DOE/RW--0189

TI88 016123

**Office Of Civilian Radioactive
Waste Management**

Annual Report To Congress

August 1988

U.S. Department of Energy
Office of Civilian Radioactive Waste Management
Washington, DC 20585

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FOREWORD

This is the fifth Annual Report to Congress by the Office of Civilian Radioactive Waste Management (OCRWM). The report, required by Section 304(d) of the Nuclear Waste Policy Act (NWPA) of 1982 (P.L. 97-425), covers the activities and expenditures of OCRWM during fiscal year 1987, which ended on September 30, 1987.

The activities and accomplishments of OCRWM during fiscal year 1987 are discussed in chapters I through IX of this report. The audited financial statements of the Nuclear Waste Fund are provided in chapter X.

Since the close of the fiscal year, a number of significant events have occurred. Foremost among them was the passage of the Nuclear Waste Policy Amendments Act of 1987

(Amendments Act) on December 21, 1987, nearly 3 months after the end of the fiscal year covered by this report. As a result, some of the plans and activities discussed in chapters I through IX are currently undergoing significant change or are being discontinued. Most prominent among the provisions of the Amendments Act is the designation of Yucca Mountain, Nevada, as the only candidate first repository site to be characterized. Therefore, the site characterization plans for Deaf Smith, Texas, and Hanford, Washington, discussed in chapter III, will not be issued. The refocusing of the waste management program under the Amendments Act is highlighted in the epilogue, chapter XI.

MISSION PLAN AMENDMENT

The *Mission Plan for the Civilian Radioactive Waste Management Program* was issued in June 1985. It set forth program plans and strategies to accomplish the mission assigned to OCRWM under the Nuclear Waste Policy Act (NWPA) of 1982. As required, that plan contained a comprehensive information base for making decisions in carrying out the program. However, it was recognized when the Mission Plan was issued that the information base would change over time and that revisions in the program plans and strategies would be needed. An evaluation of new information, data trends and experience in implementing the NWPA was completed in early 1987, and an amendment to the Mission Plan was prepared. The purpose of the Mission Plan Amendment (MPA) was to inform the Congress and other interested parties of significant developments in the program and to explain revisions in program strategies and implementation schedules.

A *Draft Mission Plan Amendment* was issued in January 1987 to the States, affected Indian Tribes, other Federal agencies and the public for review and comment. Written comments were received from 58 respondents. Following a review of the comments, changes were made and the *OCRWM Mission Plan Amendment* was forwarded to Congress on June 9, 1987, together with copies of the comment letters and responses to the comments. The Mission Plan Amendment presented the Department's considered judgments on the way implementation of the NWPA should proceed based on actual experience in administering the program during recent years, the changed information base and interactions with affected States and Indian Tribes. The most significant changes presented included the postponement of site-specific work for a second repository and the extension of the date contemplated for operation of the first repository.

The Mission Plan Amendment recommended the postponement of site-specific activity related to the second repository and the July 1, 1989 date specified in the Act for selecting sites for characterization. The MPA also recommended that a national survey to identify potential second repository sites be started in 1995. Based on the projected quantities of spent fuel (see table 1-1), this would allow

ample time for development of a second repository prior to the first repository's reaching the 70,000 metric ton capacity limit imposed by the NWPA. However, recognizing that Congressional approval was needed in order to implement DOE's proposal, an alternative schedule for resuming the existing program for siting a second repository was also provided in the MPA. Table 1-2 shows the two alternative schedules, along with the milestones contained in the 1985 Mission Plan. Although a number of bills to redirect the nuclear waste management program had been introduced and were under active consideration by Congressional committees, no final action had been taken by the end of the fiscal year. Therefore, under the alternative schedule, site-specific work on the second repository was resumed on October 1, 1987.

The MPA also advised Congress of the extension of the date contemplated for initiating operation of the first repository from January 31, 1998, to 2003. OCRWM did not believe that, despite its best efforts, it would be able to meet the dates previously identified for the first repository. Table 1-3 shows the Mission Plan Amendment schedule for major milestones, along with that in the original 1985 Mission Plan.

The extension was considered necessary to carry out a comprehensive site characterization program, to prepare licensing documents to comply with Nuclear Regulatory Commission (NRC) requirements that have yet to be promulgated in their entirety, and to provide additional opportunity for consultation and cooperation (C&C) with affected States and Indian Tribes. OCRWM also specified in the MPA that it was submitting to Congress both a report on the status of C&C negotiations and a certification report regarding DOE's good faith efforts to negotiate formal C&C agreements with affected parties. The MPA noted that, while it would be in the interest of all parties to conclude C&C agreements, the primary beneficiaries would be the public in the affected States and the Indian Tribes for whom C&C agreements would provide enhanced assurance of State, local and Tribal involvement in major decisions. In addition, Congress was asked to consider providing authority for direct funding of local governments.

**Table 1-1 Summary of Spent Fuel Forecasts by the Energy Information Administration
(In Metric Tons of Uranium)**

Report date	By the Year 2000				By the Year 2020			
	"No-new Orders" case	Low case	Middle case	High case	"No-new Orders" case	Low case	Middle case	High case
August 1980 ¹	— ²	59,587	64,628	69,593	— ²	150,393	167,074	203,982
May 1982 ³	— ²	50,110	54,133	57,392	— ²	136,939	160,332	184,138
February 1983 ⁴	45,600	45,600	48,200	49,800	84,500	108,300	132,600	156,800
November 1984 ⁵	46,400	46,800	49,000	50,200	97,700	111,000	130,300	154,500
December 1985 ⁶	39,861	39,864	41,658	42,159	74,635	87,397	106,404	126,192
September 1986 ⁷	40,800	40,800 ⁸	41,600 ⁹	42,000 ¹⁰	79,300	86,800 ⁸	106,000 ⁹	130,300 ¹⁰

¹*Domestic Nuclear Fuel Cycle Requirements Associated with the Nuclear Power Forecasts of the Energy Information Administration, SR/ES/80-08.*

²Not included.

³Draft (based on 1981 EIA Report to the Congress).

⁴*World Nuclear Fuel Cycle Requirements--1983, DOE/EIA-0436, 1983.*

⁵*World Nuclear Fuel Cycle Requirements--1984, DOE/EIA-0436, 1984.*

⁶*World Nuclear Fuel Cycle Requirements--1985, DOE/EIA-0436, 1985.*

⁷*World Nuclear Fuel Cycle Requirements--1986, DOE/EIA-0436, 1986.*

⁸Referred to as the "lower reference case" in the 1986 EIA report.

⁹Referred to as the "upper reference case" in the 1986 EIA report.

¹⁰Referred to as the "optimistic case" in the 1986 EIA report.

**Table 1-2 Preliminary Milestones
for Two Alternative Second Repository Programs
and Comparison with the 1985 Mission Plan**

Milestones	1985 Mission Plan	Program Proposed by OCRWM	Alternative Program
Begin national survey	1981	1995 ¹	²
Complete national survey	4/83	1997 ¹	²
Issue draft area recommendation report	1/86	2000 ¹	²
Issue final area recommendation report	5/86	2002	1989
Identify potentially acceptable sites	³	2002	1989
Nominate and recommend sites for characterization ⁴	10/91	2007	1994
President recommends site to the Congress ⁵	1998	2015	2002
Submit license application to the Nuclear Regulatory Commission	1998	2015	2002
Nuclear Regulatory Commission issues construction authorization	2000	2018	2005
Start construction	2000	2018	2005
Begin operations	2006	2023	2010

¹The program proposed by OCRWM assumes that the national survey is an essentially new survey of various potential host rocks.

²Milestone completed.

³Not specified in the 1985 Mission Plan.

⁴The date mandated by the Act is July 1, 1989.

⁵The date mandated by the Act is March 31, 1990.

Table 1-3 Schedule for the First Repository¹

Milestone	1985 Mission Plan Schedule	1987 Mission Plan Amendment Schedule ²
Start of exploratory shaft construction		
Tuff	Third quarter 1986	Fourth quarter 1988
Basalt	Third quarter 1986	Second quarter 1989
Salt	Third quarter 1987	Fourth quarter 1989
Start of <i>in situ</i> testing		
Tuff	Third quarter 1988	Second quarter 1990
Basalt	Fourth quarter 1988	Fourth quarter 1991
Salt	Second quarter 1989	Fourth quarter 1991
Draft environmental impact statement	Third quarter 1990	1993
Final environmental impact statement	Fourth quarter 1990	1994
Submittal of the site selection report to the President	First quarter 1991	1994
Submittal of the license application to the Nuclear Regulatory Commission	Second quarter 1991	1995
Receipt of a construction authorization from the Nuclear Regulatory Commission	Third quarter 1993	1998
Start of construction	Third quarter 1993	1998
Start of phase 1 operations	First quarter 1998	2003
Start of phase 2 operations	First quarter 2001	2006

¹The schedules are given in calendar years.

²This schedule was based on a budget requirement of \$725 million for fiscal year 1988.

PUBLIC INTERACTION

Public understanding and participation are essential to the success of the radioactive waste management program. It is the policy of OCRWM, therefore, to make information about the program readily available to the public. In addition, the NWPA contains extensive provisions to ensure that timely and complete information is available to the States and Indian Tribes affected by the facility siting activities as part of the consultation and cooperation (C&C) process required by the Act.

Both the scope and intensity of OCRWM's public information and participation activities are varied to match the special needs of different interest groups. The first section of this chapter deals with outreach activities to fit the needs of the broadest interest group--the general public. The second part covers the more intensive interactions undertaken to meet the special needs of those States and Indian Tribes directly affected by OCRWM's site selection and characterization activities. A summary of the financial assistance provided to States and Indian Tribes to support their participation in the program concludes the chapter.

PUBLIC INFORMATION AND OUTREACH

During 1987, OCRWM made major strides in improving interactions with the public by developing, implementing and expanding communication and information tools. Primary goals were to: (1) increase public understanding of program activities and provide an historical record, (2) increase efficiency and effectiveness of data management, and (3) evaluate the OCRWM outreach program by examining the availability, accessibility and effectiveness of program products.

Outreach publications issued during 1987 included 12 *OCRWM Bulletins*, periodic reports containing current information on OCRWM's activities, plans, milestones, and publications. Eleven *OCRWM Backgrounders*, a series of papers dedicated to specific program activities and topics, were also issued. Twenty *OCRWM Fact Sheets*, a series of publications that provide general descriptions of selected program elements, were published during the year. Also released was the *OCRWM Publications Catalog* which provides citations of selected technical and public information

materials on high-level radioactive waste management. A revised brochure entitled "Managing the Nation's Nuclear Waste" was issued, and a videotape with the same title was developed and produced.

Exhibits, both full-size and table-top, were provided for use in 15 States. During the year, 266,000 public information products representing 110 titles were maintained in inventory, and 93,000 of these products were distributed in response to requests from 10 foreign countries, 49 States and the District of Columbia. Also, a speakers' service was maintained to provide qualified OCRWM personnel, when requested, to address public forums on topics of specialized as well as general interest.

An evaluation of OCRWM's existing written public information products, involving reviews by a panel of communication experts and public groups, was completed.

Computer-based information for public access includes INFOLINK, an electronic bulletin board, and OCRWM's computerized transportation program, a group of computer codes that can be used to assess various aspects of a waste transportation system. An on-line computerized product record system was developed and implemented to track the development, distribution and inventory and to control the stock of public information products developed by, or relevant to, headquarters or project offices. This system was made accessible, free of charge, to States and Tribal representatives and can serve users at remote locations. In addition, a wide variety of computerized data bases was developed and made available to States and Tribes. These data bases contain technical papers and models that provide the capability to forecast such phenomena as radiation doses, radionuclide transport, and the movement of water contaminants through rock.

The number of meetings open to the public was increased significantly. During 1987, OCRWM initiated a policy of opening most of its meetings with States and Indian Tribes to the general public and the press. OCRWM sponsored or participated in a number of other public meetings and briefings and hosted tours of candidate repository and monitored retrievable storage sites for Congressional staff, members of the press and the general public. Also, there were frequent Congressional staff briefings, and the OCRWM Director testified at more than 20 Congressional hearings on the program. In conjunction with the Congressional hearings,

OCRWM responded to approximately 400 written questions from Congress.

CONSULTATION AND COOPERATION

The consultation and cooperation (C&C) provisions delineated in the NWPA serve as an important basis for OCRWM's relationships with States and affected Indian Tribes by allowing the parties to mutually define the consultation process and by requiring that, not later than 60 days after the approval of a site for characterization or following the request of a State or affected Indian Tribe, the Secretary shall seek to enter into a written C&C agreement with that State or Indian Tribe. To this end, following the President's approval of three sites for characterization, OCRWM formally invited all affected parties to enter into negotiations for written agreements. OCRWM had previously entered into negotiations with the State of Washington, the Yakima Indian Nation, and the Confederated Tribes of the Umatilla Indian Reservation; however, no agreements had been reached, and OCRWM had requested that negotiations be resumed. Formal negotiations with the Nez Perce Indian Tribe began in August 1987, and OCRWM continued to make good faith efforts to begin negotiations with the States of Nevada and Texas. Moreover, OCRWM had indicated its willingness to negotiate incremental C&C agreements and remained firmly committed to seeking negotiations.

Distinct from the pursuit of written agreements, OCRWM also pursued a process of ongoing and extensive interactions with States and Indian Tribes. This consultation program was intended to fulfill the spirit and intent of Sections 116, 117(a) and (b), and 118 of the NWPA. Some of the initiatives taken during 1987 to strengthen the consultation process are described below.

In response to a General Accounting Office recommendation, OCRWM met with States and Indian Tribes in New Orleans, Louisiana, in November 1986 to explore ways to better define "consultation and cooperation" in the Mission Plan and to explore ways to improve working relationships. Although the attendees were unable to develop a consensus definition, they did consider several means of improving the overall consultation process. In a May 1987 meeting with States and Indian Tribes held in Las Vegas, Nevada, meeting participants discussed the development of operating principles governing consultation and cooperation. At this meeting, OCRWM agreed to work with the States and Indian Tribes to establish a forum and format for developing such operating principles.

Coordinating groups composed of headquarters, project office and contractor staff members were established to develop policy options for program areas such as geosciences, licensing, waste package and repository design, environmental impacts, institutional relations, and quality assurance. The meetings of three of the coordinating groups have been

open to State and Tribal participation since 1986. In response to requests from the States and Indian Tribes during 1987, meetings of the remaining coordinating groups were opened to them. A task force developed procedures for all groups and a system to monitor meeting action items and commitments. The task force proposals were then discussed with the States and Indian Tribes.

Since 1984, senior OCRWM managers have followed a regular tri-annual schedule for meeting with senior representatives of affected States and Indian Tribes to discuss major policy issues. At the request of the States and Indian Tribes, the meetings, held in locations of their choice, were opened to the public. In addition, senior headquarters and project office technical managers began meeting more frequently with State and Indian Tribal officials to discuss policy issues informally.

Site-specific participation plans were being developed to clearly define day-to-day, working-level interactions with States, Indian Tribes, and local parties. Each participation plan defined a program for informing and involving affected parties in ongoing interactions and activities related to program milestones. Although these plans are not required by the NWPA, OCRWM regarded them as major program documents that would strengthen public participation.

During 1987, States and Indian Tribes provided extensive and constructive comments on several versions of OCRWM's financial assistance guidelines. A meeting was held with State and Tribal representatives on May 11 and 12, 1987, to explore issues associated with a proposed rule-making on financial assistance. Meanwhile, OCRWM streamlined its grant review process to ensure that funds are provided in a more timely and predictable manner.

