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

December 1, 2006

MEMORANDUM TO: ACNW Members
ACNW Staff

FROM: Michele S. Kelton
Technical Secretary, ACNW

SUBJECT: CERTIFIED MINUTES OF THE 173RD MEETING OF THE ADVISORY COMMITTEE ON NUCLEAR WASTE (ACNW) SEPTEMBER 18–21, 2006

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

Attachment:
Certified Minutes of the173rd Meeting
September 18–21, 2006

cc: A. Bates, SECY (O-16C1)
S. Jones, NMSS (T-8A23)
B. Sosa, EDO (O-16E15)

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

MEMORANDUM TO: Antonio Dias, Team Lead
Advisory Committee on Nuclear Waste

FROM: Michael T. Ryan, Chairman
Advisory Committee on Nuclear Waste

SUBJECT: PROPOSED MINUTES OF THE 173RD MEETING OF THE ADVISORY COMMITTEE ON NUCLEAR WASTE (ACNW) SEPTEMBER 18–21, 2006

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:

Michael T. Ryan, Chairman

Date 12/1/06

(1) Minutes of the 173rd Meeting of the ACNW held September 18–21, 2006, dated December 1, 2006

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

December 1, 2006

MEMORANDUM TO: Michael T. Ryan, Chairman
Advisory Committee on Nuclear Waste

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

SUBJECT: PROPOSED MINUTES OF THE 173RD MEETING OF THE ADVISORY COMMITTEE ON NUCLEAR WASTE (ACNW) SEPTEMBER 18–21, 2006

Enclosed are the proposed minutes of the 173rd meeting of the ACNW. This draft is being provided to give you an opportunity to review the record of this meeting and provide comments. Your comments will be incorporated into the final certified set of minutes as appropriate. Please provide your corrections and comments to me.

Please note that these minutes are being issued in two parts: (1) main body (working copy form) and (2) appendices. The appendices are being sent only to those members who have requested them.

A copy of the certified minutes with appendices will be forwarded to each member.

Enclosure: As stated

cc w/o Encl. 2: ACNW Members
ACNW Staff

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Appendices

CERTIFIED
12/1/2006
By MICHAEL T. RYAN

Issued: 12/01/06

CERTIFIED MINUTES OF THE 173RD MEETING OF THE ADVISORY COMMITTEE ON NUCLEAR WASTE SEPTEMBER 18-21, 2006

The U.S. Nuclear Regulatory Commission (NRC) Advisory Committee on Nuclear Waste (ACNW or the Committee) held its 173rd meeting on September 18–21, 2006, at One White Flint North, 11555 Rockville Pike, Rockville, Maryland. The ACNW published a notice of this meeting in the *Federal Register* on September 8, 2006 (71 FR 53137) (see Appendix A). This meeting served as a forum for attendees to discuss and take appropriate action on agenda items (see Appendix B). The entire meeting was open to the public.

A transcript of selected parts 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 Company, Inc.,1323 Rhode Island Avenue, NW, Washington, DC 20005. At no cost, members of the public may download transcrip ts from, or review them on, the Internet at http://www.nrc.gov/reading-rm/doc-collections/acnw/tr/ at no cost.

ACNW members Dr. Michael T. Ryan (ACNW Chairman), Mr. Allen G. Croff (ACNW Vice Chairman), Dr. James H. Clarke, Dr. William J. Hinze, and Dr. Ruth Weiner attended this meeting. Appendix C includes a list of other attendees.

I. CHAIRMAN'S REPORT (OPEN)

[Dr. Antonio Dias was the Designated Federal Official for this part of the meeting.]

Dr. Ryan, ACNW Chairman, convened the meeting at 10:00 a.m. and briefly reviewed the agenda. He noted that the meeting was being conducted in conformance with the Federal Advisory Committee Act. Dr. Ryan asked members of the public who were present and wished to address the Committee to inform the ACNW staff so that time could be allocated for them to speak. Mr. Theodore Rockwell from Radiation, Science & Health, Inc., received time to present his comments on the use of linear-no-threshold (LNT) approach when predicting the effects of low dose radiation.

II. OBSERVATIONS FROM ACNW MEMBERS AND STAFF ON RECENT ACTIVITIES (OPEN)

[Dr. Antonio Dias was the Designated Federal Official for this part of the meeting.]

Visit at Crow Butte In Situ Leach Facility in Nebraska

Dr. Weiner briefly summarized the field trip to the Crow Butte In Situ Uranium Leach Facility. Dr. Hinze and ACNW staff member Dr. Latif Hamdan also participated in the trip. A trip report for this visit is now publicly available as an NRC document.

Attendance at the U.S. Department of Energy Workshop on Low Dose Radiation Research Program

Dr. Ryan summarized his impressions based on attending the U.S. Department of Energy DOE workshop. ACNW staff member Mr. Neil Coleman also attended the workshop. A trip report for this meeting was prepared.

Attendance at the International Commission on Radiological Protection Workshop

Dr. Ryan summarized his impressions based on attending the International Commission on Radiological Protection (ICRP) workshop. Mr. Coleman also attended this workshop. The main workshop objectives were to (1) evaluate and discuss the latest draft ICRP recommendations, (2) discuss how proposed ICRP recommendations can best meet the health and safety needs of national and international radiological protection, (3) continue the open and broad dialogue among stakeholders to reach a common level of understanding about the issues at stake, and (4) contribute positively and constructively to the evolution of new ICRP recommendations.

III. ACNW WORKING GROUP MEETING ON USING MONITORING TO BUILD CONFIDENCE IN MODELS (OPEN)

[Mr. Latif Hamdan was the Designated Federal Official for this part of the meeting.]

The ACNW held a 2-day working group meeting on using monitoring to build confidence in models. The ACNW organized the working group meeting in collaboration with staff from the NRC Office of Nuclear Regulatory Research. Invited outside experts and NRC staff members from the Office of Nuclear Material Safety and Safeguards made formal presentations.

The working group meeting was held to obtain information and views from invited experts and NRC staff on using monitoring to enhance confidence in models and modeling results. The working group evaluated the use of monitoring, not only to demonstrate regulatory compliance, but also to build confidence in the conceptual and mathematical models employed to predict the performance of engineered systems and to track the transport and fate of radionuclides and hazardous chemicals that might be released to the environment. This work will support monitoring and modeling activities and risk-informed decision making in the licensing process for nuclear materials and wastes. More specifically, the working group meeting will support action on a Commission request that the Committee work with the NRC staff to identify and

assess methods of monitoring for compliance and to identify possible enhancements for increasing confidence in the validity of associated analytical models.

Meeting Overview

The working group meeting included four sessions that addressed (1) role of models and monitoring programs in licensing, (2) evaluation of radionuclide releases and groundwater contamination (case studies), (3) field experience and insights, and (4) opportunities for integrating modeling and monitoring. The following paragraphs discuss the individual sessions.

Session 1: Role of models and monitoring programs in licensing. This session focused on examining practitioners' use of models and monitoring programs in different regulatory contexts. The session included six formal presentations followed by a panel discussion and a question-and-comment session. The formal presentations addressed the three main topics discussed below.

(1) Two invited experts addressed the licensee perspective on the role of models and monitoring in demonstrating compliance with licensing criteria.

Vernon Ichimura, Energy Solutions–Duratek–Chem-Nuclear Systems. Mr. Ichimura discussed monitoring and modeling activities at the low-level radioactive waste (LLW) disposal facility in Barnwell, South Carolina. The Barnwell site has been in operation since 1969 and disposes of Classes A, B, and C LLW. It serves the Southeast LLW Compact (South Carolina, Connecticut, and New Jersey) as well as other LLW generators throughout the country. Two state authorities regulate the Barnwell facility. The South Carolina Budget Control Board, a State Public Service Commission, establishes the fees that the Barnwell facility can charge generators for disposal services. The South Carolina Department of Health and Environmental Control (DHEC) oversees public health and safety as well as the environment. South Carolina is an NRC Agreement State and its LLW regulations are consistent with those of the NRC, (as published in Title 10, Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste," of the *Code of Federal Regulations*). These regulations detail requirements for environmental monitoring during disposal operations.

Mr. Ichimura discussed the Barnwell site and current operations, DHEC environmental regulations, and environmental monitoring programs in place to satisfy the regulations. The DHEC regulations include requirements to protect both workers and members of the public. Consistent with DHEC requirements, Barnwell has an all-pathways monitoring program both on and off site to ensure that releases (and consequent doses) at the compliance points fall within acceptable limits for air, surface soil, surface water, and groundwater. The monitoring program includes about 10,000 measurements annually, some at distances as far as 6 miles from the disposal site, and calculates the dose by relying on commercially available deterministic models. Modeling results are validated against actual field measurements, and the models are adjusted as necessary.

Mr. Ichimura discussed waste disposal practices that are used to minimize potential radioactive material releases and doses. He indicated that real doses to workers in 2005 averaged 241 millirem (mrem) and that the hypothetical dose to an average member of the public at the site boundary (compliance point) via the surface water/groundwater pathway was less than 5 mrem.

David Scott, Radiation Safety & Control Services, Inc. Mr. Scott discussed groundwater monitoring associated with license termination activities at the Yankee Rowe commercial nuclear power station near Rowe, Massachusetts. The Yankee Rowe facility is a pressurized water reactor that operated from 1960 to 1992, when it ceased operations and sought termination of its NRC operating license.

Mr. Scott discussed the operational history of the Yankee Rowe facility, groundwater contamination events, criteria for license termination, and groundwater monitoring activities. He indicated that before 1963, groundwater monitoring was achieved by using privately owned wells adjacent to the Yankee Rowe site, but a total of 34 monitoring wells were constructed between 1993 and 1999. He also noted that the monitoring program includes the plant potable water well and a surface spring. He indicated that the monitoring points were sampled periodically and analyzed for tritium, gamma emitters, and chemical constituents, and, in one round of analysis, for strontium-90. Mr. Scott reported the monitoring has resulted in the identification of a tritium plume with a maximum concentration of 5000 pico-curies per liter that extends downgradient from the spent fuel pool (SFP) and the ion exchange pit.

Mr. Scott discussed additional and more comprehensive groundwater monitoring programs that were instituted in 2003, as well as groundwater investigations in 2004 and 2006. He indicated that the 2003 monitoring program included the installation of 17 additional wells that sample multiple aquifers to a maximum depth of 295 feet and resulted in the identification of several tritium plumes in a shallow aquifer, deeper sand lenses, and the bedrock. Additional drilling included 10 wells in 2004 and 17 wells in 2006. Groundwater monitoring and investigations indicate that tritium is the only plant-related radionuclide identified in the groundwater, and a numerical fate and transport computer model currently under development is using the results of the groundwater investigations. When describing this work, he expressed the view that the groundwater monitoring programs required by the NRC for licensed nuclear power reactors were insufficient to support the development of contaminant fate and transport models and the acquisition of long-term hydrogeologic data that might be needed for license termination activities.

