

April 15, 1996

FOR: The Commissioners  
 FROM: James M. Taylor /s/  
 Executive Director for Operations  
 SUBJECT: CERTIFICATION OF TWO EVOLUTIONARY DESIGNS

- [PURPOSE:](#)
- [BACKGROUND:](#)
- [DISCUSSION:](#)
- [COORDINATION:](#)
- [RECOMMENDATIONS:](#)

#### **PURPOSE:**

To request the Commission's approval to publish two final rules in the *Federal Register* that amend [10 CFR Part 52](#) to certify the U.S. Advanced Boiling Water Reactor (ABWR) and System 80+ designs by rulemaking.

#### **BACKGROUND:**

On April 7, 1995 (60 FR 17902 and 60 FR 17924), NRC published two proposed rules for certification of the U.S. ABWR and the System 80+ designs and the environmental assessments for each design. NRC invited public comment on the proposed rules and environmental assessments and provided an opportunity to request an informal hearing before an Atomic Safety and Licensing Board. In addition, NRC conducted public meetings on May 11 and December 4, 1995, for the purpose of clarifying the provisions of the rules and affording commenters the opportunity to further explain their written comments. The official comment period ended on August 7, 1995. NRC did not receive any requests for an informal hearing or comments on the environmental assessments. However, written comments on the proposed rules were received from the Nuclear Energy Institute (NEI), vendors, utilities, the Department of Energy (DOE [EXIT](#)), and a public interest group. The NRC staff has addressed these comments in the attached *Federal Register* notices ([Attachments 1](#) and [5](#)). The NRC staff requested Commission guidance on two issues that were contested by NEI ([SECY-96-028](#), "Two Issues for Design Certification Rules," dated February 6, 1996). This paper supersedes SECY-96-028, in accordance with the staff requirements memorandum (SRM) dated March 27, 1996, and provides a supplemental paper on the history of applicable regulations ([Attachment 9](#)).

#### **DISCUSSION:**

The process whereby the NRC may grant design certifications for evolutionary or advanced light-water reactor designs is set forth in 10 CFR Part 52. GE Nuclear Energy ([GE EXIT](#)), an operating component of General Electric Company's power systems business, applied for certification of the U.S. ABWR design. Likewise, Asea Brown Boveri-Combustion Engineering, Inc. (ABB-CE) submitted an application for certification for the System 80+ design. The NRC staff has reviewed both designs and issued its final safety evaluation reports (FSERs) as NUREG-1503 and NUREG-1462, respectively.

In parallel with the review of the U.S. ABWR and System 80+ designs, the staff developed the form and content of design certification rules. The staff solicited public participation in this process. The staff originally proposed a conceptual design certification rule for evolutionary designs in SECY-92-287, "Form and Content for a Design Certification Rule," and subsequently briefed the Commission on September 8, 1992. On March 26, 1993, the staff responded, in SECY-92-287A, to issues put forth by the Commission in its SRM on SECY-92-287 and to specific questions raised by Commissioner Curtiss in a memorandum dated September 9, 1992. The draft rule in SECY-92-287 was then modified to incorporate the Commission's guidance and industry comments and was published in the *Federal Register* for comment, as an advance notice of proposed rulemaking (ANPR) on November 3, 1993 (58 FR 58665). On November 23, 1993, the staff solicited further comment on this rulemaking when it conducted a public meeting entitled "Topics Related to Certification of Evolutionary Light-Water Reactor Designs." All holders of operating licenses or construction permits were informed of the issuance of the ANPR and the public meeting through [NRC Administrative Letter 93-05](#), dated October 29, 1993. Separate announcements of the meeting were also sent, on October 18, 1993, to the Union of Concerned Scientists, the Nuclear Information and Resource Service, the Natural Resources Defense Council, the Public Citizen Litigation Group, the Ohio Citizens for Responsible Energy, Inc., and the State of Illinois Department of Nuclear Safety.

NRC addressed the public comments on the ANPR and published two proposed rules that would, if promulgated, provide certification of the two evolutionary designs. Each rule adds an appendix to Part 52 and incorporates by reference Tier 1 and Tier 2 of the design control document (DCD). The staff has reviewed and approved the DCD for each design. In accordance with the rulemaking procedures approved by the Commission, in its memorandum of April 30, 1993 to the General Counsel, a public comment period of 120 days was specified and the public was also provided a concurrent time frame in which it could request an informal hearing. The comment period expired on August 7, 1995 and no requests for an informal hearing were received. The staff has addressed the public comments and revised the proposed rules accordingly. Because of the revisions to the proposed rules, the "Introductions" to the DCDs must be revised to conform with the final rules. The revised DCDs must also conform with any changes to the final rules made by the Commission. Because there were no comments on the environmental assessments (EAs), only minor editorial changes were made to the final EAs in [Attachments 2](#) and [6](#).

