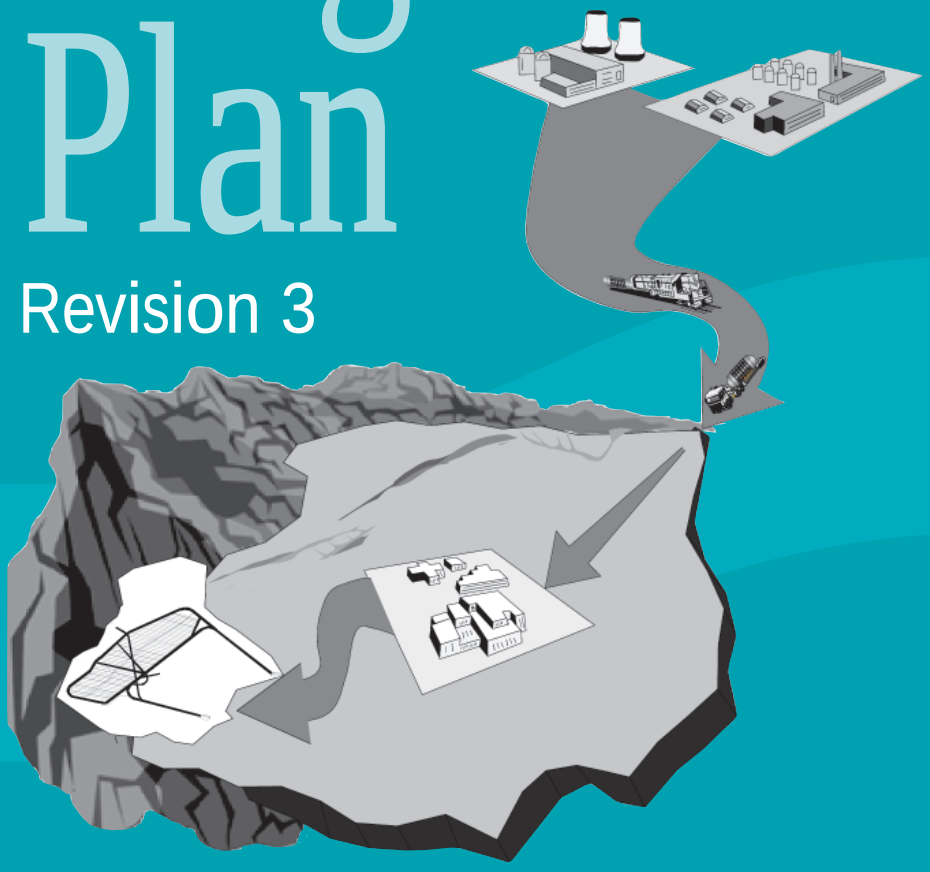
DOE/RW-0520

Civilian Radioactive Waste Management

Program Plan

Revision 3



February 2000

U.S. Department of Energy
Office of Civilian Radioactive Waste Management

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MESSAGE FROM THE DIRECTOR

From early in the nuclear age, the Nation has been faced with the challenges of safely managing its inventory of nuclear waste. A major milestone was achieved in 1982, when the Nuclear Waste Policy Act (NWPA) established geologic disposal as the Nation's policy for managing spent nuclear fuel and high-level radioactive waste. The NWPA gave the newly-created Office of Civilian Radioactive Waste Management (OCRWM), the Environmental Protection Agency (EPA), and the Nuclear Regulatory Commission (NRC) various responsibilities for implementing this policy. OCRWM's responsibility under the NWPA, as originally enacted, was to develop site-specific information and propose facility and transportation system designs that could be used for decisions regarding the selection of sites and the development of one or more geologic repositories. Since passage of the Nuclear Waste Policy Amendments Act in 1987, OCRWM has focused its investigations on a potential site at Yucca Mountain, Nevada. Extensive site and design information has been assembled, and the Nation is poised for the next step in its investigation of nuclear waste disposal – whether to recommend Yucca Mountain for the repository site and, if approval is obtained from the President and Congress, continue with the license application process. This process will begin with publication, in FY 2001, of the Site Recommendation Consideration Report.

This revision of the OCRWM Program Plan is consistent with the new Department of Energy (DOE) Strategic Plan and reflects OCRWM's desire to keep planning references up-to-date as we approach the site recommendation process. The revised Program Plan also takes cognizance of programmatic changes made since the publication, in December 1998, of the Yucca Mountain Viability Assessment (VA); and it addresses updates to the Program's regulatory framework resulting from the releases, last year, of draft site-specific EPA radiation standards for Yucca Mountain, revised draft site-specific NRC licensing regulations, and proposed revised DOE site suitability guidelines.

Two recent publications have marked the Program's progress towards the national decisions on geologic disposal. In December 1998, the Viability Assessment presented comprehensive site information and expressed our judgment that it was appropriate to complete studies of the site as a potential repository. In July 1999, we published a draft Environmental Impact Statement (DEIS) that discussed the potential effects of a Yucca Mountain repository and associated transportation systems. The DEIS analyzed repository performance under a variety of implementing alternatives and indicated that a repository would pose little risk to future populations near Yucca Mountain, affirming the conclusions of the VA. Continuing scientific and engineering studies, and interactions with stakeholders and advisory and oversight bodies, are providing the information

that will enable us to complete site characterization and prepare the documents necessary for a possible recommendation of the site. A thrust of our recent work has been to advance the respoitory design to ensure that it is flexible enough to preserve long-term options on the duration of post-closure monitoring, retrieval of spent nuclear fuel for new uses, and adoption of technical advances.

The Program's FY 2000 appropriation fell $56.5 million short of the Administration's budget request. As a result, we have reevaluated our planned activities, taking into account advances in the reference repository and waste package designs to identify impacts and refine schedules. We are giving priority to those science and engineering activities that are most important for reducing uncertainty in the performance of the repository. Our objective remains to develop the information and data necessary to determine whether there is support for a Secretarial decision on recommendation of the Yucca Mountain site in 2001, and if the site is recommended, a license application in 2002.

The publication of this Plan is another step forward, and its implementation will lead to critical national decisions in the coming years. With adequate funding, we believe we can meet the objectives defined in this Plan and provide a meaningful return on the investment the Nation has made in the development of a geologic disposal program.

Ivan Itkin, Director
Office of Civilian Radioactive
Waste Management

Chapter One

Program Overview

The problem of nuclear waste disposal

Countries worldwide have accumulated high-level radioactive waste by using nuclear materials to produce electricity, to power naval vessels, and to make nuclear weapons. Some elements of this waste are hazardous for a few years to several hundred years, while others are hazardous for many thousands of years. This waste must be safely contained until it no longer poses a significant risk to human health and the environment.

Commercial spent nuclear fuel

As of December 1998, the United States had accumulated 38,400 metric tons of used or "spent" nuclear fuel from commercial nuclear power plants; this amount could more than double by the year 2035 if all currently operating plants complete their initial 40-year license period. The commercial spent nuclear fuel is now stored in 33 States at 72 commercial sites. When a power plant ceases operations, the spent nuclear fuel and other radioactive materials must be removed before the plant can be fully decommissioned and the site used for other purposes.

Figure 1 - Nuclear Powerplant

Department of Energy spent nuclear fuel

By 2035, the United States will have accumulated approximately 2,500 metric tons of spent nuclear fuel from reactors that produce materials for nuclear weapons, from research reactors, and from reactors on the Navy's nuclear-powered ships and submarines. The majority of the Department's spent nuclear fuel is currently stored at three sites in Idaho, South Carolina, and Washington. Under a negotiated settlement agreement between the State of Idaho, the Navy, and the Department, all spent nuclear fuel must be removed from Idaho by 2035.

High-level radioactive waste

The production of nuclear weapons has left a legacy of high-level radioactive waste that was created when spent nuclear fuel was treated

Figure 2 - Nuclear powered submarine

chemically to separate uranium and plutonium. The remaining high-level waste is in liquid and solid forms; approximately 100 million gallons are stored in underground tanks in Washington, South Carolina, and Idaho. Under agreements between the Department of Energy and the States where the waste is stored, this high-level waste will continue to be solidified and placed in about 20,000 canisters for future disposal in a permanent geologic repository.

Surplus plutonium and other nuclear weapons materials

The end of the Cold War has also brought about the need for cleaning up and closing weapons plants that are no longer needed and of disposing of surplus plutonium and other nuclear materials associated with nuclear weapons production. These radioactive materials must be disposed of in a secure facility that will not only keep the waste away from people but will also keep people away from the weapons-usable material for thousands of years. Ensuring national security and preventing the proliferation of nuclear weapons depend on developing a permanent, safe, and secure disposal facility for surplus plutonium and other weapons materials.

Total inventory

At present, spent nuclear fuel and high-level radioactive wastes are located at 129 sites in 39 States. This includes 72 commercial reactor sites, one commercial storage site, 43 research reactor sites, 10 Department of Energy/naval spent nuclear fuel and high-level radioactive waste sites, and three additional surplus plutonium storage sites. However, by the time the wastes are to be shipped to a repository, they will be temporarily stored at 78 sites[1] in 35 States, as shown in *Figure 4*. Some of these storage sites are close to population centers and are located near rivers, lakes, and seacoasts. The stored materials, if left where they are indefinitely, could become a hazard to nearby populations and the environment.

Figure 3 - Commercial nuclear fuel assembly

How geologic disposal would work

The basic concept of geologic disposal is to place carefully prepared and packaged waste in excavated tunnels in geologic formations such as unsaturated volcanic tuff. The concept relies on a series of barriers, natural and engineered, to contain the waste for thousands of years and to minimize the amount of radioactive material that may eventually be released from a repository and reach the human environment.

[1] Sites can include multiple locations.

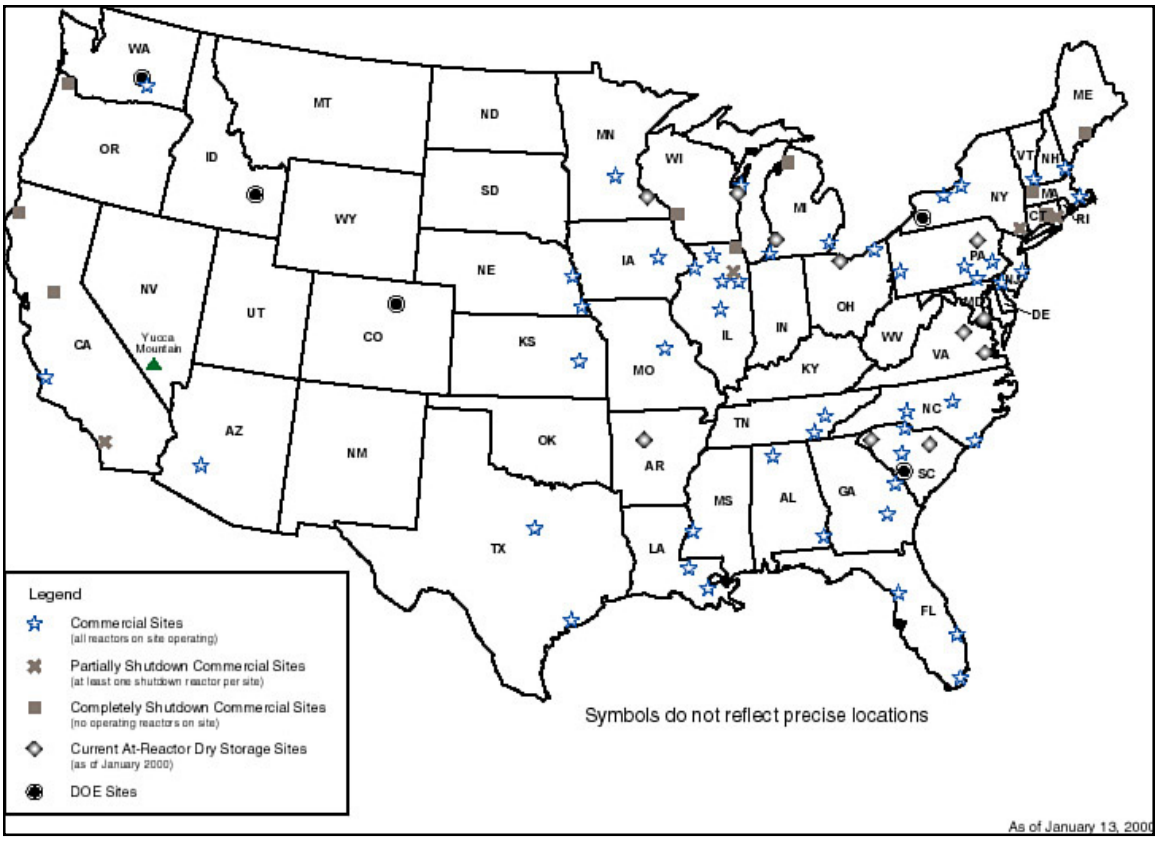

Figure 4 - Locations of commercial and DOE nuclear waste storage sites

The four key attributes that a geologic repository would need to exhibit to protect public health and the environment for thousands of years are:

- Limited water contact with waste packages;
- Long waste package lifetime;
- Low rate of release of radionuclides from breached waste packages; and
- Reduction in the concentration of radionuclides as they are transported from breached waste packages.

Water is the primary means by which radionuclides could reach the human environment. Therefore, the principal functions of the barriers are to keep water away from the waste as long as possible, to limit the amount of water that finally does contact the waste, to slow the release of radionuclides from the waste, and to reduce the concentrations of radionuclides in groundwater.

All countries pursuing geologic disposal are taking the multibarrier approach, though they differ in the barriers they emphasize. The German disposal concept, for example, depends heavily on the geologic barrier, the rock salt formation at the prospective disposal site. The Swedish method, on the other hand, relies extensively on thick copper waste packages to contain the waste.

The U.S. approach, as recommended in the 1979 Report to the President by the Interagency Review Group on Nuclear Waste Management, is to design a repository in which the natural and engineered barriers work as a system, so that some barriers will continue to function even if others fail, and so that none of

the barriers is likely to fail for the same reason or at the same time. This design strategy is called defense-in-depth. The barriers include the natural characteristics of Yucca Mountain, the chemical and physical forms of the waste, and the waste packages and other engineered barriers.

The legislative mandate for permanent disposal

The Nuclear Waste Policy Act of 1982[2] (NWPA) established the Federal Government's responsibility to provide for the permanent disposal of the Nation's civilian spent nuclear fuel and high-level radioactive waste resulting from atomic energy defense activities. It also assigned to the generators and owners of these wastes the responsibility for bearing the cost of their management and disposal. The Act created the Office of Civilian Radioactive Waste Management within the Department of Energy to develop a Federal system for the safe management and permanent disposal of the spent nuclear fuel from civilian nuclear power reactors. The NWPA also provided the President with the option of disposing of defense high-level radioactive waste in a civilian repository, and in 1985, President Reagan made the decision to do so. In 1986, at the end of a multi-year screening process, the Secretary recommended three sites for repository site characterization.

The Nuclear Waste Policy Amendments Act of 1987 (Amendments Act) redirected the Department to focus its site characterization activities at Yucca Mountain, Nevada, to determine its suitability as a candidate repository site. The Amendments Act also nullified the Department's proposal to locate a monitored retrievable storage facility at a site at Clinch River in Oak Ridge, Tennessee. In the same Act, Congress created an independent Federal agency, the Nuclear Waste Technical Review Board, to evaluate the technical and scientific validity of the Department's repository development efforts. The Amendments Act also established the Office of the Nuclear Waste Negotiator to seek a State or Native American Tribe willing to host a repository or monitored retrievable storage facility at a technically qualified site. The Negotiator was unable to secure a volunteer host for a repository or storage facility before the Office's authority expired in January 1995. A more detailed chronology is provided at *Appendix B.*

The regulatory framework for repository development

The Nuclear Waste Policy Act of 1982 required that a regulatory framework govern certain statutory decisions about repository development. The Energy Policy Act of 1992 directed the Environmental Protection Agency (EPA) and the Nuclear Regulatory Commission (NRC) to update their respective implementing regulations specific to Yucca Mountain, as described below.

Environmental Protection Agency standards

Section 801 of the Energy Policy Act of 1992 directed EPA to issue site-specific public health and safety standards for a repository at Yucca Mountain, consistent with the recommendations of the National Academy of Sciences (NAS). These standards would establish limits on annual radiation doses to individual members of the public. The NAS issued its report titled *Technical Bases for Yucca Mountain Standards* in 1995. The report recommended, *inter alia,* a risk-based standard for limiting exposure of people to radiation. EPA disagreed and proposed instead a dose-based standard of 15 millirem[3] "committed effective dose equivalent" per year for the Yucca Mountain disposal system. On August 27, 1999, EPA published in the *Federal*

[2] Relevant sections of the Nuclear Waste Policy Act of 1982, as amended, and the Energy Policy Act of 1992 are reproduced in Appendix A.

[3] A rem (roentgen equivalent man) is a unit used in radiation protection to measure the amount of damage to human tissue from a dose of ionizing radiation. A sievert (Sv) is a unit of radiation dosage equal to 100 rems.

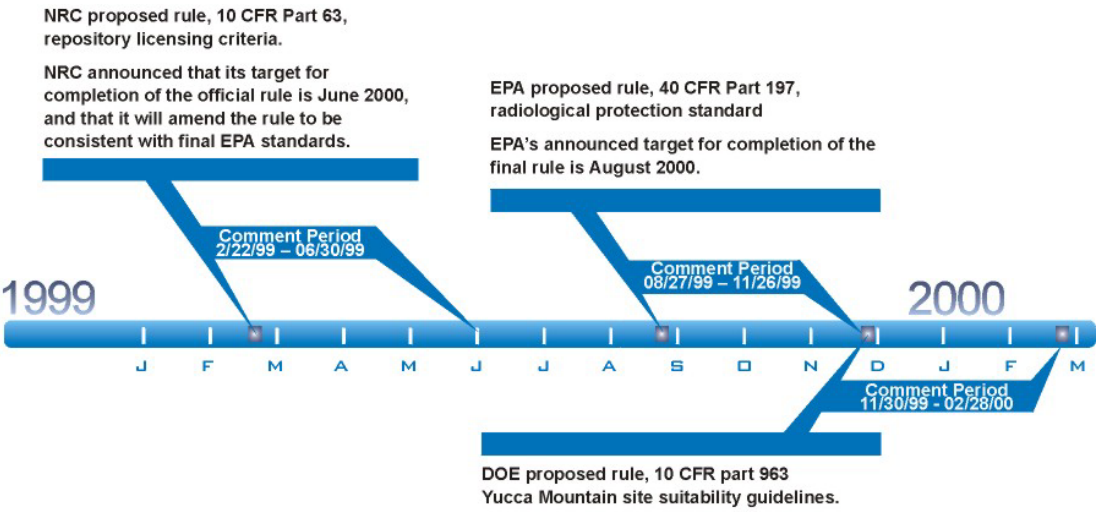

Figure 5 - Timeline of regulatory processes

Register its proposed rule titled *Environmental Radiation Protection Standards for Yucca Mountain, Nevada* (64 Fed. Reg. 46976, to be codified at 40 CFR Part 197).

Subpart A of the proposed rule establishes environmental standards for the storage of radioactive materials by OCRWM in the Yucca Mountain repository and on the Yucca Mountain site incident to the ultimate disposal of those materials in the repository. Under the proposed standards, OCRWM must ensure that no member of the public in the general environment receives more than an annual committed effective dose equivalent of 150 microsieverts (15 millirems) from the combination of management and storage of radioactive materials inside the repository and outside the repository but within the Yucca Mountain site.

Subpart B of the proposed standards covers the disposal of waste at Yucca Mountain by OCRWM. Separate standards are proposed for individual protection, human intrusion, and groundwater protection. Under these standards, OCRWM must demonstrate, using performance assessment, that there is a reasonable expectation that, for 10,000 years following disposal, the standards' numerical limits will not be exceeded.

EPA's proposed radiation standards for Yucca Mountain may be viewed on the internet at *http://www.epa.gov/radiation/yucca/rule.htm.*

Nuclear Regulatory Commission requirements and criteria

The 1987 Amendments to the Nuclear Waste Policy Act narrowed consideration of candidate sites for a repository to Yucca Mountain. The Energy Policy Act of 1992 directed NRC to revise its licensing requirements to be consistent with EPA's site-specific radiation protection standards. The Energy Policy Act signaled a broad change to the regulatory framework for repository development, shifting it from a generic to a site-specific basis for evaluation and decision-making.

On February 22, 1999, NRC proposed regulations titled *Disposal of High-Level Wastes in a Proposed Geologic Repository at Yucca Mountain, Nevada* that would apply only to a repository at Yucca Mountain, (NV 64 Fed.

Reg. 8640 to be codified at 10 CFR Part 63). The foundation for the proposed licensing criteria is the specification of overall performance objectives for preclosure and postclosure phases of the repository and requirements that compliance with these overall performance objectives be demonstrated through an integrated safety analysis of preclosure operations, and through a performance assessment for long-term, postclosure performance.

NRC held five public meetings in Nevada between March and June 1999 on the proposed regulation.

On June 30, 1999, the Department submitted comments on the proposed rule to NRC. The Department endorsed the overall strategy of using risk-informed, performance-based criteria, and the removal of subsystem performance objectives and siting criteria.

NRC's proposed regulation may be viewed at *http://www.nrc.gov.*

When EPA issues final standards for Yucca Mountain, NRC will amend its criteria at 10 CFR Part 63, if necessary, to be consistent with the final EPA standards.

Department of Energy Siting Guidelines

One of the key planned activities under the OCRWM Program Plan, Revision 1 (1996), was to update the regulatory framework for a repository at Yucca Mountain. In December 1996, the Department of Energy published a Notice of Proposed Rulemaking on its siting guidelines in 10 CFR 960 and proposed to add a new, site-specific Subpart E for evaluation of the suitability of the Yucca Mountain site for development as a repository. The proposed revisions would have taken into consideration the changes in law and national policy regarding geologic disposal since the guidelines were issued in 1984, and the results of OCRWM site characterization activities.

The proposed Subpart E would not have required an evaluation of how individual subsystems of the repository must perform. Rather, it would have assessed how the total repository system would perform and compare that performance to the limits on the permissible radiation doses for members of the public living near Yucca Mountain. The Department provided a lengthy public comment period on the proposed rule.

The Department has revised and updated its 1996 proposal to amend the repository siting guidelines. The Department's proposed criteria and methodology are consistent with NRC's recently proposed regulations for licensing a nuclear waste repository at Yucca Mountain. A new site-specific proposal titled *Office of Civilian Radioactive Waste Management; General Guidelines for the Recommendation of Sites for Nuclear Waste Repositories; Yucca Mountain Site Suitability Guidelines* was published in the *Federal Register* for public comment. (64 Fed. Reg. 67054, to be codified at 10 CFR Part 963).

This is consistent with the NRC's proposal to establish a new Part 63 for the Yucca Mountain site and EPA's proposal for site-specific public health standards, as noted in the introduction to the Department's proposal. The new regulations would (1) limit 10 CFR Part 960 to preliminary site screening for repositories located elsewhere than Yucca Mountain; and (2) establish a new Part 963 to contain the site suitability criteria and the methods for considering the potential of the Yucca Mountain site for a nuclear waste repository.

