

Table G-2. Event Sequence Grouping and  
Categorization (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Category	Basis for Categorization
ESD05-NVL-SEQ2-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, during CTT transfer to the Cask Unloading Room, resulting in a direct exposure from loss of shielding. In this sequence the canister remains intact, and the shielding function is degraded.	1 naval SNF canister	4.E-09	2.E-09	5.E-09	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD05-NVL-SEQ3-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, during CTT transfer to the Cask Unloading Room, resulting in a filtered radionuclide release. In this sequence the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD05-NVL-SEQ4-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, during CTT transfer to the Cask Unloading Room, resulting in a filtered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary remains intact, and moderator enters the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD05-NVL-SEQ5-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, during CTT transfer to the Cask Unloading Room, resulting in an unfiltered radionuclide release. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	1 naval SNF canister	4.E-06	2.E-06	5.E-06	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-2. Event Sequence Grouping and  
Categorization (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Category	Basis for Categorization
ESD05-NVL-SEQ6-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, during CTT transfer to the Cask Unloading Room, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	1 naval SNF canister	6.E-09	2.E-09	2.E-08	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD06-HLW-SEQ03-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, due to CTT collision with shield door, resulting in a direct exposure from loss of shielding. In this sequence the cell door structure remains intact, the canister remains intact, and the shielding function is degraded.	5 HLW canisters	2.E-10	7.E-11	3.E-10	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD06-HLW-SEQ04-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, due to CTT collision with shield door, resulting in a filtered radionuclide release. In this sequence the cell door structure remains intact, the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD06-HLW-SEQ05-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, due to CTT collision with shield door, resulting in a filtered radionuclide release also important to criticality. In this sequence the cell door structure remains intact, the canister fails, the confinement boundary remains intact, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-2. Event Sequence Grouping and  
Categorization (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Category	Basis for Categorization
ESD06-HLW-SEQ06-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, due to CTT collision with shield door, resulting in an unfiltered radionuclide release. In this sequence the cell door structure remains intact, the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	5 HLW canisters	2.E-10	7.E-11	3.E-10	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD06-HLW-SEQ07-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, due to CTT collision with shield door, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the cell door structure remains intact, the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD06-HLW-SEQ09-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, due to CTT collision with shield door, resulting in a direct exposure from loss of shielding. In this sequence the cell door fails and impacts the waste form, the canister remains intact, and the shielding function is degraded.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD06-HLW-SEQ10-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, due to CTT collision with shield door, resulting in a filtered radionuclide release. In this sequence the cell door fails and impacts the waste form, the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-2. Event Sequence Grouping and  
Categorization (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Category	Basis for Categorization
ESD06-HLW-SEQ11-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, due to CTT collision with shield door, resulting in a filtered radionuclide release also important to criticality. In this sequence the cell door fails and impacts the waste form, the canister fails, the confinement boundary remains intact, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD06-HLW-SEQ12-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, due to CTT collision with shield door, resulting in an unfiltered radionuclide release. In this sequence the cell door fails and impacts the waste form, the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD06-HLW-SEQ13-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, due to CTT collision with shield door, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the cell door fails and impacts the waste form, the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD06-NVL-SEQ03-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, due to CTT collision with shield door, resulting in a direct exposure from loss of shielding. In this sequence the cell door structure remains intact, the canister remains intact, and the shielding function is degraded.	1 naval SNF canister	1.E-10	5.E-11	2.E-10	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-2. Event Sequence Grouping and  
Categorization (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Category	Basis for Categorization
ESD06-NVL-SEQ04-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, due to CTT collision with shield door, resulting in a filtered radionuclide release. In this sequence the cell door structure remains intact, the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD06-NVL-SEQ05-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, due to CTT collision with shield door, resulting in a filtered radionuclide release also important to criticality. In this sequence the cell door structure remains intact, the canister fails, the confinement boundary remains intact, and moderator enters the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD06-NVL-SEQ06-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, due to CTT collision with shield door, resulting in an unfiltered radionuclide release. In this sequence the cell door structure remains intact, the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	1 naval SNF canister	1.E-10	5.E-11	2.E-10	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD06-NVL-SEQ07-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, due to CTT collision with shield door, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the cell door structure remains intact, the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	1 naval SNF canister	2.E-13	0.E+00	1.E-12	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-2. Event Sequence Grouping and  
Categorization (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Category	Basis for Categorization
ESD06-NVL-SEQ09-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, due to CTT collision with shield door, resulting in a direct exposure from loss of shielding. In this sequence the cell door fails and impacts the waste form, the canister remains intact, and the shielding function is degraded.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD06-NVL-SEQ10-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, due to CTT collision with shield door, resulting in a filtered radionuclide release. In this sequence the cell door fails and impacts the waste form, the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD06-NVL-SEQ11-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, due to CTT collision with shield door, resulting in a filtered radionuclide release also important to criticality. In this sequence the cell door fails and impacts the waste form, the canister fails, the confinement boundary remains intact, and moderator enters the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD06-NVL-SEQ12-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, due to CTT collision with shield door, resulting in an unfiltered radionuclide release. In this sequence the cell door fails and impacts the waste form, the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-2. Event Sequence Grouping and  
Categorization (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Category	Basis for Categorization
ESD06-NVL-SEQ13-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, due to CTT collision with shield door, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the cell door fails and impacts the waste form, the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD07-HLW-SEQ2-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to an HLW canister, during canister transfer by the CTM, resulting in a direct exposure from loss of shielding. In this sequence the canister remains intact, and the shielding function is degraded.	2 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD07-HLW-SEQ3-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to an HLW canister, during canister transfer by the CTM, resulting in a filtered radionuclide release. In this sequence the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	2 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD07-HLW-SEQ4-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to an HLW canister, during canister transfer by the CTM, resulting in a filtered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary remains intact, and moderator enters the canister.	2 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-2. Event Sequence Grouping and  
Categorization (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Category	Basis for Categorization
ESD07-HLW-SEQ5-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to an HLW canister, during canister transfer by the CTM, resulting in an unfiltered radionuclide release. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	2 HLW canisters	7.E-03	5.E-03	8.E-03	Category 2	Mean of distribution for number of occurrences of event sequence
ESD07-HLW-SEQ6-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to an HLW canister, during canister transfer by the CTM, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	2 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD07-NVL-SEQ2-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to a naval SNF canister, during canister transfer by the CTM, resulting in a direct exposure from loss of shielding. In this sequence the canister remains intact, and the shielding function is degraded.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD07-NVL-SEQ3-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister, during canister transfer by the CTM, resulting in a filtered radionuclide release. In this sequence the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD07-NVL-SEQ4-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister, during canister transfer by the CTM, resulting in a filtered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary remains intact, and moderator enters the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-2. Event Sequence Grouping and  
