



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

July 17, 2006

MEMORANDUM TO: ACNW Members
ACNW Staff

FROM: *Michele S. Kelton*
Michele S. Kelton
Technical Secretary, ACNW

SUBJECT: CERTIFIED MINUTES OF THE 169TH MEETING OF THE ADVISORY
COMMITTEE ON NUCLEAR WASTE (ACNW), APRIL 18-20, 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 the 169th Meeting
April 18-20, 2006

cc: A. Bates, SECY (O-16C1)
S. Jones, NMSS (T-8A23)
B. Sosa, EDO (O-16E17)



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

MEMORANDUM TO: Antonio Dias, Team Leader
ACRS/ACNW

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

SUBJECT: PROPOSED MINUTES OF THE 169TH MEETING OF THE
ADVISORY COMMITTEE ON NUCLEAR WASTE (ACNW)
APRIL 18-20, 2006

I certify that, based on my review of these minutes¹, 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: None

A handwritten signature in cursive script that reads "Michael T. Ryan".

Michael T. Ryan, Chairman

7/17/06

Date

¹ Minutes of the 169th Meeting of the ACNW held April 18-20, 2006, dated July 17, 2006.



UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON NUCLEAR WASTE
WASHINGTON, D.C. 20585-0001

July 17, 2006

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

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

SUBJECT: PROPOSED MINUTES OF THE 169TH MEETING OF THE
ADVISORY COMMITTEE ON NUCLEAR WASTE (ACNW)
APRIL 18-20, 2006

Enclosed are the proposed minutes of the 169th 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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CERTIFIED

7/17/06
By MICHAEL T. RYAN

Issued: 7/17/06

**CERTIFIED MINUTES OF THE 169TH MEETING OF THE
ADVISORY COMMITTEE ON NUCLEAR WASTE
APRIL 18-20, 2006**

The U.S. Nuclear Regulatory Commission (NRC) Advisory Committee on Nuclear Waste (ACNW or the Committee) held its 169th meeting on April 18-20, 2006, at One White Flint North, 11555 Rockville Pike, Rockville, Maryland. The ACNW published a notice of this meeting in the *Federal Register* on April 12, 2006 (71 FR 18785) (see Appendix A of these minutes). This meeting served as a forum for attendees to discuss and take appropriate action on the items in the agenda (see Appendix B of these minutes). 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. Transcripts may also be downloaded from, or reviewed on, the Internet at <http://www.nrc.gov/reading-rm/doc-collections/acnw/tr/> at no cost.

ACNW Members, Michael T. Ryan (ACNW Chairman), Allen G. Croff (ACNW Vice Chairman), James H. Clarke, William J. Hinze, and Ruth Weiner attended this meeting. For a list of other attendees, see Appendix C of these minutes.

I. CHAIRMAN'S REPORT (OPEN)

[Neil Coleman 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.

II. OVERVIEW OF ACCELERATOR MASS SPECTROMETRY (OPEN)

[Neil Coleman was the Designated Federal Official for this part of the meeting.]

The Committee was briefed by David Elmore of the PRIME Laboratory, Purdue University, in response to the Committee's concerns regarding the precision and accuracy of the measurement of cosmogenic isotopes being used to date and trace water movement at the proposed Yucca Mountain repository. He provided an overview of the accelerator mass spectrometry (AMS) methodology, including a review of AMS theory and instrumentation, challenges, statistical data analyses, and checks and balances that are used. Checks and balances include the use of chemistry blanks, analysis of multiple samples from each location, multiple collection dates, and the use of blind repeats. Dr. Elmore's initial slides included a diagram of the AMS lab setup and views of the ion source equipment and inside the accelerator. Although AMS can be used for other isotopes, the focus of this overview was on chlorine-36 analyses such as those that have been performed for Yucca Mountain. In practice, the laboratory cycles through three isotopes of chlorine (chlorine-35, chlorine-36, and chlorine-37), cycles through samples 2-5 times, measures a standard every 3-5 samples, measures a blank every 10-20 samples, and stops when 5 percent uncertainty is achieved. The standards come from the National Institute of Standards and Technology (NIST). The laboratories share standards with each

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other to ensure agreement on these standards. There has been no such problem with chlorine but previously there was a problem with the iodine-129 standards. The problem was not realized until one lab's measurements were compared with another lab's. Iodine-129 in the standard was not in chemical equilibrium. The standard was used for dilution, and light decomposed it; thus, the standard changed with time. Because the chemistry for chlorine is much simpler, this has not been a problem for chlorine-36. Every few years the PRIME laboratory compares its standards with those at Lawrence Livermore and vice versa. Thus far, no problems have turned up for chlorine.

Dr. Elmore summarized the kinds of statistical data analyses that are performed for AMS results. People who submit samples are responsible for issues such as ensuring sufficiency of sample size, obtaining multiple samples from each location, using multiple collection dates, and submitting blind repeat samples for the same AMS laboratory and for different laboratories. Actual data results were presented showing relative uncertainty versus chlorine-36 content, the interference rate from sulfur-36, and the beam current.

Dr. Elmore reviewed some of the problems and challenges encountered in AMS work. These include sampling issues, such as the mixing of sources, chloride contamination, and chlorine-36 contamination from bomb pulse, *in situ* produced chlorine-36, and reactor materials. Additional challenges include (1) the effects of sulfur-36 in sample preparation and loading and in cathode material, accelerator parameters, and blank correction techniques, and (2) the use of standards (chlorine-36 loss in beam line or due to sulfur-36 rejection). Nonetheless, a careful and complete error analysis usually identifies problem samples. In summary, AMS is a complex but powerful analysis tool for hydrologic studies.

Dr. Elmore presented some examples of Yucca Mountain data. He illustrated the percent uncertainty versus the amount of chlorine-36, with a chlorine-36 to chloride ratio of 10^{-15} , with a blank at approximately 1×10^{-15} . Most of the samples were below 5 percent precision. Some have poorer precision. At very low ratios the precision drops because of the fewer counts. If a value of the measurement is less than two times the uncertainty, then the researcher can only report an upper limit.

AMS is a sufficiently complicated measurement tool that some people might conclude that a lot of error comes from the methodology. That is not true because the lab has a good handle on the overall instrument error. Generally when samples have large errors it is possible to identify what caused the problem. Those larger errors are reported, but most of the samples are down in the 5 percent error range. The biggest uncertainty comes from sampling. The submitter has to determine what would be the source of the chlorine-36 atoms in a sample and whether it is bomb pulse or meteoric. For example, there are field studies of glacial moraines where measurements have been taken on lots of boulders to assess the moraine exposure time. There have been cases where they all agree to within 3 to 5 percent over an entire field of rocks, which incorporates instrument and sampling variability.

III. UPDATE ON U.S. DEPARTMENT OF ENERGY CHLORINE-36 (³⁶CL) STUDIES AT YUCCA MOUNTAIN (OPEN)

[Neil Coleman was the Designated Federal Official for this part of the meeting.]

Drew Coleman (U.S. Department of Energy [DOE]) provided the Committee with an update of the ongoing chlorine-36 studies. He reviewed the history of the U.S. Geological Survey-Los Alamos National Laboratory (USGS-LANL) validation activities, which began in 1999. After

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initially achieving similar results, both groups analyzed core samples from a location that previously had shown a bomb pulse signature. The new results disagreed: the USGS data indicating no bomb pulse, and the LANL results indicating bomb pulse. DOE requested both groups write up their validation work in a joint report and document the results from both perspectives. DOE has reviewed the final report and expects it to be available to the public in a few weeks.

The presenter gave the status of the University and Community College System of Nevada follow-on study on chlorine-36. This study is entitled "Bomb-Pulse Cl-36 at the Proposed Yucca Mountain Repository Horizon: An Investigation of Previous Conflicting Results and Collection of New Data." The purpose of this study is to determine the cause of the conflicting results and obtain new data. The first set of samples was leached and tested for chlorine-36 in August 2005; however, the results were problematic in that unreasonably high levels of chlorine-36 were seen in some samples, particularly for those containing low chloride content. The investigators took measures to reduce the chlorine-36 background levels and prepared and tested additional blanks to verify their techniques. The investigators are reasonably confident that they resolved the issues, and they have tested rock and soil samples again. The PRIME laboratory analyzed those samples in March 2006, and the study team is reviewing the results. This follow-up study has now ended, and the investigators are preparing a final report. DOE will decide on a path forward from this point. Additional confirmation is needed to build confidence in the data measurement and interpretation to use chlorine-36 in evaluating the presence of a bomb pulse in a deep unsaturated zone.

