

OCT 24 1988

J. C. Lau
Battelle Pacific Northwest Laboratory
P. O. Box 999
Richland, Washington 99352

Dear Mr. Lau:

Pursuant to your September 21, 1988 request my staff has modified the two papers into the journal article format you described. As you requested, I have enclosed the original and one copy to you and have also sent one copy to Abe Van Luik.

Please direct any questions about these papers to Ken Kalman, of my staff. He can be reached at (301) 492-0428.

Sincerely,

(Signed) Robert M. Bernero

Robert M. Bernero, Deputy Director
Office of Nuclear Material Safety
and Safeguards.

Enclosure: As stated

cc: Abe Van Luik
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10/27/88

STATUS OF THE NUCLEAR REGULATORY COMMISSION'S
HIGH-LEVEL WASTE REPOSITORY LICENSING PROGRAM

Michael J. Bell, Deputy Director
Division of High-Level Waste Management
Office of Nuclear Material Safety and Safeguards
United States Nuclear Regulatory Commission

Kenneth L. Kalman, Project Manager, Geosciences
Division of High-Level Waste Management
Office of Nuclear Material Safety and Safeguards
United States Nuclear Regulatory Commission

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INTRODUCTION

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The second major component of NRC's activities regarding the HLW Repository Licensing Program is the review of DOE's site characterization plans, data, and analyses and the provision of comments on their adequacy to support a license application. This paper will discuss NRC's recent review of DOE's Consultation Draft Site Characterization Plan (CDSCP) for the Yucca Mountain site and NRC's oversight of DOE's quality assurance (QA) efforts. Finally, this paper summarizes NRC's efforts to bring the FFRDC on line with the capabilities needed to support NRC's efforts in both regulatory development and the pre-licensing evaluation of DOE plans and activities.

CURRENT RULEMAKINGS

In the rulemaking area, NRC has recently published for comment in the Federal Register a proposed rule to revise NRC procedures for implementing its National Environmental Policy Act (NEPA) (Ref. 1) responsibilities in connection with an application for repository construction authorization (Ref. 2). The Nuclear Waste Policy Act of 1982 (NWPA) (Ref. 3) required that "... any environmental impact statement prepared in connection with a repository proposed to be constructed by [DOE] ... shall, to the extent practicable, be adopted by the Commission in connection with the issuance by the Commission of a construction authorization and license for such repository."

The proposed rule sets out the standards and procedures that would be used in determining whether such adoption is practicable. It reflects NRC's view that under the NWPA, the primary responsibility for evaluating environmental impacts rests with DOE. Accordingly, although NRC would comment on environmental issues in reviewing DOE's draft Environmental Impact Statement (EIS) before submittal of its application, NRC primarily would review DOE's final EIS from a radiological viewpoint after receiving the application. However, DOE would be required to supplement the EIS, for purposes of NRC adoption, whenever necessary to consider significant circumstances or information relevant to environmental concerns bearing on DOE's proposed action or its impacts.

NRC is also completing work on a proposed rule (Ref. 4) specifying criteria and procedures for entering data into an electronic Licensing Support System (LSS). The NWPA provides three years (with a possible extension of twelve

months) for the NRC to make its decision on DOE's application for construction authorization for a repository. Several years ago, NRC determined that ready access to all pertinent information must be assured if it is to meet this statutory requirement. The most time-consuming part of a licensing proceeding is the discovery stage, when all interested parties identify and obtain documents they will use in the licensing hearing. With several interested parties, numerous requests, and the number of documents projected to be in the millions, conventional discovery methods for repository licensing would take years. Thus, NRC developed and demonstrated a pilot state-of-the-art electronic information management system enabling computer search and retrieval of relevant documents. DOE has committed to build a similar operational system to facilitate the licensing process.

To develop the rule governing the use of the LSS, NRC has become one of the first federal agencies to use regulatory negotiation. Used only about a dozen times so far, negotiated rulemaking is a process where representatives of all parties who may be affected by a rulemaking (including the rulemaking agency) meet over a period of time to try to achieve consensus on rulemaking issues. This consensus is then used to develop the proposed rule.

