M.5.3.5 Vitrification Alternative

Studies of evaluation basis accidents and beyond evaluation basis accidents have been performed for a vitrification facility in the *Fissile Material Disposition Program PEIS Data Call Input Report: New Glass Vitrification Facility.* The studies postulated a set of accident scenarios that were representative of the risks and consequences for workers and the public that can be expected if the facility were constructed and operated. Although not all potential accidents were addressed, those that were postulated have consequences and risk that are expected to envelope the consequences and risks of an operating facility. In this manner, no other credible accidents with an expected frequency of occurrence larger than 1.0×10^{-7}/yr are anticipated that will have consequences and risks larger than those described in this section. The potential for an aircraft crash has been considered and dismissed because the probability of a crash into a facility and causing sufficient damage to release Pu is much less than 10^{-7}/yr.

M.5.3.5.1 *Accident Scenarios and Source Terms*

A wide range of hazardous conditions and potential accidents were identified as candidates to represent the risks to workers and the public of operating the facility. Through a screening process, seven evaluation basis accidents and three beyond evaluation basis accidents were selected for further definition and analysis. Descriptive information on these accidents is provided in Tables M.5.3.5.1–1 and M.5.3.5.1–2. Accident source term information is provided in Tables M.5.3.5.1–3 and M.5.3.5.1–4. Descriptions of accident scenarios are provided in Table M.5.3.5.1–5.

Table M.5.3.5.1–1. Evaluation Basis Accident Scenarios for the Vitrification Alternative

		Source Term	
Accident Scenario	**Accident Frequency (per year)**	**At Risk**	**Released to Environment**
Blender spill	0.01 to 0.1	82.5 kg Pu 9.23×10^{4} Ci Cs	1.24×10^{-5} g Pu 1.38×10^{-5} Ci Cs
Loss of offsite power	0.01 to 0.1	No release	No release
Melter spill	1.0×10^{-4} to 0.01	82.5 kg Pu 9.23×10^{4} Ci Cs	6.2×10^{-7} g Pu 6.9×10^{-7} Ci Cs
Cs capsule drop	1.0×10^{-4} to 0.01	70 kCi Cs	1.75×10^{-5} Ci Cs
Canister drop	1.0×10^{-4} to 0.01	82.5 kg Pu 9.23×10^{4} Ci Cs	6.1×10^{-6} g Pu 6.83×10^{-6} Ci Cs
CPC ion column fire	1.0×10^{-4} to 0.01	9.23×10^{4} Ci Cs	0.23 Ci Cs
Pu oxide solids fire oven	1.0×10^{-4} to 0.01	5 kg Pu	1.5×10^{-8} g Pu
Earthquake	1.0×10^{-6} to 1.0×10^{-4}	170 kg Pu 347 Ci Cs	3.86×10^{-4} g Pu 6.59×10^{-7} Ci Cs
Tornado	1.0×10^{-6} to 1.0×10^{-4}	No release	No release
Flood	1.0×10^{-6} to 1.0×10^{-4}	No release	No release

Source: LLNL 1996c.

Table M.5.3.5.1–2. Beyond Evaluation Basis Accident Scenarios for the Vitrification Alternative

Accident Scenario	Accident Frequency (per year)	Source Term	
		At Risk	Released to Environment
Cs fire	$<1.0 \times 10^{-6}$	1.3×10^{6} Ci Cs	1.3 Ci Cs
Blender fire	$<1.0 \times 10^{-6}$	82.5 kg Pu 9.23×10^{4} Ci Cs	5.16×10^{-5} g Pu 0.231 Ci Cs
Nuclear criticality in Pu oxide oven	$<1.0 \times 10^{-6}$	1.0×10^{18} fissions. Release fractions: 0.5 noble gases, 0.05 iodine.	[a]

[a] See Table M.5.3.5.1–4.
Source: LLNL 1996c.

