UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON NUCLEAR WASTE
WASHINGTON, DC 20555 - 0001

ACNWR-0245

August 16, 2006

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

SUBJECT: OBSERVATIONS FROM THE ACNW LOW-LEVEL WASTE WORKING GROUP MEETING OF MAY 23–24, 2006

Dear Chairman Klein:

During its 170th meeting, May 23-26, 2006, the Advisory Committee on Nuclear Waste (ACNW or the Committee) held a working group meeting regarding emerging low-level radioactive waste (LLW) issues and opportunities to better risk inform the management of these wastes. Additionally, the purpose of the working group meeting was to obtain current information from a variety of stakeholders on commercial LLW management practices and identify emerging LLW management issues and concerns.

The Committee also solicited industry and stakeholder views regarding the U.S. Nuclear Regulatory Commission's (NRC's) future role in the area of commercial LLW management. The NRC staff recently noted that it is updating its LLW strategic planning following Commission-directed program reductions. Consequently, as part of the working group meeting, the Committee solicited stakeholder views on what changes to the regulatory framework for managing LLW should be recommended for Commission consideration.

The 2-day ACNW meeting drew approximately 100 attendees. The formal participants included representatives of the American Ecology Corporation, the Army Corps of Engineers, EnergySolutions (formerly Envirocare), the California Radioactive Materials Management Forum, Duratek—Chem-Nuclear Systems, the Entergy utilities group, Harvard University, the LLW Forum, the Nuclear Energy Institute, the environmental community, the South Carolina Department of Health and Environmental Control, the Southwestern LLW Compact, the Texas Commission on Environmental Quality, and Waste Control Specialists, LLC. The staff from NRC's Division of Waste Management and Environmental Protection and independent stakeholders also participated in the discussions.

The May 2006 meeting follows from the ACNW's March 2005 briefing of the Commission. At that time, the ACNW agreed to examine issues surrounding the lack of progress in the national LLW program. As a first step, the Committee undertook the development of a background report (white paper). The Committee examined the history and current status of commercial LLW disposal in the United States as well as the reasoning and approach used to develop the NRC LLW regulations in 10 CFR Part 61.

A preliminary version of the white paper was transmitted to the Commission on December 27, 2005 (following the ACNW's 166th meeting[1]) along with a list of areas within NRC's existing LLW regulation that could be risk-informed to improve effectiveness of LLW regulation. The Committee and the Commission discussed the white paper and the preliminary list of Committee recommendations during a February 2006 briefing.

Now designated NUREG-1853, the white paper has undergone editorial and limited external peer review. The Committee also added three new topics. The first new topic is an expanded discussion concerning low-activity radioactive wastes (LAW). This discussion includes a brief review of NRC's earlier *de minimis* regulatory initiative and the subsequent Below Regulatory Concern Policy Statements. Second, additional letters prepared by the Advisory Committee on Reactor Safeguards (ACRS) were identified and are now included in the discussion of past Advisory Committee reviews of the NRC LLW program found in the white paper. Third, for the purposes of completeness, a summary has also been prepared describing how the U.S. Department of Energy (DOE) manages LLW from its programs.

NRC soon will publish the white paper, and the ACNW hopes that this white paper will help to satisfy NRC's knowledge management goal.

SUMMARY AND OBSERVATIONS FROM THE WORKING GROUP MEETING

1. Several Working Group Meeting participants noted that since the development of 10 CFR Part 61 in the late 1970 and its adoption in 1982, significant changes have occurred in the type and quantities of LLW being generated in the United States. Participants suggested that future wastes may not be the same as those currently being generated. For example, through consolidation, treatment, and compaction, the volume of Class-A wastes from materials licensees and power reactors tends to be smaller, and the specific activity is greater than in the past. Participants also noted the ACNW's Working Group Meeting was timely in addressing current and emerging LLW management issues. Many of the suggestions, discussed below, address LLW with high (Class C and Greater-than-Class C) and very low (lower end of Class A or "unimportant and exempt quantities"[2]) concentrations of radioactive materials.

2. The majority of Working Group Meeting participants indicated that the current regulatory system for managing LLW is workable, though complex. Many participants observed that there is no need for revision to the regulations in 10 CFR Part 61. Further, participants observed that NRC has used regulatory guidance and case-specific license or permit determinations to effectively address emerging issues in LLW management.

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[1] Ryan, M.T., Chairman/Advisory Committee on Nuclear Waste, Letter to the Honorable Nils J. Diaz, Chairman/U.S. Nuclear Regulatory Commission [Subject: "Opportunities in the Area of Low-Level Radioactive Waste Management"], dated December 27, 2005.