The staff is planning to issue supplements to the FSERs for the U.S. ABWR and System 80+ designs. These supplements will document the staff's evaluation of certain changes that GE and ABB-CE made to the design documentation in their DCDs, provide errata to the FSERs, and address any changes directed by the Commission, such as changes to applicable regulations. The staff informed the Commission of the changes to the U.S. ABWR documentation in a memorandum dated February 5, 1995, and to the System 80+ documentation in a memorandum dated March 14, 1995. The staff intends to provide these FSER supplements to the Commission prior to publication of the final rules in the *Federal Register*. In addition, the ABWR supplement will document the resolution of confirmatory items relating to the preparation of the DCD for design certification rulemaking and relating to the closeout of detailed design records showing that ongoing design work internationally and in first-of-a-kind-engineering did not affect the U.S. ABWR design. Also, the supplement will provide additional staff evaluations of certain documentation changes that were not evaluated in the FSER. For the System 80+ design, there were no confirmatory issues and the changes that were made to the design documentation, after issuance of the FSER, did not impact the findings in the FSER.

On March 8, 1996, the Commission conducted a public meeting in which industry representatives and NRC staff presented their views on SECY-96-028. During this meeting, NEI and the staff both indicated agreement on the ITAAC verification issue. Subsequently, the NRC staff met with representatives of ABB-CE, GE, and NEI on March 25, 1996 and proposed various means to reduce or otherwise resolve the need for new applicable regulations. The industry, represented by NEI, neither provided a proposal for resolution of applicable regulations (other than to eliminate them altogether) nor indicated any support for the staff's proposals. As a result, the NRC staff has provided revised resolutions of applicable regulations and ITAAC determinations that supersede the proposals in SECY-96-028. In addition, the final rules include various requirements that apply to combined license holders after fuel loading (e.g. outage planning and control for shutdown risk). These are generally included as requirements on applicants and licensees in Section 4 of the final rules. However, the technical specifications in the generic DCD are not requirements but are only recommendations. Most importantly, a provision has been included in Section 4 to provide that the final rules do not resolve any issues regarding conditions needed for safe operation (as opposed to safe design). The result is that, although Section 4 specifies various necessary operational requirements, they are not resolved as sufficient and the entire issue of technical specifications and other post-fuel loading operational limitations will be subject to review, possible litigation, and resolution in the combined license proceeding. This is not inconsistent with Part 52's focus on design finality and it preserves NRC's flexibility to backfit future rules on operational matters such as steam generator tube plugging criteria even though such rules may affect the design incidentally. This provision does raise a policy question because it emphasizes that the rulemaking still leaves important safety issues unresolved and subject to future litigation and backfitting. Therefore, although the staff believes that the final rules provide satisfactory resolution of the industry's comments, there may be areas where the industry disagrees with these resolutions.

The staff is preparing a letter to the Director, Office of the Federal Register (OFR), requesting preliminary approval of the ABWR and System 80+ DCDs for incorporation by reference. The letter will address OFR's criteria for approval of documents for incorporation by reference. Final approval of the DCDs and Federal Register notices will be requested after the DCDs are revised to conform with the final rules.

## COORDINATION:

The Offices of Nuclear Reactor Regulation, Nuclear Regulatory Research, Administration, Enforcement, and the General Counsel have concurred in the issuance of these amendments to 10 CFR Part 52. Copies of this paper are provided to the Advisory Committee on Reactor Safeguards for its review.

## RECOMMENDATIONS:

That the Commission:

1. Approve the Federal Register Notices in [Attachments 1](#) and [5](#).
2. Approve the final environmental assessments in [Attachments 2](#) and [6](#).
3. Authorize the staff to direct the revision of the ABWR and System 80+ DCDs to conform with the final rules.
4. Certify that these rules, if promulgated, will not have a negative economic impact on a substantial number of small entities in order to satisfy requirements of the Regulatory Flexibility Act, 5 U.S.C. 605(b). Refer to Section VII of [Attachments 1](#) and [5](#).
5. Note:
  - a. This paper will be placed in the NRC's public document room three days after it is forwarded to the Commission. A *Federal Register* notice will be issued that declares availability of this paper, provides for a 30 day comment period, and notices a public meeting to answer questions on the final rules.
  - b. The Chief Counsel for Advocacy of the Small Business Administration will be informed of these final rules regarding the economic impact on small entities and the reasons for it as required by the Regulatory Flexibility Act;
  - c. These final rules contain a new information collection requirement subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3150-0151). Refer to Section V of [Attachments 1](#) and [5](#).
  - d. Public announcements will be issued ([Attachments 3](#) and [7](#)).
  - e. The appropriate congressional committees will be informed ([Attachments 4](#) and [8](#)).
  - f. The staff will request the Director, Office of the Federal Register, to approve the revised DCDs for incorporation by reference.
  - g. The staff does not believe that the final rules fall within the Office of Management and Budget's (OMB) definition of a "major" rule and, therefore, they may become effective without a 60 day Congressional review period. However, OMB will be consulted on this matter during the comment period.

James M. Taylor  
Executive Director for Operations

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- Attachments:
1. [Federal Register Notice - U.S. ABWR](#)
  2. [Final Environmental Assessment](#)
  3. [Public Announcement - U.S. ABWR](#)
  4. [Congressional letters - U.S. ABWR](#)
  5. [Federal Register Notice - System 80+](#)
  6. [Final Environmental Assessment](#)
  7. [Public Announcement - System 80+](#)
  8. [Congressional letters - System 80+](#)
  9. [History of Applicable Regulations](#)

## NRC CERTIFIES GE NUCLEAR ENERGY'S ADVANCED BOILING WATER REACTOR DESIGN

The Nuclear Regulatory Commission (NRC) is amending its regulations to certify the U.S. Advanced Boiling Water Reactor (ABWR) design developed by GE Nuclear Energy. The certification will be valid for 15 years.

