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

May 17, 2004

MEMORANDUM TO: ACNW Members
ACNW Staff

FROM: Michele S. Kelton
Technical Secretary, ACNW

SUBJECT: CERTIFIED MINUTES OF THE 148TH MEETING OF THE ADVISORY COMMITTEE ON NUCLEAR WASTE (ACNW) FEBRUARY 24–27, 2004

The proposed minutes of the subject meeting have been certified as the official record of the proceedings for that meeting.

Attachment:
Certified Minutes of the148th
Meeting, February 24–27, 2004

cc: J. Larkins, ACRS/ACNW
H. Larson, ACNW/ACNW
A. Bates, SECY (O-16C1)
P. Justus, NMSS (T-7F3)
S. Jones, NMSS (T-8A23)
I. Schoenfeld, EDO (O-16E15)

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

MEMORANDUM TO: Michele S. Kelton, Technical Secretary
Advisory Committee on Nuclear Waste

FROM: B. John Garrick, Chairman
Advisory Committee on Nuclear Waste

SUBJECT: CERTIFIED MINUTES OF THE 148TH MEETING OF THE ADVISORY COMMITTEE ON NUCLEAR WASTE (ACNW) FEBRUARY 24–27, 2004

I certify that, based on my review of these minutes[1], and to the best of my knowledge and belief, I have observed no substantive errors or omissions in the record of this proceeding subject to the comments noted below

Comments:

B. John Garrick, Chairman

Date

[1] Minutes of 148th meeting held on February 24–27, 2004, dated April 26, 2004.

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I certify that, based on my review of these minutes[1], and to the best of my knowledge and belief, I have observed no substantive errors or omissions in the record of this proceeding subject to the comments noted below.

Comments:

B. John Garrick, Chairman

Date 05/14/04

(1) Minutes of 148th meeting held on February 24–27, 2004, dated May 14, 2004.

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**CERTIFIED**
5/14/04
**BY B. JOHN GARRICK**

**Issued: 4/26/04**

# CERTIFIED MINUTES OF THE 148TH MEETING OF THE ADVISORY COMMITTEE ON NUCLEAR WASTE FEBRUARY 24-27, 2004

The U.S. Nuclear Regulatory Commission (NRC) Advisory Committee on Nuclear Waste (ACNW or the Committee) held its 148th meeting on February 24–27, 2004, at Two White Flint North, 11545 Rockville Pike, Rockville, Maryland. The ACNW published a notice of this meeting in the *Federal Register* on February 3, 2004 (69 FR 5198) (Appendix A). This meeting served as a forum for attendees to discuss and take appropriate action on the items listed in the agenda (Appendix B). The entire meeting was open to public attendance.

A transcript of selected portions of the meeting is available in the NRC's Public Document Room at One White Flint North, Room 1F19, 11555 Rockville Pike, Rockville, Maryland. Copies of the transcript are available for purchase from Neal R. Gross and Co., Inc., 1323 Rhode Island Avenue, NW., Washington, DC 20005. Transcripts may also be downloaded from, or reviewed on, the Internet at http://www.nrc.gov/reading-rm/doc-collections/acnw/tr/ at no cost.

ACNW Members Dr. B. John Garrick, Chairman, Dr. Michael T. Ryan, Vice-Chairman, Dr George M. Hornberger, and Dr. Ruth F. Weiner attended this meeting. Dr. James Clarke, ACNW consultant, was also present. For a list of other attendees, see Appendix C.

## I. CHAIRMAN'S REPORT (OPEN)

[Dr. John Larkins was the Designated Federal Official for this portion of the meeting.]

Dr. B. John Garrick, ACNW Chairman, convened the meeting at 10:30 a.m. and briefly reviewed the agenda. He also stated that the meeting was being conducted in conformance with the Federal Advisory Committee Act. In addition, Dr. Garrick 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 concluded his report by noting the following items of interest.

- On February 23, 2004, Sher Bahadur departed the ACRS/ACNW Office and assumed the position of Deputy Director, Division of Systems Analyses and Regulatory Effectiveness, Office of Nuclear Regulatory Research.

- On February 12, 2004, President Bush announced his intention to nominate Gregory Jaczko, Senator Reid's Appropriations Director, to serve the remainder of the term opened by the departure of Commission Greta Dicus. That term expires on June 30, 2008.

- Mr. Noble Green, Jr., has assumed the position of Administrative Secretary to the Executive Director, ACRS/ACNW. He comes from Commissioner Dicus' Office.

- While Jenny Gallo is on her 3-month rotational assignment in the Office of Nuclear Reactor Regulation, Sharon Steele from the Office of Nuclear Material Safety and Safeguards (NMSS) will be filling in for her. Sharon, like Jenny, was recently selected to NRC's Leadership Potential Program which requires a rotational assignment. By training, Sharon is a fire protection engineer. She began her career at NRC 3 years ago as the lead fire protection reviewer for the MOX Fuel Fabrication Facility. She will be with the ACRS/ACNW until April 30, 2004.

- Keith McConnell has been appointed Director of the newly established Commission Adjudicatory Technical Support Program with OGC. As the agency proceeds with its review of the repository application, this organization will provide a source of technical expertise for the Commission, independent of staff involved in the review and adjudication of DOE's application for the high-level waste (HLW) repository.

- Two members of the Nuclear Waste Technical Review Board (NWTRB), Chairman Michael Coradini and Paul Craig, resigned January 12 and January 15, 2004, respectively. With the position vacated by Debra Knopman in 2003, there are now three vacancies on the NWTRB.

  In other DOE related news, Dr. Steve Brocum has retired from Federal Service.

- It is also noted that John Grosenbacher's request to President Bush that his nomination be withdrawn for appointment to the Nuclear Regulatory Commission to fill the remainder of former NRC Chairman Richard Meserve term.

- DOE has identified two rail corridors as top choices for a rail spur to Yucca Mountain (YM). The preferred corridor is a 319-mile route from Caliente, Nevada, to Yucca Mountain. The second choice is a 323-mile route from Carlin, Nevada, to Yucca Mountain.

- DOE has announced its intention to release a draft request for proposals for conceptual cask designs to move utility spent fuel and defense HLW to Yucca Mountain. Under a "mostly real scenario," the cask fleet would be comprised of 10 legal weight truck casks and 90 rail casks. It is estimated this would result in about 45 truck shipments per year over a period of 24 years and about 10,000 rail shipments involving fewer than 3300 trains carrying 3 casks a piece, over the same 24-year period.

- On January 14, 2004, a three-man U.S. Appeals Court panel in Washington heard oral arguments involving 13 law suits related to the proposed Yucca Mountain repository. The court, for 3 hours, heard arguments on issues from the Environmental Protection Agency's (EPA's) Part 197 to the states' constitutional challenge of the Federal Government's right to site a repository there. A decision by the court is expected sometime in mid to late 2004.

- John Arthur, Technical Deputy Director of the DOE YM waste program, stated last month that DOE is developing an internal licensing plan to review and approve the YM license application (LA) The plan, which is expected to be completed by March or April, will give the YM program "a clear indication" of whether it can meet the LA December 2004 submittal target date.

- The Commission has published a proposed rule applicable to the use of the licensing support network (LSN) and the electronic hearing docket in the potential licensing proceeding on the disposal of HLW at a geologic repository. The proposed changes to 10 CFR Part 2 are noted in RIN 3150-AH31. Although principally an adjudicatory related issue, the LSN is intended to facilitate the timely review of DOE's license application and for that reason is of interest to the Committee.

- Larry Camper, Deputy Director, Spent Fuel Project Office, recently stated that the NRC, rather than relying on DOE funding, will use its own money to cover the $30 million cost of a Package Performance Study. The study would test a full-scale spent fuel truck cask and a rail cask to evaluate their performance during crashes and fires.

- During his February 10, 2004, testimony before the Senate Committee on Energy and Natural Resources to discuss DOE's FY 2005 budget request, Kyle McSlarrow, Deputy Security, stated that:

  > DOE plans to submit a license application to NRC by December 2004 and that the FY 2005 budget request includes a legislative proposal to reclassify currently mandatory receipts to the Nuclear Waste Fund as discretionary to offset the amount appropriate for geologic repository activities. In FY 2005, DOE proposes that $749 million in fees collected from utilities for the purposes of the Nuclear Waste Fund be used to offset FY 2005 non-defense appropriations in support of design and other Yucca Mountain activities. This proposal is intended to ensure adequate resources for the program.

## II. WORKING GROUP ON BIOSPHERE DOSE ASSESSMENTS FOR THE PROPOSED YUCCA MOUNTAIN HIGH-LEVEL WASTE REPOSITORY (OPEN)

[Mr. Michael Lee was the Designated Federal Official for this portion of the meeting.]

To better understand the effects of assumptions and simplifications on Yucca Mountain dose assessments, the ACNW conducted a 2-day working group session (WGS) on approaches to performing the required analyses. This technical session covered how radiological doses from any geologic repository at Yucca Mountain will be calculated and the technical bases for the dose assessments. An area of particular interest to the WGS was the radiological dose to the stipulated receptor (the reasonably maximally exposed individual, or RMEI) in the rural community of Amargosa Valley. The Biosphere WGS reviewed how the U.S. Department of Energy (DOE) intends to perform the required assessments and how the NRC staff intends to review them. As part of the technical discussions, WGS participants were asked to highlight

key dose assessment modeling assumptions, uncertainties in those key assumptions, and how the assumptions and other prescribed parameters affect the magnitude of calculated radiological dose.

Like the earlier ACNW working groups, the Biosphere WGS focused on ongoing and planned activities which were intended to increase confidence in evaluating repository performance. This WGS focused on understanding how dose assessments would be performed and what are the most important contributors to dose. For certain key radionuclides known to be significant contributors to Yucca Mountain dose projections,[1] the Biosphere WGS examined (a) the modeling of the food chain/receptor pathway, (b) ingestion and inhalation scenarios, and (c) stylized approaches to dose calculations.

In addition, at the staff level, this WGS discussed (a) the technical bases (measurements, analyses, and interpretations) necessary to conduct biosphere dose assessments, (b) the role of risk insights in the development of the technical bases, and (c) the impact of outstanding technical issues on key technical issue (KTI) agreement resolution.

## FEBRUARY 24, 2004

### Greeting and Introductions

Following some brief introductory remarks, the ACNW Chairman, Dr. B. John Garrick, turned control of the ACNW working group meeting over to Dr. Michael T. Ryan, the ACNW's Vice-Chairman and the cognizant member for biosphere issues. To help with the Committee's questioning of invited speakers, Dr. Ryan noted that the Committee had decided to rely on a group of outside subject matter experts (hereafter the "WGS panel") with expertise in the area of dose assessment methodology. Dr. Ryan introduced each of the WGS panel members individually and provided some background information on their academic credentials and professional experience. The following experts were members of the WGS panel:

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|---|---|
| Dr. Dade Moeller[2] | Chairman and Chief Executive Officer<br>Dade Moeller and Associates |
| Dr. Keith Eckerman | Earth Sciences Division<br>Oak Ridge National Laboratory |
| Dr. David Kocher | SENES Oak Ridge, Inc. |

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[1]Iodine-129 ($^{129}$I), technetium-99 ($^{99}$Tc), neptunium-237 ($^{237}$Np), americium-241 ($^{241}$Am), carbon-14 ($^{14}$C), and plutonium-239 ($^{239}$Pu).

[2]Former chairman of NRC's Advisory Committee on Reactor Safety and the ACNW

| | |
|---|---|
| Dr. John Till | President<br>Risk Assessment Corporation |
| Dr. Jeffrey Daniels | Environmental Sciences Division<br>Lawrence Livermore National Laboratory |
| Dr. Michael Thorne[3] | Principal<br>Mike Thorne and Associates (UK) |

**Keynote Presentation**

Dr. Dade Moeller was the keynote speaker. He introduced the major themes of the Biosphere WGS. In his remarks, he noted that the major goals of the Biosphere WGS were to identify key issues in the biosphere dose assessments for Yucca Mountain and to understand how the respective staff approaches to those assessments enhance confidence in estimating potential doses. Dr. Moeller said that another objective of the WGS was to achieve a better understanding of the assumptions accompanying the analyses, the uncertainties associated with those assumptions, and the degree to which these uncertainties may affect the dose estimates. He repeatedly explained how the organization of the technical sessions was intended to address these issues and objectives. Dr. Moeller referenced an October 2003 speech by NRC Chairman Nils Diaz[4] on the need to ensure that the required assessments and calculations have a measure of realism.

**Introduction to Biosphere Dose Assessments[5]; U.S. Nuclear Regulatory Commission Staff Expectations Regarding Content of Potential Yucca Mountain License Application**

The first technical presentation was made by Dr. Keith Compton, a Systems Performance Analyst in NRC's Division of Waste Management (DWM). He provided an overview of the regulatory framework that would be applied to the licensing of a potential geologic repository at Yucca Mountain. Focusing on the post-closure dose assessment, Dr. Compton identified the 10 CFR Part 63 regulatory requirements that DOE must meet in any potential license application. He also reviewed key regulatory concepts (e.g., RMEI and reference biosphere) that are important to the implementation of these requirements. With regard to these requirements,

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[3]Representing the State of Nevada

[4]October 20, 2003, speech at NRC's Nuclear Safety Research Conference, Washington, D.C. Subject: "Realism and Conservatism."

