



MINUTES OF THE 100TH ACNW MEETING
APRIL 21-23, 1998

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CERTIFIED

By B. John Garrick
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**MINUTES OF THE 100TH MEETING OF THE
ADVISORY COMMITTEE ON NUCLEAR WASTE
APRIL 21-23, 1998
ROCKVILLE, MARYLAND**

The Advisory Committee on Nuclear Waste (ACNW) held its 100th meeting April 21-23, 1998, at Two White Flint North, Room T-2B3, 11545 Rockville Pike, Rockville, Maryland. The ACNW met to discuss and take appropriate action on the items listed in the attached agenda. The entire meeting was open to public attendance.

A transcript of selected portions of the meeting is available in the U.S. Nuclear Regulatory Commission (NRC) Public Document Room at the Gelman Building, 2120 L Street, NW., Washington, DC. 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>.

Dr. B. John Garrick, ACNW Chairman, convened the meeting at 8:30 a.m. and explained the purpose of this session. ACNW members Drs. Charles Fairhurst, Raymond G. Wymer, and George M. Hornberger were also present. For a list of other attendees, see Appendix III.

I. Chairman's Report (Open)

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

Dr. Garrick noted a number of items that he believed to be of interest, including the following:

- Energy Secretary Federico Peña announced on April 6, 1998, that he will leave his post effective June 30, 1998, to return to private life.

- On April 1, 1998, the Senate approved a measure consenting to a low-level radioactive waste compact which provides for waste from Texas, Maine, and Vermont to be shipped to a site in Texas. The bill will now go to the House-Senate Conference Committee.
- The Department of Energy (DOE) plans to open the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico, by May 29, 1998.
- In a paper published in the journal "*Science*" on March 27, 1998, a contractor to the Center for Nuclear Waste Regulatory Analyses (CNWRA) documented observations made by Global Positioning System Surveys of horizontal crustal movement (over a 6-year period) of the Yucca Mountain region. The 1/4-inch extension in 6 years (~ 2 mm/yr) is about 3 to 4 times faster than the average velocity elsewhere in the basin and range province. The researchers from Cal Tech and Harvard's Astrophysical Observatory hypothesized that the region is undergoing a period of anomalously high strain that may last another tens of thousands of years. The researchers suggest that conventional geological methods of determining the seismotectonic hazards have underestimated the seismic and volcanic hazards that may affect Yucca Mountain. The data and analyses of uncertainties associated with the methods appear to be valid. The hypothesis is only one of several that must be evaluated. The significance of the results is being evaluated by methods of system performance analysis under development jointly by the NRC's Division of Waste Management, Office of Nuclear Material Safety and Safeguards (DWM/NMSS) and CNWRA staffs.

II. Nuclear Regulatory Commission's Nuclear Waste-Related Research (Open)

[Mr. Giorgio N. Gnugnoli was the Designated Federal Official for this part of the meeting.]

The NRC's Office of Nuclear Regulatory Research (RES) briefed the ACNW on the current status of waste-related research being performed under the auspices of RES. As part of the

NRC implementation of the strategic assessment initiative, the waste-related research and generic technical assistance (TA) programs in waste management were curtailed. Much of what would normally be addressed as generic TA was assigned to NMSS in order to preserve efficiency in preparing for future licensing needs. The RES research program devoted to waste management is limited to a modest effort of radionuclide transport and behavior in the environment and another modest effort in decommissioning and environmental protection.

The initial discussion focused on the rationale and deliberation by the NRC with regard to core capability. Although budget-cutting continues to be actively pursued, the NRC is committed to maintaining core capabilities, which are necessary to maintaining the agency's mission.

It was acknowledged that this review would be limited because NMSS was not able to provide a presentation to the ACNW in parallel with the RES presentation. This is important because research funding becomes more balanced between the reactor side of the agency and the nuclear materials side. But this becomes evident only when one combines the waste-related research by RES with NRC-funded TA being performed for NMSS at the CNWRA. Otherwise there appears to be a disproportional allocation of research funds to reactor-related issues.

The ACNW members showed a preference to integrate the ACNW's comments and recommendations into the ACRS' report on research, rather than to have a separate section with appendices. The members felt that the ACRS-generated observations had importance with respect to the situation of waste-related research and TA. The members agreed to look at the reactor-related provisions in the ACRS draft to make sure that that text did not present incompatible judgments.

RES staff from the Waste Management Branch briefed the ACNW by presenting an updated overview of the research program on radionuclide transport. RES staff discussed the initiatives on the core capabilities of NRC research— a number of commission papers addressed this topic. One of the motivations in maintaining core capabilities is that industry is evolving, and NRC research must be sufficiently capable and flexible to make some adjustments in its

program. The Commission directed the RES/NRC staff to ensure that in the development of the core capability, efforts be directed to supporting current regulatory activities, but also to issues that might arise in the foreseeable future.

In response to the Commission, RES developed a methodology and criteria for identifying the core research capability within the office. The methodology and criteria were essentially focused into four activities: (1) Identify areas in which the core capability was needed; (2) list those functions supported by these core capabilities; (3) determine the full-time equivalent (FTE) support and the contract support needed for the core capability; and (4) identify the skills and the experimental facilities needed to maintain that core capability within RES.

Core capabilities consist of two main types: (1) expertise-driven, which consists of maintaining a cadre of staff completely independent of workload as a result of a licensing activity, serving on-call as a "brain trust" and (2) workload-driven, which are needed to respond to a complete, continuing, relatively steady-state licensing work. A key milestone for budgeting is the minimum level for workload-driven research; below this point, the NRC's mission is compromised either in effectiveness or in timeliness.

RES staff discussed research review panels consisting of coordinated efforts involving the NRC's user need, the program managers from DOE laboratories, deans of nuclear engineering departments in six universities, and the representatives from industry, including the Nuclear Energy Institute (NEI) and Electric Power Research Institute (EPRI). This resulted in criteria that could be applied to research areas to see whether they indeed have the necessary core capability required by the agency. However, current and anticipated budget levels tend to be incompatible with maintaining a large cadre of experts with no current and meaningful research work. Without some programmatic stability, the experts would leave or the facilities may disappear.

Part of the core capabilities analyses addressed "sun-setting" those research activities in which the core capabilities maintenance costs exceed the approved budget. The budgets for FY

1999, 2000, and 2001 are estimated to be \$2.95 million, \$3.1 million, and \$3.1 million, respectively. In comparison, the FY 1998 budget was \$2.7 million (including radionuclide transport and decommissioning).

RES was very active up to the mid-1990s in high-level waste (HLW), low-level waste (LLW), and decommissioning (e.g., \$6.2 or \$6.3 million dedicated solely to HLW). RES had also maintained active participation in the international arena, as well as with sister agencies and the academic community. At the beginning of 1996, a waste management review board comprised of managers from the Office of the Executive Director for Operations (OEDO), NMSS, and RES, decided that it would be more efficient to manage all the HLW projects from the NMSS project office. This terminated the role of RES in "research," except for a modest effort (\$1.5-\$2.2 million per year) for radionuclide transport and behavior in the environment. In a similar manner, the LLW research program budget dropped from about \$3 million in 1994 to zero in 1996. Projects that survived were those with application to the decommissioning of facilities and land cleanup.

The goal of the generic program on radionuclide transport was to provide NRC with a performance assessment (PA) capability, which would span the needs of HLW, LLW, and any NRC-licensed activities (e.g., spent fuel storage, reclamation of contaminated uranium milling sites, and decommissioning), in which there is a public health concern as a result of that licensed activity. The RES staff noted that this capability is not fully mature, e.g., atmospheric transport has not been activated and updated.

In summary, RES is in a position in which no new ground is broken. Cost constraints have forced merely improving existing data and experiments. RES staff speculated that further budget cuts should be expected. RES will rely more heavily on sister agencies, international efforts, academic and private sector cooperative efforts, etc., to make up for the shortfall in the knowledge base necessary to meet the NRC's technical requirements.