No application for a license using the U.S. ABWR standard design has been filed with the NRC, and issuance of this regulation does not authorize construction of any specific new nuclear power plant. However, a utility that wishes to build and operate a new nuclear power plant may choose to use the design and reference it in an application for a license. Safety issues within the scope of the certified design are not subject to litigation, although site-specific environmental impacts associated with building and operating the plant at a particular location would be litigable.

Future applicants for a license could make plant-specific changes to portions of the standard U.S. ABWR design by following the procedures set out in the rule. The applicant or licensee would be required to maintain records of all such changes until the license is terminated.

The NRC published a proposed rule on this subject in the Federal Register on April 7 for public comment and held public meetings to explain the proposal on May 11 and December 4, 1995. Responses to the comments received are discussed in the Federal Register notice on the final rule published on \_\_\_\_\_.

The agency also offered an opportunity to request a hearing on the proposed certification of the U.S. ABWR design. No requests were received.

The Honorable Dan Schaefer, Chairman  
Subcommittee on Energy and Power  
Committee on Commerce  
United States House of Representatives  
Washington, DC 20515

Dear Mr. Chairman:

The NRC has sent to the Office of the Federal Register for publication the enclosed final amendment to the Commission's regulations for commercial nuclear power plants. Specifically, this rule adds a new Appendix to 10 CFR Part 52. This rule will certify the U.S. Advanced Boiling Water Reactor (ABWR) design, which was submitted to the NRC for its review by GE Nuclear Energy. This amendment is necessary to fulfill the objectives of Part 52, which are to provide licensing stability, early resolution of licensing issues, and to foster standardization while allowing sufficient flexibility to incorporate advancements in technology and equipment. Those wishing to obtain a license to build or operate the U.S. ABWR design will be able to do so by referencing the design certification in Appendix A to 10 CFR Part 52.

Sincerely,

Dennis K. Rathbun, Director  
Office of Congressional Affairs

Enclosure: Federal Register Notice

cc: Representative Frank Pallone

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The Honorable Lauch Faircloth, Chairman  
Subcommittee on Clean Air, Wetlands, Private  
Property and Nuclear Safety  
Committee on Environment and Public Works  
United States Senate  
Washington, DC 20510

Dear Mr. Chairman:

The NRC has sent to the Office of the Federal Register for publication the enclosed final amendment to the Commission's regulations for commercial nuclear power plants. Specifically, this rule adds a new Appendix to 10 CFR Part 52. This rule will certify the U.S. Advanced Boiling Water Reactor (ABWR) design, which was submitted to the NRC for its review by GE Nuclear Energy. This amendment is necessary to fulfill the objectives of Part 52, which are to provide licensing stability, early resolution of licensing issues, and to foster standardization while allowing sufficient flexibility to incorporate advancements in technology and equipment. Those wishing to obtain a license to build or operate the ABWR design will be able to do so by referencing the design certification in Appendix A to 10 CFR Part 52.

Sincerely,

Dennis K. Rathbun, Director  
Office of Congressional Affairs

Enclosure: Federal Register Notice

cc: Senator Bob Graham

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ATTACHMENT 7

## **NRC CERTIFIES ABB-CE'S SYSTEM 80+ REACTOR DESIGN**

The Nuclear Regulatory Commission (NRC) is amending its regulations to certify the System 80+ nuclear reactor design developed by Asea Brown Boveri-Combustion Engineering (ABB-CE). The certification will be valid for 15 years.

No application for a license using the System 80+ standard design has been filed with the NRC, and issuance of this regulation does not authorize construction of any specific new nuclear power plant. However, a utility that wishes to build and operate a new nuclear power plant may choose to use the design and reference it in an application for a license. Safety issues within the scope of the certified design are not subject to litigation, although site-specific environmental impacts associated with building and operating the plant at a particular location would be litigable.

Future applicants for a license could make plant-specific changes to portions of the standard System 80+ design by following the procedures set out in the rule. The applicant or licensee would be required to maintain records of all such changes until the license is terminated.

The NRC published a proposed rule on this subject in the Federal Register on April 7 for public comment and held public meetings to explain the proposal on May 11 and December 4, 1995. Responses to the comments received are discussed in a Federal Register notice on the final rule published on \_\_\_\_\_.

The agency also offered an opportunity to request a hearing on the proposed certification of the System 80+ design. No requests were received.

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ATTACHMENT 8

The Honorable Dan Schaefer, Chairman  
Subcommittee on Energy and Power  
Committee on Commerce  
United States House of Representatives  
Washington, DC 20515

Dear Mr. Chairman:

The NRC has sent to the Office of the Federal Register for publication the enclosed final amendment to the Commission's regulations for commercial nuclear power plants. Specifically, this rule adds a new Appendix to 10 CFR Part 52. This rule will certify the System 80+ design, which was submitted to the NRC for its review by Asea Brown Boveri-Combustion Engineering, Inc. This amendment is necessary to fulfill the objectives of Part 52, which are to provide licensing stability, early resolution of licensing issues, and to foster standardization while allowing sufficient flexibility to incorporate advancements in technology and equipment. Those wishing to obtain a license to build or operate the System 80+ design will be able to do so by referencing the design certification in Appendix B to 10 CFR Part 52.

