

October 3, 2005

MEMORANDUM TO: Farouk Eltawila, Director  
Division of Systems Analysis and Regulatory Effectiveness  
Office of Nuclear Regulatory Research

THRU: Jack E. Rosenthal, Chief /RA/  
Advanced Reactors and Regulatory Effectiveness Branch  
Division of Systems Analysis and Regulatory Effectiveness  
Office of Nuclear Regulatory Research

FROM: N. Prasad Kadambi, Project Manager /RA/  
Advanced Reactors and Regulatory Effectiveness Branch  
Division of Systems Analysis and Regulatory Effectiveness  
Office of Nuclear Regulatory Research

SUBJECT: PUBLIC MEETING WITH PEBBLE BED MODULAR REACTOR (PTY)  
LTD. AND INTERESTED STAKEHOLDERS REGARDING TECHNICAL  
ISSUES AND PLANNING FOR PEBBLE BED MODULAR REACTOR  
PRE-APPLICATION REVIEW

The U.S. Nuclear Regulatory Commission (NRC) staff met with representatives from Pebble Bed Modular Reactor (Pty) Ltd. and interested stakeholders on September 21 and 22, 2005, to discuss technical issues and the planning process for a potential pre-application review for the Pebble Bed Modular Reactor (PBMR). The meeting notice with agenda was published on September 1, 2005 (ML052430619). The staff was provided with PBMR's presentation material by a letter dated September 14, 2005, (ML052660227). Additionally, PBMR provided a letter dated September 21, 2005, transmitting a summary of their outcome objectives (ML052660249). The attendance list for each of the meeting dates is shown as Attachment 1. The NRC staff's presentation is shown as Attachment 2.

This was the second in a series of meetings for the purpose of planning for a pre-application process, consistent with Commission policy on advanced nuclear power plants. The policy supports NRC interaction with advanced reactor applicants and vendors as early as possible to provide for timely regulatory feedback on advanced designs. The first meeting was held on June 30, 2005; that meeting summary is available at ML052010504.

NRC's presentation clarified the objectives for the meeting. The main source of technical information received from PBMR has been presentation slides. Therefore, it is not practical to reach agreements, as requested by PBMR, on matters that may later reveal regulatory and policy issues. However, it should be possible, and will be the purpose of NRC staff interaction, to develop a sound technical understanding of the scope, desired outcomes, and schedules

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associated with discussions on the topics that have been currently identified. These characteristics are critical for effective planning.

The following shows the title of each presentation and a brief synopsis of the material presented:

| <b><u>Title</u></b>  | <b><u>Synopsis</u></b>  |
|--|---|
| Introduction and Agenda  | Describes the agenda, role of the requests for additional information (RAI) from the Exelon PBMR project, and listing of acronyms.  |
| PBMR Safety Design   | Describes plant design, with an identification of the design requirements. Relationship to the German pebble bed technology developed in the AVR and THTR reactors during the 1980's.   |
| Selection of Licensing Basis Events and PRA                                  | Describes the PBMR approach to blending probabilistic and deterministic methods.  |
| SSC Classification & Defense-in-Depth (DID)                                  | Describes the relationship between (1) "required" safety functions, (2) the delineation of regions of the frequency-consequence curve, and (3) the applicable regulatory design criteria.<br><br>Describes the PBMR approach to DID as composed of (1) Design DID, (2) Process DID, and (3) Scenario DID. |
| Physical Security  | Identifies NRC directives and guidance that will form the basis for PBMR addressing physical security issues.   |
| Codes and Standards  | Identifies the design codes and standards that are planned to be used by PBMR.  |
| Carbon Based and Ceramic Materials Selection                                 | Identifies the service conditions for such materials and the basis for selection.   |
| High Temperature Metallic Material Selection                                 | Describes the basis for selecting such materials.   |
| Fuel Design and Qualification  | Describes the process for showing equivalence between PBMR and German fuel manufacturing. Identifies the elements of fuel performance envelope.   |
| Computer Code, Data, and Evaluation Model Verification and Validation (V&V). | Describes the PBMR V&V strategy and safety analysis process.  |
| Single versus Multi-Module Certification                                     | Describes the PBMR approach to addressing regulatory issues when going from single to multiple modules.   |
| Conclusions & Next Steps   | Describes the elements of the PBMR pre-application project plan.  |

During the meeting, PBMR identified the Exelon RAs that would be considered pertinent for each subject area, and indicated the timing to provide responses. They also indicated which of the pre-application topics would be later supported with more detailed documentation in the form of “white papers” submitted for staff review during the pre-application period. PBMR stated that the current projection of schedule for the pre-application phase is expected to extend to the end of 2007 or early 2008. This represents a delay in the projected schedule for submittal of the PBMR design certification application by at least six months to 2008.

