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U.S. DEPARTMENT OF ENERGY
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
WASHINGTON, DC 20585

CIVILIAN RADIOACTIVE WASTE MANAGEMENT

PROGRAM PLAN

Revision 2

July 1998

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Message From the Director

The Civilian Radioactive Waste Management Program is complex, but its goal is simple. Our primary goal is safe, permanent disposal of spent nuclear fuel and high-level radioactive waste. Safe disposal requires the protection of human health and safety and the environment—for thousands of years into the future. Our goal has large domestic and international impacts.

In crafting legislation to create a Federal waste management system, Congress carefully structured a developmental process that proceeds through a series of key decision points. The Secretary of Energy, the President, the State of Nevada, the Congress, the Nuclear Waste Technical Review Board (NWTRB), and the Nuclear Regulatory Commission ("the Commission") all weigh crucial matters. The Commission, in turn, implements the Environmental Protection Agency's radiation protection standard, which, in turn, is advised by recommendations of the National Academy of Sciences. The Department of Transportation and other agencies exercise regulatory authority over aspects of our Program. Congress also provided for extensive public participation and oversight to strengthen decision-making. Thus, under the structure of the Nuclear Waste Policy Act of 1982, the Office of Civilian Radioactive Waste Management (OCRWM) is one of a number of parties whose efforts—sometimes hierarchical, sometimes collaborative, sometimes in dynamic tension—together produce a functioning waste management system that can earn public acceptance.

Our Program continues to evolve. Accordingly, we must maintain the resilience to accommodate uncertainty and respond to further change, while retaining the core capabilities essential to achieving the fundamental long-term goal. Since its inception in 1983, OCRWM has formulated a number of mission plans, Program plans, and strategies, revising them as necessary to reflect the Program's evolution. Most recently, our May 1996 revised Program Plan restructured our approach to site characterization to reflect sharply reduced funding and Congressional redirection—chiefly, a narrowed focus on resolving open technical issues about the suitability of the Yucca Mountain site. In 1997, to prepare for implementation of the Government Performance and Results Act and to conform our own planning with the Department's strategic management initiatives, we chose to integrate our 1995 Strategic Plan and 1996 revised Program Plan, update them, and issue them in the form of this second revision of the OCRWM Program Plan.

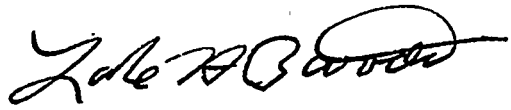
The resulting document targets statutory goals and objectives and responds to Congressional and Departmental guidance. It sets forth a realistic multi-year plan. It states the assumptions that our Program rests on. It defines concrete measures of success. It provides for the contingency planning that will enable us to accommodate change. It can thus serve both as the

foundation of our Program management and as a common framework that all parties can use to understand our work, evaluate it, and shape their own participation in it.

Since the 1996 Congressional redirection, our Program has experienced relative stability. Accordingly, this revision of the Program Plan does not fundamentally alter our approach. In the near-term, we will complete the Yucca Mountain system viability assessment, and we will work to make this assessment widely understood. The viability assessment will give all parties a clearer understanding of the information gained from site investigations and the remaining work required to support national decisions on geologic disposal at Yucca Mountain. It will represent the culmination of a significant effort by all Program participants.

This revision of the Program Plan also outlines our efforts to utilize the resources of the private sector to accept spent nuclear fuel at reactor sites around the country and ship it to a Federal facility. And it describes our plans to accept defense high-level radioactive waste and Naval reactor spent nuclear fuel for permanent disposal.

Given the scope of these tasks, this Plan will be updated in coming years to reflect changing realities and new approaches to them. But fundamentally, the Plan is built for the long term; it provides a solid foundation for carrying out a mission that will endure as long as society demands safe, permanent disposal of this long-lived radioactive waste. We hope a wide readership will find this document useful.



Lake H. Barrett, Acting Director
Office of Civilian Radioactive
Waste Management

Introduction

Purpose of the *Civilian Radioactive Waste Management Program Plan, Revision 2*

This revision of the *Civilian Radioactive Waste Management Program Plan* ("the Plan") describes the objectives of the Civilian Radioactive Waste Management Program ("the Program") as prescribed by legislative mandate, and the technical achievements, schedule, and costs planned to complete these objectives.

The Plan provides Program participants and stakeholders with an updated description of Program activities and milestones for fiscal years (FY) 1998 to 2003.[1] It describes the steps the Program will undertake to provide a viability assessment of the Yucca Mountain site in 1998; prepare the Secretary of Energy's ("the Secretary") 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 ("the Commission") in 2002 for authorization to construct a repository. The Program's ultimate challenge is to provide adequate assurance to society that an operating geologic repository at a specific site meets the required standards of safety.

The Plan is linked to the Department's 1997 Strategic Plan and sets forth strategic objectives and success measures, as required by the Government Performance and Results Act of 1993. The relationship between the Plan and the Department's Strategic Plan is illustrated in *Figure 1.*

Legislative Mandate

The Nuclear Waste Policy Act of 1982 ("the Act") establishes 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 ("OCRWM") within the Department of Energy ("the Department") to develop a Federal system for the safe management and permanent disposal of the spent nuclear fuel from civilian nuclear power reactors. The Act 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.

[1]The Program issued its first five-year *Program Plan* in December 1994. In response to guidance from the President and Congress, the Program revised its work scope and issued the *Civilian Radioactive Waste Management Program Plan, Revision 1,* in May 1996.

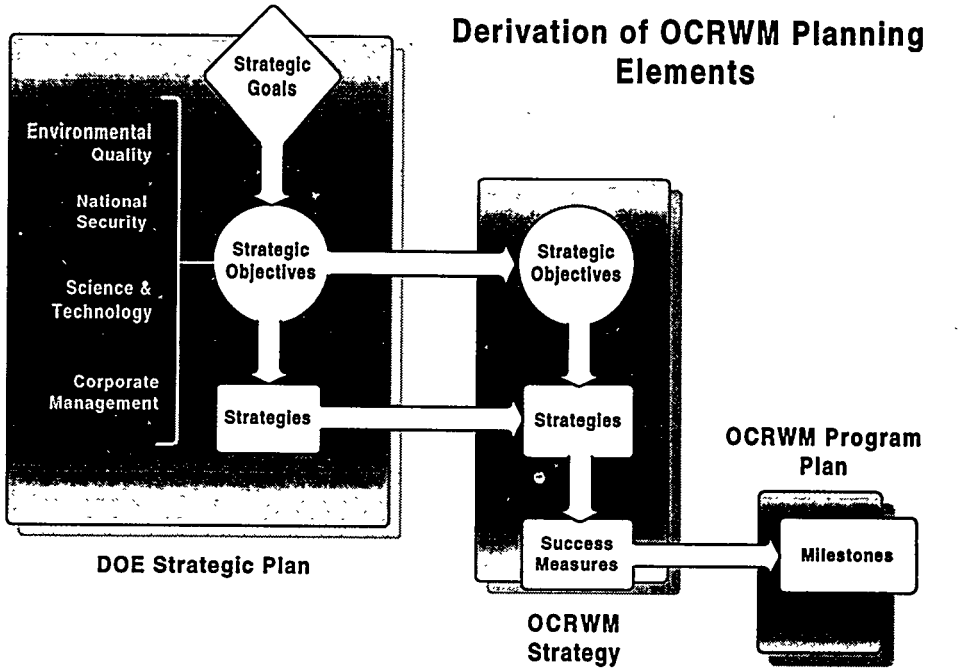


Figure 1

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, with two alternative sites in Tennessee. The Amendments Act 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 as *Appendix B*.

Program Organization

The Program is comprised of two major 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, is also located in Washington, D.C., and it conducts vital functions that intersect both projects. The Program Management Center is comprised of the Office of Quality Assurance and the Office of Program Management and Administration. 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.

Contents of the Program Plan

Chapter 1 describes the Program's mission and vision, and summarizes the Program's broad strategic objectives. *Chapter 2* describes the Program's approach to transform strategic objectives, strategies, and success measures to specific Program activities and milestones. *Chapter 3* describes the activities and milestones currently projected by the Program for the next five years for the Yucca Mountain Site Characterization Project; the Waste Acceptance, Storage and Transportation Project; and the Program Management Center. The appendices present information on the Nuclear Waste Policy Act of 1982, as amended, and the Energy Policy Act of 1992; the history of the Program; the Program's organization chart; the Commission's regulations, "Disposal of High-Level Radioactive Wastes in Geologic Repositories"; and a glossary of terms.

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Chapter One
Program Mission and Strategic Objectives

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 objectives, strategies, and success measures are derived from the Program's mission and the Department's Strategic Plan. These objectives, supporting strategies, and success measures, though broad in scope, have been translated into the functions, milestones, and activities of the Program. The Program's four strategic objectives directing its activities are:

Strategic Objective 1: *Dispose of high-level radioactive waste and spent nuclear fuel in accordance with the Nuclear Waste Policy Act of 1982, as amended.*

Strategic Objective 2: *Ensure the safety and health of the OCRWM workforce and members of the public, and the protection of the environment in all OCRWM activities.*

Strategic Objective 3: *As a good neighbor and public partner, continually work with customers and stakeholders in an open, frank, and constructive manner.*

Strategic Objective 4: *Use efficient and effective corporate management systems and approaches to guide decision-making, streamline and improve operations, align resources and reduce costs, improve the delivery of products and services, and evaluate performance.*

Strategic Objective 1: Dispose of high-level radioactive waste and spent nuclear fuel in accordance with the Nuclear Waste Policy Act of 1982, as amended.

Strategy 1: Complete the scientific and technical analyses of the Yucca Mountain site and, if it is determined to be suitable for a geologic repository, obtain a license from the Nuclear Regulatory Commission.

Success Measures:

- Complete, in 1998, the viability assessment analyses for licensing and constructing a geologic repository at the Yucca Mountain site.
- Complete a draft environmental impact statement in FY 1999.
- Complete a final environmental impact statement in FY 2000.
- If the site is found suitable, recommend the repository site to the President in FY 2001.
- If the Yucca Mountain site is designated as a repository site, submit a license application to the Nuclear Regulatory Commission in FY 2002.
- Provide responses to Nuclear Regulatory Commission queries within 60 days of receipt to support review of the license application in FY 2003.

Strategy 2: Maintain the capability to accelerate transportation of high-level radioactive waste and spent nuclear fuel to a receiving facility.

Success Measures:

- Develop, in FY 1998, a competitive, private sector approach that uses private sector management and operational capabilities to provide waste acceptance and transportation services; issue a revised draft request for proposals.
- Complete, in FY 1998, a Revised Proposed Policy and Procedures for Implementation of Section 180(c) of the Nuclear Waste Policy Act of 1982, as amended.
- Complete, in FY 1998, responses to the Nuclear Regulatory Commission's request for additional information on the non-site-specific Topical Safety Analysis Report for a centralized interim storage facility; and address long lead-time issues related to the storage of spent nuclear fuel, including design, engineering, and safety analyses.

Strategy 3: Fully integrate plans for disposal of the Department's high-level radioactive waste and spent nuclear fuel generated by nuclear weapons, Naval nuclear propulsion, and civilian nuclear research and development programs into the OCRWM Program baseline and planning process.

Success Measures:

- Issue and begin implementation of a memorandum of agreement (MOA) for acceptance of Department-owned high-level radioactive waste and spent nuclear fuel between the Office of Environmental Management and OCRWM and an MOA for acceptance of Naval spent nuclear fuel between the Naval Nuclear Propulsion Program and OCRWM during FY 1998.
- Complete integration of Department-owned and Naval spent nuclear fuels in the formal Yucca Mountain system viability assessment documents by the end of FY 1998.
- Develop detailed acceptance criteria for Department-owned and Naval spent nuclear fuel to support Departmental activities at Office of Environmental Management and Department of the Navy facilities that are presently managing spent nuclear fuel in FY 1998.
- Complete development of specific requirements for Department-owned and Naval spent nuclear fuel and high-level radioactive waste in facility and waste package designs for the repository license application by the end of FY 1999.
- Conduct environmental impact analyses for Department-owned and Naval spent nuclear fuel and high-level radioactive waste to support the draft repository environmental impact statement in FY 1999.
- Complete safety analyses for Department-owned and Naval spent nuclear fuel and high-level radioactive waste to support the repository license application in FY 2002.

Strategy 4: Fully integrate plans for disposal of weapons-usable fissile materials into the OCRWM Program Plan and baseline. Actively support the ultimate disposition of radioactive materials generated as part of the Nation's "Cold War legacy" and the Administration's nuclear nonproliferation objectives by providing disposal of radioactive materials in a deep geologic repository.

Success Measures:

- Complete a baseline change proposal for incorporation of plutonium waste forms into the civilian radioactive waste management system (CRWMS) baseline in FY 1998.
- Complete incorporation of plutonium waste form planning assumptions and Program requirements into the CRWMS baseline in FY 1998.
- Address plutonium waste forms in Yucca Mountain viability assessment documents by the end of FY 1998.
- Address specific requirements for plutonium waste forms in facility and waste package designs for the repository license application by the end of FY 1999.

- Conduct environmental impact analyses for plutonium waste forms to support the draft repository environmental impact statement in FY 1999.
- Complete safety analyses for plutonium waste forms to support the repository license application in FY 2002.

Strategy 5: Improve the integrity and range of potential interpretation of scientific data and numerical model abstraction used in site characterization by increasing the use of peer and Program review processes.

Success Measures:

- Complete peer review of the total system performance assessment in FY 1999.
- Use expert groups and external oversight groups to review selected key Program scientific reports and technical analyses.

Strategic Objective 2: Ensure the safety and health of the OCRWM workforce and members of the public, and the protection of the environment in all OCRWM activities.

Strategy 1: Integrate and embed sound environment, safety, and health (ES&H) management practices in the performance of OCRWM's day-to-day work.

Success Measures:

- Modify the management and operating (M&O) contract to require implementation of an integrated safety management system in FY 1998.
- Receive M&O contractor integrated safety management system description in FY 1998.
- Complete Program Level-2 Functions, Responsibilities, and Authorities Manual for integrated safety management in FY 1998.
- Implement formal OCRWM self-assessment programs to identify and correct ES&H deficiencies and vulnerabilities in FY 1998.

Strategy 2: Ensure that OCRWM employees are appropriately trained and technically competent commensurate with their ES&H responsibilities.

Success Measure:

- Train all construction personnel in accordance with requirements established in 29 CFR part 1926.21; Safety Training and Education.

Strategy 3: Ensure that OCRWM employees performing activities important to nuclear safety or the repository safety strategy implement quality assurance (QA) requirements commensurate with 10 CFR 60, Subpart G; 10 CFR 71, Subpart H; and 10 CFR 72, Subpart G.

Success Measures:

- Complete annual quality assurance audits of all OCRWM participant organizations.
- Ensure timely corrective action on all audit findings and implement actions to preclude recurrence.

Strategic Objective 3: As a good neighbor and public partner, continually work with customers and stakeholders in an open, frank, and constructive manner.

Strategy 1: 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.

Success Measures:

- Conduct at least four stakeholder meetings per year on a subject of programmatic interest.
- Keep key stakeholders informed of Program policy and implementation.

Strategy 2: Increase customer and public awareness of OCRWM's waste management mission by improving the quality, timeliness, frequency, and sufficiency of information disseminated about the Program.

Success Measures:

- Redesign OCRWM's Home Page in FY 1998 to make it more user-friendly and to elicit user feedback.
- Post key Program information on the OCRWM Home Page on a timely basis.
- Support the Department's commitment to advance the Nation's science education and literacy by making OCRWM's secondary school curriculum, "Science, Society and America's Nuclear Waste," available on the Internet in FY 1998.
- Develop and implement a plan for clear communication of results of the Yucca Mountain system viability assessment analyses to customers, stakeholders, and the public in 1998.
- Annually consult stakeholders on Program responsiveness.

Strategic Objective 4: Use efficient and effective corporate management systems and approaches to guide decision-making, streamline and improve operations, align resources and reduce costs, improve the delivery of products and services, and evaluate performance.

Strategy 1: Use prudent contracting and business management approaches that emphasize results, accountability, and competition; improve timeliness; minimize costs; and ensure customer satisfaction.

Success Measures:

- In FY 1998, issue a Program management policy document that implements a performance-based approach.
- Annually recover available funds from contracts in closeout.
- Award a fixed-price or performance-based audit services contract in FY 1999.
- Conduct performance-based evaluations of the OCRWM M&O contractor in FY 1998 and beyond.

Strategy 2: Strengthen fiscal and Program management practices to ensure cost-effective operations and achieve intended results.

Success Measures:

- Achieve at least 95 percent conformance with annual Program schedule and cost baseline targets.
- Conduct Program performance reviews by senior management (Director's Program Review) at least quarterly, using OCRWM-wide Program and fiscal management tracking systems.
- Perform at least one project/office-level management system performance assessment each fiscal year to improve management system effectiveness and efficiency.

Strategy 3: Enhance the productivity of human resources, support business process improvements, and reduce Program costs by managing information as a corporate asset.

Success Measures:

- Implement and maintain a Program-wide information technology baseline by the end of FY 1998.
- Implement a corporate information systems integration strategy in FY 1998.
- Maintain a local- and wide-area network prime time availability rate of at least 98 percent.

Strategy 4: Implement quality management principles, value diversity, and continue to improve human resources systems and practices, both Federal and contractor.

Success Measures:

- Nominate qualified individuals for participation in Departmental and inter-agency career development programs, and select at least one individual each year to participate in one of the career development programs.
- To the extent feasible, increase the number of minority promotions and awards by 2 percent through FY 2000.

Chapter Two
Program Approach

Introduction

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 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 far more complicated and time-consuming than was envisioned in the Program's early years. The Program has had to respond to diverse technical, oversight, operational, regulatory, and political challenges as they have evolved over time. To meet the 1998 acceptance date, the Department proposed a monitored retrievable storage facility as part of the waste management system. 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 date of repository operations.

Realizing that the complexity of the Program had grown, the Program's senior management and technical staff conducted a series of strategic planning sessions and revised the Program's approach to meeting its objectives. Program management recognized that the social and policy environment in which the Program must achieve its mission has changed and will likely continue to change. In interactions with stakeholders, a consistent theme emerged that the Program must remain responsive to evolving needs and circumstances while continuing to work toward achieving its long-term mission.

The general Program approach for the Yucca Mountain Site Characterization Project; Waste Acceptance, Storage and Transportation Project; and Program Management Center are briefly discussed below and described in detail in *Chapter 3*. Program-level milestones are summarized in *Figure 2*. Funding requirements are provided in *Table 1*.

Yucca Mountain Site Characterization Project

Prior to 1994, 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. The current approach distinguishes between tests required to evaluate site suitability, to support licensing, and to confirm the safety of the repository before closure. This distinction permits phasing of tests to achieve an earlier evaluation of whether Yucca Mountain appears to be suitable.

In 1996, after additional analyses, the Program decided to propose a new, more concentrated approach to regain a 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.

A cornerstone of the Yucca Mountain Site Characterization Project's activities is the viability assessment. The 1997 Energy and Water Development Appropriations Act directed the Department to submit a viability assessment to the President and Congress in 1998. The viability assessment will describe the Yucca Mountain site, the repository and waste package design and costs, and will detail the results of a quantitative performance assessment of how the site's engineered and natural barriers work together as a system. This analysis is referred to as total system performance assessment. Total system performance assessment evaluates future repository behavior by using mathematical models to analyze the effectiveness of the repository in isolating radioactive waste. The outputs of these models are integrated in order to develop an analysis of the overall performance of the repository.

Yucca Mountain Site Characterization Project activities for FY 1999 and beyond will be described in the license application plan of the viability assessment. This work includes further development of the repository and waste package designs, continued evaluations of future repository performance through total system performance assessment, refinement of the conceptual and numerical models used in evaluating repository performance, and continued scientific investigations to reduce the key uncertainties about the Yucca Mountain site.

These activities will support completion of the remaining milestones to: (1) complete an environmental impact statement in FY 2000; and if the site is suitable, (2) recommend the site to the President in FY 2001, and (3) submit an application to the Nuclear Regulatory Commission in FY 2002 for authorization to construct a repository at the Yucca Mountain site.

Waste Acceptance, Storage and Transportation Project

The primary challenge facing the Waste Acceptance, Storage and Transportation Project is the uncertainty surrounding the timing and availability of a Federal facility to accept spent nuclear fuel and high-level radioactive waste. Since the 1996 Revised Program Plan was issued, bills were passed in the Senate and the House of Representatives that would authorize the siting and construction of an interim storage facility to receive waste prior to 2010. The Administration opposed such legislation..

Waste Acceptance: In 1995, the Department took the position that it had no legal obligation under either the Nuclear Waste Policy Act of 1982, as amended, or under the Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste to begin disposal of spent nuclear fuel by January 31, 1998, in the absence of a repository

or interim storage facility constructed under the Act. A group of utilities and State agencies filed suit challenging that position. The U.S. Court of Appeals for the District of Columbia Circuit rejected the Department's position and subsequently ruled that, although the schedule adjustments provided for by the Standard Contract did not provide an adequate remedy, other provisions of the Standard Contract provide a potentially adequate remedy. The Department will comply with the Court's ruling and process claims received from utilities and other contract holders in accordance with the terms of the Standard Contract. Discussions are underway with a number of utilities concerning potential settlement of their delay claims.

Under the Department's current planning assumptions, certain nuclear materials managed by the Government will be emplaced in the civilian repository along with the commercial spent nuclear fuel. These materials largely result from atomic energy defense activities ("defense waste") and include materials owned by the Department and the Navy.[2] The Department also owns spent nuclear fuel of commercial origin which is now under Departmental management. 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. The Program 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.

Storage: Congress, during debate on the 1997 Energy and Water Development Appropriations Act, provided for the Program to continue with non-site-specific design and engineering safety analyses for an interim storage facility to allow flexibility for possible accommodation of commercial spent nuclear fuel storage prior to its emplacement in a permanent repository.[3] Non-site-specific interim storage work requires the Program to balance possible future Congressional direction on interim storage with the need to maintain its focus on geologic disposal.

Transportation: The uncertainty surrounding the timing and availability of a Federal facility for waste acceptance complicates planning for transportation. Currently, the Program's plans are based on transportation of waste to a repository, when one becomes operational. If interim storage legislation is enacted, the Program is prepared to accelerate this schedule and is maintaining flexibility to enable it to respond appropriately to external developments. The Program is developing a competitive, private sector waste acceptance and transportation capability that relies on the private sector for implementation. The Program will use a competitive procurement process to obtain needed services and equipment. The Program is also continuing the long-lead time activities required by the

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[2]Naval spent nuclear fuel is currently stored at the Idaho National Environmental and Engineering Laboratory in Idaho. The Department has entered into a judicially enforceable Consent Order with the State of Idaho to remove all spent nuclear fuel from the State by 2035.

[3]Energy and Water Development Appropriations Act for Fiscal Year 1997, Conference Report 104-782, September 12, 1996, p. 82

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: Program management and administration, and quality assurance. The Center ensures effective Program integration and supports the Yucca Mountain Site Characterization Project; the Waste Acceptance, Storage and Transportation Project; and the Program Director.

The Program management and administration component is concentrating efforts on improving and updating management systems to ensure the efficient application of funding levels 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.

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

Major Program Milestones

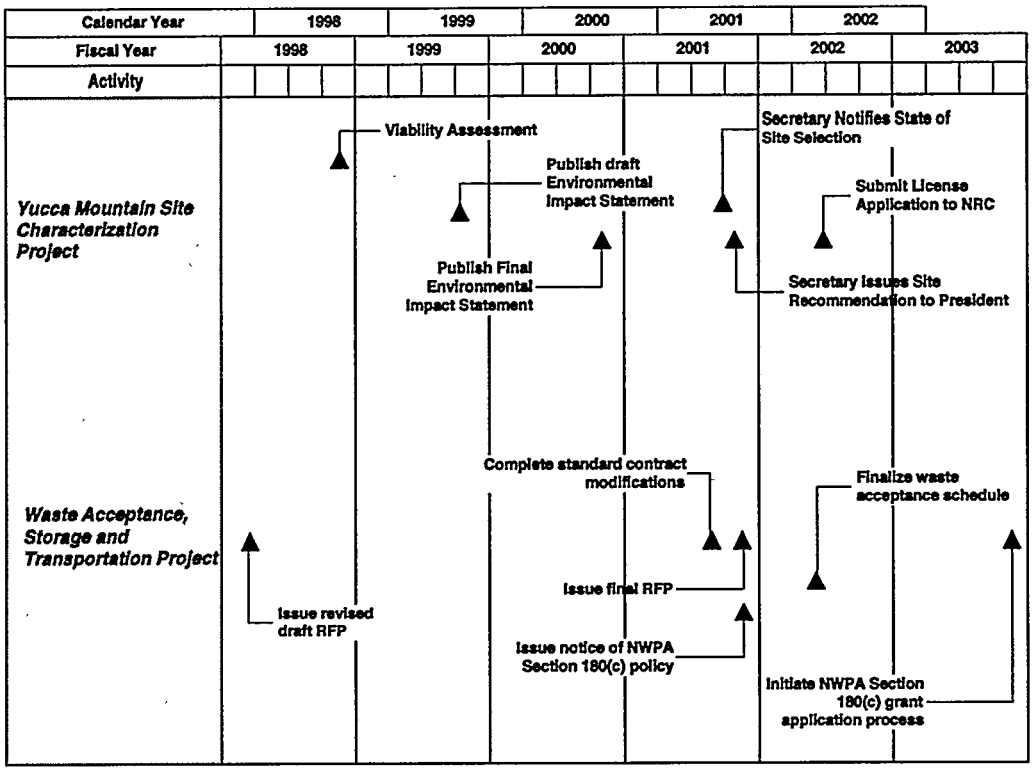

Figure 2

Civilian Radioactive Waste Management Program Funding Requirements

Dollars in Thousands

	FY 1998 enacted	FY 1999 requested	FY 2000 projected	FY 2001 projected	FY 2002 projected	FY 2003 projected
Yucca Mountain Site Characterization Project	267,710	297,823	287,328	270,186	257,911	277,911
Waste Acceptance, Storage and Transportation Project	5,947	10,505	9,130	21,855	34,130	44,355
Program Management Center	72,343	71,672	73,542	67,959	67,959	67,734
TOTAL PROGRAM	346,000	380,000	370,000	360,000	360,000	390,000

Table 1

An organization chart is available at *Appendix C.*

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Chapter Three
Program Activities

Yucca Mountain Site Characterization Project

Introduction

The long-term goal of the Program is to safely dispose of high-level radioactive waste and spent nuclear fuel in a geologic repository. Toward this end, the Yucca Mountain Site Characterization Project ("the Project") is focusing on evaluating the suitability of the Yucca Mountain site for development as the Nation's first repository, preparing an environmental impact statement and other information required by the Nuclear Waste Policy Act of 1982, as amended, for a site recommendation, and submitting a license application for repository construction to the Nuclear Regulatory Commission ("the Commission").

The activities planned for FY 1998 through FY 2003 reflect an ongoing transition from predominately investigative science to data synthesis, model development and validation, and overall safety analysis. This transition to the advanced stage of site characterization is based upon an enhanced understanding of geologic disposal and a much more efficient project structure to manage the site characterization work. The culmination of these activities will be the completion of the technical bases for the site recommendation and the license application.

