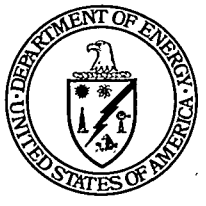
DOE/RW-0422

MOVING TOWARD A PERMANENT SOLUTION

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT

FY 1992
ANNUAL
REPORT
TO CONGRESS



UNITED STATES
DEPARTMENT OF ENERGY

July 1993

This is the ninth annual report submitted by the Office of Civilian Radioactive Waste Management to Congress. This report is required by Section 304(c) of the Nuclear Waste Policy Act (Public Law 97-425) as amended by the Nuclear Waste Policy Amendments Act of 1987 (Title V, Public Law 100-203). The Office of Civilian Radioactive Waste Management submits this report to inform Congress of its activities and expenditures during fiscal year 1992 (October 1, 1991 through September 30, 1992).

Mission Statement

The Office of Civilian Radioactive Waste Management (OCRWM) is responsible for disposing of the Nation's spent nuclear fuel from civilian nuclear power reactors and high-level radioactive waste from its defense activities in a cost-effective manner that protects the health and safety of the public and workers and the quality of the environment.

To accomplish this mission, we are developing a waste management system consisting of a geologic repository, a facility for monitored retrievable storage, and a system for transporting the waste.

DISCLAIMER

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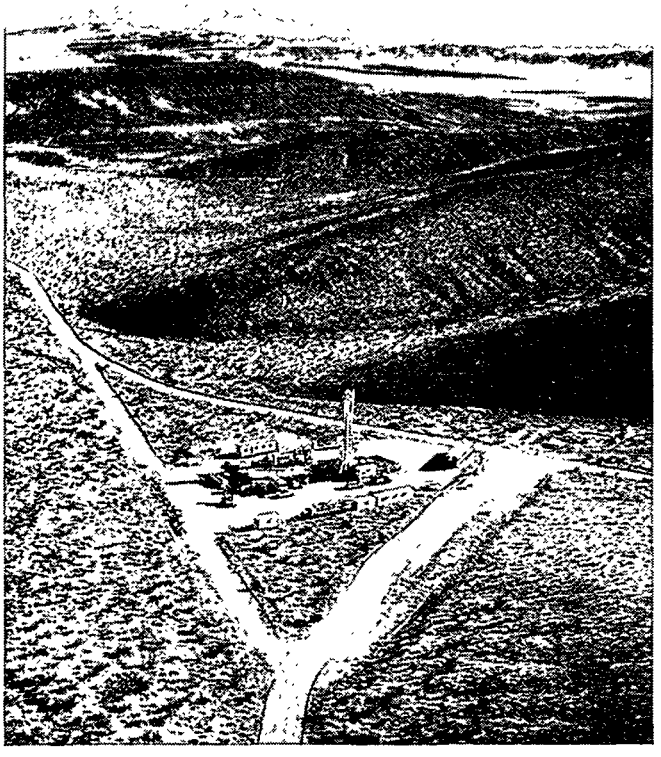
FOREWORD

The U.S. Department of Energy's Office of Civilian Radioactive Waste Management is pleased to present its Fiscal Year 1992 Annual Report to Congress.

Congress charged the Office of Civilian Radioactive Waste Management with permanently disposing of this country's spent nuclear fuel and high-level radioactive waste. Ours is a challenging program operating in challenging times.



- We must effectively isolate nuclear waste from the environment for at least 10,000 years, an endeavor of unprecedented magnitude.
- We must comply with thousands of regulatory requirements to ensure public and worker safety, environmental protection, quality assurance, and safe disposal.
- We must choose from a myriad of options for designing and deploying the waste management system.
- We must interact with various external groups with widely diverse views.
- We must be alert to the court of public opinion in which anything nuclear stirs passionate debate.
- We must continually provide program information to multiple audiences possessing varying degrees of familiarity with a highly technical subject matter.
- We must demonstrate continued progress in meeting our mandated mission in times of severe fiscal constraints.

Given these difficulties and the long-term nature of this program, progress is not easily measured on an annual basis. Nevertheless, we recognize the importance of regular self-assessment and are encouraged by the program's recent accomplishments.

Site characterization at Yucca Mountain, in particular, appears more than ever an attainable objective. This past year, we conducted extensive drilling and trenching to study faults and hydrology; we received permits from the State of Nevada needed to continue our work; and we entered into formal agreements with Nye County implementing the County's official oversight role.

Perhaps the most significant of our accomplishments was the landmark groundbreaking that occurred shortly after the close of fiscal year 1992 at Yucca Mountain for the Exploratory Studies Facility, an underground laboratory for project scientists to conduct at-depth studies of the proposed repository environment.

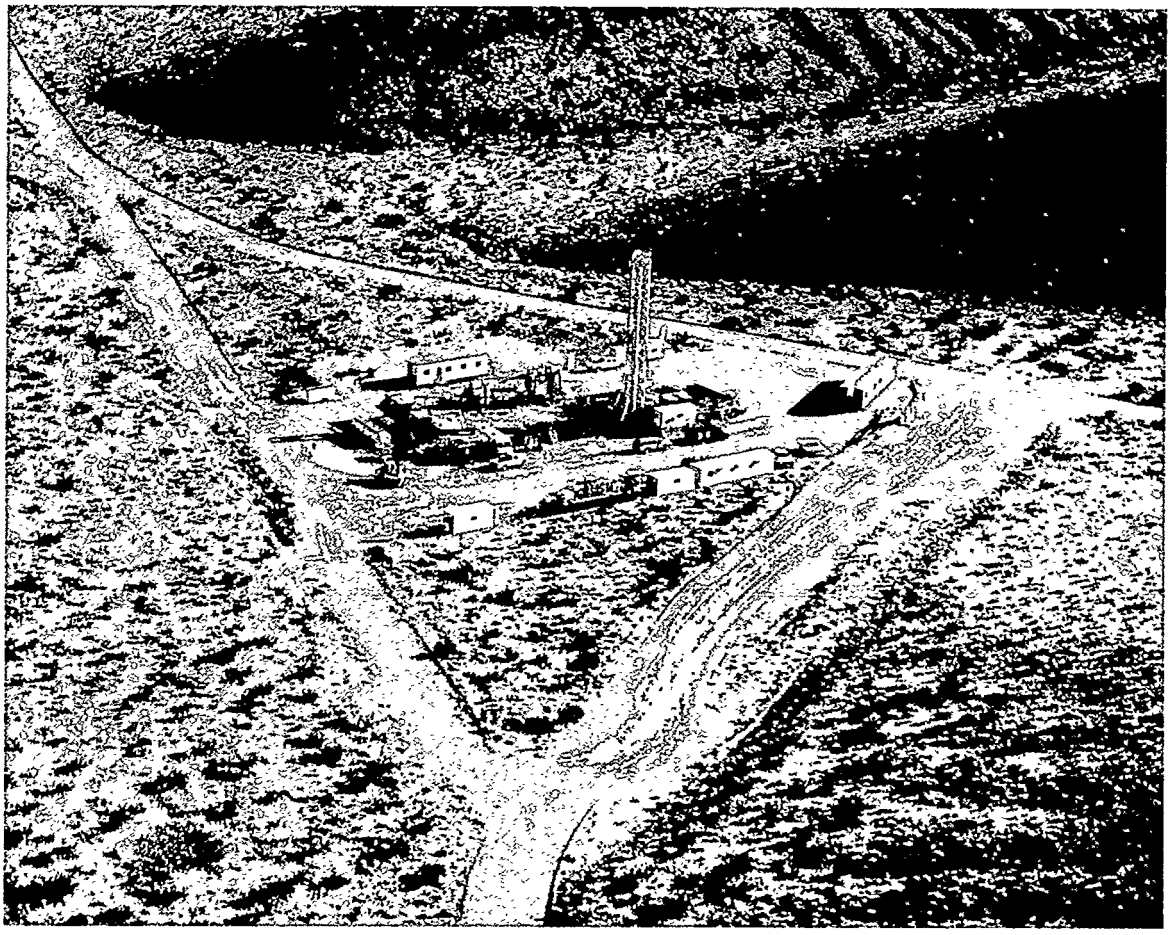
This was also a year of intense activity for the monitored retrievable storage facility voluntary siting initiative, which resulted in numerous expressions of interest in hosting such a facility by local governments and Indian Tribes. We acknowledge the efforts of the U.S. Nuclear Waste Negotiator and will continue to support the voluntary siting process as appropriate.

We have renewed our commitment to sound fiscal stewardship and have realigned our resources to concentrate on site characterization. In support of this effort, we are focusing on the early evaluation of site suitability to help minimize the effect of potential technical uncertainties on resource requirements and the schedule.

In addition to technical and financial considerations, public trust and confidence continue to be key to the success of this program. We have made progress in this area, and with additional opportunities to interact with the public we will seek to build a greater understanding of our program. Similarly, these exchanges will increase our awareness of how this program will affect others and help us address concerns when possible. Additional information on this and other developments are provided in greater detail in this report.

The activities covered by this report are for the last complete fiscal year under the previous administration. Secretary O'Leary is conducting an ongoing review of the civilian radioactive waste management program which, when completed, will result in new guidance for the future direction of the program.

SIGNIFICANT ACCOMPLISHMENTS



SIGNIFICANT ACCOMPLISHMENTS

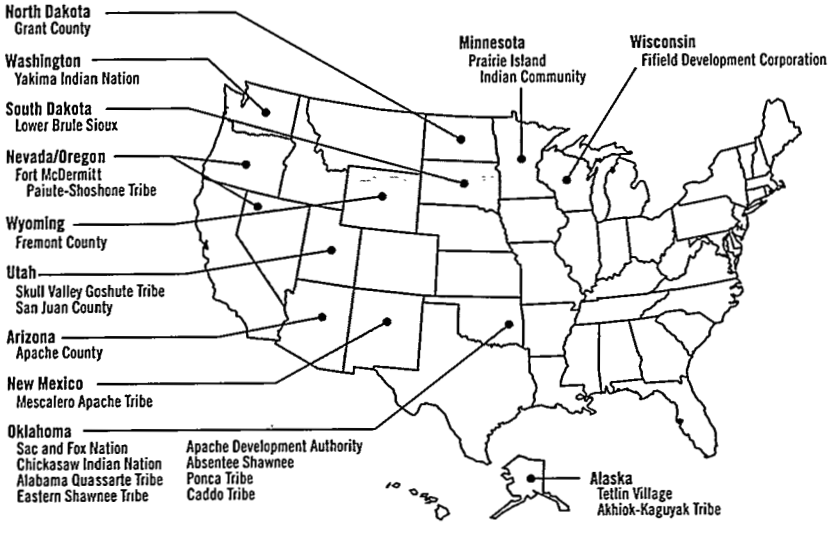
FOR OCTOBER 1991 - SEPTEMBER 1992

In an undertaking such as ours, with a goal that will take several decades to realize, success often appears on a distant horizon and progress is measured in small increments. The past year opened a new era for this country's civilian radioactive waste management program. Key developments described below provided critical building blocks to implementing an unprecedented enterprise: the permanent disposal of high-level radioactive waste.

October 1991

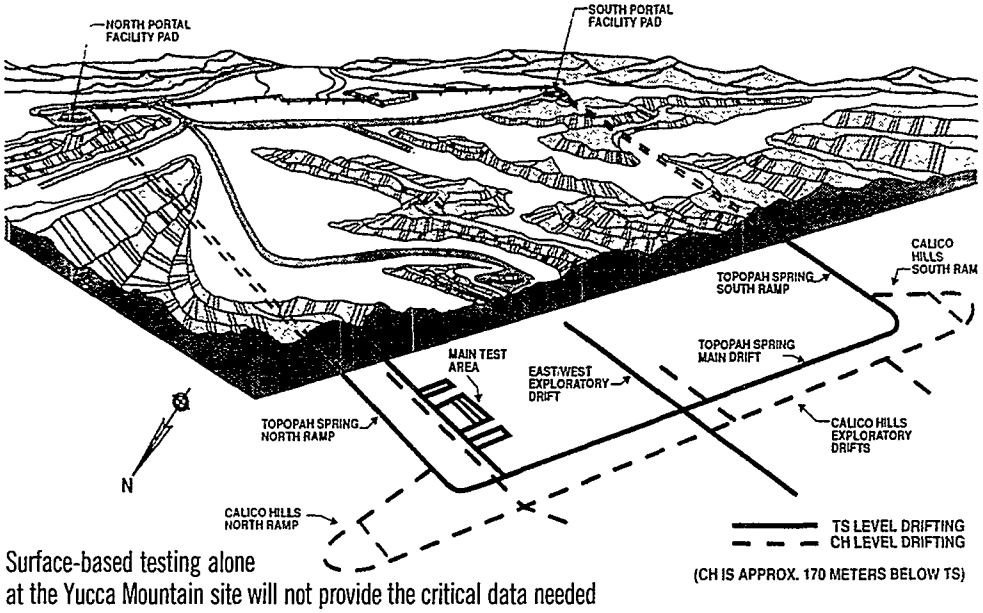
❒ **We awarded a study grant to the Mescalero Apache Tribe of New Mexico, the first jurisdiction to express an interest in learning more about the potential effects and benefits of hosting a monitored retrievable storage facility for spent nuclear fuel.** We soon received other requests from local governments and Indian Tribes. The $100,000 grants enabled recipients to educate themselves and their communities on the issues related to temporary storage and permanent disposal of nuclear waste.

In April 1992, we awarded a follow-on grant for an additional $200,000 to the Mescalero Apache Tribe to provide support for its continuing assessment of nuclear waste issues and further public information activities. By the end of this reporting period, 12 local governments and Indian Tribes had been awarded initial study grants, and one a follow-on grant. A second application for a follow-on grant was received in fiscal year 1992 and awarded in fiscal year 1993. (*The application deadline for Phase II grants was extended to March 31, 1993.*)



We received applications for monitored retrievable storage feasibility assessment grants from 21 jurisdictions around the country. By the end of this reporting period, 12 Phase I grants and one Phase IIa grant had been awarded.

ESF PRELIMINARY DESIGN



Surface-based testing alone at the Yucca Mountain site will not provide the critical data needed to determine the suitability of the site for a geologic repository. We will conduct at-depth studies in the Exploratory Studies Facility, an underground laboratory consisting of up to 22 kilometers (14 miles) of U-shaped tunnels on two levels cut through Yucca Mountain. This facility will be excavated at the potential repository depth, approximately 360 meters (1,200 feet) below the surface, so that scientists can have direct access to the rock to conduct experiments that simulate an actual waste facility.

December 1991

❒ **We received Under Secretary and Energy System Acquisition Advisory Board approval to develop final designs for the Exploratory Studies Facility, an underground laboratory for project scientists to conduct detailed studies of the potential repository environment.** These studies will help us understand the complex geological, hydrological, and seismic conditions within Yucca Mountain.

Prior to receiving this approval, we modified the original conceptual design for the facility to include inclined ramps rather than vertical shafts for access based on earlier recommendations by the Nuclear Regulatory Commission and the Nuclear Waste Technical Review Board. We also altered our original plans for using drill-and-blast excavation methods in favor of using mechanical mining techniques that will minimize potential disturbances to the host rock.

By the close of fiscal year 1992, we had completed designs for several components of the Exploratory Studies Facility, including north portal surface preparation, the tunnel boring machine launching chamber, access roads, and aboveground facilities.

❒ **We released the *Draft Strategy for OCRWM to Provide Training Assistance to State, Tribal and Local Governments* for public comment.** Section 180(c) of the Nuclear Waste Policy Act states that the Department of Energy shall provide technical assistance and funds for the training of public safety officials of appropriate units of local government and Indian Tribes through whose jurisdictions the Department plans to transport spent nuclear fuel or high-level radioactive waste. Training includes the procedures required for safe routine transportation, as well as those needed to respond to emergency situations. The final strategy, which incorporated comments received from interested parties, was published in November 1992.

January 1992

❒ **The *Yucca Mountain Site Characterization Project Plan* was approved by the Secretary's Energy System Acquisition Advisory Board.** This group advises the Secretary on the soundness of plans and cost estimates for major projects such as Yucca Mountain site characterization. Approval is a significant internal event for the program and gives us our first comprehensive and independently endorsed project plan.

February 1992

❒ **We released the *Report of Early Site Suitability Evaluation of the Potential Repository Site at Yucca Mountain, Nevada* for public comment.** This report is a study conducted by a team of contractor technical experts as a baseline site evaluation to determine if any conditions have been found at the Yucca Mountain site that would disqualify it as suitable for disposal of radioactive waste. The Early Site Suitability Evaluation report concluded that evidence currently available shows there is no technical reason at this time to stop studying the Yucca Mountain site.

The report was accompanied by a peer review panel report, which compiled the comments of the members of an independent review panel which assessed the baseline report. We are evaluating these documents and comments received from interested parties through the public comment process, and will use them as part of the basis for future plans and actions for evaluating the Yucca Mountain site.

March 1992

❒ **After a lengthy delay, we received the ground water appropriation permit that we had applied for from the State of Nevada.** This permit will allow us to pump water at the Yucca Mountain site during the next 10 years. Water is vital for dust suppression, site preparation, and drilling. Prior to permit approval, water had to be hauled from a source about 80 kilometers (50 miles) west of Yucca Mountain. Two other environmental permits, one for air quality and the other for underground injection control, were issued in the summer of 1991.

❒ **The Nuclear Regulatory Commission unconditionally accepted our quality assurance program by lifting an objection which stated that there had been insufficient implementation of the program's participant organizations'**

Determining whether the Yucca Mountain site is a suitable location for a geologic repository involves acquiring and interpreting data concerning the site's physical characteristics. The "Early Site Suitability Evaluation" found that, although additional information is needed in specific areas before a final recommendation can be made, the presently available evidence indicates the site is suitable for continued site characterization.

quality assurance programs. In lifting the objection, Commission staff concluded that each of the participants in place at the time of the objection had developed and were implementing quality assurance programs for site characterization activities and other quality-related activities. In essence, the Commission determined that the Office of Civilian Radioactive Waste Management had developed and could maintain a quality assurance program and oversee the development and implementation of participant programs.

April 1992

❒ **We submitted to the Nuclear Regulatory Commission the first annotated outline for the preparation of the license application for the proposed repository.** Because DOE will be a first-time license applicant under Federal rules governing the disposal of high-level waste in geologic repositories (10 CFR 60), and because the Commission will be applying these controlling regulations to such an application for the first time, an iterative annotated outline process was developed to ensure a common understanding of the regulations, and to help identify and resolve issues early on. The annotated outline will be an evolving document, updated as information and site specific data, and design specifications become available. A second annotated outline was submitted in September 1992. We also submitted two annotated outlines for the preparation of a license application for a monitored retrievable storage facility.

May 1992

❒ **We issued the final draft of the Conceptual Design Report for a monitored retrievable storage facility.** The main objectives of the Conceptual Design Report were:

To evaluate the technical feasibility of several monitored retrievable storage design options,

To establish technical performance levels, and

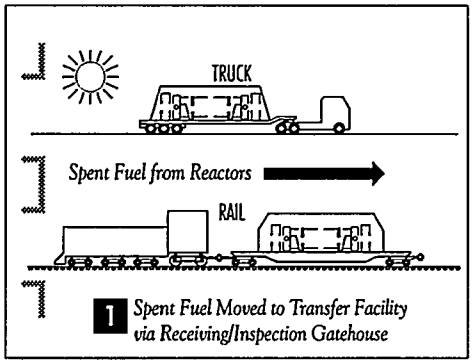
To develop reliable cost estimates and realistic schedules.

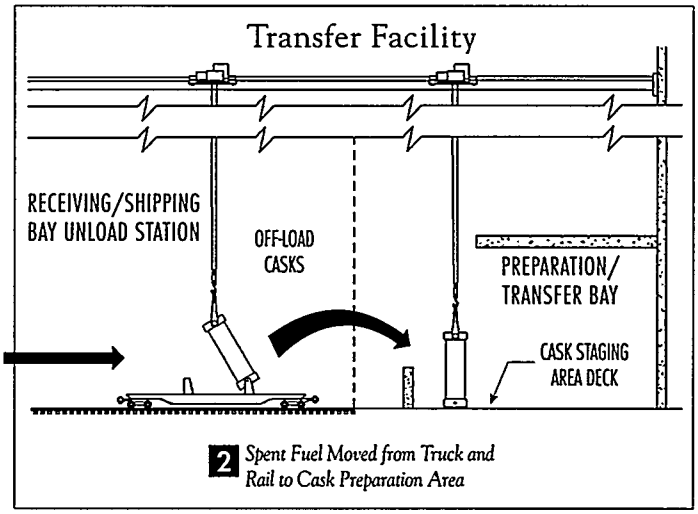
The report offers a complete design for each of six separate spent fuel storage concepts. Each design was evaluated on the basis of safety, feasibility, cost, and construction time. The report concludes that a monitored retrievable storage facility can be designed and operated in compliance with all applicable Federal regulations in a manner that protects public and worker health and safety and preserves the quality of the environment. The final Conceptual Design Report received official program approval in November 1992.

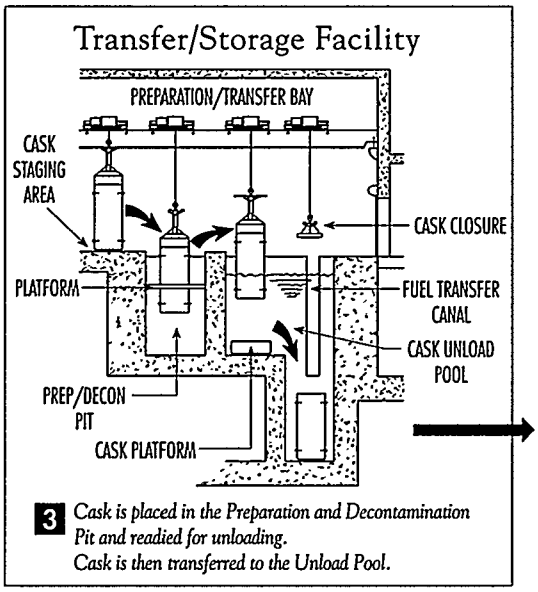
❒ **We conducted the first Director's Forum.** The Director of the Office of Civilian Radioactive Waste Management held a roundtable discussion with a group of invited interested parties focusing on policy issues related to the Early Site Suitability Evaluation report. The Director's Forum, held this year in Chicago, Illinois, was an opportunity to discuss with interested parties site evaluation plans and policies, and the relation-

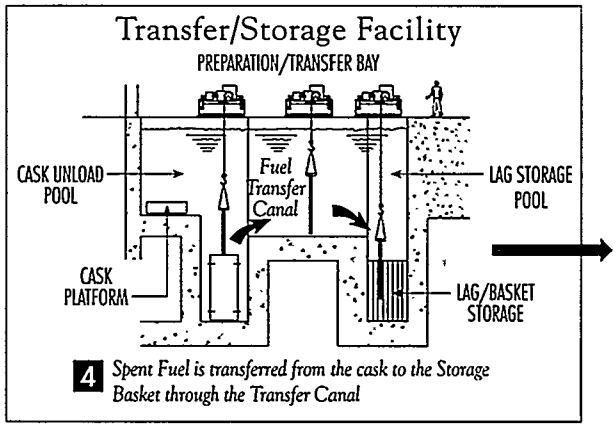
Six storage concepts were considered in developing the conceptual designs for a monitored retrievable storage facility. The illustration on the facing page demonstrates the steps involved in Concept 6: Wet Transfer and Storage in a Water Pool.

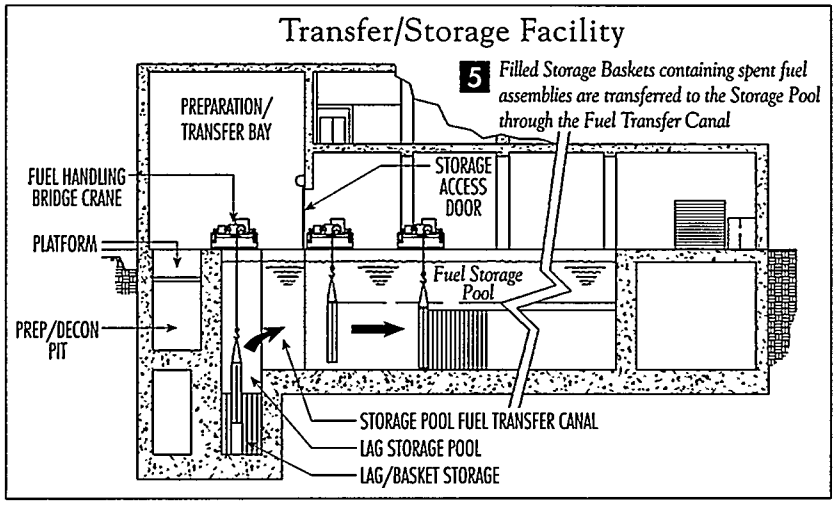
MRS Facility Wet Transfer Spent Nuclear Fuel Transfer/Storage Processing Sequence









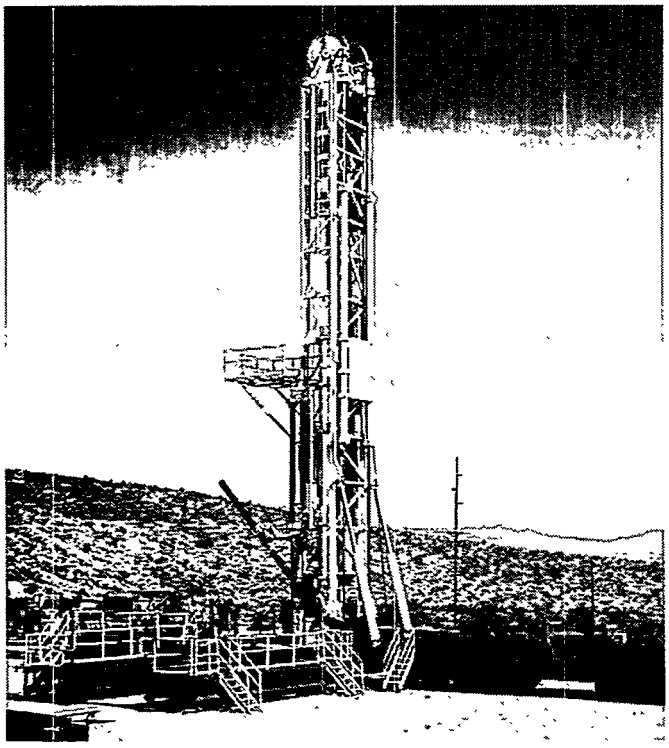


ship of the report to the site evaluation process. The Director's Forum provides one way to talk about policy alternatives with interested parties and to solicit reaction prior to making decisions concerning our program.