Categorization (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Category	Basis for Categorization
ESD07-NVL-SEQ5-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister, during canister transfer by the CTM, resulting in an unfiltered radionuclide release. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	1 naval SNF canister	4.E-06	2.E-06	6.E-06	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD07-NVL-SEQ6-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister, during canister transfer by the CTM, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	1 naval SNF canister	5.E-09	1.E-09	2.E-08	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD08-HLW-SEQ2-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to an HLW canister inside a waste package, during WPTT transfer to the Waste Package Positioning Room, resulting in a direct exposure from loss of shielding. In this sequence the canister remains intact, and the shielding function is degraded.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD08-HLW-SEQ3-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to an HLW canister inside a waste package, during WPTT transfer to the Waste Package Positioning Room, resulting in a filtered radionuclide release. In this sequence the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-2. Event Sequence Grouping and  
Categorization (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Category	Basis for Categorization
ESD08-HLW-SEQ4-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to an HLW canister inside a waste package, during WPTT transfer to the Waste Package Positioning Room, resulting in a filtered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary remains intact, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD08-HLW-SEQ5-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to an HLW canister inside a waste package, during WPTT transfer to the Waste Package Positioning Room, resulting in an unfiltered radionuclide release. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	5 HLW canisters	6.E-08	4.E-08	7.E-08	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD08-HLW-SEQ6-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to an HLW canister inside a waste package, during WPTT transfer to the Waste Package Positioning Room, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD08-NVL-SEQ2-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during WPTT transfer to the Waste Package Positioning Room, resulting in a direct exposure from loss of shielding. In this sequence the canister remains intact, and the shielding function is degraded.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-2. Event Sequence Grouping and  
Categorization (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Category	Basis for Categorization
ESD08-NVL-SEQ3-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during WPTT transfer to the Waste Package Positioning Room, resulting in a filtered radionuclide release. In this sequence the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD08-NVL-SEQ4-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during WPTT transfer to the Waste Package Positioning Room, resulting in a filtered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary remains intact, and moderator enters the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD08-NVL-SEQ5-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during WPTT transfer to the Waste Package Positioning Room, resulting in an unfiltered radionuclide release. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	1 naval SNF canister	1.E-07	8.E-08	1.E-07	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD08-NVL-SEQ6-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during WPTT transfer to the Waste Package Positioning Room, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	1 naval SNF canister	2.E-10	5.E-11	5.E-10	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-2. Event Sequence Grouping and  
Categorization (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Category	Basis for Categorization
ESD09-HLW-SEQ2-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to an HLW canister inside a waste package, during waste package assembly and closure, resulting in a direct exposure from loss of shielding. In this sequence the canister remains intact, and the shielding function is degraded.	5 HLW canisters	6.E-07	6.E-07	3.E-07	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD09-HLW-SEQ3-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to an HLW canister inside a waste package, during waste package assembly and closure, resulting in a filtered radionuclide release. In this sequence the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD09-HLW-SEQ4-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to an HLW canister inside a waste package, during waste package assembly and closure, resulting in a filtered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary remains intact, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD09-HLW-SEQ5-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to an HLW canister inside a waste package, during waste package assembly and closure, resulting in an unfiltered radionuclide release. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-2. Event Sequence Grouping and  
Categorization (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Category	Basis for Categorization
ESD09-HLW-SEQ6-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to an HLW canister inside a waste package, during waste package assembly and closure, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD09-NVL-SEQ2-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during waste package assembly and closure, resulting in a direct exposure from loss of shielding. In this sequence the canister remains intact, and the shielding function is degraded.	1 naval SNF canister	1.E-06	1.E-06	5.E-07	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD09-NVL-SEQ3-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during waste package assembly and closure, resulting in a filtered radionuclide release. In this sequence the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD09-NVL-SEQ4-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during waste package assembly and closure, resulting in a filtered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary remains intact, and moderator enters the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-2. Event Sequence Grouping and  
Categorization (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Category	Basis for Categorization
ESD09-NVL-SEQ5-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during waste package assembly and closure, resulting in an unfiltered radionuclide release. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	1 naval SNF canister	1.E-06	1.E-06	5.E-07	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD09-NVL-SEQ6-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during waste package assembly and closure, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	1 naval SNF canister	2.E-09	7.E-10	5.E-09	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD10-HLW-SEQ2-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to an HLW canister inside a waste package, during WPTT transfer to docking station, resulting in a direct exposure from loss of shielding. In this sequence the waste package remains intact, and the shielding function is degraded.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD10-HLW-SEQ3-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to an HLW canister inside a waste package, during WPTT transfer to docking station, resulting in a direct exposure from loss of shielding. In this sequence the waste package fails, and the canister remains intact.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-2. Event Sequence Grouping and  
Categorization (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Category	Basis for Categorization
ESD10-HLW-SEQ4-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to an HLW canister inside a waste package, during WPTT transfer to docking station, resulting in a filtered radionuclide release. In this sequence the waste package fails, the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD10-HLW-SEQ5-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to an HLW canister inside a waste package, during WPTT transfer to docking station, resulting in a filtered radionuclide release also important to criticality. In this sequence the waste package fails, the canister fails, the confinement boundary remains intact, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD10-HLW-SEQ6-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to an HLW canister inside a waste package, during WPTT transfer to docking station, resulting in an unfiltered radionuclide release. In this sequence the waste package fails, the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	5 HLW canisters	7.E-09	5.E-09	8.E-09	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD10-HLW-SEQ7-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to an HLW canister inside a waste package, during WPTT transfer to docking station, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the waste package fails, the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-2. Event Sequence Grouping and  
Categorization (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Category	Basis for Categorization
ESD10-NVL-SEQ2-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during WPTT transfer to docking station, resulting in a direct exposure from loss of shielding. In this sequence the waste package remains intact, and the shielding function is degraded.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD10-NVL-SEQ3-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during WPTT transfer to docking station, resulting in a direct exposure from loss of shielding. In this sequence the waste package fails, and the canister remains intact.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD10-NVL-SEQ4-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during WPTT transfer to docking station, resulting in a filtered radionuclide release. In this sequence the waste package fails, the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD10-NVL-SEQ5-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during WPTT transfer to docking station, resulting in a filtered radionuclide release also important to criticality. In this sequence the waste package fails, the canister fails, the confinement boundary remains intact, and moderator enters the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-2. Event Sequence Grouping and  
