Report of Pebble Bed Modular Reactor (PBMR) Meeting between Exelon and the NRC
January 31, 2001
1:30 - 4:00 PM
Room T10A1

Over 65 people attended the meeting.

Representatives from NRC included the following offices: RES, OCM, OCFO, NMSS, EDO, OGC, EDO, ACRS, NRR.

Representatives from the following outside organizations attended: Exelon; Stone & Webster; Nuclear Energy Institute; Westinghouse; Nuclear Control Institute; Department of Energy; Tokyo Electric; McGraw-Hill; International Atomic Energy Association; Los Alamos National Laboratory; Oak Ridge National Laboratory; University of Tennessee; Dominion; GSI, Adams Atomic Engines, Inc.; Bechtel; Union of Concerned Scientists; Scientech; Licensing Support Services; General Atomics, Foundations for Nuclear Studies; Radiation Science & Health INC; Innovative Technology Science; Constellation Nuclear; ISL, Inc.; BNL; INEEL; Morgan, Lewis & Bochius.

Representatives from Exelon Generation gave a 2 and ½ hour presentation.

The objectives of the meeting were to accomplish the following:
- Provide an overview of Exelon's involvement with the PBMR
- Provide a summary of the PBMR design and identify potential licensing issues
- Provide Exelon's preliminary ideas on licensing approach (highlight of major key technical issues identified to date) and schedule
- Provide Exelon's near term goals over the next nine months (through September 2001)
- Begin a dialogue with the NRC to reach agreement on the process, schedule, and resources.

This meeting came as a result of Exelon Generation formally requesting a meeting with the NRC to discuss Exelon's objectives of constructing a PBMR (High Temperature Gas Reactor (HTGR)) in the United States and the licensing process for the PBMR. Exelon is interested in building PBMRs in the United States in order to obtain a source of safe, efficient, and economical nuclear power.

The Republic of South Africa (RSA) is nearing the preliminary design stage of the PBMR prototype. There are 4 parties who hold interest in the PBMR and are funding the basic design and detailed feasibility study (DFS): Exelon (12 ½% stake), BNFL (22 ½% stake), ESKOM (40% stake), and Independent Development Corporation of South Africa (25% stake). Once the DFS is completed in June 2001, the parties need to make a decision about continuing on with the PBMR project. Exelon expects that the decision to build the PBMR prototype will take place by the parties by the end of 2001. It is anticipated that the prototype will take 3 years to construct and will require 1 year of startup testing. If Exelon decides to go forward with the PBMR in the United States, they anticipate submitting an application to the NRC in the middle of 2002.

The PBMR is a high temperature helium cooled reactor. The PBMR design is a hybrid of the lessons learned from three German plants that are no longer in operation. It is estimated that the construction schedule for this type of reactor would be approximately 24 months and the operating life would be 40 years. The preliminary design of the PBMR is relatively simple. It

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includes 30 different types of systems as opposed to 120 types of systems in a conventional nuclear reactor plant.

Exelon identified the licensing approach they feel would need to be taken to license a PBMR in the United States.

- Apply for an environmental safety permit (ESP) for multiple PBMRs prior to a plant license application.
- Apply for Part 52 multi-reactor construction-operating license (COL).
- Utilize remote shutdown area (RSA) prototype test results.
- Receive Part 52 design certification following the successful completion of the RSA project and operation of the first U.S. Reactor.

Exelon identified the "next" steps that they envision the NRC taking in regard to a PBMR being licensed and constructed in the United States.

- Establish a working group to develop the HTGR regulatory framework.
  - Establish the key HTGR design elements that are critical to meeting NRC safety and regulatory objectives.
  - Identify the current licensing criteria that are applicable to HTGR designs.
  - Identify any additional licensing criteria that uniquely apply to HTGR designs.
- Establish an NRC PBMR project manager.
  - Determine appropriate PBMR licensing process and schedule.
  - Develop a plan to provide gas reactor technology education to NRC staff.

From Exelon's standpoint, the near term goals (through September 2001) for the NRC include:

- Development of estimates for NRC fees, staffing, and schedules by **March 2001.**
- Developing HTGR preliminary regulatory framework by **May 2001.**
- Identifying the necessary HTGR policy/regulation changes and schedule by **September 2001**, which include the following:
  - Reaching an agreement on the PBMR licensing process.
  - Determining the NRC PBMR project schedule and budget estimates.
  - Identifying PBMR applicable regulations and any additional specific requirements.
- Establish HTGR regulatory framework/policy by **July 2002.**

During the presentation, Exelon mentioned that their goal is not to involve direct U.S. government funds. NRC activities regarding the PBMR would be fully fee-recoverable. In the presentation package, Exelon acknowledged that they realize the NRC must address resource and time constraints against competing priorities. They mentioned that the DOE might provide funding to the NRC for lab costs related to research on codes. There was a brief discussion between RES and Exelon at the end of the presentation about Exelon's near term goals for the NRC.

After the meeting, Tom King (RES project manager for PBMR) discussed with me the plan for readying the agency for a potential PBMR license application. RES has developed a draft plan that they are preparing to forward to the Commission for review and approval (some revisions need to be made based on the meeting). The original plan, which had been forwarded to offices for concurrence did not give resource estimates for offices other than RES and according to RES the estimates for RES could change depending on the outcome of the meeting. The offices of NRR and NMSS felt that the meeting with Exelon should take place before the plan is forwarded to the Commission. Therefore, those offices and the OCFO did

not give concurrence and RES agreed to wait until after the meeting so the plan and paper could be revised accordingly. The NRC draft plan is close to the Exelon proposal for the NRC. NRC is going to see if Exelon agrees with the NRC proposed plan. From this meeting and the revised proposed plan, the offices of RES, NRR, NMSS, OGC, and ACRS should be able to identify resource implications.

It is anticipated that the revised proposed paper and plan will be forwarded to the offices for concurrence in the next two weeks..

WEEKLY HIGHLIGHTS:

Pebble-Bed Modular Reactor (PBMR)

On January 31, 2001, the staff met with Exelon Corporation, at their request, to discuss Exelon's plans to explore possible licensing of the PBMR in the U.S. The PBMR is a 110 mwe modular high temperature gas reactor based upon a design currently under development in South Africa. Approximately 80 people were in attendance at the Meeting, including representatives from National Laboratories, ACRS, industry and the public. Exelon described the design and its desire for preapplication interactions with NRC for the purpose of establishing the feasibility of licensing the PBMR.