

PR 50 and 53
(71FR26267)



P B M R

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OFFICE OF SECRETARY
RULEMAKINGS AND
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Date:
September 11, 2006

Your Ref.:

Our Ref.:
USDC20060911-1

Enquiries:
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Secretary
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

ATTN: Rulemakings and Adjudications Staff.

RE: Initial Comments on Advance Notice of Proposed Rulemaking (ANPR) on
*Approaches to Risk-Informed and Performance-Based Requirements for Nuclear
Power Reactors* (71 Fed. Reg. 26267, May 4, 2006)

Pebble Bed Modular Reactor (Proprietary) Limited (hereinafter referred to as "PBMR") appreciates the opportunity to submit comments on the ANPR for development of a risk-informed and technology-neutral set of regulations in 10 CFR Part 53. We are offering the following comments on several of the important aspects of the ANPR and in support of NRC's upcoming workshop on September 14-15, 2006 on the ANPR. After the workshop, we are planning to submit more detailed comments, including responses to specific questions included in the ANPR.

The NRC's regulations in 10 CFR Part 50 are largely focused on light water reactors (LWRs), and contain little or no provisions that are directly applicable to gas-cooled reactors or other reactor technologies. PBMR is designing and will soon be constructing a gas-cooled reactor in the Republic of South Africa, and we are currently engaged with the NRC in a pre-application review for design certification of the PBMR. Additionally, PBMR is one of the leading candidate designs to form the foundation for the DOE Next Generation Nuclear Plant for hydrogen production. As a result, we believe that PBMR will be the most affected by the NRC's rulemaking to develop regulations that are technology-neutral and risk-informed, and PBMR is well-situated to contribute to the development of those regulations.

We fully support NRC's objectives for this rulemaking:

'(1) Enhance safety and security by focusing NRC and licensee resources in areas commensurate with their importance to public health and safety, (2) provide NRC

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with a framework that uses risk information in an integrated manner, (3) use risk information to provide flexibility in plant design and operation while maintaining or enhancing safety and security, (4) ensure that risk-informed activities are coherently and properly integrated such that they complement one another and continue to meet the 1995 Commission's PRA Policy Statement, and (5) allow for different reactor technologies in a manner that will promote stability and predictability in the long term.' (71 Fed. Reg. at 26268)

We urge the NRC to complete the rulemaking using these objectives. In particular, we support development of an integrated and holistic risk-informed regulatory framework that defines an acceptable level of risk (based upon the NRC's Quantitative Health Objectives) and then ensures that plants achieve that level, with due consideration for uncertainties and defense-in-depth. The case for this action is self-evident. Through considerable effort and cooperation between NRC and the nuclear industry, NRC completed the new 10 CFR §50.69 rule. In the process of developing the rule, it was recognized that the current regulatory framework did not fully assure that the safety significance of some SSC's were understood and that many SSC's received unnecessary attention and special treatment for their very limited safety roles. Thus, the rule provides for the relaxation of special treatment when risk-insights are applied to specific requests for relief from current license conditions. Additionally, the NRC has and continues to spend considerable resources to risk-inform individual regulations. While potentially useful, the incremental approach fails to provide a holistic understanding of the value of and process for fully exploiting modern risk methodologies.

As the NRC recognizes, the development of a risk-informed, technology-neutral framework will be ground-breaking. We do not believe that a rigorous and workable framework can be successfully developed as a theoretical exercise. Absent the application of the framework to an actual non-LWR design, there will be many unknowns and many unidentified issues, and less confidence that the regulations will achieve their objectives.

Therefore, prior to spending substantial effort in developing the details of such a regulatory framework, we strongly recommend that the NRC identify one or more proof-of-concept applications¹, review and approve the application(s) using risk-informed technology-neutral concepts developed by the applicant and accepted by the NRC, and then develop the details of Part 53 based upon the lessons learned from review of the application(s). This approach is similar to the approach used by the NRC to develop 10 CFR §50.69, in which the NRC reviewed and approved a risk-informed exemption for the South Texas Project, and then used the lessons-learned from that review in developing the details of the regulation.

In this regard, we do not believe that the review performed in Appendix E to NUREG-1860 is an appropriate basis for development of a risk-informed technology-neutral rule. First, the review was performed for an LWR, and therefore does not represent a true test of a regulation that is intended to transform NRC's current LWR-biased regulations into technology-neutral regulations. More importantly, the review was theoretical and did not

¹ Ideally, having a ALWR and a non-LWR will provide greater assurance that the new regulations are performance-based and risk-informed as well as being technology neutral. This will also provide a basis for assuring that advanced designs are both safe and pragmatic relative to the NRC established Safety Goals.

get to the detail required to fully understand the ramifications of a risk-informed approach for an actual design. It did not involve the review of a real application with a live applicant, and therefore did not raise and cannot have raised all of the types of issues that will arise from the review of an actual application. Therefore, the review in Appendix E to NUREG-1860 does not represent a true test of whether a risk-informed technology neutral regulatory framework is workable.

