BACKGROUND PAPER 95-9

OVERVIEW OF HIGH-LEVEL RADIOACTIVE WASTE PROGRAM

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I. INTRODUCTION

In 1982 the Congress of the United States passed the Nuclear Waste Policy Act (NWPA), which was intended to provide for the safe and permanent disposal of spent nuclear fuel from the Nation's civilian power plants and high-level radioactive waste from military nuclear weapons program. In 1987, the NWPA was amended and designated Yucca Mountain, Nevada, as the only candidate site for study to determine if it qualified to be the Nation's first deep geologic nuclear waste repository. Site characterization activities are presently underway to determine if Yucca Mountain is a suitable site to construct a nuclear waste repository.

To provide State oversight of the Yucca Mountain Site Characterization program, the Nevada Legislature created the Committee on High-Level Radioactive Waste and the Nevada’s Agency for Nuclear Projects (NANP).

The purpose of this report is to provide general information on the Federal Nuclear Waste Program, the State oversight organizations, the activities of the Legislature’s Committee on High-Level Radioactive Waste, and future oversight topics.

II. PROGRAM OVERVIEW

A. Federal Historical Perspective

The Yucca Mountain Site Characterization Project started in 1977 when the United States Department of Energy (DOE) began investigating the possibility of disposal of radioactive waste in a geologic repository at the Nevada Test Site (NTS). Over the next two years, the DOE investigated a number of locations at the NTS and finally selected Yucca Mountain as the most promising site.

In 1982, the United States Congress passed the Nuclear Waste Policy Act (42 United States Code 10101, and following 96 Stat. 2201) to establish a national policy for the disposal of highly radioactive waste materials, specifically, the disposal of spent nuclear fuel from commercial reactors and defense high-level waste. With the NWPA, the Federal Government accepted responsibility for the timely development of a national capability to accept, transport, store, and permanently dispose of high-level radioactive waste in a manner consistent with the protection of public health, worker safety, and the quality of the environment.

The NWPA created the Office of Civilian Radioactive Waste Management (OCRWM) within the DOE and assigned it the responsibility for developing a waste management system. The NWPA also:
• Established a Nuclear Waste Fund to finance the system through a surcharge on electricity produced by nuclear power;

• Specified the process for siting repositories for the permanent deep geologic disposal of spent nuclear fuel and high-level radioactive waste;

• Required the DOE to submit a proposal to construct a facility for monitored retrievable storage of spent nuclear fuel;

• Required the President of the United States to evaluate the use of the repositories to be developed under the NWPA for the disposal of high-level waste for defense activities; and

• Included specific provisions for the participation of states and Indian Tribes in the waste-management program.

The DOE developed guidelines for evaluating the suitability of sites for repositories, obtained concurrence on the guidelines from the Nuclear Regulatory Commission (NRC) and started the site screening process. The NRC is the federal agency responsible for licensing a repository or monitored retrievable storage facility. Nine possible repository sites, located throughout the Nation, were initially evaluated. Three of those sites, Yucca Mountain, Nevada; Hanford, Washington; and Deaf Smith, Texas; were ranked as being the most suitable for a detailed study and analysis (site characterization) as possible repository sites.

Amendments to the NWPA in 1987 specified Yucca Mountain as the only site to be characterized to determine its suitability as a geologic repository. The DOE developed a Site Characterization Plan (Plan) in 1988 in accordance with the NWPA, as amended, and it is now conducting scientific investigations defined in the Plan to determine the suitability of Yucca Mountain.

If the DOE finds Yucca Mountain suitable, it must develop a Site Recommendation Report to the President. If the site is approved by the President and Congress, the DOE will submit an application to the NRC for a license to construct a repository. An Environmental Impact Statement for a repository must accompany the Site Characterization Report.

If the DOE finds Yucca Mountain unsuitable, then according to the NWPA, as amended, it must mitigate all site characterization activities, mitigate any significant adverse environmental impacts and provide recommendations to Congress for further action to assure safe, permanent disposal of spent fuel and high-level radioactive waste.
B. State Historical Perspective

The NWPA, as amended authorizes the State of Nevada (Legislature and Governor) to carry out oversight on all aspects of the Yucca Mountain Site Characterization Program. State oversight began in 1983 with the adoption of Senate Concurrent Resolution No. 52 (File No. 135, Statutes of Nevada), which directed the Legislative Commission to appoint an interim subcommittee for the purpose of:

- Becoming familiar with the federal program for study of potential locations for a repository; and
- Establishing a structure within the State of Nevada to analyze and address the issues associated with the possibility of locating a repository in the State.