❒ **We initiated the Unsaturated Zone Drilling program at the Yucca Mountain site with the LM-300 Drill Rig.** A significant characteristic of the Yucca Mountain site is its deep unsaturated rock zone, which would allow the proposed repository to be located several hundred feet above the water table. "Unsaturated" means that water does not fill the pore spaces in the rock matrix, a feature that could help ensure that radioactive waste will remain isolated from the accessible environment. Studying the movement of water in the unsaturated zone presents challenges that exceed the capabilities of conventional wet-drilling technology, which could contaminate rock samples with drilling fluids. The LM-300 Drill Rig and Pipe Handling System, designed and built specifically for the Department of Energy, uses state-of-the-art dry drilling and coring techniques to acquire uncontaminated scientific samples at depth. The first drillhole, identified as UZ-16, reached its final depth of approximately 520 meters (1,700 feet), just into the water table, in March 1993.

July 1992

❒ **We published the first in a series of Total System Performance Assessments of the proposed repository site.** Performance assessment is the practice of predicting the behavior of a system using sophisticated mathematical models and serves as a primary tool in demonstrating our compliance with the health and safety standards for the repository set by the Environmental Protection Agency and the Nuclear Regulatory Commission. The Total System Performance Assessment emphasizes the behavior of the whole repository system, including the spent fuel, its storage container, backfill, and the repository material itself, rather than an assessment of an individual element of the system. The analysis addressed issues such as human intrusion, tectonism, ground water, and gaseous flow, and tested the modeling capabilities of Yucca Mountain Project participants.



The LM-300 drill rig is the largest rig of this type in existence, with a capacity over three times greater than the largest commercial rig. Its mast towers 24 meters (80 feet), and it can bore a 31 cm-in-diameter (12 inch) hole into the Earth's crust. The core samples removed will provide scientists with data to help determine the structure of the Yucca Mountain substrata in a comprehensive and thorough fashion.

"Science, Society, and America's Nuclear Waste" is a four-unit resource curriculum designed for students in grades 8-12. It contains a teacher's guide with 30 lesson plans, a set of student readers, hands-on classroom enrichment activities, transparencies, videocassette programs, and computer software all related to the characteristics and management of radioactive waste.

❒ **We introduced our new education curriculum on nuclear waste for grades 8 - 12 through a nationwide teleconference attended by more than 2,000 science and social studies teachers from throughout the country.** *Science, Society, and America's Nuclear Waste* was designed to provide resource materials to teachers and students on the scientific and societal issues related to development of a system for managing spent fuel and high-level radioactive waste. Drawing on a variety of disciplines including geology, engineering, mathematics, biology, earth sciences, topology, and political science, the unique curriculum gives students a multidisciplinary approach to critical thinking and learning while applying scientific principles and societal concerns through hands-on exercises. In the five months following the teleconference, we received requests from all 50 states and 21 countries for over 50,000 sets of curriculum materials.

August 1992

❒ **We established a formal understanding between Nye County, Nevada (the local jurisdiction in which the Yucca Mountain candidate site is located), and the Department of Energy.** Officially approved by the Nye County Board of County Commissioners, the *Protocol Addressing Procedures for Nye County On-Site Representation During Yucca Mountain Project Site Characterization Activities* was adopted to foster communication and to ensure mutual understanding of Nye County's oversight role during site characterization. The Protocol, which builds on previous agreements with the County, establishes procedures for an on-site Nye County representative on matters such as attendance at meetings, access to Department of Energy project personnel, access to records, and access to sites and facilities.

❒ **We initiated a pilot program for the first phase of InfoSTREAMS at our various office locations across the country.** InfoSTREAMS (Information STorage, REtrieval, and Access Management System) is a program-wide computerized information system that will consolidate and enhance the program's existing inventory of computerized information resources, including office automation, telecommunications, and data and records management. The first phase of the system provides electronic document creation, dissemination, and review, speeding up the entire document review

process. The ultimate goal of Info-STREAMS is to provide integrated, network-wide access to the information and technical data needed to support the design, licensing, construction, operation, and decommissioning of the various components of the waste management system.

September 1992

❒ **The Civilian Radioactive Waste Information Center celebrated its first anniversary.** The Information Center System, featuring a national toll-free telephone number, received more than 11,000 information requests during its first year of operation. The system was established as a centralized communications tool for the public to access current program information. The Civilian Radioactive Waste Information Center is the principal information and distribution point for all program documents, reports, newsletters, fact sheets, exhibits, educational materials and videotapes. Calls to our toll-free number have been made by students, teachers, industry professionals, and private citizens, all seeking information on high-level waste management issues.

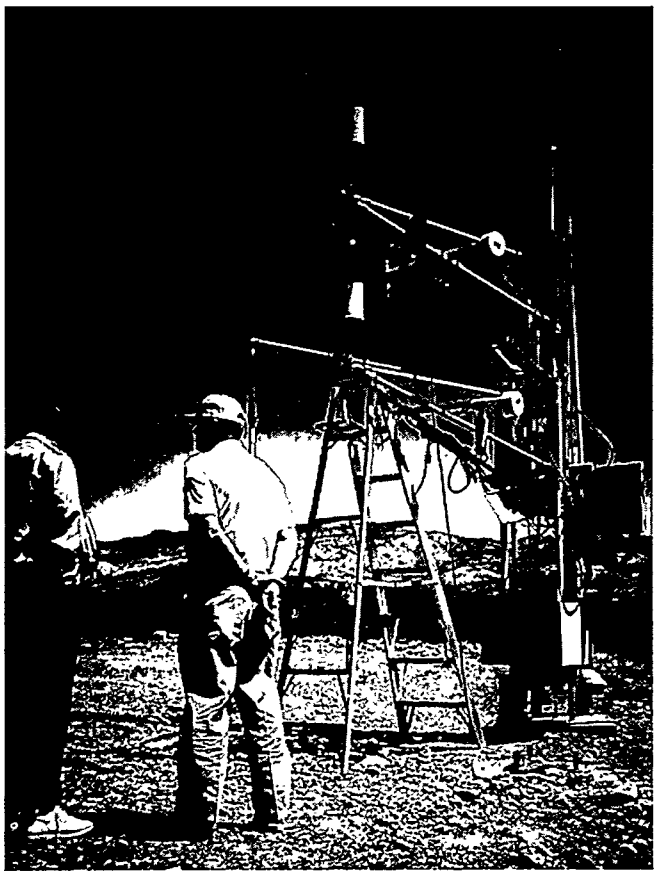
❒ **We completed the start-up and transition phase of our management and operating contract.** In 1991, the Office of Civilian Radioactive Waste Management awarded a 10-year management and operating contract to a team headed by TRW Environmental Safety Systems, Inc., which was charged with consolidating program resources, strengthening integration, and enhancing overall program progress. During its transition period, the contractor developed management systems and quality assurance programs; assumed all design work for repository, monitored retrievable storage, and transportation activities; and enhanced our regulatory investigations. Additionally, the contractor is leading the Yucca Mountain Project cost reduction and containment efforts, as well as the endeavor to accelerate the site suitability evaluation.

The OCRWM Information Center provides easy access to current information on plans and activities within the waste management program through a toll-free telephone number (800-225-NWPA [6972]) and a computerized database and communications network.

A YEAR IN REVIEW

SCIENTIFIC INVESTIGATION:

SETTING STANDARDS OF TECHNICAL EXCELLENCE



Technical excellence is a driving principle of our program. We strive for technical excellence throughout our scientific investigation by drawing on the best available expertise and methodology, by conducting extensive internal performance reviews, by collaborating on experiments with our international colleagues, and by undergoing rigorous review by nationally recognized external experts.

The current focus of our scientific studies is to determine if the Yucca Mountain candidate site can permanently isolate radioactive materials with natural and manmade barriers—multiple impediments that will provide "defense in depth," a system whereby barriers will work together to control the release of radioactive material to the environment.

Natural Barriers: Studying the Proposed Repository Site

Scientists began studying the geology of Yucca Mountain and its surrounding region more than 15 years ago. At least 10 additional years of detailed investiga-

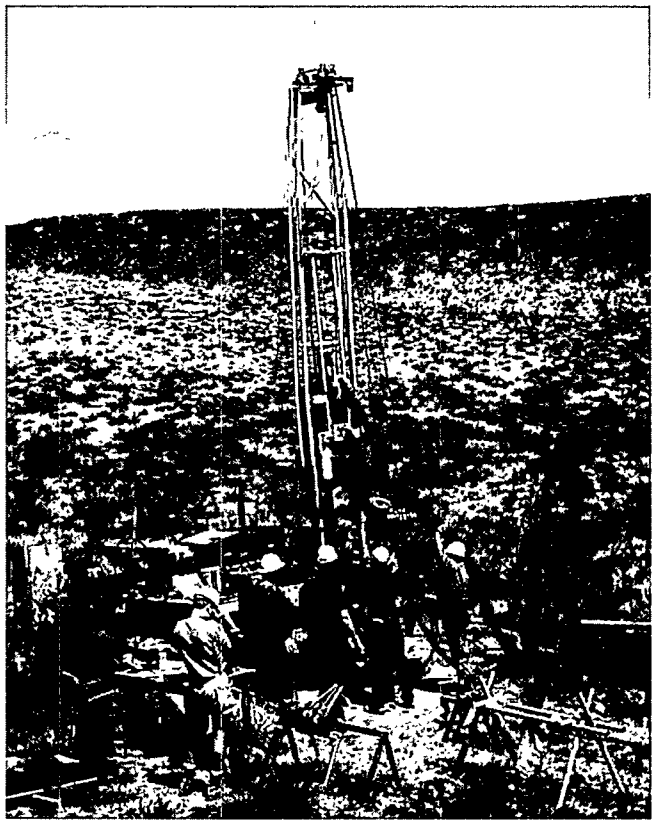
tions and suitability evaluations are planned to continue collecting and analyzing environmental and geologic data from the surface, from underground, and from laboratory tests and modeling.

Site Characterization Studies

The Site Characterization Plan calls for conducting more than 100 scientific studies comprising some 300 separate activities, including those at the surface of the site as well as underground. Companion study plans, which are reviewed by the Nuclear Regulatory Commission, provide more detailed descriptions of the studies. By the end of fiscal year 1992, 71 of 103 proposed study plans had been developed; 41 of these study plans had been submitted to the Nuclear Regulatory Commission for review, 27 of which had been accepted.

In fiscal year 1992 we continued to conduct extensive surface-based geologic investigations. Ground water is being studied to determine whether it could flood a repository, corrode waste containers, and transport radionuclides into the environment. We are also studying layers of soil and rock to learn about past volcanic activities from small and dormant volcanoes in the area. Seismic studies are being conducted to provide information

This CME-850 drill rig is used to collect rock core and cuttings samples for use in geohydrology studies, which focus on the rates, pathways, and mechanisms of water moving through the unsaturated rock zone. Understanding the site's hydrology is vital to assessing its suitability as a deep geologic repository. Scientists must determine if water can penetrate the repository and possibly corrode its waste containers. These smaller drill rigs are used to keep environmental effects at the site to a minimum.



Earthquake

A June 29, 1992, earthquake measuring 5.6 on the Richter scale occurred at Little Skull Mountain, about 19 kilometers (12 miles) southeast of Yucca Mountain, and was followed by thousands of aftershocks in the week after the original quake. Only a few were large enough to be felt.

The southern part of Nevada historically has been relatively free of strong earthquakes. This earthquake was the largest near Yucca Mountain in decades. Only two other larger ones are documented: a 6.3 quake in 1910 at Tonopah and a 6.0 event at Caliente in 1966.

No evidence of surface faulting was found by either state or federal geologists. The geologic effect of the quake appeared to be limited to dislodging boulders on Little Skull Mountain. Water levels in wells at the center of Yucca Mountain rose and fell one foot in the 10 minutes following the quake, which left the water table well below the planned repository level.

No damage was found in the tunnels at Little Skull Mountain, very near the epicenter. Experience with earthquakes throughout the world has shown that underground structures can withstand the ground motion generated by earthquakes, even when surface facilities cannot.

Geologic study of the deposits exposed in trenches and minerals found in fault zones provide evidence of how frequently and how much faults have moved in the past. Trenching excavations such as the one shown here in Midway Valley, will provide a detailed geologic map, accurately charting the Quaternary faults that may run through the area. This information will aid in assessing seismic risk and will provide design input for the Exploratory Studies Facility.

about the likelihood and potential impact of earthquakes on surface or underground facilities.

On any given day, our site characterization project is involved in a wide range of surface-based testing and laboratory activities:

Exploratory drilling. Drilling allows us to study Yucca Mountain's underground geology and geohydrology to obtain a three-dimensional picture of the site. We have drilled 200 boreholes, with some 330 to go. The three deepest boreholes will be drilled to a maximum of 1,525 meters (5,000 feet), penetrating the rocks below the candidate repository horizon and the water table; most will be less than 30 meters (100 feet).

Trenching. We dig trenches to study soil and rock characteristics and to examine any evidence of faults, that is, cracks in the Earth's crust accompanied by movement of one side of the crack in relation to the other. Data from trenches tell us the magnitude and history of past fault movement throughout the site area, and give insight into past climates through observation of a continuous geologic section.

About 40 trenches have been excavated to-date; additional trenches are planned for further fault and climate studies.

Mapping. Large-scale geologic mapping of Yucca Mountain will eventually cover about 50,000 acres and will provide important information about hydrologic and seismic conditions.

The worst damage at the site, about $1 million worth, was found at the Yucca Mountain Project Field Operations Center. There were broken windows, cracked walls, and displaced objects. The building, built in the late 1960s, was not specifically designed to withstand earthquakes. A repository and its associated waste handling facilities at the surface would be engineered to withstand earthquakes with a magnitude of 6.5 on a nearby fault. There was no damage to roads, drill sites, drilling equipment, or site trailers.

Officials at the site stated that ground accelerations produced by this earthquake in the proposed repository area were significantly below the preliminary design standards for all repository facilities. Dr. Clarence Allen, one of the country's leading seismologists, has stated "Earthquakes of the size and nature of the June 29 event are essentially inconsequential in terms of engineering damage that might cause safety or environmental concerns to a proposed repository. The effects of earthquake shaking can be accommodated by routine and well-established earthquake design."

Geophysical surveying. Seismic surveying and other geophysical methods performed at the surface aid in the study of the potential for earthquakes and volcanoes and provide insight into the structure and stratigraphy of the site.

Monitoring. Monitoring activities help to characterize environmental and geologic behavior, including meteorological conditions, streamflow, seismic activity, and ground water levels.

Laboratory testing. Laboratory investigations include studying the composition, thermal and mechanical properties, and hydrologic properties of samples from the site, as well as the chemistry of ground water from both the unsaturated and saturated zones.

During the reporting period, we performed the following surface-based testing activities:

- began the unsaturated zone drilling program at UZ-16, reaching 205 meters (673 feet);
- drilled 17 neutron access boreholes;
- excavated 69 soil test pits;
- completed 45 volcanism studies, including 37 trenches; and
- excavated six trenches for Quaternary fault studies, four in Midway Valley and two in Crater Flat.

Exploratory Studies Facility

Surface-based testing alone will not provide the critical data needed to determine site suitability. We will conduct at-depth studies in the Exploratory Studies Facility, an underground laboratory consisting of up to 22 kilometers (14 miles) of U-shaped tunnels on two levels cut through Yucca Mountain.

The Exploratory Studies Facility, when built, will allow our scientists to conduct detailed studies that will help us understand the complex geologic, hydrological and seismic conditions within Yucca Mountain at the planned depth of the repository. The structure will also allow for testing the response of the rock mass to construction of the underground ramps and drifts (openings to the sides of the ramps) under conditions similar to those expected in a repository.

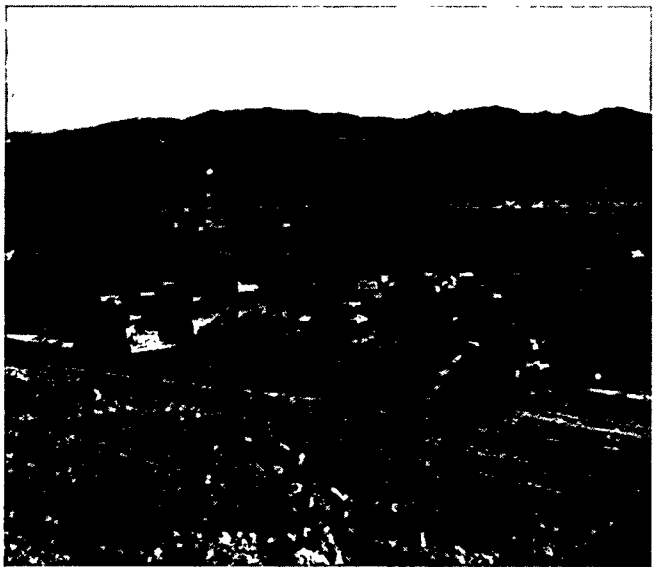
In January 1992, we received Under Secretary and Energy System Acquisition Advisory Board approval to develop final designs for the Exploratory Studies Facility. We adopted a phased approach to the overall plan that divides the facility into discrete design packages. By the end of fiscal year 1992, we finished initial technical reviews and began design verification for the first design package, which includes surface-disturbing activities for

Kris Scroggins likes to say that there are two types of geologists: those who love being in the field and those who hate it. A former gold driller, the University of Nevada, Las Vegas graduate has the scruffy, weather-beaten look of a self-described desert rat.

"To my best knowledge, I was the first geologist hired to actually work in the field. This has become one big family out here — all the geologists, the support staff, the principal investigators, the drillers. We are all working together to establish as much data as we possibly can so a good decision can be made as to whether the site is suitable for a high-level nuclear waste repository.

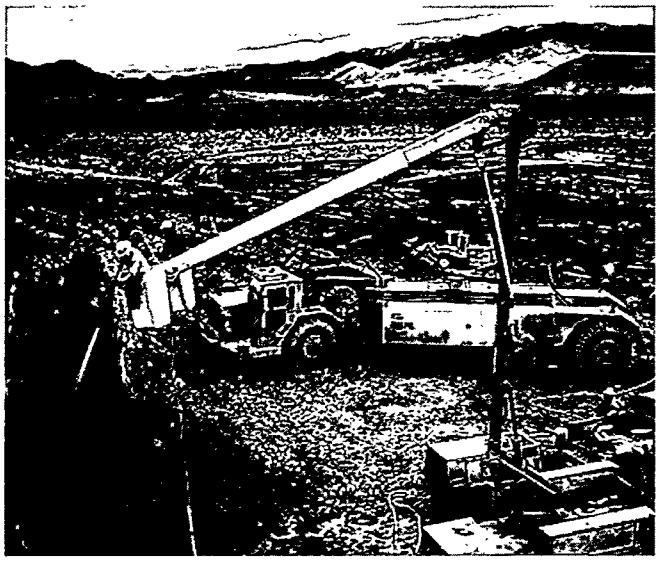
"The mountain is finally giving up its secrets. We're learning more and more. This project is just as exciting in some respects as looking for gold. This science is above anything I have ever been associated with; it's unbelievably worldclass."

Kris Scroggins
Shift Supervisor & Geologist, Drilling Support Division/Area 25
Yucca Mountain Site Characterization Project
Technical and Management Support Services Contractor/SAIC



In November 1992, site preparation began for pad construction for the north portal entrance to the Exploratory Studies Facility. The first 60 meters (200 feet) for the "starter tunnel" will serve as an assembly area and tunnel-launch chamber for a tunnel boring machine. The U-shape construction required for major test activities is expected to be completed in 1996 when the tunnel boring machine resurfaces at the South ramp. It will eventually encompass some 70 acres of surface and underground facilities.

"The significance of the Exploratory Studies Facility is that it provides project scientists with their first underground access to the mountain," says William Simecka, Director of Engineering for the Yucca Mountain Site Characterization Project. "The sooner we get underground, the sooner our scientists can discover if there's any reason to disqualify Yucca Mountain as unsuitable for a potential repository. We're best off knowing this before extensive licensing and design work on a repository has been done."



the north portal access to the Exploratory Studies Facility, surface facilities, and the tunnel-boring machine launching chamber. We released a request for proposal to select a construction contractor for the Exploratory Studies Facility in March 1992. We expect a recommendation on the proposals received by the Source Evaluation Board in fiscal year 1993.

Early Site Suitability Evaluation

One of our strategic objectives is to determine, as soon as possible, whether the Yucca Mountain candidate site is suitable for development as a potential repository. In order to meet this objective, the Office of Civilian Radioactive Waste Management's Director requested that a current baseline site evaluation be made to ascertain if evidence exists to indicate that the site is unsuitable.

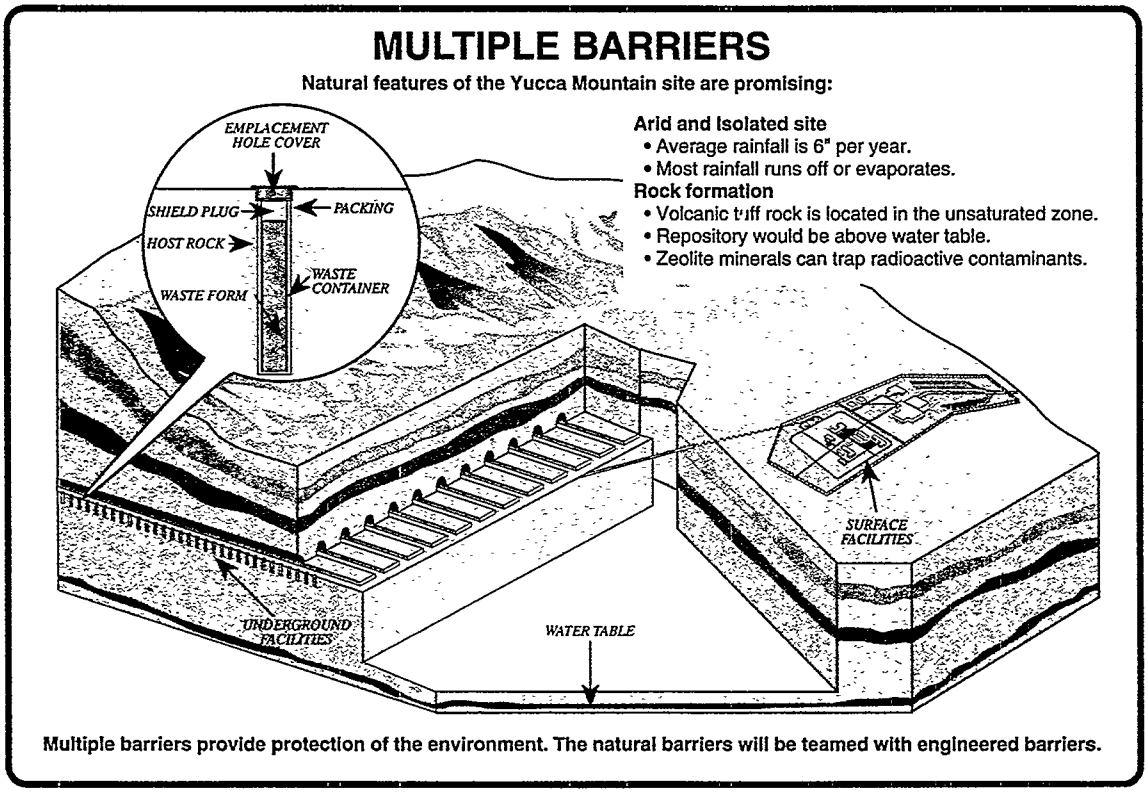
In February 1992, we released for public comment the Early Site Suitability Evaluation report, a contractor evaluation which provides preliminary conclusions concerning factors that affect the suitability or unsuitability of Yucca Mountain as a candidate site. The study was conducted, first, to determine if any disqualifying factors had been found which precluded further site characterization, and, second, to help us focus our near-term activities on those aspects of Yucca Mountain that might disqualify it as a repository site. The Early Site Suitability Evaluation report concluded that evidence currently available shows there is no technical reason at this time to stop studying the Yucca Mountain site.

Manmade Barriers

Engineered barriers are the manmade components of a disposal system, including the waste package, or disposal container. The waste package will be designed to contain the waste for at least several hundred years, possibly up to 10,000 years, until most of the radioactivity has decayed to levels below regulatory concern. The repository seal system will be designed to ensure that water will not compromise the containment and isolation of radionuclides from the accessible environment. The geologic, or natural, barriers will provide the third and primary factor of safety and further delay the migration of radioactive materials to the accessible environment for an even longer time.

We have deferred extensive research and development efforts toward the design of engineered barrier components and the repository until site characterization efforts are more advanced, in order to take fullest advantage of our understanding of the physical, chemical and hydrologic conditions at the candidate site. However, some work on the Waste Package Advanced Conceptual Design has been started. Most of the engineered barrier system design options under consideration are based on multibarrier, robust waste package concepts, as advocated by the Nuclear Waste Technical Review Board.

A key issue in repository design is thermal loading, referring to the heat energy from the radioactive decay of the spent nuclear fuel that is imparted to the surrounding material and rock of the repository. Studies of the impact of alternative thermal loading strategies on the waste management system are underway. The key data needed to predict effects of various strategies can be obtained by conducting long-term heater tests in the Exploratory Studies Facility, the actual geologic environment of the proposed repository.



An illustration of the multiple barrier concept from our education curriculum, "Science, Society and America's Nuclear Waste."

What Jeanne Cooper likes best about her job on the Yucca Mountain Project is its variety. Cooper, shown here giving a tour at the site, left Oxford, Ohio, with a doctorate in geology and joined the Project about a year-and-a-half ago. Yucca Mountain is about rocks, she says, but it's also about people.