Categorization (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Category	Basis for Categorization
ESD10-NVL-SEQ6-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during WPTT transfer to docking station, resulting in an unfiltered radionuclide release. In this sequence the waste package fails, the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	1 naval SNF canister	1.E-05	7.E-06	2.E-05	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD10-NVL-SEQ7-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during WPTT transfer to docking station, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the waste package fails, the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	1 naval SNF canister	2.E-08	5.E-09	6.E-08	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD11-HLW-SEQ2-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to an HLW canister inside a waste package, during export activities, resulting in a direct exposure from loss of shielding. In this sequence the waste package remains intact, and the shielding function is degraded.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD11-HLW-SEQ3-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to an HLW canister inside a waste package, during export activities, resulting in a direct exposure from loss of shielding. In this sequence the waste package fails, and the canister remains intact.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-2. Event Sequence Grouping and  
Categorization (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Category	Basis for Categorization
ESD11-HLW-SEQ4-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to an HLW canister inside a waste package, during export activities, resulting in a filtered radionuclide release. In this sequence the waste package fails, the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD11-HLW-SEQ5-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to an HLW canister inside a waste package, during export activities, resulting in a filtered radionuclide release also important to criticality. In this sequence the waste package fails, the canister fails, the confinement boundary remains intact, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD11-HLW-SEQ6-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to an HLW canister inside a waste package, during export activities, resulting in an unfiltered radionuclide release. In this sequence the waste package fails, the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	5 HLW canisters	2.E-06	2.E-06	3.E-06	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD11-HLW-SEQ7-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to an HLW canister inside a waste package, during export activities, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the waste package fails, the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-2. Event Sequence Grouping and  
Categorization (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Category	Basis for Categorization
ESD11-NVL-SEQ2-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during export activities, resulting in a direct exposure from loss of shielding. In this sequence the waste package remains intact, and the shielding function is degraded.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD11-NVL-SEQ3-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during export activities, resulting in a direct exposure from loss of shielding. In this sequence the waste package fails, and the canister remains intact.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD11-NVL-SEQ4-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during export activities, resulting in a filtered radionuclide release. In this sequence the waste package fails, the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD11-NVL-SEQ5-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during export activities, resulting in a filtered radionuclide release also important to criticality. In this sequence the waste package fails, the canister fails, the confinement boundary remains intact, and moderator enters the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-2. Event Sequence Grouping and  
Categorization (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Category	Basis for Categorization
ESD11-NVL-SEQ6-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during export activities, resulting in an unfiltered radionuclide release. In this sequence the waste package fails, the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	1 naval SNF canister	4.E-06	3.E-06	5.E-06	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD11-NVL-SEQ7-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during export activities, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the waste package fails, the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	1 naval SNF canister	6.E-09	2.E-09	2.E-08	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD12A-HLW-SEQ2-DEL	Direct exposure, loss of shielding	This event sequence represents a temporary loss of shielding during CTM operations, while an HLW canister is being transferred. In this sequence there are no pivotal events.	5 HLW canisters	2.E-03	9.E-04	4.E-03	Category 2	Mean of distribution for number of occurrences of event sequence
ESD12A-NVL-SEQ2-DEL	Direct exposure, loss of shielding	This event sequence represents a temporary loss of shielding during CTM operations, while a naval SNF canister is being transferred. In this sequence there are no pivotal events.	1 naval SNF canister	7.E-04	3.E-04	1.E-03	Category 2	Mean of distribution for number of occurrences of event sequence
ESD12B-HLW-SEQ2-DEL	Direct exposure, loss of shielding	This event sequence represents a direct exposure associated with assembly and closure of a waste package containing HLW canisters. In this sequence there are no pivotal events.	5 HLW canisters	2.E-02	2.E-02	2.E-04	Category 2	Mean of distribution for number of occurrences of event sequence

Table G-2. Event Sequence Grouping and  
Categorization (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Category	Basis for Categorization
ESD12B-NVL-SEQ2-DEL	Direct exposure, loss of shielding	This event sequence represents a direct exposure during preparation activities of a transportation cask containing a naval SNF canister, or during assembly and closure of a waste package containing a naval SNF canister. In this sequence there are no pivotal events.	1 naval SNF canister	2.E-01	1.E-01	1.E-01	Category 2	Mean of distribution for number of occurrences of event sequence near a category threshold. Categorization confirmed by alternative distribution
ESD12C-HLW-SEQ2-DEL	Direct exposure, loss of shielding	This event sequence represents a direct exposure during export of a waste package containing HLW canisters. In this sequence there are no pivotal events.	5 HLW canisters	6.E-03	2.E-03	1.E-02	Category 2	Mean of distribution for number of occurrences of event sequence
ESD12C-NVL-SEQ2-DEL	Direct exposure, loss of shielding	This event sequence represents a direct exposure during export of a waste package containing a naval SNF canister. In this sequence there are no pivotal events.	1 naval SNF canister	1.E-02	4.E-03	2.E-02	Category 2	Mean of distribution for number of occurrences of event sequence
ESD13-HLW-SEQ2-DEL	Direct exposure, loss of shielding	This event sequence represents a thermal challenge to HLW canisters inside a transportation cask, due to a fire, resulting in a direct exposure from loss of shielding. In this sequence the canister remains intact, and the shielding function is degraded.	5 HLW canisters	7.E-04	6.E-04	3.E-04	Category 2	Mean of distribution for number of occurrences of event sequence
ESD13-HLW-SEQ3-RRF	Filtered radionuclide release	This event sequence represents a thermal challenge to an HLW canister, due to a fire, resulting in a filtered radionuclide release. In this sequence the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD13-HLW-SEQ4-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a thermal challenge to an HLW canister, due to a fire, resulting in a filtered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary remains intact, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-2. Event Sequence Grouping and  
Categorization (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Category	Basis for Categorization
ESD13-HLW-SEQ5-RRU	Unfiltered radionuclide release	This event sequence represents a thermal challenge to an HLW canister, due to a fire, resulting in an unfiltered radionuclide release. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	5 HLW canisters	9.E-06	8.E-06	4.E-06	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD13-HLW-SEQ6-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a thermal challenge to an HLW canister, due to a fire, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD13-NVL-SEQ2-DEL	Direct exposure, loss of shielding	This event sequence represents a thermal challenge to a naval SNF canister inside a transportation cask, due to a fire, resulting in a direct exposure from loss of shielding. In this sequence the canister remains intact, and the shielding function is degraded.	1 naval SNF canister	3.E-02	3.E-02	1.E-02	Category 2	Mean of distribution for number of occurrences of event sequence
ESD13-NVL-SEQ3-RRF	Filtered radionuclide release	This event sequence represents a thermal challenge to a naval SNF canister, due to a fire, resulting in a filtered radionuclide release. In this sequence the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD13-NVL-SEQ4-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a thermal challenge to a naval SNF canister, due to a fire, resulting in a filtered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary remains intact, and moderator enters the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-2. Event Sequence Grouping and  
Categorization (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Category	Basis for Categorization
ESD13-NVL-SEQ5-RRU	Unfiltered radionuclide release	This event sequence represents a thermal challenge to a naval SNF canister, due to a fire, resulting in an unfiltered radionuclide release. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	1 naval SNF canister	4.E-06	4.E-06	2.E-06	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD13-NVL-SEQ6-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a thermal challenge to a naval SNF canister, due to a fire, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	1 naval SNF canister	4.E-06	4.E-06	2.E-06	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

NOTE: <sup>a</sup>The mean, median, and standard deviation displayed are for the number of occurrences, over the preclosure period, of the event sequence under consideration.  
