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	Print Name	Signature	Date
6. Originator	Donald A. Kalinich	[signature]	9-30-99
7. Checker	Sen Sung Tsai	Sen Sung Tsai	9-30-99
8. Lead	Richard Morissette	Richard C Morissette	9-30-99

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1. PURPOSE

The purpose of this calculation is to calculate source terms and offsite doses for Department of Energy (DOE) spent nuclear fuels (SNFs) and Navy SNF for use in design basis event (DBE) analyses. These source terms and offsite doses will be used to support pre-closure safety assessments for License Application. This calculation is performed using AP-3.12Q, *Calculations*.

2. METHOD

2.1 SOURCE TERM CALCULATION

2.1.1 Evaluation of Source Terms from Fuel Inventory

The source term released to the environment by a postulated DBE is calculated by (DOE 1994, p. 1-2)

$$ST_j = Inv_j \times fInv \times DR_j \times ARF_j \times LPF_j \tag{1}$$

where

- ST_j - the amount of the jth isotope that is released to the environment [Ci]
- Inv_j - the amount of the jth isotope in the given fuel type [Ci]
- $fInv$ - the fraction of the fuel inventory that is involved in the DBE [-]
- DR_j - the fraction of the jth isotope in the "material-at-risk" that is affected by the DBE [-]
- ARF_j - the airborne release fraction of the jth isotope applicable to the DBE [-]
- LPF_j - the leak path factor for the jth isotope applicable to the DBE [-]

The portion of the source term that is respirable is equal to

$$ST_j^{inh} = ST_j \times RF_j \tag{2}$$

where

- ST_j^{inh} - the respirable amount of the jth isotope that is released to the environment [Ci]
- RF_j - the respirable fraction of the jth isotope applicable to the DBE [-]

The SNF isotopic compositions provided by the National Spent Nuclear Fuel Program (NSNFP) (NSNFP 1999) are given in terms of the entire fuel inventories scheduled to be disposed of in the Monitored Geologic Repository (MGR). For example, if a fuel inventory is made up of 400 canisters, the isotopic data provided would be for all 400 canisters. Since the entire inventory of a

given fuel type would not be involved in a potential accident event the scaling factor ($fInv$) is used to adjust the total isotopic inventory to the amount involved in an event.

This calculation will determine the per canister dose for the SNF. In cases where the number of canisters (n_{can}) is greater than or equal to 1.0, the fraction of a given total SNF inventory involved in an event is the inverse of n_{can} [Assumption 3.2].

$$fInv = \frac{n_{canDBE}}{n_{canInv}} \quad \text{where } n_{canInv} \geq n_{canDBE} \tag{3}$$

where

n_{canInv} - total number of canisters for a given fuel inventory [canisters]

n_{canDBE} - total number of canisters involved in the DBE [canisters]

If an SNF inventory does not completely fill a canister (i.e., it is listed as having less than one canister) the entire inventory is involved in the event; in this case $fInv$ is set equal to one. .

$$fInv = 1 \quad \text{for } n_{can} < 1 \tag{4}$$

A damage ratio (DR) of 1.0 is conservatively assumed for all of the isotopes that comprise the total material-at-risk [Assumption 3.8]. A leak path factor (LPF) of 1.0 is used if no high efficiency particulate air (HEPA) filtration is assumed [Assumption 3.7]. If HEPA filtration is assumed an LPF of 3.0E-04 is used (Burchsted, et al. 1978, page 9).

The airborne release fractions (ARFs) and respirable fractions (RFs) used in the calculation are taken from a number of documents. The specific values used are discussed in Section 5.2.7.

2.1.2 Evaluation of Source Terms from DOE SNF Crud Inventory

Crud or corrosion products has been found on the exterior surface of spent nuclear fuel assemblies due to irradiation and imperfect water chemistry control in the reactor coolant system. Crud can be released to the environment during a DBE involving spent nuclear fuels at the potential repository.

The DOE SNF crud surface activity would be bounded by the commercial spent nuclear fuel (CSNF) crud surface activity since CSNF has a much higher burn-up (LMITCO 1999, p. 2) [Assumption 3.9]. CSNF crud activity was found to be dominated by Fe-55 and Co-60 (Jones 1992, Tables 1&2). For pressurized water reactor (PWR) crud at 5 years after discharge, surface activities of 1,658.3 $\mu Ci/cm^2$ and 36.3 $\mu Ci/cm^2$ for Fe-55 and Co-60, respectively, are recommended (CRWMS M&O 1999a). For boiling water reactor (BWR) crud at 5 years after discharge, surface activities of 2,083.4 $\mu Ci/cm^2$ and 324.9 $\mu Ci/cm^2$ for Fe-55 and Co-60, respectively, are recommended (CRWMS M&O 1999a). For CSNF, the following assembly data are obtained from *Source Terms for Design Basis Event Analyses* (CRWMS M&O 1996, pp. 7-8):

Assembly Surface Area:	PWR = 353,536 cm^2/assembly BWR = 111,235 cm^2/assembly
Assembly Uranium Inventory:	PWR = 0.464 MTU/assembly BWR = 0.196 MTU/assembly

Using the above data, the crud surface activities per metric ton of uranium (MTU) are calculated below:

$$C'_{\text{Fe-55.PWR}} = \frac{\left[1658.3\,\frac{\mu\text{Ci}}{\text{cm}^2}\right] \times \left[353{,}536\,\frac{\text{cm}^2}{\text{assembly}}\right]}{\left[0.464\,\frac{\text{MTU}}{\text{assembly}}\right]} = 1.264 \times 10^9\,\frac{\mu\text{Ci}}{\text{MTU}} \tag{5}$$

$$C'_{\text{Co-60.PWR}} = \frac{\left[36.3\,\frac{\mu\text{Ci}}{\text{cm}^2}\right] \times \left[353{,}536\,\frac{\text{cm}^2}{\text{assembly}}\right]}{\left[0.464\,\frac{\text{MTU}}{\text{assembly}}\right]} = 2.766 \times 10^7\,\frac{\mu\text{Ci}}{\text{MTU}} \tag{6}$$

$$C'_{\text{Fe-55.BWR}} = \frac{\left[2083.4\,\frac{\mu\text{Ci}}{\text{cm}^2}\right] \times \left[111{,}235\,\frac{\text{cm}^2}{\text{assembly}}\right]}{\left[0.196\,\frac{\text{MTU}}{\text{assembly}}\right]} = 1.182 \times 10^9\,\frac{\mu\text{Ci}}{\text{MTU}} \tag{7}$$

$$C'_{\text{Co-60.BWR}} = \frac{\left[324.9\,\frac{\mu\text{Ci}}{\text{cm}^2}\right] \times \left[111{,}235\,\frac{\text{cm}^2}{\text{assembly}}\right]}{\left[0.196\,\frac{\text{MTU}}{\text{assembly}}\right]} = 1.844 \times 10^8\,\frac{\mu\text{Ci}}{\text{MTU}} \tag{8}$$

where

$C'_{\text{Fe-55.PWR}}$ - Fe-55 activity per MTU in PWR crud [Ci Fe-55/MTU]
$C'_{\text{Co-60.PWR}}$ - Co-60 activity per MTU in PWR crud [Ci Co-60/MTU]
$C'_{\text{Fe-55.BWR}}$ - Fe-55 activity per MTU in BWR crud [Ci Fe-55/MTU]

$C'_{\text{Co-60.BWR}}$ - Co-60 activity per MTU in BWR crud [Ci Co-60/MTU]

BWR crud will be selected to represent the CSNF crud, since the above calculations show that BWR crud has a higher activity per MTU. The DOE SNF crud surface activity would be bounded by the CSNF crud surface activity since CSNF has a much higher burnup. Assuming that the DOE crud surface activity per MTHM (metric ton of heavy metal) is bounded by the BWR crud surface activity per MTU [Assumptions 3.9] and that CSNF MTU can be substituted for CSNF MTHM values [Assumption 3.10], the activity of crud in a DOE canister can be calculated as follows:

$$C_{\text{Fe-55}} = C'_{\text{Fe-55.BWR}} \frac{Inv_{MTHM}}{n_{can.Inv}} \tag{9}$$

and

$$C_{\text{Co-60}} = C'_{\text{Co-60.BWR}} \frac{Inv_{MTHM}}{n_{can.Inv}} \tag{10}$$

where

$C_{\text{Fe-55}}$ - per canister Fe-55 activity for DOE SNF crud [Ci Fe-55/canister]
$C_{\text{Co-60}}$ - per canister Co-60 activity for DOE SNF crud [Ci Co-60/canister]
Inv_{MTHV} - DOE SNF inventory MTHM per canister [MTHM/canister]

The crud source term released to the environment is calculated by

$$ST_j = C_j \times DR_j \times ARF_j \times LPF_j \tag{11}$$

with the respirable portion of the source term being equal to

$$ST_j^{inh} = ST_j \times RF_j \tag{12}$$

where

C_j - activity of the jth DOE SNF crud isotope [Ci]

A DR of 1.0 is conservatively assumed for all of the isotopes that comprise the crud inventory [Assumption 3.8]. An LPF of 1.0 is used if no HEPA filtration is assumed [Assumption 3.7]. If HEPA filtration is assumed an LPF of 3.0E-04 is used (Burchsted, et al. 1978, page 9).

The ARF and RF values used in the calculation are discussed in Section 5.2.7.

2.1.3 Source Terms from Navy SNF

Due to the robust nature of naval fuel designs, fission products contained by the fuel cladding will not be released in a DBE (Navy 1999). Therefore the Navy SNF source term consists primarily of activated corrosion products. Those corrosion products and their quantities are provided in Navy (1999) (p. 2).

$$ST_j = N_j \times LPF_j \qquad \text{noting that} \quad ST_j^{inh} = ST_j \quad \text{for Navy SNF} \tag{13}$$

where

N_j - activity of the jth Navy SNF isotope [Ci]

An LPF of 1.0 is used if no HEPA filtration is assumed [Assumption 3.7]. If HEPA filtration is assumed an LPF of 3.0E-04 is used (Burchsted, et al. 1978, page 9).

2.2 DOSE CALCULATION

Only the inhalation and air submersion dose are considered in this calculation; the potential doses from ingestion, water immersion, and contaminated soil are ignored [Assumptions 3.1 and 3.5].

The inhalation dose to an individual from each isotope in the source term is (NRC 1977, Sections C.2 and C.3)

$$D_{j,k}^{inh} = ST_j^{inh} \times \frac{\chi}{Q} \times BR \times conv \times DCF_{j,k}^{inh} \tag{14}$$

while the air submersion dose is [Assumption 3.5]

$$D_{j,k}^{sub} = ST_j \times \frac{\chi}{Q} \times conv \times DCF_{j,k}^{sub} \tag{15}$$

where

$D_{j,k}^{inh}$ - radiation dose from the jth isotope to the kth "organ" due to inhalation [rem]

$D_{j,k}^{sub}$ - radiation dose from the jth isotope to the kth "organ" due to air submersion [rem]

k - "organ" index, where "organs" are gonads, breast, lungs, red marrow, bone surface, thyroid, remainder, effective, and skin [-]

$\frac{\chi}{Q}$ - atmospheric dispersion factor [s/m^3]

BR - breathing rate [m^3/s]

$DCF_{j,k}^{inh}$ - the inhalation dose conversion factor of the jth isotope for the kth organ [Sv/Bq]

$DCF_{j,k}^{sub}$ - the submersion dose conversion factor of the jth isotope for the kth organ [(Sv m^3)/(Bq s)]

conv - DCF unit conversion factor: 3.7E+12 (rem-Bq)/(Ci-Sv) (Eckerman, et al. 1988, p. 121)

Regulatory requirements applicable to the MGR (Dyer 1999) specify four dose measures for Category 2 DBEs.

- The total effective dose equivalent (TEDE). The TEDE is equal to the committed effective dose equivalent (CEDE) plus the deep dose equivalent (DDE) per the definition in 10 CFR 20, Section 1003. The CEDE is calculated using the "effective" inhalation dose conversion factor (DCF). The DDE is calculated using the "effective" air submersion DCF.

- The highest of the seven committed dose equivalents (CDEs) plus the DDE. The seven organs evaluated to find the highest CDE are the lungs, breasts, gonads, red marrow, bone surface, thyroid, and remainder. The DDE which is added to the highest CDE is equal to that used to calculate the TEDE, as per the definition of DDE in 10 CFR 20, Section 1003.

- Lens of the Eye. No doses are calculated for this limit in this calculation, as none of the 57 DOE SNF isotopes have lens of the eye DCFs given in either Federal Guidance Report 11 (Eckerman, et al. 1988) or Federal Guidance Report 12 (Eckerman, K. F., and Ryman, J. C. 1993). In the two Federal Guidance reports only Kr-83m (an isotope not contained in any DOE SNF) has a lens of the eye DCF (Eckerman, et al. 1988, p. 182).

- Skin & Extremities. The dose to the skin and extremities is only due to the air submersion dose pathway.

The TEDE and CDEs+DDE dose measures then can be expressed, ignoring the ingestion dose pathway [Assumption 3.1] as

$$TEDE = CEDE + DDE = \sum_j D_{j,effective}^{inh} + \sum_j D_{j,effective}^{sub} \tag{16}$$

$$CDE_k + DDE = \sum_j D_{j,k}^{inh} + \sum_j D_{j,effective}^{sub} \quad \text{where } k \neq \text{effective or skin} \tag{17}$$

where

TEDE - total effective dose equivalent [rem]
CEDE - committed effective dose equivalent [rem]
DDE - deep dose equivalent [rem]
CDE_k - committed dose equivalent to the kth organ [rem]

The skin & extremities dose is equal to

$$SKIN = \sum_j D_{j,skin}^{sub} \tag{18}$$

where

SKIN - dose to the skin & extremities [rem]

2.3 TREATMENT OF DOSE CONVERSION FACTORS

The inhalation DCFs used in this calculation are taken from Federal Guidance Report 11 (Eckerman et al. 1988). The inhalation DCF of an isotope is dependent in part on its chemical form. This dependence is accounted for by the lung clearance class (D – daily, W – Weekly, Y – Yearly) used to evaluate the DCF of a given isotope. Some isotopes have only one lung clearance class, others have multiple lung clearance classes. For isotopes with multiple lung clearance classes, the lung clearance class that yields the highest DCF is assumed on a per organ basis [Assumption 3.4]. For example, Pu-238 (which has W- and Y-clearance classes) has the highest lung inhalation DCF for the Y-clearance class, while all of the other organs have the highest inhalation DCF for the W-clearance class [Assumption 3.4].

DOE SNF isotopes that have lung clearance classes other than or in addition to D, W, and/or Y are (Eckerman et al. 1988):

- H-3 –water vapor
- C-14 – organic., CO, and CO_2,
- Ni-59 – daily, weekly, and vapor
- Ni-63 – daily, weekly, and vapor

Nickel, being a metal, is in the vapor phase only at temperatures well-above ambient. As there are no events postulated in the *Preliminary Design Basis Event Calculations for the Monitored Geologic Repository* (CRWMS M&O 1998) in which temperatures well-above ambient occur, it is not anticipated that nickel isotopes in any potential source term will be in the vapor phase. Hence, only daily and weekly lung clearance classes are considered [Assumption 3.4].

The air submersion DCFs used in this calculation are taken from Federal Guidance Report 12 (Eckerman and Ryman 1993).

The inhalation DCFs from Eckerman et al. (1988) account for the presence of short-lived daughter products; however, the air submersion DCFs from Eckerman and Ryman (1993) do not. For example, the inhalation DCF for Cs-137 accounts for the presence of Ba-137m (Cs-137 has a DCF listed for it, while Ba-137m does not); however, separate air submersion DCFs are listed for each isotope.

Using the radioactive decay product data in Table A.1 of Eckerman and Ryman (1993), four DOE SNF isotopes are identified as having a short-lived (half-life < 2 hours) daughter product (see Attachment XI). The total air submersion DCF from the parent/daughter pair is then

$$DCF_j^{sub} = DCF_j^{sub-parent} + f \times DCF_j^{sub-daughter} \tag{19}$$

where

DCF_j^{sub}	-	total air submersion DCF for the jth organ [(rem m^3)/(Ci s)]
$DCF_j^{sub-parent}$	-	air submersion DCF for the jth organ from the parent isotope [(rem m^3)/(Ci s)]
$DCF_j^{sub-daughter}$	-	air submersion DCF for the jth organ from the daughter isotope [(rem m^3)/(Ci s)]
f	-	fraction of the parent isotope that decays to the daughter isotope [-]

The total air submersion DCFs for Ac-227, Cs-137, Ru-106, and Sn-126 are calculated in Attachment XI.

3. ASSUMPTIONS

The following assumptions are used in this calculation.

3.1 Only inhalation and air submersion doses are considered in this calculation; the potential doses from ingestion, water immersion, and contaminated soil are ignored.

Basis: This assumption implies that these doses are negligible in comparison to the combined inhalation and air submersion dose and/or the receptors at the assumed site boundary are evacuated shortly after the postulated event, thus precluding these source term pathways.

This assumption is used in Section 2.2.

3.2 In calculating the fraction of inventory at-risk, it is assumed that all of the canisters of a given fuel type have the same isotopic composition.

Basis: If the isotopic data are not sufficiently skewed to adequately account for variation in the isotopic composition of a given fuel type this assumption is non-conservative. Uncertainty analysis needs to be performed to determine the effect of non-homogenous isotopic composition on the calculation results.

This assumption is used in Section 2.1.

3.3 The dose receptor is assumed to be at a distance of 5 km from any postulated DBE source term release (YMP 1999, Section 3.3.J).

Basis: *Monitored Geologic Repository Requirements Document* (YMP 1999).

This assumption is used in Section 5.2.2.

3.4 For isotopes with multiple clearance classes, the lung clearance class that yields the highest inhalation DCF is assumed on a per organ basis. An exception to this assumption are nickel isotopes, where the vapor phase lung clearance class is not considered, as vapor-phase nickel is not expected to be present in the potential accident source terms, based on the accidents described in "Preliminary Design Basis Event Calculations for the Monitored Geologic Repository" (CRWMS M&O 1998).

Basis: This assumption maximizes the calculated inhalation doses.

This assumption is used in Attachments III to VIII, and X.

3.5 It is assumed that the Deep Dose Equivalent is equal to the effective dose equivalent from air submersion, and that the external dose contribution from water immersion and contaminated soil is negligible.

Basis: This assumption implies that these doses are negligible in comparison to the combined inhalation and air submersion dose and/or the receptors at the assumed site boundary are evacuated shortly after the postulated event, thus precluding these source term pathways.

This assumption is used in Section 2.2.

3.6 It is assumed that the ARFxRF for stable metal/intact DOE SNF is equal to 8.0E-07.

Basis: This assumption is based on information given for SNF in the *Nuclear Fuel Cycle Accident Analysis Handbook* (NRC 1998, p. 3-9).

This assumption is used in Section 5.2.

3.7 If HEPA filtration is not credited a leak path factor (LPF) of 1.0 is conservatively used in this calculation.

Basis: Using an LPF of 1.0 implies taking no credit for source term reduction mechanisms such as gravitational settling or operation of the Waste Handling Building ventilation system (i.e., HEPA filtration of the source term before it is released to the environment). This is a bounding assumption.

This assumption is used in Section 2.1.1 and Attachments III to VIII, and X.

3.8 A Damage Ratio (DR) of 1.0 is conservatively assumed for this analysis.

Basis: A damage ratio of 1.0 is a conservatively bounding value.

This assumption is used in Section 2.1.1, and Attachments III to VIII, and X.

3.9 The Co-60 and Fe-55 (crud) assembly surface activity for CSNF is bounding for DOE SNF.

Basis: The Co-60 and Fe-55 assembly surface activity is proportional to the fuel burnup. Since CSNF has higher burnup in comparison to DOE SNF (LMITCO 1999, p. 2), it is expected the CSNF would bound the Co-60 and Fe-55 assembly surface activity of DOE SNF.

This assumption is used in Section 2.1.2.

3.10 In the calculation of the bounding crud inventories the CSNF assembly uranium inventory is assumed to be equal to the assembly Heavy Metal inventory.

Basis: The CSNF MTU per assembly has to be equal to or less than the MTHM per assembly (MTU is a subset of MTHM). Therefore using the MTU per assembly to calculate the Curie inventories per MTHM yields a result equal or greater than that if the actual MTHM per assembly values were used.

This assumption is used in Section 2.1.2.

4. USE OF COMPUTER SOFTWARE AND MODELS

4.1 SCIENTIFIC AND ENGINEERING SOFTWARE

No scientific and engineering software, as defined by AP-SI.1Q, *Software Management*, are used in this analysis.

4.2 SOFTWARE ROUTINES AND MACROS

4.2.1 Documentation of Information Required by AP-SI.1Q

Software routines and macros, as defined by AP-SI.1Q, are used in this analysis – specifically, an Excel workbook. The procedure requires documentation of the following information regarding the workbook and macro:

- *A listing of the version and any subsequent changes to the software:*
  The workbook has no specific version; it is explicitly coupled with this analysis and its documentation. No changes can be made to the workbook without a revision of this analysis document, or the production of a separate calculation that documents the changes.

- *The version identification of the application the routine or macro was developed in:*

The workbook was developed in Excel 97 SR-2 under the Windows 95 operating system on a PC platform.

- *Documentation that the workbook and macro provide correct results for a specified range of input parameters.*
  The checking process provides verification that the results documented in Attachments III-XI are correct for the input data contained therein.

- *The installation and checkout steps performed upon first use of the software routine or macro on a new platform, operating system, or new user's location:*
  The workbook has only been developed to function under Excel 97 on a PC platform with the Windows 95 operating system. Execution of the workbook under a different version of Excel, on a different computing platform, and/or with a different operating system may impact the veracity of their results.

4.2.2 Workbook and Macro Overview Information

The Excel workbooks **DOE SNF per Canister Source Term and Dose Calculations** (Attachments III to VIII) contains the following spreadsheets. Note that a separate workbook exists for each fuel evaluated:

- **Fuel Data:** Contains the isotopic inventory of the DOE SNFs that are being evaluated, including crud isotopes (see Attachment IX). The specific fuel that is evaluated is denoted by an "x" in the row "evaluated fuel." These data are copied to column 10.

- **Parameters:** Contains the ARF, RF, and LPF data for the DOE SNF fuel types and fuel conditions that are evaluated in this calculation. The ARF, RF, and LPF data that correspond to the fuel being evaluated are copied to the "Released Fractions Used in this Calculation" table.

  The spreadsheet also contains the breathing rate, ground-level dispersion factor, and Sv/Bq to rem/Ci conversion factor.

- **Inhalation DCFs:** Contains inhalation DCFs from Eckerman et al. (1988).

- **Air Submersion DCFs:** Contains air submersion DCFs from Eckerman and Ryman (1993), modified to account for implicit daughter products (see Attachment XI).

- **ST Calc – no HEPAs:** The isotopic inventory for the evaluated fuel is copied into column 2 from the fuel data spreadsheet. The fraction of the total fuel inventory that is involved in the DBE (*fInv*) is calculated in column 3. The ARF and RF are copied to columns 4 and 5 based on the fuel type, fuel condition, and isotope material type. LPF is copied to column 6, based on the HEPA filter status (yes/no) and the isotope material type.

Equations (1) and (2) are used to calculate the source term released to the environment and the respirable source term released to the environment in columns 7 and 8. Note that a bounding *DR* of 1.0 is used in the source term calculation [Assumption 3.8].

- **ST Calc – HEPAs:**. The isotopic inventory for the evaluated fuel is copied into column 2 from the fuel data spreadsheet. The fraction of the total fuel inventory that is involved in the DBE (*fInv*) is calculated in column 3. The ARF and RF are copied to columns 4 and 5 based on the fuel type, fuel condition, and isotope material type. LPF is copied to column 6, based on the HEPA filter status (yes/no) and the isotope material type.

  Equations (1) and (2) are used to calculate the source term released to the environment and the respirable source term released to the environment in columns 7 and 8. Note that a bounding *DR* of 1.0 is used in the source term calculation [Assumption 3.8].

- **Inhalation Doses – no HEPAs:** Inhalation doses are calculated using Equation (14) with the unfiltered respirable source term released to the environment (as calculated in **ST calc – no HEPAs** spreadsheet) the inhalation DCFs (from the **Inhalation DCFs** spreadsheet), and the atmospheric dispersion factor and breathing rate (from the **Parameters** spreadsheet).

- **Air Submersion Doses – no HEPAs:** Air submersion doses are calculated using Equation (15) with the unfiltered source term released to the environment (as calculated in **ST calc – no HEPAs** spreadsheet) the inhalation DCFs (from the **Air Submersion DCFs** spreadsheet), and the atmospheric dispersion factor (from the **Parameters** spreadsheet).

- **Inhalation Doses – HEPAs:** Inhalation doses are calculated using Equation (14) with the HEPA-filtered respirable source term released to the environment (as calculated in **ST calc –HEPAs** spreadsheet) the inhalation DCFs (from the inhalation DCFs spreadsheet), and the atmospheric dispersion factor and breathing rate (from the **Parameters** spreadsheet).

- **Air Submersion Doses –HEPAs:** Air submersion doses are calculated using Equation (15) with the HEPA-filtered source term released to the environment (as calculated in **ST calc – HEPAs** spreadsheet) the inhalation DCFs (from the inhalation DCFs spreadsheet), and the atmospheric dispersion factor (from the **Parameters** spreadsheet).

- **Final Results:** The inhalation and air submersion doses for the gonad, breasts, lung, red marrow, bone surface, thyroid, remainder, whole body, and skin are copied from the respective "no HEPAs" and "HEPAs" spreadsheets.

  The inhalation whole body dose (CEDE) is added to the whole body air submersion dose (DDE) to calculate the TEDE, as per Equation (16).

  The highest inhalation organ dose (highest CDE) is identified and the whole body air submersion dose (DDE) is added to it, as per Equation (17).

- **TEDE and CDE+DDE:** The TEDE and highest CDE+DDE isotopic doses for both the "no HEPAs" and "HEPAs" case are copied to this spreadsheet. These data are used in the **Importance** calculations.

- **Importance:** Calculates the contribution to the total dose (both TEDE and highest CDE+DDE) for each material type (e.g., particulate, cesium, gas, and crud).

The Excel workbook **Crud Inventory Calculations** contains the following spreadsheets (see Attachment IX):

- **sorted fuels:** DOE SNF data (SNFID, fuel name, fuel matrix, fuel condition, MTHM, and number of canisters) are taken from NSNFP (1999). The MTHM per canister is calculated for each fuel. Then the fuels are sorted by fuel matrix, fuel condition, and by MTHM per canister in descending order. The fuel in each group with the highest MTHM per canister is denoted by **boldface** type.

- **bounding crud inventories:** The bounding MTHM per canister for each fuel group (taken from the **sorted fuels** spreadsheet) is multiplied by the Curies per MTHM for Co-60 and Fe-55 (see Section 2.1.2).

The Excel workbook **Navy SNF per Canister Dose Calculations** contains the following spreadsheets (see Attachment X):

- **Input Parameters:** Column 2 contains the source term released from a single canister (Navy 1999). The unfiltered and HEPA filtered source terms released to the environment is calculated in columns 3 and 4.

  The spreadsheet also contains the HEPA filtration LPF, breathing rate, ground-level dispersion factor, and Sv/Bq to rem/Ci conversion factor.

- **Inhalation DCFs:** Contains inhalation DCFs from Eckerman et al. (1988).

- **Air Submersion DCFs:** Contains air submersion DCFs from Eckerman and Ryman (1993), modified to account for implicit daughter products (see Attachment IX).

- **Inhalation Doses – no HEPAs:** Inhalation doses are calculated using Equation (14) with, the inhalation DCFs (from the **Inhalation DCFs** spreadsheet), and the unfiltered respirable source term released to the environment, the atmospheric dispersion factor, and breathing rate (from the **Input Parameters** spreadsheet).

- **Air Submersion Doses – no HEPAs:** Air submersion doses are calculated using Equation (15) with the inhalation DCFs (from the **Air Submersion DCFs** spreadsheet), and the

unfiltered source term released to the environment and the atmospheric dispersion factor (from the **Input Parameters** spreadsheet).

- **Inhalation Doses – HEPAs:** Inhalation doses are calculated using Equation (14) with, the inhalation DCFs (from the **Inhalation DCFs** spreadsheet), and the HEPA-filtered respirable source term released to the environment, the atmospheric dispersion factor, and breathing rate (from the **Input Parameters** spreadsheet).

- **Air Submersion Doses –HEPAs:** Air submersion doses are calculated using Equation (15) with the inhalation DCFs (from the **Air Submersion DCFs** spreadsheet), and the HEPA-filtered source term released to the environment and the atmospheric dispersion factor (from the **Input Parameters** spreadsheet).

- **Final Results:** The inhalation and air submersion doses for the gonad, breasts, lung, red marrow, bone surface, thyroid, remainder, whole body, and skin are copied from the respective "no HEPAs" and "HEPAs" spreadsheets.

  The inhalation whole body dose (CEDE) is added to the whole body air submersion dose (DDE) to calculate the TEDE, as per Equation (16).

  The highest inhalation organ dose (highest CDE) is identified and the whole body air submersion dose (DDE) is added to it, as per Equation (17).

The Excel workbook **DCFs for Parent-Implicit Daughter Products** contains the following spreadsheets (see Attachment XI):

- **isotope list:** Contains a listing of the DOE SNF isotope parent and daughter product half-lives and decay fractions. The isotopes that meet the implicit daughter product criteria (see Section 2.3) are denoted by **boldface** type.

- **calculation:** Contains the total air submersion DCF calculations (see Section 2.3) for the isotopes identified as having implicit daughter products.

4.3 MODELS

No models, as defined by AP-SI.1Q, are used in this analysis.

5. CALCULATION

5.1 CALCULATION DESCRIPTION

The calculations, as described by the methods in Section 2, are performed in the following Excel workbooks:

- **DOE SNF per Canister Source Term and Dose Calculations**
- **DOE SNF per Canister Crud Inventory Calculations**
- **Navy SNF per Canister Dose Calculations**
- **DCFs for Parent-Implicit Daughter Isotopes Calculations**

The **DOE SNF per Canister Source Term and Dose Calculations** are performed on six DOE SNFs:

- HWCTR (U/TH) [112]
- ALUM CLAD SNF [411]
- Shippingport PWR Core II [193]
- Saxton (MOX) [787]
- EBWR (U Metal) LEU [64]
- N Reactor [147]

The workbooks for these calculations are located in Attachments III through VIII.

The bounding crud inventory associated with each fuel group (i.e. fuel matrix and fuel condition) is calculated in the Excel workbook **DOE SNF per Canister Crud Inventory Calculations** (see Attachment IX).

Per Canister dose calculations for Navy SNF are performed in **Navy SNF per Canister Dose Calculations** (see Attachment X).

The determination and calculation of implicit daughter products that contribute to the air submersion DCFs are performed in **DCFs for Parent-Implicit Daughter Isotopes Calculations** (see Attachment XI).

The input parameters used in the calculations are given in Section 5.2.

5.2 INPUT PARAMETERS

5.2.1 Inhalation and air submersion DCFs are taken from Federal Guidance Report 11 and Federal Guidance Report 12, respectively. The DCFs used in this analysis are listed in Attachments III-VIII, and X. The Sv/Bq to rem/Ci unit conversion factor is taken form Federal Guidance Report 11.

Basis: Eckerman et al. (1988), Table 2.1, pp. 121-153, Eckerman and Ryman (1993), Table III.1, pp. 57-73, and Eckerman et al. (1988), p. 121.

Data Status: Accepted. These input parameters are accepted data based on their existence as established fact, as defined by Procedure AP-SIII.2Q, *Qualification of Unqualified Data and Documentation of Rational for Accepted Data.* DCFs produced by the

Environmental Protection Agency (EPA) are generally accepted by the scientific and engineering community and found to be technically defensible by those using it.

5.2.2 The atmospheric dispersion factors are based on Yucca Mountain site-specific data obtained from the Environmental Field Program (CRWMS M&O 1999b). The values were calculated using the equations prescribed in Regulatory Guide 1.145 (NRC 1982). An atmospheric dispersion factor of 4.68E-05 sec/m^3 is used in the dose calculations for the assumed 5-km dose receptor.

Basis: CRWMS M&O (1999b), p. 4.

Data Status: Unqualified.

5.2.3 An adult breathing rate of 3.33E-04 m^3/s (20 liters/min) is used for all dose calculations. This is based on the Reference Man breathing rate established in ICRP (1975). This breathing rate is based on the volume intake of air for "light activity" and is considered to be appropriate for DBE accident scenarios resulting in short-term (< 8-hour) exposures to the public at the assumed 5-km site boundary.

Basis: ICRP (1975), p 346.

Data Status: Accepted. This input parameter is accepted data based on its existence as established fact, as defined by Procedure AP-SIII.2Q, *Qualification of Unqualified Data and Documentation of Rational for Accepted Data.* Information produced by the ICRP regarding radiological dose calculations is generally accepted by the scientific and engineering community and found to be technically defensible by those using it.

5.2.4 DOE SNF inventory information is provided by the National Spent Nuclear Fuel Program (NSNFP). A listing of that information used in this calculation are given in the "Fuel Data" spreadsheet of Attachments III through VIII.

Basis: LMITCO (1999) and NSNFP (1999).

Data Status: Unqualified.

5.2.5 Isotope decay products, half-lives, and decay fractions are taken from Table A.1 of Eckerman and Ryman (1993).

Basis: Eckerman and Ryman (1993), Table A.1, pp. 197-211.

Data Status: Accepted. These input parameters are accepted data based on their existence as established fact, as defined by Procedure AP-SIII.2Q, *Qualification of Unqualified Data and Documentation of Rational for Accepted Data.* Isotope information produced by the EPA are generally accepted by the scientific and engineering community and found to be technically defensible by those using it.

5.2.6 The Navy SNF source term is taken from Navy (1999), p.2.

Table 1. Navy SNF Source Term

Isotopes	Curies released per canister
Am-241	1.30E-07
C-14	2.62E-03
Co-58	8.84E-02
Co-60	2.40E-01
Cs-137	1.03E-04
Fe-55	4.40E-01
Fe-59	1.28E-03
Mn-54	1.49E-02
Nb-94	5.24E-05
Nb-95	1.95E-03
Ni-63	7.82E-02
Pu-239	1.04E-07
Pu-240	1.04E-07
Pu-241	7.60E-06
Sr-90	2.06E-04
Zr-95	1.70E-03

Basis: Navy (1999), p.2

Data Status: Accepted. This input is accepted based on it being deemed appropriate by the provider for establishing surface facility design requirements (Navy 1999, p.3).

5.2.7 ARFs and RFs for DOE SNF.

Table 2. ARFs and RFs for DOE SNF

DBE group fuel matrix	DBE group fuel condition	Material Type	ARF	RF	Note.
Stable Metals	Intact	particulate gas cesium crud	2.0E-04 0.3 2.0E-04 1.0	4.0E-03 1.0 1.0 0.3	1, 2, 3
Stable Metals	Not Intact	particulate gas cesium crud	5.0E-03 0.3 5.0E-03 1.0	0.4 1.0 1.0 0.3	2, 3
Non Metals	Intact	particulate gas cesium crud	2.25E-03 0.3 2.25E-03 1.0	1.0 1.0 1.0 0.3	2, 3
Non Metals	Not Intact	particulate gas cesium crud	5.0E-03 0.3 5.0E-03 1.0	0.4 1.0 1.0 0.3	2, 3
Other	Intact	particulate gas cesium crud	1.0E-03 0.3 1.0E-03 1.0	1.0 1.0 1.0 0.3	2, 3
Other	Not Intact	particulate gas cesium crud	5.0E-03 0.3 5.0E-03 1.0	0.4 1.0 1.0 0.3	2, 3, 4

Notes:

1. The ARF and RF values for Stable Metals/Intact particulate material is taken from NUREG/CR-6410 (NRC 1998), p. 3-9 [Assumption 3.6].

2. The ARF and RF values for gases, crud, and cesium are taken from CRWMS M&O (1999a).

3. The greater of the ARF and RF values for gases, cesium, and crud in CRWMS M&O (1999a) and the fuel group ARF and RF values in LMITCO (1999) and NSNFP (1999) are used for gases, cesium, and crud.

4. Since the current DOE SNF data set does not differentiate between fuel that under goes complete oxidation or is in powder form, the bounding ARF/RF combination for the powder form (ARF x RF = 2.0E-03) is used for Other/Not Intact fuel particulate and cesium material types.

<u>Basis and Data Status:</u>
LMITCO (1999), Unqualified

NSNFP (1999), Unqualified
NRC (1998), Accepted
CRWMS M&O (1999a), Unqualified.

5.2.8 A single-stage HEPA filter has, by definition, an efficiency of no less than 99.97% (Burchsted, et al. 1978, page 9). Hence a mitigation factor of 3.0E-04 can be applied to all non-gaseous/non-volatile (e.g., particulate) radionuclide releases that are drawn through the exhaust HEPA filters by the WHB HVAC system.

Basis: Burchsted, et al. 1978, page 9.

Data Status: Accepted. This input parameter is accepted data based on its existence as established fact as defined by Procedure AP-SIII.2Q, *Qualification of Unqualified Data and Documentation of Rational for Accepted Data.* This definition of HEPA filter efficiency is generally accepted by the scientific and engineering community and is found to be technically defensible by those using it.

5.2.9 CSNF fuel assemblies have the following surface areas and uranium inventories:

Assembly Surface Area:	PWR = 353,536 cm^2/assembly BWR = 111,235 cm^2/assembly
Assembly Uranium Inventory:	PWR = 0.464 MTU/assembly BWR = 0.196 MTU/assembly

Basis: CRWMS M&O (1996), pp. 7-8.

Data Status: Unqualified.

6. RESULTS

6.1 DOSE CALCULATION RESULTS

The offsite dose results from the calculations in Attachments III to VIII, and Attachment X are shown in Tables 3 and 4.

Table 3. Offsite Dose Results for Source Terms Released Directly to the Environment.

Fuel	Fuel Type	Fuel Condition	TEDE [rem]	highest of CDEs + DDE [rem]	Skin [rem]	Lens of the Eye [rem]
HWCTR (U/TH) [112]	stable metal	intact	4.29E-02	4.52E-01	6.25E-04	nc
ALUM CLAD SNF [411]	stable metal	not intact	1.64E+00	2.41E+01	1.02E-03	nc
Shippingport PWR Core II [193]	non-metal	intact	1.44E+01	2.50E+02	8.35E-03	nc
Saxton (MOX) [787]	non-metal	not intact	1.13E+02	1.99E+03	9.36E-03	nc
EBWR (U Metal) LEU [64]	other	intact	2.58E+01	4.46E+02	2.00E-02	nc
N Reactor [147]	other	not intact	4.30E+01	7.30E+02	4.59E-02	nc
Navy SNF	--	--	8.72E-04	4.96E-03	7.05E-06	nc

nc: not calculated (see Section 2.2)

Table 4. Offsite Dose Results for HEPA-Filtered Source Terms Released to the Environment.

Fuel	Fuel Type	Fuel Condition	TEDE [rem]	highest of CDEs + DDE [rem]	Skin [rem]	Lens of the Eye [rem]
HWCTR (U/TH) [112]	stable metal	intact	4.32E-04	5.18E-04	2.32E-04	nc
ALUM CLAD SNF [411]	stable metal	not intact	2.28E-02	2.78E-02	7.86E-04	nc
Shippingport PWR Core II [193]	non-metal	intact	1.42E-02	8.41E-02	1.60E-03	nc
Saxton (MOX) [787]	non-metal	not intact	2.85E-01	8.29E-01	5.58E-03	nc
EBWR (U Metal) LEU [64]	other	intact	1.99E-02	1.45E-01	6.18E-04	nc
N Reactor [147]	other	not intact	8.18E-02	2.82E-01	1.59E-03	nc
Navy SNF	--	--	3.13E-07	1.54E-06	2.90E-09	nc

nc: not calculated (see Section 2.2)

The contribution of the different inventory materials (e.g., particulate, gas, cesium, and crud) to the total dose of the fuels evaluated is shown in Table 5.

Table 5. Relative Contribution of DOE SNF Isotope Material Types to Total Dose Measures.

Fuel	Fuel Type	Fuel Condition	material type	no HEPAs		HEPAs	
				fraction of TEDE [-]	fraction of highest of CDEs+DDE [-]	fraction of TEDE [-]	fraction of highest of CDEs+DDE [-]
HWCTR (U/TH) [112]	stable metal	intact	gas	1.48E-04	1.25E-05	1.47E-02	1.09E-02
			particulate	5.82E-01	9.88E-01	1.73E-02	2.59E-01
			cesium	9.62E-03	8.33E-04	9.56E-01	7.27E-01
			crud	4.08E-01	1.07E-02	1.22E-02	2.81E-03
ALUM CLAD SNF [411]	stable metal	not intact	gas	8.43E-06	4.90E-07	6.06E-04	4.25E-04
			particulate	9.82E-01	9.99E-01	2.12E-02	2.60E-01
			cesium	1.36E-02	8.53E-04	9.78E-01	7.40E-01
			crud	4.36E-03	8.24E-05	9.40E-05	2.14E-05
Shippingport PWR Core II [193]	non-metal	intact	gas	7.02E-06	3.07E-07	7.12E-03	9.12E-04
			particulate	9.78E-01	1.00E+00	2.98E-01	8.92E-01
			cesium	6.79E-04	3.60E-05	6.89E-01	1.07E-01
			crud	2.09E-02	3.34E-04	6.37E-03	2.98E-04
Saxton (MOX) [787]	non-metal	not intact	gas	1.35E-06	5.20E-08	5.36E-04	1.25E-04
			particulate	9.97E-01	1.00E+00	1.19E-01	7.21E-01
			cesium	2.22E-03	1.16E-04	8.81E-01	2.79E-01
			crud	1.22E-03	1.92E-05	1.45E-04	1.39E-05
EBWR (U Metal) LEU [64]	other	intact	gas	1.43E-06	5.61E-08	1.85E-03	1.73E-04
			particulate	9.66E-01	9.99E-01	3.76E-01	9.22E-01
			cesium	4.70E-04	2.50E-05	6.10E-01	7.70E-02
			crud	3.36E-02	5.38E-04	1.30E-02	4.96E-04
N Reactor [147]	other	not intact	gas	8.00E-07	2.84E-08	4.20E-04	7.34E-05
			particulate	9.52E-01	9.99E-01	1.50E-01	7.75E-01
			cesium	1.60E-03	8.69E-05	8.42E-01	2.25E-01
			crud	4.60E-02	7.51E-04	7.25E-03	5.82E-04

6.2 DISCUSSION OF UNQUALIFIED/UNCONTROLLED/UNCONFIRMED INPUT

The assumption of a 5,000 m site boundary is not verified. If the site boundary is closer than 5000 m the offsite doses will increase.

The airborne dispersion factor is based on meteorological data contained in the M&O Technical Data Management System (TDMS) database. Data in the TDMS are currently considered unqualified.

The DOE SNF fuel information (e.g. isotopic composition, number of canisters, ARFs, RFs) is unqualified. A change in this information will result in a change in the offsite dose.

The assumption that a DOE SNF fuel inventory that is comprised of more than one canister has its isotopic composition uniformly distributed in the canisters is unqualified. If the isotopes are not uniformly distributed the DOE SNF offsite doses will increase.

Assumptions regarding the impact of dose pathways other than inhalation and air submersion on the offsite dose are not verified. If the other dose pathways (e.g. ingestion, water submersion, contaminated soil) are important relative to the inhalation and air submersion pathways, the offsite dose will increase.

7. ATTACHMENTS

Attachment I - Document Input Record Sheets (DIRs)

Attachment II - Acronyms and Abbreviations

Attachment III - Calculations for HWCTR (U/TH) [112] DOE SNF

Attachment IV - Calculations for ALUM CLAD SNF [411] DOE SNF

Attachment V - Calculations for Shippingport PWR Core II [193] DOE SNF

Attachment VI - Calculations for Saxton (MOX) [787] DOE SNF

Attachment VII - Calculations for EBWR (U Metal) LEU [64] DOE SNF

Attachment VIII - Calculations for N Reactor [147] DOE SNF

Attachment IX - DOE SNF Crud Calculations

Attachment X - Calculations for Navy SNF

Attachment XI - Identification of Isotopes with Short-Lived Daughter Products and the Calculation of Their Total Air Submersion DCF

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Input Document							TBV Due To		
No.	Technical Product Input Source Title & Identifiers with Version	Section	Input Status	Section Used In	Input Description	TBV/ TBD Priority	Unqual.	From Uncontrolled Source	Unconfirmed
1	Burchsted, C.A., Fuller, A.B., Kahn, J.E. 1978. *Nuclear Air Cleaning Handbook, Design, Construction, and Testing of High-Efficiency Air Cleaning Systems for Nuclear Application.* ERDA 76-21. Oak Ridge National Laboratory. NNA.19901127.0194.	p. 9	TBV-3269,	2.1.1 2.1.2 2.1.3 5.2.8 Att. III Att. IV Att. V Att. VI Att. VII Att. VIII Att. X	HEPA filter LPF of 3.0E-04 (accepted data, waiting on AMOPE acceptance)	2	N/A	X	N/A
2	CRWMS M&O 1996. *Source Terms for Design Basis Event Analyses. BBA000000-01717-0200-00019, Rev. 00.* Las Vegas, Nevada: CRWMS M&O. ACC: MOL.19970203.0121. Initial use.	pp. 7-8	TBV-3231	2.1.2 5.2.9	CSNF assembly surface area and MTU/assembly	2	X	N/A	N/A
3	CRWMS M&O 1998. *Preliminary Preclosure Design Basis Event Calculations for the Monitored Geologic Repository.* BC0000000-01717-0210-00001, Rev. 00. Las Vegas, Nevada: CRWMS M&O. ACC: MOL.19981002.0001.	entire	N/A	2.3 3.4	No DBEs in which temperatures well-above ambient occur.	N/A	N/A	N/A	N/A
4	CRWMS M&O 1999a. Commercial Spent Nuclear Fuel *Information Needed for Department of Energy Spent Nuclear Fuel Design Basis Event Offsite Dose Calculations.* RSO-RSO-99266.T Las Vegas, Nevada: CRWMS M&O. ACC: MOL.19990927.0215. Initial use.	entire	TBV-3309	5.2.7 Att. III Att. IV Att. V Att. VI Att. VII Att. VIII	ARFs and RFs for gases cesium, and crud for CSNF	2	X	N/A	N/A
				2.1.2	CSNF crud surface activities	2	X	N/A	N/A

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Input Document							TBV Due To		
No.	Technical Product Input Source Title & Identifiers with Version	Section	Input Status	Section Used In	Input Description	TBV/ TBD Priority	Unqual.	From Uncontrolled Source	Unconfirmed
5	CRWMS M&O 1999b. *Calculations of Acute and Chronic "Chi/Q" Dispersion Estimates for a Surface Release.* BA0000000-01717-0210-00006, REV 00. Las Vegas, Nevada: CRWMS M&O. ACC: MOL.19990512.0064. Initial use.	Table 3	TBV-3232	5.2.2 Att. III Att. IV Att. V Att. VI Att. VII Att. VIII	Atmospheric dispersion factor of 4.68E-05 s/m^3 (exceeded only 0.5% of the time) at a 5000 m distance from radioactive release.	2	X	N/A	N/A
6	DOE 1994. *Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities, Volume 1 – Analysis of Experimental Data.* DOE-HDBK-3010-94. Washington, D.C.: US Department of Energy. TIC: 233366.	p. 1-2	TBV-3233	2.1.1 Att. III Att. IV Att. V Att. VI Att. VII Att. VIII	source term equation (accepted data, waiting on AMOPE acceptance)	2	N/A	X	X
7	Eckerman, K. F., and Ryman, J. C. 1993. *External Exposure to Radionuclides in Air, Water, and Soil, Exposure-to-Dose Coefficients for General Application, Based on the 1987 Federal Radiation Protection Guidance: Federal Guidance Report No. 12.* EPA 402-R-93-081. Washington, D.C.: Environmental Protection Agency. TIC: 225472	Table III.1 (pp. 57-73)	TBV-3101	2.2 2.3 4.2.2 5.2.1 5.2.5 Att. III Att. IV Att. V Att. VI Att. VII Att. VIII Att. X	air submersion DCFs (accepted data, waiting on AMOPE acceptance)	2	X	X	N/A
		Table A.1 (pp. 197-211)		5.2.8 Att. XI	isotopic decay products, half-lives, and decay fractions				

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Input Document							TBV Due To		
No.	Technical Product Input Source Title & Identifiers with Version	Section	Input Status	Section Used In	Input Description	TBV/ TBD Priority	Unqual.	From Uncontrolled Source	Unconfirmed
8	Eckerman, K. F., Wolbarst, A. B., Richardson, A. C. B. 1988. *Federal Guidance Report No. 11, Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion, Derived Guides for Control of Occupational Exposure-to-Dose Conversion Factors for General Application, Based on the 1987 Federal Radiation Protection Guidance.* EPA520188020. Washington, D.C.: Environmental Protection Agency. TIC: 203350.	Table 2.1 (pp. 121-153)	TBV-3100	2.2 2.3 4.2.2 5.2.1 Att. III Att. IV Att. V Att. VI Att. VII Att. VIII Att. X	inhalation DCFs (accepted data, waiting on AMOPE acceptance)	2	X	X	N/A
9	ICRP (International Commission on Radiological Protection) 1975. *Report of the Task Group on Reference Man.* Publication No. 23.: Snyder, W.S., Cook, M.J., Nassett, E.S., Tipton, I.H. Tarrytown, New York: Pergamon Press. ACC: MOL.19980623.0026.	p. 346	TBV-3102	5.2.3 Att. III Att. IV Att. V Att. VI Att. VII Att. VIII Att. X	breathing rate $3.33E-04\ m^3/s$ (20 liter/min) (accepted data, waiting on AMOPE acceptance)	2	X	X	N/A
10	Jones, R.H. 1992. *Spent Fuel Corrosion Product and Fuel Cleaning Assessment.* OCRWM Work Package 3546-42-01-1002, Contract DE-AC01-87-RW00060. Washington, DC: Weston Technical Support Team. August 1992. ACC: HQX.19920825.0007. Initial use.	Tables 1 and 2	TBV-3234	2.1.2	PWR and BWR crud surface activity after five years	2	X	X	N/A

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Input Document							TBV Due To		
No.	Technical Product Input Source Title & Identifiers with Version	Section	Input Status	Section Used In	Input Description	TBV/ TBD Priority	Unqual.	From Uncontrolled Source	Unconfirmed
11	LMITCO (Lockheed Martin Idaho Technologies Company) 1999. *National Spent Nuclear Fuel Program (NSNFP) Data Support for Design Basis Event (DBE) Analysis.* PDW-02-99. Idaho Falls, Idaho: Lockheed Martin Idaho Technologies Company. ACC: MOL.19990225.0339. Initial use.	entire p. 2	TBV-3235	5.2.4 5.2.7 2.1.2 3.9	fuel group descriptions DOE SNF vs. CSNF burnup	2	X	N/A	N/A
12	Navy 1999. Letter from E.M. Naples to D.C. Haught regarding Navy SNF Accident Source Terms. Arlington, VA: U.S. Navy. MOL.19990806.0047. Initial use.	p. 2	TBV-3475	2.1.3 5.2.6 Att. X	Navy SNF source term isotopic composition (accepted data, waiting on AMOPE acceptance)	2	X	X	N/A
13	NRC (Nuclear Regulatory Commission) 1977. *Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I.* Regulatory Guide 1.109. Washington, D.C.: U.S. Nuclear Regulatory Commission. TIC: 222641. Initial Use.	C.2 and C.3	TBV-3104	2.2	Derivation of dose equations are based on this Regulatory Guide. (accepted data, waiting on AMOPE acceptance)	2	N/A	X	X
14	NRC 1982. *Regulatory Guide 1.145 Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants, Rev. 1.* Washington, D.C.: US Nuclear Regulatory Commission. TIC: 222640.	entire	TBV-3236	5.2.2	methodology for calculating dispersion factors (accepted data, waiting on AMOPE acceptance)	2	X	X	N/A

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Input Document							TBV Due To		
No.	Technical Product Input Source Title & Identifiers with Version	Section	Input Status	Section Used In	Input Description	TBV/ TBD Priority	Unqual.	From Uncontrolled Source	Unconfirmed
15	NRC 1998. *Nuclear Fuel Cycle Facility Accident Analysis Handbook.* NUREG/CR-6410. Washington, D.C.: US Nuclear Regulatory Commission. TIC: 240909. Initial use.	p. 3-9	TBV-3237	3.6 5.2.7	basis for stable metal/intact SNF ARF and RF (accepted data, waiting on AMOPE acceptance)	2	X	X	N/A
16	NSNFP (National Spent Nuclear Fuel Program) 1999. *Design Basis Event Data, Rev. 1.* Idaho Falls, Idaho: National Spent Nuclear Fuel Program. ACC: MOL.19990225.0479. Initial use.	entire	TBV-3238	2.1.1 4.2.2 5.2.4 5.2.7 Att. III Att. IV Att. V Att. VI Att. VII Att. VIII	DOE SNF parameters: SNFID # SNF name SNF fuel type SNF fuel condition # of canisters isotopic composition ARFs and RFs	2	X	N/A	N/A
17	YMP (Yucca Mountain Site Characterization Office) 1999. *Monitored Geologic Repository Requirements Document.* YMP/CM-0025, Rev. 3, DCN 01. Las Vegas, Nevada: Yucca Mountain Site Characterization Office. ACC: MOL. 19990429.0228.	3.3.J	TBV-3098	3.3	Site Boundary will be 5,000 m from WHB ventilation release point and 5,000 m from emplacement area ventilation exhaust shaft.	2	X	N/A	N/A
18	10 CFR 20 1999. Energy. Standards for Protection Against Radiation. Readily available reference.	1003	N/A	2.2	definition of DDE	N/A	N/A	N/A	N/A

Document Identifier No./Rev.: CAL-WPS-SE-000004 REV 00			Change: N/A	Title: DOE and Navy SNF DBE Offsite Dose Calculations					
Input Document							TBV Due To		
No.	Technical Product Input Source Title & Identifiers with Version	Section	Input Status	Section Used In	Input Description	TBV/ TBD Priority	Unqual.	From Uncontrolled Source	Unconfirmed
19	Dyer, J. R. 1999. *Revised Interim Guidance Pending Issuance of New U.S. Nuclear Regulatory Commission (NRC) Regulations (Revision 01, July 22 1999) for Yucca Mountain, Nevada.* Letter from J. Russell Dyer (DOE) to D. R. Wilkins (YMP), September 03, 1999. OL&RC:SB-1714. ACC: MOL.19990910.0079.	111	N/A	2.2	Draft 10 CFR 63 requirements for MGR documents.	N/A	N/A	N/A	N/A
20	AP-3.12Q, Revision 0, ICN 0. *Calculations.* MOL.19990702.0312.	entire	N/A	entire	Reference: Procedure for preparation of document	N/A	N/A	N/A	N/A
21	AP-SI.1Q, Revision 1, ICN 0. *Software Management.* ACC: MOL.19990520.0164.	entire	N/A	4.1 4.2.1	Reference: Procedure for software management	N/A	N/A	N/A	N/A
22	AP-SIII.2Q, Rev. 0, ICN 0. *Qualification of Unqualified Data and the Documentation of Rationale for Accepted Data.* MOL.19990702.0308.	3.1 & 3.2	N/A	5.2	Reference: Definitions of Qualified and Accepted Data	N/A	N/A	N/A	N/A

Document Identifier No./Rev.: CAL-WPS-SE-000004 REV 00			Change: N/A	Title: DOE and Navy SNF DBE Offsite Dose Calculations					
Input Document							TBV Due To		
No.	Technical Product Input Source Title & Identifiers with Version	Section	Input Status	Section Used In	Input Description	TBV/ TBD Priority	Unqual.	From Uncontrolled Source	Unconfirmed
23	Only inhalation and air submersion doses are considered in this calculation; the potential doses from ingestion, water immersion, and contaminated soil are ignored. This assumption implies that these doses are negligible in comparison to the combined inhalation and air submersion dose and/or the receptors at the assumed site boundary are evacuated shortly after the postulated event, thus precluding these source term pathways. Assumption. Initial Use.	N/A	TBV-3239	3.1 2.2	Only inhalation and air submersion doses are considered in this calculation; the potential doses from ingestion, water immersion, and contaminated soil are ignored. This assumption implies that these doses are negligible in comparison to the combined inhalation and air submersion dose and/or the receptors at the assumed site boundary are evacuated shortly after the postulated event, thus precluding these source term pathways.	2	X	N/A	N/A
24	In calculating the fraction of inventory at-risk, it is assumed that all of the canisters of a given fuel type have the same isotopic composition. Assumption. Initial Use.	N/A	TBV-3240	3.2 2.1.1	In calculating the fraction of inventory at-risk, it is assumed that all of the canisters of a given fuel type have the same isotopic composition.	2	X	N/A	N/A

Document Identifier No./Rev.: CAL-WPS-SE-000004 REV 00			Change: N/A	Title: DOE and Navy SNF DBE Offsite Dose Calculations					
Input Document							TBV Due To		
No.	Technical Product Input Source Title & Identifiers with Version	Section	Input Status	Section Used In	Input Description	TBV/ TBD Priority	Unqual.	From Uncontrolled Source	Unconfirmed
25	It is assumed that the Deep Dose Equivalent is equal to the effective dose equivalent from air submersion, and that the external dose contribution from water immersion and contaminated soil is negligible. This assumption implies that these doses are negligible in comparison to the combined inhalation and air submersion dose and/or the receptors at the assumed site boundary are evacuated shortly after the postulated event, thus precluding these source term pathways. Assumption. Initial Use.	N/A	TBV-3241	2.2 3.5	It is assumed that the Deep Dose Equivalent is equal to the effective dose equivalent from air submersion, and that the external dose contribution from water immersion and contaminated soil is negligible. This assumption implies that these doses are negligible in comparison to the combined inhalation and air submersion dose and/or the receptors at the assumed site boundary are evacuated shortly after the postulated event, thus precluding these source term pathways.	2	X	N/A	N/A

Attachment II

ACRONYMS AND ABBREVIATIONS

ARF	airborne release fraction
AP	administrative procedure
BWR	boiling water reactor
CDE	committed dose equivalent
CEDE	committed effective dose equivalent
CFR	code of federal regulations
CRWMS	civilian radioactive waste management system
CSNF	commercial spent nuclear fuel
DBE	design basis event
DCF	dose conversion factor
DDE	deep dose equivalent
DOE	U.S. Department of Energy
DR	damage ratio
EPA	Environmental Protection Agency
FR	Federal Register
HEPA	high efficiency particulate air
ICRP	International Commission on Radiological Protection
LMITCO	Lockheed Martin Idaho Technologies Company
LPF	leak path factor
M&O	management and operating
MGR	monitored geologic repository
MTHM	metric tons heavy metal
MTU	metric tons uranium
NRC	U.S. Nuclear Regulatory Commission
NSNFP	National Spent Nuclear Fuel Program
PWR	pressurized water reactor
RF	respirable fraction
SNF	spent nuclear fuel
TBD	to be determined
TBV	to be verified
TDMS	technical data management system
TEDE	total effective dose equivalent
YMP	Yucca Mountain Project

Attachment III

Calculation for HWCTR (U/TH) [112] DOE SNF

	evaluated fuel	x							evaluated fuel
	fuel type	stable metal	stable metal	non-metal	non-metal	other	other		stable metal
	condition	intact	not intact	intact	not intact	intact	not intact		intact
	fuel name	HWCTR (U/TH) [112]	ALUM CLAD SNF [411]	SHIPPINGPORT PWR CORE II [193]	SAXTON (MOX) [787]	EBWR (U METAL) LEU [64]	N REACTOR [147]		HWCTR (U/TH) [112]
	# of canisters	0.17	1.00	24.00	1.00	10.50	194.95		0.17
Isotopes	material type	Curies (entire fuel inventory)							Curies
Ac-227	P	9.27E-09	2.81E-07	1.24E-02	1.33E-05	3.38E-05	1.03E-02		9.27E-09
Am-241	P	1.22E-01	2.51E+01	7.61E+04	6.45E+03	1.63E+04	2.80E+05		1.22E-01
Am-242m	P	8.67E-05	9.69E-03	1.18E+02	1.07E+01	2.71E+01	7.96E+00		8.67E-05
Am-243	P	2.85E-04	2.40E-02	3.38E+02	2.83E+01	7.18E+01	4.10E+01		2.85E-04
C-14	P	1.09E-06	1.17E-05	1.53E+00	1.81E+00	4.59E+00	3.63E+02		1.09E-06
Cd-113m	P	6.32E-02	7.25E-01	0.00E+00	2.59E+01	6.56E+01	0.00E+00		6.32E-02
Cl-36	P	2.51E-30	0.00E+00	0.00E+00	2.35E-02	5.96E-02	0.00E+00		2.51E-30
Cm-242	P	2.62E-04	8.00E-03	0.00E+00	8.79E+00	2.23E+01	0.00E+00		2.62E-04
Cm-243	P	4.52E-05	3.29E-03	0.00E+00	1.60E+01	4.06E+01	0.00E+00		4.52E-05
Cm-244	P	9.94E-03	4.27E-01	3.16E+04	9.29E+02	2.36E+03	2.44E+03		9.94E-03
Cm-245	P	5.84E-07	1.33E-05	5.82E+00	2.12E-01	5.37E-01	5.13E-01		5.84E-07
Cm-246	P	3.99E-08	9.83E-07	9.89E-01	4.28E-02	1.08E-01	6.79E-02		3.99E-08
Cm-247	P	4.17E-14	0.00E+00		1.12E-07	2.83E-07			4.17E-14
Co-60	P	7.30E-03	1.81E-09	1.10E+04	2.12E+01	5.38E+01	4.75E+02		7.30E-03
Cs-134	C	9.30E+01	2.05E+02	3.63E+03	1.24E+01	3.13E+01	1.63E+02		9.30E+01
Cs-135	C	6.58E-04	1.24E-02	6.19E+00	6.65E-01	1.69E+00	4.00E+01		6.58E-04
Cs-137	C	5.49E+02	8.60E+03	2.07E+06	1.00E+05	2.53E+05	5.34E+06		5.49E+02
Eu-154	P	1.57E+01	9.08E+01	0.00E+00	1.84E+03	4.67E+03	0.00E+00		1.57E+01
Eu-155	P	7.47E+00	2.81E+01	0.00E+00	1.92E+02	4.86E+02	0.00E+00		7.47E+00
Fe-55	P	1.29E+00	0.00E+00	0.00E+00	1.76E-01	4.45E-01	0.00E+00		1.29E+00
H-3	G	2.02E+00	2.61E+01	5.09E+03	2.92E+02	7.41E+02	1.03E+04		2.02E+00
I-129	G	1.44E-04	2.54E-03	7.20E-01	6.09E-02	1.54E-01	3.29E+00		1.44E-04
Kr-85	G	5.46E+01	6.45E+02	5.07E+04	2.59E+03	6.56E+03	1.53E+05		5.46E+01
Nb-93m	P	2.82E-03	4.96E-02	5.72E+01	2.82E+00	7.15E+00	4.54E+02		2.82E-03
Nb-94	P	1.37E-07	4.96E-06	0.00E+00	5.18E-02	1.31E-01	6.71E-05		1.37E-07
Ni-59	P	2.43E-04	0.00E+00	0.00E+00	4.01E-02	1.02E-01	2.03E+01		2.43E-04
Ni-63	P	3.69E-02	0.00E+00	8.04E+04	4.42E+00	1.12E+01	2.21E+03		3.69E-02
Np-237	P	1.82E-03	1.20E-02	7.06E+00	6.46E-01	1.64E+00	3.87E+01		1.82E-03
Pa-231	P	9.79E-08	1.88E-06	1.15E-02	3.02E-05	7.65E-05	1.38E-02		9.79E-08
Pb-210	P	1.04E-10	1.44E-11	2.71E-06	5.13E-08	1.30E-07	7.52E-08		1.04E-10
Pd-107	P	9.52E-05	2.35E-03	1.95E+00	2.14E-01	5.42E-01	7.46E+00		9.52E-05
Pm-147	P	4.86E+02	2.47E+03	0.00E+00	9.36E+01	2.37E+02	0.00E+00		4.86E+02
Pu-238	P	7.65E+02	2.20E+01	8.02E+04	5.66E+02	1.18E+04	6.37E+04		7.65E+02
Pu-239	P	1.59E+01	1.49E+01	7.55E+03	9.81E+01	2.05E+03	1.23E+05		1.59E+01
Pu-240	P	9.08E+00	1.07E+01	1.13E+04	1.70E+02	3.54E+03	7.18E+04		9.08E+00
Pu-241	P	2.56E+03	1.22E+03	1.57E+06	9.43E+03	1.97E+05	2.06E+06		2.56E+03
Pu-242	P	1.35E-02	1.04E-02	3.73E+01	4.84E-01	1.01E+01	3.46E+01		1.35E-02
Ra-226	P	1.93E-09	1.53E-10	6.13E-06	2.46E-07	6.22E-07	1.15E-03		1.93E-09
Ra-228	P	1.74E-13	8.44E-12	5.85E-02	2.80E-07	7.11E-07	1.03E-06		1.74E-13
Ru-106	P	3.64E+01	2.97E+01	1.42E+01	1.17E-03	2.97E-03	3.16E-01		3.64E+01
Sb-125	P	1.20E+01	0.00E+00	0.00E+00	1.70E+01	4.30E+01	0.00E+00		1.20E+01
Se-79	P	2.47E-03	6.93E-02	7.69E+00	7.90E-01	2.00E+00	4.46E+01		2.47E-03
Sm-147	P	3.48E-08	8.28E-07	0.00E+00	9.01E-06	2.28E-05	0.00E+00		3.48E-08
Sm-151	P	2.16E+00	2.67E+01	2.58E+04	5.86E+02	1.48E+03	8.55E+04		2.16E+00
Sn-126	P	2.21E-03	2.72E-02	9.72E+00	1.50E+00	3.80E+00	7.83E+01		2.21E-03
Sr-90	P	5.25E+02	8.16E+03	1.56E+06	6.87E+04	1.74E+05	4.03E+06		5.25E+02
Tc-99	P	8.07E-02	1.44E+00	2.67E+02	2.51E+01	6.37E+01	1.51E+03		8.07E-02
Th-229	P	3.77E-08	8.09E-10	1.57E-02	4.93E-07	1.03E-05	9.31E-06		3.77E-08
Th-230	P	3.27E-04	7.96E-08	1.08E-03	8.39E-08	1.75E-04	1.02E-03		3.27E-04
Th-232	P	1.49E-10	1.99E-11	5.56E-03	4.58E-08	9.56E-07	1.21E-07		1.49E-10
U-232	P	4.47E-03	1.11E-04	0.00E+00	4.23E-03	8.82E-02	0.00E+00		4.47E-03
U-233	P	6.56E-05	1.18E-06	6.07E+00	1.70E-04	3.55E-03	5.71E-03		6.56E-05
U-234	P	6.83E+00	1.17E-03	5.82E+00	5.70E-02	1.19E+00	4.85E+02		6.83E+00
U-235	P	1.34E-01	8.48E-03	6.58E-01	5.12E-03	1.07E-01	1.85E+01		1.34E-01
U-236	P	5.77E-01	3.95E-02	5.50E+00	7.81E-02	1.63E+00	7.02E+01		5.77E-01
U-238	P	2.22E-03	1.04E-02	5.15E+00	9.65E-02	2.01E+00	3.82E+02		2.22E-03
Zr-93	P	1.27E-02	1.40E-01	3.61E+01	3.72E+00	9.42E+00	2.10E+02		1.27E-02
crud (per canister)									
Co-60 (crud)		1.56E+01	6.37E+00	2.68E+02	1.23E+02	7.70E+02	1.76E+03		1.56E+01
Fe-55 (crud)		9.85E+01	4.01E+01	1.69E+03	7.73E+02	4.85E+03	1.11E+04		9.85E+01

Release Fractions				
Material Type	ARF	RF	Total Release Fraction	HEPA Filter LPF
stable metal/ intact				
G	0.3	1.0	3.00E-01	1.0
P	2.00E-04	4.00E-03	8.00E-07	3.00E-04
C	2.00E-04	1.0	2.00E-04	1.0
stable metal/not intact				
G	0.3	1.0	0.3	1.0
P	5.00E-03	0.4	2.00E-03	3.00E-04
C	5.00E-03	1.0	5.00E-03	1.0
non-metal/intact				
G	0.3	1.0	0.3	1.0
P	2.25E-04	1.0	2.25E-04	3.00E-04
C	2.25E-04	1.0	2.25E-04	1.0
non-metal/not intact				
G	0.3	1.0	0.3	1.0
P	5.00E-03	0.4	2.00E-03	3.00E-04
C	5.00E-03	1.0	5.00E-03	1.0
other/intact				
G	0.3	1.0	0.3	1.0
P	1.00E-03	1.0	1.00E-03	3.00E-04
C	1.00E-03	1.0	1.00E-03	1.0
other/not intact				
G	0.3	1.0	0.3	1.0
P	5.00E-03	0.4	2.00E-03	3.00E-04
C	5.00E-03	1.0	5.00E-03	1.0
crud				
crud	1.0	0.3	3.00E-01	3.00E-04
HWCTR (U/TH) [112]				
stable metal				
intact				
Release Fractions Used in this Calculation				
G	0.3	1.0	0.3	1.0
P	2.00E-04	4.00E-03	8.00E-07	3.00E-04
C	2.00E-04	1.00E+00	2.00E-04	1.00E+00
crud	1.0	0.3	0.3	3.00E-04
breathing rate	3.33E-04	[m^3/s]		
gound level dispersion factor				
distance [m]	x/Q [sec/m^3]			
5000	4.68E-05	99.5% worst-sector		
3.70E+12	unit conversion factor			
	Sv/Bq to rem/Ci			

	Inhalation DCFs [Sv/Bq]								
Isotopes	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	3.96E-04	6.66E-08	1.54E-03	2.57E-03	3.21E-02	3.59E-08	1.47E-03	1.81E-03	0.00E+00
Am-241	3.25E-05	2.67E-09	1.84E-05	1.74E-04	2.17E-03	1.60E-09	7.82E-05	1.20E-04	0.00E+00
Am-242m	3.21E-05	1.38E-09	4.20E-06	1.69E-04	2.12E-03	5.64E-10	7.48E-05	1.15E-04	0.00E+00
Am-243	3.26E-05	1.52E-08	1.78E-05	1.73E-04	2.17E-03	8.29E-09	7.74E-05	1.19E-04	0.00E+00
C-14	5.64E-10	5.64E-10	5.64E-10	5.64E-10	5.64E-10	5.64E-10	5.64E-10	5.64E-10	0.00E+00
Cd-113m	3.32E-08	3.32E-08	4.09E-07	3.32E-08	3.32E-08	3.32E-08	1.30E-06	4.13E-07	0.00E+00
Cl-36	5.04E-10	5.04E-10	4.56E-08	5.04E-10	5.04E-10	5.04E-10	5.36E-10	5.93E-09	0.00E+00
Cm-242	5.70E-07	9.44E-10	1.55E-05	3.90E-06	4.87E-05	9.41E-10	2.45E-06	4.67E-06	0.00E+00
Cm-243	2.07E-05	6.29E-09	1.94E-05	1.18E-04	1.47E-03	3.83E-09	5.76E-05	8.30E-05	0.00E+00
Cm-244	1.59E-05	1.04E-09	1.93E-05	9.38E-05	1.17E-03	1.01E-09	4.78E-05	6.70E-05	0.00E+00
Cm-245	3.37E-05	6.69E-09	1.80E-05	1.79E-04	2.24E-03	3.68E-09	7.96E-05	1.23E-04	0.00E+00
Cm-246	3.34E-05	4.00E-09	1.82E-05	1.78E-04	2.22E-03	2.26E-09	7.94E-05	1.22E-04	0.00E+00
Cm-247	3.07E-05	2.23E-08	1.67E-05	1.63E-04	2.04E-03	1.45E-08	7.30E-05	1.12E-04	0.00E+00
Co-60	4.76E-09	1.84E-08	3.45E-07	1.72E-08	1.35E-08	1.62E-08	3.60E-08	5.91E-08	0.00E+00
Cs-134	1.30E-08	1.08E-08	1.18E-08	1.18E-08	1.10E-08	1.11E-08	1.39E-08	1.25E-08	0.00E+00
Cs-135	1.20E-09	1.20E-09	1.41E-09	1.20E-09	1.20E-09	1.20E-09	1.20E-09	1.23E-09	0.00E+00
Cs-137	8.76E-09	7.84E-09	8.82E-09	8.30E-09	7.94E-09	7.93E-09	9.12E-09	8.63E-09	0.00E+00
Eu-154	1.17E-08	1.55E-08	7.92E-08	1.06E-07	5.23E-07	7.14E-09	1.13E-07	7.73E-08	0.00E+00
Eu-155	3.56E-10	6.14E-10	1.19E-08	1.43E-08	1.52E-07	2.40E-10	1.11E-08	1.12E-08	0.00E+00
Fe-55	5.23E-10	5.09E-10	1.06E-09	5.17E-10	5.14E-10	5.42E-10	1.21E-09	7.26E-10	0.00E+00
H-3	1.73E-11	1.73E-11	1.73E-11	1.73E-11	1.73E-11	1.73E-11	1.73E-11	1.73E-11	0.00E+00
I-129	8.69E-11	2.09E-10	3.14E-10	1.40E-10	1.38E-10	1.56E-06	1.18E-10	4.69E-08	0.00E+00
Kr-85	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nb-93m	4.16E-10	4.36E-11	6.45E-08	2.85E-10	7.43E-10	3.04E-11	3.95E-10	7.90E-09	0.00E+00
Nb-94	4.76E-09	2.24E-08	7.48E-07	2.26E-08	1.97E-08	2.22E-08	4.45E-08	1.12E-07	0.00E+00
Ni-59	3.59E-10	3.46E-10	1.20E-09	3.54E-10	3.51E-10	3.77E-10	3.63E-10	3.58E-10	0.00E+00
Ni-63	8.22E-10	8.22E-10	3.07E-09	8.22E-10	8.22E-10	8.22E-10	8.59E-10	8.39E-10	0.00E+00
Np-237	2.96E-05	1.69E-08	1.61E-05	2.62E-04	3.27E-03	1.34E-08	2.34E-05	1.46E-04	0.00E+00
Pa-231	6.90E-09	8.79E-09	7.47E-04	6.97E-04	8.70E-03	7.64E-09	2.87E-07	3.47E-04	0.00E+00
Pb-210	3.18E-07	3.18E-07	3.18E-07	3.75E-06	5.47E-05	3.18E-07	4.69E-06	3.67E-06	0.00E+00
Pd-107	9.45E-13	9.45E-13	2.65E-08	5.11E-12	1.36E-11	9.45E-13	2.15E-10	3.45E-09	0.00E+00
Pm-147	1.88E-14	3.60E-14	7.74E-08	8.16E-09	1.02E-07	1.98E-14	5.89E-09	1.06E-08	0.00E+00
Pu-238	2.80E-05	1.00E-09	3.20E-04	1.52E-04	1.90E-03	9.62E-10	7.02E-05	1.06E-04	0.00E+00
Pu-239	3.18E-05	9.22E-10	3.23E-04	1.69E-04	2.11E-03	9.03E-10	7.56E-05	1.16E-04	0.00E+00
Pu-240	3.18E-05	9.51E-10	3.23E-04	1.69E-04	2.11E-03	9.05E-10	7.56E-05	1.16E-04	0.00E+00
Pu-241	6.82E-07	3.06E-11	3.18E-06	3.36E-06	4.20E-05	1.24E-11	1.31E-06	2.23E-06	0.00E+00
Pu-242	3.02E-05	9.45E-10	3.07E-04	1.61E-04	2.01E-03	8.79E-10	7.18E-05	1.11E-04	0.00E+00
Ra-226	1.02E-07	1.02E-07	1.61E-05	6.64E-07	7.59E-06	1.02E-07	1.07E-07	2.32E-06	0.00E+00
Ra-228	1.83E-07	1.84E-07	7.22E-06	7.38E-07	6.51E-06	1.83E-07	1.87E-07	1.29E-06	0.00E+00
Ru-106	1.38E-08	1.37E-08	1.04E-06	1.37E-08	1.37E-08	1.37E-08	1.69E-08	1.29E-07	0.00E+00
Sb-125	3.60E-10	4.16E-10	2.17E-08	6.49E-10	2.73E-09	3.24E-10	1.45E-09	3.30E-09	0.00E+00
Se-79	6.79E-10	6.79E-10	9.81E-09	6.79E-10	6.79E-10	6.79E-10	4.24E-09	2.66E-09	0.00E+00
Sm-147	0.00E+00	0.00E+00	7.62E-06	2.75E-05	3.44E-04	0.00E+00	1.89E-05	2.02E-05	0.00E+00
Sm-151	4.03E-14	1.49E-13	3.26E-09	1.10E-08	1.38E-07	1.32E-14	7.51E-09	8.10E-09	0.00E+00
Sn-126	1.43E-08	1.41E-08	1.51E-07	5.62E-08	1.18E-07	1.31E-08	1.76E-08	2.69E-08	0.00E+00
Sr-90	2.64E-09	2.64E-09	2.86E-06	3.36E-07	7.27E-07	2.64E-09	5.73E-09	3.51E-07	0.00E+00
Tc-99	4.52E-11	4.52E-11	1.67E-08	4.52E-11	4.52E-11	1.21E-09	6.26E-10	2.25E-09	0.00E+00
Th-229	2.76E-06	2.76E-06	1.99E-03	1.15E-03	1.43E-02	2.76E-06	7.05E-06	5.80E-04	0.00E+00
Th-230	4.08E-07	4.08E-07	3.00E-04	1.73E-04	2.16E-03	4.08E-07	1.05E-06	8.80E-05	0.00E+00
Th-232	7.62E-07	7.72E-07	9.40E-04	8.93E-04	1.11E-02	7.44E-07	1.87E-06	4.43E-04	0.00E+00
U-232	8.00E-08	8.06E-08	1.48E-03	4.06E-06	6.42E-05	7.85E-08	3.11E-06	1.78E-04	0.00E+00
U-233	2.54E-08	[illegible]	3.04E-04	7.12E-07	1.12E-05	2.54E-08	9.40E-07	3.66E-05	0.00E+00
U-234	2.50E-08	[illegible]	2.98E-04	6.98E-07	1.09E-05	2.50E-08	9.26E-07	3.58E-05	0.00E+00
U-235	2.37E-08	[illegible]	2.76E-04	6.58E-07	1.01E-05	2.37E-08	8.59E-07	3.32E-05	0.00E+00
U-236	2.37E-08	2.37E-08	2.82E-04	6.60E-07	1.04E-05	2.37E-08	8.77E-07	3.39E-05	0.00E+00
U-238	2.23E-08	2.23E-08	2.66E-04	6.58E-07	9.78E-06	2.22E-08	8.22E-07	3.20E-05	0.00E+00
Zr-93	2.18E-11	4.68E-11	8.72E-08	1.77E-07	2.18E-06	1.74E-11	1.73E-10	8.67E-08	0.00E+00
crud									
Co-60	4.76E-09	1.84E-08	3.45E-07	1.72E-08	1.35E-08	1.62E-08	3.60E-08	5.91E-08	0.00E+00
Fe-55	5.23E-10	5.09E-10	1.06E-09	5.17E-10	5.14E-10	5.42E-10	1.21E-09	7.26E-10	0.00E+00

	air submersion DCFs [Sv/Bq m^3/s]								
	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	3.75E-17	4.45E-17	3.38E-17	2.94E-17	1.04E-16	3.65E-17	3.18E-17	3.74E-17	3.28E-16
Am-241	8.58E-16	1.07E-15	6.74E-16	5.21E-16	2.87E-15	7.83E-16	6.34E-16	8.18E-16	1.28E-15
Am-242m	3.80E-17	6.01E-17	1.72E-17	1.72E-17	7.94E-17	2.95E-17	1.94E-17	3.17E-17	1.36E-16
Am-243	2.19E-15	2.61E-15	1.92E-15	1.55E-15	7.47E-15	2.09E-15	1.79E-15	2.18E-15	2.75E-15
C-14	2.59E-19	3.52E-19	1.53E-19	1.21E-19	7.06E-19	2.19E-19	1.54E-19	2.24E-19	2.43E-16
Cd-113m	7.17E-18	8.76E-18	5.93E-18	5.01E-18	2.10E-17	6.76E-18	5.63E-18	6.94E-18	8.48E-15
Cl-36	2.24E-17	2.66E-17	2.02E-17	1.81E-17	5.63E-17	2.19E-17	1.92E-17	2.23E-17	1.47E-14
Cm-242	7.83E-18	1.48E-17	1.13E-18	1.89E-18	1.06E-17	4.91E-18	2.27E-18	5.69E-18	4.29E-17
Cm-243	5.77E-15	6.68E-15	5.50E-15	5.00E-15	1.50E-14	5.76E-15	5.19E-15	5.88E-15	9.79E-15
Cm-244	6.90E-18	1.33E-17	7.08E-19	1.46E-18	8.82E-18	4.19E-18	1.81E-18	4.91E-18	3.91E-17
Cm-245	3.88E-15	4.55E-15	3.63E-15	3.17E-15	1.18E-14	3.84E-15	3.40E-15	3.96E-15	5.36E-15
Cm-246	6.24E-18	1.20E-17	7.00E-19	1.35E-18	8.17E-18	3.82E-18	1.67E-18	4.46E-18	3.49E-17
Cm-247	1.47E-14	1.68E-14	1.44E-14	1.38E-14	2.83E-14	1.49E-14	1.38E-14	1.50E-14	1.79E-14
Co-60	1.23E-13	1.39E-13	1.24E-13	1.23E-13	1.78E-13	1.27E-13	1.20E-13	1.26E-13	1.45E-13
Cs-134	7.40E-14	8.43E-14	7.37E-14	7.19E-14	1.20E-13	7.57E-14	7.06E-14	7.57E-14	9.45E-14
Cs-135	6.28E-19	8.23E-19	4.19E-19	3.34E-19	1.81E-18	5.50E-19	4.09E-19	5.65E-19	9.06E-16
Cs-137	2.67E-14	3.05E-14	2.65E-14	2.58E-14	4.38E-14	2.73E-14	2.54E-14	2.73E-14	4.39E-14
Eu-154	6.00E-14	6.81E-14	5.99E-14	5.87E-14	9.43E-14	6.15E-14	5.75E-14	6.14E-14	8.29E-14
Eu-155	2.49E-15	2.95E-15	2.22E-15	1.85E-15	8.09E-15	2.41E-15	2.07E-15	2.49E-15	3.39E-15
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H-3	0.00E+00	0.00E+00	2.75E-18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.31E-19	0.00E+00
I-129	4.83E-16	6.66E-16	2.14E-16	1.64E-16	1.10E-15	3.86E-16	2.30E-16	3.80E-16	1.10E-15
Kr-85	1.17E-16	1.34E-16	1.14E-16	1.09E-16	2.20E-16	1.18E-16	1.09E-16	1.19E-16	1.32E-14
Nb-93m	6.33E-18	1.31E-17	2.55E-19	1.18E-18	6.92E-18	3.43E-18	1.36E-18	4.44E-18	4.28E-17
Nb-94	7.54E-14	8.57E-14	7.51E-14	7.34E-14	1.19E-13	7.72E-14	7.19E-14	7.70E-14	9.52E-14
Ni-59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ni-63	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Np-237	1.04E-15	1.26E-15	9.02E-16	7.69E-16	3.20E-15	9.94E-16	8.50E-16	1.03E-15	1.54E-15
Pa-231	1.71E-15	1.99E-15	1.62E-15	1.52E-15	3.64E-15	1.70E-15	1.54E-15	1.72E-15	2.44E-15
Pb-210	6.19E-17	8.18E-17	4.25E-17	3.14E-17	1.95E-16	5.42E-17	4.09E-17	5.64E-17	1.28E-16
Pd-107	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pm-147	7.48E-19	9.56E-19	5.45E-19	4.46E-19	2.18E-18	6.75E-19	5.26E-19	6.93E-19	8.11E-16
Pu-238	6.56E-18	1.27E-17	1.06E-18	1.68E-18	9.30E-18	4.01E-18	1.99E-18	4.88E-18	4.09E-17
Pu-239	4.84E-18	7.55E-18	2.65E-18	2.67E-18	9.47E-18	3.88E-18	2.86E-18	4.24E-18	1.86E-17
Pu-240	6.36E-18	1.23E-17	1.09E-18	1.65E-18	9.26E-18	3.92E-18	1.96E-18	4.75E-18	3.92E-17
Pu-241	7.19E-20	8.67E-20	6.48E-20	5.63E-20	2.19E-19	6.98E-20	6.09E-20	7.25E-20	1.17E-19
Pu-242	5.34E-18	1.03E-17	9.69E-19	1.43E-18	7.90E-18	3.32E-18	1.68E-18	4.01E-18	3.27E-17
Ra-226	3.08E-16	3.54E-16	2.95E-16	2.70E-16	7.95E-16	3.09E-16	2.79E-16	3.15E-16	4.79E-16
Ra-228	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ru-106	1.01E-14	1.16E-14	1.01E-14	9.75E-15	1.72E-14	1.03E-14	9.63E-15	1.04E-14	1.09E-13
Sb-125	1.98E-14	2.27E-14	1.95E-14	1.87E-14	3.53E-14	2.01E-14	1.86E-14	2.02E-14	2.65E-14
Se-79	3.47E-19	4.67E-19	2.11E-19	1.67E-19	9.60E-19	2.96E-19	2.10E-19	3.03E-19	3.71E-16
Sm-147	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sm-151	5.20E-20	8.80E-20	7.08E-21	1.13E-20	7.09E-20	3.58E-20	1.49E-20	3.61E-20	1.90E-19
Sn-126	7.54E-14	8.62E-14	7.48E-14	7.22E-14	1.31E-13	7.69E-14	7.14E-14	7.71E-14	1.31E-13
Sr-90	7.78E-18	9.49E-18	6.44E-18	5.44E-18	2.28E-17	7.33E-18	6.11E-18	7.53E-18	9.20E-15
Tc-99	1.74E-18	2.20E-18	1.29E-18	1.05E-18	5.17E-18	1.57E-18	1.24E-18	1.62E-18	2.74E-15
Th-229	3.77E-15	4.42E-15	3.50E-15	3.03E-15	1.15E-14	3.70E-15	3.27E-15	3.83E-15	5.41E-15
Th-230	1.80E-17	2.38E-17	1.43E-17	1.22E-17	5.29E-17	1.63E-17	1.37E-17	1.74E-17	4.51E-17
Th-232	9.34E-18	1.36E-17	6.37E-18	5.52E-18	2.60E-17	7.90E-18	6.34E-18	8.72E-18	3.44E-17
U-232	1.55E-17	2.32E-17	9.84E-18	8.99E-18	3.86E-17	1.29E-17	1.00E-17	1.42E-17	5.92E-17
U-233	1.69E-17	2.22E-17	1.35E-17	1.24E-17	4.12E-17	1.55E-17	1.31E-17	1.63E-17	4.57E-17
U-234	8.79E-18	1.44E-17	4.38E-18	4.20E-18	1.99E-17	6.69E-18	4.80E-18	7.63E-18	4.25E-17
U-235	7.05E-15	8.11E-15	6.75E-15	6.15E-15	1.84E-14	7.05E-15	6.37E-15	7.20E-15	8.64E-15
U-236	6.10E-18	1.10E-17	2.18E-18	2.33E-18	1.19E-17	4.19E-18	2.70E-18	5.01E-18	3.57E-17
U-238	4.39E-18	8.54E-18	9.96E-19	1.24E-18	7.40E-18	2.72E-18	1.51E-18	3.41E-18	2.91E-17
Zr-93	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
crud									
Co-60	1.23E-13	1.39E-13	1.24E-13	1.23E-13	1.78E-13	1.27E-13	1.20E-13	1.26E-13	1.45E-13
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Source Term Calculations		HEPA filters?		no			
HWCTR (U/TH) [112]							
stable metal	intact						
Isotope	Curies (entire fuel intentory)	finv = 1/nCan	ARF	RF	LPF	Total Source Term [Ci] released to the environment	Respirable Source Term [Ci] released to the environment
Ac-227	9.27E-09	6.00E+00	2.00E-04	4.00E-03	1.00E+00	1.11E-11	4.45E-14
Am-241	1.22E-01	6.00E+00	2.00E-04	4.00E-03	1.00E+00	1.46E-04	5.83E-07
Am-242m	8.67E-05	6.00E+00	2.00E-04	4.00E-03	1.00E+00	1.04E-07	4.16E-10
Am-243	2.85E-04	6.00E+00	2.00E-04	4.00E-03	1.00E+00	3.42E-07	1.37E-09
C-14	1.09E-06	6.00E+00	2.00E-04	4.00E-03	1.00E+00	1.31E-09	5.25E-12
Cd-113m	6.32E-02	6.00E+00	2.00E-04	4.00E-03	1.00E+00	7.58E-05	3.03E-07
Cl-36	2.51E-30	6.00E+00	2.00E-04	4.00E-03	1.00E+00	3.01E-33	1.20E-35
Cm-242	2.62E-04	6.00E+00	2.00E-04	4.00E-03	1.00E+00	3.14E-07	1.26E-09
Cm-243	4.52E-05	6.00E+00	2.00E-04	4.00E-03	1.00E+00	5.43E-08	2.17E-10
Cm-244	9.94E-03	6.00E+00	2.00E-04	4.00E-03	1.00E+00	1.19E-05	4.77E-08
Cm-245	5.84E-07	6.00E+00	2.00E-04	4.00E-03	1.00E+00	7.01E-10	2.81E-12
Cm-246	3.99E-08	6.00E+00	2.00E-04	4.00E-03	1.00E+00	4.79E-11	1.91E-13
Cm-247	4.17E-14	6.00E+00	2.00E-04	4.00E-03	1.00E+00	5.00E-17	2.00E-19
Co-60	7.30E-03	6.00E+00	2.00E-04	4.00E-03	1.00E+00	8.75E-06	3.50E-08
Cs-134	9.30E+01	6.00E+00	2.00E-04	1.00E+00	1.00E+00	1.12E-01	1.12E-01
Cs-135	6.58E-04	6.00E+00	2.00E-04	1.00E+00	1.00E+00	7.90E-07	7.90E-07
Cs-137	5.49E+02	6.00E+00	2.00E-04	1.00E+00	1.00E+00	6.58E-01	6.58E-01
Eu-154	1.57E+01	6.00E+00	2.00E-04	4.00E-03	1.00E+00	1.88E-02	7.52E-05
Eu-155	7.47E+00	6.00E+00	2.00E-04	4.00E-03	1.00E+00	8.97E-03	3.59E-05
Fe-55	1.29E+00	6.00E+00	2.00E-04	4.00E-03	1.00E+00	1.55E-03	6.18E-06
H-3	2.02E+00	6.00E+00	3.00E-01	1.00E+00	1.00E+00	3.64E+00	3.64E+00
I-129	1.44E-04	6.00E+00	3.00E-01	1.00E+00	1.00E+00	2.59E-04	2.59E-04
Kr-85	5.46E+01	6.00E+00	3.00E-01	1.00E+00	1.00E+00	9.83E+01	9.83E+01
Nb-93m	2.82E-03	6.00E+00	2.00E-04	4.00E-03	1.00E+00	3.38E-06	1.35E-08
Nb-94	1.37E-07	6.00E+00	2.00E-04	4.00E-03	1.00E+00	1.64E-10	6.55E-13
Ni-59	2.43E-04	6.00E+00	2.00E-04	4.00E-03	1.00E+00	2.91E-07	1.16E-09
Ni-63	3.69E-02	6.00E+00	2.00E-04	4.00E-03	1.00E+00	4.43E-05	1.77E-07
Np-237	1.82E-03	6.00E+00	2.00E-04	4.00E-03	1.00E+00	2.19E-06	8.75E-09
Pa-231	9.79E-08	6.00E+00	2.00E-04	4.00E-03	1.00E+00	1.17E-10	4.70E-13
Pb-210	1.04E-10	6.00E+00	2.00E-04	4.00E-03	1.00E+00	1.24E-13	4.97E-16
Pd-107	9.52E-05	6.00E+00	2.00E-04	4.00E-03	1.00E+00	1.14E-07	4.57E-10
Pm-147	4.86E+02	6.00E+00	2.00E-04	4.00E-03	1.00E+00	5.83E-01	2.33E-03
Pu-238	7.65E+02	6.00E+00	2.00E-04	4.00E-03	1.00E+00	9.18E-01	3.67E-03
Pu-239	1.59E+01	6.00E+00	2.00E-04	4.00E-03	1.00E+00	1.91E-02	7.65E-05
Pu-240	9.08E+00	6.00E+00	2.00E-04	4.00E-03	1.00E+00	1.09E-02	4.36E-05
Pu-241	2.56E+03	6.00E+00	2.00E-04	4.00E-03	1.00E+00	3.07E+00	1.23E-02
Pu-242	1.35E-02	6.00E+00	2.00E-04	4.00E-03	1.00E+00	1.62E-05	6.49E-08
Ra-226	1.93E-09	6.00E+00	2.00E-04	4.00E-03	1.00E+00	2.32E-12	9.29E-15
Ra-228	1.74E-13	6.00E+00	2.00E-04	4.00E-03	1.00E+00	2.08E-16	8.33E-19
Ru-106	3.64E+01	6.00E+00	2.00E-04	4.00E-03	1.00E+00	4.37E-02	1.75E-04
Sb-125	1.20E+01	6.00E+00	2.00E-04	4.00E-03	1.00E+00	1.44E-02	5.77E-05
Se-79	2.47E-03	6.00E+00	2.00E-04	4.00E-03	1.00E+00	2.96E-06	1.19E-08
Sm-147	3.48E-08	6.00E+00	2.00E-04	4.00E-03	1.00E+00	4.18E-11	1.67E-13
Sm-151	2.16E+00	6.00E+00	2.00E-04	4.00E-03	1.00E+00	2.59E-03	1.04E-05
Sn-126	2.21E-03	6.00E+00	2.00E-04	4.00E-03	1.00E+00	2.65E-06	1.06E-08
Sr-90	5.25E+02	6.00E+00	2.00E-04	4.00E-03	1.00E+00	6.30E-01	2.52E-03
Tc-99	8.07E-02	6.00E+00	2.00E-04	4.00E-03	1.00E+00	9.68E-05	3.87E-07
Th-229	3.77E-08	6.00E+00	2.00E-04	4.00E-03	1.00E+00	4.53E-11	1.81E-13
Th-230	3.27E-04	6.00E+00	2.00E-04	4.00E-03	1.00E+00	3.93E-07	[illegible]E-09
Th-232	1.49E-10	6.00E+00	2.00E-04	4.00E-03	1.00E+00	1.78E-13	[illegible]
U-232	4.47E-03	6.00E+00	2.00E-04	4.00E-03	1.00E+00	5.36E-06	2.14E-08
U-233	6.56E-05	6.00E+00	2.00E-04	4.00E-03	1.00E+00	7.87E-08	3.15E-10
U-234	6.83E+00	6.00E+00	2.00E-04	4.00E-03	1.00E+00	8.19E-03	3.28E-05
U-235	1.34E-01	6.00E+00	2.00E-04	4.00E-03	1.00E+00	1.61E-04	6.44E-07
U-236	5.77E-01	6.00E+00	2.00E-04	4.00E-03	1.00E+00	6.92E-04	2.77E-06
U-238	2.22E-03	6.00E+00	2.00E-04	4.00E-03	1.00E+00	2.67E-06	1.07E-08
Zr-93	1.27E-02	6.00E+00	2.00E-04	4.00E-03	1.00E+00	1.53E-05	6.10E-08
crud (per canister)							
Co-60 (crud)	1.56E+01	1	1.00E+00	3.00E-01	1.00E+00	1.56E+01	4.68E+00
Fe-55 (crud)	9.85E+01	1	1.00E+00	3.00E-01	1.00E+00	9.85E+01	2.96E+01

