



POLICY ISSUE

(Notation Vote)

October 10, 1989

SECY-89-311

For: The Commissioners

From: James M. Taylor
Acting Executive Director for Operations

Subject: RESOLUTION PROCESS FOR SEVERE ACCIDENT ISSUES ON EVOLUTIONARY LIGHT WATER REACTORS

Purpose: Recent staff requirements memoranda (SRMs) indicate the need for further guidance from the Commission on the staff's implementation of Commission policies for standardized plant designs. This paper (1) provides a discussion of the review process the staff has followed in implementing the Commission's policies in the review of the evolutionary light water reactor (LWR) designs, and (2) requests endorsement of the staff's review approach or further Commission guidance so that the reviews may be accomplished in the time frame set by the Commission. As discussed in this paper, staff reviews of these designs without such endorsement or guidance could result in inefficient expenditure of staff and industry resources and could thereby result in delays in regulatory decisions regarding certification of standard designs.

Background: The staff has reviewed the staff requirements memoranda dated February 10, July 31, August 18, August 21, and August 24, 1989 concerning recent meetings with the Commission or Commission Papers provided on evolutionary and advanced reactor reviews. These documents indicate that the Commission is concerned about the staff's implementation of the Commission's policies regarding the review process for standardized plant designs. Specifically,

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questions are raised about the process for identifying policy issues that should be raised for Commission consideration, the need for generic severe accident rulemaking, and the integration of the various reviews into a consolidated review program.

Discussion:

Current Review Process

The staff believes it has been conducting its reviews of the evolutionary LWR projects in accordance with the guidance of the Severe Accident Policy Statement, Standardization Policy Statement, and Safety Goal Policy Statement. These reviews are expected to result in the certification of individual designs at the completion of their individual design certification rulemaking in accordance with the requirements of 10 CFR Part 52. Further discussion of the interrelationship of this guidance with the Commission's regulations, the staff's review approach, the Electric Power Research Institute (EPRI) ALWR Requirements Document, and the applications currently under review is provided in Enclosure 1.

Given the considerations discussed in Enclosure 1, the staff has been proceeding along the following review path for the evolutionary LWR design projects.

- (1) The staff has identified the severe accident and major licensing issues that should be addressed in the evolutionary LWR designs, based on
 - a. the staff's reviews of current-generation reactor designs and the evolutionary LWRs,
 - b. consideration of operating experience, including the TMI-2 accident,
 - c. results of the probabilistic risk assessments (PRAs) of current-generation reactor designs and the evolutionary LWRs,
 - d. early efforts conducted in support of generic severe accident rulemaking, and
 - e. research conducted to address previously identified safety issues.

These matters were discussed in SECY-89-013 (January 19, 1989), SECY-89-153 (May 10, 1989), and SECY-89-228 (July 28, 1989). The July 31, 1989 and August 24, 1989 SRMs requested additional information to clarify these issues.

- (2) The staff is reviewing the advanced boiling water reactor (ABWR) application consistent with a licensing review basis (LRB) that the staff and the designer agreed on to ensure the designs satisfactorily address the Commission's current regulations and policy guidance.

The LRB was to provide supplementary guidance on regulatory issues which are either not addressed at all, or not covered in detail by the Standard Review Plan (SRP) which provides the staff review guidance for current plants and existing regulations. The LRB, in essence, served as an extension of the SRP to provide the staff review guidance in considering the Commission Policy Statements on Severe Accidents, Safety Goal, and Standardization and certain other technical areas not fully addressed in the SRP, but which needed to be addressed to take into account the newer technology being considered by GE for the ABWR design. It was recognized by both GE and the staff that Commission policies and staff positions were still under development in some areas. However, both the staff and GE agreed that if the acceptance criteria in the LRB were satisfied by the ABWR design, it would result in a licensable design. Likewise, it was recognized by both GE and the staff that if new safety information was developed that would cause a change in NRC requirements, they would be addressed during the course of the ABWR review.

It was with these understandings that the staff and GE accepted the LRB as the underlying supplementary regulatory guidance which was necessary to permit the ABWR review to proceed in an orderly and efficient manner commencing in 1987. This LRB was provided to the Commission on August 19, 1987. The staff is reviewing proposed design enhancements in the context of the LRB and the knowledge gained through the activities described in (1) above. In addition, any deviations from the Commission's regulations and guidance will be reviewed with consideration of the enhanced design in total to ensure proposed deviations do not adversely affect the safe operation of the plant. The staff is currently reviewing the other evolutionary LWR designs in a similar manner.

- (3) The staff is also reviewing the EPRI ALWR Requirements Document, which provides design criteria to serve as a guide to aid the LWR designer in the development of the evolutionary and advanced LWR designs. The EPRI project is not, in itself, an actual design. This document provides the framework for the LWR designs while the design-specific applications provide the

detail necessary to demonstrate the acceptability of the proposed criteria. The ALWR Requirements Document does not provide the depth of information normally provided in a design application. Thus, the staff is pursuing resolution of the severe accident and major licensing issues with both EPRI on a general basis and with the LWR vendors on a design-specific basis. Further discussion of this review is provided in Enclosure 1.