Table M.5.3.5.1–3. Vitrification Alternative Evaluation Basis Accident Source Terms

	Accident Scenario						
Accident Parameter	**Blender Spill**	**Melter Spill**	**Cs Capsule Drop**	**Canister Drop**	**CPC Ion Column Fire**	**Pu Oxide Oven Solids Fire**	**Earthquake**
Frequency of occurrence[a](per year)	0.05	1.0×10^{-3}/yr	1.0×10^{-3}/yr	1.0×10^{-3}/yr	1.0×10^{-3}/yr	1.0×10^{-3}/yr	1.0×10^{-5}/yr
Pu released to environment (g)	1.24×10^{-5}	6.2×10^{-7}	NA	6.1×10^{-6}	NA	1.5×10^{-8}	3.86×10^{-4}
Cs released to environment (Ci)	1.38×10^{-5}	6.9×10^{-7}	1.75×10^{-5}	6.83×10^{-6}	0.23	NA	6.59×10^{-7}
Isotope Released to Environment (Ci)							
Pu-238	1.96×10^{-8}	9.80×10^{-10}	0	9.64×10^{-9}	0	2.37×10^{-11}	6.10×10^{-7}
Pu-239	7.09×10^{-7}	3.55×10^{-8}	0	3.49×10^{-7}	0	8.58×10^{-10}	2.21×10^{-5}
Pu-240	1.88×10^{-7}	9.42×10^{-9}	0	9.27×10^{-8}	0	2.28×10^{-10}	5.87×10^{-6}
Pu-241	6.68×10^{-7}	3.34×10^{-8}	0	3.29×10^{-7}	0	8.08×10^{-10}	2.08×10^{-5}
Pu-242	2.77×10^{-11}	1.38×10^{-12}	0	1.36×10^{-11}	0	3.34×10^{-14}	8.61×10^{-10}
Am-241	3.52×10^{-9}	1.76×10^{-10}	0	1.73×10^{-9}	0	4.26×10^{-12}	1.10×10^{-7}
Cs-137	1.38×10^{-5}	6.9×10^{-7}	1.75×10^{-5}	6.83×10^{-6}	0.23	0	6.59×10^{-7}

[a] Midpoint of the estimated frequency range.

Note: Am=Americium; NA=not applicable.

Source: Derived from Tables M.5.1.3.4–1 and M.5.3.5.1–1.

Table M.5.3.5.1–4. Vitrification Alternative Beyond Evaluation Basis Accident Source Terms

Accident Parameter	Accident Scenario		
	Cs Fire	Blender Fire	Nuclear Criticality in Pu Oxide Furnace[a]
Frequency of occurrence (per year)	1.0×10^{-6}	1.0×10^{-6}	1.0×10^{-6}
Pu released to environment (g)	NA	5.16×10^{-5}	NA
Cs released to environment (Ci)	1.3	0.231	NA
Fissions	NA	NA	1.0×10^{18}
Isotope Released to Environment (Ci)			
Pu-238	0	8.15×10^{-8}	0
Pu-239	0	2.95×10^{-6}	0
Pu-240	0	7.84×10^{-7}	0
Pu-241	0	2.78×10^{-6}	0
Pu-242	0	1.15×10^{-10}	0
Am-241	0	1.47×10^{-8}	0
Cs-137	1.3	0.231	0
Kr-83m	0	0	5.5
Kr-85m	0	0	3.55
Kr-85	0	0	4.05×10^{-5}
Kr-87	0	0	21.5
Kr-88	0	0	11.5
Kr-89	0	0	650
Xe-131m	0	0	5.0×10^{-3}
Xe-133m	0	0	0.11
Xe-133	0	0	1.35
Xe-135m	0	0	165
Xe-135	0	0	20.5
Xe-137	0	0	2.45×10^{3}
Xe-138	0	0	550
I-131	0	0	0.055
I-132	0	0	6
I-133	0	0	0.8
I-134	0	0	21.5
I-135	0	0	2.25

[a] Curies produced (by isotope) or the 1.0×10^{18} fission criticality were scaled from Table M.5.3.1.1–3.

Note: NA=not applicable.

Source: Derived from Tables M.5.1.3.4–1, M.5.3.1.1–3, and M.5.3.5.1–2.

Table M.5.3.5.1–5. Accident Scenario Descriptions for the Vitrification Alternative