The expected benefit from this is that the additional effort at the outset will produce a proposed rule more satisfactory to the interested parties and less likely to be complicated by unforeseen disputes. The group of parties negotiating this particular rulemaking is chartered as a Federal Advisory Committee and is known as the Licensing Support System Advisory Committee (LSSAC).

So far, NRC's negotiated rulemaking has been proceeding satisfactorily. However, when the NWPA was amended to put the primary focus on the Yucca Mountain site in Nevada, the LSSAC had to be reconstituted to reflect this change.

The Commission published for comment a proposed rule on disposal requirements for "greater-than-Class-C" low-level wastes (Ref. 5), which are now a Federal disposal responsibility and are not generally acceptable for conventional near-

surface disposal. This proposed rule would amend 10 CFR Part 61 to require disposal in a deep geologic repository, unless NRC has approved another disposal method. The Part 61 amendments would obviate the need for altering existing classifications of radioactive wastes as high-level or low-level. The very small volume of "greater-than-Class-C" wastes may well make economically unattractive the alternative of disposal by an intermediate method between conventional near-surface and deep-geologic disposal. Because no such facility currently exists or is planned for these wastes, and there is no assurance that one will ever be constructed, NRC believes that its proposed technically conservative alternative choice is preferable.

CONSULTATION DRAFT SITE CHARACTERIZATION PLAN REVIEW

As you know, the Nuclear Waste Policy Amendments Act of 1987 (the Amendments Act) (Ref. 6) redirects the National high-level radioactive waste program by selecting the Yucca Mountain site as the sole candidate site to be characterized as a potential repository. The Amendments Act also requires that if the Yucca Mountain site is found unsuitable, DOE is to cease all site characterization activities there and report to Congress. As a result of the redirection of the repository program to the Yucca Mountain site, NRC has adjusted its program and staff resources to focus on DOE's program to characterize that site and to prepare to review DOE's application for a construction authorization within the three-year time period provided under the NWPA. Since the enactment of the Amendments Act, NRC interactions with DOE have increased. This increase has been largely in response to DOE's submittal of the Consultation Draft Site Characterization Plan (CDSCP) to NRC and the State of Nevada last January.

The CDSCP is a preliminary version of the Site Characterization Plan (SCP). The SCP is the statutory document intended to lay out the overall logic and structure of DOE's plans for characterizing the Yucca Mountain site. It will contain an extensive discussion of the programs and investigations to be conducted during site characterization, as well as a description of the site and conceptual designs of the repository and waste package, based on current information. The purpose of the CDSCP was to provide an advance opportunity for DOE to explain the SCP and allow early consultation on issues identified.

NRC had a two-fold purpose for reviewing the CDSCP: first, to continue the effort toward early identification and resolution of potential licensing issues during the pre-licensing part of DOE's HLW program; and second, to prepare to fulfill its mandated responsibility, under the NWPA, to review the final SCP.

NRC staff draft comments or "point papers" on the CDSCP in March 1987 included five concerns of such immediate seriousness that the staff would recommend that DOE not start site characterization in any program area related to these until they are satisfactorily resolved. These concerns relate to: (1) the need for DOE to recognize the range of alternative conceptual models of the Yucca Mountain site that need to be considered in developing testing programs; (2) DOE's QA plans; and (3) the exploratory shaft facility (ESF).

One workshop discussed the lack of consideration of alternative conceptual models in testing program development. DOE agreed that in the development of the SCP, it would consider NRC recommendations on the discussion of alternative models and will respond to them in the SCP.

NRC issued its final point papers on the CDSCP in May 1988. The staff categorized many of the concerns into general subject areas. It noted that several DOE positions appeared inconsistent with NRC licensing requirements. The staff also commented on the lack of conservatism in DOE assumptions that are the basis for several different investigations.

NRC staff also noted that the site characterization program needs to be better integrated into a unified and focused effort to obtain the information needed to understand the site and evaluate its suitability for a repository.

QUALITY ASSURANCE PROGRAM

One of NRC's critical licensing concerns in the staff's point papers on the CDSCP was Quality Assurance (QA). NRC/DOE interactions in this area continue to increase. NRC's objective in QA is to conduct enough review of the DOE QA

program, before the onset of new site characterization activities, to have confidence that necessary portions of the program are adequate and in accordance with the Commission's QA regulations.

