

MINUTES OF THE 106TH ACNW MEETING  
FEBRUARY 23-25, 1999

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# CERTIFIED

BY B. JOHN GARRICK, 5/19/99

Issued: 5/18/99

**CERTIFIED MINUTES OF THE 106TH MEETING OF THE  
ADVISORY COMMITTEE ON NUCLEAR WASTE  
FEBRUARY 23-25, 1999  
Rockville, Maryland**

The U.S. Nuclear Regulatory Commission (NRC) Advisory Committee on Nuclear Waste (ACNW) held its 106th meeting on February 23-25, 1999, at Two White Flint North, Room T-2 B 3, 11545 Rockville Pike, Rockville, Maryland. The purpose of this meeting was to provide a forum for attendees to discuss and take appropriate action on the items listed in the agenda (Appendix II). The entire meeting was open to the public.

A transcript of selected portions of the meeting is available in the NRC's Public Document Room at the Gelman Building, 2120 L Street, NW, Washington, DC 20555-0001. Copies of the transcript are available for purchase from Ann Riley & Associates, Ltd., 1250 I Street, NW, Suite 300, Washington, DC 20005. Transcripts are also available for downloading from, or reviewing on, the Internet at <http://www.nrc.gov/ACRSACNW>.

## ATTENDEES

ACNW members who attended this meeting include Dr. B. John Garrick, ACNW Chairman, Dr. Charles Fairhurst, Dr. Raymond G. Wymer, and Dr. George M. Hornberger. For a list of other attendees, see Appendix III.

### 1. CHAIRMAN'S REPORT (Open)

[Richard Major was the Designated Federal Official for this portion of the meeting.]

Dr. B. John Garrick convened the meeting at 8:35 a.m. on February 23, 1999, and explained the purpose of this session. He noted the following items he believed to be of interest:

- Paul H. Lohaus has been appointed Director of the Office of State Programs following the retirement of Richard L. Bangart.
- New Mexico's government began hearings on February 22, 1999, to decide whether to grant the Department of Energy (DOE) a permit to begin using the Waste Isolation Pilot Plant (WIPP).

- Chancellor Gerhard Schroeder has delayed approval of appointments to the German Reactor Safety Commission (RSK), the government's top nuclear safety advisory body. A spokesman for Chancellor Schroeder said that the matter may be discussed by Mr. Schroeder during the next meeting of his cabinet. According to other sources, Mr. Schroeder agreed to shelve 12 appointments to the RSK proposed by the Federal Minister of Environment after industry exerted pressure to block his designation of nuclear critics.
- Former Congressman Morris K. Udall died at age 76 from Parkinson's disease. Mr. Udall was considered by many as the father of the Low-Level Radioactive Waste Policy Act. He also sponsored legislation from which Congress consented to the formation of the Southwestern Low-Level Waste Compact. Mr. Udall represented a Tucson, Arizona, congressional district from 1962 until he resigned in 1991.

## **II. DEPARTMENT OF ENERGY'S LICENSE APPLICATION DESIGN SELECTION PROCESS (OPEN)**

[Andrew C. Campbell was the Designated Federal Official for this portion of the meeting.]

Richard Craun, DOE, provided a history of the design selection effort for the Yucca Mountain repository. He discussed the license application design selection (LADS) process, alternative designs and features being evaluated, defense-in-depth analyses, and ranking alternative designs. A repository design report is currently scheduled to be submitted to DOE in May 1999. After DOE review, DOE expects to have selected a single high-level design with flexibility in such details as waste package (WP) materials.

Mr. Craun showed the steps for the LADS process, described "one-off analyses" for design features and alternatives, and discussed some of the inherent weaknesses of these analyses. He also described how DOE developed evaluation criteria to assess the performance of individual features and how DOE defined a modeling basis for performance assessment (PA). An elicitation process was used to capture "confidence" in the rankings. An independent review panel provided recommendations to simplify the criteria and to reduce the level of detail. Mr. Craun noted that the timing of decisions could be delayed without a negative impact on the process.

Mr. Craun discussed recent and upcoming enhanced design alternatives (EDA) workshops. The most recent EDA workshop focused on different thermal loadings and enhanced access designs. DOE has reduced 23 EDAs to 8 through a process of defining integral features and similarities in each EDA. It also established a license application (LA) design integration group, which consists of DOE staff, a management and operations (M&O) contractor, and DOE subcontractor senior representatives.

Dr. Fairhurst asked about "enhanced access." Mr. Craun replied that it includes shielding and thermal management to allow some access to the waste. He and Dr. Fairhurst discussed the accessibility of WPs for different design concepts. Mr. Craun discussed the particular features of the five EDAs under consideration. He added that analyses for PA, cost, and defense in depth (DID) are now under way. Dr. Steindler asked about the difference between screening criteria and evaluation criteria. Mr. Craun said that the screening criteria originally included post-closure performance, environmental considerations, and DID, but the latter two have been converted to "evaluation criteria." The remaining screening criterion was 25-mrem/year in 10,000 years. DOE is also looking at a 15-mrem standard. All of the EDAs considered have passed the 25-rem/year screening criteria. Neutralization analyses are conducted for the evaluation criteria.

He discussed the DID analyses, including: developing the methodology, dealing with uncertainties, evaluating elements of the post-closure safety case, and identifying principal barriers and assessing the relative contribution of each. Dr. Hornberger asked if DOE views multiple barriers and DID together. Mr. Craun said that yes, they are related. He also said that the DID analysis approach is based upon the NRC staff importance measures approach. They used barrier "neutralization" to estimate performance when a barrier is not as effective as one of the tools to evaluate EDAs. Each EDA will be ranked separately against the criteria. He said that DOE will review the contractor report and select a single design.

### Questions

Dr. Steindler asked about the reasons for leaving the design "open" and the possible impacts of doing so in a licensing hearing. Mr. Craun replied that DOE will select a design concept that allows some flexibility for incorporating updated features. Dr. Steindler and Mr. Craun discussed the chemical effects of the different options in the near-field chemistry and the increased uncertainty of a "hot" repository versus a "cold" repository. Dr. Hornberger asked whether DOE deliberately omitted the use of chemical agents to trap radionuclides from the EDA designs. Mr. Craun said that DOE looked at these and other features but not as an integral part of the EDA. He added that there was considerable debate about the ability of chemical agents to function as intended and the uncertainties in performance. Dr. Fairhurst and Mr. Craun discussed the size of a "hot" versus a "cold" repository, different thermal loading strategies, and alternative materials for the WP, including the use of titanium and alloy-22. Dr. Fairhurst and Mr. Craun discussed objections to reconfiguring the surface of the mountain to limit infiltration, which included the lack of permanence, the cost to re-contour 1300 acres, and possible environmental impacts. Dr. Fairhurst noted that such a comparison would have to include the environmental impacts of a surface monitored retrievable storage facility relative to reconfiguring the mountaintop. Dr. Wymer and Mr. Craun discussed the barrier "neutralization" approach, the barrier effects on water chemistry, and evaluations of common-mode and independent failures to understand how different features contribute. Drs. Fairhurst and Hornberger discussed a number of backfill issues with Mr. Craun, including the thermal effects on waste dissolution

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rates, the timing of backfill placement, and the evaluation of crushed tuff and sand as backfill materials. Mr. Craun also described various EDAs and specific features that might be included. They also discussed ground control features that are a necessary part of drift stability, including possible alternative shapes.

Dr. Garrick asked several questions: What is different from the viability assessment (VA) design? How is screening different from evaluations? What is the role of the Nuclear Waste Technical Review Board (NWTRB) in urging DOE to consider alternative designs? Mr. Craun said that the NWTRB was not the only driver for considering design alternatives. For example, DOE is concerned about the uncertainties of the high heat load in the base case model. DOE wanted to look at simpler, more resilient design alternatives so that coupled thermal-hydrologic-chemical-mechanical processes are less of an issue. Mr. Craun discussed the heat loading and other aspects in each EDA. He emphasized the evolution of design and noted that the VA is a snapshot and is not intended to be a static design. Dr. Garrick asked if the design process is moving in the direction of stability and simplicity or in the direction of more complexity. He noted that the additional features being proposed tend to add complexity. Mr. Craun replied that as part of the evaluation criteria, DOE evaluated the simplicity and licensability in terms of the function of each element, its construction, the demonstration of performance, the track record of the feature, and so forth. He said that DOE needs to ask all the questions now as it is preparing to select a final design. He added that this is a learning process and that DOE does not want to set a design that does not have flexibility. Dr. Garrick asked about the composition of the internal review panel and its function. Mr. Craun described the members of the review panel and their backgrounds.