The subcommittee recommended to the 1985 Legislature that:

- The Legislature should continue to be actively involved in the State's program, and recommended proposed legislation to create a permanent legislative committee to perform oversight functions and formulate policy concerning the high-level radioactive waste repository issue; and
- An executive branch advisory commission and agency should be legally created by statute.

1. Creation of Permanent Legislative Oversight Committee

In 1985, the Legislature's Committee on High-Level Radioactive Waste (HLRW) (Nevada Revised Statutes [NRS] 459.0085) was created by Senate Bill 55 (Chapter 211, Statutes of Nevada). This permanent committee was charged with legislative oversight responsibilities to study and evaluate:

- Information and policies regarding the location in this state of a facility for the disposal of high-level radioactive waste;
- Any potentially adverse effects from the construction and operation of a facility and the ways of mitigating those effects;
- Any other policies relating to the disposal of high-level radioactive waste; and
- Appropriate legislation recommended to the Legislature and the Legislative Commission.

The HLRW Committee is not authorized to undertake technical studies or duplicate efforts of the Agency for Nuclear Projects.
2. **Oversight Activities of Legislative Committee**

During 1993-1994 oversight activities of the HLRW Committee to function in the structure established during the previous biennium, which is based on the seven key elements used by the Nuclear Waste Technical Review Board. The elements are:

- Structural Geology and Engineering;
- Hydrology and Geochemistry;
- Engineered Barrier System;
- Transportation Systems;
- Environment and Public Health;
- Risk and Performance Analysis; and
- Quality Assurance.

In performing its responsibilities the HLRW Committee conducted several meetings and the individual members attended a variety of meetings and technical exchanges between DOE and NRC on the nuclear waste program. In addition, committee members attended meetings of the Nuclear Waste Technical Advisory Committee, the Advisory Committee on Nuclear Waste to the NRC, DOE Stakeholder Meetings and the National Association of Regulatory Utility Commissioners, Nuclear Waster Issues Forum.

The HLRW Committee meetings involved receiving program updates from the DOE, NRC, Nuclear Waste Technical Review Board (NWTRB), NANP, the Nuclear Waste Transportation Task Force of the National Conference of State Legislatures, and the "affected units of local government." The July 1994 meeting included a site visit to Yucca Mountain, at which time the HLRW Committee and staff were able to see the Tunnel Boring Machine prior to the beginning of drilling on the Exploratory Study Facility (ESF) tunnel.

3. **Creation of Advisory Commission and State Agency**

Pursuant to the Federal NWPA, the NANP was established in early 1983 by Executive Order and placed within the Department of Minerals. In December 1983, it was transferred to the Governor's Office. A grant from the DOE provided funds for the operation of the office.
The NANP operated within the Governor’s Office until 1985, when the Commission on Nuclear Projects and the NANP (NRS 459.0091 through 459.0098) were created by Senate Bill 56 (Chapter 680 Statutes of Nevada). The primary responsibilities of the NANP are:

- Identifying health, safety, and environmental issues which are of concern to Nevada;
- Reviewing and evaluating DOE’s environmental, socioeconomic, and technical studies; and
- Performing selective independent studies of critical issues in order to confirm or negate the DOE’s analyses.

In 1993, the Commission and NANP were transferred to the State Department of Conservation and Natural Resources as an element of the reorganization of the executive department of State Government.

4. Oversight Activities of Nevada Agency for Nuclear Projects

The Nevada Agency for Nuclear Projects has been aggressively performing its monitoring and oversight responsibilities. Emphasis has been placed on reviewing and commenting on technical studies in the areas of hydrology, ground water travel time, pneumatic pathways, volcanism, seismology, transportation routes and modes, waste packaging, socioeconomic impacts and providing information to the public about the Yucca Mountain Site Characterization Program.

Details of NANP’s activities are available in its annual report. Copies are available at public libraries throughout the state or a copy may be obtained from the NANP office at 1802 North Carson Street, Suite 252, Carson City, Nevada 89710, or telephone (702) 687-3744.

The primary role of the legislative and executive branch oversight organizations has remained unchanged since their creation in 1985.

