



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

ACNWS-0164

July 13, 2006

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

Dear Chairman Klein:

SUBJECT: SUMMARY REPORT—170TH AND 171ST MEETINGS OF THE ADVISORY COMMITTEE ON NUCLEAR WASTE, MAY 23–26, AND JUNE 6–7, 2006, RESPECTIVELY, AND OTHER RELATED ACTIVITIES OF THE COMMITTEE

During its 170th and 171st meetings, May 23–26, and June 6–7, 2006, respectively, the Advisory Committee on Nuclear Waste (ACNW or the Committee) discussed several matters and completed the following reports.

REPORTS

170th ACNW Meeting

Reports to Nils J. Diaz, Chairman, U.S. Nuclear Regulatory Commission (NRC), from Michael T. Ryan, Chairman, ACNW:

- C Comments on ICRP Draft Document — Scope of Radiation Protection Regulations (Spring 2006 Version), dated June 8, 2006
- C Future Volcanism at Yucca Mountain — Comments on the Igneous Intrusion Scenario, dated June 8, 2006
- C Future Volcanism at Yucca Mountain — Comments on the NRC Staff Model for the Fluvial Redistribution of Volcanic Tephra, dated June 9, 2006
- C Revised Decommissioning Guidance to Implement the License Termination Rule, dated June 9, 2006

171st ACNW Meeting

None

HIGHLIGHTS OF KEY ISSUES

170th ACNW Meeting

1. ACNW Working Group Meeting on Low-level Radioactive Waste Management Issues

The Advisory Committee on Nuclear Waste (ACNW) held a Working Group Meeting regarding emerging low-level radioactive waste (LLW) issues and opportunities to better risk inform the management of these wastes.

The meeting objectives were to obtain current information on commercial LLW management practices and to identify emerging LLW management issues and concerns. The Committee also solicited industry and stakeholder views regarding NRC's future role in commercial LLW management. The NRC staff recently noted that it is updating its strategic plan in the LLW area following Commission-directed reduction in the program about a decade ago. 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 May 2006 meeting followed the ACNW's March 2005 briefing to the Commission. At that time, the ACNW agreed to examine some issues surrounding the lack of progress in the national LLW program. As a first step, the Committee developed a background or white paper that briefly examined the history and current status of commercial LLW disposal in the United States as well as the reasoning and approach used by the NRC staff to develop its LLW regulations for 10 CFR Part 61.¹ The ACNW will publish the white paper, now designated as NUREG-1853, later this summer. In a February 24, 2006, letter to ACNW, the NRC Executive Director for Operations commented on the draft 2005 white paper and noted that the paper was "an excellent point-of-departure" for the ACNW Working Group to discuss these broader issues being examined by the NRC staff.

The Working Group Meeting was divided into four sessions covering the following themes:

- The current LLW program status
- The existing regulatory framework for managing commercial LLW and operational issues
- The industry panel discussion on current and future challenges in the management of LLW
- Stakeholder perspectives on the forthcoming NRC strategic assessment effort

This 2-day ACNW meeting drew an attendance of approximately 100 people. Formal participation in the meeting included representatives of the American Ecology Corporation, the Army Corps of Engineers, EnergySolutions (formerly Envirocare), the California Radiation

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.

Forum, Duratek–Chem-Nuclear Systems, Entergy Utilities, Harvard University, the LLW Forum, the Nuclear Energy Institute, the Sierra Club, the South Carolina Department of Health and Environmental Control, the Southwestern LLW Compact, and Waste Control Specialists, LLC. Staff from NRC’s Division of Waste Management and Environmental Protection and independent stakeholders also participated in the discussions.

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

- Although complex, the current regulatory system for managing LLW in 10 CFR 61 was workable.
- A more risk-informed (i.e., performance-based) and site-specific approach to scenario development for LLW performance assessments should be considered for site-specific disposal cases.
- Risk-informed approaches to LLW management should emphasize the specific radionuclide content of wastes rather than their origins.
- A more transparent process for submittal, review, and decisionmaking related to NRC’s alternative disposal requirements for “unimportant quantities” of radioactive materials in 10 CFR 20.2002 (“Method for Obtaining Approval of Proposed Disposal Procedures”) and 10 CFR 61.58 (“Alternative Requirements for Waste Classification and Characteristics”) would be welcome.
- The efficacy of the disposal of large-volume, low-activity radioactive wastes² (LAW) using 10 CFR Part 61 and/or Resource Conservation Recovery Act of 1976 (RCRA) regulations³ was questioned. Guidance on ways to improve the management and disposal of LAW, in a way commensurate with risk, would be welcome.
- Commercial LLW streams with new or different characteristics from those first envisioned when 10 CFR Part 61 was promulgated are likely in the future. Case-specific guidance for the evaluation of these new waste streams would be welcome.⁴
- The Conference of Radiation Control Program Directors has previously recommended a national program to recycle and reuse sealed radioactive sources. If this program were

² Low-activity radioactive wastes are radioactive wastes in concentrations greater than background but very much less than Class-A limits.