The guidelines may be viewed on the OCRWM web site at *http://www.rw.doe.gov.*

The Program approach

The Program's approach to accomplishing its mission, as outlined in the Nuclear Waste Policy Act of 1982, as amended, has evolved since the Program's inception. When the Nuclear Waste Policy Act was enacted, it was envisioned that the Department would have a

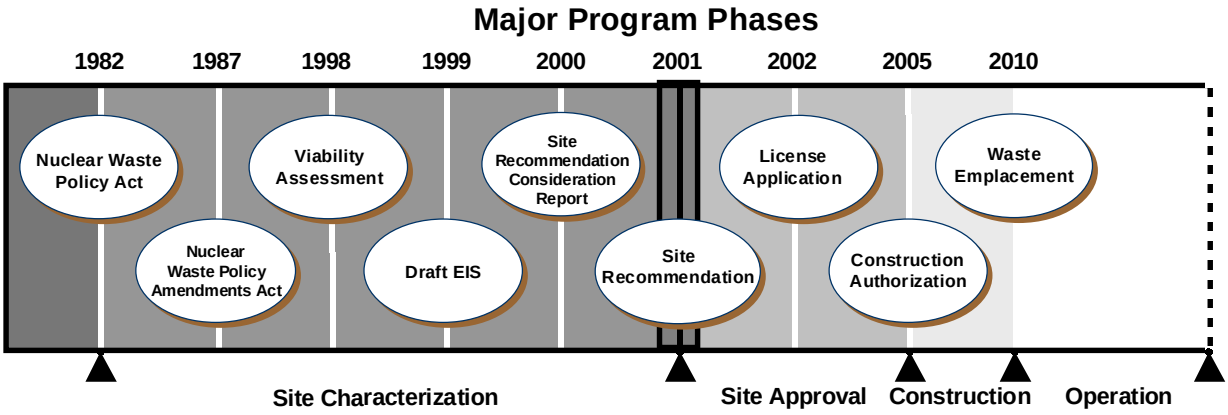

Figure 6

facility available in 1998 to accept waste for disposal, and the Department entered into contracts with utilities on that basis.

The repository site characterization effort, however, has proven to be more complex and time-consuming than was envisioned in the Program's early years. The Program has had to respond to challenges that evolved over time. In 1987, the Department announced a five-year delay in the opening date for a repository, from 1998 to 2003. In 1989, the Department announced a further delay to 2010 in the expected commencement of repository operations. The Department has held to the 2010 date for the placement of spent nuclear fuel in a repository.

The following sections provide an overview of how the Program has elected to carry out its legislative mandate. Important issues, plans, and products are described for each major organizational element. More detailed descriptions and schedules are provided in *Chapter Three*.

Organizationally, the Program is comprised of two projects or "business centers" – the Yucca Mountain Site Characterization Project, located in Las Vegas, Nevada; and the Waste Acceptance, Storage, and Transportation Project in Washington, D.C. A third component, the Program Management Center, conducts vital functions that intersect both Projects. The Program Management Center is comprised of the Office of Quality Assurance, located in Las Vegas, NV; the Office of Program Management and Administration; and the Systems Engineering and International Division of the Office of Acceptance, Transportation, and Integration, all headquartered in Washington, D.C. An Office of Civilian Radioactive Waste Management organization chart is presented at *Appendix C*.

The general Program approach for the Yucca Mountain Site Characterization Project; the Waste Acceptance, Storage and Transportation Project; and the Program Management Center is briefly discussed below and described in detail in *Chapter Three*. *Figure 6* illustrates the major Program phases beginning with site characterization. Key Program-level milestones are summarized in *Figure 8*. Projected funding requirements are provided in *Table 1*.

Yucca Mountain Site Characterization Project

Initially, the Program approach to the characterization of Yucca Mountain was based on extensive testing to obtain a comprehensive understanding of Yucca Mountain for simultaneous decisions on site suitability, repository design, and licensing. Since 1994, the approach distinguished among those tests required to evaluate site suitability, to support licensing,

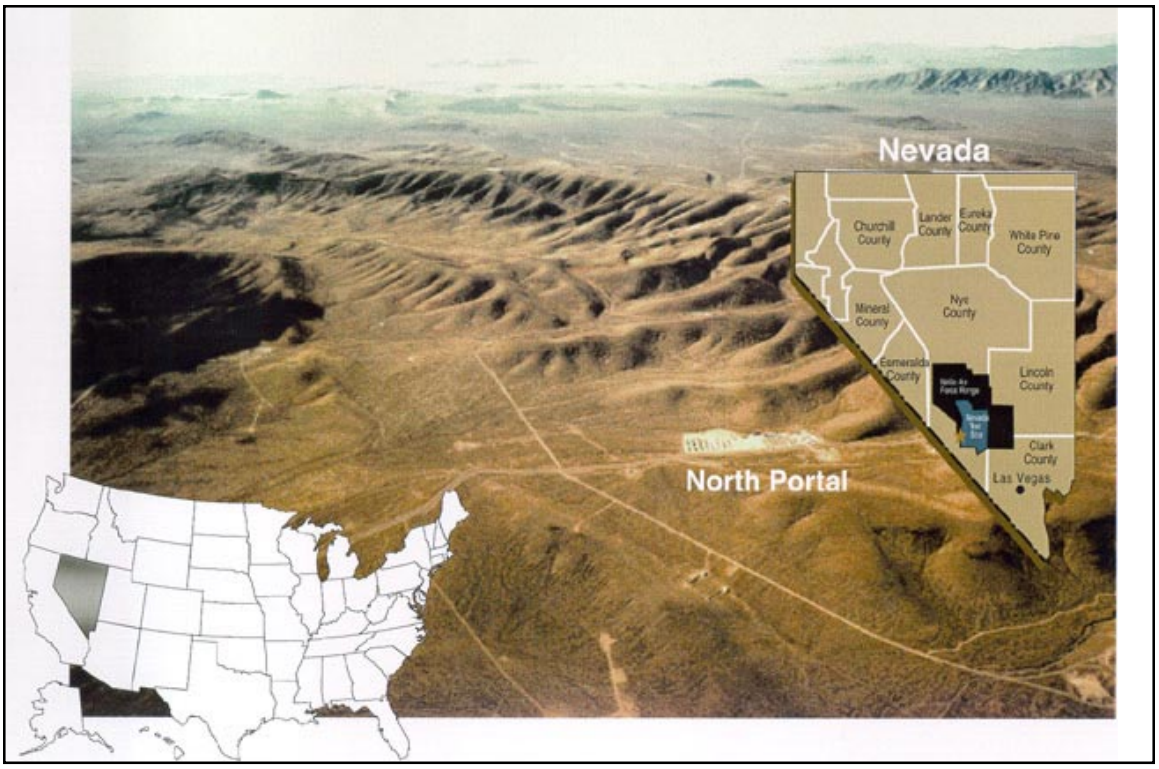

Figure 7 - Yucca Mountain and vicinity

and to confirm the safety of the repository before closure. This distinction has permitted the phasing of tests to achieve an earlier evaluation of whether Yucca Mountain appears to be suitable as the geologic disposal site.

In 1996, after additional analyses, the Program decided to propose a new, more concentrated approach to regain its target for a license application within a reasonable time, and which required only moderately increased funding in future years. This revised Program approach was described in the May 1996 Revised Program Plan. The convergence of more than a decade of scientific and engineering work at the Yucca Mountain site made this revised approach feasible. The following paragraphs summarize the key products that will continue to be the main focus of Program efforts and plans. These products consist of the viability assessment, the environmental impact statement, the site recommendation, and the license application to NRC.

Viability Assessment of the Yucca Mountain Site

The Department announced in 1996 that it would prepare a viability assessment of the Yucca Mountain site, and in the 1997 Energy and Water Development Appropriations Act, Congress formally directed the Department to do this. The Department released its report titled *Viability Assessment of a Repository at Yucca Mountain (DOE/RW-0508)* on December 18, 1998. Its five volumes presented (1) a site description; (2) a reference design for the repository and waste package; (3) a total system performance assessment that builds on total system performance assessments conducted in 1991, 1993, and 1995; (4) a plan and cost estimate for work remaining to complete a license application; and (5) an estimate of the cost to construct, operate, monitor, and close a repository based on the reference design.

Preparing the viability assessment engaged participants across the Program in a review of 15 years of work. While the viability assessment was not intended to provide a basis for site recommendation, the Department concluded that "Yucca Mounatin remains a promising site for a geologic repository and that work should proceed to support a decision in 2001 on whether to recommend the site to the President."

In April 1999, the Nuclear Waste Technical Review Board published a report, *Moving Beyond the Yucca Mountain Viability Assessment*. The Board concurred that work to determine site suitability should proceed, and that the planned studies are technically feasible and likely to produce useful information. The Board's report may be viewed on the Internet at *http://www.nwtrb.gov*.

Draft Environmental Impact Statement

The Nuclear Waste Policy Act (NWPA) specifies that the National Environmental Policy Act (NEPA) should be followed for the proposed Yucca Mountain repository and how NEPA requirements should be applied. It requires the Secretary to include a final environmental impact statement (EIS) as part of a site recommendation to the President and, ultimately, to the Congress. In particular, the NWPA specifies that it is not necessary to consider in the EIS the need for a repository, alternatives to geologic disposal, or alternative sites to Yucca Mountain. The EIS will assist the Secretary in making a decision on whether to recommend the site. A draft EIS was published by the Department in July 1999 for public comment.

The purpose of the draft EIS is to consider the possible environmental impacts that could result from the construction, operation and monitoring, and eventual closure of a geologic repository for spent nuclear fuel and high-level radioactive waste at the Yucca Mountain site. The draft EIS also evaluates the possible impacts of transporting spent nuclear fuel and high-level radioactive waste to Yucca Mountain.

In addition, the draft EIS examines the potential environmental impacts of a "no action" alternative in which a repository would not be developed at Yucca Mountain, and 63,000 metric tons heavy metal (MTHM) of commercial spent nuclear fuel and 7,000 MTHM of Department-managed nuclear materials would remain in on-site storage. The storage sites include commercial nuclear power plants and the Department's Hanford site in Washington State, the Idaho National Engineering and Environmental Laboratory, the Savannah River site in South Carolina, the West Valley site in New York State, and Fort St. Vrain in Colorado. The draft EIS can be viewed on the Internet at *http://www.rw.doe.gov.* A final EIS that addresses public comments will be published in FY 2001 and will accompany a site recommendation, as required by the NWPA.

Site Recommendation

The Program is focusing on the preparation of the necessary documentation for a Secretarial decision on whether to recommend the Yucca Mountain site for development as a repository. After an investment of 18 years and approximately $4 billion, the site characterization necessary to support a site recommendation decision is near completion, and the site recommendation report is on schedule for submittal in 2001. A determination on the suitability of Yucca Mountain and submittal of the site recommendation to the President are considered the most critical decisions in the Program's history.

License application

If the President approves and recommends the site to Congress, the submission of a license application to NRC for construction authorization will be the next significant milestone, now scheduled for FY 2002.

Waste Acceptance, Storage, and Transportation Project

Waste acceptance

The Nuclear Waste Policy Act of 1982 authorized the Secretary to enter into contracts with the owners and generators of commercial spent nuclear fuel. Departmental interactions are governed by the *Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste*, 10 CFR Part 961, promulgated as a Federal rule in 1983. The Department's obligation under the *Standard Contract* to begin waste acceptance has been the subject of litigation.

Along with commercial spent nuclear fuel, certain nuclear materials managed by the government will be accepted for emplacement in the civilian repository under OCRWM's current planning assumptions. These materials largely result from atomic energy defense activities (defense waste) and include materials owned by the Department of Energy and the Navy. The Department also manages a small quantity of spent nuclear fuel of commercial origin which was accepted by the government for research and development purposes. Located at multiple sites, these materials take forms that vary widely. Many have not yet been converted to the final waste forms that would be emplaced in the repository. OCRWM works with the Departmental offices currently responsible for these nuclear materials to integrate their near-term storage plans with plans for disposal in a repository. Unlike commercial spent nuclear fuel, which has uniform characteristics, there are many different types of defense nuclear materials, all of which need to be analyzed.

Transportation

Currently, OCRWM's plans are based on transportation of waste to a repository, when one becomes operational, scheduled for 2010. OCRWM is prepared to accelerate this schedule and is maintaining flexibility to enable it to respond appropriately to external developments. OCRWM will use a competitive procurement process to obtain needed waste acceptance and transportation services and equipment from the private sector. OCRWM has the capability to implement the long-lead time activities required by Section 180(c) of the Nuclear Waste Policy Act of 1982, as amended, for the provision of assistance to States and Native American Tribes along possible transportation corridors.

Program Management Center

The Program Management Center consists of two components: quality assurance and Program management and integration. The Center supports the Yucca Mountain Site Characterization Project; the Waste Acceptance, Storage, and Transportation Project; and the Program Director.

The quality assurance component assures that activities important to nuclear safety and waste isolation are performed in accordance with the Nuclear Regulatory Commission's quality assurance regulations. An independent Office of Quality Assurance, that reports directly to OCRWM's Director, provides quality assurance advice to the two projects and performs overview activities to assure compliance with established requirements.

The Program management and integration component is concentrating efforts on improving and streamlining management systems and processes to ensure the efficient application of available funding to Program priorities. Special attention is being paid to ensuring incorporation of Department-owned nuclear materials into the Program's plans to support the Department's national security objectives. For example, OCRWM is integrating plans for disposal of weapons-usable fissile materials and Department-owned spent nuclear fuel and high-level radioactive waste generated by nuclear weapons, naval nuclear propulsion, and civilian nuclear research and development activities in a geologic repository.

Key Program milestones

For the remainder of FY 2000 through the commencement of waste emplacement in the repository in 2010, OCRWM must reach a number of critical milestones mandated by the Nuclear Waste Policy Act of 1982, as amended. The activities to support these milestones are described and discussed in greater detail in Chapter Three of this Plan. The following sections summarize those activities that will represent the Program's central focus through 2010.

Complete an environmental impact statement (FY 2001)

The NWPA requires that the final environmental impact statement serve as one of the supporting elements for a decision on site recommendation, and that it accompany a Secretarial site recommendation to the President. The NWPA directs the Nuclear Regulatory Commission to adopt the environmental impact statement, to the extent practicable, in connection with issuance of a construction authorization and license to receive and possess radioactive waste.

A draft environmental impact statement was issued in FY 1999 for public review and comment. The comments received on the draft environmental impact statement are being considered in developing the final environmental impact statement, which will be issued in FY 2001 contemporaneously with a site recommendation if a site recommendation is submitted to the President.

Prepare and submit a site recommendation (FY 2001)

In the next year, OCRWM will focus on developing the information needed to decide whether to recommend the site. Before a license application to construct a repository can be submitted to the Nuclear Regulatory Commission, the Nuclear Waste Policy Act requires the following steps:

- The Secretary must decide, based on information obtained from site characterization and after considering the views of States, affected Indian Tribes, and the Nuclear Regulatory Commission, whether to recommend the site to the President.
- The President must decide whether to recommend approval of the Yucca Mountain site to Congress.
- Congress must decide whether to approve the Yucca Mountain site if the President recommends it.
- The Governor and legislature of Nevada may submit a notice of disapproval to Congress, in which case Congress must decide whether to override Nevada's objections and approve the Yucca Mountain site.

OCRWM plans to hold public hearings in the vicinity of Yucca Mountain in FY 2001 to inform residents of a possible site recommendation. In conjunction with the public hearings, OCRWM plans to issue a Yucca Mountain Site Recommendation Consideration Report (SRCR) that will provide the technical information concerning a possible site recommendation. After issuance of the Site Recommendation Consideration Report and completion of public hearings and the public comment process, a site recommendation statement may be prepared for submission by the Secretary of Energy to the President, and then to Congress.

Develop and submit a license application (FY 2002)

If the President and Congress ultimately support and approve development of a repository at the Yucca Mountain site, the Department will submit a license application to NRC in 2002. To obtain a license, the Department must demonstrate that a repository can be constructed, operated, monitored, and eventually closed without unreasonable risk to the health and safety of workers and the public. The challenge in licensing a geologic repository is demonstrating reasonable assurance of compliance with long-term safety standards for many thousands of years. Because a license

application takes years to prepare, OCRWM has begun to assemble the information needed to support it.

Obtain construction authorization from the Nuclear Regulatory Commission (FY 2005)

The Nuclear Regulatory Commission is expected to authorize repository construction in March 2005 at the earliest, consistent with the direction in the NWPA that the NRC issue its decision on construction authorization within three years of submittal of a license application.

Commence major transportation activities (FY 2005)

OCRWM will address transportation issues with varying degrees of focus on planning, mobilization, and operations, with the more significant phase of activities beginning in 2005. Initial pre-transportation phase activities will begin with the issuance of the Request for Proposals (RFP) in 2002. The Program strategy for transportation services, as called for in Section 137 of the NWPA, is to provide opportunities for private industries to work with OCRWM ". . . to the fullest extent possible . . ." in accomplishing OCRWM mission objectives. Starting in 2005, OCRWM will initiate the major acquisition of purchased services and all transportation-related equipment from one or more regional servicing contractor organizations, as described in the transportation section of the draft RFP.

Start repository construction (FY 2005)

Construction activities will start after the NRC authorizes construction; however, it is anticipated that several pre-construction activities will begin 12 to 18 months prior to the start of the construction phase; i.e., in 2003 or 2004. Tasking for pre-construction will include major capital expenditures, subsurface excavation, surface construction of facilities within the radiologically controlled area and balance-of-plant facilities, and initial waste package fabrication.

Submit license application amendment to receive and possess waste (FY 2008)

The Department must update its license application and submit it to NRC before NRC will issue a license to receive and possess nuclear waste. This update is scheduled for 2008.

Commence waste acceptance and emplacement (FY 2010)

Assuming that repository construction sufficient to begin waste emplacement will take five years, the first waste emplacement at Yucca Mountain could occur in the year 2010 if construction is initiated in 2005.

The repository operations phase will begin upon the Nuclear Regulatory Commission's issuance of a license to the Department of Energy to receive and possess waste at the repository, expected in 2010, and will continue until closure and decommissioning of the facility in approximately 2116. Activities that will occur during this phase include startup and training; surface and subsurface emplacement; emplacement drift excavation; waste package fabrication; and performance confirmation.

Major Program Milestones

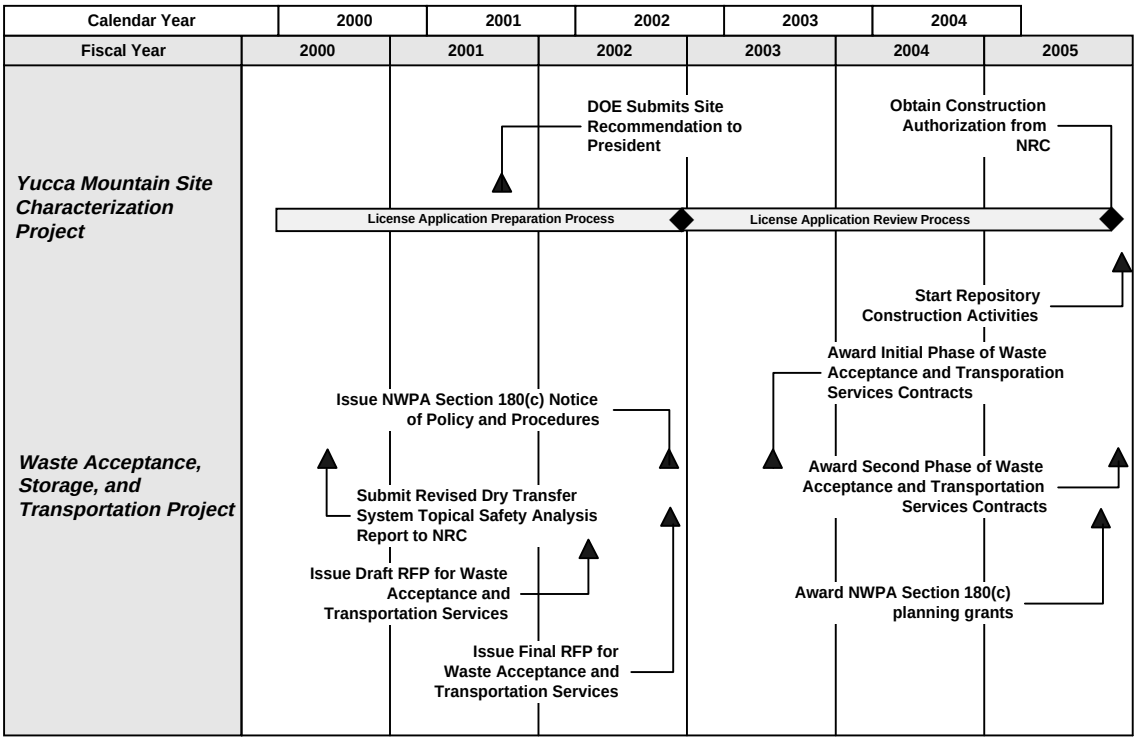

Figure 8

Office of Civilian Radioactive Waste Management **APPROPRIATIONS AND OUTYEAR FUNDING REQUIREMENTS** **(DOLLARS IN THOUSANDS)**							
Activity	**FY99** Actual	**FY00** Actual	**FY01** Request	**FY02** Projected	**FY03*** Projected	**FY04*** Projected	**FY05*** Projected
Yucca Mountain Site Characterization Project	281,879	281,175	358,306	357,917	577,115	627,515	1,030,415
Waste Acceptance, Storage, and Transportation Project	1,850	1,795	3,800	6,118	222,050	234,550	184,550
Accelerator Transmutation of Waste	4,000	0	0	0	0	0	0
Program Management and Integration	69,736	68,205	75,394	73,465	71,835	72,935	74,035
TOTAL OCRWM	**357,465[a]**	**351,175[b]**	**437,500**	**437,500**	**871,000**	**935,000**	**1,289,000**

* Source: *Report to Update TSLCC (Total System Life Cycle Cost) Estimate for Site Recommendation/License Application,* December 1999, TDR-CRW-000003 REV 01. The Program's cost estimates reflect the Department's best projections, given the scope of the work identified and the planned schedule of required activities. Future budget requests for the Program have yet to be established, and, in any event, will be determined through the annual Executive and Congressional budget process.

[a]$535K was rescinded from the FY1999 Nuclear Waste Fund per the Emergency Steel Loan Guarantee and Emergency Oil and Gas Guaranteed Load Act of 1999 (H.R. 1664).

[b]Per P.L. 106-113, a general reduction of 0.38 percent was applied to the Nuclear Waste Fund ($899K) and the Defense Nuclear Waste Disposal Appropriation ($426K).

Table 1

Chapter Two

Strategic Objectives, Performance Goals, and Strategies

Program mission

The Program's mission, as set out in the Nuclear Waste Policy Act of 1982, as amended, is to implement the Federal policy for permanent disposal of high-level radioactive waste and spent nuclear fuel, in order to protect the public health and the environment. The Program provides leadership in developing and implementing strategies to accomplish this mission that assure public and worker health and safety, protect the environment, merit public confidence, and are economically viable.

Program vision

The Program's vision is to lead the Nation to environmentally-sound disposal of high-level radioactive waste and spent nuclear fuel, thereby serving this and future generations. We will conduct the Program in a collaborative manner with integrity, openness, technical excellence, and responsiveness to social considerations.

Strategic objectives

The following strategic objectives, performance goals, and strategies are derived from the Program's mission and the Department's Strategic Plan. These goals and supporting strategies will guide the Program's development of key functions, milestones, and activities.

Strategic Objective 1

Complete the characterization of the Yucca Mountain site and, assuming it is determined suitable, recommend the site to the President and then to the Congress; if the site is designated as the repository site, submit the statutory license applications to the Nuclear Regulatory Commission; following issuance of the requisite licenses, construct and begin emplacement of spent nuclear fuel and high-level radioactive wastes in the repository in FY 2010.

Performance Goal 1: Prepare and submit site recommendation.

