

March 28, 2002

MEMORANDUM TO: John T. Larkins, Executive Director  
Advisory Committee for Reactor Safeguards

FROM: Farouk Eltawila, Director */RA/*  
Division of Systems Analysis and Regulatory Effectiveness  
Office of Nuclear Regulatory Research

SUBJECT: DRAFT ADVANCED REACTOR RESEARCH PLAN

The Office of Nuclear Regulatory Research (RES) has developed a Draft Advanced Reactor Research Plan, in response to the staff's commitment to the Commission in the Future Licensing and Inspection Readiness Assessment (FLIRA) report, SECY-01-0188, dated October 12, 2001. RES considers this plan to be in its early stages as the plan will necessarily change as knowledge and experience grow.

In developing this plan, the staff focused on determining the critical information that will be needed to establish safety standards for these new reactor designs, to explore issues involving great uncertainties, and to develop the staff's independent capabilities to review them. At this point, the plan does not delineate the research that will be conducted by the NRC, rather, it identifies the information gap that exists at NRC in terms of the necessary tools and data, and it encompasses activities to either apply existing knowledge or create new knowledge. It is also recognized that an applicant with a new reactor design is primarily responsible for demonstrating the safety of the proposed design.

Where possible, we have maintained a technology-neutral perspective. However, when design-specific safety issues are addressed, or future modifications to the existing analytical codes for specific applications are discussed, the plan discriminates between different technologies .

The key topics in this research plan are (1) the regulatory framework based on risk-informed, performance-based principle, (2) accident analysis (Probabilistic Risk Assessment (PRA)) methods and assessments, human factors, and I&C), (3 ) reactor/plant analysis (thermal-fluid dynamics, nuclear analysis and fission product release and transport), (4) fuels analysis (fuel performance testing, and fuel qualification), (5) materials analysis (graphite behavior and high-temperature materials performance), (6) structural analysis (containment/confinement performance, external challenges), (7) consequence analysis (dose calculations, environmental impact studies), (8) nuclear materials safety and nuclear waste safety, and (9) nuclear safeguards and security.

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Accordingly, the costs included in this preliminary draft, which is pre-decisional and for internal NRC use only, do not currently reflect the fact that some of this information will be obtained from others. We expect to maintain this plan as a living document, and we will modify it to accommodate any new issues and technologies as they arise. As information becomes available, we will update the plan resources to reflect only activities that will require NRC resources consistent with the FY2003-2005 budget projections.

Please note that this plan addresses all the issues identified in Dr. Dana Power's trip report that was prepared following the HTGR Safety and Research Issues and Development Workshop on October 10–12, 2001. To implement this plan, several interoffice task groups will be formed to identify these activities that the licensing office needs.

Our objective is to meet with the ACRS for their comments and feedback on the advanced reactor research plan, specifically on higher level issues involving its objectives, structure and scope. We anticipate that this will be the first of a series of meetings, and that more detailed discussions with the ACRS on research associated with specific technical and safety issues will follow in subsequent meetings. We intend to provide the advanced reactor research plan to the Commission in the Fall of 2002.

Attachment: As stated

cc:

J. Giitter, RES

J. Lyons, NRR

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