[5]During and following each of the technical presentations, the speakers responded to several comments and questions on the WGS panel members and members of the ACNW. The proceedings of this WGS will be published as NUREG/CP-0816 and will contain the details of these discussions.

Dr. Compton noted that certain issues related to future human behavior have been stipulated in the rule for the purposes of these dose calculations, whereas factors associated with the physical environment are to be estimated by DOE in light of site characterization studies. Having provided this background, Dr. Compton generally described the scope of information that should be presented in a potential DOE license application and the methods and acceptance criteria the staff would use to review that information. The staff's license application reviews would be consistent with the guidance set forth in the Yucca Mountain Review Plan (YMRP, NUREG-1804) and the results of the staff's on-going risk insights initiative.

**DOE Approach to Conducting Biosphere Dose Assessments for Yucca Mountain**

The first of the two DOE presentations was made by Dr. Peter Swift from the Sandia National Laboratory. Dr. Swift serves as the Manager for Performance Assessment Strategy and Scope for DOE's management and operating contractor–Bechtel-SAIC, Inc. In summary, Dr. Swift introduced and outlined DOE's approach to conducting a total system performance assessment (TSPA). He also presented some performance assessment results from completed DOE TSPAs with an emphasis on the contribution of biosphere model and biosphere dose conversion factors (DCFs) to these results. Dr. Swift noted that performance assessment results for the nominal (base) case[6] are based on modeling results that predict a mass flux of radionuclides migrating southward from the proposed repository location via the groundwater pathway to the rural community of Amargosa Valley. By regulation, certain modeling parameters are fixed to avoid boundless speculation about the lifestyles and habits of future receptor populations. For example, DOE is to estimate the doses to the RMEI at a location 18 kilometers (km) south of the proposed repository. In performing the calculation, DOE is also to assume that the radionuclide plume mixes with 3000 acre-feet of ground water which is subsequently used for irrigation (or for direct human consumption). DOE can assume a changing climate state for predicting future irrigation rates, growing seasons, etc.

The second DOE presentation was made by Dr. Kurt Rautenstrauch, a Senior Environmental Scientist with Bechtel-SAIC, Inc. His presentation focused on the information and methods that DOE used to develop its conceptual biosphere model for the TSPA computer code. Dr. Rautenstrauch also described the structure and function of the biosphere model and briefly summarized uncertainty and results. In summary, it was noted that DOE's biosphere model consists of two exposure scenarios–groundwater (the base case) and volcanism (the disruptive case). Computationally, the biosphere model is independent of DOE's TSPA computer code because the radionuclide concentrations that might be produced from the operation of the repository are not physically dependent on local biosphere characteristics. Dr. Rautenstrauch reviewed the how DOE developed the biosphere computational model. He noted that DOE no

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[6]By design, the scope of the WGS was limited to evaluation of the undisturbed performance of the repository. Consideration of the contribution of certain disruptive events (e.g., volcanism) to biosphere dose modeling results will be treated in a later ACNW WGS.

longer relies on the GENII computer code[7] for its biosphere dose calculation because the code lacked features necessary to demonstrate compliance with NRC's regulations.

Conceptually, he noted that the DOE development process included the identification of six environmental media (groundwater, irrigated soil, air, agricultural crops, animal products, and fish products) that could be subject to contamination by radionuclides distributed among three human exposure pathways (ingestion, inhalation, and external exposure). This information was then used to develop a radiation transfer interaction matrix that forms the basis for the computational models that ultimately generate (deterministically) the biosphere DCFs. Dr. Rautenstrauch reviewed each of the environmental media models and summarized information on lifestyles of local Amargosa Valley residents that was later used as input to the models. DOE sponsored a local biosphere survey in the late 1990s to collect the information needed for its biosphere model. Having provided this background, he presented the biosphere modeling results for each of the three exposure pathways, including the key radionuclides contributing to dose. Dr. Rautenstrauch also noted that DOE had a special submodel in its TSPA computer code to address the behavior of $^{14}C$ and radon, because of their different transfer pathways in the environment. (The treatment of $^{14}C$ was the subject of some subsequent discussion during the question and comment period.) The prepared presentation concluded with a discussion of the sources of model uncertainty in the biosphere computational module (i.e., conceptual, mathematical, and parameter uncertainty) and the relative significance of the uncertainty types to overall TSPA results.

**Public Comments**

Mr. Steve Frishman, representing the State of Nevada, expressed the view that a 1997 survey of lifestyle information on Amargosa Valley residents conducted for DOE was outdated and should be revised to reflect current trends in the area. For example, he noted that since the completion of the survey, there has been an increase in the local Hispanic population. He suggested that Hispanics tend to consume a higher percentage of locally grown produce. Mr. Frishman argued that this was a particularly important issue, especially given the need to accurately define the RMEI. As an aside, he also expressed the view that the regulatory definition of the RMEI itself was not prescriptive enough.

Mr. Frishman's second comment concerned the propagation of uncertainties though the overall performance assessment analysis. For example, he suggested that because performance assessment results were sensitive to assumptions concerning waste package failure rates and groundwater mixing volumes, decisionmakers needed to consider repository behavior beyond the current regulatory compliance period of 10,000 years in order to reach judgments based on the Part 63 reasonable expectation standard. He implied that the truncation of performance assessment analyses at 10,000 years (the current time period of regulatory concern) was a

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[7]See Napier, B. A., R. A. Peloquin, D. L. Strenge, and J. V. Ramsdell, "GENII: The Hanford Environmental Radiation Dosimetry Software System," Richland, Washington, Pacific Northwest Laboratory, PNL-6584, 3 vols., December 1988.

potential weakness in the EPA radiation standard for Yucca Mountain (e.g., 40 CFR Part 197) for it obscured information on the causative factors affecting repository performance.

**Technical Session Discussions: Elements of a Biosphere Dose Assessment Program Environmental Pathway Analysis**

The first technical session examined how humans might come into contact with radionuclides released from a potential geologic repository at Yucca Mountain. Participants described the principal exposure routes (pathways) through the local Yucca Mountain biosphere, and how they are being modeled. The principal food chain, inhalation, and direct contact pathways were discussed for the six key radionuclides of interest.

**Summary of NRC Approach**

Consistent with its regulatory role, NRC will use its biosphere modeling capability to independently review DOE's pre-licensing programs and a license application, should one be submitted. Mr. Patrick LaPlante, a Senior Research Scientist with NRC's technical assistance contractor, the Center for Nuclear Waste Regulatory Analyses (CNWRA), provided a broad overview of the biosphere modeling approach being developed by the NRC staff as part of its overall performance assessment review capability. Computationally, the staff's model relies on commercially available software (the GENII computer code with some modifications) to calculate radionuclide intakes and NRC's TPA computer code to generate DCFs. Internal and external dosimetry models are based on current Federal Guidance developed by EPA. Mr. LaPlante noted that NRC's biosphere model considers 600 input parameters for 43 radionuclides. The values and distributions selected for these parameters were based on reviews of the scientific literature. Mr. LaPlante noted that essentially all the input parameters to the NRC biosphere model are sampled, the exception being those parameters specified by regulation or the DCFs, which are essentially fixed values. To illustrate how much variation was being propagated through the biosphere calculations, Mr. LaPlante showed that sampled values of $^{129}$I varied less than an order of magnitude. Mr. LaPlante also noted that the $^{129}$I example was useful in illustrating why the variation in the groundwater pathway calculation had little effect on the variation present in the overall performance calculation. In an effort to identify which radionuclides in which environmental pathways were dominating performance assessment results, Mr. LaPlante how the staff could decompose the biosphere modeling results. For example, NRC's independent performance assessment work indicates that key radionuclides contributing to groundwater release doses are $^{99}$Tc, $^{129}$I, and $^{237}$Np; the principal exposure pathways are drinking water and ingestion of locally grown agricultural produce. Key radionuclides contributing to doses due to disruptive igneous events were $^{241}$Am and $^{238}$Pu, $^{239}$Pu, and $^{240}$Pu. The critical exposure pathway appears to be the inhalation of resuspended volcanic ash containing the radionuclides. In closing, Mr. LaPlante noted that NRC's biosphere modeling capability appears to account for the same key environmental media and human exposure pathways as DOE's model.

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**Summary of DOE Approach to Environmental Pathway Analysis for Groundwater Releases**

Dr. Maryla Wasiolek, Bechtel-SAIC, provided a particularly detailed review of DOE's approach to environmental pathway analysis for groundwater releases. In large measure, her presentation was a continuation of Dr. Rautenstrauch's earlier talk. For each of the six radionuclides of interest, Dr. Wasiolek provided information on the environmental transport pathways and the receptor exposure pathways being used by DOE in its analyses. She identified important model parameters and key radionuclides for each of those pathways. Dr. Wasiolek also presented some results of recently completed sensitivity and importance analyses associated with DOE's biosphere modeling efforts. The analyses were currently being documented as part of the license application development process.

The following presentation points were noteworthy. DOE's biosphere analyses indicate that ingestion (primarily drinking water, then locally grown food) is the most important dose pathway, regardless of radionuclide. DOE analyses also indicate that about 60 percent of the biosphere DCF came from drinking water, primarily $^{99}$Tc, which is highly soluble in water that is assumed to be locally consumed or applied to crops during irrigation. Carbon-14 and $^{129}$I are major contributors to the ingestion dose pathway. DOE analyses suggest that most of the human dose exposure is attributed to actinides as a result of the inhalation of resuspended contaminated soil (i.e., radioactive ash deposited following an extrusive igneous event).

**Metabolic Models**

The second technical session examined how the human response to radionuclides is assessed. Participants described metabolic routes and exposure duration for each of the environmental pathways identified earlier in the first session of the working group.

As background to this session of the Biosphere Working Group, we are reminded that EPA has developed guidance on the principles and policies of radiation protection that are to be applied by Federal agencies in the U.S. These principles and policies are given in Federal Guidance Report Nos. 11[8] and 12.[9] They provide scientific and technical information regarding radiation dose and health effects. Federal Guidance Report No. 11 lists dose coefficients to be used to calculate internal radiation exposure and Federal Guidance Report No. 12 lists the dose

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[8]Eckerman, K.F., A.B. Wolbarst, and A.C.B. Richardson, "Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion," U.S. Environmental Protection Agency, Office of Radiation Programs, *Federal Guidance Report No. 11*, EPA-520/1-88-020, September 1988 [prepared by Oak Ridge National Laboratory (ORNL)].

[9]Eckerman, K.F., and J.C. Ryman, "External Exposure to Radionuclides in Air, Water, and Soil," U.S. Environmental Protection Agency, Office of Radiation Programs, *Federal Guidance Report No. 12*, EPA-402-R-93-081, September 1993 [prepared by ORNL].

coefficients for external radiation exposures. The biokinetic and dosiometric models that form the bases for these reports are based largely on methodologies recommended by the International Commission on Radiation Protection (ICRP) and the ICRP cited in publications designated ICRP 26[10] and 30,[11] respectively. The ICRP dosimetry system was adopted by NRC in its regulations that apply to Yucca Mountain, e.g., Parts 20 and 63. Consequently, for the purposes of this working group, the NRC sought to better understand how this guidance system was being implemented by the staffs in their respective biosphere modeling programs.

**Summary of NRC Approach**

In his opening remarks, Mr. McKenny spoke briefly about the history of the ICRP dosimetry system and its subsequent adoption by EPA. Mr. McKenny noted that EPA recently published Federal Guidance Report No. 13,[12] but it has not been used by the staffs at this time. He also noted that the ICRP published new dosimetry recommendations in 1990 as ICRP 60[13] but NRC has not taken measures to update its regulations to reflect the new guidance. Mr. McKenny did note that NRC's regulations allow for the use of new dosimetry systems should applicants or licensees make a request.[14]

Once of the key themes of this WGS was to examine the impact of uncertainty on biosphere modeling efforts. Mr. McKenny choose to address this issue in the context of organ weighting factors and their relationship to the calculation of effective dose. During and following his presentation, Mr. McKenny responded to several comments and questions on the content of his

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[10]International Commission on Radiological Protection, "Recommendations of the International Commission on Radiological Protection," *Annals of the ICRP*, 1:3 [1977].

[11]International Commission on Radiological Protection, "Limits on Intakes of radionuclides by Workers (Part 1)," *Annals of the ICRP*, 2:3/4 [1979], and International Commission on Radiological Protection, "Limits on Intakes of Radionuclides by Workers – Statement and Recommendations of the 1980 Brighton Meeting of the ICRP (Part 2)," *Annals of the ICRP*, 4:3/4 [1980].

[12]Eckerman, K.F., R.W. Leggett, C.B. Nelson, J.S. Puskin, and A.C.B. Richardson, "Cancer Coefficients for Environmental Exposure to Radionuclides," U.S. Environmental Protection Agency, Office of Radiation Programs, *Federal Guidance Report No. 13*, EPA-402-R-99-001, September 1999 [prepared by ORNL].