[2] "Unimportant quantities" is a legal term that applies to source material defined in 10 CFR Part 40. For the purposes of this letter, this phrase is used in reference to small concentrations of radioactive materials.

3. The foundation of the concentration tables in 10 CFR 61.55 ("Waste Classification") are based on assessment of hypothetical exposure scenarios that are deterministic and bounding case analyses. The human intrusion scenario controls the concentration of radionuclides in Class A, B, and C in Tables 1 and 2 of the regulation as developed in the Draft and carried forward to the Final Environmental Impact Statements (NUREG-0782 and NUREG-0945, respectively). Many participants suggested that performance assessment scenarios be developed using a risk-informed and site-specific approach for disposal evaluations. Site-specific intruder dose analyses are performed (and allowed) at DOE LLW disposal sites.

4. Participants noted that the disposal of "unimportant and exempt quantities" of radioactive materials is permitted according to 10 CFR 20.2002 in RCRA[3] Subtitle-C and -D landfills. Several Working Group Meeting participants, citing this example, suggested that risk-informed approaches to LLW management should emphasize the specific radionuclide content of wastes rather than their origins or types of licenses. In this way, disposal options for wastes may be expanded based on the risks of a given disposal scenario.

5. In general, many Working Group Meeting participants noted that disposal using case-specific health and safety analyses are effective in assessing appropriate disposal options for some current and emerging waste streams. This is currently accomplished using 10 CFR 20.2002 case-specific authorizations in conjunction with 10 CFR Parts 30.11 and 40.14. It is anticipated in 10 CFR 61.58 that alternative waste classification systems can be developed further. The ACNW provides these regulations in Appendix A to this letter. Several participants welcomed NRC guidance that would address a more transparent process for submittal, review, and decisionmaking using these provisions in the regulations regarding alternative disposal options.

6. Participants suggested using case-specific guidance, suggested in Item 5, above, to develop more formal and widely applicable guidance such as Regulatory Guides or Branch Technical Positions. This would make the evaluation of disposal of materials with new or different characteristics easier to accomplish and more transparent.

7. As a specific example, it was suggested that NRC revisit the "factor 10 rule" embodied in the Branch Technical Position on Waste Form and Waste Classification.[4] This guidance states that for discrete pieces of irradiated hardware in a particular waste container, the piece of metal with the highest concentration of radioactive material may not be greater than a factor of 10 higher than the piece of metal with the lowest concentration. In the case of irradiated hardware, the radioactive materials are part of the matrix of the metals and not readily available for transport in the disposal environments used for these materials.

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[3] *Resource Conservation Recovery Act of 1976*. The U.S. Environmental Protection Agency's (EPA's) RCRA regulations are administered by the States, following EPA's authorization.

[4] U.S. Nuclear Regulatory Commission, "Branch Technical Position on Concentration Averaging and Encapsulation," Division of Waste Management, January 17, 1995.

By using a risk-informed approach to assessing disposal of irradiated hardware, it may be possible to dispose a wider range of concentrations of radioactive materials in irradiated hardware.

8. When considered for disposal, sealed sources are generally classified as Class-B or -C waste. Prompt secure disposal can be accomplished by considering waste form, radionuclide content, robust packaging, and specific disposal site conditions in a risk-informed way.

9. Some LAW streams are not regulated as LLW, even with radionuclide concentrations greater than background. The management of these waste streams has gained increased attention in recent years as they represent a substantial volume of material to be disposed — estimated to be on the order of about 1 billion cubic feet annually.[5] It was suggested that NRC could provide more guidance on how to dispose of these low-activity wastes in a way commensurate with risk analyses specific to these materials.

10. Many participants made observations and comments regarding the future availability of disposal capacity for Class-B and -C wastes. Barnwell will close in July 2008 to generators located in States not in the Atlantic Compact. The Texas Commission on Environmental Quality is currently reviewing an application from Waste Control Specialists for a Class-A, -B, and -C LLW and DOE LLW disposal facility for the Texas LLW Compact. Further, one participant suggested that a new initiative be undertaken to allow commercial waste disposal at either an existing DOE facility or at a new facility operated on Federal land. These issues, while interesting, were beyond the scope of the Committee's LLW Working Group Meeting aimed at addressing potential improvements in NRC LLW regulations. Two ACNW members attended a meeting initiated by the Southeast LLW Compact at which these issues were discussed. The Committee understands the documentation of this meeting is in preparation.