Strategy 1 Select the reference design for site recommendation and license application. [FY 2000]

Strategy 2 Select the reference natural systems models for site recommendation and license application. [FY 2000]

Strategy 3 Complete a Yucca Mountain Site Recommendation Consideration Report that will provide the public with the scientific and technical information concerning a possible Site Recommendation. [FY 2001]

Strategy 4 Conduct public hearings on a possible Site Recommendation by the Secretary. [FY 2001]

Strategy 5 Complete a Final Environmental Impact Statement (This also meets a milestone in a Federal Managers' Financial Integrity Act corrective action plan). [FY 2001]

Strategy 6 Finalize a Site Recommendation Statement for the Secretary of Energy to submit to the President, and then to the Congress. [FY 2001]

Performance Goal 2: Integrate plans for disposal of defense and civilian R&D waste.

Fully integrate plans for disposal of the Department's high-level radioactive waste and spent nuclear fuel generated by nuclear weapons, naval nuclear propulsion, weapons-usable fissile materials, and civilian nuclear research and development programs into the OCRWM Program baseline and planning process.

Strategy 1 Complete safety analyses for Department-owned spent nuclear fuel and high-level radioactive waste to support the repository license application. [FY 2002]

Strategy 2 Complete safety analyses for naval spent nuclear fuel to support the repository license application. [FY 2002]

Strategy 3 Complete safety analyses for plutonium waste forms to support the repository license application. [FY 2002]

Performance Goal 3: Develop and submit a license application to the Nuclear Regulatory Commission for construction authorization.

Strategy 1 Complete additional testing and analyses required to support license application design. [FY 2002]

Strategy 2 Complete license application design. [FY 2002]

Strategy 3 Develop and submit an application to the Nuclear Regulatory Commission for authorization to construct a repository at the Yucca Mountain site. [FY 2002]

Strategy 4 Support hearings before the Nuclear Regulatory Commission pursuant to the license application. [FY 2003 – 2005]

Performance Goal 4: Commence major transportation activities.

Strategy 1 Submit the revised dry transfer system topical safety analysis report (TSAR) to the Nuclear Regulatory Commission. [FY 2000]

Strategy 2 Issue NWPA Section 180(c) Notice of Revised Proposed Policy and Procedures for public comment. [FY 2002]

Strategy 3 Issue final Request for Proposals for waste acceptance and transportation services after repository site selection. [FY 2002]

Strategy 4 Issue NWPA Section 180(c) Notice of Policy and Procedures. [FY 2002]

Strategy 5 Award initial waste acceptance and transportation services contracts for planning (Phase A) work scope. [FY 2003]

Strategy 6 Award NWPA Section 180(c) planning grants. [FY 2005]

Performance Goal 5: Commence repository operations.

Strategy 1 Submit license application amendment to the Nuclear Regulatory Commission to receive and possess wastes. [FY 2008]

Strategy 2 Begin emplacement of waste in the repository. [FY 2010]

Strategic Objective 2

As a good neighbor and public partner, continually work with customers and stakeholders in an open, frank, and constructive manner.

Performance Goal 1: Foster stronger relationships with customers and other stakeholders.

Foster stronger relationships with customers and other stakeholders in the collaborative development and implementation of national policy for the disposal of high-level radioactive waste and increase customer and public awareness of OCRWM's waste management mission.

Strategy 1 Conduct at least four stakeholder meetings per year on a subject of programmatic interest.

Strategy 2 Keep key stakeholders informed of Program policy and implementation.

Strategy 3 Post key Program information on the OCRWM Home Page in a timely manner.

Strategic Objective 3

Manage human resources and diversity and implement best management practices to improve the delivery of products and services.

Performance Goal 1: Use prudent business management approaches to strengthen contracting results.

Use prudent contracting and business management approaches that emphasize results, accountability, and competition; improve timeliness; minimize costs; and ensure customer satisfaction.

Strategy 1 Conduct performance-based evaluations of the OCRWM M&O contractor in FY 2001 and beyond.

Strategy 2 Annually recover available funds from contracts in closeout.

Performance Goal 2: Implement quality management principles, strengthen fiscal and Program management practices and enhance productivity of human resources.

Strategy 1 Achieve at least 95 percent conformance with annual Program schedule and cost baseline targets.

Strategy 2 Conduct Program performance reviews by senior management at

least quarterly, using OCRWM-wide Program and financial management tracking systems.

Strategy 3 Perform at least one project/office-level management system performance assessment each fiscal year to improve management system effectiveness and efficiency.

Strategy 4 Maintain a local- and wide-area network prime time availability rate of at least 98 percent.

Strategy 5 Nominate qualified individuals for participation in Departmental and interagency career development programs, and select at least one individual each year to participate in one of the career development programs.

Chapter Three

Planned Program Activities

Yucca Mountain Site Characterization Project

Link to OCRWM strategy

The Yucca Mountain Site Characterization Project is responsible for accomplishing performance goals 1, 2, 3, and 5 of OCRWM Strategic Objective 1[1], as summarized below.

- Prepare and submit site recommendation.
- Integrate plans for disposal of defense and civilian R&D waste.
- Develop and submit a license application to the Nuclear Regulatory Commission for construction authorization.
- Commence repository operations.

Key planned activities

The Yucca Mountain Site Characterization Project is conducting the necessary scientific and technical work to support a determination on the suitability of the Yucca Mountain site for development as the Nation's first geologic repository. The near-term focus is on preparing a site recommendation statement for the Secretary of Energy to submit to the President in FY 2001. Supporting activities will include preparing a final environmental impact statement and developing other information required by the Nuclear Waste Policy Act of 1982, as amended, to support a site recommendation decision.

If the President and Congress designate Yucca Mountain as the repository site, a license application for repository construction will be prepared and submitted to the Nuclear Regulatory Commission. *Figure 9* provides a simplified conceptual drawing of the proposed repository.

The activities planned for FY 2001 through FY 2005 reflect an ongoing transition from predominately investigative science to data synthesis, model development and performance assessment for an overall safety analysis, finalizing the repository and waste package designs, and preparing to start repository construction. This transition will complete the site characterization phase, start and finish the site approval phase, and prepare OCRWM to start the construction phase, if authorized by NRC.

[1] See Chapter 2.

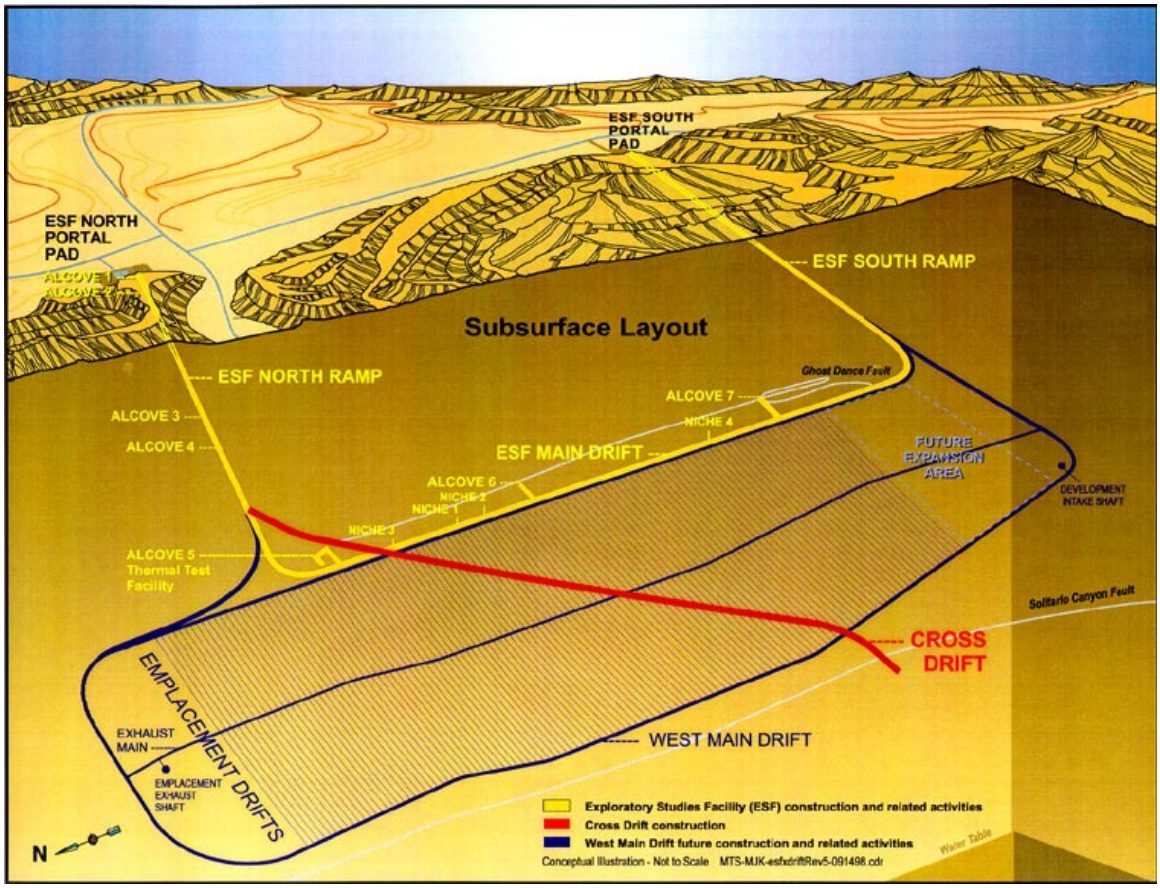

Figure 9 - Conceptual drawing of proposed repository

Major Project milestones are summarized in *Figure 17*. Projected funding requirements through FY 2005 are provided in *Table 2*.

Environmental Impact Statement

The NWPA requires the preparation of an environmental impact statement and that a final environmental impact statement accompany a Secretarial site recommendation to the President. The NWPA directs the Nuclear Regulatory Commission to adopt the final environmental impact statement, to the extent practicable, in connection with issuance of a construction authorization and license to receive and possess radioactive waste.

The environmental impact statement process began with the Notice of Intent published in the *Federal Register* on August 7, 1995. The Notice encouraged public participation in the scoping process. The public comment period closed on December 5, 1995, following 15 public meetings across the Nation. Comments received during the scoping process were formally documented in a Comment Summary Document that was published in July 1997. A draft environmental impact statement was issued in July 1999 for public review and comment. The comment period ended in February 2000. Comments received on the draft environmental impact statement will be considered in finalizing the environmental impact statement, which is scheduled to take place contemporaneously with the submission of a site recommendation to the President.

In FY 2000, further refinement of the technical analyses supporting the environmental impact statement will be performed, as appropriate, as a result of the ongoing progress of scientific

investigations and, as needed, to respond to comments received on the draft environmental impact statement.

Site Recommendation

The NWPA defines the process and information required for a site recommendation. The information required serves as the basis for the determination on site recommendation and includes: (1) a description of the proposed repository, including preliminary engineering specifications for the facility; (2) a description of the waste form or packaging proposed for use at such repository and an explanation of the relationship between such waste form or packaging and the geologic medium of such site; (3) a discussion of data obtained in site characterization activities relating to the safety of the site; (4) the final environmental impact statement, together with comments of the Secretary of the Interior, Council on Environmental Quality, Environmental Protection Agency, and the Nuclear Regulatory Commission; (5) preliminary comments of NRC concerning the extent to which the at-depth site characterization analysis and the waste form proposed for such site seem to be sufficient for inclusion in any application to be submitted by the Secretary for licensing of such site as a repository; (6) the views and comments of the governor and legislature of any State, or the governing body of any affected Native American Tribe, together with the response of the Secretary to such views; (7) other information the Secretary considers appropriate; and (8) any impact report submitted by the State of Nevada.

Activities supporting a Secretarial determination on whether to recommend the Yucca Mountain site to the President in FY 2001 and submittal of a license application to NRC in FY 2002, are based on the multi-year work scope and cost estimates derived from the viability assessment, continued refinement of repository and waste packages designs, and ongoing feedback from performance assessment models.

OCRWM initiated development of the Site Recommendation Consideration Report (SRCR) in 1999. The SRCR, which will be issued in FY 2001, and the key references that support it, will describe the technical information concerning the Secretary's consideration of whether to recommend the site. Although not required by the NWPA, the Department determined that the information to be contained in this report would enhance public review and comment during the public hearing process. The SRCR will be issued in conjunction with initiation of public hearings on a possible site recommendation. These hearings are required by the NWPA.

If, after the completion of the public hearings and upon consideration of all information required under the NWPA [42 U.S.C. 10134(a)(1)], the Secretary decides to recommend the site for development as a repository, the Secretary will submit that recommendation to the President. The designation of the site for development as a repository would be effective 60 days after the President recommends the site to Congress, unless the Governor or legislature of Nevada objects to the site by submitting a notice of disapproval to Congress within that 60-day period. If such a notice were submitted, the site would be disapproved unless, during the first 90 days of continuous session of Congress after the notice of disapproval, Congress passes a joint resolution of repository siting approval and the President signs it into law.

License Application

If the President recommends approval of the site to Congress, and if the site designation takes effect, the Department will submit a license application for repository construction to NRC. License application submittal is currently scheduled for FY 2002.

The license application is the key document upon which NRC will base its determination. It must present a defensible position that there is reasonable assurance that the repository can be

constructed and operated without unreasonable risk to the health and safety of the public. This determination is required to obtain authorization to construct the repository. The specific regulations for Yucca Mountain proposed by NRC for a new 10 CFR Part 63 are for a risk-informed, performance-based approach requiring that the license application demonstrate that the repository will meet the pre-closure and post-closure performance objectives. Additionally, the regulations require that the license application include comprehensive site, design, and operational information. The information in the license application must be sufficient for NRC to independently reach a conclusion.

The license application will be supported by a safety case that documents the Department's position on the long-term safety of the potential repository. Because of the inherent uncertainty in estimating the behavior of a repository system thousands of years into the future, the safety case will approach the issue of long-term safety from multiple perspectives. These include:

- Performance assessment,
- Defense-in-depth,
- Consideration of potentially disruptive processes and events,
- Insights from natural analogues, and
- Long-term performance evaluation and confirmation.

Performance assessment will provide an estimate of post-closure performance of the repository system for comparison with the regulatory dose limit. Defense-in-depth is achieved by use of multiple natural and engineered barriers. Defense-in-depth provides confidence that failure of any single barrier to perform as expected will not compromise the overall safety of the repository system.

The safety case will include an explicit evaluation of potentially disruptive processes and events, such as tectonic and igneous activities (for example earthquakes and volcanic activity), to account for their potential impacts on repository performance. Insights from natural analogues will be used to support the technical basis for performance assessment. Finally, the safety case will define a long-term performance confirmation program of testing and analyses that will be conducted between license application and permanent closure. The purpose of performance confirmation is to confirm that components of the repository system are performing as expected.

Interactions with the Nuclear Regulatory Commission

Ongoing interactions with NRC will continue. In the near term, OCRWM will have exchanges with the NRC on OCRWM's internal technical guidance document that will guide writing of the license application, and on NRC's license application review plan, which will guide the its review of the license application. Additionally, we will continue to meet with NRC staff to discuss their issue resolution status reports, and other technical topics of mutual interest.

After submission of the license application, if NRC accepts it for docketing, a notice will be published in the *Federal Register*. OCRWM plans to conduct activities in support of NRC's review of the application and final environmental impact statement. The admission of parties to the proceeding and discovery will occur in parallel with this NRC review.

OCRWM anticipates frequent interaction with NRC staff to clarify approaches, respond to questions, provide supplemental information, and resolve issues to support the NRC staff's preparation of the safety evaluation report. The NRC schedule for the licensing proceeding allows three years for completion of the process and issuance of construction authorization, consistent with the direction in the Nuclear Waste Policy Act, of 1982, as amended.

The Nuclear Regulatory Commission's procedures require a hearing prior to issuance of a construction authorization. These procedures

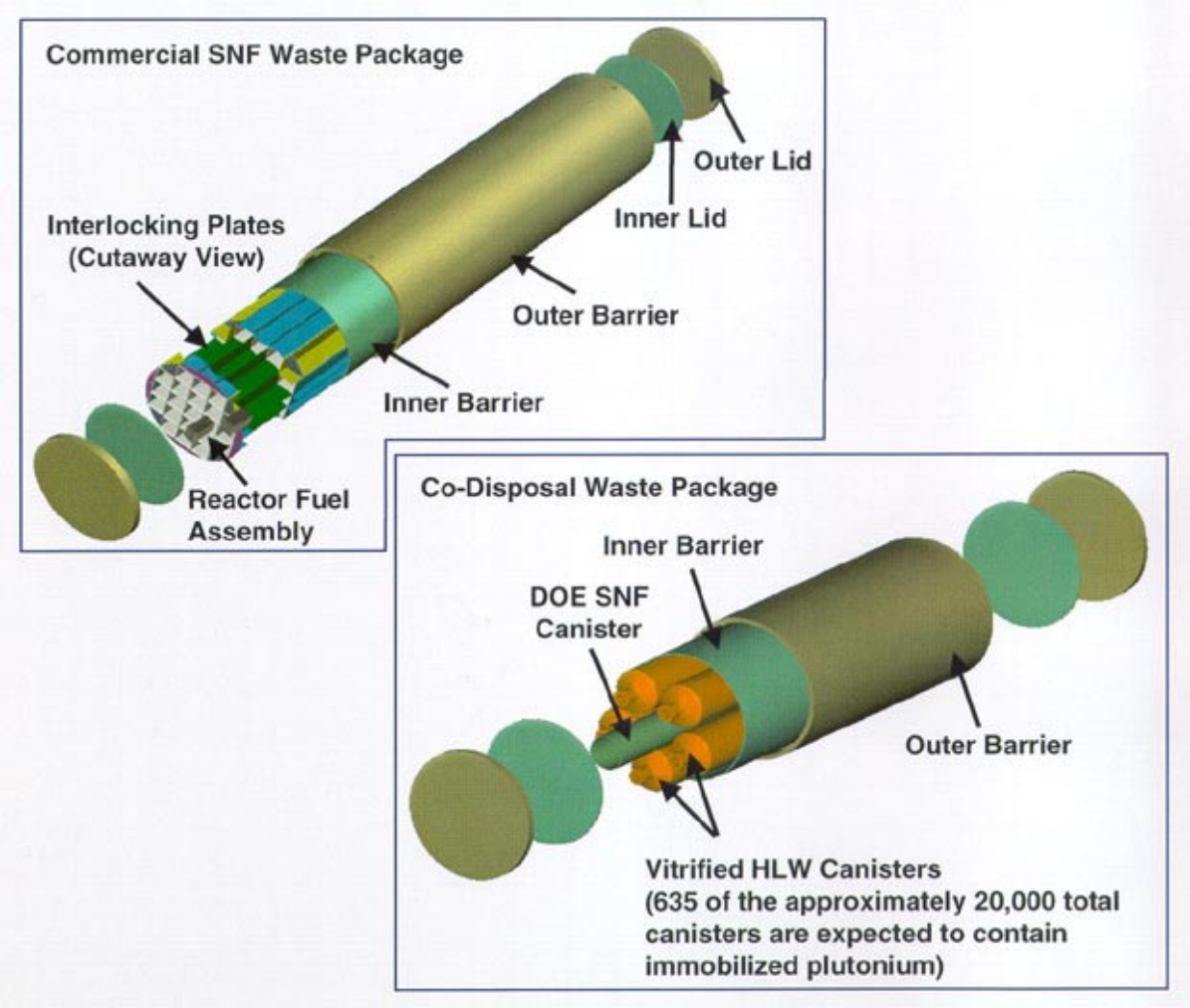

Figure 10 - Representative waste packages

establish the process and timing for outside parties to intervene and participate in the licensing proceeding, to identify the contentions that will be the subject of this proceeding, and to obtain discovery of information from the Department and other potential parties to the proceeding. Two pre-hearing conferences, together with their related orders and appeals, are planned. The NRC schedule for the licensing proceeding (10 CFR part 2, Appendix D) allocates approximately two years to complete these actions and begin the evidentiary hearings on the license application. Discovery is likely to be the most time-consuming. The NRC schedule allocates in excess of 18 months for discovery, which will be based largely on the information available in electronic form from the Licensing Support Network, required by 10 CFR 2, Subpart J. The Licensing Support Network will include information from the Department and other participants, and the electronic docket for the licensing proceeding. However, NRC procedures permit other forms of discovery that will require more direct participation by OCRWM staff in providing depositions and producing documents and other information requested.

Supporting technical activities

Key technical activities will focus on: (1) completing the remaining requirements of the Nuclear Waste Policy Act (final environmental impact statement, site recommendation, and license application); (2) completing the repository and waste package designs and waste package prototype testing; and (3) starting the procurement process for large construction equipment and services with long lead-times, and undertaking some work to prepare a safe area for the commencement of construction operations, if a construction license is granted.

Repository and waste package design

Design activities supporting development of the site recommendation and license application will continue to confirm the design bases, parameters, concepts and specifications, with sufficient detail to ensure protection of public and worker safety; and demonstrate compliance with regulatory requirements. Design activities after license application submittal will focus on responding to questions from NRC, and finalizing the design and creating sufficiently detailed design drawings for construction.

Waste forms and waste package

The repository will be designed to accept spent nuclear fuel from commercial nuclear power plants, Department-managed spent nuclear fuel and high-level radioactive waste, naval spent nuclear fuel, and immobilized surplus weapons-grade plutonium. These waste forms have diverse characteristics with respect to radioactive materials, size, weight, configuration, temperature, and levels of radioactivity.

The Department of Energy must demonstrate in the license application that a repository for spent nuclear fuel and high-level radioactive waste can perform safely. Testing of waste forms and candidate materials for waste package fabrication, under anticipated repository conditions, provides the basis for developing performance models that model degradation of waste forms and waste packages and eventual release of radionuclides. These tests, in turn, support selection of materials for fabrication of waste packages that would protect workers and the public for thousands of years.

The diverse inventory of waste forms to be disposed of in the geologic repository will require several different waste packages. All the waste package designs must meet similar requirements. During repository operations, the waste package must accommodate all handling conditions including design basis events for all waste forms. During the post-closure period the waste package must contain radionuclides for many thousands of years. The waste package must also provide safety with regard to criticality (a self-sustaining nuclear fission reaction) during both the pre- and post-closure periods.

Specific design activities supporting the site recommendation and license application will include:

- Waste form degradation tests subjecting commercial spent nuclear fuel and glass high-level radioactive waste samples to conditions similar to those expected in the repository.
- Waste package materials testing will focus on acquiring data on the performance of candidate materials and enhancing mathematical models describing their performance.

Waste package design activities supporting the site recommendation and license application will include:

- Development of design basis waste form characteristics for selected waste forms in the current and projected waste inventory.
- Development of fabrication/verification techniques, which will support the demonstration that waste packages can be fabricated and closed.

