

NUREG-1423  
Volume 1



A Compilation of  
Reports of  
**The Advisory  
Committee on  
Nuclear Waste**

July 1988 - June 1990

U.S. Nuclear Regulatory  
Commission

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August 1990

### ABSTRACT

This compilation contains 37 reports issued by the Advisory Committee on Nuclear Waste (ACNW) during the first two years of its operation. The reports were submitted to the Chairman or to the Executive Director for Operations, U. S. Nuclear Regulatory Commission (NRC). Topics include the NRC analysis of the U. S. Department of Energy Site Characterization Plan for the high-level radioactive waste repository, the standards promulgated by the U. S. Environmental Protection Agency for the disposal of high-level waste, the NRC policy statement on Below Regulatory Concern, technical documents prepared by the NRC Staff relative to the decommissioning of nuclear power plants, the stabilization of uranium mill tailings piles, and environmental monitoring. All reports prepared by the Committee have been made available to the public through the NRC Public Document Room and the U. S. Library of Congress. Included in an Appendix is a listing of references to related reports on nuclear waste matters that were issued by the Advisory Committee on Reactor Safeguards prior to the establishment of the ACNW.

## FOREWORD

The Advisory Committee on Nuclear Waste (ACNW), established by the U. S. Nuclear Regulatory Commission (NRC), held its first meeting on June 27-29, 1988. According to its Charter, the Committee shall report to and advise the Nuclear Regulatory Commission on those aspects of nuclear waste management (as applied to other than the site of production and utilization facilities), as appropriate, within the purview of NRC's regulatory responsibilities. The primary emphasis will be on disposal but will also include other aspects such as handling, processing, transportation, storage, and safeguarding of nuclear wastes including spent fuel, nuclear wastes mixed with other hazardous substances, and uranium mill tailings. In performing its work, the Committee will examine and report on specific areas of concern referred to it by the Commission or designated representatives of the Commission, and it is authorized to undertake other studies and activities on its own initiative, as appropriate, to carry out its responsibilities.

In its first two years of existence, the Committee has held 21 meetings, and several working group sessions. In addition, the Committee routinely met (approximately three times each year) with the NRC Commissioners to discuss items of mutual interest and concern. Currently, the Committee is authorized to have four members. Members are appointed by the Nuclear Regulatory Commission.

The ACNW traces its history to the Advisory Committee on Reactor Safeguards (ACRS). Drs. Dade W. Moeller and Martin J. Steindler served on the ACRS until the creation of the ACNW at which time they became the first Chairman and Vice-Chairman, respectively, of the new Committee. Both had participated extensively in the waste management reviews of the ACRS and continue this function with the new ACNW. [In the interest of continuity, a number of the nuclear waste related reports from the ACRS are referenced in Appendix A.]

Meetings of the ACNW are scheduled and conducted in accordance with the Federal Advisory Committee Act (PL 92-463) and the Government in the Sunshine Act (PL 94-409). Except for limited exemptions, meetings are conducted in a public forum. The reports of the Advisory Committee on Nuclear Waste represent a collegial view on a particular subject area (to the extent practical) and are made available to the public.

In its first two years of existence, the ACNW has commented on a variety of issues before the NRC in the field of waste management and has issued 37 reports. Some significant examples of the advice given by the Committee include reports on: (1) The NRC staff's Analysis of the U.S. Department of Energy (DOE) Site Characterization Plan; (2) A critique of the Standards for Disposal of High-Level Radioactive Wastes, as promulgated by the U.S. Environmental Protection Agency (EPA); (3) Disposal of Low-Level Radioactive Wastes; and (4) A proposed Policy Statement on Regulatory Control Exemptions for Practices Whose Public Health and Safety Impacts are Below Regulatory Concern.

#### ACNW Review of the NRC Analysis of the DOE Site Characterization Plan

Over the course of six months, the ACNW reviewed the DOE Site Characterization Plan (SCP) and the NRC staff's review of this plan, the Site Characterization Analysis (SCA). In approaching this task, specific subject categories in the SCA were assigned to individual ACNW consultants who reviewed the material in depth using an iterative review process with the staffs of the DOE and NRC. In the main, the Committee was in general agreement with the overall content of the SCA's point papers. However, the Committee did have some significant concerns which included:

- The absence of statements in the SCP addressing the systematic and early identification and evaluation of potentially disqualifying features at the Yucca Mountain Site;
- The apparent lack of sufficient attention to the limitations and uncertainties in the Yucca Mountain data bases, and the associated difficulties in demonstrating that the repository will comply with the EPA's high-level waste standard (40 CFR Part 191);
- The delays by DOE in implementing satisfactory quality assurance programs.

In addition to the above major comments, the Committee offered a number of detailed comments pertaining to other specific aspects of the site characterization program. For example, resolving the dilemma of how to determine the characteristics of the Calico Hills formation, while still maintaining this structure as a barrier between radioactive wastes placed in the repository and the underlying saturated zone, must be reached through some form of compromise. The NRC staff was urged to recommend that DOE be



definitive in how they would resolve this dilemma. A further example of a specific concern was a recommendation that a decision be reached soon on the materials to be used in fabricating the waste packages and the manner in which they will be sealed. Such information is essential in considering possible interactions between the packages and the repository materials with which they will be in contact.

As the prelicensing phase progresses, the ACNW will maintain an interest in the progress made in characterizing the proposed repository site and the resolution of its concerns.

Critique of the Standards for Disposal of High-Level Radioactive Wastes, as Promulgated by the U. S. Environmental Protection Agency (EPA)

As a general comment, the Committee concluded that the EPA Standards need to be revised, and that now is the time to accomplish this task. In undertaking such a revision, the Committee stated that such standards should be organized in a hierarchical structure with the higher levels expressing the objectives in a qualitative sense and the lower levels stating the objective quantitatively. It is important that the several levels be consistent and that lower levels not be more stringent or conservative than the higher levels, so that they become de facto new standards. The Committee also urged that the Standards apply to the disposal facility as a system. Subsystem standards, if expressed, should be given only as guidance, with qualifying statements clearly specifying that they are not to be applied in a regulatory sense.

In terms of other specifics, the Committee recommended that the Standards be revised to:

- Define what is considered an acceptable risk from a high-level waste repository;
- Specify that a probabilistic approach is acceptable so long as it is but one of several factors to be used in determining the acceptability of a specific site; and
- Include separate considerations for evaluating the impacts of human intrusion.

## Disposal of Low-Level Radioactive Wastes

One of the activities of the Committee has been to review and comment on the NRC program for the management and disposal of low-level wastes. The major comments here were as follows:

- While considerable attention has been given to the development of requirements for the siting, construction, and operation of disposal facilities, there appears to be a lack of coordination of these activities with the processes that produce the wastes. In the opinion of the Committee, these processes and the resulting products may have as much bearing on the protection of the health and safety of the public as do the requirements for the disposal facilities.
- Since many of the proposed low-level waste disposal sites are located in Agreement States, the Committee recommended that the NRC staff consider developing a single document that would provide comprehensive guidance or a "road map" to reports that pertain to this topic. This should include a summary of relevant laws and key regulations, regulatory guides, NUREG documents, and technical positions, suitably annotated and cross-referenced.

In terms of specific recommendations in this subject area, there have been four key issues that have been addressed by the ACNW. These include: (a) problems associated with the disposal of mixed wastes, (b) the acceptability of High Density Polyethylene (HDPE) High Integrity Containers (HICs) for the disposal of low-level wastes (LLW), (c) the solidification of LLW, and (d) guidelines for environmental monitoring programs for LLW facilities.

The ACNW has encouraged the NRC and EPA staffs to work together to develop joint regulations for the disposal of mixed hazardous and radioactive wastes. After reviewing the HDPE HICs in detail, the ACNW concluded that present designs would have difficulty in meeting NRC criteria that define the mechanical properties required for containers for Class B or Class C wastes. However, the ACNW concluded that HDPE HICs, when coupled with other materials that provide the necessary mechanical properties, could result in a container that should be able to satisfy NRC criteria.

The problems on the solidification of LLW have pertained primarily to ion exchange resins. Issues include the need to assure that NRC test and performance requirements are pertinent to the conditions likely to be present in a land burial site, that small scale tests characterize the behavior of full scale operations, and that the final product meets requirements relative to leachability and structural properties.

In reviewing NRC staff activities on environmental monitoring, the ACNW learned that the NRC staff, because of resource limitations, had suspended work on the development of a Branch Technical Position in which they would have provided guidance on this subject to state and local governments. As a result of an ACNW recommendation, the NRC staff resumed and completed the work.

#### Proposed Policy Statement on Below Regulatory Concern (BRC)

The ACNW was asked to comment on the Proposed Policy Statement on BRC prior to its publication in the Federal Register. The main comments of the ACNW were that:

- The policy statement should state unequivocally that practices that are candidates for exemption should not, taking into consideration all such practices, result in an annual dose rate greater than a small fraction (about 10%) of the long-term annual dose limit for individual members of the public.
- The NRC staff recognize that other agencies within the U.S. government (such as the Departments of Transportation and Health and Human Services) have already exempted certain practices, and that the NRC, in considering the granting of additional exemptions, must take into account the total impact upon the public.
- The Committee also believes that the collective dose - limit should be variable. Following this approach, higher annual collective dose limits would be permitted for exempted practices that contribute smaller dose rates to individuals.

#### Future Activities

One of the top priority issues facing the Committee will be the licensing of the nation's high-level waste repository. The licensing review phase is still over ten years in the future for the currently proposed Yucca Mountain HLW repository. Meanwhile, prelicensing activities are underway. These include site characterization activities by DOE and the analyses of these activities by the NRC Staff. Selected aspects of these programs will be reviewed. Also to be reviewed in conjunction with these activities are selected rules, applicable Technical Positions and Regulatory Guides being promulgated by the NRC, as well as related Study Plans and reports being developed by the DOE.

Also on the Committee's agenda will be to provide advice as new low-level radioactive waste disposal sites are licensed in the near future and the current sites cease to accept additional waste. The siting and engineering of these next generation LLW disposal sites will receive the Committee's attention.

The Committee also expects to review the decommissioning of a number of nuclear power plants which have reached the end of their service life.

The Committee expects to publish future compilations of its reports as appropriate.

Dade W. Moeller  
Chairman, ACNW

ACNW MEMBERSHIP (1988-1990)

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Harvard University, Boston, Massachusetts

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Purdue University, West Lafayette, Indiana

Dr. Paul W. Pomeroy  
Rondout Associates, Incorporated  
Stone Ridge, New York  
(Term started July 1990)

Dr. Clifford V. Smith, Jr., Chancellor  
University of Wisconsin, Milwaukee, Wisconsin  
(Term ended January 1990)

EXECUTIVE

DIRECTOR: Mr. Raymond F. Fraley  
Advisory Committee on Nuclear Waste  
U. S. Nuclear Regulatory Commission

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D.C. 20555

ACNWR-0001

July 1, 1988

The Honorable Lando W. Zech, Jr.  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Zech:

SUBJECT: RULEMAKING PETITION TO ESTABLISH AN ACCIDENT DOSE GUIDELINE IN  
10 CFR PART 60

During the first meeting of the Advisory Committee on Nuclear Waste (ACNW), June 27-29, 1988, we met with representatives of the U.S. Department of Energy (DOE) to discuss a Petition, being developed by DOE, for Rulemaking to Establish an Accident Dose Guideline for the High-Level Radioactive Waste (HLW) Repository (referenced). We also had the benefit of discussions with the NRC Staff.

During the meeting, DOE representatives described their proposed petition, which had previously been discussed during meetings of the ACRS Subcommittee on Waste Management. Both the DOE representatives and the NRC Staff requested that the ACNW consider and comment on certain key controversial issues. In response to these requests, we offer the following comments:

1. Although NRC regulations (10 CFR 60) applied to the design and construction of an HLW repository specify a dose limit for determining systems and components "important to safety," there is no accident dose limit for specifying systems and components whose failure must be compensated by engineered safety features. The purpose of the DOE petition is to develop such a limit. We support this action by DOE.
2. The DOE draft petition contains a number of useful concepts and approaches. Among these are the use of the "effective dose equivalent" for expressing the proposed dose guidelines, the application of the 50-year dose commitment for assessing the risks of long-lived radionuclides, and the incorporation into the supporting technical arguments of the latest findings of the National Research Council's Committee on the Biological Effects of Ionizing Radiations. The use of these guides and standards will enhance the utility of the proposed rule.

July 1, 1988

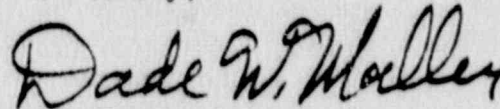
3. The draft petition also raises a number of issues that have yet to be addressed. These include:
  - a. The dose guidelines as currently proposed would apply to any accident, regardless of its probability. We believe a lower probability limit (cutoff) should be established for the range of accidents to be considered under the guidelines.
  - b. The draft petition does not include technical information in support of the proposed rulemaking. We believe that the DOE Staff should include such information in the formal petition. We also believe that it would be helpful to include a description of the full range of pertinent accident scenarios together with estimates of their associated probabilities for occurrence.
  - c. As part of the petition, the DOE Staff has proposed that an "accident dose area" be defined around the repository site. The technical information provided in support of the proposed rulemaking should include a rational and obvious process for defining this area.

Consideration should be given by the NRC Staff to the following:

1. To assure compatibility of the proposed "accident dose guidelines" with related NRC policies and numerical guidelines, the values proposed by DOE should be compared, for example, to the Safety Goals that have been developed for nuclear power plants.
2. The NRC Staff should evaluate existing information, such as the Licensee Event Reports, as an additional contribution to the data bank on the nature, type, and frequency of occurrence of fuel handling mishaps.

We hope you will find these comments useful.

Sincerely,



Dade W. Moeller  
Chairman

Reference:

Petition for Rulemaking to Establish An Accident Dose Guideline for a High-Level Radioactive Waste Repository, Draft dated 5/31/88.



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D. C. 20555

July 1, 1988

The Honorable Lando W. Zech, Jr.  
Chairman  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Dear Chairman Zech:

SUBJECT: PROPOSED RULE ON STORAGE OF SPENT NUCLEAR FUEL IN CASKS AT NUCLEAR  
POWER REACTOR SITES

During the first meeting of the Advisory Committee on Nuclear Waste, June 27-29, 1988, we met with the NRC Staff to discuss the proposed rule on "Storage of Spent Nuclear Fuel in NRC Approved Storage Casks at Nuclear Power Reactor Sites" (referenced).

Overall, we endorse the development of this rule. Formulation of regulations designed to address this subject on a generic basis will be constructive. We offer the following specific comments:

1. The portion of the rule that restricts the storage of spent fuel at a given site to only fuel that was produced at that site should be re-examined. Since a utility with multiple nuclear power plant sites may desire to centralize its storage of spent fuel at one location, it appears useful to include in the rule guidance for obtaining approval of such an approach.
2. Since the above approach would require that the fuel be transported and ultimately all such fuel will need to be shipped to a site for final disposal, it would appear useful to design the casks with the safety of, and doses associated with, subsequent operations in mind.
3. Finally, since several NRC offices will be responsible for implementing this rule, we urge that careful attention be addressed to the division of responsibilities within the NRC.

Sincerely,

A handwritten signature in cursive script that reads "Dade W. Moeller".

Dade W. Moeller  
Chairman

Reference:

U. S. Nuclear Regulatory Commission, Proposed Rule dated June 6, 1988 (7590-01), "Storage of Spent Nuclear Fuel in NRC Approved Storage Casks at Nuclear Power Reactor Sites"



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D. C. 20555

August 1, 1988

The Honorable Lando W. Zech, Jr.  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Zech:

SUBJECT: DRAFT GENERIC TECHNICAL POSITION: GUIDANCE FOR DETERMINATION OF  
ANTICIPATED PROCESSES AND EVENTS AND UNANTICIPATED PROCESSES AND  
EVENTS

During the second meeting of the Advisory Committee on Nuclear Waste (ACNW), July 21-22, 1988, the Committee heard a presentation by the staff of the Division of High-Level Waste Management (DHLWM) on the referenced document. The Committee and its attending consultants also focused attention on the possibility of rulemaking on the same subject.