"It's a major scientific challenge trying to predict what Yucca Mountain may be like 10,000 years from now. One of the key things we found in trying to determine the age of a volcano is that the traditional methods of determining the ages of volcanic rocks don't seem to work very well for materials younger than 300,000 years. We've kind of shaken up the geochronology world in trying to date this one particular volcano because we had to use all kinds of different methods, some of which are brand new and not well calibrated or understood. We've made some interesting discoveries about one technique the geological world had always accepted as something that worked very well.

"Any geology is hard to understand. It is never black or white. It's not like an engineering project, where you can engineer a nut or bolt to be exactly the size you need. In geology there will always be some uncertainty. But we're doing such a detailed study of this mountain that any uncertainty we still have by the time we're done will be minute."

Jeanne Cooper
Physical Scientist
Regulatory and Site Evaluation Division
Department of Energy, Office of Civilian Radioactive Waste Management, Yucca Mountain Site Characterization Project Office

We held a workshop on Repository Thermal Design Strategy in August 1992 in Las Vegas to define a method for establishing repository thermal characteristics in the Advanced Conceptual Design. We established a task force which prepared an action plan to prioritize research needs to allow for an early decision on the thermal load of the repository.

Independent Technical Review and Oversight

The results of our scientific investigations are examined by experts from outside the program, by external review bodies, and at public technical conferences.

Oversight: The Nuclear Waste Technical Review Board

The Nuclear Waste Technical Review Board is an independent group created by Congress to provide independent expert review of the scientific and technical aspects of the waste management program. The members of the Board are nominated by the National Academy of Sciences and appointed by the President of the United States.

The Board holds numerous public meetings throughout the year with representatives of the Office of Civilian Radioactive Waste Management and its contractors, other Federal agencies, the national laboratories, the State of Nevada, and interested organizations. At least twice each year, the Board reports to Congress and the Secretary of Energy, making specific recommendations. We formally respond to the Board's recommendations; our responses are published publicly in its next report. The Board's recommendations have led to significant changes in the program, such as using inclined ramps rather than vertical shafts

Ground Water Debate

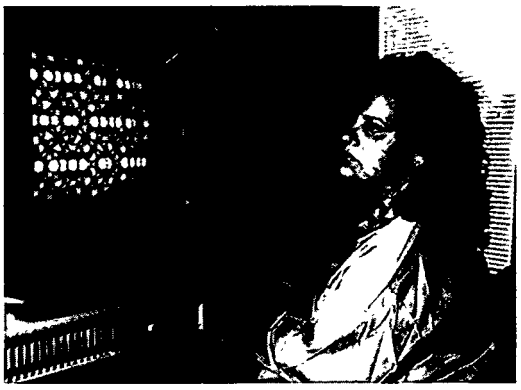
The vein-like deposits of calcite and silica exposed in the walls of Trench 14 at the Bow Ridge Fault and extending to the floor of the trench have been the subject of considerable scientific debate. The debate concerns the origin of the water responsible for depositing the minerals in the veins. Most scientists believe the deposits were formed by downward percolating rainwater that dissolved carbonate minerals and silica as it moved through the soils and redeposited them when the waters evaporated at lower levels.

A small number of scientists assert that the minerals represent ancient spring deposits and therefore indicate that a water table had been at the current surface in the past. They maintain that ground water has risen well above the level of the proposed disposal site several times in the geologically recent past, anywhere from 10,000 to 100,000 years ago, and is likely to rise again in the future. Ground water upwellings to the level of the proposed repository could affect the suitability of the site.

A National Academy of Sciences panel unanimously concluded after a two-year study that the vein deposits were not caused by the water table being at the current surface and it is not likely to rise to that level in the next 100,000 years. "Most of the features ascribed to upwelling water clearly are related to 10 million- to 12 million-year-old volcanic eruptions, are classic examples of desert soil characteristics or are formed from chemicals and wind-blown dust deposited by evaporating rainwater," said the panel chairman.

The final report of the 17-member National Research Council Panel on Coupled Hydrologic/Tectonic/Hydrothermal Systems at Yucca Mountain was released in April 1992. The panel found nothing to indicate that the Department of Energy should not proceed with characterizing Yucca Mountain.

Carl Gertz, Manager for the Yucca Mountain Site Characterization Project, points out veins filled with white mineral deposits of calcite and silica exposed in the walls of Trench 14. Most scientists believe the deposits were formed by downward percolating rainwater and melted snow. An Energy Department staff scientist attributed the deposits to surges of hot ground water driven up to the surface by earthquakes and volcanic activity.



A graduate of the University of Miami, Florida, Ines Triay has a Ph.D. in chemistry and a passion for recruiting young people for careers in science. She believes that a science education affords the ability to make hard decisions—the kind she believes this country needs if it hopes to thrive well into the next century.

"The reason studying Yucca Mountain is such a complex task is that you cannot just do it empirically, through simple observation. For instance, we want to determine to what extent the minerals in the tuff—the compacted volcanic material that comprises Yucca Mountain—can provide a natural barrier for the movement of radionuclides. You can't just say, 'okay, I took core from the site, I crushed that core, and I put it in contact with some groundwater that has a nuclide in it, and then watched what happens.' We also have to determine why things happen the way they do. That is where things get challenging."

Ines Triay
Technical Coordinator for Geochemistry
Los Alamos National Laboratory

in the underground studies facility. The Board not only provides valuable expertise that strengthens the program technically, but a forum in which affected governments and interested parties can observe and contribute to technical deliberations.

Peer Review: The National Academy of Sciences

Peer reviews of our findings and analyses by persons with technical expertise in the field who are not directly involved with the program have many benefits. The use of independent reviewers bolsters confidence in technical soundness and strengthens program credibility; different participants may generate fresh ideas and approaches to problems.

Over the years, the Board on Radioactive Waste Management of the National Academy of Sciences has maintained an active interest in our program and has provided the benefit of its technical expert advice. The Academy is a private, honorary organization whose members are elected in recognition of their contribution to science and engineering. Board contributions included its July 1990 position statement, *Rethinking Radioactive Waste Management*, which offered a valuable assessment of overall program issues, and its September 1990 symposium on repository licensing requirements.

Most recently, a National Research Council panel of the National Academy of Sciences unanimously concluded after a two-year study that mineral and silica deposits found at the Yucca Mountain site were not caused by ground water rising above the level of the proposed repository site in the geologically recent past, as had been asserted by a former Energy Department geologist. (See *Ground Water Debate.*)

Interacting with the Scientific Community

Because the repository program is a first-of-its-kind undertaking, maintaining the confidence of the scientific community in our technical work is fundamental to earning the confidence of the wider public. We participate extensively in both national and international conferences sponsored by scientific, technical,

and professional organizations. This participation not only keeps these communities informed, it exposes our work to scientific and technical scrutiny and encourages independent technical comment.

As co-founder of the annual International High-Level Radioactive Waste Management Conference, we worked closely with the conference co-sponsors, the American Society of Civil Engineers and the American Nuclear Society, in the successful implementation of the third annual scientific and technical conference, held in April 1992 in Las Vegas, Nevada. The conference was attended by close to 1,000 persons, including participants from Argentina, Australia, Japan, Sweden, the former Soviet Union, and the United Kingdom. We also participated in the Waste Management '92 conference in Tucson, Arizona, in March 1992.

Both of these conferences provided major international forums in which participants deliberated on various issues surrounding radioactive waste management technology and its environmental, social, public health and safety, and economic implications.

Sharing International Expertise

This year we continued our efforts to promote international understanding and consensus on radioactive waste issues. Our efforts included cooperative and bilateral agreements with other countries and international organizations to identify technology, approaches, and experience that would improve or facilitate similar U.S. efforts.

These agreements include collaborative efforts on underground and surface-based field testing, instrumentation development, laboratory testing, natural analogue studies, computer modeling, and data analysis. Most of these cooperative agreements have initiated technical information exchanges related specifically to permanent geologic disposal.

Sweden

The Stripa Project, initiated in 1980 and managed by Sweden, culminated at a final symposium held in October 1992. A benchmark for international projects as a long-running, tightly managed, and highly productive multinational cooperative project, this opportunity gave us access to the Stripa mine in Sweden so that we could participate in on-site experiments on the capability of fractured hard rock to isolate radioactive wastes. The Stripa Project allowed us to develop the technology for studying rock mass characteristics and broadened our understanding of fracture-flow hydrology.

We are currently finalizing an agreement with Sweden to participate in technical activities at the Hard Rock Labora

Scientific Debate

Hundreds of scientists, engineers, and other experts are involved in site characterization studies. Technical decisions are based on scientific findings. But in science absolute truths are elusive. Honest disagreements among scientists on various interpretations of data are certain to occur, especially during the early stages of information gathering. Regardless of the intensity of the debate, however, it is important that open discussions take place and opposing views are fairly evaluated.

Such a disagreement became apparent at the September 1992 meeting of the Nuclear Waste Technical Review Board. Two U.S. Geological Survey volcanologists said that the Lathrop Wells cone, a cinder cone near Yucca Mountain, some 19 kilometers (12 miles) away, last erupted 125,000 years ago during one geologic period that lasted several to a hundred years. Two other scientists maintained that the Lathrop Wells cone is younger, maybe 65,000 years old, and erupted during at least two different geologic periods.

Characterization activities being conducted at the Stripa Project in Sweden.

tory, an underground testing facility being built in Sweden to conduct research and development in a realistic and undisturbed underground rock environment at a depth equivalent to a geologic high-level radioactive waste repository. Our scientists will be able to learn first-hand about designing and coordinating underground testing. A major benefit of this agreement for both countries is to provide a mutual peer review of the techniques and models being developed and applied at the Hard Rock Laboratory and at the Yucca Mountain Exploratory Studies Facility.

Canada

The United States and Canada initiated a five-year agreement that will complement our current site characterization activities. The tasks called for under the agreement will provide valuable experience in designing and executing field and laboratory tests on water flow and transport in fractured rock and contribute to engineered barrier development and performance assessment within the civilian radioactive waste program.

Switzerland

The $3 million research project agreement initiated this year between the United States and Switzerland is aimed at developing site characterization techniques for future high-level radioactive waste repositories. The agreement covers joint research at the Swiss Grimsel Pass underground research facility in the Alps, one of only three underground laboratories in the world dedicated to nuclear

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The difference is key in determining when and where future eruptions near Yucca Mountain may occur. The problem is not what age the cone is, but whether there have been multiple events. If the cone erupted once over a relatively short geologic period, there is a significant degree of uncertainty about when and where the next volcanic activity around Yucca Mountain will occur. On the other hand, if there have been multiple eruptions, it is less likely that there will be eruptions near the mountain in the future. If there are, they will probably occur in the same place.

Whether or not the Lathrop Wells cone formed during one or more volcanic events, scientists have not ruled out the possibility that secondary volcanic effects could occur near Yucca Mountain. These include changes in ground water conditions and subsurface heat from any one of nine volcanic centers within 48 kilometers (30 miles) of the mountain.

waste repository research. The Grimsel research is valuable for our program because it is located in rock that is expected to behave like the rock located at Yucca Mountain.

International Organizations

We continued to participate actively in the consensus building efforts in many technical areas through efforts sponsored by the Nuclear Energy Agency and the International Atomic Energy Agency. Scientists from our program participated in meetings with peers from other countries to discuss common technical challenges and share expertise and experience; subjects ranged from computer modeling of repository performance to techniques for public education about nuclear waste management concerns.

We completed a collaborative initiative with the Nuclear Energy Agency, a compilation of internationally peer-reviewed thermochemical data on uranium. This compilation represents a seven-year effort by the Nuclear Energy Agency and complements our own efforts on geochemical code development.

HEALTH AND SAFETY:

PROTECTING PEOPLE AND THE ENVIRONMENT

Our philosophy for ensuring health and safety emphasizes the use of multiple safeguards, both in the physical design of the various components of the waste management system and in the oversight each component receives. This means our activities are not only subject to rigorous scrutiny from outside regulatory agencies but that we constantly assess and improve our own performance. A combination of safeguards—from regulatory control to constant evaluation to final licensing—provides an overall strategy to ensure protection of the public and the environment.

Our Regulatory Framework

The civilian nuclear waste management system operates within an intricate regulatory framework that provides a sound basis for health and safety standards. The entire program must comply with the requirements set forth in the Nuclear Waste Policy Act of 1982 and its amendments, as well as those mandated in other laws, such as the National Environmental Policy Act of 1969, the Clean Air Act, and the Resource Conservation and Recovery Act.

To ensure that the radioactive waste management system is conducted in a safe and responsible manner, we continue to work closely with the three key federal agencies that have statutory responsibility for overseeing our program:

Key Federal Regulations

The Office of Civilian Radioactive Waste Management must comply with numerous Federal regulations from agencies such as the Nuclear Regulatory Commission, the Department of Transportation, and the Environmental Protection Agency. These regulations include the following:

10 CFR 2 (NRC)
Rules of Practice for Licensing
Specifies the licensing process and requires an electronic record-keeping system to preserve data needed for licensing.

10 CFR 20 (NRC)
Standards for Protection Against Radiation
Establishes standards for radiation safety at an NRC-licensed facility.

10 CFR 50, Appendix B (NRC)
Quality Assurance Criteria for Nuclear Power Plant and Fuel Reprocessing Plants
Establishes quality assurance requirements.

10 CFR 60 (NRC)
Disposal of High-Level Radioactive Wastes in Geologic Repositories
Sets forth technical requirements governing development of a permanent geologic repository for spent nuclear fuel and high-level radioactive waste. Includes the NRC's oversight and licensing duties.

10 CFR 71 (NRC)
Packaging and Transportation of Radioactive Material
Implements Department of Transportation requirements for packaging and transporting high-level waste.

10 CFR 72 (NRC)
Licensing Requirements for the Independent Storage of Spent Fuel and High Level Radioactive Waste
Sets forth technical requirements for licensing private storage facilities to receive, ship, and store spent fuel, and outlines procedures by which DOE is licensed to receive, ship, and store spent fuel at a temporary facility.

10 CFR 960 (DOE)
General Guidelines for the Recommendation of Sites for Nuclear Waste Repository
Promulgated to establish guidelines to compare sites; now used as the basis for the Site Characterization Plan for Yucca Mountain Project.

10 CFR 961 (DOE)
Standard Contract for Disposal of Spent Nuclear Fuel or High-Level Waste
Outlines the contract with utilities to receive, ship and dispose of spent nuclear fuel and high-level waste.

40 CFR 191 (EPA)
Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes
Although this specific regulation was remanded in 1987, standards for the management and disposal of spent nuclear fuel and high-level radioactive waste are being reworked. A separate set of standards is being developed for the Yucca Mountain Project.

49 CFR 171-179
Hazardous Materials Regulations
Specifies general Department of Transportation requirements for the transportation of radioactive materials.

These rules are published in the *Code of Federal Regulations*, which is divided into volumes organized by Title and Part. For example, "10 CFR 60" refers to "Part 60 of Title 10."

- U.S. Nuclear Regulatory Commission
- U.S. Environmental Protection Agency
- U.S. Department of Transportation

An important ongoing regulatory issue this year concerns the Environmental Protection Agency's standards for radiological releases from a monitored retrievable storage facility and a permanent geologic repository, both before and after closure. A major requirement of these standards is that the disposal system be designed to provide a reasonable expectation that, for 10,000 years after disposal, cumulative releases of radioactive isotopes to the environment will be kept within specific limits. In 1987, portions of the Environmental Protection Agency's standards were remanded by the First Circuit Court of Appeals, which found some requirements overly stringent and others inconsistent with the Clean Water Act.

The Environmental Protection Agency has been revising these standards with the help of a variety of sources. We participated in a Department of Energy steering group that commented on this regulation and developed alternative approaches to several issues, including human intrusion, carbon-14 releases, and collective dose, and example regulatory language to illustrate how the proposed revisions might be incorporated into existing standards. In September 1992, the National Research Council's Board on Radioactive Waste Management met to review the technical aspects of our analyses.

We also continue to work with the Environmental Protection Agency on the reauthorization of the Resource Conservation and Recovery Act (RCRA) to determine which elements of the waste our program is to manage may be subject to RCRA hazardous waste regulations.

Our scientists monitor the water level in Devil's Hole, the only habitat in the world supporting the endangered pupfish. Some believe that water use at the Yucca Mountain site could affect the water level in the pool, although other causes for water level decline in the last few years might be prolonged drought and seismic activity. When we applied for a ground water appropriation permit from the State of Nevada, we worked out an agreement with the U.S. Park Service to monitor water levels in 35 test wells and five springs and report these results regularly.

The results are important because they will help us understand which regulations affect the design and operation of a repository and a monitored retrievable storage facility.

A key part of our regulatory compliance strategy involves identifying and organizing all of the requirements imposed on the system. Using a systems engineering approach, we are developing a series of system requirements documents which are being used to develop design requirements.

Regulatory Activities

This year we carried out a number of activities to satisfy our regulatory requirements.

Floodplain Assessment

During the past year, we completed the *Floodplain Assessment and Statement of Findings* and forwarded it for publication in the *Federal Register*. This study, performed in accordance with *Compliance with Floodplains/Wetlands Environmental Review Requirements* (10 CFR 1022), concluded that activities involving construction of the proposed Exploratory Studies Facility at Yucca Mountain would have no significant effect on floodplains in the area, nor would there be any cumulative impacts from site characterization activities. The *Floodplain Assessment* was required before we could receive approval to begin site preparation for the north portal of the Exploratory Studies Facility.

Permits

We are required to have at least 18 permits and other approvals from the State of Nevada and various Federal agencies to perform site characterization work at the Yucca Mountain site. Eleven of these permits are issued by the State. We were granted several key permits this year. The ground water appropriation permit from the State of Nevada will allow us to pump water during the next

Tortoises that range the deserts of southwest Nevada are hard to see. The ones that live near Yucca Mountain, though, have a unique identifying mark—antennae. The man who helped equip the local tortoises with radio transmitters was Kent Ostler, who now manages several programs designed to assure Department of Energy compliance with endangered species regulation at Yucca Mountain as well as reclamation work in the region.

"Federal agencies have to assess their activities for possible effect on any potentially endangered species, including the desert tortoise. We are monitoring the tortoises and conduct pre-activity surveys before any new disturbance on the site, identifying any tortoises in the area and moving them out of harm's way or relocating them.

"This isn't a one shot deal. We're continually finding new ones. We have marked about 230 animals, and we have radio transmitters on approximately 115. The larger tortoises have batteries that will go for several months up to a year. They can get around. And so do we. We had one we tracked almost 20 kilometers during the course of a summer.

"One of the most important things about this program is that the transmitters help us identify the tortoises' home ranges. Most of them have multiple burrows. If it comes to the point where we need to move one, we can identify one of the burrows in its home range and take it there temporarily."

Kent Ostler
Manager, Environmental Sciences Department
Yucca Mountain Site Characterization Project
EG&G

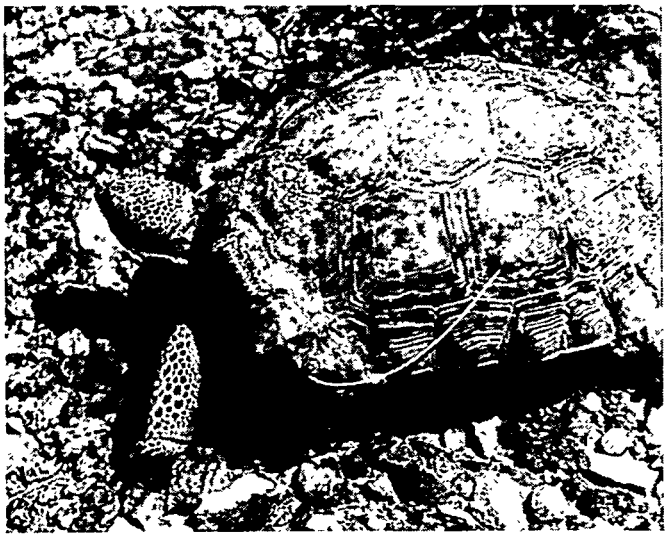
10 years to use at the characterization site for dust suppression, site preparation, and drilling. The permit also includes implementation of the monitoring plan we developed with the National Park Service for the ground water levels and spring flows in the Yucca Mountain region. Two other environmental permits, one for air quality and the other for underground injection control, were issued in the summer of 1991 and allowed us to begin major surface-based testing activities. Other Nevada permits will be required and filed for site characterization work.

Air registration certificates were granted by the State of Nevada for the LM-300 drill rig in November 1991 and for the gravel screen operation in Fortymile Wash in June 1992. A free-use permit for the extraction of sand and gravel from Fortymile Wash was received from the Bureau of Land Management in January 1992, allowing us to excavate fill material for constructing roads and drill pads for the Exploratory Studies Facility.

Environmental Field Programs

We are required by law to conduct site characterization activities at the Yucca Mountain site with as little negative impact on the physical, human, plant and animal environment as practicable. This year, we continued a number of field programs that we have established to ensure minimal harm to the environment. Many of these field programs are conducted by permit and remain in strict compliance with local, state and federal regulations. These programs include:

- ❒ Air Quality and Meteorological Monitoring
- ❒ Radiological Monitoring
- ❒ Cultural Resources Program
- ❒ Terrestrial Ecosystems
- ❒ Reclamation Studies
- ❒ Water Resources Monitoring



Emergency Preparedness

Emergency situations involving the transportation of radioactive waste are a major concern of State, Tribal, and local governments.

Section 180(c) of the Nuclear Waste Policy Act of 1982, as amended, requires us to provide technical assistance and funds to train public safety officials in safe transportation procedures and emergency response if spent nuclear fuel or high-level radioactive waste will be transported through their jurisdictions.

In January 1992, we issued the *Draft Strategy for OCRWM to Provide Training Assistance to State, Tribal and Local Governments*. The five key strategic components are to: (1) continue current efforts with interested parties to identify and discuss funding and technical assistance issues; (2) develop policy options to identify implementation processes; (3) choose a single option; (4) issue an implementation plan; and (5) initiate funding for training assistance. Comments on the strategy were received from a number of affected governments and other interested groups and were incorporated in the final strategy, which was released in November 1992.

We propose to begin providing assistance to jurisdictions along routes leading to a monitored retrievable storage facility between three to five years prior to the start of waste shipments. Similar assistance will be provided to jurisdictions along routes to a permanent disposal site.

In January 1992, we signed a Memorandum of Agreement with the Department of Energy's Office of Environmental Restoration and Waste Management establishing a way to ensure effective coordination within DOE for emergency preparedness planning. One of the key provisions was the development of the DOE Transportation External Coordination Working Group, whose members include representatives from state, Tribal, and local governments as well as from the Department of Energy.

With the overall objective of developing a consolidated, multi-year set of goals and plans of action, the working group is expected to:

- ❒ review training requirements under Section 180(c) of the Nuclear Waste Policy Act, as amended, including emergency response and safe routine transport;
- ❒ identify response, planning, training, and exercise needs;
- ❒ identify areas for the Department of Energy to coordinate activities with other Federal agencies and areas for Department-specific initiatives; and
- ❒ develop recommendations for providing technical assistance.

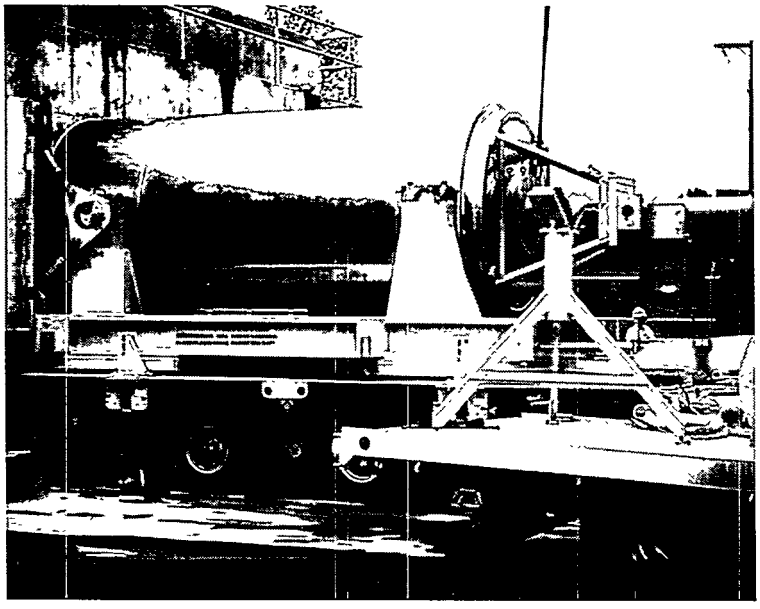
The first meeting of this Departmental transportation working group was held in March 1992 in New Orleans, Louisiana.

Designing for Safety: Proven Technologies

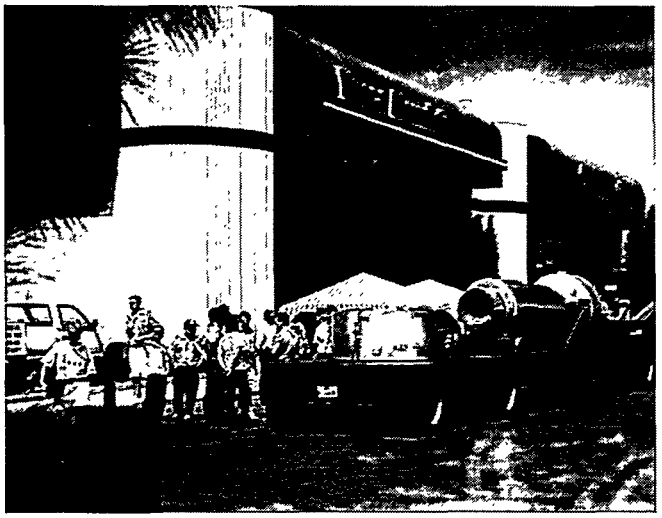
Scientists and engineers understand well the potential hazards that high-level radioactive wastes pose now and in the future. Using the technology we have today, it is possible to design both permanent disposal and temporary storage facilities and to plan a transportation system drawing upon proven technologies and incorporating safety in design.

Repository

The repository concept is based on the principle of defense in depth—the use of backup safety systems and designs with ample safety margins including natural and engineered barriers—to accomplish isolation over thousands of years. Natural



We have placed priority on using proven technologies wherever possible in all six conceptual designs for a monitored retrievable storage facility. The technology from the Conceptual Design Report for Concept 3 – dry transfer with storage in horizontal modules – is demonstrated here as a multi-element sealed canister is placed into a concrete module at Oconee Nuclear Power Station.



