



The DOE Position on the MRS Facility

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THE DOE POSITION ON THE MRS FACILITY

The position of the Department of Energy (DOE) on the facility for monitored retrievable storage (MRS) can be summarized as follows:

- The DOE supports the development of an MRS facility as an integral part of the waste-management system because an MRS facility would allow the DOE to better meet its strategic objectives of timely disposal, timely and adequate waste acceptance, schedule confidence, and system flexibility. This facility would receive, store, and stage shipments of intact spent fuel to the repository and could be later expanded to perform additional functions that may be determined to be beneficial or required as the system design matures.
- Recognizing the difficulty of DOE-directed siting through national or regional screening, the DOE prefers an MRS facility that is sited through the efforts of the Nuclear Waste Negotiator, especially if the siting negotiations lead to linkages that allow the advantages of an MRS facility to be more fully realized. Even if such revised linkages are not achieved, however, the DOE supports the development of the MRS facility.

The DOE's position on the need for an MRS facility is drawn from many analyses and evaluations performed in the last several years, beginning with a preliminary assessment in 1985 of the need for, and the feasibility of, an MRS facility¹; a study² that examined the design and operational interfaces between the MRS facility and the repository, including such factors as licensing, effects on repository development, and the allocation of functions between the MRS facility and the repository; and a detailed need-and-feasibility study in DOE's 1987 proposal to the Congress to construct an MRS facility.³ These analyses indicated that the inclusion of an MRS facility would lead to an improved-performance waste-management system with significant advantages over a system without an MRS facility. Next came a study,⁴ performed in response to comments by the General Accounting Office⁵ and others, that compared the improved-performance system against an optimized no-MRS system in which additional spent-fuel storage would be provided at reactor sites. The DOE has performed several annual analyses of total-system life-cycle costs (see, for example, Ref. 6). And the DOE has recently completed a study of dry at-reactor storage⁷ as well as a set of systems studies.⁸⁻¹⁶ The systems studies analyzed a wide range of scenarios to examine systems with and without an MRS facility as well as MRS facilities performing a variety of functions. In addition, the DOE has closely followed spent-fuel storage developments in other countries, including Canada, Germany, Switzerland, the United Kingdom, and Sweden. These studies and analyses have encompassed almost all of the issues raised in the hearings held by the MRS Review Commission and in other forums. The only issues that were not explicitly addressed were the development of multiple MRS facilities and the siting of the MRS facil-

ity in Nevada, though expanded lag storage at the repository site was examined in the environmental assessment included in the DOE's 1987 proposal.³

The DOE has also performed qualitative evaluations to examine how including an MRS facility in the waste-management system would help to achieve permanent waste isolation in a geologic repository consistent with the DOE's basic policy goals and program objectives. The policy goals include protecting the health and safety of the public, protecting the quality of the environment, and allowing full and open participation by the public. The program objectives, given these policy goals, are (1) timely disposal, (2) timely and adequate waste acceptance, (3) schedule confidence, and (4) system flexibility. These goals will be discussed in more detail later.

Its evaluations have led the DOE to identify the preferred MRS concept--namely, an integral MRS facility that is developed to provide spent-fuel acceptance from reactors, temporary storage, and staging for shipment to the repository and can be later expanded to perform other functions if appropriate.

The results of the DOE's evaluations indicate that the inclusion of such an MRS facility would provide significant advantages to the Federal waste-management system, but the addition of the MRS facility would increase the cost of the system. The DOE recognizes that storage at reactor sites can be safely continued and that additional at-reactor storage will continue to be necessary until such time, and for some time thereafter, as the Federal Government is able to begin receiving spent fuel, with or without an MRS facility. However, an MRS facility can provide direct and substantial benefits in demonstrating early Federal capability to successfully solve the waste-management problem through early and adequate waste acceptance, enhancing confidence in the development of the waste-management system, and providing needed flexibility both in operations and timing.

The DOE also looks forward with anticipation to hearing the findings and recommendations of the MRS Review Commission. The DOE will consider and take into account the MRS Review Commission's findings and observations as the DOE continues to refine the design and the implementation of the waste-management system.

1. BACKGROUND

Section 141 of the Nuclear Waste Policy Act of 1982 (NWPA--Public Law 97-425) directed the DOE to complete a study of the need for, and the feasibility of, an MRS facility and to submit to the Congress a proposal for the construction of one or more MRS facilities. Such a facility was to accommodate civilian spent fuel and high-level waste; permit continuous monitoring, management, and maintenance of these wastes; provide for the ready retrieval of these wastes for further processing or disposal; and safely store such wastes as long as may be necessary. The NWPA spe-

cified that the disposal of high-level radioactive waste and spent fuel in a repository "should proceed regardless of any construction" of an MRS facility.

In the spring of 1985, the DOE completed a preliminary need-and-feasibility analysis¹ and announced the preliminary conclusion that an MRS facility could serve as an integral component of the overall waste-management system and could enhance the development and performance of the system. On March 31, 1987, the DOE submitted to the Congress a proposal to construct and operate an MRS facility at Oak Ridge, Tennessee.³ The construction of an MRS facility was proposed because the DOE believed that the MRS facility would provide a number of significant advantages in the development and the operation of the waste-management system. The principal functions of this facility were to receive spent fuel from nuclear reactors; to prepare it for emplacement in a repository, including consolidation into more-compact arrays; and to serve as the central receiving station for the waste-management system. In addition, the MRS facility was to provide temporary storage for a limited quantity of spent fuel. The DOE's schedule called for this facility to start receiving spent fuel in 1998—that is, 5 years before the start of waste acceptance at the first repository. To allay concerns that the MRS facility could detract from the commitment to geologic disposal, the DOE recommended that the Congress (1) limit the storage capacity of the MRS facility to 15,000 metric tons of heavy metal (MTHM) and (2) direct that the MRS facility cannot start receiving spent fuel until a construction authorization for the repository has been received from the Nuclear Regulatory Commission (NRC).