[13]International Commission on Radiological Protection, "1990 Recommendations of the International Commission on Radiological Protection," *Annals of the ICRP*, 21:1-3 [1990]

[14]Mr. McKenny later remarked in the proceeding that NRC had conducted a cost-benefit analysis to determine the cost effectiveness of switching to the new system. Overall, NRC had determined that its was not cost effective for applicants or licensees to switch to the *Federal Guidance Report No. 13* system. Hence, the decision by NRC to allow the option for individual exemptions to use alternative dosimetry systems.

presentation material from both the WGS panel and the ACNW. There was also discussion among the WGS panel and the ACNW members themselves about the issue of whether the construct of the effective dose itself was conservative. Dr. Eckerman reminded the panelists that the ICRP dosimetry system was not intended to be conservative; rather, it was intended to be realistic.

**Summary of DOE Approach**

Dr. Wasiolek noted that DOE uses the same ICRP/*Federal Guidance* dosimetry system as NRC to conduct its compliance demonstrations for Yucca Mountain performance assessments. In reference to the calculation of inhalation doses, Dr. Wasiolek said that for particle sizes less that 1 micron, DOE has calculated slightly larger doses than if they were calculated by using the ICRP model. In response to questions and comments from the WGS panel and the ACNW members, Dr. Wasiolek noted that when the Department had an option of selecting from a distribution of dose coefficients, DOE would select the largest (highest). In response to questions (from Moeller) regarding whether DOE would likely adopt the newer Federal Guidance Report No. 13 methodology, she noted that the decision to adopt a new dosimetry system was DOE's to make, not Bechtel-SAIC, the contractor. Dr. Thorne said that switching to a new dosimetry system was likely to have a major programmatic impact owing to the quality assurance requirements (i.e., validation, verification, documentation) associated with implementing the program.

**Discussion of Federal Guidance Applicable to Yucca Mountain**

Because both NRC and DOE are implementing the recommendations of the *Federal Guidance* dosimetry system, the Biosphere WGS organizers thought it would be useful for workshop participants to hear some background on the basis for the recommendations from the lead author of the guidance, Dr. Keith Eckerman of Oak Ridge National Laboratory (ORNL).

The first series of slides in Dr. Eckerman's presentation of introduced to the system of Federal Guidance currently in place. His main points were that as a result of an Executive Order, the responsibility for developing the guidance documents and technical reports has rested with EPA since 1970. Federal Guidance Report Nos. 11-13 were prepared for EPA by ORNL. As noted earlier in the WGS, Federal Guidance Report No. 13 was the most recent version of the guidance. It is derived from ICRP Publication 72.[15] In developing this report at the request of user agencies, ORNL also prepared a compact disk (CD) which accompanies the report. The CD contains age-specific dose coefficients. Dr. Eckerman noted that one of the innovative features of Report No. 13 over earlier reports is that the report describes the health risk associated with direct exposure to a particular radionuclide. Before describing the types of physiological modeling approaches used to develop the radiological risk coefficients,

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[15]International Commission on Radiological Protection, "Age-dependent Doses to Members of the Public from Intake of Radionuclides: Part 5. Compilation of Ingestion and Inhalation Dose Coefficients," *Annals of the ICRP*, 25:1 [19zz].

Dr. Eckerman reminded the audience of the differences between internal and external radiological exposures. He also reviewed the biokinetic models used for iodine, the actinides, and the alkaline earths. Computationally, he observed that it was now possible to solve these first-order, biokinetic differential equations found in Federal Guidance No. 13 on a personal computer. Dr. Eckerman concluded his presentation with a review of how the *Federal Guidance* dosimetry system of reports would be used by analysts and decisionmakers.

**Public Comments**

At the end of the first day of the Biosphere WGS, Ms. Judy Treichel, representing the Nevada Nuclear Waste Task Force, requested time to address the WGS panel and the ACNW. She had two general observations. First, she questioned whether as a matter of public policy it was appropriate for Amargosa Valley to be subject to potential radiation doses from drinking contaminated groundwater and eating locally grown food, as the performance assessment modeling results suggest may ultimately happen. She suggested that a better scenario would be to follow what was done for New Mexico's Waste Isolation Pilot Plant, which was to site that repository in an area which had no potable groundwater that could be used or consumed by humans. Second, she called into question the accuracy of the biosphere lifestyle surveys conducted earlier by Bechtel-SAIC. She suggested that the surveys failed to reflect the large Spanish-speaking population currently in the valley. (The point was subsequently disputed by Dr. Wasiolek, who noted that the biosphere lifestyle surveys performed by Bechtel-SAIC were in fact bilingual–that they were conducted both in Spanish and in English.) Lastly, Ms. Treichel sought to remind the WGS panel and the ACNW that there were several types of agribusiness underway in the valley and the presence of a geologic repository would be deleterious to their economic survival.

**February 25, 2003**

**NRC's Risk Insights Initiative: Impact on Biosphere Dose Assessment Plans**

As background, it should be noted that as part of the development of its independent review capability, the NRC staff has undetaken a broad effort to evaluate what it considers to be risk-insights-based reviews [16]of predictive performance assessment results for Yucca Mountain. The core of the staff's risk insights documentation effort is the *risk insights initiative*. As part of that initiative, the staff is developing an integrated synopsis report on its understanding of the key factors in to repository performance. That understanding, once codified in a baseline

[16]Risk insights are defined as the results and findings that come from risk [performance] assessments. This could include the use of risk curves or predicted doses from facilities for the disposal of radioactive waste. Hence, a risk-informed approach implies that the performance of individual elements of a disposal facility can be quantified.

document, will be used in conjunction with the YMRP and the Integrated Issue Resolution Status Report to review DOE's license application. The intent of this agenda item was to explain what effect, if any, these agreements have had on NRC staff's biosphere modeling efforts and on the staff's pre-licensing consultations with DOE.

In his opening remarks, Mr. LaPlante noted that NRC s risk insights have been based only on the staff's independent performance assessment work but also on staff reviews of DOE programs. As a consequence, DOE/NRC pre-licensing activities have focused primarily on those topics, with large uncertainties, driving performance assessment results. Mr. LaPlante said that risk insights have helped the staff to better understand which aspects of the biosphere influence performance assessment results and thus have been very helpful in the staff's pre-licensing consultations with DOE.[17] Unlike the biosphere model in DOE's performance assessment computer code (described earlier by Dr. Rautenstrauch), Mr. LaPlante said that NRC's biosphere model does not perform independently of the overall performance assessment computer code. Because the NRC staff is interested in understanding how the biosphere influences performance assessment results, the staff has integrated the biosphere model computationally into the NRC computer code. For the purposes of his presentation, Mr. LaPlante described NRC's views on the risk insights primarily for groundwater release and *igneous activity.*

*Groundwater Release:* Mr. LaPlante said that 50 percent of the dose predicted by NRC's performance assessment computer code is attributed to drinking groundwater; 40 percent of the predicted dose is attributed to the consumption of locally grown foodstuffs irrigated with contaminated groundwater. Citing plant transfer parameters as a typical example, he said that there is generally low uncertainty in the biosphere abstractions and calculations relative to other aspects of the TPA model because the overall results show little sensitivity to variations in input parameter values. Hence, the biosphere-related KTI agreements are low-ranked by the staff. For its part, Mr. LaPlante said that the NRC staff does not intend to undertake any new major activity in this area. However, the staff is interested in understanding if DOE's biosphere modeling approach (the so-called decoupled model) is biasing their overall performance assessment results.

*Igneous Activity:* Mr. LaPlante identified those portions of the biosphere model where igneous activity is of interest to the NRC staff. In general, this issue is of higher risk significance to the NRC staff because performance assessment modeling results predict doses that exceed NRC's standards. Inhalation and mass loading are subject areas ranked high in terms of risk significance, suggesting that there is a need for an improved DOE technical basis going into licensing. Duration (exposure time) parameters in contaminated volcanic ash are also of interest to the staff. Mr. LaPlante noted that the NRC staff was independently seeking to

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[17]Most recently, these consultations have culminated in the identification of the remaining information needs the NRC staff believes that DOE should address by the time of the license application submission. These remaining information needs are the so-called 293 KTI agreements.

improve the realism of its igneous event consequence model in these areas because of the sensitivity of performance assessment results to this potentially disruptive event.

**NRC's Research Perspective on Biosphere Dose Assessments**

Ms. Cheryl Trottier, the Chief of NRC's Radiation Protection, Environmental Risk, and Waste Management Branch in NRC's Office of Nuclear Regulatory Research (RES), discussed what NRC was doing generically in the area of environmental pathway analysis to support NRC's performance assessment needs in the area of decommissioning. She noted that RES had developed a research plan consistent with past ACNW advice.[18] Consistent with that advice, RES had solicited public comment on the generic plan and sought peer review of the plan before finalizing it.[19] To implement the biosphere modeling aspects of the plan, RES engaged the Pacific Northwest National Laboratory (PNNL) in 2002 in a 4-year research contract. Specifically, PNNL was asked to study and evaluate the following:

- Radionuclide soil-to-plant concentration ratios
- Radionuclide uptake by plants of contaminated irrigation water
- Animal-product radionuclide transfer coefficients
- Alternative conceptual models for food-chain pathway models
- Biosphere DCFs and age dependency studies

Because of the modest size of the budget, some of the work described above was limited to a review and evaluation of the literature. To further leverage research monies, Ms. Trottier said that PNNL asked to coordinate its research efforts with ongoing international programs to the extent practical. For example, for some of the RES areas of interest, there may likely be extensive data from governmental organizations that operated in the former Soviet Union and PNNL may be able to get access to the data.

The initial phase of the PNNL research consisted of a literature review (published as NUREG/CR-6825[20]). As a result of the review, PNNL has decided to initially focus its research on five radionuclides of interest ($^{129}I$, $^{99}Tc$, $^{237}Np$, $^{239}Pu$, and nickel-63) for certain crops (alfalfa, onion, corn, and potato) and certain small farm animals in certain locations representative of different climatic regimes ranging from arid to humid (Washington, Nevada, South Carolina). As an example of the need to conduct this research, Ms. Trottier presented some results from

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[18]ACNW comments and recommendations dated February 5, 2001.

[19]Office of Nuclear Regulatory Research, "Radionuclide Transport in the Environment–Research Program Plan," U.S. Nuclear Regulatory Commission, Radiation Protection, Environmental Risk, and Waste Management Branch, March 2002.

[20]Serne, R.J., K.J. Cantrell, C.W. Lindenmeier, A.T. Owen, I.V. Kutnyakov, R.D. Orr, and A.R. Felmy, "Radionuclide-Chelating Agent Complexes in Low-Level Radioactive Decontamination Waste; Stability, Adsorption and Transport Potential," U.S. Nuclear Regulatory Commission, NUREG/CR-6825, February 2002 [prepared by PNNL].

the NUREG/CR-6825 literature review showing the variation in published estimates of plant concentration ratios for technetium and iodine. She observed that the goal of the NRC-sponsored research is to better understand the reasons for the variations in published parameter estimates and thereby permit the NRC staff to make reasoned decisions on which published estimates would be the most realistic for inclusion in NRC analyses.

## Presentations and Comments by Stakeholder Organizations

As is the case with all ACNW meetings, stakeholder organizations and interested members of the public are given the opportunity to express their views on the issues being discussed. For this purposes of this particular technical session, the working group chairman received one request to address the Committee from a representative of Monitor Scientific on behalf of the Electric Power Research Institute (EPRI). Comments were also offered by representatives for the State of Nevada and the Nevada Nuclear Waste Task Force.

### Summary of Monitor Scientific Presentation

Dr. Matthew Kozak was the speaker. By way of introduction, Dr. Kozak said that Monitor Scientific, along with the consulting firm Enviros (from the United Kingdom), was part of the analytical team organized by EPRI to conduct scientific studies independent of those of the DOE and NRC. He said that EPRI had been conducting independent performance assessments for Yucca Mountain for several years. By virtue of this work and other work,[21] domestically and internationally, Dr. Kozak said the EPRI team had acquired a certain expertise on matters related to the characterization and modeling of the biosphere. He noted that the most recent EPRI-sponsored TSPA went to press in December 2003, and includes a significant update to the EPRI biosphere model. He also noted that EPRI's published TSPA reports were a valuable resource of useful biosphere-related information that investigators should consider reviewing in addition to reports prepared by DOE and NRC.

Drawing on the cumulative performance assessment experience of the EPRI team, Dr. Kozak said that DOE and NRC should recognize that uncertainties in scientific process level knowledge may not always have an effect on predicted a dose outcomes and hence license decision-making. He offered as an example the fact that the treatment of future greenhouse effects on climate, although not always precisely understood, could be effectively bounded for the purposes of TSPA modeling, thereby demonstrating that predicted dose resulting from the operation of the repository do not exceed Part 63 regulatory limits. Overall, Dr. Kozak observed that although the acquisition of additional technical information might be desirable from a scientific perspective, he suggested that care should be exercised in directing DOE to undertake additional technical analyses (so-called auxiliary analyses) for which there is little reduction in uncertainty and calculated doses.