Mr. Scott discussed some lessons learned, including useful information that monitoring can provide, and offered suggestions to involve all stakeholders, analyze a wide suite of radionuclides, and include nonradioactive constituents for site closure.

(2) Two members of the NRC staff addressed the regulator's perspective on the use of models and monitoring in decisionmaking for decommissioning.

James Shepherd, NRC Staff. Mr. Shepherd is a senior project manager in the Reactor Decommissioning Section of the NRC Division of Waste Management and Environmental Protection (DWMEP). He discussed three-dimensional (3-D) model capabilities including examples for decommissioning and other applications. He indicated that the NRC staff members have relied on the use of 3-D hydrogeologic models in the past to support regulatory decisionmaking related to the decommissioning of materials licensee sites as well as the regulation of uranium mill tailing sites. He reported the use of stratigraphic and other hydrogeologic data to develop groundwater contaminant models, employing EarthVision® computer software. He discussed two examples (decommissioning actions at Kiski Valley, Ohio, and Big Rock, Michigan) in which the staff used 3-D models and EarthVision® software to support its reviews. He noted that the use of 3-D models in the decommissioning reviews of

both sites favorably benefitted both the licensee and the NRC staff without compromising public health and safety.

Mr. Shepherd observed that the use of 3-D models to evaluate contaminant fate and transport phenomena is more insightful than the application of two-dimensional (2-D) models, or the inspection of tabulated monitoring data. He discussed key advantages of 3-D models, including the ability to visually display data and to analyze variations in plume characteristics in time and space. He also identified other uses of models, including support for placement of wells for compliance monitoring and remedial actions to control contaminant migration, determination of material volumes for excavation or pump-and-treat (and associated costs) and other uses.

Mr. Shepherd concluded that 3-D modeling enables the staff to use state-of-the-art geographic information system tools and techniques, facilitates timely decommissioning at existing sites, and provides an effective visualization tool.

Mark Thaggard, NRC Staff. Mr. Thaggard, branch chief of the DWMEP Performance Assessment Branch, detailed the limitations of integrating monitoring and modeling in the context of decommissioning. He described the NRC decommissioning requirements for both unrestricted and restricted release and noted other information concerning the NRC decommissioning program. He indicated that monitoring is used to define hydrologic parameters and to gain insights into the likelihood that contaminants will reach the water table. He noted limitations on the monitoring information that is available (or can be obtained during decommissioning) and limitations associated with integrating groundwater monitoring and modeling activities for decommissioning.

Mr. Thaggard indicated that the primary tools used in decommissioning are screening analyses employing screening tables and the RESRAD code. He described the underlying concepts for the RESRAD code as well as site-specific data needed to run the code. He explained that the NRC decommissions about 300 sites each year and that the vast majority of the sites are mostly buildings and pose no environmental contamination issues. He noted that an assessment of no groundwater contamination requires verification by monitoring. He observed that a limited number of sites are known to have groundwater contamination and that the NRC is considering restricted release at only two sites.

Mr. Thaggard stated that screening analyses would be insufficient if the staff has information suggesting that groundwater is contaminated at a site or that the licensed site would be released subject to some land-use restrictions. In such cases, a more complicated (sophisticated) analysis is necessary. However, he noted that modeling of contaminant fate and transport phenomena can be problematic, in such cases for the following reasons:

- The location of any existing legacy groundwater monitoring wells is usually not optimal to permit the evaluation of contaminant plumes. Hence, such wells likely will provide little relevant information.

- Any existing legacy groundwater monitoring data typically cover a limited period of time and usually are not contemporaneous with the generation and movement of a contaminant plume.

- The timing of the on set time of initial groundwater contamination is usually not known with any degree of precision. Consequently, the modeling of contaminant fate and transport phenomena is somewhat of a forensic exercise and thus can be a hit and miss.

- Once a contaminant plume is detected experts usually must conduct a substantial amount of site characterization to permit the creation of a useful baseline hydrogeologic model that can be employed to study contaminant fate and transport phenomena.

Mr. Thaggard noted that, because of necessity and practicality, the numerical modeling of groundwater systems typically represents an oversimplification of physical reality, so the models contain numerous simplifying assumptions.

(3) An invited expert and an NRC staff member addressed the role of monitoring in performance assessment evaluations.

Matt Kozak/Monitor Scientific, LLC. Mr. Kozak focused on groundwater monitoring issues in the context of performance assessments. He noted that performance assessments are prospective and forward-looking, include the modeling of contaminant fate and transport phenomena in the geosphere as well as the behavior of engineered or other artificially created barriers, and are based on predictive models that require considerable time and money to construct.

Mr. Kozak noted that there is difference between data collection to determine the values of independent model variables and monitoring to measure and validate dependent variables (model results). He explained that, from a performance assessment perspective, collecting baseline data for a site as part of site characterization is not the same as monitoring and data collection associated with evaluating long-term performance at the site.

Mr. Kozak stated that site-specific data collection is an integral and necessary part of the modeling effort, but monitoring (as he defined it) is of little or no technical value for both new and existing facilities. He reported that, from a technical viewpoint, monitoring at proposed new facilities is irrelevant and of little value to decisionmakers. He explained that the long timeframes of regulatory concern, prevent practitioners from observing the outcome of a performance assessment model because the consequences of interest (i.e., the integrated behavior of the total system) occur very far into the future. He noted that, if the containment systems perform as intended, the engineered features of the facilities will isolate the waste for decades or even hundreds of years before contaminants enter the geosphere. In this case, decisionmakers will have limited utilization of groundwater monitoring programs because the hydrogeologic phenomena of interest occur at time spans that exceed the duration of licensed activity. The monitoring data could be useful to augment the data collection network and reduce the public perception of associated risk, but that such data do not address any specific technical need.

Mr. Kozak noted that monitoring data are also of limited utility at existing/operating facilities. He explained that negatives do not provide confidence because of the great potential for false negatives; false positives pose significant issues; and that the interpretation of true positives requires caution, but political and social pressures can overwhelm such caution.

Mr. Kozak concluded that all knowledge about a facility is useful; the design of monitoring programs should focus monitoring and data collection; and practitioners should treat monitoring results (negative or positive) carefully.

David Esh, NRC Staff. Mr. Esh is a senior systems performance analyst in the DWMEP Performance Assessment Branch. He discussed the challenges that groundwater monitoring programs face in the context of evaluating the performance of waste disposal systems. He indicated that monitoring plans not only need to satisfy regulatory requirements for characterizing environmental concentrations, but also should confirm performance assessment conceptual models, recognize the spatial and temporal challenges, and design monitoring into the system (e.g., conservative species and dyes). He explained the use of performance assessments to demonstrate compliance with dose criteria and noted that performance assessments may adopt conservatism to manage uncertainty. Mr. Esh also noted that model support is essential to regulatory decisionmaking. He added that a variety of approaches can build confidence in performance assessment results and that compliance monitoring should rely on supplements such as monitoring performance indicators of both natural and engineered systems.

Mr. Esh indicated the usefulness of performance indicators in confirming the conceptual representation of the system. He noted the need for caution to ensure that monitoring does not introduce pathways for water or contaminants and to interpret the monitoring results, which will likely be uncertain and possibly complex. He also noted that the confirmation should be based on verifying the conceptual representation of the system, not matching numbers.

Following the formal presentations, past ACNW member and Chairman George Hornberger from the University of Virginia, moderated a panel discussion, and ACNW member Dr. Clarke moderated a question-and-comment session. (Dr. Hornberger, who is also a member of the U.S. Nuclear Waste Technical Review Board, NWTRB, noted during the meeting that he was expressing his own views not those of the NWTRB). Panelists included the session speakers and Mr. Eric Darois representing the Electric Power Research Institute. These discussions addressed questions pertaining to impediments to translating some research ideas into practices useful to regulators or the industry, the iterative nature of the modeling/monitoring process, sampling procedures, lessons learned, involvement of Agreement States in the decommissioning of contaminated sites, elimination of compliance monitoring if uncertainty can be reduced sufficiently, period of compliance, and point of compliance locations.

Session 2: Evaluation of radionuclide releases and groundwater contamination (case studies). This session included five formal presentations by invited experts, followed by a panel discussion and a question-and-comment session.

Michael Fayer, Pacific Northwest National Laboratory (PNNL). Mr. Fayer discussed contaminant transport considerations at the DOE Hanford site. He recommended expanding the definition of compliance monitoring and renaming it as compliance assessment, assigning a compliance assessment owner, conducting regular external peer reviews, and including entry portals for new data of scientific, legal, and public interests. He indicated that a complex relationship of site-specific and contaminant-specific features, events, and processes governs contaminant transport in the subsurface environment and that the key to understanding, monitoring, and predicting contaminant transport lies in recognizing and addressing this complexity. Mr. Fayer also discussed site-specific examples of the difficulties encountered at the Hanford site, including insufficient early characterization, untested monitoring system,

changing flow conditions over time, uncertainty about the inventory of existing contamination and contaminant source location, complex subsurface conditions, and sometimes unintended consequences.

Brian Looney, Savannah River National Laboratory (SRNL). Mr. Looney described the detection, characterization, and delineation of subsurface contaminant plumes. He stated that remediation strategies for metals and radionuclides are limited to two broad categories: stabilization and extraction, and that biological processes can support various remediation processes. He added that monitoring for radionuclides might benefit from using an expanded view and from considering alternative phases for sampling and analysis. He noted that direct monitoring of the gas phase is reliable and inexpensive.

Mr. Looney discussed the anatomy of a contaminated site and associated site treatment and remediation, giving examples of subsurface contaminated plumes at several sites, including the Savannah River site, High Flux Beam Reactor (HFBR) at the Brookhaven National Laboratory (BNL) site, and the Hanford site. He also described monitoring, including the use of early warning monitoring systems, plume geometry, nonstandard approaches such as gas phase monitoring and geophysical methods, and site geochemistry. He noted that case studies suggest that gas phase monitoring might complement other methods for the cost-effective monitoring of metals and radionuclides. He explained that gases can be monitored directly (e.g., tritium, mercury, radon, carbon-14), or indirectly by tracking diagenetic and contaminant indicator gases such as decay products of contaminants (e.g, radon 222 for uranium and radon 220 or 222 for thorium), or by assessing contaminant mineral stability using diagnostic gases.