As discussed above, PBMR will submit more detailed comments on the ANPR following the workshop in September. In the mean time, we are supporting the Nuclear Energy Institute (NEI) in its efforts to provide comments on the ANPR. Additionally, we offer the following comments on some of the specific issues raised by the ANPR:

- Part 53 should be an *alternative* to Part 50, and should not be mandatory.
- Part 53 should focus on the licensing and regulation of new reactors. Existing reactors are unlikely to desire to engage in the substantial effort that would be required to demonstrate conformance to Part 53. As a result, in developing Part 53, NRC should *not* start with the existing requirements in Part 50 and then attempt to risk-inform those requirements, but instead start with a clean slate and develop a risk-informed framework from the top down, i.e. beginning from the Quantitative Safety Objectives and Safety Goal Policy already established by the NRC and creating a holistic view on how probabilistic and deterministic methods can be woven together to provide a satisfactory regulatory framework that continues to include the principles of defense in depth. We expect that a proof-of-concept project using a non-LWR would provide substantial insights for such an effort.
- Part 53 should be technology neutral. To the extent that technology-specific provisions might be useful, they should be developed in subordinate regulatory guidance. Given the advent of the Design Certification process, it remains unclear whether subordinate, technology specific guidance is even needed since any design that can be certified against performance based, risk-informed regulations would by virtue of the design certification process, develop and document the technology-specific details appropriate to that design type.
- The technical requirements in Part 53 need to be entirely risk-informed and performance-based. Existing technology-neutral requirements in Part 50 should not be grafted onto Part 53, because the requirements in Part 50 are either deterministic or are based upon a deterministic foundation. Use of a performance based, technology neutral regulatory framework will provide greater latitude to reactor designers to assure satisfactory safety while providing greater flexibility in the design process to exploit the benefits of advanced reactor concepts.
- Part 50 currently contains a number of technical requirements that, on their face, are technology neutral. However, in actuality those requirements were developed for a deterministic regulatory framework designed for LWRs. These requirements should be contained in Part 53 only if they 1) are consistent with the risk-informed process, and 2) are truly applicable to all types of reactors. In developing Part 53, NRC should not simply layer risk-informed requirements onto the deterministic requirements in Part 50, but instead should create a wholly new risk-informed regulatory framework.

- PBMR supports the concept that the design of nuclear power plants should provide for defense-in-depth. However, Part 53 should not contain deterministic design requirements for defense-in-depth purposes. Instead, Part 53 should include a functional requirement that applicants perform certain evaluations to ensure that plant designs incorporate appropriate features for defense-in-depth and that the residual margin to the QHOs is acceptable.
- PBMR also supports the concept of performing security assessments of new reactor designs. However, we do not believe that it is feasible to perform a risk assessment for security using current PRA methods and criteria. Instead, we recommend that the security assessment evaluate whether the design includes reasonable measures to protect against design basis threats.
- Performance standards for the containment function should reflect the risk posed by reactor accidents. Part 53 requirements for the containment function should not be stated using deterministic criteria. Mechanistic source terms should be developed for each design as part of establishing the containment function requirements. In particular, a reactor should not be required to have a low-leakage containment, if there is no credible scenario for core melt or substantial core damage.
- Emergency planning (EP) should reflect the risk posed by the plant. Plants should not be subject to deterministic EP requirements. Even the current regulations in Appendix E to Part 50 recognize that the emergency planning zones (EPZ) for gas-cooled reactors (or other types of reactors) should be determined on a case-by-case basis, and should not automatically be subject to the EPZ requirements for LWRs.
- Part 53 should be designed to accommodate, if not encourage, the design certification process in Part 52. In this regard, Part 53 should be structured to permit the certification of standard designs without the need for site-specific information or site-specific evaluations.

PBMR would welcome the opportunity to discuss these concepts in more detail at the workshop in September. Should you have any questions, please feel free to contact me.

Yours sincerely,



Edward G. Wallace
Senior General Manager – U.S. Programs
Pebble Bed Modular Reactor (Proprietary) Limited

From: Carol Gallagher
To: SECY
Date: Tue, Sep 12, 2006 10:08 AM
Subject: Comment letter on ANPR Approaches to Risk-Informed and Performance-Based Requirements for Nuclear Po

Attached for docketing is a comment letter on the above noted ANPR from Edward G. Wallace, PBMR, that I received via the rulemaking website on 9/11/06.

His address is:

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Thanks,
Carol

Mail Envelope Properties (4506BF59.9EC : 5 : 35764)

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Creation Date Tue, Sep 12, 2006 10:08 AM
From: Carol Gallagher
Created By: CAG@nrc.gov

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