MINUTES OF THE 113th ACNW MEETING
OCTOBER 12–13, 1999

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BY B. JOHN GARRICK
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MINUTES OF THE 113TH MEETING OF THE ADVISORY COMMITTEE ON NUCLEAR WASTE OCTOBER 12–13, 1999 LAS VEGAS, NEVADA

The U.S. Nuclear Regulatory Commission's (NRC's) Advisory Committee on Nuclear Waste (ACNW) held its 113th meeting on October 12–13, 1999, at the Alexis Park Hotel, 375 E. Harmon Avenue, Las Vegas, Nevada. Notice of this meeting was published in the *Federal Register* on September 27, 1999 (64 FR 52113) (Appendix I). This meeting served as a forum for attendees to discuss and take appropriate action on the items listed in the agendum (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 20003-1527. Copies of the transcript are available for purchase from Ann Riley & Associates, Ltd., 1025 Connecticut Avenue, NW., Suite 1014, Washington, DC 20036. Transcripts are also available for downloading from, or reviewing on, the Internet <http://www.nrc.gov/ACRSACNW>.

ATTENDEES

ACNW members who attended this meeting are Dr. B. John Garrick (ACNW Chairman), Dr. Raymond G. Wymer, and Dr. George M. Hornberger. ACNW invited expert, Milton Levenson, was also in attendance. 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 portion of the meeting.]

Dr. B. John Garrick, ACNW Chairman, convened the meeting at 8:30 a.m. and briefly reviewed the agendum. He stated that the meeting was being conducted in conformance with the Federal Advisory Committee Act. He asked members of the public who were present and had something to contribute to the meeting to inform the ACNW staff so that time could be allocated for them to speak. He noted the following as items of interest:

- Amarjit (Jit) Singh from the Advisory Committee on Reactor Safeguards will be helping the ACNW in its review of the draft environmental impact statement (DEIS) for Yucca Mountain. Jit expects to spend about 25% of his time with the ACNW. He is a nuclear engineer with more than 25 years of experience and is a registered professional engineer.

- NRC Commissioner nominee Richard Meserve said he would try to balance the needs of the agency, industry, and public, if confirmed. Testifying recently at his confirmation hearing, the lawyer-physicist said he believes that the agency is "on the right track" in refocusing its regulations on nuclear plant operations that are most risk significant and reaching out to better communicate with the public, industry, and Congress. His

nomination was well received by the Senate Environment & Public Works Committee, which is set to vote on his confirmation on September 29, 1999. President Clinton has said he will name Mr. Meserve NRC Chairman upon confirmation.

- On September 22, 1999, the Senate Committee voted unanimously to favorably report out the nomination of Ivan Itkin to be the Director of the Department of Energy's (DOE's) Office of Civilian Radioactive Waste Management. Mr. Itkin's nomination is now ready for consideration by the full Senate.

- There has been a criticality accident at a fuel facility outside Tokyo. Three individuals were seriously exposed and are hospitalized. Households within one-half kilometer of the site have been evacuated. Sheltering in place has been recommended to 10 kilometers.

  The ACNW's current understanding of the event was as follows:

  An incident occurred at the Tokaimura nuclear fuel processing plant which is located in Tokai, Japan, approximately 90 miles northeast of Tokyo. The incident occurred on Thursday morning at around 10:35 a.m. local time. According to news reports, workers added an excessive amount of enriched uranium (35 pounds versus the prescribed 5 pounds) into a tank containing nitric acid. The error apparently caused an inadvertent criticality. The facility and nearby residences (within several hundred yards of the facility) were evacuated shortly after the event. Three workers who had been handling the uranium were taken to hospitals; two are in critical condition as a result of receiving a very high radiation dose. The Japanese government has established teams to respond to the emergency. Radiation levels within the building are preventing re-entry to investigate the event or to take actions to ensure the nuclear reaction is terminated.

- L'Agence Nationale pour la Gestion des Déchets Radioactifs (ANDRA) has chosen 15 granite formations as potential candidates for a second deep waste laboratory. The French nuclear waste management agency presented its choices to the National Assessment Committee, which is expected to submit an opinion to the government soon. The sites are in Brittany and the Massif Central mountain range and were chosen on technical grounds, an ANDRA official said. The government is to name a three-person committee to negotiate lab siting with local populations. ANDRA was authorized in August to begin work on a waste lab in a clay formation at Bure, near Bar-le-Due in eastern France.

II. ROUND-TABLE DISCUSSION ON THE ROLE OF SAFETY ASSESSMENT IN THE YUCCA MOUNTAIN REGULATORY PROCESS (OPEN)

[Ms. Lynn G. Deering was the Designated Federal Official for this portion of the meeting.]

Dr. Garrick opened this session by noting that the ACNW is using the term safety assessment (SA) synonymously with risk assessment, which examines what can go wrong, how likely is it, and what are the consequences. He introduced the ACNW members and the facilitator, Mr. Chip Cameron, then explained that the emphasis of the meeting was to be on communication

about how risks are evaluated, how uncertainties are handled, how to communicate results most effectively, and how the public can become more involved in safety assessment. He explained that the ultimate objective of risk communication is to make good decisions about risk. He noted that a round table format is being used to enhance the participatory process, and that the ACNW has made a commitment to seek better ways for the public to get involved and to help the NRC gain greater public confidence and respect. He closed by saying that the ACNW is here to listen and learn rather than preach and talk.

Mr. Cameron introduced himself as Special Counsel for the NRC's Office of General Counsel. He then asked members of the round table to introduce themselves, and described the ground rules for the meeting. Ms. Lynn Deering, ACNW staff, described how each of the agenda topics and speaker's presentations related to the subject of the role of safety assessment in regulatory decision making. Ms. Deering posed several key questions as possible discussion topics including the following: Does the regulator need absolute certainty? Does NRC anticipate looking at or requiring the DOE to provide information other than what is in the safety assessment, and if so, what? How do we arrive at confidence in the SA answer? How should uncertainty be communicated? What does the performance assessment (PA) (or safety assessment) result mean? Should there be a greater role for the public in the safety assessment process? If so, what would it be? Even when the best science and data are used, are we naive to think that people will accept or buy into the results? What can be done to build public trust into the PA process and the results? Is PA the right tool to use to show a site will be safe? If not, what would be better? Are there other topics besides safety assessment you would like the ACNW to explore in depth?

Members at the table giving presentations included B. John Garrick, ACNW, Steve Frishman, State of Nevada, Ray Clark, Environmental Protection Agency (EPA), Paul Davis, Sandia National Laboratories, Abe Van Luik, DOE, Robert Andrews, M&O contractor, Abby Johnson, Eureka County, Mike Baughman, Lincoln County, Fred Dilger, Clark County, Jim Williams, Nye County, George Dials, M&O contractor. Other members of the round table contributing to the discussions included George Hornberger, ACNW, Ray Wymer, ACNW, Mel Levinson, invited expert to ACNW, Bill Vasconi, concerned citizen, William Phillips, concerned citizen, William Holden, National Congress of American Indians, Mal Murphy, Nye County, Judy Treichel, Nevada Nuclear Waste Task Force, and Dennis Bechtel, Clark County.

Steve Frishman, State of Nevada, Opening Remarks

Mr. Steve Frishman gave a brief introduction to a subject he would address later in the day on why people do not trust risk assessment. He pointed out that people feel scared when they realize that the objective of the repository is no longer to isolate waste or even slow the rate of waste release, but instead, the objective has become simply to delay the ultimate release of the waste. The only question becomes when the waste will be released rather than if the waste will be released. He also alluded to how the nuclear business has traditionally not trusted the American people to make the right decisions if given the uncertainties, so uncertainties have traditionally been withheld.

EPA's Proposed High-Level Waste Standard 40 CFR Part 197 — Ray Clark, Environmental Protection Agency

Mr. Ray Clark, EPA, provided a brief background discussion. His points included that the Energy Policy Act required EPA to set site-specific standards for Yucca Mountain and to contract with the National Academy of Sciences (NAS) to provide input to the standards. The NRC is required to revise its regulations to be consistent with the proposed EPA standard. EPA issued its proposed standard on August 27,1999. Subparts A and B are for storage and disposal, respectively. Subpart A is for operations, with emphasis on monitoring. Subpart B is for the repository design post closure. Subpart B is broken down into individual protection requirements, human intrusion, and groundwater protection requirements. The individual protection standard is 15 mrem for all pathways for 10,000 years to the reasonable maximum exposed individual, which is a person in the most highly exposed group of people. EPA considers this concept similar to the critical group concept suggest by the NAS. "Reasonable" implies that some of the parameters in the dose assessment will be the maximum values in the range, whereas an average or mean can be used for other values. The groundwater protection standard is proposed as the maximum contaminant levels (MCLs) developed under the Safe Drinking Water Act. Four possible compliance points are proposed, one of which will be selected: 5 km, 5 km plus the Nevada Test Site (NTS) boundary, 20 km at Lathrop wells, and 30 km from the footprint at southern Amargosa Valley. Other provisions include a 10,000-year time of compliance and a requirement to calculate peak dose, but the peak dose does not need to be included in the license application. DOE must only consider process and events that have a 1 in 10,000 chance of occurring within10,000 years. Mr. Clark described the concept of reasonable expectation. The concept acknowledges that projecting doses over 10,000 years cannot be done with absolute certainty. It is intended to be less stringent than NRC's concept of reasonable assurance used for nuclear reactors where there is much operational experience. He also mentioned the schedule for when the EPA public hearings would be held in the Las Vegas area.

Discussion

During the discussion, Mr. Frishman raised the point that the proposed standard introduces a new idea of disposal, that is, to delay waste rather than isolate waste. He explained that controlling the rate of release is a rate function, whereas delaying release is a time function. Mr. Clark disagreed that the concept was new, as did Mal Murphy, Nye County. Mr. Murphy raised the concern that the way in which risk is expressed (in terms of probability) is difficult to understand. For example, if the risk is 1 times 10^{-6} (one in a million), people assume this means that 1 in 1 million people will die of cancer. Mr. van Luik agreed that since the 1970's we have mislead the public that geologic disposal is permanent, rather than a very slow release of the waste, when radiation protection standards have always been geared at controlling doses resulting from slow releases. Ms. Treichel added that voluntary risk is very different than risk that is imposed on people without the benefit of having the waste permanently disposed of. Mr. Murphy added that risk is transferred from one group to another when waste is transported.