There are places in the world where one can measure the variation of chlorine-36 without the interference of a bomb pulse. Much work has been done with ice cores from Greenland and the Antarctic. Most of the deep ice predates any bomb-pulse effects. The deeper ice goes back in age as far as 300,000 years—none of the prehistoric levels of chlorine-36 come close to bomb-pulse levels. All are below $1,000 \times 10^{15}$. There is an observed variability in the chlorine-36 production rate over time in response to variations in the Earth's magnetic field. This varies between 500×10^{15} to 1000×10^{15} .

IV. BRIEFING FROM THE NATIONAL ACADEMY OF SCIENCES (NAS) ON ITS 2006 REPORT ON THE TRANSPORTATION OF HIGH-LEVEL NUCLEAR WASTE (OPEN)

[Richard Savio was the Designated Federal Official for this part of the meeting]

The ACNW was briefed by representatives of the National Academy of Sciences (NAS) on the findings from its recent report on the safety of the transportation of spent nuclear fuel and high-level waste. This briefing was for the ACNW's information. Kevin Crowley, Joseph Morris, Mel Kanninen, and Hank Jenkins-Smith represented the NAS. William Ruland and Earl Easton of the NRC staff participated in these discussions. The information provided will be utilized in the Committee's future deliberations on transportation safety issues. The NAS Nuclear and Radiation Studies Board was tasked with providing an independent analysis of spent nuclear fuel and high-level waste (HLW) transportation in the United States. The principal motivation consisted of proposals to construct and operate a repository at Yucca Mountain, Nevada, and to construct and operate an interim spent fuel storage facility in Utah. The study was later expanded to address the transport of spent research reactor fuel. The study does not address security risks associated with the transportation of radioactive waste. NAS was tasked to assess the risks associated with the transportation of spent nuclear fuel and HLW, identify associated key technical and societal concerns, and recommend steps to address any identified concerns. This task was later expanded to assessing the manner in which DOE selects

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transportation routes and as needed recommend improvements. In February 2006, NAS released the study "Going the Distance? The Safe Transport of Spent Nuclear Fuel and High-Level Radioactive Waste in the United States." The following are the highlights of the discussions with the NAS representatives:

- The study committee could identify no fundamental technical barriers to the safe transportation of spent nuclear fuel and HLW in the United States and stated that the safety risks associated with the transport of these materials are well understood and generally low. Extreme accidents involving very long duration fires need additional attention. The study committee noted that the likelihood of very long duration fires appears to be low and that the occurrence and consequences can be further reduced through relatively simple operational controls and restrictions.
- The study committee identified a number of social and institutional challenges that will require an expeditious resolution. The study committee recommended that transportation planners take early and proactive steps to establish formal mechanisms for gathering advice about social risks and their management. Social risks will sometimes involve issues such as trust, loss of a sense of security, economic loss, and other factors not captured in a technical analysis.
- The study committee recommended that an independent evaluation of transportation security be carried out prior to the commencement of large-quantity shipments to a Federal repository or to interim storage. As noted, the study committee did not perform a review of transportation security. A small group of the study committee members, with the required clearances, did receive a classified briefing from the NRC staff. Some of the study committee members did not have the necessary security clearances, and there were some questions as to how information could be shared. The study committee in the end did not have the necessary time to perform a review of the security-related transportation issues.
- The study committee stated that current international standards and U.S. regulations are adequate to ensure package containment effectiveness over a wide range of transportation conditions. There may however be a small number of extreme accident conditions involving very long duration fires that could compromise containment effectiveness.
- The study committee recommended that NRC undertake a detailed analysis of the impact of very long duration fires on waste package performance and implement operational controls and restrictions as necessary to reduce the chances that such conditions might be encountered in service. NRC was performing such an analysis during the course of the NAS study and is now addressing these issues.
- The study committee strongly endorsed the use of full-scale coding to determine how well packages perform under regulation and credible extra regulatory conditions and that full-scale testing should continue as part of integrated testing programs to validate package performance. The study committee stated that full-scale testing to destruction should not be required.
- DOE procedures for selecting shipment routes appear on the whole to be adequate and reasonable. Department of Transportation (DOT) routing regulations are satisfactory—provided that shippers actively and systematically consult with affected States and Indian tribes. The study committee recommended that DOE make public its selection of

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preferred highway and rail routes as soon as practical to support State, tribal, and local planning and begin to execute its emergency responder preparedness responsibilities.

- The study committee strongly endorsed DOE's decisions to use rail shipment by dedicated trains as a preferred method and recommended that DOE fully implement these decisions before commencing large-quantity shipments. The study committee endorsed DOE's negotiation with spent nuclear fuel owners to ship older fuel first and recommended that Congress consider legislative remedies if negotiation was not effective. The study committee also recommended that transport to a Federal repository be initiated through a pilot program utilizing relatively short, logistically simple movements of older fuel.
- The study committee recommended that DOE and Congress examine the following options for changing DOE organizational structure for transporting material to a Federal repository by establishing one of the following: (a) a quasi-independent DOE office reporting to upper-level DOE management; (b) a quasi-government corporation; or (c) a fully private organization operated by the commercial nuclear industry.
- The study committee recommended that DOE create a risk advisory group to obtain advice on risk characterization, communications, and mitigation. The study committee did not recommend sponsoring additional research on social risks. The study committee recommend including experts on social risk in the discussion of technical issues to increase communication and the breath of the perspective of these discussions.

V. PROPOSED RULEMAKING ON NATURALLY OCCURRING OR ACCELERATOR-PRODUCED RADIOACTIVE MATERIALS (OPEN)

[Neil Coleman was the Designated Federal Official for this part of the meeting.]

The Committee was briefed by Scott Moore and Lydia Chang of the U.S. Nuclear Regulatory staff on the proposed rule, which implements Section 651(e) of the Energy Policy Act of 2005 (the Act), to amend the definition of byproduct material in the Atomic Energy Act Section 11e to add certain naturally-occurring and accelerator-produced radioactive material (NARM). The result of these additions will bring regulatory control of NARM under NRC and Agreement State regulation. Ms. Chang pointed out that the Act requires NRC to finalize this new regulation within 18 months of the signing of the Act by the President.

Ms. Chang explained that the new definition includes discrete sources of radium-226, accelerator-produced radioactive material and other discrete sources of naturally-occurring radioactive material (NORM) that pose a similar threat as radium. Ms. Chang explained that the Act allowed for NRC to grant a waiver; NRC granted a waiver in August 2006 to allow States who were regulating these materials when the Act was passed to continue regulating. The waiver is effective through August 7, 2006, for import and export of NARM and effective through August 7, 2009, for other activities.

Ms. Chang described the cooperative effort of the NRC staff with the States in development of the proposed rule. The task force for implementing all of the provisions of the Act, as well as the working group that produced the NARM rulemaking, have had several representatives from the States, some full time, to assist with the efforts. NRC also involved stakeholders by holding a workshop in November 2005. Ms. Chang also mentioned that a smaller working group of Federal agency representatives was used to develop the definition of "discrete source" in the

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rule. The use of the Suggested State Regulations from the Conference of Radiation Control Program Directors (CRCPD) to aid in the development of NRC's proposed rule was discussed.

Ms. Chang explained that the proposed rule includes materials produced in accelerators and materials incidentally made radioactive in particle accelerators but not in accelerators that produce beams for nuclear therapy. Chairman Ryan asked about decommissioning, and Ms. Chang explained that any incidentally-produced radioactive material from decommissioning an accelerator not regulated by the NRC would still need to be disposed of appropriately as radioactive waste, if necessary. To implement the new definition, Ms. Chang explained that additions and changes were made to existing regulations, especially in the Title 10 of the *Code of Federal Regulations* (10 CFR) Part 30, but that the staff was not proposing any new parts.

Dr. Ryan asked if the new discrete source definition was risk-informed. He pointed out that a concentration-based definition was not by itself a measure of risk. The NRC staff explained that the Act required NRC to produce this definition, and that NRC had flexibility in coming up with the term. Dr. Ryan suggested that the Committee might look at this to see if there were any potential pitfalls in the definition. Mr. Moore pointed out that the proposed rule was with the Commission and that the Commission was holding a public meeting on the rule on May 15, 2006.

