

HLWYM HEmails

From: Oleg Povetko
Sent: Friday, June 29, 2007 12:51 PM
To: Sheena Whaley
Cc: Asadul Chowdhury; James Winterle
Subject: Naval fuel contribution to probability of crit
Attachments: Outlook.bmp

Sheena,

At our meeting at the Center I referred to the large overall relative contribution of naval fuel to the postclosure probability of criticality. Please find below the table from the following DOE report.

"Screening Analysis of Criticality Features, Events, and Processes for License Application REV 01, October 2004".

Note, that these are results for old pre-TAD design, no drift collapse, and that probabilities in Base Case and Rock Fall scenarios are all zeroes for all WP types. In Base Case the underlying assumption states that no water enters WP during first 10,000 years. Therefore, even though probability of early failure was estimated at 0.000028 per WP the total probability of criticality is low.

Probability of criticality for naval fuel is non-zero only for Seismic scenario.

The NNPP is responsible for assessing the criticality potential of the naval SNF waste package types that is provided in their Technical Support Document for License Application (McKenzie 2004 [DIRS 170742]) as the total probability of criticality for the NNPP long waste package type as 4.4×10^{-9} and for the NNPP short waste package type as 6.0×10^{-9} . Accounting for these additional factors, the total probability of criticality is still calculated to be below the regulatory probability criterion at 1.44×10^{-8} .

Table 6.7-1. Total Per Waste Package Probability of Criticality of Each Waste Package Type for Each Criticality FEPs Case

Waste Package Type	Per Case Total Probability of Criticality				Total Probability of Criticality
	Base Case ^a	Seismic ^b	Rock Fall ^c	Igneous ^d	
21-PWR Absorber Plate	0.00E+00	3.91E-10	0.00E+00	2.37E-09	2.76E-09
21-PWR Control Rod	0.00E+00	4.84E-11	0.00E+00	2.93E-10	3.42E-10
12-PWR Absorber Plate	0.00E+00	1.05E-13	0.00E+00	6.17E-13	7.22E-13
24-BWR Absorber Plate	0.00E+00	5.40E-14	0.00E+00	3.18E-13	3.72E-13
44-BWR Absorber Plate	0.00E+00	1.82E-12	0.00E+00	1.07E-11	1.25E-11
DOE SNF Short w/ MOX	0.00E+00	5.32E-12	0.00E+00	4.99E-12	1.03E-11
DOE SNF Long w/ MOX	0.00E+00	6.50E-11	0.00E+00	6.09E-11	1.26E-10
DOE SNF Short w/ U-Zr Hx	0.00E+00	6.92E-13	0.00E+00	6.25E-13	1.32E-12
DOE SNF Short w/ U-Metal	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
DOE SNF Long w/ U-Metal	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
DOE SNF MCO w/ U-Metal	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
DOE SNF Short w/ HEU Oxide	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
DOE SNF Long w/ HEU Oxide	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
DOE SNF Short w/ U/Th Oxide	0.00E+00	5.62E-11	0.00E+00	5.27E-11	1.09E-10
DOE SNF Long w/ U/Th Oxide	0.00E+00	2.05E-10	0.00E+00	1.92E-10	3.97E-10
DOE SNF Long w/ U/Th Carbide	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
DOE SNF Short w/ Aluminum Based	0.00E+00	5.14E-12	0.00E+00	4.64E-12	9.79E-12
DOE SNF Long w/ Aluminum Based	0.00E+00	4.19E-15	0.00E+00	3.79E-15	7.98E-15
DOE SNF Short w/ U-Zr/U-Mo Alloy	0.00E+00	3.94E-11	0.00E+00	3.69E-11	7.63E-11
DOE SNF Long w/ U-Zr/U-Mo Alloy	0.00E+00	5.34E-11	0.00E+00	5.01E-11	1.04E-10
DOE SNF Short w/ LEU Oxide	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
DOE SNF Long w/ LEU Oxide	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naval Short	0.00E+00	6.0E-09	0.00E+00	0.00E+00	6.0E-09
Naval Long	0.00E+00	4.4E-09	0.00E+00	0.00E+00	4.4E-09
TOTAL					1.44E-08

Source: ^a Table 6.3-12

^b Table 6.4-23

^c Section 6.5

^d Table 6.6-14 (Probability values below the screening criterion are set to 0.0.)

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From: Oleg Povetko

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Tracking Status: None

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