SNC000063

Statement by NRC Chairman, Ivan Selin, to US Council for Energy Awareness (1991)

UNITED STATES
NUCLEAR REGULATORY COMMISSION
Office of Governmental and Public Affairs
Washington, D.C. 20555

No.: S-21-91
Tel.: 301/492-0240

Remarks by Ivan Selin
Chairman, U.S. Nuclear Regulatory Commission
before the
U.S.Council for Energy Awareness
Winter Meeting of the American Nuclear Society
and the Nuclear Energy Forum
Tuesday, November 12, 1991, 8:00 p.m.
San Francisco, California

STANDARD DESIGN CERTIFICATIONS AND BEYOND

Good evening, ladies and gentlemen. I am delighted to be here, if only for a brief time, in San Francisco for your winter meeting. I am especially pleased to have this opportunity to share with you the Commission's thoughts about one of our top priorities, the process for certifying advanced light water reactor standard designs. Tonight I would like to advance the dialogue between the Commission and the industry on some unresolved issues in implementing the licensing process for future nuclear power plants. In particular, I want to talk about standardization of advanced designs.

We all recognize that standardization will be a key element to reviving nuclear power. In the NRC's view, standardized designs will also enhance plant safety. Some of the benefits include trained personnel for plants of common design and commonality of engineering support. These should lead to reducing human errors, improving plant maintenance, and having readily available spare parts. In addition to enhanced safety, standardized designs will also accelerate licensing and reduce costs. These are two important attributes to consider as utilities, ratepayers, and state utility commissions consider what type of new generating capacity to develop.

When the NRC revised its licensing process to create Part 52, we significantly changed our regulations to streamline the entire process for licensing future nuclear power plants. These changes enable NRC to issue early site permits, certify standard designs, and grant combined construction permits and operating licenses. In order to certify standard generic designs, the rule requires us to resolve all generic safety

issues early in the licensing process. The Commission is currently in the process of reviewing the first designs submitted for certification. It has become clear that there are difficulties in reaching early - and final - safety conclusions. We don't have a constructed plant to inspect; in fact, in some areas complete design details are unavailable for staff review. It will take hard work together to resolve these issues so that design certification and licensing can go forward.

The NRC's standardization efforts reflect reciprocal obligations on the part of the NRC and on the part of industry. For our part, the Commission committed to resolve all safety questions on the design early in the licensing process as well as to standardize the safety significant elements of the design. For their part, the industry recognized the economic advantages of standardization beyond that approved by the NRC and committed, as outlined in the Nuclear Power Oversight Committee Position Paper on Standardization, to develop a fully standardized plant design for the first plant and to keep it standard as additional plants are built. And when I use the term "standard," I mean standard for the whole plant.

We have been thinking about the whole process of getting from a certified design to the licensing and construction of a series of standardized nuclear power plants. I want to make it clear from the outset that the Commission does not intend to change Part 52's approach to final design approval and design certification, which we have so laboriously worked out. Under that rule, the Commission must reach a final conclusion on all safety questions associated with the design before the certification is granted.

One issue that the Commission and the industry have been struggling with is the level of design detail needed to reach a final conclusion on all design safety questions. The NRC currently has under review two applications for design certification: General Electric's Advanced Boiling Water Reactor and Combustion Engineering's System 80 plus. The Commission has directed the staff to get all the details necessary to make the final safety decisions on the underlying design of the plant -- not just a decision on the functions. Commitments to meet requirements are not substitutes for details of those designs which actually meet those requirements.

However, the NRC staff has identified a limited number of areas in piping analyses, control room design, and instrumentation and control system design, where, under certain circumstances, they may be able to accept less than a complete, final design if certain "design acceptance criteria" are met. In these three cases, preparation of complete design details may be impractical for several reasons: first, technologies may evolve so rapidly that it would be unwise to freeze all details of the

design many years before an actual plant is ready to be constructed; second, as-built/as-procured information to finalize the design may not be available for pipe stress and support analyses; and third, the cost of fully completing the design may be prohibitive.

We may be able to use the concept of acceptance criteria in the design certification process if the design is sufficiently detailed to permit the staff to make final safety decisions. The design acceptance criteria become a part of the ITAAC which will verify that the final, full design complies with the certification.

Let me elaborate: design acceptance criteria would be a set of prescribed algorithms, parameters, and attributes relied upon by NRC in making a final safety determination on the acceptability of a particular aspect of a proposed design. Design acceptance criteria would be objective (that is, measurable, testable, or subject to analysis using preapproved methods). Design acceptance criteria would also be verified as the first stage of Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC), performed to demonstrate that the as-fully-designed and as-built facility conforms to the certified design. The Commission has requested the staff to explore further the advantages and disadvantages of relying on design acceptance criteria and ITAAC in lieu of the design detail for these limited areas in the design certification.