The Committee discussed that the rule did not address technologically-enhanced NORM (TENORM) such as from sewage treatment plants. Dr. Ryan noted that this left out many sources of radioactive material that could potentially be brought under this rule but for the definition. He pointed out that these materials are not orphans from a regulatory-standpoint but that the States have been regulating these materials for years and presumably would continue to do so.

Ms. Chang discussed the implementation strategy for the rule, including the requirements for new licenses and amended licenses and the differences in timing allowed for under different circumstances. She also explained that NRC would be publishing a transition plan to guide an orderly change from State to NRC regulation.

Chairman Ryan asked whether there was a large amount of material that would be brought under NRC regulations by this change. Mr. Moore answered that there would not be a great volume of material but that there was a great variation of materials between the different accelerators and the different sources of radium. The Committee discussed the fact that high radiation fields are associated with some accelerators but not necessarily with high activity materials and the related the coordination challenge for the States and NRC. The States will regulate the operation of some accelerators, and the NRC will regulate the subsequently-produced material.

Dr. Clarke inquired about guidance that might explain some of the intricacies of the rule. The NRC staff said that the staff has not begun preparing the guidance but that some the explanations of some of the topics discussed were in the Statement of Considerations. The Committee discussed additional clarifications of the waivers for existing facilities.

Ms. Chang and Mr. Moore explained the issues with compatibility and the comments received by the Commission from the Organization of Agreement States and the CRCPD on this matter. Dr. Ryan inquired as to whether enough flexibility was included in the rule to allow for adjustments as staff learns more about these items, and the staff said they thought there was.

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Dr. Ryan pointed out that guidance and license conditions were good places to address the exact needs of a situation while leaving the rule flexible.

VI. UPDATE ON DOE ACTIVITIES AT THE YUCCA MOUNTAIN SITE (OPEN)

[Neil Coleman was the Designated Federal Official for this part of the meeting.]

The Committee was briefed by Scott Wade, Director of the Office of Facility Operations of the U.S. Department of Energy (DOE), Office of Civilian Radioactive Waste Management (OCRWM). Mr. Wade provided an overview of the improvements being made to the above- and below-ground infrastructure of the Yucca Mountain Repository Site Facilities. The briefing covered improvements made to the Exploratory Studies Facility, entryways at both the North and South Portals, utility systems, roadways, and laydown facilities.

Mr. Wade pointed out that these improvements to the infrastructure were as a result of a 2004 assessment that showed that OCRWM should focus FY 2005–FY 2008 funding on safety improvements to workers. Basic improvements to the utilities underground include upgrades to the fire alarm and suppression systems, lighting and ventilation, and ground support within the underground facilities. Future improvements include removing and disposing of the 16-foot-diameter tunnel boring machine.

Mr. Wade explained that most of the improvements to the entryways at the North and South Portals were to address additional security requirements. A large number of these improvements are needed to add electricity and basic utilities to Gate 510. Improvements to the roadways are to address safety concerns and to bring the roads up to modern specifications, again primarily to address safety of the workers. These roadway improvements will also reroute traffic to make travel between site facilities at Yucca Mountain more efficient. The equipment and laydown areas require major improvement because most of the facilities have been built with temporary structures.

Mr. Wade briefly addressed a small fire at the site that occurred in February 2006. DOE is building a new fire station to address the problematic, long response time to the February fire. The fire station will also contain medical facilities, which do not exist at this time. A major improvement at the site will be deployment of a dedicated power line to provide electricity to the surface and underground structures at the site. DOE will include a major upgrade to site communications system to improve communications and alert and response capabilities.

Mr. Wade addressed strategic planning that his office is doing, which will result in placing Federal OCRWM staff closer to the site. OCRWM is planning on opening offices in Pahrump, the Lathrop Wells area, and Caliente, NV. The Pahrump and Caliente facilities are planned to be opened in FY 2006.

Dr. Weiner pointed out the difficulties in placing and maintaining competent engineering staff in remote locations as based on her experience with the Waste Isolation Pilot Plant (WIPP) in New Mexico. She mentioned two major obstacles: the lack of schools and medical facilities and the lack of employment for family members who are not employed by DOE. Mr. Wade said that OCRWM had been working with Nye County to address several of these issues through long-term strategic planning.

Dr. Weiner asked why some of these basic design items, like drainage, were not addressed in the original design. Mr. Wade said that probably funding decisions were the main reason that

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temporary structures and shortcuts in design were previously elected. Dr. Weiner also asked about the occupational health and safety record of the underground facilities. Mr. Wade responded that the recordable incident injury rate and lost work rate at Yucca Mountain were some of the lowest rates within DOE.

Dr. Hinze asked how OCRWM was preparing for seismic hazards in the new facilities, especially the electrical structures. Mr. Wade answered that the Uniform Building Code for seismic hazards was being followed and that the structures would be built the same as any Las Vegas structure.

VII. UPDATE ON NYE COUNTY INDEPENDENT EARLY WARNING DRILLING PROGRAM (OPEN)

[Neil Coleman was the Designated Federal Official for this part of the meeting.]

Drew Coleman (DOE) gave a brief introduction on the scope and work elements under the cooperative agreement between DOE and Nye County. Representing Nye County, Nevada, John Campanella (Norwest Questa) then presented a status update on the County's Early Warning Drilling Program and the results of recent testing. He reviewed the history, goals, and major accomplishments of the Nye County program.

Information was provided about the locations and completion of the Phase V wells, implementation and results of tracer testing at well site EWDP-22S (located near Fortymile Wash), installation of a U-tube in well EWDP-24PB (for water sampling under downhole ambient conditions), and plans for the drilling and testing of a horizontal well. Preliminary analysis of the tracer tests using both analytical and numerical simulation indicates that diffusion into immobile water was minimal and that a fast flowpath exists between one of the injection wells and the pumping well in the shallow alluvial aquifer. A long pumping interruption between the two cross-hole tests allowed the natural drift of the groundwater to move the tracer plumes laterally.

Other key findings of the Nye County work are that upward hydraulic gradients are generally observed from deeper to shallower aquifers (local downward gradients are seen at paleospring sites) and sonic coring is the best method to collect representative samples of saturated alluvium. The "layer cake" hydrostratigraphy seen at Yucca Mountain does not exist far to the south of Highway 95. The continuity of volcanic aquifer units is complicated by the presence of buried older faults in volcanic units at and several miles north of Highway 95. Vertical gradients can be orders of magnitude larger than horizontal gradients. Flow in the volcanic aquifers likely occurs in structurally controlled compartments. Flow in alluvial aquifers is controlled by textural units (paleochannels) and likely affected by local vertical gradients near underlying faults.

The Committee discussed the current thinking regarding the horizontal extent of the saturated zone flow path that occurs in alluvium. DOE analysis indicates an uncertainty zone, based on recent drilling, that indicates a minimum travel path of 0.5-1.5 km in the alluvium to the 18-km boundary. Some flow pathways trend due south and stay in the volcanics for a large part of their travel, but these flow pathways travel least 0.5 km in the alluvium.

An attendee asked whether Nye County has optimized its drilling plan based on what is needed from a risk-significance point of view for performance assessment. The Committee then discussed the testing of horizontal wells drilled through faults. This testing evaluates whether faults act as barriers or conduits. If the faults are conduits, then the travel time of groundwater

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would increase because the flow will concentrate along those. David Diodato (Nuclear Waste Technical Review Board [NWTRB] staff) commented on the risk-significance question. He commented that the saturated zone alluvium does have risk significance. In consideration of the presented Nye County work, he noted that the tracer tests indicate that the stratigraphic architecture could make a difference in terms of radionuclide transport—especially if buried paleo-channels in the alluvium work out as part of a valid conceptual model.

VIII. MODELING IGNEOUS ACTIVITY: DYNAMIC CONTROLS ON SUMMIT AND FLANK ERUPTIONS OF BASALT (OPEN)

[Neil Coleman was the Designated Federal Official for this part of the meeting.]

The Committee was briefed by Andrew Woods (BP Institute, Cambridge, United Kingdom), a consultant to the Center for Nuclear Waste Regulatory Analyses (CNWRA), regarding CNWRA's draft paper entitled, "Modeling the Dynamics of Simultaneous Flank and Summit Eruptions of Basaltic Magma" (the CNWRA study). This paper is currently undergoing peer review for possible publication in the *Bulletin of Volcanology*. The paper presents results from experimental modeling of a volcanic eruption in which two volcanic vents exist—one on the summit of a cinder cone and another on the flank of the cone at lower elevation. In the introduction to this briefing, an NRC representative from the Office of Nuclear Material Safety and Safeguards (NMSS) described this study as being interim in nature and said that to date it has not led to published conclusions regarding its impact on risk from igneous activity at Yucca Mountain.