Link to OCRWM Strategy

The Project is responsible for accomplishing OCRWM Strategic Objective 1, Strategy 1: *Complete the scientific and technical analyses of the Yucca Mountain site and, if it is determined to be suitable for a geologic repository, obtain a license from the Nuclear Regulatory Commission.*

The following success measures are identified with this strategic objective:

- Complete, in FY 1998, the viability assessment analyses for licensing and constructing a geologic repository at the Yucca Mountain site.
- Complete a draft environmental impact statement in FY 1999.
- Complete a final environmental impact statement in FY 2000.
- If the site is found suitable, recommend the repository site to the President in FY 2001.

- If the Yucca Mountain site is designated as a repository site, submit a license application to the Nuclear Regulatory Commission in FY 2002.
- Provide responses to Nuclear Regulatory Commission queries within 60 days of receipt, to support review of the license application in FY 2003.

Key Yucca Mountain Site Characterization Project milestones are summarized later in the chapter.

Planned Activities

Project activities planned for the remainder of 1998 focus on completing the components of the viability assessment. The activities for FY 1999 and beyond will be described in the license application plan of the viability assessment. This work builds upon the foundation described in the other components of the viability assessment and supports the evaluation of the site, the preparation of an environmental impact statement, the assembly of the information required for a site recommendation, and the production of a license application. Funding requirements through FY 2003 are provided in *Table 2.*

Viability Assessment

A viability assessment of the Yucca Mountain site will be completed in 1998. Its purpose is to present an informed assessment of the viability of licensing and constructing a geologic repository at Yucca Mountain and to clarify the remaining work required to evaluate the site and to prepare a license application. The viability assessment includes the following four components:

- The preliminary design concepts for the critical elements for the repository and waste package;
- A total system performance assessment, based upon the design concept and the scientific data and analyses available by late 1998, describing the probable behavior of the repository in the Yucca Mountain geologic setting relative to the overall system performance standards;
- A plan and cost estimate for the remaining work required to complete a license application; and
- An estimate of the costs to construct and operate the repository in accordance with the design concept.

Repository and Waste Package Design: Design activities for the viability assessment are focused on the design elements critical to determining the feasibility and performance of the repository and engineered barrier system at the Yucca Mountain site. Alternative design features and concepts are being evaluated and will continue to be evaluated throughout licensing, repository construction, and operation. The design strategy recognizes the need for a workable reference design to support the development and review of a license application, as well as the reality that technological advances can be expected over the decades of reposi-

tory operation. The Project is preserving flexibility to ensure that design features identified now as possible alternatives and options, as well as those that emerge with advancements in technology, can be accommodated in the repository development process.

Total System Performance Assessment: The total system performance assessment for the viability assessment will provide a formal and reviewable analysis of the expected performance of a repository at the Yucca Mountain site based on the reference design. This analysis should provide all interested parties with a reasonable estimation of the capabilities of a Yucca Mountain repository based on the available data. This analysis will also provide important insights into the significance of the uncertainties that the Project's science program is currently addressing and help refine testing activities.

License Application Plan: The license application plan will describe the technical work that needs to be completed to support the license application to the Commission. A cost estimate for this work will also be provided. The license application will demonstrate long-term repository performance, as well as the safety of repository operation, construction, and closure. The plan will also describe ongoing testing and data collection programs and the long-term testing and monitoring program that will begin before the license application is submitted. The plan will refine the activities described in this Program Plan, and will be used to guide the detailed planning process which effectively manages the ongoing site characterization activities. A description of the technical work leading to the license application is illustrated in *Figure 3.*

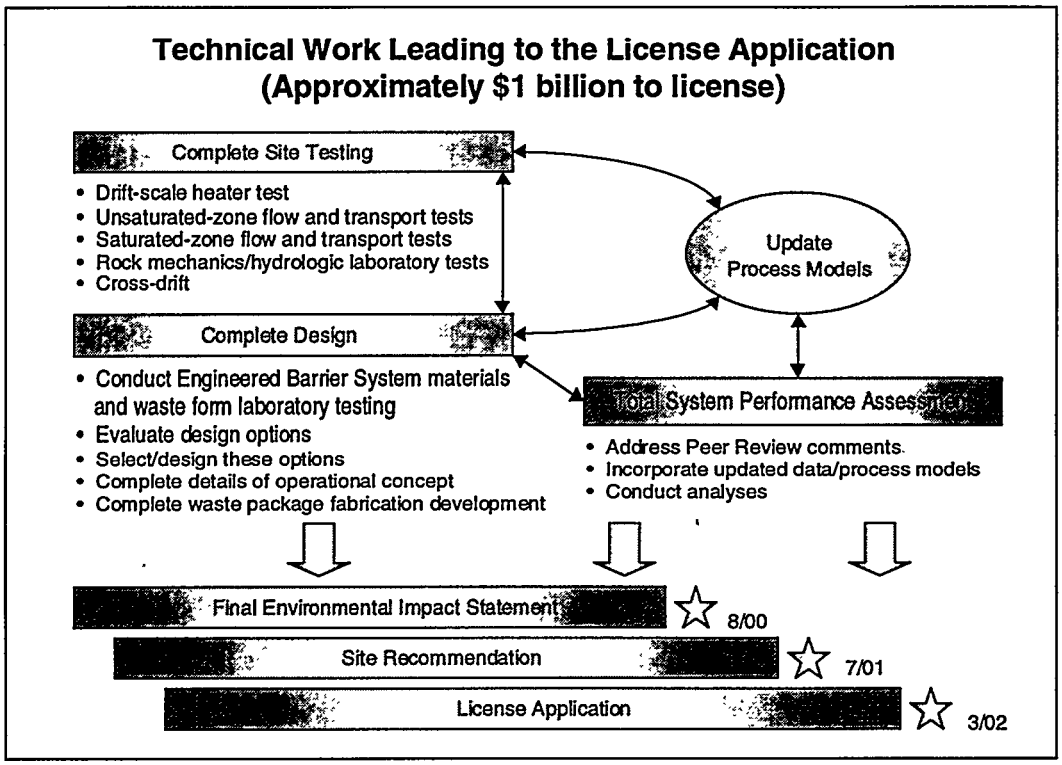

Figure 3

Estimated Cost to Construct and Operate the Repository: The cost estimate will encompass completion of site characterization; performance confirmation; and construction, operation, and closure of a repository. The estimates will be based on the repository and waste package designs developed for the viability assessment and on scientific testing and analyses to be completed in 1998.

For FY 1999 and beyond, the Project will shift its focus to completing the site evaluation for site recommendation, the environmental impact statement, and the license application and supporting documentation. The successful completion of the viability assessment is instrumental to these efforts and will clarify the working repository concept that will be carried forward. This concept will serve as the basis for the environmental impact statement as well as the license application. The work described in the license application plan will include completing the detailed design and safety analyses required for the site recommendation process.

Environmental Impact Statement

The Nuclear Waste Policy Act of 1982, as amended, 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 Act directs the 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.

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 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.

The next step in the National Environmental Policy Act (NEPA) process is the development of a draft environmental impact statement. FY 1998 activities are focused on gathering the data and completing the analyses of the environmental impacts of repository development. The environmental impact statement will also analyze transportation of spent nuclear fuel and high-level radioactive waste via truck and rail from generator sites (such as nuclear utilities) to the repository. It will evaluate the radiological and nonradiological impacts from both incident-free transportation and transportation accidents.

A draft environmental impact statement will be issued in FY 1999 for public review and comment. The comments received on the draft environmental impact statement will be considered in developing the final environmental impact statement, which is expected to be issued in FY 2000.

During FY 1999, environmental impacts and consequence analyses will be performed for each technical discipline identified in the environmental impact statement. This process will focus on, but not necessarily be limited to, an evaluation of socioeconomic impacts,

impacts on sensitive ecosystems, transportation impacts, impacts to air and water quality, impacts on cultural resources, and repository performance during the pre- and post-closure periods. Internal reviews of preliminary impact analyses and appropriate potential mitigation measures will be conducted in coordination with other Departmental offices and programs.

In FY 2000, prior to issuance of the final environmental impact statement, further refinement of the technical analyses supporting the environmental impact statement will be performed, as appropriate, as a result of the ongoing progress of site studies and, as needed, to resolve comments received on the draft environmental impact statement. This activity will be integrated with the work of the core science, and site suitability and licensing activities.

Site Recommendation and License Application

Activities supporting any Secretarial recommendation to the President in FY 2001 and submission of a license application to the Commission in FY 2002 will be based on the work scope and cost estimates described in the viability assessment and, in particular, the license application plan.

The Nuclear Waste Policy Act of 1982, as amended, defines the process and information required for a site recommendation. The information required serves as the basis for the decision 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 Commission; (5) preliminary comments of the Commission 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.

The Department will publish a Notice of Consideration and hold public hearings on the possible site recommendation. After the hearings, and at least 30 days before recommending the site to the President, the Department will notify the State of Nevada of any decision to recommend the site.

If the site is recommended by the President and its designation takes effect, the Department will submit a license application for repository construction to the Commission in FY 2002. The Act requires the Department to submit the license application within 90

days after the date the recommendation of site designation becomes effective. Under current regulations, the license application must include a detailed description of the site, designs for the repository and the waste package, a safety analysis of the repository, and operating plans for the facility. The documentation of the extensive testing done during site characterization, organized in a manner to facilitate independent review by the Commission and interested parties, underlies the license application.

The license application will be supported by a safety case, which consists of a demonstration that the repository system will contain and isolate waste sufficiently to protect public health, safety and the environment. It will include estimates of the expected performance of the repository system; consideration of effects of unanticipated processes and events; descriptions of various approaches to defense-in-depth, including multiple barrier systems, to mitigate uncertainties in site characteristics and future changes in the system; understanding from relevant natural analogues to the Yucca Mountain site; and a performance confirmation program. Underpinning this safety case is an understanding of the physical performance of the repository system.

Interactions with the Commission

After submission of the license application, the Project plans to conduct activities in support of the Commission's review of the application and environmental impact statement. The Project anticipates frequent interaction with Commission staff to clarify approaches, respond to questions, provide supplemental information, and resolve issues to support the Commission's preparation of the staff Safety Evaluation Report. Once the staff has completed the Safety Evaluation Report, anticipated to take 18 months after license application submittal, the Project expects to support the licensing hearing process.

Key Technical Activities Supporting the Project's Success Measures

Progress in characterizing the Yucca Mountain site covers four principal areas: repository and waste package design, total system performance assessment, core science, and confirmatory testing.

Repository and Waste Package Design

Repository and waste package design activities for the viability assessment are focused on the design elements critical to determining the feasibility and performance of the repository and engineered barrier system at the Yucca Mountain site. The viability assessment will not, however, contain the detail needed for licensing. The Project is developing preliminary designs for those elements significant to the performance of the repository which previously have not been used in nuclear applications.[4]

[4]An example of a preliminary design is a blueprint with all space dimensions, equipment sizes, and capacities specified, but still subject to further specification (such as material of construction).

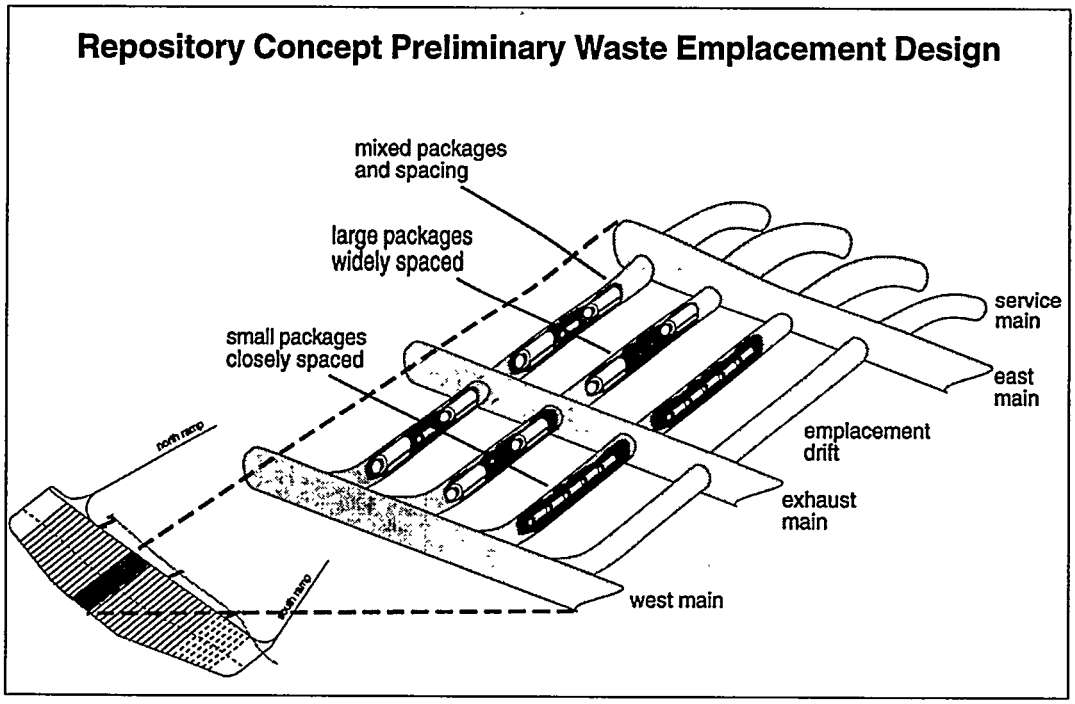

Figure 4

The feasibility of design elements that have historically been used in nuclear applications will be described in less detail. A conceptual illustration of waste emplacement in the repository is provided in *Figure 4*.

After completion of the viability assessment, repository and waste package design activities will continue in support of site recommendation, license application, and construction. The repository and waste package designs will be heavily based on and closely integrated with the performance assessment modeling and core science data collection and testing activities. In FY 1999, the design will be used in developing the total system performance assessment for the license application. Integration with core science activities will ensure that the designs are supported by the available scientific data. The repository and waste package designs will utilize information about the natural system, including structural, thermal, and hydrologic rock properties, as well as information on potential climate and seismic conditions.

Important areas of design emphasis will include: waste package materials and waste form testing and analyses; waste handling system and emplacement operations; the repository concept of operations; demonstration of compliance with codes, standards, and regulatory requirements; detailed engineering for elements of the repository system that have not been previously licensed; and analysis of design alternatives. The design for the license application will be supported by safety and accident analyses and will describe designs in sufficient detail to demonstrate safety.

Early in FY 1999, the Project will complete the Disposal Criticality Analysis Methodology Topical Report and provide it to the Commission for a formal review. Using data generated by the ongoing waste package materials and waste form testing, the Project will update the Waste Form Characteristics Report and Engineered Materials Characterization Report. Information collected from the single-element heater test completed in FY 1997 and the ongoing drift-scale heater test will support a decision on the design basis repository thermal load. Other waste forms, including Department-owned spent nuclear fuel, Naval spent fuel, and immobilized plutonium will be incorporated into the repository design. Disposal interface specifications will be developed for these waste forms. Special studies will be conducted on some of the unique aspects of these waste forms and the containers. Conceptual illustrations of waste containers for commercial spent nuclear fuel and defense-related high-level radioactive waste are provided in *Figure 5.*

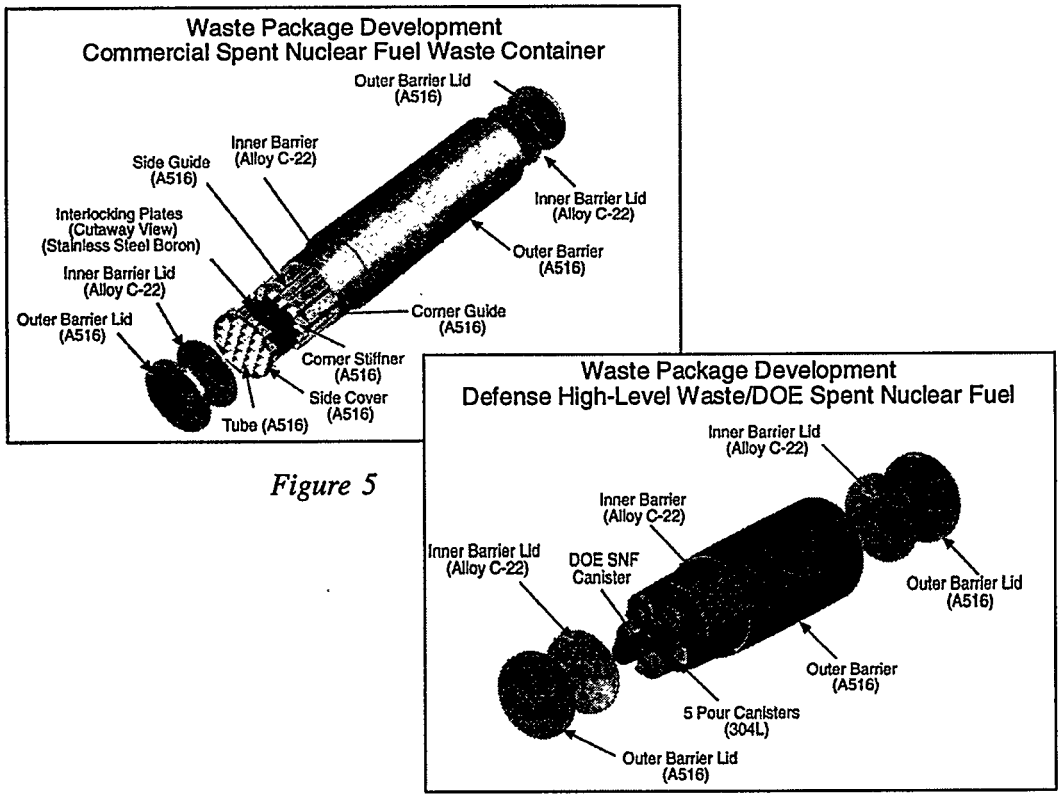

Figure 5

Total System Performance Assessment

The essential questions relating to the suitability of the site are those associated with its ability to contain radionuclides over many thousands of years. These questions are addressed through an analytical technique called total system performance assessment. The goal is to predict future repository behavior by using models and parameters that are as representative as current information allows. In those cases where representative information is not available or is very uncertain, conservative assumptions must be made.

Performance assessment uses a hierarchy of models to analyze the effectiveness of the repository in isolating the radioactive waste. This analysis uses the characteristics of the natural geologic barrier and the engineered barrier in mathematical models of the physical processes that affect waste containment and isolation, such as water flow in the geologic setting. The outputs of these models are integrated with one another in order to develop an analysis of the overall performance of the repository. Performance assessments are iterative and evolve with time, in that the information gained from each effort, together with newly acquired scientific and engineering information, is used to guide subsequent assessments.

As science and design information matures, performance assessment analyses are revised to become more representative of the actual site conditions. Iterations of total system performance assessments of the Yucca Mountain site and associated engineered barriers were conducted in 1991, 1993, and 1995. The next iteration will be the total system performance assessment for the viability assessment.

An important objective of performance assessment modeling is to identify the significance of the current uncertainty in processes, models, and parameters to system performance. 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 the site characterization and design programs to assist in prioritizing the necessary testing, and, in turn, to develop more robust and defensible performance assessments.

A phased peer review of the total system performance assessment, which started in FY 1997, will be completed in FY 1999. The comments and recommendations from the early review stages will be incorporated, as appropriate, in the total system performance assessment developed for the viability assessment. The comments and recommendations from the overall review will be incorporated into the assessment that will support the site recommendation and license application.

Modeling: The key link between the performance assessment and the core science and design activities is modeling. Modeling activities include data analysis to support the development of site process models which provide input to the total system performance assessment. These models, as well as a waste package, are illustrated in *Figure 6.*

Conceptual and numerical models of flow and transport, characteristics of the near-field environment, and repository thermohydrology have been developed and will be updated to reflect confirmatory data and the interim results from long-term testing. Process level information will be abstracted in a manner that can be used directly in the total system performance assessment for probabilistic dose calculations.

Modeling tasks planned for FY 1998 through FY 2001 include:

- Updating numerical models to support total system performance assessment and refine understanding of site geology and hydrology.

- Supporting abstraction and testing of process models for total system performance assessment.
- Continuing laboratory testing to confirm near-field environment models.
- Continuing collection of the otherwise irretrievable data to record transient events such as earthquakes, floods, and major storms.
- Updating the saturated-zone and unsaturated-zone models for flow and radionuclide transport, 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.
- Completing the 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.

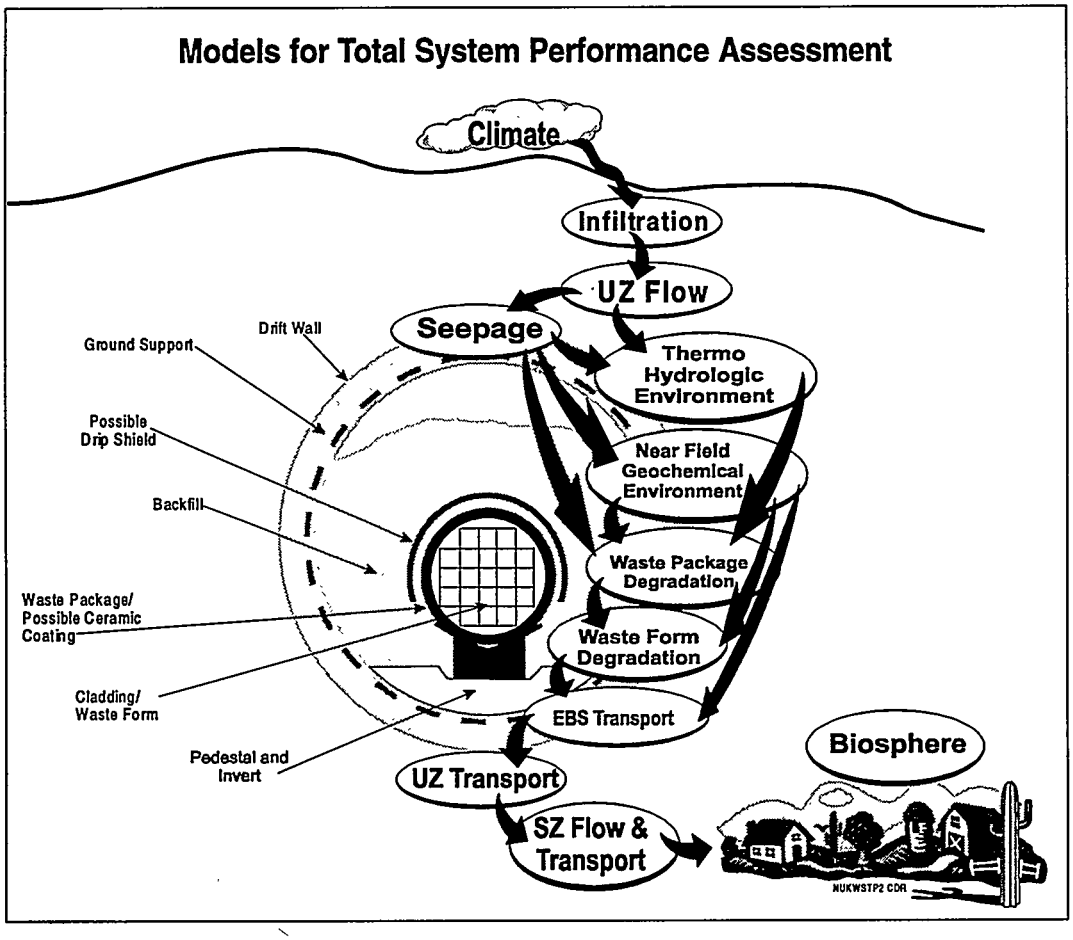

Figure 6

Strat-A-Master Drill Rig

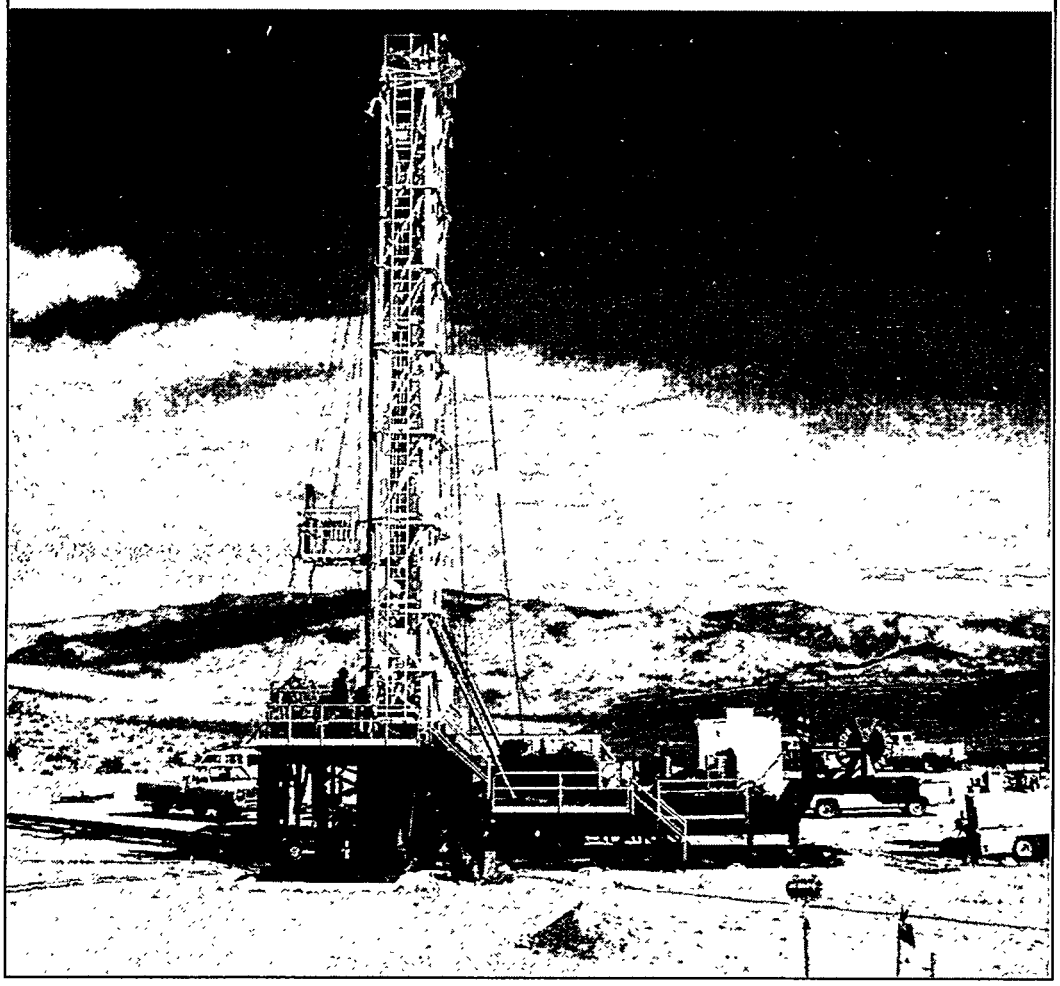

Figure 7

Core Science

Core science includes collection of site characterization and performance confirmation data; laboratory testing; environmental data collection, monitoring, and requirements compliance; site and materials performance testing; and scientific test planning and design. These activities serve as the basis for scientific descriptions and analyses used in the documentation supporting major program milestones, including the viability assessment, environmental impact statement, site recommendation, and license application.