The Committee learned that the time limit for public comments expired more than one month ago. Nevertheless, the staff has received no comments on this Draft Generic Technical Position from any Federal agency, including the Department of Energy, the Environmental Protection Agency, or the U.S. Geological Survey. The Committee is of the strong opinion that the staff, having called for public comment on this important document, should be provided with such substantive comments as these agencies can provide. We note that others, including the State of Nevada, did avail themselves of the opportunity to transmit their views to the DHLWM.

The Committee recommends that you communicate to the heads of these agencies your strong desire that they respond to such requests and that their comments are critical to the enhancement of the licensing process. The ACNW intends to continue to address this topic and will forward to you the result of our review when we have had a more complete set of comments on the subject document.

Sincerely,

A handwritten signature in cursive script that reads "Dade W. Moeller".

Dade W. Moeller  
Chairman

The Honorable Lando W. Zech, Jr. - 2 -

August 1, 1988

Reference:

Memorandum dated February 22, 1988 from Eileen T. Tana, Office of Nuclear Material Safety and Safeguards, to All Interested Parties, transmitting Draft Generic Technical Position: Guidance for Determination of Anticipated Processes and Events and Unanticipated Processes and Events, with Notice of Availability (53 FR 6040)



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D.C. 20555

August 9, 1988

The Honorable Lando W. Zech, Jr.  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Zech:

SUBJECT: ACNW COMMENTS ON PROPOSED COMMISSION POLICY STATEMENT ON  
REGULATORY CONTROL EXEMPTIONS FOR PRACTICES WHOSE PUBLIC  
HEALTH AND SAFETY IMPACTS ARE BELOW REGULATORY CONCERN  
(ERC)

During the second meeting of the Advisory Committee on Nuclear Waste, July 21-22, 1988, we met with the NRC staff to discuss the referenced draft report. This meeting represented a continuation of earlier discussions on this subject by the Waste Management Subcommittee of the Advisory Committee on Reactor Safeguards. As a result of these reviews, we offer the following additional comments, which were affirmed on August 4, 1988 during the third meeting of the ACNW.

We believe that the proposed Policy Statement is not presented in a logical manner, and it fails to address certain questions raised by you and your fellow Commissioners. We believe that the Policy Statement should be revised to include the following comments and suggestions:

1. Exemptions should be based on an acceptable individual annual, as well as lifetime, risk. The values proposed ( $10^{-7}$ /year and  $10^{-5}$ /lifetime) appear reasonable. Once this guidance has been presented and justified, comparable annual and lifetime dose limits should be given. At this level of risk, we believe that the limitation on individual risk will be sufficient; we see no need to provide a limit on the collective population dose.
2. We agree with the NRC staff that, in all cases, each proposed exemption should be justified. In this regard, applications involving radiation exposures to members of the public which have no offsetting benefits should not be approved. However, considerable care should be exercised in describing practices that would be termed as frivolous.
3. In those cases where an apparently useful application of radiation would result in individual risks slightly greater than the limits cited above, a cost-benefit analysis should be made to determine if the application should be designated as BRC. Prior to undertaking such efforts, however, we believe that the methodology for conducting such analyses should be carefully reexamined. Specific items needing attention include the monetary value assigned per unit of

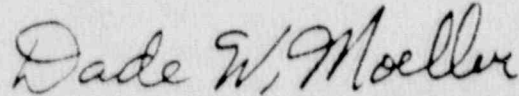
August 9, 1988

collective dose averted. In this regard, we suggest the development of a system in which higher monetary values are used as the annual risk increases above the level considered to be BRC.

4. Finally, the Policy Statement should require that, as a part of its implementation, all existing NRC exemptions be reviewed to ensure that they are commensurate with this approach.

If these comments and suggestions are incorporated, the revised Policy Statement should be satisfactory for presentation at the upcoming International Workshop on Rules for Exemption from Regulatory Control.

Sincerely,



Dade W. Moeller  
Chairman

Reference:

U. S. Nuclear Regulatory Commission, draft Commission paper (Pre-decisional) for The Commissioners from Victor Stello, Jr., EDO, Subject: Proposed Commission Policy Statement on Regulatory Control Exemptions for Practices Whose Public Health and Safety Impacts are Below Regulatory Concern (BRC), transmitted by memorandum from B. M. Morris, Director, Division of Regulatory Applications, RES, to R. F. Fraley, Executive Director, ACNW, dated July 14, 1988.





UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D.C. 20555

August 9, 1988

The Honorable Lando W. Zech, Jr.  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Zech:

SUBJECT: ACNW COMMENTS ON PROPOSED BRANCH TECHNICAL POSITION  
CONCERNING ENVIRONMENTAL MONITORING FOR LOW-LEVEL WASTE  
DISPOSAL FACILITIES

During the second meeting of the Advisory Committee on Nuclear Waste, July 21-22, 1988, we met with the NRC staff to discuss the referenced Branch Technical Position on environmental monitoring for low-level waste disposal facilities which has been deferred because of resource limitations. As a result of these discussions, we offer the following comments, which were affirmed on August 4, 1988 during the third meeting of the ACNW.

Because of the importance of this subject, particularly to the many states currently planning the establishment of such facilities, we believe that effort should be reinitiated to complete and issue this Branch Technical Position. In addition, the overall purpose of this position needs to be clarified, specifically to indicate whether it is being prepared to provide guidance on monitoring policy or to prescribe detailed monitoring requirements.

As this work progresses, the Committee would like to be kept informed.

Sincerely,

*Dade W. Moeller*  
Dade W. Moeller  
Chairman

Reference:

U.S. Nuclear Regulatory Commission, 10 CFR Part 61, "Low-Level Waste Disposal Facility; Notice of Availability and Request for Public Comment on a Branch Technical Position Paper Concerning Environmental Monitoring," published in the Federal Register, November 5, 1987 (52FR42486).





UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D.C. 20555

ACNWX-1000

September 15, 1988

The Honorable Lando W. Zech, Jr.  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Zech:

SUBJECT: PROPOSED POLICY STATEMENT ON BELOW REGULATORY CONCERN

During the fourth meeting of the Advisory Committee on Nuclear Waste, September 13-14, 1988, we held additional discussions with the NRC staff relative to the development of a Proposed Commission Policy Statement on Exemptions from Regulatory Control for Practices Whose Public Health and Safety Impacts are Below Regulatory Concern (BRC). This topic was previously discussed with the NRC staff during a meeting of the ACRS Subcommittee on Waste Management on May 4, 1988. The ACNW also discussed this topic with the NRC staff during our second meeting, July 21-22, 1988, and reported to you on this subject on August 9, 1988. We also had the benefit of the document referenced.

As a result of these discussions, we offer the following comments:

1. The proposed exemption system is based on the risks associated with the exposures involved, and the system, if modified as suggested here, will be compatible with most relevant regulations and policies of the NRC and other federal agencies, as well as those of international organizations.
2. We urge the adoption of dose rates up to 10 mrem (0.1 mSv) per year to individuals and annual collective doses up to 100 person-rem (1 person-Sv) as acceptable limits arising from a single exempted practice. Please note that this is a different use of the dose limits than is proposed in the draft Policy Statement. Provisions should be made to ensure that individuals within any population group are not exposed to any combination of exempted practices that results in dose rates greater than one to two times the dose rate limit. Experience indicates that such occurrences should be rare.
3. The current draft of the proposed Policy Statement is in need of extensive revision, partly to comply with the recommendations made under item 2, above. Additional items that need to be addressed include:

September 15, 1988

- a. The draft of the proposed Policy Statement should clearly specify 10 mrem (0.1 mSv) per year and 100 person-rem (1 person-Sv) per year as the limits for individual and collective dose rates, respectively. The ancillary use of a 100 person-rem (1 person-Sv) per year limit as a guide to the necessity for ALARA analysis should be removed (see item b, below).
  - b. There is a need for a much clearer statement relative to the role and application of the principle of "justification" in assessing practices being considered for exemption.
  - c. Instead of discussing dose rates at which collective dose calculations should be truncated, it would be better to do a complete calculation, and include within the data a tabulation of the number of people within each of several dose rate ranges.
  - d. The section pertaining to the linear nonthreshold hypothesis needs to be clarified. One approach would be simply to include a brief statement that risk (cancer) estimates should be based on the assumption that the linear nonthreshold hypothesis applies and that this approach will result in conservatism in the resulting estimates.
  - e. Since its use represents a change in NRC policy, the concept of the Effective Dose Equivalent should be defined within the Policy Statement. In a similar manner, since SI units are in common usage throughout the world, all dose rates and collective doses should be expressed in these units as well as in the conventional units.
4. As the proposed Policy Statement correctly points out, the Agreement States will play an important role in the implementation of the proposed exemptions. For this reason, it is important that the Statement be formally submitted to the Conference of State Radiation Control Program Directors for review and comment.

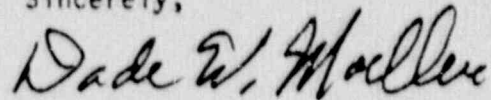
The resulting document, when properly revised, will represent a pioneering effort in nuclear safety regulation, will help conserve those of our resources that are available for the control of environmental and public health problems, and should receive strong support from the professional radiation protection community. We believe that the proposed Policy Statement, if revised as suggested above, will serve

The Honorable Lando W. Zech, Jr. - 3 -

September 15, 1988

well as a starting point for the position to be stated at the upcoming international meeting on this subject.

Sincerely,



Dade W. Moeller  
Chairman

Reference:

Memorandum dated September 8, 1988 from Bill M. Morris, Office of Nuclear Regulatory Research, NRC, to R. F. Fraley, Executive Director, ACNW, transmitting Proposed Commission Policy Statement (undated)



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D.C. 20555

September 16, 1988

The Honorable Lando W. Zech, Jr.  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Zech:

SUBJECT: SUITABILITY OF HIGH DENSITY POLYETHYLENE HIGH INTEGRITY  
CONTAINERS

During the fourth meeting of the Advisory Committee on Nuclear Waste, September 13-14, 1988, we met with the Low-Level Waste Management staff and reviewed the status of the staff's investigation into the suitability of high integrity containers (HICs) constructed from high density polyethylene (HDPE) for Class B or Class C low-level waste. This topic was also discussed during other ACNW meetings. The most recent reviews were held during the first meeting of the ACNW on June 28, 1988 and during the field trip to South Carolina, which was held in conjunction with the ACNW's third meeting on August 3-5, 1988. We also had the benefit of the documents referenced.

The Committee heard a well-structured presentation on the technical issues concerning the suitability of HDPE HICs for the disposal of low-level radioactive waste. The focal points of the presentation were the mechanical properties of the present designs and the ability of these designs to meet the NRC requirements for a satisfactory waste container. The staff had obtained expert technical opinion on the pertinent topics and had made effective use of dialogue among knowledgeable parties.

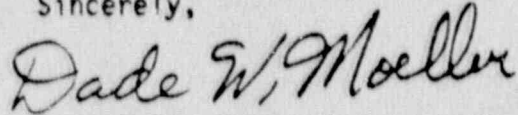
On the basis of the information presented to the Committee, it appears that the present designs of HDPE HICs will have difficulty in meeting the NRC criteria that define their mechanical properties for use as containers for Class B or Class C waste. We are mindful of HDPE's low corrosion rates which, when coupled with other materials that provide the necessary mechanical properties, could result in a container that should be able to satisfy the pertinent NRC criteria. Thus, we have not heard information that would eliminate HDPE from consideration as part of an HIC.

We recommend that the staff bring to closure its study of the HDPE HICs whose designs have been submitted to it for approval. We believe that

September 16, 1988

staff decisions would then allow the industry to better plan its response and further action, if any.

Sincerely,



Dade W. Moeller  
Chairman

References:

1. Engineering Design and Testing Corporation Report, submitted to NUS July 21, 1986, "An Assessment of Polyethylene as a Material for Use in High Integrity Containers"
2. U.S. Nuclear Regulatory Commission draft report dated April 6, 1987, prepared by J. Pires, Brookhaven National Laboratory, "Review of the High Integrity Cask Structural Evaluation Program"
3. Letter dated February 2, 1988 from David G. Ebenhack, Chem-Nuclear Systems, Inc., to M. Tokar, NMSS, NRC, attaching Chem-Nuclear Systems, Inc. report dated January 29, 1988, "Evaluation of Stress Loadings of CNSI HDPE HICS"
4. Memorandum dated June 15, 1988 from M. Tokar, NMSS, NRC, to S. J. Parry, AGRS, transmitting U.S. Nuclear Regulatory Commission, Division of Low-Level Waste Management and Decommissioning Report dated June 10, 1988, prepared by S. A. Silling, Brown University, "Review of the Structural Designs of Polyethylene High Integrity Containers"



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D. C. 20555

December 30, 1988

The Honorable Lando W. Zech, Jr.  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Zech:

SUBJECT: DRAFT GENERIC TECHNICAL POSITION: GUIDANCE FOR DETERMINATION  
OF ANTICIPATED PROCESSES AND EVENTS AND UNANTICIPATED  
PROCESSES AND EVENTS

As a follow-up to our meeting with you and your fellow Commissioners on October 27, 1988, we are pleased to provide the following comments on the subject Draft Generic Technical Position (GTP). These written comments support the oral comments that we made during our meeting with you.

One of the problems we have noted with the GTP is a lack of clarity in the definitions of anticipated and unanticipated processes and events. This has led to confusion. One approach for correcting this problem has been suggested by Dr. J. C. Maxwell, one of our consultants. It would be to classify such processes and events as: (1) expected, (2) possible but not expected, and (3) highly improbable. This is based on our understanding that anticipated events as currently used in the draft GTP can be either expected or envisioned, whereas unanticipated events can be envisioned but are not actually expected to occur.

Although we realize that existing statutes and regulations may limit your flexibility in taking such an approach, a redefinition of these terms as suggested by Dr. Maxwell may be helpful.

Sincerely,

A handwritten signature in cursive script that reads "Dade W. Moeller".

Dade W. Moeller  
Chairman

Reference:

Draft Generic Technical Position: Guidance for Determination of Anticipated Processes and Events and Unanticipated Processes and Events, transmitted by memorandum dated February 22, 1988 from Eileen T. Tana, Office of Nuclear Material Safety and Safeguards, to All Interested Parties.





UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D. C. 20555

December 30, 1988

The Honorable Lando W. Zech, Jr.  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Zech:

SUBJECT: COMMENTS ON THE PROPOSED DELETION OF SECTION 20.205 FROM THE  
PROPOSED REVISION OF 10 CFR PART 20, "STANDARDS FOR PROTECTION  
AGAINST RADIATION" (SECY-88-315)

During the fifth meeting of the Advisory Committee on Nuclear Waste, December 21, 1988, we held additional discussions with the NRC staff on the proposed revision of 10 CFR Part 20, Standards for Protection Against Radiation. In response to the inquiry from Commissioner Roberts (SRM dated November 28, 1988), these discussions were directed primarily to procedures for the control of certain long-lived radionuclides, such as those handled at fuel cycle facilities.

As you know, the proposed rule published in the Federal Register on January 9, 1986 contained a new Section 20.205 which addressed the procedures noted above. The proposed section recommended a modified procedure that had been drafted in recognition of the difficulties in measuring (in a practical manner and with the required accuracy) air concentrations in restricted areas and the amounts of radionuclides in bioassay samples taken from workers whose intakes had been held at or below the permissible annual limits of intake (ALI). Although the proposed revision would have required licensees to design facilities so that air concentrations averaged over the year in restricted areas would be below the derived air concentration limits and would also have required that such facilities be operated in a manner that would ensure that any individual would be unlikely to have an intake from occupational exposure in any one year in excess of the ALI value, the modified procedure would have allowed licensees to permit doses to workers in excess of the limits in Section 20.201 as long as the sum of the internal and external effective dose equivalent would not have exceeded 5 rem, and the annual effective dose equivalent from certain specified internally deposited long-lived radionuclides would not have exceeded 3 rem.

We believe that such a modified procedure is unacceptable. First, it would not be in accord with what we understand are the recommendations of either the International Commission on Radiological Protection (ICRP Publication 26, 1977) or the National Council on Radiation Protection and Measurements (NCRP Report No. 91, 1987). In addition, it is our interpretation that such a position would not be in conformance with the requirements outlined in the "Radiation Protection Guidance to Federal

December 30, 1988

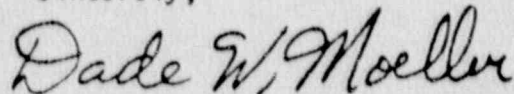
Agencies for Occupational Exposure," approved by President Reagan on January 20, 1987.