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[21]Dr. Kozak noted that EPRI has made significant contributions to the international BIOMOVS and BIOMASS programs, including approaches to defining critical receptor groups.

**Summary of Comments From the State of Nevada**

Mr. Steve Frishman stated that the biosphere model being considered for the dose assessment models was "artificially truncated" by the NRC regulation and inconsistent with the physical reality of the hydrology of the Amargosa Desert area. Mr. Frishman said that the natural sink for the hydrologic system in the Amargosa Valley area was the Franklin Lake playa, farther to the south. During the time period of regulatory concern (e.g., 10,000 years), under wetter (pluvial) climate conditions with higher groundwater elevations, radionuclides from a Yucca Mountain repository would be present in the Franklin Lake playa and in spring water discharging from local springs. Therefore, to be consistent with the National Academy of Sciences' 1995 recommendations for Yucca Mountain standards,[22] Mr. Frishman suggested that the biosphere dose assessment calculation should include these other locations rather than the regulatory stipulated irrigation well at the 18-km location (the so-called Lathrop Wells locality). In the only rebuttal comment, Mr. Neil Coleman of the ACNW staff questioned whether the springs in question were hydrologically connected to the flow system in and around Yucca Mountain based on previous geologic investigations, and therefore suitable receptor locations.

**Summary of Comments From the Nevada Nuclear Waste Task Force**

Ms. Judy Treichel said that DOE should undertake radiological studies to define current epidemiological baseline for the Amargosa Valley in light of the proposed Yucca Mountain repository. She expressed the view that such studies were needed in light of the inevitable changes to the health of local residents that would follow as a result of repository operations. There were no rebuttal or followup comments from WGS participants.

**Summary of Working Group Roundtable Discussion**

Dr. Ryan asked the WGS panel members to summarize some key thoughts and/or impressions from the various presentations made during the 2-day WGS. The following is a summary of their observations and recommendations to the ACNW for its consideration:

- As a confidence-building measure, DOE should be encouraged to perform its compliance demonstrations using the best available dosimetry science. For example, DOE should be encouraged to use Federal Guidance Report No. 13 and ICRP 26 as the principal sources of dose coefficients. In selecting its preferred suite of dose coefficients, DOE should also document how it reached its decisions. When doing so, DOE should cite primary sources in the technical literature rather than secondary sources.

[22]See National Research Council, "Technical Bases for Yucca Mountain Standards," Washington, D.C., National Academy Press, Commission on Geosciences, Environment, and Resources, July 1995.

- As an additional way of evaluating uncertainty, DOE should conduct supplemental analyses to examine the sensitivity of its performance assessment results by coupling its biosphere model with its overall performance assessment computer code.

- Conceptually, DOE's biosphere model may be too generic and not representative of actual site-specific conditions in the Amargosa Valley area. Additional bounding analyses for certain key radionuclides may be appropriate to aid in the conceptualizations. In an effort to improve the realism in this area, DOE may wish to reexamine the recommendations from the International Atomic Energy Agency (IAEA) peer review of DOE's biosphere modeling programs in 2001.[23]

- To improve the transparency of the biosphere dose assessment itself, the documentation should be made to better distinguish between those models and parameters that are fixed by regulation and those that can be sampled. In a related matter, there is a need for an improved database of environmental transport parameters that dose assessment practitioners can refer to. In this regard, DOE and NRC should study IAEA's Technical Report No. 364.[24]

- DOE should prepare a baseline radiological survey document to report on current (e.g., pre-repository) conditions in the Amargosa Valley, including information on the radiochemistry of local aquifers.

- In addition to calculations involving the RMEI, DOE should conduct supplemental dose calculations involving the average member of a conventional critical group. As an additional confidence-building measure, these supplemental calculations should also be performed for children and adolescents. Lastly, DOE and NRC should also assure themselves that the biosphere suite of models, parameterizations, and calculations is internally consistent.

- DOE and NRC should not disband that performance assessment staff until after the Yucca Mountain repository is permanently closed.

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[23]International Atomic Energy Agency, "An International Peer Review of the Biosphere Modeling Programme of the U.S. Department of Energy's Yucca Mountain Site Characterization Project—Report of the IAEA International Review Team," Vienna, Austria, Division of Radiation and Waste Safety, April 2001.

[24]International Atomic Energy Agency, "Handbook of Parameter Values for the Prediction of Radionuclide Transfer in Temperate Environments," Vienna, Austria, *Technical Report Series No. 364*, June 1994.

**Summary of ACNW Member Observations**

Following discussions with the WGS panel members, Dr. Ryan asked the ACNW Members and their invited consultant (Dr. Clarke) to express their thoughts and/or impressions from the 2 days of presentations. The intent was to elicit potential recommendations the Committee might convey to the Commission in a letter report. In addition to the WGS panel comments, the Members' summary observations were as follows:

- The performance assessment calculations being used to predict biosphere doses appear adequate for the purposes of meeting regulatory needs. However, the stylized and prescriptive nature of the regulations results in simplifications and conservatism that may lead an underestimation of reality.

- In many respects, human health effects due to radioactive species are better understood than health effects due to chemicals. However, there may be some value to the Yucca Mountain program in examining how industry and academia have modeled the human response to chronic chemical exposure.

- Performance assessment documentation should include information on how the results of site characterization were ultimately abstracted into the biosphere model and its supporting parameterizations. Moreover, it would be useful to have biosphere dose assessment results presented in a form that allows them to be decomposed and audited. Of particular interest is achieving better decisions made regarding decisions on the selection of parameter values.

- Current biosphere conditions in the Amargosa Valley area should be documented to allow a comparison of those conditions with changes that might result from the operation of the proposed repository or other anthropogenic activity.

- As an additional confidence-building measure, supplemental dose calculations should be done using the traditional (ICRP) critical group concept.

- There is a need for clarification regarding what happens to biosphere models under the expected climate change scenarios. For example, there is some confusion among practitioners regarding the meteorologic definition of "arid climate" as a baseline condition and how parameter values in the biosphere models might change under more pluvial conditions.

Dr. Ryan closed the meeting by indicating the ACNW Members would consider the recommendations and comments made over the course of the 2 days by WGS participants and stakeholders, and rely on the Committee's deliberative process to determine the types and kinds of recommendations to forward to the Commission.

## III. SAFETY RESEARCH REPORT—WASTE MANAGEMENT (OPEN)

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

The Committee discussed the NRC-sponsored technical assistance work being performed at the CNWRA. The Committee issued a report to the NRC Chairman dated March 4, 2004, with observations and recommendations related to this work.

## IV. RISK INSIGHTS BASELINE REPORT (OPEN)

[Mr. Michael Lee was the Designated Federal Official for this portion of the meeting.]

Risk insights are defined by the NRC staff as the results and findings that come from performance assessments. Risk insights could include the use of risk curves or predicted doses from radioactive waste disposal facilities. For many years, the ACNW has urged the staff to use performance assessment results (insights) to develop risk insights into its Yucca Mountain programs and to focus on the most risk-significant issues. At its 134th meeting in April 2002, the Committee was briefed on the results of the staff's initial risk insights initiative. Following that briefing, the Committee provided the Commission with recommendations in a letter report dated July 2, 2002.[25]

During its 148th meeting, the ACNW was briefed on results of the staff's most recent risk insights initiative by a Division of Waste Management (DWM) representative, Mr. James Danna. Embracing the ACNW's 2002 advice, Mr. Danna noted that the staff has developed an integrated synopsis report that describes its understanding of the key contributors to performance for a hypothetical geologic repository at Yucca Mountain. The integrated synopsis report is entitled the "Risk Insights Baseline Report." This report reflects the informal expert opinion of the NRC staff regarding the risk significance of 14 integrated subissues (ISIs)[26] to overall repository performance. This opinion was based on the staff's own independent performance assessment work, reviews of DOE performance assessments, and other documented sources.

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[25]Specifically, the ACNW has made recommendations that the staff (1) use performance assessment results to judge quantitatively the effectiveness of individual repository barriers, (2) develop and use performance assessment techniques such as a post processor to rank-order individual barrier contributions to performance, (3) use probabilistic methods (i.e., the risk triplet) in performance assessment modeling, and (4) use performance assessment analyses to prioritize key technical issues (KTIs) and to reexamine KTIs and attendant subissues.

[26]Independent of the risk insights initiative, the NRC staff identified 14 model abstractions that, in its view, collectively contribute to the waste isolation capabilities of the repository system. Within each of these 14 model abstractions, now called "ISIs," the staff has also identified key features, events, and processes (FEPs) important to repository performance.

Risk significance was evaluated by the staff relative to the waste isolation capabilities of the repository system. In general, *high risk significance* is associated with FEPs that could (a) affect the integrity and longevity of a large number of waste packages, (b) affect the release of radionuclides from the waste form and waste, or (c) affect the transport of radionuclides through the geosphere and biosphere. *Medium risk significance* is associated with a lesser effect on waste packages, radionuclide releases, or radionuclide transport. *Low risk significance* is associated with no or negligible effect.

For each of the 14 ISIs, Mr. Danna noted that the staff has developed the following types of information:

1. ranking of risk significance of waste isolation[27]

2. discussion of the specific risk insights, including the technical basis for the staff's judgment and the identification of uncertainties associated with that judgment

3. recommendations for areas for additional analyses to reduce the uncertainty in the judgments

4. identification of principal technical references

At the time of the briefing, Mr. Danna said that the Risk Insights Baseline Report was in concurrence and not publicly available. However, following his opening remarks, he was able to provide several examples of system-level and detailed risk insights taken from the report. Examples of system-level risk insights discussed include the identification of key radionuclides ($^{241}Am$, $^{239,240}Pu$, and $^{237}Np$) that dominate projected doses during the post closure period of repository performance and the identification of repository systems and components considered to be effective in the containment and isolation of these key radionuclides – that is to say these systems delay and/or limit the release of radionuclides from the repository. Examples of detailed risk insights discussed were (a) the effects of passive film formation on waste package corrosion, (b) the significance of waste form dissolution rates, and (c) the significance of early (juvenile) waste package failures.

Next, Mr. Danna discussed how the staff was using risk insights in its pre-licensing consultation programs. For example, the staff was currently using the results of the risk insights initiative to address the 293 KTI agreements with DOE and the reviews of DOE technical basis documents. The staff also intends to apply risk insights to an update of the Integrated Issue Resolution Status Report (NUREG-1762). In any potential licensing activities, Mr. Danna said that the staff will use risk insights in conjunction with the Yucca Mountain Review Plan (NUREG-1804) to review DOE's license application and help focus that review on the more risk-significant concerns. In this regard, Mr. Danna said that the availability of risk insights will be useful in evaluating the adequacy of DOE's proposed performance confirmation program plans. Should the NRC authorize repository construction at some point in the future, Mr. Danna noted that the

[27]Including both system-level insights and detailed risk insights related to specific FEPs.

staff could use its risk insights to risk-inform NRC's inspection and quality assurance oversight programs.

Lastly, Mr. Danna noted that the staff was conducting about 20 or so additional performance assessment analyses to reduce the uncertainty in the staff's current risk judgments and possibly amend those judgments. He also said that because the current edition of the Risk Insights Baseline Report focuses on the post-closure period of repository performance, future updates to the report would incorporate the staff's risk insights attributed to pre-closure repository operations.

Following the presentation, there were several questions and comments from the ACNW Members. Some were requests for clarification of information presented during Mr. Danna's presentation. Later during its 148th meeting, several ACNW Members expressed the view that the Risk Insights Baseline Report should be reviewed by the Committee once it is publicly available.

## V. REPORT ON KEY TECHNICAL ISSUE STATUS AND DIVISION OF WASTE MANAGEMENT EVALUATION OF DEPARTMENT OF ENERGY'S BUNDLING APPROACH (OPEN)

Mr. Gregory Hatchett, NRC Senior Project Manager in DWM, gave a talk about the status of KTI resolution, and about the bundling approach DOE is using to submit input for multiple agreements. He mentioned that NRC got a letter from DOE in June that described how DOE was changing its schedule to address key technical issue agreements.

Mr. Hatchett reviewed the status of the key technical issues, agreements, and the current activities. He also discussed the technical basis documents that DOE has submitted to the staff, along with the process for the review.

| KTI Agreement Status Report | |
|---|---|
| Completed | 90 |
| Received & in review | 75 |
| In process | 48 |
| Not received from DOE | 80 |
| Total | 293 |

As noted in the table above, to date, the staff has completed reviews of only 90 of the 293 total agreements. Eighty agreement responses have not yet been received from DOE. There are 75 that have been received and are being reviewed by the staff. There are 48 agreements that

are "in process," which means the agreements have been only partly received or require additional information.

Mr. Hatchett then presented the following breakdown of the agreements with respect to significance ranking:

| Agreement Significance Ranking | | | | |
|---|---|---|---|---|
| **Agreement Status** | **High** | **Medium** | **Low** | **Totals** |
| Completed | 3 | 22 | 65 | 90 |
| Received & in review | 13 | 29 | 33 | 75 |
| In process | 7 | 13 | 28 | 48 |
| Not received | 18 | 28 | 34 | 80 |
| Totals | 41 | 92 | 160 | 293 |

Mr. Hatchett noted that DOE appears to be behind in their current schedule for providing agreement responses. For example, DOE planned to submit three agreement responses to NRC in January 2004, but these have not been received. They planned to submit 16 agreement responses in March 2004, but based on recent telephone conversations between NRC and DOE staff, these March responses may also be delayed. DOE continues to have schedule challenges. Through August 2004 DOE plans to submit 121 agreement responses.