OCRWM is committed to a process of consultation and cooperation that is explicit enough to be widely understood and flexible enough to accommodate changing program needs. OCRWM believes that a healthy consultation and cooperation process will not only fulfill the NWPA's intent that States and Indian Tribes have an opportunity to participate in and oversee the waste management program, but that it will also produce substantive program benefits by broadening and strengthening the base of ideas and information that supports program policy and decision-making.

The Conference Report accompanying the Continuing Resolution Appropriation Act of 1987 (P.L. 99-500 and 99-591) made the release of \$79 million of the \$499 million total Nuclear Waste Fund Appropriation contingent upon certification by the Secretary of Energy that the Department had made a good faith effort to comply with the C&C provisions of the NWPA. Therefore, on August 4, 1987, the Secretary submitted, to the Energy and Water Development Subcommittees of the Appropriations Committees of the U.S. Senate and House of Representatives, a comprehensive report on the Department's efforts to comply with the C&C provisions of the NWPA. In the letter transmitting that report, the Secretary certified that a good faith effort had been made to comply with the C&C provisions of the NWPA. Further, the Secretary wrote that the information

transmitted to the Congressional Committees "...illustrates a broad program of enhanced efforts to establish close and productive working relations with the States and Indian Tribes, even if written agreements continue to be difficult to obtain."

On August 17, 1987, the House Appropriations Committee responded favorably to the Secretary's report by approving the release of the funds.

FINANCIAL ASSISTANCE

In 1987, the bulk of the financial assistance provided to States and affected Indian Tribes, under the provisions of the Act, was awarded to those with first repository sites being characterized. The recipients used these funds for such activities as reviewing technical program data, reviewing and commenting on program documents, participating in meetings with OCRWM, attending OCRWM meetings with NRC staff, and developing socioeconomic impact reports.

A total of \$28.8 million in financial assistance was awarded to States and affected Indian Tribes during 1987. This included \$28.4 million to the States and Indian Tribes affected by the first repository program, for a cumulative total

of \$69.4 million awarded since President Reagan signed the Act on January 7, 1983. Second repository States and Indian Tribes received \$360,000 during 1987, for a cumulative total of \$8.4 million.

In addition, ongoing cooperative agreements were maintained in FY 1987 with the following national organizations:

	<u>Annual Funding</u>
National Congress of American Indians	\$225,911
National Conference of State Legislatures	\$360,705
League of Women Voters Education Fund	<u>\$274,287</u>
Total	<u>\$860,903</u>

The purpose of the cooperative agreements with the National Congress of American Indians (NCAI) and the National Conference of State Legislatures (NCSL) was to encourage participation by the general public, Indian Tribes and State officials in implementing the NWP. Specifically, NCAI and NCSL disseminated information on the evolving status of the waste program and provided technical assistance through analysis and evaluation of the program. The League of Women Voters Education Fund was planning the development of a curriculum for technical seminars to educate citizens about nuclear waste disposal and to highlight opportunities for public involvement.

GEOLOGIC REPOSITORIES

The NWPA established a process and a schedule for the development of geologic repositories.

The first major phase in the process was completed in 1986, when the President approved site characterization activities at three candidate first repository sites--the Deaf Smith site in Texas, the Hanford site in Washington, and the Yucca Mountain site in Nevada. The locations of the three sites are shown in figure 3-1. Activities in 1987 focused on the next step in the process, the preparation of site characterization plans for these sites, in accordance with Section 113 of the NWPA.

This chapter summarizes the past year's accomplishments related to site characterization plans for the candidate repository sites, the extensive engineering and scientific activities to support these plans, the second repository technology program, and the cooperative programs conducted with foreign countries. It also provides a brief summary of the status of pending litigation.

FIRST REPOSITORY SITE CHARACTERIZATION PLANS

A major activity during 1987 at both headquarters and project offices was the preparation of a draft site characterization plan (SCP) for each of the three candidate sites for the first repository. The NWPA requires that, before sinking the exploratory shafts, a site characterization plan be issued for each site. These plans are to be submitted for review and comment to the NRC, the Governors and legislatures of the States containing the candidate sites, affected Indian Tribes, and the public.

Site characterization is a complex process entailing laboratory investigations, surface-based data collection activities such as geologic mapping and seismic surveys, studies conducted through the drilling of boreholes and, most important, studies of the proposed host rock in an exploratory shaft facility (ESF). This facility will consist of two exploratory shafts sunk to the depth of the proposed repository, a drift connecting these shafts, and other underground tunnels extending as far as several thousand feet. Concurrently with

characterization, extensive studies will be conducted of environmental and socioeconomic conditions in the area of each candidate site.

During the preparation of a draft SCP for each of the three candidate sites for the first repository, OCRWM released draft chapters and sections of the SCPs to the NRC and the States and Indian Tribes, and had a number of discussions with these parties as they reviewed the documents. In August 1987, OCRWM revised its plans in order to respond to concerns that affected parties expressed about the timing for release of the SCPs and associated environmental and socioeconomic plans, and about the length of time for review of the SCPs. Therefore, OCRWM decided that consultation drafts of the SCPs would be issued to the States, Indian Tribes and NRC for extensive review, consultation and revision before the final plans are submitted to the public as required by the NWPA. Accordingly, OCRWM scheduled the release of consultation draft SCPs, as well as draft environmental and socioeconomic monitoring and mitigation plans and environmental regulatory compliance plans, for January 1988. Consultation workshops on the draft SCPs and other plans were to be held with representatives of States, Indian Tribes, and the NRC early in 1988. After revising the documents to reflect comments received, the SCPs were to be released for public review and the series of required public hearings was to be held.

To guide the preparation of these plans and to ensure that all the data required for site selection and licensing will be available when needed, OCRWM developed two organizing principles: an "issues hierarchy" and an "issue resolution strategy." The issues hierarchy enumerates the questions that must be resolved in a logical order to demonstrate that the repository system meets regulatory requirements. It thus provides a framework for developing the site characterization program and for explaining why the characterization program is necessary and adequate. Similarly, the issue resolution strategy guides the development of specific plans for resolving each issue and provides the rationale for the associated site characterization activities. The scope and magnitude of this effort can be gauged from the length of the site characterization plans: the description of the characterization program alone covers several thousand pages.

FIGURE 3-1

**Sites Recommended by the Secretary of Energy and
Approved by the President for Site Characterization**

The issue resolution strategy, common to all three candidate sites, includes the performance allocation specifically requested by the NRC staff. Briefly stated, performance allocation requires OCRWM to identify, for each issue, the elements of the repository system that will be relied on to resolve that issue; it also requires quantitative statements describing the expected behavior of those elements and the information that the site characterization tests and analyses are expected to provide. Thus the strategy will facilitate the preparation and review of the environmental impact statement, the selection of the site for the first repository, the preparation of the license application, and the NRC's review of the application.

Regulatory compliance plans were developed to guide the internal management at each of the project offices in ensuring environmental regulatory compliance. The plans describe how OCRWM will meet all applicable regulations that govern site characterization and development activities. In addition, they delineate how OCRWM will address State and local laws and regulations that are not inconsistent with Federal responsibilities under the NWPAA.

The Environmental Coordinating Group, including the Environmental Regulatory Compliance Working Group and the Environmental Planning Working Group, met regularly to coordinate the environmental and regulatory compliance planning activities of headquarters, the project offices and their contractors. A significant change was made in the functioning of these three groups in early 1987, when their meetings were opened to participation by the States and affected Indian Tribes. Representatives of the States and Tribes were invited participants at meetings at Seattle, Washington, in May 1987 and at Washington, D.C. in September 1987, and made valuable contributions to improving the environmental and regulatory compliance planning efforts.

Draft environmental and socioeconomic monitoring and mitigation plans were developed for each site to be issued to the affected States and Indian Tribes for review and comment along with the consultation draft SCPs in January 1988. These plans identify the significant environmental resources or socioeconomic conditions that could potentially be adversely affected by site characterization activities. These plans were being prepared as a mechanism for meeting responsibilities under Section 113(a) of the NWPAA, which requires that site characterization activities, "...to the maximum extent possible..." be conducted "...in a manner that minimizes any significant adverse environmental impacts." The plans outline the site characterization activities that were to be monitored and suggest mitigation measures to avoid or minimize any adverse impacts. As with environmental and regulatory planning, the preparation of these plans was aided by the information exchange and policy discussions at meetings of the Institutional/Socioeconomic Coordinating Group. The States and affected Indian Tribes participated in the meetings of this group throughout the past year.

In conjunction with the preparation of plans for site characterization, a preliminary agreement was reached with the National Academy of Sciences/National Research Council (NAS/NRC) for the provision of independent oversight and technical review services throughout the characterization process. As agreed, the Board on Radioactive Waste Management of the NAS/NRC Commission on Physical Sciences, Mathematics and Resources submitted a proposal to evaluate key technical aspects of the characterization program at each site for completeness and accuracy, and to provide a mechanism for assuring that valid technical concerns from outside the program were given appropriate and timely consideration.

The plan of action proposed by NAS was to establish three panels of approximately 12 members each, one for each site to be characterized. The members of each panel were to have expertise in the fields of geological sciences; environmental science; socioeconomic science; radiobiology and health physics; public policy, including law and regulatory practices; systems analysis; and repository engineering. To the extent feasible, meetings were to be held at the sites being characterized. Notice of and an invitation to attend each meeting was to be sent to the designated technical representative of each affected State and Indian Tribe. These technical representatives were to be encouraged to participate in all open sessions of the panels, to comment on materials presented to the panels, and to provide written and oral comments on all released panel reports.

The results of the panel reviews were to be reports that assess the technical basis for current portions of the site characterization program and, when necessary, were to indicate the need and rationale for considering additional factors. The reports were to review selected and important technical issues underlying the process for characterizing sites, clarify uncertainties and facilitate the recommendation of a single repository site by helping to separate the technical and nontechnical aspects of site evaluation.

The contract proposal from NAS was under review at the end of the fiscal year, and award of the contract was expected soon thereafter.

FIRST REPOSITORY ENGINEERING AND GEOTECHNOLOGY

The objective of engineering and technology activities was to provide the technical support required for site characterization planning. Activities of each of the three first repository project offices are covered in this section.

Engineering

Repository design work proceeded during 1987 for the three candidate sites approved for characterization. The fo-

cus of these activities has been the development and documentation of repository and waste package conceptual designs which serve as bases for the SCPs. Figure 3-2 shows a perspective of the proposed repository at Yucca Mountain, Nevada. Draft Conceptual Design Reports (CDR) for each of the three repository projects were completed during 1987. These CDRs are key reference documents supporting the SCPs. The overall plan for the Advanced Conceptual Design (ACD) phase for both the repository and the waste package was issued early in 1987, and the system engineering effort to support ACD was finalized. Subsequently, it was announced that a management and operating (M&O) contractor for systems engineering, development and management would be responsible for the initiation of ACD for the three first repository candidate sites. Prior to ACD, existing project design contractors will conduct engineering studies which focus on project-specific issues leading to preferred design options.

Design work on the ESFs; that is, the exploratory shafts and the related underground excavations, proceeded on the basis of plans for site characterization.

Waste package activities centered on the development of conceptual designs and postclosure strategies for complying with the 10 CFR Part 60 waste package performance objectives.

Waste acceptance preliminary specifications for the Defense Waste Processing Facility at the Savannah River Plant and the West Valley Demonstration Project in New York were issued by OCRWM following concurrence by DOE's Office of Defense Programs and Office of Nuclear Energy, respectively. Draft waste compliance plans for these waste-producing activities were completed. These specifications and plans are being prepared to assure the technical acceptability of the high-level waste from these activities for receipt, handling, and disposal at the repository.

Basalt Project

The consultation draft SCP for the basalt site was completed in 1987, with release expected in January 1988. In addition, a geohydrology testing program plan was prepared in close consultation with the State of Washington, affected Indian Tribes and the NRC. This testing was to be performed prior to construction of the exploratory shafts. Draft environmental and socioeconomic monitoring and mitigation plans were issued to the State and affected Indian Tribes for review and comment.

Substantial progress was made in completing a detailed study to determine an acceptable design basis for the ESF in basalt. A draft repository facility conceptual design, based on horizontal waste emplacement, was completed in support of the SCP. A waste package postclosure strategy was developed to establish the approach to achieving compliance with the performance objectives of 10 CFR Part 60. The system engineering management plan was prepared and approved

to assure adequate technical management control within the basalt project. Continued progress was made in developing the site-specific requirements and subsystem design requirements to support the initiation of ACD.

Salt Project

Site characterization planning was a major activity throughout 1987. The Salt Repository Project Office completed the consultation draft SCP for the Deaf Smith site in 1987, with release expected in January 1988. In addition, during 1987, the project office and staff of the prime contractor were moved from Columbus, Ohio, to Hereford, Texas. This provided for onsite management of site characterization and enhanced interaction with State and local officials. The project office negotiated and signed an interagency agreement with the Army Corps of Engineers which was to assist in acquiring the land needed for site characterization, and a draft land planning report was completed.

The detailed design of the ESF was 60 percent complete at the end of the fiscal year, after extensive Federal and State agency reviews at the 30 and 60 percent completion levels. In support of the SCP, the repository facility conceptual design, for both vertical and horizontal waste emplacement modes, and the waste package conceptual design were completed in draft. A waste package postclosure strategy was developed to establish the approach to achieving compliance with the performance objectives of 10 CFR Part 60. The salt repository site-specific system description and requirements document was prepared and approved, and a draft environmental and regulatory compliance plan was completed.

Tuff Project

The consultation draft SCP for the tuff site in Nevada was completed in 1987, with release expected in January 1988. In order to adequately characterize the candidate repository site under Yucca Mountain, the project completed a study proposing five major changes to the ESF design concept. Following formal interactions with the NRC and the State of Nevada, the proposed changes were adopted by DOE. The ESF Title I design requirements were completed in preparation for Title I design initiation. The repository facility conceptual design, based on a reference vertical waste emplacement mode (with a long-horizontal waste emplacement mode alternative), was issued in support of the SCP. A waste package postclosure strategy was developed to establish the approach to achieving compliance with the performance objectives of 10 CFR Part 60. Draft environmental and socioeconomic monitoring and mitigation plans were issued to the State of Nevada for review and comment, and an initial environmental regulatory compliance plan was completed.

Figure 3-2. Perspective of the proposed repository at Yucca Mountain.

Systems engineering work continued on developing the system engineering management plan and the site-specific requirements and subsystem requirements in preparation for the initiation of the ACD phase.

Geosciences

A significant amount of geoscientific field and laboratory work was postponed during 1987 because of stop-work orders issued to contractors under OCRWM's quality assurance policies and procedures, and due to changes in the preparation schedule for the SCPs. However, ongoing geoscientific activities that could not be interrupted without risking irreversible loss of needed information were conducted during this period. These ongoing technical and scientific activities involved the acquisition of data related to either transient phenomena or studies that require long, continuous periods of data collection. The geoscientific work that was accomplished by each field project is discussed below.