Based on our review of this issue, we recommend that annual doses arising from the intake of long-lived radionuclides be limited to a dose commitment no higher than the annual dose limit of proposed Section 20.201. To make an exception for any specific group of radionuclides or licensees would, in our opinion, be inappropriate. Hence, we concur with the NRC staff's recommendation to delete Section 20.205.

In addition, we recommend that the NRC encourage licensees to follow the guidelines contained in the Radiation Protection Guidance to Federal Agencies referred to above; namely, that record keeping include data on both the annual and committed effective dose equivalent, as well as on the cumulative (lifetime) dose.

We hope these additional comments will be helpful.

Sincerely,



Dade W. Moeller  
Chairman

References:

1. SECY-88-315 dated November 4, 1988 for The Commissioners from Victor Stello, Jr., Subject: Revision of 10 CFR Part 20, "Standards for Protection Against Radiation."
2. Staff Requirements Memo dated November 28, 1988 for Victor Stello, Jr., EDO, W. C. Parler, OGC, and D. W. Moeller, ACNW, regarding Briefing on Final Rule on Standards for Protection Against Radiation in Part 20.



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D.C. 20555

December 30, 1988

The Honorable Lando W. Zech, Jr.  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Zech:

SUBJECT: COMMENTS ON ADVANCE NOTICE OF THE DEVELOPMENT OF A COMMISSION POLICY  
ON EXEMPTIONS FROM REGULATORY CONTROL FOR PRACTICES WHOSE PUBLIC  
HEALTH AND SAFETY IMPACTS ARE BELOW REGULATORY CONCERN

During the fifth meeting of the Advisory Committee on Nuclear Waste, December 21, 1988, we discussed the "Advance Notice of the Development of a Commission Policy on Exemptions From Regulatory Control for Practices Whose Public Health and Safety Impacts Are Below Regulatory Concern." This subject was also discussed with you and your fellow Commissioners during our meeting with you on October 27, 1988. We had previously submitted several written reports on this matter to you.

The purpose of this report is to provide you with our responses to the several questions on which the proposed Policy Statement requested comments and to offer our comments on selected positions and/or premises outlined in the Policy Statement.

1. Justification of Practices

In establishing its exemption policy, should the Commission exclude certain practices for which there appears to be no reasonable justification? In considering proposals for exemptions, should the Commission evaluate the social acceptability of practices?

Response

The ACNW believes that practices for which there appears to be no reasonable justification, particularly those that are considered to be of a "frivolous" nature, should be excluded from exemption. We concur with the staff in the examples that they cited for this category. At the same time, however, we would urge that the Commission recognize that what may be considered to be unjustified by one group may not be similarly regarded by others. We continue to believe that the Commission should exercise considerable care in reaching judgments on this matter.

2. Dose Limits and Criteria

The Commission specifically seeks comment on the need for establishing a collective dose limit in addition to an individual dose

December 30, 1988

criterion. If such a collective dose criterion is needed, what is the basis for this need? If the Commission decides that a collective dose criterion is needed, what approaches allowing truncation of individual dose in calculation of collective dose or weighting factors for components of collective dose would be appropriate? What alternatives should be considered for assessing societal impact?

Response

a. Collective Dose Criterion

We continue to believe that a collective dose exemption level (or criterion) is necessary, but we also recognize that some flexibility should be allowed in setting that criterion. It is important to recall that annual doses to individual members of the public arising from an exempted practice will be estimated by use of models and assumed scenarios. These models will not be, and probably cannot be, validated. As a result, dose estimates derived through the application of such models will contain potentially important uncertainties. Further, exemption from controls also increases the range of possible exposure scenarios that can take place. This will add to the uncertain nature of the calculations. Although we are aware that estimates of collective population doses and determination of compliance are plagued by the same kinds of uncertainties, the additional constraints imposed by collective dose exemption levels should provide some further assurance of the continued acceptability of a practice that has been exempted.

We believe that the magnitude of the collective dose criterion should depend on the associated dose rate to individual members of the public. As one possible approach, the Commission might consider that, for sources, practices, and/or devices that result in a dose rate as high as 10 mrem per year to individual members of the public, the collective dose criterion should be no greater than several hundred person-rem per year. For activities that result in dose rates well below 1 mrem per year, a collective dose criterion of several thousand person-rem per year might be considered.

b. Truncation of Collective Dose

Although a number of groups (such as the National Council on Radiation Protection and Measurements) have proposed individual dose rates (for example, 1 mrem per year or less) at which collective dose calculations should be truncated, we believe that such an approach would be strongly opposed by many groups within the public. We recommend that those responsible for calculating the impacts associated with a given practice being considered for exemption be required not only to provide an estimate of the total collective dose but also to provide data on the number of people within each

dose rate range. Following this practice, all interested parties would be provided with detailed information on the contribution to the total collective dose by population groups in all dose rate ranges, including those in the extremely low ranges, and the Commission could take this information into consideration in deciding whether to exempt the practice. We believe the collective dose exemption approach suggested above will be helpful in making such judgments.

c. Alternatives for Assessing Societal Impacts

The Committee is not able to comment on the issues surrounding the social acceptability of a practice under consideration for exemption. We urge the Commission to proceed into this area with caution owing to the extensive and potentially unproductive polemics that could easily be generated.

3. Role of the As Low As Reasonably Achievable (ALARA) Criterion

In the Advance Notice of the Commission Policy, the NRC staff stated that, "If the dose is less than the below regulatory concern criteria, then the risk from a practice would be considered to be ALARA without further analysis."

Response

We believe that this statement is confusing and that it does not represent the approach that the NRC staff has indicated that it intends to follow.

In all cases, the staff has indicated that no practice would be exempted without a careful review of all details of its proposed application, that all practices will have to be justified, and that the proposed licensee will have to demonstrate that the given practice incorporates good radiation protection principles. For those practices that are exempted, there will be periodic, subsequent reviews to assure that they are properly implemented and that they do not result in dose rates to individual members of the public in excess of what was predicted.

Rather than characterize the exempted practice in terms of the ALARA criterion, we believe it would be better simply to say that the practice satisfies NRC radiation protection criteria, and its impacts have been found to be so small that the Commission has deemed it acceptable for the practice to be used or for the device or source to be released to the general public.

4. Designation of Exemption Levels

In discussions on this aspect of the Policy Statement, questions have been raised on several occasions on the individual dose rates

December 30, 1988

that would be considered to be acceptable for exempted practices, sources, and devices. Although the Commission did not explicitly request comments on this matter, the Committee desires to offer the following remarks.

#### Response

First, it is important to note that there are practices, sources, and/or devices that result in exposure to the public for which exemptions have already been granted. These include consumer products, such as luminous dial watches exempted by the U.S. Nuclear Regulatory Commission, as well as items such as television sets that have been exempted by the U.S. Department of Health and Human Services. In addition, exposures resulting from the transportation of radioactive materials have been exempted through regulations of the U.S. Department of Transportation. In fact, according to studies of the National Council on Radiation Protection and Measurements (NCRP Report No. 95, December 1987), the average dose rate to individual members of the U.S. public arising from the use of consumer products (involving both radioactive materials and radiation generating machines) is currently at a level of 10 mrem per year. In short, this is not a new field.

Second, although the Policy Statement implies that some practices that could result in dose rates of as much as 100 mrem per year might be considered for exemption, we believe it is important to note that 100 mrem per year is the long-term dose limit for members of the public as recommended by the National Council on Radiation Protection and Measurements and the International Commission on Radiological Protection. It is also the limit recommended for members of the public in the revision being proposed by the NRC to Title 10, Part 20, of the Code of Federal Regulations, "Standards for Protection Against Radiation." A dose rate for individual members of the public approaching 100 mrem per year should not be viewed as an exemption level; rather, sources and practices that have the potential for causing dose rates in this range would have to be regulated. We foresee no conditions under which such sources, practices, or devices can be considered for exemption.

In terms of the exemption of practices, sources, and/or devices, it is our opinion that the limiting dose rate for individual members of the public as a result of exposures from all such exemptions should not exceed a value in the range of a few tens of mrem per year. Following this approach, and assuming that each person has the potentiality of being exposed to more than one such practice or source, then the exemption level per practice should be in the range of, at most, 1 to 10 mrem per year. We note that, in developing an exemption policy, the Commission is deciding how much of the 100 mrem per year dose limit for members of the public should be allocated to exempted practices, sources, and/or devices.

Since other government agencies have similar responsibilities, all such efforts should be well coordinated, and the total dose rate from all exempted practices must be well below (only a small fraction of) the dose limit.

5. Exposures to Multiple Practices

The Commission seeks comment on whether individuals may experience radiation exposure approaching the limiting values through the cumulative effects of more than one practice, even though the exposures from each practice are only small fractions of the limit.

Response

The recommended dose rate exemption level of a few mrem per year for individual members of the public (arising from a single source, practice, and/or device) should provide reasonable protection against the inadvertent accumulation of annual doses in excess of the exemption level for individuals due to exposures to several exempted practices. Nevertheless, the Commission will need, in the long run, to guard against concentrations of exempted practices in localities and should include in its rules provisions that allow it to use judgment in this matter.

6. General Comments

In addition to the comments above, the ACNW offers the following general comments.

One requirement that the Commission should consider for inclusion in the exemption regulations is that for a source, practice, and/or device to be eligible for consideration, it must be "inherently" safe. That is to say, no accident scenario can be reasonably postulated that would result in doses to individual members of the public greater than a few mrem.

The Commission should also emphasize that, even after the application of a practice has been justified and approval has been granted for its application and/or use, the situation will be reviewed periodically to ensure that the original conditions are being met and that the given practice, source, and/or device is still acceptable for exemption. This is currently a part of the Policy Statement. It should be emphasized.

Equally important to the development of an exemption policy is the establishment of accepted exposure pathway scenarios, both for routine use of and accidents involving the practices, sources, and/or devices under consideration. This will require the development of environmental transport models and the derivation of secondary or derived guides (for example, concentration limits for specific radionuclides in low-level radioactive wastes that should be considered eligible for exemption), as

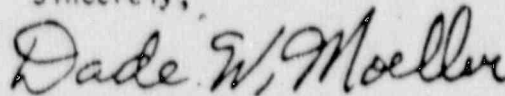
December 30, 1988

well as the development of laboratory and/or field procedures for making the measurements necessary to confirm that the given practice, source, and/or device complies with the exemption levels.

Finally, we believe that at this stage in the process one of the most important goals should be to develop a policy primarily designed for application on a case-by-case basis. It is also clear that procedural flexibility should be explicitly maintained. A Policy Statement incorporating both of these attributes can then guide the practices and, as experience is gained, both can be modified, if necessary, to lead to a more workable approach.

We hope these comments will be helpful.

Sincerely,



Dade W. Moeller  
Chairman

Reference:

"Advance Notice of the Development of a Commission Policy on Exemptions From Regulatory Control For Practices Whose Public Health and Safety Impacts are Below Regulatory Concern," presented at the NRC/NEA Workshop on Rules for Exemption from Regulatory Control on October 17-19, 1988.





UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D. C. 20555

January 4, 1989

MEMORANDUM FOR: Victor Stello, Jr.  
Executive Director for Operations

FROM: Dade W. Moeller, Chairman  
Advisory Committee on Nuclear Waste

SUBJECT: TOPICS RAISED BY ACNW DURING THE OCTOBER 27, 1988, MEETING  
WITH THE COMMISSIONERS

As a follow up to our meeting with the Commissioners on October 27, the Secretary of the Commission has requested (November 8, 1988) that we transmit to you topics or items that were raised with them during our meeting but had not been documented previously in written reports to the Commission. The following is a list of those topics:

1. The DOE contractor staff involved with waste-related activities at the Savannah River facilities has noted some difficulty in communicating with the NRC staff on acceptance criteria for Savannah River high-level, solidified waste. We believe this is an issue internal to DOE, not with the NRC staff, but it should be rectified to ensure the acceptability for disposal of the Savannah River waste product.
2. The effect of the Low-Level Radioactive Waste Policy Amendments Act of 1985 in expanding the number of LLW disposal sites may lead to a situation where it could be difficult for some of the sites to be economically viable. If this proves to be true, the NRC staff may want to monitor the situation closely to ensure that matters pertaining to public health and safety in the operation of such facilities are not neglected.
3. Representatives of the state of South Carolina have suggested that the development of a national central information bank related to the generation and disposal of LLW would be useful. Consideration should be given to the establishment of such a system.
4. The Committee indicated its inability, because of resource limitations, to conduct a comprehensive, in-depth review of the project and research activities of either of the High- or Low-Level Waste Divisions but noted that selected portions of their activities will be assessed or evaluated in connection with our review of specific technical issues.
5. Dr. Moeller noted the revisions planned for 10 CFR Part 20. The Committee has provided additional comments to Chairman Zech regarding this matter (see ACNW report dated December 30, 1988).

6. We endorsed the desirability of requiring vendors, utilities, and disposal site operators to submit reports of unusual events related to solidified LLW. We are pleased to note that Chairman Zech has requested an evaluation of such a requirement.
7. Based on recently reported events, it appears that additional emphasis needs to be directed to the review, evaluation, and inspection of the processing, solidification, and handling of LLW at nuclear power plants. We believe that this can be addressed through improved coordination between NRR and NMSS, but may require enlarging the scope of activities of either or both groups.
8. Dr. Smith noted the problems associated with overlapping responsibilities between NRC and the EPA for the disposal of mixed wastes. Concern was expressed about the possible implications of this arrangement to the disposal of high-level and transuranic wastes.

Other items on which we have commented, and which were also mentioned during the meeting with the Commissioners, included:

1. Definition of Anticipated Processes and Events and Unanticipated Processes and Events (see ACNW letter dated December 30, 1988 for additional information on this subject)
2. Below Regulatory Concern
3. Branch Technical Position on Monitoring of LLW Sites

*Dade W. Moeller*

Dade W. Moeller  
Chairman

cc: Chairman Zech  
Commissioner Roberts  
Commissioner Carr  
Commissioner Rogers  
Commissioner Curtiss  
S. J. Chilk, SECY  
H. L. Thompson, NMSS  
E. S. Beckjord, RES  
T. E. Murley, NRR  
ACNW Members/Staff



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D.C. 20555

January 25, 1989

The Honorable Lando W. Zech, Jr.  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Zech:

SUBJECT: ACTIVITIES OF ACNW CONCERNING HIGH-LEVEL WASTE MANAGEMENT

During its sixth meeting, January 23-24, 1989, the Advisory Committee on Nuclear Waste (ACNW) met with members of the NRC staff to review the activities of the Division of High-Level Waste Management (DHLWM). Emphasized in the discussions was the work of the Division with respect to the proposed High-Level Waste (HLW) Repository at Yucca Mountain and the role of the ACNW in this effort.

We found the discussions beneficial, and the NRC staff was fully responsive to our questions. We concluded that DHLWM has good leadership and their work is progressing well. We were particularly impressed by the efforts of the division director to keep the size of his staff modest and to monitor rather than duplicate the work of the U.S. Department of Energy (DOE).

In terms of the work of this Committee concerning the NRC staff's ongoing review of the Site Characterization Plan (SCP) and their preparation of the Site Characterization Analysis for the HLW repository, we have concluded that our resources would best be directed to the activities noted below and intend to proceed in this direction:

1. An evaluation of the several "Review Plans" completed or being developed by the NRC staff to be used as guidance for its reviews, e.g., the Review Plans for the SCP and for Performance Assessment,
2. An evaluation of DOE's responses to the five "Objections" cited by the NRC staff concerning the Consultation Draft SCP; any additional areas of disagreement resulting from DOE's responses to the "Point Papers," which were prepared by the NRC staff; any substantive concerns raised by the state of Nevada; and any additional areas noted by the ACNW as being of special interest.

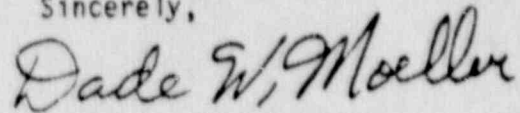
We also plan to review selected HLW rules, key NRC Technical Positions, and Regulatory Guides which are being developed within the NRC, as well as related plans and reports being developed by DOE. In addition, we plan to review relevant research under the direction of NRC, including the programs of the Center for Nuclear Waste Regulatory Analyses.

The Honorable Lando W. Zech, Jr. - 2 -

January 25, 1989

If there are additional areas important to the Commission on which you desire our input, we will be pleased to respond.