Tom Burke and Mike Hauptman, BNL. Mr. Burke and Mr. Hauptman discussed tritium investigation and remediation near the HFBR facility. They discussed the reactor history and indicated that tritium was discovered in groundwater downgradient from the reactor in 1996, and the source was the SFP. They described the tritium plume and remediation approach, which includes iterative monitoring and modeling and consists of three systems specifically the pump and recharge at the leading edge of the plume, low-flow pumping near the reactor, and monitored natural attenuation of the entire plume. They noted the design and operation of individual systems, including modeling and monitoring activities, and reported remediation results and lessons learned to date.

Mr. Burke and Mr. Hauptman explained that the reactor closed in 1999, and remediation of the tritium plume and the SFP are being performed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). They noted that BNL is a CERCLA (Superfund) site and has 30 areas of concern grouped into 7 operable units or study areas. They indicated that groundwater contamination at BNL includes volatile organic compounds, tritium, and strontium and that the initial site characterization involved well drilling, sampling, and groundwater modeling. They said that groundwater monitoring is conducted in a network of 159 wells that are also augmented by temporary wells.

Steve Yabusaki, PNNL. Mr. Yabusaki addressed uranium reactive transport in a vadoze-zone-aquifer river system. He described the operational history of process ponds at the Hanford 300 area, and underground uranium contamination including uranium plumes. He discussed flow and transport in the vadose zone, aquifer, and river system, including the mixing zone and differences in solution chemistry. He identified as key issues (1) uranium leaching from contaminated vadose zone sediments by water table fluctuations and (2) changing uranium

geochemistry during mixing of groundwater and river water. He added that interactions between the river and the sediments combined with spatial variability of uranium to create more complex conditions than previous models had assumed. He also observed that using a constant value for the distribution coefficient for uranium is not consistent with experimental observations, as uranium sorption varies strongly with the transition between aquifer and river water chemistries.

Mr. Yabusaki also discussed modeling and geophysical studies at Hanford, noting that modeling and geophysics can add value. He reported that analyses at Hanford have included uranium batch studies and modeling of uranium reactions, uranium column studies, and field-based reactive transport modeling, including one-dimensional models that simulate unsaturated reactive transport and aquifer-river interactions. He described geophysical studies at Hanford, including surface resistivity and spontaneous potential profiles and grid surveys. He also addressed work in progress at Hanford including sediment coring and geophysical logging to map uranium distribution, laboratory studies to analyze uranium mobility, and field studies to identify large-scale transport context and understand uranium fate.

Vernon Ichimura, Energy Solutions--Duratek--Chem-Nuclear Systems. Mr. Ichimura gave an overview of work activities that have been undertaken in support of the Barnwell LLW disposal site over many years. He discussed groundwater flow and transport modeling work and other activities, including the development of a prelicense conceptual burial model, a prelicense safety analysis that was rooted in assumptions, a 1982 site characterization based on observations and measurements, a 3-D finite difference regional flow model calibrated to measured parameter values, a 1982 environmental assessment that included 2-D flow and transport models, and a 2003 performance verification report based on both modeling and measurements. He also noted that the Barnwell site has more than 400 sampling locations and a long monitoring record of approximately 25 years.

Mr. Ichimura described recently completed modeling activities, with a focus on demonstrating compliance with the standards for protection of groundwater and surface water. He described a 3-D model that was used to calculate the dose to a hypothetical user of groundwater from radionuclide releases from the Barnwell site for 2000 years. He explained that this model was calibrated to several measured parameter values including hydraulic properties, average groundwater elevations, stream flow rate, pond falling head rates, radionuclide (tritium) arrival and location, and maximum tritium and carbon-14 concentrations. He indicated that the model showed that the dose would be small, and that tritium and carbon-14 are the most important contaminants while iodine-129 and technetium-99 are small dose contributors.

After the formal presentation, Dr. George Hornberger moderated a panel discussion, and ACNW member Dr. Clarke moderated a question-and-comment session. These discussions addressed issues pertaining to recommendations on methods for improving the integration of compliance operations, monitoring programs and modeling to increase confidence in model results for NRC licensed facilities; uranium contamination in the Columbia River from the Hanford site; sampling accuracy and techniques; new monitoring procedures; differing professional viewpoints; and tritium leaks.

Session 3: Field experience and insights. This session included six formal presentations by invited experts, followed by a panel discussion and a question-and-answer session.

Brian Andraski, U.S. Geological Survey (USGS). Mr. Andraski discussed integrating environmental monitoring and modeling to refine unsaturated-zone models at the USGS Amargosa Desert Research Site in Nevada. He explained that the research was field intensive, with multiple lines of data collected to test and refine the conceptual and numerical models for the Beatty, Nevada, LLW and radioactive and hazardous waste disposal facility. Monitored and modeled constraints included tritium and elemental mercury (Hg^0) as well as volatile organic compounds. Several phases of modeling were conducted to improve understanding of the processes controlling the movement of water and constituents in an arid environment. The work confirmed that tritium migration was predominantly lateral and affected by a gas-phase transport mechanism along preferential pathways, and that mercury was moving by the same mechanism. The modeling did not accurately reproduce measured movement of tritium in the unsaturated zone, although the results were improved after taking into account anisotropy, source temperature, and pressure.

Mr. Andraski provided some theories on other processes that might be modeled to improve the correlation between the modeled and actual movement of gas-phase transport of constituents.

Van Price, Advanced Environmental Solutions, LLC. Mr. Price provided an overview of a draft strategy that he said was developed under an NRC project to provide logic and guidance for groundwater monitoring at NRC-licensed sites. He indicated that the strategy focused on performance confirmation monitoring, and involved integrating groundwater monitoring and modeling to improve nuclear facility site performance. He noted that the strategy is currently in the testing phase.

Mr. Price discussed the strategy's several components, including a systems analysis of the facility/site (characterization, conceptual model, performance model), monitoring (performance indicators, devices, and locations), a database of technologies and issues, data collection and analysis, and a feedback process. Mr. Price also discussed observations from an application of the strategy to the DOE Savannah River Site in South Carolina, where data from monitoring could be used to refine models, and modeling results can be used to select monitor well locations.

Mr. Price noted differences between site characterization and monitoring, presented an overview of modeling evolution over time, and discussed the connection between modeling and monitoring. He observed that the concept of a model is much more than just a computer simulation of flow and transport and that models can also be used as tools for data management, visualization, and communication. He indicated that groundwater flow and transport models and monitoring activities can be integrated in near real time at a reasonable cost, that monitoring of performance indicators can detect off-normal conditions before they become serious problems, and that currently available software can provide powerful tools for management review and stakeholder communication.

Robert Ford, U.S. Environmental Protection Agency (EPA), Groundwater and Ecosystems Restoration Division. Mr. Ford discussed site characterization to support the development of groundwater contaminant transport models. He emphasized the importance of the chemical and physical constraints that determine the accuracy of conceptual and predictive models for particular sites and explained techniques for site characterization based on such limitations. He also discussed questions and data needed to prepare input for reactive transport models; site characterization, including defining hydrogeologic "goals", identifying contaminant transport pathways, and establishing monitoring networks; optimal well placement/location; characterization of site biogeochemistry, including reaction mechanisms, data collection needs, and sample collection and analysis procedures; behavior of "dissolving" contaminant plumes; and the importance of proper sample collection. He noted the importance of proper plume delineation, especially for multiple contaminants that travel at different rates, which he said was a problem at many hazardous waste cleanup sites. He also introduced some modeling tools used at the EPA to support monitoring at hazardous waste sites.

Craig Benson, University of Wisconsin–Madison. Mr. Benson described the hydrologic modeling and monitoring of landfill sites. He addressed two questions relevant to cover hydrology, especially the accuracy of numerical models and techniques for improving model predictions using field data. He stated that model results must be compared with field data, use measured properties as input to the maximum extent possible, and match boundary conditions.

Mr. Benson presented information on the results of the Alternative Cover Assessment Program (ACAP), an almost full-scale experiment conducted to evaluate four models commonly used in simulating cover hydrology (HYDRUS-2D, LEACHM, UNSAT-H and Vadose/W). The evaluation of the models used the same sets of field-measured site data on meteorology, vegetation properties, and hydraulic properties of two cover systems made especially for the study, and the same boundary conditions. The models produced four distinctly different results. Closer simulations were achieved when taking into account pedogenic effects on the soil properties by carefully exhuming the covers and reevaluating the hydraulic properties after years of experimentation.

Mr. Benson noted that the study led to a number of conclusions, specifically : (1) despite essentially similar input, simulation of landfill cover hydrology by different models resulted in very different predictions; (2) assessment of model accuracy is not possible without monitoring data and reasonableness of predictions should be checked against monitoring data; (3) monitoring data and decommissioning studies have produced to improvements in model parameterization relevant to future predictions or prediction update; and (4) models depend greatly on input. In addition, the lower boundary of the cover system is far less important than other studies have suggested.

Glendon Gee, PNNL. Mr. Gee discussed evapotranspiration cover concepts, monitoring and modeling needs, direct and indirect measurements, and modeling issues. He observed that model complexity can vary, and that the simplest models use default parameters based on general site characteristics, but that complex models require detailed site data. He cited examples of evapotranspiration covers at sites in Utah and California and explained that properly designed evapotranspiration covers can be effective.

Mr. Gee indicated that PNNL is also participating in the ACAP work, and he presented results of studies evaluating cover systems designed for the DOE Hanford site facilities. In this case, three models (HELP, EPIC, and UNSAT-H) adequately simulated results from the field test cover system; however, uncertainties in plant parameters and dynamics are limiting in all of these models.

Mr. Gee concluded that (1) monitoring of evapotranspiration covers over long times can be a challenge; (2) erosion control is observable and repairable; (3) biointrusion control is likely repairable; (4) water intrusion represents the greatest challenge; (5) indirect measurements are too imprecise, so measurement by direct methods is required; and (6) plant dynamics are the largest uncertainty and plague all current models.

Jody Waugh,Stoller Corporation/contractor to U.S. Department of Energy's Office of Legacy Management (LM). Mr. Waugh discussed monitoring and testing of engineered covers for uranium mill tailing sites and the use of monitoring and modeling to project their performance in the long term. He indicated that LM will have responsibility for 72 sites by the end of fiscal year 2006 and that LM checks the performance of covers by performing groundwater monitoring and visual inspection of the covers. Nonroutine investigations have also been conducted to evaluate encroachment by deep-rooted shrubs and their impact on cover permeability. A test cell constructed at the Monticello, Utah, site used embedded lysimeter instrumentation to evaluate an alternative evapotranspiration cover design. Performance modeling is being used to analyze cover performance and to determine whether covers can be expected to perform for 200 to 1000 years. For example, the FRAMES model is beginning to answer that question by modeling natural analogs. Mr. Waugh concluded that older covers are not performing as modeled, but some newer designs are; monitoring data have not been used for model improvement; and long-term instrumentation monitoring of covers is not feasible.