Dr. Fairhurst asked about international participation. Mr. Craun replied that the panel did not have international members but that the recent Tunnel Stability Workshop had participants from Italy, Canada, and other nations. Dr. Fairhurst also asked about the effect of preclosure ventilation and the possibility of putting in backfill remotely. Mr. Craun discussed remote backfill placement, preclosure ventilation, and the combined effects of aging and ventilation flow volumes. Dr. Fairhurst asked when the final design was due and what were DOE's plans for retrieving damaged packages. Mr. Craun replied that the final design milestone is April 15, 1999, and the plan for retrieving WPs is to reverse the installation process. Dr. Fairhurst also noted that other nations are expecting vertical placement in boreholes. Mr. Craun said that DOE is mostly examining at in-line placements. Dr. Garrick asked about the "one-off" analyses compared to "neutralization analyses." Mr. Craun said that the "one-off" analyses evaluate a single feature, whereas neutralization involves a possible way of evaluating multiple features. Dr. Steindler asked if DOE ignores coupled effects, such as the impact of materials on chemistry. Mr. Larry Rickertson, M&O, distinguished between "one-off" analyses, EDA analyses, and neutralization analyses. As part of the latter analyses, DOE conducted broader evaluations of synergistic chemical effects for the five EDAs that were selected. Drs. Garrick and Fairhurst discussed with Messrs. Craun and Rickertson different design alternatives and the advantages and disadvantages of a "hot" versus a "cold" repository.

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Dr. Wymer inquired about the contribution of individual barriers to performance and how it is factored in. Mr. Craun said that DOE developed an integrated perspective that includes the impact of coupled chemical processes. Mr. Rickertson said that DOE does not remove the barriers in the analysis but reduces its function to a low level. Dr. Wymer noted that removal of a barrier will change the chemistry. Mr. Rickertson described how the "neutralization" of different barriers was performed. In some cases, the process decreased some aspect of barrier performance but left other aspects of performance unaffected. For example, DOE assumes no retardation for a "neutralized" invert, but it is still assumed to be physically present, providing support to the canister. Dr. Garrick noted that the barrier's true impact is not eliminated because it still has some functions. Mr. Rickertson gave some further examples of the approach. Dr. Fairhurst noted that the WP "neutralization" produced a thousand-fold increase in dose and that this estimate may be too conservative. He inquired about the impacts of other components and features on this type of analysis. Mr. Craun said that the base case has been changed for some of the neutralization analyses so that DOE can look at the impacts of different WP designs and the effects of other parameters.

Dr. Hornberger noted that there will be changes in design features as the repository is developed. He discussed the Board on Radioactive Waste Management (BRWM) (National Research Council) report "Rethinking HLW [High-Level Waste.]" He noted that the BRWM report recommended a "design as you go" philosophy, which he said is at odds with a hearing board that will want a fixed design. He added that the NRC and the DOE will have to work out a "design as you go" approach and asked what problems are anticipated. Mr. Craun agreed. Dr. Steindler added that a (licensing) board will hold DOE's "feet to the fire" about a fixed design and that reopening the design will have a large impact. Dr. Fairhurst noted that the WIPP repository must be recertified every 5 years so that flexibility is built into the process. Dr. Steindler noted that technical specification types of changes in reactor licensing may be applied to Yucca Mountain licensing. Dr. Campbell asked about the effects that changes in design will have on DOE's priorities and whether NRC is participating in the LADS process. Mr. Craun said that DOE will update its priorities to reflect changes. Dennis Richardson, M&O contractor, stated that NRC representatives are at various workshops and Appendix 7 meetings. He also described interactions with the NRC in different areas. Dr. Hornberger concluded by noting that the Committee looks forward to hearing next time from the license application site suitability investigation, evaluation, and simulation (LASSIES) team because if we have LADS, we will surely have LASSIES.

**III. WASTE-RELATED RESEARCH ACTIVITIES OF THE NUCLEAR REGULATORY COMMISSION (OPEN)**

[Howard J. Larson was the Designated Federal Official for this portion of the meeting.]

This portion of the meeting was intended to update the Committee on its contribution to the joint (with the Advisory Committee on Reactor Safeguards) report to the Commission on NRC research activities. (Last year, the ACNW contribution was provided in NUREG-1635, Vol. 1, Chapter V, June 1998, "Review and Evaluation of the Nuclear Regulatory Commission Safety Research Program.")

William R. Ott, Team Leader, Office of Nuclear Regulatory Research (RES), gave brief introductory remarks that addressed the impending RES reorganization (introducing a new division director, Thomas King) and discussed the current RES self-assessment activity (including the part of the self-assessment effort associated with the prioritization of research activities).

He next discussed the two RES waste-related programs: the Radiation Protection and Health Effects Program and the Radionuclide Transport Program. For each of the projects in both of these programs, Mr. Ott provided the Committee with an up-to-date status report, presenting the objective, scope, current status, and expected products.

Among the questions the Committee addressed to Mr. Ott were the following:

1. Whether criteria had been established for using one code or the other in facility license terminations (viz., RESRAD vis-a-vis the DandD code).
2. Whether there was a need to obtain data on basic science such as soil/plant uptake factors.
3. Whether, in its evaluation of possible avenues for development of the "clearance" rule, RES had contemplated the adoption of relevant international standards.
4. Whether a structure had been determined for identifying technology-based research needs. (This was a consistent concern relevant to all projects. It was noted that the program may be too small and seems, perhaps, to lack an underlying basis.)
5. Whether the Office of Nuclear Material Safety and Safeguards (NMSS), had recently transmitted comprehensive user-need requests to help guide the RES efforts.

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It was observed that it was difficult to understand how it could be stated that the NRC has no low-level waste (LLW) program, while RES performs work related to LLW disposal. Conversely, it was observed that the agency holds the HLW program as being extremely important, but there is little or no funding for a RES-related effort.

The Committee thanked Mr. Ott for his presentation, noting that over the years, the Committee has found the RES staff to be extremely competent.

In conclusion, the Committee expressed some concern as to its ability to "establish a logical basis for identifying research projects and prioritizing them." The Committee indicated that it would consider the described RES programs in its report to the Commission. [Unfortunately, NMSS management was unable to be at the meeting to discuss its HLW and decommissioning program technical assistance (research-type) effort.]

The Committee intends to complete its input for the Fiscal Year (FY) 1999 report to the Commission at its 108<sup>th</sup> meeting.

**IV. MEETING WITH JOHN GREEVES, NRC'S DIRECTOR OF THE DIVISION OF WASTE MANAGEMENT, OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS (OPEN)**

[Richard Major was the Designated Federal Official for this portion of the meeting.]

John Greeves of the Director, Division of Waste Management (DWM), NMSS, gave an update on current events and timely topics for the DWM. He announced that Joseph Holonich is now the Deputy Director of DWM. He stated that DWM is reviewing DOE's LADS process and that one of his concerns is that DOE will submit eight designs in the license application for Yucca Mountain. He stated that the NRC would prefer to review a single repository design.

Mr. Greeves discussed the status of the clearance rule. The Clearance rule has a top priority with the DWM staff, as indicated in SECY-99-028, "Rulemaking Process in Response to the Staff Requirements Memorandum for SECY-98-028, 'Regulatory Options for Setting Standards on Clearance of Materials and Equipment Having Residual Radioactivity.'" The status of this rule is that a preliminary technical basis document from Science Applications, Inc., the contractor, will be submitted in March 1999. The rule will include dose factors to individuals on specific cleared items. Examples of materials that would be cleared include scrap steel, copper, aluminum, concrete rubble, and tools for reuse. DWM will be requesting contractual help with the development of an environmental impact statement and a regulatory analysis. DWM will also be preparing an issues paper to frame questions for a series of public meetings that will begin in August 1999.



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The clearance rule will be developed using the enhanced participatory rulemaking process. It is expected that a draft proposed rule will be available in the 2000-2001 time frame. The clearance rule will be applicable to reactor decommissioning.

Mr. Greeves discussed the status of the Barnwell LLW repository. He stated that the new Governor of South Carolina announced that South Carolina is interested in rejoining the Southeast Compact. It is not clear whether Barnwell will remain open to the entire country, only those States in the compact, or only South Carolina. Legislation is being considered to address these issues.

Senator Murkowski has requested the General Accounting Office (GAO) to conduct a study of the national system for commercial LLW. Senator Murkowski is concerned about the delays at the Ward Valley site, the reduction in the amount of LLW going to Barnwell, and the increased amount of LLW going to Envirocare. Other concerns raised included the status of the LLW Amendments Act; the establishment of new disposal facilities; and alternatives for disposal, including transferring the responsibility to DOE. In addition, Senator Murkowski has asked the GAO to perform a disposal cost comparison between DOE and the private sector. Mr. Greeves said that the NRC's role in LLW has been as a consultant to the Agreement States. At the Committee's urging, Mr. Greeves will revisit the ACNW letter on elements of an LLW program and study past concerns of the ACNW.

Mr. Greeves discussed the Standard Review Plan (SRP) for Decommissioning. The staff has held two workshops on this issue to address such items as parallel dose modeling, as low as reasonably achievable (ALARA) considerations, and residual contamination levels. The staff has scheduled four more workshops for this year. DWM will be posting the SRP on the Radiation Criteria Web site. Mr. Greeves stated that the comment period for the SRP closes in August 1999 and that the draft SRP will undergo final review in June 2000. The goal is to publish a final document in July 2000.

A decommissioning program is before the Commission on the West Valley site. A white paper was submitted to the Commission and a meeting was held with cognizant stakeholders. This is a unique case in which the site was formerly licensed to Nuclear Fuel Services and the State of New York. The site reverted to DOE for the waste vitrification demonstration project, and it will ultimately be transferred back to the State of New York.