CTM = canister transfer machine; CTT = cask transfer trolley; HLW = high-level radioactive waste; SNF = spent nuclear fuel;

Source: Original

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Table G-3. Beyond Category 2 Final Event Sequences Summary

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Categorization	Basis for Categorization
ESD10-NVL-SEQ6-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during WPTT transfer to docking station, resulting in an unfiltered radionuclide release. In this sequence the waste package fails, the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	1 naval SNF canister	1.E-05	7.E-06	2.E-05	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD13-HLW-SEQ5-RRU	Unfiltered radionuclide release	This event sequence represents a thermal challenge to an HLW canister, due to a fire, resulting in an unfiltered radionuclide release. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	5 HLW canisters	9.E-06	8.E-06	4.E-06	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD05-HLW-SEQ5-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, during CTT transfer to the Cask Unloading Room, resulting in an unfiltered radionuclide release. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	5 HLW canisters	6.E-06	4.E-06	7.E-06	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD11-NVL-SEQ6-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during export activities, resulting in an unfiltered radionuclide release. In this sequence the waste package fails, the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	1 naval SNF canister	4.E-06	3.E-06	5.E-06	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD05-NVL-SEQ5-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, during CTT transfer to the Cask Unloading Room, resulting in an unfiltered radionuclide release. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	1 naval SNF canister	4.E-06	2.E-06	5.E-06	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-3. Beyond Category 2 Final Event Sequences Summary (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Categorization	Basis for Categorization
ESD13-NVL-SEQ5-RRU	Unfiltered radionuclide release	This event sequence represents a thermal challenge to a naval SNF canister, due to a fire, resulting in an unfiltered radionuclide release. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	1 naval SNF canister	4.E-06	4.E-06	2.E-06	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD13-NVL-SEQ6-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a thermal challenge to a naval SNF canister, due to a fire, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	1 naval SNF canister	4.E-06	4.E-06	2.E-06	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD07-NVL-SEQ5-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister, during canister transfer by the CTM, resulting in an unfiltered radionuclide release. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	1 naval SNF canister	4.E-06	2.E-06	6.E-06	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD11-HLW-SEQ6-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to an HLW canister inside a waste package, during export activities, resulting in an unfiltered radionuclide release. In this sequence the waste package fails, the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	5 HLW canisters	2.E-06	2.E-06	3.E-06	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD09-NVL-SEQ2-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during waste package assembly and closure, resulting in a direct exposure from loss of shielding. In this sequence the canister remains intact, and the shielding function is degraded.	1 naval SNF canister	1.E-06	1.E-06	5.E-07	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD09-NVL-SEQ5-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during waste package assembly and closure, resulting in an unfiltered radionuclide release. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	1 naval SNF canister	1.E-06	1.E-06	5.E-07	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-3. Beyond Category 2 Final Event Sequences Summary (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Categorization	Basis for Categorization
ESD02-HLW-SEQ2-DED	Direct exposure, degradation of shielding	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, during upending and transfer to a CTT, resulting in a direct exposure from degradation of shielding. In this sequence the transportation cask containment function remains intact, and the shielding function is degraded.	5 HLW canisters	1.E-06	4.E-07	3.E-06	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD02-HLW-SEQ6-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, during upending and transfer to a CTT, resulting in an unfiltered radionuclide release. In this sequence the transportation cask fails, the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	5 HLW canisters	1.E-06	4.E-07	3.E-06	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD03-HLW-SEQ2-DED	Direct exposure, degradation of shielding	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, during preparation activities (unbolting, lid adapter installation), resulting in a direct exposure from degradation of shielding. In this sequence the transportation cask containment function remains intact, and the shielding function is degraded.	5 HLW canisters	8.E-07	4.E-07	2.E-06	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD03-HLW-SEQ6-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, during preparation activities (unbolting, lid adapter installation), resulting in an unfiltered radionuclide release. In this sequence the transportation cask fails, the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	5 HLW canisters	8.E-07	4.E-07	2.E-06	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD01-NVL-SEQ2-DED	Direct exposure, degradation of shielding	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, during receipt, upending, and transfer to a CTT, resulting in a direct exposure from degradation of shielding. In this sequence the transportation cask containment function remains intact, and the shielding function is degraded.	1 naval SNF canister	7.E-07	3.E-07	2.E-06	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-3. Beyond Category 2 Final Event Sequences Summary (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Categorization	Basis for Categorization
ESD01-NVL-SEQ6-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, during receipt, upending, and transfer to a CTT, resulting in an unfiltered radionuclide release. In this sequence the transportation cask fails, the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	1 naval SNF canister	7.E-07	3.E-07	2.E-06	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD09-HLW-SEQ2-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to an HLW canister inside a waste package, during waste package assembly and closure, resulting in a direct exposure from loss of shielding. In this sequence the canister remains intact, and the shielding function is degraded.	5 HLW canisters	6.E-07	6.E-07	3.E-07	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD04-NVL-SEQ2-DED	Direct exposure, degradation of shielding	This event sequence represents a structural challenge to a naval SNF canister, during preparation activities (transportation cask lid removal, naval SNF canister lifting adapter installation), resulting in a direct exposure from degradation of shielding. In this sequence the canister remains intact, and the shielding function is degraded.	1 naval SNF canister	6.E-07	2.E-07	1.E-06	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD04-NVL-SEQ5-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister, during preparation activities (transportation cask lid removal, naval SNF canister lifting adapter installation), resulting in an unfiltered radionuclide release. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	1 naval SNF canister	6.E-07	2.E-07	1.E-06	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD02-NVL-SEQ2-DED	Direct exposure, degradation of shielding	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, during removal of impact limiters, resulting in a direct exposure from degradation of shielding. In this sequence the transportation cask containment function remains intact, and the shielding function is degraded.	1 naval SNF canister	1.E-07	4.E-08	5.E-07	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-3. Beyond Category 2 Final Event Sequences Summary (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Categorization	Basis for Categorization
ESD02-NVL-SEQ6-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, during removal of impact limiters, resulting in an unfiltered radionuclide release. In this sequence the transportation cask fails, the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	1 naval SNF canister	1.E-07	4.E-08	5.E-07	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD08-NVL-SEQ5-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during WPTT transfer to the Waste Package Positioning Room, resulting in an unfiltered radionuclide release. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	1 naval SNF canister	1.E-07	8.E-08	1.E-07	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD08-HLW-SEQ5-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to an HLW canister inside a waste package, during WPTT transfer to the Waste Package Positioning Room, resulting in an unfiltered radionuclide release. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	5 HLW canisters	6.E-08	4.E-08	7.E-08	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD01-HLW-SEQ2-DED	Direct exposure, degradation of shielding	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, during receipt activities, resulting in a direct exposure from degradation of shielding. In this sequence the transportation cask containment function remains intact, and the shielding function is degraded.	5 HLW canisters	3.E-08	2.E-08	6.E-08	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD01-HLW-SEQ6-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, during receipt activities, resulting in an unfiltered radionuclide release. In this sequence the transportation cask fails, the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	5 HLW canisters	3.E-08	2.E-08	6.E-08	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-3. Beyond Category 2 Final Event  
Sequences Summary (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Categorization	Basis for Categorization
