MEMORANDUM FOR: Victor Stello, Deputy Executive Director for Regional
Operations and Generic Requirements

FROM: Harold R. Denton, Director, Office of Nuclear
Reactor Regulation

SUBJECT: POSITION ON USE OF PROBABILISTIC RISK ASSESSMENT
IN TORNADO MISSILE PROTECTION LICENSING ACTIONS

We have been reviewing probabilistic risk assessment (PRA) analyses submitted
by WNP-2, Palo Verde, Midland and Oconee 1-3 as a basis for meeting the require-
ments of General Design Criteria 2 and 4 with respect to plant protection
against tornado generated missiles. This approach has been elected by these
utilities in lieu of providing positive tornado missile protection for certain
specific plant features required for shutdown or prevention of unacceptable
radiological release. In the case of WNP-2, we have accepted the applicant's
probabilistic argument regarding the unprotected diesel generator exhaust
openings based on our current interpretation of existing Standard Review Plan
guidance. Our evaluation for WNP-2 may be found in a memorandum dated February
4, 1983 (copy attached).

We believe we have developed in this case an acceptable application of the
General Design Criteria, Regulatory Guides and Standard Review Plan (SRP) with
respect to the acceptance criterion to be used for review of PRA based analysis
offered by the utilities dealing with tornado and other high wind missile
protection. CRGR may wish to review this matter since we intend to use the
criterion on all plants that elect this alternative approach.

Guidance on use of probability in tornado missile evaluations is contained in
SRP Section 3.5.1.4. The SRP states that "the probability per year of damage
to the total of all important structures, systems and components (as discussed
in Regulatory Guide 1.117) due to a specific design basis natural phenomenon
capable of generating missiles is estimated."

The acceptance criterion associated with this review states: "if this prob-
ability is greater than the acceptable probability stated in Regulatory Guide
1.117, then specific design provisions must be provided to reduce the estimate
of damage to an allowable level."

The only mention of a numerical value in Regulatory Guide 1.117, however, is in
Section B "Discussion" which states "a credible tornado strike varies from
about 10^{-7} per year to values several orders of magnitude higher."

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ATTACHMENT

ENCLOSURE 2

Additional SRP guidance on the use of probabilistic methods may be gained from Section 2.2.3 which deals with the identification of design basis events resulting from the presence of hazardous materials or activities in the vicinity of the plant. This SRP section states that if the expected rate of occurrence of potential exposures in excess of the 10 CFR Part 100 guidelines is estimated to exceed 10^{-7} per year (stated in this SRP section to be an "NRC staff objective") then the identified hazard must be considered as a design basis event in siting and designing the plant.

Based on the guidance in SRP Sections 3.5.1.4 and 2.2.3, we plan to permit applicants and licensees to use risk assessments for tornado and other high wind missiles and to judge their acceptability against a numerical criterion which is as follows: "The probability of significant damage to structures, systems and components required to prevent a release of radioactivity in excess of 10 CFR Part 100 following a missile strike, assuming loss of offsite power, shall be less than or equal to a median value of 10^{-7} per year or a mean value of 10^{-6} per year. Significant damage is damage that would prevent meeting the design basis safety function. This criterion is a result of the same reasoning that was employed in the probabilistic criterion of SRP Section 2.2.3, that is, a hazard with a probability of occurrence of less than 10^{-7} is insignificant and need not be considered.

The SRP guidance of Section 2.2.3 goes on to state that "because of the low probabilities of events under consideration, data are often not available to permit accurate calculation of probabilities." The same situation can be said to exist for probabilistic tornado missile analyses. Therefore, the guidance of SRP Section 2.2.3 is applicable to tornado missiles. This guidance, which we will use in our probabilistic tornado missile reviews, states that an expected rate of occurrence of potential exposures in excess of the 10 CFR 100 guidelines of approximately 10^{-6} per year is acceptable if, when combined with reasonable qualitative arguments, the risk can be expected to be lower.

In developing this statement of our position we have considered the results of tornado missile PRA reviews to date and discussions with consultants under contract to NRC to review these studies.
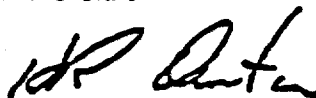
We believe that the deterministic approach in the current SRP for tornadoes should continue to be used, with the PRA approach employed on a case by case basis for assessing specific plant features which are exceptions. This is particularly true when additional, costly, wind-generated missile protective barriers or alternative systems are under consideration.

Victor Stello

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The above discussion summarizes our current practices for making licensing decisions concerning compliance with GDC 2 and 4 with respect to wind-generated missile protection. The staff is available to discuss this further should you consider such discussions warranted. While we anticipate no SRP revision regarding the above in the near future, CRGR participation is envisioned by the staff in any proposed action to revise the SRP.

Harold R. Denton, Director
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