After the proposal was prepared, the General Accounting Office,⁵ the State of Tennessee,¹⁷ and others raised a number of questions about the need for an MRS facility. In particular, the GAO was concerned that the DOE had optimized the MRS system and compared it with a less-than-optimal no-MRS system. The GAO felt that the decisionmakers needed to see the "best" no-MRS system compared against the MRS system. It also was concerned about the completeness of the cost estimates in the DOE's proposal. In response, the DOE issued, in November 1987, a report⁴ that examined a no-MRS system optimized to include transportation improvements and other modifications as well as several options involving an MRS facility. This report, known as the "Additional Information Report," concluded that no realistic combination of technological modifications and of shifting waste-preparation functions from the DOE to the utilities would yield advantages equivalent to those expected from the MRS facility or alter in a substantive way the MRS advantages. Many of the major advantages of the MRS facility can be obtained only by the construction and operation of a central facility in addition to the repository. The study concluded that no improvements to a no-MRS option, in which activities are performed at separate reactor sites, can provide comparable benefits. In its statement to the MRS Review Commission, the GAO stated that this study had been "a very good effort on DOE's part."¹⁸

On December 21, 1987, the Congress approved legislation amending the Nuclear Waste Policy Act of 1982. Known as the Nuclear Waste Policy

Amendments Act of 1987 (the Amendments Act--Public Law 100-203, Subtitle A), this legislation was signed into law by President Reagan on December 22, 1987. The Amendments Act significantly altered the environment under which the DOE had proposed the MRS facility by selecting one site for detailed characterization as a candidate site, to determine its suitability for a repository, and changing the MRS provisions of the NWPA. It annuls and revokes the DOE's proposal to construct an MRS facility at Oak Ridge, Tennessee, but it does authorize the DOE to site, construct, and operate an MRS facility subject to certain conditions. The DOE has included such a facility in its baseline authorized system for planning purposes, recognizing that the MRS Review Commission is to provide an independent assessment of the need for an MRS facility before the DOE can start site surveys and evaluations.

2. STATUTORY CONDITIONS ON THE MRS FACILITY

The Amendments Act imposes the following set of conditions on the construction and operation of the MRS facility:

1. The DOE may begin a survey and evaluation of potentially suitable sites only after the MRS Review Commission submits (in November 1989) its report to the Congress on the need for an MRS facility, and the preferred MRS site may be selected only after a repository site has been recommended to the President.
2. Any license issued by the Nuclear Regulatory Commission for the MRS facility is to provide that--
 - a. The construction of the MRS facility cannot begin until the NRC has issued a license for the construction of the repository.
 - b. The construction of, or waste acceptance at, the MRS facility must cease if the repository license is revoked or if the construction of the repository ceases.
 - c. No more than 10,000 MTHM of waste can be stored at the MRS facility until the repository begins receiving waste.
 - d. The quantity of waste present at the MRS site at any one time may not exceed 15,000 MTHM.

Condition 1 and the first licensing condition directly affect the schedule for the MRS facility. If the MRS facility is constructed in a single phase to perform all the functions described in the DOE's 1987 proposal--that is, spent-fuel receipt, consolidation, packaging in preparation for emplacement in the repository, and temporary storage for up to 15,000 MTHM--and the construction authorization for the repository is received in 1998, as currently expected, waste acceptance at an MRS facility can start no earlier than 2003--a few months before the start of waste acceptance at the repository. However, with an MRS facility that can be developed in

stages the DOE could start accepting waste years earlier, possibly as early as 2000 with the existing linkages and in 1998 or even earlier with alternative, less-limiting, linkages.

The linkages established by the Amendments Act limit the benefits expected for the system from the MRS facility. Nonetheless, the DOE continues to believe that the preferred MRS facility can enhance the overall system and its performance even with the linkages. For example, even with the repository startup in the currently projected schedule, there will remain significant uncertainties in the waste-emplacment rate because of the first-of-a-kind nature of the repository, potential variability in underground conditions, and licensing uncertainties that may favor lower emplacement rates in the early years. The addition of significant amounts of Federal storage capacity of the kind provided by the MRS facility would help achieve the program objectives of confidence in the schedule of the waste-management system and timely and adequate waste acceptance; it would also provide utilities with a firmer basis for planning and a greater rate of waste acceptance than would be possible with only a repository. These advantages would be even more significant if the MRS facility started operations earlier, with somewhat higher limits on the quantities of waste that can be stored.

Linkages to the repository schedule were recommended in the DOE's proposal to the Congress,³ to allay concerns that an MRS facility would diminish the resolve to develop a geologic repository. To reinforce this country's commitment to the repository program, the DOE proposed that the Congress link the start of MRS operations to the schedule of the repository, with no waste to be accepted at the MRS facility until a construction authorization for the repository is received. This linkage allowed greater flexibility in system development than do the linkages established by the Amendments Act.

The DOE continues to believe that it is useful to explore the implications of the existing linkages and of possible alternatives that would allow the MRS advantages to be more fully realized. The alternatives might include different linkages to the repository and an increase in the amount of spent fuel that can be stored at the MRS site. The DOE would support such revised conditions on the MRS facility if contained in a proposed agreement submitted by the Nuclear Waste Negotiator to the Congress for approval. The DOE encourages the Review Commission to examine alternative provisions that will ensure the commitment to geologic disposal while at the same time maximizing the value of the MRS facility to the waste-management system.

3. DESCRIPTION OF THE PREFERRED INTEGRAL MRS FACILITY

The concept preferred by the DOE is an integral MRS facility that is designed to allow development in stages. "Integral" means a facility that is fully integrated into a waste-management system in which all elements and components are optimized as part of a single system. It is an in-line

facility that will receive commercial spent fuel, provide a limited amount of storage, provide staging for transportation to the repository, and perform other functions if determined necessary or desirable by future analyses. If the MRS facility is located in the eastern United States, then spent fuel from western reactors, which represents about 10 percent of the total, would most likely be shipped directly to the repository.

In the first stage, the MRS facility would have a building for receiving and handling the spent fuel. It would receive and inspect spent fuel, store it, and ship it to the repository at a rate and schedule consistent with repository operations. The fuel would be received in transportation casks shipped by truck and rail, unloaded from the shipping cask, inspected, and loaded into storage modules. All shipments from the MRS facility to the repository would be made exclusively by rail in dedicated trains, which would minimize the number of shipments to the repository. During steady-state operation, when the receipt rate is equal to the shipping rate, the MRS facility would serve as a staging facility for transportation: spent fuel received in truck and rail casks would be transferred to large-capacity rail casks for shipment to the repository by dedicated train.

The DOE is also evaluating the possible use of dual-purpose transportable storage casks to allow spent-fuel acceptance at reactor sites even earlier. Although such casks are not part of the baselined system, the DOE intends to continue examining the potential benefits and costs of using such casks as part of the Federal waste-management system.

A major packaging capability is optional and could be added at a later date. It would consist of any facilities needed for additional functions (e.g., rod consolidation or packaging into disposal-ready containers) that may be determined to be beneficial or required as the system design matures. This optional phase would provide flexibility to further optimize the waste-management system.

It should be noted that the preferred MRS concept does not completely correspond to any of the MRS-facility scenarios evaluated in the recent systems studies.⁸⁻¹⁶ The systems studies did evaluate a basic MRS facility, but their scenario did not provide for a decision at a later date to add other functions; the systems studies also evaluated a phased MRS facility, but they assumed rapid phasing of specified duration. The results of the systems studies, especially the cost estimates, are not directly applicable to the preferred concept described above.

