

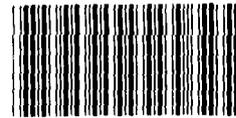
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GAO

May 1986

NUCLEAR WASTE

Monitored Retrievable Storage of Spent Nuclear Fuel

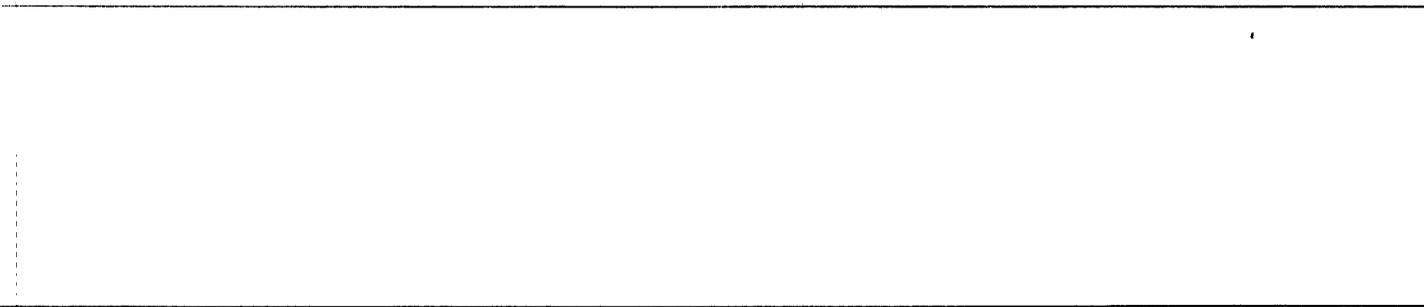


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UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

RESOURCES, COMMUNITY,
AND ECONOMIC DEVELOPMENT
DIVISION

May 8, 1986

B-202377

The Honorable Morris K. Udall
Chairman, Committee on
Interior and Insular Affairs
House of Representatives

The Honorable Edward J. Markey
Chairman, Subcommittee on Energy
Conservation and Power
Committee on Energy and Commerce
House of Representatives

As you requested in your March 18, 1985, letter and as agreed in subsequent meetings with your offices, we have compiled information on the Department of Energy's plans for monitored retrievable storage (MRS) of spent nuclear fuel. As agreed, this fact sheet describes the following points included in our briefing of your staffs on January 21, 1986: the purpose of MRS; the state of Tennessee's role in the development of the MRS proposal and the Department's plans for its future involvement, if MRS is authorized by the Congress; the potential advantages and disadvantages of MRS; and the state and local impacts of siting an MRS facility in Tennessee. In addition, we have included the results of a questionnaire we distributed to 74 nuclear power utilities requesting information on their spent-fuel storage plans and their views on MRS.

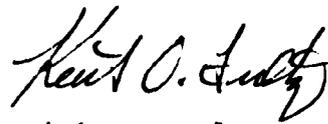
The Department of Energy has prepared a review version of a proposal for the construction of an MRS in Tennessee that would receive, consolidate, package, store, and transport spent fuel from commercial reactors. DOE identifies several advantages of MRS for the waste management system, as well as some costs and impacts. In addition, DOE and its contractors identified some disadvantages to the MRS in earlier program documents. The state of Tennessee has participated in the MRS program mainly through its review of proposal documents and, in particular, its analysis of the potential impacts of MRS on health and safety, economics, the environment, and transportation. State and local groups, as well as DOE, have identified several environmental, socioeconomic, and transportation impacts from siting an MRS in Tennessee.

This fact sheet provides a summary of the information obtained to date on the MRS and the Department's plans for waste transportation. We will continue to evaluate DOE's MRS and waste transportation plans and, as agreed, our final report to you will respond to the remaining questions in your request.

We obtained the information in this fact sheet from (1) documents provided by Department of Energy and Tennessee state and local officials, (2) discussions with these officials, and (3) responses by utilities to our questionnaire. We also discussed a draft of this fact sheet with Department of Energy and Tennessee officials and incorporated their comments as appropriate.

As arranged with your offices, unless you publicly announce its contents earlier, we plan no further distribution of this fact sheet until 10 days from the date of the letter. At that time we will send copies to interested parties and make copies available to others upon request.

Please call me on 275-1441 if you have any questions about the fact sheet.



Keith O. Fultz
Associate Director

Contents

SECTION		<u>Page</u>
1	PURPOSE OF INTEGRATED MONITORED RETRIEVABLE STORAGE	4
2	TENNESSEE'S ROLE IN MRS PROPOSAL'S DEVELOPMENT AND IMPLEMENTATION	6
3	ADVANTAGES OF AN MRS FACILITY	11
4	DISADVANTAGES OF AN MRS FACILITY	13
5	STATE AND LOCAL IMPACTS OF MRS	15
6	RESULTS OF SURVEY OF UTILITIES	19
7	OBJECTIVES, SCOPE, AND METHODOLOGY	31
FIGURE		
1.1	Distribution of waste management functions in a system with an integrated MRS facility	5
2.1	Proposed sites for first repository and MRS	10

ABBREVIATIONS

DOE	Department of Energy
GAO	General Accounting Office
MRS	monitored retrievable storage
NRC	Nuclear Regulatory Commission
RCED	Resources, Community, and Economic Development Division
REAL	Research, Evaluation, Analysis and Liaison Group
TVA	Tennessee Valley Authority

SECTION 1

PURPOSE OF INTEGRATED MONITORED RETRIEVABLE STORAGE

The Nuclear Waste Policy Act of 1982 established a comprehensive system for the management of spent nuclear fuel and high-level waste. The system described in the act is primarily composed of two elements: commercial nuclear power reactors, which generate nuclear waste in the form of spent fuel, and a geologic repository, a deep mined structure in which the spent fuel will be disposed. In addition, the act required the Department of Energy (DOE) to prepare a proposal for the construction of another facility in the system--a monitored retrievable storage (MRS) facility--as an option for the safe management of nuclear waste.

DOE has concluded that an MRS facility located in Tennessee would significantly improve the performance of the nuclear waste management system. As proposed by DOE an MRS facility would provide an early focus for developing and integrating the essential operational functions of waste acceptance, packaging, and transportation for disposal. (See fig. 1.1.)