Many basaltic volcanic eruptions involve the simultaneous discharge of magma from multiple vents with a range of eruption styles and rates including both violent explosions and effusive lava flows. The CNWRA study reviews simultaneous flank and summit eruptions at analog basaltic volcanoes and investigates partitioning of magma flux and, thus, the relative importance of explosive discharge versus effusive lava flows, between summit and flank vents. Both numerical and experimental modeling was used to study the key controls on the flux partitioning. The authors state with reference to their experimental studies, "Although the effects of two-phase flow are difficult to evaluate with tractable numerical models, analog experiments can provide useful insights on the effects of gas and magma segregation on flow partitioning." The experiments primarily involve the measure of the flux of water under pressure through simulated summit and flank vents with varying concentration of air bubbles in the water. The results of the CNWRA study, although admittedly simplified from actual conditions, illustrate how the elevation differential of the vents and the distance of flank vents from the main (summit) magma conduit, as well as the volatile content of the magma and the partitioning of the volatiles between the vents, control the relative eruption rates between summit and flank vents.

Dr. Woods described the experimental setup, modeling of the results, and the conclusions reached. In the apparatus, gas was introduced to a liquid in a tube using porous plates to generate small bubbles. Several key assumptions were made: the conduit geometry was fixed, the "magma" source maintained constant pressure, flow was at steady state, the vent sizes were the same, flow exits the vent either with atmosphere pressure or with the speed of sound in a two-phase mixture, and a simplified homogeneous flow of magma and gas occurs. Several modeling results were reported. At low gas content, the water in the experiments preferentially follows the lower flank vent as a route to the surface. As the gas content and pressure increase, the shorter flow path to the summit vent provides the easier route to the surface. An ACNW consultant commented that flank eruptions in nature develop after the main

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event starts, as at Parícutín Volcano. The ACNW consultant asked if the presenter or the NRC staff have ever seen a real volcanic system where a flank eruption starts first, producing some flows prior to the Strombolian phase. No examples were given where the flank eruption began first.

Dr. Woods presented several conclusions: (1) fluxes are partitioned between the summit and flank vents; (2) key controls were deduced from numerical and experimental modeling; (3) the gas content of the magma has important influence (if high, greater flow occurs from the summit; at smaller gas contents effusive eruption from the flank dominates); (4) if the flank vent is more distant, weaker secondary flow occurs; and (5) gas-liquid separation leads to explosive Strombolian behavior at the summit and effusion at the flank vent.

Dr. Woods noted that in his experiments the geometry of summit and flank vents was fixed. In a real system the eruption would be controlled by the geometry of the evolving dike system and by bubble-liquid dynamics. If the geometry evolves during an eruption and the pressure of the magma chamber evolves, either of these effects can change the balance during the summit and the flank eruptions. The experiments show one physically consistent picture that helps to understand why different styles of eruption of the same magma can occur from different vents simultaneously. The ACNW consultant commented that a critical thing in these experiments is the size of the bubbles relative to the conduit size. In the experiment, the bubbles are one-quarter to one-half the diameter of the volcanic conduit. In a real system, bubbles will coalesce and grow, but in the experiments the relative size of the bubbles is huge compared to the simulated conduits. Dr. Woods responded that the team was "not trying to simulate the eruption here."

IX. MODELING IGNEOUS ACTIVITY: MAGMA INTERACTIONS WITH A GEOLOGIC REPOSITORY (OPEN)

[Neil Coleman was the Designated Federal Official for this part of the meeting.]

A consultant to the ACNW, Dr. Bruce Marsh (Johns Hopkins University), gave a talk entitled "Magma Interactions with the Repository: The Effects of Solidification." This was an interim report of the characteristics of the Yucca Mountain basaltic magmas, including the characteristic rheology, solidification of these magmas upon reaching the surface, and the potential impact of their solidification on the proposed repository. The basaltic magma typical of this region when deep in the crust is likely to contain 2 to 4 percent (by mass) dissolved volatiles (principally water (H₂O) and carbon dioxide (CO₂)), which significantly affects the crystallization and viscosity of the magma. The viscosity of the magma is reduced at depth, making it more mobile. As the magma approaches the surface, and the prevailing pressure decreases to 1 atmosphere, the volatiles are lost through saturation and the magma undergoes rapid crystallization and experiences a large increase in viscosity, which strongly reduces the mobility of the magma. All lava flows that erupt on the Earth's surface contain virtually no water.

The ACNW consultant discussed the effects of water content and magma crystallinity on rheology and the location of solidification fronts. The magma that erupted at Lathrop Wells 80,000 years ago, south of Yucca Mountain, appears to have been more viscous than originally thought, and this would significantly limit how far magma of similar composition could hypothetically penetrate a repository drift. The ACNW consultant has examined the change in magma viscosity with depth within the Earth and has shown that the governing viscosity is likely to be larger by a factor of about 10⁶ when the magma reaches the surface and the repository drifts. Thus, lava may only travel 10 meters or less into a repository drift instead of flowing long

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distances. He also examined the effect of this lava quenching on the surface of a waste package and found that a 10-cm thickness of quenched glassy lava forms in about a minute. He also presented examples of similar quenching of magmas that have been observed in nature, such as lava flows quenching on trees.

During the discussion period that followed the presentation, the NMSS staff questioned the conclusions reached by the ACNW consultant regarding the volatile content of basaltic magmas reaching the surface and thus the high viscosity assigned to the intruding magma. They maintained that magmas reaching the surface remain high in dissolved volatiles and were thus very mobile. The staff maintained that such magmas could completely fill repository drifts in a matter of minutes if a dike were to intersect a repository. The ACNW consultant pointed out that the volatiles present are in the form of bubbles that have already exsolved from the magma and that the magma itself is low in volatiles and thus the mobility would be markedly decreased. This view of the ACNW consultant was strongly supported by the volcanology consultant of the Nuclear Waste Technical Review Board who participated in the discussion based on his studies of the volatile content of volcanic rocks. His research showed that when magma begins to degas it progresses very fast.

X. DOE PERFORMANCE CONFIRMATION PROGRAM PLAN: NRC STAFF PERSPECTIVE AND UPDATE (OPEN)

[Neil Coleman was the Designated Federal Official for this part of the meeting.]

Jeff Pohle and Randall Fedors, representatives of the NRC staff, briefed the Committee on staff accomplishments in this area during 2005. The staff has begun review of monitoring technologies for potential application to performance confirmation of hydrologic and geotechnical parameters. Two reports by the CNWRA will provide results of a literature review of monitoring technologies: (1) "Review of Vadose Zone Measurement and Monitoring Tools" and (2) "Review of Tools and Technologies to Monitor Repository Excavations."

The purpose of the performance confirmation program is to provide data, where practicable, to indicate whether actual subsurface conditions are within limits assumed in licensing review, and to indicate whether natural and engineered barriers are functioning as intended and anticipated. The program is required to have started during site characterization and to continue until permanent closure of a repository. The program must include in situ monitoring, laboratory and field testing, and in situ experiments, as may be appropriate to provide the required data.

To prepare for future licensing review, the staff has initiated a preliminary review of DOE's Performance Confirmation Plan (Revision 5). The kinds of comments the staff is considering relate to activities that may not be practicable with current technologies, activities that may not provide useful data, and activities that may conflict with others. Examples of comments were presented. An NRC staff member commented that DOE's plans to clean tunnel walls with water to photograph fractures could impact other planned activities requiring hydrologic or geochemical sampling or testing. The staff has provided guidance for reviewing DOE's Performance Confirmation Plan. This guidance consists of 10 CFR Part 63, Subpart F, the Yucca Mountain Review Plan, and NRC's Risk Insights Baseline Report.

Dr. Ryan commented that DOE's last presentation to ACNW on performance confirmation showed a much higher level of detail and information than their previous one. He asked whether the staff has considered the importance of data management and whether DOE has indicated how it will address data management and migration. Mr. Pohle noted that when

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developing the review plan the staff mainly considered the practicability of performing experiments, replacing sensors, and accounting for these in a detailed test plan. There are procedures for analyzing data management in the context of the performance assessment, but the NRC staff will need to determine which procedures will be best. Dr. Ryan noted that the staff may need to update the performance assessment.