As part of our public outreach program, we exhibited an unused, legal-weight spent-fuel shipping container from the Nuclear Assurance Corporation at 15 locations in the Las Vegas area during August and September 1992. The events attracted over 3,600 interested members of the public, generating substantive questions and providing opportunities for discussion with technical experts concerning the safety of the nuclear waste transportation system.

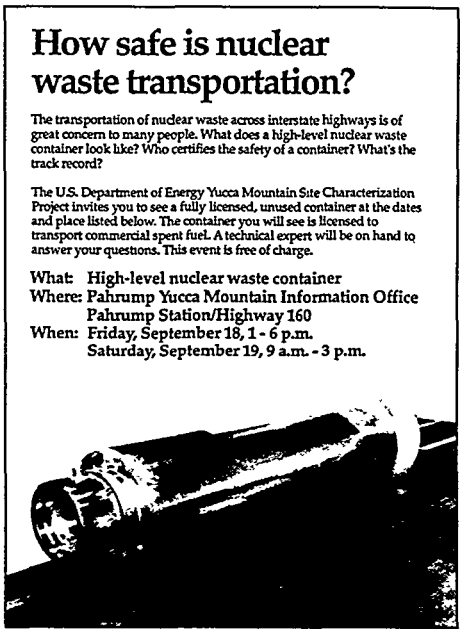
barriers will be provided by geologic characteristics of the site, and engineered components will be designed around them.

Storage Facility

As with the geologic repository, a monitored retrievable storage facility will employ multiple physical barriers to protect the public's health and safety. Several proven concepts for handling and storing spent fuel safely are used worldwide. Many of them have been approved by the Nuclear Regulatory Commission and are in use at reactor sites around this country.

In May 1992, we completed a Conceptual Design Report for the monitored retrievable storage facility. The design was developed by examining the requirements for safety, environmental regulations, and licensing. Six storage concepts were considered. A complete conceptual design was developed for each, including feasibility, costs, and construction time.

The report concludes that a storage facility can be designed and operated in compliance with all applicable Federal regulations in a manner that protects public and worker health and safety and preserves the quality of the environment.



Shipping Casks

Shipping casks are the main protection against any potential radiation exposure for both workers and the public while wastes are being transported. Spent fuel casks are certified by the Nuclear Regulatory Commission and are designed, built, and maintained to high standards to ensure that the casks will contain their contents and provide radiation shielding, even in severe accidents.

In anticipation of shipments to either a temporary storage facility or a permanent repository, we are continuing the Cask System Development Program, to develop a high-capacity cask that will hold

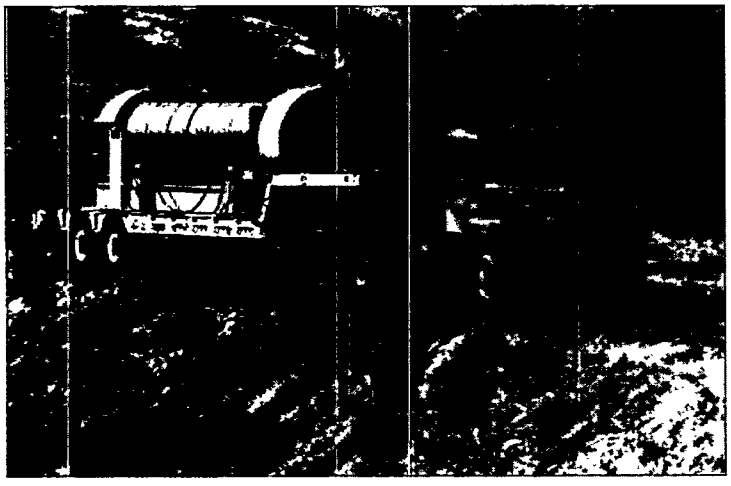
Transportation Safety

Transportation is a crucial link in the effectiveness of our entire program. The U.S. Department of Transportation has the main responsibility for regulating the safe transportation of all hazardous waste. Our shipments additionally must comply with other federal regulations, as well as applicable state, local, or Indian Tribal requirements.

Spent fuel and high-level waste will be shipped in casks which are certified by the Nuclear Regulatory Commission. Before shipment, loaded casks are sealed and the radiation level of each shipment is checked to ensure that it is within the regulatory limits. The shipments then will proceed to the federal facility following approved routes.

In conjunction with the Commercial Vehicle Safety Alliance, in August 1992 we conducted a pilot course to train State commercial vehicle inspectors in new procedures for the inspection of spent nuclear fuel and high-level radioactive waste shipments. The Commercial Vehicle Safety Alliance developed these procedures under a cooperative agreement with the Office of Civilian Radioactive Waste Management to develop uniform guidelines for the inspection of highway shipments of spent fuel and high-level waste that would comply with all pertinent federal regulations. A pilot study involving the inspection of shipments to the Waste Isolation Pilot Plant (WIPP) in New Mexico is expected to help establish a coordinated federal/state system to ensure the safety of highway shipments of spent fuel and high-level radioactive waste.

Between 1979 and 1991, there were more than 1,200 shipments of commercial spent nuclear fuel in the United States, and there has never been a single incident resulting in a radiological release. These successful experiences show that cooperative regulatory efforts have resulted in a system that works and protects the safety of transporters and the public.



A week after Pete Bolton retired from the Army in 1983, he was back at work applying his practical experience in transporting hazardous and nuclear materials to the development of a transportation program for the just established Office of Civilian Radioactive Waste Management.

"There are three major areas we need to be concerned with in development of the transportation system. The first is development of equipment, such as casks and even vehicles for transportation. When I started on this project, we looked to develop a family of casks. The casks in use then were built for hot spent fuel destined for reprocessing. Now, our shipments will consist of older and cooler fuel. Therefore we can design casks which could hold more fuel. That would reduce the number of shipments. Second, we had operational, safety and economic issues to consider, and we assisted the Department of Energy with studies in those areas. Finally, we have been involved in institutional issues — how we deal with the concerns people have about the transportation of radioactive materials, how are we going to resolve problems and issues such as routing of shipments and emergency response."

Peter Bolton
Manager, Transportation and Logistics Department
Technical Support Services
Contractor/Roy F. Weston, Inc.

greater quantities of spent fuel than those casks currently available, and, therefore, reduce the number of shipments. Designs for these new generation casks are being reviewed. In addition, we plan to initiate a procurement for shipping casks based on existing technology to ensure that a transportation capability will exist by 1998 in the event that the advanced technology casks are not available for these early shipments.

Evaluating Our Performance

One of our main tasks is to demonstrate the program's compliance with applicable laws and regulations.

Quality Assurance

We achieved a major accomplishment this year when our quality assurance program was unconditionally accepted by the Nuclear Regulatory Commission. We now have in place a quality-assurance program that meets Nuclear Regulatory Commission requirements and the nuclear industry's consensus standard for the application of quality assurance controls to nuclear facilities. A formal quality assurance program assures us of the integrity of our work while meeting one of the Commission's licensing requirements.

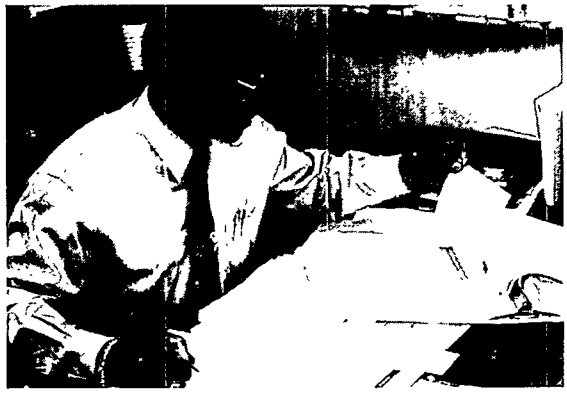
The development and implementation of this program represents one of the largest and most concentrated commitments of our time and effort since the beginning of the waste management program. All civilian radioactive waste management team members, contractors and subcontractors, and participating Department of Energy operations offices and laboratories are responsible for quality. In fact, all Department of Energy and contractor personnel performing quality-affecting work must be confirmed as possessing the requisite experience, education, and training to perform their assigned duties and responsibilities.

We reinforce our commitment to quality by implementing a strong overview program that continually audits and assesses activities affecting quality.

Self-Assessment

Self-assessment is a process to assess and improve performance at all organizational levels. It provides line managers with performance objectives and criteria to guide them in ensuring that work is performed in accordance with regulatory requirements and good business practices.

The work being done at Yucca Mountain is only as good as the instruments that probe the mountain and the record-keeping used to document the efforts of the Project's scientists and engineers. A longtime veteran of the nuclear industry, James Clark is a chemist by profession, but early on in his career he became interested in keeping weights and measures exact. Accuracy is now his career.



"My responsibility is to ensure that we have satisfied all the quality assurance requirements from the Nuclear Regulatory Commission and the Environmental Protection Agency so that our monitoring data is accepted in the licensing process. It's important that we follow and review set procedures, use calibrated equipment, and submit thorough records. Credibility and confidence in our data depend on it."

James Clark
Quality Assurance Liaison, Environmental and Field Monitoring
Yucca Mountain Site Characterization Project
Technical and Management Support Services Contractor/SAIC

This year, we developed a framework to identify and resolve overlapping requirements between the Department of Energy and other Federal agencies. For instance, because the repository and the storage facility will be licensed by the Nuclear Regulatory Commission, these facilities are required to follow Commission procedures that relate to radiological safety. However, Department of Energy projects are also subjected to Departmental orders and regulations. In areas where the Department of Energy and the Nuclear Regulatory Commission requirements overlap, exemption from the Departmental requirements will be sought.

Performance Assessment

Performance assessment is our primary tool in demonstrating the compliance of the proposed repository with the health and safety standards set by the Environmental Protection Agency (40 CFR 191) and the Nuclear Regulatory Commission (10 CFR Part 60). We must show that a repository can be designed in such a way that any radioactive releases to the accessible environment from the waste package can be controlled for 10,000 years.

We have demonstrated our capability for performance assessment, the practice of predicting the behavior of a system—in this case a repository at Yucca Mountain—using sophisticated mathematical models. In 1992, we published the first in a series of Total System Performance Assessment analyses, considering issues of human intrusion, basaltic volcanism, tectonism, and ground water and gaseous flow.

Scientists in the national labs constructed computer models for all potentially significant processes and events—such as a volcanic eruption, a change in climate, or human intrusion—that could result in radioactive releases to the environment. At the same time, the likely consequences of these events together with their probabilities of occurring were modeled. Through these analyses of expected and unexpected events, we try to predict all the possible and foreseeable

events to assess the currently designed repository's ability to withstand these events. Tests and modeling allow our scientists to design better storage containers, more efficient backfilling methods, and more effective overall repository designs.

Preparing for Licensing

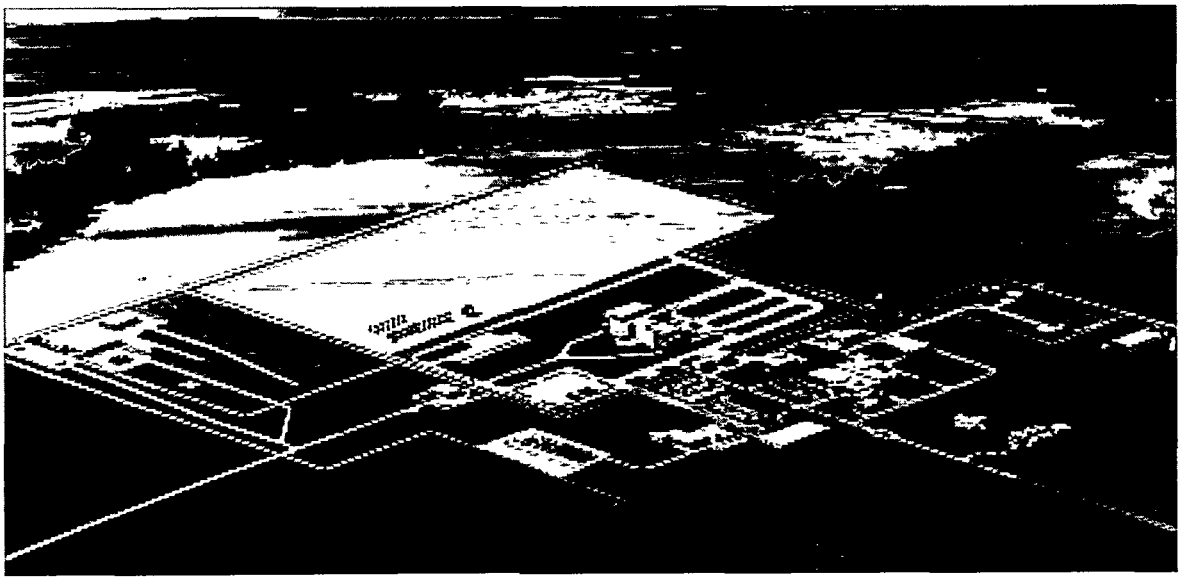
The Nuclear Waste Policy Act of 1982, as amended, requires that the Nuclear Regulatory Commission license both a disposal and a storage facility for high-level radioactive waste. The Commission will issue these licenses only if it is satisfied that its requirements for protecting the public, the workers, and the environment are fully met.

Site evaluation, design, licensing, construction, operation and decommissioning of a geologic repository is a first-of-a-kind endeavor. The regulatory framework for applying the controlling regulations of 10 CFR 60 is being developed by the regulatory agencies concurrently with the program's site evaluation and design activities.

An iterative annotated outline process, which has been used successfully in many regulatory environments, was initiated this past year for the proposed geologic repository. The annotated outline process is intended to facilitate active exchanges between the Department of Energy and the Nuclear Regulatory Commission for the identification, clarification, and resolution of issues to the extent feasible prior to submission of a license application if the Yucca Mountain site is found suitable at the conclusion of site characterization.

We submitted the first annotated outline for a license application for the repository in April 1992.

The license application itself, which must be submitted to the Nuclear Regulatory Commission within 90 days of Congressional approval of a site, will be the end product of progressively more complete annotated outlines. The annotated outline for the repository is planned to be an evolving document, to be updated as information and data from site characterization and performance assessment become available. A second annotated outline was submitted in September 1992.



An artist's conception of a monitored retrievable storage facility.

Correspondingly, the Nuclear Regulatory Commission is developing in an iterative manner its License Application Review Plan for a geologic repository. This Commission action provides a consistent and comprehensive regulatory approach to the first-time licensing of a geologic repository.

We also submitted annotated outlines for the preparation of a license application for a monitored retrievable storage facility in March and September 1992. The monitored retrievable storage facility will be licensed under 10 CFR 72.

In addition, we are developing and using an Issue Resolution Process, which is another effort to receive guidance and comment from the Nuclear Regulatory Commission staff regarding terminology, methodology and other issues relative to site characterization preceding licensing. A steering group is divided into several working groups that examine specific areas, such as groundwater travel time, erosion, or seismic hazard assessment. Working groups prepare topical and technical reports for review.

COMMUNICATION:

CULTIVATING INFORMED PUBLIC INVOLVEMENT

Communication is the mainstay of our efforts to involve the public in the civilian nuclear waste program. It is through communication that we not only inform the public about the program, but also the means through which we engage in meaningful interactions — interactions that foster a recognition for the critical importance of dealing with nuclear waste in the United States and interactions that increase our understanding of how this program may affect others.

Recognizing that nuclear waste management is a matter of justifiable public interest and concern, the architects of the Nuclear Waste Policy Act and its amendments drafted legislation giving an explicit role to certain parties, specifying when and how information is to be made available to the public for comment and review. Building on this "blueprint," we have established an ongoing effort to maximize communication opportunities with interested groups and individuals.

Public Participation

We have made a concerted effort this past year to expand and intensify our interactions with interested parties. Our goal is to continue to seek new opportunities for interacting with a broader spectrum of the public and to encourage all who express an interest to join in a dialogue about the nation's high-level radioactive waste management program.

The Director's Forum

The Director's Forum was established as one means for interested parties to participate in our program's decision-making process. At its first meeting in May 1992 in Chicago, Illinois, represen-

tatives from a variety of interested parties were invited to discuss our policy, strategy, and plans for early evaluation of site suitability. The focus of the Forum was on the policy aspects of the site evaluation process, rather than the technical evaluation of site suitability. This Forum served as a vehicle for representatives of affected governments and other interested parties to exchange information and views.

Involving Indian Tribes

Indian Tribes have a unique legal and political relationship with the United States government, defined by the Constitution, treaties, statutes and court decisions. This relationship obligates us to protect and preserve Tribal lands and resources, and to work directly with Indian Tribes affected by the program on matters of concern to them.

We continue to interact regularly with the Indian Tribes and Tribal groups that have traditional cultural and spiritual ties to Yucca Mountain. For example, this past year we conducted a private tour of the Yucca Mountain site for members of these Indian Tribes, arranged another tour for Tribal youths, and held a special briefing on cultural resources, followed by a search for special artifacts on and around the study site.

Native American Consultant Richard Arnold, shown here pointing out artifacts in a display at the Yucca Mountain Information Center, briefs government officials on Native American attitudes toward the site work at Yucca Mountain. In accordance with the American Indian Religious Freedom Act and other statutes, archaeologists affiliated with the Yucca Mountain Project are surveying the mountain to assess its archaeological significance.

Additionally, we completed negotiations to renew our cooperative agreement with the National Congress of American Indians to assist this organization, the largest Indian membership group in the country, in participating in the waste management program.

In November 1991, the Secretary announced the Department of Energy's

Building Public Trust and Confidence

An important objective of our program is to help build public trust and confidence in the Office of Civilian Radioactive Waste Management's ability to accomplish its mission and in the fairness and competence of the decisionmaking process.

On April 29, 1991, the Secretary of Energy established a 14-member task force of the Secretary of Energy Advisory Board to investigate the issue of public trust and confidence in DOE's radioactive waste management program. The Secretary asked the Board to identify steps that could be taken to increase public trust and confidence, consider whether these efforts affect other program objectives, and consider how to implement its guidance and recommendations. The task force asked the National Academy of Sciences' National Research Council and the National Academy of Public Administration to conduct workshops in early fiscal year 1992 on trust and confidence issues. The task force issued a draft report for public comment in January 1993. The Office of Civilian Radioactive Waste Management is supporting the task force by providing briefings and background information on request.

official American Indian Policy, which outlines principles for the agency to follow in its interactions with federally recognized American Indian Tribes. As a follow-up, we are in the process of developing an Indian Policy Implementation Plan, which will provide formal guidelines for involving Indian Tribes in our program and for addressing issues of concern to American Indians. In early fiscal year 1993 we will be holding a series of meetings with various Indian groups to discuss significant policy issues and key elements of the implementation plan.

Resolving Transportation Issues

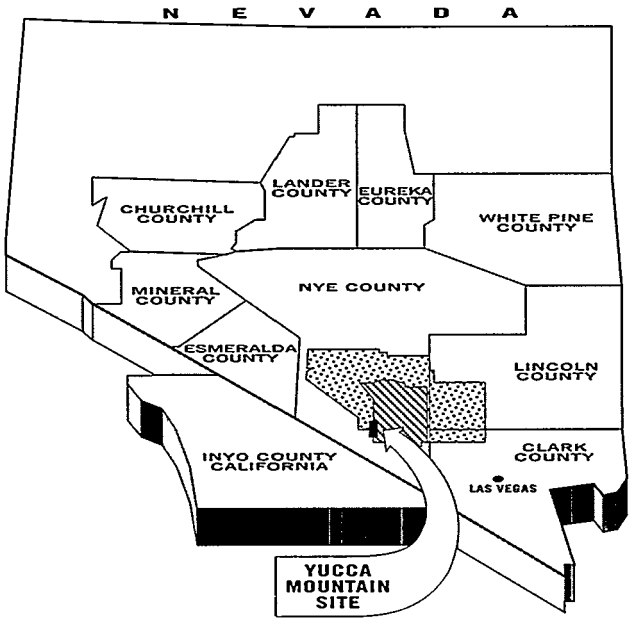
We continued to work with numerous external organizations to study and resolve issues related to transporting radioactive waste. We have consulted with States, Indian Tribes, and local governments, as well as a wide variety of professional and technical groups, including the National Conference of State Legislatures, the Western Interstate Energy Board, the Southern States Energy Board, the Midwest Office of the Council of State Governments, the National Congress of American Indians, the Conference of Radiation Control Program Directors, and the Commercial Vehicle Safety Alliance. Through cooperative agreements with many of these groups, we have benefited from input in areas such as emergency response, state inspections, highway routing, pre-notification, physical protection, liability coverage, infrastructure improvements, and State, local, and Tribal regulations.

The Transportation Coordination Group affords a forum for all parties concerned with the OCRWM transportation program to interact with each other. The group met this year in Phoenix, Arizona, to discuss the status of public safety training and emergency preparedness activities, and to assist OCRWM in developing future routing criteria.

Working With Communities in the Siting Process

Although many individuals and groups have a genuine stake and interest in our program, the storage and disposal of high-level nuclear waste will most directly

We hold two series of Public Update Meetings each year in Nevada to provide the public with an overview of the Yucca Mountain Project and current developments. Meetings are held in Nye and Clark Counties, northern Nevada, and other locations as requested. Visitors can talk individually with the scientists who staff exhibits on transportation, ground water, earthquakes, and other topics. During the second half of the meeting, there is an open question-and-answer session.



affect the local communities in which waste facilities are located.

The Nuclear Waste Policy Act of 1982, as amended, defines certain units of government as "affected" because of their jurisdiction over the site of a geologic repository or a monitored retrievable storage facility. Currently Nye County, in which the Yucca Mountain site is located, and nine contiguous counties in Nevada and California have been designated as affected. These counties are eligible for extensive participation and oversight rights and certain forms of financial assistance. When a site is selected for a monitored retrievable storage facility, other affected governments will be designated.

Characterizing the Geologic Repository Candidate Site

During fiscal year 1992, we continued efforts to strengthen communication between our program and affected governments. We formalized the *Protocol Addressing Procedures for Nye County On-Site Representation During Yucca Mountain Project Site Characterization Activities*, which establishes procedures for Nye County's oversight role during site characterization. Building on previous agreements with the County, the Protocol will aid mutual understanding on matters such as attendance at meetings, access to Department of Energy project personnel, access to records, and access to sites and facilities.

We also continue our efforts to ensure that host communities will benefit from our activities and that potentially adverse effects will be mitigated to the satisfaction of the community.

Socioeconomic activities are currently focused on the candidate repository site at Yucca Mountain, Nevada. The Office of Civilian Radioactive Waste Management's Director mandated in August 1992 that the analysis and management of potential social and economic effects on communities resulting from all program activities be coordinated with interested parties. We have consulted with affected governments on the preparation of the *Yucca Mountain Project Socioeconomic Plan*. This document presents the socioeconomic requirements that the repository program must meet, explains how we will meet those requirements, and presents a comprehensive socioeconomic program for the Yucca Mountain candidate site. This program will enable us to work cooperatively with affected

governments to identify, assess, and monitor potential effects and to select and implement appropriate mitigation strategies.

In February 1992, we published the *Profile of Housing Characteristics for Nye County*, a survey of community services and facilities, regional economic and demographic characteristics, and fiscal characteristics within Nye County.

Financial assistance in the form of direct payments is provided to the State of Nevada and affected counties to enable recipients to monitor site characterization activities, to inform their residents of program developments, and to develop requests for impact assistance. In fiscal year 1992, a direct payment of $5 million was made to the State of Nevada; each of the affected local governments received an apportioned amount from an additional $5 million. Additionally, the University of Nevada system received $3.5 million for various infrastructure and geologic studies.

In addition to direct payments, the Department of Energy is proceeding to make Payments-Equal-To-Taxes as directed by the Nuclear Waste Policy Act. These payments equal the amount of taxes that would be assessed if a private organization were conducting site characterization activities. We made a $1 million interim Payments-Equal-To-Taxes payment to Nye County in January 1992.

We also made a partial payment of $770,709 to Benton County, Washington, this year for site characterization activities from May 1986 through December 1987, when the Amendments Act to the Nuclear Waste Policy Act was passed terminating site characterization at the Texas and Washington candidate sites.

Seeking A Volunteer Host for Temporary Storage

During fiscal year 1992, we supported a unique voluntary approach to siting a monitored retrievable storage facility, an aboveground facility at which radioactive waste will be stored temporarily before being transported to the geologic repository for permanent disposal.

The Nuclear Waste Negotiator, appointed by the President and confirmed by the Senate in 1990, has taken the lead in seeking a voluntary host—a willing State, Indian Tribe, or local government with a technically qualified site—with

A group of officials from Lincoln County, Nevada, visited VEPCO's Surry Nuclear Power Station to learn more about spent nuclear fuel and storage options.

As one of the information gathering activities they undertook with their feasibility assessment grant, representatives from the Mescalero Apache Tribe toured the Yucca Mountain site to learn more about storage and disposal of nuclear waste. Tribal President Wendell Chino stated in his October 1991 application letter that the Mescalero Apache wanted the "opportunity to seize the initiative in seeking a positive resolution to a nuclear issue that is of concern to all Americans."

whom to negotiate a proposed agreement on reasonable terms. With the passage of the Energy Policy Act of 1992, the Negotiator's term of office was extended until January 29, 1995.

In conjunction with this voluntary siting process, the Department of Energy made available phased financial assistance grants to help States, Indian Tribes, and local governments assess the feasibility of hosting a storage facility within their own jurisdiction. The grants were designed to help grantees gather and disseminate to their communities information about nuclear waste issues in general and about technical, health and safety, and economic issues relating directly to the construction and operation of a monitored retrievable storage facility. Accepting the grant did not mean that the community had made any commitment to hosting such a facility.

Phase I grants of up to $100,000 were awarded to conduct a preliminary feasibility study of siting a temporary storage facility within the applicant's jurisdiction. Phase IIa grants are intended to support more detailed examinations and further public information activities.

On October 18, 1991, DOE awarded its first Phase I grant to the Mescalero Apache Tribe of New Mexico, to be used by the Tribe to gain an understanding of the Nation's nuclear waste management system and to determine whether it has an interest in pursuing further storage facility feasibility studies.

