ACNWS-0116

November 9, 2000

The Honorable Richard A. Meserve
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

SUBJECT: SUMMARY REPORT — 121ST MEETING OF THE ADVISORY COMMITTEE ON NUCLEAR WASTE ON SEPTEMBER 19–20, 2000, AND OTHER RELATED COMMITTEE ACTIVITIES

Dear Chairman Meserve:

During its 121st meeting on September 19–20, 2000, at the Crowne Plaza Hotel, Ballroom B, 4255 South Paradise Road, Las Vegas, Nevada, the Advisory Committee on Nuclear Waste (ACNW or the Committee) discussed the following 12 topics.

HIGHLIGHTS OF KEY ISSUES CONSIDERED BY THE COMMITTEE

1. Planning and Procedures

The ACNW approved the agenda for issues to be considered during the 122nd ACNW meeting on October 17–19, 2000. Topics discussed included the following:

- **Discussion of Updated Site Suitability and License Application Task Action Plan** — The Committee will discuss the revised site suitability and License Application Task Action Plan.

- **West Valley License Termination Report** — The NRC staff will brief the Committee on its evaluation of comments on, and the proposed final approach to, the West Valley decommissioning criteria.

- **Corrosion Resistance of Alloy C-22** — The Committee will discuss recent tests to explore the specific aspects of the corrosion resistance of Alloy C-22 material.

- **Entombment Option for Decommissioning Power Reactors** — The Committee will hear a presentation by the NRC staff on the entombment option in the decommissioning plan.

- **Consultant/Member Reports** — The Committee will hear comments from consultants and members on recent relevant activities.

- **Exemption in 10 CFR Part 40 for Material Less than 0.05 Percent Source Material-Options and Other Issues Concerning the Content of Source Material** — The Committee will hear an information briefing by the NRC staff on its progress in developing a more risk-informed and coherent set of requirements for the regulation and release of low concentration source material.

2. Issue Closure Process

The NRC staff discussed the issue closure process for the prelicensing phase of the proposed Yucca Mountain high-level waste repository review. In the prelicensing phase, an issue is resolved or closed when the staff no longer has questions, comments or concerns. The staff makes no safety findings in the prelicensing phase. If additional staff concerns arise, an issue can be reopened.

Conclusions/Action Items

The ACNW will continue to follow the resolution of key technical issues (KTIs), anticipating a possible Yucca Mountain license application.

3. Key Technical Issue - Unsaturated and Saturated Flow Under Isothermal Conditions

The NRC staff discussed the status of open issues for the KTI on Unsaturated and Saturated Flow Under Isothermal Conditions. The reasons why some subissues remain unresolved were explained. The path toward resolution was outlined.

Conclusions/Action Items

The ACNW will continue to follow the resolution of KTIs as the Yucca Mountain project approaches a possible license application.

4. Key Technical Issue - Igneous Activity

The NRC staff discussed the status of open issues for the KTI on Igneous Activity. The reasons why subissues are closed pending or open were explained. The path towards resolution was outlined.

Conclusions/Action Items

The ACNW will continue to follow the resolution of KTIs as the Yucca Mountain project approaches a possible license application.

5. Public Comments

Dr. Garrick stated that the purpose of this portion of the meeting was to establish a direct contact with stakeholders and the public in connection with the Yucca Mountain project. He stated that public meetings have considerable influence in the Committee's communications with, and the advice provided to, the Nuclear Regulatory Commission. Congresswoman Shelley Berkley provided a written statement and made a statement via telephone. In her written statement, she emphatically stated that the Yucca Mountain Project be shut down. The dangers of Yucca Mountain as a nuclear repository, she said, are now so well known and so well documented that it is sheer folly to continue the project and dump additional billions of dollars literally in a hole in the ground. She discussed the presence of aquifers, the potential for volcanic and seismic activity, the hazards associated with transportation, and possible alternative sites outside Nevada. Other speakers included representatives from the State of Nevada's Agency for Nuclear Projects, Nevada's Clark, Eureka, Nye, Mineral, and Lincoln Counties, the Western Shoshone Tribe, and the Nevada Waste Task Force, as well as members of the public. The speakers expressed a number of strong opinions on the proposed repository. Many of the opinions involved socioeconomic impacts of the proposed repository, the transportation of spent fuel, and the need to involve the public throughout the site sufficiency review and the licensing process.

Conclusions/Action Items

The Committee plans to write a letter report to the Commission on this matter.

6. Action Plan Issues

The ACNW considered the first-tier priority issues in its 2000 Action Plan. No changes were made to the priority issues although changes to the schedule and the current emphasis on certain subtopics were discussed.

