

UNITED STATES NUCLEAR REGULATORY COMMISSION ADVISORY COMMITTEE ON NUCLEAR WASTE AND MATERIALS WASHINGTON, D.C. 20555-0001

March 12, 2008

The Honorable Dale E. Klein Chairman U.S. Nuclear Regulatory Commission Washington, DC 20555-0001

SUBJECT: SUMMARY REPORT – 186th MEETING OF THE ADVISORY COMMITTEE ON NUCLEAR WASTE AND MATERIALS, FEBRUARY 12-14, 2008, AND OTHER RELATED ACTIVITIES OF THE COMMITTEE

Dear Chairman Klein:

During its 186th meeting, February 12 -14, 2008, the Advisory Committee on Nuclear Waste and Materials (ACNW&M) discussed several matters and completed the following letters to Dr. Dale E. Klein, NRC Chairman, from Dr. Michael T. Ryan, ACNW&M Chairman:

- "Postclosure Degradation of Emplacement Drifts and Its Impact on Engineered Barrier System Performance at the Proposed Yucca Mountain High-Level Radioactive Waste Repository," dated February 26, 2008.
- "NRC Decommissioning Requirements and Guidance," dated February 28, 2008.
- "Waste Package and Drip Shield Corrosion, Juvenile Failure of Waste Packages, and Spent Fuel Dissolution," dated February 29, 2008.

HIGHLIGHTS OF KEY ISSUES

1. <u>International Commission on Radiological Protection (ICRP) Recommendations – Final</u> <u>Report 103</u>

Dr. Donald Cool from the Office of Federal and State Materials and Environmental Programs (FSME) briefed the Committee about the final version of the ICRP Report 103. Dr. Cool commented that many NRC editorial and specific comments contributed to significant improvements in the text, including needed clarifications of constraints and their use. Unfortunately, the ICRP report continued to rely on unpublished or non-publicly available material.

Dr. Cool commented that, now that the ICRP has completed its report, the staff has initiated its effort to review Part 20 of Title 10 of the *Code of Federal Regulations* (10 CFR Part 20) and other regulations to determine which areas might warrant update as well as the associated options, costs, and impacts. There are some things, such as changes to the weighting factors,

which would warrant a very detailed examination and probable updating. There is considerable interest within the staff to update some of the regulations that were not revised at the time 10 CFR Part 20 was revised in 1991. The staff is planning to provide a paper to the Commission by December of 2008.

Committee Action

The Committee is preparing a letter report to the Commission with comments on ICRP Report 103.

2. Corrosion of Waste Package and Spent Fuel Dissolution in a Repository Environment

Dr. Tae Ahn from the Office of Nuclear Material Safety and Safeguards briefed the Committee on corrosion of the waste package and spent nuclear fuel dissolution. The briefing was in response to a series of questions on the staff's presentation to the Committee in the 182nd ACNW&M Meeting held September 18 – 20, 2007. The Committee provided two general thoughts for the staff to consider when answering the questions: (a) what radionuclides (at what activity) are released from the waste package, and (b) how they are released. During the briefing the discussion was focused on general corrosion, seepage groundwater corrosion, dust deliquescence corrosion, stress corrosion cracking, and spent nuclear fuel dissolution. Dr. Ahn indicated that of these deformation mechanisms, only general corrosion appears to be involved in damaging the waste package sufficiently to cause radionuclide release. Additional discussions were related to spent fuel dissolution and focused on the use of SIMFUEL (simulated fuel) data and the lack of high burnup fuel data. Dr. Ahn indicated that dissolution rates of spent nuclear fuel, un-irradiated uranium dioxide (UO2), and SIMFUEL are indistinguishable under similar environmental conditions, thus resolving the concerns of the Committee.

Dr. Ahn concluded the briefing by stating that fundamental risk insights developed by the staff in 2004 have not changed in light of new information. Also, he indicated that radionuclide release depends in part on the extent of the surface-area opening on the waste package. His final point was that newer internals to be used in the waste package may reduce colloid production.

