



UNITED STATES
NUCLEAR WASTE TECHNICAL REVIEW BOARD
2300 Clarendon Boulevard, Suite 1300
Arlington, VA 22201

July 26, 2011

The Honorable Peter B. Lyons
Assistant Secretary for Nuclear Energy
U.S. Department of Energy
1000 Independence Ave., SW
Washington, DC 20585-1290

Dear Dr. Lyons:

As you know, the U.S. Nuclear Waste Technical Review Board is charged with evaluating the technical and scientific validity of activities undertaken by the U.S. Department of Energy (DOE) in implementing the Nuclear Waste Policy Act and with reporting its findings and recommendations related to the management and disposition of spent nuclear fuel (SNF) and high-level radioactive waste (HLW) to Congress and the Secretary of Energy.

In discharging these responsibilities, the Board holds public meetings each year. It is customary for us to provide feedback to DOE from the presentations and discussions at these meetings, together with other points that arise from them. In the first half of this year, we held two public meetings and a workshop. In this letter, I am conveying to you important issues identified by the Board from each meeting.

Comments from February 2011 Board Meeting

The first public meeting this year was held on February 16 in Las Vegas, Nevada. The presentations and discussions focused on three main areas: DOE's activities related to the back end of the nuclear fuel cycle, technical experience gained from DOE's past SNF and HLW management efforts, and work currently being undertaken by Sandia National Laboratories related to geologic disposal options in the United States.

DOE Activities Related to the Back End of the Nuclear Fuel Cycle

Dr. Monica Regalbuto, Deputy Assistant Secretary for Fuel Cycle Technologies, and Dr. William Boyle, Director of the Office of Used Nuclear Fuel Disposition Research and Development, opened the meeting with presentations on DOE's *Nuclear Energy Research and Development Roadmap*, which was published in April 2010. The presentations covered fuel-cycle technology research and development (R&D) being undertaken by DOE's Office of Nuclear Energy (DOE-NE). The Board has a particular interest in the implications for waste management of the fuel-cycle options being studied by DOE, including the effects on the quantities and the volumes of waste that would be generated. Of primary interest to the Board in this area is work that DOE is planning related to the once-through fuel cycle and limited recycling because other options do not appear to have the potential to be deployed in the next few decades.

Dr. Boyle's presentation included work that DOE is undertaking related to SNF storage, transportation, and disposal, all of which fall under the Board's statutory mandate. From his presentation, we understand that DOE's near-term objectives in these areas are providing expertise to decision-makers on issues related to managing SNF; developing a comprehensive understanding of the technical conditions necessary for long-term storage, transportation, and disposal of SNF and HLW; and developing computer models for evaluating disposal-system performance for a variety of repository concepts.

The time available for the presentations by Dr. Regalbuto and Dr. Boyle was limited. As a consequence, the information presented was not very detailed. However, it appeared that, although the R&D program was directed at appropriate fields of activity, it was not focused on specific goals and defined objectives related to helping DOE develop a program for managing SNF and HLW. The Board believes that every aspect of the R&D program should have defined goals and should be coordinated to ensure that the overall program is integrated, focused, and managed effectively.

Since the February meeting, the Board has requested and has been provided with more-detailed information on the program, including implementation plans and funding levels for activities included in the *Roadmap*. We have invited Dr. Regalbuto and her staff to make more-detailed presentations on DOE's R&D program related to management of SNF and HLW at the next Board meeting, which will be held on September 13 and 14, 2011, in Salt Lake City, Utah. I am pleased that Dr. Regalbuto and her staff have agreed to attend, and we look forward to a full discussion of the program at that meeting.

An issue that will likely come up at the meeting is the extent to which burnup credit is being taken into account in planning the development of handling, storage, and disposal facilities for SNF. This is an important issue for SNF management, and we commend the efforts we understand that DOE has made recently to develop a technical basis for taking burnup credit in the design of equipment and facilities.

Technical Experience Gained to Date from Repository Programs

The Board held a meeting at Dulles, Virginia, on October 26, 2010, at which we started a discussion of technical experience gained during DOE's efforts over the last two decades related to developing a program for managing and disposing of SNF and HLW. That meeting included panel discussions involving former Yucca Mountain program managers, representatives of local governments that would be affected by a repository at Yucca Mountain, and representatives of international waste management programs.

We continued this theme at the February meeting in Las Vegas with a panel of three former managers from the Yucca Mountain Project: Lake H. Barrett, former Acting Director of the Office of Civilian Radioactive Waste Management (OCRWM); Christopher Kouts, former Acting Director of OCRWM; and George E. Dials, former General Manager of TRW Environment Systems, the management and operating contractor for the Yucca Mountain Project, and former manager of the DOE office in Carlsbad, New Mexico. Information and technical insights from both meetings and all the panels proved very useful as the Board prepared its report on technical advancements and issues that is discussed in the last section of this letter.

Geologic Disposal Options in the United States

The third topic covered during the February meeting was work related to options for geologic disposal in the United States. Technical presentations were made by Dr. Patrick Brady, Dr. Ernest Harding, and Mr. Andrew Orrell, all of Sandia National Laboratories. Professor Hank Jenkins-Smith, professor of political science at the University of Oklahoma, presented by telephone the results of recent surveys of how technical information related to the management of SNF and HLW is perceived by the broader U.S. population.

