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ANALYSIS OF TRITIUM MISSION FMEF/FAA FUEL HANDLING ACCIDENTS

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Abstract: The Fuels Material Examination Facility/Fuel Assembly Area (FMEF/FAA) is proposed to be used for fabrication of mixed oxide fuel to support the Fast Flux Test Facility (FFTF) tritium/medical isotopes mission. The plutonium isotope mix for the new mission is different than that analyzed in the FMEF safety analysis report. A reanalysis was performed of three representative accidents for the revised plutonium mix to determine the impact on the safety analysis. Current versions of computer codes and meteorology data files were used for the analysis. The revised accidents were a criticality, an explosion in a glovebox, and a tornado. The analysis concluded that risk guidelines were met with the revised Pu mix. Ingestion doses were also calculated for information.

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1. Introduction

The Fuels Material Examination Facility/Fuel Assembly Area (FMEF/FAA) has been proposed as a location to assemble the targets and fuel assemblies. A safety analysis of the area was conducted that concluded the facility met all safety requirements (WHC, 1992). The following accidents were reexamined as per Nielsen 1997 in light of current conditions and standards. Accident descriptions and frequencies are taken from WHC, 1992.

1) FMEF Fuel Fabrication

- a. Criticality in the Fuel Fabrication Line (estimated probability of occurrence per year 1.0 E-4 to 1.0 E-6)

A criticality accident, which would predominantly effect onsite individuals, is precluded by design and administrative controls. Conservative calculations regarding a criticality were developed for safety analysis purposes.

- b. Explosion and Release of MOX From the FMEF (estimated probability of occurrence per year: 1.0 E-4 to 1.0 E-6)

An explosion (considered extremely unlikely) is postulated to occur in a glovebox (due to loss of inert atmosphere with solvent present) containing exposed MOX powder. The glovebox is assumed to be grossly breached and the room air filled with respirable powder. The first testable HEPA filter is assumed to fail so that the material passes through only two stages of HEPAs before being released to the environment. The release is assumed to be of short duration and at ground level.

- c. Design Basis Tornado (estimated probability of occurrence per year: 1.0 E-6 to 1.0 E-7)

A design basis tornado striking the FMEF would result in a low consequence accident. This accident has a low estimated probability of occurrence per year with no estimated environmental release.

The accidents will be examined as discussed below. The same assumptions used in the FMEF/FAA PSAR will be used in this analysis, although current versions of computer codes and current meteorology files will be used. Doses to receptors are calculated at 1.5 miles (2400 m) in the worst direction, at 4.5 miles east (7200 m), for the worst onsite receptor (100 m in worst location), and at the site boundary location that produces the highest dose. A population dose will also be computed in the sector that produces the worst results.

The inhalation and submersion doses are a function of the material released, and the atmospheric dispersion between the release point and the receptor. The dispersion is characterized by a parameter called the atmospheric dispersion coefficient, or X/Q' . The dose to the onsite receptor was calculated using the GENII code (Napier, 1988). This dose can be multiplied by the ratio of the appropriate X/Q' to determine the dose to different receptors.

Population weighted doses are calculated to evaluate the collective dose for the population around Hanford. Because it is impractical to estimate an individual dose for each person in a large population, the area within a 80 km distance from the source is partitioned into a circular grid consisting of 16 compass directions, and a number of radial distances. The offsite population is assumed to extend from the Hanford site boundary to a circle having a 80 km (50 miles) radius centered at the release point. It is assumed that the population distribution within a sector interval (i.e., the area enclosed by radial and azimuthal increment) is uniform. For a chronic release the weighted estimates are summed over all 16 compass directions, whereas an acute release (such as is assumed for this accident analysis) is assumed to affect the sectors in a single directions. The direction with the highest population weighted X/Q' is used for this analysis. Hanford site specific population data from the 1990 census are used. The population data are given in Schreckhise, 1993.

The GXQ code (Hey 1994) was used to determine the maximum onsite and offsite receptor X/Q' values. The GXQ output files are included in Appendix A, and the GENII output files are included in Appendix B.

GXQ was also used to perform the X/Q' calculations necessary for the offsite population dose estimates. GXQ was run using the sector average option to calculate acute population-weighted X/Q' . This option averages the plume concentration across the sector to effectively simulate a uniform population distribution across the sector.

Ingestion doses were calculated at the site boundary with the GENII code. The ingestion doses were calculated for information only since any measurable contamination of agricultural land due to a release of radioactive material at Hanford would result in evacuation of people and interdiction of the crops meat and milk, etc. Any actual ingestion dose to the public from such a pathway would be determined not only by the severity of the accident but also by the effectiveness of the recovery action. The doses from a 50 yr exposure and ingestion without including credit for recovery actions does not represent a realistic exposure pathway, but is included for information.

Ingestion doses are presented for both winter and autumn scenarios. The winter scenario is based on the assumption that the passing contamination falls on bare soil. The potential doses represent the result of crop uptake for the next 50 years. The autumn scenario is the worst case for ingestion. The airborne contamination is assumed to fall on crops which are about to be harvested for human and animal consumption. In both the autumn and winter

cases, the effects of meat, milk, and egg consumption are included, as well as the direct shine radiation from soil contamination, and internal exposure due to inadvertent soil ingestion. Since crops or livestock are not grown on the Hanford Reservation, doses are considered only at the site boundary. Details of the modelling are described in Napier (1988).

2.0 Accident Scenarios

2.1 Criticality

The dose consequences of a criticality will depend on the magnitude of the criticality and integrated energy released, which in turn depends on the number of fissions that occur during the criticality. The analysis for the FAA (Hey, 1991) indicated that since no scenario was developed for this accident, a bounding criticality would be assumed. Regulatory Guide 3.35 (NRC 1979) specifies a criticality with a total number of fissions of 1×10^{19} . It was concluded that the criticality in the FAA would be unlikely to exceed this magnitude. There is no reason to believe that the tritium mission would invalidate this assumption.

The release is assumed to occur through two HEPA filters with an overall transmission of 1×10^{-5} for aerosol transmittal (ANSI N46.1-1980). No filtration was assumed for noble gases or halogens. The source term, as taken from NRC 1979, is shown in Table 1.

Table 1 Source Term Assumed for Criticality Accident

Isotope	Source Term (Bq)	Release Fraction	Filter transmission Factor	Release to the Environment (Bq)
Kr-83m	4.1 E12	1.0	1.0	4.1 E12
Kr-85m	2.6 E12	1.0	1.0	2.6 E12
Kr-85	3.0 E07	1.0	1.0	3.0 E07
Kr-87	1.6E13	1.0	1.0	1.6 E13
Kr-88	8.5 E12	1.0	1.0	8.5 E12
Kr-89	4.8 E14	1.0	1.0	4.8 E14
Xe-131m	3.7 E09	1.0	1.0	3.7 E09
Xe-133m	8.1 E10	1.0	1.0	8.1 E10
Xe-133	1.0 E12	1.0	1.0	1.0 E12
Xe-135m	1.2 E14	1.0	1.0	1.2 E14
Xe-135	1.5 E13	1.0	1.0	1.5 E13
Xe-137	1.8 E15	1.0	1.0	1.8 E15
Xe-138	4.1 E14	1.0	1.0	4.1 E14
I-131	4.1 E11	0.25	1.0	1.0 E11
I-132	4.4 E13	0.25	1.0	1.1 E13
I-133	5.9 E12	0.25	1.0	1.5 E12
I-134	1.6 E14	0.25	1.0	4.0 E13
I-135	1.7 E13	0.25	1.0	4.2 E12
Pu-238	2.2 E07	1.0	1.0 E-05	2.2 E02
Pu-239	1.0 E06	1.0	1.0 E-05	1.0 E01
Pu-240	2.2 E06	1.0	1.0 E-05	2.2 E01
Pu-241	6.7 E08	1.0	1.0 E-05	6.7 E03
Pu-242	1.6 E04	1.0	1.0 E-05	1.6 E-01
Am-241	8.9 E05	1.0	1.0 E-05	8.9 E00

In addition to the dose from the plume of radioactive material, the onsite receptor will be exposed to a prompt gamma and neutron dose. The prompt dose to the onsite receptor was calculated using the formulae given in NRC 1979. The prompt dose to the receptors at 1.5 miles and at the site boundary will be negligible.

The prompt gamma dose is given by:

$$D_g = 2.1E-20 N d^{-2} e^{-3.4d}/f \quad (1)$$

where

- D_g = gamma dose (rem)
- N = number of fissions
- d = distance from source (km)
- f = reduction factor for 8 inches of concrete (2.5)

The prompt neutron dose is given by:

$$D_n = 7E-20 N d^{-2} e^{-5.2d}/f \quad (2)$$

where

- D_n = gamma dose (rem)
- N = number of fissions
- d = distance from source (km)
- f = reduction factor for 8 inches of concrete (2.3)

These equations were used to compute the onsite prompt dose assuming 1×10^{19} fissions and 100 m distance. The doses were converted to Sv by multiplying by 0.01.

Since the original analysis was performed in 1991, additional meteorology data have become available and the method used for the determination of X/Q' has changed, and revisions to the GENII code and the code libraries have been made. The source term is the same for this analysis, but a revised calculation has been made of the doses in order to be consistent with current methods.

Bounding atmospheric dispersion coefficients were calculated using the GXQ code (Hey 1994) as defined by NRC Regulatory Guide 1.145 (NRC 1982). The weather conditions are defined to not result in calculated doses being exceeded more than 0.5% of the time for each sector. The data used are nine year averaged data (1983-1991) from Hanford meteorology towers. The GXQ input and output is given in Appendix B. The distances to the site boundary were taken from Hey 1991. The distances and X/Q' 's are shown in Table 2.

Table 2 Distances and Atmospheric Dispersion Coefficients for FMEF

Sector	Onsite X/Q' 100 m from source s/m ²	X/Q' at 1.5 miles (2400 m) from source (s/m ²)	Distance to Offsite Receptor (m)	Offsite X/Q' s/m ²
S	3.17 E-02*	1.65 E-04*	8700	2.90 E-05*
SSW	2.32 E-02	1.21 E-04	7000	2.82 E-05
SW	1.46 E-02	7.53 E-05	7000	1.67 E-05
WSW	1.05 E-02	5.22 E-05	13100	3.92 E-06
W	1.43 E-02	7.38 E-05	22200	3.61 E-06
WNW	1.25 E-02	6.46 E-05	36400	1.83 E-06
NW	1.53 E-02	7.91 E-05	41900	1.65 E-06
NNW	2.37 E-02	1.24 E-04	41900	3.12 E-06
N	3.17 E-02*	1.65 E-04*	16200	1.32 E-05
NNE	2.62 E-02	1.37 E-04	13100	1.43 E-05
NE	1.68 E-02	8.79 E-05	9000	1.48 E-05
ENE	1.50 E-02	7.75 E-05	7600	1.53 E-05
E	1.73 E-02	9.04 E-05	7200	2.03 E-05**
ESE	1.61 E-02	8.42 E-05	7500	1.79 E-05
SE	2.66 E-02	1.39 E-04	8700	2.44 E-05
SSE	2.56 E-02	1.34 E-04	8800	2.32 E-05

* Maximum X/Q'

** X/Q' at 4.5 miles (7200 m) E

The Gaussian plume model assumes a point source and does not account for the effects of structures in the vicinity of the release. The presence of a large building will disturb the air flow and result in more dispersion than would occur with an isolated point source. This dispersion effect, which is referred to as building wake, is accounted for using a model developed for the MACCS code. The model is described in Hey 1994. Building cross section dimensions of 45.7 m (150 ft) wide by 29.9 m (98 ft) high have been used for the FMEF building. The X/Q's with building wake are given in Table 3.

Table 3 Distances and Atmospheric Dispersion Coefficients for FMEF with Building Wake - MACCS Model

Sector	Onsite X/Q' 100 m from Source (s/m ³)	X/Q' at 2400 m from Source (s/m ³)	Distance to Offsite Receptor (m)	Offsite X/Q' (s/m ³)
S	1.52 E-03	1.17 E-04*	8700	2.65 E-05*
SSW	1.28 E-03	8.66 E-05	7000	2.42 E-05
SW	1.16 E-03	5.87 E-05	7000	1.57 E-05
WSW	9.91 E-04	4.15 E-05	13100	3.75 E-06
W	1.30 E-03	6.07 E-05	22200	3.54 E-06
WNW	1.21 E-03	5.09 E-05	36400	1.81 E-06
NW	1.21 E-03	6.06 E-05	41900	1.63 E-06
NNW	1.25 E-03	7.92 E-05	41900	3.04 E-06
N	1.53 E-03*	1.17 E-04*	16200	1.26 E-05
NNE	1.41 E-03	9.14 E-05	13100	1.32 E-05
NE	1.38 E-03	8.35 E-05	9000	1.32 E-05
ENE	1.28 E-03	6.38 E-05	7600	1.45 E-05
E	1.47 E-03	8.96 E-05	7200	1.75 E-05**
ESE	1.33 E-03	7.89 E-05	7500	1.56 E-05
SE	1.36 E-03	9.06 E-05	8700	2.16 E-05
SSE	1.38 E-03	9.01 E-05	8800	2.06 E-05

* Maximum X/Q'

** X/Q' at 7200 m E

The assumed population and population weighted X/Q's out to 80 km (50 miles) are shown in Table 4.

Table 4 Population Weighted X/Q's for 400 Area

Sector	Population in Sector	Population Weighted X/Q' (Person-m ² /s)
S	26053	1.99 E-02
SSW	6982	7.01 E-02
SW	10363	4.79 E-02
WSW	28879	5.65 E-05
W	26415	5.67 E-03
WNW	5787	1.04 E-03
NW	3076	7.44 E-04
NNW	2945	7.92 E-04
N	18742	6.14 E-03
NNE	11095	4.36 E-03
NE	3453	1.83 E-03
ENE	3649	2.10 E-03
E	2800	1.68 E-03
ESE	3038	1.58 E-03
SE	51194	3.46 E-02
S	78757	6.26 E-02*

* Peak value

Doses were calculated using the GENII code (Napier 1988).

The pertinent libraries used were as follows:

GENII Dose Calculation Program (Version 1.485 3-Dec 90; Napier 1988)

GENII Default Parameter Values (28-Mar-90 RAP)

Radionuclide Master Library (11/15/90 PDR)

External Dose Factors for GENII in person Sv/yr per Bq/n (3-May-90 RAP)

Internal Dose Increments, Worst Case Solubilities, 7/23/93 PDR

400 AREA (HMS) - 10 M - Pasquill A - G (1983 - 1991 Average)

Population within 80 km of 400 area 1990, created 10/21/91 KR, Revised

2/4/92 KR (Schreckhise, 1993)

The GENII code has the option of calculating a X/Q' or calculating doses with a X/Q' which is input externally. The method used for current safety analyses is to calculate the X/Q's with GXQ consistent with NRC regulatory Guide 1.145 (NRC 1982), and input these X/Q's to GENII. However, GENII will not calculate decay in transit, or allow the use of the finite plume model

with externally input X/Q's. These models can have significant effects on the doses from a criticality. The following was therefore used to calculate doses. The doses were initially calculated using the X/Q' calculated by GENII. The doses were then multiplied by the GXQ X/Q' over the GENII X/Q'. Since the doses are proportional to the X/Q', this correction is an appropriate method of combining the decay in transit and finite plume models with the NRC regulatory guide 1.145 X/Q's for ground level releases.

The corrected dose at 100 m is illustrated as follows:

X/Q' calculated by GENII	=	0.046 s/m ³
Doses calculated by GENII using above X/Q':		
Inhalation	=	0.12 Sv
Submersion	=	0.063 Sv
Total	=	0.18 Sv

Onsite X/Q' with building wake calculated by GXQ = 0.00153 s/m³ (from Table 3)

Adjusted inhalation dose - 0.12 Sv x 0.00153/0.046 = 0.0040 Sv

Adjusted submersion dose - 0.063 Sv x 0.00153/0.046 = 0.0021 Sv

Adjusted total dose from plume - 0.18 Sv x 0.00153/0.046 = 0.0060 Sv

The onsite doses are shown in Table 5. The prompt gamma and neutron doses are added using Equations 1 and 2.

Table 5 Dose at Onsite Receptor

Dose Type	Dose (Sv)
Inhalation	4.0 E-03
Submersion	2.1 E-03
Prompt Gamma	6.0 E-02
Prompt Neutron	1.8 E-01
Total	2.5 E-01

Doses at other receptor locations are computed by multiplying the sum of the inhalation and submersion dose times the ratio of the X/Q's. X/Q's are taken from Table 3. The prompt gamma and neutron doses are negligible at the site boundary due to the distance to the site boundary. The doses at all five receptor locations are summarized in Table 6.

Table 6 Dose Summary - Criticality

Receptor Location	Dose (Sv)*
100 m	2.5 E-01
1.5 miles (2400 m)	4.6 E-04
4.5 miles (7200 m) E	6.9 E-05
Worst Case Site Boundary	1.0 E-04
Population Weighted	2.5 E-01*

* Population dose units are Person-Sv

The equivalent doses from Hey 1991 are 0.32 Sv onsite and 1.3×10^{-4} Sv at the worst case site boundary (offsite). The onsite and offsite doses with the new mix are slightly lower than the doses with the original FMEF mix. The new onsite and offsite doses are well below the risk guidelines for extremely unlikely events (1 Sv onsite and 0.25 Sv offsite). The differences are due to the revised meteorology data and analysis methods; the tritium mission has no effect on this accident.

Ingestion doses were calculated using GENII with a X/Q of 1 s/m^3 , and the results are presented in Appendix B. The ingestion doses at a specific location are computed by multiplying the doses with a unit X/Q by the appropriate X/Q corresponding to the receptor location. Since crops or livestock are not grown on the Hanford Reservation, doses are computed only at the site boundary. The ingestion results are summarized below:

Ingestion and ground contamination doses with a X/Q of 1 s/m^3 from the GENII case in Appendix B is 1.2 Sv for the winter scenario and for the autumn scenario is 36 Sv.

X/Q at worst case offsite receptor = $2.65 \times 10^{-5} \text{ s/m}^3$ (from Table 3)

Ingestion doses

winter $1.2 \text{ Sv} \times (2.65 \times 10^{-5} \text{ s/m}^3) / (1 \text{ s/m}^3) = 3.2 \times 10^{-5} \text{ Sv}$

autumn $36 \text{ Sv} \times (2.65 \times 10^{-5} \text{ s/m}^3) / (1 \text{ s/m}^3) = 9.5 \times 10^{-4} \text{ Sv}$

2.2 Explosion and Release of PuO_2

The FMEF PSAR (WHC 1992) reports onsite and offsite doses for a release of PuO_2 . The accident scenario assumed 100 g of PuO_2 is dispersed into the ventilation system. Two stages of HEPA filtration reduces the release from the facility to 0.001 g. The explosive force in this scenario is small enough that the building and the HEPA filter integrity are not damaged. The GENII calculation in Appendix B were performed for a 1 g release with a X/Q' including building wake effects. The GENII doses are multiplied by 0.001

since the release quantity is 0.001 g. Calculations were performed for both the current Pu mix and the FMEF PSAR mix. The Pu isotope distributions for both mixes are shown in wt% and Ci/g in Table 7.

Table 7 Plutonium Isotope Mixes for Original FMEF and Tritium Mission

Isotope	Original FMEF Mix		Tritium Mission Mix	
	Wt%	Ci/g of PuO ₂	Wt%	Ci/g of PuO ₂
Pu-236	3.00 E-07	1.41 E-06	0.00 E+00	0.00 E+00
Pu-238	6.00 E-02	9.06 E-03	3.29 E-03	4.97 E-04
Pu-239	8.13 E+02	4.45 E-02	9.30 E+02	5.09 E-02
Pu-240	1.66 E+01	3.32 E-02	5.96 E+00	1.19 E-02
Pu-241	1.34 E+00	1.22 E+00	4.19 E-02	3.81 E-02
Pu-242	3.50 E-01	1.22 E-05	1.00 E-02	3.48 E-07
Am-241	3.50 E-01	1.06 E-02	6.63 E-01	2.01 E-02

²³⁶Pu was included in the original FMEF isotope mix but was not included in the revised list. The absence of ²³⁶Pu will not have an impact since the ²³⁶Pu doses are negligible. The onsite dose at 100 m for the mix has been calculated for both mixes using the GENII code. The X/Q' with building wake of 0.00153 s/m³ was assumed for the onsite dose. Libraries used are listed below. PNL solubilities were used rather than worst case solubilities because the PNL solubility data corresponds to Pu oxide.

GENII Dose Calculation Program (Version 1.485 3-Dec 90; Napier 1988)
 GENII Default Parameter Values (28-Mar-90 RAP)
 Radionuclide Master Library (11/15/90 PDR)
 External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 RAP)
 PNL Solubilities, Yearly Dose Increments, 7/23/93 PDR
 400 AREA (HMS) - 10 M - Pasquill A - G (1983 - 1991 Average)
 Population within 80 km of 400 area 1990, created 10/21/91 KR,
 Revised 2/4/92 KR (Schreckhise 1993)

The doses for the two mixes are shown in Table 8.

Table 8 Dose Calculation for a Release of 0.001 g of PuO₂

Receptor Location	Onsite Dose for the Release of 0.001 g of the Original FMEF PuO ₂ Mix (Sv)	Onsite Dose for the Release of 0.001 g of the New PuO ₂ Tritium Mission Mix (Sv)
Onsite	1.9 E-04	1.4 E-04
1.5 miles 2400 m	1.5 E-05	1.1 E-05
4.5 miles east	2.2 E-06	1.6 E-06
Worst Case Site Boundary	3.3 E-06	2.4 E-06
Population Weighted Dose*	7.7 E-03	5.7 E-03

*Population weighted dose units are person-Sv

It can be seen in Table 8 that the doses for the original Pu mix are larger than the doses for the tritium mission mix. The release mechanisms and release fractions remain constant from the original PSAR analyses. The doses from Hey 1991 are 1.0×10^{-5} Sv onsite and 3.6×10^{-6} Sv at the worst case site boundary. The new doses are slightly smaller. Doses are well below the risk guidelines of 0.25 Sv onsite and 0.05 Sv offsite for unlikely events. It can therefore be concluded that the dose in the PSAR bound potential releases of PuO₂ powder that might occur as a result of the tritium mission.

This calculation was done for pure PuO₂ powders. However, doses from mixed oxide are also bounded by the FMEF analyses, since the FMEF analyses considered up to 50% enrichment. The 50% Pu enrichment bounds the peak proposed tritium mission enrichment of 42%.

Ingestion doses were also computed for each Pu mix assuming a releases of 0.001 g as was done for the inhalation dose case. Ingestion doses were calculated using GENII for a release of 1 g with a X/Q of 1 s/m³, and the results are presented in Appendix B. The ingestion doses at a specific location are computed by multiplying the doses with a unit X/Q by the appropriate X/Q corresponding to the receptor location. Since crops or livestock are not grown on the Hanford Reservation, doses are computed only at the site boundary. The ingestion results are summarized below.

Dose with a X/Q of 1 s/m³, 1 g release:

winter scenario	original Pu mix	15 rem	= 0.15 Sv
	tritium mission mix	9.8 rem	= 0.098 Sv
autumn scenario	original Pu mix	1.2×10^4 rem	= 120 Sv
	tritium mission mix	8.6×10^3 rem	= 86 Sv

Dose at site boundary ($X/Q = 2.65 \times 10^{-5} \text{ s/m}^3$ from Table 3),
0.001 g release:

winter scenario	original Pu mix	$4.0 \times 10^{-9} \text{ Sv}$
	tritium mission mix	$2.6 \times 10^{-9} \text{ Sv}$
autumn scenario	original Pu mix	$3.2 \times 10^{-6} \text{ Sv}$
	tritium mission mix	$2.3 \times 10^{-6} \text{ Sv}$

The ingestion dose for the tritium mission Pu mix is lower than the ingestion dose for the existing mix. The conclusion that the original Pu isotope mix bounds the tritium mission Pu isotope mix is also true for ingestion doses.

2.3 Tornado Analysis

The analysis for the tornado in the PSAR concluded that there would be no releases from FMEF/FAA due to a tornado event. This conclusion is not affected by the tritium mission since the design and operating conditions assumed in the original FMEF analysis are unchanged. The conclusions in the FMEF PSAR are still valid.

3.0 References

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Schreckhise, R. G. 1993, *Recommended Environmental Dose Calculation Methods and Hanford Specific Parameters*, PNL 3777, Pacific Northwest Laboratory, Richland, Wa.

WHC 1992, *Fuels and Material Examination Facility/Fuel Assembly Area Preliminary Safety Analysis Report*, SD-FM-SAR-00002, Westinghouse Hanford Company, Richland, Wa.

Appendix A GXQ Computer Code Outputs

HNF-SD-FF-CN-012, Rev 0

Current Input File Name: fmef2.1N

GXQ Version 4.0
December 19, 1994

General Purpose Atmospheric Dispersion Code
Produced by Westinghouse Hanford Company

Users Guide documented in WHC-SD-GN-SWD-30002 Rev. 1.
Validation documented in WHC-SD-GN-SWD-30003 Rev. 1.

Code Custodian Is: Brit E. Hey
Westinghouse Hanford Company
P.O. Box 1970
Richland, WA 99352
(509) 376-2921

Run Date = 08/01/97
Run Time = 10:39:58.90

INPUT ECHO:

FMEF 99.5 sector distances from Hey 1991

c GXQ Version 4.0 Input File

c mode
1

c MODE CHOICE:

c mode = 1 then X/Q based on Hanford site specific meteorology
c mode = 2 then X/Q based on atmospheric stability class and wind speed
c mode = 3 then X/Q plot file is created

c LOGICAL CHOICES:

c
ifox inorm icdf ichk isite cipop
T F F F F F

c ifox = t then joint frequency used to compute frequency to exceed X/Q
c = f then joint frequency used to compute annual average X/Q
c inorm = t then joint frequency data is normalized (as in GENII)
c = f then joint frequency data is un-normalized
c icdf = t then cumulative distribution file created (CDF.OUT)
c = f then no cumulative distribution file created
c ichk = t then X/Q parameter print option turned on
c = f then no parameter print
c isite = t then X/Q based on joint frequency data for all 16 sectors
c = f then X/Q based on joint frequency data of individual sectors
c ipop = t then X/Q is population weighted
c = f then no population weighting

c X/Q AND WIND SPEED ADJUSTMENT MODELS:

c ipuff idep isrc iwind
0 0 0 0

c DIFFUSION COEFFICIENT ADJUSTMENT MODELS:

c iwake ipm iflow ientr
0 0 0 0

c EFFECTIVE RELEASE HEIGHT ADJUSTMENT MODELS:

c (irise igrnd)iwash igrav
0 0 0 0

c ipuff = 1 then X/Q calculated using puff model
c = 0 then X/Q calculated using default continuous plume model
c idep = 1 then plume depletion model turned on (Chamberlain model)
c isrc = 1 then X/Q multiplied by scalar
c = 2 then X/Q adjusted by wind speed function
c iwind = 1 then wind speed corrected for plume height
c iwake = 1 then NRC RG 1.145 building wake model turned on
c = 2 then MACCS virtual distance building wake model turned on

HNF-SD-FF-CN-012, Rev 0

```

c ipm = 1 then NRC RG 1.145 plume meander model turned on
c      = 2 then 5th Power Law plume meander model turned on
c      = 3 then sector average model turned on
c iflow = 1 then sigmas adjusted for volume flow rate
c cintr = 1 then method of Pasquill used to account for entrainment
c c rise = 1 then MACCS buoyant plume rise model turned on
c      = 2 then ISC2 momentum/buoyancy plume rise model turned on
c cigrnd = 1 then Mills buoyant plume rise modification for ground effects
c ciwash = 1 then stack downwash model turned on
c cigrav = 1 then gravitational settling model turned on
c      = 0 unless specified otherwise, 0 turns model off
c
c PARAMETER INPUT:
c
c      release      anemometer      mixing      frequency
c      height      height          height      to
c      hs(m)       ha(m)          hm(m)       exceed
c                                     Cx(%)
c
c      0.00000E+00      1.00000E+01      1.00000E+03      5.00000E-01
c
c      initial      initial      release      deposition      gravitational
c      plume        plume        duration     velocity        settling
c      width        height       trd(hr)      vd(m/s)         velocity
c      Wb(m)        Hb(m)                                     vg(m/s)
c
c      4.57000E+01      2.99000E+01      0.00000E+00      1.00000E-03      1.00000E-03
c
c      ambient      initial      initial      release      convective
c      temperature  plume        plume        diameter   heat release
c      Tamb(C)      T0(C)        flow rate    d(m)         rate(1)
c                                     V0(m3/s)
c
c      2.00000E+01      2.20000E+01      1.00000E+00      1.00000E+00      0.00000E+00
c
c (1) If zero then buoyant flux based on plume/ambient temperature difference.
c
c      X/Q          Wind
c      scaling      Speed
c      factor        Exponent
c      c(?)          a(?)
c
c      1.00000E+00      7.80000E-01
c
c RECEPTOR DEPENDENT DATA (no line limit)
c FOR MODE make RECEPTOR DEPENDENT DATA
c 1 (site specific) sector distance receptor-height
c 2 (by class & wind speed) class windspeed distance offset receptor-height
c 3 (create plot file) class windspeed xmax imax ymax jmax xqmin power
c
c RECEPTOR PARAMETER DESCRIPTION
c sector = 0, 1, 2... (all, S, SSW, etc.)
c distance = receptor distance (m)
c receptor height = height of receptor (m)
c class = 1, 2, 3, 4, 5, 6, 7 (P-G stability class A, B, C, D, E, F, G)
c windspeed = anemometer wind speed (m/s)
c offset = offset from plume centerline (m)
c xmax = maximum distance to plot or calculate to (m)
c imax = distance intervals
c ymax = maximum offset to plot (m)
c jmax = offset intervals
c xqmin = minimum scaled X/Q to calculate
c power = exponent in power function step size
c
MODE:
Site specific X/Q calculated.

LOGICAL CHOICES:
Joint frequency used to calculate X/Q based on frequency of exceedance.
No normalization of joint frequency.
X/Q calculated for single sector.

```

HNF-SD-FF-CN-012, Rev 0

MODELS SELECTED:
Default Gaussian plume model selected.