The ACNW members observed that in the face of significant resource constraints, regulatory agencies historically employed increasing levels and relied more on conservatism. RES staff observed that some of the currently funded research work did allow for improvements without imposing additional conservatism, but that this is presently unavailable for new issues or concerns. The priorities are established on the following order of importance: licensing office user needs and exploratory work. ACNW members inquired about the process to select and decide upon individual research projects. RES replied that it relies on ventures with the National Academy of Sciences and program office (perceived and articulated) user needs. Experience and technical judgment of RES and other staff members also plays a role. Workshops provide opportunity to solicit advice and reviews. The ACNW showed interest in whether the budget cutting may have a strong influence on maintaining inertia against change, in conflict with the risk-informed, performance-based (RIPB) direction set by the Commission. It was pointed out by the RES staff that in pursuing RIPB regulatory infrastructures, both new and existing regulations should be screened for RIPB value. RES' program is geared to implementing the existing regulations, which are not yet necessarily RIPB consistent. RES budget estimates are geared toward a maintenance capability; in effect, to perform the regulator's function. These estimates do not reflect new initiatives or exploratory research. As noted, the core capabilities were identified and developed through interaction at four levels:

- directors of the user needs, namely, the Office of Nuclear Reactor Regulation (NRR), NMSS, and the Office for Analysis and Evaluation of Operational Data
- project managers at the DOE national labs
- deans at nuclear engineering departments in six different universities
- coordination with industry, namely, EPRI, NEI, and vendors

In response to specific requests on partitioning its budget, RES indicated that the partnership with Federal agencies, the partnership with the research institutes, and the universities total

would constitute about 30 to 40 percent of the RES waste budget. International involvements are not truly funded; only travel costs for NRC participation are expended. A number of countries have extensively measured actual data, which could be very useful to the interests in the U.S. On the other hand, the U.S. made great strides in modeling behavior of natural and altered systems. RES believes this constitutes a *quid pro quo* for technical exchange.

RES observed that none of its research funding goes to the CNWRA. However, RES staff take part in weekly meetings between NMSS and the CNWRA in order to maintain consistency in the modeling approach.

Although the NRC decided to eliminate HLW and LLW research, user needs from NMSS to RES are still generated. In order to be able to maintain the core capability and response, the agency chose to maintain a generic capability in RES to address radionuclide transport issues for the agency.

The RES staff was introduced; their expertise, experience, and current role in the waste management research program were noted. The following staff made brief presentations:

- Ralph Cady, Hydrogeology: responsible for integration of the core capabilities into an overall methodology; e.g., PA
- Phillip Reed, Source term characterization and behavior needed to characterize and evaluate licensee estimates of releases from disposal units
- Linda Veblen, Geochemistry: working on source term specifically for slags; heavily involved in past research on natural analogs
- Thomas Nicholson, Hydrologist: responsible for hydrologic analyses of key processes affecting and resulting from release and flow of contaminants from waste facilities (e.g., infiltration flow and monitoring)

- Edward O'Donnell, Geologist: responsible for transport properties (e.g., sorption and colloids) and the transport phase of radionuclide movement
- Jacob Philip, Geotechnical Engineer: is responsible for engineered barrier system (EBS) (e.g., container performance and concrete durability)

The important mechanisms reflected in the RES presentation are infiltration, flow, monitoring, engineered barriers, source term, transport, and PA. RES pointed out that among all of its staff available to engage in waste-related research, there was approximately 75 years of experience in the areas of HLW, LLW, and radionuclide transport. The budget elements in the radionuclide transport research effort are listed as:

- characterization of environmental contaminants
- transport processes
- containment, interdiction, and stabilization
- performance assessment

The RES staff enhances its capabilities by outside association with such groups as the Nuclear Energy Agency Sorption Forum, Agricultural Research Service, and the United States Geological Survey, as well as with industry, many academic institutions (e.g., University of Arizona and the Johns Hopkins University) and international symposia (INTRAVAL, Japanese Atomic Energy Research Institute). RES plans to begin new projects, which will be very strongly field- and experiment-oriented, while continuing with the PA activity. As funding decreases, the RES staff will assume more of the contractor-type work.

RES acknowledged that the component for computing the dose to man was not being aggressively pursued. This work is shared between two RES branches; little progress has been made in evaluating pathways.

The development of the program focuses on understanding the mechanisms of the processes leading to release and transport in combination with a range of assessment tools (simple to complex) for use in licensing decisions.

The following observations were discussed after the presentation:

- RES is reluctant to rely heavily on PA-set priorities for RES; more emphasis is placed on the technical and regulatory judgment of the RES staff and contractors.
- RES is concerned with conceptual model uncertainty, as well as with the uncertainty associated with the quality and amount of data input. This is one of the reasons for caution in using PA as the primary decision-making tool.

III. Nuclear Waste-Related Rulemaking (Open)

[Mr. Giorgio N. Gnugnoli was the Designated Federal Official for this part of the meeting.]

Patricia Holahan, Division of Industrial and Medical and Nuclear Safety (IMNS), NMSS, briefed the ACNW on the status of the rulemaking function at NRC as a result of a Commission directive to transfer all confirmatory research from program offices to RES, and to transfer rulemaking efforts from RES to the appropriate program offices. She confined her remarks to the latter transfer. A new branch was created specifically to manage the transition to perform the rulemaking function for NMSS. She reviewed the history of this development, e.g., various staff requirements memoranda (SRMs) and SECY papers issued in late 1997. The rulemaking functions went primarily to NRR for reactor-related rulemakings, and NMSS is responsible for all rulemakings relating to fuel cycle, industrial and medical uses of radioactive materials, radioactive waste management, transportation, byproducts, and source and special nuclear material. NMSS also retained rulemaking responsibility for 10 CFR Parts 19 and 20 in coordination with NRR. Within NMSS, each programmatic division, i.e., waste management, fuel cycle, spent fuel project office, has the primary responsibility for the technical aspects and

the policy-related issues relating to its area of programmatic responsibility. Programs are coordinated at the division level. IMNS has the primary responsibility for the administrative and program management lead for the rulemakings. In the transfer of this rulemaking function, 16.5 FTEs were physically transferred from the RES rulemaking units to IMNS.

In the task team or working group approach to future rulemakings, the ACNW would receive rulemaking documentation following division director concurrence. The whole process takes about 11 weeks; division concurrence is usually given 3 weeks into the cycle. Currently, there are about 53 rules, among the various divisions in NMSS.

When asked to characterize the essential changes in the rulemaking process, Ms. Holahan indicated that

- Coordination among the affected parties [Office of the General Counsel (OGC), NMSS, Agreement States, etc.] occurs at an earlier timeframe than the timeframe for the historical process of rulemaking.
- A rulemaking status sheet is distributed weekly to all the offices and the divisions; information is presented on the progress of existing, and expectation of future, rulemakings. Rulemakings are initiated by such means as: public petition for rulemaking, Commission directives to the staff, and program office user needs. One of the rulemakings involves the Yucca Mountain repository. Ms. Holahan estimated that among the current rulemaking efforts, there is a 50-50 split between the public and industry.

In response to the ACNW's question of where its advice would be most useful, Ms. Holahan identified the rulemaking planning stage, which is the formative stage, for interaction with the advisory committees. In the event that ACNW had a particular interest in a rulemaking (e.g., 10 CFR Part 63), or the staff believes that the ACNW would have interest, or the ACNW's early advice would be useful, arrangements could be made to factor these interests into the ACNW's meeting schedules.

IV. Meeting With Hugh L. Thompson, Jr., Deputy Executive Director for Regulatory Programs (Open)

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

Hugh L. Thompson, Deputy Executive Director for Regulatory Programs, discussed the following items of mutual interest with the Committee:

1. NRC's oversight of several DOE activities — NRC has proposed a program of similar scope for next year with essentially the same level of funding. Mr. Thompson indicated that the report on the Lawrence Berkeley National Laboratory is under final review. He noted that new DOE facilities, after the year 2000, must be capable of meeting NRC regulations, whether or not they are under formal NRC regulatory authority.
2. DOE's viability assessment (VA) for the proposed repository at Yucca Mountain — The staff plans to review the VA in a relatively short period of time, intending to present an initial evaluation to the Commission in about 3 months.
3. License termination rules and guidance — Recognizing that the Committee was already involved in commenting on this topic, Mr. Thompson noted that the NRC was comfortable with its all pathways rule (vis-a-vis a separate groundwater protection requirement).

