

STATUS OF OCRWM PROGRAMS

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ABSTRACT

The Department of Energy (DOE) is responsible for implementing the Nuclear Waste Policy Act of 1982 and its amendments. To fulfill its legislative mandate, the DOE is proceeding with a national program to permanently dispose of high-level radioactive waste and spent nuclear fuel in deep geologic repositories. The purpose of this paper is to report on the progress the DOE has made up to this point, to identify the program objectives and priorities, and to examine the technical and institutional challenges the DOE faces in implementing the waste-management program.

INTRODUCTION

The nuclear industry has been concerned about the management of its wastes since the start of the nuclear age. Conceptual planning for safe disposal was begun before large quantities of these wastes were generated.

Since 1957, when the National Academy of Sciences first recommended deep geological disposal as the preferred method, techniques for isolating high-level radioactive wastes have been studied through exploration, experiments, field tests, and analyses.

It also should be noted that from the beginning of the waste management program, the Federal Government has identified public health and safety, and environmental acceptability as guiding principles for the program. Since the late 1970's, the EPA has developed general standards for protecting public health and safety, and the NRC has been developing safety regulations specific to geologic disposal. Also, in all of this time, there has been no single incident in which spent-fuel management and storage adversely affected public health and safety.

Nonetheless, the public continues to have concerns over whether the waste can indeed be safely isolated, and experience has shown that siting such facilities galvanizes public and political opinion and action like few other activities. Fundamental problems include the public's fear of radioactivity and the siting of any nuclear facility as well as the general aversion to the siting of waste-disposal facilities -- whether they are landfills, incinerators, or radioactive-waste repositories. Of course, repository siting is particularly difficult because of the concerns mentioned above, magnified by the fact that only one or two sites will be chosen to experience the burden of what is seen as a national problem.

The establishment of a national policy for effective high-level nuclear waste management through the passage of the Nuclear Waste Policy Act of 1982 and the Nuclear Waste Policy Amendments Act of 1987 represents significant progress in bringing the United States closer to a timely and effective waste management solution. However, in spite of the process represented by the original Act and its amendments and the institutional provisions incorporated into this legislation, concerns and opposition continues. Although it is unrealistic to expect a sudden change

in public attitudes given the nature of the program and the public's perception of risk, the DOE remains optimistic that continued exchange of information with all affected and interested parties will eventually lead to a better understanding and, hopefully, a greater acceptance of the program.

This education process is not an easy task and remains one of DOE's major challenges. However, DOE should not be alone in this endeavor. The obligation for this education is everyone's responsibility, and the Department is committed in its determination to provide the information necessary to build understanding of the nature and significance of this program's mission and to encourage the public's input whenever possible.

To fully understand the distance that has been covered so far in the DOE's program and the complexity of its mission, and to present a clear vantage point from which to project the future direction of the program, it will be useful to briefly review the recent history of U.S. radioactive waste management.

IMPLEMENTATION OF THE NUCLEAR WASTE POLICY ACT OF 1982

A major milestone in the Nation's waste-management program was achieved in December 1982 when the 99th Congress passed legislation implementing the Nuclear Waste Policy Act of 1982 (the Act). The Act established a statutory process for siting, provided a yardstick for measuring success in terms of a schedule for siting the first and the second repository, and established the institutional framework for the program.

The DOE's plans for implementing the requirements of the Act were presented in the Mission Plan, which was issued in June 1985. The Mission Plan included a schedule showing that the first repository would start operations in 1998, and the second repository, if authorized by Congress, would start in 2003. The site for the first repository would be one of the nine potentially acceptable sites identified in the States of Louisiana, Mississippi, Nevada, Texas, Utah, and Washington. For the second repository, the DOE was conducting preliminary screening for crystalline-rock sites in 17 States located in the northeastern, north-central, and southeastern regions of the United States. In January 1986, the DOE issued a draft report for public comment which

recommended areas in seven eastern States for further study for the second repository. This action resulted in a flood of comments numbering some 60,000 in total.