Attachments: As stated



**NRC/PBMR PUBLIC MEETING  
WEDNESDAY, SEPTEMBER 21, 2005 9:00 A.M. - 5:00 P.M.  
ATTENDANCE**

| NAME                   | AFFILIATION         | PHONE NO.    | EMAIL ADDRESS  | Check if email notification of future meetings is sufficient (U) |
|------------------------|---------------------|--------------|--|--|
| Peggy Bennett          | NRC/RES/DSARE       | 301-415-7252 | <a href="mailto:mtb1@nrc.gov">mtb1@nrc.gov</a>   | T  |
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| Steve Frantz           | Morgan Lewis        | 202-739-5460 | <a href="mailto:sfrantz@morganlewis.com">sfrantz@morganlewis.com</a>                                     | T  |
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**NRC/PBMR PUBLIC MEETING  
WEDNESDAY, SEPTEMBER 21, 2005 9:00 A.M. - 5:00 P.M.  
ATTENDANCE**

|                 |                     |              |  |   |
|-----------------|---------------------|--------------|--|---|
| Vinod Mubayi    | BNL                 | 631-344-2056 | <a href="mailto:mubayi@bnl.gov">mubayi@bnl.gov</a>   | T |
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**NRC/PBMR PUBLIC MEETING  
WEDNESDAY, SEPTEMBER 21, 2005 9:00 A.M. - 5:00 P.M.  
ATTENDANCE**

|                |                   |              |  |   |
|----------------|-------------------|--------------|--|---|
| Peter J. Kang  | NRC/RES/MEB       | 301-415-6800 | <a href="mailto:pjk@nrc.gov">pjk@nrc.gov</a>   | T |
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| John Fair      | nrc/nrr/de        | 301-415-2759 | <a href="mailto:jrf@nrc.gov">jrf@nrc.gov</a>   | T |
| Steven Arndt   | NRC/RES/DET       | 301-415-6502 | <a href="mailto:saa@nrc.gov">saa@nrc.gov</a>   | T |
| William Koo    | NRC/NRR/DE        | 301-415-2706 | <a href="mailto:WHK@NRC.GOV">WHK@NRC.GOV</a>   | T |
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**NRC/PBMR PUBLIC MEETING  
WEDNESDAY, SEPTEMBER 22, 2005 9:00 A.M. - 5:00 P.M.  
ATTENDANCE**

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| Fred A. Silady    | Technology Insights | 858-455-9500 | <a href="mailto:silady@ti-sd.com">silady@ti-sd.com</a>                                       |   |
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| Jeff Halfinger    | BWX Technologies    | 434-522-5941 | <a href="mailto:JAHalfinger@bwxt.com">JAHalfinger@bwxt.com</a>                               |   |
| Jim Kim           | NRC/NRR             | 301-415-4125 | <a href="mailto:jsk@nrc.gov">jsk@nrc.gov</a>   |   |
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## ATTENDANCE

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## **NRC-PBMR Technical Discussion**

- Purpose:
  - Discussions between NRC and PBMR will clarify mutual understanding on focus topics.
  - This understanding will facilitate planning for pre-application activities (scope, outcome, schedule, resources).
- Objectives:
  - PBMR will present technical information relevant to scope, desired outcomes, and schedules for each focus topic.
  - NRC gains understanding of PBMR's scope, desired outcomes, and schedules for each focus topic.
  - PBMR receives initial feedback on these matters.
- Outcome:
  - Sufficient understanding of each focus topic to support:
    - Pre-application planning re. Scope, Outcomes, Schedule, & Resources
    - NRC feedback on expected technical content of each focus topic.