After the formal presentations, Dr. Hornberger moderated a panel discussion and Dr. Clarke moderated a question-and-comment session. These discussions addressed issues pertaining to the monitoring program design, confidence in models, sensitivity analysis, efficient use of resources, early monitoring, staged monitoring, and cover failure, design and maintenance.

Session 4: Opportunities for Integrating Modeling and Monitoring.

This session included two formal presentations by a member of the NRC staff, and an invited expert, and brief comments by two invited experts on the American Nuclear Society standard on radiological transport and groundwater for nuclear power sites, followed by a panel discussion and a question-and-comment session.

Thomas Nicholson, NRC Office of Nuclear Regulatory Research. Mr. Nicholson addressed the need for coupling monitoring programs and modeling. He said that the objectives of monitoring and modeling are to characterize and demonstrate an understanding of the system, confirm site and engineered system behavior, and demonstrate compliance and, as appropriate, design remediation for noncompliance. He discussed the monitoring and modeling interface, performance indicators, and monitoring techniques including selecting monitoring locations. He noted the importance of feedback to inform the site conceptual model, performance assessments, and choices of performance indicators, monitoring devices, and monitoring location. He addressed generic technical issues, including what, where, when, and how to monitor. He noted that opportunities to build confidence in models can result from consider-

ation of uncertainties in parameters, conceptual models, and scenarios. He provided a list of references for additional information.

Thomas Fogwell, Energy Solutions. Mr. Fogwell provided an overview of the Hanford site, noting that Hanford contained 42 percent of the curies, 60 percent of the high-level waste, 25 percent of the waste storage and release sites, 80 percent of the spent fuel, and 25 percent of buried solid waste, compared to the estimated total wastes at the nuclear weapon complexes in the U.S. He discussed the integrating of modeling and monitoring to provide long-term control of contaminants, and advocated an approach that involves dynamic data driven application systems as a new paradigm for simulations and measurement methodology. He said that this approach includes an adaptive stochastic control system with a feedback loop requiring controller decision, actuators, the system and associated sensors.

Mr. Fogwell explained that a panel had been formed to address decision tools for the Hanford central plateau. He briefly described the issues that were addressed and listed future remediation technologies, including removal and disposal actions, as well as immobilization of contaminants left in place.

Mr. Fogwell discussed the types of conditions needing instrumentation for characterization and monitoring and detailed the current monitoring scope which includes water balance monitoring, vegetation and animal use surveys, and stability surveys. He gave examples of cover designs and discussed monitoring technologies, quantities to measure, moisture sampling methods, and trends in developing technologies. He identified technology needs relative to contaminant migration, including characterization, monitoring, transport, risk, cost, and dissemination. He concluded by presenting future development efforts for analysis of contamination migration.

James Bollinger, SRNL, and Todd Rasmussen, University of Georgia. Mr. Bollinger and Mr. Rasmussen presented an overview of their joint work related to the American Nuclear Society standard on radiological transport and groundwater for nuclear power sites. After providing background material, Mr. Bollinger noted that many standards are dated and are being withdrawn, and that a significant effort is underway to rewrite many standards in preparation for the anticipated resurgence in nuclear power. One of the most important standards relates to radionuclide transport in groundwater at nuclear power facilities. Mr. Rasmussen added that taking corrective action, assessing the likelihood of failure, and planning for recovery actions are important features to consider before a crisis occurs.

After the formal presentations, Dr. Hornberger moderated a panel discussion and Dr. Clarke moderated a question-and-comment session. These discussions addressed issues pertaining to opportunities to capitalize on monitoring and modeling and on guidance that could be developed to support the regulator; site characterization, reporting thresholds, paths forward, and new suggestions for future work; and use of old data, uncertainties, and ways to build confidence in models (in addition to monitoring).

Summary of Technical Comments

Participants expressed a range of views on the value of monitoring and the integration of monitoring and modeling activities. The discussion focused primarily on environmental monitoring, not source or in-system monitoring. Participants generally agreed that integrating monitoring and modeling activities is site specific and case specific. They noted that not all

sites, models, or monitoring programs are the same; different models and monitoring programs have different functions and operate at different levels of complexity; and the selection and design of models and monitoring programs should suit conditions at specific sites. In low-risk situations, complicated modeling and extensive monitoring are unnecessary. In situations entailing significant risk, considerations should include detailed monitoring and modeling as well as integration.

Meeting participants expressed other views, including the following:

- Monitoring should develop or enhance understanding, not just demonstrate compliance.
- Monitoring data and decommissioning studies have led to improvements in model parameterization relevant to future predictions or prediction updates.
- Monitoring and modeling represent a dynamic and iterative process. Feedback is important to inform the site conceptual model, performance assessment, and choices of performance indicators, monitoring devices, and monitoring locations.
- The design of monitoring programs should include early detection, using monitoring points that are closer to the source than the compliance location so that contaminants can be detected before they reach the point of compliance. One panelist strongly endorsed monitoring of the containment system (i.e., cover, liner, and leachate collection system) to increase understanding of system performance and to improve confidence in modeling results. He noted that technology is currently available and that this approach would result in lower expenses than traditional compliance monitoring, which tends to detect contamination after it has traveled some distance from the source, a circumstance that requires further monitoring to define the plume and imposes additional cleanup costs.
- Designers of modeling/monitoring programs should give increased consideration to the use of performance indicators to evaluate the behavior of key system features because these surrogate metrics can provide some early insight into system behavior. In addition, assessing the likelihood of failure and planning remedial/recovery actions are important features to consider before a crisis occurs.
- The approach to modeling and monitoring should be flexible, not prescriptive. Monitoring programs need to be sufficiently flexible to recognize temporal and spatial variations in the system (phenomena) being modeled.
- Practitioners should validate models with independent lines of evidence and, as appropriate, periodically review the models to determine whether updating is warranted given the availability of new information.
- Some experts supported the idea of staged monitoring, in which data collection is managed to build confidence in modeling and then optimized to achieve further confidence in modeling results and regulatory compliance.
- Modeling of contaminant transport can be problematic because of insufficient early characterizations, untested monitoring systems, changing flow conditions over time,

uncertainty about the inventory of existing contamination and the contaminant source location, and sometimes unintended consequences.

- One expert expressed the opinion that practitioners should view and use models as tools for total system management.

- According to one expert, monitoring of the gas phase is reliable and cost-effective and can complement other methods for monitoring metals and radionuclides.

- One expert held the view that, under certain conditions, decisionmakers will find limited utility in monitoring, especially when the phenomena of interest occur over time spans that exceed the duration of licensed activity.

- One expert suggested that compliance monitoring should be expanded and replaced with a "compliance assessment" concept.

- A complex relationship of site-specific and contaminant-specific features, events, and processes governs contaminant transport in the subsurface environment. The key to understanding, monitoring, and predicting contaminant transport lies in recognizing and addressing this complexity.

- Proper identification of contaminant plumes is important, especially for multiple contaminants that travel at different rates.

- The use of nontraditional monitoring techniques—such as geoprobes, geophysical measurements, coring, low-rate pumping, and tracers—can enhance monitoring. One panelist advocated the consideration of new approaches and monitoring technologies, including an adaptive stochastic control system with a feedback loop.

- Chemical and physical constraints limit the development of conceptual models for groundwater. A need exists for site characterization to support the development of conceptual groundwater transport models and to establish characterization goals based on existing limitations.

- Monitoring of evapotranspiration covers over long periods of time can pose a challenge. Indirect measurements related to evapotranspiration covers are too imprecise, so measurements by direct methods are required. Long-term instrumentation monitoring of covers is not feasible. Plant dynamics constitute the largest uncertainty and plague all current evapotranspiration models.

- Different models of engineered cover systems can produce very different results, model results depend greatly on input, and evaluation of the accuracy of cover models requires monitoring data.

- Older covers do not perform as modeled, but some newer designs do.

- Modeling results for underground tritium and mercury are not consistent with the measured data and field observations at some sites.

- Sensitivity analyses can improve confidence in modeling results.
- A need exists for regular external peer reviews of models and modeling results.
- Several infiltration models can adequately simulate evapotranspiration covers; however, all models are strictly limited by uncertainties in plant parameters and dynamics that are time dependent.
- Modelers, monitoring program designers, and operators should increase communication and interaction.
- A significant effort is under way to rewrite many standards in preparation for the anticipated resurgence in nuclear power, and the standard related to radionuclide transport in groundwater for nuclear power facilities is one of the most important under consideration.

The Committee will write a letter to the Commission based on the working group meeting and other information regarding the use of monitoring to build confidence in models.

IV. DISPOSITION OF PUBLIC COMMENTS ON SPENT NUCLEAR FUEL TRANSPORTATION PACKAGE RESPONSES TO TUNNEL FIRE SCENARIOS (NUREG/CR-6886 AND NUREG/CR-6894) (OPEN)

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

In September 2005, staff members from the NRC Spent Fuel Project Office (SFPO)[1] announced in the *Federal Register* the availability of a contractor report prepared by the PNNL that describes an updated, 3-D analysis of the 2002 Howard Street tunnel fire scenario, using three NRC-certified cask designs for the transportation of spent nuclear fuel (SNF). The NRC published this report as NUREG/CR-6886, "Spent Fuel Transportation Package Response to the Baltimore Tunnel Fire Scenario—Draft Report for Comment" (Adkins et al., 2005[2]) which was prepared with the assistance of the National Institute of Standards and Technology and the Center for Nuclear Waste Regulatory Analyses.

During the 167th ACNW meeting in January 2006, the SFPO staff provided the Committee with an overview of the tunnel fire analysis in NUREG/CR-6886. The staff study postulated a 500-megawatt fire and a peak temperature of about (1830 °F) at the cask, lasting for about 3 hours at its most sever point. The staff modeled the effect of the fire on three NRC-approved cask designs, especially NAC-LWT, HI-STAR 100, and TN-68. This overview included the identification of key modeling assumptions, conservatisms, and results. Citing that report, SFPO representatives observed that the likelihood of such an event both occurring and including an SNF transportation cask is extremely low. The draft report concluded that, although the temperatures in the regions of the cask lid and vent could exceed the rated temperature of the

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[1]Division of Spent Fuel Storage and Transportation, as of October 1, 2006.

[2]Adkins, H.E., Jr., J.M. Cuta, and B.J. Koeppel, "Spent Fuel Transportation Package Response to the Baltimore Tunnel Fire Scenario–Draft Report for Comment," U.S. Nuclear Regulatory Commission, NUREG/CR-6886, November 2005.

seals, neither SNF particles nor fission products would be released. Moreover, if such an event occurs, the staff noted that any releases of radioactive material would be extremely small and would pose no significant danger to the public or first responders. In light of these findings, the SFPO staff expressed the view that the NRC did not need to take any regulatory action to ensure public health and safety. The staff also noted that it had received public comments on NUREG/CR-6886 from the Northeast High-Level Radioactive Waste Transportation Project, the Brotherhood of Locomotive Engineers, and the State of Nevada. The SFPO staff reported that it was in the process of reviewing the public comments and agreed to brief the Committee on the disposition of those comments as part of the finalization of the tunnel fire analysis documentation.