Soon thereafter, in May 1986, the DOE formally published environmental assessments for the five nominated first repository candidate sites. The Secretary of Energy recommended to the President three sites for characterization as candidate sites for the first repository, and the President approved the recommendation. These approved sites were Yucca Mountain in Nevada, the Deaf Smith County site in Texas, and the Hanford site in Washington. The Secretary also announced that it would be prudent to postpone site-specific work for the second repository. This decision was largely based on significant decreases in the estimated quantities of spent fuel, indicating little need for a second repository before the year 2013 and significant cost savings for such a decision. This decision elicited complaints from many Western States on the grounds that they alone were being singled out to carry the burden of radioactive waste even though most of the waste was being produced in the East. Assurances that the second repository was not being canceled, merely delayed, did not help. Fortunately, these reactions by the public and by State authorities did not go unnoticed by Congress; they recognized the continuing political and institutional complexities of the program. Another directive of the Act was to have the DOE complete a study of the need for, and the feasibility of, a facility for monitored retrievable storage (MRS) and to submit to the Congress a proposal for the construction of one or more MRS facilities. In the Spring of 1985, the DOE completed a preliminary need-and-feasibility analysis and announced its conclusion that an MRS facility could serve as an integral part of the overall waste management system. Three sites were identified in Tennessee to be included in the proposal to Congress, the preferred site being the former Clinch River Breeder Reactor Site near Oak Ridge. The DOE's proposal was ready for submittal to Congress in February 1986, but litigation delayed the submittal for more than a year.

In March 1987, DOE submitted an MRS proposal to Congress. In the development of the proposal, prime consideration was given to the safety and flexibility of design concepts. The proposal itself included a program for the siting, development, construction, and operation of facilities to be licensed by the Nuclear Regulatory Commission (NRC); a funding plan so that the costs shall be borne by waste generators and owners; and a plan for integrating MRS with other storage and disposal methods. Such an MRS facility could perform spent fuel preparation and packaging functions at a central location before shipment to a geologic repository for permanent disposal. Performance of these functions at an MRS facility, centrally located to the majority of the commercial generators of spent fuel, could contribute significantly to overall systems efficiency and timeliness while reducing the total shipment miles.

There were high hopes that the process represented by the Act would go far in winning the trust and acquiescence of the public. The specified siting process was clearly aimed

at facilitating public acceptance with a compromise to help make the program regionally equitable. This was to be achieved by siting two repositories, preferably in different regions of the country. In addition, the requirement that three sites be characterized for the first repository, though directed at technical objectives, supported the concept of equitability. Congress specified a very aggressive schedule for siting the repositories while at the same time imposing various requirements for an institutional process. Though determined to meet the schedule, the DOE decided from the beginning not to sacrifice technical excellence or interactions with the States, the Indian Tribes, and the public. For example, in developing the siting guidelines, the DOE held extensive consultations with the States and Indian Tribes, and the guidelines were twice submitted for public comment. Environmental assessments were issued in draft form for nine sites nominated as potentially acceptable for the first repository to allow for fuller public participation, though the DOE was not required to send out the draft EAs for comment.

The Nuclear Waste Policy Amendments Act of 1987

Faced with greatly increasing costs and continued opposition, the 100th Congress devoted considerable attention to DOE's waste-management program. More than 30 bills were proposed in the first session to modify the program, and, on December 21, 1987, Congress approved legislation amending the Nuclear Waste Policy Act of 1982. Known as the Nuclear Waste Policy Amendments Act of 1987 (Public Law 100-203), this legislation was signed into law by President Reagan the following day.