Surface-Based Testing: Surface-based testing activities include collecting and analyzing data from hydrologic, geologic, and geochemical surface-based studies to understand the natural processes. Surface-based testing is conducted primarily in boreholes. See *Figure 7* for a photograph of a drill rig at the C-well complex. This drilling is done to measure transport parameters in the saturated zone south of Yucca Mountain.

Surface-based testing activities planned for FY 1998 through FY 2001 include:

- Completing testing and data analysis at the second tracer complex forutilization and confirmation of saturated-zone hydrologic and transport models.
- Continuing tracer testing in the C-well complex.
- Collecting geologic, hydrologic, structural, and stratigraphic data in new and existing boreholes to reduce uncertainty in total system performance assessment models.
- Evaluating variations from predictions used to update the geologic framework.

Exploratory Studies Facility Main Loop and Other Construction: The Exploratory Studies Facility main loop and associated test facilities (i.e., alcoves and niches) allow continued testing and evaluation of the geology and hydrology of the eastern portion of the proposed repository block. The underground Busted Butte test facility near Yucca Mountain is required for data collection and long-term testing of hydrologic flow and radionuclide transport in rock similar to that found underneath the repository.

Information gained from construction of the Exploratory Studies Facility will help determine the layout of the repository's emplacement drifts and ventilation shafts. The information will also be used to determine the most efficient tunnel boring machine configuration and establish a predictive performance base for excavation of the perimeter and emplacement drifts. There are 25 major systems in the Exploratory Studies Facility main loop and surface support facilities requiring maintenance to support construction and testing operations.

Many of these major construction support systems will require upgrading to facilitate a transition to a fully operational site characterization facility. Some of these construction support systems include the north portal drainage, lighting, communication, additional ground support, electrical distribution, water distribution, waste water ventilation, and air distribution. An increase in construction costs is planned in FY 1999 to permit installation of required upgrades. Construction costs are expected to decrease after FY 1999 with only a limited number of new facilities required for core science data collection.

Exploratory Studies Facility main loop products planned for FY 1998 through FY 2001 include:

- Completing construction of alcoves and niches, including excavation and test facility setup of alcove 7 and niches 3 and 4. Construction of these niche test facilities is planned for FY 1998.
- Surfacing the South Portal access road in FY 1998.
- Acquiring and installing a data acquisition system for the drift-scale heater test and other main loop test locations. Installation of the data acquisition system for the drift-scale heater test will be completed in FY 1998; the data acquisition system for the remainder of the Exploratory Studies Facility main loop will be procured and installed by the end of FY 1999.

- Completing the flow-through ventilation system.
- Developing the Southern Tracer Test Facility to evaluate flow and transport properties in the regional aquifer underlying the repository to enhance analyses of the consequences of repository releases.

Exploratory Studies Facility Testing and Other Subsurface Testing: Exploratory Studies Facility testing and other subsurface testing in the Busted Butte test facility include collecting and analyzing data from hydrologic, geologic, geochemical, and geomechanical studies to understand the natural processes of rock mechanics and moisture migration under ambient and elevated temperature conditions. The Project will also collect data on fracture-filling minerals and chlorine-36.

Testing in the Busted Butte facility will be initiated in FY 1998 and will continue through FY 2001. Testing in Exploratory Studies Facility hydrologic niches 3 and 4 also will be initiated in FY 1998. Exploratory Studies Facility testing and other subsurface testing are expected to level off in the out-years as testing and data analysis continue for an extended period of time.

Subsurface data collection and testing activities planned for FY 1998 through FY 2001 include:

- Completing analysis of composition and age of secondary minerals sampled in the tunnel walls and borehole core and estimating past percolation flux.
- Completing seismic investigations of the repository block.
- Completing borehole testing of hydrologic features.
- Monitoring responses to excavation and verifying models of rock mass response to repository construction.
- Completing hydrologic testing in alcoves 2, 3, and 4.
- Completing geological, geochemical, and hydrologic testing and sampling in the geologic unit below the proposed repository.
- Conducting hydrologic testing in the Southern Ghost Dance Fault alcove.
- Completing testing in the Northern Ghost Dance Fault alcove.
- Analyzing additional water and mineral samples for isotopic tracers to constrain and evaluate flow models for the site.
- Collecting data from selected natural analogues to strengthen the flow and transport database.
- Completing the field-scale unsaturated-zone radionuclide transport test in the Busted Butte test facility.

Enhanced characterization of the repository block facilitates collection of scientific data during tunnel excavation, from additional underground tests in alcoves and niches, and from additional boreholes drilled from the surface. Enhanced characterization includes both surface and subsurface construction and testing programs established to enhance

knowledge of the entire repository block region including the western boundary. The Project initiated construction of a cross-drift which started in the Exploratory Studies Facility's north ramp and will proceed generally southwest. This tunnel is above the existing repository horizon. Activities associated with subsurface construction for enhanced characterization of the repository block by the end of FY 1999 include:

- Excavating the launch chamber and cross-drift with a five-meter tunnel boring machine to approximately station 28+00 meters.
- Completing excavation of three alcoves and two niches.
- Providing construction support for the cross-drift heater test setup and initiation.

Construction of the cross-drift heater test is planned for FY 1999.

Thermal Testing: Thermal tests provide scientists with an opportunity to study how properties of the host rock change during the heating and cooling cycle expected with waste emplacement and to evaluate the consequences of these changes for waste isolation and performance assessment. Thermal testing is conducted in the Exploratory Studies Facility Thermal Test Alcove and Fran Ridge, an area adjacent to Yucca Mountain in a portion of the potential repository host rock exposed at the surface. Photographs of the Project's thermal test activities are provided in *Figure 8*.

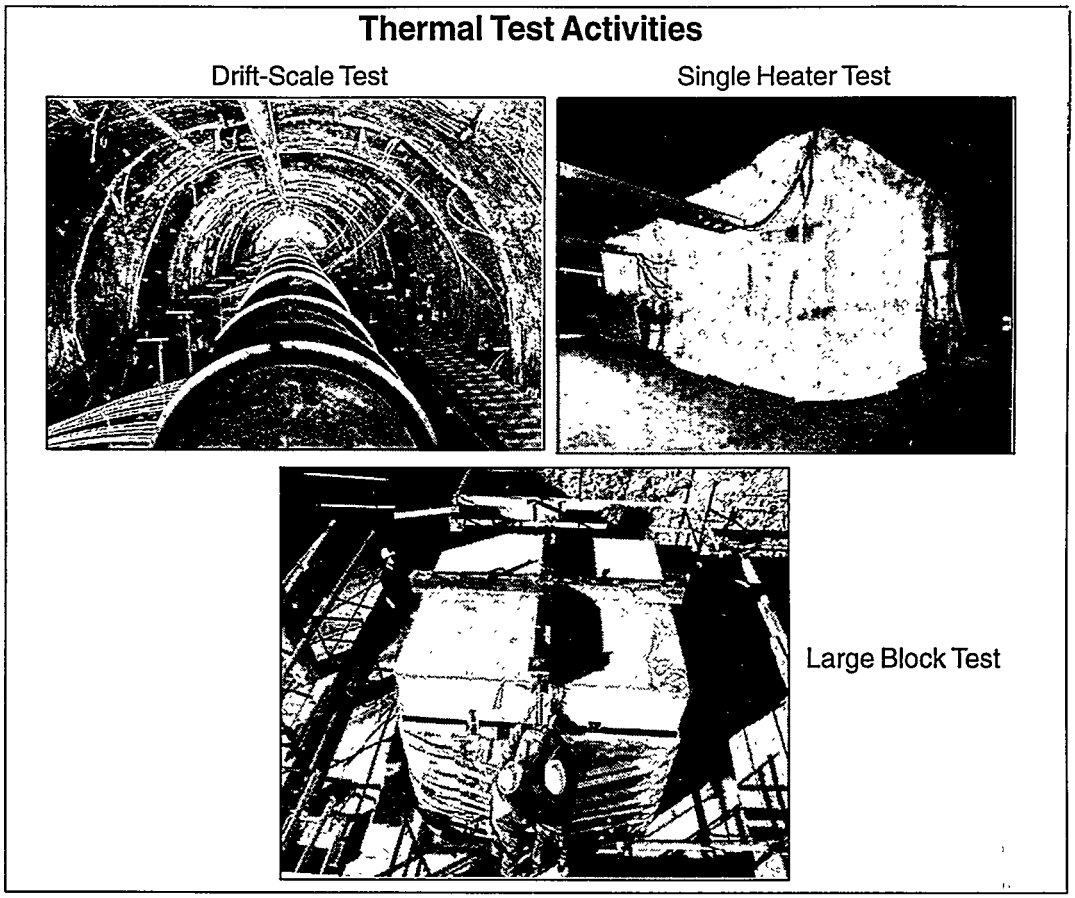

Figure 8

Thermal testing activities planned for FY 1998 through FY 2001 include:

- Initiating the first phase (heat-up) of the drift-scale heater test. The heat-up phase will continue until FY 2001.
- Monitoring thermal, hydrologic and geomechanical parameters during thermal testing.
- Completing the single-element heater test and large-block test.
- Performing post-test calculations for the single-element heater test and large-block test and documenting test results.
- Conducting large-block test geochemistry work on the dismantled block.
- Drilling out selected areas of the single-element heater test block for geochemical and hydrologic evaluation.

Environment, Safety and Health

To integrate sound environment, safety and health practices in the performance of the Program's daily activities, OCRWM has modified the Program's Management and Operating (M&O) contract to require implementation of an integrated safety management system. OCRWM also:

- Will review the M&O contractor's integrated safety management system description;
- Will complete the Program's Level-2 Functions, Responsibilities, and Authorities Manual for integrated safety management; and
- Is implementing formal Federal and contractor self-assessment programs to identify and correct deficiencies and vulnerabilities in this area.

OCRWM is also ensuring that all Federal and contractor employees receive required environmental, safety and health training.

Confirmatory Testing

Confirmatory testing includes the collection and analysis of data to confirm site hydrologic and geologic conditions that are the bases for the safety case that supports the license application. Confirmatory testing will directly support the total system performance assessment for the license application by reducing uncertainty in calculations of radionuclide releases from the engineered barrier system. Performance confirmation data will be used to fill information gaps or resolve uncertainties and expand the technical basis for the license application. The data will be incorporated into process models to be completed in FY 1999 and FY 2000.

Confirmatory testing activities planned for FY 1998 through FY 2001 include:

- Initiating confirmatory field-scale tests to support evaluation of near-field environment models. These models involve coupled thermal, chemical, mechanical, and hydrologic processes and describe how water could enter emplacement drifts,

interact with waste packages, and transport radionuclides through the engineered barrier system.

- Confirming predictions of the thermally-induced coupled process behavior in the repository near-field and altered zone. Confirmatory testing will emphasize changes in fracture permeability and radionuclide-sorption characteristics of the host-rocks along pathways.
- Evaluating test results and documenting the basis for modeling of near-field processes in the total system performance assessment for the license application.
- Evaluating results from surface-based and underground testing to confirm understanding of the ambient system as represented by site-scale process models.

Special Studies

Special Studies activities include updating the site description and other tasks that support the viability assessment, site recommendation, and license application, including discussion of all data collected related to geology, hydrology, and geochemistry. Special studies planned through FY 2001 include:

- Continuing full documentation of data sources, the description of conceptual models of geologic and hydrologic processes operating at the site, and performance confirmation information. This information will be incorporated into the Technical Information Management System and will support continued efforts in performance assessment and repository and waste package design. The data also will assist in preparing the license application site characteristics documentation.
- Updating the Project Site Atlas to support preparation of the site recommendation and license application. The Site Atlas is a collection of maps and supporting data that describe the geography and geology of Yucca Mountain and the surrounding area.
- Updating scientific data in the Reference Information Base, and other technical databases to support the development of repository and waste package designs.

Project Management

Project Management within the Yucca Mountain Site Characterization Project includes public information and outreach programs to ensure that open and informative interactions with Program stakeholders and the public are provided. Project Management also includes:

- Planning, budgeting, scheduling, and managing all Project elements.

- Cost and schedule baseline management and change control.
- The provision of facilities, administrative support services, and telecommunications.
- Procurement, maintenance, and operation of computer networks and computing facilities.
- Information and records management.
- Motor pool operations.

Information and records management products planned through FY 2001 include:

- Completing the reprocessing of microfilmed records, and providing indexes, images, and full text search capabilities for all Program records, to be available on a web-based system.
- Continuing the migration of records and supporting data to state-of-the-art functionality.
- Researching, acquiring, and maintaining all reference documents used to support Program reports and document decisions.
- Providing increased records retrievability and traceability by testing and/or adoption of most applicable thesaurus.

Key Milestones in the Yucca Mountain Site Characterization Project

FY 1999

- Publish draft environmental impact statement for public review and comment.
- Complete repository and waste package designs for use in total system performance assessment for the license application.
- Complete peer review of the total system performance assessment.

FY 2000

- Issue final 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

- Notify the State of Nevada of the decision by the Secretary of Energy to recommend the site.
- Submit site recommendation to the President.

FY 2002

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

FY 2003

- Conduct performance confirmation activities, as required by 10 CFR Part 60, Subpart F, begun prior to submission of license application.
- Update performance assessment to support licensing hearings, as part of general activities supporting Commission review and questions.
- Conduct activities in support of the Commission's review and prepare for licensing hearings.

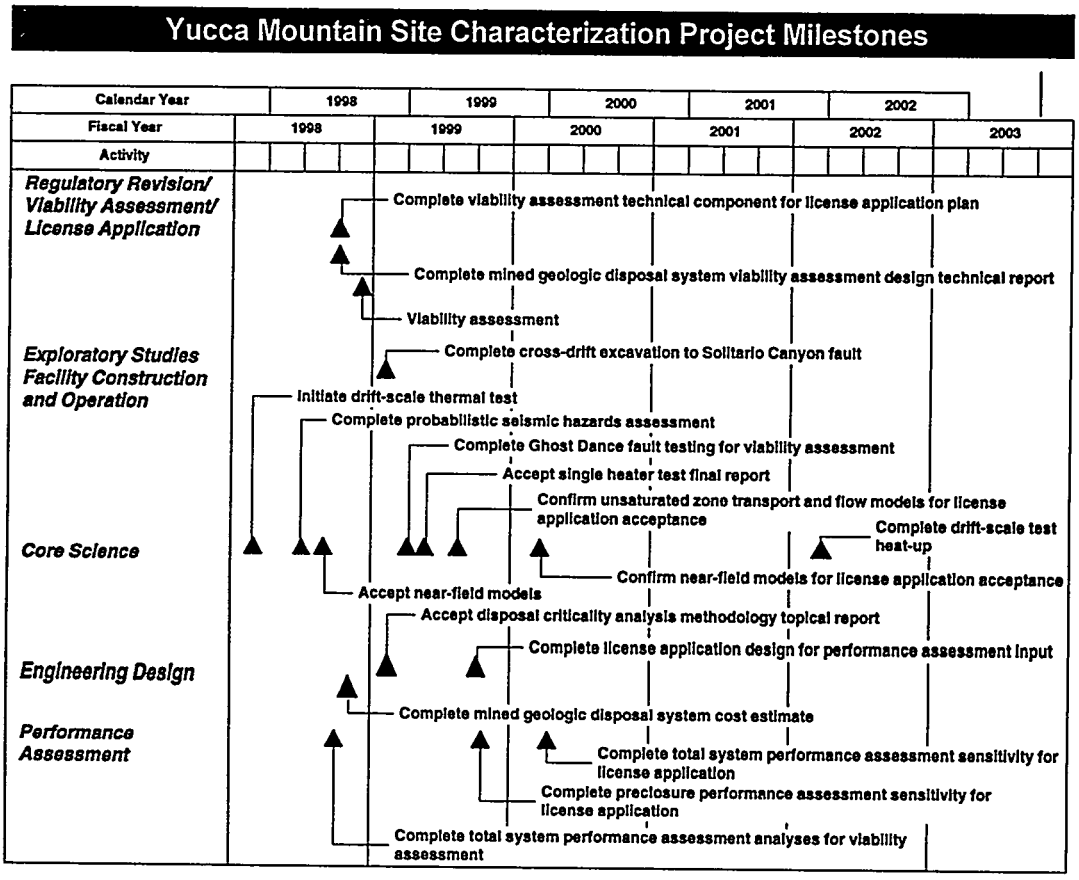

Figure 9

Yucca Mountain Site Characterization Project Funding Requirements

Dollars in Thousands

	FY 1998 enacted	FY 1999 requested	FY 2000 projected	FY 2001 projected	FY 2002 projected	FY2003 projected
Exploratory Studies Facility Construction & Operations	47,814	69,000	36,978	31,000	31,000	46,000
Core Science	73,669	70,000	56,300	56,161	50,530	60,000
Design and Engineering	62,888	78,697	80,280	88,300	88,300	85,547
Performance Assessment [a]	26,463	0	0	0	0	0
Licensing/Suitability	4,680	31,000	28,500	30,500	30,062	38,000
National Environmental Policy Act (NEPA) Compliance [b]	4,254	2,262	2,420	1,775	1,750	0
Project Management [c]	36,042	28,864	52,100	32,500	27,500	30,364
External Oversight, Payments Equal To Taxes (PETT) & Universities	11,900	18,000	30,750	29,950	28,769	18,000
TOTAL PROJECT	267,710	297,823	287,328	270,186	257,911	277,911

[a] Funding requirements for Performance Assessment are included with Licensing/Suitability in fiscal years 1999-2003.

[b] Funding for the environmental impact statement support contractor is not included in the NEPA totals above. It is included in the Program Management Center section with other support services funding.

[c] The FY 2000 projection includes facility lease scoring for Federal and contractor staff.

Table 2

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Waste Acceptance, Storage and Transportation Project

Introduction

The 1994 *Civilian Radioactive Waste Management Program Plan* described an approach for the Waste Acceptance, Storage and Transportation Project ("WAST Project") that included efforts to develop a multi-purpose canister system by 1998 for possible at-reactor storage; to maintain readiness to develop an interim storage facility if a site were designated by the Congress and the authority and resources were provided; and to develop a readiness to accept and transport spent nuclear fuel from reactors to a storage facility whenever such a facility became available.

Presidential and Congressional guidance, together with reduced funding, led to a redirection of this approach. In 1996, the Project focused its activities on two major near-term activities:

- Developing a competitive private sector waste acceptance and transportation approach that relies on the private sector for implementation.
- Conducting non-site-specific design and engineering safety analyses for an interim storage facility to reduce facility licensing time once a site is designated.

This approach 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."[5]

The current approach outlined in this Plan continues these activities and is based on the following:

- Spent nuclear fuel and high-level radioactive waste will be accepted in 2010 at Yucca Mountain if the site is found suitable and a repository becomes operational.
- Impacts resulting from the transportation - via truck and rail - of spent nuclear fuel and high-level radioactive waste from generator sites to a repository will be evaluated in the repository environmental impact statement.

Under the Nuclear Waste Policy Act of 1982, as amended, the Department is prohibited from constructing a monitored retrievable storage facility until the Commission has issued a license for the construction of a repository. Congress is considering legislation that would direct development of an interim storage facility and designate a specific facility site. The Administration believes that a decision on the siting of an interim storage facility should be based on objective, science-based criteria and should be informed by the viability assessment of Yucca Mountain.

[5]Energy and Water Development Appropriations Act for Fiscal Year 1997, Conference report 104-782, September 12, 1996, p. 82.

Link to OCRWM Strategy

The WAST Project is responsible for accomplishing OCRWM Strategic Objective 1, Strategy 2: "Maintain the capability to accelerate transportation of high-level radioactive waste and spent nuclear fuel to a receiving facility."

The following success measures are identified with this strategic objective:

- Develop, in FY 1998, a competitive private sector approach that uses private sector management and operational capabilities to provide waste acceptance and transportation services; issue a revised draft request for proposals;
- Complete, in FY 1998, a Revised Proposed Policy and Procedures for Implementation of Section 180(c) of the Nuclear Waste Policy Act of 1982, as amended; and
- Complete, in FY 1998, responses to the Nuclear Regulatory Commission's request for additional information on the non-site-specific Topical Safety Analysis Report for a centralized interim storage facility; and address long lead-time issues related to the storage of spent nuclear fuel, including design, engineering, and safety analyses.

Planned Activities

The Waste Acceptance, Storage and Transportation activities planned for FY 1999 and beyond focus on the development of processes for the legal and physical transfer of commercial spent nuclear fuel to the Federal Government, pre-licensing discussions with the Commission for a non-site-specific interim storage facility, creation of a national transportation capability for waste acceptance and transportation, and resolution of institutional issues with Program stakeholders.

Waste Acceptance

Litigation

In May 1995, the Department published a finding that it has no legal obligation under the Act or the Standard Contract to begin disposal of spent nuclear fuel by January 31, 1998, in the absence of a repository or interim storage facility constructed under the Nuclear Waste Policy Act of 1982, as amended. In response, a group of utilities and State agencies filed suit against the Department, anticipating that the Department would not meet its waste acceptance obligation. Petitioners requested that the Court: (1) permit them to escrow future payments into the Nuclear Waste Fund until the Department initiates waste acceptance operations, and (2) direct the Department to develop a Program that will enable it to begin accepting waste.

The U.S. Court of Appeals for the District of Columbia Circuit rejected the Department's position and concluded that the Department had an obligation to commence disposal by January 31, 1998. The Court also rejected the utilities' request for relief, however, finding also that the Standard Contract provides utilities with a potentially adequate remedy for the delay in beginning disposal of spent nuclear fuel. Specifically, the Court pointed to the Delays

Clause of the Standard Contract, which provides for fees to be equitably adjusted to reflect additional costs incurred due to an avoidable delay in performance. The Court further held that the Department may not use the lack of a repository or storage facility to argue that the delay is unavoidable (which would result in utilities receiving no compensation). The Court retained jurisdiction pending compliance with its ruling.

As of June 1998, no utility had sought to avail itself of the avoidable delays remedy that the Court pointed to in its November 1997 decision. Several utilities, however, filed claims in the Court of Federal Claims asserting partial breach of contract, breach of the implied duty of good faith and fair dealing, uncompensated taking, and other illegal action.

On May 18, 1998, the Department proposed a settlement for utilities that have standard contracts with the Department. The Department proposes to defer the portion of utilities' Nuclear Waste Fund payments not used to administer the civilian nuclear waste program. The deferred portion of the fee, normally paid quarterly, would be due when the Department accepts the spent nuclear fuel. Until then, a utility would be able to invest the withheld funds at higher interest rates and use the extra earnings to pay for its costs resulting from the contract delay. The Department estimates a benefit of approximately $2.8 to $5 billion to all utilities. The utilities, through the Nuclear Energy Institute, contend that the proposal is inadequate because it does not provide a mechanism for the Department to meet its obligation to accept spent nuclear fuel and does not directly provide funds for continued on-site storage. However, the Department is engaged in settlement discussions with several individual utilities.

Ongoing Waste Acceptance Efforts

The WAST 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 Standard Contract; and interactions with the International Atomic Energy Agency, the Commission, contract holders, and others concerning nuclear materials safeguards. A map illustrating the locations of spent nuclear fuel and high-level radioactive waste destined for geologic disposal is provided in *Figure 10.*

Non-Site-Specific Spent Nuclear Fuel Storage Facility

To respond to Congressional direction in appropriations, the Project has developed two non-site-specific safety analysis reports. These two activities will enable the Program to implement any new policy directives in a timely, cost-efficient, and effective manner. Two non-site-specific topical safety analysis reports necessary for licensing an interim storage facility have been developed; the first for a generic storage facility and the second for a dry transfer system. The dry transfer system report describes the design of a low-cost system for handling spent nuclear fuel assemblies in the absence of a spent nuclear fuel storage pool. Both reports have been submitted to the Commission and are currently being reviewed. A conceptual illustration of a non-site-specific interim storage facility is provided in *Figure 11.*

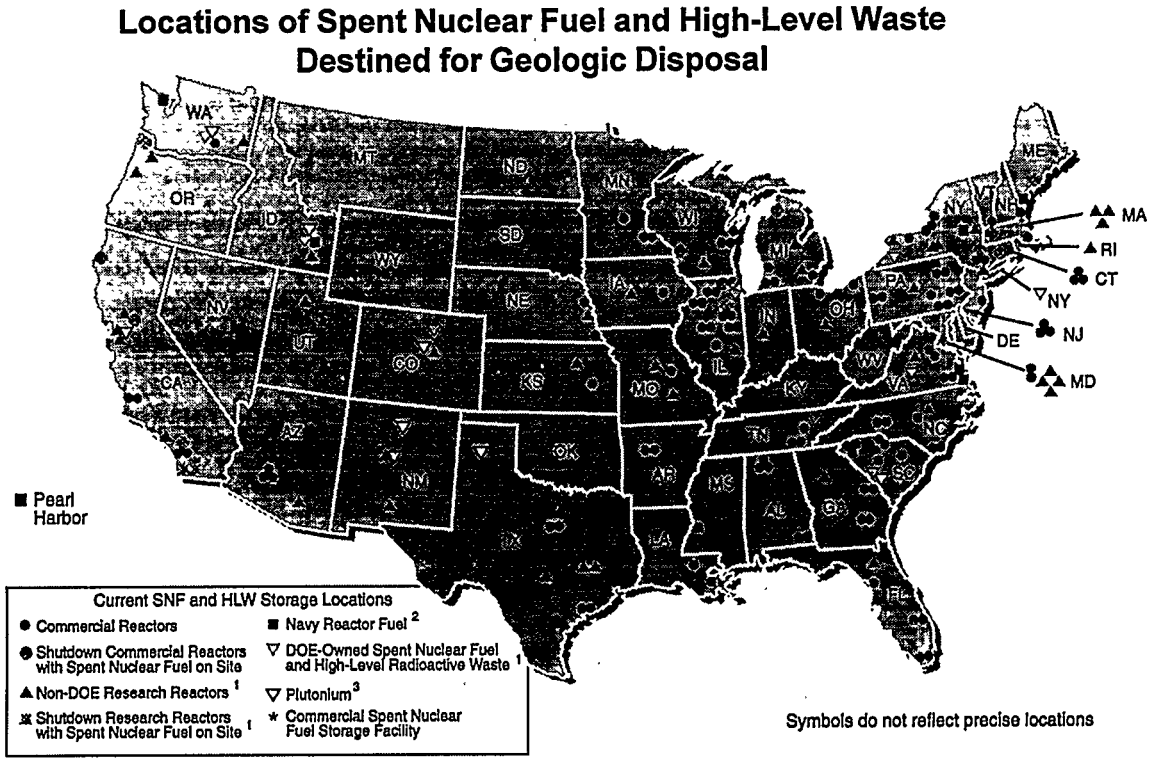


Figure 10

In addition, a Topical Report on Burn-up Credit for Actinide Elements is under Commission 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 and may be important to disposal. The WAST Project continues to support ongoing Commission staff review activities. Successful Commission review 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 WAST Project has altered priorities over the years in response to direction from Congress and the President, transportation issues have remained relatively constant. Transportation operations and planning, and State, Tribal, and local preparedness for safe routine transportation and emergency response will be central to the success of the Project. The WAST 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 development of training and technical assistance policy for States and Tribes will be conducted upon site recommendation.