Source Term Calculations		HEPA filters?	yes				
HWCTR (U/TH) [112]							
stable metal	intact						
Isotope	Curies	1/nCan	ARF	RF	LPF	Total Source Term [Ci] released to the environment	Respirable Source Term [Ci] released to the environment
Ac-227	9.27E-09	6.00E+00	2.00E-04	4.00E-03	3.00E-04	3.34E-15	1.34E-17
Am-241	1.22E-01	6.00E+00	2.00E-04	4.00E-03	3.00E-04	4.37E-08	1.75E-10
Am-242m	8.67E-05	6.00E+00	2.00E-04	4.00E-03	3.00E-04	3.12E-11	1.25E-13
Am-243	2.85E-04	6.00E+00	2.00E-04	4.00E-03	3.00E-04	1.03E-10	4.10E-13
C-14	1.09E-06	6.00E+00	2.00E-04	4.00E-03	3.00E-04	3.93E-13	1.57E-15
Cd-113m	6.32E-02	6.00E+00	2.00E-04	4.00E-03	3.00E-04	2.27E-08	9.10E-11
Cl-36	2.51E-30	6.00E+00	2.00E-04	4.00E-03	3.00E-04	9.02E-37	3.61E-39
Cm-242	2.62E-04	6.00E+00	2.00E-04	4.00E-03	3.00E-04	9.42E-11	3.77E-13
Cm-243	4.52E-05	6.00E+00	2.00E-04	4.00E-03	3.00E-04	1.63E-11	6.51E-14
Cm-244	9.94E-03	6.00E+00	2.00E-04	4.00E-03	3.00E-04	3.58E-09	1.43E-11
Cm-245	5.84E-07	6.00E+00	2.00E-04	4.00E-03	3.00E-04	2.10E-13	8.42E-16
Cm-246	3.99E-08	6.00E+00	2.00E-04	4.00E-03	3.00E-04	1.44E-14	5.74E-17
Cm-247	4.17E-14	6.00E+00	2.00E-04	4.00E-03	3.00E-04	1.50E-20	6.00E-23
Co-60	7.30E-03	6.00E+00	2.00E-04	4.00E-03	3.00E-04	2.63E-09	1.05E-11
Cs-134	9.30E+01	6.00E+00	2.00E-04	1.00E+00	1.00E+00	1.12E-01	1.12E-01
Cs-135	6.58E-04	6.00E+00	2.00E-04	1.00E+00	1.00E+00	7.90E-07	7.90E-07
Cs-137	5.49E+02	6.00E+00	2.00E-04	1.00E+00	1.00E+00	6.58E-01	6.58E-01
Eu-154	1.57E+01	6.00E+00	2.00E-04	4.00E-03	3.00E-04	5.64E-06	2.26E-08
Eu-155	7.47E+00	6.00E+00	2.00E-04	4.00E-03	3.00E-04	2.69E-06	1.08E-08
Fe-55	1.28E+00	6.00E+00	2.00E-04	4.00E-03	3.00E-04	4.64E-07	1.85E-09
H-3	2.02E+00	6.00E+00	3.00E-01	1.00E+00	1.00E+00	3.64E+00	3.64E+00
I-129	1.44E-04	6.00E+00	3.00E-01	1.00E+00	1.00E+00	2.59E-04	2.59E-04
Kr-85	5.46E+01	6.00E+00	3.00E-01	1.00E+00	1.00E+00	9.83E+01	9.83E+01
Nb-93m	2.82E-03	6.00E+00	2.00E-04	4.00E-03	3.00E-04	1.01E-09	4.08E-12
Nb-94	1.37E-07	6.00E+00	2.00E-04	4.00E-03	3.00E-04	4.92E-14	1.97E-16
Ni-59	2.43E-04	6.00E+00	2.00E-04	4.00E-03	3.00E-04	8.74E-11	3.49E-13
Ni-63	3.69E-02	6.00E+00	2.00E-04	4.00E-03	3.00E-04	1.33E-08	5.31E-11
Np-237	1.82E-03	6.00E+00	2.00E-04	4.00E-03	3.00E-04	6.56E-10	2.63E-12
Pa-231	9.79E-08	6.00E+00	2.00E-04	4.00E-03	3.00E-04	3.52E-14	1.41E-16
Pb-210	1.04E-10	6.00E+00	2.00E-04	4.00E-03	3.00E-04	3.73E-17	1.49E-19
Pd-107	9.52E-05	6.00E+00	2.00E-04	4.00E-03	3.00E-04	3.43E-11	1.37E-13
Pm-147	4.86E+02	6.00E+00	2.00E-04	4.00E-03	3.00E-04	1.75E-04	7.00E-07
Pu-238	7.65E+02	6.00E+00	2.00E-04	4.00E-03	3.00E-04	2.75E-04	1.10E-06
Pu-239	1.59E+01	6.00E+00	2.00E-04	4.00E-03	3.00E-04	5.74E-06	2.30E-08
Pu-240	9.08E+00	6.00E+00	2.00E-04	4.00E-03	3.00E-04	3.27E-06	1.31E-08
Pu-241	2.56E+03	6.00E+00	2.00E-04	4.00E-03	3.00E-04	9.21E-04	3.69E-06
Pu-242	1.35E-02	6.00E+00	2.00E-04	4.00E-03	3.00E-04	4.87E-09	1.95E-11
Ra-226	1.93E-09	6.00E+00	2.00E-04	4.00E-03	3.00E-04	6.96E-16	2.79E-18
Ra-228	1.74E-13	6.00E+00	2.00E-04	4.00E-03	3.00E-04	6.25E-20	2.50E-22
Ru-106	3.64E+01	6.00E+00	2.00E-04	4.00E-03	3.00E-04	1.31E-05	5.24E-08
Sb-125	1.20E+01	6.00E+00	2.00E-04	4.00E-03	3.00E-04	4.33E-06	1.73E-08
Se-79	2.47E-03	6.00E+00	2.00E-04	4.00E-03	3.00E-04	8.89E-10	3.56E-12
Sm-147	3.48E-08	6.00E+00	2.00E-04	4.00E-03	3.00E-04	1.25E-14	5.02E-17
Sm-151	2.16E+00	6.00E+00	2.00E-04	4.00E-03	3.00E-04	7.78E-07	3.11E-09
Sn-126	2.21E-03	6.00E+00	2.00E-04	4.00E-03	3.00E-04	7.96E-10	3.18E-12
Sr-90	5.25E+02	6.00E+00	2.00E-04	4.00E-03	3.00E-04	1.89E-04	7.56E-07
Tc-99	8.07E-02	6.00E+00	2.00E-04	4.00E-03	3.00E-04	2.90E-08	1.16E-10
Th-229	3.77E-08	6.00E+00	2.00E-04	4.00E-03	3.00E-04	1.36E-14	5.43E-17
Th-230	3.27E-04	6.00E+00	2.00E-04	4.00E-03	3.00E-04	1.18E-10	4.71E-13
Th-232	1.49E-10	6.00E+00	2.00E-04	4.00E-03	3.00E-04	5.35E-17	2.14E-19
U-232	4.47E-03	6.00E+00	2.00E-04	4.00E-03	3.00E-04	1.61E-09	6.43E-12
U-233	6.56E-05	6.00E+00	2.00E-04	4.00E-03	3.00E-04	2.36E-11	9.44E-14
U-234	6.83E+00	6.00E+00	2.00E-04	4.00E-03	3.00E-04	2.46E-06	9.83E-09
U-235	1.34E-01	6.00E+00	2.00E-04	4.00E-03	3.00E-04	4.83E-08	1.93E-10
U-236	5.77E-01	6.00E+00	2.00E-04	4.00E-03	3.00E-04	2.08E-07	8.30E-10
U-238	2.22E-03	6.00E+00	2.00E-04	4.00E-03	3.00E-04	8.00E-10	3.20E-12
Zr-93	1.27E-02	6.00E+00	2.00E-04	4.00E-03	3.00E-04	4.58E-09	1.83E-11
crud (per canister)							
Co-60 (crud)	1.56E+01	1	1.00E+00	3.00E-01	3.00E-04	4.68E-03	1.40E-03
Fe-55 (crud)	9.85E+01	1	1.00E+00	3.00E-01	3.00E-04	2.96E-02	8.87E-03

HWCTR (U/TH) [112]			No HEPAs						
stable metal	intact								
	Inhalation doses [rem]								
	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	1.02E-12	1.71E-16	3.95E-12	6.60E-12	8.24E-11	9.22E-17	3.77E-12	4.64E-12	0.00E+00
Am-241	1.09E-06	6.98E-11	6.19E-07	5.85E-06	7.30E-05	5.38E-11	2.63E-06	4.04E-06	0.00E+00
Am-242m	7.71E-10	3.31E-14	1.01E-10	4.06E-09	5.09E-08	1.35E-14	1.80E-09	2.76E-09	0.00E+00
Am-243	2.57E-09	1.20E-12	1.40E-09	1.36E-08	1.71E-07	6.54E-13	6.10E-09	9.38E-09	0.00E+00
C-14	1.71E-16	1.71E-16	1.71E-16	1.71E-16	1.71E-16	1.71E-16	1.71E-16	1.71E-16	0.00E+00
Cd-113m	5.81E-10	5.81E-10	7.15E-09	5.81E-10	5.81E-10	5.81E-10	2.27E-08	7.22E-09	0.00E+00
Cl-36	3.50E-40	3.50E-40	3.16E-38	3.50E-40	3.50E-40	3.50E-40	3.72E-40	4.11E-39	0.00E+00
Cm-242	4.13E-11	6.83E-14	1.12E-09	2.82E-10	3.53E-09	6.81E-14	1.77E-10	3.38E-10	0.00E+00
Cm-243	2.59E-10	7.87E-14	2.43E-10	1.48E-09	1.84E-08	4.79E-14	7.21E-10	1.04E-09	0.00E+00
Cm-244	4.37E-08	2.86E-12	5.31E-08	2.58E-07	3.22E-06	2.78E-12	1.31E-07	1.84E-07	0.00E+00
Cm-245	5.45E-12	1.08E-15	2.91E-12	2.90E-11	3.62E-10	5.95E-16	1.29E-11	1.99E-11	0.00E+00
Cm-246	3.69E-13	4.42E-17	2.01E-13	1.96E-12	2.45E-11	2.49E-17	8.76E-13	1.35E-12	0.00E+00
Cm-247	3.54E-19	2.57E-22	1.93E-19	1.88E-18	2.35E-17	1.67E-22	8.42E-19	1.29E-18	0.00E+00
Co-60	9.61E-12	3.72E-11	6.97E-10	3.47E-11	2.73E-11	3.27E-11	7.27E-11	1.19E-10	0.00E+00
Cs-134	8.36E-05	6.95E-05	7.59E-05	7.59E-05	7.08E-05	7.14E-05	8.94E-05	8.04E-05	0.00E+00
Cs-135	5.47E-11	5.47E-11	6.42E-11	5.47E-11	5.47E-11	5.47E-11	5.47E-11	5.60E-11	0.00E+00
Cs-137	3.33E-04	2.98E-04	3.35E-04	3.15E-04	3.01E-04	3.01E-04	3.46E-04	3.28E-04	0.00E+00
Eu-154	5.07E-08	6.72E-08	3.43E-07	4.60E-07	2.27E-06	3.10E-08	4.90E-07	3.35E-07	0.00E+00
Eu-155	7.36E-10	1.27E-09	2.46E-08	2.96E-08	3.14E-07	4.96E-10	2.30E-08	2.32E-08	0.00E+00
Fe-55	1.86E-10	1.81E-10	3.78E-10	1.84E-10	1.83E-10	1.93E-10	4.31E-10	2.59E-10	0.00E+00
H-3	3.63E-06	3.63E-06	3.63E-06	3.63E-06	3.63E-06	3.63E-06	3.63E-06	3.63E-06	0.00E+00
I-129	1.30E-09	3.12E-09	4.69E-09	2.09E-09	2.06E-09	2.33E-05	1.76E-09	7.00E-07	0.00E+00
Kr-85	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nb-93m	3.25E-13	3.40E-14	5.03E-11	2.22E-13	5.80E-13	2.37E-14	3.08E-13	6.16E-12	0.00E+00
Nb-94	1.80E-16	8.47E-16	2.83E-14	8.54E-16	7.45E-16	8.39E-16	1.68E-15	4.23E-15	0.00E+00
Ni-59	2.41E-14	2.32E-14	8.06E-14	2.38E-14	2.36E-14	2.53E-14	2.44E-14	2.40E-14	0.00E+00
Ni-63	8.40E-12	8.40E-12	3.14E-11	8.40E-12	8.40E-12	8.40E-12	8.78E-12	8.57E-12	0.00E+00
Np-237	1.49E-08	8.53E-12	8.12E-09	1.32E-07	1.65E-06	6.76E-12	1.18E-08	7.37E-08	0.00E+00
Pa-231	1.87E-16	2.38E-16	2.02E-11	1.89E-11	2.36E-10	2.07E-16	7.78E-15	9.40E-12	0.00E+00
Pb-210	9.12E-18	9.12E-18	9.12E-18	1.08E-16	1.57E-15	9.12E-18	1.35E-16	1.05E-16	0.00E+00
Pd-107	2.49E-17	2.49E-17	7.51E-13	1.35E-16	3.58E-16	2.49E-17	5.66E-15	9.09E-14	0.00E+00
Pm-147	2.53E-12	4.84E-12	1.04E-05	1.10E-06	1.37E-05	2.66E-12	7.92E-07	1.43E-06	0.00E+00
Pu-238	5.93E-03	2.12E-07	6.77E-02	3.22E-02	4.02E-01	2.04E-07	1.49E-02	2.24E-02	0.00E+00
Pu-239	1.40E-04	4.07E-09	1.43E-03	7.46E-04	9.31E-03	3.99E-09	3.34E-04	5.12E-04	0.00E+00
Pu-240	7.99E-05	2.39E-09	8.12E-04	4.25E-04	5.30E-03	2.28E-09	1.90E-04	2.92E-04	0.00E+00
Pu-241	4.83E-04	2.17E-08	2.25E-03	2.38E-03	2.98E-02	8.78E-09	9.28E-04	1.58E-03	0.00E+00
Pu-242	1.13E-07	3.54E-12	1.15E-06	6.03E-07	7.52E-06	3.29E-12	2.69E-07	4.15E-07	0.00E+00
Ra-226	5.46E-17	5.46E-17	8.62E-15	3.56E-16	4.06E-15	5.46E-17	5.73E-17	1.24E-15	0.00E+00
Ra-228	8.79E-21	8.84E-21	3.47E-19	3.55E-20	3.13E-19	8.79E-21	8.98E-21	6.20E-20	0.00E+00
Ru-106	1.39E-07	1.38E-07	1.05E-05	1.38E-07	1.38E-07	1.38E-07	1.70E-07	1.30E-06	0.00E+00
Sb-125	1.20E-09	1.38E-09	7.22E-08	2.18E-09	9.08E-09	1.08E-09	4.82E-09	1.10E-08	0.00E+00
Se-79	4.64E-13	4.64E-13	6.71E-12	4.64E-13	4.64E-13	4.64E-13	2.90E-12	1.82E-12	0.00E+00
Sm-147	0.00E+00	0.00E+00	7.35E-14	2.65E-13	3.32E-12	0.00E+00	1.82E-13	1.95E-13	0.00E+00
Sm-151	2.41E-14	8.91E-14	1.95E-09	6.58E-09	8.25E-08	7.89E-15	4.49E-09	4.84E-09	0.00E+00
Sn-126	8.75E-12	8.62E-12	9.24E-11	3.44E-11	7.22E-11	8.01E-12	1.08E-11	1.65E-11	0.00E+00
Sr-90	3.84E-07	3.84E-07	4.16E-04	4.88E-05	1.06E-04	3.84E-07	8.33E-07	5.10E-05	0.00E+00
Tc-99	1.01E-12	1.01E-12	3.73E-10	1.01E-12	1.01E-12	2.70E-11	1.40E-11	5.02E-11	0.00E+00
Th-229	2.88E-14	2.88E-14	2.08E-11	1.20E-11	1.49E-10	2.88E-14	7.36E-14	6.06E-12	0.00E+00
Th-230	3.69E-11	3.69E-11	2.72E-08	1.57E-08	1.96E-07	3.69E-11	9.51E-11	7.97E-09	0.00E+00
Th-232	3.14E-17	3.18E-17	3.87E-14	3.68E-14	4.57E-13	3.06E-17	7.70E-17	1.82E-14	0.00E+00
U-232	9.89E-11	9.96E-11	1.83E-06	5.02E-09	7.93E-08	9.70E-11	3.84E-09	2.20E-07	0.00E+00
U-233	4.61E-13	4.61E-13	5.52E-09	1.29E-11	2.03E-10	4.61E-13	1.71E-11	6.64E-10	0.00E+00
U-234	4.72E-08	4.72E-08	5.63E-04	1.32E-06	2.06E-05	4.72E-08	1.75E-06	6.76E-05	0.00E+00
U-235	8.80E-10	8.83E-10	1.02E-05	2.44E-08	3.75E-07	8.80E-10	3.19E-08	1.23E-06	0.00E+00
U-236	3.78E-09	3.78E-09	4.50E-05	1.05E-07	1.66E-06	3.78E-09	1.40E-07	5.41E-06	0.00E+00
U-238	1.37E-11	1.37E-11	1.64E-07	4.05E-10	6.02E-09	1.37E-11	5.06E-10	1.97E-08	0.00E+00
Zr-93	7.67E-14	1.65E-13	3.07E-10	6.23E-10	7.67E-09	6.12E-14	6.09E-13	3.05E-10	0.00E+00
crud									
Co-60 (crud)	1.28E-03	4.97E-03	9.31E-02	4.64E-03	3.64E-03	4.37E-03	9.71E-03	1.59E-02	0.00E+00
Fe-55 (crud)	8.91E-04	8.67E-04	1.81E-03	8.81E-04	8.76E-04	9.24E-04	2.06E-03	1.24E-03	0.00E+00
total	9.23E-03	6.20E-03	1.69E-01	4.17E-02	4.52E-01	5.70E-03	2.85E-02	4.26E-02	0.00E+00

HWCTR (U/TH)	[112]		No HEPAs						
stable metal	intact								
	air submersion doses [rem]								
	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	7.23E-20	8.58E-20	6.51E-20	5.67E-20	2.00E-19	7.03E-20	6.13E-20	7.21E-20	6.33E-19
Am-241	2.17E-11	2.70E-11	1.70E-11	1.32E-11	7.25E-11	1.98E-11	1.60E-11	2.07E-11	3.23E-11
Am-242m	6.85E-16	1.08E-15	3.10E-16	3.10E-16	1.43E-15	5.32E-16	3.50E-16	5.71E-16	2.45E-15
Am-243	1.30E-13	1.55E-13	1.14E-13	9.18E-14	4.42E-13	1.24E-13	1.06E-13	1.29E-13	1.63E-13
C-14	5.88E-20	7.99E-20	3.48E-20	2.75E-20	1.60E-19	4.97E-20	3.50E-20	5.09E-20	5.52E-17
Cd-113m	9.41E-14	1.15E-13	7.79E-14	6.58E-14	2.76E-13	8.87E-14	7.39E-14	9.11E-14	1.11E-10
Cl-36	1.17E-41	1.39E-41	1.05E-41	9.42E-42	2.93E-41	1.14E-41	1.00E-41	1.16E-41	7.65E-39
Cm-242	4.26E-16	8.04E-16	6.14E-17	1.03E-16	5.76E-16	2.67E-16	1.23E-16	3.09E-16	2.33E-15
Cm-243	5.42E-14	6.28E-14	5.17E-14	4.70E-14	1.41E-13	5.41E-14	4.88E-14	5.52E-14	9.20E-14
Cm-244	1.42E-14	2.75E-14	1.46E-15	3.01E-15	1.82E-14	8.65E-15	3.74E-15	1.01E-14	8.07E-14
Cm-245	4.71E-16	5.53E-16	4.41E-16	3.85E-16	1.43E-15	4.66E-16	4.13E-16	4.81E-16	6.51E-16
Cm-246	5.17E-20	9.94E-20	5.80E-21	1.12E-20	6.77E-20	3.17E-20	1.38E-20	3.70E-20	2.89E-19
Cm-247	1.27E-22	1.45E-22	1.25E-22	1.20E-22	2.45E-22	1.29E-22	1.20E-22	1.30E-22	1.55E-22
Co-60	1.86E-10	2.11E-10	1.88E-10	1.86E-10	2.70E-10	1.93E-10	1.82E-10	1.91E-10	2.20E-10
Cs-134	1.43E-06	1.63E-06	1.42E-06	1.39E-06	2.32E-06	1.46E-06	1.36E-06	1.46E-06	1.83E-06
Cs-135	8.59E-17	1.13E-16	5.73E-17	4.57E-17	2.48E-16	7.52E-17	5.59E-17	7.73E-17	1.24E-13
Cs-137	3.04E-06	3.47E-06	3.02E-06	2.94E-06	5.00E-06	3.11E-06	2.89E-06	3.11E-06	5.01E-06
Eu-154	1.95E-07	2.22E-07	1.95E-07	1.91E-07	3.07E-07	2.00E-07	1.87E-07	2.00E-07	2.70E-07
Eu-155	3.87E-09	4.58E-09	3.45E-09	2.87E-09	1.26E-08	3.74E-09	3.21E-09	3.87E-09	5.26E-09
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H-3	0.00E+00	0.00E+00	1.73E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.09E-10	0.00E+00
I-129	2.16E-11	2.98E-11	9.59E-12	7.35E-12	4.93E-11	1.73E-11	1.03E-11	1.70E-11	4.93E-11
Kr-85	1.99E-06	2.28E-06	1.94E-06	1.85E-06	3.74E-06	2.01E-06	1.85E-06	2.03E-06	2.25E-04
Nb-93m	3.71E-15	7.67E-15	1.49E-16	8.91E-16	4.05E-15	2.01E-15	7.97E-16	2.60E-15	2.51E-14
Nb-94	2.14E-15	2.43E-15	2.13E-15	2.08E-15	3.38E-15	2.19E-15	2.04E-15	2.18E-15	2.70E-15
Ni-59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ni-63	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Np-237	3.94E-13	4.77E-13	3.42E-13	2.91E-13	1.21E-12	3.77E-13	3.22E-13	3.90E-13	5.83E-13
Pa-231	3.48E-17	4.05E-17	3.30E-17	3.09E-17	7.41E-17	3.46E-17	3.13E-17	3.50E-17	4.96E-17
Pb-210	1.33E-21	1.76E-21	9.15E-22	6.76E-22	4.20E-21	1.17E-21	8.81E-22	1.21E-21	2.76E-21
Pd-107	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pm-147	7.55E-11	9.65E-11	5.50E-11	4.50E-11	2.20E-10	6.82E-11	5.31E-11	7.00E-11	8.19E-08
Pu-238	1.04E-09	2.02E-09	1.68E-10	2.67E-10	1.48E-09	6.37E-10	3.16E-10	7.76E-10	6.50E-09
Pu-239	1.60E-11	2.50E-11	8.78E-12	8.85E-12	3.14E-11	1.29E-11	9.48E-12	1.40E-11	6.16E-11
Pu-240	1.20E-11	2.32E-11	2.06E-12	3.11E-12	1.75E-11	7.40E-12	3.70E-12	8.96E-12	7.40E-11
Pu-241	3.82E-11	4.61E-11	3.45E-11	2.99E-11	1.16E-10	3.71E-11	3.24E-11	3.86E-11	6.22E-11
Pu-242	1.50E-14	2.89E-14	2.72E-15	4.02E-15	2.22E-14	9.33E-15	4.72E-15	1.13E-14	9.19E-14
Ra-226	1.24E-19	1.42E-19	1.19E-19	1.09E-19	3.20E-19	1.24E-19	1.12E-19	1.27E-19	1.93E-19
Ra-228	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ru-106	7.64E-08	8.77E-08	7.64E-08	7.37E-08	1.30E-07	7.79E-08	7.28E-08	7.86E-08	8.24E-07
Sb-125	4.94E-08	5.67E-08	4.87E-08	4.67E-08	8.81E-08	5.02E-08	4.64E-08	5.04E-08	6.62E-08
Se-79	1.78E-16	2.40E-16	1.08E-16	8.57E-17	4.93E-16	1.52E-16	1.08E-16	1.56E-16	1.90E-13
Sm-147	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sm-151	2.33E-14	3.95E-14	3.18E-15	5.07E-15	3.18E-14	1.61E-14	6.69E-15	1.62E-14	8.53E-14
Sn-126	3.46E-11	3.96E-11	3.43E-11	3.32E-11	6.01E-11	3.53E-11	3.28E-11	3.54E-11	6.00E-11
Sr-90	8.49E-10	1.04E-09	7.03E-10	5.94E-10	2.49E-09	8.00E-10	6.67E-10	8.22E-10	1.00E-06
Tc-99	2.92E-14	3.69E-14	2.16E-14	1.76E-14	8.66E-14	2.63E-14	2.08E-14	2.71E-14	4.59E-11
Th-229	2.96E-17	3.47E-17	2.74E-17	2.38E-17	9.02E-17	2.90E-17	2.56E-17	3.00E-17	4.24E-17
Th-230	1.22E-15	1.62E-15	9.72E-16	8.29E-16	3.60E-15	1.11E-15	9.31E-16	1.18E-15	3.07E-15
Th-232	2.89E-22	4.20E-22	1.97E-22	1.71E-22	8.03E-22	2.44E-22	1.96E-22	2.69E-22	1.06E-21
U-232	1.44E-14	2.15E-14	9.13E-15	8.34E-15	3.58E-14	1.20E-14	9.28E-15	1.32E-14	5.49E-14
U-233	2.30E-16	3.02E-16	1.84E-16	1.69E-16	5.61E-16	2.11E-16	1.78E-16	2.22E-16	6.23E-16
U-234	1.25E-11	2.04E-11	6.21E-12	5.96E-12	2.82E-11	9.49E-12	6.81E-12	1.08E-11	6.03E-11
U-235	1.96E-10	2.26E-10	1.88E-10	1.71E-10	5.13E-10	1.96E-10	1.78E-10	2.01E-10	2.41E-10
U-236	7.31E-13	1.32E-12	2.61E-13	2.79E-13	1.43E-12	5.02E-13	3.24E-13	6.00E-13	4.28E-12
U-238	2.03E-15	3.94E-15	4.60E-16	5.73E-16	3.42E-15	1.26E-15	6.97E-16	1.58E-15	1.34E-14
Zr-93	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
crud									
Co-60 (crud)	3.32E-04	3.75E-04	3.35E-04	3.32E-04	4.81E-04	3.43E-04	3.24E-04	3.40E-04	3.92E-04
Fe-55 (crud)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
total	3.39E-04	3.83E-04	3.42E-04	3.39E-04	4.92E-04	3.50E-04	3.31E-04	3.47E-04	6.25E-04

HWCTR (U/TH) [112]			HEPAs						
stable metal	intact								
	inhalation doses [rem]								
	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	3.05E-16	5.13E-20	1.19E-15	1.98E-15	2.47E-14	2.77E-20	1.13E-15	1.39E-15	0.00E+00
Am-241	3.28E-10	2.69E-14	1.86E-10	1.76E-09	2.19E-08	1.61E-14	7.89E-10	1.21E-09	0.00E+00
Am-242m	2.31E-13	9.94E-18	3.02E-14	1.22E-12	1.53E-11	4.06E-18	5.39E-13	8.28E-13	0.00E+00
Am-243	7.71E-13	3.60E-16	4.21E-13	4.09E-12	5.13E-11	1.96E-16	1.83E-12	2.82E-12	0.00E+00
C-14	5.12E-20	5.12E-20	5.12E-20	5.12E-20	5.12E-20	5.12E-20	5.12E-20	5.12E-20	0.00E+00
Cd-113m	1.74E-13	1.74E-13	2.15E-12	1.74E-13	1.74E-13	1.74E-13	6.82E-12	2.17E-12	0.00E+00
Cl-36	1.05E-43	1.05E-43	9.49E-42	1.05E-43	1.05E-43	1.05E-43	1.12E-43	1.23E-42	0.00E+00
Cm-242	1.24E-14	2.05E-17	3.37E-13	8.47E-14	1.06E-12	2.04E-17	5.32E-14	1.01E-13	0.00E+00
Cm-243	7.77E-14	2.36E-17	7.28E-14	4.43E-13	5.52E-12	1.44E-17	2.16E-13	3.12E-13	0.00E+00
Cm-244	1.31E-11	8.58E-16	1.59E-11	7.74E-11	9.85E-10	8.33E-16	3.94E-11	5.53E-11	0.00E+00
Cm-245	1.64E-15	3.25E-19	8.74E-16	8.69E-15	1.09E-13	1.79E-19	3.86E-15	5.97E-15	0.00E+00
Cm-246	1.11E-16	1.32E-20	6.03E-17	5.89E-16	7.35E-15	7.48E-21	2.63E-16	4.04E-16	0.00E+00
Cm-247	1.06E-22	7.72E-26	5.78E-23	5.64E-22	7.06E-21	5.02E-26	2.53E-22	3.88E-22	0.00E+00
Co-60	2.88E-15	1.11E-14	2.09E-13	1.04E-14	8.18E-15	9.81E-15	2.18E-14	3.56E-14	0.00E+00
Cs-134	8.36E-05	6.95E-05	7.59E-05	7.59E-05	7.08E-05	7.14E-05	8.94E-05	8.04E-05	0.00E+00
Cs-135	5.47E-11	5.47E-11	6.42E-11	5.47E-11	5.47E-11	5.47E-11	5.47E-11	5.60E-11	0.00E+00
Cs-137	3.33E-04	2.98E-04	3.35E-04	3.15E-04	3.01E-04	3.01E-04	3.46E-04	3.28E-04	0.00E+00
Eu-154	1.52E-11	2.02E-11	1.03E-10	1.38E-10	6.80E-10	9.29E-12	1.47E-10	1.01E-10	0.00E+00
Eu-155	2.21E-13	3.81E-13	7.38E-12	8.87E-12	9.43E-11	1.49E-13	6.89E-12	6.95E-12	0.00E+00
Fe-55	5.59E-14	5.44E-14	1.13E-13	5.53E-14	5.50E-14	5.79E-14	1.29E-13	7.76E-14	0.00E+00
H-3	3.63E-06	3.63E-06	3.63E-06	3.63E-06	3.63E-06	3.63E-06	3.63E-06	3.63E-06	0.00E+00
I-129	1.30E-09	3.12E-09	4.69E-09	2.09E-09	2.06E-09	2.33E-05	1.76E-09	7.00E-07	0.00E+00
Kr-85	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nb-93m	9.74E-17	1.02E-17	1.51E-14	6.67E-17	1.74E-16	7.12E-18	9.25E-17	1.85E-15	0.00E+00
Nb-94	5.40E-20	2.54E-19	8.48E-18	2.56E-19	2.23E-19	2.52E-19	5.05E-19	1.27E-18	0.00E+00
Ni-59	7.23E-18	6.97E-18	2.42E-17	7.13E-18	7.07E-18	7.60E-18	7.31E-18	7.21E-18	0.00E+00
Ni-63	2.52E-15	2.52E-15	9.41E-15	2.52E-15	2.52E-15	2.52E-15	2.63E-15	2.57E-15	0.00E+00
Np-237	4.48E-12	2.56E-15	2.44E-12	3.97E-11	4.95E-10	2.03E-15	3.54E-12	2.21E-11	0.00E+00
Pa-231	5.61E-20	7.15E-20	6.07E-15	5.67E-15	7.07E-14	6.21E-20	2.33E-18	2.82E-15	0.00E+00
Pb-210	2.74E-21	2.74E-21	2.74E-21	3.23E-20	4.71E-19	2.74E-21	4.04E-20	3.16E-20	0.00E+00
Pd-107	7.47E-21	7.47E-21	2.25E-16	4.04E-20	1.07E-19	7.47E-21	1.70E-18	2.73E-17	0.00E+00
Pm-147	7.59E-16	1.45E-15	3.12E-09	3.29E-10	4.12E-09	7.99E-16	2.38E-10	4.28E-10	0.00E+00
Pu-238	1.78E-06	6.35E-11	2.03E-05	9.65E-06	1.21E-04	6.11E-11	4.46E-06	6.73E-06	0.00E+00
Pu-239	4.21E-08	1.22E-12	4.28E-07	2.24E-07	2.79E-06	1.20E-12	1.00E-07	1.54E-07	0.00E+00
Pu-240	2.40E-08	7.17E-13	2.44E-07	1.27E-07	1.59E-06	6.83E-13	5.70E-08	8.75E-08	0.00E+00
Pu-241	1.45E-07	6.50E-12	6.76E-07	7.14E-07	8.93E-06	2.64E-12	2.78E-07	4.74E-07	0.00E+00
Pu-242	3.39E-11	1.06E-15	3.45E-10	1.81E-10	2.26E-09	9.87E-16	8.06E-11	1.25E-10	0.00E+00
Ra-226	1.64E-20	1.64E-20	2.59E-18	1.07E-19	1.22E-18	1.64E-20	1.72E-20	3.73E-19	0.00E+00
Ra-228	2.64E-24	2.65E-24	1.04E-22	1.06E-23	9.38E-23	2.64E-24	2.70E-24	1.86E-23	0.00E+00
Ru-106	4.17E-11	4.14E-11	3.14E-09	4.14E-11	4.14E-11	4.14E-11	5.11E-11	3.90E-10	0.00E+00
Sb-125	3.59E-13	4.15E-13	2.17E-11	6.48E-13	2.72E-12	3.23E-13	1.45E-12	3.29E-12	0.00E+00
Se-79	1.39E-16	1.39E-16	2.01E-15	1.39E-16	1.39E-16	1.39E-16	8.70E-16	5.46E-16	0.00E+00
Sm-147	0.00E+00	0.00E+00	2.20E-17	7.96E-17	9.95E-16	0.00E+00	5.47E-17	5.84E-17	0.00E+00
Sm-151	7.23E-18	2.67E-17	5.85E-13	1.97E-12	2.48E-11	2.37E-18	1.35E-12	1.45E-12	0.00E+00
Sn-126	2.62E-15	2.59E-15	2.77E-14	1.03E-14	2.17E-14	2.40E-15	3.23E-15	4.94E-15	0.00E+00
Sr-90	1.15E-10	1.15E-10	1.25E-07	1.47E-08	3.17E-08	1.15E-10	2.50E-10	1.53E-08	0.00E+00
Tc-99	3.03E-16	3.03E-16	1.12E-13	3.03E-16	3.03E-16	8.10E-15	4.19E-15	1.51E-14	0.00E+00
Th-229	8.65E-18	8.65E-18	6.24E-15	3.60E-15	4.48E-14	8.65E-18	2.21E-17	1.82E-15	0.00E+00
Th-230	1.11E-14	1.11E-14	8.15E-12	4.70E-12	5.87E-11	1.11E-14	2.85E-14	2.39E-12	0.00E+00
Th-232	9.41E-21	9.53E-21	1.16E-17	1.10E-17	1.37E-16	9.19E-21	2.31E-20	5.47E-18	0.00E+00
U-232	2.97E-14	2.99E-14	5.49E-10	1.51E-12	2.38E-11	2.91E-14	1.15E-12	6.60E-11	0.00E+00
U-233	1.38E-16	1.38E-16	1.65E-12	3.88E-15	6.10E-14	1.38E-16	5.12E-15	1.99E-13	0.00E+00
U-234	1.42E-11	1.42E-11	1.69E-07	3.96E-10	6.18E-09	1.42E-11	5.25E-10	2.03E-08	0.00E+00
U-235	2.64E-13	2.65E-13	3.07E-09	7.33E-12	1.12E-10	2.64E-13	9.57E-12	3.70E-10	0.00E+00
U-236	1.13E-12	1.13E-12	1.35E-08	3.16E-11	4.98E-10	1.13E-12	4.20E-11	1.62E-09	0.00E+00
U-238	4.12E-15	4.12E-15	4.91E-11	1.21E-13	1.81E-12	4.10E-15	1.52E-13	5.91E-12	0.00E+00
Zr-93	2.30E-17	4.94E-17	9.21E-14	1.87E-13	2.30E-12	1.84E-17	1.83E-16	9.15E-14	0.00E+00
crud									
Co-60 (crud)	3.85E-07	1.49E-06	2.79E-05	1.39E-06	1.09E-06	1.31E-06	2.91E-06	4.78E-06	0.00E+00
Fe-55 (crud)	2.67E-07	2.60E-07	5.42E-07	2.64E-07	2.63E-07	2.77E-07	6.19E-07	3.71E-07	0.00E+00
total	4.22E-04	3.72E-04	4.65E-04	4.07E-04	5.11E-04	4.01E-04	4.48E-04	4.25E-04	0.00E+00

HWCTR (U/TH) [112]			HEPAs						
stable metal	intact								
	air submersion doses [rem]								
	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	2.17E-23	2.57E-23	1.95E-23	1.70E-23	5.99E-23	2.11E-23	1.84E-23	2.16E-23	1.90E-22
Am-241	6.50E-15	8.11E-15	5.11E-15	3.95E-15	2.17E-14	5.93E-15	4.80E-15	6.20E-15	9.70E-15
Am-242m	2.05E-19	3.25E-19	9.30E-20	9.30E-20	4.29E-19	1.60E-19	1.05E-19	1.71E-19	7.35E-19
Am-243	3.89E-17	4.64E-17	3.41E-17	2.75E-17	1.33E-16	3.71E-17	3.18E-17	3.87E-17	4.88E-17
C-14	1.76E-23	2.40E-23	1.04E-23	8.24E-24	4.81E-23	1.49E-23	1.05E-23	1.53E-23	1.66E-20
Cd-113m	2.82E-17	3.45E-17	2.34E-17	1.97E-17	8.27E-17	2.66E-17	2.22E-17	2.73E-17	3.34E-14
Cl-36	3.50E-45	4.16E-45	3.16E-45	2.83E-45	8.79E-45	3.42E-45	3.00E-45	3.48E-45	2.30E-42
Cm-242	1.28E-19	2.41E-19	1.84E-20	3.08E-20	1.73E-19	8.01E-20	3.70E-20	9.28E-20	6.99E-19
Cm-243	1.63E-17	1.88E-17	1.55E-17	1.41E-17	4.23E-17	1.62E-17	1.46E-17	1.66E-17	2.76E-17
Cm-244	4.27E-18	8.24E-18	4.39E-19	9.04E-19	5.46E-18	2.60E-18	1.12E-18	3.04E-18	2.42E-17
Cm-245	1.41E-19	1.66E-19	1.32E-19	1.15E-19	4.30E-19	1.40E-19	1.24E-19	1.44E-19	1.95E-19
Cm-246	1.55E-23	2.98E-23	1.74E-24	3.36E-24	2.03E-23	9.50E-24	4.15E-24	1.11E-23	8.68E-23
Cm-247	3.82E-26	4.36E-26	3.74E-26	3.59E-26	7.35E-26	3.87E-26	3.59E-26	3.90E-26	4.65E-26
Co-60	5.59E-14	6.32E-14	5.64E-14	5.59E-14	8.10E-14	5.78E-14	5.46E-14	5.73E-14	6.59E-14
Cs-134	1.43E-06	1.63E-06	1.42E-06	1.39E-06	2.32E-06	1.48E-06	1.36E-06	1.46E-06	1.83E-06
Cs-135	8.59E-17	1.13E-16	5.73E-17	4.57E-17	2.48E-16	7.52E-17	5.59E-17	7.73E-17	1.24E-13
Cs-137	3.04E-06	3.47E-06	3.02E-06	2.94E-06	5.00E-06	3.11E-06	2.89E-06	3.11E-06	5.01E-06
Eu-154	5.86E-11	6.65E-11	5.85E-11	5.73E-11	9.21E-11	6.01E-11	5.62E-11	6.00E-11	8.10E-11
Eu-155	1.16E-12	1.37E-12	1.03E-12	8.62E-13	3.77E-12	1.12E-12	9.64E-13	1.16E-12	1.58E-12
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H-3	0.00E+00	0.00E+00	1.73E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.09E-10	0.00E+00
I-129	2.16E-11	2.98E-11	9.59E-12	7.35E-12	4.93E-11	1.73E-11	1.03E-11	1.70E-11	4.93E-11
Kr-85	1.99E-06	2.28E-06	1.94E-06	1.85E-06	3.74E-06	2.01E-06	1.85E-06	2.03E-06	2.25E-04
Nb-93m	1.11E-18	2.30E-18	4.48E-20	2.07E-19	1.22E-18	6.03E-19	2.39E-19	7.80E-19	7.52E-18
Nb-94	6.42E-19	7.30E-19	6.39E-19	6.25E-19	1.01E-18	6.57E-19	6.12E-19	6.55E-19	8.10E-19
Ni-59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ni-63	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Np-237	1.18E-16	1.43E-16	1.03E-16	8.74E-17	3.64E-16	1.13E-16	9.66E-17	1.17E-16	1.75E-16
Pa-231	1.04E-20	1.21E-20	9.89E-21	9.28E-21	2.22E-20	1.04E-20	9.40E-21	1.05E-20	1.49E-20
Pb-210	4.00E-25	5.28E-25	2.75E-25	2.03E-25	1.26E-24	3.50E-25	2.64E-25	3.64E-25	8.27E-25
Pd-107	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pm-147	2.27E-14	2.90E-14	1.65E-14	1.35E-14	6.60E-14	2.04E-14	1.59E-14	2.10E-14	2.46E-11
Pu-238	3.13E-13	6.06E-13	5.05E-14	8.01E-14	4.43E-13	1.91E-13	9.49E-14	2.33E-13	1.95E-12
Pu-239	4.81E-15	7.50E-15	2.63E-15	2.65E-15	9.41E-15	3.86E-15	2.84E-15	4.21E-15	1.85E-14
Pu-240	3.60E-15	6.96E-15	6.17E-16	9.34E-16	5.24E-15	2.22E-15	1.11E-15	2.69E-15	2.22E-14
Pu-241	1.15E-14	1.38E-14	1.03E-14	8.98E-15	3.49E-14	1.11E-14	9.72E-15	1.16E-14	1.87E-14
Pu-242	4.50E-18	8.88E-18	8.17E-19	1.21E-18	6.66E-18	2.80E-18	1.42E-18	3.38E-18	2.76E-17
Ra-226	3.71E-23	4.27E-23	3.56E-23	3.26E-23	9.59E-23	3.73E-23	3.36E-23	3.80E-23	5.78E-23
Ra-228	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ru-106	2.29E-11	2.63E-11	2.29E-11	2.21E-11	3.90E-11	2.34E-11	2.18E-11	2.36E-11	2.47E-10
Sb-125	1.48E-11	1.70E-11	1.46E-11	1.40E-11	2.64E-11	1.51E-11	1.39E-11	1.51E-11	1.99E-11
Se-79	5.34E-20	7.19E-20	3.25E-20	2.57E-20	1.48E-19	4.56E-20	3.23E-20	4.67E-20	5.71E-17
Sm-147	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sm-151	7.00E-18	1.18E-17	9.53E-19	1.52E-18	9.55E-18	4.82E-18	2.01E-18	4.86E-18	2.56E-17
Sn-126	1.04E-14	1.19E-14	1.03E-14	9.95E-15	1.80E-14	1.06E-14	9.84E-15	1.06E-14	1.80E-14
Sr-90	2.55E-13	3.11E-13	2.11E-13	1.78E-13	7.46E-13	2.40E-13	2.00E-13	2.47E-13	3.01E-10
Tc-99	8.75E-18	1.11E-17	6.49E-18	5.28E-18	2.60E-17	7.89E-18	6.23E-18	8.14E-18	1.38E-14
Th-229	8.87E-21	1.04E-20	8.23E-21	7.13E-21	2.71E-20	8.70E-21	7.69E-21	9.01E-21	1.27E-20
Th-230	3.67E-19	4.85E-19	2.92E-19	2.49E-19	1.08E-18	3.32E-19	2.79E-19	3.55E-19	9.20E-19
Th-232	8.66E-26	1.26E-25	5.90E-26	5.12E-26	2.41E-25	7.32E-26	5.88E-26	8.08E-26	3.19E-25
U-232	4.31E-18	6.46E-18	2.74E-18	2.50E-18	1.07E-17	3.59E-18	2.78E-18	3.95E-18	1.65E-17
U-233	6.91E-20	9.07E-20	5.52E-20	5.07E-20	1.68E-19	6.34E-20	5.35E-20	6.66E-20	1.87E-19
U-234	3.74E-15	6.13E-15	1.86E-15	1.79E-15	8.47E-15	2.85E-15	2.04E-15	3.25E-15	1.81E-14
U-235	5.89E-14	6.78E-14	5.64E-14	5.14E-14	1.54E-13	5.89E-14	5.33E-14	6.02E-14	7.22E-14
U-236	2.19E-16	3.95E-16	7.84E-17	8.38E-17	4.28E-16	1.51E-16	9.71E-17	1.80E-16	1.28E-15
U-238	6.08E-19	1.18E-18	1.38E-19	1.72E-19	1.03E-18	3.77E-19	2.09E-19	4.73E-19	4.03E-18
Zr-93	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
crud									
Co-60 (crud)	9.97E-08	1.13E-07	1.00E-07	9.97E-08	1.44E-07	1.03E-07	9.72E-08	1.02E-07	1.18E-07
Fe-55 (crud)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
total	6.56E-06	7.50E-06	6.49E-06	6.29E-06	1.12E-05	6.68E-06	6.21E-06	6.70E-06	2.32E-04

HWCTR (U/TH) [112] stable metal intact No HEPAs

	Inhalation Dose @ 5000 m [rem]	Dose Term for Regulation	Air Submersion Dose @ 5000 m [rem]	Dose Term for Regulation		Dose Term for Regulation
Gonad	9.23E-03		3.39E-04			
Breast	6.20E-03		3.83E-04			
Lung	1.69E-01		3.42E-04			
R Marrow	4.17E-02		3.39E-04			
B Surface	4.52E-01	<CDE	4.92E-04			
Thyroid	5.70E-03		3.50E-04			
Remainder	2.85E-02		3.31E-04			
Whole Body	4.26E-02	<CEDE	3.47E-04	<DDE	4.29E-02	<TEDE=CEDE+DDE
Skin	0.00E+00	<SKIN	6.25E-04	<SKIN	6.25E-04	<SKIN
Eye Lens	N/A	<EYE	N/A	<EYE	N/A	<EYE
					4.52E-01	<CDE + DDE

HWCTR (U/TH) [112] stable metal intact HEPAs

	Inhalation Dose @ 5000 m [rem]	Dose Term for Regulation	Air Submersion Dose @ 5000 m [rem]	Dose Term for Regulation	Dose for Regulation [rem]	Dose Term for Regulation
Gonad	4.22E-04		6.56E-06			
Breast	3.72E-04		7.50E-06			
Lung	4.65E-04		6.49E-06			
R Marrow	4.07E-04		6.29E-06			
B Surface	5.11E-04	<CDE	1.12E-05			
Thyroid	4.01E-04		6.68E-06			
Remainder	4.48E-04		6.21E-06			
Whole Body	4.25E-04	<CEDE	6.70E-06	<DDE	4.32E-04	<TEDE=CEDE+DDE
Skin	0.00E+00	<SKIN	2.32E-04	<SKIN	2.32E-04	<SKIN
Eye Lens	N/A	<EYE	N/A	<EYE	N/A	<EYE
					5.18E-04	<CDE + DDE

HWCTR (U/TH) [112]

isotope	material type	stable metal offsite doses with no HEPAs [rem] TEDE	stable metal offsite doses with no HEPAs [rem] bone surface CDE + DDE	intact offsite doses with HEPAs [rem] TEDE	intact offsite doses with HEPAs [rem] bone surface CDE + DDE
Ac-227	P	4.64E-12	8.24E-11	1.39E-15	2.47E-14
Am-241	P	4.04E-06	7.30E-05	1.21E-09	2.19E-08
Am-242m	P	2.76E-09	5.09E-08	8.28E-13	1.53E-11
Am-243	P	9.38E-09	1.71E-07	2.82E-12	5.13E-11
C-14	P	1.71E-16	1.71E-16	5.12E-20	5.12E-20
Cd-113m	P	7.22E-09	5.81E-10	2.17E-12	1.74E-13
Cl-36	P	4.12E-39	3.61E-40	1.24E-42	1.08E-43
Cm-242	P	3.38E-10	3.53E-09	1.01E-13	1.06E-12
Cm-243	P	1.04E-09	1.84E-08	3.12E-13	5.52E-12
Cm-244	P	1.84E-07	3.22E-06	5.53E-11	9.65E-10
Cm-245	P	1.99E-11	3.62E-10	5.97E-15	1.09E-13
Cm-246	P	1.35E-12	2.45E-11	4.04E-16	7.35E-15
Cm-247	P	1.29E-18	2.35E-17	3.88E-22	7.06E-21
Co-60	P	3.10E-10	2.18E-10	9.31E-14	6.55E-14
Cs-134	C	8.19E-05	7.22E-05	8.19E-05	7.22E-05
Cs-135	C	5.60E-11	5.47E-11	5.60E-11	5.47E-11
Cs-137	C	3.31E-04	3.05E-04	3.31E-04	3.05E-04
Eu-154	P	5.35E-07	2.47E-06	1.61E-10	7.40E-10
Eu-155	P	2.70E-08	3.18E-07	8.11E-12	9.55E-11
Fe-55	P	2.59E-10	1.83E-10	7.76E-14	5.50E-14
H-3	G	3.63E-06	3.63E-06	3.63E-06	3.63E-06
I-129	G	7.00E-07	2.08E-09	7.00E-07	2.08E-09
Kr-85	G	2.03E-06	2.03E-06	2.03E-06	2.03E-06
Nb-93m	P	6.17E-12	5.62E-13	1.85E-15	1.75E-16
Nb-94	P	6.42E-15	2.93E-15	1.93E-18	8.79E-19
Ni-59	P	2.40E-14	2.36E-14	7.21E-18	7.07E-18
Ni-63	P	8.57E-12	8.40E-12	2.57E-15	2.52E-15
Np-237	P	7.37E-08	1.65E-06	2.21E-11	4.95E-10
Pa-231	P	9.40E-12	2.36E-10	2.82E-15	7.07E-14
Pb-210	P	1.05E-16	1.57E-15	3.16E-20	4.71E-19
Pd-107	P	9.09E-14	3.58E-16	2.73E-17	1.07E-19
Pm-147	P	1.43E-06	1.37E-05	4.28E-10	4.12E-09
Pu-238	P	2.24E-02	4.02E-01	6.73E-06	1.21E-04
Pu-239	P	5.12E-04	9.31E-03	1.54E-07	2.79E-06
Pu-240	P	2.92E-04	5.30E-03	8.75E-08	1.59E-06
Pu-241	P	1.58E-03	2.98E-02	4.74E-07	8.93E-06
Pu-242	P	4.15E-07	7.52E-06	1.25E-10	2.26E-09
Ra-226	P	1.24E-15	4.06E-15	3.73E-19	1.22E-18
Ra-228	P	6.20E-20	3.13E-19	1.86E-23	9.38E-23
Ru-106	P	1.38E-06	2.17E-07	4.13E-10	6.50E-11
Sb-125	P	6.14E-08	5.95E-08	1.84E-11	1.79E-11
Se-79	P	1.82E-12	4.64E-13	5.46E-16	1.39E-16
Sm-147	P	1.95E-13	3.32E-12	5.84E-17	9.95E-16
Sm-151	P	4.84E-09	8.25E-08	1.45E-12	2.48E-11
Sn-126	P	5.19E-11	1.08E-10	1.56E-14	3.23E-14
Sr-90	P	5.10E-05	1.06E-04	1.53E-08	3.17E-08
Tc-99	P	5.03E-11	1.04E-12	1.51E-14	3.11E-16
Th-229	P	6.06E-12	1.49E-10	1.82E-15	4.48E-14
Th-230	P	7.97E-09	1.96E-07	2.39E-12	5.87E-11
Th-232	P	1.82E-14	4.57E-13	5.47E-18	1.37E-16
U-232	P	2.20E-07	7.93E-08	6.60E-11	2.38E-11
U-233	P	6.64E-10	2.03E-10	1.99E-13	6.10E-14
U-234	P	6.76E-05	2.06E-05	2.03E-08	6.18E-09
U-235	P	1.23E-06	3.75E-07	3.70E-10	1.13E-10
U-236	P	5.41E-06	1.66E-06	1.62E-09	4.98E-10
U-238	P	1.97E-08	6.02E-09	5.91E-12	1.81E-12
Zr-93	P	3.05E-10	7.67E-09	9.15E-14	2.30E-12
crud					
Co-60 (crud)	crud	1.63E-02	3.98E-03	4.89E-06	1.20E-06
Fe-55 (crud)	crud	1.24E-03	8.76E-04	3.71E-07	2.63E-07
	total	4.29E-02	4.52E-01	4.32E-04	5.18E-04

HWCTR (U/TH) [112] stable metal intact

TEDE (no HEPAs)

material type	subtotal [rem]	fraction of total [-]
G	6.36E-06	1.48E-04
P	2.50E-02	5.82E-01
C	4.13E-04	9.62E-03
crud	1.75E-02	4.08E-01
total	4.29E-02	1.00E+00

TEDE (HEPAs)

material type	subtotal [rem]	fraction of total [-]
G	6.36E-06	1.47E-02
P	7.49E-06	1.73E-02
C	4.13E-04	9.56E-01
crud	5.26E-06	1.22E-02
total	4.32E-04	1.00E+00

bone surface CDE + DDE (no HEPAs)

material type	subtotal [rem]	fraction of total [-]
G	5.66E-06	1.25E-05
P	4.47E-01	9.88E-01
C	3.77E-04	8.33E-04
crud	4.86E-03	1.07E-02
total	4.52E-01	1.00E+00

bone surface CDE + DDE (HEPAs)

material type	subtotal [rem]	fraction of total [-]
G	5.66E-06	1.09E-02
P	1.34E-04	2.59E-01
C	3.77E-04	7.27E-01
crud	1.46E-06	2.81E-03
total	5.18E-04	1.00E+00

Attachment IV

Calculations for ALUM CLAD SNF [411] DOE SNF

	evaluated fuel		x						evaluated fuel
	fuel type	stable metal	stable metal	non-metal	non-metal	other	other		stable metal
	condition	intact	not intact	intact	not intact	intact	not intact		not intact
	fuel name	HWCTR (U/TH) [112]	ALUM CLAD SNF [411]	SHIPPINGPORT PWR CORE II [193]	SAXTON (MOX) [787]	EBWR (U METAL) LEU [64]	N REACTOR [147]		ALUM CLAD SNF [411]
	# of canisters	0.17	1.00	24.00	1.00	10.50	194.95		1.00
Isotopes	material type	Curies (entire fuel inventory)							Curies
Ac-227	P	9.27E-09	2.81E-07	1.24E-02	1.33E-05	3.38E-05	1.03E-02		2.81E-07
Am-241	P	1.22E-01	2.51E+01	7.61E+04	6.45E+03	1.63E+04	2.80E+05		2.51E+01
Am-242m	P	8.67E-05	9.69E-03	1.18E+02	1.07E+01	2.71E+01	7.96E+00		9.69E-03
Am-243	P	2.85E-04	2.40E-02	3.38E+02	2.83E+01	7.18E+01	4.10E+01		2.40E-02
C-14	P	1.09E-06	1.17E-05	1.53E+00	1.81E+00	4.59E+00	3.63E+02		1.17E-05
Cd-113m	P	6.32E-02	7.25E-01	0.00E+00	2.59E+01	6.56E+01	0.00E+00		7.25E-01
Cl-36	P	2.51E-30	0.00E+00	0.00E+00	2.35E-02	5.96E-02	0.00E+00		0.00E+00
Cm-242	P	2.62E-04	8.00E-03	0.00E+00	8.79E+00	2.23E+01	0.00E+00		8.00E-03
Cm-243	P	4.52E-05	3.29E-03	0.00E+00	1.60E+01	4.06E+01	0.00E+00		3.29E-03
Cm-244	P	9.94E-03	4.27E-01	3.16E+04	9.29E+02	2.36E+03	2.44E+03		4.27E-01
Cm-245	P	5.84E-07	1.33E-05	5.82E+00	2.12E-01	5.37E-01	5.13E-01		1.33E-05
Cm-246	P	3.99E-08	9.83E-07	9.89E-01	4.28E-02	1.08E-01	6.79E-02		9.83E-07
Cm-247	P	4.17E-14	0.00E+00		1.12E-07	2.83E-07			0.00E+00
Co-60	P	7.30E-03	1.81E-09	1.10E+04	2.12E+01	5.38E+01	4.75E+02		1.81E-09
Cs-134	C	9.30E+01	2.05E+02	3.63E+03	1.24E+01	3.13E+01	1.63E+02		2.05E+02
Cs-135	C	6.58E-04	1.24E-02	6.19E+00	6.65E-01	1.69E+00	4.00E+01		1.24E-02
Cs-137	C	5.49E+02	8.60E+03	2.07E+06	1.00E+05	2.53E+05	5.34E+06		8.60E+03
Eu-154	P	1.57E+01	9.08E+01	0.00E+00	1.84E+03	4.67E+03	0.00E+00		9.08E+01
Eu-155	P	7.47E+00	2.81E+01	0.00E+00	1.92E+02	4.86E+02	0.00E+00		2.81E+01
Fe-55	P	1.29E+00	0.00E+00	0.00E+00	1.76E-01	4.45E-01	0.00E+00		0.00E+00
H-3	G	2.02E+00	2.61E+01	5.09E+03	2.92E+02	7.41E+02	1.03E+04		2.61E+01
I-129	G	1.44E-04	2.54E-03	7.20E-01	6.09E-02	1.54E-01	3.29E+00		2.54E-03
Kr-85	G	5.46E+01	6.45E+02	5.07E+04	2.59E+03	6.56E+03	1.53E+05		6.45E+02
Nb-93m	P	2.82E-03	4.96E-02	5.72E+01	2.82E+00	7.15E+00	4.54E+02		4.96E-02
Nb-94	P	1.37E-07	4.96E-06	0.00E+00	5.18E-02	1.31E-01	6.71E-05		4.96E-06
Ni-59	P	2.43E-04	0.00E+00	0.00E+00	4.01E-02	1.02E-01	2.03E+01		0.00E+00
Ni-63	P	3.69E-02	0.00E+00	8.04E+04	4.42E+00	1.12E+01	2.21E+03		0.00E+00
Np-237	P	1.82E-03	1.20E-02	7.06E+00	6.46E-01	1.64E+00	3.87E+01		1.20E-02
Pa-231	P	9.79E-08	1.88E-06	1.15E-02	3.02E-05	7.65E-05	1.38E-02		1.88E-06
Pb-210	P	1.04E-10	1.44E-11	2.71E-06	5.13E-08	1.30E-07	7.52E-08		1.44E-11
Pd-107	P	9.52E-05	2.35E-03	1.95E+00	2.14E-01	5.42E-01	7.46E+00		2.35E-03
Pm-147	P	4.86E+02	2.47E+03	0.00E+00	9.36E+01	2.37E+02	0.00E+00		2.47E+03
Pu-238	P	7.65E+02	2.20E+01	8.02E+04	5.66E+02	1.18E+04	6.37E+04		2.20E+01
Pu-239	P	1.59E+01	1.49E+01	7.55E+03	9.81E+01	2.05E+03	1.23E+05		1.49E+01
Pu-240	P	9.08E+00	1.07E+01	1.13E+04	1.70E+02	3.54E+03	7.18E+04		1.07E+01
Pu-241	P	2.56E+03	1.22E+03	1.57E+06	9.43E+03	1.97E+05	2.06E+06		1.22E+03
Pu-242	P	1.35E-02	1.04E-02	3.73E+01	4.84E-01	1.01E+01	3.46E+01		1.04E-02
Ra-226	P	1.93E-09	1.53E-10	6.13E-06	2.46E-07	6.22E-07	1.15E-03		1.53E-10
Ra-228	P	1.74E-13	8.44E-12	5.85E-02	2.80E-07	7.11E-07	1.03E-06		8.44E-12
Ru-106	P	3.64E+01	2.97E+01	1.42E+01	1.17E-03	2.97E-03	3.16E-01		2.97E+01
Sb-125	P	1.20E+01	0.00E+00	0.00E+00	1.70E+01	4.30E+01	0.00E+00		0.00E+00
Se-79	P	2.47E-03	6.93E-02	7.69E+00	7.90E-01	2.00E+00	4.48E+01		6.93E-02
Sm-147	P	3.48E-08	8.28E-07	0.00E+00	9.01E-06	2.28E-05	0.00E+00		8.28E-07
Sm-151	P	2.16E+00	2.67E+01	2.58E+04	5.86E+02	1.48E+03	8.55E+04		2.67E+01
Sn-126	P	2.21E-03	2.72E-02	9.72E+00	1.50E+00	3.80E+00	7.83E+01		2.72E-02
Sr-90	P	5.25E+02	8.16E+03	1.56E+06	6.87E+04	1.74E+05	4.03E+06		8.16E+03
Tc-99	P	8.07E-02	1.44E+00	2.67E+02	2.51E+01	6.37E+01	1.51E+03		1.44E+00
Th-229	P	3.77E-08	8.09E-10	1.57E-02	4.93E-07	1.03E-05	9.31E-06		8.09E-10
Th-230	P	3.27E-04	7.96E-08	1.08E-03	8.39E-06	1.75E-04	1.02E-03		7.96E-08
Th-232	P	1.49E-10	1.99E-11	5.56E-03	4.58E-08	9.56E-07	1.21E-07		1.99E-11
U-232	P	4.47E-03	1.11E-04	0.00E+00	4.23E-03	8.82E-02	0.00E+00		1.11E-04
U-233	P	6.56E-05	1.18E-06	6.07E+00	1.70E-04	3.55E-03	5.71E-03		1.18E-06
U-234	P	6.83E+00	1.17E-03	5.82E+00	5.70E-02	1.19E+00	4.85E+02		1.17E-03
U-235	P	1.34E-01	8.48E-03	6.58E-01	5.12E-03	1.07E-01	1.85E+01		8.48E-03
U-236	P	5.77E-01	3.95E-02	5.50E+00	7.81E-02	1.63E+00	7.02E+01		3.95E-02
U-238	P	2.22E-03	1.04E-02	5.15E+00	9.65E-02	2.01E+00	3.82E+02		1.04E-02
Zr-93	P	1.27E-02	1.40E-01	3.61E+01	3.72E+00	9.42E+00	2.10E+02		1.40E-01
crud (per canister)									
Co-60 (crud)		1.56E+01	6.37E+00	2.68E+02	1.23E+02	7.70E+02	1.76E+03		6.37E+00
Fe-55 (crud)		9.85E+01	4.01E+01	1.69E+03	7.73E+02	4.85E+03	1.11E+04		4.01E+01

Release Fractions				
Material Type	ARF	RF	Total Release Fraction	HEPA Filter LPF
stable metal/ intact				
G	0.3	1.0	3.00E-01	1.0
P	2.00E-04	4.00E-03	8.00E-07	3.00E-04
C	2.00E-04	1.0	2.00E-04	1.0
stable metal/not intact				
G	0.3	1.0	0.3	1.0
P	5.00E-03	0.4	2.00E-03	3.00E-04
C	5.00E-03	1.0	5.00E-03	1.0
non-metal/intact				
G	0.3	1.0	0.3	1.0
P	2.25E-04	1.0	2.25E-04	3.00E-04
C	2.25E-04	1.0	2.25E-04	1.0
non-metal/not intact				
G	0.3	1.0	0.3	1.0
P	5.00E-03	0.4	2.00E-03	3.00E-04
C	5.00E-03	1.0	5.00E-03	1.0
other/intact				
G	0.3	1.0	0.3	1.0
P	1.00E-03	1.0	1.00E-03	3.00E-04
C	1.00E-03	1.0	1.00E-03	1.0
other/not intact				
G	0.3	1.0	0.3	1.0
P	5.00E-03	0.4	2.00E-03	3.00E-04
C	5.00E-03	1.0	5.00E-03	1.0
crud				
crud	1.0	0.3	3.00E-01	3.00E-04
ALUM CLAD SNF [411]				
stable metal				
not intact				
Release Fractions Used in this Calculation				
G	0.3	1.0	0.3	1.0
P	5.00E-03	4.00E-01	2.00E-03	3.00E-04
C	5.00E-03	1.00E+00	5.00E-03	1.00E+00
crud	1.0	0.3	0.3	3.00E-04
breathing rate	3.33E-04	[m^3/s]		
gound level dispersion factor				
distance [m]	x/Q [sec/m^3]			
5000	4.68E-05	99.5% worst-sector		
3.70E+12	unit conversion factor			
	Sv/Bq to rem/Ci			

	inhalation DCFs [Sv/Bq]								
Isotopes	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	3.96E-04	6.66E-08	1.54E-03	2.57E-03	3.21E-02	3.59E-08	1.47E-03	1.81E-03	0.00E+00
Am-241	3.25E-05	2.67E-09	1.84E-05	1.74E-04	2.17E-03	1.60E-09	7.82E-05	1.20E-04	0.00E+00
Am-242m	3.21E-05	1.38E-09	4.20E-06	1.69E-04	2.12E-03	5.64E-10	7.48E-05	1.15E-04	0.00E+00
Am-243	3.26E-05	1.52E-08	1.78E-05	1.73E-04	2.17E-03	8.29E-09	7.74E-05	1.19E-04	0.00E+00
C-14	5.64E-10	5.64E-10	5.64E-10	5.64E-10	5.64E-10	5.64E-10	5.64E-10	5.64E-10	0.00E+00
Cd-113m	3.32E-08	3.32E-08	4.09E-07	3.32E-08	3.32E-08	3.32E-08	1.30E-06	4.13E-07	0.00E+00
Cl-36	5.04E-10	5.04E-10	4.56E-08	5.04E-10	5.04E-10	5.04E-10	5.36E-10	5.93E-09	0.00E+00
Cm-242	5.70E-07	9.44E-10	1.55E-05	3.90E-06	4.87E-05	9.41E-10	2.45E-06	4.67E-06	0.00E+00
Cm-243	2.07E-05	6.29E-09	1.94E-05	1.18E-04	1.47E-03	3.83E-09	5.76E-05	8.30E-05	0.00E+00
Cm-244	1.59E-05	1.04E-09	1.93E-05	9.38E-05	1.17E-03	1.01E-09	4.78E-05	6.70E-05	0.00E+00
Cm-245	3.37E-05	6.69E-09	1.80E-05	1.79E-04	2.24E-03	3.68E-09	7.96E-05	1.23E-04	0.00E+00
Cm-246	3.34E-05	4.00E-09	1.82E-05	1.78E-04	2.22E-03	2.26E-09	7.94E-05	1.22E-04	0.00E+00
Cm-247	3.07E-05	2.23E-08	1.67E-05	1.63E-04	2.04E-03	1.45E-08	7.30E-05	1.12E-04	0.00E+00
Co-60	4.76E-09	1.84E-08	3.45E-07	1.72E-08	1.35E-08	1.62E-08	3.60E-08	5.91E-08	0.00E+00
Cs-134	1.30E-08	1.08E-08	1.18E-08	1.18E-08	1.10E-08	1.11E-08	1.39E-08	1.25E-08	0.00E+00
Cs-135	1.20E-09	1.20E-09	1.41E-09	1.20E-09	1.20E-09	1.20E-09	1.20E-09	1.23E-09	0.00E+00
Cs-137	8.76E-09	7.84E-09	8.82E-09	8.30E-09	7.94E-09	7.93E-09	9.12E-09	8.63E-09	0.00E+00
Eu-154	1.17E-08	1.55E-08	7.92E-08	1.06E-07	5.23E-07	7.14E-09	1.13E-07	7.73E-08	0.00E+00
Eu-155	3.56E-10	6.14E-10	1.19E-08	1.43E-08	1.52E-07	2.40E-10	1.11E-08	1.12E-08	0.00E+00
Fe-55	5.23E-10	5.09E-10	1.06E-09	5.17E-10	5.14E-10	5.42E-10	1.21E-09	7.26E-10	0.00E+00
H-3	1.73E-11	1.73E-11	1.73E-11	1.73E-11	1.73E-11	1.73E-11	1.73E-11	1.73E-11	0.00E+00
I-129	8.69E-11	2.09E-10	3.14E-10	1.40E-10	1.38E-10	1.56E-06	1.18E-10	4.69E-08	0.00E+00
Kr-85	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nb-93m	4.16E-10	4.36E-11	6.45E-08	2.85E-10	7.43E-10	3.04E-11	3.95E-10	7.90E-09	0.00E+00
Nb-94	4.76E-09	2.24E-08	7.48E-07	2.26E-08	1.97E-08	2.22E-08	4.45E-08	1.12E-07	0.00E+00
Ni-59	3.59E-10	3.46E-10	1.20E-09	3.54E-10	3.51E-10	3.77E-10	3.63E-10	3.58E-10	0.00E+00
Ni-63	8.22E-10	8.22E-10	3.07E-09	8.22E-10	8.22E-10	8.22E-10	8.59E-10	8.39E-10	0.00E+00
Np-237	2.96E-05	1.69E-08	1.61E-05	2.62E-04	3.27E-03	1.34E-08	2.34E-05	1.46E-04	0.00E+00
Pa-231	6.90E-09	8.79E-09	7.47E-04	6.97E-04	8.70E-03	7.64E-09	2.87E-07	3.47E-04	0.00E+00
Pb-210	3.18E-07	3.18E-07	3.18E-07	3.75E-06	5.47E-05	3.18E-07	4.69E-06	3.67E-06	0.00E+00
Pd-107	9.45E-13	9.45E-13	2.85E-08	5.11E-12	1.36E-11	9.45E-13	2.15E-10	3.45E-09	0.00E+00
Pm-147	1.88E-14	3.60E-14	7.74E-08	8.16E-09	1.02E-07	1.98E-14	5.89E-09	1.06E-08	0.00E+00
Pu-238	2.80E-05	1.00E-09	3.20E-04	1.52E-04	1.90E-03	9.62E-10	7.02E-05	1.06E-04	0.00E+00
Pu-239	3.18E-05	9.22E-10	3.23E-04	1.69E-04	2.11E-03	9.03E-10	7.56E-05	1.16E-04	0.00E+00
Pu-240	3.18E-05	9.51E-10	3.23E-04	1.69E-04	2.11E-03	9.05E-10	7.56E-05	1.16E-04	0.00E+00
Pu-241	6.82E-07	3.06E-11	3.18E-06	3.36E-06	4.20E-05	1.24E-11	1.31E-06	2.23E-06	0.00E+00
Pu-242	3.02E-05	9.45E-10	3.07E-04	1.61E-04	2.01E-03	8.79E-10	7.18E-05	1.11E-04	0.00E+00
Ra-226	1.02E-07	1.02E-07	1.61E-05	6.64E-07	7.59E-06	1.02E-07	1.07E-07	2.32E-06	0.00E+00
Ra-228	1.83E-07	1.84E-07	7.22E-06	7.38E-07	6.51E-06	1.83E-07	1.87E-07	1.29E-06	0.00E+00
Ru-106	1.38E-08	1.37E-08	1.04E-06	1.37E-08	1.37E-08	1.37E-08	1.69E-08	1.29E-07	0.00E+00
Sb-125	3.60E-10	4.16E-10	2.17E-08	6.49E-10	2.73E-09	3.24E-10	1.45E-09	3.30E-09	0.00E+00
Se-79	6.79E-10	6.79E-10	9.81E-09	6.79E-10	6.79E-10	6.79E-10	4.24E-09	2.66E-09	0.00E+00
Sm-147	0.00E+00	0.00E+00	7.62E-06	2.75E-05	3.44E-04	0.00E+00	1.89E-05	2.02E-05	0.00E+00
Sm-151	4.03E-14	1.49E-13	3.26E-09	1.10E-08	1.38E-07	1.32E-14	7.51E-09	8.10E-09	0.00E+00
Sn-126	1.43E-08	1.41E-08	1.51E-07	5.62E-08	1.18E-07	1.31E-08	1.76E-08	2.69E-08	0.00E+00
Sr-90	2.64E-09	2.64E-09	2.86E-08	3.38E-07	7.27E-07	2.64E-09	5.73E-09	3.51E-07	0.00E+00
Tc-99	4.52E-11	4.52E-11	1.67E-08	4.52E-11	4.52E-11	1.21E-09	6.26E-10	2.25E-09	0.00E+00
Th-229	2.76E-06	2.76E-06	1.99E-03	1.15E-03	1.43E-02	2.76E-06	7.05E-06	5.80E-04	0.00E+00
Th-230	4.08E-07	4.08E-07	3.00E-04	1.73E-04	2.16E-03	4.08E-07	1.05E-06	8.80E-05	0.00E+00
Th-232	7.62E-07	7.72E-07	9.40E-04	8.93E-04	1.11E-02	7.44E-07	1.87E-06	4.43E-04	0.00E+00
U-232	8.00E-08	8.06E-08	1.48E-03	4.06E-06	6.42E-05	7.85E-08	3.11E-06	1.78E-04	0.00E+00
U-233	2.54E-08	2.54E-08	3.04E-04	7.12E-07	1.12E-05	2.54E-08	9.40E-07	3.66E-05	0.00E+00
U-234	2.50E-08	2.50E-08	2.98E-04	6.98E-07	1.09E-05	2.50E-08	9.26E-07	3.58E-05	0.00E+00
U-235	2.37E-08	2.38E-08	2.79E-04	6.58E-07	1.01E-05	2.37E-08	8.59E-07	3.32E-05	0.00E+00
U-236	2.37E-08	2.37E-08	2.82E-04	6.60E-07	1.04E-05	2.37E-08	8.77E-07	3.39E-05	0.00E+00
U-238	2.23E-08	2.23E-08	2.66E-04	6.58E-07	9.78E-06	2.22E-08	8.22E-07	3.20E-05	0.00E+00
Zr-93	2.18E-11	4.68E-11	8.72E-08	1.77E-07	2.18E-06	1.74E-11	1.73E-10	8.67E-08	0.00E+00
crud									
Co-60	4.76E-09	1.84E-08	3.45E-07	1.72E-08	1.35E-08	1.62E-08	3.60E-08	5.91E-08	0.00E+00
Fe-55	5.23E-10	5.09E-10	1.06E-09	5.17E-10	5.14E-10	5.42E-10	1.21E-09	7.26E-10	0.00E+00

	air submersion DCFs [Sv/Bq m^3/s]								
	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	3.75E-17	4.45E-17	3.38E-17	2.94E-17	1.04E-16	3.65E-17	3.18E-17	3.74E-17	3.28E-16
Am-241	6.58E-16	1.07E-15	6.74E-16	5.21E-16	2.87E-15	7.83E-16	6.34E-16	8.18E-16	1.28E-15
Am-242m	3.80E-17	6.01E-17	1.72E-17	1.72E-17	7.94E-17	2.95E-17	1.94E-17	3.17E-17	1.36E-16
Am-243	2.19E-15	2.61E-15	1.92E-15	1.55E-15	7.47E-15	2.09E-15	1.79E-15	2.18E-15	2.75E-15
C-14	2.59E-19	3.52E-19	1.53E-19	1.21E-19	7.06E-19	2.19E-19	1.54E-19	2.24E-19	2.43E-16
Cd-113m	7.17E-18	8.76E-18	5.93E-18	5.01E-18	2.10E-17	6.76E-18	5.63E-18	6.94E-18	8.48E-15
Cl-36	2.24E-17	2.66E-17	2.02E-17	1.81E-17	5.63E-17	2.19E-17	1.92E-17	2.23E-17	1.47E-14
Cm-242	7.83E-18	1.48E-17	1.13E-18	1.89E-18	1.06E-17	4.91E-18	2.27E-18	5.69E-18	4.29E-17
Cm-243	5.77E-15	6.68E-15	5.50E-15	5.00E-15	1.50E-14	5.76E-15	5.19E-15	5.88E-15	9.79E-15
Cm-244	6.90E-18	1.33E-17	7.08E-19	1.46E-18	8.82E-18	4.19E-18	1.81E-18	4.91E-18	3.91E-17
Cm-245	3.88E-15	4.55E-15	3.63E-15	3.17E-15	1.18E-14	3.84E-15	3.40E-15	3.96E-15	5.36E-15
Cm-246	6.24E-18	1.20E-17	7.00E-19	1.35E-18	8.17E-18	3.82E-18	1.67E-18	4.46E-18	3.49E-17
Cm-247	1.47E-14	1.68E-14	1.44E-14	1.38E-14	2.83E-14	1.49E-14	1.38E-14	1.50E-14	1.79E-14
Co-60	1.23E-13	1.39E-13	1.24E-13	1.23E-13	1.78E-13	1.27E-13	1.20E-13	1.26E-13	1.45E-13
Cs-134	7.40E-14	8.43E-14	7.37E-14	7.19E-14	1.20E-13	7.57E-14	7.06E-14	7.57E-14	9.45E-14
Cs-135	6.28E-19	8.23E-19	4.19E-19	3.34E-19	1.81E-18	5.50E-19	4.09E-19	5.65E-19	9.06E-16
Cs-137	2.67E-14	3.05E-14	2.65E-14	2.58E-14	4.38E-14	2.73E-14	2.54E-14	2.73E-14	4.39E-14
Eu-154	6.00E-14	6.81E-14	5.99E-14	5.87E-14	9.43E-14	6.15E-14	5.75E-14	6.14E-14	8.29E-14
Eu-155	2.49E-15	2.95E-15	2.22E-15	1.85E-15	8.09E-15	2.41E-15	2.07E-15	2.49E-15	3.39E-15
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H-3	0.00E+00	0.00E+00	2.75E-18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.31E-19	0.00E+00
I-129	4.83E-16	6.66E-16	2.14E-16	1.64E-16	1.10E-15	3.86E-16	2.30E-16	3.80E-16	1.10E-15
Kr-85	1.17E-16	1.34E-16	1.14E-16	1.09E-16	2.20E-16	1.18E-16	1.09E-16	1.19E-16	1.32E-14
Nb-93m	6.33E-18	1.31E-17	2.55E-19	1.18E-18	6.92E-18	3.43E-18	1.36E-18	4.44E-18	4.28E-17
Nb-94	7.54E-14	8.57E-14	7.51E-14	7.34E-14	1.19E-13	7.72E-14	7.19E-14	7.70E-14	9.52E-14
Ni-59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ni-63	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Np-237	1.04E-15	1.26E-15	9.02E-16	7.69E-16	3.20E-15	9.94E-16	8.50E-16	1.03E-15	1.54E-15
Pa-231	1.71E-15	1.99E-15	1.62E-15	1.52E-15	3.64E-15	1.70E-15	1.54E-15	1.72E-15	2.44E-15
Pb-210	6.19E-17	8.18E-17	4.25E-17	3.14E-17	1.95E-16	5.42E-17	4.09E-17	5.64E-17	1.28E-16
Pd-107	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pm-147	7.48E-19	9.56E-19	5.45E-19	4.46E-19	2.18E-18	6.75E-19	5.26E-19	6.93E-19	8.11E-16
Pu-238	6.56E-18	1.27E-17	1.06E-18	1.68E-18	9.30E-18	4.01E-18	1.99E-18	4.88E-18	4.09E-17
Pu-239	4.84E-18	7.55E-18	2.65E-18	2.67E-18	9.47E-18	3.88E-18	2.86E-18	4.24E-18	1.86E-17
Pu-240	6.36E-18	1.23E-17	1.09E-18	1.65E-18	9.26E-18	3.92E-18	1.96E-18	4.75E-18	3.92E-17
Pu-241	7.19E-20	8.67E-20	6.48E-20	5.63E-20	2.19E-19	6.98E-20	6.09E-20	7.25E-20	1.17E-19
Pu-242	5.34E-18	1.03E-17	9.69E-19	1.43E-18	7.90E-18	3.32E-18	1.68E-18	4.01E-18	3.27E-17
Ra-226	3.08E-16	3.54E-16	2.95E-16	2.70E-16	7.95E-16	3.09E-16	2.79E-16	3.15E-16	4.79E-16
Ra-228	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ru-106	1.01E-14	1.16E-14	1.01E-14	9.75E-15	1.72E-14	1.03E-14	9.63E-15	1.04E-14	1.09E-13
Sb-125	1.98E-14	2.27E-14	1.95E-14	1.87E-14	3.53E-14	2.01E-14	1.86E-14	2.02E-14	2.65E-14
Se-79	3.47E-19	4.67E-19	2.11E-19	1.67E-19	9.60E-19	2.96E-19	2.10E-19	3.03E-19	3.71E-16
Sm-147	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sm-151	5.20E-20	8.80E-20	7.08E-21	1.13E-20	7.09E-20	3.56E-20	1.49E-20	3.61E-20	1.90E-19
Sn-126	7.54E-14	8.62E-14	7.48E-14	7.22E-14	1.31E-13	7.69E-14	7.14E-14	7.71E-14	1.31E-13
Sr-90	7.78E-18	9.49E-18	6.44E-18	5.44E-18	2.28E-17	7.33E-18	6.11E-18	7.53E-18	9.20E-15
Tc-99	1.74E-18	2.20E-18	1.29E-18	1.05E-18	5.17E-18	1.57E-18	1.24E-18	1.62E-18	2.74E-15
Th-229	3.77E-15	4.42E-15	3.50E-15	3.03E-15	1.15E-14	3.70E-15	3.27E-15	3.83E-15	5.41E-15
Th-230	1.80E-17	2.38E-17	1.43E-17	1.22E-17	5.29E-17	1.63E-17	1.37E-17	1.74E-17	4.51E-17
Th-232	9.34E-18	1.36E-17	6.37E-18	5.52E-18	2.60E-17	7.90E-18	6.34E-18	8.72E-18	3.44E-17
U-232	1.55E-17	2.32E-17	9.84E-18	8.99E-18	3.86E-17	1.29E-17	1.00E-17	1.42E-17	5.92E-17
U-233	1.69E-17	2.22E-17	1.35E-17	1.24E-17	4.12E-17	1.55E-17	1.31E-17	1.63E-17	4.57E-17
U-234	8.79E-18	1.44E-17	4.38E-18	4.20E-18	1.99E-17	6.69E-18	4.80E-18	7.63E-18	4.25E-17
U-235	7.05E-15	8.11E-15	6.75E-15	6.15E-15	1.84E-14	7.05E-15	6.37E-15	7.20E-15	8.64E-15
U-236	6.10E-18	1.10E-17	2.18E-18	2.33E-18	1.19E-17	4.19E-18	2.70E-18	5.01E-18	3.57E-17
U-238	4.39E-18	8.54E-18	9.96E-19	1.24E-18	7.40E-18	2.72E-18	1.51E-18	3.41E-18	2.91E-17
Zr-93	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
crud									
Co-60	1.23E-13	1.39E-13	1.24E-13	1.23E-13	1.78E-13	1.27E-13	1.20E-13	1.26E-13	1.45E-13
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Source Term Calculations		HEPA filters?	no				
ALUM CLAD SNF [411]							
stable metal	not intact						
Isotope	Curies (entire fuel intentory)	fInv = 1/nCan	ARF	RF	LPF	Total Source Term [Ci] released to the environment	Respirable Source Term [Ci] released to the environment
Ac-227	2.81E-07	1.00E+00	5.00E-03	4.00E-01	1.00E+00	1.41E-09	5.62E-10
Am-241	2.51E+01	1.00E+00	5.00E-03	4.00E-01	1.00E+00	1.26E-01	5.03E-02
Am-242m	9.69E-03	1.00E+00	5.00E-03	4.00E-01	1.00E+00	4.85E-05	1.94E-05
Am-243	2.40E-02	1.00E+00	5.00E-03	4.00E-01	1.00E+00	1.20E-04	4.80E-05
C-14	1.17E-05	1.00E+00	5.00E-03	4.00E-01	1.00E+00	5.86E-08	2.35E-08
Cd-113m	7.25E-01	1.00E+00	5.00E-03	4.00E-01	1.00E+00	3.62E-03	1.45E-03
Cl-36	0.00E+00	1.00E+00	5.00E-03	4.00E-01	1.00E+00	0.00E+00	0.00E+00
Cm-242	8.00E-03	1.00E+00	5.00E-03	4.00E-01	1.00E+00	4.00E-05	1.60E-05
Cm-243	3.29E-03	1.00E+00	5.00E-03	4.00E-01	1.00E+00	1.65E-05	6.58E-06
Cm-244	4.27E-01	1.00E+00	5.00E-03	4.00E-01	1.00E+00	2.14E-03	8.55E-04
Cm-245	1.33E-05	1.00E+00	5.00E-03	4.00E-01	1.00E+00	6.65E-08	2.66E-08
Cm-246	9.83E-07	1.00E+00	5.00E-03	4.00E-01	1.00E+00	4.92E-09	1.97E-09
Cm-247	0.00E+00	1.00E+00	5.00E-03	4.00E-01	1.00E+00	0.00E+00	0.00E+00
Co-60	1.81E-09	1.00E+00	5.00E-03	4.00E-01	1.00E+00	9.06E-12	3.63E-12
Cs-134	2.05E+02	1.00E+00	5.00E-03	1.00E+00	1.00E+00	1.02E+00	1.02E+00
Cs-135	1.24E-02	1.00E+00	5.00E-03	1.00E+00	1.00E+00	6.21E-05	6.21E-05
Cs-137	8.60E+03	1.00E+00	5.00E-03	1.00E+00	1.00E+00	4.30E+01	4.30E+01
Eu-154	9.08E+01	1.00E+00	5.00E-03	4.00E-01	1.00E+00	4.54E-01	1.82E-01
Eu-155	2.81E+01	1.00E+00	5.00E-03	4.00E-01	1.00E+00	1.41E-01	5.62E-02
Fe-55	0.00E+00	1.00E+00	5.00E-03	4.00E-01	1.00E+00	0.00E+00	0.00E+00
H-3	2.61E+01	1.00E+00	3.00E-01	1.00E+00	1.00E+00	7.82E+00	7.82E+00
I-129	2.54E-03	1.00E+00	3.00E-01	1.00E+00	1.00E+00	7.61E-04	7.61E-04
Kr-85	6.45E+02	1.00E+00	3.00E-01	1.00E+00	1.00E+00	1.93E+02	1.93E+02
Nb-93m	4.96E-02	1.00E+00	5.00E-03	4.00E-01	1.00E+00	2.48E-04	9.92E-05
Nb-94	4.96E-06	1.00E+00	5.00E-03	4.00E-01	1.00E+00	2.48E-08	9.92E-09
Ni-59	0.00E+00	1.00E+00	5.00E-03	4.00E-01	1.00E+00	0.00E+00	0.00E+00
Ni-63	0.00E+00	1.00E+00	5.00E-03	4.00E-01	1.00E+00	0.00E+00	0.00E+00
Np-237	1.20E-02	1.00E+00	5.00E-03	4.00E-01	1.00E+00	5.98E-05	2.39E-05
Pa-231	1.88E-06	1.00E+00	5.00E-03	4.00E-01	1.00E+00	9.38E-09	3.75E-09
Pb-210	1.44E-11	1.00E+00	5.00E-03	4.00E-01	1.00E+00	7.21E-14	2.88E-14
Pd-107	2.35E-03	1.00E+00	5.00E-03	4.00E-01	1.00E+00	1.18E-05	4.71E-06
Pm-147	2.47E+03	1.00E+00	5.00E-03	4.00E-01	1.00E+00	1.23E+01	4.94E+00
Pu-238	2.20E+01	1.00E+00	5.00E-03	4.00E-01	1.00E+00	1.10E-01	4.40E-02
Pu-239	1.49E+01	1.00E+00	5.00E-03	4.00E-01	1.00E+00	7.45E-02	2.98E-02
Pu-240	1.07E+01	1.00E+00	5.00E-03	4.00E-01	1.00E+00	5.34E-02	2.14E-02
Pu-241	1.22E+03	1.00E+00	5.00E-03	4.00E-01	1.00E+00	6.12E+00	2.45E+00
Pu-242	1.04E-02	1.00E+00	5.00E-03	4.00E-01	1.00E+00	5.20E-05	2.08E-05
Ra-226	1.53E-10	1.00E+00	5.00E-03	4.00E-01	1.00E+00	7.64E-13	3.05E-13
Ra-228	8.44E-12	1.00E+00	5.00E-03	4.00E-01	1.00E+00	4.22E-14	1.69E-14
Ru-106	2.97E+01	1.00E+00	5.00E-03	4.00E-01	1.00E+00	1.49E-01	5.94E-02
Sb-125	0.00E+00	1.00E+00	5.00E-03	4.00E-01	1.00E+00	0.00E+00	0.00E+00
Se-79	6.93E-02	1.00E+00	5.00E-03	4.00E-01	1.00E+00	3.46E-04	1.39E-04
Sm-147	8.28E-07	1.00E+00	5.00E-03	4.00E-01	1.00E+00	4.14E-09	1.66E-09
Sm-151	2.67E+01	1.00E+00	5.00E-03	4.00E-01	1.00E+00	1.34E-01	5.35E-02
Sn-126	2.72E-02	1.00E+00	5.00E-03	4.00E-01	1.00E+00	1.36E-04	5.44E-05
Sr-90	8.16E+03	1.00E+00	5.00E-03	4.00E-01	1.00E+00	4.08E+01	1.63E+01
Tc-99	1.44E+00	1.00E+00	5.00E-03	4.00E-01	1.00E+00	7.22E-03	2.89E-03
Th-229	8.09E-10	1.00E+00	5.00E-03	4.00E-01	1.00E+00	4.05E-12	1.62E-12
Th-230	7.96E-08	1.00E+00	5.00E-03	4.00E-01	1.00E+00	3.98E-10	1.59E-10
Th-232	1.99E-11	1.00E+00	5.00E-03	4.00E-01	1.00E+00	9.93E-14	3.97E-14
U-232	1.11E-04	1.00E+00	5.00E-03	4.00E-01	1.00E+00	5.54E-07	2.22E-07
U-233	1.18E-06	1.00E+00	5.00E-03	4.00E-01	1.00E+00	5.88E-09	2.35E-09
U-234	1.17E-03	1.00E+00	5.00E-03	4.00E-01	1.00E+00	5.86E-06	2.35E-06
U-235	8.48E-03	1.00E+00	5.00E-03	4.00E-01	1.00E+00	4.24E-05	1.70E-05
U-236	3.95E-02	1.00E+00	5.00E-03	4.00E-01	1.00E+00	1.98E-04	7.91E-05
U-238	1.04E-02	1.00E+00	5.00E-03	4.00E-01	1.00E+00	5.22E-05	2.09E-05
Zr-93	1.40E-01	1.00E+00	5.00E-03	4.00E-01	1.00E+00	6.98E-04	2.79E-04
crud (per canister)							
Co-60 (crud)	6.37E+00	1	1.00E+00	3.00E-01	1.00E+00	6.37E+00	1.91E+00
Fe-55 (crud)	4.01E+01	1	1.00E+00	3.00E-01	1.00E+00	4.01E+01	1.20E+01