4. WASTE FORM

The DOE's studies indicate that intact spent nuclear fuel as received from reactors should be the waste form used as the basis for the advanced conceptual designs for the repository and the waste package. The DOE will not presume at this point that the spent fuel will be subjected to any operations like consolidation because there is no clear incentive

for such operations. However, the desirability of such operations will be evaluated during the advanced conceptual design of the repository and the waste package. An evaluation of alternatives is needed (1) to fulfill the licensing requirements of 10 CFR Part 60 on the evaluation of alternatives to major design features important to waste isolation and (2) to retain the flexibility necessary to accommodate major technical and economic uncertainties (such as the waste-package environment and its effect on waste-package design strategies for containment, controlled release, and the avoidance of nuclear criticality) that are expected to be resolved through the process of repository-site characterization.

The DOE's current position on consolidation in the Federal waste-management system is directly related to the programmatic changes resulting from the Amendments Act and analyses performed since the 1987 proposal,³ which did include consolidation. Consolidation was included in the functions of the MRS facility because it appeared to offer some advantages for repositories in basalt and salt and because consolidated spent fuel had been for several years the assumed reference waste form for all sites. However, the Congress has selected a single site—Yucca Mountain in Nevada—for characterization as a candidate site for the repository, whereas in 1987 three sites in three different host rocks were being considered. The selection of the Yucca Mountain site has allowed the DOE's studies to focus on the economics of various waste-package concepts for that site, and these studies have not identified sufficient advantages for consolidation to warrant its use at present.

The DOE has concluded that spent-fuel preparation for disposal should be performed in the Federal waste-management system rather than at the individual reactor sites. The DOE is proceeding on the basis that most of the spent nuclear fuel received from the utilities will consist of intact fuel assemblies. The DOE will retain the capability to receive, package, and dispose of the consolidated fuel that will be received from the utilities that have already performed or may perform consolidation as a means of meeting their storage requirements.

5. ASSESSMENT OF THE INTEGRAL MRS FACILITY

The advantages and disadvantages of the MRS facility have been assessed qualitatively. This assessment compared an "optimum" no-MRS case with the preferred MRS concept.

The optimum no-MRS case on which the comparison is based is the case described as "no-MRS alternative 1" in the "Additional Information Report."⁴ It includes the use of reasonably achievable improvements in transportation, such as the use of higher-capacity truck and rail shipment casks, and increased coordination between the DOE and the utilities with respect to the management of at-reactor storage. In this context, the DOE would encourage the use of at-reactor-storage options that would be beneficial to the overall waste-management system; for example, if canisters are used in at-reactor storage, the DOE might provide specifications for

canisters that would be compatible with the Federal waste-management system. The optimum no-MRS case involves no promotion of, or requirement for, spent-fuel preparation at reactor sites beyond storage. The "Additional Information Report" did evaluate alternatives that involved promoting or requiring spent-fuel preparation and packaging at reactor sites. The results showed that these alternatives provided none of the substantial system-development benefits of the MRS facility, and yet their estimated costs were comparable to, or higher than, the costs of the system with an MRS facility.

In assessing the preferred integral MRS facility, it is useful to start by examining the relationship of the system with an MRS facility to the DOE's program objectives. These objectives are as follows:

1. **Timely disposal:** to establish as soon as practicable the ability to dispose of waste in an NRC-licensed geologic repository.
2. **Timely and adequate waste acceptance:** to begin the operation of the integrated waste-management system as soon as practicable, leading to the acceptance of waste for disposal at a significant rate during the early years of system operation.
3. **Schedule confidence:** to establish confidence in the schedule for waste acceptance and disposal.
4. **System flexibility:** to ensure that the program has the flexibility necessary for adapting to future circumstances while fulfilling its commitments.

5.1 Overview of MRS advantages

As already mentioned, the DOE continues to believe that an integrated MRS facility will have major benefits for both the development and operation of the waste-management system, because it helps to achieve the DOE's program objectives. It is therefore useful to summarize the main advantages of an MRS facility. These advantages will then be discussed in detail, together with potential disadvantages and factors that do not discriminate between the MRS and no-MRS options.

Timely disposal

- The development of the repository could be facilitated by the institutional and regulatory experience obtained in siting and licensing a large-scale waste-management facility earlier than the repository--as might be possible with a negotiated MRS site.

Timely acceptance

- By reliance on proven technology, the MRS facility provides confidence in spent-fuel acceptance by the waste-management system at the earliest possible time--up to about 3 years earlier than the

repository under the conditions in the Amendments Act, which link MRS construction to the construction authorization for the repository, or up to about 5 years earlier under the linkages proposed by the DOE in 1987,³ which tied MRS operation to the construction authorization for the repository.

- The MRS facility avoids costs to utilities for additional storage both in and outside reactor pools. A waste-management system with an MRS facility opening in 2000, 3 years ahead of the repository, and receiving fuel at the rates identified in the Draft 1988 Mission Plan Amendment,¹⁹ would accept about 14,200 MTHM more than a system without an MRS facility.¹⁶ The resulting savings by the utilities would partially offset the costs of developing and operating an MRS facility.
- By stopping the overall buildup of spent fuel in at-reactor storage both in and out of pools, the MRS facility reduces the likelihood that at-reactor storage could interfere with reactor operations, thus allowing the utilities to focus on their primary objective--the safe and reliable generation of electricity.
- Early and adequate waste acceptance at an MRS facility would ensure that the removal of spent fuel from reactors would not delay the planned decontamination and decommissioning of reactors.

Schedule confidence

- A firm Federal commitment to proceed with an MRS facility would enhance confidence that the Federal Government is using all available means to ensure timely assumption of the Federal responsibility to accept spent fuel for disposal.
- Once in operation, an MRS facility would enhance confidence in the waste-management program by providing the earliest possible demonstration of a key aspect of waste management: the ability of the Federal Government to accept, transport, and handle spent fuel at high annual rates.

System flexibility

- To the extent allowed by linkages to the repository, the MRS facility would enhance the capability of the waste-management program to adapt to the uncertain future.
- To the extent allowed by linkages, the MRS facility would enhance the flexibility of the repository-development schedule by allowing some adjustments in that schedule without adverse at-reactor impacts.
- The MRS facility would provide flexibility with respect to later decisions about waste aging and the preferred location of waste-packaging functions.

Some of these points will now be discussed in greater detail, comparing the relative advantages of systems with and without an MRS facility. Some potential disadvantages of the MRS facility and factors that appear to be nondiscriminating will also be discussed.

5.2 Advantages of the MRS facility

5.2.1 Timely disposal

The central objective of the DOE's program, as embodied in the Nuclear Waste Policy Act as amended, is the development and operation of a geologic repository for the permanent disposal for spent nuclear fuel and high-level radioactive waste. Thus the potential effects of any predisposal waste-management options on the achievement of that goal must be given careful consideration.

The MRS facility could have a beneficial effect on the repository program by providing experience in regulatory and institutional areas. For example, neither the DOE nor the NRC has participated in a licensing process for a Federal waste-management facility of the size expected. Licensing an MRS facility significantly earlier than the repository--as might be possible with a negotiated site--could provide valuable experience in waste-facility licensing--experience that could make the licensing of the repository proceed more effectively.