III. REVISED FEDERAL PROGRAM APPROACH

A. Program Approach

The Yucca Mountain Site Characterization Program has continually fallen behind the targeted goals and schedules, which has resulted in delays of the projected opening date for the repository. In 1982, it was estimated that the opening date was 16 years away. Twelve years and nearly $4 billion later, the estimated opening date of the year
2010 is still 16 years away. The management and progress of the program has brought about criticism from several interested groups, organizations, and agencies, such as: (1) the United States General Accounting Office; (2) Nuclear Waste Technical Review Board; (3) National Academy of Science; (4) the Advisory Committee on Nuclear Waste of the NRC; and (5) electric utilities that operate nuclear power plants and (6) the NANP.

In 1993, Dr. Daniel Dreyfus was named by Secretary of Energy, Hazel R. O’Leary, and confirmed by Congress, as the new director of the OCRWM. His primary charge was to straighten out the problems with the high-level nuclear waste program. One of Dr. Dreyfus’ first actions was to conduct an analysis of the program to determine what problems existed and to provide a basis from which to develop corrective actions.

Dr. Dreyfus indicated, in the 1994 second quarter edition of Nuclear Energy magazine, that from the analysis it was apparent that there was no consistency between the activities being carried out and expectations for the costs and schedules. "In effect, we simply weren't going to get there from here," he said.

The analysis showed that there was not one problem, but three:

- First, the scientific work at Yucca Mountain was not properly focused;
- Second, DOE had to deal with "the perception and reality" that the program management needed improvement; and
- Finally, the DOE had to tackle the issue of when, how, and where it would accept spent fuel from nuclear utilities.

In addition, the analysis determined that the program budget was inadequate to generate the scientific information needed to meet the proposed schedules and achieve the anticipated program goals.

To address these deficiencies and get the national civilian radioactive waste program back on track, DOE has developed and is implementing a new focused program management system, which is referred to as the Program Approach (PA). The new PA is an attempt to realign the program closer to the original intent of the legislative and regulatory framework. It is designed to develop scientific information by achievable increments and in the detail needed to achieve specific program goals that are consistent with the resources that can be allocated to the program. As an example, the initial efforts will concentrate on determining site suitability and preparing an Environmental Impact Statement. If the site is determined to be suitable, the next step will be to develop the additional information from new studies, or obtain more detailed information from ongoing studies, necessary to prepare a License Application to the NRC to construct a repository at Yucca Mountain.
An outgrowth of the OCRWM strategic planning is the 5-year plan, which represents the next level of detail in elaborating the new PA. The Predecisional Draft, which is being circulated for review and comment, describes the goals, activities, and schedule milestones for the major products of the project for the Federal Fiscal Years (FFY) 1996-2000. The proposed activities for the refocused project are presented in terms of four major products required to meet the near term goals of the PA. The following are the four major products:

- **Site Suitability** includes the activities required to support the technical site suitability determination scheduled for 1998, which assesses those suitability conditions that depend on information from site characterization. If the site is found suitable, assessment of the other suitability conditions—environmental quality, transportation, and socioeconomic impacts will be included in the site recommendation report prepared by the end of FFY 2000.

- **National Environmental Policy Act Process** includes the activities required to collect, interpret, and analyze data required for the preparation of the draft and final Environmental Impact Statement in FFY 1998 and 2000, and the review of these documents.

- **Repository Licensing** includes the activities required to ensure that required information will be available to develop a license application for submission to the NRC in Fiscal Year 2001, if the site is suitable.

- **Management and Compliance** includes normal management activities required for direction and control of the project and special allocations required to support external agencies and the public in their review and interactions with the project.

The DOE has stated that the restructured program does not require any changes in the NWPA, as amended. However, it does anticipate a new Environmental Protection Agency standard for a repository at Yucca Mountain, as required by the Energy Policy Act of 1992, and if the standard is substantially different, conforming changes to the NRC regulations. Successful implementation of the restructured program will require that the NRC accept the new strategy for site characterization as a suitable basis for evaluation of a potential license application, and that litigation over the application of the program will not lead to delays.
B. Major Milestones of Revised Program Approach

- Technical Site Suitability Determination (1998);
- Draft Environmental Impact Statement (1998);
- Final Environmental Impact Statement (2000);
- Site Recommendation Report to the President (2000);
- Record of Decision (2000);
- License Application to Construct a Repository (2001);
- Construction Authorization (2004);
- License Application Update to Receive and Process Waste (2008); and
- License to Operate a Repository (2010).

