

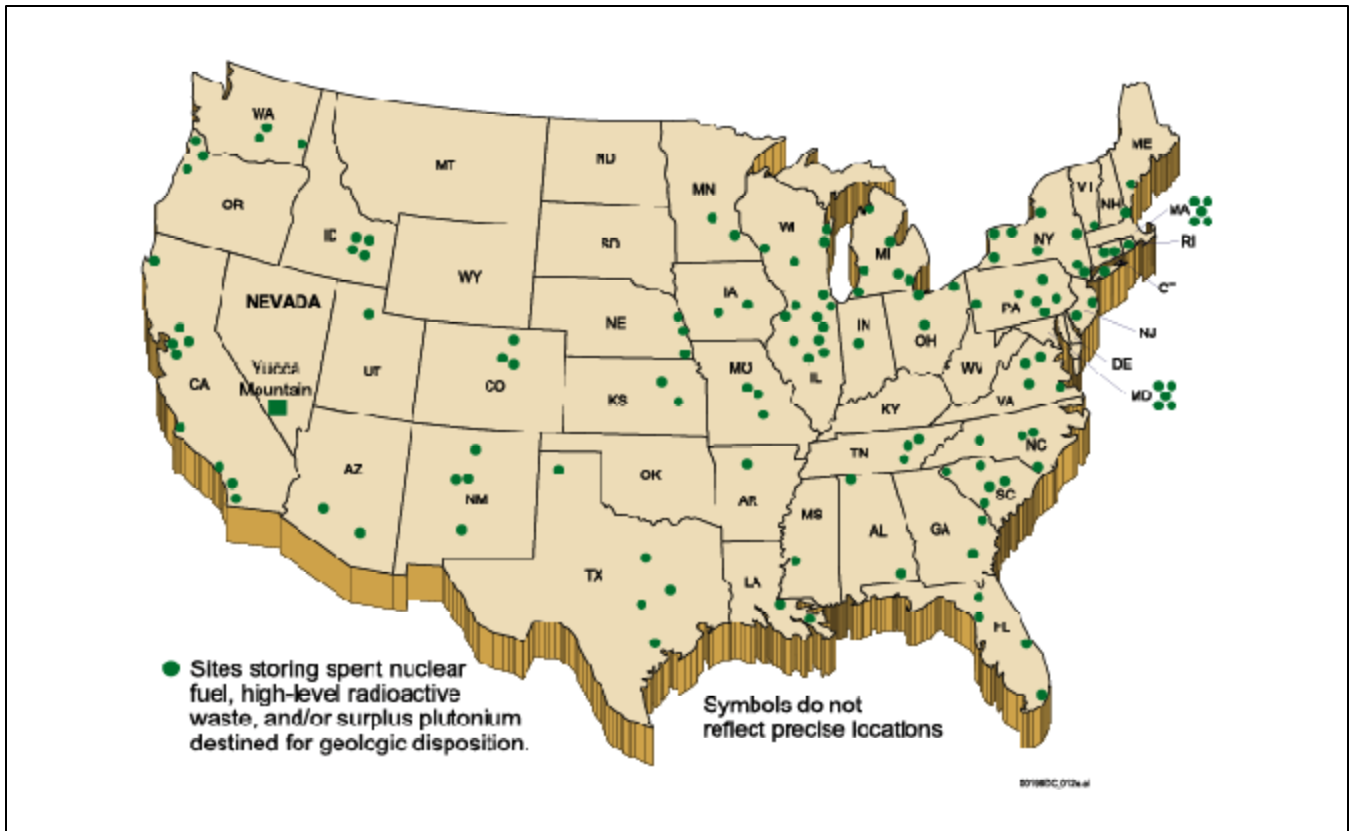
Chapter One

Introduction

Decisions made many decades ago to pursue a nuclear weapons program and to develop nuclear energy for civilian use committed the Nation to perpetual custody of a large and growing inventory of radioactive materials, as described in Appendix C. Spent nuclear fuel from commercial power plants constitutes the largest part of the inventory. The balance consists of nuclear materials managed by the Department of Energy (DOE), which result primarily from defense activities and include spent nuclear fuel from weapons production, domestic research reactors, and foreign

research reactors; high-level radioactive waste from reprocessing spent nuclear fuel; surplus weapons-usable plutonium waste forms; and naval spent nuclear fuel.

Before reaching a consensus in the Nuclear Waste Policy Act of 1982 (NWPAct), the United States studied methods for the safe storage and disposal of radioactive waste for more than 40 years. Many organizations and Government agencies participated in these studies. After analyzing a range of options, disposal in a



A national map of current waste locations

geologic repository emerged as the preferred long-term environmental solution. The NWPA and related statutes established the framework for addressing the issues of radioactive waste disposal and designated the roles and responsibilities of the Federal Government and the owners and generators of the waste.