Basalt Project

Geoscientific studies at the Hanford site consisted of a field and laboratory program that included interactions with the United States Geological Survey (USGS), the NRC, the State of Washington, and affected Indian Tribes on topics that included geology, geochemistry, and hydrology. Field calibration of the seismic network was completed, and 13 new seismometers were installed to provide more reliable data coverage. A 2,500-foot seismic reflection line survey was conducted by the USGS. Data from radionuclide sorption/solubility experiments that had been completed in previous years were reviewed. Statistical studies of physical and chemical data on basalt flows were completed. The rock mechanics program was reviewed by a panel of scientists under the direction of the U.S. National Committee for Rock Mechanics. Plans for the geohydrologic testing program that will be conducted in advance of exploratory shaft construction were finalized after consultation with the NRC, the State of Washington, and affected Indian Tribes. Plans for drilling and piezometer installation for new wells were completed, and a hydrologic data review was conducted for the NRC. New hydrologic equipment was installed in monitoring wells, and piezometers were tested for leakage. System specifications for the groundwater monitoring network were developed to determine the accuracy and precision of the existing data transmission system. Reports were prepared on oxidation-reduction reactions in groundwater, pore water pressure and *in situ* stress, earthquake recurrence intervals in the Pasco Basin, dissolved methane and nitrogen concentrations in groundwater, magnetotelluric data, and earthquake probability.

Salt Project

The project focused its resources on preparing for the characterization of the Deaf Smith County site in Texas. A number of planning documents were prepared for geoscientific investigations in the field and laboratory. Cooperative research on salt was conducted with the U.S. Bureau of Mines, the Texas Bureau of Economic Geology, and the USGS. A sample management system was developed in preparation for drilling and core sampling of the Deaf Smith site. Core preservation studies were conducted at the Mississippi Chemical Corporation Mine in New Mexico; information on core aging and core testing gained at this mine was to be used when core samples were taken in Texas. A review of existing regional microseismic station locations was accomplished, and additional microseismic monitoring sites were identified as possible future additions to the existing seismic network. Field reviews were made in Deaf Smith County to determine the extent of existing information on controlled elevation points that could be used for topographic mapping.

Tuff Project

A number of site investigation activities, initiated at the Yucca Mountain site in previous years, were continued during 1987. These activities included hydrologic, geologic and geochemical studies. Moisture conditions were continuously monitored from wells in the unsaturated zone, and gas samples were also obtained periodically from the wells. Water levels in 14 boreholes were monitored regularly to record fluctuations in water levels over time, and water level and pressure measurements were recorded continuously in three boreholes at Drill Hole Wash. Channel scour chains were monitored at three locations to measure the amount of erosion that occurs in washes during times of heavy runoff. A weather station was operated to monitor precipitation, and measurements of temperature, rainfall, and infiltration were made at two groundwater recharge sites. Laboratory measurements were used to determine the physical and chemical parameters of existing core and drill cuttings.

Fifty-five seismometers have been installed in the region around Yucca Mountain as part of a regional seismic network. The seismometers operate continuously and automatically record data. Seismic activity was measured to provide information on vibratory ground motion that could affect the design or performance of the proposed surface facilities and repository at Yucca Mountain. Geodetic survey benchmarks have been permanently installed in and around Yucca Mountain in order to monitor present-day tectonic adjustments, and an annual resurvey of these benchmarks was conducted. Determinations of soil characteristics for purposes of soil modeling were conducted on a seasonal basis; activities included dust-trap sampling, determination of field capacity of soils, and the periodic measurement of carbon dioxide and other soil gas concentrations.

Laboratory studies, using rock samples collected in the Yucca Mountain area, were conducted to better characterize geochemical conditions that exist in the field. These studies addressed dynamic transport, mineralogy/petrology, sorption, natural isotopes, groundwater chemistry, solubility, and hydrothermal conditions.

SECOND REPOSITORY TECHNOLOGY PROGRAM

The second repository technology program completed the classification and coding of the more than 60,000 comments received on the draft *Area Recommendation Report* issued in 1986. Although site-specific investigations for a second repository were in abeyance during the year, the coded comments were preserved for reference and research use. The Mission Plan Amendment, submitted to Congress in June 1987, proposed the initiation of a national survey in 1995 to begin the process of selecting a site for the second repository. An alternative schedule was also provided in the event that the proposal was not approved by Congress. Since the Congress had not acted on the proposal as of September 30, 1987, the Secretary ordered the resumption of work on the *Area Recommendation Report* effective October 1, 1987.

Major geologic concepts for repository technology research were identified, and a process for selecting those most deserving of further consideration was established during 1987. The repository technology program continued geoscientific research work with natural analog studies and sedimentary rock studies, and funded geoscientific work performed by the USGS. Field and laboratory work with natural analog sites was continued. Laboratory work on the hydrology and geochemistry of sedimentary rocks, with special emphasis on shale, was completed by the Oak Ridge National Laboratory. Cooperative research work with the USGS was accomplished in groundwater fracture flow, borehole flowmeter instrumentation, remote sensing, and fracture density studies.

INTERNATIONAL COOPERATION

During 1987, OCRWM continued its cooperation with foreign countries and international organizations on the storage, transportation and disposal of spent nuclear fuel and high-level radioactive waste to obtain the benefits of foreign experience and to further the technology for disposal of spent fuel and high-level waste.

These activities included bilateral cooperation with Belgium, Canada, the Federal Republic of Germany (FRG), France, Japan, Spain, Sweden, Switzerland, the United Kingdom and the Commission of European Communities. In addition, cooperation, through the Organization for Economic Cooperation and Development of the Nuclear Energy

Agency (OECD/NEA) and the International Atomic Energy Agency (IAEA) focused on special topics, technical exchange and collaboration through shared cost projects.

OCRWM cooperated and shared with Canada the costs of its Underground Research Laboratory studies in Manitoba for the evaluation of experimental techniques related to hydrology and rock mechanics. Observation of the construction and installation of the laboratory provided experience in the characterization of a site through shaft sinking. Construction began to extend the shaft from the 240-meter depth to a planned depth of 455 meters.

Cooperation with the FRG is focused on following its progress in constructing shafts at the Gorleben site and performing tests at the Asse salt mine. The experience gained during construction of the shaft at Gorleben, including the adverse experience of a mining accident, should provide valuable information on the appropriate procedures to be used for future construction of shafts in the U.S.

Technical exchange with the FRG continued on the properties of salt and the effects of radioactive waste disposal on salt through evaluation of tests conducted in the Asse salt mine. Information was obtained on the effects of heat and radiation on brine migration, gas generation, and container corrosion. Information was also obtained on experimental techniques and instrumentation in an underground salt environment. During 1987, several salt samples were sent to the U.S. for post-evaluation work, which includes salt and metal sample analysis and geochemical and thermochemical behavior tests.

OCRWM and the FRG also conducted joint workshops on chemical behavior and radionuclide migration. A 1-year personnel exchange enhanced the mutual sharing of information.

OCRWM has continued cooperation with the National Cooperative for Disposal of Radioactive Waste (NAGRA) in Switzerland under a general bilateral agreement on waste management signed in the spring of 1985. In June 1987, OCRWM and NAGRA entered into a 3-year project agreement focusing on the development of performance assessment techniques. The project agreement includes: determination of hydraulic parameters by means of fluid logging and by means of hydraulic testing in boreholes; assessment of flow and transport in fractured media; investigation of the influence of gas on solute transport; design of methodologies to determine relevant host rock hydraulic parameters; and the coupling of transport and geochemistry.

A bilateral meeting with the Swedish Nuclear Fuel and Waste Management Company (SKB) was held in June to plan future cooperative activities. Technical exchange continued with the transfer, by SKB, of data and experience on site investigations.

Participation by the U.S. and six other countries in phase III of the Stripa Project in Sweden was initiated and coordinated through the OECD/NEA. The Stripa mine in Sweden is being used to study methodology for site characterization. Canada, Finland, Japan, Sweden, Switzerland, the United Kingdom, and the U.S. will contribute funding for phase

III, the final phase of the Stripa Project. During phase III, the primary area of study will be the investigation of groundwater flow characteristics in an unexplored volume of granite some 350 meters below ground, using techniques developed under the earlier phases. Radar, seismic, and hydraulic measurements will be used to test the capability to predict flow through fractures. A second area of study concerns the evaluation of alternative materials for sealing any fractures found in the vicinity of an engineered repository.

Cooperation with the Nuclear Power Inspectorate (SKI) of Sweden on the HYDROCOIN project, which compared the results of computer codes from participating countries using the same input data in a benchmark exercise, was nearing completion. In addition, OCRWM worked with SKI in the planning of an INTRAVAL project which offers various countries an opportunity to participate in evaluating potential methods of validating computer codes and models used to predict the migration of radionuclides from a repository.

The current status of natural analog studies was monitored at an international meeting on natural analogs sponsored by the Commission of European Communities. Natural analogs provide insight into the behavior of radionuclides in natural geologic environments. OCRWM began participation in a natural analog study in the Pocos de Caldas district in Brazil. Other participants include Sweden, Switzerland, the United Kingdom, and Brazil.

Other international activities conducted through OECD/NEA involved OCRWM participation in the Seabed Working Group sponsored by the NEA. During 1987, the group completed the draft of an eight-volume report titled "Preliminary Feasibility Assessment Report on Subseabed Disposal." The publication of this report by OECD/NEA will conclude OCRWM's participation in this working group as this activity was being transferred to DOE's Office of Energy Research.

OCRWM also continued to participate in OECD/NEA waste management activities conducted by the Radioactive Waste Management Committee, the Advisory Group on In-Situ Research Investigations for Geologic Disposal, the Performance Assessment Advisory Group, and the Probabilistic Systems Assessment Codes Users Group. Exchange of program descriptions facilitated communications on the subjects of waste management policies, strategies and activities, and technical exchange meetings helped to ensure that the experiences of others are considered for possible specific application to the OCRWM program.

OCRWM continued to participate in relevant IAEA activities through review of and comment on IAEA documents on guidelines, standards, and technical activities.

Section 223 of the NWPAA requires that both DOE and NRC offer cooperation and technical assistance to nonnuclear weapon states in spent nuclear fuel storage and disposal, including assistance in the health, safety and environmental regulation of such activities.

Since the first offer of cooperation and assistance appeared in the *Federal Register* on March 30, 1983, 15

countries have requested assistance. In response to these requests, visits to various U.S. facilities have been provided, and technical briefings on spent fuel management have been transmitted. During FY 1987, OCRWM provided technical briefings to delegations from Taiwan, Egypt and the Republic of Korea.

On April 3, 1987, a *Federal Register* notice renewing the offer for the fourth time was reissued jointly by DOE and NRC. The fifth and final offer of assistance required by the NWPAA was scheduled for issuance in April 1988.

REPOSITORY LITIGATION

More than 30 lawsuits involving major repository siting decisions were pending against the Department at the end of fiscal year 1987. These cases are all being heard by the U.S. Court of Appeals for the Ninth Circuit.

Litigated repository siting issues have been divided into three groups. The cases dealing with the repository siting guidelines published by DOE in December 1984 were consolidated by the Court under *Environmental Policy Institute v. Herrington* (Case Number 84-7854). The second group of cases concerns the decisions and actions announced by the Secretary on May 28, 1986, regarding the first repository program. These cases have been consolidated under *State of Nevada v. Herrington* (Case Number 86-7307). The issues being litigated in this group include: (1) the final environmental assessments, (2) the nomination of five sites as suitable for characterization, (3) the recommendation of three sites for characterization, (4) the President's approval of the sites to be characterized, and (5) the preliminary determination that these three sites are suitable for the construction of a repository. The third group consists of the cases challenging the decision to postpone site-specific investigations for a second repository. These cases were consolidated by the Court under *State of Washington v. Herrington et al.* (Case Number 87-7085).

A request by the Department of Energy to transfer these cases to the U.S. Court of Appeals for the District of Columbia Circuit was denied on October 29, 1986. A motion filed by the Department to consolidate the guidelines cases and those relating to the May 28 announcement was denied on March 4, 1987, in the Court of Appeals. At the same time, the Court denied petitioners' motions for discovery without prejudice to refile at a later date and expedited the briefing schedule for the cases challenging the second repository decision. Additionally, in 1987, the States of Nevada and Washington filed motions to enjoin site characterization pending repromulgation of the Environmental Protection Agency's environmental standards which were vacated by the U.S. Court of Appeals for the First Circuit. The repository siting cases remained pending at the end of the fiscal year as DOE continued the process of providing for document access by the petitioners.

In a related issue, the States of Nevada and Washington had petitioned the U.S. Court of Appeals for the Ninth

Circuit in 1986 to review the Secretary's denial of grants to cover litigation costs. These cases, *Nevada et al. v. Herrington* (Case Number 86-7310) consolidated with *Washington v. Herrington* (Case Number 86-7456), were heard by the

Court on February 12, 1987. Ruling in favor of DOE on September 17, 1987, the Court opined that judicial review is not an activity which Congress intended the Nuclear Waste Fund to finance.

IV

MONITORED RETRIEVABLE STORAGE

On March 31, 1987, in accord with the requirements of Section 141 of the NWPA, a proposal was submitted to the Congress to construct and operate a facility for the monitored retrievable storage (MRS) of spent fuel at a site on the Clinch River in the Roane County portion of Oak Ridge, Tennessee.

PROPOSAL TO CONGRESS

As required by the NWPA, the proposal included designs for two alternative facility concepts at three alternative sites. The three alternative sites are all located in the State of Tennessee on land controlled or owned by the Federal Government. The preferred site was the former site of the proposed Clinch River Breeder Reactor; the alternatives were a site on the Oak Ridge Reservation and the former site of a proposed nuclear power plant in Hartsville, Tennessee.

The proposal also included the required environmental assessment that examines three alternative sites and various site and design combinations, as well as a program plan that includes provisions for funding and integration of the MRS facility into the overall waste management system. In addition, the submission included comments provided by the NRC, the Environmental Protection Agency and the State of Tennessee. The facility recommended in the proposal would be capable of performing all the functions specified by the NWPA.

Based on the previously completed need and feasibility study, a careful analysis of the provisions of the NWPA and an evaluation of programmatic options, it was concluded that an MRS facility located at the Clinch River site and designed to be an integral component of the waste management system would improve the performance of the system. This conclusion was also influenced by the experience of the previous 5 years in implementing the provisions of the NWPA and the resultant understanding of the managerial, regulatory, and institutional complexities of radioactive waste management, particularly of the activities that must precede final disposal, and which are often underestimated.

FUNCTIONS OF AN MRS

The MRS facility, as envisioned in the proposal, would receive, prepare and, as necessary, store spent fuel prior to emplacement in the first geologic repository. Its principal waste preparation functions would be the consolidation of the spent fuel rods and the loading of these rods into canisters. Consolidation would be performed by extracting the spent fuel rods from the hardware that holds them together in assemblies and rearranging them in a tighter array for greater efficiency in storage, handling, transportation and disposal. Canisters that are uniform in size and free of surface contamination by radioactive material, would facilitate handling, shipping, and further packaging functions at the repository. After preparation, the canisters of spent fuel would be loaded into shipping casks and transported to the repository in dedicated trains.

The MRS facility would contain a large storage yard where the canisters of spent fuel would be placed in sealed storage casks that would allow radiation monitoring and easy retrieval for shipment to the repository.

The fundamental objective in the design and operation of the MRS facility would be to protect the health and safety of the public and the workers at the facility, and the quality of the environment. It would be licensed by the NRC to operate and hence would be subject to both routine and unannounced inspections by NRC staff. The MRS facility would provide shielded confinement and containment that would limit any releases of radioactive material to levels well below established regulatory limits, and its safety-related features would be based on available and proven technology.

The MRS proposal was ready for submittal to Congress in February 1986, but this was delayed by litigation for more than a year.

MRS LITIGATION

OCRWM was enjoined from submitting the MRS proposal to Congress in February 1986 by the U.S. District Court for the Middle District of Tennessee in response to a suit filed by the State of Tennessee. Following an appeal by DOE, the U.S. Court of Appeals for the Sixth Circuit decided in favor of the Department. The State of Tennessee ap-

pealed that decision to the Supreme Court, which denied the State's request for a writ of *certiorari* on March 30, 1987. As a result, the Department, having overcome all legal impedi-

ments, formally submitted the MRS proposal to Congress on March 31, 1987.