Sincerely,

Dennis K. Rathbun, Director  
Office of Congressional Affairs

Enclosure: Federal Register Notice

cc: Representative Frank Pallone

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The Honorable Lauch Faircloth, Chairman  
Subcommittee on Clean Air, Wetlands, Private  
Property and Nuclear Safety  
Committee on Environment and Public Works  
United States Senate  
Washington, DC 20510

Dear Mr. Chairman:

The NRC has sent to the Office of the Federal Register for publication the enclosed final amendment to the Commission's regulations for commercial nuclear power plants. Specifically, this rule adds a new Appendix to 10 CFR Part 52. This rule will certify the System 80+ design, which was submitted to the NRC for its review by Asea Brown Boveri-Combustion Engineering, Inc. This amendment is necessary to fulfill the objectives of Part 52, which are to provide licensing stability, early resolution of licensing issues, and to foster standardization while allowing sufficient flexibility to incorporate advancements in technology and equipment. Those wishing to obtain a license to build or operate the System 80+ design will be able to do so by referencing the design certification in Appendix B to 10 CFR Part 52.

Sincerely,

Dennis K. Rathbun, Director  
Office of Congressional Affairs

Enclosure: Federal Register Notice

cc: Senator Bob Graham

## HISTORY OF APPLICABLE REGULATIONS

- RECOMMENDATIONS:
- COMMISSION POLICY STATEMENTS
- IMPLEMENTATION OF SEVERE ACCIDENT POLICY
- IDENTIFICATION AND DEVELOPMENT OF APPLICABLE REGULATIONS
- SUMMARY
- DERIVATION OF NEW (ADDITIONAL) APPLICABLE REGULATIONS
- DERIVATION OF ADDITIONAL REQUIREMENTS AND RESTRICTIONS

In its March 21, 1996 staff requirements memorandum (SRM), the Commission requested the NRC staff to prepare a supplemental paper containing a description and analysis of the historical documentation, evolution, and past Commission statements or decisions regarding the concept of applicable regulations, related to the 10 CFR Part 52 design certification rulemakings. The Commission also instructed the staff to include a discussion of the Commission's intent regarding applicable regulations when 10 CFR Part 52 was promulgated. The following discussion responds to the Commission's SRM.

### COMMISSION POLICY STATEMENTS

The evolution and development of applicable regulations begins with the Commission's policy statements issued in the 1980s. In the introduction to its "Policy Statement on Severe Reactor Accidents Regarding Future Designs and Existing Plants" (50 FR 32138) dated August 8, 1985, the Commission stated that "The policies presented in this statement will lead to amendment of NRC regulations ... as part of NRC's ongoing Severe Accident Program." The Commission went on to propose criteria and procedural requirements for severe accident concerns in its *Policy for New Plant Applications* and stated:

Although in the licensing of existing plants, the Commission has determined that these plants pose no undue risk to public health and safety, this should not be viewed as implying a Commission policy that safety improvements in new plant designs should not be actively sought. 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. ... (50 FR 32141)

After the Severe Accident Policy Statement was issued, the staff, industry, and Advisory Committee on Reactor Safeguards (ACRS) continued discussions on how to implement the Commission guidance. In its January 15, 1987 letter, the ACRS stated that it "has on several previous occasions recommended that future LWRs should be designed to be safer than current LWRs." The Committee further advised that "Future plants should be able to survive a wider spectrum of off-normal challenges and mistreatments. ... Accident management and mitigation systems should be designed, not for a narrow set of design-basis accidents, but to reasonably accommodate a broad range, variety, and time sequence of threats." In its policy statement on "Nuclear Power Plant Standardization" (52 FR 34884) dated September 15, 1987, the Commission adopted the Severe Accident Policy Statement for future design certification reviews.

### IMPLEMENTATION OF SEVERE ACCIDENT POLICY

SECY-88-147, "Integration Plan for Closure of Severe Accident Issues," dated May 25, 1988, presented the staff's plan for integration and closure of severe accident issues. In element #11 (pp. 69-71) of this plan, the staff proposed ... "performance regulations for future reactors ... for addressing severe accidents. This activity is considered to be consistent with the intent of the Severe Accident Policy Statement and is intended to support the design certification rulemaking (10 CFR 52)." The staff initially proposed to modify 10 CFR 50.34(f) to make it applicable to future plant designs and to include performance requirements. Subsequently, the staff held a public meeting on June 9, 1988 to discuss its plans to establish regulatory requirements for future plants related to postulated severe accidents.

In the statements of consideration (SOC) for the proposed 10 CFR Part 52 (53 FR 32060, 32067), the Commission stated:

12. The staff is considering whether there is a need for further rulemaking or guidance for future reactors, both light-water reactors and other types, to assure that future license applications adequately address the Commission's Safety Goal Policy Statement and the licensing criteria set forth in the Commission's Severe Accident Policy Statement, particularly the criteria that call for demonstration of compliance with the applicable parts of 10 CFR 50.34(f) and completion of a probabilistic risk assessment together with a systematic consideration of any severe accident vulnerabilities the PRA might expose.