Accident Scenario	Accident Description
Evaluation Basis Accidents	
Blender spill	The spill occurs as material is transferred from the blender to the melter. Fine particulate materials that became airborne during the spill would be removed from the area by the ventilation system and passed through HEPA filters before release to the environment.
Melter spill	The source document provided summary data in a tabular format for this accident scenario. This accident scenario was not described in the source document.
Cs capsule drop	The source document provided summary data in a tabular format for this accident scenario. This accident scenario was not described in the source document.
Canister drop	It was postulated that the impact shatters the glass and disperses the fragments into the cell atmosphere. Fine particulate materials that became airborne would be removed from the area by the ventilation system and passed through HEPA filters before release to the environment.
CPC ion column fire	The source document provided summary data in a tabular format for this accident scenario. This accident scenario was not described in the source document.
Pu oxide oven solids fire	The source document provided summary data in a tabular format for this accident scenario. This accident scenario was not described in the source document.
Earthquake	Contents of the blender, melter, Pu oxide oven the Cs preparation cell would be spilled. Fine particulate materials that became airborne during the spills would be removed from the area by the ventilation system and passed through HEPA filters before release to the environment.
Beyond Evaluation Basis Accidents	
Cs fire	The combustible load for the processes involving Cs is very low. The Cs is in the form of CsCl which is not flammable. A large fire was postulated in the process area and all Cs effected by the fire was released to the area ventilation system and passed through HEPA filters before release to the environment.
Blender fire	The combustible load in the process is very low. The process involves no flammable material. A large fire was postulated in the process cell. It is assumed that the fire ruptures the blender and the blender contents are exposed to the fire. The resultant airborne material is removed by the area ventilation system and passed through HEPA filters before release to the environment.
Nuclear criticality in Pu oxide furnace	A criticality event was assumed to occur in the Pu oxide oven process area and the assumed criticality accident severity is based on guidance provided in NRC Regulatory Guide 3.35.

Source: LLNL 1996c.

M.5.3.5.2 *Accident Impacts*

The estimated impacts of the postulated accidents at each site are provided in Tables M.5.3.5.2–1 through M.5.3.5.2–6. The dose and cancer fatality estimates are based on the analysis of the accident source terms in Tables M.5.3.5.1–3 and M.5.3.5.1–4 using the MACCS computer code. [Text deleted.]

Table M.5.3.5.2–1. Vitrification Alternative Accident Impacts at Hanford Site

	Worker at 1,000 m		Maximum Offsite Individual		Population to 80 km		
Accident Scenario	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (person-rem)**	**Number of Cancer Fatalities[b]**	**Accident Frequency (per year)**
Blender spill	4.6×10^{-6}	1.8×10^{-9}	3.4×10^{-8}	1.7×10^{-11}	3.1×10^{-4}	1.5×10^{-7}	0.05
Melter spill	2.3×10^{-7}	9.1×10^{-11}	1.7×10^{-9}	8.6×10^{-13}	1.5×10^{-5}	7.6×10^{-9}	1.0×10^{-3}
Cs capsule drop	1.3×10^{-6}	5.3×10^{-10}	8.0×10^{-9}	4.0×10^{-12}	1.3×10^{-4}	6.4×10^{-8}	1.0×10^{-3}
Canister drop	2.2×10^{-6}	9.0×10^{-10}	1.7×10^{-8}	8.5×10^{-12}	1.5×10^{-4}	7.5×10^{-8}	1.0×10^{-3}
Cs ion processing fire	0.017	6.9×10^{-6}	1.1×10^{-4}	5.3×10^{-8}	1.7	8.4×10^{-4}	1.0×10^{-3}
Pu oxide oven solids fire	4.3×10^{-9}	1.7×10^{-12}	3.4×10^{-11}	1.7×10^{-14}	2.5×10^{-7}	1.2×10^{-10}	1.0×10^{-3}
Earthquake	1.1×10^{-4}	4.4×10^{-8}	8.8×10^{-7}	4.4×10^{-10}	6.4×10^{-3}	3.2×10^{-6}	1.0×10^{-5}
Cs fire	0.098	3.9×10^{-5}	6.0×10^{-4}	3.0×10^{-7}	9.5	4.7×10^{-3}	1.0×10^{-6}
Blender fire	0.017	7.0×10^{-6}	1.1×10^{-4}	5.3×10^{-8}	1.7	8.4×10^{-4}	1.0×10^{-6}
Nuclear criticality in Pu oxide furnace	1.0×10^{-3}	4.2×10^{-7}	6.5×10^{-6}	3.3×10^{-9}	7.0×10^{-3}	3.5×10^{-6}	1.0×10^{-6}
[Text deleted.]							

[a] Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single onsite worker at a distance of 1,000 m or the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes the accident has occurred.

[b] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km if exposed to the indicated dose. The value assumes the accident has occurred.

Note: All values are mean values.

Source: Calculated using the source terms in Tables M.5.3.5.1–3 and M.5.3.5.1–4 and the MACCS computer code.

