1.9E-01	-8.92%
Rb-87	3.2E-02	2.9E-02	-8.92%	Th-228	2.5E+00	2.3E+00	-8.92%
Sr-89	5.5E-02	5.0E-02	-8.92%	Th-229	2.3E+01	2.1E+01	-8.92%
Sr-90	8.7E-01	7.9E-01	-8.92%	Th-230	3.5E+00	3.2E+00	-8.92%
Y-90	2.4E-02	2.2E-02	-8.92%	Th-231	6.4E-04	5.8E-04	-8.92%
Y-91	5.7E-02	5.2E-02	-8.92%	Th-232	1.9E+01	1.7E+01	-8.92%
Mo-93	8.7E-03	7.9E-03	-8.92%	Th-234	7.7E-02	7.1E-02	-8.92%
Mo-99	1.1E-02	9.8E-03	-8.92%	Pa-230	3.2E-02	2.9E-02	-8.92%
Nb-93m	3.5E-02	3.2E-02	-8.92%	Pa-231	7.4E+01	6.7E+01	-8.92%
Nb-94	3.4E-02	3.1E-02	-8.92%	Pa-233	2.0E-02	1.8E-02	-8.92%
Nb-95	1.4E-02	1.2E-02	-8.92%	U-232	8.7E+00	7.9E+00	-8.92%
Zr-93	1.1E-02	9.7E-03	-8.92%	U-233	1.8E+00	1.6E+00	-8.92%
Zr-95	2.2E-02	2.0E-02	-8.92%	U-234	1.7E+00	1.6E+00	-8.92%
Tc-96	9.5E-03	8.6E-03	-8.92%	U-235	1.7E+00	1.5E+00	-8.92%
Tc-97	1.0E-03	9.1E-04	-8.92%	U-236	1.7E+00	1.5E+00	-8.92%
Tc-98	3.2E-02	2.9E-02	-8.92%	U-237	1.2E-02	1.1E-02	-8.92%
Tc-99	8.7E-03	7.9E-03	-8.92%	U-238	1.5E+00	1.4E+00	-8.92%
Ru-97	1.6E-03	1.5E-03	-8.92%	Np-236	5.3E+00	4.8E+00	-8.92%
Ru-103	1.7E-02	1.5E-02	-8.92%	Np-237	2.6E+01	2.4E+01	-8.92%
Ru-106	1.4E-01	1.3E-01	-8.92%	Np-239	6.0E-03	5.4E-03	-8.92%
Pd-107	9.4E-04	8.5E-04	-8.92%	Am-237	8.8E-28	8.1E-28	-8.92%
Ag-108m	5.0E-02	4.6E-02	-8.92%	Am-241	3.0E+01	2.7E+01	-8.92%
Ag-110m	7.3E-02	6.6E-02	-8.92%	Am-242m	2.8E+01	2.6E+01	-8.92%
Cd-113	1.1E+00	9.7E-01	-8.92%	Am-243	3.0E+01	2.7E+01	-8.92%

Table 20. LADTAP XL Collective Water Ingestion Comparisons (person-rem) (continued)

Nuclide	Hamby Ladtap Total Water	Jannik Ladtap Total Water	% Diff	Nuclide	Hamby Ladtap Total Water	Jannik Ladtap Total Water	% Diff
Cd-115m	9.4E-02	8.6E-02	-8.92%	Pu-237	6.3E-03	5.7E-03	-8.92%
In-115	9.4E-01	8.5E-01	-8.92%	Pu-238	2.5E+01	2.3E+01	-8.92%
Sb-122	1.5E-02	1.4E-02	-8.92%	Pu-239	2.9E+01	2.6E+01	-8.92%
Sb-124	5.9E-02	5.4E-02	-8.92%	Pu-240	2.9E+01	2.6E+01	-8.92%
Sb-125	1.7E-02	1.6E-02	-8.92%	Pu-241	5.7E-01	5.2E-01	-8.92%
Te-123	2.7E-02	2.5E-02	-8.92%	Pu-242	2.7E+01	2.5E+01	-8.92%
Te-125m	2.2E-02	2.0E-02	-8.92%	Pu-244	2.7E+01	2.4E+01	-8.92%
Sn-126	1.1E-01	1.0E-01	-8.92%	Cm-241	2.8E-02	2.6E-02	-8.92%
I-129	1.9E+00	1.7E+00	-8.92%	Cm-242	7.2E-01	6.6E-01	-8.92%
I-131	2.5E-01	2.3E-01	-8.92%	Cm-243	1.9E+01	1.8E+01	-8.92%
Cs-134	4.9E-01	4.5E-01	-8.92%	Cm-244	1.5E+01	1.4E+01	-8.92%
Cs-135	4.7E-02	4.3E-02	-8.92%	Cm-245	3.0E+01	2.7E+01	-8.92%
Cs-137	3.3E-01	3.0E-01	-8.92%	Cm-246	3.0E+01	2.7E+01	-8.92%
La-137	2.9E-03	2.6E-03	-8.92%	Cm-247	2.7E+01	2.5E+01	-8.92%
La-138	3.9E-02	3.6E-02	-8.92%	Cm-248	1.1E+02	9.7E+01	-8.92%
La-140	9.9E-03	9.0E-03	-8.92%	Cm-250	5.2E+02	4.7E+02	-8.92%
Ba-140	4.5E-02	4.1E-02	-8.92%	Bk-247	1.5E+01	1.4E+01	-8.92%
Ce-141	1.6E-02	1.5E-02	-8.92%	Bk-249	4.0E-02	3.6E-02	-8.92%
Ce-144	1.3E-01	1.2E-01	-8.92%	Cf-249	3.1E+01	2.8E+01	-8.92%
				Cf-250	1.3E+01	1.2E+01	-8.92%
				Cf-251	3.1E+01	2.8E+01	-8.92%
				Cf-252	6.3E+00	5.7E+00	-8.92%
				Es-253	1.4E-01	1.3E-01	-8.92%
				Unidentified alpha	2.9E+01	2.6E+01	-8.92%
				Unidentified beta	8.7E-01	7.9E-01	-8.92%
				TOTAL Dose	**1.4E+03**	**1.3E+03**	-8.92%

Table 21. LADTAP XL Collective Sport Fish Ingestion Comparisons (person-rem)

Nuclide	Hamby Ladtap Sport fish	Jannik Ladtap Sport fish	% Diff	Nuclide	Hamby Ladtap Sport fish	Jannik Ladtap Sport fish	% Diff
H-3	2.2E-07	5.8E-08	-283.21%	Sm-146	2.0E-02	5.5E-03	-254.83%
Be-7	7.6E-07	8.9E-06	91.48%	Sm-147	1.8E-02	5.0E-03	-254.83%
Be-10	3.3E-05	3.9E-04	91.48%	Sm-151	3.3E-05	9.4E-06	-254.83%
C-14	3.8E-02	5.8E-06	-652779.16%	Pm-147	9.2E-05	2.6E-05	-254.83%
Na-22	4.7E-03	8.3E-04	-460.25%	Eu-152	5.9E-04	7.2E-04	18.12%
Na-24	8.3E-09	1.5E-09	-460.25%	Eu-154	8.9E-04	1.1E-03	18.12%
Al-26	5.1E-04	6.1E-04	16.51%	Eu-155	1.3E-04	1.5E-04	18.12%
P-32	1.9E+00	6.1E-01	-204.14%	Gd-152	1.5E-02	4.1E-03	-254.83%
Si-32	1.7E-05	3.1E-05	46.78%	Ho-166m	7.6E-04	2.2E-04	-254.83%
S-35	1.8E-03	4.4E-04	-299.18%	Lu-176	6.5E-04	1.5E-04	-325.79%
Cl-36	5.9E-04	1.3E-04	-352.97%	Ta-180	0.0E+00	0.0E+00	
K-40	7.4E-02	5.6E-02	-33.06%	Hf-182	1.8E-04	1.4E-02	98.71%
K-43	1.8E-06	1.3E-06	-33.06%	Re-186m	1.5E-03	3.6E-04	-322.24%
Ca-41	1.9E-04	1.3E-05	-1319.30%	Re-187	3.9E-06	9.2E-07	-322.24%
Ca-45	4.5E-04	3.2E-05	-1319.30%	Ir-192m	0.0E+00	0.0E+00	
Ca-47	2.1E-04	1.5E-05	-1319.30%	Pt-193	4.3E-05	3.5E-06	-1116.55%
Ti-44	7.4E-02	3.3E-03	-2141.00%	Hg-194	1.1E+00	1.6E+00	30.20%
V-49	2.1E-06	4.7E-06	56.10%	Hg-203	3.4E-02	4.8E-02	30.20%
Cr-51	7.9E-05	3.7E-06	-2028.95%	Pb-202	4.6E-02	9.0E-04	-5009.49%
Mn-53	3.9E-05	2.2E-05	-77.41%	Pb-205	1.8E-03	3.5E-05	-5009.49%
Mn-54	4.1E-03	5.8E-04	-609.65%	Pb-210	6.0E+00	1.2E-01	-5009.49%
Fe-55	2.3E-04	9.0E-05	-150.47%	Bi-207	2.9E-04	6.8E-05	-325.79%
Fe-60	5.9E-02	2.3E-02	-150.47%	Bi-210	8.7E-05	2.0E-05	-325.79%
Co-58	6.2E-04	2.2E-04	-180.13%	Bi-210m	5.1E-03	1.2E-03	-325.79%
Co-60	5.1E-03	1.8E-03	-180.13%	Po-210	3.0E+00	5.0E-02	-5813.76%
Ni-59	7.8E-05	3.9E-06	-1927.58%	Ra-223	5.9E-02	1.1E-03	-5222.38%
Ni-63	2.1E-04	1.0E-05	-1927.58%	Ra-224	9.5E-03	1.8E-04	-5222.38%
Cu-64	6.9E-10	1.9E-10	-270.25%	Ra-225	3.8E-02	7.1E-04	-5222.38%

Table 21. LADTAP XL Collective Sport Fish Ingestion Comparisons (person-rem) (continued)

Nuclide	Hamby Ladtap Sport fish	Jannik Ladtap Sport fish	% Diff	Nuclide	Hamby Ladtap Sport fish	Jannik Ladtap Sport fish	% Diff
Zn-65	1.1E-01	4.3E-02	-150.47%	Ra-226	2.2E-01	4.0E-03	-5222.38%
Ge-68	1.4E-02	4.0E-03	-254.47%	Ra-228	2.3E-01	4.4E-03	-5222.38%
Se-75	5.5E-03	4.6E-02	87.94%	Ac-227	1.4E+00	3.2E-01	-325.79%
Se-79	5.5E-03	4.6E-02	87.94%	Th-227	2.9E-03	1.4E-04	-2028.95%
Rb-87	3.8E-02	2.2E-02	-73.79%	Th-228	4.4E-02	2.1E-03	-2028.95%
Sr-89	8.9E-04	2.0E-05	-4304.73%	Th-229	4.1E-01	1.9E-02	-2028.95%
Sr-90	1.5E-02	3.5E-04	-4304.73%	Th-230	6.2E-02	2.9E-03	-2028.95%
Y-90	7.3E-05	2.8E-05	-166.12%	Th-231	2.3E-07	1.1E-08	-2028.95%
Y-91	7.7E-04	2.9E-04	-166.12%	Th-232	3.3E-01	1.5E-02	-2028.95%
Mo-93	5.1E-05	2.3E-06	-2141.00%	Th-234	1.1E-03	5.4E-05	-2028.95%
Mo-99	1.4E-05	6.2E-07	-2141.00%	Pa-230	1.7E-04	3.5E-05	-381.14%
Nb-93m	6.2E-01	1.5E-03	-42479.08%	Pa-231	4.9E-01	1.0E-01	-381.14%
Nb-94	6.0E-01	1.4E-03	-42479.08%	Pa-233	1.1E-04	2.3E-05	-381.14%
Nb-95	2.1E-01	5.0E-04	-42479.08%	U-232	5.1E-02	1.1E-03	-4335.32%
Zr-93	2.1E-05	3.2E-05	36.13%	U-233	2.1E-03	2.4E-04	-787.06%
Zr-95	3.9E-05	6.2E-05	36.13%	U-234	2.0E-03	2.3E-04	-787.06%
Tc-96	3.2E-05	9.9E-06	-219.34%	U-235	2.0E-03	2.2E-04	-787.06%
Tc-97	8.8E-06	2.8E-06	-219.34%	U-236	2.0E-03	2.2E-04	-787.06%
Tc-98	2.8E-04	8.8E-05	-219.34%	U-237	7.6E-06	8.5E-07	-787.06%
Tc-99	7.6E-05	2.4E-05	-219.34%	U-238	1.8E-03	2.0E-04	-787.06%
Ru-97	2.3E-06	3.0E-06	22.58%	Np-236	3.1E-02	1.5E-02	-102.76%
Ru-103	8.9E-05	1.1E-04	22.58%	Np-237	1.5E-01	7.5E-02	-102.76%
Ru-106	8.1E-04	1.0E-03	22.58%	Np-239	5.9E-06	2.9E-06	-102.76%
Pd-107	5.5E-06	1.3E-06	-325.79%	Am-237	3.1E-65	7.0E-65	55.65%
Ag-108m	6.8E-05	7.6E-04	91.06%	Am-241	4.4E-01	9.9E-01	55.65%
Ag-110m	9.6E-05	1.1E-03	91.10%	Am-242m	4.1E-01	9.3E-01	55.65%
Cd-113	1.3E-01	2.9E-02	-325.79%	Am-243	4.4E-01	9.9E-01	55.65%

(continued)

Nuclide	Hamby Ladtap Sport fish	Jannik Ladtap Sport fish	% Diff	Nuclide	Hamby Ladtap Sport fish	Jannik Ladtap Sport fish	% Diff
Cd-115m	1.0E-02	2.4E-03	-325.79%	Pu-237	1.2E-05	2.4E-05	50.32%
In-115	0.0E+00	1.3E+00	100.00%	Pu-238	5.2E-02	1.0E-01	50.32%
Sb-122	1.9E-06	1.7E-05	88.49%	Pu-239	5.9E-02	1.2E-01	50.32%
Sb-124	3.2E-05	2.8E-04	88.49%	Pu-240	5.9E-02	1.2E-01	50.32%
Sb-125	1.0E-05	8.8E-05	88.49%	Pu-241	1.2E-03	2.4E-03	50.32%
Te-123	0.0E+00	5.7E-04	100.00%	Pu-242	5.6E-02	1.1E-01	50.32%
Te-125m	4.7E-03	4.2E-04	-1035.44%	Pu-244	5.5E-02	1.1E-01	50.32%
Sn-126	2.0E-01	4.7E-02	-325.79%	Cm-241	3.6E-04	1.0E-04	-254.83%
I-129	1.6E-02	7.7E-03	-112.90%	Cm-242	1.0E-02	2.9E-03	-254.83%
I-131	1.3E-03	6.2E-04	-112.90%	Cm-243	2.8E-01	8.0E-02	-254.83%
Cs-134	8.6E-01	2.0E-01	-325.79%	Cm-244	2.3E-01	6.3E-02	-254.83%
Cs-135	8.3E-02	2.0E-02	-325.79%	Cm-245	4.4E-01	1.2E-01	-254.83%
Cs-137	5.9E-01	1.4E-01	-325.79%	Cm-246	4.4E-01	1.2E-01	-254.83%
La-137	4.2E-05	1.5E-05	-187.70%	Cm-247	4.0E-01	1.1E-01	-254.83%
La-138	5.8E-04	2.0E-04	-187.70%	Cm-248	1.6E+00	4.4E-01	-254.83%
La-140	1.2E-05	4.2E-06	-187.70%	Cm-250	7.6E+00	2.1E+00	-254.83%
Ba-140	7.7E-05	5.4E-06	-1319.30%	Bk-247	2.3E-01	5.3E-02	-325.79%
Ce-141	8.2E-06	4.8E-05	82.97%	Bk-249	5.8E-04	1.4E-04	-325.79%
Ce-144	7.6E-05	4.5E-04	82.97%	Cf-249	4.5E-01	1.1E-01	-325.79%
				Cf-250	1.9E-01	4.4E-02	-325.79%
				Cf-251	4.5E-01	1.1E-01	-325.79%
				Cf-252	9.1E-02	2.1E-02	-325.79%
				Es-253	6.7E-04	3.9E-04	-70.32%
				Unidentified alpha	5.9E-02	1.2E-01	50.32%
				Unidentified beta	1.5E-02	3.5E-04	-4304.73%
				TOTAL Dose	**3.3E+01**	**1.2E+01**	**-177.83%**

Table 22. LADTAP XL Collective Commercial Fish Ingestion Comparisons (person-rem)

Nuclide	Hamby Ladtap Commercial Fish	Jannik Ladtap Commercial Fish	% Diff	Nuclide	Hamby Ladtap Commercial Fish	Jannik Ladtap Commercial Fish	% Diff
H-3	1.7E-08	4.0E-07	95.74%	Sm-146	1.5E-03	3.8E-02	96.05%
Be-7	5.6E-08	5.9E-05	99.91%	Sm-147	1.4E-03	3.4E-02	96.05%
Be-10	2.5E-06	2.7E-03	99.91%	Sm-151	2.6E-06	6.5E-05	96.05%
C-14	2.9E-03	4.0E-05	-7163.16%	Pm-147	7.1E-06	1.8E-04	96.05%
Na-22	3.6E-04	5.8E-03	93.77%	Eu-152	4.5E-05	5.0E-03	99.09%
Na-24	2.3E-11	3.7E-10	93.77%	Eu-154	6.9E-05	7.5E-03	99.09%
Al-26	3.9E-05	4.2E-03	99.07%	Eu-155	9.8E-06	1.1E-03	99.09%
P-32	1.2E-01	3.7E+00	96.62%	Gd-152	1.1E-03	2.9E-02	96.05%
Si-32	1.3E-06	2.2E-04	99.41%	Ho-166m	5.9E-05	1.5E-03	96.05%
S-35	1.3E-04	3.0E-03	95.56%	Lu-176	5.0E-05	1.1E-03	95.26%
Cl-36	4.5E-05	9.0E-04	94.96%	Ta-180	0.0E+00	0.0E+00	
K-40	5.7E-03	3.9E-01	98.52%	Hf-182	1.4E-05	9.8E-02	99.99%
K-43	1.4E-08	9.8E-07	98.52%	Re-186m	1.2E-04	2.5E-03	95.30%
Ca-41	1.5E-05	9.2E-05	84.21%	Re-187	3.0E-07	6.4E-06	95.30%
Ca-45	3.4E-05	2.2E-04	84.21%	Ir-192m	0.0E+00	0.0E+00	
Ca-47	1.0E-05	6.5E-05	84.21%	Pt-193	3.3E-06	2.5E-05	86.47%
Ti-44	5.7E-03	2.3E-02	75.07%	Hg-194	8.5E-02	1.1E+01	99.22%
V-49	1.6E-07	3.3E-05	99.51%	Hg-203	2.5E-03	3.2E-01	99.22%
Cr-51	5.7E-06	2.4E-05	76.32%	Pb-202	3.5E-03	6.2E-03	43.16%
Mn-53	3.0E-06	1.5E-04	98.03%	Pb-205	1.4E-04	2.4E-04	43.16%
Mn-54	3.2E-04	4.0E-03	92.11%	Pb-210	4.6E-01	8.1E-01	43.16%
Fe-55	1.7E-05	6.2E-04	97.21%	Bi-207	2.2E-05	4.7E-04	95.26%
Fe-60	4.5E-03	1.6E-01	97.21%	Bi-210	4.4E-06	9.4E-05	95.26%
Co-58	4.7E-05	1.5E-03	96.88%	Bi-210m	3.9E-04	8.2E-03	95.26%
Co-60	3.9E-04	1.3E-02	96.88%	Po-210	2.3E-01	3.4E-01	34.21%
Ni-59	6.0E-06	2.7E-05	77.44%	Ra-223	3.8E-03	6.4E-03	40.79%
Ni-63	1.6E-05	7.2E-05	77.44%	Ra-224	4.1E-04	7.0E-04	40.79%
Cu-64	1.0E-12	2.5E-11	95.88%	Ra-225	2.5E-03	4.3E-03	40.79%

Table 22. LADTAP XL Collective Commercial Fish Ingestion Comparisons (person-rem) (continued)

Nuclide	Hamby Ladtap Commercial Fish	Jannik Ladtap Commercial Fish	% Diff	Nuclide	Hamby Ladtap Commercial Fish	Jannik Ladtap Commercial Fish	% Diff
Zn-65	8.2E-03	2.9E-01	97.21%	Ra-226	1.7E-02	2.8E-02	40.79%
Ge-68	1.1E-03	2.7E-02	96.06%	Ra-228	1.8E-02	3.1E-02	40.79%
Se-75	4.2E-04	3.1E-01	99.87%	Ac-227	1.1E-01	2.2E+00	95.26%
Se-79	4.3E-04	3.2E-01	99.87%	Th-227	2.0E-04	8.5E-04	76.32%
Rb-87	2.9E-03	1.5E-01	98.07%	Th-228	3.4E-03	1.4E-02	76.32%
Sr-89	6.6E-05	1.3E-04	51.00%	Th-229	3.2E-02	1.3E-01	76.32%
Sr-90	1.2E-03	2.4E-03	51.00%	Th-230	4.8E-03	2.0E-02	76.32%
Y-90	2.6E-06	8.8E-05	97.04%	Th-231	2.5E-09	1.0E-08	76.32%
Y-91	5.8E-05	1.9E-03	97.04%	Th-232	2.5E-02	1.1E-01	76.32%
Mo-93	3.9E-06	1.6E-05	75.07%	Th-234	8.1E-05	3.4E-04	76.32%
Mo-99	5.0E-07	2.0E-06	75.07%	Pa-230	1.1E-05	2.1E-04	94.65%
Nb-93m	4.8E-02	1.0E-02	-373.68%	Pa-231	3.8E-02	7.0E-01	94.65%
Nb-94	4.6E-02	9.8E-03	-373.68%	Pa-233	8.1E-06	1.5E-04	94.65%
Nb-95	1.5E-02	3.3E-03	-373.68%	U-232	3.9E-03	8.0E-03	50.66%
Zr-93	1.6E-06	2.2E-04	99.29%	U-233	1.6E-04	1.7E-03	90.13%
Zr-95	2.9E-06	4.1E-04	99.29%	U-234	1.6E-04	1.6E-03	90.13%
Tc-96	1.5E-06	4.3E-05	96.45%	U-235	1.5E-04	1.5E-03	90.13%
Tc-97	6.8E-07	1.9E-05	96.45%	U-236	1.5E-04	1.5E-03	90.13%
Tc-98	2.2E-05	6.1E-04	96.45%	U-237	4.3E-07	4.3E-06	90.13%
Tc-99	5.9E-06	1.7E-04	96.45%	U-238	1.4E-04	1.4E-03	90.13%
Ru-97	8.7E-08	1.0E-05	99.14%	Np-236	2.4E-03	1.1E-01	97.74%
Ru-103	6.5E-06	7.5E-04	99.14%	Np-237	1.2E-02	5.2E-01	97.74%
Ru-106	6.2E-05	7.2E-03	99.14%	Np-239	1.9E-07	8.4E-06	97.74%
Pd-107	4.2E-07	8.9E-06	95.26%	Am-237	3.7E-84	7.5E-82	99.51%
Ag-108m	5.2E-06	5.3E-03	99.90%	Am-241	3.4E-02	6.9E+00	99.51%

Table 22. LADTAP XL Collective Commercial Fish Ingestion Comparisons (person-rem) (continued)

Nuclide	Hamby Ladtap Commercial Fish	Jannik Ladtap Commercial Fish	% Diff	Nuclide	Hamby Ladtap Commercial Fish	Jannik Ladtap Commercial Fish	% Diff
Ag-110m	7.4E-06	7.4E-03	99.90%	Am-242m	3.2E-02	6.4E+00	99.51%
Cd-113	9.7E-03	2.0E-01	95.26%	Am-243	3.4E-02	6.9E+00	99.51%
Cd-115m	7.4E-04	1.6E-02	95.26%	Pu-237	8.7E-07	1.6E-04	99.45%
In-115	0.0E+00	8.9E+00	100.00%	Pu-238	4.0E-03	7.3E-01	99.45%
Sb-122	6.8E-08	5.3E-05	99.87%	Pu-239	4.5E-03	8.2E-01	99.45%
Sb-124	2.4E-06	1.9E-03	99.87%	Pu-240	4.5E-03	8.2E-01	99.45%
Sb-125	7.8E-07	6.1E-04	99.87%	Pu-241	9.1E-05	1.6E-02	99.45%
Te-123	0.0E+00	3.9E-03	100.00%	Pu-242	4.3E-03	7.9E-01	99.45%
Te-125m	3.5E-04	2.8E-03	87.37%	Pu-244	4.2E-03	7.7E-01	99.45%
Sn-126	1.5E-02	3.3E-01	95.26%	Cm-241	2.6E-05	6.7E-04	96.05%
I-129	1.3E-03	5.4E-02	97.63%	Cm-242	7.9E-04	2.0E-02	96.05%
I-131	7.8E-05	3.3E-03	97.63%	Cm-243	2.2E-02	5.5E-01	96.05%
Cs-134	6.6E-02	1.4E+00	95.26%	Cm-244	1.7E-02	4.4E-01	96.05%
Cs-135	6.4E-03	1.4E-01	95.26%	Cm-245	3.4E-02	8.6E-01	96.05%
Cs-137	4.5E-02	9.6E-01	95.26%	Cm-246	3.4E-02	8.6E-01	96.05%
La-137	3.2E-06	1.0E-04	96.80%	Cm-247	3.1E-02	7.9E-01	96.05%
La-138	4.5E-05	1.4E-03	96.80%	Cm-248	1.2E-01	3.1E+00	96.05%
La-140	2.7E-07	8.5E-06	96.80%	Cm-250	5.9E-01	1.5E+01	96.05%
Ba-140	5.0E-06	3.2E-05	84.21%	Bk-247	1.7E-02	3.7E-01	95.26%
Ce-141	6.0E-07	3.1E-04	99.81%	Bk-249	4.4E-05	9.3E-04	95.26%
Ce-144	5.9E-06	3.1E-03	99.81%	Cf-249	3.5E-02	7.3E-01	95.26%
				Cf-250	1.4E-02	3.0E-01	95.26%
				Cf-251	3.5E-02	7.3E-01	95.26%
				Cf-252	7.0E-03	1.5E-01	95.26%
				Es-253	4.7E-05	2.5E-03	98.11%
				Unidentified alpha	4.5E-03	8.2E-01	99.45%
				Unidentified beta	1.2E-03	2.4E-03	51.00%
				TOTAL Dose	**2.6E+00**	**8.3E+01**	**96.92%**

Table 23. LADTAP XL Collective Salt Water Invertebrate Ingestion Comparisons (person-rem)

Nuclide	Hamby Ladtap Invertebrates	Jannik Ladtap Invertebrates	% Diff	Nuclide	Hamby Ladtap Invertebrates	Jannik Ladtap Invertebrates	% Diff
H-3	5.3E-07	8.3E-07	35.53%	Sm-146	1.8E+00	2.8E+00	35.53%
Be-7	1.7E-04	1.3E-02	98.71%	Sm-147	1.6E+00	2.6E+00	35.53%
Be-10	7.7E-03	6.0E-01	98.71%	Sm-151	3.1E-03	4.8E-03	35.53%
C-14	2.7E-02	6.0E-01	95.49%	Pm-147	8.6E-03	1.3E-02	35.53%
Na-22	2.1E-05	1.7E-04	87.75%	Eu-152	5.5E-02	8.5E-02	35.53%
Na-24	1.3E-12	1.1E-11	87.75%	Eu-154	8.3E-02	1.3E-01	35.53%
Al-26	7.1E-03	1.1E-02	35.53%	Eu-155	1.2E-02	1.8E-02	35.53%
P-32	1.1E+00	2.2E+00	49.10%	Gd-152	1.4E+00	4.3E+00	67.76%
Si-32	5.2E-04	1.2E+00	99.96%	Ho-166m	7.1E-02	1.1E-01	35.53%
S-35	2.4E-06	8.3E-06	71.63%	Lu-176	6.0E-02	9.4E-02	35.53%
Cl-36	5.2E-07	4.3E-05	98.78%	Ta-180	0.0E+00	0.0E+00	
K-40	1.1E-03	1.8E-03	35.53%	Hf-182	2.6E-03	2.0E-01	98.71%
K-43	2.9E-09	4.5E-09	35.33%	Re-186m	1.8E-03	2.8E-03	35.53%
Ca-41	1.4E-04	8.5E-05	-61.18%	Re-187	4.5E-06	7.0E-06	35.53%
Ca-45	3.4E-04	2.0E-04	-67.63%	Ir-192m	0.0E+00	0.0E+00	
Ca-47	1.0E-04	6.0E-05	-67.63%	Pt-193	2.0E-03	3.1E-03	35.53%
Ti-44	1.7E-01	2.7E-01	35.53%	Hg-194	8.5E+01	7.9E+01	-7.35%
V-49	2.4E-05	3.7E-05	35.53%	Hg-203	2.5E+00	2.3E+00	-6.38%
Cr-51	1.7E-03	6.7E-04	-157.89%	Pb-202	3.6E-01	5.5E-01	35.53%
Mn-53	9.1E-03	1.1E-03	-705.92%	Pb-205	1.4E-02	2.1E-02	35.53%
Mn-54	9.6E-03	3.0E-02	67.76%	Pb-210	4.7E+01	7.2E+01	35.53%
Fe-55	1.1E-01	4.1E-02	-157.89%	Bi-207	4.5E-04	6.9E-02	99.36%
Fe-60	2.7E+01	1.1E+01	-157.89%	Bi-210	8.9E-05	1.4E-02	99.36%
Co-58	2.8E-02	8.7E-02	67.76%	Bi-210m	7.9E-03	1.2E+00	99.36%
Co-60	2.4E-01	7.3E-01	67.76%	Po-210	2.7E+02	1.1E+03	74.21%
Ni-59	4.6E-04	1.4E-03	67.76%	Ra-223	2.3E-01	3.5E-01	35.53%
Ni-63	1.2E-03	3.8E-03	67.76%	Ra-224	2.5E-02	3.9E-02	35.53%
Cu-64	2.7E-10	1.2E-09	78.08%	Ra-225	1.5E-01	2.4E-01	35.53%

Table 23. LADTAP XL Collective Salt Water Invertebrate Ingestion Comparisons (person-rem) (continued)

Nuclide	Hamby Ladtap Invertebrates	Jannik Ladtap Invertebrates	% Diff	Nuclide	Hamby Ladtap Invertebrates	Jannik Ladtap Invertebrates	% Diff
Zn-65	6.2E+00	9.6E+00	35.53%	Ra-226	1.0E+00	1.6E+00	35.53%
Ge-68	1.5E-01	6.0E-02	-153.06%	Ra-228	1.1E+00	1.7E+00	35.53%
Se-75	7.5E-02	5.8E-01	87.11%	Ac-227	1.3E+02	2.0E+02	35.53%
Se-79	7.6E-02	5.9E-01	87.11%	Th-227	4.1E-01	3.2E-01	-28.95%
Rb-87	7.5E-04	1.4E-02	94.52%	Th-228	6.9E+00	5.3E+00	-28.95%
Sr-89	1.3E-03	1.0E-04	-1189.47%	Th-229	6.4E+01	5.0E+01	-28.95%
Sr-90	2.4E-02	1.8E-03	-1189.47%	Th-230	9.7E+00	7.5E+00	-28.95%
Y-90	3.2E-03	4.9E-03	35.53%	Th-231	5.0E-06	3.9E-06	-28.95%
Y-91	7.0E-02	1.1E-01	35.53%	Th-232	5.1E+01	4.0E+01	-28.95%
Mo-93	1.2E-04	3.7E-04	67.76%	Th-234	1.6E-01	1.3E-01	-28.95%
Mo-99	1.5E-05	4.7E-05	67.76%	Pa-230	3.1E-04	4.7E-04	35.53%
Nb-93m	4.8E-03	3.8E-03	-28.95%	Pa-231	1.0E+00	1.6E+00	35.53%
Nb-94	4.7E-03	3.6E-03	-28.95%	Pa-233	2.2E-04	3.4E-04	35.53%
Nb-95	1.6E-03	1.2E-03	-28.95%	U-232	1.2E-01	1.8E-01	35.53%
Zr-93	1.2E-03	1.1E-03	-3.16%	U-233	2.5E-02	3.8E-02	35.53%
Zr-95	2.2E-03	2.1E-03	-3.16%	U-234	2.4E-02	3.7E-02	35.53%
Tc-96	1.5E-04	4.7E-05	-222.37%	U-235	2.3E-02	3.5E-02	35.53%
Tc-97	6.9E-05	2.1E-05	-222.37%	U-236	2.3E-02	3.5E-02	35.53%
Tc-98	2.2E-03	6.8E-04	-222.37%	U-237	6.5E-05	1.0E-04	35.53%
Tc-99	5.9E-04	1.8E-04	-222.37%	U-238	2.1E-02	3.3E-02	35.53%
Ru-97	5.2E-04	4.1E-05	-1189.47%	Np-236	7.2E-02	1.1E-01	35.53%
Ru-103	2.0E-02	3.0E-03	-544.74%	Np-237	3.6E-01	5.5E-01	35.53%
Ru-106	1.9E-01	2.9E-02	-544.74%	Np-239	5.7E-06	8.9E-06	35.53%
Pd-107	2.6E-03	6.0E-04	-329.82%	Am-237	4.5E-81	2.5E-81	-79.09%
Ag-108m	2.3E-01	3.7E-02	-513.42%	Am-241	4.1E+01	2.3E+01	-79.09%

Table 23. LADTAP XL Collective Salt Water Invertebrate Ingestion Comparisons (person-rem) (continued)