The primary purpose of an MRS facility would be to receive and prepare spent nuclear fuel from commercial reactors for disposal in a geologic repository. The facility would also have the capability to store spent fuel on site. DOE is proposing that the Congress limit the amount of storage at the MRS to 15,000 metric tons. The storage capacity technically could be expanded beyond this limit if authorized by the Congress.

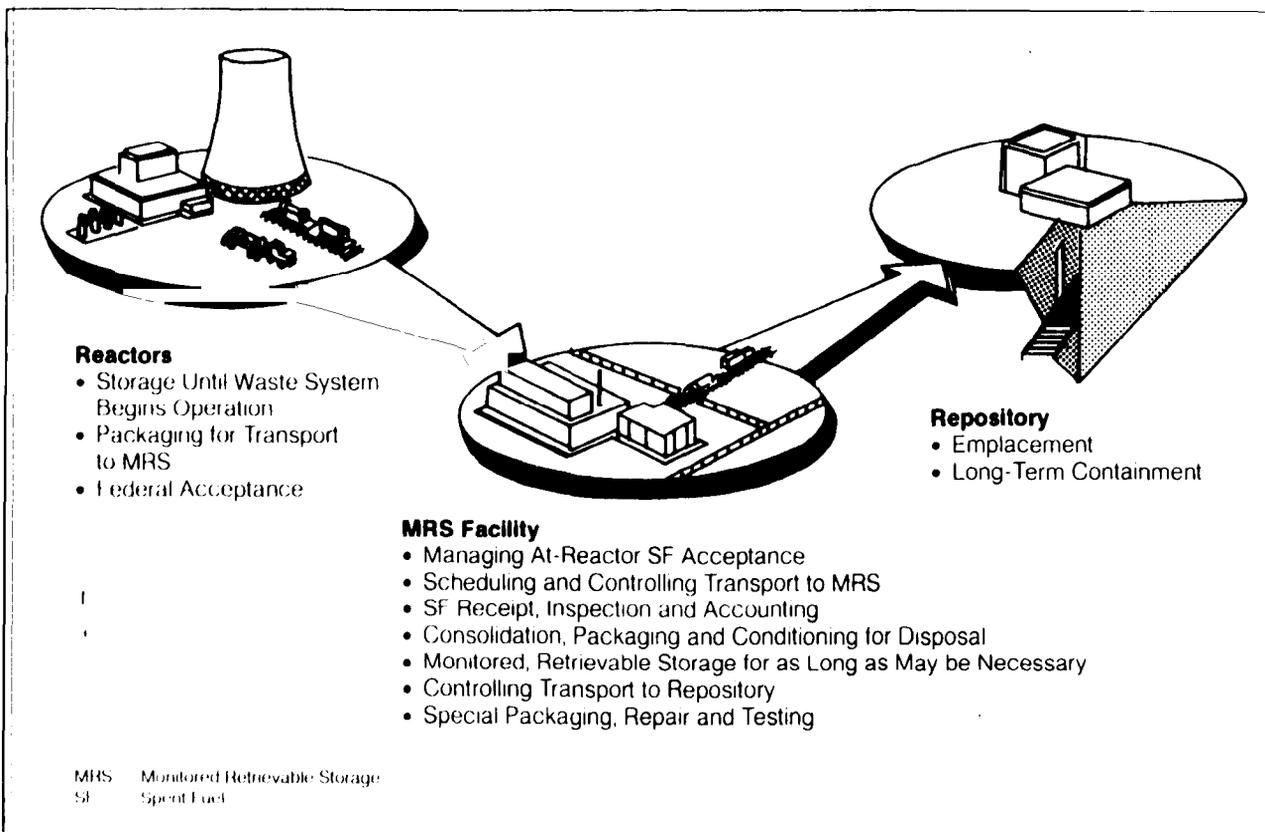
The MRS facility would perform several principal functions as an integral part of the overall system:

- receive spent nuclear fuel from most reactor sites (those in the eastern United States) prior to shipment to a repository for disposal;¹
- consolidate the spent fuel by extracting the rods from the hardware that holds them together in assemblies and rearranging them in a more compact array (rod consolidation) for greater efficiency in storage, handling, transportation, and disposal;

¹According to the December 1985 review copy of DOE's proposal, the MRS facility would not receive spent fuel from reactors located in the western United States; rather these reactors' spent fuel would be shipped directly to the repository for preparation and disposal.

- load the consolidated spent fuel into uniform canisters to facilitate storage, handling, shipping, and further processing at a repository;
- temporarily store the spent-fuel canisters in the waste-handling building, pending shipment to the repository;
- if necessary, store spent-fuel canisters for longer periods in a large storage yard in sealed concrete casks that would allow radiation monitoring and easy retrieval for shipment to a repository; and
- transport the canisters in shipping casks on dedicated trains directly to the repository for disposal.

Figure 1.1: Distribution of Waste Management Functions in a System With an Integrated MRS Facility



SECTION 2

TENNESSEE'S ROLE IN MRS PROPOSAL'S DEVELOPMENT AND IMPLEMENTATION

DOE'S SITE IDENTIFICATION PROCESS

In late April 1985 DOE identified three sites that it considered the most favorable for development of site-specific designs for the MRS proposal:

- the cancelled Clinch River Breeder Reactor Project site, located in the Roane County portion of Oak Ridge, Tennessee;
- a site on DOE's Oak Ridge Reservation, located in Oak Ridge, Tennessee; and
- the site of the Tennessee Valley Authority's (TVA) cancelled Hartsville nuclear power plant near the Hartsville, Tennessee, community. (See fig. 2.1.)

DOE identified the Clinch River site as the most preferable for several reasons:

- The site is owned by the federal government and is in the custody of TVA.
- Because the site is adjacent to DOE's Oak Ridge Reservation, nuclear activities are compatible with present land use.
- Part of the site has already been disrupted by preparation for the construction of the Clinch River Breeder Reactor.
- The site has excellent access for any mode of transportation; it is within 5 miles of the nearest interstate highway, within 1.5 miles of a main rail line, and on a navigable waterway.
- The local community can supply experienced technical personnel for the MRS project.
- An extensive base of environmental data is available for the site.
- The Nuclear Regulatory Commission (NRC) had granted a limited work authorization for the construction of a breeder reactor at this site--a far more complex nuclear installation than the MRS facility.