During the 173rd ACNW meeting on September 18–21, 2006, the SFPO staff briefed the Committee on the disposition of the public comments received on NUREG/CR-6886. Mr. Chris Bajwa and Mr. Earl Easton represented the SFPO staff, and Dr. Harold Adkins of PNNL, the lead author of NUREG/CR-6886, also participated in the briefing. In summary, those comments concerned the location, severity, and duration of the fire; the failure of the initial fire study to consider lead melt for the NAC-LWT cask and the consequent failure to consider potential loss of lead gamma shielding; the assumption that the radioactive material on the fuel rod surfaces was all cobalt-60[3]; the possibility that damaged or high-burnup SNF might be brittle when shipped; the performance of cask seals; and the lack of risk perspectives. In response to the public comments, the staff reported that it developed a revised analytical model for the fire study that assumed a tank car (the fuel source), buffer car, and SNF transportation car were separated by about 20 meters, as required by the U.S. Department of Transportation (DOT) regulations in 40 CFR 174.85, "Position in Train of Placarded Cars, Transport Vehicles, Freight Containers, and Bulk Packagings." The model assumed that the fire started with a leak in the tank car and then engulfed the whole tunnel, heating the tunnel and radiating heat to the transportation cask. The fire lasted 7 hours followed, by a 23-hour cool-down period. The PNNL study concluded that the DOT regulations requiring buffer cars would have prevented the burning tank car from getting sufficiently close to the transportation cask to engulf the cask in flames and heat it to a temperature that would result in a significant release of radioactive material.

During the 173rd ACNW meeting, the staff also introduced and summarized a second study sponsored by the NRC staff, which addresses a severe transportation fire that occurred in an automobile tunnel in Caldecott, California, in the 1980s. The Caldecott tunnel fire involved a tanker truck carrying 8800 gallons of gasoline. The staff considers this tunnel fire to be a very close analog to the 2001 Baltimore tunnel incident. The analysis in NUREG/CR-6894, "Spent Fuel Transportation Package Response to the Caldecott Tunnel Fire Scenario–Draft Report for Comment" (Adkins et al., 2006[4]) documented the second fire assessment and was also made available for public comment. On the basis of the analysis of a fire similar in type and intensity to the documented Caldecott fire documented in NUREG/CR-6894, the staff noted that

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[3]Also known as Chalk River unidentified deposit or CRUD.

[4]Adkins, H.E., Jr., B.J. Koeppel, and J.M. Cuta, "Spent Fuel Transportation Package Response to the Caldecott Tunnel Fire Scenario–Draft Report for Comment," U.S. Nuclear Regulatory Commission, NUREG/CR-6894, February 2006.

releases of radioactive material would fall within regulatory limits for a NAC-LWT model or a similar spent fuel shipping.

The staff also briefly reviewed key issues raised by the National Academy of Sciences in its 2006 report "Going the Distance? The Safe Transport of Nuclear Fuel and High-Level Radioactive Waste in the United States"[5], and how NUREG/CR-6886 accounted for such issues. In general, the staff expressed the view that the NUREG/CR-6886 tunnel fire analysis required no major changes as a result of the public comment processes, although the staff added several points of clarification to the report as a result of those comments. After the briefing, the speakers responded to questions and comments from ACNW members, who expressed the general view that the final reports on the two tunnel fires thoroughly and completely addressed the comments on earlier drafts. The ACNW members observed that the staff modeled both realistic and bounding scenarios, and the models appear to reflect the tunnel fire situation adequately. Potential releases of radioactive material from spent fuel casks in tunnel fires, and potential increases in radiation external to the cask in the event of lead melt and slump both appear to fall well within regulatory limits that protect health and safety.

The ACNW members also agreed that releasing drafts of these reports to the public for stakeholder comments resulted in improved reports when the comments were responded to as part of the report finalization process.

The meeting adjourned at 11:15 a.m. on Thursday, September 21, 2006.

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NOTE: The transcript of the meeting includes additional details and is available for downloading or viewing on the Internet at http://www.nrc.gov/ACRS/ACNW. The transcript also is available for purchase from Neal R. Gross and Company, Inc. (Court Reporters and Transcribers), 1323 Rhode Island Avenue, NW, Washington, DC 20005, telephone (202) 234-4433.

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[5]National Academy of Sciences, "Going the Distance? The Safe Transport of Spent Nuclear Fuel and High-Level Radioactive Waste in the United States," National Academy Press, Washington, DC, 2006.

APPENDIX A

Based on its review, the staff has determined that the affected environment and any environmental impacts associated with the proposed action are bounded by the impacts evaluated by the "Generic Environmental Impact Statement in Support of Rulemaking on Radiological Criteria for License Termination of NRC-Licensed Nuclear Facilities" (NUREG-1496) Volumes 1-3 (ML042310492, ML042320379, and ML042330385). Accordingly, there were no significant environmental impacts from the use of radioactive material at the Facility. The NRC staff reviewed the docket file records and the final status survey report to identify any non-radiological hazards that may have impacted the environment surrounding the Facility. No such hazards or impacts to the environment were identified. The NRC has found no other radiological or non-radiological activities in the area that could result in cumulative environmental impacts.

The NRC staff finds that the proposed release of the Facility for unrestricted use is in compliance with 10 CFR 20.1402. Based on its review, the staff considered the impact of the residual radioactivity at the Facility and concluded that the proposed action will not have a significant effect on the quality of the human environment.

Environmental Impacts of the Alternatives to the Proposed Action

Due to the largely administrative nature of the proposed action, its environmental impacts are small. Therefore, the only alternative the staff considered is the no-action alternative, under which the staff would leave things as they are by simply denying the amendment request. This no-action alternative is not feasible because it conflicts with 10 CFR 30.36(d), requiring that decommissioning of byproduct material facilities be completed and approved by the NRC after licensed activities cease. The NRC's analysis of the Licensee's final status survey data confirmed that the Facility meets the requirements of 10 CFR 20.1402 for unrestricted release. Additionally, a denial of the application would result in no change in current environmental impacts. The environmental impacts of the proposed action and the no-action alternative are therefore similar, and the no-action alternative is accordingly not further considered.

Conclusion

The NRC staff has concluded that the proposed action is consistent with the NRC's unrestricted release criteria specified in 10 CFR 20.1402. Because the proposed action will not significantly impact the quality of the human environment, the NRC staff concludes that the proposed action is the preferred alternative.

Agencies and Persons Consulted

NRC provided a draft of this Environmental Assessment to the State of New Jersey Department of Environmental Protection for review on June 13, 2006. On June 29, 2006, the Department of Environmental Protection responded by letter. The State agreed with the conclusions of the EA, and otherwise had no comments.

The NRC staff has determined that the proposed action is of a procedural nature, and will not affect listed species or critical habitat. Therefore, no further consultation is required under Section 7 of the Endangered Species Act. The NRC staff has also determined that the proposed action is not the type of activity that has the potential to cause effects on historic properties. Therefore, no further consultation is required under Section 106 of the National Historic Preservation Act.

III. Finding of No Significant Impact

The NRC staff has prepared this EA in support of the proposed action. On the basis of this EA, the NRC finds that there are no significant environmental impacts from the proposed action, and that preparation of an environmental impact statement is not warranted. Accordingly, the NRC has determined that a Finding of No Significant Impact is appropriate.

IV. Further Information

Documents related to this action, including the application for license amendment and supporting documentation, are available electronically at the NRC's Electronic Reading Room at *http://www.nrc.gov/reading-rm/adams.html*. From this site, you can access the NRC's Agencywide Document Access and Management System (ADAMS), which provides text and image files of NRC's public documents. The documents related to this action are listed below, along with their ADAMS accession numbers.

1. Amendment Request Letter dated January 17, 2006 (ML060240189);
2. Letter with additional information dated April 28, 2006 (ML061300452);
3. NUREG-1757, "Consolidated NMSS Decommissioning Guidance;"
4. Title 10 Code of Federal Regulations, part 20, subpart E, "Radiological Criteria for License Termination;"
5. Title 10, Code of Federal Regulations, part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions;"
6. NUREG-1496, "Generic Environmental Impact Statement in Support of Rulemaking on Radiological Criteria for License Termination of NRC-Licensed Nuclear Facilities."

If you do not have access to ADAMS, or if there are problems in accessing the documents located in ADAMS, contact the NRC Public Document Room (PDR) Reference staff at 1-800-397-4209, 301-415-4737, or by e-mail to *pdr@nrc.gov*. These documents may also be viewed electronically on the public computers located at the NRC's PDR, O 1 F21, One White Flint North, 11555 Rockville Pike, Rockville, MD 20852. The PDR reproduction contractor will copy documents for a fee.

Dated at 475 Allendale Road, King of Prussia, PA, this 29th day of August 2006.

For the Nuclear Regulatory Commission.

James P. Dwyer,

Chief, Commercial and R&D Branch, Division of Nuclear Materials Safety, Region 1.

[FR Doc. E6-14874 Filed 9-7-06; 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 173rd meeting on September 18-21, 2006, Room T-2B3, 11545 Rockville Pike, Rockville, Maryland.

The schedule for this meeting is as follows:

Monday, September 18, 2006

10 a.m.-10:05 a.m.: Opening Remarks by the ACNW Chairman (Open)—The ACNW Chairman, Dr. Michael Ryan, will make opening remarks regarding the conduct of today's sessions.

10:05 a.m.-11:30 a.m.: Observations from ACNW Members and Staff on recent Activities (Open)—ACNW members and staff will present a summary of their visit to Crow Butte In Situ Leach Facility in Nebraska and attendance at the U.S. Department of Energy (DOE) Workshop on Low Dose Radiation Research Program; and the International Commission on Radiological Protection (ICRP) Workshop.

12:30 p.m.-5 p.m.: Discussion of Draft ACNW Letter Reports (Open)—The Committee will discuss proposed ACNW letters.

Tuesday, September 19, 2006

ACNW Working Group Meeting on Using Monitoring to Build Model Confidence—Day 1 (Open)

8:30 a.m.–8:45 a.m.: Opening Remarks and Introductions (Open)—The ACNW Chairman will make opening remarks regarding the conduct of today's sessions. ACNW Member Dr. James Clarke will provide an overview of the Working Group Meeting (WGM), including the meeting purpose and scope, and introduce invited subject matter experts.