ESD10-NVL-SEQ7-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during WPTT transfer to docking station, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the waste package fails, the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	1 naval SNF canister	2.E-08	5.E-09	6.E-08	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD10-HLW-SEQ6-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to an HLW canister inside a waste package, during WPTT transfer to docking station, resulting in an unfiltered radionuclide release. In this sequence the waste package fails, the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	5 HLW canisters	7.E-09	5.E-09	8.E-09	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD05-HLW-SEQ2-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, during CTT transfer to the Cask Unloading Room, resulting in a direct exposure from loss of shielding. In this sequence the canister remains intact, and the shielding function is degraded.	5 HLW canisters	6.E-09	4.E-09	7.E-09	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD11-NVL-SEQ7-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during export activities, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the waste package fails, the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	1 naval SNF canister	6.E-09	2.E-09	2.E-08	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD05-NVL-SEQ6-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, during CTT transfer to the Cask Unloading Room, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	1 naval SNF canister	6.E-09	2.E-09	2.E-08	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-3. Beyond Category 2 Final Event  
Sequences Summary (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Categorization	Basis for Categorization
ESD07-NVL-SEQ6-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister, during canister transfer by the CTM, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	1 naval SNF canister	5.E-09	1.E-09	2.E-08	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD05-NVL-SEQ2-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, during CTT transfer to the Cask Unloading Room, resulting in a direct exposure from loss of shielding. In this sequence the canister remains intact, and the shielding function is degraded.	1 naval SNF canister	4.E-09	2.E-09	5.E-09	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD09-NVL-SEQ6-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during waste package assembly and closure, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	1 naval SNF canister	2.E-09	7.E-10	5.E-09	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD01-NVL-SEQ7-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, during receipt, upending, and transfer to a CTT, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the transportation cask fails, the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	1 naval SNF canister	1.E-09	2.E-10	5.E-09	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD04-NVL-SEQ6-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister, during preparation activities (transportation cask lid removal, naval SNF canister lifting adapter installation), resulting in an unfiltered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	1 naval SNF canister	8.E-10	2.E-10	3.E-09	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-3. Beyond Category 2 Final Event Sequences Summary (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Categorization	Basis for Categorization
ESD06-HLW-SEQ03-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, due to CTT collision with shield door, resulting in a direct exposure from loss of shielding. In this sequence the cell door structure remains intact, the canister remains intact, and the shielding function is degraded.	5 HLW canisters	2.E-10	7.E-11	3.E-10	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD06-HLW-SEQ06-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, due to CTT collision with shield door, resulting in an unfiltered radionuclide release. In this sequence the cell door structure remains intact, the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	5 HLW canisters	2.E-10	7.E-11	3.E-10	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD02-NVL-SEQ7-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, during removal of impact limiters, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the transportation cask fails, the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	1 naval SNF canister	2.E-10	3.E-11	1.E-09	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD08-NVL-SEQ6-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during WPTT transfer to the Waste Package Positioning Room, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	1 naval SNF canister	2.E-10	5.E-11	5.E-10	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD06-NVL-SEQ03-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, due to CTT collision with shield door, resulting in a direct exposure from loss of shielding. In this sequence the cell door structure remains intact, the canister remains intact, and the shielding function is degraded.	1 naval SNF canister	1.E-10	5.E-11	2.E-10	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-3. Beyond Category 2 Final Event Sequences Summary (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Categorization	Basis for Categorization
ESD06-NVL-SEQ06-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, due to CTT collision with shield door, resulting in an unfiltered radionuclide release. In this sequence the cell door structure remains intact, the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	1 naval SNF canister	1.E-10	5.E-11	2.E-10	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD06-NVL-SEQ07-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, due to CTT collision with shield door, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the cell door structure remains intact, the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	1 naval SNF canister	2.E-13	0.E+00	1.E-12	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD01-HLW-SEQ3-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, during receipt activities, resulting in a direct exposure from loss of shielding. In this sequence the transportation cask fails, and the canister remains intact.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD01-HLW-SEQ4-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, during receipt activities, resulting in a filtered radionuclide release. In this sequence the transportation cask fails, the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD01-HLW-SEQ5-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, during receipt activities, resulting in a filtered radionuclide release also important to criticality. In this sequence the transportation cask fails, the canister fails, the confinement boundary remains intact, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-3. Beyond Category 2 Final Event Sequences Summary (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Categorization	Basis for Categorization
ESD01-HLW-SEQ7-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, during receipt activities, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the transportation cask fails, the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD01-NVL-SEQ3-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, during receipt, upending, and transfer to a CTT, resulting in a direct exposure from loss of shielding. In this sequence the transportation cask fails, and the canister remains intact.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD01-NVL-SEQ4-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, during receipt, upending, and transfer to a CTT, resulting in a filtered radionuclide release. In this sequence the transportation cask fails, the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD01-NVL-SEQ5-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, during receipt, upending, and transfer to a CTT, resulting in a filtered radionuclide release also important to criticality. In this sequence the transportation cask fails, the canister fails, the confinement boundary remains intact, and moderator enters the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD02-HLW-SEQ3-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, during upending and transfer to a CTT, resulting in a direct exposure from loss of shielding. In this sequence the transportation cask fails, and the canister remains intact.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-3. Beyond Category 2 Final Event Sequences Summary (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Categorization	Basis for Categorization
ESD02-HLW-SEQ4-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, during upending and transfer to a CTT, resulting in a filtered radionuclide release. In this sequence the transportation cask fails, the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD02-HLW-SEQ5-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, during upending and transfer to a CTT, resulting in a filtered radionuclide release also important to criticality. In this sequence the transportation cask fails, the canister fails, the confinement boundary remains intact, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD02-HLW-SEQ7-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, during upending and transfer to a CTT, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the transportation cask fails, the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD02-NVL-SEQ3-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, during removal of impact limiters, resulting in a direct exposure from loss of shielding. In this sequence the transportation cask fails, and the canister remains intact.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD02-NVL-SEQ4-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, during removal of impact limiters, resulting in a filtered radionuclide release. In this sequence the transportation cask fails, the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-3. Beyond Category 2 Final Event Sequences Summary (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Categorization	Basis for Categorization
ESD02-NVL-SEQ5-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, during removal of impact limiters, resulting in a filtered radionuclide release also important to criticality. In this sequence the transportation cask fails, the canister fails, the confinement boundary remains intact, and moderator enters the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD03-HLW-SEQ3-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, during preparation activities (unbolting, lid adapter installation), resulting in a direct exposure from loss of shielding. In this sequence the transportation cask fails, and the canister remains intact.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD03-HLW-SEQ4-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, during preparation activities (unbolting, lid adapter installation), resulting in a filtered radionuclide release. In this sequence the transportation cask fails, the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD03-HLW-SEQ5-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, during preparation activities (unbolting, lid adapter installation), resulting in a filtered radionuclide release also important to criticality. In this sequence the transportation cask fails, the canister fails, the confinement boundary remains intact, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD03-HLW-SEQ7-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, during preparation activities (unbolting, lid adapter installation), resulting in an unfiltered radionuclide release also important to criticality. In this sequence the transportation cask fails, the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-3. Beyond Category 2 Final Event Sequences Summary (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Categorization	Basis for Categorization