Other applications soon followed. Of the 21 applications that we received,

twelve grants were awarded to the following jurisdictions:

- ❒ Mescalero Apache Tribe, New Mexico (October 1991)
- ❒ Grant County, North Dakota (November 1991)
- ❒ Yakima Indian Nation, Washington (December 1991)
- ❒ Fremont County, Wyoming (January 1992)
- ❒ Chickasaw Nation, Oklahoma (February 1992)
- ❒ Sac and Fox Nation, Oklahoma (February 1992)
- ❒ Prairie Island Indian Community, Minnesota (March 1992)
- ❒ Skull Valley Goshute, Utah (April 1992)
- ❒ Ponca Tribe, Oklahoma (April 1992)
- ❒ San Juan County, Utah (May 1992)
- ❒ Ft. McDermitt Paiute-Shoshone, Nevada (May 1992)
- ❒ Eastern Shawnee Tribe, Oklahoma (September 1992)

The Mescalero Apache Indian Tribe was also the first jurisdiction to apply for and receive a Phase IIa grant. Public information is a major feature of the Tribe's follow-on grant activities, including opening an information center and publishing a newsletter to update the community on continuing feasibility studies.

As of September 30, 1992, we had awarded 12 Phase I and one Phase II grants from a total of 21 expressions of interest. Because of continued interest in the monitored retrievable storage feasibility grant program, we extended the deadline for Phase II grant applications to March 31, 1993. A second Phase IIa grant was awarded in January 1993, and a third application was received in February 1993.

Strengthening Public Information Efforts

A wide range of external audiences—from members of the general public, educators, and students to journalists, legislators, and utility representatives—continue to express a keen interest in learning about and staying informed on our program's progress. Building on past efforts, we strengthened our public awareness activities in fiscal year 1992 so that more people could obtain the most current program information in a timely fashion.

When Vic Trebules started visiting volunteer sites for a possible monitored retrievable storage facility, he never expected a welcome so gracious that he would be invited to someone's home for mooseburgers. But that's what happened in Fremont County, Wyoming. Trebules is part of the Office of Civilian Radioactive Waste Management program which supports the independent Nuclear Waste Negotiator who works with volunteers interested in hosting a monitored retrievable storage facility. Federal law provides for grants to state and local governments or Indian Tribes who express an interest.

"We've been supporting the Office of the Nuclear Waste Negotiator in the voluntary siting process for a temporary spent nuclear fuel storage facility. The Department of Energy is responding to requests for information, providing technical briefings and preparing models that might help the Negotiator.

"I have visited with people in several areas, trying to get information out to the public. We meet with a group when the Negotiator's office agrees, and what we do is coordinated through that office."

Victor Trebules
Director, Storage Division
Department of Energy, Office of Civilian Radioactive Waste Management Headquarters

In September 1991, the Office of Civilian Radioactive Waste Management opened its national Information Center to provide the general public with quick access to program information. The Information Center includes a toll-free telephone line, a library for public use, a database system, an exhibits program, and is the hub from which education programs are planned and implemented.

"I feel that the Information Center provides an invaluable service to the general public by giving their questions and concerns immediate response. On the phones or in person, I get a feeling of gratitude from those who use the Information Center.

"Based on the number and types of calls that we receive, we feel that the Information Center provides the most efficient means of obtaining information from the Department of Energy. When a person calls the toll-free telephone number, he or she talks with an information specialist who is very knowledgeable about the program issues. The people seem to really appreciate the quick responses we give their questions and concerns and the amount of research that goes into them. We have many repeat callers."

Theresa Sebik
Public Information Specialist and Exhibits Manager
OCRWM Information Center/SAIC

Our Information Center System enjoyed a successful first year, receiving more than 11,000 public inquiries and distributing approximately 144,700 publications. For the first time, anyone with questions about spent nuclear fuel and high-level waste management could call our toll-free number and speak directly with an information specialist, available weekdays from 9:00 a.m. - 7:00 p.m. EST at 1-800-225-NWPA (6972).

We continued to operate INFOLINK, a publicly accessible, interactive database that allows users to access news releases and speeches, review information products, place publication orders, and communicate with other users. We continued to publish the *OCRWM Bulletin*, our quarterly newsletter which provides information about our program's activities, milestones, and events. Additionally, new publications and fact sheets were developed to inform the public on the latest program developments.

Community-Linked Programs

Over the past two years, we have increased our public information and outreach activities in Nevada. Two sets of public project update meetings are held each year to provide the public with an overview of current developments. Meetings were held in Nye and Clark counties, northern Nevada, and other locations, as requested. Staff from the Project Office have given more than 200 presentations to civic, educational, business, and professional groups since 1990. The Project Office also began a monthly series of public lectures on technical and socioeconomic issues.

Fostering an Informed Citizenry

In March 1992, we entered into a five-year cooperative agreement with the League of Women Voters Education Fund, which provides for a revision of the Nuclear Waste Primer, a preeminently popular information handbook for the lay reader. The updated publication will incorporate information on DOE's environmental restoration programs and will be supplemented by seminars conducted by the League in cooperation with local communities. The League of Women Voters worked with utility, environmental, and grassroots citizens groups to ensure the objectivity of the Nuclear Waste Primer.

In April 1992, we opened a public information office in Pahrump, joining two other offices in Las Vegas and Beatty. All our public information offices serve as resource centers for information about the Yucca Mountain project, providing interactive and display exhibits, science education resource materials, and educational lectures. More than 10,000 people, including some 500 students, have visited the information office in Las Vegas since it opened in February 1990.

The Project Office continued to offer monthly open houses and site tours of the Yucca Mountain candidate site. These have been a notable success since they began in March 1991. More than 500 visitors have taken the tour every month. Information on the project specifically and nuclear energy issues generally are available. Other initiatives include developing a rural outreach program for individuals, groups, and media outside the urban centers of Nevada and working with the Boy Scouts of America and Girl Scouts of America to establish merit badges on nuclear energy and on geology.

Education Initiatives

Recognizing the nuclear waste management system's fundamental stake in workforce preparedness and scientific literacy, we have developed educational programs aimed at improving the science literacy of students from kindergarten through college and post-graduate levels; enhancing teacher skills; encouraging careers in science and engineering; and developing a keener awareness of science issues among the general public.

We transferred surplus computer equipment for use in Nevada schools in support of Federal and Department of Energy educational initiatives through the assistance of the University of Nevada, Reno and the University of Nevada, Las Vegas. Schools provided modems for students and teachers to access INFOLINK to acquire current civilian radioactive waste program information.

We have developed several exhibits for presentation at technical and nontechnical meetings, and at regional and national education conferences and events. Our outreach at conferences continues to grow: attendance in 1992 for exhibits was approximately 146,000 in 29 states at 42 events.

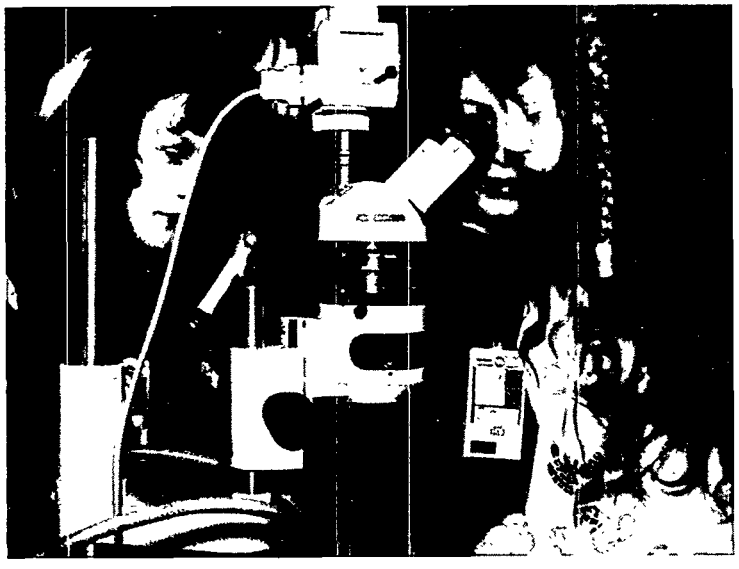
In March 1991, the Yucca Mountain Site Characterization Project conducted the first public open house and tour of Yucca Mountain. On that tour, 325 guests were able to see the site and talk to the project's scientists. The tour program has grown into one of our most effective outreach programs. In fiscal year 1992, over 100 tours were conducted for over 5,200 guests. Once in the field, visitors are provided an opportunity to go to the top of the mountain for an overview of the site characterization program, a geologic orientation to the area, and a discussion of regional hydrology.

New Education Curriculum

In response to continuing requests by teachers, and after years of planning, development, teacher testing and evaluations, we produced *Science, Society, and America's Nuclear Waste*, a new resource curriculum on nuclear waste for grades eight through 12. This resource curriculum was introduced to teachers through a nationwide teachers teleconference workshop in July 1992. The workshop was downlinked at almost 200 locations in all 50 states.

Designed to help educate students on the scientific and policy issues related to the safe management of spent fuel, the curriculum covers topics such as energy generation; sources, amounts, locations, and characteristics of spent nuclear fuel and high-level radioactive waste; sources, types, and effects of radiation; U.S. policy for managing and disposing of nuclear waste; and the components of the nuclear waste management system.

The curriculum, which includes supporting classroom activities and teaching materials, was developed by a team of classroom science and social studies teachers in concert with scientists and technical experts in all relevant fields. The curriculum withstood a rigorous evaluation process, including multi-state field tests; analysis at teachers' and inter-



national conferences; and review by the Science and Society Committee of the National Council for Social Studies.

International Education Cooperation

This year we launched the International Education Alliance in Radioactive Waste Management, an organization established to foster science literacy in radioactive waste management through international collaboration in education. This alliance was formed as a result of an international education workshop in June 1991 cosponsored by the Office of Civilian Radioactive Waste Management, Switzerland, and the Nuclear Energy Agency of the Organization for Economic Cooperation and Development.

Members of the International Education Alliance held their first meeting in Las Vegas in April 1992. The Director of our Education and Information Division currently serves as the group's chairperson. The group plans to develop an International Education Resources Catalogue for Teachers and an information packet describing the nuclear waste programs of member countries.

Graduate Fellowship Program

We strive to attract new talent into technical disciplines upon which the waste management program relies. This year we sponsored 20 graduate fellowships for students pursuing master's or doctorate degrees in fields related to radioactive waste management, such as nuclear engineering, health physics, environmental engineering, and geology. Our fellowship program is integral to our ability to develop and interest outstanding qualified professionals in advanced careers in the radioactive waste management field.

Carol Hanlon is a scientist. So why is she writing about scientific testing at Yucca Mountain instead of conducting it? Because Hanlon is an educator who believes knowledge is crucial to public trust and confidence in the program's scientific basis. By being involved through Headquarters, she can visit Yucca Mountain one month and a national laboratory the next. Then, she can communicate to the public what everyone is doing. And her 11 years' experience with the program gives her a seasoned perspective, whether she's wearing her scientist or educator cap.

"There's a lot of fascinating and excellent work going on in the field. I try to create a positive interchange between headquarters and the program people I work with to integrate our efforts and to close any gaps in our responsibilities. I try to encourage our partnership.

"We must communicate technically accurate information within our program, to other agencies and branches of government, as well as to the general public and interested parties. As a scientist and educator, I try to establish ways for the public to gain understanding of the radioactive waste management program. If the public does not understand what we are doing, how we are doing it, and why we are doing it, then we may have failed in an important part of our responsibility. Our goal is not short-term. People who live long after we are gone will have to understand what we were trying to accomplish."

Carol Hanlon
Physical scientist and Educator
Education and Information Division
Department of Energy, Office of Civilian Radioactive Waste Management Headquarters

REPONSIBLE STEWARDSHIP:

MANAGING EFFICIENTLY AND COST-EFFECTIVELY

While ensuring technical excellence, health and safety of the environment, and informed public involvement, we must manage our resources well—whether people, time, or money.

To perform the technical work, we rely on the country's best scientific and engineering expertise. To manage the program, we identify and organize required activities and establish integrated technical, cost, and schedule baselines subject to strict change control.

In 1992, our ongoing efforts to streamline our program management included:

- integrating and consolidating contracts;
- centralizing the licensing process;
- reviewing and verifying cost and schedule baselines;
- organizing program requirements by system function;
- accelerating the early site suitability evaluation process;
- piloting an electronic records management system; and
- implementing a change control tracking system.

Contract Integration

In developing the waste management system, we must integrate a complex set of multi-disciplinary activities required by the program's combination of objectives: technical excellence, regulatory compliance, fiscal responsibility, meaningful public participation, and public confidence.

In 1991, we awarded a 10-year management and operating contract to a team of companies that specialize in large-scale systems management, earth sciences, Nuclear Regulatory Commission licensing, underground construction, and nuclear facilities. The management and operating contractor's job is to help make the technical management of our program more efficient, to integrate its complex activities, and to perform systems engineering, design, and other technical work.

The transition phase of the contract was completed in September 1992. During this period, the management and operating contractor's management systems and quality assurance program were approved, and technical work was consolidated and transitioned to the contractor team.

The management and operating contract consolidated the work previously performed under several contracts. This consolidation is a response both to previous Congressional concerns about a lack of contractor integration, and to industry concerns about duplicative contractor support and the need to select contractors who have successfully integrated very complex programs in the past.

Baseline Management

A program as complex and long-lasting as ours requires solid planning and control. Our project control system involves establishing cost, schedule, and technical baselines, which are sets of data used for comparison or control that quantitatively define the costs, milestones, or activities needed to implement a scope of work. Then, we monitor project performance against these baselines, analyze variances and impacts, develop and implement corrective actions, and revise the baselines, as appropriate.

These technical, cost, and schedule baselines are controlled by a change control board at each of four levels: the Department level (through the Chairman of the Department of Energy's Energy System Acquisition Advisory Board), the program level (through the Director of the Office of Civilian Radioactive Waste Management), the project level (through the Yucca Mountain Project Manager), and the contractor level.

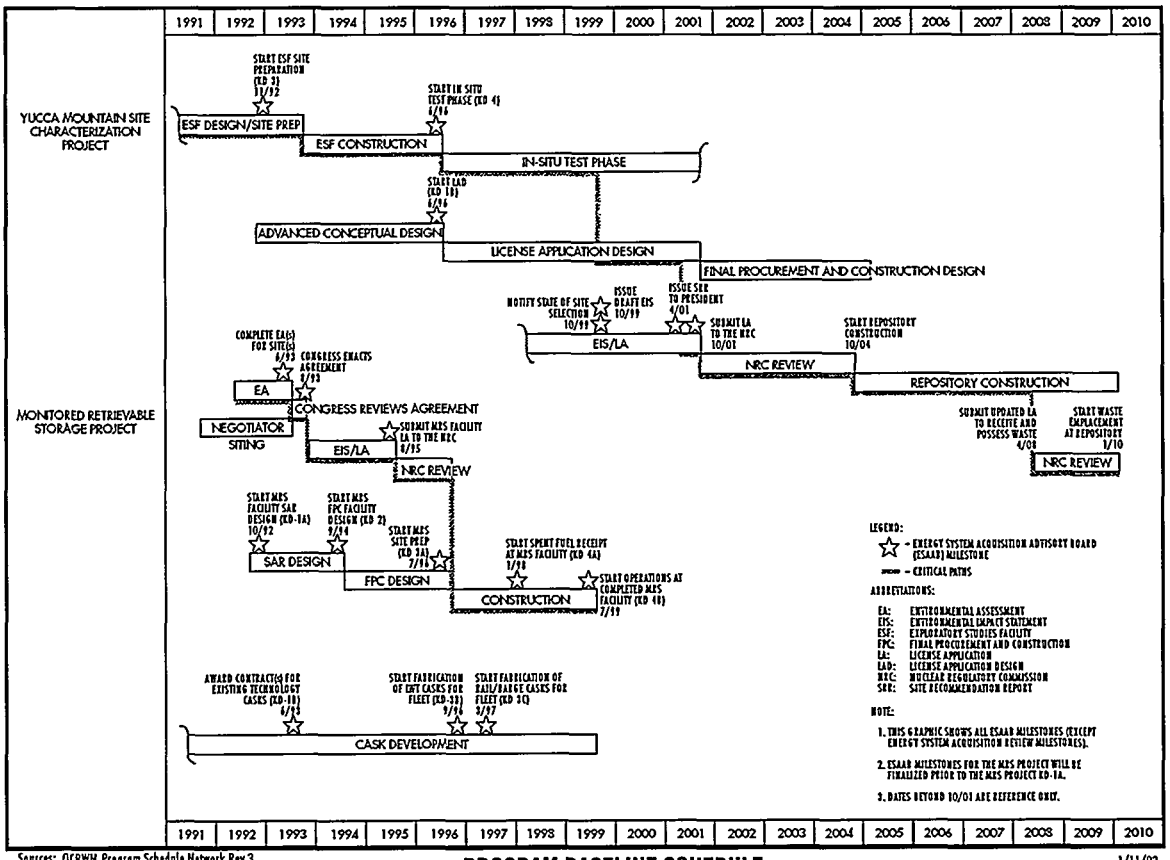
A program change-control board at each of the four levels evaluates proposals containing policy decisions or baseline changes to determine possible resulting technical, cost, schedule, regulatory,

Management Factors In a Siting Decision: Early Evaluation of Site Suitability

In November 1989, the Secretary of Energy announced in a report submitted to Congress that an early focus would be placed on identifying features or conditions that could cause the Yucca Mountain site to be unsuitable. In December 1991, OCRWM's Director requested an early technical baseline evaluation of site suitability under the Department's general siting guidelines, 10 CFR Part 960. This evaluation resulted in the February 1992 contractor-issued "Early Site Suitability Evaluation" report, which identified no early disqualifying conditions.

This initiative was aimed at helping to derive a preliminary decision that could have one of three possible outcomes: (1) to continue our site investigations, (2) to recommend the site for development as a repository, or (3) to abandon the site. Findings did not preclude further site characterization studies at Yucca Mountain.

Ongoing technical site suitability evaluations will contribute to this decision, but OCRWM will also consider



Sources: OCRWM Program Schedule Network Rev.3.
Program Cost and Schedule Baseline Rev.3.

PROGRAM BASELINE SCHEDULE

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environmental, institutional, health, or safety impacts. Approved changes are documented and distributed under strict controls which ensure that all program participants use only current approved documents.

We hold monthly program management meetings to review performance against the baselines. The project manager submits quarterly progress reports for review by program management and the Energy System Acquisition Advisory Board. The Board also holds annual meetings to review project performance against the baselines.

Cost and Schedule Baselines

The Program Cost and Schedule Baseline document describes how we

other important factors before reaching any final determination, including management considerations such as cost and schedule.

A formal decision to continue site characterization will take into account both technical findings regarding site characterization and the time, cost, and effort needed to reduce residual uncertainties.

We must consider the value of investing additional resources in investigating the site if there is large uncertainty regarding its technical suitability and only moderate hope that additional testing will resolve issues. Conversely, we must consider the value of investing additional resources in further characterizing the site if there is a high degree of confidence in its technical suitability and if the additional degree of confidence that will be gained by the testing is expected to be marginal. Similarly, we must consider the tradeoff between investing additional resources to develop designs to reduce uncertainties in system performance and investing additional resources in testing to reduce uncertainties in site conditions.

manage these baselines and explains their relationship to the technical baseline. The cost and schedule baselines provide a measurable basis against which to evaluate the program's performance in terms of meeting schedule and cost targets.

We actively manage our baselines to reflect changes to program strategy, technical requirements, funding, cost estimates, and schedule forecasts. In fiscal year 1992, we issued two revisions to the Program Cost and Schedule Baseline to reflect current planning. Revision 2, issued in November 1991, reflected Exploratory Studies Facility design and introduced prior year actual costs-to-date into the cost baseline. Revision 3, issued in September 1992, reflected Yucca Mountain Site Characterization Project schedule changes and funding, as well as Monitored Retrievable Storage Project schedule changes.

We rely on independent reviewers to validate our baselines. The Yucca Mountain Project cost and schedule baselines were approved by the Energy System Acquisition Advisory Board in January 1992. Two Independent Cost Estimates and Schedule Reviews of the Yucca Mountain Site Characterization Project have been performed by an independent group within the Department of Energy over the past two years. The most recent was a comprehensive evaluation of the entire project, including the Exploratory Studies Facility. The Phase II Independent Cost Estimate report, issued in August 1992, verified the cost of the project within four percent of the baseline.

An integrated program summary network was issued in September 1992. The network provides program management officials a quick overview of the major program milestones and their supporting activities. Also during fiscal year 1992, a major enhancement to the Yucca Mountain Project Planning and Control System was implemented. The Planning and Control System allows program officials to assess effects of changes in program direction and funding for the Yucca Mountain Project.

Technical Baselines

The current technical baseline is outlined in the program's Document Hierarchy and consists of a set of five System Requirements Documents that serve as the basis for design of the entire nuclear waste management system.

Systems Engineering

Systems engineering is a comprehensive, orderly management process for developing complex systems. It identifies and controls the many interfaces among the elements of the system, coordinates the multiple scientific and engineering disciplines involved in the program, and optimizes the design and operation of the system. Starting with a functional analysis, the systems engineering process divides the program mission into functions made up of sets of specific requirements.

Systems engineering plays a key role in our efforts to integrate the varied disciplines necessary to develop the waste management system. To improve the quality and integration of the technical baseline for a physical aspect of the system, a functional analysis team takes a technical function, such as transporting waste, divides it into several subfunctions, such as handling spent fuel casks, and then further divides the subfunctions. A requirements research team identifies the hundreds of documents that contain program requirements and extracts requirements from each. For each requirement, the team determines which subfunction will carry out that requirement.

A similar process is used to perform an analysis of a program function, such as ensuring regulatory compliance, in order to improve the quality and integration of our management practices and procedures.

George Carruth, a former Army colonel, sees systems integration as a challenge similar to designing a building both from the front and the back.

"One of the secrets of systems engineering is to divide and conquer. You have to break down the system into its components and continue to break it down into smaller and smaller pieces so that you are able to handle the small pieces while making sure that, when you put them back together, you have a system that works.

"Systems integration starts from the top, where the requirements are very general. As they flow down through the system, they become more and more detailed until you get to the point where you have a design that someone can go build.

"Systems integration is also horizontal. You have the storage facility, transportation requirements, and the mined geologic repository. Those three pieces have to work together. There are interfaces between them. It's very important to identify and control those interfaces early in the design so that one group doesn't go off and say it doesn't fit the way someone else designed his piece and we have to modify it."

George A. Carruth
Manager, Systems Integration
CRWMS Management & Operating Contractor/TRW

Applying the systems engineering process, we periodically update the existing technical baseline documents to address changing program needs and emerging new requirements. The systems engineering approach provides a means of ensuring traceability of requirements from individual regulations through the design process.

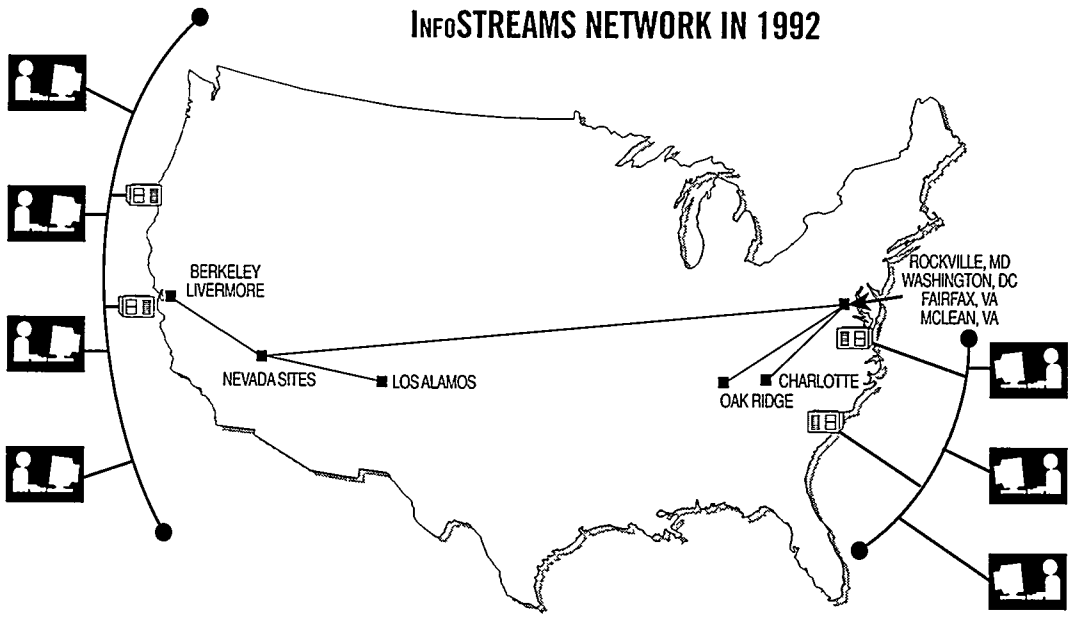
This year, we completed a physical system functional analysis of the monitored retrievable storage system and approved four physical system requirements documents: *Overall System*, *Accept Waste*, *Store Waste* and *Transport Waste*. These documents organized the hundreds of externally generated regulatory requirements by system function. They have replaced the Waste Management System Requirements and Waste Management System Description documents prepared in fiscal year 1991 as the highest level technical baseline documents for the MRS Major System Acquisition. We used the system requirements documents as the technical baseline for conceptual design efforts for the monitored retrievable storage facility.

Program Management

Over the past two years, we have undertaken and completed a systematic review of management requirements and implemented a number of significant improvements in our management system, including changes in program planning and control. We completed a major reorganization last year to strengthen the framework for carrying out our program's mission.

Most recently, we initiated a major internal review of program activities associated with siting and developing a geologic repository. The objective of this review is to improve management and coordination of the various program activities associated with selecting a suitable site, complying with the National Environmental Policy Act, and developing and submitting a successful license application for the repository.