V

TRANSPORTATION

Progress continued in 1987 toward the development of a safe, efficient, and cost-effective transportation system, through accomplishments in four major areas: cask design and development, economics and systems analysis, institutional interactions, and planning for transportation operations.

CASK DESIGN AND DEVELOPMENT

A multiphased program was pursued to support the development, by private industry, of the various casks necessary to ship radioactive waste to disposal or storage facilities. The designs of all such casks will require certification by the NRC. Plans called for the development of four categories of casks: (1) casks for shipping fuel from commercial nuclear reactors to a geologic repository or to an MRS facility, (2) casks for moving spent fuel from an MRS facility to a repository, (3) casks for transporting nonstandard fuel and nonfuel components, and (4) casks for shipping high-level radioactive waste generated in national defense activities to a repository.

Design activity was focused on casks to be used for shipping waste from reactors to a repository or MRS facility. In June 1987, six companies were selected for negotiation of contracts for the design of "from-reactor" casks. The designs under consideration would allow transport by legal weight truck, overweight truck, and rail and/or barge. The need for dual-purpose casks (casks capable of being used for both temporary storage and transport) was also being reviewed.

An overview document was drafted in 1987 to describe the policies and plans for the development of a cask testing program. That document included a description of the tests required by the NRC for cask design certification, the commitment to test scale models of casks (with continued review of the potential use of full-scale tests), the responsibilities of cask design contractors for testing, and the anticipated schedule for cask development and testing activities.

A quality assurance plan was drafted to support the cask development effort. The plan reviews policy objectives, defines organizational authorities and responsibilities, and establishes the management and technical controls needed to

provide adequate confidence in the integrity and safety of transportation activities, including the design, fabrication, testing, maintenance, repair and use of casks and associated transport equipment.

Research into technical issues continued during 1987. Studies under way included a review of transportation system options with potential to reduce radiation exposures during normal transport to levels "as low as reasonably achievable" (commonly referred to as the ALARA study), the effects of different fuel burnup scenarios on shipping requirements, and the implications of robotic handling for cask design.

ECONOMICS AND SYSTEM ANALYSIS

Significant progress was made in developing and refining data bases and computer models for use in future cost, risk, and logistical analyses of the transportation system and its component elements. In addition, a computer model to be used in the evaluation of the total life cycle costs of various cask designs was formulated and developed. Specific transport options—including transportation modes and logistics—continued to be studied for potential use in the system. Consistent with the recommendations of States and Indian Tribes, OCRWM initiated detailed evaluations of the potential costs, risks, and operational features associated with the use of dedicated train service and truck convoys in shipping radioactive wastes.

A system studies plan was prepared to formalize the approach used in the definition and development of the transportation system. The draft plan, completed in 1987, reviews the technical decisions and studies that will be required and identifies related milestones.

INSTITUTIONAL INTERACTIONS

Institutional interactions were enhanced by OCRWM during 1987 by: (1) sponsoring and participating in meetings, briefings, and workshops; (2) entering into or continuing contractual arrangements with national, regional, and

local transportation-related organizations to assist in the study of transportation issues and the cooperative development of policies and procedures; and (3) developing and exchanging transportation information.

The scope of the Transportation Coordination Group (TCG) meetings was broadened in 1987 to include substantive discussion of both technical and institutional transportation issues. Representatives from the States, Indian Tribes, utilities, and transportation industry were invited and encouraged to participate in TCG meetings, to report on independent transportation activities, and to participate in the review of program plans for the transportation system. In addition, workshops on specific transportation issues were held in conjunction with the TCG meetings to promote detailed discussion of specific transportation issues. The TCG meeting held in April 1987 in Salt Lake City, Utah, included a workshop on computer models used, or planned for use, in transportation risk analyses, and a workshop on cask design and development was held in conjunction with the October 1987 TCG meeting in Denver, Colorado.

Contractual arrangements were extended or initiated during 1987 to support the study of specific transportation issues at both regional and national levels. Cooperative agreements with the Southern States Energy Board and the Western Interstate Energy Board were extended to support the study of such transportation issues as emergency response and routing, as they relate to the particular interests of the member States in each region. Support was provided to the National Conference of State Legislatures and the National Congress of American Indians. In addition, the Commercial Vehicle Safety Alliance continued to work under a cooperative agreement with OCRWM to develop a recommended system of uniform State highway inspection standards.

In a new effort, OCRWM began to work with a task force of the American Association of State Highway and Trans-

portation Officials to review State permitting requirements for overweight truck shipments and to assist in the development of model, uniform permitting procedures.

Finally, OCRWM continued to develop and disseminate a wide range of program information to interested and involved individuals and groups. Materials developed included reviews of ongoing activities, contractor studies, meetings, and long-range plans for transportation activities.

PLANNING FOR SYSTEM OPERATIONS

The development of an operational transportation system proceeded in 1987 through work in two major areas--evaluating technical requirements for equipment and services, and reviewing options for managing actual shipping operations. Efforts to define the technical configuration of the system focused on the functions of a cask maintenance facility and conducting a study of current cask fleet operations. In addition, OCRWM surveyed current shipments of nuclear waste (identifying modes of transport and rates charged for shipping services), and initiated the drafting of documents on the requirements and description of an operational nuclear waste transport system. A survey of individuals and existing companies having transportation expertise and/or capabilities was also completed.

A study was initiated in 1987 to define viable management options. Factors being reviewed as part of the study included potential management configurations, i.e., total private operation, a combination of private and Federal operation, and total Federal operation; assignment of specific areas of responsibility, and industry's willingness and capability to provide efficient management services.

VI

SYSTEMS INTEGRATION AND ENGINEERING DEVELOPMENT

The objective of systems integration and engineering development is to ensure that the component elements of the radioactive waste management system are developed as integral parts of a total system that is safe, efficient and cost-effective. The major components of this system are the processes, equipment and facilities to be used for handling, packaging, storing, transporting and disposing of spent nuclear fuel and high-level radioactive waste. Each of these elements is, individually, a complex system. Yet, each component must function as an integrated part of a total system that is subject to severe technical and institutional constraints.

This chapter reports on the progress made during 1987 in both systems integration and in engineering development demonstrating the capability of prototypical equipment.

SYSTEMS INTEGRATION

Using a recently developed, postulated reference description of the transportation system, OCRWM estimated the cost of alternative concepts for reducing the radiation dose that might be received by transportation workers and the public. The ALARA (as low as reasonably achievable) concept was applied in this systematic review of methods for reducing the potential for transportation-related radiation exposure at a reasonable cost.

Progress was made in the continuing analysis and characterization of spent fuel and high-level waste to be accepted. A comprehensive, computerized data base of the detailed physical, thermal and radiological characteristics of spent fuel and high-level waste was established for eventual use by various program elements in planning, design and analysis.

OCRWM continued to analyze technical options chosen from competitively selected concepts for waste packaging and handling. The concepts under study included the use of a common canister for spent fuel and transportable storage (dual-purpose) casks, which have potential for improving operational efficiency and reducing costs. Results of these system studies were factored into transportation system and repository development activities.

Development of systems analysis capabilities received significant emphasis during 1987. These capabilities enable

OCRWM to successfully conduct the assessment and trade-off studies of alternative design options and operational procedures. This, in turn, will lead to an improved and optimized system design and corresponding operational procedures that will result in a safe overall system at minimum practical cost.

As part of the systems engineering process, a comprehensive draft that substantially upgraded the *Waste Management System Requirements and Description Document* (SRD) was completed. The SRD establishes the reference system which will serve as the basis for refinement and development of the waste management system.

OCRWM also initiated test visits to reactor sites during 1987 to obtain the latest information on site and facility characteristics that should be considered in planning for the design and operation of the waste management system.

ENGINEERING DEVELOPMENT

Equipment for spent fuel consolidation was designed, fabricated and installed in May 1987 at the Idaho National Engineering Laboratory. This equipment was used to consolidate spent fuel outside the storage pool (i.e., not under water). By the end of September 1987, 48 assemblies (24 metric tons of uranium) had been successfully consolidated. This was the first-ever demonstration, anywhere, of the dry rod consolidation process at a significant level, and it provided a wealth of information on the technology, equipment design and operations that had previously been based on inference. The technical data provided support for the development and demonstration of prototypical dry rod consolidation equipment that is currently in the design phase. Three awards were made in 1987 to carry this program through phase II, final design. This effort was progressing rapidly, and a final selection of a contractor(s) for phase III, fabrication and cold checkout, was expected to be made in 1988.

The prototypical rod consolidation equipment is being developed under an engineering development program initiated in 1985. Plans were prepared, and a four-phase competitive solicitation to industry resulted in an award, in August

1986, of five contracts to produce a phase I preliminary design. During phase IV, scheduled for completion by the end of calendar year 1989, the selected equipment will be qualified with actual spent fuel in a demonstration of its

capability to support the current annual target throughput rate of up to 3,000 metric tons of uranium per year, when used at the repository or an MRS facility.

VII

SPENT FUEL STORAGE

Significant progress was made during 1987 in advancing the technology for spent fuel storage. The objectives of Section 218 of the NWPAA were being achieved through cooperative demonstrations of spent fuel storage and rod consolidation. Storage technology also benefited from participation in international activities, and cooperation in providing technical assistance to nonnuclear weapon states was continued under Section 223 of the NWPAA. Finally, plans for a Federal interim storage program were updated as required under Subtitle B, Title 1, of the Act.

DEMONSTRATIONS OF SPENT FUEL STORAGE

Section 218 of the NWPAA provides for OCRWM participation with the private sector in cooperative demonstration projects to advance the technology for spent fuel storage. Dry storage in drywells, silos and vaults shows considerable promise as a cost-effective means of providing additional capacity for spent fuel storage at nuclear power plants. OCRWM was active in cooperative demonstration projects with two utilities--the Carolina Power and Light Company (CP&L) and Virginia Power (VP)--as a result of agreements signed in 1984.

The CP&L project is a licensed demonstration of dry storage in horizontal modular concrete silos. A license was obtained by CP&L from the NRC in 1986 to construct and operate an independent spent fuel storage installation (ISFSI) at its H. B. Robinson plant. The first phase of the ISFSI has been completed, and the casks were ready for the loading of spent fuel that was expected to be completed in early 1988.

The VP project resulted from a 1984 agreement between OCRWM and VP for cooperative demonstrations of dry storage of spent fuel in several types of casks. This cooperative effort involves licensed dry storage demonstrations at the Surry plant in Virginia and unlicensed dry storage demonstrations at the Idaho National Engineering Laboratory

(INEL). The construction of the initial units of the ISFSI at the Surry plant was completed in 1986 following the issuance of a license for the facility by NRC. During 1987, VP completed the loading of 84 spent fuel assemblies into four casks that are now in storage (figure 7-1).

The dry storage demonstration at INEL involved 69 spent fuel assemblies from the Surry plant, shipped three at a time in NRC-certified casks during 1985 and 1986. After arrival at INEL, these assemblies were transferred to three different types of dry storage casks (GNS CASTOR-V/21, Transnuclear TN-24 and Westinghouse MC-10). One such transfer is shown in figure 7-3. The filled storage casks have been tested under various cover gas and vacuum environments, and in both horizontal and vertical configurations. Long-term monitoring will continue for all three casks. In 1987, 36 of the 69 assemblies, together with 12 Turkey Point assemblies from the DOE CLIMAX experiment, were consolidated and replaced in the TN-24 dry storage cask for a hot demonstration of the dry storage of consolidated spent fuel in metallic casks. This cask was placed on a concrete storage pad at INEL to be tested in the same manner as the casks filled with intact assemblies.

The tests and demonstrations performed in cooperation with the utilities, and supplemented by OCRWM-sponsored generic research and development, provided information for the NRC generic rulemaking expected in 1988.

Also, an application for certification of two dual-purpose casks, submitted to the NRC on behalf of OCRWM by Transnuclear, Inc., was pending during 1987. The two casks are designed to be used for both rail transportation and storage. These casks will be used in a dual-purpose demonstration that includes shipment from West Valley, New York, of spent fuel from both boiling water and pressurized water reactors for long-term dry storage in the same cask at INEL. These demonstrations are intended to provide data and information for the eventual certification of qualified dual-purpose casks. The certification process continued through 1987, and outstanding issues were near resolution. Certification of compliance was expected to be issued by NRC in 1988.

FIGURE 7-1
EMPLACING THIRD STORAGE CASK AT VIRGINIA POWER'S
INDEPENDENT SPENT FUEL STORAGE FACILITY

ROD CONSOLIDATION

Rod consolidation involves the dismantling of a spent fuel assembly, separating the fuel rods from the hardware that holds them together, rearranging the rods into a more compact array, and separately storing the nonfuel-bearing hardware. This procedure is a cost-effective method for significantly increasing the capacity of some reactor storage pools and for reducing the cost of providing dry storage at reactor sites. Consolidation also has the potential to provide significant cost savings in spent fuel transportation and emplacement in a repository.

In August 1986, OCRWM entered into a cooperative agreement for a licensed demonstration of spent fuel consolidation at the Millstone 2 reactor near Waterford, Connecticut. In September 1987, the Northeast Utilities Services Company (NUSCO) successfully completed its in-pool consolidation demonstration at Millstone 2. The equipment was designed and fabricated by Combustion Engineering and may be used for additional license applications at the Baltimore Gas and Electric Company's Calvert Cliffs plant and Virginia Power's Surry plant. These activities will be carried out solely by the utilities.

In the first quarter of FY 1986, opportunities for early demonstration of in-pool rod consolidation became available at West Valley, New York, and the Battelle Columbus Laboratories with fuel owned by the Rochester Gas and Electric Company (RG&E) from the Ginna reactor. Following consolidation, the fuel was shipped back to the Ginna reactor, where RG&E had obtained an NRC modification to its operating license to permit the storage of consolidated fuel in the pool at the reactor site. At West Valley, assemblies were consolidated successfully, but with some difficulty, using Nuclear Assurance Corporation equipment, and consolidated fuel was then shipped back to the Ginna reactor. At the Battelle pool in West Jefferson, Ohio, five additional Ginna assemblies were in the process of consolidation at year's end. The equipment being used there was designed, fabricated, and operated by the U.S. Tool and Die Company. OCRWM provided the receiving and handling facilities, whereas RG&E and the equipment manufacturers provided all funding for the consolidation equipment and operations. The consolidation activities were completed in 1987 and the fuel was returned to RG&E.

TECHNOLOGY FOR DRY STORAGE

The first licensed facility for dry storage of spent fuel at a reactor site became operational in the United States during 1987. Dry storage provides an efficient method for expanding at-reactor storage capacity and could also be used in conjunction with a receiving and handling facility at a monitored retrievable storage site or a geologic repository. The international exchange of information on the behavior of

spent fuel in dry storage did much to facilitate implementation of dry storage techniques in the United States.

The international workshop, "Chemical Reactivity of Oxide Fuel and Fission Product Release," held in Berkeley, England, by the Central Electricity Generating Board, provided a forum for comparing the results of experimental testing conducted by OCRWM with those of other countries. Results reported by France and the United Kingdom, for example, complemented the U.S. experiments on the long-term dry storage of spent fuel and provided information on technical requirements for the technology.

