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# NUCLEAR WASTE

# Quarterly Report as of March 31, 1990


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**February 15, 1991**

The Honorable J. Bennett Johnston
Chairman, Committee on Energy
and Natural Resources
United States Senate

The Honorable Malcolm Wallop
Ranking Minority Member
Committee on Energy and Natural Resources
United States Senate

On March 26, 1984, your Committee requested that we provide quarterly status reports on the Department of Energy's (DOE) implementation of the Nuclear Waste Policy Act of 1982 (NWPA). The act established a national program and policy for safely storing and transporting civilian nuclear waste and permanently disposing of it in one or more underground repositories. December 1987 amendments to the act directed DOE to limit its characterization (investigation) of candidate sites for a repository to the site at Yucca Mountain, Nevada. The amendments also authorized DOE, subject to certain limitations, to construct and operate a monitored retrievable storage (MRS) facility.[1] The facility would be used to store nuclear waste until DOE could ship the waste to the repository.

In accordance with agreements reached with Committee staff in July 1990, this will be our final quarterly report. In it we discuss (1) public comments received by DOE on the Secretary of Energy's November 1989 report to the Congress, which assessed the civilian nuclear waste program, (2) uncertainties about the criteria DOE would use to identify the presence of unsuitable site conditions early in the investigation of Yucca Mountain, and (3) the way in which DOE's near-term site investigation plans could be affected by the state of Nevada's refusal to allow DOE access to the Yucca Mountain site.[2]

## Results in Brief

DOE received a variety of comments on the Secretary's report, which called for three basic changes in the nuclear waste program: (1) management restructuring, (2) new emphasis on scientific investigation of

[1]The amendments are contained in the Nuclear Waste Policy Amendments Act of 1987 (Amendments Act), Title V of the Omnibus Budget Reconciliation Act of 1987 (P.L. 100-203).

[2]Report to Congress on Reassessment of the Civilian Radioactive Waste Management Program (DOE/RW-0247, Nov. 29, 1989).

Yucca Mountain, focusing on early identification of conditions that would indicate that the site is not suitable and require a 7-year extension in the schedule for opening the repository, and (3) a proposal to develop an MRS facility as soon as possible. In general, respondents agreed with DOE's restructured program management plan, efforts to ensure that its site investigation is scientifically based, and revised schedule. However, DOE received mixed comments on its plans to investigate the site by conducting some tests from the surface of Yucca Mountain before constructing an exploratory shaft facility.[3] Some of the respondents opposing DOE's approach on this matter preferred that the exploratory shaft facility be constructed as soon as possible to expedite the site investigation program. DOE also received mixed views on its plan to seek congressional action to disconnect the development of an MRS facility from the development of the repository. Industry representatives agreed with DOE's approach, but some respondents were concerned that such an action could result in an MRS facility becoming a replacement for a repository.

As DOE developed its plans for the early identification of any unsuitable site conditions, a question arose within the agency about whether it should use its own regulations, as well as those of the Nuclear Regulatory Commission (NRC), as a basis for identifying potentially unsuitable conditions. DOE recently decided to use both. DOE's decision is significant because, among other reasons, its own regulations are more specific than NRC's regulations on conditions that can disqualify a site.

DOE and Nevada are engaged in a legal battle over state environmental permits that DOE needs to begin investigating the Yucca Mountain site. Because this dispute might delay the program by as much as 2 years, DOE recently sought legislation that would enable it to comply with permit requirements without Nevada's involvement. Also, DOE officials said that if the start of site investigation is significantly delayed due to the court action or other reasons, DOE may abandon its early focus on surface-based testing. This could help maintain the investigation schedule but could also eliminate the possibility of identifying unsuitable site conditions before more costly underground work is performed.

## Background

In 1989 the House Committee on Appropriations directed DOE to submit within 60 days of the enactment of the Energy and Water Development

[3]An exploratory shaft facility would consist of surface buildings, two shafts (or one shaft and one ramp) mined to repository depth, and underground testing rooms.

Appropriation Act for fiscal year 1990 (P.L. 101-101) a response to the Committee's concerns of "endemic" schedule slips, problems in management structure, and a lack of integrated contractor efforts in the civilian nuclear waste program. The Secretary of Energy's November 1989 report responded to the Committee's directive.

In the Secretary's report, DOE said that, for the first time since the enactment of the NWPA, the program schedule is based on a realistic assessment of activity durations and experiences and, as a result, the schedule shows a significant slip for the start of repository operations—from 2003 to 2010. To help achieve its milestones and goals, DOE said that its plan centers on (1) restructuring the Office of Civilian Radioactive Waste Management (OCRWM), (2) obtaining the required environmental permits from Nevada for new scientific investigations at Yucca Mountain, and (3) establishing an MRS facility with a 1998 target date for accepting nuclear wastes from utilities.[4]

On the subject of management structure, DOE said that it had established direct-line reporting by the Yucca Mountain Project Office to OCRWM and had directed an independent management review of the waste program's organizational structure and processes.

Initially DOE had planned to perform surface-based investigations of Yucca Mountain—which include such tasks as drilling boreholes and digging trenches to study site geology—at the same time that it constructed and performed underground testing in an exploratory shaft facility and in tunnels. In the Secretary's report, however, DOE said that performing some of the planned surface-based testing in advance of constructing the underground test facility would help ensure that the site investigation would be scientifically based, technically sound, and cost effective. These early surface-based tests would be used to evaluate conditions that might make the site unsuitable for a repository. DOE reported that such testing responded to various recommendations that DOE look for unsuitable conditions early in site investigation.

