

U.S. NUCLEAR REGULATORY COMMISSION

10 CFR Part 50

[NRC-2008-0237]

Regulation of Advanced Nuclear Power Plants; Draft Statement of Policy

AGENCY: U.S. Nuclear Regulatory Commission

ACTION: Issuance of draft policy statement and notice of opportunity for public comment.

SUMMARY: The Nuclear Regulatory Commission (NRC) is considering adopting a statement of policy to improve the licensing environment for advanced nuclear power reactors to minimize complexity and uncertainty in the regulatory process. This statement would provide the Commission's policy regarding the review of, and desired characteristics associated with, advanced reactors. This policy statement would be the second revision of the policy statement titled "Regulation of Advanced Nuclear Power Plants; Statement of Policy." The purpose of this revision is to update the Commission's policy statement on advanced reactors to integrate the Commission's expectations for security and preparedness with the current expectations for safety. This draft policy statement is being issued for public comment.

DATES: Comments on this document should be submitted by **[Insert date 60 days from date of publication]**. Comments received after that date will be considered to the extent practical. To ensure efficient and complete comment resolution, comments should include references to the section, page, and line numbers of the document to which the comment applies, if possible.

ADDRESSES: You may submit comments by any one of the following methods. Comments submitted in writing or in electronic form will be made available for public inspection. Because

your comments will not be edited to remove any identifying or contact information, the NRC cautions you against including any information in your submission that you do not want to be publicly disclosed.

Federal e-Rulemaking Portal: Go to <http://www.regulations.gov> and search for documents filed under Docket ID [NRC-2008-0237]. Address questions about NRC dockets to Carol Gallagher 301-415-5905, e-mail Carol.Gallagher@nrc.gov.

Mail comments to: Secretary, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, ATTN: Rulemakings and Adjudications Staff.

E-mail comments to: Rulemaking.Comments@nrc.gov. If you do not receive a reply e-mail confirming that we have received your comments, contact us directly at 301-415-1966.

Hand deliver comments to: 11555 Rockville Pike, Rockville, Maryland 20852, between 7:30 am and 4:15 pm Federal workdays. (Telephone 301-415-1966).

Fax comments to: Secretary, U.S. Nuclear Regulatory Commission at 301-415-1101.

You can access publicly available documents related to this document using the following methods:

NRC's Public Document Room (PDR): The public may examine and have copied for a fee publicly available documents at the NRC's PDR, Public File Area O F21, One White Flint North, 11555 Rockville Pike, Rockville, Maryland.

NRC's Agencywide Documents Access and Management System (ADAMS):

Publicly available documents created or received at the NRC are available electronically at the NRC's electronic Reading Room at <http://www.nrc.gov/reading-rm/adams.html>. From this page, the public can gain entry into ADAMS, which provides text and image files of NRC's public documents. If you do not have access to ADAMS or if there are problems in accessing the documents located in ADAMS, contact the NRC's PDR reference staff at 1-899-397-4209, 301-415-4737, or by e-mail to pdr.resources@nrc.gov.

FOR FURTHER INFORMATION CONTACT: Wesley H. Held, Office of New Reactors, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001, Telephone: 301-415-1583, E-mail: Wesley.Held@nrc.gov.

SUPPLEMENTARY INFORMATION:

Background

On July 8, 1986 (51 FR 24643), the Commission published a policy statement on regulation of advanced reactors in the Federal Register. The Commission's primary objectives in issuing the advanced reactor policy statement were as follows:

- To maintain the earliest possible interaction of applicants, vendors, and government agencies with the NRC.

- To provide all interested parties, including the public, with the Commission's views concerning the desired characteristics of advanced reactor designs.
- To express the Commission's intent to issue timely comment on the implications of such designs for safety and the regulatory process.

On July 12, 1994 (59 FR 35461), the Commission revised the 1986 advanced reactor policy statement by addressing the Commission's policy on metrication (57 FR 46202; October 7, 1992; as revised June 19, 1996 (61 FR 31169)).

Since the events of September 11, 2001, the NRC has assessed potential threats and their possible impacts on the Nation's fleet of operating nuclear power reactors and has required upgrades of physical security measures and mitigative strategies through the issuance of a series of security orders and license conditions. For new nuclear power reactors, the Commission considers it prudent to provide expectations and guidance on security matters to prospective applicants so that they can use this information early in the design stage to identify potential mitigative measures and/or design features that provide a more robust and effective security posture. Therefore, the Commission decided to revise the advanced reactor policy statement to integrate these expectations for security and preparedness with the current expectations for safety.

The NRC is seeking public comment in order to receive feedback from the widest range of interested parties and to ensure that all information relevant to developing this document is available to the NRC staff. This document is issued for comment only. The NRC will review public comments received on the document, incorporate suggested changes as necessary, and issue the final revision.

Commission Policy

Consistent with its legislative mandate, the Commission's policy with respect to regulating nuclear power reactors is to ensure adequate protection of the environment and public health and safety and common defense and security. Regarding advanced reactors, the Commission expects, as a minimum, at least the same degree of protection of the environment and public health and safety and the common defense and security, that is required for current-generation light-water reactors. Furthermore, the Commission expects that advanced reactors will provide enhanced margins of safety and/or use simplified, inherent, passive, or other innovative means to accomplish their safety and security functions.