³ The U.S. Environmental Protection Agency developed regulations for the management of chemically-mixed wastes in response to RCRA. Small quantities of commercial LLW are chemically-contaminated and subject to regulation under RCRA.

⁴ As a specific example, it was suggested that the “factor 10 rule” embodied in the 1995 Branch Technical Position on waste form and waste classification be revisited.

adopted, NRC may be able to reduce the disposed quantities of higher activity LLW (i.e., Class-B and -C).

- Consideration should be given to a new Federal initiative to develop LLW disposal facility for commercial wastes at a DOE-operated site.

Committee Action

The Committee intends to develop a second (new) letter report to the Commission addressing stated purposes of this Working Group Meeting. Later this fiscal year, the Committee also intends to comment on the results of the Office of Nuclear Material Safety and Safeguards (NMSS) strategic planning effort for commercial LLW management.

2. National Academy of Sciences Report on the Management of Certain Tank Wastes at U.S. Department of Energy Sites

A 5-member National Academy of Sciences (NAS) team briefed the Committee on the findings of a NAS congressionally-mandated study of radioactive wastes stored in tanks at three U.S. Department of Energy (DOE) sites: Savannah River, Hanford, and Idaho. The NAS team included three members of the “Committee on the Management of Certain Radioactive Waste Streams Stored in Tanks at Three Department of Energy Sites” including the committee chairman (Professor Frank Parker), and two other committee members (Dr. Anne Smith and Mr. Milton Levenson). The NAS team also included two NAS staff members (Dr. Kevin Crowley and Dr. Micah Lowenthal). Professor Parker was the briefing lead. He explained that the study was conducted under Section 3146 of the National Defense Authorization Act for FY 2005 (NDAA), by a 21-member committee that included one member who is also a member of the ACNW Committee (Mr. Allen Croff).

Professor Parker described the tank waste at the three sites covered by the study, highlighted similarities and differences among the sites, and discussed major as well as site-specific study findings and recommendations including a “watch list” of significant issues that DOE should resolve with “deliberate speed.” Mr. Levenson provided additional insights, and Dr. Smith added some observations. More detailed information about the meeting is provided in the meeting minutes and the transcript of the meeting.

The NAS team also responded to questions from the ACNW members, staff, and an ACNW consultant. DOE staff attending the briefing provided additional information on DOE’s actions taken in response to the NAS report.

Committee Action

The Committee will consider the results of the NAS study and information obtained from this briefing in developing its technical review comments on NRC’s draft “Standard Review Plan for Activities Related to U.S. Department of Energy Waste Determinations.”

3. NRC's Standard Review Plan for Waste Determinations

The NMSS staff in the Division of Waste Management and Environmental Protection (DWMEP) briefed the Committee on the status of ongoing activities related to the development of an SRP for WDs. The DWMEP team included Mr. Ryan Whited, Ms. Christianne Ridge, and Dr. David Esh. The presenters explained that the SRP was rooted in the passage of the NDAA, which expanded NRC's role in reviewing the WD submittals by DOE. They briefly described NRC's WD activities since the passage of the NDAA in October of 2004 and indicated that a draft SRP was nearly complete.

The DWEMP staff described the purpose of the SRP, walked through the SRP outline, and explained that the staff adopted the recommendations from ACNW's December 2005 letter report to the Commission. They also discussed waste and radionuclide removal technologies, issues, and definitions. The DWEMP staff gave an overview of the performance assessment approach, which will demonstrate compliance with the performance objectives for protection of the general population from releases of radioactivity as provided in 10 CFR Part 61.41. They indicated that the SRP will facilitate risk-informed and performance-based WD reviews and that these reviews will take into account existing NRC guidance and staff experience gained from previous WD reviews and ACNW's recommendations and comments on the draft SRP.

Committee Action

The Committee will review the draft SRP once it is issued and will receive a followup briefing from NRC staff to discuss the SRP content. The Committee will wait until that discussion for the NRC staff's response to the Committee's review questions.

4. Review of International Commission on Radiological Protection Draft Report, "The Scope of Radiological Protection Regulations"

The Committee was briefed by Dr. Donald Cool (NMSS) who gave an overview of a draft International Commission on Radiological Protection (ICRP) report titled, "The Scope of Radiological Protection Regulations." ICRP's intent was to recommend criteria for defining the radiation exposure scenarios that can and need be subject to radiation protection regulations. The document also describes the regulatory concepts of exclusion and exemption, along with their applications. However, the report seems inconsistent with ICRP's philosophy of establishing a constraint for an exposure scenario and applying "optimization." The ICRP report would not be useful as guidance for radiation protection in the United States.