Conclusions/Action Items

The ACNW will continue to use the Action Plan to focus its activities.

7. Department of Energy's Progress on Proposed Repository at Yucca Mountain, Nevada

Dr. J. R. Dyer, Project Manager, Yucca Mountain Site Characterization Office, Department of Energy (DOE), gave an overview of the Yucca Mountain project.

He discussed the following issues:

1. project accomplishments during the past year
2. the current status of the design evolution
3. the role of the Site Recommendation Considerations Report
4. progress towards closure of the NRC KTIs

5. the DOE's Integrated Safety Management System
6. the FY 2001 project outlook

With regard to item 6, he noted that funding in the FY 2001 appropriations bill has yet to be set but that both the House and Senate have proposed levels below the DOE request. Dr. Dyer stated that work supporting the Site Recommendation (SR) schedule has the highest priority and that a lower funding level may delay the license application and slow development of the Licensing Support Network.

He closed by stating that DOE is awaiting Commission approval of the NRC proposed sufficiency review process and is putting a high priority on interactions with the NRC staff to close the KTIs.

Conclusions/Action Items

The Committee appreciated the insights provided in Dr. Dyers' overview and intend to closely follow the YMP progress in the future.

8. DOE's Site Recommendation Considerations Report

Mr. Tim Sullivan, DOE, Yucca Mountain Project Office (YMPO) described the current status of DOE's Site Recommendation Considerations Report (SRCR), and gave an overview of Volumes 1 and 2. These volumes contain the pre- and post-closure evaluation against 10 CFR Part 963, the technical bases documents, the relationship between the SRCR and the SR, the current status of the SRCR hearings, and the schedule. Mr. Sullivan said that the SR will provide a comprehensive statement of the basis of any recommendation that the Secretary of Energy will make to the President, and will contain additional information required by the Nuclear Waste Policy Act, including comments by the Governor and affected Indian tribes. The DOE's response to such views, the NRC's sufficiency comments, a final environmental impact statement, and an impact report submitted by the State of Nevada will also be included in the SR. The SRCR 90-day public comment period is on schedule to begin at the end of December 2000. The ACNW will begin its review of the SRCR at that time.

Ms. Carol Hanlon, DOE, YMPO, discussed the status of technical exchanges on various KTIs to support the NRC sufficiency review. Ms. Hanlon concluded by saying that the meetings have been productive and effective in establishing closure and a path forward.

Conclusions/Action Items

The ACNW will review the SRCR when it is issued.

9. Total System Performance Assessment - Site Recommendations

The ACNW heard an overview of the DOE's Total System Performance Assessment for Site Recommendation (TSPA-SR). The objective of the TSPA-SR is to assess the integrated performance of the proposed Yucca Mountain repository, including uncertainties, relative to an

overall performance standard as well as providing one of the bases for making a site recommendation to the President and Congress. The TSPA-SR is the latest of the TSPA series of analyses, including TSPA-VA, TSPA-95, TSPA-93, and TSPA-91. Representatives of DOE and its Management and Operations (M&O) consultant compared the TSPA-SR with the TSPA-VA and provided some preliminary results of the analyses. The TSPA-SR will include all significant features, events, and processes (FEPs) to demonstrate compliance with individual dose, groundwater protection, intrusion, and environmental impact requirements and standards. The TSPA-SR includes enhancements to the methodology and models to address proposed NRC and EPA requirements. Process improvements have also been made in the quality assurance (QA) area, the development of Analysis Model Reports (AMRs) as data input sources, evaluation of FEPs, and the traceability of the data. The presenters discussed a variety of issues with the Committee members, including the use of conservatism in the models and impacts on the resulting uncertainty analyses.

Conclusions/Action Items

The ACNW will continue to follow the development of TSPA-SR and will consider future briefings by DOE and NRC to gain a more in-depth understanding of the information bases and methodologies employed in the analyses.

10. Chlorine-36 Issue

Representatives of DOE and an M&O consultant briefed the Committee on incongruities in $^{36}Cl/Cl$ ratios in samples from the Exploratory Studies Facility (ESF) measured by Los Alamos National Lab (LANL) and Lawrence Livermore National Lab (LLNL). Data collected by LANL shows apparent bomb-pulse ^{36}Cl, as evidenced by high $^{36}Cl/Cl$ ratios in the northern half of the ESF. The LLNL study was undertaken to "validate" the LANL data set. The limited sampling by LLNL so far, shows no evidence of bomb-pulse ^{36}Cl across the Sundance Fault, which is in the general area where the LANL data shows the highest $^{36}Cl/Cl$ ratios. In addition, the LLNL $^{36}Cl/Cl$ data suggest very old Cl values, suggesting pore water residence times on the order of the half life of ^{36}Cl (308,000 years). The principal investigators from the two national labs involved discussed the issues, the implications of the two data sets for the infiltration models of Yucca Mountain, and ongoing interlaboratory calibration efforts. The sampling and sample processing methods of the two laboratories are somewhat different, and they are focusing their efforts to help resolve the discrepancies.