11. A few Working Group Meeting participants provided comments on issues unrelated to the management of commercial LLW. Examples include the use of the so-called "reference man" in radiological dose assessments, the need for more stringent dose standards, and the consideration of public comments in NRC regulatory decisionmaking. Their specific views can be found in the verbatim transcript maintained as part of the Committee's meeting record. These issues, while interesting, were beyond the scope of this particular working group meeting.

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[5] U.S. Environmental Protection Agency, "Evaluation of EPA's Guidelines for Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM) — Report to Congress," EPA 402-R-00-01, June 2000. Potential NRC interested in this area has been previously reviewed by the staff.

RECOMMENDATIONS FROM THE WORKING GROUP MEETING

1. The Committee believes that there is no need to revise NRC's LLW regulations found in 10 CFR Part 61 at this time. The Committee recommends that the Commission develop license conditions and regulatory guidance to better implement the provisions of 10 CFR 20.2002 and 10 CFR 61.58 which give specific authority to implement such guidance.

2. The Committee recommends that NRC develop guidance permitting management and disposal of unique and emerging waste streams. Such guidance should consider waste types and forms, packaging, and disposal site conditions in a way that is risk-informed and performance-based consistent with the performance criteria in 10 CFR 61.41 to 61.44 and 10 CFR 61.58, as appropriate.

3. The Committee recommends that NRC should encourage a more risk-informed approach to LLW management that places greater emphasis on the radionuclide content of the waste rather than the waste source or origin.

4. The Committee recommends examining how NRC and the Agreement States are preparing to regulate potential increases in the storage of Class-B and -C LLW if and when Barnwell closes to out-of-compact waste in July 2008, and no alternative options become available.

5. The Committee recommends that, because the waste classification provisions in 10 CFR Part 61 are referenced by and included in legislation and other regulations, it is important to identify and evaluate any unintended consequences from changes recommended in this letter. The Committee believes that the incremental changes and improvements suggested in this letter are unlikely to have such unintended consequences.

Sincerely,

/RA/

Michael T. Ryan
Chairman

APPENDIX A

10 CFR 20.2002 ("Standards for protection Against Radiation. Method for Obtaining Approval of Proposed Disposal Procedures") —

"A licensee or applicant for a license may apply to the Commission for approval of proposed procedures, not otherwise authorized in the regulations in this chapter, to dispose of licensed material generated in the licensee's activities. Each application shall include:

(a) A description of the waste containing licensed material to be disposed of, including the physical and chemical properties important to risk evaluation, and the proposed manner and conditions of waste disposal; and

(b) An analysis and evaluation of pertinent information on the nature of the environment; and

(c) The nature and location of other potentially affected licensed and unlicensed facilities; and

(d) Analyses and procedures to ensure that doses are maintained ALARA and within the dose limits in this part."

* * *

10 CFR 30.11("Rules of General Applicability to Domestic Licensing of Byproduct Material. Specific Exemptions"); —

"(a) The Commission may, upon application of any interested person or upon its own initiative, grant such exemptions from the requirements of the regulations in this part and parts 31 through 36 and 39 of this chapter as it determines are authorized by law and will not endanger life or property or the common defense and security and are otherwise in the public interest.

(b) Any licensee's activities are exempt from the requirements of this part to the extent that its activities are licensed under the requirements of part 72 of this chapter.

(c) The Department of Energy is exempt from the requirements of this part to the extent that its activities are subject to the requirements of part 60 or 63 of this chapter.

(d) Except as specifically provided in part 61 of this chapter, any licensee is exempt from the requirements of this part to the extent that its activities are subject to the requirements of part 61 of this chapter.''

* * *

10 CFR 40.14 ("Domestic Licensing of Source Material. Specific Exemptions"); —

> "(a) The Commission may, upon application of any interested person or upon its own initiative, grant such exemptions from the requirements of the regulation in this part as it determines are authorized by law and will not endanger life or property or the common defense and security and are otherwise in the public interest.
>
> (b) [Reserved]
>
> (c) The Department of Energy is exempt from the requirements of this part to the extent that its activities are subject to the requirements of part 60 or 63 of this chapter.
>
> (d) Except as specifically provided in part 61 of this chapter any licensee is exempt from the requirements of this part to the extent that its activities are subject to the requirements of Part 61 of this chapter."

* * *

10 CFR 61.58 ("Licensing Requirements for Land Disposal of Radioactive Waste. Alternative Requirements for Waste Classification and Characteristics") —

> "The Commission may, upon request or on its own initiative, authorize other provisions for the classification and characteristics of waste on a specific basis, if, after evaluation, of the specific characteristics of the waste, disposal site, and method of disposal, it finds reasonable assurance of compliance with the performance objectives in subpart C of this part."

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/RA/

Michael T. Ryan
Chairman

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