

Glenn:

Here is a verbal discussion of the numerics, using the Mean Column from Table A2c-2:

NO There is a 5.4×10^{-5} per year (1 in about 18,500) chance of something going wrong with one (1) crane operation (for our case: secure, lift, move and lower the cask; or secure, lift, raise, move the cask - presumable after clearing the pool edge a drop while lower cask would not endanger the SFP).

The thing that can go wrong is one of the F_n 's:

F1 -	Load hangup resulting from operator error	0.14
F2 -	Failure of component with a backup component	0.61
F3 -	Two-blocking event	0.05
F4 -	Failure of component without a backup	0.10
F5 -	Failure from improper rigging	0.21
	SUM	1.00

So for example, there would be $NO * F1$ load hangups resulting from operator error (7.4×10^{-6}).

Depending on the F_n grouping, there may be one or more backup systems to prevent the actual drop of the load:

For example, $F1$ has an overload device which has a failure rate of 4.0×10^{-3} per demand ($CF12$)

So bottom line for $CF1$, a load hangup combined with a failure of the overload device leading to a drop is $NO * F1$ ($CF11$ in the table) * $CF12$ or 3.0×10^{-8} per year ($CF1$) of crane operation.

Add to this value the contribution from $CF2$, $CF3$ and $CF4$ (crane failures, not rigging) to get the total for the crane ($CRANE$) of 1.4×10^{-6} .

If there are 100 lifts, than 3 ($D1$) are assumed to be drops, for the crane contribution CF of 4.4×10^{-6} per year for the 100 lifts ($CRANE * D1$).

The rigging contribution comes from the WIPP study and has a mean value of 8.7×10^{-7} per year, with 6 of 100 lifts leading to a drop (5.3×10^{-6}) (CR).

This leads to the bottom line $CFCR$ value of 9.6×10^{-6} ($CF + CR$).

Do the path thing for $LOI-S$ of 2.0×10^{-7} per year.

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