Source Term Calculations		HEPA filters?	yes				
ALUM CLAD SNF [411]							
stable metal	not intact						
Isotope	Curies	1/nCan	ARF	RF	LPF	Total Source Term [Ci] released to the environment	Respirable Source Term [Ci] released to the environment
Ac-227	2.81E-07	1.00E+00	5.00E-03	4.00E-01	3.00E-04	4.22E-13	1.69E-13
Am-241	2.51E+01	1.00E+00	5.00E-03	4.00E-01	3.00E-04	3.77E-05	1.51E-05
Am-242m	9.69E-03	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.45E-08	5.82E-09
Am-243	2.40E-02	1.00E+00	5.00E-03	4.00E-01	3.00E-04	3.60E-08	1.44E-08
C-14	1.17E-05	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.76E-11	7.04E-12
Cd-113m	7.25E-01	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.09E-06	4.35E-07
Cl-36	0.00E+00	1.00E+00	5.00E-03	4.00E-01	3.00E-04	0.00E+00	0.00E+00
Cm-242	8.00E-03	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.20E-08	4.80E-09
Cm-243	3.29E-03	1.00E+00	5.00E-03	4.00E-01	3.00E-04	4.94E-09	1.98E-09
Cm-244	4.27E-01	1.00E+00	5.00E-03	4.00E-01	3.00E-04	6.41E-07	2.56E-07
Cm-245	1.33E-05	1.00E+00	5.00E-03	4.00E-01	3.00E-04	2.00E-11	7.98E-12
Cm-246	9.83E-07	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.47E-12	5.90E-13
Cm-247	0.00E+00	1.00E+00	5.00E-03	4.00E-01	3.00E-04	0.00E+00	0.00E+00
Co-60	1.81E-09	1.00E+00	5.00E-03	4.00E-01	3.00E-04	2.72E-15	1.09E-15
Cs-134	2.05E+02	1.00E+00	5.00E-03	1.00E+00	1.00E+00	1.02E+00	1.02E+00
Cs-135	1.24E-02	1.00E+00	5.00E-03	1.00E+00	1.00E+00	6.21E-05	6.21E-05
Cs-137	8.60E+03	1.00E+00	5.00E-03	1.00E+00	1.00E+00	4.30E+01	4.30E+01
Eu-154	9.08E+01	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.36E-04	5.45E-05
Eu-155	2.81E+01	1.00E+00	5.00E-03	4.00E-01	3.00E-04	4.22E-05	1.69E-05
Fe-55	0.00E+00	1.00E+00	5.00E-03	4.00E-01	3.00E-04	0.00E+00	0.00E+00
H-3	2.61E+01	1.00E+00	3.00E-01	1.00E+00	1.00E+00	7.82E+00	7.82E+00
I-129	2.54E-03	1.00E+00	3.00E-01	1.00E+00	1.00E+00	7.61E-04	7.61E-04
Kr-85	6.45E+02	1.00E+00	3.00E-01	1.00E+00	1.00E+00	1.93E+02	1.93E+02
Nb-93m	4.96E-02	1.00E+00	5.00E-03	4.00E-01	3.00E-04	7.44E-08	2.98E-08
Nb-94	4.96E-06	1.00E+00	5.00E-03	4.00E-01	3.00E-04	7.44E-12	2.98E-12
Ni-59	0.00E+00	1.00E+00	5.00E-03	4.00E-01	3.00E-04	0.00E+00	0.00E+00
Ni-63	0.00E+00	1.00E+00	5.00E-03	4.00E-01	3.00E-04	0.00E+00	0.00E+00
Np-237	1.20E-02	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.79E-08	7.17E-09
Pa-231	1.88E-06	1.00E+00	5.00E-03	4.00E-01	3.00E-04	2.82E-12	1.13E-12
Pb-210	1.44E-11	1.00E+00	5.00E-03	4.00E-01	3.00E-04	2.16E-17	8.65E-18
Pd-107	2.35E-03	1.00E+00	5.00E-03	4.00E-01	3.00E-04	3.53E-09	1.41E-09
Pm-147	2.47E+03	1.00E+00	5.00E-03	4.00E-01	3.00E-04	3.70E-03	1.48E-03
Pu-238	2.20E+01	1.00E+00	5.00E-03	4.00E-01	3.00E-04	3.30E-05	1.32E-05
Pu-239	1.49E+01	1.00E+00	5.00E-03	4.00E-01	3.00E-04	2.24E-05	8.94E-06
Pu-240	1.07E+01	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.60E-05	6.41E-06
Pu-241	1.22E+03	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.83E-03	7.34E-04
Pu-242	1.04E-02	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.56E-08	6.24E-09
Ra-226	1.53E-10	1.00E+00	5.00E-03	4.00E-01	3.00E-04	2.29E-16	9.16E-17
Ra-228	8.44E-12	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.27E-17	5.06E-18
Ru-106	2.97E+01	1.00E+00	5.00E-03	4.00E-01	3.00E-04	4.46E-05	1.78E-05
Sb-125	0.00E+00	1.00E+00	5.00E-03	4.00E-01	3.00E-04	0.00E+00	0.00E+00
Se-79	6.93E-02	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.04E-07	4.16E-08
Sm-147	8.28E-07	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.24E-12	4.97E-13
Sm-151	2.67E+01	1.00E+00	5.00E-03	4.00E-01	3.00E-04	4.01E-05	1.60E-05
Sn-126	2.72E-02	1.00E+00	5.00E-03	4.00E-01	3.00E-04	4.08E-08	1.63E-08
Sr-90	8.16E+03	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.22E-02	4.90E-03
Tc-99	1.44E+00	1.00E+00	5.00E-03	4.00E-01	3.00E-04	2.17E-06	8.67E-07
Th-229	8.09E-10	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.21E-15	4.86E-16
Th-230	7.96E-08	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.19E-13	4.77E-14
Th-232	1.99E-11	1.00E+00	5.00E-03	4.00E-01	3.00E-04	2.98E-17	1.19E-17
U-232	1.11E-04	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.66E-10	6.65E-11
U-233	1.18E-06	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.76E-12	7.05E-13
U-234	1.17E-03	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.76E-09	7.04E-10
U-235	8.48E-03	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.27E-08	5.09E-09
U-236	3.95E-02	1.00E+00	5.00E-03	4.00E-01	3.00E-04	5.93E-08	2.37E-08
U-238	1.04E-02	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.57E-08	6.27E-09
Zr-93	1.40E-01	1.00E+00	5.00E-03	4.00E-01	3.00E-04	2.10E-07	8.38E-08
crud (per canister)							
Co-60 (crud)	6.37E+00	1	1.00E+00	3.00E-01	3.00E-04	1.91E-03	5.73E-04
Fe-55 (crud)	4.01E+01	1	1.00E+00	3.00E-01	3.00E-04	1.20E-02	3.61E-03

ALUM CLAD SNF [411]			No HEPAs						
stable metal	not intact								
	inhalation doses [rem]								
	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	1.28E-08	2.16E-12	4.99E-08	8.33E-08	1.04E-06	1.16E-12	4.77E-08	5.87E-08	0.00E+00
Am-241	9.43E-02	7.74E-06	5.34E-02	5.05E-01	6.29E+00	4.64E-06	2.27E-01	3.48E-01	0.00E+00
Am-242m	3.59E-05	1.54E-09	4.69E-06	1.89E-04	2.37E-03	6.30E-10	8.36E-05	1.29E-04	0.00E+00
Am-243	9.02E-05	4.21E-08	4.93E-05	4.79E-04	6.01E-03	2.29E-08	2.14E-04	3.29E-04	0.00E+00
C-14	7.63E-13	7.63E-13	7.63E-13	7.63E-13	7.63E-13	7.63E-13	7.63E-13	7.63E-13	0.00E+00
Cd-113m	2.77E-06	2.77E-06	3.42E-05	2.77E-06	2.77E-06	2.77E-06	1.09E-04	3.45E-05	0.00E+00
Cl-36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-242	5.26E-07	8.71E-10	1.43E-05	3.60E-06	4.49E-05	8.68E-10	2.26E-06	4.31E-06	0.00E+00
Cm-243	7.86E-06	2.39E-09	7.36E-06	4.48E-05	5.58E-04	1.45E-09	2.19E-05	3.15E-05	0.00E+00
Cm-244	7.84E-04	5.13E-08	9.51E-04	4.62E-03	5.77E-02	4.98E-08	2.36E-03	3.30E-03	0.00E+00
Cm-245	5.17E-08	1.03E-11	2.76E-08	2.75E-07	3.44E-06	5.65E-12	1.22E-07	1.89E-07	0.00E+00
Cm-246	3.79E-09	4.53E-13	2.06E-09	2.02E-08	2.52E-07	2.56E-13	9.00E-09	1.38E-08	0.00E+00
Cm-247	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co-60	9.95E-16	3.85E-15	7.21E-14	3.60E-15	2.82E-15	3.39E-15	7.53E-15	1.24E-14	0.00E+00
Cs-134	7.68E-04	6.38E-04	6.97E-04	6.97E-04	6.50E-04	6.56E-04	8.21E-04	7.38E-04	0.00E+00
Cs-135	4.29E-09	4.29E-09	5.05E-09	4.29E-09	4.29E-09	4.29E-09	4.29E-09	4.40E-09	0.00E+00
Cs-137	2.17E-02	1.94E-02	2.19E-02	2.06E-02	1.97E-02	1.97E-02	2.26E-02	2.14E-02	0.00E+00
Eu-154	1.22E-04	1.62E-04	6.29E-04	1.11E-03	5.47E-03	7.47E-05	1.18E-03	8.09E-04	0.00E+00
Eu-155	1.15E-06	1.99E-06	3.86E-05	4.64E-05	4.93E-04	7.78E-07	3.60E-05	3.63E-05	0.00E+00
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H-3	7.80E-06	7.80E-06	7.80E-06	7.80E-06	7.80E-06	7.80E-06	7.80E-06	7.80E-06	0.00E+00
I-129	3.81E-09	9.17E-09	1.38E-08	6.15E-09	6.06E-09	6.85E-05	5.18E-09	2.06E-06	0.00E+00
Kr-85	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nb-93m	2.38E-09	2.49E-10	3.69E-07	1.63E-09	4.25E-09	1.74E-10	2.26E-09	4.52E-08	0.00E+00
Nb-94	2.72E-12	1.28E-11	4.28E-10	1.29E-11	1.13E-11	1.27E-11	2.55E-11	6.41E-11	0.00E+00
Ni-59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ni-63	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Np-237	4.08E-05	2.33E-08	2.22E-05	3.61E-04	4.51E-03	1.85E-08	3.23E-05	2.01E-04	0.00E+00
Pa-231	1.49E-12	1.90E-12	1.82E-07	1.51E-07	1.88E-06	1.65E-12	6.21E-11	7.51E-08	0.00E+00
Pb-210	5.29E-16	5.29E-16	5.29E-16	6.24E-15	9.10E-14	5.29E-16	7.80E-15	6.11E-15	0.00E+00
Pd-107	2.57E-13	2.57E-13	7.74E-09	1.39E-12	3.69E-12	2.57E-13	5.84E-11	9.37E-10	0.00E+00
Pm-147	5.35E-09	1.03E-08	2.20E-02	2.32E-03	2.90E-02	5.64E-09	1.68E-03	3.02E-03	0.00E+00
Pu-238	7.10E-02	2.54E-06	8.12E-01	3.86E-01	4.82E+00	2.44E-06	1.78E-01	2.69E-01	0.00E+00
Pu-239	5.47E-02	1.58E-06	5.55E-01	2.90E-01	3.63E+00	1.55E-06	1.30E-01	1.99E-01	0.00E+00
Pu-240	3.92E-02	1.17E-06	3.98E-01	2.08E-01	2.60E+00	1.11E-06	9.31E-02	1.43E-01	0.00E+00
Pu-241	9.62E-02	4.32E-06	4.49E-01	4.74E-01	5.92E+00	1.75E-06	1.85E-01	3.15E-01	0.00E+00
Pu-242	3.62E-05	1.13E-09	3.68E-04	1.93E-04	2.41E-03	1.05E-09	8.61E-05	1.33E-04	0.00E+00
Ra-226	1.80E-15	1.80E-15	2.84E-13	1.17E-14	1.34E-13	1.80E-15	1.88E-15	4.09E-14	0.00E+00
Ra-228	1.78E-16	1.79E-16	7.02E-15	7.18E-16	6.33E-15	1.78E-16	1.82E-16	1.25E-15	0.00E+00
Ru-106	4.73E-05	4.70E-05	3.56E-03	4.70E-05	4.70E-05	4.70E-05	5.79E-05	4.42E-04	0.00E+00
Sb-125	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Se-79	5.42E-09	5.42E-09	7.84E-08	5.42E-09	5.42E-09	5.42E-09	3.39E-08	2.12E-08	0.00E+00
Sm-147	0.00E+00	0.00E+00	7.27E-10	2.62E-09	3.28E-08	0.00E+00	1.80E-09	1.93E-09	0.00E+00
Sm-151	1.24E-10	4.60E-10	1.01E-05	3.39E-05	4.26E-04	4.07E-11	2.32E-05	2.50E-05	0.00E+00
Sn-126	4.49E-08	4.42E-08	4.74E-07	1.76E-07	3.70E-07	4.11E-08	5.52E-08	8.44E-08	0.00E+00
Sr-90	2.48E-03	2.48E-03	2.69E+00	3.16E-01	6.84E-01	2.48E-03	5.39E-03	3.30E-01	0.00E+00
Tc-99	7.53E-09	7.53E-09	2.78E-06	7.53E-09	7.53E-09	2.02E-07	1.04E-07	3.75E-07	0.00E+00
Th-229	2.58E-13	2.58E-13	1.86E-10	1.07E-10	1.33E-09	2.58E-13	6.58E-13	5.41E-11	0.00E+00
Th-230	3.74E-12	3.74E-12	2.75E-09	1.59E-09	1.98E-08	3.74E-12	9.63E-12	8.07E-10	0.00E+00
Th-232	1.75E-15	1.77E-15	2.15E-12	2.05E-12	2.54E-11	1.70E-15	4.28E-15	1.01E-12	0.00E+00
U-232	1.02E-09	1.03E-09	1.89E-05	5.19E-08	8.21E-07	1.00E-09	3.98E-08	2.28E-06	0.00E+00
U-233	3.44E-12	3.44E-12	4.12E-08	9.65E-11	1.52E-09	3.44E-12	1.27E-10	4.96E-09	0.00E+00
U-234	3.38E-09	3.38E-09	4.03E-05	9.44E-08	1.47E-06	3.38E-09	1.25E-07	4.84E-06	0.00E+00
U-235	2.32E-08	2.33E-08	2.70E-04	6.44E-07	9.88E-06	2.32E-08	8.40E-07	3.25E-05	0.00E+00
U-236	1.08E-07	1.08E-07	1.29E-03	3.01E-06	4.74E-05	1.08E-07	4.00E-06	1.55E-04	0.00E+00
U-238	2.69E-08	2.69E-08	3.20E-04	7.93E-07	1.18E-05	2.67E-08	9.90E-07	3.86E-05	0.00E+00
Zr-93	3.51E-10	7.54E-10	1.40E-06	2.85E-08	3.51E-05	2.80E-10	2.79E-09	1.40E-06	0.00E+00
crud									
Co-60 (crud)	5.25E-04	2.03E-03	3.80E-02	1.90E-03	1.49E-03	1.79E-03	3.97E-03	6.51E-03	0.00E+00
Fe-55 (crud)	3.63E-04	3.53E-04	7.35E-04	3.59E-04	3.57E-04	3.76E-04	8.39E-04	5.04E-04	0.00E+00
total	3.82E-01	2.52E-02	5.05E+00	2.21E+00	2.41E+01	2.52E-02	8.52E-01	1.64E+00	0.00E+00

ALUM CLAD SNF [411]			No HEPAs						
stable metal	not intact								
	air submersion doses [rem]								
	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	9.13E-18	1.08E-17	8.23E-18	7.16E-18	2.52E-17	8.89E-18	7.75E-18	9.11E-18	7.99E-17
Am-241	1.87E-08	2.33E-08	1.47E-08	1.13E-08	6.25E-08	1.70E-08	1.38E-08	1.78E-08	2.79E-08
Am-242m	3.19E-13	5.04E-13	1.44E-13	1.44E-13	6.66E-13	2.48E-13	1.63E-13	2.66E-13	1.14E-12
Am-243	4.55E-11	5.42E-11	3.99E-11	3.22E-11	1.55E-10	4.34E-11	3.72E-11	4.53E-11	5.72E-11
C-14	2.63E-18	3.57E-18	1.55E-18	1.23E-18	7.17E-18	2.22E-18	1.56E-18	2.27E-18	2.47E-15
Cd-113m	4.50E-12	5.50E-12	3.72E-12	3.14E-12	1.32E-11	4.24E-12	3.53E-12	4.35E-12	5.32E-09
Cl-36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-242	5.42E-14	1.03E-13	7.83E-15	1.31E-14	7.34E-14	3.40E-14	1.57E-14	3.94E-14	2.97E-13
Cm-243	1.64E-11	1.90E-11	1.57E-11	1.43E-11	4.28E-11	1.84E-11	1.48E-11	1.68E-11	2.79E-11
Cm-244	2.55E-12	4.92E-12	2.62E-13	5.40E-13	3.26E-12	1.55E-12	6.70E-13	1.82E-12	1.45E-11
Cm-245	4.47E-14	5.24E-14	4.18E-14	3.65E-14	1.36E-13	4.42E-14	3.92E-14	4.56E-14	6.17E-14
Cm-246	5.31E-18	1.02E-17	5.96E-19	1.15E-18	6.95E-18	3.25E-18	1.42E-18	3.80E-18	2.97E-17
Cm-247	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co-60	1.93E-16	2.18E-16	1.95E-16	1.93E-16	2.79E-16	1.99E-16	1.88E-16	1.98E-16	2.28E-16
Cs-134	1.31E-05	1.49E-05	1.31E-05	1.28E-05	2.13E-05	1.34E-05	1.25E-05	1.34E-05	1.68E-05
Cs-135	6.75E-15	8.85E-15	4.50E-15	3.59E-15	1.95E-14	5.91E-15	4.40E-15	6.07E-15	9.74E-12
Cs-137	1.99E-04	2.27E-04	1.97E-04	1.92E-04	3.26E-04	2.03E-04	1.89E-04	2.03E-04	3.27E-04
Eu-154	4.71E-06	5.35E-06	4.71E-06	4.61E-06	7.41E-06	4.83E-06	4.52E-06	4.82E-06	6.51E-06
Eu-155	6.06E-08	7.18E-08	5.40E-08	4.50E-08	1.97E-07	5.87E-08	5.04E-08	6.06E-08	8.25E-08
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H-3	0.00E+00	0.00E+00	3.72E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.48E-10	0.00E+00
I-129	6.37E-11	8.78E-11	2.82E-11	2.16E-11	1.45E-10	5.09E-11	3.03E-11	5.01E-11	1.45E-10
Kr-85	3.92E-06	4.49E-06	3.82E-06	3.65E-06	7.37E-06	3.95E-06	3.65E-06	3.99E-06	4.42E-04
Nb-93m	2.72E-13	5.83E-13	1.10E-14	5.07E-14	2.97E-13	1.47E-13	5.84E-14	1.91E-13	1.84E-12
Nb-94	3.24E-13	3.68E-13	3.23E-13	3.15E-13	5.11E-13	3.32E-13	3.09E-13	3.31E-13	4.09E-13
Ni-59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ni-63	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Np-237	1.08E-11	1.30E-11	9.34E-12	7.96E-12	3.31E-11	1.03E-11	8.80E-12	1.07E-11	1.59E-11
Pa-231	2.78E-15	3.23E-15	2.63E-15	2.47E-15	5.91E-15	2.76E-15	2.50E-15	2.79E-15	3.96E-15
Pb-210	7.73E-22	1.02E-21	5.31E-22	3.92E-22	2.44E-21	6.77E-22	5.11E-22	7.04E-22	1.60E-21
Pd-107	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pm-147	1.60E-09	2.04E-09	1.16E-09	9.53E-10	4.66E-09	1.44E-09	1.12E-09	1.48E-09	1.73E-06
Pu-238	1.25E-10	2.42E-10	2.02E-11	3.20E-11	1.77E-10	7.64E-11	3.79E-11	9.29E-11	7.79E-10
Pu-239	6.25E-11	9.74E-11	3.42E-11	3.45E-11	1.22E-10	5.01E-11	3.69E-11	5.47E-11	2.40E-10
Pu-240	5.88E-11	1.14E-10	1.01E-11	1.53E-11	8.58E-11	3.62E-11	1.81E-11	4.39E-11	3.62E-10
Pu-241	7.61E-11	9.18E-11	6.86E-11	5.96E-11	2.32E-10	7.39E-11	6.45E-11	7.68E-11	1.24E-10
Pu-242	4.81E-14	9.28E-14	8.73E-15	1.29E-14	7.11E-14	2.99E-14	1.51E-14	3.61E-14	2.94E-13
Ra-226	4.07E-20	4.68E-20	3.90E-20	3.57E-20	1.05E-19	4.09E-20	3.69E-20	4.16E-20	6.33E-20
Ra-228	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ru-106	2.60E-07	2.98E-07	2.60E-07	2.51E-07	4.43E-07	2.65E-07	2.48E-07	2.68E-07	2.80E-06
Sb-125	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Se-79	2.08E-14	2.80E-14	1.27E-14	1.00E-14	5.76E-14	1.78E-14	1.26E-14	1.82E-14	2.22E-11
Sm-147	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sm-151	1.20E-12	2.04E-12	1.64E-13	2.62E-13	1.64E-12	8.29E-13	3.45E-13	8.36E-13	4.40E-12
Sn-126	1.78E-09	2.03E-09	1.76E-09	1.70E-09	3.08E-09	1.81E-09	1.68E-09	1.82E-09	3.08E-09
Sr-90	5.50E-08	6.71E-08	4.55E-08	3.84E-08	1.61E-07	5.18E-08	4.32E-08	5.32E-08	6.50E-05
Tc-99	2.18E-12	2.75E-12	1.61E-12	1.31E-12	6.47E-12	1.96E-12	1.55E-12	2.03E-12	3.43E-09
Th-229	2.64E-16	3.10E-18	2.45E-18	2.12E-18	8.06E-18	2.59E-18	2.29E-18	2.68E-18	3.79E-18
Th-230	1.24E-18	1.64E-18	9.85E-19	8.40E-19	3.64E-18	1.12E-18	9.44E-19	1.20E-18	3.11E-18
Th-232	1.61E-22	2.34E-22	1.10E-22	9.49E-23	4.47E-22	1.36E-22	1.09E-22	1.50E-22	5.92E-22
U-232	1.49E-15	2.23E-15	9.45E-16	8.63E-16	3.71E-15	1.24E-15	9.60E-16	1.36E-15	5.68E-15
U-233	1.72E-17	2.26E-17	1.37E-17	1.26E-17	4.19E-17	1.58E-17	1.33E-17	1.66E-17	4.65E-17
U-234	8.93E-15	1.46E-14	4.45E-15	4.26E-15	2.02E-14	6.79E-15	4.87E-15	7.75E-15	4.32E-14
U-235	5.18E-11	5.96E-11	4.96E-11	4.52E-11	1.35E-10	5.18E-11	4.68E-11	5.29E-11	6.34E-11
U-236	2.09E-13	3.77E-13	7.46E-14	7.98E-14	4.07E-13	1.43E-13	9.25E-14	1.72E-13	1.22E-12
U-238	3.97E-14	7.72E-14	9.01E-15	1.12E-14	6.69E-14	2.46E-14	1.37E-14	3.08E-14	2.63E-13
Zr-93	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
crud									
Co-60 (crud)	1.36E-04	1.53E-04	1.37E-04	1.36E-04	1.96E-04	1.40E-04	1.32E-04	1.39E-04	1.60E-04
Fe-55 (crud)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
total	3.56E-04	4.05E-04	3.56E-04	3.49E-04	5.59E-04	3.65E-04	3.42E-04	3.64E-04	1.02E-03

ALUM CLAD SNF [411]			HEPAs						
stable metal	not intact								
	Inhalation doses [rem]								
	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	3.85E-12	6.48E-16	1.50E-11	2.50E-11	3.12E-10	3.49E-16	1.43E-11	1.76E-11	0.00E+00
Am-241	2.83E-05	2.32E-09	1.60E-05	1.51E-04	1.89E-03	1.39E-09	6.80E-05	1.04E-04	0.00E+00
Am-242m	1.08E-08	4.63E-13	1.41E-09	5.67E-08	7.11E-07	1.89E-13	2.51E-08	3.86E-08	0.00E+00
Am-243	2.71E-08	1.26E-11	1.48E-08	1.44E-07	1.80E-06	6.88E-12	6.43E-08	9.88E-08	0.00E+00
C-14	2.29E-16	2.29E-16	2.29E-16	2.29E-16	2.29E-16	2.29E-16	2.29E-16	2.29E-16	0.00E+00
Cd-113m	8.32E-10	8.32E-10	1.03E-08	8.32E-10	8.32E-10	8.32E-10	3.26E-08	1.04E-08	0.00E+00
Cl-36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-242	1.58E-10	2.61E-13	4.29E-09	1.08E-09	1.35E-08	2.60E-13	6.78E-10	1.29E-09	0.00E+00
Cm-243	2.36E-09	7.16E-13	2.21E-09	1.34E-08	1.67E-07	4.36E-13	6.56E-09	9.45E-09	0.00E+00
Cm-244	2.35E-07	1.54E-11	2.85E-07	1.39E-06	1.73E-05	1.49E-11	7.07E-07	9.91E-07	0.00E+00
Cm-245	1.55E-11	3.08E-15	8.29E-12	8.24E-11	1.03E-09	1.69E-15	3.66E-11	5.66E-11	0.00E+00
Cm-246	1.14E-12	1.36E-16	6.19E-13	6.05E-12	7.55E-11	7.69E-17	2.70E-12	4.15E-12	0.00E+00
Cm-247	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co-60	2.99E-19	1.15E-18	2.16E-17	1.08E-18	8.47E-19	1.02E-18	2.26E-18	3.71E-18	0.00E+00
Cs-134	7.68E-04	6.38E-04	6.97E-04	6.97E-04	6.50E-04	6.56E-04	8.21E-04	7.38E-04	0.00E+00
Cs-135	4.29E-09	4.29E-09	5.05E-09	4.29E-09	4.29E-09	4.29E-09	4.29E-09	4.40E-09	0.00E+00
Cs-137	2.17E-02	1.94E-02	2.19E-02	2.06E-02	1.97E-02	1.97E-02	2.26E-02	2.14E-02	0.00E+00
Eu-154	3.67E-08	4.87E-08	2.49E-07	3.33E-07	1.64E-06	2.24E-08	3.55E-07	2.43E-07	0.00E+00
Eu-155	3.46E-10	5.97E-10	1.16E-08	1.39E-08	1.48E-07	2.33E-10	1.08E-08	1.09E-08	0.00E+00
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H-3	7.80E-06	7.80E-06	7.80E-06	7.80E-06	7.80E-06	7.80E-06	7.80E-06	7.80E-06	0.00E+00
I-129	3.81E-09	9.17E-09	1.38E-08	6.15E-09	6.06E-09	6.85E-05	5.18E-09	2.06E-06	0.00E+00
Kr-85	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nb-93m	7.14E-13	7.48E-14	1.11E-10	4.89E-13	1.28E-12	5.22E-14	6.78E-13	1.36E-11	0.00E+00
Nb-94	8.17E-16	3.84E-15	1.28E-13	3.88E-15	3.38E-15	3.81E-15	7.64E-15	1.92E-14	0.00E+00
Ni-59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ni-63	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Np-237	1.22E-08	6.99E-12	6.66E-09	1.08E-07	1.35E-06	5.54E-12	9.68E-09	6.04E-08	0.00E+00
Pa-231	4.48E-16	5.71E-16	4.85E-11	4.53E-11	5.65E-10	4.96E-16	1.86E-14	2.25E-11	0.00E+00
Pb-210	1.59E-19	1.59E-19	1.59E-19	1.87E-18	2.73E-17	1.59E-19	2.34E-18	1.83E-18	0.00E+00
Pd-107	7.70E-17	7.70E-17	2.32E-12	4.16E-16	1.11E-15	7.70E-17	1.75E-14	2.81E-13	0.00E+00
Pm-147	1.61E-12	3.08E-12	6.61E-06	6.97E-07	8.71E-06	1.69E-12	5.03E-07	9.05E-07	0.00E+00
Pu-238	2.13E-05	7.61E-10	2.43E-04	1.16E-04	1.45E-03	7.32E-10	5.34E-05	8.07E-05	0.00E+00
Pu-239	1.64E-05	4.75E-10	1.67E-04	8.71E-05	1.09E-03	4.66E-10	3.90E-05	5.98E-05	0.00E+00
Pu-240	1.17E-05	3.51E-10	1.19E-04	6.24E-05	7.79E-04	3.34E-10	2.79E-05	4.28E-05	0.00E+00
Pu-241	2.89E-05	1.29E-09	1.35E-04	1.42E-04	1.78E-03	5.25E-10	5.54E-05	9.44E-05	0.00E+00
Pu-242	1.09E-08	3.40E-13	1.10E-07	5.79E-08	7.23E-07	3.16E-13	2.58E-08	3.99E-08	0.00E+00
Ra-226	5.39E-19	5.39E-19	8.51E-17	3.51E-18	4.01E-17	5.39E-19	5.65E-19	1.23E-17	0.00E+00
Ra-228	5.34E-20	5.37E-20	2.11E-18	2.15E-19	1.90E-18	5.34E-20	5.46E-20	3.76E-19	0.00E+00
Ru-106	1.42E-08	1.41E-08	1.07E-06	1.41E-08	1.41E-08	1.41E-08	1.74E-08	1.33E-07	0.00E+00
Sb-125	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Se-79	1.63E-12	1.63E-12	2.35E-11	1.63E-12	1.63E-12	1.63E-12	1.02E-11	6.37E-12	0.00E+00
Sm-147	0.00E+00	0.00E+00	2.18E-13	7.87E-13	9.85E-12	0.00E+00	5.41E-13	5.78E-13	0.00E+00
Sm-151	3.73E-14	1.38E-13	3.02E-09	1.02E-08	1.28E-07	1.22E-14	6.95E-09	7.50E-09	0.00E+00
Sn-126	1.35E-11	1.33E-11	1.42E-10	5.29E-11	1.11E-10	1.23E-11	1.66E-11	2.53E-11	0.00E+00
Sr-90	7.45E-07	7.45E-07	8.08E-04	9.49E-05	2.05E-04	7.45E-07	1.62E-06	9.91E-05	0.00E+00
Tc-99	2.26E-12	2.26E-12	8.35E-10	2.26E-12	2.26E-12	6.05E-11	3.13E-11	1.12E-10	0.00E+00
Th-229	7.73E-17	7.73E-17	5.57E-14	3.22E-14	4.00E-13	7.73E-17	1.97E-16	1.62E-14	0.00E+00
Th-230	1.12E-15	1.12E-15	8.26E-13	4.76E-13	5.95E-12	1.12E-15	2.89E-15	2.42E-13	0.00E+00
Th-232	5.24E-19	5.31E-19	6.46E-16	6.14E-16	7.63E-15	5.11E-19	1.29E-18	3.04E-16	0.00E+00
U-232	3.07E-13	3.09E-13	5.68E-09	1.56E-11	2.46E-10	3.01E-13	1.19E-11	6.83E-10	0.00E+00
U-233	1.03E-15	1.03E-15	1.24E-11	2.89E-14	4.55E-13	1.03E-15	3.82E-14	1.49E-12	0.00E+00
U-234	1.01E-12	1.01E-12	1.21E-08	2.83E-11	4.42E-10	1.01E-12	3.76E-11	1.45E-09	0.00E+00
U-235	6.95E-12	6.98E-12	8.10E-08	1.93E-10	2.96E-09	6.95E-12	2.52E-10	9.74E-09	0.00E+00
U-236	3.24E-11	3.24E-11	3.86E-07	9.03E-10	1.42E-08	3.24E-11	1.20E-09	4.64E-08	0.00E+00
U-238	8.06E-12	8.06E-12	9.61E-08	2.38E-10	3.53E-09	8.02E-12	2.97E-10	1.16E-08	0.00E+00
Zr-93	1.05E-13	2.26E-13	4.21E-10	8.55E-10	1.05E-08	8.41E-14	8.36E-13	4.19E-10	0.00E+00
crud									
Co-60 (crud)	1.57E-07	6.08E-07	1.14E-05	5.69E-07	4.46E-07	5.36E-07	1.19E-06	1.95E-06	0.00E+00
Fe-55 (crud)	1.09E-07	1.06E-07	2.21E-07	1.08E-07	1.07E-07	1.13E-07	2.52E-07	1.51E-07	0.00E+00
total	2.26E-02	2.01E-02	2.41E-02	2.19E-02	2.76E-02	2.04E-02	2.37E-02	2.26E-02	0.00E+00

ALUM CLAD SNF [411]			HEPAs						
stable metal	not intact								
	air submersion doses [rem]								
	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	2.74E-21	3.25E-21	2.47E-21	2.15E-21	7.57E-21	2.67E-21	2.32E-21	2.73E-21	2.40E-20
Am-241	5.60E-12	6.99E-12	4.40E-12	3.40E-12	1.87E-11	5.11E-12	4.14E-12	5.34E-12	8.36E-12
Am-242m	9.57E-17	1.51E-16	4.33E-17	4.33E-17	2.00E-16	7.43E-17	4.88E-17	7.98E-17	3.42E-16
Am-243	1.37E-14	1.63E-14	1.20E-14	9.66E-15	4.66E-14	1.30E-14	1.12E-14	1.36E-14	1.71E-14
C-14	7.89E-22	1.07E-21	4.66E-22	3.69E-22	2.15E-21	6.67E-22	4.69E-22	6.82E-22	7.40E-19
Cd-113m	1.35E-15	1.65E-15	1.12E-15	9.43E-16	3.95E-15	1.27E-15	1.06E-15	1.31E-15	1.60E-12
Cl-36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-242	1.63E-17	3.08E-17	2.35E-18	3.93E-18	2.20E-17	1.02E-17	4.72E-18	1.18E-17	8.92E-17
Cm-243	4.93E-15	5.71E-15	4.70E-15	4.28E-15	1.28E-14	4.93E-15	4.44E-15	5.03E-15	8.37E-15
Cm-244	7.66E-16	1.48E-15	7.88E-17	1.62E-16	9.79E-16	4.65E-16	2.01E-16	5.45E-16	4.34E-15
Cm-245	1.34E-17	1.57E-17	1.25E-17	1.10E-17	4.08E-17	1.33E-17	1.17E-17	1.37E-17	1.85E-17
Cm-246	1.59E-21	3.06E-21	1.79E-22	3.45E-22	2.09E-21	9.75E-22	4.26E-22	1.14E-21	8.91E-21
Cm-247	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co-60	5.79E-20	6.55E-20	5.84E-20	5.79E-20	8.38E-20	5.98E-20	5.65E-20	5.93E-20	6.83E-20
Cs-134	1.31E-05	1.49E-05	1.31E-05	1.28E-05	2.13E-05	1.34E-05	1.25E-05	1.34E-05	1.68E-05
Cs-135	6.75E-15	8.85E-15	4.50E-15	3.59E-15	1.95E-14	5.91E-15	4.40E-15	6.07E-15	9.74E-12
Cs-137	1.99E-04	2.27E-04	1.97E-04	1.92E-04	3.26E-04	2.03E-04	1.89E-04	2.03E-04	3.27E-04
Eu-154	1.41E-09	1.61E-09	1.41E-09	1.38E-09	2.22E-09	1.45E-09	1.36E-09	1.45E-09	1.95E-09
Eu-155	1.82E-11	2.15E-11	1.62E-11	1.35E-11	5.91E-11	1.76E-11	1.51E-11	1.82E-11	2.48E-11
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H-3	0.00E+00	0.00E+00	3.72E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.48E-10	0.00E+00
I-129	6.37E-11	8.78E-11	2.82E-11	2.16E-11	1.45E-10	5.09E-11	3.03E-11	5.01E-11	1.45E-10
Kr-85	3.92E-06	4.49E-06	3.82E-06	3.65E-06	7.37E-06	3.95E-06	3.65E-06	3.99E-06	4.42E-04
Nb-93m	8.16E-17	1.69E-16	3.29E-18	1.52E-17	8.92E-17	4.42E-17	1.75E-17	5.72E-17	5.51E-16
Nb-94	9.72E-17	1.10E-16	9.68E-17	9.46E-17	1.53E-16	9.95E-17	9.26E-17	9.92E-17	1.23E-16
Ni-59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ni-63	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Np-237	3.23E-15	3.91E-15	2.80E-15	2.39E-15	9.94E-15	3.09E-15	2.64E-15	3.20E-15	4.78E-15
Pa-231	8.34E-19	9.70E-19	7.90E-19	7.41E-19	1.77E-18	8.29E-19	7.51E-19	8.38E-19	1.19E-18
Pb-210	2.32E-25	3.06E-25	1.59E-25	1.18E-25	7.31E-25	2.03E-25	1.53E-25	2.11E-25	4.80E-25
Pd-107	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pm-147	4.80E-13	6.13E-13	3.49E-13	2.86E-13	1.40E-12	4.33E-13	3.37E-13	4.44E-13	5.20E-10
Pu-238	3.75E-14	7.25E-14	6.05E-15	9.60E-15	5.31E-14	2.29E-14	1.14E-14	2.79E-14	2.34E-13
Pu-239	1.87E-14	2.92E-14	1.03E-14	1.03E-14	3.67E-14	1.50E-14	1.11E-14	1.64E-14	7.20E-14
Pu-240	1.76E-14	3.41E-14	3.02E-15	4.58E-15	2.57E-14	1.09E-14	5.43E-15	1.32E-14	1.09E-13
Pu-241	2.28E-14	2.75E-14	2.06E-14	1.79E-14	6.96E-14	2.22E-14	1.93E-14	2.30E-14	3.72E-14
Pu-242	1.44E-17	2.78E-17	2.62E-18	3.86E-18	2.13E-17	8.97E-18	4.54E-18	1.08E-17	8.83E-17
Ra-226	1.22E-23	1.40E-23	1.17E-23	1.07E-23	3.15E-23	1.23E-23	1.11E-23	1.25E-23	1.90E-23
Ra-228	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ru-106	7.80E-11	8.95E-11	7.80E-11	7.53E-11	1.33E-10	7.95E-11	7.43E-11	8.03E-11	8.41E-10
Sb-125	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Se-79	6.24E-18	8.40E-18	3.80E-18	3.00E-18	1.73E-17	5.33E-18	3.78E-18	5.45E-18	6.67E-15
Sm-147	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sm-151	3.61E-16	6.11E-16	4.92E-17	7.85E-17	4.93E-16	2.49E-16	1.04E-16	2.51E-16	1.32E-15
Sn-126	5.33E-13	6.09E-13	5.28E-13	5.10E-13	9.25E-13	5.44E-13	5.05E-13	5.45E-13	9.23E-13
Sr-90	1.65E-11	2.01E-11	1.37E-11	1.15E-11	4.83E-11	1.55E-11	1.30E-11	1.60E-11	1.95E-08
Tc-99	6.53E-16	8.26E-16	4.84E-16	3.94E-16	1.94E-15	5.89E-16	4.65E-16	6.08E-16	1.03E-12
Th-229	7.92E-22	9.29E-22	7.36E-22	6.37E-22	2.42E-21	7.78E-22	6.87E-22	8.05E-22	1.14E-21
Th-230	3.72E-22	4.92E-22	2.95E-22	2.52E-22	1.09E-21	3.37E-22	2.83E-22	3.60E-22	9.32E-22
Th-232	4.82E-26	7.02E-26	3.29E-26	2.85E-26	1.34E-25	4.08E-26	3.27E-26	4.50E-26	1.78E-25
U-232	4.46E-19	6.68E-19	2.83E-19	2.59E-19	1.11E-18	3.71E-19	2.88E-19	4.09E-19	1.70E-18
U-233	5.16E-21	6.78E-21	4.12E-21	3.78E-21	1.26E-20	4.73E-21	4.00E-21	4.97E-21	1.39E-20
U-234	2.68E-18	4.39E-18	1.33E-18	1.28E-18	6.06E-18	2.04E-18	1.46E-18	2.32E-18	1.29E-17
U-235	1.55E-14	1.79E-14	1.49E-14	1.35E-14	4.05E-14	1.55E-14	1.40E-14	1.59E-14	1.90E-14
U-236	6.27E-17	1.13E-16	2.24E-17	2.39E-17	1.22E-16	4.30E-17	2.77E-17	5.15E-17	3.67E-16
U-238	1.19E-17	2.32E-17	2.70E-18	3.36E-18	2.01E-17	7.38E-18	4.10E-18	9.25E-18	7.90E-17
Zr-93	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
crud									
Co-60 (crud)	4.07E-08	4.60E-08	4.10E-08	4.07E-08	5.89E-08	4.20E-08	3.97E-08	4.17E-08	4.80E-08
Fe-55 (crud)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
total	2.16E-04	2.46E-04	2.14E-04	2.09E-04	3.55E-04	2.20E-04	2.05E-04	2.20E-04	7.86E-04

ALUM CLAD SNF [411] stable metal not intact No HEPAs

	Inhalation Dose @ 5000 m [rem]	Dose Term for Regulation	Air Submersion Dose @ 5000 m [rem]	Dose Term for Regulation		Dose Term for Regulation
Gonad	3.82E-01		3.56E-04			
Breast	2.52E-02		4.05E-04			
Lung	5.05E+00		3.56E-04			
R Marrow	2.21E+00		3.49E-04			
B Surface	2.41E+01	<CDE	5.59E-04			
Thyroid	2.52E-02		3.65E-04			
Remainder	8.52E-01		3.42E-04			
Whole Body	1.64E+00	<CEDE	3.64E-04	<DDE	1.64E+00	<TEDE=CEDE+DDE
Skin	0.00E+00	<SKIN	1.02E-03	<SKIN	1.02E-03	<SKIN
Eye Lens	N/A	<EYE	N/A	<EYE	N/A	<EYE
					2.41E+01	<CDE + DDE

ALUM CLAD SNF [411] stable metal not intact HEPAs

	Inhalation Dose @ 5000 m [rem]	Dose Term for Regulation	Air Submersion Dose @ 5000 m [rem]	Dose Term for Regulation	Dose for Regulation [rem]	Dose Term for Regulation
Gonad	2.26E-02		2.16E-04			
Breast	2.01E-02		2.46E-04			
Lung	2.41E-02		2.14E-04			
R Marrow	2.19E-02		2.09E-04			
B Surface	2.76E-02	<CDE	3.55E-04			
Thyroid	2.04E-02		2.20E-04			
Remainder	2.37E-02		2.05E-04			
Whole Body	2.26E-02	<CEDE	2.20E-04	<DDE	2.28E-02	<TEDE=CEDE+DDE
Skin	0.00E+00	<SKIN	7.86E-04	<SKIN	7.86E-04	<SKIN
Eye Lens	N/A	<EYE	N/A	<EYE	N/A	<EYE
					2.78E-02	<CDE + DDE

ALUM CLAD SNF [411]

isotope	material type	stable metal offsite doses with no HEPAs [rem] TEDE	stable metal offsite doses with no HEPAs [rem] bone surface CDE + DDE	not intact offsite doses with HEPAs [rem] TEDE	not intact offsite doses with HEPAs [rem] bone surface CDE + DDE
Ac-227	P	5.87E-08	1.04E-06	1.76E-11	3.12E-10
Am-241	P	3.48E-01	6.29E+00	1.04E-04	1.89E-03
Am-242m	P	1.29E-04	2.37E-03	3.86E-08	7.11E-07
Am-243	P	3.29E-04	6.01E-03	9.88E-08	1.80E-06
C-14	P	7.63E-13	7.63E-13	2.29E-16	2.29E-16
Cd-113m	P	3.45E-05	2.77E-06	1.04E-08	8.32E-10
Cl-36	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-242	P	4.31E-06	4.49E-05	1.29E-09	1.35E-08
Cm-243	P	3.15E-05	5.58E-04	9.45E-09	1.67E-07
Cm-244	P	3.30E-03	5.77E-02	9.91E-07	1.73E-05
Cm-245	P	1.89E-07	3.44E-06	5.66E-11	1.03E-09
Cm-246	P	1.38E-08	2.52E-07	4.15E-12	7.55E-11
Cm-247	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co-60	P	1.26E-14	3.02E-15	3.77E-18	9.06E-19
Cs-134	C	7.52E-04	6.63E-04	7.52E-04	6.63E-04
Cs-135	C	4.40E-09	4.29E-09	4.40E-09	4.29E-09
Cs-137	C	2.16E-02	1.99E-02	2.16E-02	1.99E-02
Eu-154	P	8.14E-04	5.48E-03	2.44E-07	1.64E-06
Eu-155	P	3.64E-05	4.93E-04	1.09E-08	1.48E-07
Fe-55	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H-3	G	7.80E-06	7.80E-06	7.80E-06	7.80E-06
I-129	G	2.06E-06	6.11E-09	2.06E-06	6.11E-09
Kr-85	G	3.99E-06	3.99E-06	3.99E-06	3.99E-06
Nb-93m	P	4.52E-08	4.25E-09	1.36E-11	1.28E-12
Nb-94	P	6.44E-11	1.16E-11	1.93E-14	3.48E-15
Ni-59	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ni-63	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Np-237	P	2.01E-04	4.51E-03	6.04E-08	1.35E-06
Pa-231	P	7.51E-08	1.88E-06	2.25E-11	5.65E-10
Pb-210	P	6.11E-15	9.10E-14	1.83E-18	2.73E-17
Pd-107	P	9.37E-10	3.69E-12	2.81E-13	1.11E-15
Pm-147	P	3.02E-03	2.90E-02	9.05E-07	8.71E-06
Pu-238	P	2.69E-01	4.82E+00	8.07E-05	1.45E-03
Pu-239	P	1.99E-01	3.63E+00	5.98E-05	1.09E-03
Pu-240	P	1.43E-01	2.60E+00	4.28E-05	7.79E-04
Pu-241	P	3.15E-01	5.92E+00	9.44E-05	1.78E-03
Pu-242	P	1.33E-04	2.41E-03	3.99E-08	7.23E-07
Ra-226	P	4.09E-14	1.34E-13	1.23E-17	4.01E-17
Ra-228	P	1.25E-15	6.33E-15	3.76E-19	1.90E-18
Ru-106	P	4.42E-04	4.72E-05	1.33E-07	1.42E-08
Sb-125	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Se-79	P	2.12E-08	5.42E-09	6.37E-12	1.63E-12
Sm-147	P	1.93E-09	3.28E-08	5.78E-13	9.85E-12
Sm-151	P	2.50E-05	4.26E-04	7.50E-09	1.28E-07
Sn-126	P	8.62E-08	3.72E-07	2.59E-11	1.12E-10
Sr-90	P	3.30E-01	6.84E-01	9.91E-05	2.05E-04
Tc-99	P	3.75E-07	7.53E-09	1.12E-10	2.26E-12
Th-229	P	5.41E-11	1.33E-09	1.62E-14	4.00E-13
Th-230	P	8.07E-10	1.98E-08	2.42E-13	5.95E-12
Th-232	P	1.01E-12	2.54E-11	3.04E-16	7.63E-15
U-232	P	2.28E-06	8.21E-07	6.83E-10	2.46E-10
U-233	P	4.96E-09	1.52E-09	1.49E-12	4.55E-13
U-234	P	4.84E-06	1.47E-06	1.45E-09	4.42E-10
U-235	P	3.25E-05	9.88E-06	9.74E-09	2.96E-09
U-236	P	1.55E-04	4.74E-05	4.64E-08	1.42E-08
U-238	P	3.86E-05	1.18E-05	1.16E-08	3.53E-09
Zr-93	P	1.40E-06	3.51E-05	4.19E-10	1.05E-08
crud					
Co-60 (crud)	crud	6.65E-03	1.63E-03	2.00E-06	4.88E-07
Fe-55 (crud)	crud	5.04E-04	3.57E-04	1.51E-07	1.07E-07
	total	1.64E+00	2.41E+01	2.28E-02	2.78E-02

ALUM CLAD SNF [411] stable metal not intact

TEDE (no HEPAs)

material type		subtotal [rem]	fraction of total [-]
G		1.38E-05	8.43E-06
P		1.61E+00	9.82E-01
C		2.23E-02	1.36E-02
crud		7.15E-03	4.36E-03
	total	1.64E+00	1.00E+00

TEDE (HEPAs)

material type		subtotal [rem]	fraction of total [-]
G		1.38E-05	6.06E-04
P		4.84E-04	2.12E-02
C		2.23E-02	9.78E-01
crud		2.15E-06	9.40E-05
	total	2.28E-02	1.00E+00

bone surface CDE + DDE (no HEPAs)

material type		subtotal [rem]	fraction of total [-]
G		1.18E-05	4.90E-07
P		2.41E+01	9.99E-01
C		2.05E-02	8.53E-04
crud		1.98E-03	8.24E-05
	total	2.41E+01	1.00E+00

bone surface CDE + DDE (HEPAs)

material type		subtotal [rem]	fraction of total [-]
G		1.18E-05	4.25E-04
P		7.22E-03	2.60E-01
C		2.05E-02	7.40E-01
crud		5.95E-07	2.14E-05
	total	2.78E-02	1.00E+00

Attachment V

Calculation for Shippingport PWR Core II [193] DOE SNF

	evaluated fuel			x					evaluated fuel
	fuel type	stable metal	stable metal	non-metal	non-metal	other	other		non-metal
	condition	intact	not intact	intact	not intact	intact	not intact		intact
	fuel name	HWCTR (U/TH) [112]	ALUM CLAD SNF [411]	SHIPPINGPORT PWR CORE II [193]	SAXTON (MOX) [787]	EBWR (U METAL) LEU [64]	N REACTOR [147]		SHIPPINGPORT PWR CORE II [193]
	# of canisters	0.17	1.00	24.00	1.00	10.50	194.95		24.00
Isotopes	material type	Curies (entire fuel inventory)							Curies
Ac-227	P	9.27E-09	2.81E-07	1.24E-02	1.33E-05	3.38E-05	1.03E-02		1.24E-02
Am-241	P	1.22E-01	2.51E+01	7.61E+04	6.45E+03	1.63E+04	2.80E+05		7.61E+04
Am-242m	P	8.67E-05	9.69E-03	1.18E+02	1.07E+01	2.71E+01	7.96E+00		1.18E+02
Am-243	P	2.85E-04	2.40E-02	3.38E+02	2.83E+01	7.18E+01	4.10E+01		3.38E+02
C-14	P	1.09E-06	1.17E-05	1.53E+00	1.81E+00	4.59E+00	3.63E+02		1.53E+00
Cd-113m	P	6.32E-02	7.25E-01	0.00E+00	2.59E+01	6.56E+01	0.00E+00		0.00E+00
Cl-36	P	2.51E-30	0.00E+00	0.00E+00	2.35E-02	5.96E-02	0.00E+00		0.00E+00
Cm-242	P	2.62E-04	8.00E-03	0.00E+00	8.79E+00	2.23E+01	0.00E+00		0.00E+00
Cm-243	P	4.52E-05	3.29E-03	0.00E+00	1.60E+01	4.06E+01	0.00E+00		0.00E+00
Cm-244	P	9.94E-03	4.27E-01	3.16E+04	9.29E+02	2.36E+03	2.44E+03		3.16E+04
Cm-245	P	5.84E-07	1.33E-05	5.82E+00	2.12E-01	5.37E-01	5.13E-01		5.82E+00
Cm-246	P	3.99E-08	9.83E-07	9.89E-01	4.28E-02	1.08E-01	6.79E-02		9.89E-01
Cm-247	P	4.17E-14	0.00E+00		1.12E-07	2.83E-07			0.00E+00
Co-60	P	7.30E-03	1.81E-09	1.10E+04	2.12E+01	5.38E+01	4.75E+02		1.10E+04
Cs-134	C	9.30E+01	2.05E+02	3.63E+03	1.24E+01	3.13E+01	1.63E+02		3.63E+03
Cs-135	C	6.58E-04	1.24E-02	6.19E+00	6.65E-01	1.69E+00	4.00E+01		6.19E+00
Cs-137	C	5.49E+02	8.60E+03	2.07E+06	1.00E+05	2.53E+05	5.34E+06		2.07E+06
Eu-154	P	1.57E+01	9.08E+01	0.00E+00	1.84E+03	4.67E+03	0.00E+00		0.00E+00
Eu-155	P	7.47E+00	2.81E+01	0.00E+00	1.92E+02	4.86E+02	0.00E+00		0.00E+00
Fe-55	P	1.29E+00	0.00E+00	0.00E+00	1.76E-01	4.45E-01	0.00E+00		0.00E+00
H-3	G	2.02E+00	2.61E+01	5.09E+03	2.92E+02	7.41E+02	1.03E+04		5.09E+03
I-129	G	1.44E-04	2.54E-03	7.20E-01	6.09E-02	1.54E-01	3.29E+00		7.20E-01
Kr-85	G	5.46E+01	6.45E+02	5.07E+04	2.59E+03	6.56E+03	1.53E+05		5.07E+04
Nb-93m	P	2.82E-03	4.96E-02	5.72E+01	2.82E+00	7.15E+00	4.54E+02		5.72E+01
Nb-94	P	1.37E-07	4.96E-06	0.00E+00	5.18E-02	1.31E-01	6.71E-05		0.00E+00
Ni-59	P	2.43E-04	0.00E+00	0.00E+00	4.01E-02	1.02E-01	2.03E+01		0.00E+00
Ni-63	P	3.69E-02	0.00E+00	8.04E+04	4.42E+00	1.12E+01	2.21E+03		8.04E+04
Np-237	P	1.82E-03	1.20E-02	7.06E+00	6.46E-01	1.64E+00	3.87E+01		7.06E+00
Pa-231	P	9.79E-08	1.88E-06	1.15E-02	3.02E-05	7.65E-05	1.38E-02		1.15E-02
Pb-210	P	1.04E-10	1.44E-11	2.71E-06	5.13E-08	1.30E-07	7.52E-08		2.71E-06
Pd-107	P	9.52E-05	2.35E-03	1.95E+00	2.14E-01	5.42E-01	7.46E+00		1.95E+00
Pm-147	P	4.86E+02	2.47E+03	0.00E+00	9.36E+01	2.37E+02	0.00E+00		0.00E+00
Pu-238	P	7.65E+02	2.20E+01	8.02E+04	5.66E+02	1.18E+04	6.37E+04		8.02E+04
Pu-239	P	1.59E+01	1.49E+01	7.55E+03	9.81E+01	2.05E+03	1.23E+05		7.55E+03
Pu-240	P	9.08E+00	1.07E+01	1.13E+04	1.70E+02	3.54E+03	7.18E+04		1.13E+04
Pu-241	P	2.56E+03	1.22E+03	1.57E+06	9.43E+03	1.97E+05	2.06E+06		1.57E+06
Pu-242	P	1.35E-02	1.04E-02	3.73E+01	4.84E-01	1.01E+01	3.46E+01		3.73E+01
Ra-226	P	1.93E-09	1.53E-10	6.13E-06	2.46E-07	6.22E-07	1.15E-03		6.13E-06
Ra-228	P	1.74E-13	8.44E-12	5.85E-02	2.80E-07	7.11E-07	1.03E-06		5.85E-02
Ru-106	P	3.64E+01	2.97E+01	1.42E+01	1.17E-03	2.97E-03	3.16E-01		1.42E+01
Sb-125	P	1.20E+01	0.00E+00	0.00E+00	1.70E+01	4.30E+01	0.00E+00		0.00E+00
Se-79	P	2.47E-03	6.93E-02	7.69E+00	7.90E-01	2.00E+00	4.48E+01		7.69E+00
Sm-147	P	3.48E-08	8.28E-07	0.00E+00	9.01E-06	2.28E-05	0.00E+00		0.00E+00
Sm-151	P	2.16E+00	2.67E+01	2.58E+04	5.86E+02	1.48E+03	8.55E+04		2.58E+04
Sn-126	P	2.21E-03	2.72E-02	9.72E+00	1.50E+00	3.80E+00	7.83E+01		9.72E+00
Sr-90	P	5.25E+02	8.16E+03	1.56E+06	6.87E+04	1.74E+05	4.03E+06		1.56E+06
Tc-99	P	8.07E-02	1.44E+00	2.67E+02	2.51E+01	6.37E+01	1.51E+03		2.67E+02
Th-229	P	3.77E-08	8.09E-10	1.57E-02	4.93E-07	1.03E-05	9.31E-06		1.57E-02
Th-230	P	3.27E-04	7.96E-08	1.08E-03	8.39E-06	1.75E-04	1.02E-03		1.08E-03
Th-232	P	1.49E-10	1.99E-11	5.56E-03	4.58E-08	9.56E-07	1.21E-07		5.56E-03
U-232	P	4.47E-03	1.11E-04	0.00E+00	4.23E-03	8.82E-02	0.00E+00		0.00E+00
U-233	P	6.56E-05	1.18E-06	6.07E+00	1.70E-04	3.55E-03	5.71E-03		6.07E+00
U-234	P	6.83E+00	1.17E-03	5.82E+00	5.70E-02	1.19E+00	4.85E+02		5.82E+00
U-235	P	1.34E-01	8.48E-03	6.58E-01	5.12E-03	1.07E-01	1.85E+01		6.58E-01
U-236	P	5.77E-01	3.95E-02	5.50E+00	7.81E-02	1.63E+00	7.02E+01		5.50E+00
U-238	P	2.22E-03	1.04E-02	5.15E+00	9.65E-02	2.01E+00	3.82E+02		5.15E+00
Zr-93	P	1.27E-02	1.40E-01	3.61E+01	3.72E+00	9.42E+00	2.10E+02		3.61E+01
crud (per canister)									
Co-60 (crud)		1.56E+01	6.37E+00	2.68E+02	1.23E+02	7.70E+02	1.76E+03		2.68E+02
Fe-55 (crud)		9.85E+01	4.01E+01	1.69E+03	7.73E+02	4.85E+03	1.11E+04		1.69E+03

Release Fractions				
Material Type	ARF	RF	Total Release Fraction	HEPA Filter LPF
stable metal/ intact				
G	0.3	1.0	3.00E-01	1.0
P	2.00E-04	4.00E-03	8.00E-07	3.00E-04
C	2.00E-04	1.0	2.00E-04	1.0
stable metal/not intact				
G	0.3	1.0	0.3	1.0
P	5.00E-03	0.4	2.00E-03	3.00E-04
C	5.00E-03	1.0	5.00E-03	1.0
non-metal/intact				
G	0.3	1.0	0.3	1.0
P	2.25E-04	1.0	2.25E-04	3.00E-04
C	2.25E-04	1.0	2.25E-04	1.0
non-metal/not intact				
G	0.3	1.0	0.3	1.0
P	5.00E-03	0.4	2.00E-03	3.00E-04
C	5.00E-03	1.0	5.00E-03	1.0
other/intact				
G	0.3	1.0	0.3	1.0
P	1.00E-03	1.0	1.00E-03	3.00E-04
C	1.00E-03	1.0	1.00E-03	1.0
other/not intact				
G	0.3	1.0	0.3	1.0
P	5.00E-03	0.4	2.00E-03	3.00E-04
C	5.00E-03	1.0	5.00E-03	1.0
crud				
crud	1.0	0.3	3.00E-01	3.00E-04
SHIPPINGPORT PWR CORE II [193]				
non-metal				
intact	-			
Release Fractions Used in this Calculation				
G	0.3	1.0	0.3	1.0
P	2.25E-04	1.00E+00	2.25E-04	3.00E-04
C	2.25E-04	1.00E+00	2.25E-04	1.00E+00
crud	1.0	0.3	0.3	3.00E-04
breathing rate	3.33E-04	[m^3/s]		
gound level dispersion factor				
distance [m]	x/Q [sec/m^3]			
5000	4.68E-05	99.5% worst-sector		
3.70E+12	unit conversion factor			
	Sv/Bq to rem/Ci			

	inhalation DCFs [Sv/Bq]								
Isotopes	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	3.96E-04	6.66E-08	1.54E-03	2.57E-03	3.21E-02	3.59E-08	1.47E-03	1.81E-03	0.00E+00
Am-241	3.25E-05	2.67E-09	1.84E-05	1.74E-04	2.17E-03	1.60E-09	7.82E-05	1.20E-04	0.00E+00
Am-242m	3.21E-05	1.38E-09	4.20E-06	1.69E-04	2.12E-03	5.64E-10	7.48E-05	1.15E-04	0.00E+00
Am-243	3.26E-05	1.52E-08	1.78E-05	1.73E-04	2.17E-03	8.29E-09	7.74E-05	1.19E-04	0.00E+00
C-14	5.64E-10	5.64E-10	5.64E-10	5.64E-10	5.64E-10	5.64E-10	5.64E-10	5.64E-10	0.00E+00
Cd-113m	3.32E-08	3.32E-08	4.09E-07	3.32E-08	3.32E-08	3.32E-08	1.30E-08	4.13E-07	0.00E+00
Cl-36	5.04E-10	5.04E-10	4.56E-08	5.04E-10	5.04E-10	5.04E-10	5.36E-10	5.93E-09	0.00E+00
Cm-242	5.70E-07	9.44E-10	1.55E-05	3.90E-06	4.87E-05	9.41E-10	2.45E-06	4.67E-06	0.00E+00
Cm-243	2.07E-05	6.29E-09	1.94E-05	1.18E-04	1.47E-03	3.83E-09	5.76E-05	8.30E-05	0.00E+00
Cm-244	1.59E-05	1.04E-09	1.93E-05	9.38E-05	1.17E-03	1.01E-09	4.78E-05	6.70E-05	0.00E+00
Cm-245	3.37E-05	6.69E-09	1.80E-05	1.79E-04	2.24E-03	3.68E-09	7.96E-05	1.23E-04	0.00E+00
Cm-246	3.34E-05	4.00E-09	1.82E-05	1.78E-04	2.22E-03	2.26E-09	7.94E-05	1.22E-04	0.00E+00
Cm-247	3.07E-05	2.23E-08	1.67E-05	1.63E-04	2.04E-03	1.45E-08	7.30E-05	1.12E-04	0.00E+00
Co-60	4.76E-09	1.84E-08	3.45E-07	1.72E-08	1.35E-08	1.62E-08	3.60E-08	5.91E-08	0.00E+00
Cs-134	1.30E-08	1.08E-08	1.18E-08	1.18E-08	1.10E-08	1.11E-08	1.39E-08	1.25E-08	0.00E+00
Cs-135	1.20E-09	1.20E-09	1.41E-09	1.20E-09	1.20E-09	1.20E-09	1.20E-09	1.23E-09	0.00E+00
Cs-137	8.76E-09	7.84E-09	8.82E-09	8.30E-09	7.94E-09	7.93E-09	9.12E-09	8.63E-09	0.00E+00
Eu-154	1.17E-08	1.55E-08	7.92E-08	1.06E-07	5.23E-07	7.14E-09	1.13E-07	7.73E-08	0.00E+00
Eu-155	3.56E-10	6.14E-10	1.19E-08	1.43E-08	1.52E-07	2.40E-10	1.11E-08	1.12E-08	0.00E+00
Fe-55	5.23E-10	5.09E-10	1.06E-09	5.17E-10	5.14E-10	5.42E-10	1.21E-09	7.26E-10	0.00E+00
H-3	1.73E-11	1.73E-11	1.73E-11	1.73E-11	1.73E-11	1.73E-11	1.73E-11	1.73E-11	0.00E+00
I-129	8.69E-11	2.09E-10	3.14E-10	1.40E-10	1.38E-10	1.56E-06	1.18E-10	4.69E-08	0.00E+00
Kr-85	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nb-93m	4.16E-10	4.36E-11	6.45E-08	2.85E-10	7.43E-10	3.04E-11	3.95E-10	7.90E-09	0.00E+00
Nb-94	4.76E-09	2.24E-08	7.48E-07	2.26E-08	1.97E-08	2.22E-08	4.45E-08	1.12E-07	0.00E+00
Ni-59	3.59E-10	3.46E-10	1.20E-09	3.54E-10	3.51E-10	3.77E-10	3.63E-10	3.58E-10	0.00E+00
Ni-63	8.22E-10	8.22E-10	3.07E-09	8.22E-10	8.22E-10	8.22E-10	8.59E-10	8.39E-10	0.00E+00
Np-237	2.96E-05	1.69E-08	1.61E-05	2.62E-04	3.27E-03	1.34E-08	2.34E-05	1.46E-04	0.00E+00
Pa-231	6.90E-09	8.79E-09	7.47E-04	6.97E-04	8.70E-03	7.64E-09	2.87E-07	3.47E-04	0.00E+00
Pb-210	3.18E-07	3.18E-07	3.18E-07	3.75E-06	5.47E-05	3.18E-07	4.69E-06	3.67E-06	0.00E+00
Pd-107	9.45E-13	9.45E-13	2.85E-08	5.11E-12	1.36E-11	9.45E-13	2.15E-10	3.45E-09	0.00E+00
Pm-147	1.88E-14	3.60E-14	7.74E-08	8.16E-09	1.02E-07	1.98E-14	5.89E-09	1.06E-08	0.00E+00
Pu-238	2.80E-05	1.00E-09	3.20E-04	1.52E-04	1.90E-03	9.62E-10	7.02E-05	1.06E-04	0.00E+00
Pu-239	3.18E-05	9.22E-10	3.23E-04	1.69E-04	2.11E-03	9.03E-10	7.56E-05	1.16E-04	0.00E+00
Pu-240	3.18E-05	9.51E-10	3.23E-04	1.69E-04	2.11E-03	9.05E-10	7.56E-05	1.16E-04	0.00E+00
Pu-241	6.82E-07	3.06E-11	3.18E-08	3.36E-06	4.20E-05	1.24E-11	1.31E-06	2.23E-06	0.00E+00
Pu-242	3.02E-05	9.45E-10	3.07E-04	1.61E-04	2.01E-03	8.79E-10	7.18E-05	1.11E-04	0.00E+00
Ra-226	1.02E-07	1.02E-07	1.61E-05	6.64E-07	7.59E-06	1.02E-07	1.07E-07	2.32E-06	0.00E+00
Ra-228	1.83E-07	1.84E-07	7.22E-08	7.38E-07	6.51E-06	1.83E-07	1.87E-07	1.29E-06	0.00E+00
Ru-106	1.38E-08	1.37E-08	1.04E-06	1.37E-08	1.37E-08	1.37E-08	1.69E-08	1.29E-07	0.00E+00
Sb-125	3.60E-10	4.16E-10	2.17E-08	6.49E-10	2.73E-09	3.24E-10	1.45E-09	3.30E-09	0.00E+00
Se-79	6.79E-10	6.79E-10	9.81E-09	6.79E-10	6.79E-10	6.79E-10	4.24E-09	2.66E-09	0.00E+00
Sm-147	0.00E+00	0.00E+00	7.62E-06	2.75E-05	3.44E-04	0.00E+00	1.89E-05	2.02E-05	0.00E+00
Sm-151	4.03E-14	1.49E-13	3.26E-09	1.10E-08	1.38E-07	1.32E-14	7.51E-09	8.10E-09	0.00E+00
Sn-126	1.43E-08	1.41E-08	1.51E-07	5.62E-08	1.18E-07	1.31E-08	1.76E-08	2.69E-08	0.00E+00
Sr-90	2.64E-09	2.64E-09	2.86E-06	3.36E-07	7.27E-07	2.64E-09	5.73E-09	3.51E-07	0.00E+00
Tc-99	4.52E-11	4.52E-11	1.67E-08	4.52E-11	4.52E-11	1.21E-09	6.26E-10	2.25E-09	0.00E+00
Th-229	2.76E-06	2.76E-06	1.99E-03	1.15E-03	1.43E-02	2.76E-06	7.05E-06	5.80E-04	0.00E+00
Th-230	4.08E-07	4.08E-07	3.00E-04	1.73E-04	2.16E-03	4.08E-07	1.05E-06	8.80E-05	0.00E+00
Th-232	7.62E-07	7.72E-07	9.40E-04	8.93E-04	1.11E-02	7.44E-07	1.87E-06	4.43E-04	0.00E+00
U-232	8.00E-08	8.06E-08	1.48E-03	4.06E-06	6.42E-05	7.85E-08	3.11E-06	1.78E-04	0.00E+00
U-233	2.54E-08	2.54E-08	3.04E-04	7.12E-07	1.12E-05	2.54E-08	9.40E-07	3.66E-05	0.00E+00
U-234	2.50E-08	2.50E-08	2.98E-04	6.98E-07	1.09E-05	2.50E-08	9.26E-07	3.58E-05	0.00E+00
U-235	2.37E-08	2.38E-08	2.76E-04	6.58E-07	1.01E-05	2.37E-08	8.59E-07	3.32E-05	0.00E+00
U-236	2.37E-08	2.37E-08	2.82E-04	6.60E-07	1.04E-05	2.37E-08	8.77E-07	3.39E-05	0.00E+00
U-238	2.23E-08	2.23E-08	2.66E-04	6.58E-07	9.78E-06	2.22E-08	8.22E-07	3.20E-05	0.00E+00
Zr-93	2.18E-11	4.68E-11	8.72E-08	1.77E-07	2.18E-06	1.74E-11	1.73E-10	8.67E-08	0.00E+00
crud									
Co-60	4.76E-09	1.84E-08	3.45E-07	1.72E-08	1.35E-08	1.62E-08	3.60E-08	5.91E-08	0.00E+00
Fe-55	5.23E-10	5.09E-10	1.06E-09	5.17E-10	5.14E-10	5.42E-10	1.21E-09	7.26E-10	0.00E+00

	air submersion DCFs [Sv/Bq m^3/s]								
	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	3.75E-17	4.45E-17	3.38E-17	2.94E-17	1.04E-16	3.65E-17	3.18E-17	3.74E-17	3.28E-16
Am-241	8.58E-16	1.07E-15	6.74E-16	5.21E-16	2.87E-15	7.83E-16	6.34E-16	8.18E-16	1.28E-15
Am-242m	3.80E-17	6.01E-17	1.72E-17	1.72E-17	7.94E-17	2.95E-17	1.94E-17	3.17E-17	1.36E-16
Am-243	2.19E-15	2.61E-15	1.92E-15	1.55E-15	7.47E-15	2.09E-15	1.79E-15	2.18E-15	2.75E-15
C-14	2.59E-19	3.52E-19	1.53E-19	1.21E-19	7.06E-19	2.19E-19	1.54E-19	2.24E-19	2.43E-16
Cd-113m	7.17E-18	8.76E-18	5.93E-18	5.01E-18	2.10E-17	6.76E-18	5.63E-18	6.94E-18	8.48E-15
Cl-36	2.24E-17	2.66E-17	2.02E-17	1.81E-17	5.63E-17	2.19E-17	1.92E-17	2.23E-17	1.47E-14
Cm-242	7.83E-18	1.48E-17	1.13E-18	1.89E-18	1.06E-17	4.91E-18	2.27E-18	5.69E-18	4.29E-17
Cm-243	5.77E-15	6.68E-15	5.50E-15	5.00E-15	1.50E-14	5.76E-15	5.19E-15	5.88E-15	9.79E-15
Cm-244	6.90E-18	1.33E-17	7.08E-19	1.46E-18	8.82E-18	4.19E-18	1.81E-18	4.91E-18	3.91E-17
Cm-245	3.88E-15	4.55E-15	3.63E-15	3.17E-15	1.18E-14	3.84E-15	3.40E-15	3.96E-15	5.36E-15
Cm-246	6.24E-18	1.20E-17	7.00E-19	1.35E-18	8.17E-18	3.82E-18	1.67E-18	4.46E-18	3.49E-17
Cm-247	1.47E-14	1.68E-14	1.44E-14	1.38E-14	2.83E-14	1.49E-14	1.38E-14	1.50E-14	1.79E-14
Co-60	1.23E-13	1.39E-13	1.24E-13	1.23E-13	1.78E-13	1.27E-13	1.20E-13	1.26E-13	1.45E-13
Cs-134	7.40E-14	8.43E-14	7.37E-14	7.19E-14	1.20E-13	7.57E-14	7.06E-14	7.57E-14	9.45E-14
Cs-135	6.28E-19	8.23E-19	4.19E-19	3.34E-19	1.81E-18	5.50E-19	4.09E-19	5.65E-19	9.06E-16
Cs-137	2.67E-14	3.05E-14	2.65E-14	2.58E-14	4.38E-14	2.73E-14	2.54E-14	2.73E-14	4.39E-14
Eu-154	6.00E-14	6.81E-14	5.99E-14	5.87E-14	9.43E-14	6.15E-14	5.75E-14	6.14E-14	8.29E-14
Eu-155	2.49E-15	2.95E-15	2.22E-15	1.85E-15	8.09E-15	2.41E-15	2.07E-15	2.49E-15	3.39E-15
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H-3	0.00E+00	0.00E+00	2.75E-18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.31E-19	0.00E+00
I-129	4.83E-16	6.66E-16	2.14E-16	1.64E-16	1.10E-15	3.86E-16	2.30E-16	3.80E-16	1.10E-15
Kr-85	1.17E-16	1.34E-16	1.14E-16	1.09E-16	2.20E-16	1.18E-16	1.09E-16	1.19E-16	1.32E-14
Nb-93m	6.33E-18	1.31E-17	2.55E-19	1.18E-18	6.92E-18	3.43E-18	1.36E-18	4.44E-18	4.28E-17
Nb-94	7.54E-14	8.57E-14	7.51E-14	7.34E-14	1.19E-13	7.72E-14	7.19E-14	7.70E-14	9.52E-14
Ni-59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ni-63	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Np-237	1.04E-15	1.26E-15	9.02E-16	7.69E-16	3.20E-15	9.94E-16	8.50E-16	1.03E-15	1.54E-15
Pa-231	1.71E-15	1.99E-15	1.62E-15	1.52E-15	3.64E-15	1.70E-15	1.54E-15	1.72E-15	2.44E-15
Pb-210	6.19E-17	8.18E-17	4.25E-17	3.14E-17	1.95E-16	5.42E-17	4.09E-17	5.64E-17	1.28E-16
Pd-107	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pm-147	7.48E-19	9.56E-19	5.45E-19	4.46E-19	2.18E-18	6.75E-19	5.26E-19	6.93E-19	8.11E-16
Pu-238	6.56E-18	1.27E-17	1.06E-18	1.68E-18	9.30E-18	4.01E-18	1.99E-18	4.88E-18	4.09E-17
Pu-239	4.84E-18	7.55E-18	2.65E-18	2.67E-18	9.47E-18	3.88E-18	2.86E-18	4.24E-18	1.86E-17
Pu-240	6.36E-18	1.23E-17	1.09E-18	1.65E-18	9.26E-18	3.92E-18	1.96E-18	4.75E-18	3.92E-17
Pu-241	7.19E-20	8.67E-20	6.48E-20	5.63E-20	2.19E-19	6.98E-20	6.09E-20	7.25E-20	1.17E-19
Pu-242	5.34E-18	1.03E-17	9.69E-19	1.43E-18	7.90E-18	3.32E-18	1.68E-18	4.01E-18	3.27E-17
Ra-226	3.08E-16	3.54E-16	2.95E-16	2.70E-16	7.95E-16	3.09E-16	2.79E-16	3.15E-16	4.79E-16
Ra-228	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ru-106	1.01E-14	1.16E-14	1.01E-14	9.75E-15	1.72E-14	1.03E-14	9.63E-15	1.04E-14	1.09E-13
Sb-125	1.98E-14	2.27E-14	1.95E-14	1.87E-14	3.53E-14	2.01E-14	1.86E-14	2.02E-14	2.65E-14
Se-79	3.47E-19	4.67E-19	2.11E-19	1.67E-19	9.60E-19	2.96E-19	2.10E-19	3.03E-19	3.71E-16
Sm-147	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sm-151	5.20E-20	8.80E-20	7.08E-21	1.13E-20	7.09E-20	3.58E-20	1.49E-20	3.61E-20	1.90E-19
Sn-126	7.54E-14	8.62E-14	7.48E-14	7.22E-14	1.31E-13	7.69E-14	7.14E-14	7.71E-14	1.31E-13
Sr-90	7.78E-18	9.49E-18	6.44E-18	5.44E-18	2.28E-17	7.33E-18	6.11E-18	7.53E-18	9.20E-15
Tc-99	1.74E-18	2.20E-18	1.29E-18	1.05E-18	5.17E-18	1.57E-18	1.24E-18	1.62E-18	2.74E-15
Th-229	3.77E-15	4.42E-15	3.50E-15	3.03E-15	1.15E-14	3.70E-15	3.27E-15	3.83E-15	5.41E-15
Th-230	1.80E-17	2.38E-17	1.43E-17	1.22E-17	5.29E-17	1.63E-17	1.37E-17	1.74E-17	4.51E-17
Th-232	9.34E-18	1.36E-17	6.37E-18	5.52E-18	2.60E-17	7.90E-18	6.34E-18	8.72E-18	3.44E-17
U-232	1.55E-17	2.32E-17	9.84E-18	8.99E-18	3.86E-17	1.29E-17	1.00E-17	1.42E-17	5.92E-17
U-233	1.69E-17	2.22E-17	1.35E-17	1.24E-17	4.12E-17	1.55E-17	1.31E-17	1.63E-17	4.57E-17
U-234	8.79E-18	1.44E-17	4.38E-18	4.20E-18	1.99E-17	6.69E-18	4.80E-18	7.63E-18	4.25E-17
U-235	7.05E-15	8.11E-15	6.75E-15	6.15E-15	1.84E-14	7.05E-15	6.37E-15	7.20E-15	8.64E-15
U-236	6.10E-18	1.10E-17	2.18E-18	2.33E-18	1.19E-17	4.19E-18	2.70E-18	5.01E-18	3.57E-17
U-238	4.39E-18	8.54E-18	9.96E-19	1.24E-18	7.40E-18	2.72E-18	1.51E-18	3.41E-18	2.91E-17
Zr-93	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
crud									
Co-60	1.23E-13	1.39E-13	1.24E-13	1.23E-13	1.78E-13	1.27E-13	1.20E-13	1.26E-13	1.45E-13
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Source Term Calculations		HEPA filters?	no				
SHIPPINGPORT PWR CORE II [193]							
non-metal	intact						
Isotope	Curies (entire fuel inventory)	finv = 1/nCan	ARF	RF	LPF	Total Source Term [Ci] released to the environment	Respirable Source Term [Ci] released to the environment
Ac-227	1.24E-02	4.17E-02	2.25E-04	1.00E+00	1.00E+00	1.16E-07	1.16E-07
Am-241	7.61E+04	4.17E-02	2.25E-04	1.00E+00	1.00E+00	7.14E-01	7.14E-01
Am-242m	1.18E+02	4.17E-02	2.25E-04	1.00E+00	1.00E+00	1.11E-03	1.11E-03
Am-243	3.38E+02	4.17E-02	2.25E-04	1.00E+00	1.00E+00	3.17E-03	3.17E-03
C-14	1.53E+00	4.17E-02	2.25E-04	1.00E+00	1.00E+00	1.44E-05	1.44E-05
Cd-113m	0.00E+00	4.17E-02	2.25E-04	1.00E+00	1.00E+00	0.00E+00	0.00E+00
Cl-36	0.00E+00	4.17E-02	2.25E-04	1.00E+00	1.00E+00	0.00E+00	0.00E+00
Cm-242	0.00E+00	4.17E-02	2.25E-04	1.00E+00	1.00E+00	0.00E+00	0.00E+00
Cm-243	0.00E+00	4.17E-02	2.25E-04	1.00E+00	1.00E+00	0.00E+00	0.00E+00
Cm-244	3.16E+04	4.17E-02	2.25E-04	1.00E+00	1.00E+00	2.96E-01	2.96E-01
Cm-245	5.82E+00	4.17E-02	2.25E-04	1.00E+00	1.00E+00	5.45E-05	5.45E-05
Cm-246	9.89E-01	4.17E-02	2.25E-04	1.00E+00	1.00E+00	9.28E-06	9.28E-06
Cm-247	0.00E+00	4.17E-02	2.25E-04	1.00E+00	1.00E+00	0.00E+00	0.00E+00
Co-60	1.10E+04	4.17E-02	2.25E-04	1.00E+00	1.00E+00	1.04E-01	1.04E-01
Cs-134	3.63E+03	4.17E-02	2.25E-04	1.00E+00	1.00E+00	3.40E-02	3.40E-02
Cs-135	6.19E+00	4.17E-02	2.25E-04	1.00E+00	1.00E+00	5.80E-05	5.80E-05
Cs-137	2.07E+06	4.17E-02	2.25E-04	1.00E+00	1.00E+00	1.94E+01	1.94E+01
Eu-154	0.00E+00	4.17E-02	2.25E-04	1.00E+00	1.00E+00	0.00E+00	0.00E+00
Eu-155	0.00E+00	4.17E-02	2.25E-04	1.00E+00	1.00E+00	0.00E+00	0.00E+00
Fe-55	0.00E+00	4.17E-02	2.25E-04	1.00E+00	1.00E+00	0.00E+00	0.00E+00
H-3	5.09E+03	4.17E-02	3.00E-01	1.00E+00	1.00E+00	6.37E+01	6.37E+01
I-129	7.20E-01	4.17E-02	3.00E-01	1.00E+00	1.00E+00	9.00E-03	9.00E-03
Kr-85	5.07E+04	4.17E-02	3.00E-01	1.00E+00	1.00E+00	6.34E+02	6.34E+02
Nb-93m	5.72E+01	4.17E-02	2.25E-04	1.00E+00	1.00E+00	5.36E-04	5.36E-04
Nb-94	0.00E+00	4.17E-02	2.25E-04	1.00E+00	1.00E+00	0.00E+00	0.00E+00
Ni-59	0.00E+00	4.17E-02	2.25E-04	1.00E+00	1.00E+00	0.00E+00	0.00E+00
Ni-63	8.04E+04	4.17E-02	2.25E-04	1.00E+00	1.00E+00	7.54E-01	7.54E-01
Np-237	7.06E+00	4.17E-02	2.25E-04	1.00E+00	1.00E+00	6.62E-05	6.62E-05
Pa-231	1.15E-02	4.17E-02	2.25E-04	1.00E+00	1.00E+00	1.08E-07	1.08E-07
Pb-210	2.71E-06	4.17E-02	2.25E-04	1.00E+00	1.00E+00	2.54E-11	2.54E-11
Pd-107	1.95E+00	4.17E-02	2.25E-04	1.00E+00	1.00E+00	1.83E-05	1.83E-05
Pm-147	0.00E+00	4.17E-02	2.25E-04	1.00E+00	1.00E+00	0.00E+00	0.00E+00
Pu-238	8.02E+04	4.17E-02	2.25E-04	1.00E+00	1.00E+00	7.52E-01	7.52E-01
Pu-239	7.55E+03	4.17E-02	2.25E-04	1.00E+00	1.00E+00	7.08E-02	7.08E-02
Pu-240	1.13E+04	4.17E-02	2.25E-04	1.00E+00	1.00E+00	1.06E-01	1.06E-01
Pu-241	1.57E+06	4.17E-02	2.25E-04	1.00E+00	1.00E+00	1.47E+01	1.47E+01
Pu-242	3.73E+01	4.17E-02	2.25E-04	1.00E+00	1.00E+00	3.49E-04	3.49E-04
Ra-226	6.13E-06	4.17E-02	2.25E-04	1.00E+00	1.00E+00	5.75E-11	5.75E-11
Ra-228	5.85E-02	4.17E-02	2.25E-04	1.00E+00	1.00E+00	5.49E-07	5.49E-07
Ru-106	1.42E+01	4.17E-02	2.25E-04	1.00E+00	1.00E+00	1.33E-04	1.33E-04
Sb-125	0.00E+00	4.17E-02	2.25E-04	1.00E+00	1.00E+00	0.00E+00	0.00E+00
Se-79	7.69E+00	4.17E-02	2.25E-04	1.00E+00	1.00E+00	7.21E-05	7.21E-05
Sm-147	0.00E+00	4.17E-02	2.25E-04	1.00E+00	1.00E+00	0.00E+00	0.00E+00
Sm-151	2.58E+04	4.17E-02	2.25E-04	1.00E+00	1.00E+00	2.42E-01	2.42E-01
Sn-126	9.72E+00	4.17E-02	2.25E-04	1.00E+00	1.00E+00	9.11E-05	9.11E-05
Sr-90	1.56E+06	4.17E-02	2.25E-04	1.00E+00	1.00E+00	1.46E+01	1.46E+01
Tc-99	2.67E+02	4.17E-02	2.25E-04	1.00E+00	1.00E+00	2.51E-03	2.51E-03
Th-229	1.57E-02	4.17E-02	2.25E-04	1.00E+00	1.00E+00	1.47E-07	[illegible]
Th-230	1.08E-03	4.17E-02	2.25E-04	1.00E+00	1.00E+00	1.02E-08	[illegible]
Th-232	5.56E-03	4.17E-02	2.25E-04	1.00E+00	1.00E+00	5.21E-08	[illegible]
U-232	0.00E+00	4.17E-02	2.25E-04	1.00E+00	1.00E+00	0.00E+00	0.00E+00
U-233	6.07E+00	4.17E-02	2.25E-04	1.00E+00	1.00E+00	5.69E-05	5.69E-05
U-234	5.82E+00	4.17E-02	2.25E-04	1.00E+00	1.00E+00	5.45E-05	5.45E-05
U-235	6.58E-01	4.17E-02	2.25E-04	1.00E+00	1.00E+00	6.17E-06	6.17E-06
U-236	5.50E+00	4.17E-02	2.25E-04	1.00E+00	1.00E+00	5.16E-05	5.16E-05
U-238	5.15E+00	4.17E-02	2.25E-04	1.00E+00	1.00E+00	4.83E-05	4.83E-05
Zr-93	3.61E+01	4.17E-02	2.25E-04	1.00E+00	1.00E+00	3.38E-04	3.38E-04
crud (per canister)							
Co-60 (crud)	2.68E+02	1	1.00E+00	3.00E-01	1.00E+00	2.68E+02	8.04E+01
Fe-55 (crud)	1.69E+03	1	1.00E+00	3.00E-01	1.00E+00	1.69E+03	5.07E+02