William Reamer, NRC, noted that the NRC expects to complete its draft regulation for high-level waste (HLW) disposal in the first quarter of next year. The NRC will file its comments on

the proposed EPA standard, and NRC is required by law to modify its regulation to be consistent with the EPA standard.

Abby Johnson, Eureka County, commented that those communicating risk have a vested interest in "getting to yes" in disposing the waste in Nevada. She explained that DOE, NRC, EPA etc., assume that people do not understand risk, but the public does understand the desire of "getting to yes" all too well. As long as the project goal is to "get to yes," then risk communication is a farce. Dr. Wymer, ACNW, noted that he does not think that the ACNW has a position on what the outcome of Yucca Mountain should be. Mr. Dennis Bechtel, Clark County, added that additional risks to public health and safety that must be considered include risk to the economy, risk to livelihood, and the quality of life. William Phillips, health physicist, commented that it is ludicrous to set standards as low as 15 mrem because we do not have evidence that low doses can cause any harm, that is, standards are set based on the linear no-threshold theory (LNT) which has not been proven. Mr. Clark noted that the proposed rule acknowledges that there is uncertainty with the LNT, and that health effects could be higher or lower than what is assumed with the LNT.

Ms. Abby Johnson, citizen, questioned why NRC and EPA are at odds about the standard, that is, 15 versus 25 mrem, and noted that it appears that NRC wants a less stringent standard because Yucca Mountain cannot meet the current standards. She added that a conflict or disagreement between the two agencies does nothing to promote public understanding or acceptance. Mr. Reamer responded that it is a wrong conclusion that NRC prefers 25 mrem because the NRC wants to see the repository licensed. He noted that the NRC is interested in getting a quality application and running a process that involves everyone in reaching an unbiased objective decision based on science and technology.

Mike Baughman, Lincoln County, noted that the cost differential between 15 and 25 mrem should be acknowledged, if no risk benefit is to be gained in meeting 15 mrem. He also noted that the primary risk is from transportation of waste, rather than the repository itself. He suggested that the cost spent on meeting 15 mrem versus 25 mrem should be reallocated to making transportation safer. Ms. Treichel pointed out that the real disagreement is not 15 mrem versus 25 mrem, but whether there should be separate groundwater protection standard.

<u>NRC's Use of Safety Assessment to Support Licensing Decisions and the Licensing Process — William Reamer, NRC</u>

Mr. Reamer made four main points: (1) the NRC will hold DOE responsible for the safety assessment, (2) the NRC will independently oversee DOE's safety assessment, that is, monitor, assess, and come to a conclusion, (3) the NRC will rigorously review the safety assessment document, and (4) the NRC will involve the public throughout the process. Regarding point number 1, he explained that DOE must provide all of the information required by the NRC, DOE must control all significant changes to the safety assessment, DOE must keep the safety assessment up to date, and DOE must prove that the public is protected. DOE must also carry out its safety assessment with very high standards and adopt the "nuclear culture" attitude of other NRC licensees. Regarding the second point, NRC sets the rules for DOE, which include

requiring DOE to evaluate what is important to the safety assessment. NRC will weigh all of the evidence to make an impartial and objective decision. Regarding the third point, NRC will require DOE to monitor repository performance and conditions and update its safety assessment. NRC will cite DOE for any violations of its rules. The NRC also has the authority to require that the waste be retrieved, if there is a repository. NRC will review the safety assessment at all stages and will verify that all of the necessary elements are covered. NRC will return safety assessment to DOE if it is incomplete. NRC will request any additional information it needs that is not provided. The NRC will apply a broad range of expertise to its review, and will review all parts of the assessment that are important to protecting the public. The NRC will conduct its review in accordance with a systematic review plan. With regards to the fourth point, the NRC will take the steps needed to establish a long-term relationship that creates opportunities for the public to be involved in the process. NRC will listen to and respond to public concerns in a language that the public understands. Involvement will include informal dialogue on key issues such as defense in depth (DID), public meetings, public hearings, and improving public access to safety information.

Discussion

Mr. Vasconi questioned why the waste retrievability period could not be extended indefinitely, and have the waste monitored? Ms. Treichel commented that the public's perception is that everybody thinks successful communication results when the public agrees with the project. She added that educating people means providing them with tools to be able to make their own decisions, thus communication should not be equated with public acceptance.

Ms. Treichel also asked how Nevadans can get out of having the repository if they don't want it, because saying "no" to the repository does not appear to be an option. Mr. Reamer, NRC clarified that the NRC's goal of involving the public is not to obtain public acceptance, and NRC is not a supporter of the project. The NRC hopes to get a clear understanding of the public's concerns because they can drive and focus NRC's review. Mr. Murphy commented that in a democratic society people don't necessarily have the right to say yes or no to public policy decisions, but they do have the right to express their feelings and concerns, and to insist that the decision makers on their behalf take those concerns into consideration and do what is fair and equitable to compensate for and mitigate the risks to those whom the risk is transferred. He noted that Nye County's position is to oversee the process to ensure that the decision is made on the right technical basis, and not for political reasons. Mr. Vasconi noted that about 75 percent of Nevadans feel that the repository will be built whether they like it or not. He noted that some Nevadans would like to see equity entitlements come into the state. Mr. van Luik expressed the challenge of trying to inform without persuading or inflaming, which is DOE's job, and noted that DOE has given up on gaining public acceptance. He mentioned that DOE had organized random focus groups around the country and talked about how the performance assessment (PA) curves can be explained to the public. In general, people indicated that if they could think of anything that DOE hasn't already thought of, they would have much lower confidence.

Mr. Holden commented that cultural impacts must also be considered along with political and safety impacts. He also discussed the lack of funding and resources for Indian Nations to

participate in the process. Mr. Cameron paraphrased the question as to where and how impacts on cultural and quality of lifestyle are considered in the regulatory process? Mr. Reamer added that the NRC can be depended upon for finding fatal flaws should they exist.

Mr. Frishman suggested that the ACNW play an important role of reviewing how the NRC addresses public comments, given the controversy between EPA and NRC, perceptions that the rule is being changed to make it possible for Yucca Mountain to get a license, and because 10 CFR Part 63 is such a departure from 10 CFR Part 60, which is justified by the questionable statement that so much has been learned about PA since10 CFR Part 60. Dr. Garrick noted that the ACNW is in the critical path of the rulemaking and intends to review the evolving rule and the public comments and how the staff is dealing with them.

Mr. van Luik added that he is relieved that the NRC sounds like it is going to be tough, and also that it is easier to communicate with the NRC than to the public, because NRC understands probability. Mr. Reamer clarified that NRC must ensure that whatever it does is documented in terms that are understandable to the public. Mike Baughman added that there are those in the State and local governments that are concerned that the NRC will not impose any conditions that are not addressed in the DEIS. Mr. Baughman suggested that the ACNW should ensure that the NRC does not constrain its licensing review to only those issues already addressed in the DEIS.

Mr. Frishman posed a question to Mr. Reamer regarding the Commission's strong position opposing groundwater protection proposed by EPA at Yucca Mountain. He added that he has never heard a convincing or clear statement from the NRC justifying its position to oppose groundwater protection. Mr. Reamer responded that NRC's view is that a radiation protection standard should be designed to protect human health and should be based on an all pathways, and that this is the approach NRC uses to regulate all of its facilities.

Role and Management of Uncertainty in Safety Assessments— Paul Davis, Sandia National Laboratories

Mr. Davis shared some of his views on various aspects of uncertainty. Highlights of his presentation include:

- The more we learn about a repository, the more our uncertainty increases.
- The concepts of reasonable assurance/reasonable expectation and of calculating the "expected performance" of the system are mutually inconsistent.
- The use of Monte Carlo analyses does not minimize uncertainty.
- The role of uncertainty analysis is to define the meaning of the calculated result from a PA.
- The end result of the performance or safety assessment will unfortunately not be "technically defensible" or based on accurate science, but rather, it will be based on belief,

expert judgment, and scientific inference. All decisions about what we think will happen in the future are based on belief, constrained by fact and science. This was the experience at the Waste Isolation Pilot Plant (WIPP) program.

- Belief is a function of bias. This is why the process must involve a variety of people with varying biases to get meaningful results. Belief is also a function of trust. Belief is a function of process, that is, whether the person was included in the process and the degree to which their concerns were addressed along the way.

- It is incorrect to equate the concept of probability of receiving a dose to the probability of gambling or of car accidents, as they are not the same. In safety assessment, we are making assumptions about processes over the long time frame where we have no independent measurements of those processes or of repository performance. Thus, it is different than rolling dice.

- Informing the public does little to build trust. Listening to the public is getting closer to building trust. Involving the public is critical to building trust, and that going all the way to factor their concerns into the PA if their concerns cannot be dismissed based on knowledge and data. The key to a successful process is that the outcome has not been pre-determined. All parties must be willing to live with the outcome of the analyses.

- Uncertainty does not increase with time, but variability may increase with time, as more things can happen that must be considered over a longer time frame.

- We think we are focused on the largest uncertainties in safety assessment but we really are ignoring them. Examples of this include future projections of population growth around Yucca Mountain and the risk associated with low levels of ionizing radiation (LNT), which are standardized and ignored. Our analyses do not include the uncertainty for these factors.

- Dose is not the same thing as risk. The dose a person would receive if he consumed water contaminated to a certain level is estimated, but the likelihood that a person will actually be exposed to contaminated water is not factored into the equation.

- How do we manage uncertainty? First we quantify it, when we can. The first question we must ask is what can go wrong? There is no mathematical way to deal with this. The only way to deal with this belief is to have people together to list things that can go wrong, and to screen out those things that are not likely to occur at Yucca Mountain over the period of concern. This is a process, not a measurement. We also must deal with the uncertainty of multiple conceptual models of the system. None of these models can be proven or validated to give a true answer. It is very difficult, if not impossible, to assign likelihoods to each model, that is, where one model is more consistent with the data than another. We are still wrestling with how to treat multiple conceptual models. We cannot say whether a particular model is conservative relative to reality because we don't know. Parameter values are then assigned for the various models—using measurements and scientific inference. The next step is to propagate the uncertainty to the end. In addition to

parameter uncertainty, we assign a probability to the various scenarios for what can go wrong, how likely is it, and what are the consequences. The result is a probabilistic distribution of future doses. There is no sense in showing curves that all comply with the standard, but meanwhile plan more measurements. If the uncertainty in the analysis is captured in the result in the first place, we should be done if we comply; otherwise, the curves mean nothing because they have not captured the uncertainty.