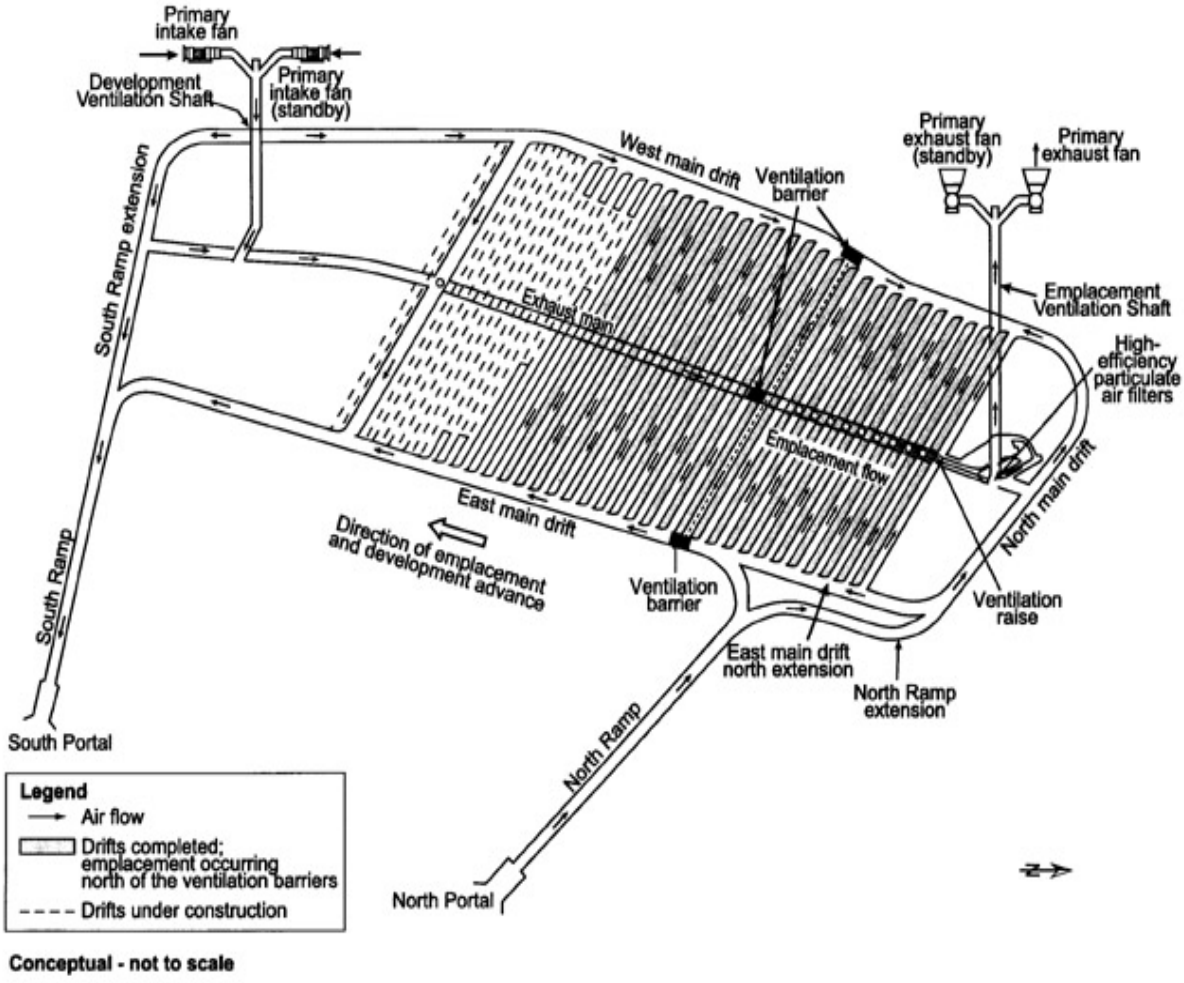

Figure 11 - Subsurface conceptual design

An important design activity supporting the licensing process and production of construction drawings will be development of waste package designs to accommodate the different waste forms and of a computer model for each version of a waste package. The primary components of the waste package are (1) cylindrical shells with lids that provide structural protection and isolation from corroding environments and (2) an internal basket to arrange the waste to provide criticality safety and augment heat transfer out of the package.

Subsurface design

Subsurface facilities are being designed to support excavation, emplacement, storage, potential retrieval, and permanent closure of a geologic repository. Subsurface facility design activities involve extensive structural, thermal, mechanical, and radiation protection analyses, and development of cost estimates.

Specific design activities supporting a site recommendation and license application will include:

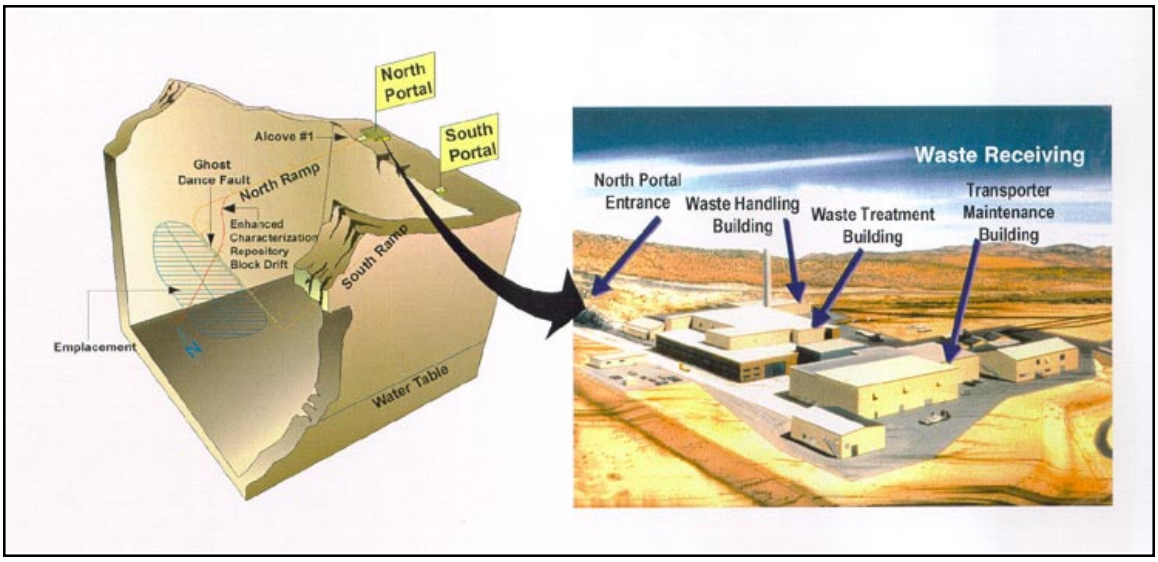

Figure 12 - Conceptual repository surface facilities

- Developing a description of the systems that are required to protect the health and safety of the public and of those that are necessary to meet post-closure repository performance objectives. The design supporting the license application will also include a description of systems that process radiological waste, provide fire protection, and protect from interactions with non-safety systems. In addition, design features that protect the health and safety of the workers will be identified.
- Continuing development of the system description documents, which document the design and regulatory basis for each system. Specific subsurface systems include those for excavation, ground control, ventilation, water distribution, waste emplacement, backfill emplacement, and retrieval.

Future specific design activities supporting the licensing process and production of construction drawings include:

- Drafting drawings for structures and components, which entail much more specific details such as size, materials, location, assembly sequence, and routing for pipes and wires.
- Continuing testing of materials and systems such as drainage assessment, thermal and chemical effects on a drip shield, and testing backfill mechanical and hydrological properties.
- Performing constructability studies.
- Developing plans and procedures for construction crews.

Surface design

Surface facilities will occupy an area of approximately 870 acres and will include 22 major systems. Key facility functions involve: (1) receiving wastes transported to the site in shipping casks; (2) removing wastes from shipping casks and loading them into waste packages within a handling building; (3) sealing waste packages by welding; and (4) delivering the waste packages to a holding area in preparation for underground emplacement. Major surface facilities include a waste treatment building, waste transporter mainte-

nance building, utility buildings, warehouses, maintenance shops, and administrative facilities.

Waste handling and operations pose unique design considerations: (1) to protect worker safety, casks weighing up to 60-tons must be remotely handled; (2) the number of fuel assemblies handled each year would be approximately 300 times greater than at a nuclear power plant; and, (3) the production rates for the waste handling hot cell would be significantly greater than in a power plant.

Specific design activities supporting the site recommendation and license application include:

- Development of surface facility system description documents for the disposal container handling system, site radiological monitoring system, fuel assembly transfer system, canister transfer system, fire protection system, and emergency response system.
- Developing preliminary designs for the waste handling and waste treatment buildings and their associated systems.

Future specific design activities supporting the licensing process and production of construction drawings involve:

- Design of off-site transportation systems, including the rail lines and roads from the proposed Nevada transfer stations. Design of off-site utilities consisting of electric power, communications, and water supply.
- Drafting drawings for structures and components, which include much more specific details such as size, materials, location, assembly sequence, and routing for pipes and wires.
- Developing plans and procedures for construction crews.

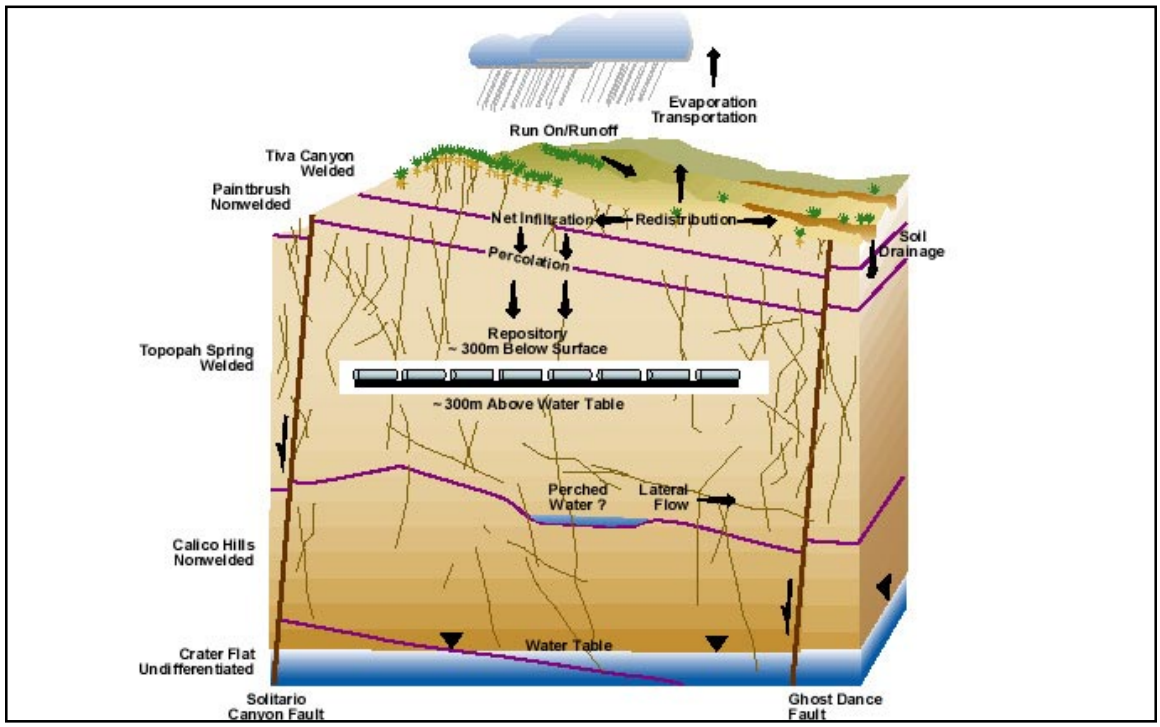

Figure 13 - Cutaway view of potential repository

Figure 14 - Yucca Mountain geologist performing analyses in the cross-drift

Total system performance assessment

The essential questions relating to the suitability and licensing of the Yucca Mountain site are those associated with the potential repository's ability to perform safely over many thousands of years. These questions are addressed through a suite of interrelated computer models, collectively called total system performance assessment (TSPA). Total system performance assessments have been used for the last decade to model the potential behavior of repository parameters that are as representative as current information allows. In those cases where representative information is not available or is very uncertain, conservative assumptions will continue to be used.

Total system performance assessment employs a hierarchy of models to analyze the performance of the repository in safely containing radioactive waste. This analysis uses the characteristics of the natural system (geology, hydrology, etc.) and the engineered system (waste form, waste package, drip shield, etc.) in mathematical models of the physical processes that can affect waste containment. Performance assessments evolve with time, in

Figure 15 - Drift scale thermal test

Figure 16 - Single heater thermal test

that the information gained from each effort, together with newly acquired scientific and engineering information, is used to guide subsequent assessments.

As natural system and engineered system information matures, performance assessment analyses have been revised to become more representative of actual site conditions. Iterations of total system performance assessments of the Yucca Mountain site were conducted in 1991, 1993, 1995, and 1998. A phased peer review of the total system performance assessment was completed in 1999. The comments and recommendations from the peer review have been incorporated into the next total system performance assessment that will support the site recommendation and license application.

An important objective of performance assessment modeling is to identify the significance to system performance of the current uncertainty in processes, models, and parameters. The impact of the uncertainty is directly evaluated in the assessments themselves by the probabilistic nature of the analyses. Those components that are most significant and uncertain are identified as warranting additional investigation. This provides direct input to site characterization and design activities to assist in prioritizing the necessary testing, and, in turn, to develop more robust and defensible performance assessments.

Models of how the natural system and engineered system are expected to perform as part of the repository system (referred to as process models) draw on data from site investigations, laboratory testing, and design. The total system performance assessment uses models abstracted from the process models. OCRWM is producing a set of process model reports synthesizing the modeling and analysis for all relevant physical processes that could affect repository performance. These reports will provide the technical basis for the total system performance assessment that will support a site recommendation; they will be updated to support the license application.

The process model reports will help ensure the traceability, transparency, and defensibility of the total system performance assessment. The process model reports include integrated site model, near-field environment, engineered barrier system, waste package degradation, waste form degradation, unsaturated zone flow and transport, saturated zone flow and transport, biosphere, and disruptive events.

Performance assessment tasks planned to support the site recommendation and license application include:

- Updating models, and confirming these models for use in the site recommendation and license application.
- Conducting confirmation activities to compare the most recently available field and laboratory data to selected natural analog work, as appropriate.
- Incorporating the Busted Butte unsaturated-zone transport test to investigate scaling effects between laboratory and in situ tests and to validate the site-scale transport model for the license application.

- Incorporating data analysis and interpretations of thermal testing into process models that support total system performance assessment.

Future specific activities supporting the licensing process and production of construction drawings include:

- Incorporating otherwise irretrievable data collected on transient events such as earthquakes, floods, and major storms into the performance assessment models to confirm TSPA calculations with new data.
- Continuing confirmation activities to compare the most recently available field and laboratory data to selected natural analog work, as appropriate.

Core science

Core science includes data collection, analyses, and modeling of geologic, hydrologic, geochemical, climatological, geophysical, tectonic, and environmental conditions at the Yucca Mountain site. Data will continue to be collected from the surface, from boreholes, from underground excavations, in the Exploratory Studies Facility (ESF) alcoves and niches, in the Busted Butted test facility, and from analog sites. Many data collection activities are nearing completion, and efforts to support the site recommendation and license application are focusing on data synthesis, model refinement, calibration, validation, and quality assurance documentation. Specific ongoing field and laboratory tests include:

- Conducting seepage and fracture-matrix interaction tests in the lower lithophysal and non-lithophysal units of the Topopah Spring welded unit in the cross-drift.
- Conducting fault testing at the Solitario Canyon fault in the cross-drift.
- Conducting a moisture-monitoring test of the cross-drift environment.
- Conducting moisture distribution tests at ambient conditions within the cross-drift.
- Conducting thermal tests that generate data on the effects of heat on water, rock chemistry, and rock structure, and the relationships among them.
- Drilling additional boreholes and taking geotechnical measurements within the footprint of the waste handling building, to support preclosure seismic analysis for design.
- Continuing seismic monitoring through an extensive network that includes 24 surface locations on and around the site and instrumentation in alcoves and niches of the ESF.
- Continuing to provide funding to Nye County to drill remaining boreholes to test water characteristics and movement. Under this cooperative effort, Nye County's boreholes will be used to perform tracer tests in the alluvium that constitutes a potential flow path between the site and the Amargosa Valley.

Continuing environmental compliance activities include:

- Conducting surveillances, audits, and assessments of site activities to ensure compliance, and filing quarterly and annual reports, as required by environmental regulations.
- Monitoring weather and other environmental conditions to provide data for models that support design and engineering, performance assessments, and analyses of potential radiological doses.
- Collecting data to develop the environmental baseline that would be used to monitor for potential impacts caused by repository construction and operation.

Future specific activities supporting the licensing process and production of construction drawings include:

- Continuing collection of otherwise irretrievable data to record transient events such as earthquakes, floods, and major storms.
- Continuing the long-term drift-scale heater test (the cool-down phase will be started in FY 2001), thermal test in the cross-drift, and seepage tests.
- Continuing the comprehensive environmental compliance program that ensures that OCRWM can conduct performance confirmation testing without interruption, by maintaining continuous compliance with over 40 active environmental permits from the State of Nevada, as well as Federal laws and Departmental directives. The program includes activities to monitor air quality and meteorology, water quality, hazardous materials management/pollution control, cultural resources, environmental justice, socioeconomics, biological resources, and land access.

Operations and construction

The Yucca Mountain site and the adjacent support area occupy 195 square miles in a remote location (100 miles northwest of Las Vegas, Nevada) and require their own infrastructure. Included in this area are a large facility to store geologic samples in a controlled environment that meets strict quality assurance requirements; laboratory facilities for testing geologic and hydrologic samples; the C-Well testing complex important to determining site saturated zone processes; buildings used to administer field operations; 20 miles of paved roads and 28 miles of unpaved roads; utilities; communication systems; approximately 800 separate test areas, including 451 boreholes — many of them instrumented; 276 pits and trenches; and environmental plots.

The underground facilities include the main loop of the ESF, which is 7.9 kilometers (5 miles) long and 7.6 meters (25 feet) in diameter and the cross-drift, a tunnel 2.8 kilometers (1.7 miles) long and 5 meters (16 feet) in diameter that crosses the repository block from northeast to southwest. There are 16 alcoves and niches within the ESF and the cross-drift.

Ongoing operations support will continue during development of the site recommendation and license application and during the licensing process. Specific examples include providing communication services, electricity and water, collecting sewage and refuse, and janitorial services; controlling materials and property on the site and warehousing supplies; operating a motor pool and providing bus transportation for workers and fuel for vehicles; providing staging for underground activities and utility feeds to underground operations; helping to calibrate scientific equipment; coordinating tours of the site; and ensuring site security.

Environment, safety and health

OCRWM is integrating sound environment, safety and health practices into the performance of the Program's daily activities, and continues to comply with applicable Federal and state health and safety requirements, and national consensus standards, such as those of the American National Standards Institute, National Fire Protection Association, and National Electrical Code. An integrated safety management system is also being implemented.

Project management

Project management within the Yucca Mountain Site Characterization Project includes public information and outreach programs to ensure that open and informative interactions occur with Program stakeholders and the public; development, operation and maintenance of information technology systems; project control functions; and business process and support services. After the license applica-

tion is submitted, this area will also include procurement functions for construction equipment and services.

Business processes include establishing and implementing training policies and cost-effective "nuclear culture" training practices. Also included are procurement and property management and financial assistance programs. The purpose of these activities is to implement the requirements of the Nuclear Waste Policy Act of 1982, as amended; the Quality Assurance Requirements and Description (QARD) document; and Federal and Department of Energy acquisition regulations.

Information management

Information management (IM) involves the strategic application of information technology to enhance productivity, facilitate process improvement, promote information exchange and system interoperability, and reduce overall Program costs. IM activities include document development and production support, data and records storage, data access and control, information systems and network support, and information security. OCRWM IM functions were recently consolidated under a senior information officer assigned to the Yucca Mountain Site Characterization Office but located at OCRWM Headquarters. IM activities planned to support site recommendation, license application, and the licensing process include:

- Developing and implementing a Program-wide information architecture.
- Implementing an Electronic Document Management System (EDMS).
- Processing and indexing 200,000+ records.
- Developing and implementing a Licensing Support Network.
- Augmenting engineering design with advanced computer-aided design systems.
- Upgrading the Yucca Mountain site telecommunications network.
- Consolidating the Program information base into a normalized distributed database with a standardized data dictionary.
- Increasing document and record retrievability.
- Implementing a site environmental data monitoring system.
- Upgrading the Program data, voice, and video telecommunications network.

Key Yucca Mountain Site Characterization Project milestones

The following represent significant milestones for the Yucca Mountain Site Characterization Project for Fiscal Years 2000 through 2005. These milestones correspond to strategies that support the Program's Performance Goals presented in *Chapter Three*.

FY 2000

- Complete public hearings on the draft environmental impact statement.
- Select reference design for site recommendation and license application.
- Select reference natural systems models for site recommendation and license application.

FY 2001

- Finalize environmental impact statement. (This also meets a milestone in a Federal Managers' Financial Integrity Act corrective action plan).
- Complete a Yucca Mountain Site Recommendation Consideration Report that will provide to the public technical information underlying a possible site recommendation.

- Conduct public hearings on a possible site recommendation.
- If appropriate, finalize a site recommendation statement for the Secretary of Energy to submit to the President.
- Submit the site recommendation and EIS to the President.

FY 2002

- Submit a license application for construction authorization to the Nuclear Regulatory Commission. NRC staff will review the license application and environmental impact statement submitted by the Department to support an NRC decision on authorization of repository construction. The NRC's rules of practice define the licensing process and schedule.

FY 2003 - 2005

- Conduct performance confirmation activities, as required by the Nuclear Regulatory Commission's licensing regulations, begun prior to submission of the license application.
- Update performance assessment to support licensing hearings, as part of general activities supporting the NRC's review and questions.
- Conduct activities in support of the NRC's review and prepare for licensing hearings.

FY 2005

- Commence repository construction upon receipt of a Nuclear Regulatory Commission construction authorization.

Yucca Mountain Site Characterization Project Milestones

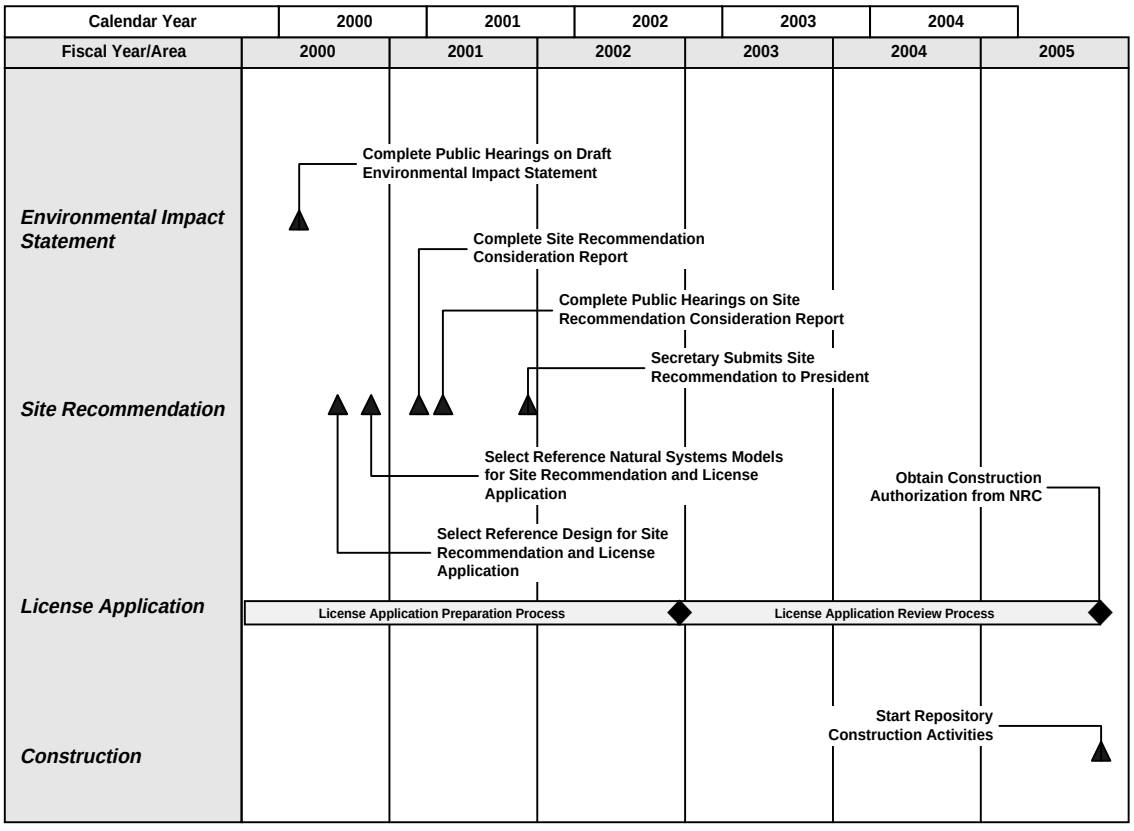

Figure 17

Yucca Mountain Site Characterization Project **APPROPRIATIONS AND OUTYEAR FUNDING REQUIREMENTS** **(DOLLARS IN THOUSANDS)**							
Activity	**FY99** Actual	**FY00** Actual	**FY01** Request	**FY02** Projected	**FY03** Projected	**FY04** Projected	**FY05** Projected
Operations/Construction	34,203	30,000	32,967	29,658	172,500	227,721	
Core Science	74,832	70,624	69,432	44,634	32,000	26,000	
Design & Engineering	77,859	66,275	111,234	140,914	89,024	91,000	
Licensing/Suitability	53,130	61,407	84,985	85,232	26,691	24,300	
National Environmental Policy Act	1,962	1,320	1,600	0	0	0	**TBD**
Project Management	28,234	35,177	36,253	34,404	32,000	32,194	
External Oversight, Payments Equal To Taxes, & Closeout	11,659	16,372	21,835	23,075	24,900	26,300	
Nevada Rail	0	0	0	0	200,000	200,000	
TOTAL YUCCA MTN	**281,879**	**281,175**	**358,306**	**357,917**	**577,115**	**627,515**	**1,030,415**

Table 2

Waste Acceptance, Storage, and Transportation Project

Link to OCRWM strategy

The Waste Acceptance, Storage, and Transportation Project is responsible for accomplishing OCRWM Strategic Objective 1, Performance Goal 4: "Commence major transportation activities," as described in Chapter 2.