The staff has received seven technical basis documents that cover the topics listed below The number of related KTI agreement items is shown in parentheses. Those marked with an asterisk exclude responses to the agreement known as GEN 1.01 that is associated with many KTI agreements. GEN 1.01 will always be listed as "partially received" until all related agreement responses have been received.

#3 Water seeping into drifts (6*)
#5 In-drift chemical environment (16*)
#6 Waste package and drip shield corrosion (9*)
#8 Colloids (11*)
#11 Saturated zone flow and transport (24*)
#12 Biosphere transport (7)
#13 Volcanic events (4)

Mr. Hatchett reported that the entire group of technical basis documents covers the 14 post-closure component processes. The documents have enabled a more integrated NRC review across the disciplines of the related agreements and have provided the NRC staff an early look

at what DOE's Safety Analysis Report might include. The integration uses the YMRP and uses performance assessment insights, which are derived from the baseline of risk insights.

By way of example, Mr. Hatchett referred to Technical Basis Document #3 (on water seeping into the drifts [tunnels]). This document gives the staff a broad technical view of what is going on with water seeping in the drift, prior to looking at specific agreement inputs. The staff can look at how the program has evolved since the agreements were developed several years ago, and whether circumstances have changed. The staff is also applying risk insights to its review. Mr. Hatchett concluded that the technical basis documents provide very good overviews of each technical area.

Mr. Hatchett noted that one problem the staff has had is that technical justifications or bases are not always apparent in the technical basis documents. The staff sent DOE a letter on December 23, 2003, asking for the unpublished references that DOE had cited. The staff believed those references would provide the underlying bases for DOE's positions and conclusions. Unknown to the NRC staff, DOE was preparing to send the staff a letter on the same date, noting how the NRC staff could obtain easier access to the predecisional references.

Mr. Hatchett stated that complete references are available for the biosphere documents on DOE's Web site. The staff is still waiting for the references for the other technical basis documents that DOE previously sent. Some references are available for the technical basis document on colloids. DOE is creating a satellite office (at the Doubletree Hotel, near the Twinbrook metro station) that would serve the same purpose as the NRC Onsite Representative's office in Las Vegas in providing the staff access to predecisional documents. The staff can examine DOE work in progress as part of its pre-licensing reviews. Mr. Hatchett noted that DOE still intends to try to meet its schedule for submission of agreement items, despite the previously noted schedule challenges.

Dr. Hornberger asked a question about agreement status. There are 90 completed agreements. In response to a question as to whether "complete" means that all of the issues are closed, Mr. Hatchett replied that it meant that the staff has no further questions at this time and that those agreements are no longer open.

Dr. Hornberger then asked about the 75 agreements received and in review. Mr. Hatchett said that the review process looks for adequate justification for satisfying the agreement where the staff has no more concerns and could complete the agreement. There is also the issue of quality, with the three categories of transparency, traceability, and completeness. The main staff concern is to understand how DOE reached a particular technical conclusion. DOE may have completed the technical work, but may not have explained in some documents how their conclusions are adequately supported.

Dr. Hornberger asked about agreements "in the pipeline" and the portions that have to go back to DOE and the portions that get completed. The question was designed to get a sense of the pressures on the NRC staff. Dr. King Stablein, who works with Mr. Hatchett on issue resolution,

responded. He said that as the staff gets closer to the projected license application submission date of December 2004, it becomes more difficult for the staff to do a complete review in terms of closure of the agreements. The staff will do so to the extent that it can. The NRC staff have a number of other initiatives ongoing for the license application review. Dr. Stablein noted that if the agreements cannot be closed by the staff prior to license application submittal, the staff will be looking at the requested material in the license application itself, where DOE will have possibly provided all of the information needed. Dr. Stablein suggested that the staff is not going to have time to completely address all of the agreements and certify them closed prior to license application.

Dr. Ryan noted that agreements under the "high-risk" category are a little less than 10 percent complete, and half of the high-risk agreement items have not been received by NRC yet. If all the agreements aren't closed, it might look to some people that the license application is incomplete. Dr. Stablein responded that the staff will be doing an acceptance review of any potential license application. That acceptance review will be based on what is required in 10 CFR Part 63. There is also some guidance in the YMRP. The incomplete agreements would factor in to how the staff looks at the information provided. These are not criteria for determining whether the application would be acceptable or not.

Dr. Garrick commented on differences in NRC and DOE views on the bundling approach. He asked whether the importance of an agreement based on a risk insights perspective was consistent with the amount of documentation received from DOE on that agreement. Mr. Hatchett replied that, to the extent DOE agrees with the NRC staff, the amount of information received is consistent with its importance. DOE provides more information for higher significance agreements. Chairman Garrick then noted that the 18 remaining high-risk agreements could introduce quite a bit of uncertainty about the NRC schedule. Mr. Hatchett said that he thought that was a fair assumption.

Dr. Clarke asked about differences in NRC and DOE agreement rankings. Mr. Hatchett replied that DOE had submitted a risk prioritization report to NRC. That is the report that they are using to do their risk ranking, which is not necessarily the same way NRC did its risk ranking.

Mr. Neil Coleman, ACNW staff, commented on the low-significance agreements. There are 160 altogether and 34 have not been received. He questioned whether the staff had looked at the risk insights to determine if responses from DOE would be needed for all of those 34 that haven't been received. Mr. Hatchett replied that staff is waiting for responses on all of the agreements, despite their risk significance. The staff is engaged in this process to the end. Through the risk insights work it has been determined that some agreements have more significance than others. But the staff is still waiting to receive all of them.

Mr. Timothy McCartin, NRC staff, stated that there was never an implication when the agreements were ranked that "low" meant "zero" information was needed. It was felt that all of the agreements were information that was needed. Certainly the level of detail is impacted. The NRC staff did not put forward agreements for information that wasn't needed, but it's fair to say not all of the information has the same impact. That's why it was ranked. Mr. Hatchett

commented that every licensing activity has a baseline of information that is fundamentally needed to make a decision, despite the degree of significance. Without that baseline the staff has a difficult time making a decision. It is that underlying information that supports the safety argument that a potential applicant could make.

## VI. PROPOSED AGENDA FOR THE 149TH ACNW MEETING

The Committee agreed to consider the following topics at its 149th meeting on April 20–22, 2004:

- Update on West Valley and Its Performance Assessment Plans
- Risk-Informed Regulatory Activities of the Office of Nuclear Material Safety and Safeguards (NMSS)
- Environmental Protection Agency, Regulation 40 CFR, Chapter 1, Advance Notice of Proposed Rulemaking, "Approaches to An Integrated Framework for Management and Disposal of Low-Activity Radioactive Waste"
- DOE Schedule for Responses to KTI Agreements
- Division of Waste Management (DWM) Evaluation of DOE Bundling Approach
- Preparation of ACNW Reports on:
  - Risk Insights Report
  - DWM Evaluation of DOE Bundling Approach
  - Risk-Informed Regulation for NMSS Activities
  - Public Interactions During November 2003 Nevada Field Trip
  - Biosphere Working Group Session
  - West Valley Performance Assessment Plans
  - ACNW Annual Report on Waste-Management-Related Research

# APPENDIX A



by Rochester Gas and Electric Corporation (RG & E), and is located in Wayne County, New York, approximately 20 miles east of Rochester, New York. Possible alternatives to the proposed action (license renewal) include no action and reasonable alternative methods of power generation.

It is stated in Section 9.3 of the report based on (1) the analysis and findings in the GEIS (NRC, 1996; 1999); (2) the Ginna ER (Environmental Report) (RG & E 2002b); (3) consultation with other Federal, State, and local agencies; (4) the staff's own independent review; and (5) the staff's consideration of the public comments received, the recommendation of the staff is that the Commission determine that the adverse environmental impacts of license renewal for Ginna, including cumulative impacts, are not so great that preserving the option of license renewal for energy-planning decisionmakers would be unreasonable.

The final Supplement 14 to the GEIS is available for public inspection in the NRC Public Document Room (PDR) located at One White Flint North, 11555 Rockville Pike (first floor), Rockville, Maryland, or from the Publicly Available Records (PARS) component of NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at *http://www.nrc.gov* (the Public Electronic Reading Room). Persons who do not have access to ADAMS, or who encounter problems in accessing the documents located in ADAMS, should contact the PDR reference staff at 1-800-397-4209, 301-415-4737, or by e-mail to *pdr@nrc.gov*. The final supplement to the GEIS is also available for public inspection at the Ontario Public Library, located at 1850 Ridge Road, Ontario, New York, and the Rochester Public Library, located at 115 South Avenue, Rochester, New York.

**FOR FURTHER INFORMATION CONTACT:** Mr. Robert Schaaf, License Renewal and Environmental Impacts Program, Division of Regulatory Improvement Programs, U.S. Nuclear Regulatory Commission, Washington, DC 20555. Mr. Schaaf may be contacted at (301) 415-1312 or *RGS@nrc.gov*.

Dated at Rockville, Maryland, this 22nd day of January, 2004.

For the Nuclear Regulatory Commission.

**Pao Tsin Kuo,**

*Program Director, License Renewal and Environmental Impacts Program, Division of Regulatory Improvement Programs, Office of Nuclear Reactor Regulation.*

[FR Doc. E4-169 Filed 2-2-04; 8:45 am]

BILLING CODE 7590-01-P

## NUCLEAR REGULATORY COMMISSION

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

The Advisory Committee on Nuclear Waste (ACNW) will hold its 148th meeting on February 24-27, 2004, Room T-2B3, 11545 Rockville Pike, Rockville, Maryland.

The entire meeting will be open to public attendance except for portions that will be closed to discuss and protect information as well as unclassified safeguards information pursuant to 5 U.S.C. 552b(c)(1) and (3).

The schedule for this meeting is as follows:

**Tuesday, February 24, 2004**

*8 a.m.-8:10 a.m.: Opening Statement* (Open)—The Chairman will open the meeting and turn it over to the Working Group Chairman.

*Working Group: Biosphere Dose Assessments for the Proposed Yucca Mountain High-Level Waste Repository* (Open)

*10 a.m.-8:20 a.m.:* The Working Group Chairman will discuss the purposes of these working group sessions.

*8:20 a.m.-8:50 a.m.: Keynote Presentation: What are the key issues in Biosphere Dose Assessments? How do the assessments enhance confidence by estimating potential doses?* (Open)—The Committee will hear and discuss views on biosphere dose assessments by a distinguished expert.

*8:50 a.m.-9:50 a.m.: Introduction to Biosphere Dose Assessment: NRC Staff Expectations Regarding Content of Potential Yucca Mountain License Application* (Open)—The Committee will hear presentations by NRC staff representatives regarding the potential Yucca Mountain license application.

*10:10 a.m.-11:10 a.m.: U.S. Department of Energy (DOE) Approach to Conducting Biosphere Dose Assessments for Yucca Mountain* (Open)—The Committee will hear a presentation by DOE representatives regarding the biosphere dose assessments for Yucca Mountain.

*11:10 a.m.-12 Noon: Public Comments* (Open)—The Committee will hear comments from the public.

*1 p.m.-5:15 p.m.: Technical Session Discussions: Elements of a Biosphere Dose Assessment Program* (Open)—The Committee will hear presentations on two key areas of interest: environmental pathway analysis and metabolic models.

*5:15 p.m.-5:45 p.m.: Public Comments* (Open)—The Committee will hear comments from the public.

**Wednesday, February 25, 2004**

*8 a.m.-8:10 a.m.: Opening Statement* (Open)—The Working Group Chairman will make opening remarks regarding the conduct of today's sessions.

*Working Group: Biosphere Dose Assessments for the Proposed Yucca Mountain High-Level Waste Repository—Continued* (Open)

*8:10 a.m.-9:40 a.m.: NRC's Risk Insights Initiative: Impact on Biosphere Dose Assessment Plans* (Open)—The Committee will hear presentations by NRC and DOE representatives regarding agreement information needs to be included in a potential Yucca Mountain License Application.

*9:55 a.m.-12 Noon: Presentations by Stakeholder Organizations* (Open)—The Committee will hear presentations by stakeholder organizations.

*1 p.m.-1:30 p.m.: NRC's Office of Nuclear Regulatory Research (RES) Perspective on Biosphere Dose Assessments* (Open)—The Committee will hear a presentation by NRC RES representative regarding biosphere dose assessments.

*1:30 p.m.-2:45 p.m.: Working Group Roundtable Panel Discussion* (Open)

*3 p.m.-4 p.m.: Panel and Committee Summary Discussion* (Open)

*4 p.m.-4:30 p.m.: Public Comments* (Open)

*4:30 p.m.-4:45 p.m. Closing Comments by the Working Group Chairman* (Open)

*4:45 p.m.-5:45 p.m. Discussion of ACNW Letter Report* (Open)—The Committee will outline the principal points to be included in a potential letter report resulting from these Working Group sessions.