The Amendments Act streamlines and focuses the waste-management program established by the NWPA. The Amendments Act specifies that only one site -- the Yucca Mountain site in Nevada -- is to be characterized for the first repository. If site characterization shows Yucca Mountain to be suitable, the Secretary of Energy may submit to the President a recommendation that the President approve the site for development as a repository. If the President approves, he will submit the recommendation to the Congress. If this happens, the State of Nevada may submit, within 60 days, a notice of disapproval to the Congress. This disapproval would prevent the use of the site for a repository unless Congress takes affirmative action by passing a joint resolution of site approval in the next 90 days of continuous session. If no notice of disapproval is submitted or if a notice of disapproval is overturned by a joint resolution, the site designation becomes effective.

For the second repository, the Amendments Act prohibits site-specific activities unless Congress later authorizes and appropriates funds for that purpose. The DOE is also required to report to the President and Congress between 2007 and 2010 on the need for a second repository.

While the Amendments Act did not change the basic elements of the waste program, it does alter some of the program features -- among them, provisions for a monitored retrievable storage (MRS) facility. The Amendments Act authorizes an MRS facility and subjects it to a number of

conditions, including an altered siting process and several licensing conditions. Given these constraints and protocols, the DOE is updating the analyses of how the MRS, under different system configurations, might best contribute to the overall system goals.

Importantly, the Amendments Act established new institutional entities including the Office of the Nuclear Waste Negotiator, the Nuclear Waste Technical Review Board, and the MRS Review Commission. Each of these promises to enhance program effectiveness, credibility and acceptability. The main role of the Negotiator is to attempt to find a State or Indian Tribe willing to host an MRS facility or a State willing to host a repository at a technically qualified site on reasonable terms. This is to be accomplished by negotiating a proposed agreement specifying the terms and conditions under which the State or Indian Tribe would host the facility. The proposed agreement would then be submitted to Congress for its consideration. In addition, the Negotiator is to consult with any State, affected unit of local government, or any Indian Tribe that the Negotiator determines may be affected by the siting of a repository or an MRS facility under such an agreement. A Negotiator has yet to be named.

The Nuclear Waste Technical Review Board will provide independent oversight of the program. The 11 members of the Board are to be appointed by the President from candidates nominated by the National Academy of Sciences. The Board will evaluate the technical and scientific validity of DOE activities in site characterization, waste packaging, and transportation throughout the characterization, licensing, and construction phases. On January 18, 1989, the President appointed eight members to the Board, and the DOE looks forward to a fruitful working relationship with them.

The other institutional entity created by the Amendments Act, the MRS Review Commission, is an independent three-person authority which has been appointed by Congress to evaluate the need for an MRS facility. Though the Amendments Act authorized the MRS, Congress is certain to closely study the recommendations of the MRS Review Commission. The MRS Review Commission is planning to report its findings to Congress by the end of this year. After consideration of this report, the DOE may begin a siting process. These adjustments to the program addressed in the Amendments Act are less an indication of failure in implementing the mandate of the NWPA than a natural evolution in the waste-management program, and reflect the attitudes and mandate of the Congressional constituencies. Passage of this legislation required significant compromises between the houses of Congress and a significant commitment from the leadership of both houses. For this reason, the Amendments Act represents a reaffirmation of the Nation's commitment to solving the problem of permanent disposal for radioactive wastes. The DOE believes that the program authorized by the Amendments Act is prudent, reasonable, and workable.

CURRENT PROGRAM STATUS

Before examining where the DOE presently stands in its implementation of the Nuclear Waste Policy Act as amended, it would be useful to review the overall policies which guide the formulation and implementation of the DOE's waste-management program:

1. The program must assign paramount importance to the protection of public health and safety and the environment.
2. The program must provide for the dissemination of information to the public and ensure opportunities for participation by the public and their representatives in order to gain their confidence and support.
3. The program must be conducted in a financially responsible and cost-effective manner and on the basis of full cost recovery.

With these principles in mind, the following objectives have been established to guide the DOE's implementation:

Timely disposal. The main focus of the waste-management program remains permanent disposal in a geologic repository. Until licensed disposal is demonstrated, doubts about its feasibility will continue to influence decisions on how wastes are to be managed. It is essential, therefore, that the efforts to site, build, and operate a geologic repository be vigorous and that they be completed as soon as practicable.