As the following chronology indicates, Tennessee was not involved in DOE's initial site identification. DOE interacted with Tennessee regarding the MRS in the following ways:

- In late March 1985, according to DOE records, the Director, Office of Civilian Radioactive Waste Management, called the governor of Tennessee; his call was referred to the Commissioner of Health and the Environment. At this time, the Director notified the Commissioner that DOE was considering 3 sites in Tennessee, out of 11 nationwide, for the location of the MRS facility. Tennessee officials stated that this contact occurred in April 1985.
- On April 25, 1985, according to Tennessee officials, DOE delivered documents and background information to the office of the Commissioner of Health and the Environment indicating that three Tennessee sites had been identified as DOE's alternative sites for an MRS.
- On April 26, 1985, the first meeting between Tennessee and DOE officials took place to inform the state of the basis for DOE's decision to propose an MRS facility in Tennessee. Also on this date, DOE established an MRS office in Oak Ridge and information facilities in the state to facilitate communication and interaction.

STATE'S ROLE IN DEVELOPMENT OF MRS PROPOSAL

Since April 1985 Tennessee has been reviewing draft segments of DOE's proposal for MRS. Several state and local agencies participated in this review to critique DOE's information as well as conduct independent analyses:

- In May 1985 the governor gave the Safe Growth Cabinet Council² the responsibility for evaluating the MRS proposal at the state level. At the same time, two groups--the Clinch River MRS Task Force for the Oak Ridge area (the Clinch River and Oak Ridge sites) and the Five County Research, Evaluation, Analysis and Liaison (REAL) group for the Hartsville area--were formed to analyze and evaluate the proposal at the local level.

²The Safe Growth Cabinet Council--which includes the Commissioners of the Tennessee Departments of Health and Environment, Transportation, Economic and Community Development, Conservation, Agriculture, and the Executive Director of the Tennessee Wildlife Resources Agency--is an advisory group to the governor on the subject of environmental protection and enhancement of Tennessee's aesthetic qualities and environment.

- In June 1985 Tennessee received a \$1.4 million grant from DOE to assist the state in determining the potential impacts of MRS on the state and developing an opinion on the acceptability of the facility. Of this \$1.4 million, \$100,000 was allocated to the Clinch River MRS Task Force and \$100,000 to the REAL group for their evaluations of local impacts.
- In the process of evaluating the proposal and determining the potential impacts of DOE's MRS plans, meetings, workshops, field trips, public hearings, and other activities were undertaken with the participation of representatives of DOE, the state and local governments, the state legislature, consultants, and the general public.
- In October 1985 the Clinch River MRS Task Force completed its evaluation and gave its conditional acceptance to the facility providing certain concerns are addressed in Congress's authorization of MRS. (The Task Force's findings are discussed in sec. 5 of this fact sheet.)
- In November 1985 the REAL group completed its evaluation and found that an MRS facility in Hartsville was unacceptable because of perceived negative impacts on the community.
- In December 1985 all the participating state agencies and contractors submitted their written reports to the Safe Growth Cabinet Council for final disposition and communication of the results to the governor.
- On January 21, 1986, the governor of Tennessee notified the Secretary of Energy that he opposed the MRS because (1) the MRS is unnecessary and (2) the public's perceptions and the controversy over the MRS would have a detrimental effect on industrial recruitment, economic expansion, and tourism in the Knoxville-Oak Ridge area.
- On February 5, 1986, the governor of Tennessee formally submitted to the Secretary of Energy the state's comments on DOE's MRS proposal documents.

Ongoing litigation

The extent and timing of Tennessee's participation in the MRS siting process has been the subject of litigation still pending in the courts. Consequently, DOE did not submit its MRS proposal to the Congress in February 1986, as planned; DOE is awaiting resolution of the litigation to formally submit the proposal. In summary, the legal proceedings relating to the MRS include the following:

- On August 20, 1985, the state of Tennessee filed a complaint with a Tennessee district court, arguing that the Nuclear Waste Policy Act required DOE to consult in a timely manner with the state concerning the MRS and that DOE had failed to meet this requirement. The state also sought an injunction to prevent DOE from submitting the MRS proposal to the Congress.
- On October 21, 1985, DOE asked the district court to dismiss the state's case on the grounds that the district court had no subject matter jurisdiction in the case. The court denied DOE's motion for dismissal on November 12. On January 9, 1986, a court of appeals granted DOE permission to appeal this decision and for expedited consideration of the appeal. The appeal is pending.
- While the appeals court was reviewing the jurisdiction issue, the district court considered the merits of the case. On February 5, 1986, the district court concluded that DOE violated the act by failing to consult and cooperate with the governor and legislature of the state of Tennessee in the MRS siting process.
- On February 7, 1986, the district court permanently enjoined DOE from making any proposal to the Congress that relies on siting studies developed prior to consultation and cooperation with Tennessee. On February 12, DOE filed both a notice of appeal with the district court and a motion to stay the injunction pending appeal. That motion was denied on February 14.
- On February 13, 1986, DOE appealed the district court's decision and asked the appeals court to reverse the injunction or stay the injunction pending appeal. In early March 1986, the court of appeals denied DOE's request for reversal or stay of the injunction prohibiting DOE from submitting the MRS proposal to the Congress.

STATE'S PROPOSED ROLE IN
IMPLEMENTATION OF PROPOSAL

In December 1985 DOE released a review copy of its MRS proposal required by the Nuclear Waste Policy Act. DOE envisions that after approval of the MRS proposal, it would enter into a written consultation-and-cooperation agreement with the state of Tennessee, which would formalize arrangements for state and local involvement. Such an agreement is provided for under Section 117 of the Nuclear Waste Policy Act.

DOE has proposed to provide the state and local governments both annual financial assistance payments during MRS's

preoperational period and payments equal to property and other taxes paid by taxable facilities during MRS operation. This financial assistance would be in addition to reimbursements for work performed for the MRS project.

DOE has also proposed the establishment of an MRS Steering Committee to review the project's implementation. This committee would conduct performance evaluations, provide advice, and recommend any needed corrective actions. The committee could also

- provide information to the public about the safety of the facility;
- ensure that state and local perspectives are considered in key programmatic decisions; and
- participate in planning for the collection of data on the environmental, demographic, and socioeconomic conditions of the site and the local community.

