February 15, 1991

MEMORANDUM FOR: James M. Taylor
Executive Director for Operations

FROM: Samuel J. Chilk, Secretary /S/

SUBJECT: SECY-90-377 - REQUIREMENTS FOR DESIGN CERTIFICATION UNDER 10 CFR PART 52

This is to advise you that the Commission (with all Commissioners agreeing) has approved the following actions concerning the implementation of the Design Certification process under 10 CFR Part 52.

I. DEVELOPMENT OF REGULATORY GUIDANCE

The Commission approves the staff's proposal to develop regulatory guidance which will clarify the definition of "essentially complete design" in terms of the scope and depth of design, including a description of the structures, systems, and components to be included in the application for design certification and COL. The staff should also develop regulatory guidance on the formulation of an ITAAC program.

Development of the regulatory guidance will provide for a systematic, integrated, and methodical examination of a design to ensure final resolution of all safety questions, including those that arise from interactions within and among systems. This effort should begin in parallel with the ABWR review and document staff's experience in certifying the ABWR. The staff should develop a preliminary list of the specific engineering products it believes are necessary to permit the preparation of procurement specifications and construction and installation specifications for structures, systems, and components that can affect safe plant operation, seeking input from interested parties. Such regulatory guidance should be incorporated into the SRP and Regulatory Guide 1.70 or into a separate guide(s) as staff deems appropriate.

II. INSPECTION, TESTS, AND ACCEPTANCE CRITERIA (ITAAC)

With regard to ITAAC, the Commission has previously amplified on the provisions of Part 52 by stating that " ... ITAAC are to provide reasonable assurance that a plant which references the design is built and will operate in accordance with the design certification, and thus are not to be used to reach a final conclusion on any safety question associated with the design."

ITAAC should not be used to impose additional design requirements. ITAAC are to be sufficient to confirm that a plant is built and will operate in conformance with the design certification.

III. LEVEL OF DETAIL

Under 10 CFR 52.47, "The application must contain a level of design information sufficient to enable the Commission to judge the applicant's proposed means of assuring that construction conforms to the design and to reach a final conclusion on all safety questions associated with the design before the certification is granted. The information submitted for a design certification must include performance requirements and design information sufficiently detailed to permit the preparation of acceptance and inspection requirements by the NRC, and procurement specifications and construction and installation specifications by an applicant. The Commission will require, prior to design certification, that information normally contained in certain procurement specifications and construction and installation specifications be completed and available for audit if such information is necessary for the Commission to make its safety determination." In the Statements of Consideration accompanying Part 52, an "essentially complete nuclear power plant" is defined as a design which includes all structures, systems and components which can affect safe operation of the plant except for site-specific features such as the service water intake structure and the ultimate heat sink. In addition, the Statements of Consideration specify that an essentially complete design is a design that has been finalized to the point that procurement specifications and construction and installation specifications can be completed and made available for audit if it is determined that they are required for Commission review in accordance with 52.47(a).

In order to make a final safety determination with reasonable assurance, the Commission intended that for all structures, systems, and components which can affect safe operation of the plant, the design information contained in the application would reflect a design which was complete, except to the extent that further adjustment to the design within established design envelopes would be necessary -- during what the staff has referred to as the design reconciliation process -- in order to accommodate variations in actual as-procured hardware characteristics. The Commission did not require information of the type found in the actual procurement and construction specifications in all instances because it recognized that some degree of flexibility in the level of detail to be submitted was necessary to accommodate as-procured hardware characteristics. Nevertheless, the rule provides that the Commission's safety determinations could require in specific cases that final design information normally contained in certain actual specifications be provided in the

application. Consistent with the above, the Commission approves the staff's proposal to take a graded approach to the level of detail, that is, that the level of detail needed for design certification will vary according to a structure's, system's, or component's relationship to safety.

Based on the foregoing the Commission believes that the information submitted in an application should: (1) reflect a design which, for all structures, systems or components that can affect safe operation of the plant, is complete, except to the extent that some further adjustment to the design within established design envelopes may be necessary -- during what the staff has referred to as the design reconciliation process -- to accommodate actual, as-procured hardware characteristics; (2) encompass a depth of detail no less than that in an FSAR at the operating stage for a recently licensed plant, except for site-specific, as-procured, and as-built information; (3) be sufficient to allow staff to evaluate the resolution of severe accident issues in the design, as well as to incorporate the experience from operating events in current designs which we want to prevent in the future; and (4) provide a sufficient level of detail to ascertain how the risk insights from the design-specific PRA are addressed in the design. The additional supporting documentation and analyses developed in accordance with 10 CFR 52.47, if not already developed, will be developed and reviewed as needed to reach a final conclusion on all safety questions in the application review process. The Commission's safety determination could require that final design information normally contained in certain procurement and construction and installation specifications be reviewed as well. The SRP should be revised to be consistent with this.