- (4) Concurrently, the Advisory Committee on Reactor Safeguards (ACRS) is reviewing the evolutionary LWR designs and the EPRI Requirements Document to provide an independent assessment of the acceptability of the applicants' designs and proposed criteria.
- (5) Upon satisfactory completion of both the staff's and the ACRS's reviews of the design applications, the staff intends to issue final design approvals (FDAs). Since it is not a design, review of the EPRI ALWR Requirements Document will result only in the issuance of a safety evaluation report (SER) that discusses the results of the review.
- (6) Design certification hearings for the evolutionary designs will begin after the FDA is issued. During these hearings, enhancements and deviations from the Commission's requirements and guidance would be scrutinized through the certification rulemaking process.
- (7) Completion of certification rulemaking for a particular evolutionary LWR design would occur after the Commission issued its final determination regarding the acceptability of that design. The certified design would be a new rule including areas where the design departed from current regulations and guidance.

Staff Interpretation of Guidance

The staff reviews of standard plant applications have proceeded on the basis that 10 CFR Part 52 and the Severe Accident Policy Statement provide sufficient policy guidelines for the staff to determine major licensing issues and to evaluate proposed resolutions of severe accident issues. However, based on the SRMs, the staff is concerned that the Commission believes the staff may have misinterpreted certain policy guidance set forth in 10 CFR Part 52, the Severe Accident Policy Statement, the Standardization Policy Statement, and the Safety Goal Policy Statement. There are two areas in which Commission endorsement of staff actions is needed or clarification to guidance should be provided to support timely reviews of the evolutionary LWRs.

A. Enhanced Designs

The first area where the staff provided interpretation of the Commission's guidance concerns the statement in the Severe Accident Policy Statement that "the Commission fully expects that vendors engaged in designing new standard (or custom) plants will achieve a higher standard of severe accident safety performance than their prior designs." The staff has interpreted this statement to mean that new generations of reactor designs should be demonstrably safer than the current generation from a severe accident perspective which will include overall enhancement of the defense-in-depth principle. This objective might result in designs that incorporate features or systems different from those required by current regulations and standards. This interpretation means that the evolutionary LWR plant designs (e.g., ABWR) should be safer than the current generation of operating reactors, as should the passive ALWR designs (e.g., AP-600) and the advanced reactors (e.g., MHTGR). The staff recognizes that the question of degree of such safety improvement could entail important policy considerations. Some features provided in the evolutionary LWR designs have resulted in departure from current regulations and guidance, and will be analyzed in the total context of the integrated plant design to ensure the acceptability of these departures for each design. The certification process will include consideration of all features of a particular design and will result in codification of that design into the Commission's regulations.

The inclusion of a containment performance criterion in the ABWR licensing review basis is one example of the staff's proposal to supplement current requirements to ensure future designs enhance safety. Alternatively, General Electric's (GE's) proposal to use a manually operated standby liquid control system (SLCS) in the ABWR design instead of an automatic SLCS represents a deviation from the anticipated transient without scram (ATWS) rule that GE proposes to justify in light of the design's other safety features. Further discussion of these issues can be found in SECY-89-153 and SECY-89-228 and will be the subject of future staff responses to the Commission's SRMs.

B. Design Certification, Generic Rulemaking, and Individual Rule Changes

The second area where the staff provided interpretation of the Commission's guidance concerns the need for generic rulemaking to resolve design and severe accident issues. The above mentioned SRMs suggest the Commission is considering the need to codify the results of the standardized design reviews throughout the Commission's regulations where the staff is proposing to approve design features or criteria that depart from the existing regulations.

SECY-88-248 proposed that generic rulemaking be initiated to address severe accident issues for future LWRs. Since that time, the staff has concluded that generic rulemaking is no longer the preferred approach. Enclosure 2 provides detailed information regarding developments that have led the staff to conclude that design-specific rulemaking through certification is preferred over generic rulemaking to resolve severe accident issues. The enclosure also provides a discussion of the potential impact of modifying the Commission's regulations in those areas where the staff is proposing to approve design features or criteria that depart from current requirements. In summary, the staff has concluded that the design-specific rulemaking that results from the design certification process of individual applications is a more effective method of resolving severe accident issues than attempting to develop one generic severe accident rule or several individual rule changes for evolutionary LWRs. Although there is a large body of information available to support design-specific rulemaking for evolutionary LWRs, the staff has concluded that the usefulness of generic rulemakings for this class of plants may be limited because of the diversity and limited number (i.e., three) of evolutionary LWR designs. In addition, such codification would likely not be applicable to other advanced designs (such as passive ALWR designs) owing to their fundamental differences. On completion of the reviews of evolutionary design, including the EPRI requirements document, the staff will consider whether further rulemaking on these issues is needed. This approach is not in conflict with the Commission's directive to the staff contained in the Supplementary Information accompanying 10 CFR Part 52 that the staff, as soon as practicable, advise the Commission of the need for criteria judging the safety of designs offered for certification that are different from or supplementary to current regulations. The staff has concluded that rulemaking will have a significant effect on the schedules for review of the evolutionary LWR designs and the resources dedicated to complete these reviews. Details on schedule and resource effects will be provided in the staff paper discussed in the paragraph titled "Future Action."