Table M.5.3.5.2–2. Vitrification Alternative Accident Impacts at Nevada Test Site

	Worker at 1,000 m		Maximum Offsite Individual		Population to 80 km		
Accident Scenario	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (person-rem)**	**Number of Cancer Fatalities[b]**	**Accident Frequency (per year)**
Blender spill	3.1×10^{-6}	1.2×10^{-9}	5.5×10^{-8}	2.8×10^{-11}	7.0×10^{-6}	3.5×10^{-9}	0.05
Melter spill	1.6×10^{-7}	6.2×10^{-11}	2.7×10^{-9}	1.4×10^{-12}	3.5×10^{-7}	1.7×10^{-10}	1.0×10^{-3}
Cs capsule drop	8.9×10^{-7}	3.6×10^{-10}	1.3×10^{-8}	6.6×10^{-12}	3.0×10^{-6}	1.5×10^{-9}	1.0×10^{-3}
Canister drop	1.5×10^{-6}	6.1×10^{-10}	2.7×10^{-8}	1.4×10^{-11}	3.4×10^{-6}	1.7×10^{-9}	1.0×10^{-3}
Cs ion processing fire	0.012	4.7×10^{-6}	1.7×10^{-4}	8.7×10^{-8}	0.039	1.9×10^{-5}	1.0×10^{-3}
Pu oxide oven solids fire	2.9×10^{-9}	1.2×10^{-12}	5.4×10^{-11}	2.7×10^{-14}	5.6×10^{-9}	2.8×10^{-12}	1.0×10^{-3}
Earthquake	7.5×10^{-5}	3.0×10^{-8}	1.4×10^{-6}	9.0×10^{-10}	1.4×10^{-4}	7.2×10^{-8}	1.0×10^{-5}
Cs fire	0.066	2.6×10^{-5}	9.8×10^{-4}	4.9×10^{-7}	0.22	1.1×10^{-4}	1.0×10^{-6}
Blender fire	0.012	4.7×10^{-6}	1.8×10^{-4}	8.7×10^{-8}	0.039	2.0×10^{-5}	1.0×10^{-6}
Nuclear criticality in Pu oxide furnace	7.7×10^{-4}	3.1×10^{-7}	1.3×10^{-5}	6.5×10^{-9}	1.4×10^{-4}	6.9×10^{-8}	1.0×10^{-6}
[Text deleted.]							

[a] Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single onsite worker at a distance of 1,000 m or the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes the accident has occurred.

[b] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km if exposed to the indicated dose. The value assumes the accident has occurred.

Note: All values are mean values.

Source: Calculated using the source terms in Tables M.5.3.5.1–3 and M.5.3.5.1–4 and the MACCS computer code.

Table M.5.3.5.2–3. Vitrification Alternative Accident Impacts at Idaho National Engineering Laboratory

	Worker at 1,000 m		Maximum Offsite Individual		Population to 80 km		
Accident Scenario	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (person-rem)**	**Number of Cancer Fatalities[b]**	**Accident Frequency (per year)**
Blender spill	4.2×10^{-6}	1.7×10^{-9}	3.5×10^{-8}	1.7×10^{-11}	9.3×10^{-5}	4.7×10^{-8}	0.05
Melter spill	2.1×10^{-7}	8.4×10^{-11}	1.7×10^{-9}	8.7×10^{-13}	4.7×10^{-6}	2.3×10^{-9}	1.0×10^{-3}
Cs capsule drop	1.2×10^{-6}	4.6×10^{-10}	7.7×10^{-9}	3.8×10^{-12}	4.0×10^{-5}	2.0×10^{-8}	1.0×10^{-3}
Canister drop	2.1×10^{-6}	8.3×10^{-10}	1.7×10^{-8}	8.5×10^{-12}	4.6×10^{-5}	2.3×10^{-8}	1.0×10^{-3}
Cs ion processing fire	0.015	6.1×10^{-6}	1.0×10^{-4}	5.0×10^{-8}	0.53	2.6×10^{-4}	1.0×10^{-3}
Pu oxide oven solids fire	4.0×10^{-9}	1.6×10^{-12}	3.4×10^{-11}	1.7×10^{-14}	7.4×10^{-8}	3.7×10^{-11}	1.0×10^{-3}
Earthquake	1.0×10^{-4}	4.1×10^{-8}	8.8×10^{-7}	4.4×10^{-10}	1.9×10^{-3}	9.6×10^{-7}	1.0×10^{-5}
Cs fire	0.086	3.4×10^{-5}	5.7×10^{-4}	2.9×10^{-7}	3.0	1.5×10^{-3}	1.0×10^{-6}
Blender fire	0.015	6.1×10^{-6}	1.0×10^{-4}	5.1×10^{-8}	0.53	2.7×10^{-4}	1.0×10^{-6}
Nuclear criticality in Pu oxide furnace	1.0×10^{-3}	4.0×10^{-7}	7.7×10^{-6}	3.9×10^{-9}	1.8×10^{-3}	9.0×10^{-7}	1.0×10^{-6}
[Text deleted.]							