Our Program Management System consists of all the baselines, plans, policies, procedures, systems, and processes, that, taken together, serve as the mechanism for managing the program in a



Enhancing OCRWM Productivity

In early August 1992, we put a new computerized work environment to the test. Contractors in Las Vegas working on the Annotated Outline for the geologic repository needed to have sections of the massive document reviewed by co-workers located in Virginia, and then passed on to the publications staff the same day. Enter InfoSTREAMS, a system which provides automated document distribution, review and comment, and concurrence. Marked-up document sections were electronically transferred from Las Vegas to Vienna, Virginia, reviewed and discussed over the phone, and again electronically transferred to publications by day's end. A process that normally would have taken three days was accomplished in a few hours.

InfoSTREAMS (**Info**rmation **S**torage, **Re**trieval and **A**ccess **M**anagement **S**ystem) is a key initiative of OCRWM's Information Resource Management Program. InfoSTREAMS builds on the existing office automation, telecommunications, and records management infrastructure, and license application procedures. Users are linked through personal computers into local- and wide-area networks and into mainframe capabilities.

InfoSTREAMS will automate eventually all processes involved in licensing and records management. The first phase of the system automated the document review process. Users are allowed to share "electronic work spaces" where draft versions of documents and associated comments are accessible electronically to the work group. Unlike its physical equivalent, the "electronic work group" does not need to be gathered in one office or building to work efficiently—the group can just as easily reside at locations throughout the country.

We are already developing follow-on phases which when completed will automate many other aspects of information management. In addition to improving the efficiency of OCRWM work flow, InfoSTREAMS will provide the mechanism to capture program records electronically for use in the licensing process, to support records retention and access requirements and to provide nationwide access to data systems.

The InfoSTREAMS pilot has demonstrated the potential for improving productivity. As InfoSTREAMS develops and matures, it promises significant improvements in how we do business, with practical improvements in our overall efficiency and effectiveness.

cohesive, cost-efficient manner. It specifies how to plan and control all major activities in the program, including technical activities, cost and schedules, quality assurance, regulatory compliance, institutional planning, records management, and the management of information resources.

The Program Management System Manual is the program's top-level management directive. The manual, which is revised as needed, is the principal source of program-specific policies and requirements for developing baselines, management plans, and procedures.

Contingency planning

Contingency planning provides parallel alternatives to key components of the system so that, if our current strategy cannot be fulfilled, we can devise an alternative with minimized delay. We have established a framework for identifying and analyzing contingencies, which include both potential obstacles to our progress and opportunities to advance our efforts.

Among the top contingency issues under consideration are the unsuitability of the current candidate repository site, the inability to voluntarily site a monitored retrievable storage facility, and insufficient resources to conduct the program. We are also soliciting input into our contingency planning process from outside groups. In October 1991, we held a workshop with representatives from affected governments and interested parties to discuss the early development of contingency measures.

Information Resources Management

During fiscal year 1992, we continued to develop and enhance our Information Resources Management Program, which draws on the latest computer technology to produce, file, store, access, retrieve and transfer an array of technical and institutional data and information. This electronic information management system is essential in a program such as ours that will produce and rely on an enormous volume of information over its lifetime.

During fiscal year 1992, we continued work on three major information resource initiatives.

- InfoSTREAMS (Information Storage, Retrieval and Access Management System). We initiated the first phase of a major computerized records management system in pilot locations around the country. (See *Enhancing Program Productivity*.)
- ARMS (Automated Requirements Management System). ARMS is being developed to ensure that the requirements relevant to the siting, design, licensing, construction, operation, and decommissioning of the civilian radioactive waste management system can be traced from source documents to implementing documents.
- CIS (Configuration Information System). CIS is being implemented to track all level Change Control Board actions. CIS will provide configuration management support including baseline and specifications maintenance, the status of change proposals, and preservation of change histories.

FACTS AND FIGURES

PROGRAM HISTORY

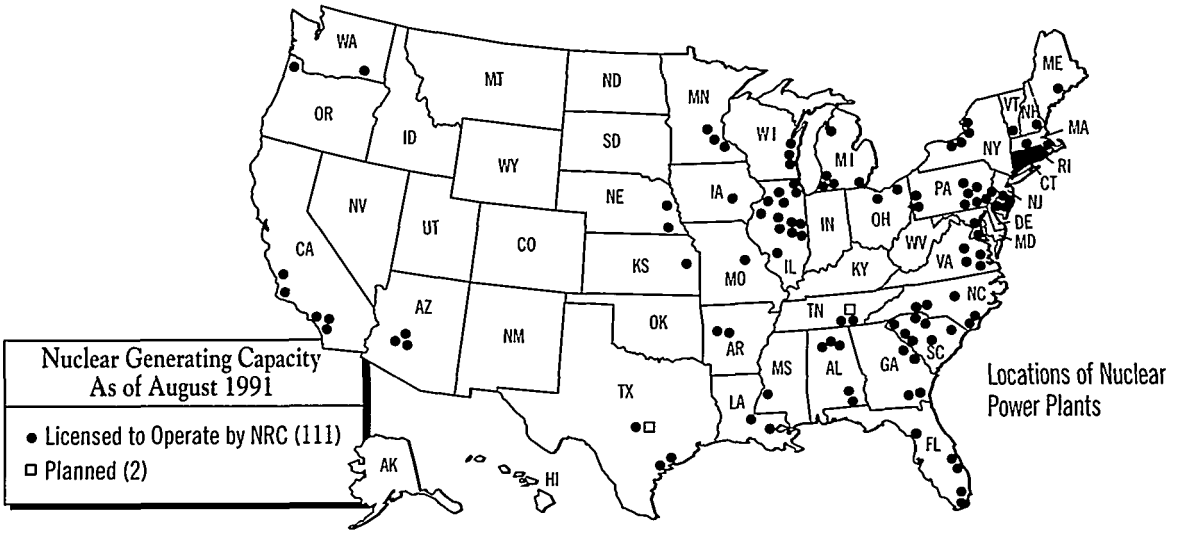
The United States began studies for isolating high-level nuclear waste in 1957 when the National Academy of Sciences first recommended deep geologic disposal. Various geologic features have been considered for long-term waste isolation. In the 1960s, thick deposits of salt were studied for possible repository sites. During the 1970s, scientific research began in basalt and welded tuff; later, scientists also began to investigate granite and similar types of rock as suitable materials for long-term isolation of waste.

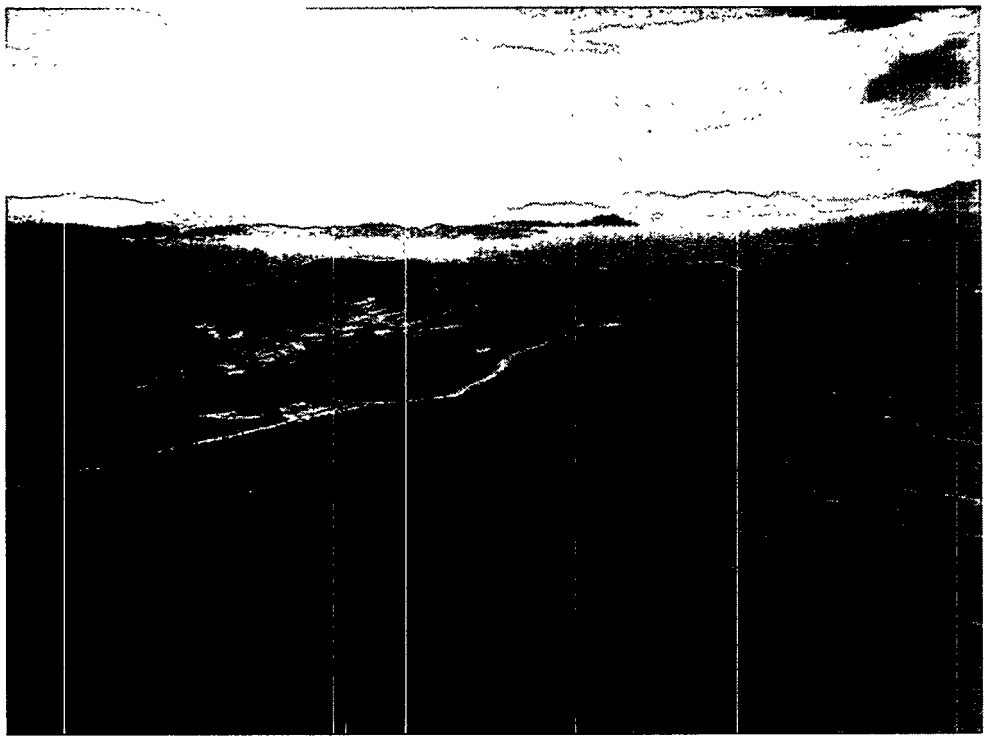
In 1975, the Energy Research and Development Administration began a search for possible permanent repository sites. In 1976, a Federal program was established to study ways to dispose of nuclear waste safely based on suggestions from the National Academy of Sciences, the U.S. Geological Survey, and other professional scientific organizations. The U.S. Department of Energy was formed in 1977 and absorbed the responsibility for nuclear research and waste management, from its predecessor agencies, the Atomic Energy Commission and Energy Research and Development Administration.

The Nuclear Waste Policy Act

The mission of the DOE's Office of Civilian Radioactive Waste Management was explicitly established by the Nuclear Waste Policy Act of 1982 and affirmed in 1987 by the Nuclear Waste Policy Amendments Act.

Disposal in deep geologic repositories has been established as the preferred method of permanently isolating nuclear waste. As enacted in 1982, the Nuclear Waste Policy Act provided for characterizing three candidate sites for a repository, prescribed a schedule and a process for





Yucca Mountain, Nevada. Location of site characterization for a permanent geologic repository of spent nuclear fuel and high-level radioactive waste.

the siting of two geologic repositories, authorized the construction of one repository, and mandated the development of a transportation system for the waste. The Act also required the Secretary of Energy to study the need for and feasibility of a monitored retrievable storage facility and to submit a proposal to Congress.

In February 1983, the Department of Energy named nine potentially acceptable sites for a permanent geologic repository in five distinct geohydrologic settings. In 1986, following environmental assessments of all nine sites, the Office of Civilian Radioactive Waste Management recommended three sites to the President for detailed studies. Site characterization began at Yucca Mountain, Nevada; Deaf Smith County, Texas; and Hanford, Washington.

The Amendments Act of 1987 focused the program by directing that the program characterize only one candidate site for the geologic repository: Yucca Mountain, Nevada.

The Amendments Act also obligated the Department of Energy to report to Congress between 2007 and 2010 on the need for a second repository. Section 803 of the Energy Policy Act of 1992 requires that the Secretary of Energy submit a report to Congress within one year on whether current programs are adequate for management of any additional volumes or categories of nuclear waste that might be generated by any new nuclear power plants constructed and licensed after 1992.

Why Yucca Mountain?

Yucca Mountain has special inherent qualities which may allow it to keep nuclear waste isolated for thousands of years.

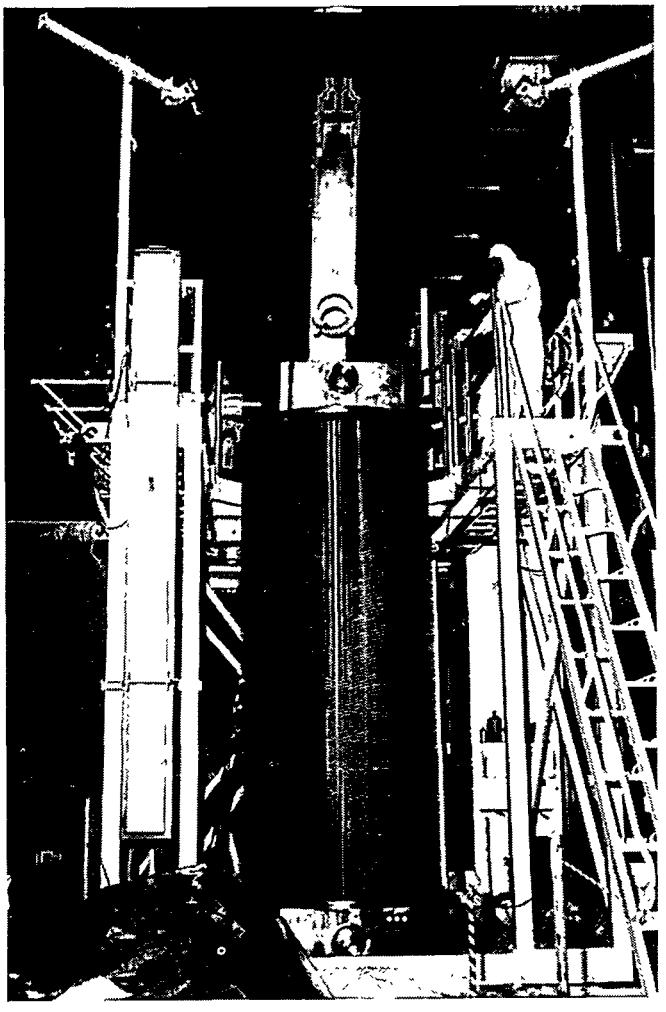
- The water table under Yucca Mountain is very deep. The repository would be located in the unsaturated zone 250-350 meters (800-1,200 feet) above the water table, which would help decrease water migration into the repository environment.
- The dry, desert environment also leads to very limited water infiltration.
- Zeolite minerals, known to retard the movement of radionuclides, are found

along potential water flow paths from the repository to the accessible environment.

- Population density in the vicinity of the Yucca Mountain site is very low.

Nevertheless, many scientific and technical issues still must be resolved to determine Yucca Mountain's suitability to host a geologic repository. These issues include:

- the effect of the site's hydrology and chemistry on the waste;
- the time required for ground water to flow from the repository to the accessible environment;
- the effects volcanic activity might have on a repository at Yucca Mountain;
- the effects an earthquake might have on a repository and the ground water table below it.



Spent fuel storage cask.

If at any time the Yucca Mountain site is found unsuitable, characterization activities will stop, and the Office of Civilian Radioactive Waste Management will recommend further actions to Congress. If, on the other hand, the studies conclude that Yucca Mountain can safely store waste, the program will recommend to the President that the site be developed as a permanent geologic repository. If the President and Congress approve, the Office of Civilian Radioactive Waste Management will then be required to demonstrate to the Nuclear Regulatory Commission, an independent federal agency, that the proposed repository system will meet applicable licensing regulations.

Defense Waste

The Nuclear Waste Policy Act required the President to decide whether to dispose of high-level waste generated by defense activities in the same repository as commercial spent fuel. In 1985, the President decided that having separate facilities would not be pursued. Defense high-level waste will be emplaced in the repository in the form of glass-filled canisters. Production of these canisters is expected to begin in 1994.

Temporary Storage

The Amendments Act of 1987 authorized the Office of Civilian Radioactive Waste Management to site, construct, and operate a monitored retrievable storage facility for temporary storage of waste: It provided for two alternatives: (1) siting by the Department of Energy through a

directed survey-and-evaluation process, the traditional approach; or (2) voluntary siting through the efforts of the Nuclear Waste Negotiator.

The Office of the Nuclear Waste Negotiator was authorized by the Amendments Act of 1987, and a Negotiator, appointed by the President, was confirmed by the Senate in August 1990. The Negotiator's term has been extended until January 1995 with the recent passage of the Energy Policy Act of 1992.

The Nuclear Waste Policy Amendments Act currently limits the quantity of spent fuel that can be stored at a monitored retrievable storage facility. In addition, the Amendments Act states, with respect to a Department-sited facility, that construction may not begin until the Nuclear Regulatory Commission has issued a license for the geologic repository.

Nuclear Waste Fund

To finance the waste management program, the Nuclear Waste Policy Act established the Nuclear Waste Fund, composed of payments by the generators and owners of the waste. People who use electricity generated at nuclear powerplants are paying for the disposal of spent fuel, rather than the taxpayers.

Reassessment of the Office of Civilian Radioactive Waste Management

In the November 1989 *Report to Congress on Reassessment of the Civilian Radioactive Waste Management Program*, the Department of Energy said scheduling for the first-of-a-kind geologic repository had been ambitious. The reassessment led to the development of an action plan for restructuring the program that centered on three initiatives.

The first focused on management and organization issues and included implementing more formal management controls, streamlining contractor support, and establishing a realistic schedule for the repository that delayed the start of operations from 2003 to 2010.

The report's second initiative said that the Department of Energy would work with Congress to modify the current links between the monitored retrievable storage facility schedule and the repository schedule in order to meet the 1998 goal for federal acceptance of commercial spent fuel. A temporary storage facility could then start operations significantly earlier.

The third initiative addressed Yucca Mountain site characterization issues, including changing priorities and focus for site evaluation activities in order to identify potentially disqualifying factors of the site earlier and postponing major repository and waste package design activities until the site characterization process was further along.

ORGANIZATION

The organization of the Office of Civilian Radioactive Waste Management consists of five offices headed by Associate Directors and three offices headed by Office Directors, all of whom report to the Director. A brief description of the responsibilities of each is given below.

Office of Quality Assurance: responsible for developing a quality assurance program that meets the requirements of the Nuclear Regulatory Commission and overseeing compliance with the requirements.

Office of Strategic Planning and International Programs: responsible for strategic, long-range, and contingency planning and for directing relations with waste-management programs in other nations.

Office of External Relations: responsible for managing intergovernmental relations and interactions with affected governments and interested parties and for managing education and public information programs.

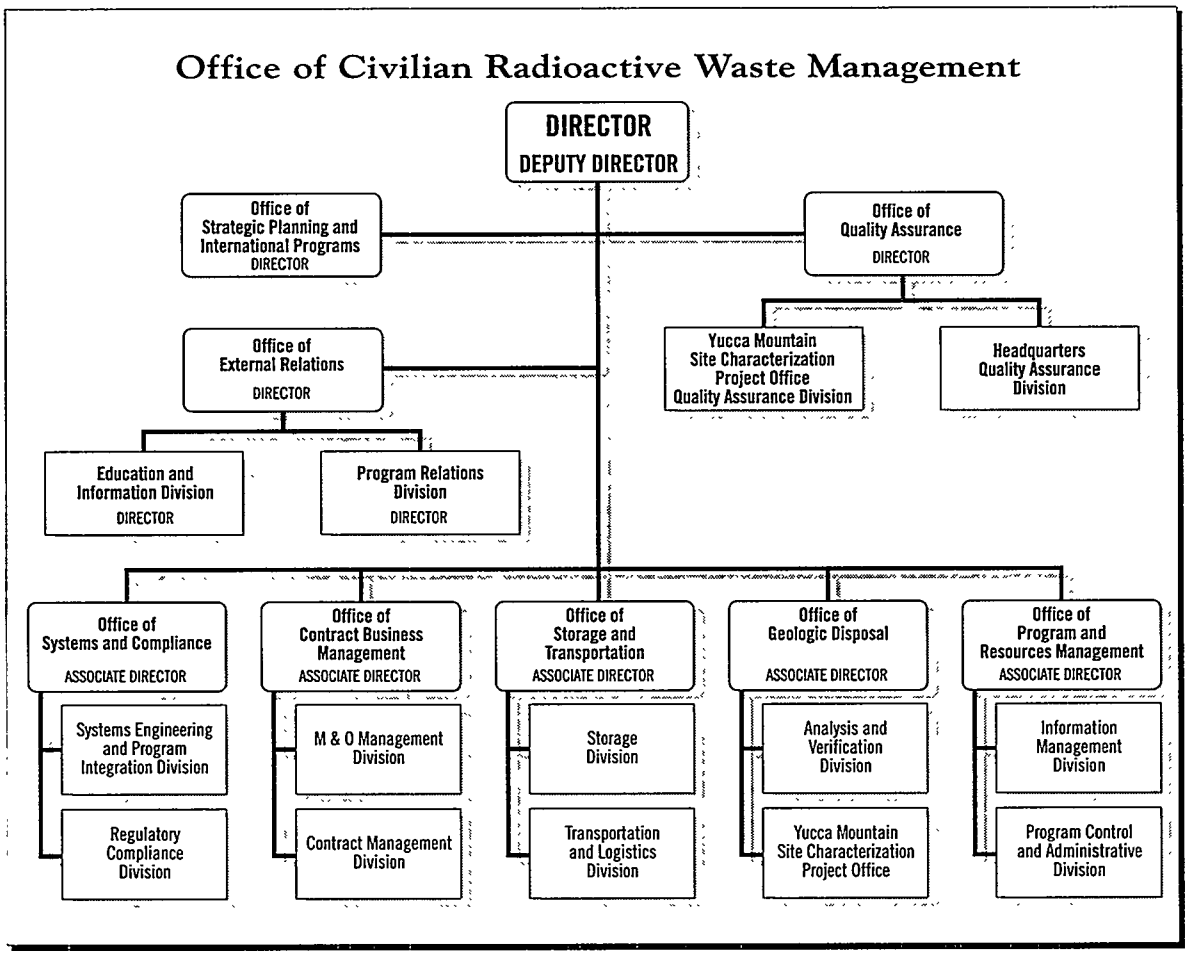
Office of Program and Resources Management: responsible for controlling the program's schedule and cost, managing the Nuclear Waste Fund, managing program information systems and budget activities, and for providing administrative support services, including the acquisition and development of human resources.

Office of Geologic Disposal: responsible for directing the Yucca Mountain Site Characterization Project (a major system acquisition) to include the scientific evaluations needed to determine whether the Yucca Mountain site is suitable for a geologic repository and for waste-package and repository design and development.

Office of Systems and Compliance: responsible for establishing systems requirements based on regulatory, legislative, and other external requirements, overseeing the implementation of program requirements, conducting program self-assessments, and for providing systems integration.

Office of Storage and Transportation: responsible for directing the monitored retrievable storage facility project (a major system acquisition) to include developing a transportation system, shipping casks, developing systems for spent fuel acceptance, and systems logistics activities.

Office of Contract Business Management: responsible for managing business relations with the management and operating contractor and support services contractors and for consolidating contractor services.



Office of Civilian Radioactive Waste Management organizational chart, fiscal year 1992.

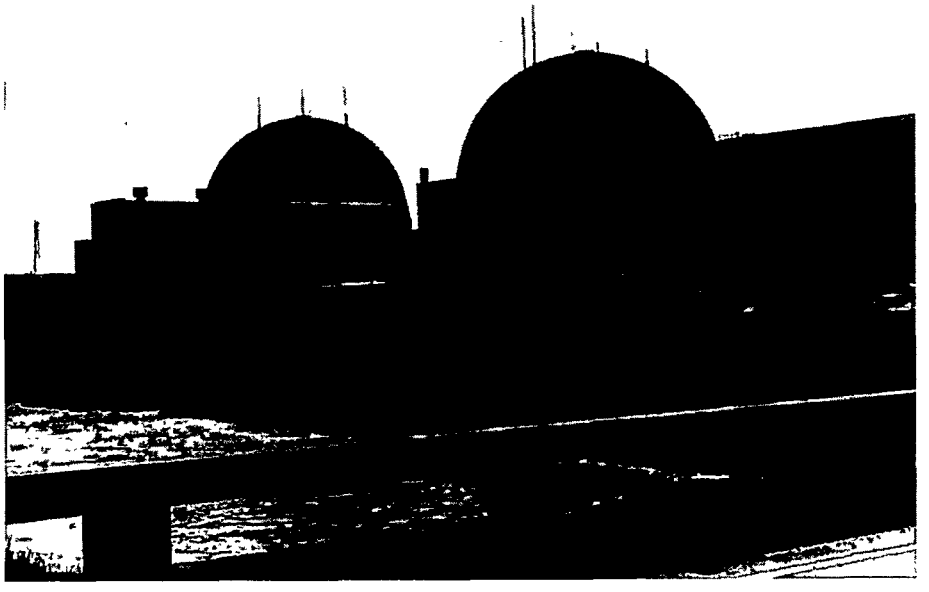
FINANCIAL MANAGEMENT

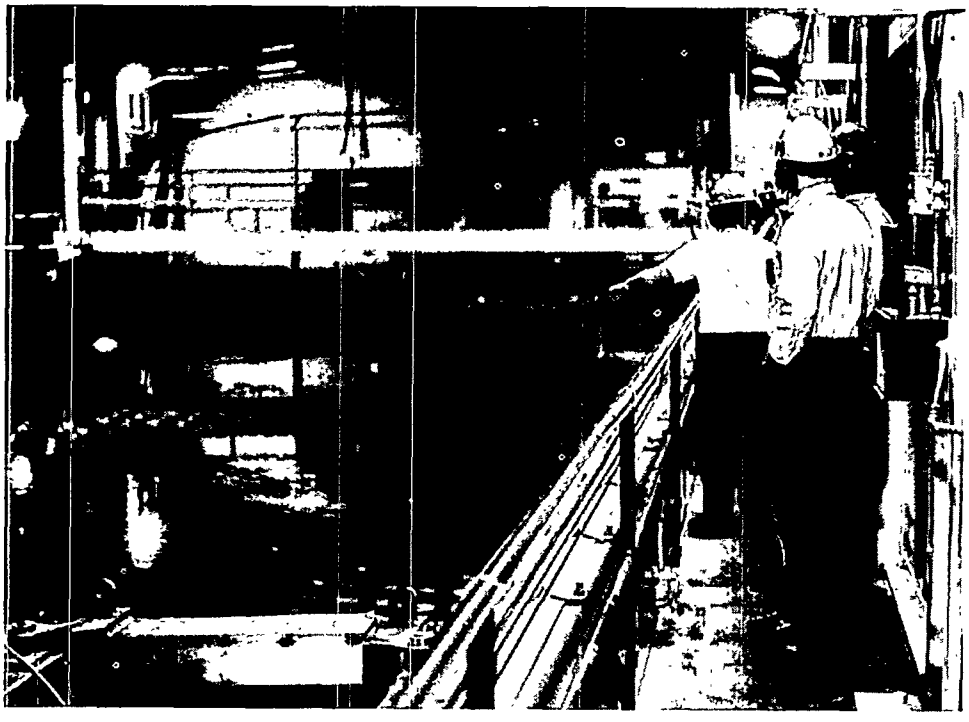
Our primary financial responsibility is managing the Nuclear Waste Fund.