XI. PHYSICAL CAPACITY OF YUCCA MOUNTAIN FOR THE EMPLACEMENT OF HIGH-LEVEL WASTE (OPEN)

[Neil Coleman was the Designated Federal Official for this part of the meeting.]

John Kessler and Mick Apted, representatives of the Electric Power Research Institute (EPRI), briefed the Committee on their latest study regarding the physical capacity of Yucca Mountain. Based on a preliminary analysis, EPRI considers it would be possible for Yucca Mountain to receive significantly more waste than the currently imposed limit of 70,000 metric tons. They presented a summary of an EPRI draft report that is expected to be available by the end of May 2006 on the capacity of Yucca Mountain to contain additional amounts of HLW.

EPRI has reviewed possible design considerations regarding the spacing of waste packages, relative aging of canisters (i.e., older is cooler), drift spacing, and the possibility that a multi-level repository could be designed and constructed. Higher repository temperatures would result, making it necessary to change some previous goals such as maintaining pillars below the boiling point for all times after repository closure. Rock walls could reach temperatures up to 200 °C and still avoid silica phase changes. Various options include (1) an expanded repository footprint, (2) design of a multi-level repository, (3) the use of grouped, single-level emplacement drifts, or (4) a combination of options.

For option 1, EPRI considered an expanded-footprint design with additional rock blocks defined by the major northwest-trending faults, from which setback distances would be required. The presenters cited various studies that have been done that examined the extended footprint design. EPRI is confident that an expansion factor of 2 could confidently be achieved. For option 2, a multi-level repository, EPRI considered a 3-level design with additional drifts 30-50 m above and below the current single-level design. This design was previously considered by DOE for Yucca Mountain, is being considered by the Europeans and Japanese, and also was discussed by Charles Fairhurst in a report to ACNW in 1999. For option 3, the staff considered groups of three disposal drifts at the same elevation with spacing of 20 m within the group and a pillar spacing of 41 m between groups. EPRI performed thermal analysis of this design and the multi-level design using the TOUGH2 Code and a series of design permutations.

Based on its calculations, EPRI derived expansion factors between 2 to 3.5 for option 1 and expansion factors between 2 to 3 for options 2 and 3. EPRI concluded that at least 4 times the existing limit of spent nuclear fuel can be emplaced at Yucca Mountain with current or limited additional information. With additional site characterization or design optimization, EPRI further concluded that possibly upwards of 9 times the existing limit could be emplaced (i.e., ~570,000 metric tons of heavy metal).

During the discussion, a question was raised concerning the significance of the physical properties of the geologic units under consideration for expansion, both in a horizontal and a vertical manner: Have the physical properties of the rocks been evaluated in terms of their stability for construction as well as for drift stability over time? EPRI staff noted that Appendix A of the draft EPRI report that will be available by the end of next month discusses some

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constructability issues. At present, EPRI sees no impediments to construction even after the initial load of 70,000 metric tons. Major geologic units, like the Topopah Spring tuff and its subunits, cover a large area for which DOE has already developed extensive rock mechanics information, thermal conductivity data, mineability estimates, and additional data. A question was also asked about the possible need for additional characterization to support expansion. EPRI notes that information is available to support an approximate expansion factor of 2. More site characterization work would be needed on some blocks to justify a higher expansion factor.

XII. NRC RADIATION RESEARCH PROGRAM (OPEN)

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

Representatives of NRC's Office of Nuclear Regulatory Research (RES) briefed the ACNW on the radiation protection related work being carried out in the RES Health Effects Branch. The Branch's programs are currently focused on supporting NRC reporting requirements, developing and improving analytical tools used to support licensing and inspection activities, and supporting the updating of identified Division 1 (Power Reactors), Division 4 (Environmental and siting), Division 8 (Occupational Health), and Division 10 (General Guidance) Regulatory Guides. The planned updating of selected Regulatory is generally to support anticipated licensing of new reactors. Possible approaches to the update of Regulatory Guidance were discussed at some length. The ACNW plan to issue a supplement to its April 14, 2006, report to the Commission on RES research and NMSS technical assistance programs. Insights gained from these discussions will be included in this report.

The strategic goals for the program are (1) to maintain and improve organizational knowledge of health effects, (2) to support the development and implementation of radiation protection standards, (3) to support the development of the rationale and technical basis for the NRC's radiation protection programs, and (4) to develop technical basis for risk-informing materials applications. The current program specially addresses support for the abnormal occurrences report and the REIRS database, the VARSKIN, MARSAME, and RESRAD computer codes, dose modeling projects. A significant amount of effort is being devoted to the revision of the current NRC regulations, codes, and standards (e.g., SECY 04-0144 and SECY-04-0030) and the identification of new guides that need to be developed. The highest priority is to be given to work that is needed to support expected new reactor licensing activities.

The meeting adjourned at 10:15 A.M. on Thursday, April 20, 2006.

the proposed Ginna EPU. Implementation of the proposed EPU would have less impact on the environment than the construction and operation of a new coal or natural-gas fired plant at an alternative site. In addition, the EPU does not involve environmental impacts that are significantly different from those presented in the 1973 FES for Ginna. Therefore, the NRC staff concludes that the impacts of the no-action alternative would be greater than the impacts of the proposed action based on information in the FES and NUREG-1437 Supplement 14.

Alternative Use of Resources

This action does not involve the use of any resources not previously considered in the FES and NUREG-1437 Supplement 14.

Agencies and Persons Consulted

In accordance with its stated policy, on [xxxxxxx], 2006, the NRC staff consulted with the State of New York official, [xxxxxxx], of the Energy Research and Development Authority, regarding the environmental impact of the proposed action. The State official had [xxxxxxx] comments.

Finding of No Significant Impact

On the basis of the environmental assessment, the Commission concludes that implementation of the action as proposed would not have a significant effect on the quality of the human environment. Accordingly, the Commission has determined not to prepare an environmental impact statement for the proposed action.

For further details with respect to the proposed action, see the licensee's application dated July 7, 2005, as supplemented by letters dated August 15, September 30, December 6, 9, and 22, 2005, and January 11 and 25, and February 16 and March 3 and 24, 2006 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML051950123, ML052310155, ML052800223, ML053480388, ML053480362, ML053640080, ML060180262, ML060960416, ML060540349, ML060810278, and ML060940312, respectively). Documents may be examined, and/or copied for a fee, at the NRC's Public Document Room (PDR), located at One White Flint North, Public File Area O-1P21, 11555 Rockville Pike (first floor), Rockville, Maryland. Publicly available records will be accessible electronically from the Agencywide Documents Access and Management System (ADAMS) Public Electronic Reading Room on the NRC

Web site, <http://www.nrc.gov/reading-rm/adams.html>. Persons who do not have access to ADAMS or who encounter problems in accessing the documents located in ADAMS should contact the NRC PDR Reference staff at 1-800-397-4209, or 301-415-4737, or send an e-mail to pdr@nrc.gov.

DATES: The comment period expires 30 days after publication. Comments received after this date will be considered if it is practical to do so, but the Commission is only able to assure consideration of comments received on or before 30 days after publication.

ADDRESSES: Submit written comments to Chief, Rules and Directives Branch, Division of Administration, U.S. Nuclear Regulatory Commission, Mail Stop T-6D59, Washington, DC 20555-0001. Written comments may also be delivered to 11545 Rockville Pike, Room T-6D59, Rockville, Maryland, 20852 from 7:30 a.m. to 4:15 p.m. on Federal workdays. Copies of written comments received will be electronically available at the NRC's Public Electronic Reading Room (PERR) link, <http://www.nrc.gov/reading-rm/adams.html>, on the NRC Web site or at the NRC's Public Document Room located at One White Flint North, 11555 Rockville Pike (first floor), Rockville, Maryland 20852. Persons who do not have access to ADAMS or who encounter problems in accessing the documents located in ADAMS should contact the NRC PDR Reference staff at 1-800-397-4209, or 301-415-4737, or by e-mail to pdr@nrc.gov.

SUPPLEMENTARY INFORMATION: The NRC is considering issuance of an amendment to Facility Operating License No. DPR-18 issued to Ginna LLC for operation of Ginna, located in Wayne County, New York.

FOR FURTHER INFORMATION CONTACT: Patrick Milano, Office of Nuclear Reactor Regulation, Mail Stop O-8C2, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, by telephone at 301-415-1457, or by e-mail at pdm@nrc.gov.

Dated at Rockville, Maryland, this 6th day of April 2006.

