



NUCLEAR ENERGY INSTITUTE

Joe F. Colvin

PRESIDENT AND  
CHIEF EXECUTIVE OFFICER

*Docket 52-001 & 52-002  
and  
PDR : per J.N. Wilson*

September 16, 1996

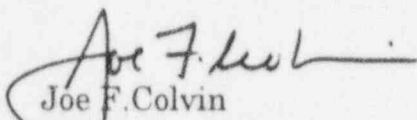
The Honorable Shirley A. Jackson  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

Dear Chairman Jackson:

During the August 27 briefing on the design certification rulemaking, the Commission raised several questions on remaining certification issues. This letter provides additional information in response to those questions.

We appreciate the continued strong interest of the Commission in the appropriate resolution of the remaining design certification issues and hope the enclosed information is helpful in your deliberations on these issues.

Sincerely,

  
Joe F. Colvin  
Enclosure

c: Commissioner Kenneth C. Rogers  
Commissioner Greta J. Dicus  
Commissioner Nils J. Diaz  
Commissioner Edward McGaffigan, Jr.  
Mr. James M. Taylor (EDO)

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**August 27 Commission Briefing on the Design Certification Rulemakings  
Responses to Questions on Remaining Issues and Points of Clarification**

**Questions:**

1. Does the Design Control Document (DCD) provide standards for review of future design changes? Is it necessary to add the proposed "applicable regulations" to the rules for this purpose?
2. How would "applicable regulations" be adverse to design stability? Give specific examples.
3. Does Section 8 adequately ensure that enhanced safety will be preserved?
4. What are the differences between the industry and the NRC staff on the "applicable regulations" issue?
5. What is the backfit standard at renewal?
6. Clarify the options for Commission resolution of the issue of the scope of NRC review at certification renewal.
7. What is the status of the NRC review of the technical specifications and operational-related requirements specified in the DCDs?
8. Are "applicable regulations" needed so that the NRC would not be compelled to grant an exemption from a design feature that is subject to an "applicable regulation?"

**August 27 Commission Briefing on the Design Certification Rulemakings  
Responses to Questions on Remaining Issues and Points of Clarification**

1. **Does the Design Control Document (DCD) provide standards for review of future design changes? Is it necessary to add the proposed "applicable regulations" to the rules for this purpose?** (Tr. pp. 74-75).
- Because of the extensive record on the technical and severe accident issues in question and the extensive information in the DCDs (and NRC Final Safety Evaluation Reports (FSERs)), it is not necessary to add the proposed "applicable regulations" to the rules for the purpose of providing standards for review of future design changes.
- The DCD contains design descriptions and extensive supporting information on design functions, performance characteristics and bases. SECY-90-016 and SECY-90-087 and their respective Commission SRMs provide policy guidance and associated bases on the resolution of technical and severe accident issues, and the FSER documents the NRC staff bases for determining that specific designs conform to this guidance. It is this detailed information that a future NRC reviewer would use in evaluating the acceptability of a change to the Tier 1 or Tier 2 design. The extent of this information is illustrated by the following examples concerning design features addressed by two of the proposed "applicable regulations."

**Example 1:** "Applicable regulation" 5(c)(9) on core debris cooling calls for design features such as floor space for core debris spreading, a passive flooders and AC-independent water addition system, and concrete to protect the lower drywell liner and reactor pedestal. This standard is fully discussed in both the DCD and FSER. In particular,

- DCD Section 19.8.7 for the ABWR describes the design features to mitigate core damage "consistent with the issues discussed in SECY-90-016," including the AC-independent water addition system, the lower drywell flooders that provide core debris cooling, Containment Overpressure Protection System, the floor spreading area and concrete protection for the containment floor and reactor vessel pedestal. Section 9.5.12 of Tier 2 provides more detail on the core debris quenching function of the lower drywell flooders, and Section 5.4.7.1.10 of Tier 2 provides more detail on the functioning of the AC-independent water addition system in cooling the lower drywell in the event of core damage.
- Section 2.14.1 of Tier 1 describes the floor spreading space, the lower drywell flooders that provide core debris cooling, and the concrete to protect the containment floor and reactor vessel pedestal. Section 2.4.1 of Tier 1

describes the function of the AC independent water addition system in providing drywell cooling. Section 2.14.6 of Tier 1 describes the Containment Overpressure Protection System.

– Section 19.2.3.3.2 of the FSER addresses the provisions in SECY-93-087 on core debris coolability, including provisions related to floor spreading area, lower drywell flooders, AC-independent water addition system, sacrificial concrete, the reactor vessel pedestal, and the Containment Overpressure Protection System. This section also describes how the design of the ABWR meets these standards.