In the institutional area, the conclusion of a negotiated agreement for an MRS site may encourage negotiations with a potential repository host State or Indian Tribe and provide experience that would benefit DOE interactions with States or Tribes in the repository program.

The experience benefits of the MRS facility proposed in 1987³ depended on the ability to select an MRS site well ahead of the repository site and to get on with the design and licensing (and, if possible, construction) of a major part of the waste-management system independent of the uncertainties about the repository. The selection of the Yucca Mountain site for characterization and the linkages between the MRS facility and the repository substantially reduce these benefits if the MRS facility is to be sited through a survey-and-evaluation process. However, many of the experience benefits could nonetheless be obtained if the MRS facility can be sited through the Nuclear Waste Negotiator and a negotiated agreement is approved by the Congress. Since the Amendments Act allows a negotiated site to be identified before the repository site is recommended, an early negotiated agreement could allow the design and licensing of the MRS facility to proceed independent of progress at Yucca Mountain.

In addition, it is possible that a State or an Indian Tribe might negotiate an agreement that would allow the construction--and perhaps even the operation--of the MRS facility to proceed at a faster pace than allowed

by the current linkages in the Amendments Act. If that occurred, and the Congress approved the agreement, more of the early-experience benefits expected in the original MRS proposal³ could be obtained.

A no-MRS system cannot provide the same experience benefits. Those benefits are largely dependent on siting and licensing a large-scale centralized Federal waste-management facility--the MRS facility--earlier than, and separately from, the geologic repository. The no-MRS option involves lower financial and institutional costs in the near term, since it does not require siting and constructing a large-scale facility in addition to the repository. On the other hand, it can be seen as an "all-the-eggs-in-one-basket" approach, in which every major challenge in waste management is faced for the first time in the effort to license, construct, and operate the first repository. In the DOE's view, that poses greater risks to the success of the repository program than would the effort to develop an integral MRS facility.

5.2.2 Timely and adequate waste acceptance

The preferred MRS facility could begin accepting spent fuel as early as 2000--up to about 3 years earlier than the repository--because it can be built in less time. Because the waste-acceptance rate at the repository is limited by underground construction, higher waste-acceptance rates can be achieved more rapidly and with greater confidence at the MRS facility. As a result, the MRS facility would allow more waste to be accepted into the Federal waste-management system in the early years. For example, the MRS facility is expected to accept 1200 MTHM during its first year of operation, whereas the repository will accept only 400 MTHM in its first year. Because of the combined effects of earlier start-up and higher initial acceptance rates, an MRS facility starting in 2000 could replace about 14,200 MTHM of at-reactor storage even if the repository opens in 2003 as planned.¹⁶ The number of reactor sites requiring out-of-pool storage could be reduced from 53 to 38.

Early Federal acceptance can reduce any potential problems resulting from the fact that, the longer Federal acceptance is delayed, the more utilities must make decisions about storage options that may involve doing something to the spent fuel (e.g., consolidating it or loading it into canisters of some sort) other than simply storing it as is. If any operations are performed on spent fuel before key elements of the Federal system (e.g., the waste package) are well defined, they run the risk of being incompatible with the system design that is finally developed, thereby leading to increased costs. At the same time, it is difficult for the DOE to encourage or discourage specific actions that utilities might take because it is not clear whether such actions would cause problems later. Accelerating waste acceptance with an MRS facility can reduce the potential for compatibility problems simply by reducing the number of reactors that must take some action beyond the simple storage of unconsolidated, unpackaged fuel in reracked pools.

These benefits are based on reference schedules that are difficult to project with confidence, and the benefits could increase or, less likely, decrease, depending on the future course of events.

5.2.3 Schedule confidence

Deferring Federal waste acceptance until a repository is available and requiring that all additional spent-fuel storage be provided by the utilities would not enhance public confidence in the Federal waste-management program. It would not strengthen the Federal commitment to timely acceptance, and it would give no early evidence of the capability of the Federal program to perform any of the important functions of waste management.

There is little question that an MRS facility can be built and licensed. The early certainty that the Federal Government will build an MRS facility and begin taking title, accepting, and transporting spent fuel to a centralized facility should dramatically increase the confidence of the Congress, the public, the nuclear industry, and the utilities that this problem will be solved and solved in a predictable and timely manner.

5.2.4 System flexibility

Flexibility is the ability of a system to perform its mission when decisions must be made in the face of uncertainty or incomplete information. In complex and first-of-a-kind projects, complete mission decisions can seldom be made at one time; rather, "midcourse corrections" are usually required. Thus flexibility is also the ability to redirect a project in response to changing circumstances in an effective way while still achieving the objectives. The DOE believes that the inclusion of an integral MRS facility in the system enhances the likelihood that its objectives will be successfully achieved.

Insurance against future uncertainties

As the only authorized facility other than the first repository that can be used for large-scale waste-management operations, the MRS facility could make a substantial contribution to the reliability and flexibility of the system. The MRS facility authorized by the Amendments Act would provide the only alternative facility at which the Federal Government could accept spent fuel from utilities.

A Federal waste-management system that includes a storage facility would provide a substantially greater capability to accommodate the circumstances of the future, whatever they might be. Without the MRS facility, the nation's ability to provide for the continuous orderly transfer of spent fuel from reactors will depend totally on the achievement of uninterrupted operation at a first-of-a-kind geologic repository.

Improved flexibility in the repository-development schedule

Section 143 of Amendments Act directs the MRS Review Commission to make a recommendation to the Congress as to whether an MRS facility should be part of the Federal waste-management system "in order to achieve the purposes of this Act, including...improving the flexibility of the repository development schedule." In a first-of-a-kind technical and regulatory enterprise like the repository, flexibility in the schedule may increase the likelihood of success by allowing the program to adapt to the contingencies that are almost certain to arise. This consideration must be balanced against concerns about the need to maintain pressure on the repository program in order to ensure continued effort and the related concerns that an MRS facility would undermine such pressure.

An MRS facility could add flexibility by insulating reactors from the effects of slippages in the schedule for repository development and operation. The extent of such insulation would depend on the linkages between the MRS facility and the repository. Flexibility during site characterization can be accomplished only with an MRS facility that can be constructed before the selection of the repository site. That would require modification or elimination of the linkages in the Amendments Act.

Increased flexibility may also be useful after characterization, during repository construction and operation. Because of the complexity of underground construction, there is uncertainty about the time it will take to start repository operation and achieve the planned loading rate. The schedule for repository operation after the construction authorization is success oriented and could be extended by delays in construction, licensing for operation, or scaleup to the planned maximum loading rate. Since the Amendments Act linkages would allow the MRS facility to store up to 10,000 MTHM before the repository starts operation and an additional 5000 MTHM thereafter, it could allow a more gradual, stepwise approach to full-scale repository operation without imposing additional burdens on utilities. The technology that will be used for storage at the MRS facility has already been demonstrated and is not subject to the uncertainties associated with underground mining. Thus it is more likely to meet projected startup dates and waste-acceptance rates than the first-of-a-kind enterprise represented by the repository. Without the MRS facility, uncertainties about repository construction and loading will be seen at the nuclear power plants, where additional storage would have to be provided.