**Thursday, February 26, 2004**

*11:30 a.m.-11:40 a.m.: Opening Remarks by the ACNW Chairman* (Open)—The Chairman will make opening remarks regarding the conduct of today's sessions.

*11:40 a.m.-12:30 p.m.: Waste Management-Related Safety Research Report* (Open)—The Committee will discuss recent Member activities relevant to the ACNW review of NRC waste management-related safety research as well as discuss a proposed report.

*1:30 p.m.-4:30 p.m.: Radiological Dispersal Devices* (Closed)—The Committee will be briefed by the NRC staff on the current status of work in progress on health and safety and public protection issues related to radiological dispersal devices.

*4:45 p.m.-6:30 p.m.: Preparation of ACNW Reports* (Open)—The Committee will discuss potential ACNW reports on matters discussed during this meeting. It may also discuss possible reports on matters discussed during prior meetings.

**Friday, February 27, 2004**

*8:30 a.m.-8:35 a.m.: Opening Remarks by the ACNW Chairman* (Open)—The Chairman will make opening remarks regarding the conduct of today's sessions.

*8:35 a.m.-10 a.m.: Risk Insights Report* (Open)—The Committee will be updated by and hold discussions with representatives of the NRC staff on recent risk insight activities.

*10:15 a.m.-11:15 a.m.: Report on Key Technical Issue (KTI) Status and DWM Evaluation of DOE's Bundling Approach*

(Open)—The Committee will be briefed by a representative of the NRC staff on the status of Yucca Mountain KTIs and the results of its evaluation of DOE "Bundles" received to date.

11:15 a.m.–2:45 p.m. *Preparation of ACNW Reports* (Open/Closed)—The Committee will continue discussion of proposed ACNW reports. In addition, the Committee will discuss a proposed ACNW report on Radiological Dispersal Device (Closed).

2:45 p.m.–3 p.m.: *Miscellaneous* (Open)—The Committee will discuss matters related to the conduct of Committee activities and matters and specific issues that were not completed during previous meetings, as time and availability of information permit.

Procedures for the conduct of and participation in ACNW meetings were published in the **Federal Register** on October 16, 2003 (68 FR 59643). In accordance with these procedures, oral or written statements may be presented by members of the public. Electronic recordings will be permitted only during those portions of the meeting that are open to the public. Persons desiring to make oral statements should notify Mr. Howard J. Larson, Special Assistant (Telephone 301–415–6805), between 7:30 a.m. and 4 p.m. ET, as far in advance as practicable so that appropriate arrangements can be made to schedule the necessary time during the meeting for such statements. Use of still, motion picture, and television cameras during this meeting will be limited to selected portions of the meeting as determined by the ACNW Chairman. Information regarding the time to be set aside for taking pictures may be obtained by contacting the ACNW office prior to the meeting. In view of the possibility that the schedule for ACNW meetings may be adjusted by the Chairman as necessary to facilitate the conduct of the meeting, persons planning to attend should notify Mr. Howard J. Larson as to their particular needs.

In accordance with Subsection 10(d) Pub.L. 92–463, I have determined that it is necessary to close portions of this meeting noted above to discuss and protect information as well as unclassified safeguards information pursuant to 5 U.S.C. 552b(c)(1) and (3).

Further information regarding topics to be discussed, whether the meeting has been canceled or rescheduled, the Chairman's ruling on requests for the opportunity to present oral statements and the time allotted, therefore can be obtained by contacting Mr. Howard J. Larson.

ACNW meeting agenda, meeting transcripts, and letter reports are available through the NRC Public Document Room at *pdr@nrc.gov*, or by calling the PDR at 1–800–397–4209, or from the Publicly Available Records System (PARS) component of NRC's document system (ADAMS) which is accessible from the NRC Web site at *http://www.nrc.gov/reading-rm/adams.html* or *http://www.nrc.gov/reading-rm/doc-collections/* (ACRS & ACNW Mtg schedules/agendas).

Video Teleconferencing service is available for observing open sessions of ACNW meetings. Those wishing to use this service for observing ACNW meetings should contact Mr. Theron Brown, ACNW Audiovisual Technician (301–415–8066), between 7:30 a.m. and 3:45 p.m. ET, at least 10 days before the meeting to ensure the availability of this service. Individuals or organizations requesting this service will be responsible for telephone line charges and for providing the equipment and facilities that they use to establish the video teleconferencing link. The availability of video teleconferencing services is not guaranteed.

Dated: January 28, 2004.

**Andrew L. Bates,**

*Advisory Committee Management Officer.*

[FR Doc. 04–2115 Filed 2–2–04; 8:45 am]

BILLING CODE 7590–01–P

## NUCLEAR REGULATORY COMMISSION

### Advisory Committee on Reactor Safeguards; Subcommittee Meeting on Thermal-Hydraulic Phenomena; Notice of Meeting

The ACRS Subcommittee on Thermal-Hydraulic Phenomena will hold a meeting on February 10–11, 2004, Room T–2B3, 11545 Rockville Pike, Rockville, Maryland.

Portions of the meeting may be closed to public attendance to discuss Westinghouse proprietary information per 5 U.S.C. 552b(c)(4).

The agenda for the subject meeting shall be as follows:

*Tuesday and Wednesday, February 10–11, 2004–8:30 a.m. until the conclusion of business*

The Subcommittee will discuss the resolution of open thermal-hydraulic issues related to the AP1000 design, including ADS–4 entrainment, long term cooling, boron concentration, and computer code modeling differences. The Subcommittee will hear presentations by and hold discussions with representatives of Westinghouse and the NRC staff regarding these matters. The Subcommittee will gather information, analyze relevant issues and facts, and formulate proposed positions and actions, as appropriate, for deliberation by the full Committee.

Members of the public desiring to provide oral statements and/or written comments should notify the Designated Federal Official, Mr. Ralph Caruso (Telephone: 301–415–8065) five days prior to the meeting, if possible, so that appropriate arrangements can be made. Electronic recordings will be permitted only during those portions of the meeting that are open to the public.

Further information regarding this meeting can be obtained by contacting the Designated Federal Official between 7:30 a.m. and 4:15 p.m. (ET). Persons planning to attend this meeting are urged to contact the above named individual at least two working days prior to the meeting to be advised of any potential changes to the agenda.

Dated: January 21, 2004.

**Sher Bahadur,**

*Associate Director for Technical Support, ACRS/ACNW.*

[FR Doc. 04–2114 Filed 2–2–04; 8:45 am]

BILLING CODE 7590–01–P

## NUCLEAR REGULATORY COMMISSION

### Sunshine Act Meeting

**DATE:** Weeks of February 2, 9, 16, 23, March 1, 8, 2004

**PLACE:** Commissioners' Conference Room, 11555 Rockville Pike, Rockville, Maryland.

**STATUS:** Public and Closed

**MATTERS TO BE CONSIDERED:**

**Week of February 2, 2004**

There are no meetings scheduled for the Week of February 2, 2004.

**Week of February 9, 2004—Tentative**

There are no meetings scheduled for the Week of February 9, 2004.

**Week of February 16, 2004—Tentative**

*Wednesday, February 18, 2004*

9:30 a.m.

Briefing on Status of Office of Chief Financial Officer Programs, Performance, and Plans (Public Meeting) (Contact: Edward L. New, 301–415–5646)

This meeting will be webcast live at the Web address *http://www.nrc.gov*

**Week of February 23, 2004—Tentative**

*Wednesday, February 25, 2004*

9 a.m.

Discussion of Security Issues (Closed—Ex. 1)

*Thursday, February 26, 2004*

9:30 a.m.

Meeting with UK Regulators to Discuss Security Issues (Closed—Ex. 1)

**Week of March 1, 2004—Tentative**

*Tuesday, March 2, 2004*

9:30 a.m.

Meeting with Advisory Committee on the Medical Uses of Isotopes (ACMUI) & NRC Staff (Public Meeting) (Contact: Angela Williamson, 301–415–5030)

This meeting will be webcast live at the Web address: *http://www.nrc.gov*.

# APPENDIX B

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

**January 23, 2004**

**AGENDA**
**148th ACNW MEETING**
**FEBRUARY 24-27, 2004**

**TUESDAY, FEBRUARY 24, 2004, CONFERENCE ROOM T- 2B3, TWO WHITE FLINT NORTH, ROCKVILLE, MARYLAND**

1) 8:00 - 8:10 A.M. Opening Statement (Open) (BJG/MTR/MPL)
The Chairman will open the meeting and turn it over to the Working Group Chairman who will state the Working Group objectives and provide a session overview. Invited experts will also be introduced at this time.

**WORKING GROUP: BIOSPHERE DOSE ASSESSMENTS FOR THE PROPOSED YUCCA MOUNTAIN HIGH-LEVEL WASTE REPOSITORY** (Open)

2) 8:10 - 8:20 A.M. The purposes of this Working Group Sessions are to:
- 2.1) Increase the ACNW's technical knowledge of NRC staff plans to develop and conduct biosphere dose assessment work for the proposed Yucca Mountain repository;
- 2.2) Understand NRC staff expectations for biosphere dose assessments;
- 2.3) Review examples of biosphere dose assessment work being planned;
- 2.4) Identify aspects of biosphere dose assessments that may warrant further study; and
- 2.5) Complement the previous Working Groups.

3) 8:20 - 8:50 A.M. Keynote Presentation: What are the key issues in Biosphere dose assessments. How do the assessments enhance confidence by estimating potential doses? (Open)
- 3.1) Views on biosphere dose assessments will be presented by a distinguished expert.
- 3.2) Discussion

4) 8:50 - 9:50 A.M. Introduction to Biosphere Dose Assessment: NRC Staff Expectations Regarding Content of Potential Yucca Mountain License Application (Open)
- 4.1) Presentation by representative(s) of NRC's Office of Nuclear Material Safety and Safeguards' Division of Waste Management (DWM).
- 4.2) Discussion

**9:50 - 10:10 A.M.** ***BREAK***

5) 10:10 - 11:10 A.M. U.S. Department of Energy (DOE) Approach to Conducting Biosphere Dose Assessments for Yucca Mountain (Open)
5.1) Presentation by DOE representative(s)
5.2) Discussion

6) 11:10 - 12:00 Noon Public Comments (Open)

**12:00 - 1:00 P.M.** ***LUNCH***

7) 1:00 - 3:15 P.M. Technical Session Discussions: Elements of a Biosphere Dose Assessment Program (Open)
The two key areas of interest to the Working Group are environmental pathway analysis and metabolic models.

7.1) Environmental Pathway Analysis: The first technical session will examine how humans might come into contact with radionuclides released from a potential geologic repository at Yucca Mountain. Participants will be asked to describe the principal exposure routes (pathways) through the local biosphere, and how they are being modeled. Principal food-chain, inhalation, and direct contact pathways will be discussed for 6 key radionuclides ($^{129}I$, $^{99}Tc$, $^{237}Np$, $^{241}Am$, $^{14}C$, and $^{239}Pu$)

1:00 - 1:30 P.M. 7.1.1) Presentation by NRC's DWM representative(s)
1:30 - 2:00 P.M. 7.1.2) Presentation by DOE representative(s)
2:00 - 2:30 P.M. 7.1.3) Discussion
2:30 - 3:00 P.M. 7.1.4) Public Comments

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

3:15 - 5:45 P.M. 7.2) Metabolic Models: The second technical session will examine the manner by which the human response to radionuclides is assessed. Participants will be asked to describe metabolic routes and exposure duration for each of the environmental pathways identified in Section 7.1 of the Working Group Session. Again, the discussions will be in the context of the 6 key radionuclides of interest.