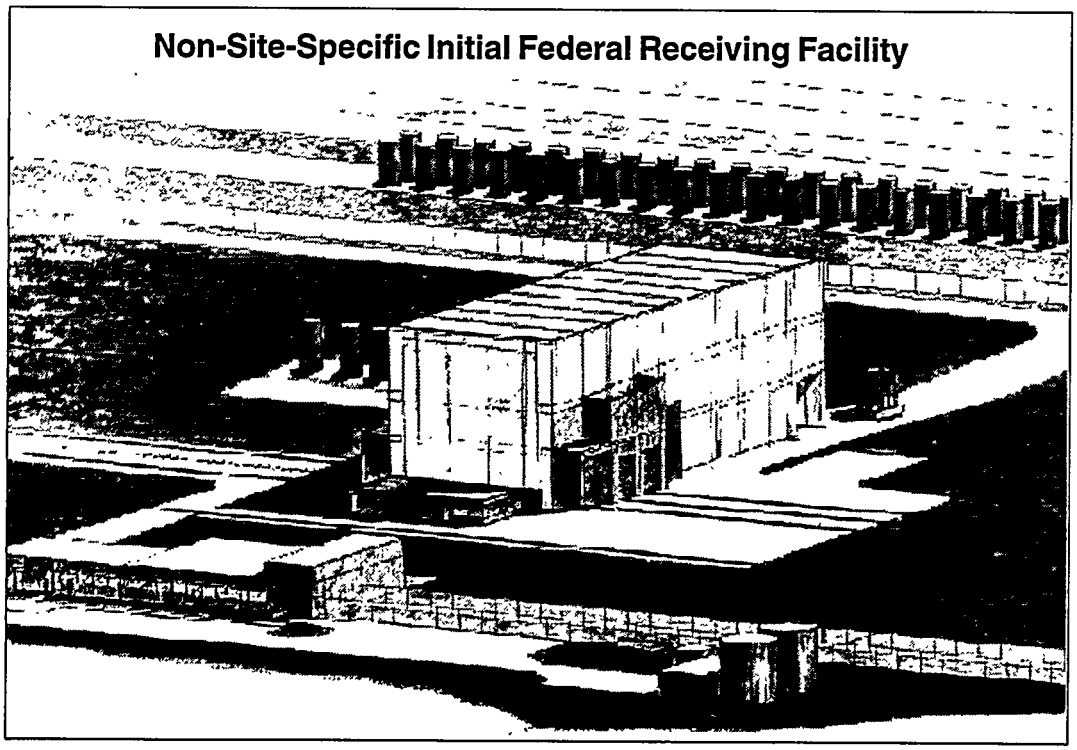


Figure 11

Competitive Private Sector Initiative

In accordance with the transportation provisions of the Nuclear Waste Policy Act of 1982, as amended, the WAST 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. In 1996, consistent with guidance from the President and Congress, the Project developed 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 WAST Project held a presolicitation conference in July 1996 to discuss technical and contractual issues related to the potential acquisition of transportation services. A first draft Request for Proposals (RFP) was issued for comment in December 1996. A second presolicitation conference was held in February 1997 to discuss the draft Request for Proposals and gather input that helped the WAST Project further shape the competitive private sector approach. A second revised draft RFP was issued for comment in November 1997. Comments were received in April 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. A three-phased acquisition process is being refined that relies on private sector entities, to the greatest extent practicable, to satisfy the Program's commercial spent nuclear fuel waste acceptance and transportation needs. Phase A of the acquisition process provides contract

awardees with one year for the development of planning documents, schedules for waste acceptance, and pricing of equipment and services. Phase B of the acquisition spans the life of the contract (13 years) and is concurrent with Phase C from the fourth year. Referred to as the mobilization phase, Phase B includes the following key activities: acquisition of equipment necessary for waste acceptance and transportation; finalization of specific shipping routes; establishment of logistics, security, and escorts; communications; real-time tracking; and emergency response support capabilities. Phase C of the acquisition covers the actual transportation of spent nuclear fuel from the designated purchaser's site to the Federal facility. This final phase is expected to last 10 years, with additional follow-on contracts to be awarded as necessary, to provide for shipment of all commercial spent nuclear fuel to the repository. These phases are planned for receipt of fuel in 2010, starting with Phase A in 2003.

Ongoing Transportation Institutional Activities

The WAST 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 would be provided every year beginning approximately 3 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 site is chosen under law.

To help resolve issues related to the transportation of radioactive materials, the WAST 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 DOE-wide transportation policy and monitor the activities of other DOE shipping campaigns and the lessons learned from those campaigns.

Key Milestones of the Waste Acceptance, Storage and Transportation Project

FY 1999

- Develop proposed enhancements and modifications to the Standard Contract to support procurement of waste acceptance and transportation services.

FY 2000

- Achieve agreement with purchasers on enhancements to the Standard Contract.

FY 2001

- Issue final Request for Proposals for waste acceptance and transportation services after site selection.
- Complete Standard Contract enhancements to allow for finalization of schedules and procedures to effect the transfer of spent nuclear fuel to the Federal Government.
- Issue notice of Policy and Procedures for implementation of Section 180(c) of the Nuclear Waste Policy Act of 1982, as amended.

FY 2002

- Develop schedules and finalize requirements to support the acquisition of waste acceptance and transportation services.

FY 2003

- Award Phase A contracts to develop overall management and operational plans for waste acceptance and transportation services.
- Initiate grant application process for funding of incremental training of eligible States and Native American Tribes for the safe transportation of spent nuclear fuel and emergency response preparedness pursuant to Section 180(c) of the Nuclear Waste Policy Act of 1982, as amended.

Key WAST Project milestones are shown in *Figure 12*. Funding requirements are shown in *Table 3*.

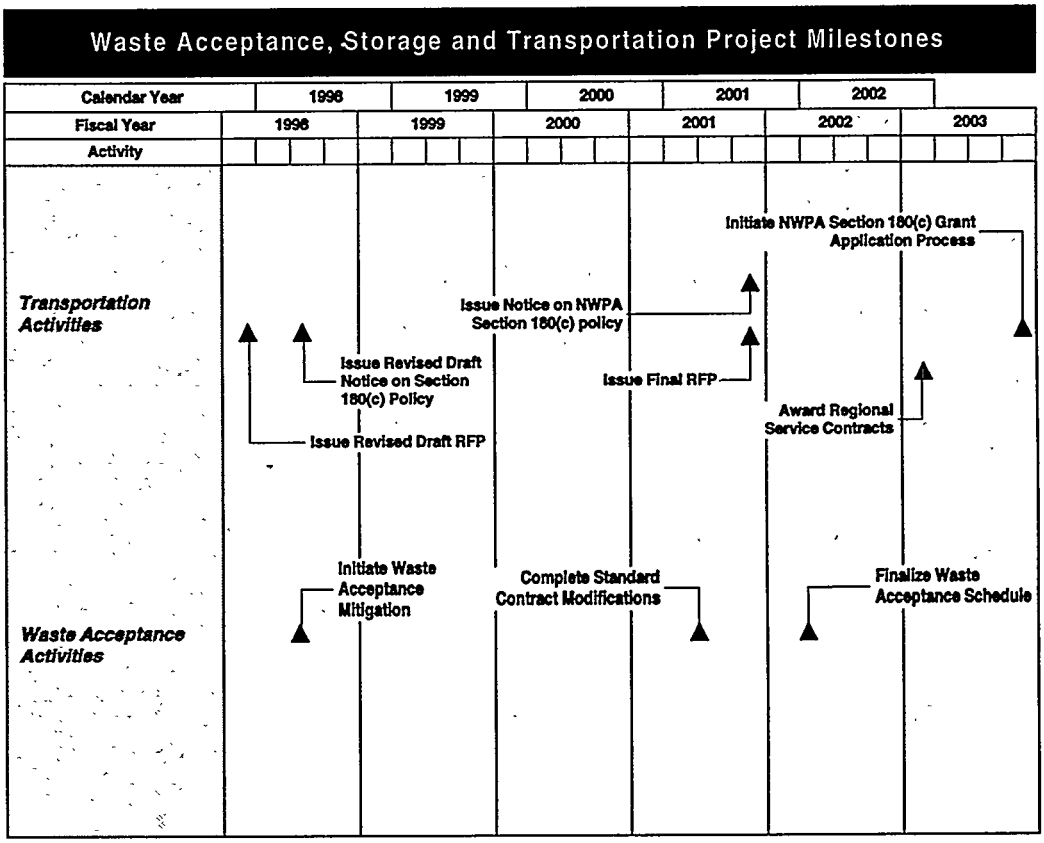


Figure 12

Waste Acceptance, Storage and Transportation Project

Funding Requirements for Base Case: Waste Acceptance in 2010 at the Repository

Dollars in Thousands

	FY 1998 enacted	FY 1999 requested	FY 2000 projected	FY 2001 projected	FY 2002 projected	FY2003 projected
Spent Fuel Storage	1,549	500	0	0	0	0
Transportation	3,180	5,500	7,495	19,055	30,630	40,655
Waste Acceptance	523	780	910	1,460	2,000	2,000
MPC Subsystem	0	3,000	0	0	0	0
Project Integration	695	725	725	1,340	1,500	1,700
TOTAL PROJECT	5,947	10,505	9,130	21,855	34,130	44,355

Note: Does not include funding for resolution of waste acceptance obligations to commercial waste owners/utilities.

Table 3

Program Management Center

Introduction

The Program Management Center, which is located in Washington, D.C., provides Program integration and management support to 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 and the Office of Program Management and Administration. These offices are responsible for Program planning and management, Program integration, regulatory coordination, quality assurance, institutional activities, resources and information management, and international waste management activities. Funding requirements for the Program Management Center are provided in *Table 4*. A breakdown of the Center's budget is provided in *Figure 13*.

Links to OCRWM Strategy

The Program Management Center materially supports accomplishment of the following three OCRWM strategic objectives:

Strategic Objective 2: *Ensure the safety and health of the OCRWM workforce and members of the public, and the protection of the environment in all OCRWM activities.*

Strategic Objective 3: *As a good neighbor and public partner, continually work with customers and stakeholders in an open, frank, and constructive manner.*

Strategic Objective 4: *Use efficient and effective corporate management systems and approaches to guide decision-making, streamline and improve operations, align resources and reduce costs, improve the delivery of products and services, and evaluate performance.*

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

Program Planning and Management

The Management Center assists the Program Director and two projects in developing multi-year technical, managerial, and institutional strategies. The Center also formulates and executes budgets and annual work plans, establishes project- and Program-level cost, schedule, and technical baselines, and monitors and analyzes Program performance.

Under Department of Energy Order 430.1, "Life Cycle Asset Management," the Program is now managed as one integrated, strategic system. Performance-based requirements for cost estimating, systems engineering, and project management processes have been established. Efforts are being made to clarify accountability, responsibility, and authority. Management attention is focused on the identification and consolidation of overlapping, duplicative, and redundant management system requirements, processes, and practices necessary to manage the Program.

The Center is strengthening management practices to ensure cost-effective operations and is striving to achieve at least 95 percent conformance with annual Program schedule and cost baseline targets. Senior Program management will conduct Program performance reviews on a quarterly basis, and the Center will perform at least one project- or office-level management system performance assessment each year to improve management effectiveness and efficiency. This will ensure that contractor organizations are complying with requirements for technical management, planning and control, and baseline management.

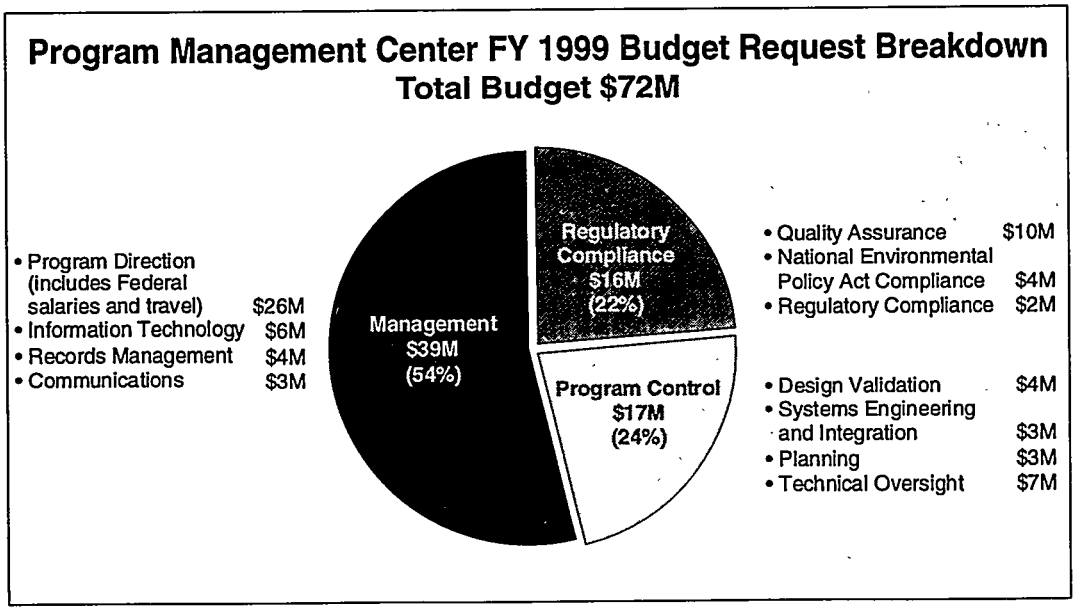


Figure 13

Program Integration

The components of the waste management system (e.g., transportation services procurement activities, repository and waste package design activities) are being integrated into a single system that is safe, efficient, reliable, and cost-effective. For example, the Center is supporting the full integration of 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. Disposal of weapons-usable fissile materials has already been incorporated into the Program's technical baseline.

Defense Waste Acceptance

The Program is enhancing its acceptance criteria for Department-owned spent nuclear fuel and Naval spent nuclear fuel. The Program and the Department's Office of Environmental Management are establishing a memorandum of agreement for the acceptance of Department-owned spent nuclear fuel and high-level radioactive waste. The agreement will include detailed arrangements for the acceptance, transportation, and disposal of these nuclear materials. Specifically, the agreement will:

- Assign responsibilities for the transportation of Department-owned spent nuclear fuel and high-level radioactive waste from Environmental Management facilities to Program facilities;
- Define the process for documenting a payment schedule for the disposal fees owed by the Department equivalent to those paid by civilian utilities;
- Formalize the development of a waste acceptance schedule by identifying the specific quantities of these materials and their locations; and
- Provide for appropriate interfaces between the two Offices.

Many Departmental Decisions Assume Geologic Disposal

RECORDS OF DECISION

- Hanford Tank Remediation System, 1997
- Programmatic Spent Nuclear Fuel Management and INEEL Environmental Restoration and Waste Management Programs, 1997
- Storage and Disposal of Weapons-Usable Fissile Materials, 1997
- Dry Storage Container System for Naval Spent Nuclear Fuel, 1997
- Disposition of Surplus Highly Enriched Uranium, 1996
- Department of Energy-Department of the Navy-State of Idaho Consent Agreement, 1995

In addition, the Program is working with the Office of Naval Reactors' Navy Nuclear Propulsion Program to establish a similar agreement for acceptance of Naval spent nuclear fuel. According to the terms of an agreement signed by the Department and the State of Idaho, Naval reactor fuel currently stored in Idaho must be removed from the State by 2035. The two memoranda of agreement are expected to be finalized in FY 1998.

In the future, the Program will develop similar agreements with the Department's Office of Fissile Materials Disposition for acceptance and transport of surplus weapons-grade plutonium. Collectively, these efforts should ensure that the impacts of integrating these materials into the waste management system are well understood and adequately accommodated.

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

Regulatory Coordination

The Management Center coordinates Program-level regulatory policy, provides guidance and support for licensing and safeguards and security activities to the 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 appli-

cable statutes, standards, and regulations, including those set forth by the Department, Environmental Protection Agency, Nuclear Regulatory Commission (Commission), and Department of Labor. Finally, the Center coordinates interactions with the Program's external oversight agencies, including the Commission, Nuclear Waste Technical Review Board, and Environmental Protection Agency to address technical and management concerns related to the repository program, interim storage, and transportation of spent nuclear fuel.

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 Commission's quality assurance requirements found in 10 CFR Part 60, Subpart G. The Office also manages the OCRWM Concerns Program to ensure that employees may communicate their Program-related concerns directly and confidentially to the Program Director.

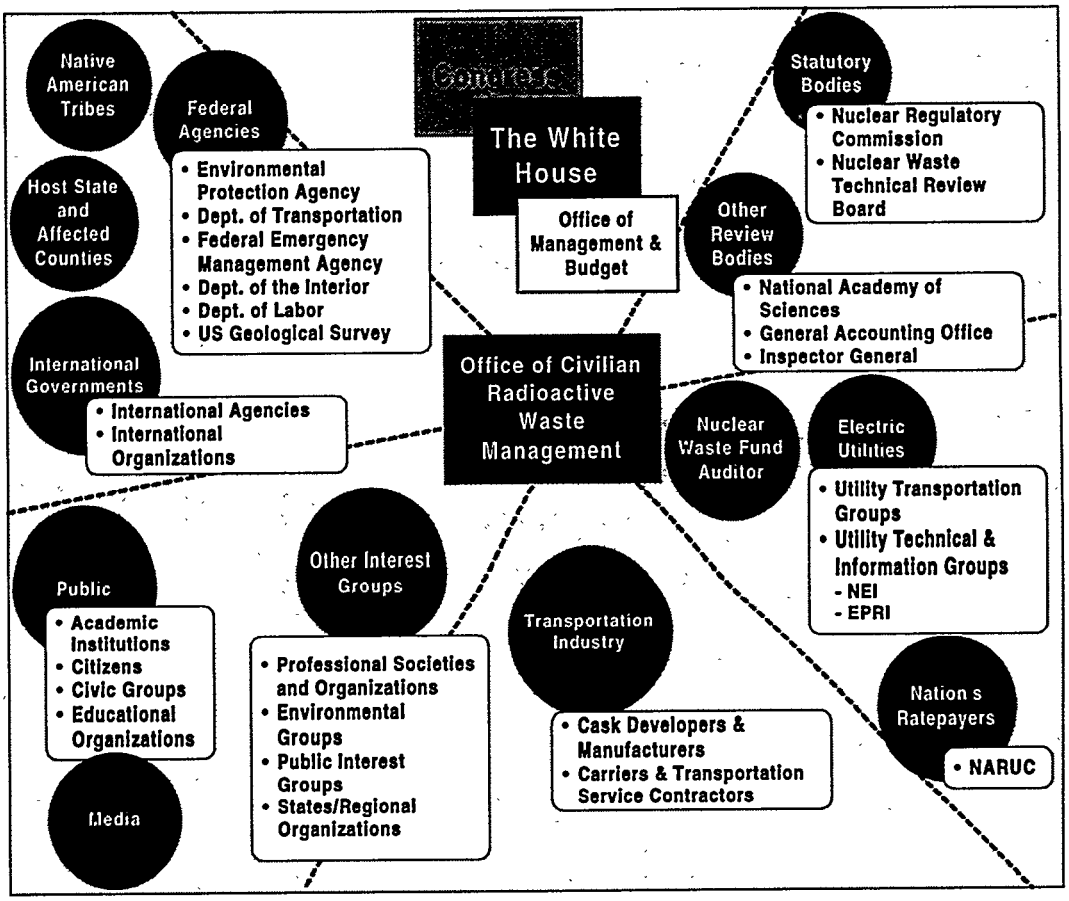
Institutional Activities

The Nuclear Waste Policy Act of 1982, as amended, established public participation as a key component of Program activities. The 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, the Program 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. Program stakeholders will be consulted annually on the Program's responsiveness to their comments and recommendations. An illustration of the Program's stakeholder groups and oversight bodies is provided in *Figure 14.*

To improve the quality, timeliness, frequency, and sufficiency of information disseminated to stakeholders, the Center redesigned OCRWM's Home Page to make it more user-friendly and to elicit user feedback. The Center will post key Program information on the Home Page on a timely basis. An illustration of the Home Page is provided in *Figure 15.* The Center will support the Department's commitment to advance the Nation's science education and literacy by posting the Program's "Science, Society, and America's Nuclear Waste" on the Home Page in FY 1998. This resource curriculum is an educational tool for grades 8-12 that encourages hands-on, real-world experience.

The Center will continue to provide, free-of-charge, public information materials on Program-wide activities through the National Information Center. Callers may order materials by calling 1-800-225-6972 or (202) 488-6720. Finally, the Center will continue to publish *The OCRWM Enterprise*, a semiannual newsletter detailing activities of the Program, including news from Yucca Mountain.

The Center will continue to manage the Program'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.



Legend	
NEI	Nuclear Energy Institute
EPRI	Electric Power Research Institute
NARUC	National Association of Regulatory Utility Commissioners

Figure 14

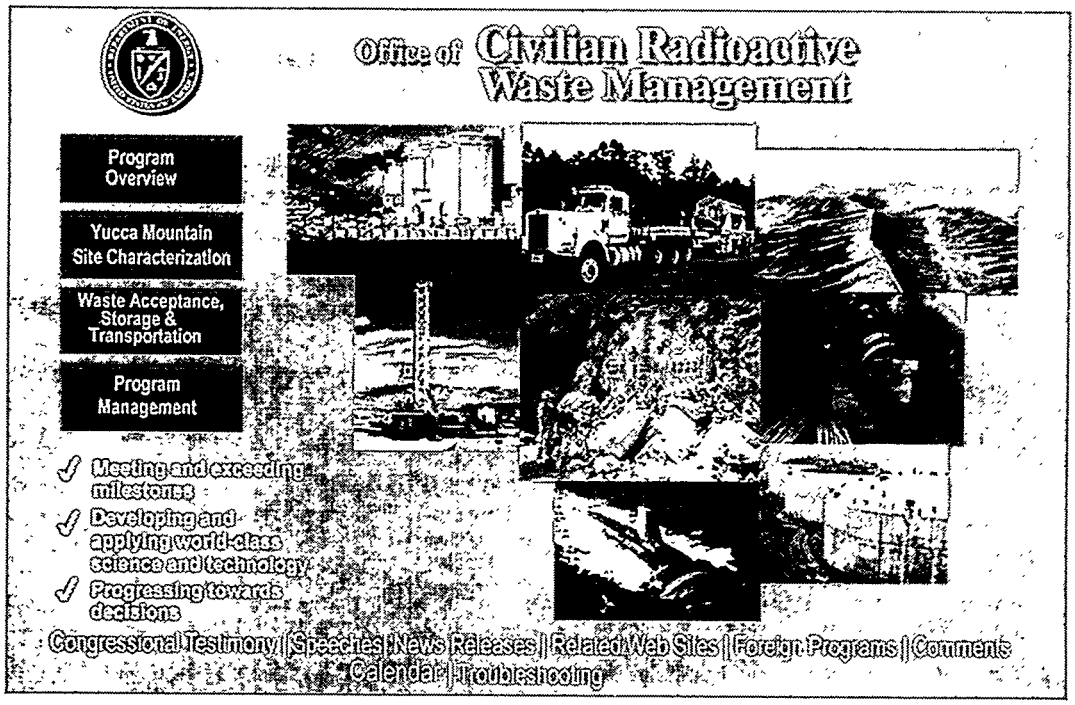


Figure 15

Resources Management

Human Resources

The Management Center is responsible for recruiting, training, developing, and evaluating the performance of, and providing appropriate recognition for, the Program's Federal staff and for establishing a workplace environment that supports the Program's strategic objectives. Federal salaries represent approximately 50 percent of the Center's budget.

The Center will continue to implement quality management principles, value diversity, and improve human resource systems and practices by:

- Nominating qualified individuals for participation in Departmental and interagency career development Programs, and selecting at least one individual each year to participate in one of the career development programs, and
- Increasing the number of minority promotions and awards by 2 percent through FY 2000, to the extent feasible.

To meet the Department's FY 1998 strategic alignment initiative staffing targets, the Program conducted a reduction-in-force with an effective date of May 6, 1998. The reduction-in-force eliminated approximately 25 percent of the positions at the Program's Headquarters in Washington, D.C. Based on a decision to transfer contract management activities from Headquarters to the Yucca Mountain Site Characterization Office, effective May 6, 1998, employees performing contract management have been reassigned to Las Vegas, Nevada. The Program is continuing to examine the need to realign functions at Headquarters and the Yucca Mountain Site Characterization Office.

Contractor Resources

The Management Center will continue to employ contracting 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 the M&O contractor. The Center will award a fixed-price or performance-based audit services contract in FY 1999.

In 1997, the Program 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. The Program has limited the scope of the work performed by support services contractors to those necessary support activities essential to achieve implementation of Federal regulations and the Program mission. These key support service contracts provide support for Commission-required quality assurance verification; support for 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 support.

Information Resources

The Management Center is responsible for the strategic application of information technology to improve productivity, drive process improvements, and reduce overall Program costs. The Center is implementing a Program-wide information architecture, a conceptual framework that will guide the building of an efficient, effective, and flexible information infrastructure. The architecture will provide the blueprint by which all data and information systems are defined, organized, developed, accessed, maintained, and managed for the Program. The information management architecture baseline is reviewed annually to assess technological capability with respect to the Program's information management requirements.

Other key information resources activities include:

- Implementing a corporate information systems integration strategy in FY 1998.
- Maintaining a local- and wide-area network prime time availability rate of at least 98 percent.
- Selecting and implementing an Electronic Document Management System, including a technical solution for managing e-mail correspondence.
- Performing a Program-wide records inventory in FY 1999 and providing annual updates to the Program's records retention schedules.
- Providing support for Freedom of Information Act requests.
- Implementing and administering a copyright policy for the Program, which includes guidance for handling of electronic documents.

Financial Resources

The Nuclear Waste Policy Act of 1982 provides for two types of fees: an ongoing fee of 1 mil (one tenth of a cent) per kilowatt-hour (kWh) of electricity generated and sold on or after April 7, 1983, and a one-time fee for electricity generated and sold prior to April 7, 1983. Cumulative revenues from fees through September 30, 1997, totalled $9.513 billion.

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.

International Waste Management Activities

The Management Center's international waste management activities involve cooperation with other countries and international organizations to exchange information and develop consensus on common issues. The Center focuses on areas of technical exchange that will benefit the Yucca Mountain Site Characterization Project and lead toward a national decision on geologic disposal. The Center also focuses on areas that will benefit the Program's waste acceptance, storage and transportation activities. The Center participates in bilateral agreements with Canada, Japan, France, Sweden, Switzerland, and Spain to support the exchange of waste management information.

The Center will continue interactions 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. The Center will also continue to participate in the IAEA's Advisory Group on Spent Fuel Management as well as specific projects. Ongoing NEA work will focus on interpretation of site characterization data and performance assessment through the Center'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.

Key Annual Milestones for the Program Management Center

Fiscal Years 1999 - 2003

- Develop and submit to Congress the Program's annual report on activities and expenditures 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 quality assurance audit of all Program participant organizations.
- Conduct a project- or office-level management system performance assessment to improve management system effectiveness and efficiency.
- Review the information management architecture baseline.
- Prepare Congressional testimony, speeches, and other briefing materials to support the Program Director's interaction with external parties.