The following strategies are identified with preparatory work necessary to realize this performance goal:

Strategy 1: Submit the revised dry transfer system topical safety analysis report (TSAR) to the Nuclear Regulatory Commission. [FY 2000]

Strategy 2: Issue Nuclear Waste Policy Act Section 180(c) Notice of Revised Proposed Policy and Procedures for public comment. [FY 2002]

***S**trategy 3:* Issue final Request for Proposals (RFP) for waste acceptance and transportation services. [FY 2002]

Strategy 4: Issue Nuclear Waste Policy Act Section 180(c) Notice of Policy and Procedures. [FY 2002]

Strategy 5: Award initial waste acceptance and transportation services contracts for planning (Initial Phase) work scope. [FY 2003]

Strategy 6: Award Nuclear Waste Policy Act Section 180(c) planning grants. [FY 2005]

Key planned activities

The Project will focus its near-term waste acceptance, storage, and transportation activities on two major areas:

- Development of plans and processes to achieve the legal and physical transfer of spent nuclear fuel and high-level radioactive waste from owners and generators to the Department of Energy.
- Development of a competitive process for the private-sector acquisition of waste acceptance and transportation services.

This focus was affirmed by Congress during debate on the 1997 Energy and Water Development Appropriations Act when Congress provided that "the appropriated funds be used in accordance with the Civilian Radioactive Waste Management Draft Program Plan issued by the Program in May 1996 and for interim storage activities as authorized by law." The approach assumes that spent nuclear fuel and high-level radioactive waste will be accepted in 2010 at Yucca Mountain if the site is approved for development and a repository becomes operational. Other waste acceptance, storage, and transportation activities planned for FY 2000 and beyond focus on resolution of institutional issues with other Departmental offices and with Program stakeholders.

Waste acceptance

Litigation

Litigation against the Department over the delay in waste acceptance is currently proceeding in the United States Court of Appeals for the District of Columbia Circuit, and the United States District Court for the District of Minnesota.

Ongoing waste acceptance efforts

The Waste Acceptance, Storage, and Transportation Project continues to focus on core activities that will precede removal and transportation of spent nuclear fuel from reactor sites to a Federal facility. These activities include collection and maintenance of spent nuclear fuel discharge information, development of procedures for verification of spent nuclear fuel parameters, maintenance and implementation of the disposal contracts, and interactions with contract holders and others concerning nuclear materials safeguards.

Defense waste acceptance

OCRWM is enhancing its acceptance criteria for Department-owned spent nuclear fuel and naval spent nuclear fuel. OCRWM executed a memorandum of agreement with the Department's Office of Environmental Management for the acceptance of Department-owned spent nuclear fuel and high-level radioactive waste and a similar agreement with the Office of Naval Reactors' Navy Nuclear Propulsion Program for acceptance of naval spent nuclear fuel. These agreements include detailed arrangements for the acceptance, transportation, and disposal of these nuclear materials.

The two memoranda of agreement were finalized in FY 1998 and are available on the OCRWM web site at *http://www.rw.doe.gov*.

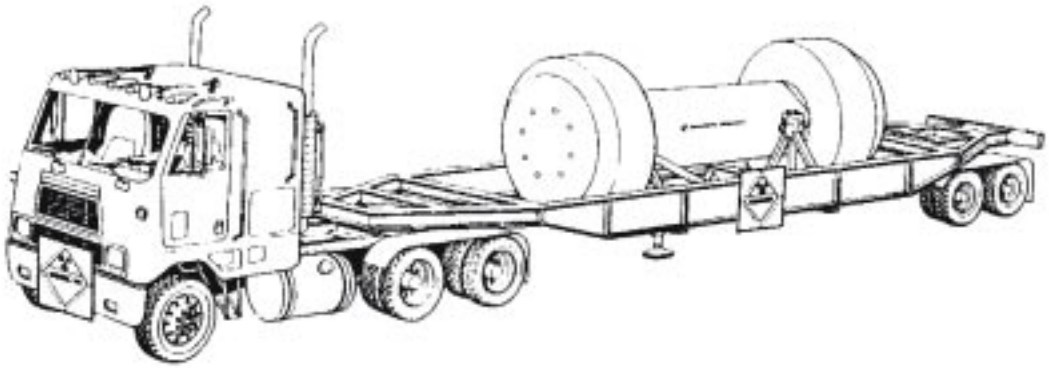

Figure 18 - Artist's rendering of transportation cask

To coordinate and integrate the management of the Department's spent nuclear fuel and high-level radioactive waste with the Department's Office of Environmental Management, OCRWM developed an integrated schedule for activities involving the Yucca Mountain Site Characterization Project, the Waste Acceptance, Storage, and Transportation Project, the Office of Environmental Management, and the Department's Office of Fissile Materials Disposition.

In the future, OCRWM will work with the Office of Fissile Materials Disposition and other involved Departmental elements to ensure that the arrangements and responsibilities for acceptance, transport and disposal of surplus weapons-grade plutonium are appropriately assigned.

Collectively, these efforts should ensure that the impacts of integrating these materials into the waste management system are well understood and adequately accommodated.

Storage

Non-site-specific spent nuclear fuel storage facility

To respond to Congressional direction in appropriations legislation, the Project has developed two non-site-specific safety analysis reports. These analyses will enable OCRWM to implement new policy directives in a timely, cost-effective, and efficient manner. The first is for a generic storage facility, and the second is for a dry transfer system. Both reports have been submitted to the Nuclear Regulatory Commission and are currently being reviewed.

In addition, a topical report on burn-up credit for actinide elements was submitted to the Nuclear Regulatory Commission for review. This report provides a method for taking credit for the reductions in spent nuclear fuel reactivity that occur as a result of fuel usage in a reactor. Obtaining burnup credit will improve overall system efficiency. Some of the techni-

cal data developed for transportation burnup credit may contribute to work being done by the Yucca Mountain Site Characterization Project on disposal criticality. Submittal of the last revision of the actinide-only burnup credit topical report marked the completion of OCRWM's work in this area. NRC was asked to use the report, along with the results of its review, in working with the private sector to approve the use of burnup credit for transport of spent nuclear fuel. At the completion of its review, NRC issued guidance on burnup credit in May 1999 and August 1999 (*Nuclear Regulatory Commission Interim Staff Guidance, ISG-8, Rev 0 and Rev 1*).

The Project continues to support ongoing NRC staff review activities. Successful NRCreview of all these products will increase the options available to service reactor sites and will allow the Department to respond rapidly to changes in policy.

Transportation

Although the Project has adjusted its priorities over the last several years in response to direction from Congress and the President, transportation planning issues have remained relatively stable. Transportation operations and planning, and State, Tribal, and local preparedness for safe routine transportation and emergency response will be central to the successful implementation of the Project. Accordingly, the Project coordinates with a broad network of State, Tribal, and local government officials, industry representatives, technical experts, and private citizens who have an interest in how the Department will transport spent nuclear fuel and high-level radioactive waste.

Further work on the competitive private sector initiative and on development of the training and technical assistance policy for States and Tribes will be conducted only after a national decision is made on the repository site recommendation.

Competitive private sector initiative

In accordance with the transportation provisions of the Nuclear Waste Policy Act of 1982, as amended, the Project has proceeded with efforts to contract with private industry, to the maximum extent possible, for equipment and services for transportation and delivery of commercial spent nuclear fuel. Since 1996, consistent with guidance from the President and Congress, the Project developed a draft Request for Proposals (RFP), a Statement of Work, and a Concept of Operations for the competitive private sector approach. The approach will utilize a competitive procurement to acquire services and equipment from a contractor-operated waste acceptance and transportation organization. The Project held pre-solicitation conferences in July 1996 and February 1997 to discuss technical and contractual issues related to the potential acquisition of transportation services. Draft RFPs were issued for comment in December 1996 and November 1997. The second pre-solicitation conference gathered public comments that helped the Project further shape the competitive private sector approach. A third revised draft RFP was issued in September 1998.

The transportation initiative will be time-phased so that it can proceed in steps consistent with Administration policy for the development of a Federal facility.

Ongoing transportation institutional activities

The Project has developed a *Revised Proposed Policy and Procedures for Implementation of Section 180(c) of the Nuclear Waste Policy Act of 1982, as amended*. Section 180(c) requires the Secretary to provide technical assistance and funds to States for training of public safety officials of appropriate units of local governments and Native American Tribes through whose jurisdictions the Secretary plans to transport spent nuclear fuel or high-level radioactive waste. Funding is proposed to be

provided every year, beginning approximately four years prior to the first shipment through State or Tribal reservation boundaries. The Revised Proposed Policy and Procedures will remain in draft form until a final repository site is chosen under the law.

To help resolve issues related to the transportation of radioactive materials, the Project continues to participate in the Transportation External Coordination Working Group (TEC/WG), a broad forum for stakeholder participation. The TEC/WG provides the Project with opportunities to interact with organizations representing State, Tribal, local, professional, technical, and industry interests. The Project will also track and, when appropriate, participate in the development of Department-wide transportation policy and monitor the activities of other Departmental shipping campaigns and the lessons learned from those campaigns.

Key Waste Acceptance, Storage, and Transportation Project milestones

The following represent significant Waste Acceptance, Storage, and Transportation Project milestones for Fiscal Years 2000 through 2005. These milestones correspond to strategies that support the Program's performance goals presented in *Chapter Three*.

FY 2000

- Submit revised dry transfer system topical safety analysis report (TSAR), Revision 1, to the Nuclear Regulatory Commission.

FY 2002

- Issue draft RFP for waste acceptance and transportation services.
- Issue for public comment an NWPA Section 180(c) Notice of Revised Proposed Policy and Procedures.
- Issue final RFP for waste acceptance and transportation services after site selection.
- Issue NWPA Section 180(c) Notice of Policy and Procedures.

FY 2003

- Award initial phase of waste acceptance and transportation services contracts.

FY 2005

- Award NWPA Section 180(c) planning grants.
- Award second phase of waste acceptance and transportation services contracts.

Waste Acceptance, Storage, and Transporation Project Milestones

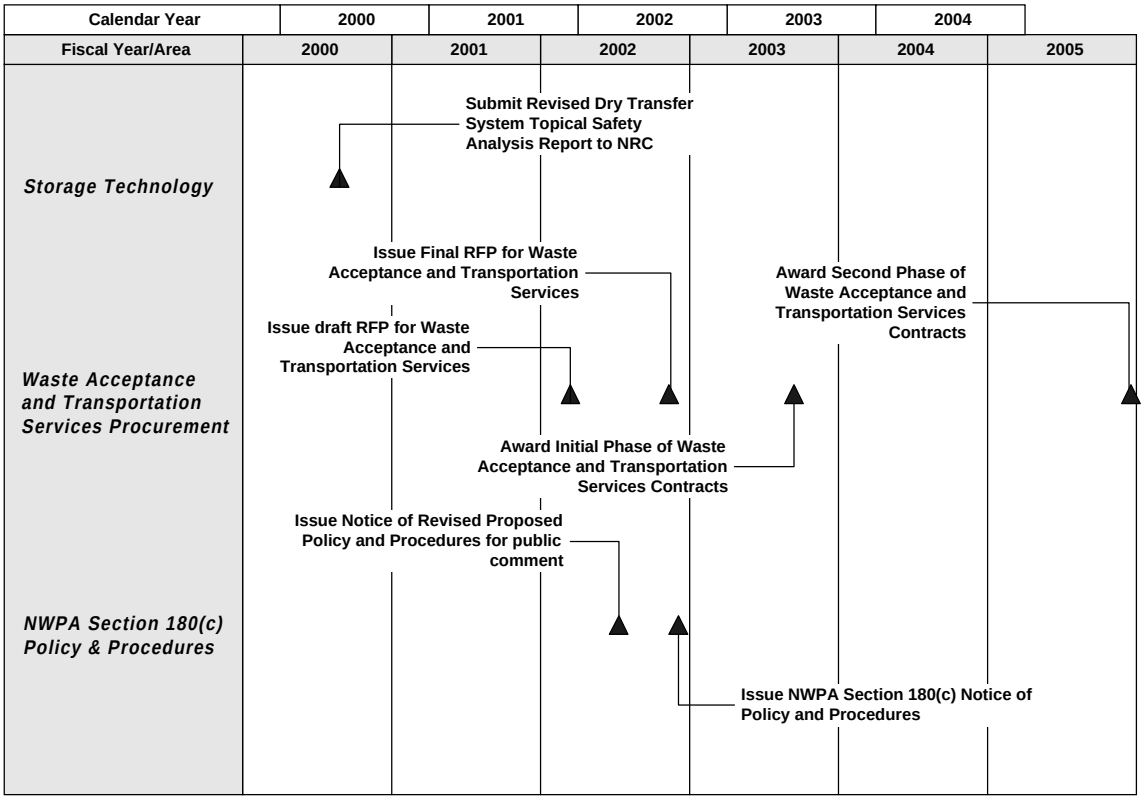

Figure 19

Waste Acceptance, Storage, and Transportation Project
APPROPRIATIONS AND OUTYEAR FUNDING REQUIREMENTS
(DOLLARS IN THOUSANDS)

Activity	FY99 Actual	FY00 Actual	FY01 Request	FY02 Projected	FY03 Projected	FY04 Projected	FY05 Projected
Spent Fuel Storage	320	0	0	0	0	0	
Transportation	0	0	1,750	4,376	219,311	230,258	**TBD**
Waste Acceptance	916	1,268	1,523	1,302	1,399	2,192	
Project Management	614	527	527	440	1,340	2,100	
TOTAL, Project	**1,850**	**1,795**	**3,800**	**6,118**	**222,050**	**234,550**	**184,550**

Table 3

Program Management Center

Links to OCRWM strategy

The Program Management Center coordinates and supports accomplishment of the following OCRWM strategic objectives:

Strategic Objective 2:

> As a good neighbor and public partner, continually work with customers and stakeholders in an open, frank, and constructive manner.

Strategic Objective 3:

> Manage human resources and diversity and implement best management practices to improve the delivery of products and services.

The steps the Management Center is taking to accomplish these strategic objectives are discussed below.

Key planned activities

The Program Management Center provides quality assurance and Program management and integration services in support of the Program Director, the Yucca Mountain Site Characterization Project, and the Waste Acceptance, Storage, and Transportation Project. The Program Management Center is comprised of the Office of Quality Assurance, located in Las Vegas, NV, the Office of Program Management and Administration, and the Systems Engineering and International Division of the Office of Acceptance, Transportation, and Integration, all located in Washington, D.C. Funding requirements for the Program Management Center are provided in *Table 4*.

Quality assurance

The Office of Quality Assurance ensures the adequate and appropriate implementation of federally-mandated nuclear quality assurance requirements for Program activities related to radiological health and safety and waste isolation. The Office conducts annual audits and surveillances to independently verify that engineering designs and scientific activities comply with regulatory requirements. The Office ensures that all employees performing activities important to nuclear safety or the safety of the repository implement the quality assurance requirements found in Nuclear Regulatory Commission's licensing regulations.

Program management and integration

The Program Management Center assists the Program Director and the two projects by providing a wide spectrum of specialized Program management and integration services. These include coordination of Program-level strategic planning activities, periodic revision or updating of the OCRWM Program Plan, preparation of the OCRWM Annual Report to Congress, coordination of Program reporting as required under the Government Performance and Results Act, integration of OCRWM plans and strategies with the Department of Energy's planning activities, management of the Nuclear Waste Fund, integrating various waste management system components into a single system, and interfacing with other countries and international organizations to develop consensus positions on waste management. The Center establishes Program-level baselines, formulates and executes OCRWM budgets and annual work plans, and monitors, analyzes, and reports on Program performance.

The Center assists the Director in strengthening OCRWM management practices, in ensuring cost-effective operations and in achieving conformance with annual Program schedule and cost baseline targets. In addition to an annual review required by the Financial

Managers' Financial Integrity Act and bi-monthly Program reviews, at least one project- or office-level management system performance assessment is conducted by the Center each year. These reviews are designed to improve management effectiveness and efficiency by focusing management attention on overlapping, duplicative, and redundant requirements, processes, and practices.

Regulatory coordination

The Management Center coordinates Program-level regulatory policy, provides guidance and support for licensing and safeguards and security activities to the two Projects, and supports the identification and resolution of regulatory issues. The Center also coordinates and integrates Program-related environment, safety, and health activities to ensure compliance with applicable statutes, standards, and regulations, including those set forth by the Department of Energy, EPA, NRC, the Department of Transportation, and the Department of Labor. Finally, the Center coordinates interactions with the Program's external oversight agencies, including NRC, NWTRB, and EPA, to address technical and management concerns related to the Yucca Mountain Site Characterization Project, and transportation of spent nuclear fuel and high-level radioactive waste.

System integration and analysis

The components of the waste management system, such as the acceptance of spent nuclear fuel and high-level radioactive waste, repository surface facilities, and waste package design, are being integrated into a single system that is safe, reliable, and cost-effective. Interface documents are being developed between the Waste Acceptance, Storage, and Transportation Project and the Yucca Mountain Site Characterization Project, and between OCRWM and the Department's Office of Environmental Management regarding the impacts of accepting the Department of Energy's spent nuclear fuel. System analyses are also performed to determine the total system life cycle cost. These cost analyses are used as inputs to determining the adequacy of fees paid by waste owners and generators, and in the determination of the Department's financial liability to OCRWM.

International waste management activities

OCRWM's international waste management activities involve cooperation with other countries and international organizations to exchange information and develop consensus on common issues. The activities focus on areas of technical exchange that will benefit the Yucca Mountain Site Characterization Project, and on matters that will benefit the Program's waste acceptance, storage and transportation activities. OCRWM and the Department participate in cooperative activities under bilateral agreements with Canada, Japan, France, Sweden, Switzerland, and Spain to support the exchange of waste management information, and are working to establish a bilateral agreement with Russia on geologic disposal.

Interactions will continue with the International Atomic Energy Agency (IAEA) and the Organization for Economic Cooperation and Development's Nuclear Energy Agency (NEA). Ongoing IAEA work will focus on consensus development on technical waste management issues, particularly spent nuclear fuel storage and systems integration. Participation in the IAEA's Advisory Group on Spent Fuel Management, as well as specific projects, will continue. Ongoing NEA work will focus on interpretation of site characterization data and performance assessment through OCRWM's participation in the NEA's Site Evaluation and Design of Experiments Group and the Performance Assessment Advisory Group. These groups work cooperatively to improve the state-of-the-art in modeling, database development, and performance assessment.

Institutional activities

The Nuclear Waste Policy Act of 1982, as amended, established public participation as a key component of Program activities. The

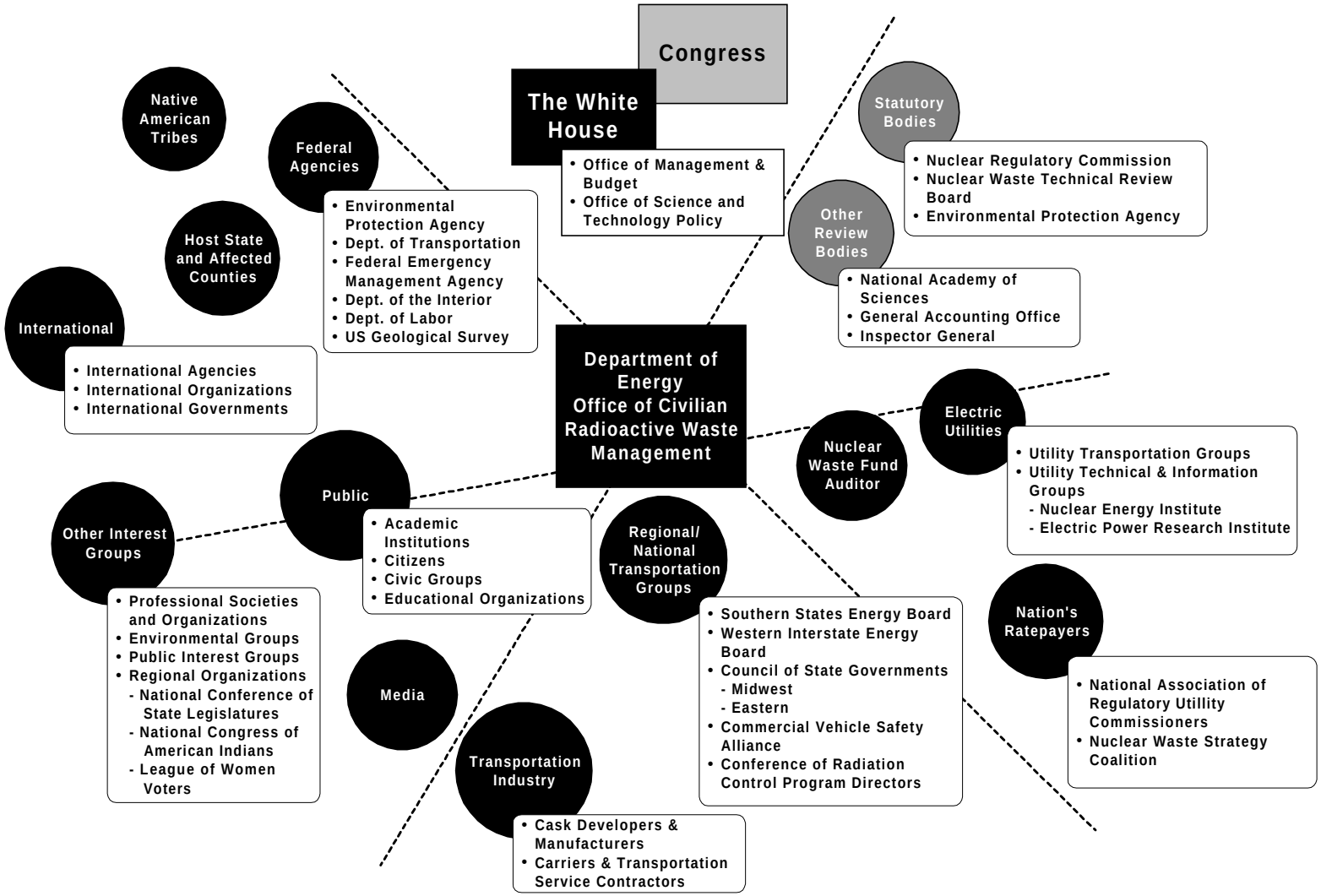

Figure 20 - OCRWM stakeholder groups and oversight bodies

Center supports the two Projects and the Office of the Director in their extensive interactions with a broad range of external parties, including Congress, the Office of Management and Budget, the State of Nevada and other affected jurisdictions, industry, regulatory agencies, other Federal agencies, and public interest groups. While budget cuts have curtailed some of these activities, OCRWM will continue to work with stakeholders in an open, frank, and constructive manner, and collaborate with them on development of national radioactive waste management policy. An illustration of OCRWM's stakeholder groups and oversight bodies is provided in *Figure 20.*

The Center will continue to manage OCRWM's Historically Black Colleges and Universities (HBCU) Undergraduate Scholarship Program and Radioactive Waste Management Graduate Fellowship Program. The HBCU Program seeks to attract academically superior juniors and seniors attending HBCUs who have expressed a desire to pursue a career in a field related to radioactive waste management. The Graduate Fellowship Program recruits academically superior students with a strong desire to pursue an advanced degree in fields directly related to high-level radioactive waste management.

