

Appendix B

History of the Civilian Radioactive Waste Management Program

This Appendix describes the evolution of the Nation's efforts to resolve radioactive waste management issues, from the 1950s through the 1990s.

Early development of radioactive waste management policy

In the mid-1950s, the National Academy of Sciences (NAS) considered the disposal of defense-related high-level radioactive waste and recommended salt as a potentially suitable host rock for geologic disposal. In 1957, the NAS concluded that radioactive wastes could be disposed of safely in a variety of geologic media within the United States. The NAS noted, however, the technical and institutional uncertainties involved in implementing a geologic repository strategy, and assumed that significant research would be necessary and substantial costs incurred before a final conclusion could be reached on the feasibility, reliability, and safety of geologic disposal.

At the same time, preliminary nationwide screening for suitable repository sites began

and resulted in the identification of four large potentially suitable regions underlain by rock salt:

- The salt domes of the Gulf Coastal Plain in Texas, Louisiana, and Mississippi.
- Bedded salt in the Paradox Basin of Utah, Colorado, Arizona, and New Mexico.
- Bedded salt in the Permian Basin of Kansas, Oklahoma, Texas, and New Mexico.
- Bedded salt in the Michigan and Appalachian Basins of Michigan, Ohio, Pennsylvania, and New York.

In 1970, the Atomic Energy Commission proposed the salt deposits near Lyons, Kansas for a permanent repository. This proposal was abandoned two years later for political and technical reasons. Following the failure of the Lyons siting proposal, the Energy Research and Development Administration proposed the development of a retrievable surface storage facility at the Hanford Nuclear Reservation, in

the State of Washington. However, this proposal was also dropped amid concerns it would defer geologic disposal efforts.

In 1977, the National Waste Terminal Storage Program was initiated to find suitable repository sites and to develop the technology necessary for repository licensing, construction, operation, and closure. The site screening process was based on a two-fold approach. The first approach focused on a survey of areas underlain by salt; the second focused on Federal lands where radioactive materials were already present. Site screening was initiated at the Hanford Site and the Nevada Test Site.

In 1978, President Carter initiated an Inter-agency Review Group to conduct a comprehensive review of nuclear waste policy. In 1979, the Interagency Review Group recommended proceeding with geologic disposal and also recommended that the United States consider alternative host rocks for geologic disposal. In response, a national survey of crystalline rocks (granite) was undertaken and a survey identified near-surface and exposed crystalline rock formations in 17 States.

The End of Reprocessing

In 1975, President Ford decided to forego reprocessing of commercial spent nuclear fuel in favor of a once-through fuel cycle. In 1977, President Carter also decided that reprocessing should be indefinitely deferred to address urgent concerns about global nuclear proliferation. As part of this policy, President Carter proposed acceptance of spent nuclear fuel at an Away-From-Reactor facility. The United States currently supports a “Nonproliferation and Export Control Policy,” established in 1993, which discourages reprocessing of commercial spent nuclear fuel and the commercial trade in plutonium as an energy source.

The Nation adopts policy on radioactive waste management and disposal

In 1980, the Department of Energy (“the Department”) issued a *Final Environmental*

Impact Statement for the Management of Commercially Generated Radioactive Waste (DOE/EIS-0046F) and a Record of Decision which officially selected mined geologic repositories as the preferred means for the disposal of commercial spent nuclear fuel. In 1981, President Reagan withdrew the ban on reprocessing and President Carter’s Away-From-Reactor storage proposal.

The Nuclear Waste Policy Act of 1982 is Enacted

In 1982, Congress passed the Nuclear Waste Policy Act (NWPA), which established the Office of Civilian Radioactive Waste Management within the Department. The NWPA adopted geologic disposal as the Nation’s long-term strategy for the safe isolation of radioactive wastes and confirmed the Federal Government’s responsibility for managing and disposing of commercial spent fuel. The NWPA directed the Department to identify three potential sites for the first repository and to conduct a multi-year evaluation, known as site characterization, of each of the three sites. The Department was directed to issue general guidelines for the recommendation of sites for repositories, which were finalized in December 1984 as *General Guidelines for the Recommendation of Sites for the Nuclear Waste Repositories* (10 CFR Part 960).

According to the NWPA, following site characterization, the Secretary of Energy (“the Secretary”) may decide to recommend a site for development as a repository. If the President accepts the Secretary’s recommendation, the NWPA directs the President to submit a recommendation of the site to Congress. The site designation becomes effective 60 days after the President’s recommendation, unless in the interim a Notice of Disapproval is submitted by the Governor and legislature of the State in which the site is located, or by the governing body of a Native American Tribe on whose reservation the site is located. If such a notice is submitted, the site would be disapproved unless within the first 90 days of a continuing session of Congress after the submittal, Con-

gress passes a resolution of siting approval. If the President recommends a site and its designation becomes effective, the NWPA directs the Department to submit an application to the Nuclear Regulatory Commission (NRC) for a license authorizing repository construction. If the application is approved and construction proceeds, the NWPA requires the Department to apply to NRC for additional licensing authority to begin accepting waste into the repository, and ultimately to close the facility when waste emplacement is completed.