In the Secretary's report, DOE said that because of the emphasis on early surface-based testing for specific conditions, construction of the underground test facility would be delayed until November 1992. According to DOE, the delay would allow it to reevaluate issues raised by NRC and

[4]Under DOE's standard disposal contract, services provided by DOE (including accepting title to the waste and transporting and disposing of it) are to begin "after commencement of facility operations, not later than January 31, 1998."

by the Nuclear Waste Technical Review Board, which was created by the Amendments Act to provide independent technical review of the waste program. Among these issues were the location of the two exploratory shafts and the method to be followed in constructing the shafts. Also, DOE said that it is committed to ensuring that the results of its scientific investigations are technically sound and not constrained by schedules that do not permit adequate time for gathering information.[5]

Further, DOE said that an MRS facility is critical to achieving the goal of early waste acceptance and will allow the agency to better meet other strategic objectives, such as timely disposal, schedule confidence, and systems flexibility. However, the Amendments Act links the development of the MRS facility to progress on the repository—construction of the facility can begin, for example, only after NRC has authorized construction of a repository. Since DOE now expects that it might receive such authorization as late as 2004, the agency said it could not meet the anticipated schedule set forth in the NWPA for accepting waste in 1998 and, accordingly, it plans to work with the Congress to modify the statutory linkage so that an MRS facility can be operating by about 1998.

Although DOE invited comments only on the proposed schedule contained in the Secretary's report, the 25 respondents did not limit their comments to the schedule. In March 1990 the Secretary told the respondents that their comments were considered in preparing the final program schedule and that their comments not related to the schedule would be considered in a draft revision to the mission plan.[6] DOE addressed the respondents' comments in a separate report released in December 1990.[7] Revisions to the mission plan are scheduled to be issued in 1991.

## Comments on the Secretary's Report

In general, respondents approved of DOE's proposed actions to restructure program management. Most respondents also agreed that the new overall program schedule was more realistic than the prior schedule. DOE

[5]For a fuller discussion of the concerns of the Nuclear Waste Technical Review Board and NRC about DOE's proposed exploratory shaft facility, see our report Nuclear Waste: Quarterly Report as of September 30, 1989 (GAO/RCED-90-103, Mar. 2, 1990).

[6]The Mission Plan for the Civilian Radioactive Waste Management Program presented DOE's plans for implementing the waste-management program mandated by the NWPA. The plan was published in 1985 and amended in 1987 and 1988 (in draft only).

[7]Comments Response Document for the Secretary of Energy's "Report to Congress on Reassessment of the Civilian Radioactive Waste Management Program" (Nov. 21, 1990).

has now implemented much of the management restructuring. Further, DOE expects to meet the plan's schedule for obtaining NRC's acceptance of enough of the quality assurance program to be prepared to begin limited surface-based testing in January 1991. Thus, once DOE obtains the necessary environmental permits from Nevada it could begin its surface-based testing program. Comments on DOE's actions regarding management structure and program schedule are discussed in more detail in appendix I.

Under its plan, DOE's scientific investigation of Yucca Mountain will focus initially on early surface-based testing to evaluate whether the site has any features indicating that it is not suitable as a repository. Also, DOE's plan calls for the construction of the exploratory shaft facility to begin about 2 years after the scheduled start of its early surface-based testing program.

The utility industry, the U.S. Geological Survey (USGS), and Nevada generally agreed that DOE should identify early in the scientific investigation the presence of any disqualifying condition at Yucca Mountain. However, the utility industry opposed delaying the construction of the exploratory shaft facility until the early surface-based testing is completed because this would lengthen the overall site investigation schedule. The American Committee on Radwaste Disposal, whose comments were endorsed by several utilities and trade associations, said that although early identification of potentially disqualifying conditions is appropriate, both surface-based and underground testing should proceed together. It said that construction of the underground test facility should begin as soon as possible to expedite the investigation program. In contrast, the USGS, which participates in DOE's program, agreed with DOE's new approach and noted that the mining industry also obtains information from surface-based tests to determine if more costly underground work is warranted.

According to Nevada, DOE should not begin early surface-based testing until it has developed sufficient measures to ensure the integrity of the data compiled and the site's ability to isolate the waste from the environment. The state also said that DOE had not allowed sufficient time for early surface-based testing. In Nevada's view DOE did not base its November 1992 target date for beginning construction of the exploratory shaft facility on the time needed to perform surface-based tests necessary for an adequate determination of whether conditions present at Yucca Mountain could disqualify the site. Instead, according to

Nevada, DOE based the November 1992 date on the time needed to complete essential preparations for constructing the facility.

Finally, respondents such as utility organizations and Nevada said that DOE should develop a methodology for early evaluation of potentially disqualifying conditions. Nevada pointed out, for example, that nothing in the Secretary's report shows how DOE will make a determination about site suitability before constructing the exploratory shaft facility. Comments on early site investigation are discussed in more detail in appendix II.

Industry representatives agreed with DOE's plan to seek congressional action to disconnect the development of an MRS facility from the development of the repository so that DOE might begin accepting waste by January 1998. Some respondents, however, were concerned that such an action could result in an MRS facility becoming a replacement for a repository, and others were concerned about whether a safe transportation system could be developed by January 1998. DOE has not yet asked the Congress to amend the act. Appendix III contains a more detailed discussion of comments on DOE's plans for an MRS facility.

