



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

JAN 28 1992

MEMORANDUM FOR: The Chairman  
Commissioner Rogers  
Commissioner Curtiss  
Commissioner Remick  
Commissioner de Planque

FROM: James M. Taylor  
Executive Director for Operations

SUBJECT: RESPONSE TO SRM FOR SECY-91-229, "SEVERE ACCIDENT MITIGATION  
DESIGN ALTERNATIVES FOR CERTIFIED STANDARD DESIGNS"

The staff requirements memorandum (SRM) of October 25, 1991, included a request that the staff take the following actions:

1. Provide a more detailed assessment and identification of the NEPA-SAMDA issues, if any, that might lend themselves to generic resolution;
2. Provide an estimate of the agency resources that would be required to pursue Alternative 2 (outlined in SECY-91-229) for any NEPA-SAMDA issues that can be resolved on a generic basis; and
3. Advise the Commission, on the basis of that more detailed assessment, as to whether it would be worthwhile to commit such resources to the parallel environmental rulemaking reflected in Alternative 2.

Alternative 2 of SECY-91-229 would require the staff to consider severe accident design alternatives as part of a 10 CFR Part 51 rulemaking, considering the aspects of the National Environmental Policy Act (NEPA) that apply to the severe accident mitigation design alternatives (SAMDA), which would run in parallel with the certification rulemaking for a specific design under Part 52. 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 that the NRC would certify.

In SECY-91-229, the staff noted that it does not believe that it could address the SAMDAs generically for all designs, because of the differences between boiling water reactors and pressurized water reactors, between different types

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of containments, and between other key design features that would influence the type of alternatives to be considered. Moreover, even assuming some truly generic SAMDA issues could be identified, for the staff to make a generic rulemaking effective, consistent with established schedules, the Part 51 rulemaking would need to be completed in parallel with the Part 52 rulemaking on the design certification. However, as indicated in the SECY paper, the staff does not believe that an effective generic rulemaking to address SAMDAs could be completed with available resources on a schedule consistent with those presented in SECY-91-161. In theory there could be a group of generic SAMDA issues potentially applicable to all certified designs, namely how unlikely must an accident sequence be in order to be considered "remote and speculative" and thus not require consideration of mitigative measures under NEPA. This complex policy issue involves the staff's ongoing effort to define what is a "credible" severe accident as it relates to 10 CFR Part 100, as well as the staff's efforts with safety goals, the objectives and purpose of the NRC research programs on severe accidents, and PRA methodology and limitations. The staff is working on its final definition of what is a "credible" severe accident for possible rulemaking.

In SECY-91-229, the staff concluded that Alternative 3 was the most feasible course. This Alternative would provide for consideration of the severe accident design alternatives per 10 CFR 50.34(f) and the severe accident mitigation design alternatives required by NEPA in a single design certification rulemaking package. The staff argued that, by using this approach, it could use a common review basis when it reviewed severe accident design features related to Section 50.34(f) and NEPA. The staff would develop this common review basis as it performed the generic rulemaking for a specific design. This approach would conserve critical staff resources necessary for design certification review efforts.

The staff presents the following response to the requests forwarded by the Commission's SRM.

The staff has reviewed the SAMDA issues raised in the environmental impact review performed for the operating license application for the Limerick Generating Station. The staff published its review of the SAMDAs for Limerick as a Supplement to NUREG-0794, "Final Environmental Statement Related to the Operation of Limerick Generating Station, Units 1 and 2," August 1989. In performing this review, the staff reviewed candidate SAMDAs to compare their costs to their benefits in terms of averted offsite dose. The following seven candidate SAMDAs passed this screening, two of which were implemented at Limerick:

1. Dedicated suppression pool cooling
2. Alternate means of decay heat removal
3. Improved venting capability
4. Core debris control
5. Drywell overpressure/overtemperature protection
6. Makeup to reactor using low pressure diesel driven pump
7. Enhanced reactor depressurization capability

The staff performed a similar analysis to complete the review for the Comanche Peak Steam Electric Station. The staff published this review as a supplement to NUREG-0775, "Final Environmental Statement related to the operation of Comanche Peak Steam Electric Station, Units 1 and 2." The staff identified the following SAMDAs while performing the review for Comanche Peak:

1. Additional diesel generator
2. Additional dc battery capability
3. Alternate means of core injection
4. Improved availability of recirculation mode
5. Additional service water pump
6. Additional instrumentation for bypass sequences
7. Deliberate ignition system
8. Reactor coolant system depressurization
9. Independent containment spray system
10. Reactor cavity flooding system
11. Filtered containment venting

The staff formed special work groups and expended about 15 person-months for each of these two reviews. The staff researched many source documents and compiled a broad range of information on severe accident sequences and possible improvements. In performing each review, the staff screened many SAMDAs to determine which of them pertained to the facility. After considering the applicable SAMDAs in each case, the staff discovered no substantial changes in the proposed actions of the Final Environmental Statements for either plant.

In performing both the Limerick and Comanche Peak reviews, the staff used large amounts of source documents and operational experience in formulating a plant-specific list of candidate SAMDAs. To generate a universal list of SAMDAs, it is estimated that the staff would need to dedicate substantially more resources to a larger effort including screening/reducing the list and ultimately evaluating each item to support a generic resolution for the SAMDA. The staff estimates that it would need to expend about 45 to 60 person months to review the designs for the General Electric (GE) advanced boiling water reactor (ABWR), the Electric Power Research Institute (EPRI) Utilities Requirements Documents for evolutionary and passive designs, and the Combustion Engineering (CE) System 80+ reactor. The staff would need to expend additional effort for the GE simplified boiling water reactor (SBWR) and the Westinghouse AP600 reactor once these designs are submitted for review.

In addition to the difficulties and resource commitments associated with identifying an inclusive generic SAMDA listing, the staff believes that performing Part 52 and Part 51 rulemakings in parallel would increase the demand on the agency's resources as a result of addressing similar severe accident related design issues in two different proceedings. The resources

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necessary to carry out such an approach are not readily available and any redirection of resources from ongoing advanced reactor review activities could adversely impact the challenging schedules established in SECY-91-161. Accordingly, the staff continues to recommend that the most effective approach for considering SAMDAs is in a single design certification rulemaking which takes advantage of the entire review of the advanced reactor plant design.

The staff, as directed by the Commission, has advised applicants for design certification that they must assess SAMDAs and the applicable decision rationale for finding that they will or will not benefit the safety of their designs. In carrying out its review of vendor-supplied information, the staff will continue to assess the potential for generic SAMDA resolutions and Part 51 rulemaking. The staff will continue to advise the Commission on this issue including any potential schedular impacts.

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cc: SECY  
OGC

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