Then, in the final rule SOC (54 FR 15372, 15376), the Commission stated:

The Commission recognizes that new designs may incorporate new features not addressed by the current standards in Parts 20, 50, 73 or 100 and that, accordingly, new standards may be required to address any such new design features. Therefore, the NRC staff shall, as soon as practicable, advise the Commission of the need for criteria for judging the safety of designs offered for certification that are different from or supplementary to current standards in 10 CFR Parts 20, 50, 73, and 100. The Commission shall consider the NRC staff's views and determine whether additional rulemaking is needed or appropriate to resolve generic questions that are applicable to multiple designs. The objective of such rulemaking would be to incorporate any new standards in Part 50 or 100, as appropriate, rather than to develop such standards in the context of the Commission's review and approval of individual applications for design certifications. On the other hand, new design features that are unique to a particular design would be addressed in the context of a rulemaking proceeding for that particular design.

In SECY-88-248, "Implementation of Severe Accident Policy," dated September 6, 1988, the staff again proposed "rulemaking to amend 10 CFR 50.34 to require that technical information on severe accidents be included in future applications. In addition to these procedural requirements, we are recommending that general performance requirements be promulgated addressing severe accident prevention and mitigation." The staff stated that it intended to clarify severe accident requirements for future LWRs (including the evolutionary LWRs) before initiation of design certification rulemaking. The staff informed the Commission that it proposed to implement the Commission's severe accident policy for future LWRs by establishing requirements for the consideration of severe accidents applicable to those LWR designs which do not differ significantly from current generation LWR designs (i.e., evolutionary LWRs). The purpose of the proposed rules and regulatory guides was to ensure an adequate and consistent assessment of severe accidents on future plants. In a memorandum to the Commission on "Implementation of Severe Accident Policy

for Evolutionary LWR Designs," dated December 1, 1988, the staff clarified its plan in SECY-88-248 for severe accident rulemaking.

After much internal discussion, the staff concluded that it was more appropriate to implement the Severe Accident Policy for evolutionary LWRs by design-specific rulemaking because the staff believed that there was insufficient time to complete generic rulemaking in a time frame to support the evolutionary LWR review schedules, and because the generic rulemaking would be applicable to only a small class of plant designs. In SECY-89-178, "Policy Statement Integration," dated June 9, 1989, the staff stated its intent to codify the severe accident design features of the evolutionary LWRs through design-specific rulemaking. The staff stated:

[The] approach to implementing the Severe Accident Policy for evolutionary LWRs, on a plant specific basis, replaces the staff's previous proposal in SECY-88-248 to initiate generic rulemaking. This plant-specific approach to severe accidents we are now following on the future plants is viewed as being consistent with that on the existing plants (i.e., a plant-specific IPE, SECY-88-205). And it is an approach that will not prematurely foreclose on innovative developments and designs. Also, it is expected that *those severe accident design features provided by the future designs will be generally codified by the certification rulemaking applicable to each. In this manner, the certification rulemaking will bring generic closure of the severe accident issues for a class of plants subsequently using the certified design and will ensure the intents of the Safety Goal Policy have been achieved by regulations* (emphasis added).

In SECY-89-311, "Resolution Process for Severe Accident Issues on Evolutionary Light Water Reactors," dated October 10, 1989, the staff requested the Commission to endorse its implementation approach or to provide additional guidance. The staff stated:

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 ALWR plant designs (e.g., ABWR) should be safer than the current generation of operating reactors ...

The staff further reiterated in SECY-89-311 its revised position regarding design-specific rulemaking:

... 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.... 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 (3) of the evolutionary LWR designs. In addition, such codification would likely not be applicable to other advanced designs .... owing to their fundamental differences.

In its SRM dated December 15, 1989, the Commission responded to the staff's queries in SECY-89-311 by stating that:

The Commission, with all Commissioners agreeing, reaffirms its expectation stated in the Policy Statement on Severe Reactor Accidents Regarding Future Designs and Existing Plants, "... that vendors engaged in designing new standard (or custom) plants will achieve a higher standard of severe accident safety performance than their prior designs." In order to accomplish this goal, in promulgating 10 CFR Part 52, the Commission incorporated the criteria and procedural requirements from the Severe Accident Policy Statement. Generally, the Commission has indicated that it believes a new design for a nuclear power plant can be shown to be acceptable for severe accident concerns if it addresses the TMI requirements, unresolved safety issues, the medium and high priority generic safety issues, and the severe accident vulnerabilities exposed by a completed probabilistic risk assessment. In staff's application of these criteria during reviews, it is expected that significant policy questions may arise. The staff should elevate to the Commission ... all issues dealing with policy considerations ... Instances where staff proposes to require measures that depart from current regulatory requirements -- including, but not limited to, design enhancements to address severe accident vulnerabilities ...

The Commission also stated, in its SRM on SECY-89-311, "The Commission will provide additional guidance regarding generic rulemaking following receipt of staff's paper on Proposed Departure from Current Regulations." Further, in its SRM on SECY-89-102, "Implementation of the Safety Goals," dated June 15, 1990, the Commission stated:

5) It is important to note that the Commission has made it clear in the advanced plant and severe accident policy statements that it expects that advanced designs will reflect the benefits of significant research and development work and experience gained in operating the many power and development reactors, and that vendors will achieve a higher standard of severe accident safety performance than their prior designs ... However, the NRC will not use industry's design objectives as the basis to establish new requirements.