Nuclide	Hamby Ladtap Invertebrates	Jannik Ladtap Invertebrates	% Diff	Nuclide	Hamby Ladtap Invertebrates	Jannik Ladtap Invertebrates	% Diff
Ag-110m	3.2E-01	5.3E-02	-507.89%	Am-242m	3.8E+01	2.1E+01	-79.09%
Cd-113	3.7E+02	1.1E+01	-3123.68%	Am-243	4.1E+01	2.3E+01	-79.09%
Cd-115m	2.8E+01	8.7E-01	-3123.68%	Pu-237	7.5E-04	3.5E-03	78.51%
In-115	0.0E+00	2.0E+01	100.00%	Pu-238	6.9E+00	1.6E+01	57.02%
Sb-122	1.0E-05	3.2E-04	96.78%	Pu-239	7.9E+00	1.8E+01	57.02%
Sb-124	3.7E-04	1.1E-02	96.78%	Pu-240	7.9E+00	1.8E+01	57.02%
Sb-125	1.2E-04	3.7E-03	96.78%	Pu-241	1.6E-01	3.7E-01	57.02%
Te-123	3.7E+00	5.8E-02	-6347.37%	Pu-242	7.5E+00	1.7E+01	57.02%
Te-125m	2.7E+00	4.1E-02	-6347.37%	Pu-244	3.7E+00	1.7E+01	78.51%
Sn-126	1.6E-01	1.2E+01	98.71%	Cm-241	3.2E-02	2.3E-02	-40.16%
I-129	1.3E-01	2.0E-01	35.53%	Cm-242	9.5E-01	6.8E-01	-40.16%
I-131	7.9E-03	1.2E-02	35.53%	Cm-243	2.6E+01	1.9E+01	-40.16%
Cs-134	1.7E-02	3.1E-02	46.27%	Cm-244	2.1E+01	1.5E+01	-40.16%
Cs-135	1.6E-03	3.0E-03	46.27%	Cm-245	4.1E+01	2.9E+01	-40.16%
Cs-137	1.1E-02	2.1E-02	46.27%	Cm-246	4.1E+01	2.9E+01	-40.16%
La-137	3.9E-03	6.1E-04	-544.74%	Cm-247	3.7E+01	2.7E+01	-40.16%
La-138	5.4E-02	8.4E-03	-544.74%	Cm-248	1.5E+02	1.0E+02	-40.16%
La-140	3.3E-04	5.1E-05	-544.74%	Cm-250	7.1E+02	5.1E+02	-40.16%
Ba-140	3.8E-03	5.9E-05	-6347.37%	Bk-247	2.1E+01	3.3E+01	35.53%
Ce-141	1.1E-02	1.4E-02	22.63%	Bk-249	5.3E-02	8.3E-02	35.53%
Ce-144	1.1E-01	1.4E-01	22.63%	Cf-249	4.2E+01	3.3E+01	-28.95%
				Cf-250	1.7E+01	1.3E+01	-28.95%
				Cf-251	4.2E+01	3.3E+01	-28.95%
				Cf-252	8.5E+00	6.6E+00	-28.95%
				Es-253	1.4E-03	1.5E+00	99.91%
				Unidentified alpha	7.9E+00	1.8E+01	57.02%
				Unidentified beta	2.4E-02	1.8E-03	########
				TOTAL Dose	**2.4E+03**	**2.6E+03**	**7.55%**

Table 24. LADTAP XL Collective Shoreline Exposure Comparisons (person-rem)

Nuclide	Hamby Ladtap Shoreline Pathway	Jannik Ladtap Shoreline Pathway	% Diff	Nuclide	Hamby Ladtap Shoreline Pathway	Jannik Ladtap Shoreline Pathway	% Diff
H-3	0.0E+00	0.0E+00		Sm-146	0.0E+00	0.0E+00	
Be-7	6.7E-05	5.7E-05	-16.79%	Sm-147	0.0E+00	0.0E+00	
Be-10	0.0E+00	0.0E+00		Sm-151	1.1E-06	9.5E-07	-16.79%
C-14	0.0E+00	0.0E+00		Pm-147	9.6E-08	8.2E-08	-16.79%
Na-22	4.9E-02	4.2E-02	-16.79%	Eu-152	1.2E-01	1.0E-01	-16.79%
Na-24	1.8E-05	1.5E-05	-16.79%	Eu-154	9.1E-02	7.8E-02	-16.79%
Al-26	6.2E-01	5.3E-01	-16.79%	Eu-155	3.2E-03	2.7E-03	-16.79%
P-32	0.0E+00	0.0E+00		Gd-152	0.0E+00	0.0E+00	
Si-32	0.0E+00	0.0E+00		Ho-166m	4.1E-01	3.5E-01	-16.79%
S-35	0.0E+00	0.0E+00		Lu-176	0.0E+00	0.0E+00	
Cl-36	1.2E-08	9.9E-09	-16.79%	Ta-180	0.0E+00	0.0E+00	
K-40	3.4E-02	2.9E-02	-16.79%	Hf-182	0.0E+00	0.0E+00	
K-43	1.1E-05	9.4E-06	-16.79%	Re-186m	0.0E+00	0.0E+00	
Ca-41	5.1E-06	4.4E-06	-16.79%	Re-187	0.0E+00	0.0E+00	
Ca-45	8.6E-13	7.4E-13	-16.79%	Ir-192m	0.0E+00	0.0E+00	
Ca-47	9.2E-05	7.9E-05	-16.79%	Pt-193	1.1E-04	9.1E-05	-16.79%
Ti-44	3.2E-02	2.7E-02	-16.79%	Hg-194	0.0E+00	0.0E+00	
V-49	6.1E-07	5.2E-07	-16.79%	Hg-203	2.8E-04	2.4E-04	-16.79%
Cr-51	2.3E-05	1.9E-05	-16.79%	Pb-202	0.0E+00	0.0E+00	
Mn-53	3.9E-05	3.4E-05	-16.79%	Pb-205	1.9E-04	1.6E-04	-16.79%
Mn-54	6.4E-03	5.5E-03	-16.79%	Pb-210	4.3E-04	3.6E-04	-16.79%
Fe-55	5.3E-06	4.5E-06	-16.79%	Bi-207	2.5E-01	2.2E-01	-16.79%
Fe-60	0.0E+00	0.0E+00		Bi-210	0.0E+00	0.0E+00	
Co-58	1.7E-03	1.5E-03	-16.79%	Bi-210m	0.0E+00	0.0E+00	
Co-60	1.1E-01	9.1E-02	-16.79%	Po-210	2.9E-08	2.5E-08	-16.79%
Ni-59	1.0E-04	8.8E-05	-16.79%	Ra-223	4.0E-05	3.4E-05	-16.79%
Ni-63	0.0E+00	0.0E+00		Ra-224	8.1E-07	6.9E-07	-16.79%
Cu-64	6.8E-07	5.8E-07	-16.79%	Ra-225	2.6E-06	2.3E-06	-16.79%

Table 24. LADTAP XL Collective Shoreline Exposure Comparisons (person-rem) (continued)

Nuclide	Hamby Ladtap Shoreline Pathway	Jannik Ladtap Shoreline Pathway	% Diff	Nuclide	Hamby Ladtap Shoreline Pathway	Jannik Ladtap Shoreline Pathway	% Diff
Zn-65	3.3E-03	2.8E-03	-16.79%	Ra-226	1.9E-03	1.6E-03	-16.79%
Ge-68	8.1E-06	6.9E-06	-16.79%	Ra-228	3.4E-11	2.9E-11	-16.79%
Se-75	1.3E-03	1.1E-03	-16.79%	Ac-227	3.0E-05	2.5E-05	-16.79%
Se-79	0.0E+00	0.0E+00		Th-227	5.2E-05	4.5E-05	-16.79%
Rb-87	0.0E+00	0.0E+00		Th-228	4.7E-05	4.1E-05	-16.79%
Sr-89	1.7E-07	1.4E-07	-16.79%	Th-229	2.6E-02	2.2E-02	-16.79%
Sr-90	0.0E+00	0.0E+00		Th-230	2.3E-04	1.9E-04	-16.79%
Y-90	0.0E+00	0.0E+00		Th-231	2.6E-07	2.2E-07	-16.79%
Y-91	4.7E-06	4.0E-06	-16.79%	Th-232	1.7E-04	1.4E-04	-16.79%
Mo-93	1.4E-03	1.2E-03	-16.79%	Th-234	5.8E-06	5.0E-06	-16.79%
Mo-99	1.5E-05	1.3E-05	-16.79%	Pa-230	2.7E-04	2.4E-04	-16.79%
Nb-93m	1.1E-04	9.3E-05	-16.79%	Pa-231	8.9E-03	7.6E-03	-16.79%
Nb-94	3.9E-01	3.4E-01	-16.79%	Pa-233	1.5E-04	1.3E-04	-16.79%
Nb-95	6.5E-04	5.6E-04	-16.79%	U-232	2.1E-04	1.8E-04	-16.79%
Zr-93	0.0E+00	0.0E+00		U-233	1.2E-04	1.1E-04	-16.79%
Zr-95	2.4E-03	2.0E-03	-16.79%	U-234	2.0E-04	1.7E-04	-16.79%
Tc-96	2.3E-04	1.9E-04	-16.79%	U-235	4.2E-02	3.6E-02	-16.79%
Tc-97	1.6E-03	1.4E-03	-16.79%	U-236	1.8E-04	1.6E-04	-16.79%
Tc-98	3.5E-01	3.0E-01	-16.79%	U-237	2.4E-05	2.1E-05	-16.79%
Tc-99	1.6E-07	1.3E-07	-16.79%	U-238	1.6E-04	1.4E-04	-16.79%
Ru-97	1.5E-05	1.2E-05	-16.79%	Np-236	3.9E-02	3.4E-02	-16.79%
Ru-103	4.8E-04	4.1E-04	-16.79%	Np-237	8.0E-03	6.9E-03	-16.79%
Ru-106	1.9E-03	1.6E-03	-16.79%	Np-239	8.2E-06	7.1E-06	-16.79%
Pd-107	0.0E+00	0.0E+00		Am-237	0.0E+00	0.0E+00	
Ag-108m	3.7E-01	3.2E-01	-16.79%	Am-241	7.2E-03	6.2E-03	-16.79%

Table 24. LADTAP XL Collective Shoreline Exposure Comparisons (person-rem) (continued)

Nuclide	Hamby Ladtap Shoreline Pathway	Jannik Ladtap Shoreline Pathway	% Diff	Nuclide	Hamby Ladtap Shoreline Pathway	Jannik Ladtap Shoreline Pathway	% Diff
Ag-110m	1.6E-02	1.4E-02	-16.79%	Am-242m	6.3E-04	5.4E-04	-16.79%
Cd-113	0.0E+00	0.0E+00		Am-243	1.6E-02	1.4E-02	-16.79%
Cd-115m	2.3E-05	1.9E-05	-16.79%	Pu-237	6.5E-05	5.6E-05	-16.79%
In-115	0.0E+00	0.0E+00		Pu-238	1.8E-04	1.6E-04	-16.79%
Sb-122	2.3E-05	2.0E-05	-16.79%	Pu-239	9.4E-05	8.0E-05	-16.79%
Sb-124	2.6E-03	2.2E-03	-16.79%	Pu-240	2.0E-04	1.7E-04	-16.79%
Sb-125	1.1E-02	9.3E-03	-16.79%	Pu-241	0.0E+00	0.0E+00	
Te-123	1.8E-03	1.5E-03	-16.79%	Pu-242	1.7E-04	1.4E-04	-16.79%
Te-125m	3.0E-05	2.5E-05	-16.79%	Pu-244	1.4E-04	1.2E-04	-16.79%
Sn-126	1.5E-02	1.3E-02	-16.79%	Cm-241	0.0E+00	0.0E+00	
I-129	5.5E-03	4.7E-03	-16.79%	Cm-242	3.7E-06	3.2E-06	-16.79%
I-131	7.3E-05	6.3E-05	-16.79%	Cm-243	2.3E-02	2.0E-02	-16.79%
Cs-134	2.9E-02	2.5E-02	-16.79%	Cm-244	1.1E-04	9.0E-05	-16.79%
Cs-135	0.0E+00	0.0E+00		Cm-245	2.1E-02	1.8E-02	-16.79%
Cs-137	9.4E-02	8.0E-02	-16.79%	Cm-246	1.8E-04	1.6E-04	-16.79%
La-137	0.0E+00	0.0E+00		Cm-247	8.3E-02	7.1E-02	-16.79%
La-138	0.0E+00	0.0E+00		Cm-248	1.5E-04	1.3E-04	-16.79%
La-140	5.8E-05	5.0E-05	-16.79%	Cm-250	0.0E+00	0.0E+00	
Ba-140	6.9E-04	5.9E-04	-16.79%	Bk-247	0.0E+00	0.0E+00	
Ce-141	6.9E-05	5.9E-05	-16.79%	Bk-249	0.0E+00	0.0E+00	
Ce-144	3.5E-04	3.0E-04	-16.79%	Cf-249	8.4E-02	7.2E-02	-16.79%
				Cf-250	7.1E-05	6.0E-05	-16.79%
				Cf-251	3.3E-02	2.8E-02	-16.79%
				Cf-252	1.5E-05	1.3E-05	-16.79%
				Es-253	3.5E-07	3.0E-07	-16.79%
				Unidentified alpha	9.4E-05	8.0E-05	-16.79%
				Unidentified beta	0.0E+00	0.0E+00	
				TOTAL Dose	**3.4E+00**	**2.9E+00**	**-16.79%**

Table 25. LADTAP XL Collective Swimming Exposure Comparisons (person-rem)

Nuclide	Hamby Ladtap Swimming	Jannik Ladtap Swimming	% Diff	Nuclide	Hamby Ladtap Swimming	Jannik Ladtap Swimming	% Diff
H-3	4.0E-08	7.3E-08	45.76%	Sm-146	0.0E+00	0.0E+00	
Be-7	1.1E-06	2.0E-06	45.76%	Sm-147	0.0E+00	0.0E+00	
Be-10	0.0E+00	0.0E+00		Sm-151	2.4E-11	4.4E-11	45.76%
C-14	0.0E+00	0.0E+00		Pm-147	8.5E-11	1.6E-10	45.76%
Na-22	5.0E-05	9.2E-05	45.76%	Eu-152	2.6E-05	4.8E-05	45.76%
Na-24	3.5E-05	6.4E-05	45.76%	Eu-154	2.9E-05	5.3E-05	45.76%
Al-26	6.4E-05	1.2E-04	45.76%	Eu-155	1.4E-06	2.5E-06	45.76%
P-32	0.0E+00	0.0E+00		Gd-152	0.0E+00	0.0E+00	
Si-32	0.0E+00	0.0E+00		Ho-166m	6.5E-07	1.2E-06	45.76%
S-35	0.0E+00	0.0E+00		Lu-176	0.0E+00	0.0E+00	
Cl-36	2.1E-13	3.9E-13	45.76%	Ta-180	0.0E+00	0.0E+00	
K-40	3.6E-06	6.6E-06	45.76%	Hf-182	0.0E+00	0.0E+00	
K-43	1.0E-05	1.9E-05	45.76%	Re-186m	0.0E+00	0.0E+00	
Ca-41	7.9E-11	1.5E-10	45.76%	Re-187	0.0E+00	0.0E+00	
Ca-45	4.3E-16	7.8E-16	45.76%	Ir-192m	0.0E+00	0.0E+00	
Ca-47	2.1E-05	3.9E-05	45.76%	Pt-193	1.1E-09	2.1E-09	45.76%
Ti-44	3.3E-06	6.1E-06	45.76%	Hg-194	0.0E+00	0.0E+00	
V-49	2.4E-10	4.4E-10	45.76%	Hg-203	5.1E-06	9.4E-06	45.76%
Cr-51	6.9E-07	1.3E-06	45.76%	Pb-202	0.0E+00	0.0E+00	
Mn-53	4.4E-10	8.2E-10	45.76%	Pb-205	1.5E-09	2.7E-09	45.76%
Mn-54	1.9E-05	3.5E-05	45.76%	Pb-210	3.4E-08	6.3E-08	45.76%
Fe-55	5.8E-10	1.1E-09	45.76%	Bi-207	3.5E-05	6.5E-05	45.76%
Fe-60	0.0E+00	0.0E+00		Bi-210	0.0E+00	0.0E+00	
Co-58	2.2E-05	4.1E-05	45.76%	Bi-210m	0.0E+00	0.0E+00	
Co-60	7.7E-05	1.4E-04	45.76%	Po-210	1.9E-10	3.6E-10	45.76%
Ni-59	9.9E-10	1.8E-09	45.76%	Ra-223	2.9E-06	5.4E-06	45.76%
Ni-63	0.0E+00	0.0E+00		Ra-224	1.9E-07	3.5E-07	45.76%
Cu-64	1.1E-06	2.1E-06	45.76%	Ra-225	1.7E-07	3.1E-07	45.76%

Table 25. LADTAP XL Collective Swimming Exposure Comparisons (person-rem) (continued)

Nuclide	Hamby Ladtap Swimming	Jannik Ladtap Swimming	% Diff	Nuclide	Hamby Ladtap Swimming	Jannik Ladtap Swimming	% Diff
Zn-65	1.3E-05	2.5E-05	45.76%	Ra-226	1.6E-07	2.9E-07	45.76%
Ge-68	2.3E-09	4.3E-09	45.76%	Ra-228	1.6E-15	3.0E-15	45.76%
Se-75	8.9E-06	1.6E-05	45.76%	Ac-227	2.9E-09	5.4E-09	45.76%
Se-79	0.0E+00	0.0E+00		Th-227	2.3E-06	4.2E-06	45.76%
Rb-87	0.0E+00	0.0E+00		Th-228	4.6E-08	8.6E-08	45.76%
Sr-89	3.1E-09	5.8E-09	45.76%	Th-229	2.0E-06	3.7E-06	45.76%
Sr-90	0.0E+00	0.0E+00		Th-230	9.5E-09	1.7E-08	45.76%
Y-90	0.0E+00	0.0E+00		Th-231	1.5E-07	2.7E-07	45.76%
Y-91	8.2E-08	1.5E-07	45.76%	Th-232	4.6E-09	8.5E-09	45.76%
Mo-93	2.0E-08	3.7E-08	45.76%	Th-234	1.8E-07	3.3E-07	45.76%
Mo-99	4.8E-06	8.9E-06	45.76%	Pa-230	1.5E-05	2.7E-05	45.76%
Nb-93m	3.6E-09	6.6E-09	45.76%	Pa-231	6.8E-07	1.3E-06	45.76%
Nb-94	3.6E-05	6.7E-05	45.76%	Pa-233	4.7E-06	8.7E-06	45.76%
Nb-95	1.7E-05	3.2E-05	45.76%	U-232	6.5E-09	1.2E-08	45.76%
Zr-93	0.0E+00	0.0E+00		U-233	5.6E-09	1.0E-08	45.76%
Zr-95	1.7E-05	3.1E-05	45.76%	U-234	3.8E-09	7.0E-09	45.76%
Tc-96	4.9E-05	9.0E-05	45.76%	U-235	3.5E-06	6.5E-06	45.76%
Tc-97	2.5E-08	4.6E-08	45.76%	U-236	3.1E-09	5.7E-09	45.76%
Tc-98	3.2E-05	5.8E-05	45.76%	U-237	2.8E-06	5.2E-06	45.76%
Tc-99	1.3E-11	2.3E-11	45.76%	U-238	2.6E-09	4.9E-09	45.76%
Ru-97	4.1E-06	7.6E-06	45.76%	Np-236	3.1E-06	5.7E-06	45.76%
Ru-103	1.1E-05	1.9E-05	45.76%	Np-237	5.5E-07	1.0E-06	45.76%
Ru-106	4.7E-06	8.6E-06	45.76%	Np-239	2.9E-06	5.3E-06	45.76%
Pd-107	0.0E+00	0.0E+00		Am-237	0.0E+00	0.0E+00	
Ag-108m	3.6E-05	6.7E-05	45.76%	Am-241	4.8E-07	8.8E-07	45.76%

Table 25. LADTAP XL Collective Swimming Exposure Comparisons (person-rem) (continued)

Nuclide	Hamby Ladtap Swimming	Jannik Ladtap Swimming	% Diff	Nuclide	Hamby Ladtap Swimming	Jannik Ladtap Swimming	% Diff
Ag-110m	6.3E-05	1.2E-04	45.76%	Am-242m	1.2E-08	2.2E-08	45.76%
Cd-113	0.0E+00	0.0E+00		Am-243	1.2E-06	2.3E-06	45.76%
Cd-115m	5.0E-07	9.2E-07	45.76%	Pu-237	1.1E-06	2.1E-06	45.76%
In-115	0.0E+00	0.0E+00		Pu-238	2.3E-09	4.2E-09	45.76%
Sb-122	7.7E-06	1.4E-05	45.76%	Pu-239	2.0E-09	3.7E-09	45.76%
Sb-124	4.3E-05	8.0E-05	45.76%	Pu-240	2.2E-09	4.1E-09	45.76%
Sb-125	9.5E-06	1.7E-05	45.76%	Pu-241	0.0E+00	0.0E+00	
Te-123	8.0E-08	1.5E-07	45.76%	Pu-242	1.9E-09	3.5E-09	45.76%
Te-125m	2.5E-07	4.6E-07	45.76%	Pu-244	1.4E-09	2.6E-09	45.76%
Sn-126	1.2E-06	2.2E-06	45.76%	Cm-241	0.0E+00	0.0E+00	
I-129	2.2E-07	4.0E-07	45.76%	Cm-242	2.5E-09	4.7E-09	45.76%
I-131	7.8E-06	1.4E-05	45.76%	Cm-243	2.9E-06	5.4E-06	45.76%
Cs-134	3.5E-05	6.5E-05	45.76%	Cm-244	2.2E-09	4.0E-09	45.76%
Cs-135	0.0E+00	0.0E+00		Cm-245	1.7E-06	3.1E-06	45.76%
Cs-137	1.3E-05	2.3E-05	45.76%	Cm-246	1.8E-09	3.4E-09	45.76%
La-137	0.0E+00	0.0E+00		Cm-247	7.1E-06	1.3E-05	45.76%
La-138	0.0E+00	0.0E+00		Cm-248	1.6E-09	3.0E-09	45.76%
La-140	3.6E-05	6.6E-05	45.76%	Cm-250	0.0E+00	0.0E+00	
Ba-140	5.6E-05	1.0E-04	45.76%	Bk-247	0.0E+00	0.0E+00	
Ce-141	1.7E-06	3.2E-06	45.76%	Bk-249	0.0E+00	0.0E+00	
Ce-144	1.2E-06	2.2E-06	45.76%	Cf-249	7.3E-06	1.4E-05	45.76%
				Cf-250	2.2E-09	4.1E-09	45.76%
				Cf-251	2.7E-06	5.0E-06	45.76%
				Cf-252	1.9E-09	3.6E-09	45.76%
				Es-253	7.5E-09	1.4E-08	45.76%
				Unidentified alpha	2.0E-09	3.7E-09	45.76%
				Unidentified beta	0.0E+00	0.0E+00	
				TOTAL Dose	**9.8E-04**	**1.8E-03**	**45.76%**

Table 26. LADTAP XL Collective Boating Exposure Comparisons (person-rem)

Nuclide	Hamby Ladtap Boating Pathway	Jannik Ladtap Boating Pathway	% Diff	Nuclide	Hamby Ladtap Boating Pathway	Jannik Ladtap Boating Pathway	% Diff
H-3	0.0E+00	0.0E+00		Sm-146	0.0E+00	0.0E+00	
Be-7	3.8E-06	1.1E-05	182.73%	Sm-147	0.0E+00	0.0E+00	
Be-10	0.0E+00	0.0E+00		Sm-151	8.3E-11	2.3E-10	182.73%
C-14	0.0E+00	0.0E+00		Pm-147	2.9E-10	8.2E-10	182.73%
Na-22	1.7E-04	4.8E-04	182.73%	Eu-152	9.0E-05	2.5E-04	182.73%
Na-24	1.2E-04	3.4E-04	182.73%	Eu-154	9.9E-05	2.8E-04	182.73%
Al-26	2.2E-04	6.2E-04	182.73%	Eu-155	4.7E-06	1.3E-05	182.73%
P-32	0.0E+00	0.0E+00		Gd-152	0.0E+00	0.0E+00	
Si-32	0.0E+00	0.0E+00		Ho-166m	2.2E-06	6.3E-06	182.73%
S-35	0.0E+00	0.0E+00		Lu-176	0.0E+00	0.0E+00	
Cl-36	7.3E-13	2.1E-12	182.73%	Ta-180	0.0E+00	0.0E+00	
K-40	1.2E-05	3.5E-05	182.73%	Hf-182	0.0E+00	0.0E+00	
K-43	3.5E-05	1.0E-04	64.63%	Re-186m	0.0E+00	0.0E+00	
Ca-41	2.7E-10	7.7E-10	182.73%	Re-187	0.0E+00	0.0E+00	
Ca-45	1.5E-15	4.1E-15	182.73%	Ir-192m	0.0E+00	0.0E+00	
Ca-47	7.2E-05	2.0E-04	182.73%	Pt-193	3.9E-09	1.1E-08	182.73%
Ti-44	1.1E-05	3.2E-05	182.73%	Hg-194	0.0E+00	0.0E+00	
V-49	8.2E-10	2.3E-09	182.73%	Hg-203	1.8E-05	5.0E-05	182.73%
Cr-51	2.4E-06	6.7E-06	182.73%	Pb-202	0.0E+00	0.0E+00	
Mn-53	1.5E-09	4.3E-09	182.73%	Pb-205	5.1E-09	1.4E-08	182.73%
Mn-54	6.6E-05	1.9E-04	182.73%	Pb-210	1.2E-07	3.3E-07	182.73%
Fe-55	2.0E-09	5.7E-09	182.73%	Bi-207	1.2E-04	3.4E-04	182.73%
Fe-60	0.0E+00	0.0E+00		Bi-210	0.0E+00	0.0E+00	
Co-58	7.6E-05	2.1E-04	182.73%	Bi-210m	0.0E+00	0.0E+00	
Co-60	2.7E-04	7.5E-04	182.73%	Po-210	6.7E-10	1.9E-09	182.73%
Ni-59	3.4E-09	9.6E-09	182.73%	Ra-223	1.0E-05	2.8E-05	182.73%
Ni-63	0.0E+00	0.0E+00		Ra-224	6.4E-07	1.8E-06	182.73%
Cu-64	3.9E-06	1.1E-05	182.73%	Ra-225	5.8E-07	1.6E-06	182.73%

Table 26. LADTAP XL Collective Boating Exposure Comparisons (person-rem) (continued)

Nuclide	Hamby Ladtap Boating Pathway	Jannik Ladtap Boating Pathway	% Diff	Nuclide	Hamby Ladtap Boating Pathway	Jannik Ladtap Boating Pathway	% Diff
Zn-65	4.6E-05	1.3E-04	182.73%	Ra-226	5.4E-07	1.5E-06	182.73%
Ge-68	8.0E-09	2.3E-08	182.73%	Ra-228	5.6E-15	1.6E-14	182.73%
Se-75	3.1E-05	8.6E-05	182.73%	Ac-227	1.0E-08	2.9E-08	182.73%
Se-79	0.0E+00	0.0E+00		Th-227	7.9E-06	2.2E-05	182.73%
Rb-87	0.0E+00	0.0E+00		Th-228	1.6E-07	4.5E-07	182.73%
Sr-89	1.1E-08	3.0E-08	182.73%	Th-229	7.0E-06	2.0E-05	182.73%
Sr-90	0.0E+00	0.0E+00		Th-230	3.3E-08	9.2E-08	182.73%
Y-90	0.0E+00	0.0E+00		Th-231	5.0E-07	1.4E-06	182.73%
Y-91	2.8E-07	8.0E-07	182.73%	Th-232	1.6E-08	4.5E-08	182.73%
Mo-93	6.9E-08	1.9E-07	182.73%	Th-234	6.2E-07	1.8E-06	64.63%
Mo-99	1.7E-05	4.7E-05	182.73%	Pa-230	5.0E-05	1.4E-04	182.73%
Nb-93m	1.2E-08	3.5E-08	182.73%	Pa-231	2.3E-06	6.6E-06	182.73%
Nb-94	1.2E-04	3.5E-04	182.73%	Pa-233	1.6E-05	4.6E-05	182.73%
Nb-95	5.9E-05	1.7E-04	182.73%	U-232	2.2E-08	6.4E-08	182.73%
Zr-93	0.0E+00	0.0E+00		U-233	1.9E-08	5.5E-08	182.73%
Zr-95	5.7E-05	1.6E-04	182.73%	U-234	1.3E-08	3.7E-08	182.73%
Tc-96	1.7E-04	4.8E-04	182.73%	U-235	1.2E-05	3.4E-05	182.73%
Tc-97	8.6E-08	2.4E-07	182.73%	U-236	1.1E-08	3.0E-08	182.73%
Tc-98	1.1E-04	3.1E-04	182.73%	U-237	9.7E-06	2.7E-05	182.73%
Tc-99	4.3E-11	1.2E-10	182.73%	U-238	9.1E-09	2.6E-08	182.73%
Ru-97	1.4E-05	4.0E-05	182.73%	Np-236	1.1E-05	3.0E-05	182.73%
Ru-103	3.6E-05	1.0E-04	182.73%	Np-237	1.9E-06	5.3E-06	182.73%
Ru-106	1.6E-05	4.5E-05	182.73%	Np-239	9.9E-06	2.8E-05	182.73%
Pd-107	0.0E+00	0.0E+00		Am-237	0.0E+00	0.0E+00	
Ag-108m	1.2E-04	3.5E-04	182.73%	Am-241	1.6E-06	4.6E-06	182.73%

Table 26. LADTAP XL Collective Boating Exposure Comparisons (person-rem) (continued)

Nuclide	Hamby Ladtap Boating Pathway	Jannik Ladtap Boating Pathway	% Diff	Nuclide	Hamby Ladtap Boating Pathway	Jannik Ladtap Boating Pathway	% Diff
Ag-110m	2.2E-04	6.1E-04	182.73%	Am-242m	4.1E-08	1.2E-07	182.73%
Cd-113	0.0E+00	0.0E+00		Am-243	4.3E-06	1.2E-05	182.73%
Cd-115m	1.7E-06	4.9E-06	182.73%	Pu-237	3.8E-06	1.1E-05	182.73%
In-115	0.0E+00	0.0E+00		Pu-238	7.9E-09	2.2E-08	182.73%
Sb-122	2.6E-05	7.5E-05	182.73%	Pu-239	6.8E-09	1.9E-08	182.73%
Sb-124	1.5E-04	4.2E-04	182.73%	Pu-240	7.7E-09	2.2E-08	182.73%
Sb-125	3.3E-05	9.2E-05	182.73%	Pu-241	0.0E+00	0.0E+00	
Te-123	2.7E-07	7.8E-07	182.73%	Pu-242	6.6E-09	1.9E-08	182.73%
Te-125m	8.6E-07	2.4E-06	182.73%	Pu-244	4.8E-09	1.4E-08	182.73%
Sn-126	4.0E-06	1.1E-05	182.73%	Cm-241	0.0E+00	0.0E+00	
I-129	7.5E-07	2.1E-06	182.73%	Cm-242	8.8E-09	2.5E-08	182.73%
I-131	2.7E-05	7.6E-05	182.73%	Cm-243	1.0E-05	2.8E-05	182.73%
Cs-134	1.2E-04	3.4E-04	182.73%	Cm-244	7.5E-09	2.1E-08	182.73%
Cs-135	0.0E+00	0.0E+00		Cm-245	5.7E-06	1.6E-05	182.73%
Cs-137	4.4E-05	1.2E-04	182.73%	Cm-246	6.3E-09	1.8E-08	182.73%
La-137	0.0E+00	0.0E+00		Cm-247	2.4E-05	6.9E-05	64.63%
La-138	0.0E+00	0.0E+00		Cm-248	5.5E-09	1.6E-08	182.73%
La-140	1.2E-04	3.5E-04	182.73%	Cm-250	0.0E+00	0.0E+00	
Ba-140	1.9E-04	5.4E-04	182.73%	Bk-247	0.0E+00	0.0E+00	
Ce-141	6.0E-06	1.7E-05	182.73%	Bk-249	0.0E+00	0.0E+00	
Ce-144	4.1E-06	1.2E-05	182.73%	Cf-249	2.5E-05	7.1E-05	182.73%
				Cf-250	7.6E-09	2.1E-08	182.73%
				Cf-251	9.3E-06	2.6E-05	182.73%
				Cf-252	6.7E-09	1.9E-08	182.73%
				Es-253	2.6E-08	7.3E-08	182.73%
				Unidentified alpha	6.8E-09	1.9E-08	182.73%
				Unidentified beta	0.0E+00	0.0E+00	
				TOTAL Dose	**3.4E-03**	**9.5E-03**	**182.73%**

Table 27. LADTAP XL Collective Total of All Pathways Comparisons (person-rem)

