August 1, 2001

MEMORANDUM TO: Ashok C. Thadani, Director
Office of Nuclear Regulatory Research

FROM: Thomas L. King, Directork **/RA/**
Division Systems Analysis and Regulatory Effectiveness
Office of Nuclear Regulatory Research

SUBJECT: MEETING WITH THE EXELON GENERATION COMPANY, THE DEPARTMENT OF ENERGY, AND OTHER INTERESTED STAKEHOLDERS REGARDING THE PEBBLE BED MODULAR REACTOR

On July 17 and 18, 2001, the Nuclear Regulatory Commission (NRC) staff held a day-and-half meeting with the representatives of the Exelon Generation Company, the Department of Energy (DOE), and other interested stakeholders to discuss topics associated with the Pebble Bed Modular Reactor (PBMR) pre-application review. This meeting was the third in a series of planned monthly topical meetings that are being conducted between the NRC staff, Exelon and DOE during the course of the review.

Attachment 1 contains the meeting agenda. Attachment 2-a and 2-b contain a list of attendees for each day. The Exelon presentation material is included in Attachments 3-a through 3-e. The Working Draft A of a discussion paper titled, "Selection of Licensing Basis for the Pebble Bed Modular Reactor in the United States," submitted by Exelon, is included as Attachment 4. Additionally, another submittal, "PBMR Response to NRC Questions From June 13, 2001 Meeting," is included as Attachment 5. NRC presentation material is included as Attachment 6. On the second day, in a closed session, Exelon discussed proprietary information with D. Lee, N. Broom, K. Smit, J. Van derWesthuizn, K. Van Rensburg, I. Drodskie, A. George, J. Venter (all of PBMR Pty.) and J. Hufnagel participated via teleconference. The presentation material used in this session is not being released to the public

On July 17th, in his opening remarks, Stuart Rubin (NRC) stated that the main objective of the PBMR pre-application review process is to develop and feedback to Exelon NRC guidance concerning the resolution of significant issues related to the siting, construction, and licensing of a PBMR in the US. At this meeting, discussions on PBMR licensing approach as well as fuel performance and qualification continued from the June meeting, and a new discussion topic – codes and standards – was introduced.

Kevin Borton (Exelon) led the discussion on the planned scope of PBMR technical reviews and discussed the schedule for presenting information at the monthly meetings. Attachment 3-a contains the presentation material. Exelon's objectives were to get an agreement on the licensing approach and the Part 52 licensing process. Format content and resolution process for license application will be a topic of discussion at the August meeting.

Joseph Sebrosky et al. (NRR) requested information on the schedule for fabrication of major components as part of PBMR construction to support the staff's readiness review for new plant construction (Attachment 6). Diane Jackson et al. discussed the status of open items related to the nine white papers that were submitted by Exelon in May 2001, and were addressed at length at the June meeting with Exelon. There were additional brief discussions led by the following: Edward Wallace (Exelon) on the fuel cycle impacts in reference to 10 CFR Part 51; James Turdici (OCIO) on the requirements on annual fees in 10 CFR Part 171; Michael Dusaniwskyj and Norman St. Amour on antitrust review under 10 CFR 50.33a; and Norman St. Amour on financial protection requirements. As noted previously in other meetings with Exelon, resolution of various issues will require Commission policy decisions. Finally, there was a re-cap of the open items identified in the June meeting and due dates for various submittals by Exelon and responses by NRC were re-affirmed. The staff also stressed the importance of timely submittals of revised documentation from Exelon on various topics discussed at the meeting.

The discussion on the proposed PBMR licensing approach continued in the afternoon of July 17, with Kevin Borton (Exelon) leading the discussion. Edward Wallace (Exelon) and Fred Silady (Exelon consultant) made individual presentations and K. Fleming (Exelon consultant) participated via teleconference. F. Silady discussed in detail the integrated process for selection of licensing basis events (LBE) for the PBMR using the top level regulatory criteria (Attachment 3-b). The proposed LBE selection process is risk-informed. The method for initial screening of regulations for applicability to the PBMR was illustrated by using examples from the application of a similar process in the 80's for the modular high temperature gas reactor (MHTGR). The PBMR probabilistic risk assessment scope was outlined and also discussed was applicability of the established probabilistic risk assessment standards for light-water reactors to the PBMR. Exelon sought out staff comments and feedback on the LBE selection process and agreement on the use of risk-informed LBE as a foundation of the licensing approach. Edward Wallace discussed the PBMR licensing approach by preliminary screening of current NRC regulations, including the General Design Criteria (GDC), for applicability to PBMR (Attachment 3-c). Since PBMR will use both a probabilistic and deterministic approach, he also discussed plans for a pilot project to deterministically evaluate "regulatory applicability." The key elements of this decision-making process were depicted in a logic diagram that will be used to determine applicability (complete or partial) or inapplicability to the existing regulations or the intent of regulations, including the GDC. Exelon had assembled a seven-member expert panel, comprising a variety of technical and legal expertise, to look at a sample of existing regulations, to determine their applicability to PBMR.

On July 18, Robert Calabro (Exelon consultant) discussed the PBMR fuel irradiation program (Attachment 3-d). The objectives of the PBMR fuel irradiation program are (1) to confirm performance of the PBMR fuel (manufactured at the Pelindaba plant) to be within the envelope of the German-measured irradiation data, and (2) to provide irradiation data for the steady state and transient operating conditions as closely possible to those expected in the demonstration plant. He described the program plan and schedule, irradiation measurements to be taken, and the PBMR proposed joint international irradiation program. He presented the proprietary-blocked-out information related to the proposed test programs which are planned to be conducted at the Safari reactor in the Republic of South Africa, and in the Russian IVV-2M reactor. The proprietary information was later discussed in a closed session.

Vijay Nilekani (Exelon), with Dr. Johan Venter and others via teleconferencing, presented an overview of the selected areas of codes and standards applicable to the PBMR design seeking staff's comments and feedback (Attachment 3-e). The areas covered were: civil, structural and seismic; reactor pressure vessel and the primary pressure boundary; electrical and instrumentation & control; and fire protection. Dr. Joseph Muscara (NRC) led the staff's discussion. During exchange at this meeting and various comments from the staff, several areas were identified where NRC endorsements of the industry standards or specific code cases would be required. Further discussion on the Codes and Standards, which will continue at the August and September meetings, will give staff a feel for the required lead time for various review and endorsement activities.

The dates for the future 2-day topical meetings are: (1) August 15 and 16 (revised) to continue discussions on licensing approach, fuel performance, and qualification as well as the Codes and Standards to be used, and to provide an overview of analytical codes to be used; and (2) September 19 and 20 to close out discussions on licensing approach and fuel performance, and to continue discussion of Codes and Standards. The staff will coordinate the meeting schedule with Exelon and the final dates will be announced in a formal meeting notice.

The meeting adjourned at 1:30 p.m. on July 18th. Any questions regarding this meeting should be addressed to Stuart Rubin (SDR1@nrc.gov), (301) 415-7480.

Attachments: As stated

ADAMS PACKAGE NO. ML012140060

cc w/o attachments: See attached list

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