The United States is an official participant in IAEA's BEFAST (Behavior of Spent Fuel Assemblies in Extended Storage) program. The BEFAST-I working group published its final report summarizing the first 5 years of the project. BEFAST-II will address topics of continuing interest to U.S. utilities and Federal programs, including wet and dry storage and spent fuel consolidation. Because storage needs remain a major worldwide consideration, the IAEA elected to extend the BEFAST-II program to 1991. A working group of IAEA consultants finalized a report on the world survey of wet and dry storage experience and expected to release the report toward the end of 1987. IAEA also published the proceedings of its Spent Fuel Storage Symposium held in Leningrad, USSR, in 1986.

Other OCRWM foreign information exchanges on dry storage included briefings in the Republic of Korea, Taiwan and the FRG on the U.S. dry storage cask testing program.

FEDERAL INTERIM STORAGE

Section 131 of the NWPA specifies that the owners and operators of civilian nuclear power reactors have the primary responsibility for interim storage of their spent fuel; it also directs the Federal Government to encourage the effective use and expansion of onsite storage. In addition, Section 136 of the Act authorizes the Secretary of Energy to offer to enter into contracts to provide Federal interim storage for utilities that, despite the diligent pursuit of licensed alternatives to Federal interim storage, cannot provide adequate spent fuel storage capacity and whose continued orderly operation is thereby threatened. Eligibility for such storage is to be determined by the NRC in response to an application by the owner of the reactor. The total capacity of Federal interim storage cannot exceed 1,900 metric tons of uranium. The authority to enter into contracts for Federal interim storage expires on January 1, 1990.

Current spent fuel inventories and storage projections indicate little, if any, immediate demand for Federal interim storage. Accordingly, OCRWM has not submitted a budget request to Congress to activate the Interim Storage Fund established under Section 136 of the Act. All costs of any Federal interim storage must be paid by the user utilities. Therefore, it would not be appropriate to request authority to borrow funds and implement costly storage preparation

activities before the submittal of an application to the Commission and the Commission's determination of eligibility.

As required by Section 136(a)(2) of the Act, fees to be charged for Federal interim storage for calendar year 1987 were published in the *Federal Register* on November 25, 1986. Fees will be assessed only if contracts for storage are actually executed with utility companies. Also, as required by Section 135(f) of the Act, OCRWM prepared and sub-

mitted to Congress the fourth annual deployment plan for Federal interim storage. This plan included updated information on shipping capabilities, data on spent fuel that may require Federal interim storage, and a generic outline of the activities that would be required to develop the capacity for such storage. The fifth update of both the *Federal Register* notice and the report to Congress were issued in December 1987.

VIII

QUALITY ASSURANCE AND SAFETY

All levels of OCRWM management share a commitment to quality assurance and safety in the conduct of program activities. The demonstration and documentation of strict compliance with legislative and regulatory requirements and prescribed quality and safety standards are essential to securing authorization from the NRC to construct and obtaining a license to operate radioactive waste management equipment and facilities. The quality assurance (QA) program and safety plans developed under the Director's managing-for-quality guidance encompass every activity of the program.

QUALITY ASSURANCE

During 1987, QA policies were redefined in response to the managing-for-quality guidance delineated by OCRWM's Director. A revision of OCRWM's *Quality Assurance Management Policies and Requirements* document was prepared to establish a QA management structure, define the QA classification system, and standardize program-wide QA procedures, controls and performance requirements for all participating organizations.

QA management operates at each of the four basic organizational levels. The Director (level 1) provides overall policy guidance, assisted by a full-time OCRWM Quality Assurance Manager who is responsible for policy implementation and overview. Level 2 is the headquarters program element, level 3 is the project office, and level 4 is the project contractor. Qualified QA managers and staff are employed at each level with direct lines of communication maintained between the levels. QA plans, policies and procedural controls at each lower level are required to be in compliance with those at the higher levels.

A three-level QA classification system was adopted to facilitate the decision-making process for selecting and applying appropriate QA requirements and procedures. The system is based on the relative importance of items and activities to radiological safety, waste isolation, NRC licensing and regulatory compliance. Items and activities directly related to radiological safety and the NRC licensing process are classified as quality level 1, which demands the highest quality standards. Quality level 2 imposes somewhat fewer QA requirements on systems and activities whose failure or degradation could adversely affect the performance of the

waste management system or its components but would not impact on safety and waste isolation. Quality level 3 establishes standards of good practice within a formal QA program for administrative and other technical activities. Revised QA policies and improved procedural controls were implemented at all management levels during 1987. QA management assessments were performed at the program element, project office, and major integrating contractor levels to determine QA program adequacy and effectiveness.

Audits were performed of the QA programs of each project. Representatives of the NRC, States and Indian Tribes participated as observers in QA audits of first repository project contractors.

Representatives of the States, Indian Tribes and the NRC were also invited to participate in the quarterly meetings of OCRWM's Quality Assurance Coordinating Group to discuss and resolve QA issues. Among the matters raised by these participants were their need for more information, QA training and greater participation. Accordingly, provisions were made for the State, Tribal and NRC representatives to participate in the OCRWM lead auditor training course.

Progress was made in developing procedural controls for qualifying site characterization data and analyses in response to NRC's draft generic technical position. Particular attention was given to the qualification of data collected and analyses performed prior to the implementation of formal QA programs. Progress was also made in developing procedural controls for the computer codes to be used for site characterization analyses.

SAFETY

The OCRWM Safety Program was initiated in accordance with the *OCRWM Safety Plan* issued in December 1986. This program, applicable to all individuals and organizational elements, sets forth generic management policies and requirements for ensuring the safety of both the public and of the personnel associated with the program. The OCRWM safety philosophy is summarized in the plan as follows: (1) safety is the personal responsibility of every participant in the program, (2) safety is a management responsibility at all levels of the program, (3) workers are to be trained to work safely and to understand that it is to their advantage to work safely, (4) program activities are to be

conducted in a manner that limits the risk to workers and members of the general public of injuries, illnesses, or radiation exposures consistent with governing standards, regula-

tions and program objectives, and (5) all work-related injuries, illnesses, or radiation exposures are to be reported immediately to management.

IX

PROGRAM MANAGEMENT

This chapter reports on program management accomplishments and activities during 1987 and provides a summary description of the management organization.

process of determining whether the preliminary refunds based on interim guidance required adjustments to conform with the final rule.

FINANCIAL MANAGEMENT

OCRWM's primary financial responsibility is the management of the Nuclear Waste Fund (NWF) established by the NWPA to ensure that the Government recovers from the owners and generators of the radioactive waste the full cost of the disposal services it provides. In addition to preparing, submitting and executing budgets, management of the NWF includes establishing fees, handling investments, accounting for revenues and expenditures and conducting annual evaluations of fee adequacy.

Nuclear Waste Fund Revenues

During Fiscal Year 1987, the ongoing fee of 1 mill per kilowatt-hour (kWh) on electricity generated by nuclear power plants produced \$434.8 million in revenues, while \$6.0 million was received from the one-time fee for spent fuel generated prior to April 7, 1983. As of September 30, 1987, the face value of the NWF's long-term U.S. Treasury securities was \$1.51 billion. For the fiscal year ended on September 30, 1987, interest earned on the Fund's investments totaled \$131.2 million. Audited financial statements of the NWF, in the next chapter, contain further information on Fund revenues and expenditures.

On December 6, 1985, the U.S. Court of Appeals for the District of Columbia, in *Wisconsin Electric Power Company v. Department of Energy*, ruled that the ongoing fee of 1.0 mill per kWh, specified in the Standard Disposal Contract, should be based on net (rather than gross) generation of electricity. During 1986, based on interim guidance, OCRWM completed preliminary refunds totaling about \$40 million. On November 7, 1986, a Notice of Proposed Rule-making, to implement the Court's decision, was published in the *Federal Register*. After carefully reviewing written comments on the proposed rule received from 17 organizations representing nuclear power companies, OCRWM issued a final rule to formally amend the Standard Disposal Contract on September 18, 1987. Subsequently, OCRWM began the

Total System Life Cycle Cost

A comprehensive analysis of the total cost of the radioactive waste management system over its complete life cycle is performed each year as part of the required annual evaluation of the adequacy of the disposal fee to cover those costs. The *Analysis of the Total System Life Cycle Cost for the Civilian Radioactive Waste Management Program* was published in June 1987. This analysis was consistent with the program strategy and schedules in the *OCRWM Mission Plan Amendment* submitted to Congress the same month. Alternative estimates of total cost were presented for systems with the two repositories in different combinations of host media and with or without a monitored retrievable storage (MRS) facility.

Reference case estimates of the total cost of the waste management system with an MRS ranged from \$32.1 to \$38.2 billion in constant 1986 dollars. The net contribution of the MRS to these costs was calculated at \$1.5 to \$1.6 billion. The 1987 estimates of total costs for the reference cases are \$3.8 to \$5.4 billion higher than those developed in the 1986 analysis. Nearly all of this increase is due to the higher cost of the larger effort required for development and evaluation as described in the 1987 Mission Plan Amendment.

Fee Adequacy Analysis

The fifth annual evaluation of the adequacy of the 1 mill per kWh fee for nuclear waste disposal was submitted to Congress in June 1987. The report, *Nuclear Waste Fund Fee Adequacy: an Assessment*, presented a summary analysis of projected revenues and total system life cycle cost estimates based on assumptions in the 1987 Mission Plan Amendment. This report also incorporated the long-term impact of the costs and fees associated with the disposal of defense high-level wastes. The principal recommendation derived from the analysis was that the ongoing disposal fee should remain at 1 mill per kWh for 1987. However, a number of

alternative cases were analyzed to reflect the uncertainty inherent in such long-term projections. Depending upon the assumptions made about inflation, cost projections and interest rates, the report contained some scenarios in which a fee increase and/or future indexing of the fee would be necessary to ensure full recovery of all costs.

Fees for Defense Waste

The calculation of an appropriate fee to be charged for the disposal of defense high-level waste (DHLW) was a major management activity during 1987. On December 2, 1986, OCRWM published a Notice of Inquiry in the *Federal Register* (51FR43566) soliciting public comment on the methodology for calculating the fees to be paid by DOE into the Nuclear Waste Fund for the disposal of DHLW. After consideration of the comments received, a notice, "Civilian Radioactive Waste Management: Calculating Nuclear Waste Fund Disposal Fees for Department of Energy Defense Programs," was published in the *Federal Register* (52FR31508) on August 20, 1987. This notice identified and explained the methodology to be used in calculating the DHLW share of disposal costs. An example of the application of the methodology was included in the notice. It used the Energy Information Administration's 1986 projections of civilian spent fuel quantities and current estimates of total system life cycle costs to calculate a total DHLW cost share, exclusive of interest, of between \$5.17 billion and \$6.1 billion. However, the DHLW fee will be reviewed annually as part of the required fee adequacy evaluation, and payments are subject to the Congressional appropriation process.

PROGRAM MANAGEMENT SYSTEM

The OCRWM program management system was in place and operating throughout 1987. At the same time, the performance of the system was being evaluated on a continuing basis, and a number of improvements, revisions and additions were initiated or completed during the year. A significant effort was undertaken during 1987 to reinforce and enhance the managing-for-quality concept throughout OCRWM. Under guidance issued by the Director, quality performance standards were being developed for all activities, and for all management levels, and requirements for formal evaluations of the quality of performance were instituted. Other improvements or additions during 1987 included the reorganization and consolidation of all information resource management activities, development and revision of program baselines, publication of summary program management information and preparation of the first *Annual Capacity Report* required by the Standard Contract for the Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste.

Information Management

A major requirement for OCRWM during the siting and licensing of a geologic repository, and for other components of the waste management system, is the collection, storage, analysis, retrieval and dissemination of large amounts of data and information. For example, the ready retrieval of voluminous reports and the data from extensive scientific and technical investigations will be required to prepare and defend the license application for the geologic repository. Other related requirements include automated systems for tracking project costs and schedules, estimating total system life cycle costs, documenting the issues raised and their resolution, and tracking commitments made by the office. Correspondence and other records are needed to provide evidence of compliance with the NWPA and with NRC and EPA regulations and safety standards. Integrated, automated information systems are also needed to help manage program activities and resources.

In June 1987, OCRWM established an Information Resources Management Division to consolidate planning, integrate information systems development and deal more effectively with information management issues. Development of a long-range information resources management plan was under way to serve as the overall information systems planning vehicle throughout OCRWM. The plan gives OCRWM a structured development tool for organizing and controlling information management requirements and contains guidance, system descriptions, change control procedures and system validation standards. This plan was expected to be finalized in FY 1988 and updated at least semiannually thereafter.

Although it is difficult to overstate the importance of an effective information management system, the prodigious information requirements of the repository licensing process must be the predominant concern in managing OCRWM's information resources. The NRC has specified requirements for a state-of-the-art automated information storage and retrieval system to support the licensing procedure if it is to be accomplished within the 3 year period mandated by the NWPA. Therefore, emphasis in 1987 was placed on coordination with the project offices in initiating the development of a licensing support system (LSS) and preparing a strategy for securing its implementation. Following a competitive solicitation, a contract was awarded in September 1987 for support in designing the LSS. However, implementation of a common LSS model at OCRWM headquarters and project offices was proceeding on a concurrent basis to avoid the substantial costs of developing data base management systems at each location, to minimize the duplication of systems, and to promote improved data management practices. As a result of initial development efforts, a computer-indexed records management subsystem became operational in 1987.

Program Cost and Schedule Baselines

The operation of OCRWM's program management system includes the continuing process of reviewing and revising the series of controlled documents that define the system. During 1987, in conjunction with developing and issuing the Mission Plan Amendment, substantive revisions of both the *Program Reference Schedule Baseline* (PRSB) and the draft *Program Reference Cost Baseline* (PRCB) were required.

The PRSB was first issued in July 1986. The purpose of the PRSB is to establish and control the major milestone schedules for the entire waste management program. It is supported by a series of lower-level schedule documents and logic networks that divide each of the major milestones into a series of more detailed tasks. The PRSB was extensively revised in conjunction with the preparation of the Mission Plan Amendment. The revised PRSB was approved through the formal change control process and reissued in July 1987.

The purpose of the PRCB is to establish and control the costs attached to achieving the major program milestones in the PRSB. A draft PRCB was first completed in October 1986. This document was based on the projected costs stated in OCRWM's 1986 Total System Life Cycle Cost Analysis, the Mission Plan and the July 1986 PRSB. In accordance with the programmatic changes announced in the 1987 Mission Plan Amendment, a revised draft of the PRCB was completed in August 1987 to be consistent with the PRSB. At the end of FY 1987, the revised draft was being reviewed by OCRWM'S change control board. The draft baselined the cost estimates for the first repository program through the submission of license application (January 1995), and transportation activities through the completion of the reactor cask prototype testing.

Program Management Information Report

The *Program Management System Manual* calls for the regular issuance of a series of reports generated by a program management information system (PMIS). The objective is to collect, summarize and issue key, up-to-date data on program status and performance in a format that is useful to OCRWM management. The PMIS was completed in 1987, and four issues of a new *Quarterly Report on Program Cost and Schedule* were published during the year. These quarterly reports provided a summary of cost and

schedule performance for the overall first repository activity as well as for each of the three site-specific projects and the other major elements of the program. The reports also provide the status of Nuclear Waste Fund revenues and disbursements and other useful financial data.

Annual Capacity Report

The first *Annual Capacity Report* required by the Standard Disposal Contract was published in June 1987. This report provides, for planning purposes, the projected annual receiving capacity of the waste management system and a ranking for annual acceptance of spent fuel during the first 10 years of facility operations. The report is designed to provide a mechanism for communicating to the owners and generators of spent fuel and high-level radioactive waste how the Department intends to discharge its responsibilities under the contract.