- The question must be asked whether we need to reduce uncertainty before we decide how to reduce it. On the other hand, if a curve does not comply it does not necessarily mean we have a bad site, it may mean we haven't reduced uncertainty enough.

Discussion

Ms. Treichel questioned whether DOE can "prove" that the public is being protected, as Mr. Reamer implied is necessary, if PA results are based on "belief," how is proof to be had? Bill Phillips complimented the speaker and made an analogy to his experience with building test-flying helicopters. He can make every possible measurement, but in the end, he has not flown the helicopter, so he is operating on belief that it will fly, until he flies it—he has no performance data. In addition, Mr. Murphy, Ms. Treichel, Mr. Holden, and Mr. Fred Dilger all complimented the speaker. Mr. Dilger noted that a persistent criticism of risk assessment has been that uncertainty has not been documented and expressed clearly. This is true in the DEIS.

Dr. Garrick cautioned not to construe Mr. Davis' remarks into suggesting that we can't do anything because there is uncertainty. He pointed out that uncertainty is the reason risk assessment came into being, and that probabilistic risk assessment (PRA) has revolutionized reactor safety. He also noted that our ignorance has been dramatically reduced in regarding our understanding of what drives the safety of nuclear power plants. He added that PRA has provided a process by which we can develop insights into the safety of complex systems.

Ms. Mary Manning, Las Vegas Sun, noted that public perception is as real as scientific fact. She asked Mr. Davis how a citizen could participate in the risk assessment process and have a voice at the table. Mr. Davis suggested that this be discussed during the evening public meeting.

Determining What Elements of Safety Assessment are Most Important; Managing Uncertainty; and Making Results Understandable — Abe van Luik, and Robert Andrews, DOE

Mr. Abe van Luik introduced DOE's topic of how to determine what is most important, how to manage uncertainty, and how to make the process and results transparent. He noted that the PA process is necessary, but that society must always make decisions in the face of uncertainty. He agreed that uncertainty increases as we learn more about the repository, but the knowledge base also increases. DOE must state a safety case, which is more than just a safety assessment. DOE must communicate results, and confidence in the results and the basis for the confidence. The total system performance assessment (TSPA) is part of the safety case, and it relies on models, data, and expert judgment. DOE believes that the safety case includes a robust repository concept and a margin of safety that can be demonstrated outside the TSPA. DOE plans to disclose uncertainty, including showing opposing views have been considered. He noted that DOE must also document the case so as to illustrate the system and its components and discuss important components to safety. For the analysis to be traceable and transparent, the reader must be able to walk through the arguments. DOE's approach is to use a hierarchy of documentation as well as 3-D animated graphics that show how plumes migrate and how the plume changes when input is changed. Mr. van Luik acknowledged Mr. Davis' earlier remarks that the public must be involved directly, but he admitted that he did not know how to involve the public in formulating and running a model, especially in a genuine way. He indicated he was open to ideas on how to do this.

Mr. Bob Andrews noted that the DOE gained a lot of experience in communicating results in doing its Viability Assessment (VA). Doe had many internal and external reviewers looking at the scientific basis for the VA, and how the uncertainty in the basis was propagated through the system to arrive at the family of dose curves. Expert elicitation was also used to probe the validity of the system. Peer reviewers were used to point out areas and assumptions of the analysis that did not have a sufficient scientific basis, and areas where the uncertainties were not adequately addressed, including where uncertainty was thought to be larger or smaller than was addressed. He noted that all the comments received on the VA, including the comments on the DEIS, will be used to strengthen the scientific basis and the approach for incorporating uncertainties in the site recommendation and license application to make future work more transparent and traceable.

He noted that DOE continues to evaluate the best way to document the analyses in a way that is clearly understandable, including the technical basis for every assumption, and how all of the assumptions propagate through the system for all the varying barriers, of water contacting waste, and waste leaving the repository.

Mr. Andrews noted that DOE used a number of quantitative techniques to determine what was most important in PA, which resulted in prioritization of work. In addition, DOE used some judgments and beliefs of program scientists and external and internal reviewers of how the work should be prioritized to address key uncertainties.

Discussion

Mr. Cameron began the discussion by asking whether there is a way to involve the public more meaningfully in the safety assessment process. As an example, Dr. Garrick mentioned formulation of a stakeholder steering committee following the Exxon Valdez accident. The steering committee participated in performing a comprehensive risk assessment of the Prince William Sound. Ms. Treichel disagreed with the concept, noting that cleanup projects often involve people with a common goal, quite different from Yucca Mountain. She mentioned the DEIS, and how it was poorly done, including the fact that the public was never involved in the consideration of whether or not there is a need for the repository.

Mr. Cameron posed the question of whether a common goal is needed in order to make a steering committee work. Mr. Davis commented that the WIPP site used a process called system prioritization, which was designed to get the public involved at the ground level to build the PA. The first step was to develop a consensus among the scientists on the project as to what aspects of the existing PA they could support and defend. Mr. Davis asked Mr. van Luik how this consensus building was done for Yucca Mountain, to get the full breadth of experience and knowledge and differences of opinion in the scientific team. Mr. van Luik responded that individuals from various disciplines involved at the process model level came together to meet and discuss what to do. The team periodically meets to build the basis for TSPA from the ground up, and later evaluates the outcome of the TSPA and debates again whether their discipline has been represented correctly. Mr. van Luik implied that members of the team would stand behind the end results. Mr. Davis commented that the WIPP program had great difficulty when the PA always complied, but the experimentalists were not willing to defend the assumptions. He questioned that if everyone on the Yucca Mountain team is willing to stand behind the analysis, then why aren't you done with PA? Mr. Van Luik responded that all parts of the analysis must have sufficient bases so that those involved have confidence in the results, and this is why they continue to strengthen certain lines of evidence such as seepage, longevity of waste package, and so on. He added that our belief in the defensibility of the bottom line is still lacking something. Mr. Andrews clarified that where DOE strives for consensus is in whether the uncertainties within each of the models have been adequately addressed and the significance of the uncertainty is captured.

Mr. Frishman criticized DOE for historically not accepting input from the public on issues to be considered in Yucca Mountain, that is, to have thought of everything. He gave two examples. In 1983 a group of state geologists offered to serve as an advisory committee on site screening and characterization, which DOE refused. In addition, a meeting was held to hear from people outside the project on possible alternative conceptual models, where a model for the unsaturated zone (UZ) was presented and ignored, although DOE has now come to use this model many years and dollars later. He stated that the question of have we thought of everything needs to go beyond the walls of DOE. Mr. Murphy expressed support for Mr. Frishman's point and the steering committee idea.

Mr. Davis clarified that the WIPP system prioritization was less of a steering committee and more of an open invitation to anyone wishing participate in building the PA. From his experience, he noted that this approach builds trust. If you put the scientists doing the work in front of the public the trust level goes way up. Mr. Davis noted that the downside of the process is that you must give up control and power—if the result in the end complies, and everyone's

concerns were all factored into the process, both sides must accept the answer. For WIPP, the extreme environmentalist side dropped out after the first meeting, and some on the DOE side didn't want the process to be driven by the public because the only answer they were willing to accept is that the site was safe.

Dr. Garrick clarified that the Exxon Valdez project was to assess future risk rather than conduct a cleanup. He also added that there were problems with the process—it was not perfect. Mr. Cameron posed the question as to why it hasn't been done before for Yucca Mountain? Ms. Treichel noted that Hazel O'Leary, former Secretary of DOE, ordered a steering committee at one point, and the unaffected units of government refused. Ms. Treichel pointed out that an advisory board simply adds an extra layer of bureaucracy, as opposed to Mr. Davis' idea of inviting the public to participate.

Ms. Johnson commented that openness would be more believable if DOE actually waited for test results to make decisions, such as results from the thermal test before deciding it is going to build the repository.

Mr. Frishman commented that Paul Davis' view about power was correct in that DOE has never been able to put together a public involvement plan because they didn't want to give up their "statutory authority."

Ms. Manning recommended the book "Risk Assessment" by Howard Margolis that discusses how to involve the public in nuclear waste. The author suggests getting a paid consultant for the public.

Analyzing the Risk of Transporting High-Level Waste — Fred Dilger, Clark County; Jim Williams, Nye County; Abby Johnson, Eureka County; Mike Baughman, Lincoln County,

Jim Williams, Nye County, remarked that Nye County holds the view that the PRA in the DEIS on transportation risk is not sufficient to make a policy decision. Nye County's position is based on the history of the NTS, and Nye County's aspirations after the cold war. Nye County is the target for two major shipment campaigns, one involving up to 30,000 shipments from 25 or more low-level waste (LLW) sites, containing 4 and one-half million curies, and from some 72–75 HLW sites, 50–75, 000 shipments, containing 14 billion curies, over a 24-year period. The community development effort in Nye County has never been comparable to other DOE communities such as Oak Ridge, Richland, and so on.

Mr. Williams' main point is that use of the NTS in Nye County has had major benefit for others, but has consistently been undervalued and treated like a dump. Nye County believes that the routing decisions are political and decision criteria for routing are inappropriate. DOE itself will be making these routing decisions for LLW shipments to NTS, and HLW shipments to Yucca Mountain and the NTS, without formal input form the destination state and county, and decisions on LLW and HLW will be made in isolation of each other, with no integration.

Michael Baughman, Lincoln County, asked what role does transportation risk play regarding disposal policy and routing decisions? He pointed out that by using data compiled from the

DEIS, most fatalities associated with the repository occur within the first 100 years, and over 90 percent of the fatalities will be associated with transportation. He asked the question of whether transportation would influence waste disposal policy, given that the project is heavily focused on the risks from the repository that pose the least amount of risk. He also pointed to a table from the DEIS showing that an alternative route from the north possibly to be designated by the governor to avoid the Las Vegas area, poses greater risk, but avoids the otherwise possible economic and fiscal consequences of routing through Las Vegas. He noted that this is not addressed in the DEIS. The issue is an equity issue.