## Questions About Criteria for Determining Site Suitability

The Secretary's report did not, as some respondents pointed out, discuss the criteria DOE would use to identify unsuitable site conditions. However, in January 1990 OCRWM had established guidance for a task force to use in developing priorities for surface-based testing. Such guidance would ensure that the presence of any conditions indicating the site's unsuitability for a repository would be identified early. The guidance instructed the task force to use NRC's regulations but did not mention DOE's own regulations for evaluating sites (siting guidelines). The applicability of DOE's siting guidelines is an important issue because these guidelines, rather than NRC's regulations, contain specific criteria for disqualifying a site.

There was uncertainty and disagreement within OCRWM over the applicability of DOE's siting guidelines. OCRWM officials who opposed use of the guidelines argued that they were no longer applicable because the Amendments Act identifies the Yucca Mountain site as the only site to be characterized; therefore, it appears logical to develop criteria specifically for that site.

OCRWM officials who favored the use of the siting guidelines said, among other things, that the NWPA provides for the consideration of DOE's guidelines in any recommendation by the Secretary of Energy to the President that a site be approved for development as a repository. According to this view, findings that all qualifying conditions contained in the guidelines have been met and that no disqualifying conditions listed in the guidelines are present must be substantiated at the conclusion of site investigation if the Yucca Mountain site is to be recommended for development as a repository.

As discussed above, the debate within OCRWM over the applicability of DOE's siting guidelines focused on both the usefulness of the guidelines to evaluate a single candidate repository site and whether DOE is still required, under the NWPA, as amended, to use the guidelines in determining site suitability. During the period of debate on this issue, however, OCRWM did not request an opinion from DOE's General Counsel on the latter issue.

In October 1990 OCRWM's Director publicly stated that DOE's guidelines would be used in evaluating the suitability of Yucca Mountain.[8] OCRWM officials told us that DOE has used and will continue to use the guidelines to establish priorities for surface-based testing and to eventually determine if Yucca Mountain is suitable for a repository. Also, the officials said that the public will have an opportunity to comment on the report of the task force on surface-based testing and that decisions on implementing the task force's recommendations will be made in the spring of 1991.

## Delayed Access to Site May Alter Early Surface-Based Testing Program

The conflict between DOE and Nevada over DOE's access to the Yucca Mountain site could significantly delay or change the agency's early surface-based testing program. Recognizing this conflict, the Secretary's report said that the January 1991 target date for beginning new site investigations was optimistic because it presupposes that the conflict will be resolved by then.

Nevada has refused to act on DOE's applications for the environmental permits DOE needs to start surface-based testing at Yucca Mountain and, in January 1990, Nevada sued DOE in the Ninth Circuit Court of Appeals

[8]This question was also addressed by the Ninth Circuit Court of Appeals on September 19, 1990, when, in deciding a Nevada lawsuit, the Court stated that the siting guidelines developed by DOE are to be used to determine the suitability of Yucca Mountain for a repository.

seeking an order that DOE terminate activities at the site. Nevada's basic position in the suit was that the NWPA allows a state to disapprove of a repository site within its boundaries, and Nevada's legislature passed two joint resolutions disapproving of the site. Subsequently, DOE sued Nevada in the U.S. District Court, District of Nevada, to obtain the necessary permits. The Ninth Circuit Court of Appeals decided Nevada's suit in DOE's favor on September 19, 1990, stating, in part, that Nevada could not veto the selection of Yucca Mountain before the President's recommendation to the Congress. If the President was to recommend the site, the recommendation would occur after completion of site investigation in the year 2001, according to DOE's present schedule. The state's Attorney General appealed the court's decision on December 17, 1990. The district court has not yet acted on DOE's suit, and the permit issue continues to block DOE's access to the site.

On October 11, 1990, the Secretary of Energy stated in a letter to the Chairman of the Senate Committee on Energy and Natural Resources that, considering Nevada's statement that it will do everything in its power to "frustrate the federal program," the current legal proceedings could take up to 2 years to resolve. The Secretary, therefore, asked for legislation enabling DOE to apply for, and comply with, the necessary permits without Nevada's permission. The Secretary did not propose specific legislation but offered to work with the Chairman toward this end.

OCRWM officials told us that if the start of surface-based testing is significantly delayed, DOE would consider reverting to its original plan to conduct more of the surface-based tests at the same time it constructs, and conducts tests in, the exploratory shaft facility. This alternative would minimize potential delays in the overall schedule of completing site investigation and submitting a license application to NRC by 2001. However, the advantage of early surface-based testing—providing early information about whether the site should be disqualified—would not be achieved. Early identification of a condition disqualifying a site could prevent unnecessary expenditures on more costly underground work. DOE estimates, for example, that the planned program of early surface-based testing would cost about $88 million and that construction of, and testing in, the exploratory shaft facility would cost about $400 million.

## Observations

The Secretary's report is a positive step for the nuclear waste disposal program. DOE appears to have recognized that it can successfully resolve the nuclear waste disposal issue only by taking the time needed to plan

and implement a program that can withstand independent technical review. However, DOE may still not be realistic enough in establishing program milestones, particularly in regard to Nevada's ability to block or delay investigation of Yucca Mountain and possibly the eventual development of a repository at the site. For example, DOE's plan to obtain the necessary permits from Nevada in time to begin surface-based testing in January 1991 was, by its own admission, optimistic.