In response to a question from the Committee, Mr. Thompson stated that although he had knew of no specific issues upon which the ACNW should concentrate, advisory committees need to provide timely advice to the Commission that is based on fact. For that reason he understood the Committee's interest in desiring access to predecisional documents. He cautioned, however, that there is also a need to protect sensitive predecisional documents from premature release.

Mr. Thompson noted the occasion of the Committee's 100th meeting and expressed his appreciation to the Committee for its identification of issues and its past advice.

V. Total System Sensitivity Analysis for Yucca Mountain (Open)

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

Dr. Keith McConnell, Chief, Performance Assessment and Integration Section, DWM/NMSS, presented an update on NRC staff PA activities for the HLW program. He noted that the staff is using total system performance assessment (TPA) to support a variety of activities including the following: development of a regulatory framework for HLW; to help develop a risk-informed, performance-based HLW rule; to develop acceptance criteria that will eventually be incorporated into a standard review plan (SRP); to help to integrate activities among the different disciplines in the ten key technical issues (KTIs) groups, and to provide feedback to DOE on its TSPA-VA Program. He discussed in some detail how DWM is using the TPA code to integrate and evaluate information across technical disciplines. This activity involves updating the TPA code, identifying key elements of subsystem abstraction, conducting sensitivity studies of the individual models and of the total system model, and documenting the results. He also discussed how DWM intends to use TPA activities in reviewing DOE's TSPA-VA and DOE's draft license application (LA). He noted some modeling differences with DOE. He described the activities and planned accomplishments over the next year. The Committee asked about NRC differences with DOE on important assumptions. A question was also raised on the DOE and NRC approaches to structuring scenarios. Another question was how the TPA work might affect the selection of KTIs. Dr. McConnell said that one goal of the TPA activities is to integrate and assess subissues, but the KTIs serve a broader purpose in the program. He said that DWM would look at rearranging subissues, but not at changing the KTIs.

Tim McCartin, team leader for TPA activities within the DWM, discussed a number of the activities that are supported by the TPA code is being used to support. He discussed how the

KTI groups are working together to modify the code. He also discussed how the code improves staff capability by providing a tool with the flexibility to accommodate different approaches. He said that the NRC staff uses conservative models and conservative data to limit the size of a code and to limit the amount of work. He noted that the modeling only focuses on a few key areas and added that DWM is not trying to model everything realistically. Mr. McCartin cautioned that the results presented were not regulatory conclusions and that the staff's use of a particular value or model does not imply regulatory acceptance. Mr. McCartin depicted the conceptual model of the repository. He described the TPA Code (Version 3.1.4) in terms of seven calculation modules—deep percolation, waste package (WP) degradation, radionuclide release, unsaturated zone (UZ) flow and transport, saturated zone (SZ) flow and transport, direct releases, and dose.

Mr. McCartin described the deep percolation conceptual model and how it is implemented in the TPA code. He noted that the main inputs are temperature and mean annual precipitation. The TPA code also incorporates a transition to a cooler, wetter glacial cycle over long time frames. Mr. McCartin discussed the refluxing of water when the waste heats up the rock. He said that the corrosion model does not consider dripping water, but only considers the relative humidity (RH) in the repository drifts. He said that DWM is looking at the impact of dripping water on waste package corrosion. It is of special concern if water drips on the WPs at higher temperatures. He also discussed the conceptual model for the seepage of water into the drifts and the assumptions used to estimate the fraction of water that can contact the WP. He noted that DOE is conducting studies to establish an experimental basis for moisture distribution.

Mr. McCartin then discussed the WP degradation model and radionuclide release issues. He said that the NRC staff simulates a representative WP for each subarea. Dr. Garrick asked about the model's capability to accommodate graded failure of WPs. Mr. McCartin said that a subarea can be broken down into more sub-subareas to model more WPs, but that this adds complexity to the code. Therefore, the staff wants to understand the importance and sensitivity of such an approach to repository performance before trying to simulate a large number of WPs in the code. Mr. McCartin discussed why a distributed failure of WPs might be important for

alloy C-22 as the corrosion-resistant material (CRM). He also said that the staff needs to understand the performance of C-22 much better in near-field conditions. Mr. McCartin discussed the radionuclide release model, including the water chemistry, the fraction of WPs that can get wet, and the specifics of the NRC bathtub model.

Mr. McCartin discussed the approaches for modeling flow and transport in the TPA code. He described the UZ flow and transport model and said that, based upon the NRC staff's current analyses, matrix diffusion has no big influence. He added that researchers model the stratigraphic units as having either fracture flow or matrix flow. He described differences between DOE and NRC modeling of the Calico Hills unit. Mr. McCartin also described the SZ transport model, which consists of four stream tubes that start under the repository and end at the critical group location. He said that in the tuff units, transport only occurs in fractures, but in the alluvium, transport occurs in the matrix. He discussed the transport times in the fractured tuff and in the alluvium. He also discussed the sorption coefficients used in the model.

Mr. McCartin then described the direct release modules. He described the FAULTO module, which assumes that containers in an active fault zone will fail. He also described the SEISMO module, which estimates seismic events and the damage to WPs by falling rock. He was asked if DWM had assessed the importance of this issue. Mr. McCartin replied that its relative importance is small for WPs using alloy 625 for the corrosion-resistant material, but for alloy C-22 it could be the most significant release mode in 10,000 years. There were also questions and discussion about the rock category. He was asked if DOE is looking at ways to preclude rockfall damage by engineering design. Mr. McCartin noted that this was one of the major functions of backfill. There was also some discussion of what can be done with the natural setting. Mr. McCartin also discussed the volcanic release model. The NRC uses its own probability estimate for a volcanic intrusion into the repository. He said the model assumes that 1 to 10 containers will be disrupted and their contents entrained in an ash plume. A key issue is the assumed particle size for the waste material used in the air transport model.

Mr. McCartin discussed the dose calculation used in the TPA code. This included the well pumping scenarios, the NRC approach to dilution, estimates of soil concentrations, and the calculation of dose conversion factors (DCFs). When he was asked about the sensitivity of the DCFs to assumptions in the dose model, Mr. McCartin replied that NRC did not test to this level of sensitivity. Mr. McCartin summarized his main points. The Committee members discussed a number of other issues with Mr. McCartin and others on the NRC staff.

The next speaker, Dr. Sitikanta Mohanty, CNWRA, described a flow diagram for the TPA 3.1.4 code and discussed calculations for the different modules. He noted that the "nominal case" includes seismically induced rockfall as part of the base case, whereas direct release from an igneous intrusion is treated as a separate event. Dr. Mohanty discussed the infiltration module and noted that an assumed glacial cycle increases the water flux after 10,000 years. He described the near-field model in terms of the changes in temperature and relative humidity (RH) with time. He was asked about NRC's model results that show relatively early failures of waste packages. He said that early failure was predominantly due to pitting corrosion after the RH increases above a critical amount. Dr. Mohanty said that thermally induced refluxing ends after 1,000 to 3,000 yrs. He said that the amount of water that gets into the WPs is about 1 to 2 percent of the total flux. He discussed the calculated WP failures and the releases from the engineered barrier system. He noted that the NRC does not take any credit for cladding or for flow resistance in corrosion pits. He described the bimodal distribution of WP failures that results from localized corrosion (early failures) and general corrosion (later failures). He also discussed the cumulative release results and noted that the time differences are due to SZ effects. He also discussed the modeling results for ground-water travel time. Finally, he described and discussed the calculated doses due to consumption and use of contaminated ground water at 10,000 years and at 50,000 years.