Nuclide	Hamby Ladtap All Pathways	Jannik Ladtap All Pathways	% Diff	Nuclide	Hamby Ladtap All Pathways	Jannik Ladtap All Pathways	% Diff
H-3	4.2E-04	3.8E-04	-8.77%	Sm-146	3.2E+00	4.1E+00	28.60%
Be-7	9.4E-04	1.4E-02	1383.70%	Sm-147	2.9E+00	3.7E+00	28.60%
Be-10	3.6E-02	6.2E-01	1644.71%	Sm-151	5.4E-03	7.0E-03	28.59%
C-14	8.2E-02	6.1E-01	644.86%	Pm-147	1.5E-02	1.9E-02	28.49%
Na-22	1.3E-01	1.2E-01	-9.01%	Eu-152	2.1E-01	2.3E-01	7.01%
Na-24	2.8E-04	5.2E-04	83.26%	Eu-154	2.4E-01	2.7E-01	14.86%
Al-26	7.2E-01	6.3E-01	-12.34%	Eu-155	2.4E-02	3.0E-02	26.84%
P-32	3.1E+00	6.5E+00	107.11%	Gd-152	2.4E+00	5.2E+00	117.62%
Si-32	1.2E-02	1.2E+00	10122.75%	Ho-166m	5.3E-01	5.1E-01	-4.28%
S-35	6.1E-03	7.3E-03	19.13%	Lu-176	1.1E-01	1.3E-01	28.37%
Cl-36	2.1E-02	1.9E-02	-6.53%	Ta-180	4.9E-215	4.4E-215	-8.92%
K-40	2.4E-01	5.9E-01	143.69%	Hf-182	9.6E-02	4.0E-01	311.41%
K-43	3.2E-04	3.7E-04	15.12%	Re-186m	2.6E-02	2.6E-02	1.01%
Ca-41	8.4E-03	7.5E-03	-10.35%	Re-187	6.4E-05	6.5E-05	1.01%
Ca-45	2.1E-02	1.8E-02	-10.37%	Ir-192m	0.0E+00	0.0E+00	0.00%
Ca-47	2.3E-02	2.1E-02	-8.92%	Pt-193	2.9E-03	3.9E-03	34.80%
Ti-44	4.1E-01	4.4E-01	6.30%	Hg-194	8.8E+01	9.4E+01	5.99%
V-49	3.8E-04	4.0E-04	4.23%	Hg-203	2.6E+00	2.8E+00	6.89%
Cr-51	2.6E-03	1.4E-03	-45.03%	Pb-202	6.7E-01	8.0E-01	19.65%
Mn-53	9.8E-03	1.9E-03	-80.27%	Pb-205	2.6E-02	3.1E-02	19.40%
Mn-54	3.8E-02	5.6E-02	46.64%	Pb-210	8.7E+01	1.0E+02	19.64%
Fe-55	1.1E-01	4.5E-02	-58.80%	Bi-207	2.9E-01	3.2E-01	10.38%
Fe-60	2.8E+01	1.2E+01	-58.82%	Bi-210	2.3E-02	3.5E-02	51.52%
Co-58	5.3E-02	1.1E-01	109.52%	Bi-210m	5.9E-01	1.8E+00	198.06%
Co-60	5.2E-01	1.0E+00	91.10%	Po-210	2.9E+02	1.1E+03	272.77%
Ni-59	2.0E-03	2.8E-03	39.03%	Ra-223	3.2E+00	3.0E+00	-5.87%
Ni-63	5.1E-03	7.2E-03	41.96%	Ra-224	1.1E+00	9.7E-01	-8.18%
Cu-64	2.1E-05	2.8E-05	31.70%	Ra-225	1.9E+00	1.8E+00	-5.43%

Table 27. LADTAP XL Collective Total of All Pathways Comparisons (person-rem) (continued)

Nuclide	Hamby Ladtap All Pathways	Jannik Ladtap All Pathways	% Diff	Nuclide	Hamby Ladtap All Pathways	Jannik Ladtap All Pathways	% Diff
Zn-65	6.4E+00	1.0E+01	56.60%	Ra-226	8.6E+00	8.3E+00	-3.51%
Ge-68	1.8E-01	9.8E-02	-43.97%	Ra-228	9.4E+00	9.0E+00	-3.53%
Se-75	1.4E-01	9.9E-01	610.98%	Ac-227	2.2E+02	2.9E+02	28.36%
Se-79	1.4E-01	1.0E+00	630.26%	Th-227	6.2E-01	5.1E-01	-18.13%
Rb-87	7.3E-02	2.1E-01	192.57%	Th-228	9.4E+00	7.6E+00	-19.04%
Sr-89	5.7E-02	5.0E-02	-12.11%	Th-229	8.8E+01	7.1E+01	-19.06%
Sr-90	9.1E-01	8.0E-01	-12.44%	Th-230	1.3E+01	1.1E+01	-19.06%
Y-90	2.7E-02	2.7E-02	-1.25%	Th-231	6.5E-04	5.9E-04	-8.88%
Y-91	1.3E-01	1.6E-01	27.33%	Th-232	7.0E+01	5.7E+01	-19.06%
Mo-93	1.0E-02	9.5E-03	-7.45%	Th-234	2.4E-01	2.0E-01	-18.35%
Mo-99	1.1E-02	9.9E-03	-8.38%	Pa-230	3.3E-02	3.0E-02	-7.77%
Nb-93m	7.1E-01	4.8E-02	-93.29%	Pa-231	7.5E+01	6.9E+01	-7.63%
Nb-94	1.1E+00	3.8E-01	-64.41%	Pa-233	2.0E-02	1.9E-02	-7.79%
Nb-95	2.4E-01	1.8E-02	-92.57%	U-232	8.9E+00	8.1E+00	-8.52%
Zr-93	1.2E-02	1.1E-02	-6.35%	U-233	1.8E+00	1.7E+00	-8.07%
Zr-95	2.6E-02	2.5E-02	-6.80%	U-234	1.8E+00	1.6E+00	-8.07%
Tc-96	1.0E-02	9.5E-03	-6.08%	U-235	1.7E+00	1.6E+00	-8.22%
Tc-97	2.7E-03	2.3E-03	-13.20%	U-236	1.7E+00	1.6E+00	-8.07%
Tc-98	3.9E-01	3.3E-01	-14.06%	U-237	1.2E-02	1.1E-02	-8.43%
Tc-99	9.4E-03	8.3E-03	-11.50%	U-238	1.6E+00	1.4E+00	-8.07%
Ru-97	2.2E-03	1.6E-03	-26.87%	Np-236	5.4E+00	5.1E+00	-6.43%
Ru-103	3.7E-02	2.0E-02	-46.70%	Np-237	2.7E+01	2.5E+01	-6.38%
Ru-106	3.3E-01	1.7E-01	-49.66%	Np-239	6.0E-03	5.5E-03	-8.41%
Pd-107	3.5E-03	1.5E-03	-58.36%	Am-237	8.8E-28	8.1E-28	-8.92%
Ag-108m	6.5E-01	4.1E-01	-37.38%	Am-241	7.2E+01	5.8E+01	-18.75%

Table 27. LADTAP XL Collective Total of All Pathways Comparisons (person-rem) (continued)

Nuclide	Hamby Ladtap All Pathways	Jannik Ladtap All Pathways	% Diff	Nuclide	Hamby Ladtap All Pathways	Jannik Ladtap All Pathways	% Diff
Ag-110m	4.1E-01	1.4E-01	-65.29%	Am-242m	6.7E+01	5.4E+01	-18.75%
Cd-113	3.7E+02	1.3E+01	-96.58%	Am-243	7.2E+01	5.8E+01	-18.75%
Cd-115m	2.8E+01	9.7E-01	-96.54%	Pu-237	7.1E-03	9.5E-03	32.93%
In-115	9.4E-01	3.1E+01	3206.29%	Pu-238	3.2E+01	4.0E+01	23.85%
Sb-122	1.5E-02	1.4E-02	-6.05%	Pu-239	3.7E+01	4.5E+01	23.86%
Sb-124	6.3E-02	7.0E-02	12.44%	Pu-240	3.7E+01	4.5E+01	23.86%
Sb-125	2.8E-02	3.0E-02	4.17%	Pu-241	7.3E-01	9.1E-01	23.83%
Te-123	3.8E+00	8.9E-02	-97.64%	Pu-242	3.5E+01	4.3E+01	23.86%
Te-125m	2.7E+00	6.4E-02	-97.61%	Pu-244	3.0E+01	4.2E+01	38.74%
Sn-126	5.0E-01	1.3E+01	2410.47%	Cm-241	6.1E-02	4.9E-02	-18.64%
I-129	2.0E+00	2.0E+00	-2.65%	Cm-242	1.7E+00	1.4E+00	-19.31%
I-131	2.6E-01	2.4E-01	-5.93%	Cm-243	4.6E+01	3.7E+01	-19.47%
Cs-134	1.5E+00	2.1E+00	43.67%	Cm-244	3.7E+01	2.9E+01	-19.47%
Cs-135	1.4E-01	2.0E-01	45.19%	Cm-245	7.2E+01	5.8E+01	-19.47%
Cs-137	1.1E+00	1.5E+00	39.95%	Cm-246	7.2E+01	5.8E+01	-19.47%
La-137	6.9E-03	3.3E-03	-51.20%	Cm-247	6.5E+01	5.3E+01	-19.47%
La-138	9.4E-02	4.6E-02	-51.20%	Cm-248	2.5E+02	2.1E+02	-19.47%
La-140	1.0E-02	9.5E-03	-8.72%	Cm-250	1.2E+03	1.0E+03	-19.47%
Ba-140	5.0E-02	4.2E-02	-15.03%	Bk-247	3.7E+01	4.7E+01	28.37%
Ce-141	2.7E-02	2.9E-02	7.81%	Bk-249	9.4E-02	1.2E-01	28.06%
Ce-144	2.4E-01	2.6E-01	9.50%	Cf-249	7.3E+01	6.2E+01	-16.14%
				Cf-250	3.0E+01	2.5E+01	-16.14%
				Cf-251	7.3E+01	6.1E+01	-16.14%
				Cf-252	1.5E+01	1.2E+01	-16.12%
				Es-253	1.4E-01	1.7E+00	1070.73%
				Unidentified alpha	3.7E+01	4.5E+01	23.86%
				Unidentified beta	9.1E-01	8.0E-01	-12.44%
				TOTAL Dose	**3.9E+03**	**4.0E+03**	**3.27%**

Table 28. LADTAP XL IRRIDOSE Maximally Exposed Individual Vegetable Ingestion Pathway Comparison (mrem/yr)

Nuclide	Hamby Ladtap Veg	Jannik Ladtap Veg	% Diff	Nuclide	Hamby Ladtap Veg	Jannik Ladtap Veg	% Diff
H-3	2.25E-06	2.25E-06	0.00%	Sm-146	1.72E-01	6.10E-02	-64.45%
Be-7	7.25E-05	2.44E-05	-66.31%	Sm-147	1.54E-01	5.49E-02	-64.45%
Be-10	3.63E-03	1.22E-03	-66.50%	Sm-151	2.91E-04	1.03E-04	-64.62%
C-14	4.44E-02	2.00E-03	-95.50%	Pm-147	7.96E-04	2.84E-04	-64.34%
Na-22	1.04E-02	3.43E-03	-67.15%	Eu-152	5.11E-03	1.78E-03	-65.27%
Na-24	1.88E-06	6.32E-07	-66.32%	Eu-154	7.73E-03	2.67E-03	-65.51%
Al-26	1.12E-02	3.73E-03	-66.81%	Eu-155	1.10E-03	3.76E-04	-65.81%
P-32	3.02E-03	1.01E-03	-66.69%	Gd-152	1.28E-01	4.58E-02	-64.37%
Si-32	1.98E-03	7.01E-04	-64.69%	Ho-166m	6.69E-03	2.38E-03	-64.46%
S-35	4.94E-04	1.71E-04	-65.40%	Lu-176	5.66E-03	1.91E-03	-66.23%
Cl-36	2.24E-01	5.20E-02	-76.80%	Ta-180	3.77E-166	1.27E-166	-66.31%
K-40	3.72E-02	2.90E-02	-22.06%	Hf-182	1.19E-02	4.02E-03	-66.21%
K-43	4.55E-06	1.54E-06	-66.10%	Re-186m	2.56E+00	2.90E-03	-99.89%
Ca-41	3.24E-03	2.32E-02	617.88%	Re-187	6.45E-03	7.28E-06	-99.89%
Ca-45	2.52E-03	2.26E-03	-10.11%	Ir-192m	0.00E+00	0.00E+00	#DIV/0!
Ca-47	8.46E-04	3.36E-04	-60.24%	Pt-193	1.02E-04	3.36E-05	-66.95%
Ti-44	1.61E-02	5.47E-03	-66.04%	Hg-194	6.26E-01	2.02E-01	-67.77%
V-49	4.39E-05	1.48E-05	-66.31%	Hg-203	6.49E-03	2.18E-03	-66.47%
Cr-51	6.98E-05	2.35E-05	-66.31%	Pb-202	3.45E-02	1.21E-02	-64.86%
Mn-53	9.46E-05	5.92E-05	-37.42%	Pb-205	1.33E-03	4.67E-04	-64.86%
Mn-54	2.21E-03	7.79E-04	-64.71%	Pb-210	4.46E+00	1.55E+00	-65.36%
Fe-55	4.85E-04	1.68E-04	-65.34%	Bi-207	5.64E-03	3.22E-03	-42.83%
Fe-60	1.28E-01	5.10E-02	-60.10%	Bi-210	9.02E-04	3.05E-04	-66.20%
Co-58	2.45E-03	8.29E-04	-66.14%	Bi-210m	1.05E-01	6.56E-02	-37.40%
Co-60	2.22E-02	8.30E-03	-62.63%	Po-210	1.23E+00	4.13E-01	-66.31%
Ni-59	1.84E-04	7.85E-05	-57.29%	Ra-223	1.81E-01	6.09E-02	-66.31%
Ni-63	4.94E-04	2.07E-04	-58.02%	Ra-224	3.35E-02	1.13E-02	-66.31%
Cu-64	2.70E-07	9.13E-08	-66.16%	Ra-225	1.21E-01	4.09E-02	-66.31%

(continued)

Nuclide	Hamby Ladtap Veg	Jannik Ladtap Veg	% Diff	Nuclide	Hamby Ladtap Veg	Jannik Ladtap Veg	% Diff
Zn-65	1.22E-02	4.22E-03	-65.37%	Ra-226	1.10E+00	3.78E-01	-65.49%
Ge-68	9.11E-04	3.03E-04	-66.74%	Ra-228	1.08E+00	3.63E-01	-66.36%
Se-75	7.63E-03	2.25E-03	-70.45%	Ac-227	1.20E+01	4.00E+00	-66.56%
Se-79	4.69E-02	3.14E-03	-93.30%	Th-227	1.61E-02	5.43E-03	-66.31%
Rb-87	6.38E-03	4.64E-03	-27.31%	Th-228	3.17E-01	1.07E-01	-66.38%
Sr-89	5.67E-03	1.95E-03	-65.63%	Th-229	3.03E+00	1.01E+00	-66.74%
Sr-90	1.17E-01	9.59E-02	-17.83%	Th-230	4.58E-01	1.52E-01	-66.74%
Y-90	6.46E-04	2.18E-04	-66.31%	Th-231	1.14E-05	3.84E-06	-66.31%
Y-91	6.00E-03	2.02E-03	-66.31%	Th-232	2.42E+00	8.05E-01	-66.74%
Mo-93	1.68E-03	9.24E-04	-44.95%	Th-234	6.58E-03	2.22E-03	-66.31%
Mo-99	2.98E-04	1.01E-04	-66.24%	Pa-230	2.41E-03	8.11E-04	-66.32%
Nb-93m	4.60E-03	1.54E-03	-66.46%	Pa-231	9.74E+00	3.15E+00	-67.68%
Nb-94	4.51E-03	1.51E-03	-66.43%	Pa-233	1.75E-03	5.91E-04	-66.32%
Nb-95	1.29E-03	4.34E-04	-66.31%	U-232	1.11E+00	4.09E-01	-63.25%
Zr-93	1.36E-03	4.64E-04	-65.89%	U-233	2.32E-01	8.61E-02	-62.86%
Zr-95	2.33E-03	7.86E-04	-66.31%	U-234	2.23E-01	8.29E-02	-62.86%
Tc-96	3.45E-04	2.15E-04	-37.68%	U-235	2.15E-01	7.97E-02	-62.86%
Tc-97	2.66E-04	1.32E-02	4846.48%	U-236	2.15E-01	7.97E-02	-62.86%
Tc-98	8.51E-03	4.21E-01	4846.48%	U-237	5.64E-04	1.90E-04	-66.30%
Tc-99	2.30E-03	1.14E-01	4846.37%	U-238	1.97E-01	7.33E-02	-62.86%
Ru-97	4.70E-05	1.58E-05	-66.32%	Np-236	6.78E-01	2.41E-01	-64.45%
Ru-103	1.64E-03	5.53E-04	-66.36%	Np-237	3.35E+00	1.19E+00	-64.45%
Ru-106	1.74E-02	5.81E-03	-66.64%	Np-239	1.51E-04	5.08E-05	-66.31%
Pd-107	1.71E-04	4.88E-05	-71.37%	Am-237	3.62E-25	1.22E-25	-66.31%
Ag-108m	1.03E-02	2.15E-03	-79.15%	Am-241	3.82E+00	1.29E+00	-66.30%
Ag-110m	9.12E-03	2.97E-03	-67.41%	Am-242m	3.57E+00	1.20E+00	-66.31%

(continued)

Nuclide	Hamby Ladtap Veg	Jannik Ladtap Veg	% Diff
Cd-113	3.08E-01	1.64E-01	-46.83%
Cd-115m	9.59E-03	3.26E-03	-66.04%
In-115	1.20E-01	4.02E-02	-66.60%
Sb-122	4.15E-04	1.40E-04	-66.31%
Sb-124	6.30E-03	2.12E-03	-66.33%
Sb-125	2.20E-03	7.33E-04	-66.60%
Te-123	2.32E-02	2.35E-03	-89.88%
Te-125m	2.47E-03	7.79E-04	-68.44%
Sn-126	1.46E-02	5.05E-03	-65.38%
I-129	2.58E-01	9.81E-02	-62.03%
I-131	1.31E-02	4.41E-03	-66.30%
Cs-134	6.20E-02	2.11E-02	-66.06%
Cs-135	6.29E-03	2.27E-03	-63.93%
Cs-137	4.39E-02	1.56E-02	-64.54%
La-137	3.69E-04	1.25E-04	-66.15%
La-138	5.06E-03	1.71E-03	-66.15%
La-140	2.09E-04	7.05E-05	-66.31%
Ba-140	2.98E-03	1.01E-03	-66.31%
Ce-141	1.48E-03	5.00E-04	-66.31%
Ce-144	1.62E-02	5.45E-03	-66.29%

Nuclide	Hamby Ladtap Veg	Jannik Ladtap Veg	% Diff
Am-243	3.82E+00	1.29E+00	-66.30%
Pu-237	6.33E-04	2.13E-04	-66.31%
Pu-238	3.23E+00	1.09E+00	-66.33%
Pu-239	3.65E+00	1.23E+00	-66.34%
Pu-240	3.65E+00	1.23E+00	-66.34%
Pu-241	7.29E-02	2.45E-02	-66.33%
Pu-242	3.48E+00	1.17E+00	-66.34%
Pu-244	3.40E+00	1.14E+00	-66.34%
Cm-241	2.63E-03	8.87E-04	-66.31%
Cm-242	8.56E-02	2.88E-02	-66.32%
Cm-243	2.48E+00	8.30E-01	-66.54%
Cm-244	1.96E+00	6.57E-01	-66.52%
Cm-245	3.86E+00	1.29E+00	-66.60%
Cm-246	3.86E+00	1.29E+00	-66.60%
Cm-247	3.52E+00	1.18E+00	-66.60%
Cm-248	1.37E+01	4.59E+00	-66.60%
Cm-250	6.67E+01	2.23E+01	-66.60%
Bk-247	1.95E+00	6.69E-01	-65.75%
Bk-249	4.87E-03	1.64E-03	-66.28%
Cf-249	3.92E+00	1.32E+00	-66.42%
Cf-250	1.61E+00	5.42E-01	-66.38%
Cf-251	3.92E+00	1.32E+00	-66.42%
Cf-252	7.87E-01	2.65E-01	-66.33%
Es-253	1.12E-02	3.79E-03	-66.31%
Unidentified alpha	3.65E+00	1.23E+00	-66.34%
Unidentified beta	1.17E-01	9.58E-02	-17.93%
TOTAL Dose	**1.9E+02**	**6.32E+01**	**-66.51%**

Table 29. LADTAP XL IRRIDOSE Maximally Exposed Individual Milk Ingestion Pathway Comparison (mrem/yr)

Nuclide	Hamby Ladtap Milk	Jannik Ladtap Milk	% Diff	Nuclide	Hamby Ladtap Milk	Jannik Ladtap Milk	% Diff
H-3	1.62E-06	1.62E-06	0.00%	Sm-146	1.18E-05	1.73E-04	1373.22%
Be-7	2.09E-09	2.11E-09	0.96%	Sm-147	1.06E-05	1.56E-04	1373.22%
Be-10	1.01E-07	9.87E-08	-1.91%	Sm-151	2.00E-08	2.94E-07	1373.07%
C-14	1.95E-02	1.34E-03	-93.11%	Pm-147	5.40E-08	8.13E-07	1404.53%
Na-22	6.05E-03	4.37E-03	-27.67%	Eu-152	3.49E-07	5.14E-06	1373.33%
Na-24	4.55E-07	1.96E-07	-56.91%	Eu-154	5.26E-07	7.76E-06	1373.90%
Al-26	3.12E-05	7.56E-05	142.57%	Eu-155	7.46E-08	1.10E-06	1375.13%
P-32	1.22E-03	2.18E-03	78.15%	Gd-152	1.05E-04	1.30E-04	23.50%
Si-32	7.94E-07	1.12E-06	40.93%	Ho-166m	1.84E-06	6.76E-06	268.30%
S-35	1.35E-04	1.32E-04	-2.51%	Lu-176	1.55E-06	3.85E-06	147.90%
Cl-36	1.67E-01	3.40E-02	-79.60%	Ta-180	0.00E+00	0.00E+00	0.00%
K-40	7.05E-03	1.02E-02	44.96%	Hf-182	8.81E-08	2.17E-07	146.73%
K-43	3.08E-07	4.66E-07	51.54%	Re-186m	1.34E-02	2.49E-04	-98.14%
Ca-41	2.90E-04	8.92E-03	2970.17%	Re-187	3.38E-05	6.27E-07	-98.14%
Ca-45	1.17E-04	1.34E-03	1049.06%	Ir-192m	0.00E+00	0.00E+00	0.00%
Ca-47	4.09E-05	2.97E-04	625.74%	Pt-193	7.88E-06	1.64E-05	108.05%
Ti-44	1.19E-07	4.04E-05	33733.73%	Hg-194	8.87E-03	5.85E-03	-34.03%
V-49	1.20E-08	3.03E-08	153.34%	Hg-203	4.84E-05	1.06E-04	118.83%
Cr-51	2.30E-06	1.08E-06	-53.04%	Pb-202	1.50E-04	2.16E-04	44.06%
Mn-53	3.82E-07	1.62E-07	-57.63%	Pb-205	5.77E-06	8.31E-06	44.06%
Mn-54	7.63E-06	3.08E-06	-59.68%	Pb-210	1.90E-02	2.79E-02	46.66%
Fe-55	7.88E-06	5.72E-07	-92.74%	Bi-207	5.57E-05	1.03E-04	85.09%
Fe-60	2.07E-03	1.59E-04	-92.35%	Bi-210	7.26E-06	1.54E-05	112.40%
Co-58	3.48E-05	9.34E-06	-73.13%	Bi-210m	1.09E-03	1.98E-03	82.24%
Co-60	3.07E-04	8.40E-05	-72.68%	Po-210	5.78E-03	8.76E-03	51.56%
Ni-59	1.88E-05	6.12E-06	-67.54%	Ra-223	2.88E-03	2.52E-03	-12.35%
Ni-63	5.02E-05	1.63E-05	-67.46%	Ra-224	5.29E-04	4.06E-04	-23.22%
Cu-64	1.73E-08	3.14E-09	-81.85%	Ra-225	1.90E-03	1.69E-03	-11.02%

Table 29. LADTAP XL IRRIDOSE Maximally Exposed Individual Milk Ingestion Pathway Comparison (mrem/yr) (continued)

Nuclide	Hamby Ladtap Milk	Jannik Ladtap Milk	% Diff	Nuclide	Hamby Ladtap Milk	Jannik Ladtap Milk	% Diff
Zn-65	7.42E-03	1.06E-03	-85.66%	Ra-226	1.86E-02	1.27E-02	-31.92%
Ge-68	9.09E-04	2.16E-03	137.89%	Ra-228	1.62E-02	1.31E-02	-18.89%
Se-75	5.80E-03	9.08E-04	-84.33%	Ac-227	3.27E-03	7.89E-03	141.35%
Se-79	7.15E-02	1.05E-03	-98.53%	Th-227	1.24E-06	2.95E-06	137.07%
Rb-87	4.24E-03	3.09E-03	-27.03%	Th-228	2.15E-05	5.27E-05	144.79%
Sr-89	6.55E-05	2.60E-04	297.22%	Th-229	2.10E-04	4.94E-04	135.26%
Sr-90	1.38E-03	7.62E-03	451.82%	Th-230	3.18E-05	7.49E-05	135.25%
Y-90	9.85E-08	3.76E-07	282.10%	Th-231	6.12E-10	9.35E-10	52.96%
Y-91	8.58E-07	4.18E-06	387.23%	Th-232	1.68E-04	3.96E-04	135.25%
Mo-93	2.73E-04	6.31E-05	-76.90%	Th-234	4.99E-07	1.19E-06	139.22%
Mo-99	3.42E-05	9.62E-06	-71.86%	Pa-230	1.87E-07	4.42E-07	136.26%
Nb-93m	1.62E-04	6.16E-08	-99.96%	Pa-231	7.05E-04	1.55E-03	120.14%
Nb-94	1.62E-04	5.98E-08	-99.96%	Pa-233	1.32E-07	3.16E-07	139.91%
Nb-95	4.75E-05	1.88E-08	-99.96%	U-232	7.63E-03	6.85E-02	797.78%
Zr-93	9.16E-08	1.63E-07	78.17%	U-233	1.59E-03	1.43E-02	799.58%
Zr-95	1.66E-07	2.92E-07	75.66%	U-234	1.53E-03	1.38E-02	799.58%
Tc-96	1.38E-04	2.64E-05	-80.88%	U-235	1.47E-03	1.32E-02	799.58%
Tc-97	1.73E-04	9.27E-04	436.95%	U-236	1.47E-03	1.32E-02	799.58%
Tc-98	5.53E-03	2.97E-02	436.95%	U-237	4.56E-06	3.62E-05	694.15%
Tc-99	1.50E-03	8.04E-03	436.95%	U-238	1.35E-03	1.22E-02	799.58%
Ru-97	7.25E-10	1.32E-08	1723.19%	Np-236	4.65E-05	1.14E-04	145.55%
Ru-103	2.41E-08	5.47E-07	2164.85%	Np-237	2.30E-04	5.64E-04	145.55%
Ru-106	2.44E-07	5.42E-06	2120.47%	Np-239	1.12E-08	2.09E-08	85.91%
Pd-107	1.77E-05	4.28E-05	141.71%	Am-237	1.22E-39	9.09E-41	-92.54%
Ag-108m	1.17E-02	3.35E-04	-97.13%	Am-241	2.58E-04	5.33E-05	-79.33%

Table 29. LADTAP XL IRRIDOSE Maximally Exposed Individual Milk Ingestion Pathway Comparison (mrem/yr) (continued)

Nuclide	Hamby Ladtap Milk	Jannik Ladtap Milk	% Diff	Nuclide	Hamby Ladtap Milk	Jannik Ladtap Milk	% Diff
Ag-110m	6.59E-03	4.69E-04	-92.88%	Am-242m	2.41E-04	4.97E-05	-79.33%
Cd-113	9.92E-04	1.70E-03	70.97%	Am-243	2.58E-04	5.33E-05	-79.33%
Cd-115m	1.71E-05	6.38E-05	273.57%	Pu-237	1.84E-08	2.23E-07	1113.98%
In-115	3.32E-04	7.91E-04	138.48%	Pu-238	8.71E-05	1.07E-03	1130.27%
Sb-122	9.50E-06	4.61E-07	-95.15%	Pu-239	9.86E-05	1.21E-03	1130.03%
Sb-124	1.35E-04	8.34E-06	-93.83%	Pu-240	9.86E-05	1.21E-03	1130.04%
Sb-125	4.53E-05	2.76E-06	-93.91%	Pu-241	1.97E-06	2.42E-05	1131.13%
Te-123	7.85E-04	5.43E-05	-93.09%	Pu-242	9.40E-05	1.16E-03	1130.03%
Te-125m	3.94E-05	2.72E-05	-30.85%	Pu-244	9.17E-05	1.13E-03	1130.03%
Sn-126	5.00E-04	4.86E-04	-2.80%	Cm-241	1.95E-07	1.88E-06	864.92%
I-129	2.39E-02	4.63E-02	94.04%	Cm-242	5.91E-06	5.80E-05	881.60%
I-131	1.27E-03	2.56E-03	102.05%	Cm-243	1.70E-04	1.63E-03	864.28%
Cs-134	1.02E-02	9.51E-03	-6.70%	Cm-244	1.34E-04	1.30E-03	866.82%
Cs-135	1.09E-03	9.62E-04	-11.89%	Cm-245	2.65E-04	2.54E-03	858.67%
Cs-137	7.52E-03	6.70E-03	-10.89%	Cm-246	2.65E-04	2.54E-03	858.69%
La-137	2.53E-08	2.44E-07	863.52%	Cm-247	2.41E-04	2.31E-03	858.65%
La-138	3.47E-07	3.35E-06	863.52%	Cm-248	9.42E-04	9.03E-03	858.65%
La-140	1.42E-08	9.79E-08	588.11%	Cm-250	4.57E-03	4.39E-02	858.68%
Ba-140	1.89E-05	1.76E-05	-6.95%	Bk-247	1.05E-05	1.31E-04	1140.69%
Ce-141	1.32E-05	1.06E-06	-91.96%	Bk-249	2.66E-08	3.27E-07	1131.22%
Ce-144	1.33E-04	1.09E-05	-91.81%	Cf-249	3.99E-05	1.95E-04	387.83%
				Cf-250	1.64E-05	8.02E-05	389.81%
				Cf-251	3.99E-05	1.95E-04	387.77%
				Cf-252	7.99E-06	3.93E-05	391.97%
				Es-253	6.90E-08	8.21E-07	1089.83%
				Unidentified alpha	9.86E-05	1.21E-03	1130.03%
				Unidentified beta	1.38E-03	7.62E-03	451.42%
				TOTAL Dose	**4.86E-01**	**4.89E-01**	**0.65%**

Table 30. LADTAP XL IRRIDOSE Maximally Exposed Individual Meat Ingestion Pathway Comparison (mrem/yr)

Nuclide	Hamby Ladtap Meat	Jannik Ladtap Meat	% Diff	Nuclide	Hamby Ladtap Meat	Jannik Ladtap Meat	% Diff
H-3	5.7E-07	5.7E-07	0.00%	Sm-146	2.9E-03	4.4E-04	-85.00%
Be-7	2.5E-07	5.9E-07	133.57%	Sm-147	2.7E-03	4.0E-04	-85.00%
Be-10	1.3E-05	2.9E-05	128.30%	Sm-151	5.0E-06	7.5E-07	-85.01%
C-14	1.2E-02	8.4E-04	-93.15%	Pm-147	1.3E-05	1.3E-07	-98.99%
Na-22	1.1E-03	1.2E-03	7.62%	Eu-152	8.4E-05	8.3E-07	-99.01%
Na-24	3.4E-09	1.8E-09	-47.50%	Eu-154	1.3E-04	1.2E-06	-99.01%
Al-26	1.9E-05	1.3E-04	582.43%	Eu-155	1.8E-05	1.8E-07	-99.01%
P-32	4.9E-04	1.2E-03	152.77%	Gd-152	8.8E-04	2.1E-05	-97.62%
Si-32	3.9E-07	5.4E-07	38.01%	Ho-166m	1.0E-04	1.6E-05	-84.19%
S-35	1.8E-04	7.9E-04	328.92%	Lu-176	8.8E-05	2.0E-04	132.38%
Cl-36	1.2E-01	8.3E-03	-93.20%	Ta-180	0.0E+00	0.0E+00	0.00%
K-40	4.9E-03	6.9E-03	39.64%	Hf-182	4.0E-08	3.0E-06	7427.31%
K-43	2.6E-08	3.1E-08	20.67%	Re-186m	2.3E-03	3.2E-04	-86.22%
Ca-41	3.8E-05	2.8E-03	7351.98%	Re-187	5.9E-06	8.1E-07	-86.22%
Ca-45	1.5E-05	4.2E-04	2620.99%	Ir-192m	0.0E+00	0.0E+00	0.00%
Ca-47	3.6E-06	5.8E-05	1518.77%	Pt-193	1.6E-06	3.1E-06	95.97%
Ti-44	5.4E-08	2.2E-05	41212.62%	Hg-194	4.3E-01	7.5E-01	73.62%
V-49	3.7E-07	8.8E-07	137.11%	Hg-203	2.3E-03	1.3E-02	459.22%
Cr-51	5.9E-07	5.1E-06	761.21%	Pb-202	1.0E-04	1.9E-04	92.61%
Mn-53	3.0E-07	5.7E-07	88.73%	Pb-205	3.8E-06	7.4E-06	92.61%
Mn-54	6.1E-06	1.1E-05	77.89%	Pb-210	1.3E-02	2.5E-02	95.94%
Fe-55	6.6E-05	5.5E-05	-15.97%	Bi-207	5.5E-05	2.0E-05	-63.70%
Fe-60	1.7E-02	1.5E-02	-11.38%	Bi-210	5.0E-06	1.9E-06	-61.02%
Co-58	1.1E-04	8.6E-06	-92.23%	Bi-210m	1.1E-03	3.8E-04	-64.19%
Co-60	1.0E-03	7.9E-05	-92.07%	Po-210	2.1E-02	5.0E-02	136.29%
Ni-59	3.7E-06	7.8E-06	109.65%	Ra-223	6.1E-04	2.3E-03	269.81%
Ni-63	9.9E-06	2.1E-05	110.05%	Ra-224	7.8E-05	2.4E-04	210.08%
Cu-64	5.5E-11	6.1E-11	11.71%	Ra-225	4.2E-04	1.6E-03	277.37%

Table 30. LADTAP XL IRRIDOSE Maximally Exposed Individual Meat Ingestion Pathway Comparison (mrem/yr) (continued)