Dr. Hardin's presentation made clear that many geologic media in the United States would be suitable for geologic disposal. He indicated that considerable academic study has been completed on deep borehole disposal, and the information that he and Dr. Brady presented indicates that it may be appropriate to begin field investigations, including a test drilling program and emplacing surrogate SNF and HLW in a borehole. If such a program is to be developed, however, the Board believes that it is essential that it is coupled with a program for developing the appropriate facility designs and for evaluating the necessary operational requirements for a borehole disposal program.

To follow-up on the presentations at the February meeting, the Board would like to know more about the progress being made regarding borehole disposal and other geologic-specific disposal programs that are under consideration. We are planning to make this a central part of the Board meeting we are planning for the spring of 2012 and will be contacting you or your staff regarding this in the near future. In this regard, we are particularly interested in work directed at optimizing the characteristics of the waste forms intended for disposal in specific geologic media.

From the technical presentations made at the meeting, it appears that at this point DOE has not developed a siting strategy or a plan for defining the siting criteria for a future repository for SNF and HLW. The Board understands that to some extent this results from an expectation that recommendations to be made by the Blue Ribbon Commission on America's Nuclear Future may affect the basis for developing such a siting strategy or criteria. Despite this possibility, however, the Board believes that there is technical merit in preparing for disposal of SNF and HLW on an early timeframe, and it encourages DOE to begin these activities.

Comments from April 2011 Board Meeting

The Board's second public meeting this year was held on April 27 in Amherst, New York, and followed a site visit to the West Valley site the previous day. The primary focus of the meeting was the management of HLW from the West Valley Demonstration Project (WVDP), and most of the issues from that meeting related to the DOE Office of Environmental Management (DOE-EM), rather than to DOE-NE. However, one item from the discussion at that meeting also is relevant to the fuel-cycle R&D program being developed by DOE-NE. During the meeting, the Board was not able to establish the extent to which "lessons learned" information from the decommissioning project is being made available to DOE-NE staff and support contractors so that it can be taken into account in developing plans for potential fuel-cycle options that include reprocessing and recycle operations. The Board recommends that DOE-NE ensure that the necessary level of contact exists between its staff and the staff of DOE-EM to maximize the benefit of this information to future DOE fuel-cycle programs.

Following the meeting in Amherst, two members of the Board staff attended the regular monthly meeting of the West Valley Citizen Task Force during the evening of April 27. I have passed on to Mr. David Huizenga, Acting Assistant Secretary for the Office of Environmental Management, the Board's commendation regarding DOE's ongoing interaction with this well-informed group and other members of the interested public. In that regard, the Board has recommended to Mr. Huizenga, and also recommends to you, that DOE consider using all available information platforms, including electronic social media, to maintain and enhance the level of transparency in its operations.

Comments from Workshop on Benchmarking Analytical Results

The third event organized by the Board this year was the Workshop on Evaluation of Waste Streams Associated with LWR Fuel Cycle Options, which was held in Arlington, Virginia, on June 6 and 7. The workshop was arranged to provide a forum for developers and users of computer models, codes, and analytical tools to benchmark their results by analyzing and comparing a set of fuel cycle scenarios. The scenarios defined for this workshop were only for benchmarking purposes and were not intended to be realistic scenarios that would necessarily be implemented in the United States. The Board has developed an analytical tool called the Nuclear Waste Assessment System for Technical Evaluation (NUWASTE) to assess the effects of different nuclear power program assumptions and fuel-cycle options on the U.S. programs for managing SNF and HLW. Dr. Steven Piet from Idaho National Laboratory (INL) presented the results of INL's assessments of the standard scenarios performed using the VISION code that was developed by INL. The other participants who presented the results of their analyses were from MIT, AREVA, and the National Nuclear Laboratory in the United Kingdom. The transcript from the workshop is available on the Board's Web site (www.nwtrb.gov). The final results of the analyses of the standard scenarios by the participants will be posted to the Board's Web site soon.

Preserving Technical Experience, Data, and Documents from Repository Efforts

The Board has finalized and issued a report titled *Technical Advancements and Issues Associated with the Permanent Disposal of High-Activity Wastes: Lessons Learned from Yucca Mountain and Other Programs*. Copies have been sent to you and to other key DOE officials. It also is available at www.nwtrb.gov. Our objective in preparing this report was to ensure that the information it contains will be available to Congress and the Secretary; DOE management, staff, and contractors; and stakeholders with roles in managing the nation's SNF and HLW, now and in the future. We believe that a substantial body of knowledge and experience exists among DOE and contractor staffs who have worked on the Yucca Mountain repository program that remains to be recorded. We encourage DOE to capture as far as possible this additional information that may be useful in developing SNF and HLW management and disposal programs in the United States in the future. We believe that this would represent an invaluable technical resource.

Toward that end, I also am pleased to report that the Board is close to agreement with DOE's Office of Legacy Management (DOE-LM) regarding the Board's role in providing independent review of DOE-LM's plans and implementation of the plans to preserve the documentation and electronic information generated from the Yucca Mountain Project. As mentioned above, we believe that this information will be of significant value in the future, and ensuring that it is available is extremely important.

The Board appreciates very much the participation of DOE-NE staff and other representatives at these Board meetings. We look forward to continued DOE-NE participation in our meetings and to following up on the issues raised above.

Sincerely,

{Signed by}

B. John Garrick
Chairman

cc:

Dr. S. Chu, Secretary of Energy

Mr. D. Huizenga, Acting Assistant Secretary, DOE-EM