Moreover, given Nevada's strong opposition to the program, DOE has little assurance that it can adhere to future revisions to its schedule for repository development. In view of Nevada's determination to inhibit the program's progress, it appears that, as best it can, DOE will have to anticipate actions that Nevada may take to slow and/or block progress and take these actions into account in developing revised program schedules and plans.

If Nevada delays access to Yucca Mountain, one way for DOE to revise its plans, according to DOE officials, would be to conduct surface-based and underground tests at the same time, rather than starting with about 2 years of surface-based tests alone. Conducting both kinds of tests at the same time could speed the program along. It would, however, eliminate the potential for identifying site disqualifiers without the more costly underground work or information that could be useful in planning the underground test program.

For almost 1 year, OCRWM debated whether DOE's siting guidelines should be used as criteria in determining the suitability of the Yucca Mountain site. Considering that this is a question of interpretation of the NWPA, as amended, OCRWM could have resolved the issue earlier by asking DOE's Office of General Counsel for a formal opinion.

To obtain information on the comments made on the Secretary's report, we reviewed correspondence DOE sent and received on the report, including the comments of 25 respondents—federal agencies, Nevada, local governments, the national association of regulatory utility commissioners, utility industries and groups that represent them, and an Indian tribe. In addition, we interviewed OCRWM officials responsible for preparing responses to those who commented.

Regarding the status of DOE's actions to implement the Secretary's report, we obtained information on (1) the objectives and status of DOE's task force on surface-based testing, (2) the criteria DOE plans to use in

determining site suitability, (3) actions taken to restructure OCRWM management, and (4) the status of the Nevada and DOE court cases. We also obtained and reviewed other documentation from DOE and NRC, such as minutes of bimonthly quality assurance meetings between DOE and NRC and NRC's report on its observations of DOE's quality assurance audits. We also discussed these issues with the Deputy Director, OCRWM, other DOE officials, and NRC officials.

We discussed the facts in this report with cognizant DOE officials, and we incorporated their comments in appropriate instances. As requested, however, we did not obtain official comments on the report.

We are sending copies of this report to the Chairmen of the Senate Committee on Governmental Affairs; the House Committees on Government Operations and on Energy and Commerce; the Secretary of Energy; the Chairman, Nuclear Regulatory Commission; and other interested parties. If you have any questions, please contact me at (202) 275-1441.

Major contributors to this report are listed in appendix IV.

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# Contents

## Abbreviations

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| ACORD | American Committee on Radwaste Disposal |
| DOE | Department of Energy |
| EPA | Environmental Protection Agency |
| GAO | General Accounting Office |
| MRS | Monitored Retrievable Storage |
| NARUC | National Association of Regulatory Utility Commissioners |
| NRC | Nuclear Regulatory Commission |
| NWPA | Nuclear Waste Policy Act of 1982 |
| OCRWM | Office of Civilian Radioactive Waste Management |
| USGS | U.S. Geological Survey |

# Comments and DOE's Actions Regarding Management Structure and Program Schedule

In general, respondents approved of the actions that the Department of Energy (DOE) proposed in the Secretary's report to restructure program management, and most agreed that the new overall program schedule was more realistic than the prior schedule. DOE has now implemented much of the management restructuring. Further, DOE expects to meet the plan's schedule for obtaining the Nuclear Regulatory Commission's (NRC) acceptance of enough of the quality assurance program to be prepared to begin limited surface-based testing in January 1991. Thus, once DOE obtains the necessary environmental permits from Nevada it could begin its surface-based testing program.

However, the respondents raised some concerns related to DOE's new schedule.

- NRC said that detailed milestones should be established on the dates DOE will (1) meet NRC's acceptance of DOE's quality assurance program and (2) begin surface-based testing.
- Utility associations expressed concerns about the (1) further delays resulting from the new program schedule, (2) probability that program costs will further escalate because of delays and other factors, and (3) lack of contingency planning.
- Nevada said that DOE based its target date for beginning the exploratory shaft facility construction on the time needed to perform essential activities leading up to its construction, rather than on the time needed for surface-based testing to look for disqualifying conditions.
- Nevada questioned DOE's ability to meet the waste acceptance date of January 1998 and said that the plan does not recognize the way in which the revised transportation schedule will affect states and local communities.

## Background

The Nuclear Waste Policy Act of 1982 (NWPA) established a step-by-step process and time schedule by which DOE would screen potential sites, select and characterize candidate sites, recommend to the President sites for two repositories, and develop plans for one repository. Also, the NWPA provided that DOE contract with utilities to dispose of nuclear waste beginning not later than January 31, 1998, and established the Office of Civilian Radioactive Waste Management (OCRWM) within DOE to carry out the nuclear waste disposal program.

In December 1987, because of mounting opposition to the program and rising cost estimates, the Congress redirected the program through the Amendments Act. Most importantly, the Amendments Act directed DOE

to stop work at all potential sites except Yucca Mountain, Nevada; determine if that site is suitable for a repository; and, if so, seek authorization from NRC to construct a repository there. If DOE finds that the Yucca Mountain site is unsuitable, it must, among other things, (1) terminate site-specific activities, (2) report its determination to the Congress and to the Governor and legislature of Nevada, and (3) within 6 months of such determination, provide the Congress with recommendations for further action. The Amendments Act also authorized DOE to construct an MRS facility.