Session I: Role of Models and Monitoring Programs in Licensing

8:45 a.m.–12 p.m.: Representatives from the industry (Energy Solutions-Duratek-Chem Nuclear, and Radiation Safety Control, Inc.) will discuss the licensee's perspective on the role of models and monitoring in demonstrating compliance with licensing criteria. NRC staff will address NRC's perspectives on the use of ground water monitoring and modeling for regulatory decision making. At the end of this Session, a panel discussion by Committee members and invited subject matter experts will take place.

Session II: Evaluating Radionuclide Releases and Ground Water Contamination (Case Studies)

1 p.m.–5 p.m.: Representatives from national laboratories (Pacific Northwest, Savannah River, and Brookhaven) will discuss lessons learned from remedial, characterization, modeling and monitoring efforts at their sites. A representative from Energy Solutions-Duratek-Chem Nuclear will discuss ground water contaminant migration modeling projections at the Barnwell low-level waste site. At the end of this Session, a panel discussion by Committee members and invited subject matter experts will take place.

Wednesday, September 20, 2006

ACNW Working Group Meeting on Using Monitoring to Build Model Confidence—Day 2 (Open)

8:30 a.m.–8:45 a.m.: Opening Remarks and Introductions—The ACNW Chairman will make opening remarks regarding the conduct of today's sessions. ACNW Member Clarke will provide an overview of the WGM, including the meeting purpose and scope, and introduce invited subject matter experts.

Session III: Field Experience and Insights

8:45 a.m.–12 p.m.: Representatives from U.S. Geological Survey, U.S. Environmental Protection Agency, U.S. Department of Energy, Pacific Northwest National Laboratory, and University of Wisconsin-Madison will discuss their efforts in developing, bench marking and improving models for different waste sites. At the end of this Session, a panel discussion by Committee members and invited subject matter experts will take place.

Session IV: Opportunities for Integrating Modeling and Monitoring

1 p.m.–4:30 p.m.: A representative from NRC's Office of Research will discuss modeling and monitoring integration issues. A representative from Fluor Hanford will discuss integrating modeling and monitoring activities to support long-term interactions and control of contaminants. At the end of this Session, a panel discussion by Committee members and invited subject matter experts will take place. A roundtable wrap up discussion will follow, when all participants will be able to provide their comments. Committee members will discuss their impressions of the WGM and a possible letter report to the Commission.

Thursday, September 21, 2006

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.: Disposition of Public Comments on Spent Nuclear Fuel Transportation Package Responses to Tunnel Fire Scenarios (NUREG/CR-6886 for the Baltimore Tunnel and NUREG/CR-6894 for the Caldecott Tunnel) (Open)—NMSS/SFPO representatives will brief the Committee on the public comments received for the two tunnel fire studies and how these comments were addressed in the final versions of the two NUREGs, expected to be released shortly for publication.

10:30 a.m.–4:30 p.m.: Discussion of Potential and Draft ACNW Letter Reports (Open)—The Committee will discuss potential and proposed ACNW letters reports.

4:30 p.m.–5 p.m.: Miscellaneous (Open)—The Committee will discuss matters related to the conduct of ACNW activities and specific issues that were not completed during previous meetings, as time and availability of information permit. Discussions may include future Committee Meetings.

Procedures for the conduct of and participation in ACNW meetings were published in the **Federal Register** on October 11, 2005 (70 FR 59081). 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. Antonio F. Dias (Telephone 301–415–6805), between 8:15 a.m. and 5 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. Dias as to their particular needs.

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

ACNW meeting agenda, meeting transcripts, and letter reports are available through the NRC Public Document Room (PDR) at *pdr@nrc.gov*, or by calling the PDR at 1–800–397–4209, or from the Publicly Available Records System 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: September 1, 2006.
Annette L. Vietti-Cook,
Secretary of the Commission.
[FR Doc. E6–14873 Filed 9–7–06; 8:45 am]
BILLING CODE 7590–01–P

NUCLEAR REGULATORY COMMISSION

Advisory Committee on Reactor Safeguards; Meeting of the Subcommittee on Reliability and Probabilistic Risk Assessment; Notice of Meeting

The ACRS Subcommittee on Reliability and Probabilistic Risk Assessment will hold a meeting on September 21, 2006, Room T–2B1, 11545 Rockville Pike, Rockville, Maryland.

The entire meeting will be open to public attendance.

The agenda for the subject meeting shall be as follows: Thursday, September 21, 2006, 8:30 a.m. until 5 p.m.

The purpose of the meeting is to discuss draft final NUREG–1824 (EPRI 1011999), "Verification and Validation of Selected Fire Models for Nuclear Power Plant Applications." The Subcommittee will hear presentations by and hold discussions with representatives of the NRC staff, Electric Power Research Institute (EPRI), and other interested persons regarding this matter. The Subcommittee will also be briefed by representatives of the NRC staff on draft NUREG–1852, "Demonstrating the Feasibility and Reliability of Operator Manual Actions in Response to Fire." 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, Dr. Hossein P. Nourbakhsh (telephone 301/415–5622), five days prior to the meeting, if possible, so that appropriate arrangements can be made. Electronic recordings will be permitted.

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: August 31, 2006.
Michael R. Snodderly,
Branch Chief, ACRS/ACNW.
[FR Doc. E6–14864 Filed 9–7–06; 8:45 am]
BILLING CODE 7590–01–P

SECURITIES AND EXCHANGE COMMISSION

Submission for OMB Review; Comment Request

Upon written request, copies available from: Securities and Exchange Commission, Office of Filings and Information Services, Washington, DC 20549.

Extension: Rule 12d1–1; SEC File No. 270–526; OMB Control No. 3235–0584.

Notice is hereby given that pursuant to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 *et seq.*), the Securities and Exchange Commission (the "Commission") has submitted to the Office of Management and Budget ("OMB") a request for extension of the previously approved collection of information discussed below.

Under current law, an investment company ("fund") is limited in the amount of securities the fund ("acquiring fund") can acquire from another fund ("acquired fund"). In general under the Investment Company Act of 1940 (15 U.S.C. 80a) (the "Investment Company Act" or "Act"), a registered fund (and companies it controls) cannot: (i) Acquire more than three percent of another fund's securities; (ii) invest more than five percent of its own assets in another fund; or (iii) invest more than ten percent of its own assets in other funds in the aggregate.[1] In addition, a registered open-end fund, its principal underwriter, and any registered broker or dealer cannot sell that fund's shares to another fund if, as a result: (i) The acquiring fund (and any companies it controls) owns more than three percent of the acquired fund's stock; or (ii) all acquiring funds (and companies they control) in the aggregate own more than ten percent of the acquired fund's stock.[2] Rule 12d1–1 (17 CFR 270.12d1–1) under the Act provides an exemption from these limitations for "cash sweep" arrangements, in which a fund invests all or a portion of its available cash in a money market fund rather than directly in short-term instruments. An acquiring fund relying on the exemption may not pay a sales load, distribution fee, or service fee on acquired fund shares, or if it does, the acquiring fund's investment adviser must waive a sufficient amount of its advisory fee to offset the cost of the loads or distribution fees.[3] The acquired fund may be a fund in the same fund complex or in a different fund complex. In addition to providing an exemption from section 12(d)(1) of the Act, the rule provides exemptions from section 17(a) and rule 17d–1, which restrict a fund's ability to enter into transactions and joint arrangements with affiliated persons.[4] These provisions could otherwise prohibit an acquiring fund from investing in a money market fund in the same fund complex,[5] or prohibit a fund that acquires five percent or more of the securities of a money market fund in another fund complex from making any additional investments in the money market fund.[6]

The rule also permits a registered fund to rely on the exemption to invest in an unregistered money market fund that limits its investments to those in which a registered money market fund may invest under rule 2a–7 under the Act (17 CFR 270.2a–7), and undertakes to comply with all the other provisions of rule 2a–7. In addition the acquiring fund must reasonably believe that the unregistered money market fund (i) operates in compliance with rule 2a–7, (ii) complies with sections 17(a), (d), (e), 18, and 22(e) of the Act[7] as if it were a registered open-end fund, (iii) has adopted procedures designed to ensure that it complies with these statutory provisions, (iv) maintains the records required by rules 31a–1(b)(2)(ii), 31a–

[1] *See* 15 U.S.C. 80a–12(d)(1)(A). If an acquiring fund is not registered, these limitations apply only with respect to the acquiring fund's acquisition of registered funds.

[2] *See* 15 U.S.C. 80a–12(d)(1)(B).

[3] *See* Rule 12d1–1(b)(1).

[4] *See* 15 U.S.C. 80a–17(a), 15 U.S.C. 80a–17(d); 17 CFR 270.17d–1.

[5] An affiliated person of a fund includes any person directly or indirectly controlling, controlled by, or under common control with such other person. *See* 15 U.S.C. 80a–2(a)(3)(C) (definition of "affiliated person"). Most funds today are organized by an investment adviser that advises or provides administrative services to other funds in the same complex. Funds in a fund complex are generally under common control of an investment adviser or other person exercising a controlling influence over the management or policies of the funds. *See* 15 U.S.C. 80a–2(a)(9). Not all advisers control funds they advise. The determination of whether a fund is under the control of its adviser, officers, or directors depends on all the relevant facts and circumstances. *See* Investment Company Mergers, Investment Company Act Release No. 25259 (Nov. 8, 2001) [66 FR 57602 (Nov. 15, 2001)], at n.11. To the extent that an acquiring fund in a fund complex is under common control with a money market fund in the same complex, the funds would rely on the rule's exemptions from section 17(a) and rule 17d–1.

[6] *See* 15 U.S.C. 80a–2(a)(3)(A), (B).

[7] *See* 15 U.S.C. 80a–17(a), 15 U.S.C. 80a–17(d), 15 U.S.C. 80a–17(e), 15 U.S.C. 80a–18, 15 U.S.C. 80a–22(e).

APPENDIX B

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

September 14, 2006 (REVISED)

AGENDA
173rd ACNW MEETING
SEPTEMBER 18-21, 2006

MONDAY, SEPTEMBER 18, 2006, CONFERENCE ROOM T-2B3, TWO WHITE FLINT NORTH, ROCKVILLE, MARYLAND

1) 10:00 - 10:05 A.M. **Opening Remarks by the ACNW Chairman** (Open) (MTR/AFD)
The ACNW Chairman, Dr. Michael Ryan, will make opening remarks regarding the conduct of today's sessions.