MANAGEMENT ORGANIZATION

The only significant change in the OCRWM organizational structure during FY 1987 was the addition of an Information Resources Management Division under the Associate Director for Resource Management. The headquarters organization, depicted in figure 9-1, consisted of four major components reporting to the Director.

Office of Geologic Repositories

In 1987, the Associate Director for Geologic Repositories had primary responsibility for the screening and characterization of potential geologic repository sites; preliminary and final site selection; the design and construction of exploratory shafts; the evaluation of regulatory requirements; the design, development, licensing, construction, operation and decommissioning of mined geologic repositories; the design, development, siting, licensing, construction and operation of a test-and-evaluation facility (TEF); the management of RD&D activities for both geologic repositories and other options for permanent disposal; and the management and coordination of safety, quality assurance and standards activities for the geologic repository program. In carrying out these functions, the Associate Director interacted, developed agreements and coordinated activities with State and local governments, Indian Tribal councils, other Federal agencies and OCRWM project offices.

FIGURE 9-1
OFFICE OF CIVILIAN RADIOACTIVE
WASTE MANAGEMENT

Office of Storage and Transportation Systems

During 1987, the Associate Director for Storage and Transportation Systems had primary responsibility for the implementation of Subtitles B and C, Title I, and Sections 218 and 220, Title II, of the NWPA, and other activities related to the interim or long-term storage of SNF and HLW, including waste packaging, handling and transportation technologies. Other responsibilities included planning for the provision of Federal interim storage facilities and the preparation of a Congressionally mandated proposal for the construction of one or more MRS facilities, waste management system integration studies, SNF storage research and development, international cooperation programs in SNF technology, and the development of transportation systems. The Associate Director also encouraged and expedited, through a joint demonstration program and associated R&D efforts, at-reactor storage of SNF, and assisted in licensing various spent fuel storage options.

Office of Resource Management

In 1987, the Associate Director for Resource Management was responsible for the development, implementation and maintenance of an OCRWM-wide program management system (PMS), including the development and maintenance of the program's schedule and cost baselines, the *Project Decision Schedule* and a program management information system (PMIS), and for the proper management and administration of the Nuclear Waste Fund and the Interim Storage Fund. Resource management responsibilities also included activities related to fee collection and payment; the performance of an annual review to determine fee adequacy; the management of contracts for disposal and interim storage services; the preparation and execution of OCRWM budgets, fund control and accounting activities; the preparation of special management studies; the Annual Report to Congress; the Annual Capacity Report; and the provision of management support services to OCRWM. The Associate Director was also responsible for planning, designing, devel-

oping and managing OCRWM's information systems and for coordinating automatic data processing support throughout the program.

Office of Policy and Outreach

During 1987, the Director of the Office of Policy and Outreach (OPO) provided staff support to the Director, OCRWM, and the Associate Directors in program-level policy formulation and communication, as well as in the development, coordination and review of external institutional activities, including media affairs and Congressional affairs. The Director, OPO, was responsible for program-level quality assurance, safety and environmental activities, including the development of program-level quality assurance plans and documents, and the application of environmental, safety and health policies and standards in OCRWM. In addition, the Director coordinated international energy policy relating to radioactive waste management and acted as an integrator of national and international policy relating to radioactive waste issues.

Operations Offices and Project Offices

Major programmatic activity assignments to DOE operations and project offices during 1987 are shown in figure 9-2.

Three operations offices had assignments for major elements of the transportation system. The Oak Ridge Operations Office administered the operational aspects of the transportation system, the Idaho Operations Office managed the development of transportation casks, and the Chicago Operations Office was responsible for institutional, integrative, economic and environmental issues. An OCRWM project office assigned to the Chicago Operations Office managed repository technology development. Project offices in Hereford, Texas (assigned to the Chicago Operations Office); Las Vegas, Nevada; and Richland, Washington, were each responsible for site characterization studies at one of the three candidate sites for the first repository.

**Figure 9-2. DOE Operations Offices
responsible for major projects in FY 1987**

NOTES:

1. The Richland Operations Office administered, without a Project Office, studies related to monitored retrievable storage (MRS).
2. Two operations offices administered spent fuel activities. Richland administered storage technology. Idaho administered dual purpose cask development.
3. No Project Office had been established for subseabed disposal. The Albuquerque Operations Office administered the prime contract for this activity.
4. Three operations offices administered transportation activities. Oak Ridge administered operation of transportation systems. Idaho administered transportation cask development. Chicago administered institutional, integration, economic and environmental issues.

STAFFING THE ORGANIZATION

Continued progress was made during 1987 toward achieving staffing levels considered optimal for program direction, technical management, and support activities at OCRWM and the project offices. In FY 1987, OCRWM and the project offices used 310 full-time equivalent (FTE) staff years, of which 307 FTEs were charged to the Nuclear Waste Fund, and 3 were funded from the Civilian Radioac-

tive Waste R&D account. The total included 18 FTEs in other DOE organizations that were charged to the Nuclear Waste Fund for work in support of OCRWM activities.

Given competition with compensation levels in the private sector, OCRWM continued to experience difficulties in attracting professionals who meet specialized skill and experience criteria to technical positions. However, it was successful in establishing and filling positions in the newly created Information Resources Management Division and in increasing overall staffing from 291 FTEs in 1986 to the 310 FTEs used in 1987.

 

X

FINANCIAL STATEMENTS

The NWPA authorizes program expenditures for civilian radioactive waste management under three accounts. Two of these--the Interim Storage Fund (Section 136) and the Nuclear Waste Fund (Section 302)--are special funds established in the U.S. Treasury. The third, the Civilian Radioactive Waste Research and Development (R&D) account, provides for expenditures from the General Fund on taxpayer-supported programs authorized under Sections 151, 218, 222, and 223 of the NWPA. There has been no request for Federal interim storage services. Thus, that fund has not been activated, and there are no plans to submit a budget request for that purpose. This chapter presents financial statements for the two active accounts, the Nuclear Waste Fund and the Civilian Radioactive Waste R&D account.

NUCLEAR WASTE FUND

OCRWM secured the services of a certified public accounting firm to provide an independent examination of the Fund financial statements for those who finance the waste management program through the payment of user fees into the Nuclear Waste Fund. This section contains the report of that firm, Peat Marwick Main & Co., for fiscal years 1987 and 1986, and cumulative amounts from the inception of the Nuclear Waste Fund (January 7, 1983) through September 30, 1987.

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

FINANCIAL STATEMENTS

SEPTEMBER 30, 1987 AND 1986

(With Auditors' Report Thereon)**

Peat Marwick

Certified Public Accountants

Peat Marwick Main & Co.

2001 M. Street, N.W.

Washington, DC 20036

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

We have examined the balance sheets of the Nuclear Waste Fund as of September 30, 1987 and 1986 and the related statements of operations and changes in financial position for the years then ended and cumulatively from inception (January 7, 1983) to September 30, 1987. Our examinations were made in accordance with generally accepted auditing standards and the standards for financial and compliance audits contained in Standards for Audit of Governmental Organizations, Programs, Activities and Functions (1981 Revision) issued by the U.S. General Accounting Office and, accordingly, included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the aforementioned financial statements present fairly the financial position of the Nuclear Waste Fund as of September 30, 1987 and 1986, and the results of its operations and the changes in its financial position for the periods indicated above, in conformity with generally accepted accounting principles applied on a consistent basis.

Peat Marwick Main & Co.

December 15, 1987 (except as to note 8a which
is as of December 22, 1987 and note 8b which
is as of March 16, 1988)

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

Balance Sheets

**September 30, 1987 and 1986
(Dollars in thousands)**

<u>Assets</u>	<u>1987</u>	<u>1986</u>
Cash	\$ 296	500
U.S. Treasury securities (note 2)	1,688,337	1,557,849
Receivables from utilities (note 3):		
One-time spent fuel fees	904,479	906,224
KWH fees	108,100	100,600
Interest on one-time spent fuel fees	373,801	305,012
	<u>1,386,380</u>	<u>1,311,836</u>
Accrued interest on U.S. Treasury securities (note 2)	56,219	43,950
Other receivables and advances	1,701	3,752
Capital equipment, less accumulated depreciation of \$9,882 and \$6,243	<u>32,386</u>	<u>27,732</u>
	<u>\$3,165,319</u>	<u>2,945,619</u>
<u>Liabilities</u>		
Accounts payable and accrued expenses	65,162	45,903
Deferred revenue	<u>3,100,157</u>	<u>2,899,716</u>
	<u>\$3,165,319</u>	<u>2,945,619</u>

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, 1987 and 1986
and cumulatively from January 7, 1983, date of inception
to September 30, 1987
(Dollars in thousands)**

	<u>1987</u>	<u>1986</u>	<u>Cumulative</u>
Revenue:			
Fees (note 3):			
One-time spent fuel fees	\$ -	(506)	2,334,973
KWH fees	442,359	361,087	1,675,625
Interest:			
One-time spent fuel fees (note 3)	73,071	80,764	382,275
U.S. Treasury securities	131,130	133,932	297,807
Gain on sale of U.S. Treasury securities	<u>16,641</u>	<u>11,978</u>	<u>28,619</u>
	663,201	587,255	4,719,299
Less amount deferred	<u>(200,441)</u>	<u>(191,308)</u>	<u>(3,100,157)</u>
	<u>462,760</u>	<u>395,947</u>	<u>1,619,142</u>
Expenses:			
First repository	360,914	291,746	1,229,617
Second repository	25,886	25,963	99,495
Monitored retrievable storage	1,394	5,938	36,825
Program management	45,510	60,533	196,226
Transportation and systems integration	29,056	11,767	46,679
Interest	<u>-</u>	<u>-</u>	<u>10,300</u>
	<u>462,760</u>	<u>395,947</u>	<u>1,619,142</u>
Excess of revenue over expenses	<u>\$ -</u>	<u>-</u>	<u>-</u>

See accompanying notes to financial statements.

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

Statements of Changes in Financial Position

**Years ended September 30, 1987 and 1986
and cumulatively from January 7, 1983, date of inception
to September 30, 1987
(Dollars in thousands)**

	<u>1987</u>	<u>1986</u>	<u>Cumulative</u>
Cash provided from:			
Revenue received	\$613,444	536,995	3,361,365
Expenses paid	(436,410)	(372,349)	(1,532,983)
Cash provided from operations	177,034	164,646	1,828,382
Borrowings from U.S. Treasury	-	-	264,964
Proceeds from sales and maturities of U.S. Treasury securities	640,371	854,770	1,695,719
Borrowings from DOE for capital equipment	-	-	9,739
Total cash provided	<u>817,405</u>	<u>1,019,416</u>	<u>3,798,804</u>
Cash used for:			
Capital equipment	11,745	10,743	53,383
Repayment of borrowings from DOE for capital equipment	-	-	9,739
Repayment of borrowings from U.S. Treasury	-	-	264,964
Purchase of U.S. Treasury securities	811,162	1,004,825	3,467,516
Purchase of accrued interest on U.S. Treasury securities	(3,247)	2,107	1,205
Advances (reduction in)	(2,051)	1,964	1,701
Total cash used	<u>817,609</u>	<u>1,019,639</u>	<u>3,798,508</u>
Increase (decrease) in cash	<u>\$ (204)</u>	<u>(223)</u>	<u>296</u>

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

Statements of Changes in Financial Position, Continued

	<u>1987</u>	<u>1986</u>	<u>Cumulative</u>
Changes in cash:			
Charges not affecting cash:			
Depreciation	\$ (4,318)	(3,748)	(12,813)
Amortization of premiums and accretion of discounts on U.S. Treasury securities	(40,303)	(35,313)	(83,460)
Net book value of dispositions and charge-offs of capital equipment	<u>(2,773)</u>	<u>(4,762)</u>	<u>(8,184)</u>
	<u>(47,394)</u>	<u>(43,823)</u>	<u>(104,457)</u>
Increase (decrease) in assets excluding cash:			
U.S. Treasury securities	170,791	150,055	1,771,797
Receivables	84,762	89,644	1,444,300
Capital equipment	<u>11,745</u>	<u>10,743</u>	<u>53,383</u>
	<u>267,298</u>	<u>250,442</u>	<u>3,269,480</u>
Increase (decrease) in liabilities:			
Accounts payable and accrued expenses	19,259	15,088	65,162
Deferred revenue	<u>200,441</u>	<u>191,308</u>	<u>3,100,157</u>
	<u>219,700</u>	<u>206,396</u>	<u>3,165,319</u>
Increase (decrease) in cash	<u>\$ (204)</u>	<u>(223)</u>	<u>296</u>

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)

September 30, 1987 and 1986

(1) ORGANIZATION AND SIGNIFICANT ACCOUNTING POLICIES

(a) Organization

The Nuclear Waste Policy Act (the Act) was signed into law on January 7, 1983. The Act establishes a framework for the financing, siting, licensing, operating and decommissioning of one or more permanent repositories for the Nation's spent nuclear fuel and high-level radioactive waste. In addition, the Act 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 Department of Energy (DOE).

Committing the federal government to study monitored retrievable storage (MRS) concurrent with mined geologic repositories.

Provision for contracts with the owners and generators of nuclear power plants and other waste producing facilities for DOE initial acceptance of spent nuclear fuel no later than January 31, 1998 in return for payment of specified fees to the NWF.

A requirement that consideration be given to the disposal of waste resulting from atomic energy defense activities (Defense waste) through use of the civilian repositories. 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. In August 1987, DOE published in the Federal Register, a proposed methodology for sharing costs between the generators of commercial and defense wastes. An agreement specifying fees and payment schedules has not been finalized.

Research was conducted relative to tuff, bedded salt, domed salt and basalt geological media to determine potential candidate sites for site characterization for a first repository.

Under the Act, the NWF can perform only non-generic research. Costs incurred for this non-generic research relative to repository media and general and administrative costs are expensed as incurred.

On May 27, 1986, the Secretary of Energy, as required by the Nuclear Waste Policy Act, nominated five sites in the states of Mississippi, Nevada, Texas, Utah, and Washington

(1) ORGANIZATION AND SIGNIFICANT ACCOUNTING POLICIES (Continued)

as suitable for characterization and recommended to the President that three of these sites--the Yucca Mountain site in Nevada, the Deaf Smith County site in Texas, and the Hanford site in Washington--be characterized as candidate sites for the first repository. The Secretary's recommendation was approved by the President on May 28, 1986.

On May 28, 1986, the Secretary of Energy announced his decision that it would be prudent to postpone site-specific activities for the second repository. The Secretary's decision was based on a number of factors, including declining projections of the rates at which spent fuel will be discharged from commercial nuclear power plants, progress in siting the first repository and confidence in finding suitable sites among the three sites approved by the President for site characterization, the advantages to be gained from the experience of the first repository, developments concerning the submission of a proposal to Congress for an MRS facility, and fiscal management and responsibility.

DOE submitted its MRS proposal to Congress on March 31, 1987. DOE proposed the construction of an MRS facility in Oak Ridge, Tennessee as an integral part of its Nuclear Waste Management System. The MRS would receive, consolidate and package spent nuclear fuel for shipment to a repository. The proposal indicates that the MRS could begin accepting spent nuclear fuel in 1998. To allay concerns that the MRS facility could become a substitute for a permanent repository, whose development remains the highest priority, DOE, in its proposal, asked Congress to limit the MRS storage capacity and specify that the MRS cannot start receiving spent fuel until a construction authorization for the repository has been received from the Nuclear Regulatory Commission.

On January 28, 1987, DOE released a draft amendment to the Mission Plan for the Civilian Radioactive Waste Management Program. The draft amendment, which was submitted to the states, affected Indian tribes and federal agencies for formal comments prior to submission to Congress, proposed a revised schedule for the first repository extending the date for accepting spent nuclear fuel at the first repository until the year 2003. The draft amendment was finalized and issued in June 1987.

