



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

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✓ The Honorable John Glenn, Chairman  
Subcommittee on Energy, Nuclear  
Proliferation and Federal Services  
Committee on Governmental Affairs  
United States Senate  
Washington, D. C. 20510

Dear Senator Glenn:

Thank you for your letter dated February 6, 1979, in which you requested the Commission's views on certain specific aspects of nuclear waste management. The responses to your questions are enclosed. I would like to point out that while the answer to Question 2 is collegial, the answer to Question 1 expresses my views as well as those of Commissioners Kennedy and Ahearne. It is my understanding that Commissioners Gilinsky and Bradford may be forwarding their views on this question under separate cover.

If you have any further questions concerning this subject, please let me know.

Sincerely,

Joseph M. Hendrie

Enclosure:  
Response to Questions  
in Senator Glenn's  
ltr to Chairman  
Hendrie dtd 2/6/79

cc: Sen. Jacob K. Javits

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QUESTION 1. Accordingly, I would like to be advised as to the Commission's state of confidence at the present time that nuclear waste materials will be safely cared for, the basis for this confidence, and any steps the Commission intends to take in its licensing process to reflect its present thinking on this matter.

ANSWER

As your letter indicates, in its December 4 comments on the IRG report, the Commission said that it is committed to reassessing its basis for confidence as new data are developed and progress is made in the Federal waste management program. The Commission retains its basis for confidence that wastes will be disposed of safely. The accumulating evidence from government programs continues to support the Commission's belief that a technical solution for safe permanent disposal of high level wastes will be available when needed. This is further reinforced by the fact that nuclear waste management is continuing to receive the serious attention which it deserves. The activities of the Interagency Review Group on Nuclear Waste Management (IRG), and the plans and activities of the U.S. Department of Energy (DOE), demonstrate the serious attention that the waste management problem is receiving in Washington.

NRC is continuing its own independent exploration of the health, safety, and environmental implications of geologic waste disposal. The NRC's technical support program was initiated in April 1976, with site suitability scoping studies for geologic repositories in bedded salt to determine those aspects of a site that are important to safety, to identify those parameters important to the migration of radionuclides, and to understand the geologic process that might be encountered by a repository over its lifetime. Since then, additional research and technical support studies have been performed by the NRC which consider repository design and waste form. These studies have shown that the uncertainties in our current understanding warrant a conservative approach to the development of geologic repositories. There have not been, however, any indications from our studies that geologic disposal is not feasible; furthermore, preliminary results from our radionuclide transport modeling studies indicate that releases from a repository to the biosphere over very long time periods would be negligible. Our confidence in the technical feasibility of geologic disposal has been supported by the results of the IRG report.

The draft report of the IRG<sup>1</sup> concluded that "Successful isolation of radioactive wastes from the biosphere appears technically feasible for periods of thousands of years provided that the system view is utilized rigorously."

A National Research Council report done for the NRC indicates technical community support for the technical feasibility of solidifying high level wastes for geological disposal<sup>2</sup>.

The fact that the classic tenets of waste management, such as incorporating the wastes in borosilicate glass and placing the glass billets, suitably contained, in bedded salt deposits, are being questioned reflects a realization that prior concentration on engineering solutions with a less than desirable earth and materials science input has been too simplistic. As we continue to investigate these scientific foundations of solutions to long-term waste disposal, we will very likely identify additional areas of concern, but we will also be resolving issues that were previously thought to be problems. On balance the weight of information continues to support our confidence in the feasibility of safe disposal.

Our confidence that a technical solution for safe permanent disposal will be available when needed is further buttressed by the fact that nuclear waste management is now receiving the serious attention it deserves.

The Interagency Review Group has made a significant contribution to the resolution of the complex issue of high-level waste management in three important areas. First, the strong involvement of upper level management in the group has promoted greater understanding, expanded the visibility of waste management in the respective agencies, and provided stronger support for waste management programmatic needs. Second, by its interagency nature, the IRG represents a commitment by the agencies to support a national waste management policy. Finally, the IRG has made a significant effort to involve the public, which serves to expand our understanding, provide a diversity of viewpoints, and subject our decisionmaking to vigorous scrutiny.

In recent months, both the NRC and DOE have acted to increase their emphasis on waste management. For instance, DOE has elevated radio-

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<sup>1</sup>"Report to the President by the Interagency Review Group on Nuclear Waste Management," TID-28817 (Draft), October 1978.