Sincerely,

A handwritten signature in cursive script that reads "Dade W. Moeller". The signature is written in dark ink and is positioned above the typed name.

Dade W. Moeller  
Chairman



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D.C. 20555

ACNW-1001

January 26, 1989

The Honorable Lando W. Zech, Jr.  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Zech:

SUBJECT: WEST VALLEY DEMONSTRATION PROJECT

During its sixth meeting, January 23-24, 1989, the Advisory Committee on Nuclear Waste (ACNW) met with representatives of the U.S. Department of Energy (DOE), its contractors, and the New York State Energy Research and Development Authority for a review of the West Valley Demonstration Project. We discussed, among other concerns, the procedures that have been developed and are being applied in solidifying decontaminated supernatant low-level wastes and testing the melter for vitrification of the high-level wastes.

As a result of this review, the Committee concludes that the program is appropriately focused and that the results are favorable. Although there appears to be good communication between the DOE contractors and staff and the Nuclear Regulatory Commission (NRC) staff, there may be a need for additional input from the NRC staff in two areas:

1. Acceptance criteria for the vitrified high-level waste, including the enumeration of testing procedures to indicate conformance with these criteria, need to be identified by DOE for the waste producers, and these criteria, in turn, need to be reviewed by the NRC to determine if they are acceptable; and
2. Public health and safety criteria for the facilities and land areas being decontaminated and decommissioned as part of this project need to be established.

We plan to schedule a visit to the West Valley site within the next six months.

We trust these comments are responsive to your request.

Sincerely,

*Dade W. Moeller*  
Dade W. Moeller  
Chairman

January 26, 1989

References:

1. U. S. Department of Energy Report, DOE/NE/44139--15, "West Valley Demonstration Project Plan," January 1989
2. Letter dated August 3, 1988 from R. D. Hurt, U. S. Nuclear Regulatory Commission, to W. W. Bixby, U. S. Department of Energy, regarding comments on the revised West Valley Demonstration Project Plan



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D.C. 20555

February 24, 1989

The Honorable Lando W. Zech, Jr.  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Zech:

SUBJECT: FINAL RULEMAKING ON 10 CFR PART 61 RELATIVE TO DISPOSAL OF  
GREATER-THAN-CLASS-C LOW-LEVEL RADIOACTIVE WASTES

During its seventh meeting, February 21-23, 1989, the Advisory Committee on Nuclear Waste (ACNW) met with members of the Office of Nuclear Regulatory Research to discuss the proposed amendment to 10 CFR Part 61 relative to final rulemaking for disposal of greater-than-Class-C low-level radioactive wastes. A representative from the U.S. Department of Energy (DOE) participated in this meeting.

The NRC staff discussed the proposed rule (referenced), public comments on the rule, and the draft final rule. On the basis of these discussions, we recommend that the NRC staff:

- (1) Explicitly state that DOE can exercise a range of options in selecting methods for disposing of such wastes in NRC-licensed facilities; and
- (2) Specify the performance requirements for the waste package in order to assist DOE in selecting an appropriate option.

Subject to these qualifications, we agree with the rule as proposed.

Sincerely,

A handwritten signature in dark ink that reads "Dade W. Moeller". The signature is written in a cursive style.

Dade W. Moeller  
Chairman

Reference:

Nuclear Regulatory Commission, Proposed Rule, 10 CFR Part 61, "Disposal of Radioactive Wastes," published in the Federal Register, Vol. 53, No. 96, Wednesday, May 18, 1988







UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D.C. 20555

ACNWR-0011

May 3, 1989

The Honorable Lando W. Zech, Jr.  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Zech:

SUBJECT: PROPOSED WASTE CONFIDENCE DECISION BY THE WASTE CONFIDENCE  
REVIEW GROUP

During its ninth meeting, April 26-28, 1989, the Advisory Committee on Nuclear Waste (ACNW) met with members of the NRC Staff to discuss the preliminary draft of the proposed Waste Confidence Decision (see reference) by the Waste Confidence Review Group. This matter was also a subject of discussion during a meeting held on April 19, 1989 by an ACNW Working Group.

On August 31, 1984, the NRC issued a final decision on what has come to be known as its "Waste Confidence Proceeding." The current review is an update of that assessment, and a significant feature in this latest review is the incorporation of the changes brought about by the Nuclear Waste Policy Amendments Act of December 1987.

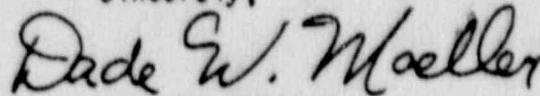
On the basis of our discussions on this matter, we offer the following comments:

1. We believe the present report appears to be technically sound, and in this assessment, we endorse both the expanded application of the generic approach to the majority of nuclear power plants and the incorporation into the proceedings of a more realistic timetable for the availability of a licensed repository and an extended time interval for the storage of spent fuel.
2. We continue to have concerns about the ability of the NRC staff to confirm that the repository complies with the probabilistic standards developed by the U.S. Environmental Protection Agency. The explanations given in the proposed Waste Confidence Decision on how this is to be accomplished do not illuminate the process nor do they provide convincing arguments that it can be accomplished.

May 3, 1989

The report also needs organizational and editorial changes to enhance the ease with which it can be read and assimilated.

Sincerely,

A handwritten signature in cursive script that reads "Dade W. Moeller".

Dade W. Moeller  
Chairman

Reference:

Memorandum dated April 17, 1989 from Robert M. Bernero, Director, Nuclear Material Safety and Safeguards, to Dade Moeller, Chairman, ACNW, transmitting Preliminary Draft of Waste Confidence Review Group Proposed Waste Confidence Decision (PREDECISIONAL)



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D. C. 20555

May 3, 1989

The Honorable Lando W. Zech, Jr.  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Zech:

SUBJECT: DRAFT TECHNICAL POSITION ON POSTCLOSURE SEALS IN AN UNSATURATED  
MEDIUM

During its ninth meeting, April 26-28, 1989, the Advisory Committee on Nuclear Waste (ACNW) met with members of the NRC staff to discuss the draft Technical Position on Postclosure Seals in an Unsaturated Medium. Representatives from the U.S. Department of Energy were present at this meeting. We also had the benefit of the document referenced.

On the basis of this review, we offer the following comments:

1. The draft technical position does not deal adequately with factors such as seismicity, tectonics, and long-term changes in geology, hydrology, and climate that might affect seal or barrier performance. Long-term projections on the geology, seismicity, tectonics, and climate of the Yucca Mountain area contain uncertainties and each of these factors could have impacts on the design, location, and performance of the seals. For these reasons, we believe that the draft technical position needs to be expanded to explicitly address these considerations.
2. Backfill materials for shafts and seal cements for boreholes can be selected to have sorptive properties for radionuclides. Such materials would provide added protection against unanticipated events, even if no containment functions are assigned to the backfills and seals. We recommend that the draft technical position include a statement addressing this additional consideration.
3. The draft technical position indicates that the outflow of radioactive gases from the repository could be significant and needs to be prevented. We believe that a rationale to support this position should be provided, as well as some perspective on the significance of this potential release.
4. Whether fracture or matrix flow predominates within the repository is an unresolved issue, and its resolution could have an impact on the method of control of potential releases. Because fracture flow may prove significant, its potential impact on the performance requirements for the barriers needs to be addressed in the draft technical position.

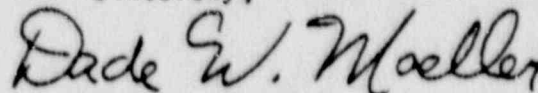
May 3, 1989

5. It appears that the closures that the U.S. Department of Energy proposes to install in the Yucca Mountain facility might be better characterized as "barriers" rather than "seals." If appropriate, the title of the draft technical position should be altered to reflect this fact.

The Committee wishes to express concern about the apparent lack of response from the geological community to which the draft technical position was available for review. The NRC should consider implementation of a more active program for soliciting reviews from such groups.

On the basis of our review, we believe that development of the draft technical position is justified. We hope these comments will be helpful.

Sincerely,



Dade W. Moeller  
Chairman

Reference:

Memorandum dated March 31, 1989 from John J. Linehan, NRC, to Richard K. Major, ACNW, Subject: Transmittal of Draft Technical Position on "Postclosure Seals in an Unsaturated Medium"



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D.C. 20555

AT NRC-1001-7

May 3, 1989

The Honorable Lando W. Zech, Jr.  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Zech:

SUBJECT: MANAGEMENT OF MIXED HAZARDOUS AND LOW-LEVEL RADIOACTIVE WASTES  
(MIXED WASTES)

During its ninth meeting, April 26-28, 1989, the Advisory Committee on Nuclear Waste (ACNW) met with members of the NRC staff and representatives from the Nuclear Management and Resources Council (NUMARC) to discuss the current status of the development of procedures for licensing facilities for the disposal of mixed wastes. This matter has also been discussed during meetings held by the Committee in calendar year 1988.

As you know, the U.S. Congress has assigned dual jurisdiction for the regulation of mixed wastes to the NRC and the Environmental Protection Agency (EPA). As a result, representatives of these two agencies have met on a regular basis over the past several years in attempting to resolve the problems caused by dual jurisdiction and to develop a common approach toward regulation. Unfortunately, for various reasons, these meetings have not resulted in full resolution of these problems, while at the same time mixed wastes continue to be generated and various groups are developing plans to submit applications for licensing disposal facilities for such wastes.

On the basis of these observations and our latest discussions on this matter, we offer the following comments.

1. It should be possible to resolve the problems caused by dual jurisdiction. For example, existing agreements between NRC and the Occupational Safety and Health Administration on the regulation of occupational health and safety at nuclear power plants, and between NRC and the Department of Transportation on matters relating to the transportation of radioactive materials, could serve as models for developing a joint agreement between NRC and EPA. Direct discussions between the NRC Chairman and the EPA Administrator could help bring this subject to closure. We urge that consideration be given to this approach.
2. During our meeting, we learned that most organizations knowledgeable in this field have concluded that any facility that meets NRC's regulatory requirements for the disposal of low-level radioactive wastes is capable of meeting the EPA criteria for the disposal of hazardous (nonradioactive) wastes. This conclusion

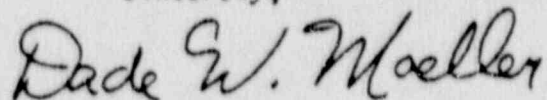
May 3, 1989

could serve as a basis for the development of a joint NRC-EPA statement for regulating such wastes.

3. This matter is of sufficient importance that the NRC resources being directed to its attention should be increased. We were told that the projected effort for Fiscal Years 1990 and 1991 is at a level of 0.5 FTE. We believe this is inadequate.
4. Many groups (NRC, EPA, NUMARC, and the Department of Energy) are addressing the problems related to the disposal of mixed wastes, and, although most of the related issues appear to have been identified, several appear to have been overlooked. These include the development of specific guidance for the regulation of hazardous wastes that contain naturally occurring and accelerator-produced radioactive materials and of hazardous wastes that contain greater-than-Class-C low-level radioactive wastes. These matters need to be addressed.

It is our conclusion that the problems associated with the development of a joint NRC-EPA regulatory approach for licensing facilities for the disposal of mixed wastes are primarily institutional. We hope that these comments will serve as a stimulus for the development of approaches for resolving these problems.

Sincerely,



Dade W. Moeller  
Chairman



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D.C. 20566

ACNWF 0013

May 3, 1989

The Honorable Lando W. Zech, Jr.  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Zech:

SUBJECT: PROPOSED COMMISSION POLICY ON EXEMPTIONS FROM REGULATORY CONTROL

During its ninth meeting, April 26-28, 1989, the Advisory Committee on Nuclear Waste (ACNW) met with members of the NRC staff to discuss the proposed Commission Policy on Exemptions from Regulatory Control. We also had the benefit of the document referenced. This matter was also a subject for discussion at several of our previous meetings. We most recently commented to you on this matter on December 30, 1988.

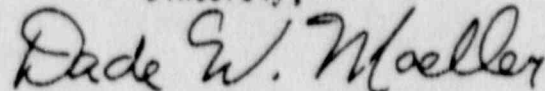
As a result of our review, we believe the latest version of the proposed Policy Statement has successfully addressed a number of formerly unresolved issues. Areas that still need to be strengthened and/or clarified are listed below:

1. The Policy Statement should state unequivocally that practices (including sources and devices) that are candidates for exemption should not, taking into consideration all such practices, result in an annual dose rate greater than a small fraction [i.e., about 10 mrem (about 0.1 mSv) per year] of the long-term annual dose limit [100 mrem (1 mSv) per year] for individual members of the public. Although this could mean that the dose rate from individual sources might approach 10 mrem (0.1 mSv) per year, suitable adjustments will need to be made where a given population group might be exposed to multiple sources.
2. Another important consideration, particularly in terms of releases of radioactive materials into the environment which represent an irretrievable action, is the associated longer-term dose commitment to the affected population. In essence, the proposed policy must take into consideration both the annual dose and the dose commitment.
3. We continue to believe that the permissible annual collective dose limit should be reduced as the allowable dose rate to members of the public from individual practices increases. We urge that this approach be made a part of the Policy Statement.

May 3, 1989

4. Although differences in the dose rates to members of the public from natural background sources can be used to provide perspective, we believe that such differences should not be used as a justification for setting dose rate limits for practices being considered for exemption. The Policy Statement should be modified to reflect this limitation.

Sincerely,



Dade W. Moeller  
Chairman

Reference:

Memorandum dated April 13, 1989 from Bill M. Morris, Office of Nuclear Regulatory Research (RES), for Raymond F. Fraley, ACRS, transmitting Preliminary RES Draft of Proposed Commission Policy on Exemptions from Regulatory Control





UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D.C. 20555

July 3, 1989

The Honorable Kenneth M. Carr  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Carr:

SUBJECT: ACNW REVIEW OF NRC COMMENTS ON DOE SITE CHARACTERIZATION PLAN

During its twelfth meeting, June 28-30, 1989, the Advisory Committee on Nuclear Waste (ACNW) completed its review of the Site Characterization Analysis (SCA) being prepared by the NRC staff on the Site Characterization Plan (SCP) developed by the U.S. Department of Energy (DOE) for the proposed high-level waste (HLW) repository at Yucca Mountain. During this meeting, the Committee had the benefit of discussions with staff members from the NRC and DOE. This matter was also a subject for discussion during the sixth through eleventh meetings of the ACNW, as well as during an ACNW Working Group meeting on April 19, 1989. During the seventh meeting, February 21-23, 1989, we had discussions and interactions with representatives from the State of Nevada's Nuclear Waste Project Office. The Committee also had the benefit of the documents referenced.

In approaching this task, the Committee assigned the responsibility for reviewing specific subject categories in the SCA to individual ACNW consultants. These consultants met with members of the NRC staff for in-depth discussions and then served as leaders for reviews of the assigned subject categories during the eleventh and twelfth meetings of the Committee. Throughout our reviews, we have interacted with the NRC staff on a continuing basis, and many of our comments are the culmination of this iterative process.

As a result of our review, we have reached certain conclusions and want to offer specific recommendations concerning the SCP and/or the SCA. Our more significant comments deal with:

- . the absence in the SCP of statements addressing the systematic and early identification and evaluation of potentially disqualifying features at the Yucca Mountain Site;
- . the apparent lack of sufficient attention to the limitations and uncertainties in the Yucca Mountain data bases, and the associated difficulties in demonstrating that the repository will comply with the Environmental Protection Agency (EPA) standard (40 CFR Part 191, "Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes"); and

July 3, 1989

- . Delays by DOE in implementing satisfactory quality assurance (QA) programs.

Our specific comments follow:

1. Although the SCP is an action plan for site characterization, we believe that a much stronger focus should be placed on early detection of potentially disqualifying features. The SCA is not sufficiently emphatic in its critique of the lack of such a focus. We believe that the SCA should point out the need in the SCP for an integrated section of the plan that explicitly addresses the activities leading to an evaluation of characteristics of the site directly related to disqualifying features (e.g., groundwater travel time) as stated in the regulations.
2. Uncertainties and limitations in the data used to justify conclusions will be the center of most contentions. Since the ability to resolve these uncertainties experimentally may well be beyond the practicality of the program, planning for their management is required. We recommend that the NRC staff strengthen its treatment of this topic in the SCA.