Comments are due May 10, 1999, on the proposed HLW regulation specific to Yucca Mountain, 10 CFR Part 63. DWM is conducting a public outreach program and has scheduled public meetings for March 23 and 25, 1999. DWM has also been developing a Yucca Mountain review plan and will meet with DOE in April 1999 to exchange information. A final plan will be available late this calendar year.

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Mr. Greeves discussed the status of the Environmental Protection Agency's (EPA's) HLW standard specific to Yucca Mountain. This standard has not yet been sent to the Office of Management and Budget but is expected to be sent soon. Mr. Greeves also mentioned that the Commission testified on House Resolution (H.R.) 45, the Nuclear Waste Policy Act of 1999. This bill proposes a 10,000-year repository compliance time for the Yucca Mountain repository, with a 100-rem all-pathways dose to an average member of the critical group and a 25-mrem contribution from the repository.

Mr. Greeves also discussed HLW technical assistance. He stated that the emphasis on engineering is 26 percent of the technical program. He also stated that augmented work is being conducted on 19 additional tasks related to key technical issues (KTIs). The Center for Nuclear Waste Regulatory Analyses has acquired consultants and contractors for assistance in the area of WP and repository design; these consultants and contractors possess international reputations in this area.

#### **V. DEPARTMENT OF ENERGY PRESENTATION ON THE VIABILITY ASSESSMENT OF A REPOSITORY AT YUCCA MOUNTAIN, NEVADA (OPEN)**

[Andrew Campbell was the Designated Federal Official for this portion of the meeting.]

Steve Brocoum, DOE, Yucca Mountain Project Office, summarized the congressional mandate and basis of the Viability Assessment (VA) and some of the key conclusions of the study. Mr. Brocoum reviewed the key attributes of the DOE Repository Safety Strategy and discussed the most important uncertainties and sensitive parameters identified in the Total System Performance Assessment for the VA (TSPA-VA). These include parameters that affect seepage into the WP, cladding degradation, and the movement of water in the saturated zones (SZs) and the unsaturated zones (UZs). He discussed some of the alternative designs being evaluated, including different repository temperatures and features intended to minimize water contact with the WP. Mr. Brocoum discussed both the U.S. Geological Survey report on the VA and DOE's TSPA-VA Final Peer Review Panel Report and noted specific concerns and recommendations. He also described DOE's plans for key tests to be carried out in the next few years that will address some of the uncertainties.

Mr. Brocoum described the transition of the Yucca Mountain project (YMP) from a "research and development" type of culture to a "regulatory culture." He said that DOE is placing a lot of attention on quality initiatives and resolving quality assurance (QA) issues and is reorganizing the project to enhance its quality and excellence. Mr. Brocoum also said that the project recognizes deficiencies in documentation and the traceability of data. Much of the emphasis is on either qualifying existing data and/or identifying it as non-qualified as DOE prepares for the environmental impact statement and the site recommendation (SR). DOE has also initiated a process validation and re-engineering effort to make its process more efficient.

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Mr. Brocoum discussed the organizational structure of the Office of Civilian Radioactive Waste Management and the Yucca Mountain Site Characterization Office (YMSCO). He described the functions and products of the four main offices in the YMSCO. He also described the connections between supporting technical studies and work, technical reference documents, and licensing and regulatory documents. He described development of the LA plan and some of the major products and milestones. Mr. Brocoum discussed the YMP strategy decision plan and described its focus. He also discussed the structure and contents for the SR document and the FY 1999 priorities.

### Questions

The ACNW members and consultant discussed the following issues with Mr. Brocoum: communication with the public, the amount of detail in the SR, design alternatives, development of a regulatory culture at DOE, and lessons learned from the nuclear power industry. Dr. Hornberger asked about the most important QA issues and how DOE plans to resolve them. Mr. Brocoum said that most of the data are adequate, but the problem was in following QA procedures. He said that DOE is instituting procedures to ensure that QA procedures are followed.

Dr. Fairhurst and Mr. Brocoum discussed different thermal loading designs for the repository and any subsequent impacts on water movement.

Carol Hanlon, DOE/YMSCO, described Volume 4 of the VA, the License Application Plan. The purpose of the LA plan is to identify additional scientific and engineering information needed for the LA, to set priorities, to provide a schedule and costs for a docketable LA, and to communicate with the public on these issues. She said that the LA plan is not intended to provide a detailed description of statutory and regulatory activities. Ms. Hanlon described the organization of the LA plan and noted five areas of emphasis that included the rationale for technical work, the post-closure safety case, post-closure performance, the prioritization of principal factors that affect performance, and the technical work plans.

Ms. Hanlon described the differences between the post-closure and pre-closure safety cases. Dr. Garrick asked about differences in assessing repository performance for different pre-closure periods. Ms. Hanlon stated that the pre-closure analysis is roughly analogous to the post-closure, but not as rigorous. Dr. Garrick asked about comparing pre-closure risk with post-closure risk. Ms. Hanlon said that DOE is attempting to deal with that issue.

Ms. Hanlon discussed prioritization of 19 principal factors in terms of their importance to performance, the uncertainty significance, the current confidence, the confidence goal, and the assigned priority for each factor. She said that work will be performed on all the factors but that the highest priority factors will receive the most attention. Ms. Hanlon then described the technical work plans and the multi-year planning efforts that will be revised in terms of the

prioritization. She described development of the technical work plans, which are organized by three functional areas: site, design, and PA. She said that the NRC's KTIs are noted and referenced in all four volumes of the VA and are specifically addressed in the LA plan.

### Questions

Dr. Hornberger and Ms. Hanlon discussed the basis for the confidence goals and priorities, the role that limited time played in determining what those goals were, and obtaining additional data and information during performance confirmation. Dr. Steindler questioned the use of the "performance confirmation" period to collect additional data for a previously submitted LA. Ms. Hanlon said that DOE will submit a docketable LA and all the needed information, but it will have some additional data that will allow it to evaluate whether there are any adverse impacts on its conclusions. Dr. Fairhurst supported the concept that DOE can make changes over the 50- to 100-year pre-closure period, as new things are learned. He noted that WIPP has a 5-year recertification requirement. Dr. Garrick expressed concern that TSPA appeared to play a minor role in prioritization. Ms. Hanlon said that DOE did not want to leave that impression because the TSPA and prioritization work were performed together to set priorities. Ernie Hardin, M&O, stated that the "current confidence" included a TSPA basis but also included judgment because of model limitations. Dr. Steindler expressed concern about the consistency of the TSPA results and assigned priorities. He questioned whether DOE had considered model uncertainty in setting priorities and provided examples of his concern that the highest priority work may fail to meet all the data needs of the LA. Mr. Brocoum commented that the priorities were based on the reference design in the VA. DOE will have to revisit the priority tables to make them consistent with changes in design and updates in the program. Dr. Garrick said that the prioritization table was a very good idea, but the primary concern was its basis. Dr. Wymer expressed concern that the selection of data needs was driven too hard by the schedule. Ms. Hanlon said that the schedule was an issue.

Ernie Hardin, M&O, discussed the prioritization of principal factors. He noted that these priorities are based on the VA design, that the selection of priorities involved different constituencies, and that DOE had to use judgment in selecting the priorities, given the limitations of TSPA. Dr. Hardin reviewed the prioritization process and then discussed activities in the three highest priority principal factors: seepage into the drifts, corrosion of the WP, and UZ flow and transport. He noted that variations in the predicted seepage lead to 50-fold variations in dose. He described the basis for these variations in the model and the reason for the assigned low "current confidence." He said that the confidence goal was high because the current testing program will be completed by the LA. Some tests, however, will continue beyond the LA. He described current work plans for drift seepage. Dr. Hardin discussed UZ flow and transport issues. He described the technical work plans for UZ flow and transport, including studies at the Busted Butte site, the cross-drift tracer studies, review of analogs, and updating the mountain model. Dr. Hardin also discussed the integrity of the corrosion barrier, the uncertainty in corrosion rates, the current confidence, the confidence goal, and the assigned priority. In

addition, he discussed the technical work plans, including long-term corrosion testing, the development of local corrosion and phase separation models, and measurements to evaluate how well the materials maintain their corrosion-resistant passive layer over a wide range of conditions. DOE will also continue testing for microbially enhanced corrosion.

### Questions

The Committee members and the consultant discussed the following issues with Dr. Hardin: peak dose in the 10,000-year time of compliance and at longer time frames; the main factors that influence the dose curves and uncertainties; setting work priorities in terms of the amount that these uncertainties can be reduced; the use of judgment in developing confidence goals; the role of data acquisition in updating conceptual models; conceptual model uncertainty and defensibility of the models; and the need for the confidence goals to reflect performance analysis and performance measures.