Mr. Baughman also noted that emergency "mismanagement" has not been addressed in the DEIS and has not been considered as a component to risk and it is assumed that Lincoln County residents will be able to respond effectively to transportation incidents or accidents. How is this risk of being wrong factored into total risk? Assumptions about the density of the population living along the transportation route are not reasonable, given that most of rural Nevada's population is immediately adjacent to transportation infrastructure. He stated that Lincoln County hired its own expert to conduct its own risk assessment and provided the information to DOE, which so far, DOE has appeared to ignore.

Mr. Baughman remarked that consideration of the cost-benefit analysis in all sources of risk should also be included in the factors affecting the people's acceptance of risk. Will see that DOE is spending too much time in the wrong areas if we are really concerned about public health and safety. Lincoln County did a study to compare the impact on tourism in the region around Three Mile Island following the accident. If a comparable response were to occur to a perceived threat of exposure to radionuclides following an accident in Lincoln County, Lincoln County would lose $500 to $1 million dollars per year. Lincoln County is proposing that a contingency plan be put in place should an accident occur, which is not addressed in the DEIS. Mr. Baughman suggested that the ACNW ensure that the NRC challenge the staff to not simply adopt the DEIS on its face because it is very likely it will not address many of the issues that the stakeholders will be voicing to the Commission about prospective licensing conditions.

Abby Johnson, Eureka County, noted that Eureka County's concern is that one of five potential rail alternatives being proposed would run through Eureka County and cut through Crescent Valley. The existing rail is 20 miles away. She expressed some concerns of the people include the following: (1) people live in Crescent Valley to get away from the Federal Government; (2) a small group of citizens is interested in what is going on with this project and want information; and (3) that many people are without power or phones. People are also concerned about what the new rail line might do to property values and their way of life. Transportation has always been a low priority in this project. Finding a safe place for the waste is far more important than issues of transporting it. The DEIS includes only a small amount of information on the proposed rail line called the Carlin Rail line. DOE makes it clear that it will make a decision based on the existing information. Ms Johnson challenged the round table to review the information and decide whether they would be comfortable with the federal government deciding to build a rail line to transport nuclear waste if it were to run through their small community. She noted that they have evaluated that 59 percent of Eureka County residents will live within 10 miles of the line. There is no emergency response plan in the DEIS. Ms. Johnson indicated that it appears that DOE's hidden agenda with the DEIS is to postpone the decisions

on transportation, even though all the information that will be considered is already in the DEIS—until the repository is decided on when it will be too late to factor in any concerns related to transportation. She posed the same question of how and when transportation will be factored into the waste management decision-making process?

Fred Dilger, Clark County raised the concern about integration of decision making regarding LLW and HLW. He noted that there is fragmentation and confusion on the low-level side, and the transportation associated with Yucca Mountain only makes it worse. He is requesting that DOE look at the management of transportation in its totality, noting that DOE has been reluctant to involve stakeholders because of the magnitude of the issue. It appears that DOE plans to spend all of its money constructing the site, then transportation will be an after thought. He noted that WIPP provides an excellent example of how to do a transportation program. The success can be attributed, in part, to DOE taking extra regulatory measures to satisfy stakeholders. He noted that the Department of Transportation (DOT) should have been involved in the round-table discussion. Regarding transportation risk, Mr. Dilger indicated that Clark County has done its own analysis of the routes contained in the DEIS and simple modeling to estimate possible loss in property values. Even assuming a 5 percent loss, the cost impact can be as much as $17 to $54 million depending on which route is chosen. Clark County anticipates losing $2 to $3 million the day the routes are designated.

Discussion

Robert Holden, National Congress of American Indians, indicated that WIPP is not a good model because WIPP promised a lot that has not been delivered to Pueblos and tribes that are being impacted. He also iterated that rural and poor areas and tribal lands seem to bear the brunt of the burden, when they do not deserve it. Money that was to be allocated to states and tribes for transportation readiness, training, and so on, has been cut because of emphasis on building the repository. Programs involving emergency management schemes take many years to put in place.

William Vasconi discussed the equity entitlement benefits that other states have received for taking nuclear waste, noting that Nevada should have made the costs more prohibitive. For example, New Mexico receives $20 million annual for 14 years for WIPP, and South Carolina receives $80 per square foot plus $235 per cubic foot surcharge for Barnwell. The NTS receives $12.63 per square foot, yet it's the largest waste disposal site in the country. Mr. Vasconi served on a site-specific advisory board for NTS, yet Yucca Mountain was not discussed because it was noted that Yucca Mountain was in the study phase, and was not approved, thus it was premature to talk about transportation. Mr. Vasconi also pointed out that a railway running north and south through Nevada could open the State for economic growth and could benefit Nevadans.

Why People Do Not Trust Risk Assessment — Steve Frishman, State of Nevada

Mr. Frishman noted that one problem with basing the Yucca Mountain decision on performance or risk assessment is that there is no prior experience to draw from, as is done in other industrial applications of risk assessment. He remarked that this is a concern especially since

the 10 CFR Part 63 regulation has been changed to rely completely on risk assessment results. The perception is that the new regulation is a less stringent approach than 10 CFR Part 60, which had quantitative standards in addition to the PA analysis, that is, the subsystem requirements. He cautioned that if people don't believe the risk assessment, we might never be able to convince people that we know enough. Another problem is the practice of adding additional barriers because we can't get supporting data quickly enough. Why should people trust risk assessment when there are arbitrary overlays and barriers added on because the assumptions might be wrong?

Another problem is that the PA results have always been presented as if everything has been thought of, when over the years clearly things hadn't been thought of and the PA has had to be changed considerably. Another problem in trusting risk assessment is the degree of reliance on expert judgment. Mr. Frishman also added that just because a PA is transparent does not mean that it is right or acceptable.

Mr. Frishman referred the Committee to the proceedings on the VALDOR (Values in Decisions on Risk) conference. The conference focused on how values get applied into decisions on risk. The problem is people who are most impacted by the decisions don't trust the way the decisions are made. The conference looked at how to incorporate values to the extent that people, whether they agree or not, have some confidence that all of the things that are important to them were considered in the decision. He explained that this really translates to the question, did you think of everything?

Discussion

A discussion followed about human error and how that is factored into the process, and whether not thinking of every possible thing that could go wrong is considered human error. Mr. Dilger suggested that after a certain investment of time in evaluating what can go wrong, the return diminishes, and instead, it might be better to put the money into creating a system to respond to events effectively. Mr. van Luik responded to Mr. Frishman's point about adding arbitrary barriers to the system. He noted that the reason for the drip shield is because DOE did the analysis but was not as confident in the analysis as it should be. He also added that expert judgment is used to help interpret data, such as data collected at a small scale that must be inferred at a mountain scale. Dr. Garrick added from his experience that more gross errors occur from logic errors in how the system works than from having insufficient data.

Public Outreach at the Waste Isolation Pilot Plant Site — George Dials, President and General Manager, TRW M&O

Mr. Dials described the significant commitments made by WIPP regarding public outreach, the major public communication themes, the key concerns of stakeholders, the focus areas, goals, and unique challenges of the program, and the overall communication plan and overall strategy. Commitments included (1) placing authority and responsibility in the field by establishing a new DOE organization in the site location, (2) holding a single manager responsible for regulatory compliance, and (3) committing to greater public involvement in decision making. Communication themes included that (1) WIPP is a solution to a national problem, (2) emphasis

is on safety to workers and the public and protection of the environment, (3) WIPP is a permanent solution to disposal of defense transuranic waste and enables cleanup of DOE facilities, and (4) commitment to cost-effectiveness, allowing open communication with stakeholders. Stakeholder concerns included impacts due to storage and transportation of waste; DOE history in poor project management; disposal capability allowing continued weapons development and use; and the need for stakeholder involvement. Effort was made to reach out to neighboring communities and all of New Mexico, as well as on a national and international level. DOE's communications plan included (1) DOE being pro active rather than an advocate, (2) building relationships, (3) creating two-way communication, (4) encouraging technology transfer, (5) seeking public interaction opportunities, (6) encouraging and increasing public participation, (7) developing a partnership, (8) coordinating activities with other federal and non-government organizations, (9) modifying to meet evolving needs, (10) responding to questions, and (11) committing to follow-through. DOE's communication strategy included (1) assessing hostile environment in northern New Mexico, (2) opening an office in Santa Fe, (3) assigning staff to focus on needs of that area, (4) generating speaking engagements, (5) reaching out to those who are interested or impacted, (6) hiring a consultant with knowledge of and contacts in the area, (7) meeting the needs of the audience, (8) providing simple, straightforward, and relevant information, (9) developing public participation opportunities, and (10) listening and responding, with focus on goal.

Mr. Dials mentioned the Environmental Evaluation Group (EEG), which was an independent oversight group funded by one of the state universities. He mentioned that Robert Neil, Director of EEG, would be available to talk with the ACNW. Mr. Dials also mentioned Mr. Davis' systems prioritization method, which allowed the program to revisit the baseline for the program and prioritize important research needs as they moved to finalize the PA. He noted that M&O invited all of the stakeholder groups to participate in this process and that the stakeholders provided excellent input. He also mentioned that the M&O had frequent interactions with EPA, the regulator.

Regarding lessons learned, Mr. Dials mentioned that the M&O did have some contentious meetings with regulators and activist groups, but that the M&O were honest and responsive.

Questions

Mr. Baughman noted that DOE had the most frequent interactions with EEG and asked Mr. Dials to describe the role of EEG. Mr. Dials explained that the M&O met publicly each quarter with EEG. EEG consisted of approximately 16 scientists and engineers with a budget of $2.5 million. EEG acted as a technical review body and as a catalyst and resource for involving other groups. The EEG was effective in dealing with technical issues and in keeping DOE focused in terms of transparency and dealing with technical issues.