As was briefly discussed with the Commission during our meeting on April 27, 1989, we believe that the NRC staff should encourage DOE to develop a scoping Level 2 (Release Estimate) probabilistic risk assessment (PRA) for the proposed Yucca Mountain repository. Such a PRA should be useful in defining those parameters that are critical to the adequate performance of the proposed facility, and would help to set priorities for the accompanying investigations.

Subsequent to our discussions with the Commission, we were pleased to learn that DOE plans to begin conducting in 1990 or 1991 probabilistic system performance assessments for the proposed repository. We recommend that the NRC allocate resources sufficient to develop the expertise necessary to conduct an adequate, independent evaluation of the probabilistic system performance assessments that will be submitted by DOE as part of its application for a construction permit for the proposed repository.

The Committee was told by the NRC staff (and this view was supported by one of our consultants) that the DOE staff may have considerable difficulties in generating a complementary cumulative distribution function (CCDF) for the site and, if this is the case, they may not be able to demonstrate the required compliance with the EPA standard. This difficulty in demonstrating compliance could represent a disqualifying feature for the proposed repository location. We urge that this concern be addressed in the SCA.

3. We believe that the NRC staff has been extremely tolerant of the delays by DOE in establishing a satisfactory QA process by the Office of Civilian Radioactive Waste Management (OCRWM) for

the Yucca Mountain project. Although one of the Objections in the SCA being prepared by the NRC staff addresses this matter, we believe that this troublesome issue should be promptly resolved since continued absence of approvable QA systems will increase the burden on the participants in licensing processes when qualification of data is at issue.

4. Additional comments on selected topics include:

- a. Because the Calico Hills formation is intended to serve as a barrier between the radioactive waste and the underlying saturated zone, some form of compromise must be reached between maintaining this formation as a barrier and drilling into or exploring within it to determine its critical characteristics. The NRC staff should include in the SCA a recommendation that DOE be definitive on how they will obtain the data necessary to determine the characteristics of the Calico Hills formation.
- b. Because of the significance of the waste package in the containment of the associated radionuclides, it is important that decisions be made soon on the materials to be used in fabricating the waste packages and the manner in which they are to be sealed. Such information is essential in considering possible interactions between the packages and the repository materials with which they will be in contact. Consideration of these interactions will require determination of the specific chemical composition of the repository water, and the SCA should reflect this concern.
- c. One of the key parameters in determining the adequacy of the proposed site is the rate of groundwater flow. In this regard, the NRC staff should emphasize in the SCA the need to obtain information on whether matrix or fracture flow (or a combination of the two) will govern water movement.
- d. Current concerns with the location of the Exploratory Shaft Facility (ESF) pertain to its distance from faults and the appropriateness of the samples it will yield in providing data that are representative of the proposed repository location. We believe the SCA should emphasize the need for the application of a comprehensive range of techniques (e.g., subsurface mapping, geophysical surveys) to the study of this problem.

In the development of the Title I design for the ESF, the DOE staff was supposed to have provided a conceptual approach for construction of the facility. Reviews by the NRC staff (and ACNW consultants) indicate that this was not the case. The staff should ensure that the SCA states that before DOE proceeds further with the Title II design, which will provide

July 3, 1989

additional details on the proposed ESF, DOE should promptly address the errors and deficiencies in the Title I design.

- e. We believe that consideration should be given to extending the geoscience (hydrology, geology, geophysics) investigations to a distance sufficient to provide data on conditions within the region surrounding the site. Some of the existing investigations appear to be too limited in their geographical coverage. For example, because of the importance of the potential of volcanism, such an extension would appear mandatory to ensure that these studies have the potential for uncovering any disqualifying features.
- f. A range of alternative conceptual models will be used in conducting performance assessments for the repository. In our opinion, there are two problems associated with these models, namely, they are incomplete and they are not integrated. The SCP should be constructed so as to provide data that identifies the correct model, rather than merely confirming the preferred model. Since modeling is essential in determining the performance of the proposed repository and for uncovering potential disqualifying features, these deficiencies must be corrected. Such determinations should be scheduled as early as possible in the site characterization process, and this should be reflected in the SCA.
- g. The potential for natural resources in the area and the scenarios that are to be considered relative to possible human intrusion (some of which are related to exploration for such resources) need to be given more attention. A much more thorough assessment of potential mineral resources, including petroleum, should be required in the SCP, and the SCA should indicate this need.

With respect to human intrusion, the Committee notes that guidance on this matter is provided in EPA standard 40 CFR Part 191. We support the NRC staff recommendation that the DOE staff should consider this guidance in the development of the CCDF for the site.

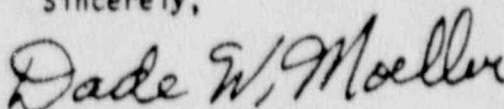
- h. The NRC staff has apparently accepted the lack of details in the SCP on test procedures and schedules for various site analyses since these are to be provided in the Study Plans being prepared by DOE. This places an increased burden for reviewing the Study Plans on the NRC staff. We recommend that the NRC staff note this problem in the SCA and that enhanced details of the characterization program be included in the periodic progress reports that will be submitted by DOE to supplement the SCP.

July 3, 1989

5. The SCA methodology and its basis are sharply focused on the individual sections of the SCP. Nevertheless, it might be useful if the NRC staff would produce an addendum that, among other items, contains those comments related to global or generic matters. For example, we believe that a useful comment in such a section would be to urge DOE to recognize that the licensing process and any decisional activities connected with it are adversarial. We also believe that this characteristic of the licensing proceedings should encourage DOE to ensure that its technical arguments are as much beyond challenge by responsible scientists as reasonable. The context of the SCA should be responsive to this need.

We trust these comments will be helpful in the development of the Site Characterization Analysis. In closing, we want to acknowledge and thank staff members of both the NRC and DOE for their cooperation and support during our review. All the people with whom we have interacted have been helpful and responsive to our questions.

Sincerely,



Dade W. Moeller  
Chairman

References:

1. U. S. Department of Energy, DOE/RW-0199, "Site Characterization Plan - Yucca Mountain Site," December 1988
2. U. S. Nuclear Regulatory Commission draft Site Characterization Analysis, Sections 1, 2, and 3, received June 27, 1989 (Pre-decisional)
3. U. S. Department of Energy, DOE/RW-0206, "Site Characterization Plan - Public Handbook, Yucca Mountain, Nevada," January 1989
4. U. S. Department of Energy, DOE/RW-198, "Site Characterization Plan Overview, Yucca Mountain Site," December 1988
5. U. S. Nuclear Regulatory Commission, "Administrative Plan and Procedures for NRC Staff Review of DOE's Consultation Draft Site Characterization Plan," December 18, 1987
6. U. S. Nuclear Regulatory Commission, "Draft Technical Review Plan for NRC Staff Review of DOE's Site Characterization Plans," December 18, 1987
7. U. S. Nuclear Regulatory Commission, "Review Plan for NRC Staff Review of DOE's Site Characterization Plan," December 12, 1988
8. U. S. Nuclear Regulatory Commission, Regulatory Guide 4.17, "Standard Format and Content of Site Characterization Plans for High-Level-Waste Geologic Repositories," March 1987
9. Ross, B., Disposal Safety Incorporated, Prepared for Sandia National Laboratories, SAND 85-7117, "A First Survey of Disruption Scenarios for a High-Level-Waste Repository at Yucca Mountain, Nevada," December 1987

July 3, 1989

10. Letter dated June 1, 1989 from John J. Kearney, Edison Electric Institute, to C. P. Gertz, Yucca Mountain Project Office, DOE, regarding DOE Site Characterization Plan
11. Letter dated May 3, 1989 from R. Loux, Nevada Agency for Nuclear Projects, Waste Project Affairs, to C. Gertz, , DOE Yucca Mountain Project Office, Subject: State of Nevada Preliminary Comments on the Site Characterization Plan for the Yucca Mountain Candidate High-Level Nuclear Waste Repository Site



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D.C. 20555

July 5, 1989

The Honorable Kenneth M. Carr  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Carr:

SUBJECT: REPORTING INCIDENTS INVOLVING THE MANAGEMENT AND DISPOSAL OF  
LOW-LEVEL RADIOACTIVE WASTES

During its twelfth meeting, June 28-30, 1989, the Advisory Committee on Nuclear Waste (ACNW) met with members of the NRC staff to discuss the current status of activities related to the solidification of low-level radioactive wastes and plans for developing a program for reporting incidents involving the management and disposal of such wastes.

One of the subjects covered was the Workshop on Cement Solidification of Low-Level Wastes convened from May 31 through June 2, 1989, by the NRC staff, in cooperation with the National Institute of Standards and Technology. This appears to have been a very successful meeting and it demonstrated that all affected groups share a desire to solve the problems in this field. One result of the workshop was to identify specific areas that need to be addressed. These include:

1. Development of a better system for characterizing low-level wastes (LLW) and for separating out waste streams with compositions that pose particular problems;
2. More effective application of process control programs so that laboratory tests will be more indicative of what can be anticipated in full-scale operations;
3. Better correlation of testing requirements, procedures, and data with regulations for long-term waste stability and other performance indicators; and
4. Establishment of a system for collecting, storing, and testing of archival samples.

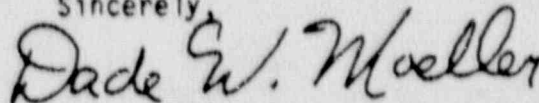
The workshop also confirmed the need to establish a system for reporting incidents involving low-level waste management and disposal. With respect to this item, we believe that the NRC staff should expand its approach to the collection of useful information on LLW management incidents by including exploration of a range of options, e.g., the possible development of cooperative reporting programs with the Nuclear

July 5, 1989

Management and Resources Council and/or the Institute of Nuclear Power Operations. One item of concern to the ACNW was the apparent resource limitations within the NRC Division of Low-Level Waste Management and Decommissioning (DLLWMD) to address both this problem and revision of the associated technical position on waste form. Because of the importance of this subject, we recommend that steps be taken to provide sufficient resources to address this problem in an expeditious manner. We believe that a delay of several years in implementing a comprehensive reporting system is highly undesirable in light of the schedules for operation of existing LLW burial facilities and the new facilities planned for establishment through the state compacts.

In the course of discussions with the NRC staff, we explored the options available to implement a reporting process in a timely manner. Of the several possible methods mentioned, we believe that adding a reporting requirement to the topical report system for LLW waste forms could serve as a useful interim approach until explicit procedures for reporting such incidents are in place. We also recommend the issuance of an Information Notice to alert licensees and vendors to the desire of the NRC staff for more complete reporting of such incidents.

Sincerely,



Dade W. Moeller  
Chairman





UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D.C. 20555

ACNWR-0073

August 21, 1989

The Honorable Kenneth M. Carr  
Chairman  
U. S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Carr:

SUBJECT: COMMENTS ON ACNW REVIEW OF THE NRC ANALYSIS OF THE DOE SITE  
CHARACTERIZATION PLAN

In response to the July 21, 1989 memorandum from the Secretary of the Commission, we are pleased to offer the following comments on the NRC analysis of the Site Characterization Plan (SCP) prepared by the U.S. Department of Energy (DOE). Our report of July 3, 1989, which this report supplements, was based on the draft of the Site Characterization Analysis (SCA), including the draft comments of the Director, Office of Nuclear Material Safety and Safeguards (NMSS), available at the time of our 12th meeting, June 28-30, 1989.

The Committee is in general agreement with the overall content of the SCA's point papers. However, our report of July 3, 1989 contained three comments that we deem to be of particular significance. The first two are what we consider to be areas of disagreement with the comments of the Director, NMSS. Our third comment was an expression of concern related to DOE's schedule for implementation of their quality assurance programs.

These specific comments are presented below, with discussions of the specific subject areas where there are disagreements:

1. "The absence in the SCP of statements addressing the systematic and early identification and evaluation of potentially disqualifying features at the Yucca Mountain Site."

The Director has attempted to address this issue in his proposed letter for transmitting the SCA to the DOE (SECY-89-199). However, he has addressed this issue in what we consider to be an implicit rather than an explicit manner, and has referred to it as a "second level of concern." We believe that it is a basic deficiency in the SCP and should have been directly addressed in the Director's comments.

In item (2) at the top of page 3 of his proposed letter, the Director states that "investigations associated with tectonic phenomena should receive early attention" and that "an understanding (of such phenomena) is critical to evaluating the site

August 21, 1989

suitability in terms of potentially adverse conditions...." However, neither in the Director's proposed letter of transmittal nor in his "Comments" does he call for the systematic and early identification and evaluation of all potentially disqualifying features.

Our recommendation that this point be emphasized is based upon two concerns: (a) DOE officials in their presentations to this Committee stated that, if disqualifying features were present, they would "pop up" (as contrasted to having a plan to actively seek them out), and (b) the NRC staff's call for the search for potentially disqualifying features could be interpreted as being limited to tectonic phenomena. We believe that tectonic phenomena are but one of several such features that should receive attention. For example, the NRC regulations require that the pre-waste-emplacement groundwater travel time along the fastest path from the disturbed zone to the accessible environment shall be at least one thousand years. We believe that confirmation of the suitability of the site with respect to this and similar parameters should also be emphasized.

2. "The apparent lack of sufficient attention to the limitations and uncertainties in the Yucca Mountain data bases, and the associated difficulties in demonstrating that the repository will comply with the Environmental Protection Agency (EPA) standard (40 CFR Part 191, 'Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes')."

Here, the key factor is that the EPA Standard is probabilistic and therefore the methods for demonstrating compliance must have a probabilistic base. The approach to be used includes the construction of a Complementary Cumulative Distribution Function (CCDF) and, through this process, a demonstration that the repository complies with the EPA Standard. Our primary concerns are the uncertainties and limitations in the data to be used to construct the CCDF. Since the ability to resolve these uncertainties experimentally may well be beyond the capability of the site characterization program, increased consideration should be given to the feasibility of developing deterministic criteria for judging the adequacy of the site relative to the EPA Standard.

In its discussions with members of the NRC staff, the Committee was given the impression that, while the staff could readily construct a CCDF, there would be considerable limitations and uncertainties in the data that they would be using. Although EPA, in response to earlier concerns on the part of the NRC staff, added caveats to their Standard to make the demonstration of compliance easier to achieve, consultants to the ACNW are

August 21, 1989

strong in their belief that this does not resolve the problem of demonstrating compliance with the EPA Standard. A review of the background on the development of the EPA Standard reveals that an awareness of these problems is not new. Other groups, including EPA's Science Advisory Board, have expressed concerns about this matter in the past.

In summary, we consider the demonstration of compliance of the proposed repository with the EPA Standard to be a major concern. The Committee is scheduled to meet with the NRC Staff on this and related matters and expects to provide you with additional comments as this work progresses.

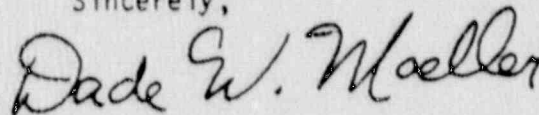
3. "Delays by DOE in implementing satisfactory quality assurance (QA) programs."

This concern is one that we share with the NRC staff. If there is an area of disagreement, it is that we would have been less tolerant of the continuing delays in the implementation of the QA programs.

In addition to the above, the Committee offered a number of comments pertaining to other specific aspects of the site characterization program. In the main, these comments have been, or are being, addressed by the NRC and/or DOE. Examples include the meetings that are under way between the NRC and DOE staffs relative to the location of the Exploratory Shaft Facility and its associated Title I and Title II designs. As was the case with the NRC comments on quality assurance programs, any areas of disagreement on these issues between this Committee and the NRC staff are related primarily to the degree of emphasis given to an item, rather than to a fundamental disagreement on the technical aspects of the review.

We hope this provides the information you need. Should questions remain, or if we can be of further assistance, please let us know.

Sincerely,



Dade W. Moeller  
Chairman

References:

1. SECY-89-199, Memorandum dated July 3, 1989 for the Commissioners from Hugh L. Thompson, Jr., Office of the Executive Director for Operations, Subject: NRC Staff Review of the Department of Energy's Site Characterization Plan, Yucca Mountain Site, Nevada Research and Development Area, Nevada.

August 21, 1989

2. Letter dated February 17, 1984, from Herman E. Collier, Jr., U. S. Environmental Protection Agency, to William D. Ruckelshaus, Administrator, EPA, transmitting EPA report dated January 1984 entitled "Report on the Review of Proposed Environmental Standards for the Management and Disposal of Spent Nuclear Fuel High-Level and Transuranic Radioactive Wastes (40 CFR 191)."