WARNING/ERROR MESSAGES:

JOINT FREQUENCY DATA:
400 AREA (FFTF) - 10 M - Pasquill A - G (1983 - 1991 Average)
Created 8/26/92 KR

FMEF 99.5 sector distances from Hey 1991

SECTOR	DISTANCE (m)	RECEPT HEIGHT (m)	SECT. FREQ. (%)	POPULATION	TOTAL POPULATION SCALED X/0 (s/m3)	AVERAGE INDIVIDUAL SCALED X/0 (s/m3)	ATM. STAB. CLASS	WIND SPEED (m/s)
S	100	0	7.29	1	3.17E-02	3.17E-02	F	0.89
SSW	100	0	5.75	1	2.32E-02	2.32E-02	G	2.65
SW	100	0	3.41	1	1.46E-02	1.46E-02	E	0.89
WSW	100	0	2.22	1	1.05E-02	1.05E-02	F	2.65
W	100	0	2.87	1	1.43E-02	1.43E-02	E	0.89
WNW	100	0	2.65	1	1.25E-02	1.25E-02	F	2.65
NW	100	0	4.08	1	1.53E-02	1.53E-02	E	0.89
NNW	100	0	7.41	1	2.37E-02	2.37E-02	G	2.65
N	100	0	13.26	1	3.17E-02	3.17E-02	F	0.89
NNE	100	0	12.15	1	2.62E-02	2.62E-02	G	2.65
NE	100	0	6.95	1	1.68E-02	1.68E-02	G	4.70
ENE	100	0	3.94	1	1.50E-02	1.50E-02	E	0.89
E	100	0	5.45	1	1.73E-02	1.73E-02	G	4.70
ESE	100	0	6.48	1	1.61E-02	1.61E-02	G	4.70
SE	100	0	9.75	1	2.66E-02	2.66E-02	G	2.65
SSE	100	0	6.32	1	2.56E-02	2.56E-02	G	2.65
S	2400	0	7.29	1	1.65E-04	1.65E-04	F	0.89
SSW	2400	0	5.75	1	1.21E-04	1.21E-04	G	2.65
SW	2400	0	3.41	1	7.53E-05	7.53E-05	E	0.89
WSW	2400	0	2.22	1	5.22E-05	5.22E-05	F	2.65
W	2400	0	2.87	1	7.38E-05	7.38E-05	E	0.89
WNW	2400	0	2.65	1	6.46E-05	6.46E-05	F	2.65
NW	2400	0	4.08	1	7.91E-05	7.91E-05	E	0.89
NNW	2400	0	7.41	1	1.24E-04	1.24E-04	G	2.65
N	2400	0	13.26	1	1.65E-04	1.65E-04	F	0.89
NNE	2400	0	12.15	1	1.37E-04	1.37E-04	G	2.65
NE	2400	0	6.95	1	8.79E-05	8.79E-05	G	4.70
ENE	2400	0	3.94	1	7.75E-05	7.75E-05	E	0.89
E	2400	0	5.45	1	9.04E-05	9.04E-05	G	4.70
ESE	2400	0	6.48	1	8.42E-05	8.42E-05	G	4.70
SE	2400	0	9.75	1	1.39E-04	1.39E-04	G	2.65
SSE	2400	0	6.32	1	1.34E-04	1.34E-04	G	2.65
S	8700	0	7.29	1	2.90E-05	2.90E-05	F	0.89
SSW	7000	0	5.75	1	2.82E-05	2.82E-05	G	2.65
SW	7000	0	3.41	1	1.67E-05	1.67E-05	E	0.89
WSW	13100	0	2.22	1	3.92E-06	3.92E-06	F	4.70
W	22200	0	2.87	1	3.61E-06	3.61E-06	E	0.89
WNW	36400	0	2.65	1	1.83E-06	1.83E-06	F	2.65
NW	41900	0	4.08	1	1.65E-06	1.65E-06	E	0.89
NNW	41900	0	7.41	1	3.12E-06	3.12E-06	G	2.65
N	16200	0	13.26	1	1.32E-05	1.32E-05	F	0.89
NNE	13100	0	12.15	1	1.43E-05	1.43E-05	G	2.65
NE	9000	0	6.95	1	1.48E-05	1.48E-05	G	4.70
ENE	7600	0	3.94	1	1.53E-05	1.53E-05	E	0.89
E	7200	0	5.45	1	2.03E-05	2.03E-05	G	4.70
ESE	7500	0	6.48	1	1.79E-05	1.79E-05	G	4.70
SE	8700	0	9.75	1	2.44E-05	2.44E-05	G	2.65
SSE	8800	0	6.32	1	2.32E-05	2.32E-05	G	2.65

HNF-SD-FF-CN-012, Rev 0

Current Input File Name: fmef4.IN

GXQ Version 4.0
December 19, 1994

General Purpose Atmospheric Dispersion Code
Produced by Westinghouse Hanford Company

Users Guide documented in WHC-SD-GN-SWD-30002 Rev. 1.
Validation documented in WHC-SD-GN-SWD-30003 Rev. 1.
Code Custodian is: Brit E. Hey
Westinghouse Hanford Company
P.O. Box 1970
Richland, WA 99352
(509) 376-2921

Run Date = 08/01/97
Run Time = 10:48:38.00

INPUT ECHO:

FMEF 99.5 sector with MACCS BW, distances from Hey 1991
c GXQ Version 4.0 Input File
c mode
1
c
c MODE CHOICE:
c mode = 1 then X/Q based on Hanford site specific meteorology
c mode = 2 then X/Q based on atmospheric stability class and wind speed
c mode = 3 then X/Q plot file is created
c
c LOGICAL CHOICES:
c ifox inorm icdf ichk isite ipop
T F F F F F
c ifox = t then joint frequency used to compute frequency to exceed X/Q
c = f then joint frequency used to compute annual average X/Q
c inorm = t then joint frequency data is normalized (as in GENII)
c = f then joint frequency data is un-normalized
c icdf = t then cumulative distribution file created (CDF.OUT)
c = f then no cumulative distribution file created
c ichk = t then X/Q parameter print option turned on
c = f then no parameter print
c isite = t then X/Q based on joint frequency data for all 16 sectors
c = f then X/Q based on joint frequency data of individual sectors
c ipop = t then X/Q is population weighted
c = f then no population weighting
c
c X/Q AND WIND SPEED ADJUSTMENT MODELS:
c ipuff idep isrc iwind
0 0 0 0
c DIFFUSION COEFFICIENT ADJUSTMENT MODELS:
c iwake ipm iflow ientr
2 0 0 0
c EFFECTIVE RELEASE HEIGHT ADJUSTMENT MODELS:
c (irise igrnd)iwash igrav
0 0 0 0
c ipuff = 1 then X/Q calculated using puff model
c = 0 then X/Q calculated using default continuous plume model
c idep = 1 then plume depletion model turned on (Chamberlain model)
c isrc = 1 then X/Q multiplied by scalar
c = 2 then X/Q adjusted by wind speed function
c iwind = 1 then wind speed corrected for plume height
c iwake = 1 then NRC RG 1.145 building wake model turned on
c = 2 then MACCS virtual distance building wake model turned on
c ipm = 1 then NRC RG 1.145 plume meander model turned on

HNF-SD-FF-CN-012, Rev 0

```

c      = 2 then 5th Power Law plume meander model turned on
c      = 3 then sector average model turned on
c iflow = 1 then sigmas adjusted for volume flow rate
c ientr = 1 then method of Pasquill used to account for entrainment
c irise = 1 then MACCS buoyant plume rise model turned on
c      = 2 then ISC2 momentum/buoyancy plume rise model turned on
c igrnd = 1 then Mills buoyant plume rise modification for ground effects
c iwash = 1 then stack downwash model turned on
c igrav = 1 then gravitational settling model turned on
c      = 0 unless specified otherwise, 0 turns model off
c
c PARAMETER INPUT:
c
c      release      reference      mixing      frequency
c      height      anemometer     height     to
c      hs(m)       ha(m)          hm(m)      exceed
c                                     Cx(%)
c
c      0.00000E+00      1.00000E+01      1.00000E+03      5.00000E-01
c
c      initial      initial      release      deposition      gravitational
c      plume        height      duration     velocity        settling
c      Wb(m)        Hb(m)        trd(hr)      vd(m/s)         velocity
c                                     vg(m/s)
c
c      4.57000E+01      2.99000E+01      0.00000E+00      1.00000E-03      1.00000E-03
c
c      ambient      initial      initial      release      convective
c      temperature  plume        plume        diameter   heat release
c      Tamb(C)      T0(C)        flow rate   d(m)        rate(1)
c                                     qh(w)
c
c      2.00000E+01      2.20000E+01      1.00000E+00      1.00000E+00      0.00000E+00
c
c (1) If zero then buoyant flux based on plume/ambient temperature difference.
c
c      X/Q          Wind
c      scaling      Speed
c      factor        Exponent
c      c(?)         a(?)
c
c      1.00000E+00      7.80000E-01
c
c RECEPTOR DEPENDENT DATA (no line limit)
c FOR MODE make RECEPTOR DEPENDENT DATA
c 1 (site specific) sector distance receptor-height
c 2 (by class & wind speed) class windspeed distance offset receptor-height
c 3 (create plot file) class windspeed xmax imax ymax jmax xqmin power
c
c RECEPTOR PARAMETER DESCRIPTION
c sector = 0, 1, 2... (all, S, SSW, etc.)
c distance = receptor distance (m)
c receptor height = height of receptor (m)
c class = 1, 2, 3, 4, 5, 6, 7 (P-G stability class A, B, C, D, E, F, G)
c windspeed = anemometer wind speed (m/s)
c offset = offset from plume centerline (m)
c xmax = maximum distance to plot or calculate to (m)
c imax = distance intervals
c ymax = maximum offset to plot (m)
c jmax = offset intervals
c xqmin = minimum scaled X/Q to calculate
c power = exponent in power function step size
c
MODE:
Site specific X/Q calculated.
LOGICAL CHOICES:
Joint frequency used to calculate X/Q based on frequency of exceedance.
No normalization of joint frequency.
X/Q calculated for single sector.

```

HNF-SD-FF-CN-012, Rev 0

MODELS SELECTED:
MACCS Virtual source building wake model selected.
Default Gaussian plume model selected.

WARNING/ERROR MESSAGES:

JOINT FREQUENCY DATA:
400 AREA (FFTF) - 10 M - Pasquill A - G (1983 - 1991 Average)
Created 8/26/92 KR

FMEF 99.5 sector with MACCS BW, distances from Hey 1991

SECTOR	DISTANCE (m)	RECEIPT HEIGHT (m)	SECT. FREQ. (%)	POPULATION	TOTAL POPULATION SCALED X/Q (s/m3)	AVERAGE INDIVIDUAL SCALED X/Q (s/m3)	ATM. STAB. CLASS	WIND SPEED (m/s)
S	100	0	7.29	1	1.52E-03	1.52E-03	E	0.89
SSW	100	0	5.75	1	1.28E-03	1.28E-03	E	0.89
SW	100	0	3.41	1	1.16E-03	1.16E-03	D	0.89
WSW	100	0	2.22	1	9.91E-04	9.91E-04	D	0.89
W	100	0	2.87	1	1.30E-03	1.30E-03	E	0.89
WNW	100	0	2.65	1	1.21E-03	1.21E-03	D	0.89
NW	100	0	4.08	1	1.21E-03	1.21E-03	D	0.89
NNW	100	0	7.41	1	1.25E-03	1.25E-03	D	0.89
N	100	0	13.26	1	1.53E-03	1.53E-03	F	0.89
NNE	100	0	12.15	1	1.41E-03	1.41E-03	E	0.89
NE	100	0	6.95	1	1.38E-03	1.38E-03	E	0.89
ENE	100	0	3.94	1	1.28E-03	1.28E-03	E	0.89
E	100	0	5.45	1	1.47E-03	1.47E-03	E	0.89
ESE	100	0	6.48	1	1.33E-03	1.33E-03	E	0.89
SE	100	0	9.75	1	1.36E-03	1.36E-03	E	0.89
SSE	100	0	6.32	1	1.38E-03	1.38E-03	E	0.89
S	2400	0	7.29	1	1.17E-04	1.17E-04	F	0.89
SSW	2400	0	5.75	1	8.66E-05	8.66E-05	G	2.65
SW	2400	0	3.41	1	5.87E-05	5.87E-05	G	4.70
WSW	2400	0	2.22	1	4.15E-05	4.15E-05	F	2.65
W	2400	0	2.87	1	6.07E-05	6.07E-05	E	0.89
WNW	2400	0	2.65	1	5.09E-05	5.09E-05	F	2.65
NW	2400	0	4.08	1	6.06E-05	6.06E-05	E	0.89
NNW	2400	0	7.41	1	7.92E-05	7.92E-05	E	0.89
N	2400	0	13.26	1	1.17E-04	1.17E-04	F	0.89
NNE	2400	0	12.15	1	9.14E-05	9.14E-05	G	2.65
NE	2400	0	6.95	1	8.35E-05	8.35E-05	G	2.65
ENE	2400	0	3.94	1	6.38E-05	6.38E-05	E	0.89
E	2400	0	5.45	1	8.96E-05	8.96E-05	G	2.65
ESE	2400	0	6.48	1	7.89E-05	7.89E-05	E	0.89
SE	2400	0	9.75	1	9.06E-05	9.06E-05	G	2.65
SSE	2400	0	6.32	1	9.01E-05	9.01E-05	G	2.65
S	8700	0	7.29	1	2.65E-05	2.65E-05	F	0.89
SSW	7000	0	5.75	1	2.42E-05	2.42E-05	G	2.65
SW	7000	0	3.41	1	1.57E-05	1.57E-05	E	0.89
WSW	13100	0	2.22	1	3.75E-06	3.75E-06	F	4.70
W	22200	0	2.87	1	3.54E-06	3.54E-06	E	0.89
WNW	36400	0	2.65	1	1.81E-06	1.81E-06	F	2.65
NW	41900	0	4.08	1	1.63E-06	1.63E-06	E	0.89
NNW	41900	0	7.41	1	3.04E-06	3.04E-06	G	2.65
N	16200	0	13.26	1	1.26E-05	1.26E-05	F	0.89
NNE	13100	0	12.15	1	1.32E-05	1.32E-05	G	2.65
NE	9000	0	6.95	1	1.32E-05	1.32E-05	G	4.70
ENE	7600	0	3.94	1	1.45E-05	1.45E-05	E	0.89
E	7200	0	5.45	1	1.75E-05	1.75E-05	G	4.70
ESE	7500	0	6.48	1	1.56E-05	1.56E-05	G	4.70
SE	8700	0	9.75	1	2.16E-05	2.16E-05	G	2.65
SSE	8800	0	6.32	1	2.06E-05	2.06E-05	G	2.65

HNF-SD-FF-CN-012, Rev 0

Current Input File Name: fmfep.IN

GXQ Version 4.0
December 19, 1994

General Purpose Atmospheric Dispersion Code
Produced by Westinghouse Hanford Company

Users Guide documented in WHC-SD-GN-SWD-30002 Rev. 1.
Validation documented in WHC-SD-GN-SWD-30003 Rev. 1.

Code Custodian is: Brit E. Hey
Westinghouse Hanford Company
P.O. Box 1970
Richland, WA 99352
(509) 376-2921

Run Date = 07/30/97
Run Time = 11:29:20.81

INPUT ECHO:

FMEF 99.5% population weighted, 50 mile distances
c GXQ Version 4.0 Input File
c mode
1
c
c MODE CHOICE:
c mode = 1 then X/Q based on Hanford site specific meteorology
c mode = 2 then X/Q based on atmospheric stability class and wind speed
c mode = 3 then X/Q plot file is created
c
c LOGICAL CHOICES:
c ifox inorm icdf ichk isite ipop
c T F F F F T
c ifox = t then joint frequency used to compute frequency to exceed X/Q
c = f then joint frequency used to compute annual average X/Q
c inorm = t then joint frequency data is normalized (as in GENII)
c = f then joint frequency data is un-normalized
c icdf = t then cumulative distribution file created (CDF.OUT)
c = f then no cumulative distribution file created
c ichk = t then X/Q parameter print option turned on
c = f then no parameter print
c isite = t then X/Q based on joint frequency data for all 16 sectors
c = f then X/Q based on joint frequency data of individual sectors
c ipop = t then X/Q is population weighted
c = f then no population weighting
c
c X/Q AND WIND SPEED ADJUSTMENT MODELS:
c ipuff idep isrc iwind
0 0 0 0
c DIFFUSION COEFFICIENT ADJUSTMENT MODELS:
c iwake ipm iflow ientr
0 3 0 0
c EFFECTIVE RELEASE HEIGHT ADJUSTMENT MODELS:
c (irise igrnd)iwash igrav
0 0 0 0
c ipuff = 1 then X/Q calculated using puff model
c = 0 then X/Q calculated using default continuous plume model
c idep = 1 then plume depletion model turned on (Chamberlain model)
c isrc = 1 then X/Q multiplied by scalar
c = 2 then X/Q adjusted by wind speed function
c iwind = 1 then wind speed corrected for plume height
c iwake = 1 then NRC RG 1.145 building wake model turned on
c = 2 then MACCS virtual distance building wake model turned on
c ipm = 1 then NRC RG 1.145 plume meander model turned on

HNF-SD-FF-CN-012, Rev 0

```

c      = 2 then 5th Power Law plume meander model turned on
c      = 3 then sector average model turned on
c iflow = 1 then sigmas adjusted for volume flow rate
c ientr = 1 then method of Pasquill used to account for entrainment
c irise = 1 then MACCS buoyant plume rise model turned on
c      = 2 then ISC2 momentum/buoyancy plume rise model turned on
c igrnd = 1 then Mills buoyant plume rise modification for ground effects
c iwash = 1 then stack downwash model turned on
c igrav = 1 then gravitational settling model turned on
c      = 0 unless specified otherwise, 0 turns model off

c
c PARAMETER INPUT:
c
c      release      reference      mixing      frequency
c      height      anemometer      height      to
c      hs(m)        height          height      exceed
c                  ha(m)           hm(m)      Cx(%)
c
c      0.00000E+00  1.00000E+01  1.00000E+03  5.00000E-01
c
c      initial      initial      release      deposition      gravitational
c      plume        height      duration      velocity      settling
c      width        Hb(m)        trd(hr)      vd(m/s)        velocity
c      Wb(m)                vd(m/s)        vg(m/s)
c
c      4.57000E+01  2.99000E+01  0.00000E+00  1.00000E-03  1.00000E-03
c
c      ambient      initial      initial      release      convective
c      temperature  plume        plume        diameter   heat release
c      Tamb(C)      T0(C)        flow rate    d(m)        rate(1)
c                  V0(m3/s)      d(m)        qh(w)
c
c      2.00000E+01  2.20000E+01  1.00000E+00  1.00000E+00  0.00000E+00
c
c (1) If zero then buoyant flux based on plume/ambient temperature difference.
c
c      X/Q          Wind
c      scaling      Speed
c      factor       Exponent
c      c(?)         a(?)
c
c      1.00000E+00  7.80000E-01
c
c RECEPTOR DEPENDENT DATA (no line limit)
c FOR MODE make RECEPTOR DEPENDENT DATA
c 1 (site specific) sector distance receptor-height
c 2 (by class & wind speed) class windspeed distance offset receptor-height
c 3 (create plot file) class windspeed xmax lmax ymax jmax xqmin power
c
c RECEPTOR PARAMETER DESCRIPTION
c sector = 0, 1, 2... (all, S, SSW, etc.)
c distance = receptor distance (m)
c receptor height = height of receptor (m)
c class = 1, 2, 3, 4, 5, 6, 7 (P-G stability class A, B, C, D, E, F, G)
c windspeed = anemometer wind speed (m/s)
c offset = offset from plume centerline (m)
c xmax = maximum distance to plot or calculate to (m)
c lmax = distance intervals
c ymax = maximum offset to plot (m)
c jmax = offset intervals
c xqmin = minimum scaled X/Q to calculate
c power = exponent in power function step size

MODE:
Site specific X/Q calculated.

LOGICAL CHOICES:
Joint frequency used to calculate X/Q based on frequency of exceedance.
No normalization of joint frequency.
X/Q calculated for single sector.
X/Q is population weighted.

```

HNF-SD-FF-CN-012, Rev 0

MODELS SELECTED:

Sector average model selected.

Default Gaussian plume model selected.

WARNING/ERROR MESSAGES:

JOINT FREQUENCY DATA:

400 AREA (FFTF) - 10 M - Pasquill A - G (1983 - 1991 Average)

Created 8/26/92 KR

POPULATION DATA:

Population within 80 km of the Hanford 400 Area, 1990 Census (Beck, et al 1991)

Created 10/21/91 KR, Revised 2/4/92 KR

FMEF 99.5% population weighted, 50 mile distances

SECTOR	DISTANCE (m)	RECEIPT HEIGHT (m)	SECT. FREQ. (%)	POPULATION	TOTAL POPULATION	AVERAGE INDIVIDUAL	ATM. STAB. CLASS	WIND SPEED (m/s)
					SCALED X/Q (s/m3)	SCALED X/Q (s/m3)		
S	80000	0	7.29	26053	1.99E-02	7.64E-07	F	0.89
SSW	80000	0	5.75	6982	7.01E-03	1.00E-06	E	0.89
SW	80000	0	3.41	10363	4.79E-03	4.62E-07	E	0.89
WSW	80000	0	2.22	28879	5.65E-03	1.96E-07	F	2.65
W	80000	0	2.87	26415	5.67E-03	2.15E-07	E	0.89
WNW	80000	0	2.65	5787	1.04E-03	1.80E-07	F	2.65
NW	80000	0	4.08	3076	7.44E-04	2.42E-07	E	0.89
NNW	80000	0	7.41	2945	7.92E-04	2.69E-07	E	0.89
N	80000	0	13.26	18742	6.14E-03	3.28E-07	F	0.89
NNE	80000	0	12.15	11095	4.36E-03	3.93E-07	G	2.65
NE	80000	0	6.95	3453	1.83E-03	5.30E-07	G	2.65
ENE	80000	0	3.94	3649	2.10E-03	5.75E-07	E	0.89
E	80000	0	5.45	2800	1.68E-03	6.01E-07	G	2.65
ESE	80000	0	6.48	3038	1.58E-03	5.20E-07	E	0.89
SE	80000	0	9.75	51194	3.46E-02	6.75E-07	G	2.65
SSE	80000	0	6.32	78757	6.26E-02	7.95E-07	G	2.65

HNF-SD-FF-CN-012, Rev 0

Appendix B GENII Output Files

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: FMEF Reg guide criticality onsite GENII calculated X/Qs finite plume

Executed on: 08/01/97 at 11:30:49

Page A. 1

This is a far-field (wide-scale release, multiple site) scenario.
Release is acute
Individual dose

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Inhalation uptake

THE FOLLOWING TIMES ARE USED:
Intake ends after (yr): 1.0
Dose calculations ends after (yr): 50.0

===== FILENAMES AND TITLES OF FILES/LIBRARIES USED =====

Input file name: \GENII\FMEFCRT2.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
400 AREA (FFTF) - 10 M - Pasquill A - G (1983 - 1991 Average)

=====

-----Release Terms-----				
Release	Surface Buried			
Radio-	Air	Water	Source	
nuclide	Bq/yr	Bq/yr	Bq/m3	
KR83M	4.1E+12	0.0E+00	0.0E+00	
KR85M	2.6E+12	0.0E+00	0.0E+00	
KR85	3.0E+07	0.0E+00	0.0E+00	
KR87	1.6E+13	0.0E+00	0.0E+00	
KR88	8.5E+12	0.0E+00	0.0E+00	
KR89	4.0E+14	0.0E+00	0.0E+00	
XE131M	3.7E+09	0.0E+00	0.0E+00	
XE133M	8.1E+10	0.0E+00	0.0E+00	
XE133	1.0E+12	0.0E+00	0.0E+00	
XE135M	1.2E+14	0.0E+00	0.0E+00	
XE135	1.5E+13	0.0E+00	0.0E+00	
XE137	1.0E+15	0.0E+00	0.0E+00	
XE138	4.1E+14	0.0E+00	0.0E+00	
I 131	1.0E+11	0.0E+00	0.0E+00	
I 132	1.1E+13	0.0E+00	0.0E+00	
I 133	1.5E+12	0.0E+00	0.0E+00	
I 134	4.0E+13	0.0E+00	0.0E+00	
I 135	4.2E+12	0.0E+00	0.0E+00	
PU238	2.2E+02	0.0E+00	0.0E+00	
PU239	1.0E+01	0.0E+00	0.0E+00	
PU240	2.2E+01	0.0E+00	0.0E+00	
PU241	6.7E+03	0.0E+00	0.0E+00	
PU242	1.6E+01	0.0E+00	0.0E+00	
AM241	8.9E+00	0.0E+00	0.0E+00	

===== AIR TRANSPORT =====
Joint frequency data input.
1.0E+02 Maximum individual distance from release point (m)
5.0E+00 Maximum individual sector index (Wind Toward W)

HNF-SD-FF-CN-012, Rev 0

Ground level release.

```
===== EXTERNAL EXPOSURE =====
1.0E+00 Fraction of time spent in cloud

===== INHALATION =====
Resuspension not considered
=====
```

Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

=====

HNF-SD-FF-CN-012, Rev 0

 GENII Dose Calculation Program
 (Version 1.485 3-Dec-90)

Case title: FMEF Reg guide criticality onsite GENII calculated X/Qs fini
 te plume

Executed on: 08/01/97 at 11:30:49

Page A. 2

Sector Index: 5
 Probability: 5.0E-02

Distance (m)	Travel Time (sec)	Energy 0.15 (MeV)	Energy 0.4 (MeV)	Energy 0.75 (MeV)	Energy 1.25 (MeV)	Energy 1.75 (MeV)	Energy 2.25 (MeV)
100.	112.	2.2E-04	2.3E-04	2.4E-04	2.2E-04	2.0E-04	1.7E-04

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: FMEF Reg guide criticality onsite GENII calculated X/Qs fini
 te plume

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Page B. 1

4.6E-02 Individual E/Q

HNF-SD-FF-CN-012, Rev 0

----- GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: FMEF Reg guide criticality onsite GENII calculated X/Qs fini
 te plume

Executed on: 08/01/97 at 11:31:15

Page C. 1

Acute release
 Uptake/exposure period: 1.0
 Dose commitment period: 50.0
 Dose units: Sv

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	7.5E-03	2.5E-01	1.9E-03
Breast	1.0E-02	1.5E-01	1.5E-03
R Marrow	1.0E-02	1.2E-01	1.2E-03
Lung	2.6E-01	1.2E-01	3.1E-02
Thyroid	2.5E+00	3.0E-02	7.4E-02
Bone Sur	9.1E-03	3.0E-02	2.7E-04
Stomach	1.1E-01	6.0E-02	6.3E-03
UL Int.	9.4E-03	6.0E-02	5.6E-04
S Int.	9.3E-03	6.0E-02	5.6E-04
LL Int.	8.3E-03	6.0E-02	5.0E-04
Liver	2.1E-06	6.0E-02	1.3E-07
Internal Effective Dose Equivalent			1.2E-01
External Dose			6.3E-02
Annual Effective Dose Equivalent			1.8E-01

 Controlling Organ: Thyroid
 Controlling Pathway: Inh
 Controlling Radionuclide: I 133

 Total Inhalation EDE: 1.2E-01
 Total Ingestion EDE: 0.0E+00

----- GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: FMEF Reg guide criticality onsite GENII calculated X/Qs fini
 te plume

Executed on: 08/01/97 at 11:31:15

Page C. 2

Acute release
 Uptake/exposure period: 1.0
 Dose commitment period: 50.0
 Dose units: Sv

Dose Commitment Year

HNF-SD-FF-CN-012, Rev 0

	1	2	3	...	
Internal Intake Year:	3		0.0E+00	...	
			+		
	2	0.0E+00	0.0E+00	...	Internal Effective Dose
			+		
	1	1.2E-01	1.4E-06	1.5E-07 + ...	= 1.2E-01 Internal Effective Dose Equivalent
Internal Annual Dose		1.2E-01	1.4E-06	1.5E-07 + ...	= 1.2E-01 Cumulative Internal Dose
		+	+	+	+
External Annual Dose		6.3E-02	0.0E+00	0.0E+00 ...	6.3E-02
Annual Dose		1.8E-01	1.4E-06	1.5E-07 + ...	= 1.8E-01 Cumulative Dose
					Maximum Annual Dose Occurred In Year 1

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: FMEF Reg guide criticality onsite GENII calculated X/Qs fini
te plume

Executed on: 08/01/97 at 11:31:15

Page C. 3

Acute release
Uptake/exposure period: 1.0
Dose commitment period: 50.0
Dose units: Sv

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	2.6E-01	1.1E-01	9.3E-03	9.4E-03	8.3E-03	9.1E-03	1.0E-02	7.1E-03
Total	2.6E-01	1.1E-01	9.3E-03	9.4E-03	8.3E-03	9.1E-03	1.0E-02	7.1E-03

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver
Inhale	7.5E-03	1.0E-02	2.5E+00	1.5E-20	2.1E-06
Total	7.5E-03	1.0E-02	2.5E+00	1.5E-20	2.1E-06

External Dose by Exposure Pathway

Pathway	
Plume	6.3E-02
Total	6.3E-02

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: FMEF Reg guide critically onsite GENII calculated X/Qs fini
te plume

Executed on: 08/01/97 at 11:31:15

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Acute release

Uptake/exposure period:

1.0
50.0

Dose commitment period:

Dose units:

Sv

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
KR 83M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 87	1.4E-17	9.6E-18	9.4E-18	9.4E-18	9.4E-18	3.3E-17	1.8E-17	9.4E-18
KR 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 88	1.4E-03	5.8E-04	1.3E-05	1.4E-05	1.3E-05	1.5E-05	1.6E-05	1.2E-05
KR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 89	3.4E-02	1.5E-02	7.7E-04	8.2E-04	7.2E-04	1.3E-03	1.1E-03	6.2E-04
SR 89	8.7E-06	1.4E-06	1.8E-06	5.5E-06	1.6E-05	3.8E-05	2.4E-05	9.7E-07
I 131	9.7E-04	1.1E-04	4.0E-05	3.9E-05	3.8E-05	1.7E-04	8.8E-05	3.3E-05
XE 131M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 132	4.8E-02	1.7E-02	2.2E-03	2.2E-03	2.0E-03	1.9E-03	2.2E-03	1.7E-03
I 133	1.9E-02	2.5E-03	5.1E-04	5.1E-04	4.8E-04	5.1E-04	6.0E-04	4.6E-04
XE 133M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 133	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 134	9.0E-02	4.4E-02	3.5E-03	3.6E-03	3.0E-03	2.8E-03	3.6E-03	2.5E-03
I 135	2.9E-02	6.4E-03	1.3E-03	1.2E-03	1.2E-03	1.1E-03	1.3E-03	1.0E-03
XE 135M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 135	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 135	3.6E-13	3.1E-13	3.1E-13	3.1E-13	3.1E-13	3.6E-13	3.7E-13	3.1E-13
XE 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 137	1.7E-05	1.7E-05	1.7E-05	1.7E-05	1.7E-05	1.5E-05	1.6E-05	1.7E-05
XE 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 138	3.8E-02	1.9E-02	9.4E-04	9.8E-04	8.6E-04	1.2E-03	1.4E-03	7.2E-04
PU 240	5.8E-09	5.1E-13	8.2E-13	3.3E-12	9.5E-12	7.4E-07	5.7E-08	1.0E-08
PU 238	6.2E-08	5.4E-12	8.8E-12	3.7E-11	1.0E-10	6.5E-06	5.2E-07	9.0E-08
PU 242	4.1E-11	3.6E-15	5.5E-15	2.2E-14	6.5E-14	4.7E-09	3.9E-10	6.7E-11
PU 241	7.4E-10	3.8E-12	4.3E-12	9.5E-12	1.6E-11	4.2E-06	3.3E-07	6.3E-08
U 237	1.6E-18	5.0E-20	1.1E-19	5.0E-19	1.3E-18	2.4E-20	1.8E-20	1.9E-21
AM 241	2.5E-09	4.9E-13	6.2E-13	1.8E-12	4.5E-12	3.1E-07	2.4E-08	4.3E-09
PU 239	2.6E-09	2.3E-13	3.6E-13	1.5E-12	4.2E-12	3.3E-07	2.5E-08	4.5E-09
Total	2.6E-01	1.1E-01	9.3E-03	9.4E-03	8.3E-03	9.1E-03	1.0E-02	7.1E-03

GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: FMEF Reg guide critically onsite GENII calculated X/Qs fini
te plume

Executed on: 08/01/97 at 11:31:15

Page C. 5

Acute release

Uptake/exposure period:

1.0
50.0

Dose commitment period:

Dose units:

Sv

Committed Dose Equivalent by Radionuclide

Radionuclide Ovaries Muscle Thyroid Kidneys Liver

HNF-SD-FF-CN-012, Rev 0

KR 83M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 87	9.4E-18	9.4E-18	9.4E-18	0.0E+00	0.0E+00
KR 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 88	1.3E-05	1.4E-05	1.3E-05	0.0E+00	0.0E+00
KR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 89	6.7E-04	8.6E-04	8.2E-04	0.0E+00	0.0E+00
SR 89	9.7E-07	9.7E-07	9.7E-07	0.0E+00	0.0E+00
I 131	3.6E-05	1.1E-04	4.0E-01	0.0E+00	0.0E+00
XE 131M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 132	1.7E-03	2.4E-03	2.7E-01	0.0E+00	0.0E+00
I 133	4.6E-04	6.9E-04	1.1E+00	0.0E+00	0.0E+00
XE 133M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 133	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 134	2.6E-03	3.7E-03	1.7E-01	0.0E+00	0.0E+00
I 135	1.1E-03	1.5E-03	5.2E-01	0.0E+00	0.0E+00
XE 135M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 135	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 135	3.1E-13	3.1E-13	3.1E-13	0.0E+00	0.0E+00
XE 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 137	1.6E-05	1.5E-05	1.5E-05	0.0E+00	0.0E+00
XE 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 138	8.4E-04	1.0E-03	9.1E-04	0.0E+00	0.0E+00
PU 240	1.0E-08	3.3E-13	3.1E-13	0.0E+00	1.3E-07
PU 238	8.9E-08	3.4E-12	3.3E-12	0.0E+00	1.2E-06
PU 242	6.8E-11	2.4E-15	2.1E-15	0.0E+00	8.6E-10
PU 241	6.3E-08	4.0E-12	1.7E-12	0.0E+00	6.6E-07
U 237	2.8E-20	8.6E-21	3.3E-21	1.5E-20	0.0E+00
AM 241	4.2E-09	4.2E-13	2.4E-13	0.0E+00	5.5E-08
PU 239	4.5E-09	1.4E-13	1.4E-13	0.0E+00	5.7E-08

Total	7.5E-03	1.0E-02	2.5E+00	1.5E-20	2.1E-06

HNF-SD-FF-CN-012, Rev 0

 GENII Dose Calculation Program
 (Version 1.485 3-Dec-90)

Case title: FMEF Reg guide criticality onsite GENII calculated X/Qs finite plume

Executed on: 08/01/97 at 11:31:15

Page C. 6

Acute release
 Uptake/exposure period: 1.0
 Dose commitment period: 50.0
 Dose units: Sv

Radio-nuclide	Inhalation Effective Dose Equivalent	Ingestion Effective Dose Equivalent	External Dose	Internal Effective Dose Equivalent	Annual Effective Dose Equivalent
KR 83M	0.0E+00	0.0E+00	4.1E-07	0.0E+00	4.1E-07
KR 85M	0.0E+00	0.0E+00	1.6E-05	0.0E+00	1.6E-05
KR 85	0.0E+00	0.0E+00	3.0E-12	0.0E+00	3.0E-12
KR 87	0.0E+00	0.0E+00	4.9E-04	0.0E+00	4.9E-04
RB 87	1.1E-17	0.0E+00	0.0E+00	1.1E-17	1.1E-17
KR 88	0.0E+00	0.0E+00	6.2E-04	0.0E+00	6.2E-04
RB 88	2.1E-04	0.0E+00	1.5E-05	2.1E-04	2.2E-04
KR 89	0.0E+00	0.0E+00	2.3E-02	0.0E+00	2.3E-02
RB 89	5.6E-03	0.0E+00	2.6E-03	5.6E-03	8.2E-03
SR 89	7.0E-06	0.0E+00	1.8E-12	7.0E-06	7.0E-06
I 131	1.2E-02	0.0E+00	1.6E-06	1.2E-02	1.2E-02
XE 131M	0.0E+00	0.0E+00	3.0E-09	0.0E+00	3.0E-09
I 132	1.6E-02	0.0E+00	1.1E-03	1.6E-02	1.7E-02
I 133	3.6E-02	0.0E+00	4.1E-05	3.6E-02	3.6E-02
XE 133M	0.0E+00	0.0E+00	1.4E-07	0.0E+00	1.4E-07
XE 133	0.0E+00	0.0E+00	1.8E-06	0.0E+00	1.8E-06
I 134	2.1E-02	0.0E+00	4.3E-03	2.1E-02	2.5E-02
I 135	2.1E-02	0.0E+00	2.7E-04	2.1E-02	2.1E-02
XE 135M	0.0E+00	0.0E+00	2.1E-03	0.0E+00	2.1E-03
XE 135	0.0E+00	0.0E+00	1.5E-04	0.0E+00	1.5E-04
CS 135	3.0E-13	0.0E+00	0.0E+00	3.0E-13	3.0E-13
XE 137	0.0E+00	0.0E+00	1.0E-02	0.0E+00	1.0E-02
CS 137	1.5E-05	0.0E+00	3.0E-09	1.5E-05	1.5E-05
XE 138	0.0E+00	0.0E+00	1.6E-02	0.0E+00	1.6E-02
CS 138	6.5E-03	0.0E+00	1.5E-03	6.5E-03	8.0E-03
PU 240	4.0E-08	0.0E+00	1.4E-18	4.0E-08	4.0E-08
PU 238	3.6E-07	0.0E+00	1.4E-17	3.6E-07	3.6E-07
PU 242	2.6E-10	0.0E+00	8.1E-21	2.6E-10	2.6E-10
PU 241	2.2E-07	0.0E+00	0.0E+00	2.2E-07	2.2E-07
U 237	3.2E-19	0.0E+00	1.3E-22	3.2E-19	3.2E-19
AM 241	1.7E-08	0.0E+00	1.0E-17	1.7E-08	1.7E-08
PU 239	1.8E-08	0.0E+00	2.6E-19	1.8E-08	1.8E-08

HMF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: FMEF CRITICALITY INGESTION DOSES UNIT X/Q

Executed on: 10/23/97 at 15:56:06

Page A. 1

This is a far-field (wide-scale release, multiple site) scenario.
Release is acute
Individual dose

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Ground, external
Terrestrial foods ingestion
Animal product ingestion
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:
Intake ends after (yr): 50.0
Dose calculations ends after (yr): 50.0

===== FILENAMES AND TITLES OF FILES/LIBRARIES USED =====

Input file name: \GENII\fmefcin.in
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
PNL Food Transfer Factor Library (by Z, with Fr&Os 7/19/93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)