## DOE's Efforts to Restructure Program

DOE has progressed in restructuring management of the civilian nuclear waste program. For example, the U.S. Senate confirmed a permanent director of OCRWM in April 1990—the first permanent director in more than 2 years—and confirmed a Nuclear Waste Negotiator in August 1990. The position of Waste Negotiator was established by the December 1987 amendments to the NWPA. The Waste Negotiator is responsible for trying to negotiate proposed agreements with states/and or Indian tribes that would be willing to host a repository or an MRS facility.

Using the results of a consulting firm's independent review of OCRWM's management structure and processes, systems, and contractual arrangements, the Director of OCRWM issued a strategy to restructure the management of the program in August 1990. The reorganized office contains eight offices with the following functions: (1) quality assurance, (2) external relations, (3) strategic planning and international programs, (4) systems and compliance, (5) contractor business management, (6) storage and transportation, (7) geologic disposal, and (8) program and resources management.

In response to the Secretary's report, several respondents approved of DOE's planned management restructuring. For example, the National Association of Regulatory Utility Commissioners (NARUC) said it strongly supports as fundamental necessities independent management review, direct-line reporting, control over contractors, and revised management controls as provided for in the Secretary's report. The American Committee on Radwaste Disposal (ACORD), an electric utility body formed to promote progress in the civilian high-level radioactive waste management program, said that it was pleased that DOE's proposed changes focused on the management of the program and institutional relationships. ACORD, whose comments were supported by several utilities and their associations, said that DOE must approach the program with an attitude much different from its past attitude. Clark County, Nevada,

which is adjacent to the county where Yucca Mountain is located, said it is hopeful that proposed management recommendations will assist in streamlining the operations of DOE. For example the county said DOE needs to improve the timeliness of reviews of grant applications and subcontracts.

## Quality Assurance

DOE reported that a quality assurance program was one of the most important improvements in the management system that OCRWM was implementing. NRC's repository licensing regulations require DOE and its contractors to implement quality assurance programs for site characterization and to inspect and audit activities that affect quality. According to NRC, a sound quality assurance program helps ensure that the repository can be operated safely and that it can isolate waste for the required period of time. In 1985 DOE agreed that it would not begin new site characterization activities until it had demonstrated, to NRC's satisfaction, that the necessary programs were in place for these activities.

In 1989 DOE delayed three times its scheduled date for obtaining NRC's acceptance of the quality assurance program. DOE and NRC officials said, however, that they expect that DOE will have its quality assurance program approved by NRC in time to begin limited surface-based testing in January 1991. One remaining task is NRC's unconditional acceptance of quality assurance programs for OCRWM headquarters, the Yucca Mountain Project Office, and Los Alamos National Laboratory, one of the program participants. DOE and NRC officials anticipate that these programs will be acceptable and not adversely affect DOE's new schedule.

DOE and NRC officials said that NRC has conditionally accepted DOE's quality assurance plan to proceed with two studies on site characterization. One study discusses calcite and opaline silica vein deposits. Large, vein-like deposits of calcite and silica occur in faults near the site. On the basis of this study, DOE will determine (1) whether the origin of the calcite and silica veins could have any bearing on future ground water hydrology at repository depth and (2) the implications of potential adverse effects of hydrologic conditions, tectonics, and volcanism on site performance in the regulatory context. In the second study, DOE will gather geological data from Midway Valley, located east of Yucca Mountain, to support the evaluation of the suitability of potential sites for surface facilities and to assess the potential for fault displacement on repository design.

These two studies will be the initial scientific investigations when surface-based testing begins. DOE expected to have other portions of the site characterization program approved and to conduct additional work at the site in accordance with its schedule.

## Schedule and Costs

DOE reported in its 1989 reassessment report that its comprehensive review of the schedule for repository-related activities enabled it to realistically assess, for the first time since passage of the NWPA, activity durations and program experience and to incorporate this assessment into a new schedule. It intends that the technical, cost, and scheduling baselines define the criteria and objectives against which program performance and progress can be measured, thus facilitating effective program control. While the schedule was included in DOE's report, DOE planned to issue the technical and cost baselines later.

In commenting on the Secretary's report, NRC said that it recognized the importance of activities planned for the 1990-91 period and of DOE's and NRC's development of consistent and detailed milestones for the period. NRC said that early interaction was particularly important on events necessary for (1) obtaining NRC's acceptance of DOE's quality assurance program by 1990, (2) ensuring adequate technical consultation through open meetings during NRC's ongoing refinement of regulatory requirements and guidance, (3) beginning surface-based testing in January 1991, and (4) beginning construction of the exploratory shaft facility in November 1992.

NRC said that its ability to complete its licensing review in the 3-year period allowed by the NWPA depends on the effectiveness of DOE's prelicensing application program. According to NRC, the restructured program reinforces DOE's commitment to early identification and resolution of issues through systematic consultation with NRC and the early implementation of the quality assurance program. However, NRC said that it was unclear about the way in which the restructured program would help develop the licensing support system needed to assist in the licensing process itself.[1] For this reason, NRC suggested that a design and development schedule for a licensing support system be established in accordance with the restructured program.

[1]The licensing support system is a computerized document data base capable of producing all relevant documentation associated with DOE's repository-license application.