The ACNW's Role of Advising NRC on Safety Aspects of Yucca Mountain — B. John Garrick , ACNW

Dr. Garrick explained that the ACNW is an independent oversight body that uses its expertise and independence to add credibility to NRC's decisions. He described that ACNW's scope includes transportation, storage, and disposal of HLW and LLW, as well as reactor and nuclear material plant decommissioning activities, but that currently the majority of effort is focused on Yucca Mountain. He explained that in addition to advising the Commission, the ACNW provides a forum for various stakeholders to air their views in public. He encouraged the audience to use the Committee as a means to relay its views to the Commission. He explained that the Committee has evidence that it Influences changes in DOE's program, as well as NRC's, and that the public can influence what the ACNW does and what it focuses on.

Dr. Garrick briefly described three main messages the Committee has tried to convey: (1) the Commission transitioning to a risk-informed approach to regulation, (2) making safety assessments understandable, and (3) the need for public involvement.

Discussion

Mr. Cameron captures and reviews suggestions made throughout the day regarding items for the ACNW to consider. Suggestions identified included (1) persuading the Commission to include mitigating licensing conditions that go beyond the scope of the DEIS; (2) letting the Commission know that it needs to develop a more convincing rationale for its position against groundwater protection; (3) making sure regulatory documents (DEIS, TSPA-SR, and the LA) express and quantify uncertainty; (4) exploring the use of system prioritization method as a way of getting at the question of have we thought of everything and bringing in broad public perspective, or use of a steering committee; (5) challenging the NRC staff to take a hard look at the DEIS in terms of transportation; and (6) involving the DOT in future meetings that deal with transportation and possibly involving the Bureau of Land Management.

Mr. Baughman suggested that he would like to get eventual feedback on what influence he and others have had on the ACNW by participating in today's meeting. Dr. Garrick agreed that this was an excellent idea, and noted that in the interest of time he had omitted part of his presentation that described some of the influences the ACNW has had.

He described ways in which the ACNW communicates to the Commission, including formal letter reports, one-on-one meetings with Commissioners, and public meetings with the

Commission. He also mentioned the Committee's planning and self- assessment process and that the local community during ACNW's meeting last year in Nevada greatly influenced the ACNW to make risk communication a high priority.

Ms. Johnson thanked the Committee for holding the round-table discussion and appealed to the ACNW to take on the Nevada public involvement challenge as its special concern. She added that it is difficult for the NRC to have a relationship with Nevada when it is 3,000 miles away. Mr. Holden made an appeal for the special needs for Indians in terms of cultural impacts and specific pathways that must be considered that are unique to Indians. Following some final comments, the meeting was adjourned until the 7:00 P.M. public meeting.

The ACNW held an evening meeting with the public and other stakeholders on October 12, 1999 to clarify the role of the ACNW and to listen to concerns and perspectives the public and other stakeholders have on the proposed repository.

The following are highlights from some of the major concerns and questions raised:

- People don't attend these meetings because Yucca Mountain is not a high concern for most people in Las Vegas.
- NRC should make documents easier to understand.
- NRC should consider solutions to nuclear waste management other than geologic disposal.
- Will the repository be monitored for 10,000 years?
- In order to have more people attend public meetings, the ACNW and NRC should hold meetings in those areas in which people are going to be most affected, such as Nye or Lincoln counties.
- More people would come to meetings if the ACNW could change the outcome of Yucca Mountain project or if the ACNW could serve as a means for people to impact the outcome of the proposed repository project.
- The viability of transmutation of waste rather than disposal was raised. ACNW members remarked that the National Academy of Sciences (NAS) study found transmutation of waste was not economically viable at this point and that an entire infrastructure of nuclear facilities would be needed to implement it. Long-term studies are underway in several European countries.
- The NRC Commissioners should meet in Nevada
- If the NRC is interested in a long-term relationship with the State of Nevada and in obtaining public involvement, it needs to have a functional office in Nevada to show a commitment to Nevadans in this regard.

- Does NRC have a bottom line, that is, what will it take for NRC to reject the site? An NRC representative responded that NRC's bottom line is compliance with the regulations.

- What is the relationship between NRC and EPA and why are the two agencies in disagreement with one another on the standard and how will disagreements be resolved. Dr. Garrick reiterated that the ACNW supports the 25 mrem all pathways standard, and that the 4 mrem groundwater standard essentially makes the standard 4 mrem because most of the dose will be from the groundwater pathway. He added that in the judgment of most health physicists, 4 mrem is way below what is necessary to achieve the goal of protecting the health and safety of the public. Mr. Clark, EPA, disagreed with Dr. Garrick that the standard becomes a defacto 4 mrem because the EPA has proposed a number of compliance points and scenarios, some of which may not result in the greatest dose being from groundwater. Mr. Clark added that EPA is basing its proposed 15 mrem standard on the NAS risk level, for which 15 mrem is within the recommended range and 25 mrem is slightly above it. He noted that 15 mrem is also consistent with the generic standards that are applicable to WIPP, is consistent with the risk range EPA allows for its other programs, and is consistent with other international and foreign countries' standards.

- NRC should coordinate its meeting so the meetings do not conflict iwth other NRC meetings or with DOE meetings, such was the case with the ACNW meeting and the License Support Network meeting.

Sally Devlin, Nye County, expressed concern about plans to place classified waste in Yucca Mountain, concern that microbial action is not being considered, and concern about the lack of emergency action plans. She noted that the DOT and Department of Defense are indemnified should any accidents occur. She appealed to the ACNW to recommend that NRC reject the site. Ms. Devlin also questioned what is meant by a phrase used by DOE "assumed uncertainty."

Ms. Abby Johnson, Eureka County, commented that it is not in NRC's or DOE's interest to find fatal flaws, and there is an apparent comradery between the two agencies, and noted that there is a perception that the NRC is not independent.

Based on input received during the evening meeting and the all-long round-table discussion, the Committee plans to prepare a letter to the Commission conveying its insights gained from questions, suggestions, and concerns of the public and stakeholders about Yucca Mountain, and to advise the Commission on opportunities to better involve the stakeholders and the public in NRC's licensing and pre-licensing processes.

III. DRILLING PROGRAM OF NYE COUNTY, NEVADA (OPEN)

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

After presenting an overview of the Nye County early warning drilling program(EWDP), Nick Stellevato, Project Manager, Nye County, introduced Tom Buqo, Nye County consulting hydrologist, who discussed Nye County's drilling program in greater detail.

Mr. Buqo discussed results obtained to date in the following areas:

1. Hydrostratigraphy. Among his observations was that permeable pathways exist in the valley-fill and volcanic aquifers down gradient of Yucca Mountain.
2. Nye County's aquifer testing program. He noted particularly the wide variance in measurement of some parameters, for example, transmissibility (gal/day/ft).

3. Water chemistry. The U.S. Geological Survey and Nye Country results generally matched. He also presented some anomalies between the different wells and a postulated reason for the differences. A gamma spike found in the 3D well was also discussed.

4. Geophysical surveys. Preliminary interpretations from a recently conducted low-altitude aeromagnetic survey were discussed.

5. Other areas discussed included the steep temperature profiles in wells 1D and 3D, the observations associated with the August 1, 1999, Scotty's Junction earthquake, and a conceptual compartmentalization in the Amargosa Desert.

Mr. Buqo closed his presentation with a discussion of Nye County's Phase 2 plans, which were as follows:

1. Deepening NC-EWDP-3D.
2. Conducting a long-term, higher discharge aquifer test at the Jackass Aeropark Well.
3. Changing NC-EWDP-12S from a monitoring well to a test well.
4. Investigating spring deposits, aquifers, and water levels in Crater Flat at NC-EWDP-7S.
5. Performing additional deep and intermediate drilling.

In response to a question, the Nye County representatives stated that in terms of the importance of the Nye County drilling program to the proposed repository at Yucca Mountain, in addition to its being important to know where the receptors were located, the current modeling capability was unable to make meaningful predictions without collection of additional data.

The Committee proposed that consideration should be given to controlled archiving of samples taken from the wells, a proposal the Nye County representatives indicated they would consider.

The Committee stated that it appreciated the presentation and would continue to be interested in hearing periodic reports on the NC-EWDP.

IV. PRESENTATION BY REPRESENTATIVE FROM CLARK COUNTY, NEVADA (OPEN)

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

Englebrecht von Teisenhausen, Clark County, observed that since the DEIS for Yucca Mountain uses the total system performance assessment (TSPA) models for long-term performance, comments on the viability assessment (VA) are still useful in reviewing the DEIS. Therefore, he noted for the Committee's consideration several comments made by an outside consultant in a report prepared for Clark County on the TSPA-VA:

1. "At this VA stage of the process toward evaluation of the suitability of the Yucca Mountain site for disposal, there are data deficiencies which limit confidence in some of the models...."

2. "Some portions of the VA documentation did not meet DOE's objective to be clear and comprehensive in its description of TSPA-VA methodology, assumptions, and use of information...."

3. "The natural barrier system was assumed to make no contribution to repository system base-case performance except for dilution of radionuclide concentrations by a factor of 10 during transit of the saturated zone. The burden for repository system performance was therefore placed on engineered features of the system..."

4. "The waste-package design is not an effective defense-in-depth design..."

Mr. Teisenhausen presented several other observations from the consultant's report before introducing Nye County presenter, Fred Dilger.

Mr. Dilger commented on transportation issues. His review covered his perspectives of transportation risk and impacts. Among the deficiencies he noted were:

1. There was no analysis comparing the use of dedicated versus general freight;
2. The age of the shipped fuel should have covered the likely spectrum of ages rather than being based on all fuel shipped being the same age; and

3. The population information used by DOE was improperly based on the 1990 census figures. In this regard, the DOE DEIS used a population within ½ mile of the HLW routes of 88,745. By comparison, Mr. Dilger's analysis of population within ½ mile of the routes, using official projections, was:

Year 2000	154,792
Year 2020	372,579

He indicated that discrepancies such as this caused the DEIS to be viewed with misgiving.

He closed his formal comments by noting the following as major concerns of the County:

1. The DEIS does not identify the most likely highway or rail routes through the U.S.

2. The DEIS does not provide the printouts that contain the analysis (RADTRAN, HIGHWAY, INTERLINE, et al.)

3. The DEIS does not provide a basis for mitigation negotiations.

James Williams, a citizen of Nye County, stated that the DEIS does not recognize that there is going to be a major transfer of nuclear material from a group of sites around the country to this one rural Nevada county (Nye). Among several suggested issues he considered relevant were that the DEIS does not adequately consider the impact of the NTS on the cumulative risks to which Nye County would be subjected or the impact of politically powerful counties on the routing of the shipments.