For the Nuclear Regulatory Commission,

Patrick D. Milano,

Senior Project Manager, Plant Licensing Branch I-1, Division of Operating Reactor Licensing, Office of Nuclear Reactor Regulation

[FR Doc. E6-5384 Filed 4-11-06; 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 169th meeting on April 18-20, 2006, Room T-2B3, 11545 Rockville Pike, Rockville, Maryland.

The schedule for this meeting is as follows:

Tuesday, April 18, 2006

10 a.m.-10:15 a.m.: Opening Statement (Open)—The ACNW Chairman will make opening remarks regarding the conduct of the meeting.

10:15 a.m.-11:15 a.m.: Overview of Accelerator Mass Spectrometry (Open)—A faculty member of Purdue University (PRIME Lab) will brief the Committee on the methodology of accelerator mass spectrometry, including the statistical analysis of analytical results.

11:15 a.m.-12 Noon: Update on U.S. Department of Energy (DOE) Chlorine-36 Studies at Yucca Mountain (Open)—DOE representatives will update the Committee on the status of Chlorine-36 validation studies at Yucca Mountain, Nevada.

2 p.m.-4:30 p.m.: Briefing from National Academy of Sciences (NAS) on Its 2006 Report on the Transportation of High-Level Nuclear Waste (Open)—NAS representatives will brief the Committee on their recent report titled "Going the Distance? The Safe Transport of Spent Nuclear Fuel and High-Level Radioactive Waste in the United States." A copy of this report is available on the NAS Web site at <http://www.nap.edu/catalog/11538.html>.

4:45 p.m.-5:15 p.m.: Proposed Rulemaking on Naturally Occurring or Accelerator-Produced Radioactive Materials (Open)—A representative from NRC's Office of Nuclear Material Safety and Safeguards (NMSS) will brief the Committee on the staff's proposed rulemaking to implement Section 651(e) of the Energy Policy Act of 2005 to include certain discrete sources of naturally occurring or accelerator-produced radioactive materials (NARM) in NRC's regulations for byproduct material.

5:15 p.m.-6:15 p.m.: Discussion of Draft Letters and Reports (Open)—The Committee will discuss proposed ACNW letters.

Wednesday, April 19, 2006

8:30 a.m.-8:35 a.m.: Opening Remarks by the ACNW Chairman (Open)—The ACNW Chairman will make opening

remarks regarding the conduct of the meeting.

8:35 a.m.–9:30 a.m.: Update on DOE Activities at the Yucca Mountain Site (Open)—DOE representatives will brief the Committee on recent activities related to the development of a proposed geologic repository at Yucca Mountain.

9:30 a.m.–11:30 a.m.: Update on Nye County Independent Early Warning Drilling Program (Open)—Representatives from Nye County and DOE will provide the Committee with an update of technical developments related to this independent ground water monitoring program.

1 p.m.–2 p.m.: Modeling Igneous Activity: Dynamic Controls on Summit and Flank Eruptions of Basalt (Open)—A faculty member of Cambridge University (an NMSS contractor) will brief the Committee on research regarding a theoretical model for the eruption of basalt through multiple vents originating from a common source. The discussion will address partitioning of flow between summit and flank vents. This work potentially applies to the proposed Yucca Mountain repository.

2 p.m.–3 p.m.: Modeling Igneous Activity: Magma Interactions with a Geologic Repository (Open)—An ACNW consultant from the Johns Hopkins University will present an analysis of the realistic effects of magma solidification during potential interactions with repository drifts and waste packages. This work potentially applies to the proposed Yucca Mountain repository.

3:15 p.m.–4:15 p.m.: DOE Performance Confirmation Program Plan: NRC Staff Perspective and Update (Open)—NMSS representatives will brief the Committee on the staff's preliminary views regarding the most recent update of DOE's Performance Confirmation Program Plan.

4:15 p.m.–5 p.m.: Physical Capacity of Yucca Mountain for the Emplacement of High-Level Waste (Open)—A representative from the Electric Power Research Institute (EPRI) will present a preliminary analysis of the physical capacity of Yucca Mountain for the disposal of additional commercial spent nuclear fuel.

5 p.m.–6 p.m.: Discussion of Draft Letters and Reports (Open)—The Committee will discuss proposed ACNW letters.

Thursday, April 20, 2006

8:30 a.m.–8:35 a.m.: Opening Remarks by the ACNW Chairman (Open)—The ACNW Chairman will

make opening remarks regarding the conduct of the meeting.

8:35 a.m.–10:30 a.m.: NRC Radiation Research Program (Open)—Representatives of the Office of Nuclear Regulatory Research will brief the Committee on recent NRC-sponsored activities in the area of health physics research.

10:45 a.m.–4 p.m.: Discussion of Draft Letters and Reports (Open)—The Committee will discuss proposed ACNW letters.

4 p.m.–4:30 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 59061). 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. Michael R. Snodderly (Telephone 301-415-6927), 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. Snodderly 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. Snodderly.

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](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: April 6, 2006

Andrew L. Bates,
Advisory Committee Management Officer.
[FR Doc. E6-5385 Filed 4-11-06; 8:45 am]
BILLING CODE 7590-01 P

NUCLEAR REGULATORY COMMISSION

Advisory Committee on Nuclear Waste Meeting on Planning and Procedures; Notice of Meeting

The Advisory Committee on Nuclear Waste (ACNW) will hold a Planning and Procedures meeting on April 18, 2006, Room T-2B3, 11545 Rockville Pike, Rockville, Maryland. The entire meeting will be open to public attendance, with the exception of a portion that may be closed pursuant to 5 U.S.C. 552b(c)(2) and (6) to discuss organizational and personnel matters that relate solely to internal personnel rules and practices of ACNW, and information the release of which would constitute a clearly unwarranted invasion of personal privacy.

The agenda for the subject meeting shall be as follows:

Tuesday, April 18, 2006—8:30 a.m.–9:30 a.m.

The Committee will discuss proposed ACNW activities and related matters. The purpose of this meeting is to gather information, analyze relevant issues and facts, and formulate proposed positions and actions, as appropriate, for deliberation by the full Committee.

Members of the public desiring to provide oral statements and/or written comments should notify the Designated Federal Official, Mr. Michael R. Snodderly (Telephone: 301/415-6927) between 8:15 a.m. and 5 p.m. (ET) five days prior to the meeting, if possible, so



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

April 6, 2006

AGENDA
169th ACNW MEETING
APRIL 18-20, 2006

Table and

Commissioners' Conference Room, OWFA,

TUESDAY, APRIL 18, 2006, CONFERENCE ROOM T-2B3, TWO WHITE FLINT NORTH,
ROCKVILLE, MARYLAND

- 1) 10:00 - 10:15 A.M. Opening Remarks by the ACNW Chairman (Open) (MTR/JTL)
The Chairman will make opening remarks regarding the conduct of the meeting.
- 2) 10:15 - ^{11:20}~~11:15~~ A.M. Overview of Accelerator Mass Spectrometry (Open)(WJH/NMC) (Elmore)
A member of the faculty of Purdue University (PRIME Lab) will brief the Committee on the methodology of accelerator mass spectrometry, including the statistical analysis of analytical results.
- 3) ~~11:15 - 12:00 Noon~~
^{11:30 - 12:00 pm} Update on U.S. Department of Energy (DOE) Chlorine-36 (Cl-36) Studies at Yucca Mountain (Open) (WJH/NMC) (Coleman)
DOE representatives will update the Committee on the status of Cl-36 validation studies at Yucca Mountain, Nevada.
- ^{12:00 -}
~~12:00 - 2:00 P.M.~~ ***LUNCH***
^{2:00 - 2:04}
Chairman's remarks
- 4) ~~2:00 - 4:30 P.M.~~
^{2:04 - 4:30} Briefing from National Academy of Sciences (NAS) on Its 2006 Report on the Transportation of High-Level Nuclear Waste (Open) (RFW/RPS) (Crowley)
NAS representatives will brief the Committee on their recent report titled "Going the Distance? The Safe Transport of Spent Nuclear Fuel and High-Level Radioactive Waste in the United States." A copy of this report is available on the NAS Web site at <http://www.nap.edu/catalog/11538.html>.
- ^{4:30 - 4:35}
~~4:30 - 4:45 P.M.~~ ***BREAK***
- 5) ~~4:45 - 5:15 P.M.~~
^{4:35 - 5:35} Proposed Rulemaking on Naturally Occurring or Accelerator-Produced Radioactive Materials (Open) (MTR/DAW) (Chang)
A representative from NRC's Office of Nuclear Material Safety and Safeguards (NMSS) will brief the Committee on the staff's proposed rulemaking to implement Section 651(e) of the Energy Policy Act of 2005 to include certain discrete sources of naturally occurring or accelerator-produced radioactive materials (NARM) in NRC's regulations for byproduct material.