Human resources

The Management Center is responsible for implementing the Department's workforce planning initiatives within OCRWM. Through targeted hiring, career development and workforce planning, the Center is working towards the Secretary's commitment to strengthen the Department's technical and management capability.

The Center will continue to develop strategies that reshape the workforce to meet OCRWM's mission requirements and organizational needs. OCRWM's human resource planning efforts will ensure the employment and retention of a talented and diverse workforce to accomplish our mission.

Contractor resources

The Management Center will continue to employ contract management practices that emphasize results, accountability, and competition. The Center will annually recover available funds from contracts in closeout, and conduct performance-based evaluations of OCRWM's M&O contractor. The Center awarded a fixed-price, performance-based, audit services contract in FY 1999 to replace the former cost-plus-fixed-fee contract.

In 1997, OCRWM procured a new integrated technical and management support services contractor to further enhance the integration of its Yucca Mountain, waste acceptance, storage, transportation, and general management activities. OCRWM has limited the scope of the work performed by support services contractors to those activities that are essential to implementing Federal regulations and the Program mission and cannot be performed by in-house Federal staff. For example, these contracts provide support for Nuclear Regulatory Commission-required quality assurance verification, publication of the required environmental impact statement, consolidated management and technical support to the Department's Federal staff as the Commission licensee, and information management.

Financial resources

The Management Center manages the Nuclear Waste Fund investment portfolio by providing monthly investment instructions to the Department's Chief Financial Officer for implementation. The Center develops and submits the Program's financial statements to the Department's Chief Financial Officer for incorporation into the Department's financial statements that are submitted to the Office of Management and Budget. The Center also prepares the Program's total system life cycle cost analyses to provide: (1) a cost estimate for financial planning, (2) information to policy makers for use in determining Program costs, and (3) a system cost estimate as one of the inputs for assessing the adequacy of fees being

paid by waste generating sources. The Center conducts fee adequacy analyses to assess the adequacy of the 1.0 mil per kWh fee being paid by nuclear utilities for the permanent disposal of their spent nuclear fuel.

Key Program Management Center annual milestones

The following milestones represent significant recurring activities that will be undertaken annually by the Program Management Center in supporting the two Program business centers and the Office of the Director.

Fiscal Years 2000–2005

- Conduct a quality assurance audit of all Program participant organizations.
- Develop and submit to Congress OCRWM's annual report on the activities and expenditures of the Office during the previous fiscal year.
- Develop and submit to the Department's Chief Financial Officer the Program's audited financial statements.
- Conduct and publish a fee adequacy analysis.
- Develop and submit to the Office of Management and Budget, through the Department's Chief Financial Officer, the Program's annual Congressional budget request.
- Conduct a project- or office-level management system performance assessment to improve management system effectiveness and efficiency.

Program Management Center

APPROPRIATIONS AND OUTYEAR FUNDING REQUIREMENTS

(DOLLARS IN THOUSANDS)

Activity	FY99 Actual	FY00 Actual	FY01 Request	FY02 Projected	FY03 Projected	FY04 Projected	FY05 Projected
Systems Integration	3,143	2,266	2,600	3,265	3,265	3,265	
Regulatory Compliance	763	593	862	730	730	730	
Strategic Planning	1,127	712	1,179	1,208	1,208	1,208	
International Waste Management	313	627	627	627	309	309	
Program Management	663	563	653	558	878	878	**TBD**
Program Direction & Administrative Costs*	58,486	59,584	63,628	61,384	59,884	60,984	
Human Resources Development	89	20	25	30	30	30	
Audits, Reports, Education and Information	1,149	1190	1,247	1,217	1,217	1,217	
Information Management	4,003	2,650	4,573	4,446	4,314	4,314	
TOTAL PMC	**69,736**	**68,205**	**75,394**	**73,465**	**71,835**	**72,935**	**74,035**

*Includes quality assurance activities, technical support service contracts, and Federal salaries.

Table 4

Appendix A

Relevant Sections of the Nuclear Waste Policy Act of 1982, as Amended, and the Energy Policy Act of 1992

NUCLEAR WASTE POLICY ACT OF 1982, AS AMENDED

TITLE I—DISPOSAL AND STORAGE OF HIGH-LEVEL RADIOACTIVE WASTE, SPENT NUCLEAR FUEL, AND LOW-LEVEL RADIOACTIVE WASTE

SUBTITLE A—REPOSITORIES FOR DISPOSAL OF HIGH-LEVEL RADIOACTIVE WASTE AND SPENT NUCLEAR FUEL SITE APPROVAL AND CONSTRUCTION AUTHORIZATION

Sec. 114. (a) Hearings and Presidential recommendation.

(1) The Secretary shall hold public hearings in the vicinity of the Yucca Mountain site, for the purposes of informing the residents of the area of such consideration and receiving their comments regarding the possible recommendation of such site. If, upon completion of such hearings and completion of site characterization activities at the Yucca Mountain site, under section 113 [42 U.S.C. 10133], the Secretary decides to recommend approval of such site to the President, the Secretary shall notify the Governor and legislature of the State of Nevada of such decision. No sooner than the expiration of the 30-day period following such notification, the Secretary shall submit to the President a recommendation that the President approve such site for the development of a repository. Any such recommendation by the Secretary shall be based on the record of information developed by the Secretary under section 113 [42 U.S.C. 10133] and this section, including the information described in subparagraph (A) through subparagraph (G). Together with any recommendation of a site under this paragraph, the Secretary shall make available to the public, and submit to the President, a comprehensive statement of the basis of such recommendation, including the following:

(A) a description of the proposed repository, including preliminary engineering specifications for the facility;

(B) a description of the waste form or packaging proposed for use at such repository, and

an explanation of the relationship between such waste form or packaging and the geologic medium of such site;

(C) a discussion of data, obtained in site characterization activities, relating to the safety of such site;

(D) a final environmental impact statement prepared for the Yucca Mountain site pursuant to subsection (f) and the National Environmental Policy Act of 1969 [42 U.S.C. 4321 et seq.], together with comments made concerning such environmental impact statement by the Secretary of the Interior, the Council on Environmental Quality, the Administrator, and the Commission, except that the Secretary shall not be required in any such environmental impact statement to consider the need for a repository, the alternatives to geological disposal, or alternative sites to the Yucca Mountain site;

(E) preliminary comments of the Commission concerning the extent to which the at-depth site characterization analysis and the waste form proposal for such site seem to be sufficient for inclusion in any application to be submitted by the Secretary for licensing of such site as a repository;

(F) the views and comments of the Governor and legislature of any State, or the governing body of any affected Indian tribe, as determined by the Secretary, together with the response of the Secretary to such views;

(G) such other information as the Secretary considers appropriate; and

(H) any impact report submitted under section 116(c)(2)(B) [42 U.S.C. 10136(c)(2)(B)] by the State of Nevada.

(2)(A) If, after recommendation by the Secretary, the Presidentconsiders the Yucca Mountain site qualified for application for a construction authorization for a repository, the President shall submit a recommendation of such site to Congress.

(B) The President shall submit with such recommendation a copy of the statement for such site prepared by the Secretary under paragraph (1).

(3)(A) The President may not recommend the approval of the Yucca Mountain site unless the Secretary has recommended to the President under paragraph (1) approval of such site and has submitted to the President a statement for such site as required under such paragraph.

(B) No recommendation of a site by the President under this subsection shall require the preparation of an environmental impact statement under section 102(2)(C) of the National Environmental Policy Act of 1969 [42 U.S.C. 4332(2)(C)], or to require any environmental review under subparagraph (E) or (F) of section 102(2) of such Act [42 U.S.C. 4332(2)(E), (F)].

(b) Submission of application. If the President recommends to the Congress the Yucca Mountain site under subsection (a) and the site designation is permitted to take effect under section 115 [42 U.S.C. 10135], the Secretary shall submit to the Commission an application for a construction authorization for a repository at such site not later than 90 days after the date on which the recommendation of the site designation is effective under such section and shall provide to the Governor and legislature of the State of Nevada a copy of such application.

(c) Status report on application. Not later than 1 year after the date on which an application for a construction authorization is submitted under subsection (b), and annually thereafter until the date on which such authorization is granted, the Commission shall submit a report to the Congress describing the proceedings undertaken through the date of such report with regard to such application, including a description of—

(1) any major unresolved safety issues, and the explanation of the Secretary with respect to design and operation plans for resolving such issues;
(2) any matters of contention regarding such application; and
(3) any Commission actions regarding the granting or denial of such authorization.

(d) Commission action. The Commission shall consider an application for a construction authorization for all or part of a repository in accordance with the laws applicable to such applications, except that the Commission shall issue a final decision approving or disapproving the issuance of a construction authorization not later than the expiration of 3 years after the date of the submission of such application, except that the Commission may extend such deadline by not more than 12 months if, not less than 30 days before such deadline, the Commission complies with the reporting requirements established in subsection (e)(2). The Commission decision approving the first such application shall prohibit the emplacement in the first repository of a quantity of spent fuel containing in excess of 70,000 metric tons of heavy metal or a quantity of solidified high-level radioactive waste resulting from the reprocessing of such a quantity of spent fuel until such time as a second repository is in operation. In the event that a monitored retrievable storage facility, approved pursuant to subtitle C of this Act, shall be located, or is planned to be located, within 50 miles of the first repository, then the Commission decision approving the first such application shall prohibit the emplacement of a quantity of spent fuel containing in excess of 70,000 metric tons of heavy metal or a quantity of solidified high-level radioactive waste resulting from the reprocessing of spent fuel in both the repository and monitored retrievable storage facility until such time as a second repository is in operation.

(e) Project decision schedule.

(1) The Secretary shall prepare and update, as appropriate, in cooperation with all affected Federal agencies, a project decision schedule that portrays the optimum way to attain the operation of the repository within the time periods specified in this subtitle. Such schedule shall include a description of objectives and a sequence of deadlines for all Federal agencies required to take action, including an identification of the activities in which a delay in the start, or completion, of such activities will cause a delay in beginning repository operation.

(2) Any Federal agency that determines that it cannot comply with any deadline in the project decision schedule, or fails to so comply, shall submit to the Secretary and to the Congress a written report explaining the reason for its failure or expected failure to meet such deadline, the reason why such agency could not reach an agreement with the Secretary, the estimated time for completion of the activity or activities involved, the associated effect on its other deadlines in the project decision schedule, and any recommendations it may have or actions it intends to take regarding any improvements in its operation or organization, or changes to its statutory directives or authority, so that it will be able to mitigate the delay involved. The Secretary, within 30 days after receiving any such report, shall file with the Congress his response to such report, including the reasons why the Secretary could not amend the project decision schedule to accommodate the Federal agency involved.

(f) Environmental impact statement.

(1) Any recommendation made by the Secretary under this section shall be considered a major Federal action significantly affecting the quality of the human environment for purposes of the National Environmental Policy Act of 1969 [42 U.S.C. 4321 et seq.]. A final environmental impact statement prepared by the Secretary under such Act shall

accompany any recommendation to the President to approve a site for a repository.

(2) With respect to the requirements imposed by the National Environmental Policy Act of 1969 [42 U.S.C. 4321 et seq.], compliance with the procedures and requirements of this Act shall be deemed adequate consideration of the need for a repository, the time of the initial availability of a repository, and all alternatives to the isolation of high-level radioactive waste and spent nuclear fuel in a repository.

(3) For purposes of complying with the requirements of the National Environmental Policy Act of 1969 [42 U.S.C. 4321 et seq.] and this section, the Secretary need not consider alternate sites to the Yucca Mountain site for the repository to be developed under this subtitle.

(4) Any environmental impact statement prepared in connection with a repository proposed to be constructed by the Secretary under this subtitle shall, to the extent practicable, be adopted by the Commission in connection with the issuance by the Commission of a construction authorization and license for such repository. To the extent such statement is adopted by the Commission, such adoption shall be deemed to also satisfy the responsibilities of the Commission under the National Environmental Policy Act of 1969 [42 U.S.C. 4321 et seq.] and no further consideration shall be required, except that nothing in this subsection shall affect any independent responsibilities of the Commission to protect the public health and safety under the Atomic Energy Act of 1954 [42 U.S.C. 2011 et seq.].

(5) Nothing in this Act shall be construed to amend or otherwise detract from the licensing requirements of the Nuclear Regulatory Commission established in title II of the Energy Reorganization Act of 1974 [42 U.S.C. 5841 et seq.].

(6) In any such statement prepared with respect to the repository to be constructed under this subtitle, the Nuclear Regulatory Commission need not consider the need for a repository, the time of initial availability of a repository, alternate sites to the Yucca Mountain site, or nongeologic alternatives to such site. [42 U.S.C. 10134]

REVIEW OF REPOSITORY SITE SELECTION

Sec. 115. (a) Definition. For purposes of this section, the term resolution of repository siting approval means a joint resolution of the Congress, the matter after the resolving clause of which is as follows: That there hereby is approved the site at _____ for a repository, with respect to which a notice of disapproval was submitted by _____ on _____. The first blank space in such resolution shall be filled with the name of the geographic location of the proposed site of the repository to which such resolution pertains; the second blank space in such resolution shall be filled with the designation of the State Governor and legislature or Indian tribe governing body submitting the notice of disapproval to which such resolution pertains; and the last blank space in such resolution shall be filled with the date of such submission.

(b) State or Indian tribe petitions. The designation of a site as suitable for application for a construction authorization for a repository shall be effective at the end of the 60-day period beginning on the date that the President recommends such site to the Congress under section 114 [42 U.S.C. 10134], unless the Governor and legislature of the State in which such site is located, or the governing body of an Indian tribe on whose reservation such site is located, as the case may be, has submitted to the Congress a notice of disapproval under section 116 or 118 [42 U.S.C. 10136, 10138]. If any such notice of disapproval has been submitted, the designation of such site shall not be effective except as provided under subsection (c).

(c) Congressional review of petitions. If any notice of disapproval of a repository site designation has been submitted to the Congress under section 116 or 118 [42 U.S.C. 10136, 10138] after a recommendation for approval of such site is made by the President under section 114 [42 U.S.C. 10134], such site shall be disapproved unless, during the first period of 90 calendar days of continuous session of the Congress after the date of the receipt by the Congress of such notice of disapproval, the Congress passes a resolution of repository siting approval in accordance with this subsection approving such site, and such resolution thereafter becomes law.

(d) Procedures applicable to the Senate.

(1) The provisions of this subsection are enacted by the Congress

(A) as an exercise of the rulemaking power of the Senate, and as such they are deemed a part of the rules of the Senate, but applicable only with respect to the procedure to be followed in the Senate in the case of resolutions of repository siting approval, and such provisions supersede other rules of the Senate only to the extent that they are inconsistent with such other rules; and

(B) with full recognition of the constitutional right of the Senate to change the rules (so far as relating to the procedure of the Senate) at any time, in the same manner and to the same extent as in the case of any other rule of the Senate.

(2) (A) Not later than the first day of session following the day on which any notice of disapproval of a repository site selection is submitted to the Congress under section 116 or 118 [42 U.S.C. 10136, 10138], a resolution of repository siting approval shall be introduced (by request) in the Senate by the chairman of the committee to which such notice of disapproval is referred, or by a Member or Members of the Senate designated by such chairman.

(B) Upon introduction, a resolution of repository siting approval shall be referred to the appropriate committee or committees of the Senate by the President of the Senate, and all such resolutions with respect to the same repository site shall be referred to the same committee or committees. Upon the expiration of 60 calendar days of continuous session after the introduction of the first resolution of repository siting approval with respect to any site, each committee to which such resolution was referred shall make its recommendations to the Senate.

(3) If any committee to which is referred a resolution of siting approval introduced under paragraph (2)(A), or, in the absence of such a resolution, any other resolution of siting approval introduced with respect to the site involved, has not reported such resolution at the end of 60 days of continuous session of Congress after introduction of such resolution, such committee shall be deemed to be discharged from further consideration of such resolution, and such resolution shall be placed on the appropriate calendar of the Senate.

(4)(A) When each committee to which a resolution of siting approval has been referred has reported, or has been deemed to be discharged from further consideration of, a resolution described in paragraph (3), it shall at any time thereafter be in order (even though a previous motion to the same effect has been disagreed to) for any Member of the Senate to move to proceed to the consideration of such resolution. Such motion shall be highly privileged and shall not be debatable. Such motion shall not be subject to amendment, to a motion to postpone, or to a motion to proceed to the consideration of other business. A motion to reconsider the vote by which such motion is agreed to or disagreed to shall not be in order. If a motion to proceed to the consideration of such resolution is agreed to,

such resolution shall remain the unfinished business of the Senate until disposed of.

(B) Debate on a resolution of siting approval, and on all debatable motions and appeals in connection with such resolution, shall be limited to not more than 10 hours, which shall be divided equally between Members favoring and Members opposing such resolution. A motion further to limit debate shall be in order and shall not be debatable. Such motion shall not be subject to amendment, to a motion to postpone, or to a motion to proceed to the consideration of other business, and a motion to recommit such resolution shall not be in order. A motion to reconsider the vote by which such resolution is agreed to or disagreed to shall not be in order.

(C) Immediately following the conclusion of the debate on a resolution of siting approval, and a single quorum call at the conclusion of such debate if requested in accordance with the rules of the Senate, the vote on final approval of such resolution shall occur.

(D) Appeals from the decisions of the Chair relating to the application of the rules of the Senate to the procedure relating to a resolution of siting approval shall be decided without debate.

(5) If the Senate receives from the House a resolution of repository siting approval with respect to any site, then the following procedure shall apply:

(A) The resolution of the House with respect to such site shall not be referred to a committee.

(B) With respect to the resolution of the Senate with respect to such site

(i) the procedure with respect to that or other resolutions of the Senate with respect to such site shall be the same as if no resolution from the House with respect to such site had been received; but

(ii) on any vote on final passage of a resolution of the Senate with respect to such site, a resolution from the House with respect to such site where the text is identical shall be automatically substituted for the resolution of the Senate.

(e) Procedures applicable to the House of Representatives.

(1) The provisions of this subsection are enacted by the Congress

(A) as an exercise of the rulemaking power of the House of Representatives, and as such they are deemed a part of the rules of the House, but applicable only with respect to the procedure to be followed in the House in the case of resolutions of repository siting approval, and such provisions supersede other rules of the House only to the extent that they are inconsistent with such other rules; and

(B) with full recognition of the constitutional right of the House to change the rules (so far as relating to the procedure of the House) at any time, in the same manner and to the same extent as in the case of any other rule of the House.

(2) Resolutions of repository siting approval shall upon introduction, be immediately referred by the Speaker of the House to the appropriate committee or committees of the House. Any such resolution received from the Senate shall be held at the Speakers table.

(3) Upon the expiration of 60 days of continuous session after the introduction of the first resolution of repository siting approval with respect to any site, each committee to which such resolution was referred shall be discharged from further consideration of such resolution, and such resolution shall be referred to the appropriate calendar, unless such resolution or an identical resolution was previously reported by each committee to which

it was referred.

(4) It shall be in order for the Speaker to recognize a Member favoring a resolution to call up a resolution of repository siting approval after it has been on the appropriate calendar for 5 legislative days. When any such resolution is called up, the House shall proceed to its immediate consideration and the Speaker shall recognize the Member calling up such resolution and a Member opposed to such resolution for 2 hours of debate in the House, to be equally divided and controlled by such Members. When such time has expired, the previous question shall be considered as ordered on the resolution to adoption without intervening motion. No amendment to any such resolution shall be in order, nor shall it be in order to move to reconsider the vote by which such resolution is agreed to or disagreed to.

(5) If the House receives from the Senate a resolution of repository siting approval with respect to any site, then the following procedure shall apply:

(A) The resolution of the Senate with respect to such site shall not be referred to a committee.

(B) With respect to the resolution of the House with respect to such site

(i) the procedure with respect to that or other resolutions of the House with respect to such site shall be the same as if no resolution from the Senate with respect to such site had been received; but

(ii) on any vote on final passage of a resolution of the House with respect to such site, a resolution from the Senate with respect to such site where the text is identical shall be automatically substituted for the resolution of the House.

(f) Computation of days. For purposes of this section (1) continuity of session of Congress is broken only by an adjournment sine die; and (2) the days on which either House is not in session because of an adjournment of more than 3 days to a day certain are excluded in the computation of the 90-day period referred to in subsection (c) and the 60-day period referred to in subsections (d) and (e).

(g) Information provided to Congress. In considering any notice of disapproval submitted to the Congress under section 116 or 118 [42 U.S.C. 10136, 10138], the Congress may obtain any comments of the Commission with respect to such notice of disapproval. The provision of such comments by the Commission shall not be construed as binding the Commission with respect to any licensing or authorization action concerning the repository involved. [42 U.S.C. 10135]

PARTICIPATION OF STATES

Sec. 116. (a) Notification of States and affected tribes. The Secretary shall identify the States with one or more potentially acceptable sites for a repository within 90 days after the date of enactment of this Act [enacted Jan. 7, 1983]. Within 90 days of such identification, the Secretary shall notify the Governor, the State legislature, and the tribal council of any affected Indian tribe in any State of the potentially acceptable sites within such State. For the purposes of this title [42 U.S.C. 10121 et seq.], the term potentially acceptable site means any site at which, after geologic studies and field mapping but before detailed geologic data gathering, the Department undertakes preliminary drilling and geophysical testing for the definition of site location.

(b) State participation in repository siting decisions.

(1) Unless otherwise provided by State law, the Governor or legislature of each State shall have authority to submit a notice of disapproval to the Congress under paragraph (2). In any case in which State law provides for submission of any such notice of disapproval by

any other person or entity, any reference in this subtitle [42 U.S.C. 10131 et seq.] to the Governor or legislature of such State shall be considered to refer instead to such other person or entity.