Nuclide	Hamby Ladtap Meat	Jannik Ladtap Meat	% Diff	Nuclide	Hamby Ladtap Meat	Jannik Ladtap Meat	% Diff
Zn-65	1.4E-03	1.5E-02	970.58%	Ra-226	4.6E-03	1.4E-02	196.60%
Ge-68	2.3E-03	5.0E-03	123.03%	Ra-228	4.0E-03	1.4E-02	251.57%
Se-75	4.7E-04	8.1E-04	71.13%	Ac-227	8.2E-04	3.8E-02	4559.24%
Se-79	5.8E-03	9.5E-04	-83.62%	Th-227	1.1E-05	2.9E-05	159.40%
Rb-87	1.1E-03	6.3E-04	-42.04%	Th-228	2.2E-04	5.8E-04	171.53%
Sr-89	1.2E-05	6.0E-05	408.44%	Th-229	2.1E-03	5.5E-03	161.34%
Sr-90	2.6E-04	1.8E-03	614.81%	Th-230	3.2E-04	8.3E-04	161.33%
Y-90	5.5E-06	2.0E-06	-63.18%	Th-231	9.5E-10	1.4E-09	45.61%
Y-91	9.6E-05	4.9E-05	-49.13%	Th-232	1.7E-03	4.4E-03	161.33%
Mo-93	7.2E-05	1.4E-05	-80.64%	Th-234	4.6E-06	1.2E-05	162.58%
Mo-99	4.5E-06	9.7E-07	-78.70%	Pa-230	4.2E-05	8.4E-06	-79.91%
Nb-93m	4.5E-03	9.4E-09	-100.00%	Pa-231	1.8E-01	3.4E-02	-80.95%
Nb-94	4.5E-03	9.2E-09	-100.00%	Pa-233	3.1E-05	6.3E-06	-79.49%
Nb-95	1.3E-03	2.7E-09	-100.00%	U-232	1.3E-03	3.6E-03	176.24%
Zr-93	1.6E-04	1.3E-08	-99.99%	U-233	2.7E-04	7.5E-04	176.83%
Zr-95	2.7E-04	2.3E-08	-99.99%	U-234	2.6E-04	7.2E-04	176.83%
Tc-96	3.6E-04	1.3E-05	-96.30%	U-235	2.5E-04	6.9E-04	176.83%
Tc-97	6.8E-04	7.6E-04	12.67%	U-236	2.5E-04	6.9E-04	176.83%
Tc-98	2.2E-02	2.4E-02	12.67%	U-237	5.9E-07	1.4E-06	134.95%
Tc-99	5.9E-03	6.6E-03	12.67%	U-238	2.3E-04	6.4E-04	176.83%
Ru-97	3.7E-05	5.3E-07	-98.57%	Np-236	4.7E-04	5.5E-03	1085.61%
Ru-103	2.3E-03	4.4E-05	-98.09%	Np-237	2.3E-03	2.7E-02	1085.61%
Ru-106	2.4E-02	4.6E-04	-98.12%	Np-239	4.9E-08	4.0E-07	717.11%
Pd-107	8.7E-07	4.1E-06	373.63%	Am-237	2.2E-56	3.4E-56	53.07%
Ag-108m	9.8E-04	1.5E-04	-84.30%	Am-241	2.6E-03	1.5E-02	493.58%

Table 30. LADTAP XL IRRIDOSE Maximally Exposed Individual Meat Ingestion Pathway Comparison (mrem/yr) (continued)

Nuclide	Hamby Ladtap Meat	Jannik Ladtap Meat	% Diff	Nuclide	Hamby Ladtap Meat	annik Ladtap Meat	% Diff
Ag-110m	5.6E-04	2.1E-04	-61.61%	Am-242m	2.4E-03	1.4E-02	493.61%
Cd-113	1.1E-03	1.3E-02	1069.34%	Am-243	2.6E-03	1.5E-02	493.56%
Cd-115m	1.8E-05	4.5E-04	2379.61%	Pu-237	3.1E-08	5.7E-09	-81.70%
In-115	1.7E-03	7.6E-03	360.57%	Pu-238	1.5E-04	2.8E-05	-81.35%
Sb-122	3.1E-06	1.6E-06	-49.04%	Pu-239	1.7E-04	3.2E-05	-81.35%
Sb-124	8.8E-05	6.1E-05	-29.86%	Pu-240	1.7E-04	3.2E-05	-81.35%
Sb-125	3.0E-05	2.1E-05	-30.41%	Pu-241	3.4E-06	6.4E-07	-81.34%
Te-123	1.5E-02	2.7E-04	-98.17%	Pu-242	1.6E-04	3.1E-05	-81.35%
Te-125m	7.3E-04	1.3E-04	-82.15%	Pu-244	1.6E-04	3.0E-05	-81.35%
Sn-126	4.0E-03	9.4E-03	134.64%	Cm-241	1.8E-06	8.5E-07	-53.82%
I-129	2.9E-03	1.4E-02	383.38%	Cm-242	5.9E-05	2.8E-05	-52.72%
I-131	1.2E-04	5.9E-04	384.52%	Cm-243	1.7E-03	7.9E-04	-53.46%
Cs-134	8.5E-04	1.1E-02	1191.62%	Cm-244	1.3E-03	6.3E-04	-53.34%
Cs-135	9.1E-05	1.1E-03	1123.59%	Cm-245	2.7E-03	1.2E-03	-53.72%
Cs-137	6.3E-04	7.7E-03	1136.71%	Cm-246	2.7E-03	1.2E-03	-53.72%
La-137	2.5E-07	3.8E-07	51.17%	Cm-247	2.4E-03	1.1E-03	-53.72%
La-138	3.5E-06	5.3E-06	51.17%	Cm-248	9.4E-03	4.4E-03	-53.72%
La-140	4.5E-08	4.3E-08	-4.04%	Cm-250	4.6E-02	2.1E-02	-53.72%
Ba-140	3.3E-05	3.1E-06	-90.38%	Bk-247	1.3E-04	3.9E-04	199.24%
Ce-141	6.2E-06	2.4E-07	-96.15%	Bk-249	3.3E-07	9.8E-07	196.71%
Ce-144	6.6E-05	2.6E-06	-96.05%	Cf-249	8.0E-04	1.3E-03	56.92%
				Cf-250	3.3E-04	5.2E-04	57.53%
				Cf-251	8.0E-04	1.3E-03	56.90%
				Cf-252	1.6E-04	2.5E-04	58.17%
				Es-253	7.9E-07	2.2E-06	183.36%
				Unidentified alpha	1.7E-04	3.2E-05	-81.35%
				Unidentified beta	2.6E-04	1.8E-03	614.28%
				TOTAL Dose	**1.0E+00**	**1.2E+00**	**21.59%**

Table 31. LADTAP XL IRRIDOSE Maximally Exposed Individual Total Ingestion Pathway Comparison (mrem/yr)

Nuclide	Hamby Ladtap Total	Jannik Ladtap Total	% Diff	Nuclide	Hamby Ladtap Total	Jannik Ladtap Total	% Diff
H-3	4.4E-06	4.4E-06	0.00%	Sm-146	1.7E-01	6.2E-02	-64.70%
Be-7	7.3E-05	2.5E-05	-65.62%	Sm-147	1.6E-01	5.5E-02	-64.70%
Be-10	3.6E-03	1.2E-03	-65.82%	Sm-151	3.0E-04	1.0E-04	-64.87%
C-14	7.6E-02	4.2E-03	-94.51%	Pm-147	8.1E-04	2.8E-04	-64.80%
Na-22	1.8E-02	9.0E-03	-48.81%	Eu-152	5.2E-03	1.8E-03	-65.72%
Na-24	2.3E-06	8.3E-07	-64.46%	Eu-154	7.9E-03	2.7E-03	-65.96%
Al-26	1.1E-02	3.9E-03	-65.11%	Eu-155	1.1E-03	3.8E-04	-66.24%
P-32	4.7E-03	4.4E-03	-6.49%	Gd-152	1.3E-01	4.6E-02	-64.53%
Si-32	2.0E-03	7.0E-04	-64.62%	Ho-166m	6.8E-03	2.4E-03	-64.67%
S-35	8.1E-04	1.1E-03	33.91%	Lu-176	5.8E-03	2.1E-03	-63.15%
Cl-36	5.1E-01	9.4E-02	-81.61%	Ta-180	0.0E+00	0.0E+00	0.00%
K-40	4.9E-02	4.6E-02	-6.26%	Hf-182	1.2E-02	4.0E-03	-66.19%
K-43	4.9E-06	2.0E-06	-58.24%	Re-186m	2.6E+00	3.5E-03	-99.87%
Ca-41	3.6E-03	3.5E-02	881.25%	Re-187	6.5E-03	8.7E-06	-99.87%
Ca-45	2.6E-03	4.0E-03	51.77%	Ir-192m	0.0E+00	0.0E+00	0.00%
Ca-47	8.9E-04	6.9E-04	-22.38%	Pt-193	1.1E-04	5.3E-05	-52.26%
Ti-44	1.6E-02	5.5E-03	-65.65%	Hg-194	1.1E+00	9.6E-01	-10.00%
V-49	4.4E-05	1.6E-05	-64.53%	Hg-203	8.9E-03	1.5E-02	72.37%
Cr-51	7.3E-05	3.0E-05	-59.20%	Pb-202	3.5E-02	1.3E-02	-63.94%
Mn-53	9.5E-05	6.0E-05	-37.10%	Pb-205	1.3E-03	4.8E-04	-63.94%
Mn-54	2.2E-03	7.9E-04	-64.30%	Pb-210	4.5E+00	1.6E+00	-64.43%
Fe-55	5.6E-04	2.2E-04	-59.92%	Bi-207	5.7E-03	3.3E-03	-41.79%
Fe-60	1.5E-01	6.6E-02	-54.82%	Bi-210	9.1E-04	3.2E-04	-64.75%
Co-58	2.6E-03	8.5E-04	-67.35%	Bi-210m	1.1E-01	6.8E-02	-36.45%
Co-60	2.4E-02	8.5E-03	-64.01%	Po-210	1.3E+00	4.7E-01	-62.37%
Ni-59	2.1E-04	9.2E-05	-55.22%	Ra-223	1.8E-01	6.6E-02	-64.35%
Ni-63	5.5E-04	2.4E-04	-55.87%	Ra-224	3.4E-02	1.2E-02	-65.01%
Cu-64	2.9E-07	9.5E-08	-67.09%	Ra-225	1.2E-01	4.4E-02	-64.29%

Table 31. LADTAP XL IRRIDOSE Maximally Exposed Individual Total Ingestion Pathway Comparison (mrem/yr) (continued)

Nuclide	Hamby Ladtap Total	Jannik Ladtap Total	% Diff	Nuclide	Hamby Ladtap Total	Jannik Ladtap Total	% Diff
Zn-65	2.1E-02	2.0E-02	-3.00%	Ra-226	1.1E+00	4.0E-01	-63.85%
Ge-68	4.1E-03	7.5E-03	83.94%	Ra-228	1.1E+00	3.9E-01	-64.50%
Se-75	1.4E-02	4.0E-03	-71.42%	Ac-227	1.2E+01	4.0E+00	-66.18%
Se-79	1.2E-01	5.1E-03	-95.86%	Th-227	1.6E-02	5.5E-03	-66.14%
Rb-87	1.2E-02	8.4E-03	-28.57%	Th-228	3.2E-01	1.1E-01	-66.20%
Sr-89	5.7E-03	2.3E-03	-60.52%	Th-229	3.0E+00	1.0E+00	-66.56%
Sr-90	1.2E-01	1.1E-01	-10.97%	Th-230	4.6E-01	1.5E-01	-66.56%
Y-90	6.5E-04	2.2E-04	-66.23%	Th-231	1.1E-05	3.8E-06	-66.30%
Y-91	6.1E-03	2.1E-03	-65.98%	Th-232	2.4E+00	8.1E-01	-66.56%
Mo-93	2.0E-03	1.0E-03	-50.53%	Th-234	6.6E-03	2.2E-03	-66.14%
Mo-99	3.4E-04	1.1E-04	-66.98%	Pa-230	2.5E-03	8.2E-04	-66.54%
Nb-93m	9.3E-03	1.5E-03	-83.40%	Pa-231	9.9E+00	3.2E+00	-67.90%
Nb-94	9.2E-03	1.5E-03	-83.57%	Pa-233	1.8E-03	6.0E-04	-66.53%
Nb-95	2.6E-03	4.3E-04	-83.30%	U-232	1.1E+00	4.8E-01	-57.12%
Zr-93	1.5E-03	4.6E-04	-69.39%	U-233	2.3E-01	1.0E-01	-56.71%
Zr-95	2.6E-03	7.9E-04	-69.85%	U-234	2.2E-01	9.7E-02	-56.71%
Tc-96	8.4E-04	2.5E-04	-69.65%	U-235	2.2E-01	9.4E-02	-56.71%
Tc-97	1.1E-03	1.5E-02	1228.93%	U-236	2.2E-01	9.4E-02	-56.71%
Tc-98	3.6E-02	4.7E-01	1228.93%	U-237	5.7E-04	2.3E-04	-60.00%
Tc-99	9.7E-03	1.3E-01	1228.91%	U-238	2.0E-01	8.6E-02	-56.71%
Ru-97	8.4E-05	1.6E-05	-80.60%	Np-236	6.8E-01	2.5E-01	-63.64%
Ru-103	3.9E-03	6.0E-04	-84.87%	Np-237	3.3E+00	1.2E+00	-63.64%
Ru-106	4.2E-02	6.3E-03	-84.95%	Np-239	1.5E-04	5.1E-05	-66.04%
Pd-107	1.9E-04	9.6E-05	-49.38%	Am-237	3.6E-25	1.2E-25	-66.31%
Ag-108m	2.3E-02	2.6E-03	-88.51%	Am-241	3.8E+00	1.3E+00	-65.93%

Table 31. LADTAP XL IRRIDOSE Maximally Exposed Individual Total Ingestion Pathway Comparison (mrem/yr) (continued)

Nuclide	Hamby Ladtap Total	Jannik Ladtap Total	% Diff	Nuclide	Hamby Ladtap Total	Jannik Ladtap Total	% Diff
Ag-110m	1.6E-02	3.7E-03	-77.53%	Am-242m	3.6E+00	1.2E+00	-65.93%
Cd-113	3.1E-01	1.8E-01	-42.58%	Am-243	3.8E+00	1.3E+00	-65.93%
Cd-115m	9.6E-03	3.8E-03	-60.84%	Pu-237	6.3E-04	2.1E-04	-66.28%
In-115	1.2E-01	4.9E-02	-60.25%	Pu-238	3.2E+00	1.1E+00	-66.30%
Sb-122	4.3E-04	1.4E-04	-66.83%	Pu-239	3.7E+00	1.2E+00	-66.30%
Sb-124	6.5E-03	2.2E-03	-66.41%	Pu-240	3.7E+00	1.2E+00	-66.30%
Sb-125	2.3E-03	7.6E-04	-66.66%	Pu-241	7.3E-02	2.5E-02	-66.30%
Te-123	3.9E-02	2.7E-03	-93.10%	Pu-242	3.5E+00	1.2E+00	-66.30%
Te-125m	3.2E-03	9.4E-04	-71.08%	Pu-244	3.4E+00	1.1E+00	-66.30%
Sn-126	1.9E-02	1.5E-02	-21.75%	Cm-241	2.6E-03	8.9E-04	-66.24%
I-129	2.9E-01	1.6E-01	-44.48%	Cm-242	8.6E-02	2.9E-02	-66.25%
I-131	1.4E-02	7.6E-03	-47.78%	Cm-243	2.5E+00	8.3E-01	-66.47%
Cs-134	7.3E-02	4.2E-02	-43.17%	Cm-244	2.0E+00	6.6E-01	-66.45%
Cs-135	7.5E-03	4.3E-03	-41.88%	Cm-245	3.9E+00	1.3E+00	-66.53%
Cs-137	5.2E-02	3.0E-02	-42.33%	Cm-246	3.9E+00	1.3E+00	-66.53%
La-137	3.7E-04	1.3E-04	-66.01%	Cm-247	3.5E+00	1.2E+00	-66.53%
La-138	5.1E-03	1.7E-03	-66.01%	Cm-248	1.4E+01	4.6E+00	-66.53%
La-140	2.1E-04	7.1E-05	-66.25%	Cm-250	6.7E+01	2.2E+01	-66.53%
Ba-140	3.0E-03	1.0E-03	-66.20%	Bk-247	2.0E+00	6.7E-01	-65.72%
Ce-141	1.5E-03	5.0E-04	-66.66%	Bk-249	4.9E-03	1.6E-03	-66.26%
Ce-144	1.6E-02	5.5E-03	-66.61%	Cf-249	3.9E+00	1.3E+00	-66.39%
				Cf-250	1.6E+00	5.4E-01	-66.35%
				Cf-251	3.9E+00	1.3E+00	-66.39%
				Cf-252	7.9E-01	2.7E-01	-66.30%
				Es-253	1.1E-02	3.8E-03	-66.28%
				Unidentified alpha	3.7E+00	1.2E+00	-66.30%
				Unidentified beta	1.2E-01	1.1E-01	-11.07%
				TOTAL Dose	**1.9E+02**	**6.5E+01**	**-65.87%**

Table 32. LADTAP XL IRRIDOSE Vegetable Ingestion Pathway Collective Dose Comparison (person-rem/yr)

Nuclide	Hamby Ladtap Veg	Jannik Ladtap Veg	% Diff	Nuclide	Hamby Ladtap Veg	Jannik Ladtap Veg	% Diff
H-3	2.00E-05	6.28E-05	214.25%	Sm-146	1.52E+00	1.70E+00	11.71%
Be-7	5.44E-04	6.39E-04	17.46%	Sm-147	1.37E+00	1.53E+00	11.71%
Be-10	3.22E-02	3.39E-02	5.27%	Sm-151	2.59E-03	2.88E-03	11.19%
C-14	3.94E-01	5.58E-02	-85.84%	Pm-147	7.00E-03	7.89E-03	12.71%
Na-22	9.19E-02	9.54E-02	3.83%	Eu-152	4.53E-02	4.95E-02	9.25%
Na-24	9.01E-12	6.85E-08	760467.65%	Eu-154	6.85E-02	7.43E-02	8.56%
Al-26	9.97E-02	1.04E-01	4.28%	Eu-155	9.71E-03	1.05E-02	7.78%
P-32	1.43E-02	2.20E-02	54.31%	Gd-152	1.14E+00	1.28E+00	11.96%
Si-32	1.76E-02	1.96E-02	10.98%	Ho-166m	5.94E-02	6.64E-02	11.67%
S-35	3.96E-03	4.59E-03	15.86%	Lu-176	5.03E-02	5.34E-02	6.13%
Cl-36	1.99E+00	1.45E+00	-27.08%	Ta-180	0.00E+00	0.00E+00	0.00%
K-40	3.30E-01	8.09E-01	144.93%	Hf-182	1.06E-01	1.12E-01	6.18%
K-43	2.48E-09	1.03E-06	41520.29%	Re-186m	2.28E+01	8.08E-02	-99.64%
Ca-41	2.87E-02	6.48E-01	2155.91%	Re-187	5.72E-02	2.03E-04	-99.64%
Ca-45	2.12E-02	6.18E-02	192.14%	Ir-192m	0.00E+00	0.00E+00	0.00%
Ca-47	1.03E-03	4.37E-03	324.90%	Pt-193	9.04E-04	9.39E-04	3.88%
Ti-44	1.43E-01	1.53E-01	6.75%	Hg-194	5.56E+00	5.63E+00	1.29%
V-49	3.79E-04	4.09E-04	7.68%	Hg-203	4.75E-02	5.64E-02	18.70%
Cr-51	4.48E-04	5.79E-04	29.31%	Pb-202	3.07E-01	3.39E-01	10.43%
Mn-53	8.41E-04	1.65E-03	96.64%	Pb-205	1.18E-02	1.30E-02	10.43%
Mn-54	1.90E-02	2.15E-02	12.89%	Pb-210	3.96E+01	4.31E+01	8.93%
Fe-55	4.27E-03	4.68E-03	9.54%	Bi-207	5.00E-02	8.99E-02	79.73%
Fe-60	1.13E+00	1.42E+00	25.40%	Bi-210	1.33E-03	4.26E-03	221.05%
Co-58	1.91E-02	2.20E-02	15.07%	Bi-210m	9.30E-01	1.83E+00	96.73%
Co-60	1.96E-01	2.31E-01	17.76%	Po-210	1.02E+01	1.13E+01	10.20%
Ni-59	1.63E-03	2.19E-03	34.22%	Ra-223	7.30E-01	1.25E+00	71.92%
Ni-63	4.38E-03	5.78E-03	31.93%	Ra-224	2.47E-02	1.21E-01	389.63%
Cu-64	9.63E-14	3.65E-09	3785338.19%	Ra-225	5.86E-01	9.02E-01	53.97%

Table 32. LADTAP XL IRRIDOSE Vegetable Ingestion Pathway Collective Dose Comparison (person-rem/yr) (continued)

Nuclide	Hamby Ladtap Veg	Jannik Ladtap Veg	% Diff	Nuclide	Hamby Ladtap Veg	Jannik Ladtap Veg	% Diff
Zn-65	1.04E-01	1.16E-01	11.33%	Ra-226	9.73E+00	1.06E+01	8.44%
Ge-68	7.85E-03	8.36E-03	6.54%	Ra-228	9.54E+00	1.01E+01	5.98%
Se-75	6.28E-02	6.11E-02	-2.75%	Ac-227	1.06E+02	1.12E+02	5.17%
Se-79	4.17E-01	8.77E-02	-78.95%	Th-227	8.84E-02	1.26E-01	42.35%
Rb-87	5.67E-02	1.29E-01	128.42%	Th-228	2.78E+00	2.96E+00	6.50%
Sr-89	4.21E-02	5.08E-02	20.51%	Th-229	2.69E+01	2.81E+01	4.53%
Sr-90	1.04E+00	2.67E+00	158.34%	Th-230	4.07E+00	4.25E+00	4.53%
Y-90	1.98E-04	1.66E-03	740.66%	Th-231	2.12E-08	4.11E-06	19353.17%
Y-91	4.57E-02	5.31E-02	16.34%	Th-232	2.15E+01	2.25E+01	4.53%
Mo-93	1.49E-02	2.58E-02	72.98%	Th-234	4.02E-02	5.36E-02	33.24%
Mo-99	9.99E-05	7.96E-04	696.59%	Pa-230	1.27E-02	1.86E-02	45.56%
Nb-93m	4.08E-02	4.30E-02	5.51%	Pa-231	8.65E+01	8.79E+01	1.56%
Nb-94	4.00E-02	4.22E-02	5.50%	Pa-233	1.12E-02	1.45E-02	29.96%
Nb-95	8.84E-03	1.10E-02	24.03%	U-232	9.89E+00	1.14E+01	15.52%
Zr-93	1.21E-02	1.29E-02	7.20%	U-233	2.06E+00	2.40E+00	16.71%
Zr-95	1.80E-02	2.08E-02	15.44%	U-234	1.98E+00	2.31E+00	16.71%
Tc-96	3.77E-04	2.68E-03	610.00%	U-235	1.91E+00	2.22E+00	16.71%
Tc-97	2.36E-03	3.67E-01	15444.16%	U-236	1.91E+00	2.22E+00	16.71%
Tc-98	7.56E-02	1.17E+01	15444.17%	U-237	1.31E-03	3.17E-03	141.42%
Tc-99	2.05E-02	3.18E+00	15443.83%	U-238	1.75E+00	2.05E+00	16.71%
Ru-97	1.87E-05	1.34E-04	615.87%	Np-236	6.02E+00	6.73E+00	11.73%
Ru-103	1.16E-02	1.41E-02	21.71%	Np-237	2.97E+01	3.32E+01	11.73%
Ru-106	1.51E-01	1.61E-01	6.43%	Np-239	2.89E-05	3.24E-04	1021.41%
Pd-107	1.51E-03	1.36E-03	-10.03%	Am-237	0.00E+00	0.00E+00	0.00%
Ag-108m	9.15E-02	6.00E-02	-34.46%	Am-241	3.40E+01	3.60E+01	5.89%

Table 32. LADTAP XL IRRIDOSE Vegetable Ingestion Pathway Collective Dose Comparison (person-rem/yr) (continued)

Nuclide	Hamby Ladtap Veg	Jannik Ladtap Veg	% Diff	Nuclide	Hamby Ladtap Veg	Jannik Ladtap Veg	% Diff
Ag-110m	7.81E-02	8.18E-02	4.70%	Am-242m	3.17E+01	3.36E+01	5.90%
Cd-113	2.73E+00	4.56E+00	67.09%	Am-243	3.40E+01	3.60E+01	5.89%
Cd-115m	6.97E-02	8.42E-02	20.82%	Pu-237	4.60E-03	5.51E-03	19.65%
In-115	1.07E+00	1.12E+00	4.95%	Pu-238	2.87E+01	3.03E+01	5.81%
Sb-122	1.32E-04	1.08E-03	720.62%	Pu-239	3.25E+01	3.43E+01	5.79%
Sb-124	4.82E-02	5.59E-02	16.00%	Pu-240	3.25E+01	3.43E+01	5.79%
Sb-125	1.93E-02	2.04E-02	5.55%	Pu-241	6.46E-01	6.84E-01	5.93%
Te-123	2.06E-01	6.55E-02	-68.19%	Pu-242	3.09E+01	3.27E+01	5.79%
Te-125m	1.88E-02	2.05E-02	9.10%	Pu-244	3.02E+01	3.19E+01	5.79%
Sn-126	1.30E-01	1.41E-01	8.80%	Cm-241	1.78E-02	2.23E-02	25.35%
I-129	2.29E+00	2.74E+00	19.33%	Cm-242	7.20E-01	7.88E-01	9.50%
I-131	3.79E-02	8.00E-02	111.07%	Cm-243	2.20E+01	2.31E+01	5.19%
Cs-134	5.44E-01	5.85E-01	7.46%	Cm-244	1.74E+01	1.83E+01	5.31%
Cs-135	5.59E-02	6.33E-02	13.34%	Cm-245	3.43E+01	3.60E+01	4.96%
Cs-137	3.89E-01	4.34E-01	11.48%	Cm-246	3.43E+01	3.60E+01	4.96%
La-137	3.28E-03	3.49E-03	6.36%	Cm-247	3.12E+01	3.28E+01	4.96%
La-138	4.50E-02	4.78E-02	6.36%	Cm-248	1.22E+02	1.28E+02	4.96%
La-140	8.66E-06	2.49E-04	2781.91%	Cm-250	5.92E+02	6.21E+02	4.96%
Ba-140	1.31E-02	2.14E-02	63.33%	Bk-247	1.73E+01	1.87E+01	7.64%
Ce-141	9.99E-03	1.25E-02	25.55%	Bk-249	4.21E-02	4.53E-02	7.81%
Ce-144	1.39E-01	1.50E-01	8.03%	Cf-249	3.48E+01	3.67E+01	5.53%
				Cf-250	1.43E+01	1.51E+01	5.77%
				Cf-251	3.48E+01	3.68E+01	5.52%
				Cf-252	6.92E+00	7.37E+00	6.41%
				Es-253	6.43E-02	8.93E-02	38.82%
				Unidentified alpha	3.25E+01	3.43E+01	5.79%
				Unidentified beta	1.04E+00	2.67E+00	158.04%
				TOTAL Dose	**1.7E+03**	**1.76E+03**	**5.35%**

Table 33. LADTAP XL IRRIDOSE Milk Ingestion Pathway Collective Dose Comparison (person-rem/yr)

Nuclide	Hamby Ladtap Milk	Jannik Ladtap Milk	% Diff	Nuclide	Hamby Ladtap Milk	Jannik Ladtap Milk	% Diff
H-3	2.5E-05	9.7E-06	-60.69%	Sm-146	1.8E-04	1.0E-03	479.16%
Be-7	3.2E-08	1.3E-08	-60.31%	Sm-147	1.6E-04	9.3E-04	479.16%
Be-10	1.5E-06	5.9E-07	-61.44%	Sm-151	3.0E-07	1.8E-06	479.10%
C-14	3.0E-01	8.0E-03	-97.29%	Pm-147	8.2E-07	4.9E-06	491.46%
Na-22	9.2E-02	2.6E-02	-71.57%	Eu-152	5.3E-06	3.1E-05	479.20%
Na-24	6.9E-06	1.2E-06	-83.06%	Eu-154	8.0E-06	4.6E-05	479.43%
Al-26	4.7E-04	4.5E-04	-4.64%	Eu-155	1.1E-06	6.6E-06	479.91%
P-32	1.9E-02	1.3E-02	-29.97%	Gd-152	1.6E-03	7.8E-04	-51.45%
Si-32	1.2E-05	6.7E-06	-44.60%	Ho-166m	2.8E-05	4.0E-05	44.79%
S-35	2.1E-03	7.9E-04	-61.67%	Lu-176	2.4E-05	2.3E-05	-2.54%
Cl-36	2.5E+00	2.0E-01	-91.98%	Ta-180	3.5E-273	1.6E-274	-95.49%
K-40	1.1E-01	6.1E-02	-43.01%	Hf-182	1.3E-06	1.3E-06	-3.00%
K-43	4.7E-06	2.8E-06	-40.43%	Re-186m	2.0E-01	1.5E-03	-99.27%
Ca-41	4.4E-03	5.3E-02	1106.95%	Re-187	5.1E-04	3.8E-06	-99.27%
Ca-45	1.8E-03	8.0E-03	351.72%	Ir-192m	0.0E+00	0.0E+00	#DIV/0!
Ca-47	6.2E-04	1.8E-03	185.31%	Pt-193	1.2E-04	9.8E-05	-18.21%
Ti-44	1.8E-06	2.4E-04	13200.83%	Hg-194	1.3E-01	3.5E-02	-74.07%
V-49	1.8E-07	1.8E-07	-0.41%	Hg-203	7.4E-04	6.3E-04	-13.97%
Cr-51	3.5E-05	6.5E-06	-81.54%	Pb-202	2.3E-03	1.3E-03	-43.37%
Mn-53	5.8E-06	9.7E-07	-83.34%	Pb-205	8.8E-05	5.0E-05	-43.37%
Mn-54	1.2E-04	1.8E-05	-84.15%	Pb-210	2.9E-01	1.7E-01	-42.35%
Fe-55	1.2E-04	3.4E-06	-97.15%	Bi-207	8.5E-04	6.2E-04	-27.24%
Fe-60	3.2E-02	9.5E-04	-96.99%	Bi-210	1.1E-04	9.2E-05	-16.50%
Co-58	5.3E-04	5.6E-05	-89.44%	Bi-210m	1.7E-02	1.2E-02	-28.36%
Co-60	4.7E-03	5.0E-04	-89.26%	Po-210	8.8E-02	5.2E-02	-40.42%
Ni-59	2.9E-04	3.7E-05	-87.24%	Ra-223	4.4E-02	1.5E-02	-65.54%
Ni-63	7.6E-04	9.8E-05	-87.21%	Ra-224	8.0E-03	2.4E-03	-69.81%
Cu-64	2.6E-07	1.9E-08	-92.86%	Ra-225	2.9E-02	1.0E-02	-65.02%

Table 33. LADTAP XL IRRIDOSE Milk Ingestion Pathway Collective Dose Comparison (person-rem/yr) (continued)

Nuclide	Hamby Ladtap Milk	Jannik Ladtap Milk	% Diff	Nuclide	Hamby Ladtap Milk	Jannik Ladtap Milk	% Diff
Zn-65	1.1E-01	6.4E-03	-94.36%	Ra-226	2.8E-01	7.6E-02	-73.23%
Ge-68	1.4E-02	1.3E-02	-6.48%	Ra-228	2.5E-01	7.8E-02	-68.11%
Se-75	8.8E-02	5.4E-03	-93.84%	Ac-227	5.0E-02	4.7E-02	-5.12%
Se-79	1.1E+00	6.3E-03	-99.42%	Th-227	1.9E-05	1.8E-05	-6.80%
Rb-87	6.4E-02	1.9E-02	-71.31%	Th-228	3.3E-04	3.2E-04	-3.77%
Sr-89	1.0E-03	1.6E-03	56.16%	Th-229	3.2E-03	3.0E-03	-7.51%
Sr-90	2.1E-02	4.6E-02	116.93%	Th-230	4.8E-04	4.5E-04	-7.52%
Y-90	1.5E-06	2.3E-06	50.21%	Th-231	9.3E-09	5.6E-09	-39.87%
Y-91	1.3E-05	2.5E-05	91.54%	Th-232	2.6E-03	2.4E-03	-7.52%
Mo-93	4.2E-03	3.8E-04	-90.92%	Th-234	7.6E-06	7.1E-06	-5.96%
Mo-99	5.2E-04	5.8E-05	-88.94%	Pa-230	2.8E-06	2.6E-06	-7.12%
Nb-93m	2.5E-03	3.7E-07	-99.99%	Pa-231	1.1E-02	9.3E-03	-13.46%
Nb-94	2.5E-03	3.6E-07	-99.99%	Pa-233	2.0E-06	1.9E-06	-5.69%
Nb-95	7.2E-04	1.1E-07	-99.98%	U-232	1.2E-01	4.1E-01	252.94%
Zr-93	1.4E-06	9.8E-07	-29.96%	U-233	2.4E-02	8.6E-02	253.65%
Zr-95	2.5E-06	1.7E-06	-30.94%	U-234	2.3E-02	8.2E-02	253.65%
Tc-96	2.1E-03	1.6E-04	-92.49%	U-235	2.2E-02	7.9E-02	253.65%
Tc-97	2.6E-03	5.5E-03	111.09%	U-236	2.2E-02	7.9E-02	253.65%
Tc-98	8.4E-02	1.8E-01	111.09%	U-237	6.9E-05	2.2E-04	212.20%
Tc-99	2.3E-02	4.8E-02	111.09%	U-238	2.1E-02	7.3E-02	253.65%
Ru-97	1.1E-08	7.9E-08	616.74%	Np-236	7.1E-04	6.8E-04	-3.47%
Ru-103	3.7E-07	3.3E-06	790.37%	Np-237	3.5E-03	3.4E-03	-3.47%
Ru-106	3.7E-06	3.2E-05	772.92%	Np-239	1.7E-07	1.2E-07	-26.91%
Pd-107	2.7E-04	2.6E-04	-4.98%	Am-237	1.9E-38	5.4E-40	-97.07%
Ag-108m	1.8E-01	2.0E-03	-98.87%	Am-241	3.9E-03	3.2E-04	-91.87%