Source Term Calculations		HEPA filters?	yes				
SHIPPINGPORT PWR CORE II [193]							
non-metal	intact						
Isotope	Curies	1/nCan	ARF	RF	LPF	Total Source Term [Ci] released to the environment	Respirable Source Term [Ci] released to the environment
Ac-227	1.24E-02	4.17E-02	2.25E-04	1.00E+00	3.00E-04	3.47E-11	3.47E-11
Am-241	7.61E+04	4.17E-02	2.25E-04	1.00E+00	3.00E-04	2.14E-04	2.14E-04
Am-242m	1.18E+02	4.17E-02	2.25E-04	1.00E+00	3.00E-04	3.32E-07	3.32E-07
Am-243	3.38E+02	4.17E-02	2.25E-04	1.00E+00	3.00E-04	9.50E-07	9.50E-07
C-14	1.53E+00	4.17E-02	2.25E-04	1.00E+00	3.00E-04	4.31E-09	4.31E-09
Cd-113m	0.00E+00	4.17E-02	2.25E-04	1.00E+00	3.00E-04	0.00E+00	0.00E+00
Cl-36	0.00E+00	4.17E-02	2.25E-04	1.00E+00	3.00E-04	0.00E+00	0.00E+00
Cm-242	0.00E+00	4.17E-02	2.25E-04	1.00E+00	3.00E-04	0.00E+00	0.00E+00
Cm-243	0.00E+00	4.17E-02	2.25E-04	1.00E+00	3.00E-04	0.00E+00	0.00E+00
Cm-244	3.16E+04	4.17E-02	2.25E-04	1.00E+00	3.00E-04	8.89E-05	8.89E-05
Cm-245	5.82E+00	4.17E-02	2.25E-04	1.00E+00	3.00E-04	1.64E-08	1.64E-08
Cm-246	9.89E-01	4.17E-02	2.25E-04	1.00E+00	3.00E-04	2.78E-09	2.78E-09
Cm-247	0.00E+00	4.17E-02	2.25E-04	1.00E+00	3.00E-04	0.00E+00	0.00E+00
Co-60	1.10E+04	4.17E-02	2.25E-04	1.00E+00	3.00E-04	3.11E-05	3.11E-05
Cs-134	3.63E+03	4.17E-02	2.25E-04	1.00E+00	1.00E+00	3.40E-02	3.40E-02
Cs-135	6.19E+00	4.17E-02	2.25E-04	1.00E+00	1.00E+00	5.80E-05	5.80E-05
Cs-137	2.07E+06	4.17E-02	2.25E-04	1.00E+00	1.00E+00	1.94E+01	1.94E+01
Eu-154	0.00E+00	4.17E-02	2.25E-04	1.00E+00	3.00E-04	0.00E+00	0.00E+00
Eu-155	0.00E+00	4.17E-02	2.25E-04	1.00E+00	3.00E-04	0.00E+00	0.00E+00
Fe-55	0.00E+00	4.17E-02	2.25E-04	1.00E+00	3.00E-04	0.00E+00	0.00E+00
H-3	5.09E+03	4.17E-02	3.00E-01	1.00E+00	1.00E+00	6.37E+01	6.37E+01
I-129	7.20E-01	4.17E-02	3.00E-01	1.00E+00	1.00E+00	9.00E-03	9.00E-03
Kr-85	5.07E+04	4.17E-02	3.00E-01	1.00E+00	1.00E+00	6.34E+02	6.34E+02
Nb-93m	5.72E+01	4.17E-02	2.25E-04	1.00E+00	3.00E-04	1.61E-07	1.61E-07
Nb-94	0.00E+00	4.17E-02	2.25E-04	1.00E+00	3.00E-04	0.00E+00	0.00E+00
Ni-59	0.00E+00	4.17E-02	2.25E-04	1.00E+00	3.00E-04	0.00E+00	0.00E+00
Ni-63	8.04E+04	4.17E-02	2.25E-04	1.00E+00	3.00E-04	2.26E-04	2.26E-04
Np-237	7.06E+00	4.17E-02	2.25E-04	1.00E+00	3.00E-04	1.99E-08	1.99E-08
Pa-231	1.15E-02	4.17E-02	2.25E-04	1.00E+00	3.00E-04	3.23E-11	3.23E-11
Pb-210	2.71E-06	4.17E-02	2.25E-04	1.00E+00	3.00E-04	7.63E-15	7.63E-15
Pd-107	1.95E+00	4.17E-02	2.25E-04	1.00E+00	3.00E-04	5.49E-09	5.49E-09
Pm-147	0.00E+00	4.17E-02	2.25E-04	1.00E+00	3.00E-04	0.00E+00	0.00E+00
Pu-238	8.02E+04	4.17E-02	2.25E-04	1.00E+00	3.00E-04	2.26E-04	2.26E-04
Pu-239	7.55E+03	4.17E-02	2.25E-04	1.00E+00	3.00E-04	2.12E-05	2.12E-05
Pu-240	1.13E+04	4.17E-02	2.25E-04	1.00E+00	3.00E-04	3.18E-05	3.18E-05
Pu-241	1.57E+06	4.17E-02	2.25E-04	1.00E+00	3.00E-04	4.41E-03	4.41E-03
Pu-242	3.73E+01	4.17E-02	2.25E-04	1.00E+00	3.00E-04	1.05E-07	1.05E-07
Ra-226	6.13E-06	4.17E-02	2.25E-04	1.00E+00	3.00E-04	1.72E-14	1.72E-14
Ra-228	5.85E-02	4.17E-02	2.25E-04	1.00E+00	3.00E-04	1.65E-10	1.65E-10
Ru-106	1.42E+01	4.17E-02	2.25E-04	1.00E+00	3.00E-04	4.00E-08	4.00E-08
Sb-125	0.00E+00	4.17E-02	2.25E-04	1.00E+00	3.00E-04	0.00E+00	0.00E+00
Se-79	7.69E+00	4.17E-02	2.25E-04	1.00E+00	3.00E-04	2.16E-08	2.16E-08
Sm-147	0.00E+00	4.17E-02	2.25E-04	1.00E+00	3.00E-04	0.00E+00	0.00E+00
Sm-151	2.58E+04	4.17E-02	2.25E-04	1.00E+00	3.00E-04	7.25E-05	7.25E-05
Sn-126	9.72E+00	4.17E-02	2.25E-04	1.00E+00	3.00E-04	2.73E-08	2.73E-08
Sr-90	1.56E+06	4.17E-02	2.25E-04	1.00E+00	3.00E-04	4.37E-03	4.37E-03
Tc-99	2.67E+02	4.17E-02	2.25E-04	1.00E+00	3.00E-04	7.52E-07	7.52E-07
Th-229	1.57E-02	4.17E-02	2.25E-04	1.00E+00	3.00E-04	4.42E-11	4.42E-11
Th-230	1.08E-03	4.17E-02	2.25E-04	1.00E+00	3.00E-04	3.05E-12	3.05E-12
Th-232	5.56E-03	4.17E-02	2.25E-04	1.00E+00	3.00E-04	1.56E-11	1.56E-11
U-232	0.00E+00	4.17E-02	2.25E-04	1.00E+00	3.00E-04	0.00E+00	0.00E+00
U-233	6.07E+00	4.17E-02	2.25E-04	1.00E+00	3.00E-04	1.71E-08	1.71E-08
U-234	5.82E+00	4.17E-02	2.25E-04	1.00E+00	3.00E-04	1.64E-08	1.64E-08
U-235	6.58E-01	4.17E-02	2.25E-04	1.00E+00	3.00E-04	1.85E-09	1.85E-09
U-236	5.50E+00	4.17E-02	2.25E-04	1.00E+00	3.00E-04	1.55E-08	1.55E-08
U-238	5.15E+00	4.17E-02	2.25E-04	1.00E+00	3.00E-04	1.45E-08	1.45E-08
Zr-93	3.61E+01	4.17E-02	2.25E-04	1.00E+00	3.00E-04	1.02E-07	1.02E-07
crud (per canister)							
Co-60 (crud)	2.68E+02	1	1.00E+00	3.00E-01	3.00E-04	8.04E-02	2.41E-02
Fe-55 (crud)	1.69E+03	1	1.00E+00	3.00E-01	3.00E-04	5.07E-01	1.52E-01

SHIPPINGPORT PWR CORE II [193]			No HEPAs						
non-metal	intact								
	inhalation doses [rem]								
	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	2.64E-06	4.45E-10	1.03E-05	1.72E-05	2.14E-04	2.40E-10	9.82E-06	1.21E-05	0.00E+00
Am-241	1.34E+00	1.10E-04	7.57E-01	7.16E+00	8.93E+01	6.58E-05	3.22E+00	4.94E+00	0.00E+00
Am-242m	2.05E-03	8.79E-08	2.68E-04	1.08E-02	1.35E-01	3.59E-08	4.77E-03	7.33E-03	0.00E+00
Am-243	5.95E-03	2.77E-06	3.25E-03	3.16E-02	3.96E-01	1.51E-06	1.41E-02	2.17E-02	0.00E+00
C-14	4.68E-10	4.68E-10	4.68E-10	4.68E-10	4.68E-10	4.68E-10	4.68E-10	4.68E-10	0.00E+00
Cd-113m	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cl-36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-242	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-243	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-244	2.72E-01	1.78E-05	3.30E-01	1.60E+00	2.00E+01	1.73E-05	8.17E-01	1.15E+00	0.00E+00
Cm-245	1.06E-04	2.10E-08	5.66E-05	5.63E-04	7.04E-03	1.16E-08	2.50E-04	3.87E-04	0.00E+00
Cm-246	1.79E-05	2.14E-09	9.73E-06	9.52E-05	1.19E-03	1.21E-09	4.25E-05	6.53E-05	0.00E+00
Cm-247	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co-60	2.84E-05	1.10E-04	2.06E-03	1.03E-04	8.06E-05	9.67E-05	2.15E-04	3.53E-04	0.00E+00
Cs-134	2.55E-05	2.12E-05	2.32E-05	2.32E-05	2.16E-05	2.18E-05	2.73E-05	2.45E-05	0.00E+00
Cs-135	4.01E-09	4.01E-09	4.72E-09	4.01E-09	4.01E-09	4.01E-09	4.01E-09	4.11E-09	0.00E+00
Cs-137	9.80E-03	8.77E-03	9.86E-03	9.28E-03	8.88E-03	8.87E-03	1.02E-02	9.65E-03	0.00E+00
Eu-154	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Eu-155	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H-3	6.35E-05	6.35E-05	6.35E-05	6.35E-05	6.35E-05	6.35E-05	6.35E-05	6.35E-05	0.00E+00
I-129	4.51E-08	1.08E-07	1.83E-07	7.27E-08	7.16E-08	8.10E-04	6.12E-08	2.43E-05	0.00E+00
Kr-85	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nb-93m	1.29E-08	1.35E-09	1.99E-06	8.81E-09	2.30E-08	9.40E-10	1.22E-08	2.44E-07	0.00E+00
Nb-94	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ni-59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ni-63	3.57E-05	3.57E-05	1.33E-04	3.57E-05	3.57E-05	3.57E-05	3.73E-05	3.65E-05	0.00E+00
Np-237	1.13E-04	6.45E-08	6.15E-05	1.00E-03	1.25E-02	5.12E-08	8.94E-05	5.58E-04	0.00E+00
Pa-231	4.28E-11	5.45E-11	4.63E-06	4.32E-06	5.40E-05	4.74E-11	1.78E-09	2.15E-06	0.00E+00
Pb-210	4.66E-13	4.66E-13	4.66E-13	5.50E-12	8.02E-11	4.66E-13	6.88E-12	5.38E-12	0.00E+00
Pd-107	9.97E-13	9.97E-13	3.01E-08	5.39E-12	1.43E-11	9.97E-13	2.27E-10	3.64E-09	0.00E+00
Pm-147	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pu-238	1.21E+00	4.34E-05	1.39E+01	6.59E+00	8.24E+01	4.17E-05	3.04E+00	4.60E+00	0.00E+00
Pu-239	1.30E-01	3.76E-06	1.32E+00	6.90E-01	8.61E+00	3.69E-06	3.09E-01	4.74E-01	0.00E+00
Pu-240	1.94E-01	5.81E-06	1.97E+00	1.03E+00	1.29E+01	5.53E-06	4.62E-01	7.09E-01	0.00E+00
Pu-241	5.78E-01	2.60E-05	2.70E+00	2.85E+00	3.56E+01	1.05E-05	1.11E+00	1.89E+00	0.00E+00
Pu-242	6.09E-04	1.90E-08	6.19E-03	3.24E-03	4.05E-02	1.77E-08	1.45E-03	2.24E-03	0.00E+00
Ra-226	3.38E-13	3.38E-13	5.33E-11	2.20E-12	2.51E-11	3.38E-13	3.54E-13	7.69E-12	0.00E+00
Ra-228	5.79E-09	5.82E-09	2.29E-07	2.34E-08	2.06E-07	5.79E-09	5.92E-09	4.08E-08	0.00E+00
Ru-106	1.06E-07	1.05E-07	7.99E-06	1.05E-07	1.05E-07	1.05E-07	1.30E-07	9.91E-07	0.00E+00
Sb-125	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Se-79	2.82E-09	2.82E-09	4.08E-08	2.82E-09	2.82E-09	2.82E-09	1.76E-08	1.11E-08	0.00E+00
Sm-147	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sm-151	5.81E-10	2.07E-09	4.54E-05	1.53E-04	1.92E-03	1.84E-10	1.05E-04	1.13E-04	0.00E+00
Sn-126	7.51E-08	7.41E-08	7.94E-07	2.95E-07	6.20E-07	6.88E-08	9.25E-08	1.41E-07	0.00E+00
Sr-90	2.22E-03	2.22E-03	2.40E+00	2.83E-01	6.11E-01	2.22E-03	4.82E-03	2.95E-01	0.00E+00
Tc-99	6.53E-09	6.53E-09	2.41E-06	6.53E-09	6.53E-09	1.75E-07	9.05E-08	3.25E-07	0.00E+00
Th-229	2.34E-08	2.34E-08	1.69E-05	9.77E-06	1.21E-04	2.34E-08	5.99E-08	4.93E-06	0.00E+00
Th-230	2.39E-10	2.39E-10	1.76E-07	1.01E-07	1.26E-06	2.39E-10	6.15E-10	5.15E-08	0.00E+00
Th-232	2.29E-09	2.32E-09	2.83E-06	2.69E-06	3.34E-05	2.24E-09	5.62E-09	1.33E-06	0.00E+00
U-232	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
U-233	8.33E-08	8.33E-08	9.97E-04	2.34E-06	3.67E-05	8.33E-08	3.08E-06	1.20E-04	0.00E+00
U-234	7.86E-08	7.86E-08	9.37E-04	2.19E-06	3.43E-05	7.86E-08	2.91E-06	1.13E-04	0.00E+00
U-235	8.43E-09	8.46E-09	9.81E-05	2.34E-07	3.59E-06	8.43E-09	3.05E-07	1.18E-05	0.00E+00
U-236	7.05E-08	7.05E-08	8.39E-04	1.96E-06	3.09E-05	7.05E-08	2.61E-06	1.01E-04	0.00E+00
U-238	6.21E-08	6.21E-08	7.41E-04	1.83E-06	2.72E-05	6.18E-08	2.29E-06	8.91E-05	0.00E+00
Zr-93	4.25E-10	9.13E-10	1.70E-06	3.45E-06	4.25E-05	3.40E-10	3.38E-09	1.69E-06	0.00E+00
crud									
Co-60 (crud)	2.21E-02	8.53E-02	1.60E+00	7.97E-02	6.26E-02	7.51E-02	1.67E-01	2.74E-01	0.00E+00
Fe-55 (crud)	1.53E-02	1.49E-02	3.10E-02	1.51E-02	1.50E-02	1.58E-02	3.54E-02	2.12E-02	0.00E+00
total	3.78E+00	1.12E-01	2.50E+01	2.04E+01	2.50E+02	1.03E-01	9.20E+00	1.44E+01	0.00E+00

SHIPPINGPORT PWR CORE II [193]			No HEPAs						
non-metal	intact								
	air submersion doses [rem]								
	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	7.52E-16	8.93E-16	6.78E-16	5.90E-16	2.08E-15	7.32E-16	6.38E-16	7.50E-16	6.59E-15
Am-241	1.06E-07	1.32E-07	8.33E-08	6.44E-08	3.55E-07	9.67E-08	7.83E-08	1.01E-07	1.58E-07
Am-242m	7.27E-12	1.15E-11	3.29E-12	3.29E-12	1.52E-11	5.65E-12	3.71E-12	6.07E-12	2.60E-11
Am-243	1.20E-09	1.43E-09	1.05E-09	8.50E-10	4.09E-09	1.15E-09	9.81E-10	1.19E-09	1.51E-09
C-14	6.45E-16	8.77E-16	3.81E-16	3.01E-16	1.76E-15	5.45E-16	3.83E-16	5.58E-16	6.05E-13
Cd-113m	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cl-36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-242	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-243	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-244	3.54E-10	6.83E-10	3.63E-11	7.49E-11	4.53E-10	2.15E-10	9.29E-11	2.52E-10	2.01E-09
Cm-245	3.66E-11	4.30E-11	3.43E-11	2.99E-11	1.11E-10	3.63E-11	3.21E-11	3.74E-11	5.06E-11
Cm-246	1.00E-14	1.93E-14	1.12E-15	2.17E-15	1.31E-14	6.14E-15	2.68E-15	7.16E-15	5.61E-14
Cm-247	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co-60	2.21E-06	2.49E-06	2.22E-06	2.21E-06	3.19E-06	2.28E-06	2.15E-06	2.28E-06	2.60E-06
Cs-134	4.36E-07	4.97E-07	4.34E-07	4.24E-07	7.07E-07	4.46E-07	4.16E-07	4.46E-07	5.57E-07
Cs-135	6.31E-15	8.27E-15	4.21E-15	3.35E-15	1.82E-14	5.52E-15	4.11E-15	5.67E-15	9.10E-12
Cs-137	8.96E-05	1.02E-04	8.90E-05	8.67E-05	1.47E-04	9.15E-05	8.52E-05	9.15E-05	1.47E-04
Eu-154	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Eu-155	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H-3	0.00E+00	0.00E+00	3.03E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.65E-09	0.00E+00
I-129	7.53E-10	1.04E-09	3.34E-10	2.56E-10	1.71E-09	6.02E-10	3.59E-10	5.92E-10	1.71E-09
Kr-85	1.29E-05	1.47E-05	1.25E-05	1.20E-05	2.42E-05	1.30E-05	1.20E-05	1.31E-05	1.45E-03
Nb-93m	5.88E-13	1.22E-12	2.37E-14	1.10E-13	6.42E-13	3.18E-13	1.26E-13	4.12E-13	3.97E-12
Nb-94	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ni-59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ni-63	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Np-237	1.19E-11	1.45E-11	1.03E-11	8.82E-12	3.67E-11	1.14E-11	9.75E-12	1.18E-11	1.77E-11
Pa-231	3.19E-14	3.71E-14	3.02E-14	2.83E-14	6.78E-14	3.17E-14	2.87E-14	3.20E-14	4.55E-14
Pb-210	2.73E-19	3.60E-19	1.87E-19	1.38E-19	8.59E-19	2.39E-19	1.80E-19	2.48E-19	5.64E-19
Pd-107	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pm-147	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pu-238	8.54E-10	1.65E-09	1.38E-10	2.19E-10	1.21E-09	5.22E-10	2.59E-10	6.35E-10	5.33E-09
Pu-239	5.93E-11	9.26E-11	3.25E-11	3.27E-11	1.16E-10	4.76E-11	3.51E-11	5.20E-11	2.28E-10
Pu-240	1.17E-10	2.26E-10	2.00E-11	3.03E-11	1.70E-10	7.19E-11	3.60E-11	8.71E-11	7.19E-10
Pu-241	1.83E-10	2.21E-10	1.65E-10	1.43E-10	5.58E-10	1.78E-10	1.55E-10	1.85E-10	2.98E-10
Pu-242	3.23E-13	6.23E-13	5.86E-14	8.65E-14	4.78E-13	2.01E-13	1.02E-13	2.43E-13	1.98E-12
Ra-226	3.06E-18	3.52E-18	2.93E-18	2.69E-18	7.91E-18	3.07E-18	2.78E-18	3.13E-18	4.77E-18
Ra-228	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ru-106	2.33E-10	2.68E-10	2.33E-10	2.25E-10	3.97E-10	2.38E-10	2.22E-10	2.40E-10	2.51E-09
Sb-125	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Se-79	4.33E-15	5.83E-15	2.63E-15	2.08E-15	1.20E-14	3.69E-15	2.62E-15	3.78E-15	4.63E-12
Sm-147	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sm-151	2.17E-12	3.68E-12	2.96E-13	4.73E-13	2.97E-12	1.50E-12	6.23E-13	1.51E-12	7.95E-12
Sn-126	1.19E-09	1.36E-09	1.18E-09	1.14E-09	2.07E-09	1.21E-09	1.13E-09	1.22E-09	2.06E-09
Sr-90	1.96E-08	2.40E-08	1.63E-08	1.37E-08	5.76E-08	1.85E-08	1.54E-08	1.90E-08	2.32E-05
Tc-99	7.55E-13	9.55E-13	5.60E-13	4.56E-13	2.24E-12	6.81E-13	5.38E-13	7.03E-13	1.19E-09
Th-229	9.61E-14	1.13E-13	8.93E-14	7.73E-14	2.93E-13	9.44E-14	8.34E-14	9.77E-14	1.38E-13
Th-230	3.16E-17	4.18E-17	2.51E-17	2.15E-17	9.30E-17	2.87E-17	2.41E-17	3.06E-17	7.93E-17
Th-232	8.43E-17	1.23E-16	5.75E-17	4.98E-17	2.35E-16	7.13E-17	5.72E-17	7.87E-17	3.11E-16
U-232	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
U-233	1.67E-13	2.19E-13	1.33E-13	1.22E-13	4.06E-13	1.53E-13	1.29E-13	1.61E-13	4.50E-13
U-234	8.30E-14	1.36E-13	4.14E-14	3.97E-14	1.88E-13	6.32E-14	4.53E-14	7.20E-14	4.01E-13
U-235	7.53E-12	8.66E-12	7.21E-12	6.57E-12	1.96E-11	7.53E-12	6.80E-12	7.69E-12	9.22E-12
U-236	5.45E-14	9.83E-14	1.95E-14	2.08E-14	1.06E-13	3.74E-14	2.41E-14	4.48E-14	3.19E-13
U-238	3.67E-14	7.14E-14	8.33E-15	1.04E-14	6.19E-14	2.27E-14	1.26E-14	2.85E-14	2.43E-13
Zr-93	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
crud									
Co-60 (crud)	5.71E-03	6.45E-03	5.75E-03	5.71E-03	8.26E-03	5.89E-03	5.57E-03	5.85E-03	6.73E-03
Fe-55 (crud)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
total	5.81E-03	6.57E-03	5.86E-03	5.81E-03	8.44E-03	6.00E-03	5.67E-03	5.95E-03	8.35E-03

SHIPPINGPORT PWR CORE II [193]			HEPAs						
non-metal	intact								
	Inhalation doses [rem]								
	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	7.93E-10	1.33E-13	3.09E-09	5.15E-09	6.43E-08	7.20E-14	2.95E-09	3.63E-09	0.00E+00
Am-241	4.01E-04	3.30E-08	2.27E-04	2.15E-03	2.68E-02	1.97E-08	9.85E-04	1.48E-03	0.00E+00
Am-242m	6.14E-07	2.64E-11	8.03E-08	3.23E-06	4.05E-05	1.08E-11	1.43E-06	2.20E-06	0.00E+00
Am-243	1.78E-06	8.32E-10	9.75E-07	9.47E-06	1.19E-04	4.54E-10	4.24E-06	6.52E-06	0.00E+00
C-14	1.40E-13	1.40E-13	1.40E-13	1.40E-13	1.40E-13	1.40E-13	1.40E-13	1.40E-13	0.00E+00
Cd-113m	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cl-36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-242	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-243	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-244	8.15E-05	5.33E-09	9.90E-05	4.81E-04	6.00E-03	5.18E-09	2.45E-04	3.44E-04	0.00E+00
Cm-245	3.18E-08	6.31E-12	1.70E-08	1.89E-07	2.11E-06	3.47E-12	7.51E-08	1.16E-07	0.00E+00
Cm-246	5.36E-09	6.42E-13	2.92E-09	2.86E-08	3.56E-07	3.63E-13	1.27E-08	1.96E-08	0.00E+00
Cm-247	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co-60	8.53E-09	3.30E-08	6.18E-07	3.08E-08	2.42E-08	2.90E-08	6.45E-08	1.06E-07	0.00E+00
Cs-134	2.55E-05	2.12E-05	2.32E-05	2.32E-05	2.16E-05	2.18E-05	2.73E-05	2.45E-05	0.00E+00
Cs-135	4.01E-09	4.01E-09	4.72E-09	4.01E-09	4.01E-09	4.01E-09	4.01E-09	4.11E-09	0.00E+00
Cs-137	9.80E-03	8.77E-03	9.86E-03	9.28E-03	8.88E-03	8.87E-03	1.02E-02	9.65E-03	0.00E+00
Eu-154	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Eu-155	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H-3	6.35E-05	6.35E-05	6.35E-05	6.35E-05	6.35E-05	6.35E-05	6.35E-05	6.35E-05	0.00E+00
I-129	4.51E-08	1.08E-07	1.63E-07	7.27E-08	7.16E-08	8.10E-04	6.12E-08	2.43E-05	0.00E+00
Kr-85	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nb-93m	3.86E-12	4.04E-13	5.98E-10	2.64E-12	6.89E-12	2.82E-13	3.66E-12	7.33E-11	0.00E+00
Nb-94	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ni-59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ni-63	1.07E-08	1.07E-08	4.00E-08	1.07E-08	1.07E-08	1.07E-08	1.12E-08	1.09E-08	0.00E+00
Np-237	3.39E-08	1.94E-11	1.84E-08	3.00E-07	3.75E-06	1.54E-11	2.68E-08	1.67E-07	0.00E+00
Pa-231	1.28E-14	1.64E-14	1.39E-09	1.30E-09	1.62E-08	1.42E-14	5.34E-13	6.46E-10	0.00E+00
Pb-210	1.40E-16	1.40E-16	1.40E-16	1.65E-15	2.41E-14	1.40E-16	2.06E-15	1.61E-15	0.00E+00
Pd-107	2.99E-16	2.99E-16	9.02E-12	1.62E-15	4.30E-15	2.99E-16	6.80E-14	1.09E-12	0.00E+00
Pm-147	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pu-238	3.64E-04	1.30E-08	4.16E-03	1.98E-03	2.47E-02	1.25E-08	9.13E-04	1.38E-03	0.00E+00
Pu-239	3.90E-05	1.13E-09	3.96E-04	2.07E-04	2.58E-03	1.11E-09	9.26E-05	1.42E-04	0.00E+00
Pu-240	5.83E-05	1.74E-09	5.92E-04	3.10E-04	3.87E-03	1.66E-09	1.39E-04	2.13E-04	0.00E+00
Pu-241	1.74E-04	7.79E-09	8.09E-04	8.55E-04	1.07E-02	3.16E-09	3.33E-04	5.67E-04	0.00E+00
Pu-242	1.83E-07	5.71E-12	1.86E-06	9.73E-07	1.22E-05	5.31E-12	4.34E-07	6.71E-07	0.00E+00
Ra-226	1.01E-16	1.01E-16	1.60E-14	6.60E-16	7.54E-15	1.01E-16	1.06E-16	2.31E-15	0.00E+00
Ra-228	1.74E-12	1.75E-12	6.86E-11	7.01E-12	6.18E-11	1.74E-12	1.78E-12	1.22E-11	0.00E+00
Ru-106	3.18E-11	3.16E-11	2.40E-09	3.16E-11	3.16E-11	3.18E-11	3.89E-11	2.97E-10	0.00E+00
Sb-125	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Se-79	8.47E-13	8.47E-13	1.22E-11	8.47E-13	8.47E-13	8.47E-13	5.29E-12	3.32E-12	0.00E+00
Sm-147	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sm-151	1.68E-13	6.22E-13	1.36E-08	4.60E-08	5.77E-07	5.51E-14	3.14E-08	3.38E-08	0.00E+00
Sn-126	2.25E-11	2.22E-11	2.38E-10	8.86E-11	1.86E-10	2.06E-11	2.78E-11	4.24E-11	0.00E+00
Sr-90	6.66E-07	6.66E-07	7.21E-04	8.48E-05	1.83E-04	6.66E-07	1.45E-06	8.85E-05	0.00E+00
Tc-99	1.96E-12	1.96E-12	7.24E-10	1.96E-12	1.96E-12	5.25E-11	2.71E-11	9.76E-11	0.00E+00
Th-229	7.03E-12	7.03E-12	5.07E-09	2.93E-09	3.64E-08	7.03E-12	1.80E-11	1.48E-09	0.00E+00
Th-230	7.17E-14	7.17E-14	5.27E-11	3.04E-11	3.79E-10	7.17E-14	1.84E-13	1.55E-11	0.00E+00
Th-232	6.87E-13	6.96E-13	8.48E-10	8.06E-10	1.00E-08	6.71E-13	1.69E-12	4.00E-10	0.00E+00
U-232	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
U-233	2.50E-11	2.50E-11	2.99E-07	7.01E-10	1.10E-08	2.50E-11	9.25E-10	3.60E-08	0.00E+00
U-234	2.36E-11	2.36E-11	2.81E-07	6.58E-10	1.03E-08	2.36E-11	8.73E-10	3.38E-08	0.00E+00
U-235	2.53E-12	2.54E-12	2.94E-08	7.02E-11	1.08E-09	2.53E-12	9.16E-11	3.54E-09	0.00E+00
U-236	2.12E-11	2.12E-11	2.52E-07	5.89E-10	9.28E-09	2.12E-11	7.83E-10	3.03E-08	0.00E+00
U-238	1.86E-11	1.86E-11	2.22E-07	5.50E-10	8.17E-09	1.85E-11	6.87E-10	2.67E-08	0.00E+00
Zr-93	1.28E-13	2.74E-13	5.11E-10	1.04E-09	1.28E-08	1.02E-13	1.01E-12	5.08E-10	0.00E+00
crud									
Co-60 (crud)	6.62E-06	2.56E-05	4.80E-04	2.39E-05	1.88E-05	2.25E-05	5.01E-05	8.22E-05	0.00E+00
Fe-55 (crud)	4.59E-06	4.46E-06	9.30E-06	4.53E-06	4.51E-06	4.75E-06	1.06E-05	6.37E-06	0.00E+00
total	1.10E-02	8.88E-03	1.75E-02	1.55E-02	8.40E-02	9.79E-03	1.30E-02	1.41E-02	0.00E+00

SHIPPINGPORT PWR CORE II [193]			HEPAs						
non-metal	intact								
	air submersion doses [rem]								
	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	2.26E-19	2.88E-19	2.03E-19	1.77E-19	6.23E-19	2.20E-19	1.92E-19	2.25E-19	1.98E-18
Am-241	3.18E-11	3.97E-11	2.50E-11	1.93E-11	1.06E-10	2.90E-11	2.35E-11	3.03E-11	4.74E-11
Am-242m	2.18E-15	3.45E-15	9.87E-16	9.87E-16	4.56E-15	1.69E-15	1.11E-15	1.82E-15	7.81E-15
Am-243	3.60E-13	4.29E-13	3.16E-13	2.55E-13	1.23E-12	3.44E-13	2.94E-13	3.58E-13	4.52E-13
C-14	1.93E-19	2.63E-19	1.14E-19	9.04E-20	5.27E-19	1.64E-19	1.15E-19	1.67E-19	1.82E-18
Cd-113m	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cl-36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-242	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-243	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-244	1.06E-13	2.05E-13	1.09E-14	2.25E-14	1.36E-13	6.45E-14	2.79E-14	7.56E-14	6.02E-13
Cm-245	1.10E-14	1.29E-14	1.03E-14	8.98E-15	3.34E-14	1.09E-14	9.63E-15	1.12E-14	1.52E-14
Cm-246	3.01E-18	5.78E-18	3.37E-19	6.51E-19	3.94E-18	1.84E-18	8.05E-19	2.15E-18	1.68E-17
Cm-247	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co-60	6.62E-10	7.48E-10	6.67E-10	6.62E-10	9.58E-10	6.83E-10	6.46E-10	6.78E-10	7.80E-10
Cs-134	4.36E-07	4.97E-07	4.34E-07	4.24E-07	7.07E-07	4.46E-07	4.16E-07	4.46E-07	5.57E-07
Cs-135	6.31E-15	8.27E-15	4.21E-15	3.35E-15	1.82E-14	5.52E-15	4.11E-15	5.67E-15	9.10E-12
Cs-137	8.96E-05	1.02E-04	8.90E-05	8.67E-05	1.47E-04	9.15E-05	8.52E-05	9.15E-05	1.47E-04
Eu-154	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Eu-155	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H-3	0.00E+00	0.00E+00	3.03E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.65E-09	0.00E+00
I-129	7.53E-10	1.04E-09	3.34E-10	2.56E-10	1.71E-09	6.02E-10	3.59E-10	5.92E-10	1.71E-09
Kr-85	1.29E-05	1.47E-05	1.25E-05	1.20E-05	2.42E-05	1.30E-05	1.20E-05	1.31E-05	1.45E-03
Nb-93m	1.76E-16	3.65E-16	7.10E-18	3.29E-17	1.93E-16	9.55E-17	3.79E-17	1.24E-16	1.19E-15
Nb-94	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ni-59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ni-63	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Np-237	3.58E-15	4.34E-15	3.10E-15	2.65E-15	1.10E-14	3.42E-15	2.92E-15	3.54E-15	5.30E-15
Pa-231	9.56E-18	1.11E-17	9.05E-18	8.49E-18	2.03E-17	9.50E-18	8.61E-18	9.61E-18	1.36E-17
Pb-210	8.18E-23	1.08E-22	5.61E-23	4.15E-23	2.58E-22	7.16E-23	5.40E-23	7.45E-23	1.69E-22
Pd-107	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pm-147	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pu-238	2.58E-13	4.96E-13	4.14E-14	6.56E-14	3.63E-13	1.57E-13	7.77E-14	1.91E-13	1.60E-12
Pu-239	1.78E-14	2.78E-14	9.75E-15	9.82E-15	3.48E-14	1.43E-14	1.05E-14	1.56E-14	6.84E-14
Pu-240	3.50E-14	6.77E-14	6.00E-15	9.08E-15	5.10E-14	2.16E-14	1.08E-14	2.61E-14	2.16E-13
Pu-241	5.49E-14	6.63E-14	4.95E-14	4.30E-14	1.67E-13	5.33E-14	4.65E-14	5.54E-14	8.94E-14
Pu-242	9.69E-17	1.87E-16	1.76E-17	2.60E-17	1.43E-16	6.03E-17	3.05E-17	7.28E-17	5.94E-16
Ra-226	9.19E-22	1.06E-21	8.80E-22	8.06E-22	2.37E-21	9.22E-22	8.33E-22	9.40E-22	1.43E-21
Ra-228	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ru-106	6.99E-14	8.03E-14	6.99E-14	6.75E-14	1.19E-13	7.13E-14	6.66E-14	7.20E-14	7.54E-13
Sb-125	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Se-79	1.30E-18	1.75E-18	7.90E-19	6.25E-19	3.59E-18	1.11E-18	7.86E-19	1.13E-18	1.39E-15
Sm-147	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sm-151	6.52E-16	1.10E-15	8.88E-17	1.42E-16	8.90E-16	4.49E-16	1.87E-16	4.53E-16	2.38E-15
Sn-126	3.57E-13	4.08E-13	3.54E-13	3.42E-13	6.20E-13	3.64E-13	3.38E-13	3.65E-13	6.18E-13
Sr-90	5.89E-12	7.19E-12	4.88E-12	4.12E-12	1.73E-11	5.55E-12	4.63E-12	5.70E-12	6.97E-09
Tc-99	2.27E-16	2.86E-16	1.68E-16	1.37E-16	6.73E-16	2.04E-16	1.61E-16	2.11E-16	3.57E-13
Th-229	2.88E-17	3.38E-17	2.68E-17	2.32E-17	8.80E-17	2.83E-17	2.50E-17	2.93E-17	4.14E-17
Th-230	9.49E-21	1.26E-20	7.54E-21	6.44E-21	2.79E-20	8.60E-21	7.23E-21	9.18E-21	2.38E-20
Th-232	2.53E-20	3.68E-20	1.73E-20	1.50E-20	7.04E-20	2.14E-20	1.72E-20	2.36E-20	9.32E-20
U-232	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
U-233	5.00E-17	6.56E-17	3.99E-17	3.67E-17	1.22E-16	4.58E-17	3.87E-17	4.82E-17	1.35E-16
U-234	2.49E-17	4.08E-17	1.24E-17	1.19E-17	5.64E-17	1.89E-17	1.36E-17	2.16E-17	1.20E-16
U-235	2.26E-15	2.60E-15	2.16E-15	1.97E-15	5.89E-15	2.26E-15	2.04E-15	2.31E-15	2.77E-15
U-236	1.63E-17	2.95E-17	5.84E-18	6.25E-18	3.19E-17	1.12E-17	7.24E-18	1.34E-17	9.57E-17
U-238	1.10E-17	2.14E-17	2.50E-18	3.11E-18	1.86E-17	6.82E-18	3.79E-18	8.56E-18	7.30E-17
Zr-93	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
crud									
Co-60 (crud)	1.71E-06	1.94E-06	1.73E-06	1.71E-06	2.48E-06	1.77E-06	1.67E-06	1.75E-06	2.02E-06
Fe-55 (crud)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
total	1.05E-04	1.19E-04	1.04E-04	1.01E-04	1.75E-04	1.07E-04	9.92E-05	1.07E-04	1.60E-03

SHIPPINGPORT PWR CORE II [193] non-metal intact No HEPAs

	Inhalation Dose @ 5000 m [rem]	Dose Term for Regulation	Air Submersion Dose @ 5000 m [rem]	Dose Term for Regulation		Dose Term for Regulation
Gonad	3.78E+00		5.81E-03			
Breast	1.12E-01		6.57E-03			
Lung	2.50E+01		5.86E-03			
R Marrow	2.04E+01		5.81E-03			
B Surface	2.50E+02	<CDE	8.44E-03			
Thyroid	1.03E-01		6.00E-03			
Remainder	9.20E+00		5.67E-03			
Whole Body	1.44E+01	<CEDE	5.95E-03	<DDE	1.44E+01	<TEDE=CEDE+DDE
Skin	0.00E+00	<SKIN	8.35E-03	<SKIN	8.35E-03	<SKIN
Eye Lens	N/A	<EYE	N/A	<EYE	N/A	<EYE
					2.50E+02	<CDE + DDE

SHIPPINGPORT PWR CORE II [193] non-metal intact HEPAs

	Inhalation Dose @ 5000 m [rem]	Dose Term for Regulation	Air Submersion Dose @ 5000 m [rem]	Dose Term for Regulation	Dose for Regulation [rem]	Dose Term for Regulation
Gonad	1.10E-02		1.05E-04			
Breast	8.88E-03		1.19E-04			
Lung	1.75E-02		1.04E-04			
R Marrow	1.55E-02		1.01E-04			
B Surface	8.40E-02	<CDE	1.75E-04			
Thyroid	9.79E-03		1.07E-04			
Remainder	1.30E-02		9.92E-05			
Whole Body	1.41E-02	<CEDE	1.07E-04	<DDE	1.42E-02	<TEDE=CEDE+DDE
Skin	0.00E+00	<SKIN	1.60E-03	<SKIN	1.60E-03	<SKIN
Eye Lens	N/A	<EYE	N/A	<EYE	N/A	<EYE
					8.41E-02	<CDE + DDE

SHIPPINGPORT PWR CORE II [193]

isotope	material type	non-metal offsite doses with no HEPAs [rem] TEDE	non-metal offsite doses with no HEPAs [rem] bone surface CDE + DDE	intact offsite doses with HEPAs [rem] TEDE	intact offsite doses with HEPAs [rem] bone surface CDE + DDE
Ac-227	P	1.21E-05	2.14E-04	3.63E-09	6.43E-08
Am-241	P	4.94E+00	8.93E+01	1.48E-03	2.68E-02
Am-242m	P	7.33E-03	1.35E-01	2.20E-06	4.05E-05
Am-243	P	2.17E-02	3.96E-01	6.52E-06	1.19E-04
C-14	P	4.68E-10	4.68E-10	1.40E-13	1.40E-13
Cd-113m	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cl-36	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-242	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-243	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-244	P	1.15E+00	2.00E+01	3.44E-04	6.00E-03
Cm-245	P	3.87E-04	7.04E-03	1.16E-07	2.11E-06
Cm-246	P	6.53E-05	1.19E-03	1.96E-08	3.58E-07
Cm-247	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co-60	P	3.55E-04	8.29E-05	1.07E-07	2.49E-08
Cs-134	C	2.50E-05	2.20E-05	2.50E-05	2.20E-05
Cs-135	C	4.11E-09	4.01E-09	4.11E-09	4.01E-09
Cs-137	C	9.74E-03	8.97E-03	9.74E-03	8.97E-03
Eu-154	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Eu-155	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fe-55	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H-3	G	6.35E-05	6.35E-05	6.35E-05	6.35E-05
I-129	G	2.43E-05	7.22E-08	2.43E-05	7.22E-08
Kr-85	G	1.31E-05	1.31E-05	1.31E-05	1.31E-05
Nb-93m	P	2.44E-07	2.30E-08	7.33E-11	6.89E-12
Nb-94	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ni-59	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ni-63	P	3.65E-05	3.57E-05	1.09E-08	1.07E-08
Np-237	P	5.58E-04	1.25E-02	1.67E-07	3.75E-06
Pa-231	P	2.15E-06	5.40E-05	6.46E-10	1.62E-08
Pb-210	P	5.38E-12	8.02E-11	1.61E-15	2.41E-14
Pd-107	P	3.64E-09	1.43E-11	1.09E-12	4.30E-15
Pm-147	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pu-238	P	4.60E+00	8.24E+01	1.38E-03	2.47E-02
Pu-239	P	4.74E-01	8.61E+00	1.42E-04	2.58E-03
Pu-240	P	7.09E-01	1.29E+01	2.13E-04	3.87E-03
Pu-241	P	1.89E+00	3.56E+01	5.67E-04	1.07E-02
Pu-242	P	2.24E-03	4.05E-02	6.71E-07	1.22E-05
Ra-226	P	7.69E-12	2.51E-11	2.31E-15	7.54E-15
Ra-228	P	4.08E-08	2.06E-07	1.22E-11	6.18E-11
Ru-106	P	9.91E-07	1.05E-07	2.97E-10	3.16E-11
Sb-125	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Se-79	P	1.11E-08	2.82E-09	3.32E-12	8.47E-13
Sm-147	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sm-151	P	1.13E-04	1.92E-03	3.38E-08	5.77E-07
Sn-126	P	1.43E-07	6.21E-07	4.28E-11	1.86E-10
Sr-90	P	2.95E-01	6.11E-01	8.85E-05	1.83E-04
Tc-99	P	3.25E-07	6.53E-09	9.76E-11	1.96E-12
Th-229	P	4.93E-06	1.21E-04	1.48E-09	3.64E-08
Th-230	P	5.15E-08	1.26E-06	1.55E-11	3.79E-10
Th-232	P	1.33E-06	3.34E-05	4.00E-10	1.00E-08
U-232	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
U-233	P	1.20E-04	3.67E-05	3.60E-08	1.10E-08
U-234	P	1.13E-04	3.43E-05	3.38E-08	1.03E-08
U-235	P	1.18E-05	3.59E-06	3.54E-09	1.08E-09
U-236	P	1.01E-04	3.09E-05	3.03E-08	9.28E-09
U-238	P	8.91E-05	2.72E-05	2.67E-08	8.17E-09
Zr-93	P	1.69E-06	4.25E-05	5.08E-10	1.28E-08
crud					
Co-60 (crud)	crud	2.80E-01	6.84E-02	8.40E-05	2.05E-05
Fe-55 (crud)	crud	2.12E-02	1.50E-02	6.37E-06	4.51E-06
	total	1.44E+01	2.50E+02	1.42E-02	8.41E-02

SHIPPINGPORT PWR CORE II [193] non-metal intact

TEDE (no HEPAs)

material type		subtotal [rem]	fraction of total [-]
G		1.01E-04	7.02E-06
P		1.41E+01	9.78E-01
C		9.77E-03	6.79E-04
crud		3.01E-01	2.09E-02
	total	1.44E+01	1.00E+00

TEDE (HEPAs)

material type		subtotal [rem]	fraction of total [-]
G		1.01E-04	7.12E-03
P		4.22E-03	2.98E-01
C		9.77E-03	6.89E-01
crud		9.03E-05	6.37E-03
	total	1.42E-02	1.00E+00

bone surface CDE + DDE (no HEPAs)

material type		subtotal [rem]	fraction of total [-]
G		7.69E-05	3.07E-07
P		2.50E+02	1.00E+00
C		8.99E-03	3.60E-05
crud		8.35E-02	3.34E-04
	total	2.50E+02	1.00E+00

bone surface CDE + DDE (HEPAs)

material type		subtotal [rem]	fraction of total [-]
G		7.67E-05	9.12E-04
P		7.50E-02	8.92E-01
C		8.99E-03	1.07E-01
crud		2.50E-05	2.98E-04
	total	8.41E-02	1.00E+00

Attachment VI

Calculations for Saxton (MOX) [787] DOE SNF

	evaluated fuel				x				evaluated fuel
	fuel type	stable metal	stable metal	non-metal	non-metal	other	other		non-metal
	condition	intact	not intact	intact	not intact	intact	not intact		not intact
	fuel name	HWCTR (U/TH) [112]	ALUM CLAD SNF [411]	SHIPPINGPORT PWR CORE II [193]	SAXTON (MOX) [787]	EBWR (U METAL) LEU [64]	N REACTOR [147]		SAXTON (MOX) [787]
	# of canisters	0.17	1.00	24.00	1.00	10.50	194.95		1.00
Isotopes	material type	Curies (entire fuel inventory)							Curies
Ac-227	P	9.27E-09	2.81E-07	1.24E-02	1.33E-05	3.38E-05	1.03E-02		1.33E-05
Am-241	P	1.22E-01	2.51E+01	7.61E+04	6.45E+03	1.63E+04	2.80E+05		6.45E+03
Am-242m	P	8.67E-05	9.69E-03	1.18E+02	1.07E+01	2.71E+01	7.96E+00		1.07E+01
Am-243	P	2.85E-04	2.40E-02	3.38E+02	2.83E+01	7.18E+01	4.10E+01		2.83E+01
C-14	P	1.09E-06	1.17E-05	1.53E+00	1.81E+00	4.59E+00	3.63E+02		1.81E+00
Cd-113m	P	6.32E-02	7.25E-01	0.00E+00	2.59E+01	6.56E+01	0.00E+00		2.59E+01
Cl-36	P	2.51E-30	0.00E+00	0.00E+00	2.35E-02	5.96E-02	0.00E+00		2.35E-02
Cm-242	P	2.62E-04	8.00E-03	0.00E+00	8.79E+00	2.23E+01	0.00E+00		8.79E+00
Cm-243	P	4.52E-05	3.29E-03	0.00E+00	1.60E+01	4.06E+01	0.00E+00		1.60E+01
Cm-244	P	9.94E-03	4.27E-01	3.16E+04	9.29E+02	2.36E+03	2.44E+03		9.29E+02
Cm-245	P	5.84E-07	1.33E-05	5.82E+00	2.12E-01	5.37E-01	5.13E-01		2.12E-01
Cm-246	P	3.99E-08	9.83E-07	9.89E-01	4.28E-02	1.08E-01	6.79E-02		4.28E-02
Cm-247	P	4.17E-14	0.00E+00		1.12E-07	2.83E-07			1.12E-07
Co-60	P	7.30E-03	1.81E-09	1.10E+04	2.12E+01	5.38E+01	4.75E+02		2.12E+01
Cs-134	C	9.30E+01	2.05E+02	3.63E+03	1.24E+01	3.13E+01	1.63E+02		1.24E+01
Cs-135	C	6.58E-04	1.24E-02	6.19E+00	6.65E-01	1.69E+00	4.00E+01		6.65E-01
Cs-137	C	5.49E+02	8.60E+03	2.07E+06	1.00E+05	2.53E+05	5.34E+06		1.00E+05
Eu-154	P	1.57E+01	9.08E+01	0.00E+00	1.84E+03	4.67E+03	0.00E+00		1.84E+03
Eu-155	P	7.47E+00	2.81E+01	0.00E+00	1.92E+02	4.88E+02	0.00E+00		1.92E+02
Fe-55	P	1.29E+00	0.00E+00	0.00E+00	1.76E-01	4.45E-01	0.00E+00		1.76E-01
H-3	G	2.02E+00	2.61E+01	5.09E+03	2.92E+02	7.41E+02	1.03E+04		2.92E+02
I-129	G	1.44E-04	2.54E-03	7.20E-01	6.09E-02	1.54E-01	3.29E+00		6.09E-02
Kr-85	G	5.46E+01	6.45E+02	5.07E+04	2.59E+03	6.56E+03	1.53E+05		2.59E+03
Nb-93m	P	2.82E-03	4.96E-02	5.72E+01	2.82E+00	7.15E+00	4.54E+02		2.82E+00
Nb-94	P	1.37E-07	4.96E-06	0.00E+00	5.18E-02	1.31E-01	6.71E-05		5.18E-02
Ni-59	P	2.43E-04	0.00E+00	0.00E+00	4.01E-02	1.02E-01	2.03E+01		4.01E-02
Ni-63	P	3.69E-02	0.00E+00	8.04E+04	4.42E+00	1.12E+01	2.21E+03		4.42E+00
Np-237	P	1.82E-03	1.20E-02	7.06E+00	6.46E-01	1.64E+00	3.87E+01		6.46E-01
Pa-231	P	9.79E-08	1.88E-06	1.15E-02	3.02E-05	7.65E-05	1.38E-02		3.02E-05
Pb-210	P	1.04E-10	1.44E-11	2.71E-06	5.13E-08	1.30E-07	7.52E-08		5.13E-08
Pd-107	P	9.52E-05	2.35E-03	1.95E+00	2.14E-01	5.42E-01	7.46E+00		2.14E-01
Pm-147	P	4.86E+02	2.47E+03	0.00E+00	9.36E+01	2.37E+02	0.00E+00		9.36E+01
Pu-238	P	7.65E+02	2.20E+01	8.02E+04	5.66E+02	1.18E+04	6.37E+04		5.66E+02
Pu-239	P	1.59E+01	1.49E+01	7.55E+03	9.81E+01	2.05E+03	1.23E+05		9.81E+01
Pu-240	P	9.08E+00	1.07E+01	1.13E+04	1.70E+02	3.54E+03	7.18E+04		1.70E+02
Pu-241	P	2.56E+03	1.22E+03	1.57E+06	9.43E+03	1.97E+05	2.06E+06		9.43E+03
Pu-242	P	1.35E-02	1.04E-02	3.73E+01	4.84E-01	1.01E+01	3.46E+01		4.84E-01
Ra-226	P	1.93E-09	1.53E-10	6.13E-06	2.46E-07	6.22E-07	1.15E-03		2.46E-07
Ra-228	P	1.74E-13	8.44E-12	5.85E-02	2.80E-07	7.11E-07	1.03E-06		2.80E-07
Ru-106	P	3.64E+01	2.97E+01	1.42E+01	1.17E-03	2.97E-03	3.16E-01		1.17E-03
Sb-125	P	1.20E+01	0.00E+00	0.00E+00	1.70E+01	4.30E+01	0.00E+00		1.70E+01
Se-79	P	2.47E-03	6.93E-02	7.69E+00	7.90E-01	2.00E+00	4.48E+01		7.90E-01
Sm-147	P	3.48E-08	8.28E-07	0.00E+00	9.01E-06	2.28E-05	0.00E+00		9.01E-06
Sm-151	P	2.16E+00	2.67E+01	2.58E+04	5.86E+02	1.48E+03	8.55E+04		5.86E+02
Sn-126	P	2.21E-03	2.72E-02	9.72E+00	1.50E+00	3.80E+00	7.83E+01		1.50E+00
Sr-90	P	5.25E+02	8.16E+03	1.56E+06	6.87E+04	1.74E+05	4.03E+06		6.87E+04
Tc-99	P	8.07E-02	1.44E+00	2.67E+02	2.51E+01	6.37E+01	1.51E+03		2.51E+01
Th-229	P	[illegible]E-08	8.09E-10	1.57E-02	4.93E-07	1.03E-05	9.31E-06		4.93E-07
Th-230	P	3.27E-04	7.96E-08	1.08E-03	8.39E-06	1.75E-04	1.02E-03		8.39E-06
Th-232	P	1.49E-10	1.99E-11	5.56E-03	4.58E-08	9.56E-07	1.21E-07		4.58E-08
U-232	P	4.47E-03	1.11E-04	0.00E+00	4.23E-03	8.82E-02	0.00E+00		4.23E-03
U-233	P	6.56E-05	1.18E-06	6.07E+00	1.70E-04	3.55E-03	5.71E-03		1.70E-04
U-234	P	6.83E+00	1.17E-03	5.82E+00	5.70E-02	1.19E+00	4.85E+02		5.70E-02
U-235	P	1.34E-01	8.48E-03	6.58E-01	5.12E-03	1.07E-01	1.85E+01		5.12E-03
U-236	P	5.77E-01	3.95E-02	5.50E+00	7.81E-02	1.63E+00	7.02E+01		7.81E-02
U-238	P	2.22E-03	1.04E-02	5.15E+00	9.65E-02	2.01E+00	3.82E+02		9.65E-02
Zr-93	P	1.27E-02	1.40E-01	3.61E+01	3.72E+00	9.42E+00	2.10E+02		3.72E+00
crud (per canister)									
Co-60 (crud)		1.56E+01	6.37E+00	2.68E+02	1.23E+02	7.70E+02	1.76E+03		1.23E+02
Fe-55 (crud)		9.85E+01	4.01E+01	1.69E+03	7.73E+02	4.85E+03	1.11E+04		7.73E+02

Release Fractions				
Material Type	ARF	RF	Total Release Fraction	HEPA Filter LPF
stable metal/ intact				
G	0.3	1.0	3.00E-01	1.0
P	2.00E-04	4.00E-03	8.00E-07	3.00E-04
C	2.00E-04	1.0	2.00E-04	1.0
stable metal/not intact				
G	0.3	1.0	0.3	1.0
P	5.00E-03	0.4	2.00E-03	3.00E-04
C	5.00E-03	1.0	5.00E-03	1.0
non-metal/intact				
G	0.3	1.0	0.3	1.0
P	2.25E-04	1.0	2.25E-04	3.00E-04
C	2.25E-04	1.0	2.25E-04	1.0
non-metal/not intact				
G	0.3	1.0	0.3	1.0
P	5.00E-03	0.4	2.00E-03	3.00E-04
C	5.00E-03	1.0	5.00E-03	1.0
other/intact				
G	0.3	1.0	0.3	1.0
P	1.00E-03	1.0	1.00E-03	3.00E-04
C	1.00E-03	1.0	1.00E-03	1.0
other/not intact				
G	0.3	1.0	0.3	1.0
P	5.00E-03	0.4	2.00E-03	3.00E-04
C	5.00E-03	1.0	5.00E-03	1.0
crud				
crud	1.0	0.3	3.00E-01	3.00E-04
SAXTON (MOX) [787]				
non-metal				
not intact				
Release Fractions Used in this Calculation				
G	0.3	1.0	0.3	1.0
P	5.00E-03	4.00E-01	2.00E-03	3.00E-04
C	5.00E-03	1.00E+00	5.00E-03	1.00E+00
crud	1.0	0.3	0.3	3.00E-04
breathing rate	3.33E-04	[m^3/s]		
gound level dispersion factor				
distance [m]	x/Q [sec/m^3]			
5000	4.68E-05	99.5% worst-sector		
3.70E+12	unit conversion factor			
	Sv/Bq to rem/Ci			

	Inhalation DCFs [Sv/Bq]								
Isotopes	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	3.96E-04	6.66E-08	1.54E-03	2.57E-03	3.21E-02	3.59E-08	1.47E-03	1.81E-03	0.00E+00
Am-241	3.25E-05	2.67E-09	1.84E-05	1.74E-04	2.17E-03	1.60E-09	7.82E-05	1.20E-04	0.00E+00
Am-242m	3.21E-05	1.38E-09	4.20E-06	1.69E-04	2.12E-03	5.64E-10	7.48E-05	1.15E-04	0.00E+00
Am-243	3.26E-05	1.52E-08	1.78E-05	1.73E-04	2.17E-03	8.29E-09	7.74E-05	1.19E-04	0.00E+00
C-14	5.64E-10	5.64E-10	5.64E-10	5.64E-10	5.64E-10	5.64E-10	5.64E-10	5.64E-10	0.00E+00
Cd-113m	3.32E-08	3.32E-08	4.09E-07	3.32E-08	3.32E-08	3.32E-08	1.30E-06	4.13E-07	0.00E+00
Cl-36	5.04E-10	5.04E-10	4.56E-08	5.04E-10	5.04E-10	5.04E-10	5.36E-10	5.93E-09	0.00E+00
Cm-242	5.70E-07	9.44E-10	1.55E-05	3.90E-06	4.87E-05	9.41E-10	2.45E-06	4.67E-06	0.00E+00
Cm-243	2.07E-05	6.29E-09	1.94E-05	1.18E-04	1.47E-03	3.83E-09	5.76E-05	8.30E-05	0.00E+00
Cm-244	1.59E-05	1.04E-09	1.93E-05	9.38E-05	1.17E-03	1.01E-09	4.78E-05	6.70E-05	0.00E+00
Cm-245	3.37E-05	6.69E-09	1.80E-05	1.79E-04	2.24E-03	3.68E-09	7.96E-05	1.23E-04	0.00E+00
Cm-246	3.34E-05	4.00E-09	1.82E-05	1.78E-04	2.22E-03	2.26E-09	7.94E-05	1.22E-04	0.00E+00
Cm-247	3.07E-05	2.23E-08	1.67E-05	1.63E-04	2.04E-03	1.45E-08	7.30E-05	1.12E-04	0.00E+00
Co-60	4.76E-09	1.84E-08	3.45E-07	1.72E-08	1.35E-08	1.62E-08	3.60E-08	5.91E-08	0.00E+00
Cs-134	1.30E-08	1.08E-08	1.18E-08	1.18E-08	1.10E-08	1.11E-08	1.39E-08	1.25E-08	0.00E+00
Cs-135	1.20E-09	1.20E-09	1.41E-09	1.20E-09	1.20E-09	1.20E-09	1.20E-09	1.23E-09	0.00E+00
Cs-137	8.76E-09	7.84E-09	8.82E-09	8.30E-09	7.94E-09	7.93E-09	9.12E-09	8.63E-09	0.00E+00
Eu-154	1.17E-08	1.55E-08	7.92E-08	1.06E-07	5.23E-07	7.14E-09	1.13E-07	7.73E-08	0.00E+00
Eu-155	3.56E-10	6.14E-10	1.19E-08	1.43E-08	1.52E-07	2.40E-10	1.11E-08	1.12E-08	0.00E+00
Fe-55	5.23E-10	5.09E-10	1.06E-09	5.17E-10	5.14E-10	5.42E-10	1.21E-09	7.26E-10	0.00E+00
H-3	1.73E-11	1.73E-11	1.73E-11	1.73E-11	1.73E-11	1.73E-11	1.73E-11	1.73E-11	0.00E+00
I-129	8.69E-11	2.09E-10	3.14E-10	1.40E-10	1.38E-10	1.56E-06	1.18E-10	4.69E-08	0.00E+00
Kr-85	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nb-93m	4.16E-10	4.36E-11	6.45E-08	2.85E-10	7.43E-10	3.04E-11	3.95E-10	7.90E-09	0.00E+00
Nb-94	4.76E-09	2.24E-08	7.48E-07	2.26E-08	1.97E-08	2.22E-08	4.45E-08	1.12E-07	0.00E+00
Ni-59	3.59E-10	3.46E-10	1.20E-09	3.54E-10	3.51E-10	3.77E-10	3.63E-10	3.58E-10	0.00E+00
Ni-63	8.22E-10	8.22E-10	3.07E-09	8.22E-10	8.22E-10	8.22E-10	8.59E-10	8.39E-10	0.00E+00
Np-237	2.96E-05	1.69E-08	1.61E-05	2.62E-04	3.27E-03	1.34E-08	2.34E-05	1.46E-04	0.00E+00
Pa-231	6.90E-09	8.79E-09	7.47E-04	6.97E-04	8.70E-03	7.64E-09	2.87E-07	3.47E-04	0.00E+00
Pb-210	3.18E-07	3.18E-07	3.18E-07	3.75E-06	5.47E-05	3.18E-07	4.69E-06	3.67E-06	0.00E+00
Pd-107	9.45E-13	9.45E-13	2.85E-08	5.11E-12	1.36E-11	9.45E-13	2.15E-10	3.45E-09	0.00E+00
Pm-147	1.88E-14	3.60E-14	7.74E-08	8.16E-09	1.02E-07	1.98E-14	5.89E-09	1.06E-08	0.00E+00
Pu-238	2.80E-05	1.00E-09	3.20E-04	1.52E-04	1.90E-03	9.62E-10	7.02E-05	1.06E-04	0.00E+00
Pu-239	3.18E-05	9.22E-10	3.23E-04	1.69E-04	2.11E-03	9.03E-10	7.56E-05	1.16E-04	0.00E+00
Pu-240	3.18E-05	9.51E-10	3.23E-04	1.69E-04	2.11E-03	9.05E-10	7.56E-05	1.16E-04	0.00E+00
Pu-241	6.82E-07	3.06E-11	3.18E-06	3.36E-06	4.20E-05	1.24E-11	1.31E-06	2.23E-06	0.00E+00
Pu-242	3.02E-05	9.45E-10	3.07E-04	1.61E-04	2.01E-03	8.79E-10	7.18E-05	1.11E-04	0.00E+00
Ra-226	1.02E-07	1.02E-07	1.61E-05	6.64E-07	7.59E-06	1.02E-07	1.07E-07	2.32E-06	0.00E+00
Ra-228	1.83E-07	1.84E-07	7.22E-06	7.38E-07	6.51E-06	1.83E-07	1.87E-07	1.29E-06	0.00E+00
Ru-106	1.38E-08	1.37E-08	1.04E-06	1.37E-08	1.37E-08	1.37E-08	1.69E-08	1.29E-07	0.00E+00
Sb-125	3.60E-10	4.16E-10	2.17E-08	6.49E-10	2.73E-09	3.24E-10	1.45E-09	3.30E-09	0.00E+00
Se-79	6.79E-10	6.79E-10	9.81E-09	6.79E-10	6.79E-10	6.79E-10	4.24E-09	2.66E-09	0.00E+00
Sm-147	0.00E+00	0.00E+00	7.62E-06	2.75E-05	3.44E-04	0.00E+00	1.89E-05	2.02E-05	0.00E+00
Sm-151	4.03E-14	1.49E-13	3.26E-09	1.10E-08	1.38E-07	1.32E-14	7.51E-09	8.10E-09	0.00E+00
Sn-126	1.43E-08	1.41E-08	1.51E-07	5.62E-08	1.18E-07	1.31E-08	1.76E-08	2.69E-08	0.00E+00
Sr-90	2.64E-09	2.64E-09	2.86E-06	3.36E-07	7.27E-07	2.64E-09	5.73E-09	3.51E-07	0.00E+00
Tc-99	4.52E-11	4.52E-11	1.67E-08	4.52E-11	4.52E-11	1.21E-09	6.26E-10	2.25E-09	0.00E+00
Th-229	2.76E-06	2.76E-06	1.99E-03	1.15E-03	1.43E-02	2.76E-06	7.05E-06	5.80E-04	0.00E+00
Th-230	4.08E-07	4.08E-07	3.00E-04	1.73E-04	2.16E-03	4.08E-07	1.05E-06	8.80E-05	0.00E+00
Th-232	7.62E-07	7.72E-07	9.40E-04	8.93E-04	1.11E-02	7.44E-07	1.87E-06	4.43E-04	0.00E+00
U-232	8.00E-08	8.06E-08	1.48E-03	4.06E-06	6.42E-05	7.85E-08	3.11E-06	1.78E-04	0.00E+00
U-233	2.54E-08	2.54E-08	3.04E-04	7.12E-07	1.12E-05	2.54E-08	9.40E-07	3.66E-05	0.00E+00
U-234	2.50E-08	2.50E-08	2.98E-04	6.98E-07	1.09E-05	2.50E-08	9.26E-07	3.58E-05	0.00E+00
U-235	2.37E-08	2.38E-08	2.76E-04	6.58E-07	1.01E-05	2.37E-08	8.59E-07	3.32E-05	0.00E+00
U-236	2.37E-08	2.37E-08	2.82E-04	6.60E-07	1.04E-05	2.37E-08	8.77E-07	3.39E-05	0.00E+00
U-238	2.23E-08	2.23E-08	2.66E-04	6.58E-07	9.78E-06	2.22E-08	8.22E-07	3.20E-05	0.00E+00
Zr-93	2.18E-11	4.68E-11	8.72E-08	1.77E-07	2.18E-06	1.74E-11	1.73E-10	8.67E-08	0.00E+00
crud									
Co-60	4.76E-09	1.84E-08	3.45E-07	1.72E-08	1.35E-08	1.62E-08	3.60E-08	5.91E-08	0.00E+00
Fe-55	5.23E-10	5.09E-10	1.06E-09	5.17E-10	5.14E-10	5.42E-10	1.21E-09	7.26E-10	0.00E+00

	air submersion DCFs [Sv/Bq m^3/s]								
	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	3.75E-17	4.45E-17	3.38E-17	2.94E-17	1.04E-16	3.65E-17	3.18E-17	3.74E-17	3.28E-16
Am-241	8.58E-16	1.07E-15	6.74E-16	5.21E-16	2.87E-15	7.83E-16	6.34E-16	8.16E-16	1.28E-15
Am-242m	3.80E-17	6.01E-17	1.72E-17	1.72E-17	7.94E-17	2.95E-17	1.94E-17	3.17E-17	1.36E-16
Am-243	2.19E-15	2.61E-15	1.92E-15	1.55E-15	7.47E-15	2.09E-15	1.79E-15	2.18E-15	2.75E-15
C-14	2.59E-19	3.52E-19	1.53E-19	1.21E-19	7.06E-19	2.19E-19	1.54E-19	2.24E-19	2.43E-16
Cd-113m	7.17E-18	8.76E-18	5.93E-18	5.01E-18	2.10E-17	6.76E-18	5.63E-18	6.94E-18	8.48E-15
Cl-36	2.24E-17	2.66E-17	2.02E-17	1.81E-17	5.63E-17	2.19E-17	1.92E-17	2.23E-17	1.47E-14
Cm-242	7.83E-18	1.48E-17	1.13E-18	1.89E-18	1.06E-17	4.91E-18	2.27E-18	5.69E-18	4.29E-17
Cm-243	5.77E-15	6.68E-15	5.50E-15	5.00E-15	1.50E-14	5.76E-15	5.19E-15	5.88E-15	9.79E-15
Cm-244	6.90E-18	1.33E-17	7.08E-19	1.46E-18	8.82E-18	4.19E-18	1.81E-18	4.91E-18	3.91E-17
Cm-245	3.88E-15	4.55E-15	3.63E-15	3.17E-15	1.18E-14	3.84E-15	3.40E-15	3.96E-15	5.36E-15
Cm-246	6.24E-18	1.20E-17	7.00E-19	1.35E-18	8.17E-18	3.82E-18	1.67E-18	4.46E-18	3.49E-17
Cm-247	1.47E-14	1.68E-14	1.44E-14	1.38E-14	2.83E-14	1.49E-14	1.38E-14	1.50E-14	1.79E-14
Co-60	1.23E-13	1.39E-13	1.24E-13	1.23E-13	1.78E-13	1.27E-13	1.20E-13	1.26E-13	1.45E-13
Cs-134	7.40E-14	8.43E-14	7.37E-14	7.19E-14	1.20E-13	7.57E-14	7.06E-14	7.57E-14	9.45E-14
Cs-135	6.28E-19	8.23E-19	4.19E-19	3.34E-19	1.81E-18	5.50E-19	4.09E-19	5.65E-19	9.06E-16
Cs-137	2.67E-14	3.05E-14	2.65E-14	2.58E-14	4.38E-14	2.73E-14	2.54E-14	2.73E-14	4.39E-14
Eu-154	6.00E-14	6.81E-14	5.99E-14	5.87E-14	9.43E-14	6.15E-14	5.75E-14	6.14E-14	8.29E-14
Eu-155	2.49E-15	2.95E-15	2.22E-15	1.85E-15	8.09E-15	2.41E-15	2.07E-15	2.49E-15	3.39E-15
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H-3	0.00E+00	0.00E+00	2.75E-18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.31E-19	0.00E+00
I-129	4.83E-16	6.66E-16	2.14E-16	1.64E-16	1.10E-15	3.86E-16	2.30E-16	3.80E-16	1.10E-15
Kr-85	1.17E-16	1.34E-16	1.14E-16	1.09E-16	2.20E-16	1.18E-16	1.09E-16	1.19E-16	1.32E-14
Nb-93m	6.33E-18	1.31E-17	2.55E-19	1.18E-18	6.92E-18	3.43E-18	1.36E-18	4.44E-18	4.28E-17
Nb-94	7.54E-14	8.57E-14	7.51E-14	7.34E-14	1.19E-13	7.72E-14	7.19E-14	7.70E-14	9.52E-14
Ni-59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ni-63	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Np-237	1.04E-15	1.26E-15	9.02E-16	7.69E-16	3.20E-15	9.94E-16	8.50E-16	1.03E-15	1.54E-15
Pa-231	1.71E-15	1.99E-15	1.62E-15	1.52E-15	3.64E-15	1.70E-15	1.54E-15	1.72E-15	2.44E-15
Pb-210	6.19E-17	8.18E-17	4.25E-17	3.14E-17	1.95E-16	5.42E-17	4.09E-17	5.64E-17	1.28E-16
Pd-107	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pm-147	7.48E-19	9.56E-19	5.45E-19	4.46E-19	2.18E-18	6.75E-19	5.26E-19	6.93E-19	8.11E-16
Pu-238	6.56E-18	1.27E-17	1.06E-18	1.68E-18	9.30E-18	4.01E-18	1.99E-18	4.88E-18	4.09E-17
Pu-239	4.84E-18	7.55E-18	2.65E-18	2.67E-18	9.47E-18	3.88E-18	2.86E-18	4.24E-18	1.86E-17
Pu-240	6.36E-18	1.23E-17	1.09E-18	1.65E-18	9.26E-18	3.92E-18	1.96E-18	4.75E-18	3.92E-17
Pu-241	7.19E-20	8.67E-20	6.48E-20	5.63E-20	2.19E-19	6.98E-20	6.09E-20	7.25E-20	1.17E-19
Pu-242	5.34E-18	1.03E-17	9.69E-19	1.43E-18	7.90E-18	3.32E-18	1.68E-18	4.01E-18	3.27E-17
Ra-226	3.08E-16	3.54E-16	2.95E-16	2.70E-16	7.95E-16	3.09E-16	2.79E-16	3.15E-16	4.79E-16
Ra-228	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ru-106	1.01E-14	1.16E-14	1.01E-14	9.75E-15	1.72E-14	1.03E-14	9.63E-15	1.04E-14	1.09E-13
Sb-125	1.96E-14	2.27E-14	1.95E-14	1.87E-14	3.53E-14	2.01E-14	1.86E-14	2.02E-14	2.65E-14
Se-79	3.47E-19	4.67E-19	2.11E-19	1.67E-19	9.60E-19	2.96E-19	2.10E-19	3.03E-19	3.71E-16
Sm-147	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sm-151	5.20E-20	8.80E-20	7.08E-21	1.13E-20	7.09E-20	3.58E-20	1.49E-20	3.61E-20	1.90E-19
Sn-126	7.54E-14	8.62E-14	7.48E-14	7.22E-14	1.31E-13	7.69E-14	7.14E-14	7.71E-14	1.31E-13
Sr-90	7.78E-18	9.49E-18	6.44E-18	5.44E-18	2.28E-17	7.33E-18	6.11E-18	7.53E-18	9.20E-15
Tc-99	1.74E-18	2.20E-18	1.29E-18	1.05E-18	5.17E-18	1.57E-18	1.24E-18	1.62E-18	2.74E-15
Th-229	3.77E-15	4.42E-15	3.50E-15	3.03E-15	1.15E-14	3.70E-15	3.27E-15	3.83E-15	5.41E-15
Th-230	1.80E-17	2.38E-17	1.43E-17	1.22E-17	5.29E-17	1.63E-17	1.37E-17	1.74E-17	4.51E-17
Th-232	9.34E-18	1.36E-17	6.37E-18	5.52E-18	2.60E-17	7.90E-18	6.34E-18	8.72E-18	3.44E-17
U-232	1.55E-17	2.32E-17	9.84E-18	8.99E-18	3.86E-17	1.29E-17	1.00E-17	1.42E-17	5.92E-17
U-233	1.69E-17	2.22E-17	1.35E-17	1.24E-17	4.12E-17	1.55E-17	1.31E-17	1.63E-17	4.57E-17
U-234	8.79E-18	1.44E-17	4.38E-18	4.20E-18	1.99E-17	6.69E-18	4.80E-18	7.63E-18	4.25E-17
U-235	7.05E-15	8.11E-15	6.75E-15	6.15E-15	1.84E-14	7.05E-15	6.37E-15	7.20E-15	8.64E-15
U-236	6.10E-18	1.10E-17	2.18E-18	2.33E-18	1.19E-17	4.19E-18	2.70E-18	5.01E-18	3.57E-17
U-238	4.39E-18	8.54E-18	9.96E-19	1.24E-18	7.40E-18	2.72E-18	1.51E-18	3.41E-18	2.91E-17
Zr-93	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
crud									
Co-60	1.23E-13	1.39E-13	1.24E-13	1.23E-13	1.78E-13	1.27E-13	1.20E-13	1.26E-13	1.45E-13
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Source Term Calculations		HEPA filters?	no				
SAXTON (MOX) [787]							
non-metal	not intact						
Isotope	Curies (entire fuel inventory)	fInv = 1/nCan	ARF	RF	LPF	Total Source Term [Ci] released to the environment	Respirable Source Term [Ci] released to the environment
Ac-227	1.33E-05	1.00E+00	5.00E-03	4.00E-01	1.00E+00	6.67E-08	2.67E-08
Am-241	6.45E+03	1.00E+00	5.00E-03	4.00E-01	1.00E+00	3.22E+01	1.29E+01
Am-242m	1.07E+01	1.00E+00	5.00E-03	4.00E-01	1.00E+00	5.34E-02	2.13E-02
Am-243	2.83E+01	1.00E+00	5.00E-03	4.00E-01	1.00E+00	1.42E-01	5.66E-02
C-14	1.81E+00	1.00E+00	5.00E-03	4.00E-01	1.00E+00	9.05E-03	3.62E-03
Cd-113m	2.59E+01	1.00E+00	5.00E-03	4.00E-01	1.00E+00	1.29E-01	5.17E-02
Cl-36	2.35E-02	1.00E+00	5.00E-03	4.00E-01	1.00E+00	1.18E-04	4.70E-05
Cm-242	8.79E+00	1.00E+00	5.00E-03	4.00E-01	1.00E+00	4.39E-02	1.76E-02
Cm-243	1.60E+01	1.00E+00	5.00E-03	4.00E-01	1.00E+00	8.01E-02	3.21E-02
Cm-244	9.29E+02	1.00E+00	5.00E-03	4.00E-01	1.00E+00	4.65E+00	1.86E+00
Cm-245	2.12E-01	1.00E+00	5.00E-03	4.00E-01	1.00E+00	1.06E-03	4.24E-04
Cm-246	4.28E-02	1.00E+00	5.00E-03	4.00E-01	1.00E+00	2.14E-04	8.56E-05
Cm-247	1.12E-07	1.00E+00	5.00E-03	4.00E-01	1.00E+00	5.58E-10	2.23E-10
Co-60	2.12E+01	1.00E+00	5.00E-03	4.00E-01	1.00E+00	1.06E-01	4.25E-02
Cs-134	1.24E+01	1.00E+00	5.00E-03	1.00E+00	1.00E+00	6.18E-02	6.18E-02
Cs-135	6.65E-01	1.00E+00	5.00E-03	1.00E+00	1.00E+00	3.32E-03	3.32E-03
Cs-137	1.00E+05	1.00E+00	5.00E-03	1.00E+00	1.00E+00	5.00E+02	5.00E+02
Eu-154	1.84E+03	1.00E+00	5.00E-03	4.00E-01	1.00E+00	9.20E+00	3.68E+00
Eu-155	1.92E+02	1.00E+00	5.00E-03	4.00E-01	1.00E+00	9.59E-01	3.84E-01
Fe-55	1.76E-01	1.00E+00	5.00E-03	4.00E-01	1.00E+00	8.79E-04	3.51E-04
H-3	2.92E+02	1.00E+00	3.00E-01	1.00E+00	1.00E+00	8.76E+01	8.76E+01
I-129	6.09E-02	1.00E+00	3.00E-01	1.00E+00	1.00E+00	1.83E-02	1.83E-02
Kr-85	2.59E+03	1.00E+00	3.00E-01	1.00E+00	1.00E+00	7.77E+02	7.77E+02
Nb-93m	2.82E+00	1.00E+00	5.00E-03	4.00E-01	1.00E+00	1.41E-02	5.64E-03
Nb-94	5.18E-02	1.00E+00	5.00E-03	4.00E-01	1.00E+00	2.59E-04	1.04E-04
Ni-59	4.01E-02	1.00E+00	5.00E-03	4.00E-01	1.00E+00	2.01E-04	8.03E-05
Ni-63	4.42E+00	1.00E+00	5.00E-03	4.00E-01	1.00E+00	2.21E-02	8.85E-03
Np-237	6.46E-01	1.00E+00	5.00E-03	4.00E-01	1.00E+00	3.23E-03	1.29E-03
Pa-231	3.02E-05	1.00E+00	5.00E-03	4.00E-01	1.00E+00	1.51E-07	6.03E-08
Pb-210	5.13E-08	1.00E+00	5.00E-03	4.00E-01	1.00E+00	2.57E-10	1.03E-10
Pd-107	2.14E-01	1.00E+00	5.00E-03	4.00E-01	1.00E+00	1.07E-03	4.28E-04
Pm-147	9.36E+01	1.00E+00	5.00E-03	4.00E-01	1.00E+00	4.68E-01	1.87E-01
Pu-238	5.66E+02	1.00E+00	5.00E-03	4.00E-01	1.00E+00	2.83E+00	1.13E+00
Pu-239	9.81E+01	1.00E+00	5.00E-03	4.00E-01	1.00E+00	4.90E-01	1.96E-01
Pu-240	1.70E+02	1.00E+00	5.00E-03	4.00E-01	1.00E+00	8.48E-01	3.39E-01
Pu-241	9.43E+03	1.00E+00	5.00E-03	4.00E-01	1.00E+00	4.71E+01	1.89E+01
Pu-242	4.84E-01	1.00E+00	5.00E-03	4.00E-01	1.00E+00	2.42E-03	9.68E-04
Ra-226	2.46E-07	1.00E+00	5.00E-03	4.00E-01	1.00E+00	1.23E-09	4.91E-10
Ra-228	2.80E-07	1.00E+00	5.00E-03	4.00E-01	1.00E+00	1.40E-09	5.61E-10
Ru-106	1.17E-03	1.00E+00	5.00E-03	4.00E-01	1.00E+00	5.85E-06	2.34E-06
Sb-125	1.70E+01	1.00E+00	5.00E-03	4.00E-01	1.00E+00	8.48E-02	3.39E-02
Se-79	7.90E-01	1.00E+00	5.00E-03	4.00E-01	1.00E+00	3.95E-03	1.58E-03
Sm-147	9.01E-06	1.00E+00	5.00E-03	4.00E-01	1.00E+00	4.50E-08	1.80E-08
Sm-151	5.86E+02	1.00E+00	5.00E-03	4.00E-01	1.00E+00	2.93E+00	1.17E+00
Sn-126	1.50E+00	1.00E+00	5.00E-03	4.00E-01	1.00E+00	7.50E-03	3.00E-03
Sr-90	6.87E+04	1.00E+00	5.00E-03	4.00E-01	1.00E+00	3.44E+02	1.37E+02
Tc-99	2.51E+01	1.00E+00	5.00E-03	4.00E-01	1.00E+00	1.26E-01	5.03E-02
Th-229	4.93E-07	1.00E+00	5.00E-03	4.00E-01	1.00E+00	2.47E-09	9.87E-10
Th-230	8.39E-06	1.00E+00	5.00E-03	4.00E-01	1.00E+00	4.19E-08	1.68E-08
Th-232	4.58E-08	1.00E+00	5.00E-03	4.00E-01	1.00E+00	2.29E-10	9.16E-11
U-232	4.23E-03	1.00E+00	5.00E-03	4.00E-01	1.00E+00	2.11E-05	8.45E-06
U-233	1.70E-04	1.00E+00	5.00E-03	4.00E-01	1.00E+00	8.51E-07	3.41E-07
U-234	5.70E-02	1.00E+00	5.00E-03	4.00E-01	1.00E+00	2.85E-04	1.14E-04
U-235	5.12E-03	1.00E+00	5.00E-03	4.00E-01	1.00E+00	2.56E-05	1.02E-05
U-236	7.81E-02	1.00E+00	5.00E-03	4.00E-01	1.00E+00	3.90E-04	1.56E-04
U-238	9.65E-02	1.00E+00	5.00E-03	4.00E-01	1.00E+00	4.82E-04	1.93E-04
Zr-93	3.72E+00	1.00E+00	5.00E-03	4.00E-01	1.00E+00	1.86E-02	7.43E-03
crud (per canister)							
Co-60 (crud)	1.23E+02	1	1.00E+00	3.00E-01	1.00E+00	1.23E+02	3.69E+01
Fe-55 (crud)	7.73E+02	1	1.00E+00	3.00E-01	1.00E+00	7.73E+02	2.32E+02

