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Part III

Nuclear Regulatory Commission

10 CFR Part 50

Nuclear Power Plant Standardization; Policy Statement

NUCLEAR REGULATORY COMMISSION

10 CFR Part 50

Nuclear Power Plant Standardization

AGENCY: Nuclear Regulatory Commission.

ACTION: Policy statement.

SUMMARY: The Nuclear Regulatory Commission is issuing a revised policy statement on the standardization of nuclear power plant designs. The policy statement encourages the use of standard plant designs and provides information concerning the certification of plant designs that are essentially complete in scope and level of detail. The intent of these actions are to improve the licensing process and to reduce the complexity and uncertainty in the regulatory process for standardized plants.

DATE: Effective on September 15, 1987. Workshop to be held October 20, 1987.

ADDRESSES: Submit comments to: The Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, DC 20555, Attention: Docketing and Service Branch. A public workshop will be held on October 20, 1987, in the Cabinet Room of the Hyatt Regency Bethesda, One Bethesda Metro Center, Bethesda, Maryland.

FOR FURTHER INFORMATION CONTACT: Jerry N. Wilson, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, DC 20555, telephone (301) 492-4727.

SUPPLEMENTARY INFORMATION:

Workshop

The NRC staff will conduct a workshop to inform the public of staff efforts to develop an implementing rulemaking on standardization and to provide a forum for public discussion of the revised policy statement and relevant issues that need to be addressed in the rulemaking package. The workshop will be held on October 20, 1987 at the Hyatt Regency Bethesda, One Bethesda Metro Center, Bethesda, Maryland 20814 in the Cabinet Room. The workshop will start at 9:00 a.m. The NRC staff will present an overview of the revised policy statement and the proposed rulemaking package at the workshop. Those members of the public who wish to make a presentation at the workshop should notify the contact listed above so that they can be added to the agenda. Anyone who wishes to add further comments to the record or who cannot attend the workshop should send written comments to the Secretary of the Commission no later than October 30, 1987.

Background

The Nuclear Regulatory Commission believes that standardization of nuclear power plant designs is an important initiative that can significantly enhance the safety, reliability and availability of nuclear plants. The Commission intends to improve the licensing process for standardized nuclear power plants and to reduce complexity and uncertainty in the regulatory process. Appendices M, N and O to Title 10, Part 50 of the Code of Federal Regulations (10 CFR Part 50) establish various options and procedures for the approval of standardized plant designs. A provision for Commission approval of a reference design in a rulemaking proceeding is included in Appendix O. This has been termed Reference System Design Certification and is the focus of the Commission's standardization policy. This policy statement revises the Standardization Policy Statement of 1978 (August 31, 1978; 43 FR 38954).

The purpose of this policy statement is to encourage standardization and to provide information concerning the Commission's efforts to develop a regulatory framework for the certification of plant designs which:

- Are essentially complete in both scope and level of detail;
- Cover plant design, construction, and quality assurance programs;
- Satisfy regulatory requirements before construction begins; and
- Can be referenced for individual plant applications.

Use of certified reference designs in future license applications should enhance plant safety, increase the efficiency of the NRC review process, and reduce complexity and uncertainty in the regulatory process. A regulatory framework which provides for certification of reference designs by means of rulemaking will alleviate the need to reconsider design issues in individual licensing proceedings on future license applications which reference the certified designs. Areas included within the scope of the reference system design certification rulemaking would require no further review by the staff, the Advisory Committee on Reactor Safeguards (ACRS), or the hearing boards.

The Commission's primary objectives in issuing a policy statement on nuclear power plant standardization are threefold:

- To encourage the use of standard plant designs in future license applications in order to enhance plant safety, improve the efficiency and reduce the complexity and uncertainty of the regulatory process;
- To identify the issues that are important to the implementation of standardization and to state the Commission's intent to develop proposed rules to address these issues more fully; and
- To express the Commission's intent to make resources available on a priority basis to facilitate the reference system design certification process for essentially complete nuclear power plant designs and for the licensing reviews of applications referencing these certified designs.

Experience has shown that the "one-of-a-kind" approach to reactor design, construction, and operation has led to an operating reactor population of great variability and diversity, even among reactors from the same vendor. This variability is introduced when utilities and designers incorporate custom features into their designs; when varying construction practices are used; and when plants are operated and maintained by different organizations. This variability has introduced significant differences in the licensing and operation of these plants, in the transfer of experience from one reactor to another, in technical specifications, in operating procedures, and in backfitting considerations.