(2) Upon the submission by the President to the Congress of a recommendation of a site for a repository, the Governor or legislature of the State in which such site is located may disapprove the site designation and submit to the Congress a notice of disapproval. Such Governor or legislature may submit such a notice of disapproval to the Congress not later than the 60 days after the date that the President recommends such site to the Congress under section 114 [42 U.S.C. 10134]. A notice of disapproval shall be considered to be submitted to the Congress on the date of the transmittal of such notice of disapproval to the Speaker of the House and the President pro tempore of the Senate. Such notice of disapproval shall be accompanied by a statement of reasons explaining why such Governor or legislature disapproved the recommended repository site involved.

(3) The authority of the Governor or legislature of each State under this subsection shall not be applicable with respect to any site located on a reservation.

(c) Financial Assistance.

(1)(A) The Secretary shall make grants to the State of Nevada and any affected unit of local government for the purpose of participating in activities required by this section and section 117 [42 U.S.C. 10137] or authorized by written agreement entered into pursuant to section 117(c) [42 U.S.C. 10137(c)]. Any salary or travel expense that would ordinarily be incurred by such State or affected unit of local government, may not be considered eligible for funding under this paragraph.

(B) The Secretary shall make grants to the State of Nevada and any affected unit of local government for purposes of enabling such State or affected unit of local government

(i) to review activities taken under this subtitle with respect to the Yucca Mountain site for purposes of determining any potential economic, social, public health and safety, and environmental impacts of a repository on such State, or affected unit of local government and its residents;

(ii) to develop a request for impact assistance under paragraph (2);

(iii) to engage in any monitoring, testing, or evaluation activities with respect to site characterization programs with regard to such site;

(iv) to provide information to Nevada residents regarding any activities of such State, the Secretary, or the Commission with respect to such site; and

(v) to request information from, and make comments and recommendations to, the Secretary regarding any activities taken under this subtitle with respect to such site.

(C) Any salary or travel expense that would ordinarily be incurred by the State of Nevada or any affected unit of local government may not be considered eligible for funding under this paragraph.

(2)(A)(i) The Secretary shall provide financial and technical assistance to the State of Nevada and any affected unit of local government requesting such assistance.

(ii) Such assistance shall be designed to mitigate the impact on such State or affected unit of local government of the development of such repository and the characterization of such site.

(iii) Such assistance to such State or affected unit of local government of such

State shall commence upon the initiation of site characterization activities.

(B) The State of Nevada and any affected unit of local government may request assistance under this subsection by preparing and submitting to the Secretary a report on the economic, social, public health and safety, and environmental impacts that are likely to result from site characterization activities at the Yucca Mountain site. Such report shall be submitted to the Secretary after the Secretary has submitted to the State a general plan for site characterization activities under section 113(b) [42 U.S.C. 10133(b)].

(C) As soon as practicable after the Secretary has submitted such site characterization plan, the Secretary shall seek to enter into a binding agreement with the State of Nevada setting forth

(i) the amount of assistance to be provided under this subsection to such State or affected unit of local government; and

(ii) the procedures to be followed in providing such assistance.

(3)(A) In addition to financial assistance provided under paragraphs (1) and (2), the Secretary shall grant to the State of Nevada and any affected unit of local government an amount each fiscal year equal to the amount such State or affected unit of local government, respectively, would receive if authorized to tax site characterization activities at such site, and the development and operation of such repository, as such State or affected unit of local government taxes the non-Federal real property and industrial activities occurring within such State or affected unit of local government.

(B) Such grants shall continue until such time as all such activities, development, and operation are terminated at such site.

(4)(A) The State of Nevada or any affected unit of local government may not receive any grant under paragraph (1) after the expiration of the 1-year period following

(i) the date on which the Secretary notifies the Governor and legislature of the State of Nevada of the termination of site characterization activities at the site in such State;

(ii) the date on which the Yucca Mountain site is disapproved under section 115 [42 U.S.C. 10135]; or

(iii) the date on which the Commission disapproves an application for a construction authorization for a repository at such site; whichever occurs first.

(B) The State of Nevada or any affected unit of local government may not receive any further assistance under paragraph (2) with respect to a site if repository construction activities or site characterization activities at such site are terminated by the Secretary or if such activities are permanently enjoined by any court.

(C) At the end of the 2-year period beginning on the effective date of any license to receive and possess for a repository in a State, no Federal funds, shall be made available to such State or affected unit of local government under paragraph (1) or (2), except for

(i) such funds as may be necessary to support activities related to any other repository located in, or proposed to be located in, such State, and for which a license to receive and possess has not been in effect for more than 1 year;

(ii) such funds as may be necessary to support State activities pursuant to agreements or contracts for impact assistance entered into, under paragraph (2), by such State with the Secretary during such 2-year period; and

(iii) such funds as may be provided under an agreement entered into under title IV.

(5) Financial assistance authorized in this subsection shall be made out of amounts held in the Waste Fund.

(6) No State, other than the State of Nevada, may receive financial assistance under this subsection after the date of the enactment of the Nuclear Waste Policy Amendments Act of 1987 [enacted Dec. 22, 1987].

(d) Additional notification and consultation. Whenever the Secretary is required under any provision of this Act [42 U.S.C. 10101 et seq.] to notify or consult with the governing body of an affected Indian tribe where a site is located, the Secretary shall also notify or consult with, as the case may be, the Governor of the State in which such reservation is located. [42 U.S.C. 10136]

CONSULTATION WITH STATES AND AFFECTED INDIAN TRIBES

Sec. 117. (a) Provision of information.

(1) The Secretary, the Commission, and other agencies involved in the construction, operation, or regulation of any aspect of a repository in a State shall provide to the Governor and legislature of such State, and to the governing body of any affected Indian tribe, timely and complete information regarding determinations or plans made with respect to the site characterization siting, development, design, licensing, construction, operation, regulation, or decommissioning of such repository.

(2) Upon written request for such information by the Governor or legislature of such State, or by the governing body of any affected Indian tribe, as the case may be, the Secretary shall provide a written response to such request within 30 days of the receipt of such request. Such response shall provide the information requested or, in the alternative, the reasons why the information cannot be so provided. If the Secretary fails to so respond within such 30 days, the Governor or legislature of such State, or the governing body of any affected Indian tribe, as the case may be, may transmit a formal written objection to such failure to respond to the President. If the President or Secretary fails to respond to such written request within 30 days of the receipt by the President of such formal written objection, the Secretary shall immediately suspend all activities in such State authorized by this subtitle [42 U.S.C. 10131 et seq.], and shall not renew such activities until the Governor or legislature of such State, or the governing body of any affected Indian tribe, as the case may be, has received the written response to such written request required by this subsection.

(b) Consultation and cooperation. In performing any study of an area within a State for the purpose of determining the suitability of such area for a repository pursuant to section 112(c) [42 U.S.C. 10132(c)], and in subsequently developing and loading any repository within such State, the Secretary shall consult and cooperate with the Governor and legislature of such State and the governing body of any affected Indian tribe in an effort to resolve the concerns of such State and any affected Indian tribe regarding the public health and safety, environmental, and economic impacts of any such repository. In carrying out his duties under this subtitle [42 U.S.C. 10131 et seq.], the Secretary shall take such concerns into account to the maximum extent feasible and as specified in written agreements entered into under subsection (c).

(c) Written agreement. Not later than 60 days after (1) the approval of a site for site characterization for such a repository under section 112(c) [42 U.S.C. 10132(c)], or (2) the written request of the State or Indian tribe in any affected State notified under section 116(a) [42 U.S.C. 10136(a)]

to the Secretary, whichever first occurs, the Secretary shall seek to enter into a binding written agreement, and shall begin negotiations, with such State and, where appropriate, to enter into a separate binding agreement with the governing body of any affected Indian tribe, setting forth (but not limited to) the procedures under which the requirements of subsections (a) and (b), and the provisions of such written agreement, shall be carried out. Any such written agreement shall not affect the authority of the Commission under existing law. Each such written agreement shall, to the maximum extent feasible, be completed not later than 6 months after such notification. If such written agreement is not completed within such period, the Secretary shall report to the Congress in writing within 30 days on the status of negotiations to develop such agreement and the reasons why such agreement has not been completed. Prior to submission of such report to the Congress, the Secretary shall transmit such report to the Governor of such State or the governing body of such affected Indian tribe, as the case may be, for their review and comments. Such comments shall be included in such report prior to submission to the Congress. Such written agreement shall specify procedures

(1) by which such State or governing body of an affected Indian tribe, as the case may be, may study, determine, comment on, and make recommendations with regard to the possible public health and safety, environmental, social, and economic impacts of any such repository;

(2) by which the Secretary shall consider and respond to comments and recommendations made by such State or governing body of an affected Indian tribe, including the period in which the Secretary shall so respond;

(3) by which the Secretary and such State or governing body of an affected Indian tribe may review or modify the agreement periodically;

(4) by which such State or governing body of an affected Indian tribe is to submit an impact report and request for impact assistance under section 116(c) [42 U.S.C. 10136(b)] or section 118(b) [42 U.S.C. 10138(b)], as the case may be;

(5) by which the Secretary shall assist such State, and the units of general local government in the vicinity of the repository site, in resolving the offsite concerns of such State and units of general local government, including, but not limited to, questions of State liability arising from accidents, necessary road upgrading and access to the site, ongoing emergency preparedness and emergency response, monitoring of transportation of high-level radioactive waste and spent nuclear fuel through such State, conduct of baseline health studies of inhabitants in neighboring communities near the repository site and reasonable periodic monitoring thereafter, and monitoring of the repository site upon any decommissioning and decontamination;

(6) by which the Secretary shall consult and cooperate with such State on a regular, ongoing basis and provide for an orderly process and timely schedule for State review and evaluation, including identification in the agreement of key events, milestones, and decision points in the activities of the Secretary at the potential repository site;

(7) by which the Secretary shall notify such State prior to the transportation of any high-level radioactive waste and spent nuclear fuel into such State for disposal at the repository site;

(8) by which such State may conduct reasonable independent monitoring and testing of activities on the repository site, except that such monitoring and testing shall not unreasonably interfere with or delay onsite activities;

(9) for sharing, in accordance with applicable law, of all technical and licensing information, the utilization of available expertise, the facilitating of permit procedures, joint project

review, and the formulation of joint surveillance and monitoring arrangements to carry out applicable Federal and State laws;

(10) for public notification of the procedures specified under the preceding paragraphs; and

(11) for resolving objections of a State and affected Indian tribes at any stage of the planning, siting, development, construction, operation, or closure of such a facility within such State through negotiation, arbitration, or other appropriate mechanisms.

(d) On-site representative. The Secretary shall offer to any State, Indian tribe or unit of local government within whose jurisdiction a site for a repository or monitored retrievable storage facility is located under this title an opportunity to designate a representative to conduct on-site oversight activities at such site. Reasonable expenses of such representatives shall be paid out of the Waste Fund. [42 U.S.C. 10137]

PARTICIPATION OF INDIAN TRIBES

Sec. 118. (a) Participation of Indian tribes in repository siting decisions. Upon the submission by the President to the Congress of a recommendation of a site for a repository located on the reservation of an affected Indian tribe, the governing body of such Indian tribe may disapprove the site designation and submit to the Congress a notice of disapproval. The governing body of such Indian tribe may submit such a notice of disapproval to the Congress not later than the 60 days after the date that the President recommends such site to the Congress under section 114 [42 U.S.C. 10134]. A notice of disapproval shall be considered to be submitted to the Congress on the date of the transmittal of such notice of disapproval to the Speaker of the House and the President pro tempore of the Senate. Such notice of disapproval shall be accompanied by a statement of reasons explaining why the governing body of such Indian tribe disapproved the recommended repository site involved.

(b) Financial assistance.

(1) The Secretary shall make grants to each affected tribe notified under section 116(a) [42 U.S.C. 10136(a)] for the purpose of participating in activities required by section 117 [42 U.S.C. 10137] or authorized by written agreement entered into pursuant to section 117(c) [42 U.S.C. 10137(c)]. Any salary or travel expense that would ordinarily be incurred by such tribe may not be considered eligible for funding under this paragraph.

(2)(A) The Secretary shall make grants to each affected Indian tribe where a candidate site for a repository is approved under section 112(c) [42 U.S.C. 10132(c)]. Such grants may be made to each such Indian tribe only for purposes of enabling such Indian tribe

(i) to review activities taken under this subtitle [42 U.S.C. 10131 et seq.] with respect to such site for purposes of determining any potential economic, social, public health and safety, and environmental impacts of such repository on the reservation and its residents;

(ii) to develop a request for impact assistance under paragraph (2);

(iii) to engage in any monitoring, testing, or evaluation activities with respect to site characterization programs with regard to such site;

(iv) to provide information to the residents of its reservation regarding any activities of such Indian tribe, the Secretary, or the Commission with respect to such site; and

(v) to request information from, and make comments and recommendations to, the Secretary regarding any activities taken under this subtitle [42 U.S.C. 10131 et seq.] with respect to such site.

(B) The amount of funds provided to any affected Indian tribe under this paragraph in any fiscal year may not exceed 100 percent of the costs incurred by such Indian tribe with respect to the activities described in clauses (I) through (v) of subparagraph (A). Any salary or travel expense that would ordinarily be incurred by such Indian tribe may not be considered eligible for funding under this paragraph.

(3)(A) The Secretary shall provide financial and technical assistance to any affected Indian tribe requesting such assistance and where there is a site with respect to which the Commission has authorized construction of a repository. Such assistance shall be designed to mitigate the impact on such Indian tribe of the development of such repository. Such assistance to such Indian tribe shall commence within 6 months following the granting by the Commission of a construction authorization for such repository and following the initiation of construction activities at such site.

(B) Any affected Indian tribe desiring assistance under this paragraph shall prepare and submit to the Secretary a report on any economic, social, public health and safety, and environmental impacts that are likely as a result of the development of a repository at a site on the reservation of such Indian tribe. Such report shall be submitted to the Secretary following the completion of site characterization activities at such site and before the recommendation of such site to the President by the Secretary for application for a construction authorization for a repository. As soon as practicable following the granting of a construction authorization for such repository, the Secretary shall seek to enter into a binding agreement with the Indian tribe involved setting forth the amount of assistance to be provided to such Indian tribe under this paragraph and the procedures to be followed in providing such assistance.

(4) The Secretary shall grant to each affected Indian tribe where a site for a repository is approved under section 112(c) [42 U.S.C. 10132(c)] an amount each fiscal year equal to the amount such Indian tribe would receive were it authorized to tax site characterization activities at such site, and the development and operation of such repository, as such Indian tribe taxes the other commercial activities occurring on such reservation. Such grants shall continue until such time as all such activities, development, and operation are terminated at such site.

(5)(A) An affected Indian tribe may not receive any grant under paragraph (1) after the expiration of the 1-year period following

(i) the date on which the Secretary notifies such Indian tribe of the termination of site characterization activities at the candidate site involved on the reservation of such Indian tribe;

(ii) the date on which such site is disapproved under section 115 [42 U.S.C. 10135];

(iii) the date on which the Commission disapproves an application for a construction authorization for a repository at such site; or

(iv) the date of the enactment of the Nuclear Waste Policy Amendments Act of 1987 [enacted Dec. 22, 1987]; whichever occurs first, unless there is another candidate site on the reservation of such Indian tribe that is approved under section 112(c) [42 U.S.C. 10132(c)] and with respect to which the actions described in clauses (I), (ii), and (iii) have not been taken.

(B) An affected Indian tribe may not receive any further assistance under paragraph (2) with respect to a site if repository construction activities at such site are terminated by

the Secretary or if such activities are permanently enjoined by any court.

(C) At the end of the 2-year period beginning on the effective date of any license to receive and possess for a repository at a site on the reservation of an affected Indian tribe, no Federal funds shall be made available under paragraph (1) or (2) to such Indian tribe, except for

(i) such funds as may be necessary to support activities of such Indian tribe related to any other repository where a license to receive and possess has not been in effect for more than 1 year; and

(ii) such funds as may be necessary to support activities of such Indian tribe pursuant to agreements or contracts for impact assistance entered into, under paragraph (2), by such Indian tribe with the Secretary during such 2-year period.

(6) Financial assistance authorized in this subsection shall be made out of amounts held in the Nuclear Waste Fund established in section 302 [42 U.S.C. 10222]. [42 U.S.C. 10138]

CERTAIN STANDARDS AND CRITERIA

Sec. 121. (a) Environmental Protection Agency standards. Not later than 1 year after the date of the enactment of this Act [enacted Jan. 7, 1983], the Administrator, pursuant to authority under other provisions of law, shall, by rule, promulgate generally applicable standards for protection of the general environment from offsite releases from radioactive material in repositories.

(b) Commission requirements and criteria.

(1) (A) Not later than January 1, 1984, the Commission, pursuant to authority under other provisions of law, shall, by rule, promulgate technical requirements and criteria that it will apply, under the Atomic Energy Act of 1954 [42 U.S.C. 2011 et seq.] and the Energy Reorganization Act of 1974 [42 U.S.C. 5801 et seq.], in approving or disapproving -

(i) applications for authorization to construct repositories;

(ii) applications for licenses to receive and possess spent nuclear fuel and high-level radioactive waste in such repositories; and

(iii) applications for authorization for closure and decommissioning of such repositories.

(B) Such criteria shall provide for the use of a system of multiple barriers in the design of the repository and shall include such restrictions on the retrievability of the solidified high-level radioactive waste and spent fuel emplaced in the repository as the Commission deems appropriate.

(C) Such requirements and criteria shall not be inconsistent with any comparable standards promulgated by the Administrator under subsection (a).

(2) For purposes of this Act [42 U.S.C. 10101 et seq.], nothing in this section shall be construed to prohibit the Commission from promulgating requirements and criteria under paragraph (1) before the Administrator promulgates standards under subsection (a). If the Administrator promulgates standards under subsection (a) after requirements and criteria are promulgated by the Commission under paragraph (1), such requirements and criteria shall be revised by the Commission if necessary to comply with paragraph (1)(C).

(c) Environmental impact statement. The promulgation of standards or criteria in accordance with the provisions of this section shall not require the preparation of an environmental impact statement under section 102(2)(C) of the National Environmental Policy Act of 1969 [42 U.S.C.

4332(2)(C)], or to require any environmental review under subparagraph (E) or (F) of section 102(2) of such Act [42 U.S.C. 4332(2)(E), (F)]. [42 U.S.C. 10141]

DISPOSAL OF SPENT NUCLEAR FUEL

Sec. 122. Notwithstanding any other provision of this subtitle [42 U.S.C. 10131 et seq.], any repository constructed on a site approved under this subtitle [42 U.S.C. 10131 et seq.] shall be designed and constructed to permit the retrieval of any spent nuclear fuel placed in such repository, during an appropriate period of operation of the facility, for any reason pertaining to the public health and safety, or the environment, or for the purpose of permitting the recovery of the economically valuable contents of such spent fuel. The Secretary shall specify the appropriate period of retrievability with respect to any repository at the time of design of such repository, and such aspect of such repository shall be subject to approval or disapproval by the Commission as part of the construction authorization process under subsections (b) through (d) of section 114 [42 U.S.C. 10134(b)-(d)]. [42 U.S.C. 10142]

SUBTITLE B—INTERIM STORAGE PROGRAM

FINDINGS AND PURPOSES

TRANSPORTATION

Sec. 137. (a)

(1) Transportation of spent nuclear fuel under section 136(a) [42 U.S.C. 10136(a)] shall be subject to licensing and regulation by the Commission and by the Secretary of Transportation as provided for transportation of commercial spent nuclear fuel under existing law.

(2) The Secretary, in providing for the transportation of spent nuclear fuel under this Act [42 U.S.C. 10101 et seq.], shall utilize by contract private industry to the fullest extent possible in each aspect of such transportation. The Secretary shall use direct Federal services for such transportation only upon a determination of the Secretary of Transportation, in consultation with the Secretary, that private industry is unable or unwilling to provide such transportation services at reasonable cost. [42 U.S.C 10157]

SUBTITLE C—MONITORED RETRIEVABLE STORAGE

MONITORED RETRIEVABLE STORAGE

Sec. 142. (a) Nullification of Oak Ridge siting proposal. The proposal of the Secretary (EC-1022, 100th Congress) to locate a monitored retrievable storage facility at a site on the Clinch River in the Roane County portion of Oak Ridge, Tennessee, with alternative sites on the Oak Ridge Reservation of the Department of Energy and on the former site of a proposed nuclear powerplant in Hartsville, Tennessee, is annulled and revoked. In carrying out the provisions of sections 144 and 145 [42 U.S.C. 10164, 10165], the Secretary shall make no presumption or preference to such sites by reason of their previous selection.

(b) Authorization. The Secretary is authorized to site, construct, and operate one monitored retrievable storage facility subject to the conditions described in sections 143 through 149 [42 U.S.C. 10163-10169]. [42 U.S.C. 10162].

SITE SELECTION

Sec. 145. (a) In general. The Secretary may select the site evaluated under section 144 [42 U.S.C. 10164] that the Secretary determines on the basis of available information to be the most suitable for a monitored retrievable storage facility that is an integral part of the system for the disposal of spent nuclear fuel and high-level radioactive waste established under this Act.
(b) Limitation. The Secretary may not select a site under subsection (a) until the Secretary recommends to the President the approval of a site for development as a repository under section 114(a) [42 U.S.C. 10164(a)].
(c) Site specific activities. The Secretary may conduct such site specific activities at each site surveyed under section 144 [42 U.S.C. 10164] as he determines may be necessary to support an application to the Commission for a license to construct a monitored retrievable storage facility at such site.
(d) Environmental assessment. Site specific activities and selection of a site under this section shall not require the preparation of an environmental impact statement under section 102(2)(C) of the National Environmental Policy Act of 1969 [42 U.S.C. 4332(2)(C)]. The Secretary shall prepare an environmental assessment with respect to such selection in accordance with regulations issued by the Secretary implementing such Act. Such environmental assessment shall be based upon available information regarding alternative technologies for the storage of spent nuclear fuel and high-level radioactive waste. The Secretary shall submit such environmental assessment to the Congress at the time such site is selected.
(e) Notification before selection.

(1) At least 6 months before selecting a site under subsection (a), the Secretary shall notify the Governor and legislature of the State in which such site is located, or the governing body of the affected Indian tribe where such site is located, as the case may be, of such potential selection and the basis for such selection.
(2) Before selecting any site under subsection (a), the Secretary shall hold at least one public hearing in the vicinity of such site to solicit any recommendations of interested parties with respect to issues raised by the selection of such site.

(f) Notification of selection. The Secretary shall promptly notify Congress and the appropriate State or Indian tribe of the selection under subsection (a).
(g) Limitation. No monitored retrievable storage facility authorized pursuant to section 142(b) [42 U.S.C. 10162(b)] may be constructed in the State of Nevada. [42 U.S.C. 10165]

NOTICE OF DISAPPROVAL

Sec. 146. (a) In general. The selection of a site under section 145 [42 U.S.C. 10165] shall be effective at the end of the period of 60 calendar days beginning on the date of notification under such subsection, unless the governing body of the Indian tribe on whose reservation such site is located, or, if the site is not on a reservation, the Governor and the legislature of the State in which the site is located, has submitted to Congress a notice of disapproval with respect to such site. If any such notice of disapproval has been submitted under this subsection, the selection of the site under section 145 [42 U.S.C. 10165] shall not be effective except as provided under section 115(c) [42 U.S.C. 10135(c)].
(b) References. For purposes of carrying out the provisions of this subsection, references in section 115(c) [42 U.S.C. 10135(c)] to a repository shall be considered to refer to a monitored retrievable storage facility and references to a notice of disapproval of a repository site designa-

tion under section 116(b) or 118(a) [42 U.S.C. 10136(b) or 10138(a)] shall be considered to refer to a notice of disapproval under this section. [42 U.S.C. 10166]

CONSTRUCTION AUTHORIZATION

Sec. 148. (a) Environmental impact statement.