Conclusions/Action Items

The ACNW does not intend to take any action at this time, but the Committee will follow the efforts to resolve this issue because of the significant impact it may have on understanding unsaturated zone flow at Yucca Mountain.

11. Fluid Inclusion Issue

Representatives from University of Nevada at Las Vegas (UNLV), the State of Nevada, and the DOE/U. S. Geological Survey (USGS) briefed the ACNW on differing interpretations of the ongoing UNLV fluid inclusion study funded by the DOE. Representatives included the principal investigator, Dr. Jean Cline, UNLV, Zell Peterman USGS, and Yuri Dublyanski, State of Nevada.

Yuri Dublyanski, from the State of Nevada and a member of the Russian Academy of Sciences, provided an introduction to and a history of the fluid inclusion issue. He said that the real issue is not fluid inclusions themselves, but the origin of the secondary minerals, whether they were formed by downward percolation or upwelling of heated waters. Because of the conflicting observations and interpretations by scientists working for the State of Nevada and the DOE/USGS using samples taken from the same location, DOE initiated a verification project on the fluid inclusion issue in April 1999.

Dr. Jean Cline reported on the status of her project funded by the DOE to understand the movement of fluid with elevated temperatures through Yucca Mountain. The study objectives are to answer the four questions: Are these populations of fluid inclusions indicating the recent influx of thermal waters into the repository site? If these inclusions are present, what minimum fluid temperatures do they indicate? If present, when were these inclusions trapped, i.e., when did the influx occur? If an influx occurred, how widespread was this influx within the repository site? Dr. Cline described four studies designed to answer the questions, the methods used for studies, status of the studies, and the results. Presently, researchers are awaiting results of uranium lead and uranium series dating to determine the most recent influx of thermal waters. A final report on the study will be issued in March 2001. Preliminary findings will be reported at the Geological Society of America meeting in Reno, Nevada, in November 2000.

Dr. Zell Peterman, USGS, presented results of ongoing USGS fracture mineral studies which he believes refutes the theory of recent hydrothermal upwelling. Dr. Peterman also presented results of chemical and isotopic studies, geochronology, growth rates, and fluid inclusions, all of which he believes refute the idea of sporadic hydrothermal upwelling, but are consistent with continuous downward percolation of fracture water.

Dr. Dublyanski presented evidence (based on data available to the USGS and himself) to refute the USGS's contention that the calcite containing the fluid inclusions occurs paragenetically below a prominent silica stage formed of chalcedony and quartz, which formed at least 7 to 8 million years ago. He noted that the USGS contends that elevated temperatures could be due to percolation of rain water through cooling tuffs or the result of the Timber Mountain Caldera hydrothermal episode. However, Dr. Dublyanski considers that hydrothermal activity (less than 10 million years ago) cannot be discounted as a source of heat. After presenting his evidence, Dr. Dublyanski said that the USGS's contention that the calcite occurs paragenetically beneath the chalcedony-quartz layer is not supported by existing evidence, and that indirect mineralogical and geochemical evidence indicates that part of the fluid inclusion-bearing calcite could have been formed between 100,000 and 8,000,000 years ago.

The researchers continued to debate the issue throughout the forum. Dr. Wymer, ACNW, asked when the data would be available to definitively answer the question. Dr. Peterman replied that the data should be available in less than 1 year.

Conclusions/Action Items

The Committee will continue to follow the fluid inclusion issue.

12. Site Status - Tour

Dr. Mark Peters, Manager, Test Integration Department, Los Alamos National Laboratory, DOE M&O, provided a technical preview of the Committee's September 21st tour of the Yucca Mountain site.

He discussed the underground facilities to be visited (Alcoves 1, 2, and 8) and described the objective of the current testing, results to date, and other considerations.

Dr. Peters also discussed the Nye County Alluvial Testing Complex and the geotechnical studies at the North Portal Area. The purpose of these studies is to support development of ground motion design inputs for the license application design of surface facilities.

Sincerely,

/RA/

B. John Garrick
Chairman