The Commission believes that the use of certified standardized designs can benefit the public health and safety by concentrating resources on specific design approaches without stifling ingenuity; by stimulating standardized programs of construction practice, quality assurance, and personnel training; and by fostering more effective maintenance and improved operation. Standardization should result in significant economies of scale in learning and sharing operating experience, in maintaining qualified vendor support, and in maintaining an adequate inventory of long lead-time, high cost spare parts that can be shared by a number of units. These concepts are embodied in foreign experience with the standardization of nuclear power plant design, contruction, and operation. Standardization is expected to further improve the safety performance of future plants. Standardization will allow for a more expeditious and efficient review process and a more thorough understanding of the designs by the industry and the NRC staff. In strongly endorsing the concept of standardization, the Commission acknowledges that there can be drawbacks. The most significant is that specific problems may potentially affect

a large number of reactors. However, on balance, the Commission believes that the enhanced safety of reactor operation should far outweigh any disadvantages.

Commission policy for plant safety is articulated in its Policy Statement on Safety Goals (August 4, 1986; 51 FR 28044, August 21, 1986; 51 FR 30028). The Standardization Policy also is consistent with the standardized plant provisions of the Commission's complementary Severe Accident Policy Statement (August 8, 1985; 50 FR 32138). Many of the desirable safety characteristics listed in the Advanced Reactor Policy Statement (July 8, 1986; 51 FR 24643) are equally desirable for evolutionary light water reactor standardized designs.

The Commission believes that Congress should promote nuclear safety by pursuing legislative initiatives to further encourage the standardization concept. The proposed Nuclear Power Plant Standardization and Licensing Act of 1987, which the Commission forwarded to Congress in January of this year, includes the following three legislative proposals:

- Issuance of a combined construction permit and operating license;
- Issuance of a site permit prior to submission of an application for a construction permit or combined construction permit and operating license;
- Issuance of a facility design approval (Reference System Design Certification) prior to submission of an application for a construction permit or combined construction permit and operating license.

The Commission believes that these legislative changes are important to achieving the full benefits of standardization. The one-step licensing process would give licensees greater assurance that if the facility is constructed in accordance with the terms of the application/permit, it will be permitted to operate once construction is complete. The issuance of site permits and facility design approvals, in advance of specific applications for their use, would allow subsequent facility applications to reference the permits and/or approvals without further regulatory action unless there is a substantial reason not to do so. This process would also facilitate early identification and resolution of site and design issues after affording an opportunity for public participation.

The Commission continues to believe that nuclear standardization and licensing legislation should be enacted. The Commission recognizes, however, that much of its legislative proposal with respect to standardization could be accomplished under its existing statutory authority. In addition, there is a need for regulations to implement the Commission's standardization policy more effectively. For these reasons, the Commission is developing proposed regulations that will address licensing reform and standardization. With regard to standardization, the proposed rules will provide a regulatory framework for Commission certification of standard designs by rulemaking, as set forth in paragraph 7 of Appendix O to 10 CFR Part 50. The proposed rules will address the following subjects: Relationship of the new regulatory framework to the existing provisions of Appendices M, N, and O to Part 50; filing requirements; contents of applications; design certification and renewal fees; design certification rulemaking procedures; referral of applications to the Advisory Committee on Reactor Safeguards (ACRS); duration and renewal of design certifications; changes to certified standard designs; and provisions for plant specific variances. The Commission's general approach to standard design certification under its existing rules is outlined in this policy statement. The issues important to execution of the Commission's standardization policy will be addressed more fully in the proposed rules.

Statement of Policy on Nuclear Power Plant Standardization

The purpose of this standardization policy is to provide the regulatory framework for reference system design certification of nuclear power plant designs which are essentially complete in both scope and level of detail; cover plant design, construction, and quality assurance programs; satisfy regulatory requirements before construction begins; and can be referenced in individual plant applications.

The reference system designs, at least initially, are expected to be evolutions of existing proven LWR designs. Detailed information consisting of design and procurement specifications, performance requirements, and acceptance and inspection requirements will be substituted for name plate data. For those systems, structures and component designs which represent significant deviations from previously-approved LWR designs, prototype testing and/or empirical information may also be required. Advanced design concepts should be developed according to the guidelines of the Advanced Reactor Policy Statement. When an advanced design concept is sufficiently mature, e.g., through comprehensive, prototypical testing, an application for design certification could be made.

In the reference system design certification process, the final decision will be made by the Commission itself following review by the ACRS, the issuance of a final design approval by the staff, and the completion of a rulemaking proceeding. The reference system concept means that an entire nuclear power plant design or a major portion of the design is acceptable for incorporation by reference in individual license applications. The design certification concept focuses on the certification of a reference system design through rulemaking, as provided for by Appendix O to 10 CFR Part 50. The rules being developed to implement this policy will address the criteria and procedures for issuance and renewal of design certifications, as well as the duration of the certification and renewals. The certified design must be used and relied upon by the staff, the ACRS, the hearing boards and the Commission in their consideration of applications that reference the certified design. The issue of relitigation of issues considered and decided in the design certification rulemaking will be addressed in the proposed rules.