The proposed committee would consist of nine members--a chairman named by DOE in consultation with the governor of Tennessee; two members representing DOE; two representing the state; and one each representing Roane County, the city of Oak Ridge, all utilities paying into the Nuclear Waste Fund, and other public interests.

Figure 2.1: Proposed Sites for First Repository and MRS



SECTION 3

ADVANTAGES OF AN MRS FACILITY

DOE has stated that an MRS would significantly improve the performance of the waste management system. In the December 1985 review copy of the MRS proposal, DOE identified the following advantages and benefits for the waste management system that DOE has concluded would result from development of the proposed MRS. In general, according to DOE's proposal documents, MRS would

- improve waste system development by allowing some licensing and planning activities in the program to be implemented prior to repository site selection. Planning for waste transportation, including routes, logistics, and equipment procurement, as well as some other activities, could begin earlier.
- accelerate spent-fuel acceptance from the utilities. By starting in 1996 and reaching full operations by 1998, MRS would allow DOE to receive spent fuel at full capacity 5 years sooner than a repository-only system. (The repository-only system is designed to reach full-capacity operation in 2002.)
- provide increased reliability and flexibility in operating the system. Among other system operation benefits, DOE said that adding storage capacity at the MRS would allow the unloading of reactor storage pools to be independent of the loading of the repository. Thus, delays or disruptions in one component of the system would be less likely to affect progress of the entire waste management system.
- facilitate the operations of the repository. In addition to other repository benefits, DOE said that the repository would receive fewer shipments arriving by one transport mode (rail) from an MRS.
- improve the performance of the transportation system. According to DOE, MRS would serve as a hub for transportation operations, focus the control and management of transportation operations, reduce the number of cross-country shipments and shipping routes, reduce public exposure from transport operations, and provide other transportation benefits.
- produce institutional benefits that could enhance progress in the repository program and public acceptance of these repositories. Among other institutional benefits, DOE expects to gain experience from its interactions with

the state of Tennessee that would enhance the public's confidence in DOE's ability to carry out the program.

SECTION 4

DISADVANTAGES OF AN MRS FACILITY

The December 1985 version of DOE's proposal documents identified the following costs and impacts of MRS:

- an increase in system facility costs of about \$1.4 to \$2 billion (approximately 6 percent of total system costs), plus additional financial assistance and other costs of the facility (DOE's revised estimates show that the net cost increase to the system of constructing and operating an MRS would range between \$1.6 to \$2.6 billion.);
- a requirement for additional licensing activities;
- an increase--within regulatory limits--in occupational exposure to radiation from additional spent-fuel handling; and
- some duplication in facilities or operations in the overall system since the repository must have the capability to receive and package western reactors' spent fuel.

In addition, in earlier issue papers and internal DOE working documents, DOE contractors and field office officials preparing DOE's proposal determined that the MRS proposed by DOE would have some disadvantages. Included among the disadvantages are these:

- Increased system complexity. MRS would add another facility to the waste management system requiring more equipment and more interfaces to accommodate as well as additional siting and decommissioning activities.
- Shifting transportation patterns. MRS would significantly redistribute shipments of spent fuel and, consequently, the risk in the transportation system. The redistribution of shipments would decrease the number of shipments seen by most states but would likely increase the number of shipments for Tennessee and some adjacent states. It would add a second area in the system--in addition to the repository site--where spent-fuel shipments would converge.
- Altered cash flows. MRS would increase near-term costs of the Nuclear Waste Fund, significantly altering cash flows. Although some of the costs incurred are compensated by lower costs later in time, a question may exist as to the ability of the fund in its early years to sustain the additional facility. (In the review version of the MRS proposal, DOE states that it believes the fee paid by

utilities to finance the waste management program is adequate to fund the program in the near-term.)

In discussions concerning this fact sheet, DOE officials stated that some of the identified costs and impacts of the MRS may have positive implications for the waste management system. For example, while an MRS would add another facility that must be licensed, DOE officials stated that separating licensing of waste preparation functions from waste emplacement activities may facilitate repository licensing.

SECTION 5

STATE AND LOCAL IMPACTS OF MRS

DOE considers each of the three Tennessee sites acceptable for MRS and has identified Clinch River as the preferred site. Data on the candidate sites were also evaluated by the state and concerned local governments for acceptability in terms of environmental, socioeconomic, and transportation impacts.

DOE, the state, and the Roane County/Oak Ridge community evaluations generally agree that (1) environmental impacts from MRS would be within regulatory limits and could be mitigated; (2) socioeconomic impacts, including loss of tax revenues, will require compensation; and (3) further transportation planning and physical improvements will be required to alleviate state and local concerns. Some disagreement exists between DOE and the Tennessee Department of Conservation over the geologic suitability of the Clinch River site. In addition, the Clinch River Task Force raised several concerns about the need for better site-specific data and a thorough study of the possibility of accidents. The following presents a summary of the major concerns and conclusions regarding impacts of siting an MRS facility in Tennessee.

ENVIRONMENTAL IMPACTS

DOE concluded that the environmental impacts of the MRS would be slight and all within applicable federal and state standards. However, DOE said that MRS could result in a potential for temporary degradation of ambient air and water quality in the immediate vicinity of the proposed MRS site during construction activities (e.g., site clearing and excavation) and loss of land for ecological processes at the site. DOE stated that these environmental impacts are less than or equivalent to those expected for any moderately sized industrial facility.

The Tennessee State Department of Health and Environment found that DOE's plans for monitoring the site could help alleviate possible impacts from construction and agreed that any degradation would likely be temporary and within regulatory limits.

The Clinch River MRS Task Force concluded that construction activities could affect noise levels, surface and groundwater, and local ecology including forests, wildlife, fish, and endangered species. It also stated that more detailed study will be necessary to quantify the environmental impacts due to clearing and site preparation at the Oak Ridge site.

The State Department of Conservation was concerned that ecological data used for site selection were out of date or not site-specific and that this could delay construction if more current and site-specific data indicate problems. In addition, the Tennessee Department of Conservation's review of geologic data indicated that the Clinch River site contains sink holes and may be susceptible to flooding in the event of dam failure.