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D.C. 20555

ACNWR 0022

September 19, 1989

The Honorable Kenneth M. Carr  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Carr:

SUBJECT: COMMENTS ON TECHNICAL POSITION PAPER ON ENVIRONMENTAL  
MONITORING OF LOW-LEVEL RADIOACTIVE WASTE DISPOSAL FACILITIES

During its 13th meeting, September 13-15, 1989, the Advisory Committee on Nuclear Waste met with the NRC staff to continue the discussion of the development of a Technical Position Paper on Environmental Monitoring of Low-Level Radioactive Waste Disposal Facilities (referenced). An earlier draft of this paper was discussed with the NRC staff during the 10th meeting of the Committee on May 11, 1989.

We believe that the current draft, appropriately edited based on discussions during our 13th meeting, will be acceptable for publication.

Sincerely,

A handwritten signature in cursive script that reads "Dade W. Moeller".

Dade W. Moeller  
Chairman

Reference:

Memorandum dated August 2, 1989 from John J. Surmeier, Office of Nuclear Material Safety and Safeguards, to Sidney J. S. Parry, Advisory Committee on Nuclear Waste, transmitting U. S. Nuclear Regulatory Commission, Division of Low-Level Waste Management and Decommissioning Technical Branch, Technical Position Paper, Environmental Monitoring of Low-Level Radioactive Waste Disposal Facilities



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D.C. 20555

September 19, 1989

The Honorable Kenneth M. Carr  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Carr:

SUBJECT: DIVISION OF RESPONSIBILITIES BETWEEN THE ACNW AND THE ACRS

In response to your request, we are pleased to provide the following comments on the division of responsibilities between the Advisory Committee on Nuclear Waste (ACNW) and the Advisory Committee on Reactor Safeguards (ACRS). Serving as background for our comments were the proposals contained in the letter to you from Dr. Forrest J. Remick, Chairman, ACRS, dated June 14, 1989.

As you may recall, this matter was discussed with members of the ACRS during a Commission meeting on August 10, 1989, and it has been a continuing subject of discussion within the ACNW. Although we view it as a matter requiring resolution, we would have preferred to have gained additional operating experience before the development of a formal statement on the subject.

In its letter to you dated June 14, 1989, the ACRS proposed a division of responsibilities based primarily on two factors: (a) the physical location of the activities in question, and (b) the Code of Federal Regulations. Although it would be helpful if this type of approach could be applied, we believe that it could lead to confusion. For example, with respect to proposal (a), we believe that the fulfillment of our responsibilities will require us to have knowledge of, and be involved in, the processes within nuclear power plants that generate low-level wastes, particularly those that might fall within the "mixed waste" category. In addition, we view our responsibilities as extending to the reviews of operating procedures for the solidification of low-level wastes, such as spent resins, and the submission of applications by nuclear utilities for the construction and operation of incinerators and other devices for the treatment of such wastes.

Although we agree with respect to item (b) that selected parts of Title 10 of the Code of Federal Regulations clearly fall under the primary purview of one of the Committees (for example, Parts 55, 74, and 100 clearly pertain to activities of the ACRS, and Parts 60 and 61 clearly pertain to activities of the ACNW), we believe that, in the majority of cases, to properly address questions that develop may require input from both Committees. Examples include:

Part 50 -- the ACNW has interests in activities related to Appendices F and I and to decommissioning;

September 19, 1989

Part 70 -- the ACNW has interests in those portions of this part that pertain to effluent monitoring;

Part 71 -- although the ACRS has proposed that this part be assigned to the ACNW, we would be hesitant to attempt to take on this responsibility without substantial input from the ACRS;

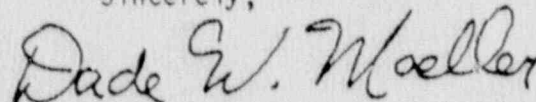
Part 72 -- while the ACRS has indicated that the on-site storage of spent fuel would primarily be their area of responsibility, we believe that on-site dry cask storage (once the fuel is outside the spent fuel pool) would clearly be within the ACNW realm of responsibility.

In summary, while we believe that the responsibilities of the ACNW and the ACRS are separate in selected areas, we find that in many instances they overlap. As experience is gained, we will be able to set down a statement outlining how these responsibilities can be separated. To establish a policy at this time might very well hamper both Committees in the effective conduct of their business. For the moment, members of the ACNW would prefer to resolve any issues as they arise and for the two Committees to pursue their duties to the maximum extent possible in a spirit of cooperation and mutual support.

Until such time as experience clarifies the responsibilities of the two Committees, we suggest that one Committee take the lead in any upcoming reviews that are believed to fall within the purview of both groups. Distribution of such responsibilities can be handled by the two Committees, with the assistance of the Executive Director, ACRS/ACNW. Following this approach, applicants and/or licensees will in no case be required to appear before more than one of the two Committees, and any associated complications will be avoided.

We hope you will find these comments helpful.

Sincerely,



Dade W. Moeller  
Chairman



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D. C. 20555

ACNWR 0024

October 18, 1989

The Honorable Kenneth M. Carr  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Carr:

SUBJECT: DRAFT TECHNICAL POSITION ON TECTONIC MODELS IN THE ASSESSMENT OF  
PERFORMANCE OF HIGH-LEVEL RADIOACTIVE WASTE REPOSITORIES

During its 13th meeting, September 13-15, 1989 and 14th meeting, October 11-13, 1989, the Advisory Committee on Nuclear Waste met with representatives of the NRC staff to discuss the subject draft Technical Position on Tectonic Models (referenced). This matter was also discussed with staff representatives during an ACNW Working Group meeting on October 10, 1989. On the basis of these discussions and our review of the draft report, we offer the following comments.

Although the preparation of this draft Technical Position has resulted in certain benefits, including promotion of discussion on related issues, helping the NRC staff to formulate its positions, and assisting in a better understanding of certain issues, there is still a need to better justify the reasons for issuing the document and to demonstrate how it and other related reports are to be integrated. There are at least two options for proceeding with this matter in order to transmit the views of the NRC staff to DOE. These include summarizing the staff's views in a Technical Position considerably improved from the one proposed or expressing the staff's position in the form of a guidance letter.

Our comments regarding the adequacy of the proposed Technical Position are as follows:

1. The proposed draft Technical Position is unnecessarily terse. Additional discussion is needed to avoid misunderstandings. For example, further treatment is needed on the development and application of tectonic models in the evaluation of a proposed geologic repository. Specific subjects to be addressed should include:
  - a. The explicit use of models in performance allocation and performance assessment,
  - b. The development of broad-based criteria by which tectonic models can be evaluated, and
  - c. The relative role of deterministic and probabilistic methods for assessing processes and events as they relate to, and are developed from, tectonic models.

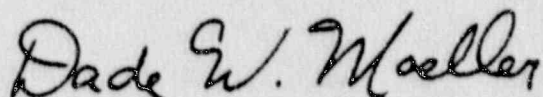


October 18, 1989

2. There are many words and phrases in the draft Technical Position that need to be clarified and/or defined to assist in making the Technical Position effective. These include a wide range of terms, such as a "relatively short period of time," "over long times," "full range" of tectonic models, and "bounding values." There should also be a major effort to ensure that the definitions of certain scientific terms being proposed by the NRC staff for guidance purposes are compatible with the technical definitions currently in use within the professional geosciences community.
3. Although the NRC staff has indicated that they are scheduled to complete and issue this Technical Position by the end of this calendar year, we are not convinced of the necessity for meeting this timetable. Our position is based, in part, on the fact that rulemaking is underway to clarify the meaning and applications of anticipated and unanticipated processes and events. The outcome of the rulemaking could have an impact on the development of this Technical Position. If, however, there is a need to issue the Technical Position by the indicated date, we will make ourselves available to review and comment on a revised draft. Because of the extensive changes that we believe are necessary, a follow-up review by the ACNW should be scheduled.

We hope these comments will be helpful, and we look forward to having an opportunity to review and comment on the revised report.

Sincerely,



Dade W. Moeller  
Chairman

Reference:

Memorandum dated July 24, 1989 to ACNW Members from S. J. S. Parry, ACRS, with attached "Technical Position on Tectonic Models in the Assessment of Performance of High-Level Radioactive Waste Repositories" (Predecisional)



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D.C. 20555

ALNWK-1022

October 18, 1989

The Honorable Kenneth M. Carr  
Chairman  
U. S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Carr:

SUBJECT: DRAFT STAFF TECHNICAL POSITION ON THE DESIGN OF EROSION PROTECTION  
COVERS FOR STABILIZATION OF URANIUM MILL TAILINGS SITES

During its 14th meeting, October 11-13, 1989, the Advisory Committee on Nuclear Waste met with representatives of the NRC staff to discuss the subject Draft Technical Position (referenced). On the basis of these discussions, we offer the following comments:

1. The Draft Technical Position being proposed by the NRC staff acknowledges that the procedures for prevention of erosion (described in the position) may increase the probability for increased infiltration of water which, in turn, could lead to groundwater contamination. While the NRC staff cautions that "The decision to use a particular reclamation strategy should consider all the possible failure modes with respect to all applicable EPA and NRC standards," they also state that "The 'systematic' process to address certain design aspects, other than the surface water erosion considerations for cover designs, is beyond the scope of this Staff Technical Position and is, therefore, not addressed." In addition, they state that "addressing only the concerns and criteria detailed in this position may not be sufficient to address the other features necessary to comply with other applicable regulations and standards."

We find this limited approach disturbing and unsatisfactory. We believe it would be better to employ a systems approach to the problem of stabilizing uranium mill tailings, wherein all related aspects of regulatory concerns would be taken into consideration. Alternatively, the Technical Position should identify and limit those activities pertinent to stabilization that could result in violations of other regulations. We believe the Technical Position should be rewritten to reflect these comments.

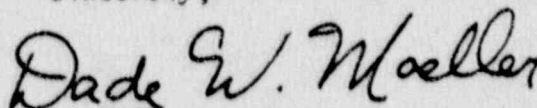
2. There is inadequate justification for the exemptions that the NRC staff is willing to grant for difficulties in meeting the standards for the control of uranium mill tailings. For example, where designing for the Probable Maximum Flood or Probable Maximum Precipitation is "impracticable," the staff will accept the Standard Project Flood. Where the provision of combined stable soil top slopes and/or rock-protected side slopes is "excessively costly," other approaches may be acceptable. We believe that additional discussion of and justification for these positions needs to be provided.

October 18, 1989

3. Lastly is the matter of performance assessment and/or the determination of compliance with the NRC regulations. For example, the Technical Position states that the limit of 20 picocuries per square meter per second for radon-222 releases is for a value "averaged over the entire surface of the disposal site and over at least a one-year period, for the control period of 200 to 1000 years." The criteria for determining the numbers and frequency of the required measurements should be specified. Additional discussion and clarification of this and other aspects of the Technical Position to ensure compliance with NRC regulations are needed.

In summary, while the Draft Technical Position provides a considerable amount of explanation with respect to details of the various alternatives for the designs of covers for the control of uranium mill tailings, certain fundamental aspects of the philosophy and justification for the approaches being taken are lacking. We believe that additional discussion of these broader aspects is necessary and justified.

Sincerely,



Dade W. Moeller  
Chairman

Reference:

U.S. Nuclear Regulatory Commission, "Draft Staff Technical Position, Design of Erosion Protection Covers for Stabilization of Uranium Mill Tailings Sites," dated August, 1989 (Predecisional)



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D.C. 20555

October 18, 1989

The Honorable Kenneth M. Carr  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Carr:

SUBJECT: RECOMMENDATIONS DEALING WITH INVESTIGATION OF POTENTIAL VOLCANISM  
AT THE YUCCA MOUNTAIN HIGH-LEVEL WASTE REPOSITORY SITE

This letter is a follow-up to our letter to you of July 3, 1989, regarding the NRC staff's analysis of DOE's Yucca Mountain Site Characterization Plan. In that letter we expressed our concern that early studies at Yucca Mountain should be focused on identifying and evaluating potential problems that may disqualify the site as a high-level waste repository. As a result of that concern and an increasing interest in volcanism as a potential "fatal flaw," an ACNW Working Group on Tectonic Models met on October 10, 1989 with Professor Bruce D. Marsh who is head of the Department of Earth and Planetary Sciences at The Johns Hopkins University and is a recognized expert on volcanic processes. Professor Marsh presented an overview of the state-of-knowledge with regard to volcanogenesis. He made several observations pertaining to the prediction of volcanic hazards in general, and specifically to the work that has been done to date in the southern Basin and Range Province which includes the Yucca Mountain site.

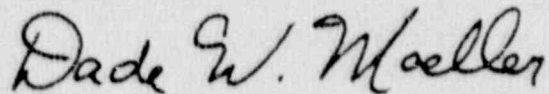
First, he urged that volcanogenesis studies be undertaken in the context of a systems approach that includes integration of geochemical, geologic, tectonic, and geophysical studies of the immediate vicinity of Yucca Mountain aimed specifically at the volcanogenesis problem, as well as more regional studies conducted as part of the general site characterization. This supports our point of view as well as the view of the NRC staff that integration of multidisciplinary data is essential to studying potential geologic processes and events at Yucca Mountain.

Secondly, he suggested that consideration should be given to the establishment of a small, "blue-ribbon" peer panel to examine the state-of-knowledge of volcanogenesis as it pertains to southern Nevada and Yucca Mountain in particular and, based on requirements such as 10 CFR Part 60, to provide guidelines on the appropriate studies to fulfill a systems approach to the investigation of volcanism. This panel, consisting of recognized experts in the germane disciplines, and working under the aegis of the National Research Council or a similar impartial body, could, in a limited period of time, provide a fresh, comprehensive, unbiased approach to the issue of volcanism. The report from this panel could provide the Department of

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Energy with invaluable guidance on one aspect of their future site characterization activities at Yucca Mountain and would make available to all interested organizations basic information for review and assessment of volcanism at the site. The Committee believes that there is merit to Dr. Marsh's proposal. We recommend that efforts be initiated to follow through on his recommendations. We, of course, are prepared to assist in further developing this suggestion and bringing it to fruition.

Sincerely,

A handwritten signature in cursive script that reads "Dade W. Moeller". The signature is written in dark ink and is centered on the page.

Dade W. Moeller  
Chairman



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D.C. 20555

ACNWI-0027

October 18, 1989

The Honorable Kenneth M. Carr  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Carr:

SUBJECT: PATHFINDER ATOMIC POWER PLANT DISMANTLEMENT

During its 13th meeting, September 13-15, 1989, the Advisory Committee on Nuclear Waste met with representatives of the NRC staff to discuss the proposed dismantlement of the Pathfinder plant. This was also a subject of discussion among the Committee members during our 14th meeting, October 11-13, 1989. On the basis of these discussions, the following comments are provided.

Because the criteria that are established during the dismantlement of the Pathfinder plant may become precedents for similar operations in the future, we believe it is important that care be taken in their formulation. In this regard, we offer the following preliminary suggestions and/or recommendations:

1. Evaluation of the dismantlement operation should be based on a systems approach. That is to say, consideration should be given to ways in which the associated regulatory criteria can help minimize the volumes of waste generated, as well as facilitate their handling, transport, and disposal.
2. Overall, the criteria should be as nonprescriptive as possible; acceptable levels of residual contamination should be clearly defined and justified; and the establishment of overly restrictive limits (for example, at the level of "no detectable activity") should be avoided. One consideration in the establishment of residual radionuclide limits should be the potential for long-term contamination of groundwater.
3. The assumption should be made that the site on which the dismantled facility was located may some day be released for use by members of the public. For this reason, exposures well in excess of an occupational time of 2,000 hours per year should be considered.
4. To the extent practical, maximum benefit should be taken of the experience gained in the decommissioning of related facilities, such as the Shippingport Atomic Power Station.
5. Although adequate quality assurance (QA) conditions should be required, including confirmation that representative samples are collected for evaluating specific conditions, care must be taken to avoid burdening licensees with excessive QA requirements.

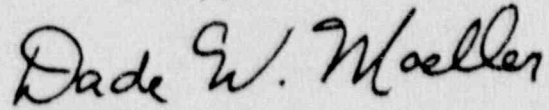
The Honorable Kenneth M. Carr

- 2 -

October 18, 1989

We look forward to follow-up meetings with the NRC staff after issuance of the Safety Evaluation Report on the dismantlement of the Pathfinder plant.