ESD04-NVL-SEQ3-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister, during preparation activities (transportation cask lid removal, naval SNF canister lifting adapter installation), resulting in a filtered radionuclide release. In this sequence the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD04-NVL-SEQ4-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister, during preparation activities (transportation cask lid removal, naval SNF canister lifting adapter installation), resulting in a filtered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary remains intact, and moderator enters the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD05-HLW-SEQ3-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, during CTT transfer to the Cask Unloading Room, resulting in a filtered radionuclide release. In this sequence the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD05-HLW-SEQ4-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, during CTT transfer to the Cask Unloading Room, resulting in a filtered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary remains intact, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD05-HLW-SEQ6-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, during CTT transfer to the Cask Unloading Room, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-3. Beyond Category 2 Final Event Sequences Summary (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Categorization	Basis for Categorization
ESD05-NVL-SEQ3-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, during CTT transfer to the Cask Unloading Room, resulting in a filtered radionuclide release. In this sequence the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD05-NVL-SEQ4-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, during CTT transfer to the Cask Unloading Room, resulting in a filtered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary remains intact, and moderator enters the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD06-HLW-SEQ04-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, due to CTT collision with shield door, resulting in a filtered radionuclide release. In this sequence the cell door structure remains intact, the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD06-HLW-SEQ05-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, due to CTT collision with shield door, resulting in a filtered radionuclide release also important to criticality. In this sequence the cell door structure remains intact, the canister fails, the confinement boundary remains intact, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD06-HLW-SEQ07-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, due to CTT collision with shield door, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the cell door structure remains intact, the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-3. Beyond Category 2 Final Event Sequences Summary (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Categorization	Basis for Categorization
ESD06-HLW-SEQ09-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, due to CTT collision with shield door, resulting in a direct exposure from loss of shielding. In this sequence the cell door fails and impacts the waste form, the canister remains intact, and the shielding function is degraded.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD06-HLW-SEQ10-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, due to CTT collision with shield door, resulting in a filtered radionuclide release. In this sequence the cell door fails and impacts the waste form, the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD06-HLW-SEQ11-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, due to CTT collision with shield door, resulting in a filtered radionuclide release also important to criticality. In this sequence the cell door fails and impacts the waste form, the canister fails, the confinement boundary remains intact, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD06-HLW-SEQ12-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, due to CTT collision with shield door, resulting in an unfiltered radionuclide release. In this sequence the cell door fails and impacts the waste form, the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD06-HLW-SEQ13-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to HLW canisters inside a transportation cask, due to CTT collision with shield door, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the cell door fails and impacts the waste form, the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-3. Beyond Category 2 Final Event Sequences Summary (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Categorization	Basis for Categorization
ESD06-NVL-SEQ04-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, due to CTT collision with shield door, resulting in a filtered radionuclide release. In this sequence the cell door structure remains intact, the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD06-NVL-SEQ05-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, due to CTT collision with shield door, resulting in a filtered radionuclide release also important to criticality. In this sequence the cell door structure remains intact, the canister fails, the confinement boundary remains intact, and moderator enters the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD06-NVL-SEQ09-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, due to CTT collision with shield door, resulting in a direct exposure from loss of shielding. In this sequence the cell door fails and impacts the waste form, the canister remains intact, and the shielding function is degraded.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD06-NVL-SEQ10-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, due to CTT collision with shield door, resulting in a filtered radionuclide release. In this sequence the cell door fails and impacts the waste form, the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD06-NVL-SEQ11-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, due to CTT collision with shield door, resulting in a filtered radionuclide release also important to criticality. In this sequence the cell door fails and impacts the waste form, the canister fails, the confinement boundary remains intact, and moderator enters the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-3. Beyond Category 2 Final Event Sequences Summary (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Categorization	Basis for Categorization
ESD06-NVL-SEQ12-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, due to CTT collision with shield door, resulting in an unfiltered radionuclide release. In this sequence the cell door fails and impacts the waste form, the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD06-NVL-SEQ13-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a transportation cask, due to CTT collision with shield door, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the cell door fails and impacts the waste form, the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD07-HLW-SEQ2-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to an HLW canister, during canister transfer by the CTM, resulting in a direct exposure from loss of shielding. In this sequence the canister remains intact, and the shielding function is degraded.	2 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD07-HLW-SEQ3-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to an HLW canister, during canister transfer by the CTM, resulting in a filtered radionuclide release. In this sequence the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	2 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD07-HLW-SEQ4-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to an HLW canister, during canister transfer by the CTM, resulting in a filtered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary remains intact, and moderator enters the canister.	2 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD07-HLW-SEQ6-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to an HLW canister, during canister transfer by the CTM, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	2 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-3. Beyond Category 2 Final Event Sequences Summary (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Categorization	Basis for Categorization
ESD07-NVL-SEQ2-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to a naval SNF canister, during canister transfer by the CTM, resulting in a direct exposure from loss of shielding. In this sequence the canister remains intact, and the shielding function is degraded.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD07-NVL-SEQ3-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister, during canister transfer by the CTM, resulting in a filtered radionuclide release. In this sequence the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD07-NVL-SEQ4-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister, during canister transfer by the CTM, resulting in a filtered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary remains intact, and moderator enters the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD08-HLW-SEQ2-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to an HLW canister inside a waste package, during WPTT transfer to the Waste Package Positioning Room, resulting in a direct exposure from loss of shielding. In this sequence the canister remains intact, and the shielding function is degraded.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD08-HLW-SEQ3-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to an HLW canister inside a waste package, during WPTT transfer to the Waste Package Positioning Room, resulting in a filtered radionuclide release. In this sequence the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD08-HLW-SEQ4-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to an HLW canister inside a waste package, during WPTT transfer to the Waste Package Positioning Room, resulting in a filtered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary remains intact, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-3. Beyond Category 2 Final Event  
Sequences Summary (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Categorization	Basis for Categorization