The Clinch River Task Force was concerned that workers, the public, or the environment could be exposed to radiation from accidents or during improper operation of the MRS.

SOCIOECONOMIC IMPACTS

DOE identified certain specific socioeconomic impacts applicable to the Clinch River community including the following:

- If the MRS were located at Clinch River, the community would lose use of the site for other commercial development with a resulting potential loss of additional tax revenues. Both the state and the Clinch River Task Force also identified this revenue loss as a negative impact.
- Local government costs would increase because of increased public services, especially in the Oak Ridge, Tennessee, community, given the present concentration of federal activities in the community. (Both the Clinch River and Oak Ridge sites are in Oak Ridge.) The Clinch River Task Force also believed MRS could hinder the community's efforts to diversify its economic base.
- The community could potentially lose some local control over its economic base accompanied by feelings of loss of financial independence.

The REAL group stated that Hartsville could experience negative socioeconomic impacts from construction of MRS. This group also believes MRS would negatively affect land values in the community.

The state agencies identified both negative and positive impacts from MRS in Tennessee. Among these impacts are the following:

- Public perceptions of the MRS facility could negatively affect tourism and new industry. The Clinch River Task Force agreed with this assessment.
- MRS would not create a material boom-bust effect on local communities.

--The benefits from the MRS are small relative to the existing local economy.

--An MRS facility would increase employment, increase revenue from sales taxes, and bring positive impacts from decreased property tax rates in the affected communities.

TRANSPORTATION IMPACTS

DOE concluded that each site would require varying degrees of access upgrading, such as highway improvements. In terms of safety and reliability, DOE concluded that

--radiological risks³ from transportation are low and

--nonradiological risks⁴ are slightly higher than radiological risks, but still extremely low.

Both the state and the Clinch River Task Force agreed with DOE's findings on transportation risks.

DOE recognized that more work was needed on other issues that would affect state and local governments, including

--specific shipment procedures and regulations,

--route designations and restrictions,

--training of all involved personnel,

--emergency responsiveness, and

--development of shipment tracking methods.

The Clinch River Task Force raised numerous concerns about some of the same issues, including routing, inspections, vehicle escorts, and emergency response procedures that it believes would be required for safe transport of spent fuel in the community. DOE and the state have agreed that these issues could be resolved in future agreements.

³Radiological risks arise from routine exposure to radiation from shipping spent fuel and potential releases from severe accidents.

⁴Nonradiological risks are associated with the actual act of transportation and possible breakdowns or accidents.

While the state identified some direct transportation impacts of the MRS on Tennessee, their analysis focused primarily on overall waste system impacts of shipping spent fuel with and without an MRS. The state studies identified the following transportation impacts:

- The amount of transportation of spent fuel in Tennessee will be greater with an MRS facility than without an MRS facility, and to the extent that risk is a function of the amount of transportation, the risk to Tennessee citizens will also be greater.
- Transport of spent nuclear fuel incurs relatively fewer risks than other types of transport (e.g., movement of gasoline, chemicals, coal, general freight, and even automobile occupants).
- Improving the logistics of the overall waste transportation system (by using large casks, increasing the proportion of transport by rail, and making greater use of trains that carry only spent fuel) can reduce all transportation impacts.
- Transportation improvements in a system without an MRS can achieve reductions in system impacts that are equal to or greater than those attributed to an MRS.

The REAL group found that road, bridge, and rail improvements would be needed to satisfy MRS transportation requirements and that public perceptions of the risks of nuclear shipment accidents contributed to the community's opposition to a facility in Hartsville.

SECTION 6

RESULTS OF SURVEY OF UTILITIES

In November 1985 we distributed a questionnaire to the chief executive officers of those utilities (74) that either own or operate nuclear power plants, asking their views on DOE's plans for MRS. The questionnaire, with a compilation of utilities' responses, is included on pages 22 through 30. The number of nonresponses and other responses for each question is also noted on the questionnaire. The following is a summary of the responses from the 54 utilities that completed our questionnaire.⁵

SPENT-FUEL STORAGE PLANS

Most spent fuel from reactors is currently stored in pools at the individual reactor sites. Some reactors are rapidly depleting their existing storage capacity. These reactors must find alternative means to expand or supplement this storage to accommodate their growing spent-fuel inventories until DOE accepts it for disposal as planned beginning in 1998. Utilities' ability to expand storage capacity at reactor sites bears directly on the question of need for and benefits of MRS for storage until a repository becomes available. Therefore, we asked the utilities questions regarding their spent-fuel storage plans. The following summarizes their responses:

--Most utilities (76 percent) are planning or have completed reracking their spent-fuel storage pools to expand their capacity. The two other storage methods mentioned most frequently as at least under consideration to keep plants operating were rod consolidation (43 percent) and on-site dry storage (31 percent).

--Almost all companies believe they can provide for their own spent-fuel storage needs until 1998 (when DOE expects a repository to be available), although 10 companies believe this would require great effort on their part.

--After 1998 it becomes more difficult for companies to provide storage. Three companies believe they would not be

⁵Of the 74 utilities sent questionnaires, 54 completed the questionnaire; 17 did not respond because they are minority owners and other companies responded for them; 2 companies did not complete the questionnaire but provided their comments in letters; and 1 company did not reply. For each question discussed in this summary, out of 54 responses 4 or fewer companies did not reply to a specific question (i.e., the answer was blank). All percentages in this summary are based on these 54 responses.

able to provide storage if a repository is delayed less than 5 years. Ten companies said they could not provide storage if a repository is delayed 5 years or more.

--Fifty-six percent of those responding said they would be willing to provide storage after 1998 if a repository is delayed less than 5 years. Twenty-two percent are willing to provide such storage after a 5-year or more delay.

--If a repository is not available in 1998--the year in which DOE has committed to begin accepting spent fuel from utilities--many utilities (48 to 67 percent) expect to seek some form of financial reimbursement from DOE for continued storage of their spent fuel either through financial credit or direct payment for company services.

--Most utilities (83 percent) anticipate that community reaction and NRC licensing are most likely to cause some problems if spent-fuel storage is provided on-site beyond 1998.