**Example 2:** "Applicable regulation" 5(c)(8) specifies the use on an on-site alternative AC power source for safe shutdown in the event of a station blackout. This standard is fully discussed in both the DCD and FSER. In particular,

– Section 1C.2.2 of Tier 2 for the ABWR identifies the design basis for the station blackout, including use of an Alternate AC source to comply with 10 CFR 52.63 and SECY-90-016, and Section 1C.2.4 shows how this standard is met by the Combustion Turbine Generator for the ABWR. Similar provisions are contained in Section 9.5.11 of Tier 2.

– Section 2.12.11 of Tier 1 states that the Combustion Turbine Generator "functions as an alternative AC power source."

– Sections 19.2.2.1.2 and 8.3.9 of the FSER discuss 10 CFR 50.63 and the provisions in SECY-90-016 which call for an Alternate AC source, and states that these provisions are met by the Combustion Turbine Generator.

- Similarly extensive information exists on the generic and design-specific resolution of each of the other technical and severe accident issues addressed by the proposed "applicable regulations." This information could be used in evaluating any design changes that may be proposed in the future, thus obviating the need to add "applicable regulations" for this purpose.

2. How would "applicable regulations" be adverse to design stability?  
Give specific examples. (Tr. pp. 14-15, 18, 30).

Design stability would be undermined by the proposed additional "applicable regulations" because substantial portions of the DCD would be subject to lesser backfit protection than intended by Part 52. The Commission established Section 52.63 to provide greater backfit protection to certified standard designs (*i.e., design stability*) than that provided under Section 50.109 for plants licensed under Part 50. The staff proposal would revert back to "50.109-like" backfit protection for substantial portions of the DCD that specify design features and related DCD requirements credited in meeting "applicable regulations." The following examples illustrate why the proposed "applicable regulations" are a source of significant design instability and uncertainty.

**Example 1:** Section 3.4.C of Tier 1 for the ABWR identifies specific features that provide defense-in-depth, diversity, and protection against common-mode failures for digital instrumentation and control systems. Such features include a hardwired manual scram capability, hardwired manual capability to trip each safety division, and hardwired independent displays of specified plant parameters. In contrast, the broadly worded "applicable regulation" in Section 5(c)(3) of the rule states (emphasis added):

*The digital instrumentation and control systems of this design must provide for:*

- (i) *defense-in-depth and diversity,*
- (ii) *adequate defense against common-mode failures, and*
- (iii) *independent backup manual controls and displays for critical safety functions in the control room.*

Given this very general language, it would not be surprising if future NRC staff reviewers were to change the current interpretation of this "applicable regulation." Such changes could then be used as a basis for imposing backfits on the specific Tier 1 design features identified above. In particular, there is a significant potential that future NRC staff might require the installation of additional hard-wired instruments and controls beyond those currently listed in Tier 1.

**Example 2:** Tier 1 of the ABWR identifies numerous features that contribute to a low shutdown risk, including three separate divisions of Residual Heat Removal, main steam relief valves, automatic initiation of the High Pressure Core Flooder and Low Pressure Core Flooder upon low reactor vessel water level, an AC Independent Water Addition System, and multiple sources of AC power, among many other features. In contrast, the broadly worded "applicable regulation" in Section 5(c)(13) of the rule states (emphasis added):



*This design must include assessments of:*

- (i) Features that minimize shutdown risk;*
- (ii) The reliability of decay heat removal systems;*
- (iii) Features that mitigate vulnerabilities resulting from other design features; and*
- (iv) Features that assure the operator's ability to shut down the plant safely and maintain it in a safe condition in the event of fires and floods occurring with the plant in modes other than full power.*

Over the 60 year life of a plant that references the design certification, there undoubtedly will be further developments in the state-of-the-art with respect to shutdown risk features, and this "applicable regulation" would enable the staff to backfit such features in order to further "minimize" shutdown risk.