Sincerely,

A handwritten signature in cursive script that reads "Dade W. Moeller".

Dade W. Moeller  
Chairman



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D.C. 20555

ACNWR 0028

October 18, 1989

Mr. James M. Taylor  
Acting Executive Director for Operations  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Mr. Taylor:

SUBJECT: LOW-LEVEL WASTE PERFORMANCE ASSESSMENT METHODOLOGY

During its 14th meeting, October 11-13, 1989, the Advisory Committee on Nuclear Waste met with representatives of the NRC staff to discuss a report prepared by R. John Starmer, Lynn G. Deering, and Michael F. Weber on a "Performance Assessment Strategy for Low-Level Waste Disposal Sites" (see Reference).

This report is well written and provides guidance on a subject that is fundamental to the conduct of licensing reviews of proposed LLW disposal facilities. To ensure that it receives the attention it deserves, we recommend that the NRC staff consider updating and issuing the report as an NRC technical position, as a guidance letter, or in another suitable form. Revisions should include expression of the dose limits in the report in both International System of Measurement (SI) and English units and should include the use of the concept of "effective dose equivalent." The requirements and goals in this report should also be made comparable to those in other related NRC documents. In addition, the issue of how uncertainties should be assessed warrants attention.

The NRC staff reported to us that the resources currently available for this work are minimal. We believe that this effort is important, and we urge that additional resources be made available to support this program.

Sincerely,

Dade W. Moeller  
Chairman

Reference:

Report by R. John Starmer, Lynn G. Deering, and Michael F. Weber during the Tenth Annual DOE Low-Level Waste Management Conference, August 30-September 1, 1988 in Denver, Colorado, "Performance Assessment Strategy for Low-Level Waste Disposal Sites"





UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D.C. 20555

ACNWI 10029

December 21, 1989

The Honorable Kenneth M. Carr  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Carr:

SUBJECT: COMMENTS ON PROPOSED REVISIONS OF EPA'S HIGH-LEVEL WASTE  
STANDARDS

During its 15th meeting on December 20, 1989, the Advisory Committee on Nuclear Waste met with the NRC staff and representatives from the Department of Energy (DOE) and the Environmental Protection Agency (EPA) for additional discussions pertaining to the Standards for a high-level waste (HLW) repository currently being revised by EPA. We previously discussed this matter with a representative from EPA during our 14th meeting on October 11-13, 1989 and the ACNW or its predecessor, the ACRS, have had continuing interactions with the NRC staff on the matter over the past several years. We also had the benefit of the documents referenced.

On the basis of these discussions, we continue to doubt that compliance with the EPA standards can be demonstrated for a specific repository site, even recognizing the caveats included in the standard, such as the "reasonable assurance" phrase that allows for certain flexibilities in the interpretation of probabilistic analyses. If the construction of a Complementary Cumulative Distribution Function clearly demonstrates compliance with the EPA Standards, then the need for interpreting the "reasonable assurance" phrase is removed. If, as is more likely, demonstration of compliance is not clear, it will be necessary to have a definitive understanding of how the NRC staff plans to interpret the wording in the EPA Standards that:

Proof of the future performance of a disposal system is not to be had in the ordinary sense of the word in situations that deal with much shorter time frames. Instead, what is required is a reasonable expectation, on the basis of the record before the implementing agency, that compliance with 191.13 (a) will be achieved.

The preferred alternative in the plan as outlined in SECY-89-319 for implementation of the EPA Standards calls for the NRC staff to resolve the major problems concerning implementation of Section 191.13 (a) through rulemaking. It is not clear to us, however, how

December 21, 1989

such rulemaking would resolve the uncertainties in applying probabilistic techniques, nor is it clear that this method represents the best approach for coping with problems that are, in the main, a result of what we consider to be an unacceptable set of standards.

We believe that the NRC staff in SECY-89-319 has not provided the Commission an adequate range of alternatives. One such alternative that we recommend would be that the Commission object to the EPA Standards on the basis that:

1. There are no obvious ways for demonstrating compliance of any specific repository site with the Standards. In this sense, the Standards may be unrealistic.
2. The Standards are also overly stringent and inconsistent. There is strong evidence that they will be wasteful of resources with little commensurate benefit.

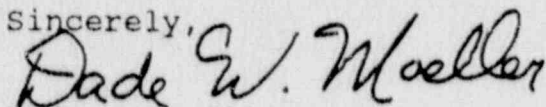
The EPA Standards are internally inconsistent, in that lower level quantitative limits are more stringent than upper level qualitative goals. Thus far we have been provided no information to convince us that less stringent Standards would not provide adequate protection of the public health and safety. The NRC subsystem performance criteria have the potential for imposing even more stringent requirements on the repository.

While EPA has attempted to justify the added conservatisms as a means for allowing for uncertainties, we fail to understand the logic of this approach. Resolution of the problems of uncertainties would best be pursued through site characterization and performance assessment. The latter process, in particular, can be used to reveal where and to what degree uncertainties exist, and can provide guidance on where additional and better data are needed.

To resolve these issues, we recommend that the NRC staff be more aggressive in dealing with EPA. The task of the NRC staff, as we interpret it, should be to ensure that the EPA Standards are scientifically sound, consistent, and readily subject to interpretation and implementation. With the EPA in the process of revising their Standards, and DOE having announced an overall reassessment of its HLW program, this would appear to be an opportune time for the NRC to undertake these initiatives.

We will be pleased to discuss these matters with you in additional detail, if you desire.

Sincerely,



Dade W. Moeller,  
Chairman

December 21, 1989

References:

1. SECY-89-319, "Implementation of the U.S. Environmental Protection Agency's High-Level Waste Disposal Standards," dated October 17, 1989
2. EPA Working Draft 1 of 40 CFR Part 191, dated June 2, 1989, "Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes"
3. 40 CFR Part 191, "Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes"



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D.C. 20555

January 30, 1990

The Honorable Kenneth M. Carr  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Carr:

SUBJECT: COMMISSION POLICY STATEMENT ON EXEMPTIONS FROM REGULATORY CONTROL

During its 16th meeting, January 24-25, 1990, the Advisory Committee on Nuclear Waste reviewed the above subject report (SECY-89-360). Because this has been a matter of continuing interest to the Committee, we take this opportunity to offer the following comments.

1. We believe that expressing the Policy Statement in terms of "Exemptions from Regulatory Control" is a positive step. We have, for some time, believed that the term, "Below Regulatory Control," was a misnomer. In fact, for the case of low-level radioactive wastes, the objective is to develop a system for granting approval for certain (exempted) wastes to be disposed of in facilities not licensed by the NRC.
2. We agree that the Commission is wise to be conservative in the selection of applicable dose rate limits until such time as more experience is gained relative to assessing the potential for individual exposures from multiple practices. However, we believe that the limits of 1 mrem/yr for individual dose rates and 0.1 mrem/yr for the truncation of collective doses are too low. Neither would be directly measurable and both would have large accompanying uncertainties.

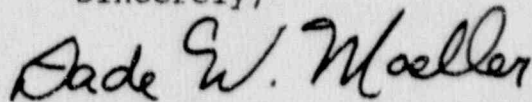
From our perspective, it appears that the Commission would need to take experience into account only in the establishment of an annual dose limit for individuals. Even so, a limit of 3 to 5 mrem/yr for each individual source or practice would not appear to be unreasonable. In the selection of a limit for truncating collective dose calculations, we suggest that the Commission adopt the 1 mrem/yr value being used by the National Council on Radiation Protection and Measurements.

January 30, 1990

3. As stated in our letter dated December 30, 1988, we believe that the collective dose limit should be variable. Following this approach, higher annual collective dose limits would be permitted for exempted practices that contribute smaller dose rates to individuals. It should be noted that the suggested collective dose rate limit of 1000 person-rem/yr may require the Commission to reconsider existing exemptions, such as those that permit the incorporation of licensed materials in smoke detectors and in luminous watches and clocks. Both of these applications appear to yield annual collective doses exceeding the proposed limit.
4. We believe the NRC staff is correct in urging that the Policy Statement include recommendations to discourage "frivolous" uses of radioactive materials. Although which practices constitute such uses may be subject to interpretation, most people would agree that exemptions should not be granted for the purposeful introduction of radioactive materials into food or toys, regardless of how low the associated dose rates might be.

We hope these comments will be helpful.

Sincerely,



Dade W. Moeller  
Chairman

Reference:

SECY-89-360, Commission Policy Statement on Exemptions  
From Regulatory Control, December 1, 1989 (Predecisional)



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D. C. 20555

January 30, 1990

The Honorable Kenneth M. Carr  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Carr:

SUBJECT: FINAL RULE ON STORAGE OF SPENT FUEL IN NRC-APPROVED  
STORAGE CASKS AT POWER REACTOR SITES

During its 16th meeting, January 24-25, 1990, the Advisory Committee on Nuclear Waste reviewed the October 27, 1989 version of the subject rule. We had the benefit of discussions with the staff and the document listed. The Committee also reviewed a previous version of the rule during its first meeting, June 27-29, 1988.

The Committee concludes that the NRC staff has done a fully satisfactory job in responding to the many comments received on the proposed rule and has been responsive to the recommendations made by the ACNW in its letter of July 1, 1988. In light of the potential need to accommodate spent fuel for some period prior to disposal in a repository, the Committee recommends timely approval and promulgation of this rule.

The discussions with the staff on this rule have made it clear that the principal issues raised by the public, and also most recently by the Committee, concern the implementation process, i.e., the certification of the casks and the thoroughness with which the staff examines the nuances of design and operation of the dry-cask storage facilities at nuclear power plant sites. We believe that initial certification and later recertification can be done in a satisfactory manner but urge that, in the absence of long experience with this type of storage, particular care be taken in the early stages of the program to ensure that the health and safety of both the public and plant personnel are protected.

Sincerely,

Dade W. Moeller  
Chairman

January 30, 1990

Reference:

Memorandum dated November 30, 1989 from B. Morris, RES, to R. F. Fraley, ACRS, Subject: Final Rule Entitled, "Storage of Spent Fuel in NRC-Approved Casks at Power Reactor Sites."



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D.C. 20555

January 30, 1990

The Honorable Kenneth M. Carr  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Carr:

SUBJECT: NRC PROGRAM ON LOW-LEVEL RADIOACTIVE WASTES

During its 16th meeting, January 24-25, 1990, the Advisory Committee on Nuclear Waste met with representatives of the Division of Low-Level Waste Management and Decommissioning for a review of matters pertaining to the production, treatment, and disposal of low-level radioactive wastes (LLWs). These matters had also been discussed with other members of the NRC staff on several previous occasions. As a result of these reviews, we offer the following comments.

1. While considerable attention has been given to the development of requirements for the siting, construction, and operation of disposal facilities, there appears to be a lack of coordination of these activities with the processes that produce the wastes. It is these processes which, in turn, determine the chemical and physical characteristics, radionuclide content, and volumes of the wastes. In our opinion, these processes and the resulting products may have as much bearing on the protection of public health and safety as do the requirements for the disposal facilities. We believe this is an excellent example where a systems approach could yield dividends. Before this can be accomplished, however, there is a need for closer coordination of relevant activities by NMSS, NRR, and RES.
2. Under the requirements of the Low-Level Radioactive Waste Policy Act and amendments, a number of states and state compacts are moving forward to develop plans for the siting and construction of low-level radioactive waste disposal facilities. Although the NRC staff has prepared a multitude of reports containing information that would be useful to the Agreement States and LLW facility developers, there is currently no single document containing comprehensive guidance or a "road map" to



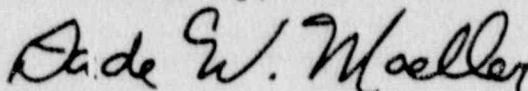
January 30, 1990

reports that pertain to this topic. To correct this situation, we recommend that a guidance document containing a summary of relevant laws and key regulations, regulatory guides, NUREG documents, and technical positions, suitably annotated and cross-referenced, be prepared. To the extent practical, pertinent standards developed by the U.S. Environmental Protection Agency and applicable key documents developed by the U.S. Department of Energy might also be cited in this report.

3. The Committee continues to believe that a need exists for a system through which the benefits of operating experience can be factored into NRC activities related to the generation and disposal of LLW. One contribution to this subject would be the preparation of a report based on a definitive review and digest of the experience gained at the Maxey Flats, Sheffield, and West Valley disposal facilities.
4. The Committee is concerned about the availability of adequate disposal capacity, licensed under the provisions of 10 CFR 61, Licensing Requirements for Land Disposal of Radioactive Waste, to accommodate LLWs after the scheduled closure in 1992 of the currently operated Barnwell, South Carolina, and Beatty, Nevada, disposal facilities. We urge that the Commission increase its efforts to encourage the States to accelerate the process for developing suitable disposal facilities.

We hope these comments will be helpful.

Sincerely,



Wade W. Moeller  
Chairman



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D.C. 20555

ACNW-1032

May 1, 1990

The Honorable Kenneth M. Carr  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Carr:

SUBJECT: PROGRAM PLAN FOR THE ADVISORY COMMITTEE ON NUCLEAR WASTE

This is our second response to your memorandum of November 6, 1989, in which you requested that the Advisory Committee on Nuclear Waste (ACNW) provide a program plan at four-month intervals. This plan covers the period May-August 1990. We hope you will find this a convenient source for anticipating our upcoming activities and for providing feedback on issues on which the Commission wishes us to focus our efforts.

In preparing this program plan, we have considered the list of specific technical issues of particular interest to the Commission, the EDO's list of proposed agenda items for the ACRS and the ACNW, the NRC's Five-Year Plan, and items of particular interest and/or concern to the Committee. The priorities proposed are based on information provided by representatives of NMSS, NRR, RES, and the EDO office, as well as our own interpretation of the subject in relation to our activities as a Committee and our input into the regulatory process.

This program plan is based on the current best estimates of work output by the DOE, EPA, NRC staff, and their consultants and contractors, as well as our own estimates of how to deal with these issues effectively. In addition to the full Committee meetings noted, Working Group meetings will be held as necessary to facilitate full Committee review and action. There may be some revisions to this plan associated with the completion of NRC staff, applicant, and/or contractor studies and reviews as well as other schedule problems beyond our control.

May 1, 1990

Full Committee meeting dates for this period are tentatively scheduled as follows:

20th Meeting	-	May 23-25, 1990
21st Meeting	-	June 28-29, 1990
22nd Meeting	-	July 30-31, 1990
23rd Meeting	-	August 29-31, 1990

The Committee anticipates considering the topics listed below during this four-month period.