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DOE committed not to start new work in any program area until NRC has reviewed the QA plan for that area and confirmed its implementation through audits. As part of its overall QA program, NRC is reviewing the effectiveness of DOE's own audit program in evaluating the QA performance of its contractors. Since enactment of the Amendments Act, NRC staff has conducted four observation audits of DOE audits of its contractors. It will monitor DOE's follow-up to the concerns NRC identified in these audits before extensive site characterization begins.

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One final aspect of the NRC HLW program is also of interest. NRC has recently established a Center for Nuclear Waste Regulatory Analyses at the Southwest Research Institute in San Antonio, Texas, to provide the technical support that NRC will need over the coming decades for the HLW repository program. The Center has been in operation since January 1988. It will provide a dedicated, stable, multi-disciplinary technical capability free of problems arising from the issue of conflict-of-interest. The Center must develop a QA program equivalent to or more stringent than the program that the Commission applies to DOE and its contractors.

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CONCLUSIONS

The future of the repository program depends on its quality and comprehensiveness. NRC stands as monitor at the threshold of the major site characterization work.

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THE U.S. NUCLEAR REGULATORY COMMISSION'S ROLE
IN THE MANAGEMENT OF RADIOACTIVE WASTES

Robert M. Bernero, Deputy Director
Office of Nuclear Material Safety and Safeguards
United States Nuclear Regulatory Commission

Kenneth L. Kalman, Project Manager, Geosciences
Division of High-Level Waste Management
Office of Nuclear Material Safety and Safeguards
United States Nuclear Regulatory Commission

ABSTRACT

This paper discusses the U.S. Nuclear Regulatory Commission's (NRC's) role in the management of radioactive waste. It provides an overview of the NRC's programs for the management of High-Level and Low-Level radioactive wastes and uranium mill tailings.

INTRODUCTION

This paper focuses on the National program for the disposal of high-level radioactive wastes (HLW), which includes highly radioactive wastes from defense-related reprocessing, limited commercial reprocessing of irradiated reactor fuel, and spent fuel from licensed reactors.

Because it is responsible for reviewing and making licensing recommendations to the five members of the U.S. Nuclear Regulatory Commission (NRC), the Division of High Level Waste Management (HLWM) staff is acutely aware of its responsibility to assure that the U.S. Department of Energy's (DOE's) planned deep geologic repository for HLW is constructed and operated without undue risk to public health and safety.

This is a first-of-a-kind enterprise, requiring a capability to predict, with reasonable assurance, the performance of the waste isolation system over an unprecedented period of time. DOE will have to conduct extensive testing to characterize the waste isolation properties of any candidate repository site.

The disposal of the waste must also be integrated with several related activities, such as storage, waste packaging, and transportation, into an effective management system. The system itself will be subject to DOE, NRC, and other Federal agency requirements.

REPOSITORY PROGRAM AND POTENTIAL PROBLEMS

There is little margin for error if DOE's current schedule for repository operation in 2003 is to be met. The Nuclear Waste Policy Amendments Act of 1987 (Ref. 1) requires the characterization of only the Yucca Mountain site in southwest Nevada for possible repository development. There will be no immediately available alternative if Yucca Mountain proves unsuitable.

Delays or disruptions in the repository program could thus have significant consequences for nuclear power operations. Under the Amendments Act, even if DOE is allowed to proceed with a Monitored Retrievable Storage (MRS) facility, a delay in the repository program will result in a delay in the MRS. For example, the Act prohibits MRS operation until NRC issues a repository construction authorization, and MRS operation is prohibited while repository construction is stopped or the repository license is revoked. The possible consequences of any significant delay in the current repository program include the following:

- There is unlikely to be any timely DOE spent fuel storage facility sufficient to meet utilities' needs;
- Without a timely repository or MRS, spent fuel may have to be stored for indefinite periods at some nuclear power plant sites after the end of reactor operation;
- If post-operation at-reactor storage were considered likely to exceed 30 years, the Commission's Waste Confidence finding (Ref. 2) concerning the environmental impacts of extended spent fuel storage may be affected. This could conceivably make unavoidable the litigation of these impacts in individual reactor licensing or license amendment proceedings;

° The possibility of having to litigate the environmental impacts of indefinite spent fuel storage at reactor sites would appear to complicate utility efforts to seek license amendments to extend the life of currently-operating reactors.