Individual design certification rulemaking will provide a timely and effective process for the resolution of severe accident issues and the certification of the evolutionary LWR designs. As discussed in Enclosure 2, the staff proposes to reexamine the need for generic rulemaking after completion of design certification of the evolutionary LWR

designs. At that time, the staff will have a broader base of information on which to determine the need and appropriateness of a generic severe accident rule for future reactors.

Commission Review of Safety Evaluation Reports

The staff recognizes the need to keep the Commission abreast of the important judgments concerning severe accident issues and other major licensing issues made during the course of the staff review of the evolutionary designs. The LRB for the ABWR, which established the initial ground rules for the staff's review of severe accident issues and certain other technical areas not addressed in the SRP for that design, was provided to the Commission in August 1987. The recent SRMs indicate that the Commission may desire to be involved in the review process during the development of the SERs. If the Commission elects to review the draft SERs for policy matters, the staff could forward the draft SERs to the Commission highlighting any potential policy issues in the transmittal paper. Once the Commission review of the SER is completed, the staff would then release the SER to the applicant and the public.¹ Enclosure 1 discusses the review approach that could be followed should the Commission desire to become more involved in the process at this stage of review. The approach discussed in the enclosure would provide the staff a firm basis on which to proceed with its review and would allow the industry to develop its designs with clear Commission guidance. Issuance of SERs by the staff in parallel with Commission review could result in confusion and regulatory instability, and, therefore, is not recommended by the staff.

Future Actions

In further response to recent SRMs the staff intends to send the following papers to the Commission:

- (1) Recommended Review Priorities (October 30, 1989). This paper will respond to the Commission's request for suggestions on how priorities should be assigned to

¹Appropriate procedures should be developed to avoid the appearance of prejudgment on the part of the Commission in connection with its adjudicatory role in connection with Part 52 certification proceedings. NRR staff and OGC will work with the Commissioners' staffs to develop such procedures.

review design certification submittals. It will further estimate new schedules for completion of reviews. Among the reasons new schedules are necessary is that key staff personnel who have been performing the reviews of the standard designs have been redirected from the conduct of the evolutionary LWR reviews to completing the tasks delineated in these SRMs for a several month period.

- (2) Status Of Updated Source Term Methodology (October 30, 1989). This paper will respond to the Commission's request for a description of efforts to develop an updated source term methodology that takes into account current knowledge on the subject.
- (3) Proposed Departure From Current Regulations (December 29, 1989). This paper will respond to the Commission's request for a discussion of proposed departures from current regulations for the ALWR Requirements Document and the three evolutionary LWR standard plant designs.

The staff will also provide resource and schedule estimates for making individual rule changes if it were decided to codify the proposed departures in new generic rules.

Conclusions:

The staff has been conducting its reviews of the evolutionary LWR projects in accordance with the guidance of the Severe Accident Policy Statement, Standardization Policy Statement, and Safety Goal Policy Statement. The staff believes that these policies provide sufficient guidelines to support the timely and effective reviews of the evolutionary LWRs. These reviews are expected to result in the certification of individual designs at the completion of their individual design certification rulemaking in accordance with the requirements of 10 CFR Part 52. In this paper, the staff has provided its interpretation of the Commission's guidance and described the review process as it is now being implemented. Commission endorsement of this approach or clarification of its guidance is needed.

Coordination:

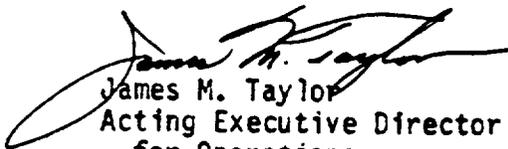
The Office of General Counsel has reviewed this paper and has no legal objection to it.

Recommendation:

That the Commission

- (1) Note that the staff intends to provide further answers to SRM requests in three subsequent Commission Papers,
- (2) Note that the staff intends to defer action on a generic rule or individual rule changes pending Commission guidance after all papers are sent to the Commission.

- (3) provide guidance on whether
 - a. new generations of reactor designs should be demonstrably safer than the current generation, and accordingly, should be required to incorporate design features that provide an enhanced level of severe accident safety, and
 - b. the staff's approach to the review of evolutionary LWRs including aspects concerning Commission review of SERs discussed in Section E of Enclosure 1 is appropriate.