Source Term Calculations		HEPA filters?	yes				
SAXTON (MOX) [787]							
non-metal	not intact						
Isotope	Curies	1/nCan	ARF	RF	LPF	Total Source Term [Ci] released to the environment	Respirable Source Term [Ci] released to the environment
Ac-227	1.33E-05	1.00E+00	5.00E-03	4.00E-01	3.00E-04	2.00E-11	8.01E-12
Am-241	6.45E+03	1.00E+00	5.00E-03	4.00E-01	3.00E-04	9.67E-03	3.87E-03
Am-242m	1.07E+01	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.60E-05	6.40E-06
Am-243	2.83E+01	1.00E+00	5.00E-03	4.00E-01	3.00E-04	4.25E-05	1.70E-05
C-14	1.81E+00	1.00E+00	5.00E-03	4.00E-01	3.00E-04	2.72E-06	1.09E-06
Cd-113m	2.59E+01	1.00E+00	5.00E-03	4.00E-01	3.00E-04	3.88E-05	1.55E-05
Cl-36	2.35E-02	1.00E+00	5.00E-03	4.00E-01	3.00E-04	3.53E-08	1.41E-08
Cm-242	8.79E+00	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.32E-05	5.27E-06
Cm-243	1.60E+01	1.00E+00	5.00E-03	4.00E-01	3.00E-04	2.40E-05	9.62E-06
Cm-244	9.29E+02	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.39E-03	5.57E-04
Cm-245	2.12E-01	1.00E+00	5.00E-03	4.00E-01	3.00E-04	3.18E-07	1.27E-07
Cm-246	4.28E-02	1.00E+00	5.00E-03	4.00E-01	3.00E-04	6.42E-08	2.57E-08
Cm-247	1.12E-07	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.67E-13	6.70E-14
Co-60	2.12E+01	1.00E+00	5.00E-03	4.00E-01	3.00E-04	3.19E-05	1.27E-05
Cs-134	1.24E+01	1.00E+00	5.00E-03	1.00E+00	1.00E+00	6.18E-02	6.18E-02
Cs-135	6.65E-01	1.00E+00	5.00E-03	1.00E+00	1.00E+00	3.32E-03	3.32E-03
Cs-137	1.00E+05	1.00E+00	5.00E-03	1.00E+00	1.00E+00	5.00E+02	5.00E+02
Eu-154	1.84E+03	1.00E+00	5.00E-03	4.00E-01	3.00E-04	2.76E-03	1.10E-03
Eu-155	1.92E+02	1.00E+00	5.00E-03	4.00E-01	3.00E-04	2.88E-04	1.15E-04
Fe-55	1.76E-01	1.00E+00	5.00E-03	4.00E-01	3.00E-04	2.64E-07	1.05E-07
H-3	2.92E+02	1.00E+00	3.00E-01	1.00E+00	1.00E+00	8.76E+01	8.76E+01
I-129	6.09E-02	1.00E+00	3.00E-01	1.00E+00	1.00E+00	1.83E-02	1.83E-02
Kr-85	2.59E+03	1.00E+00	3.00E-01	1.00E+00	1.00E+00	7.77E+02	7.77E+02
Nb-93m	2.82E+00	1.00E+00	5.00E-03	4.00E-01	3.00E-04	4.23E-06	1.69E-06
Nb-94	5.18E-02	1.00E+00	5.00E-03	4.00E-01	3.00E-04	7.77E-08	3.11E-08
Ni-59	4.01E-02	1.00E+00	5.00E-03	4.00E-01	3.00E-04	6.02E-08	2.41E-08
Ni-63	4.42E+00	1.00E+00	5.00E-03	4.00E-01	3.00E-04	6.63E-06	2.65E-06
Np-237	6.46E-01	1.00E+00	5.00E-03	4.00E-01	3.00E-04	9.70E-07	3.88E-07
Pa-231	3.02E-05	1.00E+00	5.00E-03	4.00E-01	3.00E-04	4.52E-11	1.81E-11
Pb-210	5.13E-08	1.00E+00	5.00E-03	4.00E-01	3.00E-04	7.70E-14	3.08E-14
Pd-107	2.14E-01	1.00E+00	5.00E-03	4.00E-01	3.00E-04	3.21E-07	1.28E-07
Pm-147	9.36E+01	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.40E-04	5.62E-05
Pu-238	5.66E+02	1.00E+00	5.00E-03	4.00E-01	3.00E-04	8.48E-04	3.39E-04
Pu-239	9.81E+01	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.47E-04	5.88E-05
Pu-240	1.70E+02	1.00E+00	5.00E-03	4.00E-01	3.00E-04	2.54E-04	1.02E-04
Pu-241	9.43E+03	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.41E-02	5.66E-03
Pu-242	4.84E-01	1.00E+00	5.00E-03	4.00E-01	3.00E-04	7.26E-07	2.90E-07
Ra-226	2.46E-07	1.00E+00	5.00E-03	4.00E-01	3.00E-04	3.68E-13	1.47E-13
Ra-228	2.80E-07	1.00E+00	5.00E-03	4.00E-01	3.00E-04	4.21E-13	1.68E-13
Ru-106	1.17E-03	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.76E-09	7.02E-10
Sb-125	1.70E+01	1.00E+00	5.00E-03	4.00E-01	3.00E-04	2.54E-05	1.02E-05
Se-79	7.90E-01	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.18E-06	4.74E-07
Sm-147	9.01E-06	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.35E-11	5.41E-12
Sm-151	5.86E+02	1.00E+00	5.00E-03	4.00E-01	3.00E-04	8.79E-04	3.51E-04
Sn-126	1.50E+00	1.00E+00	5.00E-03	4.00E-01	3.00E-04	2.25E-06	9.00E-07
Sr-90	6.87E+04	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.03E-01	4.12E-02
Tc-99	2.51E+01	1.00E+00	5.00E-03	4.00E-01	3.00E-04	3.77E-05	1.51E-05
Th-229	4.93E-07	1.00E+00	5.00E-03	4.00E-01	3.00E-04	7.40E-13	2.96E-13
Th-230	8.39E-06	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.26E-11	5.03E-12
Th-232	4.58E-08	1.00E+00	5.00E-03	4.00E-01	3.00E-04	6.87E-14	2.75E-14
U-232	4.23E-03	1.00E+00	5.00E-03	4.00E-01	3.00E-04	6.34E-09	2.54E-09
U-233	1.70E-04	1.00E+00	5.00E-03	4.00E-01	3.00E-04	2.55E-10	1.02E-10
U-234	5.70E-02	1.00E+00	5.00E-03	4.00E-01	3.00E-04	8.55E-08	3.42E-08
U-235	5.12E-03	1.00E+00	5.00E-03	4.00E-01	3.00E-04	7.68E-09	3.07E-09
U-236	7.81E-02	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.17E-07	4.68E-08
U-238	9.65E-02	1.00E+00	5.00E-03	4.00E-01	3.00E-04	1.45E-07	5.79E-08
Zr-93	3.72E+00	1.00E+00	5.00E-03	4.00E-01	3.00E-04	5.57E-06	2.23E-06
crud (per canister)							
Co-60 (crud)	1.23E+02	1	1.00E+00	3.00E-01	3.00E-04	3.69E-02	1.11E-02
Fe-55 (crud)	7.73E+02	1	1.00E+00	3.00E-01	3.00E-04	2.32E-01	6.96E-02

SAXTON (MOX) [787]			No HEPAs						
non-metal	not intact								
	inhalation doses [rem]								
	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	6.10E-07	1.03E-10	2.37E-06	3.96E-06	4.94E-05	5.53E-11	2.26E-06	2.79E-06	0.00E+00
Am-241	2.42E+01	1.98E-03	1.37E+01	1.29E+02	1.61E+03	1.19E-03	5.81E+01	8.92E+01	0.00E+00
Am-242m	3.95E-02	1.70E-06	5.17E-03	2.08E-01	2.61E+00	6.94E-07	9.21E-02	1.42E-01	0.00E+00
Am-243	1.06E-01	4.96E-05	5.81E-02	5.65E-01	7.08E+00	2.71E-05	2.53E-01	3.89E-01	0.00E+00
C-14	1.18E-07	1.18E-07	1.18E-07	1.18E-07	1.18E-07	1.18E-07	1.18E-07	1.18E-07	0.00E+00
Cd-113m	9.90E-05	9.90E-05	1.22E-03	9.90E-05	9.90E-05	9.90E-05	3.88E-03	1.23E-03	0.00E+00
Cl-36	1.37E-09	1.37E-09	1.24E-07	1.37E-09	1.37E-09	1.37E-09	1.45E-09	1.61E-08	0.00E+00
Cm-242	5.78E-04	9.57E-07	1.57E-02	3.95E-03	4.94E-02	9.54E-07	2.48E-03	4.73E-03	0.00E+00
Cm-243	3.83E-02	1.16E-05	3.59E-02	2.18E-01	2.72E+00	7.08E-06	1.06E-01	1.53E-01	0.00E+00
Cm-244	1.70E+00	1.11E-04	2.07E+00	1.00E+01	1.25E+02	1.08E-04	5.12E+00	7.18E+00	0.00E+00
Cm-245	8.23E-04	1.63E-07	4.40E-04	4.37E-03	5.47E-02	8.99E-08	1.94E-03	3.00E-03	0.00E+00
Cm-246	1.65E-04	1.97E-08	8.98E-05	8.78E-04	1.10E-02	1.12E-08	3.92E-04	6.02E-04	0.00E+00
Cm-247	3.95E-10	2.87E-13	2.15E-10	2.10E-09	2.63E-08	1.87E-13	9.40E-10	1.44E-09	0.00E+00
Co-60	1.17E-05	4.51E-05	8.45E-04	4.21E-05	3.31E-05	3.97E-05	8.82E-05	1.45E-04	0.00E+00
Cs-134	4.63E-05	3.85E-05	4.20E-05	4.20E-05	3.92E-05	3.96E-05	4.95E-05	4.45E-05	0.00E+00
Cs-135	2.30E-07	2.30E-07	2.70E-07	2.30E-07	2.30E-07	2.30E-07	2.30E-07	2.36E-07	0.00E+00
Cs-137	2.52E-01	2.26E-01	2.54E-01	2.39E-01	2.29E-01	2.29E-01	2.63E-01	2.49E-01	0.00E+00
Eu-154	2.48E-03	3.29E-03	1.68E-02	2.25E-02	1.11E-01	1.52E-03	2.40E-02	1.64E-02	0.00E+00
Eu-155	7.88E-06	1.36E-05	2.63E-04	3.16E-04	3.36E-03	5.31E-06	2.46E-04	2.48E-04	0.00E+00
Fe-55	1.06E-08	1.03E-08	2.15E-08	1.05E-08	1.04E-08	1.10E-08	2.45E-08	1.47E-08	0.00E+00
H-3	8.74E-05	8.74E-05	8.74E-05	8.74E-05	8.74E-05	8.74E-05	8.74E-05	8.74E-05	0.00E+00
I-129	9.15E-08	2.20E-07	3.31E-07	1.47E-07	1.45E-07	1.64E-03	1.24E-07	4.94E-05	0.00E+00
Kr-85	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nb-93m	1.35E-07	1.42E-08	2.10E-05	9.27E-08	2.42E-07	9.89E-09	1.28E-07	2.57E-06	0.00E+00
Nb-94	2.84E-08	1.34E-07	4.47E-06	1.35E-07	1.18E-07	1.33E-07	2.66E-07	6.69E-07	0.00E+00
Ni-59	1.66E-09	1.60E-09	5.55E-09	1.64E-09	1.62E-09	1.74E-09	1.68E-09	1.66E-09	0.00E+00
Ni-63	4.19E-07	4.19E-07	1.57E-06	4.19E-07	4.19E-07	4.19E-07	4.38E-07	4.28E-07	0.00E+00
Np-237	2.21E-03	1.26E-06	1.20E-03	1.95E-02	2.44E-01	9.99E-07	1.74E-03	1.09E-02	0.00E+00
Pa-231	2.40E-11	3.06E-11	2.60E-06	2.42E-06	3.03E-05	2.66E-11	9.98E-10	1.21E-06	0.00E+00
Pb-210	1.88E-12	1.88E-12	1.88E-12	2.22E-11	3.24E-10	1.88E-12	2.78E-11	2.17E-11	0.00E+00
Pd-107	2.33E-11	2.33E-11	7.03E-07	1.26E-10	3.36E-10	2.33E-11	5.31E-09	8.51E-08	0.00E+00
Pm-147	2.03E-10	3.89E-10	8.36E-04	8.81E-05	1.10E-03	2.14E-10	6.36E-05	1.14E-04	0.00E+00
Pu-238	1.83E+00	6.52E-05	2.09E+01	9.91E+00	1.24E+02	6.27E-05	4.58E+00	6.91E+00	0.00E+00
Pu-239	3.60E-01	1.04E-05	3.65E+00	1.91E+00	2.39E+01	1.02E-05	8.55E-01	1.31E+00	0.00E+00
Pu-240	6.22E-01	1.86E-05	6.32E+00	3.31E+00	4.13E+01	1.77E-05	1.48E+00	2.27E+00	0.00E+00
Pu-241	7.42E-01	3.33E-05	3.46E+00	3.65E+00	4.57E+01	1.35E-05	1.42E+00	2.43E+00	0.00E+00
Pu-242	1.68E-03	5.27E-08	1.71E-02	8.98E-03	1.12E-01	4.90E-08	4.01E-03	6.19E-03	0.00E+00
Ra-226	2.89E-12	2.89E-12	4.56E-10	1.88E-11	2.15E-10	2.89E-12	3.03E-12	6.57E-11	0.00E+00
Ra-228	5.92E-12	5.95E-12	2.33E-10	2.39E-11	2.10E-10	5.92E-12	6.05E-12	4.17E-11	0.00E+00
Ru-106	1.86E-09	1.85E-09	1.40E-07	1.85E-09	1.85E-09	1.85E-09	2.28E-09	1.74E-08	0.00E+00
Sb-125	7.04E-07	8.14E-07	4.24E-05	1.27E-06	5.34E-06	6.34E-07	2.84E-06	6.46E-06	0.00E+00
Se-79	6.18E-08	6.18E-08	8.93E-07	6.18E-08	6.18E-08	6.18E-08	3.86E-07	2.42E-07	0.00E+00
Sm-147	0.00E+00	0.00E+00	7.92E-09	2.86E-08	3.57E-07	0.00E+00	1.96E-08	2.10E-08	0.00E+00
Sm-151	2.72E-09	1.01E-08	2.20E-04	7.43E-04	9.32E-03	8.92E-10	5.07E-04	5.47E-04	0.00E+00
Sn-126	2.47E-06	2.44E-06	2.61E-05	9.72E-06	2.04E-05	2.27E-06	3.05E-06	4.66E-06	0.00E+00
Sr-90	2.09E-02	2.09E-02	2.27E+01	2.66E+00	5.76E+00	2.09E-02	4.54E-02	2.78E+00	0.00E+00
Tc-99	1.31E-07	1.31E-07	4.84E-05	1.31E-07	1.31E-07	3.51E-06	1.82E-06	6.52E-06	0.00E+00
Th-229	1.57E-10	1.57E-10	1.13E-07	6.54E-08	8.14E-07	1.57E-10	4.01E-10	3.30E-08	0.00E+00
Th-230	3.95E-10	3.95E-10	2.90E-07	1.67E-07	2.09E-06	3.95E-10	1.02E-09	8.51E-08	0.00E+00
Th-232	4.03E-12	4.08E-12	4.97E-09	4.72E-09	5.87E-08	3.93E-12	9.88E-12	2.34E-09	0.00E+00
U-232	3.90E-08	3.93E-08	7.21E-04	1.98E-06	3.13E-05	3.83E-08	1.52E-06	8.68E-05	0.00E+00
U-233	4.99E-10	4.99E-10	5.97E-06	1.40E-08	2.20E-07	4.99E-10	1.85E-08	7.19E-07	0.00E+00
U-234	1.64E-07	1.64E-07	1.96E-03	4.59E-06	7.16E-05	1.64E-07	6.09E-06	2.35E-04	0.00E+00
U-235	1.40E-08	1.40E-08	1.63E-04	3.88E-07	5.96E-06	1.40E-08	5.07E-07	1.96E-05	0.00E+00
U-236	2.13E-07	2.13E-07	2.54E-03	5.94E-06	9.36E-05	2.13E-07	7.90E-06	3.05E-04	0.00E+00
U-238	2.48E-07	2.48E-07	2.96E-03	7.32E-06	1.09E-04	2.47E-07	9.15E-06	3.56E-04	0.00E+00
Zr-93	9.34E-09	2.01E-08	3.74E-05	7.58E-05	9.34E-04	7.48E-09	7.41E-08	3.72E-05	0.00E+00
crud									
Co-60 (crud)	1.01E-02	3.92E-02	7.34E-01	3.66E-02	2.87E-02	3.45E-02	7.66E-02	1.26E-01	0.00E+00
Fe-55 (crud)	6.99E-03	6.81E-03	1.42E-02	6.91E-03	6.87E-03	7.25E-03	1.62E-02	9.71E-03	0.00E+00
total	2.99E+01	2.99E-01	7.39E+01	1.62E+02	1.99E+03	2.96E-01	7.25E+01	1.13E+02	0.00E+00

SAXTON (MOX) [787]			No HEPAs						
non-metal	not intact								
	air submersion doses [rem]								
	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	4.34E-16	5.15E-16	3.91E-16	3.40E-16	1.20E-15	4.22E-16	3.68E-16	4.33E-16	3.80E-15
Am-241	4.79E-06	5.97E-06	3.76E-06	2.91E-06	1.60E-05	4.37E-06	3.54E-06	4.56E-06	7.14E-06
Am-242m	3.51E-10	5.55E-10	1.59E-10	1.59E-10	7.34E-10	2.73E-10	1.79E-10	2.93E-10	1.26E-09
Am-243	5.37E-08	6.40E-08	4.71E-08	3.80E-08	1.83E-07	5.12E-08	4.39E-08	5.34E-08	6.74E-08
C-14	4.06E-13	5.52E-13	2.40E-13	1.90E-13	1.11E-12	3.43E-13	2.41E-13	3.51E-13	3.81E-10
Cd-113m	1.61E-10	1.96E-10	1.33E-10	1.12E-10	4.70E-10	1.51E-10	1.26E-10	1.55E-10	1.90E-07
Cl-36	4.56E-13	5.41E-13	4.11E-13	3.68E-13	1.15E-12	4.46E-13	3.91E-13	4.54E-13	2.99E-10
Cm-242	5.96E-11	1.13E-10	8.60E-12	1.44E-11	8.06E-11	3.74E-11	1.73E-11	4.33E-11	3.26E-10
Cm-243	8.01E-08	9.27E-08	7.63E-08	6.94E-08	2.08E-07	7.99E-08	7.20E-08	8.16E-08	1.36E-07
Cm-244	5.55E-09	1.07E-08	5.69E-10	1.17E-09	7.09E-09	3.37E-09	1.46E-09	3.95E-09	3.15E-08
Cm-245	7.12E-10	8.34E-10	6.66E-10	5.81E-10	2.16E-09	7.04E-10	6.24E-10	7.26E-10	9.83E-10
Cm-246	2.31E-13	4.45E-13	2.59E-14	5.00E-14	3.03E-13	1.42E-13	6.19E-14	1.65E-13	1.29E-12
Cm-247	1.42E-15	1.62E-15	1.39E-15	1.33E-15	2.74E-15	1.44E-15	1.33E-15	1.45E-15	1.73E-15
Co-60	2.26E-06	2.58E-06	2.28E-06	2.26E-06	3.27E-06	2.34E-06	2.21E-06	2.32E-06	2.67E-06
Cs-134	7.92E-07	9.02E-07	7.89E-07	7.69E-07	1.28E-06	8.10E-07	7.55E-07	8.10E-07	1.01E-06
Cs-135	3.62E-13	4.74E-13	2.41E-13	1.92E-13	1.04E-12	3.17E-13	2.35E-13	3.25E-13	5.22E-10
Cs-137	2.31E-03	2.64E-03	2.29E-03	2.24E-03	3.79E-03	2.36E-03	2.19E-03	2.36E-03	3.80E-03
Eu-154	9.56E-05	1.09E-04	9.55E-05	9.38E-05	1.50E-04	9.80E-05	9.16E-05	9.79E-05	1.32E-04
Eu-155	4.14E-07	4.90E-07	3.69E-07	3.07E-07	1.34E-06	4.00E-07	3.44E-07	4.14E-07	5.63E-07
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H-3	0.00E+00	0.00E+00	4.17E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.02E-09	0.00E+00
I-129	1.53E-09	2.11E-09	6.77E-10	5.19E-10	3.48E-09	1.22E-09	7.27E-10	1.20E-09	3.48E-09
Kr-85	1.57E-05	1.80E-05	1.53E-05	1.47E-05	2.96E-05	1.59E-05	1.47E-05	1.60E-05	1.76E-03
Nb-93m	1.55E-11	3.20E-11	6.23E-13	2.88E-12	1.69E-11	8.37E-12	3.32E-12	1.08E-11	1.05E-10
Nb-94	3.38E-09	3.84E-09	3.37E-09	3.29E-09	5.33E-09	3.46E-09	3.22E-09	3.45E-09	4.27E-09
Ni-59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ni-63	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Np-237	5.82E-10	7.05E-10	5.05E-10	4.30E-10	1.79E-09	5.56E-10	4.76E-10	5.76E-10	8.62E-10
Pa-231	4.47E-14	5.20E-14	4.23E-14	3.97E-14	9.50E-14	4.44E-14	4.02E-14	4.49E-14	6.37E-14
Pb-210	2.75E-18	3.64E-18	1.89E-18	1.40E-18	8.67E-18	2.41E-18	1.82E-18	2.51E-18	5.69E-18
Pd-107	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pm-147	6.06E-11	7.75E-11	4.42E-11	3.62E-11	1.77E-10	5.47E-11	4.26E-11	5.62E-11	6.57E-08
Pu-238	3.21E-09	6.22E-09	5.19E-10	8.23E-10	4.55E-09	1.96E-09	9.74E-10	2.39E-09	2.00E-08
Pu-239	4.11E-10	6.41E-10	2.25E-10	2.27E-10	8.04E-10	3.29E-10	2.43E-10	3.60E-10	1.58E-09
Pu-240	9.34E-10	1.81E-09	1.60E-10	2.42E-10	1.36E-09	5.76E-10	2.88E-10	6.98E-10	5.76E-09
Pu-241	5.87E-10	7.08E-10	5.29E-10	4.60E-10	1.79E-09	5.70E-10	4.97E-10	5.92E-10	9.55E-10
Pu-242	2.24E-12	4.31E-12	4.06E-13	5.99E-13	3.31E-12	1.39E-12	7.04E-13	1.68E-12	1.37E-11
Ra-226	6.55E-17	7.53E-17	6.27E-17	5.74E-17	1.69E-16	6.57E-17	5.93E-17	6.70E-17	1.02E-16
Ra-228	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ru-106	1.02E-11	1.18E-11	1.02E-11	9.88E-12	1.74E-11	1.04E-11	9.76E-12	1.05E-11	1.10E-10
Sb-125	2.91E-07	3.33E-07	2.86E-07	2.75E-07	5.18E-07	2.95E-07	2.73E-07	2.97E-07	3.89E-07
Se-79	2.37E-13	3.19E-13	1.44E-13	1.14E-13	6.56E-13	2.02E-13	1.44E-13	2.07E-13	2.54E-10
Sm-147	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sm-151	2.64E-11	4.46E-11	3.59E-12	5.73E-12	3.60E-11	1.82E-11	7.56E-12	1.83E-11	9.63E-11
Sn-126	9.80E-08	1.12E-07	9.71E-08	9.38E-08	1.70E-07	9.99E-08	9.28E-08	1.00E-07	1.70E-07
Sr-90	4.63E-07	5.65E-07	3.83E-07	3.24E-07	1.36E-06	4.36E-07	3.64E-07	4.48E-07	5.47E-04
Tc-99	3.79E-11	4.79E-11	2.81E-11	2.29E-11	1.13E-10	3.42E-11	2.70E-11	3.53E-11	5.96E-08
Th-229	1.61E-15	1.89E-15	1.50E-15	1.29E-15	4.91E-15	1.58E-15	1.40E-15	1.64E-15	2.31E-15
Th-230	1.31E-16	1.73E-16	1.04E-16	8.86E-17	3.84E-16	1.18E-16	9.95E-17	1.26E-16	3.28E-16
Th-232	[illegible]9	5.39E-19	2.53E-19	2.19E-19	1.03E-18	3.13E-19	2.51E-19	3.46E-19	1.36E-18
U-23[illegible]	[illegible]-14	8.49E-14	3.80E-14	3.29E-14	1.41E-13	4.72E-14	3.66E-14	5.20E-14	2.17E-13
U-233	[illegible]-15	3.27E-15	1.99E-15	1.83E-15	6.07E-15	2.28E-15	1.93E-15	2.40E-15	6.74E-15
U-234	[illegible]34E-13	7.11E-13	2.16E-13	2.07E-13	9.82E-13	3.30E-13	2.37E-13	3.77E-13	2.10E-12
U-235	3.12E-11	3.59E-11	2.99E-11	2.72E-11	8.15E-11	3.12E-11	2.82E-11	3.19E-11	3.83E-11
U-236	4.12E-13	7.44E-13	1.47E-13	1.57E-13	8.04E-13	2.83E-13	1.82E-13	3.39E-13	2.41E-12
U-238	3.67E-13	7.13E-13	8.32E-14	1.04E-13	6.18E-13	2.27E-13	1.26E-13	2.85E-13	2.43E-12
Zr-93	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
crud									
Co-60 (crud)	2.62E-03	2.96E-03	2.64E-03	2.62E-03	3.79E-03	2.70E-03	2.56E-03	2.68E-03	3.09E-03
Fe-55 (crud)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
total	5.05E-03	5.74E-03	5.05E-03	4.97E-03	7.79E-03	5.19E-03	4.86E-03	5.16E-03	9.36E-03

SAXTON (MOX) [787]			HEPAs						
non-metal	not intact								
	Inhalation doses [rem]								
	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	1.83E-10	3.08E-14	7.11E-10	1.19E-09	1.48E-08	1.66E-14	6.79E-10	8.36E-10	0.00E+00
Am-241	7.25E-03	5.95E-07	4.10E-03	3.88E-02	4.84E-01	3.57E-07	1.74E-02	2.68E-02	0.00E+00
Am-242m	1.19E-05	5.10E-10	1.55E-06	6.24E-05	7.83E-04	2.08E-10	2.76E-05	4.25E-05	0.00E+00
Am-243	3.19E-05	1.49E-08	1.74E-05	1.69E-04	2.13E-03	8.12E-09	7.58E-05	1.17E-04	0.00E+00
C-14	3.53E-11	3.53E-11	3.53E-11	3.53E-11	3.53E-11	3.53E-11	3.53E-11	3.53E-11	0.00E+00
Cd-113m	2.97E-08	2.97E-08	3.66E-07	2.97E-08	2.97E-08	2.97E-08	1.16E-06	3.70E-07	0.00E+00
Cl-36	4.10E-13	4.10E-13	3.71E-11	4.10E-13	4.10E-13	4.10E-13	4.36E-13	4.82E-12	0.00E+00
Cm-242	1.73E-07	2.87E-10	4.71E-06	1.19E-06	1.48E-05	2.88E-10	7.45E-07	1.42E-06	0.00E+00
Cm-243	1.15E-05	3.49E-09	1.08E-05	6.54E-05	8.15E-04	2.12E-09	3.19E-05	4.60E-05	0.00E+00
Cm-244	5.11E-04	3.34E-08	6.20E-04	3.01E-03	3.76E-02	3.25E-08	1.54E-03	2.15E-03	0.00E+00
Cm-245	2.47E-07	4.90E-11	1.32E-07	1.31E-06	1.64E-05	2.70E-11	5.83E-07	9.01E-07	0.00E+00
Cm-246	4.94E-08	5.92E-12	2.69E-08	2.64E-07	3.29E-06	3.35E-12	1.18E-07	1.81E-07	0.00E+00
Cm-247	1.19E-13	8.61E-17	6.45E-14	6.30E-13	7.88E-12	5.60E-17	2.82E-13	4.33E-13	0.00E+00
Co-60	3.50E-09	1.35E-08	2.53E-07	1.26E-08	9.92E-09	1.19E-08	2.65E-08	4.34E-08	0.00E+00
Cs-134	4.63E-05	3.85E-05	4.20E-05	4.20E-05	3.92E-05	3.96E-05	4.95E-05	4.45E-05	0.00E+00
Cs-135	2.30E-07	2.30E-07	2.70E-07	2.30E-07	2.30E-07	2.30E-07	2.30E-07	2.36E-07	0.00E+00
Cs-137	2.52E-01	2.26E-01	2.54E-01	2.39E-01	2.29E-01	2.29E-01	2.63E-01	2.49E-01	0.00E+00
Eu-154	7.45E-07	9.87E-07	5.04E-06	6.75E-06	3.33E-05	4.55E-07	7.20E-06	4.92E-06	0.00E+00
Eu-155	2.36E-09	4.07E-09	7.90E-08	9.49E-08	1.01E-06	1.59E-09	7.37E-08	7.43E-08	0.00E+00
Fe-55	3.18E-12	3.09E-12	6.44E-12	3.14E-12	3.12E-12	3.29E-12	7.36E-12	4.41E-12	0.00E+00
H-3	8.74E-05	8.74E-05	8.74E-05	8.74E-05	8.74E-05	8.74E-05	8.74E-05	8.74E-05	0.00E+00
I-129	9.15E-08	2.20E-07	3.31E-07	1.47E-07	1.45E-07	1.64E-03	1.24E-07	4.94E-05	0.00E+00
Kr-85	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nb-93m	4.06E-11	4.25E-12	6.29E-09	2.78E-11	7.25E-11	2.97E-12	3.85E-11	7.71E-10	0.00E+00
Nb-94	8.53E-12	4.01E-11	1.34E-09	4.05E-11	3.53E-11	3.98E-11	7.97E-11	2.01E-10	0.00E+00
Ni-59	4.98E-13	4.80E-13	1.67E-12	4.91E-13	4.87E-13	5.23E-13	5.04E-13	4.97E-13	0.00E+00
Ni-63	1.26E-10	1.26E-10	4.70E-10	1.26E-10	1.26E-10	1.26E-10	1.31E-10	1.28E-10	0.00E+00
Np-237	6.62E-07	3.78E-10	3.60E-07	5.86E-06	7.31E-05	3.00E-10	5.23E-07	3.27E-06	0.00E+00
Pa-231	7.20E-15	9.17E-15	7.79E-10	7.27E-10	9.08E-09	7.97E-15	2.99E-13	3.62E-10	0.00E+00
Pb-210	5.65E-16	5.65E-16	5.65E-16	6.66E-15	9.72E-14	5.65E-16	8.33E-15	6.52E-15	0.00E+00
Pd-107	7.00E-15	7.00E-15	2.11E-10	3.78E-14	1.01E-13	7.00E-15	1.59E-12	2.55E-11	0.00E+00
Pm-147	6.09E-14	1.17E-13	2.51E-07	2.64E-08	3.30E-07	6.41E-14	1.91E-08	3.43E-08	0.00E+00
Pu-238	5.48E-04	1.96E-08	6.26E-03	2.97E-03	3.72E-02	1.88E-08	1.37E-03	2.07E-03	0.00E+00
Pu-239	1.08E-04	3.13E-09	1.10E-03	5.73E-04	7.16E-03	3.06E-09	2.57E-04	3.94E-04	0.00E+00
Pu-240	1.87E-04	5.58E-09	1.90E-03	9.92E-04	1.24E-02	5.31E-09	4.44E-04	6.81E-04	0.00E+00
Pu-241	2.22E-04	9.98E-09	1.04E-03	1.10E-03	1.37E-02	4.05E-09	4.27E-04	7.28E-04	0.00E+00
Pu-242	5.05E-07	1.58E-11	5.14E-06	2.69E-06	3.36E-05	1.47E-11	1.20E-06	1.86E-06	0.00E+00
Ra-226	8.67E-16	8.67E-16	1.37E-13	5.64E-15	6.45E-14	8.67E-16	9.09E-16	1.97E-14	0.00E+00
Ra-228	1.78E-15	1.78E-15	7.00E-14	7.16E-15	8.31E-14	1.78E-15	1.61E-15	1.25E-14	0.00E+00
Ru-106	5.59E-13	5.55E-13	4.21E-11	5.55E-13	5.55E-13	5.55E-13	6.84E-13	5.22E-12	0.00E+00
Sb-125	2.11E-10	2.44E-10	1.27E-08	3.81E-10	1.60E-09	1.90E-10	8.51E-10	1.94E-09	0.00E+00
Se-79	1.85E-11	1.85E-11	2.68E-10	1.85E-11	1.85E-11	1.85E-11	1.16E-10	7.27E-11	0.00E+00
Sm-147	0.00E+00	0.00E+00	2.37E-12	8.57E-12	1.07E-10	0.00E+00	5.89E-12	6.30E-12	0.00E+00
Sm-151	8.17E-13	3.02E-12	6.61E-08	2.23E-07	2.80E-06	2.67E-13	1.52E-07	1.64E-07	0.00E+00
Sn-126	7.42E-10	7.32E-10	7.84E-09	2.92E-09	6.13E-09	6.80E-10	9.14E-10	1.40E-09	0.00E+00
Sr-90	6.28E-06	6.28E-06	6.80E-03	7.99E-04	1.73E-03	6.28E-06	1.36E-05	8.35E-04	0.00E+00
Tc-99	3.93E-11	3.93E-11	1.45E-08	3.93E-11	3.93E-11	1.05E-09	5.45E-10	1.96E-09	0.00E+00
Th-229	4.71E-14	4.71E-14	3.40E-11	1.96E-11	2.44E-10	4.71E-14	1.20E-13	9.90E-12	0.00E+00
Th-230	1.18E-13	1.18E-13	8.71E-11	5.02E-11	6.27E-10	1.18E-13	3.05E-13	2.55E-11	0.00E+00
Th-232	1.21E-15	1.22E-15	1.49E-12	1.42E-12	1.76E-11	1.18E-15	2.96E-15	7.02E-13	0.00E+00
U-232	1.17E-11	1.18E-11	2.16E-07	5.94E-10	9.39E-09	1.15E-11	4.55E-10	2.60E-08	0.00E+00
U-233	1.50E-13	1.50E-13	1.79E-09	4.19E-12	6.60E-11	1.50E-13	5.54E-12	2.16E-10	0.00E+00
U-234	4.93E-11	4.93E-11	5.88E-07	1.38E-09	2.15E-08	4.93E-11	1.83E-09	7.06E-08	0.00E+00
U-235	4.20E-12	4.21E-12	4.89E-08	1.17E-10	1.79E-09	4.20E-12	1.52E-10	5.88E-09	0.00E+00
U-236	6.40E-11	6.40E-11	7.62E-07	1.78E-09	2.81E-08	6.40E-11	2.37E-09	9.16E-08	0.00E+00
U-238	7.44E-11	7.44E-11	8.88E-07	2.20E-09	3.26E-08	7.41E-11	2.74E-09	1.07E-07	0.00E+00
Zr-93	2.80E-12	6.02E-12	1.12E-08	2.28E-08	2.80E-07	2.24E-12	2.22E-11	1.11E-08	0.00E+00
crud									
Co-60 (crud)	3.04E-06	1.17E-05	2.20E-04	1.10E-05	8.62E-06	1.03E-05	2.30E-05	3.77E-05	0.00E+00
Fe-55 (crud)	2.10E-06	2.04E-06	4.25E-06	2.07E-06	2.06E-06	2.17E-06	4.85E-06	2.91E-06	0.00E+00
total	2.61E-01	2.26E-01	2.76E-01	2.88E-01	8.26E-01	2.30E-01	2.85E-01	2.83E-01	0.00E+00

SAXTON (MOX) [787]			HEPAs						
non-metal	not intact								
	air submersion doses [rem]								
	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	1.30E-19	1.54E-19	1.17E-19	1.02E-19	3.59E-19	1.27E-19	1.10E-19	1.30E-19	1.14E-18
Am-241	1.44E-09	1.79E-09	1.13E-09	8.72E-10	4.80E-09	1.31E-09	1.06E-09	1.37E-09	2.14E-09
Am-242m	1.05E-13	1.67E-13	4.77E-14	4.77E-14	2.20E-13	8.18E-14	5.38E-14	8.79E-14	3.77E-13
Am-243	1.61E-11	1.92E-11	1.41E-11	1.14E-11	5.49E-11	1.54E-11	1.32E-11	1.60E-11	2.02E-11
C-14	1.22E-16	1.66E-16	7.19E-17	5.69E-17	3.32E-16	1.03E-16	7.24E-17	1.05E-16	1.14E-13
Cd-113m	4.82E-14	5.88E-14	3.98E-14	3.37E-14	1.41E-13	4.54E-14	3.78E-14	4.66E-14	5.70E-11
Cl-36	1.37E-16	1.62E-16	1.23E-16	1.10E-16	3.44E-16	1.34E-16	1.17E-16	1.36E-16	8.97E-14
Cm-242	1.79E-14	3.38E-14	2.58E-15	4.31E-15	2.42E-14	1.12E-14	5.18E-15	1.30E-14	9.79E-14
Cm-243	2.40E-11	2.78E-11	2.29E-11	2.08E-11	6.24E-11	2.40E-11	2.16E-11	2.45E-11	4.08E-11
Cm-244	1.67E-12	3.21E-12	1.71E-13	3.52E-13	2.13E-12	1.01E-12	4.37E-13	1.18E-12	9.44E-12
Cm-245	2.13E-13	2.50E-13	2.00E-13	1.74E-13	6.49E-13	2.11E-13	1.87E-13	2.18E-13	2.95E-13
Cm-246	6.94E-17	1.33E-16	7.78E-18	1.50E-17	9.08E-17	4.25E-17	1.86E-17	4.96E-17	3.88E-16
Cm-247	4.26E-19	4.87E-19	4.18E-19	4.00E-19	8.21E-19	4.32E-19	4.00E-19	4.35E-19	5.19E-19
Co-60	6.79E-10	7.67E-10	6.84E-10	6.79E-10	9.82E-10	7.01E-10	6.62E-10	6.95E-10	8.00E-10
Cs-134	7.92E-07	9.02E-07	7.89E-07	7.69E-07	1.28E-06	8.10E-07	7.55E-07	8.10E-07	1.01E-06
Cs-135	3.62E-13	4.74E-13	2.41E-13	1.92E-13	1.04E-12	3.17E-13	2.35E-13	3.25E-13	5.22E-10
Cs-137	2.31E-03	2.64E-03	2.29E-03	2.24E-03	3.79E-03	2.36E-03	2.19E-03	2.36E-03	3.80E-03
Eu-154	2.87E-08	3.26E-08	2.86E-08	2.81E-08	4.51E-08	2.94E-08	2.75E-08	2.94E-08	3.96E-08
Eu-155	1.24E-10	1.47E-10	1.11E-10	9.22E-11	4.03E-10	1.20E-10	1.03E-10	1.24E-10	1.69E-10
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H-3	0.00E+00	0.00E+00	4.17E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.02E-09	0.00E+00
I-129	1.53E-09	2.11E-09	6.77E-10	5.19E-10	3.48E-09	1.22E-09	7.27E-10	1.20E-09	3.48E-09
Kr-85	1.57E-05	1.80E-05	1.53E-05	1.47E-05	2.98E-05	1.59E-05	1.47E-05	1.60E-05	1.78E-03
Nb-93m	4.64E-15	9.60E-15	1.87E-16	8.64E-16	5.07E-15	2.51E-15	9.96E-16	3.25E-15	3.14E-14
Nb-94	1.01E-12	1.15E-12	1.01E-12	9.87E-13	1.60E-12	1.04E-12	9.87E-13	1.04E-12	1.28E-12
Ni-59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ni-63	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Np-237	1.75E-13	2.12E-13	1.51E-13	1.29E-13	5.37E-13	1.67E-13	1.43E-13	1.73E-13	2.59E-13
Pa-231	1.34E-17	1.56E-17	1.27E-17	1.19E-17	2.85E-17	1.33E-17	1.21E-17	1.35E-17	1.91E-17
Pb-210	8.25E-22	1.09E-21	5.67E-22	4.19E-22	2.60E-21	7.23E-22	5.45E-22	7.52E-22	1.71E-21
Pd-107	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pm-147	1.82E-14	2.32E-14	1.33E-14	1.08E-14	5.30E-14	1.64E-14	1.28E-14	1.69E-14	1.97E-11
Pu-238	9.64E-13	1.87E-12	1.56E-13	2.47E-13	1.37E-12	5.89E-13	2.92E-13	7.17E-13	6.01E-12
Pu-239	1.23E-13	1.92E-13	6.75E-14	6.80E-14	2.41E-13	9.88E-14	7.29E-14	1.08E-13	4.74E-13
Pu-240	2.80E-13	5.42E-13	4.80E-14	7.27E-14	4.08E-13	1.73E-13	8.64E-14	2.09E-13	1.73E-12
Pu-241	1.76E-13	2.12E-13	1.59E-13	1.38E-13	5.36E-13	1.71E-13	1.49E-13	1.78E-13	2.87E-13
Pu-242	6.71E-16	1.29E-15	1.22E-16	1.80E-16	9.93E-16	4.17E-16	2.11E-16	5.04E-16	4.11E-15
Ra-226	1.96E-20	2.26E-20	1.88E-20	1.72E-20	5.07E-20	1.97E-20	1.78E-20	2.01E-20	3.06E-20
Ra-228	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ru-106	3.07E-15	3.53E-15	3.07E-15	2.98E-15	5.23E-15	3.13E-15	2.93E-15	3.16E-15	3.31E-14
Sb-125	8.72E-11	1.00E-10	8.59E-11	8.24E-11	1.56E-10	8.86E-11	8.19E-11	8.90E-11	1.17E-10
Se-79	7.12E-17	9.58E-17	4.33E-17	3.42E-17	1.97E-16	6.07E-17	4.31E-17	6.21E-17	7.61E-14
Sm-147	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sm-151	7.91E-15	1.34E-14	1.08E-15	1.72E-15	1.08E-14	5.45E-15	2.27E-15	5.49E-15	2.89E-14
Sn-126	2.94E-11	3.36E-11	2.91E-11	2.81E-11	5.10E-11	3.00E-11	2.78E-11	3.00E-11	5.09E-11
Sr-90	1.39E-10	1.69E-10	1.15E-10	9.71E-11	4.07E-10	1.31E-10	1.09E-10	1.34E-10	1.64E-07
Tc-99	1.14E-14	1.44E-14	8.42E-15	6.86E-15	3.38E-14	1.03E-14	8.10E-15	1.08E-14	1.79E-11
Th-229	4.83E-19	5.66E-19	4.49E-19	3.88E-19	1.47E-18	4.74E-19	4.19E-19	4.91E-19	6.93E-19
Th-230	3.92E-20	5.19E-20	3.12E-20	2.66E-20	1.15E-19	3.55E-20	2.99E-20	3.79E-20	9.83E-20
Th-232	1.11E-22	1.62E-22	7.58E-23	6.57E-23	3.09E-22	9.40E-23	7.54E-23	1.04E-22	4.09E-22
U-232	1.70E-17	2.55E-17	1.08E-17	9.87E-18	4.24E-17	1.42E-17	1.10E-17	1.56E-17	6.50E-17
U-233	7.47E-19	9.82E-19	5.97E-19	5.48E-19	1.82E-18	6.65E-19	5.79E-19	7.21E-19	2.02E-18
U-234	1.30E-16	2.13E-16	6.48E-17	6.22E-17	2.95E-16	9.90E-17	7.11E-17	1.13E-16	6.29E-16
U-235	9.37E-15	1.08E-14	8.97E-15	8.17E-15	2.45E-14	9.37E-15	8.47E-15	9.57E-15	1.15E-14
U-236	1.24E-16	2.23E-16	4.42E-17	4.72E-17	2.41E-16	8.50E-17	5.47E-17	1.02E-16	7.24E-16
U-238	1.10E-16	2.14E-16	2.50E-17	3.11E-17	1.85E-16	6.82E-17	3.78E-17	8.55E-17	7.29E-16
Zr-93	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
crud									
Co-60 (crud)	7.86E-07	8.88E-07	7.92E-07	7.86E-07	1.14E-06	8.11E-07	7.67E-07	8.05E-07	9.26E-07
Fe-55 (crud)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
total	2.33E-03	2.66E-03	2.31E-03	2.25E-03	3.82E-03	2.38E-03	2.21E-03	2.38E-03	5.58E-03

SAXTON (MOX) [787] non-metal not intact No HEPAs

	Inhalation Dose @ 5000 m [rem]	Dose Term for Regulation	Air Submersion Dose @ 5000 m [rem]	Dose Term for Regulation		Dose Term for Regulation
Gonad	2.99E+01		5.05E-03			
Breast	2.99E-01		5.74E-03			
Lung	7.39E+01		5.05E-03			
R Marrow	1.62E+02		4.97E-03			
B Surface	1.99E+03	<CDE	7.79E-03			
Thyroid	2.96E-01		5.19E-03			
Remainder	7.25E+01		4.86E-03			
Whole Body	1.13E+02	<CEDE	5.16E-03	<DDE	1.13E+02	<TEDE=CEDE+DDE
Skin	0.00E+00	<SKIN	9.36E-03	<SKIN	9.36E-03	<SKIN
Eye Lens	N/A	<EYE	N/A	<EYE	N/A	<EYE
					1.99E+03	<CDE + DDE

SAXTON (MOX) [787] non-metal not intact HEPAs

	Inhalation Dose @ 5000 m [rem]	Dose Term for Regulation	Air Submersion Dose @ 5000 m [rem]	Dose Term for Regulation	Dose for Regulation [rem]	Dose Term for Regulation
Gonad	2.61E-01		2.33E-03			
Breast	2.26E-01		2.66E-03			
Lung	2.76E-01		2.31E-03			
R Marrow	2.88E-01		2.25E-03			
B Surface	8.26E-01	<CDE	3.82E-03			
Thyroid	2.30E-01		2.38E-03			
Remainder	2.85E-01		2.21E-03			
Whole Body	2.83E-01	<CEDE	2.38E-03	<DDE	2.85E-01	<TEDE=CEDE+DDE
Skin	0.00E+00	<SKIN	5.58E-03	<SKIN	5.58E-03	<SKIN
Eye Lens	N/A	<EYE	N/A	<EYE	N/A	<EYE
					8.29E-01	<CDE + DDE

SAXTON (MOX) [787]

isotope	material type	offsite doses with no HEPAs [rem] TEDE	non-metal bone surface CDE + DDE	not intact offsite doses with HEPAs [rem] TEDE	bone surface CDE + DDE
Ac-227	P	2.79E-06	4.94E-05	8.36E-10	1.48E-08
Am-241	P	8.92E+01	1.61E+03	2.68E-02	4.84E-01
Am-242m	P	1.42E-01	2.61E+00	4.25E-05	7.83E-04
Am-243	P	3.89E-01	7.08E+00	1.17E-04	2.13E-03
C-14	P	1.18E-07	1.18E-07	3.53E-11	3.53E-11
Cd-113m	P	1.23E-03	9.90E-05	3.70E-07	2.97E-08
Cl-36	P	1.61E-08	1.37E-09	4.82E-12	4.10E-13
Cm-242	P	4.73E-03	4.94E-02	1.42E-06	1.48E-05
Cm-243	P	1.53E-01	2.72E+00	4.60E-05	8.15E-04
Cm-244	P	7.18E+00	1.25E+02	2.15E-03	3.76E-02
Cm-245	P	3.00E-03	5.47E-02	9.01E-07	1.64E-05
Cm-246	P	6.02E-04	1.10E-02	1.81E-07	3.29E-06
Cm-247	P	1.44E-09	2.63E-08	4.33E-13	7.88E-12
Co-60	P	1.47E-04	3.54E-05	4.41E-08	1.06E-08
Cs-134	C	4.54E-05	4.00E-05	4.54E-05	4.00E-05
Cs-135	C	2.36E-07	2.30E-07	2.36E-07	2.30E-07
Cs-137	C	2.51E-01	2.31E-01	2.51E-01	2.31E-01
Eu-154	P	1.65E-02	1.11E-01	4.95E-06	3.33E-05
Eu-155	P	2.48E-04	3.36E-03	7.45E-08	1.01E-06
Fe-55	P	1.47E-08	1.04E-08	4.41E-12	3.12E-12
H-3	G	8.74E-05	8.74E-05	8.74E-05	8.74E-05
I-129	G	4.94E-05	1.47E-07	4.94E-05	1.47E-07
Kr-85	G	1.60E-05	1.60E-05	1.60E-05	1.60E-05
Nb-93m	P	2.57E-06	2.42E-07	7.71E-10	7.25E-11
Nb-94	P	6.72E-07	1.21E-07	2.02E-10	3.63E-11
Ni-59	P	1.66E-09	1.62E-09	4.97E-13	4.87E-13
Ni-63	P	4.28E-07	4.19E-07	1.28E-10	1.26E-10
Np-237	P	1.09E-02	2.44E-01	3.27E-06	7.31E-05
Pa-231	P	1.21E-06	3.03E-05	3.62E-10	9.08E-09
Pb-210	P	2.17E-11	3.24E-10	6.52E-15	9.72E-14
Pd-107	P	8.51E-08	3.36E-10	2.55E-11	1.01E-13
Pm-147	P	1.14E-04	1.10E-03	3.43E-08	3.30E-07
Pu-238	P	6.91E+00	1.24E+02	2.07E-03	3.72E-02
Pu-239	P	1.31E+00	2.39E+01	3.94E-04	7.16E-03
Pu-240	P	2.27E+00	4.13E+01	6.81E-04	1.24E-02
Pu-241	P	2.43E+00	4.57E+01	7.28E-04	1.37E-02
Pu-242	P	6.19E-03	1.12E-01	1.86E-06	3.36E-05
Ra-226	P	6.57E-11	2.15E-10	1.97E-14	6.45E-14
Ra-228	P	4.17E-11	2.10E-10	1.25E-14	6.31E-14
Ru-106	P	1.74E-08	1.86E-09	5.23E-12	5.58E-13
Sb-125	P	6.75E-06	5.64E-06	2.03E-09	1.69E-09
Se-79	P	2.42E-07	6.18E-08	7.27E-11	1.85E-11
Sm-147	P	2.10E-08	3.57E-07	6.30E-12	1.07E-10
Sm-151	P	5.47E-04	9.32E-03	1.64E-07	2.80E-06
Sn-126	P	4.76E-06	2.05E-05	1.43E-09	6.16E-09
Sr-90	P	2.78E+00	5.76E+00	8.35E-04	1.73E-03
Tc-99	P	6.52E-06	1.31E-07	1.96E-09	3.93E-11
Th-229	P	3.30E-08	8.14E-07	9.90E-12	2.44E-10
Th-230	P	8.51E-08	2.09E-06	2.55E-11	6.27E-10
Th-232	P	2.34E-09	5.87E-08	7.02E-13	1.76E-11
U-232	P	8.68E-05	3.13E-05	2.60E-08	9.39E-09
U-233	P	7.19E-07	2.20E-07	2.16E-10	6.60E-11
U-234	P	2.35E-04	7.16E-05	7.06E-08	2.15E-08
U-235	P	1.96E-05	5.96E-06	5.88E-09	1.79E-09
U-236	P	3.05E-04	9.36E-05	9.16E-08	2.81E-08
U-238	P	3.56E-04	1.09E-04	1.07E-07	3.26E-08
Zr-93	P	3.72E-05	9.34E-04	1.11E-08	2.80E-07
crud					
Co-60 (crud)	crud	1.28E-01	3.14E-02	3.85E-05	9.42E-06
Fe-55 (crud)	crud	9.71E-03	6.87E-03	2.91E-06	2.06E-06
	total	1.13E+02	1.99E+03	2.85E-01	8.29E-01

SAXTON (MOX) [787] non-metal not intact

TEDE (no HEPAs)

material type		subtotal [rem]	fraction of total [-]
G		1.53E-04	1.35E-06
P		1.13E+02	9.97E-01
C		2.51E-01	2.22E-03
crud		1.38E-01	1.22E-03
	total	1.13E+02	1.00E+00

TEDE (HEPAs)

material type		subtotal [rem]	fraction of total [-]
G		1.53E-04	5.36E-04
P		3.38E-02	1.19E-01
C		2.51E-01	8.81E-01
crud		4.14E-05	1.45E-04
	total	2.85E-01	1.00E+00

bone surface CDE + DDE (no HEPAs)

material type		subtotal [rem]	fraction of total [-]
G		1.04E-04	5.20E-08
P		1.99E+03	1.00E+00
C		2.31E-01	1.16E-04
crud		3.83E-02	1.92E-05
	total	1.99E+03	1.00E+00

bone surface CDE + DDE (HEPAs)

material type		subtotal [rem]	fraction of total [-]
G		1.04E-04	1.25E-04
P		5.98E-01	7.21E-01
C		2.31E-01	2.79E-01
crud		1.15E-05	1.39E-05
	total	8.29E-01	1.00E+00

Attachment VII

Calculations for EBWR (U Metal) LEU DOE SNF

	evaluated fuel					x			evaluated fuel
	fuel type	stable metal	stable metal	non-metal	non-metal	other	other		other
	condition	intact	not intact	intact	not intact	intact	not intact		intact
	fuel name	HWCTR (U/TH) [112]	ALUM CLAD SNF [411]	SHIPPINGPORT PWR CORE II [193]	SAXTON (MOX) [787]	EBWR (U METAL) LEU [64]	N REACTOR [147]		EBWR (U METAL) LEU [64]
	# of canisters	0.17	1.00	24.00	1.00	10.50	194.95		10.50
Isotopes	material type	Curies (entire fuel inventory)							Curies
Ac-227	P	9.27E-09	2.81E-07	1.24E-02	1.33E-05	3.38E-05	1.03E-02		3.38E-05
Am-241	P	1.22E-01	2.51E+01	7.61E+04	6.45E+03	1.63E+04	2.80E+05		1.63E+04
Am-242m	P	8.67E-05	9.69E-03	1.18E+02	1.07E+01	2.71E+01	7.96E+00		2.71E+01
Am-243	P	2.85E-04	2.40E-02	3.38E+02	2.83E+01	7.18E+01	4.10E+01		7.18E+01
C-14	P	1.09E-06	1.17E-05	1.53E+00	1.81E+00	4.59E+00	3.63E+02		4.59E+00
Cd-113m	P	6.32E-02	7.25E-01	0.00E+00	2.59E+01	6.56E+01	0.00E+00		6.56E+01
Cl-36	P	2.51E-30	0.00E+00	0.00E+00	2.35E-02	5.96E-02	0.00E+00		5.96E-02
Cm-242	P	2.62E-04	8.00E-03	0.00E+00	8.79E+00	2.23E+01	0.00E+00		2.23E+01
Cm-243	P	4.52E-05	3.29E-03	0.00E+00	1.60E+01	4.06E+01	0.00E+00		4.06E+01
Cm-244	P	9.94E-03	4.27E-01	3.16E+04	9.29E+02	2.36E+03	2.44E+03		2.36E+03
Cm-245	P	5.84E-07	1.33E-05	5.82E+00	2.12E-01	5.37E-01	5.13E-01		5.37E-01
Cm-246	P	3.99E-08	9.83E-07	9.89E-01	4.28E-02	1.08E-01	6.79E-02		1.08E-01
Cm-247	P	4.17E-14	0.00E+00		1.12E-07	2.83E-07			2.83E-07
Co-60	P	7.30E-03	1.81E-09	1.10E+04	2.12E+01	5.38E+01	4.75E+02		5.38E+01
Cs-134	C	9.30E+01	2.05E+02	3.63E+03	1.24E+01	3.13E+01	1.63E+02		3.13E+01
Cs-135	C	6.58E-04	1.24E-02	6.19E+00	6.65E-01	1.69E+00	4.00E+01		1.69E+00
Cs-137	C	5.49E+02	8.60E+03	2.07E+06	1.00E+05	2.53E+05	5.34E+06		2.53E+05
Eu-154	P	1.57E+01	9.08E+01	0.00E+00	1.84E+03	4.67E+03	0.00E+00		4.67E+03
Eu-155	P	7.47E+00	2.81E+01	0.00E+00	1.92E+02	4.86E+02	0.00E+00		4.86E+02
Fe-55	P	1.29E+00	0.00E+00	0.00E+00	1.76E-01	4.45E-01	0.00E+00		4.45E-01
H-3	G	2.02E+00	2.61E+01	5.09E+03	2.92E+02	7.41E+02	1.03E+04		7.41E+02
I-129	G	1.44E-04	2.54E-03	7.20E-01	6.09E-02	1.54E-01	3.29E+00		1.54E-01
Kr-85	G	5.46E+01	6.45E+02	5.07E+04	2.59E+03	6.56E+03	1.53E+05		6.56E+03
Nb-93m	P	2.82E-03	4.96E-02	5.72E+01	2.82E+00	7.15E+00	4.54E+02		7.15E+00
Nb-94	P	1.37E-07	4.96E-06	0.00E+00	5.18E-02	1.31E-01	6.71E-05		1.31E-01
Ni-59	P	2.43E-04	0.00E+00	0.00E+00	4.01E-02	1.02E-01	2.03E+01		1.02E-01
Ni-63	P	3.69E-02	0.00E+00	8.04E+04	4.42E+00	1.12E+01	2.21E+03		1.12E+01
Np-237	P	1.82E-03	1.20E-02	7.06E+00	6.46E-01	1.64E+00	3.87E+01		1.64E+00
Pa-231	P	9.79E-08	1.88E-06	1.15E-02	3.02E-05	7.65E-05	1.38E-02		7.65E-05
Pb-210	P	1.04E-10	1.44E-11	2.71E-06	5.13E-08	1.30E-07	7.52E-08		1.30E-07
Pd-107	P	9.52E-05	2.35E-03	1.95E+00	2.14E-01	5.42E-01	7.46E+00		5.42E-01
Pm-147	P	4.86E+02	2.47E+03	0.00E+00	9.36E+01	2.37E+02	0.00E+00		2.37E+02
Pu-238	P	7.65E+02	2.20E+01	8.02E+04	5.66E+02	1.18E+04	6.37E+04		1.18E+04
Pu-239	P	1.59E+01	1.49E+01	7.55E+03	9.81E+01	2.05E+03	1.23E+05		2.05E+03
Pu-240	P	9.08E+00	1.07E+01	1.13E+04	1.70E+02	3.54E+03	7.18E+04		3.54E+03
Pu-241	P	2.56E+03	1.22E+03	1.57E+06	9.43E+03	1.97E+05	2.06E+06		1.97E+05
Pu-242	P	1.35E-02	1.04E-02	3.73E+01	4.84E-01	1.01E+01	3.46E+01		1.01E+01
Ra-226	P	1.93E-09	1.53E-10	6.13E-06	2.46E-07	6.22E-07	1.15E-03		6.22E-07
Ra-228	P	1.74E-13	8.44E-12	5.85E-02	2.80E-07	7.11E-07	1.03E-06		7.11E-07
Ru-106	P	3.64E+01	2.97E+01	1.42E+01	1.17E-03	2.97E-03	3.16E-01		2.97E-03
Sb-125	P	1.20E+01	0.00E+00	0.00E+00	1.70E+01	4.30E+01	0.00E+00		4.30E+01
Se-79	P	2.47E-03	6.93E-02	7.69E+00	7.90E-01	2.00E+00	4.48E+01		2.00E+00
Sm-147	P	3.48E-08	8.28E-07	0.00E+00	9.01E-06	2.28E-05	0.00E+00		2.28E-05
Sm-151	P	2.16E+00	2.67E+01	2.58E+04	5.86E+02	1.48E+03	8.55E+04		1.48E+03
Sn-126	P	2.21E-03	2.72E-02	9.72E+00	1.50E+00	3.80E+00	7.83E+01		3.80E+00
Sr-90	P	5.25E+02	8.16E+03	1.56E+06	6.87E+04	1.74E+05	4.03E+06		1.74E+05
Tc-99	P	8.07E-02	1.44E+00	2.67E+02	2.51E+01	6.37E+01	1.51E+03		6.37E+01
Th-229	P	3.77E-06	8.09E-10	1.57E-02	4.93E-07	1.03E-05	9.31E-06		1.03E-05
Th-230	P	3.27E-04	7.96E-08	1.08E-03	8.39E-06	1.75E-04	1.02E-03		1.75E-04
Th-232	P	1.49E-10	1.99E-11	5.56E-03	4.58E-08	9.56E-07	1.21E-07		9.56E-07
U-232	P	4.47E-03	1.11E-04	0.00E+00	4.23E-03	8.82E-02	0.00E+00		8.82E-02
U-233	P	6.56E-05	1.18E-06	6.07E+00	1.70E-04	3.55E-03	5.71E-03		3.55E-03
U-234	P	6.83E+00	1.17E-03	5.82E+00	5.70E-02	1.19E+00	4.85E+02		1.19E+00
U-235	P	1.34E-01	8.48E-03	6.58E-01	5.12E-03	1.07E-01	1.85E+01		1.07E-01
U-236	P	5.77E-01	3.95E-02	5.50E+00	7.81E-02	1.63E+00	7.02E+01		1.63E+00
U-238	P	2.22E-03	1.04E-02	5.15E+00	9.65E-02	2.01E+00	3.82E+02		2.01E+00
Zr-93	P	1.27E-02	1.40E-01	3.61E+01	3.72E+00	9.42E+00	2.10E+02		9.42E+00
crud (per canister)									
Co-60 (crud)		1.56E+01	6.37E+00	2.68E+02	1.23E+02	7.70E+02	1.76E+03		7.70E+02
Fe-55 (crud)		9.85E+01	4.01E+01	1.69E+03	7.73E+02	4.85E+03	1.11E+04		4.85E+03

Release Fractions				
Material Type	ARF	RF	Total Release Fraction	HEPA Filter LPF
stable metal/ intact				
G	0.3	1.0	3.00E-01	1.0
P	2.00E-04	4.00E-03	8.00E-07	3.00E-04
C	2.00E-04	1.0	2.00E-04	1.0
stable metal/not intact				
G	0.3	1.0	0.3	1.0
P	5.00E-03	0.4	2.00E-03	3.00E-04
C	5.00E-03	1.0	5.00E-03	1.0
non-metal/intact				
G	0.3	1.0	0.3	1.0
P	2.25E-04	1.0	2.25E-04	3.00E-04
C	2.25E-04	1.0	2.25E-04	1.0
non-metal/not intact				
G	0.3	1.0	0.3	1.0
P	5.00E-03	0.4	2.00E-03	3.00E-04
C	5.00E-03	1.0	5.00E-03	1.0
other/intact				
G	0.3	1.0	0.3	1.0
P	1.00E-03	1.0	1.00E-03	3.00E-04
C	1.00E-03	1.0	1.00E-03	1.0
other/not intact				
G	0.3	1.0	0.3	1.0
P	5.00E-03	0.4	2.00E-03	3.00E-04
C	5.00E-03	1.0	5.00E-03	1.0
crud				
crud	1.0	0.3	3.00E-01	3.00E-04
EBWR (U METAL) LEU [64]				
other				
intact				
Release Fractions Used in this Calculation				
G	0.3	1.0	0.3	1.0
P	1.00E-03	1.00E+00	1.00E-03	3.00E-04
C	1.00E-03	1.00E+00	1.00E-03	1.00E+00
crud	1.0	0.3	0.3	3.00E-04
breathing rate	3.33E-04	[m^3/s]		
gound level dispersion factor				
distance [m]	x/Q [sec/m^3]			
5000	4.68E-05	99.5% worst-sector		
3.70E+12	unit conversion factor			
	Sv/Bq to rem/Ci			

	Inhalation DCFs [Sv/Bq]								
Isotopes	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	3.96E-04	6.66E-08	1.54E-03	2.57E-03	3.21E-02	3.59E-08	1.47E-03	1.81E-03	0.00E+00
Am-241	3.25E-05	2.67E-09	1.84E-05	1.74E-04	2.17E-03	1.60E-09	7.82E-05	1.20E-04	0.00E+00
Am-242m	3.21E-05	1.38E-09	4.20E-06	1.69E-04	2.12E-03	5.64E-10	7.48E-05	1.15E-04	0.00E+00
Am-243	3.26E-05	1.52E-08	1.78E-05	1.73E-04	2.17E-03	8.29E-09	7.74E-05	1.19E-04	0.00E+00
C-14	5.64E-10	5.64E-10	5.64E-10	5.64E-10	5.64E-10	5.64E-10	5.64E-10	5.64E-10	0.00E+00
Cd-113m	3.32E-08	3.32E-08	4.09E-07	3.32E-08	3.32E-08	3.32E-08	1.30E-06	4.13E-07	0.00E+00
Cl-36	5.04E-10	5.04E-10	4.56E-08	5.04E-10	5.04E-10	5.04E-10	5.36E-10	5.93E-09	0.00E+00
Cm-242	5.70E-07	9.44E-10	1.55E-05	3.90E-06	4.87E-05	9.41E-10	2.45E-06	4.67E-06	0.00E+00
Cm-243	2.07E-05	6.29E-09	1.94E-05	1.18E-04	1.47E-03	3.83E-09	5.76E-05	8.30E-05	0.00E+00
Cm-244	1.59E-05	1.04E-09	1.93E-05	9.38E-05	1.17E-03	1.01E-09	4.78E-05	6.70E-05	0.00E+00
Cm-245	3.37E-05	6.69E-09	1.80E-05	1.79E-04	2.24E-03	3.68E-09	7.96E-05	1.23E-04	0.00E+00
Cm-246	3.34E-05	4.00E-09	1.82E-05	1.78E-04	2.22E-03	2.26E-09	7.94E-05	1.22E-04	0.00E+00
Cm-247	3.07E-05	2.23E-08	1.67E-05	1.63E-04	2.04E-03	1.45E-08	7.30E-05	1.12E-04	0.00E+00
Co-60	4.76E-09	1.84E-08	3.45E-07	1.72E-08	1.35E-08	1.62E-08	3.60E-08	5.91E-08	0.00E+00
Cs-134	1.30E-08	1.08E-08	1.18E-08	1.18E-08	1.10E-08	1.11E-08	1.39E-08	1.25E-08	0.00E+00
Cs-135	1.20E-09	1.20E-09	1.41E-09	1.20E-09	1.20E-09	1.20E-09	1.20E-09	1.23E-09	0.00E+00
Cs-137	8.76E-09	7.84E-09	8.82E-09	8.30E-09	7.94E-09	7.93E-09	9.12E-09	8.63E-09	0.00E+00
Eu-154	1.17E-08	1.55E-08	7.92E-08	1.06E-07	5.23E-07	7.14E-09	1.13E-07	7.73E-08	0.00E+00
Eu-155	3.56E-10	6.14E-10	1.19E-08	1.43E-08	1.52E-07	2.40E-10	1.11E-08	1.12E-08	0.00E+00
Fe-55	5.23E-10	5.09E-10	1.06E-09	5.17E-10	5.14E-10	5.42E-10	1.21E-09	7.26E-10	0.00E+00
H-3	1.73E-11	1.73E-11	1.73E-11	1.73E-11	1.73E-11	1.73E-11	1.73E-11	1.73E-11	0.00E+00
I-129	8.69E-11	2.09E-10	3.14E-10	1.40E-10	1.38E-10	1.56E-06	1.18E-10	4.69E-08	0.00E+00
Kr-85	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nb-93m	4.16E-10	4.36E-11	6.45E-08	2.85E-10	7.43E-10	3.04E-11	3.95E-10	7.90E-09	0.00E+00
Nb-94	4.76E-09	2.24E-08	7.48E-07	2.26E-08	1.97E-08	2.22E-08	4.45E-08	1.12E-07	0.00E+00
Ni-59	3.59E-10	3.46E-10	1.20E-09	3.54E-10	3.51E-10	3.77E-10	3.63E-10	3.58E-10	0.00E+00
Ni-63	8.22E-10	8.22E-10	3.07E-09	8.22E-10	8.22E-10	8.22E-10	8.59E-10	8.39E-10	0.00E+00
Np-237	2.96E-05	1.69E-08	1.61E-05	2.62E-04	3.27E-03	1.34E-08	2.34E-05	1.46E-04	0.00E+00
Pa-231	6.90E-09	8.79E-09	7.47E-04	6.97E-04	8.70E-03	7.64E-09	2.87E-07	3.47E-04	0.00E+00
Pb-210	3.18E-07	3.18E-07	3.18E-07	3.75E-06	5.47E-05	3.18E-07	4.69E-06	3.67E-06	0.00E+00
Pd-107	9.45E-13	9.45E-13	2.85E-08	5.11E-12	1.36E-11	9.45E-13	2.15E-10	3.45E-09	0.00E+00
Pm-147	1.88E-14	3.60E-14	7.74E-08	8.16E-09	1.02E-07	1.98E-14	5.89E-09	1.06E-08	0.00E+00
Pu-238	2.80E-05	1.00E-09	3.20E-04	1.52E-04	1.90E-03	9.62E-10	7.02E-05	1.06E-04	0.00E+00
Pu-239	3.18E-05	9.22E-10	3.23E-04	1.69E-04	2.11E-03	9.03E-10	7.56E-05	1.16E-04	0.00E+00
Pu-240	3.18E-05	9.51E-10	3.23E-04	1.69E-04	2.11E-03	9.05E-10	7.56E-05	1.16E-04	0.00E+00
Pu-241	6.82E-07	3.06E-11	3.18E-06	3.36E-06	4.20E-05	1.24E-11	1.31E-06	2.23E-06	0.00E+00
Pu-242	3.02E-05	9.45E-10	3.07E-04	1.61E-04	2.01E-03	8.79E-10	7.18E-05	1.11E-04	0.00E+00
Ra-226	1.02E-07	1.02E-07	1.61E-05	6.64E-07	7.59E-06	1.02E-07	1.07E-07	2.32E-06	0.00E+00
Ra-228	1.83E-07	1.84E-07	7.22E-06	7.38E-07	6.51E-06	1.83E-07	1.87E-07	1.29E-06	0.00E+00
Ru-106	1.38E-08	1.37E-08	1.04E-06	1.37E-08	1.37E-08	1.37E-08	1.69E-08	1.29E-07	0.00E+00
Sb-125	3.60E-10	4.16E-10	2.17E-08	6.49E-10	2.73E-09	3.24E-10	1.45E-09	3.30E-09	0.00E+00
Se-79	6.79E-10	6.79E-10	9.81E-09	6.79E-10	6.79E-10	6.79E-10	4.24E-09	2.66E-09	0.00E+00
Sm-147	0.00E+00	0.00E+00	7.62E-06	2.75E-05	3.44E-04	0.00E+00	1.89E-05	2.02E-05	0.00E+00
Sm-151	4.03E-14	1.49E-13	3.26E-09	1.10E-08	1.38E-07	1.32E-14	7.51E-09	8.10E-09	0.00E+00
Sn-126	1.43E-08	1.41E-08	1.51E-07	5.62E-08	1.18E-07	1.31E-08	1.76E-08	2.69E-08	0.00E+00
Sr-90	2.64E-09	2.64E-09	2.86E-06	3.38E-07	7.27E-07	2.64E-09	5.73E-09	3.51E-07	0.00E+00
Tc-99	4.52E-11	4.52E-11	1.67E-08	4.52E-11	4.52E-11	1.21E-09	6.26E-10	2.25E-09	0.00E+00
Th-229	2.76E-06	2.76E-06	1.99E-03	1.15E-03	1.43E-02	2.76E-06	7.05E-06	5.80E-04	0.00E+00
Th-230	4.08E-07	4.08E-07	3.00E-04	1.73E-04	2.16E-03	4.08E-07	1.05E-06	8.80E-05	0.00E+00
Th-232	7.62E-07	7.72E-07	9.40E-04	8.93E-04	1.11E-02	7.44E-07	1.87E-06	4.43E-04	0.00E+00
U-232	8.00E-08	8.06E-08	1.48E-03	4.06E-06	6.42E-05	7.85E-08	3.11E-06	1.78E-04	0.00E+00
U-233	2.54E-08	2.54E-08	3.04E-04	7.12E-07	1.12E-05	2.54E-08	9.40E-07	3.66E-05	0.00E+00
U-234	2.50E-08	2.50E-08	2.98E-04	6.98E-07	1.09E-05	2.50E-08	9.26E-07	3.58E-05	0.00E+00
U-235	2.37E-08	2.38E-08	2.76E-04	6.58E-07	1.01E-05	2.37E-08	8.59E-07	3.32E-05	0.00E+00
U-236	2.37E-08	2.37E-08	2.82E-04	6.60E-07	1.04E-05	2.37E-08	8.77E-07	3.39E-05	0.00E+00
U-238	2.23E-08	2.23E-08	2.66E-04	6.58E-07	9.78E-06	2.22E-08	8.22E-07	3.20E-05	0.00E+00
Zr-93	2.18E-11	4.68E-11	8.72E-08	1.77E-07	2.18E-06	1.74E-11	1.73E-10	8.67E-08	0.00E+00
crud									
Co-60	4.76E-09	1.84E-08	3.45E-07	1.72E-08	1.35E-08	1.62E-08	3.60E-08	5.91E-08	0.00E+00
Fe-55	5.23E-10	5.09E-10	1.06E-09	5.17E-10	5.14E-10	5.42E-10	1.21E-09	7.26E-10	0.00E+00

	air submersion DCFs [Sv/Bq m^3/s]								
	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	3.75E-17	4.45E-17	3.38E-17	2.94E-17	1.04E-16	3.65E-17	3.18E-17	3.74E-17	3.28E-16
Am-241	8.58E-16	1.07E-15	6.74E-16	5.21E-16	2.87E-15	7.83E-16	6.34E-16	8.18E-16	1.28E-15
Am-242m	3.80E-17	6.01E-17	1.72E-17	1.72E-17	7.94E-17	2.95E-17	1.94E-17	3.17E-17	1.36E-16
Am-243	2.19E-15	2.61E-15	1.92E-15	1.55E-15	7.47E-15	2.09E-15	1.79E-15	2.18E-15	2.75E-15
C-14	2.59E-19	3.52E-19	1.53E-19	1.21E-19	7.06E-19	2.19E-19	1.54E-19	2.24E-19	2.43E-18
Cd-113m	7.17E-18	8.76E-18	5.93E-18	5.01E-18	2.10E-17	6.76E-18	5.63E-18	6.94E-18	8.48E-15
Cl-36	2.24E-17	2.66E-17	2.02E-17	1.81E-17	5.63E-17	2.19E-17	1.92E-17	2.23E-17	1.47E-14
Cm-242	7.83E-18	1.48E-17	1.13E-18	1.89E-18	1.06E-17	4.91E-18	2.27E-18	5.69E-18	4.29E-17
Cm-243	5.77E-15	6.68E-15	5.50E-15	5.00E-15	1.50E-14	5.76E-15	5.19E-15	5.88E-15	9.79E-15
Cm-244	6.90E-18	1.33E-17	7.08E-19	1.46E-18	8.82E-18	4.19E-18	1.81E-18	4.91E-18	3.91E-17
Cm-245	3.88E-15	4.55E-15	3.63E-15	3.17E-15	1.18E-14	3.84E-15	3.40E-15	3.96E-15	5.36E-15
Cm-246	6.24E-18	1.20E-17	7.00E-19	1.35E-18	8.17E-18	3.82E-18	1.67E-18	4.46E-18	3.49E-17
Cm-247	1.47E-14	1.68E-14	1.44E-14	1.38E-14	2.83E-14	1.49E-14	1.38E-14	1.50E-14	1.79E-14
Co-60	1.23E-13	1.39E-13	1.24E-13	1.23E-13	1.78E-13	1.27E-13	1.20E-13	1.26E-13	1.45E-13
Cs-134	7.40E-14	8.43E-14	7.37E-14	7.19E-14	1.20E-13	7.57E-14	7.06E-14	7.57E-14	9.45E-14
Cs-135	6.28E-19	8.23E-19	4.19E-19	3.34E-19	1.81E-18	5.50E-19	4.09E-19	5.65E-19	9.06E-16
Cs-137	2.67E-14	3.05E-14	2.65E-14	2.58E-14	4.38E-14	2.73E-14	2.54E-14	2.73E-14	4.39E-14
Eu-154	6.00E-14	6.81E-14	5.99E-14	5.87E-14	9.43E-14	6.15E-14	5.75E-14	6.14E-14	8.29E-14
Eu-155	2.49E-15	2.95E-15	2.22E-15	1.85E-15	8.09E-15	2.41E-15	2.07E-15	2.49E-15	3.39E-15
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H-3	0.00E+00	0.00E+00	2.75E-18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.31E-19	0.00E+00
I-129	4.83E-16	6.66E-16	2.14E-16	1.64E-16	1.10E-15	3.86E-16	2.30E-16	3.80E-16	1.10E-15
Kr-85	1.17E-16	1.34E-16	1.14E-16	1.09E-16	2.20E-16	1.18E-16	1.09E-16	1.19E-16	1.32E-14
Nb-93m	6.33E-18	1.31E-17	2.55E-19	1.18E-18	6.92E-18	3.43E-18	1.36E-18	4.44E-18	4.28E-17
Nb-94	7.54E-14	8.57E-14	7.51E-14	7.34E-14	1.19E-13	7.72E-14	7.19E-14	7.70E-14	9.52E-14
Ni-59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ni-63	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Np-237	1.04E-15	1.26E-15	9.02E-16	7.69E-16	3.20E-15	9.94E-16	8.50E-16	1.03E-15	1.54E-15
Pa-231	1.71E-15	1.99E-15	1.62E-15	1.52E-15	3.64E-15	1.70E-15	1.54E-15	1.72E-15	2.44E-15
Pb-210	6.19E-17	8.18E-17	4.25E-17	3.14E-17	1.95E-16	5.42E-17	4.09E-17	5.64E-17	1.28E-16
Pd-107	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pm-147	7.48E-19	9.56E-19	5.45E-19	4.46E-19	2.18E-18	6.75E-19	5.26E-19	6.93E-19	8.11E-16
Pu-238	6.56E-18	1.27E-17	1.06E-18	1.68E-18	9.30E-18	4.01E-18	1.99E-18	4.88E-18	4.09E-17
Pu-239	4.84E-18	7.55E-18	2.65E-18	2.67E-18	9.47E-18	3.88E-18	2.86E-18	4.24E-18	1.86E-17
Pu-240	6.36E-18	1.23E-17	1.09E-18	1.65E-18	9.26E-18	3.92E-18	1.96E-18	4.75E-18	3.92E-17
Pu-241	7.19E-20	8.67E-20	6.48E-20	5.63E-20	2.19E-19	6.98E-20	6.09E-20	7.25E-20	1.17E-19
Pu-242	5.34E-18	1.03E-17	9.69E-19	1.43E-18	7.90E-18	3.32E-18	1.68E-18	4.01E-18	3.27E-17
Ra-226	3.08E-16	3.54E-16	2.95E-16	2.70E-16	7.95E-16	3.09E-16	2.79E-16	3.15E-16	4.79E-16
Ra-228	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ru-106	1.01E-14	1.16E-14	1.01E-14	9.75E-15	1.72E-14	1.03E-14	9.63E-15	1.04E-14	1.09E-13
Sb-125	1.98E-14	2.27E-14	1.95E-14	1.87E-14	3.53E-14	2.01E-14	1.86E-14	2.02E-14	2.65E-14
Se-79	3.47E-19	4.67E-19	2.11E-19	1.67E-19	9.60E-19	2.96E-19	2.10E-19	3.03E-19	3.71E-16
Sm-147	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sm-151	5.20E-20	8.80E-20	7.08E-21	1.13E-20	7.09E-20	3.58E-20	1.49E-20	3.61E-20	1.90E-19
Sn-126	7.54E-14	8.62E-14	7.48E-14	7.22E-14	1.31E-13	7.69E-14	7.14E-14	7.71E-14	1.31E-13
Sr-90	7.78E-18	9.49E-18	6.44E-18	5.44E-18	2.28E-17	7.33E-18	6.11E-18	7.53E-18	9.20E-15
Tc-99	1.74E-18	2.20E-18	1.29E-18	1.05E-18	5.17E-18	1.57E-18	1.24E-18	1.62E-18	2.74E-15
Th-229	3.77E-15	4.42E-15	3.50E-15	3.03E-15	1.15E-14	3.70E-15	3.27E-15	3.83E-15	5.41E-15
Th-230	1.80E-17	2.38E-17	1.43E-17	1.22E-17	5.29E-17	1.63E-17	1.37E-17	1.74E-17	4.51E-17
Th-232	9.34E-18	1.36E-17	6.37E-18	5.52E-18	2.60E-17	7.90E-18	6.34E-18	8.72E-18	3.44E-17
U-232	1.55E-17	2.32E-17	9.84E-18	8.99E-18	3.86E-17	1.29E-17	1.00E-17	1.42E-17	5.92E-17
U-233	1.69E-17	2.22E-17	1.35E-17	1.24E-17	4.12E-17	1.55E-17	1.31E-17	1.63E-17	4.57E-17
U-234	8.79E-18	1.44E-17	4.38E-18	4.20E-18	1.99E-17	6.69E-18	4.80E-18	7.63E-18	4.25E-17
U-235	7.05E-15	8.11E-15	6.75E-15	6.15E-15	1.84E-14	7.05E-15	6.37E-15	7.20E-15	8.64E-15
U-236	6.10E-18	1.10E-17	2.18E-18	2.33E-18	1.19E-17	4.19E-18	2.70E-18	5.01E-18	3.57E-17
U-238	4.39E-18	8.54E-18	9.96E-19	1.24E-18	7.40E-18	2.72E-18	1.51E-18	3.41E-18	2.91E-17
Zr-93	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
crud									
Co-60	1.23E-13	1.39E-13	1.24E-13	1.23E-13	1.78E-13	1.27E-13	1.20E-13	1.26E-13	1.45E-13
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Source Term Calculations		HEPA filters?	no				
EBWR (U METAL) LEU [64]							
other	intact						
Isotope	Curies (entire fuel inventory)	finv = 1/nCan	ARF	RF	LPF	Total Source Term [Ci] released to the environment	Respirable Source Term [Ci] released to the environment
Ac-227	3.38E-05	9.52E-02	1.00E-03	1.00E+00	1.00E+00	3.22E-09	3.22E-09
Am-241	1.63E+04	9.52E-02	1.00E-03	1.00E+00	1.00E+00	1.56E+00	1.56E+00
Am-242m	2.71E+01	9.52E-02	1.00E-03	1.00E+00	1.00E+00	2.58E-03	2.58E-03
Am-243	7.18E+01	9.52E-02	1.00E-03	1.00E+00	1.00E+00	6.83E-03	6.83E-03
C-14	4.59E+00	9.52E-02	1.00E-03	1.00E+00	1.00E+00	4.37E-04	4.37E-04
Cd-113m	6.56E+01	9.52E-02	1.00E-03	1.00E+00	1.00E+00	6.24E-03	6.24E-03
Cl-36	5.96E-02	9.52E-02	1.00E-03	1.00E+00	1.00E+00	5.67E-06	5.67E-06
Cm-242	2.23E+01	9.52E-02	1.00E-03	1.00E+00	1.00E+00	2.12E-03	2.12E-03
Cm-243	4.06E+01	9.52E-02	1.00E-03	1.00E+00	1.00E+00	3.87E-03	3.87E-03
Cm-244	2.36E+03	9.52E-02	1.00E-03	1.00E+00	1.00E+00	2.24E-01	2.24E-01
Cm-245	5.37E-01	9.52E-02	1.00E-03	1.00E+00	1.00E+00	5.11E-05	5.11E-05
Cm-246	1.08E-01	9.52E-02	1.00E-03	1.00E+00	1.00E+00	1.03E-05	1.03E-05
Cm-247	2.83E-07	9.52E-02	1.00E-03	1.00E+00	1.00E+00	2.69E-11	2.69E-11
Co-60	5.38E+01	9.52E-02	1.00E-03	1.00E+00	1.00E+00	5.13E-03	5.13E-03
Cs-134	3.13E+01	9.52E-02	1.00E-03	1.00E+00	1.00E+00	2.98E-03	2.98E-03
Cs-135	1.69E+00	9.52E-02	1.00E-03	1.00E+00	1.00E+00	1.61E-04	1.61E-04
Cs-137	2.53E+05	9.52E-02	1.00E-03	1.00E+00	1.00E+00	2.41E+01	2.41E+01
Eu-154	4.67E+03	9.52E-02	1.00E-03	1.00E+00	1.00E+00	4.44E-01	4.44E-01
Eu-155	4.86E+02	9.52E-02	1.00E-03	1.00E+00	1.00E+00	4.63E-02	4.63E-02
Fe-55	4.45E-01	9.52E-02	1.00E-03	1.00E+00	1.00E+00	4.24E-05	4.24E-05
H-3	7.41E+02	9.52E-02	3.00E-01	1.00E+00	1.00E+00	2.12E+01	2.12E+01
I-129	1.54E-01	9.52E-02	3.00E-01	1.00E+00	1.00E+00	4.41E-03	4.41E-03
Kr-85	6.56E+03	9.52E-02	3.00E-01	1.00E+00	1.00E+00	1.88E+02	1.88E+02
Nb-93m	7.15E+00	9.52E-02	1.00E-03	1.00E+00	1.00E+00	6.81E-04	6.81E-04
Nb-94	1.31E-01	9.52E-02	1.00E-03	1.00E+00	1.00E+00	1.25E-05	1.25E-05
Ni-59	1.02E-01	9.52E-02	1.00E-03	1.00E+00	1.00E+00	9.69E-06	9.69E-06
Ni-63	1.12E+01	9.52E-02	1.00E-03	1.00E+00	1.00E+00	1.07E-03	1.07E-03
Np-237	1.64E+00	9.52E-02	1.00E-03	1.00E+00	1.00E+00	1.56E-04	1.56E-04
Pa-231	7.65E-05	9.52E-02	1.00E-03	1.00E+00	1.00E+00	7.28E-09	7.28E-09
Pb-210	1.30E-07	9.52E-02	1.00E-03	1.00E+00	1.00E+00	1.24E-11	1.24E-11
Pd-107	5.42E-01	9.52E-02	1.00E-03	1.00E+00	1.00E+00	5.17E-05	5.17E-05
Pm-147	2.37E+02	9.52E-02	1.00E-03	1.00E+00	1.00E+00	2.26E-02	2.26E-02
Pu-238	1.18E+04	9.52E-02	1.00E-03	1.00E+00	1.00E+00	1.12E+00	1.12E+00
Pu-239	2.05E+03	9.52E-02	1.00E-03	1.00E+00	1.00E+00	1.95E-01	1.95E-01
Pu-240	3.54E+03	9.52E-02	1.00E-03	1.00E+00	1.00E+00	3.37E-01	3.37E-01
Pu-241	1.97E+05	9.52E-02	1.00E-03	1.00E+00	1.00E+00	1.87E+01	1.87E+01
Pu-242	1.01E+01	9.52E-02	1.00E-03	1.00E+00	1.00E+00	9.61E-04	9.61E-04
Ra-226	6.22E-07	9.52E-02	1.00E-03	1.00E+00	1.00E+00	5.93E-11	5.93E-11
Ra-228	7.11E-07	9.52E-02	1.00E-03	1.00E+00	1.00E+00	6.77E-11	6.77E-11
Ru-106	2.97E-03	9.52E-02	1.00E-03	1.00E+00	1.00E+00	2.83E-07	2.83E-07
Sb-125	4.30E+01	9.52E-02	1.00E-03	1.00E+00	1.00E+00	4.09E-03	4.09E-03
Se-79	2.00E+00	9.52E-02	1.00E-03	1.00E+00	1.00E+00	1.91E-04	1.91E-04
Sm-147	2.28E-05	9.52E-02	1.00E-03	1.00E+00	1.00E+00	2.17E-09	2.17E-09
Sm-151	1.48E+03	9.52E-02	1.00E-03	1.00E+00	1.00E+00	1.41E-01	1.41E-01
Sn-126	3.80E+00	9.52E-02	1.00E-03	1.00E+00	1.00E+00	3.62E-04	3.62E-04
Sr-90	1.74E+05	9.52E-02	1.00E-03	1.00E+00	1.00E+00	1.66E+01	1.66E+01
Tc-99	6.37E+01	9.52E-02	1.00E-03	1.00E+00	1.00E+00	6.07E-03	6.07E-03
Th-229	1.03E-05	9.52E-02	1.00E-03	1.00E+00	1.00E+00	9.81E-10	9.81E-10
Th-230	1.75E-04	9.52E-02	1.00E-03	1.00E+00	1.00E+00	1.67E-08	1.67E-08
Th-232	9.56E-07	9.52E-02	1.00E-03	1.00E+00	1.00E+00	9.11E-11	9.11E-11
U-232	8.82E-02	9.52E-02	1.00E-03	1.00E+00	1.00E+00	8.40E-06	8.40E-06
U-233	3.55E-03	9.52E-02	1.00E-03	1.00E+00	1.00E+00	3.38E-07	3.38E-07
U-234	1.19E+00	9.52E-02	1.00E-03	1.00E+00	1.00E+00	1.13E-04	1.13E-04
U-235	1.07E-01	9.52E-02	1.00E-03	1.00E+00	1.00E+00	1.02E-05	1.02E-05
U-236	1.63E+00	9.52E-02	1.00E-03	1.00E+00	1.00E+00	1.55E-04	1.55E-04
U-238	2.01E+00	9.52E-02	1.00E-03	1.00E+00	1.00E+00	1.92E-04	1.92E-04
Zr-93	9.42E+00	9.52E-02	1.00E-03	1.00E+00	1.00E+00	8.97E-04	8.97E-04
crud (per canister)							
Co-60 (crud)	7.70E+02	1	1.00E+00	3.00E-01	1.00E+00	7.70E+02	2.31E+02
Fe-55 (crud)	4.85E+03	1	1.00E+00	3.00E-01	1.00E+00	4.85E+03	1.46E+03