2) 10:05 - ~~11:30~~ 11:05 A.M. **Observations from ACNW Members and Staff on recent Activities** (Open) (All)
ACNW members and staff will present a summary of their
- 2.1) Visit to Crow Butte In Situ Leach Facility in Nebraska (RFW/LSH) 10:05 - 10:32 A.M.
- 2.2) Attendance to the U.S. Department of Energy (DOE) Workshop on Low Dose Radiation Research Program (MTR/NMC) 10:33 - 10:47 AM.
- 2.3) Attendance to the International Commission on Radiological Protection (ICRP) Workshop (MTR/NMC) 10:57 - 11:05 A

10:47 - 10:57 A.M. Comments from T. Brockwell

~~11:30~~ - 12:30 P.M. 11:05 ***LUNCH***

3) 12:30 - 5:00 P.M. **Discussion of Draft ACNW Letter Reports** (Open) (All)
Discussion of proposed ACNW reports on the following:
- 3.1) Draft Standard Review Plan for Waste Determinations (AGC/LSH) 12:30
- 3.2) Predicting the Performance of Cementitious Barriers (AGC/LSH) 2:30
- 3.3) Draft Rule/Guidance on Preventing Legacy Sites (JHC/DAW) 2:46 - 4:00
- 3.4) Dry Cask Storage Probabilistic Risk Assessment (PRA) (RFW/AFD) 4:00 - 5:25
- 3.5) DOE Low Dose Radiation Research Workshop (VI) (MTR/NMC) 5:25 - 5:54

2:31 - 2:46 BREAK

~~5:00~~ 5:55 P.M. **Adjourn**

TUESDAY, SEPTEMBER 19, 2006, CONFERENCE ROOM T-2B3, TWO WHITE FLINT NORTH, ROCKVILLE, MARYLAND

ACNW WORKING GROUP MEETING ON USING MONITORING TO BUILD MODEL CONFIDENCE - DAY 1 (OPEN)

4) ~~8:30~~ - ~~8:40~~ A.M. (8:33 - 8:35)
Opening Remarks and Introductions (MTR/JHC/LSH)
The ACNW Chairman will make opening remarks regarding the conduct of today's sessions. ACNW Member Dr. James Clarke will provide an overview of the Working Group Meeting (WGM), including the meeting purpose and scope, and introduce invited subject matter experts.

SESSION I: ROLE OF MODELS AND MONITORING PROGRAMS IN LICENSING

5) ~~8:40~~ - ~~9:20~~ A.M. (8:35 - 9:28)
Vernon Ichimura (Energy Solutions-Duratek-Chem Nuclear) and David Scott (Radiation Safety Control, Inc.) will discuss the licensee's perspective on the role of models and monitoring in demonstrating compliance with licensing criteria.

6) ~~9:20~~ - 10:00 A.M. (9:29)
James Shepherd and Mark Thaggard from NRC headquarters will discuss the staff's perspectives on the use of ground water monitoring and modeling for regulatory decision making.

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

7) 10:15 - ~~11:00~~ A.M. (11:30)
Matt Kozak from Monitor Scientific LLC and David Esh from NRC headquarter staff will address the role of monitoring in model support and performance assessment evaluations.

8) ~~11:00~~ - 12:00 P.M. (11:32 - 12:00)
Session I Panel Discussion (All)
Committee Member Clarke will moderate and Dr. George Hornberger from the University of Virginia will lead a panel discussion by Committee members and invited subject matter experts on the role of models and monitoring programs in licensing activities.

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

SESSION II: EVALUATING RADIONUCLIDE RELEASES AND GROUND WATER CONTAMINATION (CASE STUDIES)

9) 1:00 - 1:30 P.M.
Michael Fayer from the Pacific Northwest National Laboratory (PNNL) will discuss lessons learned from remedial actions at the Hanford site with emphasis on contaminant fate and transport.

10) 1:30 - ~~2:00~~ P.M. (2:00)
Brian Looney from the Savannah River National Laboratory will discuss how detection, characterization and delineation of contaminant plumes can be used to support environmental management and environmental protection objectives.

11) 2:00 - 2:45 P.M. Tom Burke and Mike Hauptman from the Brookhaven National Laboratory will discuss characterization, and modeling and monitoring basis for tritium plume management strategies at Brookhaven National Laboratory.

12) 2:45 - ~~3:15~~ 3:10 P.M. Steve Yabusaki from PNNL Hanford will discuss the use of subsurface simulation to build, test, and couple conceptual process models to better understand controls on the observed uranium plume behavior at the Hanford site.

~~3:15~~ 3:10 - ~~3:30~~ 3:35 P.M. ***BREAK***

13) ~~3:30~~ 3:36 - ~~4:00~~ 4:15 P.M. Vernon Ichimura from Energy Solutions-Duratek-Chem Nuclear will discuss groundwater contaminant migration modeling projections at the Barnwell low-level waste site.

14) ~~4:00~~ 4:15 - ~~5:00~~ 4:55 P.M. **Session II Panel Discussion** (All)
ACNW Committee Member Clarke will moderate and Dr. Hornberger will lead a panel discussion by invited experts on radionuclide release and ground water contamination.

4:55 **~~5:00~~ P.M. Adjourn**

WEDNESDAY, SEPTEMBER 20, 2006, CONFERENCE ROOM T-2B3, TWO WHITE FLINT NORTH, ROCKVILLE, MARYLAND

ACNW WORKING GROUP MEETING ON USING MONITORING TO BUILD MODEL CONFIDENCE - DAY 2 (OPEN)

15) 8:30 - 8:45 A.M. **Opening Remarks and Introductions** (MTR/JHC/LSH)
The ACNW Chairman will make opening remarks regarding the conduct of today's sessions. ACNW Member Clarke will provide an overview of the WGM, including the meeting purpose and scope, and introduce invited subject matter experts.

SESSION III: FIELD EXPERIENCE AND INSIGHTS

16) 8:45 - ~~9:05~~ 8:50 A.M. Brian Andraski from the U.S. Geological Survey (USGS) will discuss how environmental monitoring and modeling are being integrated to refine unsaturated-zone models to capture the essential features and processes of contaminant migration at the USGS Amargosa Desert Research Site, Nevada.

17) ~~9:05~~ 8:50 - ~~9:25~~ 9:15 A.M. Van Price from Advanced Environmental solutions, LLC, will discuss model value with a focus on conceptual model development and the dynamic modeling process.

18) ~~9:25~~ 9:15 - 9:45 A.M. Robert Ford from the U.S. Environmental Protection Agency (Robert S. Kerr Laboratory) will discuss site characterization to support development of conceptual transport models.

THURSDAY, SEPTEMBER 21, 2006, CONFERENCE ROOM T-2B3, TWO WHITE FLINT NORTH, ROCKVILLE, MARYLAND

28) 8:30 - 8:35 A.M. **Opening Remarks by the ACNW Chairman** (Open) (MTR/JHF)
The Chairman will make opening remarks regarding the conduct of today's sessions.

29) 8:35 - 10:00 A.M. **Disposition of Public Comments on Spent Nuclear Fuel Transportation Package Responses to Tunnel Fire Scenarios (NUREG/CR-6886 for the Baltimore Tunnel and NUREG/CR-6894 for the Caldecott Tunnel)** (Open) (RFW/MPL)
NMSS/SFPO representatives will brief the Committee on the public comments received for the two tunnel fire studies and how these comments were addressed in the final versions of the two NUREGs, expected to be released shortly for publication.

10:00 10:15

~~10:15 - 10:30~~ **A.M.** ***BREAK***

30) ~~10:30 -~~ 11:00 A.M. **Discussion of Potential ACNW Letter Reports** (Open) (All)
10:15 11:10
Discussion of possible ACNW reports on:
30.1) ACNW Working Group Meeting on Using Monitoring to Build Model Confidence (JHC/LSH)
30.2) Disposition of Public Comments on Transportation Package Responses to Tunnel Fire Scenarios (RFW/MPL)

31) ~~11:00 - 12:00 P.M.~~ **Discussion of Draft ACNW Letter Reports** (Open) (All)
Continued discussion of proposed ACNW reports listed under Item 3.

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

32) ~~1:00 - 4:30 P.~~M. **Discussion of Draft ACNW Letter Reports** (Open) (All)
Continued discussion of proposed ACNW reports listed under Item 3.

33) ~~4:30 - 5:00 P.~~M. **Miscellaneous** (Open)
The Committee will discuss matters related to the conduct of ACNW activities and specific issues that were not completed during previous meetings, as time and availability of information permit. Discussions may include future Committee Meetings.

~~5:00 P.M.~~ **Adjourn**
11:15

NOTES:

- Presentation time should not exceed 50 percent of the total time allocated item. The remaining 50 percent of the time is reserved for discussion.

- **Fifty (50) hard copies and one (1) electronic copy of the presentation materials should be provided to the ACNW in advance of the briefing.**

- 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. Antonio F. Dias at 301-415-6805 between 8:00 a.m. and 5:00 p.m. prior to the meeting.

APPENDIX C: MEETING ATTENDEES
173RD ACNW MEETING
SEPTEMBER 18-21, 2006

ACNW MEMBERS

Michael Ryan, Chairman
Allen Croff, Vice Chairman
James Clarke
William Hinze
Ruth Weiner

INVITED EXPERTS

Dave Scott, Yankee Atomic Electric Co.
Eric Darois, CHP, Radiation Safety & Control Services, Inc.
James Shepherd, NRC/NMSS
Mark Thaggard, NRC/NMSS
Matthew Kozak, Monitor Scientific, LLC
David Esh, NRC/NMSS
Mike Fayer, Pacific Northwest National Laboratory
Brian Looney, Savannah River National Laboratory
Thomas Burke, Brookhaven National Laboratory
Michael Hauptmann, Brookhaven National Laboratory
Steve Yabusaki, Pacific Northwest National Laboratory
Vernon Ichimura, EnergySolutions
Brian Andraski, USGS
Van Price, Advanced Environmental Solutions, LLC
Robert Ford, EPA
Craig Benson, University of Wisconsin-Madison
Glendon Gee, Pacific Northwest National Laboratory
W. Jody Waugh, S.M. Stoller Corporation
Thomas Nicholson, NRC/RES
Thomas Fogwell, EnergySolutions - Fluor Hanford Team
Todd Rasmussen, University of Georgia
James Bollinger, Savannah River National Laboratory

ACNW STAFF

John Larkins
Neil Coleman
Antonio Dias
John Flack
Latif Hamdan
Michele Kelton
Michael Lee
Richard Savio
Michael Snodderly
Derek Widmayer

ATTENDEES FROM THE NUCLEAR REGULATORY COMMISSION

SEPTEMBER 18, 2006

V. Holahan	RES
D. Cool	NMSS
P. Liotta	NMSS
B. Eid	NMSS
A. Kock	OEDO
J. Mitchell	RES
A. Bradford	NMSS
G. Bjorkman	NMSS
J. Shepherd	NMSS
K. O'Sullivan	NMSS
M. Shah	NMSS
J. Chuang	NMSS
B. Jagannath	NMSS