9) ... Therefore, the staff in applying the criteria provided in 10 CFR Part 52 may conclude that additional requirements are needed based on experience with prior designs in order to provide substantial assurance that future designs will meet the level of safety provided in the Safety Goal Policy Statement. The staff should elevate such safety issues to the Commission for consideration and should not be constrained from proposing new requirements where benefits cannot be quantified in terms of risk.

## IDENTIFICATION AND DEVELOPMENT OF APPLICABLE REGULATIONS

In SECY-89-013, "Design Requirements Related to the Evolutionary Advanced Light-Water Reactors (ALWRs)," dated January 19, 1989, the staff first identified its intent to pursue certain areas of the design review in a manner that may go beyond the present acceptance criteria defined in the Standard Review Plan. In its SRM dated February 10, 1989, the Commission directed the staff to ensure that the Commission was involved early in the development of new requirements for advanced reactors. The direction to keep the Commission informed of policy matters and obtain guidance and approval from the Commission on proposed resolutions of such matters is provided in several subsequent SRMs. The staff elevated these new requirements to the Commission in SECY-90-016, "Evolutionary Light-Water Reactor (LWR) Certification Issues and Their Relationship to Current Regulatory Requirements," dated January 12, 1990. The purpose of this paper was to present the staff's recommendations for proposed departures from current regulations for the evolutionary designs:

The staff recommendations identified in this paper have been developed as a result of (1) the staff's reviews of current generation reactor designs and evolutionary ALWRs, (2) consideration of operating experience, including the TMI-2 accident, (3) results of the PRAs of current-generation reactor designs and the evolutionary LWRs, (4) early

efforts conducted in support of severe accident rulemaking, and (5) research conducted to address previously identified safety issues. ... The staff believes its conclusions and recommendations regarding these matters are in keeping with the Commission's policy expectation that future designs for nuclear plants will achieve a higher standard of severe accident safety performance.

In its SRM on SECY-90-016 dated June 26, 1990, the Commission approved some and disapproved some of the staff's recommendations and "... agreed that in those cases where the staff proposed requirements depart from current regulations, consideration should be given to incorporating these requirements into the regulations." The issues in SECY-90-016 and SECY-93-087, "Policy, Technical, and Licensing Issues Pertaining to Evolutionary and Advanced Light-Water Reactor Designs," that were approved by the Commission became review criteria for the future designs. See the "Table of Applicable Regulations" at the end of this paper. Therefore, in SECY-91-262, "Resolution of Selected Technical and Severe Accident Issues for Evolutionary Light-Water Reactor (LWR) Designs," dated August 16, 1991, the staff stated its intent:

... current course of action for the two evolutionary plant designs is for the final resolutions of selected technical and severe accident issues, including issues that have been the subject of Commission guidance (e.g., the SRM on SECY-90-016), to be codified in rulemaking as part of the specific design certifications for the GE ABWR and the ABB-CE System 80+.

This paper also described the advantages and disadvantages of generic versus design-specific rulemaking. Although there were limited generic rulemaking activities underway, such as revising the source term, the staff requested the Commission to "approve the staff's plans for proceeding with *design-specific rulemakings through individual design certifications* to resolve selected technical and severe accident issues for the ABWR and ABB-CE System 80+." In its SRM on SECY-91-262 dated January 28, 1992, the Commission stated:

The Commission (with all Commissioners agreeing) has approved the staff's recommendation to proceed with design-specific rulemakings through individual design certifications to resolve selected technical and severe accident issues for the ABWR and ABB-CE System 80+ designs. ...

With regard to the issue of obtaining early informal public comment on these issues, the staff should provide a more detailed analysis of exactly what kind of informal public comment is envisioned and elaborate on the following questions ...

The General Counsel responded to these questions in a memorandum to the Commission dated February 28, 1992 and went on to say:

Common to all approaches, the Commission would set forth proposed *special review criteria* that it intends to use in *judging the design certification* for a specified design, with the intention of requesting public comments on the applicability and appropriateness of those review criteria (emphasis added).

The staff proceeded with design-specific rulemaking for the evolutionary LWRs, and also continued with its generic rulemaking activities, with the intent of incorporating, to the extent possible, the Commission-approved positions from SECY-90-016, the ACRS-proposed severe accident containment design criteria and the proposed staff positions for the passive LWRs. In SECY-92-287, "Form and Content for a Design Certification Rule," dated August 18, 1992, the staff provided a conceptual proposed design certification rule along with a discussion of pertinent issues. In Enclosure 3 to the paper regarding documentation of selected technical and severe accident issues, the staff defined what it termed "applicable regulations," stating

In the SRM pertaining to SECY-91-262 ... the Commission approved the staff's recommendation to proceed with design-specific rulemakings through individual design certifications to resolve selected technical and severe accident issues for the GE ABWR and ABB-CE System 80+ designs. These matters include staff positions that deviate from or are not embodied in current regulations, but were approved by the Commission and will be clearly identified and evaluated in the staff's FSER and supplements, thereto. ... The completed standard design certification rule will then designate these agency positions, which are identified in the FSER and supplements thereto, as "applicable regulations" for the specific design for the purposes of 10 CFR 52.48 and 52.63.