The Commission believes that several benefits will be realized in this process which will not only enhance safety, but should also contribute added stability and predictability to the regulatory process. The rulemaking will certify the acceptability of the design. The certified design will be referenced in the application for a Construction Permit or Operating License. The rulemaking to obtain the design certification will cover the criteria necessary for design and construction of a plant; the quality assurance program; and whatever tests, analyses, and inspection criteria are necessary to assure that the plant is built within the certified design specifications.

The Commission expects to implement the following policies with regard to design certification review. An applicant for a design certification must first obtain a Final Design Approval (FDA) pursuant to Appendix O to Part 50. If the applicant intends to seek a design certification, the FDA application must indicate that intent. As set forth in Appendix O, the FDA application must include information on scope and design detail which is essentially equivalent to that required by 10 CFR 50.34(b), as well as any other information customarily required by the staff to perform a Final Safety Analysis Report review. In addition, it must address the following four licensing criteria for new plant designs set forth in the Commission's Severe Accident Policy Statement:

(1) Demonstration of compliance with the requirements of the current Commission regulations, including the Three Mile Island requirements for new plants as reflected in the construction permit rule, 10 CFR 50.34(f);

(2) Demonstration of technical resolution of all applicable Unresolved Safety Issues and the medium- and high-priority Generic Safety Issues, including a special focus on ensuring the reliability of decay heat removal systems and the reliability of both AC and DC electrical supply systems;

(3) Completion of a probabilistic risk assessment (PRA) and consideration of the severe accident vulnerabilities that the PRA exposes, along with the insights that it may add to the assurance that there is no undue risk to public health and safety; and

(4) Completion of staff review of the design with a conclusion of safety acceptability using an approach that stresses deterministic engineering analysis and judgment complemented by PRA.

The design certification application should also propose, for staff review and approval, the tests, analyses, inspections and acceptance criteria that are considered necessary to provide reasonable assurance that a plant which references the certified design is built and operated within the specifications of the final design. Additional information beyond that required for an FDA may be necessary to support the design certification rulemaking. Further detailed guidance in this area will be developed by the staff, if necessary, as a result of experience with the first few FDA/design certification reviews.

Features of the design which can only be determined when a specific site is chosen generally are not included in the design approval or certification. Rather, the designer defines a set of site enveloping parameters (seismic events, rainfall, flood, etc.) which are used in the design of the plant. These parameters usually are selected to envelop a large portion of the potential sites in the U.S. Once the design is certified by the Commission, conformance of actual sites with the established site envelope must be demonstrated by the applicant and verified by the staff at the time an actual plant application is reviewed. Other features of the design which are dependent on the site (*i.e.*, cooling water supply, emergency preparedness plans, etc.) are also reviewed for acceptability and compatibility with the pre-approved/certified design at the time of an actual application.

Currently, NRC-initiated changes to the design certification rule will not be required unless the Commission determines that these modifications are in accord with the backfit rule specified in 10 CFR 50.109. The subject of modifications to be required after the design certification is granted, as well as amendments at the request of the design certification holder and variances at the request of a utility, will be addressed in the proposed rules. In developing those rules, the Commission will consider the appropriateness of employing the backfitting standard set forth in the proposed standardization and licensing reform legislation. The Commission expects that backfits to the design certification rule would be applied uniformly to all plants referencing the certified design. Similarly, amendments to the design certification rule initiated by the holder of the design certification would also be applied uniformly to all plants referencing the standard design. In addition, procedures will be developed to allow for plant-specific variances in limited circumstances at the request of the facility licensee.

All applications for licenses and approvals for standard designs are at present subject to the fees and the fee recovery rates identified in 10 CFR Part 170. The Commission has authorized a revision of 10 CFR Part 170 to include a new provision for the reference system design certification process. This revision would permit the phased recovery of design certification costs through collection of fees from the holder of the design certification, as the design is referenced. If the design is not referenced or if all the costs are not recovered within ten years, the holder of the design certification will be responsible for any amounts still due at the end of the ten year period.

Although the Commission strongly encourages the use of certified designs for the entire plant in all future license applications, the regulations also allow for other standardization options including the duplicate plant, the replicate plant, and the manufacturing license concepts. While these options may be used in the interim, they are discouraged for the longer term. The Commission also recognizes that review, approval and certification of major portions of complete plants may be useful in the interim. However, applications for essentially complete designs are preferred and will be given priority in allocation of resources to support review and approval.

Dated at Washington, DC, this 9th day of September, 1987.

For the Nuclear Regulatory Commission.

Samuel J. Chilk,

Secretary of the Commission.

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