

November 14, 2000

Release

MEMORANDUM TO: Chairman Meserve
Commissioner Dicus
Commissioner Diaz
Commissioner McGaffigan
Commissioner Merrifield

FROM: William D. Travers */RA/*
Executive Director for Operations

SUBJECT: ADVANCED REACTORS

Over the past several years there has been increasing interest worldwide in new advanced reactor designs. This interest has been stimulated by various activities, including DOE's "Generation IV" program (a multi-national cooperative effort to develop requirements, technology, concepts and conduct research on the next generation of power reactors), the South African program to develop a modular pebble-bed HTGR (PBMR) and U.S. industry initiatives. Such designs go beyond the currently certified LWR designs (ABWR, System 80 + and AP-600) in terms of the use of advanced technology and innovative design concepts.

Although the future interest in building such designs in the U.S. is not certain, it is prudent for NRC to invest a small amount of resources to keep abreast of these programs and to support interactions with the designers of such concepts early in the design process to ensure fundamental safety issues and potential solutions are identified. Such early interactions will contribute to the effectiveness and efficiency of the licensing process, should such designs ever reach that stage. Such early interactions are also consistent with the Commission's Advanced Reactor Policy Statement. Accordingly, NRR has taken the lead to interact with Westinghouse on AP-1000 and with NEI on their "New Nuclear Plant Development" initiative and, as discussed below, RES will take the lead for interactions on longer range and non-LWR advanced reactor initiatives.

These longer range and non-LWR advanced reactor design initiatives are likely to raise some fundamental issues due to their reliance on new technology and non-traditional ways to accomplish defense-in-depth. This was the case in the 1980s when RES reviewed three DOE sponsored advanced non-LWR reactor concepts (MHTGR, SAFR, PRISM) and issued three draft pre-application safety evaluations. In fact, since our current regulatory requirements are primarily based upon LWR technology and existing plant designs, fundamentally new safety and licensing criteria will need to be developed. Development of these criteria could use a risk-informed, performance-based approach so as to be flexible enough to accommodate non-LWR technology. The advanced designs and new criteria will need to address issues such as:

- what accidents should the plants be designed for?

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- what PRA issues need to be addressed to support application to new designs and technology?
- how should defense-in-depth be addressed?
(e.g., how should containment and EP requirements be determined?)
- what source term and requirements should be used for siting?
- level of staffing and control room design, particularly in view of multi-modular designs and broad application of advanced I&C.

In addition, research needs and NRC infrastructure needs (e.g., analytical tools) will need to be assessed.

To better scope out the issues and develop proposed future actions for NRC, I have directed RES to take the lead to initiate interaction with DOE and the Generation IV participants. This effort will require a small commitment of resources (approximately one FTE in FY2001 and possibly a small amount of contractor support; e.g., \$100K). DOE has indicated they will be willing to discuss mechanisms for providing funding for NRC activities related to the Generation IV Program. In addition, if NRC involvement is requested on the South African PBMR project, RES will take the lead (in coordination with NRR) to plan and implement NRC work in this area. Within the next several months, we will develop a proposed approach and schedule for future NRC involvement in both of the above activities. Following development of the proposed approach and schedule, I will inform the Commission of developments in this area, including resource implications.

cc: SECY
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*** Previously concurred.**

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