

POLICY ISSUE NOTATION VOTE

February 24, 2004

SECY-04-0030

FOR: The Commissioners

FROM: William D. Travers
Executive Director for Operations

SUBJECT: DEVELOPMENT OF A MORE ROBUST MATERIALS RESEARCH PROGRAM

PURPOSE:

To obtain Commission approval of staff plans for a more robust materials research program.

BACKGROUND:

The staff briefed the Commission on the status of programs, performance, and plans for the Office of Nuclear Regulatory Research (RES) on March 27, 2003. In a staff requirements memorandum, dated April 11, 2003, the Commission directed the staff to inform the Commission of options for developing a more robust materials program in RES. While the activities discussed in this paper primarily address issues for the Office of Nuclear Material, Safety and Safeguards (NMSS), much of this research would support the Office of Nuclear Reactor Regulation (NRR) and the Office of Nuclear Security and Incident Response (NSIR) as well.

DISCUSSION:

The nuclear materials research program has been a relatively small program, with a stable funding base, in terms of both staff resources and contract support. This program has met the needs of the regulatory staff in NMSS. The research has tended to focus on topics specifically requested by NMSS or NRR, with a modest 'anticipatory' research component.

Over the next few years, the Commission will be faced with a major challenge in radiation protection. The International Commission on Radiological Protection (ICRP) is proposing new series of recommendations outlining a simplified system of radiation protection.

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These recommendations, when fully articulated in 2005, could significantly affect Nuclear Regulatory Commission (NRC) regulations, policies and guidance. To effectively support the NRC mission, RES will participate in national and international activities to revise radiation protection recommendations and guidance. These recommendations will need to be evaluated to ensure that there is a sound and robust technical basis for such changes. Any NRC issues or concerns will need to be communicated to the ICRP in a timely fashion in order to have an effective role in influencing the outcome. Secondly, if the Commission were to consider adopting the new recommendations, research would be needed to assess the potential impact on our licensees and to support development of a sound technical basis for any revision to our regulations (e.g., Parts 20 and 30) and supporting guidance.

In addition, there will continue to be emerging radiation protection and health effects issues where research is needed to support NRC staff evaluations. For example, existing internal dose assessment models were developed during the 1970's and 1980's. However, new biophysical models were developed and adopted by the international community during the 1990's. These models have not yet been adopted by the NRC. If the NRC adopts the newer biophysical models, existing health physics codes and tools would need to be revised or developed. Furthermore, a variety of dispersion and environmental models are being used to assess the consequences from the malevolent uses of radioactivity, yet the appropriateness of their application for this purpose needs confirmation. Finally, there is a need to continue to modify existing computer codes used by staff to allow their continued use as computer hardware and operating systems change.

Another regulatory need is to streamline and focus regulatory processes using risk insights and performance based approaches where feasible. This is consistent with the regulatory strategy to focus NMSS licensing and inspection efforts consistent with risk insights to be as efficient and effective as possible in light of resource limitations in the national materials program. For example, RES can assist NMSS by providing the technical basis for refining the categories for exempt, general, and specific byproduct and source material licenses under 10 CFR 30, 31, and 32, as well as 10 CFR Part 40 based on modeling as well as analysis of operational data. Use of risk insights from NUREG/CR-6642, "Risk Analysis and Evaluation of Regulatory Options for Nuclear Byproduct Material Systems," and other sources, such as the recent work conducted by Sandia National Laboratories to identify materials of concern from a risk perspective, when combined with empirical operational data, may provide information on how to adjust the regulatory scheme to be more effective and efficient, for both safety and security. As part of the overall effort, staff will consider what is being done internationally in this area. Specifically, staff would assure that our research activities are harmonized with those of the International Atomic Energy Agency (IAEA), as described in the Code of Conduct for the Safety and Security of Radioactive Sources, and TECDOC-1344 on, "Categorization of Radioactive Sources."

In considering these issues, the staff developed two options to identify the most cost-effective way to proceed. These are described briefly in the following paragraphs.

Option 1

Under the first option, RES staff would continue to rely on the existing approach of identifying research needs through the development of user need requests by the program offices. A

small anticipatory research component would continue to be considered. This approach is an effective method for identifying research needs and prioritizing program office requests, as all user needs are reviewed and approved by program office management before submission to RES. Under this approach, RES staff would continue to interface with other federal agencies and the international community involved with radiation protection issues in the use of radioactive materials.

This option reflects a more reactive approach to identifying and initiating regulatory research and this approach relies on the supported offices recognizing the changing environments and frequently reacting to outside proposals. Using this approach, RES staff do not necessarily gain the direct experience of participating as peers in the evolution of the science and anticipating changes. NRC would still expect to have some early impact on regulatory issues through international organizations such as the IAEA and Nuclear Energy Agency (NEA), and through collaboration with the Department of Energy (DOE) and the Environmental Protection Agency (EPA). This approach would allow RES to participate in the application of research to regulatory challenges.

This is the less costly option in the near term.

Option 2

Under the second option, RES would initiate a more pro-active radiation protection research program. This research program would be comprised of three facets. First, user need requests that identify radiation protection issues will continue to be solicited from the program offices. This ensures that technical support and research resources respond to high priority issues identified by the program offices.

Second, RES staff would become more actively involved with the development of radiation protection recommendations by giving increased attention to positions and papers developed by national and international organizations including government bodies charged with developing these recommendations. Examples of such groups are the ICRP, the United Nations Scientific Committee on the Effects of Ionizing Radiation, foreign governments, and IAEA as well as various committees that fall under the IAEA and NEA. Examples of national groups include the National Council on Radiation Protection and Measurements and the Health Physics Society, and other Federal Agencies such as EPA and DOE. RES staff would participate, to a greater extent, in the development of the scientific information. Through more active participation, NRC could also strengthen its position in the international community and be recognized as scientific peers and experts in both radiation protection and health effects issues.

Under this option, NRC would need access to the same information, tools and analytical capabilities as others in the national and international arena and would assess this information for its regulatory implications. RES may have to strengthen the staff's technical expertise and experience in order to be effective in this arena. This would enable NRC to more actively engage in national and international efforts to establish or revise radiation protection recommendations and standards, and would ensure that NRC's issues and views are considered in the development of any recommendations and standards. Furthermore, staff capabilities in mathematical modeling and the development, modification and use of computer

codes will be enhanced. Significant attention would be given to training NRC staff in the supported offices on the use of NRC sponsored computer codes.

Third, a more robust forward thinking research program would be initiated. RES staff would propose research projects that would be evaluated and prioritized during the budget formulation process. A draft radiation protection research plan (attached) has been proposed, and includes a number of research proposals that are forward thinking in nature.

This option would be more costly than the current program. However, if greater reliance were placed on in-house staff rather than contractors, overall growth should be modest. If this option were phased in over a 2-3 year period with a small increase (\$400-600K) in the current combined reactor, waste and materials budget, its goals could be achieved with re-arrangement of current priorities and a mix of contractors and staff.

Recommendation

The staff recommends adopting the second option, as this approach will give NRC a greater opportunity to participate in a meaningful way in the development of new recommendations and guidance involving radiation protection issues. A draft research plan is attached which incorporates the approaches outlined under option 2.

RESOURCES:

Resources need to implement this plan will be addressed through the planning, budgeting, and performance management process (PBPM) based on final Commission decision.

COORDINATION:

This paper has been coordinated with the Office of the General Counsel, which has no legal objection. The Office of the Chief Financial Officer has reviewed this Commission paper for resource implications and notes the potential for unbudgeted requirements. Offices will consider unbudgeted resources through the PBPM process.

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