The Committee expressed chagrin that a satisfactory transportation risk assessment had not yet been completed, although it has not been determined that Yucca Mountain is a satisfactory site for an HLW repository.

Several other attendees at this public meeting also expressed their views, generally indicating that additional analysis of the data is necessary, particularly Nye County water temperature data and earthquake data.

V. DEPARTMENT OF ENERGY PROCESS MODEL REPORTS (OPEN)

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

This briefing on Process Model Reports (PMRs) presented by Mr. Mike Lugo, M&O contractor, provided an update on DOE's plans for developing supporting documentation to the Total Systems Performance Assessment (TSPA) models. The PMRs will provide the technical basis for the TSPA site recommendation (SR) and license application (LA) for the Yucca Mountain High-Level Waste Repository. The PMRs will focus on technical information relevant to a defensible TSPA and ensuring transparency and traceability of the data. There will be nine PMRs as follows: (1) Integrated Site Model, (2) Unsaturated Zone Flow and Transport Model, (3) Saturated Zone Flow and Transport Model, (4) Near Field Environment, (5) Waste Package Degradation, (6) Waste Form Degradation, (7) Engineered Barrier System Degradation and Flow/Transport Model, (8) Biosphere, and (9) Tectonics. These PMRs will compile all the necessary technical information for the TSPA related to each of the nine topical areas, including technical issues, the conceptual basis and assumptions, models and codes, verification of quality assurance status for the codes, data supporting the models, model validation, and abstraction of models into the TSPA framework. Each PMR will be supported by Analysis and Modeling Reports (AMRs) that in turn will be based on data sets and modeling inputs. Most of the Revision 0 PMRs will be issued in the first 6 months of calender year 2000.

Questions

In answer to a question about how coupled processes would be addressed, Mr. Lugo said that there would be specific AMRs on coupled processes. Another Committee member inquired about plans on upgrading the saturated zone model. A contractor for DOE said there would be some changes. Mr. Lugo was also asked about any gaps between the NRC's IRSRs and the DOE's PMRs. He said it is too early to say, but this issue would be addressed. Asked about the consistency of the output for each PMR, Mr. Lugo replied that the output varies among the PMRs. In further discussion he stated that the specific input values to the TSPA actually come from the AMRs. There was also a discussion of the transparency and traceability of information flow from the AMRs to the TSPA. Another DOE contractor described the uses of the PMRs, what will be included, and what will not be included in the PMRs.

VI. EARTHQUAKE HAZARDS AND PUBLIC PERCEPTION (OPEN)

[Ms. Lynn G. Deering was the Designated Federal Official for this portion of the meeting.]

Kevin Coppersmith, DOE's M&O contractor, briefed the ACNW on the basic elements and approach used to conduct DOE's probabilistic seismic hazard analysis (PSHA) and discussed approaches to address public perceptions of earthquake hazards. He also discussed aspects of two recent earthquakes in the Yucca Mountain vicinity: Little Skull Mountain and Scotty's Junction. The PSHA relied on an extensive amount of geologic and seismologic data including existing information, and on the use of expert elicitation on source characterization. The PSHA results are used to support DOE's PA. Examples include examining the effects of rock fall and disruption of drip shields due to seismic shaking, and for seismic design, Mr. Coppersmith reviewed some common misconceptions about earthquakes, including the misconception that earthquakes are always a surprise. When an earthquake occurs is a surprise, but the earthquake event itself and its magnitude are usually anticipated. Thus, it is very unusual for individual events to affect hazard estimates, especially in well-studied areas. To change the PSHA, a single earthquake event must affect at least one principal component of the PSHA, such as evidence of a new seismic source zone, a change in the reoccurrence rate on the source, a change in the maximum magnitude earthquake (M_{max}) on the source, or change in attenuation laws or weights on alternative models. Earthquake events provide an opportunity to learn, are important to empirical and theoretical source models , and provide an incremental gain in knowledge. Both the Little Skull Mountain and the Scotty's Junction earthquakes were moderate, occurred in zones identified as seismic source zones, did not exceed M_{max} estimates, and had a small possibility of recurring.

Mr. Coppersmith summarized by indicating that (1) methods for PSHA incorporate the likelihood of future earthquake locations, future reoccurrence rates, and future sizes of ground motions; (2) the probabilistic format of PSHA and considerable precedence requires that uncertainties be characterized; (3) Yucca Mountain PSHA incorporates knowledge and uncertainty in source and ground motion characteristics and appears to be robust in light of occurrence of recent earthquakes; and (4) public interest in earthquakes is high; efforts to show the value of each event to our incremental knowledge should be encouraged.

The ACNW asked the speaker about his recommendations on how to communicate information about earthquake risk to the public. He acknowledged this as a challenge and suggested

jargon and acronyms be avoided and that an attempt be made to reach out to more people. The Committee also asked whether DOE could calculate a minimum earthquake magnitude that would be needed to violate the HLW standard? The speaker indicated that low magnitude earthquakes have been shown to have very little impact on compliance, and that DOE could calculate the impact of rock fall from a maximum credible earthquake.

During the discussion period, Mr. Jerry Szymanski pointed out that the issue is not the influence of earthquake motion on the waste package, but rather the effect of faulting due to earthquake motion on the hydrologic system. Mr. Szymanski described that observed water table decline following an earthquake implies that the system stores liquid and possibly heat, which may trigger seismic pumping. He noted that both the Solitario Canyon and Paintbrush faults contain thermal instabilities, thus the question is how does fault movement affect the stability of heated circulating water. He mentioned that this could be answered by the ongoing study looking at the origin of mineral deposits.

VII. DEPARTMENT OF ENERGY'S WORK REPRIORITIZATION (OPEN)

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

Paul Harrington, DOE, presented an update on the revised DOE repository design. DOE recommended the Enhanced Design Alternative II (EDA-II) in May 1999. The EDA-II design acceptance was confirmed in a letter dated September 10, 1999, to the Nuclear Waste Technical Review Board (NWTRB). Mr. Harrington compared the EDA-II design with the viability assessment (VA) design, including line loading of the waste packages (WPs), changes in WP materials and design, changes in the thermal loading of the WPs and in the repository, addition of titanium drip shields and backfill, a high ventilation rate, and a preclosure period of 50 to 125 years. In response to a question about thermal management implications for the operational phase of the repository, Mr. Harrington said that the approach will require more storage area in the surface facility to allow for blending. Messrs. Harrington and Daniel McKinzie, M&O contractor, discussed different options that DOE has considered in optimizing the design and managing the thermal load. He also discussed pre-closure risk versus postclosure risk.

Mr. Harrington described the design and development testing that is being performed to provide input data on the EDA-II for the site recommendation and license application (LA). He also compared the projected performance of EDA-II with the other proposed EDA designs. Mr. Harrington discussed the flexibility that EDA-II provides. He described some of the sensitivity analyses being planned to refine thermal models and reduce conservatism. He also discussed backfill, different emplacement options, and impacts on thermal loading.

Mr. Harrington discussed the response to NWTRB comments and discussed the technical evaluation factors DOE used in the design selection process. In terms of postclosure performance, all the EDA designs are 1,000 times below either the proposed NRC regulations or Environmental Protection Agency standard. He discussed demonstrability of postclosure performance in terms of defense in depth and reducing modeling uncertainties. In response to a question, he said that the drip shield is not necessary for compliance, but it provides defense

in depth. There was also a discussion between DOE representatives and the ACNW concerning quantifying improved performance for the new design features. Worker safety and flexibility for the different EDA designs were discussed. Mr. Harrington stated that because Alloy 22 was found susceptible to stress-corrosion cracking at welds, DOE is performing more materials studies. He also discussed evaluation of microstructural phase changes and potential impacts on corrosion resistance. He added that it is believed that these types of changes can only occur at more elevated temperatures than would be encountered in the repository. Finally, he discussed funding limitations and the impacts on work to support the LA.

Questions

Mr. Harrington was asked about the reasons for the change from a hot to a cold repository concept after much work went into the hot repository. Mr. Harrington replied that the increased potential for water flux and movement of water through fractures convinced investigators that they could not show that water would not get back to WPs. He was also quizzed on the multi-tier repository design concept and possible benefits and problems with such a design. James Williams asked about the amount of waste, layout, design, and cost comparison of EDAs relative to the VA design. Mr. Harrington said that investigators are looking at where the 105,000 MTU that was included in the DEIS would go. He was also asked if there is a risk that there will be surprises and uncertainties with the new design and if there are plans to address such surprises. Mr. Harrington described how DOE believed it is dealing with potential uncertainties with tests and specific design features. Sally Devlin was concerned with defense waste and how different canisters and waste would be treated. Mr. Harrington noted that all waste types would go into the same disposal container and that DOE is evaluating all the different waste streams and forms and the impacts on repository performance. Englebrecht von Tiesenhausen expressed a concern about radiation effects from the thinner WP in the EDA-II design.

Mike Voegele, M&O contractor, discussed the prioritization of development work that is needed for the Total Systems Performance Assessment for the Site Recommendation (TSPA-SR). He noted that the M&O contractor evaluated a design similar to the ACNW white paper design and had concluded that lateral movement of water was an issue. He described how DOE is revising its repository safety strategy (RSS) for the postclosure safety case and is updating the 19 principal factors that were a key element of the RSS for the VA.

DOE conducted a series of workshops in which it conducted a confidence assessment, evaluated the technical basis for the safety case, and prioritized the new factors in the updated safety case. DOE considered results from TSPA, barriers importance assessments, design margin and DID, disruptive processes, insights from analogs, uncertainties, model limitations, and the degree of "confidence" needed for an adequate safety case. He discussed with the ACNW members confidence building versus validation of models and the role of analogs. The design enhancements include a more robust WP, a drip shield for DID, backfill, and an improved thermal design. The preliminary analyses of the enhanced design indicate that the system of both natural and engineered barriers is effective, that the dose is due to a few radionuclides, and that the WP and drip shield address residual mobile radionuclides. Mr. Voegele discussed barriers importance analyses, which show that WP and drip shield failures

are very important to performance; however, other important factors may be masked by the WP performance. He also identified important natural factors.

