



## **POLICY ISSUE** **(Notation Vote)**

July 31, 1991

SECY-91-229

For: The Commissioners

From: James M. Taylor  
Executive Director for Operations

Subject: SEVERE ACCIDENT MITIGATION DESIGN ALTERNATIVES FOR  
CERTIFIED STANDARD DESIGNS

Purpose: To present alternative courses of action and the staff's recommendations concerning the treatment of the severe accident mitigation design alternatives (SAMDA) issues to be considered under the National Environmental Policy Act (NEPA) as they relate to the certification of standard plant designs, including evolutionary, passive, and advanced reactors.

Background: In the October 29, and November 16, 1990, staff requirements memoranda (SRM), the Commission directed the staff to assure that the necessary and appropriate NEPA review of potential SAMDAs is incorporated into the design certification review process. The Commission also indicated that the staff should explore potential definitions of "remote and speculative" in the context of the NEPA reviews.

Discussion: The National Environmental Policy Act, Section 102.(C)(iii) requires, in part, that

...all agencies of the Federal Government shall...(C) include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on...(iii) alternatives to the proposed action.

NOTE: TO BE MADE PUBLICLY AVAILABLE  
WHEN THE FINAL SRM IS MADE  
AVAILABLE

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The U.S. Court of Appeals, in Limerick Ecology Action v. NRC, 869 F.2d 719 (3d Cir. 1989), effectively required the NRC to include consideration of certain SAMDAs in the environmental impact review performed as part of the operating license application for the Limerick Generation Station. The review of SAMDAs for Limerick was published as a Supplement to NUREG-0794, "Final Environmental Statement Related to the Operation of Limerick Generation Station, Units 1 and 2," dated August 1989. Subsequent to the Limerick review, SAMDAs have also been considered and documented in a Supplement to NUREG-0775, "Final Environmental Statement Related to the Operation of Comanche Peak Steam Electric Station, Units 1 and 2," dated October 1989.

Subpart B of Part 52 of Title 10 of the Code of Federal Regulations (10 CFR Part 52) does not specifically require an environmental impact statement (EIS) for a standard plant design certification. However, a NEPA evaluation in the form of an EIS that considered severe accident mitigation design alternatives would be an essential element of an application for a combined license under Subpart C of 10 CFR Part 52, for those applications that reference a design certified under Subpart B.

Section 52.47 of Subpart B, [by reference to 10 CFR 50.34 (f)] requires that applicants for certification consider severe accident design alternative for their designs. In conducting previous final design approval reviews, the staff has interpreted the provisions within 10 CFR 50.34(f) to require a cost benefit analysis of design alternatives related to the prevention and mitigation of severe accidents. The staff took this approach in the GESSAR II review well in advance of the court decision on Limerick.

However, the staff's review of GESSAR II was done as part of the final design approval review under the Commission's Severe Accident Policy Statement. Since no Design Certification Rulemaking was envisioned, no EIS was prepared.

In performing the severe accident review for GESSAR II, a cost benefit analysis was carried out on over 70 potential design improvements related to the prevention and mitigation of severe accidents. The staff documented its analysis in Supplements 2-4 of NUREG-0979, "Safety Evaluation Report Related to the Final Design Approval of the GESSAR II BWR/6 Nuclear Island Design."

In reviewing standard plant designs for certification, the staff plans to consider design alternative measures related to both prevention and mitigation of severe accidents. In this context the staff believes that there are three

alternative courses of action available to the Commission; all requiring the consideration of severe accident prevention and mitigation design alternatives (severe accident design alternatives) in the design certification process.

1. Consider severe accident design alternatives in the 10 CFR Part 52 rulemaking for the design certification only through consideration of 10 CFR 50.34(f). An environmental assessment (EA), and if warranted, a finding of no significant impact (FONSI) related to the certification rule would be prepared, but would not consider severe accident mitigation design alternatives. If the staff made a FONSI, it would not prepare an EIS for the certification rule. However, an environmental appraisal with a FONSI would fulfill the NEPA requirement for consideration of "alternatives to the proposed action" for scenarios other than those associated with severe accident mitigation.
2. Consider severe accident design alternatives as part of the 10 CFR Part 52 rulemaking using 10 CFR 50.34(f) with an EA as in 1. above, and in a parallel, consider SAMDAS in a 10 CFR Part 51 rulemaking. This rulemaking would be directed to prepare a rule similar to Tables S-3 and S-4.
3. Consider severe accident design alternatives in the Part 52 design certification rulemaking through consideration of 10 CFR 50.34(f) as above, and consider severe accident mitigation design alternatives as part of the requisite design certification NEPA review.

The first alternative would address the severe accident design alternatives under 10 CFR 50.34(f) which requires an evaluation of the cost benefit ratio of the severe accident design alternatives. In this alternative, the staff would perform §50.34(f), a cost benefit evaluation as part of the design certification rule with the requisite EA. If a FONSI were made, no EIS would be prepared.