**Example 3:** Sections 2.14.1 and 2.14.6 of Tier 1 for the ABWR identify specific features to protect the containment from the effects of core debris, including minimum floor spreading space, drywell flooders valves that provide for core debris cooling, corium protection at least 1.5 meters thick for the areas beneath the reactor vessel, concrete protection for the reactor vessel pedestal, and a Containment Overpressure Protection System. In contrast to this level of specificity, the broadly worded "applicable regulation" in Section 5(c)(9) of the rule states (emphasis added):

*For the severe accident sequences identified in Section 19E of the DCD, this design must include the following design features that, in combination with other design features, ensure that environmental conditions (pressure and temperature) described in Section 19E of the DCD resulting from interactions of molten core debris with containment structures do not exceed ASME Code Service Level C for steel containments or Factored Load Category for concrete containments for a time from the initiation of the accident sequence sufficient to mitigate them in view of their probability of occurrence and the uncertainties in severe accident progression and phenomenology:*

- (i) A minimum of 79 m<sup>2</sup> of unobstructed reactor cavity floor space for molten core debris spreading;*
- (ii) A passive flooders system and an ac-independent water addition system capable of directly or indirectly flooding the reactor cavity for cooling molten core debris; and*
- (iii) Concrete to protect portions of the lower drywell containment liner and the reactor pedestal.*

This vague and subjective language could lead to backfits on the specific design features in Tier 1 or supporting Tier 2 requirements as more information is developed in the future regarding the probability of occurrence of severe accidents and the progression and phenomenology of severe accidents.

- The proposed backfit protections do not mitigate this concern because we cannot predict with any degree of certainty how they will be used by future NRC staff. The technical and severe accident issues that are the subject of the proposed additional "applicable regulations" are characterized by relatively greater analytical uncertainty and/or address beyond design basis events of very low probability. On such matters, differences of opinion are inevitable concerning when new information indicates a "substantial" decrease in protection and whether there is a fix that provides a cost justified "compensating" increase. It is in this way that the concern about "design instability" becomes inseparable from overall licensing instability and uncertainty that would be caused by "applicable regulations."
- The NRC staff estimates that most, if not all, backfits will be procedural in nature. We must not underestimate the potential cost over the life of a plant of NRC-mandated procedural changes. Moreover, there is nothing in the proposed backfit provisions that would give sufficient protection against backfits to the standard design consistent with the intent of Part 52.

3. Does Section 8 adequately ensure that enhanced safety will be preserved? (Tr. p. 57).

- Yes. The advanced plant technical issues and enhanced safety features that are the subject of the proposed additional "applicable regulations" are addressed by Tier 1 requirements of the design. A generic change to these requirements requires new rulemaking and, in any event, cannot be made unless the change is necessary for adequate protection of the public health and safety or compliance with NRC regulations. A licensee may not deviate from these requirements for a specific plant except by an exemption request meeting the requirements of Section 52.63(b)(1) and approved by the Commission.
- Design information and requirements supporting and implementing Tier 1 design commitments are contained in Tier 2. Section 8 requires prior NRC review and approval of any change that involves an unreviewed safety question. The determination of whether a unreviewed safety question exists includes evaluation of the impact of a change on technical and severe accident design features, including those addressed by the proposed additional "applicable regulations."
- Thus, Section 8 provides adequate protection against the erosion over time of enhanced safety features that are part of the design certification.



4. **What are the differences between the industry and the NRC staff on the "applicable regulations" issue? (Tr. pp. 34-35).**

Fundamentally, the NRC staff wants the design certification rules to include new "applicable regulations," and the industry does not. This basic difference reflects a number of differences on the need and impact of the "applicable regulations," including the following:

- The staff believes that the proposed "applicable regulations" are necessary to comply with previous Commission guidance that severe accident issues be treated in design-specific certification rulemakings rather than generic rulemakings. The industry believes that the design-specific features in the DCD, which itself is part of the design certification rule, satisfy Commission guidance regarding design-specific rulemaking.
- The staff believes that "applicable regulations" are necessary to ensure maintenance of the level of safety and margins that the NRC believes it is approving through the design certifications. The industry believes that, absent "applicable regulations," the features in the design certifications together with the stringent controls on changes of those features, will provide substantial additional levels of safety and margins above those contained in existing plants. Furthermore, the industry believes that it is inappropriate for the NRC to codify by regulation the additional margins embodied in these advanced designs.
- The staff believes that the "applicable regulations" are necessary to provide the NRC with a basis for reviewing changes. The industry does not believe that "applicable regulations" are necessary for this purpose, because an adequate basis for reviewing changes already exists in the DCD, FSER, and NRC guidance in SECY-90-016 and 93-087.
- The staff believes that there is little likelihood that the "applicable regulations" will be used to impose backfits on the design. The industry believes that the "applicable regulations" are vague and subjective, and will be subject to new and different interpretations in the future that can be used to impose design backfits. In this regard, the proposed backfit standard for "applicable regulations" is similar to the backfit standard in Section 50.109, which has been used extensively to impose both design and procedural backfits on existing plants.
- In the August 27 Commission briefing, the staff stated that the proposed "applicable regulations" can be bifurcated into those that are basically deterministic in nature and those that are not. The staff implied that there may be less of a need to include the deterministic "applicable regulations" in the design certifications. The industry believes that none of the proposed

new "applicable regulations" are needed for design certification, and eliminating several of the proposed new "applicable regulations" would be a step in the right direction. However, the severe accident-related "applicable regulations" that would remain are the source of most of the uncertainty that so concerns the industry. Moreover, the fundamental policy concerns associated with the staff proposal are the same whether three or thirteen "applicable regulations" are proposed for the final rules.