Committee Action

During this meeting, the Committee prepared and finalized a letter to the Commission on this topic. This letter states that the Committee believes the draft ICRP document does not add value to the radiation protection programs in the United States, especially those promulgated by the Commission for licensees of NRC or the Agreement States. The Committee also notes the inconsistencies between this ICRP draft document and the terminology used in U.S. laws, regulations, and implementing guidance. These inconsistencies could lead to significant confusion in radiation protection programs and practice in the United States. Therefore, the Committee believes that the draft ICRP document in its present form is not useful for further

consideration without substantial revision and alignment with other draft ICRP guidance documents.

5. Overview of NRC's Spent Fuel Storage Program

The NMSS staff from the Spent Fuel Project Office (SFPO) briefed the Committee on the status of SFPO's work. SFPO is responsible for the licensing and inspection of spent fuel storage casks and facilities, certification and inspection of transportation casks, coordination with government stakeholders, and public outreach on storage and transportation activities. There are currently 42 licensed independent spent fuel storage installations (ISFSIs) in the United States and announced plans for an additional 14 ISFSIs. SFPO is addressing the technical challenges associated with the transportation of high burnup fuel and burnup credit. In the near future, DOE is expected to complete the development of performance specifications for a transportation, aging, and disposal canister. SFPO is increasing its public outreach effort and continuing to respond to the Nation's need for fuel storage capacity and changes in fuel management strategy.

Committee Action

This briefing was for the Committee's information. No Committee action is planned.

171st ACNW Meeting

1. Overview of Commercial Spent Nuclear Fuel Reprocessing

Consistent with the ACNW FY 2006-07 Action Plan, the Committee initiated activities to keep informed of technical developments in the nuclear fuel recycle area. Former ACNW member Dr. Ray Wymer provided the Committee with an overview of the history of nuclear fuel recycling in the United States. The briefing addressed the basic elements including chemical separation processes, various waste streams, transportation, and storage of spent fuel. The overview included experience in chopping and decladding fuel elements, continuous and batch dissolvers, solvent extraction, hot cells, glove boxes, and canyons. A video was shown on international reprocessing plants (e.g., Sellafield, United Kingdom; La Hague, France) and associated operations. Dr. Wymer noted that NRC has not considered licensing a new reprocessing facility for almost 30 years and that much of NRC's effort will be completely new.

Committee discussions followed that focused on the need to have a systems optimization approach to the entire fuel cycle, taking into account important aspects (e.g., waste streams and waste minimization, dose to workers, decommissioning costs, and difficulty in handling materials). Dr. Wymer indicated that over the next 20 to 30 years the plutonium and uranium recovery by extraction (PUREX) method would likely be the process of choice because of the many advantages (including economics) over other processes. Dr. Wymer also noted that the pyroprocess had some advantages but required additional review (i.e., "it was further down the line"). In closing, the Committee agreed to proceed using total system optimization, regardless of which process the Department of Energy (DOE) selects

Committee Action

This briefing was for information only. The information will be used in future deliberations with NRC and DOE staff in upcoming meetings on recycling spent nuclear fuel, and in development of a proposed white paper due to be completed later this year.

2. Nuclear Regulatory Commission's Spent Nuclear Fuel Reprocessing Regulation

To remain informed of reprocessing activities, the ACNW FY 2006-2007 Action Plan included NRC staff briefings on the status of standards, regulations, and guidance concerning licensing of fuel recycle facilities. In accordance with the plan, Joseph Giitter (Chief of the Special Projects Branch) and Stewart Magruder from NRC's Nuclear Material Safety and Safeguards (NMSS) staff briefed the Committee on the implications of DOE's Global Nuclear Energy partnership (GNEP) on NRC programs, specifically with respect to nuclear fuel recycling. The FY 2006 Appropriations Act directed DOE to develop a Spent Fuel Recycling Plan, and NMSS staff received a pre-decisional draft in March 2006 on DOE's plans.

Mr. Magruder gave an overview of key parts of DOE's program: the separator to remove unspent fuel, the Advanced Fuel Cycle Facility to separate out transuranics (TRU), and the Advanced Burner Reactor to eliminate TRU. Mr. Giitter summarized the Commission's staff requirements memorandum (SRM) SECY-00-0066 dated May 16, 2006, that directed the staff to (1) develop a conceptual licensing process for GNEP facilities and (2) prepare draft legislation that would give NRC licensing authority over demonstration facilities. He noted that the Energy Reorganization Act of 1974 did not subject DOE's planned reprocessing facilities and TRU fuel fabrication facilities to NRC regulation, but that the staff was drafting legislation that would clarify NRC's role and its authority over DOE facilities.