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Enclosures:
As stated

Commissioners' comments or consent should be provided directly to the Office of the Secretary by COB Wednesday, October 18, 1989.

Commission Staff Office comments, if any, should be submitted to the Commissioners NLT Friday, October 13, 1989, with an information copy to the Office of the Secretary. If the paper is of such a nature that it requires additional time for analytical review and comment, the Commissioners and the Secretariat should be apprised of when comments may be expected.

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POLICY CONSIDERATIONS FOR THE EVOLUTIONARY LWR REVIEWS

The staff has been conducting its reviews of the evolutionary LWR projects in accordance with the guidance of the Severe Accident Policy Statement, Standardization Policy Statement, and Safety Goal Policy Statement. These reviews are expected to result in the certification of individual designs at the completion of their individual design certification rulemaking in accordance with the requirements of 10 CFR Part 52. The following is a discussion of the interrelationship of this guidance with the Commission's regulations, the staff's review approach, the EPRI ALWR Requirements Document, and the applications currently under review.

A. Severe Accident Policy Statement and 10 CFR Part 52

In August 1985, the Commission issued its Severe Accident Policy Statement to establish the process to be followed to achieve resolution of severe accident issues. In issuing the policy statement, the Commission stated it "...fully expects that vendors engaged in designing new standard (or custom) plants will achieve a higher standard of severe accident safety performance than their prior designs." It provided four broad criteria and procedural guidance through which a nuclear plant designer could demonstrate acceptable resolution of severe accident concerns. The Severe Accident Policy Statement states that future designs should

- (1) demonstrate compliance with the Commission's regulations, including 10 CFR 50.34(f)(Construction Permit/Manufacturing License (CP/ML) Rule),
- (2) demonstrate technical resolution of the unresolved safety issues (USIs) and medium- and high-priority generic safety issues (GSIs),
- (3) complete a probabilistic risk assessment (PRA) to identify vulnerabilities in the design, and
- (4) complete a review by the staff of the safety acceptability using deterministic engineering analysis and judgement complemented by PRA.

This guidance was restated in the Standardization Policy Statement in September 1987 and then codified in 10 CFR Part 52 in May 1989. This guidance provides the basis on which the staff is evaluating standard plant designs.

B. Departure From the Commission's Current Regulations

From the guidance provided in the Severe Accident Policy Statement and 10 CFR Part 52, the staff concluded that future reactor designs should continue to follow a defense-in-depth safety philosophy which includes a broader focus on severe accident considerations to ensure that future plant designs achieved an enhanced level of safety over the current generation of plants. This guidance requires that a PRA be performed by the designers to identify vulnerabilities in the designs and to implement features to address these vulnerabilities. In some cases, as a result of the PRA findings, plant designers proposed design enhancements to reduce the probability of a severe accident for a given vulnerability. These enhancements may result in design features that exceed what the Commission would normally require through its current regulations or

guidance. For example, General Electric (GE) included a containment vent in the design of the ABWR to ensure the plant design met its own stated safety goals that (1) the likelihood of core damage for the ABWR will be less than 1.0×10^{-5} /reactor-year, (2) the expected mean frequency of occurrence of offsite doses in excess of 25 rem beyond a half mile radius from the reactor will be less than 1.0×10^{-6} /reactor-year, and (3) the design will meet a conditional containment failure probability of 0.1 when weighted over credible core damage sequences. These goals are described in the ABWR Licensing Review Basis (LRB) dated August 7, 1987, which represents the staff's understanding of certain approaches that GE has proposed and committed to follow in the ABWR design. The LRB formulates the foundations of the staff's review, and supports a timely and efficient review. A copy of the LRB was provided to the Commission on August 19, 1987.

On the other hand, improved design features, taken in the total context of the integrated plant design, may also justify departure from present regulatory requirements or past practices. For example, GE has concluded that the enhanced reliability of the reactor protection system negates the need for automatic initiation of the standby liquid control system (SLCS) that is required by the ATWS rule. GE has agreed to provide a reliability analysis supporting this position so that the staff can verify the adequacy of this deviation from the regulation.

In either case, however, an improved design can depart from current regulations and guidance when analyzed in the total context of the integrated plant design. The staff uses deterministic engineering analysis complemented by PRA assessment to ensure the acceptability of these departures for each design. The certification process involves adjudication of all features of a particular design and will result in codification of that design into the Commission's regulations.

C. Applicability of Issues

An apparent conflict in the identification of severe accident and major licensing issues in the staff's communications to the Commission (i.e., the need for a containment performance criteria) has resulted from the difficulty in arriving at one comprehensive set of issues and associated design solutions that are applicable to all future reactor designs. By their very nature, treatment of one class of plants may require special consideration that need not be required for other classes. Therefore, the staff may require resolution of an issue on one class of plants that may not need to be addressed on other designs, or may need to be addressed in a different manner. The evolutionary LWR designers and the staff agree that the evolutionary LWR designs require the defense-in-depth margins a containment provides for mitigation of the consequences of accidents. The staff has interpreted Commission guidance to indicate standard plant designs must have enhanced safety features. Therefore, it has been working to define containment performance criteria for the evolutionary ALWRs against which the proposed containment designs could be evaluated. As an example, such criteria were specified by GE for the ABWR in the LRB, dated August 7, 1987.