Program Management Center Funding Requirements

Dollars in Thousands

	FY 1998 enacted	FY 1999 requested	FY 2000 projected	FY 2001 projected	FY 2002 projected	FY 2003 projected
Program Management	5,049	5,995	5,995	5,995	5,995	5,995
Human Resources & Administration	4,814	5,188	5,188	5,188	5,188	5,188
Program Direction*	62,480	60,489	62,359	56,776	56,776	56,551
TOTAL PROGRAM MANAGEMENT CENTER	72,343	71,672	73,542	67,959	67,959	67,734

* Includes quality assurance activities and Federal salaries.

Table 4

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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 President considers 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 andeadline 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 determi nations or plans made with respect to the site characterization siting, develop ment, 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][1]

[1] For the sake of brevity, Sections 143, 144, and 147 are not included here. Section 143 establishes the Monitored Retrievable Storage (MRS) Commission and directs it to prepare a report on the need for an MRS facility for submittal to Congress. Section 144 directs the Secretary to conduct a survey and evaluation of potentially suitable sites for an MRS facility (following submission of the Commission's report to Congress). Section 147 permits the MRS host State or tribe to enter into a benefits agreement with the Secretary.

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 designation 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 1 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

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

Early Development of Radioactive Waste Management Policy

In the mid-1950's, the National Academy of Sciences 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 Academy concluded that radioactive waste could be disposed of safely in a variety of geologic media within the United States. The Academy 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 2 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. In 1981, President Reagan withdrew the ban on reprocessing and President Carter's Away-From-Reactor storage proposal. 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 that officially selected mined geologic repositories as the preferred means for the disposal of commercial spent nuclear fuel.

The Nuclear Waste Policy Act of 1982 is Enacted

In 1982, Congress passed the Nuclear Waste Policy Act, which established the Office of Civilian Radioactive Waste Management within the Department. The Act adopted geologic disposal as the Nation's long-term strategy for the safe isolation of radioactive waste and confirmed the Federal Government's responsibility for managing and disposing of commercial spent nuclear fuel. The Act 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 Act, following site characterization, the Secretary of Energy ("the Secretary") may decide to recommend a site to the President for development as a repository. If the President accepts the Secretary's recommendation, the Act 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, Congress passes a resolution of siting approval. If the President recommends a site and its designation becomes effective, the Act directs the Department to submit an application to the Nuclear Regulatory Commission ("the Commission") for a license authorizing repository construction. If the application is approved and construction proceeds, the Department must apply to the Commission for additional licensing authority to begin accepting waste into the repository, and ultimately to close the facility when waste emplacement is completed.

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

The Act directed that activities associated with the management and disposal of civilian spent nuclear fuel conducted under the Act be funded through fees 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 Act 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 Contract 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 nuclear fuel.

The Act 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 9 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 the Hanford Site, Washington (basalt flows). In 1994, Draft Environmental Assessments to support the proposed nomination of 5 sites and the recommendation of 3 sites for characterization were issued for all 9 sites.

In 1986, the Secretary nominated 5 sites as suitable for characterization for the first repository, and recommended 3 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. This site selection process is illustrated in *Figure 16.*

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 7 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 nuclear fuel requiring disposal.

International Consensus on Geologic Disposal

In parallel with the evolution of United States policy, geologic disposal also emerged as the international community's consensus strategy for managing the permanent disposal of highly radioactive waste.

In 1985, the Nuclear Energy Agency of the Organization of Economic Cooperation and Development, an international organization of 23 countries (including the United States) cooperating in the development of peaceful uses of nuclear energy, reported a high degree of confidence worldwide that disposal systems in deep geologic structures can be designed and operated safely to assure long-term isolation of spent nuclear fuel or high-level radioactive waste. In 1995, the Nuclear Energy Agency reaffirmed the international consensus in its report, *The Environmental and Ethical Basis of Geologic Disposal: A Collective Opinion of the Radioactive Waste Management Committee of the OECD.* The Agency asserted that, "[O]ur responsibilities to future generations are better discharged by a strategy of final disposal than by reliance on stores which require surveillance, bequeath long-term responsibilities of care, and may in due course be neglected by future societies whose structural stability should not be presumed."

First Repository Site Selection

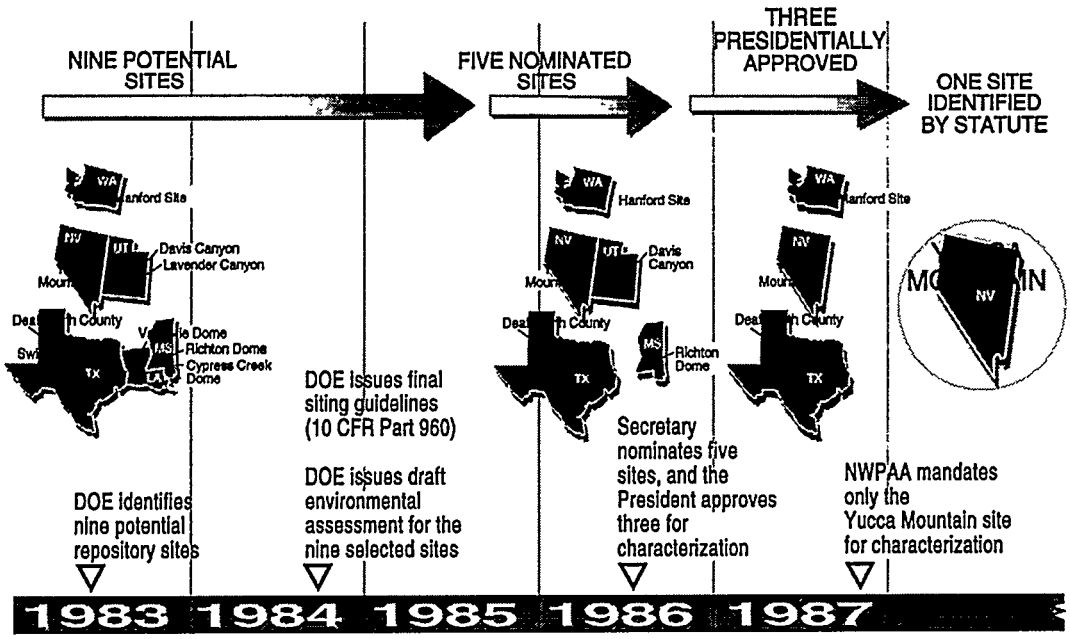

Figure 16

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 defines 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 Act requires that packages for transport be certified by the Commission, and that the Department provide technical assistance and funds to States to train transportation public safety officials.

The Nuclear Waste Negotiator

The Nuclear Waste Negotiator established a Federal grants process for interested candidates to assess the feasibility of hosting a repository or monitored retrievable storage facility. Applications for Phase IA study grants were received from 21 groups; 12 grants were awarded. Nine groups subsequently applied for and were awarded Phase IIA grants. The 1994 Energy and Water Development Appropriations Act prohibited the award of Phase IIB grants, to be used for advanced feasibility studies and preparation of environmental assessments. In 1995, authority for the Negotiator's Office expired.

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 site recommendation and environmental impact statement to the President by 2000, contingent on a positive suitability evaluation; and (3) 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 nuclear 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

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 enacted 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."

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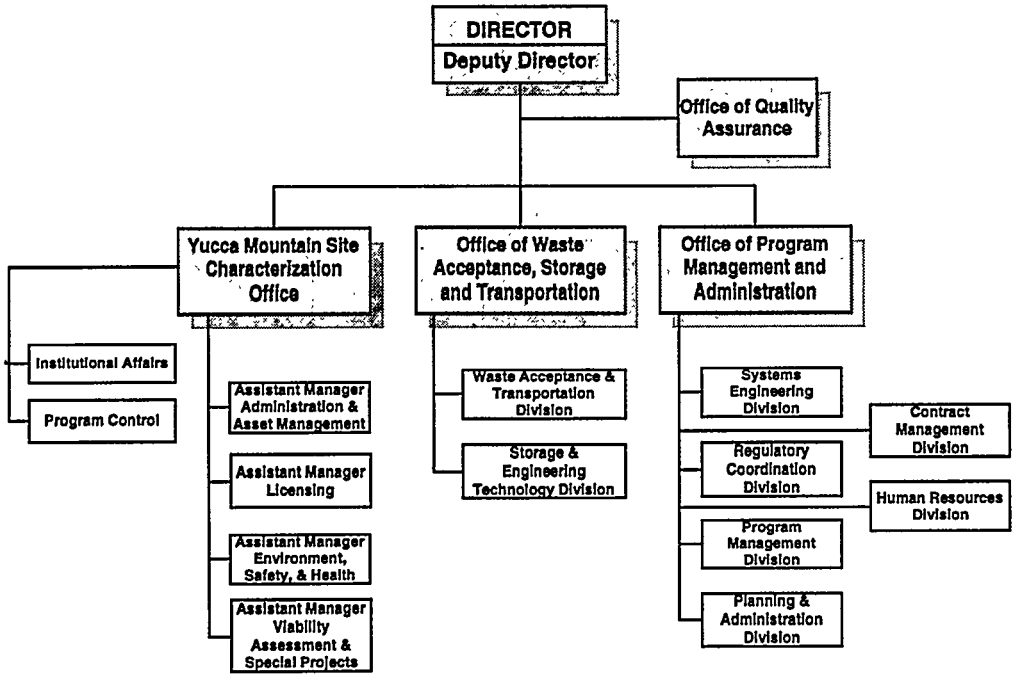
Appendix C

Organization Chart for the Office of Civilian Radioactive Waste Management



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Appendix D

10 CFR Part 60
Disposal Of High-level Radioactive Wastes In Geologic Repositories

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Authority: Secs. 51, 53, 62, 63, 65, 81, 161, 182, 183, 68 Stat. 929, 930, 932, 933, 935, 948, 953, 954, as amended (42 U.S.C. 2071, 2073, 2092, 2093, 2095, 2111, 2201, 2232, 2233); secs. 202, 206, 88 Stat. 1244, 1246 (42 U.S.C. 5842, 5846); secs. 10 and 14, Pub. L. 95-601, 92 Stat. 2951 (42 U.S.C. 2021a and 5851); sec. 102, Pub. L. 91-190, 83 Stat. 853 (42 U.S.C. 4332); secs. 114, 121, Pub. L. 97-425, 96 Stat. 2213g, 2228, as amended (42 U.S.C. 10134, 10141), and Pub. L. 102-486, sec. 2902, 106 Stat. 3123 (42 U.S.C. 5851).

Source: 46 FR 13980, Feb. 25, 1981, unless otherwise noted.

Subpart A—General Provisions

Sec. 60.1 Purpose and scope.

This part prescribes rules governing the licensing of the U.S. Department of Energy to receive and possess source, special nuclear, and byproduct material at a geologic repository operations area sited, constructed, or operated in accordance with the Nuclear Waste Policy Act of 1982. This part does not apply to any activity licensed under another part of this chapter. This part also gives notice to all persons who knowingly provide to any licensee, contractor, or subcontractor,

components, equipment, materials, or other goods or services, that relate to a licensee's activities subject to this part, that they may be individually subject to NRC enforcement action for violation of Sec. 60.11.
[56 FR 40690, Aug. 15, 1991]

Sec. 60.2 Definitions.

As used in this part:

Accessible environment means:
(1) The atmosphere; (2) The land surface; (3) Surface water; (4) Oceans; and (5) The portion of the lithosphere that is outside the postclosure controlled area.

Affected Indian Tribe means any Indian Tribe (1) within whose reservation boundaries a repository for high-level radioactive waste or spent fuel is proposed to be located; or (2) whose Federally defined possessory or usage rights to other lands outside of the reservation's boundaries arising out of Congressionally ratified treaties or other Federal law may be substantially and adversely affected by the locating of such a facility; Provided, That the Secretary of the Interior finds, upon the petition of the appropriate governmental officials of the Tribe, that such effects are both substantial and adverse to the Tribe.

Anticipated processes and events means those natural processes and events that are reasonably likely to occur during the period the intended performance objective must be achieved. To the extent reasonable in the light of the geologic record, it shall be assumed that those processes operating in the geologic setting during the Quaternary Period continue to operate but with the perturbations caused by the presence of emplaced radioactive waste superimposed thereon.

Barrier means any material or structure that prevents or substantially delays movement of water or radionuclides.

Candidate area means a geologic and hydrologic system within which a geologic repository may be located.

Commencement of construction means clearing of land, surface or subsurface excavation, or other substantial action that would adversely affect the environment of a site, but does not include changes desirable for the temporary use of the land for public recreational uses, site characterization activities, other preconstruction monitoring and investigation necessary to establish background information related to the suitability of a site or to the protection of environmental values, or procurement or manufacture of components of the geologic repository operations area.

Commission means the Nuclear Regulatory Commission or its duly authorized representatives.

Containment means the confinement of radioactive waste within a designated boundary.

Controlled area means a surface location, to be marked by suitable

monuments, extending horizontally no more than 10 kilometers in any direction from the outer boundary of the underground facility, and the underlying subsurface, which area has been committed to use as a geologic repository and from which incompatible activities would be restricted following permanent closure.

Design bases means that information that identifies the specific functions to be performed by a structure, system, or component of a facility and the specific values or ranges of values chosen for controlling parameters as reference bounds for design. These values may be restraints derived from generally accepted "state-of-the-art" practices for achieving functional goals or requirements derived from analysis (based on calculation or experiments) of the effects of a postulated event under which a structure, system, or component must meet its functional goals. The values for controlling parameters for external events include:

(1) Estimates of severe natural events to be used for deriving design bases that will be based on consideration of historical data on the associated parameters, physical data, or analysis of upper limits of the physical processes involved; and

(2) Estimates of severe external man-induced events, to be used for deriving design bases, that will be based on analysis of human activity in the region, taking into account the site characteristics and the risks associated with the event.

Design basis events means:

(1)(i) Those natural and human-induced events that are reasonably likely to occur regularly, moderately frequently, or one or more times before permanent closure of the geologic repository operations area; and

(ii) Other natural and man-induced events that are considered unlikely, but sufficiently credible to warrant consideration, taking into account the potential for significant radiological impacts on public health and safety.

(2) The events described in paragraph (1)(i) of this definition are referred to as "Category 1" design basis events. The events described in paragraph (1)(ii) of this definition are referred to as "Category 2" design basis events.

Director means the Director of the Nuclear Regulatory Commission's Office of Nuclear Material Safety and Safeguards.

Disposal means the isolation of radioactive wastes from the accessible environment.

Disturbed zone means that portion of the postclosure controlled area, the physical or chemical properties of which have changed as a result of underground facility construction or as a result of heat generated by the emplaced radioactive wastes, such that the resultant change of properties may have a significant effect on the performance of the geologic repository.

DOE means the U.S. Department of Energy or its duly authorized

representatives.

Engineered barrier system means the waste packages and the underground facility.

Geologic repository means a system which is intended to be used for, or may be used for, the disposal of radioactive wastes in excavated geologic media. A geologic repository includes: (1) The geologic repository operations area, and (2) the portion of the geologic setting that provides isolation of the radioactive waste.

Geologic repository operations area means a high-level radioactive waste facility that is part of a geologic repository, including both surface and subsurface areas, where waste handling activities are conducted.

Geologic setting means the geologic, hydrologic, and geochemical systems of the region in which a geologic repository operations area is or may be located.

Groundwater means all water which occurs below the land surface.

High-level radioactive waste or HLW means: (1) Irradiated reactor fuel, (2) liquid wastes resulting from the operation of the first cycle solvent extraction system, or equivalent, and the concentrated wastes from subsequent extraction cycles, or equivalent, in a facility for reprocessing irradiated reactor fuel, and (3) solids into which such liquid wastes have been converted.

HLW facility means a facility subject to the licensing and related regulatory authority of the Commission pursuant to Sections 202(3) and 202(4) of the Energy Reorganization Act of 1974 (88 Stat. 1244).[1]

Host rock means the geologic medium in which the waste is emplaced.

Important to safety, with reference to structures, systems, and components, means those engineered features of the repository whose function is:

(1) To provide reasonable assurance that high-level waste can be received, handled, packaged, stored, emplaced, and retrieved without exceeding the requirements of Sec. 60.111(a) for Category 1 design basis events; or

(2) To prevent or mitigate Category 2 design basis events that could result in doses equal to or greater than the values specified in Sec. 60.136 to any individual located on or beyond any point on the boundary of the preclosure controlled area.

Isolation means inhibiting the transport of radioactive material so that amounts and concentrations of this material entering the accessible environment will be kept within prescribed limits.

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[1]These are DOE "facilities used primarily for the receipt and storage of high-level radioactive wastes resulting from activities licensed under such Act [the Atomic Energy Act]" and "Retrievable Surface Storage Facilities and other facilities authorized for the express purpose of subsequent long-term storage of high-level radioactive wastes generated by [DOE], which are not used for, or are part of, research and development activities."

Permanent closure means final backfilling of the underground facility and the sealing of shafts and boreholes.

Performance confirmation means the program of tests, experiments, and analyses which is conducted to evaluate the accuracy and adequacy of the information used to determine with reasonable assurance that the performance objectives for the period after permanent closure will be met.

Postclosure controlled area means a surface location, to be marked by suitable monuments, extending horizontally no more than 10 kilometers in any direction from the outer boundary of the underground facility, and the underlying subsurface, which area has been committed to use as a geologic repository and from which incompatibleactivities would be restricted following permanent closure.

Preclosure controlled area means that surface area surrounding the geologic repository operations area for which the licensee exercises authority over its use, in accordance with the provisions of this part, until permanent closure has been completed.

Public Document Room means the place at 2120 L Street NW., Washington, DC, at which records of the Commission will ordinarily be made available for public inspection and any other place, the location of which has been published in the Federal Register, at which public records of the Commission pertaining to a particular geologic repository are made available for public inspection.

Radioactive waste or waste means HLW and other radioactive materials other than HLW that are received for emplacement in a geologic repository.

Restricted area means an area, access to which is limited by the licensee for the purpose of protecting individuals against undue risks from exposure to radiation and radioactive materials. Restricted area does not include areas used as residential quarters, but separate rooms in a residential building may be set aside as a restricted area.

Retrieval means the act of intentionally removing radioactive waste from the underground location at which the waste had been previously emplaced for disposal.

Saturated zone means that part of the earth's crust beneath the regional water table in which all voids, large and small, are ideally filled with water under pressure greater than atmospheric.

Site means the location of the preclosure controlled area, or of the postclosure controlled area, or both.

Site characterization means the program of exploration and research, both in the laboratory and in the field, undertaken to establish the geologic conditions and the ranges of those parameters of a particular site relevant to the procedures under this part. Site characterization includes borings, surface excavations, excavation of exploratory shafts, limited subsurface lateral excavations and borings, and in situ testing at depth needed to determine the suitability of the site for a geologic repository, but does not include preliminary borings and geophysical testing needed to decide whether site characterization should be undertaken.

Unanticipated processes and events means those processes and events affecting the geologic setting that are judged not to be reasonably likely to occur during the period the intended performance objective must be achieved, but which are nevertheless sufficiently credible to warrant consideration. Unanticipated processes and events may be either natural processes or events or processes and events initiated by human activities other than those activities licensed under this part. Processes and events initiated by human activities may only be found to be sufficiently credible to warrant consideration if it is assumed that: (1) The monuments provided for by this part are sufficiently permanent to serve their intended purpose; (2) the value to future generations of potential resources within the site can be assessed adequately under the applicable provisions of this part; (3) an understanding of the nature of radioactivity, and an appreciation of its hazards, have been retained in some functioning institutions; (4) institutions are able to assess risk and to take remedial action at a level of social organization and technological competence equivalent to, or superior to, that which was applied in initiating the processes or events concerned; and (5) relevant records are preserved, and remain accessible, for several hundred years after permanent closure.

Underground facility means the underground structure, including openings and backfill materials, but excluding shafts, boreholes, and their seals.

Unrestricted area means an area, access to which is neither limited nor controlled by the licensee.

Unsaturated zone means the zone between the land surface and the regional water table. Generally, fluid pressure in this zone is less than atmospheric pressure, and some of the voids may contain air or other gases at atmospheric pressure. Beneath flooded areas or in perched water bodies the fluid pressure locally may be greater than atmospheric.

Waste form means the radioactive waste materials and any encapsulating or stabilizing matrix.

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

Water table means that surface in a groundwater body at which the water pressure is atmospheric.

[48 FR 28217, June 21, 1983, as amended at 50 FR 29647, July 22, 1985; 51 FR 27162, July 30, 1986; 53 FR 43421, Oct. 27, 1988; 61 FR 64267, Dec. 4, 1996]

Sec. 60.3 License required.

(a) DOE shall not receive or possess source, special nuclear, or byproduct material at a geologic repository operations area except as authorized by a license issued by the Commission pursuant to this part.

(b) DOE shall not commence construction of a geologic repository operations area unless it has filed an application with the Commission and has obtained construction authorization as provided in this part. Failure to comply with this requirement shall be grounds for denial of a license.

Sec. 60.4 Communications and records.

(a) Except where otherwise specified, all communications and reports concerning the regulations in this part and applications filed under them should be addressed to the Director of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555. Communications reports, and applications may be delivered in person at the Commission's offices at 2120 L Street NW., Washington DC, or 11555 Rockville Pike, Rockville, MD.

(b) Each record required by this part must be legible throughout the retention period specified by each Commission regulation. The record may be the original or a reproduced copy or a microform provided that the copy or microform is authenticated by authorized personnel and that the microform is capable of producing a clear copy throughout the required retention period. The record may also be stored in electronic media with the capability for producing legible, accurate, and complete records during the required retention period. Records such as letters, drawings, specifications, must include all pertinent information such as stamps, initials, and signatures. The licensee shall maintain adequate safeguards against tampering with and loss of records.
[53 FR 19251, May 27, 1988, as amended at 53 FR 43421, Oct. 27, 1988]

Sec. 60.5 Interpretations.

Except as specifically authorized by the Commission, in writing, no interpretation of the meaning of the regulations in this part by any officer or employee of the Commission other than a written interpretation by the General Counsel will be considered binding upon the Commission.

Sec. 60.6 Exemptions.

The Commission may, upon application by DOE, any interested person, or upon its own initiative, grant such exemptions from the requirements of the regulations in this part as it determines are authorized by law, will not endanger life or property or the common defense and security, and are otherwise in the public interest.

Sec. 60.7 License not required for certain preliminary activities.

The requirement for a license set forth in Sec. 60.3(a) of this part is not applicable to the extent that DOE receives and possesses source, special nuclear, and byproduct material at a geologic repository:

(a) For purposes of site characterization; or

(b) For use, during site characterization or construction, as components of radiographic, radiation monitoring, or similar equipment or instrumentation.

Sec. 60.8 Information collection requirements: Approval.

(a) The Nuclear Regulatory Commission has submitted the information collection requirements contained in this part to the Office of Management and Budget (OMB) for approval as required by the Paperwork reduction Act (44 U.S.C. 3501 et seq.). The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. OMB has approved the information collection requirements contained in this part under control number 3150-0127.

(b) The approved information collection requirements contained in this part appear in Secs. 60.62, 60.63, and 60.65.

[61 FR 64268, Dec. 4, 1996, as amended at 62 FR 52188, Oct. 6, 1997]

Sec. 60.9 Employee protection.

(a) Discrimination by a Commission licensee, an applicant for a Commission license, or a contractor or subcontractor of a Commission licensee or applicant against an employee for engaging in certain protected activities is prohibited. Discrimination includes discharge and other actions that relate to compensation, terms, conditions, or privileges of employment. The protected activities are established in section 211 of the Energy Reorganization Act of 1974, as amended, and in general are related to the administration or enforcement of a requirement imposed under the Atomic Energy Act or the Energy Reorganization Act.

(1) The protected activities include but are not limited to:

(i) Providing the Commission or his or her employer information about alleged violations of either of the statutes named in paragraph (a) introductory text of this section or possible violations of requirements imposed under either of those statutes;

(ii) Refusing to engage in any practice made unlawful under either of the statutes named in paragraph (a) introductory text or under these requirements if the employee has identified the alleged illegality to the employer;

(iii) Requesting the Commission to institute action against his or her employer for the administration or enforcement of these requirements;

(iv) Testifying in any Commission proceeding, or before Congress, or at any Federal or State proceeding regarding any provision (or proposed provision) of either of the statutes named in paragraph (a) introductory text.

(v) Assisting or participating in, or is about to assist or participate in, these activities.

(2) These activities are protected even if no formal proceeding is actually initiated as a result of the employee assistance or participation.

(3) This section has no application to any employee alleging discrimination prohibited by this section who, acting without direction from his or her employer (or the employer's agent), deliberately causes a violation of any requirement of the Energy Reorganization Act of 1974, as amended, or the Atomic Energy Act of 1954, as amended.

(b) Any employee who believes that he or she has been discharged or otherwise discriminated against by any person for engaging in protected activities specified in paragraph (a)(1) of this section may seek a remedy for the discharge or discrimination through an administrative proceeding in the Department of Labor. The administrative proceeding must be initiated within 180 days after an alleged violation occurs. The employee may do this by filing a complaint alleging the violation with the Department of Labor, Employment Standards Administration, Wage and Hour Division. The Department of Labor may order reinstatement, back pay, and compensatory damages.

(c) A violation of paragraph (a), (e), or (f) of this section by a Commission licensee, an applicant for a Commission license, or a contractor or subcontractor of a Commission licensee or applicant may be grounds for—

(1) Denial, revocation, or suspension of the license.

(2) Imposition of a civil penalty on the licensee or applicant.

(3) Other enforcement action.

(d) Actions taken by an employer, or others, which adversely affect an employee may be predicated upon nondiscriminatory grounds. The prohibition applies when the adverse action occurs because the employee has engaged in protected activities. An employee's engagement in protected activities does not automatically render him or her immune from discharge or discipline for legitimate reasons or from adverse action dictated by nonprohibited considerations.

(e)(1) Each licensee and each applicant for a license shall prominently post the revision of NRC Form 3, "Notice to Employees," referenced in 10 CFR 19.11(c). This form must be posted at locations sufficient to permit employees protected by this section to observe a copy on the way to or from their place of work. Premises must be posted not later than 30 days after an application is docketed and

remain posted while the application is pending before the Commission, during the term of the license, and for 30 days following license termination.

(2) Copies of NRC Form 3 may be obtained by writing to the Regional Administrator of the appropriate U.S. Nuclear Regulatory Commission Regional Office listed in Appendix D to Part 20 of this chapter or by calling the NRC Information and Records Management Branch at 301-415-7230.

(f) No agreement affecting the compensation, terms, conditions, or privileges of employment, including an agreement to settle a complaint filed by an employee with the Department of Labor pursuant to section 211 of the Energy Reorganization Act of 1974, as amended, may contain any provision which would prohibit, restrict, or otherwise discourage an employee from participating in protected activity as defined in paragraph (a)(1) of this section including, but not limited to, providing information to the NRC or to his or her employer on potential violations or other matters within NRC's regulatory responsibilities.
[58 FR 52411, Oct. 8, 1993, as amended at 60 FR 24552, May 9, 1995; 61 FR 6765, Feb. 22, 1996]

Sec. 60.10 Completeness and accuracy of information.