Committee Action

This briefing was for information only and is intended to keep the Committee informed of staff developments in response to DOE's initiatives on reprocessing. The Committee plans to continue discussions with staff to remain informed and ready to provide advice to the Commission should the need arise.

3. Overview of the Application of NRC Regulations to Spent Nuclear Fuel Reprocessing

The NMSS staff (Joseph Giitter and Stewart Magruder) briefed the Committee on existing NRC regulations and processes associated with recycling. The briefing addressed licensing production/utilization facilities under 10 CFR Part 50 as a two-step process or 10 CFR Part 52 as a one-step process, the application of 10 CFR Part 70 to licensing special materials, and the application of 10 CFR Parts 30 and 72 to byproduct material and high level waste and to waste incidental to reprocessing (WIR). Under GNEP, NRC could regulate up to five different facilities: (1) separations reprocessing facility (10 CFR Part 50), (2) fuel fabrication facility (10 CFR Part 70), (3) fast flux facility (under 10 CFR Part 50 or 52), (4) interim storage facility (10 CFR Part 72), and (5) vitrification facility (10 CFR Part 30). The fast reactor facility would be licensed under 10 CFR Part 50 but incorporate 10 CFR Part 52 features, or it would be licensed under a new technology-neutral framework now under development. The NRC staff identified potential radiological, environmental, and waste issues including the need to recycle

spent fuel within 5 years to avoid a significant buildup of americium-241 from plutonium-241 decays. The staff presented a path forward that included (1) meetings with DOE to discuss cost-reimbursable agreement, (2) draft legislation, and (3) development of a conceptual licensing process.

Committee Action

This briefing was for information only to keep the Committee informed of regulatory developments in the area of reprocessing. The Committee plans to continue discussions with staff, remain abreast of NRC's activities, and be ready to provide advice to the Commission should the need arise.

4. Discussion of the Proposed White Paper on Spent Nuclear Fuel Reprocessing

DOE has been studying advanced nuclear fuel cycles for several years and may employ a cycle substantially different from existing technologies to recover and recycle various constituents of power reactor fuels. Dr. Wymer (future ACNW consultant) outlined a white paper that will examine reprocessing technologies. The paper will support ACNW activities to become familiar with fuel cycles for the advanced reactor systems being developed by DOE. During this session, the Committee discussed and planned the scope and content of the white paper.

Committee Action

The Committee will continue to provide feedback on the recycle white paper during its development. A draft of the proposed white paper on spent nuclear fuel reprocessing is expected to be available in September 2006.

5. Discussion of Matters Related to the Conduct of ACNW Activities and Specific Issues That Were Not Completed During Previous Meetings

The Committee discussed possible agenda items for the next 12 months. The Committee also discussed steps for more effective and efficient letter writing.

6. Election of ACNW Officers

The Committee reelected Michael T. Ryan and Allen G. Croff to the positions of Chairman and Vice Chairman, respectively, of the ACNW for a 1-year term ending June 30, 2007.

RECONCILIATION OF ACNW COMMENTS AND RECOMMENDATIONS/EDO COMMITMENTS

None for 170th or 171st ACNW meeting.

PROPOSED SCHEDULE

The Committee agreed to consider the following topics during the 172nd ACNW meeting, to be held July 17–20, 2006:

- C DOE Briefing on Exploratory Drilling of Aeromagnetic Anomalies in the Yucca Mountain Region
- C NRC Staff Review of Revised International Commission on Radiological Protection Recommendations
- C Exchange of Information Between NMSS Management and ACNW Members
- C ACNW Working Group Meeting on Predicting the Performance of Cementitious Barriers for Near Surface Disposal
- C NRC Draft Rule/Guidance on Preventing Legacy Sites
- C Expanded Potential NRC Use of the Center for Nuclear Waste Regulatory Analysis Expertise
- C DOE Briefing on Advanced Fuel Cycle Initiative
- C Standard Review Plan for Activities Related to DOE Waste Determinations
- C Office of Nuclear Regulatory Research/Office of Nuclear Material Safety and Safeguards Dry Cask Storage Probabilistic Risk Assessment Study
- C Electric Power Research Institute Dry Cask Storage Probabilistic Risk Assessment Study
- C Discussion of Draft and Possible ACNW Letter Reports
- C Miscellaneous — Matters Related to the Conduct of ACNW Activities and Specific Issues that were not Completed During Previous Meetings

Sincerely,

/RA/

Michael T. Ryan
Chairman

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