(b) Significant Accounting Policies

Revenue recognition - A one-time fee (see note 3) was recorded by the NWF as of April 7, 1983 for spent

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

Notes to Financial Statements
(Dollars in thousands)

(1) ORGANIZATION AND SIGNIFICANT ACCOUNTING POLICIES (Continued)

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 in excess of 7 decades. The Act requires an annual evaluation of the adequacy of fees to insure full cost recovery and provides for adjustment of such fees, as needed, with the approval of Congress. The evaluation for 1987, including the provisions contained in the Mission Plan Amendment, issued in June 1987, and a facility for monitored retrievable storage, indicates total estimated program costs of \$32.1 to \$38.2 billion (in constant 1986 dollars).

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 capitalized at cost and depreciated over the estimated useful lives of the assets which range from five to thirty years. Capital equipment purchased prior to the Act 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.

(2) U.S. TREASURY SECURITIES

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

	1987		1986	
	Book value	Market value	Book value	Market value
Due within 1 year	\$ 80,074	80,855	189,308	193,106
Due after 1 year but within 5 years	1,291,447	1,243,391	1,017,001	1,056,432
Due after 5 years but within 10 years	316,816	283,588	351,540	353,185
	<u>\$1,688,337</u>	<u>1,607,834</u>	<u>1,557,849</u>	<u>1,602,723</u>

(2) U.S. TREASURY SECURITIES (Continued)

Accrued interest receivable on U.S. Treasury securities as of September 30, 1987 and 1986 totalled \$56,219 and \$43,950, 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 Act specifies two fees to be paid to the NWF for disposal services: (a) a one-time charge per kilogram of heavy metal in the high-level waste and spent nuclear fuel existing prior to April 7, 1983; and (b) an adjustable fee payable quarterly, initially one mill per kilowatt-hour, on all electricity generated by nuclear reactors after April 6, 1983. The contracts provided three options for payment of the one-time spent fuel fee, one of which must have been selected by June 30, 1985, or within two 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 two years after contract execution, in the form of a single payment, with no interest due.

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 ten-year Treasury note rate in effect at the time.

During 1987 and 1986, payments (refunds) of one-time spent fuel fees by (to) owners and generators of civilian high-level waste and spent nuclear fuel consisted of:

	1987	1986
Option (1)	\$1,745	1,836
Option (3)	-	(516)
	<u>\$1,745</u>	<u>1,320</u>
Receivables from utilities at September 30 of each year consisted of:		
	1987	1986
One-time spent fuel fees:		
Option (1)	\$169,107	170,852
Option (2)	<u>735,372</u>	<u>735,372</u>
	<u>904,479</u>	<u>906,224</u>

NUCLEAR WASTE FUND
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Notes to Financial Statements
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(3) RECEIVABLES - UTILITIES (Continued)

Kilowatt-hour fees	108,100	100,600
Interest on one-time spent fuel fees:		
Option (1)	65,998	55,440
Option (2)	307,803	249,572
	<u>373,801</u>	<u>305,012</u>
	<u>\$1,386,380</u>	<u>1,311,836</u>

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 as a result of this ruling totaled \$40,116 of which \$2,649 and \$37,467 were charged against 1987 and 1986 KWH fees, respectively.

(4) FINANCING

The Act 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 Act, additional borrowings may be made from the U.S. Treasury. The Act limits the NWF from incurring expenditures, entering into contracts and obligating amounts to be expended, except as provided in advance by appropriation Acts.

(5) 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 which became effective January 1, 1987. As required by law, employees make contributions based on a percent of their salaries to the plan with an equal amount contributed by OCRWM. The total pension expense for 1987 and 1986 was \$1,185 and \$1,218, respectively.

(6) RELATED PARTIES

The Act established the Office of Civilian Radioactive Waste Management within DOE to carry out the provisions of the Act 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 Act, 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, 1987 and 1986, the NWF owed other government agencies \$7,220 and \$16,652, respectively, for services and costs provided to the NWF. For the years ended September 30, 1987 and 1986, the NWF had incurred costs of \$17,428 and \$17,098, respectively for services and costs provided by other government agencies.

(7) CONTINGENCIES

In May, 1986, the President named three sites, which had been formally nominated and recommended by DOE, to begin site characterization to determine the selection of an acceptable site for the first repository. Various litigation is now pending regarding the selection of these candidate sites. Resolution of this litigation is not expected to have a material effect on the financial position of NWF.

Litigation is also pending regarding DOE's adoption of a cost allocation methodology for allocating the costs of developing, constructing and operating a repository between the generators of commercial and defense waste. The litigation seeks judicial review of various actions by DOE involving the disposal of high-level radioactive waste generated by or as a result of atomic energy defense activities. Resolution of this litigation is not expected to have a material effect on the financial position of NWF.

A claim is pending before the Department of Energy Board of Contract Appeals concerning an interpretation of the contract provision governing the interest rate to be used in the calculation of interest on one-time fees paid or to be paid by the utilities to the Fund. Because the final outcome of this claim is not presently determinable, the Fund has not adjusted the amounts of interest presently accrued on one-time fees. In the event of an unfavorable outcome, accrued interest receivable and deferred revenue would decrease by approximately \$16,000 as of September 30, 1987.

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**Notes to Financial Statements
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(8) SUBSEQUENT EVENTS

(a) Legislation

On December 22, 1987, the President signed into law The Omnibus Budget Reconciliation Act of 1987, which contains amendments to the Nuclear Waste Policy Act of 1982. The legislation directs DOE to characterize the Yucca Mountain site in Nevada for development of the first repository. Drilling of an exploratory shaft at the Yucca Mountain site may begin upon completion of the site characterization plan and public hearings required by the Nuclear Waste Policy Act.

The legislation also provided for the termination of site specific activities for the Hanford, Washington and Deaf Smith County, Texas sites within 90 days of enactment. In the event that the Yucca Mountain site proves unsuitable for use as a repository, DOE is required 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 authorizes an MRS facility and DOE's conducting of a survey of potentially suitable sites. The selection of a site for an MRS may not be made until after the Secretary recommends to the President a site for development of the first repository.

(8) SUBSEQUENT EVENTS (Continued)

Further, the legislation authorizes 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. The interest rates to be used have not been determined as of this date. NWF management has estimated that the liability for interest to be paid or credited to the utilities as of September 30, 1987 could range from \$10,000 to \$18,000. Upon determination by the U.S. Treasury of the interest rates to be used, the NWF will calculate the amounts due and charge current operations.

(b) Litigation

On March 16, 1988, a Petition for Review was filed before the U.S. Court of Appeals for the District of Columbia regarding a portion of the final rule on the calculation of net generation in determining on-going (KWH) fees to be paid by the utilities. The petition seeks judicial review of DOE's treatment of transmission and distribution losses in calculating net generation. An unfavorable outcome could have a material effect on the financial position of the NWF by reducing past and future revenues. DOE is currently reviewing the petition and is not in a position to express an opinion on the outcome of this matter at this time.

CIVILIAN RADIOACTIVE WASTE R&D ACCOUNT

The year-end statements for OCRWM's Civilian Radioactive Waste R&D account for fiscal years 1986 and 1987 are provided in table 10-4. These statements show the accrued costs for the four major activities funded through this account: spent fuel storage development, alternative disposal concepts, generic methods and supporting studies and program direction.

Spent fuel storage development is authorized by Section 218 of the NWPA. The 1987 activities included cooperative demonstrations of dry storage and of in-pool rod consolidation. Costs in 1987 were \$6.7 million, a decrease of \$3.6 million from the previous year. Activities in the alternative

disposal category covered by Section 222 of the Act were limited to studies of subseabed disposal. Accrued costs for 1987 were \$1.8 million, a decrease of \$5.0 million from 1986. Activities in generic methods and supporting studies included publishing documentation on the technical basis for NRC certification of dry storage of spent fuel and the annual spent fuel requirements report. Accrued costs of \$0.5 million in 1987 were \$0.6 million under those for 1986. Program direction, in addition to overall management, included the preparation of reports on Federal interim storage and international cooperation with nonnuclear weapon states under Section 223 of the Act. The 1987 costs of \$0.2 million represented an increase of \$0.1 million over those of 1986. For the total R&D account, 1987 costs were \$9.2 million, a decrease of \$9.1 million from the previous year.

TABLE 10-4
SUMMARY STATEMENTS OF ACCRUED COSTS
CIVILIAN RADIOACTIVE WASTE R&D ACCOUNT
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
(Dollars in Millions)
(Unaudited)

	Actual Accrued Costs	
	1987	1986
Spent Fuel Storage		
Development		
Operating expenses	\$ 6.6	\$8.4
Plant and capital equipment	<u>0.1</u>	<u>1.9</u>
Subtotal	6.7	10.3
Alternative Disposal Concepts		
Operating expenses	1.7	6.0
Plant and capital equipment	<u>0.1</u>	<u>0.8</u>
Subtotal	1.8	6.8
Generic Methods and		
Supporting Studies		
Operating expenses	<u>0.5</u>	<u>1.1</u>
Subtotal	0.5	1.1
Program Direction		
Operating expenses	<u>0.2</u>	<u>0.1</u>
Subtotal	0.2	0.1
TOTALS		
Operating expenses	9.0	15.6
Plant and capital equipment	<u>0.2</u>	<u>2.7</u>
Total Civilian Radioactive		
Waste R&D	<u>\$ 9.2</u>	<u>\$18.3</u>

XI

EPILOGUE

The previous chapters report on the activities and expenditures of OCRWM for the fiscal year ending on September 30, 1987. This epilogue is provided to inform the reader of actions and events affecting the program since the end of the fiscal year.

The enactment of the Nuclear Waste Policy Amendments Act (Amendments Act) of 1987 on December 21, 1987, as part of the Omnibus Budget Reconciliation Act for Fiscal Year 1988 (P.L. 100-203) was a significant event for the radioactive waste management program. Therefore, this year's epilogue is focused on that Act and the initial actions taken to implement its provisions.

MAJOR PROVISIONS OF THE AMENDMENTS ACT

The Amendments Act modifies major elements of the radioactive waste management program. Most significant are the new provisions for the siting of the first repository and a monitored retrievable storage (MRS) facility.

First Repository

The Amendments Act directs that OCRWM characterize only one site, Yucca Mountain in Nevada (figure 11-1), for development of the first repository. It authorizes the siting and construction, subject to existing licensing requirements, of a geologic repository at the Yucca Mountain site only. Within 1 year of enactment of the Amendments Act, the Secretary is to submit to Congress a report on the potential socioeconomic impacts of locating a repository at the Yucca Mountain site. This report is to include recommendations for the mitigation of such impacts, the authorities available to mitigate these impacts and the appropriate source of funds for such mitigation. If the Yucca Mountain site is found at any time to be technically unsuitable, site-specific activities are to be terminated, and a report is to be submitted to Congress with recommendations for further action.

The Amendments Act authorizes a State, Indian Tribe or unit of local government, within whose jurisdiction a site for a repository or a monitored retrievable storage facility is located, to designate an onsite representative to conduct oversight activities at that site.

An orderly phaseout of site-specific activities, other than reclamation, at the Hanford, Washington, and Deaf Smith, Texas, sites is to be completed within 90 days after enactment of the Amendments Act.

Second Repository

Site-specific activities with respect to a second repository are prohibited unless Congress has specifically authorized and appropriated funds for such activities. The Secretary is to report to Congress on the need for a second repository on or after January 1, 2007, but no later than January 1, 2010. In addition, funding for research programs designed to evaluate the suitability of crystalline rock as a potential repository host medium is to be phased out within 6 months of enactment of the Amendments Act.

MRS

The Amendments Act authorizes the siting, construction and operation of one MRS facility, subject to the following conditions: (1) the Department's proposal to locate an MRS facility in Tennessee is annulled; (2) a survey of potentially suitable sites for an MRS facility may be conducted after the MRS Commission, established under the Amendments Act, submits its report to Congress on the need for an MRS facility; (3) a site for an MRS facility may not be selected until the Secretary recommends to the President the approval of a site for development as a repository; (4) no MRS facility may be located in Nevada; (5) construction of an MRS facility may not begin until the NRC has issued a construction authorization for the repository; and (6) storage at an MRS facility is limited to 10,000 metric tons uranium until a repository first accepts waste for disposal, and 15,000 metric tons after that time.

Other provisions of the Amendments Act with respect to an MRS facility include the extension of financial assistance to the States, affected Indian Tribes and affected units of local government, in the same manner as for a repository. The State or affected Indian Tribe agreeing to host an MRS facility is also eligible to enter into a benefits agreement as further detailed below.

Financial Assistance

The Amendments Act contains broadened authority for the provision of financial assistance and establishes the option for States and affected Indian Tribes to receive fixed annual payments under a benefits agreement.

Authority is provided to extend financial assistance directly to affected local governments. Federal funds may be made available for technical assistance, the mitigation of impacts associated with site characterization, and for payments equal to the taxes that would be paid if the State of Nevada or the affected units of local government were authorized to tax site characterization activities at the Yucca Mountain site and the development and operation of the repository.

The Amendments Act provides that the Secretary may enter into a benefits agreement with the State of Nevada to host the repository or with another State or Indian Tribe that agrees to host an MRS facility. The schedule of benefits authorized for hosting a repository is \$10 million annually until the first receipt of spent fuel and \$20 million annually

thereafter until closure of the repository. For hosting an MRS facility, benefits are \$5 million annually until receipt of spent fuel and \$10 million annually thereafter until closure of the facility. In return for these benefits, a State or Indian Tribe would waive its rights, if any, to impact assistance and its right to disapprove the recommendation of a site for a repository.

As part of the benefits agreement, a Review Panel is to be established to oversee activities and provide advice and recommendations on matters related to the facility.

Other Provisions

A Nuclear Waste Negotiator is to be appointed by the President, by and with the advice and consent of the Senate. The Negotiator is to attempt to find a State or Indian Tribe willing to host a repository or MRS facility, at a technically qualified site, on reasonable terms. Any proposed agreement that is negotiated is to be submitted to Congress, and an environmental assessment is to be prepared for the site concerned.

Figure 11-1, Location of the Yucca Mountain Site in Southern Nevada

A Nuclear Waste Technical Review Board is established, to be composed of 11 members appointed by the President from at least 22 qualified persons nominated by the National Academy of Sciences. This Board is an independent body established within the Executive Branch to evaluate the technical and scientific validity of activities undertaken by the Secretary, including site characterization, packaging and transportation activities.

An MRS Commission is established, to be composed of three members appointed by the President *pro tempore* of the Senate and the Speaker of the House of Representatives. The Commission is to prepare a report on the need for an MRS facility as a part of a national nuclear waste management system. The report, together with the recommendations of the MRS Commission, is to be transmitted to Congress by June 1, 1989.

CURRENT ACTIVITIES

The major focus of activities during 1988 has been on implementing the Amendments Act. Accordingly, this section reports on the current status of OCRWM's planning and actions in response to that Act.

Mission Plan Amendment

Following enactment of the Amendments Act on December 21, 1987, OCRWM initiated a comprehensive review of program plans and strategies and began the development of a 1988 Mission Plan Amendment. This amendment is being developed to inform Congress and the public of OCRWM's plans for implementing the program changes mandated by the Amendments Act. A draft of the 1988 Mission Plan Amendment was issued for public review and comment in June 1988. Following the evaluation of comments received, the revised Mission Plan Amendment is scheduled for transmittal to Congress in the fall.

