

Department of Energy Washington, DC 20585

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March 31, 1993

Mr. Lake Barrett, Acting Director, Office of Civilian Radioactive Waste Management U.S. Department of Energy 1000 Independence Avenue, S.W. Washington, D.C. 20585

Dear Mr. Barrett:

In his January 12, 1993 letter to Senator Johnston, Secretary Watkins promised to develop a conceptual revised program strategy for public review. The enclosed document represents the final report of the Task Force on an Alternative Program Strategy that was established to fulfill that commitment. The report incorporates refinements to the preliminary draft you received on March 8, based on discussions with key people in the program.

In developing this alternative strategy, the Task Force has drawn on the extensive analyses of program options, and discussions of those options with stakeholders, undertaken by the program during the last four years. The Task Force has also drawn on the recommendations the program has received from such external bodies as the Nuclear Waste Technical Review Board, the National Academy of Sciences' Board on Radioactive Waste Management, and the Nuclear Regulatory Commission's Advisory Committee on Nuclear Waste.

The alternative strategy seeks to better achieve the objectives of the program while satisfying concerns of stakeholders. We believe that the alternative strategy could serve as a basis for a broad public review and discussion of key aspects of the program. Such a review could help improve the strategy and develop the external support needed to enable it to succeed.

In submitting this report, the Task Force would like to recognize the important role played in its discussions by Kenneth Baskin, Thomas A. Cotton, and J. Michael McGarry, III. We would also like to acknowledge the help that we received from many other participants in the waste program. We are particularly grateful for the efforts of Robert Waxman of the Office of General Counsel and the exceptional writing support from John Burns of the M&O.

Thomas H. Isaacs, Chairman U.S. Department of Energy

9401060003 931116 PDR COMMS NRCC CORRESPONDENCE PDR Sincerely,

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Maxwell B. Blanchard U.S. Department of Energy

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09:21 52025869608 PROPOSED ALTERNATIVE STRATEGY FOR THE DEPARTMENT OF ENERGY'S CIVILIAN RADIOACTIVE WASTE MANAGEMENT PROGRAM A TASK FORCE REPORT

PROGRAM REDIRECTION

Shift program goal from rapid full-scale disposal to the early licensed demonstration of the capability for disposal

- No urgent safety reason for rapid large-scale permanent disposal, and some oppose premature irreversible action
- New approach gives maximum flexibility: provides the option for disposal without foreclosing other options.

Responds to recommendations of independent groups:

- National Academy of Sciences (NAS)
- Nuclear Waste Technical Review Board (NWTRB)
- The Congressional Office of Technology Assessment

NEW STRATEGY BENEFITS

- Licensed demonstration of disposal sconer and with smaller investment than the current strategy
 - More likely to meet 2010 disposal goal despite budget limits, schedule slips
- Clear interim milestones to mark steady progress toward the early achievement of licensed disposal capability
 - Reduced investment risk and perception of irreversible momentum by tying increasing resource commuments to clear progress
 - Measurable progress despite budget constraints
- Lower time and cost of characterization by focusing on tests needed to confirm or refute a clear safety concept

KEY ELEMENTS OF THE NEW STRATEGY

I. The early development and broad external review of a robust repository safety concept

- Design for direct and stringent safety goals
- Use demonstrable site features and a conservative engineered barrier system to reduce site testing needs and simplify post-closure performance demonstration
- · Focus characterization on testable hypotheses

2. Periodic suitability findings during characterization to lower investment risk and, if the findings are favorable, to increase confidence in the safety of the site, with ongoing external review process to enhance credibility

3. Earlier formal pre-licensing interactions with and preliminary findings by the NRC so increasing investments in the site can be based on increasing confidence that a repository can be licensed

4. Early offsite waste packaging R&D facility to package small amount of waste needed for early licensed disposal and allow later development of improved waste packages