However, the 50.34(f) cost benefit evaluations would not qualify as a NEPA review inasmuch as the environmental effects of severe accidents would not be discussed explicitly. The staff believes that since this alternative lacks an up-front NEPA review of severe accident mitigation design alternatives as part of the certified design rulemaking, this approach would not clearly provide the necessary issue preclusion and design finality to make design certification an effective process.

The second alternative would, as in the first, consider severe accident design alternatives as part of the 10 CFR Part 52 rulemaking. However, in this approach, the NEPA consideration of the severe accident mitigation design alternatives would be done as part of a generic rulemaking for a specific design. The NRC could then promulgate a 10 CFR Part 51 rule in keeping with generic considerations of Tables S-3 and S-4 for each of the designs to undergo certification. The staff does not believe that the severe accident mitigation design alternatives can be dealt with in a generic fashion for all designs, because of the differences between boiling water reactors and pressurized water reactors, the types of containments, and other significant differences between designs that would influence the type of alternatives to be considered.

In using this alternative approach, it would be imperative that a Part 51 rulemaking be completed on a schedule coincident with the Part 52 rulemaking on the design certification. Given this schedular constraint, the staff believes that a parallel rulemaking approach might not necessarily be the most efficient and effective way of addressing the SAMDA aspect of the NEPA requirements for certified designs. Also, the staff believes that this approach might lack the necessary issue preclusion and finality needed for design certification if the Part 51 rulemaking were to lag significantly beyond the Part 52 rulemaking.

The third alternative and the one that the staff recommends would consider the severe accident design alternatives for 10 CFR 50.34(f) and severe accident mitigation design alternatives for NEPA as part of one design certification rulemaking. In this approach, the 50.34(f) consideration and the NEPA considerations of the severe accident mitigation design alternatives could take advantage of a common review basis that would be done as part of a generic rulemaking for a specific design. This approach would conserve critical staff and industry resources that would be necessary for individual review efforts. This approach would require a careful consideration of the procedural aspects of NEPA in order to insure that the NEPA requirements are not obscured by the design certification rulemaking and become overlooked.

The staff believes that the requisite PRA and cost benefit analysis used to consider improvements in the core and containment heat removal systems related to severe accident considerations should by now be an integral part of the vendors standard plant design process and the information relating to severe accident design alternatives should be readily available to support a NEPA evaluation in support of a design certification rulemaking.

Part 52 requires that each certified design meet all the technically relevant portions of 10 CFR 50.34(f). Thus, each of these alternatives would require the treatment of severe accident design alternatives in support of a design certification rulemaking. Based on this fact, the questions remaining are (1) should the Commission mandate a consideration of severe accident mitigation design alternatives under NEPA for design certification rulemaking, and (2) if yes, should the NEPA review be completed in a time frame that would support the 10 CFR Part 52 design certification rulemaking. The staff believes the answer to both questions is yes.

In order to carry out a NEPA analysis for a standard plant, an environmental report will need to be provided by the standard plant vendor evaluating the severe accident mitigation design alternatives for its design. Further, the staff will need to develop its review guidance and certain surrogate site information as it relates to the consideration of the costs and benefits associated with the need to add certain severe accident mitigation design features to a standard plant design. Also, there exists the question whether to consider, and how to consider the costs associated with socioeconomic impacts of severe accidents in a NEPA analysis for a standard plant review. The staff proposes to develop these considerations consistent with the approach that is being developed in response to Commission direction related to the level of detail issue as the staff reviews the Advanced Boiling Water Reactor (ABWR).

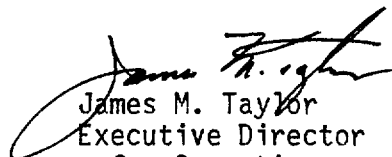
The staff plans to start its review of the NEPA information for the ABWR which is presently scheduled to be submitted by General Electric Company by the end of July 1991. Also, in the context of the NEPA review for the ABWR, the staff will explore a potential definition of "remote and speculative" in a manner that would be applicable to all NEPA reviews of standard plant designs.

Coordination: OGC has reviewed this paper and has no legal objection.

Recommendation: That the Commission

- (1) Approve the staff's recommendation to address severe accident mitigation design alternatives for certified designs in a single rulemaking process that would consider both the 10 CFR 50.34(f) and the NEPA requirements in the 10 CFR Part 52 design certification rulemaking, and

- (2) Approve the staff's approach for considering the costs and benefits associated with the review of the severe accident design alternatives for standard plant design certification.
- (3) Approve the staff proposal to advise applicants for design certification that they will be required to assess severe accident mitigation design alternatives and the applicable decision rationale as to why they will or will not benefit the safety of their designs.

  
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for Operations

Commissioners' comments or consent should be provided directly to the Office of the Secretary by COB Friday, August 16, 1991.

Commission Staff Office comments, if any, should be submitted to the Commissioners NLT Friday, August 9, 1991, with an information copy to the Office of the Secretary. If the paper is of such a nature that it requires additional review and comment, the Commissioners and the Secretariat should be apprised of when comments may be expected.

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