D. EPRI ALWR Requirements Document

The EPRI ALWR Requirements Document provides the framework for the evolutionary and advanced LWR designs while the design-specific applications provide the detail necessary to demonstrate the acceptability of the requirements. The ALWR Requirements Document is a guide to aid the designer in the development of advanced LWR designs, and is not, in itself, an actual design. The ALWR Requirements Document does not provide the depth of information normally provided in a design application. Thus, the staff is pursuing resolution of the severe accident and major licensing issues with both EPRI, on a general basis, and the LWR vendors, on a design-specific basis.

The staff has concluded that review of design-specific applications provide a necessary vehicle to demonstrate that the criteria of the ALWR Requirements Document is appropriate for a given design. In addition, these reviews identify areas in which deviations or alternative criteria to the ALWR Requirements Document may not only be acceptable, but may be necessary to support a successful ALWR design.

The staff is performing its reviews fully aware that each design-specific review reflects a specific design and that the ALWR Requirements Document reflects generic requirements that the utilities desire future ALWRs to meet. Although design-specific applications may deviate from the ALWR Requirements Document in certain areas, the staff believes that completion of the certification process on individual designs is the proper vehicle to verify that the EPRI-proposed criteria are acceptable and appropriate. GE has indicated that the ABWR meets or exceeds the ALWR Requirements Document. Combustion Engineering (CE) has indicated that its System 80+ design will meet selected criteria of the ALWR Requirements Document after technical, licensing, and cost reviews. On the other hand, Westinghouse has not committed to meeting the ALWR Requirements Document for its RESAR SP/90 PDA design.

GE has provided design-specific resolutions to the severe accident and major licensing issues that have been determined acceptable to the staff (i.e., containment inerting to resolve the hydrogen generation issue) that may not be amenable to incorporation in the other evolutionary LWR designs. The staff issued SECY-89-153 delineating its conclusions regarding the GE-proposed design-specific resolutions to the severe accident and major licensing issues. The conclusions reached in SECY-89-153 are based on technically supportable analysis that broadly demonstrates resolution of these issues for the ABWR design, although detailed information remains to be provided to confirm these conclusions. As can be seen in SECY-89-228 regarding the draft safety evaluation report (DSER) on Chapter 5 of the ALWR Requirements Document, the staff is not prepared to issue such conclusions regarding the generic solutions proposed by EPRI to resolve these issues for all the evolutionary LWRs. This is the primary reason for the open status of these issues in the ALWR Requirements Document review.

E. Commission Review of Safety Evaluation Reports

The recent SRMs indicate that the Commission may desire to be involved in the review process during the development of the SERs. If the Commission desires

to become more involved in the review process at this stage of review, the staff proposes the Commission consider the following review approach:

- (1) The staff would send its draft SERs on the evolutionary projects to the Commission before they are released to the applicant and the public. The document forwarding the draft SER would identify any potential policy issues identified by the staff. The ACRS would also receive copies so it could provide its views to the Commission.
- (2) The Commission could determine the appropriateness of the staff's positions and evaluations, and provide guidance as necessary.
- (3) The DSERs would be issued to the industry and public after incorporating the Commission guidance.
- (4) The staff and industry would then work to resolve any issues.
- (5) The final SER would go through steps 1 through 3 above.
- (6) The staff would then proceed with the issuance of the final design approval (FDA) and participate as a party in the design certification hearings which would culminate in a rule for each specific design.

This process is a departure from the review approach currently utilized by the staff. Issuance of SERs by the staff in parallel with Commission review could result in confusion and regulatory instability, and, therefore, is not recommended by the staff. The above approach would provide the staff a firm basis on which to proceed with its review and it would allow the industry to develop its designs with clear Commission guidance.

Current review schedules do not include Commission review of the SERs on a chapter-by-chapter (or module-by-module) basis. The staff estimates that such involvement will extend the review schedule of each evolutionary LWR project by about two months, assuming the staff receives timely feedback on each of the SERs and that the Commission basically affirms the staff's findings.

DESIGN CERTIFICATION, GENERIC RULEMAKING, AND
INDIVIDUAL RULE CHANGES

Introduction

SECY-88-248 proposed that generic rulemaking be initiated to address severe accident issues for evolutionary LWRs. Since that time, the staff has concluded that generic rulemaking is no longer the preferred approach for the evolutionary LWRs. The following is a discussion of the staff's rationale that has led to the conclusion that design-specific rulemaking through certification is preferred over generic rulemaking to resolve severe accident issues. This enclosure also provides a discussion of the potential impact of modifying the Commission's regulations in those areas where the staff proposes to approve design features or criteria that depart from current regulations.