The Committee members asked the staff what the result would be if DWM calculated the peak dose, as recommended by the National Research Council Panel on the Technical Bases for Yucca Mountain Standards. Mr. McCartin said that the staff does not expect doses to get much larger, but it may need to review this. In response to a question, Mr. McCartin said that the

dominant radionuclide contributing to dose is Np (neptunium), but DWM will look at the whole spectrum of doses to see the contributions of other radionuclides. A question was asked about the model of water refluxing and the adequacy of a one-dimensional approach to estimate possible dripping on WPs. Mr. McCartin said that the staff will take the drift scale heater test results into account and that it is conducting modeling to gain a better understanding of water refluxing effects. A question was asked about the oxidation state of Am (americium) and its potential to be retarded by sorption processes. Mr. McCartin said that they do not account for retardation in fractures, but they use a large range for the Kd values in alluvial material. There was a question about the effect of WP degradation on the chemical environment. Dr. Mohanty said that they had not done this analysis yet. Dr. Brett Leslie, DWM, noted that the choice of material in the repository EBS design may influence how they think about the problem. Dr. Tae Ahn, DWM, said that DOE's analysis of oxygen transport into the WP shows no net depletion of oxygen.

Jim Firth, DWM/NMSS, the next speaker, discussed the process level sensitivity studies for the KTIs and how the TPA code was used for these analyses. The objectives included improving staff skills, distinguishing the relative importance of selected parameters, providing input to the PA activities, developing issue resolution status reports (IRSRs), and identifying other information and modeling needs. He described the organization of the sensitivity studies, the involvement of different KTI groups, and the specific approaches used by the KTI groups. He then discussed the most significant parameters for each KTI group. He noted that an important conclusion was that the use of backfill delays failure of WPs because the insulating properties of backfill cause hotter and dryer conditions at the WP surface. He discussed seismic issues in detail. He noted that DWM needs to verify the rock stability assumptions and yield zone values used in the model. A key conclusion is that the direct rupture of WPs in a fault zone does not significantly increase corrosion and does not significantly affect dose. An ACNW member asked about the apparent asymmetry in the level of detail for this KTI relative to the others. Mr. Firth said that they want to be able to say that this is not an issue. There was significant discussion between the Committee and staff on this issue. A question was asked about the conceptual link between a sampled "factor" and the process level model it represents. Mr. Firth

said that DWM needs to focus on those areas where the results are significant to performance and where there is not a good technical basis for the assumptions. One of the Committee members cautioned that staff members may be required to include conservative assumptions that they start with as happened with the Waste Isolation Pilot Plant's performance assessment. Mr. McCartin said that DWM is using the code to prioritize how to review DOE's approach.

Richard Codell, DWM/NMSS, discussed the total system sensitivity studies conducted by him, by Dr. Rose Byrne, DWM/NMSS, and by other members of the DWM staff; he described the purpose of the sensitivity studies, including the evaluation of alternative designs and developing a better understanding of modeling approaches. He discussed the sensitivity analyses on the base-case model, described the base-case conceptualizations and assumptions, described alternatives, and discussed the statistical tests and approaches. He discussed the modeling results and noted that 79 percent of the variance in the results can be explained by seven variables. He said that in the analyses to 50,000 years, the alluvium Kd was most important, the amount of fuel exposed to water was second, and the subarea wet fraction was third in importance. He noted that the main contributors to dose are Np and Am. In response to a question about the time of peak doses, Dr. Codell said that the highest peaks occur earlier than 50,000 years. He then described the analyses of 12 different alternative conceptual models. He said that use of alloy C-22 as the CRM may result in WP failures with bigger holes that have a greater potential for admitting water flow into the WP. He showed histograms for different model results. He noted that the use of backfill pushes failures further out in time because WPs are kept hotter for longer time periods. He was asked about diffusion through the backfill. Dr. Codell said it was relatively minor. He then showed a series of converse cumulative distribution functions (CCDFs) for different alternative models. An important conclusion was that the amount of water flow was not important, but that the amount of fuel that got exposed to water was important.

The Committee asked about the recently published CNWRA work at the Pena Blanca natural analog site. Another question concerned how the NRC analyses compare to the DOE analyses. Dr. Codell said that solubility of Np is a big difference — NRC uses a lower solubility

and it tends to determine the dose. Dr. John Bradbury, DWM, said that the NRC used information from experimental determinations of solubility from both over- and undersaturation. He noted that a key issue is the identity of the Np-bearing solid phase from the oversaturation experiments. He added that DOE has hypothesized that the precipitating phase is metastable and that it slowly decomposes to a more stable solid phase with a lower solubility, which DOE uses in its calculations.

Finally, Dr. Abe Van Luik, DOE, noted some recent changes in DOE's TSPA-VA modeling approaches that were presented at the Nuclear Waste Technical Review Board meeting in Albuquerque, NM. These included taking credit for cladding and using a one-dimensional model instead of a three-dimensional model. These model changes significantly alter the results. He said that the importance of Np solubility decreases with cladding credit and, because the cladding fails 1,000 times more slowly than alloy C-22, the fraction of fuel exposed to water becomes most important to the dose.

VI. Viability Assessment Guidance (Open)

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

Dr. Mike Bell, DWM/NMSS, briefed the ACNW on the NRC staff's draft guidance for review of DOE's VA for a Yucca Mountain HLW repository. Dr. Bell discussed the background, objectives, approach, and products of the staff's VA review guidance, including planned interactions with ACNW.

Dr. Bell noted that, although the Congress has not assigned the NRC staff a formal role in reviewing the DOE's VA, the staff expects to be asked by Congress to comment on DOE's VA, and believes that its views on the VA, as they relate to licensing, are important to the national decision on the viability of the proposed Yucca Mountain repository.

The objectives of the staff's VA review are (1) identify progress in the development of information needed to complete the LA; (2) identify potential licensing vulnerabilities based on independent assessments that could preclude or pose a risk to licensing; and (3) identify major concerns with DOE's test plans, design concepts (to the extent practicable), and TSPA, that, if not resolved, might result in an unacceptable LA.

The NRC staff will limit its VA review to information related to the KTIs and their subissues. NRC will use the IRSRs, and independent assessments using the TPA 3 code, to guide its review of the VA. The VA review is already in progress. To complete the VA review in a timely manner, the staff will review draft VA information and provide early feedback to DOE through IRSRs and NRC-DOE interactions. In addition, the staff is conducting an ongoing review of draft DOE products related to TSPA that will form the basis for the VA; this review is being done concurrently with DOE's development of the draft VA documents. The NRC is also in the process of developing acceptance criteria for each KTI. NRC staff's goal is to have no "surprises." The staff expects to make no significant comments in the VA review that have not already been identified; thus the final VA review will be done to confirm the results of the ongoing preliminary VA reviews.

Of the four elements of the VA, the NRC will focus its review primarily on TSPA, but will conduct a limited review of DOE's preliminary design, LA plan and cost estimate, and costs of construction and operation. For the preliminary design concept, the staff will focus on the reference repository and waste package design. The NRC staff will not review concepts of operation because this preclosure topic is not within the scope of NRC's current KTI program; the concepts of operation will be reviewed in the future if adequate funding is restored. Pre-closure information that will affect post-closure performance will be reviewed.

For its review of the LA plan and cost estimate, NRC will review the adequacy of plans for additional testing and analyses, and schedules to ensure that its views on the information needed to complete an LA are available for consideration by DOE. The NRC considers the LA plan very important because it identifies data needed for the LA. NRC's review of the costs of

construction and operation will be limited to regulatory costs to ensure that they are not over-inflated. NRC will not review cost estimates and schedules for construction, operation, and closure because these areas are not within NRC's regulatory responsibility.

The NRC staff will report the findings of its review in two ways: (1) submit a Commission paper within 3 months after receipt of the VA and (2) identify major concerns related to tests plans, design concepts, and TSPA in revisions to IRSRs and provide these to DOE.

Products include:

- Commission paper outline and draft comments
- Commission paper documenting results of review, to include progress observed, NRC's views on potential licensing vulnerabilities, and recommendations for Commission action
- revised IRSRs to address major concerns important to a complete LA
- briefing on VA review guidance
- ongoing interactions on IRSRs and TSPA
- near-field Engineered Barrier Workshop in June 1998

ACNW Interactions include the following:

- briefing on VA review guidance
- interactions on IRSRs and TSPA

- near-field Engineered Barrier Workshop in June 1998

A question was raised on whether NRC is still concerned about the VA considering alternative designs. Dr. Bell explained that the Nuclear Waste Technical Review Board (NWTRB) had been pressuring DOE to evaluate alternative repository configurations, heat loadings, etc., in the VA. However, when the NWTRB briefed the Commission in March 1998, it appeared to have softened its position to make it more consistent with the NRC position; that is, for DOE to focus on a robust reference design, and only to the extent possible on alternative designs. Dr. Hornberger also asked whether the staff is confident that it can evaluate design enhancements, such as drip shields, etc. Dr. Bell replied that the NRC expects to review the case of backfill, and was not sure whether DOE would be considering drip shields in the VA.