3:15 - 4:15 P.M. 7.2.1) Presentations by NRC's DWM and DOE representative(s)
4:15 - 4:45 P.M. 7.2.2) Discussion of Federal Guidance applicable to Yucca Mountain
4:45 - 5:15 P.M. 7.2.3) Discussion
5:15 - 5:45 P.M. 7.2.4) Public Comments

5:45 P.M. Adjourn Day 1

**WEDNESDAY, FEBRUARY 25, 2004, CONFERENCE ROOM T- 2B3, TWO WHITE FLINT NORTH, ROCKVILLE, MARYLAND**

| | | |
|---|---|---|
| 8) | 8:00 - 8:10 A.M. | Opening Statement (Open) (BJG/MTR/MPL)<br>The Working Group Chairman will make opening remarks regarding the conduct of today's sessions. |

**WORKING GROUP: BIOSPHERE DOSE ASSESSMENTS FOR THE PROPOSED YUCCA MOUNTAIN HIGH-LEVEL WASTE REPOSITORY - CONTINUED** (Open)

| | | |
|---|---|---|
| 9) | 8:10 - 9:40 A.M. | NRC's Risk Insights Initiative: Impact on Biosphere Dose Assessment Plans (Open) (MTR/MPL)<br>NRC and DOE reached agreement on 293 additional information needs to be included in a potential Yucca Mountain License Application. These agreements were subsequently risk-ranked by the NRC staff. The intent of this agenda item is for participants and stakeholders to understand what affect, if any, these agreements have had on respective staff approaches to biosphere dose assessments for Yucca Mountain. |
| | 8:10 - 8:40 A.M. | 9.1.1) Presentation by NRC's DWM representative(s) |
| | 8:40 - 9:10 A.M. | 9.1.2) Presentation by DOE representative on the Departments' position on NRC's risk insights initiative. |
| | 9:10 - 9:40 A.M. | 9.1.3) Discussion |
| | **9:40 - 9:55 A.M.** | *****BREAK***** |
| 10) | 9:55 - 12:00 Noon | Presentations by Stakeholder Organizations (Open) |
| | **12:00 - 1:00 P.M.** | *****LUNCH***** |
| 11) | 1:00 - 1:30 P.M. | NRC's Office of Nuclear Regulatory Research (RES) Perspective on Biosphere Dose Assessments (Open)<br>11.1) Presentation by NRC RES representative<br>11.2) Discussion |
| 12) | 1:30 - 2:45 P.M. | Working Group Roundtable Panel Discussion (Open) |
| | **2:45 - 3:00 P.M.** | *****BREAK***** |
| 13) | 3:00 - 4:00 P.M. | Panel and Committee Summary Discussion (Open) |
| 14) | 4:00 - 4:30 P.M. | Public Comments (Open) |
| 15) | 4:30 - 4:45 P.M. | Closing Comments by the Working Group Chairman (Open) (MTR/MPL) |
| 16) | 4:45 - 5:45 P.M. | Discussion of ACNW Letter Report (Open) (MTR/MPL)<br>Discussion of principal points in potential letter report to the Commission on results and observations from the ACNW Biosphere Dose Assessment Working Group. |
| | 5:45 P.M. | Adjourn Day 2 |

**THURSDAY, FEBRUARY 26, 2004, CONFERENCE ROOM T-2B3, TWO WHITE FLINT NORTH, ROCKVILLE, MARYLAND**

17) 11:30 - 11:40 A.M. Opening Remarks by the ACNW Chairman (Open) (BJG/JTL)
The Chairman will make opening remarks regarding the conduct of today's sessions.

18) 11:40 - 12:30 P.M. Waste Management - Related Safety Research Report (Open) (RFW/MTR/RPS)
Discussion of recent Member activities relevant to the ACNW review of NRC waste management - related safety research as well as a discussion of the proposed report.

**12:30 - 1:30 P.M.** ***LUNCH***

19) 1:30 - 4:30 P.M. Radiological Dispersal Devices **(Closed)** (MTR/RKM)
The Committee will be briefed by the NRC staff on the current status of work in progress on health and safety and public protection issues related to radiological dispersal devices (**Room T-8E8**).

**4:30 - 4:45 P.M.** ***BREAK***

20) 4:45 - 6:30 P.M. Preparation of ACNW Reports (Open) (BJG/RKM)
The Committee will discuss potential reports on:
20.1) Pre-Closure Safety Assessment Tool (RFW/RKM)
20.2) Drift Degradation at Yucca Mountain (BJG/RKM)
20.3) Public Interactions during November 2003 Nevada Field Trip (BJG/MPL)
20.4) ACNW Chair/Vice Chair January 7-8, 2004 Individual Meetings with Commissioners and NRC Senior Management (BJG/MPL)

**FRIDAY, FEBRUARY 27, 2004, CONFERENCE ROOM T-2B3, TWO WHITE FLINT NORTH, ROCKVILLE, MARYLAND**

8:50
21) ~~8:30~~ - 8:35 A.M. Opening Remarks by the ACNW Chairman (Open) (BJG/JTL)
The Chairman will make opening remarks regarding the conduct of today's sessions.

8:52
22) ~~8:35~~ - 10:00 A.M. Risk Insights Report (Open) (BJG/NMC)
The Committee will be updated by and hold discussions with representatives of the NRC staff on recent risk insight activities.

**10:00 - 10:15 A.M.** ***BREAK***

23) 10:15 - ~~11:15~~ a.m. Report on KTI Status and DWM Evaluation of DOE's Bundling Approach (Open) (GMH/MPL)
11:00
The Committee will be briefed by a representative of the NRC staff on the status of Yucca Mountain KTIs and the results of the DWM evaluation of DOE "Bundles" received to date.

Break

24) ~~11:45~~ 11:07 - 12:15 P.M. Preparation of ACNW Reports (Open) (BJG/RKM)
The Committee will discuss potential reports on:
- 24.1) Pre-Closure Safety Assessment Tool (RFW/RKM)
- 24.2) Drift Degradation at Yucca Mountain (BJG/RKM)
- 24.3) Public Interactions during November 2003 Nevada Field Trip (BJG/MPL)
- 24.4) Risk Insights Report (BJG/NMC)
- 24.5) Report on DWM Evaluation of DOE Bundling Approach (GMH/MPL)
- 24.6) Radiological Dispersal Devices (MTR/RKM) **(Closed) (Room T-8E8)** Cancelled
- 11:07-11:15 24.7) Biosphere Working Group (MTR/MPL)
- ✓ 24.8) ACNW Chair/Vice Chair January 7-8, 2004 Individual Meetings with Commissioners and NRC Senior Management (BJG/MPL)

**12:15 - 1:15 P.M.** *****LUNCH*****

25) 1:15 - 2:45 P.M. Preparation of ACNW Report (Open) (BJG/RKM)
The Committee will continue preparation of reports in Item 24.

26) 2:45 - 3:00 P.M. Miscellaneous (Open)
The Committee will discuss matters related to the conduct of Committee activities and matters and specific issues that were not completed during previous meetings, as time and availability of information permit.

11:15 ~~3:00~~ P.M. Adjourn 148th Meeting

**NOTE**:

- Presentation time should not exceed 50 percent of the total time allocated for a specific item. The remaining 50 percent of the time is reserved for discussion.
- Thirty-Five (35) copies of the presentation materials should be provided to the ACNW.
- ACNW meeting schedules are subject to change. Presentations may be canceled or rescheduled to another day. If such a change would result in significant inconvenience or hardship, be sure to verify the schedule with Mr. Howard Larson at 301-415-6805 between 8:00 a.m. and 4:00 p.m. prior to the meeting.

# ACNW BIOSPHERE WORKING GROUP
# FEBRUARY 24-25, 2004
# AGENDA
(REVISED 2/17/04)

[redacted]

(1) 8:00 – 8:10 am **Opening Statement (Open) (BJG/HJL)**
The ACNW Chairman will open the meeting and then turn control over to the Working Group Chairman.

**WORKING GROUP BIOSPHERE DOSE ASSESSMENTS FOR THE PROPOSED YUCCA MOUNTAIN HIGH-LEVEL WASTE REPOSITORY (OPEN)**

(2) 8:10 – 8:20 am **Greeting and Introductions (Open) (MTR/MPL)**
The Working Group Chairman who will state the objectives for this Working Group Session (WGS) and provide a technical session overview. Invited experts will also be introduced at this time. The invited experts include:

- Dr. Dade Moeller/Dade Moeller and Associates
- Dr. Jeffrey Daniels/Lawrence Livermore National Laboratory
- Dr. Keith Eckerman/Oak Ridge National Laboratory
- Dr. David Kocher/SENES Oak Ridge, Inc.
- Dr. John Till/Risk Assessment Corporation
- Dr. Michael Thorne/Mike Thorne and Associates (UK)

**WGS Purposes**
The purposes of this WGS are: (1) to increase the ACNW's technical knowledge of staff plans to develop and conduct biosphere dose assessment work for the proposed Yucca Mountain repository, (2) to understand NRC staff expectations for biosphere dose assessments, (3) to review examples of biosphere dose assessment work being planned, (4) to identify aspects of biosphere dose assessments that may warrant further study, and (5) to complement the previous WGS.

(3) 8:20 ~~8:50~~ 8:40 am **Keynote Presentation: What are the key issues in biosphere dose assessments. How do the assessments enhance confidence by estimating potential doses? (Open)**

3.1 Views on biosphere dose assessments will be presented by Dr. Dade Moeller/Chairman of the Board, Dade Moeller and Associates.

3.2 Discussion

(4) ~~8:50~~ 8:40 – 9:50 am **Introduction to Biosphere Dose Assessment, Framework and Process for U.S. Nuclear Regulatory Commission (NRC) Staff Review of a Potential Yucca Mountain License Application (Open)** (Compton) 8:40-9:

9:50 -

4.1 Presentation by a representative(s) of NRC's Office of Nuclear Material Safety and Safeguards' Division of Waste Management (DWM) on NRC's dose assessment requirements in 10 CFR Part 63 and the acceptance criteria in NUREG-1804 (the *Yucca Mountain Review Plan*) to be used to review DOE's dose assessment. [Swift]

4.2 Discussion

9:20 9:50
~~9:50~~ – 10:10am *** **BREAK** ***

(5) 10:10 – ~~11:10~~ 11:40 am **DOE Approach to Conducting Biosphere Dose Assessments for Yucca Mountain** (Open)

5.1 Presentation by a representative(s) from the U.S. Department of Energy (DOE) on the Department's overall approach to conducting the dose assessments called for in NRC's site-specific regulation for Yucca Mountain. [Rautenstrauch]

5.2 Discussion

(6) ~~11:40~~ 11:50 – ~~12:00~~ pm **Public Comments** (Open) Friehman

11:50
12:00 – 1:00 pm *** **LUNCH** ***

(7) 1:00 pm – ~~5:45~~ pm **Technical Session Discussions: Elements of a Biosphere Dose Assessment Program** (Open).
The two key areas of interest to the Working Group are environmental pathway analysis and metabolic models.

1:00 – 3:15 pm 7.1 **Environmental Pathway Analysis:** The first technical session will examine how humans might come into contact with radionuclides released from a potential geologic repository at Yucca Mountain. Participants will be asked to describe the principal exposure routes (pathways) through the local biosphere, and how they are being modeled. Principal food-chain, inhalation, and direct contact pathways will be discussed for 6 key radionuclides ($^{129}I$, $^{99}Tc$, $^{237}Np$, $^{241}Am$, $^{14}C$, and $^{239}Pu$).

1:45
1:00 – ~~1:00~~ pm 7.1.1 Presentation by a NRC DWM representative Lattante

1:45 2:45
~~1:00~~ – ~~2:00~~ pm 7.1.2 Presentation by a DOE representative Wasiolek

2:45 3:05
2:00 – ~~2:00~~ pm 7.1.3 Discussion

| | | | |
|---|---|---|---|
| ~~2:30 – 3:00~~ pm<br>3:05 3:20 | 7.1.4 | Public Comments None | |
| ~~3:00~~ – 3:15 pm | *** **BREAK** *** | | |
| ~~3:15 –~~ 5:15 pm<br>3:30 | 7.2 | **Metabolic Models:** The second technical session will examine the manner by which the human response to radionuclides is assessed. Participants will be asked to describe metabolic routes and exposure duration for each of the environmental pathways identified in Section 7.1 of this agenda. Again, the discussions will be in the context of the 5 key radionuclides of interest. | |
| 3:20<br>~~3:15~~ – 3:45 pm | 7.2.1 | Presentations by representative(s) from NRC's DWM and DOE [McKenney, Wasiolek] | |
| 4:25<br>3:45 – ~~4:45~~ pm | 7.2.2 | Discussion of Federal Guidance applicable to Yucca Mountain led by Dr. Keith Eckerman | |
| 4:45 4:50<br>~~4:45 – 5:15~~ pm | 7.2.3 | Discussion | |
| 4:50 5:00<br>~~5:15 – 5:45~~ pm | 7.2.4 | Public Comments [Treichel] | |
| ~~5:45~~ pm<br>5:00 | Adjourn Day 1 | | |

[redacted]

| | | | |
|---|---|---|---|
| (8) | 8:00 – 8:10 am | | **Opening Statement** (Open) (BJG)<br>The ACNW Chairman will open the meeting and turn it control of the meeting over to the Working Group Chairman. The Working Group Chairman will make some opening remarks regarding the conduct of the day's technical sessions. |