ESD08-HLW-SEQ6-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to an HLW canister inside a waste package, during WPTT transfer to the Waste Package Positioning Room, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD08-NVL-SEQ2-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during WPTT transfer to the Waste Package Positioning Room, resulting in a direct exposure from loss of shielding. In this sequence the canister remains intact, and the shielding function is degraded.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD08-NVL-SEQ3-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during WPTT transfer to the Waste Package Positioning Room, resulting in a filtered radionuclide release. In this sequence the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD08-NVL-SEQ4-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during WPTT transfer to the Waste Package Positioning Room, resulting in a filtered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary remains intact, and moderator enters the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD09-HLW-SEQ3-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to an HLW canister inside a waste package, during waste package assembly and closure, resulting in a filtered radionuclide release. In this sequence the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-3. Beyond Category 2 Final Event Sequences Summary (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Categorization	Basis for Categorization
ESD09-HLW-SEQ4-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to an HLW canister inside a waste package, during waste package assembly and closure, resulting in a filtered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary remains intact, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD09-HLW-SEQ5-RRU	Unfiltered radionuclide release	This event sequence represents a structural challenge to an HLW canister inside a waste package, during waste package assembly and closure, resulting in an unfiltered radionuclide release. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator is excluded from entering the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD09-HLW-SEQ6-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to an HLW canister inside a waste package, during waste package assembly and closure, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD09-NVL-SEQ3-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during waste package assembly and closure, resulting in a filtered radionuclide release. In this sequence the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD09-NVL-SEQ4-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during waste package assembly and closure, resulting in a filtered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary remains intact, and moderator enters the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD10-HLW-SEQ2-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to an HLW canister inside a waste package, during WPTT transfer to docking station, resulting in a direct exposure from loss of shielding. In this sequence the waste package remains intact, and the shielding function is degraded.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-3. Beyond Category 2 Final Event Sequences Summary (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Categorization	Basis for Categorization
ESD10-HLW-SEQ3-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to an HLW canister inside a waste package, during WPTT transfer to docking station, resulting in a direct exposure from loss of shielding. In this sequence the waste package fails, and the canister remains intact.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD10-HLW-SEQ4-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to an HLW canister inside a waste package, during WPTT transfer to docking station, resulting in a filtered radionuclide release. In this sequence the waste package fails, the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD10-HLW-SEQ5-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to an HLW canister inside a waste package, during WPTT transfer to docking station, resulting in a filtered radionuclide release also important to criticality. In this sequence the waste package fails, the canister fails, the confinement boundary remains intact, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD10-HLW-SEQ7-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to an HLW canister inside a waste package, during WPTT transfer to docking station, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the waste package fails, the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD10-NVL-SEQ2-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during WPTT transfer to docking station, resulting in a direct exposure from loss of shielding. In this sequence the waste package remains intact, and the shielding function is degraded.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD10-NVL-SEQ3-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during WPTT transfer to docking station, resulting in a direct exposure from loss of shielding. In this sequence the waste package fails, and the canister remains intact.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-3. Beyond Category 2 Final Event Sequences Summary (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Categorization	Basis for Categorization
ESD10-NVL-SEQ4-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during WPTT transfer to docking station, resulting in a filtered radionuclide release. In this sequence the waste package fails, the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD10-NVL-SEQ5-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during WPTT transfer to docking station, resulting in a filtered radionuclide release also important to criticality. In this sequence the waste package fails, the canister fails, the confinement boundary remains intact, and moderator enters the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD11-HLW-SEQ2-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to an HLW canister inside a waste package, during export activities, resulting in a direct exposure from loss of shielding. In this sequence the waste package remains intact, and the shielding function is degraded.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD11-HLW-SEQ3-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to an HLW canister inside a waste package, during export activities, resulting in a direct exposure from loss of shielding. In this sequence the waste package fails, and the canister remains intact.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD11-HLW-SEQ4-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to an HLW canister inside a waste package, during export activities, resulting in a filtered radionuclide release. In this sequence the waste package fails, the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD11-HLW-SEQ5-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to an HLW canister inside a waste package, during export activities, resulting in a filtered radionuclide release also important to criticality. In this sequence the waste package fails, the canister fails, the confinement boundary remains intact, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-3. Beyond Category 2 Final Event Sequences Summary (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Categorization	Basis for Categorization
ESD11-HLW-SEQ7-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a structural challenge to an HLW canister inside a waste package, during export activities, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the waste package fails, the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD11-NVL-SEQ2-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during export activities, resulting in a direct exposure from loss of shielding. In this sequence the waste package remains intact, and the shielding function is degraded.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD11-NVL-SEQ3-DEL	Direct exposure, loss of shielding	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during export activities, resulting in a direct exposure from loss of shielding. In this sequence the waste package fails, and the canister remains intact.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD11-NVL-SEQ4-RRF	Filtered radionuclide release	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during export activities, resulting in a filtered radionuclide release. In this sequence the waste package fails, the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD11-NVL-SEQ5-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a structural challenge to a naval SNF canister inside a waste package, during export activities, resulting in a filtered radionuclide release also important to criticality. In this sequence the waste package fails, the canister fails, the confinement boundary remains intact, and moderator enters the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD13-HLW-SEQ3-RRF	Filtered radionuclide release	This event sequence represents a thermal challenge to an HLW canister, due to a fire, resulting in a filtered radionuclide release. In this sequence the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

Table G-3. Beyond Category 2 Final Event  
Sequences Summary (Continued)

Event Sequence Group ID	End State	Description	Material at Risk	Mean <sup>a</sup>	Median <sup>a</sup>	Standard Deviation <sup>a</sup>	Event Sequence Categorization	Basis for Categorization
ESD13-HLW-SEQ4-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a thermal challenge to an HLW canister, due to a fire, resulting in a filtered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary remains intact, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD13-HLW-SEQ6-RRC	Unfiltered radionuclide release, important to criticality	This event sequence represents a thermal challenge to an HLW canister, due to a fire, resulting in an unfiltered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary is not relied upon, and moderator enters the canister.	5 HLW canisters	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD13-NVL-SEQ3-RRF	Filtered radionuclide release	This event sequence represents a thermal challenge to a naval SNF canister, due to a fire, resulting in a filtered radionuclide release. In this sequence the canister fails, the confinement boundary remains intact, and moderator is excluded from entering the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence
ESD13-NVL-SEQ4-RRC	Filtered radionuclide release, important to criticality	This event sequence represents a thermal challenge to a naval SNF canister, due to a fire, resulting in a filtered radionuclide release also important to criticality. In this sequence the canister fails, the confinement boundary remains intact, and moderator enters the canister.	1 naval SNF canister	0.E+00	0.E+00	0.E+00	Beyond Category 2	Mean of distribution for number of occurrences of event sequence

NOTE: <sup>a</sup>The mean, median, and standard deviation displayed are for the number of occurrences, over the preclosure period, of the event sequence under consideration.  
CTM = canister transfer machine; CTT = cask transfer trolley; HLW = high-level radioactive waste; SNF = spent nuclear fuel.