Nevada Site Characterization

The Amendments Act directs that the Yucca Mountain site in Nevada be characterized as the potential location of a geologic repository.

The Consultation Draft Site Characterization Plan (CD/SCP) for the Yucca Mountain site was delivered to Nevada officials and the NRC and made available for public review on January 8, 1988. Also in January, OCRWM issued a draft environmental regulatory compliance plan, a revised environmental monitoring and mitigation plan and a revised socioeconomic monitoring and mitigation plan for the Yucca Mountain site.

The issuance of the CD/SCP marked the initiation of a series of technical discussions with the State of Nevada and the NRC. The first of these was held in Reno, Nevada, on

January 28-29, 1988, to provide background information on the site characterization plan and supporting documents to technical experts of the State of Nevada, the NRC, other interested parties and members of the general public.

The following meetings have been conducted since that time to elicit comments on the CD/SCP and discuss technical concerns:

- o A 4-day workshop was held with the NRC and the State of Nevada on March 21-24, 1988, to discuss the NRC's five principal technical concerns, submitted to OCRWM on March 7, 1988, in the form of draft point papers.
- o OCRWM again met with the NRC on March 31, 1988, to review conclusions drawn from the workshop and establish necessary action plans to address NRC concerns.
- o A technical workshop on alternative conceptual models for groundwater system studies of the Yucca Mountain site was held in Las Vegas, Nevada, on April 11-14, 1988, with the NRC and the State of Nevada. Members of the scientific community attended, as did the press and the general public.

On May 11, 1988, the NRC submitted its final comments on the CD/SCP.

Site characterization planning activities are proceeding on schedule at the Yucca Mountain site, and OCRWM expects to issue the site characterization plan for Yucca Mountain in the latter part of calendar year 1988.

Terminated Projects

The Amendments Act requires an orderly phaseout of site-specific activities, other than reclamation, at the Hanford, Washington, and Deaf Smith, Texas, sites to be completed within 90 days after enactment.

OCRWM immediately notified all prime contractors, grantees, participating national laboratories, and other Federal agencies of the requirement for an orderly phaseout and termination of site-specific activities at the Deaf Smith County, Texas, and Hanford, Washington, sites. Consequently, the consultation drafts of the site characterization plans for the Hanford, Washington, and Deaf Smith County, Texas, sites were not released, nor were the environmental monitoring and mitigation plans, the socioeconomic monitoring and mitigation plans, or the environmental regulatory compliance plans for those sites. OCRWM also issued formal, technical guidance directing the affected parties to suspend or limit their activities.

Concurrently, OCRWM undertook a comprehensive review of all activities and developed plans for an orderly phaseout at the two sites. All site-specific activities were terminated by March 21, 1988.

The States of Louisiana, Mississippi, Texas, Utah and Washington were informed that, pursuant to the Amendments Act, they were to cease all activities, except reclamation, currently funded by grants under the NWPA. Any

remaining grant funds were to be used only for the purpose of engaging in an orderly closeout of existing site-specific programs.

In addition, detailed plans for reclamation were developed, and formal termination letters were issued with specific instructions to prime contractors to take the actions necessary to ensure near-term completion of open contracts.

Remaining managerial and administrative tasks included the following: (1) compilation, review, editing, indexing, and/or publication of key project documents, including computer programs; (2) final cataloging, classification, and disposition of surplus property; (3) closing of information and other offices in Louisiana, Mississippi, Utah, Washington State, and Texas; and (4) employee outplacement and closeout of contracts and grants.

Reclamation activities at the basalt and salt sites include reclaiming the Near-Surface Test Facility, the exploratory shaft, and the Waste Pond at Hanford, and the borehole sites in Utah, Louisiana, Mississippi, and Washington State. In addition, OCRWM is removing the seismic and erosion monitoring network and weather monitoring stations in Texas.

On April 14, 1988, OCRWM submitted to the Senate Committee on Energy and Natural Resources, with copies to other cognizant Congressional committees, a report on the status of phaseout and reclamation actions undertaken in response to the Amendments Act.

As mandated by the Amendments Act, all second repository activities were terminated during early 1988. Chapter III reported that site-specific activities of the second repository project had been discontinued in May 1986 and restarted on October 1, 1987, with a review of comments received on the draft Area Recommendation Report. This review was terminated in January 1988, and both the document and the comments have been archived.

Other Activities

Two new studies required by the Amendments Act were initiated. Planning for the report on the potential socioeconomic impacts of locating a repository in Yucca Mountain, Nevada, began in early January.

A study of the use of dry cask storage technology at the sites of civilian nuclear power reactors was also initiated in January. This study is to evaluate the use of dry cask technology for the temporary storage of spent nuclear fuel until such time as a permanent repository is operational. Among other factors, the study is to consider the cost and effects on human health and the environment of dry cask storage and the costs and risks of transporting spent fuel from reactor sites to a central facility, such as an MRS. The study is also to consider if and to what extent funds from the NWF can and should be used to support dry storage at reactor sites. The final report is to be submitted to Congress by October 1, 1988.

OCRWM is conducting an evaluation of its international research programs in light of the Amendments Act. At this stage in the review, it is believed that the continued participation by the United States in cooperative international activities is required and can be accomplished consistent with the requirements of the Amendments Act. When the review is completed, negotiations will be undertaken to recast the international agreements to ensure that OCRWM participation does not involve research designed to evaluate the suitability of crystalline rock as a potential repository host medium. The overriding basis for the United States' participation in research under the agreements will be its relevance to the Yucca Mountain site and the nuclear waste management program as modified by the Amendments Act.

In accordance with the new financial assistance provisions of the Amendments Act, the Department officially notified the State of Nevada on April 6, 1988, that it is prepared to enter into negotiations for the development of a benefits agreement. In a May 20, 1988 letter to the Secretary, Governor Bryan formally declined this offer. Clark County, Nevada, and Lincoln County, Nevada, requested, and have been granted, designation as "affected units of local government" under the new financial assistance provisions of the legislation. Nye County, Nevada, location of Yucca Mountain, is an affected unit of local government without Secretarial designation.

The three-member MRS commission has been appointed by the President *pro tempore* of the Senate and the Speaker of the House of Representatives. The National Academy of Sciences has submitted a list of 38 candidates for appointment by the President to the Nuclear Waste Technical Review Board.

Program Management

OCRWM's plan to reorganize along functional lines was approved on March 27, 1988 and implemented in early April. The new organizational structure (figure 11-2) is comprised of four major components, headed by Associate Directors, and a separate Office of Quality Assurance, headed by a Director, reporting directly to the Director, OCRWM. The four major component offices are: (1) program administration and resources management, (2) facilities siting and development, (3) systems integration and regulations, and (4) external relations and policy. The Office of Quality Assurance was established in response to the high priority accorded this function by the Director, OCRWM, and to emphasize the overall managing-for-quality approach being implemented by OCRWM.

REPOSITORY LITIGATION

Since the end of FY 1987, several events and actions have affected the status of pending repository litigation. In light of the passage of the Amendments Act, the Department, in

February 1988, filed with the U.S. Court of Appeals for the Ninth Circuit, a motion to dismiss most of the pending lawsuits which challenge the siting guidelines and the May 28, 1986 decisions and actions on the first repository program. The exceptions involve two lawsuits by the State of Nevada, the first of which challenges the validity of the siting guidelines, while the second challenges the Department's authority to begin site characterization at Yucca Mountain without withdrawing public lands in accordance with the Federal Land Policy and Management Act.

Additionally, based on the Amendments Act, the Department filed a memorandum in January 1988 with the U.S. Court of Appeals for the Ninth Circuit to supplement the motion it had filed in October 1987 for dismissal of the lawsuits challenging the postponement decision on the second repository program. On April 26, 1988, the Court dismissed the petition. In February, the same Court dismissed the motions filed by the States of Nevada and Washington to enjoin site characterization pending repromulgation of the EPA environmental standards.

Figure 11-2
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT

March 27, 1988

BIBLIOGRAPHY

Pacific Northwest Laboratories, *International Nuclear Fuel Cycle Fact Book*, January 1987, (PNL-3594/7).

Sandia National Laboratories, *NNWSI Project SCP Conceptual Design Report*, September 1987, (SAND 84-2641).

U.S. Department of Energy, "Calculating Nuclear Waste Fund Disposal Fees for DOE Defense Program Waste: Inquiry and Request for Public Comment," *Federal Register*, Volume 51, December 2, 1986.

U.S. Department of Energy, "Civilian Radioactive Waste Management: Calculating Nuclear Waste Fund Disposal Fees for Department of Energy Defense Programs," *Federal Register*, Volume 52, August 20, 1987.

U.S. Department of Energy, "Fees for Federal Interim Storage, Calendar Year 1988," *Federal Register*, Volume 52, December 10, 1987.

U.S. Department of Energy, "Report By The U.S. Secretary of Energy on Efforts to Comply With Consultation and Cooperation Provisions of the Nuclear Waste Policy Act of 1982" (letter dated August 4, 1987).

U.S. Department of Energy, "Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste" (final rule), *Federal Register*, Volume 52, September 18, 1987.

U.S. Department of Energy, "Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste," *Federal Register*, Volume 48, April 18, 1983.

U.S. Department of Energy, Nevada Operations Office, *Draft Environmental Regulatory Compliance Plan for Site Characterization of the Yucca Mountain Site*, January 1988, (DOE/RW-0177).

U.S. Department of Energy, Nevada Operations Office, *Environmental Monitoring and Mitigation Plan for Site Characterization* (Revision 1), January 1988, (DOE/RW-0176).

U.S. Department of Energy, Nevada Operations Office, *Socioeconomic Monitoring and Mitigation Plan for Site Characterization* (Revision 1), January 1988, (DOE/RW-0179).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *Additional Information on Monitored Retrievable Storage*, November 1987, (DOE/RW-0166).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *Analysis of the Total System Life Cycle Cost for the Civilian Radioactive Waste Management Program* (2 volumes), June 1987, (DOE/RW-0047).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *Annotated Outline for Site Characterization Plans*, April 1987, (DOE/RW-0142).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *Annual Capacity Report*, June 1987, (DOE/RW-0146).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *Annual Report to Congress*, April 1987, (DOE/RW-0144).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *Answers to Your Questions on High-Level Nuclear Waste*, November 1987, (DOE/RW-0152).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *Consultation Draft, Site Characterization Plan for the Yucca Mountain Site* (7 volumes), January 1988, (DOE/RW-0160).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *Consultation Draft Site Characterization Plan Overview, Yucca Mountain Site, Nevada Research and Development Area, Nevada*, January 1988, (DOE/RW-0161).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *Draft Area Recommendation Report for the Crystalline Repository Project*, January 1986, (DOE/CH-15).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *Draft Mission Plan Amendment*, January 1987, (DOE/RW-0128).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *Implementation Plan for Deployment of Federal Interim Storage Facilities for Commercial Spent Nuclear Fuel*, December 1987, (DOE/RW-0186).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *International Cooperation Program*, November 1986, (DOE/RW-0097).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *Managing the Nation's Nuclear Waste* (Revised), December 1987, (DOE/RW-0036).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *Mission Plan for the Civilian Radioactive Waste Management Program* (3 volumes), June 1985, (DOE/RW-0005).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *Monitored Retrievable Storage Submission to Congress* (3 volumes), March 1987, (DOE/RW-0035).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *Nuclear Waste Fund Fee Adequacy: An Assessment*, June 1987, (DOE/RW-0020).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *OCRWM Backgrounder Series*:

Activities During the Site Characterization Phase of the Geologic Repository Program (Revised), April 1987, (DOE/RW-0137).

Addressing Concerns About Water Through Repository Siting and Design, January 1987, (DOE/RW-0123).

Characteristics and Inventories of Nuclear Waste (Revised), April 1987, (DOE/RW-0140).

Cooperative Demonstration Projects for Spent Nuclear Fuel (Revised), April 1987, (DOE/RW-0138).

Federal Agencies Involved in the Implementation of the Nuclear Waste Policy Act of 1982, February 1987, (DOE/RW-0127).

Public Participation in the Development of the Transportation Institutional Plan, April 1987, (DOE/RW-0141).

Quality Assurance for Nuclear Waste Repositories, February 1987, (DOE/RW-0126).

Shipments of Spent Nuclear Fuel in Support of the Nuclear Waste Policy Act Research and Development Program, January 1987, (DOE/RW-0124).

The Status of the Nuclear Waste Fund, January 1987, (DOE/RW-0034).

Studies of Alternative Methods of Radioactive Waste Disposal (Revised), April 1987, (DOE/RW-0139).

Transportation Casks for Spent Nuclear Fuel and High-Level Radioactive Waste, January 1987, (DOE/RW-0121).

Transportation Routing Issues Related to the Shipment of High-Level Nuclear Waste, January 1987, (DOE/RW-0122).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *OCRWM Bulletin*, published monthly since July 1985.

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *OCRWM Fact Sheet Series*:

Can Nuclear Waste Be Transported Safely?, November 1986, (DOE/RW-0109).

How Much High-Level Nuclear Waste Is There?, November 1986, (DOE/RW-0111).

The Illustrated Mechanisms of Nuclear Waste Disposal, November 1986, (DOE/RW-0105).

Overview--Nuclear Waste Policy Act, November 1986, (DOE/RW-0104).

Radiation and Nuclear Waste--How Are They Related?, November 1986, (DOE/RW-0110).

What is Nuclear Waste?, November 1986, (DOE/RW-0107).

What Is Spent Nuclear Fuel?, October 1986, (DOE/RW-0108).

What Rock Types Are Being Considered for Nuclear Waste Repositories and Why?, November 1986, (DOE/RW-0112).

What Will a Nuclear Waste Repository Look Like?, November 1986, (DOE/RW-0106).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *OCRWM Mission Plan Amendment*, June 1987, (DOE/RW-0128).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *OCRWM Publications Catalog*, July 1987, (DOE/RW-0150).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *OCRWM Safety Plan*, December 1986, (DOE/RW-0119).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *Program Management System Manual*, January 1986, (DOE/RW-0043).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *Program Reference Schedule Baseline* (Revised), July 1987, (DOE/RW-0091/1).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *Project Decision Schedule*, March 1986, (DOE/RW-0067).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *Quality Assurance Management Policies and Requirements*, October 1985, (DOE/RW-0032).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *Quarterly Report on Program Cost and Schedule*, issued quarterly since the first quarter of fiscal year 1987.

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *Recommendation by The Secretary of Energy of Candidate Sites for Site Characterization for the First Radioactive Waste Repository*, May 1986, (DOE/RW-0080).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *Waste Management System Requirements and Description*, March 1986, (DOE/RW-0063).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *Salt Repository Project MGDS Description Document*, June 1987, (SRP/B-19).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *Salt Repository Project MGDS Requirements Document* (Revision 4), June 1987, (SRP/B-18).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *Shipment of Radioactive Materials by the U.S. Department of Energy*, December 1986, (DOE/RW-0030).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *Spent Fuel and Radioactive Waste Inventories, Projections, and Characteristics* (Revision 2), December 1986, (DOE/RW-0006).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *Waste Acceptance Preliminary Specifi-*

cations for the Defense Waste Processing Facility High-Level Waste Form, December 1986, (DOE/RW-0125).

U.S. Department of Energy, Office of Civilian Radioactive Waste Management, *Waste Acceptance Preliminary Specifications for the West Valley Demonstration Project High-Level Waste Form*, April 1987, (DOE/RW-0136).

U.S. Nuclear Regulatory Commission, "Disposal of High-Level Radioactive Wastes in Geologic Repositories," *Code of Federal Regulations*, Title 10, Part 60 (1983).