In a memorandum dated September 9, 1992, Commissioner Curtiss asked the staff and the Office of the General Counsel (OGC) to respond to questions related to the September 8, 1992 Commission briefing on SECY-92-287. The staff responded to these questions in Enclosure 2 to SECY-92-287A, "Form and Content for a Design Certification Rule," dated March 26, 1993. The staff provided the following in response to question 1:

The purpose of Section A.9(d) [of Enclosure 1 to SECY-92-287] of the proposed design certification rule is to identify the staff positions that deviate from or are not embodied in current regulations, but were approved by the Commission, such as SECY-90-016 ... These staff positions will then become "applicable regulations" via the certification rulemaking that will be added to the list of regulations in Sections 52.48 and 52.54 that were used to approve the design to be certified. Rather than reference these proposed regulations, as was done in Enclosure 1 to SECY-92-287, the staff now plans to list these proposed regulations in the design certification rule. These proposed regulations would be stated broadly, similar to the general design criteria, and would become part of the Commission's baseline of regulations that were "applicable and in effect at the time the certification was issued." Without this baseline of applicable regulations, the staff could not perform reviews in accordance with Sections 52.59 and 52.63.

After further consideration of Section A.9, OGC recognized that it should be modified to also reference Section 52.59, to make it clear that for the purposes of renewal of a design certification under Section 52.59, the staff positions are part of the applicable regulations in effect at the time that the design certification was first issued.

In its response to a question on whether the staff's technical positions at the referenced FSER pages would be given the force and effect of regulations, the staff stated:

Yes, but the technical positions that are deemed "applicable regulations" in Section A.9 of the certification rule would have the force and effect of regulations only for those applications or licenses that reference that certified design. In addition, the staff's technical positions would be considered "applicable regulations" for purposes of the design certification rule in which they are included, and for applying the backfitting requirements of 52.63. However, the staff positions would not be "regulations" in the sense of "generally applicable" requirements that all design certification applicants must comply with, e.g., Section 50.48. Each design certification for which the Commission wishes to make the staff positions applicable must specify the staff positions as "applicable regulations."

The staff further stated that:

... The "applicable regulations" should not be in Tier 1 of the design certification rule. The staff does not consider the technical positions themselves to be either "Tier 1" or "Tier 2," since from a legal standpoint, they are requirements that a design must meet, rather than the actual design information. The staff will incorporate into Tier 1 the key features of the design resulting from these regulations. A deviation from a staff technical position (applicable regulation) could

affect Tier 1 or Tier 2 information; and any changes to Tier 1 or Tier 2 must involve either exemption, rulemaking, or a determination under the "50.59-like" process. Therefore, an exemption or a rulemaking amendment may be required in order to deviate from the staff technical position.

To solicit public comments on criteria to address severe accidents, the staff issued an advance notice of proposed rulemaking (ANPR) on the subject of severe accident plant performance criteria for future LWRs in the Federal Register (Volume 57, No. 188) on September 28, 1992. In SECY-93-226, "Public Comments on 57 FR 44513 - Proposed Rule on ALWR Severe Accident Performance," dated August 18, 1993, the staff discussed comments on the ANPR. The staff recommended that it continue to develop a draft generic rule [on severe accident design criteria], but to defer a decision to issue the rule until after the FSERs are issued for the GE ABWR and ABB-CE System 80+ designs. The staff indicated that this rulemaking would codify the already existing Commission guidance on severe accident issues that has resulted from reviews of the GE ABWR and the ABB-CE System 80+ reactor designs. Again, the staff pointed out that:

It is expected that severe accident licensing issues will primarily be resolved for the ABWR and System 80+ designs through the individual design certification rulemakings for these two evolutionary designs. However, the staff is considering a procedure wherein if generic rules are put in place sufficiently early to facilitate (through reference) the design certification process for reactor designs licensed after the evolutionary designs, such generic rules or parts of the rules, could possibly be utilized."

In its SRM on SECY-93-226 dated September 14, 1993, the Commission (with all Commissioners agreeing) "... approved the staff recommendation to delay a decision on the need for generic rulemaking to address severe accidents at least until after the FSERs are issued for the ABWR and the System 80+."

In its May 31, 1994 memorandum to the Commission, "Implementation of Design Certification and Light Water Reactor Design Issues," the staff requested Commission approval of its positions and safety findings addressed in each FSER on the ABWR and System 80+ designs. The staff stated that

... approval of the FSER will indicate Commission acceptance of the staff's implementation of specific issues (such as those discussed in SECY-93-087 ... ), as well as other policy issues relating to the general implementation of 10 CFR Part 52.

This memorandum identified the key issues and areas of interest that the Commission was being requested to approve as part of the FSER and FDA reviews. The memorandum went on to say:

... Commission approval of the FSERs will necessarily include consideration of the applicable regulations and exemptions. Final Commission action on applicable regulations will take place in connection with promulgation of the design certification rules.

In its SRMs dated June 30 and July 26, 1994, the Commission approved the publication of the ABWR and System 80+ FSERs, respectively.

In SECY-95-023, "Proposed Design Certification Rules for the Advanced Boiling Water Reactor (ABWR) and System 80 + Standard Designs," dated February 1, 1995, the staff forward proposed rules for the two evolutionary plants. In its SRM dated March 17, 1995, the Commission approved the proposed rules, subject to soliciting comments on whether each specific applicable regulation is justified, and requested the staff to:

- 1) give special attention to the resolution of comments received, particularly regarding inclusion of "applicable regulations" in the rule, and re-evaluate, as necessary, the need for their inclusion; and
- 2) if the staff recommends keeping "applicable regulations" as part of the rule, the statement of each applicable regulation should be reviewed to ensure that it is justified and:
  - a) it is in conformance with past approved Commission guidance;
  - b) that it correctly reflects the intended technical requirements; and
  - c) that requirements have not been inadvertently made more stringent through word changes since Commission approval.