Timely and adequate acceptance. The timing and rate of waste acceptance by the DOE is the factor that has the largest effect on utilities' additional storage requirements. For this reason, the DOE is working to provide for timely waste acceptance at significant rates by the Federal system.

Schedule confidence. The utilities and the managers of high-level waste need a firm and dependable basis for making decisions about storing waste. The DOE is therefore working to develop schedules upon which waste managers can rely

System flexibility. The repository is a first-of-a-kind undertaking that necessarily entails significant uncertainties. To ensure flexibility in the face of an uncertain future, the total waste-management system must be designed so as to accommodate moderate schedule variances without large cost impacts and to accommodate significant program changes while limiting impacts on waste acceptance schedules. To ensure that the program has the flexibility that will allow it to adapt to future events and changes while fulfilling its commitments, system development must be supported by rigorous contingency planning

Recent achievements and current direction

Repository. In December 1988, a major milestone was achieved with the publication of the statutory site characterization plan (SCP), which is rigorously based on regulatory requirements for site characterization and licensing of the repository. This statutory SCP was preceded by a consultation draft that enabled the DOE to obtain comments from the NRC staff about the adequacy of the

plan in terms of data needed for licensing. After the DOE holds hearings on the SCP and considers comments received on the exploratory shaft, construction of the shaft may begin. With the start of exploratory-shaft construction scheduled for late in 1989, the program will begin intense characterization heading to the final evaluation of the suitability of the Yucca Mountain site. The DOE is now preparing to start the advanced conceptual design for both the repository and the waste package in the Fall of this year.

If found to be suitable after site characterization, the site will be recommended to the President in the mid-1990s. The construction of the repository will begin in 1998 after a construction authorization is received from the NRC. The repository would begin operation in two phases: during Phase 1, scheduled to start in 2003, spent fuel would be accepted at the repository at a rate of 400 MTHM per year; during Phase 2, scheduled to begin in 2006, an additional 3000 MTHM per year would eventually be accepted.

As the DOE focuses more of its attention on licensing related to the construction of the repository, activities relating to quality assurance are becoming increasingly important. The DOE is implementing a fully qualified Quality Assurance (QA) program that meets all NRC requirements. Through the QA program, the DOE applies procedures designed to ensure that all data and data interpretations, design activities important to safety or waste isolation, and performance assessments are conducted and fully documented in accordance with strict quality assurance standards. MRS facility. The DOE continues to believe that an integral MRS facility can enhance system development and performance and help meet the objective of timely and adequate waste acceptance. Because an MRS facility could store spent fuel and thus augment the Federal system's acceptance capacity, the dates and rates of the MRS waste-acceptance schedule affect utilities' additional at-reactor storage requirements, as well. However, under the terms of the Amendments Act, DOE cannot begin to survey sites for an MRS until the MRS Commission has submitted its report to Congress, now scheduled for November 1989. The DOE may not begin construction of an MRS it has sited until the NRC has authorized construction of a repository. The MRS could begin accepting fuel in 2003 at the rate of 1,200 MTHM per year, and within 4 years could accept approximately 2,700 MTHM per year. By law, it could store no more than 10,000 MTHM before the start of waste acceptance at a repository and no more than 15,000 MTHM thereafter.

However, conditions for an MRS facility negotiated with a host State or Indian Tribe and approved by Congress might provide some flexibility in, or perhaps eliminate, such constraints. Such an MRS facility could begin accepting waste sooner, particularly if it were developed in phases, the first being a simple storage operation. In fact, a phased MRS may allow acceptance in advance of 2003 given current linkages to the repository, and the value of such a phased facility is being studied.