Table 33. LADTAP XL IRRIDOSE Milk Ingestion Pathway Collective Dose Comparison (person-rem/yr) (continued)

Nuclide	Hamby Ladtap Milk	Jannik Ladtap Milk	% Diff	Nuclide	Hamby Ladtap Milk	Jannik Ladtap Milk	% Diff
Ag-110m	1.0E-01	2.8E-03	-97.20%	Am-242m	3.7E-03	3.0E-04	-91.87%
Cd-113	1.5E-02	1.0E-02	-32.79%	Am-243	3.9E-03	3.2E-04	-91.87%
Cd-115m	2.6E-04	3.8E-04	46.86%	Pu-237	2.8E-07	1.3E-06	377.24%
In-115	5.0E-03	4.7E-03	-6.25%	Pu-238	1.3E-03	6.4E-03	383.65%
Sb-122	1.4E-04	2.8E-06	-98.09%	Pu-239	1.5E-03	7.3E-03	383.56%
Sb-124	2.1E-03	5.0E-05	-97.58%	Pu-240	1.5E-03	7.3E-03	383.56%
Sb-125	6.9E-04	1.6E-05	-97.61%	Pu-241	3.0E-05	1.4E-04	383.99%
Te-123	1.2E-02	3.2E-04	-97.28%	Pu-242	1.4E-03	6.9E-03	383.55%
Te-125m	6.0E-04	1.6E-04	-72.82%	Pu-244	1.4E-03	6.7E-03	383.55%
Sn-126	7.6E-03	2.9E-03	-61.79%	Cm-241	3.0E-06	1.1E-05	279.33%
I-129	3.6E-01	2.8E-01	-23.72%	Cm-242	9.0E-05	3.5E-04	285.89%
I-131	1.9E-02	1.5E-02	-20.57%	Cm-243	2.6E-03	9.8E-03	279.08%
Cs-134	1.6E-01	5.7E-02	-63.32%	Cm-244	2.0E-03	7.8E-03	280.08%
Cs-135	1.7E-02	5.8E-03	-65.36%	Cm-245	4.0E-03	1.5E-02	276.88%
Cs-137	1.1E-01	4.0E-02	-64.97%	Cm-246	4.0E-03	1.5E-02	276.88%
La-137	3.9E-07	1.5E-06	278.78%	Cm-247	3.7E-03	1.4E-02	276.87%
La-138	5.3E-06	2.0E-05	278.78%	Cm-248	1.4E-02	5.4E-02	276.87%
La-140	2.2E-07	5.9E-07	170.51%	Cm-250	7.0E-02	2.6E-01	276.88%
Ba-140	2.9E-04	1.1E-04	-63.42%	Bk-247	1.6E-04	7.8E-04	387.74%
Ce-141	2.0E-04	6.3E-06	-96.84%	Bk-249	4.0E-07	2.0E-06	384.02%
Ce-144	2.0E-03	6.5E-05	-96.78%	Cf-249	6.1E-04	1.2E-03	91.78%
				Cf-250	2.5E-04	4.8E-04	92.56%
				Cf-251	6.1E-04	1.2E-03	91.75%
				Cf-252	1.2E-04	2.4E-04	93.40%
				Es-253	1.0E-06	4.9E-06	367.75%
				Unidentified alpha	1.5E-03	7.3E-03	383.56%
				Unidentified beta	2.1E-02	4.6E-02	116.77%
				TOTAL Dose	**7.4E+00**	**2.9E+00**	**-60.43%**

Table 34. LADTAP XL IRRIDOSE Meat Ingestion Pathway Collective Dose Comparison (person-rem/yr)

Nuclide	Hamby Ladtap Meat	Jannik Ladtap Meat	% Diff	Nuclide	Hamby Ladtap Meat	Jannik Ladtap Meat	% Diff
H-3	7.8E-07	2.9E-07	-63.21%	Sm-146	4.0E-03	2.2E-04	-94.48%
Be-7	3.4E-07	2.9E-07	-14.07%	Sm-147	3.6E-03	2.0E-04	-94.48%
Be-10	1.7E-05	1.4E-05	-16.01%	Sm-151	6.8E-06	3.7E-07	-94.48%
C-14	1.7E-02	4.2E-04	-97.48%	Pm-147	1.8E-05	6.5E-08	-99.63%
Na-22	1.5E-03	6.1E-04	-60.41%	Eu-152	1.1E-04	4.1E-07	-99.64%
Na-24	4.7E-09	9.0E-10	-80.68%	Eu-154	1.7E-04	6.2E-07	-99.64%
Al-26	2.6E-05	6.6E-05	151.06%	Eu-155	2.4E-05	8.9E-08	-99.64%
P-32	6.7E-04	6.2E-04	-7.01%	Gd-152	1.2E-03	1.0E-05	-99.12%
Si-32	5.3E-07	2.7E-07	-49.23%	Ho-166m	1.4E-04	8.2E-06	-94.18%
S-35	2.5E-04	3.9E-04	57.80%	Lu-176	1.2E-04	1.0E-04	-14.51%
Cl-36	1.7E-01	4.1E-03	-97.50%	Ta-180	0.0E+00	0.0E+00	0.00%
K-40	6.7E-03	3.4E-03	-48.63%	Hf-182	5.4E-08	1.5E-06	2669.23%
K-43	3.5E-08	1.6E-08	-55.61%	Re-186m	3.2E-03	1.6E-04	-94.93%
Ca-41	5.1E-05	1.4E-03	2641.52%	Re-187	8.0E-06	4.1E-07	-94.93%
Ca-45	2.1E-05	2.1E-04	901.03%	Ir-192m	0.0E+00	0.0E+00	0.00%
Ca-47	4.9E-06	2.9E-05	495.53%	Pt-193	2.1E-06	1.5E-06	-27.91%
Ti-44	7.4E-08	1.1E-05	15098.54%	Hg-194	5.9E-01	3.8E-01	-36.13%
V-49	5.1E-07	4.4E-07	-12.77%	Hg-203	3.2E-03	6.5E-03	105.73%
Cr-51	8.0E-07	2.5E-06	216.83%	Pb-202	1.4E-04	9.6E-05	-29.14%
Mn-53	4.1E-07	2.9E-07	-30.57%	Pb-205	5.2E-06	3.7E-06	-29.14%
Mn-54	8.3E-06	5.4E-06	-34.55%	Pb-210	1.7E-02	1.2E-02	-27.92%
Fe-55	8.9E-05	2.8E-05	-69.09%	Bi-207	7.5E-05	1.0E-05	-86.65%
Fe-60	2.4E-02	7.7E-03	-67.40%	Bi-210	6.8E-06	9.7E-07	-85.66%
Co-58	1.5E-04	4.3E-06	-97.14%	Bi-210m	1.5E-03	1.9E-04	-86.83%
Co-60	1.4E-03	4.0E-05	-97.08%	Po-210	2.9E-02	2.5E-02	-13.07%
Ni-59	5.0E-06	3.9E-06	-22.87%	Ra-223	8.3E-04	1.1E-03	36.05%
Ni-63	1.3E-05	1.0E-05	-22.73%	Ra-224	1.1E-04	1.2E-04	14.08%
Cu-64	7.4E-11	3.1E-11	-58.90%	Ra-225	5.7E-04	7.9E-04	38.83%

Table 34. LADTAP XL IRRIDOSE Meat Ingestion Pathway Collective Dose Comparison (person-rem/yr) (continued)

Nuclide	Hamby Ladtap Meat	Jannik Ladtap Meat	% Diff	Nuclide	Hamby Ladtap Meat	Jannik Ladtap Meat	% Diff
Zn-65	1.9E-03	7.6E-03	293.85%	Ra-226	6.3E-03	6.9E-03	9.12%
Ge-68	3.1E-03	2.5E-03	-17.95%	Ra-228	5.5E-03	7.1E-03	29.34%
Se-75	6.4E-04	4.0E-04	-37.04%	Ac-227	1.1E-03	1.9E-02	1614.09%
Se-79	7.9E-03	4.8E-04	-93.97%	Th-227	1.5E-05	1.5E-05	-4.57%
Rb-87	1.5E-03	3.1E-04	-78.68%	Th-228	2.9E-04	2.9E-04	-0.11%
Sr-89	1.6E-05	3.0E-05	87.05%	Th-229	2.9E-03	2.7E-03	-3.86%
Sr-90	3.5E-04	9.2E-04	162.97%	Th-230	4.3E-04	4.2E-04	-3.86%
Y-90	7.5E-06	1.0E-06	-86.45%	Th-231	1.3E-09	6.9E-10	-46.43%
Y-91	1.3E-04	2.4E-05	-81.29%	Th-232	2.3E-03	2.2E-03	-3.86%
Mo-93	9.8E-05	6.9E-06	-92.88%	Th-234	6.3E-06	6.1E-06	-3.40%
Mo-99	6.2E-06	4.8E-07	-92.16%	Pa-230	5.7E-05	4.2E-06	-92.61%
Nb-93m	6.2E-03	4.7E-09	-100.00%	Pa-231	2.4E-01	1.7E-02	-92.99%
Nb-94	6.2E-03	4.6E-09	-100.00%	Pa-233	4.2E-05	3.2E-06	-92.46%
Nb-95	1.7E-03	1.4E-09	-100.00%	U-232	1.8E-03	1.8E-03	1.63%
Zr-93	2.1E-04	6.6E-09	-100.00%	U-233	3.7E-04	3.7E-04	1.84%
Zr-95	3.7E-04	1.1E-08	-100.00%	U-234	3.5E-04	3.6E-04	1.84%
Tc-96	4.8E-04	6.6E-06	-98.64%	U-235	3.4E-04	3.5E-04	1.84%
Tc-97	9.2E-04	3.8E-04	-58.55%	U-236	3.4E-04	3.5E-04	1.84%
Tc-98	2.9E-02	1.2E-02	-58.55%	U-237	8.0E-07	6.9E-07	-13.56%
Tc-99	8.0E-03	3.3E-03	-58.55%	U-238	3.1E-04	3.2E-04	1.84%
Ru-97	5.1E-05	2.7E-07	-99.48%	Np-236	6.3E-04	2.8E-03	336.18%
Ru-103	3.1E-03	2.2E-05	-99.30%	Np-237	3.1E-03	1.4E-02	336.18%
Ru-106	3.3E-02	2.3E-04	-99.31%	Np-239	6.7E-08	2.0E-07	200.61%
Pd-107	1.2E-06	2.1E-06	74.24%	Am-237	3.0E-56	1.7E-56	-43.69%
Ag-108m	1.3E-03	7.7E-05	-94.22%	Am-241	3.5E-03	7.7E-03	118.37%

Table 34. LADTAP XL IRRIDOSE Meat Ingestion Pathway Collective Dose Comparison (person-rem/yr) (continued)

Nuclide	Hamby Ladtap Meat	Jannik Ladtap Meat	% Diff	Nuclide	Hamby Ladtap Meat	Jannik Ladtap Meat	% Diff
Ag-110m	7.5E-04	1.1E-04	-85.88%	Am-242m	3.3E-03	7.2E-03	118.39%
Cd-113	1.5E-03	6.3E-03	330.19%	Am-243	3.5E-03	7.7E-03	118.37%
Cd-115m	2.5E-05	2.2E-04	812.23%	Pu-237	4.2E-08	2.8E-09	-93.27%
In-115	2.3E-03	3.8E-03	69.44%	Pu-238	2.1E-04	1.4E-05	-93.14%
Sb-122	4.2E-06	7.9E-07	-81.25%	Pu-239	2.3E-04	1.6E-05	-93.14%
Sb-124	1.2E-04	3.1E-05	-74.20%	Pu-240	2.3E-04	1.6E-05	-93.14%
Sb-125	4.1E-05	1.0E-05	-74.40%	Pu-241	4.7E-06	3.2E-07	-93.13%
Te-123	2.0E-02	1.4E-04	-99.33%	Pu-242	2.2E-04	1.5E-05	-93.14%
Te-125m	9.9E-04	6.5E-05	-93.43%	Pu-244	2.2E-04	1.5E-05	-93.14%
Sn-126	5.4E-03	4.7E-03	-13.68%	Cm-241	2.5E-06	4.3E-07	-83.01%
I-129	3.9E-03	6.9E-03	77.83%	Cm-242	8.0E-05	1.4E-05	-82.61%
I-131	1.6E-04	2.9E-04	78.25%	Cm-243	2.3E-03	3.9E-04	-82.88%
Cs-134	1.2E-03	5.5E-03	375.18%	Cm-244	1.8E-03	3.1E-04	-82.83%
Cs-135	1.2E-04	5.6E-04	350.15%	Cm-245	3.6E-03	6.1E-04	-82.97%
Cs-137	8.5E-04	3.9E-03	354.98%	Cm-246	3.6E-03	6.1E-04	-82.97%
La-137	3.4E-07	1.9E-07	-44.39%	Cm-247	3.3E-03	5.6E-04	-82.97%
La-138	4.7E-06	2.6E-06	-44.39%	Cm-248	1.3E-02	2.2E-03	-82.97%
La-140	6.0E-08	2.1E-08	-64.70%	Cm-250	6.2E-02	1.1E-02	-82.97%
Ba-140	4.4E-05	1.6E-06	-96.46%	Bk-247	1.8E-04	2.0E-04	10.09%
Ce-141	8.5E-06	1.2E-07	-98.58%	Bk-249	4.5E-07	4.9E-07	9.16%
Ce-144	9.0E-05	1.3E-06	-98.55%	Cf-249	1.1E-03	6.3E-04	-42.27%
				Cf-250	4.5E-04	2.6E-04	-42.05%
				Cf-251	1.1E-03	6.3E-04	-42.28%
				Cf-252	2.2E-04	1.3E-04	-41.81%
				Es-253	1.1E-06	1.1E-06	4.25%
				Unidentified alpha	2.3E-04	1.6E-05	-93.14%
				Unidentified beta	3.5E-04	9.2E-04	162.78%
				TOTAL Dose	**1.4E+00**	**6.2E-01**	**-55.27%**

Table 35. LADTAP XL IRRIDOSE All Pathway Collective Dose Comparison (person-rem/yr)

Nuclide	Hamby Ladtap Total	Jannik Ladtap Total	% Diff	Nuclide	Hamby Ladtap Total	Jannik Ladtap Total	% Diff
H-3	4.5E-05	7.3E-05	60.19%	Sm-146	1.5E+00	1.7E+00	11.49%
Be-7	5.4E-04	6.4E-04	17.44%	Sm-147	1.4E+00	1.5E+00	11.49%
Be-10	3.2E-02	3.4E-02	5.26%	Sm-151	2.6E-03	2.9E-03	10.97%
C-14	7.1E-01	6.4E-02	-90.91%	Pm-147	7.0E-03	7.9E-03	12.48%
Na-22	1.9E-01	1.2E-01	-34.11%	Eu-152	4.5E-02	5.0E-02	9.03%
Na-24	6.9E-06	1.2E-06	-82.07%	Eu-154	6.9E-02	7.4E-02	8.34%
Al-26	1.0E-01	1.0E-01	4.28%	Eu-155	9.7E-03	1.0E-02	7.56%
P-32	3.4E-02	3.6E-02	6.37%	Gd-152	1.1E+00	1.3E+00	11.75%
Si-32	1.8E-02	2.0E-02	10.94%	Ho-166m	6.0E-02	6.6E-02	11.44%
S-35	6.3E-03	5.8E-03	-7.90%	Lu-176	5.0E-02	5.4E-02	6.07%
Cl-36	4.7E+00	1.7E+00	-64.66%	Ta-180	0.0E+00	0.0E+00	0.00%
K-40	4.4E-01	8.7E-01	96.64%	Hf-182	1.1E-01	1.1E-01	6.18%
K-43	4.7E-06	3.8E-06	-18.67%	Re-186m	2.3E+01	8.2E-02	-99.64%
Ca-41	3.3E-02	7.0E-01	2017.03%	Re-187	5.8E-02	2.1E-04	-99.64%
Ca-45	2.3E-02	7.0E-02	205.12%	Ir-192m	0.0E+00	0.0E+00	0.00%
Ca-47	1.7E-03	6.2E-03	272.92%	Pt-193	1.0E-03	1.0E-03	1.24%
Ti-44	1.4E-01	1.5E-01	6.93%	Hg-194	6.3E+00	6.0E+00	-3.85%
V-49	3.8E-04	4.1E-04	7.65%	Hg-203	5.1E-02	6.4E-02	23.57%
Cr-51	4.8E-04	5.9E-04	21.59%	Pb-202	3.1E-01	3.4E-01	10.02%
Mn-53	8.5E-04	1.7E-03	95.34%	Pb-205	1.2E-02	1.3E-02	10.02%
Mn-54	1.9E-02	2.2E-02	12.28%	Pb-210	4.0E+01	4.3E+01	8.54%
Fe-55	4.5E-03	4.7E-03	5.12%	Bi-207	5.1E-02	9.1E-02	77.70%
Fe-60	1.2E+00	1.4E+00	20.32%	Bi-210	1.4E-03	4.4E-03	201.44%
Co-58	2.0E-02	2.2E-02	11.43%	Bi-210m	9.5E-01	1.8E+00	94.27%
Co-60	2.0E-01	2.3E-01	14.52%	Po-210	1.0E+01	1.1E+01	9.71%
Ni-59	1.9E-03	2.2E-03	15.97%	Ra-223	7.7E-01	1.3E+00	64.10%
Ni-63	5.2E-03	5.9E-03	14.14%	Ra-224	3.3E-02	1.2E-01	275.83%
Cu-64	2.6E-07	2.2E-08	-91.47%	Ra-225	6.2E-01	9.1E-01	48.35%

Table 35. LADTAP XL IRRIDOSE All Pathway Collective Dose Comparison (person-rem/yr) (continued)

Nuclide	Hamby Ladtap Total	Jannik Ladtap Total	% Diff	Nuclide	Hamby Ladtap Total	Jannik Ladtap Total	% Diff
Zn-65	2.2E-01	1.3E-01	-40.64%	Ra-226	1.0E+01	1.1E+01	6.13%
Ge-68	2.5E-02	2.4E-02	-3.77%	Ra-228	9.8E+00	1.0E+01	4.13%
Se-75	1.5E-01	6.7E-02	-55.87%	Ac-227	1.1E+02	1.1E+02	5.18%
Se-79	1.5E+00	9.4E-02	-93.76%	Th-227	8.8E-02	1.3E-01	42.33%
Rb-87	1.2E-01	1.5E-01	20.89%	Th-228	2.8E+00	3.0E+00	6.50%
Sr-89	4.3E-02	5.2E-02	21.36%	Th-229	2.7E+01	2.8E+01	4.53%
Sr-90	1.1E+00	2.7E+00	157.52%	Th-230	4.1E+00	4.3E+00	4.52%
Y-90	2.1E-04	1.7E-03	705.70%	Th-231	3.2E-08	4.1E-06	12878.43%
Y-91	4.6E-02	5.3E-02	16.08%	Th-232	2.1E+01	2.2E+01	4.52%
Mo-93	1.9E-02	2.6E-02	36.58%	Th-234	4.0E-02	5.4E-02	33.23%
Mo-99	6.3E-04	8.5E-04	36.33%	Pa-230	1.3E-02	1.9E-02	44.93%
Nb-93m	4.9E-02	4.3E-02	-12.90%	Pa-231	8.7E+01	8.8E+01	1.30%
Nb-94	4.9E-02	4.2E-02	-13.23%	Pa-233	1.1E-02	1.5E-02	29.49%
Nb-95	1.1E-02	1.1E-02	-2.78%	U-232	1.0E+01	1.2E+01	18.27%
Zr-93	1.2E-02	1.3E-02	5.35%	U-233	2.1E+00	2.5E+00	19.46%
Zr-95	1.8E-02	2.1E-02	13.09%	U-234	2.0E+00	2.4E+00	19.46%
Tc-96	3.0E-03	2.8E-03	-3.93%	U-235	1.9E+00	2.3E+00	19.46%
Tc-97	5.9E-03	3.7E-01	6210.03%	U-236	1.9E+00	2.3E+00	19.46%
Tc-98	1.9E-01	1.2E+01	6210.03%	U-237	1.4E-03	3.4E-03	144.88%
Tc-99	5.1E-02	3.2E+00	6209.92%	U-238	1.8E+00	2.1E+00	19.46%
Ru-97	7.0E-05	1.3E-04	92.94%	Np-236	6.0E+00	6.7E+00	11.76%
Ru-103	1.5E-02	1.4E-02	-3.96%	Np-237	3.0E+01	3.3E+01	11.76%
Ru-106	1.8E-01	1.6E-01	-12.51%	Np-239	2.9E-05	3.2E-04	1013.38%
Pd-107	1.8E-03	1.6E-03	-9.21%	Am-237	1.9E-38	5.4E-40	-97.07%
Ag-108m	2.7E-01	6.2E-02	-77.05%	Am-241	3.4E+01	3.6E+01	5.89%

Table 35. LADTAP XL IRRIDOSE All Pathway Collective Dose Comparison (person-rem/yr) (continued)

Nuclide	Hamby Ladtap Total	Jannik Ladtap Total	% Diff	Nuclide	Hamby Ladtap Total	Jannik Ladtap Total	% Diff
Ag-110m	1.8E-01	8.5E-02	-52.72%	Am-242m	3.2E+01	3.4E+01	5.90%
Cd-113	2.7E+00	4.6E+00	66.68%	Am-243	3.4E+01	3.6E+01	5.89%
Cd-115m	7.0E-02	8.5E-02	21.20%	Pu-237	4.6E-03	5.5E-03	19.67%
In-115	1.1E+00	1.1E+00	5.03%	Pu-238	2.9E+01	3.0E+01	5.83%
Sb-122	2.8E-04	1.1E-03	287.32%	Pu-239	3.2E+01	3.4E+01	5.81%
Sb-124	5.0E-02	5.6E-02	11.15%	Pu-240	3.2E+01	3.4E+01	5.81%
Sb-125	2.0E-02	2.0E-02	1.84%	Pu-241	6.5E-01	6.8E-01	5.94%
Te-123	2.4E-01	6.6E-02	-72.28%	Pu-242	3.1E+01	3.3E+01	5.81%
Te-125m	2.0E-02	2.1E-02	1.69%	Pu-244	3.0E+01	3.2E+01	5.81%
Sn-126	1.4E-01	1.5E-01	4.17%	Cm-241	1.8E-02	2.2E-02	25.38%
I-129	2.7E+00	3.0E+00	13.55%	Cm-242	7.2E-01	7.9E-01	9.52%
I-131	5.7E-02	9.6E-02	66.71%	Cm-243	2.2E+01	2.3E+01	5.21%
Cs-134	7.0E-01	6.5E-01	-7.61%	Cm-244	1.7E+01	1.8E+01	5.33%
Cs-135	7.3E-02	7.0E-02	-4.10%	Cm-245	3.4E+01	3.6E+01	4.98%
Cs-137	5.0E-01	4.8E-01	-5.27%	Cm-246	3.4E+01	3.6E+01	4.98%
La-137	3.3E-03	3.5E-03	6.38%	Cm-247	3.1E+01	3.3E+01	4.98%
La-138	4.5E-02	4.8E-02	6.38%	Cm-248	1.2E+02	1.3E+02	4.98%
La-140	8.9E-06	2.5E-04	2699.37%	Cm-250	5.9E+02	6.2E+02	4.98%
Ba-140	1.3E-02	2.2E-02	60.09%	Bk-247	1.7E+01	1.9E+01	7.65%
Ce-141	1.0E-02	1.3E-02	23.04%	Bk-249	4.2E-02	4.5E-02	7.82%
Ce-144	1.4E-01	1.5E-01	6.46%	Cf-249	3.5E+01	3.7E+01	5.53%
				Cf-250	1.4E+01	1.5E+01	5.77%
				Cf-251	3.5E+01	3.7E+01	5.52%
				Cf-252	6.9E+00	7.4E+00	6.41%
				Es-253	6.4E-02	8.9E-02	38.82%
				Unidentified alpha	3.2E+01	3.4E+01	5.81%
				Unidentified beta	1.1E+00	2.7E+00	157.22%
				TOTAL Dose	**1.7E+03**	**1.8E+03**	**5.01%**

Table 36. MAXDOSE-SR Maximally Exposed Individual Ground Exposure Comparisons (mrem/yr)

Maxdose Ground Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
Ag-110M	9.89E-03	9.89E-03	0.00%
Am-241	1.40E-04	1.40E-04	0.00%
Am-243	3.10E-04	3.10E-04	0.00%
Ba-139	2.16E-08	2.16E-08	0.00%
Ba-140	1.10E-03	1.10E-03	0.00%
Ba-141	9.80E-10	9.80E-10	0.00%
Ba-142	7.73E-12	7.73E-12	0.00%
Be-7	9.24E-05	9.24E-05	0.00%
Br-83	1.31E-08	1.31E-08	0.00%
Br-84	4.02E-08	4.02E-08	0.00%
Ce-141	1.03E-04	1.03E-04	0.00%
Ce-143	1.38E-05	1.38E-05	0.00%
Ce-144	1.93E-04	1.93E-04	0.00%
Cf-252	2.79E-06	2.79E-06	0.00%
Cm-242	5.87E-06	5.87E-06	0.00%
Cm-243	6.83E-04	6.83E-04	0.00%
Cm-244	3.86E-06	3.86E-06	0.00%
Cm-246	3.45E-06	3.45E-06	0.00%
Cm-248	2.76E-06	2.76E-06	0.00%
Co-57	5.36E-04	5.36E-04	0.00%
Co-58	2.18E-03	2.18E-03	0.00%
Co-60	1.03E-02	1.03E-02	0.00%
Cr-51	3.47E-05	3.47E-05	0.00%
Cs-134	6.82E-03	6.82E-03	0.00%
Cs-137	2.70E-03	2.70E-03	0.00%
Cs-138	5.76E-08	5.76E-08	0.00%
Eu-152	5.16E-03	5.16E-03	0.00%
Eu-154	5.57E-03	5.57E-03	0.00%
Eu-155	3.24E-04	3.24E-04	0.00%
Fe-55	9.70E-07	9.70E-07	0.00%
Fe-59	1.72E-03	1.72E-03	0.00%
Hf-181	8.62E-04	8.62E-04	0.00%
I-129	1.03E-04	1.03E-04	0.00%
I-131	1.20E-04	1.20E-04	0.00%
I-132	3.65E-06	3.65E-06	0.00%
I-133	1.97E-05	1.97E-05	0.00%
I-134	4.24E-07	4.24E-07	0.00%
I-135	1.12E-05	1.12E-05	0.00%
La-140	1.27E-04	1.27E-04	0.00%
La-141	1.45E-07	1.45E-07	0.00%
La-142	1.76E-06	1.76E-06	0.00%

Table 36. MAXDOSE-SR Maximally Exposed Individual Ground Exposure Comparisons (mrem/yr) (continued)

Maxdose Ground Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
Mn-54	3.25E-03	3.25E-03	0.00%
Mn-56	3.10E-06	3.10E-06	0.00%
Mo-99	2.89E-05	2.89E-05	0.00%
Na-24	7.32E-05	7.32E-05	0.00%
Nb-95	9.80E-04	9.80E-04	0.00%
Nb-97	2.72E-07	2.72E-07	0.00%
Ni-59	1.96E-06	1.96E-06	0.00%
Ni-65	9.28E-07	9.28E-07	0.00%
Np-237	1.52E-04	1.52E-04	0.00%
Np-238	4.08E-05	4.08E-05	0.00%
Np-239	1.63E-05	1.63E-05	0.00%
Os-185	1.88E-03	1.88E-03	0.00%
P-32	0.00E+00	0.00E+00	
Pa-233	2.34E-04	2.34E-04	0.00%
Pd-109	1.29E-08	1.29E-08	0.00%
Pm-147	1.80E-08	1.80E-08	0.00%
Pm-148	1.06E-04	1.06E-04	0.00%
Pm-151	1.47E-05	1.47E-05	0.00%
Pr-144	2.16E-11	2.16E-11	0.00%
Pu-238	4.02E-06	4.02E-06	0.00%
Pu-239	1.78E-06	1.78E-06	0.00%
Pu-240	3.85E-06	3.85E-06	0.00%
Pu-242	3.21E-06	3.21E-06	0.00%
Ra-224	1.47E-06	1.47E-06	0.00%
Ra-228	3.04E-12	3.04E-12	0.00%
Rb-86	6.22E-05	6.22E-05	0.00%
Rb-88	5.36E-10	5.36E-10	0.00%
Rb-89	5.08E-10	5.08E-10	0.00%
Rh-105	4.35E-06	4.35E-06	0.00%
Ru-103	7.07E-04	7.07E-04	0.00%
Ru-105	3.64E-06	3.64E-06	0.00%
Ru-106	8.36E-04	8.36E-04	0.00%
Sb-122	4.44E-05	4.44E-05	0.00%
Sb-124	3.46E-03	3.46E-03	0.00%
Sb-125	1.98E-03	1.98E-03	0.00%
Sb-126	1.29E-03	1.29E-03	0.00%
Sb-126M	2.33E-09	2.33E-09	0.00%
Se-75	1.25E-03	1.25E-03	0.00%
Sm-151	2.44E-08	2.44E-08	0.00%
Sn-123	1.96E-05	1.96E-05	0.00%
Sn-126	2.90E-04	2.90E-04	0.00%

Table 36. MAXDOSE-SR Maximally Exposed Individual Ground Exposure Comparisons (mrem/yr) (continued)

Maxdose Ground Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
Sr-89	2.33E-07	2.33E-07	0.00%
Sr-90	0.00E+00	0.00E+00	
Sr-91	8.18E-06	8.18E-06	0.00%
Sr-92	2.53E-06	2.53E-06	0.00%
Tc-101	5.47E-11	5.47E-11	0.00%
Tc-99	2.94E-09	2.94E-09	0.00%
Tc-99 M	1.01E-06	1.01E-06	0.00%
Te-125M	4.02E-05	4.02E-05	0.00%
Te-127	6.07E-08	6.07E-08	0.00%
Te-127M	1.86E-05	1.86E-05	0.00%
Te-129	2.07E-08	2.07E-08	0.00%
Te-129M	4.46E-05	4.46E-05	0.00%
Te-131	3.38E-09	3.38E-09	0.00%
Te-131M	6.16E-05	6.16E-05	0.00%
Te-132	2.93E-05	2.93E-05	0.00%
Te-134	6.87E-08	6.87E-08	0.00%
Th-228	1.19E-05	1.19E-05	0.00%
Th-230	4.28E-06	4.28E-06	0.00%
Th-232	3.13E-06	3.13E-06	0.00%
Th-234	8.94E-06	8.94E-06	0.00%
U-232	4.85E-06	4.85E-06	0.00%
U-233	2.35E-06	2.35E-06	0.00%
U-234	3.79E-06	3.79E-06	0.00%
U-235	8.03E-04	8.03E-04	0.00%
U-236	3.45E-06	3.45E-06	0.00%
U-237	3.99E-05	3.99E-05	0.00%
U-238	3.03E-06	3.03E-06	0.00%
W-187	1.69E-05	1.69E-05	0.00%
Y-90	0.00E+00	0.00E+00	
Y-91	6.36E-06	6.36E-06	0.00%
Y-91M	7.57E-08	7.57E-08	0.00%
Y-92	7.90E-07	7.90E-07	0.00%
Y-93	1.11E-06	1.11E-06	0.00%
Zn-65	2.01E-03	2.01E-03	0.00%
Zr-95	3.18E-03	3.18E-03	0.00%
Zr-97	4.08E-06	4.08E-06	0.00%
TOTAL*	**7.16E-02**	**7.16E-02**	**0.00%**

Table 37. MAXDOSE-SR Maximally Exposed Individual Plume Immersion Comparisons (mrem/yr)

Maxdose Plume Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
Ar-41	1.57E-06	1.57E-06	0.00%
Kr-83 M	1.12E-10	1.12E-10	0.00%
Kr-85	7.27E-09	7.27E-09	0.00%
Kr-85 M	3.51E-07	3.51E-07	0.00%
Kr-87	6.82E-07	6.82E-07	0.00%
Kr-88	5.05E-06	5.05E-06	0.00%
Kr-89	6.03E-21	6.03E-21	0.00%
Xe-133	1.13E-07	1.13E-07	0.00%
Xe-133M	9.34E-08	9.34E-08	0.00%
Xe-135	6.62E-07	6.62E-07	0.00%
Xe-135M	1.03E-09	1.03E-09	0.00%
Xe-137	2.88E-19	2.88E-19	0.00%
Xe-138	1.64E-09	1.64E-09	0.00%
Xe-131M	2.77E-08	2.77E-08	0.00%
Total	**8.56E-06**	**8.56E-06**	**-0.01%**

Table 38. MAXDOSE-SR Maximally Exposed Individual Inhalation Pathway Comparisons (mrem/yr)

