

**THE DECISION TO RECOMMEND YUCCA MOUNTAIN
AND THE NEXT STEPS TOWARD LICENSED REPOSITORY DEVELOPMENT**

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ABSTRACT

After more than 20 years of carefully planned and reviewed scientific field work by the U.S. Department of Energy, the U.S. Geological Survey, and numerous other organizations, Secretary of Energy Abraham concluded in January that the Yucca Mountain site is suitable, within the meaning of the Nuclear Waste Policy Act, for development as a permanent nuclear waste and spent fuel repository. In February, the Secretary recommended to the President that the site be developed for licensed disposal of these wastes, and the President transmitted this recommendation to Congress. This paper summarizes key technical and national interest considerations that provided the basis for the recommendation. It also discusses the program's near-term plans for repository development if Congress designates the site.

INTRODUCTION

For more than half a century, scientists have known that the Nation would need a secure, permanent facility in which to dispose of highly radioactive wastes. Twenty years ago, when Congress adopted the Nuclear Waste Policy Act of 1982 (NWPA or "the Act"), it recognized the overwhelming consensus in the scientific community that the best option for such a facility would be a deep underground repository. Fifteen years ago, Congress directed the Secretary of Energy to investigate and recommend to the President whether such a repository could be located safely at Yucca Mountain, Nevada.

In the course of making a decision on whether to recommend Yucca Mountain for further development, the Department went well beyond the Act's requirements in providing notice to the public and opportunities for discussion and debate. From 1995 through 2001, there were 126 official hearings with a court reporter present, and 600 hours of public meetings for the hearings last year alone. All in all, DOE provided a total of 528 comment days, or about a year and a half.

On January 10th, Secretary Abraham informed Governor Guinn of Nevada of his intent to recommend Yucca Mountain to the President for development as the repository for the nation's high-level nuclear waste. On February 14th the Secretary made his formal recommendation to President Bush. Before making his decision, the President listened to the Governor of Nevada, the State's U.S. Senators and representatives of the people of Nevada, giving careful consideration to their views. The President consulted extensively with science and environmental advisors to ensure that they concurred with the science, safety, and environmental conclusions of the recommendation. On February 15th, the President forwarded his recommendation to Congress stating, "I consider the Yucca Mountain site qualified for application [to the Nuclear Regulatory Commission] for a construction authorization for a

repository.” In his letter to Congress, the President also cited the need to protect public safety, health, and the Nation’s security as well as securing our energy future. These two sets of considerations – the scientific and technical basis for confidence that the site can be licensed, and the national interest in timely repository development – are discussed in the next two sections below, followed by a brief discussion of our plans at this point.

SCIENTIFIC AND TECHNICAL BASIS FOR RECOMMENDING THE SITE

The Secretary’s decision to recommend Yucca Mountain and the President’s subsequent approval are based on sound science. After more than 20 years of specific research on the suitability of Yucca Mountain for this purpose, a broad spectrum of experts agrees that we now have enough information to support a conclusion that such a repository can be safely located there. Yucca Mountain is far and away the most thoroughly researched site of its kind in the world. It is a geologically stable site, in a closed groundwater basin, isolated on thousands of acres of Federal land, and farther from any metropolitan area than the great majority of less secure, temporary nuclear waste storage sites that exist in the country today.

During decades of scientific and technical study, some of the world’s best scientists have examined every element of the natural processes that could affect the ability of a repository at Yucca Mountain to isolate radionuclides contained in spent fuel and radioactive waste. Experts have been conducting equally searching investigations into the processes that could affect the behavior of the engineered barriers that are expected to contribute to successful isolation of radionuclides. These investigations run the gamut, from mapping the geological features of the site, to studying the repository rock, to determining whether and how water moves through the Yucca Mountain site.

In the course of these investigations, Yucca Mountain scientists have excavated more than 200 pits and trenches, drilled more than 450 surface boreholes, collected over 75,000 feet of geologic core samples, and taken some 18,000 geologic and water samples. They have conducted aquifer testing and tectonic field studies. Underground, DOE and contractor scientists constructed a five mile-long main tunnel, the Exploratory Studies Facility, to provide access to the specific rock type that would be used for the repository. After completing the main tunnel, they excavated a second tunnel, 1.6-miles long, to map faults, fractures, and other features exposed by the underground openings in the tunnels. They conducted the largest known heater test in history, heating some seven million cubic feet of rock to observe the effects of heat on the hydrologic, mechanical, and chemical properties of the rock, and chemical properties of the water and gas liberated as a result of heating. The four year heating test also included samples of engineered materials to determine corrosion resistance in simulated repository conditions.