(a) Information provided to the Commission by an applicant for a license or by a licensee or information required by statute or by the Commission's regulations, orders, or license conditions to be maintained by the applicant or the licensee shall be complete and accurate in all material respects.

(b) Each applicant or licensee shall notify the Commission of information identified by the applicant or licensee as having for the regulated activity a significant implication for public health and safety or common defense and security. An applicant or licensee violates this paragraph only if the applicant or licensee fails to notify the Commission of information that the applicant or licensee has identified as having a significant implication for public health and safety or common defense and security. Notification shall be provided to the Administrator of the appropriate Regional Office within two working days of identifying the information. This requirement is not applicable to information which is already required to be provided to the Commission by other reporting or updating requirements.
[52 FR 49372, Dec. 31, 1987]

Sec. 60.11 Deliberate misconduct.

(a) Any licensee or any employee of a licensee; and any contractor (including a supplier or consultant), subcontractor, or any employee of a contractor or subcontractor, of any licensee, who knowingly provides to any licensee, contractor, or subcontractor, components, equipment,

materials, or other goods or services, that relate to a licensee's activities subject to this part; may not:

(1) Engage in deliberate misconduct that causes or, but for detection, would have caused, a licensee to be in violation of any rule, regulation, or order, or any term, condition, or limitation of any license, issued by the Commission, or

(2) Deliberately submit to the NRC, a licensee, or a licensee's contractor or subcontractor, information that the person submitting the information knows to be incomplete or inaccurate in some respect material to the NRC.

(b) A person who violates paragraph (a)(1) or (a)(2) of this section may be subject to enforcement action in accordance with the procedures in 10 CFR part 2, subpart B.

(c) For purposes of paragraph (a)(1) of this section, deliberate misconduct by a person means an intentional act or omission that the person knows:

(1) Would cause a licensee to be in violation of any rule, regulation, or order, or any term, condition, or limitation, of any license issued by the Commission, or

(2) Constitutes a violation of a requirement, procedure, instruction, contract, purchase order or policy of a licensee, contractor, or subcontractor.

[56 FR 40690, Aug. 15, 1991]

Subpart B—Licenses

PREAPPLICATION REVIEW

Sec. 60.15 Site characterization.

(a) Prior to submittal of an application for a license to be issued under this part DOE shall conduct a program of site characterization with respect to the site to be described in such application.

(b) Unless the Commission determines with respect to the site described in the application that it is not necessary, site characterization shall include a program of in situ exploration and testing at the depths that wastes would be emplaced.

(c) The program of site characterization shall be conducted in accordance with the following:

(1) Investigations to obtain the required information shall be conducted in such a manner as to limit adverse effects on the long-term performance of the geologic repository to the extent practical.

(2) The number of exploratory boreholes and shafts shall be limited to the extent practical consistent with obtaining the information needed for site characterization.

(3) To the extent practical, exploratory boreholes and shafts in the geologic repository operations area shall be located where shafts are planned for underground facility construction and operation or where large unexcavated pillars are planned.

(4) Subsurface exploratory drilling, excavation, and in situ testing before and during construction shall be planned and coordinated with geologic repository operations area design and construction.
[46 FR 13980, Feb. 25, 1981, as amended at 48 FR 28219, June 21, 1983. Redesignated and amended at 51 FR 27162, July 30, 1986; 54 FR 27871, July 3, 1989]

Sec. 60.16 Site characterization plan required.

Before proceeding to sink shafts at any area which has been approved by the President for site characterization, DOE shall submit to the Director, for review and comment, a site characterization plan for such area. DOE shall defer the sinking of such shafts until such time as there has been an opportunity for Commission comments thereon to have been solicited and considered by DOE.
[51 FR 27162, July 30, 1986]

Sec. 60.17 Contents of site characterization plan.

The site characterization plan shall contain—

(a) A general plan for site characterization activities to be conducted at the area to be characterized, which general plan shall include:

(1) A description of such area, including information on quality assurance programs that have been applied to the collection, recording, and retention of information used in preparing such description.

(2) A description of such site characterization activities, including the following—

(i) The extent of planned excavations;

(ii) Plans for any onsite testing with radioactive material, including radioactive tracers, or nonradioactive material;

(iii) Plans for any investigation activities that may affect the capability of such area to isolate high-level radioactive waste;

(iv) Plans to control any adverse impacts from such site characterization activities that are important to safety or that are important to waste isolation; and

(v) Plans to apply quality assurance to data collection, recording, and retention.

(3) Plans for the decontamination and decommissioning of such area, and for the mitigation of any significant adverse environmental impacts caused by site characterization activities, if such area is determined unsuitable for application for a construction authorization for a geologic repository operations area;

(4) Criteria, developed pursuant to section 112(a) of the Nuclear Waste Policy Act of 1982, to be used to determine the suitability of such area for the location of a geologic repository; and

(5) Any other information which the Commission, by rule or order, requires.

(b) A description of the possible waste form or waste package for the high-level radioactive waste to be emplaced in such geologic repository, a description (tothe extent practicable) of the relationship between such waste form or waste package and the host rock at such area, and a description of the activities being conducted by DOE with respect to such possible waste form or waste package or their relationship; and

(c) A conceptual design for the geologic repository operations area that takes into account likely site-specific requirements.

[51 FR 27163, July 30, 1986]

Sec. 60.18 Review of site characterization activities.[2]

(a) The Director shall cause to be published in the Federal Register a notice that a site characterization plan has been received from DOE and that a staff review of such plan has begun. The notice shall identify the area to be characterized and the NRC staff members to be consulted for further information.

(b) The Director shall make a copy of the site characterization plan available at the Public Document Room. The Director shall also transmit copies of the published notice of receipt to the Governor and legislature of the State in which the area to be characterized is located and to the governing body of any affected Indian Tribe. The Director shall provide an opportunity, with respect to any area to be characterized, for the State in which such area is located and for affected Indian Tribes to present their views on the site characterization plan and their suggestions with respect to comments thereon which may be made by NRC. In addition, the Director shall make NRC staff available to consult with States and affected Indian Tribes as provided in Subpart C of this part.

(c) The Director shall review the site characterization plan and prepare a site characterization analysis with respect to such plan. In the preparation of such site characterization analysis, the Director may invite and consider the views of interested persons on DOE's site characterization plan and may review and consider comments made in connection with public hearings held by DOE.

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[2]In addition to the review of site characterization activities specified in this section, the Commission contemplates an ongoing review of other information on site investigation and site characterization, in order to allow early identification of potential licensing issues for timely resolution. This activity will include, for example, a review of the environmental assessments prepared by DOE at the time of site nomination, and review of issues related to long lead time exploratory shaft planning and procurement actions by DOE prior to issuance of site characterization plans.

(d) The Director shall provide to DOE the site characterization analysis together with such additional comments as may be warranted. These comments shall include either a statement that the Director has no objection to the DOE's site characterization program, if such a statement is appropriate, or specific objections with respect to DOE's program for characterization of the area concerned. In addition, the Director may make specific recommendations pertinent to DOE's site characterization program.

(e) If DOE's planned site characterization activities include onsite testing with radioactive material, including radioactive tracers, the Director's comments shall include a determination regarding whether or not the Commission concurs that the proposed use of such radioactive material is necessary to provide data for the preparation of the environmental reports required by law and for an application to be submitted under Sec. 60.22 of this part.

(f) The Director shall publish in the Federal Register a notice of availability of the site characterization anaylsis and a request for public comment. A reasonable period, not less than 90 days, shall be allowed for comment. Copies of the site characterization analysis and of the comments received shall be made available at the Public Document Room.

(g) During the conduct of site characterization activities, DOE shall report not less than once every six months to the Commission on the nature and extent of such activities and the information that has been developed, and on the progress of waste form and waste package research and development. The semiannual reports shall include the results of site characterization studies, the identification of new issues, plans for additional studies to resolve new issues, elimination of planned studies no longer necessary, identification of decision points reached and modifications to schedules where appropriate. DOE shall also report its progress in developing the design of a geologic repository operations area appropriate for the area being characterized, noting when key design parameters or features which depend upon the results of site characterization will be established. Other topics related to site characterization shall also be covered if requested by the Director.

(h) During the conduct of site characterization activities, NRC staff shall be permitted to visit and inspect the locations at which such activities are carried out and to observe excavations, borings, and in situ tests as they are done.

(i) The Director may comment at any time in writing to DOE, expressing current views on any aspect of site characterization. In particular, such comments shall be made whenever the Director, upon review of comments invited on the site characterization analysis or upon review of DOE's semiannual reports, determines that there are substantial new grounds for making recommendations or stating objections

to DOE's site characterization program. The Director shall invite public comment on any comments which the Director makes to DOE upon review of the DOE semiannual reports or on any other comments which the Director makes to DOE on site characterization.

(j) The Director shall transmit copies of the site characterization analysis and all comments to DOE made by the Director under this section to the Governor and legislature of the State in which the area to be characterized is located and to the governing body of any affected Indian Tribe. When transmitting the site characterization analysis under this paragraph, the Director shall invite the addressees to review and comment thereon.

(k) All correspondence between DOE and the NRC under this section, including the reports described in paragraph (g), shall be placed in the Public Document Room.

(l) The activities described in paragraphs (a) through (k) of this section constitute informal conference between a prospective applicant and the staff, as described in Sec. 2.101(a)(1) of this chapter, and are not part of a proceeding under the Atomic Energy Act of 1954, as amended. Accordingly, neither the issuance of a site characterization analysis nor any other comments of the Director made under this section constitutes a commitment to issue any authorization or license or in any way affect the authority of the Commission, the Atomic Safety and Licensing Appeal Board, Atomic Safety and Licensing Boards, other presiding officers, or the Director, in any such proceeding.
[51 FR 27163, July 30, 1986]

LICENSE APPLICATIONS

Sec. 60.21 Content of application.

(a) An application shall consist of general information and a Safety Analysis Report. An environmental impact statement shall be prepared in accordance with the Nuclear Waste Policy Act of 1982, as amended, and shall accompany the application. Any Restricted Data or National Security Information shall be separated from unclassified information.

(b) The general information shall include:

(1) A general description of the proposed geologic repository identifying the location of the geologic repository operations area, the general character of the proposed activities, and the basis for the exercise of licensing authority by the Commission.

(2) Proposed schedules for construction, receipt of waste, and emplacement of wastes at the proposed geologic repository operations area.

(3) A certification that DOE will provide at the geologic repository operations area such safeguards as it requires at comparable surface facilities (of DOE) to promote the common defense and security.

(4) A description of the physical security plan for protection against radiological sabotage. Since the radiation hazards associated with high-level wastes make them inherently unattractive as a target for theft or diversion, no detailed information need be submitted on protection against theft or diversion.

(5) A description of site characterization work actually conducted by DOE at all sites considered in the application and, as appropriate, explanations of why such work differed from the description of the site characterization program described in the Site Characterization Report for each site.

(c) The Safety Analysis Report shall include:

(1) A description and assessment of the site at which the proposed geologic repository operations area is to be located with appropriate attention to those features of the site that might affect geologic repository operations area design and performance. The description of the site shall identify the location of the geologic repository operations area with respect to the boundary of the accessible environment.

(i) The description of the site shall also include the following information regarding subsurface conditions. This description shall, in all cases, include this information with respect to the postclosure controlled area. In addition, where subsurface conditions outside the postclosure controlled area may affect isolation within the postclosure controlled area, the description shall include information with respect to subsurface conditions outside the postclosure controlled area to the extent the information is relevant and material. The detailed information referred to in this paragraph shall include:

(A) The orientation, distribution, aperture in-filling and origin of fractures, discontinuities, and heterogeneities;

(B) The presence and characteristics of other potential pathways such as solution features, breccia pipes, or other potentially permeable features;

(C) The geomechanical properties and conditions, including pore pressure and ambient stress conditions;

(D) The hydrogeologic properties and conditions;

(E) The geochemical properties; and

(F) The anticipated response of the geomechanical, hydrogeologic, and geochemical systems to the maximum design thermal loading, given the pattern of fractures and other discontinuities and the heat transfer properties of the rock mass and groundwater.

(ii) The assessment shall contain:

(A) An analysis of the geology, geophysics, hydrogeology, geochemistry, climatology, and meteorology of the site,

(B) Analyses to determine the degree to which each of the favorable and potentially adverse conditions, if present, has been characterized, and the extent to which it contributes to or detracts from isolation. For the purpose of determining the presence of the potentially adverse conditions, investigations shall extend from the surface to a depth sufficient to determine critical pathways for radionuclide migration from the underground facility to the accessible environment. Potentially

adverse conditions shall be investigated outside of the postclosure controlled area if they affect isolation within the postclosure controlled area.

(C) An evaluation of the performance of the proposed geologic repository for the period after permanent closure, assuming anticipated processes and events, giving the rates and quantities of releases of radionuclides to the accessible environment as a function of time; and a similar evaluation which assumes the occurrence of unanticipated processes and events.

(D) The effectiveness of engineered and natural barriers, including barriers that may not be themselves a part of the geologic repository operations area, against the release of radioactive material to the environment. The analysis shall also include a comparative evaluation of alternatives to the major design features that are important to waste isolation, with particular attention to the alternatives that would provide longer radionuclide containment and isolation.

(E) An analysis of the performance of the major design structures, systems, and components, both surface and subsurface, to identify those that are important to safety. For the purposes of this analysis, it shall be assumed that operations at the geologic repository operations area will be carried out at the maximum capacity and rate of receipt of radioactive waste stated in the application.

(F) An explanation of measures used to support the models used to perform the assessments required in paragraphs (A) through (D). Analyses and models that will be used to predict future conditions and changes in the geologic setting shall be supported by using an appropriate combination of such methods as field tests, in situ tests, laboratory tests which are representative of field conditions, monitoring data, and natural analog studies.

(2) A description and discussion of the design, both surface and subsurface, of the geologic repository operations area including: (i) the principal design criteria and their relationship to any general performance objectives promulgated by the Commission, (ii) the design bases and the relation of the design bases to the principal design criteria, (iii) information relative to materials of construction (including geologic media, general arrangement, and approximate dimensions), and (iv) codes and standards that DOE proposes to apply to the design and construction of the geologic repository operations area.

(3) A description and analysis of the design and performance requirements for structures, systems, and components of the geologic repository that are important to safety. The analysis must include a demonstration that—

(i) The requirements of Sec. 60.111(a) will be met, assuming occurrence of Category 1 design basis events; and

(ii) The requirements of Sec. 60.136 will be met, assuming occurrence of Category 2 design basis events.

(4) A description of the quality assurance program to be applied to the structures, systems, and components important to safety and to the engineered and natural barriers important to waste isolation.

(5) A description of the kind, amount, and specifications of the radioactive material proposed to be received and possessed at the geologic repository operations area.

(6) An identification and justification for the selection of those variables, conditions, or other items which are determined to be probable subjects of license specifications. Special attention shall be given to those items that may significantly influence the final design.

(7) A description of the program for control and monitoring of radioactive effluents and occupational radiation exposures to maintain such effluents and exposures in accordance with the requirements of part 20 of this chapter.

(8) A description of the controls that the applicant will apply to restrict access and to regulate land use at the site and adjacent areas, including a conceptual design of monuments which would be used to identify the postclosure controlled area after permanent closure.

(9) Plans for coping with radiological emergencies at any time prior to permanent closure and decontamination or dismantlement of surface facilities.

(10) A description of the nuclear material control and accounting program.

(11) A description of design considerations that are intended to facilitate permanent closure and decontamination or dismantlement of surface facilities.

(12) A description of plans for retrieval and alternate storage of the radioactive wastes should the geologic repository prove to be unsuitable for disposal of radioactive wastes.

(13) An identification and evaluation of the natural resources of the geologic setting, including estimates as to undiscovered deposits, the exploitation of which could affect the ability of the geologic repository to isolate radioactive wastes. Undiscovered deposits of resources characteristic of the area shall be estimated by reasonable inference based on geological and geophysical evidence. This evaluation of resources, including undiscoverd deposits, shall be conducted for the site and for areas of similar size that are representative of and are within the geologic setting. For natural resources with current markets the resources shall be assessed, with estimates provided of both gross and net value. The estimate of net value shall take into account current development, extraction and marketing costs. For natural resources without current markets, but which would be marketable given credible projected changes in economic or technological factors, the resources shall be described by physical factors such as tonnage or other amount, grade, and quality.

(14) An identification of those structures, systems, and components of the geologic repository, both surface and subsurface, which require research and development to confirm the adequacy of design. For

structures, systems, and components important to safety and for the engineered and natural barriers important to waste isolation, DOE shall provide a detailed description of the programs designed to resolve safety questions, including a schedule indicating when these questions would be resolved.

(15) The following information concerning activities at the geologic repository operations area:

(i) The organizational structure of DOE as it pertains to construction and operation of the geologic repository operations area including a description of any delegations of authority and assignments of responsibilities, whether in the form of regulations, administrative directives, contract provisions, or otherwise.

(ii) Identification of key positions which are assigned responsibility for safety at and operation of the geologic repository operations area.

(iii) Personnel qualifications and training requirements.

(iv) Plans for startup activities and startup testing.

(v) Plans for conduct of normal activities, including maintenance, surveillance, and periodic testing of structures, systems, and components of the geologic repository operation area.

(vi) Plans for permanent closure and plans for the decontamination or dismantlement of surface facilities.

(vii) Plans for any uses of the geologic repository operations area for purposes other than disposal of radioactive wastes, with an analysis of the effects, if any, that such uses may have upon the operation of the structures, systems, and components important to safety and the engineered and natural barriers important to waste isolation.

[46 FR 13980, Feb. 25, 1981, as amended at 48 FR 28219, June 21, 1983; 54 FR 27871, July 3, 1989; 61 FR 64268, Dec. 4, 1996]

Sec. 60.22 Filing and distribution of application.

(a) An application for a license to receive and possess source, special nuclear, or byproduct material at a geologic repository operations area at a site which has been characterized, and any amendments thereto, and an accompanying environmental impact statement and any supplements, shall be signed by the Secretary of Energy or the Secretary's authorized representative and shall be filed in triplicate with the Director.

(b) Each portion of such application and any amendments, and each environmental impact statement and any supplements, shall be accompanied by 30 additional copies. Another 120 copies shall be retained by DOE for distribution in accordance with written instructions from the Director or the Director's designee.

(c) DOE shall, upon notification of the appointment of an Atomic Safety and Licensing Board, update the application, eliminating all

superseded information, and supplement the environmental impact statement if necessary, and serve the updated application and environmental impact statement (as it may have been supplemented) as directed by the Board. At that time DOE shall also serve one such copy of the application and environmental impact statement on the Atomic Safety and Licensing Appeal Panel. Any subsequent amendments to the application or supplements to the environmental impact statement shall be served in the same manner.

(d) At the time of filing of an application and any amendments thereto, one copy shall be made available in an appropriate location near the proposed geologic repository operations area (which shall be a public document room, if one has been established) for inspection by the public and updated as amendments to the application are made. The environmental impact statement and any supplements thereto shall be made available in the same manner. An updated copy of the application, and the environmental impact statement and supplements, shall be produced at any public hearing held by the Commission on the application, for use by any party to the proceeding.

(e) The DOE shall certify that the updated copies of the application, and the environmental impact statement as it may have been supplemented, as referred to in paragraphs (c) and (d) of this section, contain the current contents of such documents submitted in accordance with the requirements of this part.

[54 FR 27871, July 3, 1989]

Sec. 60.23 Elimination of repetition.

In its application, environmental report, or Site Characterization Report, the DOE may incorporate by reference information contained in previous applications, statements, or reports filed with the Commission: Provided, That such references are clear and specific and that copies of the information so incorporated are available in the public document room located near the site of the proposed geologic repository.

Sec. 60.24 Updating of application and environmental impact statement.

(a) The application shall be as complete as possible in the light of information that is reasonably available at the time of docketing.

(b) The DOE shall update its application in a timely manner so as to permit the Commission to review, prior to issuance of a license:

(1) Additional geologic, geophysical, geochemical, hydrologic, meteorologic and other data obtained during construction.

(2) Conformance of construction of structures, systems, and components with the design.

(3) Results of research programs carried out to confirm the adequacy of designs.

(4) Other information bearing on the Commission's issuance of a license that was not available at the time a construction authorization was issued.

(c) The DOE shall supplement its environmental impact statement in a timely manner so as to take into account the environmental impacts of any substantial changes in its proposed actions or any significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts.

[46 FR 13980, Feb. 25, 1981, as amended at 54 FR 27872, July 3, 1989]

CONSTRUCTION AUTHORIZATION

Sec. 60.31 Construction authorization.

Upon review and consideration of an application and environmental impact statement submitted under this part, the Commission may authorize construction if it determines:

(a) *Safety.* That there is reasonable assurance that the types and amounts of radioactive materials described in the application can be received, possessed, and disposed of in a geologic repository operations area of the design proposed without unreasonable risk to the health and safety of the public. In arriving at this determination, the Commission shall consider whether:

(1) DOE has described the proposed geologic repository including but not limited to: (i) The geologic, geophysical, geochemical and hydrologic characteristics of the site; (ii) the kinds and quantities of radioactive waste to be received, possessed, stored, and disposed of in the geologic repository operations area; (iii) the principal architectural and engineering criteria for the design of the geologic repository operations area; (iv) construction procedures which may affect the capability of the geologic repository to serve its intended function; and (v) features or components incorporated in the design for the protection of the health and safety of the public.

(2) The site and design comply with the performance objectives and criteria contained in Subpart E of this part.

(3) The DOE's quality assurance program complies with the requirements of Subpart G of this part.

(4) The DOE's personnel training program complies with the criteria contained in Subpart H of this part.

(5) The DOE's emergency plan complies with the criteria contained in Subpart I of this part.

(6) The DOE's proposed operating procedures to protect health and to minimize danger to life or property are adequate.

(b) *Common defense and security.* That there is reasonable assurance that the activities proposed in the application will not be inimical to the common defense and security. A DOE certification that it will provide at the geologic repository operations area such safeguards as it requires

at comparable DOE surface facilities to promote the common defense and security will constitute a rebuttable presumption of noninimicality to the common defense and security.

(c) *Environmental.* That, after weighing the environmental, economic, technical and other benefits against environmental costs and considering available alternatives, the action called for is issuance of the construction authorization, with any appropriate conditions to protect environmental values.

[46 FR 13980, Feb. 25, 1981, as amended at 48 FR 28220, June 21, 1983; 54 FR 27872, July 3, 1989]

Sec. 60.32 Conditions of construction authorization.

(a) A construction authorization shall include such conditions as the Commission finds to be necessary to protect the health and safety of the public, the common defense and security, or environmental values.

(b) The Commission will incorporate in the construction authorization provisions requiring DOE to furnish periodic or special reports regarding: (1) Progress of construction, (2) any data about the site obtained during construction which are not within the predicted limits upon which the facility design was based, (3) any deficiencies in design and construction which, if uncorrected, could adversely affect safety at any future time, and (4) results of research and development programs being conducted to resolve safety questions.

(c) The construction authorization will include restrictions on subsequent changes to the features of the geologic repository and the procedures authorized. The restrictions that may be imposed under this paragraph can include measures to prevent adverse effects on the geologic setting as well as measures related to the design and construction of the geologic repository operations area. These restrictions will fall into three categories of descending importance to public health and safety as follows: (1) Those features and procedures which may not be changed without: (i) 60 days prior notice to the Commission (ii) 30 days notice of opportunity for a prior hearing, and (iii) prior Commission approval; (2) those features and procedures which may not be changed without (i) 60 days prior notice to the Commission, and (ii) prior Commission approval; and (3) those features and procedures which may not be changed without 60 days notice to the Commission. Features and procedures falling in paragraph (c)(3) of this section may not be changed without prior Commission approval if the Commission, after having received the required notice, so orders.

(d) A construction authorization shall be subject to the limitation that a license to receive and possess source, special nuclear, or byproduct material at the geologic repository operations area shall not be issued by the Commission until (1) the DOE has updated its application as specified in Sec. 60.24, and (2) the Commission has made the findings stated in Sec. 60.41.

[46 FR 13980, Feb. 25, 1981, as amended at 48 FR 28221, June 21, 1983]

Sec. 60.33 Amendment of construction authorization.

(a) An application for amendment of a construction authorization shall be filed with the Commission fully describing any changes desired and following as far as applicable the format prescribed in Sec. 60.21.

(b) In determining whether an amendment of a construction authorization will be approved, the Commission will be guided by the considerations which govern the issuance of the initial construction authorization, to the extent applicable.

LICENSE ISSUANCE AND AMENDMENT

Sec. 60.41 Standards for issuance of a license.

A license to receive and possess source, special nuclear, or byproduct material at a geologic repository operations area may be issued by the Commission upon finding that:

(a) Construction of the geologic repository operations area has been substantially completed in conformity with the application as amended, the provisions of the Atomic Energy Act, and the rules and regulations of the Commission. Construction may be deemed to be substantially complete for the purposes of this paragraph if the construction of (1) surface and interconnecting structures, systems, and components, and (2) any underground storage space required for initial operation are substantially complete.

(b) The activities to be conducted at the geologic repository operations area will be in conformity with the application as amended, the provisions of the Atomic Energy Act and the Energy Reorganization Act, and the rules and regulations of the Commission.

(c) The issuance of the license will not be inimical to the common defense and security and will not constitute an unreasonable risk to the health and safety of the public. A DOE certification that it will provide at the geologic repository operations area such safeguards as it requires at comparable DOE facilities to promote the common defense and security, will constitute a rebuttable presumption of non-inimicality to the common defense and security.

(d) All applicable requirements of part 51 have been satisfied.

Sec. 60.42 Conditions of license.

(a) A license issued pursuant to this part shall include such conditions, including license specifications, as the Commission finds to be necessary to protect the health and safety of the public, the common defense and security, and environmental values.

(b) Whether stated therein or not, the following shall be deemed conditions in every license issued:

(1) The license shall be subject to revocation, suspension, modification, or amendment for cause as provided by the Atomic Energy Act and the Commission's regulations.

(2) The DOE shall at any time while the license is in effect, upon written request of the Commission, submit written statements to enable the Commission to determine whether or not the license should be modified, suspended or revoked.

(3) The license shall be subject to the provisions of the Atomic Energy Act now or hereafter in effect and to all rules, regulations, and orders of the Commission. The terms and conditions of the license shall be subject to amendment, revision, or modification, by reason of amendments to or by reason of rules, regulations, and orders issued in accordance with the terms of the Atomic Energy Act.

(c) Each license shall be deemed to contain the provisions set forth in Section 183 b-d, inclusive, of the Atomic Energy Act, whether or not these provisions are expressly set forth in the license.

Sec. 60.43 License specification.

(a) A license issued under this part shall include license conditions derived from the analyses and evaluations included in the application, including amendments made before a license is issued, together with such additional conditions as the Commission finds appropriate.

(b) License conditions shall include items in the following categories:

(1) Restrictions as to the physical and chemical form and radioisotopic content of radioactive waste.

(2) Restrictions as to size, shape, and materials and methods of construction of radioactive waste packaging.

(3) Restrictions as to the amount of waste permitted per unit volume of storage space considering the physical characteristics of both the waste and the host rock.