=====

Release Radio- nuclide	-----Release Terms-----		
	Air Bq/yr	Surface Water Bq/yr	Buried Source Bq/m3
KR83M	4.1E+12	0.0E+00	0.0E+00
KR85	3.0E+07	0.0E+00	0.0E+00
KR85M	2.6E+12	0.0E+00	0.0E+00
KR87	1.6E+13	0.0E+00	0.0E+00
KR88	8.5E+12	0.0E+00	0.0E+00
KR89	4.8E+14	0.0E+00	0.0E+00
I 131	1.0E+11	0.0E+00	0.0E+00
I 132	1.1E+13	0.0E+00	0.0E+00
I 133	1.5E+12	0.0E+00	0.0E+00
I 134	4.0E+13	0.0E+00	0.0E+00
I 135	4.2E+12	0.0E+00	0.0E+00
XE131M	3.7E+09	0.0E+00	0.0E+00
XE133	1.0E+12	0.0E+00	0.0E+00
XE133M	8.1E+10	0.0E+00	0.0E+00
XE135	1.5E+13	0.0E+00	0.0E+00
XE135M	1.2E+14	0.0E+00	0.0E+00
XE137	1.8E+15	0.0E+00	0.0E+00
XE138	4.1E+14	0.0E+00	0.0E+00
PU238	2.2E+02	0.0E+00	0.0E+00
PU239	1.0E+01	0.0E+00	0.0E+00
PU240	2.2E+01	0.0E+00	0.0E+00
PU241	6.7E+03	0.0E+00	0.0E+00
PU242	1.6E-01	0.0E+00	0.0E+00
AM241	8.9E+00	0.0E+00	0.0E+00

===== AIR TRANSPORT =====
1.0E+00 Input E/Q value (s/m3)

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===== EXTERNAL EXPOSURE =====
4.4E+03 Hours of exposure to ground contamination

===== INGESTION POPULATION =====
1 Atmospheric production definition: 1 - Use population-weighted chi/0

===== TERRESTRIAL FOOD INGESTION =====

FOOD TYPE	GROW TIME d	--IRRIGATION-- S RATE * in/yr	TIME mo/yr	YIELD kg/m2	PROD- UCTION kg/yr	--CONSUMPTION-- HOLDUP d	RATE kg/yr
Leaf Veg	90.0	0	0.0	0.0	1.5	1.0	3.0E+01
Oth. Veg	90.0	0	0.0	0.0	4.0	5.0	2.2E+02
Fruit	90.0	0	0.0	0.0	2.0	5.0	3.3E+02
Cereals	90.0	0	0.0	0.0	0.8	180.0	8.0E+01

===== ANIMAL FOOD INGESTION =====

FOOD TYPE	---HUMAN---		TOTAL PROD- UCTION kg/yr	DRINK WATER CONTAM FRACT.	DIET FRAC- TION	GROW TIME d	--STOR- ED FEED-- IRRIGATION-- S RATE * in/yr	TIME mo/yr	YIELD kg/m3	STOR- AGE d	
	CONSUMPTION RATE kg/yr	HOLDUP d									
Meat	8.0E+01	15.0		0.00	0.3	90.00	0	0.0	0.0	0.80	0.0
Poultry	1.8E+01	1.0		0.00	1.0	90.00	0	0.0	0.0	0.80	0.0
Cow Milk	2.7E+02	1.0		0.00	0.3	45.00	0	0.0	0.0	2.00	0.0
Eggs	3.0E+01	1.0		0.00	1.0	90.00	0	0.0	0.0	0.80	0.0

	-----FRESH FORAGE-----			
Meat	0.75	45.0	0	0.0
Cow Milk	0.75	30.0	0	0.0

Note: Animal diet fraction for years 2 through 50.0000

Input prepared by: _____ Date: _____
Input checked by: _____ Date: _____

 GENII Dose Calculation Program
 (Version 1.485 3-Dec-90)

Case title: Winter: FMEF CRITICALITY INGESTION DOSES UNIT X/Q

Executed on: 10/23/97 at 15:58:20

Page C. 1

 Acute release
 Uptake/exposure period: 50.0
 Dose commitment period: 50.0
 Dose units: Sv

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	4.3E-06	2.5E-01	1.1E-06
Breast	6.5E-06	1.5E-01	9.7E-07
R Marrow	5.4E-06	1.2E-01	6.4E-07
Lung	6.1E-06	1.2E-01	7.3E-07
Thyroid	1.3E-02	3.0E-02	3.9E-04
Bone Sur	6.4E-06	3.0E-02	1.9E-07
Stomach	8.2E-05	6.0E-02	4.9E-06
UL Int.	5.3E-06	6.0E-02	3.2E-07
S Int.	5.2E-06	6.0E-02	3.1E-07
LL Int.	4.7E-06	6.0E-02	2.8E-07
Liver	1.1E-09	6.0E-02	6.4E-11
Internal Effective Dose Equivalent			4.0E-04
External Dose			1.2E+00
Annual Effective Dose Equivalent			1.2E+00

 Controlling Organ: Thyroid
 Controlling Pathway: Ext
 Controlling Radionuclide: I 134

 Total Inhalation EDE: 0.0E+00
 Total Ingestion EDE: 4.0E-04

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Winter: FMEF CRITICALITY INGESTION DOSES UNIT X/Q

Executed on: 10/23/97 at 15:58:20

Page C. 2

Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Sv

	Dose Commitment Year				
	1	2	3	...	
Internal Intake Year:	3				
			3.8E-10	...	
			+		
	2	3.8E-10	4.5E-11	...	Internal Effective Dose Equivalent
		+	+		
	1	4.0E-04	9.2E-11	1.6E-11 + ... = 4.0E-04	
Internal Annual Dose		4.0E-04	4.7E-10	4.4E-10 + ... = 4.0E-04	Cumulative Internal Dose
		+	+	+	
External Annual Dose		1.2E+00	6.0E-13	7.4E-13 ... = 1.2E+00	
Annual Dose		1.2E+00	4.7E-10	4.4E-10 + ... = 1.2E+00	Cumulative Dose
				1.2E+00	Maximum Annual Dose Occurred In Year 1

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Winter: FMEF CRITICALITY INGESTION DOSES UNIT X/Q

Executed on: 10/23/97 at 15:58:20

Page C. 3

Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Sv

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Leaf Veg	9.3E-12	1.4E-11	8.0E-12	8.0E-12	8.0E-12	5.4E-11	1.4E-11	8.4E-12
Oth. Veg	1.6E-10	2.2E-10	1.4E-10	1.4E-10	1.4E-10	9.6E-10	2.5E-10	1.5E-10
Fruit	1.7E-10	2.4E-10	1.5E-10	1.5E-10	1.5E-10	1.0E-09	2.7E-10	1.6E-10
Cereals	1.7E-11	1.8E-11	1.7E-11	1.7E-11	1.7E-11	4.1E-11	2.3E-11	1.7E-11
Meat	3.8E-10	4.0E-10	3.8E-10	3.8E-10	3.8E-10	4.7E-10	4.8E-10	3.8E-10
Poultry	2.3E-11	2.4E-11	2.3E-11	2.3E-11	2.3E-11	2.8E-11	2.9E-11	2.3E-11
Cow Milk	3.7E-10	6.5E-10	3.0E-10	3.0E-10	3.0E-10	5.2E-10	4.3E-10	2.9E-10
Eggs	1.2E-11	2.7E-11	7.4E-12	7.4E-12	7.3E-12	1.8E-11	1.2E-11	6.9E-12
Soil Ing	6.1E-06	8.2E-05	5.2E-06	5.3E-06	4.7E-06	6.4E-06	5.4E-06	4.1E-06
Total	6.1E-06	8.2E-05	5.2E-06	5.3E-06	4.7E-06	6.4E-06	5.4E-06	4.1E-06

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver
Leaf Veg	8.5E-12	9.7E-12	1.0E-08	3.0E-20	7.2E-12
Oth. Veg	1.5E-10	1.6E-10	1.3E-07	5.4E-19	1.3E-10
Fruit	1.6E-10	1.8E-10	1.4E-07	5.7E-19	1.4E-10
Cereals	1.7E-11	1.7E-11	1.7E-11	1.2E-20	3.5E-12
Meat	3.8E-10	3.8E-10	1.1E-08	2.5E-21	6.9E-14
Poultry	2.3E-11	2.3E-11	1.5E-10	2.5E-20	8.3E-16
Cow Milk	3.0E-10	4.0E-10	5.7E-07	8.4E-20	4.8E-15
Eggs	7.1E-12	1.3E-11	3.3E-08	3.3E-20	6.9E-14
Soil Ing	4.3E-06	6.5E-06	1.3E-02	3.0E-18	7.8E-10
Total	4.3E-06	6.5E-06	1.3E-02	4.3E-18	1.1E-09

External Dose by Exposure Pathway

Pathway	
Sur Soil	1.2E+00
Total	1.2E+00

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Winter: FMEF CRITICALITY INGESTION DOSES UNIT X/Q

Executed on: 10/23/97 at 15:58:20

Page C. 4

Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Sv

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Leaf Veg	3.5E-10	3.8E-10	3.5E-10	3.6E-10	3.8E-10	4.9E-09	8.0E-10	4.1E-10
Oth. Veg	6.2E-09	6.6E-09	6.2E-09	6.3E-09	6.5E-09	5.3E-08	1.1E-08	6.8E-09
Fruit	6.7E-09	7.2E-09	6.7E-09	6.8E-09	7.0E-09	5.7E-08	1.2E-08	7.3E-09
Cereals	8.2E-10	8.6E-10	8.2E-10	8.2E-10	8.3E-10	3.2E-09	1.2E-09	8.5E-10
Meat	3.6E-09	3.8E-09	3.6E-09	3.6E-09	3.6E-09	4.4E-09	4.6E-09	3.6E-09
Poultry	1.2E-10	1.2E-10	1.2E-10	1.2E-10	1.2E-10	1.4E-10	1.5E-10	1.2E-10
Cow Milk	2.4E-09	2.8E-09	2.3E-09	2.3E-09	2.3E-09	3.0E-09	3.0E-09	2.3E-09
Eggs	2.9E-11	4.6E-11	2.5E-11	2.5E-11	2.5E-11	4.1E-11	3.4E-11	2.5E-11
Soil Ing	6.1E-06	8.2E-05	5.2E-06	5.3E-06	4.7E-06	6.6E-06	5.4E-06	4.1E-06
Total	6.1E-06	8.2E-05	5.2E-06	5.3E-06	4.7E-06	6.7E-06	5.4E-06	4.1E-06

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver
Leaf Veg	4.1E-10	3.5E-10	1.0E-08	5.4E-18	9.1E-10
Oth. Veg	6.8E-09	6.2E-09	1.3E-07	5.8E-17	9.3E-09
Fruit	7.3E-09	6.7E-09	1.5E-07	6.2E-17	1.0E-08
Cereals	8.4E-10	8.2E-10	8.2E-10	7.4E-19	4.5E-10
Meat	3.6E-09	3.6E-09	1.4E-08	7.0E-20	2.9E-12
Poultry	1.2E-10	1.2E-10	2.4E-10	7.3E-20	3.0E-15
Cow Milk	2.3E-09	2.4E-09	5.7E-07	2.3E-18	1.3E-13
Eggs	2.5E-11	3.1E-11	3.3E-08	1.0E-19	2.4E-13
Soil Ing	4.3E-06	6.5E-06	1.3E-02	6.1E-17	2.6E-08
Total	4.3E-06	6.5E-06	1.3E-02	1.9E-16	4.7E-08

External Dose by Exposure Pathway

Pathway	
Sur Soil	1.2E+00
Total	1.2E+00

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Winter: FMEF CRITICALITY INGESTION DOSES UNIT X/Q

Executed on: 10/23/97 at 15:58:20

Page C. 5

Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Sv

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
KR 83M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 131	2.1E-06	6.3E-06	9.0E-07	9.0E-07	8.6E-07	3.6E-06	1.8E-06	7.6E-07
XE 131M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 132	7.6E-07	1.8E-05	9.0E-07	9.5E-07	7.8E-07	5.3E-07	6.4E-07	6.4E-07
I 133	1.5E-06	1.9E-05	1.4E-06	1.4E-06	1.3E-06	1.2E-06	1.4E-06	1.3E-06
XE 133M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 133	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 134	5.1E-07	2.2E-05	6.6E-07	7.0E-07	5.1E-07	3.1E-07	4.3E-07	3.6E-07
I 135	1.2E-06	1.7E-05	1.3E-06	1.3E-06	1.2E-06	8.7E-07	1.1E-06	1.1E-06
XE 135M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 135	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 135	9.6E-10	1.0E-09	9.6E-10	9.6E-10	9.6E-10	1.2E-09	1.2E-09	9.6E-10
XE 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PU 240	1.6E-16	2.4E-14	5.9E-14	3.3E-13	1.1E-12	3.5E-10	2.7E-11	4.9E-12
PU 238	1.7E-15	2.5E-13	6.3E-13	3.7E-12	1.1E-11	3.1E-09	2.5E-10	4.3E-11
PU 242	1.2E-18	1.7E-16	4.0E-16	2.3E-15	7.4E-15	2.4E-12	2.0E-13	3.4E-14
PU 241	3.2E-15	3.5E-14	9.2E-14	5.2E-13	1.5E-12	2.0E-09	1.6E-10	3.0E-11
U 237	3.2E-19	4.0E-17	1.1E-16	4.9E-16	1.3E-15	5.0E-18	8.3E-18	1.7E-18
AM 241	9.5E-16	3.6E-14	8.5E-14	4.9E-13	1.5E-12	4.7E-10	3.7E-11	6.6E-12
PU 239	6.9E-17	1.1E-14	2.7E-14	1.5E-13	4.7E-13	1.6E-10	1.2E-11	2.2E-12
Total	6.1E-06	8.2E-05	5.2E-06	5.3E-06	4.7E-06	6.4E-06	5.4E-06	4.1E-06

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GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Winter: FMEF CRITICALITY INGESTION DOSES UNIT X/Q

Executed on: 10/23/97 at 15:58:20

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Sv

Committed Dose Equivalent by Radionuclide

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver
-----	-----	-----	-----	-----	-----
KR 83M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 131	8.2E-07	2.5E-06	9.2E-03	0.0E+00	0.0E+00
XE 131M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 132	6.7E-07	7.3E-07	1.0E-04	0.0E+00	0.0E+00
I 133	1.2E-06	1.6E-06	3.0E-03	0.0E+00	0.0E+00
XE 133M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 133	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 134	4.3E-07	4.7E-07	2.3E-05	0.0E+00	0.0E+00
I 135	1.1E-06	1.2E-06	5.3E-04	0.0E+00	0.0E+00
XE 135M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 135	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 135	9.6E-10	9.6E-10	9.6E-10	0.0E+00	0.0E+00
XE 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PU 240	4.9E-12	1.6E-16	1.5E-16	0.0E+00	6.2E-11
PU 238	4.2E-11	1.7E-15	1.6E-15	0.0E+00	5.7E-10
PU 242	3.4E-14	1.2E-18	1.1E-18	0.0E+00	4.3E-13
PU 241	3.0E-11	1.9E-15	8.0E-16	0.0E+00	3.1E-10
U 237	2.7E-17	2.6E-18	3.3E-20	4.3E-18	0.0E+00
AM 241	6.5E-12	7.5E-16	3.6E-16	0.0E+00	8.4E-11
PU 239	2.2E-12	6.9E-17	6.6E-17	0.0E+00	2.8E-11
-----	-----	-----	-----	-----	-----
Total	4.3E-06	6.5E-06	1.3E-02	4.3E-18	1.1E-09

External Dose by Radionuclide

Radionuclide	
-----	-----
KR 83M	0.0E+00
KR 85M	0.0E+00
KR 85	0.0E+00
KR 87	0.0E+00
RB 87	0.0E+00
KR 88	0.0E+00
RB 88	0.0E+00
KR 89	0.0E+00
RB 89	0.0E+00
SR 89	0.0E+00
I 131	3.9E-02
XE 131M	2.8E-06
I 132	3.2E-01

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I 133	1.0E-01
XE 133M	1.0E-04
XE 133	2.3E-03
I 134	4.9E-01
I 135	2.4E-01
XE 135M	1.1E-02
XE 135	3.1E-02
CS 135	2.0E-13
XE 137	0.0E+00
CS 137	0.0E+00
XE 138	0.0E+00
CS 138	0.0E+00
PU 240	1.4E-15
PU 238	1.4E-14
PU 242	0.0E+00
PU 241	7.6E-19
U 237	4.7E-14
AM 241	2.0E-13
PU 239	1.4E-15

Total	1.2E+00

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Winter: FMEF CRITICALITY INGESTION DOSES UNIT X/Q

Executed on: 10/23/97 at 15:58:20

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Sv

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
KR 83M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 131	2.1E-06	6.3E-06	9.0E-07	9.0E-07	8.6E-07	3.6E-06	1.8E-06	7.6E-07
XE 131M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 132	7.6E-07	1.8E-05	9.0E-07	9.5E-07	7.8E-07	5.3E-07	6.4E-07	6.4E-07
I 133	1.5E-06	1.9E-05	1.4E-06	1.4E-06	1.3E-06	1.2E-06	1.4E-06	1.3E-06
XE 133M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 133	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 134	5.1E-07	2.2E-05	6.6E-07	7.0E-07	5.1E-07	3.1E-07	4.3E-07	3.6E-07
I 135	1.2E-06	1.7E-05	1.3E-06	1.3E-06	1.2E-06	8.7E-07	1.1E-06	1.1E-06
XE 135M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 135	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 135	2.1E-08	2.2E-08	2.1E-08	2.1E-08	2.1E-08	2.6E-08	2.7E-08	2.1E-08
XE 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PU 240	8.1E-15	1.2E-12	3.0E-12	1.7E-11	5.3E-11	1.0E-08	7.9E-10	1.3E-10
PU 238	7.0E-14	1.1E-11	2.6E-11	1.6E-10	4.7E-10	8.3E-08	6.7E-09	1.1E-09
PU 242	5.8E-17	8.6E-15	2.0E-14	1.1E-13	3.7E-13	6.8E-11	5.6E-12	8.8E-13
PU 241	6.5E-14	7.1E-13	1.9E-12	1.0E-11	3.0E-11	2.7E-08	2.1E-09	3.8E-10
U 237	1.4E-17	1.0E-15	4.7E-15	2.1E-14	5.6E-14	2.2E-16	3.7E-16	7.6E-17
AM 241	4.4E-13	1.7E-11	4.0E-11	2.3E-10	7.0E-10	1.1E-07	8.3E-09	1.3E-09
PU 239	3.5E-15	5.4E-13	1.4E-12	7.7E-12	2.4E-11	4.6E-09	3.6E-10	5.9E-11
Total	6.1E-06	8.2E-05	5.2E-06	5.3E-06	4.7E-06	6.7E-06	5.4E-06	4.1E-06

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Winter: FMEF CRITICALITY INGESTION DOSES UNIT X/Q

Executed on: 10/23/97 at 15:58:20

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Sv

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver
KR 83M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 131	8.2E-07	2.5E-06	9.2E-03	0.0E+00	0.0E+00
XE 131M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 132	6.7E-07	7.3E-07	1.0E-04	0.0E+00	0.0E+00
I 133	1.2E-06	1.6E-06	3.0E-03	0.0E+00	0.0E+00
XE 133M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 133	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 134	4.3E-07	4.7E-07	2.3E-05	0.0E+00	0.0E+00
I 135	1.1E-06	1.2E-06	5.3E-04	0.0E+00	0.0E+00
XE 135M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 135	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 135	2.1E-08	2.1E-08	2.1E-08	0.0E+00	0.0E+00
XE 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PU 240	1.3E-10	8.0E-15	7.4E-15	0.0E+00	2.0E-09
PU 238	1.0E-09	7.0E-14	6.6E-14	0.0E+00	1.7E-08
PU 242	8.9E-13	5.9E-17	5.3E-17	0.0E+00	1.4E-11
PU 241	3.7E-10	3.8E-14	1.6E-14	0.0E+00	4.5E-09
U 237	1.2E-15	1.1E-16	1.4E-18	1.9E-16	0.0E+00
AM 241	1.3E-09	3.5E-13	1.7E-13	0.0E+00	2.2E-08
PU 239	5.9E-11	3.5E-15	3.4E-15	0.0E+00	9.2E-10
Total	4.3E-06	6.5E-06	1.3E-02	1.9E-16	4.7E-08

External Dose by Radionuclide

Radionuclide	
KR 83M	0.0E+00
KR 85M	0.0E+00
KR 85	0.0E+00
KR 87	0.0E+00
RB 87	0.0E+00
KR 88	0.0E+00
RB 88	0.0E+00
KR 89	0.0E+00
RB 89	0.0E+00
SR 89	0.0E+00
I 131	3.9E-02
XE 131M	2.8E-06
I 132	3.2E-01

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I 133	1.0E-01
XE 133M	1.0E-04
XE 133	2.3E-03
I 134	4.9E-01
I 135	2.4E-01
XE 135M	1.1E-02
XE 135	3.1E-02
CS 135	9.6E-12
XE 137	0.0E+00
CS 137	0.0E+00
XE 138	0.0E+00
CS 138	0.0E+00
PU 240	6.6E-14
PU 238	5.5E-13
PU 242	0.0E+00
PU 241	1.4E-17
U 237	9.2E-13
AM 241	9.7E-11
PU 239	6.7E-14
-----	-----
Total	1.2E+00

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Spring: FMEF CRITICALITY INGESTION DOSES UNIT X/Q

Executed on: 10/23/97 at 15:59:05

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Sv

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	1.0E-01	2.5E-01	2.5E-02
Breast	2.1E-01	1.5E-01	3.1E-02
R Marrow	1.6E-01	1.2E-01	2.0E-02
Lung	1.8E-01	1.2E-01	2.2E-02
Thyroid	6.3E+02	3.0E-02	1.9E+01
Bone Sur	2.5E-01	3.0E-02	7.4E-03
Stomach	1.2E+00	6.0E-02	7.3E-02
UL Int.	1.1E-01	6.0E-02	6.9E-03
S Int.	1.1E-01	6.0E-02	6.8E-03
LL Int.	1.1E-01	6.0E-02	6.5E-03
Liver	4.1E-07	6.0E-02	2.5E-08
Internal Effective Dose Equivalent			1.9E+01
External Dose			1.2E+00
Annual Effective Dose Equivalent			2.0E+01

Controlling Organ: Thyroid
Controlling Pathway: Ing
Controlling Radionuclide: I 131

Total Inhalation EDE: 0.0E+00
Total Ingestion EDE: 1.9E+01

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Spring: FMEF CRITICALITY INGESTION DOSES UNIT X/Q

Executed on: 10/23/97 at 15:59:05

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Sv

		Dose Commitment Year				
		1	2	3	...	
Internal Intake	:					
Year:	3	3.8E-10 ...				
	2	3.8E-10 4.5E-11 ...				Internal Effective Dose Equivalent
	1	1.9E+01 + 1.5E-08 + 4.2E-09 + ... = 1.9E+01				Cumulative Internal Dose
Internal Annual Dose		1.9E+01	1.5E-08	4.6E-09	...	
External Annual Dose		1.2E+00	6.0E-13	7.4E-13	...	
Annual Dose		2.0E+01	1.5E-08	4.6E-09	...	
						Maximum Annual Dose Occurred In Year 1

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Spring: FMEF CRITICALITY INGESTION DOSES UNIT X/Q

Executed on: 10/23/97 at 15:59:05

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Sv

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Leaf Veg	1.9E-02	1.3E-01	1.2E-02	1.2E-02	1.1E-02	2.6E-02	1.7E-02	1.0E-02
Oth. Veg	7.6E-08	2.3E-07	3.3E-08	3.3E-08	3.2E-08	1.3E-07	6.8E-08	2.8E-08
Fruit	8.2E-08	2.5E-07	3.6E-08	3.6E-08	3.4E-08	1.4E-07	7.3E-08	3.0E-08
Cereals	1.7E-11	1.8E-11	1.7E-11	1.7E-11	1.7E-11	4.0E-11	2.3E-11	1.7E-11
Meat	2.1E-03	6.3E-03	9.0E-04	9.0E-04	8.6E-04	3.6E-03	1.8E-03	7.6E-04
Poultry	9.9E-11	2.5E-10	5.6E-11	5.6E-11	5.4E-11	1.6E-10	9.7E-11	5.0E-11
Cow Milk	1.6E-01	1.1E+00	1.0E-01	1.0E-01	9.6E-02	2.2E-01	1.4E-01	8.7E-02
Eggs	2.0E-08	6.0E-08	8.6E-09	8.6E-09	8.2E-09	3.4E-08	1.8E-08	7.2E-09
Soil Ing	6.1E-06	8.2E-05	5.2E-06	5.3E-06	4.7E-06	6.4E-06	5.4E-06	4.1E-06
Total	1.8E-01	1.2E+00	1.1E-01	1.1E-01	1.1E-01	2.5E-01	1.6E-01	9.8E-02

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver
Leaf Veg	1.1E-02	2.2E-02	6.6E+01	1.3E-15	4.1E-07
Oth. Veg	3.0E-08	9.3E-08	3.4E-04	5.4E-19	1.3E-10
Fruit	3.3E-08	1.0E-07	3.7E-04	5.7E-19	1.4E-10
Cereals	1.7E-11	1.7E-11	4.1E-11	1.2E-20	3.3E-12
Meat	8.2E-04	2.5E-03	9.2E+00	1.6E-17	3.0E-10
Poultry	5.3E-11	1.2E-10	3.4E-07	2.5E-20	8.0E-16
Cow Milk	9.0E-02	1.8E-01	5.5E+02	4.5E-16	3.1E-11
Eggs	7.8E-09	2.4E-08	8.8E-05	3.3E-20	6.7E-14
Soil Ing	4.3E-06	6.5E-06	1.3E-02	3.0E-18	7.8E-10
Total	1.0E-01	2.1E-01	6.3E+02	1.7E-15	4.1E-07

External Dose by Exposure Pathway

Pathway	
Soil	1.2E+00
Total	1.2E+00

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GENII Dose Calculation Program
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Case title: Spring: FMEF CRITICALITY INGESTION DOSES UNIT X/Q

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Sv

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Leaf Veg	1.9E-02	1.3E-01	1.2E-02	1.2E-02	1.1E-02	2.6E-02	1.7E-02	1.0E-02
Oth. Veg	8.2E-08	2.4E-07	3.9E-08	3.9E-08	3.8E-08	1.8E-07	7.9E-08	3.4E-08
Fruit	8.9E-08	2.6E-07	4.2E-08	4.2E-08	4.1E-08	2.0E-07	8.5E-08	3.7E-08
Cereals	8.2E-10	8.6E-10	8.2E-10	8.2E-10	8.3E-10	3.2E-09	1.2E-09	8.5E-10
Meat	2.1E-03	6.3E-03	9.0E-04	9.0E-04	8.6E-04	3.6E-03	1.8E-03	7.6E-04
Poultry	1.9E-10	3.5E-10	1.5E-10	1.5E-10	1.5E-10	2.7E-10	2.2E-10	1.4E-10
Cow Milk	1.6E-01	1.1E+00	1.0E-01	1.0E-01	9.6E-02	2.2E-01	1.4E-01	8.7E-02
Eggs	2.0E-08	6.0E-08	8.6E-09	8.6E-09	8.2E-09	3.4E-08	1.8E-08	7.2E-09
Soil Ing	6.1E-06	8.2E-05	5.2E-06	5.3E-06	4.7E-06	6.6E-06	5.4E-06	4.1E-06
Total	1.8E-01	1.2E+00	1.1E-01	1.1E-01	1.1E-01	2.5E-01	1.6E-01	9.8E-02

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver
Leaf Veg	1.1E-02	2.2E-02	6.6E+01	1.3E-15	4.1E-07
Oth. Veg	3.7E-08	9.9E-08	3.4E-04	5.8E-17	9.3E-09
Fruit	4.0E-08	1.1E-07	3.7E-04	6.2E-17	1.0E-08
Cereals	8.4E-10	8.2E-10	8.4E-10	7.4E-19	4.5E-10
Meat	8.2E-04	2.5E-03	9.2E+00	1.6E-17	3.0E-10
Poultry	1.5E-10	2.1E-10	3.4E-07	7.3E-20	2.9E-15
Cow Milk	9.0E-02	1.8E-01	5.5E+02	4.5E-16	3.1E-11
Eggs	7.8E-09	2.4E-08	8.8E-05	1.0E-19	2.4E-13
Soil Ing	4.3E-06	6.5E-06	1.3E-02	6.1E-17	2.6E-08
Total	1.0E-01	2.1E-01	6.3E+02	1.9E-15	4.6E-07

External Dose by Exposure Pathway

Pathway	
Sur Soil	1.2E+00
Total	1.2E+00

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GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Spring: FMEF CRITICALITY INGESTION DOSES UNIT X/Q

Executed on: 10/23/97 at 15:59:05

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Sv

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
KR 83M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 131	1.1E-01	3.4E-01	4.9E-02	4.9E-02	4.7E-02	1.9E-01	1.0E-01	4.1E-02
XE 131M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 132	5.2E-05	1.3E-03	6.2E-05	6.6E-05	5.4E-05	3.7E-05	4.4E-05	4.4E-05
I 133	6.0E-02	7.5E-01	5.5E-02	5.6E-02	5.2E-02	4.6E-02	5.5E-02	5.0E-02
XE 133M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 133	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 134	5.1E-07	2.2E-05	6.6E-07	7.0E-07	5.1E-07	3.1E-07	4.3E-07	3.6E-07
I 135	8.5E-03	1.2E-01	9.4E-03	9.4E-03	9.0E-03	6.3E-03	7.6E-03	7.6E-03
XE 135M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 135	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 135	1.4E-07	1.4E-07	1.4E-07	1.4E-07	1.4E-07	1.7E-07	1.7E-07	1.4E-07
XE 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PU 240	6.6E-14	9.6E-12	2.4E-11	1.4E-10	4.3E-10	1.4E-07	1.1E-08	2.0E-09
PU 238	6.9E-13	1.0E-10	2.6E-10	1.5E-09	4.6E-09	1.3E-06	1.0E-07	1.8E-08
PU 242	4.7E-16	7.0E-14	1.6E-13	9.3E-13	3.0E-12	9.6E-10	7.9E-11	1.4E-11
PU 241	1.3E-12	1.5E-11	3.9E-11	2.2E-10	6.3E-10	8.4E-07	6.6E-08	1.3E-08
U 237	1.3E-16	1.6E-14	4.3E-14	2.0E-13	5.1E-13	2.0E-15	3.3E-15	6.9E-16
AM 241	1.3E-13	5.0E-12	1.2E-11	6.7E-11	2.1E-10	6.5E-08	5.1E-09	9.1E-10
PU 239	2.9E-14	4.5E-12	1.1E-11	6.3E-11	2.0E-10	6.7E-08	5.2E-09	9.2E-10
Total	1.8E-01	1.2E+00	1.1E-01	1.1E-01	1.1E-01	2.5E-01	1.6E-01	9.8E-02

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GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Springs: FMEF CRITICALITY INGESTION DOSES UNIT X/Q

Executed on: 10/23/97 at 15:59:05

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Sv

Committed Dose Equivalent by Radionuclide

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver
KR 83M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 131	4.4E-02	1.4E-01	5.0E+02	0.0E+00	0.0E+00
XE 131M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 132	4.6E-05	5.0E-05	7.1E-03	0.0E+00	0.0E+00
I 133	4.8E-02	6.3E-02	1.2E+02	0.0E+00	0.0E+00
XE 133M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 133	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 134	4.3E-07	4.7E-07	2.3E-05	0.0E+00	0.0E+00
I 135	8.3E-03	8.5E-03	3.8E+00	0.0E+00	0.0E+00
XE 135M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 135	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 135	1.4E-07	1.4E-07	1.4E-07	0.0E+00	0.0E+00
XE 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PU 240	2.0E-09	6.5E-14	6.0E-14	0.0E+00	2.5E-08
PU 238	1.7E-08	6.8E-13	6.4E-13	0.0E+00	2.3E-07
PU 242	1.4E-11	4.8E-16	4.3E-16	0.0E+00	1.7E-10
PU 241	1.3E-08	8.0E-13	3.4E-13	0.0E+00	1.3E-07
U 237	1.1E-14	1.0E-15	1.3E-17	1.7E-15	0.0E+00
AM 241	8.9E-10	1.0E-13	5.0E-14	0.0E+00	1.2E-08
PU 239	9.2E-10	2.9E-14	2.8E-14	0.0E+00	1.2E-08
Total	1.0E-01	2.1E-01	6.3E+02	1.7E-15	4.1E-07

External Dose by Radionuclide

Radionuclide	
KR 83M	0.0E+00
KR 85M	0.0E+00
KR 85	0.0E+00
KR 87	0.0E+00
RB 87	0.0E+00
KR 88	0.0E+00
RB 88	0.0E+00
KR 89	0.0E+00
RB 89	0.0E+00
SR 89	0.0E+00
I 131	3.9E-02
XE 131M	2.8E-06
I 132	3.2E-01

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I 133	1.0E-01
XE 133M	1.0E-04
XE 133	2.3E-03
I 134	4.9E-01
I 135	2.4E-01
XE 135M	1.1E-02
XE 135	3.1E-02
CS 135	2.0E-13
XE 137	0.0E+00
CS 137	0.0E+00
XE 138	0.0E+00
CS 138	0.0E+00
PU 240	1.4E-15
PU 238	1.4E-14
PU 242	0.0E+00
PU 241	7.6E-19
U 237	4.7E-14
AM 241	2.0E-13
PU 239	1.4E-15

Total	1.2E+00

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GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Spring: FMEF CRITICALITY INGESTION DOSES UNIT X/Q

Executed on: 10/23/97 at 15:59:05

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Sv

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
KR 83M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 131	1.1E-01	3.4E-01	4.9E-02	4.9E-02	4.7E-02	1.9E-01	1.0E-01	4.1E-02
XE 131M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 132	5.2E-05	1.3E-03	6.2E-05	6.6E-05	5.4E-05	3.7E-05	4.4E-05	4.4E-05
I 133	6.0E-02	7.5E-01	5.5E-02	5.6E-02	5.2E-02	4.6E-02	5.5E-02	5.0E-02
XE 133M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 133	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 134	5.1E-07	2.2E-05	6.6E-07	7.0E-07	5.1E-07	3.1E-07	4.3E-07	3.6E-07
I 135	8.5E-03	1.2E-01	9.4E-03	9.4E-03	9.0E-03	6.3E-03	7.6E-03	7.6E-03
XE 135M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 135	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 135	1.6E-07	1.6E-07	1.6E-07	1.6E-07	1.6E-07	1.9E-07	2.0E-07	1.6E-07
XE 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PU 240	7.4E-14	1.1E-11	2.7E-11	1.5E-10	4.9E-10	1.5E-07	1.2E-08	2.1E-09
PU 238	7.6E-13	1.1E-10	2.8E-10	1.7E-09	5.0E-09	1.4E-06	1.1E-07	1.9E-08
PU 242	5.3E-16	7.8E-14	1.8E-13	1.0E-12	3.3E-12	1.0E-09	8.4E-11	1.4E-11
PU 241	1.4E-12	1.5E-11	4.0E-11	2.3E-10	6.5E-10	8.7E-07	6.8E-08	1.3E-08
U 237	1.4E-16	1.8E-14	4.7E-14	2.2E-13	5.7E-13	2.2E-15	3.7E-15	7.7E-16
AM 241	5.7E-13	2.2E-11	5.2E-11	3.0E-10	9.1E-10	1.7E-07	1.3E-08	2.2E-09
PU 239	3.2E-14	5.0E-12	1.2E-11	7.1E-11	2.2E-10	7.1E-08	5.5E-09	9.8E-10
Total	1.8E-01	1.2E+00	1.1E-01	1.1E-01	1.1E-01	2.5E-01	1.6E-01	9.8E-02

