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SUBJECT: Summary report -187th meeting of the ACNWM, March 18-20, 2008, and other related activities of the Committee

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

March 28, 2008

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

**SUBJECT: SUMMARY REPORT – 187<sup>th</sup> MEETING OF THE ADVISORY COMMITTEE ON NUCLEAR WASTE AND MATERIALS, MARCH 18 - 20, 2008, AND OTHER RELATED ACTIVITIES OF THE COMMITTEE**

Dear Chairman Klein:

During its 187<sup>th</sup> meeting, March 18 - 20, 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:

- "2007 Strategic Assessment of the Low-Level Radioactive Waste Regulatory Program," dated March 25, 2008.
- "Review of ICRP Publication 103 - The 2007 Recommendations of the International Commission on Radiological Protection," dated March 27, 2008.

**HIGHLIGHTS OF KEY ISSUES**

**1. Use of Burnup Credit for Licensing Spent Fuel Transportation Casks**

Representatives from the NRC Office of Nuclear Material Safety and Safeguards, Division of Spent Fuel Storage and Transportation (NMSS/SFST) and Oak Ridge National Laboratory (ORNL) briefed the Committee on the use of burnup credit (BUC) and the progress in resolving BUC issues for licensing spent fuel transportation casks.

The most common assumption used in criticality safety analysis of spent nuclear fuel (SNF) from nuclear reactors is that spent fuel has the same reactivity as unburned fuel. This approach is typically known as the "fresh fuel" assumption and results in conservatism in the calculated value of the system reactivity. Burnup accounts for the amount of energy released from a fuel assembly in terms of megawatt-days per metric ton of initial uranium (MWD/MTU) and is used as an indication of the reactivity reduction experienced by the fuel assembly once it has been "burned" in the reactor core. Current calculational methods have made possible taking credit for this reduction in reactivity, hence reducing some of the conservatism in the analysis while maintaining an adequate criticality safety margin. NMSS/SFST issued Interim Staff Guidance 8 (ISG-8) in May 1999, providing the first allowance of burnup credit for PWR fuel. Subsequently, ISG-8 has undergone two revisions, which have eliminated or lessened a number of the restrictions. The initial issuance and subsequent revisions of ISG-8 have provided the impetus for industry to proceed with a new generation of high-capacity rail-type cask designs using

burnup credit. However, ISG-8 recommends the burnup credit allowance to be limited to that provided by the change in actinide composition only. To accommodate the majority of the SNF in high-capacity rail casks, extended burnup credit is needed (i.e., credit for the fission product nuclides as well). The use of higher-capacity packages enables a reduction in SNF casks, a reduction in cask handling and loading operations, and fewer cask shipments.

SFST staff indicated that computational codes supporting reactor core criticality are constantly being validated due to the monitoring aspect of any reactor operation. Data such as startup criticals or critical boron concentrations can be used to verify the precision of these codes. For SNF transportation, however, the existing reactor operational data does not perfectly fit the geometry and content of a cask. For this reason, the supporting computer codes need to be validated using critical benchmarks that more closely mimic a transportation cask. Dr. Cecil Parks from ORNL discussed why and how validation is done, what needs to be validated for full BUC in transport casks, and the potential data sources for BUC validation. The French critical experiments are the most suitable and currently available sources of data. Recent experiments in Japan using fission products are now becoming available and will be assessed. Domestic experiments at Sandia National Laboratory have been considered but may take time to mature. Dr. Parks indicated that the NRC Office of Nuclear Regulatory Research and ORNL will continue to work to obtain additional assay data for validation; however, sufficient data does exist to allow credit for some key fission products, which might be enough to support the industry's request. In addition, techniques for incorporating bias and uncertainty from assay data have been developed, illustrated, and documented.

The staff also told the Committee that they plan to recommend that data from the French critical experiments for fission product isotopes be obtained.

Dr. Everett Redmond from the Nuclear Energy Institute made a brief statement to the Committee in response to the staff's presentation. He briefly described what studies have been done by the industry. He indicated that a white paper on burnup credit will be submitted to the staff in the summer of 2008.

#### Committee Action

The Committee plans to write a letter addressing the staff's presentation on BUC.

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

There were no recent responses from the Executive Director for Operation (EDO) to previous ACNW&M letter reports that required reconciliation by the ACNW&M.

PROPOSED SCHEDULE FOR THE 188<sup>th</sup> ACNW&M MEETING

The Committee agreed to consider the following topic during the 188<sup>th</sup> ACNW&M meeting to be held April 8 - 10, 2008:

- Working Group on the Effects of Low Radiation Doses, Science and Policy

Sincerely,

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Michael T. Ryan  
Chairman