



## **POLICY ISSUE**

December 15, 1988

(NEGATIVE CONSENT)

SECY-88-344

For: The Commissioners

From: Victor Stello, Jr.  
Executive Director for Operations

Subject: SELECTION OF A WORST ACTUAL AIRCRAFT ACCIDENT FOR MURKOWSKI  
AMENDMENT IMPLEMENTATION (PUBLIC LAW 100-103)

Purpose: To inform the Commission of the staff's intent to select an actual aircraft accident for determining worst case aircraft accident conditions under the Murkowski Amendment.

Background: The staff has previously informed the Commission on the status of actions implementing the Murkowski Amendment (SECY-88-302 dated October 25, 1988). The Murkowski Amendment requires the use of "actual worst case transportation conditions" in the design of test procedures; the Office of the General Counsel (OGC) has previously interpreted "worst case" to mean the worst aircraft crash on record (Enclosure 1).

More recently, staff informed the Commission of a draft Agreement between the U.S. Nuclear Regulatory Commission (NRC) and the Power Reactor and Nuclear Fuel Development Corporation (PNC), which establishes a testing and administrative program to certify plutonium air transport packages under the Murkowski Amendment (SECY-88-329, dated December 1, 1988). The draft Agreement is limited to Phase One of a four-phase program that addresses draft test criteria development, final test criteria development, physical testing, and certification, respectively. We have received a Letter of Intent from PNC, dated November 30, 1988, irrevocably committing \$750,000 for initiation of the program prior to final approval of the Agreement, scheduled for December 20, 1988 (Enclosure 2).

The principal products of Phase One include draft requirements for an actual aircraft crash test, draft criteria for controlled tests to be used in developing the package (as an alternative to an actual aircraft crash test), and requirements for the package drop test. The selection of actual worst case transportation

Contact:  
J.R. Cook, NMSS  
49-20458

conditions will influence the nature of the draft requirements for an actual crash test. It is noted that it will be difficult to develop criteria which precisely replicate worst case conditions due to a number of variables including the hardness of the surface impacted, impact angle and speed as well as the extent and nature of any crash associated fire and available test sites. As a result, criteria developed for conducting an aircraft crash test would have the potential of being either less or more severe than conditions which occurred in the actual crash being replicated. The Murkowski Amendment recognizes this possibility when it makes reference to replicating "actual worst case transportation conditions to the maximum extent practicable."

On the other hand, criteria for controlled tests could produce forces which are more severe than those which would occur in a staged worst case crash test. This is because in the controlled test criteria it will be necessary to simulate various types of worst case accident forces (e.g., impact, crush, puncture, fire, immersion, etc.).

Although Phase One will not be completed until September 30, 1990, PNC requested that interim reports on the aircraft crash test, controlled test and drop test requirements be available by July 15, 1989. The interim reports are needed by PNC so decisions on shipment mode (air or sea) and requests for funding may be made. The selection of an actual aircraft crash as representative of worst case is in turn necessary at this time in order to meet the Phase One schedule for the interim reports.

Discussion:

The parameters which are important in determining the impact forces experienced in aircraft crashes include the impact speed, impact angle, and hardness of the surface struck. Based on the staff's comprehensive review of aircraft accidents in connection with developing criteria under the Scheuer Amendment (PL 94-78), and an informal survey of information available regarding accidents since that time, the staff believes the crash of Pacific Southwest Airlines (PSA) Flight 1771 on December 7, 1987, represents a worst case aircraft accident. The crash involved a four-engine British Aerospace-146 jetliner. The evidence indicates that a passenger killed the cockpit crew, and that the jet subsequently descended into power dive from about 22,000 feet, crashing into a California hillside. The angle of impact appears to have been high, perhaps close to vertical, with an impact speed approaching 750 miles per hour. This impact speed is more than two and one-half times greater than the impact speed used as a basis for package testing and certification in NUREG-0360.

In remarks made in support of his legislation on the Senate floor, Senator Murkowski stated that he expected NRC to conduct a survey of actual aircraft accidents and replicate the most severe conditions under which such accidents have occurred. The Senator went

on to note the crash of a Turkish airlines DC-10 in March, 1974, into a forest in France at an impact speed of almost 500 mph, as an example of the most severe conditions.

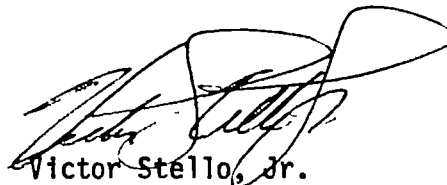
The staff believes that the PSA crash, at a nearly 50 percent higher impact speed, an apparent higher impact angle, and probably similar impact surfaces, represents more severe impact conditions than the Turkish airlines crash. Further, the staff is generally knowledgeable of commercial jet aircraft accidents and is not aware of any commercial jet aircraft accident which would be considered more severe than the PSA crash. Discussions with the FAA and the U.S. Air Force support the conclusion that, excluding high performance aircraft such as fighter jets, it is unlikely that any aircraft impact speed has exceeded that of the PSA accident. The staff believes the severity of the PSA crash makes it an appropriate candidate to use as a basis for conducting an actual aircraft crash test under the Murkowski Amendment.

Conclusion: The draft Agreement between PNC and NRC calls for interim reports in mid-1989 on actual aircraft crash test requirements to worst case conditions. Staff believes it is appropriate to proceed at this time with Phase One activities by identifying the PSA crash as worst case for purposes of implementing the Murkowski Amendment.

Scheduling: We are scheduled to send two signed originals of the Agreement to PNC by December 15, 1988, so that the Agreement may be formally concluded by December 20, 1988. PNC also indicates that the first payment to NRC will be made in accordance with the Agreement on December 20, 1988.

Coordination: This paper has been coordinated with the Office of the General Counsel and they have no legal objection.

Recommendation: The staff intends to instruct the technical support group at Lawrence Livermore National Laboratory (LLNL) to proceed with Phase One using the PSA crash to determine worst case aircraft accident conditions on December 20, 1988, unless the Commission directs otherwise.



Victor Stello, Jr.  
Executive Director for Operations

Enclosure:

1. Memo from S. Treby to  
R. Burnett dated 3/23/88
2. PNC Letter of Intent  
dated 11/30/88

SECY NOTE: In the absence of instructions to the contrary, SECY will notify the staff on Tuesday, December 20, 1988, that the Commission, by negative consent, assents to the action proposed in this paper. (We understand that the instructions to LLNL could be revised after the December 20, 1988 date if the Commission so desires.)

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