ATTENDEES FROM THE NUCLEAR REGULATORY COMMISSION (CONT'D)

SEPTEMBER 19, 2006

P. Reed	RES
A. Schwartzman	RES
T. Nicholson	RES
B. Eid	NMSS
A. Fetter	NMSS
D. Esh	NMSS
J. Shepherd	NMSS
H. Arlt	NMSS
J. Bradbury	NMSS
J. Shaffner	NMSS
J. Peckenpaugh	NMSS
A. C. Ridge	NMSS
Q. Gan	NMSS
J. Moore	NMSS
J. Hammelman	SAIC
A. Gray	NMSS
R. Johnson	NMSS
A. Gross	NMSS

SEPTEMBER 20, 2006

P. Reed	RES
A. Schwartzman	RES
B. Eid	NMSS
G. Stirewalt	NRR
T. Nicholson	RES
H. Arlt	NMSS

APPENDIX C
173RD ACNW MEETING
SEPTEMBER 18-21, 2006

ATTENDEES FROM THE NUCLEAR REGULATORY COMMISSION (CONT'D)

SEPTEMBER 20, 2006

A. Fetter	NMSS
J. Peckenpaugh	NMSS
A. Gross	NMSS
J. Shepherd	NMSS
J. Bradbury	NMSS

SEPTEMBER 21, 2006

E. Hackett	NMSS
W. Brach	NMSS
R. Wharton	NMSS
R. Jagannath	NMSS
M. Shah	NMSS

ATTENDEES FROM OTHER AGENCIES AND GENERAL PUBLIC

SEPTEMBER 18, 2006

J. Johnsrud	Sierra Club
T. Rockwell	Radiation, Science & Health, Inc.
E. von Tiesenhausen	Clark County
B. Eid	NMSS
J Lieberman	Self
B. Looney	Savannah River National Lab.

SEPTEMBER 19, 2006

G. Dickert	Washington Savannah River Co. (WSRC)
E. von Tiesenhausen	Clark County, NV
T. Rasmussen	University of Georgia
J. Bollinger	Savannah River National Lab.
D. D'Arrigo	NIRS
G. Oliver	Nuclear Energy Institute
P. Beam	DOE
J. Lieberman	Self
S. Werts	NRR
C. Barr	NMSS
L. Sutton	EM-DOE

APPENDIX C
173RD ACNW MEETING
SEPTEMBER 18-21, 2006

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

SEPTEMBER 19, 2006 (Cont'd)

D. Jones	Lincoln County, NV
J. Greeves	JTG
A. Clarke	ANC Associates, Inc.
D. Lesmes	DOE-SC
R. Anderson	DOE-SC
M. Adam	EPA
J. Pye	Nuclear Waste Technical Review Board
K. Rosenberger	WSRC
S. Thomas	WSRC

SEPTEMBER 20, 2006

E. von Tiesenhausen	Clark County, NV
A. Clarke	ANC Associates, Inc.
G. Oliver	Nuclear Energy Institute
K. Rosenberger	WSRC
J. Lieberman	Self
M. Adam	EPA
S. Thomas	WSRC
G. Dickert	WSRC
J. Pye	Nuclear Waste Technical Review Board
M. VanDerVoort	Texas A&M University
B. Neuman	Carter Ledyard & Milburn

SEPTEMBER 21, 2006

E. Von Tiesenhausen	Clark County, NV
N. Henderson	BSC

APPENDIX D: FUTURE AGENDA

The Committee approved the following topics for discussion during its 174th meeting November 14–17, 2006:

- Update on Status of Seismic Design Bases and Methodology: NRC Perspective
- Results from the Liquid Radioactive Release Lessons Learned Task Force
- Preparation for Meeting with NRC Commissioners
- ACNW Working Group Meeting on Decommissioning Lessons Learned
- Dose Effect Relationships and Estimation of the Carcinogenic Effects of Low Doses of Ionizing Radiation
- White Paper on Potential Advanced Fuel Cycles
- Proposed Revision to Regulatory Guide 1.112, Calculation of Releases of Radioactive Materials in Gaseous and Liquid Effluents from Light-Water-Cooled Reactors
- Proposed Revision to Regulatory Guide 4.15, Quality Assurance for Radiological Monitoring Programs (Inception Through Normal Operations to License Termination) – Effluent Streams and the Environment
- Discussion of draft and possible letters and reports on the following:
  - Developing Model Confidence Through the Use of Site Monitoring
  - Spent Nuclear Fuel Transportation Package Responses to Tunnel Fire Scenarios
  - Update on Status of Seismic Design Bases and Methodology: NRC Perspective
  - Results from the Liquid Radioactive Release Lessons Learned Task Force
  - ACNW Working Group Meeting on Design and Construction Considerations for Decommissioning
  - Dose Effect Relationships and Estimation of the Carcinogenic Effects of Low Doses of Ionizing Radiation
  - Proposed Revision to Reg Guide 1.112, Calculation of Releases of Radioactive Materials in Gaseous and Liquid Effluents from Light-Water-Cooled Reactors
  - Proposed Revision to Reg Guide 4.15, Quality Assurance for Radiological Monitoring Programs (Normal Operations) – Effluent Streams and the Environment

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
4-27	**ACNW Working Group Meeting on Using Monitoring to Build Model Confidence**

1. Article, "NCRP-136 Misrepresents the Scientific Evidence," by Radiation, Science & Health, Inc., provided by Theodore Rockwell, Radiation, Science & Health, Inc. **[Handout]**

2. Article, "Nuclear Power Plants and Their fuel as Terrorist Targets," *Science*, Vol. 297, September 20, 2002, provided by Theodore Rockwell, Radiation, Science & Health, Inc. **[Handout]**

3. Role of Models in Demonstration, Compliance with Licensing Requirements, presented by Vernon Ichimura, EnergySolutions **[Viewgraphs]**

4. Groundwater Monitoring in Support of License Termination at Yankee Nuclear Power Station, presented by Dave Scott and Eric Darois, Radiation Safety & Control Services, Inc. **[Viewgraphs]**

5. 3D Geospatial Models to Support Decisions in Complex Decommissioning, presented by James Shepherd, NRC/NMSS **[Viewgraphs]**

6. Limitations with Integrating Monitoring and Modeling in the Context of Decommissioning, presented by Mark Thaggard, NRC/NMSS **[Viewgraphs]**

7. Integration of Performance Assessment and Monitoring, presented by Matthew Kozak, Monitor Scientific, LLC **[Viewgraphs]**

8. Integrating Monitoring with Performance Assessment, presented by David Esh, NRC/NMSS **[Viewgraphs]**

9. Contaminant Transport Considerations at the Hanford Site, presented by Mike Fayer, Pacific Northwest National Laboratory **[Viewgraphs]**

10. Detection, characterization and delineation of contaminant plumes, presented by Brian Looney, Savannah River National Laboratory **[Viewgraphs]**

APPENDIX E
173RD ACNW MEETING
SEPTEMBER 18-21, 2006

MEETING HANDOUTS (CONT'D)

AGENDA ITEM NO.	DOCUMENTS
4-27 (cont'd)	11. Tritium Investigation and Remediation at Brookhaven National Laboratory, presented by Thomas Burke and Michael Hauptmann, Brookhaven National Laboratory **[Viewgraphs]**
	12. Uranium Reactive Transport in a Vadose Zone-Aquifer-River System, presented by Steve Yabusaki, Pacific Northwest National Laboratory **[Viewgraphs]**
	13. Barnwell Low-Level Radioactive Waste Disposal Facility Groundwater Migration Modeling Overview, presented by Vernon Ichimura, EnergySolutions **[Viewgraphs]**
	14. Monitoring and Modeling to Improve Understanding of Contaminant-Transport Processes in an Arid Environment, presented by Brian Andraski, U.S. Geological Survey **[Viewgraphs]**
	15. Toward a Modeling Mindset for Nuclear Facility Site Performance — Integrating Groundwater Modeling with Groundwater Monitoring, presented by Van Price, Advanced Environmental Solutions, LLC **[Viewgraphs]**
	16. Site Characterization to Support Model Development for Contaminants in Ground Water, presented by Robert Ford, U.S. Environmental Protection Agency **[Viewgraphs]**
	17. Hydrology of Landfill Final Covers: Modeling and Monitoring, presented by Craig Benson, University of Wisconsin-Madison **[Viewgraphs]**
	18. Monitoring and Modeling of ET Covers, presented by Glendon Gee, Pacific Northwest National Laboratory **[Viewgraphs]**
	19. Performance Monitoring and Sustainability of Engineered Covers for Uranium Mill Tailings, presented by W. Jody Waugh, S.M. Stoller Corporation **[Viewgraphs**
	20. Coupling Monitoring Programs to Modeling, presented by Thomas Nicholson, NRC/RES and James Shepherd, NRC/NMSS **[Viewgraphs]**
	21. Monitoring to Provide Long-Term Control of Contaminants, presented by Thomas Fogwell, EnergySolutions - Fluor Hanford Team **[Viewgraphs]**

APPENDIX E
173RD ACNW MEETING
SEPTEMBER 18-21, 2006

MEETING HANDOUTS (CONT'D)

AGENDA ITEM NO.	DOCUMENTS
4-27 (cont'd)	22. Evaluation of Subsurface Radionuclide Transport at Commercial Nuclear Power Production Facilities, presented by Todd Rasmussen, The University of Georgia and James Bollinger, Savannah River National Laboratory **[Viewgraphs]**
29	**Disposition of Public Comments on Spent Nuclear Fuel Transportation Package Responses to Tunnel Fire Scenarios (NUREG/CR-6886) for the Baltimore Tunnel and NUREG/CR-6894 for the Caldecott Tunnel**
	23. Response to Comments, presented by Chris Bajwa dn Earl Easton, Spent Fuel Project Office and Harold Adkins, Pacific Northwest National Laboratory **[Viewgraphs]**

APPENDIX E
173RD ACNW MEETING
SEPTEMBER 18-21, 2006

MEETING NOTEBOOK CONTENTS

TAB NUMBER (S)	DOCUMENTS
	Agenda, 173rd ACNW Meeting, September 18-21, 2006, dated September 14, 2006
	Color Code — 173rd ACNW Meeting
4-27	**ACNW Working Group Meeting on Using Monitoring to Build Model Confidence**
	1. Status Report
	2. Prospectus
29	**Disposition of Public Comments on Spent Nuclear Fuel Transportation Package Responses to Tunnel Fire Scenarios (NUREG/CR-6886) for the Baltimore Tunnel and NUREG/CR-6894 for the Caldecott Tunnel**
	1. Status Report