Vulnerability Study Status Report

Friday 22 November 2002

Jetliner Impact Studies. Global analyses of the crash of a ( ) into a Hi-Storm storage cask have been completed. All of the calculations were originally run assuming a ( ) seemed overly precise, the jetliner hard component (e.g., a landing gear strut) impact calculations were run using a ( ) impact velocity,, Therefore, for consistency, the more important global calculations are being rerun at ( ) Hard component impact calculations have been performed for both the Hi-Storm storage cask and the NAC-UMS rail cask. Four additional, Hi-Storm impact calculations are being run ( ) EX2

These calculations should be completed by the end of this month. The ( ) respectively require the linear or the rotational exit velocity from the global aircraft crash calculation as an input.

NRC comments on the preliminary draft of the Jetliner Impact Studies report have been reviewed. All editorial changes and minor edits for clarity have been made. An extensive reorganization and rewrite of the thermal section including addition of the pool fire results for a wind blown pool fire will be completed next week. Because of the conservative nature of the original canister heatup calculations, no additional canister heat transfer calculations are needed. Once the additional global and hard target impact calculations are completed, the finite element analysis chapter will be reorganized and/or rewritten so that the flow of the calculations and the methodology used to perform them is more clearly presented. This rewrite should be completed before Christmas. After NRC comments on this second report draft are received in early January, appropriate revisions to the report will be made, and the entire report will be revised by a technical editor.

( ) **Studies.** A survey of small aircraft that might be used as a delivery vehicle for ( ) during a sabotage attack on a RAM package has been completed and a representative aircraft has been recommended for further study. The damage inflicted on the Hi-Storm storage and the NAC-UMS transportation casks by the detonation of ( ) at a short standoff distance has been analyzed using the CTH code. ( ) However, because the CTH computational grid is not fine enough to allow the steel shells of the NAC-UMS cask to be explicitly represented, these shell masses were incorporated into the lead gamma shield layer. This causes the CTH calculation to overpredict cask overpack damage. This problem will be resolved by performing PRONTO finite element impact calculations using the pressure loading of the cask calculated by CTH as a starting point. In addition, the CTH calculations are being benchmarked against SNL test data for a ( ) test with a simple Steel-Lead-Steel cask. Since the damage inflicted on a cask by a ( ) depends only on the amount of ( ) but not on the delivery vehicle, these ( ) will apply to scenarios where the delivery vehicle is a small plane, a truck, or a barge. Of course, the delivery EX2

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