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6) 5:45- 6:45 P.M. Discussion of Draft ACNW Letter Reports (Open) (All)
Discussion of proposed ACNW reports on:
6.1) Risk-Informed Decisionmaking (JHC/JHF)
6.2) NRC Research Director Annual Update (MTR/RPS) 5:37
6.3) DOE Office of Science and Technology and International Waste Safety-Related Research (RFW/RPS)
6.4) ACNW Working Group Meeting on Draft Final Guidance to Implement NRC's License Termination Rule (JHC/MPL)

6:45 P.M. Adjourn

6:50

Commissioners' Conf. Room, ONIEN

WEDNESDAY, APRIL 19, 2006, CONFERENCE ROOM T-2B3, TWO WHITE FLINT NORTH, ROCKVILLE, MARYLAND

- 7) 8:30 - 8:35 A.M. Opening Remarks by the ACNW Chairman (Open) (MTR/JTL)
The Chairman will make opening remarks regarding the conduct of the meeting.
- 9:35
8) 8:35 - 9:30 A.M. Update on DOE Activities at the Yucca Mountain Site (Open)
(WJH/DAW) (Wada)
DOE representatives will brief the Committee on recent activities related to the development of a proposed geologic repository at Yucca Mountain.
- 9:35 9:45
9) 9:30 - 11:30 A.M. Update on Nye County Independent Early Warning Drilling Program
(Open) (WJH/NMC) (Coleman) (Campanella)
Representatives from Nye County and DOE will provide the Committee with an update of technical developments related to this independent ground water monitoring program.
- 11:35 am
11:30 - 1:00 P.M. ***LUNCH***
- 10) 1:00 - 2:00 P.M. Modeling Igneous Activity: Dynamic Controls on Summit and Flank Eruptions of Basalt (Open) (WJH/NMC) (Woods)
A faculty member of Cambridge University (an NMSS contractor) will brief the Committee on research regarding a theoretical model for the eruption of basalt through multiple vents originating from a common source. The discussion will address partitioning of flow between summit and flank vents. This work potentially applies to the proposed Yucca Mountain repository.

- 11) 2:00 - 3:00 P.M. Modeling Igneous Activity: Magma Interactions with a Geologic Repository (Open) (WJH/NMC) (Marsh)
 An ACNW consultant from the Johns Hopkins University will present an analysis of the realistic effects of magma solidification during potential interactions with repository drifts and waste packages. This work potentially applies to the proposed Yucca Mountain repository.
 3:00 - 3:15 P.M. *****BREAK*****
- 12) ~~3:15 - 4:15 P.M.~~ DOE Performance Confirmation Program Plan: NRC Staff Perspective and Update (Open) (RFW/NMC) (Pohle/Ford) ~~3:15 - 4:05~~
 NMSS representatives will brief the Committee on the staff's preliminary views regarding the most recent update of DOE's Performance Confirmation Program Plan.
- 13) ~~4:15 - 5:00 P.M.~~ Physical Capacity of Yucca Mountain for the Emplacement of High-Level Waste (Open) (RFW/NMC) (Kessler/Apted) ~~4:05 - 4:50~~
 A representative from the Electric Power Research Institute (EPRI) will present a preliminary analysis of the physical capacity of Yucca Mountain for the disposal of additional commercial spent nuclear fuel.
 Break
- 14) ~~5:00 - 6:00 P.M.~~ Discussion of Draft ACNW Letter Reports (Open) (All) ~~4:55 - 7:10~~
 Discussion of proposed ACNW reports on:
 14.1) Risk-Informed Decisionmaking (JHC/JHF)
 14.2) NRC Research Director Annual Update (MTR/RPS)
 14.3) DOE Office of Science and Technology and International Waste Safety-Related Research (RFW/RPS)
 14.4) ACNW Working Group Meeting on Draft Final Guidance to Implement NRC's License Termination Rule (JHC/MPL)
 7:10
 - 6:00 P.M. **Adjourn**

THURSDAY, APRIL 20, 2006. CONFERENCE ROOM T-2B3, TWO WHITE FLINT NORTH, ROCKVILLE, MARYLAND

- 15) 8:30 - 8:35 A.M. Opening Remarks by the ACNW Chairman (Open) (MTR/JTL)
 The Chairman will make opening remarks regarding the conduct of today's sessions.
- 16) 8:35 - ~~10:30~~ A.M. NRC Radiation Research Program (Open) (MTR/RPS) (Bush-Goddard) ~~9:40 AM~~
 Representatives of the Office of Nuclear Regulatory Research will brief the Committee on recent NRC-sponsored activities in the area of health physics research.

9:40 9:50
~~10:30 - 10:45 A.M.~~

BREAK

17) ~~10:45 - 11:15 A.M.~~

9:50 - 10:15

Discussion of Potential Draft Letters and Reports (Open) (All)

Discussion of possible ACNW reports on:

- 17.1) Briefing from National Academy of Sciences on its 2006 Report on the Transportation of High-Level Nuclear Waste (RFW/RPS)
- 17.2) Update on DOE Chlorine-36 Studies at Yucca Mountain (JHC/NMC)
- 17.3) Proposed Rulemaking on NARM (MTR/DAW)
- 17.4) Update on DOE Activities at the Yucca Mountain Site (WJH/DAW)
- 17.5) Update on Nye County Independent Early Warning Drilling Program (WJH/NMC)
- 17.6) NRC Radiation Research Program (MTR/NMC)
- 17.7) DOE Performance Confirmation Program Plan: NRC Staff Perspective and Update (RFW/NMC)
- 17.8) Recent Developments Related to Modeling the Igneous Activity in the Yucca Mountain Region (WJH/NMC)

18) ~~11:15 - 12:00 Noon~~

Discussion of Draft ACNW Letter Reports (Open) (All)

Continued discussion of proposed ACNW reports on:

- 18.1) Risk-Informed Decisionmaking (JHC/JHF)
- 18.2) NRC Research Director Annual Update (MTR/RPS)
- 18.3) DOE Office of Science and Technology and International Waste Safety-Related Research (RFW/RPS)
- 18.4) ACNW Working Group Meeting on Draft Final Guidance to Implement NRC's License Termination Rule (JHC/MPL)

~~12:00 - 1:00 P.M.~~

LUNCH

19) ~~1:00 - 4:00 P.M.~~

Discussion of Draft ACNW Letter Reports (Open) (All)

Continued discussion of proposed ACNW reports listed under Item 18.

20) ~~4:00 - 4:30 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.

10:15 am ~~4:30 P.M.~~

Adjourn

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. Michael R. Snodderly at 301-415-6927 between 8:00 a.m. and 5:00 p.m. prior to the meeting.

APPENDIX C: MEETING ATTENDEES

**169TH ACNW MEETING
APRIL 18-20, 2006**

ACNW MEMBERS

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

ACNW STAFF

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

ATTENDEES FROM THE NUCLEAR REGULATORY COMMISSION

APRIL 18, 2006

J. Rubenstone	NMSS
B. Leslie	NMSS
A. Fetter	NMSS
L. Chang	NMSS
R. Blanton	STP

APRIL 19, 2006

T. Ahn	NMSS
L. Kokajko	NMSS
B. Leslie	NMSS
M. Young	OGC
J. Rubenstone	NMSS
B. Hill	NMSS
P. Justus	NMSS
R. Codell	NMSS
G. Peters	NMSS
M. Nataraja	NMSS
R. Fedors	NMSS
J. Pohle	NMSS
K. Banova	NMSS
J. Trapp	

**APPENDIX C
169TH ACNW MEETING
APRIL 18-20, 2006**

ATTENDEES FROM THE NUCLEAR REGULATORY COMMISSION (CONT'D)

APRIL 20, 2006

S. Bush-Goddard	RES
N. Chokshi	RES
H. Karagiannis	RES
S. Burrows	RES
M. Simmons	RES (rotation)
S. Bahadur	RES
C. Feldman	RES
T. Brock	RES
A. Schwartzman	RES
R. Meck	RES
V. Holahan	RES