Dwight T. Hoxie, M&O, discussed seepage into drifts. He discussed why seepage is an important issue and described the planned alcove and niche studies in the main and cross-drifts, including geochemical and mineralogical studies, moisture monitoring, and updating seepage and percolation models. He described the study areas on a map of the Exploratory Studies Facility (ESF). He also described and discussed several experiments in the main drift of the ESF, including the infiltration experiments in Alcove 1; the ambient percolation flux experiment in Alcove 7; flow tests in Alcove 4 in the Paintbrush non-welded hydrogeologic unit; and the seepage testing in Niches 1, 3, and 4. Dr. Hoxie then discussed the moisture studies planned in the east-west (E-W) cross-drift, including infiltration studies in which the E-W drift crosses over the ESF (15 meters above Alcove 3 and Niche 3 in the ESF) and seepage testing in Niches 5 and 6 in the E-W cross-drift. He also discussed planned geochemical sampling in the E-W drift for bomb pulse <sup>36</sup>CL, which can indicate the presence of fast pathways. He discussed the planned mineralogical sampling and analyses for oxygen, carbon, strontium, and uranium isotopes and described what DOE is looking for in these studies. Dr. Hoxie also discussed the moisture sampling of air in the main and cross-drifts of the ESF. He said that the data show that the rock mass at a depth of 2 meters from the drift wall is 90 percent wetter than the rock at the drift wall. He also described the program to update the ambient seepage and percolation models, including key aspects and features of the models DOE plans to update, information DOE hopes to obtain from these updated models, and the specific work that is planned.

### Questions

The Committee members and Dr. Hoxie discussed fracture modeling; mining-induced fracturing and use of an alpine miner in creating the niches; techniques used to determine disturbance of the rock mass and how it was accounted for in the studies; incorporating the effects of drift collapse into the TSPA seepage model; extrapolating the wet conditions used in the percolation studies to the dry natural conditions in discrete fracture models; fracture density and the use of

a fracture continuum model in TSPA; how to treat high-flow fractures statistically, using comparisons to other tests; and concerns about the boundary conditions of the model.

Dr. Hoxie discussed UZ flow and transport and focused on three issues: sorption in fractures, dispersion, and matrix diffusion. He discussed planned UZ studies at the Busted Butte site, including laboratory and field studies. Dr. Hoxie also discussed the key moisture flow features at the Busted Butte site. He said that matrix flow dominates, that fracture flow is rate limited by imbibition into the matrix, and that contacts at different geologic units act as transient hydrologic barriers. He described ongoing and planned work, including work on colloids and solubility studies. He also discussed natural analog studies and noted that most worldwide analog work on geologic repositories is performed in the SZ, but DOE needs information on the UZ. DOE has completed a "synthesis report" for the use of natural analogs in the LA and in performance confirmation. He then described specific ongoing and planned work for the post-VA/TSPA-VA period, which includes the general fracture model (GFM 3.1), the study of inclined faults, 1- and 2-dimensional inversions, investigation of the Paintbrush Tuff unit to examine lateral diversion of flow, and improvements to the Calico Hills models. He then summarized the key issues.

### Questions

The Committee members asked about estimates of contaminant travel time to the ground water table from the repository, incorporation of data into the models, the impact of matrix-fracture interactions on performance, and the disturbance zone created by excavating the alcoves at Busted Butte. Dr. Hoxie discussed the range of ground water travel times, the fracture-matrix coupling factor, the flow volume in fast water paths, the role of a capillary barrier, and how the data will be incorporated into TSPA.

Dr. David Stahl, M&O, discussed the WP materials testing program. He said that the critical WP issues were as follows: Does the material have adequate corrosion performance? Can analogs be used to estimate performance? Has an adequate case been made for cladding performance? He discussed the integrity of the corrosion-resistant material barrier in terms of long-term tests on the candidate materials (nickel and titanium alloys). He described the WP design, the corrosion tests and facility, the range of conditions, the variety of materials being tested, and the results to date. The container material testing includes the following: crevice corrosion tests, long-term relative humidity tests, drip tests onto heated surfaces to evaluate this process over time, WP surface water chemistry tests, microbially influenced corrosion tests, and tests for a variety of coatings being evaluated. In response to a question. Dr. Stahl said that DOE evaluated radiolytic impacts and that there was no impact. He described alternative WP design and some possible features that DOE is considering. Dr. Stahl described plans for additional testing, including crevice corrosion, stress-corrosion cracking, hydrogen attack on titanium, and phase stability of alloy-22. Dr. Stahl also discussed natural analog models for different materials, but, he said, DOE needs a model for titanium to validate the performance models. In the area of cladding performance, DOE is examining a range of burn-up values and

other aspects of spent fuel. He described some of the experiments to discover whether the cladding could split when the fuel oxidizes and expands as it forms uranium silicate. Finally, he provided a summary of his presentation.

### Questions

Drs. Steindler and Stahl discussed validation of corrosion models using short-term (accelerated) tests and long-term data sets, the possible use of ceramic, and evaluations of different materials. Dr. Stahl said that DOE hopes to have 50 years of data from performance confirmation. Drs. Wymer, Garrick, and Steindler discussed with Dr. Stahl some of the chemical and physical conditions used in the tests and the basis for selecting specific values. Drs. Fairhurst and Stahl discussed the reasons for the cladding temperature limit that DOE imposes on the repository design, creep rupture, whether localized pinhole failures can lead to general failure of cladding, analog data, and interactions with the NRC staff on the issue of cladding.

### VI. NUCLEAR REGULATORY COMMISSION STAFF'S PRESENTATION ON THE VIABILITY ASSESSMENT OF A REPOSITORY AT YUCCA MOUNTAIN, NEVADA (OPEN)

Michael Bell, Chief of the Performance Assessment and High Level Waste Integration Branch, DWM, NMSS, presented the preliminary results of the staff's review of the DOE VA. He discussed the objectives and scope of the review, the schedule for completing it, and the basis and results for the review. Dr. Bell discussed the background for the VA and NRC's role. He described the objective of the review: to identify DOE's progress in developing information necessary for an LA. This description included identifying any major concerns with test plans, design concepts, the TSPA, and the LA plan that might result in an unacceptable LA if not resolved. The scope of the review touched upon all volumes of the VA: the preliminary design concept, the TSPA, the LA plan and cost, and the cost to construct and operate the repository. The staff, however, did not examine costs and instead focused its efforts on the preliminary design concept, the TSPA, and the LA plan. Dr. Bell said that the staff prepared for the review through interactions with DOE, such as technical exchanges. Dr. Bell also discussed the schedule for completing the review, submitting a SECY paper, and briefing the Commission.

In addition, Dr. Bell discussed the basis of the review. He said that DOE evaluated the probable performance of the reference design, and the NRC conducted an independent analysis using its TPA code to determine whether DOE is performing the right work. The NRC staff focused on the most significant issues on the basis of sensitivity analyses. He said that the NRC staff wanted to determine whether DOE's data and analysis capability is sufficient to prepare a high-quality LA. Both DOE and NRC used a 25-mrem dose standard to the average member of the critical group as the basis for performance. Although 10 CFR Part 63 has a 10,000-year performance period, both DOE and NRC carried out analyses past that time. He said that the NRC staff had not identified any new issues, that had not previously been identified in the KTIs.

The NRC staff found many positive aspects to the VA but there were some areas of concern that might affect the DOE's ability to submit a complete LA. He discussed the NRC staff's view of the positive aspects of VA, including frequent interaction, substantial information furnished by DOE, and recognition by DOE of the need for additional work. He noted that there are many areas in which the NRC staff has no major concerns, such as the mechanical disruption of WPs, the spatial and temporal distribution of flow, the distribution of mass flux between rock fractures and matrix, retardation in rock fractures, airborne transport of radionuclides, dilution of radionuclides in soil, and the definition of the critical group. Areas of concern include the lack of a fixed design, the limited supporting information for DOE's model of WP corrosion, the adequacy of DOE's treatment of water dripping onto the WP, problems with DOE's model and database for analyzing SZ flow and transport, the completeness of DOE's treatment of igneous activity, and problems with DOE's QA program.

Dr. Bell described the impact of design changes on data acquisition and discussed how these changes affect the NRC program and why it is a concern. He said that a major TSPA issue is WP corrosion. If the final design includes alloy C-22, the staff is concerned that there is limited data or experience with the material, there are fabrication issues, and possible failure modes at welds are not currently being addressed in the testing program. Another concern is the quantity and chemistry of water contacting the waste. This concern includes problems with DOE's model of water movement and chemistry during the thermal period and questions not being addressed in current testing programs. In the area of SZ flow and transport, Dr. Bell said that DOE does not have ample time to develop all the data needed to support the LA in 3 years. He said that the NRC staff has concerns with the DOE igneous activity consequence models, which are documented in Revision 1 to the Issue Resolution Status Report (IRSR) on Igneous Activity. Dr. Bell added that the LA plan is already out of date and that DOE is currently planning to refine some of these models.

Dr. Bell discussed the LA plan review. He noted that it is a snapshot in time and that DOE is focusing on the resolution of issues and is using the IRSRs to plan its work. He described some of the workshops DOE is holding and stated that the workshops will follow the implementation of revised work plans. He discussed some of NRC's QA concerns. He said that although the VA is not a licensing document that was developed under a QA program, NRC is still concerned that DOE did not follow its own QA requirements. The data is not properly qualified and the NRC has not been successful in trying to resolve this issue over the years. NRC will follow closely how DOE addresses this problem, including its "root cause analysis" and corrective action program. He added that this area is receiving a lot of attention from DOE senior management. Finally, Dr. Bell discussed some of the upcoming milestones in the staff's VA review, and, he added, the NRC staff will continue preclicensing consultation with DOE to resolve the staff's concerns.