(4) Requirements relating to test, calibration, or inspection to assure that the foregoing restrictions are observed.

(5) Controls to be applied to restricted access and to avoid disturbance to the postclosure controlled area and to areas outside the controlled area where conditions may affect isolation within the controlled area.

(6) Administrative controls, which are the provisions relating to organization and management, procedures, recordkeeping, review and audit, and reporting necessary to assure that activities at the facility are conducted in a safe manner and in conformity with the other license specifications.

[46 FR 13980, Feb. 25, 1981, as amended at 48 FR 28221, June 21, 1983; 61 FR 64268, Dec. 4, 1996]

Sec. 60.44 Changes, tests, and experiments.

(a)(1) Following authorization to receive and possess source, special nuclear, or byproduct material at a geologic repository operations area, the DOE may (i) make changes in the geologic repository operations area as described in the application, (ii) make changes in the procedures as described in the application, and (iii) conduct tests or experiments not described in the application, without prior Commission approval, provided the change, test, or experiment involves neither a change in the license conditions incorporated in the license nor an unreviewed safety question.

(2) A proposed change, test, or experiment shall be deemed to involve an unreviewed safety question if (i) the likelihood of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the application is increased, (ii) the possibility of an accident or malfunction of a different type than any previously evaluated in the application is created, or (iii) the margin of safety as defined in the basis for any license condition is reduced.

(b) The DOE shall maintain records of changes in the geologic repository operations area and of changes in procedures made pursuant to this section, to the extent that such changes constitute changes in the geologic repository operations area or procedures as described in the application. Records of tests and experiments carried out pursuant to paragraph (a) of this section shall also be maintained. These records shall include a written safety evaluation which provides the basis for the determination that the change, test, or experiment does not involve an unreviewed safety question. The DOE shall prepare annually, or at such shorter intervals as may be specified in the license, a report containing a brief description of such changes, tests, and experiments, including a summary of the safety evaluation of each. The DOE shall furnish the report to the appropriate NRC Regional Office shown in Appendix D of part 20 of this chapter with a copy to the Director, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555. Any report submitted pursuant to this paragraph shall be made a part of the public record of the licensing proceedings.

[46 FR 13980, Feb. 25, 1981, as amended at 52 FR 31612, Aug. 21, 1987]

Sec. 60.45 Amendment of license.

(a) An application for amendment of a license may be filed with the Commission fully describing the changes desired and following as far as applicable the format prescribed for license applications.

(b) In determining whether an amendment of a license will be approved, the Commission will be guided by the considerations that govern the issuance of the initial license, to the extent applicable.

Sec. 60.46 Particular activities requiring license amendment.

(a) Unless expressly authorized in the license, an amendment of the license shall be required with respect to any of the following activities:

(1) Any action which would make emplaced high-level radioactive waste irretrievable or which would substantially increase the difficulty of retrieving such emplaced waste.

(2) Dismantling of structures.

(3) Removal or reduction of controls applied to restrict access to or avoid disturbance of the controlled area and to areas outside the postclosure controlled area where conditions may affect isolation within the controlled area.

(4) Destruction or disposal of records required to be maintained under the provisions of this part.

(5) Any substantial change to the design or operating procedures from that specified in the license.

(6) Permanent closure.

(7) Any other activity involving an unreviewed safety question.

(b) An application for such an amendment shall be filed, and shall be reviewed, in accordance with the provisions of Sec. 60.45.

[46 FR 13980, Feb. 25, 1981, as amended at 48 FR 28221, June 21, 1983; 61 FR 64268, Dec. 4, 1996]

PERMANENT CLOSURE

Sec. 60.51 License amendment for permanent closure.

(a) DOE shall submit an application to amend the license prior to permanent closure. The submission shall consist of an update of the license application submitted under Secs. 60.21 and 60.22, including:

(1) A description of the program for post-permanent closure monitoring of the geologic repository.

(2) A detailed description of the measures to be employed—such as land use controls, construction of monuments, and preservation of records—to regulate or prevent activities that could impair the long-term isolation of emplaced waste within the geologic repository and to assure that relevant information will be preserved for the use of future generations. As a minimum, such measures shall include:

(i) Identification of the postclosure controlled area and geologic repository operations area by monuments that have been designed, fabricated, and emplaced to be as permanent as is practicable; and

(ii) Placement of records in the archives and land record systems of local State, and Federal government agencies, and archives elsewhere in the world, that would be likely to be consulted by potential human intruders—such records to identify the location of the geologic repository operations area, including the underground facility,

boreholes and shafts, and the boundaries of the postclosure controlled area, and the nature and hazard of the waste.

(3) Geologic, geophysical, geochemical, hydrologic, and other site data that are obtained during the operational period pertinent to the long-term isolation of emplaced radioactive wastes.

(4) The results of tests, experiments, and any other analyses relating to backfill of excavated areas, shaft sealing, waste interaction with the host rock, and any other tests, experiments, or analyses pertinent to the long-term isolation of emplaced wastes within the geologic repository.

(5) Any substantial revision of plans for permanent closure.

(6) Other information bearing upon permanent closure that was not available at the time a license was issued.

(b) If necessary, so as to take into account the environmental impact of any substantial changes in the permanent closure activities proposed to be carried out or any significant new information regarding the environmental impacts of such closure, DOE shall also supplement its environmental impact statement and submit such statement, as supplemented, with the application for license amendment.

[46 FR 13980, Feb. 25, 1981, as amended at 48 FR 28221, June 21, 1983; 54 FR 27872, July 3, 1989; 61 FR 64268, Dec. 4, 1996]

Sec. 60.52 Termination of license.

(a) Following permanent closure and the decontamination or dismantlement of surface facilities, DOE may apply for an amendment to terminate the license.

(b) Such application shall be filed, and will be reviewed, in accordance with the provisions of Sec. 60.45 and this section.

(c) A license shall be terminated only when the Commission finds with respect to the geologic repository:

(1) That the final disposition of radioactive wastes has been made in conformance with the DOE's plan, as amended and approved as part of the license.

(2) That the final state of the geologic repository operations area conforms to DOE's plans for permanent closure and DOE's plans for the decontamination or dismantlement of surface facilities, as amended and approved as part of the license.

(3) That the termination of the license is authorized by law, including sections 57, 62, and 81 of the Atomic Energy Act, as amended.

[46 FR 13980, Feb. 25, 1981, as amended at 48 FR 28222, June 21, 1983]

Subpart C—Participation by State Governments and Affected Indian Tribes

Source: 51 FR 27164, July 30, 1986, unless otherwise noted.

Sec. 60.61 Provision of information.

(a) The Director shall provide to the Governor and legislature of any State in which a geologic repository operations area is or may be located, and to the governing body of any affected Indian Tribe, timely and complete information regarding determinations or plans made by the Commission with respect to the site characterization, siting, development, design, licensing, construction, operation, regulation, permanent closure, or decontamination and dismantlement of surface facilities, of such geologic repository operations area.

(b) For purposes of this section, a geologic repository operations area shall be considered to be one which "may be located" in a State if the location thereof in such State has been described in a site characterization plan submitted to the Commission under this part.

(c) Notwithstanding paragraph (a) of this section, the Director is not required to distribute any document to any entity if, with respect to such document, that entity or its counsel is included on a service list prepared pursuant to part 2 of this chapter.

(d) Copies of all communications by the Director under this section shall be placed in the Public Document Room, and copies thereof shall be furnished to DOE.

Sec. 60.62 Site review.

(a) Whenever an area has been approved by the President for site characterization, and upon request of a State or an affected Indian Tribe, the Director shall make NRC staff available to consult with representatives of such States and Tribes.

(b) Requests for consultation shall be made in writing to the Director.

(c) Consultation under this section may include:

(1) Keeping the parties informed of the Director's views on the progress of site characterization.

(2) Review of applicable NRC regulations, licensing procedures, schedules, and opportunities for State and Tribe participation in the Commission's regulatory activities.

(3) Cooperation in development of proposals for State and Tribe participation in license reviews.

Sec. 60.63 Participation in license reviews.

(a) State and local governments and affected Indian Tribes may participate in license reviews as provided in subpart G of part 2 of this chapter. A State in which a repository for high-level radioactive waste is proposed to be located and any affected Indian Tribe shall have an unquestionable legal right to participate as a party in such proceedings.

(b) In addition, whenever an area has been approved by the President for site characterization, a State or an affected Indian Tribe may submit to the Director a proposal to facilitate its participation in the review of a site characterization plan and/or license application. The proposal may be submitted at any time and shall contain a description and schedule of how the State or affected Indian Tribe wishes to participate in the review, or what services or activities the State or affected Indian Tribe wishes NRC to carry out, and how the services or activities proposed to be carried out by NRC would contribute to such participation. The proposal may include educational or information services (seminars, public meetings) or other actions on the part of NRC, such as establishing additional public document rooms or employment or exchange of State personnel under the Intergovernmental Personnel Act.

(c) The Director shall arrange for a meeting between the representatives of the State or affected Indian Tribe and the NRC staff to discuss any proposal submitted under paragraph (b) of this section, with a view to identifying any modifications that may contribute to the effective participation by such State or Tribe.

(d) Subject to the availability of funds, the Director shall approve all or any part of a proposal, as it may be modified through the meeting described above, if it is determined that:

(1) The proposed activities are suitable in light of the type and magnitude of impacts which the State or affected Indian Tribe may bear;

(2) The proposed activities:

(i) Will enhance communications between NRC and the State or affected Indian Tribe;

(ii) Will make a productive and timely contribution to the review; and

(iii) Are authorized by law.

(e) The Director will advise the State or affected Indian Tribe whether its proposal has been accepted or denied, and if all or any part of proposal is denied, the Director shall state the reason for the denial.

(f) Proposals submitted under this section, and responses thereto, shall be made available at the Public Document Room.

Sec. 60.64 Notice to States.

If the Governor and legislature of a State have jointly designated on their behalf a single person or entity to receive notice and information from the Commission under this part, the Commission will provide such notice and information to the jointly designated person or entity instead of the Governor and legislature separately.

Sec. 60.65 Representation.

Any person who acts under this subpart as a representative for a State (or for the Governor or legislature thereof) or for an affected Indian Tribe shall include in the request or other submission, or at the request of the Commission, a statement of the basis of his or her authority to act in such representative capacity.

Subpart D—Records, Reports, Tests, and Inspections

Sec. 60.71 Records and reports.

(a) DOE shall maintain such records and make such reports in connection with the licensed activity as may be required by the conditions of the license or by rules, regulations, and orders of the Commission as authorized by the Atomic Energy Act and the Energy Reorganization Act.

(b) Records of the receipt, handling, and disposition of radioactive waste at a geologic repository operations area shall contain sufficient information to provide a complete history of the movement of the waste from the shipper through all phases of storage and disposal. DOE shall retain these records in a manner that ensures their useability for future generations in accordance with Sec. 60.51(a)(2).

[48 FR 28222, June 21, 1983, as amended at 53 FR 19251, May 27, 1988]

Sec. 60.72 Construction records.

(a) DOE shall maintain records of construction of the geologic repository operations area in a manner that ensures their useability for future generations in accordance with Sec. 60.51(a)(2).

(b) The records required under paragraph (a) shall include at least the following:

(1) Surveys of the underground facility excavations, shafts, and boreholes referenced to readily identifiable surface features or monuments;

(2) A description of the materials encountered;

(3) Geologic maps and geologic cross sections;
(4) Locations and amount of seepage;
(5) Details of equipment, methods, progress, and sequence of work;
(6) Construction problems;
(7) Anomalous conditions encountered;
(8) Instrument locations, readings, and analysis;
(9) Location and description of structural support systems;
(10) Location and description of dewatering systems; and
(11) Details, methods of emplacement, and location of seals used.
[48 FR 28222, June 21, 1983, as amended at 53 FR 19251, May 27, 1988]

Sec. 60.73 Reports of deficiencies.

DOE shall promptly notify the Commission of each deficiency found in the characteristics of the site, and design and construction of the geologic repository operations area which, were it to remain uncorrected, could: (a) Be a substantial safety hazard, (b) represent a significant deviation from the design criteria and design bases stated in the application, or (c) represent a deviation from the conditions stated in the terms of a construction authorization or the license, including license specifications. The notification shall be in the form of a written report, copies of which shall be sent to the Director and to the appropriate Nuclear Regulatory Commission Regional Office listed in appendix D of part 20 of this chapter. [48 FR 28222, June 21, 1983]

Sec. 60.74 Tests.

(a) DOE shall perform, or permit the Commission to perform, such tests as the Commission deems appropriate or necessary for the administration of the regulations in this part. These may include tests of:
(1) Radioactive waste,
(2) The geologic repository including its structures, systems, and components,
(3) Radiation detection and monitoring instruments, and
(4) Other equipment and devices used in connection with the receipt, handling, or storage of radioactive waste.
(b) The tests required under this section shall include a performance confirmation program carried out in accordance with subpart F of this part. [48 FR 28222, June 21, 1983]

Sec. 60.75 Inspections.

(a) DOE shall allow the Commission to inspect the premises of the geologic repository operations area and adjacent areas to which DOE has rights of access.
(b) DOE shall make available to the Commission for inspection, upon reasonable notice, records kept by DOE pertaining to activities under this part.

(c)(1) DOE shall upon requests by the Director, Office of Nuclear Material Safety and Safeguards, provide rent-free office space for the exclusive use of the Commission inspection personnel. Heat, air-conditioning, light, electrical outlets and janitorial services shall be furnished by DOE. The office shall be convenient to and have full access to the facility and shall provide the inspector both visual and acoustic privacy.

(2) The space provided shall be adequate to accommodate a full-time inspector, a part-time secretary and transient NRC personnel and will be generally commensurate with other office facilities at the geologic repository operations area. A space of 250 square feet either within the geologic repository operations area's office complex or in an office trailer or other onsite space at the geologic repository operations area is suggested as a guide. For locations at which activities are carried out under licenses issued under other parts of this chapter, additional space may be requested to accomodate additional full-time inspectors. The Office space that is provided shall be subject to the approval of the Director, Office of Nuclear Material Safety and Safeguards. All furniture, supplies and communication equipment will be furnished by the Commission.

(3) DOE shall afford any NRC resident inspector assigned to that location, or other NRC inspectors identified by the Regional Administrator as likely to inspect the facility, immediate unfettered access, equivalent to access provided regular employees, following proper identification and compliance with applicable access control measures for security, radiological protection and personal safety.
[48 FR 28222, June 21, 1983, as amended at 52 FR 31612, Aug. 21, 1987]

Subpart E—Technical Criteria

Source: 48 FR 28222, June 21, 1983, unless otherwise noted.

Sec. 60.101 Purpose and nature of findings.

(a)(1) Subpart B of this part prescribes the standards for issuance of a license to receive and possess source, special nuclear, or byproduct material at a geologic repository operations area. In particular, Sec. 60.41(c) requires a finding that the issuance of a license will not constitute an unreasonable risk to the health and safety of the public. The purpose of this subpart is to set out performance objectives and site and design criteria which, if satisfied, will support such a finding of no unreasonable risk.

(2) While these performance objectives and criteria are generally stated in unqualified terms, it is not expectedthat complete assurance that they will be met can be presented. A reasonable assurance, on the basis of the record before the Commission, that the objectives and criteria will be met is

the general standardthat is required. For Sec. 60.112, and other portions of this subpart that impose objectives and criteria for repository performance over long times into the future, there will inevitably be greater uncertainties. Proof of the future performance of engineered barrier systems and the geologic setting over time periods of many hundreds or many thousands of years is not to be had in the ordinary sense of the word. For such long-term objectives and criteria, what is required is reasonable assurance, making allowance for the time period, hazards, and uncertainties involved, that the outcome will be in conformance with those objectives and criteria. Demonstration of compliance with such objectives and criteria will involve the use of data from accelerated tests and predictive models that are supported by such measures as field and laboratory tests, monitoring data and natural analog studies.

(b) Subpart B of this part also lists findings that must be made in support of an authorization to construct a geologic repository operations area. In particular, Sec. 60.31(a) requires a finding that there is reasonable assurance that the types and amounts of radioactive materials described in the application can be received, possessed, and disposed of in a geologic repository operations area of the design proposed without unreasonable risk to the health and safety of the public. As stated in that paragraph, in arriving at this determination, the Commission will consider whether the site and design comply with the criteria contained in this subpart. Once again, while the criteria may be written in unqualified terms, the demonstration of compliance may take uncertainties and gaps in knowledge into account, provided that the Commission can make the specified finding of reasonable assurance as specified in paragraph (a) of this section.

Sec. 60.102 Concepts.

This section provides a functional overview of subpart E. In the event of any inconsistency with definitions found in Sec. 60.2, those definitions shall prevail.

(a) *The HLW facility.* NRC exercises licensing and related regulatory authority over those facilities described in section 202 (3) and (4) of the Energy Reorganization Act of 1974. Any of these facilities is designated a HLW facility.

(b) *The geologic repository operations area.* (1) This part deals with the exercise of authority with respect to a particular class of HLW facility—namely a geologic repository operations area.

(2) *A geologic repository operations area* consists of those surface and subsurface areas that are part of a geologic repository where radioactive waste handling activities are conducted. The underground structure, including openings and backfill materials, but excluding shafts, boreholes, and their seals, is designated the underground facility.

(3) The exercise of Commission authority requires that the geologic repository operations area be used for *storage* (which includes *disposal*) of *high-level radioactive wastes (HLW).*

(4) HLW includes irradiated reactor fuel as well as reprocessing wastes. However, if DOE proposes to use the geologic repository operations area for storage of *radioactive waste* other than HLW, the storage of this radioactive waste is subject to the requirements of this part.

(c) *Areas related to isolation.* Although the activities subject to regulation under this part are those to be carried out at the geologic repository operations area, the licensing process also considers characteristics of adjacent areas that are defined in other ways. There is to be an area surrounding the underground facility referred to above, which is designated the postclosure *controlled area,* within which DOE is to exercise specified controls to prevent adverse human actions following permanent closure. The location of the controlled area is the *site.* The *accessible environment* is the atmosphere, land surface, surface water, oceans, and the portion of the lithosphere that is outside the controlled area. There is an area, designated the *geologic setting,* which includes the geologic, hydrologic, and geochemical systems of the region in which a geologic repository operations area is or may be located. The geologic repository operations area plus the portion of the geologic setting that provides isolation of the radioactive waste make up the *geologic repository.*

(d) *Stages in the licensing process.* There are several stages in the licensing process. The *site characterization* stage, though begun before submission of a license application, may result in consequences requiring evaluation in the license review. The *construction stage* would follow, after issuance of a construction authorization. *A period of operations* follows the issuance of a license by the Commission. The period of operations includes the time during which *emplacement* of wastes occurs; any subsequent period before permanent closure during which the emplaced wastes are *retrievable;* and *permanent closure,* which includes sealing of shafts. Permanent closure represents the end of active human intervention with respect to the engineered barrier system.

(e) *Isolation of waste.* (1) During the first several hundred years following permanent closure of a geologic repository, when radiation and thermal levels are high and the uncertainties in assessing repository performance are large, special emphasis is placed upon the ability to contain the wastes by waste packages within an *engineered barrier system.* This is known as the *containment period.* The *engineered barrier system* includes the waste packages and the underground facility. A *waste package* is composed of the waste form and any containers, shielding, packing, and absorbent materials immediately surrounding an individual waste container. The *underground facility* means the underground structure, including openings and backfill materials, but excluding, shafts, boreholes, and their seals.

(2) Following the containment period special emphasis is placed upon the ability to achieve isolation of the wastes by virtue of the characteristics of the geologic repository. The engineered barrier system works to control the release of radioactive material to the geologic setting and the geologic setting works to control the release of radioactive material to the accessible environment. *Isolation* means inhibiting the transport of radioactive material so that amounts and concentrations of the materials entering the accessible environment will be kept within prescribed limits.
[48 FR 28222, June 21, 1983, as amended at 61 FR 64268, Dec. 4, 1996]

PERFORMANCE OBJECTIVES

Sec. 60.111 Performance of the geologic repository operations area through permanent closure.

(a) *Protection against radiation exposures and releases of radioactive material.* The geologic repository operations area shall be designed so that until permanent closure has been completed, radiation exposures and radiation levels, and releases of radioactive materials to unrestricted areas, will be maintained within the limits specified in part 20 of this chapter and such generally applicable environmental standards for radioactivity as may have been established by the Environmental Protection Agency.

(b) *Retrievability of waste.* (1) The geologic repository operations area shall be designed to preserve the option of waste retrieval throughout the period during which wastes are being emplaced and, thereafter, until the completion of a preformance confirmation program and Commission review of the information obtained from such a program. To satisfy this objective, the geologic repository operations area shall be designed so that any or all of the emplaced waste could be retrieved on a reasonable schedule starting at any time up to 50 years after waste emplacement operations are initiated, unless a different time period is approved or specified by the Commission. This different time period may be established on a case-by-case basis consistent with the emplacement schedule and the planned performance confirmation program.

(2) This requirement shall not preclude decisions by the Commission to allow backfilling part or all of, or permanent closure of, the geologic repository operations area prior to the end of the period of design for retrievability.

(3) For purposes of this paragraph, a reasonable schedule for retrieval is one that would permit retrieval in about the same time as that devoted to construction of the geologic repository operations area and the emplacement of wastes.
[48 FR 28222, June 21, 1983, as amended at 61 FR 64268, Dec. 4, 1996; 62 FR 59276, Nov. 3, 1997]

Sec. 60.112 Overall system performance objective for the geologic repository after permanent closure.

The geologic setting shall be selected and the engineered barrier system and the shafts, boreholes and their seals shall be designed to assure that releases of radioactive materials to the accessible environment following permanent closure conform to such generally applicable environmental standards for radioactivity as may have been established by the Environmental Protection Agency with respect to both anticipated processes and events and unanticipated processes and events.

Sec. 60.113 Performance of particular barriers after permanent closure.

(a) *General provisions*—(1) *Engineered barrier system.* (i) The engineered barrier system shall be designed so that assuming anticipated processes and events: (A) Containment of HLW will be substantially complete during the period when radiation and thermal conditions in the engineered barrier system are dominated by fission product decay; and (B) any release of radionuclides from the engineered barrier system shall be a gradual process which results in small fractional releases to the geologic setting over long times. For disposal in the saturated zone, both the partial and complete filling with groundwater of available void spaces in the underground facility shall be appropriately considered and analysed among the anticipated processes and events in designing the engineered barrier system.

(ii) In satisfying the preceding requirement, the engineered barrier system shall be designed, assuming anticipated processes and events, so that:

(A) Containment of HLW within the waste packages will be substantially complete for a period to be determined by the Commission taking into account the factors specified in Sec. 60.113(b) provided, that such period shall be not less than 300 years nor more than 1,000 years after permanent closure of the geologic repository; and

(B) The release rate of any radionuclide from the engineered barrier system following the containment period shall not exceed one part in 100,000 per year of the inventory of that radionuclide calculated to be present at 1,000 years following permanent closure, or such other fraction of the inventory as may be approved or specified by the Commission; provided, that this requirement does not apply to any radionuclide which is released at a rate less than 0.1% of the calculated total release rate limit. The calculated total release rate limit shall be taken to be one part in 100,000 per year of the inventory of radioactive waste, originally emplaced in the underground facility, that remains after 1,000 years of radioactive decay.

(2) *Geologic setting.* The geologic repository shall be located so that pre-waste-emplacement groundwater travel time along the fastest path of likely radionuclide travel from the disturbed zone to the accessible environment shall be at least 1,000 years or such other travel time as may be approved or specified by the Commission.

(b) On a case-by-case basis, the Commission may approve or specify some other radionuclide release rate, designed containment period or pre-waste-emplacement groundwater travel time, provided that the overall system performance objective, as it relates to anticipated processes and events, is satisfied. Among the factors that the Commission may take into account are:

(1) Any generally applicable environmental standard for radioactivity established by the Environmental Protection Agency;

(2) The age and nature of the waste, and the design of the underground facility, particularly as these factors bear upon the time during which the thermal pulse is dominated by the decay heat from the fission products;

(3) The geochemical characteristics of the host rock, surrounding strata and groundwater; and

(4) Particular sources of uncertainty in predicting the performance of the geologic repository.

(c) Additional requirements may be found to be necessary to satisfy the overall system performance objective as it relates to unanticipated processes and events.

LAND OWNERSHIP AND CONTROL

Sec. 60.121 Requirements for ownership and control of interests in land.

(a) *Ownership of land.* (1) Both the geologic repository operations area and the postclosure controlled area shall be located in and on lands that are either acquired lands under the jurisdiction and control of DOE, or lands permanently withdrawn and reserved for its use.

(2) These lands shall be held free and clear of all encumbrances, if significant, such as: (i) Rights arising under the general mining laws; (ii) easements for right-of-way; and (iii) all other rights arising under lease, rights of entry, deed, patent, mortgage, appropriation, prescription, or otherwise.

(b) *Additional controls.* Appropriate controls shall be established outside of the postclosure controlled area. DOE shall exercise any jurisdiction and control over surface and subsurface estates necessary to prevent adverse human actions that could significantly reduce the geologic repository's ability to achieve isolation. The rights of DOE may take the form of appropriate possessory interests, servitudes, or withdrawals from location or patent under the general mining laws.

(c) *Water rights.* (1) DOE shall also have obtained such water rights as may be needed to accomplish the purpose of the geologic repository operations area.

(2) Water rights are included in the additional controls to be established under paragraph (b) of this section.

[48 FR 28222, June 21, 1983, as amended at 61 FR 64268, Dec. 4, 1996]

SITING CRITERIA

Sec. 60.122 Siting criteria.

(a)(1) A geologic setting shall exhibit an appropriate combination of the conditions specified in paragraph (b) of this section so that, together with the engineered barriers system, the favorable conditions present are sufficient to provide reasonable assurance that the performance objectives relating to isolation of the waste will be met.

(2) If any of the potentially adverse conditions specified in paragraph (c) of this section is present, it may compromise the ability of the geologic repository to meet the performance objectives relating to isolation of the waste. In order to show that a potentially adverse condition does not so compromise the performance of the geologic repository the following must be demonstrated:

(i) The potentially adverse human activity or natural condition has been adequately investigated, including the extent to which the condition may be present and still be undetected taking into account the degree of resolution achieved by the investigations; and

(ii) The effect of the potentially adverse human activity or natural condition on the site has been adequately evaluated using analyses which are sensitive to the potentially adverse human activity or natural condition and assumptions which are not likely to underestimate its effect; and

(iii)(A) The potentially adverse human activity or natural condition is shown by analysis pursuant to paragraph (a)(2)(ii) of this section not to affect significantly the ability of the geologic repository to meet the performance objectives relating to isolation of the waste, or

(B) The effect of the potentially adverse human activity or natural condition is compensated by the presence of a combination of the favorable characteristics so that the performance objectives relating to isolation of the waste are met, or

(C) The potentially adverse human activity or natural condition can be remedied.

(b) *Favorable conditions.* (1) The nature and rates of tectonic, hydrogeologic, geochemical, and geomorphic processes (or any of such processes) operating within the geologic setting during the Quaternary Period, when projected, would not affect or would favorably affect the ability of the geologic repository to isolate the waste.