The Nuclear Waste Fund

The Nuclear Waste Fund was established by the Nuclear Waste Policy Act of 1982 to recover program costs fully and to separate nuclear waste disposal fees and expenditures from other government accounts. All costs of the waste management program are paid from fees charged to generators and owners of spent nuclear fuel and high-level radioactive waste. These fees are placed into a separate account in the U.S. Treasury. This means that people who use electricity generated at nuclear powerplants, rather than the taxpayers, are paying for the disposal of spent fuel. The cost of disposal of high-level radioactive waste resulting from the Nation's defense production facilities is borne by the taxpayers through directed appropriations in the Department of Energy budget.

Through September 30, 1992, accrued fees totaled $7.023 billion, accrued interest earnings totalled $2.380 billion, net gains on the sale of U.S. Treasury Securities totalled $98 million, for a total accrued revenue of $9.501 billion. Accrued program expenses totalled $3.495 billion. The net





Spent fuel assemblies in temporary storage pools on site at a nuclear power station.

book value of investments in U.S. Treasury Securities totalled $3.719 billion, with a market value of $4.031 billion.

Fee Payments

There are three primary types of fees paid into the Nuclear Waste Fund, two from the generators and owners of spent nuclear fuel from civilian nuclear power reactors, and one from the Department of Energy for disposal of defense-related high-level waste.

The Department of Energy's *Standard Contract for the Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste* established for owners and generators of spent nuclear fuel the terms of payment and a two-tier fee system: a one-time fee to be computed for electricity generated prior to April 7, 1983; and an ongoing fee to be applied to electricity generated after that date, currently 1.0 mill per kilowatt hour. Utilities make quarterly payments of the ongoing fee to the Fund.

The *Standard Contract* has been amended twice, most recently to comply with a court ruling that the fee should be based on "electricity generated and sold" rather than net kilowatt hours generated. The first contract amendment already has resulted in fee reimbursements and credits of approximately $50 million to utilities. And, through fiscal year 1995, we will continue the refund process by issuing credits against quarterly payments expected to total over $400 million.

In 1985, the President decided that developing separate facilities for spent nuclear fuel and defense-related waste would not be pursued but that both the government and the utilities must pay their full share of total program costs into the Nuclear Waste Fund. The current estimates for the defense share of total costs range from $3.8 billion (single-repository system) to $5.8 billion (two-repository system) in constant 1988 dollars. This total is expected to increase due to rising programmatic costs and growth of the volume of defense waste requiring

disposal as a result of revised defense production policy.

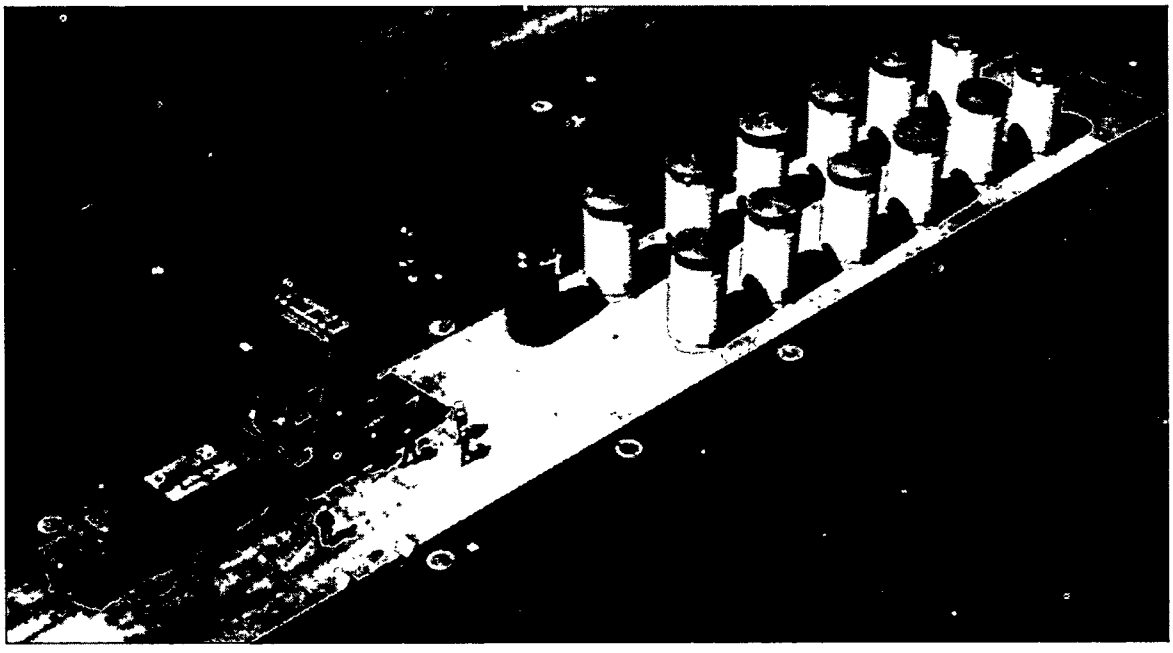
A methodology for allocating the costs for defense-related waste was developed by public rulemaking. A notice of the selected full cost recovery methodology was published in an August 1987 *Federal Register Notice.* We are working toward a Memorandum of Agreement with the Office of Environmental Restoration and Waste Management that will establish the working arrangements for the disposal of defense waste. Specifically, it will outline the responsibilities of the parties, procedures for identifying wastes for disposal, determination of fees, and establishment of payment schedules.

The Office of Environmental Restoration and Waste Management made payments of $5 million and $7.5 million into the Nuclear Waste Fund in fiscal year 1991 and 1992, respectively. Congress appropriated an additional $100 million for fiscal year 1993 toward the government's share of the cost of the waste disposal system. In a recent report, the General Accounting Office recommended that the Secretary of Energy develop a plan so that government payments to the Nuclear Waste Fund would be completed by 2015, or sooner, and request annual appropriations from Congress in accordance with such a plan.

Fund Disbursements

Disbursements from the Nuclear Waste Fund are subject to the same budget process as other Federal Government programs. New obligations for the year are limited to the funds appropriated by Congress for that year, plus funds appropriated previously that are not yet obligated. Consequently, there are significant controls on the amount and uses of funds from the Nuclear Waste Fund each year.

Dry cask storage of spent fuel at Surry Nuclear Power Station.



Nuclear Waste Fund Management

Nuclear Waste Fund management includes receiving and verifying payments, investing surplus funds, accounting for revenues and expenses, developing estimates of the total-system life-cycle costs, analyzing fee adequacy, and providing for independent audits of the Nuclear Waste Fund.

For fiscal year 1992, the Nuclear Waste Fund recorded total revenues of $1,652 million, compared to $910 million in fiscal year 1991. The total revenues include $556 million in quarterly kilowatt-hour fees (1.0 mill per kilowatt-hour), $343 million in interest earned on one-time spent fuel fees and U.S. Treasury securities, $54 million net gain on sales of U.S. Treasury securities, and $699 million in principal and interest owed to the Nuclear Waste Fund by the Department for work conducted from fiscal year 1983 through fiscal year 1992, to be paid some time in the future, for the disposal of defense high-level waste in the civilian repository. On September 30, 1992, the book value of NWF investments was approximately $3.7 billion, as compared to $3.3 billion at the end of fiscal year 1991.

To manage a fund of these proportions, we have established a series of fund management processes:

- Fee verification
- Revenue projections
- Life-cycle cost projections
- Fee adequacy
- Investment analysis
- Independent audit

These activities are performed on an ongoing basis to ensure that the financial management of the Nuclear Waste Fund is based on the best information available, all of which is consistently integrated.

Total-System Life-Cycle Cost

We perform a comprehensive analysis of the total cost of the waste management system over its complete life cycle, from enactment of the Nuclear Waste Policy Act through repository closure and decommissioning. The primary purpose of the total-system life-cycle cost analysis is to provide cost data needed to compute the fee adequacy analysis, a report that determines whether the fees paid by the waste generators will be sufficient to cover the costs of the program. The total-system life-cycle cost analysis is intended to follow as closely as possible the most current program strategy, plans, and policies, providing a "snapshot" that incorporates all available and appropriate information on program activities.

The most recent set of cost estimates was published in December 1990. The total-system cost estimates in this report ranged from $25.6 billion to $34.6 billion (in constant 1988 dollars), depending on assumptions about the number of repositories and the projected quantities of spent fuel. The defense waste share of the total-system cost was estimated to range

from $3.8 billion (single-repository system) to $5.6 billion (two-repository system), or 15 to 16 percent of the total cost for the corresponding cases.

Fee Adequacy Assessment

The Nuclear Waste Policy Act requires the Secretary of Energy to annually review the fees collected from utilities to determine if the fee is sufficient to offset the commercial, or nondefense, share of the costs of the waste management system. The fee adequacy analysis calculates the end of program Nuclear Waste Fund balance based on annual projections of program costs, revenues, real interest, and inflation rates.

The most recent fee adequacy assessment was published in November 1990. In developing the assessment, we analyzed a variety of scenarios involving the development of one or two repositories and various inflation rate and real interest projections. The 1990 report concluded that a compelling case for an immediate fee adjustment did not exist.

In a recent report, the General Accounting Office recommended that Congress amend the Nuclear Waste Policy Act to authorize the Secretary to automatically adjust the fee on the basis of the annual rate of inflation. We prefer an approach that would provide for periodic step increases after thorough review of all contributing factors.

The 1990 report will be updated after we issue the sixth total-system life-cycle cost report in fiscal year 1993.

Investment Analysis

We analyze the Nuclear Waste Fund investment portfolio on a monthly basis. Our investment strategy is to maximize earnings while providing funds when needed for operations without exposing the Fund to unnecessarily high risks of loss in the event of a sale before maturity. Investments are limited by law to U.S. Treasury securities.

FINANCIAL STATEMENTS

The Nuclear Waste Fund

To assure that the management of the Nuclear Waste Fund is performed according to appropriate accounting industry standards, we have contracted with an independent accounting firm for an annual audit of the Nuclear Waste Fund. Although not required by law, this audit demonstrates our sense of accountability for the funds paid by the utilities into the Fund.

This chapter contains the Office of Civilian Radioactive Waste Management's financial statements for the year ended September 30, 1992, as audited by KPMG Peat Marwick. Following the financial statements is a "Year-end Review" prepared by OCRWM'S Office of Program and Resources Management for the Department of Energy Comptroller's Annual Report to the Office of Management and Budget.

NUCLEAR WASTE FUND
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
UNITED STATES DEPARTMENT OF ENERGY

Financial Statements

September 30, 1992 and 1991
(With Independent Auditors' Report Thereon)

Independent Auditors' Report on Financial Statements

Office of Civilian Radioactive
Waste Management
United States Department of Energy:

We have audited the accompanying statements of financial position of the Nuclear Waste Fund (Fund) as of September 30, 1992 and 1991, and the related statements of operations and cash flows for the years then ended, and the statement of budget and actual expenses for the year ended September 30, 1992, and cumulatively for each statement except the statement of budget and actual expenses, from inception (January 7, 1983) to September 30, 1992. These financial statements are the responsibility of the Fund's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with generally accepted auditing standards; *Government Auditing Standards* (1988 revision), issued by the U.S. General Accounting Office; and the provisions of the Office of Management and Budget Bulletin 93-06, *Audit Requirements for Federal Financial Statements*. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of the Nuclear Waste Fund at September 30, 1992 and 1991, and the results of its operations, its cash flows and its budget and actual expenses for the periods indicated above, in conformity with generally accepted accounting principles.

KPMG Peat Marwick

Washington, DC
December 23, 1992

NUCLEAR WASTE FUND
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
UNITED STATES DEPARTMENT OF ENERGY

Statements of Financial Position

September 30, 1992 and 1991
(Dollars in thousands)

Assets	**1992**	**1991**
Current assets:		
Cash	$ 1,609	$ 2,118
U.S. Treasury securities (note 2)	3,718,793	3,182,140
Current portion of receivables from utilities (note 3):		
One-time spent fuel fees	3,808	3,431
Interest on one-time spent fuel fees	1,275	809
kWh fees	129,018	136,800
	134,101	141,040
Current portion of receivable from Department of Energy (notes 1 and 7)	100,000	–
Accrued interest on U.S. Treasury securities (note 2)	87,433	79,798
Other receivables and advances	1,110	411
Total current assets	4,043,046	3,405,507
Receivables from utilities, excluding current portion (note 3)		
One-time spent fuel fees	886,547	890,353
Interest on one-time spent fuel fees	857,729	787,196
	1,744,276	1,677,549
Receivable from Department of Energy, excluding current portion (notes 1 and 7)	591,320	–
Capital equipment, less accumulated depreciation of $31,365 in 1992 and $25,476 in 1991	32,080	31,354
Total assets	$ 6,410,722	$ 5,114,410

(Continued)

See accompanying notes to financial statements.

NUCLEAR WASTE FUND
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
UNITED STATES DEPARTMENT OF ENERGY

Statements of Financial Position, Continued

September 30, 1992 and 1991
(Dollars in thousands)

Liabilities	**1992**	**1991**
Current liabilities:		
Accounts payable and accrued expenses	$ 41,773	$ 38,368
Current portion of amounts payable to utilities on overpayment of kWh fees (note 3)	160,421	30,000
Total current liabilities	202,194	68,368
Amounts payable to utilities on overpayment of kWh fees, excluding current portion (note 3)	202,730	320,000
Deferred revenue	6,005,798	4,726,042
Total liabilities	6,410,722	5,114,410
Fund balance	–	–
Contingencies (notes 3 and 8)		
	$ 6,410,722	$ 5,114,410

See accompanying notes to financial statements.

NUCLEAR WASTE FUND
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
UNITED STATES DEPARTMENT OF ENERGY

Statements of Operations

Years ended September 30, 1992 and 1991 and cumulatively from January 7, 1983, date of inception to September 30, 1992
(Dollars in thousands)

	1992	1991	Cumulative
Revenue:			
Fees (note 3):			
One-time spent fuel fees	$ –	$ (10)	$ 2,334,767
kWh fees	556,296	548,882	4,165,225
Defense high level waste fees (note 1)	518,170	5,000	523,170
Interest:			
One-time spent fuel fees (note 3)	73,596	105,235	883,549
U.S. Treasury securities	269,879	237,323	1,315,327
Defense high level waste fees (note 1)	180,650	–	180,650
Net gain on sale of U.S. Treasury securities	53,602	12,161	97,961
	1,652,193	908,591	9,500,649
Less amount deferred	(1,279,756)	(566,466)	(6,005,798)
	372,437	342,125	3,494,851
Expenses:			
First repository	202,485	188,353	2,355,760
Second repository	2	26	108,887
Monitored retrievable storage	20,779	5,459	68,113
Transportation and systems integration	36,970	44,586	237,811
Program management	64,836	64,051	524,440
Interest (notes 1 and 3)	24,109	20,000	122,117
Transfer appropriations (note 5)	23,256	19,650	77,723
	372,437	342,125	3,494,851
Excess of revenue over expenses	$ –	$ –	$ –

See accompanying notes to financial statements.

NUCLEAR WASTE FUND
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
UNITED STATES DEPARTMENT OF ENERGY

Statements of Cash Flows

Years ended September 30, 1992 and 1991 and cumulatively from January 7, 1983, date of inception to September 30, 1992
(Dollars in thousands)

	1992	1991	Cumulative
Cash flows provided by operating activities:			
Excess of revenue over expenses	$ –	$ –	$ –
Adjustments to reconcile excess of revenue over expenses to net cash provided by operating activities:			
Depreciation expense	6,226	3,700	42,935
Amortization of premiums and accretion of discounts on U.S. Treasury securities	37,040	55,522	330,570
Net book value of dispositions of capital equipment	1,201	2,976	30,366
Net gain on sale of U.S. Treasury securities	(53,602)	(12,161)	(97,961)
Increase in receivables from utilities	(59,788)	(104,407)	(1,878,377)
Increase in receivable from Department of Energy	(691,320)	–	(691,320)
Increase (decrease) in accrued interest on U.S. Treasury securities	(7,635)	12,466	(87,433)
(Increase) decrease in other receivables and advances	(699)	175	(1,110)
Increase in accounts payable and accrued expenses	3,405	7,016	41,773
Increase in amount payable to utilities on overpayment of kWh fees	13,151	70,000	363,151
Increase in deferred revenue	1,279,756	566,466	6,005,798
Net cash provided by operating activities	527,735	601,753	4,058,392
Cash flows from investing activities:			
Purchase of U.S. Treasury securities	(1,733,115)	(1,899,572)	(9,376,623)
Proceeds from sales and maturities of U.S. Treasury securities	1,213,024	1,304,240	5,425,089
Purchases of capital equipment	(8,153)	(6,792)	(105,249)
Net cash used in investing activities	(528,244)	(602,124)	(4,056,783)

(Continued)

NUCLEAR WASTE FUND
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
UNITED STATES DEPARTMENT OF ENERGY

Statements of Cash Flows, Continued

Years ended September 30, 1992 and 1991 and cumulatively from January 7, 1983, date of inception to September 30, 1992
(Dollars in thousands)

	1992	1991	Cumulative
Cash flows from financing activities:			
Borrowings from U.S. Treasury	$ –	$ –	$264,964
Repayments of borrowings from U.S. Treasury	–	–	(264,964)
Borrowings from DOE for capital equipment	–	–	9,739
Repayments of borrowings from DOE for capital equipment	–	–	(9,739)
Net cash used in financing activities	–	–	–
Net decrease in cash	(509)	(371)	1,609
Cash, beginning of period	2,118	2,489	–
Cash, end of period	$ 1,609	$ 2,118	$ 1,609

See accompanying notes to financial statements.

NUCLEAR WASTE FUND
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
UNITED STATES DEPARTMENT OF ENERGY

Statement of Budget and Actual Expenses

Years ended September 30, 1992 and 1991
(Dollars in thousands)

	BUDGET		ACTUAL
	Resources	Obligations	Expenses
First repository	$ 189,990	$ 187,129	$ 202,485
Second repository	–	(7)	2
Monitored retrieval storage	31,519	24,436	20,779
Transportation and systems integration	33,666	29,256	36,970
Program management	89,346	71,277	64,836
Interest	–	–	24,109
Transfer appropriations	–	–	23,256
	$ 344,521	$ 312,091	$ 372,437

Budget Reconciliation	
Total actual expenses	$ 372,437
Add:	
Capital acquisitions	8,153
Accrued annual leave	385
Proceeds from sale of capital equipment	65
	8,603
Less:	
Depreciation	6,226
Dispositions of capital equipment	1,201
Interest	24,109
Transfer appropriations	23,256
	54,792
Accrued expenditures, direct	$ 326,248

See accompanying notes to financial statements.

NUCLEAR WASTE FUND
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
UNITED STATES DEPARTMENT OF ENERGY

Notes to Financial Statements

(Dollars in thousands unless otherwise noted)
September 30, 1992 and 1991

(1) Organization and Summary of Significant Accounting Policies

(a) Legislative Background

The Nuclear Waste Policy Act (NWPA) was signed into law on January 7, 1983. The NWPA establishes a framework for the financing, siting, licensing, operating and decommissioning of one or more mined geologic repositories for the Nation's spent nuclear fuel and high-level radioactive waste. In addition, the NWPA contains several other features including:

Assigning responsibility for the full payment of disposal cost to the owners and generators of high-level waste and spent nuclear fuel and, accordingly, creating a special Nuclear Waste Fund (NWF) within the Treasury of the United States.

Committing the Federal Government to study the need for and feasibility of one or more monitored retrievable storage (MRS) facilities.

Providing for contracts between the Department of Energy (DOE) and the owners and generators of spent nuclear fuel and high-level radioactive waste pursuant to which DOE is to take title to the spent nuclear fuel or high-level radioactive waste as expeditiously as possible, following commencement of repository operations, and in return for payment of fees established by the NWPA, begin disposal of the spent nuclear fuel or high-level radioactive waste not later than January 31, 1998.

A requirement to evaluate the use of disposal capacity at one or more repositories for the disposal of high-level radioactive waste resulting from atomic energy defense activities (defense waste). In April 1985, the President notified DOE of his determination that a separate defense waste repository was not necessary and directed DOE to proceed with arrangements for disposal of such waste. Fees, equivalent to those paid by commercial owners, must be paid for this use by the Federal Government.

Under the NWPA, expenditures from the NWF may be used only for nongeneric research, development and demonstration activities. Costs incurred for these activities are expensed as incurred.

In June 1987, DOE issued the Office of Civilian Radioactive Waste Management (OCRWM) Mission Plan Amendment. The amendment, which was submitted to Congress, extended the date for spent nuclear fuel acceptance at a repository from 1998 to the year 2003.

On December 22, 1987, the President signed into law the Budget Reconciliation Act for fiscal year 1988 (Amendments Act), which contained amendments to the NWPA. The legislation directed DOE to characterize only the Yucca Mountain site in Nevada as a candidate site for the first repository.

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Notes to Financial Statements, Continued

(Dollars in thousands unless otherwise noted)
September 30, 1992 and 1991

The legislation also provided for the termination of site specific activities at all candidate sites other than the Yucca Mountain site, within 90 days of enactment, and for phasing out, not later than 6 months after enactment, all research programs in existence designed to evaluate the suitability of crystalline rock as a potential repository host medium. In the event that the Yucca Mountain site proves unsuitable for use as a repository, the legislation requires DOE to terminate site-specific activities and report to Congress.

Additionally, the legislation annulled and revoked DOE's MRS proposal, submitted to Congress on March 31, 1987, to construct an MRS facility in Oak Ridge, Tennessee. However, the legislation authorized DOE to site, construct and operate one MRS facility subject to the following conditions: after the MRS Commission submits its report to Congress, DOE may conduct a survey and evaluation of potentially suitable sites for an MRS. The selection of a site for an MRS may not be made until after the Secretary of Energy recommends to the President a site for development of the first repository. Construction of the MRS may not begin until the Nuclear Regulatory Commission (NRC) issues a license for the construction of a repository. The quantity of spent fuel at the MRS at any one time may not exceed 10,000 metric tons until a repository begins accepting spent fuel or solidified high-level radioactive waste. The quantity of spent nuclear fuel or high-level radioactive waste at the MRS at any one time may not exceed 15,000 metric tons.

Further, the legislation authorized DOE to pay interest on overpayments of kWh fees consistent with the December 5, 1985 ruling of the United States Court of Appeals as discussed in note 3. Interest on these overpayments of kWh fees was fully paid or credited as of September 30, 1990.

On November 29, 1989, the Secretary of Energy submitted to Congress his *Report on the Reassessment of the Civilian Radioactive Waste Management Program*. At the direction of the Secretary, a comprehensive review of the schedule for repository-related activities was performed, based on realistic assessments of activity durations and past experience. This review resulted in a significant schedule slip for the expected start of repository operations from the year 2003 to approximately 2010. In developing the revised schedule, DOE was mindful that certain activities, such as the issuance of environmental permits by the State of Nevada and the NRC review of the license application, are outside the DOE's control.

In its report of November 1, 1989, the MRS Review Commission found that "cumulatively the advantages of an MRS would justify the building of an MRS if: (1) there were no linkages between the MRS and the repository; (2) the MRS could be constructed at an early date; and (3) the opening of the repository were delayed considerably beyond its presently scheduled date of operation." The MRS Review Commission recommended that the Congress authorize the construction of a Federal emergency storage facility to provide storage before permanent geologic disposal.

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Notes to Financial Statements, Continued

(Dollars in thousands unless otherwise noted)
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Although the Amendments Act prohibits the selection of an MRS site through a DOE-directed site-survey process until the repository site is recommended to the President, it allows for expedited siting to proceed via a Nuclear Waste Negotiator, who may negotiate a proposed agreement with a State or Indian Tribe that would agree to host a repository or MRS facility. The Negotiator shall submit to Congress any proposed agreement. No proposed agreement shall have legal effect unless enacted into Federal law.

(b) Significant Accounting Policies

Basis of Accounting - Under the authority of the Budget and Accounting Act of 1950, GAO published Title 2 of its *Policy and Procedures Manual for Guidance of Federal Agencies*, which codified what it considered to be the relevant generally accepted accounting principles to be implemented by all federal departments and agencies in the preparation of their annual financial statements. In 1991, GAO participated with the Office of Management and Budget (OMB) and the Treasury Department in the establishment of the Federal Accounting Standards Advisory Board (FASAB). The FASAB was organized to make recommendations regarding the accounting standards to be implemented by departments and agencies. The resulting standards will be concurrently issued by GAO and OMB. In the interim, and in accordance with FASAB's recommendation that agencies continue to prepare financial statements using their current accounting policies, the NWF continues to prepare its financial statements based upon generally accepted accounting principles as described in Title 2.

Statement of Budget and Actual Expenses - In order to comply with financial reporting requirements of the Chief Financial Officers Act of 1990 (CFO Act), DOE has prepared a statement of budget and actual expenses for fiscal year 1992. This statement provides a comparison of NWF's 1992 budgetary resources and obligations to expenses accompanied by a reconciliation of these expenses to budget. Office of Management and Budget Bulletin 93-02, *Form and Content of Agency Financial Statements* requires this statement effective in 1992.

Revenue Recognition - A one-time fee (see note 3) was recorded by the NWF as of April 7, 1983 for spent nuclear fuel generated prior to that date. Fees based upon kilowatt-hours (kWh) of electricity generated by civilian nuclear reactors on or after April 7, 1983 are accrued as earned. All fees are recognized as revenue to the extent of expenses incurred. Revenue in excess of current expenses is deferred. The life cycle of the program is expected to extend over a period of nearly 100 years.

The NWPA requires an annual evaluation of the adequacy of fees to ensure full cost recovery and provides for adjustment of such fees, as needed, with the approval of Congress. As of November 1990, the total-system life cycle cost for the system with a repository at Yucca Mountain, Nevada, a facility for MRS, and a transportation system was estimated at $26 billion (expressed in con-

NUCLEAR WASTE FUND
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UNITED STATES DEPARTMENT OF ENERGY

Notes to Financial Statements, Continued

(Dollars in thousands unless otherwise noted)
September 30, 1992 and 1991

stant 1988 dollars). In the event that a second repository is required and is authorized by the Congress, the total-system life cycle cost was estimated at $34 to $35 billion, depending on the quantity of spent fuel and high-level waste to be disposed of.

To estimate the share of the total-system costs that should be allocated to the disposal of defense high-level waste in the civilian repositories, the methodology announced by the DOE in the *Federal Register* in August 1987 was used. Estimates of the defense-waste share of costs, as of December 1990 are approximately $4 billion (15 percent of the total) for the single-repository system and approximately $6 billion (17 percent of the total) for the two-repository system.