The Amendments Act also sets capacity limits on the MRS that may affect nuclear utility plans and operations. The Act provides that no more than the equivalent of 10,000 metric tons of heavy metal can be accepted at an MRS until the repository begins operation, and no more than 15,000 tonnes can be accepted at any one time during the life of MRS operation. With about 100 reactors operating in this country today, these figures represent only a few years of reactor operation. Thus, even with timely repository and MRS operation, capacity limits on the MRS and delays in DOE's schedule for acceptance of wastes may still necessitate some post-operation at-reactor spent fuel storage at some sites for indeterminate periods.

Finally, NRC staff will have to meet a stringent schedule to permit timely action. Under the 1982 Nuclear Waste Policy Act (NWPA) (Ref. 3), the Commission is given three years--with a possible 12-month extension for good cause--to reach a decision on authorizing construction of the first repository.

Licensing Process

To enable the Commission to meet this deadline, NRC staff is working to assure that potential licensing issues are identified as early as possible in the reviews of DOE site characterization plans and activities; that DOE thoroughly addresses each of these issues; and that it has complete, well-validated documentation for each part of its application. Under the NWPA, this early identification of issues and discussion of program adjustments to address them will be performed under the close scrutiny of potential host states and any affected Indian tribes, with numerous opportunities for comments by interested members of the public. While there are no Indian tribes currently certified as "affected" at the Yucca Mountain site, any such certified affected tribe would enjoy the same participation rights as the candidate host state.

After DOE has completed all necessary site characterization and submitted an application for the site it believes to be suitable for repository development, the NRC staff will have to review DOE's application and supporting documents, and formulate and defend recommendations to the Commission's Atomic Safety and Licensing Board at a mandatory adjudicatory hearing. There will be intensive examination by all parties in the licensing process. The hearing is expected to take at least 15 months, during which time the NRC staff will have to be prepared to undergo thorough cross-examination and respond to interrogatories from well-prepared parties on both sides of the licensing question. Finally, the Licensing Board's decision itself must be reviewed by the Commission.

If the licensing findings are to stand up to the scrutiny inherent in the NRC licensing process, the NRC staff's technical judgments and the process by which it arrives at them will have to be fully supported and clearly documented. Since the NRC staff will have to make these judgments in a formal proceeding under the pressure of a statutory deadline, good planning and preparation during the pre-application review phase--the current phase--is critical.

One lesson NRC has learned from its reactor licensing experience is the necessity for a vigorously applied quality assurance program. It is important that the applicant's work is of high quality--that tests are properly conducted and results properly verified. The ability to demonstrate this high quality is also essential. NRC has a strong interest in DOE's programs to assure the quality of its work and the documentation of that quality. NRC will need a system that provides convenient access to information and permits ready traceability to confirm the sources of the information upon which DOE and NRC must rely in making decisions concerning the site.

INTERACTION WITH DOE AND OTHERS

An essential ingredient to the success of both NRC's and DOE's respective missions is the need for free and open exchange of information. Only through exchanges with technically qualified representatives of a candidate host state government, any affected Indian tribes, and other interested groups can NRC be aware of issues of concern to them and assure that these issues are addressed. These exchanges contribute to the critical oversight necessary for this

first-of-a-kind undertaking. The NWPA gives DOE primary responsibility for funding and working with interested states and tribes. NRC must recognize this statutory priority regarding direct interaction of these parties with DOE. Within these limits, however, the NRC staff intends to continue pursuing close consultations with Nevada.

Some major points on repository program interactions among NRC, DOE, and other parties are summarized below.

1. The National HLW program has entered a critical phase. The consequences to the nuclear power industry of a delay in repository availability have been magnified by a conscious policy trade-off designed to enhance the cost-effectiveness and schedular firmness of the repository effort by concentrating on one site. This policy choice significantly raises the stakes of misjudgments about the existence and magnitude of potential repository licensing issues. It also makes it all the more important that NRC and DOE identify and address these issues as early as possible in the program.
2. NRC regulation of the National HLW program adds a different dimension to the environment to which DOE is accustomed. Not only must the work of both DOE and NRC be technically and scientifically correct, but that correctness must be demonstrated in the open forum of a licensing proceeding.
3. The program must be characterized by openness. DOE and NRC, the candidate host state, any affected tribe, and all interested parties must have timely access to information if DOE is to understand the issues it will have to address early enough in the program to make adjustments at minimum cost in funds, program momentum, and institutional commitments.
4. An effective quality assurance program is essential. DOE, NRC, states, any affected tribes that may be certified, and interested members of the public all must ultimately be able to make their respective cases on the basis of information that is thoroughly documented and demonstrably fit to be relied on.