5. **What is the backfit standard at renewal?** (Tr. pp. 47-49).

- Except in the design certification renewal rulemaking, backfits are restricted by Section 52.63. This means that backfits may be imposed to assure the adequate protection of the public health and safety or compliance with the regulations applicable and in effect at the time of the design certification. This reflects the Commission intent that Part 52 establish greater protection against backfits for design certification information than that provided by Section 50.109 for plants licensed under Part 50.
- The Commission also structured Part 52 to accommodate the potential that new information may be identified during the life of the certification that could lead to further improvement of the certified standard design. Thus, in addition to the ability to impose backfits, at any time, under Section 52.63 to assure adequate protection, the NRC may impose backfits under Section 52.59 during the certification renewal rulemaking. This means that the NRC may, at time of renewal, impose additional cost-justified requirements that may result from the identification of significant new information or operating experience since the design was originally certified.
- Thus, Part 52 provides the authority for the NRC to impose cost-justified backfits at time of renewal.
- It is important to emphasize the point made by Mr. Malsch in responding to the question of Chairman Jackson concerning the "reference standard" that the staff would use to impose a change at time of renewal. Mr. Malsch stated,

*... regardless of how you come out on applicable regulations, there is still the opportunity in theory, at the certification renewal stage, to add safety increments above whatever applicable regulations would otherwise require.*

In other words, Part 52 currently allows the NRC to impose changes on the design certification at time of renewal so long as the changes (1) provide a substantial increase in protection and (2) are cost justified. The staff may impose such changes without regard for the regulations applicable and in effect at the time of design certification. Thus it is not necessary to codify the proposed additional "applicable regulations" in order for the staff to impose cost-justified changes at time of renewal.

**6. Clarify the options for Commission resolution of the issue of the scope of NRC review at time of certification renewal. (Tr. p. 89).**

The August 13 options paper identified three alternatives for Commission consideration on the issue of the scope of NRC staff review for design certification renewal. Based on the clarifications and discussion from the August 27 briefing, we believe that the Commission has the following options for addressing this issue (which differ somewhat from the three options characterized by the NRC staff):

- **Option 1** - Include a provision in the design certification rules, with appropriate explanation in the Statements of Consideration, establishing the framework for NRC review of design certification renewal applications. This framework would provide for NRC review of the following, subject to the backfit provisions of Section 52.59:
  - updates of the design certification that are part of the renewal application
  - any modifications proposed by the applicant, including relevant operating experience or other material new information since the time of the original certification
  - any modifications proposed by the NRC
- **Option 2** - Do not include a provision in the final rules but describe in the Statements of Consideration the framework outlined under Option 1 to capture current industry-NRC agreement concerning NRC review at renewal and to provide a basis for development of appropriate regulatory guidance on the certification renewal process.
- **Option 3** - defer resolution of the scope of renewal review issue in a manner that does not prejudice its future consideration

Option 1 is preferred because it would establish in the regulations the policy focus for subsequent implementation. It is understood that detailed regulatory guidance concerning the scope and content of applications for design certification renewal would be developed at a later date. We intend to propose revised rule language for implementing this option for NRC consideration.

Based on the industry-NRC staff agreement on the nature of the renewal review, we believe that, at a minimum, the Commission should describe the agreed-upon principles and the policy concepts underlying them in the Statements of Consideration (Option 2). While deferral (Option 3) is an option available to the Commission, we see no reason why principles governing the framework for the renewal review should not be established in the final rules and/or Statements of Consideration.

7. **What is the status of the NRC review of the technical specifications and operational-related requirements specified in the DCDs?**  
(Tr. pp. 77, 81-83).

At the Commission meeting on August 27, 1996, the NRC staff stated that the technical specifications and operational-related provisions in the DCD should not have protection under Section 52.63 because the staff's review of the technical specifications and operational-related provisions is not complete. As support for their opinion, they referred to information in brackets in the technical specifications.