Committee Action

The Committee wrote a letter addressing the staff's presentation on corrosion of the waste package and spent fuel dissolution in a repository environment.

3. <u>Meeting with NRC Commissioner Peter Lyons</u>

NRC Commissioner Peter Lyons met with the Committee to discuss current topics of interest. He focused on the planned merger of ACNW&M with the Advisory Committee on Reactor Safeguards (ACRS). Commissioner Lyons stated that he had originally proposed the idea of the merger to his Commission colleagues. He complimented the Committee for having performed a very important and valued function for NRC and the American people in its reviews of NRC and external programs. In the coming months, the Department of Energy will submit a license application for the proposed Yucca Mountain repository, which will change the role of the ACNW&M dramatically. Interactions with the staff will be greatly limited after that license application is filed. In addition, several areas of focus for the ACNW&M are maturing, such as lowlevel waste and decommissioning. On the other hand, the ACNW&M expertise in health physics and radiation dose effects will play an important role once merged with the ACRS. Commissioner Lyons is looking forward to the Committee's Working Group meeting on low dose radiation effects to be held in April 2008 and in which he will be giving a keynote speech.

Committee Action

The Committee looks forward to Commissioner Lyons keynote address, to be presented at the 2008 April Working Group meeting.

4. Working Group Meeting on Managing Low Activity Radioactive Waste

The Committee held a Working Group meeting to understand how low activity radioactive waste (LAW) is being managed in the United States, and to determine if there are ways to improve its management. Also addressed during the Working Group meeting was the extent to which disposal sites used to manage chemically-hazardous wastes or other types of disposal scenarios authorized under the Resources Conservation and Recovery Act (RCRA) could play a greater role in the management of LAW.

The Working Group meeting was divided into three sessions covering the following themes:

- (a) Discussions concerning various regulatory approaches to defining LAW.
- (b) Examination of risk-based approaches to the management of LAW commensurate with its risk.
- (c) Review of a few case studies describing how LAW has been managed in RCRA types of disposal facilities.

The Working Group two-day meeting drew an attendance of approximately 75 participants. Formal participation in the meeting included representatives of the Conference of Radiation Control Program Directors, the Environmental Protection Agency, the Southeast Low-Level Waste (LLW) Compact Commission, the American Ecology Corporation, Energy Solutions, Clean Harbors Environmental Services, and Waste Control Specialists, LLC. Staff from the Office of FSME also participated in the discussions, and two stakeholder organizations, the Nuclear Energy Institute and Talisman International, LLC. NRC Commissioner Gregory B. Jaczko also presented his opening remarks during the Working Group Meeting.

Participants and stakeholders from the Working Group Meeting offered the following key observations for the Committee to consider:

- (a) The current regulatory system for managing LAW in the context of Part 61 of Title 10 of the Code of Federal Regulations (10 CFR Part 61) is workable, although somewhat complicated. Commercial LLW/LAW streams with new or different characteristics from those first envisioned when 10 CFR Part 61 was promulgated are likely in the future and some case-specific guidance for the evaluation of these new waste streams would be welcome.
- (b) Risk-informed approaches to LAW management should emphasize the specific radionuclide content of wastes rather than its origin. Guidance on ways to improve the management and disposal of LAW would be welcome.

- (c) Unlike RCRA-characteristic wastes, which are hazardous indefinitely, the hazard posed by LAW streams diminishes exponentially with time. As a consequence, some Agreement States have permitted the disposal of LAW streams in both RCRA Subtitle C (hazardous) and Subtitle D (nonhazardous) disposal facilities. This has been achieved by case-specific license exceptions with the cognizant regulatory authorities in those States where these facilities are sited. There is every indication that these wastes have been managed effectively and safely.
- (d) In comparison to Class-A LLW, some LAW streams will remain hazardous for only a relatively short period of time (i.e.; for a generation or two). After that hazard diminishes to levels at or below background, these wastes can be disposed of safely in municipal landfills at a considerably reduced disposal cost to the waste generator.
- (e) There is an extensive RCRA disposal capacity for the future management of LAW. However, there are certain aspects of the RCRA regulations that are unproven and might benefit from additional review to ensure that those regulations achieve their intent of protecting the public and the environment during the period that LAW continues to pose a radiological risk.