The 15,000-MTHM limit on the MRS storage capacity forces a tradeoff between early acceptance and buffering during repository operation. As noted earlier, an MRS facility opening 3 years ahead of a repository would receive and store an additional 14,000 MTHM of spent fuel. Under the 15,000-MTHM limit, that would leave only 1000 MTHM for use as a buffer against slowdowns in repository loading. An MRS facility with a higher maximum storage capacity would allow both early acceptance and operational buffering.

Maintenance of future options

The preferred integral MRS facility would be designed to provide flexibility with respect to future options for the allocation of waste-management functions in the system. For example, it would keep open the option of adding packaging functions later, once uncertainties about the waste package have been sufficiently resolved. Thus a decision to site and construct such a facility ahead of, or in parallel with, the repository keeps open the option of minimizing operations at the repository by locating some packaging functions at another site. With a substantially higher limit on maximum storage capacity, the MRS facility could also provide the option of aging the spent fuel before emplacement in the repository without placing an additional burden on utilities--an option that has been chosen by several other countries. This could probably not be efficiently done at reactor sites because of the relatively high cost of maintaining spent fuel at reactors after their useful lifetime.

5.2.5 Promoting the development of an integrated system

In general, the preferred MRS facility has the potential for helping the DOE achieve all four of its objectives by promoting the development of the integrated waste-management system. The DOE's 1987 proposal³ noted that the MRS facility would accelerate system development because it would allow the DOE to plan, design, and deploy major components of the waste-management system in advance of the repository. The two-step approach to system development (i.e., first the MRS facility and the transfer of spent fuel from reactors and second the repository) was seen as leading to a number of advantages. For example, with early approval of the MRS project, the development of the pre-waste-emplacment functions of the system could proceed on the basis of more-complete and more-certain information. A single focal point for early system development would be established. In addition, the parameters needed to develop the transportation system would be defined earlier because route-specific planning, logistics planning, and equipment procurement for shipments from the reactors could begin after the MRS proposal is approved. Finally, the inclusion of the MRS facility would require the DOE to focus attention on the overall Federal waste-management system, rather than just the repository.

Some of these benefits depend on selecting the MRS site significantly ahead of the repository site. The Amendments Act prohibits the selection of an MRS site through a DOE-directed siting process until the repository site is formally selected. Therefore, it would be difficult for an MRS facility sited in that manner to provide the benefits of a two-step system-development process. A site negotiated in the near term, however, could have such benefits, since it would be possible to proceed with MRS design and licensing independent of the repository schedule. Once a license is received for an MRS facility at a given site, there is a high level of certainty that the MRS facility can then be built and operated--higher than for a repository, because of the more complex criteria the latter facility

must meet. Thus an MRS facility, once sited, would offer a more certain focal point for early system development than the repository site.

5.3: Potential disadvantages

5.3.1 Need for additional site

Locating a site for an MRS facility is not a trivial task. Under the best of circumstances it will require a substantial effort on the DOE's part. The magnitude of that effort will depend on the process that must be used to select a site. The Amendments Act established two alternative MRS siting processes: a DOE-directed siting process that may not start until the MRS Review Commission makes its report and a siting process in which the Nuclear Waste Negotiator seeks a State or Indian Tribe willing to host such a facility. The costs and impacts of MRS siting will depend heavily on which path must be followed to find a site.

It is hard to predict with confidence just how difficult and contentious a DOE-directed siting process might be. Experience with the repository-siting program, especially the siting of the second repository in the mid-1980s, has shown that any screening of sites regionally or nationally can meet determined resistance and provoke public opposition. Thus, a DOE-directed siting process could require some novel approaches and dedicated efforts. On the other hand, the experience with the selection of sites for the MRS proposal was mixed. Many people in the community near the site at Oak Ridge, Tennessee, concluded that with appropriate mitigation and compensation such a facility could provide a net benefit, but the State concluded otherwise. The State's objection was not based on concerns about safety or environmental impacts,¹⁷ but rather on the judgment that the facility was not needed and concerns about potential adverse economic impacts to the area around the facility--concerns that were not shared by most members of the local community. Since the Amendments Act greatly expanded the provisions for mitigation, compensation, and benefits for hosting an MRS facility, it may be easier in the future to find a State and a locality that would conclude that such a facility could provide a net benefit.

Even in the best of circumstances, however, it is likely that a DOE-directed site-screening process would require substantially greater financial, manpower, and institutional resources than the Negotiator's efforts to find a willing host. In view of this consideration, and the potential for earlier siting, greater flexibility of operation, and other institutional benefits available with a negotiated site, the DOE will strongly encourage the efforts of the Nuclear Waste Negotiator to identify a potential negotiated site for the MRS facility as quickly as possible.

Incidentally, it is not at all clear that using existing reactor sites for buffer storage instead of a new MRS site will be a path of substantially less resistance. A 1986 General Accounting Office survey²⁰ of

utility executives indicated that a significant number of them expected local opposition to spent-fuel storage if the repository schedule slipped beyond 1998. The report concluded that "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." Detailed responses to the survey showed that 22 of the 47 respondents expected major or very major problems with community or public reaction for storage beyond 1998.

5.3.2 Requirement for a second licensing proceeding

The MRS facility will be licensed separately from the repository, under 10 CFR Part 72. This will require additional resources on the part of both the DOE and the NRC. Whether this is a net cost to the program depends largely on whether the MRS licensing proceeding can be conducted before the repository proceeding or must be conducted in parallel. In the former case, achievable with an early negotiated site or with different linkages, the MRS licensing process can be a net plus to the program by providing experience with NRC licensing procedures that can benefit the later repository-licensing effort. In the latter case, with parallel licensing efforts, the opportunity for learning is limited, while the likelihood that the MRS effort would divert resources from the repository is increased.

Regulatory advantages for the MRS facility have also been identified by the NRC: in its appearance before the MRS Review Commission, the NRC indicated that an MRS facility would reduce the regulatory burden associated with the review and licensing of at-reactor storage expansions.

5.3.3 Possible negative impacts on the repository program

As discussed above, the DOE believes that an MRS facility offers a potential for a positive contribution to progress in the repository program. At the same time, perhaps the single strongest objection to any Federal storage facility has been the concern that it would derail the repository program, by reducing the national impetus for developing the repository or by diverting resources from the repository effort. Both the positive and negative impacts on the repository program of each alternative (including no-MRS options) need to be considered explicitly. The DOE believes that on balance the MRS facility can provide a net positive benefit for the repository, although the value of that benefit would be greatest with an early negotiated site.