5. Phased development plan for ficensed full-scale repository to allow earlier, smaller steps

- Early licensed demonstration of small-scale disposal using a conservative system design: begin design tests with small amount of waste (packaged in the R&D facility) soon after construction authorization, while building a small pilot packaging facility at repository
- Optimize repository design using information from characterization, licensing, small-scale operation; construct, operate full-scale facilities when needed
- Design to allow extended open operation and monitoring to confirm that the repository is performing as expected

6. Clear separation of waste acceptance from emplacement in the repository for disposal. Surface storage at the repository after licensing could allow adequate waste acceptance if MRS capacity is not available

 Multi-purpose containers could allow storage with minimal surface facilities and serve as a robust, retrievable disposal packages

7. Management and institutional initiatives to ensure that the new strategy is carried out both efficiently and inclusively

- Commission a thorough independent review of the program's organization and management
- Institutionalize a systematic process for interaction with the external scientific and technical community
- Establish a Stakeholder Advisory Committee

8. Plan for extensive public review to develop as broad a consensus as possible

- Seek review of the alternative strategy by external technical and regulatory bodies: the NAS' Board on Radioactive Waste Management, the Nuclear Waste Technical Review Board, and the NRC's Advisory Committee on Nuclear Waste
- Use a recognized, independent consensus-building group to convene one or more stakeholder forums
- Seek wide public review through a Federal Register notice and comment period



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SUMMARY OF A PROPOSED ALTERNATIVE STRATEGY FOR THE DEPARTMENT OF ENERGY'S CIVILIAN RADIOACTIVE WASTE MANAGEMENT PROGRAM

A TASK FORCE REPORT

The Problem with the Current Strategy

Background

The Nuclear Waste Policy Act of 1982 (NWPA) directed the Department of Energy to lead the nation's effort to create a system for the safe and final disposal of highly radioactive wastes in one or more deep geologic repositories. The central issue the Act resolved was whether the best way to protect human and environmental health and safety was to develop a system for permanent disposal of those wastes or to store them for long periods of time before deciding on disposal. Congress decided that the generation which first enjoyed the benefits of nuclear energy had an obligation to give future generations a clear option for disposal and to bear the political and financial costs of developing that option.

To meet that obligation, NWPA set an ambituous schedule for DOE to site two geologic repositories and to begin disposal in the first by January 31. 1998. In 1987 amendments, Congress directed the Department to study only one site at Yucca Mountain, Nevada to decide whether it is suitable for a repository.

NWPA required utilities with nuclear power plants to pay a fee to fund the disposal program. In return, the Federal government would accept their spent (used) reactor fuel for disposal. (As allowed by the Act, DOE will also accept waste from defense nuclear activities for disposal.) The expectation was that acceptance would begin in 1998 at the first repository, and that waste would be emplaced in the repository as soon as it was accepted. That would avoid the need for substantial surface storage for extended periods at reactors or Federal storage facilities.

The law required the Environmental Protection Agency (EPA) to set safety standards for disposal, and the Nuclear Regulatory Agency (NRC) to issue regulations to enforce those standards. Because of concerns about the workability of the unprecedented standards and regulations that were issued, Congress in 1992 directed the National Academy of Sciences (NAS) to study the issues and make scientific findings and recommendations. EPA is to issue a new safety standard for the Yucca Mountain size that conforms to these recommendations, and NRC is to revise its regulations accordingly.

The Current Strategy

Over the decade since NWPA, the disposal program's strategy, based on its interpretation of the legislative mandate and regulatory requirements, has sought

- in a single large step and under a tight schedule, to achieve the first-of-a-kind licensing of a first-of-a-kind repository for isolating wastes from the human environment for many thousands of years.
- in a single large step and as rapidly as possible, to build a full-scale repository and begin disposing of the bulk of the nation's inventory of spent fuel and high-level radioactive waste.

The goal of that strategy is rapid, full-scale disposal. The strategy assumed that we owed the future no less than the rapid, full and final disposal of waste. A broad range of stakeholders did, in fact, share that assumption when NWPA was passed.