Maxdose Inhalation Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
Ag-110M	2.71E-04	2.71E-04	0.00%
Am-241	2.65E+00	2.65E+00	0.00%
Am-243	2.65E+00	2.65E+00	0.00%
Ba-139	2.13E-07	2.13E-07	0.00%
Ba-140	1.83E-05	1.83E-05	0.00%
Ba-141	8.79E-10	8.79E-10	0.00%
Ba-142	5.82E-12	5.82E-12	0.00%
Be-7	1.38E-06	1.38E-06	0.00%
Br-83	1.89E-07	1.89E-07	0.00%
Br-84	1.37E-08	1.37E-08	0.00%
Ce-141	4.33E-05	4.33E-05	0.00%
Ce-143	1.55E-05	1.55E-05	0.00%
Ce-144	1.79E-03	1.79E-03	0.00%
Cf-252	6.64E-01	6.64E-01	0.00%
Cm-242	8.68E-02	8.68E-02	0.00%
Cm-243	1.79E+00	1.79E+00	0.00%
Cm-244	1.38E+00	1.38E+00	0.00%
Cm-246	2.76E+00	2.76E+00	0.00%
Cm-248	9.70E+00	9.70E+00	0.00%
Co-57	3.83E-05	3.83E-05	0.00%
Co-58	3.62E-05	3.62E-05	0.00%
Co-60	7.66E-04	7.66E-04	0.00%
Cr-51	1.32E-06	1.32E-06	0.00%
Cs-134	2.40E-04	2.40E-04	0.00%
Cs-135	2.30E-05	2.30E-05	0.00%
Cs-137	1.63E-04	1.63E-04	0.00%
Cs-138	1.45E-08	1.45E-08	0.00%
Eu-152	1.12E-03	1.12E-03	0.00%
Eu-154	1.33E-03	1.33E-03	0.00%
Eu-155	1.99E-04	1.99E-04	0.00%
Fe-55	1.33E-05	1.33E-05	0.00%
Fe-59	7.65E-05	7.65E-05	0.00%
H-3	7.05E-07	7.05E-07	0.00%
Hf-181	6.63E-05	6.63E-05	0.00%
I-129	9.19E-04	9.19E-04	0.00%
I-131	1.62E-04	1.62E-04	0.00%
I-132	7.55E-07	7.55E-07	0.00%
I-133	2.52E-05	2.52E-05	0.00%
I-134	6.81E-08	6.81E-08	0.00%
I-135	4.24E-06	4.24E-06	0.00%
La-140	2.15E-05	2.15E-05	0.00%
La-141	1.72E-06	1.72E-06	0.00%
La-142	3.39E-07	3.39E-07	0.00%

Table 38. MAXDOSE-SR Maximally Exposed Individual Inhalation Pathway Comparisons (mrem/yr) (continued)

Maxdose Inhalation Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
Mn-54	3.27E-05	3.27E-05	0.00%
Mn-56	8.21E-07	8.21E-07	0.00%
Mo-99	1.79E-05	1.79E-05	0.00%
Na-24	4.29E-06	4.29E-06	0.00%
Nb-95	2.29E-05	2.29E-05	0.00%
Nb-97	7.81E-08	7.81E-08	0.00%
Ni-59	6.64E-06	6.64E-06	0.00%
Ni-63	1.53E-05	1.53E-05	0.00%
Ni-65	5.15E-07	5.15E-07	0.00%
Np-237	2.50E+00	2.50E+00	0.00%
Np-238	1.53E-04	1.53E-04	0.00%
Np-239	1.09E-05	1.09E-05	0.00%
Os-185	5.10E-05	5.10E-05	0.00%
P-32	6.60E-05	6.60E-05	0.00%
Pa-233	4.38E-05	4.38E-05	0.00%
Pd-109	4.90E-06	4.90E-06	0.00%
Pm-147	1.74E-04	1.74E-04	0.00%
Pm-148	5.03E-05	5.03E-05	0.00%
Pm-151	7.65E-06	7.65E-06	0.00%
Pr-144	3.50E-10	3.50E-10	0.00%
Pu-238	2.35E+00	2.35E+00	0.00%
Pu-239	2.60E+00	2.60E+00	0.00%
Pu-240	2.60E+00	2.60E+00	0.00%
Pu-241	5.11E-02	5.11E-02	0.00%
Pu-242	2.45E+00	2.45E+00	0.00%
Ra-224	1.45E-02	1.45E-02	0.00%
Ra-228	2.14E-02	2.14E-02	0.00%
Rb-86	3.36E-05	3.36E-05	0.00%
Rb-87	1.68E-05	1.68E-05	0.00%
Rb-88	8.23E-10	8.23E-10	0.00%
Rb-89	1.29E-10	1.29E-10	0.00%
Rh-105	4.31E-06	4.31E-06	0.00%
Rh-106M	4.38E-07	4.38E-07	0.00%
Ru-103	3.97E-05	3.97E-05	0.00%
Ru-105	1.38E-06	1.38E-06	0.00%
Ru-106	2.25E-03	2.25E-03	0.00%
S-35	1.17E-05	1.17E-05	0.00%
Sb-122	2.33E-05	2.33E-05	0.00%
Sb-124	1.07E-04	1.07E-04	0.00%
Sb-125	5.00E-05	5.00E-05	0.00%
Sb-126	5.07E-05	5.07E-05	0.00%

Table 38. MAXDOSE-SR Maximally Exposed Individual Inhalation Pathway Comparisons (mrem/yr) (continued)

Maxdose Inhalation Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
Sb-126M	4.19E-10	4.19E-10	0.00%
Se-75	4.18E-05	4.18E-05	0.00%
Se-79	4.54E-05	4.54E-05	0.00%
Sm-151	1.48E-04	1.48E-04	0.00%
Sn-123	1.53E-04	1.53E-04	0.00%
Sn-126	4.39E-04	4.39E-04	0.00%
Sr-89	1.89E-04	1.89E-04	0.00%
Sr-90	6.64E-03	6.64E-03	0.00%
Sr-91	5.88E-06	5.88E-06	0.00%
Sr-92	1.99E-06	1.99E-06	0.00%
Tc-101	3.32E-11	3.32E-11	0.00%
Tc-99	3.83E-05	3.83E-05	0.00%
Tc-99 M	1.20E-07	1.20E-07	0.00%
Te-125M	3.42E-05	3.42E-05	0.00%
Te-127	1.22E-06	1.22E-06	0.00%
Te-127M	9.69E-05	9.69E-05	0.00%
Te-129	8.00E-08	8.00E-08	0.00%
Te-129M	1.02E-04	1.02E-04	0.00%
Te-131	6.07E-09	6.07E-09	0.00%
Te-131M	2.64E-05	2.64E-05	0.00%
Te-132	3.84E-05	3.84E-05	0.00%
Te-134	3.58E-08	3.58E-08	0.00%
Th-228	1.58E+00	1.58E+00	0.00%
Th-230	1.63E+00	1.63E+00	0.00%
Th-232	8.17E+00	8.17E+00	0.00%
Th-234	1.68E-04	1.68E-04	0.00%
U-232	3.42E+00	3.42E+00	0.00%
U-233	6.64E-01	6.64E-01	0.00%
U-234	6.64E-01	6.64E-01	0.00%
U-235	6.13E-01	6.13E-01	0.00%
U-236	6.13E-01	6.13E-01	0.00%
U-237	1.67E-05	1.67E-05	0.00%
U-238	6.13E-01	6.13E-01	0.00%
W-187	2.50E-06	2.50E-06	0.00%
Y-90	4.07E-05	4.07E-05	0.00%
Y-91	2.24E-04	2.24E-04	0.00%
Y-91M	1.71E-08	1.71E-08	0.00%
Y-92	1.88E-06	1.88E-06	0.00%
Y-93	8.93E-06	8.93E-06	0.00%
Zn-65	9.19E-05	9.19E-05	0.00%
Zr-93	1.63E-03	1.63E-03	0.00%
Zr-95	9.69E-05	9.69E-05	0.00%
Zr-97	1.83E-05	1.83E-05	0.00%
Total	**5.23E+01**	**5.23E+01**	**0.00%**

Table 39. MAXDOSE-SR Maximally Exposed Individual Vegetable Consumption Comparisons (mrem/yr)

Maxdose Vegetation Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
Ag-110M	4.83E-03	1.59E-03	-67.08%
Am-241	2.34E+00	7.44E-01	-68.21%
Am-243	2.34E+00	7.44E-01	-68.21%
Ba-139	2.11E-13	6.73E-14	-68.10%
Ba-140	4.13E-04	1.32E-04	-68.04%
Ba-141	7.43E-35	2.36E-35	-68.24%
Be-7	2.52E-05	8.02E-06	-68.17%
Br-83	2.16E-11	7.02E-12	-67.50%
Br-84	1.61E-23	5.23E-24	-67.52%
C-14	3.42E-04	3.42E-04	0.00%
Ce-141	3.84E-04	1.22E-04	-68.23%
Ce-143	1.97E-05	6.27E-06	-68.17%
Ce-144	8.83E-03	2.81E-03	-68.18%
Cf-252	4.65E-01	1.48E-01	-68.17%
Cm-242	4.31E-02	1.37E-02	-68.21%
Cm-243	1.50E+00	4.78E-01	-68.13%
Cm-244	1.19E+00	3.78E-01	-68.24%
Cm-246	2.34E+00	7.45E-01	-68.16%
Cm-248	8.32E+00	2.65E+00	-68.15%
Co-57	4.82E-04	1.54E-04	-68.05%
Co-58	9.78E-04	3.12E-04	-68.10%
Co-60	1.32E-02	4.21E-03	-68.11%
Cr-51	1.62E-05	5.15E-06	-68.21%
Cs-134	3.62E-02	1.15E-02	-68.23%
Cs-135	3.70E-03	1.18E-03	-68.11%
Cs-137	2.59E-02	8.27E-03	-68.07%
Cs-138	2.78E-23	8.83E-24	-68.24%
Eu-152	3.09E-03	9.84E-04	-68.16%
Eu-154	4.66E-03	1.48E-03	-68.24%
Eu-155	6.59E-04	2.10E-04	-68.13%
Fe-55	2.87E-04	9.15E-05	-68.12%
Fe-59	1.32E-03	4.19E-04	-68.26%
H-3	4.91E-07	4.91E-07	0.00%
Hf-181	8.21E-04	2.61E-04	-68.21%
I-129	7.28E-01	2.32E-01	-68.13%
I-131	8.27E-03	2.63E-03	-68.20%
I-132	5.73E-10	1.82E-10	-68.24%
I-133	1.10E-04	3.49E-05	-68.27%
I-134	1.52E-16	4.83E-17	-68.22%
I-135	1.07E-06	3.39E-07	-68.32%
La-140	4.75E-05	1.51E-05	-68.21%

Table 39. MAXDOSE-SR Maximally Exposed Individual Vegetable Consumption Comparisons (mrem/yr) (continued)

Maxdose Vegetation Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
La-141	1.35E-08	4.31E-09	-68.07%
La-142	1.61E-12	5.13E-13	-68.14%
Mn-54	1.21E-03	3.89E-04	-67.85%
Mn-56	4.91E-10	1.56E-10	-68.23%
Mo-99	3.29E-05	1.05E-05	-68.09%
Na-24	1.60E-06	5.11E-07	-68.06%
Nb-95	3.51E-04	1.12E-04	-68.09%
Nb-97	1.60E-14	5.09E-15	-68.19%
Ni-59	1.04E-04	3.33E-05	-67.98%
Ni-63	2.81E-04	8.99E-05	-68.01%
Ni-65	2.71E-10	8.62E-11	-68.19%
Np-237	2.03E+00	6.46E-01	-68.18%
Np-238	2.83E-05	9.01E-06	-68.16%
Np-239	2.75E-05	8.77E-06	-68.11%
Os-185	6.77E-04	2.17E-04	-67.95%
P-32	4.44E-04	1.51E-04	-65.99%
Pa-233	3.98E-04	1.27E-04	-68.09%
Pd-109	2.01E-06	7.37E-07	-63.33%
Pm-147	4.70E-04	1.50E-04	-68.09%
Pm-148	2.09E-04	6.66E-05	-68.13%
Pm-151	1.03E-05	3.29E-06	-68.06%
Pr-144	1.11E-36	3.52E-37	-68.29%
Pu-238	1.97E+00	6.28E-01	-68.12%
Pu-239	2.23E+00	7.11E-01	-68.12%
Pu-240	2.23E+00	7.11E-01	-68.12%
Pu-241	4.43E-02	1.41E-02	-68.17%
Pu-242	2.13E+00	6.78E-01	-68.17%
Ra-224	5.06E-03	1.61E-03	-68.18%
Ra-228	6.10E-01	1.94E-01	-68.20%
Rb-86	7.29E-04	2.34E-04	-67.90%
Rb-87	2.54E-03	8.38E-04	-67.01%
Rb-88	1.38E-35	4.40E-36	-68.12%
Rb-89	1.14E-40	3.65E-41	-67.98%
Rh-105	8.69E-06	3.79E-06	-56.39%
Rh-106M	8.91E-11	3.81E-11	-57.24%
Ru-103	4.87E-04	1.56E-04	-67.97%
Ru-105	1.85E-08	5.88E-09	-68.22%
Ru-106	9.68E-03	3.12E-03	-67.77%
S-35	2.11E-04	7.40E-05	-64.93%
Sb-122	7.02E-05	2.23E-05	-68.23%
Sb-124	2.33E-03	7.44E-04	-68.07%
Sb-125	1.29E-03	4.12E-04	-68.06%
Sb-126	4.56E-04	1.45E-04	-68.20%

Table 39. MAXDOSE-SR Maximally Exposed Individual Vegetable Consumption Comparisons (mrem/yr) (continued)

Maxdose Vegetation Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
Sb-126M	2.82E-34	8.98E-35	-68.16%
Se-75	3.50E-03	1.37E-03	-60.86%
Se-79	5.08E-03	2.14E-03	-57.87%
Sm-151	1.77E-04	5.62E-05	-68.25%
Sn-123	2.81E-03	8.94E-04	-68.19%
Sn-126	8.84E-03	2.81E-03	-68.21%
Sr-89	1.92E-03	6.12E-04	-68.13%
Sr-90	6.74E-02	2.16E-02	-67.95%
Sr-91	1.07E-06	3.41E-07	-68.13%
Sr-92	1.52E-09	4.85E-10	-68.09%
Tc-101	2.84E-43	9.11E-44	-67.92%
Tc-99	6.99E-04	2.38E-04	-65.95%
Tc-99 M	4.48E-09	1.44E-09	-67.86%
Te-125M	9.04E-04	3.38E-04	-62.61%
Te-127	2.41E-07	7.97E-08	-66.93%
Te-127M	3.02E-03	1.18E-03	-60.93%
Te-129	7.30E-15	2.42E-15	-66.85%
Te-129M	1.61E-03	5.77E-04	-64.16%
Te-131	1.40E-27	4.62E-28	-67.00%
Te-131M	6.18E-05	2.05E-05	-66.83%
Te-132	1.03E-04	3.44E-05	-66.60%
Te-134	1.14E-19	3.78E-20	-66.84%
Th-228	1.85E-01	5.89E-02	-68.16%
Th-230	2.76E-01	8.78E-02	-68.19%
Th-232	1.46E+00	4.64E-01	-68.22%
Th-234	1.37E-03	4.37E-04	-68.10%
U-232	6.75E-01	2.15E-01	-68.15%
U-233	1.40E-01	4.47E-02	-68.07%
U-234	1.35E-01	4.30E-02	-68.15%
U-235	1.30E-01	4.14E-02	-68.15%
U-236	1.30E-01	4.14E-02	-68.15%
U-237	7.23E-05	2.30E-05	-68.19%
U-238	1.20E-01	3.81E-02	-68.25%
W-187	7.28E-06	2.32E-06	-68.13%
Y-90	1.10E-04	3.49E-05	-68.27%
Y-91	2.19E-03	6.96E-04	-68.22%
Y-91M	1.87E-18	5.94E-19	-68.24%
Y-92	9.98E-09	3.18E-09	-68.14%
Y-93	1.91E-06	6.09E-07	-68.12%
Zn-65	6.28E-03	2.18E-03	-65.29%
Zr-93	8.32E-04	2.65E-04	-68.15%
Zr-95	9.02E-04	2.87E-04	-68.18%
Zr-97	1.17E-05	3.72E-06	-68.21%
Total	**3.40E+01**	**1.08E+01**	**-68.24%**

Table 40. MAXDOSE-SR Maximally Exposed Individual Milk Consumption Comparisons (mrem/yr)

Maxdose Milk Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
Ag-110M	5.80E-03	6.28E-03	8.28%
Am-241	2.87E-04	2.75E-04	-4.18%
Am-243	2.87E-04	2.75E-04	-4.18%
Ba-139	2.35E-20	6.05E-20	157.45%
Ba-140	6.50E-06	1.65E-05	153.85%
Be-7	5.80E-08	9.40E-08	62.07%
Br-83	5.27E-14	1.33E-13	152.37%
Br-84	9.32E-37	2.36E-36	153.22%
C-14	1.64E-04	1.64E-04	0.00%
Ce-141	5.72E-06	1.15E-05	101.05%
Ce-143	3.66E-07	9.42E-07	157.38%
Ce-144	1.26E-04	1.35E-04	7.14%
Cf-252	5.66E-05	5.60E-05	-1.06%
Cm-242	5.04E-06	5.84E-06	15.87%
Cm-243	1.84E-04	1.77E-04	-3.80%
Cm-244	1.46E-04	1.40E-04	-4.11%
Cm-246	2.88E-04	2.75E-04	-4.51%
Cm-248	1.02E-03	9.78E-04	-4.12%
Co-57	1.15E-05	1.23E-05	6.96%
Co-58	2.23E-05	3.22E-05	44.39%
Co-60	3.23E-04	3.14E-04	-2.79%
Cr-51	9.32E-07	1.99E-06	113.52%
Cs-134	1.05E-02	1.05E-02	0.00%
Cs-135	1.09E-03	1.04E-03	-4.59%
Cs-137	7.64E-03	7.33E-03	-4.06%
Cs-138	5.86E-37	1.51E-36	157.68%
Eu-152	3.79E-07	3.65E-07	-3.69%
Eu-154	5.71E-07	5.52E-07	-3.33%
Eu-155	8.05E-08	7.84E-08	-2.61%
Fe-55	8.39E-06	8.29E-06	-1.19%
Fe-59	3.68E-05	6.45E-05	75.27%
H-3	1.96E-07	1.96E-07	0.00%
Hf-181	9.65E-08	1.72E-07	78.24%
I-129	1.07E-01	1.03E-01	-3.74%
I-131	2.23E-03	5.72E-03	156.50%
I-132	1.25E-13	3.22E-13	157.60%
I-133	1.51E-05	3.89E-05	157.62%
I-134	2.48E-25	6.38E-25	157.26%
I-135	2.61E-08	6.72E-08	157.47%
La-140	8.06E-09	2.07E-08	156.82%

Table 40. MAXDOSE-SR Maximally Exposed Individual Milk Consumption Comparisons (mrem/yr) (continued)

Maxdose Milk Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
La-141	5.03E-14	1.29E-13	156.46%
La-142	8.23E-21	2.12E-20	157.59%
Mn-54	7.25E-06	7.68E-06	5.93%
Mn-56	9.52E-15	2.45E-14	157.35%
Mo-99	9.84E-06	2.52E-05	156.10%
Na-24	1.09E-06	2.79E-06	155.96%
Nb-95	2.14E-05	4.16E-05	94.39%
Nb-97	1.97E-21	5.06E-21	156.85%
Ni-59	1.72E-05	1.64E-05	-4.65%
Ni-63	4.63E-05	4.44E-05	-4.10%
Ni-65	1.24E-13	3.20E-13	158.06%
Np-237	2.49E-04	2.38E-04	-4.42%
Np-238	5.23E-09	1.34E-08	156.21%
Np-239	5.26E-09	1.35E-08	156.65%
Os-185	7.79E-05	1.03E-04	32.22%
P-32	4.34E-04	1.04E-03	139.63%
Pa-233	5.27E-08	1.14E-07	116.32%
Pd-109	3.32E-07	7.69E-07	131.63%
Pm-147	5.72E-08	5.66E-08	-1.05%
Pm-148	4.68E-08	1.20E-07	156.41%
Pm-151	1.47E-09	3.78E-09	157.14%
Pu-238	9.69E-05	9.28E-05	-4.23%
Pu-239	1.10E-04	1.05E-04	-4.55%
Pu-240	1.10E-04	1.05E-04	-4.55%
Pu-241	2.17E-06	2.09E-06	-3.69%
Pu-242	1.05E-04	1.00E-04	-4.76%
Ra-224	1.72E-03	4.41E-03	156.40%
Ra-228	1.19E-01	1.16E-01	-2.52%
Rb-86	7.02E-04	1.68E-03	139.32%
Rb-87	1.89E-03	1.81E-03	-4.23%
Rh-105	3.53E-06	7.14E-06	102.27%
Rh-106M	2.73E-14	5.61E-14	105.49%
Ru-103	1.16E-08	2.13E-08	83.62%
Ru-105	2.21E-14	5.67E-14	156.56%
Ru-106	2.33E-07	2.43E-07	4.29%
S-35	9.09E-05	1.20E-04	32.01%
Sb-122	4.18E-06	1.07E-05	155.98%
Sb-124	8.01E-05	1.23E-04	53.56%
Sb-125	4.72E-05	4.66E-05	-1.27%
Sb-126	2.73E-05	6.94E-05	154.21%
Se-75	3.98E-03	4.75E-03	19.35%
Se-79	6.15E-03	5.94E-03	-3.41%

Table 40. MAXDOSE-SR Maximally Exposed Individual Milk Consumption Comparisons (mrem/yr) (continued)

Maxdose Milk Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
Sm-151	2.17E-08	2.08E-08	-4.15%
Sn-123	1.63E-04	1.98E-04	21.47%
Sn-126	5.43E-04	5.19E-04	-4.42%
Sr-89	3.55E-05	5.87E-05	65.35%
Sr-90	1.33E-03	1.27E-03	-4.51%
Sr-91	7.57E-09	1.95E-08	157.60%
Sr-92	1.33E-13	3.43E-13	157.89%
Tc-99	4.38E-04	4.20E-04	-4.11%
Tc-99 M	3.61E-10	9.24E-10	155.96%
Te-125M	2.26E-05	3.33E-05	47.35%
Te-127	2.13E-09	5.32E-09	149.77%
Te-127M	7.61E-05	9.27E-05	21.81%
Te-129	2.20E-22	5.50E-22	150.00%
Te-129M	4.29E-05	7.94E-05	85.08%
Te-131	0.00E+00	1.40E-45	#DIV/0!
Te-131M	1.88E-06	4.67E-06	148.40%
Te-132	4.42E-06	1.10E-05	148.87%
Te-134	2.30E-31	5.75E-31	150.00%
Th-228	2.24E-05	2.24E-05	0.00%
Th-230	3.39E-05	3.24E-05	-4.42%
Th-232	1.79E-04	1.71E-04	-4.47%
Th-234	1.91E-07	4.30E-07	125.13%
U-232	8.29E-03	7.94E-03	-4.22%
U-233	1.73E-03	1.65E-03	-4.62%
U-234	1.66E-03	1.59E-03	-4.22%
U-235	1.60E-03	1.53E-03	-4.38%
U-236	1.60E-03	1.53E-03	-4.38%
U-237	1.64E-06	4.20E-06	156.10%
U-238	1.47E-03	1.41E-03	-4.08%
W-187	9.30E-08	2.39E-07	156.99%
Y-90	4.34E-08	1.12E-07	158.06%
Y-91	5.01E-07	7.80E-07	55.69%
Y-91M	1.80E-30	4.63E-30	157.22%
Y-92	4.68E-14	1.20E-13	156.41%
Y-93	1.87E-10	4.82E-10	157.75%
Zn-65	5.98E-03	6.48E-03	8.36%
Zr-93	1.02E-07	9.77E-08	-4.22%
Zr-95	1.03E-07	1.53E-07	48.54%
Zr-97	1.12E-09	2.87E-09	156.25%
Total	**2.97E-01**	**2.99E-01**	**0.67%**

Table 41. MAXDOSE-SR Maximally Exposed Individual Meat Consumption Comparisons (mrem/yr)

Maxdose Meat Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
Ag-110M	5.75E-04	8.82E-04	53.39%
Am-241	3.18E-03	4.47E-03	40.57%
Am-243	3.18E-03	4.47E-03	40.57%
Ba-139	9.37E-41	2.41E-40	157.20%
Ba-140	1.96E-05	5.00E-05	155.10%
Be-7	1.97E-07	4.01E-07	103.55%
Br-83	1.12E-26	2.84E-26	153.57%
C-14	1.49E-04	1.49E-04	0.00%
Ce-141	4.25E-06	9.73E-06	128.94%
Ce-143	4.66E-08	1.20E-07	157.51%
Ce-144	7.26E-05	1.12E-04	54.27%
Cf-252	6.35E-04	9.16E-04	44.25%
Cm-242	5.98E-05	9.76E-05	63.21%
Cm-243	2.04E-03	2.88E-03	41.18%
Cm-244	1.62E-03	2.28E-03	40.74%
Cm-246	3.19E-03	4.48E-03	40.44%
Cm-248	1.13E-02	1.59E-02	40.71%
Co-57	4.30E-05	6.63E-05	54.19%
Co-58	9.38E-05	1.78E-04	89.77%
Co-60	1.17E-03	1.67E-03	42.74%
Cr-51	3.86E-07	9.13E-07	136.53%
Cs-134	9.88E-04	1.44E-03	45.75%
Cs-135	1.01E-04	1.41E-04	39.60%
Cs-137	7.07E-04	9.94E-04	40.59%
Eu-152	1.01E-04	1.43E-04	41.58%
Eu-154	1.52E-04	2.16E-04	42.11%
Eu-155	2.15E-05	3.07E-05	42.79%
Fe-55	7.83E-05	1.13E-04	44.32%
Fe-59	4.30E-04	9.16E-04	113.02%
H-3	8.30E-08	8.30E-08	0.00%
Hf-181	2.73E-03	5.88E-03	115.38%
I-129	1.44E-02	2.02E-02	40.28%
I-131	3.60E-04	9.24E-04	156.67%
I-132	8.23E-27	2.12E-26	157.59%
I-133	1.42E-07	3.65E-07	157.04%
I-135	2.51E-13	6.46E-13	157.37%
La-140	2.92E-08	7.51E-08	157.19%
La-141	4.47E-20	1.15E-19	157.27%
La-142	2.90E-38	7.45E-38	156.90%
Mn-54	6.67E-06	1.01E-05	51.42%
Mn-56	8.32E-26	2.14E-25	157.21%
Mo-99	1.81E-06	4.64E-06	156.35%

Table 41. MAXDOSE-SR Maximally Exposed Individual Meat Consumption Comparisons (mrem/yr) (continued)

Maxdose Meat Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
Na-24	4.64E-09	1.19E-08	156.47%
Nb-95	8.77E-04	1.98E-03	125.77%
Nb-97	1.11E-43	2.84E-43	155.86%
Ni-59	3.77E-06	5.29E-06	40.32%
Ni-63	1.02E-05	1.43E-05	40.20%
Ni-65	1.66E-25	4.26E-25	156.63%
Np-237	2.76E-03	3.88E-03	40.58%
Np-238	2.67E-08	6.86E-08	156.93%
Np-239	3.07E-08	7.89E-08	157.00%
Os-185	1.95E-03	3.47E-03	77.95%
P-32	3.06E-04	7.41E-04	142.16%
Pa-233	3.21E+00	7.64E+00	138.01%
Pd-109	4.51E-10	1.04E-09	130.60%
Pm-147	1.54E-05	2.22E-05	44.16%
Pm-148	1.27E-05	3.26E-05	156.69%
Pm-151	6.38E-08	1.64E-07	157.05%
Pu-238	1.88E-04	2.64E-04	40.43%
Pu-239	2.13E-04	2.99E-04	40.38%
Pu-240	2.13E-04	2.99E-04	40.38%
Pu-241	4.22E-06	5.96E-06	41.23%
Pu-242	2.03E-04	2.85E-04	40.39%
Ra-224	1.62E-03	4.15E-03	156.17%
Ra-228	1.41E-01	2.01E-01	42.55%
Rb-86	2.83E-04	7.03E-04	148.41%
Rb-87	5.46E-04	7.59E-04	39.01%
Rh-105	3.80E-08	7.68E-08	102.11%
Rh-106M	1.14E-28	2.33E-28	104.39%
Ru-103	1.66E-03	3.63E-03	118.67%
Ru-105	1.31E-15	3.36E-15	156.49%
Ru-106	2.66E-02	4.00E-02	50.38%
S-35	1.62E-04	2.81E-04	73.46%
Sb-122	1.89E-06	4.87E-06	157.67%
Sb-124	7.09E-05	1.40E-04	97.46%
Sb-125	3.53E-05	5.08E-05	43.91%
Sb-126	2.73E-05	6.97E-05	155.31%
Se-75	4.21E-04	6.55E-04	55.58%
Se-79	6.02E-04	7.80E-04	29.57%
Sm-151	6.01E-06	8.45E-06	40.60%

Table 41. MAXDOSE-SR Maximally Exposed Individual Meat Consumption Comparisons (mrem/yr) (continued)

Maxdose Meat Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
Sn-123	1.57E-03	2.66E-03	69.43%
Sn-126	4.82E-03	6.76E-03	40.25%
Sr-89	9.11E-06	1.88E-05	106.37%
Sr-90	2.76E-04	3.88E-04	40.58%
Sr-91	2.43E-12	6.26E-12	157.61%
Sr-92	1.09E-24	2.79E-24	155.96%
Tc-99	1.97E-03	2.71E-03	37.56%
Tc-99 M	4.38E-14	1.12E-13	155.71%
Te-125M	5.97E-04	1.08E-03	80.90%
Te-127	6.35E-11	1.58E-10	148.82%
Te-127M	1.87E-03	2.96E-03	58.29%
Te-129	1.40E-45	2.80E-45	100.00%
Te-129M	1.24E-03	2.58E-03	108.06%
Te-131M	7.43E-06	1.85E-05	148.99%
Te-132	6.87E-05	1.71E-04	148.91%
Th-228	2.52E-04	3.68E-04	46.03%
Th-230	3.76E-04	5.27E-04	40.16%
Th-232	1.98E-03	2.79E-03	40.91%
Th-234	2.95E-06	7.14E-06	142.03%
U-232	1.56E-03	2.20E-03	41.03%
U-233	3.25E-04	4.57E-04	40.62%
U-234	3.13E-04	4.40E-04	40.58%
U-235	3.01E-04	4.23E-04	40.53%
U-236	3.01E-04	4.23E-04	40.53%
U-237	3.48E-07	8.94E-07	156.90%
U-238	2.77E-04	3.89E-04	40.43%
W-187	7.09E-09	1.82E-08	156.70%
Y-90	3.34E-06	8.60E-06	157.49%
Y-91	7.68E-05	1.53E-04	99.22%
Y-92	7.69E-20	1.98E-19	157.48%
Y-93	5.59E-11	1.44E-10	157.60%
Zn-65	1.36E-03	2.05E-03	50.74%
Zr-93	1.92E-04	2.70E-04	40.63%
Zr-95	2.29E-04	4.44E-04	93.89%
Zr-97	7.02E-08	1.80E-07	156.41%
Total	**3.46E+00**	**8.00E+00**	**131.21%**

Table 42. MAXDOSE-SR Maximally Exposed Individual Total All Pathways Comparisons (mrem/yr)

Maxdose Total Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
Ar-41	1.66E-06	1.57E-06	-5.42%
Ag-110M	2.11E-02	1.89E-02	-10.43%
Am-241	5.16E+00	3.40E+00	-34.11%
Am-243	5.16E+00	3.40E+00	-34.11%
Ba-139	2.49E-07	2.35E-07	-5.62%
Ba-140	1.54E-03	1.32E-03	-14.29%
Ba-141	1.88E-09	1.86E-09	-1.06%
Ba-142	1.35E-11	1.35E-11	0.00%
Be-7	1.18E-04	1.02E-04	-13.56%
Br-83	2.15E-07	2.02E-07	-6.05%
Br-84	5.39E-08	5.39E-08	0.00%
C-14	6.94E-04	6.55E-04	-5.62%
Ce-141	5.37E-04	2.90E-04	-46.00%
Ce-143	5.01E-05	3.66E-05	-26.95%
Ce-144	1.10E-02	5.04E-03	-54.18%
Cf-252	1.17E+00	8.13E-01	-30.51%
Cm-242	1.36E-01	1.01E-01	-25.74%
Cm-243	3.40E+00	2.27E+00	-33.24%
Cm-244	2.65E+00	1.76E+00	-33.58%
Cm-246	5.27E+00	3.51E+00	-33.40%
Cm-248	1.86E+01	1.24E+01	-33.33%
Co-57	1.10E-03	8.07E-04	-26.64%
Co-58	3.27E-03	2.74E-03	-16.21%
Co-60	2.55E-02	1.73E-02	-32.16%
Cr-51	5.30E-05	4.40E-05	-16.98%
Cs-134	5.41E-02	3.06E-02	-43.44%
Cs-135	4.85E-03	2.39E-03	-50.72%
Cs-137	3.67E-02	1.95E-02	-46.87%
Cs-138	7.18E-08	7.21E-08	0.42%
Eu-152	9.46E-03	7.41E-03	-21.67%
Eu-154	1.17E-02	8.60E-03	-26.50%
Eu-155	1.21E-03	7.64E-04	-36.86%
Fe-55	3.85E-04	2.27E-04	-41.04%
Fe-59	3.54E-03	3.19E-03	-9.89%
H-3	1.56E-06	1.48E-06	-5.13%
Hf-181	4.43E-03	7.07E-03	59.59%
I-129	8.41E-01	3.56E-01	-57.67%
I-131	1.10E-02	9.56E-03	-13.09%
I-132	4.40E-06	4.40E-06	0.00%
I-133	1.70E-04	1.19E-04	-30.00%
I-134	4.89E-07	4.92E-07	0.61%
I-135	1.67E-05	1.59E-05	-4.79%
Kr-83 M	1.19E-10	1.12E-10	-5.88%

Table 42. MAXDOSE-SR Maximally Exposed Individual Total All Pathways Comparisons (mrem/yr) (continued)