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GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Spring: FMEF CRITICALITY INGESTION DOSES UNIT X/Q

Executed on: 10/23/97 at 15:59:05

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Sv

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver
KR 83M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 131	4.4E-02	1.4E-01	5.0E+02	0.0E+00	0.0E+00
XE 131M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 132	4.6E-05	5.0E-05	7.1E-03	0.0E+00	0.0E+00
I 133	4.8E-02	6.3E-02	1.2E+02	0.0E+00	0.0E+00
XE 133M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 133	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 134	4.3E-07	4.7E-07	2.3E-05	0.0E+00	0.0E+00
I 135	8.3E-03	8.5E-03	3.8E+00	0.0E+00	0.0E+00
XE 135M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 135	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 135	1.6E-07	1.6E-07	1.6E-07	0.0E+00	0.0E+00
XE 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PU 240	2.1E-09	7.3E-14	6.7E-14	0.0E+00	2.7E-08
PU 238	1.8E-08	7.5E-13	7.1E-13	0.0E+00	2.5E-07
PU 242	1.5E-11	5.3E-16	4.8E-16	0.0E+00	1.9E-10
PU 241	1.3E-08	8.3E-13	3.5E-13	0.0E+00	1.3E-07
U 237	1.2E-14	1.1E-15	1.5E-17	1.9E-15	0.0E+00
AM 241	2.2E-09	4.5E-13	2.2E-13	0.0E+00	3.4E-08
PU 239	9.8E-10	3.2E-14	3.1E-14	0.0E+00	1.3E-08
Total	1.0E-01	2.1E-01	6.3E+02	1.9E-15	4.6E-07

External Dose by Radionuclide

Radionuclide	
KR 83M	0.0E+00
KR 85M	0.0E+00
KR 85	0.0E+00
KR 87	0.0E+00
RB 87	0.0E+00
KR 88	0.0E+00
RB 88	0.0E+00
KR 89	0.0E+00
RB 89	0.0E+00
SR 89	0.0E+00
I 131	3.9E-02
XE 131M	2.8E-06
I 132	3.2E-01

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I 133	1.0E-01
XE 133M	1.0E-04
XE 133	2.3E-03
I 134	4.9E-01
I 135	2.4E-01
XE 135M	1.1E-02
XE 135	3.1E-02
CS 135	9.6E-12
XE 137	0.0E+00
CS 137	0.0E+00
XE 138	0.0E+00
CS 138	0.0E+00
PU 240	6.6E-14
PU 238	5.5E-13
PU 242	0.0E+00
PU 241	1.4E-17
U 237	9.2E-13
AM 241	9.7E-11
PU 239	6.7E-14

Total	1.2E+00

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GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Summer: FMEF CRITICALITY INGESTION DOSES UNIT X/Q

Executed on: 10/23/97 at 15:59:50

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Sv

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	1.3E-01	2.5E-01	3.1E-02
Breast	2.6E-01	1.5E-01	3.9E-02
R Marrow	2.0E-01	1.2E-01	2.5E-02
Lung	2.3E-01	1.2E-01	2.7E-02
Thyroid	7.9E+02	3.0E-02	2.4E+01
Bone Sur	3.1E-01	3.0E-02	9.3E-03
Stomach	1.5E+00	6.0E-02	9.0E-02
UL Int.	1.4E-01	6.0E-02	8.6E-03
S Int.	1.4E-01	6.0E-02	8.5E-03
LL Int.	1.3E-01	6.0E-02	8.1E-03
Liver	6.2E-06	6.0E-02	3.7E-07
Internal Effective Dose Equivalent			2.4E+01
External Dose			1.2E+00
Annual Effective Dose Equivalent			2.5E+01

Controlling Organ: Thyroid
Controlling Pathway: Ing
Controlling Radionuclide: I-131

Total Inhalation EDE: 0.0E+00
Total Ingestion EDE: 2.4E+01

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Summer: FMEI CRITICALITY INGESTION DOSES UNIT X/Q

Executed on: 10/23/97 at 15:59:50

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Sv

	Dose Commitment Year				
	1	2	3	...	
Internal Intake					
Year: 3			3.8E-10	...	
			+		
2		3.8E-10	4.5E-11	...	Internal Effective Dose
		+	+		Equivalent
1	2.4E+01	7.1E-08	4.8E-08	+ ... = 2.4E+01	
Internal Annual Dose	2.4E+01	7.1E-08	4.8E-08	+ ... = 2.4E+01	Cumulative Internal Dose
	+	+	+	+	
External Annual Dose	1.2E+00	6.0E-13	7.4E-13	...	1.2E+00
Annual Dose	2.5E+01	7.1E-08	4.8E-08	+ ... = 2.5E+01	Cumulative Dose
				2.5E+01	Maximum Annual Dose Occurred In Year 1

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GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Summer: FMEF CRITICALITY INGESTION DOSES UNIT X/Q

Executed on: 10/23/97 at 15:59:50

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Sv

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Leaf Veg	1.9E-02	1.3E-01	1.2E-02	1.2E-02	1.1E-02	2.6E-02	1.7E-02	1.0E-02
Oth. Veg	3.4E-04	1.0E-03	1.5E-04	1.5E-04	1.4E-04	5.9E-04	3.0E-04	1.2E-04
Fruit	3.5E-04	1.1E-03	1.5E-04	1.5E-04	1.4E-04	6.1E-04	3.1E-04	1.3E-04
Cereals	2.1E-08	2.2E-08	2.2E-08	2.5E-08	3.4E-08	5.2E-06	4.4E-07	9.4E-08
Meat	2.7E-03	8.1E-03	1.2E-03	1.2E-03	1.1E-03	4.6E-03	2.4E-03	9.7E-04
Poultry	9.8E-08	2.9E-07	4.4E-08	4.4E-08	4.2E-08	1.7E-07	8.8E-08	3.7E-08
Cow Milk	2.1E-01	1.4E+00	1.3E-01	1.3E-01	1.2E-01	2.8E-01	1.8E-01	1.1E-01
Eggs	2.5E-05	7.5E-05	1.1E-05	1.1E-05	1.0E-05	4.3E-05	2.2E-05	9.0E-06
Soil Ing	6.1E-06	8.2E-05	5.2E-06	5.3E-06	4.7E-06	6.4E-06	5.4E-06	4.1E-06
Total	2.3E-01	1.5E+00	1.4E-01	1.4E-01	1.3E-01	3.1E-01	2.0E-01	1.2E-01

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver
Leaf Veg	1.1E-02	2.2E-02	6.6E+01	1.3E-15	4.1E-07
Oth. Veg	1.3E-04	4.1E-04	1.5E+00	9.9E-15	2.4E-06
Fruit	1.4E-04	4.2E-04	1.5E+00	1.0E-14	2.5E-06
Cereals	9.3E-08	2.1E-08	1.7E-07	3.6E-15	8.9E-07
Meat	1.1E-03	3.2E-03	1.2E+01	2.0E-17	3.8E-10
Poultry	4.0E-08	1.2E-07	4.3E-04	1.1E-16	3.6E-12
Cow Milk	1.1E-01	2.4E-01	7.1E+02	5.7E-16	3.8E-11
Eggs	9.8E-06	3.0E-05	1.1E-01	1.5E-16	3.2E-10
Soil Ing	4.3E-06	6.5E-06	1.3E-02	3.0E-18	7.8E-10
Total	1.3E-01	2.6E-01	7.9E+02	2.6E-14	6.2E-06

External Dose by Exposure Pathway

Pathway	
Sur Soil	1.2E+00
Total	1.2E+00

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GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Summer: FMEF CRITICALITY INGESTION DOSES UNIT X/Q

Executed on: 10/23/97 at 15:59:50

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Sv

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Leaf Veg	1.9E-02	1.3E-01	1.2E-02	1.2E-02	1.1E-02	2.6E-02	1.7E-02	1.0E-02
Oth. Veg	3.4E-04	1.0E-03	1.5E-04	1.5E-04	1.4E-04	5.9E-04	3.0E-04	1.2E-04
Fruit	3.5E-04	1.1E-03	1.5E-04	1.5E-04	1.4E-04	6.1E-04	3.1E-04	1.3E-04
Cereals	2.2E-08	2.3E-08	2.2E-08	2.6E-08	3.5E-08	5.2E-06	4.4E-07	9.5E-08
Meat	2.7E-03	8.1E-03	1.2E-03	1.2E-03	1.1E-03	4.6E-03	2.4E-03	9.7E-04
Poultry	9.9E-08	2.9E-07	4.4E-08	4.4E-08	4.2E-08	1.7E-07	8.9E-08	3.7E-08
Cow Milk	2.1E-01	1.4E+00	1.3E-01	1.3E-01	1.2E-01	2.8E-01	1.8E-01	1.1E-01
Eggs	2.5E-05	7.5E-05	1.1E-05	1.1E-05	1.0E-05	4.3E-05	2.2E-05	9.0E-06
Soil Ing	6.1E-06	8.2E-05	5.2E-06	5.3E-06	4.7E-06	6.6E-06	5.4E-06	4.1E-06
Total	2.3E-01	1.5E+00	1.4E-01	1.4E-01	1.3E-01	3.1E-01	2.0E-01	1.2E-01

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver
Leaf Veg	1.1E-02	2.2E-02	6.6E+01	1.3E-15	4.1E-07
Oth. Veg	1.3E-04	4.1E-04	1.5E+00	1.0E-14	2.4E-06
Fruit	1.4E-04	4.2E-04	1.5E+00	1.0E-14	2.5E-06
Cereals	9.4E-08	2.2E-08	1.7E-07	3.6E-15	8.9E-07
Meat	1.1E-03	3.2E-03	1.2E+01	2.0E-17	3.8E-10
Poultry	4.0E-08	1.2E-07	4.3E-04	1.1E-16	3.6E-12
Cow Milk	1.1E-01	2.4E-01	7.1E+02	5.7E-16	3.8E-11
Eggs	9.8E-06	3.0E-05	1.1E-01	1.5E-16	3.2E-10
Soil Ing	4.3E-06	6.5E-06	1.3E-02	6.1E-17	2.6E-08
Total	1.3E-01	2.6E-01	7.9E+02	2.6E-14	6.2E-06

External Dose by Exposure Pathway

Pathway	
Sur Soil	1.2E+00
Total	1.2E+00

HNF-SD-FF-CN-012, Rev 0

----- GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Summer: FMEF CRITICALITY INGESTION DOSES UNIT X/Q

Executed on: 10/23/97 at 15:59:50

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Acute release

Uptake/exposure period:

50.0

Dose commitment period:

50.0

Dose units:

Sv

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
KR 83M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 131	1.4E-01	4.4E-01	6.3E-02	6.3E-02	6.0E-02	2.5E-01	1.3E-01	5.2E-02
XE 131M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 132	6.3E-05	1.5E-03	7.4E-05	7.9E-05	6.5E-05	4.4E-05	5.4E-05	5.4E-05
I 133	7.4E-02	9.2E-01	6.7E-02	6.9E-02	6.4E-02	5.6E-02	6.7E-02	6.1E-02
XE 133M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 133	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 134	5.1E-07	2.2E-05	6.4E-07	7.0E-07	5.1E-07	3.1E-07	4.3E-07	3.6E-07
I 135	1.0E-02	1.5E-01	1.2E-02	1.2E-02	1.1E-02	7.7E-03	9.3E-03	9.3E-03
XE 135M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 135	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 135	3.0E-07	3.2E-07	3.0E-07	3.0E-07	3.0E-07	3.7E-07	3.8E-07	3.0E-07
XE 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PU 240	9.7E-13	1.4E-10	3.5E-10	2.0E-09	6.4E-09	2.1E-06	1.6E-07	2.9E-08
PU 238	1.0E-11	1.5E-09	3.8E-09	2.2E-08	6.7E-08	1.9E-05	1.5E-06	2.6E-07
PU 242	6.9E-15	1.0E-12	2.4E-12	1.4E-11	4.3E-11	1.4E-08	1.1E-09	2.0E-10
PU 241	2.0E-11	2.2E-10	5.6E-10	3.2E-09	9.2E-09	1.2E-05	9.7E-07	1.9E-07
U 237	1.9E-15	2.4E-13	6.4E-13	2.9E-12	7.7E-12	3.0E-14	5.0E-16	1.0E-14
AN 241	3.1E-12	1.2E-10	2.8E-10	1.6E-09	4.8E-09	1.5E-06	1.2E-07	2.1E-08
PU 239	4.2E-13	6.4E-11	1.6E-10	9.1E-10	2.8E-09	9.6E-07	7.4E-08	1.3E-08
Total	2.3E-01	1.5E+00	1.4E-01	1.4E-01	1.3E-01	3.1E-01	2.0E-01	1.2E-01

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Summer: FMEF CRITICALITY INGESTION DOSES UNIT X/O

Executed on: 10/23/97 at 15:59:50

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Sv

Committed Dose Equivalent by Radionuclide

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver
KR 83M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 131	5.7E-02	1.7E-01	6.4E+02	0.0E+00	0.0E+00
XE 131M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 132	5.6E-05	6.1E-05	8.6E-03	0.0E+00	0.0E+00
I 133	5.9E-02	7.7E-02	1.5E+02	0.0E+00	0.0E+00
XE 133M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 133	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 134	4.3E-07	4.7E-07	2.3E-05	0.0E+00	0.0E+00
I 135	1.0E-02	1.0E-02	4.7E+00	0.0E+00	0.0E+00
XE 135M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 135	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 135	3.0E-07	3.0E-07	3.0E-07	0.0E+00	0.0E+00
XE 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PU 240	2.9E-08	9.6E-13	8.9E-13	0.0E+00	3.7E-07
PU 238	2.6E-07	1.0E-11	9.4E-12	0.0E+00	3.5E-06
PU 242	2.0E-10	7.0E-15	6.3E-15	0.0E+00	2.5E-09
PU 241	1.8E-07	1.2E-11	4.9E-12	0.0E+00	1.9E-06
U 237	1.6E-13	1.5E-14	2.0E-16	2.6E-14	0.0E+00
AM 241	2.1E-08	2.4E-12	1.2E-12	0.0E+00	2.7E-07
PU 239	1.3E-08	4.2E-13	4.0E-13	0.0E+00	1.7E-07
Total	1.3E-01	2.6E-01	7.9E+02	2.6E-14	6.2E-06

External Dose by Radionuclide

Radionuclide	
KR 83M	0.0E+00
KR 85M	0.0E+00
KR 85	0.0E+00
KR 87	0.0E+00
RB 87	0.0E+00
KR 88	0.0E+00
RB 88	0.0E+00
KR 89	0.0E+00
RB 89	0.0E+00
SR 89	0.0E+00
I 131	3.9E-02
XE 131M	2.8E-06
I 132	3.2E-01

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I 133	1.0E-01
XE 133M	1.0E-04
XE 133	2.3E-03
I 134	4.9E-01
I 135	2.4E-01
XE 135M	1.1E-02
XE 135	3.1E-02
CS 135	2.0E-13
XE 137	0.0E+00
CS 137	0.0E+00
XE 138	0.0E+00
CS 138	0.0E+00
PU 240	1.4E-15
PU 238	1.4E-14
PU 242	0.0E+00
PU 241	7.6E-19
U 237	4.7E-14
AM 241	2.0E-13
PU 239	1.4E-15

Total	1.2E+00

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Summer: FMEF CRITICALITY INGESTION DOSES UNIT X/Q

Executed on: 10/23/97 at 15:59:50

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Sv

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
KR 83M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 131	1.4E-01	4.4E-01	6.3E-02	6.3E-02	6.0E-02	2.5E-01	1.3E-01	5.2E-02
XE 131M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 132	6.3E-05	1.5E-03	7.4E-05	7.9E-05	6.5E-05	4.4E-05	5.4E-05	5.4E-05
I 133	7.4E-02	9.2E-01	6.7E-02	6.9E-02	6.4E-02	5.6E-02	6.7E-02	6.1E-02
XE 133M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 133	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 134	5.1E-07	2.2E-05	6.6E-07	7.0E-07	5.1E-07	3.1E-07	4.3E-07	3.6E-07
I 135	1.0E-02	1.5E-01	1.2E-02	1.2E-02	1.1E-02	7.7E-03	9.3E-03	9.3E-03
XE 135M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 135	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 135	3.2E-07	3.4E-07	3.2E-07	3.2E-07	3.2E-07	3.9E-07	4.1E-07	3.2E-07
XE 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PU 240	9.8E-13	1.4E-10	3.6E-10	2.0E-09	6.4E-09	2.1E-06	1.5E-07	2.9E-08
PU 238	1.0E-11	1.5E-09	3.8E-09	2.3E-08	6.8E-08	1.9E-05	1.5E-06	2.6E-07
PU 242	6.9E-15	1.0E-12	2.4E-12	1.4E-11	4.4E-11	1.4E-08	1.2E-09	2.0E-10
PU 241	2.0E-11	2.2E-10	5.7E-10	3.2E-09	9.2E-09	1.2E-05	9.7E-07	1.9E-07
U 237	1.9E-15	2.4E-13	6.4E-13	2.9E-12	7.7E-12	3.0E-14	5.0E-14	1.0E-14
AM 241	3.5E-12	1.3E-10	3.2E-10	1.8E-09	5.5E-09	1.6E-06	1.3E-07	2.3E-08
PU 239	4.2E-13	6.5E-11	1.6E-10	9.2E-10	2.9E-09	9.7E-07	7.5E-08	1.3E-08
Total	2.3E-01	1.5E+00	1.4E-01	1.4E-01	1.3E-01	3.1E-01	2.0E-01	1.2E-01

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Summer: FMEF CRITICALITY INGESTION DOSES UNIT X/Q

Executed on: 10/23/97 at 15:59:50

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Sv

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver
KR 83M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 131	5.7E-02	1.7E-01	6.4E-02	0.0E+00	0.0E+00
XE 131M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 132	5.6E-05	6.1E-05	8.6E-03	0.0E+00	0.0E+00
I 133	5.9E-02	7.7E-02	1.5E-02	0.0E+00	0.0E+00
XE 133M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 133	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 134	4.3E-07	4.7E-07	2.3E-05	0.0E+00	0.0E+00
I 135	1.0E-02	1.0E-02	4.7E+00	0.0E+00	0.0E+00
XE 135M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 135	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 135	3.2E-07	3.2E-07	3.2E-07	0.0E+00	0.0E+00
XE 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PU 240	2.9E-08	9.6E-13	8.9E-13	0.0E+00	3.7E-07
PU 238	2.6E-07	1.0E-11	9.5E-12	0.0E+00	3.5E-06
PU 242	2.0E-10	7.0E-15	6.3E-15	0.0E+00	2.5E-09
PU 241	1.8E-07	1.2E-11	4.9E-12	0.0E+00	1.9E-06
U 237	1.6E-13	1.6E-14	2.0E-16	2.6E-14	0.0E+00
AM 241	2.2E-08	2.8E-12	1.3E-12	0.0E+00	2.9E-07
PU 239	1.3E-08	4.2E-13	4.0E-13	0.0E+00	1.7E-07
Total	1.3E-01	2.6E-01	7.9E+02	2.6E-14	6.2E-06

External Dose by Radionuclide

Radionuclide	
KR 83M	0.0E+00
KR 85M	0.0E+00
KR 85	0.0E+00
KR 87	0.0E+00
RB 87	0.0E+00
KR 88	0.0E+00
RB 88	0.0E+00
KR 89	0.0E+00
RB 89	0.0E+00
SR 89	0.0E+00
I 131	3.9E-02
XE 131M	2.8E-06
I 132	3.2E-01

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I 133	1.0E-01
XE 133M	1.0E-04
XE 133	2.3E-03
I 134	4.9E-01
I 135	2.4E-01
XE 135M	1.1E-02
XE 135	3.1E-02
CS 135	9.6E-12
XE 137	0.0E+00
CS 137	0.0E+00
XE 138	0.0E+00
CS 138	0.0E+00
PU 240	6.6E-14
PU 238	5.5E-13
PU 242	0.0E+00
PU 241	1.4E-17
U 237	9.2E-13
AM 241	9.7E-11
PU 239	6.7E-14

Total	1.2E+00

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Autumn: FMEF CRITICALITY INGESTION DOSES UNIT X/Q

Executed on: 10/23/97 at 16:00:35

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Sv

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	1.5E-01	2.5E-01	3.8E-02
Breast	3.6E-01	1.5E-01	5.3E-02
R Marrow	2.7E-01	1.2E-01	3.3E-02
Lung	3.0E-01	1.2E-01	3.7E-02
Thyroid	1.2E+03	3.0E-02	3.5E+01
Bone Sur	4.5E-01	3.0E-02	1.4E-02
Stomach	1.7E+00	6.0E-02	9.9E-02
UL Int.	1.7E-01	6.0E-02	1.0E-02
S Int.	1.7E-01	6.0E-02	1.0E-02
LL Int.	1.6E-01	6.0E-02	9.7E-03
Liver	3.3E-05	6.0E-02	2.0E-06
Internal Effective Dose Equivalent			3.5E+01
External Dose			1.2E+00
Annual Effective Dose Equivalent			3.6E+01

Controlling Organ:	Thyroid
Controlling Pathway:	Ing
Controlling Radionuclide:	I 131

Total Inhalation EDE:	0.0E+00
Total Ingestion EDE:	3.5E+01

Executed on: 10/23/97 at 16:00:35

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SV 50.0
50.0

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GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Autumn: FMEF CRITICALITY INGESTION DOSES UNIT X/Q

Executed on: 10/23/97 at 16:00:35

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Sv

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Leaf Veg	2.6E-02	1.5E-01	1.5E-02	1.5E-02	1.5E-02	3.8E-02	2.4E-02	1.3E-02
Oth. Veg	1.9E-02	6.2E-02	8.5E-03	8.5E-03	8.1E-03	3.3E-02	1.7E-02	7.2E-03
Fruit	1.9E-02	6.2E-02	8.5E-03	8.5E-03	8.1E-03	3.3E-02	1.7E-02	7.2E-03
Cereals	9.1E-08	1.0E-07	9.3E-08	1.1E-07	1.5E-07	2.3E-05	1.9E-06	4.1E-07
Meat	3.4E-03	1.0E-02	1.5E-03	1.5E-03	1.4E-03	5.8E-03	3.0E-03	1.2E-03
Poultry	6.7E-06	3.9E-05	3.9E-06	3.9E-06	3.7E-06	9.6E-06	6.0E-06	3.4E-06
Cow Milk	2.3E-01	1.4E+00	1.4E-01	1.4E-01	1.3E-01	3.4E-01	2.1E-01	1.2E-01
Eggs	1.8E-03	1.0E-02	1.0E-03	1.0E-03	9.8E-04	2.6E-03	1.6E-03	8.9E-04
Soil Ing	6.1E-06	8.2E-05	5.2E-06	5.3E-06	4.7E-06	6.4E-06	5.4E-06	4.1E-06
Total	3.0E-01	1.7E+00	1.7E-01	1.7E-01	1.6E-01	4.5E-01	2.7E-01	1.5E-01

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver
Leaf Veg	1.4E-02	3.1E-02	9.7E+01	3.0E-14	7.4E-06
Oth. Veg	7.7E-03	2.3E-02	8.4E+01	4.2E-14	1.0E-05
Fruit	7.7E-03	2.3E-02	8.4E+01	4.5E-14	1.1E-05
Cereals	4.1E-07	9.1E-08	8.4E-06	1.6E-14	3.9E-06
Meat	1.3E-03	4.1E-03	1.5E+01	4.2E-16	6.1E-09
Poultry	3.5E-06	7.8E-06	2.5E-02	4.8E-16	1.6E-11
Cow Milk	1.2E-01	2.7E-01	8.7E+02	1.2E-14	5.7E-10
Eggs	9.2E-04	2.1E-03	6.6E+00	6.3E-16	1.4E-09
Soil Ing	4.3E-06	6.5E-06	1.3E-02	3.0E-18	7.8E-10
Total	1.5E-01	3.6E-01	1.2E+03	1.5E-13	3.3E-05

External Dose by Exposure Pathway

Pathway	
Sur Soil	1.2E+00
Total	1.2E+00

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GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Autumn: FMEF CRITICALITY INGESTION DOSES UNIT X/Q

Executed on: 10/23/97 at 16:00:35

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Sv

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Leaf Veg	2.6E-02	1.5E-01	1.5E-02	1.5E-02	1.5E-02	3.8E-02	2.4E-02	1.3E-02
Oth. Veg	1.9E-02	6.2E-02	8.5E-03	8.5E-03	8.1E-03	3.3E-02	1.7E-02	7.2E-03
Fruit	1.9E-02	6.2E-02	8.5E-03	8.5E-03	8.1E-03	3.3E-02	1.7E-02	7.2E-03
Cereals	9.1E-08	1.0E-07	9.4E-08	1.1E-07	1.5E-07	2.3E-05	1.9E-06	4.2E-07
Meat	3.4E-03	1.0E-02	1.5E-03	1.5E-03	1.4E-03	5.8E-03	3.0E-03	1.2E-03
Poultry	6.7E-06	3.9E-05	3.9E-06	3.9E-06	3.7E-06	9.6E-06	6.0E-06	3.4E-06
Cow Milk	2.3E-01	1.4E+00	1.4E-01	1.4E-01	1.3E-01	3.4E-01	2.1E-01	1.2E-01
Eggs	1.8E-03	1.0E-02	1.0E-03	1.0E-03	9.8E-04	2.6E-03	1.6E-03	8.9E-04
Soil Ing	6.1E-06	8.2E-05	5.2E-06	5.3E-06	4.7E-06	6.6E-06	5.4E-06	4.1E-06
Total	3.0E-01	1.7E+00	1.7E-01	1.7E-01	1.6E-01	4.5E-01	2.7E-01	1.5E-01

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver
Leaf Veg	1.4E-02	3.1E-02	9.7E+01	3.0E-14	7.4E-06
Oth. Veg	7.7E-03	2.3E-02	8.4E+01	4.2E-14	1.0E-05
Fruit	7.7E-03	2.3E-02	8.4E+01	4.5E-14	1.1E-05
Cereals	4.1E-07	9.2E-08	8.4E-06	1.6E-14	3.9E-06
Meat	1.3E-03	4.1E-03	1.5E+01	4.2E-16	6.1E-09
Poultry	3.5E-06	7.8E-06	2.5E-02	4.8E-16	1.6E-11
Cow Milk	1.2E-01	2.7E-01	8.7E+02	1.2E-14	5.7E-10
Eggs	9.2E-04	2.1E-03	6.6E+00	6.3E-16	1.4E-09
Soil Ing	4.3E-06	6.5E-06	1.3E-02	6.1E-17	2.6E-08
Total	1.5E-01	3.6E-01	1.2E+03	1.5E-13	3.3E-05

External Dose by Exposure Pathway

Pathway	
Sur Soil	1.2E+00
Total	1.2E+00

HNF-SD-FF-CN-012, Rev 0

----- GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Autumn: FMEF CRITICALITY INGESTION DOSES UNIT X/Q

Executed on: 10/23/97 at 16:00:35

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Sv

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
KR 83M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 131	2.3E-01	7.0E-01	1.0E-01	1.0E-01	9.5E-02	3.9E-01	2.0E-01	8.3E-02
XE 131M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 132	5.2E-05	1.3E-03	6.2E-05	6.6E-05	5.4E-05	3.7E-05	4.5E-05	4.5E-05
I 133	6.6E-02	8.3E-01	6.1E-02	6.2E-02	5.8E-02	5.0E-02	6.1E-02	5.5E-02
XE 133M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 133	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 134	5.1E-07	2.2E-05	6.6E-07	7.0E-07	5.1E-07	3.1E-07	4.3E-07	3.6E-07
I 135	9.0E-03	1.3E-01	9.9E-03	9.9E-03	9.4E-03	6.6E-03	8.0E-03	8.0E-03
XE 135M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 135	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 135	3.1E-06	3.3E-06	3.1E-06	3.1E-06	3.1E-06	3.9E-06	4.0E-06	3.1E-06
XE 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PU 240	5.2E-12	7.6E-10	1.9E-09	1.1E-08	3.4E-08	1.1E-05	8.8E-07	1.6E-07
PU 238	5.4E-11	8.1E-09	2.0E-08	1.2E-07	3.6E-07	1.0E-04	8.0E-06	1.4E-06
PU 242	3.8E-14	5.6E-12	1.3E-11	7.4E-11	2.4E-10	7.6E-08	6.3E-09	1.1E-09
PU 241	1.0E-10	1.1E-09	3.0E-09	1.7E-08	4.9E-08	6.6E-05	5.1E-06	9.8E-07
U 237	1.1E-14	1.4E-12	3.6E-12	1.7E-11	4.3E-11	1.7E-13	2.8E-13	5.9E-14
AM 241	1.6E-11	5.9E-10	1.4E-09	8.0E-09	2.4E-08	7.7E-06	6.0E-07	1.1E-07
PU 239	2.2E-12	3.4E-10	8.6E-10	4.9E-09	1.5E-08	5.2E-06	4.0E-07	7.1E-08
Total	3.0E-01	1.7E+00	1.7E-01	1.7E-01	1.6E-01	4.5E-01	2.7E-01	1.5E-01

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Autumn: FMEF CRITICALITY INGESTION DOSES UNIT X/Q

Executed on: 10/23/97 at 16:00:35

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Sv

Committed Dose Equivalent by Radionuclide

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver
KR 83M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 131	9.0E-02	2.8E-01	1.0E+03	0.0E+00	0.0E+00
XE 131M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 132	4.7E-05	5.0E-05	7.2E-03	0.0E+00	0.0E+00
I 133	5.3E-02	6.9E-02	1.3E+02	0.0E+00	0.0E+00
XE 133M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 133	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 134	4.3E-07	4.7E-07	2.3E-05	0.0E+00	0.0E+00
I 135	8.7E-03	9.0E-03	4.0E+00	0.0E+00	0.0E+00
XE 135M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 135	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 135	3.1E-06	3.1E-06	3.1E-06	0.0E+00	0.0E+00
XE 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PU 240	1.6E-07	5.1E-12	4.8E-12	0.0E+00	2.0E-06
PU 238	1.4E-06	5.3E-11	5.0E-11	0.0E+00	1.8E-05
PU 242	1.1E-09	3.8E-14	3.4E-14	0.0E+00	1.4E-08
PU 241	9.7E-07	6.2E-11	2.6E-11	0.0E+00	1.0E-05
U 237	9.3E-13	8.8E-14	1.1E-15	1.5E-13	0.0E+00
AM 241	1.1E-07	1.2E-11	5.9E-12	0.0E+00	1.4E-06
PU 239	7.1E-08	2.2E-12	2.1E-12	0.0E+00	9.0E-07
Total	1.5E-01	3.6E-01	1.2E+03	1.5E-13	3.3E-05

External Dose by Radionuclide

Radionuclide	
KR 83M	0.0E+00
KR 85M	0.0E+00
KR 85	0.0E+00
KR 87	0.0E+00
RB 87	0.0E+00
KR 88	0.0E+00
RB 88	0.0E+00
KR 89	0.0E+00
RB 89	0.0E+00
SR 89	0.0E+00
I 131	3.9E-02
XE 131M	2.8E-06
I 132	3.2E-01

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I 133	1.0E-01
XE 133M	1.0E-04
XE 133	2.3E-03
I 134	4.9E-01
I 135	2.4E-01
XE 135M	1.1E-02
XE 135	3.1E-02
CS 135	2.0E-13
XE 137	0.0E+00
CS 137	0.0E+00
XE 138	0.0E+00
CS 138	0.0E+00
PU 240	1.4E-15
PU 238	1.4E-14
PU 242	0.0E+00
PU 241	7.6E-19
U 237	4.7E-14
AM 241	2.0E-13
PU 239	1.4E-15

Total	1.2E+00

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Autumn: FMEF CRITICALITY INGESTION DOSES UNIT X/Q

Executed on: 10/23/97 at 16:00:35

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Sv

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
KR 83M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 131	2.3E-01	7.0E-01	1.0E-01	1.0E-01	9.5E-02	3.9E-01	2.0E-01	8.3E-02
XE 131M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 132	5.2E-05	1.3E-03	6.2E-05	6.6E-05	5.4E-05	3.7E-05	4.5E-05	4.5E-05
I 133	6.6E-02	8.3E-01	6.1E-02	6.2E-02	5.8E-02	5.0E-02	6.1E-02	5.5E-02
XE 133M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 133	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 134	5.1E-07	2.2E-05	6.6E-07	7.0E-07	5.1E-07	3.1E-07	4.3E-07	3.6E-07
I 135	9.0E-03	1.3E-01	9.9E-03	9.9E-03	9.4E-03	6.6E-03	8.0E-03	8.0E-03
XE 135M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 135	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 135	3.2E-06	3.3E-06	3.2E-06	3.2E-06	3.2E-06	3.9E-06	4.0E-06	3.2E-06
XE 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PU 240	5.2E-12	7.6E-10	1.9E-09	1.1E-08	3.4E-08	1.1E-05	8.8E-07	1.6E-07
PU 238	5.4E-11	8.1E-09	2.0E-08	1.2E-07	3.6E-07	1.0E-04	8.0E-06	1.4E-06
PU 242	3.8E-14	5.6E-12	1.3E-11	7.5E-11	2.4E-10	7.6E-08	6.3E-09	1.1E-09
PU 241	1.0E-10	1.1E-09	3.0E-09	1.7E-08	4.9E-08	6.6E-05	5.1E-06	9.8E-07
U 237	1.1E-14	1.4E-12	3.6E-12	1.7E-11	4.3E-11	1.7E-13	2.8E-13	5.9E-14
AM 241	1.6E-11	6.1E-10	1.4E-09	8.2E-09	2.5E-08	7.8E-06	6.1E-07	1.1E-07
PU 239	2.2E-12	3.4E-10	8.6E-10	4.9E-09	1.5E-08	5.2E-06	4.0E-07	7.1E-08
Total	3.0E-01	1.7E+00	1.7E-01	1.7E-01	1.6E-01	4.5E-01	2.7E-01	1.5E-01

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Autumn: FMEF CRITICALITY INGESTION DOSES UNIT X/Q