NARUC was concerned that no budget or revised cost estimates appeared in DOE's report and said it has continually advised DOE that major program revisions without concurrent consideration of program cost destroys DOE's credibility. NARUC said that, although DOE planned to issue a cost baseline after the Secretary's report was issued, expenditures of ratepayer funds should not be treated as an afterthought if the program was to succeed.[2] NARUC generally agreed with corrective measures in DOE's report; for example, it said the measures to restructure OCRWM's management were on target. It also said, however, it could not dismiss the failed plans and inefficient spending of the past. NARUC's experience with nuclear power plant construction, it said, had shown that failed schedules and cost overruns are the first indications of troubled management.

ACORD said that it generally approved of DOE's plan but that the plan is "only a good first step" and that much work remains to be done to implement it. However, while DOE has made some progress in implementing the program, ACORD added, electric utilities, their customers, and regulators are deeply concerned about program delays. Further, it said that concern has grown that the more than $4 billion that utilities have paid to DOE to cover program costs will become a lost investment because DOE may be unable to live up to the congressional mandate to develop and operate a nuclear waste management program.

ACORD said that it is extremely important that DOE meet its immediate decision plan, including revising the schedule, cost, and technical baselines, to permit the start of site characterization by January 1, 1991. Although agreeing that the revised schedule was more realistic than the prior schedule, ACORD said that, given DOE's history, it has serious concerns that the agency will not adhere to the new schedule. ACORD recommended that, to build credibility, DOE revise its standard contract with utilities to include performance standards, immediate long-term milestones, and a right for industry to review DOE's program. Moreover, ACORD said that if DOE does not begin to accept spent nuclear fuel by January 31, 1998, a funding mechanism must be developed to accommodate the additional costs of spent fuel storage at reactors that will be incurred by electric utilities after that date.

[2]The nuclear waste disposal program's costs are recovered from the generators and owners of nuclear waste. Among those owners and generators are utilities, who pass on their costs to ratepayers.

## DOE's Response to Comments

In March 1990, the Secretary of Energy assured the respondents of his continuing personal involvement in and support of the civilian radioactive waste program and provided them with a brief summary of the comments received and actions accomplished. Also, he said that their comments had been considered in finalizing the schedule with only one minor change, a 1-month slip in initiating the schedule. Finally, the Secretary said that DOE will address comments not related to scheduling in the mission plan revision which, at that time, was scheduled to be issued for public comment in June 1990 but has since been delayed to June 1991. According to OCRWM officials, the delay was needed to allow time to obtain input from affected and involved parties in developing strategic principles for guiding the program in the future.

On March 30, 1990, the Secretary provided a more detailed written response to the Governor of Nevada. The Secretary said, among other things, that he had provided Nevada with his personal assurance that he would stop all work at the site if scientific investigations indicated that the Yucca Mountain site is unsuitable. He added, however, that Nevada has blocked DOE's investigation by refusing to act on DOE's applications for environmental permits that are needed to start surface-based testing.

# Comments on Early Site Investigations That Focus on Potential Disqualifying Conditions

Respondents generally agreed with DOE's revised program strategy, including DOE's commitment to ensure that the scientific investigation will be the focal point of the restructured program. However, respondents disagreed on one aspect of DOE's scientific investigation plan, namely performing early surface-based testing before proceeding with the exploratory shaft facility construction and testing program. While some respondents agreed with DOE's approach, utility industry representatives did not. They said that they would prefer that DOE construct the exploratory shaft facilities as early as possible. DOE officials said that DOE's approach might be revised if, because of the court cases or other factors, a significant delay in the site characterization program occurs. DOE officials said if delays occur DOE may revert to its original plan to conduct more of the surface-based tests together with construction of and testing in the exploratory shaft facility.

Nevada stated that Yucca Mountain should be disqualified under DOE's guidelines without further site characterization. The state also said that DOE should issue a new comprehensive mission plan and site characterization plan. The Secretary of Energy responded that when DOE is permitted to characterize the site, data will be reviewed as it is collected to determine the validity of the state's concerns. The Secretary also stated that totally new documents are not necessary.

## Views Differ on DOE's Revised Approach to Site Investigations

According to the Secretary's report, DOE will focus its scientific investigation initially on surface-based testing of the Yucca Mountain site to evaluate whether the site has any features indicating that it is not suitable as a repository. Although respondents generally agreed with the need to identify, as early as possible, conditions that could disqualify the site, utility industry representatives did not believe that construction of the exploratory shaft facility should be delayed until 2 years of initial surface-based testing are completed. Also, some respondents disagreed with other aspects of DOE's approach. For example, Nevada said that DOE did not allow enough time to adequately evaluate the potential disqualifiers before beginning shaft construction.

NRC, U.S. Geological Survey (USGS), and others responded favorably to DOE's commitment to ensure that the scientific investigation will be the focal point of DOE's restructured program. According to NRC, DOE's emphasis on a scientific approach should help ensure that study results are technically sound and independent from a scheduling process that might constrain the collection of data needed for determining site suitability and the filing of a complete license application.

USGS said that it endorsed DOE's early search for conditions listed by NRC as potential site disqualifiers—such as volcanism, faulting, and seismicity. Some questions regarding the suitability of the site, however, will depend on studies based not only on surface-based but also underground tests. Nevertheless, USGS said that DOE's new emphasis on surface-based testing in advance of tests in the exploratory shaft facility is consistent with the mining industry's normal practice. According to USGS, mining companies try to obtain sufficient information from the relatively inexpensive surface-based investigations to determine if the much more costly underground exploration by shafts and tunnels is warranted. USGS said that what is learned from the surface-based studies at Yucca Mountain can only improve the planning for the underground test facilities and the design of the repository.