Maxdose Total Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
Kr-85	7.70E-09	7.27E-09	-5.58%
Kr-85 M	3.71E-07	3.51E-07	-5.39%
Kr-87	7.19E-07	6.82E-07	-5.15%
Kr-88	5.34E-06	5.05E-06	-5.43%
Kr-89	5.82E-21	6.03E-21	3.61%
La-140	1.95E-04	1.63E-04	-16.41%
La-141	2.00E-06	1.87E-06	-6.50%
La-142	2.09E-06	2.09E-06	0.00%
Mn-54	4.46E-03	3.69E-03	-17.26%
Mn-56	3.94E-06	3.92E-06	-0.51%
Mo-99	9.17E-05	8.71E-05	-5.02%
Na-24	7.96E-05	8.08E-05	1.51%
Nb-95	2.23E-03	3.13E-03	40.36%
Nb-97	3.51E-07	3.51E-07	0.00%
Ni-59	1.33E-04	6.37E-05	-52.11%
Ni-63	3.50E-04	1.64E-04	-53.14%
Ni-65	1.47E-06	1.44E-06	-2.04%
Np-237	4.69E+00	3.15E+00	-32.84%
Np-238	2.32E-04	2.02E-04	-12.93%
Np-239	5.50E-05	3.60E-05	-34.55%
Os-185	4.63E-03	5.72E-03	23.54%
P-32	1.25E-03	2.00E-03	60.00%
Pa-233	3.21E+00	7.64E+00	138.01%
Pd-109	7.26E-06	6.42E-06	-11.57%
Pm-147	6.59E-04	3.46E-04	-47.50%
Pm-148	3.78E-04	2.55E-04	-32.54%
Pm-151	3.28E-05	2.59E-05	-21.04%
Pr-144	3.72E-10	3.72E-10	0.00%
Pu-238	4.32E+00	2.98E+00	-31.02%
Pu-239	4.84E+00	3.32E+00	-31.40%
Pu-240	4.84E+00	3.32E+00	-31.40%
Pu-241	9.54E-02	6.52E-02	-31.66%
Pu-242	4.58E+00	3.13E+00	-31.66%
Ra-224	2.29E-02	2.47E-02	7.86%
Ra-228	8.92E-01	5.32E-01	-40.36%
Rb-86	1.81E-03	2.71E-03	49.72%
Rb-87	4.99E-03	3.43E-03	-31.26%
Rb-88	1.36E-09	1.36E-09	0.00%
Rb-89	6.37E-10	6.37E-10	0.00%
Rh-105	2.09E-05	1.97E-05	-5.74%
Rh-106M	4.38E-07	4.38E-07	0.00%
Ru-103	2.90E-03	4.53E-03	56.21%
Ru-105	5.04E-06	5.03E-06	-0.20%

Table 42. MAXDOSE-SR Maximally Exposed Individual Total All Pathways Comparisons (mrem/yr) (continued)

Maxdose Total Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
Ru-106	3.94E-02	4.62E-02	17.26%
S-35	4.76E-04	4.87E-04	2.31%
Sb-122	1.44E-04	1.06E-04	-26.39%
Sb-124	6.05E-03	4.57E-03	-24.46%
Sb-125	3.40E-03	2.54E-03	-25.29%
Sb-126	1.85E-03	1.62E-03	-12.43%
Sb-126M	2.75E-09	2.75E-09	0.00%
Se-75	9.20E-03	8.07E-03	-12.28%
Se-79	1.19E-02	8.90E-03	-25.21%
Sm-151	3.31E-04	2.13E-04	-35.65%
Sn-123	4.72E-03	3.92E-03	-16.95%
Sn-126	1.49E-02	1.08E-02	-27.52%
Sr-89	2.15E-03	8.79E-04	-59.12%
Sr-90	7.57E-02	2.99E-02	-60.50%
Sr-91	1.51E-05	1.44E-05	-4.64%
Sr-92	4.52E-06	4.52E-06	0.00%
Tc-101	8.79E-11	8.79E-11	0.00%
Tc-99	3.14E-03	3.41E-03	8.60%
Tc-99 M	1.14E-06	1.14E-06	0.00%
Te-125M	1.60E-03	1.53E-03	-4.38%
Te-127	1.52E-06	1.36E-06	-10.53%
Te-127M	5.09E-03	4.35E-03	-14.54%
Te-129	1.01E-07	1.01E-07	0.00%
Te-129M	3.03E-03	3.39E-03	11.88%
Te-131	9.45E-09	9.45E-09	0.00%
Te-131M	1.59E-04	1.32E-04	-16.98%
Te-132	2.44E-04	2.84E-04	16.39%
Te-134	1.05E-07	1.05E-07	0.00%
Th-228	1.77E+00	1.64E+00	-7.34%
Th-230	1.91E+00	1.72E+00	-9.95%
Th-232	9.63E+00	8.64E+00	-10.28%
Th-234	1.55E-03	6.21E-04	-59.94%
U-232	4.11E+00	3.65E+00	-11.19%
U-233	8.06E-01	7.11E-01	-11.79%
U-234	8.01E-01	7.09E-01	-11.49%
U-235	7.45E-01	6.57E-01	-11.81%
U-236	7.45E-01	6.56E-01	-11.95%
U-237	1.31E-04	8.47E-05	-35.34%
U-238	7.34E-01	6.53E-01	-11.04%
W-187	2.68E-05	2.20E-05	-17.91%
Xe-131M	2.77E-08	2.77E-08	0.00%
Xe-133	1.13E-07	1.13E-07	0.00%
Xe-133M	9.34E-08	9.34E-08	0.00%

Table 42. MAXDOSE-SR Maximally Exposed Individual Total All Pathways Comparisons (mrem/yr) (continued)

Maxdose Total Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
Xe-135	6.62E-07	6.62E-07	0.00%
Xe-135M	1.03E-09	1.03E-09	0.00%
Xe-137	2.88E-19	2.88E-19	0.00%
Xe-138	1.64E-09	1.64E-09	0.00%
Y-90	1.54E-04	8.43E-05	-45.26%
Y-91	2.50E-03	1.08E-03	-56.80%
Y-91 M	9.28E-08	9.28E-08	0.00%
Y-92	2.68E-06	2.68E-06	0.00%
Y-93	1.19E-05	1.06E-05	-10.92%
Zn-65	1.57E-02	1.28E-02	-18.47%
Zr-93	2.66E-03	2.17E-03	-18.42%
Zr-95	4.40E-03	4.00E-03	-9.09%
Zr-97	3.42E-05	2.63E-05	-23.10%
TOTAL	**9.16E+01**	**7.15E+01**	**-21.94%**

Table 43. POPDOSE-SR Collective Ground Exposure Comparisons (person-rem/yr)

Popdose Ground Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
Ag110M	4.83E-01	4.82E-01	-0.21%
Am241	6.87E-03	6.85E-03	-0.29%
Am243	1.52E-02	1.52E-02	0.00%
Ba139	1.65E-07	1.63E-07	-1.23%
Ba140	5.31E-02	5.30E-02	-0.19%
Ba141	1.73E-09	2.03E-09	14.78%
Ba142	1.99E-11	2.58E-11	22.87%
Be 7	4.50E-03	4.49E-03	-0.22%
Br 83	1.82E-07	1.80E-07	-1.11%
Br 84	9.55E-08	9.91E-08	3.63%
Ce141	5.02E-03	5.01E-03	-0.20%
Ce143	6.01E-04	5.99E-04	-0.33%
Ce144	9.45E-03	9.43E-03	-0.21%
Cf252	1.37E-04	1.36E-04	-0.74%
Cm242	2.87E-04	2.86E-04	-0.35%
Cm243	3.34E-02	3.34E-02	0.00%
Cm244	1.89E-04	1.88E-04	-0.53%
Cm246	1.69E-04	1.69E-04	0.00%
Cm248	1.35E-04	1.35E-04	0.00%
Co 57	2.62E-02	2.61E-02	-0.38%
Co 58	1.06E-01	1.06E-01	0.00%
Co 60	5.05E-01	5.04E-01	-0.20%
Cr 51	1.68E-03	1.68E-03	0.00%
Cs134	3.33E-01	3.33E-01	0.00%
Cs137	1.32E-01	1.32E-01	0.00%
Cs138	1.39E-07	1.44E-07	3.47%
Eu152	2.53E-01	2.52E-01	-0.40%
Eu154	2.72E-01	2.72E-01	0.00%
Eu155	1.59E-02	1.58E-02	-0.63%
Fe 55	4.74E-05	4.73E-05	-0.21%
Fe 59	8.36E-02	8.34E-02	-0.24%
Hf181	4.20E-02	4.19E-02	-0.24%
I 129	5.06E-03	5.05E-03	-0.20%
I 131	5.72E-03	5.71E-03	-0.18%
I 132	4.87E-05	4.81E-05	-1.25%
I 133	8.00E-04	7.96E-04	-0.50%
I 134	1.86E-06	1.85E-06	-0.54%
I 135	3.20E-04	3.17E-04	-0.95%
La140	5.62E-03	5.61E-03	-0.18%
La141	3.03E-06	3.00E-06	-1.00%
La142	1.54E-05	1.51E-05	-1.99%
Mn 54	1.59E-01	1.58E-01	-0.63%
Mn 56	4.59E-05	4.54E-05	-1.10%
Mo 99	1.33E-03	1.33E-03	0.00%

Table 43. POPDOSE-SR Collective Ground Exposure Comparisons (person-rem/yr) (continued)

Popdose Ground Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
Na 24	2.79E-03	2.77E-03	-0.72%
Nb 95	4.77E-02	4.76E-02	-0.21%
Nb 97	1.78E-06	1.76E-06	-1.14%
Ni 59	9.57E-05	9.55E-05	-0.21%
Ni 65	1.35E-05	1.33E-05	-1.50%
Np237	7.45E-03	7.44E-03	-0.13%
Np238	1.85E-03	1.84E-03	-0.54%
Np239	7.42E-04	7.40E-04	-0.27%
Os185	9.14E-02	9.14E-02	0.00%
P 32	0.00E+00	0.00E+00	
Pa233	1.13E-02	1.13E-02	0.00%
Pd109	4.75E-07	4.75E-07	0.00%
Pm147	8.81E-07	8.81E-07	0.00%
Pm148	5.00E-03	5.00E-03	0.00%
Pm151	6.27E-04	6.27E-04	0.00%
Pr144	4.59E-11	4.59E-11	0.00%
Pu238	1.96E-04	1.96E-04	0.00%
Pu239	8.68E-05	8.68E-05	0.00%
Pu240	1.88E-04	1.88E-04	0.00%
Pu242	1.57E-04	1.57E-04	0.00%
Ra224	6.85E-05	6.85E-05	0.00%
Ra228	1.48E-10	1.48E-10	0.00%
Rb 86	3.00E-03	3.00E-03	0.00%
Rb 88	1.12E-09	1.12E-09	0.00%
Rb 89	1.17E-09	1.17E-09	0.00%
Rh105	1.90E-04	1.90E-04	0.00%
Ru103	3.43E-02	3.43E-02	0.00%
Ru105	8.22E-05	8.22E-05	0.00%
Ru106	4.08E-02	4.08E-02	0.00%
Sb122	2.04E-03	2.04E-03	0.00%
Sb124	1.68E-01	1.68E-01	0.00%
Sb125	9.65E-02	9.65E-02	0.00%
Sb126	6.19E-02	6.19E-02	0.00%
Sb126M	4.76E-09	4.76E-09	0.00%
Se 75	6.10E-02	6.10E-02	0.00%
Sm151	1.19E-06	1.19E-06	0.00%
Sn123	9.54E-04	9.54E-04	0.00%
Sn126	1.42E-02	1.42E-02	0.00%
Sr 89	1.13E-05	1.13E-05	0.00%
Sr 90	0.00E+00	0.00E+00	
Sr 91	2.70E-04	2.70E-04	0.00%
Sr 92	3.89E-05	3.89E-05	0.00%
Tc 99	1.44E-07	1.44E-07	0.00%
Tc 99M	2.74E-05	2.74E-05	0.00%

Table 43. POPDOSE-SR Collective Ground Exposure Comparisons (person-rem/yr) (continued)

Popdose Ground Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
Tc101	1.33E-10	1.33E-10	0.00%
Te125M	1.95E-03	1.95E-03	0.00%
Te127	1.99E-06	1.99E-06	0.00%
Te127M	9.07E-04	9.07E-04	0.00%
Te129	1.28E-07	1.28E-07	0.00%
Te129M	2.16E-03	2.16E-03	0.00%
Te131	7.08E-09	7.08E-09	0.00%
Te131M	2.64E-03	2.64E-03	0.00%
Te132	1.36E-03	1.36E-03	0.00%
Te134	2.26E-07	2.26E-07	0.00%
Th228	5.81E-04	5.81E-04	0.00%
Th230	2.09E-04	2.09E-04	0.00%
Th232	1.53E-04	1.53E-04	0.00%
Th234	4.33E-04	4.33E-04	0.00%
U 232	2.37E-04	2.37E-04	0.00%
U 233	1.15E-04	1.15E-04	0.00%
U 234	1.85E-04	1.85E-04	0.00%
U 235	3.92E-02	3.92E-02	0.00%
U 236	1.68E-04	1.68E-04	0.00%
U 237	1.90E-03	1.90E-03	0.00%
U 238	1.48E-04	1.48E-04	0.00%
W 187	7.02E-04	7.02E-04	0.00%
Y 90	0.00E+00	0.00E+00	
Y 91	3.09E-04	3.09E-04	0.00%
Y 91M	3.09E-07	3.09E-07	0.00%
Y 92	1.52E-05	1.52E-05	0.00%
Y 93	3.75E-05	3.75E-05	0.00%
Zn 65	9.79E-02	9.79E-02	0.00%
Zr 95	1.54E-01	1.54E-01	0.00%
Zr 97	1.59E-04	1.59E-04	0.00%
TOTAL*	**3.52E+00**	**3.52E+00**	**0.00%**

Table 44. POPDOSE-SR Collective Plume Immersion Comparisons (person-rem/yr)

Popdose Plume			
Nuclide	**Hamby**	**Jannik**	**% Diff**
Ar 41	2.44E-05	2.44E-05	0.00%
Kr 83M	1.76E-09	1.76E-09	0.00%
Kr 85	6.15E-07	6.15E-07	0.00%
Kr 85M	1.28E-05	1.28E-05	0.00%
Kr 87	6.71E-06	6.71E-06	0.00%
Kr 88	1.26E-04	1.26E-04	0.00%
Kr 89	8.85E-19	8.85E-19	0.00%
Xe131M	2.30E-06	2.30E-06	0.00%
Xe133	9.20E-06	9.20E-06	0.00%
Xe133M	7.28E-06	7.28E-06	0.00%
Xe135	3.59E-05	3.59E-05	0.00%
Xe135M	2.84E-09	2.84E-09	0.00%
Xe137	1.60E-17	1.60E-17	0.00%
Xe138	4.82E-09	4.82E-09	0.00%
TOTAL	**2.28E-04**	**2.28E-04**	**0.00%**

Table 45. POPDOSE-SR Collective Inhalation Dose Comparisons (person-rem/yr)

Popdose Inhalation Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
Ag110M	2.61E-02	1.79E-02	-31.42%
Am241	2.56E+02	1.76E+02	-31.25%
Am243	2.56E+02	1.76E+02	-31.25%
Ba139	3.00E-06	2.04E-06	-32.00%
Ba140	1.74E-03	1.20E-03	-31.03%
Ba141	2.79E-09	2.20E-09	-21.15%
Ba142	2.73E-11	2.36E-11	-13.55%
Be 7	1.32E-04	9.10E-05	-31.06%
Br 83	4.91E-06	3.35E-06	-31.77%
Br 84	5.81E-08	4.10E-08	-29.43%
Ce141	4.15E-03	2.86E-03	-31.08%
Ce143	1.32E-03	9.08E-04	-31.21%
Ce144	1.72E-01	1.18E-01	-31.40%
Cf252	6.40E+01	4.40E+01	-31.25%
Cm242	8.35E+00	5.75E+00	-31.14%
Cm243	1.72E+02	1.19E+02	-30.81%
Cm244	1.33E+02	9.14E+01	-31.28%
Cm246	2.66E+02	1.83E+02	-31.20%
Cm248	9.35E+02	6.44E+02	-31.12%
Co 57	3.69E-03	2.54E-03	-31.17%
Co 58	3.48E-03	2.40E-03	-31.03%
Co 60	7.38E-02	5.08E-02	-31.17%
Cr 51	1.27E-04	8.73E-05	-31.26%
Cs134	2.31E-02	1.59E-02	-31.17%
Cs135	2.21E-03	1.52E-03	-31.22%
Cs137	1.57E-02	1.08E-02	-31.21%
Cs138	6.26E-08	4.40E-08	-29.71%
Eu152	1.08E-01	7.45E-02	-31.02%
Eu154	1.28E-01	8.81E-02	-31.17%
Eu155	1.92E-02	1.32E-02	-31.25%
Fe 55	1.28E-03	8.80E-04	-31.25%
Fe 59	7.34E-03	5.05E-03	-31.20%
H 3	8.40E-05	5.79E-05	-31.07%
Hf181	6.36E-03	4.38E-03	-31.13%
I 129	8.86E-02	6.10E-02	-31.15%
I 131	1.53E-02	1.05E-02	-31.37%
I 132	1.89E-05	1.29E-05	-31.75%
I 133	2.01E-03	1.38E-03	-31.34%
I 134	5.38E-07	3.67E-07	-31.78%
I 135	2.34E-04	1.60E-04	-31.62%
La140	1.87E-03	1.29E-03	-31.02%

Table 45. POPDOSE-SR Collective Inhalation Dose Comparisons (person-rem/yr) (continued)

Popdose Inhalation Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
La141	6.91E-05	4.73E-05	-31.55%
La142	5.45E-06	3.71E-06	-31.93%
Mn 54	3.15E-03	2.17E-03	-31.11%
Mn 56	2.29E-05	1.56E-05	-31.88%
Mo 99	1.62E-03	1.11E-03	-31.48%
Na 24	3.19E-04	2.19E-04	-31.35%
Nb 95	2.20E-03	1.51E-03	-31.36%
Nb 97	9.30E-07	6.33E-07	-31.94%
Ni 59	6.40E-04	4.40E-04	-31.25%
Ni 63	1.48E-03	1.02E-03	-31.08%
Ni 65	1.41E-05	9.63E-06	-31.70%
Np237	2.41E+02	1.66E+02	-31.12%
Np238	1.36E-02	9.35E-03	-31.25%
Np239	9.76E-04	6.71E-04	-31.25%
Os185	4.87E-03	3.38E-03	-30.60%
P 32	6.24E-03	4.33E-03	-30.61%
Pa233	4.16E-03	2.89E-03	-30.53%
Pd109	3.51E-04	2.43E-04	-30.77%
Pm147	1.66E-02	1.15E-02	-30.72%
Pm148	4.67E-03	3.24E-03	-30.62%
Pm151	6.36E-04	4.41E-04	-30.66%
Pr144	1.30E-09	8.98E-10	-30.92%
Pu238	2.25E+02	1.56E+02	-30.67%
Pu239	2.49E+02	1.73E+02	-30.52%
Pu240	2.49E+02	1.73E+02	-30.52%
Pu241	4.88E+00	3.39E+00	-30.53%
Pu242	2.34E+02	1.63E+02	-30.34%
Ra224	1.32E+00	9.18E-01	-30.45%
Ra228	2.05E+00	1.42E+00	-30.73%
Rb 86	3.18E-03	2.21E-03	-30.50%
Rb 87	1.61E-03	1.12E-03	-30.43%
Rb 88	3.00E-09	2.08E-09	-30.67%
Rb 89	5.16E-10	3.58E-10	-30.62%
Rh105	3.68E-04	2.55E-04	-30.71%
Rh106M	1.02E-05	7.07E-06	-30.69%
Ru103	3.79E-03	2.63E-03	-30.61%

Table 45. POPDOSE-SR Collective Inhalation Dose Comparisons (person-rem/yr) (continued)

Popdose Inhalation Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
Ru105	5.94E-05	4.12E-05	-30.64%
Ru106	2.15E-01	1.49E-01	-30.70%
S 35	1.12E-03	7.77E-04	-30.63%
Sb122	2.10E-03	1.45E-03	-30.95%
Sb124	1.02E-02	7.08E-03	-30.59%
Sb125	4.78E-03	3.32E-03	-30.54%
Sb126	4.79E-03	3.32E-03	-30.69%
Sb126M	1.49E-09	1.04E-09	-30.20%
Se 75	4.00E-03	2.77E-03	-30.75%
Se 79	4.35E-03	3.01E-03	-30.80%
Sm151	1.42E-02	9.82E-03	-30.85%
Sn123	1.46E-02	1.01E-02	-30.82%
Sn126	4.20E-02	2.91E-02	-30.71%
Sr 89	1.80E-02	1.25E-02	-30.56%
Sr 90	6.35E-01	4.40E-01	-30.71%
Sr 91	3.76E-04	2.61E-04	-30.59%
Sr 92	5.75E-05	3.99E-05	-30.61%
Tc 99	3.66E-03	2.54E-03	-30.60%
Tc 99M	6.24E-06	4.33E-06	-30.61%
Tc101	1.41E-10	9.75E-11	-30.85%
Te125M	3.26E-03	2.26E-03	-30.67%
Te127	7.72E-05	5.36E-05	-30.57%
Te127M	9.26E-03	6.42E-03	-30.67%
Te129	8.92E-07	6.19E-07	-30.61%
Te129M	9.70E-03	6.72E-03	-30.72%
Te131	2.22E-08	1.54E-08	-30.63%
Te131M	2.21E-03	1.53E-03	-30.77%
Te132	3.49E-03	2.42E-03	-30.66%
Te134	2.08E-07	1.45E-07	-30.29%
Th228	1.51E+02	1.05E+02	-30.46%
Th230	1.56E+02	1.08E+02	-30.77%
Th232	7.81E+02	5.42E+02	-30.60%
Th234	1.60E-02	1.11E-02	-30.63%

Table 45. POPDOSE-SR Collective Inhalation Dose Comparisons (person-rem/yr) (continued)

Popdose Inhalation Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
U 232	3.27E+02	2.27E+02	-30.58%
U 233	6.35E+01	4.40E+01	-30.71%
U 234	6.35E+01	4.40E+01	-30.71%
U 235	5.86E+01	4.06E+01	-30.72%
U 236	5.86E+01	4.06E+01	-30.72%
U 237	1.55E-03	1.08E-03	-30.32%
U 238	5.86E+01	4.06E+01	-30.72%
W 187	2.03E-04	1.41E-04	-30.54%
Y 90	3.65E-03	2.53E-03	-30.68%
Y 91	2.14E-02	1.48E-02	-30.84%
Y 91M	1.24E-07	8.61E-08	-30.56%
Y 92	6.87E-05	4.76E-05	-30.71%
Y 93	5.83E-04	4.05E-04	-30.53%
Zn 65	8.78E-03	6.09E-03	-30.64%
Zr 93	1.56E-01	1.08E-01	-30.77%
Zr 95	9.24E-03	6.41E-03	-30.63%
Zr 97	1.39E-03	9.62E-04	-30.79%
TOTAL	**5.02E+03**	**3.46E+03**	**-31.08%**

Table 46. POPDOSE-SR Collective Vegetable Ingestion Comparisons (person-rem/yr)

Popdose Vegetation Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
Ag110M	8.95E-02	3.79E-03	-95.77%
Am241	3.93E+01	1.66E+00	-95.78%
Am243	3.93E+01	1.66E+00	-95.78%
Ba140	1.66E-02	1.08E-03	-93.49%
Be 7	6.43E-04	3.00E-05	-95.33%
C 14	9.45E-03	1.27E-03	-86.56%
Ce141	1.20E-02	5.98E-04	-95.02%
Ce143	2.51E-06	5.80E-06	131.08%
Ce144	1.62E-01	6.94E-03	-95.72%
Cf252	8.03E+00	3.40E-01	-95.77%
Cm242	8.40E-01	3.66E-02	-95.64%
Cm243	2.53E+01	1.07E+00	-95.77%
Cm244	2.00E+01	8.44E-01	-95.78%
Cm246	3.93E+01	1.66E+00	-95.78%
Cm248	1.40E+02	5.89E+00	-95.79%
Co 57	8.87E-03	3.84E-04	-95.67%
Co 58	2.26E-02	1.03E-03	-95.44%
Co 60	2.25E-01	9.58E-03	-95.74%
Cr 51	5.42E-04	2.78E-05	-94.87%
Cs134	6.28E-01	2.67E-02	-95.75%
Cs135	6.21E-02	2.62E-03	-95.78%
Cs137	4.37E-01	1.84E-02	-95.79%
Eu152	5.22E-02	2.20E-03	-95.79%
Eu154	7.90E-02	3.34E-03	-95.77%
Eu155	1.12E-02	4.75E-04	-95.76%
Fe 55	4.95E-03	2.11E-04	-95.74%
Fe 59	3.58E-02	1.71E-03	-95.22%
H 3	1.36E-05	1.82E-06	-86.62%
Hf181	2.28E-02	1.10E-03	-95.18%
I 129	1.22E+01	5.16E-01	-95.77%
I 131	2.53E-01	2.12E-02	-91.62%
I 133	2.73E-07	6.74E-06	2368.86%
I 135	0.00E+00	0.00E+00	0.00%
La140	1.97E-05	2.24E-05	13.71%
La141	0.00E+00	0.00E+00	0.00%
Mn 54	2.20E-02	9.64E-04	-95.62%
Mn 56	0.00E+00	0.00E+00	0.00%
Mo 99	1.15E-04	3.62E-05	-68.52%
Na 24	6.88E-11	1.96E-08	28388.37%

Table 46. POPDOSE-SR Collective Vegetable Ingestion Comparisons (person-rem/yr) (continued)

Popdose Vegetation Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
Nb 95	1.06E-02	5.22E-04	-95.08%
Ni 59	1.75E-03	7.43E-05	-95.75%
Ni 63	4.73E-03	2.00E-04	-95.77%
Ni 65	0.00E+00	0.00E+00	0.00%
Np237	3.41E+01	1.44E+00	-95.78%
Np238	3.65E-05	2.09E-05	-42.74%
Np239	5.54E-05	2.43E-05	-56.14%
Os185	1.46E-02	6.51E-04	-95.54%
P 32	1.80E-02	1.10E-03	-93.89%
Pa233	1.35E-02	6.97E-04	-94.84%
Pd109	1.55E-11	1.16E-08	74738.71%
Pm147	8.11E-03	3.47E-04	-95.72%
Pm148	3.74E-03	4.41E-04	-88.21%
Pm151	4.25E-07	1.94E-06	356.47%
Pu238	3.32E+01	1.40E+00	-95.78%
Pu239	3.76E+01	1.58E+00	-95.80%
Pu240	3.76E+01	1.58E+00	-95.80%
Pu241	7.48E-01	3.15E-02	-95.79%
Pu242	3.58E+01	1.51E+00	-95.78%
Ra224	4.07E-02	7.76E-03	-80.93%
Ra228	1.04E+01	4.40E-01	-95.77%
Rb 86	2.85E-02	1.63E-03	-94.28%
Rb 87	4.27E-02	1.87E-03	-95.62%
Rh105	1.65E-06	2.50E-06	51.52%
Ru103	1.39E-02	6.73E-04	-95.16%
Ru105	0.00E+00	0.00E+00	0.00%
Ru106	1.74E-01	7.40E-03	-95.75%
S 35	4.64E-03	2.13E-04	-95.41%
Sb122	2.34E-04	7.57E-05	-67.65%
Sb124	5.70E-02	2.63E-03	-95.39%
Sb125	2.23E-02	9.41E-04	-95.78%
Sb126	1.82E-02	1.20E-03	-93.41%
Se 75	7.18E-02	2.84E-03	-96.04%
Se 79	8.54E-02	3.08E-03	-96.39%

Table 46. POPDOSE-SR Collective Vegetable Ingestion Comparisons (person-rem/yr) (continued)

Popdose Vegetation Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
Sm151	2.97E-03	1.25E-04	-95.79%
Sn123	5.68E-02	2.50E-03	-95.60%
Sn126	1.49E-01	6.26E-03	-95.80%
Sr 89	4.99E-02	2.40E-03	-95.19%
Sr 90	1.14E+00	5.02E-02	-95.60%
Sr 91	0.00E+00	0.00E+00	0.00%
Sr 92	0.00E+00	0.00E+00	0.00%
Tc 99	1.17E-02	4.17E-03	-64.36%
Tc 99M	0.00E+00	0.00E+00	0.00%
Te125M	2.23E-02	9.63E-04	-95.68%
Te127	0.00E+00	0.00E+00	0.00%
Te127M	6.31E-02	2.54E-03	-95.97%
Te129M	4.94E-02	2.33E-03	-95.28%
Te131M	3.92E-06	1.35E-05	244.39%
Te132	6.09E-04	1.37E-04	-77.50%
Th228	3.22E+00	1.37E-01	-95.75%
Th230	4.63E+00	1.95E-01	-95.79%
Th232	2.45E+01	1.03E+00	-95.80%
Th234	4.89E-02	2.59E-03	-94.70%
U 232	1.14E+01	4.79E-01	-95.80%
U 233	2.36E+00	9.96E-02	-95.78%
U 234	2.27E+00	9.59E-02	-95.78%
U 235	2.19E+00	9.22E-02	-95.79%
U 236	2.19E+00	9.22E-02	-95.79%
U 237	1.81E-03	1.73E-04	-90.44%
U 238	2.01E+00	8.49E-02	-95.78%
W 187	7.15E-08	7.74E-07	982.52%
Y 90	3.49E-04	1.16E-04	-66.76%
Y 91	5.39E-02	2.49E-03	-95.38%
Y 92	0.00E+00	0.00E+00	0.00%
Y 93	0.00E+00	1.35E-09	
Zn 65	1.17E-01	5.10E-03	-95.64%
Zr 93	1.40E-02	5.89E-04	-95.79%
Zr 95	2.14E-02	9.81E-04	-95.42%
Zr 97	2.49E-09	2.71E-07	10783.53%
TOTAL	**5.73E+02**	**2.42E+01**	-95.78%

Table 47. POPDOSE-SR Collective Milk Ingestion Comparisons (person-rem/yr)

Popdose Milk Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
Ag110M	1.57E-01	6.97E-03	-95.56%
Am241	7.82E-03	8.26E-04	-89.44%
Am243	7.82E-03	8.26E-04	-89.44%
Ba139	2.99E-25	6.39E-25	113.71%
Ba140	1.65E-04	2.20E-04	33.33%
Be 7	1.55E-06	2.75E-08	-98.23%
Br 83	2.53E-16	4.63E-16	83.00%
C 14	7.33E-03	8.50E-03	15.96%
Ce141	1.52E-04	1.33E-05	-91.25%
Ce143	5.18E-06	5.99E-07	-88.44%
Ce144	3.42E-03	1.60E-04	-95.32%
Cf252	1.54E-03	6.00E-04	-61.04%
Cm242	1.36E-04	8.31E-04	511.03%
Cm243	5.02E-03	2.53E-02	403.98%
Cm244	3.96E-03	2.00E-02	405.05%
Cm246	7.83E-03	3.93E-02	401.92%
Cm248	2.78E-02	1.40E-01	403.60%
Co 57	3.11E-04	4.85E-05	-84.41%
Co 58	6.00E-04	1.26E-04	-79.00%
Co 60	8.79E-03	1.24E-03	-85.89%
Cr 51	2.46E-05	1.35E-05	-45.12%
Cs134	2.87E-01	1.44E-01	-49.83%
Cs135	2.97E-02	1.43E-02	-51.85%
Cs137	2.08E-01	1.00E-01	-51.92%
Eu152	1.03E-05	7.83E-05	660.19%
Eu154	1.55E-05	1.18E-04	661.29%
Eu155	2.19E-06	1.68E-05	667.12%
Fe 55	2.28E-04	8.66E-06	-96.20%
Fe 59	9.83E-04	6.60E-05	-93.29%
H 3	8.77E-06	1.53E-05	74.46%
Hf181	2.57E-06	6.65E-07	-74.12%
I 129	2.92E+00	3.31E+00	13.36%
I 131	5.41E-02	1.65E-01	204.99%
I 132	4.34E-16	1.85E-15	326.27%
I 133	1.45E-04	4.61E-04	217.93%
I 134	1.42E-33	7.41E-33	421.83%
I 135	2.78E-08	9.67E-08	247.84%
La140	1.28E-07	1.77E-06	1282.81%
La141	6.46E-15	1.08E-13	1571.83%

Table 47. POPDOSE-SR Collective Milk Ingestion Comparisons (person-rem/yr) (continued)

Popdose Milk Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
La142	4.56E-25	9.50E-24	1983.33%
Mn 54	1.97E-04	4.52E-05	-77.06%
Mn 56	8.04E-17	6.06E-17	-24.63%
Mo 99	1.93E-04	9.64E-05	-50.05%
Na 24	7.03E-06	8.17E-06	16.22%
Nb 95	5.67E-04	2.38E-07	-99.96%
Nb 97	3.57E-27	3.22E-30	-99.91%
Ni 59	4.68E-04	8.34E-05	-82.18%
Ni 63	1.26E-03	2.25E-04	-82.14%
Ni 65	9.10E-16	5.96E-16	-34.51%
Np237	6.78E-03	8.53E-03	25.81%
Np238	9.28E-08	3.19E-07	243.75%
Np239	9.75E-08	3.35E-07	243.59%
Os185	2.13E-03	3.62E-03	69.95%
P 32	1.12E-02	2.72E-02	142.86%
Pa233	1.40E-06	3.94E-06	181.43%
Pd109	1.84E-06	5.50E-06	198.91%
Pm147	1.58E-06	1.22E-05	672.15%
Pm148	1.09E-06	2.20E-05	1918.35%
Pm151	1.88E-08	3.89E-07	1969.15%
Pu238	2.67E-03	1.66E-02	521.72%
Pu239	3.03E-03	1.88E-02	520.46%
Pu240	3.03E-03	1.88E-02	520.46%
Pu241	5.99E-05	3.74E-04	524.37%
Pu242	2.89E-03	1.79E-02	519.38%
Ra224	3.69E-02	5.91E-03	-83.98%
Ra228	3.29E+00	1.97E-01	-94.01%
Rb 86	1.84E-02	2.30E-02	25.00%
Rb 87	5.22E-02	2.60E-02	-50.19%
Rh105	5.26E-05	1.17E-04	122.43%
Rh106M	6.00E-17	1.91E-16	218.33%
Ru103	3.13E-07	6.98E-06	2130.03%
Ru105	5.16E-15	1.96E-13	3698.45%
Ru106	6.40E-06	8.07E-05	1160.94%
S 35	2.48E-03	1.80E-03	-27.42%
Sb122	8.24E-05	7.06E-06	-91.43%
Sb124	2.17E-03	1.10E-04	-94.93%

