



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

ACNWR-0206

May 3, 2004

The Honorable Nils J. Diaz  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

**SUBJECT: OBSERVATIONS FROM THE 147TH MEETING OF THE ADVISORY  
COMMITTEE ON NUCLEAR WASTE IN LAS VEGAS, NEVADA**

Dear Chairman Diaz:

During the 147<sup>th</sup> meeting of the Advisory Committee on Nuclear Waste (ACNW) in Las Vegas, Nevada, several important topics were discussed regarding the potential Yucca Mountain high-level waste (HLW) repository. They included public outreach, Amargosa Valley characteristics, the igneous disruptive event issue, the status of the Yucca Mountain repository design, and the analysis of emplacement drift stability. The latter was the subject of a separate letter report to you on March 4, 2004.

The comments in this letter are observations and status reports and not specific recommendations. They are considered important because of their implications for the quality and completeness of the anticipated U.S. Department of Energy (DOE) license application.

### **Public Outreach**

It has become a tradition to hold an ACNW meeting once a year in the Las Vegas area to take advantage of the available technical personnel working on the Yucca Mountain project. It has also become a tradition to make a special effort to reach out for public participation in our Nevada meetings. While the public forum part of our meetings has been very successful in giving members of the public the opportunity to tell us about their interests and their concerns with the Yucca Mountain project, the Committee continues to be disappointed by the degree of public participation and representation. Clark County officials offered the Committee the use of its public meeting facility for future meetings, suggesting that they said their facility might provide a comfort zone for increasing attendance. To further stimulate public interest in the Las Vegas meetings, the Committee is considering combining working group sessions with future meetings. All of the stakeholders are generally very well represented at the working group sessions.

### **Amargosa Valley Tour**

One of the key observations by invited experts to the Committee's February 2004 working group session on the biosphere and dose calculations for Yucca Mountain was that more effort should be given to quantifying site-specific features having an impact on dose calculations. To a limited extent, the Committee had a first-hand opportunity as a result of its site visit to Amargosa

Valley to observe and make inquiries with residents on local lifestyle activities, including those that would affect the calculated radiation dose to individuals. A local resident who has been in the valley since 1992 hosted the Committee tour. Features related to ingestion and inhalation pathways were observed. These included a large commercial dairy operation, a few alfalfa farms, irrigation and drinking water wells, and the use of evaporative cooling for human comfort. Most of the feed for the dairy is imported from outside the valley. The local population numbers about 1500 residents in an estimated 500 dwellings, many of which are of the mobile or manufactured type. Our host pointed out that most of the residents work outside of the valley and others maintain part-time retirement homes in the valley. One of the major concerns of the dairy farmers is the perception that the HLW repository will taint their products and handicap their marketing opportunities.

Aside from the dairy, a clay mining operation, and alfalfa farms, there are few commercial enterprises in the valley. The Ash Meadows National Wildlife Refuge with its protected desert pupfish is located in Amargosa Valley. It was reported to the Committee during the tour that a comprehensive documentation of site-specific features clearly linked to performance assessment would add a great deal of credibility to the analysis in the eyes of the local population.

### **Igneous Disruptive Event**

The ACNW was briefed on a DOE-sponsored review of the igneous consequence modeling program. DOE was motivated to have its igneous work reviewed partly because of technical differences with NRC on the modeling of magma-repository interactions. The final recommendations on the adequacy of the DOE modeling were issued by the Igneous Consequences Peer Review (ICPR) Panel in February 2003. Among the findings of the panel were that (1) DOE's performance assessment conceptual model of igneous activity at Yucca Mountain was adequate and reasonable and (2) major advances in the understanding of localized magma-drift interactions at the site would *not* be available within the next 3 years (the timeframe during which DOE is expected to submit its license application) and therefore the panel did not recommend alteration of current DOE models and computer codes.

The ICPR Panel made 29 specific recommendations for technical analyses that DOE should consider in order to reduce uncertainties in the models and codes. These recommendations included (1) specific improvements in geologic knowledge that were necessary to achieve a better understanding of volcanology in the Yucca Mountain region, (2) specific improvements in the ability to model and predict magma-repository interactions, and (3) specific design elements in the underground repository that, if used, could be expected to mitigate the effects of intrusive volcanism on emplaced waste package canisters.