Reduced incentive for the repository

A major and continuing objection to the provision of any Federal storage has been that it would reduce the incentive and determination to get on with the difficult job of developing a permanent repository. This

concern was addressed in the MRS proposal by recommending a limit on capacity and including linkages to the repository that were subsequently made even more stringent by the Amendments Act.

The nearest current analog to the situation that might exist with spent fuel stored at a Federal MRS facility is the case of the transuranic waste now stored at the Idaho National Engineering Laboratory and other Federal sites. Despite the fact that this waste is in temporary storage at Federal facilities, there is continued pressure from the Congress and the State of Idaho, and determination on the DOE's part, to keep moving on the development of the Waste Isolation Pilot Plant (WIPP), where the waste is destined for permanent disposal. The WIPP has been sited and constructed, and the start of waste emplacement in a testing program is expected in less than a year.²¹

Some argue that keeping spent fuel at reactors will maintain pressure on the Federal Government to get on with the repository program. However, if the no-MRS facility option is adopted as national policy and steps are taken to facilitate it (as some have suggested), and if expansions of at-reactor storage are not contested, it is not clear why the resulting ease of providing at-reactor storage would not also lead to some relaxation in the pressures to continue with the repository. Given the experience with the WIPP, the DOE does not believe that the no-MRS option enjoys any major advantage in terms of maintaining the Federal Government's determination to develop a permanent repository.

Diversion of resources from the repository effort

An MRS facility with the linkages in the Amendments Act and an early MRS facility with different linkages differ sharply in their potential for diverting resources from the repository program. An MRS facility with the Amendments Act linkages has a much higher risk of diverting resources from the repository because it would be licensed and constructed at essentially the same time. And as already mentioned, siting an MRS facility through the survey-and-evaluation process may impose a much greater burden on the DOE than siting through the efforts of the Nuclear Waste Negotiator.

It is worth noting that the no-MRS case places fewer management demands on the DOE by placing them instead on the utilities who would bear the burden of dealing with the uncertainty about when and at what rate their spent fuel could be accepted at a repository. Thus one cost of avoiding any diversion of the DOE's attention from the repository is some diversion of utility management's attention from its primary function of reliable generation of electricity.

5.3.4 Increases in the direct cost of the system

The systems studies indicate that the total life-cycle cost of the Federal portion of a waste-management system with an integrated MRS facility (with no packaging functions) starting in 2000 and with the repository

starting in 2003 is about \$31.2 billion (assuming two repositories).¹⁶ This is some \$2.1 billion (7 percent) higher than the cost of the Federal system without an MRS facility. However, while the costs of the Federal system are higher with an MRS facility, the costs of at-reactor storage are lower. Thus the net incremental cost of the MRS facility to utility rate-payers is reduced to the extent that the MRS facility is able to avoid at-reactor storage costs.

Out-of-pool dry storage is estimated to cost from \$50,000 to \$90,000 per metric ton of heavy metal (MTHM);⁷ the MRS systems studies¹⁶ used an average cost of \$77,000 per MTHM. With a repository in 2003, therefore, the MRS facility offsets some 5300 MTHM of at-reactor dry storage estimated to cost about \$400 million. This reduces the net MRS increment to the total costs of waste management (both to the Federal government and the utilities) to about \$1.7 billion.

The more at-reactor dry storage is replaced by MRS storage, the lower the calculated net cost of the MRS facility. The reason is that the estimated incremental cost of adding more storage at the MRS facility once it has been constructed is about \$26,000 per MTHM, compared to the average cost of at-reactor storage of \$77,000 per MTHM. This implies that every additional metric ton of spent fuel stored at the MRS facility that avoids at-reactor dry storage reduces the net MRS cost to the ratepayer by just over \$50,000. In the scenario with the largest MRS storage considered (the case with an MRS facility without linkages or capacity limits that starts in 2000 with a 10-year delay for the repository), the net cost of the MRS facility drops to \$1.3 billion.

A system with an MRS facility opening in 2000 would be able to accept waste earlier and, in the earlier years, at a greater rate than a system with only a repository. This means that a system with an MRS facility would accept more spent fuel that would otherwise have to be stored at reactor sites in pools or in dry-storage systems. The fact that the system with an MRS facility would stop the net increase in at-reactor spent-fuel-pool inventories while the no-MRS system just accommodates the excess beyond the maximum pool-storage capacity should be recognized when comparing costs.

By examining cases in which the same amount of dry storage is provided with and without an MRS facility, systems that have the same impact on pool storage can be compared. For example, an MRS facility with conditions different from those in the Amendments Act could accept as much as 44,200 MTHM of spent fuel if the repository were delayed 10 years. About 24,500 MTHM of the total replaces additions to at-reactor pool inventories. Since the incremental cost of MRS storage is about \$26,000 per MTHM, this amount of storage represents on the order of \$600 million of the total net MRS cost of 1.3 billion.

The net cost to the ratepayers of a system that includes an MRS facility may be reduced further if extended spent-fuel storage at reactor sites can be avoided after reactors are shut down. The maintenance of any

spent fuel at a reactor site can cost \$2 to \$3 million per year regardless of the quantity of fuel involved. Under current plans and contract provisions, spent fuel will stay at reactor sites for up to 5 years after shutdown, since the contract provides only for the acceptance of fuel that is at least 5 years old. Depending on the acceptance schedule, however, spent fuel may remain at some reactor sites considerably longer, adding substantially to the cost of at-reactor storage. An MRS facility opening in 2000 and with linkages different than in the Amendments Act could ensure that no spent fuel stays at reactor sites more than 5 years after reactor shutdown and could avoid significant additional at-reactor storage costs if the repository were delayed. Such an approach results in the consideration of alternative waste-acceptance strategies and schedules.

By avoiding some amount of at-reactor storage, an MRS facility also avoids the hidden costs that would be associated with providing that storage at reactor sites, including those attributable to reactor downtime caused by fuel-handling demands, the diversion of management attention from reactor operation, and any difficulties encountered in obtaining approval for storage expansions. (As discussed above, the 1986 GAO survey²⁰ of utility executives concluded that most utilities expect community reaction and licensing problems for at-reactor storage past 1998.) Although very difficult to estimate rigorously, such costs will be borne by ratepayers of those utilities just as will the costs of the MRS facility paid for through the Nuclear Waste Fund and should be taken into account in assessing the total cost to ratepayers of both the MRS and the no-MRS options.

In conclusion, a note of caution about cost. The cost estimates for all parts of the waste-management system, including the avoided costs of at-reactor storage, are subject to considerable uncertainty. Because the estimated incremental cost of adding an MRS facility is the difference between two very large and uncertain numbers, it is subject to even greater uncertainty. Thus the significance of all estimates of incremental MRS costs must be kept in perspective.

5.4 Nondiscriminating factors

5.4.1 Health and safety

Protecting the health and safety of both the public and workers is a primary goal of the waste program. However, comparisons of MRS and no-MRS systems in terms of health and safety show that for both options the absolute levels of risk from systemwide waste-management operations are so low that they do not significantly discriminate between the options.