In various laboratory-based studies, Yucca Mountain scientists have supplemented surface and underground tests to determine radionuclide solubility and colloid formation that might affect transport. They have tested over 13,000 engineered material samples to determine their corrosion resistance in a variety of environments. They have determined the chemical properties of water samples and the effects of heat on the behavior and properties of water in the host rock.

In all, the site recommendation reflects the results of scientific activities encompassing 36 million hours of labor, 1.14 million records, and over 40,000 academic references. The recommendation itself is comprised of 10,000 pages weighing over 80 lbs. in paper form. It is the most comprehensive analysis of a physical site ever performed. The problem of nuclear waste disposal generally, and Yucca Mountain in particular, have now been studied for more than twice the amount of time it took to plan and complete the moon landing. Substantial evidence shows that a repository at Yucca Mountain will be effective in containing, at minimum risk, the material it is designed to hold.

Although we are satisfied that we have sufficient scientific and technical confidence to support the site recommendation that the NWPA requires, more scientific and technical work is planned under the license preparation phase if the site is designated under law. Before an ounce of spent fuel or radioactive waste could be sent to Yucca Mountain, indeed even before construction of the permanent facilities for emplacement of waste could begin there, the DOE will be required to submit an application to the independent Nuclear Regulatory Commission. There, DOE would be required to make its case through a formal review process that will include public hearings and is expected to last at least three years. Only after that, if the license were granted, could construction begin. The DOE would also have to obtain a license amendment, supported by evidence that public health and safety will be preserved, before any waste could actually be received.

Thus, should Congress ultimately designate Yucca Mountain for further repository development over the State of Nevada's certain objections, considerable additional study would still lie ahead. Unquestionably, for example, uncertainties remain regarding the performance of a repository at Yucca Mountain -- or any site for deep geologic disposal -- over a regulatory compliance period of thousands of years. But the technical base can be strengthened, and confidence in dose projections out to one million years in the future can be enhanced.

THE NATIONAL INTEREST IN TIMELY REPOSITORY DEVELOPMENT

Even if the Yucca Mountain Recommendation were accepted today, an estimated minimum of eight more years lies ahead before the site would become operational. Thus, in addition to the health and safety aspects of recommending the site, there are compelling national interests that require us to complete the siting process and move forward.

- A repository is important to our national security. It will provide certainty for the future operational capability of our nuclear-powered warships. A strong Navy is vital to our status as a world power and about 40% of our fleet's principal combat vessels, including submarines and aircraft carriers, are nuclear-powered. These vessels have played a major role in every significant military action in which our country has been involved in over the last 40 years, including our current operations in Afghanistan.
- A repository is important to promote our non-proliferation objectives. A secure place to dispose of weapons-grade plutonium, spent fuel and waste products is essential to prevent the proliferation of nuclear weapons. Our commitment to a repository will serve as an example

to other nations to decommission their nuclear weapons and dispose of the resulting nuclear material permanently.