Background

The staff's initial proposal for implementing the Severe Accident Policy was set forth in SECY-86-76, "Implementation Plan for the Severe Accident Policy Statement and the Regulatory Use of New Source-Term Information," dated February 28, 1986. This paper proposed a systematic examination of existing plants for severe accident vulnerabilities and the development of severe accident requirements for new plant applications. Additional information was provided to the Commission about severe accident implementation in the following areas:

- introduction of realistic source terms into licensing (SECY-86-228),
- treatment of external events in severe accident considerations (SECY-86-162), and
- development of an integration plan for closure of severe accidents (SECY-86-147).

As part of the staff's preparation of an implementation plan for closure of severe accident issues for future plants, the staff held a public meeting on June 9, 1988 in Rockville, Maryland, to solicit comments and input from industry and the general public. A summary of the meeting is provided in Attachment 1. On September 6, 1988, the staff issued SECY-88-248, "Implementation of the Severe Accident Policy for Future Light Water Reactors," which proposed that a generic rulemaking be initiated to reach closure on severe accident issues for the evolutionary LWRs. On September 12, 1988, a Commission briefing was held on SECY-88-248 and, in a memorandum dated December 1, 1988, the staff responded to two questions from Commissioner Rogers that resulted from this briefing. The staff continued to work on generic rulemaking for severe accidents and held a second public meeting on December 13, 1988. The purpose of the second meeting was to discuss and receive comments on a preliminary proposed list of severe accident issues and their proposed resolutions, which were developed by the staff as part of the work on rulemaking. Attachment 1 also provides a summary of that meeting. The public meetings served to initiate a dialogue on issues that are important to future licensing activities and to focus attention on those areas needing to be addressed.

After the second public meeting, by a memorandum dated December 28, 1988 (Attachment 2), the staff withdrew SECY-88-248 to allow for incorporation of updated staff information and comments expected from industry and other public representatives. At that time the staff intended to resubmit the revised document as SECY-88-248A. After further consideration of the information available for generic severe accident rulemaking, and consideration of the differences in the individual reactor designs and each of the design-specific approaches to resolution of these issues, the staff concluded it would be more prudent to proceed on a case-by-case basis for identifying and resolving severe accident issues for each of the evolutionary LWRs. As discussed in a March 28, 1989 memorandum from the EDO (Attachment 3), the staff concluded that it would reexamine the need for rulemaking after it received Commission approval for each of the evolutionary LWR design features. Instead of resubmitting SECY-88-248, the staff submitted SECY-89-153, "Severe Accident Design Features of the Advanced Boiling Water Reactor (ABWR)," dated May 10, 1989. This document discussed the design features of the ABWR that resolved severe accident concerns as they applied only to the ABWR design. This paper also informed the Commission of the staff's change in approach toward resolution of the severe accident issues on a design-specific basis. However, it did not provide a detailed explanation for this change in approach.

Single Generic Severe Accident Rule

At the time SECY-88-248 was written, it was the staff's view that generic severe accident rulemaking for the evolutionary LWRs was the preferred resolution approach for the following reasons:

- (1) It was believed that rulemaking could provide stability and consistency in the resolution of severe accident issues and could, in the long run, conserve staff resources spent on resolution of these issues in each individual design certification hearing. It was also believed that rulemaking could be completed on a schedule which would support the first design-specific certification rulemaking (General Electric's (GE's) ABWR).
- (2) It was believed that completion of generic rulemaking could clarify Commission requirements and expectations, and could, in the long run, facilitate the design certification process for all of the evolutionary LWR designs. This was based, in part, on the possibility that generic rulemaking could remove from litigation each design certification hearing issue related to severe accidents, provided that the issue was materially disposed of during the rulemaking.

Since SECY-88-248 was issued, several developments have caused the staff to reconsider and change its recommended approach to severe accident resolution from generic rulemaking to design-specific resolution of these issues, as discussed below:

- (1) After the staff held workshops on the technical issues, it became clear that it would be very difficult to develop a consensus on the resolution of the severe accident issues, because many of the technical resolutions would be design-dependent. Thus, it would take much longer to develop a generic rule that would adequately address design differences than had been contemplated earlier.

- (2) The staff became concerned that a generic rule could not be written with sufficient prescription and detailed criteria regarding resolution of severe accident issues that it would materially dispose of the issues. Therefore, a generic rule would likely not be sufficient to eliminate the need to litigate severe accident issues in each design certification hearing.
- (3) Plant designers have proposed solutions to certain severe accident issues that are unique to their design. A concern developed that generic rulemaking could conceivably act to inhibit creativity in solving severe accident concerns. Solutions developed during a generic rulemaking could be incomplete or perhaps inferior to solutions proposed during the development and review of a specific design. Such solutions would be difficult to capture concisely in a single rule. In addition, such a rule would probably not be applicable to fundamentally different designs, such as the passive plants.
- (4) Because of the limited number of staff having expertise in severe accident issues, developing a generic rule in parallel with standard plant reviews would result in substantial delays in completing design certifications, particularly for the ABWR.