The Problem

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The technical and institutional optimism underlying the ambhious schedules in the NWPA has not been borne out. The planned start date for operating the first repository has slipped from 1998 to 2003 to 2010, and may slip even further. As a result, a repository can no longer serve as the basis for accepting spent fuel from milities on a dependable schedule.

As schedules have slipped, the estimated costs of studying a site to determine its suitability for a repository and prepare a license application have tisen from \$100 million in 1982 to \$6.3 billion now. Current plans call for spending at least \$6.3 billion and waiting until the year 2001 before deciding on suitability and a license application. Another \$3 billion and nearly 9 more years would be invested before NRC finally decides whether to allow disposal in the repository. That creates two critical problems for the program and for its various "stakeholders":

huge investment risk on the one hand.

• and irreversible momentum on the other.

The Congress, utilities and ratepayers see high and escalating costs with no clear assurances of a favorable result in hand or in sight. The State of Nevada, some environmentalists, public interest groups and others fear that, with so much time and money invested and so much pressure for a favorable result, the program cannot afford to find the site unsuitable or unlicenseable.

In brief, the current disposal program requires a large and growing investment of time and money before the achievement, or even assurance, of any significant results to justify that investment. That is the direct result of a strategy that seeks, in single large steps, to license and operate a repository for rapid full-scale disposal.

The Alternative Strategy

The overriding purpose of the disposal program is to protect human and environmental health and safety. The alternative strategy is designed to ensure the achievement of that purpose and, in the near term, to build increasing confidence that it will be achieved. The goal of the alternative strategy is the early development and licensed demonstration of the capability for full, safe and final disposal in a repository. By "demonstrating capability." we mean to begin actual waste disposal in a licensed repository that could accommodate large amounts of waste. The alternative strategy assumes that, while there is no urgent need for rapid full-scale disposal, we do need;

- to demonstrate as soon as possible that we have the bicensed capability for disposal.
- to build increasing confidence in the near term that we will develop and demonstrate such an early capability, and
- to make provisions for meeting waste acceptance obligations in a way that does not depend on schedules for disposal in a repository.

We need that early capability to give future generations a real disposal choice. We also need that early capability — and increasing confidence that it will occur — to remove the greatest obstacle to providing interim storage facilities to meet our obligation to willities: the fear that such facilities will become "de facto" repositories.

Today few. if any, stakeholders believe there is any urgent need for rapid full-scale disposal. The NRC has said that wastes can be safely stored for up to 100 years. Moreover, there is a greater sense today that, while we owe future generations a clear option for disposal, we do not want to present them with anything irreversible or irremediable. Meeting the goal of early disposal capability would fulfill our obligation to give future generations a real disposal option without foreclosing any other options.

The alternative surategy aimed at that goal resembles the approaches taken by such countries as Sweden and Canada and recommended by the National Academy of Sciences, the Nuclear Waste Technical Review Board, and the Congressional Office of Technology Assessment.

Benefits of the Alternative Strategy

The alternative strategy seeks to build confidence that the program is on the right track by tying the increasing commitment of resources to clear results and deciding the suitability of the site, developing the repository and demonstrating its safety through a sequence of earlier, smaller, surer steps rather than a few later, larger ones.

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The alternative strategy would:

- Achieve the licensed demonstration of disposal sooner and with smaller investment than the current strategy would.
- Establish clear interim milestones to mark steady progress toward the early achievement of licensed disposal capability. Such milestones reduce both investment risk and the perception of ineversible momentum by linking the increasing commitment of resources to clear progress.
- Ensure the efficient evaluation of the suitability of the Yucca Mountain site by concentrating on those tests needed to confirm or refute a clear and robust concept of repository safety.