Source Term Calculations		HEPA filters?	yes				
EBWR (U METAL) LEU [64]							
other	intact						
Isotope	Curies	1/nCan	ARF	RF	LPF	Total Source Term [Ci] released to the environment	Respirable Source Term [Ci] released to the environment
Ac-227	3.38E-05	9.52E-02	1.00E-03	1.00E+00	3.00E-04	9.67E-13	9.67E-13
Am-241	1.63E+04	9.52E-02	1.00E-03	1.00E+00	3.00E-04	4.67E-04	4.67E-04
Am-242m	2.71E+01	9.52E-02	1.00E-03	1.00E+00	3.00E-04	7.73E-07	7.73E-07
Am-243	7.18E+01	9.52E-02	1.00E-03	1.00E+00	3.00E-04	2.05E-06	2.05E-06
C-14	4.59E+00	9.52E-02	1.00E-03	1.00E+00	3.00E-04	1.31E-07	1.31E-07
Cd-113m	6.56E+01	9.52E-02	1.00E-03	1.00E+00	3.00E-04	1.87E-06	1.87E-06
Cl-36	5.96E-02	9.52E-02	1.00E-03	1.00E+00	3.00E-04	1.70E-09	1.70E-09
Cm-242	2.23E+01	9.52E-02	1.00E-03	1.00E+00	3.00E-04	6.36E-07	6.36E-07
Cm-243	4.06E+01	9.52E-02	1.00E-03	1.00E+00	3.00E-04	1.16E-06	1.16E-06
Cm-244	2.36E+03	9.52E-02	1.00E-03	1.00E+00	3.00E-04	6.73E-05	6.73E-05
Cm-245	5.37E-01	9.52E-02	1.00E-03	1.00E+00	3.00E-04	1.53E-08	1.53E-08
Cm-246	1.08E-01	9.52E-02	1.00E-03	1.00E+00	3.00E-04	3.10E-09	3.10E-09
Cm-247	2.83E-07	9.52E-02	1.00E-03	1.00E+00	3.00E-04	8.08E-15	8.08E-15
Co-60	5.38E+01	9.52E-02	1.00E-03	1.00E+00	3.00E-04	1.54E-06	1.54E-06
Cs-134	3.13E+01	9.52E-02	1.00E-03	1.00E+00	1.00E+00	2.98E-03	2.98E-03
Cs-135	1.69E+00	9.52E-02	1.00E-03	1.00E+00	1.00E+00	1.61E-04	1.61E-04
Cs-137	2.53E+05	9.52E-02	1.00E-03	1.00E+00	1.00E+00	2.41E+01	2.41E+01
Eu-154	4.67E+03	9.52E-02	1.00E-03	1.00E+00	3.00E-04	1.33E-04	1.33E-04
Eu-155	4.86E+02	9.52E-02	1.00E-03	1.00E+00	3.00E-04	1.39E-05	1.39E-05
Fe-55	4.45E-01	9.52E-02	1.00E-03	1.00E+00	3.00E-04	1.27E-08	1.27E-08
H-3	7.41E+02	9.52E-02	3.00E-01	1.00E+00	1.00E+00	2.12E+01	2.12E+01
I-129	1.54E-01	9.52E-02	3.00E-01	1.00E+00	1.00E+00	4.41E-03	4.41E-03
Kr-85	6.56E+03	9.52E-02	3.00E-01	1.00E+00	1.00E+00	1.88E+02	1.88E+02
Nb-93m	7.15E+00	9.52E-02	1.00E-03	1.00E+00	3.00E-04	2.04E-07	2.04E-07
Nb-94	1.31E-01	9.52E-02	1.00E-03	1.00E+00	3.00E-04	3.75E-09	3.75E-09
Ni-59	1.02E-01	9.52E-02	1.00E-03	1.00E+00	3.00E-04	2.91E-09	2.91E-09
Ni-63	1.12E+01	9.52E-02	1.00E-03	1.00E+00	3.00E-04	3.20E-07	3.20E-07
Np-237	1.64E+00	9.52E-02	1.00E-03	1.00E+00	3.00E-04	4.68E-08	4.68E-08
Pa-231	7.65E-05	9.52E-02	1.00E-03	1.00E+00	3.00E-04	2.18E-12	2.18E-12
Pb-210	1.30E-07	9.52E-02	1.00E-03	1.00E+00	3.00E-04	3.72E-15	3.72E-15
Pd-107	5.42E-01	9.52E-02	1.00E-03	1.00E+00	3.00E-04	1.55E-08	1.55E-08
Pm-147	2.37E+02	9.52E-02	1.00E-03	1.00E+00	3.00E-04	6.78E-06	6.78E-06
Pu-238	1.18E+04	9.52E-02	1.00E-03	1.00E+00	3.00E-04	3.37E-04	3.37E-04
Pu-239	2.05E+03	9.52E-02	1.00E-03	1.00E+00	3.00E-04	5.85E-05	5.85E-05
Pu-240	3.54E+03	9.52E-02	1.00E-03	1.00E+00	3.00E-04	1.01E-04	1.01E-04
Pu-241	1.97E+05	9.52E-02	1.00E-03	1.00E+00	3.00E-04	5.62E-03	5.62E-03
Pu-242	1.01E+01	9.52E-02	1.00E-03	1.00E+00	3.00E-04	2.88E-07	2.88E-07
Ra-226	6.22E-07	9.52E-02	1.00E-03	1.00E+00	3.00E-04	1.78E-14	1.78E-14
Ra-228	7.11E-07	9.52E-02	1.00E-03	1.00E+00	3.00E-04	2.03E-14	2.03E-14
Ru-106	2.97E-03	9.52E-02	1.00E-03	1.00E+00	3.00E-04	8.48E-11	8.48E-11
Sb-125	4.30E+01	9.52E-02	1.00E-03	1.00E+00	3.00E-04	1.23E-06	1.23E-06
Se-79	2.00E+00	9.52E-02	1.00E-03	1.00E+00	3.00E-04	5.72E-08	5.72E-08
Sm-147	2.28E-05	9.52E-02	1.00E-03	1.00E+00	3.00E-04	6.52E-13	6.52E-13
Sm-151	1.48E+03	9.52E-02	1.00E-03	1.00E+00	3.00E-04	4.24E-05	4.24E-05
Sn-126	3.80E+00	9.52E-02	1.00E-03	1.00E+00	3.00E-04	1.09E-07	1.09E-07
Sr-90	1.74E+05	9.52E-02	1.00E-03	1.00E+00	3.00E-04	4.98E-03	4.98E-03
Tc-99	6.37E+01	9.52E-02	1.00E-03	1.00E+00	3.00E-04	1.82E-06	1.82E-06
Th-229	1.03E-05	9.52E-02	1.00E-03	1.00E+00	3.00E-04	2.94E-13	2.94E-13
Th-230	1.75E-04	9.52E-02	1.00E-03	1.00E+00	3.00E-04	5.00E-12	5.00E-12
Th-232	9.56E-07	9.52E-02	1.00E-03	1.00E+00	3.00E-04	2.73E-14	2.73E-14
U-232	8.82E-02	9.52E-02	1.00E-03	1.00E+00	3.00E-04	2.52E-09	2.52E-09
U-233	3.55E-03	9.52E-02	1.00E-03	1.00E+00	3.00E-04	1.02E-10	1.02E-10
U-234	1.19E+00	9.52E-02	1.00E-03	1.00E+00	3.00E-04	3.40E-08	3.40E-08
U-235	1.07E-01	9.52E-02	1.00E-03	1.00E+00	3.00E-04	3.05E-09	3.05E-09
U-236	1.63E+00	9.52E-02	1.00E-03	1.00E+00	3.00E-04	4.65E-08	4.65E-08
U-238	2.01E+00	9.52E-02	1.00E-03	1.00E+00	3.00E-04	5.75E-08	5.75E-08
Zr-93	9.42E+00	9.52E-02	1.00E-03	1.00E+00	3.00E-04	2.69E-07	2.69E-07
crud (per canister)							
Co-60 (crud)	7.70E+02	1	1.00E+00	3.00E-01	3.00E-04	2.31E-01	6.93E-02
Fe-55 (crud)	4.85E+03	1	1.00E+00	3.00E-01	3.00E-04	1.46E+00	4.37E-01

EBWR (U METAL) LEU [64]			No HEPAs						
other	intact								
	inhalation doses [rem]								
	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	7.36E-08	1.24E-11	2.86E-07	4.78E-07	5.97E-06	6.68E-12	2.73E-07	3.36E-07	0.00E+00
Am-241	2.92E+00	2.40E-04	1.65E+00	1.56E+01	1.95E+02	1.44E-04	7.02E+00	1.08E+01	0.00E+00
Am-242m	4.77E-03	2.05E-07	6.24E-04	2.51E-02	3.15E-01	8.38E-08	1.11E-02	1.71E-02	0.00E+00
Am-243	1.28E-02	5.99E-06	7.01E-03	6.82E-02	8.55E-01	3.27E-06	3.05E-02	4.69E-02	0.00E+00
C-14	1.42E-08	1.42E-08	1.42E-08	1.42E-08	1.42E-08	1.42E-08	1.42E-08	1.42E-08	0.00E+00
Cd-113m	1.20E-05	1.20E-05	1.47E-04	1.20E-05	1.20E-05	1.20E-05	4.88E-04	1.49E-04	0.00E+00
Cl-36	1.65E-10	1.65E-10	1.49E-08	1.65E-10	1.65E-10	1.65E-10	1.75E-10	1.94E-09	0.00E+00
Cm-242	6.97E-05	1.15E-07	1.90E-03	4.77E-04	5.96E-03	1.15E-07	3.00E-04	5.71E-04	0.00E+00
Cm-243	4.62E-03	1.40E-06	4.33E-03	2.63E-02	3.28E-01	8.54E-07	1.29E-02	1.85E-02	0.00E+00
Cm-244	2.06E-01	1.35E-05	2.50E-01	1.21E+00	1.51E+01	1.31E-05	6.18E-01	8.67E-01	0.00E+00
Cm-245	9.94E-05	1.97E-08	5.31E-05	5.28E-04	6.61E-03	1.09E-08	2.35E-04	3.63E-04	0.00E+00
Cm-246	1.99E-05	2.38E-09	1.08E-05	1.06E-04	1.32E-03	1.35E-09	4.73E-05	7.27E-05	0.00E+00
Cm-247	4.77E-11	3.47E-14	2.60E-11	2.53E-10	3.17E-09	2.25E-14	1.13E-10	1.74E-10	0.00E+00
Co-60	1.41E-06	5.44E-06	1.02E-04	5.09E-06	3.99E-06	4.79E-06	1.06E-05	1.75E-05	0.00E+00
Cs-134	2.24E-06	1.86E-06	2.03E-06	2.03E-06	1.89E-06	1.91E-06	2.39E-06	2.15E-06	0.00E+00
Cs-135	1.11E-08	1.11E-08	1.31E-08	1.11E-08	1.11E-08	1.11E-08	1.11E-08	1.14E-08	0.00E+00
Cs-137	1.22E-02	1.09E-02	1.23E-02	1.15E-02	1.10E-02	1.10E-02	1.27E-02	1.20E-02	0.00E+00
Eu-154	3.00E-04	3.97E-04	2.03E-03	2.72E-03	1.34E-02	1.83E-04	2.90E-03	1.98E-03	0.00E+00
Eu-155	9.51E-07	1.64E-06	3.18E-05	3.82E-05	4.06E-04	6.41E-07	2.96E-05	2.99E-05	0.00E+00
Fe-55	1.28E-09	1.25E-09	2.59E-09	1.26E-09	1.26E-09	1.33E-09	2.96E-09	1.78E-09	0.00E+00
H-3	2.11E-05	2.11E-05	2.11E-05	2.11E-05	2.11E-05	2.11E-05	2.11E-05	2.11E-05	0.00E+00
I-129	2.21E-08	5.31E-08	7.98E-08	3.56E-08	3.51E-08	3.97E-04	3.00E-08	1.19E-05	0.00E+00
Kr-85	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nb-93m	1.63E-08	1.71E-09	2.53E-06	1.12E-08	2.92E-08	1.19E-09	1.55E-08	3.10E-07	0.00E+00
Nb-94	3.43E-09	1.61E-08	5.39E-07	1.63E-08	1.42E-08	1.60E-08	3.21E-08	8.07E-08	0.00E+00
Ni-59	2.01E-10	1.93E-10	6.70E-10	1.98E-10	1.96E-10	2.11E-10	2.03E-10	2.00E-10	0.00E+00
Ni-63	5.06E-08	5.06E-08	1.89E-07	5.06E-08	5.06E-08	5.06E-08	5.29E-08	5.17E-08	0.00E+00
Np-237	2.66E-04	1.52E-07	1.45E-04	2.36E-03	2.94E-02	1.21E-07	2.11E-04	1.31E-03	0.00E+00
Pa-231	2.90E-12	3.69E-12	3.14E-07	2.93E-07	3.65E-06	3.21E-12	1.20E-10	1.46E-07	0.00E+00
Pb-210	2.27E-13	2.27E-13	2.27E-13	2.68E-12	3.91E-11	2.27E-13	3.35E-12	2.62E-12	0.00E+00
Pd-107	2.82E-12	2.82E-12	8.49E-08	1.52E-11	4.05E-11	2.82E-12	6.41E-10	1.03E-08	0.00E+00
Pm-147	2.45E-11	4.69E-11	1.01E-04	1.06E-05	1.33E-04	2.58E-11	7.68E-06	1.38E-05	0.00E+00
Pu-238	1.81E+00	6.48E-05	2.07E+01	9.85E+00	1.23E+02	6.23E-05	4.55E+00	6.87E+00	0.00E+00
Pu-239	3.57E-01	1.04E-05	3.63E+00	1.90E+00	2.37E+01	1.01E-05	8.50E-01	1.30E+00	0.00E+00
Pu-240	6.18E-01	1.85E-05	6.28E+00	3.29E+00	4.10E+01	1.76E-05	1.47E+00	2.25E+00	0.00E+00
Pu-241	7.37E-01	3.31E-05	3.44E+00	3.63E+00	4.54E+01	1.34E-05	1.42E+00	2.41E+00	0.00E+00
Pu-242	1.67E-03	5.24E-08	1.70E-02	8.93E-03	1.11E-01	4.87E-08	3.98E-03	6.15E-03	0.00E+00
Ra-226	3.49E-13	3.49E-13	5.50E-11	2.27E-12	2.59E-11	3.49E-13	3.86E-13	7.93E-12	0.00E+00
Ra-228	7.14E-13	7.18E-13	2.82E-11	2.88E-12	2.54E-11	7.14E-13	7.30E-13	5.04E-12	0.00E+00
Ru-106	2.25E-10	2.23E-10	1.69E-08	2.23E-10	2.23E-10	2.23E-10	2.75E-10	2.10E-09	0.00E+00
Sb-125	8.50E-08	9.82E-08	5.12E-06	1.53E-07	6.45E-07	7.65E-08	3.42E-07	7.79E-07	0.00E+00
Se-79	7.46E-09	7.46E-09	1.08E-07	7.46E-09	7.46E-09	7.46E-09	4.66E-08	2.92E-08	0.00E+00
Sm-147	0.00E+00	0.00E+00	9.56E-10	3.45E-09	4.31E-08	0.00E+00	2.37E-09	2.53E-09	0.00E+00
Sm-151	3.29E-10	1.21E-09	2.66E-05	8.97E-05	1.13E-03	1.08E-10	6.12E-05	6.60E-05	0.00E+00
Sn-126	2.99E-07	2.94E-07	3.16E-06	1.17E-06	2.46E-06	2.74E-07	3.68E-07	5.62E-07	0.00E+00
Sr-90	2.53E-03	2.53E-03	2.74E+00	3.21E-01	6.96E-01	2.53E-03	5.48E-03	3.36E-01	0.00E+00
Tc-99	1.58E-08	1.58E-08	5.85E-06	1.58E-08	1.58E-08	4.24E-07	2.19E-07	7.88E-07	0.00E+00
Th-229	1.56E-10	1.56E-10	1.13E-07	6.50E-08	8.09E-07	1.56E-10	3.99E-10	3.28E-08	0.00E+00
Th-230	3.92E-10	3.92E-10	2.88E-07	1.66E-07	2.08E-06	3.92E-10	1.01E-09	8.46E-08	0.00E+00
Th-232	4.00E-12	4.05E-12	4.94E-09	4.69E-09	5.83E-08	3.91E-12	9.82E-12	2.33E-09	0.00E+00
U-232	3.87E-08	3.90E-08	7.17E-04	1.97E-06	3.11E-05	3.80E-08	1.51E-06	8.62E-05	0.00E+00
U-233	4.96E-10	4.96E-10	5.93E-06	1.39E-08	2.19E-07	4.96E-10	1.83E-08	7.14E-07	0.00E+00
U-234	1.63E-07	1.63E-07	1.95E-03	4.56E-06	7.12E-05	1.63E-07	6.05E-06	2.34E-04	0.00E+00
U-235	1.39E-08	1.40E-08	1.62E-04	3.86E-07	5.92E-06	1.39E-08	5.04E-07	1.95E-05	0.00E+00
U-236	2.12E-07	2.12E-07	2.52E-03	5.90E-06	9.30E-05	2.12E-07	7.85E-06	3.03E-04	0.00E+00
U-238	2.47E-07	2.47E-07	2.94E-03	7.27E-06	1.08E-04	2.45E-07	9.09E-06	3.54E-04	0.00E+00
Zr-93	1.13E-09	2.42E-09	4.51E-06	9.16E-06	1.13E-04	9.00E-10	8.95E-09	4.48E-06	0.00E+00
crud									
Co-60 (crud)	6.34E-02	2.45E-01	4.60E+00	2.29E-01	1.80E-01	2.16E-01	4.80E-01	7.87E-01	0.00E+00
Fe-55 (crud)	4.39E-02	4.27E-02	8.89E-02	4.34E-02	4.31E-02	4.55E-02	1.02E-01	6.09E-02	0.00E+00
total	6.80E+00	3.02E-01	4.35E+01	3.62E+01	4.46E+02	2.76E-01	1.66E+01	2.58E+01	0.00E+00

EBWR (U METAL) LEU [64]			No HEPAs						
other	intact								
	air submersion doses [rem]								
	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	2.09E-17	2.48E-17	1.89E-17	1.64E-17	5.78E-17	2.04E-17	1.78E-17	2.09E-17	1.83E-16
Am-241	2.31E-07	2.88E-07	1.82E-07	1.40E-07	7.73E-07	2.11E-07	1.71E-07	2.20E-07	3.45E-07
Am-242m	1.70E-11	2.68E-11	7.68E-12	7.68E-12	3.54E-11	1.32E-11	8.66E-12	1.41E-11	6.07E-11
Am-243	2.59E-09	3.09E-09	2.27E-09	1.83E-09	8.84E-09	2.47E-09	2.12E-09	2.58E-09	3.25E-09
C-14	1.96E-14	2.66E-14	1.16E-14	9.16E-15	5.34E-14	1.66E-14	1.17E-14	1.70E-14	1.84E-11
Cd-113m	7.75E-12	9.47E-12	6.41E-12	5.42E-12	2.27E-11	7.31E-12	6.09E-12	7.50E-12	9.17E-09
Cl-36	2.20E-14	2.61E-14	1.98E-14	1.78E-14	5.53E-14	2.15E-14	1.89E-14	2.19E-14	1.44E-11
Cm-242	2.88E-12	5.44E-12	4.15E-13	6.94E-13	3.89E-12	1.80E-12	8.34E-13	2.09E-12	1.58E-11
Cm-243	3.87E-09	4.48E-09	3.68E-09	3.35E-09	1.00E-08	3.86E-09	3.48E-09	3.94E-09	6.56E-09
Cm-244	2.68E-10	5.17E-10	2.75E-11	5.67E-11	3.43E-10	1.63E-10	7.03E-11	1.91E-10	1.52E-09
Cm-245	3.44E-11	4.03E-11	3.21E-11	2.81E-11	1.04E-10	3.40E-11	3.01E-11	3.51E-11	4.75E-11
Cm-246	1.12E-14	2.15E-14	1.25E-15	2.41E-15	1.46E-14	6.83E-15	2.99E-15	7.98E-15	6.24E-14
Cm-247	6.86E-17	7.84E-17	6.72E-17	6.44E-17	1.32E-16	6.95E-17	6.44E-17	7.00E-17	8.35E-17
Co-60	1.09E-07	1.23E-07	1.10E-07	1.09E-07	1.58E-07	1.13E-07	1.07E-07	1.12E-07	1.29E-07
Cs-134	3.82E-08	4.36E-08	3.81E-08	3.72E-08	6.20E-08	3.91E-08	3.65E-08	3.91E-08	4.86E-08
Cs-135	1.75E-14	2.29E-14	1.16E-14	9.29E-15	5.03E-14	1.53E-14	1.14E-14	1.57E-14	2.52E-11
Cs-137	1.12E-04	1.27E-04	1.11E-04	1.08E-04	1.83E-04	1.14E-04	1.06E-04	1.14E-04	1.84E-04
Eu-154	4.62E-06	5.24E-06	4.61E-06	4.52E-06	7.26E-06	4.73E-06	4.43E-06	4.73E-06	6.38E-06
Eu-155	2.00E-08	2.37E-08	1.78E-08	1.48E-08	6.49E-08	1.93E-08	1.66E-08	2.00E-08	2.72E-08
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H-3	0.00E+00	0.00E+00	1.01E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.21E-09	0.00E+00
I-129	3.69E-10	5.08E-10	1.63E-10	1.25E-10	8.40E-10	2.95E-10	1.76E-10	2.90E-10	8.40E-10
Kr-85	3.80E-06	4.35E-06	3.70E-06	3.54E-06	7.14E-06	3.83E-06	3.54E-06	3.86E-06	4.29E-04
Nb-93m	7.46E-13	1.54E-12	3.01E-14	1.39E-13	8.16E-13	4.04E-13	1.60E-13	5.23E-13	5.05E-12
Nb-94	1.63E-10	1.85E-10	1.63E-10	1.59E-10	2.58E-10	1.67E-10	1.58E-10	1.67E-10	2.06E-10
Ni-59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ni-63	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Np-237	2.81E-11	3.40E-11	2.44E-11	2.08E-11	8.65E-11	2.69E-11	2.30E-11	2.78E-11	4.16E-11
Pa-231	2.16E-15	2.51E-15	2.04E-15	1.92E-15	4.59E-15	2.14E-15	1.94E-15	2.17E-15	3.08E-15
Pb-210	1.33E-19	1.76E-19	9.12E-20	6.74E-20	4.19E-19	1.16E-19	8.78E-20	1.21E-19	2.75E-19
Pd-107	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pm-147	2.93E-12	3.74E-12	2.13E-12	1.75E-12	8.53E-12	2.64E-12	2.06E-12	2.71E-12	3.17E-09
Pu-238	1.28E-09	2.47E-09	2.06E-10	3.27E-10	1.81E-09	7.80E-10	3.87E-10	9.50E-10	7.96E-09
Pu-239	1.63E-10	2.55E-10	8.94E-11	9.01E-11	3.20E-10	1.31E-10	9.65E-11	1.43E-10	6.28E-10
Pu-240	3.71E-10	7.18E-10	6.36E-11	9.63E-11	5.41E-10	2.29E-10	1.14E-10	2.77E-10	2.29E-09
Pu-241	2.33E-10	2.81E-10	2.10E-10	1.83E-10	7.11E-10	2.27E-10	1.98E-10	2.35E-10	3.80E-10
Pu-242	8.89E-13	1.71E-12	1.61E-13	2.38E-13	1.32E-12	5.53E-13	2.80E-13	6.68E-13	5.44E-12
Ra-226	3.16E-18	3.63E-18	3.03E-18	2.77E-18	8.16E-18	3.17E-18	2.86E-18	3.23E-18	4.92E-18
Ra-228	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ru-106	4.94E-13	5.68E-13	4.94E-13	4.77E-13	8.42E-13	5.04E-13	4.71E-13	5.09E-13	5.33E-12
Sb-125	1.40E-08	1.61E-08	1.38E-08	1.33E-08	2.50E-08	1.43E-08	1.32E-08	1.43E-08	1.88E-08
Se-79	1.15E-14	1.54E-14	6.96E-15	5.51E-15	3.17E-14	9.77E-15	6.93E-15	1.00E-14	1.22E-11
Sm-147	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sm-151	1.27E-12	2.15E-12	1.73E-13	2.77E-13	1.74E-12	8.77E-13	3.65E-13	8.84E-13	4.65E-12
Sn-126	4.73E-09	5.40E-09	4.69E-09	4.53E-09	8.21E-09	4.83E-09	4.48E-09	4.84E-09	8.19E-09
Sr-90	2.24E-08	2.73E-08	1.85E-08	1.56E-08	6.55E-08	2.11E-08	1.76E-08	2.16E-08	2.64E-05
Tc-99	1.83E-12	2.31E-12	1.36E-12	1.10E-12	5.43E-12	1.65E-12	1.30E-12	1.70E-12	2.88E-09
Th-229	6.40E-16	7.50E-16	5.94E-16	5.14E-16	1.95E-15	6.28E-16	5.55E-16	6.50E-16	9.19E-16
Th-230	5.20E-17	6.87E-17	4.13E-17	3.52E-17	1.53E-16	4.71E-17	3.96E-17	5.02E-17	1.30E-16
Th-232	1.47E-19	2.14E-19	1.00E-19	8.70E-20	4.10E-19	1.25E-19	1.00E-19	1.37E-19	5.42E-19
U-232	2.25E-14	3.37E-14	1.43E-14	1.31E-14	5.61E-14	1.88E-14	1.45E-14	2.07E-14	8.61E-14
U-233	9.90E-16	1.30E-15	7.91E-16	7.27E-16	2.41E-15	9.08E-16	7.68E-16	9.55E-16	2.68E-15
U-234	1.72E-13	2.82E-13	8.59E-14	8.24E-14	3.90E-13	1.31E-13	9.42E-14	1.50E-13	8.34E-13
U-235	1.24E-11	1.43E-11	1.19E-11	1.08E-11	3.24E-11	1.24E-11	1.12E-11	1.27E-11	1.52E-11
U-236	1.64E-13	2.96E-13	5.86E-14	6.26E-14	3.20E-13	1.13E-13	7.25E-14	1.35E-13	9.59E-13
U-238	1.46E-13	2.84E-13	3.31E-14	4.12E-14	2.46E-13	9.03E-14	5.01E-14	1.13E-13	9.66E-13
Zr-93	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
crud									
Co-60 (crud)	1.64E-02	1.85E-02	1.65E-02	1.64E-02	2.37E-02	1.69E-02	1.60E-02	1.68E-02	1.93E-02
Fe-55 (crud)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
total	1.65E-02	1.87E-02	1.67E-02	1.65E-02	2.39E-02	1.71E-02	1.61E-02	1.69E-02	2.00E-02

EBWR (U METAL) LEU [64]			HEPAs						
other	intact								
	inhalation doses [rem]								
	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	2.21E-11	3.71E-15	8.59E-11	1.43E-10	1.79E-09	2.00E-15	8.20E-11	1.01E-10	0.00E+00
Am-241	8.75E-04	7.19E-08	4.95E-04	4.88E-03	5.84E-02	4.31E-08	2.10E-03	3.23E-03	0.00E+00
Am-242m	1.43E-06	6.15E-11	1.87E-07	7.53E-06	9.45E-05	2.51E-11	3.33E-06	5.13E-06	0.00E+00
Am-243	3.85E-06	1.80E-09	2.10E-06	2.05E-05	2.57E-04	9.80E-10	9.15E-06	1.41E-05	0.00E+00
C-14	4.26E-12	4.26E-12	4.26E-12	4.26E-12	4.26E-12	4.26E-12	4.26E-12	4.26E-12	0.00E+00
Cd-113m	3.59E-09	3.59E-09	4.42E-08	3.59E-09	3.59E-09	3.59E-09	1.40E-07	4.46E-08	0.00E+00
Cl-36	4.95E-14	4.95E-14	4.48E-12	4.95E-14	4.95E-14	4.95E-14	5.26E-14	5.82E-13	0.00E+00
Cm-242	2.09E-08	3.46E-11	5.69E-07	1.43E-07	1.79E-06	3.45E-11	8.99E-08	1.71E-07	0.00E+00
Cm-243	1.39E-06	4.21E-10	1.30E-06	7.90E-06	9.84E-05	2.56E-10	3.88E-06	5.56E-06	0.00E+00
Cm-244	6.17E-05	4.04E-09	7.49E-05	3.64E-04	4.54E-03	3.92E-09	1.85E-04	2.60E-04	0.00E+00
Cm-245	2.98E-08	5.92E-12	1.59E-08	1.58E-07	1.98E-06	3.26E-12	7.04E-08	1.09E-07	0.00E+00
Cm-246	5.97E-09	7.15E-13	3.25E-09	3.18E-08	3.97E-07	4.04E-13	1.42E-08	2.18E-08	0.00E+00
Cm-247	1.43E-14	1.04E-17	7.79E-15	7.60E-14	9.51E-13	6.76E-18	3.40E-14	5.22E-14	0.00E+00
Co-60	4.22E-10	1.63E-09	3.06E-08	1.53E-09	1.20E-09	1.44E-09	3.19E-09	5.24E-09	0.00E+00
Cs-134	2.24E-06	1.86E-06	2.03E-06	2.03E-06	1.89E-06	1.91E-06	2.39E-06	2.15E-06	0.00E+00
Cs-135	1.11E-08	1.11E-08	1.31E-08	1.11E-08	1.11E-08	1.11E-08	1.11E-08	1.14E-08	0.00E+00
Cs-137	1.22E-02	1.09E-02	1.23E-02	1.15E-02	1.10E-02	1.10E-02	1.27E-02	1.20E-02	0.00E+00
Eu-154	9.00E-08	1.19E-07	6.09E-07	8.15E-07	4.02E-06	5.49E-08	8.69E-07	5.94E-07	0.00E+00
Eu-155	2.85E-10	4.92E-10	9.53E-09	1.15E-08	1.22E-07	1.92E-10	8.89E-09	8.97E-09	0.00E+00
Fe-55	3.84E-13	3.74E-13	7.78E-13	3.79E-13	3.77E-13	3.98E-13	8.88E-13	5.33E-13	0.00E+00
H-3	2.11E-05	2.11E-05	2.11E-05	2.11E-05	2.11E-05	2.11E-05	2.11E-05	2.11E-05	0.00E+00
I-129	2.21E-08	5.31E-08	7.98E-08	3.56E-08	3.51E-08	3.97E-04	3.00E-08	1.19E-05	0.00E+00
Kr-85	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nb-93m	4.90E-12	5.13E-13	7.60E-10	3.36E-12	8.75E-12	3.58E-13	4.65E-12	9.30E-11	0.00E+00
Nb-94	1.03E-12	4.84E-12	1.62E-10	4.89E-12	4.26E-12	4.80E-12	9.62E-12	2.42E-11	0.00E+00
Ni-59	6.02E-14	5.80E-14	2.01E-13	5.93E-14	5.88E-14	6.32E-14	6.08E-14	6.00E-14	0.00E+00
Ni-63	1.52E-11	1.52E-11	5.67E-11	1.52E-11	1.52E-11	1.52E-11	1.59E-11	1.55E-11	0.00E+00
Np-237	7.99E-08	4.56E-11	4.35E-08	7.07E-07	8.83E-06	3.62E-11	6.32E-08	3.94E-07	0.00E+00
Pa-231	8.69E-16	1.11E-15	9.41E-11	8.78E-11	1.10E-09	9.62E-16	3.61E-14	4.37E-11	0.00E+00
Pb-210	6.82E-17	6.82E-17	6.82E-17	8.04E-16	1.17E-14	6.82E-17	1.01E-15	7.87E-16	0.00E+00
Pd-107	8.45E-16	8.45E-16	2.55E-11	4.57E-15	1.22E-14	8.45E-16	1.92E-13	3.08E-12	0.00E+00
Pm-147	7.35E-15	1.41E-14	3.03E-08	3.19E-09	3.99E-08	7.74E-15	2.30E-09	4.14E-09	0.00E+00
Pu-238	5.44E-04	1.94E-08	6.22E-03	2.96E-03	3.69E-02	1.87E-08	1.36E-03	2.06E-03	0.00E+00
Pu-239	1.07E-04	3.11E-09	1.09E-03	5.70E-04	7.11E-03	3.04E-09	2.55E-04	3.91E-04	0.00E+00
Pu-240	1.85E-04	5.55E-09	1.88E-03	9.86E-04	1.23E-02	5.28E-09	4.41E-04	6.76E-04	0.00E+00
Pu-241	2.21E-04	9.92E-09	1.03E-03	1.09E-03	1.36E-02	4.02E-09	4.25E-04	7.23E-04	0.00E+00
Pu-242	5.02E-07	1.57E-11	5.11E-06	2.68E-06	3.34E-05	1.46E-11	1.19E-06	1.85E-06	0.00E+00
Ra-226	1.05E-16	1.05E-16	1.65E-14	6.81E-16	7.78E-15	1.05E-16	1.10E-16	2.38E-15	0.00E+00
Ra-228	2.14E-16	2.15E-16	8.45E-15	8.64E-16	7.62E-15	2.14E-16	2.19E-16	1.51E-15	0.00E+00
Ru-106	6.75E-14	6.70E-14	5.08E-12	6.70E-14	6.70E-14	6.70E-14	8.26E-14	6.31E-13	0.00E+00
Sb-125	2.55E-11	2.95E-11	1.54E-09	4.60E-11	1.93E-10	2.30E-11	1.03E-10	2.34E-10	0.00E+00
Se-79	2.24E-12	2.24E-12	3.23E-11	2.24E-12	2.24E-12	2.24E-12	1.40E-11	8.77E-12	0.00E+00
Sm-147	0.00E+00	0.00E+00	2.87E-13	1.03E-12	1.29E-11	0.00E+00	7.11E-13	7.60E-13	0.00E+00
Sm-151	9.86E-14	3.64E-13	7.97E-09	2.69E-08	3.38E-07	3.23E-14	1.84E-08	1.98E-08	0.00E+00
Sn-126	8.96E-11	8.83E-11	9.47E-10	3.52E-10	7.39E-10	8.21E-11	1.10E-10	1.69E-10	0.00E+00
Sr-90	7.58E-07	7.58E-07	8.21E-04	9.64E-05	2.09E-04	7.58E-07	1.64E-06	1.01E-04	0.00E+00
Tc-99	4.75E-12	4.75E-12	1.75E-09	4.75E-12	4.75E-12	1.27E-10	6.57E-11	2.36E-10	0.00E+00
Th-229	4.68E-14	4.68E-14	3.38E-11	1.95E-11	2.43E-10	4.68E-14	1.20E-13	9.84E-12	0.00E+00
Th-230	1.18E-13	1.18E-13	8.65E-11	4.99E-11	6.23E-10	1.18E-13	3.03E-13	2.54E-11	0.00E+00
Th-232	1.20E-15	1.22E-15	1.48E-12	1.41E-12	1.75E-11	1.17E-15	2.95E-15	6.98E-13	0.00E+00
U-232	1.16E-11	1.17E-11	2.15E-07	5.90E-10	9.33E-09	1.14E-11	4.52E-10	2.59E-08	0.00E+00
U-233	1.49E-13	1.49E-13	1.78E-09	4.17E-12	6.56E-11	1.49E-13	5.50E-12	2.14E-10	0.00E+00
U-234	4.90E-11	4.90E-11	5.84E-07	1.37E-09	2.14E-08	4.90E-11	1.81E-09	7.02E-08	0.00E+00
U-235	4.17E-12	4.19E-12	4.86E-08	1.16E-10	1.78E-09	4.17E-12	1.51E-10	5.84E-09	0.00E+00
U-236	6.36E-11	6.36E-11	7.57E-07	1.77E-09	2.79E-08	6.36E-11	2.35E-09	9.10E-08	0.00E+00
U-238	7.40E-11	7.40E-11	8.82E-07	2.18E-09	3.24E-08	7.36E-11	2.73E-09	1.06E-07	0.00E+00
Zr-93	3.38E-13	7.26E-13	1.35E-09	2.75E-09	3.38E-08	2.70E-13	2.68E-12	1.35E-09	0.00E+00
crud									
Co-60 (crud)	1.90E-05	7.35E-05	1.38E-03	6.87E-05	5.39E-05	6.47E-05	1.44E-04	2.36E-04	0.00E+00
Fe-55 (crud)	1.32E-05	1.28E-05	2.67E-05	1.30E-05	1.29E-05	1.36E-05	3.05E-05	1.83E-05	0.00E+00
total	1.42E-02	1.10E-02	2.53E-02	2.24E-02	1.45E-01	1.15E-02	1.77E-02	1.98E-02	0.00E+00

EBWR (U METAL) LEU [64]			HEPAs						
other	intact								
	air submersion doses [rem]								
	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	6.28E-21	7.45E-21	5.66E-21	4.93E-21	1.73E-20	6.11E-21	5.33E-21	6.27E-21	5.50E-20
Am-241	6.94E-11	8.65E-11	5.45E-11	4.21E-11	2.32E-10	6.33E-11	5.12E-11	6.61E-11	1.03E-10
Am-242m	5.09E-15	8.05E-15	2.30E-15	2.30E-15	1.06E-14	3.95E-15	2.60E-15	4.24E-15	1.82E-14
Am-243	7.78E-13	9.27E-13	6.82E-13	5.50E-13	2.65E-12	7.42E-13	6.36E-13	7.74E-13	9.76E-13
C-14	5.88E-18	7.99E-18	3.47E-18	2.75E-18	1.60E-17	4.97E-18	3.50E-18	5.09E-18	5.52E-15
Cd-113m	2.33E-15	2.84E-15	1.92E-15	1.62E-15	6.81E-15	2.19E-15	1.83E-15	2.25E-15	2.75E-12
Cl-36	6.60E-18	7.84E-18	5.95E-18	5.33E-18	1.66E-17	6.45E-18	5.66E-18	6.57E-18	4.33E-15
Cm-242	8.63E-16	1.63E-15	1.25E-16	2.08E-16	1.17E-15	5.41E-16	2.50E-16	6.27E-16	4.73E-15
Cm-243	1.16E-12	1.34E-12	1.11E-12	1.00E-12	3.01E-12	1.16E-12	1.04E-12	1.18E-12	1.97E-12
Cm-244	8.04E-14	1.55E-13	8.25E-15	1.70E-14	1.03E-13	4.88E-14	2.11E-14	5.72E-14	4.56E-13
Cm-245	1.03E-14	1.21E-14	9.64E-15	8.42E-15	3.13E-14	1.02E-14	9.03E-15	1.05E-14	1.42E-14
Cm-246	3.35E-18	6.44E-18	3.76E-19	7.24E-19	4.38E-18	2.05E-18	8.96E-19	2.39E-18	1.87E-17
Cm-247	2.06E-20	2.35E-20	2.02E-20	1.93E-20	3.96E-20	2.09E-20	1.93E-20	2.10E-20	2.51E-20
Co-60	3.28E-11	3.70E-11	3.30E-11	3.28E-11	4.74E-11	3.38E-11	3.20E-11	3.36E-11	3.86E-11
Cs-134	3.82E-08	4.36E-08	3.81E-08	3.72E-08	6.20E-08	3.91E-08	3.65E-08	3.91E-08	4.88E-08
Cs-135	1.75E-14	2.29E-14	1.16E-14	9.29E-15	5.03E-14	1.53E-14	1.14E-14	1.57E-14	2.52E-11
Cs-137	1.12E-04	1.27E-04	1.11E-04	1.08E-04	1.83E-04	1.14E-04	1.06E-04	1.14E-04	1.84E-04
Eu-154	1.39E-09	1.57E-09	1.38E-09	1.36E-09	2.18E-09	1.42E-09	1.33E-09	1.42E-09	1.91E-09
Eu-155	5.99E-12	7.10E-12	5.34E-12	4.45E-12	1.95E-11	5.80E-12	4.98E-12	5.99E-12	8.16E-12
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H-3	0.00E+00	0.00E+00	1.01E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.21E-09	0.00E+00
I-129	3.69E-10	5.08E-10	1.63E-10	1.25E-10	8.40E-10	2.95E-10	1.76E-10	2.90E-10	8.40E-10
Kr-85	3.80E-06	4.35E-06	3.70E-06	3.54E-06	7.14E-06	3.83E-06	3.54E-06	3.86E-06	4.29E-04
Nb-93m	2.24E-16	4.63E-16	9.02E-18	4.17E-17	2.45E-16	1.21E-16	4.81E-17	1.57E-16	1.51E-15
Nb-94	4.90E-14	5.56E-14	4.88E-14	4.77E-14	7.73E-14	5.01E-14	4.67E-14	5.00E-14	6.18E-14
Ni-59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ni-63	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Np-237	8.43E-15	1.02E-14	7.31E-15	6.23E-15	2.59E-14	8.06E-15	6.89E-15	8.35E-15	1.25E-14
Pa-231	6.47E-19	7.53E-19	6.13E-19	5.75E-19	1.38E-18	6.43E-19	5.82E-19	6.51E-19	9.23E-19
Pb-210	3.99E-23	5.27E-23	2.74E-23	2.02E-23	1.26E-22	3.49E-23	2.63E-23	3.63E-23	8.24E-23
Pd-107	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pm-147	8.78E-16	1.12E-15	6.40E-16	5.24E-16	2.56E-15	7.93E-16	6.18E-16	8.14E-16	9.52E-13
Pu-238	3.83E-13	7.41E-13	6.19E-14	9.81E-14	5.43E-13	2.34E-13	1.16E-13	2.85E-13	2.39E-12
Pu-239	4.90E-14	7.64E-14	2.68E-14	2.70E-14	9.59E-14	3.93E-14	2.90E-14	4.29E-14	1.88E-13
Pu-240	1.11E-13	2.15E-13	1.91E-14	2.89E-14	1.62E-13	6.86E-14	3.43E-14	8.32E-14	6.86E-13
Pu-241	7.00E-14	8.44E-14	6.31E-14	5.48E-14	2.13E-13	6.80E-14	5.93E-14	7.06E-14	1.14E-13
Pu-242	2.67E-16	5.14E-16	4.84E-17	7.14E-17	3.95E-16	1.66E-16	8.39E-17	2.00E-16	1.63E-15
Ra-226	9.49E-22	1.09E-21	9.09E-22	8.32E-22	2.45E-21	9.52E-22	8.59E-22	9.70E-22	1.48E-21
Ra-228	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ru-106	1.48E-16	1.70E-16	1.48E-16	1.43E-16	2.53E-16	1.51E-16	1.41E-16	1.53E-16	1.60E-15
Sb-125	4.21E-12	4.83E-12	4.15E-12	3.98E-12	7.51E-12	4.28E-12	3.96E-12	4.30E-12	5.64E-12
Se-79	3.44E-18	4.62E-18	2.09E-18	1.65E-18	9.51E-18	2.93E-18	2.08E-18	3.00E-18	3.67E-15
Sm-147	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sm-151	3.82E-16	6.46E-16	5.20E-17	8.30E-17	5.21E-16	2.63E-16	1.09E-16	2.65E-16	1.40E-15
Sn-126	1.42E-12	1.62E-12	1.41E-12	1.36E-12	2.46E-12	1.45E-12	1.34E-12	1.45E-12	2.46E-12
Sr-90	6.71E-12	8.18E-12	5.55E-12	4.69E-12	1.97E-11	6.32E-12	5.27E-12	6.49E-12	7.93E-09
Tc-99	5.49E-16	6.94E-16	4.07E-16	3.31E-16	1.63E-15	4.95E-16	3.91E-16	5.11E-16	8.64E-13
Th-229	1.92E-19	2.25E-19	1.78E-19	1.54E-19	5.86E-19	1.88E-19	1.67E-19	1.95E-19	2.76E-19
Th-230	1.56E-20	2.08E-20	1.24E-20	1.06E-20	4.58E-20	1.41E-20	1.19E-20	1.51E-20	3.91E-20
Th-232	4.42E-23	6.43E-23	3.01E-23	2.61E-23	1.23E-22	3.74E-23	3.00E-23	4.12E-23	1.63E-22
U-232	6.76E-18	1.01E-17	4.29E-18	3.92E-18	1.68E-17	5.63E-18	4.36E-18	6.20E-18	2.58E-17
U-233	2.97E-19	3.90E-19	2.37E-19	2.18E-19	7.24E-19	2.72E-19	2.30E-19	2.87E-19	8.03E-19
U-234	5.17E-17	8.47E-17	2.58E-17	2.47E-17	1.17E-16	3.94E-17	2.82E-17	4.49E-17	2.50E-16
U-235	3.72E-15	4.28E-15	3.57E-15	3.25E-15	9.72E-15	3.72E-15	3.37E-15	3.80E-15	4.56E-15
U-236	4.92E-17	8.87E-17	1.76E-17	1.88E-17	9.59E-17	3.38E-17	2.18E-17	4.04E-17	2.88E-16
U-238	4.37E-17	8.51E-17	9.92E-18	1.24E-17	7.37E-17	2.71E-17	1.50E-17	3.40E-17	2.90E-16
Zr-93	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
crud									
Co-60 (crud)	4.92E-06	5.56E-06	4.96E-06	4.92E-06	7.12E-06	5.08E-06	4.80E-06	5.04E-06	5.80E-06
Fe-55 (crud)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
total	1.20E-04	1.37E-04	1.19E-04	1.16E-04	1.97E-04	1.23E-04	1.14E-04	1.23E-04	6.18E-04

EBWR (U METAL) LEU [64] other intact No HEPAs

	Inhalation Dose @ 5000 m [rem]	Dose Term for Regulation	Air Submersion Dose @ 5000 m [rem]	Dose Term for Regulation		Dose Term for Regulation
Gonad	6.80E+00		1.65E-02			
Breast	3.02E-01		1.87E-02			
Lung	4.35E+01		1.67E-02			
R Marrow	3.62E+01		1.65E-02			
B Surface	4.46E+02	<CDE	2.39E-02			
Thyroid	2.76E-01		1.71E-02			
Remainder	1.66E+01		1.61E-02			
Whole Body	2.58E+01	<CEDE	1.69E-02	<DDE	2.58E+01	<TEDE=CEDE+DDE
Skin	0.00E+00	<SKIN	2.00E-02	<SKIN	2.00E-02	<SKIN
Eye Lens	N/A	<EYE	N/A	<EYE	N/A	<EYE
					4.46E+02	<CDE + DDE

EBWR (U METAL) LEU [64] other intact HEPAs

	Inhalation Dose @ 5000 m [rem]	Dose Term for Regulation	Air Submersion Dose @ 5000 m [rem]	Dose Term for Regulation	Dose for Regulation [rem]	Dose Term for Regulation
Gonad	1.42E-02		1.20E-04			
Breast	1.10E-02		1.37E-04			
Lung	2.53E-02		1.19E-04			
R Marrow	2.24E-02		1.16E-04			
B Surface	1.45E-01	<CDE	1.97E-04			
Thyroid	1.15E-02		1.23E-04			
Remainder	1.77E-02		1.14E-04			
Whole Body	1.98E-02	<CEDE	1.23E-04	<DDE	1.99E-02	<TEDE=CEDE+DDE
Skin	0.00E+00	<SKIN	6.18E-04	<SKIN	6.18E-04	<SKIN
Eye Lens	N/A	<EYE	N/A	<EYE	N/A	<EYE
					1.45E-01	<CDE + DDE

EBWR (U METAL) LEU [64]

		other offsite doses with no HEPAs [rem]		intact offsite doses with HEPAs [rem]	
isotope	material type	TEDE	bone surface CDE + DDE	TEDE	bone surface CDE + DDE
Ac-227	P	3.36E-07	5.97E-06	1.01E-10	1.79E-09
Am-241	P	1.08E+01	1.95E+02	3.23E-03	5.84E-02
Am-242m	P	1.71E-02	3.15E-01	5.13E-06	9.45E-05
Am-243	P	4.69E-02	8.55E-01	1.41E-05	2.57E-04
C-14	P	1.42E-08	1.42E-08	4.26E-12	4.26E-12
Cd-113m	P	1.49E-04	1.20E-05	4.46E-08	3.59E-09
Cl-36	P	1.94E-09	1.65E-10	5.82E-13	4.95E-14
Cm-242	P	5.71E-04	5.96E-03	1.71E-07	1.79E-06
Cm-243	P	1.85E-02	3.28E-01	5.56E-06	9.84E-05
Cm-244	P	8.67E-01	1.51E+01	2.60E-04	4.54E-03
Cm-245	P	3.63E-04	6.61E-03	1.09E-07	1.98E-06
Cm-246	P	7.27E-05	1.32E-03	2.18E-08	3.97E-07
Cm-247	P	1.74E-10	3.17E-09	5.22E-14	9.51E-13
Co-60	P	1.76E-05	4.10E-06	5.28E-09	1.23E-09
Cs-134	C	2.19E-06	1.93E-06	2.19E-06	1.93E-06
Cs-135	C	1.14E-08	1.11E-08	1.14E-08	1.11E-08
Cs-137	C	1.21E-02	1.12E-02	1.21E-02	1.12E-02
Eu-154	P	1.99E-03	1.34E-02	5.96E-07	4.02E-06
Eu-155	P	2.99E-05	4.06E-04	8.98E-09	1.22E-07
Fe-55	P	1.78E-09	1.26E-09	5.33E-13	3.77E-13
H-3	G	2.11E-05	2.11E-05	2.11E-05	2.11E-05
I-129	G	1.19E-05	3.54E-08	1.19E-05	3.54E-08
Kr-85	G	3.86E-06	3.86E-06	3.86E-06	3.86E-06
Nb-93m	P	3.10E-07	2.92E-08	9.30E-11	8.75E-12
Nb-94	P	8.09E-08	1.44E-08	2.43E-11	4.31E-12
Ni-59	P	2.00E-10	1.96E-10	6.00E-14	5.88E-14
Ni-63	P	5.17E-08	5.06E-08	1.55E-11	1.52E-11
Np-237	P	1.31E-03	2.94E-02	3.94E-07	8.83E-06
Pa-231	P	1.46E-07	3.65E-06	4.37E-11	1.10E-09
Pb-210	P	2.62E-12	3.91E-11	7.87E-16	1.17E-14
Pd-107	P	1.03E-08	4.05E-11	3.08E-12	1.22E-14
Pm-147	P	1.38E-05	1.33E-04	4.14E-09	3.99E-08
Pu-238	P	6.87E+00	1.23E+02	2.06E-03	3.69E-02
Pu-239	P	1.30E+00	2.37E+01	3.91E-04	7.11E-03
Pu-240	P	2.25E+00	4.10E+01	6.76E-04	1.23E-02
Pu-241	P	2.41E+00	4.54E+01	7.23E-04	1.36E-02
Pu-242	P	6.15E-03	1.11E-01	1.85E-06	3.34E-05
Ra-226	P	7.93E-12	2.59E-11	2.38E-15	7.78E-15
Ra-228	P	5.04E-12	2.54E-11	1.51E-15	7.62E-15
Ru-106	P	2.10E-09	2.24E-10	6.31E-13	6.71E-14
Sb-125	P	7.94E-07	6.59E-07	2.38E-10	1.98E-10
Se-79	P	2.92E-08	7.46E-09	8.77E-12	2.24E-12
Sm-147	P	2.53E-09	4.31E-08	7.60E-13	1.29E-11
Sm-151	P	6.60E-05	1.13E-03	1.98E-08	3.38E-07
Sn-126	P	5.67E-07	2.47E-06	1.70E-10	7.41E-10
Sr-90	P	3.36E-01	6.96E-01	1.01E-04	2.09E-04
Tc-99	P	7.88E-07	1.58E-08	2.36E-10	4.75E-12
Th-229	P	3.28E-08	8.09E-07	9.84E-12	2.43E-10
Th-230	P	8.46E-08	2.08E-06	2.54E-11	6.23E-10
Th-232	P	2.33E-09	5.83E-08	6.98E-13	1.75E-11
U-232	P	8.62E-05	3.11E-05	2.59E-08	9.33E-09
U-233	P	7.14E-07	2.19E-07	2.14E-10	6.56E-11
U-234	P	2.34E-04	7.12E-05	7.02E-08	2.14E-08
U-235	P	1.95E-05	5.92E-06	5.84E-09	1.78E-09
U-236	P	3.03E-04	9.30E-05	9.10E-08	2.79E-08
U-238	P	3.54E-04	1.08E-04	1.06E-07	3.24E-08
Zr-93	P	4.48E-06	1.13E-04	1.35E-09	3.38E-08
crud					
Co-60 (crud)	crud	8.04E-01	1.97E-01	2.41E-04	5.90E-05
Fe-55 (crud)	crud	6.09E-02	4.31E-02	1.83E-05	1.29E-05
	total	2.58E+01	4.46E+02	1.99E-02	1.45E-01

EBWR (U METAL) LEU [64] other intact

TEDE (no HEPAs)

material type		subtotal [rem]	fraction of total [-]
G		3.69E-05	1.43E-06
P		2.49E+01	9.66E-01
C		1.21E-02	4.70E-04
crud		8.65E-01	3.36E-02
	total	2.58E+01	1.00E+00

TEDE (HEPAs)

material type		subtotal [rem]	fraction of total [-]
G		3.69E-05	1.85E-03
P		7.47E-03	3.76E-01
C		1.21E-02	6.10E-01
crud		2.59E-04	1.30E-02
	total	1.99E-02	1.00E+00

bone surface CDE + DDE (no HEPAs)

material type		subtotal [rem]	fraction of total [-]
G		2.50E-05	5.61E-08
P		4.45E+02	9.99E-01
C		1.12E-02	2.50E-05
crud		2.40E-01	5.38E-04
	total	4.46E+02	1.00E+00

bone surface CDE + DDE (HEPAs)

material type		subtotal [rem]	fraction of total [-]
G		2.50E-05	1.73E-04
P		1.34E-01	9.22E-01
C		1.12E-02	7.70E-02
crud		7.19E-05	4.96E-04
	total	1.45E-01	1.00E+00

Attachment VIII

Calculations for N Reactor [147] DOE SNF

	evaluated fuel						x		evaluated fuel
	fuel type	stable metal	stable metal	non-metal	non-metal	other	other		other
	condition	intact	not intact	intact	not intact	intact	not intact		not intact
	fuel name	HWCTR (U/TH) [112]	ALUM CLAD SNF [411]	SHIPPINGPORT PWR CORE II [193]	SAXTON (MOX) [787]	EBWR (U METAL) LEU [64]	N REACTOR [147]		N REACTOR [147]
	# of canisters	0.17	1.00	24.00	1.00	10.50	194.95		194.95
Isotopes	material type	Curies (entire fuel inventory)							Curies
Ac-227	P	9.27E-09	2.81E-07	1.24E-02	1.33E-05	3.38E-05	1.03E-02		1.03E-02
Am-241	P	1.22E-01	2.51E+01	7.61E+04	6.45E+03	1.63E+04	2.80E+05		2.80E+05
Am-242m	P	8.67E-05	9.69E-03	1.18E+02	1.07E+01	2.71E+01	7.96E+00		7.96E+00
Am-243	P	2.85E-04	2.40E-02	3.38E+02	2.83E+01	7.18E+01	4.10E+01		4.10E+01
C-14	P	1.09E-06	1.17E-05	1.53E+00	1.81E+00	4.59E+00	3.63E+02		3.63E+02
Cd-113m	P	6.32E-02	7.25E-01	0.00E+00	2.59E+01	6.56E+01	0.00E+00		0.00E+00
Cl-36	P	2.51E-30	0.00E+00	0.00E+00	2.35E-02	5.96E-02	0.00E+00		0.00E+00
Cm-242	P	2.62E-04	8.00E-03	0.00E+00	8.79E+00	2.23E+01	0.00E+00		0.00E+00
Cm-243	P	4.52E-05	3.29E-03	0.00E+00	1.60E+01	4.06E+01	0.00E+00		0.00E+00
Cm-244	P	9.94E-03	4.27E-01	3.16E+04	9.29E+02	2.36E+03	2.44E+03		2.44E+03
Cm-245	P	5.84E-07	1.33E-05	5.82E+00	2.12E-01	5.37E-01	5.13E-01		5.13E-01
Cm-246	P	3.99E-08	9.83E-07	9.89E-01	4.28E-02	1.08E-01	6.79E-02		6.79E-02
Cm-247	P	4.17E-14	0.00E+00		1.12E-07	2.83E-07			0.00E+00
Co-60	P	7.30E-03	1.81E-09	1.10E+04	2.12E+01	5.38E+01	4.75E+02		4.75E+02
Cs-134	C	9.30E+01	2.05E+02	3.63E+03	1.24E+01	3.13E+01	1.63E+02		1.63E+02
Cs-135	C	6.58E-04	1.24E-02	6.19E+00	6.65E-01	1.69E+00	4.00E+01		4.00E+01
Cs-137	C	5.49E+02	8.60E+03	2.07E+06	1.00E+05	2.53E+05	5.34E+06		5.34E+06
Eu-154	P	1.57E+01	9.08E+01	0.00E+00	1.84E+03	4.67E+03	0.00E+00		0.00E+00
Eu-155	P	7.47E+00	2.81E+01	0.00E+00	1.92E+02	4.86E+02	0.00E+00		0.00E+00
Fe-55	P	1.29E+00	0.00E+00	0.00E+00	1.76E-01	4.45E-01	0.00E+00		0.00E+00
H-3	G	2.02E+00	2.61E+01	5.09E+03	2.92E+02	7.41E+02	1.03E+04		1.03E+04
I-129	G	1.44E-04	2.54E-03	7.20E-01	6.09E-02	1.54E-01	3.29E+00		3.29E+00
Kr-85	G	5.46E+01	6.45E+02	5.07E+04	2.59E+03	6.56E+03	1.53E+05		1.53E+05
Nb-93m	P	2.82E-03	4.96E-02	5.72E+01	2.82E+00	7.15E+00	4.54E+02		4.54E+02
Nb-94	P	1.37E-07	4.96E-06	0.00E+00	5.18E-02	1.31E-01	6.71E-05		6.71E-05
Ni-59	P	2.43E-04	0.00E+00	0.00E+00	4.01E-02	1.02E-01	2.03E+01		2.03E+01
Ni-63	P	3.69E-02	0.00E+00	8.04E+04	4.42E+00	1.12E+01	2.21E+03		2.21E+03
Np-237	P	1.82E-03	1.20E-02	7.06E+00	6.46E-01	1.64E+00	3.87E+01		3.87E+01
Pa-231	P	9.79E-08	1.88E-06	1.15E-02	3.02E-05	7.65E-05	1.38E-02		1.38E-02
Pb-210	P	1.04E-10	1.44E-11	2.71E-06	5.13E-08	1.30E-07	7.52E-08		7.52E-08
Pd-107	P	9.52E-05	2.35E-03	1.95E+00	2.14E-01	5.42E-01	7.46E+00		7.46E+00
Pm-147	P	4.86E+02	2.47E+03	0.00E+00	9.36E+01	2.37E+02	0.00E+00		0.00E+00
Pu-238	P	7.65E+02	2.20E+01	8.02E+04	5.66E+02	1.18E+04	6.37E+04		6.37E+04
Pu-239	P	1.59E+01	1.49E+01	7.55E+03	9.81E+01	2.05E+03	1.23E+05		1.23E+05
Pu-240	P	9.08E+00	1.07E+01	1.13E+04	1.70E+02	3.54E+03	7.18E+04		7.18E+04
Pu-241	P	2.56E+03	1.22E+03	1.57E+06	9.43E+03	1.97E+05	2.06E+06		2.06E+06
Pu-242	P	1.35E-02	1.04E-02	3.73E+01	4.84E-01	1.01E+01	3.46E+01		3.46E+01
Ra-226	P	1.93E-09	1.53E-10	6.13E-06	2.46E-07	6.22E-07	1.15E-03		1.15E-03
Ra-228	P	1.74E-13	8.44E-12	5.85E-02	2.80E-07	7.11E-07	1.03E-06		1.03E-06
Ru-106	P	3.64E+01	2.97E+01	1.42E+01	1.17E-03	2.97E-03	3.16E-01		3.16E-01
Sb-125	P	1.20E+01	0.00E+00	0.00E+00	1.70E+01	4.30E+01	0.00E+00		0.00E+00
Se-79	P	2.47E-03	6.93E-02	7.69E+00	7.90E-01	2.00E+00	4.48E+01		4.48E+01
Sm-147	P	3.48E-08	8.28E-07	0.00E+00	9.01E-06	2.28E-05	0.00E+00		0.00E+00
Sm-151	P	2.16E+00	2.67E+01	2.58E+04	5.86E+02	1.48E+03	8.55E+04		8.55E+04
Sn-126	P	2.21E-03	2.72E-02	9.72E+00	1.50E+00	3.80E+00	7.83E+01		7.83E+01
Sr-90	P	5.25E+02	8.16E+03	1.56E+06	6.87E+04	1.74E+05	4.03E+06		4.03E+06
Tc-99	P	8.07E-02	1.44E+00	2.67E+02	2.51E+01	6.37E+01	1.51E+03		1.51E+03
Th-229	P	3.77E-08	8.09E-10	1.57E-02	4.93E-07	1.03E-05	9.31E-06		9.31E-06
Th-230	P	3.27E-04	7.96E-08	1.08E-03	8.39E-06	1.75E-04	1.02E-03		1.02E-03
Th-232	P	1.49E-10	1.99E-11	5.56E-03	4.58E-08	9.56E-07	1.21E-07		1.21E-07
U-232	P	4.47E-03	1.11E-04	0.00E+00	4.23E-03	8.82E-02	0.00E+00		0.00E+00
U-233	P	6.56E-05	1.18E-06	6.07E+00	1.70E-04	3.55E-03	5.71E-03		5.71E-03
U-234	P	6.83E+00	1.17E-03	5.82E+00	5.70E-02	1.19E+00	4.85E+02		4.85E+02
U-235	P	1.34E-01	8.48E-03	6.58E-01	5.12E-03	1.07E-01	1.85E+01		1.85E+01
U-236	P	5.77E-01	3.95E-02	5.50E+00	7.81E-02	1.63E+00	7.02E+01		7.02E+01
U-238	P	2.22E-03	1.04E-02	5.15E+00	9.65E-02	2.01E+00	3.82E+02		3.82E+02
Zr-93	P	1.27E-02	1.40E-01	3.61E+01	3.72E+00	9.42E+00	2.10E+02		2.10E+02
crud (per canister)									
Co-60 (crud)		1.56E+01	6.37E+00	2.68E+02	1.23E+02	7.70E+02	1.76E+03		1.76E+03
Fe-55 (crud)		9.85E+01	4.01E+01	1.69E+03	7.73E+02	4.85E+03	1.11E+04		1.11E+04

Release Fractions				
Material Type	ARF	RF	Total Release Fraction	HEPA Filter LPF
stable metal/ intact				
G	0.3	1.0	3.00E-01	1.0
P	2.00E-04	4.00E-03	8.00E-07	3.00E-04
C	2.00E-04	1.0	2.00E-04	1.0
stable metal/not intact				
G	0.3	1.0	0.3	1.0
P	5.00E-03	0.4	2.00E-03	3.00E-04
C	5.00E-03	1.0	5.00E-03	1.0
non-metal/intact				
G	0.3	1.0	0.3	1.0
P	2.25E-04	1.0	2.25E-04	3.00E-04
C	2.25E-04	1.0	2.25E-04	1.0
non-metal/not intact				
G	0.3	1.0	0.3	1.0
P	5.00E-03	0.4	2.00E-03	3.00E-04
C	5.00E-03	1.0	5.00E-03	1.0
other/intact				
G	0.3	1.0	0.3	1.0
P	1.00E-03	1.0	1.00E-03	3.00E-04
C	1.00E-03	1.0	1.00E-03	1.0
other/not intact				
G	0.3	1.0	0.3	1.0
P	5.00E-03	0.4	2.00E-03	3.00E-04
C	5.00E-03	1.0	5.00E-03	1.0
crud				
crud	1.0	0.3	3.00E-01	3.00E-04
N REACTOR [147]				
other				
not intact				
Release Fractions Used in this Calculation				
G	0.3	1.0	0.3	1.0
P	5.00E-03	4.00E-01	2.00E-03	3.00E-04
C	5.00E-03	1.00E+00	5.00E-03	1.00E+00
crud	1.0	0.3	0.3	3.00E-04
breathing rate	3.33E-04	[m^3/s]		
gound level dispersion factor				
distance [m]	x/Q [sec/m^3]			
5000	4.68E-05	99.5% worst-sector		
3.70E+12	unit conversion factor			
	Sv/Bq to rem/Ci			

	Inhalation DCFs [Sv/Bq]								
Isotopes	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	3.96E-04	6.66E-08	1.54E-03	2.57E-03	3.21E-02	3.59E-08	1.47E-03	1.81E-03	0.00E+00
Am-241	3.25E-05	2.67E-09	1.84E-05	1.74E-04	2.17E-03	1.60E-09	7.82E-05	1.20E-04	0.00E+00
Am-242m	3.21E-05	1.38E-09	4.20E-06	1.69E-04	2.12E-03	5.64E-10	7.48E-05	1.15E-04	0.00E+00
Am-243	3.26E-05	1.52E-08	1.78E-05	1.73E-04	2.17E-03	8.29E-09	7.74E-05	1.19E-04	0.00E+00
C-14	5.64E-10	5.64E-10	5.64E-10	5.64E-10	5.64E-10	5.64E-10	5.64E-10	5.64E-10	0.00E+00
Cd-113m	3.32E-08	3.32E-08	4.09E-07	3.32E-08	3.32E-08	3.32E-08	1.30E-06	4.13E-07	0.00E+00
Cl-36	5.04E-10	5.04E-10	4.56E-08	5.04E-10	5.04E-10	5.04E-10	5.36E-10	5.93E-09	0.00E+00
Cm-242	5.70E-07	9.44E-10	1.55E-05	3.90E-06	4.87E-05	9.41E-10	2.45E-06	4.67E-06	0.00E+00
Cm-243	2.07E-05	6.29E-09	1.94E-05	1.18E-04	1.47E-03	3.83E-09	5.76E-05	8.30E-05	0.00E+00
Cm-244	1.59E-05	1.04E-09	1.93E-05	9.38E-05	1.17E-03	1.01E-09	4.78E-05	6.70E-05	0.00E+00
Cm-245	3.37E-05	6.69E-09	1.80E-05	1.79E-04	2.24E-03	3.68E-09	7.96E-05	1.23E-04	0.00E+00
Cm-246	3.34E-05	4.00E-09	1.82E-05	1.78E-04	2.22E-03	2.26E-09	7.94E-05	1.22E-04	0.00E+00
Cm-247	3.07E-05	2.23E-08	1.67E-05	1.63E-04	2.04E-03	1.45E-08	7.30E-05	1.12E-04	0.00E+00
Co-60	4.76E-09	1.84E-08	3.45E-07	1.72E-08	1.35E-08	1.62E-08	3.60E-08	5.91E-08	0.00E+00
Cs-134	1.30E-08	1.08E-08	1.18E-08	1.18E-08	1.10E-08	1.11E-08	1.39E-08	1.25E-08	0.00E+00
Cs-135	1.20E-09	1.20E-09	1.41E-09	1.20E-09	1.20E-09	1.20E-09	1.20E-09	1.23E-09	0.00E+00
Cs-137	8.76E-09	7.84E-09	8.82E-09	8.30E-09	7.94E-09	7.93E-09	9.12E-09	8.63E-09	0.00E+00
Eu-154	1.17E-08	1.55E-08	7.92E-08	1.06E-07	5.23E-07	7.14E-09	1.13E-07	7.73E-08	0.00E+00
Eu-155	3.56E-10	6.14E-10	1.19E-08	1.43E-08	1.52E-07	2.40E-10	1.11E-08	1.12E-08	0.00E+00
Fe-55	5.23E-10	5.09E-10	1.06E-09	5.17E-10	5.14E-10	5.42E-10	1.21E-09	7.26E-10	0.00E+00
H-3	1.73E-11	1.73E-11	1.73E-11	1.73E-11	1.73E-11	1.73E-11	1.73E-11	1.73E-11	0.00E+00
I-129	8.69E-11	2.09E-10	3.14E-10	1.40E-10	1.38E-10	1.56E-06	1.18E-10	4.69E-08	0.00E+00
Kr-85	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nb-93m	4.16E-10	4.36E-11	6.45E-08	2.85E-10	7.43E-10	3.04E-11	3.95E-10	7.90E-09	0.00E+00
Nb-94	4.76E-09	2.24E-08	7.48E-07	2.26E-08	1.97E-08	2.22E-08	4.45E-08	1.12E-07	0.00E+00
Ni-59	3.59E-10	3.46E-10	1.20E-09	3.54E-10	3.51E-10	3.77E-10	3.63E-10	3.58E-10	0.00E+00
Ni-63	8.22E-10	8.22E-10	3.07E-09	8.22E-10	8.22E-10	8.22E-10	8.59E-10	8.39E-10	0.00E+00
Np-237	2.96E-05	1.69E-08	1.61E-05	2.62E-04	3.27E-03	1.34E-08	2.34E-05	1.46E-04	0.00E+00
Pa-231	6.90E-09	8.79E-09	7.47E-04	6.97E-04	8.70E-03	7.64E-09	2.87E-07	3.47E-04	0.00E+00
Pb-210	3.18E-07	3.18E-07	3.18E-07	3.75E-06	5.47E-05	3.18E-07	4.69E-06	3.67E-06	0.00E+00
Pd-107	9.45E-13	9.45E-13	2.85E-08	5.11E-12	1.36E-11	9.45E-13	2.15E-10	3.45E-09	0.00E+00
Pm-147	1.88E-14	3.60E-14	7.74E-08	8.16E-09	1.02E-07	1.98E-14	5.89E-09	1.06E-08	0.00E+00
Pu-238	2.80E-05	1.00E-09	3.20E-04	1.52E-04	1.90E-03	9.62E-10	7.02E-05	1.06E-04	0.00E+00
Pu-239	3.18E-05	9.22E-10	3.23E-04	1.69E-04	2.11E-03	9.03E-10	7.56E-05	1.16E-04	0.00E+00
Pu-240	3.18E-05	9.51E-10	3.23E-04	1.69E-04	2.11E-03	9.05E-10	7.56E-05	1.16E-04	0.00E+00
Pu-241	6.82E-07	3.06E-11	3.18E-06	3.36E-06	4.20E-05	1.24E-11	1.31E-06	2.23E-06	0.00E+00
Pu-242	3.02E-05	9.45E-10	3.07E-04	1.61E-04	2.01E-03	8.79E-10	7.18E-05	1.11E-04	0.00E+00
Ra-226	1.02E-07	1.02E-07	1.61E-05	6.64E-07	7.59E-06	1.02E-07	1.07E-07	2.32E-06	0.00E+00
Ra-228	1.83E-07	1.84E-07	7.22E-06	7.38E-07	6.51E-06	1.83E-07	1.87E-07	1.29E-06	0.00E+00
Ru-106	1.38E-08	1.37E-08	1.04E-06	1.37E-08	1.37E-08	1.37E-08	1.69E-08	1.29E-07	0.00E+00
Sb-125	3.60E-10	4.16E-10	2.17E-08	6.49E-10	2.73E-09	3.24E-10	1.45E-09	3.30E-09	0.00E+00
Se-79	6.79E-10	6.79E-10	9.81E-09	6.79E-10	6.79E-10	6.79E-10	4.24E-09	2.66E-09	0.00E+00
Sm-147	0.00E+00	0.00E+00	7.62E-06	2.75E-05	3.44E-04	0.00E+00	1.89E-05	2.02E-05	0.00E+00
Sm-151	4.03E-14	1.49E-13	3.26E-09	1.10E-08	1.38E-07	1.32E-14	7.51E-09	8.10E-09	0.00E+00
Sn-126	1.43E-08	1.41E-08	1.51E-07	5.62E-08	1.18E-07	1.31E-08	1.76E-08	2.69E-08	0.00E+00
Sr-90	2.64E-09	2.64E-09	2.88E-06	3.36E-07	7.27E-07	2.64E-09	5.73E-09	3.51E-07	0.00E+00
Tc-99	4.52E-11	4.52E-11	1.67E-08	4.52E-11	4.52E-11	1.21E-09	6.26E-10	2.25E-09	0.00E+00
Th-229	2.76E-06	2.76E-06	1.99E-03	1.15E-03	1.43E-02	2.76E-06	7.05E-08	5.80E-04	0.00E+00
Th-230	4.08E-07	4.08E-07	3.00E-04	1.73E-04	2.16E-03	4.08E-07	1.05E-06	8.80E-05	0.00E+00
Th-232	7.62E-07	7.72E-07	9.40E-04	8.93E-04	1.11E-02	7.44E-07	1.87E-06	4.43E-04	0.00E+00
U-232	8.00E-08	8.06E-08	1.48E-03	4.06E-06	6.42E-05	7.85E-08	3.11E-06	1.78E-04	0.00E+00
U-233	2.54E-08	2.54E-08	3.04E-04	7.12E-07	1.12E-05	2.54E-08	9.40E-07	3.66E-05	0.00E+00
U-234	2.50E-08	2.50E-08	2.98E-04	6.98E-07	1.09E-05	2.50E-08	9.26E-07	3.58E-05	0.00E+00
U-235	2.37E-08	2.38E-08	2.76E-04	6.58E-07	1.01E-05	2.37E-08	8.59E-07	3.32E-05	0.00E+00
U-236	2.37E-08	2.37E-08	2.82E-04	6.60E-07	1.04E-05	2.37E-08	8.77E-07	3.39E-05	0.00E+00
U-238	2.23E-08	2.23E-08	2.66E-04	6.58E-07	9.78E-06	2.22E-08	8.22E-07	3.20E-05	0.00E+00
Zr-93	2.18E-11	4.88E-11	8.72E-08	1.77E-07	2.18E-06	1.74E-11	1.73E-10	8.67E-08	0.00E+00
crud									
Co-60	4.76E-09	1.84E-08	3.45E-07	1.72E-08	1.35E-08	1.62E-08	3.60E-08	5.91E-08	0.00E+00
Fe-55	5.23E-10	5.09E-10	1.06E-09	5.17E-10	5.14E-10	5.42E-10	1.21E-09	7.26E-10	0.00E+00

	air submersion DCFs [Sv/Bq m^3/s]								
	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	3.75E-17	4.45E-17	3.38E-17	2.94E-17	1.04E-16	3.65E-17	3.18E-17	3.74E-17	3.28E-16
Am-241	8.58E-16	1.07E-15	6.74E-16	5.21E-16	2.87E-15	7.83E-16	6.34E-16	8.18E-16	1.28E-15
Am-242m	3.80E-17	6.01E-17	1.72E-17	1.72E-17	7.94E-17	2.95E-17	1.94E-17	3.17E-17	1.36E-16
Am-243	2.19E-15	2.61E-15	1.92E-15	1.55E-15	7.47E-15	2.09E-15	1.79E-15	2.18E-15	2.75E-15
C-14	2.59E-19	3.52E-19	1.53E-19	1.21E-19	7.06E-19	2.19E-19	1.54E-19	2.24E-19	2.43E-16
Cd-113m	7.17E-18	8.76E-18	5.93E-18	5.01E-18	2.10E-17	6.76E-18	5.63E-18	6.94E-18	8.48E-15
Cl-36	2.24E-17	2.66E-17	2.02E-17	1.81E-17	5.63E-17	2.19E-17	1.92E-17	2.23E-17	1.47E-14
Cm-242	7.83E-18	1.48E-17	1.13E-18	1.89E-18	1.06E-17	4.91E-18	2.27E-18	5.69E-18	4.29E-17
Cm-243	5.77E-15	6.68E-15	5.50E-15	5.00E-15	1.50E-14	5.76E-15	5.19E-15	5.88E-15	9.79E-15
Cm-244	6.90E-18	1.33E-17	7.08E-19	1.46E-18	8.82E-18	4.19E-18	1.81E-18	4.91E-18	3.91E-17
Cm-245	3.88E-15	4.55E-15	3.63E-15	3.17E-15	1.18E-14	3.84E-15	3.40E-15	3.96E-15	5.36E-15
Cm-246	6.24E-18	1.20E-17	7.00E-19	1.35E-18	8.17E-18	3.82E-18	1.67E-18	4.46E-18	3.49E-17
Cm-247	1.47E-14	1.68E-14	1.44E-14	1.38E-14	2.83E-14	1.49E-14	1.38E-14	1.50E-14	1.79E-14
Co-60	1.23E-13	1.39E-13	1.24E-13	1.23E-13	1.78E-13	1.27E-13	1.20E-13	1.26E-13	1.45E-13
Cs-134	7.40E-14	8.43E-14	7.37E-14	7.19E-14	1.20E-13	7.57E-14	7.06E-14	7.57E-14	9.45E-14
Cs-135	6.28E-19	8.23E-19	4.19E-19	3.34E-19	1.81E-18	5.50E-19	4.09E-19	5.65E-19	9.06E-16
Cs-137	2.67E-14	3.05E-14	2.65E-14	2.58E-14	4.38E-14	2.73E-14	2.54E-14	2.73E-14	4.39E-14
Eu-154	6.00E-14	6.81E-14	5.99E-14	5.87E-14	9.43E-14	6.15E-14	5.75E-14	6.14E-14	8.29E-14
Eu-155	2.49E-15	2.95E-15	2.22E-15	1.85E-15	8.09E-15	2.41E-15	2.07E-15	2.49E-15	3.39E-15
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H-3	0.00E+00	0.00E+00	2.75E-18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.31E-19	0.00E+00
I-129	4.83E-16	6.66E-16	2.14E-16	1.64E-16	1.10E-15	3.86E-16	2.30E-16	3.80E-16	1.10E-15
Kr-85	1.17E-16	1.34E-16	1.14E-16	1.09E-16	2.20E-16	1.18E-16	1.09E-16	1.19E-16	1.32E-14
Nb-93m	6.33E-18	1.31E-17	2.55E-19	1.18E-18	6.92E-18	3.43E-18	1.36E-18	4.44E-18	4.28E-17
Nb-94	7.54E-14	8.57E-14	7.51E-14	7.34E-14	1.19E-13	7.72E-14	7.19E-14	7.70E-14	9.52E-14
Ni-59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ni-63	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Np-237	1.04E-15	1.26E-15	9.02E-16	7.69E-16	3.20E-15	9.94E-16	8.50E-16	1.03E-15	1.54E-15
Pa-231	1.71E-15	1.99E-15	1.62E-15	1.52E-15	3.64E-15	1.70E-15	1.54E-15	1.72E-15	2.44E-15
Pb-210	6.19E-17	8.18E-17	4.25E-17	3.14E-17	1.95E-16	5.42E-17	4.09E-17	5.64E-17	1.28E-16
Pd-107	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pm-147	7.48E-19	9.56E-19	5.45E-19	4.46E-19	2.18E-18	6.75E-19	5.26E-19	6.93E-19	8.11E-16
Pu-238	6.56E-18	1.27E-17	1.06E-18	1.68E-18	9.30E-18	4.01E-18	1.99E-18	4.88E-18	4.09E-17
Pu-239	4.84E-18	7.55E-18	2.65E-18	2.67E-18	9.47E-18	3.88E-18	2.86E-18	4.24E-18	1.86E-17
Pu-240	6.36E-18	1.23E-17	1.09E-18	1.65E-18	9.26E-18	3.92E-18	1.96E-18	4.75E-18	3.92E-17
Pu-241	7.19E-20	8.67E-20	6.48E-20	5.63E-20	2.19E-19	6.98E-20	6.09E-20	7.25E-20	1.17E-19
Pu-242	5.34E-18	1.03E-17	9.69E-19	1.43E-18	7.90E-18	3.32E-18	1.68E-18	4.01E-18	3.27E-17
Ra-226	3.08E-16	3.54E-16	2.95E-16	2.70E-16	7.95E-16	3.09E-16	2.79E-16	3.15E-16	4.79E-16
Ra-228	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ru-106	1.01E-14	1.16E-14	1.01E-14	9.75E-15	1.72E-14	1.03E-14	9.63E-15	1.04E-14	1.09E-13
Sb-125	1.98E-14	2.27E-14	1.95E-14	1.87E-14	3.53E-14	2.01E-14	1.86E-14	2.02E-14	2.65E-14
Se-79	3.47E-19	4.67E-19	2.11E-19	1.67E-19	9.60E-19	2.96E-19	2.10E-19	3.03E-19	3.71E-16
Sm-147	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sm-151	5.20E-20	8.80E-20	7.08E-21	1.13E-20	7.09E-20	3.58E-20	1.49E-20	3.61E-20	1.90E-19
Sn-126	7.54E-14	8.62E-14	7.48E-14	7.22E-14	1.31E-13	7.69E-14	7.14E-14	7.71E-14	1.31E-13
Sr-90	7.78E-18	9.49E-18	6.44E-18	5.44E-18	2.28E-17	7.33E-18	6.11E-18	7.53E-18	9.20E-15
Tc-99	1.74E-18	2.20E-18	1.29E-18	1.05E-18	5.17E-18	1.57E-18	1.24E-18	1.62E-18	2.74E-15
Th-229	3.77E-15	4.42E-15	3.50E-15	3.03E-15	1.15E-14	3.70E-15	3.27E-15	3.83E-15	5.41E-15
Th-230	1.80E-17	2.38E-17	1.43E-17	1.22E-17	5.29E-17	1.63E-17	1.37E-17	1.74E-17	4.51E-17
Th-232	9.34E-18	1.36E-17	6.37E-18	5.52E-18	2.60E-17	7.90E-18	6.34E-18	8.72E-18	3.44E-17
U-232	1.55E-17	2.32E-17	9.84E-18	8.99E-18	3.86E-17	1.29E-17	1.00E-17	1.42E-17	5.92E-17
U-233	1.69E-17	2.22E-17	1.35E-17	1.24E-17	4.12E-17	1.55E-17	1.31E-17	1.63E-17	4.57E-17
U-234	8.79E-18	1.44E-17	4.38E-18	4.20E-18	1.99E-17	6.69E-18	4.80E-18	7.63E-18	4.25E-17
U-235	7.05E-15	8.11E-15	6.75E-15	6.15E-15	1.84E-14	7.05E-15	6.37E-15	7.20E-15	8.64E-15
U-236	8.10E-18	1.10E-17	2.18E-18	2.33E-18	1.19E-17	4.19E-18	2.70E-18	5.01E-18	3.57E-17
U-238	4.39E-18	8.54E-18	9.98E-19	1.24E-18	7.40E-18	2.72E-18	1.51E-18	3.41E-18	2.91E-17
Zr-93	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
crud									
Co-60	1.23E-13	1.39E-13	1.24E-13	1.23E-13	1.78E-13	1.27E-13	1.20E-13	1.26E-13	1.45E-13
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Source Term Calculations		HEPA filters?	no				
N REACTOR [147]							
other	not intact						
Isotope	Curies (entire fuel intentory)	finv = 1/nCan	ARF	RF	LPF	Total Source Term [Ci] released to the environment	Respirable Source Term [Ci] released to the environment
Ac-227	1.03E-02	5.13E-03	5.00E-03	4.00E-01	1.00E+00	2.65E-07	1.06E-07
Am-241	2.80E+05	5.13E-03	5.00E-03	4.00E-01	1.00E+00	7.19E+00	2.88E+00
Am-242m	7.96E+00	5.13E-03	5.00E-03	4.00E-01	1.00E+00	2.04E-04	8.17E-05
Am-243	4.10E+01	5.13E-03	5.00E-03	4.00E-01	1.00E+00	1.05E-03	4.21E-04
C-14	3.63E+02	5.13E-03	5.00E-03	4.00E-01	1.00E+00	9.31E-03	3.73E-03
Cd-113m	0.00E+00	5.13E-03	5.00E-03	4.00E-01	1.00E+00	0.00E+00	0.00E+00
Cl-36	0.00E+00	5.13E-03	5.00E-03	4.00E-01	1.00E+00	0.00E+00	0.00E+00
Cm-242	0.00E+00	5.13E-03	5.00E-03	4.00E-01	1.00E+00	0.00E+00	0.00E+00
Cm-243	0.00E+00	5.13E-03	5.00E-03	4.00E-01	1.00E+00	0.00E+00	0.00E+00
Cm-244	2.44E+03	5.13E-03	5.00E-03	4.00E-01	1.00E+00	6.25E-02	2.50E-02
Cm-245	5.13E-01	5.13E-03	5.00E-03	4.00E-01	1.00E+00	1.31E-05	5.26E-06
Cm-246	6.79E-02	5.13E-03	5.00E-03	4.00E-01	1.00E+00	1.74E-06	6.97E-07
Cm-247	0.00E+00	5.13E-03	5.00E-03	4.00E-01	1.00E+00	0.00E+00	0.00E+00
Co-60	4.75E+02	5.13E-03	5.00E-03	4.00E-01	1.00E+00	1.22E-02	4.87E-03
Cs-134	1.63E+02	5.13E-03	5.00E-03	1.00E+00	1.00E+00	4.19E-03	4.19E-03
Cs-135	4.00E+01	5.13E-03	5.00E-03	1.00E+00	1.00E+00	1.03E-03	1.03E-03
Cs-137	5.34E+06	5.13E-03	5.00E-03	1.00E+00	1.00E+00	1.37E+02	1.37E+02
Eu-154	0.00E+00	5.13E-03	5.00E-03	4.00E-01	1.00E+00	0.00E+00	0.00E+00
Eu-155	0.00E+00	5.13E-03	5.00E-03	4.00E-01	1.00E+00	0.00E+00	0.00E+00
Fe-55	0.00E+00	5.13E-03	5.00E-03	4.00E-01	1.00E+00	0.00E+00	0.00E+00
H-3	1.03E+04	5.13E-03	3.00E-01	1.00E+00	1.00E+00	1.59E+01	1.59E+01
I-129	3.29E+00	5.13E-03	3.00E-01	1.00E+00	1.00E+00	5.06E-03	5.06E-03
Kr-85	1.53E+05	5.13E-03	3.00E-01	1.00E+00	1.00E+00	2.35E+02	2.35E+02
Nb-93m	4.54E+02	5.13E-03	5.00E-03	4.00E-01	1.00E+00	1.16E-02	4.66E-03
Nb-94	6.71E-05	5.13E-03	5.00E-03	4.00E-01	1.00E+00	1.72E-09	6.89E-10
Ni-59	2.03E+01	5.13E-03	5.00E-03	4.00E-01	1.00E+00	5.22E-04	2.09E-04
Ni-63	2.21E+03	5.13E-03	5.00E-03	4.00E-01	1.00E+00	5.66E-02	2.26E-02
Np-237	3.87E+01	5.13E-03	5.00E-03	4.00E-01	1.00E+00	9.93E-04	3.97E-04
Pa-231	1.38E-02	5.13E-03	5.00E-03	4.00E-01	1.00E+00	3.54E-07	1.41E-07
Pb-210	7.52E-08	5.13E-03	5.00E-03	4.00E-01	1.00E+00	1.93E-12	7.71E-13
Pd-107	7.46E+00	5.13E-03	5.00E-03	4.00E-01	1.00E+00	1.91E-04	7.65E-05
Pm-147	0.00E+00	5.13E-03	5.00E-03	4.00E-01	1.00E+00	0.00E+00	0.00E+00
Pu-238	6.37E+04	5.13E-03	5.00E-03	4.00E-01	1.00E+00	1.63E+00	6.53E-01
Pu-239	1.23E+05	5.13E-03	5.00E-03	4.00E-01	1.00E+00	3.15E+00	1.26E+00
Pu-240	7.18E+04	5.13E-03	5.00E-03	4.00E-01	1.00E+00	1.84E+00	7.37E-01
Pu-241	2.06E+06	5.13E-03	5.00E-03	4.00E-01	1.00E+00	5.28E+01	2:11E+01
Pu-242	3.46E+01	5.13E-03	5.00E-03	4.00E-01	1.00E+00	8.87E-04	3.55E-04
Ra-226	1.15E-03	5.13E-03	5.00E-03	4.00E-01	1.00E+00	2.95E-08	1.18E-08
Ra-228	1.03E-06	5.13E-03	5.00E-03	4.00E-01	1.00E+00	2.63E-11	1.05E-11
Ru-106	3.16E-01	5.13E-03	5.00E-03	4.00E-01	1.00E+00	8.11E-06	3.24E-06
Sb-125	0.00E+00	5.13E-03	5.00E-03	4.00E-01	1.00E+00	0.00E+00	0.00E+00
Se-79	4.48E+01	5.13E-03	5.00E-03	4.00E-01	1.00E+00	1.15E-03	4.60E-04
Sm-147	0.00E+00	5.13E-03	5.00E-03	4.00E-01	1.00E+00	0.00E+00	0.00E+00
Sm-151	8.55E+04	5.13E-03	5.00E-03	4.00E-01	1.00E+00	2.19E+00	8.77E-01
Sn-126	7.83E+01	5.13E-03	5.00E-03	4.00E-01	1.00E+00	2.01E-03	8.03E-04
Sr-90	4.03E+06	5.13E-03	5.00E-03	4.00E-01	1.00E+00	1.03E+02	4.14E+01
Tc-99	1.51E+03	5.13E-03	5.00E-03	4.00E-01	1.00E+00	3.88E-02	1.54E-02
Th-229	9.31E-06	5.13E-03	5.00E-03	4.00E-01	1.00E+00	2.39E-10	9.55E-11
Th-230	1.02E-03	5.13E-03	5.00E-03	4.00E-01	1.00E+00	2.62E-08	1.05E-08
Th-232	1.21E-07	5.13E-03	5.00E-03	4.00E-01	1.00E+00	3.09E-12	1.24E-12
U-232	0.00E+00	5.13E-03	5.00E-03	4.00E-01	1.00E+00	0.00E+00	0.00E+00
U-233	5.71E-03	5.13E-03	5.00E-03	4.00E-01	1.00E+00	1.46E-07	5.86E-08
U-234	4.85E+02	5.13E-03	5.00E-03	4.00E-01	1.00E+00	1.24E-02	4.98E-03
U-235	1.85E+01	5.13E-03	5.00E-03	4.00E-01	1.00E+00	4.75E-04	1.90E-04
U-236	7.02E+01	5.13E-03	5.00E-03	4.00E-01	1.00E+00	1.80E-03	7.20E-04
U-238	3.82E+02	5.13E-03	5.00E-03	4.00E-01	1.00E+00	9.79E-03	3.91E-03
Zr-93	2.10E+02	5.13E-03	5.00E-03	4.00E-01	1.00E+00	5.39E-03	2.16E-03
crud (per canister)							
Co-60 (crud)	1.76E+03	1	1.00E+00	3.00E-01	1.00E+00	1.76E+03	5.28E+02
Fe-55 (crud)	1.11E+04	1	1.00E+00	3.00E-01	1.00E+00	1.11E+04	3.33E+03