Dr. Fairhurst mentioned that perhaps a ventilated, cooler repository will be considered. Dr. Bell acknowledged that there is political support for a ventilated repository.

VII. Nuclear Energy Institute Comments on the Department of Energy's Yucca Mountain Viability Assessment (Open)

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

The Committee heard a presentation by, and exchanged perspectives with, the following NEI staff members: M. Fertel, Vice President; S. Kraft, Director, Spent Nuclear Fuel Management; and R. Anderson, Senior Project Manager.

The principal topic discussed was DOE's VA report, which is due to be released in September 1998. NEI pointed out that since the VA will be a "snapshot in time" the licensing plan about how to proceed forward from that point will be very important. NEI proposed that the VA could

be of great help in future NRC/DOE licensing activities, although the relationship between the two agencies will probably change once the LA is submitted.

It was also suggested that, during the NRC review of the VA, the staff look at a broader perspective than just the KTIs (e.g., there may be significant safety concerns associated with pre-closure issues such as above-ground facility operation, and waste retrievability). It was also suggested that in addition to including in the NRC VA review report a statement that either additional information is needed or that the reasoning is faulty, the NRC staff should also consider noting areas covered well and in sufficient depth.

In response to a question from a Committee member regarding NEI recommendations for NRC consideration, the speakers suggested the following:

1. the need for the NRC to make available an SRP for the LA
2. the need for the NRC to "close" issues from further consideration (and hold them closed absent new information that would cause the original finding to be invalid)
3. the need for the NRC to consider a "phased-licensing" approach, that could permit construction to commence sooner than the current schedule would seem to suggest (Would the regulations need to be modified to support such a position?)

In closing, Mr. Fertel indicated that NEI intended to become more closely involved with the activities of the ACNW in the future and intended to provide to the Committee relevant NEI observations and recommendations in a timely fashion. In the near future, NEI will provide insights to the Committee on spent fuel storage.

VIII. Meeting With the Director, Division of Waste Management, NRC Office of Nuclear Material Safety and Safeguards (Open)

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

The Committee heard from John Greeves and Margaret Federline, the Director and Deputy Director, respectively, DWM/NMSS. Mr. Greeves noted that several of the topics he had planned to discuss had already been presented to the Committee, so he intended to only mention the importance the NRC places upon DOE's VA, and to note that the staff recognizes that it has only a short period of time during which to conduct a review and report to the Commission.

He did mention the Commission's response to the ACNW's strategic plan, observing that the comment suggesting that the ACNW review several "second tier" issues (e.g., Trojan reactor pressure vessel shipment, criticality issues at Yucca Mountain, LLW standard-setting activities) must be closely integrated with the DWM staff as there are limitations on resources available to the staff for supporting presentations to the Committee. DWM recommends that the ACNW concentrate its activities on the Yucca Mountain project and the forthcoming NRC site-specific regulations for that facility, 10 CFR Part 63. Mr. Greeves noted that the Director, NMSS, has indicated DOE's VA report and 10 CFR Part 63 as "top priority".

He noted that DWM has only 1 FTE assigned to LLW, with more resources planned for FY 1999. He also expects a Commission SRM on Envirocare issues. In the meantime, support for LLW activities is "running on fumes." In FY 1999 the staff should be able to expend more resources on generic criticality issues and the issuance of the LLW PA document. In FY 2000, DWM should have sufficient resources to look at clearance levels rulemaking issues. He noted that in the decommissioning area, DWM was preparing an SRP for implementing the license termination rule. At present, that SRP is scheduled for review by the Committee at its 102nd meeting, currently planned for July 21-23, 1998.

In response to Dr. Garrick's question regarding the most important two or three issues that need to be addressed in the area of decontamination and decommissioning, Mr. Greeves said his current thoughts, without preconsideration, would be to denote the following:

1. issues related to uranium and thorium contamination (These cover a full spectrum from small to large amounts of contamination.)
2. a decision as to what model should be used for screening and analysis (It is anticipated that the feedback from the industry over the next 2-year comment period should provide a level of guidance in this regard.)

Ms. Federline commented on the Committee's recent "issue resolution" letter, stating that the suggestion for more public involvement was a good one and that, during the May 1998 International High-Level Waste Conference, NRC has scheduled an evening workshop that will be open to the public.

She stated that the DWM budget only permits the Division to look at pre-closure issues if they bear on post-closure items (such as fatal flaws), or pre-closure items that affect worker health (such as ventilation and retrievability). It should be recognized that the DWM approach is a phased one, with phase 3 of the approach being concerned with operational activities. During the 3-month period following the issuance of the VA, the staff will not comment on such operations as fuel handling.

Ms. Federline reported on an April 14, 1998, letter from Nevada questioning NRC's attention to the DOE quality assurance (QA) program. She stated that the implementation of the QA program at the Yucca Mountain Project (YMP) is a "top" concern of the NRC and that the DOE YMP office must recognize that there is a need for a graded approach to QA.

Dr. Garrick thanked the presenters for their comments, indicating his belief that these exchanges were of mutual benefit. He stated that he looked forward to further discussions at the 101st meeting.

IX. Status of Issues Related to the Yucca Mountain Project (Open)

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

Lake Barrett, Acting Director, Office of Civilian Radioactive Waste Management (OCRWM), DOE, stated that although this would be his first presentation to the ACNW, many members of his staff had made presentations before the Committee, .

His briefing on DOE activities related to the proposed HLW repository at Yucca Mountain focused on the status of the following components that comprise the DOE VA:

1. the preliminary design concept for the repository and waste package
2. the total system performance assessment
3. the plan and cost estimate for the License Application
4. the cost estimate to construct and operate the repository

He stated that the effort on all four components is proceeding on schedule and that the complete report will be available September 1998.

Mr. Barrett stated that DOE is committed to conducting its VA effort in such a manner that the methodology and results will be fully transparent. He concluded his formal presentation by discussing several of the science and engineering efforts in progress.

Carol Hanlon, OCRWM Licensing/DOE, updated the Committee on the most recent site characterization and construction activities at the Yucca Mountain site, embellishing her

presentation with photographs of progress on the recently started cross-drift, the status of the thermal testing, and the current and planned activities at Busted Butte. She stressed that it was not too early for the Committee to begin planning for its September meeting in Amargosa Valley and the concurrent trip to the Yucca Mountain site.

Chairman Garrick thanked the presenters, indicating that it is apparent that many interesting activities are underway on the project. He gave Mr. Barrett an open invitation to address the Committee in the future and thanked him for past DOE participation in ACNW meetings.

X. Executive Session (Open)

[Mr. Richard K. 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 101st ACNW Meeting, June 10–12, 1998.

B. Future Committee Activities (Open)

The ACNW plans to meet with the RSK during the week of September 14–18, 1998. The Committee also plans to tour the Konrad, Morsleben, and Gorleben facilities during its visit to Germany.

Summary of the Environmental Assessment

The purpose of decommissioning a nuclear facility is to remove the facility safely from service, and to reduce residual radioactivity at the site to levels that permit the license granted by the NRC to be terminated.