The staff made appropriate modifications to the proposed design certification rules and issued the notice of proposed rulemaking (60 FR 17901) on April 7, 1995. As a result of comments received from the Nuclear Energy Institute (NEI), the staff issued SECY-96-028, "Two Issues for Design Certification Rules," dated February 6, 1996. One of these issues was applicable regulations, in which the staff concluded that:

... there appears to be agreement [between the staff and industry] that: (1) these new requirements go beyond existing regulations and improve safety; (2) the design descriptions that meet the proposed applicable regulations are binding on the applicants and licensees that reference these design certification rules in the same manner that other design descriptions are binding; (3) in evaluating the possible need for a compliance backfit, as permitted by Part 52, and in evaluating an application to renew or request to change a design certification, these new requirements will have no legal effect unless they are designated as applicable regulations; and (4) the need for these new applicable regulations must be resolved in the final design certification rule.

The staff summarized in SECY-96-028 that it "continues to believe that new applicable regulations are necessary and desirable for the final design certification rules." Subsequently, in response to the Commission's SRM dated March 21, 1996, the staff met with representatives of ABB-CE, GE, and NEI on March 25, 1996 and proposed various means to reduce or otherwise resolve the need for new applicable regulations. The industry, represented by NEI, neither provided a proposal for resolution of applicable regulations (other than to eliminate them altogether) nor indicated any support for the staff's proposals. As a result, the NRC staff has provided revised resolutions of applicable regulations in the final rules (Attachments 1 and 5) that supersede the proposals in SECY-96-028.

## SUMMARY

The staff has been working on the development of new "applicable regulations" for future nuclear power plants since 1988, as identified in SECY-88-147. The purpose was to achieve a higher level of safety for future nuclear power plant designs. This effort has included exemptions from as well as additions to existing regulations. The staff proceeded steadily on this course of action and kept the Commission informed of its progress in numerous SECY papers and memoranda, as summarized above. The Commission and industry have been cognizant of the staff's intent to codify applicable regulations since 1989. The pivotal decision in this process was the decision in early 1989 to abandon generic rulemaking and proceed in parallel with design-specific rulemaking for the applicable regulations and design approval for each evolutionary design by rulemaking (design certification). This decision was discussed in several SECY papers and memoranda, in particular SECY-91-262 and its SRM. The consequence of this approach was deferral of the

Commission's final decision on applicable regulations until its decision on the final design certification rules.

Incorporation of the new (additional) applicable regulations into the final design certification rules was a fundamental assumption of the staff during its design reviews, as can be seen in the FSERs for the ABWR and System 80 + designs. The staff continues to believe that new applicable regulations are necessary and desirable to achieve the Commission's intent for a higher level of safety for future designs, to achieve stability and predictability for certified designs, and to identify the requirements for these designs that are applicable and in effect at the time the certification is issued for the purposes of 10 CFR 52.48, 52.54, 52.59, and 52.63.

#### DERIVATION OF NEW (ADDITIONAL) APPLICABLE REGULATIONS

ADDITIONAL APPLICABLE REGULATION SUBJECT	SECY-90-016 REFERENCE	SECY-93-087 REFERENCE
5(c)(1) INTERSYSTEM LOCA	II.E	I.F
5(c)(2) INSERVICE TESTING OF PUMPS AND VALVES	IV.B	I.N
5(c)(3) DIGITAL INSTRUMENTATION AND CONTROL SYSTEMS	N/A	II.Q
5(c)(4) ALTERNATE OFFSITE POWER SOURCE TO NON-SAFETY EQUIPMENT	N/A	II.B
5(c)(5) OFFSITE POWER SOURCE TO SAFETY DIVISIONS	N/A	II.B
5(c)(6) POST-FIRE SAFE SHUTDOWN	II.D	I.E
5(c)(7) ANALYSIS OF EXTERNAL EVENTS	N/A	II.N
5(c)(8) ALTERNATE AC POWER SOURCE	II.C	I.D
5(c)(9) CORE DEBRIS COOLING	III.B	I.H
5(c)(10) HIGH PRESSURE CORE MELT EJECTION	III.C	I.I
5(c)(11) EQUIPMENT SURVIVABILITY	III.F	I.L
5(c)(12) CONTAINMENT PERFORMANCE	III.D	I.J
5(c)(13) SHUTDOWN RISK	II.B	I.C
5(c)(14) STEAM GENERATOR TUBE RUPTURES	N/A	II.R

#### DERIVATION OF ADDITIONAL REQUIREMENTS AND RESTRICTIONS

REQUIREMENT/RESTRICTION	SECY-90-016	SECY-93-087
4(a)(vii) INSERVICE TESTING AND INSPECTION OF PUMPS AND VALVES	IV.B	I.N
4(a)(viii) SHUTDOWN RISK	II.B	I.C
4(a)(ix) RELIABILITY ASSURANCE PROGRAM	N/A	II.M