MRS

According to DOE's December 1985 proposal documents, utilities will bear the costs of MRS through their payments to the Nuclear Waste Fund. In addition, if the MRS is not approved, some or all of the functions attributed to the MRS--storage, rod consolidation, packaging, and others--may be performed at the reactor sites. Therefore, we asked the utilities questions to determine their views of the need for and desirability of MRS. The following is a summary of their responses:

--If a repository is not available in 1998, 52 percent of those responding said they would prefer that their spent fuel be stored at an MRS rather than on-site at power plants.

--Most utilities (70 percent) are willing to pay a share of the costs of MRS if it is covered by the current 1-mill-per-kilowatt-hour fee to utilities.

--Utilities are unwilling or uncertain that they would agree to pay these costs if

- (1) MRS requires an increase in the 1-mill fee (80 percent),
- (2) they have already incurred substantial investments for on-site storage (89 percent), or
- (3) their spent fuel is not shipped to an MRS (91 percent).

- Most utilities believe that with effort they could arrange for the functions of an MRS--rod consolidation (81 percent), standardized packaging (69 percent), cask decontamination (85 percent), and centralized transportation (52 percent)--without an MRS facility.
- More utilities (44 percent) would prefer a waste management system with only a repository to one with both a repository and an MRS (39 percent).
- More companies support an MRS (44 percent) than oppose it (31 percent); 20 percent are neutral at this time.
- Seventy percent of the utilities have no confidence that DOE will have a repository in operation in 1998. Another 9 percent have little confidence.
- Most companies believe a repository will not be available before 2003. Eight utilities foresee a gap between when they will no longer be able to provide storage and when they expect a repository to be available.

U.S. GENERAL ACCOUNTING OFFICE



Review of DOE's Plans for Monitored Retrievable Storage

INTRODUCTION

The U.S. General Accounting Office (GAO) is an agency that assists the U.S. Congress in evaluating federal programs. At the request of two U.S. House of Representative committees, we are examining the Department of Energy's (DOE's) plans for monitored retrievable storage of spent nuclear fuel.

The purpose of this questionnaire is to obtain information from utility nuclear powerplant managers about the impacts of the DOE's plans for monitored retrievable storage of spent nuclear fuel on utilities. DOE has announced plans to propose that a facility for monitored retrievable storage of spent nuclear fuel be constructed in Tennessee. Such a facility would be scheduled to begin accepting spent fuel from utilities in 1996. DOE believes that monitored retrievable storage (MRS) will benefit utilities by relieving utilities from adding storage capacity in the initial years of its operation and that such a facility will fulfill DOE's contractual commitment with your company to begin accepting waste in 1998.

To refresh your memory, as proposed by DOE, an MRS would be a centralized facility to:

- receive, handle, package, and ship spent fuel to a repository
- store limited amounts of spent fuel (approximately 15,000 MT).

The repository planned for 1998 would:

- receive, handle, and package spent fuel
- have extensive storage capacity and disposal capability for spent fuel.

The results of this survey will be used by the GAO in reporting to the Congress on DOE's plans for MRS. Since your utility is likely to be directly affected by DOE's program, your frank and honest answers will provide valuable information. Please answer the questions in terms of your company's needs and plans, not in terms of the industry as a whole.

The questionnaire may take about 20 minutes to complete. Most of the questions can be completed by checking boxes. There is space at the end of the questionnaire for any comments you may wish to make concerning DOE's plans for MRS.

We want to make one point clear. Your answers will be confidential and used only for the purpose of this study. The questionnaire is numbered so that when we receive your completed questionnaire we do not have to send you a follow-up request. In fact, your name and address will be disassociated from your questionnaire and your answers will be combined so that nobody will be able to tell how you or any other single company answered a given question. Remember, while your name is not important to this study, your plans and opinions are. We cannot make meaningful recommendations without help from you and others like you.

Please return the completed questionnaire in the self-addressed envelope within 3 weeks after receipt. If you have any questions, please call either Mary Cheston or Vince Price at (202) 252-8720.

Thank you for your cooperation.

If the self-addressed envelope is misplaced, please mail the completed questionnaire to:

Mr. Vince Price
U.S. General Accounting Office
Forrestal Building, Room GB-236
1000 Independence Avenue, S.W.
Washington, D.C. 20585

ID1 (1-2)
DT1 (3-8)
CD1 (9)

1. In order to maintain full core reserve and keep your company plant(s) operating until the license(s) expires, your company may be considering storage options.

For each of the storage options listed below, which stage of planning best describes your company's plans for spent fuel storage? (FOR EACH STORAGE OPTION CHECK ONE COLUMN.) (10-15)

STORAGE OPTIONS	1. Not Currently Under Consideration	2. Under Consideration	3. Tentatively Planned	4. Planned and Budgeted	5. Ongoing	6. Completed	7. 1	8. 2
1. Reracking pool	8	3	3	5	6	27	0	2
2. Transshipment to another pool	42	6	2	0	2	0	0	2
3. Rod consolidation	28	15	4	4	0	0	0	3
4. Onsite dry storage	34	15	1	1	0	0	1	2
5. Offsite dry storage (SPECIFY WHERE)	48	3	1	0	0	0	1	1
6. Other (SPECIFY)	9	2	0	0	1	2	40	0

2. By what month and year does your company anticipate the end of operating life for each of your plants? (PLEASE SPECIFY THE PLANT'S NAME AND ENTER THE MONTH AND YEAR FOR EACH PLANT CURRENTLY LICENSED.)

	Plant Name	Month	Year	
1. Plant	Reactor-Specific			(16-19)
2. Plant				(20-23)
3. Plant				(24-27)
4. Plant				(28-31)
5. Plant				(32-35)
6. Plant				(36-39)
7. Plant				(40-43)

¹N=No Response
²O=Other Response

PLEASE READ

- 1) ANSWER QUESTIONS IN TERMS OF YOUR COMPANY'S NEEDS AND PLANS, NOT THE PERSPECTIVE OF THE INDUSTRY AS A WHOLE.
- 2) UNLESS OTHERWISE NOTED, COMPLETE THE QUESTIONNAIRE ASSUMING DOE'S PLANS FOR A REPOSITORY IN 1998 WILL BE REALIZED.

4a. If a repository is not available in 1998, would your company be willing to store on site spent fuel generated by your currently licensed reactors during the following time periods?
(FOR EACH PERIOD CHECK ONE COLUMN.)