Committee Action

The Committee intends to develop a letter report to the Commission addressing the above stated purposes of the Working Group meeting. Included with the letter report will be a brief White Paper.

5. <u>ICRP's Draft Report on Environmental Protection: The Concept and Use of Reference</u> <u>Animals and Plants</u>

Dr. Donald Cool and Mr. Christopher McKenney from the Office of FSME provided preliminary staff views regarding the new ICRP draft report on Environmental Protection. There are three potential questions for environmental protection: (a) what is being protected (i.e., individuals or population); (b) what are they being protected from (i.e., mortality, morbidity or reproductive success); and (c) what dose or dose rates cause the effects that you are protecting them from. The draft ICRP report is a summary of information to provide initial discussion on the dose rates question. However, the report is preliminary in nature and many areas need more information. The ICRP draft report does not set dose limits and does not answer what the desired outcome of derived consideration levels is, how individual effects are extrapolated to the population, or how the information will be applied in practice.

Mr. McKenney stated that the next steps for the staff include evaluating whether the report affects the Commission's long-standing assumption regarding protection of biota; e.g., if humans are protected then the environment will also be protected. NRC will participate in a Nuclear Energy Agency (NEA) meeting on the report, will prepare an information paper for the Commission, and will provide comments to ICRP by the requested date of the end of March 2008.

Committee Action

The ICRP letter that had been drafted for review at the February ACNW&M meeting will be expanded to include Committee comments on the new ICRP draft report on environmental protection. This letter will be drafted for review at the March 2008 ACNW&M meeting.

RECONCILIATION OF ACNW&M COMMENTS AND RECOMMENDATIONS WITH COMMITMENTS TO THE EXECUTIVE DIRECTOR FOR OPERATIONS (EDO)

During its planning and procedures meeting on February 12, 2008, the Committee considered the following responses from the EDO:

- The EDO Response dated January 7, 2008, to comments and recommendations included in the November 30, 2007, ACNW&M letter entitled, "Regulatory Guide Revision." The Committee decided no action is warranted at this time.
- The EDO Response dated January 9, 2008, to comments and recommendations included in the November 26, 2007, ACNW&M letter entitled, "NUREG-1854, "NRC Staff Guidance for Activities Related to U.S. Department of Energy Waste Determinations-Draft Final Report for Interim Use." The Committee decided no action is warranted at this time.
- The EDO Response dated January 11, 2008, to comments and recommendations included in the November 30, 2007, ACNW&M letter entitled, "Total System Performance Assessment Code Version 5.1." The Committee decided no subsequent action is warranted since nothing technical needed to be brought up.
- The EDO Response dated January 14, 2008, to comments and recommendations included in the November 27, 2007, ACNW&M letter entitled, "Review of Draft Regulatory Guide 4012." The Committee found the EDO's response unsatisfactory. Due to the merger of Advisory Committees, ACRS and ACNW&M, the Members agreed that no further action was of value. However, the final version of this Regulatory Guide will be brought to the ACRS for review, after the resolution of the public comments.

PROPOSED SCHEDULE FOR THE 187th ACNW&M MEETING

The Committee agreed to consider the following topic during the 187th ACNW&M meeting to be held on March 18-20, 2008:

• Use of Burnup Credit for Licensing Spent Fuel Transportation Casks

Sincerely,

/RA/

Michael T. Ryan Chairman

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Michael T. Ryan Chairman

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From: Michael T. Ryan, Chairman ACNW&M

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