The radiation exposures received by the public from an MRS facility--including those from normal operations, postulated accidents, and spent-fuel transportation to and from the MRS facility--will, by design, be below the regulatory limits set by the Nuclear Regulatory Commission in 10 CFR Part 72 (0.025 rem annually for the maximally exposed individual for normal operations and 5 rem for any design-basis accident). The population doses

are estimated to be less than 1 percent of the radiation dose received by the same population group from naturally occurring background radiation. In comparison with no-MRS systems, the occupational risk is slightly higher and the public risk is somewhat lower with an MRS facility in the waste-management system.¹⁶

The extra shipment required with an integrated MRS facility involves an extra handling step as well, which may lead to some increase in worker exposures. However, since the extra handling would be done in facilities expressly designed for the large-scale receipt and handling of spent fuel, the additional exposure can be kept to a minimum. While the occupational risks increase slightly because of the extra handling step introduced with an MRS facility in the system, the population risks go down because of improvements in transportation. In general, transportation risks will be the largest, and they will be dominated by nonradiological fatalities from transportation accidents. The largest single category of transportation risks is nonradiological fatalities in the public. In general, the risks from the transportation of spent fuel are very small in absolute terms and do not discriminate between MRS and no-MRS options.

5.4.2 Environmental impacts

The MRS proposal³ concluded that the construction, operation, and decommissioning of an MRS facility at any of the three recommended sites would entail slight environmental impacts, all well below the applicable regulatory guidelines. Moreover, most of the potential impacts can be mitigated. The estimated total-system risks and environmental costs do not differ significantly for systems with and without an MRS facility. The primary effect of adding an MRS facility would be to redistribute some of these risks and environmental costs among facilities and transportation routes. In a system with an MRS facility, most spent-fuel shipments would converge at the MRS site rather than the repository site, but the overall transportation impacts would be reduced. With an MRS facility, facility-related impacts would be reduced somewhat at the repository, but some impacts can be expected in the MRS host State.

In its review of the MRS proposal,²² the U.S. Environmental Protection Agency agreed that MRS impacts could be acceptably low: "We believe from our review of the proposal and our knowledge of the required technology for the MRS that this action can be accomplished within acceptable regulatory and environmental standards."

5.4.3 Socioeconomic impacts

Like all industrial developments, the MRS facility can be expected to have some socioeconomic impacts, such as additional jobs and demands on public services. Recognizing that the preparation for, and accommodation of, a major radioactive-waste-management facility imposes a variety of

burdens on the host community and State, the NWPA as amended makes extensive provisions for impact compensation and mitigation (or incentive payments if a benefits agreement is signed) and payments equal to taxes for a site selected through a DOE-directed siting process; it also allows for an open-ended package of benefits to be worked out through the Nuclear Waste Negotiator (subject to Congressional approval). In this way, the net social costs of the facility, if any, can be transferred to the users of electricity generated by nuclear reactors.

The effects of waste-management activities on host communities may depend to some extent on the degree of participation in decisionmaking about these activities. The no-MRS option differs from the MRS option in this regard. While both options provide the opportunity for involvement in decisions on spent-fuel storage through the NRC licensing process, the MRS option provides in addition the extensive measures for participation contained in the NWPA as amended.

While all of the provisions for mitigation, compensation, incentives, and participation available for an MRS host increase the calculated cost of the MRS option relative to the no-MRS option (which has no such provisions), it is not at all clear that the net societal costs of the MRS option are in fact higher. If access to a site can be negotiated and an agreement approved, that would be prima facie evidence that the net socioeconomic impacts of the facility are seen as positive by the local community and the State or Indian Tribe.

5.4.4 Transportation impacts

Including an integrated MRS facility in the system requires most fuel assemblies (i.e., all except those shipped directly to the repository from western reactors) to be shipped twice. Shipping fuel first from reactors to the MRS facility and later from the MRS facility to the repository increases the gross ton-miles of shipping, the amount depending on the location of the MRS facility and whether western fuel is shipped directly to the repository. At the same time, the MRS facility reduces both cask-miles (an indicator of the relative radiological risk) and shipment-miles (related to cost and nonradiological risk), again depending on MRS location and the treatment of western fuel.¹⁶ The greatest reductions occur for an eastern MRS facility with western fuel shipped directly to the repository: cask-miles are reduced by just under 50 percent, while shipment-miles are reduced by about 60 percent. The most significant impact results from replacing the single-cask shipments of low-capacity trucks with dedicated trains of much higher cask capacities. As would be expected, there is little, if any, improvement for a western MRS facility, since fuel would have to be shipped from reactors most of the way to the repository in any case.

While the actual risks from spent-fuel transportation are small with or without an MRS facility, as mentioned earlier, an eastern MRS facility

would still reduce the impacts of transportation on some affected communities. Despite the low absolute risk from spent-fuel transportation, affected States and communities must nonetheless be prepared to deal with possible accidents. Emergency-preparedness plans must be developed, State and local officials must be trained to respond to potential accidents involving radioactive material, shipments must be monitored, and, when accidents occur, officials must respond. Combining spent fuel from eastern reactors into fewer cross-country rail shipments across fewer cross-country routes from an eastern MRS facility to the repository would decrease both the number of affected States and communities and the impact of shipping operations on them.

Regardless of the location of a potential MRS facility, the DOE believes that net transportation impacts do not significantly discriminate between the MRS and no-MRS options. This conclusion is supported by the State of Tennessee's detailed transportation analysis of MRS and no-MRS options.²³ This analysis concluded that the radiological risk of all alternatives studied is very small and that "the choice between alternative nuclear waste disposal systems should not rest on transportation and handling cost or risk."

6. SUMMARY

The MRS issue represents both a choice between two distinct approaches to managing spent fuel before emplacement in a repository (the system-operation aspect of the decision) and a choice between two distinct paths toward the development of the system for permanent disposal at an operational scale (the system-development aspect).

The DOE continues to believe that an integrated MRS facility can enhance the performance of the Federal waste-management system during operation. A Federal waste-management system with a storage facility would help ensure that the burden of uncertainty about repository startup and operation would be borne primarily by the Federal system rather than by the utilities, thus minimizing the impacts of waste management on the primary function of reactors--safe, reliable, and efficient generation of electricity. Without the MRS facility, the nation's ability to provide for the timely transfer of spent fuel from reactors to the Federal waste-management system would depend on the achievement of a success-oriented schedule for a first-of-a-kind geologic repository. The value of having two facilities rather than one is largely independent of the precise allocation of waste-management functions.

