

RF: DE  
11:00  
NR

From: Stuart Rubin  
To: Farouk Eltawila  
Date: 2/28/01 10:48AM  
Subject: Commission Q&As

RES

Farouk:

Attached is my first draft on the Q&As on Question 4 under License Renewal. I think that Tom King and Ashok will need to look at this before we send it to the EDO. After you have provided your revisions you can send it to NRR for their comment/revisions/use and input, however. NRR has the lead for "A," RES has the lead for "B." "C" does not have a lead assigned on the markup you gave me.

Stu

CC: Brian Kildee

T/22

H. License Renewal:

Question 4

(A). What is the NRC's involvement in the licensing process of the Pebble Bed Modular Reactor in South Africa?

The National Nuclear Regulator (NNR) is the licensing authority for nuclear power reactors in the Republic of South Africa. The NRC has several cooperative agreements with the NNR for the exchange of nuclear safety information and research on the development and maintenance of nuclear safety analysis tools. These safety analysis tools involve areas such as severe accident analysis, thermal-hydraulic analysis and probabilistic risk assessment. As part of NRC's continuing cooperative relationship with the NNR, several NRC senior staff members met with the NNR in February of this year. The purpose of the meeting was to discuss the NNR's preliminary safety and licensability assessments of the Pebble Bed Modular Reactor design concept that they are conducting in preparation for a potential license application for a Pebble Bed Modular Reactor in the RSA. However, the NRC is not involved in the licensing process of a Pebble Bed Modular Reactor in the RSA.

(B) Do you believe that a reactor of this type will be built and licensed in the United States?

Reactors of this type may be built in the United States. The Exelon Generating Company (a subsidiary of Exelon Corporation, one of the nation's largest utility services companies) is a partner in a multi-national joint venture of companies that is funding a basic design and detailed feasibility study (DFS) for a 110 MWe pebble bed modular reactor (PBMR). This technical work is being done in the RSA. The DFS is scheduled to be completed in June 2001 and a decision on whether to build a prototype PBMR, on the Koeberg nuclear power plant site, near Capetown, is expected in late 2001. The decision will be dependent on the economics of the plant design, approval from the partners and the approval of the government of South Africa. Exelon has indicated that 3 years would be required to construct the prototype and one additional year would be required for the conduct of extensive testing of the plant. Exelon has requested that the NRC begin a pre-application review of the PBMR design to establish the regulatory framework for the PBMR including and additional licensing criteria which uniquely applies to advanced HTGR designs such as the PBMR. Depending on the outcomes of these activities, Exelon has indicated that they would decide whether to apply for an NRC license to build and operate one or more PBMRs in the United States. Their decision to proceed with a PBMR licensing application will depend on whether Exelon concludes that the design will provide safe and reliable electrical energy that can compete successfully in the U.S. energy markets.

C. What are your views on this design? Is the design considered to be safer than existing reactors?

The Commission's Policy Statement on Advanced Reactors states that advanced reactors, such as the PBMR, must as a minimum, provide at least the same degree of protection of the public and the environment that is required for current generation light water reactors. Further, the policy states that the Commission expects that advanced designs provide for enhanced margins of safety. Each new generation of reactor designs is therefor expected to provide for improved safety characteristics over previous generations. The Commission staff has not yet begun to assess the safety of the PBMR design and is not in a position to conclude with

certainty whether the PBMR would provide for improved safety. However, the PBMR design concept involves aspects that have the potential to provide for enhanced margins of safety. These design concepts include: relatively low core power density with high core thermal capacity which result in very slow increase in core temperature in the event of a loss of coolant accident; the ability of the ceramic core components including the fuel to withstand very high temperatures; the ability of the reactor core to dissipate decay heat by natural cooling processes in the event of a loss of and to therefore not involve standby core cooling systems; and coated fuel particles that have the ability to retain fission products, even at high temperatures. Such inherent safety characteristics of the PBMR design concept would need to be evaluated as part of any NRC safety review of the PBMR.