Executed on: 10/23/97 at 16:00:35

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Sv

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver
KR 83M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 85	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 87	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 88	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
KR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RB 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SR 89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 131	9.0E-02	2.8E-01	1.0E+03	0.0E+00	0.0E+00
XE 131M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 132	4.7E-05	5.0E-05	7.2E-03	0.0E+00	0.0E+00
I 133	5.3E-02	6.9E-02	1.3E+02	0.0E+00	0.0E+00
XE 133M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 133	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I 134	4.3E-07	4.7E-07	2.3E-05	0.0E+00	0.0E+00
I 135	8.7E-03	9.0E-03	4.0E+00	0.0E+00	0.0E+00
XE 135M	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 135	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 135	3.2E-06	3.2E-06	3.2E-06	0.0E+00	0.0E+00
XE 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 137	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
XE 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CS 138	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PU 240	1.6E-07	5.2E-12	4.8E-12	0.0E+00	2.0E-06
PU 238	1.4E-06	5.3E-11	5.0E-11	0.0E+00	1.8E-05
PU 242	1.1E-09	3.8E-14	3.4E-14	0.0E+00	1.4E-08
PU 241	9.7E-07	6.2E-11	2.6E-11	0.0E+00	1.0E-05
U 237	9.3E-13	8.8E-14	1.1E-15	1.5E-13	0.0E+00
AM 241	1.1E-07	1.3E-11	6.1E-12	0.0E+00	1.4E-06
PU 239	7.1E-08	2.2E-12	2.1E-12	0.0E+00	9.0E-07
Total	1.5E-01	3.6E-01	1.2E+03	1.5E-13	3.3E-05

External Dose by Radionuclide

Radionuclide	
KR 83M	0.0E+00
KR 85M	0.0E+00
KR 85	0.0E+00
KR 87	0.0E+00
RB 87	0.0E+00
KR 88	0.0E+00
RB 88	0.0E+00
KR 89	0.0E+00
RB 89	0.0E+00
SR 89	0.0E+00
I 131	3.9E-02
XE 131M	2.8E-06
I 132	3.2E-01

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I 133	1.0E-01
XE 133M	1.0E-04
XE 133	2.3E-03
I 134	4.9E-01
I 135	2.4E-01
XE 135M	1.1E-02
XE 135	3.1E-02
CS 135	9.6E-12
XE 137	0.0E+00
CS 137	0.0E+00
XE 138	0.0E+00
CS 138	0.0E+00
PU 240	6.6E-14
PU 238	5.5E-13
PU 242	0.0E+00
PU 241	1.4E-17
U 237	9.2E-13
AM 241	9.7E-11
PU 239	6.7E-14

Total	1.2E+00

HNF-SD-FF-CN-012, Rev 0

 GENII Dose Calculation Program
 (Version 1.485 3-Dec-90)

Case title: FMEF release of 1 g of Pu-tritium mission worst case mix ons
 ite with BW

Executed on: 08/04/97 at 09:33:54

Page A. 1

 This is a far-field (wide-scale release, multiple site) scenario.
 Release is acute
 Individual dose

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
 Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
 Infinite plume, external
 Inhalation uptake

THE FOLLOWING TIMES ARE USED:
 Intake ends after (yr): 1.0
 Dose calculations ends after (yr): 50.0

===== FILENAMES AND TITLES OF FILES/LIBRARIES USED =====

Input file name: \GENII\FFTFPU02.IN
 GENII Default Parameter Values (28-Mar-90 RAP)
 Radionuclide Library - Times<100 years (23-July-93 PDR)
 External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
 PNL Solubilities, Yearly Dose Increments (23-Jul-93 PDR)

=====

----- Release Terms-----			
Release	Surface Buried		
Radio-	Air	Water	Source
nuclide	Ci/yr	Ci/yr	Ci/m3
PU238	5.0E-04	0.0E+00	0.0E+00
PU239	5.1E-02	0.0E+00	0.0E+00
PU240	1.2E-02	0.0E+00	0.0E+00
PU241	3.8E-02	0.0E+00	0.0E+00
PU242	3.5E-07	0.0E+00	0.0E+00
AM241	2.0E-02	0.0E+00	0.0E+00

===== AIR TRANSPORT =====
 1.5E-03 Input E/Q value (s/m3)

===== EXTERNAL EXPOSURE =====
 1.0E+00 Fraction of time spent in cloud

===== INHALATION =====
 Resuspension not considered

=====

Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

=====

 GENII Dose Calculation Program
 (Version 1.485 3-Dec-90)

HNF-SD-FF-CN-012, Rev 0

Case title: FMEF release of 1 g of Pu-tritium mission worst case mix ons

ite with BW

Executed on: 08/04/97 at 09:34:12

Page C. 1

Acute release
Uptake/exposure period: 1.0
Dose commitment period: 50.0
Dose units: Rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	2.5E+00	2.5E-01	6.3E-01
Breast	1.6E-04	1.5E-01	2.4E-05
R Marrow	1.4E+01	1.2E-01	1.7E+00
Lung	3.8E+01	1.2E-01	4.5E+00
Thyroid	1.1E-04	3.0E-02	3.3E-06
Bone Sur	1.8E+02	3.0E-02	5.5E+00
Liver	3.3E+01	6.0E-02	2.0E+00
LL Int.	4.9E-03	6.0E-02	3.0E-04
UL Int.	1.7E-03	6.0E-02	1.0E-04
S Int.	4.2E-04	6.0E-02	2.5E-05
Stomach	2.6E-04	6.0E-02	1.6E-05
Internal Effective Dose Equivalent			1.4E+01
External Dose			6.9E-08
Annual Effective Dose Equivalent			1.4E+01

Controlling Organ: Bone Sur
Controlling Pathway: Inh
Controlling Radionuclide: PU239
Total Inhalation EDE: 1.4E+01
Total Ingestion EDE: 0.0E+00

HNf-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: FMEF release of 1 g of Pu-tritium mission worst case mix ons
ite with BW

Executed on: 08/04/97 at 09:34:12

Page C. 2

Acute release
Uptake/exposure period: 1.0
Dose commitment period: 50.0
Dose units: Rem

		Dose Commitment Year				
		1	2	3	...	
Internal Intake	:					
Year:	3	0.0E+00 ...				
		+				
	2	0.0E+00 0.0E+00 ...				
		+				
	1	1.1E+00 + 8.1E-01 + 6.5E-01 + ... = 1.4E+01				
Internal Annual Dose		1.1E+00 + 8.1E-01 + 6.5E-01 + ... = 1.4E+01				
		+ + + +				
External Annual Dose		6.9E-08 0.0E+00 0.0E+00 ... 6.9E-08				
Annual Dose		1.1E+00 + 8.1E-01 + 6.5E-01 + ... = 1.4E+01				
		1.1E+00				

Internal Effective Dose Equivalent

Cumulative Internal Dose

Cumulative Dose

Maximum Annual Dose Occurred In Year 1

HNF-SD-FF-CN-012, Rev 0

----- GENII Dose Calculation Program (Version 1.485 3-Dec-90) -----

Case title: FMEF release of 1 g of Pu-tritium mission worst case mix ons
 ite with BW

Executed on: 08/04/97 at 09:34:12

Page C. 3

Acute release

Uptake/exposure period:

1.0

Dose commitment period:

50.0

Dose units:

Rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	3.8E+01	2.6E-04	4.2E-04	1.7E-03	4.9E-03	1.8E+02	1.4E+01	2.5E+00
Total	3.8E+01	2.6E-04	4.2E-04	1.7E-03	4.9E-03	1.8E+02	1.4E+01	2.5E+00

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	2.5E+00	1.6E-04	1.1E-04	3.3E+01
Total	2.5E+00	1.6E-04	1.1E-04	3.3E+01

External Dose by Exposure Pathway

Pathway	
Plume	6.9E-08
Total	6.9E-08

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: FMEF release of 1 g of Pu-tritium mission worst case mix ons
ite with BW

Executed on: 08/04/97 at 09:34:12

Page C. 4

Acute release

Uptake/exposure period:

1.0

Dose commitment period:

50.0

Dose units:

Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
PU 240	7.0E+00	2.5E-05	4.7E-05	2.3E-04	7.2E-04	1.9E+01	1.5E+00	2.6E-01
PU 238	2.9E-01	1.0E-06	2.0E-06	1.0E-05	3.1E-05	6.8E-01	5.4E-02	9.2E-03
PU 242	2.1E-04	7.3E-10	1.3E-09	6.6E-09	2.0E-08	5.1E-04	4.2E-05	7.1E-06
PU 241	2.2E-01	2.1E-06	2.0E-06	5.7E-06	1.3E-05	1.3E+00	9.9E-02	1.8E-02
U 237	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
AM 241	6.7E-01	1.3E-04	1.6E-04	4.8E-04	1.2E-03	8.1E+01	6.3E+00	1.1E+00
PU 239	3.0E+01	1.1E-04	2.0E-04	9.6E-04	3.0E-03	8.1E+01	6.3E+00	1.1E+00
Total	3.8E+01	2.6E-04	4.2E-04	1.7E-03	4.9E-03	1.8E+02	1.4E+01	2.5E+00

Radionuclide	Ovaries	Muscle	Thyroid	Liver
PU 240	2.6E-01	9.9E-06	8.6E-06	3.4E+00
PU 238	9.0E-03	4.2E-07	3.6E-07	1.3E-01
PU 242	7.2E-06	3.0E-10	2.5E-10	9.5E-05
PU 241	1.8E-02	2.0E-06	8.4E-07	2.1E-01
U 237	0.0E+00	0.0E+00	0.0E+00	0.0E+00
AM 241	1.1E+00	1.1E-04	6.3E-05	1.4E+01
PU 239	1.1E+00	3.8E-05	3.7E-05	1.5E+01
Total	2.5E+00	1.6E-04	1.1E-04	3.3E+01

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: FMEF release of 1 g of Pu-tritium mission worst case mix ons
ite with BW

Executed on: 08/04/97 at 09:34:12

Page C. 5

Acute release
Uptake/exposure period: 1.0
Dose commitment period: 50.0
Dose units: Rem

Radio-nuclide	Inhalation Effective Dose Equivalent	Ingestion Effective Dose Equivalent	External Dose	Internal Effective Dose Equivalent	Annual Effective Dose Equivalent
PU 240	1.9E+00	0.0E+00	5.6E-10	1.9E+00	1.9E+00
PU 238	7.2E-02	0.0E+00	2.4E-11	7.2E-02	7.2E-02
PU 242	5.2E-05	0.0E+00	0.0E+00	5.2E-05	5.2E-05
PU 241	9.4E-02	0.0E+00	4.3E-15	9.4E-02	9.4E-02
U 237	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
AM 241	4.4E+00	0.0E+00	6.7E-08	4.4E+00	4.4E+00
PU 239	7.9E+00	0.0E+00	1.7E-09	7.9E+00	7.9E+00

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: FMEF release of 1 g of Pu - original FMEF mix, onsite, PNL s
ol with 8W

Executed on: 08/01/97 at 14:26:23

Page A. 1

This is a far-field (wide-scale release, multiple site) scenario.
Release is acute
Individual dose

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Infinite plume, external
Inhalation uptake

THE FOLLOWING TIMES ARE USED:
Intake ends after (yr): 1.0
Dose calculations ends after (yr): 50.0

===== FILENAMES AND TITLES OF FILES/LIBRARIES USED =====

Input file name: \GENII\FFTFPU03.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/m (8-May-90 R
PNL Solubilities, Yearly Dose Increments (23-Jul-93 PDR)

-----Release Terms-----				
Release	Surface		Buried	
Radio-	Air	Water	Source	
nuclide	Ci/yr	Ci/yr	Ci/m3	
✓ PU236	1.4E-06	0.0E+00	0.0E+00	
PU238	9.1E-03	0.0E+00	0.0E+00	
PU239	4.5E-02	0.0E+00	0.0E+00	
PU240	3.3E-02	0.0E+00	0.0E+00	
PU241	1.2E+00	0.0E+00	0.0E+00	
PU242	1.2E-05	0.0E+00	0.0E+00	
AM241	1.1E-02	0.0E+00	0.0E+00	

===== AIR TRANSPORT =====
1.5E-03 Input E/Q value (s/m3)

===== EXTERNAL EXPOSURE =====
1.0E+00 Fraction of time spent in cloud

===== INHALATION =====
Resuspension not considered

Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

 GENII Dose Calculation Program
 (Version 1.485 3-Dec-90)

Case title: FMEF release of 1 g of Pu - original FMEF mix, onsite, PNL s
 ol with BW

Executed on: 08/01/97 at 14:26:51

Page C. 1

 Acute release
 Uptake/exposure period: 1.0
 Dose commitment period: 50.0
 Dose units: Rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	3.1E+00	2.5E-01	7.7E-01
Breast	1.9E-04	1.5E-01	2.9E-05
R Marrow	1.7E+01	1.2E-01	2.1E+00
Lung	5.8E+01	1.2E-01	7.0E+00
Thyroid	1.3E-04	3.0E-02	3.8E-06
Bone Sur	2.2E+02	3.0E-02	6.7E+00
Liver	4.0E+01	6.0E-02	2.4E+00
LL Int.	6.3E-03	6.0E-02	3.8E-04
UL Int.	2.1E-03	6.0E-02	1.3E-04
S Int.	5.0E-04	6.0E-02	3.0E-05
Stomach	3.2E-04	6.0E-02	1.9E-05
Internal Effective Dose Equivalent			1.9E+01
External Dose			4.0E-08
Annual Effective Dose Equivalent			1.9E+01

 Controlling Organ: Bone Sur
 Controlling Pathway: Inh
 Controlling Radionuclide: PU239

 Total Inhalation EDE: 1.9E+01
 Total Ingestion EDE: 0.0E+00

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: FMEF release of 1 g of Pu - original FMEF mix, onsite, PNL s
ol with BW

Executed on: 08/01/97 at 14:26:51

Page C. 2

Acute release

Uptake/exposure period:

1.0

Dose commitment period:

50.0

Dose units:

Rem

		Dose Commitment Year				
		1	2	3	...	
Internal	:					
Intake	:					
Year:	3			0.0E+00	...	
				+		
	2		0.0E+00	0.0E+00	...	Internal
			+	+		Effective
	1	1.4E+00	+ 1.1E+00	+ 8.3E-01	+ ...	Dose
						Equivalent
		1.4E+00	+ 1.1E+00	+ 8.3E-01	+ ...	= 1.9E+01
Internal		1.4E+00	+ 1.1E+00	+ 8.3E-01	+ ...	= 1.9E+01
Annual		1.4E+00	+ 1.1E+00	+ 8.3E-01	+ ...	= 1.9E+01
Dose		1.4E+00	+ 1.1E+00	+ 8.3E-01	+ ...	= 1.9E+01
External		4.0E-08	0.0E+00	0.0E+00	...	4.0E-08
Annual		4.0E-08	0.0E+00	0.0E+00	...	4.0E-08
Dose		4.0E-08	0.0E+00	0.0E+00	...	4.0E-08
Annual		1.4E+00	+ 1.1E+00	+ 8.3E-01	+ ...	= 1.9E+01
Dose		1.4E+00	+ 1.1E+00	+ 8.3E-01	+ ...	= 1.9E+01
						1.4E+00
						Maximum
						Annual
						Dose Occurred
						In Year 1

HNF-SD-FF-CN-012, Rev 0

GENTII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: FMEF release of 1 g of Pu - original FMEF mix, onsite, PNL s
ol with BW

Executed on: 08/01/97 at 14:26:51

Page C. 3

Acute release

Uptake/exposure period:

1.0

Dose commitment period:

50.0

Dose units:

Rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	5.8E+01	3.2E-04	5.0E-04	2.1E-03	6.3E-03	2.2E+02	1.7E+01	3.1E+00
Total	5.8E+01	3.2E-04	5.0E-04	2.1E-03	6.3E-03	2.2E+02	1.7E+01	3.1E+00

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	3.0E+00	1.9E-04	1.3E-04	4.0E+01
Total	3.0E+00	1.9E-04	1.3E-04	4.0E+01

External Dose by Exposure Pathway

Pathway	
Plume	4.0E-08
Total	4.0E-08

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: FMEF release of 1 g of Pu - original FMEF mix, onsite, PNL s
ol with BW

Executed on: 08/01/97 at 14:26:51

Page C. 4

Acute release

Uptake/exposure period:

1.0

Dose commitment period:

50.0

Dose units:

Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
PU 240	1.9E+01	6.9E-05	1.3E-04	6.3E-04	2.0E-03	5.3E+01	4.1E+00	7.2E-01
PU 236	5.1E-04	6.8E-09	8.9E-09	3.2E-08	8.9E-08	5.9E-04	4.7E-05	1.0E-05
U 232	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
TH 232	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RA 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
AC 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
TH 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RA 224	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PB 212	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
BI 212	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PU 238	5.4E+00	1.9E-05	3.7E-05	1.9E-04	5.6E-04	1.2E+01	1.0E+00	1.7E-01
PU 242	7.0E-03	2.5E-08	4.5E-08	2.2E-07	6.8E-07	1.7E-02	1.4E-03	2.4E-04
PU 241	7.1E+00	6.8E-05	6.3E-05	1.8E-04	4.1E-04	4.1E+01	3.2E+00	5.9E-01
U 237	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
AM 241	3.8E-01	7.3E-05	9.1E-05	2.7E-04	6.6E-04	4.5E+01	3.6E+00	6.4E-01
PU 239	2.6E+01	9.4E-05	1.8E-04	8.5E-04	2.6E-03	7.2E+01	5.5E+00	9.7E-01
Total	5.8E+01	3.2E-04	5.0E-04	2.1E-03	6.3E-03	2.2E+02	1.7E+01	3.1E+00

HNF-SD-FF-CN-012, Rev 0

----- GENII Dose Calculation Program (Version 1.485 3-Dec-90) -----

Case title: FMEF release of 1 g of Pu - original FMEF mix, onsite, PNL s
 ol with 8W

Executed on: 08/01/97 at 14:26:51

Page C. 5

Acute release

Uptake/exposure period:

1.0

Dose commitment period:

50.0

Dose units:

Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Ovaries	Muscle	Thyroid	Liver
-----	-----	-----	-----	-----
PU 240	7.1E-01	2.8E-05	2.4E-05	9.5E+00
PU 236	1.0E-05	4.7E-09	2.5E-09	1.2E-04
U 232	0.0E+00	0.0E+00	0.0E+00	0.0E+00
TH 232	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RA 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00
AC 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00
TH 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RA 224	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PB 212	0.0E+00	0.0E+00	0.0E+00	0.0E+00
BI 212	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PU 238	1.7E-01	7.7E-06	6.6E-06	2.3E+00
PU 242	2.4E-04	1.0E-08	8.6E-09	3.2E-03
PU 241	5.8E-01	6.3E-05	2.7E-05	6.8E+00
U 237	0.0E+00	0.0E+00	0.0E+00	0.0E+00
AM 241	6.3E-01	6.2E-05	3.5E-05	8.1E+00
PU 239	9.7E-01	3.4E-05	3.2E-05	1.3E+01
-----	-----	-----	-----	-----
Total	3.0E+00	1.9E-04	1.3E-04	4.0E+01

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GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: FMEF release of 1 g of Pu - original FMEF mix, onsite, PNL s
ol with BW

Executed on: 08/01/97 at 14:26:51

Page C. 6

Acute release
Uptake/exposure period: 1.0
Dose commitment period: 50.0
Dose units: Rem

Radio-nuclide	Inhalation Effective Dose Equivalent	Ingestion Effective Dose Equivalent	External Dose	Internal Effective Dose Equivalent	Annual Effective Dose Equivalent
PU 240	5.2E+00	0.0E+00	1.6E-09	5.2E+00	5.2E+00
PU 236	9.4E-05	0.0E+00	8.2E-14	9.4E-05	9.4E-05
U 232	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
TH 232	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RA 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
AC 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
TH 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RA 224	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PB 212	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
BI 212	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PU 238	1.3E+00	0.0E+00	4.4E-10	1.3E+00	1.3E+00
PU 242	1.8E-03	0.0E+00	4.7E-13	1.8E-03	1.8E-03
PU 241	3.0E+00	0.0E+00	1.4E-13	3.0E+00	3.0E+00
U 237	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
AM 241	2.5E+00	0.0E+00	3.7E-08	2.5E+00	2.5E+00
PU 239	7.0E+00	0.0E+00	1.5E-09	7.0E+00	7.0E+00

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: FFTF OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 13:59:18

Page A. 1

This is a far-field (wide-scale release, multiple site) scenario.
Release is acute
Individual dose

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Ground, external
Terrestrial foods ingestion
Animal product ingestion
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:
Intake ends after (yr): 50.0
Dose calculations ends after (yr): 50.0

===== FILENAMES AND TITLES OF FILES/LIBRARIES USED =====

Input file name: \GENII\fmfpui1.in
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
PNL Food Transfer Factor Library (by Z, with Fr&Ds 7/19/93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)

=====

----- Release Terms -----

Release Radio- nuclide	Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
PU236	1.4E-06	0.0E+00	0.0E+00
PU238	9.1E-03	0.0E+00	0.0E+00
PU239	4.5E-02	0.0E+00	0.0E+00
PU240	3.3E-02	0.0E+00	0.0E+00
PU241	1.2E+00	0.0E+00	0.0E+00
PU242	1.2E-05	0.0E+00	0.0E+00
AM241	1.1E-02	0.0E+00	0.0E+00

===== AIR TRANSPORT =====
1.0E+00 Input E/Q value (s/m3)

===== EXTERNAL EXPOSURE =====
4.4E+03 Hours of exposure to ground contamination

===== INGESTION POPULATION =====
1 Atmospheric production definition: 1 - Use population-weighted chi/Q

===== TERRESTRIAL FOOD INGESTION =====

FOOD TYPE	GROW TIME d	--IRRIGATION--		YIELD kg/m2	PROD- UCTION kg/yr	--CONSUMPTION--	
		S *	RATE in/yr			HOLDUP d	RATE kg/yr
Leaf Veg	90.0	0	0.0	0.0	1.5	1.0	3.0E+01
Oth. Veg	90.0	0	0.0	0.0	4.0	5.0	2.2E+02
Fruit	90.0	0	0.0	0.0	2.0	5.0	3.3E+02
Cereals	90.0	0	0.0	0.0	0.8	180.0	8.0E+01

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===== ANIMAL FOOD INGESTION =====

FOOD TYPE	---HUMAN---		TOTAL PROD- CONSUMPTION kg/yr d	DRINK WATER CONTAM FRACT. kg/yr	DIET FRAC- TION	GROW TIME d	---STORED FEED---				STOR- AGE kg/m ³ d
	CONSUMPTION RATE kg/yr	HOLDUP d					IRRIGATION- RATE in/yr	TIME mo/yr	YIELD		
Meat	8.0E+01	15.0		0.00	0.3	90.00	0	0.0	0.0	0.80	0.0
Poultry	1.8E+01	1.0		0.00	1.0	90.00	0	0.0	0.0	0.80	0.0
Cow Milk	2.7E+02	1.0		0.00	0.3	45.00	0	0.0	0.0	2.00	0.0
Eggs	3.0E+01	1.0		0.00	1.0	90.00	0	0.0	0.0	0.80	0.0
-----FRESH FORAGE-----											
Meat				0.75	45.0	0	0.0	0.0	0.0	2.00	0.0
Cow Milk				0.75	30.0	0	0.0	0.0	0.0	1.50	0.0

Note: Animal diet fraction for years 2 through 50.0000

Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

 GENII Dose Calculation Program
 (Version 1.485 3-Dec-90)

Case title: Winter: FFTF OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:01:05

Page C. 1

 Acute release
 Uptake/exposure period: 50.0
 Dose commitment period: 50.0
 Dose units: Rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	1.1E-01	2.5E-01	2.7E-02
Breast	5.8E-06	1.5E-01	8.6E-07
R Marrow	6.0E-01	1.2E-01	7.3E-02
Lung	7.3E-06	1.2E-01	8.7E-07
Thyroid	3.7E-06	3.0E-02	1.1E-07
Bone Sur	7.8E+00	3.0E-02	2.3E-01
Liver	1.3E+00	6.0E-02	8.0E-02
LL Int.	2.1E-02	6.0E-02	1.2E-03
UL Int.	6.7E-03	6.0E-02	4.0E-04
S Int.	1.2E-03	6.0E-02	7.0E-05
Stomach	4.7E-04	6.0E-02	2.8E-05
Internal Effective Dose Equivalent			4.2E-01
External Dose			6.6E-04
Annual Effective Dose Equivalent			4.2E-01

 Controlling Organ: Bone Sur
 Controlling Pathway: Ing
 Controlling Radionuclide: AM241

 Total Inhalation EDE: 0.0E+00
 Total Ingestion EDE: 4.2E-01

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 GENII Dose Calculation Program
 (Version 1.485 3-Dec-90)

Case title: Winter: FTFE OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:01:05

Page C. 2

Acute release
 Uptake/exposure period: 50.0
 Dose commitment period: 50.0
 Dose units: Rem

	Dose Commitment Year				
	1	2	3	...	
Internal Intake					
Year: 3			1.4E-02	...	
			+		
2		1.3E-02	1.1E-02	...	Internal Effective Dose Equivalent
		+	+		
1	1.2E-02	1.1E-02	1.0E-02	...	= 4.2E-01
Internal Annual Dose	1.2E-02	2.4E-02	3.5E-02	...	= 1.5E+01
	+	+	+	+	
External Annual Dose	6.6E-04	7.5E-04	8.4E-04	...	8.9E-02
Annual Dose	1.3E-02	2.5E-02	3.6E-02	...	= 1.5E+01
					Cumulative Dose
					5.3E-01
					Maximum Annual Dose Occurred In Year 50

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GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Winter: FFTF OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:01:05

Page C. 3

Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Leaf Veg	7.0E-08	3.9E-06	9.5E-06	5.4E-05	1.7E-04	6.0E-02	4.7E-03	8.5E-04
Oth. Veg	1.3E-06	7.2E-05	1.7E-04	1.0E-03	3.1E-03	1.1E+00	8.6E-02	1.6E-02
Fruit	1.4E-06	7.7E-05	1.9E-04	1.1E-03	3.3E-03	1.2E+00	9.3E-02	1.7E-02
Cereals	3.5E-08	1.9E-06	4.7E-06	2.7E-05	8.3E-05	3.0E-02	2.3E-03	4.2E-04
Meat	1.8E-09	7.0E-08	1.7E-07	9.6E-07	2.9E-06	9.5E-04	7.4E-05	1.3E-05
Poultry	2.1E-11	6.5E-10	1.6E-09	8.6E-09	2.6E-08	7.3E-06	5.7E-07	1.0E-07
Cow Milk	1.2E-10	4.1E-09	1.0E-08	5.6E-08	1.7E-07	5.2E-05	4.0E-06	7.2E-07
Eggs	7.5E-10	4.0E-08	9.7E-08	5.5E-07	1.7E-06	6.1E-04	4.7E-05	8.5E-06
Soil Ing	4.4E-06	3.2E-04	7.9E-04	4.5E-03	1.4E-02	5.4E+00	4.2E-01	7.6E-02
Total	7.3E-06	4.7E-04	1.2E-03	6.7E-03	2.1E-02	7.8E+00	6.0E-01	1.1E-01

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver
Leaf Veg	8.4E-04	5.6E-08	3.3E-08	2.2E-09	1.0E-02
Oth. Veg	1.5E-02	1.0E-06	6.1E-07	3.9E-08	1.9E-01
Fruit	1.7E-02	1.1E-06	6.5E-07	4.3E-08	2.1E-01
Cereals	4.1E-04	2.7E-08	1.6E-08	6.4E-10	5.1E-03
Meat	1.3E-05	1.4E-09	7.2E-10	7.9E-10	1.7E-04
Poultry	1.0E-07	2.7E-11	1.4E-11	1.9E-09	1.3E-06
Cow Milk	7.1E-07	1.3E-10	6.9E-11	6.4E-09	9.0E-06
Eggs	8.4E-06	6.1E-10	3.5E-10	2.6E-09	1.1E-04
Soil Ing	7.5E-02	3.5E-06	2.4E-06	2.6E-08	9.2E-01
Total	1.1E-01	5.8E-06	3.7E-06	1.2E-07	1.3E+00

External Dose by Exposure Pathway

Pathway	
Sur Soil	6.6E-04
Total	6.6E-04

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Winter: FFTF OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:01:05

Page C. 4

Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R	Marro	Testes
Leaf Veg	1.1E-05	6.4E-04	1.6E-03	8.9E-03	2.7E-02	5.0E+00	3.9E-01	6.4E-02	
Oth. Veg	1.3E-04	6.5E-03	1.6E-02	9.0E-02	2.8E-01	4.9E+01	3.8E+00	6.2E-01	
Fruit	1.4E-04	7.0E-03	1.7E-02	9.7E-02	3.0E-01	5.2E+01	4.1E+00	6.7E-01	
Cereals	5.6E-06	3.2E-04	7.7E-04	4.4E-03	1.4E-02	2.5E+00	2.0E-01	3.2E-02	
Meat	5.8E-08	2.0E-06	4.8E-06	2.7E-05	8.4E-05	1.4E-02	1.1E-03	1.8E-04	
Poultry	8.7E-11	2.5E-09	6.1E-09	3.3E-08	1.0E-07	1.9E-05	1.5E-06	2.5E-07	
Cow Milk	1.6E-08	1.3E-07	2.8E-07	1.5E-06	4.5E-06	6.7E-04	5.2E-05	8.6E-06	
Eggs	3.0E-09	1.6E-07	3.9E-07	2.2E-06	6.9E-06	1.5E-03	1.2E-04	2.0E-05	
Soil Ing	2.6E-04	1.8E-02	4.5E-02	2.6E-01	8.0E-01	1.6E+02	1.2E+01	2.0E+00	
Total	5.6E-04	3.3E-02	8.0E-02	4.6E-01	1.4E+00	2.7E+02	2.1E+01	3.4E+00	

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver
Leaf Veg	6.3E-02	9.2E-06	5.4E-06	7.9E-07	1.0E+00
Oth. Veg	6.1E-01	1.1E-04	5.8E-05	1.1E-05	9.9E+00
Fruit	6.6E-01	1.1E-04	6.3E-05	1.2E-05	1.1E+01
Cereals	3.2E-02	4.5E-06	2.7E-06	2.0E-07	5.1E-01
Meat	1.8E-04	4.8E-08	2.8E-08	4.7E-08	2.9E-03
Poultry	2.5E-07	1.0E-10	6.2E-11	8.1E-09	3.6E-06
Cow Milk	8.4E-06	1.6E-08	1.4E-08	3.1E-07	1.4E-04
Eggs	2.0E-05	2.4E-09	1.4E-09	1.1E-08	3.0E-04
Soil Ing	2.0E+00	2.2E-04	1.4E-04	7.0E-06	3.1E+01
Total	3.4E+00	4.5E-04	2.7E-04	3.2E-05	5.3E+01

External Dose by Exposure Pathway

Pathway	
Sur Soil	8.9E-02
Total	8.9E-02

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GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Winter: FFTF OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:01:05

Page C. 5

Acute release

Uptake/exposure period:

50.0

Dose commitment period:

50.0

Dose units:

Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
PU 240	8.8E-07	1.3E-04	3.2E-04	1.8E-03	5.8E-03	1.9E+00	1.5E-01	2.7E-02
PU 236	1.5E-10	5.5E-09	1.4E-08	7.9E-08	2.3E-07	2.2E-05	1.8E-06	2.9E-07
U 232	6.5E-10	7.2E-10	8.4E-10	1.9E-09	4.6E-09	5.0E-07	3.2E-08	6.4E-10
TH 232	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RA 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
AC 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
TH 228	4.0E-11	6.0E-11	1.0E-10	5.4E-10	2.2E-09	4.0E-08	3.2E-09	4.0E-11
RA 224	1.5E-10	2.2E-10	3.1E-10	1.2E-09	3.3E-09	5.5E-09	4.7E-10	1.5E-10
PB 212	2.9E-11	5.0E-11	1.0E-10	2.9E-10	3.4E-10	3.1E-09	2.9E-10	2.9E-11
BI 212	1.9E-13	2.7E-11	1.9E-11	1.2E-11	2.4E-12	1.9E-12	3.3E-13	1.5E-13
PU 238	2.6E-07	3.9E-05	9.5E-05	5.6E-04	1.7E-03	4.7E-01	3.8E-02	6.6E-03
PU 242	3.2E-10	4.7E-08	1.1E-07	6.3E-07	2.0E-06	6.4E-04	5.3E-05	9.1E-06
PU 241	2.1E-06	2.3E-05	6.0E-05	3.4E-04	9.8E-04	1.3E+00	1.0E-01	2.0E-02
U 237	2.2E-10	2.8E-08	7.3E-08	3.4E-07	8.8E-07	3.5E-09	5.7E-09	1.2E-09
AM 241	2.9E-06	1.1E-04	2.6E-04	1.5E-03	4.5E-03	1.4E+00	1.1E-01	2.0E-02
PU 239	1.1E-06	1.8E-04	4.4E-04	2.5E-03	7.8E-03	2.6E+00	2.0E-01	3.6E-02
Total	7.3E-06	4.7E-04	1.2E-03	6.7E-03	2.1E-02	7.8E+00	6.0E-01	1.1E-01

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Winter: FFTF OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:01:05

Page C. 6

Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver
PU 240	2.7E-02	8.7E-07	8.0E-07	0.0E+00	3.4E-01
PU 236	3.0E-07	1.2E-10	6.7E-11	0.0E+00	4.5E-06
U 232	6.4E-10	6.3E-10	6.2E-10	1.2E-07	0.0E+00
TH 232	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RA 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
AC 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
TH 228	4.4E-11	3.9E-11	3.9E-11	0.0E+00	3.4E-10
RA 224	1.6E-10	1.5E-10	1.5E-10	0.0E+00	0.0E+00
PB 212	3.4E-11	2.9E-11	2.7E-11	2.2E-10	4.3E-10
BI 212	5.0E-13	2.2E-13	1.3E-13	2.1E-11	0.0E+00
PU 238	6.4E-03	2.5E-07	2.4E-07	0.0E+00	8.7E-02
PU 242	9.2E-06	3.2E-10	2.9E-10	0.0E+00	1.2E-04
PU 241	2.0E-02	1.2E-06	5.3E-07	0.0E+00	2.0E-01
U 237	1.9E-08	1.8E-09	2.3E-11	3.0E-09	0.0E+00
AM 241	1.9E-02	2.2E-06	1.1E-06	0.0E+00	2.5E-01
PU 239	3.6E-02	1.1E-06	1.1E-06	0.0E+00	4.6E-01
Total	1.1E-01	5.8E-06	3.7E-06	1.2E-07	1.3E+00

External Dose by Radionuclide

Radionuclide	
PU 240	7.3E-06
PU 236	4.3E-10
U 232	0.0E+00
TH 232	0.0E+00
RA 228	0.0E+00
AC 228	0.0E+00
TH 228	8.7E-12
RA 224	6.8E-11
PB 212	8.8E-11
BI 212	1.2E-08
PU 238	2.1E-06
PU 242	2.3E-09
PU 241	5.0E-10
U 237	0.0E+00
AM 241	6.3E-04
PU 239	2.2E-05
Total	6.6E-04

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Winter: FFTF OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:01:05