Because of the institutional benefits to be obtained through the use of a negotiated site and the potential for

earlier siting and greater flexibility of operation, the DOE will encourage the efforts of the Nuclear Waste Negotiator to identify a potential negotiated site for an MRS facility as quickly as possible. The DOE's planning attempts to minimize the time required to respond to the needs of the Negotiator and ensure that the program could be adapted to Congressional approval of a negotiated agreement with minimum cost and delay.

A set of MRS systems studies currently being conducted will provide information needed for optimizing the total waste management system for efficiency and manageability, and will help the DOE allocate functions between the MRS facility and the repository.

The DOE's final position and recommendation on a waste management system configuration and a recommended MRS function is being formulated and will be presented to the MRS Review Commission in the late Spring.

Transportation. An important component of the waste-management system is a safe, efficient, and cost-effective system for transporting waste to storage and disposal facilities. The transportation of waste to waste-management facilities will be subject to all applicable Federal regulations, including those of the NRC and the Department of Transportation (DOT).

The waste-transportation system will move waste from designated points of origin and storage locations to the MRS facility and the repository. These points of origin and storage locations will include about 80 reactor sites at which spent fuel is stored. The number of shipments that will be required will depend on many factors, such as the use of a new generation of truck and rail-and-barge casks with increased carrying capacities and the use of rail-and-barge transport, where possible, which would reduce the number of shipments that would be required if truck transport is used.

Shipments of waste from reactors to the MRS facility or the repository are expected to be by rail or by truck. Shipments from the MRS facility to the repository are expected to be exclusively by rail in dedicated trains carrying several transportation casks. However, no surface mode of transportation has been ruled out, and, in the case of reactors located on waterways, it is possible that spent fuel may be shipped part of the way by barge and transferred to a railcar for the remainder of the trip to the MRS facility or repository. Both defense and commercial high-level wastes are expected to be shipped exclusively by rail. The casks to be used in transportation will be developed by private industry under contract to the DOE, and their designs will be certified by the NRC. The DOE has negotiated five contracts for the development of transportation casks, and this past summer the DOE issued the initial version of the mandated report on dry-cask storage at reactor sites. The final version, which includes public comments and final NRC comments, will be submitted to Congress in February 1989. As mentioned, the casks to be developed for shipments from reactors will differ from the casks currently used for spent-fuel shipments in that they will have considerably

greater capacities. For shipments from the MRS facility, the cask design will depend on the functions performed at the MRS facility.

Systems integration. The DOE's objective is to develop an effective, integrated waste-management system that satisfies all applicable regulatory and legislative requirements. The development of such a system requires the management of the many diverse disciplines involved in research, development, siting, design, and regulatory compliance. A systems engineering approach is being used to develop and control the design of an integrated system to ensure the safe handling and permanent disposal of spent fuel and high-level radioactive waste. The DOE is increasing its emphasis on systems integration to establish the requirements for the major elements of the system, allocate functions among the elements, evaluate alternatives for the configuration and the design of the system, and to exercise configuration control.

Strategic/contingency planning. The DOE intends to exercise every option under its control to achieve the scheduled implementation of the waste-management system. For this reason, the Department has increased its efforts in strategic planning and planning for contingencies. The purpose of contingency planning is to deal with uncertainties and to build flexibility into the program. The suitability of the Yucca Mountain site, unexpected changes in the repository loading schedule, and the possible availability of a negotiated site for the repository or the MRS facility represent examples of situations that necessitate the continued preparation of contingency plans that could become operational as needed in the future. In addition to contingency planning, the DOE has recently selected a management-and-operations contractor to facilitate implementation of the waste system and to aid in integrating the program.

MEETING CURRENT AND FUTURE CHALLENGES

By directing that only the Yucca Mountain site in Nevada be characterized for the first repository, the Amendments Act has eliminated some of the challenges of the earlier program conducted by DOE's Office of Civilian Radioactive Waste Management. This earlier program had been directed at characterizing three different host rocks in three different geohydrologic settings. The DOE is now able to concentrate its resources on meeting the technical and institutional challenges that are specific to the Yucca Mountain site.

