Ex 2

From: Bernard White
To: plane
Date: Fri, Dec 20, 2002 1:34 PM
Subject: Fwd: SNL plans for resolving the HI-STORM issue isattache d

Ex 2

Attached is a qualitative description of the approach SNL is going to use to evaluate the HI-STORM cask based on our phone conversation from Wednesday.

Any comments??

Bernie

CC: Hodges, M. Wayne

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From: "Sprung, Jeremy L" <jlsprun@sandia.gov>
To: "'White, Bernard'" <bhw@nrc.gov>
Date: 12/20/02 11:51AM
Subject: SNL plans for resolving the HI-STORM issue isattache d

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Bernie:

The attached is a first cut by me. Although Ken, Doug, and Jeff were asked for comments yesterday, I have not heard from any of them (and I think they are now all on vacation until January). So this first cut should be taken as exactly that, something that will be resubmitted later after I receive the comments of others.

Jeremy Sprung

<<JetImpWayForward.doc>>

CC: "Sorenson, Ken B" <kbsoren@sandia.gov>, "Ammerman, Douglas J" <djammer@sandia.gov>, "Smith, Jeffrey" <jasmith@sandia.gov>

C:\Documents and Settings\jlsprun\My Documents\Winword\Sabotage\JetImpWayForward.doc

RAM Package Vulnerability Study

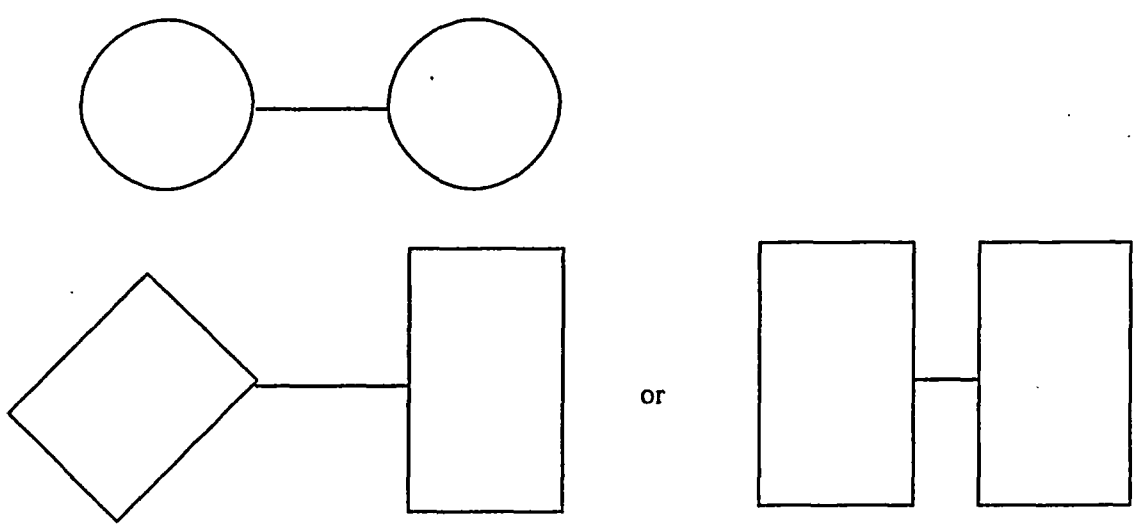
Approach to Evaluating the Effects of Jetliner Impacts

First Problem: The global CTH jetliner impact analysis suggests that the maximum cask exit velocity could be as large as , A CG/corner cask on cask PRONTO impact calculation this happens, the

Problem Resolution: are the expected result for most crash scenarios. This conclusion will be developed as follows:

Cask Separation Distance (ft)	Impact Speed (m/s)	Impact Orientation	Is Loss of the Struck Cask Lid Predicted
4		Side/Side	
11		Side/Side CG/Corner	
23		CG/Corner	

All of these PRONTO calculations will assume that the



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Conservatisms: These calculations develop worst case estimates of the damage done to the struck cask by the striking cask. Provided that the velocity vector of the striking cask is

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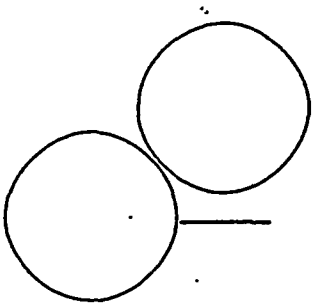
But the most likely orientation of the impact is not as shown above. Instead, the velocity vector of the striking cask relative to the surface of the struck cask can range from Because of the randomness of the motions of the striking cask, all of these orientations are equally probable. Therefore, the expected result is cask to cask contact with the velocity vector of the striking cask oriented as shown below.



For this impact orientation, the forces on the , Thus the most likely result will be represented by a striking cask velocity normal to the surface of the struck cask of for a distance, for an distance, and distance. Thus, regardless of the impact orientation. for any impacts when the casks are separated by and when the expected normal component of the impact velocity is so that to occur for of the possible impact orientations.

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Second Problem: The impact of the landing gear strut onto the HI-STORM at a point

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Canister(If the(, The worst orientation for canister impact is _ But since the canister must(The next most severe impact orientation would be \ / Therefore, a credible canister [redacted] using PRONTO using a model of the HI-STORM canister developed for the PPS study with two modifications, explicit representation of the [redacted] If this calculation [redacted] HI-STORM cask due to jetliner impact forces will have been shown to be exceedingly unlikely (essentially not credible). And if canister failure is predicted, then a consequence calculation will be performed that assumes that the storage site was at a reactor located in [redacted] and that the canister failure cross-sectional area is so large that the canister blows down to rapidly to allow significant retention of fission products released to the canister interior by rod failure. If the peak acceleration experienced by the rods can be estimated, the fraction of the rods in the cask that fail will be estimated as was done for NUREG/CR-6672 by scaling a rod strain map for a regulatory impact using the peak acceleration as the scale factor and comparing the scaled strains to a rod strain failure criterion. If peak acceleration can not be estimated, than failure of all of the rods in the canister will be assumed. Now given that all fission products other than radioactive noble gases must be released as constituents of particles, these assumptions will allow a radioactive source term to be estimated whereupon a MACCS calculation will allow an estimate of population dose and latent cancer fatalities to be developed. If the resulting consequences are small enough, then canister failure may not be of great concern.

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