ATTENDEES FROM OTHER AGENCIES AND GENERAL PUBLIC

APRIL 18, 2006

E. v. Tiesenhausen	Clark County
N. Henderson	Bechtel SAIC
M. O'Mealia	Nevada
M. Baughman	Lincoln and White Pine Counties
B. House	Duratek/Chem-Nuclear
D. Coleman	Department of Energy (DOE)
T. Yamad	JNES

via Teleconference

C. Fitzpatrick	State of Nevada
H. Jenkins-Smith	Texas A&M University

APRIL 19, 2006

E. v. Tiesenhausen	Clark County
N. Henderson	Bechtel SAIC Co.
M. O'Mealia	Nevada
V. Jain	Center for Nuclear Waste Regulatory Analyses (CNWRA)
R. McCullum	Nuclear Energy Institute (NEI)
T. Yamada	JNES
J. Campanella	Nye County, Norwest Quest

**APPENDIX C
169TH ACNW MEETING
APRIL 18-20, 2006**

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

APRIL 19, 2006 (Cont'd)

B. House	Duratek/Chem-Nuclear
B. Melson	MB Consulting
N. Franklin	CNWRA
D. Hooper	CNWRA
J. Stamataka	CNWRA
A. Woods	BPI, Cambridge, UK
M. Baughman	Lincoln and White Pine Counties
J. Pye	Nuclear Waste Technical Review Board
M. Apted	Monitor Scientific
D. Coleman	DOE

via Teleconference

C. Fitzpatrick	State of Nevada
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APRIL 20, 2006

E. v. Tiesenhausen	Clark County
B. House	Duratek/Chem-Nuclear

APPENDIX D: FUTURE AGENDA

The Committee approved the following topics for discussion during its 170th meeting, scheduled for May 23–25, 2006:

- ACNW Working Group Meeting on Low-level Radioactive (LLW) Waste Management Issues
- NAS Report on the Management of Certain Tank Wastes at DOE Sites
- NRC Standard Review Plan for Waste Determinations
- Review of International Commission on Radiological Protection (ICRP) Draft Report, "The Scope of Radiological Protection Regulations"
- Overview of NRC Spent Nuclear Fuel Storage Program
- Discussion of draft and possible letters and reports on the following:
 - Additional Recommendations related to RES Programs
 - ACNW Working Group Meeting on Draft Final Guidance to Implement NRC's License Termination Rule
 - Recent Developments Related to Modeling the Igneous Activity in the Yucca Mountain Region
 - ACNW Working Group Meeting on LLW Management Issues
 - NAS Report on the Management of Certain Tank Wastes at DOE Sites
 - Review of ICRP Draft Report, "The Scope of Radiological Protection Regulations"
 - NRC SRP for Waste Determinations
 - Overview of NRC Spent Nuclear Fuel Storage Program

**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

<u>AGENDA ITEM NO.</u>	<u>DOCUMENTS</u>
2	Overview of Accelerator Mass Spectrometry 1. Accelerator Mass Spectrometry of ³⁶ Cl, presented by David Elmore, Purdue University [Viewgraphs]
3	<u>Update on U.S. Department of Energy Chlorine-36 (³⁶Cl) Studies at Yucca Mountain</u> 2. Update on Chlorine-36 (³⁶ Cl) Studies, presented by Drew Coleman, DOE [Viewgraphs]
4	<u>Briefing From National Academy of Sciences (NAS) on Its 2006 Report on the Transportation of High-Level Nuclear Waste</u> 3. Going the Distance? The Safe Transport of Spent Nuclear Fuel and High-Level Radioactive Waste in the United States, presented by Kevin Crowley, Nuclear and Radiation Studies Board, et al [Viewgraphs] 4. Social Risks: Challenges and Recommended Solutions, presented by Hank Jenkins-Smith, Texas A&M University [Viewgraphs] 5. Going the Distance? The Safe Transport of Spent Nuclear Fuel and High-Level Radioactive Waste in the United States by Committee on Transportation of Radioactive, Nuclear and Radiation Studies Board, Transportation Research Board, National Research Council of the National Academies (Prepublication Draft) [Handout]
5	<u>Proposed Rulemaking on Naturally Occurring or Accelerator-Produced Radioactive Materials</u> 6. NARM Rulemaking, presented by Lydia Chang, NRC [Viewgraphs]
8	<u>Update on DOE Activities at the Yucca Mountain Site</u> 7. Yucca Mountain Site Infrastructure Improve Plan, presented by Scott Wade, DOE [Viewgraphs]

- 9 **Update on Nye County Independent Early Warning Drilling Program**
8. Cooperative Agreement—Nye County Early Warning Drilling Program, presented by Drew Coleman, DOE **[Viewgraphs]**
9. Nye County Department of Natural Resources and Federal Facilities, Independent Scientific Investigations Program Review, presented by John Campanella, Nye County **[Viewgraphs]**
- 10 **Modeling Igneous Activity: Dynamic Controls on Summit and Flank Eruptions of Basalt**
10. Modelling the Dynamics of Simultaneous Flank and Summit Eruptions of Basaltic Magma, presented by Andy Woods, BP Institute, Cambridge, UK **[Viewgraphs]**
- 11 **Modeling Igneous Activity: Magma Interactions With a Geologic Repository**
11. Magma Interactions With the Repository: The Effects of Solidification, presented by Bruce Marsh, Johns Hopkins University **[Viewgraphs]**
- 12 **DOE Performance Confirmation Program Plan: NRC Staff Perspective and Update**
12. Performance Confirmation, NRC Staff Activity Update, presented by Jeffrey Pohle and Randall Fedors, NRC/NMSS **[Viewgraphs]**
- 13 **Physical Capacity of Yucca Mountain for the Emplacement of High-Level Waste**
13. Preliminary Analysis of the Maximum Disposal Capacity for CSNF in a Yucca Mountain Repository, presented by John Kessler, EPRI **[Viewgraphs]**
- 16 **NRC Radiation Research Program**
14. Program Review of the Health Effects Branch in the Office of Research, presented by Stephanie Bush-Goddard **[Viewgraphs]**
15. RES Regulatory Guide Revision Effort for Divisions 1, 4, 8, and 10 **[Handout]**

APPENDIX E
169TH ACNW MEETING
APRIL 18-20, 2006

MEETING NOTEBOOK CONTENTS

TAB
NUMBER (S)

DOCUMENTS

- Agenda, 169th ACNW Meeting, April 18–20, 2006, dated April 6, 2006
- Color Code - 169th ACNW Meeting, dated March 9, 2006
- 2** **Overview of Accelerator Mass Spectrometry**
1. Muzikar, P., Elmore, D., and Granger, D., 2003, Accelerator mass spectrometry in geologic research: Geological Society of America Bulletin, pp. 643-654
- 3** **Update on U.S. Department of Energy Chlorine-36 (³⁶Cl) Studies at Yucca Mountain**
2. Status Report
- 4** **Briefing From National Academy of Sciences (NAS) on Its 2006 Report on the Transportation of High-Level Nuclear Waste**
3. Agenda
4. Status Report
- 5** **Proposed Rulemaking on Naturally Occurring or Accelerator-Produced Radioactive Materials**
5. Status Report
- 9** **Update on Nye County Independent Early Warning Drilling Program**
6. Status Report
- 10** **Modeling Igneous Activity: Dynamic Controls on Summit and Flank Eruptions of Basalt**
7. Status Report
8. Woods, W., Gladstone, C., and Hill, B., 2005, Dynamic Controls on Summit and Flank Eruptions of Basalt:

**APPENDIX E
169TH ACNW MEETING
APRIL 18-20, 2006**

12 DOE Performance Confirmation Program Plan: NRC Staff Perspective and Update

- 9. Status Report
- 10. Letter dated October 1, 2003, to Nils J. Diaz, Chairman, NRC, from B. John Garrick, Chairman, ACNW, Subject: Working Group Session on Performance Confirmation for Yucca Mountain
- 11. Letter dated November 12, 2003, to B. John Garrick, Chairman, ACNW, from William D. Travers, Executive Director for Operations, NRC, Subject: Working Group Session on Performance Confirmation for Yucca Mountain
- 12. Viewgraphs entitled, "Performance Confirmation Program. prepared by Deborah Barr, DOE, dated September 20, 2005

13 Physical Capacity of Yucca Mountain for the Emplacement of High-Level Waste

- 13. Status Report

16 NRC Radiation Research Program

- 14. Agenda
- 15. Status Report