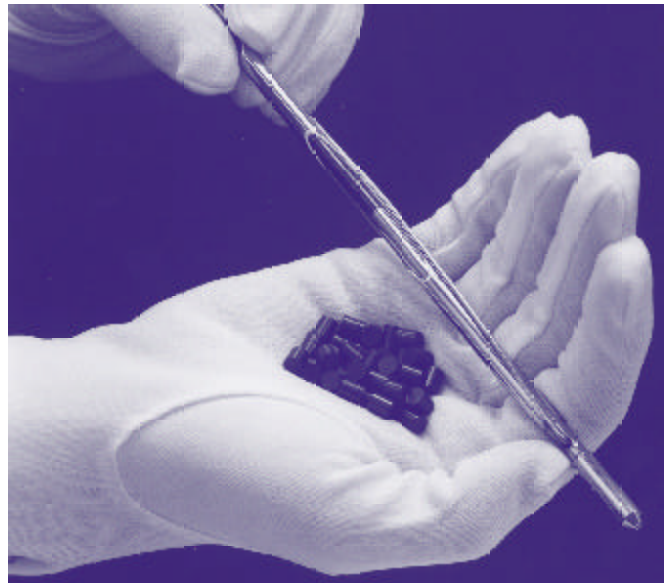
The NWPA created the Office of Civilian Radioactive Waste Management (OCRWM) to develop a permanent, safe geologic repository for disposal of spent nuclear fuel and high-level radioactive waste. The NWPA affirmed the authority of the Nuclear Regulatory Commission (NRC) under the Atomic Energy Act and Energy Reorganization Act to authorize construction and operation of the repository. Initially, OCRWM was concerned primarily with disposal of commercial spent nuclear fuel. In 1985, President Reagan determined that defense-related high-level radioactive waste would also be disposed of in the repository. Since then, disposal of DOE-managed nuclear materials has grown in importance.

The Program Profile in Appendix B provides basic information on the Civilian Radioactive Waste Management Program.

The Nuclear Waste Problem and National Policy

Geologic disposal remains the basic goal of the Nation's high-level radioactive waste management policy. Developing this disposal capability supports national policies for environmental protection and national security:

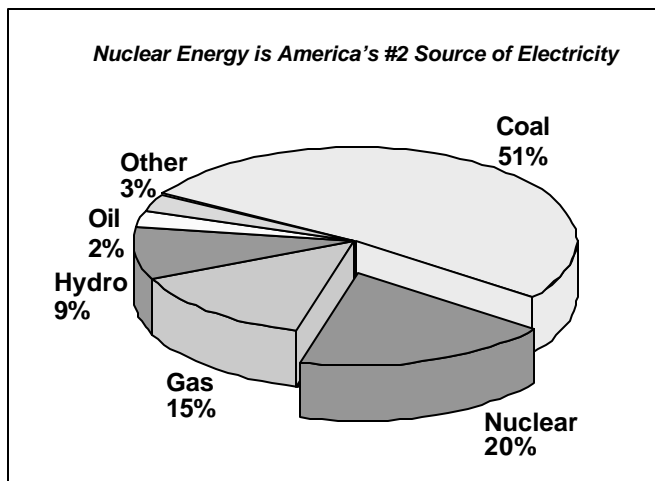
- The United States is committed to a once-through fuel cycle and to disposing of commercial spent nuclear fuel in geologic repositories. This policy assumes that fuel originating in the United States and used in foreign research reactors will be disposed of in a U.S. repository. It supports our Nation's advocacy of limiting international trade in weapons-usable nuclear materials. Other nations facing the same challenge observe our progress. Our commitment to geologic disposal strengthens our policy of nuclear nonproliferation and provides a model for the



A collection of simulated spent nuclear fuel pellets. Each solid ceramic pellet is approximately the size of a pencil eraser

efforts of other nations. The discussion of international cooperation in Chapter 4 underscores the importance of the U.S. contribution to resolution of this global problem.

