

# *Executive Summary*

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During Fiscal Year 2001, the Office of Civilian Radioactive Waste Management (OCRWM) reached significant Program milestones and, despite challenges, maintained the momentum essential to implementing our Nation's policy for the management of spent nuclear fuel and high-level radioactive waste. We focused on documenting the results of more than two decades of scientific investigations, field tests, and laboratory analyses conducted to determine the suitability of the Yucca Mountain, Nevada, site as a geologic repository. OCRWM prepared the technical basis for a decision on site recommendation and conducted statutorily required public hearings in the vicinity of the site. These Fiscal Year 2001 activities laid the groundwork for the Secretary of Energy's recommendation to the President on February 14, 2002, that the President approve the site and recommend it to Congress as the repository

site. On February 15, 2002, after receiving the Secretary's recommendation, the President announced that he considered Yucca Mountain qualified for a construction permit application to the Nuclear Regulatory Commission. Accordingly, the President transmitted his recommendation of the site to Congress.

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

All four of OCRWM's performance targets in the Department's revised Annual Performance Plan for Fiscal Year 2001 were related to completing the necessary prerequisites for a determination on site suitability. As a result of an appropriation \$40.2 million less than the President's budget request, OCRWM adjusted its optimum work scope but met its targets in the Department's Annual Performance Plan.

***Performance Target #1: Complete the scientific and technical documents that will provide the technical basis for a possible site recommendation***

OCRWM issued the *Yucca Mountain Science and Engineering Report, Revision 0 (S&ER)* in May 2001. This report summarized the scientific and technical information developed through more than 20 years of studies of the site. It provided a description of the potential repository, including preliminary



**Aerial view of surface facilities at the North Portal of Yucca Mountain**

engineering specifications; a description of the waste form or packaging proposed for use, and an explanation of the relationship between the waste form or packaging and the geologic medium of the site; and a discussion of data obtained in site characterization activities relating to the safety of the site.

The technical information in the S&ER, along with that contained in other reports and analyses, was evaluated in the *Preliminary Site Suitability Evaluation (PSSE)*. The PSSE, released in August 2001, provides a preliminary assessment of the Yucca Mountain site's performance against the radiation protection standards of the Environmental Protection Agency (EPA) and the licensing regulations of the Nuclear Regulatory Commission (NRC). The evaluation for both the repository pre-closure and post-closure periods concluded that the estimated radiation doses released from the repository would be below regulatory limits. Together, the S&ER, PSSE, and supporting documentation provided an initial basis for public comment on a recommendation of the Yucca Mountain site.

Concurrently with the S&ER, OCRWM issued a *Supplement to the Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada*, which updates the information presented in the 1999 Draft Environmental Impact Statement (DEIS). It reflects, among other changes, important design enhancements such as the addition of titanium drip shields and the redesign of waste packages. Based on these updates, the Supplement reports that estimates for long-term performance of the repository indicate a peak mean annual dose (post-10,000 years) that is lower than that produced by the lowest dose scenario in the DEIS.

***Performance Target #2: Conduct statutory hearings in the vicinity of Yucca Mountain to inform the residents that the site is under consideration and to receive comments regarding a possible site recommendation***

As required by Section 114(a)(1) of the Nuclear Waste Policy Act, OCRWM held hearings in the vicinity of Yucca Mountain to inform residents in the area and to receive their comments regarding the Secretary of

Energy's consideration of whether to recommend Yucca Mountain as the site for the Nation's first repository for spent nuclear fuel and high-level radioactive waste. The public comment period opened on May 4, 2001. The comment period, which was to end on September 20, 2001, was extended twice and ended on October 19, 2001.

