UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D. C. 20555

December 23, 1993

The Honorable Ivan Selin
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Chairman Selin:

SUBJECT: ELECTRIC POWER RESEARCH INSTITUTE ADVANCED LIGHT WATER REACTOR UTILITY REQUIREMENTS DOCUMENT -- VOLUME III PASSIVE PLANTS

During the 402nd meeting of the Advisory Committee on Reactor Safeguards, October 7-8, 1993, we reviewed the staff Final Safety Evaluation Report (FSER) for Volume III of the Electric Power Research Institute (EPRI) Advanced Light Water Reactor (ALWR) Utility Requirements Document (URD) for Passive Plants. Our Subcommittee on Improved Light Water Reactors held a meeting on October 6, 1993, to review this subject. Our final deliberations on this matter occurred during our 404th meeting, December 9-11, 1993. During these meetings, we had the benefit of discussions with representatives of the NRC staff and EPRI. We also had the benefit of the documents referenced.

In the early 1980s, EPRI established the ALWR program to support the United States utility industry efforts to ensure a viable nuclear power generation option for the 1990s and beyond. The overall objective was to establish utility industry policy along with top-tier technical and operational criteria for evolutionary and passive plant designs that would facilitate standardization and combined licensing. The intent of the program was to resolve as many of the policy, technical, and licensing issues as could be identified before specific plant designs were to be submitted, or approved. The remaining specific detailed technical and operational issues were to be resolved during consideration of detailed design information on specific plant design submittals. The program was to ensure that future nuclear power plants would be safer, simpler, more robust with greater margins, more easily operated and maintained, and more certain of being constructed and licensed without delays. The approach was to use utility experience to establish design philosophy, produce design criteria and guidance to achieve the objective, and to address the policies and regulations of the NRC.

The EPRI ALWR URD is a compendium of technical requirements for the design, construction, and performance of ALWR nuclear power plants for the 1990s and beyond. The URD consists of three volumes:

- Volume I, "ALWR Policy and Summary of Top-Tier Requirements," is a management-level synopsis of the URD, including the design objectives and philosophy, the overall physical configuration and features of a future nuclear plant design, and the steps necessary to take the proposed ALWR design criteria beyond the conceptual design state to a completed, functioning power plant.

- Volume II, "ALWR Evolutionary Plant," consists of 13 chapters and contains utility design requirements for evolutionary nuclear power plants.

- Volume III, "ALWR Passive Plant," consists of 13 chapters and contains utility design requirements for passive nuclear power plants.

We have followed the development of the EPRI ALWR program from its inception and offered suggestions regarding safety improvements on several occasions. We discussed development of the EPRI URD program and the NRC staff reviews during numerous Subcommittee and full Committee meetings. We previously presented our comments to the Commission pertaining to the FSER for Volume II by our report of August 18, 1992.

Volume III is similar to Volume II and many chapters are identical except for the features, requirements, and those policy, technical, and licensing issues unique to the passive plants. Although the Standard Review Plan (SRP) was used by the staff as guidance, the level of detail in the URD did not permit a verification of adequacy. (The SRP was written to support the review of the final safety analysis reports on specific plant designs for which a significant amount of design and construction information is normally available.) The staff conducted its review with the understanding that the EPRI design criteria would meet all current regulations, except where deviations were identified. The staff review of the URD focused on determining whether the EPRI criteria conflict with current regulatory requirements.

In addition, the staff identified a number of policy, technical, and licensing issues which needed resolution in order to complete its review of the ALWRs, including the URD. We provided comments on these issues by our referenced letters. The Commission considered the staff positions on twenty-one of the issues identified in SECY-93-087 pertaining to passive plants.

We believe that the staff has conducted a thorough and comprehensive review. We are in general agreement with the FSER pertaining

to Volume III and its conclusion that meeting the URD requirements could result in a reactor design that would not conflict with regulatory guidelines, and that would be responsive to various policy statements. Nevertheless, we are disappointed in the limited technical basis provided for several of the requirements relating to severe accidents – in particular hydrogen control, melt spreading and coolability, and fuel coolant interaction (steam explosion). In addition, we believe additional consideration should have been given to general design criteria for containment to withstand severe accident loads.

Sincerely,

J. Ernest Wilkins, Jr.

J. Ernest Wilkins, Jr.
Chairman

References:

1. SECY-93-087, dated April 2, 1993, from James M. Taylor, Executive Director for Operations, for the Commissioners, Subject: Policy, Technical, and Licensing Issues Pertaining to Evolutionary and Advanced Light-Water Reactor (ALWR) Designs
2. SECY-92-172, dated May 12, 1992, from James M. Taylor, Executive Director for Operations, for the Commissioners, Subject: Final Safety Evaluation Report for Volume II of the Electric Power Research Institute's Advanced Light Water Reactor Requirements Document, including the following enclosures:
   - Draft Safety Evaluation Report for Volume I, "Program Summary of the NRC Review of the Electric Power Research Institute's Advanced Light Water Reactor Utility Requirements Document," prepared by the Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, dated May 1992
   - Final Safety Evaluation Report for Volume II, "NRC Review of the Electric Power Research Institute's Advanced Light Water Reactor Utility Requirements Document for Evolutionary Plant Designs," prepared by the Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, dated May 1992
3. Electric Power Research Institute, Advanced Light Water Reactor Utility Requirements Document, Volume II, "ALWR Evolutionary Plant," Chapters 1-13 through Revision 4, dated April 1992

4. Draft Commission Paper, undated, from James M. Taylor, Executive Director for Operations, for the Commissioners, Subject: Policy and Technical Issues Associated with the Regulatory Treatment of Non-Safety Systems in Passive Plant Designs
5. Staff Requirements Memorandum dated July 21, 1993, from Samuel J. Chilk, Secretary, to James M. Taylor, Executive Director for Operations, Subject: SECY-93-087 - Policy, Technical, and Licensing Issues Pertaining to Evolutionary and Advanced Light-Water Reactor (ALWR) Designs
6. Letter dated November 10, 1993, from J. Ernest Wilkins, Jr., ACRS Chairman, to Ivan Selin, NRC Chairman, Subject: Draft Commission Paper, "Policy and Technical Issues Associated with the Regulatory Treatment of Non-safety Systems in Passive Plant Designs"
7. Letter dated April 26, 1993, from Paul Shewmon, ACRS Chairman, to Ivan Selin, NRC Chairman, Subject: SECY-93-087, "Policy, Technical, and Licensing Issues Pertaining to Evolutionary and Advanced Light-Water Reactor (ALWR) Designs
8. Letter dated August 18, 1992, from David A. Ward, ACRS Chairman, to Ivan Selin, NRC Chairman, Subject: Electric Power Research Institute Advanced Light Water Reactor Utility Requirements Document -- Volume II, Evolutionary Plants
9. Letter dated August 17, 1992, from David A. Ward, ACRS Chairman, to James M. Taylor, EDO, Subject: Issues Pertaining to Evolutionary and Passive Light-Water Reactors and Their Relationship to Current Regulatory Requirements
10. Letter dated May 13, 1992, from David A. Ward, ACRS Chairman, to James M. Taylor, EDO, Subject: Issues Pertaining to Evolutionary and Passive Light-Water Reactors and Their Relationship to Current Regulatory Requirements
11. Letter dated April 26, 1990, from Carlyle Michelson, ACRS Chairman, to Kenneth M. Carr, NRC Chairman, Subject: Evolutionary Light-Water Reactor Certification Issues and Their Relationship to Current Regulatory Requirements