Source Term Calculations		HEPA filters?		yes			
N REACTOR [147]							
other	not intact						
Isotope	Curies	1/nCan	ARF	RF	LPF	Total Source Term [Ci] released to the environment	Respirable Source Term [Ci] released to the environment
Ac-227	1.03E-02	5.13E-03	5.00E-03	4.00E-01	3.00E-04	7.94E-11	3.18E-11
Am-241	2.80E+05	5.13E-03	5.00E-03	4.00E-01	3.00E-04	2.16E-03	8.63E-04
Am-242m	7.96E+00	5.13E-03	5.00E-03	4.00E-01	3.00E-04	6.13E-08	2.45E-08
Am-243	4.10E+01	5.13E-03	5.00E-03	4.00E-01	3.00E-04	3.16E-07	1.26E-07
C-14	3.63E+02	5.13E-03	5.00E-03	4.00E-01	3.00E-04	2.79E-06	1.12E-06
Cd-113m	0.00E+00	5.13E-03	5.00E-03	4.00E-01	3.00E-04	0.00E+00	0.00E+00
Cl-36	0.00E+00	5.13E-03	5.00E-03	4.00E-01	3.00E-04	0.00E+00	0.00E+00
Cm-242	0.00E+00	5.13E-03	5.00E-03	4.00E-01	3.00E-04	0.00E+00	0.00E+00
Cm-243	0.00E+00	5.13E-03	5.00E-03	4.00E-01	3.00E-04	0.00E+00	0.00E+00
Cm-244	2.44E+03	5.13E-03	5.00E-03	4.00E-01	3.00E-04	1.87E-05	7.50E-06
Cm-245	5.13E-01	5.13E-03	5.00E-03	4.00E-01	3.00E-04	3.94E-09	1.58E-09
Cm-246	6.79E-02	5.13E-03	5.00E-03	4.00E-01	3.00E-04	5.23E-10	2.09E-10
Cm-247	0.00E+00	5.13E-03	5.00E-03	4.00E-01	3.00E-04	0.00E+00	0.00E+00
Co-60	4.75E+02	5.13E-03	5.00E-03	4.00E-01	3.00E-04	3.65E-06	1.46E-06
Cs-134	1.63E+02	5.13E-03	5.00E-03	1.00E+00	1.00E+00	4.19E-03	4.19E-03
Cs-135	4.00E+01	5.13E-03	5.00E-03	1.00E+00	1.00E+00	1.03E-03	1.03E-03
Cs-137	5.34E+06	5.13E-03	5.00E-03	1.00E+00	1.00E+00	1.37E+02	1.37E+02
Eu-154	0.00E+00	5.13E-03	5.00E-03	4.00E-01	3.00E-04	0.00E+00	0.00E+00
Eu-155	0.00E+00	5.13E-03	5.00E-03	4.00E-01	3.00E-04	0.00E+00	0.00E+00
Fe-55	0.00E+00	5.13E-03	5.00E-03	4.00E-01	3.00E-04	0.00E+00	0.00E+00
H-3	1.03E+04	5.13E-03	3.00E-01	1.00E+00	1.00E+00	1.59E+01	1.59E+01
I-129	3.29E+00	5.13E-03	3.00E-01	1.00E+00	1.00E+00	5.06E-03	5.06E-03
Kr-85	1.53E+05	5.13E-03	3.00E-01	1.00E+00	1.00E+00	2.35E+02	2.35E+02
Nb-93m	4.54E+02	5.13E-03	5.00E-03	4.00E-01	3.00E-04	3.49E-06	1.40E-06
Nb-94	6.71E-05	5.13E-03	5.00E-03	4.00E-01	3.00E-04	5.16E-13	2.07E-13
Ni-59	2.03E+01	5.13E-03	5.00E-03	4.00E-01	3.00E-04	1.57E-07	6.26E-08
Ni-63	2.21E+03	5.13E-03	5.00E-03	4.00E-01	3.00E-04	1.70E-05	6.79E-06
Np-237	3.87E+01	5.13E-03	5.00E-03	4.00E-01	3.00E-04	2.98E-07	1.19E-07
Pa-231	1.38E-02	5.13E-03	5.00E-03	4.00E-01	3.00E-04	1.06E-10	4.24E-11
Pb-210	7.52E-08	5.13E-03	5.00E-03	4.00E-01	3.00E-04	5.78E-16	2.31E-16
Pd-107	7.46E+00	5.13E-03	5.00E-03	4.00E-01	3.00E-04	5.74E-08	2.30E-08
Pm-147	0.00E+00	5.13E-03	5.00E-03	4.00E-01	3.00E-04	0.00E+00	0.00E+00
Pu-238	6.37E+04	5.13E-03	5.00E-03	4.00E-01	3.00E-04	4.90E-04	1.96E-04
Pu-239	1.23E+05	5.13E-03	5.00E-03	4.00E-01	3.00E-04	9.46E-04	3.78E-04
Pu-240	7.18E+04	5.13E-03	5.00E-03	4.00E-01	3.00E-04	5.53E-04	2.21E-04
Pu-241	2.06E+06	5.13E-03	5.00E-03	4.00E-01	3.00E-04	1.58E-02	6.33E-03
Pu-242	3.46E+01	5.13E-03	5.00E-03	4.00E-01	3.00E-04	2.66E-07	1.06E-07
Ra-226	1.15E-03	5.13E-03	5.00E-03	4.00E-01	3.00E-04	8.84E-12	3.54E-12
Ra-228	1.03E-06	5.13E-03	5.00E-03	4.00E-01	3.00E-04	7.90E-15	3.16E-15
Ru-106	3.16E-01	5.13E-03	5.00E-03	4.00E-01	3.00E-04	2.43E-09	9.73E-10
Sb-125	0.00E+00	5.13E-03	5.00E-03	4.00E-01	3.00E-04	0.00E+00	0.00E+00
Se-79	4.48E+01	5.13E-03	5.00E-03	4.00E-01	3.00E-04	3.45E-07	1.38E-07
Sm-147	0.00E+00	5.13E-03	5.00E-03	4.00E-01	3.00E-04	0.00E+00	0.00E+00
Sm-151	8.55E+04	5.13E-03	5.00E-03	4.00E-01	3.00E-04	6.58E-04	2.63E-04
Sn-126	7.83E+01	5.13E-03	5.00E-03	4.00E-01	3.00E-04	6.02E-07	2.41E-07
Sr-90	4.03E+06	5.13E-03	5.00E-03	4.00E-01	3.00E-04	3.10E-02	1.24E-02
Tc-99	1.51E+03	5.13E-03	5.00E-03	4.00E-01	3.00E-04	1.16E-05	4.63E-06
Th-229	9.31E-06	5.13E-03	5.00E-03	4.00E-01	3.00E-04	7.16E-14	2.87E-14
Th-230	1.02E-03	5.13E-03	5.00E-03	4.00E-01	3.00E-04	7.85E-12	3.14E-12
Th-232	1.21E-07	5.13E-03	5.00E-03	4.00E-01	3.00E-04	9.28E-16	3.71E-16
U-232	0.00E+00	5.13E-03	5.00E-03	4.00E-01	3.00E-04	0.00E+00	0.00E+00
U-233	5.71E-03	5.13E-03	5.00E-03	4.00E-01	3.00E-04	4.39E-11	1.76E-11
U-234	4.85E+02	5.13E-03	5.00E-03	4.00E-01	3.00E-04	3.73E-06	1.49E-06
U-235	1.85E+01	5.13E-03	5.00E-03	4.00E-01	3.00E-04	1.42E-07	5.69E-08
U-236	7.02E+01	5.13E-03	5.00E-03	4.00E-01	3.00E-04	5.40E-07	2.16E-07
U-238	3.82E+02	5.13E-03	5.00E-03	4.00E-01	3.00E-04	2.94E-06	1.17E-06
Zr-93	2.10E+02	5.13E-03	5.00E-03	4.00E-01	3.00E-04	1.62E-06	6.47E-07
crud (per canister)							
Co-60 (crud)	1.76E+03	1	1.00E+00	3.00E-01	3.00E-04	5.28E-01	1.58E-01
Fe-55 (crud)	1.11E+04	1	1.00E+00	3.00E-01	3.00E-04	3.33E+00	9.99E-01

N REACTOR [147]			No HEPAs						
other	not intact								
	air submersion doses [rem]								
	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	1.72E-15	2.04E-15	1.55E-15	1.35E-15	4.75E-15	1.67E-15	1.46E-15	1.72E-15	1.51E-14
Am-241	1.07E-06	1.33E-06	8.39E-07	6.49E-07	3.57E-06	9.75E-07	7.90E-07	1.02E-06	1.59E-06
Am-242m	1.34E-12	2.13E-12	6.08E-13	6.08E-13	2.81E-12	1.04E-12	6.86E-13	1.12E-12	4.81E-12
Am-243	3.99E-10	4.76E-10	3.50E-10	2.82E-10	1.36E-09	3.81E-10	3.26E-10	3.97E-10	5.01E-10
C-14	4.18E-13	5.68E-13	2.47E-13	1.95E-13	1.14E-12	3.53E-13	2.48E-13	3.61E-13	3.92E-10
Cd-113m	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cl-36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-242	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-243	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-244	7.47E-11	1.44E-10	7.66E-12	1.58E-11	9.54E-11	4.53E-11	1.96E-11	5.31E-11	4.23E-10
Cm-245	8.83E-12	1.04E-11	8.26E-12	7.22E-12	2.69E-11	8.74E-12	7.74E-12	9.01E-12	1.22E-11
Cm-246	1.88E-15	3.62E-15	2.11E-16	4.07E-16	2.46E-15	1.15E-15	5.04E-16	1.35E-15	1.05E-14
Cm-247	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co-60	2.59E-07	2.93E-07	2.61E-07	2.59E-07	3.75E-07	2.68E-07	2.53E-07	2.66E-07	3.06E-07
Cs-134	5.36E-08	6.11E-08	5.34E-08	5.21E-08	8.70E-08	5.49E-08	5.12E-08	5.49E-08	6.85E-08
Cs-135	1.12E-13	1.46E-13	7.44E-14	5.93E-14	3.21E-13	9.77E-14	7.26E-14	1.00E-13	1.61E-10
Cs-137	6.33E-04	7.23E-04	6.29E-04	6.13E-04	1.04E-03	6.47E-04	6.02E-04	6.47E-04	1.04E-03
Eu-154	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Eu-155	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H-3	0.00E+00	0.00E+00	7.56E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.10E-10	0.00E+00
I-129	4.23E-10	5.83E-10	1.87E-10	1.44E-10	9.63E-10	3.38E-10	2.01E-10	3.33E-10	9.63E-10
Kr-85	4.77E-06	5.46E-06	4.64E-06	4.44E-06	8.96E-06	4.81E-06	4.44E-06	4.85E-06	5.38E-04
Nb-93m	1.28E-11	2.64E-11	5.14E-13	2.38E-12	1.40E-11	6.92E-12	2.74E-12	8.95E-12	8.63E-11
Nb-94	2.25E-14	2.55E-14	2.24E-14	2.19E-14	3.55E-14	2.30E-14	2.14E-14	2.30E-14	2.84E-14
Ni-59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ni-63	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Np-237	1.79E-10	2.17E-10	1.55E-10	1.32E-10	5.50E-10	1.71E-10	1.46E-10	1.77E-10	2.65E-10
Pa-231	1.05E-13	1.22E-13	9.92E-14	9.31E-14	2.23E-13	1.04E-13	9.43E-14	1.05E-13	1.49E-13
Pb-210	2.07E-20	2.73E-20	1.42E-20	1.05E-20	6.51E-20	1.81E-20	1.37E-20	1.88E-20	4.27E-20
Pd-107	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pm-147	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pu-238	1.85E-09	3.59E-09	3.00E-10	4.75E-10	2.63E-09	1.13E-09	5.63E-10	1.38E-09	1.16E-08
Pu-239	2.64E-09	4.12E-09	1.45E-09	1.46E-09	5.17E-09	2.12E-09	1.56E-09	2.32E-09	1.02E-08
Pu-240	2.03E-09	3.92E-09	3.48E-10	5.26E-10	2.95E-09	1.25E-09	6.25E-10	1.52E-09	1.25E-08
Pu-241	6.57E-10	7.92E-10	5.92E-10	5.14E-10	2.00E-09	6.38E-10	5.56E-10	6.62E-10	1.07E-09
Pu-242	8.20E-13	1.58E-12	1.49E-13	2.20E-13	1.21E-12	5.10E-13	2.58E-13	6.16E-13	5.02E-12
Ra-226	1.57E-15	1.81E-15	1.51E-15	1.38E-15	4.06E-15	1.58E-15	1.42E-15	1.61E-15	2.44E-15
Ra-228	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ru-106	1.42E-11	1.63E-11	1.42E-11	1.37E-11	2.41E-11	1.45E-11	1.35E-11	1.46E-11	1.53E-10
Sb-125	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Se-79	6.91E-14	9.30E-14	4.20E-14	3.32E-14	1.91E-13	5.89E-14	4.18E-14	6.03E-14	7.39E-11
Sm-147	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sm-151	1.97E-11	3.34E-11	2.69E-12	4.29E-12	2.69E-11	1.36E-11	5.66E-12	1.37E-11	7.22E-11
Sn-126	2.62E-08	2.99E-08	2.60E-08	2.51E-08	4.55E-08	2.67E-08	2.48E-08	2.68E-08	4.54E-08
Sr-90	1.39E-07	1.70E-07	1.15E-07	9.75E-08	4.08E-07	1.31E-07	1.09E-07	1.35E-07	1.65E-04
Tc-99	1.16E-11	1.47E-11	8.63E-12	7.02E-12	3.46E-11	1.05E-11	8.29E-12	1.08E-11	1.83E-08
Th-229	1.56E-16	1.83E-16	1.45E-16	1.25E-16	4.75E-16	1.53E-16	1.35E-16	1.58E-16	2.24E-16
Th-230	8.16E-17	1.08E-16	6.48E-17	5.53E-17	2.40E-16	7.39E-17	6.21E-17	7.89E-17	2.04E-16
Th-232	5.01E-21	7.29E-21	3.41E-21	2.96E-21	1.39E-20	4.23E-21	3.40E-21	4.67E-21	1.84E-20
U-232	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
U-233	4.29E-16	5.63E-16	3.42E-16	3.15E-16	1.05E-15	3.93E-16	3.32E-16	4.13E-16	1.16E-15
U-234	1.89E-11	3.10E-11	9.43E-12	9.05E-12	4.29E-11	1.44E-11	1.03E-11	1.64E-11	9.15E-11
U-235	5.79E-10	6.66E-10	5.55E-10	5.05E-10	1.51E-09	5.79E-10	5.23E-10	5.92E-10	7.10E-10
U-236	1.90E-12	3.43E-12	6.80E-13	7.27E-13	3.71E-12	1.31E-12	8.42E-13	1.56E-12	1.11E-11
U-238	7.44E-12	1.45E-11	1.69E-12	2.10E-12	1.25E-11	4.61E-12	2.56E-12	5.78E-12	4.93E-11
Zr-93	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
crud									
Co-60 (crud)	3.75E-02	4.24E-02	3.78E-02	3.75E-02	5.42E-02	3.87E-02	3.66E-02	3.84E-02	4.42E-02
Fe-55 (crud)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
total	3.81E-02	4.31E-02	3.84E-02	3.81E-02	5.53E-02	3.94E-02	3.72E-02	3.91E-02	4.59E-02

N REACTOR [147]			HEPAs						
other	not intact								
	inhalation doses [rem]								
	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	7.25E-10	1.22E-13	2.82E-09	4.71E-09	5.88E-08	6.58E-14	2.69E-09	3.32E-09	0.00E+00
Am-241	1.62E-03	1.33E-07	9.16E-04	8.66E-03	1.08E-01	7.96E-08	3.89E-03	5.97E-03	0.00E+00
Am-242m	4.54E-08	1.95E-12	5.94E-09	2.39E-07	3.00E-06	7.97E-13	1.06E-07	1.63E-07	0.00E+00
Am-243	2.37E-07	1.11E-10	1.30E-07	1.26E-06	1.58E-05	6.04E-11	5.64E-07	8.66E-07	0.00E+00
C-14	3.64E-11	3.64E-11	3.64E-11	3.64E-11	3.64E-11	3.64E-11	3.64E-11	3.64E-11	0.00E+00
Cd-113m	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cl-36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-242	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-243	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-244	6.88E-06	4.50E-10	8.35E-06	4.06E-05	5.06E-04	4.37E-10	2.07E-05	2.90E-05	0.00E+00
Cm-245	3.07E-09	6.09E-13	1.64E-09	1.63E-08	2.04E-07	3.35E-13	7.24E-09	1.12E-08	0.00E+00
Cm-246	4.03E-10	4.82E-14	2.19E-10	2.15E-09	2.68E-08	2.72E-14	9.57E-10	1.47E-09	0.00E+00
Cm-247	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co-60	4.01E-10	1.55E-09	2.91E-08	1.45E-09	1.14E-09	1.38E-09	3.03E-09	4.98E-09	0.00E+00
Cs-134	3.14E-06	2.61E-06	2.85E-06	2.85E-06	2.65E-06	2.68E-06	3.35E-06	3.02E-06	0.00E+00
Cs-135	7.10E-08	7.10E-08	8.34E-08	7.10E-08	7.10E-08	7.10E-08	7.10E-08	7.28E-08	0.00E+00
Cs-137	6.92E-02	6.20E-02	6.97E-02	6.56E-02	6.28E-02	6.27E-02	7.21E-02	6.82E-02	0.00E+00
Eu-154	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Eu-155	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H-3	1.58E-05	1.58E-05	1.58E-05	1.58E-05	1.58E-05	1.58E-05	1.58E-05	1.58E-05	0.00E+00
I-129	2.53E-08	6.10E-08	9.16E-08	4.08E-08	4.02E-08	4.55E-04	3.44E-08	1.37E-05	0.00E+00
Kr-85	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nb-93m	3.35E-11	3.51E-12	5.20E-09	2.30E-11	5.99E-11	2.45E-12	3.18E-11	6.36E-10	0.00E+00
Nb-94	5.67E-17	2.67E-16	8.91E-15	2.69E-16	2.35E-16	2.64E-16	5.30E-16	1.33E-15	0.00E+00
Ni-59	1.30E-12	1.25E-12	4.33E-12	1.28E-12	1.27E-12	1.36E-12	1.31E-12	1.29E-12	0.00E+00
Ni-63	3.22E-10	3.22E-10	1.20E-09	3.22E-10	3.22E-10	3.22E-10	3.36E-10	3.29E-10	0.00E+00
Np-237	2.03E-07	1.16E-10	1.11E-07	1.80E-06	2.25E-05	9.21E-11	1.61E-07	1.00E-06	0.00E+00
Pa-231	1.69E-14	2.15E-14	1.83E-09	1.71E-09	2.13E-08	1.87E-14	7.02E-13	8.49E-10	0.00E+00
Pb-210	4.24E-18	4.24E-18	4.24E-18	5.00E-17	7.30E-16	4.24E-18	6.26E-17	4.90E-17	0.00E+00
Pd-107	1.25E-15	1.25E-15	3.77E-11	6.76E-15	1.80E-14	1.25E-15	2.85E-13	4.57E-12	0.00E+00
Pm-147	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pu-238	3.16E-04	1.13E-08	3.62E-03	1.72E-03	2.15E-02	1.09E-08	7.93E-04	1.20E-03	0.00E+00
Pu-239	6.94E-04	2.01E-08	7.05E-03	3.69E-03	4.60E-02	1.97E-08	1.65E-03	2.53E-03	0.00E+00
Pu-240	4.05E-04	1.21E-08	4.12E-03	2.15E-03	2.69E-02	1.15E-08	9.64E-04	1.48E-03	0.00E+00
Pu-241	2.49E-04	1.12E-08	1.16E-03	1.23E-03	1.53E-02	4.53E-09	4.78E-04	8.14E-04	0.00E+00
Pu-242	1.85E-07	5.80E-12	1.88E-06	9.88E-07	1.23E-05	5.40E-12	4.41E-07	6.81E-07	0.00E+00
Ra-226	2.08E-14	2.08E-14	3.28E-12	1.35E-13	1.55E-12	2.08E-14	2.18E-14	4.73E-13	0.00E+00
Ra-228	3.33E-17	3.35E-17	1.32E-15	1.34E-16	1.19E-15	3.33E-17	3.41E-17	2.35E-16	0.00E+00
Ru-106	7.74E-13	7.68E-13	5.83E-11	7.68E-13	7.68E-13	7.68E-13	9.48E-13	7.24E-12	0.00E+00
Sb-125	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Se-79	5.40E-12	5.40E-12	7.80E-11	5.40E-12	5.40E-12	5.40E-12	3.37E-11	2.12E-11	0.00E+00
Sm-147	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sm-151	6.12E-13	2.26E-12	4.95E-08	1.67E-07	2.09E-06	2.00E-13	1.14E-07	1.23E-07	0.00E+00
Sn-126	1.99E-10	1.96E-10	2.10E-09	7.81E-10	1.64E-09	1.82E-10	2.45E-10	3.74E-10	0.00E+00
Sr-90	1.89E-06	1.89E-06	2.05E-03	2.41E-04	5.20E-04	1.89E-06	4.10E-06	2.51E-04	0.00E+00
Tc-99	1.21E-11	1.21E-11	4.46E-09	1.21E-11	1.21E-11	3.23E-10	1.67E-10	6.01E-10	0.00E+00
Th-229	4.56E-15	4.56E-15	3.29E-12	1.90E-12	2.36E-11	4.56E-15	1.16E-14	9.58E-13	0.00E+00
Th-230	7.39E-14	7.39E-14	5.43E-11	3.13E-11	3.91E-10	7.39E-14	1.90E-13	1.59E-11	0.00E+00
Th-232	1.63E-17	1.65E-17	2.01E-14	1.91E-14	2.38E-13	1.59E-17	4.00E-17	9.49E-15	0.00E+00
U-232	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
U-233	2.57E-14	2.57E-14	3.08E-10	7.22E-13	1.14E-11	2.57E-14	9.53E-13	3.71E-11	0.00E+00
U-234	2.15E-09	2.15E-09	2.56E-05	6.01E-08	9.38E-07	2.15E-09	7.97E-08	3.08E-06	0.00E+00
U-235	7.78E-11	7.82E-11	9.06E-07	2.16E-09	3.32E-08	7.78E-11	2.82E-09	1.09E-07	0.00E+00
U-236	2.95E-10	2.95E-10	3.51E-06	8.22E-09	1.30E-07	2.95E-10	1.09E-08	4.22E-07	0.00E+00
U-238	1.51E-09	1.51E-09	1.80E-05	4.46E-08	6.62E-07	1.50E-09	5.57E-08	2.17E-06	0.00E+00
Zr-93	8.14E-13	1.75E-12	3.25E-09	6.61E-09	8.14E-08	6.49E-13	6.46E-12	3.24E-09	0.00E+00
crud									
Co-60 (crud)	4.35E-05	1.68E-04	3.15E-03	1.57E-04	1.23E-04	1.48E-04	3.29E-04	5.40E-04	0.00E+00
Fe-55 (crud)	3.01E-05	2.93E-05	6.11E-05	2.98E-05	2.96E-05	3.12E-05	6.97E-05	4.18E-05	0.00E+00
total	7.26E-02	6.22E-02	9.19E-02	8.35E-02	2.82E-01	6.33E-02	8.03E-02	8.11E-02	0.00E+00

N REACTOR [147]			HEPAs						
other	not intact								
	air submersion doses [rem]								
	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Ac-227	5.16E-19	6.12E-19	4.65E-19	4.05E-19	1.42E-18	5.02E-19	4.38E-19	5.15E-19	4.52E-18
Am-241	3.21E-10	4.00E-10	2.52E-10	1.95E-10	1.07E-09	2.93E-10	2.37E-10	3.06E-10	4.78E-10
Am-242m	4.03E-16	6.38E-16	1.83E-16	1.83E-16	8.43E-16	3.13E-16	2.06E-16	3.36E-16	1.44E-15
Am-243	1.20E-13	1.43E-13	1.05E-13	8.47E-14	4.08E-13	1.14E-13	9.78E-14	1.19E-13	1.50E-13
C-14	1.25E-16	1.70E-16	7.40E-17	5.85E-17	3.42E-16	1.06E-16	7.45E-17	1.08E-16	1.18E-13
Cd-113m	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cl-36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-242	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-243	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-244	2.24E-14	4.32E-14	2.30E-15	4.74E-15	2.86E-14	1.36E-14	5.88E-15	1.59E-14	1.27E-13
Cm-245	2.65E-15	3.11E-15	2.48E-15	2.16E-15	8.06E-15	2.62E-15	2.32E-15	2.70E-15	3.66E-15
Cm-246	5.65E-19	1.09E-18	6.33E-20	1.22E-19	7.39E-19	3.46E-19	1.51E-19	4.04E-19	3.16E-18
Cm-247	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co-60	7.78E-11	8.79E-11	7.84E-11	7.78E-11	1.13E-10	8.03E-11	7.59E-11	7.97E-11	9.17E-11
Cs-134	5.36E-08	6.11E-08	5.34E-08	5.21E-08	8.70E-08	5.49E-08	5.12E-08	5.49E-08	6.85E-08
Cs-135	1.12E-13	1.46E-13	7.44E-14	5.93E-14	3.21E-13	9.77E-14	7.26E-14	1.00E-13	1.61E-10
Cs-137	6.33E-04	7.23E-04	6.29E-04	6.13E-04	1.04E-03	6.47E-04	6.02E-04	6.47E-04	1.04E-03
Eu-154	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Eu-155	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H-3	0.00E+00	0.00E+00	7.56E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.10E-10	0.00E+00
I-129	4.23E-10	5.83E-10	1.87E-10	1.44E-10	9.63E-10	3.38E-10	2.01E-10	3.33E-10	9.63E-10
Kr-85	4.77E-06	5.46E-06	4.64E-06	4.44E-06	8.96E-06	4.81E-06	4.44E-06	4.85E-06	5.38E-04
Nb-93m	3.83E-15	7.92E-15	1.54E-16	7.14E-16	4.19E-15	2.07E-15	8.23E-16	2.89E-15	2.59E-14
Nb-94	6.74E-18	7.66E-18	6.72E-18	6.56E-18	1.06E-17	6.90E-18	6.43E-18	6.89E-18	8.51E-18
Ni-59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ni-63	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Np-237	5.37E-14	6.50E-14	4.65E-14	3.97E-14	1.65E-13	5.13E-14	4.39E-14	5.32E-14	7.95E-14
Pa-231	3.14E-17	3.66E-17	2.98E-17	2.79E-17	6.89E-17	3.12E-17	2.83E-17	3.16E-17	4.48E-17
Pb-210	6.20E-24	8.19E-24	4.26E-24	3.14E-24	1.95E-23	5.43E-24	4.10E-24	5.65E-24	1.28E-23
Pd-107	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pm-147	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pu-238	5.56E-13	1.08E-12	8.99E-14	1.43E-13	7.89E-13	3.40E-13	1.69E-13	4.14E-13	3.47E-12
Pu-239	7.93E-13	1.24E-12	4.34E-13	4.37E-13	1.55E-12	6.36E-13	4.89E-13	6.95E-13	3.05E-12
Pu-240	6.09E-13	1.16E-12	1.04E-13	1.58E-13	8.88E-13	3.75E-13	1.88E-13	4.55E-13	3.75E-12
Pu-241	1.97E-13	2.38E-13	1.78E-13	1.54E-13	6.00E-13	1.91E-13	1.67E-13	1.99E-13	3.21E-13
Pu-242	2.46E-16	4.75E-16	4.47E-17	6.59E-17	3.64E-16	1.53E-16	7.74E-17	1.85E-16	1.51E-15
Ra-226	4.72E-19	5.42E-19	4.52E-19	4.13E-19	1.22E-18	4.73E-19	4.27E-19	4.82E-19	7.33E-19
Ra-228	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ru-106	4.25E-15	4.88E-15	4.25E-15	4.11E-15	7.24E-15	4.34E-15	4.06E-15	4.38E-15	4.59E-14
Sb-125	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Se-79	2.07E-17	2.79E-17	1.26E-17	9.97E-18	5.73E-17	1.77E-17	1.25E-17	1.81E-17	2.22E-14
Sm-147	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sm-151	5.92E-15	1.00E-14	8.07E-16	1.29E-15	8.08E-15	4.08E-15	1.70E-15	4.11E-15	2.16E-14
Sn-126	7.87E-12	8.98E-12	7.79E-12	7.53E-12	1.36E-11	8.02E-12	7.45E-12	8.04E-12	1.36E-11
Sr-90	4.18E-11	5.10E-11	3.46E-11	2.92E-11	1.23E-10	3.94E-11	3.28E-11	4.05E-11	4.94E-08
Tc-99	3.49E-15	4.41E-15	2.59E-15	2.11E-15	1.04E-14	3.15E-15	2.49E-15	3.25E-15	5.50E-12
Th-229	4.68E-20	5.48E-20	4.34E-20	3.76E-20	1.43E-19	4.59E-20	4.06E-20	4.75E-20	6.71E-20
Th-230	2.45E-20	3.24E-20	1.94E-20	1.66E-20	7.19E-20	2.22E-20	1.86E-20	2.37E-20	6.13E-20
Th-232	1.50E-24	2.19E-24	1.02E-24	8.87E-25	4.18E-24	1.27E-24	1.02E-24	1.40E-24	5.53E-24
U-232	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E[illegible]
U-233	1.29E-19	1.69E-19	1.03E-19	9.44E-20	3.14E-19	1.18E-19	9.97E-20	1.24E-19	3.48E-19
U-234	5.68E-15	9.30E-15	2.83E-15	2.71E-15	1.29E-14	4.32E-15	3.10E-15	4.93E-15	2.75E-14
U-235	1.74E-13	2.00E-13	1.66E-13	1.52E-13	4.54E-13	1.74E-13	1.57E-13	1.77E-13	2.13E-13
U-236	5.71E-16	1.03E-15	2.04E-16	2.18E-16	1.11E-15	3.92E-16	2.53E-16	4.69E-16	3.34E-15
U-238	2.23E-15	4.34E-15	5.06E-16	6.30E-16	3.76E-15	1.38E-15	7.68E-16	1.73E-15	1.48E-14
Zr-93	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
crud									
Co-60 (crud)	1.12E-05	1.27E-05	1.13E-05	1.12E-05	1.63E-05	1.16E-05	1.10E-05	1.15E-05	1.33E-05
Fe-55 (crud)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
total	6.50E-04	7.41E-04	6.45E-04	6.29E-04	1.07E-03	6.63E-04	6.17E-04	6.63E-04	1.59E-03

N REACTOR [147] other not intact No HEPAs

	Inhalation Dose @ 5000 m [rem]	Dose Term for Regulation	Air Submersion Dose @ 5000 m [rem]	Dose Term for Regulation		Dose Term for Regulation
Gonad	1.13E+01		3.81E-02			
Breast	7.27E-01		4.31E-02			
Lung	7.40E+01		3.84E-02			
R Marrow	5.98E+01		3.81E-02			
B Surface	7.30E+02	<CDE	5.53E-02			
Thyroid	6.67E-01		3.94E-02			
Remainder	2.74E+01		3.72E-02			
Whole Body	4.29E+01	<CEDE	3.91E-02	<DDE	4.30E+01	<TEDE=CEDE+DDE
Skin	0.00E+00	<SKIN	4.59E-02	<SKIN	4.59E-02	<SKIN
Eye Lens	N/A	<EYE	N/A	<EYE	N/A	<EYE
					7.30E+02	<CDE + DDE

N REACTOR [147] other not intact HEPAs

	Inhalation Dose @ 5000 m [rem]	Dose Term for Regulation	Air Submersion Dose @ 5000 m [rem]	Dose Term for Regulation	Dose for Regulation [rem]	Dose Term for Regulation
Gonad	7.26E-02		6.50E-04			
Breast	6.22E-02		7.41E-04			
Lung	9.19E-02		6.45E-04			
R Marrow	8.35E-02		6.29E-04			
B Surface	2.82E-01	<CDE	1.07E-03			
Thyroid	6.33E-02		6.63E-04			
Remainder	8.03E-02		6.17E-04			
Whole Body	8.11E-02	<CEDE	6.63E-04	<DDE	8.18E-02	<TEDE=CEDE+DDE
Skin	0.00E+00	<SKIN	1.59E-03	<SKIN	1.59E-03	<SKIN
Eye Lens	N/A	<EYE	N/A	<EYE	N/A	<EYE
					2.82E-01	<CDE + DDE

N REACTOR [147]

isotope	material type	other offsite doses with no HEPAs [rem] TEDE	bone surface CDE + DDE	not intact offsite doses with HEPAs [rem] TEDE	bone surface CDE + DDE
Ac-227	P	1.11E-05	1.96E-04	3.32E-09	5.88E-08
Am-241	P	1.99E+01	3.60E+02	5.97E-03	1.08E-01
Am-242m	P	5.42E-04	9.99E-03	1.63E-07	3.00E-06
Am-243	P	2.89E-03	5.27E-02	8.66E-07	1.58E-05
C-14	P	1.21E-07	1.21E-07	3.64E-11	3.64E-11
Cd-113m	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cl-36	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-242	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-243	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cm-244	P	9.66E-02	1.69E+00	2.90E-05	5.06E-04
Cm-245	P	3.73E-05	6.79E-04	1.12E-08	2.04E-07
Cm-246	P	4.90E-06	8.92E-05	1.47E-09	2.68E-08
Cm-247	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co-60	P	1.69E-05	4.06E-06	5.06E-09	1.22E-09
Cs-134	C	3.07E-06	2.71E-06	3.07E-06	2.71E-06
Cs-135	C	7.28E-08	7.10E-08	7.28E-08	7.10E-08
Cs-137	C	6.89E-02	6.34E-02	6.89E-02	6.34E-02
Eu-154	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Eu-155	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fe-55	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H-3	G	1.58E-05	1.58E-05	1.58E-05	1.58E-05
I-129	G	1.37E-05	4.06E-08	1.37E-05	4.06E-08
Kr-85	G	4.85E-06	4.85E-06	4.85E-06	4.85E-06
Nb-93m	P	2.12E-06	2.00E-07	6.36E-10	5.99E-11
Nb-94	P	4.47E-12	8.05E-13	1.34E-15	2.42E-16
Ni-59	P	4.31E-09	4.22E-09	1.29E-12	1.27E-12
Ni-63	P	1.10E-06	1.07E-06	3.29E-10	3.22E-10
Np-237	P	3.35E-03	7.49E-02	1.00E-06	2.25E-05
Pa-231	P	2.83E-06	7.10E-05	8.49E-10	2.13E-08
Pb-210	P	1.63E-13	2.43E-12	4.90E-17	7.30E-16
Pd-107	P	1.52E-08	6.00E-11	4.57E-12	1.80E-14
Pm-147	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pu-238	P	3.99E+00	7.16E+01	1.20E-03	2.15E-02
Pu-239	P	8.44E+00	1.53E+02	2.53E-03	4.60E-02
Pu-240	P	4.93E+00	8.97E+01	1.48E-03	2.69E-02
Pu-241	P	2.71E+00	5.11E+01	8.14E-04	1.53E-02
Pu-242	P	2.27E-03	4.11E-02	6.81E-07	1.23E-05
Ra-226	P	1.58E-09	5.16E-09	4.73E-13	1.55E-12
Ra-228	P	7.83E-13	3.95E-12	2.35E-16	1.19E-15
Ru-106	P	2.41E-08	2.58E-09	7.24E-12	7.73E-13
Sb-125	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Se-79	P	7.05E-08	1.80E-08	2.12E-11	5.40E-12
Sm-147	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sm-151	P	4.10E-04	6.98E-03	1.23E-07	2.09E-06
Sn-126	P	1.27E-06	5.49E-06	3.82E-10	1.65E-09
Sr-90	P	8.38E-01	1.73E+00	2.51E-04	5.20E-04
Tc-99	P	2.00E-06	4.03E-08	6.01E-10	1.21E-11
Th-229	P	3.19E-09	7.87E-08	9.58E-13	2.36E-11
Th-230	P	5.31E-08	1.30E-06	1.59E-11	3.91E-10
Th-232	P	3.16E-11	7.92E-10	9.49E-15	2.38E-13
U-232	P	0.00E+00	0.00E+00	0.00E+00	0.00E+00
U-233	P	1.24E-07	3.78E-08	3.71E-11	1.14E-11
U-234	P	1.03E-02	3.13E-03	3.08E-06	9.38E-07
U-235	P	3.63E-04	1.11E-04	1.09E-07	3.32E-08
U-236	P	1.41E-03	4.32E-04	4.22E-07	1.30E-07
U-238	P	7.22E-03	2.21E-03	2.17E-06	6.62E-07
Zr-93	P	1.08E-05	2.71E-04	3.24E-09	8.14E-08
crud					
Co-60 (crud)	crud	1.84E+00	4.49E-01	5.51E-04	1.35E-04
Fe-55 (crud)	crud	1.39E-01	9.87E-02	4.18E-05	2.96E-05
	total	4.30E+01	7.30E+02	8.18E-02	2.82E-01

N REACTOR [147] other not intact

TEDE (no HEPAs)

material type		subtotal [rem]	fraction of total [-]
G		3.44E-05	8.00E-07
P		4.09E+01	9.52E-01
C		6.89E-02	1.60E-03
crud		1.98E+00	4.60E-02
	total	4.30E+01	1.00E+00

TEDE (HEPAs)

material type		subtotal [rem]	fraction of total [-]
G		3.44E-05	4.20E-04
P		1.23E-02	1.50E-01
C		6.89E-02	8.42E-01
crud		5.93E-04	7.25E-03
	total	8.18E-02	1.00E+00

bone surface CDE + DDE (no HEPAs)

material type		subtotal [rem]	fraction of total [-]
G		2.07E-05	2.84E-08
P		7.29E+02	9.99E-01
C		6.34E-02	8.69E-05
crud		5.48E-01	7.51E-04
	total	7.30E+02	1.00E+00

bone surface CDE + DDE (HEPAs)

material type		subtotal [rem]	fraction of total [-]
G		2.07E-05	7.34E-05
P		2.19E-01	7.75E-01
C		6.34E-02	2.25E-01
crud		1.64E-04	5.82E-04
	total	2.82E-01	1.00E+00

Attachment IX

DOE SNF Crud Calculations

SNFID	Fuel Name	Matrix	Fuel Condition	MTHM 2035	SDC 17X10	SDC 17X15	SDC 24X10	SDC 24X15	HIC	MCO	Bare Fuel	# of canisters	MTHM/can
153	NAVAL [153]	Naval	Intact	5.14E+01	0.00	0.00	0.00	0.00	0.00	0.00	NO	0.0000	5.14E+01
151	NAVAL [151]	Naval	Intact	9.65E+00	0.00	0.00	0.00	0.00	0.00	0.00	NO	0.0000	9.65E+00
152	NAVAL [152]	Naval	Intact	4.00E+00	0.00	0.00	0.00	0.00	0.00	0.00	NO	0.0000	4.00E+00
781	S1W1 [781]	Naval	Intact	1.86E-04	0.13	0.00	0.00	0.00	0.00	0.00	NO	0.1250	1.86E-04
182	ROBERT E. GINNA [182]	Non-Metals	Intact	1.51E+01	0.00	0.00	0.00	0.00	0.00	0.00	YES	0.0000	1.51E+01
286	VEPCO [286]	Non-Metals	Intact	9.28E+00	0.00	0.00	0.00	0.00	0.00	0.00	YES	0.0000	9.28E+00
27	BRP-E [27]	Non-Metals	Intact	6.87E+00	0.00	0.00	0.00	0.00	0.00	0.00	YES	0.0000	6.87E+00
700	VEPCO [700]	Non-Metals	Intact	5.30E+00	0.00	0.00	0.00	0.00	0.00	0.00	YES	0.0000	5.30E+00
63	TURKEY POINT [271]	Non-Metals	Intact	2.22E+00	0.00	0.00	0.00	0.00	0.00	0.00	YES	0.0000	2.22E+00
271	BRP-F [30]	Non-Metals	Intact	2.02E+00	0.00	0.00	0.00	0.00	0.00	0.00	YES	0.0000	2.02E+00
30	SHIPPINGPORT LWBR BLKT III [376]	Non-Metals	Intact	8.70E+00	0.00	6.00	0.00	0.00	0.00	0.00	NO	6.0000	1.45E+00
376	SHIPPINGPORT LWBR BLKT II [375]	Non-Metals	Intact	4.33E+00	0.00	3.00	0.00	0.00	0.00	0.00	NO	3.0000	1.44E+00
375	SHIPINGPORT LWBR REFLCT. IV [371]	Non-Metals	Intact	1.15E+01	0.00	9.00	0.00	0.00	0.00	0.00	NO	9.0000	1.28E+00
371	SHIPPINGPORT LWBR BLKT I [374]	Non-Metals	Intact	3.76E+00	0.00	3.00	0.00	0.00	0.00	0.00	NO	3.0000	1.25E+00
374	POINT BEACH [311]	Non-Metals	Intact	1.16E+00	0.00	0.00	0.00	0.00	0.00	0.00	YES	0.0000	1.16E+00
311	LOFT CENTER FUEL MODULE [127]	Non-Metals	Intact	1.09E+00	0.00	0.00	0.00	0.00	0.00	0.00	YES	0.0000	1.09E+00
127	SHIPPINGPORT PWR C2 BLKT [192]	Non-Metals	Intact	1.04E+00	0.00	0.00	0.00	0.00	0.00	0.00	NO	0.0000	1.04E+00
192	SHIPINGPORT LWBR REFLCT. V [372]	Non-Metals	Intact	5.84E+00	0.00	6.00	0.00	0.00	0.00	0.00	NO	6.0000	9.74E-01
372	EBWR MOX [63]	Non-Metals	Intact	9.32E-01	0.25	0.00	0.00	0.00	0.00	0.00	NO	0.2500	9.32E-01
701	DRCT [701]	Non-Metals	Intact	6.17E+00	0.00	7.00	0.00	0.00	0.00	0.00	NO	7.0000	8.81E-01
756	DRCT [756]	Non-Metals	Intact	1.51E+01	0.00	17.08	0.00	0.00	0.00	0.00	NO	17.0809	8.81E-01
129	LOFT SQUARE FUEL MODULE [129]	Non-Metals	Intact	8.20E-01	0.00	0.00	0.00	0.00	0.00	0.00	YES	0.0000	8.20E-01
307	CALVERT CLIFFS 1 [307]	Non-Metals	Intact	6.76E-01	0.00	0.00	0.00	0.00	0.00	0.00	YES	0.0000	6.76E-01
193	SHIPPINGPORT PWR CORE II [193]	Non-Metals	Intact	1.56E+01	0.00	24.00	0.00	0.00	0.00	0.00	NO	24.0000	6.59E-01
191	SHIPPINGPORT PWR C1 BLKT [191]	Non-Metals	Intact	5.70E-01	0.00	0.00	0.00	0.00	0.00	0.00	NO	0.0000	5.70E-01
28	BRP-EG [28]	Non-Metals	Intact	5.10E-01	0.00	0.00	0.00	0.00	0.00	0.00	YES	0.0000	5.10E-01
25	BRP-D1 [25]	Non-Metals	Intact	5.08E-01	0.00	0.00	0.00	0.00	0.00	0.00	YES	0.0000	5.08E-01
24	BRP-C [24]	Non-Metals	Intact	4.60E-01	0.00	0.00	0.00	0.00	0.00	0.00	YES	0.0000	4.60E-01
380	SHIPPINGPORT LWBR SEED [380]	Non-Metals	Intact	5.11E+00	0.00	12.00	0.00	0.00	0.00	0.00	NO	12.0000	4.26E-01
19	BCD B-17 [19]	Non-Metals	Intact	4.12E-01	0.00	0.00	0.00	0.00	0.00	0.00	YES	0.0000	4.12E-01
120	HWCTR (UO2) LEU [120]	Non-Metals	Intact	4.38E-01	1.13	0.00	0.00	0.00	0.00	0.00	NO	1.1310	3.87E-01
34	CONNECTICUT YANKEE (S004) [34]	Non-Metals	Intact	3.82E-01	0.00	0.00	0.00	0.00	0.00	0.00	YES	0.0000	3.82E-01
306	COOPER NUCLEAR [306]	Non-Metals	Intact	3.68E-01	0.00	0.00	0.00	0.00	0.00	0.00	YES	0.0000	3.68E-01
29	BRP-EP [29]	Non-Metals	Intact	3.56E-01	0.00	0.00	0.00	0.00	0.00	0.00	YES	0.0000	3.56E-01
771	EBWR (UO2) LEU [65]	Non-Metals	Intact	2.96E+00	9.25	0.00	0.00	0.00	0.00	0.00	NO	9.2500	3.20E-01
65	ERR [68]	Non-Metals	Intact	5.01E+00	15.75	0.00	0.00	0.00	0.00	0.00	NO	15.7500	3.18E-01
68	PEACH BOTTOM (ASSEMBLY) [385]	Non-Metals	Intact	2.85E-01	0.00	0.00	0.00	0.00	0.00	0.00	YES	0.0000	2.85E-01
385	PULSTAR-N.C. STATE UNIV. (4% ASSEMBLIES) [175]	Non-Metals	Intact	3.16E-01	1.25	0.00	0.00	0.00	0.00	0.00	NO	1.2500	2.53E-01
175	BRP-B [23]	Non-Metals	Intact	2.50E-01	0.00	0.00	0.00	0.00	0.00	0.00	YES	0.0000	2.50E-01
23	H. B. ROBINSON (ASSEMBLY) [382]	Non-Metals	Intact	2.39E-01	0.00	0.00	0.00	0.00	0.00	0.00	YES	0.0000	2.39E-01
283	BRP-D2 [26]	Non-Metals	Intact	2.17E-01	0.00	0.00	0.00	0.00	0.00	0.00	YES	0.0000	2.17E-01
382	DRESDEN [47]	Non-Metals	Intact	1.66E-01	0.00	0.00	0.00	0.00	0.00	0.00	YES	0.0000	1.66E-01
26	HWCTR (UO2) LEU [283]	Non-Metals	Intact	1.44E-01	0.00	0.58	0.00	0.00	0.00	0.00	NO	0.5833	1.44E-01
704	LOFT CORNER FUEL MODULE [128]	Non-Metals	Intact	2.87E-01	2.00	0.00	0.00	0.00	0.00	0.00	NO	2.0000	1.43E-01
47	SAXTON (UO2) [788]	Non-Metals	Intact	9.96E-02	1.06	0.00	0.00	0.00	0.00	0.00	NO	1.0556	9.44E-02
37	CVTR FUEL [37]	Non-Metals	Intact	6.77E-02	0.00	0.45	0.00	0.00	0.00	0.00	NO	0.4533	6.77E-02
128	PBF DRIVER CORE [167]	Non-Metals	Intact	5.62E-01	0.00	8.98	0.00	0.00	0.00	0.00	NO	8.9815	6.25E-02
788	HWCTR (UO2) LEU [771]	Non-Metals	Intact	6.20E-02	0.19	0.00	0.00	0.00	0.00	0.00	NO	0.1875	6.20E-02
347	FSVR [85]	Non-Metals	Intact	8.62E+00	0.00	148.80	0.00	0.00	0.00	0.00	NO	148.8000	5.80E-02
728	FFTF OXIDE EXPERIMENTS [349]	Non-Metals	Intact	5.20E-02	1.00	0.00	0.00	0.00	0.00	0.00	NO	1.0000	5.20E-02
731	FSVR [86]	Non-Metals	Intact	1.47E+01	0.00	292.80	0.00	0.00	0.00	0.00	NO	292.8000	5.03E-02
167	TRIGA (FLIP LEU-II) PHILIPPINES [499]	Non-Metals	Intact	7.48E-02	1.60	0.00	0.00	0.00	0.00	0.00	NO	1.6000	4.67E-02

SNFID	Fuel Name	Matrix	Fuel Condition	MTHM 2035	SDC 17X10	SDC 17X15	SDC 24X10	SDC 24X15	HIC	MCO	Bare Fuel	# of canisters	MTHM/can
497	TRIGA (FLIP LEU-II) TAIWAN [498]	Non-Metals	Intact	8.38E-02	1.80	0.00	0.00	0.00	0.00	0.00	NO	1.8000	4.66E-02
85	TRIGA (FLIP LEU-1) MALAYSIA [497]	Non-Metals	Intact	4.65E-02	0.75	0.00	0.00	0.00	0.00	0.00	NO	0.7520	4.65E-02
470	TRIGA (FLIP LEU-I) BANGLADESH [470]	Non-Metals	Intact	4.61E-02	0.80	0.00	0.00	0.00	0.00	0.00	NO	0.8000	4.61E-02
496	TRIGA (STD) PENN. STATE UNIV. [237]	Non-Metals	Intact	5.18E-02	0.00	1.17	0.00	0.00	0.00	0.00	NO	1.1689	4.43E-02
349	SPERT-3 [209]	Non-Metals	Intact	4.22E-02	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	4.22E-02
86	TRIGA (ALUM) [235]	Non-Metals	Intact	1.03E-01	0.00	2.48	0.00	0.00	0.00	0.00	NO	2.4800	4.13E-02
499	TRIGA (STD) U OF IL [449]	Non-Metals	Intact	4.01E-02	0.00	0.94	0.00	0.00	0.00	0.00	NO	0.9378	4.01E-02
498	ACRR (PULSED CORE) [757]	Non-Metals	Intact	6.74E-01	16.86	0.00	0.00	0.00	0.00	0.00	NO	16.8571	4.00E-02
237	TRIGA (STD) USGS [266]	Non-Metals	Intact	3.80E-02	0.00	0.89	0.00	0.00	0.00	0.00	NO	0.8889	3.80E-02
481	FFTF-TFA-AB-1 [317]	Non-Metals	Intact	3.74E-02	0.00	1.00	0.00	0.00	0.00	0.00	NO	1.0000	3.74E-02
305	FFTF-TFA-ABA-1 THRU 6 [318]	Non-Metals	Intact	2.25E-01	0.00	6.00	0.00	0.00	0.00	0.00	NO	6.0000	3.74E-02
473	FFTF-TFA-AC-3 [319]	Non-Metals	Intact	3.74E-02	0.00	1.00	0.00	0.00	0.00	0.00	NO	1.0000	3.74E-02
238	FFTF-TFA-AC0-1 THRU 16 [320]	Non-Metals	Intact	5.99E-01	0.00	16.00	0.00	0.00	0.00	0.00	NO	16.0000	3.74E-02
780	FFTF-TFA-CRBR-3 & CRBR-5 [322]	Non-Metals	Intact	7.49E-02	0.00	2.00	0.00	0.00	0.00	0.00	NO	2.0000	3.74E-02
472	FFTF-TFA-DE-9 [323]	Non-Metals	Intact	3.74E-02	0.00	1.00	0.00	0.00	0.00	0.00	NO	1.0000	3.74E-02
474	FFTF-TFA-DEA-2 [324]	Non-Metals	Intact	3.74E-02	0.00	1.00	0.00	0.00	0.00	0.00	NO	1.0000	3.74E-02
475	FFTF-TFA-FC-1 [325]	Non-Metals	Intact	3.74E-02	0.00	1.00	0.00	0.00	0.00	0.00	NO	1.0000	3.74E-02
476	FFTF-TFA-FO-1 & FO-2 [326]	Non-Metals	Intact	7.49E-02	0.00	2.00	0.00	0.00	0.00	0.00	NO	2.0000	3.74E-02
477	FFTF-TFA-MFA-1 & 2, MBA-1 [329]	Non-Metals	Intact	1.12E-01	0.00	3.00	0.00	0.00	0.00	0.00	NO	3.0000	3.74E-02
479	FFTF-TFA-P0-1,2,4 & 5 [333]	Non-Metals	Intact	1.50E-01	0.00	4.00	0.00	0.00	0.00	0.00	NO	4.0000	3.74E-02
480	FFTF-TFA-SRF-3 & SRF-4 [334]	Non-Metals	Intact	7.49E-02	0.00	2.00	0.00	0.00	0.00	0.00	NO	2.0000	3.74E-02
736	FFTF-TFA-UO-1 [335]	Non-Metals	Intact	3.74E-02	0.00	1.00	0.00	0.00	0.00	0.00	NO	1.0000	3.74E-02
265	FFTF-TFA-WBO18 & WBO42 [336]	Non-Metals	Intact	7.49E-02	0.00	2.00	0.00	0.00	0.00	0.00	NO	2.0000	3.74E-02
478	TRIGA (STD) JAPAN [480]	Non-Metals	Intact	3.48E-02	0.00	0.81	0.00	0.00	0.00	0.00	NO	0.8089	3.48E-02
59	TRIGA (STD) INDONESIA [475]	Non-Metals	Intact	3.33E-02	0.00	0.77	0.00	0.00	0.00	0.00	NO	0.7733	3.33E-02
250	FFTF-DFA/TDFA [71]	Non-Metals	Intact	9.00E+00	0.00	275.00	0.00	0.00	0.00	0.00	NO	275.0000	3.27E-02
266	OCONEE [156]	Non-Metals	Intact	3.19E-02	0.00	0.00	0.00	0.00	0.00	0.00	YES	0.0000	3.19E-02
314	TRIGA (STD) KANSAS STATE UNIV [253]	Non-Metals	Intact	3.06E-02	0.00	0.73	0.00	0.00	0.00	0.00	NO	0.7333	3.06E-02
316	TRIGA (STD) U OF TX AUSTIN [265]	Non-Metals	Intact	3.04E-02	0.00	0.71	0.00	0.00	0.00	0.00	NO	0.7067	3.04E-02
449	TRIGA (STD) CORNELL [246]	Non-Metals	Intact	2.99E-02	0.00	0.71	0.00	0.00	0.00	0.00	NO	0.7067	2.99E-02
485	TRIGA (STD) MEXICO [482]	Non-Metals	Intact	2.84E-02	0.00	0.67	0.00	0.00	0.00	0.00	NO	0.6711	2.84E-02
487	FFTF-TFA-ACN-1 [321]	Non-Metals	Intact	2.73E-02	0.00	1.00	0.00	0.00	0.00	0.00	NO	1.0000	2.73E-02
264	TRIGA (STD) GERMANY [474]	Non-Metals	Intact	2.62E-02	0.00	0.61	0.00	0.00	0.00	0.00	NO	0.6089	2.62E-02
775	TRIGA (STD) WSU [268]	Non-Metals	Intact	2.35E-02	0.00	0.61	0.00	0.00	0.00	0.00	NO	0.6089	2.35E-02
303	PEACH BOTTOM UNIT I CORE II [171]	Non-Metals	Intact	1.25E+00	0.00	56.14	0.00	0.00	0.00	0.00	NO	56.1429	2.22E-02
233	EBR-II OXIDE FUEL EXPER [345]	Non-Metals	Intact	5.65E-02	0.00	2.56	0.00	0.00	0.00	0.00	NO	2.5600	2.21E-02
246	TRIGA (STD) ITALY [478]	Non-Metals	Intact	2.11E-02	0.00	0.49	0.00	0.00	0.00	0.00	NO	0.4933	2.11E-02
489	TRIGA (STD) UNIV. OF CAL-IRVINE [264]	Non-Metals	Intact	2.03E-02	0.00	0.48	0.00	0.00	0.00	0.00	NO	0.4756	2.03E-02
482	TRIGA (STD) [252]	Non-Metals	Intact	2.01E-02	0.00	0.50	0.00	0.00	0.00	0.00	NO	0.4978	2.01E-02
489	TRIGA (STD) FINLAND [472]	Non-Metals	Intact	1.95E-02	0.00	0.45	0.00	0.00	0.00	0.00	NO	0.4533	1.95E-02
490	TRIGA (STD) SO. KOREA [484]	Non-Metals	Intact	1.93E-02	0.00	0.46	0.00	0.00	0.00	0.00	NO	0.4622	1.93E-02
471	TRIGA (FLIP) SO. KOREA [494]	Non-Metals	Intact	1.91E-02	0.00	0.51	0.00	0.00	0.00	0.00	NO	0.5067	1.91E-02
483	TRIGA (STD) THAILAND [489]	Non-Metals	Intact	1.88E-02	0.00	0.44	0.00	0.00	0.00	0.00	NO	0.4444	1.88E-02
256	EBR-II OXIDE FUEL EXPER [364]	Non-Metals	Intact	9.25E-02	4.96	0.00	0.00	0.00	0.00	0.00	NO	4.9600	1.86E-02
209	TRIGA (STD) U OF AZ [59]	Non-Metals	Intact	1.86E-02	0.00	0.44	0.00	0.00	0.00	0.00	NO	0.4356	1.86E-02
488	TRIGA (STD) AFRRI [250]	Non-Metals	Intact	1.81E-02	0.00	0.42	0.00	0.00	0.00	0.00	NO	0.4222	1.81E-02
253	TRIGA (FLIP) UNIV OF WISCONSIN [242]	Non-Metals	Intact	1.72E-02	0.00	0.45	0.00	0.00	0.00	0.00	NO	0.4489	1.72E-02
484	TRIGA (STD) ENGLAND [485]	Non-Metals	Intact	1.71E-02	0.00	0.40	0.00	0.00	0.00	0.00	NO	0.4000	1.71E-02
235	TRIGA (FLIP) [729]	Non-Metals	Intact	1.71E-02	0.00	0.50	0.00	0.00	0.00	0.00	NO	0.5022	1.71E-02
254	TRIGA (STD) [233]	Non-Metals	Intact	1.70E-02	0.00	0.40	0.00	0.00	0.00	0.00	NO	0.4000	1.70E-02
487	TRIGA (LEU HIGH LOADING) [728]	Non-Metals	Intact	1.67E-02	0.23	0.00	0.00	0.00	0.00	0.00	NO	0.2316	1.67E-02
251	TRIGA (STD) UNIV OF MARYLAND [260]	Non-Metals	Intact	1.63E-02	0.00	0.41	0.00	0.00	0.00	0.00	NO	0.4133	1.63E-02

SNFID	Fuel Name	Matrix	Fuel Condition	MTHM 2035	SDC 17X10	SDC 17X15	SDC 24X10	SDC 24X15	HIC	MCO	Bare Fuel	# of canisters	MTHM/can
465	SHIPPINGPORT PWR BLANKET [189]	Non-Metals	Intact	1.61E-02	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	1.61E-02
267	TRIGA (FLIP) OSU [240]	Non-Metals	Intact	1.60E-02	0.00	0.40	0.00	0.00	0.00	0.00	NO	0.4044	1.60E-02
737	TRIGA (FLIP LEU-I) THAILAND [496]	Non-Metals	Intact	1.56E-02	0.29	0.00	0.00	0.00	0.00	0.00	NO	0.2860	1.56E-02
252	GCRE [745]	Non-Metals	Intact	6.13E-02	0.00	0.00	0.00	0.00	4.00	0.00	NO	4.0000	1.53E-02
464	TRIGA (STD) ZAIRE [486]	Non-Metals	Intact	1.53E-02	0.00	0.53	0.00	0.00	0.00	0.00	NO	0.5333	1.53E-02
483	SHIPPINGPORT PWR-C2-S2 [196]	Non-Metals	Intact	3.02E-01	20.00	0.00	0.00	0.00	0.00	0.00	NO	20.0000	1.51E-02
466	TRIGA (30/20) MNRC [704]	Non-Metals	Intact	1.50E-02	0.00	0.08	0.00	0.00	0.00	0.00	NO	0.0844	1.50E-02
757	TRIGA (STD) TURKEY [490]	Non-Metals	Intact	1.49E-02	0.00	0.35	0.00	0.00	0.00	0.00	NO	0.3511	1.49E-02
240	PATHFINDER (SUPERHEATER) [168]	Non-Metals	Intact	5.26E-02	3.57	0.00	0.00	0.00	0.00	0.00	NO	3.5739	1.47E-02
462	ML-1 [137]	Non-Metals	Intact	5.86E-02	4.00	0.00	0.00	0.00	0.00	0.00	NO	4.0000	1.46E-02
702	TRIGA (FLIP) TEXAS A&M [241]	Non-Metals	Intact	1.46E-02	0.00	0.43	0.00	0.00	0.00	0.00	NO	0.4267	1.46E-02
260	TRIGA (ALUM) ARRR [238]	Non-Metals	Intact	1.45E-02	0.00	0.34	0.00	0.00	0.00	0.00	NO	0.3378	1.45E-02
619	TRIGA (STD) U OF UTAH [261]	Non-Metals	Intact	1.45E-02	0.00	0.38	0.00	0.00	0.00	0.00	NO	0.3778	1.45E-02
447	TRIGA (STD) TEXAS A&M [258]	Non-Metals	Intact	1.43E-02	0.00	0.38	0.00	0.00	0.00	0.00	NO	0.3778	1.43E-02
501	TRIGA (STD) DOW [251]	Non-Metals	Intact	1.41E-02	0.00	0.35	0.00	0.00	0.00	0.00	NO	0.3467	1.41E-02
354	TRIGA (STD) JAPAN [479]	Non-Metals	Intact	1.40E-02	0.00	0.32	0.00	0.00	0.00	0.00	NO	0.3244	1.40E-02
468	TRIGA (STD) JAPAN [481]	Non-Metals	Intact	1.38E-02	0.00	0.32	0.00	0.00	0.00	0.00	NO	0.3156	1.38E-02
370	TRIGA (STD) INDONESIA [476]	Non-Metals	Intact	1.36E-02	0.00	0.32	0.00	0.00	0.00	0.00	NO	0.3156	1.36E-02
268	TRIGA (ALUM) GERMANY [303]	Non-Metals	Intact	1.34E-02	0.00	0.32	0.00	0.00	0.00	0.00	NO	0.3156	1.34E-02
493	TRIGA (FLIP) WSU [243]	Non-Metals	Intact	1.33E-02	0.00	0.35	0.00	0.00	0.00	0.00	NO	0.3467	1.33E-02
495	TRIGA (ALUM) SO. KOREA [483]	Non-Metals	Intact	1.30E-02	0.00	0.31	0.00	0.00	0.00	0.00	NO	0.3067	1.30E-02
804	PEACH BOTTOM UNIT I CORE II TESTS [206]	Non-Metals	Intact	2.56E-02	0.00	2.00	0.00	0.00	0.00	0.00	NO	2.0000	1.28E-02
261	TRIGA (ALUM) ITALY [487]	Non-Metals	Intact	1.27E-02	0.00	0.31	0.00	0.00	0.00	0.00	NO	0.3111	1.27E-02
699	TRIGA (STD) [314]	Non-Metals	Intact	1.25E-02	0.00	0.29	0.00	0.00	0.00	0.00	NO	0.2933	1.25E-02
239	TRIGA (ALUM) FINLAND [463]	Non-Metals	Intact	1.24E-02	0.00	0.31	0.00	0.00	0.00	0.00	NO	0.3067	1.24E-02
242	TRIGA (ALUM) GERMANY [465]	Non-Metals	Intact	1.17E-02	0.00	0.29	0.00	0.00	0.00	0.00	NO	0.2889	1.17E-02
243	TRIGA (ALUM) GERMANY [464]	Non-Metals	Intact	1.16E-02	0.00	0.29	0.00	0.00	0.00	0.00	NO	0.2889	1.16E-02
353	TRIGA (ALUM) AUSTRIA [462]	Non-Metals	Intact	1.16E-02	0.00	0.29	0.00	0.00	0.00	0.00	NO	0.2933	1.16E-02
258	TRIGA (FLIP) ANL-W [354]	Non-Metals	Intact	1.16E-02	0.00	0.30	0.00	0.00	0.00	0.00	NO	0.2978	1.16E-02
494	SHIPPINGPORT PWR-C2-S1 [195]	Non-Metals	Intact	2.20E-01	19.00	0.00	0.00	0.00	0.00	0.00	NO	19.0000	1.16E-02
317	TRIGA (ALUM) SOLVENIA [468]	Non-Metals	Intact	1.16E-02	0.00	0.30	0.00	0.00	0.00	0.00	NO	0.2978	1.16E-02
318	TRIGA (ALUM) BRAZIL [471]	Non-Metals	Intact	1.11E-02	0.00	0.26	0.00	0.00	0.00	0.00	NO	0.2622	1.11E-02
319	TRIGA (ALUM) REED COLLEGE [256]	Non-Metals	Intact	1.09E-02	0.00	0.26	0.00	0.00	0.00	0.00	NO	0.2578	1.09E-02
320	EBWR (UO2) HEU [60]	Non-Metals	Intact	2.89E-02	2.67	0.00	0.00	0.00	0.00	0.00	NO	2.6667	1.08E-02
322	TRIGA (ALUM) ITALY [466]	Non-Metals	Intact	1.07E-02	0.00	0.27	0.00	0.00	0.00	0.00	NO	0.2667	1.07E-02
323	TRIGA (ALUM STD) U OF UTAH [699]	Non-Metals	Intact	1.07E-02	0.00	0.28	0.00	0.00	0.00	0.00	NO	0.2800	1.07E-02
324	TRIGA (ALUM) ZAIRE [467]	Non-Metals	Intact	1.06E-02	0.00	0.25	0.00	0.00	0.00	0.00	NO	0.2489	1.06E-02
325	BORAX V [22]	Non-Metals	Intact	2.08E-02	2.00	0.00	0.00	0.00	0.00	0.00	NO	2.0000	1.04E-02
326	TRIGA (ALUM) VA [287]	Non-Metals	Intact	1.01E-02	0.00	0.25	0.00	0.00	0.00	0.00	NO	0.2489	1.01E-02
329	TRIGA (ALUM) U OF IL [447]	Non-Metals	Intact	1.01E-02	0.00	0.26	0.00	0.00	0.00	0.00	NO	0.2578	1.01E-02
333	TRIGA (ALUM) MNRC [737]	Non-Metals	Intact	9.32E-03	0.00	0.23	0.00	0.00	0.00	0.00	NO	0.2311	9.32E-03
334	BER-II (GERMANY) [236]	Non-Metals	Intact	9.19E-03	0.50	0.00	0.00	0.00	0.00	0.00	NO	0.5000	9.19E-03
335	TRIGA (STD) ITALY [477]	Non-Metals	Intact	9.17E-03	0.00	0.21	0.00	0.00	0.00	0.00	NO	0.2133	9.17E-03
336	TRIGA (STD) MNRC [254]	Non-Metals	Intact	9.06E-03	0.00	0.22	0.00	0.00	0.00	0.00	NO	0.2222	9.06E-03
492	FFTF CARBIDE FUEL EXPER. [347]	Non-Metals	Intact	7.36E-03	0.08	0.00	0.00	0.00	0.00	0.00	NO	0.0798	7.36E-03
844	BR-3 FUEL [340]	Non-Metals	Intact	7.06E-03	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	7.06E-03
734	TRIGA (STD) ANL-W [370]	Non-Metals	Intact	6.86E-03	0.00	0.16	0.00	0.00	0.00	0.00	NO	0.1778	6.86E-03
241	TRIGA (STD) [316]	Non-Metals	Intact	6.27E-03	0.00	0.15	0.00	0.00	0.00	0.00	NO	0.1467	6.27E-03
729	TRIGA (FLIP) MEXICO [493]	Non-Metals	Intact	5.99E-03	0.00	0.16	0.00	0.00	0.00	0.00	NO	0.1556	5.99E-03
71	TRIGA (STD) AUSTRIA [469]	Non-Metals	Intact	5.84E-03	0.00	0.13	0.00	0.00	0.00	0.00	NO	0.1333	5.84E-03
156	TRIGA STD. UNIV. OF WISCONSIN [262]	Non-Metals	Intact	2.22E-02	4.54	0.00	0.00	0.00	0.00	0.00	NO	4.5357	4.89E-03
815	TRIGA (STD 20/20) SOLVENIA [731]	Non-Metals	Intact	4.75E-03	0.07	0.00	0.00	0.00	0.00	0.00	NO	0.0690	4.75E-03

SNFID	Fuel Name	Matrix	Fuel Condition	MTHM 2035	SDC 17X10	SDC 17X15	SDC 24X10	SDC 24X15	HIC	MCO	Bare Fuel	# of canisters	MTHM/can
486	TRIGA (FLIP) SOLVENIA [495]	Non-Metals	Intact	4.45E-03	0.00	0.12	0.00	0.00	0.00	0.00	NO	0.1156	4.45E-03
315	TRIGA (HIGH POWER) ROMANIA [302]	Non-Metals	Intact	2.01E-02	0.00	5.86	0.00	0.00	0.00	0.00	NO	5.8800	3.43E-03
448	TRIGA (STD) SOLVENIA [488]	Non-Metals	Intact	3.35E-03	0.00	0.08	0.00	0.00	0.00	0.00	NO	0.0800	3.35E-03
321	GA RERTR [90]	Non-Metals	Intact	3.07E-03	0.00	0.00	0.00	0.00	0.50	0.00	NO	0.5000	3.07E-03
732	FRR TARGET ARGENTINA [297]	Non-Metals	Intact	3.97E-03	1.33	0.00	0.00	0.00	0.00	0.00	NO	1.3333	2.98E-03
735	TRIGA (STD) GERMANY [305]	Non-Metals	Intact	2.88E-03	0.00	0.07	0.00	0.00	0.00	0.00	NO	0.0667	2.88E-03
730	TRIGA (STD) ARRR [780]	Non-Metals	Intact	2.87E-03	0.00	0.07	0.00	0.00	0.00	0.00	NO	0.0667	2.87E-03
703	TREAT DRIVER [232]	Non-Metals	Intact	1.49E-02	6.11	0.00	0.00	0.00	0.00	0.00	NO	6.1094	2.44E-03
171	GA HTGR FUEL [89]	Non-Metals	Intact	2.08E-03	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	2.08E-03
345	SHIPPINGPORT PWR-C1-S4 [194]	Non-Metals	Intact	2.02E-03	1.00	0.00	0.00	0.00	0.00	0.00	NO	1.0000	2.02E-03
364	TRIGA (STD) BRAZIL [736]	Non-Metals	Intact	1.72E-03	0.00	0.04	0.00	0.00	0.00	0.00	NO	0.0400	1.72E-03
236	TRIGA (STD) REED COLLEGE [775]	Non-Metals	Intact	1.71E-03	0.00	0.04	0.00	0.00	0.00	0.00	NO	0.0400	1.71E-03
733	TRIGA (FFCR) MNRC [703]	Non-Metals	Intact	1.70E-03	0.00	0.07	0.00	0.00	0.00	0.00	NO	0.0733	1.70E-03
189	TRIGA (FLIP) AUSTRIA [492]	Non-Metals	Intact	1.66E-03	0.00	0.04	0.00	0.00	0.00	0.00	NO	0.0444	1.66E-03
745	TRIGA (FFCR) PENN. STATE UNIV. [815]	Non-Metals	Intact	1.38E-03	0.00	0.05	0.00	0.00	0.00	0.00	NO	0.0467	1.38E-03
196	TRIGA (FLIP) [239]	Non-Metals	Intact	1.19E-03	0.00	0.03	0.00	0.00	0.00	0.00	NO	0.0311	1.19E-03
166	TRIGA (STD) GERMANY [473]	Non-Metals	Intact	9.61E-04	0.00	0.02	0.00	0.00	0.00	0.00	NO	0.0222	9.61E-04
137	TRIGA (DAMAGED) SO. KOREA [819]	Non-Metals	Intact	8.76E-04	0.00	0.02	0.00	0.00	0.00	0.00	NO	0.0222	8.76E-04
206	TRIGA (FLIP) TEXAS A&M - DAMAGED [844]	Non-Metals	Intact	8.01E-04	0.00	0.02	0.00	0.00	0.00	0.00	NO	0.0222	8.01E-04
195	TRIGA (FFCR) U OF IL [448]	Non-Metals	Intact	7.51E-04	0.00	0.03	0.00	0.00	0.00	0.00	NO	0.0267	7.51E-04
60	TRIGA (FLIP) FFCR OSU [702]	Non-Metals	Intact	7.04E-04	0.00	0.02	0.00	0.00	0.00	0.00	NO	0.0178	7.04E-04
22	TRIGA (FFCR) ENGLAND [732]	Non-Metals	Intact	6.41E-04	0.00	0.03	0.00	0.00	0.00	0.00	NO	0.0267	6.41E-04
340	TRIGA (STD FFCR) ZAIRE [735]	Non-Metals	Intact	6.38E-04	0.00	0.03	0.00	0.00	0.00	0.00	NO	0.0267	6.38E-04
90	TRIGA (FLIP FFCR) SO. KOREA [733]	Non-Metals	Intact	5.61E-04	0.00	0.03	0.00	0.00	0.00	0.00	NO	0.0320	5.61E-04
262	TRIGA (ALUM) KANSAS STATE UNIV [804]	Non-Metals	Intact	5.13E-04	0.00	0.01	0.00	0.00	0.00	0.00	NO	0.0133	5.13E-04
302	ORR MIXED OXIDE [160]	Non-Metals	Intact	4.75E-04	0.18	0.00	0.00	0.00	0.00	0.00	NO	0.1806	4.75E-04
297	TRIGA (STD FFCR) S. KEOREA [734]	Non-Metals	Intact	4.72E-04	0.00	0.01	0.00	0.00	0.00	0.00	NO	0.0133	4.72E-04
160	TRIGA (FFCR) [315]	Non-Metals	Intact	3.80E-04	0.00	0.01	0.00	0.00	0.00	0.00	NO	0.0133	3.80E-04
409	PNL MOX STAR 7 [422]	Non-Metals	Intact	3.48E-04	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	3.48E-04
232	TRIGA (STD) ANL-W [353]	Non-Metals	Intact	3.40E-04	0.00	0.01	0.00	0.00	0.00	0.00	NO	0.0089	3.40E-04
89	TRIGA (FFCR) ITALY [730]	Non-Metals	Intact	3.18E-04	0.00	0.01	0.00	0.00	0.00	0.00	NO	0.0133	3.18E-04
194	FFTF-TFA-MFF-1A [331]	Non-Metals	Intact	3.14E-02	0.00	129.00	0.00	0.00	0.00	0.00	NO	129.0000	2.43E-04
422	FFTF-TFA-MFF-1 [330]	Non-Metals	Intact	3.72E-02	0.00	163.00	0.00	0.00	0.00	0.00	NO	163.0000	2.28E-04
331	TRIGA (ALUM) U OF IL [501]	Non-Metals	Intact	1.73E-04	0.00	0.00	0.00	0.00	0.00	0.00	NO	0.0044	1.73E-04
330	PNL MOX STAR 5 [435]	Non-Metals	Intact	1.39E-04	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	1.39E-04
435	MOX STAR 1 & 2 [838]	Non-Metals	Intact	2.50E-04	0.00	0.00	0.00	0.00	2.00	0.00	NO	2.0000	1.25E-04
838	TRIGA (FPT) [409]	Non-Metals	Intact	1.19E-04	0.05	0.00	0.00	0.00	0.00	0.00	NO	0.0478	1.19E-04
434	PNL MOX STAR 4 [434]	Non-Metals	Intact	6.00E-05	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	6.00E-05
433	PNL MOX STAR 3 [433]	Non-Metals	Intact	5.50E-05	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	5.50E-05
44	DRESDEN THO2/UO2 (HEU) [44]	Non-Metals	Not Intact	1.66E+00	0.00	2.50	0.00	0.00	0.00	0.00	NO	2.5000	6.63E-01
377	SHIPPINGPORT LWBR R SCRAP [377]	Non-Metals	Not Intact	1.26E+00	0.00	2.00	0.00	0.00	0.00	0.00	NO	2.0000	6.30E-01
379	SHIPPINGPORT LWBR SCRAP [379]	Non-Metals	Not Intact	4.63E-01	0.00	1.00	0.00	0.00	0.00	0.00	NO	1.0000	4.63E-01
49	DRESDEN THO2-UO2 (LEU) [49]	Non-Metals	Not Intact	8.78E-01	2.00	0.00	0.00	0.00	0.00	0.00	YES	2.0000	4.39E-01
373	SHIPPINGPORT LWBR BLKT SCRAP [373]	Non-Metals	Not Intact	1.66E+00	0.00	4.00	0.00	0.00	0.00	0.00	NO	4.0000	4.15E-01
126	LOOSE FUEL ROD STOR BASKET (LFRSB) [126]	Non-Metals	Not Intact	3.11E-01	0.00	1.00	0.00	0.00	0.00	0.00	NO	1.0000	3.11E-01
787	SAXTON (MOX) [787]	Non-Metals	Not Intact	2.90E-01	1.00	0.00	0.00	0.00	0.00	0.00	NO	1.0000	2.90E-01
176	PULSTAR-SUNY-BUFFALO [176]	Non-Metals	Not Intact	6.55E-01	2.27	0.00	0.00	0.00	0.00	0.00	NO	2.2727	2.88E-01
229	TMI-2 CORE DEBRIS [229]	Non-Metals	Not Intact	8.16E+01	0.00	344.00	0.00	0.00	0.00	0.00	NO	344.0000	2.37E-01
378	SHIPPINGPORT LWBR S SCRAP [378]	Non-Metals	Not Intact	2.00E-01	0.00	1.00	0.00	0.00	0.00	0.00	NO	1.0000	2.00E-01
115	HWCTR (U02) LEU [115]	Non-Metals	Not Intact	1.42E-01	0.75	0.00	0.00	0.00	0.00	0.00	NO	0.7500	1.42E-01
174	PULSTAR - BUFFALO [174]	Non-Metals	Not Intact	2.52E-01	1.87	0.00	0.00	0.00	0.00	0.00	NO	1.8667	1.35E-01
386	PEACH BOTTOM (SCRAP) [386]	Non-Metals	Not Intact	7.11E-02	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	7.11E-02