(1) Once the selection of a site is effective under section 146 [42 U.S.C. 10166], the requirements of the National Environmental Policy Act of 1969 [42 U.S.C. 4321 et seq.] shall apply with respect to construction of a monitored retrievable storage facility, except that any environmental impact statement prepared with respect to such facility shall not be required to consider the need for such facility or any alternative to the design criteria for such facility set forth in section 141(b)(1) [42 U.S.C. 10161(b)(1)].

(2) Nothing in this section shall be construed to limit the consideration of alternative facility designs consistent with the criteria described in section 141(b)(1) [42 U.S.C. 10161(b)(1)] in any environmental impact statement, or in any licensing procedure of the Commission, with respect to any monitored retrievable storage facility authorized under section 142(b) [42 U.S.C. 10162(b)].

(b) Application for construction license. Once the selection of a site for a monitored retrievable storage facility is effective under section 146 [42 U.S.C. 10166], the Secretary may submit an application to the Commission for a license to construct such a facility as part of an integrated nuclear waste management system and in accordance with the provisions of this section and applicable agreements under this Act affecting such facility.

(c) Licensing. Any monitored retrievable storage facility authorized pursuant to section 142(b) [42 U.S.C. 10162(b)] shall be subject to licensing under section 202(3) of the Energy Reorganization Act of 1974 [42 U.S.C. 5842(3)]. In reviewing the application filed by the Secretary for licensing of such facility, the Commission may not consider the need for such facility or any alternative to the design criteria for such facility set forth in section 141(b)(1) [42 U.S.C. 10161(b)(1)].

(d) Licensing conditions. Any license issued by the Commission for a monitored retrievable storage facility under this section shall provide that

(1) construction of such facility may not begin until the Commission has issued a license for the construction of a repository under section 115(d) [42 U.S.C. 10135(d)];

(2) construction of such facility or acceptance of spent nuclear fuel or high-level radioactive waste shall be prohibited during such time as the repository license is revoked by the Commission or construction of the repository ceases;

(3) the quantity of spent nuclear fuel or high-level radioactive waste at the site of such facility at any one time may not exceed 10,000 metric tons of heavy metal until a repository under this Act first accepts spent nuclear fuel or solidified high-level radioactive waste; and

(4) the quantity of spent nuclear fuel or high-level radioactive waste at the site of such facility at any one time may not exceed 15,000 metric tons of heavy metal. [42 U.S.C. 10168]

FINANCIAL ASSISTANCE

Sec. 149. The provisions of section 116(c) or 118(b) [42 U.S.C. 10136(c) or 10138(b)] with respect to grants, technical assistance, and other financial assistance shall apply to the State, to affected Indian tribes and to affected units of local government in the case of a monitored retrievable storage facility in the same manner as for a repository. [42 U.S.C. 10169]

SUBTITLE H—TRANSPORTATION

TRANSPORTATION

Sec. 180. (a) No spent nuclear fuel or high-level radioactive waste may be transported by or for the Secretary under subtitle A or under subtitle C except in packages that have been certified for such purpose by the Commission.
(b) The Secretary shall abide by regulations of the Commission regarding advance notification of State and local governments prior to transportation of spent nuclear fuel or high-level radioactive waste under subtitle A or under subtitle C.
(c) The Secretary shall provide technical assistance and funds to States for training for public safety officials of appropriate units of local government and Indian tribes through whose jurisdiction the Secretary plans to transport spent nuclear fuel or high-level radioactive waste under subtitle A or under subtitle C. Training shall cover procedures required for safe routine transportation of these materials, as well as procedures for dealing with emergency response situations. The Waste Fund shall be the source of funds for work carried out under this subsection. [42 U.S.C. 10175]

ENERGY POLICY ACT OF 1992

TITLE VIII—HIGH-LEVEL RADIOACTIVE WASTE

NUCLEAR WASTE DISPOSAL

Sec. 801. 42 USC 10141 note.
(a) Environmental Protection Agency Standards.

(1) Promulgation. Notwithstanding the provisions of section 121(a) of the Nuclear Waste Policy Act of 1982 [42 U.S.C. 210141(a)], section 161 b. of the Atomic Energy Act of 1954 [42 U.S.C. 2201(b)], and any other authority of the Administrator of the Environmental Protection Agency to set generally applicable standards for the Yucca Mountain site, the Administrator shall, based upon and consistent with the findings and recommendations of the National Academy of Sciences, promulgate, by rule, public health and safety standards for protection of the public from releases from radioactive materials stored or disposed of in the repository at the Yucca Mountain site. Such standards shall prescribe the maximum annual effective dose equivalent to individual members of the public from releases to the accessible environment from radioactive materials stored or disposed of in the repository. The standards shall be promulgated not later than 1 year after the Administrator receives the findings and recommendations of the National Academy of Sciences under paragraph (2) and shall be the only such standards applicable to the Yucca Mountain site.

(2) Study by National Academy of Sciences. Within 90 days after the date of the enactment of this Act, the Administrator shall contract with the National Academy of Sciences to conduct a study to provide, by not later than December 31, 1993, findings and recommendations on reasonable standards for protection of the public health and safety, including

(A) whether a health-based standard based upon doses to individual members of the public

from releases to the accessible environment (as that term is defined in the regulations contained in subpart B of part 191 of title 40, Code of Federal Regulations, as in effect on November 18, 1985) will provide a reasonable standard for protection of the health and safety of the general public;

(B) whether it is reasonable to assume that a system for post-closure oversight of the repository can be developed, based upon active institutional controls, that will prevent an unreasonable risk of breaching the repository's engineered or geologic barriers or increasing the exposure of individual members of the public to radiation beyond allowable limits; and

(C) whether it is possible to make scientifically supportable predictions of the probability that the repository's engineered or geologic barriers will be breached as a result of human intrusion over a period of 10,000 years.

(3) Applicability. The provisions of this section shall apply to the Yucca Mountain site, rather than any other authority of the Administrator to set generally applicable standards for radiation protection.

(b) Nuclear Regulatory Commission requirements and criteria.

(1) Modifications. Not later than l year after the Administrator promulgates standards under subsection (a), the Nuclear Regulatory Commission shall, by rule, modify its technical requirements and criteria under section 121(b) of the Nuclear Waste Policy Act of 1982 [42 U.S.C. 10141(b)], as necessary, to be consistent with the Administrators standards promulgated under subsection (a).

(2) Required assumptions. The Commissions requirements and criteria shall assume, to the extent consistent with the findings and recommendations of the National Academy of Sciences, that, following repository closure, the inclusion of engineered barriers and the Secretary's post-closure oversight of the Yucca Mountain site, in accordance with subsection (c), shall be sufficient to

(A) prevent any activity at the site that poses an unreasonable risk of breaching the repository's engineered or geologic barriers; and

(B) prevent any increase in the exposure of individual members of the public to radiation beyond allowable limits.

(c) Post-closure oversight. Following repository closure, the Secretary of Energy shall continue to oversee the Yucca Mountain site to prevent any activity at the site that poses an unreasonable risk of -

(1) breaching the repository's engineered or geologic barriers; or

(2) increasing the exposure of individual members of the public to radiation beyond allowable limits.

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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 Interagency 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.

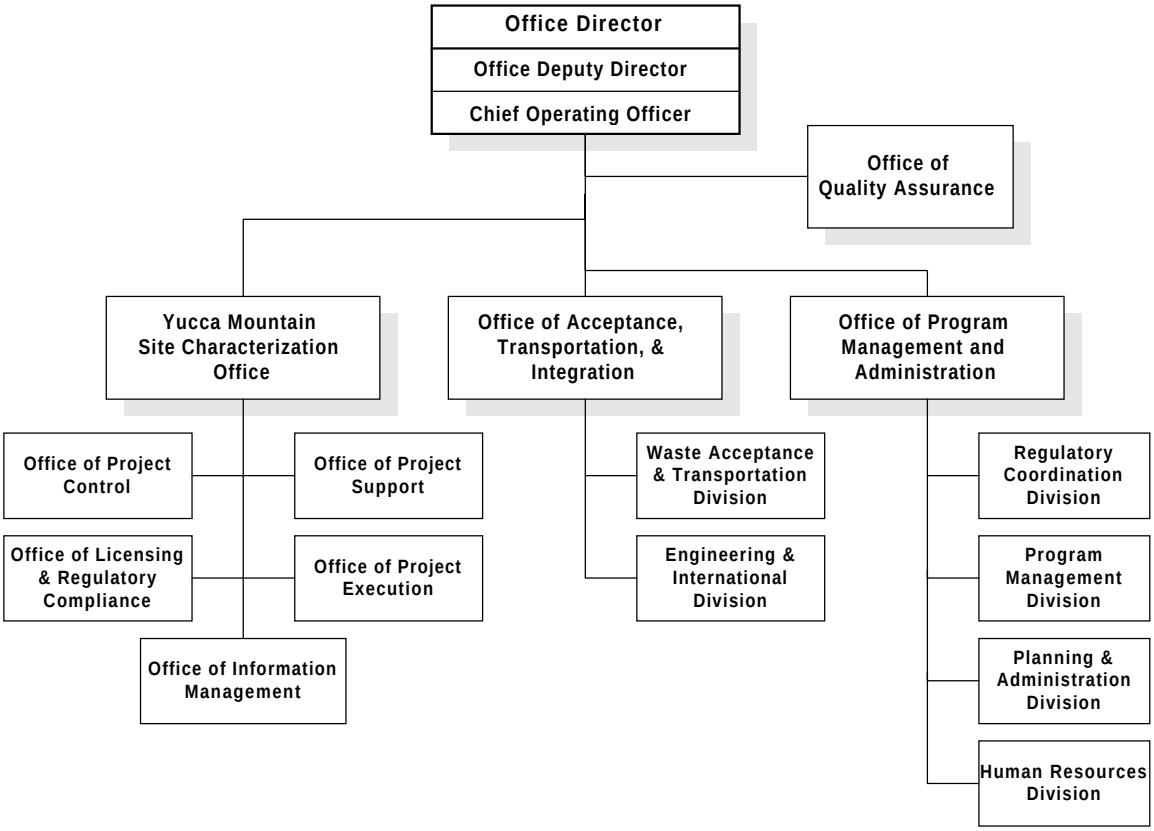
On December 18, 1998, the Department of Energy submitted the Viability Assessment and its companion documents to the President and the Congress, and released it to the public. Based on the Viability Assessment, the Program concluded that work should proceed to support a decision by the Secretary in 2001 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.

Appendix C

Organization Chart

Office of Civilian Radioactive Waste Management



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Appendix D

Glossary

Actinides are a set of 15 radioactive heavy metals, from actinium to lawrencium in the periodic chart of elements.

Advanced conceptual design refers to the final part of the conceptual design phase for the repository, including engineered barriers and the waste package. It is intended to develop possible solutions to all identified design-related licensing issues and to develop design requirements for the technical baseline. This phase will explore limited design alternatives and will establish and refine the design criteria and concepts to be finalized in the later design phases that will support licensing and construction.

Burnup refers to the reduction of fissionable material in the nuclear fuel that is used up during the nuclear fission process in a reactor. As the fissionable material is depleted, the ability of the fuel to sustain a chain reaction (reactivity) declines.

Burnup credit refers to a strategy being considered for effective reduction in calculated spent nuclear fuel reactivity in multi-purpose canisters and transportation casks. The strategy considers the burnup of fuel instead of using fresh-fuel assumptions in establishing criticality control measures and in designing the appropriate spent nuclear fuel geometry and neutron-absorbing material that must be used in spent nuclear fuel loading. Burnup credit is one of the licensing issues that may be addressed in obtaining certificates of compliance for transportation casks.

Criticality control refers to the suite of measures taken to maintain nuclear fuel, including spent nuclear fuel, in a subcritical condition during storage, transportation and disposal, so that no self-sustaining nuclear chain reaction can occur. Subcriticality is assured by loading spent nuclear fuel in specific configurations that meet certain requirements related to fuel age, enrichment, and reduction in nuclear fuel reactivity through burnup.

Contract holders refer to owners and generators of spent nuclear fuel who have contracted with the Department of Energy for acceptance and disposal of the spent nuclear fuel under provisions of the Nuclear Waste Policy Act.

Defense high-level nuclear waste refers to high-level radioactive waste generated in the course of national defense activities.

Drift is a horizontal or near-horizontal passageway in a mine or tunnel.

Dry transfer refers to moving spent nuclear fuel into a container or between containers in the absence of a spent nuclear fuel storage pool; transfer is generally conducted in pools, where the water provides cooling and radiation shielding.

Energy Policy Act (42 USC 1251 et seq.) refers to comprehensive energy legislation enacted by Congress in 1992. Section 801 of the Act directed the Environmental Protection Agency to contract with the National Academy of Sciences to provide "findings and recommendations on reasonable standards...that would govern the long-term performance of a repository at the Yucca Mountain site." Section 802 of the Act extended the term of the Nuclear Waste Negotiator. Section 803 of the Act instructed the Department of Energy to evaluate whether its current programs and plans are adequate to deal with additional volumes or categories of nuclear waste that might be generated by nuclear power plants newly licensed after October 1992.

Engineered barrier refers to a man-made component of a disposal system designed to prevent releases of radionuclides from the underground facility. This term includes the waste form, the waste package, materials placed over and around the waste packages.

Environmental assessment refers to a public document for which a Federal agency is responsible that serves to provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact.

Environmental impact statement refers to a detailed written statement to support a decision to proceed with major Federal actions affecting the quality of the human environment. Required by the National Environmental Policy Act (NEPA), the environmental impact statement describes the environmental impact of the proposed action; any adverse environmental effects that cannot be avoided should the proposal be implemented; and alternatives to the proposed action. Preparation of an environmental impact statement requires a public process that includes public meetings, reviews, and comments, as well as agency responses to the public comments.

Environmental report is a document, similar in content to an environmental impact statement, required of facility license applicants for submission to the Nuclear Regulatory Commission. The document, while it does not involve the public process required in an environmental impact statement, serves to provide information necessary to prepare an environmental impact statement by the Commission (The Nuclear Waste Policy Act directs the Commission to adopt the Department's environmental impact statement prepared for the repository, to the extent practicable, in connection with any decision to issue a construction authorization and license for the repository.).

Evapotranspiration is the loss of water from the land to the atmosphere through evaporation from the soil and transpiration of plants.

Exploratory Studies Facility refers to the facility constructed for the purpose of performing underground studies during repository site characterization.

Geologic repository refers to a system for the disposal of radioactive waste in excavated geologic media, including surface and subsurface areas of operation and the adjacent part of the natural setting.

Ground water refers to all subsurface water as distinct from surface water.

High-level radioactive waste refers to: (1) the highly radioactive material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations; and (2) other highly radioactive material that the Nuclear Regulatory Commission, consistent with existing law, determines requires permanent isolation.

Information management architecture refers to the conceptual framework that guides the building of an efficient, effective, and flexible information infrastructure. The architecture provides the blueprint upon which all information, data, and information systems are defined, organized, developed, accessed, maintained, and managed for the Program.

Institutional activities refer to activities involving stakeholders and the public, and include participation in program decision making, program information dissemination, and program funding to State and local governments and stakeholder groups.

Interim storage facility is a facility for acceptance of spent nuclear fuel and high-level radioactive waste from owners and generators for temporary storage prior to permanent disposal in a repository. See also "monitored retrievable storage facility."

License application is a document submitted to the Nuclear Regulatory Commission containing general information and a safety analysis for either a geologic repository or an interim storage facility. A license is required to construct a geologic repository or interim storage facility and to receive, possess and dispose of spent nuclear fuel and high-level radioactive waste.

Licensing support network refers to an electronic information retrieval and distribution system to support the licensing process, as required by the Nuclear Regulatory Commission in 10 CFR Part 2, Subpart J. This system must be certified by the Commission at least six months before the Department submits a repository license application. The Department has worked with the Commission and the Commission-sponsored stakeholder group to develop an acceptable system that will be used for document discovery by all participants in the repository licensing hearings.

Metric tons heavy metal (MTHM) refers to metals with high atomic numbers that are loaded into nuclear reactors to take part in chain reactions. Examples of heavy metals include thorium, uranium, plutonium, and neptunium. When used in the Civilian Radioactive Waste Management Program, the term usually refers to the mass of heavy metal in spent nuclear fuel that was present when the fuel was initially loaded into a reactor.

Metric tons of uranium (MTU) refers to the mass of uranium in spent nuclear fuel that was present when the fuel was initially loaded into a reactor. (A metric ton is a unit of mass equal to 1,000 kilograms.)

Monitored retrievable storage facility is a facility for acceptance of spent nuclear fuel and high-level radioactive waste from owners and generators for temporary storage prior to permanent disposal in a repository. See also "interim storage facility."

Multi-purpose canister refers to a sealed, metallic container holding multiple spent nuclear fuel assemblies in a dry, inert environment and inserted into different outer containers for storage, transportation, and disposal.

National Environmental Policy Act (42 USC 1251 et seq.) refers to the Federal statute that is the national charter for protection of the environment. The Act is implemented by procedures issued by the Council on Environmental Quality. These procedures ensure that environmental information is available to public officials and citizens before Federal decisions are made and before Federal actions are taken.

Notice of Expression of Interest refers to a notice published in the Commerce Business Daily to develop or identify interested sources, request preliminary information based on a general description of supplies or services, or explain complicated specifications or requirements.

Notice of Inquiry refers to a notice published in the *Federal Register* eliciting the views of affected parties on issues that may result in rulemaking by a Federal agency.

Notice of Intent refers to a notice published in the *Federal Register* to inform the public that

an environmental impact statement will be prepared and considered by a Federal agency. The notice is required by the National Environmental Policy Act implementing procedures. The notice must describe the proposed action and possible alternatives; describe the agency's proposed scoping process including whether, when, and where any scoping meeting will be held; and state the name of an agency official who can answer questions about the proposed action and the environmental impact statement.

Nuclear Waste Fund refers to a separate fund in the U.S. Treasury established by the Nuclear Waste Policy Act to assure that the costs of high-level radioactive waste management and disposal are borne by the owners and generators of the waste. Civilian utility payments for spent nuclear fuel disposal are deposited in the Fund and later appropriated by Congress to cover Program costs. Appropriations from the Fund can only be used for purposes defined in the Act. Since civilian payments must cover both current and long-term costs, utility payments in excess of current appropriations are invested in Treasury securities that pay interest to the Fund. Defense Nuclear Waste Disposal appropriations, which are intended for expenditure during the appropriation year, are not currently deposited in the Fund.

Nuclear Waste Policy Act (42 USC 10101 et seq.) refers to the Federal statute enacted in 1982 that established the Office of Civilian Radioactive Waste Management and defined its mission to develop a Federal system for the management and geologic disposal of commercial spent nuclear fuel and other high-level radioactive wastes, as appropriate. The Act also specified other Federal responsibilities for nuclear waste management, established the Nuclear Waste Fund to cover the cost of geologic disposal, authorized interim storage until a repository is available, and defined interactions between Federal agencies and the states, local governments, and Indian Tribes.

Nuclear Waste Policy Amendments Act of 1987 (42 USC 10101 et seq.) refers to legislation which amended the Nuclear Waste Policy Act to limit repository site characterization activities to Yucca Mountain, Nevada; to establish the Office of the Nuclear Waste Negotiator to seek a State or Indian Tribe willing to host a repository or monitored retrievable storage facility; to create the Nuclear Waste Technical Review Board; and to increase State and local government participation in the waste management program.

OCRWM Home Page refers to the electronic communications capability established on the World Wide Web in March 1995. The Home Page provides the public with access to a range of Program documents, information and services, including current program and budget plans, testimony, speeches, fact sheets, brochures, photographs, a calendar of events (including Yucca Mountain tours and lectures), newsletters covering site characterization activities, and a publications ordering system. Users can access the system at http://www.rw.doe.gov.

Peer review refers to a documented critical review performed by those who are independent from individuals who performed the work but have technical expertise at least equivalent to those who performed the original work.

Performance assessment refers to any analysis that predicts the behavior of a system or a component of a system under a given set of constant or transient conditions.

Postclosure refers to the period of time after the closure of the geologic repository.

Preclosure refers to the period of time before and during the closure of the geologic repository.

Program participant refers to any organization or individual charged with a responsibility by law or contract to provide services aimed at satisfying Program needs or furtherance of Program objectives. Includes any organization or individual, including contractors, Department of Energy laboratories, and the United States Geological Survey, engaged in the performance of such services.

Quality assurance refers to all of the planned and systematic actions necessary to provide adequate confidence that a structure, system, or component is constructed according to plans and specifications and will perform satisfactorily. The Program has established a rigorous quality assurance program, which is required and overseen by the Nuclear Regulatory Commission. Establishment and execution of the quality assurance program is intended to protect the health and safety of the public and workers, and the environment. Compliance with the quality assurance program enables OCRWM to collect and maintain qualified, traceable data that can be used and considered valid by the Commission and other oversight bodies during program execution and licensing proceedings.

Reactivity is a measure of a nuclear system's potential to self-sustain a nuclear chain reaction.

Spent nuclear fuel refers to fuel that has been withdrawn from a nuclear reactor following irradiation, the constituent elements of which have not been separated by reprocessing.

Stakeholders refer to individuals or organizations that have an important, ongoing interest in the Program and quality of products developed by the Office of Civilian Radioactive Waste Management.

Storage cask refers to a waste receptacle designed to safely hold one or more spent nuclear fuel assemblies during storage at a reactor site, an interim storage facility, or a repository.

Strategic system refers to a Department of Energy designation under which a program will be managed as a single integrated entity rather than as separate independent projects.

Thermal loading refers to the manner in which application of heat to a system is distributed in space, and is usually measured in terms of watt density. The thermal loading for a repository is the "watts-per-acre" produced by the radioactive waste in the disposal area.

Topical safety analysis report refers to a document, submitted for review and approval to the Nuclear Regulatory Commission prior to a license application for a radioactive waste management facility, containing analyses and evaluations addressing the potential impact of the facility on public health and safety.

Total system life-cycle cost refers to the cost estimate that reflects the most current assumptions for system components and operational procedures for the Civilian Radioactive Waste Management System. The Nuclear Waste Policy Act of 1982 requires the Secretary of Energy annually to review the 1.0 mil per kilowatt-hour fee, paid by nuclear utilities for the disposal of spent nuclear fuel, to determine its adequacy for offsetting the estimated costs of the Program. The total system life-cycle cost analysis is prepared to document the estimated Program cost and is a necessary component of the fee-adequacy analysis.

Transportation and storage system refers to equipment for the acceptance, transportation, and interim storage of spent nuclear fuel.

Utilities refers to commercial entities that provide electricity to users for a fee. If a utility company generates electricity using a nuclear reactor and sells that electricity, a portion of the fees it charges its customers is to be paid into the Nuclear Waste Fund.

Viability assessment refers to the Program's assessment of the prospects for geologic disposal at the Yucca Mountain site, based on repository and waste package designs, a total system performance assessment, a license application plan, and repository cost and schedule estimates.

Waste acceptance refers to the processes necessary for the Department of Energy to take title to and physical possession of spent nuclear fuel or high-level radioactive waste from owners and generators of these wastes.

Waste canister refers to a metallic or nonmetallic container enclosing the waste form.

Waste form refers to radioactive waste materials and any encapsulating or stabilizing matrix. Examples include used nuclear power reactor fuel elements and borosilicate glass "logs" containing radioactive materials.

Waste package refers to the waste form and any containers, shielding, packing, and other absorbent materials immediately surrounding an individual waste container.

Water table refers to a continuous underground boundary below which the rock void-space is filled with water and above which the void-space is not filled with water.