IV. CONCERNS OVER REVISED PROGRAM APPROACH

The initial reception of the new PA has been mixed. The program participants and several oversight groups have been cautiously supportive with DOE's effort to refocus on the mainstream scientific activities necessary for evaluating the suitability of Yucca Mountain and the establishment of achievable milestones. However, others are concerned with the possible increased risk in near-term technical and scientific uncertainties from deferring or deleting some of the studies in the 1988 Site Characterization Plan, which relate to the long-term waste isolation capability of the repository.

This concern is expressed well by Dr. John Cantlon, Chairman of the Nuclear Waste Technical Review Board, in his concluding remarks presented at a meeting of the NRC in September 1994:

It appears to us that the PA is an attempt by the DOE to make the best of what has been a bad situation. For reasons that need not be repeated here, too much time has elapsed in which too little work has been satisfactorily completed in this program. The DOE seems to believe that the PA is a politically more acceptable way to proceed with its high-level waste program, and the NWTRB sees no reason to disagree with that judgement. However, from a technical and scientific perspective, there are real and substantial risks associated the PA. If the PA is to succeed, it must produce a large amount of
information in a short time. Careful planning and prioritization of the exploration and testing activities will be important, and schedule flexibility will be essential. The ultimate objective of the program must be the development of the necessary technical information, not meeting the scheduled decisions points of the PA.

V. FUTURE OVERSIGHT ACTIVITIES OF THE LEGISLATIVE COMMITTEE ON HIGH-LEVEL RADIOACTIVE WASTE

With the increased funding and the new DOE accelerated and streamlined Program Approach the pace of the Yucca Mountain Site Characterization and associated activities will be accelerating over the next few years. This increased activity will require a more intensive oversight effort by the HLRW Committee.

A. Temporary Storage of Spent Nuclear Fuel

An issue that will require special monitoring is the temporary storage of spent nuclear fuel (SNF). The NWPA provided that the Federal Government would develop one or more temporary nuclear waste storage facilities, which are more commonly referred to as Monitored Retrievable Systems (MRS). The schedule of the original nuclear waste program provided for DOE to begin accepting SNF from the nuclear power plants in 1998 and placing it in an MRS until a permanent repository was completed. Due to program slippage and the inability to locate a state willing to voluntarily host an MRS: (1) DOE has stated it will not be able to accept SNF in 1998; (2) DOE does not believe it has a firm commitment to meet that date; and (3) the nuclear power plants will have to continue to store SNF at the reactor sites or make other arrangements, such as a private MRS type facility until a repository is constructed. The current target date for the completion of a repository is between the years of 2010 and 2014.

This DOE position has created problems for the civilian nuclear power industry, since most of the power reactors sites were not designed to provide permanent on-site storage for SNF. By 1998, an estimated 26 of the 109 licensed commercial nuclear power reactors will run out of on-site waste storage capacity and most of the others will run out of storage capacity before the year 2010, which is the current scheduled opening date of a repository.

The nuclear power industry, believing that the 1998 is a firm date for DOE to begin to accept SNF, is attacking this problem from two sides. First, 27 utilities as well as the state utility regulators or attorney general of 25 states have filed lawsuits asking a federal appeals court to order DOE to begin accepting spent nuclear fuel from utilities by 1998. Secondly, the nuclear power industry is expected to have legislation introduced in the 104th Session of Congress to require DOE to establish at least one temporary storage facility and begin accepting SNF in 1998, or as soon as possible
thereafter. The Nevada Test Site is one of the possible locations that has been suggested for an MRS.

This could become an important issue to the State of Nevada that the HLRW Committee will be closely watching. If Congress considers legislation to amend the NWPA, it could: (1) designate one or more MRS sites in the country; (2) remove the provision that prohibits an MRS from being developed in a state that is being considered for a repository; and (3) designate the NTS as one of the sites.

B. Additional Oversight Topics

Additional topics for HLRW Committee oversight during the next 2 years include:

- Accelerated site characterization technical studies and reports;
- Initiation of the Yucca Mountain Environmental Impact Statement process;
- Development of the Multi-Purpose Canister system for the transportation and storage of spent nuclear fuel;
- Development of plans for the transportation modes (rail and highway), and process for selection of routes;
- Liaison with state and local government monitoring agencies; and
- Proposed federal legislation that may affect the national radioactive waste program.

VI. CONCLUSION

The restructuring of the Yucca Mountain Site Characterization program, the issue of temporary storage for spent nuclear fuel, with its potential impacts on the State of Nevada, and the proposed changes to the NWPA will warrant close monitoring and oversight by the HLRW Committee as well as the NANP.