- A national repository is also vital to the secure disposal of nuclear waste. Currently, at 131 sites in 39 of our states, there is spent nuclear fuel, high-level radioactive waste, and excess plutonium for which there is no complete disposal pathway without the repository. The painful events of September 11th have taught us to be vigilant regarding potential terrorist targets. Approximately 161 million Americans live within 75 miles of a commercial reactor site. We should enhance our protection by consolidating the wastes in a secure underground location that is able to withstand attack as well as being far from population centers.
- A national repository is ultimately needed to protect our environment. Because nuclear reactors require abundant water for cooling, on-site storage tends to be located near rivers, lakes, and seacoasts. Already, ten closed facilities, such as Big Rock Point on the banks of Lake Michigan, also house spent fuel and incur significant annual costs without providing any ongoing benefit. Over the long-term, without active management and monitoring, degrading surface storage facilities, which were never designed for permanent service, may pose a risk to any of 20 major U.S. lakes and waterways, including the Mississippi River. Millions of Americans are served by municipal water systems with intakes along these waterways. I call to your attention the ten sites that only have closed nuclear reactors with spent nuclear fuel stranded on site. In the interest of the surrounding and downstream communities, this material should be moved to a better location like Yucca Mountain. Although today these materials are safely maintained and guarded, we should not leave them indefinitely located on the coast of Maine, the Connecticut River, the Mississippi River, the Sacramento River, and the California coast. There are major population centers totaling approximately 40 million people in close proximity to closed facilities storing commercial spent fuel which have no ongoing nuclear electricity generation. We owe our children a better future.
- Beyond physical and environmental security, a repository is vital to our energy security, which in turn supports our national economy. Nuclear power provides 20% of the nation's electricity or approximately five hours of power on average to each home, business and school. Without the stabilizing effects of nuclear power, energy markets could become further exposed to price fluctuations and supply uncertainty.
- Finally, although some do not care to recognize this, a repository is important to the environment and our efforts to clean up our defense sites. Communities in Colorado, South Carolina, New York, Washington and Idaho played vital roles in World War II and the Cold War that followed. As Assistant Secretary Roberson stated in a recent memo to Undersecretary Card, "Surplus nuclear material remains unconsolidated across the country, spent reactor fuel remains in wet storage and at Hanford the fuel still sits less than a quarter of a mile away from the Columbia River, and the high-level liquid waste inventory has grown, not been reduced." It is time to move to the next step and remove these wastes to support clean up at sites like Rocky Flats, not far from Denver. Assistant Secretary Roberson's top to bottom review has led to the recommendation of an approach to clean up

that is mindful of resources, respectful of our environment, and responsive to the taxpayers and neighbors alike.

PATH FORWARD

The President's February 15th recommendation to approve Yucca Mountain is just the start of the site approval process. Nevada, as the host-state, has the right to negate the President's recommendation by submitting a notice of disapproval. Governor Guinn has clearly stated that he disagrees with the site recommendation and will send notice of disapproval within sixty days. Under the NWPA the site is then disapproved unless Congress, within 90 days of continuous session, overrides the state's disapproval. Congress will make a decision this summer. This is certain. It is right that the representatives of the people make the decision for the people. If they override we will move forward promptly with the license application phase. If they sustain the state's disapproval or fail to act, the site is disapproved.

We are prepared to act in either case. If the disapproval is not overridden we are prepared to promptly terminate our contracts and the program. We will then await congressional direction. If the site is designated our proposed 2003 budget puts us in a position to accelerate the license application process. The President's fiscal year 2003 budget request of \$537 million seeks to remedy past budget shortfalls and looks toward submitting a license application in calendar year 2004. A decision to develop Yucca Mountain will be a critical step forward in addressing our Nation's energy future, our national defense, our safety at home, and protection for our economy and environment.

To meet the goal of waste acceptance in 2010, we will incorporate a modular design and staged construction approach to the engineering of the repository. We will perform a complete interim design review for the waste package, surface and subsurface facilities. In order to increase confidence in the long-term projections of repository performance we will continue the intensive scientific investigation of the system behavior of the repository. To facilitate the 2010 goal, we will begin accelerating the establishment of our transportation plans and infrastructure. Part of this effort will involve building upon the experience and lessons of the success the Department has had with transportation campaigns of shipments to the Waste Isolation Pilot Plant, from research reactor fuel shipments, naval reactors and with our experience with defense shipments.

If Congress does designate the site this year, we want to improve the long-term management and financing plan for the program to fully utilize the Nuclear Waste Fund for its intended purpose. Last year we submitted the Alternative Means of Financing and Management Report to Congress. We will work with the Administration and Congress to develop a better arrangement.

CONCLUSION

Within the first two months of 2002, we reached an important milestone: the Site Recommendation. Now we await site designation. These recent events are just the beginning. Many challenges remain, both legal and financial. The current utility lawsuits are painful and time consuming. Regarding the lawsuits brought by the State of Nevada, I have confidence that these will be favorably resolved as we have faithfully and diligently followed the steps outlined

in the NWPA. Obtaining the funding we need through the appropriations process is always a challenge. Since 1998, the Program has received about \$224 million less than was requested. Other challenges include overcoming water permitting issues, transportation systems, public perception, and overlapping regulations. These challenges, while formidable, pale in comparison to the objective of serving as a global example in stemming the proliferation of nuclear weapons and accelerating the clean up of our environment. Moving forward with these efforts will encourage nations with weaker controls over their own materials to follow a similar path of permanent, underground disposal. By moving forward with Yucca Mountain, we will show leadership, set out a roadmap, and encourage other nations to follow.