The NRC staff has reviewed the licensees' application and the SNEC Decommissioning Environmental Report prepared in accordance with 10 CFR 51.53(d). The staff also referred to the SNEC Facility Updated Safety Analysis Report, Revisions 0, 1, and 2 and the SNEC Facility Decommissioning Quality Assurance Plan. To document its review, the staff has prepared an environmental assessment (EA) which examined decommissioning alternatives, non-radiological and radiological impacts of decommissioning, and effects of postulated radiological accidents during decommissioning. The alternatives available for decommissioning—DECON, ENTOMB, SAFSTOR, and no action—are evaluated and discussed in the "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities," NUREG-0586, dated August 1988 (GEIS). Based on its review of the licensees' application and plans for decommissioning described in the Post Shutdown Decommissioning Activities Report (PSDAR), the staff has determined that the environmental impacts, both radiological and nonradiological, associated with the decommissioning of the SNEF, are bounded by the impacts evaluated by the GEIS and have been adequately evaluated by the licensees. The staff also finds that the proposed decommissioning of the SNEF complies with 10 CFR Part 50, Appendix I, and 10 CFR Part 20.

Finding of No Significant Impact

The staff has reviewed the licensees' application for license amendment and environmental report in accordance with the requirements of 10 CFR Part 51. Based upon the EA, the staff concluded that there are no significant environmental impacts associated with the proposed action and that the proposed action will not have a significant effect on the quality of the human environment. Therefore, the Commission has determined, pursuant to 10 CFR 51.31, not to prepare an environmental impact statement.

For further details with respect to this action see (1) the application for license amendment dated November 25, 1996, as supplemented on May 30, June 4 and 16, August 21 and September 16, 1997,

and February 3 and 9, 1998, (2) the SNEC Decommissioning Environmental Report submitted on April 17, 1996, and the licensees' response to Commission questions about the environmental report dated July 18, 1996, and March 3 and 31, 1998, (3) the SNEC Facility Updated Safety Analysis Report, Revision 0, submitted on October 25, 1996, Revision 1, submitted on August 21, 1997, and Revision 2, submitted on February 3, 1998, (4) the SNEC Facility Decommissioning Quality Assurance Plan submitted by letter dated November 8, 1996, as supplemented on May 30, 1997, and February 3 and 9, 1998, (5) the PSDAR (originally submitted as the SNEF Decommissioning Plan) dated February 1996, which was submitted on February 16, 1996, as supplemented on July 18, 1996, and (6) the EA dated March 1998. These documents are available for public inspection at the NRC Public Document Room, the Gelman Building, 2120 L Street, NW, Washington, D.C. 20003, and at the Local Public Document Room for the SNEF at the Saxton Community Library, Front Street, Saxton, Pennsylvania 16678. Single copies of the EA may be obtained from Alexander Adams Jr., Senior Project Manager, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, M.S. O-11-B-20, Washington, D.C. 20555.

Dated at Rockville, Maryland, this 9th day of April 1998.

For the Nuclear Regulatory Commission,
Marvin M. Mendonca,

*Acting Director, Non-Power Reactors and Decommissioning Project Directorate,
Division of Reactor Program Management,
Office of Nuclear Reactor Regulation.*

[FR Doc. 98-9994 Filed 4-14-98; 8:45 am]

BILLING CODE 7590-01-P

NUCLEAR REGULATORY COMMISSION

Advisory Committee on Nuclear Waste; Revised

The agenda for the 100th meeting of the Advisory Committee on Nuclear Waste (ACNW) scheduled to be held on April 21-23, 1998, 11545 Rockville Pike, Rockville, Maryland, has been revised. On Thursday, April 23 the Acting Director, Office of Civilian Radioactive Waste Management, DOE, will provide an overview of DOE high level waste activities. In addition, Ms. C. Hanlon, DOE will update the Committee on site characterization activities at Yucca Mountain.

All other items pertaining to this meeting remains the same as published

in the Federal Register on Monday, April 6, 1998 (63 FR 16831).

Further information regarding this meeting 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. EDT.

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

Dated: April 9, 1998.

Andrew L. Bates,
Advisory Committee Management Officer.
[FR Doc. 98-9997 Filed 4-14-98; 8:45 am]
BILLING CODE 7590-01-P

NUCLEAR REGULATORY COMMISSION

[Docket No. 50-133]

Pacific Gas and Electric Company, Humboldt Bay Power Plant; Notice of Public Meeting

The NRC will conduct a public meeting at the Eureka Inn, 518 7th Street, Eureka, California, on April 29, 1998, to discuss plans developed by Pacific Gas and Electric Company (PG&E, the Humboldt Bay Power Plant licensee) to decommission the Humboldt Bay Power Plant located near Eureka, California. The meeting will begin at 7:00 p.m. and be chaired by Mr. Stan Dixon, 1st District Supervisor, Humboldt County Board of Supervisors. The meeting will include a short presentation by the NRC staff on the decommissioning process and NRC programs for monitoring decommissioning activities, with attention being given to the licensee's updated Post-Shutdown Decommissioning Activities Report (PSDAR) dated February 27, 1998. There will also be a presentation by PG&E on their planned decommissioning activities, and there will be an opportunity for members of the public to make comments and question the NRC staff and PG&E representatives. The meeting will be transcribed.

The licensee's update to the PSDAR provides a short discussion of the plant history, and a description and schedule of planned decommissioning activities. The PSDAR update also comments briefly on anticipated decommissioning costs and environmental impacts.

The PSDAR update is available for public inspection at the local public document room, located at the Humboldt County Library, 1313 3rd Street, Eureka, CA 95501, and the

APPENDIX II



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

Revised: April 16, 1998

SCHEDULE AND OUTLINE FOR DISCUSSION
100TH ACNW MEETING
APRIL 21-23, 1998

Tuesday, April 21, 1998, Two White Flint North, Room T-2B3, 11545 Rockville Pike,
Rockville, Maryland

- ✓ 1) 8:30 - 8:40 A.M. Opening Remarks by the ACNW Chairman (Open)]
1.1) Opening Statement (BJG/RKM)
1.2) Items of Current Interest
1.3) Anticipated ACNW reports this meeting
- 2) ^{9:15} 8:40 - ~~9:30~~ A.M. Committee Activities/Future Agenda (Open) (BJG/RKM)
2.1) Set Agenda for 101st ACNW Meeting
June 10-12, 1998
2.2) Review topics for out months
2.3) Review EDO response to recent Committee letters
2.4) Recent and planned attendance at outside meetings
- 3) ^{9:15 12:50} ~~9:30~~ - 12:30 P.M. NRC's Nuclear Waste Related Research (Open)]
(GMH/HJL-GNG)
(BREAK ~~10:30-10:45~~ A.M.) ^{9:35-} 3.1) Generic Radionuclide Transport Research Program
^(BREAK ~~10:40-10:50~~) 3.2) Elements of an ACNW report to the Commission
12:30 - 1:30 P.M. ***LUNCH***
- 4) ^{1:35 - 1:55} 1:30 - 2:00 P.M. Nuclear Waste Related Rulemaking (Open) (BJG/GNG)]
The Committee will hear about the transfer of the rulemaking process in nuclear waste related areas from NRC's Office of Research to the Office of Nuclear Material Safety and Safeguards (Josie Piccone, NMSS)
- 5) ^{1:55 - 2:55} 2:00 - 3:00 P.M. Meeting with Hugh L. Thompson, Jr. Deputy Executive Director for Regulatory Programs (DEDR) (Open) (BJG/RKM)]
The DEDR will discuss items of mutual interest including:
5.1) Risk-Informed, Performance-Based regulation
5.2) Oversight of certain DOE activities by NRC
5.3) The DOE's Viability Assessment for Yucca Mountain
5.4) Discussion of predecisional information by advisory committees in open meetings
- ^{2:55 - 3:00} ~~3:00 - 3:15~~ P.M. ***BREAK***
^{3:30 - 5:15} BREAK

100TH ACNW MEETING

- 3:00 5:45
 6) 3:15 - 6:00 P.M. Preparation of ACNW Reports (Open)
 Discuss possible ACNW reports on the following topics:
 6.1) Waste Related Research (GMH/GNG)
 6.2) Decommissioning Guidance (RGW/HJL)

5:45
~~6:00 P.M.~~ *****RECESS*****

Wednesday, April 22, 1998, Two White Flint North, Room T-2B3, 11545 Rockville Pike, Rockville, Maryland

- 7) ^{8:35}~~8:30~~ - 8:35 A.M. Opening Remarks by ACNW Chairman (Open) (BJG/RKM)