TIME PERIODS	1. Definitely Yes	2. Probably Yes	3. Uncertain	4. Probably No	5. Definitely No	N	O
1. After 1998 if a repository is delayed for less than 5 years	10	20	10	7	5	1	1
2. After 1998 if a repository is delayed for 5 years or more	2	10	2	8	10	2	1

3a. Do you expect your company will be able to provide for onsite storage for all spent fuel generated by your currently licensed reactors through each of the periods listed below?
(FOR EACH PERIOD CHECK ONE COLUMN.)
(44-47)

PERIODS	1. Able With Little or No Effort	2. Able With Some Effort	3. Able With Moderate Effort	4. Able With Great Effort	5. Not Able	N	O
1. Until 1996 (when an MRS is scheduled to be available)	29	10	8	5	0	1	1
2. Until 1998 (when a repository is scheduled to be available)	21	12	9	10	0	1	1
3. After 1998 if a repository is delayed for less than 5 years	10	7	11	20	3	1	2
4. After 1998 if a repository is delayed for 5 years or more	1	4	8	28	10	1	2

4b. Why or why not?
(54)

Narrative answers _____

3b. In what year will your company no longer be able to provide for onsite storage? (SPECIFY YEAR.)

Year Range from _____ (48-51)
 1992 to 2030

9. If a repository is not available in 1998, do you expect that your company will request any of the following types of assistance from DOE in order to provide spent fuel storage during the following time periods? (UNDER EACH TIME PERIOD, FOR EACH TYPE OF ASSISTANCE CHECK ONE COLUMN.)

ASSISTANCE	TIME PERIODS														
	IF REPOSITORY IS DELAYED UNDER 5 YEARS							IF REPOSITORY IS DELAYED 5 YEARS OR MORE							
	N	Q	1. Definitely Yes	2. Probably Yes	3. Uncertain	4. Probably No	5. Definitely No	1. Definitely Yes	2. Probably Yes	3. Uncertain	4. Probably No	5. Definitely No	N	O	
1. Federal Interim Storage as defined by the Waste Act	2	1	3	7	11	20	10	6	10	14	17	4	2	1	(55-56)
2. Financial credit	2	1	14	13	17	7	0	20	16	13	2	0	2	1	(57-58)
3. Direct payment for your company's services	1	1	14	12	18	8	0	22	9	19	2	0	1	1	(59-60)
4. Equipment (storage cask, rod consolidation equipment, etc.)	2	1	10	15	13	12	1	19	13	15	4	0	2	1	(61-62)
5. Other (SPECIFY)															(63-64)
	43	1	4	4	1	1	0	5	5	1	0	0	4	2	1

6. In your opinion, how major or minor a problem (if at all) does your company anticipate any of the following would be in providing onsite storage of spent fuel after 1998? (FOR EACH ITEM CHECK ONE COLUMN.)

(65-69)

ITEMS	1. No Problems	2. Minor Problems	3. Moderate Problems	4. Major Problems	5. Very Major Problems	N	O
1. Public utility commission(s) approval	9	11	18	8	2	3	3
2. NRC licensing	5	8	27	9	1	1	3
3. Community or public reaction	5	7	16	10	12	1	3
4. Local permits	17	4	16	6	4	4	3
5. Other (SPECIFY)	0	0	0	3	2	47	2

8. Assuming a repository is available in 1998 and considering your company's needs and plans, does your company feel that it would be more costly to store spent fuel at an MRS or onsite at your reactor(s)? (CHECK ONE.)

(71)

1. [16] MRS would be much more costly
2. [10] MRS would be somewhat more costly
3. [1] MRS would be about as costly as reactor storage
4. [10] Reactor storage would be somewhat more costly
5. [5] Reactor storage would be much more costly

1 N

11 O

7. If a repository is not available in 1998, which of the following options for storing spent fuel generated by your currently licensed reactors does your company prefer? (CHECK ONE.)

1. [15] Onsite storage (70)
2. [28] MRS
3. [1] Other (SPECIFY)

9. To what extent, if at all, would your company be willing to pay a proportional share of the costs for an MRS facility under each of the following conditions? (FOR EACH CONDITION CHECK ONE COLUMN.)

(72-75)

CONDITIONS	1. Definitely Willing	2. Probably Willing	3. Uncertain	4. Probably Unwilling	5. Definitely Unwilling	N	O
1. If MRS costs are covered by existing 1 mill fee	21	17	4	6	3	1	2
2. If MRS costs require an increase in 1 mill fee	1	7	18	12	13	1	2
3. If your company has incurred substantial investment in alternative onsite storage methods	2	1	11	22	15	2	1
4. If your company's spent fuel is not sent to an MRS, but goes directly to a repository	1	2	9	14	26	1	1

ID2 (1-2)
CD2 (3)

10. Considering your company's needs and plans, which of the following activities, if any, does your company feel should be done at an MRS given the following conditions? (UNDER EACH CONDITION, CHECK ONE COLUMN FOR EACH ACTIVITY.)

ACTIVITIES	A IF REPOSITORY IS AVAILABLE IN 1998					B IF REPOSITORY IS DELAYED UNDER 5 YRS					C IF REPOSITORY IS DELAYED 5 YEARS OR MORE											
	1. Definitely Yes	2. Probably Yes	3. Uncertain	4. Probably No	5. Definitely No	1. Definitely Yes	2. Probably Yes	3. Uncertain	4. Probably No	5. Definitely No	1. Definitely Yes	2. Probably Yes	3. Uncertain	4. Probably No	5. Definitely No	N		O				
1. Long term storage	4	4	5	21	18	8	4	14	16	9	16	16	11	3	6	1	1	1	2	1		
2. Rod consolidation	10	17	13	4	7	12	20	8	5	5	22	13	10	2	4	2	2	2	1	2	1	
3. Standardized packaging	15	16	11	4	6	17	16	9	5	4	25	14	8	2	3	1	1	1	1	2	1	
4. Centralized transportation to repository	15	16	10	5	6	16	15	10	5	4	23	15	8	3	3	1	2	1	1	2	1	
5. Other (SPECIFY)	4	0	1	1	1	5	1	0	1	1	5	1	0	1	0	4	6	4	6	1	2	1