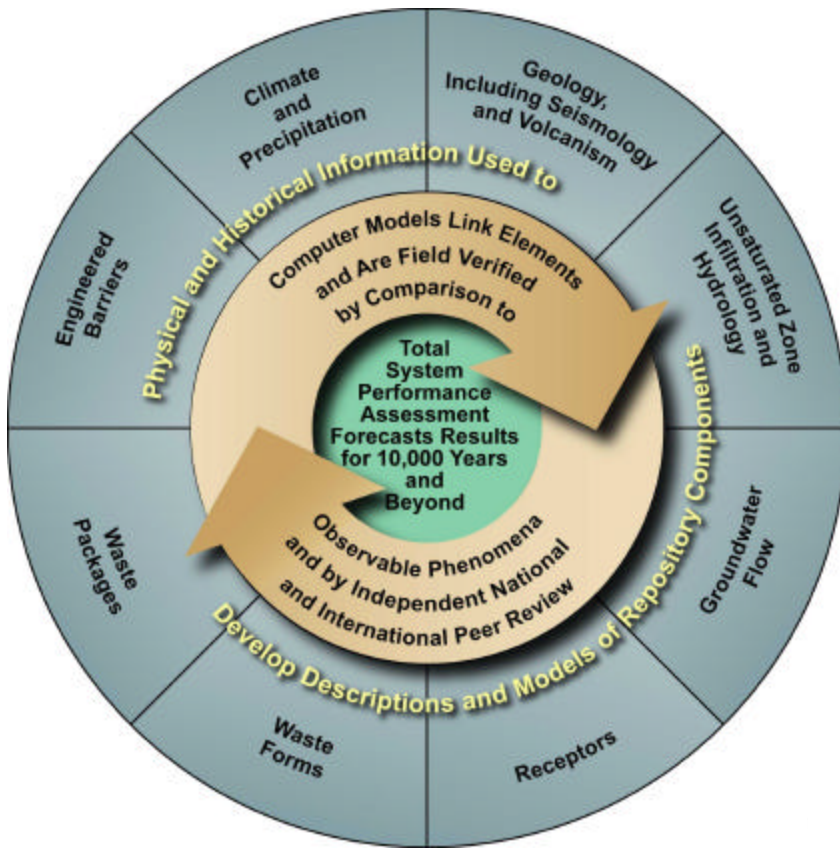
Subsequently, the comment period was reopened from November 14 to December 14, 2001, to provide the public an opportunity to comment on our documents that evaluated the effects of the final rulemakings. The EPA had finalized its radiation protection standards for Yucca Mountain on June 6, 2001. NRC had released its final rule incorporating EPA's standards on November 2, 2001, and the Department of Energy (DOE) had finalized its repository siting guidelines on November 14, 2001.

In all, 66 hearings were held in locations across Nevada and in Inyo County, California. Comments received at the hearings and through other public comment channels (e.g., U.S. mail) were categorized and addressed in a Comment Summary Document. The Secretary considered the comments received during this period before making his recommendation to the President.

***Performance Target #3: Update all process models and conduct a total system performance assessment for use in the site recommendation***

Detailed mathematical models, integrating information from site investigations, laboratory studies, expert judgment, and repository design, enable OCRWM analysts to assess the anticipated performance of a potential repository at Yucca Mountain. The total system model is used to simulate how a repository at the site might perform over thousands of years after it is closed, resulting in an estimate of the radiation dose a person thousands of years in the future might receive from emplaced radioactive waste. This dose estimate is the basis for the comparison that was shown in the PSSE and that supported the final site suitability evaluation.

In Fiscal Year 2001, OCRWM completed the refinement of models used to examine the natural system to reflect new information from site



**Development of the Total System Performance Model for a 10,000-year assessment**

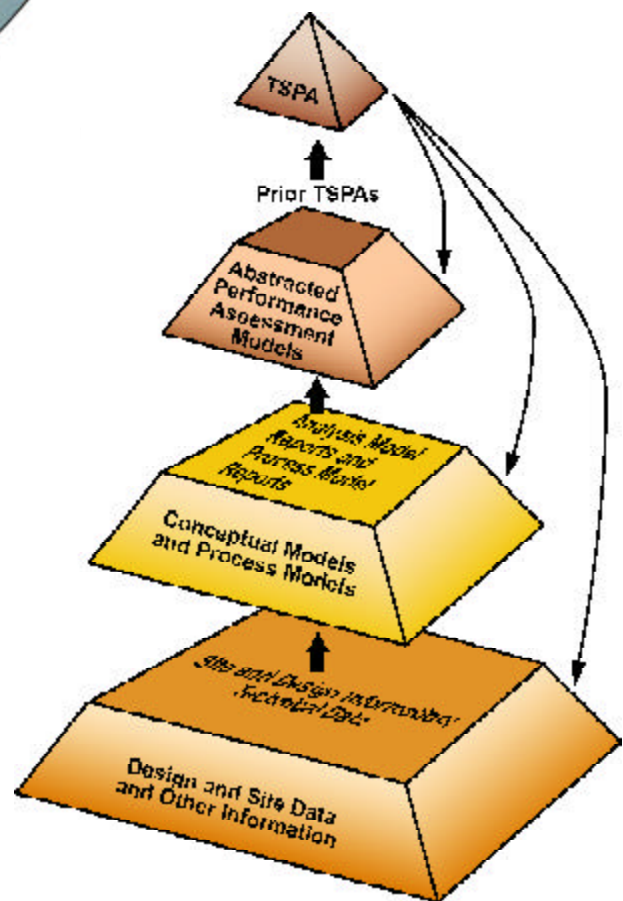
investigations and laboratory studies, advances in modeling physical processes at the site, and an enhanced repository design. We considered the requests and recommendations made by the Nuclear Waste Technical Review Board and the NRC for further design enhancements and details. We used all of these refinements to complete, in December 2000, the *Total System Performance Assessment for the Site Recommendation*.