<sup>2</sup>"Solidification of High Level Radioactive Wastes," draft report of the National Research Council, 1978.

active waste management to an Office Director level. Similarly, NRC has created a new Division of Waste Management within the Office of Nuclear Material Safety and Safeguards. There have been significant increases in support from FY 1976 to FY 1979 in both agencies for waste management activities, which, I believe, reflect a healthy realization of the magnitude of the effort that is required to construct, operation and regulate a repository, and a commitment to get on with it.

The licensing process that we have proposed involves our critical review of DOE plans at a number of decision points. There are two major approvals envisioned: full approval to construct the repository, and approval to receive and emplace the waste in it. These major steps are likely to be taken in several substeps, which could include site selection, site clearing and sinking of the initial shaft, completion of underground and surface permanent structures, a possible testing phase, full operation, and closure.

It is currently estimated that it will take 9 to 12 years from the submittal of an initial application, through the various review stages and construction stages, to the granting of a license to receive waste. There may then be a period during which the option of retrievability of the waste is maintained. During this period, and at each of the steps in the licensing sequence, we anticipate that our understanding of the behavior of waste in a repository will increase, the uncertainties associated with the data will decrease, and sophistication of our analytic modeling capabilities will increase. Our ability to have confidence in the successful long-term operation of the facility will thus increase as these steps are taken.

In summary, the Commission finds no reason at this time to modify its reactor licensing process because of any uncertainties in waste management programs.

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QUESTION 2

In this regard, I would like to be informed of the Commission's views as to the principle areas where additional R&D on nuclear waste is needed over the next several years, and the pace at which these R&D efforts need to be undertaken so as to complement the Commission's licensing and regulatory activities on a timely basis.

ANSWER:

Broadly speaking, over the next several years research and development is needed to develop and test methods for selecting and evaluating sites, and for designing, constructing, operating and decommissioning repositories in which high-level wastes and spent fuel can be safely stored with maximum assurance that they will remain isolated from the biosphere until they pose no undue hazard to future generations. Safe methods for transporting wastes and spent fuel is another area of comparatively lesser magnitude which requires additional research and development.

NRC is operating on the basis that the bulk of the research and technical work will be done by DOE to support their license application. NRC contemplates research only to the extent to permit us to independently evaluate the DOE program and application for a license. Our work to date has identified seven general topical areas where DOE research is needed. These are:

- (1) assessment and testing of methods for processing waste into chemical and physical forms which will provide adequate radiological safety for handling;
- (2) development of improved methods for measuring and understanding the mechanisms, rates, and probabilistics governing the migration of radionuclides to the biosphere due to hydrological processes, or other natural phenomena or by the activities of man in the distant future;
- (3) development and testing of probabilistic risk analysis models which will integrate and analyze the multi-disciplinary data needed to provide predictive information for siting and licensing of high-level waste management facilities;
- (4) development of adequate understanding of the characteristics and effects of geochemical and hydrological processes which will be involved with waste and containers which are deposited in repositories;

- (5) assessments of the engineering designs and mining engineering practices that may likely be used in developing and operating repositories in geologic media;
- (6) confirmation of the short-term reliability and long-term durability of containers needed for handling and storing waste and spent fuel; and
- (7) development of data to confirm understanding of the radiological pathways and potential impacts on man that could occur if radioactive products from the wastes should be released into the biosphere in the future.

All of these items are key areas requiring resolution before a repository can become operational. Since research can turn up new problems as well as resolve old ones each of the above items should be pursued as quickly as possible. The most urgent are those which relate to site selection and to information required to evaluate the likely performance of the site (items 2, 3, and 4 above). This information is needed first so that an evaluation of the suitability of the site for a repository can be made to support a construction authorization. This is the point where a substantial commitment is made.

DOE has informed us that an application may be made for the first commercial repository as early as January, 1982. It would be highly desirable to have the research results at the time the application is submitted.

Since we estimate 2 to 3 years to complete all reviews and another year for a hearing prior to construction being authorized, there is time to accept and use confirmatory research information well into the review period. NRC would, therefore, need the research information from DOE within the next 4 to 6 years for the first commercial repository. If WIPP were to be licensed this would be accelerated.

This is a demanding pace. At the present time, we do not fully understand the extent to which the DOE program is geared to produce results in the time frame discussed. To overcome this deficiency, the Division of Waste Management has started a program to actively and openly conduct a detailed review of the DOE's waste management program; both to identify deficiencies in their program and ours, and to avoid unnecessary overlaps.

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