### Questions

The Committee raised a number of questions concerning design and information needs to support a design. The staff noted that changes in design have an impact on the staff's ability to conduct a review because a change in materials and combinations of materials will affect what data is being collected and how long it will take. The staff also stated that it is concerned with data acquisition, even if the design was set, because of possible impacts on the LA if the testing plan is not met. The Committee members and Dr. Steindler discussed with the staff the differences between NRC and DOE models, assumptions, and uncertainty. The staff discussed some of the contrasting assumptions in the models. Dr. Bell noted that DOE's use of conservative fuel dissolution assumptions makes it necessary to rely on cladding credit to a degree that NRC believes is not supported by data.

Dr. Steindler asked whether DOE and NRC use different models for fuel dissolution. Brett Leslie, DOE, described how the NRC uses four different conceptual models some of which include DOE models and data. A discussion ensued of the similarities and differences in DOE and NRC models. Drs. Garrick and Bell discussed whether NRC uses engineering design analyses for evaluating the DOE design and operational aspects of the repository that may affect post-closure performance. There were also questions about "show stopper" issues. Dr. Bell said that nothing leads the staff to conclude that the site is not suitable, but its concerns are the possible weakness and lack of appropriate data that will affect the LA. Committee members and the NRC staff discussed the 10,000-year time of compliance in the draft HLW regulation (10 CFR Part 63) and implications of model results beyond the compliance period. There also was a discussion of the QA issue, in terms of data qualification, paperwork issues, qualifying literature data, the use of peer review, and the need to evaluate the importance of parameters and models to determine what data are most important. Dr. Hornberger and the staff discussed NRC's concern about the lack of certain data and the adequacy of the LA database. The staff discussed the relative importance of sorption in alluvial material for NRC and DOE models and the basis for those differences. The staff also emphasized that because there are no subsystem performance requirements, DOE needs to demonstrate that it has multiple barriers.

Drs. Hornberger and Fairhurst discussed igneous activity issues with Dr. Bell and the NRC staff. Dr. Bell said that if DOE proposes a well-engineered system, in which the dose may be zero (in the compliance period), disruptive scenarios may have the highest risk. John Trapp, NMSS, discussed some of the specific concerns NMSS has with respect to possible consequences. Dr. Fairhurst questioned the assumption that the drifts would remain open over long periods. Dr. Hornberger said that the NRC needs to consider likelihood and consequences and that it needs to come to ACNW and DOE and brief them on this problem. Timothy McCartin, NMSS, said that the probability weighted dose is about a millirem, so this is not the issue; rather, it is that DOE must arrive at an appropriate calculation for the LA. There was further discussion about the need to couple probability and consequences and not consider them separately.

Dr. Stahl said that there is a limited data set for the C-22 alloy, but that the C-alloys go back 60 years; in addition, stainless steel has a history of about 80 to 100 years. He said that DOE does need more data. He asked about welding issues, which the staff thought had been resolved. Jennifer Davis, NMSS, responded that the staff is concerned about the final weld, which is not heat treated, and is also concerned with shrink-fit issues. The staff is concerned about fabrication in relation to estimating the number of juvenile failures, and localized corrosion aspects of C-22 that had not been discussed.

**VII. 1999 HIGH-LEVEL WASTE INITIATIVES OF THE NUCLEAR ENERGY INSTITUTE (OPEN)**

[Richard K. Major was the Designated Federal Official for this portion of the meeting.]

Marvin Fertel and Steve Kraft, Nuclear Energy Institute (NEI), gave an update on current NEI initiatives for 1999 concerning HLW disposal. Mr. Fertel stated that NEI was pleased with the developments over the last 60 days, that is, DOE's ability to publish the VA in a timely fashion and DOE's willingness to stand behind the science available in light of the uncertainties with which DOE still had to deal. In addition, Mr. Fertel stated that NEI was pleased that DOE had laid out plans for moving ahead with the LA. There is still concern about implementing the plan as written. NEI has offered its assistance with DOE's licensing and QA programs. NEI has over 50 years' experience in these two areas.

Mr. Fertel stated that NEI and its members are pleased with the proposed Yucca Mountain specific HLW regulation, 10 CFR Part 63. NEI is concerned that the currently proposed nuclear waste legislation could jeopardize a number of plants that are in the process of decommissioning and have nowhere to put their waste, let alone their spent fuel.

NEI favors the proposed legislation in H.R. 45, which sets a 100-mrem/year dose limit for an average member of the critical group living near Yucca Mountain. NEI is pleased that the NRC also favors this legislation. NEI believes that EPA's 4-mrem/year drinking water standard at the HLW repository boundary is overly restrictive.

Mr. Fertel stated that it was probably much easier to apply risk-informed regulations to nuclear power plants because of the amount of data available on reactor systems and components as opposed to making a risk-informed decision on the proposed HLW repository. He hoped that the ACNW could assist in this area. He also stated that he favors a multi-stage licensing process for Yucca Mountain and that perhaps an above-ground facility could be licensed earlier than the repository. He posed the concept of early HLW emplacement for testing purposes at Yucca Mountain. He stated that informal (legislative) hearings rather than adjudicatory hearings would be preferable since they are likely to create less delay. He is concerned about how the NRC will help the President make the decision that the site is suitable when the staff will only comment on the completeness of the SR. Mr. Kraft stated that the most important issues facing

106<sup>th</sup> ACNW Meeting  
February 23-25, 1999

the HLW program are adequate funds, DOE's ability to produce an LA, an adequate QA program, and the uncertainties related to the forthcoming EPA standard for HLW disposal.

**VIII . EXECUTIVE SESSION (Open)**

[Mr. Richard Major was the Designated Federal Official for this part of the meeting.]

**A. Future Meeting Agenda (Open)**

Appendix IV summarizes the proposed items endorsed by the Committee for the 107<sup>th</sup> ACNW meeting, March 16–17, 1999.

**B. Future Committee Activities (Open)**

The 107<sup>th</sup> ACNW meeting is scheduled for March 16 and 17, 1999, and the 108<sup>th</sup> ACNW meeting is scheduled for March 23–25, 1999.

## NUCLEAR REGULATORY COMMISSION

[Docket No. 50-293]

### Boston Edison Company, Pilgrim Nuclear Power Station; Notice of Consideration of Approval of Transfer of Facility Operating License and Materials License and Issuance of Conforming Amendment, and Opportunity for a Hearing

The U.S. Nuclear Regulatory Commission (the Commission) is considering the issuance of an order under 10 CFR 50.80 approving the transfer of Facility Operating License No. DPR-35 for the Pilgrim Nuclear Power Station (Pilgrim) currently held by Boston Edison Company (Boston Edison), as owner and licensed operator of Pilgrim. The transfer would be to Entergy Nuclear Generation Company (Entergy). The Commission is also considering amending the license for administrative purposes to reflect the proposed transfer.

According to an application for approval filed by Boston Edison and Entergy, Entergy would assume title to the facility following approval of the proposed license transfer, and would be responsible for the operation, maintenance, and eventual decommissioning of Pilgrim. No physical changes to the Pilgrim facility or operational changes are being proposed in the application.

The proposed amendment would replace references to Boston Edison in the license with references to Entergy, to reflect the proposed transfer.

Pursuant to 10 CFR 50.80, no license, or any right thereunder, shall be transferred, directly or indirectly, through transfer of control of the license, unless the Commission shall give its consent in writing. The Commission will approve an application for the transfer of a license, if the Commission determines that the proposed transferee is qualified to hold the license, and that the transfer is otherwise consistent with applicable provisions of law, regulations, and orders issued by the Commission pursuant thereto.

Before issuance of the proposed conforming license amendment, the Commission will have made findings required by the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations.

As provided in 10 CFR 2.1315, unless otherwise determined by the Commission with regard to a specific application, the Commission has determined that any amendment to the license of a utilization facility which

does no more than conform the license to reflect the transfer action involves no significant hazards consideration. No contrary determination has been made with respect to this specific license amendment application. In light of the generic determination reflected in 10 CFR 2.1315, no public comments with respect to significant hazards considerations are being solicited, notwithstanding the general comment procedures contained in 10 CFR 50.91.

The filing of requests for hearing and petitions for leave to intervene, and written comments with regard to the license transfer application, are discussed below.

By February 16, 1999, any person whose interest may be affected by the Commission's action on the application may request a hearing, and, if not the applicants, may petition for leave to intervene in a hearing proceeding on the Commission's action. Requests for a hearing and petitions for leave to intervene should be filed in accordance with the Commission's rules of practice set forth in Subpart M, "Public Notification, Availability of Documents and Records, Hearing Requests and Procedures for Hearings on License Transfer Applications," of 10 CFR Part 2. In particular, such requests and petitions must comply with the requirements set forth in 10 CFR 2.1306, and should address the considerations contained in 10 CFR 2.1308(a). Untimely requests and petitions may be denied, as provided in 10 CFR 2.1308(b), unless good cause for failure to file on time is established. In addition, an untimely request or petition should address the factors that the Commission will also consider, in reviewing untimely requests or petitions, set forth in 10 CFR 2.1308(b)(1)-(2).