**WORKING GROUP BIOSPHERE DOSE ASSESSMENTS FOR THE PROPOSED YUCCA MOUNTAIN HIGH-LEVEL WASTE REPOSITORY – CONTINUED (OPEN)**

| | | | |
|---|---|---|---|
| (9) | 8:10 – 9:40 am | | **NRC's Risk Insights Initiative: Impact on Biosphere Dose Assessment Phase** (Open) (MTR/MPL)<br>NRC and DOE recently reached agreement on 293 additional information needs to be included in a potential Yucca Mountain License Application. These agreements were subsequently risk-ranked by the NRC staff. The intent of this agenda item is for WGS participants and stakeholders to understand what affect, if any, these agreements have had on respective staff approaches to biosphere dose assessments for Yucca Mountain. [Mr. Mauro] |
| | 8:10 – 8:40 am | 9.1.1 | Presentation by a NRC DWM representative |
| | 8:40 – 9:10 am | 9.1.2 | Discussion |
| | 9:10 – 9:40 am | 9.13 | Public Comments |

| | | |
|---|---|---|
| (10) | 9:40 – 10:10 am | **NRC's Office of Nuclear Regulatory Research (RE$) Perspective on Biosphere Dose Assessments** (Open) [Trotter] |
| | | 10.1.1 Presentation by an NRC RES representative |
| | | 10.1.2 Discussion |
| | | 10.1.3 Public Comments |
| | 10:10 – 10:25 am | *** **BREAK** *** |
| (11) | 10:25 – ~~11:25~~ 11:20 pm | **Presentations by Stakeholder Organizations** (Open). [Kozak] Upon request, representatives for stakeholder organizations may make a 10 minute presentation concerning the technical material presented during the WGS. Scheduled time: 10 minutes/stakeholder organization. Each presentation would be followed by a 10 minute discussion. |
| | ~~11:25 am – 12:30 pm~~ 11:20 – 1:00 | *** **LUNCH** *** |
| (12) | ~~12:30~~ 1:00 – 1:45 pm | **Working Group Roundtable Discussion** (Open). Includes closing comments and observations from the respective Working Group invited experts. Scheduled time: 10 minutes/expert. |
| (13) | 1:45 – 2:45 pm | **Panel and Committee Summary Discussion** (Open) |
| | 2:45 – 3:00 pm | *** **BREAK** *** |
| (14) | 3:00 – 3:30 pm | **Public Comments** (Open) |
| (14) | 3:30 – 3:45 pm | **Closing Comments by the Working Group Chairman** (Open) (MTR/MPL) |
| (16) | 3:45 – 4:45 pm | **Discussion of ACNW Letter Report** (Open) (MTR/MPL). Discussion of principal points in any future Letter Report to the Commission on results and observations from the ACNW Biosphere Dose Assessment Working Group. |
| | ~~4:45 pm~~ 5:05 | **Adjourn Day 2** |

## APPENDIX C: MEETING ATTENDEES

## 148TH ACNW MEETING
## FEBRUARY 24–27, 2004

### ACNW STAFF

John Larkins
Neil Coleman
Michele Kelton
Howard Larson
Michael Lee
Richard Major
Richard Savio

### ATTENDEES FROM THE NUCLEAR REGULATORY COMMISSION

### FEBRUARY 24, 2004

| | |
|---|---|
| B. Leslie | NMSS |
| P. Reed | RES |
| K. Compton | NMSS |
| T. McCartin | NMSS |
| J. Mitchell | RES |
| P. Justus | NMSS |
| C. McKenney | NMSS |
| A. Campbell | NMSS |
| C. Grossman | NMSS |
| C. Trottier | RES |
| A. Ridge | NMSS |
| D. Esh | NMSS |
| J. Rubenstone | NMSS |
| R. Codell | NMSS |
| M. Young | OGC |
| L. Hamdan | NMSS |
| T. Mo | RES |

### FEBRUARY 25, 2004

| | |
|---|---|
| T. McCartin | NMSS |
| P. Reed | NMSS |
| L. Hamdan | NMSS |
| B. Ibrahim | NMSS |
| P. Justun | NMSS |
| C. Trottier | RES |
| A. Ridge | NMSS |
| T. Nicholson | RES |

**APPENDIX C**
**148TH ACNW MEETING**
**FEBRUARY 24-27, 2004**

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

**FEBRUARY 25, 2004 (Cont'd)**

| | |
|---|---|
| J. Bradbury | NMSS |
| M. Young | OGC |
| H. Arlt | NMSS |
| A. Campbell | NMSS |
| M. Nataraja | NMSS |
| B. Leslie | |

**FEBRUARY 26, 2004**

| | |
|---|---|
| B. Leslie | NMSS |
| P. Justus | NMSS |
| M. Nataraja | NMSS |
| B. Jagannath | NMSS |

**FEBRUARY 27, 2004**

| | |
|---|---|
| T. Ahn | NMSS |
| L. Kokajko | NMSS |
| B. Leslie | NMSS |
| C. Hatchett | NMSS |
| P. Justus | NMSS |
| B. Ibrahim | NMSS |
| A. Campbell | NMSS |
| K. Stablein | NMSS |

**APPENDIX C**
**148TH ACNW MEETING**
**FEBRUARY 24-27, 2004**

## ATTENDEES FROM OTHER AGENCIES AND GENERAL PUBLIC

### FEBRUARY 24, 2004

| | |
|---|---|
| C. Hanlon | Department of Energy (DOE) |
| P. Swift | Bechtel SAIC Co. (BSC) |
| M. Wasiolek | BSC |
| E. von Tiesenhausen | Clark County |
| K. Rautenstrauch | BSC |
| N. Henderson | BSC |
| M. Thorne | State of Nevada |
| S. Frichman | State of Nevada |
| M. O'Mealia | Nevada |
| R. McCullum | Nuclear Energy Institute (NEI) |
| J. Shaffner | MTS-East |
| J. Treichel | Nevada Nuclear Waste Task Force |
| P. LaPlante | Center for Nuclear Waste Regulatory Analyses (CNWRA) |
| C. Fitzpatrick | Egan & Associates (Nevada) |
| B. Hoffman | Public Citizen |
| B. Cherry | Dade Moeller & Associates |
| S. Stiuglinski | Las Vegas Sun |
| D. Oakley | Florida State Univ. |
| V. Gilinsky | Self |
| M. Kozak | Monitor Scientific |

### via Telecom

| | |
|---|---|
| L. Howard | CNWRA |
| O. Povetko | CNWRA |
| R. Nes | CNWRA |
| R. Benke | CNWRA |
| S. Mohanty | CNWRA |
| B. Sagar | CNWRA |
| M. Smith | CNWRA |

**APPENDIX C**
**148TH ACNW MEETING**
**FEBRUARY 24-27, 2004**

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

### FEBRUARY 25, 2004

| | |
|---|---|
| C. Hanlon | DOE |
| S. Frishman | State of Nevada |
| J. Treichel | Nevada Nuclear Waste Task Force |
| N. Henderson | BSC |
| E. von Tiesenhausen | Clark County |
| P. LaPlante | CNWRA |
| D. Oakley | Florida State Univ. |
| R. McCullum | NEI |
| D. Fehringer | Nuclear Waste Technical Review Board |
| P. Swift | BSC |
| C. Fitzpatrick | Egan & Associates (Nevada) |
| J. Shaffner | MTS-East |
| M. Kozak | Monitor Scientific |
| B. Cherry | Dade Moeller & Associates |
| V. Gilinsky | Self |
| M. Wasiolek | BSC |

### FEBRUARY 26, 2004

| | |
|---|---|
| C. Hanlon | DOE |

### FEBRUARY 27, 2004

| | |
|---|---|
| E. von Tiesenhausen | Clark County |
| J. York | BSC |
| C. Hanlon | DOE |
| R. McCullum | NEI |
| N. Henderson | BSC |
| J. Shaffner | MTS-East |
| H. Thompson | Talisman Int'l |

## APPENDIX D: FUTURE AGENDA

The Committee approved the following topics for discussion during its 149th meeting, scheduled for April 20–22, 2004:

- Update on West Valley and Its Performance Assessment Plans
- Risk-Informed Regulatory Activities of the Office of Nuclear Material Safety and Safeguards (NMSS)
- Environmental Protection Agency, Regulation 40 CFR, Chapter 1, Advance Notice of Proposed Rulemaking, "Approaches to An Integrated Framework for Management and Disposal of Low-Activity Radioactive Waste"
- DOE Schedule for Responses to KTI Agreements
- Division of Waste Management (DWM) Evaluation of DOE Bundling Approach
- Preparation of ACNW Reports on:
  - Risk Insights Report
  - DWM Evaluation of DOE Bundling Approach
  - Risk-Informed Regulation for NMSS Activities
  - Public Interactions During November 2003 Nevada Field Trip
  - Biosphere Working Group Session
  - West Valley Performance Assessment Plans
  - ACNW Annual Report on Waste-Management-Related Research

## APPENDIX E
## 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 |
|---|---|
| | **WORKING GROUP: BIOSPHERE DOSE ASSESSMENTS FOR THE PROPOSED YUCCA MOUNTAIN HIGH-LEVEL WASTE REPOSITORY** |
| 3 | **Keynote Presentation: What are the key issues in Biosphere Dose Assessments? How do the assessments enhance confidence by estimating potential doses?** |
| | 1. ACNW Working Group Meeting, presented by Dade W. Moeller, Chair, Science & Technology Review Panel, Office of Civilian Radioactive Waste Management, U.S. Department of Energy **[Viewgraphs]** |
| 4 | **Introduction to Biosphere Dose Assessment: NRC Staff Expectations Regarding Content of Potential Yucca Mountain License Application** |
| | 2. Introduction to Biosphere Dose Assessment: Framework and Process for NRC Staff Review of a Potential Yucca Mountain License Application, presented by Keith Compton, DWM, NRC **[Viewgraphs]** |
| 5 | **DOE Approach to Conducting Biosphere Dose Assessments for Yucca Mountain** |
| | 3. Overview of the U.S. Department of Energy Total System Performance Assessment Model, presented by Peter Swift, Manager, Performance Assessment Strategy and Scope, Bechtel SAIC Company, LLC **[Viewgraphs]** |
| | 4. Yucca Mountain Biosphere Model for Postclosure Performance, Assessment, presented by Kurt Rautenstrauch, Bechtel SAIC Company, LLC **[Viewgraphs]** |
| 7 | **Technical Session Discussions: Elements of a Biosphere Dose Assessment Program** |
| | 5. Overview of Biosphere Pathway Analyses Supporting NRC Pre-licensing Activities, presented by Patrick LaPlante, CNWRA **[Viewgraphs]** |

6. Environmental Transport and Receptor Exposure Pathways for the Biosphere Model, presented by Maryla Wasiolek, Biosphere Department, Bechtel SAIC Company, LLC **[Viewgraphs]**

7. Disimetry and Metabolic Models, presented by Christepher McKenney, DWM, NRC **[Viewgraphs]**

8. Metabolic Models, presented by Maryla Wasiolek, Biosphere Department, Bechtel SAIC Company, LLC **[Viewgraphs]**

9. Federal Guidance, presented by Keith F. Eckerman, Oak Ridge National Laboratory **[Viewgraphs]**

9 **NRC's Risk Insights Initiative: Impact on Biosphere Dose Assessment Plans**

10. Risk Insights for Biosphere, presented by Patrick LaPlante, CNWRA **[Viewgraphs]**

10 **Presentation by Stakeholder Organizations**

11. Summary of Electric Power Research Institute Evaluations of the Yucca Mountain Biosphere, presented by John Kessler, EPRI **[Viewgraphs]**

11 **NRC's Office of Nuclear Regulatory Research Perspective on Biosphere Dose Assessments**

12. Biosphere Research: Food Chain Pathways, presented by Cheryl Trottier, Chief, Radiation Protection, Environmental Risk, and Waste Management Branch, Division of Systems Analysis and Regulatory Effectiveness, RES **[Viewgraphs]**

22 **RISK INSIGHTS REPORT**

13. Status of HLW Risk Insights Initiative, presented by James Danna, DWM, NRC **[Viewgraphs]**

23 **REPORT ON KEY TECHNICAL ISSUE STATUS AND DIVISION OF WASTE MANAGEMENT EVALUATION OF DOE'S BUNDLING APPROACH**

14. Issue Resolution, presented by Gregory Hatchett, DWM, NRC **[Viewgraphs]**

## MEETING NOTEBOOK CONTENTS

| TAB NUMBER | DOCUMENTS |
|---|---|
| | **Opening Statement by ACNW Chairman** |
| | 1. Agenda, 148th ACNW Meeting, February 24–27, 2004, dated January 23, 2004 |
| | 2. Color Code - 148th ACNW Meeting |
| | 3. Introductory Statement by ACNW Chairman, Tuesday, February 24, 2004, undated |
| | 4. Items of Interest for 148th ACNW Meeting, undated |
| | 5. Introductory Statement by ACNW Chairman, Wednesday, February 25, 2004, undated |
| | 6. Introductory Statement by ACNW Chairman, Thursday, February 26, 2004, undated |
| | 7. Introductory Statement by ACNW Chairman, Friday, February 27, 2004, undated |
| 2-16 | **Working Group: Biosphere Dose Assessments for the Proposed Yucca Mountain High-Level Waste Repository** |
| | 1. Status Report<br>• Attachments:<br>1. Agenda<br>2. Biosphere Working Group Panel of Invited Experts<br>3. Part 63 - Disposal of High-Level Radioactive Wastes in a Geologic Repository At Yucca Mountain, Subpart L - Preclosure Public Health and Environmental Standards (selected portions) |
| 18 | **Waste Management-Related Safety Research Report** |
| | 2. Status Report<br>3. Proposed Agenda for Meeting With Mike Ryan and Ruth Weiner on February 17-18, 2004, at the Center for Nuclear Waste Regulatory Analyses |

## MEETING NOTEBOOK CONTENTS


| TAB NUMBER | DOCUMENTS | |
|---|---|---|
| 22 | **Risk Insights Report** | |
| | 4. | Status Report |
| 23 | **Report on Key Technical Issue Status and Division of Waste Management Evaluation of DOE's Bundling Approach** | |
| | 5. | Current Agreement Status as Reported by the Division of Waste Management |