Page C. 7

Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R	Marro	Testes
PU 240	4.5E-05	6.6E-03	1.6E-02	9.3E-02	3.0E-01	5.7E+01	4.4E+00	7.2E-01	
PU 236	7.7E-10	2.8E-08	6.9E-08	4.0E-07	1.2E-06	1.1E-04	8.6E-06	1.4E-06	
U 232	1.7E-07	1.9E-07	2.2E-07	5.1E-07	1.3E-06	9.8E-05	6.2E-06	1.6E-07	
TH 232	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	
RA 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	
AC 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	
TH 228	4.8E-08	7.3E-08	1.2E-07	6.5E-07	2.6E-06	4.7E-05	3.8E-06	4.8E-08	
RA 224	1.4E-06	2.1E-06	2.9E-06	1.1E-05	3.0E-05	5.1E-05	4.3E-06	1.4E-06	
PB 212	3.0E-07	5.2E-07	1.0E-06	3.0E-06	3.6E-06	3.2E-05	3.0E-06	3.0E-07	
BI 212	2.0E-09	2.9E-07	2.0E-07	1.3E-07	2.5E-08	2.0E-08	3.4E-09	1.6E-09	
PU 238	1.1E-05	1.6E-03	4.0E-03	2.4E-02	7.2E-02	1.3E+01	1.0E+00	1.6E-01	
PU 242	1.6E-08	2.4E-06	5.6E-06	3.2E-05	1.0E-04	1.9E-02	1.5E-03	2.4E-04	
PU 241	4.3E-05	4.7E-04	1.2E-03	6.9E-03	2.0E-02	1.8E+01	1.4E+00	2.5E-01	
U 237	9.2E-09	1.2E-06	3.1E-06	1.4E-05	3.7E-05	1.5E-07	2.4E-07	5.0E-08	
AM 241	4.0E-04	1.5E-02	3.6E-02	2.1E-01	6.3E-01	1.0E+02	7.9E+00	1.3E+00	
PU 239	5.8E-05	9.0E-03	2.2E-02	1.3E-01	4.0E-01	7.7E+01	6.0E+00	9.8E-01	
Total	5.6E-04	3.3E-02	8.0E-02	4.6E-01	1.4E+00	2.7E+02	2.1E+01	3.4E+00	

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GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Winter: FFTF OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:01:05

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Acute release

Uptake/exposure period:

Dose commitment period:

Dose units:

50.0

50.0

Rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver
PU 240	7.1E-01	4.4E-05	4.1E-05	0.0E+00	1.1E+01
PU 236	1.4E-06	6.2E-10	3.4E-10	0.0E+00	2.2E-05
U 232	1.6E-07	1.6E-07	1.6E-07	2.9E-05	0.0E+00
TH 232	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RA 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
AC 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
TH 228	5.2E-08	4.6E-08	4.6E-08	0.0E+00	4.0E-07
RA 224	1.5E-06	1.4E-06	1.4E-06	0.0E+00	0.0E+00
PB 212	3.6E-07	3.0E-07	2.8E-07	2.3E-06	4.4E-06
BI 212	5.2E-09	2.3E-09	1.4E-09	2.2E-07	0.0E+00
PU 238	1.6E-01	1.1E-05	1.0E-05	0.0E+00	2.6E+00
PU 242	2.5E-04	1.6E-08	1.5E-08	0.0E+00	3.9E-05
PU 241	2.5E-01	2.5E-05	1.1E-05	0.0E+00	3.0E+00
U 237	7.9E-07	7.5E-08	9.6E-10	1.3E-07	0.0E+00
AM 241	1.3E+00	3.1E-04	1.5E-04	0.0E+00	2.1E+01
PU 239	9.8E-01	5.8E-05	5.6E-05	0.0E+00	1.5E+01
Total	3.4E+00	4.5E-04	2.7E-04	3.2E-05	5.3E+01

External Dose by Radionuclide

Radionuclide	
PU 240	3.6E-04
PU 236	2.0E-09
U 232	0.0E+00
TH 232	0.0E+00
RA 228	0.0E+00
AC 228	0.0E+00
TH 228	2.3E-08
RA 224	2.0E-07
PB 212	2.5E-06
BI 212	3.3E-05
PU 238	8.4E-05
PU 242	1.1E-07
PU 241	9.5E-09
U 237	0.0E+00
AM 241	8.7E-02
PU 239	1.1E-03
Total	8.9E-02

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GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Spring: FFTF OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:01:40

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	4.1E+01	2.5E-01	1.0E+01
Breast	1.9E-03	1.5E-01	2.9E-04
R Marrow	2.3E+02	1.2E-01	2.7E+01
Lung	2.4E-03	1.2E-01	2.9E-04
Thyroid	1.3E-03	3.0E-02	4.0E-05
Bone Sur	2.9E+03	3.0E-02	8.8E+01
Liver	5.0E+02	6.0E-02	3.0E+01
LL Int.	7.6E+00	6.0E-02	4.5E-01
UL Int.	2.4E+00	6.0E-02	1.5E-01
S Int.	4.3E-01	6.0E-02	2.6E-02
Stomach	1.7E-01	6.0E-02	1.0E-02
Internal Effective Dose Equivalent			1.6E+02
External Dose			6.6E-04
Annual Effective Dose Equivalent			1.6E+02

Controlling Organ:	Bone Sur
Controlling Pathway:	Ing
Controlling Radionuclide:	PU239
Total Inhalation EDE:	
Total Ingestion EDE:	
0.0E+00	
1.6E+02	

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GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Spring: FFTF OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:01:40

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

		Dose Commitment Year				
		1	2	3	...	
Internal	:					
Intake	:					
Year:	3			1.4E-02	...	
				+		
2			1.3E-02	1.1E-02	...	Internal
			+	+		Effective
1		4.5E+00	3.9E+00	3.8E+00	+ ... = 1.6E+02	Dose
						Equivalent
Internal						Cumulative
Annual		4.5E+00	3.9E+00	3.8E+00	+ ... = 1.7E+02	Internal
Dose						Dose
		+	+	+	+	
External		6.6E-04	7.5E-04	8.4E-04	...	8.9E-02
Annual						
Dose						
Annual		4.5E+00	3.9E+00	3.8E+00	+ ... = 1.7E+02	Cumulative
Dose						Dose
					4.5E+00	Maximum
						Annual
						Dose Occurred
						In Year 1

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GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Spring: FFTF OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:01:40

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Leaf Veg	2.4E-03	1.7E-01	4.3E-01	2.4E+00	7.5E+00	2.9E+03	2.3E+02	4.1E+01
Oth. Veg	1.3E-06	7.0E-05	1.7E-04	9.8E-04	3.0E-03	1.1E+00	8.5E-02	1.5E-02
Fruit	1.4E-06	7.6E-05	1.9E-04	1.1E-03	3.3E-03	1.2E+00	9.2E-02	1.7E-02
Cereals	3.3E-08	1.9E-06	4.6E-06	2.6E-05	8.0E-05	2.9E-02	2.3E-03	4.1E-04
Meat	4.4E-06	2.1E-04	5.1E-04	2.9E-03	9.1E-03	3.2E+00	2.5E-01	4.4E-02
Poultry	1.6E-11	6.3E-10	1.6E-09	8.5E-09	2.5E-08	7.2E-06	5.6E-07	1.0E-07
Cow Milk	2.7E-07	1.8E-05	4.4E-05	2.4E-04	7.3E-04	2.4E-01	1.9E-02	3.4E-03
Eggs	7.3E-10	3.9E-08	9.6E-08	5.5E-07	1.7E-06	6.0E-04	4.7E-05	8.5E-06
Soil Ing	4.4E-06	3.2E-04	7.9E-04	4.5E-03	1.4E-02	5.4E+00	4.2E-01	7.6E-02
Total	2.4E-03	1.7E-01	4.3E-01	2.4E+00	7.6E+00	2.9E+03	2.3E+02	4.1E+01

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver
Leaf Veg	4.1E+01	1.9E-03	1.3E-03	2.5E-06	5.0E+02
Oth. Veg	1.5E-02	1.0E-06	5.9E-07	2.2E-08	1.9E-01
Fruit	1.6E-02	1.1E-06	6.4E-07	2.4E-08	2.1E-01
Cereals	4.0E-04	2.6E-08	1.6E-08	4.1E-10	5.0E-03
Meat	4.4E-02	3.4E-06	1.9E-06	1.0E-07	5.5E-01
Poultry	1.0E-07	2.3E-11	9.7E-12	1.1E-09	1.3E-06
Cow Milk	3.3E-03	3.8E-07	1.3E-07	9.3E-07	4.1E-02
Eggs	8.4E-06	5.9E-10	3.4E-10	1.4E-09	1.0E-04
Soil Ing	7.5E-02	3.5E-06	2.4E-06	2.6E-08	9.2E-01
Total	4.1E+01	1.9E-03	1.3E-03	3.6E-06	5.0E+02

External Dose by Exposure Pathway

Pathway	
Sur Soil	6.6E-04
Total	6.6E-04

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Spring: FFTF OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:01:40

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Acute release

Uptake/exposure period:

50.0

Dose commitment period:

50.0

Dose units:

Rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Leaf Veg	2.4E-03	1.7E-01	4.3E-01	2.4E+00	7.6E+00	2.9E+03	2.3E+02	4.1E+01
Oth. Veg	1.3E-04	6.5E-03	1.6E-02	9.0E-02	2.8E-01	4.9E+01	3.8E+00	6.2E-01
Fruit	1.4E-04	7.0E-03	1.7E-02	9.7E-02	3.0E-01	5.2E+01	4.1E+00	6.7E-01
Cereals	5.6E-06	3.2E-04	7.7E-04	4.4E-03	1.4E-02	2.5E+00	2.0E-01	3.2E-02
Meat	4.4E-06	2.1E-04	5.2E-04	3.0E-03	9.1E-03	3.2E+00	2.5E-01	4.5E-02
Poultry	8.2E-11	2.5E-09	6.0E-09	3.3E-08	9.9E-08	1.9E-05	1.5E-06	2.5E-07
Cow Milk	2.8E-07	1.8E-05	4.4E-05	2.4E-04	7.4E-04	2.4E-01	1.9E-02	3.4E-03
Eggs	3.0E-09	1.6E-07	3.9E-07	2.2E-06	6.9E-06	1.5E-03	1.2E-04	2.0E-05
Soil Ing	2.6E-04	1.8E-02	4.5E-02	2.6E-01	8.0E-01	1.6E+02	1.2E+01	2.0E+00
Total	3.0E-03	2.0E-01	5.1E-01	2.9E+00	9.0E+00	3.2E+03	2.5E+02	4.4E+01

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver
Leaf Veg	4.1E+01	1.9E-03	1.3E-03	3.2E-06	5.0E+02
Oth. Veg	6.1E-01	1.1E-04	5.8E-05	1.1E-05	9.9E+00
Fruit	6.6E-01	1.1E-04	6.3E-05	1.2E-05	1.1E+01
Cereals	3.2E-02	4.5E-06	2.7E-06	2.0E-07	5.1E-01
Meat	4.4E-02	3.5E-06	1.9E-06	1.5E-07	5.5E-01
Poultry	2.4E-07	1.0E-10	5.8E-11	7.3E-09	3.6E-06
Cow Milk	3.3E-03	3.9E-07	1.4E-07	1.2E-06	4.1E-02
Eggs	2.0E-05	2.4E-09	1.4E-09	1.0E-08	2.9E-04
Soil Ing	2.0E+00	2.2E-04	1.4E-04	7.0E-06	3.1E+01
Total	4.4E+01	2.4E-03	1.6E-03	3.6E-05	5.5E+02

External Dose by Exposure Pathway

Pathway	
Sur Soil	8.9E-02
Total	8.9E-02

 GENII Dose Calculation Program
 (Version 1.485 3-Dec-90)

Case title: Spring: FFTF OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:01:40

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Acute release

Uptake/exposure period:

50.0

Dose commitment period:

50.0

Dose units:

Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
PU 240	3.7E-04	5.3E-02	1.3E-01	7.6E-01	2.4E+00	8.0E+02	6.2E+01	1.1E+01
PU 236	7.2E-08	2.6E-06	6.5E-06	3.7E-05	1.1E-04	1.0E-02	8.3E-04	1.4E-04
U 232	1.3E-08	1.5E-08	1.7E-08	3.9E-08	9.4E-08	1.0E-05	6.5E-07	1.3E-08
TH 232	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RA 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
AC 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
TH 228	1.4E-10	2.1E-10	3.5E-10	1.8E-09	7.4E-09	1.4E-07	1.1E-08	1.4E-10
RA 224	4.5E-10	6.9E-10	9.5E-10	3.6E-09	1.0E-08	1.7E-08	1.4E-09	4.5E-10
PB 212	8.9E-11	1.5E-10	3.0E-10	8.9E-10	1.0E-09	9.4E-09	8.9E-10	8.9E-11
BI 212	5.7E-13	8.3E-11	5.7E-11	3.7E-11	7.3E-12	5.7E-12	9.9E-13	4.6E-13
PU 238	1.1E-04	1.6E-02	3.9E-02	2.3E-01	7.0E-01	2.0E+02	1.6E+01	2.7E+00
PU 242	1.3E-07	2.0E-05	4.6E-05	2.6E-04	8.3E-04	2.7E-01	2.2E-02	3.8E-03
PU 241	9.2E-04	1.0E-02	2.6E-02	1.5E-01	4.2E-01	5.7E+02	4.5E+01	8.6E+00
U 237	8.5E-08	1.1E-05	2.9E-05	1.3E-04	3.4E-04	1.3E-06	2.2E-06	4.6E-07
AM 241	5.7E-04	2.1E-02	5.1E-02	2.9E-01	8.9E-01	2.8E+02	2.2E+01	3.9E+00
PU 239	4.6E-04	7.1E-02	1.8E-01	1.0E+00	3.1E+00	1.1E+03	8.3E+01	1.5E+01
Total	2.4E-03	1.7E-01	4.3E-01	2.4E+00	7.6E+00	2.9E+03	2.3E+02	4.1E+01

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GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Spring: FTFD OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:01:40

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver
PU 240	1.1E+01	3.6E-04	3.3E-04	0.0E+00	1.4E+02
PU 236	1.4E-04	5.8E-08	3.2E-08	0.0E+00	2.1E-03
U 232	1.3E-08	1.3E-08	1.3E-08	2.4E-06	0.0E+00
TH 232	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RA 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
AC 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
TH 228	1.5E-10	1.3E-10	1.3E-10	0.0E+00	1.1E-09
RA 224	5.0E-10	4.5E-10	4.5E-10	0.0E+00	0.0E+00
PB 212	1.0E-10	8.9E-11	8.3E-11	6.8E-10	1.3E-09
BI 212	1.5E-12	6.8E-13	4.0E-13	6.3E-11	0.0E+00
PU 238	2.7E+00	1.0E-04	9.8E-05	0.0E+00	3.6E+01
PU 242	3.8E-03	1.3E-07	1.2E-07	0.0E+00	4.8E-02
PU 241	8.5E+00	5.4E-04	2.3E-04	0.0E+00	8.9E+01
U 237	7.3E-06	6.9E-07	8.9E-09	1.2E-06	0.0E+00
AM 241	3.9E+00	4.4E-04	2.1E-04	0.0E+00	5.0E+01
PU 239	1.5E+01	4.6E-04	4.5E-04	0.0E+00	1.9E+02
Total	4.1E+01	1.9E-03	1.3E-03	3.6E-06	5.0E+02

External Dose by Radionuclide

Radionuclide	
PU 240	7.3E-06
PU 236	4.3E-10
U 232	0.0E+00
TH 232	0.0E+00
RA 228	0.0E+00
AC 228	0.0E+00
TH 228	8.7E-12
RA 224	6.8E-11
PB 212	8.8E-10
BI 212	1.2E-08
PU 238	2.1E-06
PU 242	2.3E-09
PU 241	5.0E-10
U 237	0.0E+00
AM 241	6.3E-04
PU 239	2.2E-05
Total	6.6E-04

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GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Spring: FTF OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:01:40

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone S	R Marro	Testes
PU 240	4.1E-04	6.0E-02	1.5E-01	8.5E-01	2.7E+00	8.6E+02	6.6E+01	1.2E+01
PU 236	7.3E-08	2.6E-06	6.5E-06	3.7E-05	1.1E-04	1.0E-02	8.4E-04	1.4E-04
U 232	1.8E-07	2.0E-07	2.3E-07	5.5E-07	1.4E-06	1.1E-04	6.9E-06	1.8E-07
TH 232	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RA 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
AC 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
TH 228	4.8E-08	7.3E-08	1.2E-07	6.5E-07	2.6E-06	4.7E-05	3.8E-06	4.8E-08
RA 224	1.4E-06	2.1E-06	2.9E-06	1.1E-05	3.0E-05	5.1E-05	4.3E-06	1.4E-06
PB 212	3.0E-07	5.2E-07	1.0E-06	3.0E-06	3.6E-06	3.2E-05	3.0E-06	3.0E-07
BI 212	2.0E-09	2.9E-07	2.0E-07	1.3E-07	2.5E-08	2.0E-08	3.4E-09	1.6E-09
PU 238	1.2E-04	1.8E-02	4.3E-02	2.6E-01	7.7E-01	2.1E+02	1.7E+01	2.9E+00
PU 242	1.5E-07	2.2E-05	5.1E-05	2.9E-04	9.3E-04	2.9E-01	2.4E-02	4.0E-03
PU 241	9.6E-04	1.0E-02	2.7E-02	1.5E-01	4.4E-01	5.9E+02	4.6E+01	8.8E+00
U 237	9.4E-08	1.2E-05	3.2E-05	1.4E-04	3.8E-04	1.5E-06	2.5E-06	5.1E-07
AM 241	9.6E-04	3.7E-02	8.6E-02	5.0E-01	1.5E+00	3.8E+02	3.0E+01	5.2E+00
PU 239	5.2E-04	8.0E-02	2.0E-01	1.1E+00	3.5E+00	1.1E+03	8.8E+01	1.6E+01
Total	3.0E-03	2.0E-01	5.1E-01	2.9E+00	9.0E+00	3.2E+03	2.5E+02	4.4E+01

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GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Spring: FFTF OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:01:40

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver
PU 240	1.2E+01	4.0E-04	3.7E-04	0.0E+00	1.5E+02
PU 236	1.4E-04	5.8E-08	3.2E-08	0.0E+00	2.1E-03
U 232	1.8E-07	1.7E-07	1.7E-07	3.2E-05	0.0E+00
TH 232	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RA 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
AC 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
TH 228	5.2E-08	4.6E-08	4.6E-08	0.0E+00	4.0E-07
RA 224	1.5E-06	1.4E-06	1.4E-06	0.0E+00	0.0E+00
PB 212	3.6E-07	3.0E-07	2.8E-07	2.3E-06	4.4E-06
BI 212	5.2E-09	2.3E-09	1.4E-09	2.2E-07	0.0E+00
PU 238	2.8E+00	1.1E-04	1.1E-04	0.0E+00	3.8E+01
PU 242	4.1E-03	1.5E-07	1.4E-07	0.0E+00	5.2E-02
PU 241	8.7E+00	5.6E-04	2.4E-04	0.0E+00	9.1E+01
U 237	8.1E-06	7.7E-07	9.8E-09	1.3E-06	0.0E+00
AM 241	5.1E+00	7.6E-04	3.7E-04	0.0E+00	7.1E+01
PU 239	1.6E+01	5.2E-04	5.0E-04	0.0E+00	2.0E+02
Total	4.4E+01	2.4E-03	1.6E-03	3.6E-05	5.5E+02

External Dose by Radionuclide

Radionuclide	
PU 240	3.6E-04
PU 236	2.0E-09
U 232	0.0E+00
TH 232	0.0E+00
RA 228	0.0E+00
AC 228	0.0E+00
TH 228	2.3E-08
RA 224	2.0E-07
PB 212	2.5E-06
BI 212	3.3E-05
PU 238	8.4E-05
PU 242	1.1E-07
PU 241	9.5E-09
U 237	0.0E+00
AM 241	8.7E-02
PU 239	1.1E-03
Total	8.9E-02

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Summer: FFTF OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:02:16

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	6.1E+02	2.5E-01	1.5E+02
Breast	2.8E-02	1.5E-01	4.3E-03
R Marrow	3.4E+03	1.2E-01	4.0E+02
Lung	3.6E-02	1.2E-01	4.3E-03
Thyroid	2.0E-02	3.0E-02	5.9E-04
Bone Sur	4.3E+04	3.0E-02	1.3E+03
Liver	7.4E+03	6.0E-02	4.4E+02
LL Int.	1.1E+02	6.0E-02	6.8E+00
UL Int.	3.6E+01	6.0E-02	2.2E+00
S Int.	6.4E+00	6.0E-02	3.8E-01
Stomach	2.6E+00	6.0E-02	1.5E-01
Internal Effective Dose Equivalent			2.3E+03
External Dose			6.6E-04
Annual Effective Dose Equivalent			2.3E+03

Controlling Organ: Bone Sur
Controlling Pathway: Ing
Controlling Radionuclide: PU239
Total Inhalation EDE: 0.0E+00
Total Ingestion EDE: 2.3E+03

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Summer: FFTF OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:02:16

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Acute release

Uptake/exposure period:

50.0

Dose commitment period:

Rem

	Dose	Commitment	Year		
	1	2	3	...	
Internal Intake Year:	:	:	:	:	
3	:	:	1.4E-02	...	
			+		
2		1.3E-02	1.1E-02	...	Internal Effective Dose Equivalent
		+	+		
1	6.7E+01	+ 5.8E+01	+ 5.7E+01 + ... =	2.3E+03	
Internal Annual Dose	6.7E+01 +	5.8E+01 +	5.7E+01 + ... =	2.3E+03	Cumulative Internal Dose
	+	+	+	+	
External Annual Dose	6.6E-04	7.5E-04	8.4E-04 ...	8.9E-02	
Annual Dose	6.7E+01 +	5.8E+01 +	5.7E+01 + ... =	2.3E+03	Cumulative Dose
				6.7E+01	Maximum Annual Dose Occurred In Year 1

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GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Summer: FTFE OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:02:16

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Acute release
Uptake/exposure period:
Dose commitment period:
Dose units:

50.0
50.0
Rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Leaf Veg	2.4E-03	1.7E-01	4.3E-01	2.4E+00	7.5E+00	2.9E+03	2.3E+02	4.1E+01
Oth. Veg	1.4E-02	1.0E+00	2.5E+00	1.4E+01	4.4E+01	1.7E+04	1.3E+03	2.4E+02
Fruit	1.4E-02	1.0E+00	2.5E+00	1.4E+01	4.5E+01	1.7E+04	1.3E+03	2.4E+02
Cereals	5.2E-03	3.8E-01	9.3E-01	5.3E+00	1.7E+01	6.3E+03	4.9E+02	8.8E+01
Meat	5.3E-06	2.6E-04	6.3E-04	3.6E-03	1.1E-02	3.9E+00	3.0E-01	5.5E-02
Poultry	3.4E-08	2.2E-06	5.6E-06	3.0E-05	8.9E-05	2.6E-02	2.0E-03	3.6E-04
Cow Milk	3.4E-07	2.3E-05	5.6E-05	3.1E-04	9.4E-04	3.1E-01	2.4E-02	4.3E-03
Eggs	1.9E-06	1.4E-04	3.4E-04	2.0E-03	6.1E-03	2.3E+00	1.8E-01	3.2E-02
Soil Ing	4.4E-06	3.2E-04	7.9E-04	4.5E-03	1.4E-02	5.4E+00	4.2E-01	7.6E-02
Total	3.6E-02	2.6E+00	6.4E+00	3.6E+01	1.1E+02	4.3E+04	3.4E+03	6.1E+02

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver
Leaf Veg	4.1E+01	1.9E-03	1.3E-03	2.5E-06	5.0E+02
Oth. Veg	2.3E+02	1.1E-02	7.6E-03	9.3E-05	2.9E+03
Fruit	2.4E+02	1.1E-02	7.8E-03	9.9E-05	2.9E+03
Cereals	8.8E+01	4.2E-03	2.9E-03	5.9E-05	1.1E+03
Meat	5.4E-02	4.2E-06	2.3E-06	1.3E-07	6.8E-01
Poultry	3.6E-04	6.7E-08	1.8E-08	1.1E-06	4.4E-03
Cow Milk	4.3E-03	4.8E-07	1.6E-07	1.2E-06	5.3E-02
Eggs	3.2E-02	1.6E-06	1.1E-06	1.5E-06	3.9E-01
Soil Ing	7.5E-02	3.5E-06	2.4E-06	2.6E-08	9.2E-01
Total	6.0E+02	2.8E-02	2.0E-02	2.6E-04	7.4E+03

External Dose by Exposure Pathway

Pathway	
Sur Soil	6.6E-04
Total	6.6E-04

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 GENII Dose Calculation Program
 (Version 1.485 3-Dec-90)

Case title: Summer: FFTF OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:02:16

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Acute release
 Uptake/exposure period: 50.0
 Dose commitment period: 50.0
 Dose units: Rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Leaf Veg	2.4E-03	1.7E-01	4.3E-01	2.4E+00	7.6E+00	2.9E+03	2.3E+02	4.1E+01
Oth. Veg	1.4E-02	1.0E+00	2.5E+00	1.4E+01	4.4E+01	1.7E+04	1.3E+03	2.4E+02
Fruit	1.4E-02	1.0E+00	2.6E+00	1.5E+01	4.5E+01	1.7E+04	1.3E+03	2.4E+02
Cereals	5.2E-03	3.8E-01	9.4E-01	5.3E+00	1.7E+01	6.3E+03	4.9E+02	8.9E+01
Meat	5.4E-06	2.6E-04	6.4E-04	3.6E-03	1.1E-02	3.9E+00	3.0E-01	5.5E-02
Poultry	3.4E-08	2.2E-06	5.6E-06	3.0E-05	8.9E-05	2.6E-02	2.0E-03	3.6E-04
Cow Milk	3.6E-07	2.3E-05	5.6E-05	3.1E-04	9.4E-04	3.1E-01	2.4E-02	4.3E-03
Eggs	1.9E-06	1.4E-04	3.4E-04	2.0E-03	6.1E-03	2.3E+00	1.8E-01	3.2E-02
Soil Ing	2.6E-04	1.8E-02	4.5E-02	2.6E-01	8.0E-01	1.6E+02	1.2E+01	2.0E+00
Total	3.6E-02	2.6E+00	6.5E+00	3.7E+01	1.1E+02	4.3E+04	3.4E+03	6.1E+02

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver
Leaf Veg	4.1E+01	1.9E-03	1.3E-03	3.2E-06	5.0E+02
Oth. Veg	2.3E+02	1.1E-02	7.7E-03	1.0E-04	2.9E+03
Fruit	2.4E+02	1.1E-02	7.9E-03	1.1E-04	3.0E+03
Cereals	8.8E+01	4.2E-03	2.9E-03	5.9E-05	1.1E+03
Meat	5.4E-02	4.2E-06	2.3E-06	1.8E-07	6.8E-01
Poultry	3.6E-04	6.7E-08	1.8E-08	1.1E-06	4.4E-03
Cow Milk	4.3E-03	4.9E-07	1.8E-07	1.5E-06	5.3E-02
Eggs	3.2E-02	1.6E-06	1.1E-06	1.5E-06	3.9E-01
Soil Ing	2.0E+00	2.2E-04	1.4E-04	7.0E-06	3.1E+01
Total	6.1E+02	2.9E-02	2.0E-02	2.9E-04	7.5E+03

External Dose by Exposure Pathway

Pathway	
Sur Soil	8.9E-02
Total	8.9E-02

HNF-SD-FF-CN-012, Rev 0

----- GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Summer: FFTF OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:02:16

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su R	Marro	Testes
PU 240	5.4E-03	7.9E-01	2.0E+00	1.1E+01	3.5E+01	1.2E+04	9.1E+02	1.6E+02
PU 236	9.3E-07	3.3E-05	8.3E-05	4.8E-04	1.4E-03	1.3E-01	1.1E-02	1.8E-03
U 232	1.3E-06	1.4E-06	1.7E-06	3.8E-06	9.4E-06	1.0E-03	6.5E-05	1.3E-06
TH 232	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RA 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
AC 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
TH 228	5.0E-08	7.5E-08	1.3E-07	6.6E-07	2.7E-06	5.0E-05	4.0E-06	5.0E-08
RA 224	1.8E-07	2.7E-07	3.7E-07	1.4E-06	3.9E-06	6.5E-06	5.5E-07	1.8E-07
PB 212	3.5E-08	5.9E-08	1.2E-07	3.5E-07	4.1E-07	3.7E-06	3.5E-07	3.5E-08
BI 212	2.2E-10	3.3E-08	2.2E-08	1.4E-08	2.9E-09	2.2E-09	3.9E-10	1.8E-10
PU 238	1.5E-03	2.3E-01	5.7E-01	3.4E+00	1.0E+01	2.9E+03	2.3E+02	3.9E+01
PU 242	1.9E-06	2.9E-04	6.7E-04	3.8E-03	1.2E-02	3.9E+00	3.2E-01	5.6E-02
PU 241	1.3E-02	1.4E-01	3.7E-01	2.1E+00	6.0E+00	8.1E+03	6.3E+02	1.2E+02
U 237	1.3E-06	1.6E-04	4.2E-04	1.9E-03	5.1E-03	2.0E-05	3.3E-05	6.9E-06
AM 241	8.9E-03	3.4E-01	8.0E-01	4.6E+00	1.4E+01	4.4E+03	3.4E+02	6.2E+01
PU 239	7.0E-03	1.1E+00	2.7E+00	1.5E+01	4.7E+01	1.6E+04	1.2E+03	2.2E+02
Total	3.6E-02	2.6E+00	6.4E+00	3.6E+01	1.1E+02	4.3E+04	3.4E+03	6.1E+02

HNF-SD-FF-CN-012, Rev 0

 GENII Dose Calculation Program
 (Version 1.485 3-Dec-90)

Case title: Summer: FTF OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:02:16

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Acute release
 Uptake/exposure period: 50.0
 Dose commitment period: 50.0
 Dose units: Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver
PU 240	1.6E+02	5.3E-03	4.9E-03	0.0E+00	2.1E+03
PU 236	1.8E-03	7.4E-07	4.1E-07	0.0E+00	2.7E-02
U 232	1.3E-06	1.3E-06	1.3E-06	2.4E-04	0.0E+00
TH 232	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RA 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
AC 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
TH 228	5.4E-08	4.8E-08	4.8E-08	0.0E+00	4.2E-07
RA 224	1.9E-07	1.7E-07	1.7E-07	0.0E+00	0.0E+00
PB 212	4.1E-08	3.5E-08	3.5E-08	2.7E-07	5.1E-07
BI 212	5.9E-10	2.7E-10	1.6E-10	2.4E-08	0.0E+00
PU 238	3.9E+01	1.5E-03	1.4E-03	0.0E+00	5.2E+02
PU 242	5.6E-02	2.0E-06	1.8E-06	0.0E+00	7.1E-01
PU 241	1.2E+02	7.6E-03	3.2E-03	0.0E+00	1.3E+03
U 237	1.1E-04	1.0E-05	1.3E-07	1.7E-05	0.0E+00
AM 241	6.1E+01	7.0E-03	3.4E-03	0.0E+00	7.8E+02
PU 239	2.2E+02	7.0E-03	6.7E-03	0.0E+00	2.8E+03
Total	6.0E+02	2.8E-02	2.0E-02	2.6E-04	7.4E+03

External Dose by Radionuclide

Radionuclide	
PU 240	7.3E-06
PU 236	4.3E-10
U 232	0.0E+00
TH 232	0.0E+00
RA 228	0.0E+00
AC 228	0.0E+00
TH 228	8.7E-12
RA 224	6.8E-11
PB 212	8.8E-10
BI 212	1.2E-08
PU 238	2.1E-06
PU 242	2.3E-09
PU 241	5.0E-10
U 237	0.0E+00
AM 241	6.3E-04
PU 239	2.2E-05
Total	6.6E-04

HNF-SD-FF-CN-012, Rev 0

----- GENII Dose Calculation Program (Version 1.485 3-Dec-90) -----

Case title: Summer: FFTF OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:02:16

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Acute release
 Uptake/exposure period: 50.0
 Dose commitment period: 50.0
 Dose units: Rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
PU 240	5.4E-03	7.9E-01	2.0E+00	1.1E+01	3.6E+01	1.2E+04	9.1E+02	1.6E+02
PU 236	9.3E-07	3.3E-05	8.3E-05	4.8E-04	1.4E-03	1.3E-01	1.1E-02	1.8E-03
U 232	1.5E-06	1.6E-06	1.9E-06	4.4E-06	1.1E-05	1.1E-03	7.1E-05	1.5E-06
TH 232	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RA 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
AC 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
TH 228	9.8E-08	1.5E-07	2.5E-07	1.3E-06	5.3E-06	9.6E-05	7.8E-06	9.8E-08
RA 224	1.5E-06	2.3E-06	3.2E-06	1.2E-05	3.4E-05	5.7E-05	4.8E-06	1.5E-06
PB 212	3.4E-07	5.8E-07	1.2E-06	3.4E-06	4.0E-06	3.6E-05	3.4E-06	3.4E-07
BI 212	2.2E-09	3.2E-07	2.2E-07	1.4E-07	2.8E-08	2.2E-08	3.8E-09	1.8E-09
PU 238	1.5E-03	2.3E-01	5.8E-01	3.4E+00	1.0E+01	2.9E+03	2.3E+02	4.0E+01
PU 242	2.0E-06	2.9E-04	6.8E-04	3.9E-03	1.2E-02	3.9E+00	3.3E-01	5.6E-02
PU 241	1.3E-02	1.4E-01	3.7E-01	2.1E+00	6.0E+00	8.1E+03	6.3E+02	1.2E+02
U 237	1.3E-06	1.6E-04	4.3E-04	2.0E-03	5.1E-03	2.0E-05	3.3E-05	6.9E-06
AM 241	9.3E-03	3.5E-01	8.3E-01	4.8E+00	1.5E+01	4.5E+03	3.5E+02	6.3E+01
PU 239	7.0E-03	1.1E+00	2.7E+00	1.5E+01	4.8E+01	1.6E+04	1.2E+03	2.2E+02
Total	3.6E-02	2.6E+00	6.5E+00	3.7E+01	1.1E+02	4.3E+04	3.4E+03	6.1E+02

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Summer: FFTF OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:02:16

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver
PU 240	1.6E+02	5.3E-03	5.0E-03	0.0E+00	2.1E+03
PU 236	1.8E-03	7.4E-07	4.1E-07	0.0E+00	2.7E-02
U 232	1.5E-06	1.4E-06	1.4E-06	2.7E-04	0.0E+00
TH 232	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RA 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
AC 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
TH 228	1.1E-07	9.4E-08	9.4E-08	0.0E+00	8.2E-07
RA 224	1.7E-06	1.5E-06	1.5E-06	0.0E+00	0.0E+00
PB 212	4.0E-07	3.4E-07	3.2E-07	2.6E-06	5.0E-06
BI 212	5.8E-09	2.6E-09	1.5E-09	2.4E-07	0.0E+00
PU 238	3.9E+01	1.5E-03	1.4E-03	0.0E+00	5.3E+02
PU 242	5.7E-02	2.0E-06	1.8E-06	0.0E+00	7.1E-01
PU 241	1.2E+02	7.6E-03	3.2E-03	0.0E+00	1.3E+03
U 237	1.1E-04	1.0E-05	1.3E-07	1.7E-05	0.0E+00
AM 241	6.2E+01	7.3E-03	3.5E-03	0.0E+00	8.0E+02
PU 239	2.2E+02	7.0E-03	6.7E-03	0.0E+00	2.8E+03
Total	6.1E+02	2.9E-02	2.0E-02	2.9E-04	7.5E+03