11. Assuming a repository is available in 1998 and considering your company's needs and plans, for each of the following features of DOE's MRS proposal, how necessary or beneficial does your company believe the feature is? (FOR EACH FEATURE CHECK ONE COLUMN.) (19-23)

FEATURES	1. Necessary	2. Beneficial But Not Necessary	3. Neither Necessary Nor Beneficial	N	O
1. Long term storage	5	18	29	2	0
2. Rod consolidation	7	29	15	2	1
3. Standardized repackaging of spent fuel by remote technology	14	23	15	1	1
4. Decontamination of transport casks	23	12	16	1	2
5. Centralized transportation	15	22	16	1	0

12. Assuming a repository is available in 1998, does your company expect to be able to provide or arrange for each of the following services, if Congress does not authorize DOE's proposal for an MRS? (FOR EACH SERVICE CHECK ONE COLUMN.) (24-27)

SERVICES	1. Able With Little or No Effort	2. Able With Some Effort	3. Able With Moderate Effort	4. Able With Great Effort	5. Not Able	N	O
1. Rod consolidation	2	7	18	17	3	4	3
2. Standardized packaging of spent fuel	1	6	13	17	10	3	4
3. Decontamination of transport casks	11	12	18	5	2	3	3
4. Centralized transportation	2	3	13	10	19	4	3

13a. Assuming a repository is available in 1998 and considering your company's needs and plans, does your company support or oppose DOE's current plans proposing an MRS through which all or most spent fuel will pass en route from reactors to the repository? (CHECK ONE.) (28)

- 1. [9] Strongly support
- 2. [5] Generally support
- 3. [1] Neither support nor oppose
- 4. [4] Generally oppose
- 5. [3] Strongly oppose

13b. Why does your company support or oppose DOE's current plan proposing an MRS? (29)

Narrative answers

14. Which of the following options for waste management of spent fuel generated by your currently licensed reactors does your company prefer? (CHECK ONE.) (30)

- 1. [24] Repository only
- 2. [21] MRS and repository
- 3. [7] Other (SPECIFY)

Narrative answers

2 N

15. In your opinion, how major or minor (if at all) will long-term storage problems be for your company's reactors not currently licensed, but in some phase of construction? (CHECK ONE.) (31)

- 1. [33] No reactors under construction
- 2. [3] No problems
- 3. [8] Minor problems
- 4. [8] Moderate problems
- 5. [0] Major problems
- 6. [0] Very major problems

16. If your company anticipates any problems at reactors under construction, please describe them below. (32)

Narrative answers

17a. In general, how confident (if at all) is your company that DOE will have a repository available in 1998? (CHECK ONE.) (33)

- 1. [38] Not confident
- 2. [5] A little confident
- 3. [1] Somewhat confident
- 4. [1] Moderately confident
- 5. [2] Greatly confident
- 6. [5] No basis to judge

17b. In what year does your company expect the repository to be available? (SPECIFY YEAR.)

Year Range from 1998 to 2010

(34-37)

SECTION 7

OBJECTIVES, SCOPE, AND METHODOLOGY

The chairmen of the House Committee on Interior and Insular Affairs and the Subcommittee on Energy Conservation and Power, House Committee on Energy and Commerce, asked GAO on March 18, 1985, to review DOE's proposal for MRS to assist the Congress in evaluating the MRS and the integrated transportation system associated with it. The request includes seven specific questions concerning the purpose, benefits, and impacts of MRS, Tennessee's role in the program, and how well DOE has analyzed the costs of; scheduling, siting, and transportation impacts of; need for; and alternatives to a nuclear waste management system including an MRS. The overall objective of our review is to determine whether DOE's proposal provides sufficient information for congressional authorization of the MRS.

The objective in this fact sheet is to provide the requesters with factual information on the MRS to assist during deliberations on whether to approve construction of the MRS. To achieve this objective, we agreed with the requesters' offices to provide this information in a briefing document prior to completion of our overall assignment. This fact sheet addresses those questions in the March 18, 1985, letter that involve a compilation of basic information on the MRS rather than detailed analysis and evaluation--those concerning the purpose, advantages/disadvantages, and impacts of the MRS and the role of the state of Tennessee in the program. We did not attempt to evaluate the information presented. The remaining questions requiring our evaluation and analysis will be addressed in our final report. The information contained in this fact sheet will be used in our evaluation of the remaining issues raised in the request.

In addition to presenting information on the MRS proposal, we are including the results of a questionnaire we distributed to the chief executive officers of all utilities (74) that either own or operate nuclear power plants to obtain information that also will be useful in answering the remaining questions in the request. The questionnaire was designed to obtain information on utilities' plans for expanding spent-fuel storage and their views on the need for, and benefits of, the MRS proposed by DOE. This information is important for our evaluation since utilities' plans and views bear directly on whether the MRS is either necessary to prevent some reactors from having to shut down because of insufficient storage space or beneficial to utilities in that MRS may lessen the amount of storage capacity that must be added at reactor sites.

The questionnaire was pretested with four utilities and the Edison Electric Institute--a national association representing the utility industry--prior to its distribution. Fifty-four companies

completed the questionnaire; 17 companies did not respond because they are minority owners and either a parent company or the plant's operating company was submitting a response that was representative of their views; 2 companies submitted their views in letters but did not complete the questionnaire; and 1 company did not reply. The questionnaire, with a compilation of utilities' responses, is included in this fact sheet.

We obtained most of the information for this fact sheet from documents provided by the Department of Energy. We reviewed the December 1985 "Review Copies" of DOE's MRS proposal documents, as well as various internal DOE memoranda, some draft segments of the proposal documents, and early contractor studies relating to the proposal. Because DOE has not yet submitted its final proposal to the Congress pending resolution of litigation, we were not able to review the final MRS proposal. We also obtained information from discussions with officials of DOE's Office of Civilian Radioactive Waste Management.

In addition, we obtained information from officials of the Tennessee Safe Growth Cabinet Council, the city of Oak Ridge, and the Clinch River MRS Task Force and the Research, Evaluation, Analysis and Liaison group--two local groups established to evaluate DOE's proposal. In addition, we reviewed various documents and studies prepared by advisors and contractors assisting the state in evaluating DOE's MRS proposal.

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