On the basis of the EDA-II design, DOE updated the principal factors for the nominal scenario and identified seven factors that are most important: seepage, drip shield performance, WP performance, radionuclide solubility, radionuclide retardation in the unsaturated and saturated zones, and dilution of radionuclides. DOE has identified additional testing and analyses to support TSPA-SR. Other needs include developing screening for features, events, and processes, revising the model to focus on the key principal factors and simplify the less important ones, evaluating disruptive events and identifying principal factors, and completing the performance confirmation plan. He said that DOE is continuing to use TSPA, sensitivity studies, importance analyses, and expert judgment to refine its safety case.

Questions

The Committee members discussed with Mr. Voegele transport through engineered barriers, coupled processes, radionuclide solubility and retardation, and the role of secondary products and the impacts on release. Mr. Voegele stated that a number of things could change the importance ranking on his chart; so DOE is not ruling anything out solely on the basis of these ratings.

VIII. STATUS OF THE DEPARTMENT OF ENERGY'S YUCCA MOUNTAIN PROJECT (OPEN)

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

Mark Peters, M&O contractor, presented a detailed and comprehensive update to the Committee on activities that have occurred at the Yucca Mountain site since the Committee's last visit. He noted that the data collected will be used for DOE's site recommendation to the President. He stated that DOE is incorporating data from the Nye County Early Warning Drilling Program into the site-scale saturated zone flow and transport model and that, further, DOE is also establishing processes and interfaces for data transfer and control to allow for timely and quality incorporation of the Nye County data.

Dr. Peters suggested that based on the results from the Drift Scale Test, the range of the thermal-mechanical-hydrologic-chemical processes considered encompass anticipated behavior in most repository designs and therefore, can be used to evaluate conditions expected in other design scenarios. The presentation by Dr. Peters provided an extensive overview of the areas that the Committee would visit during its tour of the exploratory studies facility (ESF), which was scheduled for the next day. He outlined specific potential areas of interest at each of the stops scheduled for the underground tour.

John Stuckless discussed many of the natural analog sites that he has visited in Europe, Africa, India, Israel, and Turkey. He made his investigative trips to find (and better understand) natural analogs that show that moisture would go around the tunnels. As an example of his diligence,

he personally visited more than 100 sites in France and Spain alone. He noted that the French have begun a technical study to determine why the ancient paintings in many of the caves (in some cases, tens of thousands of years old) have not deteriorated. In closing, Dr. Stuckless indicated that for those interested there was a Web site for ancient rock art.

The Committee expressed its thanks to both presenters, indicating that it would save its questions until the tour the following day.

IX. YUCCA MOUNTAIN TOUR AND VISIT TO THE DEPARTMENT OF ENERGY ATLAS RESEARCH FACILITY AT LOSEE ROAD (OPEN)

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

The Committee, its invited expert Milton Levenson, and the ACNW staff visited several areas at the Yucca Mountain site. In addition to DOE and M&O contractor guides, representatives from both Nye and Clark Counties, the State of Nevada, the Nevada Nuclear Waste Task Force, and the Nuclear Energy Institute accompanied the group.

The group observed the construction activities in Alcove 8 in the cross-drift. Studies are to be started in this area February 2000. This alcove was of particular interest, as it is located above where the cross-over drift passes over the main ESF drift.

A discussion of many of the proposed cross-drift studies was provided, noting that the studies fell into several general classifications, that is, lithostratigraphy, small-scale fracture mapping, fracture mineral studies, moisture monitoring, hydrologic bulkhead studies, and alcove/niche studies.

Niche 1 was the next stop on the tour. At this location the group heard a discussion of the niche studies in general, it being noted that their purpose was to evaluate drift-scale seepage processes and seepage threshold in potential repository horizon rocks.

At Alcove 5 the Committee observed the single heater and drift-scale thermal heater testing. It was noted that 22 months (of a four-year program) have been completed on the drift-scale test. The current temperature of the drift wall is ~180°C with the goal being 200°C. In addition to obtaining a better understanding of thermal-mechanical rock mass properties, it was noted that pore water, mobilized by heating, drains by gravity by way of fractures to below the heated region rather than remaining perched above it. Several other observations were that heat transfer is conduction dominated and that the dual-continuum model [DKM] simulates the movement of moisture better than the equivalent continuum model.

Flow diversion testing was being conducted at Alcove 4. At this location small, field-scale, unsaturated flow and transport tests are to be performed in non-welded Ptn intersected with small, near-vertical faults. A slot excavated under the test bed will collect tracer dyes that are released from the boreholes. Results are being obtained and fracture conductivity testing, flow, transfer, and aqueous tracer mixture testing are planned. (It was noted that the Ptn covers the whole repository block, being thick at the north end and fairly thin at the south.)

Testing at Alcove 1 has two purposes. One is to evaluate infiltration and percolation through the unsaturated zone (UZ) above Alcove 1 while the other is to evaluate the climatic effects associated with increased precipitation. During Phase 1, over 60,000 gallons of water were applied on the surface. Seepage began to appear in approximately 8 and a half weeks with approximately 10 percent of the applied water being recovered in the alcove collection system. Originally it was believed that the porosity would be approximately 0.001 percent but it is now believed to be in the 2–3 percent range. During Phase 2 of the testing, which started February 19, 1999, approximately 41,700 gallons of water had been applied using varying application rates. This amount of water was equal to 7 years of average annual precipitation. (Water was added at 2 cm/day). Seepage began in approximately 3 weeks, with approximately 10 percent of the applied water being recovered in the collection system.

Following lunch and a tour of the ESF, the Committee proceeded to the Busted Butte underground research facility. Studies at the Busted Butte excavation are expected to validate laboratory data on radionuclide and colloid migration or sorption or both in fractured and unfractured Calico Hills non-welded rocks. The UZ testing will reveal the effects of heterogeneities on flow and transport in unsaturated and partially saturated rocks, particularly fracture/matrix interactions and permeability contrast boundaries. Because of work in the area, access to the experimental area was limited to the ACNW members and staff.

The group then departed for the DOE Atlas research facility located on Losee Road, North Las Vegas. At Atlas the Committee was able to observe the performance testing of several of the various engineered barrier system (EBS) concepts. John Pye explained that testing was being conducted at both ambient and elevated temperatures over a wide range of water infiltration values. Among the EBS concepts discussed was the use of "getters," backfill, drip shields, and the Richards Barrier.

Test canister No. 1, which was initiated in mid-December 1998, is a Richards Barrier concept under super pluvial rates. The barrier continues to effectively divert more than 98 percent of the water. The performance of such a system depends upon the interface between the medium and coarse sands, it being noted that the migration of fines impacts the efficiency of the system. However, from the perspectives of performance, constructability and durability, the drip shield concept appears most advantageous. Testing of canister No. 3 (fabricated from 2cm thick 304 stainless steel-vice titanium, whose cost was prohibitive) with a crushed tuff invert (no backfill) began in June 1999. Although results are preliminary, it was noted that radiation heat transfer dominates and that performance appears relatively insensitive to geometry.

The Committee found the visit to Yucca Mountain of value and intends to continue to periodically visit the site as progress is made. The Committee also indicated a desire to further follow the testing at the Atlas facility, particularly as the results become available.

X. EXECUTIVE SESSION (OPEN)

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

A. Future Meeting Agendum (Open)

Appendix IV summarizes the proposed items endorsed by the Committee for the 114th ACNW meeting on November 17–19, 1999.

B. Future Committee Activities (Open)

The 115th ACNW meeting is scheduled for December 14–16, 1999.

APPENDIX III: MEETING ATTENDEES

113TH ACNW MEETING
OCTOBER 12–13, 1999

ACNW STAFF

Dr. Andrew Campbell
Ms. Lynn Deering
Ms. Michele Kelton
Dr. John Larkins
Mr. Howard Larson
Mr. Richard Major
Dr. Richard Savio
Mr. Armajit Singh

ATTENDEES FROM OTHER AGENCIES AND GENERAL PUBLIC

OCTOBER 12, 1999

K. Trauth	Sandia National Labs.
K. Jenni	Geomatrix/M&O
E. Tiesenhausen	Clark County
R. Lewis	U.S. NRC
C. Hanlon	DOE
R. Wallace	U.S. Geological Survey/HQ
M. Scott	CRWMS/M&O
M. Manning	Las Vegas Sun Newspaper
R. Irish	U.S. NRC
T. Moulia	PG&E
P. Davis	Sandia Labs
B. Andrews	CRWMS/M&O
B. Phillips	Nevada Resident
B. Bradbury	MTS/DOE
S. Devlin	Public Pahrump Nuclear Comm.
J. York	Booz Allen & Hamilton
J. Williams	Nye County
A. Remus	Inyo County
A. Van Luik	DOE
B. Reamer	U.S. NRC
K. Severson	NWTRB
N. Stellavato	Nye County
K. McConnell	U.S. NRC
D. Bechtel	Clark County

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

OCTOBER 12, 1999 (Cont'd)

R. Clark	EPA
B. Vasconi	Study Committee
J. Booth	DOE
J. Treichel	Nevada Nuclear Waste Task Force
S. Frishman	State of Nevada
R. McCullum	NEI
I. Zabarte	Western Shoshone Govt.
A. Johnson	Eureka County
Szyrahsui	TRAC-NA
R. Holden	National Congress of American Indians
C. Binzer	Robinson/Seidler
M. Baughman	Lincoln County, NV
K. Coppersmith	Geomatrix
A. Gil	DOE
F. Dilger	Clark County
P. Adams	DOE
J. Smyder	Naval Reactors
E. Lent	Inyo County Board of Supervisors
P. Gehner	M&O/YMP
P. Van Nelson	Booz Allen & Hamilton
J. Bailey	TRW-M&O
J. Hoyle	NRC
J. Stuckless	USGS
G. Dials	TRW
H. Dockery	M&O/SNL

OCTOBER 12, 1999 P.M. SESSION

B. Vasconi	Concerned Citizen
L. Chase	Concerned Citizen
A. Johnson	Eureka County Nevada

OCTOBER 13, 1999

H. Dockery	M&O
E. Tiesenhausen	Clark County

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

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OCTOBER 13, 1999 (Cont'd)