SNFID	Fuel Name	Matrix	Fuel Condition	MTHM 2035	SDC 17X10	SDC 17X15	SDC 24X10	SDC 24X15	HIC	MCO	Bare Fuel	# of canisters	MTHM/can
130	LWR COMMERCIAL FUEL [130]	Non-Metals	Not Intact	6.39E-02	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	6.39E-02
412	SST & ZR CLAD SNF [412]	Non-Metals	Not Intact	1.18E-01	0.00	0.00	0.00	0.00	1.93	0.00	NO	1.9333	6.09E-02
396	PBF SCRAP [396]	Non-Metals	Not Intact	4.93E-02	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	4.93E-02
404	SFD SCRAP [404]	Non-Metals	Not Intact	4.02E-02	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	4.02E-02
309	GE VALLECITOS SCRAP [309]	Non-Metals	Not Intact	3.98E-02	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	3.98E-02
244	TRIGA (STD) [244]	Non-Metals	Not Intact	5.03E-02	0.00	1.32	0.00	0.00	0.00	0.00	NO	1.3156	3.82E-02
310	H. B. ROBINSON [310]	Non-Metals	Not Intact	3.05E-02	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	3.05E-02
170	PEACH BOTTOM UNIT I CORE I [170]	Non-Metals	Not Intact	1.61E+00	0.00	56.86	0.00	0.00	0.00	0.00	NO	56.8571	2.84E-02
356	PNL MIXED MAT'L EXP.DCC-1 [430]	Non-Metals	Not Intact	2.36E-02	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	2.36E-02
430	MAPI SCRAP [396]	Non-Metals	Not Intact	2.30E-02	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	2.30E-02
396	GE TEST [96]	Non-Metals	Not Intact	4.52E-02	0.00	0.00	0.00	0.00	2.00	0.00	NO	2.0000	2.26E-02
96	H. B. ROBINSON (RODS) [383]	Non-Metals	Not Intact	2.09E-02	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	2.09E-02
383	PNL MIXED MAT'L EXP.DCC-2 [431]	Non-Metals	Not Intact	2.06E-02	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	2.06E-02
431	PNL MIXED MAT'L EXP.DCC-3 [432]	Non-Metals	Not Intact	2.04E-02	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	2.04E-02
432	OPTRAN SCRAP [397]	Non-Metals	Not Intact	1.98E-02	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	1.98E-02
397	DRESII, HBR, BR-3, BRP, TMI [50]	Non-Metals	Not Intact	1.96E-02	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	1.96E-02
50	DRESDEN SCRAP [388]	Non-Metals	Not Intact	1.87E-02	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	1.87E-02
388	SM-1A [201]	Non-Metals	Not Intact	6.58E-02	0.00	4.04	0.00	0.00	0.00	0.00	NO	4.0435	1.63E-02
201	TORY-IIA [230]	Non-Metals	Not Intact	4.86E-02	0.00	0.00	0.00	0.00	3.65	0.00	NO	3.6500	1.33E-02
230	LWR SAMPLES [134]	Non-Metals	Not Intact	1.27E-02	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	1.27E-02
134	VBWR (GENEVA) [285]	Non-Metals	Not Intact	1.24E-02	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	1.24E-02
285	PEACH BOTTOM UNIT I CORE I [169]	Non-Metals	Not Intact	3.65E-02	0.00	3.00	0.00	0.00	0.00	0.00	NO	3.0000	1.22E-02
169	ARKANSAS [7]	Non-Metals	Not Intact	1.19E-02	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	1.19E-02
367	GAP CONDUCTANCE (GC) SCRAP [389]	Non-Metals	Not Intact	1.15E-02	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	1.15E-02
7	SCRAP [403]	Non-Metals	Not Intact	1.13E-02	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	1.13E-02
389	TEST TRAIN [227]	Non-Metals	Not Intact	2.24E-02	2.00	0.00	0.00	0.00	0.00	0.00	NO	2.0000	1.12E-02
403	PEACH BOTTOM SCRAP [400]	Non-Metals	Not Intact	9.38E-03	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	9.38E-03
227	US/UK FUEL PINS [356]	Non-Metals	Not Intact	8.04E-03	0.33	0.00	0.00	0.00	0.00	0.00	NO	0.3300	8.04E-03
56	LOSS OF COOLANT SCRAP [395]	Non-Metals	Not Intact	7.77E-03	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	7.77E-03
400	LWR COMMERCIAL FUEL [133]	Non-Metals	Not Intact	7.50E-03	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	7.50E-03
6	SODIUM LOOP SAFETY FAC. [367]	Non-Metals	Not Intact	7.17E-03	0.00	0.00	0.00	0.00	0.60	0.00	NO	0.6000	7.17E-03
395	SAXTON SCRAP [402]	Non-Metals	Not Intact	7.15E-03	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	7.15E-03
133	TORY-IIC [231]	Non-Metals	Not Intact	5.91E-02	0.00	0.00	0.00	0.00	8.73	0.00	NO	8.7333	6.77E-03
402	H. B. ROBINSON [390]	Non-Metals	Not Intact	6.35E-03	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	6.35E-03
231	DOE & COMMERCIAL TEST [40]	Non-Metals	Not Intact	1.99E-01	0.00	0.00	0.00	0.00	32.00	0.00	NO	32.0000	6.23E-03
390	IRRADIATION EFFECTS (IE) SCRAP [392]	Non-Metals	Not Intact	6.09E-03	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	6.09E-03
40	RIA SCRAP [401]	Non-Metals	Not Intact	6.07E-03	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	6.07E-03
392	STERLING FOREST OXIDE [225]	Non-Metals	Not Intact	9.84E-02	0.00	0.00	0.00	0.00	16.93	0.00	NO	16.9250	5.81E-03
401	LWR COMMERCIAL FUEL [132]	Non-Metals	Not Intact	5.51E-03	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	5.51E-03
225	PCM SCRAP [399]	Non-Metals	Not Intact	5.40E-03	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	5.40E-03
132	SNAP [203]	Non-Metals	Not Intact	2.10E-02	0.00	0.00	0.00	0.00	4.00	0.00	NO	4.0000	5.24E-03
399	DOE & COMMERCIAL [39]	Non-Metals	Not Intact	4.90E-03	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	4.90E-03
203	MISCELLANEOUS FUEL [725]	Non-Metals	Not Intact	4.71E-03	1.00	0.00	0.00	0.00	0.00	0.00	NO	1.0000	4.71E-03
39	T.C. SCRAP [405]	Non-Metals	Not Intact	4.08E-03	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	4.08E-03
725	HTRE (ANP) [105]	Non-Metals	Not Intact	4.04E-03	1.00	0.00	0.00	0.00	0.00	0.00	NO	1.0000	4.04E-03
405	POINT BEACH (PIECES) [312]	Non-Metals	Not Intact	4.00E-03	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	4.00E-03
105	SODIUM LOOP SAFETY FAC. [352]	Non-Metals	Not Intact	3.97E-03	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	3.97E-03
312	AI [693]	Non-Metals	Not Intact	7.85E-03	0.00	0.00	0.00	0.00	2.00	0.00	NO	2.0000	3.92E-03
352	LOFT LEAD ROD SCRAP [394]	Non-Metals	Not Intact	3.51E-03	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	3.51E-03
693	EBR-II (MOX) [56]	Non-Metals	Not Intact	3.34E-03	0.36	0.00	0.00	0.00	0.00	0.00	NO	0.3550	3.34E-03
394	FRR TARGET CANADA [671]	Non-Metals	Not Intact	4.92E-01	165.33	0.00	0.00	0.00	0.00	0.00	NO	165.3333	2.98E-03
671	FRR TARGET INDONESIA [672]	Non-Metals	Not Intact	3.97E-03	1.33	0.00	0.00	0.00	0.00	0.00	NO	1.3333	2.98E-03

SNFID	Fuel Name	Matrix	Fuel Condition	MTHM 2035	SDC 17X10	SDC 17X15	SDC 24X10	SDC 24X15	HIC	MCO	Bare Fuel	# of canisters	MTHM/can
672	CANDU SCRAP [387]	Non-Metals	Not Intact	2.66E-03	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	2.66E-03
387	HALDEN (NORWAY) SCRAP [391]	Non-Metals	Not Intact	2.64E-03	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	2.64E-03
391	GETR FILTERS [98]	Non-Metals	Not Intact	4.42E-03	0.00	0.00	0.00	0.00	2.00	0.00	NO	2.0000	2.21E-03
98	PNL MOX FUEL 7057 [417]	Non-Metals	Not Intact	1.48E-03	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	1.48E-03
417	SP-100 FUEL [777]	Non-Metals	Not Intact	2.63E-03	0.00	0.00	0.00	0.00	2.00	0.00	NO	2.0000	1.31E-03
777	BMI (CPI-2) [774]	Non-Metals	Not Intact	1.29E-03	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	1.29E-03
774	RESIDUE FAILED PBF RODS [381]	Non-Metals	Not Intact	1.11E-03	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	1.11E-03
381	ANP [451]	Non-Metals	Not Intact	1.10E-03	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	1.10E-03
451	SHIPPINGPORT PWR C1 BLKT [313]	Non-Metals	Not Intact	1.00E-03	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	1.00E-03
313	GCRE CAN [94]	Non-Metals	Not Intact	9.08E-04	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	9.08E-04
94	PNL MOX PELLETS 7057 [418]	Non-Metals	Not Intact	6.47E-04	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	6.47E-04
418	ANL-MXOX (EBR-II) [847]	Non-Metals	Not Intact	6.00E-04	1.00	0.00	0.00	0.00	0.00	0.00	NO	1.0000	6.00E-04
847	SPSS (SPERT) [213]	Non-Metals	Not Intact	5.90E-04	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	5.90E-04
213	BMI (CPI-38) [20]	Non-Metals	Not Intact	5.59E-04	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	5.59E-04
20	H. B. ROBINSON [99]	Non-Metals	Not Intact	5.20E-04	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	5.20E-04
99	HEDL-ENG (EBR-II) [848]	Non-Metals	Not Intact	2.80E-03	7.88	0.00	0.00	0.00	0.00	0.00	NO	7.8750	3.56E-04
848	MISCELLANEOUS FUEL [351]	Non-Metals	Not Intact	2.64E-04	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	2.64E-04
351	APPR (AGE-2) [6]	Non-Metals	Not Intact	2.20E-04	0.03	0.00	0.00	0.00	0.00	0.00	NO	0.0250	2.20E-04
18	H. B. ROBINSON (SCRAP) [384]	Non-Metals	Not Intact	1.90E-04	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	1.90E-04
384	PNL-3 [420]	Non-Metals	Not Intact	1.06E-04	1.00	0.00	0.00	0.00	0.00	0.00	NO	1.0000	1.06E-04
420	PNL MOX FUEL [414]	Non-Metals	Not Intact	2.08E-04	0.00	0.00	0.00	0.00	2.00	0.00	NO	2.0000	1.04E-04
414	BABCOCK & WILCOX SCRAP [18]	Non-Metals	Not Intact	7.62E-05	0.33	0.00	0.00	0.00	0.00	0.00	NO	0.3333	7.62E-05
95	GCRE PELLETS [95]	Non-Metals	Not Intact	7.60E-05	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	7.60E-05
436	PNL MOX STAR 6 [436]	Non-Metals	Not Intact	6.90E-05	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	6.90E-05
415	PNL MOX FUEL [415]	Non-Metals	Not Intact	6.30E-05	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	6.30E-05
416	PNL MOX FUEL 7055 [416]	Non-Metals	Not Intact	5.76E-05	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	5.76E-05
228	TMI-2 [228]	Non-Metals	Not Intact	3.00E-05	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	3.00E-05
67	EPRI [67]	Non-Metals	Not Intact	2.20E-05	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	2.20E-05
393	LOFT (LP-FP-1) SCRAP [393]	Non-Metals	Not Intact	2.00E-05	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	2.00E-05
419	PNL MOX PINS 7057 [419]	Non-Metals	Not Intact	5.00E-06	1.00	0.00	0.00	0.00	0.00	0.00	NO	1.0000	5.00E-06
386	**MISCELLANEOUS FUEL [386]**	**Other**	**Intact**	**4.16E+00**	**1.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**NO**	**1.0000**	**4.16E+00**
787	EBWR (U METAL) LEU [64]	Other	Intact	6.08E+00	10.50	0.00	0.00	0.00	0.00	0.00	NO	10.5000	5.77E-01
64	ACRR (MO99 CORE) [802]	Other	Intact	2.36E+00	9.12	0.00	0.00	0.00	0.00	0.00	NO	9.1200	2.59E-01
772	CORE FILTER [35]	Other	Intact	2.18E-01	1.00	0.00	0.00	0.00	0.00	0.00	NO	1.0000	2.18E-01
802	HWCTR (U-ZR) LEU [783]	Other	Intact	5.33E-01	0.00	5.58	0.00	0.00	0.00	0.00	NO	5.5833	9.55E-02
35	HWCTR (U METAL) LEU [113]	Other	Intact	7.90E-02	0.60	0.00	0.00	0.00	0.00	0.00	NO	0.6019	7.90E-02
113	HWCTR (U METAL) LEU [787]	Other	Intact	4.31E-02	0.04	0.00	0.00	0.00	0.00	0.00	NO	0.0417	4.31E-02
783	FFTF-TFA-FSP-1 & FSP-1R [327]	Other	Intact	7.49E-02	0.00	2.00	0.00	0.00	0.00	0.00	NO	2.0000	3.74E-02
118	FERMI CORE I & 2 (CORE SHIM) [69]	Other	Intact	3.68E-02	0.84	0.00	0.00	0.00	0.00	0.00	NO	0.8358	3.68E-02
69	HWCTR (U METAL) LEU [772]	Other	Intact	3.12E-02	0.10	0.00	0.00	0.00	0.00	0.00	NO	0.1019	3.12E-02
327	FERMI CORE I & 2 (SODIUM WORTH) [455]	Other	Intact	5.54E-02	2.40	0.00	0.00	0.00	0.00	0.00	NO	2.4000	2.31E-02
455	FERMI CORE I & 2 (STD FUEL SUBASSEMBLY) [456]	Other	Intact	3.57E+00	155.20	0.00	0.00	0.00	0.00	0.00	NO	155.2000	2.30E-02
456	FERMI CORE I & 2 (CORE FOIL) [457]	Other	Intact	1.77E-02	0.78	0.00	0.00	0.00	0.00	0.00	NO	0.7771	1.77E-02
457	EBR-II NITRIDE FUEL EXPER [363]	Other	Intact	9.59E-03	0.56	0.00	0.00	0.00	0.00	0.00	NO	0.5565	9.59E-03
363	HWCTR DRIVER (U-ZR) HEU [117]	Other	Intact	3.81E-02	0.00	5.58	0.00	0.00	0.00	0.00	NO	5.5833	6.82E-03
117	HWCTR (UMO) [118]	Other	Intact	6.68E-03	0.08	0.00	0.00	0.00	0.00	0.00	NO	0.0833	6.68E-03
306	LAMPRE [306]	Other	Intact	7.48E-03	0.00	0.00	0.00	0.00	2.00	0.00	NO	2.0000	3.74E-03
36	CP-5 CONVERTER CYLINDER [36]	Other	Intact	1.24E-03	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	1.24E-03
754	SRP [754]	Other	Intact	1.18E-03	0.00	1.00	0.00	0.00	0.00	0.00	NO	1.0000	1.18E-03
438	**EBR-II (U-METAL DE-CLAD) [438]**	**Other**	**Not Intact**	**1.68E+01**	**0.08**	**1.77**	**0.00**	**0.00**	**0.00**	**0.00**	**NO**	**1.7650**	**9.50E+00**
147	N REACTOR [147]	Other	Not Intact	1.15E+03	0.00	0.00	0.00	0.00	0.00	194.95	NO	194.9500	5.88E+00
148	N REACTOR [148]	Other	Not Intact	9.54E+02	0.00	0.00	0.00	0.00	0.00	200.70	NO	200.7045	4.75E+00

SNFID	Fuel Name	Matrix	Fuel Condition	MTHM 2035	SDC 17X10	SDC 17X15	SDC 24X10	SDC 24X15	HIC	MCO	Bare Fuel	# of canisters	MTHM/can
198	SINGLE PASS REACTOR FUEL [198]	Other	Not Intact	2.88E+00	0.00	0.00	0.00	0.00	0.00	0.86	NO	0.8579	2.88E+00
197	SINGLE PASS REACTOR FUEL [197]	Other	Not Intact	4.00E-01	0.00	0.00	0.00	0.00	0.00	0.14	NO	0.1421	4.00E-01
791	HWCTR (U METAL) LEU [791]	Other	Not Intact	4.38E-01	0.00	1.33	0.00	0.00	0.00	0.00	NO	1.3333	3.29E-01
368	TRU SCRAP SNF [368]	Other	Not Intact	2.13E-01	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	2.13E-01
770	HWCTR (U METAL) LEU [770]	Other	Not Intact	2.00E-01	0.00	1.08	0.00	0.00	0.00	0.00	NO	1.0833	1.85E-01
790	HWCTR (U METAL) LEU [790]	Other	Not Intact	7.10E-02	0.00	0.92	0.00	0.00	0.00	0.00	NO	0.9167	7.10E-02
42	DOE TEST & EXPERIMENTAL [42]	Other	Not Intact	6.21E-02	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	6.21E-02
454	FERMI CORE I & 2 (SECTIONED) [454]	Other	Not Intact	1.25E-01	5.60	0.00	0.00	0.00	0.00	0.00	NO	5.6000	2.23E-02
453	FERMI CORE I & 2 (DECLAD) [453]	Other	Not Intact	1.11E-01	5.58	0.00	0.00	0.00	0.00	0.00	NO	5.5771	1.99E-02
41	DOE TEST [41]	Other	Not Intact	1.68E-02	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	1.68E-02
208	SPEC (ORME) [208]	Other	Not Intact	2.39E-03	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	2.39E-03
740	EBWR SCRAP [740]	Other	Not Intact	1.73E-03	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	1.73E-03
369	MISCELLANEOUS FUEL [369]	Other	Not Intact	2.40E-04	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	2.40E-04
715	MK-14 TARGET [715]	Other	Not Intact	1.72E-04	1.00	0.00	0.00	0.00	0.00	0.00	NO	1.0000	1.72E-04
776	AMERICIUM TARGETS [776]	Other	Not Intact	7.44E-05	0.00	0.00	0.00	0.00	12.00	0.00	NO	12.0000	6.20E-06
112	FRR PIN CLUSTER U3SI2-LEU CANADA [660]	Stable Metals	Intact	3.23E+00	38.18	0.00	0.00	0.00	0.00	0.00	NO	38.1750	8.45E-02
660	HWCTR (U/TH) [112]	Stable Metals	Intact	7.86E-02	0.00	0.17	0.00	0.00	0.00	0.00	NO	0.1667	7.86E-02
659	FRR PIN CLUSTER U3SI2-LEU SO. KOREA [659]	Stable Metals	Intact	2.27E-01	3.00	0.00	0.00	0.00	0.00	0.00	NO	3.0000	7.55E-02
165	ORR (LEU) [753]	Stable Metals	Intact	1.03E-01	1.78	0.00	0.00	0.00	0.00	0.00	NO	1.7778	5.78E-02
753	ORR (LEU) [165]	Stable Metals	Intact	5.20E-02	0.89	0.00	0.00	0.00	0.00	0.00	NO	0.8889	5.20E-02
507	JMTR [507]	Stable Metals	Intact	1.11E+00	23.92	0.00	0.00	0.00	0.00	0.00	NO	23.9167	4.62E-02
528	FRR MTR-S (U3SI2 LEU) TURKEY [528]	Stable Metals	Intact	5.91E-02	1.33	0.00	0.00	0.00	0.00	0.00	NO	1.3333	4.44E-02
525	FRR MTR-S (U3SI2 LEU) ISRAEL [525]	Stable Metals	Intact	5.68E-02	1.29	0.00	0.00	0.00	0.00	0.00	NO	1.2917	4.38E-02
443	SAPHIR LEU (SWITZERLAND) [443]	Stable Metals	Intact	7.12E-02	1.63	0.00	0.00	0.00	0.00	0.00	NO	1.6250	4.38E-02
523	FRR MTR-C (U3SI2 LEU) SWEDEN [523]	Stable Metals	Intact	1.02E+00	24.17	0.00	0.00	0.00	0.00	0.00	NO	24.1667	4.22E-02
556	FRR TUBES (U3SI2 LEU) GERMANY [675]	Stable Metals	Intact	1.37E-01	3.38	0.00	0.00	0.00	0.00	0.00	NO	3.3750	4.05E-02
178	FRR PIN CLUSTER U3SI2-LEU SO. KOREA [293]	Stable Metals	Intact	5.21E-02	1.33	0.00	0.00	0.00	0.00	0.00	NO	1.3333	3.91E-02
675	FRR ASTRA (U3SI2 LEU) AUSTRIA [515]	Stable Metals	Intact	1.08E-01	2.96	0.00	0.00	0.00	0.00	0.00	NO	2.9583	3.65E-02
293	FRR TUBES (UALX LEU) AUSTRALIA [299]	Stable Metals	Intact	2.60E-01	7.23	0.00	0.00	0.00	0.00	0.00	NO	7.2250	3.60E-02
515	FRR MTR (UALX-LEU) TAIWAN [555]	Stable Metals	Intact	3.48E-02	0.96	0.00	0.00	0.00	0.00	0.00	NO	0.9583	3.48E-02
555	FRR MTR-S (U3SI2 LEU) GERMANY [520]	Stable Metals	Intact	1.34E-01	4.00	0.00	0.00	0.00	0.00	0.00	NO	4.0000	3.35E-02
299	RINSC [181]	Stable Metals	Intact	6.05E-02	1.83	0.00	0.00	0.00	0.00	0.00	NO	1.8333	3.30E-02
674	FRR MTR-S (U3SI2 LEU) GERMANY [519]	Stable Metals	Intact	1.32E-01	4.04	0.00	0.00	0.00	0.00	0.00	NO	4.0417	3.26E-02
520	FRR MTR-S (UALX-LEU) JAPAN [553]	Stable Metals	Intact	6.83E-01	21.08	0.00	0.00	0.00	0.00	0.00	NO	21.0833	3.24E-02
181	FRR TUBES (U3SI2 LEU) GERMANY [673]	Stable Metals	Intact	1.09E-01	3.38	0.00	0.00	0.00	0.00	0.00	NO	3.3750	3.24E-02
527	UNIV OF MASS-LOWELL (MTR) [275]	Stable Metals	Intact	5.49E-02	1.71	0.00	0.00	0.00	0.00	0.00	NO	1.7083	3.21E-02
519	FRR TUBES (U3SI2 LEU) DENMARK [298]	Stable Metals	Intact	4.43E-01	13.90	0.00	0.00	0.00	0.00	0.00	NO	13.9000	3.19E-02
553	FRR MTR-S (U3SI2 LEU) NETHERLANDS [510]	Stable Metals	Intact	5.68E-02	1.79	0.00	0.00	0.00	0.00	0.00	NO	1.7917	3.17E-02
673	FRR MTR-S (U3SI2 LEU) CANADA [513]	Stable Metals	Intact	4.57E-02	1.46	0.00	0.00	0.00	0.00	0.00	NO	1.4583	3.13E-02
524	FRR MTR-S (U3SI2 LEU) JAPAN [508]	Stable Metals	Intact	1.93E-01	6.21	0.00	0.00	0.00	0.00	0.00	NO	6.2083	3.11E-02
759	UNIV OF VIRGINIA (LEU) [280]	Stable Metals	Intact	4.07E-02	1.38	0.00	0.00	0.00	0.00	0.00	NO	1.3750	2.96E-02
275	FRR MTR-S (U308-LEU) PERU [504]	Stable Metals	Intact	2.90E-02	0.96	0.00	0.00	0.00	0.00	0.00	NO	0.9583	2.90E-02
298	FRR MTR-S (U308-LEU) INDONESIA [502]	Stable Metals	Intact	1.86E-01	6.88	0.00	0.00	0.00	0.00	0.00	NO	6.8750	2.70E-02
510	FRR MTR-C (U3SI2 LEU) SWEDEN [522]	Stable Metals	Intact	8.80E-02	3.42	0.00	0.00	0.00	0.00	0.00	NO	3.4167	2.57E-02
513	FRR MTR-S (U3SI2 LEU) GREECE [532]	Stable Metals	Intact	6.40E-02	2.58	0.00	0.00	0.00	0.00	0.00	NO	2.5833	2.48E-02
508	FRR ASTRA (U308-LEU) AUSTRIA [556]	Stable Metals	Intact	2.44E-02	0.58	0.00	0.00	0.00	0.00	0.00	NO	0.5833	2.44E-02
741	HFIR [796]	Stable Metals	Intact	8.08E-02	3.33	0.00	0.00	0.00	0.00	0.00	NO	3.3333	2.42E-02
557	FRR MTR-S (U3SI2 LEU) JAPAN [506]	Stable Metals	Intact	7.04E-02	2.92	0.00	0.00	0.00	0.00	0.00	NO	2.9167	2.41E-02
504	FRR MTR-C (U3SI2 LEU) GERMANY [517]	Stable Metals	Intact	2.61E-02	1.08	0.00	0.00	0.00	0.00	0.00	NO	1.0833	2.41E-02
581	FRR MTR (UALX-LEU) BRAZIL [546]	Stable Metals	Intact	2.80E-02	1.17	0.00	0.00	0.00	0.00	0.00	NO	1.1667	2.40E-02
280	HFIR [707]	Stable Metals	Intact	1.11E-01	4.67	0.00	0.00	0.00	0.00	0.00	NO	4.6667	2.37E-02
526	FRG-1 (U3SI2 LEU) GERMANY [741]	Stable Metals	Intact	2.30E-02	0.75	0.00	0.00	0.00	0.00	0.00	NO	0.7500	2.30E-02

SNFID	Fuel Name	Matrix	Fuel Condition	MTHM 2035	SDC 17X10	SDC 17X15	SDC 24X10	SDC 24X15	HIC	MCO	Bare Fuel	# of canisters	MTHM/can
502	FRR MTR (U3SI2 LEU) JAPAN [505]	Stable Metals	Intact	4.47E-02	1.96	0.00	0.00	0.00	0.00	0.00	NO	1.9583	2.28E-02
522	UMRR (LEU) [146]	Stable Metals	Intact	2.65E-02	1.17	0.00	0.00	0.00	0.00	0.00	NO	1.1667	2.27E-02
532	UMRR (LEU) [849]	Stable Metals	Intact	2.65E-02	1.17	0.00	0.00	0.00	0.00	0.00	NO	1.1667	2.27E-02
796	ENEA (ITALY) LEU UALX [760]	Stable Metals	Intact	2.18E-02	0.92	0.00	0.00	0.00	0.00	0.00	NO	0.9167	2.18E-02
506	UNIV OF MICHIGAN (MTR-SI) [278]	Stable Metals	Intact	3.55E-01	16.50	0.00	0.00	0.00	0.00	0.00	NO	16.5000	2.15E-02
517	HFIR [103]	Stable Metals	Intact	2.72E+00	128.33	0.00	0.00	0.00	0.00	0.00	NO	128.3333	2.12E-02
546	WORCESTER POLY INSTITUTE [287]	Stable Metals	Intact	2.28E-02	1.08	0.00	0.00	0.00	0.00	0.00	NO	1.0833	2.10E-02
760	MURR (UALX) [144]	Stable Metals	Intact	6.93E-01	33.33	0.00	0.00	0.00	0.00	0.00	NO	33.3333	2.08E-02
707	FRR MTR-S (UALX-LEU) PORTUGAL [542]	Stable Metals	Intact	3.86E-02	1.88	0.00	0.00	0.00	0.00	0.00	NO	1.8750	2.06E-02
505	FRR MTR-C (UALX-LEU) JAPAN [562]	Stable Metals	Intact	8.48E-02	4.13	0.00	0.00	0.00	0.00	0.00	NO	4.1250	2.05E-02
146	MURR (UALX) [142]	Stable Metals	Intact	3.80E-02	1.87	0.00	0.00	0.00	0.00	0.00	NO	1.8667	2.04E-02
503	IOWA STATE UNIVERSITY (U3SI2 LEU) [122]	Stable Metals	Intact	2.02E-02	1.00	0.00	0.00	0.00	0.00	0.00	NO	1.0000	2.02E-02
849	JMTR (UALX HEU 45%) JAPAN [561]	Stable Metals	Intact	8.08E-02	4.17	0.00	0.00	0.00	0.00	0.00	NO	4.1667	1.94E-02
514	FRR MTR-C (U308-LEU) INDONESIA [288]	Stable Metals	Intact	2.68E-02	1.38	0.00	0.00	0.00	0.00	0.00	NO	1.3750	1.93E-02
278	NEREIDE (FRANCE) [751]	Stable Metals	Intact	3.54E-02	1.92	0.00	0.00	0.00	0.00	0.00	NO	1.9167	1.85E-02
103	PURDUE UNIVERSITY-MTR-SI [178]	Stable Metals	Intact	1.82E-02	0.44	0.00	0.00	0.00	0.00	0.00	NO	0.4444	1.82E-02
287	ATR [16]	Stable Metals	Intact	2.44E+00	137.50	0.00	0.00	0.00	0.00	0.00	NO	137.5000	1.77E-02
144	IEA-R1 (UALX LEU) BRAZIL [545]	Stable Metals	Intact	6.19E-02	3.50	0.00	0.00	0.00	0.00	0.00	NO	3.5000	1.77E-02
542	FRR MTR (UALX-MEU) JAPAN [565]	Stable Metals	Intact	2.15E-02	1.25	0.00	0.00	0.00	0.00	0.00	NO	1.2500	1.72E-02
552	FRR ASTRA (U3SI2 LEU) AUSTRIA [526]	Stable Metals	Intact	1.69E-02	0.63	0.00	0.00	0.00	0.00	0.00	NO	0.6250	1.69E-02
142	ATR [15]	Stable Metals	Intact	9.43E-01	56.40	0.00	0.00	0.00	0.00	0.00	NO	56.4000	1.67E-02
122	RV-1 (UALX LEU) VENEZUELA [616]	Stable Metals	Intact	3.87E-02	2.33	0.00	0.00	0.00	0.00	0.00	NO	2.3333	1.66E-02
561	MURR [143]	Stable Metals	Intact	1.49E-01	9.00	0.00	0.00	0.00	0.00	0.00	NO	9.0000	1.65E-02
268	FRR TUBES (U3SI2 LEU) GERMANY [674]	Stable Metals	Intact	1.62E-02	0.45	0.00	0.00	0.00	0.00	0.00	NO	0.4500	1.62E-02
751	RU-1 (UALX LEU) URAGUAY [557]	Stable Metals	Intact	1.61E-02	0.53	0.00	0.00	0.00	0.00	0.00	NO	0.5278	1.61E-02
16	FRR MTR (UALX-LEU) PHILLIPPINES [558]	Stable Metals	Intact	1.97E-02	1.25	0.00	0.00	0.00	0.00	0.00	NO	1.2500	1.58E-02
545	FRR MTR (UALX-LEU) VENEZUELA [559]	Stable Metals	Intact	3.89E-02	2.50	0.00	0.00	0.00	0.00	0.00	NO	2.5000	1.56E-02
512	FRR MTR (UALX-LEU) JAPAN [551]	Stable Metals	Intact	1.75E-02	1.13	0.00	0.00	0.00	0.00	0.00	NO	1.1250	1.55E-02
795	ATR [843]	Stable Metals	Intact	9.93E-02	6.40	0.00	0.00	0.00	0.00	0.00	NO	6.4000	1.55E-02
748	JRR-2 (UALX-HEU 45%) JAPAN [583]	Stable Metals	Intact	3.89E-02	2.56	0.00	0.00	0.00	0.00	0.00	NO	2.5556	1.52E-02
664	FRR MTR-S (UALX-MEU) JAPAN [564]	Stable Metals	Intact	4.26E-01	28.13	0.00	0.00	0.00	0.00	0.00	NO	28.1250	1.51E-02
585	HFBR [789]	Stable Metals	Intact	9.21E-01	61.25	0.00	0.00	0.00	0.00	0.00	NO	61.2500	1.50E-02
15	FRR-MTR (UALX-LEU) TAIWAN [554]	Stable Metals	Intact	2.19E-02	1.46	0.00	0.00	0.00	0.00	0.00	NO	1.4583	1.50E-02
509	FRR MTR (UALX-LEU) ARGENTINA [547]	Stable Metals	Intact	1.87E-02	1.25	0.00	0.00	0.00	0.00	0.00	NO	1.2500	1.50E-02
666	UNIVERSITY OF MICHIGAN [277]	Stable Metals	Intact	1.13E-01	7.80	0.00	0.00	0.00	0.00	0.00	NO	7.8000	1.45E-02
667	FRG-1 UALX (GERMANY) [793]	Stable Metals	Intact	1.95E-02	1.38	0.00	0.00	0.00	0.00	0.00	NO	1.3750	1.42E-02
668	UNIV OF MICHIGAN [276]	Stable Metals	Intact	3.40E-02	2.40	0.00	0.00	0.00	0.00	0.00	NO	2.4000	1.42E-02
669	FRR MTR-CYLINDER (UALX-MEU) JAPAN [562]	Stable Metals	Intact	5.32E-02	3.83	0.00	0.00	0.00	0.00	0.00	NO	3.8333	1.39E-02
816	UMRR (HEU) [442]	Stable Metals	Intact	3.64E-02	2.65	0.00	0.00	0.00	0.00	0.00	NO	2.6500	1.37E-02
143	RHF [179]	Stable Metals	Intact	2.56E-02	2.00	0.00	0.00	0.00	0.00	0.00	NO	2.0000	1.28E-02
558	FRR MTR-C2 (U3SI2 LEU) TURKEY [527]	Stable Metals	Intact	1.23E-02	0.38	0.00	0.00	0.00	0.00	0.00	NO	0.3750	1.23E-02
665	FRR (UALX-HEU 45%) JAPAN [817]	Stable Metals	Intact	1.10E-02	0.72	0.00	0.00	0.00	0.00	0.00	NO	0.7222	1.10E-02
559	FRR MTR-C (U3SI2 LEU) ISRAEL [524]	Stable Metals	Intact	1.08E-02	0.33	0.00	0.00	0.00	0.00	0.00	NO	0.3333	1.08E-02
551	HFBR [706]	Stable Metals	Intact	5.65E-02	5.25	0.00	0.00	0.00	0.00	0.00	NO	5.2500	1.08E-02
843	HFBR [746]	Stable Metals	Intact	2.26E-01	21.00	0.00	0.00	0.00	0.00	0.00	NO	21.0000	1.08E-02
563	MIT [135]	Stable Metals	Intact	1.52E-01	14.17	0.00	0.00	0.00	0.00	0.00	NO	14.1667	1.07E-02
817	FRR MTR-S (UALX-MEU) GERMANY [560]	Stable Metals	Intact	2.88E-02	2.71	0.00	0.00	0.00	0.00	0.00	NO	2.7083	1.06E-02
564	HFBR [102]	Stable Metals	Intact	6.34E-02	6.00	0.00	0.00	0.00	0.00	0.00	NO	6.0000	1.06E-02
789	FRR MTR-C (U3SI2 LEU) GREECE [531]	Stable Metals	Intact	1.03E-02	0.75	0.00	0.00	0.00	0.00	0.00	NO	0.7500	1.03E-02
554	MIT [136]	Stable Metals	Intact	1.91E-02	1.87	0.00	0.00	0.00	0.00	0.00	NO	1.8667	1.02E-02
547	FRR PIN CLUSTER UALX HEU CANADA [663]	Stable Metals	Intact	3.24E-02	3.28	0.00	0.00	0.00	0.00	0.00	NO	3.2750	9.89E-03
296	TSR FUEL [270]	Stable Metals	Intact	9.20E-03	0.00	0.00	0.00	0.00	0.00	0.00	NO	0.0000	9.20E-03

SNFID	Fuel Name	Matrix	Fuel Condition	MTHM 2035	SDC 17X10	SDC 17X15	SDC 24X10	SDC 24X15	HIC	MCO	Bare Fuel	# of canisters	MTHM/can
277	FRG-1 (U3O8 LEU) GERMANY [561]	Stable Metals	Intact	8.64E-03	0.29	0.00	0.00	0.00	0.00	0.00	NO	0.2917	8.64E-03
793	FRR MTR-C (U3Si2 LEU) JAPAN [289]	Stable Metals	Intact	8.60E-03	0.71	0.00	0.00	0.00	0.00	0.00	NO	0.7083	8.60E-03
276	FRR MTR-C (UALX-MEU) GERMANY [292]	Stable Metals	Intact	9.17E-03	1.17	0.00	0.00	0.00	0.00	0.00	NO	1.1667	7.86E-03
562	FRR TUBES (UALX-HEU) AUSTRALIA [684]	Stable Metals	Intact	3.27E-02	4.23	0.00	0.00	0.00	0.00	0.00	NO	4.2250	7.73E-03
442	JEN-1 (UALX HEU 40%) SPAIN [749]	Stable Metals	Intact	1.01E-02	1.33	0.00	0.00	0.00	0.00	0.00	NO	1.3333	7.59E-03
531	ORR (HEU) [163]	Stable Metals	Intact	2.12E-02	2.81	0.00	0.00	0.00	0.00	0.00	NO	2.8056	7.57E-03
179	SAPHIR MEU (SWITZERLAND) [444]	Stable Metals	Intact	3.94E-02	5.33	0.00	0.00	0.00	0.00	0.00	NO	5.3333	7.38E-03
566	FRR MTR (UALX-HEU) JAPAN [605]	Stable Metals	Intact	9.18E-03	1.25	0.00	0.00	0.00	0.00	0.00	NO	1.2500	7.34E-03
289	STERLING FOREST (U-AL) [226]	Stable Metals	Intact	2.85E-02	0.00	0.00	0.00	0.00	4.00	0.00	NO	4.0000	7.12E-03
805	BNL MEDICAL RX (BMRR) [21]	Stable Metals	Intact	9.42E-03	1.42	0.00	0.00	0.00	0.00	0.00	NO	1.4167	6.65E-03
541	FRR PIN CLUSTER UALX HEU CANADA [661]	Stable Metals	Intact	3.46E-02	5.63	0.00	0.00	0.00	0.00	0.00	NO	5.6250	6.16E-03
706	NIST [154]	Stable Metals	Intact	1.43E-01	24.44	0.00	0.00	0.00	0.00	0.00	NO	24.4444	5.87E-03
746	FRR MTR-C (U3Si2 LEU) CANADA [512]	Stable Metals	Intact	5.87E-03	0.33	0.00	0.00	0.00	0.00	0.00	NO	0.3333	5.87E-03
135	JMTR (JAPAN) [123]	Stable Metals	Intact	1.72E-02	2.96	0.00	0.00	0.00	0.00	0.00	NO	2.9583	5.82E-03
560	JMTR (UALX HEU) JAPAN [799]	Stable Metals	Intact	1.45E-02	2.50	0.00	0.00	0.00	0.00	0.00	NO	2.5000	5.80E-03
102	FRR TUBES (UALX-HEU) GERMANY [685]	Stable Metals	Intact	2.89E-02	5.00	0.00	0.00	0.00	0.00	0.00	NO	5.0000	5.78E-03
540	FRR MTR-C (U3O8-LEU) PERU [503]	Stable Metals	Intact	5.67E-03	0.25	0.00	0.00	0.00	0.00	0.00	NO	0.2500	5.67E-03
136	HIFAR (UALX-HEU) AUSTRALIA [645]	Stable Metals	Intact	1.69E-02	3.00	0.00	0.00	0.00	0.00	0.00	NO	3.0000	5.63E-03
800	HIFAR (UALX-HEU) AUSTRALIA [680]	Stable Metals	Intact	1.68E-02	3.00	0.00	0.00	0.00	0.00	0.00	NO	3.0000	5.61E-03
762	ENEA (UALX HEU) ITALY [574]	Stable Metals	Intact	1.77E-02	3.19	0.00	0.00	0.00	0.00	0.00	NO	3.1944	5.55E-03
663	JMTR (UALX HEU) JAPAN [612]	Stable Metals	Intact	5.49E-03	0.58	0.00	0.00	0.00	0.00	0.00	NO	0.5833	5.49E-03
812	MIT [600]	Stable Metals	Intact	5.46E-03	0.53	0.00	0.00	0.00	0.00	0.00	NO	0.5333	5.46E-03
270	FRR PIN CLUSTER UALX HEU CANADA [662]	Stable Metals	Intact	9.76E-02	18.53	0.00	0.00	0.00	0.00	0.00	NO	18.5250	5.27E-03
121	JEN-1 (UALX LEU) SPAIN [748]	Stable Metals	Intact	5.13E-03	0.29	0.00	0.00	0.00	0.00	0.00	NO	0.2917	5.13E-03
738	FRR TUBES (UALX-HEU) GERMANY [683]	Stable Metals	Intact	2.55E-02	5.00	0.00	0.00	0.00	0.00	0.00	NO	5.0000	5.10E-03
292	FRR MTR (UALX-HEU) ITALY [762]	Stable Metals	Intact	5.01E-03	0.50	0.00	0.00	0.00	0.00	0.00	NO	0.5000	5.01E-03
650	GRR (GREECE) [440]	Stable Metals	Intact	8.81E-03	1.81	0.00	0.00	0.00	0.00	0.00	NO	1.8056	4.88E-03
684	GRR (UALX HEU) GREECE [797]	Stable Metals	Intact	5.69E-03	1.17	0.00	0.00	0.00	0.00	0.00	NO	1.1667	4.87E-03
749	RINSC [180]	Stable Metals	Intact	8.04E-03	1.65	0.00	0.00	0.00	0.00	0.00	NO	1.6500	4.87E-03
183	FRR MTR-C (U3Si2 LEU) NETHERLANDS [509]	Stable Metals	Intact	4.87E-03	0.29	0.00	0.00	0.00	0.00	0.00	NO	0.2917	4.87E-03
818	FRR ASTRA (UALX-HEU) AUSTRIA [738]	Stable Metals	Intact	4.86E-03	0.58	0.00	0.00	0.00	0.00	0.00	NO	0.5833	4.86E-03
444	ARMF/CFRMF MARK I [9]	Stable Metals	Intact	1.12E-02	2.33	0.00	0.00	0.00	0.00	0.00	NO	2.3333	4.80E-03
605	FRR ASTRA (U3Si2 LEU) AUSTRIA [514]	Stable Metals	Intact	4.63E-03	0.21	0.00	0.00	0.00	0.00	0.00	NO	0.2083	4.63E-03
226	GTRR [87]	Stable Metals	Intact	4.47E-03	0.69	0.00	0.00	0.00	0.00	0.00	NO	0.6944	4.47E-03
603	FRM (UALX HEU 45%) GERMANY [805]	Stable Metals	Intact	4.26E-03	0.38	0.00	0.00	0.00	0.00	0.00	NO	0.3750	4.26E-03
461	BSR [31]	Stable Metals	Intact	7.00E-03	1.71	0.00	0.00	0.00	0.00	0.00	NO	1.7083	4.10E-03
21	DR-3 (UALX HEU)(DENMARK) [796]	Stable Metals	Intact	5.80E-03	1.45	0.00	0.00	0.00	0.00	0.00	NO	1.4500	4.00E-03
649	GENTR [97]	Stable Metals	Intact	3.98E-03	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	3.98E-03
87	FRR MTR (UALX-HEU) UK [650]	Stable Metals	Intact	3.93E-03	0.50	0.00	0.00	0.00	0.00	0.00	NO	0.5000	3.93E-03
764	FRR MTR-S (UALX-HEU) PORTUGAL [632]	Stable Metals	Intact	3.92E-03	0.92	0.00	0.00	0.00	0.00	0.00	NO	0.9167	3.92E-03
808	FRR MTR-C (UALX-LEU) PORTUGAL [540]	Stable Metals	Intact	3.91E-03	0.38	0.00	0.00	0.00	0.00	0.00	NO	0.3750	3.91E-03
661	UNIV OF WASHINGTON [281]	Stable Metals	Intact	3.90E-03	0.72	0.00	0.00	0.00	0.00	0.00	NO	0.7222	3.90E-03
154	OMEGA WEST (250) [406]	Stable Metals	Intact	5.20E-03	1.35	0.00	0.00	0.00	0.00	0.00	NO	1.3500	3.85E-03
123	FRR MTR-S (UALX-HEU) ARGENTINA [637]	Stable Metals	Intact	9.33E-03	2.46	0.00	0.00	0.00	0.00	0.00	NO	2.4583	3.80E-03
799	ASTRA-(AUSTRIA) [712]	Stable Metals	Intact	3.65E-03	0.72	0.00	0.00	0.00	0.00	0.00	NO	0.7222	3.65E-03
17	FRR MTR-S (UALX-HEU) JAPAN [602]	Stable Metals	Intact	3.28E-02	9.08	0.00	0.00	0.00	0.00	0.00	NO	9.0833	3.61E-03
685	JRR-2 (UALX-HEU) JAPAN [606]	Stable Metals	Intact	4.21E-03	1.17	0.00	0.00	0.00	0.00	0.00	NO	1.1667	3.61E-03
294	FRR MTR-S (UALX-HEU) ARGENTINA [636]	Stable Metals	Intact	2.14E-02	6.00	0.00	0.00	0.00	0.00	0.00	NO	6.0000	3.56E-03
845	FRR MTR (UALX-HEU) JAPAN [603]	Stable Metals	Intact	3.55E-03	0.50	0.00	0.00	0.00	0.00	0.00	NO	0.5000	3.55E-03
680	FRR MTR (UALX-HEU) JAPAN [601]	Stable Metals	Intact	7.85E-03	2.25	0.00	0.00	0.00	0.00	0.00	NO	2.2500	3.49E-03
574	OHIO STATE (HEU) [157]	Stable Metals	Intact	3.41E-03	1.00	0.00	0.00	0.00	0.00	0.00	NO	1.0000	3.41E-03
609	FRR MTR-S (UALX-HEU) BRAZIL [595]	Stable Metals	Intact	4.60E-03	1.38	0.00	0.00	0.00	0.00	0.00	NO	1.3750	3.35E-03

SNFID	Fuel Name	Matrix	Fuel Condition	MTHM 2035	SDC 17X10	SDC 17X15	SDC 24X10	SDC 24X15	HIC	MCO	Bare Fuel	# of canisters	MTHM/can
281	RECH-1 (CHILE) [708]	Stable Metals	Intact	3.90E-03	1.17	0.00	0.00	0.00	0.00	0.00	NO	1.1667	3.35E-03
662	R-2 SVTR (UALX HEU) SWEDEN [807]	Stable Metals	Intact	6.92E-03	2.67	0.00	0.00	0.00	0.00	0.00	NO	2.6667	3.34E-03
11	FRR MTR (UALX HEU) AUSTRALIA [649]	Stable Metals	Intact	3.32E-03	0.50	0.00	0.00	0.00	0.00	0.00	NO	0.5000	3.32E-03
683	ORR [461]	Stable Metals	Intact	3.32E-03	0.47	0.00	0.00	0.00	0.00	0.00	NO	0.4722	3.32E-03
712	FRR TUBES (UALX-HEU) AUSTRALIA [300]	Stable Metals	Intact	2.20E-02	6.65	0.00	0.00	0.00	0.00	0.00	NO	6.6500	3.31E-03
440	OMEGA WEST (236) [407]	Stable Metals	Intact	7.27E-03	2.20	0.00	0.00	0.00	0.00	0.00	NO	2.2000	3.30E-03
797	FRR MTR (UALX-HEU) THAILAND [633]	Stable Metals	Intact	4.23E-03	1.29	0.00	0.00	0.00	0.00	0.00	NO	1.2917	3.27E-03
180	FRR MTR-S (UALX-HEU) CANADA [614]	Stable Metals	Intact	7.22E-03	2.21	0.00	0.00	0.00	0.00	0.00	NO	2.2083	3.27E-03
9	FRR MTR (UALX-HEU) TAIWAN [628]	Stable Metals	Intact	4.76E-03	1.46	0.00	0.00	0.00	0.00	0.00	NO	1.4583	3.26E-03
792	ATSR [17]	Stable Metals	Intact	3.22E-03	0.56	0.00	0.00	0.00	0.00	0.00	NO	0.5556	3.22E-03
794	MNR (CANADA) [705]	Stable Metals	Intact	5.49E-03	1.71	0.00	0.00	0.00	0.00	0.00	NO	1.7083	3.21E-03
763	FRR MTR (UALX-HEU) NETHERLANDS [609]	Stable Metals	Intact	3.19E-03	0.58	0.00	0.00	0.00	0.00	0.00	NO	0.5833	3.19E-03
632	R-2 (SWEDEN) [710]	Stable Metals	Intact	2.23E-02	7.00	0.00	0.00	0.00	0.00	0.00	NO	7.0000	3.18E-03
31	R-2 SVTR (UALX HEU) SWEDEN [801]	Stable Metals	Intact	1.80E-02	5.67	0.00	0.00	0.00	0.00	0.00	NO	5.6667	3.18E-03
714	UNIV OF VIRGINIA [279]	Stable Metals	Intact	6.86E-03	2.20	0.00	0.00	0.00	0.00	0.00	NO	2.2000	3.12E-03
796	FMRB (GERMANY) [577]	Stable Metals	Intact	1.17E-02	3.83	0.00	0.00	0.00	0.00	0.00	NO	3.8333	3.05E-03
97	DR-3 (UALX HEU)(DENMARK) [714]	Stable Metals	Intact	3.00E-03	0.75	0.00	0.00	0.00	0.00	0.00	NO	0.7500	3.00E-03
644	UNIV OF MASS-LOWELL [274]	Stable Metals	Intact	6.74E-03	2.25	0.00	0.00	0.00	0.00	0.00	NO	2.2500	3.00E-03
408	HOR (NETHERLANDS) [713]	Stable Metals	Intact	4.02E-03	1.38	0.00	0.00	0.00	0.00	0.00	NO	1.3750	2.92E-03
637	FRR MTR-S (UALX-HEU) TURKEY [644]	Stable Metals	Intact	2.90E-03	0.75	0.00	0.00	0.00	0.00	0.00	NO	0.7500	2.90E-03
682	FRR MTR-S (UALX-HEU) CANADA [720]	Stable Metals	Intact	2.86E-03	0.88	0.00	0.00	0.00	0.00	0.00	NO	0.8750	2.86E-03
602	FRM (UALX HEU) GERMANY [806]	Stable Metals	Intact	2.86E-03	1.00	0.00	0.00	0.00	0.00	0.00	NO	1.0000	2.86E-03
608	NIST [846]	Stable Metals	Intact	8.60E-03	3.06	0.00	0.00	0.00	0.00	0.00	NO	3.0556	2.82E-03
636	FRR MTR-C (UALX-HEU) ARGENTINA [634]	Stable Metals	Intact	4.22E-03	1.50	0.00	0.00	0.00	0.00	0.00	NO	1.5000	2.81E-03
601	IEA-R1 (UALX HEU) BRAZIL [811]	Stable Metals	Intact	4.98E-03	1.79	0.00	0.00	0.00	0.00	0.00	NO	1.7917	2.78E-03
157	FRG-1 (UALX HEU) GERMANY [742]	Stable Metals	Intact	1.15E-02	4.17	0.00	0.00	0.00	0.00	0.00	NO	4.1667	2.76E-03
678	FRR ASTRA (UALX-HEU) AUSTRIA [646]	Stable Metals	Intact	2.69E-03	0.92	0.00	0.00	0.00	0.00	0.00	NO	0.9167	2.69E-03
595	BER-II (UALX HEU) GERMANY [758]	Stable Metals	Intact	7.33E-03	2.75	0.00	0.00	0.00	0.00	0.00	NO	2.7500	2.67E-03
708	FRR MTR (UALX-HEU) TAIWAN [629]	Stable Metals	Intact	3.74E-03	1.42	0.00	0.00	0.00	0.00	0.00	NO	1.4167	2.64E-03
807	FRR MTR-S (UALX-HEU) NETHERLANDS [608]	Stable Metals	Intact	6.67E-03	2.54	0.00	0.00	0.00	0.00	0.00	NO	2.5417	2.62E-03
300	FRR MTR-S (UALX-HEU) SWITZERLAND [658]	Stable Metals	Intact	5.97E-03	2.29	0.00	0.00	0.00	0.00	0.00	NO	2.2917	2.61E-03
407	FRR MTR (UALX-HEU) PHILIPPIINES [638]	Stable Metals	Intact	2.56E-03	0.83	0.00	0.00	0.00	0.00	0.00	NO	0.8333	2.56E-03
596	FRR ASTRA (UALX-MEU) AUSTRIA [566]	Stable Metals	Intact	2.53E-03	0.21	0.00	0.00	0.00	0.00	0.00	NO	0.2083	2.53E-03
588	OMEGA WEST (204) [406]	Stable Metals	Intact	2.53E-03	0.80	0.00	0.00	0.00	0.00	0.00	NO	0.8000	2.53E-03
633	FRR MTR-S (UALX HEU) ISRAEL [648]	Stable Metals	Intact	1.25E-02	5.08	0.00	0.00	0.00	0.00	0.00	NO	5.0833	2.45E-03
720	DR-3 (UALX HEU)(DENMARK) [759]	Stable Metals	Intact	2.42E-03	0.08	0.00	0.00	0.00	0.00	0.00	NO	0.0750	2.42E-03
614	FRR MTR-S (UALX-HEU) SWEDEN [619]	Stable Metals	Intact	2.36E-03	0.88	0.00	0.00	0.00	0.00	0.00	NO	0.8750	2.36E-03
628	FRR MTR-S (UALX-HEU) GERMANY [585]	Stable Metals	Intact	6.58E-03	2.96	0.00	0.00	0.00	0.00	0.00	NO	2.9583	2.22E-03
584	FRR MTR UALX HEU CANADA [294]	Stable Metals	Intact	2.19E-03	0.39	0.00	0.00	0.00	0.00	0.00	NO	0.3889	2.19E-03
705	IAN-R1 (COLUMBIA) [596]	Stable Metals	Intact	2.19E-03	0.67	0.00	0.00	0.00	0.00	0.00	NO	0.6667	2.19E-03
710	FRR MTR-C (UALX-HEU) JAPAN [600]	Stable Metals	Intact	4.16E-03	2.25	0.00	0.00	0.00	0.00	0.00	NO	2.2500	1.85E-03
801	FRR MTR-C (UALX-HEU) ISRAEL [639]	Stable Metals	Intact	2.34E-03	1.29	0.00	0.00	0.00	0.00	0.00	NO	1.2917	1.81E-03
406	FRR MTR-C (UALX-HEU) CANADA [612]	Stable Metals	Intact	1.76E-03	0.96	0.00	0.00	0.00	0.00	0.00	NO	0.9583	1.76E-03
279	ANLJ [5]	Stable Metals	Intact	2.79E-03	1.58	0.00	0.00	0.00	0.00	0.00	NO	1.5833	1.76E-03
638	FRR MTR-S (UALX-HEU) GERMANY [584]	Stable Metals	Intact	1.76E-03	0.54	0.00	0.00	0.00	0.00	0.00	NO	0.5417	1.76E-03
577	FRR MTR-C (UALX-HEU) ARGENTINA [635]	Stable Metals	Intact	1.75E-03	0.58	0.00	0.00	0.00	0.00	0.00	NO	0.5833	1.75E-03
582	IOWA ST. UNIV. (HEU UALX) [792]	Stable Metals	Intact	1.74E-03	0.37	0.00	0.00	0.00	0.00	0.00	NO	0.3667	1.74E-03
719	IOWA ST. UNIV. (HEU UALX) [794]	Stable Metals	Intact	1.74E-03	0.37	0.00	0.00	0.00	0.00	0.00	NO	0.3667	1.74E-03
274	FRR MTR-C (UALX-HEU) GERMANY [580]	Stable Metals	Intact	1.71E-03	1.04	0.00	0.00	0.00	0.00	0.00	NO	1.0417	1.64E-03
635	OHIO STATE (LEU) [158]	Stable Metals	Intact	2.61E-02	17.25	0.00	0.00	0.00	0.00	0.00	NO	17.2500	1.51E-03
646	FRR MTR-C (UALX-HEU) GERMANY [579]	Stable Metals	Intact	2.06E-03	1.38	0.00	0.00	0.00	0.00	0.00	NO	1.3750	1.50E-03
713	FRR (UALX-HEU) JAPAN [818]	Stable Metals	Intact	1.47E-03	0.19	0.00	0.00	0.00	0.00	0.00	NO	0.1944	1.47E-03

SNFID	Fuel Name	Matrix	Fuel Condition	MTHM 2035	SDC 17X10	SDC 17X15	SDC 24X10	SDC 24X15	HIC	MCO	Bare Fuel	# of canisters	MTHM/can
10	FRR MTR-O (UALX-LEU) PORTUGAL [541]	Stable Metals	Intact	1.35E-03	0.13	0.00	0.00	0.00	0.00	0.00	NO	0.1250	1.35E-03
643	FRR MTR-S (UALX-HEU) GERMANY [719]	Stable Metals	Intact	1.25E-03	0.42	0.00	0.00	0.00	0.00	0.00	NO	0.4167	1.25E-03
806	NIST [752]	Stable Metals	Intact	1.25E-03	0.44	0.00	0.00	0.00	0.00	0.00	NO	0.4444	1.25E-03
752	ARMF/CFRMF MARK II [11]	Stable Metals	Intact	1.16E-03	0.22	0.00	0.00	0.00	0.00	0.00	NO	0.2222	1.16E-03
846	FRR TUBES (UALX-HEU) DENMARK [682]	Stable Metals	Intact	1.11E-03	0.30	0.00	0.00	0.00	0.00	0.00	NO	0.3000	1.11E-03
834	FRR MTR-S (UALX-HEU) NETHERLANDS [607]	Stable Metals	Intact	1.09E-03	0.79	0.00	0.00	0.00	0.00	0.00	NO	0.7917	1.09E-03
811	FRR MTR-C2 (UALX-HEU) SWITZERLAND [657]	Stable Metals	Intact	9.95E-04	0.46	0.00	0.00	0.00	0.00	0.00	NO	0.4583	9.95E-04
742	FRR MTR-C (UALX-HEU) GERMANY [718]	Stable Metals	Intact	9.58E-04	0.67	0.00	0.00	0.00	0.00	0.00	NO	0.6667	9.58E-04
594	FRR MTR-C (UALX-HEU) TURKEY [643]	Stable Metals	Intact	9.53E-04	0.33	0.00	0.00	0.00	0.00	0.00	NO	0.3333	9.53E-04
619	FRR SLOWPOKE (HEU) CANADA [666]	Stable Metals	Intact	9.26E-04	0.06	0.00	0.00	0.00	0.00	0.00	NO	0.0556	9.26E-04
620	FRR SLOWPOKE (HEU) MONTREAL [667]	Stable Metals	Intact	9.26E-04	0.06	0.00	0.00	0.00	0.00	0.00	NO	0.0556	9.26E-04
676	FRR SLOWPOKE (HEU) CANADA [668]	Stable Metals	Intact	9.26E-04	0.06	0.00	0.00	0.00	0.00	0.00	NO	0.0556	9.26E-04
758	FRR SLOWPOKE (HEU) CANADA [669]	Stable Metals	Intact	9.26E-04	0.06	0.00	0.00	0.00	0.00	0.00	NO	0.0556	9.26E-04
629	FRR MTR-C (UALX-HEU) PORTUGAL [631]	Stable Metals	Intact	8.94E-04	0.38	0.00	0.00	0.00	0.00	0.00	NO	0.3750	8.94E-04
608	FRR SLOWPOKE (HEU) CANADA [665]	Stable Metals	Intact	8.71E-04	0.06	0.00	0.00	0.00	0.00	0.00	NO	0.0556	8.71E-04
658	FRR SLOWPOKE (HEU) JAMAICA [664]	Stable Metals	Intact	8.65E-04	0.05	0.00	0.00	0.00	0.00	0.00	NO	0.0500	8.65E-04
648	FRR TUBES (UALX-HEU) DENMARK [676]	Stable Metals	Intact	8.46E-04	0.25	0.00	0.00	0.00	0.00	0.00	NO	0.2500	8.46E-04
631	FRR SLOWPOKE (HEU) CANADA [296]	Stable Metals	Intact	8.18E-04	0.06	0.00	0.00	0.00	0.00	0.00	NO	0.0556	8.18E-04
642	FRR ASTRA (UALX-HEU) AUSTRIA [645]	Stable Metals	Intact	7.60E-04	0.38	0.00	0.00	0.00	0.00	0.00	NO	0.3750	7.60E-04
585	JEN-1 MEU UALX (SPAIN) [795]	Stable Metals	Intact	7.33E-04	0.04	0.00	0.00	0.00	0.00	0.00	NO	0.0417	7.33E-04
657	FRR MTR-C (UALX-HEU) SWEDEN [620]	Stable Metals	Intact	6.74E-04	0.25	0.00	0.00	0.00	0.00	0.00	NO	0.2500	6.74E-04
645	IOWA STATE UNIVERSITY (UALX HEU) [121]	Stable Metals	Intact	6.72E-04	0.08	0.00	0.00	0.00	0.00	0.00	NO	0.0800	6.72E-04
600	PURDUE UNIVERSITY (U-ALX HEU) [177]	Stable Metals	Intact	2.22E-03	3.44	0.00	0.00	0.00	0.00	0.00	NO	3.4444	6.44E-04
612	UNIV OF FLORIDA (ARGONAUT) HEU [272]	Stable Metals	Intact	4.01E-03	7.19	0.00	0.00	0.00	0.00	0.00	NO	7.1944	5.58E-04
639	FRR MTR-C1 (UALX-HEU) SWITZERLAND [656]	Stable Metals	Intact	5.18E-04	0.29	0.00	0.00	0.00	0.00	0.00	NO	0.2917	5.18E-04
656	FRR MTR-O (UALX-HEU) BRAZIL [594]	Stable Metals	Intact	4.55E-04	0.17	0.00	0.00	0.00	0.00	0.00	NO	0.1667	4.55E-04
5	FRR MTR-C (UALX-HEU) BRAZIL [593]	Stable Metals	Intact	4.19E-04	0.25	0.00	0.00	0.00	0.00	0.00	NO	0.2500	4.19E-04
593	FRR TUBES (UALX-HEU) DENMARK [678]	Stable Metals	Intact	3.37E-04	0.13	0.00	0.00	0.00	0.00	0.00	NO	0.1250	3.37E-04
580	FRR MTR-S (UALX-HEU) GERMANY [588]	Stable Metals	Intact	2.73E-04	0.06	0.00	0.00	0.00	0.00	0.00	NO	0.0633	2.73E-04
158	FRR MTR (UALX-HEU) SPAIN [764]	Stable Metals	Intact	2.68E-04	0.04	0.00	0.00	0.00	0.00	0.00	NO	0.0417	2.68E-04
579	JEN-1 (UALX HEU 50%) SPAIN [606]	Stable Metals	Intact	2.68E-04	0.04	0.00	0.00	0.00	0.00	0.00	NO	0.0417	2.68E-04
654	ARMF/CFRMF MARK I LL [10]	Stable Metals	Intact	2.40E-04	0.06	0.00	0.00	0.00	0.00	0.00	NO	0.0633	2.40E-04
718	ATR PLATES [779]	Stable Metals	Intact	2.01E-04	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	2.01E-04
607	FRR MTR-O (UALX-HEU) TURKEY [642]	Stable Metals	Intact	1.96E-04	0.06	0.00	0.00	0.00	0.00	0.00	NO	0.0833	1.96E-04
778	FRR MTR (UALX-MEU) ITALY [763]	Stable Metals	Intact	1.86E-04	0.04	0.00	0.00	0.00	0.00	0.00	NO	0.0417	1.86E-04
177	FRR MTR-S (UALX-HEU) GERMANY [582]	Stable Metals	Intact	1.25E-04	0.04	0.00	0.00	0.00	0.00	0.00	NO	0.0417	1.25E-04
272	FRR ASTRA (UALX-HEU) AUSTRIA [654]	Stable Metals	Intact	1.20E-04	0.08	0.00	0.00	0.00	0.00	0.00	NO	0.0833	1.20E-04
12	UNIV OF WASHINGTON [778]	Stable Metals	Intact	8.40E-05	0.00	0.09	0.00	0.00	0.00	0.00	NO	0.0882	8.40E-05
779	ARMF/CFRMF MARK III [12]	Stable Metals	Intact	8.00E-05	0.17	0.00	0.00	0.00	0.00	0.00	NO	0.1667	8.00E-05
215	SRE (U/TH) [215]	Stable Metals	Not Intact	2.17E+00	0.00	5.29	0.00	0.00	0.00	0.00	NO	5.2857	4.11E-01
411	ALUM CLAD SNF [411]	Stable Metals	Not Intact	3.44E-02	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	3.44E-02
413	MARK 42 TARGETS (PU) [413]	Stable Metals	Not Intact	1.01E-03	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	1.01E-03
8	ARMF [8]	Stable Metals	Not Intact	1.98E-04	0.00	0.00	0.00	0.00	1.00	0.00	NO	1.0000	1.98E-04

Bounding Crud Inventory for each Fuel Fuel Group						
SNFID	Fuel Name	Matrix	Fuel Condition	MTHM per can	Curies Co-60 per can	Curies Fe-55 per can
30	SHIPPINGPORT LWBR BLKT III [376]	Non-Metals	Intact	1.45E+00	2.68E+02	1.69E+03
44	DRESDEN THO2/UO2 (HEU) [44]	Non-Metals	Not Intact	6.63E-01	1.23E+02	7.73E+02
366	MISCELLANEOUS FUEL [366]	Other	Intact	4.16E+00	7.70E+02	4.85E+03
438	EBR-II (U-METAL DE-CLAD) [438]	Other	Not Intact	9.50E+00	1.76E+03	1.11E+04
112	FRR PIN CLUSTER U3SI2-LEU CANADA [660]	Stable Metals	Intact	8.45E-02	1.56E+01	9.85E+01
411	ALUM CLAD SNF [411]	Stable Metals	Not Intact	4.11E-01	7.60E+01	4.79E+02

185.1 Curies Co-60 per MTHM
1166 Curies Fe-55 per MTHM

Curies "x" per can = [Curies "x" per MTHM] * [MTHM per can]

Attachment X

Calculations for Navy SNF

Isotopes	Curies released per canister [Ci]	Curies released to the environment w/o HEPAs [Ci]	Curies released to the environment w/ HEPAs [Ci]	
Am-241	1.30E-07	1.30E-07	3.90E-11	
C-14	2.62E-03	2.62E-03	7.86E-07	
Co-58	8.84E-02	8.84E-02	2.65E-05	
Co-60	2.40E-01	2.40E-01	7.20E-05	
Cs-137	1.03E-04	1.03E-04	1.03E-04	[note: HEPA LPF = 1.0]
Fe-55	4.40E-01	4.40E-01	1.32E-04	
Fe-59	1.28E-03	1.28E-03	3.84E-07	
Mn-54	1.49E-02	1.49E-02	4.47E-06	
Nb-94	5.24E-05	5.24E-05	1.57E-08	
Nb-95	1.95E-03	1.95E-03	5.85E-07	
Ni-63	7.82E-02	7.82E-02	2.35E-05	
Pu-239	1.04E-07	1.04E-07	3.12E-11	
Pu-240	1.04E-07	1.04E-07	3.12E-11	
Pu-241	7.60E-06	7.60E-06	2.28E-09	
Sr-90	2.06E-04	2.06E-04	6.18E-08	
Zr-95	1.70E-03	1.70E-03	5.10E-07	
Breathing Rate	3.33E-04	[m^3/s]		
Dispersion factor	4.68E-05	[s/m^3]		
unit conv. Factor	3.70E+12	[(rem Bq)/(Ci Sv)]		
leak path factor	3.00E-04	[-]		

	inhalation DCFs [Sv/Bq]								
Isotopes	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Am-241	3.25E-05	2.67E-09	1.84E-05	1.74E-04	2.17E-03	1.60E-09	7.82E-05	1.20E-04	0.00E+00
C-14	5.64E-10	5.64E-10	5.64E-10	5.64E-10	5.64E-10	5.64E-10	5.64E-10	5.64E-10	0.00E+00
Co-58	6.52E-10	9.37E-10	1.60E-08	9.23E-10	6.93E-10	8.72E-10	1.89E-09	2.94E-09	0.00E+00
Co-60	4.76E-09	1.84E-08	3.45E-07	1.72E-08	1.35E-08	1.62E-08	3.60E-08	5.91E-08	0.00E+00
Cs-137	8.76E-09	7.84E-09	8.82E-09	8.30E-09	7.94E-09	7.93E-09	9.12E-09	8.63E-09	0.00E+00
Fe-55	5.23E-10	5.09E-10	1.06E-09	5.17E-10	5.14E-10	5.42E-10	1.21E-09	7.26E-10	0.00E+00
Fe-59	3.32E-09	3.01E-09	1.38E-08	3.18E-09	2.91E-09	2.95E-09	5.81E-09	4.00E-09	0.00E+00
Mn-54	8.85E-10	9.13E-10	6.66E-09	1.66E-09	2.56E-09	7.40E-10	2.09E-09	1.81E-09	0.00E+00
Nb-94	4.76E-09	2.24E-08	7.48E-07	2.26E-08	1.97E-08	2.22E-08	4.45E-08	1.12E-07	0.00E+00
Nb-95	4.84E-10	4.07E-10	8.32E-09	6.72E-10	2.42E-09	3.58E-10	1.07E-09	1.57E-09	0.00E+00
Ni-63	8.22E-10	8.22E-10	3.07E-09	8.22E-10	8.22E-10	8.22E-10	8.59E-10	8.39E-10	0.00E+00
Pu-239	3.18E-05	9.22E-10	3.23E-04	1.69E-04	2.11E-03	9.03E-10	7.56E-05	1.16E-04	0.00E+00
Pu-240	3.18E-05	9.51E-10	3.23E-04	1.69E-04	2.11E-03	9.05E-10	7.56E-05	1.16E-04	0.00E+00
Pu-241	6.82E-07	3.06E-11	3.18E-06	3.36E-06	4.20E-05	1.24E-11	1.31E-06	2.23E-06	0.00E+00
Sr-90	2.64E-09	2.64E-09	2.86E-06	3.36E-07	7.27E-07	2.64E-09	5.73E-09	3.51E-07	0.00E+00
Zr-95	1.88E-09	1.91E-09	4.07E-08	1.30E-08	1.03E-07	1.44E-09	2.77E-09	6.39E-09	0.00E+00

	air submersion DCFs [Sv/Bq m^3/s]								
	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Am-241	8.58E-16	1.07E-15	6.74E-16	5.21E-16	2.87E-15	7.83E-16	6.34E-16	8.18E-16	1.28E-15
C-14	2.59E-19	3.52E-19	1.53E-19	1.21E-19	7.06E-19	2.19E-19	1.54E-19	2.24E-19	2.43E-16
Co-58	4.66E-14	5.30E-14	4.64E-14	4.53E-14	7.41E-14	4.77E-14	4.44E-14	4.76E-14	5.58E-14
Co-60	1.23E-13	1.39E-13	1.24E-13	1.23E-13	1.78E-13	1.27E-13	1.20E-13	1.26E-13	1.45E-13
Cs-137	2.67E-14	3.05E-14	2.65E-14	2.58E-14	4.38E-14	2.73E-14	2.54E-14	2.73E-14	4.39E-14
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fe-59	5.83E-14	6.59E-14	5.85E-14	5.79E-14	8.51E-14	6.00E-14	5.64E-14	5.97E-14	7.13E-14
Mn-54	4.01E-14	4.55E-14	4.00E-14	3.91E-14	6.23E-14	4.11E-14	3.83E-14	4.09E-14	4.67E-14
Nb-94	7.54E-14	8.57E-14	7.51E-14	7.34E-14	1.19E-13	7.72E-14	7.19E-14	7.70E-14	9.52E-14
Nb-95	3.66E-14	4.16E-14	3.65E-14	3.56E-14	5.79E-14	3.75E-14	3.49E-14	3.74E-14	4.30E-14
Ni-63	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pu-239	4.84E-18	7.55E-18	2.65E-18	2.67E-18	9.47E-18	3.88E-18	2.86E-18	4.24E-18	1.86E-17
Pu-240	6.36E-18	1.23E-17	1.09E-18	1.65E-18	9.26E-18	3.92E-18	1.96E-18	4.75E-18	3.92E-17
Pu-241	7.19E-20	8.67E-20	6.48E-20	5.63E-20	2.19E-19	6.98E-20	6.09E-20	7.25E-20	1.17E-19
Sr-90	7.78E-18	9.49E-18	6.44E-18	5.44E-18	2.28E-17	7.33E-18	6.11E-18	7.53E-18	9.20E-15
Zr-95	3.53E-14	4.01E-14	3.51E-14	3.43E-14	5.62E-14	3.61E-14	3.36E-14	3.60E-14	4.50E-14

	Inhalation Dose - no HEPAs [rem/canister]								
Isotopes	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Am-241	2.44E-07	2.00E-11	1.38E-07	1.30E-06	1.63E-05	1.20E-11	5.86E-07	9.00E-07	0.00E+00
C-14	8.52E-08	8.52E-08	8.52E-08	8.52E-08	8.52E-08	8.52E-08	8.52E-08	8.52E-08	0.00E+00
Co-58	3.32E-06	4.78E-06	8.16E-05	4.70E-06	3.53E-06	4.44E-06	9.63E-06	1.50E-05	0.00E+00
Co-60	6.59E-05	2.55E-04	4.77E-03	2.38E-04	1.87E-04	2.24E-04	4.98E-04	8.18E-04	0.00E+00
Cs-137	5.20E-08	4.66E-08	5.24E-08	4.93E-08	4.72E-08	4.71E-08	5.42E-08	5.13E-08	0.00E+00
Fe-55	1.33E-05	1.29E-05	2.69E-05	1.31E-05	1.30E-05	1.38E-05	3.07E-05	1.84E-05	0.00E+00
Fe-59	2.45E-07	2.22E-07	1.02E-06	2.35E-07	2.15E-07	2.18E-07	4.29E-07	2.95E-07	0.00E+00
Mn-54	7.60E-07	7.84E-07	5.72E-06	1.43E-06	2.20E-06	6.36E-07	1.80E-06	1.56E-06	0.00E+00
Nb-94	1.44E-08	6.77E-08	2.26E-06	6.83E-08	5.95E-08	6.71E-08	1.34E-07	3.38E-07	0.00E+00
Nb-95	5.44E-08	4.58E-08	9.36E-07	7.56E-08	2.72E-07	4.03E-08	1.20E-07	1.77E-07	0.00E+00
Ni-63	3.71E-06	3.71E-06	1.38E-05	3.71E-06	3.71E-06	3.71E-06	3.87E-06	3.78E-06	0.00E+00
Pu-239	1.91E-07	5.53E-12	1.94E-06	1.01E-06	1.27E-05	5.42E-12	4.53E-07	6.96E-07	0.00E+00
Pu-240	1.91E-07	5.70E-12	1.94E-06	1.01E-06	1.27E-05	5.43E-12	4.53E-07	6.96E-07	0.00E+00
Pu-241	2.99E-07	1.34E-11	1.39E-06	1.47E-06	1.84E-05	5.43E-12	5.74E-07	9.77E-07	0.00E+00
Sr-90	3.14E-08	3.14E-08	3.40E-05	3.99E-06	8.64E-06	3.14E-08	6.81E-08	4.17E-06	0.00E+00
Zr-95	1.84E-07	1.87E-07	3.99E-06	1.27E-06	1.01E-05	1.41E-07	2.72E-07	6.26E-07	0.00E+00
	8.85E-05	2.78E-04	4.95E-03	2.72E-04	2.89E-04	2.47E-04	5.47E-04	8.66E-04	0.00E+00

	Air Submersion Dose - no HEPAs [rem/canister]								
Isotopes	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Am-241	1.93E-14	2.41E-14	1.52E-14	1.17E-14	6.46E-14	1.76E-14	1.43E-14	1.84E-14	2.88E-14
C-14	1.18E-13	1.60E-13	6.94E-14	5.49E-14	3.20E-13	9.94E-14	6.99E-14	1.02E-13	1.10E-10
Co-58	7.13E-07	8.11E-07	7.10E-07	6.93E-07	1.13E-06	7.30E-07	6.80E-07	7.29E-07	8.54E-07
Co-60	5.11E-06	5.78E-06	5.15E-06	5.11E-06	7.40E-06	5.28E-06	4.99E-06	5.24E-06	6.03E-06
Cs-137	4.76E-10	5.43E-10	4.72E-10	4.61E-10	7.82E-10	4.86E-10	4.52E-10	4.86E-10	7.83E-10
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fe-59	1.29E-08	1.46E-08	1.30E-08	1.28E-08	1.89E-08	1.33E-08	1.25E-08	1.32E-08	1.58E-08
Mn-54	1.03E-07	1.17E-07	1.03E-07	1.01E-07	1.61E-07	1.06E-07	9.88E-08	1.06E-07	1.20E-07
Nb-94	6.84E-10	7.78E-10	6.81E-10	6.66E-10	1.08E-09	7.00E-10	6.52E-10	6.99E-10	8.64E-10
Nb-95	1.24E-08	1.40E-08	1.23E-08	1.20E-08	1.96E-08	1.27E-08	1.18E-08	1.26E-08	1.45E-08
Ni-63	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pu-239	8.72E-17	1.36E-16	4.77E-17	4.81E-17	1.71E-16	6.99E-17	5.15E-17	7.64E-17	3.35E-16
Pu-240	1.15E-16	2.22E-16	1.96E-17	2.97E-17	1.67E-16	7.06E-17	3.53E-17	8.55E-17	7.06E-16
Pu-241	9.46E-17	1.14E-16	8.53E-17	7.41E-17	2.88E-16	9.19E-17	8.01E-17	9.54E-17	1.54E-16
Sr-90	2.78E-13	3.39E-13	2.30E-13	1.94E-13	8.13E-13	2.61E-13	2.18E-13	2.69E-13	3.28E-10
Zr-95	1.04E-08	1.18E-08	1.03E-08	1.01E-08	1.65E-08	1.06E-08	9.89E-09	1.06E-08	1.32E-08
	5.97E-06	6.75E-06	6.00E-06	5.94E-06	8.75E-06	6.15E-06	5.80E-06	6.11E-06	7.05E-06

	Inhalation Dose - HEPAs [rem/canister]								
Isotopes	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Am-241	7.31E-11	6.00E-15	4.14E-11	3.91E-10	4.88E-09	3.60E-15	1.76E-10	2.70E-10	0.00E+00
C-14	2.56E-11	2.56E-11	2.56E-11	2.56E-11	2.56E-11	2.56E-11	2.56E-11	2.56E-11	0.00E+00
Co-58	9.97E-10	1.43E-09	2.45E-08	1.41E-09	1.06E-09	1.33E-09	2.89E-09	4.50E-09	0.00E+00
Co-60	1.98E-08	7.64E-08	1.43E-06	7.14E-08	5.60E-08	6.73E-08	1.49E-07	2.45E-07	0.00E+00
Cs-137	5.20E-08	4.66E-08	5.24E-08	4.93E-08	4.72E-08	4.71E-08	5.42E-08	5.13E-08	0.00E+00
Fe-55	3.98E-09	3.87E-09	8.07E-09	3.94E-09	3.91E-09	4.13E-09	9.21E-09	5.53E-09	0.00E+00
Fe-59	7.35E-11	6.66E-11	3.06E-10	7.04E-11	6.44E-11	6.53E-11	1.29E-10	8.86E-11	0.00E+00
Mn-54	2.28E-10	2.35E-10	1.72E-09	4.28E-10	6.60E-10	1.91E-10	5.39E-10	4.67E-10	0.00E+00
Nb-94	4.31E-12	2.03E-11	6.78E-10	2.05E-11	1.79E-11	2.01E-11	4.03E-11	1.02E-10	0.00E+00
Nb-95	1.63E-11	1.37E-11	2.81E-10	2.27E-11	8.16E-11	1.21E-11	3.61E-11	5.30E-11	0.00E+00
Ni-63	1.11E-09	1.11E-09	4.15E-09	1.11E-09	1.11E-09	1.11E-09	1.16E-09	1.13E-09	0.00E+00
Pu-239	5.72E-11	1.66E-15	5.81E-10	3.04E-10	3.80E-09	1.62E-15	1.36E-10	2.09E-10	0.00E+00
Pu-240	5.72E-11	1.71E-15	5.81E-10	3.04E-10	3.80E-09	1.63E-15	1.36E-10	2.09E-10	0.00E+00
Pu-241	8.97E-11	4.02E-15	4.18E-10	4.42E-10	5.52E-09	1.63E-15	1.72E-10	2.93E-10	0.00E+00
Sr-90	9.41E-12	9.41E-12	1.02E-08	1.20E-09	2.59E-09	9.41E-12	2.04E-11	1.25E-09	0.00E+00
Zr-95	5.53E-11	5.62E-11	1.20E-09	3.82E-10	3.03E-09	4.23E-11	8.15E-11	1.88E-10	0.00E+00
	7.86E-08	1.30E-07	1.54E-06	1.31E-07	1.34E-07	1.21E-07	2.18E-07	3.11E-07	0.00E+00

	Air Submersion Dose - HEPAs [rem/canister]								
Isotopes	gonads	breast	lungs	red marrow	bone surface	thyroid	remainder	effective	skin
Am-241	5.79E-18	7.23E-18	4.55E-18	3.52E-18	1.94E-17	5.29E-18	4.28E-18	5.52E-18	8.64E-18
C-14	3.53E-17	4.79E-17	2.08E-17	1.65E-17	9.61E-17	2.98E-17	2.10E-17	3.05E-17	3.31E-14
Co-58	2.14E-10	2.43E-10	2.13E-10	2.08E-10	3.40E-10	2.19E-10	2.04E-10	2.19E-10	2.56E-10
Co-60	1.53E-09	1.73E-09	1.55E-09	1.53E-09	2.22E-09	1.58E-09	1.50E-09	1.57E-09	1.81E-09
Cs-137	4.76E-10	5.43E-10	4.72E-10	4.61E-10	7.82E-10	4.86E-10	4.52E-10	4.86E-10	7.83E-10
Fe-55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fe-59	3.88E-12	4.38E-12	3.89E-12	3.85E-12	5.66E-12	3.99E-12	3.75E-12	3.97E-12	4.74E-12
Mn-54	3.10E-11	3.52E-11	3.10E-11	3.03E-11	4.82E-11	3.18E-11	2.96E-11	3.17E-11	3.61E-11
Nb-94	2.05E-13	2.33E-13	2.04E-13	2.00E-13	3.24E-13	2.10E-13	1.96E-13	2.10E-13	2.59E-13
Nb-95	3.71E-12	4.21E-12	3.70E-12	3.61E-12	5.87E-12	3.80E-12	3.54E-12	3.79E-12	4.36E-12
Ni-63	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pu-239	2.61E-20	4.08E-20	1.43E-20	1.44E-20	5.12E-20	2.10E-20	1.55E-20	2.29E-20	1.00E-19
Pu-240	3.44E-20	6.65E-20	5.89E-21	8.91E-21	5.00E-20	2.12E-20	1.06E-20	2.57E-20	2.12E-19
Pu-241	2.84E-20	3.42E-20	2.56E-20	2.22E-20	8.65E-20	2.76E-20	2.40E-20	2.86E-20	4.62E-20
Sr-90	8.33E-17	1.02E-16	6.89E-17	5.82E-17	2.44E-16	7.84E-17	6.54E-17	8.06E-17	9.85E-14
Zr-95	3.12E-12	3.54E-12	3.10E-12	3.03E-12	4.96E-12	3.19E-12	2.97E-12	3.18E-12	3.97E-12
	2.27E-09	2.57E-09	2.27E-09	2.24E-09	3.41E-09	2.33E-09	2.19E-09	2.32E-09	2.90E-09

Navy Fuel No HEPAs

	Inhalation Dose @ 5000 m [rem]	Dose Term for Regulation	Air Submersion Dose @ 5000 m [rem]	Dose Term for Regulation		Dose Term for Regulation
Gonad	8.85E-05					
Breast	2.78E-04					
Lung	4.95E-03	<CDE				
R Marrow	2.72E-04					
B Surface	2.89E-04					
Thyroid	2.47E-04					
Remainder	5.47E-04					
Whole Body	8.66E-04	<CEDE	6.11E-06	<DDE	8.72E-04	<TEDE=CEDE+DDE
Skin	0.00E+00	<SKIN	7.05E-06	<SKIN	7.05E-06	<SKIN
Eye Lens	N/A	<EYE	N/A	<EYE	N/A	<EYE .
					4.96E-03	<CDE + DDE

Navy Fuel HEPAs

	Inhalation Dose @ 5000 m [rem]	Dose Term for Regulation	Air Submersion Dose @ 5000 m [rem]	Dose Term for Regulation	Dose for Regulation [rem]	Dose Term for Regulation
Gonad	7.86E-08					
Breast	1.30E-07					
Lung	1.54E-06	<CDE				
R Marrow	1.31E-07					
B Surface	1.34E-07					
Thyroid	1.21E-07					
Remainder	2.18E-07					
Whole Body	3.11E-07	<CEDE	2.32E-09	<DDE	3.13E-07	<TEDE=CEDE+DDE
Skin	0.00E+00	<SKIN	2.90E-09	<SKIN	2.90E-09	<SKIN
Eye Lens	N/A	<EYE	N/A	<EYE	N/A	<EYE
					1.54E-06	<CDE + DDE

Attachment XI

Identification of Isotopes with Short-Lived Daughter Products and the Calculation of Their Total Air Submersion DCF

DOE SNF Isotopes and Their 1st Generation Daughter Products

parent isotope	parent's half life	daughter product	decay fraction (f)	daughter's half-life	daughter product	decay fraction (f)	daughter's half-life
Ac-227	21.773y	**Fr-223**	**1.380E-02**	**21.8m**	Th-227	9.862E-01	18.718d
Am-241	432.2y	Np-237	1.000E+00	87.74y			
Am-242m	152y	Np-238	4.800E-03	2.117d	Am-242	9.952E-01	16.02h
Am-243	7380y	Np-239	1.000E+00	2.355d			
C-14		none					
Cd-113m		none					
Cl-36		none					
Cm-242	162.8d	Pu-238	1.000E+00	87.74y			
Cm-243	28.5y	Pu-239	9.980E-01	24065y	Am-243	2.400E-03	7380y
Cm-244	19.4m	Pu-240	1.000E+00	6537y			
Cm-245	8500y	Pu-241	1.000E+00	14.4y			
Cm-246	4730y	Pu-242	1.000E+00	3.763E+5y			
Cm-247	1.56E+07	Pu-243	1.000E+00	4.956h			
Co-60		none					
Cs-134		none					
Cs-135		none					
Cs-137	30.0y	**Ba-137m**	**9.460E-01**	**2.522m**			
Eu-154		none					
Eu-155		none					
Fe-55		none					
H-3		none					
I-129		none					
Kr-85		none					
Nb-93m		none					
Nb-94		none					
Ni-59		none					
Ni-63		none					
Np-237	2.14E+6y	Pa-233	1.000E+00	27.0d			
Pa-231	32760	Ac-227	1.000E+00	21.773y			
Pb-210	22.3y	Bi-210	1.000E+00	5.012d			
Pd-107		none					
Pm-147	2.623E+4y	Sm-147	1.000E+00	1.06e+11y			
Pu-238	87.7y	U-234	1.000E+00	2.445e+5y			
Pu-239	24065y	U-235	1.000E+00	703.8e+6y			
Pu-240	6537y	U-236	1.000E+00	2.3415e+7y			
Pu-241	14.4y	U-237	2.450E-05	6.75d	Am-241	1.000E+00	432.2y
Pu-242	3.763e+5y	U-238	1.000E+00	4.468e+9y			
Ra-226	1600y	Rn-222	1.000E+00	3.8235d			
Ra-228	5.75y	Ac-228	1.000E+00	6.13h			
Ru-106	3.682d	**Rh-106**	**1.000E+00**	**29.9s**			
Sb-125	2.77y	Te-125m	2.280E-01	58d			
Se-79		none					
Sm-147		none					
Sm-151		none					
Sn-126	1.0e+5y	**Sb-126m**	**1.000E+00**	**19.0m**			
Sr-90	29.12y	Y-90	1.000E+00	64.0h			
Tc-99		none					
Th-229	7340y	Ra-225	1.000E+00	14.8d			
Th-230	7.7e+4y	Ra-226	1.000E+00	1600y			
Th-232	1.405e+10y	Ra-228	1.000E+00	5.75y			
U-232	72y	Th-228	1.000E+00	1.9131y			
U-233	1.585e+5y	Th-229	1.000E+00	7340y			
U-234	2.445r+5y	Th-230	1.000E+00	7.7e+4y			
U-235	703.8e+6y	Th-231	1.000E+00	25.5h			
U-236	2.3415e+y	Th-232	1.000E+00	1.405e+10y			
U-238	4.468e+9y	Th-234	1.000E+00	24.1d			
Zr-93	1.53e+6y	Nb-93m	1.000E+00	13.6y			

Total Air Submersion DCF Calculations

	parent isotope	daughter isotope	decay fraction	
	Ac-227	Fr-223	1.380E-02	
	air sub. DCF	air sub. DCF		total air submersion DCF
gonad	5.78E-18	2.30E-15		3.75E-17
breast	6.98E-18	2.72E-15		4.45E-17
lung	5.22E-18	2.07E-15		3.38E-17
red marrow	4.59E-18	1.80E-15		2.94E-17
bone surface	1.68E-17	6.29E-15		1.04E-16
thyroid	5.60E-18	2.24E-15		3.65E-17
remainder	4.92E-18	1.95E-15		3.18E-17
effective	5.82E-18	2.29E-15		3.74E-17
skin	1.10E-17	2.30E-14		3.28E-16

	parent isotope	daughter isotope	decay fraction	
	Cs-137	Ba-137m	9.460E-01	
	air sub. DCF	air sub. DCF		total effective air submersion DCF
gonad	7.96E-18	2.82E-14		2.67E-14
breast	9.67E-18	3.22E-14		3.05E-14
lung	6.68E-18	2.80E-14		2.65E-14
red marrow	5.40E-18	2.73E-14		2.58E-14
bone surface	2.29E-17	4.63E-14		4.38E-14
thyroid	7.55E-18	2.88E-14		2.73E-14
remainder	6.34E-18	2.68E-14		2.54E-14
effective	7.74E-18	2.88E-14		2.73E-14
skin	8.63E-15	3.73E-14		4.39E-14

	parent isotope	daughter isotope	decay fraction	
	Ru-106	Rh-106	1.000E+00	
	air sub. DCF	air sub. DCF		total effective air submersion DCF
gonad	0.00E+00	1.01E-14		1.01E-14
breast	0.00E+00	1.16E-14		1.16E-14
lung	0.00E+00	1.01E-14		1.01E-14
red marrow	0.00E+00	9.75E-15		9.75E-15
bone surface	0.00E+00	1.72E-14		1.72E-14
thyroid	0.00E+00	1.03E-14		1.03E-14
remainder	0.00E+00	9.63E-15		9.63E-15
effective	0.00E+00	1.04E-14		1.04E-14
skin	0.00E+00	1.09E-13		1.09E-13

	parent isotope	daughter isotope	decay fraction	
	Sn-126	Sb-126m	1.000E+00	
	air sub. DCF	air sub. DCF		total effective air submersion DCF
gonad	2.13E-15	7.33E-14		7.54E-14
breast	2.55E-15	8.38E-14		8.62E-14
lung	1.85E-15	7.29E-14		7.48E-14
red marrow	1.53E-15	7.07E-14		7.22E-14
bone surface	6.94E-15	1.24E-14		1.93E-14
thyroid	2.03E-15	7.49E-14		7.69E-14
remainder	1.73E-15	6.97E-14		7.14E-14
effective	2.11E-15	7.50E-14		7.71E-14
skin	6.65E-15	1.24E-13		1.31E-13

total DCF = parent DCF + (decay fraction x daughter DCF)