To further analyze uncertainties in the performance assessment, we developed the *Supplemental Science and Performance Analyses*. Revised process model reports were completed to address comments based on technical reviews of earlier reports. They included comprehensive validation and estimation of the spatial uncertainty associated with each of the models. The results of performance assessment analyses were a major component of the repository safety case that

underlies the site recommendation and will be refined for a license application.

**Performance Target #4: Complete and issue Total System Life Cycle Cost and Fee Adequacy reports**

On May 4, 2001, OCRWM published the *Analysis of the Total System Life Cycle Cost of the Civilian Radioactive Waste Management Program (TSLCC)*, which provides our Fiscal Year 2001 total system life cycle cost estimates for a repository system based on the design and operating modes described in the S&ER and the Supplement to the



**Total System Performance Assessment method**

DEIS. The TSLCC reports that OCRWM expended \$6.7 billion (in year-of-expenditure dollars) from 1983 through Fiscal Year 2000, and that the cost to complete the Program is approximately \$49.3 billion (in constant 2000 dollars).

The 2001 TSLCC, coupled with projected Program revenues from civilian fees and Nuclear Waste Fund investments, provided the basis for the *Nuclear Waste Fund Fee Adequacy: An Assessment*. That report concluded that the 1-mil-per-kilowatt-hour fee continues to be adequate to pay for the estimated costs presented in the TSLCC, under the assumptions used in the analysis. The analysis considered a range of repository designs and bounding conditions for real interest rates and potential settlement impacts on future utility payments.

### Other Significant Activities

In addition to meeting its specific Fiscal Year 2001 performance targets in the Department's Performance Plan, OCRWM continued related scientific and engineering activities and analyses that further refine our understanding of how a repository at Yucca Mountain would perform far into the future. Scientists focused on understanding more fully how lower temperature subsurface operational modes may reduce uncertainties in analyzing long-term repository performance.

Work continued on long-term and confirmatory tests, some of which will be ongoing for many years. For example, DOE's national laboratories continued to conduct long-term testing and modeling of waste forms. In addition, OCRWM conducted an International Waste Package Materials Performance Peer Review, designed to elicit information on materials issues and provide a basis for future experiments and analysis.

Of fundamental importance to the Program was the finalization of the site-specific regulatory framework under which a potential repository at Yucca Mountain could be evaluated and licensed. The EPA published its final radiation protection standards for the site on June 6, 2001, and the NRC released its final regulations for disposal of high-level radioactive waste at Yucca

Mountain on November 2, 2001. OCRWM provided comments during the development of both the EPA standards and the NRC's licensing regulations. On November 14, 2001, DOE finalized its site suitability guidelines, making minor changes as necessary to ensure consistency with NRC licensing criteria.

In Fiscal Year 2001, we updated our discharge projections for commercial spent nuclear fuel. In addition, we continued to integrate acceptance criteria and schedules for DOE-owned spent nuclear fuel, high-level radioactive waste, and surplus plutonium managed by the Office of Environmental Management, the Office of Fissile Materials Disposition, and the Naval Nuclear Propulsion Program. Following a request from the Assistant Secretary for Environmental Management that OCRWM assume responsibility for the supply of transportation equipment and services for DOE-owned spent nuclear fuel, we began integrating this activity with our other transportation planning.

In February 2001, OCRWM completed its transition to a new management and operating (M&O) contractor, selecting Bechtel SAIC Company, LLC. The contract secures services for a five-year period with options up to a total of five additional years. A transition management team composed of Federal staff and personnel from the old and new contractors developed a transition management plan, procedures for implementation, and an integrated database to house the numerous issues, resolutions, and costs associated with the transition. Approximately 1,600 people, working for one prime contractor, with 24 subcontractors and a host of laboratories, were successfully transitioned into one M&O contract with six subcontracts and continued support from the national laboratories.

We used the initiatives in *The President's Management Agenda* to prepare for the transition from primarily scientific activities to licensing, construction, and operations, assuming that Congress would approve the Yucca Mountain site. We continued to strengthen our human resources, financial management, procurement, and information management systems so that they will be ready to effectively support the Program's transition from the site characterization to the licensing phase and the commencement of major procurement activities for transportation services.

### **Fiscal Year 2001 in Context**

OCRWM's Fiscal Year 2001 activities are consistent with the long-held goal of commencing waste acceptance in 2010. While many external factors will influence OCRWM's ability to meet this goal, in Fiscal

Year 2001 OCRWM substantially completed the documentation of over 20 years of scientific investigations and related laboratory testing and set the stage for imminent national decisions on geologic disposal at Yucca Mountain.

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