Although other respondents generally agreed on the need to identify potential disqualifiers as early as possible, some differed over certain aspects of DOE's plan for early surface-based testing. Nevada, for example, said that the surface-based testing program should not begin until the following two concerns are resolved.

- First, the underground test facility plans should be sufficiently developed to ensure that surface-based testing and shaft development will not compromise DOE's ability to collect needed site characterization data.
- Second, the underground test facility and surface-based testing plans should be evaluated to ensure that, performed together, they do not adversely affect the site's nuclear waste isolation capabilities.

Moreover, Nevada said that it is unlikely that DOE's new approach conforms with Nevada's earlier suggestion that DOE complete its critical scientific evaluations of known disqualifying site characteristics before beginning its underground test facility program. Nevada said that its conclusion was based on the short period of time DOE has scheduled for surface-based testing aimed at evaluating potential site disqualifiers. It said that the period of time scheduled is not sufficient to collect and analyze the data. According to Nevada, the time allowed to perform surface-based testing reflects DOE's latest estimate of the time needed to accomplish certain required tasks that are a prelude to constructing the shafts, such as developing an acceptable quality assurance program. Also, DOE's plan does not show DOE's criteria in making a determination about whether it should begin constructing the underground test facility.

ACORD said that while early determination of the principal, potentially disqualifying conditions is appropriate, both surface-based and underground testing should proceed together. To such an end, reevaluation of the underground test facility should be completed as soon as possible so that underground testing could begin at the earliest possible date. Moreover, ACORD said that DOE should develop (1) a methodology for early evaluation of potential disqualifying conditions (2) a contingency plan in the event that Yucca Mountain is found to be unsuitable, and (3) a detailed baseline schedule accompanied by the rationale for all activities.

Although the Edison Electric Institute, an association of the nation's investor-owned electrical utilities, said that it supported the program changes contained in the Secretary's report, it also said that it fully endorsed ACORD's comments on DOE's report. Specifically, the institute said that it agreed with ACORD that surface-based and underground testing must proceed together. Also, it said that DOE should develop a coordinated effort to determine what data are needed to meet regulations and that DOE's contracts with the electric utilities should be modified to include performance standards, program milestones, and industry rights to review DOE's program.

## Nevada's Comments

In commenting on the Secretary's report, Nevada reiterated its belief that it is unlawful for DOE to continue to pursue siting at Yucca Mountain and developing a repository there because, among other reasons, sufficient information exists for the site to be disqualified under DOE's own repository siting guidelines. Accordingly, Nevada has not acted on DOE's applications for the permits needed to begin site characterization. In the Secretary of Energy's March 30, 1990, response to Nevada's comments on his report to the Congress, he said that if scientific investigations indicate that the Yucca Mountain site is unsuitable for further investigation, he will not hesitate to stop all work at the site. The Secretary said that when DOE is permitted to conduct the scientific investigation that the law directs, data will be reviewed as it is collected to determine the validity of the state's concerns.

Nevada said that the grave implications of the Secretary's report requires that DOE provide more documentation than the report alone. The state said that the lack of a valid mission plan, coupled with the implications of the Secretary's report, requires that DOE issue a new comprehensive mission plan before the agency implements its revised

program. Nevada also said that because the Secretary's report restructures the site characterization program at Yucca Mountain, the existing site characterization plan should be considered invalid until a revised mission plan has been accepted by the Congress and a new site characterization plan has been drafted and submitted for public review.

DOE disagreed with Nevada's comments on the need for new mission and site characterization plans. According to DOE, no requirement exists for the issuance of a new mission plan before implementing the new initiatives. The NWPA, it said, specified that one mission plan be prepared. Also, DOE said that amending the mission plan is an appropriate way to apprise the Congress and the public of changes to the program. DOE said, however, that it does plan to incorporate the changes called for in the Secretary's report in an updated version of the mission plan.

Also, DOE said that the site characterization plan remains a viable document that adequately and completely describes the full range of testing that may be needed to characterize the site. The Secretary's report led to the development of a revised sequence for the scientific investigations and schedule for the overall repository program, based in large measure on the detailed information developed for the site characterization plan. The Secretary's report does not invalidate DOE's plans for obtaining this information as described in the site characterization plan.

# Comments on DOE's Plans for a Monitored Retrievable Storage Facility

Industry representatives agreed with DOE's plan to seek congressional action to disconnect the development of a monitored retrievable storage (MRS) facility from the development of the repository so that DOE might begin accepting waste by January 1998. Some respondents, however, were concerned that such an action could result in an MRS facility becoming a replacement for a repository and others were concerned about whether a safe transportation system could be developed by January 1998. DOE has not yet acted to ask the Congress to amend the act.

## DOE's Plan to Disconnect MRS Facility From Repository

According to the Secretary's report, DOE will work with the Congress to allow the building of an MRS facility that could accept waste as early as January 1998—which, under DOE's schedule, is 6 years before the NRC is to issue a license for construction of a repository. DOE's program plans, including its triennial budget, presuppose that the Congress will agree to modify the act's requirements linking the construction of an MRS to the progress made in licensing and constructing a repository. To date DOE has not attempted to get the Congress to modify the statutory linkages between the MRS and the repository. The OCRWM Director said it would be appropriate to modify linkages through a proposed agreement that the Nuclear Waste Negotiator would develop with a volunteer for an MRS facility. The agreement would be submitted to the Congress for enactment into law. Meanwhile, however, DOE has no contingency plan on how it will proceed if the linkages remain.