External Dose by Radionuclide

Radionuclide	
PU 240	3.6E-04
PU 236	2.0E-09
U 232	0.0E+00
TH 232	0.0E+00
RA 228	0.0E+00
AC 228	0.0E+00
TH 228	2.3E-08
RA 224	2.0E-07
PB 212	2.5E-06
BI 212	3.3E-05
PU 238	8.4E-05
PU 242	1.1E-07
PU 241	9.5E-09
U 237	0.0E+00
AM 241	8.7E-02
PU 239	1.1E-03
Total	8.9E-02

HNF-SD-FF-CN-012, Rev 0

 GENII Dose Calculation Program
 (Version 1.485 3-Dec-90)

Case title: Autumn: FFTF OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:02:51

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 Acute release
 Uptake/exposure period: 50.0
 Dose commitment period: 50.0
 Dose units: Rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	3.2E+03	2.5E-01	8.1E+02
Breast	1.5E-01	1.5E-01	2.3E-02
R Marrow	1.8E+04	1.2E-01	2.1E+03
Lung	1.9E-01	1.2E-01	2.3E-02
Thyroid	1.0E-01	3.0E-02	3.1E-03
Bone Sur	2.3E+05	3.0E-02	6.9E+03
Liver	3.9E+04	6.0E-02	2.4E+03
LL Int.	6.0E+02	6.0E-02	3.6E+01
UL Int.	1.9E+02	6.0E-02	1.2E+01
S Int.	3.4E+01	6.0E-02	2.0E+00
Stomach	1.4E+01	6.0E-02	8.2E-01
Internal Effective Dose Equivalent			1.2E+04
External Dose			6.6E-04
Annual Effective Dose Equivalent			1.2E+04

 Controlling Organ: Bone Sur
 Controlling Pathway: Ing
 Controlling Radionuclide: PU239

 Total Inhalation EDE: 0.0E+00
 Total Ingestion EDE: 1.2E+04

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GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Autumn: FTF OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:02:51

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

		Dose Commitment Year				
		1	2	3	...	
Internal	:					
Intake	:					
Year:	3			1.4E-02	...	
				+		
	2		1.3E-02	1.1E-02	...	Internal
			+	+		Effective
	1	3.6E+02	3.1E+02	3.0E+02	+	Dose
					=	Equivalent
						1.2E+04
Internal						
Annual		3.6E+02	3.1E+02	3.0E+02	+	Cumulative
Dose					=	Internal
						Dose
		+	+	+	+	
External		6.6E-04	7.5E-04	8.4E-04	...	8.9E-02
Annual						
Dose		3.6E+02	3.1E+02	3.0E+02	+	Cumulative
					=	Dose
						1.2E+04
						3.6E+02
						Maximum
						Annual
						Dose Occurred
						In Year 1

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GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Autumn: FFTF OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:02:51

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Acute release
Uptake/exposure period:
Dose commitment period:
Dose units:

50.0
50.0
Rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Leaf Veg	4.4E-02	3.2E+00	7.9E+00	4.5E+01	1.4E+02	5.4E+04	4.2E+03	7.5E+02
Oth. Veg	6.1E-02	4.4E+00	1.1E+01	6.2E+01	1.9E+02	7.4E+04	5.7E+03	1.0E+03
Fruit	6.2E-02	4.5E+00	1.1E+01	6.3E+01	2.0E+02	7.5E+04	5.9E+03	1.1E+03
Cereals	2.3E-02	1.6E+00	4.0E+00	2.3E+01	7.1E+01	2.7E+04	2.1E+03	3.8E+02
Meat	8.5E-05	4.1E-03	9.9E-03	5.7E-02	1.7E-01	6.0E+01	4.7E+00	8.5E-01
Poultry	1.4E-07	9.8E-06	2.5E-05	1.3E-04	4.0E-04	1.2E-01	9.0E-03	1.6E-03
Cow Milk	5.9E-06	3.6E-04	9.0E-04	4.9E-03	1.5E-02	4.6E+00	3.6E-01	6.4E-02
Eggs	8.5E-06	6.0E-04	1.5E-03	8.5E-03	2.6E-02	1.0E+01	7.8E-01	1.4E-01
Soil Ing	4.4E-06	3.2E-04	7.9E-04	4.5E-03	1.4E-02	5.4E+00	4.2E-01	7.6E-02
Total	1.9E-01	1.4E+01	3.4E+01	1.9E+02	6.0E+02	2.3E+05	1.8E+04	3.2E+03

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver
Leaf Veg	7.5E+02	3.5E-02	2.4E-02	2.6E-04	9.2E+03
Oth. Veg	1.0E+03	4.9E-02	3.4E-02	3.6E-04	1.3E+04
Fruit	1.1E+03	4.9E-02	3.4E-02	3.8E-04	1.3E+04
Cereals	3.8E+02	1.8E-02	1.2E-02	2.4E-04	4.7E+03
Meat	8.4E-01	6.7E-05	3.7E-05	1.4E-05	1.1E+01
Poultry	1.6E-03	2.9E-07	7.7E-08	4.3E-06	2.0E-02
Cow Milk	6.4E-02	9.0E-06	2.9E-06	1.1E-04	7.9E-01
Eggs	1.4E-01	7.0E-06	4.6E-06	5.8E-06	1.7E+00
Soil Ing	7.5E-02	3.5E-06	2.4E-06	2.6E-08	9.2E-01
Total	3.2E+03	1.5E-01	1.0E-01	1.4E-03	3.9E+04

External Dose by Exposure Pathway

Pathway	
Sur Soil	6.6E-04
Total	6.6E-04

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Autumn: FFTF OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:02:51

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Leaf Veg	4.4E-02	3.2E+00	7.9E+00	4.5E+01	1.4E+02	5.4E+04	4.2E+03	7.5E+02
Oth. Veg	6.2E-02	4.4E+00	1.1E+01	6.2E+01	1.9E+02	7.4E+04	5.8E+03	1.0E+03
Fruit	6.2E-02	4.5E+00	1.1E+01	6.3E+01	2.0E+02	7.5E+04	5.9E+03	1.1E+03
Cereals	2.3E-02	1.6E+00	4.0E+00	2.3E+01	7.1E+01	2.7E+04	2.1E+03	3.8E+02
Meat	8.5E-05	4.1E-03	9.9E-03	5.7E-02	1.7E-01	6.0E+01	4.7E+00	8.5E-01
Poultry	1.4E-07	9.8E-06	2.5E-05	1.3E-04	4.0E-04	1.2E-01	9.0E-03	1.6E-03
Cow Milk	5.9E-06	3.6E-04	9.0E-04	4.9E-03	1.5E-02	4.6E+00	3.6E-01	6.4E-02
Eggs	8.5E-06	6.0E-04	1.5E-03	8.5E-03	2.6E-02	1.0E+01	7.8E-01	1.4E-01
Soil Ing	2.6E-04	1.8E-02	4.5E-02	2.6E-01	8.0E-01	1.6E+02	1.2E+01	2.0E+00
Total	1.9E-01	1.4E+01	3.4E+01	1.9E+02	6.0E+02	2.3E+05	1.8E+04	3.2E+03

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver
Leaf Veg	7.5E+02	3.5E-02	2.4E-02	2.6E-04	9.2E+03
Oth. Veg	1.0E+03	4.9E-02	3.4E-02	3.8E-04	1.3E+04
Fruit	1.1E+03	4.9E-02	3.4E-02	3.9E-04	1.3E+04
Cereals	3.8E+02	1.8E-02	1.2E-02	2.4E-04	4.7E+03
Meat	8.4E-01	6.7E-05	3.7E-05	1.4E-05	1.1E+01
Poultry	1.6E-03	2.9E-07	7.7E-08	4.3E-06	2.0E-02
Cow Milk	6.4E-02	9.0E-06	3.0E-06	1.1E-04	7.9E-01
Eggs	1.4E-01	7.0E-06	4.6E-06	5.9E-06	1.7E+00
Soil Ing	2.0E+00	2.2E-04	1.4E-04	7.0E-06	3.1E+01
Total	3.2E+03	1.5E-01	1.0E-01	1.4E-03	4.0E+04

External Dose by Exposure Pathway

Pathway	
Sur Soil	8.9E-02
Total	8.9E-02

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Autumn: FFTF OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:02:51

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Acute release

Uptake/exposure period:

50.0

Dose commitment period:

50.0

Dose units:

Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
PU 240	2.9E-02	4.2E+00	1.0E+01	5.9E+01	1.9E+02	6.3E+04	4.8E+03	8.6E+02
PU 236	5.1E-06	1.8E-04	4.5E-04	2.6E-03	7.6E-03	7.3E-01	5.8E-02	9.7E-03
U 232	7.0E-06	7.7E-06	9.0E-06	2.0E-05	5.0E-05	5.4E-03	3.4E-04	6.9E-06
TH 232	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RA 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
AC 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
TH 228	2.8E-07	4.3E-07	7.2E-07	3.8E-06	1.5E-05	2.8E-04	2.3E-05	2.8E-07
RA 224	1.0E-06	1.5E-06	2.1E-06	8.0E-06	2.2E-05	3.7E-05	3.1E-06	1.0E-06
PB 212	2.0E-07	3.3E-07	6.7E-07	2.0E-06	2.3E-06	2.1E-05	2.0E-06	2.0E-07
BI 212	1.3E-09	1.8E-07	1.3E-07	8.2E-08	1.6E-08	1.3E-08	2.2E-09	1.0E-09
PU 238	8.2E-03	1.2E+00	3.1E+00	1.8E+01	5.5E+01	1.5E+04	1.2E+03	2.1E+02
PU 242	1.0E-05	1.5E-03	3.5E-03	2.0E-02	6.4E-02	2.1E+01	1.7E+00	2.9E-01
PU 241	7.0E-02	7.6E-01	2.0E+00	1.1E+01	3.2E+01	4.4E+04	3.4E+03	6.5E+02
U 237	7.3E-06	9.3E-04	2.5E-03	1.1E-02	3.0E-02	1.2E-04	1.9E-04	4.0E-05
AM 241	4.7E-02	1.8E+00	4.2E+00	2.4E+01	7.4E+01	2.3E+04	1.8E+03	3.3E+02
PU 239	3.7E-02	5.7E+00	1.4E+01	8.1E+01	2.5E+02	8.6E+04	6.6E+03	1.2E+03
Total	1.9E-01	1.4E+01	3.4E+01	1.9E+02	6.0E+02	2.3E+05	1.8E+04	3.2E+03

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Autumn: FFTF OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:02:51

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver
PU 240	8.6E+02	2.8E-02	2.6E-02	0.0E+00	1.1E+04
PU 236	9.9E-03	4.0E-06	2.2E-06	0.0E+00	1.5E-01
U 232	6.9E-06	6.8E-06	6.7E-06	1.3E-03	0.0E+00
TH 232	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RA 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
AC 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
TH 228	3.1E-07	2.7E-07	2.7E-07	0.0E+00	2.4E-06
RA 224	1.1E-06	9.9E-07	9.9E-07	0.0E+00	0.0E+00
PB 212	2.3E-07	2.0E-07	1.8E-07	1.5E-06	2.9E-06
BI 212	3.3E-09	1.5E-09	8.8E-10	1.4E-07	0.0E+00
PU 238	2.1E+02	8.1E-03	7.7E-03	0.0E+00	2.8E+03
PU 242	3.0E-01	1.0E-05	9.3E-06	0.0E+00	3.7E+00
PU 241	6.5E+02	4.1E-02	1.7E-02	0.0E+00	6.8E+03
U 237	6.3E-04	6.0E-05	7.6E-07	9.9E-05	0.0E+00
AM 241	3.2E+02	3.7E-02	1.8E-02	0.0E+00	4.1E+03
PU 239	1.2E+03	3.7E-02	3.6E-02	0.0E+00	1.5E+04
Total	3.2E+03	1.5E-01	1.0E-01	1.4E-03	3.9E+04

External Dose by Radionuclide

Radionuclide	
PU 240	7.3E-06
PU 236	4.3E-10
U 232	0.0E+00
TH 232	0.0E+00
RA 228	0.0E+00
AC 228	0.0E+00
TH 228	8.7E-12
RA 224	6.8E-11
PB 212	8.8E-10
BI 212	1.2E-08
PU 238	2.1E-06
PU 242	2.3E-09
PU 241	5.0E-10
U 237	0.0E+00
AM 241	6.3E-04
PU 239	2.2E-05
Total	6.6E-04

HNF-SD-FF-CN-012, Rev 0

----- GENII Dose Calculation Program (Version 1.485 3-Dec-90) -----

Case title: Autumn: FFTF OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:02:51

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Acute release
 Uptake/exposure period: 50.0
 Dose commitment period: 50.0
 Dose units: Rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
PU 240	2.9E-02	4.2E+00	1.0E+01	5.9E+01	1.9E+02	6.3E+04	4.8E+03	8.7E+02
PU 236	5.1E-06	1.8E-04	4.5E-04	2.6E-03	7.6E-03	7.3E-01	5.8E-02	9.7E-03
U 232	7.1E-06	7.9E-06	9.2E-06	2.1E-05	5.1E-05	5.5E-03	3.5E-04	7.0E-06
TH 232	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RA 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
AC 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
TH 228	3.3E-07	5.0E-07	8.5E-07	4.4E-06	1.8E-05	3.3E-04	2.7E-05	3.3E-07
RA 224	2.4E-06	3.6E-06	5.0E-06	1.9E-05	5.2E-05	8.8E-05	7.4E-06	2.4E-06
PB 212	5.0E-07	8.5E-07	1.7E-06	5.0E-06	5.9E-06	5.3E-05	5.0E-06	5.0E-07
BI 212	3.2E-09	4.7E-07	3.2E-07	2.1E-07	4.1E-08	3.2E-08	5.6E-09	2.6E-09
PU 238	8.3E-03	1.2E+00	3.1E+00	1.8E+01	5.5E+01	1.5E+04	1.2E+03	2.1E+02
PU 242	1.0E-05	1.5E-03	3.5E-03	2.0E-02	6.4E-02	2.1E+01	1.7E+00	2.9E-01
PU 241	7.0E-02	7.6E-01	2.0E+00	1.1E+01	3.2E+01	4.4E+04	3.4E+03	6.5E+02
U 237	7.3E-06	9.3E-06	2.5E-05	1.1E-02	3.0E-02	1.2E-04	1.9E-04	6.0E-05
AM 241	4.7E-02	1.8E+00	4.2E+00	2.4E+01	7.4E+01	2.3E+04	1.8E+03	3.3E+02
PU 239	3.7E-02	5.7E+00	1.4E+01	8.1E+01	2.5E+02	8.6E+04	6.6E+03	1.2E+03
Total	1.9E-01	1.4E+01	3.4E+01	1.9E+02	6.0E+02	2.3E+05	1.8E+04	3.2E+03

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GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Autumn: FFTF OLD PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:02:51

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver
PU 240	8.6E+02	2.8E-02	2.6E-02	0.0E+00	1.1E+04
PU 236	9.9E-03	4.0E-06	2.2E-06	0.0E+00	1.5E-01
U 232	7.0E-06	6.9E-06	6.9E-06	1.3E-03	0.0E+00
TH 232	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RA 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
AC 228	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
TH 228	3.6E-07	3.2E-07	3.2E-07	0.0E+00	2.8E-06
RA 224	2.6E-06	2.3E-06	2.3E-06	0.0E+00	0.0E+00
PB 212	5.9E-07	5.0E-07	4.7E-07	3.8E-06	7.3E-06
BI 212	8.5E-09	3.8E-09	2.3E-09	3.5E-07	0.0E+00
PU 238	2.1E+02	8.2E-03	7.7E-03	0.0E+00	2.8E+03
PU 242	3.0E-01	1.0E-05	9.3E-06	0.0E+00	3.7E+00
PU 241	6.5E+02	4.1E-02	1.7E-02	0.0E+00	6.8E+03
U 237	6.3E-04	6.0E-05	7.6E-07	1.0E-04	0.0E+00
AM 241	3.2E+02	3.7E-02	1.8E-02	0.0E+00	4.2E+03
PU 239	1.2E+03	3.7E-02	3.6E-02	0.0E+00	1.5E+04
Total	3.2E+03	1.5E-01	1.0E-01	1.4E-03	4.0E+04

External Dose by Radionuclide

Radionuclide	
PU 240	3.6E-04
PU 236	2.0E-09
U 232	0.0E+00
TH 232	0.0E+00
RA 228	0.0E+00
AC 228	0.0E+00
TH 228	2.3E-08
RA 224	2.0E-07
PB 212	2.5E-06
BI 212	3.3E-05
PU 238	8.4E-05
PU 242	1.1E-07
PU 241	9.5E-09
U 237	0.0E+00
AM 241	8.7E-02
PU 239	1.1E-03
Total	8.9E-02

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: FFTF NEW PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:30:54

Page A. 1

This is a far-field (wide-scale release, multiple site) scenario.
Release is acute
Individual dose

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Ground, external
Terrestrial foods ingestion
Animal product ingestion
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:
Intake ends after (yr): 50.0
Dose calculations ends after (yr): 50.0

===== FILENAMES AND TITLES OF FILES/LIBRARIES USED =====

Input file name: \GENII\mfepuil.in
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
PNL Food Transfer Factor Library (by Z, with Fr&Os 7/19/93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
=====

-----Release Terms-----

Release	Air	Surface	Buried
Radio- nuclide	Cl/yr	Water Cl/yr	Source Cl/m3
PU238	5.0E-04	0.0E+00	0.0E+00
PU239	5.1E-02	0.0E+00	0.0E+00
PU240	1.2E-02	0.0E+00	0.0E+00
PU241	3.8E-02	0.0E+00	0.0E+00
PU242	3.5E-07	0.0E+00	0.0E+00
AM241	2.0E-02	0.0E+00	0.0E+00

===== AIR TRANSPORT =====
1.0E+00 Input E/Q value (s/m3)

===== EXTERNAL EXPOSURE =====
4.4E+03 Hours of exposure to ground contamination

===== INGESTION POPULATION =====
1 Atmospheric production definition: 1 - Use population-weighted chi/Q

===== TERRESTRIAL FOOD INGESTION =====

FOOD TYPE	GROW TIME d	--IRRIGATION--		YIELD kg/m2	PROD- UCTION kg/yr	--CONSUMPTION--	
		S RATE * in/yr	TIME mo/yr			HOLDUP d	RATE kg/yr
Leaf Veg	90.0	0	0.0	0.0	1.5	1.0	3.0E+01
Oth. Veg	90.0	0	0.0	0.0	4.0	5.0	2.2E+02
Fruit	90.0	0	0.0	0.0	2.0	5.0	3.3E+02
Cereals	90.0	0	0.0	0.0	0.8	180.0	8.0E+01

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===== ANIMAL FOOD INGESTION =====

FOOD TYPE	---HUMAN---		TOTAL	DRINK	-----STORED FEED-----						
	CONSUMPTION RATE kg/yr	PROD- HOLDUP d	PROD- DUCTION kg/yr	WATER CONTAM FRACT.	DIET FRAC- TION	GROW TIME d	-IRRIGATION- S * in/yr	TIME mo/yr	YIELD kg/m3	STOR- AGE d	
Meat	8.0E+01	15.0		0.00	0.3	90.00	0	0.0	0.0	0.80	0.0
Poultry	1.8E+01	1.0		0.00	1.0	90.00	0	0.0	0.0	0.80	0.0
Cow Milk	2.7E+02	1.0		0.00	0.3	45.00	0	0.0	0.0	2.00	0.0
Eggs	3.0E+01	1.0		0.00	1.0	90.00	0	0.0	0.0	0.80	0.0

-----FRESH FORAGE-----											
Meat					0.75	45.0	0	0.0	0.0	2.00	0.0
Cow Milk					0.75	30.0	0	0.0	0.0	1.50	0.0

Note: Animal diet fraction for years 2 through 50.0000

=====

Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

=====

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 GENII Dose Calculation Program
 (Version 1.485 3-Dec-90)

Case title: Winter: FFTF NEW PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:31:42

Page C. 1

 Acute release
 Uptake/exposure period: 50.0
 Dose commitment period: 50.0
 Dose units: Rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	8.5E-02	2.5E-01	2.1E-02
Breast	5.4E-06	1.5E-01	8.1E-07
R Marrow	4.7E-01	1.2E-01	5.7E-02
Lung	6.4E-06	1.2E-01	7.7E-07
Thyroid	3.4E-06	3.0E-02	1.0E-07
Bone Sur	6.1E+00	3.0E-02	1.8E-01
Liver	1.1E+00	6.0E-02	6.4E-02
LL Int.	1.8E-02	6.0E-02	1.1E-03
UL Int.	6.0E-03	6.0E-02	3.6E-04
S Int.	1.0E-03	6.0E-02	6.3E-05
Stomach	4.3E-04	6.0E-02	2.6E-05
Internal Effective Dose Equivalent			3.3E-01
External Dose			1.1E-03
Annual Effective Dose Equivalent			3.3E-01

 Controlling Organ: Bone Sur
 Controlling Pathway: Ing
 Controlling Radionuclide: PU239

 Total Inhalation EDE: 0.0E+00
 Total Ingestion EDE: 3.3E-01

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GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Winter: FFTF NEW PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:31:42

Page C. 2

Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

		Dose Commitment Year				
		1	2	3	...	
Internal Intake Year:	3					
				1.2E-02	...	
	2		1.2E-02	1.0E-02	...	
	1	1.1E-02	9.6E-03	9.4E-03	...	3.3E-01
Internal Annual Dose		1.1E-02	2.1E-02	3.1E-02	...	9.7E+00
		+	+	+		+
External Annual Dose		1.1E-03	1.1E-03	1.1E-03	...	5.2E-02
Annual Dose		1.2E-02	2.3E-02	3.2E-02	...	9.8E+00
						3.3E-01
						Maximum Annual Dose Occurred In Year 50

HNF-SD-FF-CN-012, Rev 0

GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Winter: FFTF NEW PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:31:42

Page C. 3

Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Leaf Veg	8.4E-08	4.3E-06	1.0E-05	5.9E-05	1.8E-04	5.9E-02	4.6E-03	8.2E-04
Oth. Veg	1.5E-06	7.9E-05	1.9E-04	1.1E-03	3.3E-03	1.1E+00	8.4E-02	1.5E-02
Fruit	1.7E-06	8.7E-05	2.1E-04	1.2E-03	3.7E-03	1.2E+00	9.3E-02	1.7E-02
Cereals	4.1E-08	2.1E-06	5.0E-06	2.9E-05	8.8E-05	2.8E-02	2.2E-03	4.0E-04
Meat	2.6E-09	1.0E-07	2.5E-07	1.4E-06	4.3E-06	1.4E-03	1.1E-04	1.9E-05
Poultry	1.2E-11	5.7E-10	1.4E-09	7.8E-09	2.4E-08	7.7E-06	6.0E-07	1.1E-07
Cow Milk	1.1E-10	4.9E-09	1.2E-08	6.7E-08	2.1E-07	6.6E-05	5.1E-06	9.2E-07
Eggs	8.9E-10	4.5E-08	1.1E-07	6.1E-07	1.9E-06	6.1E-04	4.8E-05	8.5E-06
Soil Ing	3.1E-06	2.6E-04	6.3E-04	3.6E-03	1.1E-02	3.7E+00	2.9E-01	5.2E-02
Total	6.4E-06	4.3E-04	1.0E-03	6.0E-03	1.8E-02	6.1E+00	4.7E-01	8.5E-02

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver
Leaf Veg	8.1E-04	6.8E-08	3.7E-08	6.4E-13	1.0E-02
Oth. Veg	1.5E-02	1.2E-06	6.8E-07	1.1E-11	1.9E-01
Fruit	1.6E-02	1.4E-06	7.6E-07	1.2E-11	2.1E-01
Cereals	3.9E-04	3.3E-08	1.8E-08	2.4E-13	5.0E-03
Meat	1.9E-05	2.1E-09	1.0E-09	5.2E-14	2.4E-04
Poultry	1.1E-07	9.7E-12	5.0E-12	5.1E-13	1.4E-06
Cow Milk	9.0E-07	9.2E-11	4.6E-11	1.8E-12	1.2E-05
Eggs	8.4E-06	7.2E-10	3.9E-10	7.1E-13	1.1E-04
Soil Ing	5.1E-02	2.7E-06	1.9E-06	6.5E-11	6.5E-01
Total	8.4E-02	5.4E-06	3.4E-06	9.3E-11	1.1E+00

External Dose by Exposure Pathway

Pathway	
Sur Soil	1.1E-03
Total	1.1E-03

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GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Winter: FFTF NEW PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:31:42

Page C. 4

Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Leaf Veg	6.5E-06	4.2E-04	1.0E-03	5.8E-03	1.8E-02	3.4E+00	2.6E-01	4.3E-02
Oth. Veg	7.6E-05	4.1E-03	9.8E-03	5.6E-02	1.7E-01	3.3E+01	2.5E+00	4.2E-01
Fruit	8.3E-05	4.4E-03	1.1E-02	6.1E-02	1.9E-01	3.5E+01	2.7E+00	4.5E-01
Cereals	3.2E-06	2.1E-04	5.0E-04	2.9E-03	8.9E-03	1.7E+00	1.3E-01	2.1E-02
Meat	3.0E-08	1.2E-06	2.9E-06	1.7E-05	5.2E-05	1.0E-02	7.8E-04	1.3E-04
Poultry	2.8E-11	1.5E-09	3.7E-09	2.1E-08	6.5E-08	1.5E-05	1.2E-06	2.0E-07
Cow Milk	1.2E-09	5.8E-08	1.4E-07	8.0E-07	2.5E-06	4.7E-04	3.7E-05	6.2E-06
Eggs	2.1E-09	1.2E-07	3.0E-07	1.7E-06	5.2E-06	1.2E-03	9.6E-05	1.6E-05
Soil Ing	1.5E-04	1.2E-02	3.1E-02	1.7E-01	5.4E-01	1.0E+02	8.1E+00	1.3E+00
Total	3.2E-04	2.2E-02	5.3E-02	3.0E-01	9.3E-01	1.8E+02	1.4E+01	2.3E+00

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver
Leaf Veg	4.2E-02	5.4E-06	3.3E-06	1.1E-10	6.7E-01
Oth. Veg	4.1E-01	6.2E-05	3.5E-05	1.2E-09	6.5E+00
Fruit	4.5E-01	6.7E-05	3.8E-05	1.3E-09	7.1E+00
Cereals	2.1E-02	2.7E-06	1.6E-06	1.6E-11	3.4E-01
Meat	1.3E-04	2.4E-08	1.2E-08	1.5E-12	2.0E-03
Poultry	2.0E-07	2.3E-11	1.3E-11	1.5E-12	2.9E-06
Cow Milk	6.1E-06	1.0E-09	5.2E-10	4.8E-11	9.4E-05
Eggs	1.6E-05	1.8E-09	1.0E-09	2.1E-12	2.3E-04
Soil Ing	1.3E+00	1.3E-04	9.0E-05	1.3E-09	2.1E+01
Total	2.2E+00	2.7E-04	1.7E-04	4.0E-09	3.5E+01

External Dose by Exposure Pathway

Pathway	
Sur Soil	5.2E-02
Total	5.2E-02

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GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Winter: FFTF NEW PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:31:42

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R	Marro	Testes
PU 240	3.2E-07	4.7E-05	1.2E-04	6.7E-04	2.1E-03	7.1E-01	5.4E-02	9.7E-03	
PU 238	1.4E-08	2.1E-06	5.2E-06	3.1E-05	9.2E-05	2.6E-02	2.1E-03	3.6E-04	
PU 242	9.1E-12	1.3E-09	3.1E-09	1.8E-08	5.7E-08	1.8E-05	1.5E-06	2.6E-07	
PU 241	6.8E-08	7.4E-07	1.9E-06	1.1E-05	3.1E-05	4.2E-02	3.3E-03	6.4E-04	
U 237	6.8E-12	8.7E-10	2.3E-09	1.1E-08	2.8E-08	1.1E-10	1.8E-10	3.7E-11	
AM 241	4.7E-06	1.8E-04	4.2E-04	2.4E-03	7.4E-03	2.3E+00	1.8E-01	3.3E-02	
PU 239	1.3E-06	2.0E-04	5.0E-04	2.8E-03	8.8E-03	3.0E+00	2.3E-01	4.1E-02	
Total	6.4E-06	4.3E-04	1.0E-03	6.0E-03	1.8E-02	6.1E+00	4.7E-01	8.5E-02	

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver
PU 240	9.7E-03	3.2E-07	2.9E-07	0.0E+00	1.2E-01
PU 238	3.5E-04	1.4E-08	1.3E-08	0.0E+00	4.7E-03
PU 242	2.6E-07	9.2E-12	8.3E-12	0.0E+00	3.3E-06
PU 241	6.3E-04	4.0E-08	1.7E-08	0.0E+00	6.6E-03
U 237	5.9E-10	5.6E-11	7.1E-13	9.3E-11	0.0E+00
AM 241	3.2E-02	3.7E-06	1.8E-06	0.0E+00	4.2E-01
PU 239	4.1E-02	1.3E-06	1.2E-06	0.0E+00	5.2E-01
Total	8.4E-02	5.4E-06	3.4E-06	9.3E-11	1.1E+00

External Dose by Radionuclide

Radionuclide	
PU 240	2.8E-06
PU 238	1.2E-07
PU 242	0.0E+00
PU 241	1.6E-11
U 237	9.9E-07
AM 241	1.0E-03
PU 239	2.6E-05
Total	1.1E-03

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GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Winter: FFTF NEW PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:31:42

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
PU 240	1.6E-05	2.4E-03	6.0E-03	3.4E-02	1.1E-01	2.1E+01	1.6E+00	2.6E-01
PU 238	5.9E-07	9.0E-05	2.2E-04	1.3E-03	3.9E-03	7.0E-01	5.6E-02	9.0E-03
PU 242	4.7E-10	7.0E-08	1.6E-07	9.3E-07	3.0E-06	5.5E-04	4.5E-05	7.1E-06
PU 241	1.4E-06	1.5E-05	3.9E-05	2.2E-04	6.3E-04	5.6E-01	4.4E-02	7.9E-03
U 237	2.9E-10	3.7E-08	9.8E-08	4.5E-07	1.2E-06	4.6E-09	7.7E-09	1.6E-09
AM 241	2.3E-04	8.9E-03	2.1E-02	1.2E-01	3.7E-01	6.7E+01	5.3E+00	8.7E-01
PU 239	6.6E-05	1.0E-02	2.5E-02	1.4E-01	4.5E-01	8.8E+01	6.8E+00	1.1E+00
Total	3.2E-04	2.2E-02	5.3E-02	3.0E-01	9.3E-01	1.8E+02	1.4E+01	2.3E+00

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver
PU 240	2.6E-01	1.6E-05	1.5E-05	0.0E+00	4.1E+00
PU 238	8.8E-03	5.9E-07	5.5E-07	0.0E+00	1.4E-01
PU 242	7.2E-06	4.8E-10	4.3E-10	0.0E+00	1.1E-04
PU 241	7.8E-03	8.0E-07	3.4E-07	0.0E+00	9.5E-02
U 237	2.5E-08	2.4E-09	3.0E-11	4.0E-09	0.0E+00
AM 241	8.5E-01	1.8E-04	8.8E-05	0.0E+00	1.4E+01
PU 239	1.1E+00	6.6E-05	6.4E-05	0.0E+00	1.7E+01
Total	2.2E+00	2.7E-04	1.7E-04	4.0E-09	3.5E+01

External Dose by Radionuclide

Radionuclide	
PU 240	1.3E-04
PU 238	4.6E-06
PU 242	0.0E+00
PU 241	3.0E-10
U 237	1.9E-05
AM 241	5.1E-02
PU 239	1.3E-03
Total	5.2E-02

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----- GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Spring: FFTF NEW PU MIX INGESTION DOSES UNIT X/Q

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 Acute release
 Uptake/exposure period: 50.0
 Dose commitment period: 50.0
 Dose units: Rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	2.9E+01	2.5E-01	7.3E+00
Breast	1.5E-03	1.5E-01	2.2E-04
R Marrow	1.6E+02	1.2E-01	1.9E+01
Lung	1.7E-03	1.2E-01	2.1E-04
Thyroid	1.0E-03	3.0E-02	3.1E-05
Bone Sur	2.1E+03	3.0E-02	6.3E+01
Liver	3.7E+02	6.0E-02	2.2E+01
LL Int.	6.3E+00	6.0E-02	3.8E-01
UL Int.	2.0E+00	6.0E-02	1.2E-01
S Int.	3.5E-01	6.0E-02	2.1E-02
Stomach	1.4E-01	6.0E-02	8.6E-03
Internal Effective Dose Equivalent			1.1E+02
External Dose			1.1E-03
Annual Effective Dose Equivalent			1.1E+02

 Controlling Organ: Bone Sur
 Controlling Pathway: Ing
 Controlling Radionuclide: PU239

 Total Inhalation EDE: 0.0E+00
 Total Ingestion EDE: 1.1E+02

GENII Dose Calculation Program
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GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Spring: FFTF NEW PU MIX INGESTION DOSES UNIT X/Q

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Leaf Veg	1.7E-03	1.4E-01	3.5E-01	2.0E+00	6.2E+00	2.1E+03	1.6E+02	2.9E+01
Oth. Veg	1.5E-06	7.9E-05	1.9E-04	1.1E-03	3.3E-03	1.1E+00	8.4E-02	1.5E-02
Fruit	1.7E-06	8.7E-05	2.1E-04	1.2E-03	3.7E-03	1.2E+00	9.3E-02	1.7E-02
Cereals	4.1E-08	2.1E-06	5.0E-06	2.9E-05	8.8E-05	2.8E-02	2.2E-03	4.0E-04
Meat	6.2E-06	2.8E-04	6.6E-04	3.8E-03	1.2E-02	3.7E+00	2.9E-01	5.2E-02
Poultry	1.2E-11	5.7E-10	1.4E-09	7.8E-09	2.4E-08	7.7E-06	6.0E-07	1.1E-07
Cow Milk	2.6E-07	1.5E-05	3.7E-05	2.1E-04	6.5E-04	2.1E-01	1.6E-02	2.9E-03
Eggs	8.9E-10	4.5E-08	1.1E-07	6.1E-07	1.9E-06	6.1E-04	4.8E-05	8.5E-06
Soil Ing	3.1E-06	2.6E-04	6.3E-04	3.6E-03	1.1E-02	3.7E+00	2.9E-01	5.2E-02
Total	1.7E-03	1.4E-01	3.5E-01	2.0E+00	6.3E+00	2.1E+03	1.6E+02	2.9E+01