The Commission's expectation for advanced reactor designs that consider the effects of a large, commercial airplane impact is currently being addressed through rulemaking (Consideration of Aircraft Impacts for New Nuclear Power Reactor Designs – RIN AI19 – ID Docket NRC-2007-0009). The Commission believes that reactors designed with potential aircraft impact considerations resulting from this rule would be more robust than if they were designed in the absence of this rule.

Among the attributes that could assist in establishing the acceptability or licensability of a proposed advanced reactor design, and therefore should be considered in advanced designs, are:

- Highly reliable and less complex shutdown and decay heat removal systems. The use of inherent or passive means to accomplish this objective is encouraged (negative temperature coefficient, natural circulation, etc.).

- Longer time constants and sufficient instrumentation to allow for more diagnosis and management before reaching safety systems challenge and/or exposure of vital equipment to adverse conditions.
- Simplified safety systems that, where possible, reduce required operator actions, equipment subjected to severe environmental conditions, and components needed for maintaining safe shutdown conditions. Such simplified systems should facilitate operator comprehension, reliable system function, and more straightforward engineering analysis.
- Designs that minimize the potential for severe accidents and their consequences by providing sufficient inherent safety, reliability, redundancy, diversity, and independence in safety systems.
- Designs that provide reliable equipment in the balance of plant (BOP) (or safety-system independence from BOP) to reduce the number of challenges to safety systems.
- Designs that provide easily maintainable equipment and components.
- Designs that reduce potential radiation exposures to plant personnel.
- Designs that incorporate the defense-in-depth philosophy by maintaining multiple barriers against radiation release, and by reducing the potential for, and consequences of, severe accidents.
- Design features that can be proven by citation of existing technology, or that can be satisfactorily established by commitment to a suitable technology development program.
- Designs that include considerations for safety and security requirements together in the design process such that security issues (e.g., newly identified threats of terrorist attacks) can be effectively resolved through facility design and engineered security features, and formulation of mitigation measures, with reduced reliance on human actions.

- Designs with features to prevent a simultaneous loss of containment integrity (including situations where the containment is by-passed), and the ability to maintain core cooling as a result of an aircraft impact, or identification of system designs that would provide inherent delay in radiological releases (if prevention of release is not possible).
- Designs with features to prevent loss of spent fuel pool integrity as a result of an aircraft impact.

If specific advanced reactor designs with some or all of the previously mentioned attributes are brought to the NRC for comment and/or evaluation, the Commission can develop preliminary design safety evaluation and licensing criteria for their safety-related and security-related aspects. Incorporating the above attributes may promote more efficient and effective design reviews. However, the listing of a particular attribute does not necessarily mean that specific licensing criteria will attach to that attribute. Designs with some or all of these attributes are also likely to be more readily understood by the general public. Indeed, the number and nature of the regulatory requirements may depend on the extent to which an individual advanced reactor design incorporates general attributes such as those listed previously.

In addition, the Commission expects that the safety features of these advanced reactor designs will be complemented by the operational program for Emergency Planning (EP). This EP operational program, in turn, must be demonstrated by inspections, tests, analyses, and acceptance criteria to ensure effective implementation of established measures. The Commission also expects that advanced reactor designs will comply with the Commission's safety goal policy statement (51 FR 28044; August 4, 1986 as corrected and republished at

51 FR 30028; August 21, 1986), and the policy statement on conversion to the metric measurement system (61 FR 31169; June 19, 1996).

To provide for more timely and effective regulation of advanced reactors, the Commission encourages the earliest possible interaction of applicants, vendors, other government agencies, and the NRC to provide for early identification of regulatory requirements for advanced reactors and to provide all interested parties, including the public, with a timely, independent assessment of the safety and security characteristics of advanced reactor designs. Such licensing interaction and guidance early in the design process will contribute towards minimizing complexity and adding stability and predictability in the licensing and regulation of advanced reactors.

While the NRC does not develop new designs, the Commission intends to develop the capability, when appropriate, for timely assessment and response to innovative and advanced designs that might be presented for NRC review. Prior experience has shown that new reactor designs – even variations of established designs – may involve technical problems that must be solved to ensure adequate protection of the public health and safety. The earlier these design problems are identified, the earlier satisfactory resolution can be achieved. Prospective applicants are reminded that, while the NRC will undertake to review and comment on new design concepts, the applicants are responsible for documentation and research necessary to support a specific application. Research activities would include testing of new safety or security features that differ from existing designs for operating reactors, or that use simplified, inherent, passive means to accomplish their safety or security function. The testing shall ensure that these new features will perform as predicted, provide collection of sufficient data to validate computer codes, and show that the effects of system interactions are acceptable.

During the initial phase of advanced reactor development, the Commission particularly encourages design innovations that enhance safety, reliability, and security (such as those described previously) and that generally depend on technology that is either proven or can be demonstrated by a straightforward technology development program. In the absence of a significant history of operating experience on an advanced concept reactor, plans for innovative use of proven technology and/or new technology development programs should be presented to the NRC for review as early as possible, so that the NRC can assess how the proposed program might influence regulatory requirements.

Finally, the NRC also believes that it will be in the interest of the public as well as the design vendors' and the prospective license applicants to address security issues early in the design stage to achieve a more robust and effective security posture for future nuclear power reactors.

Dated at Rockville, Maryland, this 5th day of May 2008.

For the Nuclear Regulatory Commission,

/ RA /

Annette L. Vietti-Cook,
Secretary of the Commission