To date, the Office of Environment Restoration and Waste Management has not entered into an agreement with the Office of Civilian Radioactive Waste Management for payment of fees and interest to the NWF on DOE's defense high-level waste share of costs. The Office of Civilian Radioactive Waste Management has estimated that approximately $703,820 of costs incurred to date by the NWF, including interest of $180,650, assessed from passage of the NWPA (January 1983), are attributable to defense high-level waste based on the methodology previously published.

As of September 30, 1992, the Department recorded the NWF receivable and the related defense high-level waste liability of $691,320. As of September 30, 1992, Congress had appropriated and DOE had paid the NWF $12,500 towards its share of the program costs. Total fees recognized as revenue were $698,820 and $5,000 in 1992 and 1991, respectively. For fiscal year 1993, Congress appropriated $100,000 from the Defense Nuclear Waste Disposal Appropriation to be used for nuclear waste disposal activities.

U.S. Treasury Securities - U.S. Treasury securities are stated at cost, adjusted for amortization of premiums and accretion of discounts, which are recognized as adjustments to interest income using the effective interest method.

Capital Equipment - Capital equipment is recorded at cost and depreciated over the estimated useful lives of the assets which range from 5 to 30 years. Capital equipment purchased prior to the NWPA and permanently transferred to nuclear waste activities, was recorded as an asset of the NWF with a corresponding liability to the federal government at the net book value of the transferring agency at the date of acquisition. Maintenance costs are borne by the NWF for equipment either on loan from non-NWF programs or shared with other programs.

Tax Status - The NWF, as a part of the Department of Energy which is a federal agency, is not subject to federal, state or local income taxes.

Reclassifications - Certain 1991 amounts have been reclassified to conform to the 1992 presentation.

NUCLEAR WASTE FUND
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
UNITED STATES DEPARTMENT OF ENERGY

Notes to Financial Statements, Continued

(Dollars in thousands unless otherwise noted)
September 30, 1992 and 1991

(2) U.S. Treasury Securities

U.S. Treasury securities held as of September 30 of each year consisted of the following:

	1992		1991	
	Book value	Market value	Book value	Market value
Due within 1 year	$ 32,413	$ 32,414	$ 18,765	$ 18,765
Due after 1 year but within 5 years	1,720,396	1,882,417	2,099,694	2,178,298
Due after 5 years but within 10 years	1,965,984	2,116,356	1,063,681	1,100,462
	$3,718,793	$4,031,187	$3,182,140	$3,297,525

Accrued interest receivable on U.S. Treasury securities as of September 30, 1992 and 1991 totaled $87,433 and $79,798, respectively.

(3) Receivables - Utilities

All owners and generators of civilian high-level waste and spent nuclear fuel have entered into contracts with the DOE for nuclear waste disposal services and for payment of fees to the NWF.

The NWPA specifies two fees to be paid to the NWF for disposal services: (a) a one-time charge per kilogram of heavy metal in solidified high-level waste or spent nuclear fuel existing prior to April 7, 1983; and (b) a one mill per kilowatt-hour fee on all net electricity generated by civilian nuclear power reactors after April 7, 1983. The Secretary shall annually review the fees established. In the event the Secretary determines either insufficient or excess revenues are being collected, the Secretary shall propose an adjustment to the fee to insure full cost recovery. The contracts between DOE and the owners and generators of the waste provide three options for payment of the one-time spent fuel fee, one of which must have been selected by June 30, 1985, or within 2 years of contract execution. The options were:

(1) Payment of the amount due, plus interest earned from April 7, 1983, in 40 quarterly installments, with the final payment due on or before the first scheduled delivery of spent fuel to DOE;

(2) Payment of the amount due, plus interest from April 7, 1983, in a single payment, any time prior to the first delivery of spent fuel to DOE;

(3) Payment of the amount due, any time prior to June 30, 1985, or 2 years after contract execution, in the form of a single payment, with no interest due.

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Notes to Financial Statements, Continued

(Dollars in thousands unless otherwise noted)
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Under options (1) and (2), interest accrues from April 7, 1983 to date of first payment at the 13-week Treasury bill rate compounded quarterly. Under option (1), beginning with the first payment, interest is calculated at the 10-year Treasury note rate in effect at the time.

During 1992 and 1991, payments or adjustments of one-time spent fuel fees by owners and generators of civilian high-level waste and spent nuclear fuel consisted of:

	1992	1991
Option (1)	$ 3,429	$ 3,090
Option (2)	–	–
Option (3)	–	(10)
	$ 3,429	$ 3,080

Receivables from utilities at September 30 of each year consisted of:

	1992	1991
One-time spent fuel fees:		
Option (1)	$ 155,039	$ 158,468
Option (2)	735,316	735,316
	890,355	893,784
Kilowatt hour fees	129,018	136,800
Interest on one-time spent fuel fees:		
Option (1)	143,058	132,038
Option (2)	715,946	655,967
	859,004	788,005
Total receivables from utilities	1,878,377	1,818,589
Less current portion	134,101	141,040
Total receivables from utilities, excluding current portion	$1,744,276	$1,677,549

On December 5, 1985, the United States Court of Appeals for the District of Columbia ruled against the DOE regarding the calculation of kilowatt-hour (kWh) fees. Consistent with the ruling, utilities were requested to recalculate their fees since April 7, 1983 and submit their request for reimbursement to NWF for approval and subsequent refund or credit against kWh fees. Fees reimbursed or credited since 1986 as a result of this ruling totaled $42,936.

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Notes to Financial Statements, Continued

(Dollars in thousands unless otherwise noted)
September 30, 1992 and 1991

On March 16, 1988, a Petition for Review was filed before the United States Court of Appeals for the District of Columbia regarding the calculation of net generation in determining kWh fees to be paid by the utilities. The petition sought judicial review of DOE's treatment of transmission and distribution losses in calculating net generation. On March 17, 1989, the Court decided that the fee should be based on electricity generated and sold. On September 7, 1990, DOE issued a Notice of Proposed Rulemaking to change the basis of the fee, consistent with the Court ruling. In November 1990, Congress granted approval for DOE to pay or credit interest to the utilities on the kWh overpayments.

On December 31, 1991, DOE issued the final rule amending the calculation of kWh fees effective January 30, 1992. The utilities were requested to submit revised calculations, and the Department advised each of the utilities that it would implement the refund process for previous overpayments, plus interest, through credits against future quarterly payments or through refunds for those utilities no longer generating. The refund process is to be completed in two phases. In the first phase, principal overpayments and accrued interest through March 31, 1992, are to be made available for credit during the period from July 1, 1992 through September 30, 1994. In the second phase, additional accrued interest for the period April 1, 1992 through September 30, 1994 is to be calculated and made available for credit during fiscal year 1995. The Department estimates that the credits will be prorated over a four-year payment period as follows:

Fiscal year 1992	7.5%
Fiscal year 1993	40.0%
Fiscal year 1994	45.0%
Fiscal year 1995	7.5%

Interest is payable on the cumulative unpaid overpayment balance, plus accrued interest thereon. Interest is calculated based on the average 91 day Treasury bill auction bond equivalent rate for each calendar quarter.

The NWF is in the process of verifying the revised calculations submitted by the utilities; however, the estimated fees to be credited total $290,049 of which $20,049 and $50,000 have been charged against kWh fees for 1992 and 1991, respectively. As of September 30, 1992 and 1991, the liability for unpaid fees was $266,308 and $270,000.

Interest expense for 1992 and 1991 on account of these overpayments was $24,109 and $20,000. Accrued interest payable as of September 30, 1992 and 1991, was $96,843 and $80,000, respectively.

NUCLEAR WASTE FUND
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Notes to Financial Statements, Continued

(Dollars in thousands unless otherwise noted)
September 30, 1992 and 1991

(4) Financing

The NWPA provides that the NWF consist of:

- Unexpended balances available on the date of enactment for functions or activities incident to the disposal of civilian high-level radioactive waste or civilian spent nuclear fuel.
- Appropriations made by Congress
- Receipt of fees
- Investment income from authorized investments

Expenditures may be made from the NWF subject to appropriations which require triennial authorization. Investments may be made in U.S. obligations from funds in excess of current needs. If at any time monies available in the NWF are insufficient to discharge responsibilities under the NWPA, additional borrowings may be made from the U.S. Treasury. The NWPA limits the NWF from incurring expenditures, entering into contracts and obligating amounts to be expended, except as provided in advance by appropriation Acts.

(5) Transfer Appropriations

During 1992 and 1991, Congress authorized certain funds to be transferred directly from the NWF to various entities to pay for necessary expenses of the NWF. Amounts transferred consisted of:

	1992	1991	Cumulative
Nuclear Regulatory Commission	$ 19,962	$ 19,650	$ 62,482
Nuclear Waste Technical Review Board	3,294	–	9,282
Office of the Nuclear Waste Negotiator	–	–	5,959
	$ 23,256	$ 19,650	$ 77,723

The Nuclear Waste Technical Review Board (Board) and the Office of the Nuclear Waste Negotiator (Negotiator) were established under the Amendments Act. The Board, an independent establishment within the executive branch of the U.S. government, was established to evaluate the technical and scientific validity of activities undertaken by the Secretary, including site characterization activities and activities relating to the packaging or transportation of high-level radioactive waste or spent nuclear fuel. The Negotiator, who was appointed by the President and approved by the Senate, is to seek a State or Indian Tribe willing to host a repository or MRS facility, at a technically qualified site, on reasonable terms.

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September 30, 1992 and 1991

(6) Pension Plan

The employees of the Office of Civilian Radioactive Waste Management (OCRWM) of the DOE are covered by the Civil Service Retirement System or the Federal Employees Retirement System. As required by law, employees make contributions to the plans based on a percentage of their salaries with an amount contributed by OCRWM in accordance with the required retirement system regulations. Data regarding the Civil Service Retirement System's and the Federal Employees Retirement System's actuarial present value of accumulated benefits, assets available for benefits, and unfunded pension liability are not available to individual departments and agencies and therefore not disclosed by the NWF.

The total pension expense for 1992 and 1991 was $526 and $485, respectively.

(7) Related Parties

The NWPA established the Office of Civilian Radioactive Waste Management within DOE to carry out the provisions of the NWPA and created a separate fund in the Treasury of the United States. All of the investment and borrowing powers of the NWF are limited to transactions with the U.S. Treasury. In discharging its obligations under the NWPA, DOE contracts for services with numerous contractors including other federal government agencies. Further, significant administrative services are provided by DOE. The authority to incur indebtedness or enter into contracts obligating the federal government are effective only to such extent as is provided in advance by appropriation Acts.

As of September 30, 1992 and 1991, the NWF owed other government agencies $3,839 and $3,624, respectively, for services and costs provided to the NWF. For the years ended September 30, 1992 and 1991, the NWF had incurred costs of $23,713 and $20,961, respectively, for services and costs provided by other government agencies.

As discussed in note 1, the NWF is owed $691,320 from the Department of Energy for the disposal of defense high-level waste in civilian repositories.

NUCLEAR WASTE FUND
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
UNITED STATES DEPARTMENT OF ENERGY

Notes to Financial Statements, Continued

(Dollars in thousands unless otherwise noted)
September 30, 1992 and 1991

(8) Contingencies

The DOE is currently involved in various litigation arising from its activities. Resolution of this litigation is not expected to have a material effect on the financial position of the NWF.

The NWPA requires the DOE to provide, each fiscal year, payments-equal-to-taxes to eligible States, Indian tribes, and affected units of local governments. These payments are equal to the amount that they would receive were they authorized to tax Federal site characterization activities at a candidate repository site or site specific activities at an MRS site. The DOE has published a Notice of Interpretation and Procedures in the *Federal Register* outlining the implementation of Section 116(c) (3) and 118(b) (4) of the NWPA. In fiscal year 1992, the DOE made an initial payment of $1 million to Nye County, Nevada. The County request was $109 million for fiscal year 1986 through fiscal year 1992. The DOE is working with Nye County to determine the correct amount. Also in fiscal year 1992, the DOE made a payment of $771 to Benton County, Washington. The County request was $20.5 million. The DOE is working with Benton County to determine the final payment-equal-to-taxes. These amounts are not expected to have a material effect on the financial statements.

Civilian Radioactive Waste R&D Account

The year-end statements for OCRWM's Civilian Radioactive Waste R&D accounts for fiscal year 1992 follow. Civilian Radioactive Waste research and development activities are authorized by Title II of the Nuclear Waste Policy Act. The financial data contained in the table are unaudited.

CIVILIAN RADIOACTIVE WASTE R&D ACCOUNT
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
UNITED STATES DEPARTMENT OF ENERGY

Statements of Budget and Actual Expenses

Years ended September 30, 1992 and 1991
(Dollars in thousands)
(*Unaudited*)

	1992	1991
Spent Fuel Storage and Development		
Operating Expenses	$ 705	$ 781
Plant and Capital Equipment	0	0
Subtotal	705	781
Program Management		
Operating Expenses	114	38
Plant and Capital Equipment	0	0
Subtotal	114	38
Totals		
Operating Expenses	819	819
Capital Equipment	0	0
Total Civilian Radioactive Waste R&D	$ 819	$ 819

Year-End Review

The "Year-end Review" was prepared by the OCRWM Office of Program and Resources Management for the Department of Energy Comptroller's Annual Report to the Office of Management and Budget.

Background

The Nuclear Waste Policy Act of 1982, as amended, authorizes the Department of Energy (DOE) to site, construct, and operate a geologic repository for the disposal of spent nuclear fuel and high-level radioactive waste; to site, construct, and operate one monitored retrievable storage facility; and to provide for the safe transportation of spent nuclear fuel and high-level radioactive waste in casks certified by the Nuclear Regulatory Commission and in accordance with regulations promulgated by the U.S. Department of Transportation. The Act established the Office of Civilian Radioactive Waste Management to carry out this mission. The Nuclear Waste Policy Act, as amended, directs the Department of Energy to characterize the Yucca Mountain candidate site in Nevada to assess whether it is suitable for a geologic repository. To ensure the safe management and disposal of waste, the program must execute all activities related to radiological safety and waste isolation in accordance with an NRC-accepted quality assurance program.

The civilian radioactive waste management program provides, under contract executed between the Department and the owners and generators of spent nuclear fuel from civilian power reactors, nuclear waste storage and disposal services in return for the payment of fees into the Nuclear Waste Fund. In addition, it provides disposal services, in return for payment of fees by the Federal Government, for high-level radioactive waste from atomic energy defense activities.

The civilian radioactive waste management program consists of two major system acquisitions, the Yucca Mountain Site Characterization Project, and the Monitored Retrievable Storage Project. Program direction for both major system acquisitions comes from the Office of Civilian Radioactive Waste Management at DOE Headquarters. The Yucca Mountain Site Characterization Project Office is located in Las Vegas, Nevada. Since the site for the monitored retrievable storage facility has not been determined, the Project is being managed at Headquarters. As of September 30, 1992, the Office of Civilian Radioactive Waste Management program employed about 220 Federal staff and 2,000 contractor employees. The organization consists of eight offices as follows:

- Office of Quality Assurance, responsible for developing and overseeing compliance with a quality assurance program that meets the requirements of the Nuclear Regulatory Commission.
- Office of Strategic Planning and International Programs, responsible

for strategic, long-range, and contingency planning and for managing relations with waste-management programs in other nations.

- Office of External Relations, responsible for managing intergovernmental relations and interactions with affected governments and interested parties and for managing an education and public information program.
- Office of Program and Resources Management, responsible for controlling the program's schedule and cost, managing the Nuclear Waste Fund, managing program budget activities, developing and maintaining information systems and for providing administrative support services, including the acquisition and development of human resources.
- Office of Geologic Disposal, responsible for directing the Yucca Mountain Site Characterization Project in the scientific evaluations needed to determine whether the Yucca Mountain site is suitable for a geologic repository and for waste-package and repository design and development.
- Office of Systems and Compliance, responsible for establishing systems requirements based on regulatory, legislative, and other external requirements, conducting program self-assessments, providing systems integration, and overseeing regulatory compliance activities.
- Office of Storage and Transportation, responsible for directing the MRS Project in siting and designing the MRS facility and developing a transportation system, shipping casks, systems for spent fuel acceptance, and systems logistics activities.
- Office of Contract Business Management, responsible for managing business relations with the OCRWM management and operating contractor and support services contractors and for consolidating contractor services.

The civilian radioactive waste management program (from inception through final decommissioning of waste management facilities) is estimated to span more than 90 years and cost about $26 billion in 1988 dollars, as referenced in the single repository/no new orders case of the *Preliminary Estimate of the Total-System Cost for the Restructured Program*, DOE/RW-0295P, December 1990. Funding for the program, which is annually appropriated by Congress, comes primarily from two sources: (1) the Nuclear Waste Fund, and (2) the Defense Nuclear Waste Appropriation. The FY 1992 appropriation was approximately $275 million.

The Nuclear Waste Fund was established by the Nuclear Waste Policy Act. It consists of fees paid to the Department of Energy by civilian nuclear power utilities to dispose of their spent nuclear fuel and by the Department for the disposal of its defense-related high-level radioactive waste, in accordance with the full-cost recovery provisions of the Act, as amended. Funds in excess of those

needed to pay program costs are invested in U.S. Treasury securities. Interest earnings are returned to the Nuclear Waste Fund. As of September 30, 1992, the accrued fees totaled $7.023 billion, and accrued interest earnings totaled $2.380 billion. Accrued program expenses totaled $3.495 billion.

Limitations of the Financial Statements

The preceding financial statements were prepared to report the financial position and results of operations of the Nuclear Waste Fund, pursuant to requirements of the Nuclear Waste Policy Act, as amended, and the Chief Financial Officers Act of 1990.

While the statements have been prepared from the books and records of the Nuclear Waste Fund in accordance with the formats prescribed by the Office of Management and Budget, the statements are different from the financial reports used to monitor and control budgetary resources, which are prepared from the same books and records.

The statements should be read with the realization that they relate to the Nuclear Waste Fund, a sovereign entity; that unfunded liabilities reported in the financial statements cannot be liquidated without the enactment of an appropriation; and that the payment of all liabilities, other than those resulting from contractual obligations, can be abrogated by the Department of Energy.

Program Performance Measures

Program schedule performance is measured by comparing actual accomplishments to the Program schedule baseline. The following reflect the status of FY 1992 Energy Systems Acquisition Advisory Board and major Program-level milestones toward the objective of determining the suitability of Yucca Mountain, Nevada, as a site for a geologic repository:

- In July 1991, new surface-based testing began at Yucca Mountain, 6 months ahead of the baselined January 1992 date. This testing, which consists of trenching and drilling, characterizes the geology, hydrology and geochemistry of Yucca Mountain.
- In December 1991, the Office of Civilian Radioactive Waste Management received approval from the ESAAB to start final design for the Exploratory Studies Facility, 2 months later than the baseline date of October 1991.
- In March 1992, the Office of Civilian Radioactive Waste Management received a ground water appropriation permit from the State of Nevada, 3 months later than planned. This permit is significant because it allows the program to pump water at the Yucca Mountain site during the next 10 years. Water is essential for dust suppression, site preparation and drilling. Prior to permit approval, water had to be hauled from a source about 50 miles west of Yucca Mountain. In the summer of

1992, two other environmental permits required for new surface-based testing were issued by the State of Nevada, after significant delays, but six months ahead of the baseline date.

- The most significant accomplishment was the November 1992 groundbreaking at Yucca Mountain for the Exploratory Studies Facility, an underground laboratory in which project scientists will conduct detailed studies of the proposed repository environment. This event was originally planned for June 1992 but, because of delays in design due to funding constraints, the work scope was replanned, moved to FY 1993, and subsequently initiated, as replanned, in November 1992.

Other significant FY 1992 project-level accomplishments important to the success of site characterization at Yucca Mountain are noted below:

- In January 1992, the Yucca Mountain Site Characterization Project Plan and level-0 technical, cost and schedule baselines were approved by the Energy Systems Acquisition Advisory Board.
- In March 1992, the NRC accepted the Office of Civilian Radioactive Waste Management's Quality Assurance program after lifting an objection which stated that there had been insufficient implementation of the program's participant organizations' quality assurance programs. This event allows the Office of Civilian Radioactive Waste Management to oversee the development and implementation of participant programs.
- In May 1992, the Office of Civilian Radioactive Waste Management began the unsaturated zone drilling program at the Yucca Mountain site with the state-of-the-art LM-300 drill rig. Unsaturated rock is believed to be an ideal barrier that will ensure that the radioactive waste will remain isolated from the accessible environment. Results of the analysis of the rock core samples will be a factor in determining the feasibility of locating the proposed repository in the unsaturated rock zone.

Success in meeting Program-level milestones for the Monitored Retrievable Storage Project was hampered by lack of a suitable site and budgetary constraints, which led to deferral of, or significant reductions in, the level of effort for many activities. The Office of Civilian Radioactive Waste Management fully supported the efforts of the Nuclear Waste Negotiator, whose legislative mandate is to actively seek parties willing to consider hosting a storage facility or repository and to negotiate an agreement that can be submitted to Congress for approval. The Negotiator, however, was unsuccessful in his attempts to identify a volunteer MRS host site by the baseline date of September 1992. As a result, existing plans were put on hold, and a new strategy and workaround plan were developed to enhance confidence in meeting the project's long-

term goals. A decision was made that Title I design and follow-on design activities for a monitored retrievable storage facility would be postponed until a site has been identified. In addition, completion of final designs for advanced technology, high-efficiency truck and rail casks was deferred pending review of an independent assessment of the designs, which addressed numerous cask-utility interface issues. Therefore, the Office of Civilian Radioactive Waste Management initiated a new procurement to ensure the availability of current-technology casks to meet early system shipping needs.

The following FY 1992 accomplishments relate to the Office of Civilian Radioactive Waste Management's Monitored Retrievable Storage Project:

- The voluntary siting initiative led by the Nuclear Waste Negotiator resulted in numerous expressions of interest in hosting a temporary storage facility by local governments and Indian Tribes. During FY 1992, the Office of Civilian Radioactive Waste Management awarded initial feasibility study grants to 12 jurisdictions interested in educating themselves and their constituent communities on issues related to the temporary storage and permanent disposal of nuclear waste. These grants were intended to allow recipients to determine whether or not they wanted to pursue further studies by applying for follow-on, phase II grants. During FY 1992, one such grant was awarded to interested parties.
- In November 1992, the final conceptual design report for a monitored retrievable storage facility was issued. The main objectives of the conceptual design report are: (1) to demonstrate the technical feasibility of several storage facility design options; (2) to establish technical performance levels; and (3) to develop reliable cost estimates and realistic schedules. The report offers a complete design for each of six separate spent fuel storage concepts. The report concluded that a monitored retrievable storage facility can be designed and operated in compliance with all applicable Federal regulations, in a manner that protects public and worker health and safety and preserves the quality of the environment.

Financial Performance Measures

DOE is required to receive fee payments, invest excess cash and make disbursements from the Nuclear Waste Fund in accordance with the requirements of the Nuclear Waste Policy Act of 1982, as amended. As of September 30, 1992, two financial performance measures were used to evaluate Fund performance: (1) the amount of interest earnings lost as a result of untimely receipt of remittances from the owners and generators of spent nuclear fuel; and (2) excessive uninvested daily cash balances.

Timeliness of Receipts

A review of the timeliness of receipts by the Nuclear Waste Fund was performed with the following results.

Six late payments were received during FY 1992. Three of these late payments, totaling $192,853, resulted in lost interest to the Nuclear Waste Fund. The total interest lost from these late payments was $251, of which $40 was collected in FY 1992. The remaining $211 will be collected in FY 1993. These three payments were an average of 36 days late. In comparison to the total interest collected, the amount of interest lost from the lack of timely receipts is immaterial.

The other three late payments, which totaled $13,180,263, resulted in no lost interest to the Nuclear Waste Fund. These payments were only an average of one day late and were received before the daily investment transactions were made.

Uninvested Daily Cash Balances

Investments of excess funds from the Nuclear Waste Fund, that is, quarterly fees, receipts from investment maturities and semi-annual interest collections from investments, were evaluated to determine if excess uninvested cash balances existed. The allowable cash balances are $1,000 for Treasury notes and $5,000 for Treasury bills. A review of the daily investment activities concluded that there were no occurrences of excessive uninvested daily cash balances. About $10 to $15 million, is maintained in cash for daily payment of bills. These funds are invested in U.S. Treasury overnight notes/bills at the end of each business day. As of September 30, 1992, the book value of Treasury notes and bills was about $3.7 billion, at a market value of about $4.0 billion. Earnings from investment activities in FY 1992 were $324 million, including $270 million in interest earned on investments and gains from the sale of securities totaling $54 million.

Financial Management Performance Measures

Although there were no specific performance measures identified in this area for the Nuclear Waste Fund, during FY 1992 the Fund outperformed an index fund of intermediate-term Treasury bonds by almost two percentage points; the Fund gained 14.73 percent compared to a gain of 12.83 percent for the index fund. The Fund adheres to sound financial management practices and strategies. Bills are paid in a timely manner, accounts receivable are properly managed, and sound internal controls are in place. In addition, reviews of the Nuclear Waste Fund are performed by both internal and external auditors.

Summary Findings

Both sound technical and financial management are essential to successfully meeting the goals and objectives

of the Office of Civilian Radioactive Waste Management. Significant progress has been made on the Yucca Mountain Site Characterization Project and modest progress, accompanied by a number of delays, on the Monitored Retrievable Storage Project. The civilian radioactive waste management program's performance is directly linked to the adequacy of resources made available to accomplish planned work. The need, during the last two fiscal years and, potentially, in future years, to defer and replan scheduled work because of budget constraints has been a primary concern to the program because of its legislative mandate and the nuclear utilities' expectation that the Office of Civilian Radioactive Waste Management perform in accordance with the Standard Contract executed between the utilities and the Department of Energy. The Office of Civilian Radioactive Waste Management needs continued Departmental, Administration, and Congressional support to ensure that it has adequate funds and Federal manpower to make steady and visible progress year after year. In addition to technical and financial considerations, public trust and confidence continue to be vital to the success of the program.