- A geologic repository is critical to the accelerated environmental cleanup of numerous DOE sites around the country. That cleanup serves not only an environmental, but also a fiscal, goal: reduction of the huge mortgage costs (maintenance and oversight at current facilities) that are the legacy of the Cold War.
- The Department of the Navy is committed to ensuring uninterrupted operation of its nuclear-powered fleet and the management of its spent nuclear fuel to facilitate safe disposal. DOE has the responsibility for storage and ultimate disposition of this naval spent nuclear fuel.
- Nuclear power currently supplies approximately 20 percent of the Nation's electricity, and solving the waste problem to ensure this supply capacity is a key recommendation of the Administration's National Energy Policy report, released in



Nuclear power plants produce nearly 20% of our Nation's electricity

May 2001. Operation of nuclear reactors is contingent on the NRC's licensing of the reactors, which in turn depends on periodic reviews that NRC conducts to assess prospects for timely disposal of commercial spent nuclear fuel. Without progress toward a repository, continued reactor operations and license renewals could be jeopardized.

Geologic disposal is a cornerstone of all these policies. The National Academy of Sciences has repeatedly affirmed its support for geologic disposal. The Academy stated in a June 2001 report, *"After four decades of study, the geological repository option remains the only scientifically credible, long-term solution for safely isolating waste without having to rely on active management. Although there are still some significant technical challenges, the broad consensus within the scientific and technical communities is that enough is known for countries to move forward with geological disposal."*

In working to develop a geologic disposal capability, OCRWM remains committed to objective science as the basis for any decision; to full consideration of the views of the residents of Nevada; and to fulfillment of the requirements of the NWPA with regard to the collection, documentation, and public availability of information.

What Have We Achieved to Date?

Nuclear waste management presents a daunting set of challenges: (1) the complexities of managing a large, first-of-its-kind, project in a Federal setting subject to multiple regulatory requirements; (2) the challenges of operating on a scientific frontier; (3) the need to integrate an unusually broad array of scientific, technical, and managerial disciplines; (4) the demands of a complex and lengthy licensing process; and (5) the political sensitivities associated with an inherently controversial mission.

The Congress, several Administrations, regulatory and oversight bodies, stakeholders, OCRWM staff and contractors, and DOE's national laboratories have worked steadily toward the goal of geologic disposal. They have achieved significant results:

- Landmark legislation, the NWPA, that acknowledged the Federal Government's responsibility for high-level nuclear waste disposal, created a financial mechanism to pay for it, and defined an orderly, open process to develop a waste management system.
- An extensive underground laboratory at Yucca Mountain, Nevada, that gives scientists direct



In 1997, we finished boring a 5-mile tunnel that now houses an extensive underground laboratory

access to geologic formations within which a potential repository could be housed.

- An increasingly comprehensive body of scientific, engineering, and performance assessment expertise with which we have: (1) designed site investigations that yielded needed data; (2) designed a repository that could be tailored to the site and comply with NRC's licensing requirements; (3) developed models simulating the performance of a repository under a range of site conditions over thousands of years; and (4) developed the technical basis for a decision on the suitability of the Yucca Mountain site.
- The regulatory expertise needed to participate in a complex licensing procedure that could take at least three years and entail the review of thousands of supporting documents. A shared understanding of how to approach difficult technical issues has been achieved through years of consultation between OCRWM and NRC. The results of this approach were evident in NRC's November 2001 submittal of a sufficiency letter, indicating that the analysis and proposal for the Yucca Mountain site seem to be sufficient for future inclusion in a licensing application.
- A final, interlocking regulatory framework that governed the final site suitability evaluation and a possible licensing proceeding, including radiation protection standards from the Environmental Protection Agency, licensing criteria from the NRC, and site suitability guidelines by DOE.
- Longstanding and productive working relationships. Critical comments from oversight bodies, the larger technical and scientific communities, a host of stakeholder groups, and the public provide input that has strengthened our work.



On his first official visit to Yucca Mountain in January 2002, Secretary of Energy Spencer Abraham visited the mountain's crest

The expertise, data, working relationships, and physical assets that we have developed are the resources with which OCRWM reached important milestones in moving toward the national decision to develop a geologic repository at Yucca Mountain. In 1998, we released a comprehensive viability assessment detailing what has been learned from years of site characterization. In 1999, we published a Draft Environmental Impact Statement providing the background, data, and analyses to help stakeholders understand the effects of developing a repository. During Fiscal Year 2001, we completed the information needed to support a determination of site suitability, made that information available to the public, and invited public comment. Based on that body of knowledge, the Secretary, on January 10, 2002, notified the Governor and legislature of the State of Nevada of his intent to recommend to the President that the Yucca Mountain site be approved for development as the Nation's first geologic repository. On February 14, 2002, the Secretary of Energy forwarded his recommendation to the President. On February 15, 2002 the President transmitted his recommendation of the site to Congress

On May 8 and July 9, 2002 the House of Representatives and the Senate, respectively, passed resolution approving the siting of the repository. And on July 23, 2002, the President signed into law the Congressional Joint Resolution designating the Yucca Mountain site as the nation's first geologic repository.