- 8) 8:35 - 12:00 NOON Total System Sensitivity Analysis for Yucca Mountain (Open) (BJG/ACC)
 (BREAK 10:00 A.M.)
 to 10:20
 8.1) Introduction
 8.2) TPA-3 Code Overview
 8.3) Modeling Results
 8.4) Process Level (KTI) Sensitivity Studies
 8.5) Total System Sensitivity Studies
~~8.6) Roundtable discussion~~

✓ 12:00 - 1:00 P.M. *****LUNCH*****

- 9) ~~1:00 - 3:00 P.M.~~
 1:05 - 1:50
 * 1:50
Viability Assessment Guidance (Open) (GMH/LGD)
 The NRC staff will discuss guidance being prepared for its review of the DOE's Yucca Mountain Viability Assessment

3:00 - 3:15 P.M. *****BREAK*****

- 10) 3:15 - ~~5:00~~ P.M.
 4:45
Nuclear Energy Institute Comments on the Department of Energy's Yucca Mountain Viability Assessment (Open) (GMH/RKM)
 Representatives of NEI will comment on the viability assessment and other issues related to high-level waste disposal which may include pending legislation and spent fuel storage (Marv Fertel/Steve Kraft, NEI)

- 11) ^{4:45 - 5:00}
 5:00 - 6:00 P.M. Preparation of ACNW Reports (Open)
 Discuss possible ACNW reports on the following topics:
 11.1) Decommissioning Guidance
 11.2) Waste Related Research
 11.3) Viability Assessment

6:45
~~6:00 P.M.~~ *****RECESS*****

* 1:50 - 3:15 Preparation of ACNW Reports (Cont'd)

[Denotes transcribed portion.

Thursday, April 23, 1998, Two White Flint North, Room T-2B3, 11545 Rockville Pike, Rockville, Maryland

- 12) ~~8:30~~ - 8:35 A.M. Opening Remarks by ACNW Chairman (Open) (BJG/RKM)
8:34
- 13) 8:35 - ~~9:30~~ A.M. Meeting with NRC's Director, Division of Waste Management, Office of Nuclear Material Safety and Safeguards (Open) (BJG/RKM)
9:25
A current events discussion with John Greeves on developments at Yucca Mountain, rules and guidance under development, available resources and other items of mutual interest
- 14) ~~9:30~~ - 10:30 A.M. Status of Issues Related to the Yucca Mountain Project (Open) (BJG/HJL)
9:25
- Overview of DOE HLW related activities (Lake Barrett, DOE)
- Status of Site Characterization Activities (Carol Hanlon, DOE)
- 15) 10:30 - ~~4:00~~ P.M. Continue Preparation of ACNW Reports (Open)
Continue preparation of ACNW reports as noted in item 11
- 12:00 - 1:00 P.M. ***LUNCH***
- ~~4:00~~ P.M. ***ADJOURN***

- 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

**100TH ACNW MEETING
APRIL 21-23, 1998**

<u>ACNW STAFF</u>	<u>1st Day</u>	<u>2nd Day</u>	<u>3rd Day</u>
Dr. Andrew Campbel I	<u>X</u>	<u>X</u>	<u>X</u>
Ms. Lynn Deering	<u>X</u>	—	—
Ms. Michele Kelton	<u>X</u>	<u>X</u>	<u>X</u>
Dr. John Larkins	<u>X</u>	<u>X</u>	<u>X</u>
Mr. Howard Larson	<u>X</u>	<u>X</u>	<u>X</u>
Mr. Richard Major	<u>X</u>	<u>X</u>	<u>X</u>
Dr. Gail Marcus	<u>X</u>	<u>X</u>	<u>X</u>

ATTENDEES FROM THE NUCLEAR REGULATORY COMMISSION

APRIL 21, 1998

H. Felsher	NMSS
S. Bahadur	RES
R. Cady	RES
P. Reed	RES
J. Philip	RES
E. O'Donnell	RES
R. Neel	NMSS
R. Johnson	NMSS
T. Nicholson	RES
P. Holahan	NMSS
J. Kotra	NMSS

**APPENDIX III
100th ACNW Meeting**

ATTENDEES FROM THE NUCLEAR REGULATORY COMMISSION (CONT'D)

APRIL 22, 1998

J. Firth	NMSS
B. Ibrahim	NMSS
J. Trapp	NMSS
K. Chang	NMSS
B. Leslie	NMSS
P. Reed	RES
J. Ciocco	NMSS
K. Stablein	NMSS
M. Rose Byrne	NMSS
K. Gruss	NMSS
P. Justus	NMSS
M. Bell	NMSS
T. Ahn	NMSS
R. Codell	NMSS

APRIL 23, 1998

B. Ibrahim	NMSS
K. Stablein	NMSS
R. Johnson	NMSS
B. Leslie	NMSS
S. Wastler	NMSS
J. Firth	NMSS
M. Nataraja	NMSS
K. Gruss	NMSS
L. Hamdan	NMSS
K. Gruss	NMSS
J. Ciocco	NMSS

ATTENDEES FROM OTHER AGENCIES AND GENERAL PUBLIC

APRIL 21, 1998

R. Wallace	USGS
C. Hanlon	DOE
P. Phibbs	Nuclear Waste News
M. Hopps	Exchange Monitor Publications
J. Clifton	NIST
A. Haghi	M&O/Duke Engineering

APPENDIX III
100th ACNW Meeting

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

APRIL 21, 1998 (Cont'd)

J. Russell	CNWRA
J. York	Booz Allen & Hamilton
W. Beck	Sciencetech
R. Wallace	USGS
J. Russell	CNWRA
L. Fairbent	TEC
A. Haghi	Duke Engineering
W. Matskiela	Gamma Engineering
S. Colwell	SC&A
D. Doherty	DOE
A. VanLuik	DOE
C. Hanlon	DOE
J. York	Booz Allen & Hamilton
P. Krishna	M&O/TRW
S. Krill	ICF
M. Hopps	Exchange Monitor Publications
G. Roseboom	USGS
S. Mohanty	CNWRA
W. Beck	Sciencetech
Robert W.	DOE
R. Andersen	NEI
S. Kraft	NEI
M. Fertel	NEI
P. Phibbs	Nuclear Waste News

APRIL 23, 1998

R. Wallace	USGS
L. Fairbent	TEC
A. Haghi	Duke Engineering
F. Galpin	Rogers & Assoc. Eng.
S. Colwell	SC&A, Inc
I. Fiero	ABB
L. Phillips	URA
R. Lanza	ICF Kaiser
D. Curtis	DOE
C. Hanlon	DOE
A. Brownstein	DOE
M. Hopps	Exchange/Monitor Publications

**APPENDIX III
100th ACNW Meeting**

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

APRIL 23, 1998 (Cont'd)

L. Desell	DOE
L. Barrett	DOE
P. Krishna	M&O/TRW
G. Kiernan	U.S. OSTP
R. Clark	EPA
S. Crawford	Self
G. Roseboom	USGS - retired
W. Beck	Sciencetech
J. Russell	CNWRA
M. Seitz	Booz Allen & Hamilton

APPENDIX IV: FUTURE AGENDA

The Committee agreed to consider the following during the 101st ACNW Meeting, June 10-12, 1998:

- Near-Field Environmental and Performance Engineered Barriers in the Yucca Mountain Repository – Representatives from NRC and DOE, and other outside experts will discuss engineered barriers, corrosion, and the chemistry of the near field at the Yucca Mountain repository.
- Meeting With the Director, Division of Waste Management, NRC Office of Nuclear Material Safety and Safeguards – The Committee will meet with the Director of DWM to discuss recent developments within the division, such as developments at the Yucca Mountain repository, rules and guidance being developed, available resources, and other items of mutual interest.
- Meeting With a Representative of the Nuclear Energy Institute – A representative of the Nuclear Energy Institute will comment on the ACNW's strategic plan and priority issues for 1998.
- Meeting With the Nuclear Regulatory Commission – The Committee will prepare for a meeting with the Commission to discuss items of mutual interest. Topics will include NRC's High-Level Waste Issue Resolution Status Reports; ACNW's support of the NRC staff's approach to assessing the performance of multiple barriers; ACNW strategic plan; facility license termination; risk-informed, performance-based regulation; and NRC's safety research program. The Committee is scheduled to meet with the Commission in July 1998.
- Preparation of ACNW Reports – The Committee will discuss planned reports, including comments on DOE's Viability Assessment, engineered barriers, total system sensitivity analysis, and other topics discussed during this and previous meetings.