Although industry associations generally favor DOE's plan to seek a legislative change to disconnect the construction and operation of an MRS facility from progress in repository development, others raised questions about this plan, including whether such a change could result in the MRS facility becoming a de facto repository. Industry groups were encouraged to see that DOE was planning on having an MRS facility in operation by January 1998.[1]

ACORD said that an interim storage facility is technically sound in concept and would provide an environmentally safe means of providing storage until a permanent repository is built. It emphasized its view that under the NWPA and the standard contract DOE has with utilities (see 10

[1]The NWPA, as amended, requires that disposal contracts entered into by DOE and waste generators include provisions that require the Secretary to (1), following commencement of operations of a repository, take title to the waste, as expeditiously as practical upon the request of the owner or generator of such waste and (2), in return for the payment of fees, dispose of such waste beginning not later than January 31, 1998. Under DOE's standard disposal contract, services provided by DOE (including accepting title to the waste and transporting and disposing of it) are to begin "after commencement of facility operations, not later than January 31, 1998."

C.F.R. 961) DOE is obligated to begin accepting waste by January 1998. By then, utilities will have paid DOE $8 billion to $10 billion, and if DOE does not meet its obligation, the utilities will have to incur additional costs to store the waste at the reactor sites.

Further, ACORD said that an MRS site located through negotiation with a state or Indian tribe appears to be the most likely way to achieve success. Once a volunteer has been identified, the Congress should then be asked to modify the statutory linkages. Also, it said that early demonstrated success of a major program element such as an MRS facility is crucial in building credibility in the civilian nuclear waste program.

The Public Service Electric and Gas Company said that to meet the 1998 target date, two initial tasks—site selection and elimination of MRS linkage with the repository—must proceed rapidly and together and that the Secretary of Energy must be personally involved.

NARUC said that it has never taken a position on the need for or value of an MRS facility; however, to be cost effective an MRS facility must be built in time to help utilities avoid having to pay for additional on-site storage facilities. In a letter attached to NARUC's comments, a Commissioner of the Arkansas Public Service Commission said that it is not clear whether the MRS facility can meet DOE's goal of storage from 1998 through 2010 (when the repository is scheduled to open); however, even if that schedule is met, the on-site storage for Arkansas' utility company will reach capacity before the MRS facility is available.

Two respondents, the Environmental Protection Agency (EPA) and the Southern States Energy Board, expressed concern that the MRS facility might become a replacement for a permanent repository. An overriding concern for EPA was that the report may give the impression that DOE is changing its priorities from developing a repository to establishing a temporary MRS facility. The agency said that it believes very strongly that the program should continue to focus on developing a permanent repository for these dangerous materials as soon as possible. EPA also said that it recognizes that some amount of MRS capacity may be appropriate to manage spent fuel until a repository becomes available; however, great care must be taken to ensure that an MRS facility does not become a replacement for the ultimate disposal facility that is needed.

Southern States Energy Board said that some linkage between an MRS and the repository should be maintained so that an MRS facility does not

become a replacement for a repository. The Board referred to the conclusion of the Monitored Retrievable Storage Review Commission that while there is no technical justification for the linkages, in light of concerns by the Congress and others about an MRS facility becoming a replacement for a repository, some linkages are justified.[2] Conversely, ACORD said that it favors a modification in the statutory linkage and the revised schedule for opening an MRS facility to receive spent fuel.

Although the U.S. Council for Energy Awareness, an industry lobby group, favors disconnecting the MRS facility from the repository schedule, it faulted DOE's report for failing to provide contingencies if this does not happen. Nevada's Clark County, alluding to the high cost of an MRS and the difficulties involved in selecting an MRS facility, said that DOE should strongly consider storing the nuclear waste at the reactor sites until the issue of permanent waste disposal is resolved.

Regarding the transportation issues related to the MRS facility, the Western Interstate Energy Board, an association of 16 western states, said that while the repository schedule has slipped 7 years, the transportation program has been accelerated 5 years by DOE's proposal to begin accepting waste at an MRS facility as early as 1998. The Board said that this major acceleration of the transportation program will require the commitment of significant additional resources of DOE and states. There is no slack time on the critical path for transportation. The Board said that because the starting date has been moved up to 1998, certain transportation activities that would be conducted more efficiently in sequence must now be done together. Another concern is route selection. The Board proposes that potential routes from reactors to potential MRS sites should be identified as soon as the candidate MRS sites are established (around 1993 according to DOE's schedule). The Board said that key issues requiring action by DOE and states within the next 12 to 18 months include, among other things, developing route selection criteria and plans for emergency response training.

Local governments in Nevada also were concerned about emergency training for transportation. Lincoln County said that inclusion of local governments in emergency training and transportation system planning relating to the repository, not just the MRS facility, may be important in gaining public confidence. Esmeralda County said that spent fuel may

[2]The Monitored Retrievable Storage Review Commission, established in accordance with the provisions of the December 1987 amendments to the NWPA, studied and reported on the need for an MRS facility.

well travel through Esmeralda County, and therefore they expect issues such as emergency training to be resolved prior to the 1998 planned shipment date.

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