May 23-25, 1990

- Review and comment on the NRC staff's draft Technical Position on soil erosion and protection for uranium mill tailings sites. (High priority)
- Briefing by the Center for Nuclear Waste Regulatory Analyses on the Systematic Regulatory Analysis (Program Architecture) for the high-level radioactive waste repository. (Medium priority)
- Briefing on the EPA's low-level radioactive waste standards. (Medium priority)
- Briefing on alternative exploratory shaft facility construction techniques from both engineering and geoscience perspectives. (High priority)
- Invite a representative from the EPA to continue the dialogue on the EPA's high-level radioactive waste standards. (High priority)

June 28-29, 1990

- Discuss the definition of "representativeness" as it pertains to the NRC staff's review of DOE's methodology for three-dimensional characterization of the proposed Yucca Mountain repository site. (High priority)
- Review and comment on the NRC staff's safety evaluation report on the Pathfinder Atomic Power Plant dismantlement plan. (High priority)
- Review and comment on the NRC staff's draft Technical Position on seismic hazards. (High priority)
- Review and comment on NRC's Low-Level Radioactive Waste Research Program Plan. (High priority)

May 1, 1990

- Briefing for information on the status of proactive work in the Division of High-Level Waste Management (technical positions and rules). This will include the impact of changes in the DOE program and schedule on NRC's high-level waste program. (Medium priority)
- Briefing by a representative of the Committee on the Biological Effects of Ionizing Radiations, Board on Radiation Effects Research, Commission on Life Sciences, National Research Council on the BEIR V report, "Health Effects of Exposure to Low Levels of Ionizing Radiation." (Medium priority)
- Briefing by EPRI/NUMARC on a methodology for predicting the iodine-129 source term for low-level radioactive waste sites. (Medium priority)

July 30-31, 1990

- Review and comment on NRC's High-Level Waste Research Program Plan. This may include a briefing by a representative of NRC's Nuclear Safety Research Review Committee on the NRC's radioactive waste research program. (High priority)
- Briefing by Dr. L. Lehman of Lehman & Associates, Inc., on her recent trips to review radioactive waste management activities in the U.S.S.R. (Low priority)
- Briefing on quality assurance activities associated with the high-level radioactive waste repository. (Medium priority)
- Review and comment on the NRC staff's draft Technical Position on stabilization/waste form for low-level radioactive waste. (High priority)
- Briefing on the status of activities associated with the Licensing Support System. (Medium priority)

Unscheduled: (Will be considered as documents and time become available)

- Review and comment on low-level radioactive waste shipment manifest system. (High priority)
- Preparation of a Memorandum of Understanding between the EDO and the ACNW to establish procedures for and describe the roles of the parties in interactions of the ACNW with the NRC staff on topics related to nuclear waste. (High priority)

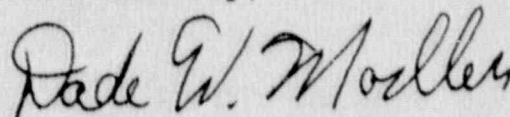
May 1, 1990

- Briefing and/or trip to a proposed low-level radioactive waste disposal site and meeting with appropriate state and/or local officials. (Low priority)
- Briefing on the potential problems that could arise at a high-level radioactive waste repository as a result of migration of carbon-14. This will include a discussion of what fundamental assumptions are made in evaluating the hazard from this radionuclide. (High priority)
- Briefing to explore the subject of human intrusion at a high-level radioactive waste repository. This will be designed to explore the range of current thinking from various groups in the United States and other countries. (High priority)

Plans to review various aspects of on-site dry cask storage activities have been deleted per the April 18, 1990 memorandum from S. Chilk, Secretary, to C. Michelson, ACRS, and D. Moeller, ACNW.

This list represents our best estimate of the topics to be considered through August 1990. If you or your fellow Commissioners have additional items to suggest or proposed changes in priorities, please let us know.

Sincerely,



Dade W. Moeller  
Chairman

cc: Commissioner Roberts  
Commissioner Rogers  
Commissioner Curtiss  
Commissioner Remick  
Samuel J. Chilk, SECY  
James M. Taylor, EDO  
Robert M. Bernero, NMSS



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D.C. 20555

AC-NWH-00164

May 1, 1990

The Honorable Kenneth M. Carr  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Carr:

SUBJECT: CRITIQUE OF THE ENVIRONMENTAL PROTECTION AGENCY'S  
STANDARDS FOR DISPOSAL OF HIGH-LEVEL WASTES

In response to your request during our meeting on February 21, 1990, the Advisory Committee on Nuclear Waste offers the following comments on the problems we see with the EPA standards (Ref. 1) for the disposal of high-level wastes. These comments are an outgrowth of our ongoing review of these standards, including a full-day session on this matter during our 18th meeting, March 22-23, 1990, and additional discussions during our 19th meeting, April 26-27, 1990. Organizations whose representatives took part in the discussions during our 18th meeting included the Environmental Protection Agency, the Nuclear Waste Technical Review Board, the staff of the Board on Radioactive Waste Management of the National Academy of Sciences, the Environmental Evaluation Group of the State of New Mexico, the Advisory Committee on Nuclear Facility Safety of the U.S. Department of Energy, and the General Accounting Office. Members of the NRC staff also attended these meetings.

Key technical problems with the EPA standards include the following:

1. All such standards should be organized in a hierarchical structure with the higher levels expressing the objectives in a qualitative sense and the lower levels stating the objectives quantitatively. Of utmost importance is that the several levels be consistent and that lower levels not be more stringent or conservative than the higher levels, so that they become de facto new standards. This is not the case with the EPA standards.

2. Although lower level standards can be stated probabilistically, they should be expressed in terms of annual risk limits from a disposal facility in an undisturbed and a disturbed state. The critical population group being considered should be clearly defined. This approach is in accord with recommendations of organizations such as the International Commission on Radiological Protection and the United Kingdom's National Radiological Protection Board.
3. The standards should apply to the disposal facility as a system. Subsystem standards, if expressed, should be given only as guidance, with qualifying statements clearly specifying that they are not to be applied in a regulatory sense.
4. Evaluations of the anticipated performance of the proposed Waste Isolation Pilot Plant indicate that, for the disturbed state, human intrusion is the dominant contributor to risk. Early indications suggested that performance analyses for the proposed Yucca Mountain repository may also show human intrusion to be important. This appears to be a direct result of how the standards for evaluating such intrusions are interpreted, compounded by the overly conservative requirements of the standards. To ameliorate this issue, we suggest that the standards be rewritten to separate the evaluations of anticipated performance into three parts: (a) the undisturbed repository; (b) the disturbed repository, exclusive of human intrusion; and (c) the repository as it might be affected by human intrusion. This would clearly separate out the problem of human intrusion and permit it to be addressed directly. In this regard, we join with the Advisory Committee on Nuclear Facility Safety, U.S. Department of Energy, in recommending that EPA's standards be reworded to permit "considerations such as expectations for future borehole sealing at least as good as the current state-of-the-art." We also believe that more realistic assessments should be made of the potential impacts of human intrusions and that greater credit should be allocated to the ability of future generations to be aware of the presence of a geologic repository through identifying markers and associated records.
5. Experience has shown that probabilistic risk analyses cannot be used reliably to determine the compliance of a single nuclear power plant with a set of standards. A high-level waste repository, which must function for 10,000 years, is still more difficult to assess quantitatively. The EPA standards should clearly specify that risk assessments are but one of several inputs into the evaluation of a given high-level waste repository site and/or facility. Such assessments should not be the only factor in evaluating compliance of such a facility with the EPA standards.

May 1, 1990

In summary, our key recommendations are:

1. The existing EPA standards need to be revised; now is the time to accomplish this task;
2. The standards should be revised to define what is considered to be an acceptable risk from a high-level waste repository;
3. The standards should specify that a probabilistic approach is acceptable so long as it is but one of several factors to be used in determining the acceptability of a specific site; and
4. The standards should be revised to include separate considerations for evaluating the impacts of human intrusion.

We stand ready to join you and the NRC staff in working with EPA to help develop an acceptable set of standards for a high-level radioactive waste repository. We believe this is the best course of action at the present time. If, however, after a reasonable period of time these efforts do not appear to be accomplishing our mutual goals, we believe other approaches should be considered. One would be for you, as Chairman of the NRC (perhaps joining with the Secretary of DOE) to approach the EPA Administrator with a suggestion that an appropriate organization be selected to review the standards and make recommendations for change. Suggestions for two such organizations are the National Academy of Sciences and the Council on Environmental Quality.

We hope that these comments are helpful. We will be pleased to discuss these matters with you at your convenience.

Sincerely,



Dade W. Moeller  
Chairman

References:

1. U.S. Environmental Protection Agency, "Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes," (40 CFR Part 191), Working Draft 2, dated January 31, 1990



May 1, 1990

2. Letter dated April 17, 1990 from F. L. Galpin, Environmental Protection Agency to Dade W. Moeller
3. Letter dated December 11, 1989 from John F. Ahearne, Advisory Committee on Nuclear Facility Safety, DOE, to James D. Watkins, Secretary of Energy, DOE
4. Sandia National Laboratories, SAND89-2027, "Performance Assessment Methodology Demonstration: Methodology Development for Evaluating Compliance With EPA 40 CFR 191, Subpart B, for the Waste Isolation Pilot Plant," Printed December 1989
5. International Commission on Radiological Protection, ICRP Publication 46, "Radiation Protection Principles for the Disposal of Solid Radioactive Waste," published for the International Commission on Radiological Protection by Pergamon Press, Oxford, England, July 1985
6. National Radiological Protection Board, NRPB-GS 1, "Radiological Protection Objectives for the Disposal of Solid Radioactive Wastes," published in Oxfordshire, England, 1983



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D.C. 20555

May 1, 1990

The Honorable Kenneth M. Carr  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Carr:

SUBJECT: WASTE CONFIDENCE DECISION REVIEW

During its 19th meeting, April 26-27, 1990, the Advisory Committee on Nuclear Waste met with members of the NRC staff to review the results of the Waste Confidence Review Group's reexamination of the Commission's Waste Confidence Findings.

On the basis of these discussions and our review of the supporting documents we endorse the findings of the Review Group. We also suggest that consideration be given to adding to the statement a brief discussion of the criteria that would be used to prompt a re-evaluation of the current findings sooner than the scheduled ten-year review cycle.

Sincerely,

A handwritten signature in cursive script that reads "Dade W. Moeller".

Dade W. Moeller  
Chairman

Reference:

Draft Final Waste Confidence Decision Review and Conforming Amendment to 10 CFR Part 51, With Public Comments, April 12, 1990 (Predecisional)



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D. C. 20555

ACNWR-00-5

May 31, 1990

The Honorable Kenneth M. Carr  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Carr:

SUBJECT: FINAL STAFF TECHNICAL POSITION ON THE DESIGN OF EROSION  
PROTECTION COVERS FOR STABILIZATION OF URANIUM MILL  
TAILINGS SITES

During its 20th meeting, May 24-25, 1990, the Advisory Committee on Nuclear Waste met with members of the NRC staff for a briefing on and a discussion of the referenced Final Draft Technical Position.

We are pleased with the modifications included in this draft in response to our October 18, 1989 comments on the draft Technical Position, as well as in response to public comments received by the NRC staff. We believe that this Technical Position will be helpful to applicants and licensees in designing erosion protection covers for uranium mill tailings sites so as to meet the requirements of 10 CFR Part 40, Appendix A for Title II (Active) sites and 40 CFR Part 192 for Title I (Inactive) sites. Specifically, the staff recommendations aid in defining the concept of "reasonable assurance" as set out in the regulations and provide a consistent basis for site-specific designs and reviews.

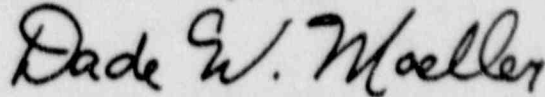
We understand that this Technical Position is limited to guidance regarding erosion protection; it does not provide comprehensive guidance on other aspects of the EPA Standards and NRC regulations.

As a result of our review, we have recommended to the staff several specific areas where clarification is needed, consistency of terms would be useful, and placement of statements could be employed to improve the general use and understanding of this Technical Position.

May 31, 1990

We believe that the Technical Position, contrary to several public comments as discussed in Appendix 4.1 (page E-4), is not too conservative and is in accordance with the NRC Uranium Mill Tailings Management Position.

Sincerely,



Dade W. Moeller  
Chairman

Reference:

U.S. Nuclear Regulatory Commission, "Final Staff Technical Position, Design of Erosion Protection Covers For Stabilization of Uranium Mill Tailings Sites," May 1990.



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
WASHINGTON, D.C. 20555

June 1, 1990

The Honorable Kenneth M. Carr  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Chairman Carr:

SUBJECT: REVIEW OF NRC STAFF COMMENTS ON WORKING DRAFT NO. 2 OF  
EPA'S HIGH-LEVEL WASTE DISPOSAL STANDARDS

In response to your request, the Advisory Committee on Nuclear Waste reviewed the above subject report (SECY-90-162) during its 20th meeting, May 24-25, 1990. Our comments follow.

Overall, we believe that the comments and recommendations of the NRC staff are thorough and comprehensive. If implemented by EPA, these suggestions would represent an important step toward resolving many of the problems cited by this Committee. The comments by the NRC staff are in general agreement with the remarks submitted to you in our letter of May 1, 1990. However, we offer the following clarifications on several key points:

1. One of our criticisms of the EPA Standards was that they should be organized using a hierarchical structure and that lower levels should not be more stringent or conservative than higher levels. The call (Comment 2.1) by the NRC staff for EPA to conduct performance assessments of real sites (which will undoubtedly prove to be more complex than the hypothetical sites evaluated to date), and (Comment 1) to "explicitly document the acceptable risk level that underlies the release limits in the standards" should provide the information necessary to resolve this criticism.
2. We also urged that EPA express its lower level standards in terms of annual risk limits and that the critical population group be defined. We wish to reiterate this recommendation since this is standard practice in evaluations of public exposures from all types of environmental radionuclide releases. When combined with limits on cumulative releases, this approach assures control of both individual and collective doses.

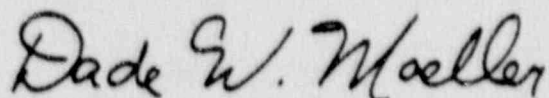
June 1, 1990

3. Our recommendation that subsystem standards be used only as guidance was directed primarily to the limits within the EPA Standards on doses to members of the public arising through consumption of contaminated groundwater. This recommendation applies equally, however, to the 1,000 year groundwater travel time in 10 CFR Part 60. If, for example, waste containers that have a projected lifetime of 10,000 years could be developed, a more relaxed groundwater travel time might be acceptable.
4. Because of its major contribution to risk, we recommended that the EPA Standards be revised to include separate considerations for evaluating the impacts of human intrusion. The approaches suggested by the NRC staff (Comments 5 and 18) are fully compatible with our recommendations.

In addition, the steps recommended by the NRC staff will help resolve some of our basic concerns relative to the potential difficulties that might be encountered in attempting to confirm compliance of a proposed HLW repository facility with the probabilistic requirements of the EPA Standards.

In summary, we believe that the comments and suggestions of the NRC staff are in concert with our recommendations. If implemented, these suggestions would resolve our major concerns.

Sincerely,



Dade W. Moeller  
Chairman

Reference:

SECY-90-162, May 7, 1990, "Comments on Working Draft No. 2 of the U.S. Environmental Protection Agency's High-Level Waste Disposal Standards" (Predecisional)

## APPENDIX

### LIST OF THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS (ACRS) REPORTS ON RADIOLOGICAL EFFECTS AND WASTE MANAGEMENT

This list of ACRS Reports on Waste Management was compiled from Volumes 1 through 10 of NUREG-1125, "A Compilation of Reports of the Advisory Committee on Reactor Safeguards", U. S. Nuclear Regulatory Commission, published annually. The corresponding Volume and page number for each report have been included.

APPENDIX

LIST OF ACRS REPORTS ON RADIOLOGICAL EFFECTS  
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p. 1137	Report on Nuclear Fuel Services, Inc.	10/11/62
p. 1139	Report on Nuclear Fuel Services, Inc.	12/26/62
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p. 2031	Report on Decommissioning of Nuclear Facilities	03/15/78
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p. 2917	ACRS Subcommittee Report on the Use of Potassium Iodide (KI) as a Thyroid Blocking Agent	05/17/83
p. 2943	ACRS Comments on the Environmental Protection Agency's Proposed "National Emission Standards for Hazardous Air Pollutants - Standards for Radionuclides" (40 CFR Part 61)	08/09/83
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p. 2950	Establishment of <u>de minimis</u> Values	02/13/84
p. 2952	ACRS Comments on Proposed Amendments to 10 CFR 20 to Specify Residual Radioactive Contamination Limits	05/14/84
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p. 2955	Control Room Habitability	12/18/84
p. 2957	Interim Report on Management of Radioactive Wastes	04/15/76

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p. 2969	Report on Environmental Survey of the Reprocessing and Waste Management Portions of the LWR Fuel Cycle (NUREG-0116)	01/14/77
p. 2972	Qualifications of Radioactive Waste System Operating Personnel	02/13/80
p. 2974	Waste Confidence Rulemaking - Storage and Disposal of Nuclear Waste	12/10/80
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This compilation contains 37 reports issued by the Advisory Committee on Nuclear Waste (ACNW) during the first two years of its operation. The reports were submitted to the Chairman or to the Executive Director for Operations, U.S. Nuclear Regulatory Commission (NRC). Topics include the NRC analysis of the U.S. Department of Energy Site Characterization Plan for the high-level radioactive waste repository, the standards promulgated by the U.S. Environmental Protection Agency for the disposal of high-level waste, the NRC policy statement on Below Regulatory Concern, technical documents prepared by the NRC staff relative to the decommissioning of nuclear power plants, the stabilization of uranium mill tailings piles, and environmental monitoring. All reports prepared by the Committee have been made available to the public through the NRC Public Document Room and the U.S. Library of Congress. Included in an Appendix is a listing of references to related reports on nuclear waste matters that were issued by the Advisory Committee on Reactor Safeguards prior to the establishment of the ACNW.

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