[a] Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single onsite worker at a distance of 1,000 m or the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes the accident has occurred.

[b] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km if exposed to the indicated dose. The value assumes the accident has occurred.

Note: All values are mean values.

Source: Calculated using the source terms in Tables M.5.3.5.1–3 and M.5.3.5.1–4 and the MACCS computer code.

Table M.5.3.5.2–4. Vitrification Alternative Accident Impacts at Pantex Plant

	Worker at 1,000 m		Maximum Offsite Individual		Population to 80 km		
Accident Scenario	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (person-rem)**	**Number of Cancer Fatalities[b]**	**Accident Frequency (per year)**
Blender spill	1.9×10^{-6}	7.5×10^{-10}	4.2×10^{-7}	2.1×10^{-10}	1.0×10^{-4}	5.0×10^{-8}	0.05
Melter spill	9.3×10^{-8}	3.7×10^{-11}	2.1×10^{-8}	1.0×10^{-11}	5.0×10^{-6}	2.5×10^{-9}	1.0×10^{-3}
Cs capsule drop	5.6×10^{-7}	2.2×10^{-10}	1.2×10^{-7}	5.9×10^{-11}	3.8×10^{-5}	1.9×10^{-8}	1.0×10^{-3}
Canister drop	9.2×10^{-7}	3.7×10^{-10}	2.1×10^{-7}	1.0×10^{-10}	4.9×10^{-5}	2.5×10^{-8}	1.0×10^{-3}
Cs ion processing fire	7.4×10^{-3}	3.0×10^{-6}	1.5×10^{-3}	7.7×10^{-7}	0.51	2.5×10^{-4}	1.0×10^{-3}
Pu oxide oven solids fire	1.7×10^{-9}	6.9×10^{-13}	4.0×10^{-10}	2.0×10^{-13}	8.4×10^{-8}	4.2×10^{-11}	1.0×10^{-3}
Earthquake	4.4×10^{-5}	1.8×10^{-8}	1.0×10^{-5}	5.1×10^{-9}	2.2×10^{-3}	1.1×10^{-6}	1.0×10^{-5}
Cs fire	0.042	1.7×10^{-5}	8.7×10^{-3}	4.4×10^{-6}	2.9	1.4×10^{-3}	1.0×10^{-6}
Blender fire	7.4×10^{-3}	3.0×10^{-6}	1.6×10^{-3}	7.8×10^{-7}	0.51	2.5×10^{-4}	1.0×10^{-6}
Nuclear criticality in Pu oxide furnace	4.8×10^{-4}	1.9×10^{-7}	1.4×10^{-4}	7.0×10^{-8}	4.5×10^{-3}	2.2×10^{-6}	1.0×10^{-6}
[Text deleted.]							

[a] Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single onsite worker at a distance of 1,000 m or the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes the accident has occurred.

[b] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km if exposed to the indicated dose. The value assumes the accident has occurred.

Note: All values are mean values.

Source: Calculated using the source terms in Tables M.5.3.5.1–3 and M.5.3.5.1–4 and the MACCS computer code.

Table M.5.3.5.2–5. Vitrification Alternative Accident Impacts at Oak Ridge Reservation