The NWPA limited the quantity of waste licensed for emplacement in the first repository to 70,000 metric tons of heavy metal until a second repository is in operation. The NWPA provides for the disposal of defense-related high-level radioactive waste, contingent upon a Presidential determination that such wastes could be disposed of in a geologic repository along with commercial waste. In 1985, President Reagan found no basis to conclude that a defense-only repository was required, and therefore, under provisions of the NWPA, the Department is to proceed with plans and actions to dispose of defense waste with commercial spent fuel in a single repository.

The NWPA directed that activities associated with the management and disposal of civilian spent nuclear fuel conducted under the NWPA be funded through a fee on the commercial generation of nuclear power. The fee was set initially at 1.0 mil per kilowatt-hour, to be deposited into the Nuclear Waste Fund. The Secretary is directed to review the fee amount annually to determine its adequacy to meet Federal Government costs of managing civilian spent nuclear fuel, and to propose adjustments as needed to ensure full cost recovery. Costs associated with the disposal of high-level radioactive waste from defense activities are to be paid by the Federal Government.

The NWPA authorized the Secretary to enter into contracts with utilities for the acceptance and disposal of spent nuclear fuel. These contracts, which came to be known as the *Standard Contracts for Disposal of Spent*

Nuclear Fuel and/or High-Level Radioactive Waste (10 CFR Part 961), were promulgated through rulemaking and provide that the Department will:

- take title to the spent nuclear fuel as expeditiously as practicable following commencement of operation of a repository, and
- in return for the payment of fees, beginning not later than January 31, 1998, dispose of such spent fuel.

The NWPA directed the Department to study the need for and feasibility of a monitored retrievable storage facility for the purpose of storing nuclear waste on an interim basis prior to disposing of it permanently in an underground repository, and to submit to Congress a site-specific proposal for such a facility. It also required the Federal Government to transport spent nuclear fuel to a Federal storage facility, utilizing private industry to the fullest extent possible.

Site Characterization Under the Nuclear Waste Policy Act of 1982

In 1983, the Department selected nine candidate repository sites for the first repository: Vacherie dome, Louisiana (salt dome); Cypress dome, Mississippi (salt dome); Richton dome, Mississippi (salt dome); Yucca Mountain, Nevada (tuff); Deaf Smith County, Texas (bedded salt); Swisher County, Texas (bedded salt); Davis Canyon, Utah (bedded salt); Lavender Canyon, Utah (bedded salt); and Hanford Site, Washington (basalt flows). In 1994, Draft Environmental Assessments to support the proposed nomination of five sites and the recommendation of three sites for characterization were issued for all nine sites.

In 1986, the Secretary nominated five sites as suitable for characterization for the first repository, and recommended three of the sites to the President for approval for site characterization. The President approved the sites: Yucca Mountain, Nevada; Deaf Smith County, Texas; and the Hanford Site, Washington. The Department concluded that this particular order

of preference provided the maximum diversity of geohydrologic settings and rock types. In 1985, the Department also began crystalline rock investigations to identify sites for a second repository. In 1986, the Secretary recommended 12 potential areas in seven States for the second repository, but postponed site-specific work for the second repository due to cost savings and decreases in the estimates of spent fuel requiring disposal.

Nuclear Waste Policy Amendments Act of 1987

Motivated in part by concern about Program costs, Congress reassessed the need to characterize three potential repository sites. Through passage of the Nuclear Waste Policy Amendments Act of 1987, Congress redirected the Department to focus its site characterization activities only at Yucca Mountain, Nevada, and report on the need for a second repository on or after January 1, 2007, but no later than January 1, 2010.

The Department's proposal to locate a monitored retrievable storage facility at a site at Clinch River in Oak Ridge, Tennessee, with two alternative sites in Tennessee, was nullified by the Amendments Act. Congress directed that the need for a monitored retrievable storage facility be examined by a commission before the Department could proceed and restricted the Department's ability to site and develop such a facility by prohibiting the following activities:

- selection of a monitored retrievable storage facility site until the Secretary recommends for Presidential approval a site for development as a repository.
- selection of a site within the State of Nevada.
- commencing facility construction until the Commission issues a license for the construction of a repository.

The Amendments Act established the Office of the Nuclear Waste Negotiator to seek a volunteer host site for a repository or monitored

retrievable storage facility. This Act also expanded external oversight of the Department by establishing the Nuclear Waste Technical Review Board, authorizing on-site oversight representatives of host jurisdictions, and providing for increased local government participation.

The Act defined certain units of government as "affected" because of their jurisdiction over the site of a proposed geologic repository or monitored retrievable storage facility, and permits the Secretary to designate additional units of local government as "affected" because of their proximity to such sites. It requires the Department to provide financial assistance to support participation of parties with "affected" status in defined activities.