Based on these considerations, the staff concluded that generic severe accident rulemaking should not be undertaken for the evolutionary LWRs.

In addition, now that 10 CFR Part 52 has become final, it has codified the major elements of the Commission's severe accident policy and provided the staff and industry with sufficient guidance to ensure that future designs adequately address severe accidents.

Individual Rulemakings

The August 24, 1989 SRM indicates the Commission may be considering the need to codify the results of the standardized plant reviews throughout the Commission's existing regulations in several individual rulemaking proceedings before completing certification of the evolutionary LWR designs. Preparation of one severe accident rule or the many rule changes required by such a change in policy in parallel with the standard plant reviews will significantly impact staff resources and review schedules for the evolutionary LWR projects. Such rulemaking would consist of rule development, completion of reviews of ongoing research in support of the rules, issuance of the rules, and involvement of the staff in the review and disposition of public comments for the rules. Much of the staff resources currently devoted to the design-specific reviews would have to be reallocated to the rulemakings, potentially significantly delaying completion of the staff's review of the evolutionary ALWR projects currently under review by the staff and any new review applications received in the interim.

In taking such an approach, once the issues were identified and solutions agreed on, the staff would propose the appropriate rules to the Commission, after which the Commission would complete its review of the issues. With this uncertainty in the review process, the staff believes reactor designers would be very concerned about developing a final design until these matters are resolved. Even if a designer submitted its final design, the staff could not

complete its design-specific review until rulemaking on these issues was complete because specific requirements of the rules may change during the rulemaking process. Therefore, the staff believes such actions could disrupt the licensing stability 10 CFR Part 52 was meant to achieve.

An additional problem associated with development of individual rule changes results from the dependence that resolution of issues has on one another. Completion of a rulemaking in one area may affect the staff's proposal for a change in another area. Three of the issues called out in the August 24, 1989 SRM are illustrative of this dependency. Completion of a rule change on source term would be required before a rule change regarding a containment performance criteria. In similar fashion, a rule change regarding hydrogen generation and control would be interrelated with any rule change on a containment performance criteria. Completing rule changes for these and other issues would be a long and time-consuming process that would delay the staff's reviews of the standardized plants.

Conclusions

The staff is implementing 10 CFR Part 52 and the guidelines of the Severe Accident Policy Statement and the Safety Goal Policy Statement in its review and evaluation of the severe accident issues that are being addressed in the applications for the evolutionary LWR design certifications. The staff believes its conclusions regarding these matters are in keeping with the Commission's policy that future designs for nuclear plants should reduce the risk from severe accidents.

The staff has concluded that the design-specific rulemaking that results from the design certification process of individual applications eliminates the need for one generic severe accident rule or several individual rulemaking changes for the evolutionary LWRs. Although there is a large body of information available to support design-specific rulemaking for evolutionary LWRs, the usefulness of generic rulemaking or several rulemaking changes for this class of plants may be limited because of the diversity and limited number (i.e., three) of evolutionary LWR designs. In addition, such codification would likely not resolve all severe accident concerns for other advanced designs owing to their fundamental differences. The staff further concludes that generic severe accident rulemaking may have a significant effect on the schedules for review of the evolutionary LWR designs and the resources dedicated to complete these reviews.

Given sufficient time, the staff could develop one severe accident rule or several individual rules that would be based on criteria developed with input from the industry, such as through the EPRI Requirements Document. Once these rules were in place, the staff could then review the vendor-proposed design certification applications using the new or revised regulations as acceptance criteria and guidance. However, for the reasons discussed above, such an approach at this time would delay the schedules for design certification of the evolutionary LWRs by as much as 4-5 years.

Individual design certification rulemaking will provide a timely and effective process for the resolution of severe accident issues and the certification of the evolutionary LWR designs. The staff intends to reexamine the need for generic rulemaking after completion of design certification of the

evolutionary LWR designs. At that time, the staff will have a broader base of information on which to determine the need and appropriateness of a generic severe accident rule for future LWRs.

Public Meetings: Two public meetings were held in Rockville, Maryland to solicit comments and input from the industry and general public on the implementation of Severe Accident Policy for future LWR's. Transcripts were made during both meetings and are available as formal records of the meeting proceedings. The first such meeting was held on June 9, 1988 and the second on December 13, 1988. At the first meeting the NRC staff described the regulatory role that severe accident considerations were expected to play in the licensing of future LWRs. Various options were also posed for the implementation of the Commission's severe accident policy in a question format for consideration and discussion with the meeting participants.