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

Committee Activities/Future Agenda

1. Committee Activities/Future Agenda, **Agenda Item 2.3, Handout No. 1**, provided by Lynn G. Deering, ACNW, with the following attachments:
 - Memo from L. Deering, ACNW, dated April 20, 1998, transmitting Memo from J. Callan to J. Garrick re "ACNW's Support for the NRC's Staff Approach to Assessing the Performance of Multiple Barriers," dated April 15, 1998
 - Letter from B. John Garrick, ACNW, to Chairman Shirley Ann Jackson, NRC, Subject: ACNW's Support for the NRC Staff Approach to Assessing the Performance of Multiple Barriers," dated March 6, 1998
2. Committee Activities/Future Agenda, **Agenda Item 2.4, Handout No. 1**, provided by L. Deering, ACNW, providing Tentative Agenda for the April 23-24, 1998, Meeting of the Nuclear Waste Technical Review Board Panel on Performance Assessment, Albuquerque, NM
3. Office of Civilian Radioactive Waste Management Management & Operations Meeting Status, dated April 13, 1998

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NRC's Nuclear Waste-Related Research

4. Radionuclide Transport Research Program for the Advisory Committee on Nuclear Waste, dated April 21, 1998, presented by Sher Bahadur, Office of Nuclear Regulatory Research (RES) **[Viewgraph]**
5. Radionuclide Transport Research Program, Program Implementation, presented by William R. Ott, RES, undated **[Viewgraph]**
6. Radionuclide Transport Research Program, Hydrology, presented by Thomas J. Nicholson, RES, undated, **[Viewgraph]**
7. Radionuclide Transport Research Program, Engineered Barriers, presented by Jacob Philip, RES, dated April 21, 1998 **[Viewgraph]**
8. Radionuclide Transport Research Program, Source Term, presented by Phillip R. Reed, RES, dated April 21, 1998 **[Viewgraph]**

MEETING HANDOUTS (CONT'D)

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DOCUMENTS

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NRC's Nuclear Waste-Related Research

9. Radionuclide Transport Research Program, Source Term (Slags), presented by Linda Veblen, RES, undated, **[Viewgraph]**
10. Radionuclide Transport Research Program, Transport, presented by Edward O'Donnell, RES, undated, **[Viewgraph]**
11. Radionuclide Transport Research Program, Performance Assessment, presented by Ralph Cady, RES, undated, **[Viewgraph]**
12. Biographical Information: Radionuclide Transport Team, Waste Management Branch, DRA, RES, undated **[Viewgraph]**
13. Package re Research Projects, Investigating Institutions, and Principal Investigators, undated, **[Viewgraph]**

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Nuclear Waste-Related Rulemaking

14. Transfer of Rulemaking Responsibilities, presented by Patricia Holahan, Division of Industrial and Medical and Nuclear Safety, undated **[Viewgraph]**

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Total System Sensitivity Analysis for Yucca Mountain

15. Introduction to NRC Sensitivity Studies and Status of TPA Activities, presented by Keith I. McConnell, NMSS, dated April 22, 1998 **[Viewgraph]**
16. TPA 3.1.4 Approach and Reference Case, presented by Tim McCartin, NMSS, dated April 22, 1998 **[Viewgraph]**
17. NRC's Total-System Performance Assessment Code (Version 3.1): Nominal case and Selected Scenario Outputs, presented by Sitakanta Mohanty, CNWRA, dated April 22, 1998 **[Viewgraph]**
18. Process-Level Sensitivity Studies (TPA 3.1.1), presented by James R. Firth, NMSS, dated April 22, 1998 **[Viewgraph]**
19. System-Level Sensitivity Results and Alternative Conceptual Models in TPA 3.1, presented by Richard B. Codell, NMSS, undated, **[Viewgraph]**
20. Total System Sensitivity Analysis for Yucca Mountain, **Agenda Item 8, Handout No. 1**, provide by Andrew C. Campbell, ACNW, with the following attachments:

- Memo from A. Campbell, ACNW, to ACNW Members,

Subject: Synopsis of Issues and Questions for Total System Sensitivity Studies, dated April 21, 1998

- Memo from A. Campbell, ACNW, to ACNW Members, Subject: Possible Improvements for TPA 3.2 Code, dated April 20, 1998

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Viability Assessment Guidance

21. Draft NRC Staff Guidance for Review of DOE's Viability Assessment for a Yucca Mountain HLW Repository, presented by Michael J. Bell, NMSS, dated April 22, 1998 **[Viewgraph]**

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Status of Issues Related to the Yucca Mountain Project

22. Briefing on Repository Activities, presented by Lake Barrett, DOE, dated April 23, 1998 **[Viewgraph]**

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1 **Opening Remarks by ACNW Chairman**

1. Introductory Statement by the ACNW Chairman, undated
2. Items of Current Interest, undated
3. Introductory Statement by the ACNW Chairman, Second Day, undated
4. Introductory Statement by the ACNW Chairman, Third Day, undated

2 **Committee Activities/Future Agenda**

5. Agenda for 101st ACNW Meeting, June 10–12, 1998
6. Agenda for Out Months through October 1998
7. Reconciliation of Executive Director for Operations' Responses to Recent ACNW Reports
8. Executive Director for Operations' List of Future Meeting Topics
9. Civilian Radioactive Waste Management Office M&O Meeting List and ACNW 1998 Calendar

3 **NRC's Nuclear Waste-Related Research**

10. Status Report
11. Enclosures
 - Outline of talking points used in pre-meeting with RES/WMB staff
 - Current draft of the ACRS' Report to the Commission on the NRC Research Program
 - Revised draft outline for ACNW contribution
 - Draft White Paper by G. Hornberger w/ACNW staff comments
 - Copy of ACNW Approved Insert to ACNW Report

4 **Nuclear Waste-Related Rulemaking**

12. Status Report
13. Enclosures
 - SECY-97-220 Implementation of DSI 22 Research, September 30, 1997
 - Excerpt from Conference Report for Energy Reorganization Act of 1974; Commission Research Activities

MEETING NOTEBOOK CONTENTS (CONT'D)

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DOCUMENTS

5 Meeting With Hugh L. Thompson, Jr., Deputy Executive Director for Regulatory Programs

- 14. Note to ACNW Members, from L. Deering, dated April 3, 1998, Subject: Draft Decommissioning Letter
- 15. Comments on draft Decommissioning letter, April 7, 1998, from R. Wymer

8 Total System Sensitivity Analysis for Yucca Mountain

- 16. Status Report
- 17. Enclosures
 - "NRC High-Level Radioactive Waste Program Annual Progress Report Fiscal Year 1996," NUREG/CR-6513, No. 1, dated January 1997.
 - Draft predecisional CNWRA Report, "Total-System Performance Assessment (TPA) Version 3.1.3 Code: Module Descriptions and User's Guide," (April 1998)
 - NRC overheads from DOE/NRC Technical Exchange, March 17-19, 1998
 - DOE overheads from DOE/NRC Technical Exchange, March 17-19, 1998
 - Trip Report, NRC-DOE Technical Exchange on Total Systems Performance, March 17-19, 1998, by Andy Campbell

9 Viability Assessment Guidance

- 18. Status Report
- 19. Enclosures
 - Guidance for NRC's Review of DOE's Viability Assessment, draft, August 26, 1998
 - "Overview of NRC's Issue Resolution Process, Accomplishments, and Plans for Review of DOE's Viability Assessment"
 - Excerpts from FY 1998-1999 NMSS Operating Plan, HLW Repository Regulation
 - Memorandum from G. Hornberger to L. Deering, transmitting preliminary thoughts for a VA Letter, dated February 27, 1998
 - Comments on Viability Assessment Letter, dated March 16, 1998, R. Wymer
 - Memorandum from J. Garrick to G. Hornberger, transmitting comments on VA letter, March 17, 1998