The DOE also believes that an MRS facility can play an important role in a stepwise process for the development of the waste-management system. Analyses that simply compare the operational characteristics of MRS and no-MRS systems tend to overlook the importance of proceeding with an MRS facility as a strategic step toward a repository. Whether or not there is an MRS facility in the waste-management system, much in the way of resources and a large amount of human ingenuity will be dedicated during the next two decades to managing spent fuel before it is emplaced in a repository. If those efforts were made by utilities in providing at-reactor

storage at approximately 70 separate reactor sites, it would provide little learning experience that would help the DOE in meeting the technical, regulatory, and institutional challenges of developing and operating a Federal waste-management system capable of accepting, transporting, and handling large quantities of high-level waste and spent fuel at high annual rates. If the efforts were exerted by the DOE in developing and operating an MRS facility, much of that experience would directly increase the likelihood of timely and reliable operation of the Federal waste-management system.

Overall, the integrated MRS facility can provide a valuable flexible coupling between waste-management activities at reactors and the repository program that allows each to be developed at the appropriate pace without impinging on the other. It provides a buffer between systems that have unlike needs and characteristics and that would function less efficiently if directly connected. During system development, the MRS facility allows the interface between the Federal system and reactors to be defined independent of the uncertainties about the waste package to be used at the repository. During operation, the MRS facility can allow an orderly transfer of spent fuel from reactor sites to the Federal waste-management system that is independent (to the extent allowed by linkages) of the ability to emplace fuel in the repository. While the waste-management system can be developed and operated without an integral MRS facility, with the reactors directly coupled to the repository, the DOE believes that the flexibility added by the MRS facility would substantially increase its ability to achieve the program objectives.

Thus, as the DOE has already stated on several occasions, the decision on whether or not an MRS facility should be pursued rests more on the vision of how its program objectives can best be achieved, and this decision is supported, but not driven, by considerations of technical optimization and cost. While recognizing the value of differing viewpoints, the associated costs, the reduced benefits resulting from the current links between the MRS facility and the repository, and the difficulties of siting when the host is an unwilling partner, the DOE nonetheless believes that an integral MRS provides measurable, significant, and, in the final analysis, worthwhile benefits.

In summary, it may be useful to restate the DOE's position on the MRS facility. The DOE supports the development of an MRS facility as an integral part of the waste-management system because an MRS facility would allow the DOE to better meet its strategic objectives of timely disposal, timely and adequate waste acceptance, schedule confidence, and system flexibility. This facility would receive, store, and stage shipments of intact spent fuel to the repository and could be later expanded to perform additional functions that may be determined to be beneficial or required as the system design matures.

The DOE recognizes the problems associated with DOE-directed siting by the traditional method of national and regional screening. Hence, the DOE prefers an MRS facility that is sited at a volunteer site negotiated

through the efforts of the Nuclear Waste Negotiator, especially if the siting negotiations lead to linkages that allow the advantages of an MRS facility to be more fully realized.

The DOE believes that a system with an MRS facility subject to the linkages in the Amendments Act is preferable to a system without an MRS facility. However, the DOE prefers that the current schedule linkages between the MRS facility and the repository and the statutory limit on MRS storage capacity be revised to enhance confidence that the development of the system is progressing and to allow other MRS advantages to be more fully realized. The DOE would support such revised conditions on the MRS facility if contained in a proposed agreement submitted by the Nuclear Waste Negotiator to the Congress for approval. Even if such revised linkages are not achieved, however, the DOE supports the development of the MRS facility.

REFERENCES

1. U.S. Department of Energy Need for and Feasibility of Monitored Retrievable Storage--A Preliminary Analysis, DOE/RW-0022, Washington, D.C., 1985.
2. U.S. Department of Energy, Report of the Task Force on the MRS/Repository Interface, DOE/RW-0044, Washington, D.C., February 1986.
3. U.S. Department of Energy, Monitored Retrievable Storage Submission to Congress, DOE/RW-0035, three volumes, Washington, D.C., March 1987.
4. U.S. Department of Energy, Additional Information on Monitored Retrievable Storage, DOE/RW-0166, Washington, D.C., November 1987.
5. U.S. General Accounting Office, Nuclear Waste--DOE Should Provide More Information on Monitored Retrievable Storage, GAO/RCED-87-92, June 1987.
6. U.S. Department of Energy, Analysis of the Total System Life Cycle Cost for the Civilian Radioactive Waste Management Program, DOE-RW-0047, Washington, D.C., June 1987.
7. U.S. Department of Energy, Final Version, Dry Cask Storage Study, DOE/RW-0220, Washington, D.C., February 1989.
8. U.S. Department of Energy, "MRS Systems Study Assumptions, Task A," Appendix A in MRS System Study Summary Report, DOE/RW-0235, Washington, D.C., 1989.
9. Roy F. Weston, Inc., MRS Systems Studies Task B--Facility Design (Repository/MRS) and Task D--HLW Packaging Location, Washington, D.C., May 1989.
10. Roy F. Weston, Inc., MRS Systems Studies Task C--Storage Concepts for the MRS Facility, Washington, D.C., May 1989.
11. Lawrence Livermore National Laboratory, MRS Systems Studies Task E--Yucca Mountain Project Waste Package Design for MRS System Studies, Livermore, Calif., May 1989.
12. Battelle Nuclear Systems Group, MRS Systems Studies Task F--Transportation Impacts of a Monitored Retrievable Storage Facility, Columbus, Ohio, May 1989.
13. Pacific Northwest Laboratory, MRS Systems Studies Task G--The Role and Functions of Surface Storage of Radioactive Material in the Federal Waste Management System, Washington, D.C., May 1989.
14. Office of Waste Technology Development, Battelle Memorial Institute, MRS Systems Studies Task H--Licensing, Columbus, Ohio, May 1989.

15. Pacific Northwest Laboratory, MRS Systems Studies Task I--Waste Management System Reliability Analysis, Washington, D.C., May 1989.
16. U.S. Department of Energy, MRS System Study Summary Report, DOE/RW-0235, Washington, D.C., 1989.
17. Comments of the State of Tennessee on the Monitored Retrievable Storage Facility Submission to Congress, February 1986.
18. Statement by Mr. Keith Fultz, Senior Associate Director, Resource and Economic Development Division, General Accounting Office, to the MRS Review Commission, Washington, D.C., July 26, 1988.
19. U.S. Department of Energy, Draft 1988 Mission Plan Amendment, DOE/RW-0187, Washington, D.C., June 1988.
20. U.S. General Accounting Office, Monitored Retrievable Storage of Spent Nuclear Fuel, GAO-RCED-86-104FS, Washington, D.C., May 1986.
21. U.S. Department of Energy, Draft Supplemental Environmental Impact Statement, Waste Isolation Pilot Plant, DOE/EIS-0026-DS, Washington, D.C., April 1989.
22. Letter from Jack E. Ravan, Regional Administrator, Region IV, U.S. Environmental Protection Agency, to Ben C. Rusche, Director, Office of Civilian Radioactive Waste Management, January 31, 1986.
23. University of Tennessee Transportation Center and Vanderbilt University Department of Civil and Environmental Engineering, prepared for the State of Tennessee Safe Growth Team, Monitored Retrievable Storage of Spent Fuel: Transportation Studies, December 16, 1985, revised October 20, 1986.

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