LOW-LEVEL WASTE

NRC responsibilities, for low-level waste (LLW) under Low-Level Radioactive Waste Policy Amendments Act are discussed next.

One area reserved to the Federal Government under the Amendments Act is the disposal of "Greater than Class C" (GTCC) waste. GTCC wastes are those whose concentrations of radioactive materials exceed the limits in NRC's Part 61 waste classification system, and are therefore not suitable for routine near-surface disposal. DOE was to have recommended to Congress methods for disposing of GTCC waste, but was unable to do so due to lack of regulatory criteria. Generators of GTCC wastes were left with no appropriate disposal facility, and therefore with the potential burden of having to store this waste indefinitely. To address this impasse, NRC has proposed a change in its LLW disposal regulation to require that GTCC wastes be disposed of in an HLW repository unless DOE develops a suitable licensed alternative. This proposal reflects the Commission's conclusion that, in the absence of an approved alternative, a geologic repository is the only currently authorized facility acceptable for GTCC disposal without further review by the Commission. The proposed rule was published in the Federal Register on May 18, for a sixty-day comment period (Ref. 4).

NRC has been working with the U.S. Environmental Protection Agency (EPA), a sister Federal agency, in the area of "mixed waste." "Mixed wastes" are wastes that contain both radioactive materials subject to NRC licensing under the Atomic Energy Act and materials that are considered hazardous wastes under the Resource Conservation and Recovery Act (Ref. 5). As a result of these overlapping statutes, "mixed wastes" are subject to both NRC and EPA regulatory authority. Their disposal must be in accordance with the requirements of both agencies. The two agencies have been working cooperatively to develop guidance that better defines mixed waste and that provides siting and design criteria for mixed waste disposal facilities.

An important third area of NRC's LLW program is decommissioning. After several years of development, the Commission has approved a final rule pertaining to decommissioning of nuclear facilities. This rule was published in the

Federal Register in June 1988 (Ref. 6) to become effective in July 1988. It requires applicants for certain licenses to provide financial assurances that funds for decommissioning will be available when needed. In other cases, when the licensee possesses larger quantities of radioactive materials, decommissioning plans and cost estimates, as well as a financial assurance certification, are required. Holders of existing licenses have two years to come into compliance with the new rule.

NRC also has regulatory authority over the area of uranium mill tailings. In this case, the applicable statute is the Uranium Mill Tailings Control Act of 1978 (Ref. 7). Under Title I of the Act, NRC consults with DOE and concurs at key points in DOE's remedial action program. NRC will eventually license the long-term custody of the reclaimed tailings. Under Title II of the Act, NRC or an Agreement State regulates the operation of uranium mills and the long-term stabilization of the tailings. Because the domestic uranium industry is currently considered economically non-viable, most of NRC's attention is focused on assuring adequate long-term stabilization.

SUMMARY

This paper provided an overview of NRC's role in the management of radioactive waste. The development of an HLW repository is a first-of-a-kind enterprise requiring much interaction among NRC, DOE, the host state, any affected Indian tribes, and other interested groups to assure the necessary oversight for the safe disposal of HLW. NRC has also been working toward resolving the impasse on the disposal of GTCC wastes. In May 1988, NRC published a proposed rule that requires GTCC wastes to be disposed in the HLW repository. In the area of low-level waste, NRC published a final rule on decommissioning of nuclear facilities in June, 1988. Efforts continue at both NRC and EPA to clarify their respective requirements concerning mixed waste management. NRC is also continuing both its effort to assure long-term stabilization of licensed uranium mill tailings sites, and its review and concurrence role in DOE's remedial action program at formerly utilized uranium processing sites.

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THE U.S. NUCLEAR REGULATORY COMMISSION'S ROLE
IN THE MANAGEMENT OF RADIOACTIVE WASTES

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