Technical Challenges

An important technical challenge is defining a site-characterization program that will achieve DOE's technical and programmatic objectives by being technically sound, timely, and cost effective. The information needed is defined as that necessary to demonstrate the suitability of the site for a repository, to design the repository and the waste package, and to obtain authorization from the NRC to construct the repository. The plan for obtaining the needed information is presented in the statutory SCP.

The development of the SCP was based on two organizing principles: a hierarchy of issues and a strategy for resolving these issues. The issues are directly derived from the regulations governing repositories, and they specifically address either the performance or the design of the repository or the waste package. In addition, to determine priorities for the site characterization program, DOE developed a top-level strategy -- a brief explanation of the role the various features of the Yucca Mountain site are expected to play in achieving the general objectives for the waste-isolation system.

The site-characterization program has been carefully defined to reduce the uncertainties about the performance of the site and the other elements of the repository system. However, the end of the formal site-characterization program is not the end of our efforts to understand the site. A performance-confirmation program will be implemented to continue the process of reducing uncertainties. This performance confirmation program will continue throughout the construction period and the operating life of the repository and during the subsequent "caretaker" period.

Performance assessment of the repository system will be the principal means for demonstrating compliance with regulations. Performance assessment will rely heavily on numerical codes based on conceptual models for the system and on empirical or theoretical relationships for the processes considered to be important in these conceptual models. The numerical codes to be used in performance assessment will be verified and validated. That is, analytic techniques will be tested to ensure that they correctly perform the encoded mathematical operations, and the conceptual models and the empirical and theoretical relationships will be evaluated to ensure that they adequately represent the physical system, to the extent practicable.

Verification will involve quality assurance in the development of the technique; the benchmarking of the techniques against other related techniques; and the evaluation of carefully chosen examples, including those with analytic solutions. The verification of a particular analytic technique may require substantial effort, but it is a relatively straightforward process.

The validation of the conceptual models and empirical and theoretical relationships, on the other hand, will be more difficult because the validation process must address in a fundamental way the uncertainties in the description of the system itself. Such uncertainties include those in the specifications of the input parameters for the system and those in the conceptual model itself (e.g., in its geometrical configuration, major figures, and boundary and initial conditions).

The most difficult technical challenge will be demonstrating that the NRC's performance objectives for the waste package and the engineered and natural barrier systems will be met -- that is, that the waste package will provide substantially complete containment for 300 to 1,000 years, that thereafter the rate of radionuclide release from the engineered-barrier system will be controlled, and that the waste will be effectively isolated from the accessible

environment for thousands of years. To do this, the waste package must withstand the effects of heat and radioactivity generated by the waste it contains. It must also withstand the geochemical and hydrologic conditions of the tuff environment in which it is emplaced -- an environment which will both affect and be affected by the heat and radioactivity associated with the emplaced waste.

To advance the waste package design, DOE will evaluate alternative concepts, materials, fabrication techniques, and configurations for emplacement. Underground testing will substantially advance our understanding of the environment in which the waste package must function. Extensive laboratory testing of waste package components and materials -- including the various forms in which waste may be encapsulated in the waste package -- in simulations of the repository environment will enable DOE to develop models for predicting how physical and chemical processes may operate on and in the waste package in this environment.

To facilitate the licensing process, DOE has entered into a procedural agreement with the NRC to foster cooperation in planning licensing activities and to foster information exchange between the two agencies. The procedural agreement provides for meetings at which the staffs of DOE and the NRC can discuss plans, review progress, and facilitate the resolution of problems. For the purpose of resolving issues early and in an open manner, the DOE will continue to work with the NRC staff on various technical topics such as facility and waste-package designs, design features for limiting radionuclide releases from the engineered-barrier system, and model verification and validation.