Table 47. POPDOSE-SR Collective Milk Ingestion Comparisons (person-rem/yr) (continued)

Popdose			
Milk Pathway			
Nuclide	**Hamby**	**Jannik**	**% Diff**
Sb125	1.30E-03	4.21E-05	-96.76%
Sb126	7.00E-04	5.86E-05	-91.63%
Se 75	1.09E-01	1.27E-02	-88.35%
Se 79	1.69E-01	1.46E-02	-91.36%
Sm151	5.98E-07	4.46E-06	645.82%
Sn123	4.45E-03	2.81E-03	-36.85%
Sn126	1.50E-02	7.43E-03	-50.47%
Sr 89	9.60E-04	3.38E-03	252.08%
Sr 90	3.65E-02	7.57E-02	107.40%
Sr 91	2.16E-08	1.29E-07	497.22%
Sr 92	1.72E-15	1.26E-14	632.56%
Tc 99	1.21E-02	5.59E-03	-53.80%
Tc 99M	2.88E-10	1.06E-10	-63.19%
Te125M	6.12E-04	3.58E-04	-41.50%
Te127	5.89E-09	7.01E-09	19.02%
Te127M	2.08E-03	9.61E-04	-53.80%
Te129	2.26E-28	4.01E-28	77.43%
Te129M	1.15E-03	8.77E-04	-23.74%
Te131M	2.51E-05	2.78E-05	10.76%
Te132	9.23E-05	1.00E-04	8.34%
Te134	5.97E-42	1.15E-41	92.63%
Th228	6.16E-04	8.00E-04	29.87%
Th230	9.34E-04	1.16E-03	24.20%
Th232	4.93E-03	6.12E-03	24.14%
Th234	5.07E-06	1.48E-05	191.91%
U 232	2.28E-01	1.02E+00	347.37%
U 233	4.75E-02	2.13E-01	348.42%
U 234	4.58E-02	2.05E-01	347.60%
U 235	4.40E-02	1.97E-01	347.73%
U 236	4.40E-02	1.97E-01	347.73%
U 237	3.94E-05	4.76E-04	1108.12%
U 238	4.05E-02	1.81E-01	346.91%
W 187	1.04E-06	1.36E-06	30.77%
Y 90	8.52E-07	5.76E-06	576.06%
Y 91	1.36E-05	5.50E-05	304.41%
Y 91M	3.32E-39	3.84E-38	1056.63%
Y 92	3.48E-15	2.94E-14	744.83%
Y 93	6.11E-10	4.45E-09	628.31%
Zn 65	1.64E-01	1.54E-02	-90.61%
Zr 93	2.82E-06	2.52E-06	-10.64%
Zr 95	2.80E-06	3.90E-06	39.29%
Zr 97	8.55E-09	2.17E-08	153.80%
TOTAL	**8.15E+00**	**6.50E+00**	**-20.25%**

Table 48. POPDOSE-SR Collective Meat Ingestion Comparisons (person- rem/yr)

Popdose Meat Pathway							
Nuclide	**Hamby**	**Jannik**	**% Diff**	**Nuclide**	**Hamby**	**Jannik**	**% Diff**
Ag110M	8.19E-03	1.37E-03	-83.3%	H 3	1.97E-06	0.00E+00	-100.0%
Am241	4.54E-02	1.01E-01	122.5%	Hf181	3.87E-02	4.22E-06	-100.0%
Am243	4.54E-02	1.01E-01	122.5%	I 129	2.05E-01	4.20E-01	104.9%
Ba139	1.59E-40	1.47E-41	-90.8%	I 131	5.00E-03	1.88E-02	276.0%
Ba140	2.75E-04	1.94E-05	-92.9%	I 132	2.60E-26	1.22E-25	369.2%
Be 7	2.79E-06	3.60E-06	29.0%	I 133	1.62E-06	6.30E-06	288.9%
Br 83	3.70E-26	6.99E-26	88.9%	I 135	1.88E-12	7.81E-12	315.4%
C 14	3.55E-03	2.08E-03	-41.4%	La140	3.71E-07	3.98E-07	7.3%
Ce141	6.02E-05	1.45E-06	-97.6%	La141	2.34E-19	2.89E-19	23.5%
Ce143	5.77E-07	1.60E-08	-97.2%	La142	5.72E-38	7.79E-38	36.2%
Ce144	1.03E-03	1.67E-05	-98.4%	Mn 54	9.50E-05	6.88E-05	-27.6%
Cf252	9.05E-03	1.65E-03	-81.8%	Mn 56	2.95E-25	4.42E-25	49.8%
Cm242	8.51E-04	1.75E-04	-79.4%	Mo 99	2.40E-05	4.91E-06	-79.5%
Cm243	2.92E-02	5.18E-03	-82.3%	Na 24	4.89E-08	4.16E-08	-14.9%
Cm244	2.31E-02	4.10E-03	-82.3%	Nb 95	1.24E-02	1.64E-08	-100.0%
Cm246	4.55E-02	8.05E-03	-82.3%	Ni 59	5.38E-05	4.49E-05	-16.5%
Cm248	1.62E-01	2.86E-02	-82.3%	Ni 63	1.45E-04	1.21E-04	-16.6%
Co 57	6.13E-04	1.98E-05	-96.8%	Ni 65	5.77E-25	1.09E-24	88.9%
Co 58	1.33E-03	5.30E-05	-96.0%	Np237	3.94E-02	1.75E-01	344.2%
Co 60	1.67E-02	4.97E-04	-97.0%	Np238	3.47E-07	2.86E-06	724.2%
Cr 51	5.47E-06	3.06E-05	459.4%	Np239	4.03E-07	3.31E-06	721.3%
Cs134	1.41E-02	7.10E-02	403.5%	Os185	2.77E-02	3.11E-02	12.3%
Cs135	1.44E-03	7.00E-03	386.1%	P 32	4.30E-03	7.66E-03	78.1%
Cs137	1.01E-02	4.92E-02	387.1%	Pa233	4.55E+01	3.84E-05	-100.0%
Eu152	1.44E-03	5.35E-06	-99.6%	Pd109	4.60E-09	6.60E-09	43.5%
Eu154	2.17E-03	8.10E-06	-99.6%	Pm147	2.19E-04	8.36E-07	-99.6%
Eu155	3.07E-04	1.15E-06	-99.6%	Pm148	1.74E-04	1.19E-06	-99.3%
Fe 55	1.12E-03	3.57E-04	-68.1%	Pm151	7.71E-07	5.36E-09	-99.3%
Fe 59	6.11E-03	2.88E-03	-52.9%	Pu238	2.68E-03	1.87E-04	-93.0%

Table 48. POPDOSE-SR Collective Meat Ingestion Comparisons (person- rem/yr) **(continued)**

Popdose Meat Pathway							
Nuclide	**Hamby**	**Jannik**	**% Diff**	**Nuclide**	**Hamby**	**Jannik**	**% Diff**
Pu239	3.04E-03	2.12E-04	-93.0%	Te125M	8.48E-03	8.00E-04	-90.6%
Pu240	3.04E-03	2.12E-04	-93.0%	Te127	5.64E-10	8.57E-11	-84.8%
Pu241	6.02E-05	4.22E-06	-93.0%	Te127M	2.67E-02	2.11E-03	-92.1%
Pu242	2.90E-03	2.02E-04	-93.0%	Te129M	1.75E-02	1.97E-03	-88.7%
Ra224	2.18E-02	1.79E-03	-91.8%	Te131M	9.07E-05	1.30E-05	-85.7%
Ra228	2.01E+00	9.06E-02	-95.5%	Te132	9.23E-04	1.30E-04	-85.9%
Rb 86	4.00E-03	2.02E-03	-49.5%	Th228	3.59E-03	3.80E-03	5.8%
Rb 87	7.78E-03	2.21E-03	-71.6%	Th230	5.36E-03	5.45E-03	1.7%
Rh105	4.74E-07	6.84E-07	44.3%	Th232	2.83E-02	2.88E-02	1.8%
Rh106M	3.39E-28	6.18E-28	82.3%	Th234	4.17E-05	7.34E-05	76.0%
Ru103	2.36E-02	2.67E-04	-98.9%	U 232	2.23E-02	2.27E-02	1.8%
Ru105	7.54E-15	1.16E-16	-98.5%	U 233	4.64E-03	4.72E-03	1.7%
Ru106	3.80E-01	2.94E-03	-99.2%	U 234	4.46E-03	4.54E-03	1.8%
S 35	2.30E-03	4.89E-03	112.6%	U 235	4.29E-03	4.37E-03	1.9%
Sb122	2.51E-05	1.24E-05	-50.6%	U 236	4.29E-03	4.37E-03	1.9%
Sb124	1.01E-03	3.77E-04	-62.7%	U 237	4.82E-06	9.01E-06	86.9%
Sb125	5.03E-04	1.37E-04	-72.8%	U 238	3.95E-03	4.02E-03	1.8%
Sb126	3.83E-04	1.86E-04	-51.4%	W 187	8.33E-08	4.29E-06	5050.1%
Se 75	5.99E-03	5.08E-03	-15.2%	Y 90	4.43E-05	1.58E-05	-64.3%
Se 79	8.59E-03	5.59E-03	-34.9%	Y 91	1.09E-03	2.98E-04	-72.7%
Sm151	8.57E-05	4.87E-06	-94.3%	Y 92	3.70E-19	1.55E-19	-58.1%
Sn123	2.24E-02	2.39E-02	6.7%	Y 93	5.13E-10	1.95E-10	-62.0%
Sn126	6.87E-02	6.09E-02	-11.4%	Zn 65	1.94E-02	9.50E-02	389.7%
Sr 89	1.29E-04	3.68E-04	185.3%	Zr 93	2.75E-03	8.59E-08	-100.0%
Sr 90	3.94E-03	7.73E-03	96.2%	Zr 95	3.26E-03	1.41E-07	-100.0%
Sr 91	2.18E-11	8.28E-11	279.8%	Zr 97	7.63E-07	4.57E-11	-100.0%
Sr 92	4.07E-24	1.75E-23	330.0%	***TOTAL***	**4.90E+01**	**1.43E+00**	**-97.1%**
Tc 99	2.81E-02	1.69E-03	-94.0%				
Tc 99M	3.10E-13	1.11E-14	-96.4%				

Table 49. POPDOSE-SR Total Collective Dose Comparisons (person-rem/yr)

Popdose Total Pathway											
Nuclide	**Hamby**	**Jannik**	**% Diff**	**Nuclide**	**Hamby**	**Jannik**	**% Diff**	**Nuclide**	**Hamby**	**Jannik**	**% Diff**
Ar 41	2.48E-05	2.44E-05	-1.61%	Eu152	4.15E-01	3.29E-01	-20.72%	Ni 63	7.61E-03	1.56E-03	-79.50%
Ag110M	7.64E-01	5.12E-01	-32.98%	Eu154	4.82E-01	3.63E-01	-24.69%	Ni 65	2.76E-05	2.30E-05	-16.67%
Am241	2.95E+02	1.78E+02	-39.66%	Eu155	4.66E-02	2.95E-02	-36.70%	Np237	2.75E+02	1.68E+02	-38.91%
Am243	2.95E+02	1.78E+02	-39.66%	Fe 55	7.63E-03	1.50E-03	-80.34%	Np238	1.55E-02	1.12E-02	-27.74%
Ba139	3.16E-06	2.20E-06	-30.38%	Fe 59	1.34E-01	9.31E-02	-30.52%	Np239	1.77E-03	1.44E-03	-18.64%
Ba140	7.19E-02	5.55E-02	-22.81%	H 3	1.08E-04	7.49E-05	-30.65%	Os185	1.41E-01	1.30E-01	-7.80%
Ba141	4.52E-09	4.23E-09	-6.42%	Hf181	1.10E-01	4.74E-02	-56.91%	P 32	3.98E-02	4.03E-02	1.26%
Ba142	4.72E-11	4.93E-11	4.45%	I 129	1.55E+01	4.31E+00	-72.19%	Pa233	4.55E+01	1.49E-02	-99.97%
Be 7	5.28E-03	4.62E-03	-12.50%	131	3.33E-01	2.21E-01	-33.63%	Pd109	3.53E-04	2.49E-04	-29.46%
Br 83	5.09E-06	3.53E-06	-30.65%	I 132	6.76E-05	6.10E-05	-9.76%	Pm147	2.49E-02	1.19E-02	-52.21%
Br 84	1.54E-07	1.40E-07	-9.09%	I 133	2.96E-03	2.65E-03	-10.47%	Pm148	1.36E-02	8.70E-03	-36.03%
C 14	2.03E-02	1.19E-02	-41.38%	I 134	2.40E-06	2.21E-06	-7.92%	Pm151	1.26E-03	1.07E-03	-15.08%
Ce141	2.14E-02	8.48E-03	-60.37%	I 135	5.54E-04	4.78E-04	-13.72%	Pr144	1.34E-09	9.44E-10	-29.55%
Ce143	1.93E-03	1.51E-03	-21.76%	Kr 83M	1.79E-09	1.76E-09	-1.68%	Pu238	2.58E+02	1.57E+02	-39.15%
Ce144	3.48E-01	1.35E-01	-61.21%	Kr 85	6.19E-07	6.15E-07	-0.65%	I 132	6.76E-05	6.10E-05	-9.76%
Cf252	7.20E+01	4.44E+01	-38.33%	Kr 85M	1.30E-05	1.28E-05	-1.54%	I 133	2.96E-03	2.65E-03	-10.47%
Cm242	9.20E+00	5.79E+00	-37.07%	Kr 87	6.84E-06	6.71E-06	-1.90%	I 134	2.40E-06	2.21E-06	-7.92%
Cm243	1.98E+02	1.20E+02	-39.39%	Kr 88	1.28E-04	1.26E-04	-1.56%	I 135	5.54E-04	4.78E-04	-13.72%
Cm244	1.53E+02	9.23E+01	-39.67%	Kr 89	1.06E-18	8.85E-19	-16.51%	Kr 83M	1.79E-09	1.76E-09	-1.68%
Cm246	3.05E+02	1.85E+02	-39.34%	La140	7.52E-03	6.92E-03	-7.98%	Kr 85	6.19E-07	6.15E-07	-0.65%
Cm248	1.08E+03	6.50E+02	-39.81%	La141	7.22E-05	5.03E-05	-30.33%	Kr 85M	1.30E-05	1.28E-05	-1.54%
Co 57	3.97E-02	2.91E-02	-26.70%	La142	2.08E-05	1.89E-05	-9.13%	Kr 87	6.84E-06	6.71E-06	-1.90%
Co 58	1.34E-01	1.10E-01	-17.91%	Mn 54	1.84E-01	1.62E-01	-11.96%	Kr 88	1.28E-04	1.26E-04	-1.56%
Co 60	8.29E-01	5.66E-01	-31.72%	Mn 56	6.88E-05	6.10E-05	-11.34%	Kr 89	1.06E-18	8.85E-19	-16.51%
Cr 51	2.38E-03	1.84E-03	-22.69%	Mo 99	3.28E-03	2.58E-03	-21.34%	La140	7.52E-03	6.92E-03	-7.98%
Cs134	1.29E+00	5.90E-01	-54.26%	Na 24	3.11E-03	3.00E-03	-3.54%	La141	7.22E-05	5.03E-05	-30.33%
Cs135	9.55E-02	2.54E-02	-73.40%	Nb 95	7.35E-02	4.96E-02	-32.52%	La142	2.08E-05	1.89E-05	-9.13%
Cs137	8.03E-01	3.11E-01	-61.27%	Nb 97	2.71E-06	2.39E-06	-11.81%	Mn 54	1.84E-01	1.62E-01	-11.96%
Cs138	2.01E-07	1.88E-07	-6.47%	Ni 59	3.01E-03	7.38E-04	-75.48%	Mn 56	6.88E-05	6.10E-05	-11.34%

Table 49. POPDOSE-SR Total Collective Dose Comparisons (person-rem/yr) (continued)

Popdose Total Pathway											
Nuclide	**Hamby**	**Jannik**	**% Diff**	**Nuclide**	**Hamby**	**Jannik**	**% Diff**	**Nuclide**	**Hamby**	**Jannik**	**% Diff**
Mo 99	3.28E-03	2.58E-03	-21.34%	Rh106M	1.02E-05	7.07E-06	-30.69%	Te134	4.34E-07	3.70E-07	-14.75%
Na 24	3.11E-03	3.00E-03	-3.54%	Ru103	7.56E-02	3.79E-02	-49.87%	Th228	1.55E+02	1.05E+02	-32.26%
Nb 95	7.35E-02	4.96E-02	-32.52%	Ru105	1.42E-04	1.23E-04	-13.38%	Th230	1.61E+02	1.09E+02	-32.30%
Nb 97	2.71E-06	2.39E-06	-11.81%	Ru106	8.09E-01	2.00E-01	-75.28%	Th232	8.06E+02	5.43E+02	-32.63%
Ni 59	3.01E-03	7.38E-04	-75.48%	S 35	1.05E-02	7.69E-03	-26.76%	Th234	6.53E-02	1.42E-02	-78.25%
Ni 63	7.61E-03	1.56E-03	-79.50%	Sb122	4.48E-03	3.59E-03	-19.87%	U 232	3.39E+02	2.28E+02	-32.74%
Ni 65	2.76E-05	2.30E-05	-16.67%	Sb124	2.38E-01	1.78E-01	-25.21%	U 233	6.59E+01	4.43E+01	-32.78%
Np237	2.75E+02	1.68E+02	-38.91%	Sb125	1.25E-01	1.01E-01	-19.20%	U 234	6.58E+01	4.43E+01	-32.67%
Np238	1.55E-02	1.12E-02	-27.74%	Sb126	8.60E-02	6.67E-02	-22.44%	U 235	6.09E+01	4.10E+01	-32.68%
Np239	1.77E-03	1.44E-03	-18.64%	Sb126M	6.25E-09	5.79E-09	-7.36%	U 236	6.08E+01	4.09E+01	-32.73%
Os185	1.41E-01	1.30E-01	-7.80%	Se 75	2.52E-01	8.44E-02	-66.51%	U 237	5.30E-03	3.63E-03	-31.51%
P 32	3.98E-02	4.03E-02	1.26%	Se 79	2.68E-01	2.63E-02	-90.19%	U 238	6.07E+01	4.09E+01	-32.62%
Pa233	4.55E+01	1.49E-02	-99.97%	Sm151	1.72E-02	9.96E-03	-42.09%	W 187	9.06E-04	8.49E-04	-6.29%
Pd109	3.53E-04	2.49E-04	-29.46%	Sn123	9.92E-02	4.03E-02	-59.38%	Xe131M	2.30E-06	2.30E-06	0.00%
Pm147	2.49E-02	1.19E-02	-52.21%	Sn126	2.88E-01	1.18E-01	-59.03%	Xe133	9.20E-06	9.20E-06	0.00%
Pm148	1.36E-02	8.70E-03	-36.03%	Sr 89	6.90E-02	1.86E-02	-73.04%	Xe133M	7.28E-06	7.28E-06	0.00%
Pm151	1.26E-03	1.07E-03	-15.08%	Sr 90	1.81E+00	5.74E-01	-68.29%	Xe135	3.59E-05	3.59E-05	0.00%
Pr144	1.34E-09	9.44E-10	-29.55%	Sr 91	6.46E-04	5.31E-04	-17.80%	Xe135M	2.84E-09	2.84E-09	0.00%
Pu238	2.58E+02	1.57E+02	-39.15%	Sr 92	9.64E-05	7.88E-05	-18.26%	Xe137	1.60E-17	1.60E-17	0.00%
Pu239	2.87E+02	1.74E+02	-39.37%	Tc 99	5.56E-02	1.40E-02	-74.82%	Xe138	4.82E-09	4.82E-09	0.00%
Pu240	2.87E+02	1.74E+02	-39.37%	Tc 99M	3.36E-05	3.17E-05	-5.65%	Y 90	4.05E-03	2.67E-03	-34.07%
Pu241	5.63E+00	3.42E+00	-39.25%	Tc101	2.73E-10	2.30E-10	-15.75%	Y 91	7.67E-02	1.80E-02	-76.53%
Pu242	2.70E+02	1.64E+02	-39.26%	Te125M	3.67E-02	6.34E-03	-82.72%	Y 91M	4.33E-07	3.95E-07	-8.78%
Ra224	1.42E+00	9.34E-01	-34.23%	Te127	7.92E-05	5.56E-05	-29.80%	Y 92	8.39E-05	6.29E-05	-25.03%
Ra228	1.77E+01	2.15E+00	-87.85%	Te127M	1.02E-01	1.29E-02	-87.35%	Y 93	6.21E-04	4.42E-04	-28.82%
Rb 86	5.71E-02	3.18E-02	-44.31%	Te129	1.02E-06	7.46E-07	-26.86%	Zn 65	4.07E-01	2.20E-01	-45.95%
Rb 87	1.04E-01	3.12E-02	-70.00%	Te129M	8.00E-02	1.41E-02	-82.38%	Zr 93	1.73E-01	1.09E-01	-36.99%
Rb 88	4.12E-09	3.20E-09	-22.33%	Te131	2.93E-08	2.25E-08	-23.21%	Zr 95	1.88E-01	1.62E-01	-13.83%
Rb 89	1.68E-09	1.52E-09	-9.52%	Te131M	4.97E-03	4.22E-03	-15.09%	Zr 97	1.55E-03	1.12E-03	-27.74%
Rh105	6.12E-04	5.65E-04	-7.68%	Te132	6.47E-03	4.14E-03	-36.01%	***TOTAL***	**5.65E+03**	**3.51E+03**	**-37.88%**

Table 50. LADTAP XL 2009 Annual Report Maximally Exposed Individual Dose Comparisons (mrem)

Maximally-Exposed-Individual Dose (50-Yr CEDE) (mrem)			
Nuclide	**All Pathways**		**% Diff**
	2009 SRS Annual Report Doses	**Jannik 2010 Parameters (2009 Data)**	
H-3	1.3E-02	1.3E-02	0.28%
Zn-65	5.3E-05	8.9E-05	68.57%
Sr-90	1.2E-03	7.3E-04	-39.61%
Tc-99	4.6E-06	5.0E-06	9.36%
I-129	1.8E-03	2.3E-03	27.91%
Cs-137	4.7E-02	4.7E-02	-0.09%
U-234	5.7E-06	5.6E-06	-2.58%
U-235	7.7E-08	7.5E-08	-3.04%
U-238	3.6E-06	3.5E-06	-2.57%
Np-237	5.8E-06	7.1E-06	22.70%
Am-241	1.0E-04	4.4E-04	338.90%
Pu-238	1.2E-03	2.0E-03	63.21%
Pu-239	9.4E-05	1.5E-04	63.21%
Cm-244	1.4E-05	1.5E-05	7.88%
Unidentified alpha	1.07E-02	1.8E-02	63.21%
Unidentified beta	1.64E-03	9.9E-04	-39.61%
TOTAL Dose	**7.70E-02**	**8.4E-02**	**9.57%**

Table 51. LADTAP XL Annual Report Collective Dose Comparisons (person-rem)

Nuclide	All Pathways		% Diff
	2009 SRS Annual Report Doses	Jannik 2010 Parameters (2009 Data)	
H-3	8.05E-01	7.34E-01	-8.84%
Zn-65	7.94E-03	7.93E-03	-0.17%
Sr-90	4.59E-02	3.91E-02	-14.74%
Tc-99	2.37E-04	2.01E-04	-15.48%
I-129	9.29E-02	8.78E-02	-5.51%
Cs-137	1.45E-01	2.07E-01	42.74%
U-234	3.54E-04	3.22E-04	-8.80%
U-235	4.70E-06	4.28E-06	-8.97%
U-238	2.24E-04	2.04E-04	-8.80%
Np-237	2.99E-04	2.79E-04	-6.64%
Am-241	1.38E-02	8.29E-03	-40.02%
Pu-238	1.07E-01	1.20E-01	12.31%
Pu-239	8.25E-03	9.27E-03	12.31%
Cm-244	1.96E-03	1.15E-03	-41.33%
Unidentified alpha	9.42E-01	1.06E+00	12.31%
Unidentified beta	6.26E-02	5.34E-02	-14.74%
TOTAL Dose	**2.23E+00**	**2.33E+00**	**4.18%**

Table 52. LADTAP XL IRRIDOSE 2009 Annual Report Maximally Exposed Individual Dose Comparisons (mrem)

CALCULATION OF INDIVIDUAL DOSE			
Nuclide	**2009 SRS Annual Report Doses**	**Jannik 2010 Parameters (2009 Data)**	**% Diff**
	All Pathways	**All Pathways**	
H-3	1.1E-02	1.1E-02	0.00%
Zn-65	1.1E-05	1.8E-05	63.80%
Sr-90	2.5E-03	6.7E-03	163.15%
Tc-99	4.0E-04	4.0E-03	896.14%
I-129	6.7E-03	8.9E-03	33.45%
Cs-137	3.1E-03	4.3E-03	41.56%
U-234	1.7E-05	2.5E-05	46.69%
U-235	2.2E-07	3.2E-07	46.69%
U-238	1.1E-05	1.6E-05	46.69%
Np-237	1.4E-05	1.7E-05	25.12%
Am-241	1.8E-04	2.2E-04	21.19%
Pu-238	3.3E-03	3.9E-03	20.16%
Pu-239	2.5E-04	3.0E-04	20.10%
Cm-244	2.6E-05	3.0E-05	17.11%
Unidentified alpha	2.9E-02	3.4E-02	20.10%
Unidentified beta	3.5E-03	9.1E-03	162.85%
TOTAL Dose	**6.0E-02**	**8.3E-02**	**39.33%**

Table 53. LADTAP XL IRRIDOSE Annual Report Collective Dose Comparisons (person-rem)

CALCULATION OF POPULATION DOSE			
Nuclide	**All Pathways**		**% Diff**
	2009 SRS Annual Report Doses	**Jannik 2010 Parameters (2009 Data)**	
H-3	9.40E-01	1.80E-01	-80.90%
Zn-65	1.08E-03	1.13E-04	-89.46%
Sr-90	1.53E-01	1.73E-01	12.99%
Tc-99	2.60E-02	1.00E-01	285.68%
I-129	4.83E-01	1.70E-01	-64.85%
Cs-137	2.54E-01	6.91E-02	-72.75%
U-234	1.01E-03	6.14E-04	-39.14%
U-235	1.30E-05	7.90E-06	-39.14%
U-238	6.39E-04	3.89E-04	-39.14%
Np-237	8.06E-04	4.77E-04	-40.85%
Am-241	1.03E-02	5.97E-03	-42.08%
Pu-238	1.88E-01	1.09E-01	-41.95%
Pu-239	1.45E-02	8.42E-03	-41.98%
Cm-244	1.50E-03	8.47E-04	-43.54%
Unidentified alpha	1.66E+00	9.61E-01	-41.98%
Unidentified beta	2.09E-01	2.36E-01	12.85%
TOTAL Dose	**3.94E+00**	**2.01E+00**	**-48.86%**

Table 54. MAXDOSE SR Annual Report Maximally Exposed Individual Dose Comparisons (mrem)

Nuclide	All Pathways		% Diff
	2009 SRS Annual Report Doses	Jannik 2010 Parameters (2009 Data)	
Ag-110M	1.02E-13	9.55E-14	-6.37%
Am-241	2.22E-05	1.60E-05	-27.93%
Am-243	5.51E-09	4.11E-09	-25.41%
C-14	4.47E-11	4.47E-11	0.00%
Ce-144	8.38E-11	4.28E-11	-48.93%
Cm-244	1.08E-05	7.80E-06	-27.78%
Co-58	1.23E-13	1.04E-13	-15.45%
Co-60	1.21E-06	1.15E-06	-4.96%
Cs-134	1.88E-08	1.39E-08	-26.06%
Cs-137	1.74E-03	1.54E-03	-11.49%
Eu-154	7.49E-09	7.31E-09	-2.40%
H-3	3.36E-02	3.36E-02	0.00%
I-129	3.98E-03	1.75E-03	-56.03%
Ni-63	1.09E-13	5.85E-14	-46.33%
Np-237	1.38E-05	1.05E-05	-23.91%
Np-239	4.29E-12	2.95E-12	-31.24%
Pa-233	7.14E-06	1.70E-05	138.10%
Pm-147	1.02E-09	5.86E-10	-42.55%
Pu-238	3.21E-04	2.41E-04	-24.92%
Pu-239	3.48E-04	2.54E-04	-27.01%
Pu-240	2.49E-05	1.86E-05	-25.30%
Pu-241	1.42E-05	1.06E-05	-25.35%

Table 54. MAXDOSE SR Annual Report Maximally Exposed Individual Dose Comparisons (mrem) (continued)

Nuclide	All Pathways		% Diff
	2009 SRS Annual Report Doses	Jannik 2010 Parameters (2009 Data)	
Pu-242	1.27E-07	9.52E-08	-25.04%
Ra-228	3.82E-07	2.30E-07	-39.79%
Ru-103	2.34E-12	3.64E-12	55.56%
Ru-106	7.09E-10	8.20E-10	15.66%
Sb-124	1.07E-10	8.33E-11	-22.15%
Sb-125	8.45E-10	8.05E-10	-4.73%
Sn-126	1.02E-11	8.89E-12	-12.84%
Sr-89	5.37E-11	2.32E-11	-56.80%
Sr-90	3.77E-05	1.69E-05	-55.17%
Tc-99	1.42E-08	1.45E-08	2.11%
Th-228	2.43E-10	2.31E-10	-4.94%
Th-230	8.79E-11	8.18E-11	-6.94%
U-232	5.03E-09	4.63E-09	-7.95%
U-233	2.50E-10	2.29E-10	-8.40%
U-234	3.21E-05	2.91E-05	-9.35%
U-235	1.23E-06	1.12E-06	-8.94%
U-236	2.36E-08	2.16E-08	-8.47%
U-238	5.32E-05	4.84E-05	-9.02%
Zr-95	2.60E-12	2.39E-12	-8.08%
Alpha	9.05E-04	6.64E-04	-26.63%
Beta	7.43E-04	3.40E-04	-54.24%
Total	**4.19E-02**	**3.86E-02**	**-7.86%**

Table 55. POPDOSE SR Annual Report Collective Dose Comparisons (person-rem)

Nuclide	2009 SRS Annual Report Doses	Jannik 2010 Parameters (2009 Data)	% Diff
	All Pathways	All Pathways	
Ag110M	6.90E-12	5.74E-12	-16.81%
Am241	1.25E-03	7.12E-04	-43.04%
Am243	2.78E-07	1.59E-07	-42.81%
C 14	6.63E-10	3.89E-10	-41.33%
Ce144	3.22E-09	1.20E-09	-62.73%
Cm244	6.09E-04	3.48E-04	-42.86%
Co 58	8.31E-12	7.11E-12	-14.44%
Co 60	9.26E-05	8.99E-05	-2.92%
Cs134	1.04E-06	8.12E-07	-21.92%
Cs137	1.21E-01	1.11E-01	-8.26%
Eu154	5.94E-07	5.85E-07	-1.52%
H 3	1.64E+00	1.14E+00	-30.49%
I 129	1.14E-01	3.37E-02	-70.44%
Ni 63	3.33E-12	5.77E-13	-82.67%
Np237	7.05E-04	4.08E-04	-42.13%
Np239	1.74E-10	1.48E-10	-14.94%
Pa233	1.65E-04	5.18E-08	-99.97%
Pm147	4.03E-08	1.67E-08	-58.56%
Pu238	1.66E-02	9.53E-03	-42.59%
Pu239	1.91E-02	1.10E-02	-42.50%
Pu240	1.26E-03	7.22E-04	-42.70%
Pu241	7.21E-04	4.12E-04	-42.86%

(continued)

Nuclide	All Pathways		% Diff
	2009 SRS Annual Report Doses	Jannik 2010 Parameters (2009 Data)	
Pu242	6.44E-06	3.68E-06	-42.86%
Ra228	1.13E-05	1.12E-06	-90.09%
Ru103	9.83E-11	5.11E-11	-48.02%
Ru106	2.21E-08	6.56E-09	-70.32%
Sb124	6.91E-09	5.44E-09	-21.27%
Sb125	6.53E-08	6.36E-08	-2.60%
Sn126	5.65E-10	4.79E-10	-15.22%
Sr 89	2.30E-09	5.36E-10	-76.70%
Sr 90	1.45E-03	5.29E-04	-63.44%
Tc 99	3.81E-07	9.39E-07	146.46%
Th228	1.52E-08	1.02E-08	-32.89%

Th230	5.37E-09	3.57E-09	-33.52%
U 232	3.05E-07	2.03E-07	-33.44%
U 233	1.50E-08	9.98E-09	-33.47%
U 234	2.25E-03	1.50E-03	-33.33%
U 235	8.68E-05	5.92E-05	-31.80%
U 236	1.42E-06	9.41E-07	-33.73%
U 238	3.74E-03	2.49E-03	-33.42%
Zr 95	1.82E-10	1.62E-10	-10.99%
Alpha	4.88E-02	2.79E-02	-42.71%
Beta-Gamma	2.39E-02	8.72E-03	-63.44%
TOTAL	**2.00E+00**	**1.35E+00**	**-32.35%**