Notwithstanding NRC staff statements that certain aspects of their design certification reviews were not complete, the NRC staff reviewed the technical specifications and a number of operational-related provisions in the DCD and approved them in the Final Safety Evaluation Report (FSER). For example, the FSER for the ABWR has the following conclusions regarding the technical specifications and specific operational-related provisions:

- Technical Specifications – Section 16 of the FSER states that “the ABWR TS satisfy 10 CFR 50.36 and are acceptable.”
- Initial Test Program – Section 14.2 of the FSER states: “The staff also conducted an in-depth review of system-specific testing requirements within each test abstract. The staff concludes that GE provided a sufficient level of detail to adequately describe system-specific test prerequisites and acceptance criteria.”
- Inservice Test Program – Section 3.9.6 of the FSER states: “Based upon the evaluations described above, the staff concludes that the pump and valve IST program described in the SSAR is acceptable and meets the requirements of GDC 37, 40, 43, 46, and 54 and 10 CFR 50.55a(f).”
- Shutdown Risk – Section 19.3.7 of the FSER states: “The staff finds that improvement in safe operation of the ABWR plant in low-power and shutdown modes can be reasonably accomplished by implementing GE's guidelines for preparing and implementing an outage plan. It concludes that GE has adequately addressed important areas described in NUREG-1449 regarding outage planning and control. The staff also notes that specific shutdown TS requirements and guidelines for preparing and implementing an outage plan will significantly improve safe shutdown operation.”

As the staff has noted, the DCDs do not address all information that must be included in the technical specifications or all operational provisions. For example,



the technical specifications contain information in brackets that must be updated based upon as-built plan information, and the DCD contains numerous COL license information items for operational matters that must be addressed by COL applicants. Both the information in the brackets in the technical specifications and the matters subject to COL license information items will be subject to review and approval by the NRC at the COL stage and are not subject to the finality provisions in Section 52.63. However, to the extent that a matter is addressed in the DCD, including the technical specifications in Tier 2, such matters have been approved by the NRC, and therefore backfits should be strictly controlled. We intend to propose rule language that responds to the NRC staff concerns expressed in the August 13 options paper and August 27 briefing.

It is worth noting that replacement of bracketed information with specific entries for the technical specifications will, as noted by the staff, depend on as-built information. As such, combined licenses (which will be issued prior to plant construction) will necessarily contain bracketed information, just as the DCD technical specifications do. Therefore, the fact that the DCD technical specifications contain bracketed information does not mean that the technical specifications are not otherwise complete or that they should not otherwise have finality.

8. **Are "applicable regulations" needed so that the NRC would not be compelled to grant an exemption from a design feature that is subject to an "applicable regulation?"** (Tr. pp. 73, 91).

At the Commission briefing, Mr. Russell and Mr. Malsch implied that "applicable regulations" are needed in order to permit the NRC to deny a licensee exemption request for a feature that is subject to an "applicable regulation." As an example, they stated that, absent "applicable regulations," the NRC would be compelled to grant an exemption to allow coping to address station blackout (which is allowed by Section 50.63) even though the relevant "applicable regulation" allows only for alternate AC. We do not believe this to be so, as discussed below.

Each of the "applicable regulations" is addressed in whole or part in Tier 1 of the DCDs, which will itself be part of an NRC regulation - - the design certification rule. Specifically, the requirements for alternate AC are contained in Tier 1. If an applicant or licensee desires to use coping rather than alternate AC, it would be required to seek an exemption from Tier 1 because Tier 1 is part of the design certification rule. Contrary to statements at the briefing, the NRC is not required to grant an exemption from Tier 1 merely because the exemption complies with the technical standards in Part 50 (such as the coping provision in Section 50.63). Instead, Section 52.63(b)(1) allows an exemption from Tier 1 only if the exemption satisfies Section 50.12, and if the "special circumstances which Section 50.12(a)(2) requires to be present outweigh any decrease in safety that may result from the reduction in standardization." Furthermore, it is clear from the Statements of Consideration for Part 52 (54 Fed. Reg. at 15377) that the criteria in Section 50.12 (including the criterion for "special circumstances") are applied against the design certification rule itself, not just the provisions in Part 50.

Therefore, in determining whether to grant an exemption from Tier 1 to allow coping rather than alternate AC, the NRC would have to determine whether "special circumstances" exist for the deviation from the requirement for alternate AC. The mere fact that the exemption complies with the coping provisions in Section 50.63 would not be sufficient, in and of itself, as a basis for granting the exemption. In making this determination, the NRC could consider a myriad of factors, including the technical positions in SECY-90-016 and 93-087 that led to the Tier 1 provision on alternate AC.