(2) For disposal in the saturated zone, hydrogeologic conditions that provide:

(i) A host rock with low horizontal and vertical permeability;

(ii) Downward or dominantly horizontal hydraulic gradient in the host rock and immediately surrounding hydrogeologic units; and

(iii) Low vertical permeability and low hydraulic gradient between the host rock and the surrounding hydrogeologic units.

(3) Geochemical conditions that:

(i) Promote precipitation or sorption of radionuclides;

(ii) Inhibit the formation of particulates, colloids, and inorganic and organic complexes that increase the mobility of radionuclides; or

(iii) Inhibit the transport of radionuclides by particulates, colloids, and complexes.

(4) Mineral assemblages that, when subjected to anticipated thermal loading, will remain unaltered or alter to mineral assemblages having equal or increased capacity to inhibit radionuclide migration.

(5) Conditions that permit the emplacement of waste at a minimum depth of 300 meters from the ground surface. (The ground surface shall be deemed to be the elevation of the lowest point on the surface above the disturbed zone.)

(6) A low population density within the geologic setting and a postclosure controlled area that is remote from population centers.

(7) Pre-waste-emplacement groundwater travel time along the fastest path of likely radionuclide travel from the disturbed zone to the accessible environment that substantially exceeds 1,000 years.

(8) For disposal in the unsaturated zone, hydrogeologic conditions that provide—

(i) Low moisture flux in the host rock and in the overlying and underlying hydrogeologic units;

(ii) A water table sufficiently below the underground facility such that fully saturated voids contiguous with the water table do not encounter the underground facility;

(iii) A laterally extensive low-permeability hydrogeologic unit above the host rock that would inhibit the downward movement of water or divert downward moving water to a location beyond the limits of the underground facility;

(iv) A host rock that provides for free drainage; or

(v) A climatic regime in which the average annual historic precipitation is a small percentage of the average annual potential evapotranspiration.

(c) *Potentially adverse conditions.* The following conditions are potentially adverse conditions if they are characteristic of the postclosure controlled area or may affect isolation within the controlled area.

(1) Potential for flooding of the underground facility, whether resulting from the occupancy and modification of floodplains or from the failure of existing or planned man-made surface water impoundments.

(2) Potential for foreseeable human activity to adversely affect the groundwater flow system, such as groundwater withdrawal, extensive irrigation, subsurface injection of fluids, underground pumped storage, military activity or construction of large scale surface water impoundments.

(3) Potential for natural phenomena such as landslides, subsidence, or volcanic activity of such a magnitude that large-scale surface water impoundments could be created that could change the regional groundwater flow system and thereby adversely affect the performance of the geologic repository.

(4) Structural deformation, such as uplift, subsidence, folding, or faulting that may adversely affect the regional groundwater flow system.

(5) Potential for changes in hydrologic conditions that would affect the migration of radionuclides to the accessible environment, such as changes in hydraulic gradient, average interstitial velocity, storage coefficient, hydraulic conductivity, natural recharge,potentiometric levels, and discharge points.

(6) Potential for changes in hydrologic conditions resulting from reasonably foreseeable climatic changes.

(7) Groundwater conditions in the host rock, including chemical composition, high ionic strength or ranges of Eh-pH, that could increase the solubility or chemical reactivity of the engineered barrier system.

(8) Geochemical processes that would reduce sorption of radionuclides, result in degradation of the rock strength, or adversely affect the performance of the engineered barrier system.

(9) Groundwater conditions in the host rock that are not reducing.

(10) Evidence of dissolutioning such as breccia pipes, dissolution cavities, or brine pockets.

(11) Structural deformation such as uplift, subsidence, folding, and faulting during the Quaternary Period.

(12) Earthquakes which have occurred historically that if they were to be repeated could affect the site significantly.

(13) Indications, based on correlations of earthquakes with tectonic processes and features, that either the frequency of occurrence or magnitude of earthquakes may increase.

(14) More frequent occurrence of earthquakes or earthquakes of higher magnitude than is typical of the area in which the geologic setting is located.

(15) Evidence of igneous activity since the start of the Quaternary Period.

(16) Evidence of extreme erosion during the Quaternary Period.

(17) The presence of naturally occurring materials, whether identified or undiscovered, within the site, in such form that:

(i) Economic extraction is currently feasible or potentially feasible during the foreseeable future; or

(ii) Such materials have greater gross value or net value than the average for other areas of similar size that are representative of and located within the geologic setting.

(18) Evidence of subsurface mining for resources within the site.

(19) Evidence of drilling for any purpose within the site.

(20) Rock or groundwater conditions that would require complex engineering measures in the design and construction of the underground facility or in the sealing of boreholes and shafts.

(21) Geomechanical properties that do not permit design of underground opening that will remain stable through permanent closure.

(22) Potential for the water table to rise sufficiently so as to cause saturation of an underground facility located in the unsaturated zone.

(23) Potential for existing or future perched water bodies that may saturate portions of the underground facility or provide a faster flow path from an underground facility located in the unsaturated zone to the accessible environment.

(24) Potential for the movement of radionuclides in a gaseous state through air-filled pore spaces of an unsaturated geologic medium to the accessible environment.

[48 FR 28222, June 21, 1983, as amended at 50 FR 29647, July 22, 1985; 61 FR 64269, Dec. 4, 1996]

DESIGN CRITERIA FOR THE GEOLOGIC REPOSITORY OPERATIONS AREA

Sec. 60.130 General considerations.

Pursuant to the provisions of Sec. 60.21(c)(2)(i), an application to receive, possess, store, and dispose of high-level radioactive waste in the geologic repository operations area must include the principal design criteria for a proposed facility. The principal design criteria establish the necessary design, fabrication, construction, testing, maintenance, and performance requirements for structures, systems, and components important to safety and/or important to waste isolation. Sections 60.131 through 60.134 specify minimum requirements for the principal design criteria for the geologic repository operations area.

These design criteria are not intended to be exhaustive. However, omissions in Secs. 60.131 through 60.134 do not relieve DOE from any obligation to provide such features in a specific facility needed to achieve the performance objectives.

[61 FR 64269, Dec. 4, 1996]

Sec. 60.131 General design criteria for the geologic repository operations area.

(a) *Radiological protection.* The geologic repository operations area shall be designed to maintain radiation doses, levels, and concentrations of radioactive material in air in restricted areas within the limits specified in part 20 of this chapter. Design shall include:

(1) Means to limit concentrations of radioactive material in air;

(2) Means to limit the time required to perform work in the vicinity of radioactive materials, including, as appropriate, designing equipment for ease of repair and replacement and providing adequate space for ease of operation;

(3) Suitable shielding;

(4) Means to monitor and control the dispersal of radioactive contamination;

(5) Means to control access to high radiation areas or airborne radioactivity areas; and

(6) A radiation alarm system to warn of significant increases in radiation levels, concentrations of radioactive material in air, and of increased radioactivity released in effluents. The alarm system shall be designed with provisions for calibration and for testing its operability.

(b) Protection against design basis events. The structures, systems, and components important to safety shall be designed so that they will perform their necessary safety functions, assuming occurrence of design basis events.

(c) *Protection against dynamic effects of equipment failure and similar events.* The structures, systems, and components important to safety shall be designed to withstand dynamic effects such as missile impacts, that could result from equipment failure, and similar events and conditions that could lead to loss of their safety functions.

(d) *Protection against fires and explosions.* (1) The structures, systems, and components important to safety shall be designed to perform their safety functions during and after credible fires or explosions in the geologic repository operations area.

(2) To the extent practicable, the geologic repository operations area shall be designed to incorporate the use of noncombustible and heat resistant materials.

(3) The geologic repository operations area shall be designed to include explosion and fire detection alarm systems and appropriate suppression systems with sufficient capacity and capability to reduce the adverse effects of fires and explosions on structures, systems, and components important to safety.

(4) The geologic repository operations area shall be designed to include means to protect systems, structures, and components important to safety against the adverse effects of either the operation or failure of the fire suppression systems.

(e) *Emergency capability.* (1) The structures, systems, and components important to safety shall be designed to maintain control of radioactive waste and radioactive effluents, and permit prompt termination of operations and evacuation of personnel during an emergency.

(2) The geologic repository operations area shall be designed to include onsite facilities and services that ensure a safe and timely response to emergency conditions and that facilitate the use of available offsite services (such as fire, police, medical, and ambulance service) that may aid in recovery from emergencies.

(f) *Utility services.* (1) Each utility service system that is important to safety shall be designed so that essential safety functions can be performed, assuming occurrence of the design basis events.

(2) The utility services important to safety shall include redundant systems to the extent necessary to maintain, with adequate capacity, the ability to perform their safety functions.

(3) Provisions shall be made so that, if there is a loss of the primary electric power source or circuit, reliable and timely emergency power can be provided to instruments, utility service systems, and operating systems, including alarm systems, important to safety.

(g) *Inspection, testing, and maintenance.* The structures, systems, and components important to safety shallbe designed to permit periodic inspection, testing, and maintenance, as necessary, to ensure their continued functioning and readiness.

(h) *Criticality control.* All systems for processing, transporting, handling, storage, retrieval, emplacement, and isolation of radioactive waste shall be designed to ensure that nuclear criticality is not possible unless at least two unlikely, independent, and concurrent or sequential changes have occurred in the conditions essential to nuclear criticality safety. Each system must be designed for criticality safety assuming occurrence of design basis events. The calculated effective multiplication factor must be sufficiently below unity to show at least a 5 percent margin, after allowance for the bias in the method of calculation and the uncertainty in the experiments used to validate the method of calculation.

(i) *Instrumentation and control systems.* The design shall include provisions for instrumentation and control systems to monitor and control the behavior of systems important to safety, assuming occurrence of design basis events.

(j) *Compliance with mining regulations.* To the extent that DOE is not subject to the Federal Mine Safety and Health Act of 1977, as to the construction and operation of the geologic repository operations area, the design of the geologic repository operations area shall nevertheless include provisions for worker protection necessary to provide reasonable assurance that all structures, systems, and components important to safety can perform their intended functions. Any deviation from relevant design requirements in 30 CFR, chapter I, subchapters D, E, and N will give rise to a rebuttable presumption that this requirement has not been met.

(k) Shaft conveyances used in radioactive waste handling. (1) Hoists important to safety shall be designed to preclude cage free fall.

(2) Hoists important to safety shall be designed with a reliable cage location system.

(3) Loading and unloading systems for hoists important to safety shall be designed with a reliable system of interlocks that will fail safely upon malfunction.

(4) Hoists important to safety shall be designed to include two independent indicators to indicate when waste packages are in place and ready for transfer.

[48 FR 28222, June 21, 1983, as amended at 61 FR 64269, Dec. 4, 1996]

Sec. 60.132 Additional design criteria for surface facilities in the geologic repository operations area.

(a) *Facilities for receipt and retrieval of waste.* Surface facilities in the geologic repository operations area shall be designed to allow safe handling and storage of wastes at the geologic repository operations area, whether these wastes are on the surface before emplacement or as a result of retrieval from the underground facility.

(b) *Surface facility ventilation.* Surface facility ventilation systems supporting waste transfer, inspection, decontamination, processing, or packaging shall be designed to provide protection against radiation exposures and offsite releases as provided in Sec. 60.111(a).

(c) *Radiation control and monitoring*—(1) *Effluent control.* The surface facilities shall be designed to control the release of radioactive materials in effluents during Category 1 design basis events so as to meet the performance objectives of Sec. 60.111(a).

(2) *Effluent monitoring.* The effluent monitoring systems shall be designed to measure the amount and concentration of radionuclides in any effluent with sufficient precision to determine whether releases conform to the design requirement for effluent control. The monitoring systems shall be designed to include alarms that can be periodically tested.

(d) *Waste treatment.* Radioactive waste treatment facilities shall be designed to process any radioactive wastes generated at the geologic repository operations area into a form suitable to permit safe disposal at the geologic repository operations area or to permit safe transportation and conversion to a form suitable for disposal at an alternative site in accordance with any regulations that are applicable.

(e) *Consideration of decommissioning.* The surface facility shall be designedto facilitate decontamination or dismantlement to the same extent as would be required, under other parts of this chapter, with respect to equivalent activities licensed thereunder.

[48 FR 28222, June 21, 1983, as amended at 61 FR 64270, Dec. 4, 1996]

Sec. 60.133 Additional design criteria for the underground facility.

(a) *General criteria for the underground facility.* (1) The orientation, geometry, layout, and depth of the underground facility, and the design of any engineered barriers that are part of the underground facility shall contribute to the containment and isolation of radionuclides.

(2) The underground facility shall be designed so that the effects of credible disruptive events during the period of operations, such as flooding, fires and explosions, will not spread through the facility.

(b) *Flexibility of design.* The underground facility shall be designed with sufficient flexibility to allow adjustments where necessary to accommodate specific site conditions identified through in situ monitoring, testing, or excavation.

(c) *Retrieval of waste.* The underground facility shall be designed to permit retrieval of waste in accordance with the performance objectives of Sec. 60.111.

(d) *Control of water and gas.* The design of the underground facility shall provide for control of water or gas intrusion.

(e) *Underground openings.* (1) Openings in the underground facility shall be designed so that operations can be carried out safely and the retrievability option maintained.

(2) Openings in the underground facility shall be designed to reduce the potential for deleterious rock movement or fracturing of overlying or surrounding rock.

(f) *Rock excavation.* The design of the underground facility shall incorporate excavation methods that will limit the potential for creating a preferential pathway for groundwater to contact the waste packages or radionuclide migration to the accessible environment.

(g) *Underground facility ventilation.* The ventilation system shall be designed to:

(1) Control the transport of radioactive particulates and gases within and releases from the underground facility in accordance with the performance objectives of Sec. 60.111(a),

(2) Assure the ability to perform essential safety functions assuming occurrence of design basis events.

(3) Separate the ventilation of excavation and waste emplacement areas.

(h) *Engineered barriers.* Engineered barriers shall be designed to assist the geologic setting in meeting the performance objectives for the period following permanent closure.

(i) *Thermal loads.* The underground facility shall be designed so that the performance objectives will be met taking into account the predicted thermal and thermomechanical response of the host rock, and surrounding strata, groundwater system.

[48 FR 28222, June 21, 1983, as amended at 50 FR 29648, July 22, 1985; 61 FR 64270, Dec. 4, 1996]

Sec. 60.134 Design of seals for shafts and boreholes.

(a) General design criterion. Seals for shafts and boreholes shall be designed so that following permanent closure they do not become pathways that compromise the geologic repository's ability to meet the performance objectives or the period following permanent closure.

(b) Selection of materials and placement methods. Materials and placement methods for seals shall be selected to reduce, to the extent practicable:

(1) The potential for creating a preferential pathway for groundwater to contact the waste packages or

(2) For radionuclide migration through existing pathways.

[48 FR 28222, June 21, 1983, as amended at 50 FR 29648, July 22, 1985]

DESIGN CRITERIA FOR THE WASTE PACKAGE

Sec. 60.135 Criteria for the waste package and its components.

(a) High-level-waste package design in general. (1) Packages for HLW shall be designed so that the in situ chemical,physical, and nuclear properties of the waste package and its interactions with the emplacement environment do not compromise the function of the waste packages or the performance of the underground facility or the geologic setting.

(2) The design shall include but not be limited to consideration of the following factors: solubility, oxidation/reduction reactions, corrosion, hydriding, gas generation, thermal effects, mechanical strength, mechanical stress, radiolysis, radiation damage, radionuclide retardation, leaching, fire and explosion hazards, thermal loads, and synergistic interactions.

(b) *Specific criteria for HLW package design—(1) Explosive, pyrophoric, and chemically reactive materials.* The waste package shall not contain explosive or pyrophoric materials or chemically reactive materials in an amount that could compromise the ability of the underground facility to contribute to waste isolation or the ability of the geologic repository to satisfy the performance objectives.

(2) *Free liquids.* The waste package shall not contain free liquids in an amount that could compromise the ability of the waste packages to achieve the performance objectives relating to containment of HLW (because of chemical interactions or formation of pressurized vapor) or result in spillage and spread of contamination in the event of waste package perforation during the period through permanent closure.

(3) *Handling.* Waste packages shall be designed to maintain waste containment during transportation, emplacement, and retrieval.

(4) *Unique identification.* A label or other means of identification shall be provided for each waste package. The identification shall not impair the integrity of the waste package and shall be applied in such a way that the information shall be legible at least to the end of the period of retrievability. Each waste package identification shall be consistent with the waste package's permanent written records.

(c) Waste form criteria for HLW. High-level radioactive waste that is emplaced in the underground facility shall be designed to meet the following criteria:

(1) *Solidification.* All such radioactive wastes shall be in solid form and placed in sealed containers.

(2) *Consolidation.* Particulate waste forms shall be consolidated (for example, by incorporation into an encapsulating matrix) to limit the availability and generation of particulates.

(3) *Combustibles.* All combustible radioactive wastes shall be reduced to a noncombustible form unless it can be demonstrated that a fire involving the waste packages containing combustibles will not compromise the integrity of other waste packages, adversely affect any structures, systems, or components important to safety, or compromise the ability of the underground facility to contribute to waste isolation.

(d) *Design criteria for other radioactive wastes.* Design criteria for waste types other than HLW will be addressed on an individual basis if and when they are proposed for disposal in a geologic repository.

PRECLOSURE CONTROLLED AREA

Sec. 60.136 Preclosure controlled area.

(a) A preclosure controlled area must be established for the geologic repository operations area.

(b) The geologic repository operations area shall be designed so that, for Category 2 design basis events, no individual located on or beyond any point on the boundary of the preclosure controlled area will receive the more limiting of a total effective dose equivalent of 0.05 Sv (5 rem), or the sum of the deep-dose equivalent and the committed dose equivalent to any individual organ or tissue (other than the lens of the eye) of 0.5 Sv (50 rem). The eye dose equivalent shall not exceed 0.15 Sv (15 rem), and the shallow dose equivalent to skin shall not exceed 0.5 Sv (50 rem). The minimum distance from the surface facilities in the geologic repository operations area to the boundary of the preclosure controlled area must be at least 100 meters.

(c) The preclosure controlled area may be traversed by a highway, railroad, or waterway, so long as appropriate and effective arrangements are made to control traffic and to protect public health and safety.
[61 FR 64270, Dec. 4, 1996]

PERFORMANCE CONFIRMATION REQUIREMENTS

Sec. 60.137 General requirements for performance confirmation.

The geologic repository operations area shall be designed so as to permit implementation of a performance confirmation program that meets the requirements of subpart F of this part.

Subpart F—Performance Confirmation Program

Source: 48 FR 28228, June 21, 1983, unless otherwise noted.

Sec. 60.140 General requirements.

(a) The performance confirmation program shall provide data which indicates, where practicable, whether:

(1) Actual subsurface conditions encountered and changes in those conditions during construction and waste emplacement operations are within the limits assumed in the licensing review; and

(2) Natural and engineered systems and components required for repository operation, or which are designed or assumed to operate as barriers after permanent closure, are functioning as intended and anticipated.

(b) The program shall have been started during site characterization and it will continue until permanent closure.

(c) The program shall include in situ monitoring, laboratory and field testing, and in situ experiments, as may be appropriate to accomplish the objective as stated above.

(d) The program shall be implemented so that:

(1) It does not adversely affect the ability of the natural and engineered elements of the geologic repository to meet the performance objectives.

(2) It provides baseline information and analysis of that information on those parameters and natural processes pertaining to the geologic setting that may be changed by site characterization, construction, and operational activities.

(3) It monitors and analyzes changes from the baseline condition of parameters that could affect the performance of a geologic repository.

(4) It provides an established plan for feedback and analysis of data, and implementation of appropriate action.

Sec. 60.141 Confirmation of geotechnical and design parameters.

(a) During repository construction and operation, a continuing program of surveillance, measurement, testing, and geologic mapping shall be conducted to ensure that geotechnical and design parameters are confirmed and to ensure that appropriate action is taken to inform the Commission of changes needed in design to accommodate actual field conditions encountered.

(b) Subsurface conditions shall be monitored and evaluated against design assumptions.

(c) As a minimum, measurements shall be made of rock deformations and displacement, changes in rock stress and strain, rate and location of water inflow into subsurface areas, changes in groundwater conditions, rock pore water pressures including those along fractures

and joints, and the thermal and thermomechanical response of the rock mass as a result of development and operations of the geologic repository.

(d) These measurements and observations shall be compared with the original design bases and assumptions. If significant differences exist between the measurements and observations and the original design bases and assumptions, the need for modifications to the design or in construction methods shall be determined and these differences and the recommended changes reported to the Commission.

(e) In situ monitoring of the thermomechanical response of the underground facility shall be conducted until permanent closure to ensure that the performance of the natural and engineering features are within design limits.

Sec. 60.142 Design testing.

(a) During the early or developmental stages of construction, a program for in situ testing of such features as borehole and shaft seals, backfill, and the thermal interaction effects of the waste packages, backfill, rock, and groundwater shall be conducted.

(b) The testing shall be initiated as early as is practicable.

(c) A backfill test section shall be constructed to test the effectiveness of backfill placement and compaction procedures against design requirements before permanent backfill placement is begun.

(d) Test sections shall be established to test the effectiveness of borehole and shaft seals before full-scale operation proceeds to seal boreholes and shafts.

Sec. 60.143 Monitoring and testing waste packages.

(a) A program shall be established at the geologic repository operations area for monitoring the condition of the waste packages. Waste packages chosen for the program shall be representative of those to be emplaced in the underground facility.

(b) Consistent with safe operation at the geologic repository operations area, the environment of the waste packages selected for the waste package monitoring program shall be representative of the environment in which the wastes are to be emplaced.

(c) The waste package monitoring program shall include laboratory experiments which focus on the internal condition of the waste packages. To the extent practical, the environment experienced by the emplaced waste packages within the underground facility during the waste package monitoring program shall be duplicated in the laboratory experiments.

(d) The waste package monitoring program shall continue as long as practical up to the time of permanent closure.

Subpart G—Quality Assurance

Source: 48 FR 28228, June 21, 1983, unless otherwise noted.

Sec. 60.150 Scope.

As used in this part, *quality assurance* comprises all those planned and systematic actions necessary to provide adequate confidence that the geologic repository and its subsystems or components will perform satisfactorily in service. Quality assurance includes quality control, which comprises those quality assurance actions related to the physical characteristics of a material, structure, component, or system which provide a means to control the quality of the material, structure, component, or system to predetermined requirements.

Sec. 60.151 Applicability.

The quality assurance program applies to all systems, structures and components important to safety, to design and characterization of barriers important to waste isolation and to activities related thereto. These activities include: site characterization, facility and equipment construction, facility operation, performance confirmation, permanent closure, and decontamination and dismantling of surface facilities.

Sec. 60.152 Implementation.

DOE shall implement a quality assurance program based on the criteria of appendix B of 10 CFR part 50 as applicable, and appropriately supplemented by additional criteria as required by Sec. 60.151.

Subpart H—Training and Certification of Personnel

Source: 48 FR 28229, June 21, 1983, unless otherwise noted.

Sec. 60.160 General requirements.

Operations of systems and components that have been identified as important to safety in the Safety Analysis Report and in the license shall be performed only by trained and certified personnel or by personnel under the direct visual supervision of an individual with training and certification in such operation. Supervisory personnel who direct operations that are important to safety must also be certified in such operations.

Sec. 60.161 Training and certification program.

DOE shall establish a program for training, proficiency testing, certification and requalification of operating and supervisory personnel.

Sec. 60.162 Physical requirements.

The physical condition and the general health of personnel certified for operations that are important to safety shall not be such as might cause operational errors that could endanger the public health and safety. Any condition which might cause impaired judgment or motor coordination must be considered in the selection of personnel for activities that are important to safety. These conditions need not categorically disqualify a person, so long as appropriate provisions are made to accommodate such conditions.

Subpart I—Emergency Planning Criteria [Reserved]

Subpart J—Violations

Sec. 60.181 Violations.

(a) The Commission may obtain an injunction or other court order to prevent a violation of the provisions of—

(1) The Atomic Energy Act of 1954, as amended;

(2) Title II of the Energy Reorganization Act of 1974, as amended; or

(3) A regulation or order issued pursuant to those Acts.

(b) The Commission may obtain a court order for the payment of a civil penalty imposed under section 234 of the Atomic Energy Act:

(1) For violations of—

(i) Sections 53, 57, 62, 63, 81, 82, 101, 103, 104, 107, or 109 of the Atomic Energy Act of 1954, as amended;

(ii) Section 206 of the Energy Reorganization Act;

(iii) Any rule, regulation, or order issued pursuant to the sections specified in paragraph (b)(1)(i) of this section;

(iv) Any term, condition, or limitation of any license issued under the sections specified in paragraph (b)(1)(i) of this section.

(2) For any violation for which a license may be revoked under section 186 of the Atomic Energy Act of 1954, as amended.

[57 FR 55076, Nov. 24, 1992]

Sec. 60.183 Criminal penalties.

(a) Section 223 of the Atomic Energy Act of 1954, as amended, provides for criminal sanctions for willful violation of, attempted violation of, or conspiracy to violate, any regulation issued under sections 161b, 161i, or 161o of the Act. For purposes of section 223, all the regulations in part 60 are issued under one or more of sections 161b, 161i, or 161o, except for the sections listed in paragraph (b) of this section.

(b) The regulations in part 60 that are not issued under sections 161b, 161i, or 161o for the purposes of section 223 are as follows: Secs. 60.1, 60.2, 60.3, 60.5, 60.6, 60.7, 60.8, 60.15, 60.16, 60.17, 60.18, 60.21, 60.22, 60.23, 60.24, 60.31, 60.32, 60.33, 60.41, 60.42, 60.43, 60.44, 60.45, 60.46, 60.51, 60.52, 60.61, 60.62, 60.63, 60.64, 60.65, 60.101, 60.102, 60.111, 60.112, 60.113, 60.121, 60.122, 60.130, 60.131, 60.132, 60.133, 60.134, 60.135, 60.137, 60.140, 60.141, 60.142, 60.143, 60.150, 60.151, 60.152, 60.162, 60.181, and 60.183.
[57 FR 55076, Nov. 24, 1992]

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Appendix E
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 of 1992 (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 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.

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 that evaluates a proposed major Federal action affecting the quality of the human environment. Required by the National Environmental Policy Act (NEPA), the environmental impact statement describes, among other things, 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 entails 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 a 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 includes 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 receive, possess and dispose of spent nuclear fuel and high-level radioactive waste.

Licensing support system 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 6 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 4321 et seq.) refers to the Federal statute that is the national charter for protection of the environment. The Act is implemented by procedures established 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 account in the U.S. Treasury established by the Nuclear Waste Policy Act to ensure 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 deposited in the Fund.

Nuclear Waste Policy Act of 1982 (42 USC 10101 et seq.) refers to the Federal statute enacted in 1983 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, and defined interactions between Federal agencies and the States, local governments, and Native American 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 Alignment Initiative refers to the second phase of the Secretary of Energy's Five-Year Strategic Plan. The Plan was developed in Fiscal Year 1995 to enhance the Department's performance of core missions, while reducing costs. The Strategic Alignment Initiative is a package of organizational, legislative and cost-cutting actions, including downsizing, privatization and management restructuring throughout the Department.

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 to annually 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 and sells that electricity using a nuclear reactor, 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.