DOE has prepared responses to each of the 29 ICPR Panel recommendations in a report made available to the NRC on January 23, 2004. In the briefing to the ACNW, DOE noted that the main emphasis of its igneous activity modeling programs prior to the submittal of a license application would be to address the information needs related to the NRC/DOE key technical issue (KTI) agreements. With respect to the ICPR Panel recommendations, DOE noted the following:

- Improvements to its igneous activity consequence models and computer codes, available since the completion of the ICPR Panel's work, were considered generally sufficient by DOE to address some of the panel recommendations. Considering the improvements made thus far, and based on DOE's determination of the risk significance of a potential disruptive igneous event at the site, DOE believes that its improved igneous activity consequence computational module is sufficient for inclusion in a 10 CFR Part 63 license application.
- Using conservative modeling assumptions and bounding parameter distributions can obviate the need for improvements to igneous activity consequence models and computer codes in some areas.
- Ongoing or planned model enhancements, as well as focused confirmatory testing, are expected to satisfy any remaining ICPR Panel-recommended improvements to the consequence models and computer codes.
- DOE intends to update the technical bases for its 1996 probabilistic volcanic hazards analysis (PVHA) used to estimate the probability of a disruptive igneous event at Yucca Mountain. An update to the PVHA would be consistent with the ICPR Panel recommendations and earlier agreements with the NRC staff.

As a result of these developments it is likely that several KTI agreements will still be open at the time of the license application submittal.

The ACNW has long been concerned with NRC's practice of separating the review of an igneous event into a probability and a consequence component. Such decoupling obscures the linkage between the consequence assumptions (or boundary conditions) and the supporting evidence, since assumptions about consequences are often probabilistic. Invoking the triplet definition of risk avoids these anomalies by characterizing the risk as the likelihood of scenarios and their attendant consequences (See SECY-98-144). Consequence assumptions and evidence become properties of the scenarios.

### **Yucca Mountain Repository Design**

The Committee was briefed on the status of the proposed Yucca Mountain repository design. The design of the repository is still very much in a state of flux. The detailed conceptual design for the surface facilities is only now emerging. In addition, the subsurface facilities are currently going through a number of changes.

A transportation cask receipt facility with a buffer storage area is the most recent design change to the surface facilities. A separate building will be used as a canister-handling facility. Two dry transfer facilities with remediation capability are planned and will be constructed in phases. The dry transfer facilities will process the fuel, placing the spent fuel in the waste packages, primarily using dry handling techniques. Each of the dry transfer facilities will have a small pool for remediating and handling damaged fuel. DOE has returned to a rail-based transporter to place the waste packages in the emplacement drifts. Surface aging pads for the spent fuel will have a capacity of up to 20,000 metric tons of heavy metal. Many design changes and decisions are still being made; for example, consideration is being given to how best to address the threat of aircraft impact on surface facilities.

There are a number of design changes in the subsurface as well. The emplacement drifts will use perforated stainless steel sheets and rock bolts for ground support. The emplacement gantry will be electrically powered. The emplacement drift invert will be made of carbon steel and used to support the emplacement gantry rail system, waste package supports, and drip shields during the preclosure period. Changes to the drip shield under consideration include increasing the distance between the drip shield and the waste package to prevent contact in the event of rock fall and increasing the stiffness for bending loads and stresses along the bulkheads. Longitudinal stiffener beams will be added between the bulkheads along the axial direction to provide additional strength for axial bending loads.

### **Summary**

The annual meeting of the ACNW in Nevada has become an important exercise in the Committee's advisory role to the Commission on the safety of the potential Yucca Mountain high-level waste repository. It is an opportunity for the Committee to have access to the extensive technical resources of the Yucca Mountain project while being able to observe first-hand site activities and public involvement. The highlights of this meeting were new information on both surface and subsurface facilities, an outside review of the igneous disruptive event scenario, a demographics presentation and properties of the Amargosa Valley, and the continued challenge of engaging the public in the evaluation process.

Sincerely,

**/RA/**

B. John Garrick  
Chairman

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