Finally, the Amendments Act required that packages for transport be certified by the NRC, and that the Department provide technical assistance and funds to States to train transportation public safety officials.

Meeting Stakeholder Expectations

In the years since passage of the Nuclear Waste Policy Act and its amendments, the Civilian Radioactive Waste Management Program ("the Program") has faced changing legislative mandates, regulatory modifications, fluctuating funding levels, and the evolving and often conflicting needs and expectations of diverse interest groups. The real complexity of the scientific and regulatory challenge at the Yucca Mountain site began to be realized, and projected costs greatly exceeded initial expectations. It became increasingly clear that many of the expectations embodied in the Nuclear Waste Policy Act could not be met.

The end result was increased Congressional and constituent dissatisfaction with the Program. In 1993, the Program undertook a comprehensive assessment of its activities and stakeholder expectations for costs, schedules, and accomplishments. A new approach was developed to make measurable and significant progress toward key objectives. The new program approach, described in the December

1994 *Civilian Radioactive Waste Management Program Plan*, refocused the work of the Yucca Mountain Site Characterization Project business center on

- 1) evaluating by 1998 the technical suitability of the Yucca Mountain site for development as a geologic repository; (2) delivering a statutory site recommendation and environmental impact statement to the President by 2000, contingent on a positive suitability evaluation; and
- 2) submitting a license application to the Commission by 2001.

The main objectives of the Waste Acceptance, Storage and Transportation Project business center were to make a new generation of spent fuel storage and transportation technology, multi-purpose canisters, available by 1998; and to support timely resolution of waste acceptance and interim storage issues.

Further Congressional Redirection

However, the Energy and Water Development Appropriations Act of 1996 reduced program funding by 40 percent from 1995 levels. The Congress recognized that the significant reduction in funding would require a more constrained repository program. The Conference Report accompanying the appropriations language provided the following guidance:

“The conferees agree on the importance of continuing existing scientific work at Yucca Mountain to determine the ultimate feasibility and licensability of the permanent repository at that site. The conferees direct the Department to refocus the repository program on completing the core scientific activities at Yucca Mountain. The Department should complete excavation of the necessary portions of the exploratory tunnel and the scientific tests needed to assess the performance of the repository. It should defer preparation and filing of a license application for the repository with the Nuclear Regulatory Commission until a later date. The Department’s goal should be to collect the scientific information needed to

determine the suitability of the Yucca Mountain site and to complete a conceptual design for the repository and waste package for later submission to the Nuclear Regulatory Commission.”

The Program reduced its rate of expenditure to meet the funding restrictions. The continuity of the core scientific work at Yucca Mountain was preserved. Elsewhere, activities were reduced to carrying out programmatic responsibilities for oversight of the Nuclear Waste Fund and of the contractual arrangements with nuclear utilities; limited coordination with transportation-related organizations; and only the necessary program-wide planning, management, and administrative functions. Canister technology development activities were terminated.

In May 1996, the Program issued a *Draft Revised Program Plan* which restructured its approach to Yucca Mountain site characterization to reflect sharply reduced funding and Congressional redirection. The 1996 Plan also defined a new milestone and management tool for the Program - the Yucca Mountain viability assessment. This interim milestone was later codified into law by the 1997 Energy and Water Development Appropriations Act, which directed that, “no later than September 30, 1998, the Secretary shall provide to the President and to the Congress a viability assessment of the Yucca Mountain site. The viability assessment shall include: (1) the preliminary design concept for the critical elements for the repository and waste package; (2) a total system performance assessment, based upon the design concept and the scientific data and analysis available by September 30, 1998, describing the probable behavior of the repository in the Yucca Mountain geological setting relative to the overall system performance standards; (3) a plan and cost estimate for the remaining work required to complete a license application; and (4) an estimate of the costs to construct and operate the repository in accordance with the design concept.

In July 1998, the Program issued *the Civilian Radioactive Waste Management Program Plan, Revision 2*, which described the steps the Program planned to undertake to provide a viability assessment of the Yucca Mountain site in 1998; prepare the Secretary of Energy's site recommendation to the President in 2001, if the site is found to be suitable for development as a repository; and submit a license application to the Nuclear Regulatory Commission in 2002 for authorization to construct a repository.

The Plan was linked to the Department's 1997 Strategic Plan and set forth strategic objectives and success measures, as required by the Government Performance and Results Act of 1993.

On December 18, 1998, the Department of Energy submitted the Viability Assessment and its companion documents to the President and the Congress, and released it to the public. Based on the Viability Assessment, the Program concluded that work should proceed to support a decision by the Secretary in 2001 on whether to recommend the site. The Viability Assessment identified areas where additional work is required before site suitability can be determined and the Secretary can decide whether to recommend the site.

More recent Program developments are detailed in the body of this Plan.