Key Elements of the Alternative Strategy

The Department has been exploring disposal program options, both internally and with stakeholders, since the summer of 1989. The alternative strategy draws upon that work. Thus, none of the individual elements of the alternative strategy is new. Each has been proposed in some form at one time or another by participants in the waste program or outside observers, and some are already being incorporated into the program. What is new is the integration of these elements into a coherent strategy for making steady, demonstrable progress towards the goal of licensed geologic disposal in a way that responds to the concerns that have been raised about the current strategy.

In developing this strategy, the Task Force carefully considered and explicitly rejected the option that some have proposed of putting waste in a repository before a license.

The major elements of the alternative strategy proposed by the Task Force for discussion are:

1. The early development and broad external review of a robust repository safety concept. The program needs a clear and widely understood safety concept to guide and focus its efforts while the EPA standard and NRC regulations are under review and revision.

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- Establish direct and stringent repository safety goals.
- Define that set of multiple, redundant barriers

 both natural and engineered that, both
 singly and together, are most demonstrable
 and offer high margins of safety.
 - Include those site features that are most important to safety and can be demonstrated at reasonable time and cost.
 - Employ a conservative engineered barrier system, including a waste package that exceeds regulatory requirements, to enhance confidence in safety.
- Submit the safety concept to broad review by the U.S. and international scientific and technical communities and key U.S. stakeholder groups.
- Focus site study and repository development efforts on those tests needed to confirm or refute the safety concept.

2. Periodic suitability findings during site study to lower investment risk and, if favorable, to increase confidence in the safety of the site. An ongoing external review process would be set up to help ensure the credibility of the findings.

3. Earlier formal interactions with and preliminary findings by the NRC so that increasing investments in the site can be based on increasing confidence that a repository can be licensed.

4. An early offsite waste packaging R&D facility to package small amounts of waste that can be emplaced in a repository for confirmatory testing soon after a license is received. The facility would also serve as a center for developing improved waste packages during the life of the repository.

5. Phased development of the repository after licensing so that confirmatory testing with actual waste does not have to wait until full-scale construction and operation, and so that the full-scale system can take advantage of the latest technology improvements and the results of earlier, small-scale operating experience. Key steps include:

- Start with an early licensed demonstration of small-scale disposal using a conservative system design.
- "Optimize" the repository design on the basis of the information developed during site study, licensing and small-scale operation.
- Construct and operate full-scale facilities when needed.
- Design the repository to allow an extended period of open operation and monitoring to confirm that the repository is performing as expected.

6. Clear separation of waste acceptance from emplacement in the repository for disposal. Surface storage at the repository after a disposal license is received could be used to allow adequate waste acceptance despite slower repository loading. if there is no other interim storage facility with adequate capacity.

 Multi-purpose containers – licensed by the NRC for storage, transportation and disposal – could both allow acceptance and storage with minimal surface facilities and serve as robust, remievable waste packages.

7. Management and institutional initiatives to ensure that the new strategy is carried out both efficiently and inclusively.

 Commission a thorough independent review of the program's organization and management. with particular emphasis on management of scientific investigations to ensure that they are focused on timely and efficient resolution of questions important to site suitability and disposal safety.

- Institutionalize a systematic process for interaction with the external scientific and technical community.
 - Establish a Stakeholder Advisory Committee reporting to the program's director.

8. Plan for extensive public review to develop as broad a consensus as possible about any changes to the program strategy.

- Seek review of the alternative strategy by external technical and regulatory bodies: the Board on Radioactive Waste Management of the NAS, the Nuclear Waste Technical Review Board, and the NRC's Advisory Committee on Nuclear Waste.
- Contract with a recognized, independent consensus-building group to convene one or more stakeholder forums.
- Seek wide public review through a Federal Register notice and comment period.

Task Force Report - Since Summer of 1909 DOE and sisksholders

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PROPOSED ALTERNATIVE STRATEGY

for the Department of Energy's

Civilian Radioactive Waste Management Program

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- license is received **Develop Improved waste** packages for later Integration Into system

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