An important part of DOE's strategy for facilitating the resolution of licensing issues is quality assurance, as previously mentioned. An effective program of quality assurance is essential for demonstrating that the technical performance of the repository system and its elements meets regulatory standards. This demonstration is needed not only for licensing the repository but also for establishing public confidence in the technical quality of the program.

Institutional challenges

Public confidence will also be sought through the process of institutional interactions between the DOE and parties affected by the program. Congress clearly intends that the State of Nevada and its affected local governments play an active role in program development. Toward that end, the DOE has provided from the Nuclear Waste Fund participation grants totalling over \$26 million to date. With this funding, the State has operated programs of considerable scope, closely overseeing DOE's work. State representatives have reviewed key documents; participated in numerous technical meetings, including intensive meetings between DOE and the NRC on the Consultation Draft of the Site Characterization Plan; and attended monthly management meetings with DOE's Yucca Mountain Project Office. Personnel from that Office provide information about the repository program in numerous public forums. The amendments extend the right to receive participation

grants to affected units of local government and expand the definition of "affected." Currently, three counties hold this designation and are receiving direct participation grants.

The Secretary has written to the Governor of Nevada offering to negotiate the benefits agreement authorized by the Amendments Act and offering again to enter into the consultation and cooperation agreement authorized by the original Act. To date, the Governor has declined these offers, but they remain open should the Governor at some future date decide that the interests of the citizens of Nevada are served by acceptance of the offers. Under the amendments, following issuance of the Site Characterization Plan, the State may receive impact assistance in lieu of a benefits agreement, if it so chooses. Under the original Act, it is also eligible for payments-equal-to-taxes (PETT). Under the amendments, the State and the county in which the site is located may designate on-site representatives with oversight authority; and representatives of the State participate as observers on DOE audits of the quality assurance program.

The DOE will closely review the State's and public comments on the statutory site characterization plan, will continue to provide information, and will continue to ensure opportunities for participation. The DOE hopes that as the State and local governments exercise their rights to participation and oversight, they will gain more confidence in the technical program, and interactions will become more fruitful.

Marked changes in public attitudes are not likely to occur rapidly given the nature of the program and the reality that individual perspectives often differ from the program prescribed by law. In addition, different standards are applied to risk, risk assessment, and risk avoidance, partly because the perception of risk changes when one is directly affected by the risk or, on the other hand, in control of the situation causing the risk.

In the case of geologic disposal, it is difficult to communicate information regarding the preclosure and postclosure risks of the repository. Because the repository is a first-of-a-kind facility, people are reluctant to accept assurances that its operation will be safe. Trust and confidence in almost anything with a nuclear label will not have deep roots. This, among other reasons, makes it extremely hard to communicate the concepts involved in determining that permanent waste isolation can be achieved for 10,000 years or what constitutes reasonable assurance that such isolation will be achieved. This is exacerbated because of predictable disagreements, which are often misunderstood by the media and the public, among scientists on complex geotechnical topics. As a result, these disagreements, though expected and healthy, increase public uneasiness.

Continued exchange of information with the public and all affected parties and listening to their concerns will eventually lead to a better understanding and, hopefully, greater acceptance of its program. To this end, the DOE expects a very positive contribution from the institutional entities established by the Amendments Act. The DOE believes that independent bodies like the Nuclear Waste Technical

Review Board, the MRS Review Commission, the Nuclear Regulatory Commission and its staff, and the newly created Advisory Committee on Nuclear Waste should contribute to the confidence of the public and affected parties in regard to technical excellence.

For its part, DOE intends to keep the process open to public input and intends to demonstrate its determination to appropriately address the concerns of the public. The degree of its success in this endeavor will again be judged by the public and the democratic process. This program will

continue to receive criticism as it did before the enactment of legislation; therefore, it is extremely important to build a record of technically credible results. We will continue to strive to meet the often complex and demanding requirements of the law with a commitment to an open process and with our eyes fixed on the objective of solving this important national problem.