IV. ISSUE FINALITY

The Commission agrees with the staff that the process provides issue finality on all information provided in the application that is reviewed and approved in the design certification rulemaking. Information obtained during the staff's review process that forms the basis for a safety decision should be formally docketed as part of the application. Only this information will have regulatory significance for the design certification process.

V. TWO-TIERED APPROACH

The Commission agrees with the proposed two-tiered design certification rule structure. To ensure continuity and consistency in the staff's safety review efforts, decisions on what information should reside in each tier should be made in parallel with the staff's review and should be documented at the time the staff issues the Safety Evaluation Report so that the staff's position on this matter is available at the time of FDA issuance.

Generic conclusions from this process should be reflected in regulatory guidance.

VI. FLEXIBILITY

Although changes to the design reviewed and approved by the staff should be minimized, the Commission recognizes that a certain amount of flexibility will be needed to finalize procurement information and to construct the facility. Therefore, the Commission has no objection to a process similar to 10 CFR 50.59 for making changes to tier 2 information between COL issuance and authorization for operation, recognizing of course, that such changes open the possibility for challenge in a hearing.

The staff should ensure that this process requires preservation of the severe accident, human factors, and operating experience insights that are part of the certified design, in addition to the more traditional "unreviewed safety question" which today focuses on design basis accidents only. The staff should also consider whether reporting of changes should be at some interval shorter than a year and whether more information, including the impact of such changes on standardization, should be reported than is currently required under 10 CFR 50.59.

The Commission believes that the design certification holder should be limited in making changes to matters resolved as part of the design certification rulemaking (in both tiers 1 and 2) to rulemaking to amend the certification, exemption under 10 CFR 52.63, or waiver under 10 CFR 2.758.

The Commission believes that the staff should be held to the backfitting standards of 10 CFR 52.63 for all matters resolved in the design certification rulemaking (in both tiers 1 and 2).

VII. PROTOTYPE REQUIREMENTS OF NEW AND INNOVATIVE TECHNOLOGY

The Commission approves in principle the requirement for prototype testing of new, innovative technology such as the nuclear power plant control room designs intended for design certification, if the testing is required to confirm expected operational performance under normal and abnormal conditions and thus is essential for the staff's safety determination. The testing would also serve to confirm that unforeseen systems interactions do not exist or occur, as well as to verify the efficacy of human factors embodied in the design as these affect the assimilation of information by plant operators in advanced control rooms and the cognitive processes of the operators in making correct plant control decisions.

In deciding whether prototype testing of innovative technology in control room designs is essential for the staff's safety determination, the staff should consider whether the staff could reach

its safety determination through an alternative program of analysis, experience, testing (other than prototype testing) or some combination thereof. Part 52 allows such an alternative to prototypes with regard to innovative designs of whole plants. See 10 CFR 52.47(b)(2)(i)(A)(l) to (3).

Because prototype testing issues are long lead time issues, it is important that an applicant be alerted to them as soon as possible. The Commission therefore requests that the staff identify any such issue and communicate it to the applicant as soon as practicable, whether the issue arises in connection with an evolutionary design or a passive one. The staff should periodically keep the Commission apprised of its list of such issues.

VIII. SCHEDULE

The staff should provide the Commission with realistic schedules for completion of the design certification reviews, the EPRI evolutionary and passive document reviews and the revised regulatory guidance and SRP.

(EDO) (SECY Suspense: 6/1/91)

IX. OTHER

During the life of a certified design there will likely be changes in technology as well as in engineering codes and standards that should be considered for modifications to that design. During the time that the regulatory guide is being developed, the staff should prepare recommendations on how to deal with this information, including possible regulation changes, and present them to the Commission for approval.

In a related matter, in finalizing the EPRI Requirements Document, the staff should review the document against the SRP, and also review it to ensure that it is sufficient to allow the staff to evaluate the resolution of severe accident issues and the incorporation of experience from operating events in current designs.

cc: Chairman Carr
Commissioner Rogers
Commissioner Curtiss
Commissioner Remick
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