We have been encouraged by a recent meeting between the NRC staff and General Electric in which progress was made in reaching agreement on a path for settling safety issues in the application for the Advanced Boiling Water Reactor. I sincerely hope this progress continues.

Another issue we have been considering is how to maintain standardization from the first plant to succeeding plants built from the same certified design. We all recognize that the Commission will not have reviewed the design for every aspect of the entire nuclear power plant upon certification. Even with sufficient design detail to make final decisions on all safety aspects, the design will not be complete for the entire non-site-specific portion of the plant at the certification stage. It will be up to the industry to complete, before construction, the additional level of detail for the certified design, and to keep the entire design standardized.

In this regard I would like to go back to a point I made at the beginning of my speech, namely that standardized designs will enhance plant safety and this includes areas not strictly necessary for NRC to make safety conclusions. For instance, a significant number of safety-threatening transients have been

initiated by component failures or malfunctions in the balance of plant.

Insights from the design acceptance criteria and ITAAC concepts may encourage standardization beyond the part of the design that is certified. I hope that the economic disincentives inherent in the cost of the additional design work and the additional rigorous review under the design acceptance criteria will discourage the implementation of multiple realizations of a certified design. In other words, when the additional design detail is developed beyond, yet consistent with, the design certification, there would be a great incentive not to change this design casually.

Finally, the Commission is looking at ways of updating the standard designs. We recognize that during the life of a certified design there may well be advances in technology and in engineering codes and standards which should be evaluated to determine whether they would justify modification of a standard design. In order to provide stability in the design, Part 52 was intentionally written to minimize changes to the certified design by both NRC and the industry once a design certification has been issued. However, it is important to consider defining an appropriate threshold for making changes to the design. It seems appropriate to make changes that are needed to incorporate significant advances in technology.

In those limited areas where design acceptance criteria and ITAAC may be used to reach final safety conclusions at the design certification stage, there may be some point at which the benefits of an advanced technology outweigh the risk of development and review of a new design against the design acceptance criteria and ITAAC, even if this means changing the detailed design that had previously been approved in a separate combined operating license application. In this case, where the design acceptance criteria and ITAAC are met by the new detailed design, the design certificate would not have to be changed.

In other cases where design detail is needed for the Commission to reach a final conclusion on all safety questions, the vendor may wish to accumulate the updates and voluntarily apply for a new design certificate to reflect those changes.

In either case, when changes are made to the detailed design that was reflected in constructed plants, it might be worthwhile to consider whether mechanisms exist to encourage the retrofit of such improvements into the plants built to earlier designs, in order to maintain the benefits of standardization. The Commission has requested the staff to prepare recommendations on how to deal with updating advanced standard designs and to present them to the Commission. The industry should also be

considering how they plan to accommodate design improvements while maintaining standardization from plant to plant.

One process for updating that I am familiar with and I think should be examined for its applicability in keeping systems current is the concept of configuration control and releases in the maintenance of software packages. This is a concept which allows the detailed design and, in fact, the implementation of the package to be known to both the vendor and the user at every instant in time, while permitting both the code and, when necessary, the design to be updated as technology or experience requires.

In summary, I have made eight points:

1. The NRC believes that the design certification process provided for under Part 52 is sound and workable.

2. The Commission is firmly committed to Part 52 and its process for final design approval and design certification.

3. We need enough information from the vendor to fulfill our responsibility, which is early and final resolution of all design safety issues.

4. The industry must complete the additional level of detail on the certified design before construction and keep the entire design standardized from plant to plant.

5. In considering the level of design detail needed for design certification, in extraordinary circumstances, and in limited areas, we can accept something less than the detailed final design at design certification, provided that (a) the staff can make its final safety decisions and (b) the design certification contains elements that will ensure that the final, full design complies with the design certification. I want to emphasize that these areas must remain very limited so that the staff can make a final safety determination on the whole plant.

6. The concept of design acceptance criteria, if coupled with the concept of configuration control for new releases, also appears to provide the flexibility to allow significant advances in technology to be incorporated into the designs for follow-on plants.

7. A design certification as envisioned by Part 52, will achieve a good degree of standardization. In addition, the costs of modifying approved design details and

subsequently demonstrating that they also satisfy the design certification should minimize changes and encourage standardization of the entire design from the first to the Nth plant.

8. The Commission is firmly committed to a process that will facilitate standardization of advanced designs in order to provide lasting benefits in both plant safety and economy. We are exploring mechanisms to encourage that standardization to be maintained from plant to plant, even while incorporating advances to technology.

I have presented some ideas to you tonight that I hope will move us into the next stage of dialogue on the whole process leading to a series of standardized nuclear power plants. What I have said tonight is not a fait accompli; neither is it a trial balloon. It is something that we have been discussing and about which we are interested in hearing your views. I appreciate the opportunity to provide this group the Commission's part of this important dialogue. Thank you.