Requests for a hearing and petitions for leave to intervene should be served upon John M. Fulton, Assistant General Counsel, at Boston Edison Company, 800 Boylston Street, Boston, Massachusetts 02199-8003 (tel: 617-424-2553; fax: 617-424-2733; e-mail: john\_fulton@bedison.com), Jay E. Silberg, counsel for Boston Edison, at Shaw Pittman Potts & Trowbridge, 2300 N Street, NW., Washington, DC 20037-1128 (tel: 202-663-8063; fax: 202-663-8007; e-mail: jay\_silberg@shawpittman.com), and Douglas E. Levanway, counsel for Entergy Nuclear Generating Company, at Wise, Carter, Childs and Caraway, P.O. Box 651, Jackson, Mississippi, 39205-0651 (tel: 601-968-5524; fax: 601-968-5519; e-mail: del@wisecarter.com); the General Counsel, U.S. Nuclear Regulatory

Commission, Washington, DC 20555; and the Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, Attention: Rulemakings and Adjudications Staff, in accordance with 10 CFR 2.1313.

The Commission will issue a notice or order granting or denying a hearing request or intervention petition, designating the issues for any hearing that will be held and designating the Presiding Officer. A notice granting a hearing will be published in the Federal Register and served on the parties to the hearing.

As an alternative to requests for hearing and petitions to intervene, by February 25, 1999, persons may submit written comments regarding the license transfer application, as provided for in 10 CFR 2.1305. The Commission will consider and, if appropriate, respond to these comments, but such comments will not otherwise constitute part of the decisional record. Comments should be submitted to the Secretary, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, Attention: Rulemakings and Adjudications Staff, and should cite the publication date and page number of this Federal Register notice.

For further details with respect to this action, see the application dated December 21, 1998, available for public inspection at the Commission's Public Document Room, the Gelman Building, 2120 L Street, NW., Washington, DC, and at the local public document room located at the Plymouth Public Library, 11 North Street, Plymouth, Massachusetts 02199.

Dated at Rockville, Maryland this 21st day of January 1999.

For the Nuclear Regulatory Commission:  
William M. Dean,  
Director, Project Directorate I-2, Division of Reactor Projects—I/II, Office of Nuclear Reactor Regulation.  
[FR Doc. 99-1703 Filed 1-25-99; 8:45 am]  
BILLING CODE 7890-01-P

## NUCLEAR REGULATORY COMMISSION

### Advisory Committee on Nuclear Waste; Notice of Meeting

The Advisory Committee on Nuclear Waste (ACNW) will hold its 106th meeting on February 23-25, 1999, Room T-2B3, 11545 Rockville Pike, Rockville, Maryland.

The entire meeting will be open to public attendance.

The schedule for this meeting is as follows:

Tuesday, February 23, 1999—8:30 A.M. until 6:00 P.M.

Wednesday, February 24, 1999—8:30

A.M. until 6:00 P.M.

Thursday, February 25, 1999—8:30 A.M.  
until 4:00 P.M.

The following topics will be discussed:

**A. Viability Assessment**—The Committee will continue its review of the Department of Energy's (DOE's) Yucca Mountain viability assessment (VA). Discussions with representatives of DOE and the NRC staff are possible. The Committee will discuss its own internal review of the VA.

**B. Waste Related Research**—The Committee will review nuclear waste related research and technical assistance being performed for the NRC. The Committee will present the results of this review in a report to the Commissioners due April 1999. Discussions with representatives of NRC's Office of Nuclear Regulatory Research and Nuclear Material Safety and Safeguards is anticipated.

**C. Preparation of ACNW Reports**—The Committee will discuss planned reports on the following topics: an ACNW self-assessment, DOE's Viability Assessment, NRC supported Waste Related Research, a White Paper on Repository Design Issues at Yucca Mountain, and other topics discussed during this and previous meetings as the need arises.

**D. Repository Design**—The Committee will begin work on a White Paper that addresses Repository Design Issues for Yucca Mountain. The paper will focus on the results of thermal testing and modeling and how moisture contacts and affects the waste package. The Committee may also examine the significance of coupled effects, aspects of waste retrievability, repository ventilation, rock fall, and water dripping into drifts.

**E. Meeting with NEI**—Representatives from the Nuclear Energy Institute will present their perspective on the upcoming year. Topics will focus on the U.S. high-level radioactive waste program and related legislation.

**F. Meeting with NRC's Director, Division of Waste Management, Office of Nuclear Material Safety and Safeguards**—The Committee will meet with the Director to discuss recent developments within the division such as developments at the Yucca Mountain project, rules and guidance under development, available resources, and other items of mutual interest.

**G. Prepare for the Next Meeting with the Commission**—The Committee will begin preparations for its next public meeting with the Commission. Specific topics for discussion will be finalized and reviewed.

**H. Committee Activities/Future Agenda**—The Committee will consider topics proposed for future consideration by the full Committee and Working Groups. The Committee will discuss ACNW-related activities of individual members.

**I. Miscellaneous**—The Committee will discuss miscellaneous matters related to the conduct of Committee activities and organizational activities and complete discussion of matters and specific issues that were not completed during previous meetings, as time and availability of information permit.

Procedures for the conduct of and participation in ACNW meetings were published in the Federal Register on September 29, 1998 (63 FR 51967). In accordance with these procedures, oral or written statements may be presented by members of the public, electronic recordings will be permitted only during those portions of the meeting that are open to the public, and questions may be asked only by members of the Committee, its consultants, and staff. Persons desiring to make oral statements should notify the Chief, Nuclear Waste Branch, Mr. Richard K. Major, as far in advance as practicable so that appropriate arrangements can be made to schedule the necessary time during the meeting for such statements. Use of still, motion picture, and television cameras during this meeting will be limited to selected portions of the meeting as determined by the ACNW Chairman. Information regarding the time to be set aside for taking pictures may be obtained by contacting the Chief, Nuclear Waste Branch, prior to the meeting. In view of the possibility that the schedule for ACNW meetings may be adjusted by the Chairman as necessary to facilitate the conduct of the meeting, persons planning to attend should notify Mr. Major as to their particular needs.

Further information regarding topics to be discussed, whether the meeting has been canceled or rescheduled, the Chairman's ruling on requests for the opportunity to present oral statements and the time allotted therefor can be obtained by contacting Mr. Richard K. Major, Chief, Nuclear Waste Branch (telephone 301/415-7366), between 8:00 A.M. and 5:00 P.M. EST.

ACNW meeting notices, meeting transcripts, and letter reports are now available for downloading or reviewing on the internet at <http://www.nrc.gov/ACRSACNW>.

Dated: January 20, 1999.

Andrew L. Bates,  
Advisory Committee Management Officer.  
[FR Doc. 99-1707 Filed 1-25-99; 8:45 am]  
BILLING CODE 7890-01-P

## NUCLEAR REGULATORY COMMISSION

### Advisory Committee on Reactor Safeguards; Revised Meeting

The agenda for the 459th meeting of the Advisory Committee on Reactor Safeguards scheduled to be held on February 3-6, 1999, in Conference Room T-2B3, 11545 Rockville Pike, Rockville, Maryland, has been revised to change the time for the ACRS meeting with the NRC Commissioners. The meeting with the NRC Commissioners will be held between 1:00 and 2:30 p.m., on Wednesday, February 3, 1999, instead of 2:00 and 3:30 p.m. Preparation of ACRS reports will begin at 3:00 p.m. instead of 4:00 p.m.

The agenda for February 4-6, 1999 remains the same as published in the Federal Register on Thursday, January 14, 1999 (64 FR 2525).

Further information regarding this meeting can be obtained by contacting Mr. Sam Duraiswamy, Chief of the Nuclear Reactors Branch (telephone 301/415-7364), between 7:30 a.m. and 4:15 p.m. EST.

Dated: January 20, 1999.

Andrew L. Bates,  
Advisory Committee Management Officer.  
[FR Doc. 99-1708 Filed 1-25-99; 8:45 am]  
BILLING CODE 7890-01-P

## NUCLEAR REGULATORY COMMISSION

### Sunshine Act Meeting

AGENCY HOLDING THE MEETING: Nuclear Regulatory Commission.  
DATES: Weeks of January 25, February 1, 8, and 15, 1999.

PLACE: Commissioner's Conference Room, 11555 Rockville Pike, Rockville, Maryland.

STATUS: Public and Closed.

MATTERS TO BE CONSIDERED:

#### Week of January 25—Tentative

There are no meetings scheduled for the Week of January 25.

#### Week of February 1—Tentative

Tuesday, February 2

2:00 p.m.—Briefing by Executive Branch (Closed-Ex. 1)

3:30 p.m.—Affirmation Session (Public Meeting) (if needed)



# APPENDIX II

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

Revised: February 19, 1999

SCHEDULE AND OUTLINE FOR DISCUSSION  
106<sup>TH</sup> ACNW MEETING  
FEBRUARY 23-25, 1999

Tuesday, February 23, 1999, Two White Flint North, Room 2B3, 11545 Rockville Pike, Rockville, Maryland

- 1) ~~8:30 - 8:40 A.M.~~  
8:32 - 8:36 Opening Remarks by the ACNW Chairman (Open)  
1.2) Opening Statement (BJG/RKM)  
1.3) Items of Interest (BJG/RKM)
  
- 2) ~~8:40 - 10:10 A.M.~~  
8:36 10:15 Department of Energy's (DOE) License Application Design Selection (LADS) Presentation (Open) GMH/ACC  
A presentation on the LADS process - Ric Craun, DOE
  - Description of Process
  - Culling down the number of options
  - Considerations for Engineered and Natural Barriers
  
- 10:10 - 10:25 A.M.  
10:15 - 10:33 **\*\*\*BREAK\*\*\***
  
- 3) ~~10:25 - 11:30 A.M.~~  
10:33 11:35 Meeting with John Greeves, NRC's Director, Division of Waste Management, Office of Nuclear Material Safety and Safeguards (Open) (BJG/RKM)  
A current events discussion with the Director to discuss developments at Yucca Mountain, rules and guidance under development, resources and other issues of mutual interest. Including: Technical Assistance being conducted in the area of high-level waste.
  