During the meeting, statements were made by representatives of the following organizations or activities: Electric Power Research Institute, Advanced Reactor Severe Accident Program, Combustion Engineering, General Atomic, and the New York Power Authority. While there did not appear to be a consensus among the meeting participants on many of the topics discussed, in general, it was stated that the industry wanted additional guidance on the treatment of severe accidents in future reactor designs. It was not clear as to the preferred form of the guidance but numerical acceptance criteria was not desirable to most participants.

In the second meeting, the NRC staff presented more detailed information on the issues and requirements being considered for addressing severe accidents via rulemaking. These issues and strawman requirements reflected a concentrated effort on the staff's part during the preceding months to summarize current knowledge of specific vulnerabilities to severe accidents in LWR designs of the evolutionary type. Nine major topics, three in the area of core damage prevention and six associated with challenges to containment integrity were discussed. For each topic, a range of perceived design options that were considered by the staff to be available to address these vulnerabilities was presented for consideration by the meeting participants. Due to the breadth and complexity of the issues involved, no consensus was reached (or expected) on any of the issues discussed.

DEC 28 1988

MORANDUM FOR: Chairman Zech
Commissioner Roberts
Commissioner Carr
Commissioner Rogers
Commissioner Curtiss

FROM: Victor Stello, Jr., Executive Director for Operations

SUBJECT: IMPLEMENTATION OF SEVERE ACCIDENT POLICY FOR FUTURE LWR DESIGNS

The purpose of this memorandum is to withdraw our request that the Commission endorse the staff's plan for implementing the Severe Accident Policy for future LWR designs. The staff's proposal was set forth in SECY 88-248 and further clarified in my memorandum dated December 1, 1988. On December 13, 1988, we held a second public meeting on this subject that was attended by representatives of NUMARC, EPRI, GE, CE, and Westinghouse. At that meeting, we presented further details on the status and technical content of our proposed implementation plan and requested comments on this draft material by January 13, 1989. We understand that NUMARC and EPRI plan to submit comments by that date and other attendees may also. Therefore, we would like an opportunity to revise and resubmit SECY 88-248 in consideration of these comments, as well as to reflect the latest staff technical work in this area.

In addition, ACRS has requested the staff to present our proposed implementation plan to the Full Committee. The staff plans to be ready to meet with the ACRS their February 1989 meeting. Therefore, I request that the Commission delay action on SECY 88-248 until it is revised as discussed above and resubmitted as SECY 88-248A. I expect to resubmit the subject paper by February 28, 1989.

Original signed by
Victor Stello, Jr.

Victor Stello, Jr.
Executive Director
for Operations

cc: OGC
GPA
SECY
ACRS



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

MAR 28 1989

MEMORANDUM FOR: Thomas E. Murley, Director, Office of Nuclear Reactor
Regulation

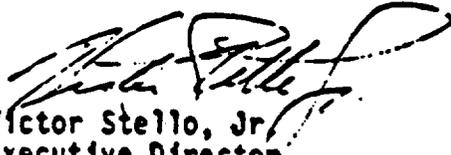
Eric S. Beckford, Director, Office of Nuclear Regulatory
Research

FROM: Victor Stello, Jr., Executive Director for Operations

SUBJECT: IMPLEMENTATION OF THE SEVERE ACCIDENT
POLICY FOR EVOLUTIONARY LWRs

I held a meeting on March 20, 1989 to discuss the additional design requirements for the evolutionary LWRs that were proposed by NRR in their draft SECY paper. A list of attendees is enclosed. After reviewing the draft paper, I decided that the paper should focus specifically on GE's ABWR design features. Therefore, NRR will revise the paper to describe the design features that GE is providing to address Severe Accident issues. The paper will also identify any additional design features that NRR believes should be added to the ABWR design to be consistent with the Severe Accident and Safety Goal Policies. After we have received Commission approval of the ABWR design features, we will decide if any new rules are needed to fully implement the Severe Accident Policy for the ABWR design. Based upon the discussions in the meeting, it appears that Severe Accident Rulemaking might not be needed for the ABWR design.

NRR will also review Westinghouse's SP/90 design, CE's System 80+ design, and EPRI's ALWR requirements document to determine if there are any additional design features that are needed to address Severe Accident issues. NRR will continue to work with RES on these issues in accordance with the Severe Accident Master Integration Plan. When we have Commission approval of the design features for each design, we will reexamine the need for Severe Accident Rulemaking. RES has revised SECY 88-248, "Implementation of the Severe Accident Policy for Evolutionary LWRs," which proposed generic Severe Accident Rulemaking. This paper will be put on hold pending our future decisions on Severe Accident Rulemaking. Since I committed to provide the Commission with a revised SECY 88-248, I will use the NRR SECY paper to satisfy my commitment and the NRR paper will describe our method for resolving Severe Accident issues on the evolutionary LWRs. RES will complete the regulatory guide that they are developing on the format, content, and use of design-specific PRAs for the evolutionary LWRs.


Victor Stello, Jr.
Executive Director
for Operations

cc: OGC

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