	Worker at 1,000 m		Maximum Offsite Individual		Population to 80 km		
Accident Scenario	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (person-rem)**	**Number of Cancer Fatalities[b]**	**Accident Frequency (per year)**
Blender spill	4.3×10^{-6}	1.7×10^{-9}	7.3×10^{-7}	3.7×10^{-10}	7.1×10^{-4}	3.5×10^{-7}	0.05
Melter spill	2.1×10^{-7}	8.6×10^{-11}	3.7×10^{-8}	1.8×10^{-11}	3.5×10^{-5}	1.8×10^{-8}	1.0×10^{-3}
Cs capsule drop	1.3×10^{-6}	5.2×10^{-10}	2.1×10^{-7}	1.0×10^{-10}	2.7×10^{-4}	1.3×10^{-7}	1.0×10^{-3}
Canister drop	2.1×10^{-6}	8.4×10^{-10}	3.6×10^{-7}	1.8×10^{-10}	3.5×10^{-4}	1.7×10^{-7}	1.0×10^{-3}
Cs ion processing fire	0.017	6.8×10^{-6}	2.7×10^{-3}	1.4×10^{-6}	3.5	1.8×10^{-3}	1.0×10^{-3}
Pu oxide oven solids fire	3.9×10^{-9}	1.6×10^{-12}	6.9×10^{-10}	3.5×10^{-13}	6.0×10^{-7}	3.0×10^{-10}	1.0×10^{-3}
Earthquake	1.0×10^{-4}	4.1×10^{-8}	1.8×10^{-5}	8.9×10^{-9}	0.015	7.7×10^{-6}	1.0×10^{-5}
Cs fire	0.095	3.8×10^{-5}	0.015	7.7×10^{-6}	19.8	9.9×10^{-3}	1.0×10^{-6}
Blender fire	0.017	6.8×10^{-6}	2.7×10^{-3}	1.4×10^{-6}	3.5	1.8×10^{-3}	1.0×10^{-6}
Nuclear criticality in Pu oxide furnace	9.5×10^{-4}	3.8×10^{-7}	1.7×10^{-4}	8.5×10^{-8}	0.031	1.6×10^{-5}	1.0×10^{-6}
[Text deleted.]							

[a] Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single onsite worker at a distance of 1,000 m or the site boundary [1,000 m for this facility at ORR], whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes the accident has occurred.

[b] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km if exposed to the indicated dose. The value assumes the accident has occurred.

Note: All values are mean values.

Source: Calculated using the source terms in Tables M.5.3.5.1–3 and M.5.3.5.1–4 and the MACCS computer code.

Table M.5.3.5.2–6. Vitrification Alternative Accident Impacts at Savannah River Site

	Worker at 1,000 m		Maximum Offsite Individual		Population to 80 km		
Accident Scenario	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (rem)**	**Probability of Cancer Fatality[a]**	**Dose (person-rem)**	**Number of Cancer Fatalities[b]**	**Accident Frequency (per year)**
Blender spill	3.0×10^{-6}	1.2×10^{-9}	5.8×10^{-8}	2.9×10^{-11}	3.2×10^{-4}	1.6×10^{-7}	0.05
Melter spill	1.5×10^{-7}	6.1×10^{-11}	2.9×10^{-9}	1.5×10^{-12}	1.6×10^{-5}	8.0×10^{-9}	1.0×10^{-3}
Cs capsule drop	9.2×10^{-7}	3.7×10^{-10}	1.6×10^{-8}	8.2×10^{-12}	1.3×10^{-4}	6.4×10^{-8}	1.0×10^{-3}
Canister drop	1.5×10^{-6}	6.0×10^{-10}	2.9×10^{-8}	1.4×10^{-11}	1.6×10^{-4}	7.9×10^{-8}	1.0×10^{-3}
Cs ion processing fire	0.012	4.8×10^{-6}	2.2×10^{-4}	1.1×10^{-7}	1.7	8.4×10^{-4}	1.0×10^{-3}
Pu oxide oven solids fire	2.8×10^{-9}	1.1×10^{-12}	5.5×10^{-11}	2.7×10^{-12}	2.7×10^{-7}	1.3×10^{-10}	1.0×10^{-3}
Earthquake	7.2×10^{-5}	2.9×10^{-8}	1.4×10^{-6}	7.1×10^{-10}	6.8×10^{-3}	3.4×10^{-8}	1.0×10^{-5}
Cs fire	0.068	2.7×10^{-5}	1.2×10^{-3}	6.1×10^{-7}	9.5	4.7×10^{-3}	1.0×10^{-6}
Blender fire	0.012	4.8×10^{-6}	2.2×10^{-4}	1.1×10^{-7}	1.7	8.4×10^{-4}	1.0×10^{-6}
Nuclear criticality in Pu oxide furnace	6.9×10^{-4}	2.8×10^{-7}	1.1×10^{-5}	5.7×10^{-9}	9.4×10^{-3}	4.7×10^{-6}	1.0×10^{-6}
[Text deleted.]							

[a] Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single onsite worker at a distance of 1,000 m or the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes the accident has occurred.

[b] Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km if exposed to the indicated dose. The value assumes the accident has occurred.

Note: All values are mean values.

Source: Calculated using the source terms in Tables M.5.3.5.1–3 and M.5.3.5.1–4 and the MACCS computer code.