Source: Original

Table G-4. Important to Criticality Final Event Sequences Summary

Event Sequence Group ID	End State	Description	Material-At-Risk	Mean	Median	Std Dev	Event Sequence. Cat.	Basis for Categorization
ESD01-HLW-SEQ5-RRC	RR-FILTERED-ITC	This sequence represents a structural challenge to HLW canisters inside a transportation cask resulting in a filtered radionuclide release also important to criticality due to a railcar derailment, a truck/trailer rollover or a railcar/truck trailer collision. In this sequence the transportation cask fails, the canister fails, the confinement boundary remains intact, and moderator enters canister.	1 HLW CASK	0.E+00	0.E+00	0.E+00	Beyond Category 2	Categorization by mean frequency and grouping by sequences
ESD01-HLW-SEQ7-RRC	RR-UNFILTERED-ITC	This sequence represents a structural challenge to HLW canisters inside a transportation cask resulting in an unfiltered radionuclide release also important to criticality due to a railcar derailment, a truck/trailer rollover or a railcar/truck trailer collision. In this sequence the transportation cask fails, the canister fails, the confinement boundary fails, and moderator enters canister.	1 NAVAL CASK	0.E+00	0.E+00	0.E+00	Beyond Category 2	Categorization by mean frequency and grouping by sequences
ESD01-NVL-SEQ5-RRC	RR-FILTERED-ITC	This sequence represents a structural challenge to a naval canister inside a transportation cask resulting in a filtered radionuclide release also important to criticality due to a crane drops object, a crane drops TC from operational height or above operational height, a railcar derailment or collision, a cask collision off the railcar, or a railcar/truck trailer tipover. In this sequence the transportation cask fails, the canister fails, the confinement boundary remains intact, and moderator enters canister.	1 NAVAL CASK	0.E+00	0.E+00	0.E+00	Beyond Category 2	Categorization by mean frequency and grouping by sequences
ESD01-NVL-SEQ7-RRC	RR-UNFILTERED-ITC	This sequence represents a structural challenge to a naval canister inside a transportation cask resulting in an unfiltered radionuclide release also important to criticality due to a crane drops object, a crane drops TC from operational height or above operational height, a railcar derailment or collision, a cask collision off the railcar, or a railcar/truck trailer tipover. In this sequence the transportation cask fails, the canister fails, the confinement boundary fails, and moderator enters canister.	1 NAVAL CASK	1.E-09	2.E-10	5.E-09	Beyond Category 2	Categorization by mean frequency and grouping by sequences
ESD02-HLW-SEQ5-RRC	RR-FILTERED-ITC	This sequence represents a structural challenge to HLW canisters inside a transportation cask resulting in a filtered radionuclide release also important to criticality due to a cask dropped from operational height or above operation height, an unplanned conveyance movement, a collision with side impact, a dropped object or a TC tipover. In this sequence the transportation cask fails, the canister fails, the confinement boundary remains intact, and moderator enters canister.	1 HLW CASK	0.E+00	0.E+00	0.E+00	Beyond Category 2	Categorization by mean frequency and grouping by sequences
ESD02-HLW-SEQ7-RRC	RR-UNFILTERED-ITC	This sequence represents a structural challenge to HLW canisters inside a transportation cask resulting in an unfiltered radionuclide release also important to criticality due to a cask dropped from operational height or above operation height, an unplanned conveyance movement, a collision with side impact, a dropped object or a TC tipover. In this sequence the transportation cask fails, the canister fails, the confinement boundary fails, and moderator enters canister.	1 HLW CASK	0.E+00	0.E+00	0.E+00	Beyond Category 2	Categorization by mean frequency and grouping by sequences

Table G-3. Beyond Category 2 Final Event  
Sequences Summary (Continued)

Event Sequence Group ID	End State	Description	Material-At-Risk	Mean	Median	Std Dev	Event Sequence. Cat.	Basis for Categorization
ESD02-NVL-SEQ5-RRC	RR-FILTERED-ITC	This sequence represents a structural challenge to a naval canister inside a transportation cask resulting in a filtered radionuclide release also important to criticality due to either a side impact or a drop of a heavy object. In this sequence the transportation cask fails, the canister fails, the confinement boundary remains intact, and moderator enters canister.	1 NAVAL CASK	0.E+00	0.E+00	0.E+00	Beyond Category 2	Categorization by mean frequency and grouping by sequences
ESD02-NVL-SEQ7-RRC	RR-UNFILTERED-ITC	This sequence represents a structural challenge to a naval canister inside a transportation cask resulting in an unfiltered radionuclide release also important to criticality due to either a side impact or a drop of a heavy object. In this sequence the transportation cask fails, the canister fails, the confinement boundary fails, and moderator enters canister.	1 NAVAL CASK	2.E-10	3.E-11	1.E-09	Beyond Category 2	Categorization by mean frequency and grouping by sequences
ESD03-HLW-SEQ5-RRC	RR-FILTERED-ITC	This sequence represents a structural challenge to HLW canisters inside a transportation cask resulting in a filtered radionuclide release also important to criticality due to a cask tips over, a side impact or a dropped object. In this sequence the transportation cask fails, the canister fails, the confinement boundary remains intact, and moderator enters canister.	1 HLW TC	0.E+00	0.E+00	0.E+00	Beyond Category 2	Categorization by mean frequency and grouping by sequences
ESD03-HLW-SEQ7-RRC	RR-UNFILTERED-ITC	This sequence represents a structural challenge to HLW canisters inside a transportation cask resulting in an unfiltered radionuclide release also important to criticality due to a cask tips over, a side impact or a dropped object. In this sequence the transportation cask fails, the canister fails, the confinement boundary fails, and moderator enters canister.	1 HLW TC	0.E+00	0.E+00	0.E+00	Beyond Category 2	Categorization by mean frequency and grouping by sequences
ESD04-NVL-SEQ4-RRC	RR-FILTERED-ITC	This sequence represents a structural challenge to a naval canister inside a transportation cask resulting in a filtered radionuclide release also important to criticality due to a cask tips over, a side impact or a dropped object. In this sequence the transportation cask fails, the confinement boundary remains intact, and moderator enters canister.	1 NAVAL CASK	0.E+00	0.E+00	0.E+00	Beyond Category 2	Categorization by mean frequency and grouping by sequences
ESD04-NVL-SEQ6-RRC	RR-UNFILTERED-ITC	This sequence represents a structural challenge to a naval canister inside a transportation cask resulting in an unfiltered radionuclide release also important to criticality due to a cask tips over, a side impact or a dropped object. In this sequence the transportation cask fails, the confinement boundary fails, and moderator enters canister.	1 NAVAL CASK	8.E-10	2.E-10	3.E-09	Beyond Category 2	Categorization by mean frequency and grouping by sequences
ESD05-HLW-SEQ4-RRC	RR-FILTERED-ITC	This sequence represents a structural challenge to HLW canisters inside a transportation cask resulting in a filtered radionuclide release also important to criticality due to a crane induced impact to TC or a CTT collision. In this sequence the transportation cask fails, the confinement boundary remains intact, and moderator enters canister.	5 HLW CANISTERS	0.E+00	0.E+00	0.E+00	Beyond Category 2	Categorization by mean frequency and grouping by sequences