- 11:30 - 12:30 P.M.  
11:35 - 12:34 **\*\*\*LUNCH\*\*\***
  
- 4) ~~12:30 - 2:00 P.M.~~  
12:34 - 2:30 Waste Related Research Activities of the NRC (Open) (GMH/HJL)  
The Committee will review nuclear waste related research and technical assistance underway in the agency in preparation for a report to the Commission
  
- 2:30 - 2:48 **\*\* BREAK \*\***
  
- 5) ~~2:00 - 3:00 P.M.~~  
2:48 - 5:55 Prepare for next meeting with the Commission (Open)  
Discuss topics and presentations for the next meeting with the Commission on March 17, 1999 from 9:00 - 11:30 A.M. the topic for discussion will be - Viability Assessment for a Repository at Yucca Mountain
  
- ~~3:00 - 3:15 P.M.~~ **\*\*\*BREAK\*\*\***

6) ~~3:15 - 6:00 P.M.~~*Began on 2/24  
at 3:00 - 3:55*Preparation of ACNW Reports (Open)

Discuss a possible report on the following topics:

- 6.1) ACNW Self Assessment
- 6.2) NRC's Waste Related Research and Technical Assistance Program
- 6.3) Viability Assessment
- 6.4) White Paper on Repository Design Issues

*5:55***6:00 P.M.****\*\*\*RECESS\*\*\***Wednesday, February 24, 1999, Two White Flint North, Room 2B3, 11545 Rockville Pike, Rockville, Maryland7) ~~8:30 - 8:35 A.M.~~*8:34 -*Opening Remarks by ACNW Chairman (Open) (BJG/RKM)8) ~~8:35 - 12:00 NOON~~*12:*DOE Presentation on the Viability Assessment of a Repository at Yucca Mountain (Open) (GMH/ACC)~~10:30 - 10:45 A.M. BREAK~~*10:21 - 10:40*8.1) Future course of Yucca Mountain project - Steve Brocoum, YMPO *8:35 - 9:21*8.2) License Application Plan overview - Carol Hanlon, YMPO *9:21 - 10:00*8.3) Waste Package Corrosion - David Stahl - *11:42 - 12:17*8.4) Seepage in Drifts - ~~Ernie Harden~~ Dwight Hoxie - *10:40 - 11:25*8.5) UZ Flow and Transport - ~~Ernie Harden~~ Dwight Hoxie - *11:25 -*8.6) Rationale for Highest Priority Principal Factors of Postclosure Performance - Ernie Hardin *10:00 - 10:21**12:18 1:15***12:00 - 1:00 P.M.****\*\*\*LUNCH\*\*\***9) ~~4:00 - 4:00 P.M.~~*1:18 - 2:45*NRC Staff Presentation on the Viability Assessment of a Repository at Yucca Mountain (Open) (GMH/ACC)

9.1) Programmatic Issues

9.2) Technical Issues with VA

*2:45 - 3:00**Break*10) ~~4:00 - 5:30 P.M.~~*4:05 - 4:55*Nuclear Energy Institute (NEI) Presentation of 1999 High-Level Waste Initiatives (Open) (BJG/RKM)

Discussions with the following:

Marvin Fertel, Senior Vice President

Steven Kraft, Director, Spent Nuclear Fuel Program

Ralph Andersen, Senior Project Manager

Rodney McCullum, Senior Project Manager

*4:55 - 6:30***~~5:30 P.M.~~***Continue Preparation for Mtg. with Commission***\*\*\*RECESS\*\*\****6:30*Thursday, February 25, 1999, Two White Flint North, Room 2B3, 11545 Rockville Pike, Rockville, Maryland

11) 8:30 - 8:35 A.M.

Opening Remarks by ACNW Chairman (Open) (BJG/RKM)

- 12) ~~8:35 - 10:30~~ A.M. Committee Activities/Future Agenda (Open) (BJG/RKM)  
~~8:35 - 11:35~~ 12.1) Finalize Agenda for 107<sup>th</sup> ACNW Meeting, March 23-25, 1999  
 12.2) Review topics for out months  
 12.3) Review EDO response to recent Committee letters  
 12.4) Recent and planned attendance of outside meetings
- 13) ~~10:30 - 12:00~~ Noon Continue preparation of ACNW Reports as noted in item 6 (Open)  
~~12:00 - 1:00~~ P.M. **\*\*\*LUNCH\*\*\***
- 14) ~~1:00 - 3:00~~ P.M. Continue to prepare for next meeting with the Commissioners as noted in item 5 (Open)  
~~1:10 2:25~~  
~~3:00~~ P.M. **\*\*\*ADJOURN\*\*\***  
~~2:25~~

**NOTE:**

- Presentation time should not exceed 50 percent of the total time allocated for a specific item. The remaining 50 percent of the time is reserved for discussion.
- Number of copies of the presentation materials to be provided to the ACNW - 35.



**APPENDIX III: MEETING ATTENDEES**

**106TH ACNW MEETING  
FEBRUARY 23-25, 1999**

**ACNW STAFF**

Dr. Andrew Campbell  
Ms. Lynn Deering  
Ms. Michele Kelton  
Dr. John Larkins  
Mr. Howard Larson  
Dr. Richard Savio  
Ms. Mary Thomas

**ATTENDEES FROM THE NUCLEAR REGULATORY COMMISSION**

**FEBRUARY 23, 1999**

M. Dimarzo	RES
M. Nataraja	NMSS
J. Davis	NMSS
R. Johnson	NMSS
C. Greene	NMSS
P. Reed	RES
M. Bell	NMSS
K. Chang	NMSS
T. Nicholson	RES
E. O'Donnell	RES
L. Veblen	RES
R. Cady	RES
B. Meck	RES
B. Leslie	NMSS
T. Mo	RES
R. Eid	NRC

**ATTENDEES FROM THE NUCLEAR REGULATORY COMMISSION (CONT'D)**

**FEBRUARY 24, 1999**

T. Ahn	NMSS
T. McCartin	NMSS
C. Greene	NMSS
L. Hamdan	NMSS
J. Smith	OCM/SAJ
B. Leslie	NMSS
M. Nataraja	NMSS
J. Firth	NMSS
D. Dancer	NMSS
R. Byrne	NMSS
J. Trapp	NMSS
K. Chang	NMSS
M. Comar	NMSS
J. Davis	NMSS
B. Ibrahim	NMSS
M. Bell	NMSS
R. Johnson	NMSS
P. Justus	NMSS
P. Reed	RES
N. Coleman	NMSS

**FEBRUARY 25, 1999**

L. Lund	OEDO
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**ATTENDEES FROM OTHER AGENCIES AND GENERAL PUBLIC**

**FEBRUARY 23, 1999**

D. Richardson	YMPO
L. Rickertsen	YMPO
E. Scalsky	The Environmental Co.
M. Scott	DOE
R. Wallace	USGS
T. Cotton	DOE
E. Tiesenhausen	CCCP
C. Hanlon	DOE/YMPO
M. Michewicz	DOE
R. Craun	DOE
S. Trubatch	Winston & Strawn
B. Sagar	CNWRA
J. Bartlett	SC&A
R. McCullum	NEI

**Appendix III  
106th ACNW Meeting  
February 23-25, 1999**

**ATTENDEES FROM OTHER AGENCIES AND GENERAL PUBLIC (CONT'D)**

**FEBRUARY 23, 1999 (Cont'd)**

G. Roseboom	USGS (retired)
K. Singh	Penn. Dept. of Environ. Prot.
L. Bissell	Booz Allen/DOE
S. Echols	Winston & Strawn

**FEBRUARY 24, 1999**

R. Wallace	USGS
T. Cotton	DOE
E. Tiesenhausen	Clark County
J. York	Booz Allen & Hamilton
D. Stahl	DOE
J. Bartlett	SC&A
M. Scott	DOE
L. Fairbent	TEC
E. Hardin	DOE/LLNL
D. Hoxie	USGS
K. Singh	PA/DEP
B. Sagar	CNWRA
M. Michewicz	DOE
R. Edwards	FTI
G. Roseboom	USGS
B. Robinette	DOE
R. McCullum	NEI
C. Hanlon	DOE
S. Echols	Winston & Strawn

**FEBRUARY 25, 1999**

C. Hanlon	DOE/YMPO
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#### APPENDIX IV: FUTURE AGENDA

The Committee agreed to consider the following during the 107th ACNW Meeting, March 16-18, 1999:

- **Meeting with the NRC Commissioners, Commissioners' Conference Room, One White Flint North, March 17, 1999, 9:00 a.m. to 11:30 a.m.** — The Committee will continue preparations for its public meeting with the Commission. The Viability Assessment of a Repository at Yucca Mountain will be the topic of discussion.
- **Preparation of ACNW Reports** — The Committee will discuss planned reports including reports on its self-assessment, DOE's Viability Assessment, NRC-supported Waste-Related Research, a white paper on repository design issues at Yucca Mountain, and other topics discussed at this and previous meetings.
- **Miscellaneous** — The Committee will discuss miscellaneous matters related to the conduct of Committee activities and organizational activities and complete discussion of matters and specific issues that were not completed during previous meetings, as time and availability of information permit.