R. Wallace	USGS
J. Stuckless	USGS
R. Clark	EPA
R. Mele	MTS/BAH
M. Scott	CRWMS/M&O
P. Harrington	DOE/YMSCO
C. Hanlon	DOE
M. Lugo	M&O/TRW
D. McKenzie	M&O
B. Bradbury	MTS
N. Stellavato	Nye County
K. Coppersmith	Geomatrix
J. Treichel	Nevada NWTF
F. Dilger	Clark County
R. Sweeney	DOE/YMSCO
S. Thomas	Nye County Resident
R. Snell	M&O
J. Williams	Nye County
A. Remus	Inyo County
R. Lewis	U.S. NRC
K. McConnell	U.S. NRC
S. Devlin	Public
K. Severson	NWTRB
Szyrahsui	TRAC-NA
A. Van Luik	DOE
J. Bailey	M&O
M. Peters	M&O/CRWMS
G. Swartz	Nevada Agency for Nuclear Proj.
M. Manning	Las Vegas Sun
B. Marshall	USGS
J. Rice	Congressman Jim Gibbons Office
M. Voegele	M&O/SAIC
P. Montzer	Nye/MET
A. Gil	DOE/YMP
R. Massey	Churchill/Lander County
T. Buqo	Nye County
E. Lent	Inyo County
A. Johnson	Eureka County, NV

APPENDIX IV: FUTURE AGENDA

The Committee agreed to consider the following during the 114th ACNW Meeting, November 17-19, 1999:

- **ACNW Planning and Procedures** — The Committee will hear a briefing from its staff on issues to be covered during this meeting. The Committee will also consider topics proposed for future consideration by the full Committee and Working Groups. These topics will include strategic planning and self-assessment, as well as topics for the next Commission briefing. The Committee will discuss ACNW-related activities of individual members. The Committee may also discuss potential ACNW members.

- **Department of Energy's Yucca Mountain Draft Environmental Impact Statement** — The Committee will discuss with the NRC staff the staff's review of the DEIS. The Committee plans to submit a letter report on this topic.

- **NRC's Yucca Mountain Specific High-Level Waste Regulation** — The Committee will review the latest version of 10 CFR Part 63, "Disposal of High-Level Radioactive Wastes in a Proposed Geologic Repository at Yucca Mountain, Nevada." The Committee will also explore the tenor of the public comments.

- **Rubblization** — The Committee will review this decommissioning option and prepare comments on the concept.

- **Annotated Outline for Yucca Mountain Review Plan** — The Committee will hear a briefing from the NRC staff describing the transition from Issue Resolution Status Reports to a Yucca Mountain review plan.

- **Research Plan for Environmental Transport** — The ACNW will review generic codes used to predict radionuclide transport in the geosphere. The Committee intends to submit comments on this review.

- **Meeting With Office of Nuclear Material Safety and Safeguards Managers** — The Committee will meet with NMSS managers to discuss items of mutual interest.

- **Preparation of ACNW Reports** — The Committee will discuss planned reports, including reports on a White Paper on Near-Field Chemistry Issues, a joint ACRS/ACNW letter report on an NMSS approach to risk-informed, performance-based regulation in NMSS, the Yucca Mountain DEIS, NRC's Yucca Mountain specific HLW disposal regulation, the rubblization decommissioning option, waste-related research, 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**

3. **ENVIRONMENTAL PROTECTION ENERGY'S PROPOSED HIGH-LEVEL WASTE STANDARD**

   1. Proposed Standards for Yucca Mountain, presented by Ray Clark, EPA, dated October 12, 1999 **[Viewgraphs]**

7. **ANALYZING THE RISK OF TRANSPORTING HIGH-LEVEL WASTE**

   2. Talking Points for ACNW Meeting, October 12, 1999, by Mike L. Baughman, consultant to Lincoln County **[Handout]**

8. **WHY PEOPLE DISTRUST RISK ASSESSMENT**

   3. Viewgraphs presented by Steve Frishman, State of Nevada

9. **PUBLIC OUTREACH FOR THE WIPP SITE AND ROLE OF THE PUBLIC IN RISK/SAFETY ASSESSMENT**

   4. Public Outreach for the Waste Isolation Pilot Plant Site, Successful Public Involvement, presented by George Dials, DOE, dated October 12, 1999 **[Viewgraphs]**

13. **DEPARTMENT OF ENERGY'S WORK REPRIORITIZATION**

   5. Repository Safety Strategy — Implementation & Work Prioritization, presented by Michael Voegele, DOE **[Viewgraphs]**

   6. Update on Status of Design Work, presented by Paul Harrington, DOE, dated October 13, 1999 **[Viewgraphs]**

14. **DEPARTMENT OF ENERGY'S PROCESS MODEL REPORTS**

   7. Process Model Reports, presented by Mike Lugo, DOE, dated October 13, 1999 **[Viewgraphs]**

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MEETING HANDOUTS (CONT'D)

AGENDA ITEM NO.	DOCUMENTS

15. **EARTHQUAKE HAZARDS AND PUBLIC PERCEPTION**

    8. Earthquake Hazards and Public Perception, presented by Kevin J. Coppersmith, DOE, dated October 13, 1999 **[Viewgraphs]**

17. **STATUS OF THE DEPARTMENT OF ENERGY'S YUCCA MOUNTAIN PROJECT**

    9. Viewgraphs presented by John Stuckless, U.S. Geological Survey
    10. Testing Update, presented by Mark T. Peters, DOE, dated October 13, 1999 **[Viewgraphs]**

18. **NYE COUNTY EARLY WARNING DRILLING PROGRAM**

    11. Nye County Early Warning Drilling Program, Interim Status Report, presented by Tom Buqo, Consulting Hydrogeologist **[Viewgraphs]**

19. **PRESENTATION BY REPRESENTATIVE OF CLARK COUNTY PRESENTATION**

    12. Review of Total System Performance Assessment in the U.S. Department of Energy Viability Assessment for the Yucca Mountain Site, prepared by S. Cohen & Associates, Inc., prepared for Clark County, Nevada, dated May 28, 1999

    13. Yucca Mountain Draft EIS Preliminary Transportation Concerns, presented by Fred Dilger, Clark County, Nevada **[Viewgraphs]**

20. **OPPORTUNITY FOR PUBLIC COMMENT**

    14. Yucca Mountain Draft Environmental Impact Statement, Proposed Heavy-Haul Truck Shipments, presented by Judy Treichel, Nevada Nuclear Waste Task Force **[Handout]**

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MEETING NOTEBOOK CONTENTS

TAB NUMBER		DOCUMENTS
	1.	Schedule and Outline for Discussion, 113th ACNW Meeting, October 12–13, 1999, undated
	2.	Status Report, Risk Communication
	3.	High Risk, Low Trust Communications: Nuclear Energy as a Case Study, Highlights of Talk Given by Dr. Vincent Covello at the 7th Annual Meeting of Women in Nuclear, May 21, 1999
	4.	First List of 20 Questions
	5.	Second List of 20 Questions
1		**Opening Remarks by ACNW Chairman**
	6.	Introductory Statement by the ACNW Chairman, undated
	7.	Introductory Statement by the ACNW Chairman, Second Day, undated
	8.	Items of Current Interest, undated
1-11		**The Role of Safety Assessment in the Yucca Mountain Regulatory Process**
	9.	Status Report
	10.	Meeting Agenda
	11.	Public Meeting Announcement
	12.	Proposed Talking Points for Dr. Garrick's Opening Remarks
	13.	Proposed Annotated Outline for ACNW's Presentation
	14.	Memo dated September 30, 1999, from Lynn Deering, ACNW, to ACNW Members, Subject: Recommended Background Reading for October 12, 1999, Round-Table Discussion on the Role of Safety Assessment in the Yucca Mountain Regulatory Process
	15.	Draft Strawman and Agenda, The Role of Safety Assessment in the Yucca Mountain Regulatory Process
	16.	Task Action Plan, Risk Communication
12		**Opening Remarks by ACNW Chairman**
	17.	Introductory Statement by the ACNW Chairman, Second Day, undated
	18.	Items of Current Interest, undated

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MEETING NOTEBOOK CONTENTS (CONT'D)

TAB NUMBER	DOCUMENTS
13	**Department of Energy's Work Reprioritization**
	19. Status Report • Attachments a. "DOE Program Status and Quality Issues," Viewgraphs presented by Don Horton at NRC/DOE Quarterly Management/Quality Assurance Meeting, August 11, 1999 b. "Implementing DOE's Strategy for the Postclosure Safety Case," Viewgraphs presented by Dennis Richardson at NRC/DOE Technical Exchange, May 25–27, 1999
14	**Department of Energy Process Model Reports**
	22. Status Report • Attachments a. "Process Model Reports, Viewgraphs presented by Miguel Lugo at NRC/DOE Technical Exchange, May 25–27, 1999 b. "Waste Package Degradation Process Model Report," Excerpt of Viewgraphs presented by Pasu Pasupathi at CLST Appendix 7 Meeting, July 7–8, 1999 c. Status of Data, Model, and Code Qualification/Validation and Control Plan," Viewgraphs presented by Jean Younker at NRC/DOE Quarterly Management/Quality Assurance Meeting, August 11, 1999
15	**Earthquake Hazards and Public Perception**
	23. Status Report
17	**Department of Energy's Yucca Mountain Project Status**
	24. Status Report
18	**Nye County Drilling Program**
	25. Status Report
19	**Presentation by Clark County Representatives**
	26. Status Report

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MEETING NOTEBOOK CONTENTS (CONT'D)

TAB NUMBER	DOCUMENTS
20	**Presentation by the State of Nevada Representative**
	27. Status Report
21	**ACNW Planning and Procedures**
	28. 113th ACNW Meeting, Planning and Procedures • **Enclosures** a. Items for the 114th ACNW Meeting, November 17–19, 1999 b. Set Agenda for December 1999 and beyond c. EDO Response to ACNW White Paper on Repository Design d. OCRWM/M&O Meetings Status e. EDO's List of Future Meeting Topics
	29. Status Report - Draft Letter to the Commission, "Implementing a Framework for Risk-Informed Regulation in the Office of Nuclear Material Safety and Safeguards"
	Tour of Yucca Mountain and the Department of Energy Test Facility at Losee Road, Las Vegas, Nevada
	30. Status Report
	31. Draft Itinerary