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver
Leaf Veg	2.9E+01	1.5E-03	1.0E-03	2.7E-08	3.6E+02
Oth. Veg	1.5E-02	1.2E-06	6.8E-07	1.1E-11	1.9E-01
Fruit	1.6E-02	1.4E-06	7.6E-07	1.2E-11	2.1E-01
Cereals	3.9E-04	3.3E-08	1.8E-08	2.6E-13	5.0E-03
Meat	5.2E-02	4.9E-06	2.6E-06	3.3E-10	6.6E-01
Poultry	1.1E-07	9.7E-12	5.0E-12	5.2E-13	1.4E-06
Cow Milk	2.9E-03	2.2E-07	1.2E-07	9.5E-09	3.7E-02
Eggs	8.4E-06	7.2E-10	3.9E-10	7.1E-13	1.1E-04
Soil Ing	5.1E-02	2.7E-06	1.9E-06	6.5E-11	6.5E-01
Total	2.9E+01	1.5E-03	1.0E-03	3.7E-08	3.7E+02

External Dose by Exposure Pathway

Pathway	
Sur Soil	1.1E-03
Total	1.1E-03

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GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Spring: FETP NEW PU MIX INGESTION DOSES UNIT X/Q

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Leaf Veg	1.7E-03	1.4E-01	3.5E-01	2.0E+00	6.2E+00	2.1E+03	1.6E+02	2.9E+01
Oth. Veg	7.6E-05	4.1E-03	9.8E-03	5.6E-02	1.7E-01	3.3E+01	2.5E+00	4.2E-01
Fruit	8.3E-05	4.4E-03	1.1E-02	6.1E-02	1.9E-01	3.5E+01	2.7E+00	4.5E-01
Cereals	3.2E-06	2.1E-04	5.0E-04	2.9E-03	8.9E-03	1.7E+00	1.3E-01	2.1E-02
Meat	6.2E-06	2.8E-04	6.7E-04	3.8E-03	1.2E-02	3.8E+00	2.9E-01	5.3E-02
Poultry	2.8E-11	1.5E-09	3.7E-09	2.1E-08	6.5E-08	1.5E-05	1.2E-06	2.0E-07
Cow Milk	2.6E-07	1.5E-05	3.7E-05	2.1E-04	6.5E-04	2.1E-01	1.6E-02	2.9E-03
Eggs	2.1E-09	1.2E-07	3.0E-07	1.7E-06	5.2E-06	1.2E-03	9.6E-05	1.6E-05
Soil Ing	1.5E-04	1.2E-02	3.1E-02	1.7E-01	5.4E-01	1.0E+02	8.1E+00	1.3E+00
Total	2.0E-03	1.6E-01	4.1E-01	2.3E+00	7.2E+00	2.3E+03	1.8E+02	3.1E+01

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver
Leaf Veg	2.9E+01	1.5E-03	1.0E-03	2.7E-08	3.6E+02
Oth. Veg	4.1E-01	6.2E-05	3.5E-05	1.2E-09	6.5E+00
Fruit	4.5E-01	6.7E-05	3.8E-05	1.3E-09	7.1E+00
Cereals	2.1E-02	2.7E-06	1.6E-06	1.6E-11	3.4E-01
Meat	5.2E-02	4.9E-06	2.6E-06	3.3E-10	6.7E-01
Poultry	2.0E-07	2.3E-11	1.3E-11	1.5E-12	2.9E-06
Cow Milk	2.9E-03	2.2E-07	1.2E-07	9.6E-09	3.7E-02
Eggs	1.6E-05	1.8E-09	1.0E-09	2.1E-12	2.3E-04
Soil Ing	1.3E+00	1.3E-04	9.0E-05	1.3E-09	2.1E+01
Total	3.1E+01	1.8E-03	1.2E-03	4.0E-08	4.0E+02

External Dose by Exposure Pathway

Pathway	
Sur Soil	5.2E-02
Total	5.2E-02

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----- GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Spring: FFTF NEW PU MIX INGESTION DOSES UNIT X/Q

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
PU 240	1.3E-04	2.0E-02	4.9E-02	2.8E-01	8.8E-01	2.9E+02	2.3E+01	4.1E+00
PU 238	5.7E-06	8.7E-04	2.1E-03	1.3E-02	3.8E-02	1.1E+01	8.6E-01	1.5E-01
PU 242	3.9E-09	5.8E-07	1.4E-06	7.7E-06	2.5E-05	7.9E-03	6.5E-04	1.1E-04
PU 241	2.9E-05	3.2E-04	8.3E-04	4.7E-03	1.4E-02	1.8E+01	1.4E+00	2.7E-01
U 237	2.7E-09	3.4E-07	9.0E-07	4.1E-06	1.1E-05	4.3E-08	7.1E-08	1.5E-08
AM 241	1.0E-03	3.8E-02	9.0E-02	5.2E-01	1.6E+00	5.0E+02	3.9E+01	7.0E+00
PU 239	5.5E-04	8.5E-02	2.1E-01	1.2E+00	3.7E+00	1.3E+03	9.8E+01	1.8E+01
Total	1.7E-03	1.4E-01	3.5E-01	2.0E+00	6.3E+00	2.1E+03	1.6E+02	2.9E+01

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver
PU 240	4.0E+00	1.3E-04	1.2E-04	0.0E+00	5.1E+01
PU 238	1.4E-01	5.7E-06	5.3E-06	0.0E+00	2.0E+00
PU 242	1.1E-04	4.0E-09	3.6E-09	0.0E+00	1.4E-03
PU 241	2.7E-01	1.7E-05	7.3E-06	0.0E+00	2.8E+00
U 237	2.3E-07	2.2E-08	2.8E-10	3.7E-08	0.0E+00
AM 241	6.9E+00	7.9E-04	3.8E-04	0.0E+00	8.9E+01
PU 239	1.7E+01	5.5E-04	5.3E-04	0.0E+00	2.2E+02
Total	2.9E+01	1.5E-03	1.0E-03	3.7E-08	3.7E+02

External Dose by Radionuclide

Radionuclide	
PU 240	2.8E-06
PU 238	1.2E-07
PU 242	0.0E+00
PU 241	1.6E-11
U 237	9.9E-07
AM 241	1.0E-03
PU 239	2.6E-05
Total	1.1E-03

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----- GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Spring: FFTF NEW PU MIX INGESTION DOSES UNIT X/Q

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Acute release
 Uptake/exposure period: 50.0
 Dose commitment period: 50.0
 Dose units: Rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
PU 240	1.5E-04	2.2E-02	5.5E-02	3.1E-01	9.9E-01	3.1E+02	2.4E+01	4.3E+00
PU 238	6.3E-06	9.6E-04	2.4E-03	1.4E-02	4.2E-02	1.1E+01	9.1E-01	1.6E-01
PU 242	4.4E-09	6.5E-07	1.5E-06	8.6E-06	2.8E-05	8.4E-03	7.0E-04	1.2E-04
PU 241	3.0E-05	3.3E-04	8.7E-04	4.9E-03	1.4E-02	1.9E+01	1.5E+00	2.8E-01
U 237	3.0E-09	3.8E-07	1.0E-06	4.6E-06	1.2E-05	4.7E-08	7.8E-08	1.6E-08
AM 241	1.2E-03	4.7E-02	1.1E-01	6.4E-01	1.9E+00	5.6E+02	4.4E+01	7.8E+00
PU 239	6.1E-04	9.5E-02	2.4E-01	1.3E+00	4.2E+00	1.4E+03	1.0E+02	1.9E+01
Total	2.0E-03	1.6E-01	4.1E-01	2.3E+00	7.2E+00	2.3E+03	1.8E+02	3.1E+01

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver
PU 240	4.3E+00	1.5E-04	1.4E-04	0.0E+00	5.5E+01
PU 238	1.5E-01	6.3E-06	5.9E-06	0.0E+00	2.1E+00
PU 242	1.2E-04	4.4E-09	4.0E-09	0.0E+00	1.5E-03
PU 241	2.8E-01	1.8E-05	7.6E-06	0.0E+00	2.9E+00
U 237	2.6E-07	2.4E-08	3.1E-10	4.0E-08	0.0E+00
AM 241	7.7E+00	9.7E-04	4.7E-04	0.0E+00	1.0E+02
PU 239	1.9E+01	6.1E-04	5.9E-04	0.0E+00	2.4E+02
Total	3.1E+01	1.8E-03	1.2E-03	4.0E-08	4.0E+02

External Dose by Radionuclide

Radionuclide	
PU 240	1.3E-04
PU 238	4.6E-06
PU 242	0.0E+00
PU 241	3.0E-10
U 237	1.9E-05
AM 241	5.1E-02
PU 239	1.3E-03
Total	5.2E-02

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GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Summer: FFTF NEW PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:32:13

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	4.2E+02	2.5E-01	1.1E+02
Breast	2.2E-02	1.5E-01	3.3E-03
R Marrow	2.4E+03	1.2E-01	2.8E+02
Lung	2.5E-02	1.2E-01	3.0E-03
Thyroid	1.5E-02	3.0E-02	4.6E-04
Bone Sur	3.1E+04	3.0E-02	9.2E+02
Liver	5.3E+03	6.0E-02	3.2E+02
LL Int.	9.1E+01	6.0E-02	5.5E+00
UL Int.	2.9E+01	6.0E-02	1.8E+00
S Int.	5.2E+00	6.0E-02	3.1E-01
Stomach	2.1E+00	6.0E-02	1.3E-01
Internal Effective Dose Equivalent			1.6E+03
External Dose			1.1E-03
Annual Effective Dose Equivalent			1.6E+03

Controlling Organ: Bone Sur
Controlling Pathway: Ing
Controlling Radionuclide: PU239
Total Inhalation EDE: 0.0E+00
Total Ingestion EDE: 1.6E+03

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GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Summer: FFTF NEW PU MIX INGESTION DOSES UNIT X/Q

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Acute release

Uptake/exposure period:

50.0

Dose commitment period:

50.0

Dose units:

Rem

		Dose Commitment Year				
		1	2	3	...	
Internal	:					
Intake	:					
Year:	3			1.2E-02	...	
				+		
	2		1.2E-02	1.0E-02	...	Internal Effective Dose Equivalent
			+	+		
	1	5.6E+01 + 4.8E+01	+ 4.7E+01	+ ...	= 1.6E+03	
Internal Annual Dose		5.6E+01 + 4.8E+01	+ 4.7E+01	+ ...	= 1.6E+03	Cumulative Internal Dose
		+	+	+	+	
External Annual Dose		1.1E-03	1.1E-03	1.1E-03	...	5.2E-02
Annual Dose		5.6E+01 + 4.8E+01	+ 4.7E+01	+ ...	= 1.6E+03	Cumulative Dose
					5.6E+01	Maximum Annual Dose Occurred in Year 1

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GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Summer: FTF NEW PU MIX INGESTION DOSES UNIT X/Q

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Leaf Veg	1.7E-03	1.4E-01	3.5E-01	2.0E+00	6.2E+00	2.1E+03	1.6E+02	2.9E+01
Oth. Veg	9.9E-03	8.2E-01	2.0E+00	1.2E+01	3.6E+01	1.2E+04	9.3E+02	1.7E+02
Fruit	1.0E-02	8.3E-01	2.1E+00	1.2E+01	3.6E+01	1.2E+04	9.4E+02	1.7E+02
Cereals	3.5E-03	2.9E-01	7.3E-01	4.1E+00	1.3E+01	4.3E+03	3.3E+02	6.0E+01
Meat	7.8E-06	3.5E-04	8.4E-04	4.8E-03	1.5E-02	4.7E+00	3.7E-01	6.6E-02
Poultry	1.8E-08	1.3E-06	3.3E-06	1.9E-05	5.8E-05	1.9E-02	1.5E-03	2.7E-04
Cow Milk	3.2E-07	1.9E-05	4.6E-05	2.6E-04	8.1E-04	2.6E-01	2.0E-02	3.7E-03
Eggs	1.4E-06	1.1E-04	2.7E-04	1.5E-03	4.8E-03	1.6E+00	1.2E-01	2.2E-02
Soil Ing	3.1E-06	2.6E-04	6.3E-04	3.6E-03	1.1E-02	3.7E+00	2.9E-01	5.2E-02
Total	2.5E-02	2.1E+00	5.2E+00	2.9E+01	9.1E+01	3.1E+04	2.4E+03	4.2E+02

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver
Leaf Veg	2.9E+01	1.5E-03	1.0E-03	2.7E-08	3.6E+02
Oth. Veg	1.7E+02	8.6E-03	6.0E-03	2.1E-07	2.1E+03
Fruit	1.7E+02	8.7E-03	6.1E-03	2.1E-07	2.1E+03
Cereals	5.9E+01	3.1E-03	2.1E-03	7.5E-08	7.5E+02
Meat	6.5E-02	6.2E-06	3.2E-06	4.1E-10	8.4E-01
Poultry	2.6E-04	1.6E-08	1.0E-08	2.2E-09	3.4E-03
Cow Milk	3.6E-03	2.7E-07	1.5E-07	1.2E-08	4.6E-02
Eggs	2.2E-02	1.2E-06	8.2E-07	3.1E-09	2.8E-01
Soil Ing	5.1E-02	2.7E-06	1.9E-06	6.5E-11	6.5E-01
Total	4.2E+02	2.2E-02	1.5E-02	5.4E-07	5.3E+03

External Dose by Exposure Pathway

Pathway	
Sun Soil	1.1E-03
Total	1.1E-03

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GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Summer: FFTF NEW PU MIX INGESTION DOSES UNIT X/Q

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Acute release
Uptake/exposure period:
Dose commitment period:
Dose units:

50.0
50.0
Rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Leaf Veg	1.7E-03	1.4E-01	3.5E-01	2.0E+00	6.2E+00	2.1E+03	1.6E+02	2.9E+01
Oth. Veg	9.9E-03	8.3E-01	2.0E+00	1.2E+01	3.6E+01	1.2E+04	9.3E+02	1.7E+02
Fruit	1.0E-02	8.4E-01	2.1E+00	1.2E+01	3.6E+01	1.2E+04	9.4E+02	1.7E+02
Cereals	3.5E-03	2.9E-01	7.3E-01	4.1E+00	1.3E+01	4.3E+03	3.3E+02	6.0E+01
Meat	7.8E-06	3.5E-04	8.4E-04	4.8E-03	1.5E-02	4.8E+00	3.7E-01	6.6E-02
Poultry	1.8E-08	1.3E-06	3.3E-06	1.9E-05	5.8E-05	1.9E-02	1.5E-03	2.7E-04
Cow Milk	3.2E-07	1.9E-05	4.6E-05	2.6E-04	8.1E-04	2.6E-01	2.0E-02	3.7E-03
Eggs	1.4E-06	1.1E-04	2.7E-04	1.5E-03	4.8E-03	1.6E+00	1.2E-01	2.2E-02
Soil Ing	1.5E-04	1.2E-02	3.1E-02	1.7E-01	5.4E-01	1.0E+02	8.1E+00	1.3E+00
Total	2.5E-02	2.1E+00	5.2E+00	3.0E+01	9.2E+01	3.1E+04	2.4E+03	4.3E+02

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver
Leaf Veg	2.9E+01	1.5E-03	1.0E-03	2.7E-08	3.6E+02
Oth. Veg	1.7E+02	8.6E-03	6.0E-03	2.1E-07	2.1E+03
Fruit	1.7E+02	8.8E-03	6.1E-03	2.1E-07	2.1E+03
Cereals	5.9E+01	3.1E-03	2.1E-03	7.5E-08	7.5E+02
Meat	6.5E-02	6.2E-06	3.2E-06	4.1E-10	8.4E-01
Poultry	2.6E-04	1.6E-08	1.0E-08	2.2E-09	3.4E-03
Cow Milk	3.6E-03	2.7E-07	1.6E-07	1.2E-08	4.6E-02
Eggs	2.2E-02	1.2E-06	8.2E-07	3.1E-09	2.8E-01
Soil Ing	1.3E+00	1.3E-04	9.0E-05	1.3E-09	2.1E+01
Total	4.2E+02	2.2E-02	1.5E-02	5.5E-07	5.4E+03

External Dose by Exposure Pathway

Pathway	
Sur Soil	5.2E-02
Total	5.2E-02

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----- GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Summer: FFTF NEW PU MIX INGESTION DOSES UNIT X/Q

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
PU 240	2.0E-03	2.9E-01	7.2E-01	4.1E+00	1.3E+01	4.3E+03	3.3E+02	6.0E+01
PU 238	8.5E-05	1.3E-02	3.2E-02	1.9E-01	5.6E-01	1.6E+02	1.3E+01	2.2E+00
PU 242	5.6E-08	8.3E-06	1.9E-05	1.1E-04	3.5E-04	1.1E-01	9.4E-03	1.6E-03
PU 241	4.1E-04	4.5E-03	1.2E-02	6.6E-02	1.9E-01	2.6E+02	2.0E+01	3.9E+00
U 237	4.0E-08	5.1E-06	1.3E-05	6.1E-05	1.6E-04	6.3E-07	1.0E-06	2.2E-07
AM 241	1.5E-02	5.6E-01	1.3E+00	7.5E+00	2.3E+01	7.2E+03	5.7E+02	1.0E+02
PU 239	8.0E-03	1.2E+00	3.1E+00	1.7E+01	5.5E+01	1.9E+04	1.4E+03	2.6E+02
Total	2.5E-02	2.1E+00	5.2E+00	2.9E+01	9.1E+01	3.1E+04	2.4E+03	4.2E+02

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver
PU 240	5.9E+01	1.9E-03	1.8E-03	0.0E+00	7.5E+02
PU 238	2.1E+00	8.4E-05	7.9E-05	0.0E+00	2.9E+01
PU 242	1.6E-03	5.7E-08	5.1E-08	0.0E+00	2.1E-02
PU 241	3.8E+00	2.4E-04	1.0E-04	0.0E+00	4.0E+01
U 237	3.4E-06	3.3E-07	4.2E-09	5.4E-07	0.0E+00
AM 241	1.0E+02	1.2E-02	5.6E-03	0.0E+00	1.3E+03
PU 239	2.6E+02	8.0E-03	7.7E-03	0.0E+00	3.2E+03
Total	4.2E+02	2.2E-02	1.5E-02	5.4E-07	5.3E+03

External Dose by Radionuclide

Radionuclide	
PU 240	2.8E-06
PU 238	1.2E-07
PU 242	0.0E+00
PU 241	1.6E-11
U 237	9.9E-07
AM 241	1.0E-03
PU 239	2.6E-05
Total	1.1E-03

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GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Summer: FFTF NEW PU MIX INGESTION DOSES UNIT X/Q

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
PU 240	2.0E-03	2.9E-01	7.2E-01	4.1E+00	1.3E+01	4.3E+03	3.3E+02	6.0E+01
PU 238	8.5E-05	1.3E-02	3.2E-02	1.9E-01	5.6E-01	1.6E+02	1.3E+01	2.2E+00
PU 242	5.7E-08	8.4E-06	2.0E-05	1.1E-04	3.6E-04	1.1E-01	9.5E-03	1.6E-03
PU 241	4.1E-04	4.5E-03	1.2E-02	6.6E-02	1.9E-01	2.6E+02	2.0E+01	3.9E+00
U 237	4.0E-08	5.1E-06	1.3E-05	6.2E-05	1.6E-04	6.4E-07	1.1E-06	2.2E-07
AM 241	1.5E-02	5.6E-01	1.3E+00	7.7E+00	2.3E+01	7.3E+03	5.7E+02	1.0E+02
PU 239	8.1E-03	1.2E+00	3.1E+00	1.8E+01	5.5E+01	1.9E+04	1.4E+03	2.6E+02
Total	2.5E-02	2.1E+00	5.2E+00	3.0E+01	9.2E+01	3.1E+04	2.4E+03	4.3E+02

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver
PU 240	5.9E+01	2.0E-03	1.8E-03	0.0E+00	7.5E+02
PU 238	2.1E+00	8.4E-05	7.9E-05	0.0E+00	2.9E+01
PU 242	1.6E-03	5.8E-08	5.2E-08	0.0E+00	2.1E-02
PU 241	3.8E+00	2.4E-04	1.0E-04	0.0E+00	4.0E+01
U 237	3.5E-06	3.3E-07	4.2E-09	5.5E-07	0.0E+00
AM 241	1.0E+02	1.2E-02	5.6E-03	0.0E+00	1.3E+03
PU 239	2.6E+02	8.1E-03	7.8E-03	0.0E+00	3.2E+03
Total	4.2E+02	2.2E-02	1.5E-02	5.5E-07	5.4E+03

External Dose by Radionuclide

Radionuclide	
PU 240	1.3E-04
PU 238	4.6E-06
PU 242	0.0E+00
PU 241	3.0E-10
U 237	1.9E-05
AM 241	5.1E-02
PU 239	1.3E-03
Total	5.2E-02

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GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Autumn: FFTF NEW PU MIX INGESTION DOSES UNIT X/Q

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	2.2E+03	2.5E-01	5.6E+02
Breast	1.2E-01	1.5E-01	1.7E-02
R Marrow	1.2E+04	1.2E-01	1.5E+03
Lung	1.3E-01	1.2E-01	1.6E-02
Thyroid	8.0E-02	3.0E-02	2.4E-03
Bone Sur	1.6E+05	3.0E-02	4.8E+03
Liver	2.8E+04	6.0E-02	1.7E+03
LL Int.	4.8E+02	6.0E-02	2.9E+01
UL Int.	1.5E+02	6.0E-02	9.3E+00
S Int.	2.7E+01	6.0E-02	1.6E+00
Stomach	1.1E+01	6.0E-02	6.6E-01
Internal Effective Dose Equivalent			8.6E+03
External Dose			1.1E-03
Annual Effective Dose Equivalent			8.6E+03

Controlling Organ: Bone Sur
Controlling Pathway: Ing
Controlling Radionuclide: PU239
Total Inhalation EDE: 0.0E+00
Total Ingestion EDE: 8.6E+03

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GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Autumn: FFTF NEW PU MIX INGESTION DOSES UNIT X/Q

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

		Dose Commitment Year				
		1	2	3	...	
Internal Intake	:					
Year:	3			1.2E-02	...	
				+		
	2		1.2E-02	1.0E-02	...	Internal Effective Dose Equivalent
			+	+		
	1	3.0E+02	+ 2.5E+02	+ 2.5E+02	+ ...	= 8.6E+03
Internal Annual Dose		3.0E+02	+ 2.5E+02	+ 2.5E+02	+ ...	= 8.6E+03
		+	+	+	+	
External Annual Dose		1.1E-03	1.1E-03	1.1E-03	...	5.2E-02
Annual Dose		3.0E+02	+ 2.5E+02	+ 2.5E+02	+ ...	= 8.6E+03
						Cumulative Internal Dose
						3.0E+02
						Maximum Annual Dose Occurred In Year 1

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GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Autumn: FFTF NEW PU MIX INGESTION DOSES UNIT X/Q

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Acute release
Uptake/exposure period:
Dose commitment period:
Dose units:

50.0
50.0
Rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Leaf Veg	3.1E-02	2.6E+00	6.3E+00	3.6E+01	1.1E+02	3.7E+04	2.9E+03	5.2E+02
Oth. Veg	4.2E-02	3.5E+00	8.7E+00	5.0E+01	1.5E+02	5.2E+04	4.0E+03	7.2E+02
Fruit	4.4E-02	3.6E+00	8.9E+00	5.1E+01	1.6E+02	5.3E+04	4.1E+03	7.3E+02
Cereals	1.6E-02	1.3E+00	3.2E+00	1.8E+01	5.7E+01	1.9E+04	1.5E+03	2.6E+02
Meat	1.2E-04	5.2E-03	1.2E-02	7.1E-02	2.2E-01	7.0E+01	5.5E+00	9.8E-01
Poultry	7.8E-08	6.0E-06	1.5E-05	8.3E-05	2.6E-04	8.5E-02	6.6E-03	1.2E-03
Cow Milk	4.8E-06	2.8E-04	6.8E-04	3.9E-03	1.2E-02	3.9E+00	3.0E-01	5.4E-02
Eggs	6.2E-06	5.0E-04	1.2E-03	6.9E-03	2.2E-02	7.2E+00	5.6E-01	1.0E-01
Soil Ing	3.1E-06	2.6E-04	6.3E-04	3.6E-03	1.1E-02	3.7E+00	2.9E-01	5.2E-02
Total	1.3E-01	1.1E+01	2.7E+01	1.5E+02	4.8E+02	1.6E+05	1.2E+04	2.2E+03

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver
Leaf Veg	5.1E+02	2.7E-02	1.9E-02	6.5E-07	6.5E+03
Oth. Veg	7.1E+02	3.7E-02	2.6E-02	9.1E-07	9.0E+03
Fruit	7.3E+02	3.8E-02	2.7E-02	9.3E-07	9.3E+03
Cereals	2.6E+02	1.4E-02	9.5E-03	3.3E-07	3.3E+03
Meat	9.7E-01	9.2E-05	4.8E-05	8.5E-09	1.2E+01
Poultry	1.2E-03	7.2E-08	4.4E-08	9.8E-09	1.5E-02
Cow Milk	5.4E-02	4.1E-06	2.3E-06	2.6E-07	6.9E-01
Eggs	9.9E-02	5.4E-06	3.7E-06	1.3E-08	1.3E+00
Soil Ing	5.1E-02	2.7E-06	1.9E-06	6.5E-11	6.5E-01
Total	2.2E+03	1.2E-01	8.0E-02	3.1E-06	2.8E+04

External Dose by Exposure Pathway

Pathway	
Sur Soil	1.1E-03
Total	1.1E-03

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GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Autumn: FFTF NEW PU MIX INGESTION DOSES UNIT X/Q

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Leaf Veg	3.1E-02	2.6E+00	6.3E+00	3.6E+01	1.1E+02	3.7E+04	2.9E+03	5.2E+02
Oth. Veg	4.2E-02	3.5E+00	8.7E+00	5.0E+01	1.5E+02	5.2E+04	4.0E+03	7.2E+02
Fruit	4.4E-02	3.6E+00	9.0E+00	5.1E+01	1.6E+02	5.3E+04	4.1E+03	7.3E+02
Cereals	1.6E-02	1.3E+00	3.2E+00	1.8E+01	5.7E+01	1.9E+04	1.5E+03	2.6E+02
Meat	1.2E-04	5.2E-03	1.2E-02	7.1E-02	2.2E-01	7.0E+01	5.5E+00	9.8E-01
Poultry	7.8E-08	6.0E-06	1.5E-05	8.3E-05	2.6E-04	8.5E-02	6.6E-03	1.2E-03
Cow Milk	4.8E-06	2.8E-04	6.8E-04	3.9E-03	1.2E-02	3.9E+00	3.0E-01	5.4E-02
Eggs	6.2E-06	5.0E-04	1.2E-03	6.9E-03	2.2E-02	7.2E+00	5.6E-01	1.0E-01
Soil Ing	1.5E-04	1.2E-02	3.1E-02	1.7E-01	5.4E-01	1.0E+02	8.1E+00	1.3E+00
Total	1.3E-01	1.1E+01	2.7E+01	1.5E+02	4.8E+02	1.6E+05	1.2E+04	2.2E+03

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver
Leaf Veg	5.1E+02	2.7E-02	1.9E-02	6.6E-07	6.5E+03
Oth. Veg	7.1E+02	3.7E-02	2.6E-02	9.1E-07	9.0E+03
Fruit	7.3E+02	3.8E-02	2.7E-02	9.3E-07	9.3E+03
Cereals	2.6E+02	1.4E-02	9.5E-03	3.3E-07	3.3E+03
Meat	9.7E-01	9.2E-05	4.8E-05	8.5E-09	1.2E+01
Poultry	1.2E-03	7.2E-08	4.4E-08	9.8E-09	1.5E-02
Cow Milk	5.4E-02	4.1E-06	2.3E-06	2.6E-07	6.9E-01
Eggs	9.9E-02	5.4E-06	3.7E-06	1.3E-08	1.3E+00
Soil Ing	1.3E+00	1.3E-04	9.0E-05	1.3E-09	2.1E+01
Total	2.2E+03	1.2E-01	8.1E-02	3.1E-06	2.8E+04

External Dose by Exposure Pathway

Pathway	
Sur Soil	5.2E-02
Total	5.2E-02

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----- GENII Dose Calculation Program (Version 1.485 3-Dec-90) -----

Case title: Autumn: FFTF NEW PU MIX INGESTION DOSES UNIT X/Q

Executed on: 10/30/97 at 14:32:29

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Acute release
 Uptake/exposure period: 50.0
 Dose commitment period: 50.0
 Dose units: Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
PU 240	1.0E-02	1.5E+00	3.8E+00	2.1E+01	6.8E+01	2.3E+04	1.7E+03	3.1E+02
PU 238	4.6E-04	6.9E-02	1.7E-01	1.0E+00	3.0E+00	8.4E+02	6.8E+01	1.2E+01
PU 242	3.0E-07	4.4E-05	1.0E-04	5.9E-04	1.9E-03	6.1E-01	5.0E-02	8.6E-03
PU 241	2.2E-03	2.4E-02	6.2E-02	3.5E-01	1.0E+00	1.4E+03	1.1E+02	2.0E+01
U 237	2.3E-07	2.9E-05	7.7E-05	3.5E-04	9.2E-04	3.6E-06	6.0E-06	1.2E-06
AM 241	7.8E-02	2.9E+00	6.9E+00	4.0E+01	1.2E+02	3.8E+04	3.0E+03	5.4E+02
PU 239	4.2E-02	6.5E+00	1.6E+01	9.2E+01	2.9E+02	9.8E+04	7.5E+03	1.3E+03
Total	1.3E-01	1.1E+01	2.7E+01	1.5E+02	4.8E+02	1.6E+05	1.2E+04	2.2E+03

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver
PU 240	3.1E+02	1.0E-02	9.4E-03	0.0E+00	3.9E+03
PU 238	1.1E+01	4.5E-04	4.2E-04	0.0E+00	1.5E+02
PU 242	8.7E-03	3.0E-07	2.7E-07	0.0E+00	1.1E-01
PU 241	2.0E+01	1.3E-03	5.4E-04	0.0E+00	2.1E+02
U 237	2.0E-05	1.9E-06	2.4E-08	3.1E-06	0.0E+00
AM 241	5.3E+02	6.1E-02	2.9E-02	0.0E+00	6.8E+03
PU 239	1.3E+03	4.2E-02	4.1E-02	0.0E+00	1.7E+04
Total	2.2E+03	1.2E-01	8.0E-02	3.1E-06	2.8E+04

External Dose by Radionuclide

Radionuclide	
PU 240	2.8E-06
PU 238	1.2E-07
PU 242	0.0E+00
PU 241	1.6E-11
U 237	9.9E-07
AM 241	1.0E-03
PU 239	2.6E-05
Total	1.1E-03

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GENII Dose Calculation Program (Version 1.485 3-Dec-90)

Case title: Autumn: FFTF NEW PU MIX INGESTION DOSES UNIT X/Q

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Acute release
Uptake/exposure period: 50.0
Dose commitment period: 50.0
Dose units: Rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
PU 240	1.0E-02	1.5E+00	3.8E+00	2.1E+01	6.8E+01	2.3E+04	1.8E+03	3.1E+02
PU 238	4.6E-04	6.9E-02	1.7E-01	1.0E+00	3.0E+00	8.4E+02	6.8E+01	1.2E+01
PU 242	3.0E-07	4.4E-05	1.0E-04	5.9E-04	1.9E-03	6.1E-01	5.0E-02	8.6E-03
PU 241	2.2E-03	2.4E-02	6.2E-02	3.5E-01	1.0E+00	1.4E+03	1.1E+02	2.0E+01
U 237	2.3E-07	2.9E-05	7.7E-05	3.5E-04	9.3E-04	3.6E-06	6.0E-06	1.2E-06
AM 241	7.8E-02	3.0E+00	7.0E+00	4.0E+01	1.2E+02	3.8E+04	3.0E+03	5.4E+02
PU 239	4.2E-02	6.5E+00	1.6E+01	9.2E+01	2.9E+02	9.8E+04	7.5E+03	1.3E+03
Total	1.3E-01	1.1E+01	2.7E+01	1.5E+02	4.8E+02	1.6E+05	1.2E+04	2.2E+03

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver
PU 240	3.1E+02	1.0E-02	9.5E-03	0.0E+00	3.9E+03
PU 238	1.1E+01	4.5E-04	4.2E-04	0.0E+00	1.5E+02
PU 242	8.7E-03	3.0E-07	2.7E-07	0.0E+00	1.1E-01
PU 241	2.0E+01	1.3E-03	5.4E-04	0.0E+00	2.1E+02
U 237	2.0E-05	1.9E-06	2.4E-08	3.1E-06	0.0E+00
AM 241	5.3E+02	6.1E-02	3.0E-02	0.0E+00	6.9E+03
PU 239	1.3E+03	4.2E-02	4.1E-02	0.0E+00	1.7E+04
Total	2.2E+03	1.2E-01	8.1E-02	3.1E-06	2.8E+04

External Dose by Radionuclide

Radionuclide	
PU 240	1.3E-04
PU 238	4.6E-06
PU 242	0.0E+00
PU 241	3.0E-10
U 237	1.9E-05
AM 241	5.1E-02
PU 239	1.3E-03
Total	5.2E-02

HEDOP REVIEW CHECKLIST

Document Reviewed: Analysis of Tritium Mission FMEF/FAA Fuel Handling Accidents
 HNF-SD-FF-CN-012
 Author: J. C. Van Keuren
 Date: October 1997
 Scope of Review: Entire Document

YES NO* N/A

☒	☐	☐	1. A detailed technical review and approval of the environmental transport and dose calculation portion of the analysis has been performed and documented.
☒	☐	☐	2. Detailed technical review(s) and approval(s) of scenario and release determinations have been performed and documented.
☒	☐	☐	3. HEDOP-approved code(s) were used.
☐	☐	☒	4. Receptor locations were selected according to HEDOP recommendations.
☒	☐	☐	5. All applicable environmental pathways and code options were included and are appropriate for the calculations.
☒	☐	☐	6. Hanford site data were used.
☐	☐	☒	7. Model adjustments external to the computer program were justified and performed correctly.
☒	☐	☐	8. The analysis is consistent with HEDOP recommendations.
☐	☐	☒	9. Supporting notes, calculations, comments, comment resolutions, or other information is attached. (Use the "Page 1 of X" page numbering format and sign and date each added page.)
☒	☐	☐	10. Approval is granted on behalf of the Hanford Environmental Dose Overview Panel.

* All "NO" responses must be explained and use of nonstandard methods justified.

D.A. Himes
 HEDOP-Approved Reviewer (Printed Name and Signature)

10/31/97
 Date

COMMENTS (add additional signed and dated pages if necessary):