**APPENDIX V**  
**LIST OF DOCUMENTS PROVIDED TO THE COMMITTEE**

[Note: Some documents listed below may have been provided or prepared for Committee use only. These documents must be reviewed prior to release to the public.]

**MEETING HANDOUTS**

**AGENDA**  
**ITEM NO.**

**DOCUMENTS**

- 2**            **Department of Energy's License Application Design Selection (LADS) Presentation**
1. License Application Design Selection Process Summary and Status Report, presented by Richard Craun, DOE [Viewgraphs]
- 4**            **Waste-Related Research Activities of the NRC**
2. General Topics of Interest, presented by William R. Ott, RES/NRC, [Viewgraphs]
3. U.S. Nuclear Regulatory Commission Radiation Protection and Health Effects Program Update - February 23, 1999, presented by William R. Ott, RES/NRC [Viewgraphs]
4. U.S. Nuclear Regulatory Commission Radionuclide Transport Research Program Update - February 23, 1999, presented by William R. Ott, RES/NRC [Viewgraphs]
- 8**            **DOE Presentation on the Viability Assessment of a Repository at Yucca Mountain**
5. Status of the Yucca Mountain Project, presented by Stephan J. Brocoum, DOE [Viewgraphs]
6. License Application Plan Viability Assessment - Volume 4, presented by Carol L. Hanlon, DOE [Viewgraphs]
7. Rationale for Highest Priority Principal Factors of Postclosure Performance, presented by Ernest L. Hardin, M&O [Viewgraphs]
8. Seepage Into Drifts, presented by Dwight T. Hoxie, M&O [Viewgraphs]
9. Unsaturated-Zone Flow and Transport, presented by Dwight T. Hoxie, M&O [Viewgraphs]
10. Current Status and Plans for Container Materials Testing and Modeling, presented by David Stahl, M&O [Viewgraphs]
- 8**            **NRC Staff Presentation on the Viability Assessment of a Repository at Yucca Mountain**
11. Viability Assessment Review, presented by Michael Bell, Branch Chief, Performance Assessment & HLW Integration Branch, dated February 24, 1999 [Viewgraphs]

**MEETING NOTEBOOK CONTENTS**

**TAB  
NUMBER**

**DOCUMENTS**

- 1**                    **Opening Remarks by ACNW Chairman**
1. Schedule and Outline for Discussion, 106<sup>th</sup> ACNW Meeting, February 23–25, 1999, dated
  2. Introductory Statement by the ACNW Chairman, undated
  3. Items of Current Interest, undated
  4. Introductory Statement by the ACNW Chairman, Second Day, undated
  5. Introductory Statement by the ACNW Chairman, Third Day, undated
- 2 & 8**                    **DOE's License Application Design Selection & DOE's Presentation on the VA of a Repository at Yucca Mountain**
6. Status Report w/Attachments
    - Attachments
      - Template for ACNW Review of DOE's VA
      - Matrix of DOE and NRC Model Components and Issues
      - Viewgraphs presented by DOE Representatives during the 105<sup>th</sup> ACNW Meeting, 12/16/98
        - Repository Safety Strategy, presented by J. Bailey
        - TSPA Overview, presented by A. van Luik
        - Comparative Analysis To Determine Sensitivity of Uncertainty for Principal Factors, presented by H. Dockery
        - Prioritization of Technical Work Needed To Complete the Postclosure Safety Case, presented by E. Hardin
        - Postclosure Defense in Depth, presented by J. Bailey
      - Overview of Design Selection Process Viewgraphs Presented at the Nuclear Waste Technical Review Board's Meeting, 1/25/99, by K. Coppersmith, Geomatrix
      - Statement for the Record L. Barrett, Acting Director, OCRWM, On the Status of the CRWM Program, presented to the NRC on 2/8/99
      - "License Application Plan Viability Assessment, Volume 4;" Viewgraphs Presented by C. Hanlon, DOE, at NWTRB's Meeting, 1/27/99
      - ACNW Member and Staff Reports on Review of VA
      - Source Material on Defense in Depth [Prepared for Committee Use Only]

**Waste-Related Research Activities of the NRC**

**7. Status Report**

• **Attachments**

- "Review and Evaluation of the Nuclear Regulatory Commission Safety Research Program," NUREG-1635, Vol. 1, June 1998 (Transmitted separately 2/6/99)
- Memo dated 1/18/99 from H. J. Larson, ACNW, to Members, Subject: Draft-Predecisional Response to the ACRS NUREG-1635, Vol. 1, Relating to the NRC Safety Research Programs
- Technical Program Description, Center for Nuclear Waste Regulatory Analyses Operations, Rev. 12, Chg 0 (Transmitted to NMSS on 12/1/8/98 and to ACNW via H. Larson 2/4/99 memo)
- Letter dated 9/3/98 from B. John Garrick, Chairman, ACNW, to Shirley Ann Jackson, Chairman, NRC, Subject: Advisory Committee on Nuclear Waste Comments on NRC's Draft 10 CFR Part 63 and Revision 0 of the Total System Performance Assessment Issue Resolution Status Report
- Letter dated 10/13/98 from L. Joseph Callan, EDO, NRC, to B. John Garrick, Chairman, ACNW, Subject: Advisory Committee on Nuclear Waste Comments on NRC's Draft 10 CFR Part 63 and Revision 0 of the Total System Performance Assessment Issue Resolution Status Report
- Letter dated 9/9/98 from B. John Garrick, Chairman, ACNW, to Shirley Ann Jackson, Chairman, NRC, Subject: Issues and Recommendations Concerning the Near-Field Environment and the Performance of Engineered Barriers At Yucca Mountain
- Letter dated 10/30/98 from William D. Travers, EDO, NRC, to B. John Garrick, Chairman, ACNW, Subject: Issues and Recommendations Concerning the Near-Field Environment and the Performance of Engineered Barriers At Yucca Mountain
- Letter dated 7/29/98 from B. John Garrick, Chairman, ACNW, to Shirley Ann Jackson, Chairman, NRC, Subject: Comments on NRC's Total System Sensitivity Studies for the Proposed High-Level Radioactive Waste Repository at Yucca Mountain, Nevada
- Letter dated 8/31/98 from L. Joseph Callan, EDO, NRC, to B. John Garrick, Chairman, ACNW, Subject: Comments on NRC's Total System Sensitivity Studies for the Proposed High-Level Radioactive Waste Repository at Yucca Mountain, Nevada
- RES Budget Formats, FY 1999, FY 2000 and FY 2001 (Updated 10/30/98) (Transmitted separately 2/5/99)

Appendix V  
106th ACNW Meeting  
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3 (Cont'd)      Waste-Related Research Activities of the NRC

7. Status Report (Cont'd)

- Attachments (Cont'd)
  - FY 1998-1999 Operating Plan: (Transmitted separately 2/5/99)
    - **Materials Research** — 1A, Materials Criticality Safety; 1B, Materials Radiation Dosimetry & Health Effects Research; 1C, Dry Cask Research
    - **Radionuclide Transport and Decommissioning** — 1A, Radionuclide Transport and Behavior in the Environment; 1H, Planned Accomplishments: Reactor Radiation Dosimetry & Health Effects Research
  - NRC Safety Research Program, presented by R. Uhrig, ACRS (Viewgraphs for 2/3/99 Commission Briefing)

4      Meeting With John Greeves, NRC's Director, Division of Waste Management, Office of Nuclear Material Safety and Safeguards

8. Status Report

6.1      ACNW Self Assessment

9. ACNW Metrics and Self Evaluation for FY 1998, Draft 1, 2/11/99

9      NRC Staff Presentation on the Viability Assessment of a Repository at Yucca Mountain

10. Memo dated 12/21/98 from William D. Travers, EDO, to Commissioners, Subject: Viability Assessment Review
11. Viability Assessment Review, presented by Michael Bell, Branch Chief, Performance Assessment & HLW Integration Branch, dated 2/2/99 (Viewgraphs) [Draft - PREDECISIONAL]
12. Letter dated 7/6/98 from Michael Bell, Branch Chief, Performance Assessment & HLW Integration Branch, DWM, NMSS, to Stephan J. Brocoum, Assistant Manager for Licensing, DOE, Yucca Mountain Site Characterization Office

10      Nuclear Energy Institute Presentation of 1999 High-Level Waste Initiatives

13. Status Report

- NEI Organizational Chart, 7/11/97

12      Committee Activities/Future Agenda



**Appendix V**  
**106th ACNW Meeting**  
**February 23-25, 1999**

14. Set Agenda for 107th ACNW Meeting, March 23-25, 1999
15. Agenda for Out Months through May 1999
16. ACRS/ACNW Meeting Calendar for 1999
17. Executive Director for Operations' List of Future Meeting Topics
18. Civilian Radioactive Waste Management Office M&O Meeting List and ACNW 1998 Calendar